

297-8091-021

DMS-100 Family

DMS-100 Wireless

Service Implementation Guide

LWW0007 Standard 06.02 February 2001

DMS-100 Family

DMS-100 Wireless

Service Implementation Guide

Publication number: 297-8091-021

Product release: LWW0007

Document release: Standard 06.02

Date: February 2001

Copyright © 1997 - 2001 Nortel Networks,
All Rights Reserved

Printed in the United States of America

NORTEL NETWORKS CONFIDENTIAL: The information contained herein is the property of Nortel Networks and is strictly confidential. Except as expressly authorized in writing by Nortel Networks, the holder shall keep all information contained herein confidential, shall disclose the information only to its employees with a need to know, and shall protect the information, in whole or in part, from disclosure and dissemination to third parties with the same degree of care it uses to protect its own confidential information, but with no less than reasonable care. Except as expressly authorized in writing by Nortel Networks, the holder is granted no rights to use the information contained herein.

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant.

DMS, MAP, NORTEL, NORTEL NETWORKS, NORTHERN TELECOM, NT, and SUPERNODE are trademarks Northern Telecom.

Publication history

06.02 February 2001

Standard re-release of document. Added subsection LWW0007 system capacity forecasts, including four capacity estimate figures, to Chapter 2, Planning and engineering.

06.01 August 2000

Standard re-release of document. The following content was added or changed.

- Added a description of the Communications Assistance for Law Enforcement Act (CALEA) to Chapter 1, Introduction
- Updated system capacity figures in Chapter 2, Planning and engineering
- Enhanced 911 emergency services feature descriptions in Chapter 5, Translations and call processing
- Added a pre-one night process (ONP) procedure to Chapter 7, Frame relay and table control, when upgrading to software release LWW0006.

Note: Nortel Networks strongly recommends following this procedure to avoid inadvertent datafill loss due to the removal of table LINEATTR (Line Attribute) for wireless use in LWW0006. Refer to subsection “Pre-ONP check for table LINEATTR” on page 7-17 for details.

- Added guidelines to Chapter 12, Wireless centrex, on the appropriate use of option CTX in the translations verification (TRAVR) command line
- Added activation/deactivation procedures for Second Dial Tone to Chapter 14, LWW0006 functionality
- Replaced pretranslations selector MODDIGS with MD in Chapter 14, LWW0006 functionality

05.02 December 1999

Standard re-release of document. The following content was added or changed.

- Added the following information to Chapter 8, Billing:
 - Moved section “SuperNode Data Manager billing support” to beginning of chapter. Added wireline and wireless SuperNode Data Manager (SDM) NTP references to subsection “Supporting documentation.”
 - Added note to section “Billing formats” to recommend separating wireline and wireless billing streams
 - Added subsection “Separate billing streams”
 - Added brief datafill description and example of table TOLLENTC (Entry Code) to section “Required datafill”
 - Added references of billing-related sections in other chapters of this NTP to section “Supporting documentation.”
- Expanded List of terms

05.01 September 1999

Standard re-release of document. The following content was added or changed.

- Moved content of wireless centrex services from Chapter 1, Introduction, to Chapter 12, Wireless centrex. Added description of feature “Integrated Wireless Centrex” to Chapter 12
- Added brief description of open-A interface support to Chapter 1, Introduction
- Added brief description of SuperNode Data Manager (SDM) support to Chapter 1, Introduction, and Chapter 8, Billing
- Added note to section “Feature packaging” about Munch-controlled options to Chapter 2, Planning and engineering
- Added description of command CMXMON to Chapter 4, User interface
- Added a bulleted item under “Datafill restrictions” in Chapter 5, Translations and call processing, that office parameter CPSTACKSIZE in table OFCSTD (Office Standard) has been set to 6000

-
- Added content from feature “Line Data and SERVORD Fold-in” to chapter 6, Line provisioning, and chapter 7, Frame relay and table control support
 - Updated the DMS-100 Wireless OM groups table to include LWW0006 logs in Chapter 9, Operational measurements, alarms, and logs
 - Added Chapter 13, Trunking configuration options, describing how to set up or migrate existing offices to wireless
 - Added Chapter 14, LWW0006 functionality, describing the features available in this release
 - Added Appendix A, DMS-100 Wireless open-A interface

04.02 December 1998

Standard re-release of document. The following content was added or changed.

- Expanded description of the wireless centrex service in Chapter 1, Introduction
- Added traffic capacity information and metrics to Chapter 1, Introduction
- Enhanced system provisioning information in Chapter 2, Planning and engineering
- Added a TRAVER for non-Equal Access (EA) calls to Chapter 5, Translations and call processing
- Added description and datafill for Wireless Enhanced 911 Emergency Service (E911) calls
- Expanded List of terms

04.01 October 1998

Standard re-release of document. The following content was added or changed.

- Added AMPS/TDMA information to chapters, as applicable
- Added description of integrated service link (ISL) trunks in Chapter 1, Introduction
- Updated system capacity figures in Chapter 2, Planning and engineering

- Added the following information in Chapter 4, User interface:
 - MAP screen displays for posting integrated cellular peripherals (ICP)
 - description of continuous TRAVER functionality
- Added the following information in Chapter 5, Translations and call processing:
 - specific datafill names for ISL trunk groups
 - TRAVER example for an Enhanced 911 Emergency Service (E911) call
 - description and TRAVER examples of wireless centrex calls
- Updated operational measurements (OM) list in Chapter 9, Operational measurements, alarms, and logs
- Added description of the following modified and new maintenance commands in Chapter 11, Maintenance:
 - LTP commands POST and ROUTE
 - TTP commands POST and ROUTE
- Expanded List of terms

03.02 June 1998

Standard re-release of document. The following content was added or changed.

- Added index tables to beginning of Chapters 3-11, listing delta features that apply to the DMS-100 Wireless switch.
- Expanded Chapter 5, Translations and call processing, to include the following translations-specific information:
 - wireless feature selector LOCMS
 - wireless network restriction options MTXNRS and NWKRESSV
 - operator-assisted (OA) national and international calls
 - datafill restrictions
- Expanded List of terms

03.01 March 1998

Standard re-release of document. The following content was added or changed.

- Enhanced voice mail description to Chapter 1, Introduction
- Chapter 2, Planning and engineering
- Chapter 3, Operations support systems
- Added Gateway MSC: Resolve DNTRIG Conflict feature description to Chapter 5, Translations and call processing
- Updated OM list in Chapter 9, Operational measurements, alarms, and logs
- Added attention box regarding intermediate intertoll (IT) trunk configuration to Chapter 10, Equal Access and trunking

02.01 October 1997

Standard release of document. The following content was added.

- Tools Resolution for the DMS-100 Wireless to Chapter 4, User interface
- Chapter 10, Equal Access and trunking
- NORESTARTSWACT/MTC SWATC for the DMS-100 Wireless to Chapter 11, Maintenance

01.01 July 1997

Initial draft release of document.

Contents

About this document xvii

- When to use this document xvii
- How to check the version and issue of this document xvii
- References in this document xvii
 - Terminology xviii
- What precautionary messages mean xviii
- How commands, parameters, and responses are represented xx
 - Input prompt (>) xx
 - Commands and fixed parameters xx
 - Variables xx
 - Responses xx
- How measurements are described xxi

1 Introduction 1-1

- Document perspectives 1-1
 - Purpose 1-1
 - Scope 1-2
 - Supporting documentation 1-2
- Wireless radio interfaces 1-2
 - AMPS 1-2
 - TDMA 1-3
 - CDMA 1-3
- DMS-100 Wireless system description 1-3
 - Wireless system 1-3
 - Wireline system 1-5
 - Limitations and restrictions 1-6
 - Supporting documentation 1-9
- DMS-100 Wireless system architecture 1-10
 - Subscriber interfaces 1-11
 - Open-A interface 1-12
 - Commercial AC power 1-12
 - Clock synchronization interfaces 1-12
 - External trunks and call routing 1-12
 - CCS7 network interfaces 1-16
 - Public safety answering point interfaces 1-18
 - Engineering and administrative data acquisition system links 1-18
 - Billing 1-19
 - Equal access 1-20

MAP terminal	1-20
Voice mail	1-23
Wireless centrex services	1-26
Communications Assistance for Law Enforcement Act	1-26
CALEA limitations and restrictions	1-27

2 Planning and engineering 2-1

Required hardware	2-1
Technical specifications	2-4
Generic network PCS overview	2-4
CDMA radio subsystem	2-4
Engineering considerations	2-6
Data assignment	2-6
Installation considerations	2-7
Grounding	2-9
Central office grounding	2-10
BSC grounding	2-10
Cell site grounding	2-10
External power supply	2-11
Supporting documentation	2-14
Hardware descriptions	2-14
Common DMS equipment	2-16
Wireline DMS equipment	2-20
CDMA equipment	2-20
Wireless CDMA DMS equipment	2-21
Wireless CDMA BSC/BTS equipment	2-22
Backhaul interface unit	2-25
Wireless AMPS/TDMA DMS equipment	2-32
Wireless AMPS/TDMA cell site equipment	2-33
NT1900	2-40
AMPS/TDMA cell configuration summary	2-43
Supporting documentation	2-45
Packaging descriptions	2-46
BSC packaging	2-46
BTS packaging	2-47
AMPS/TDMA packaging	2-50
Trunk configurations	2-54
CCS7 signaling configuration	2-54
Host remote configuration	2-56
System capacity	2-57
SR60 burst mode	2-64
Traffic capacity	2-72
Traffic modeling overview	2-73
CM capacity model	2-76
CM activity computations	2-76
Network performance summary	2-84
Network system overview	2-86
Recommendations	2-87
Network compatibility	2-90
Network management	2-90

Support for point code	2-93
DMS-100 Wireless CAVU and CSD EIU provisioning	2-94
LPP frames	2-95
ASU types	2-97
Authentication and CAVU provisioning	2-98
CAVU provisioning guidelines	2-100
CM system capacity impact	2-103
CSD and EIU provisioning overview	2-103
CSD impact on CM switching capacity	2-105
CSD EIU provisioning	2-109
CSD EIU provisioning summary	2-111
Feature packaging	2-111
SOC options	2-111
Network interworking	2-112
Performance	2-113

3 Operations support systems 3-1

Introduction	3-2
DMS-100 Wireless system	3-3
The MAP terminal, BSM, and SDM roles in OAM	3-5
OSS network view of DMS-100 Wireless switch	3-5
TMN model and OSS support summary	3-6
OSS interfaces and support	3-8
Maintenance operations	3-9
Surveillance	3-10
Line maintenance and testing	3-11
Trunk maintenance and testing	3-12
OMs	3-14
Network management	3-16
Service analysis	3-18
Network administration	3-18
Service provisioning	3-19
Billing	3-21
Software downloading	3-24

4 User interface 4-1

MAP terminal	4-1
Maintenance system	4-2
Alarms	4-2
Supporting documentation	4-4
DMS-100 Wireless MAP Display Conflict Resolution	4-4
MTX and LNS alarm banner conflict	4-5
MTX and LNS menu conflict	4-6
MTXCDR menu option (in MTC;IOD level) conflict	4-6
Accessing CDMA, wireless-specific alarms	4-8
Limitations and restrictions	4-10
AMPS/TDMA-related MAP screen displays	4-11
Tools Resolution for DMS-100; Wireless	4-13
CPSTATUS display	4-14
SCHEDMAP sub-level display	4-15

PARMS subcommand display	4-16
Operational measurements	4-17
TRAVER on the DMS-100 Wireless switch	4-17
Existing wireline and wireless TRAVERS	4-17
TRAVER originator limitations	4-24
Continuous TRAVER	4-24
Command CMXMON	4-25
Supporting documentation	4-26

5 Translations and call processing 5-1

Introduction	5-3
Datafill requirements	5-4
ISL trunks	5-4
Separate serving translations scheme	5-6
Office parameter MOBILE_NPA_OR_STS_IN_CDR	5-6
Equal access	5-6
Screening tables	5-7
Wireless feature selectors	5-8
Voice mail	5-10
Gateway MSC: Resolve DNTRIG Conflicts	5-10
Wireless network restriction fast feature	5-11
Operator-assisted national and international calls	5-12
Wireless centrex translations	5-30
911 emergency services	5-40
Datafill restrictions	5-46
Datafill sequence	5-50
Datafill examples	5-53
Datafill example for table CLLI	5-53
Datafill example for table CARRMTC	5-53
Datafill example for table LTCINV	5-54
Datafill example for table LTCPSINV	5-54
Datafill example for table LIUINV	5-55
Datafill example for table PVDNCUST	5-55
Datafill example for table PVDNAGEN	5-56
Datafill example for table PVDNCHAN	5-56
Datafill examples for table HNPACONT	5-56
Datafill example for table TOFCNAME	5-58
Datafill examples for subtable STDPRTCT.STDPRT	5-59
Datafill example for table TRKGRP	5-60
Datafill example for table TRKSGRP	5-61
Datafill example for table TRKMEM	5-61
Datafill example for table LINEATTR	5-62
Table XLAPLAN	5-63
Table RATEAREA	5-63
Datafill example for table TLDNPOOL	5-64
Datafill example for table MSACON	5-64
Datafill example for table MSERVE	5-64
Datafill example for table CDMACONF	5-65
Datafill example for table CDMACELL	5-65
Datafill example for table CDMAPART	5-66

Datafill example for table SBSINV	5-66
Datafill example for table CELLCUST	5-67
Datafill example for table CELLULAR	5-67
Datafill example for table CELLFEAT	5-67
Datafill example for table SERVCHNG	5-68
Datafill for wireline-to-wireless calls over ISUP ISL trunks	5-68
Datafill example for table CLLI	5-69
Datafill example for table TRKGRP	5-70
Datafill example for table TRKSGRP	5-70
Datafill example for table TRKMEM	5-71
Datafill example for table C7TIMER	5-71
Datafill example for table C7NETWRK	5-71
Datafill example for table C7LKSET	5-72
Datafill example for table C7RTESET	5-72
Datafill example for table C7LINK	5-73
Datafill example for table ISUPDEST	5-73
Datafill example for table C7TRKMEM	5-73
TRAVER	5-74
Supporting documentation	5-88

6 Line provisioning 6-1

Provisioning for the DMS-100 Wireless switch	6-2
Provisioning wireline and wireless data	6-2
Querying wireline and wireless DNS	6-3
Support of existing wireline and wireless line options	6-8
Limitations and restrictions	6-11
Datafill tables	6-11
Table MLCCOPT	6-11
Table MOPTOPT	6-13
Line data storage	6-13
Office parameters	6-17
SO_BULK_DMO_MOB	6-17
SO_ECHO_MOB	6-17
Supporting documentation	6-18

7 Frame relay and table control support 7-1

Frame Relay Software Support for DMS-100 Wireless	7-2
Feature description	7-3
Limitations and restrictions	7-8
Supporting documentation	7-8
Non-frame Relay Software Support: Table Control	7-8
Feature description	7-8
Limitations and restrictions	7-18
Supporting documentation	7-18

8 Billing 8-1

SuperNode Data Manager billing support	8-2
Supporting documentation	8-3
Billing formats	8-4
AMA streams	8-5

DIRP 8-6
 Separate billing streams 8-6
 Limitations and restrictions 8-17
 Downstream billing 8-17
 Supporting documentation 8-18

9 Operational measurements, alarms, and logs 9-1

Operational measurements 9-2
 Operational measurements and ISL trunks 9-3
 Tools affecting OMs 9-3
 Base station controller and base station transceiver subsystem OMs 9-6
 Operational measurements for planning and engineering 9-6
 System capacity model 9-7
 Wireless call types 9-10
 DMS-100 Wireless OM groups 9-14
 Supporting documentation 9-34
 Office Type Resolution for the DMS-100 Wireless 9-34
 Feature description 9-35
 Conflict Resolution for DMS-100 Wireless 9-35
 Alarms 9-36
 Logs 9-36
 Recovery management 9-37
 Supporting documentation 9-38

10 Equal access and trunking 10-1

Introduction 10-2
 Equal Access for DMS-100 Wireless 10-4
 FGB carrier support 10-16
 FGC carrier support 10-19
 Limitations and restrictions 10-22
 FGD carrier 10-22
 FGB carrier 10-23
 FGC carrier 10-24
 Billing 10-24
 Datafill tables 10-25
 Table TRKGRP 10-26
 Datafill example for table TRKGRP 10-27
 Table LINEATTR 10-28
 Table XLAPLAN 10-28
 Table RATEAREA 10-29
 Subtable SDTPRTCT.STDPRT 10-29
 Table OFRT 10-30
 Table LATANAME 10-30
 Table LATAULA 10-31
 Table OCCINFO 10-34
 Table CICSIZE4 10-34
 Office parameter 10-35
 Provisioning rules 10-35
 Verification 10-35

Memory	10-35
Dump and restore rules	10-35
Supporting documentation	10-36

11 Maintenance **11-1**

DTC maintenance	11-1
Relationship between the BSM and trunks	11-2
Trunk test position MAP commands TST and SEIZE	11-2
Busying and returning an idle trunk to service	11-3
Busying a call processing busy trunk	11-4
Integrated service link trunks	11-5
Out-of-service carrier	11-7
Back-in-service carrier	11-8
Out-of-service DTC	11-9
Back-in-service DTC	11-9
Supporting documentation	11-10
NORESTARTSWACT/MTCSWACT for DMS-100 Wireless	11-10
NORESTARTSWACT	11-10
MTCSWACT	11-11
Supporting documentation	11-11

12 Wireless centrex **12-1**

Wireless centrex services	12-1
Integrated Wireless Centrex	12-1
Shared private dialing plan	12-8
SimRing/"Phone Twinning" feature	12-11
Single integrated voice mail	12-14
Wireless business group service	12-18
Air interface support	12-23
System engineering impact	12-29

13 Trunking configurations **13-1**

Introduction	13-1
Configuration 1 - Integrated interoffice traffic routed through wireline call processing	13-1
Configuration 2 - Interoffice traffic routed through wireless call processing	13-3
Configuration 3 - Interoffice traffic separated by wireless and wireline call processing	13-5
Migration strategies	13-7
Migration strategy from configuration 1 to configuration 3	13-8
Migration strategy from configuration 2 to configuration 3	13-8
Billing	13-9
Limitations and restrictions	13-10

14 LWW0006 functionality **14-1**

Conflict Resolution for DMS-100 Wireless switch	14-1
Datafill	14-1
Office parameters	14-1
CVID Fold-in	14-1

Logs	14-2
Enhanced 911 via WINGTT	14-2
Interactions	14-2
Datafill	14-2
Integrated Wireless Centrex	14-3
Integrated Wireline/Wireless SDM Load	14-3
Hardware requirements	14-4
Limitations and restrictions	14-4
Line Data and SERVORD Fold-in	14-4
Datafill	14-4
Translation verification tool	14-4
Provisioning	14-4
Second Dial Tone for Wireless Services	14-5
Limitations and restrictions	14-5
Interactions	14-6
Datafill	14-6
Activation/deactivation procedures	14-6
SimRing and MADN Compatibility	14-7
Limitations and restrictions	14-7
Service orders	14-8
Switch-based Common Voice Mailbox for DMS-100 Wireless	14-8
Limitations and restrictions	14-8
Datafill	14-9
Service orders	14-9
Translation Enhancement to Modify Called DN	14-10
Datafill	14-10
Logs	14-11
Limitations and restrictions	14-11
Translation verification tool	14-12

Appendix A DMS-100 Wireless open-A interface	A-1

DMS-100 Wireless traffic analysis (AIF CDMA)	A-1
DMS-100 Wireless switch and traffic modeling	A-2
DMS-100 Wireless system call attempts	A-3
System access call attempts	A-5
System traffic flow and percentage of call mix	A-6
CDMA OMs	A-13
CDMA access traffic metrics	A-14
Switch core	A-21
Trunk groups	A-23
Digital trunk controller occupancy	A-26
IS-41 link occupancy	A-27
ACE and BSAP_LIU7 occupancy	A-29
IS-634 (AIF) CCS7 link usage	A-29
AIF ACE OMs	A-30

List of terms	B-1

About this document

When to use this document

This document describes those modifications or differences that a wireless and wireline customer or end user can encounter with the DMS-100 Wireless switch.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *Product Documentation Directory*, 297-8991-001.

References in this document

Since both the Nortel Networks wireline and wireless switches comprise an extensive amount of existing documentation, it is not possible to reproduce all the operational, maintenance, engineering, and descriptive information available in each product's library.

Therefore, the *DMS-100 Wireless Service Implementation Guide (SIG)* contains references to existing Nortel Networks documentation to direct the reader to comprehensive information describing either the wireline or the wireless switches, as applicable.

Terminology

The DMS-100 Wireless switch integrates the capabilities of two existing Nortel Networks switches-wireline and wireless functionality. Therefore, it is important that the reader understand how references to certain words or phrases apply to this product.

Prior to the introduction of the DMS-100 Wireless switch, the words *radio*, *mobile*, or *code division multiple access (CDMA)* strictly referred to the wireless functionality, while the words *wireline*, or *switching* referred to the wireline functionality. However, in this NTP, these terms now refer to those features or functionalities previously associated with either product, but now available with this DMS-100 Wireless switch.

In addition, the term *telephone operating company* is used to refer to the customer, while the term *end user* is used to refer to the subscriber.

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION

Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic is not carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER

Possibility of personal injury

**DANGER****Risk of electrocution**

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING

Possibility of equipment damage

**WARNING****Damage to the backplane connector pins**

Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION

Possibility of service interruption or degradation

**CAUTION****Possible loss of service**

Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.

The following excerpt from a procedure shows the command syntax used in this document:

- 1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no

and pressing the Enter key.

where

ctrl_no

is the number of the CTRL (0 or 1)

Example of a MAP response:

FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.

How measurements are described

The following table lists measurement abbreviations used in this document.

Table 1 Measurement abbreviations

Abbreviation	Description
Gbyte	gigabyte
Hz	hertz
kbit/s	kilobit per second
kbyte	kilobyte
kHz	kilohertz
Mbit/s	megabit per second
Mbyte	megabyte
MHz	megahertz
ms	milliseconds
V	volt
V dc	volt dc

1 Introduction

The DMS-100 Wireless switch merges Nortel Networks' wireline and wireless capabilities onto a single platform. This combination product allows service providers to upgrade existing DMS switches with a suite of wireline and wireless mobility and fixed access services.

The wireless software, with embedded home location register (HLR) and visitor location register (VLR) functions, adds mobility to a wireline switch in a wireless environment. The DMS-100 Wireless switch supports both local exchange carriers (LEC) and personal communications service (PCS) providers.

The DMS-100 Wireless switch supports the following wireless technologies:

- code division multiple access (CDMA)
- advanced mobile phone service (AMPS)
- time division multiple access (TDMA)

Document perspectives

Purpose

As the DMS-100 Wireless switch integrates the functionalities from two existing Nortel Networks products, Nortel Networks introduces a seamless combination product for both wireless and wireline telephone operating companies, PCS service providers, and their end users.

DMS-100 Wireless service interaction emulates the behavior from each original switching environment (that is, a wireline or wireless network). Wireless and wireline users are likely to detect differences with the DMS-100 Wireless switch from the switching environment they are accustomed to.

The DMS-100 Wireless switch does not support *all* wireless services. Also, some services from the wireline and wireless functionalities operate differently on the DMS-100 Wireless switch (for example, the MAP display). This document describes the modifications or differences that wireless and wireline users can encounter with the DMS-100 Wireless switch.

Scope

Because Nortel Networks wireline and wireless switches include an extensive amount of existing documentation, it is not possible to reproduce all the information already in each product's library. Therefore, the *DMS-100 Family DMS-100 Wireless Service Implementation Guide (SIG)* contains references to existing Nortel Networks documentation. These references direct the reader to Nortel Networks technical publications (NTP) describing an existing functionality associated with either the wireline or wireless switch. Throughout this NTP, refer to subsections called "Supporting documentation" for a list of other Nortel Networks NTPs, which describe a specific topic in detail.

Also, wireline NTPs that underwent Digital Multiplex System evolution (DMSE), as part of the product computing-module load (PCL), contain general references. General references contain only the NTP title. However, references to miscellaneous NTPs (those not migrated by DMSE) contain both the NTP number and title.

Note: Wireless NTPs did not undergo DMSE migration. Therefore, wireless NTP references include both number and title.

Supporting documentation

Refer to the following documents for a source listing of current NTPs on the DMS Family of switches:

- *DMS-10 and DMS-100 Product Documentation Directory*, 297-8991-001
- *DMS-MTX Training and Documentation Catalog*, 411-2131-003

Wireless radio interfaces

In addition to wireline technology, the DMS-100 Wireless switch supports the following wireless technologies:

- AMPS
- TDMA
- CDMA

AMPS

Advanced mobile phone service uses frequency division multiple access (FDMA) in an 800-MHz spectrum to transmit and receive analog voice signals. Each voice channel uses one carrier frequency. During an analog call, each AMPS mobile unit occupies one 30-kHz uplink and one 30-kHz downlink voice channel for conversation. One mobile unit uses the full 30-kHz bandwidth. The voice quality of an AMPS system is inferior to the voice quality of digital radio technology (such as TDMA or CDMA).

Nortel Networks' AMPS technology supports the Telecommunications Industry Association (TIA) and Electronic Industries Association (EIA) 553 standard and IS-20 standard.

TDMA

Time division multiple access uses FDMA in 800- and 1900-MHz spectrums to transmit and receive digital voice signals. Like AMPS, TDMA uses one 30-kHz channel on each direction. But, unlike AMPS, TDMA divides each 30-kHz channel into six time slots to be used by different voice traffic. Each voice traffic uses two dedicated time slots for a conversation. A TDMA system can hold four to six times more voice traffic in a given frequency range than AMPS. A TDMA system also has better voice quality and improved security than AMPS.

Nortel Networks' TDMA technology operates in 800 and 1900 MHz, and supports IS-54 and IS-136 standards.

CDMA

Code division multiple access carries wireless voice and data transmissions over a wideband frequency that can be reused in every cell. The CDMA technology uses a multiple access scheme based on direct frequency spread spectrum. All signals share the same wideband frequency channel. A correlator separates each user's signal in the receiver. The receiver accepts only signal energy from the selected binary sequence and despreads the spectrum.

DMS-100 Wireless system description

The following paragraphs provide a brief description of the components that comprise the DMS-100 Wireless system.

Wireless system

CDMA

The CDMA portion of the DMS-100 Wireless switch consists of switching and cell site equipment. The cell site is the radio frequency interface between the wireless (or mobile) subscriber and the DMS-100 Wireless switch. Radio units at the cell site send and receive voice and control messages between the mobile subscriber and the switch. These components interact with the public switched telephone network (PSTN) and the mobile subscriber unit (MSU) to provide a cellular communications system.

The DMS-100 Wireless switch is a digital cellular telephone system using CDMA and AMPS/TDMA technologies. The DMS-100 Wireless switch supports 800 and 1900 MHz frequencies.

Note: The DMS-100 Wireless bases its CDMA technology on TIA standard IS-95A and IS-95+ (personal station-base station requirements for 1.8 to 2.0 GHz) CDMA Personal Communications System (J-STD-008) standards.

The DMS-100 Wireless CDMA system consists of the following subsystems:

- the base station controller (BSC) that controls the message and signaling routing between itself, the switch, and the base station transceiver subsystem (BTS). The BSC also provides call processing functions, such as power control, voice coding, service optionality, and intrasystem soft handoffs. The DMS-100 Wireless switch requires only one BSC, which is collocated with the switch.
- the BTS that provides the radio frequency (RF) link to the end user's mobile radios at cell sites
- the base station manager (BSM), a graphical user interface (GUI) that provides the operation, administration, and maintenance (OAM) platform for the BSC and the BTS. Wireless BSC and BTS operation include the following associated BSM functions:
 - maintenance testing
 - equipment status
 - configuration management
 - operational measurements (OM) and log display

AMPS/TDMA

The AMPS/TDMA portion of the DMS-100 Wireless switch consists of the following switching and cell site equipment:

- digital/enhanced signal processing module (DSPM/EDSPM), a peripheral module (PM) equipped with a digital speech and data coder (DSDC) transcoder circuit pack. The DSPM performs low bit rate speech coding and decoding, and provides TDMA frame synchronization. The DSPM/EDSPM communicates with the DMS-100 Wireless switch through the intelligent cellular peripheral (ICP).
- ICP, a cell site controller (CSC) that supports A/B bit signalling trunks to the PSTN, voice trunks, and D-channels to the cell sites

- integrated cellular remote module (ICRM), cell site peripherals that serve as an interface between the ICP and the radio transmission subsystems
- dualmode radio unit (DRU), a cell site transceiver and power amplifier combination that operates in the TDMA (digital) mode or AMPS (analog) mode.

Wireline system

The wireline portion of the DMS-100 Wireless switch is based on digital multiplex switching systems, consisting of modular, software-controlled, digital central office and remote switches. These switches provide local and toll services with various optional features.

The wireline family of hardware and software products includes a telephone switching system with services, features, and capacity limits.

The DMS SuperNode is the current generation of DMS-100 switching technology and consists of the following components:

- DMS-core control component, comprising a computing module (CM) and a system load module (SLM)
- DMS-bus messaging component, comprising duplicated message switches (MS)
- DMS-link software infrastructure, implementing public network signaling standards, including common channel signaling, and ISDN public standards and protocols

In addition, the wireline switch consists of the following functional elements:

- the control component
- messaging switch
- switching network
- peripheral modules
- input/output controller

Limitations and restrictions

The following limitations and restrictions apply to the DMS-100 Wireless switch:

- The DMS-100 Wireless switch supports the SuperNode 70 EM (SN70EM) call processing unit (CPU). The switch also supports SN60 for upgrades only. The DMS-100 Wireless switch does *not* support SN70.
- Provisioning wireless and wireline end users is limited to the capacity of 512-Mbyte, on-board memory for the SR70EM processor. Backplane memory to handle overflow is required in an office exceeds the 512-Mbyte (on board) memory capacity limit.
- Intersystem handoffs must use NWK trunks that directly connect to another wireless office. You cannot use integrated service link (ISL) trunks for intersystem handoffs.
- Use separate sets of Common Channel Signaling 7 (CCS7) links for each CCS7 network that the DMS-100 Wireless directly interfaces with. Each CCS7 set requires a minimum of two links. Integrated service link signaling does not require separate physical CCS7 links.
- The DMS-100 Wireless switch cannot be used as any of the following configurations:
 - a stand-alone home location register (HLR)
 - a gateway-only mobile switching center (MSC)
 - an HLR/gateway-only MSC
- The resource management unit (RMU) load requires an EX22CA card for software release LWW0007. Software releases below LWW0007 can use a lower revision level of the card. However, an upgrade to LWW0007 requires an EX22CA card.
- The DMS-100 Wireless switch requires a minimum of two link interface shelf (LIS) platforms (LPP/FLIS).
- The following component configurations require separate LPP/FLISs:
 - wireless/wireline CCS7
 - wireless CDMA application units (CAU)/CDMA interface units (CIU)/RMU (Nortel Networks products), or wireless ACE/BSAP-LIU7/NIU (for A Interface products)

Note: Existing DMS-100 or DMS-200 offices must purchase two additional LPP/FLIS, depending on the interface to be supported.

- Subscriber and operator services at 1900-MHz TDMA/AMPS adhere to IS-136 Revision A limitations.

- TDMA/AMPS cells based on RDMI controller can only operate in the 800-MHz hyperband.
- The operation of 1900-MHz TDMA/AMPS is limited to one 20-MHz slice of the 1900-MHz spectrum.
- Signal quality measurements, which digital locate receivers (DLR) provide, are not available for target cell selection during interband handoffs between 800-MHz TDMA/AMPS hyperbands.

Note: The DMS-100 Wireless switch does support mobile-assisted handoff (MAHO) measurements.

- Nortel Networks recommends a maximum of four simultaneous, remote BSM GUI sessions, eight command line interface (CLI) sessions, or one data application interface.
- Do not activate the GUI session on the active side of the BSM.
- Before loading new software, remove the wireless BSC/BTS hardware from service.

- The DMS-100 Wireless switch does *not* support the following capabilities, products, or services:
 - Service Analysis for wireless calls
 - the wireless MTX Data Server (MDS)
 - NT-40
 - XA-Core 1+1
 - American National Standard Institute (ANSI)/IS-41 transaction capabilities application part (TCAP) server
 - For CDMA:
 - AMPS-to-CDMA intersystem handoffs (although CDMA-to-AMPS handoffs are supported for 1900-MHz CDMA and 800-MHz CDMA that are dual-mode phone)
 - IS-95 mobile standard (although it supports IS-95A mobile standard)
 - unchannelized A Interface configurations
 - TDMA-to-CDMA handoffs, nor CDMA-to-TDMA handoffs
 - For TDMA/AMPS:
 - handups from 800-MHz analog mode to 1900-MHz digital mode
 - backwards compatibility to previous standards (such as TIA-627 and EIA-553) in the 1900-MHz band
 - cellular digital packet data (CDPD)
 - handoffs between cells with different vocoders (such as VSELP and EFRC)
 - dynamic frequency allocation (DFA) in the 1900-MHz hyperband
 - a combined digital control channel/digital traffic channel (DCCH/DTC) functionality in the 1900-MHz hyperband
 - analog voice channel (AVC) in the in 1900-MHz hyperband according to IS-136
 - analog control channel (ACCH) in the 1900-MHz hyperband according to IS-136A

Supporting documentation

Refer to the following NTPs for additional information on Nortel Networks' wireline and wireless equipment:

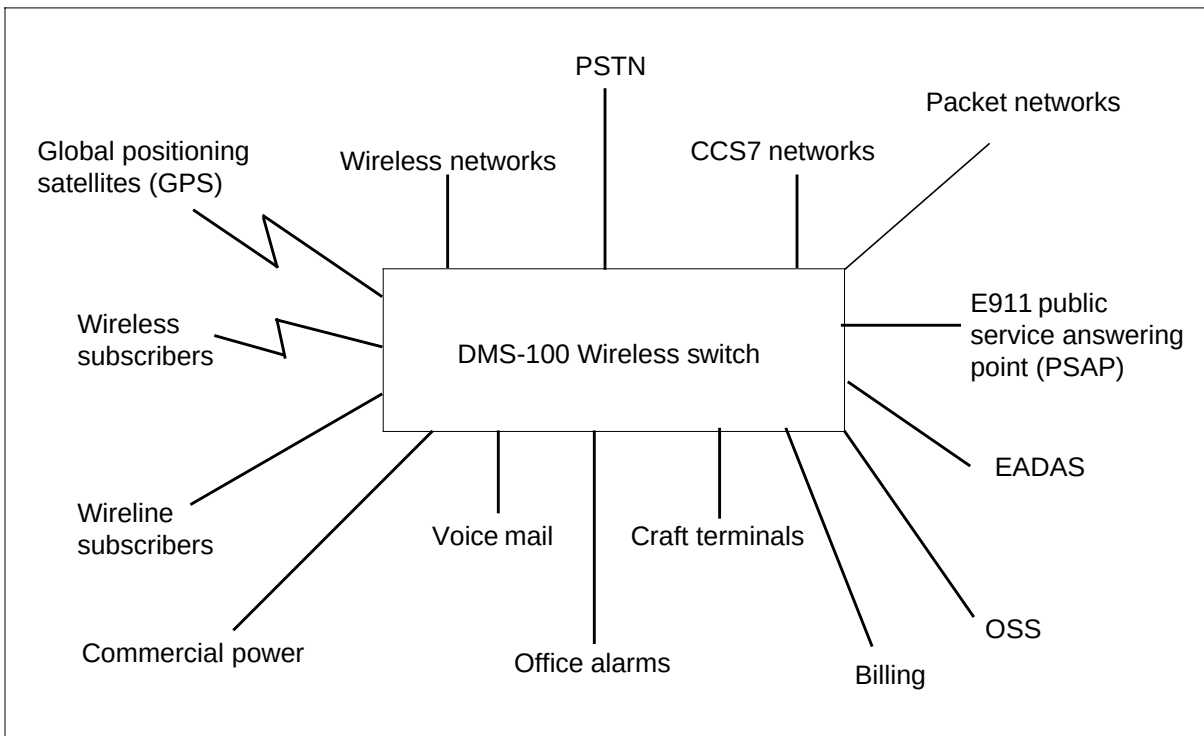
- *DMS-100 Family All Products Computing-Module Loads Provisioning Manual*, Volumes 1-4, PLN-8991-104
- *DMS-100 Family DMS SuperNode Technical Specification*, PLN-5001-001
- *Wireless Solutions DualMode Metrocell Radio Frequency (RF) Frame Description Manual*, 411-2021-113
- *Wireless Solutions DualMode Minicell Pre-installation Manual*, 411-2031-201
- *Wireless Solutions DualMode Minicell Operations and Maintenance Manual*, 411-2031-501
- *Wireless Solutions DualMode 800 Enclosure Functional Description*, 411-2051-100
- *Wireless Solutions DualMode 800 Enclosure Pre-installation Guidelines*, 411-2051-200
- *Wireless Solutions DualMode 800 Enclosure Operations and Maintenance Manual*, 411-2051-500
- *Wireless Solutions NT800DR DualMode Radio Unit Technical Description*, 411-2131-165
- *Wireless Solutions CDMA 1900 MHz Outdoor BTS Technical Overview*, 411-2133-100
- *CDMA BSC Theory of Operations Handbook*, 411-2133-101
- *CDMA 800 MHz BTS Functional Operations Technical Overview*, 411-2133-102
- *CDMA Base Station Manager User's Guide*, 411-2133-103
- *CDMA BSC Maintenance and Troubleshooting Guide*, 411-2133-501
- *DMS-MTX TDMA 1900 Macrocell Cell Site Description Manual*, 411-6201-111
- *DMS-MTX TDMA 1900 Macrocell CE Frame Description Manual*, 411-6201-112
- *DMS-MTX TDMA 1900 Macrocell RF Frame Description Manual*, 411-6201-113
- *DMS-MTX TDMA 1900 Outdoor Enclosure Description Manual*, 411-6201-114
- *DMS-MTX TDMA 1900 Outdoor Enclosure Pre-installation Guide*, 411-6201-115

- *DMS-MTX TDMA Site Manager User Guide*, 411-6201-120
- *DMS-MTX TDMA 1900 Macrocell RF Deployment Guide*, 411-6201-200
- *DMS-MTX TDMA 1900 Macrocell Installation Methods*, 411-6201-201
- *DMS-MTX TDMA 1900 Macrocell Operations and Maintenance Guide*, 411-6201-500
- *DMS-MTX TDMA 1900 Macrocell Troubleshooting Guidelines*, 411-6201-501

DMS-100 Wireless system architecture

The following information describes the DMS-100 Wireless system from an external view; that is, its interworking with other products or capabilities. Figure 1-1 shows the DMS-100 Wireless external interfaces, which are described in the following paragraphs.

Figure 1-1 DMS-100 Wireless external interfaces



Subscriber interfaces

Subscriber interfaces include wireless (CDMA, AMPS/TDMA) equipment along with wireline DMS equipment.

CDMA subscriber interface

The wireless CDMA subscriber interface for the DMS-100 Wireless switch uses radio transceivers that operate in the 800- and 1900-MHz range of the RF spectrum. These radio transceivers use digital modulation CDMA technology, based on and compliant with ANSI standard J-STD-008 for 1900 MHz. The CDMA 800-MHz equipment conforms to TIA standard IS-95A. (Equipment installers can locate the radio transceivers at the central office [CO] or at a remote location.)

AMPS/TDMA subscriber interface

The wireless AMPS/TDMA subscriber interface for the DMS-100 Wireless switch includes Nortel Networks' P2/P3 BTS, DRU and TRU-1900 in the cell site.

A P2/P3 BTS supports AMPS mode at 800 MHz in compliance with standard TIA/EIA 553.

A DRU operates in one of the following three radio interfaces:

- AMPS only
- TDMA only
- AMPS and TDMA

The DMS-100 Wireless switch supports transmit receive units (TRU) TRU-II and TRU-III dual mode transceivers. The TRU-II transceiver supports AMPS and TDMA technologies at 800 MHz in compliance with IS-20A, IS-54B, IS-56, IS-91, and EIA-553 standards. The TRU-III transceiver supports AMPS and TDMA technologies at 800 MHz in compliance with IS-136 standards. For the 1900-MHz spectrum, TRU-1900 supports fully digital TDMA technology in compliance with IS-136 standards.

Wireline subscriber interface

The wireline subscriber interfaces can include coin lines, single party lines, multi-party lines, Meridian business set (MBS) lines, ISDN lines, and datapath lines. As with the wireless interface, operating company personnel can locate these interfaces at the CO or a remote location. In addition, wireline subscriber interfaces manufactured by other vendors are available through Bellcore standards TR-TSY-00303 and TR-TSY-00008.

Services to wireline end users include all services, such as POTS, MDC, and Automatic Call Distribution (ACD), which the North American (NA) software supports with each current DMS-100 Wireless release.

Open-A interface

The DMS-100 Wireless switch provides support for an open A-interface. Open-A is the interface between the BSC and an MSC, or the DMS switch. Nortel Networks' open-A interface supports up to ten BSCs on the same MSC, and complies to interoperability specification (IOS) version 2.0a requirements.

Note: Refer to appendix A “DMS-100 Wireless open-A interface” for details.

Supporting documentation

Refer to NTP *DMS-MTX CDMA MTX Open-A Interface Implementation Guide*, 411-2131-923, for a description of Nortel Networks open A-interface.

Commercial AC power

The DMS-100 Wireless switch requires commercial alternating current (AC) power at the CO and all remote locations. It does not require any additional external power supply beyond standard CO power requirements.

A -48 V dc source powers the wireless CDMA BSC/BTS equipment. The primary power for the BTS is +27 V nominal. Each BTS provides an “A” and “B” battery feed and return power connection point.

Supporting documentation

Refer to the following NTPs for additional information on DMS-100 power requirements:

- *DMS-100 Family Power Distribution and Grounding Guide*, 297-1001-156
- *DMS-100 Family Digital Switching System Power and Grounding Routine Maintenance Manual*, 297-1001-350

Clock synchronization interfaces

A global positioning satellite receiver (GPSR) can synchronize the wireless BSC and BTS equipment. The BSC and BTS equipment each contain a GPSR.

A clock subsystem synchronizes the wireline equipment, which drives the clock to the remaining wireline, wireless, and common DMS-100 equipment in the CO. The DMS-100 synchronous clock subsystem receives input from the next higher switch in the clock hierarchy (from a digital trunk) or from an external clock standard.

External trunks and call routing

Use analog or digital trunks to connect public and private switches (used for wireline, wireless, or both networks) to the DMS-100 Wireless equal access end office (EAEO). External digital trunks connect with the DMS-100 Wireless switch through circuit packs mounted in a digital trunk controller

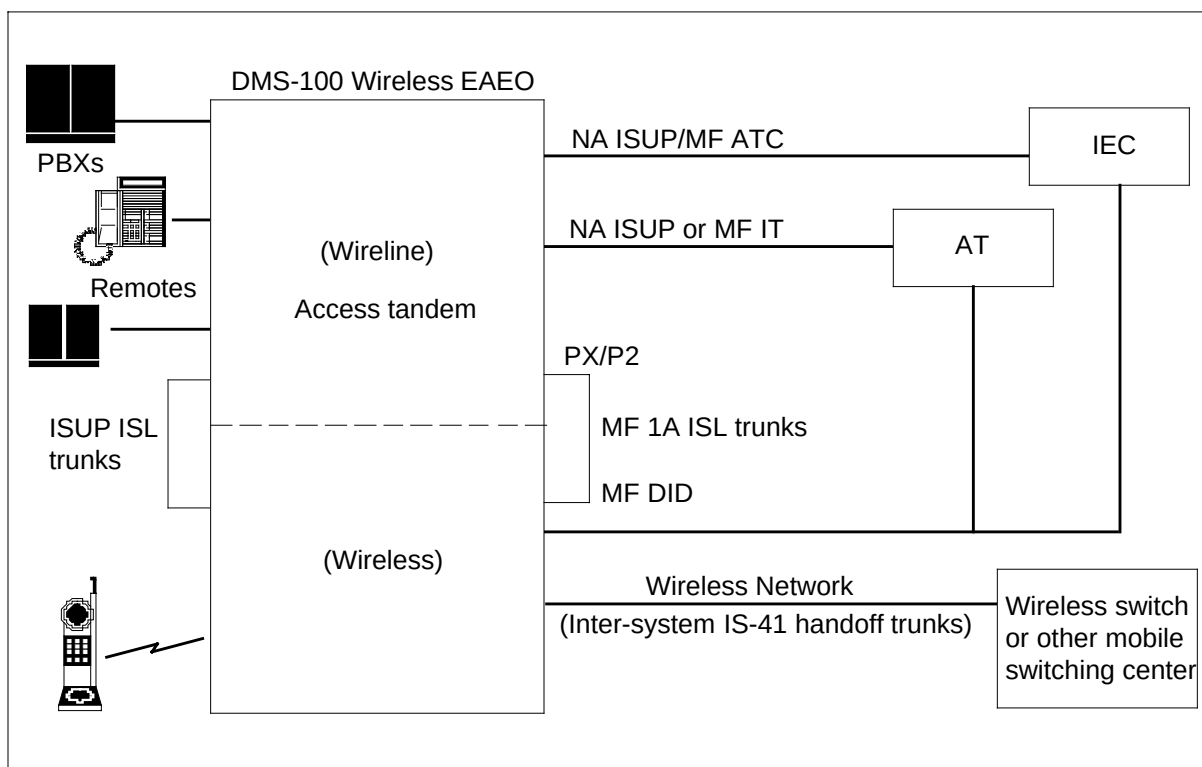
(DTC), line trunk controller (LTC), or remote switching center (RSC). Analog trunks interact with the switch through circuit packs mounted in a maintenance trunk module (MTM). The wireless software cannot control digital trunks mounted in LTCs nor RSCs.

Call routing uses home numbering-plan area (HNPA) and three-digit office (or NXX) codes. The wireless and wireline end users can share the same HNPA and NXX code.

Existing translations without special processing supports geographic routing for 500-NXX-XXXX calls.

Figure 1-2 shows how external trunk interfaces connect the DMS-100 Wireless system.

Figure 1-2 External trunk interfaces to the DMS-100 Wireless



Integrated service link trunks

The DMS-100 Wireless switch requires ISDN user part (ISUP) ISL trunks to route wireline-to-wireless calls, or wireless-to-wireline calls. Operating company personnel must engineer ISL trunk groups based on the projected amount of wireless-to-wireline call traffic for the switch.

Note: Nortel Networks strongly recommends that operating company personnel use standard datafill names for all ISL trunk groups. Refer to chapter 5 “Translations and call processing” for datafill examples with specific ISL trunks groups.

The DMS-100 Wireless switch requires ISUP ISL trunks to route wireless equal access (EA) calls with CCS7 to an access tandem (AT) or an interexchange carrier (IEC). Nortel Networks also requires this configuration because wireless-related ISUP trunks do not support full TR-394 requirements for messaging EA parameters. Therefore, use NA ISUP trunks for connections to the IEC and international carriers. (Wireless centrex calls also require dedicated ISL trunk groups.)

A wireless CO can support multifrequency (MF) trunks to an AT or directly to an IEC for EA. However, this configuration requires separate trunking for wireless and wireline EA traffic.

North American centrex groups on the DMS-100 Wireless switch can include wireless members. Operating company personnel must provision a dedicated ISL trunk for a centrex group. The ISL group allows wireless subscribers to originate calls with the centrex group's dialing plan.

The use of ISL trunks also changes MAP maintenance commands LTP (line test position) and TTP (trunk test position).

Supporting documentation Refer to the following chapters in this NTP for additional information on ISL trunks:

- chapter 2 “Planning and engineering” for information on traffic capacity planning with ISL trunking
- chapter 5 “Translations and call processing” for recommended datafill names for ISL trunk groups
- chapter 11 “Maintenance” for information on ISL modifications for MAP commands
- chapter 12 “Wireless centrex” for information on the wireless centrex functionality
- chapter 13 “Trunking configurations” for information on ISL trunking

Calls supported

An end user of the DMS-100 Wireless system can dial

- another end user in the same PCS network or connected PCS network
- another end user in the NA PSTN network or connected network (including local, long distance, and international calls)
- another end user in a connected cellular network
- special area code calls (that is, 500, 700, 800, and 900), providing translations has been configured to allow these calls
- 0- calls

Note: Wireless 0- calls can route to a PCS service provider (PSP) or to an LEC operator. Operating company personnel can set up translations to route 0- calls to one operator, while *0 calls can route to another operator.

- 0+ calls

Note: Operating company personnel can set up translations to route 0+, inter-local access and transport area (LATA) calls to the presubscribed IEC operator.

- 00 calls

Note: Operating company personnel can set up translations to route 00 calls to the prescribed IEC operator.

- 911 (E911) emergency calls
- N11 calls (such as, directory assistance and service center calls)
- feature code calls with a special prefix (that is, *XX for cellular) as the service providers define, which feature activation and deactivation use
- 10XXX calls to select a carrier (that is, 10XXX 0+ calls to select a carrier's operator)

Callers from anywhere in the PSTN, cellular, or PCS networks (including international calls) can place calls to DMS-100 Wireless end users.

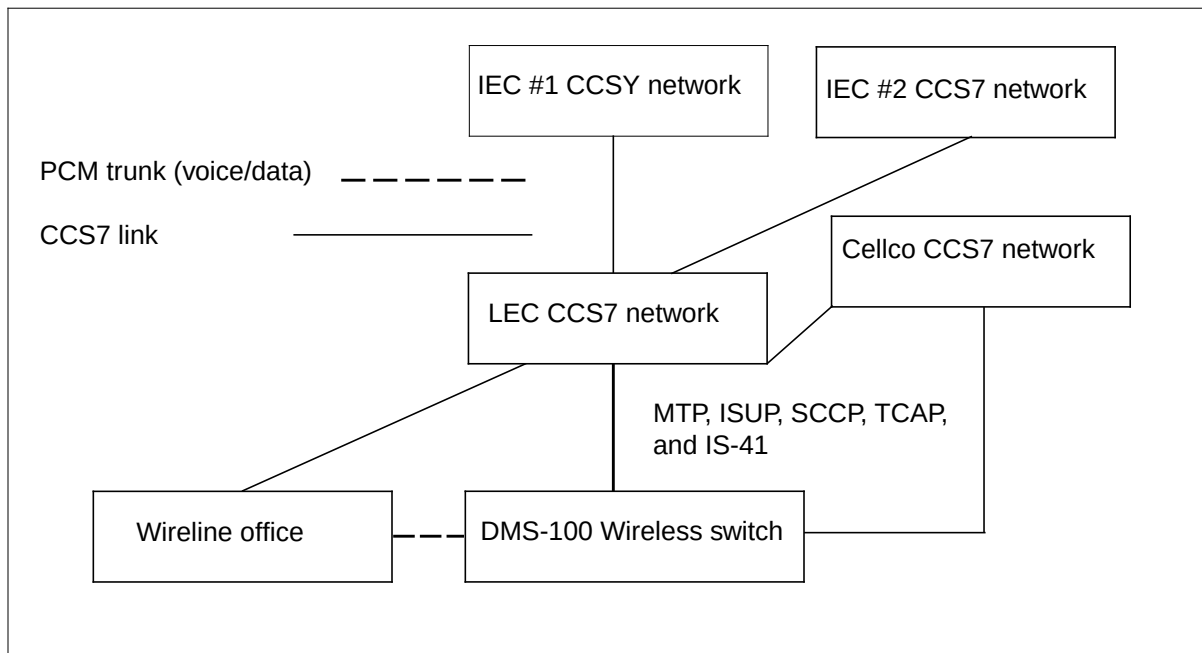
Operating company personnel can associate supervisory and address signaling for call control and routing with a channel signal, such as E & M signaling or loop supervisory signaling, and MF or dial pulse (DP) address signaling.

Operating company personnel can also use ISUP over CCS7 links to transport signaling over a common channel.

CCS7 network interfaces

Figure 1-3 shows an example of CCS7 connectivity.

Figure 1-3 Sample CCS7 connectivity

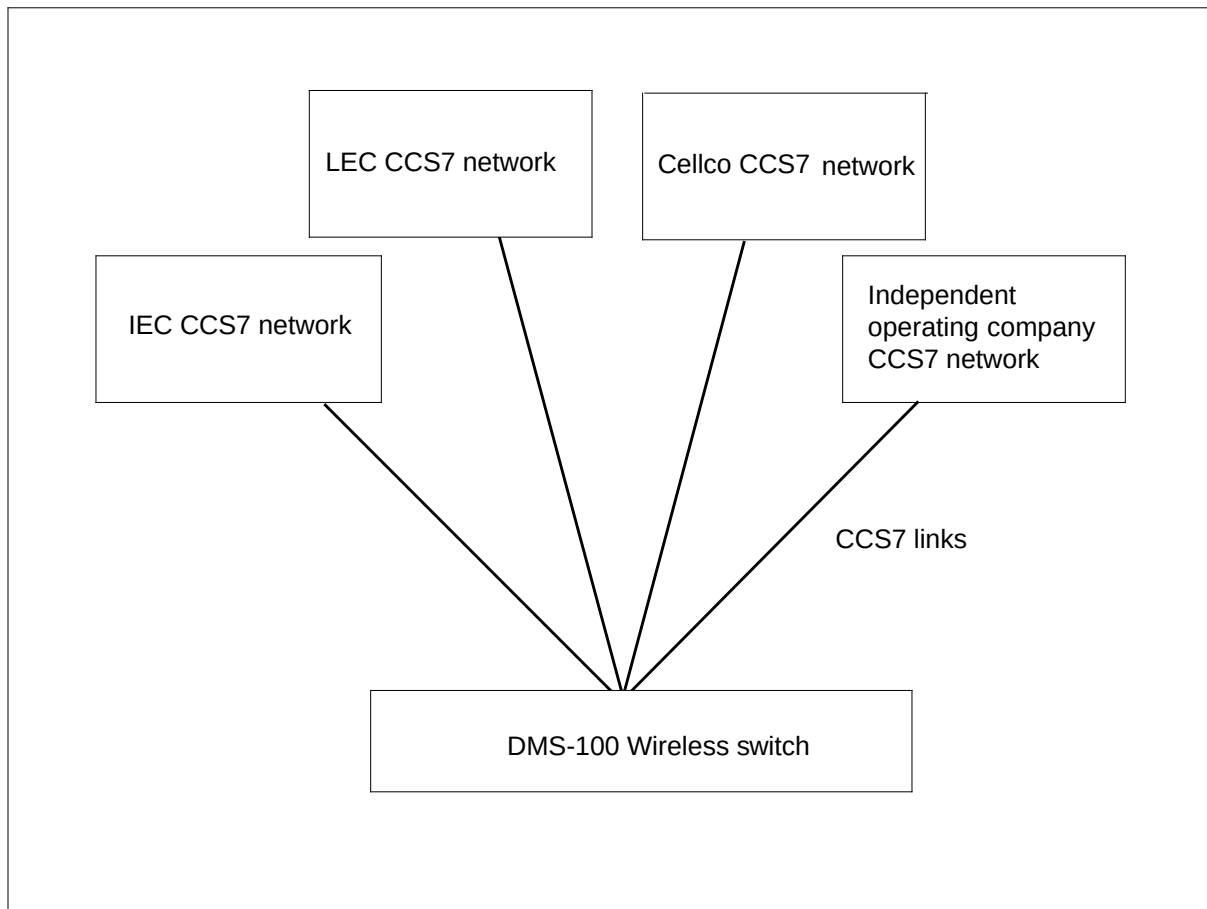


Call processing services from the wireless system interact with the wireline services at an interoffice level. The CCS7 ISL trunks and signaling provide interoffice linkage.

CCS7 link connections

The DMS-100 Wireless system requires a minimum of two CCS7 links be connected to each CCS7 network. Connect the links to an STP pair for each network.

Figure 1-4 shows several configurations for the DMS-100 Wireless system to connect to CCS7 networks.

Figure 1-4 Sample network CCS7 interface connections

The CCS7 links support the following protocols:

- Message Transfer Part (MTP)
- TCAP
- Signaling Connection Control Point (SCCP)
- InterSwitch messaging (IS-41 Revisions 0, A, and B)
- ISUP
- mobile application part

Note 1: The TCAP protocol is a standard protocol for CCS7 signaling.

Note 2: Protocol IS-41C supports intersystem handoff, handback, and registration.

ISUP signaling

The ISUP signaling for wireline trunks is TR-317 or TR-394 compliant. ISUP signaling for wireless direct inward dial (DID) trunks also complies with protocol TR-394.

Note: Wireless ISUP DID trunks do not comply with TR-394. Do not connect them to an AT or to an IEC.

Wireless-to-wireline ISL trunks in the DMS-100 Wireless CO do not require separate physical CCS7 links. Use virtual links to support ISUP protocols.

Public safety answering point interfaces

From the wireline functionality, E911 service uses ACD lines or emergency service (ES) trunks to connect to a public safety answering point (PSAP).

Refer to subsection “PSAP 911 and E911 service” in chapter 2 “Planning and engineering” for information on wireless E911 calls.

Engineering and administrative data acquisition system links

The Engineering and Administrative Data Acquisition System (EADAS) provides near real time (RT) traffic (operational measurement) data collection and surveillance from a number of switching systems through an EADAS data collection (EADAS/DC) interface from each office.

The data link is a single, dedicated, synchronous, low-speed data link with three BX.25 permanent virtual circuits (PVC). The OM data collection (EADAS/DC interface) uses one circuit. Network management applications (EADAS/NM interface) uses the other two circuits. The data link terminates to a modem connected to an RS232 interface on a multiprotocol (MPC) card.

EADAS performs the following functions:

- data collection

EADAS collects and validates data from the DMS-100 Wireless switch. EADAS polls the switch through BX.25 protocol.

- report generation

EADAS generates near RT reports on network terminals located at various operations centers. These near RT reports enable users to take immediate corrective action when the associated switching system is not performing as expected. The switch generates reports on a scheduled, exception, or demand basis. Users can also request raw data or make database changes when necessary. Data can be written to tape for downstream processing.

- database management

EADAS supports two user interfaces for database management and resolution of data collection problems. Through both network terminals

and the file system, users can establish collection schedules, provide data collection device (DCD) assignments, and establish other parameters and thresholds necessary to properly collect and report traffic data.

Although the DMS-100 Wireless switch does not change existing wireline EADAS operation, it does define some of the OMs sent on the EADAS link differently.

Supporting documentation

Refer to the following NTPs for additional information on EADAS:

- *Customer Data Schema Reference Manual*
- *Translations Guide*
- *DMS-100 Family All Products Computing-Module Loads Provisioning Manual*, PLN-8991-104

Note: Refer to chapter 9 “Operational measurements, alarms, and logs” for information on OMs with the DMS-100 Wireless system.

Billing

For the DMS-100 Wireless switch, wireline and wireless billing formats differ.

Call detail recording (CDR) billing records that wireless calls generate use Northern Telecom (NT)-formatted records. Wireline calls generate billing records in either Bellcore automatic message accounting (AMA) format (BAF) or NT format. The DMS-100 Wireless system supports the storage of both billing record formats. (The BAF format is more widely used in North America.)

The DMS-100 Wireless system requires separate downstream billing applications for the wireless and wireline records. The wireline, BAF-generated records use data processing peripheral (DPP) links to communicate between the wireline switch and the downstream processing application. The wireless, CDR-generated records use automatic file transfer (AFT) to relay information from the switch to the downstream processing application.

Both formats use the same Device Independent Recording Package (DIRP) system to record billing data. If you use a hard disk, or other device that permits multiple, open files for billing storage, both formats can share the same device. If you use a magnetic tape drive (MTD) for storage, you must have two drives.

However, if an office uses a hard drive or another device to store billing information, both streams can share the same device.

Calls between wireline and wireless end users require ISL trunks. Since this configuration equates to two separate calls, the switch generates separate records.

SuperNode Data Manager

The DMS-100 Wireless switch supports combination SuperNode Data Manager (SDM) product loads beginning with wireless DMS-MTX08 (SDMX08) and wireline DMS-100 NA012 (SDMN12) releases on an SDM12 base. Feature Integrated Wireline/Wireless SDM Load, which introduced this capability, supports both wireless CDR and wireline BAF billing records.

Note: Refer to chapter 8 “Billing” for detailed billing information and the implications of using AFT for CDR record transfer for the DMS-100 Wireless switch.

Equal access

Equal Access for DMS-100 Wireless enables the DMS-100 Wireless switch to route both wireline and wireless EA calls using existing trunking facilities to either an AT or an IEC.

The access arrangement for a carrier can be set up as feature group D (FGD), feature group B (FGB), or feature group C (FGC).

Wireline end users can access FGD, FGB, or FGC carriers. However, wireless end users must access FGD carriers using the existing trunking facilities in an office. Wireless FGD carrier support uses ISUP DID trunks in compliance with GR-317 and GR-394 requirements. Equal Access for DMS-100 Wireless also provides limited support for wireless end users to access FGB and FGC carriers.

In each of these cases, the wireline portion of the DMS-100 Wireless switch acts as an AT. Set up AT translations on the wireline portion of the switch to route calls over existing intertoll (IT) or access to carrier (ATC) routes to the IECs.

MAP terminal

The MAP terminal is the primary interface between operating company personnel and a DMS switch. Operating company personnel can access system test, data interrogation and modification, and trouble analysis functions from a MAP terminal.

Operating company personnel can control, maintain, and administer most DMS-100 Wireless equipment from a MAP terminal. They can also maintain the AMPS and TDMA cell site equipment from a MAP terminal. However, operating company personnel can only *receive* alarm information that the BSC or BTS equipment generates. Operating company personnel cannot use a MAP

terminal to control these wireless components. The BSM terminal controls BSC and BTS equipment and provides a window to MAP display functions. If the MAP terminal displays an alarm indicating a BSC or BTS equipment problem, use a BSM terminal to determine the cause of the alarm.

All MAP levels and commands from the wireline and wireless switches are available in the DMS-100 Wireless switch.

Note 1: The MAP and BSM terminals support only English language displays.

Note 2: Refer to chapter 4 “User interface” for additional information on MAP terminal use on the DMS-100 Wireless switch.

Telephone operating company personnel can use the DMS-100 Wireless MAP terminal to execute the following functions:

- table control, a collection of software and commands to enter, display, and reconfigure databases

These databases include

- customer database
- translations and routing tables
- hardware equipment properties
- network connectivity
- cell site definitions and interactions
- system operating parameters

- journal file, a record that tracks the daily changes to the switch's Service Order System (SERVORD) and table control activities. When the journal file is active, the switch records service orders set for immediate activation. The switch records those service orders in a batch file or set for pending on the day they are activated. The journal file re-enters service order if a switch failure occurs.

Note: Refer to *NTP Journal File Description*, 297-1001-127, for additional information on journal files.

- translations verification (TRAVER), a tool that checks translations information. For calls that span wireless to wireline terminals using service links, TRAVER automatically continues translations verification from the associated ISL trunk until the switch translates a non-ISL termination.

Note: Refer to chapter 4 “User interface” and chapter 5 “Translations and call processing” for additional information on TRAVER use on the DMS-100 Wireless switch.

- service analysis select (SASelect) level of the MAP display, a tool that provides service analysis monitoring of circuits.

Note 1: The DMS-100 Wireless switch requires an audio channel connection to execute service analysis.

Note 2: Service analysis supports only wireline calls.

- network management (NWM) level of the MAP terminal, a tool that enables operating company personnel to control traffic by preventing network congestion. Network management controls prevent congestion by altering and restricting telephone traffic patterns between a switch and its connecting switching network elements (NE).

Nortel Networks recommends that operating company personnel follow these guidelines for NWM.

— Do not apply NWM controls to circuits with trunk type MTX or NWK. Use trunk types DID or DOL instead.

— Code controls cannot work with universal translations (UXLA).

- maintenance (MTC) level of the MAP terminal, a tool that accesses the DMS-100 Wireless subsystems, including the CM, message switch (MS), input output device (IOD), network (NET), and peripheral modules (PM). Also use the MAP terminal to access performance tools.

The DMS-100 Wireless switch adds the CDMA maintenance subsystem. From the frame relay interface unit (FRIU) subsystem level, operating company personnel can monitor the number of CAU and CIU currently in and out of service.

The MTC level of the MAP terminal also displays office alarm status and subsystem alarm status.

The PM level of the MAP terminal manages the following AMPS/TDMA-specific PMs:

- intelligent cellular peripheral (ICP)
- integrated cellular remote module (ICRM)
- cellular authentication and voice encryption unit (CAVU)
- radio channel unit (RCU)
- digital signal processing module (DSPM)

- call processing system (CPSys) level of the MAP, which provides an integrated view of the wireline, wireless, and common DMS equipment.

Note: Refer to chapter 4 “User interface” for additional information on MAP displays.

Base station manager display

This subsystem of the BSC is a centralized OAM element for the BSC and the BTS. The BSM uses UNIX workstations to provide a GUI or a command line interface (CLI) to the wireless BSC and BTS equipment.

The BSM acts as a hardware interface to an input/output controller (IOC) port with a VT100 emulation or TELNET software that works in a windows environment, along with the CDMA equipment monitor. With this capability, information from both the wireless and wireline equipment displays on the same workstation, but in separate windows.

The BSM can be used for the following functions:

- maintenance testing
- equipment status
- security management
- configuration management
- fault management
- OM and log display

In addition, the BSM includes peripheral devices that perform the following auxiliary functions:

- local area network (LAN) and wide area network (WAN) communications
- tape backup
- printed output

Voice mail

The DMS-100 Wireless switch includes support for a voice mail system (VMS) for both wireless and wireline end users.

The DMS-100 Wireless switch supports existing configurations for either wireless or wireline voice mail operation. Or with the DMS-100 Wireless's integrated architecture, operating companies can use a single VMS configuration to provide seamless voice mail communication for wireline and wireless end users.

Existing wireline and wireless switches use different interfaces and network protocols to communicate with their VMS.

For example, wireline switches use bidirectional Simplified Message Desk Interface (SMDI) links for signaling and uniform call distribution (UCD) lines for voice. Wireless switches use MF trunks to store and retrieve voice mail messages in a local VMS setup.

Wireline switches can use primary rate interface (PRI) or ISUP (GR-394) trunks to interwork with the host switch to which a supporting VMS is attached. The wireline switches receive message waiting indicators (MWI) through network message service (NMS) TCAP messaging. Wireless switches use IS-41 messaging to deliver MWIs to the wireless handsets. The wireless switches also use MF or ISUP (GR-317) trunks.

With the DMS-100 Wireless switch, end users can also subscribe to a common VMS, allowing them to access their voice mail messages from a wireline or wireless telephone. The following paragraphs describe how to best configure your VMS for operation.

Voice mail configurations

For an integrated VMS, Nortel Networks recommends that you configure your DMS-100 Wireless VMS as follows (depending on your setup).

Local setup In a local setup (that is, the VMS connects directly to the switch), wireline and wireless end users use the same VMS. In this case, UCD lines carry the voice traffic and the SMDI links carry the signaling information to the VMS.

This integrated configuration uses ISUP ISL trunks to pass wireless call-related information to the wireline portion of the switch. The remainder of voice mail processing resembles wireline VMS.

Note 1: With this configuration, do *not* set subfield OPTION in table SLLNKDEV (SL-100 Link Device) to NONMS (no network message service) for SMDI links.

Note 2: Trunk use can increase with the addition of ISL trunks for incoming wireline or interoffice calls to wireless end users.

Network setup Your DMS-100 Wireless VMS network configuration depends on the following factors:

- type of network (wireline or wireless)
- location of the VMS (network or local setup)
- location of the HLR in a wireless network (that is, if the HLR is collocated with or external to the switch)
- existing interface between the VMS and the switch

In a network setup, you can configure separate VMSs for independent wireline and wireless end users. In these cases, provision independent interfaces from the DMS-100 Wireless switch to these networked VMSs.

The wireless calls pass over ISL trunks to the wireline portion of the switch. The calls pass over ISUP or PRI trunks to connect to the remote wireline portion of the switch with direct VMS connection.

The IS-41P or IS-41C protocols for the wireless network deliver MWI, and NMS TCAP messaging over PRI or ISUP trunks for the wireline network.

Voice mail interfaces The DMS-100 Wireless switch supports the following interfaces for an integrated wireline and wireless VMS.

1. The UCD lines with bidirectional SMDI links in a local VMS setting support *all* wireless and wireline voice mail features.

Note: To fully support SMDI messaging protocols in an integrated wireline and wireless VMS, provision the 1X89BA card in the IOC.

2. An MF trunk with a uni-directional SMDI link supports wireless calls but *not* all wireline voice mail features.
3. The ISUP trunks for voice messaging, and IS-41C messaging for signaling interface from the VMS supports the wireless voice mail features, but *not* wireline features.

Note: The IS-41 protocols that the DMS-100 Wireless switch supports include IS-41B+, IS-41P, and IS-41C.

4. Independent VMS for both wireline and wireless end users.

Note: The first interface has no limitations. The second, third, and fourth configurations have limitations.

Common Networked Voice Mail

The Common Networked Voice Mail for DMS-100 Wireless feature resolves the conflicts with MWI to a mobile unit on the DMS-100 Wireless switch with a VMS in a wireline network. This feature also supports conditions when a wireless subscriber is roaming in a serving area.

Common Networked Voice Mail for DMS-100 Wireless does not support configurations where the HLR is external to the MSC. This feature also requires NMS software.

Supporting documentation

Refer to the following NTPs for additional information on voice mail:

- *DMS VoiceMail System Administration*, 297-7001-300
- *DMS VoiceMail Customer Administration Guide*, 297-7001-301
- *DMS VoiceMail System Administration Guide-Single Customer*, 297-7001-302

- *DMS VoiceMail System Administration Tools*, 297-7001-305
- *DMS VoiceMail Voice Forms Application Guide*, 297-7001-306
- *DMS VoiceMail Voice Menus Application Guide*, 297-7001-307
- *DMS VoiceMail Outcalling Application Guide*, 297-7001-308
- *DMS VoiceMail Translations Guide*, 297-7001-310
- *DMS VoiceMail Routine Maintenance Procedures*, 297-7001-501
- *DMS VoiceMail Card Replacement Procedures*, 297-7001-502
- *DMS VoiceMail Trouble-locating Alarm Clearing Procedures*, 297-7001-503
- *DMS VoiceMail System Installation Modification Guide*, 297-7001-504
- *DMS VoiceMail Maintenance messages (SEER) Manual*, 297-7001-510

Wireless centrex services

Wireless centrex services allow operating company personnel to configure wireless subscribers into centrex business groups, and access the dialing plans and services of the groups.

The DMS-100 Wireless switch provides the following services to wireless centrex members:

- Integrated Wireless Centrex feature
- shared private dialing plan
- Simultaneous Ringing (SimRing)/“Phone Twinning” feature
- single integrated voice mail
- wireless business group service

Note: Refer to chapter 12 “Wireless centrex” for additional information on these services.

Communications Assistance for Law Enforcement Act

The DMS-100 Wireless switch supports lawfully authorized electronic surveillance (LAES) activities, which allow law enforcement agencies (LEA) to monitor the content of a subscriber’s communications. A standardized message set also provides LEAs with additional monitoring information.

For wireline calls, this capability is called the United States Network Broadcast Delivery (USNBD) functionality. For wireless calls, this capability

is called MTX Electronic Surveillance (MES) functionality. The DMS-100 Wireless switch supports both USNBD and MES functionalities.

Note: Since USNBD and MES can operate differently, Nortel Networks strongly recommends that users first familiarize themselves with the following NTPs before implementing CALEA on the DMS-100 Wireless switch:

- *US Network Broadcast Delivery (USNBD) Feature Guide*, 297-9801-300
- *DMS-MTX Electronic Surveillance (MES) Deployment Guide and Reference Manual*, 411-213-144

The DMS-100 Wireless switch complies with USNBD and MES monitoring behaviors.

CALEA limitations and restrictions

The following limitations and restrictions apply to CALEA use on the DMS-100 Wireless switch:

- The wireless portion of the DMS-100 Wireless switch does not verify the accuracy of any of the parameters during use of the SURV ADD command for provisioning a target during datafill of a surveillance with MES data.

Note: For CALEA to operate as intended, customers must assume full responsibility for ensuring valid datafill entry in each field of this command.

- Nailed-up (NU) connections cannot be shared between the MES and USNBD CI commands. Nortel Networks recommends maintaining separate NU connections that span both portions of the switch when using the MES and USNBD CI commands.

2 Planning and engineering

Required hardware

The DMS-100 Wireless switch uses existing wireline equipment. To support wireless calls for the code division multiple access (CDMA) radio interface, the switch requires the following hardware:

- Fiberized link interface shelf (FLIS) or link peripheral processor (LPP) cabinet is equipped with CDMA interface units (CIU) and CDMA application units (CAU). These units provide an interface to enable wireless messages between the switch and the radio access subsystem. Wireless messages include those associated with mobile phone call setup, registration, and intersystem handoff.
- Digital trunk controllers (DTC) provide voice trunks between the wireless and radio systems, and trunking to the public switched telephone network (PSTN) or wireless network.
- Base station controller (BSC) provides CDMA voice coding, intra-system handoff, and advanced power control. It is collocated with the DMS-100 Wireless system.
- Base station transceiver subsystem (BTS) consists of cell site equipment that provides the air interface between the mobile (or wireless) phones and the cell site. Each BTS covers a separate area. They are collocated with the antenna towers; the combination is called a cell site.
- Series 60 processor is the baseline processor required for DMS-100 Wireless systems. (Larger wireless systems require the series 70 extended memory processor.)

To support advanced mobile phone service (AMPS)/time division multiple access (TDMA), the switch requires the following hardware:

- an intelligent cellular peripheral (ICP). An ICP is a cell site controller (CSC) that supports A/B bit signalling trunks to the PSTN, voice trunks, and D-channels to the cell sites.
- a digital signal processing module (DSPM). A DSPM is a peripheral module (PM) equipped with the digital speech and data coder (DSDC)

transcoder circuit pack. The DSPM performs low bit rate speech coding and decoding, and provides TDMA frame synchronization.

Note: Refer to section “Hardware descriptions” in this chapter for details on these hardware components.

Figure 2-1 shows the system components of the DMS-100 Wireless switch.

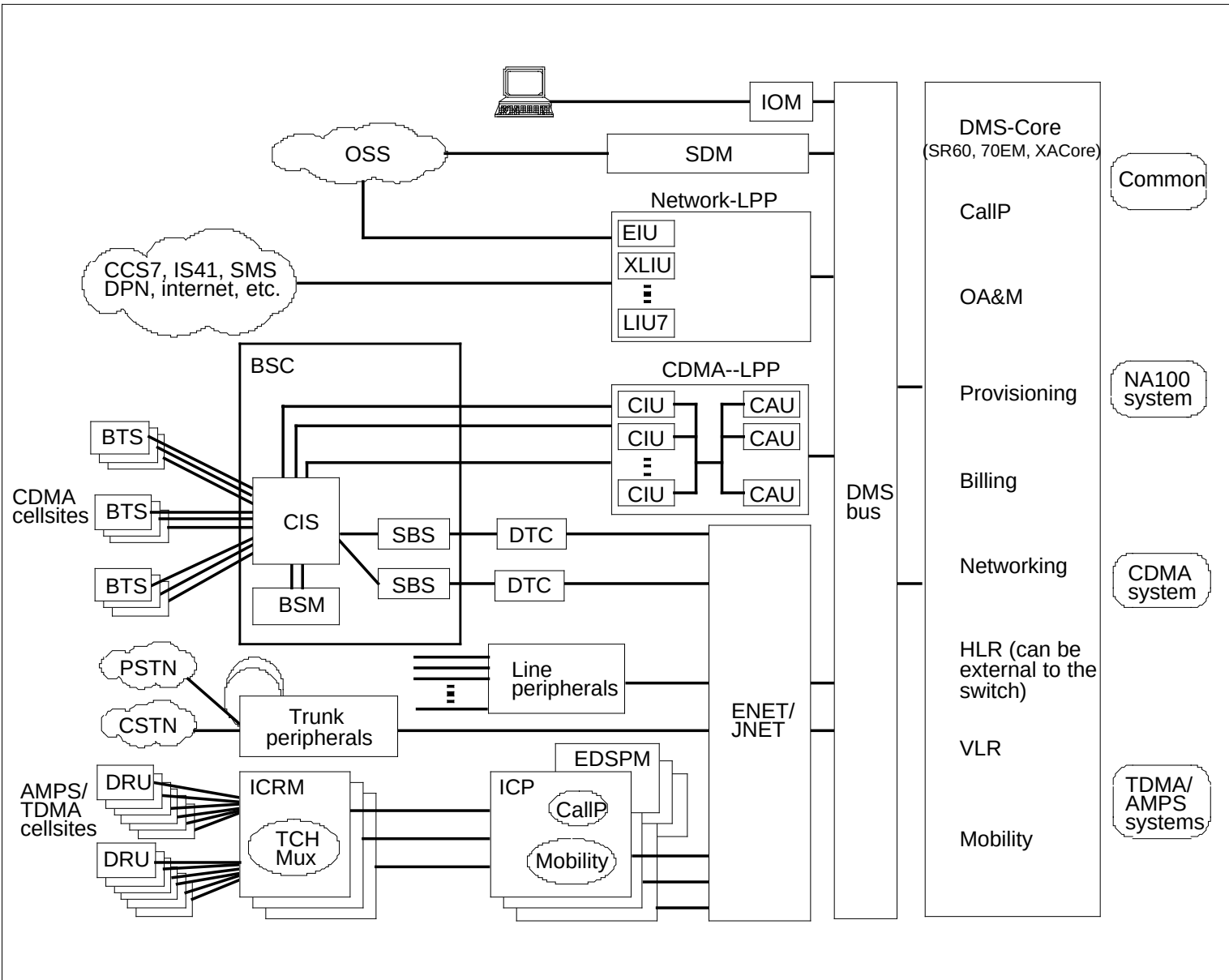


Figure 2-1 DMS-100 Wireless system components

Technical specifications

Generic network PCS overview

There are three major subsystems in a wireless PCS network:

- radio
- switching
- mobility database

The following sections describe the functions of each major subsystem in the DMS-100 Wireless switch.

CDMA radio subsystem

The DMS-100 Wireless switch connects to the CDMA radio subsystem. Nortel Networks' CDMA radio subsystem includes cell site equipment that operates at the 800-MHz (cellular) and 1900-MHz personal communications service (PCS) frequencies.

The CDMA radio subsystem includes the following BTS options:

- outdoor 1900 MHz—an outdoor enclosure that contains DC rectifiers, T1 backhaul interfaces and battery backup
- indoor 1900 MHz—an indoor version of the outdoor unit
- indoor 800 MHz—an indoor, 800-MHz, “macro” version of the 1900-MHz model integrated into an existing cellular system

All units comply with technical standards IS-95A (800 MHz), ANSI J-STD-008 (1900 MHz), and other applicable CDMA specifications.

Radio subsystem

The radio subsystem consists of the following network elements related to the control and management of radio resources:

- The BSCs control the message and signaling routing between itself, the switch, and the BTS subsystem.
- The BTSs link the mobile handsets and the BSC.
- Mobile handsets include equipment by which the end user communicates to the BTS through radio channels.

The radio subsystem provides operations, maintenance, testing, and accounting management capabilities.

The radio subsystem can also have a local database, or visitor location register (VLR), to manage roaming (or visiting) mobile end user information. This information is called profile information.

The home location register (HLR) is the permanent database that stores profile information about a mobile end user. The VLR retrieves profile information from the HLR when a mobile end user moves into the territory of the switch. The switch checks the serving VLR for the profile information. If the switch finds the information in the serving VLR, the call proceeds. If the switch does not find the profile information, it sends a profile request message to the HLR of the mobile unit. When the HLR responds with the information, the switch stores it in the serving VLR and then the call proceeds.

Note: The DMS-100 Wireless switch supports internal VLRs only.

The BSC, which interfaces directly with the switching subsystem, connects to a number of BTSs. These BTSs provide protocol conversion for communication between the mobile handsets and the BSC.

Switching subsystem

The switching subsystem performs the following wireless functions:

- routes calls between mobile handsets, or between a mobile handset and the PSTN
- routes incoming calls to a wireless PCS end user. The switching subsystem queries the location tracking database(s) and redirects the calls to the end user's present location.
- receives outgoing calls for delivery to the called party
- provides the connection to the PSTN, inter-exchange carrier (IEC), North American cellular network (NACN), and other networks to allow wireless end users to communicate with other telephone end users throughout the world.

Mobility database subsystem

The mobility database subsystem manages end user and terminal (PCS handset) information. This information includes service profile, accounting information, and authentication. The mobility database subsystem also provides operations, maintenance, and accounting management capabilities.

The mobility databases that handle calls to and from the mobile PCS end users include:

- an HLR that provides
 - a permanent repository for an end user's service profile
 - the terminal location tracking at VLR granularity
 - support and management of the end user's service profile
 - service validation (for example, credit check and lost terminals)
 - accounting management capabilities
- a VLR that provides
 - assistance in terminal registration
 - current terminal location and tracking
 - temporary storage of the SP

Engineering considerations

Data assignment

Table control is the collection of software and commands necessary to enter, display, and change configuration databases. These databases, also known as datafill tables, include the customer database (the HLR), translations and routing tables, hardware equipment properties, network connectivity, cell site definition and interactions, and system operating parameters.

Note: The computing module (CM) stores two sets of translations tables, one for wireline and one for wireless call processing.

No software exists to exchange configuration data between the CM and the base station manager (BSM). (The BSM provides a graphic user interface [GUI] for operations, administration, and maintenance of the BSC and the BTS.) Both sides require datafill configuration data (such as where the selector bank subsystems [SBS] are, or what cells are sectorized, on both systems).

“Static data” is the configuration data and operating parameters that the switch downloads to its peripherals from the CM. When operating company personnel bring the switch from an out-of-service state, the switch downloads static data to its peripherals. This download is called bulk static data because the peripherals receive the whole static data load.

After operating company personnel make table control changes, the peripheral receives a dynamic static data update (providing the peripheral is in service). The update includes only the tuple for the changed data.

Installation considerations

Installation tools

Use the automatic board-to-board testing tool when the DMS-100 Wireless switch receives lines from a wireline office. Use the pretest and cut-over testing tool when the DMS-100 Wireless switch receives trunks from an existing office.

Refer to Nortel Networks publication (NTP) *DMS-100 Family Automatic Board-to-Board Testing Reference Manual*, 297-1001-522, for additional information on board-to-board testing.

BSC/BSM and BSM placement

The BSC (central office equipment) and BTS (cell site equipment) use standard C28 cabinets. Make sure that all test locations are accessible and are not concealed behind door panels that require tools for equipment removal.

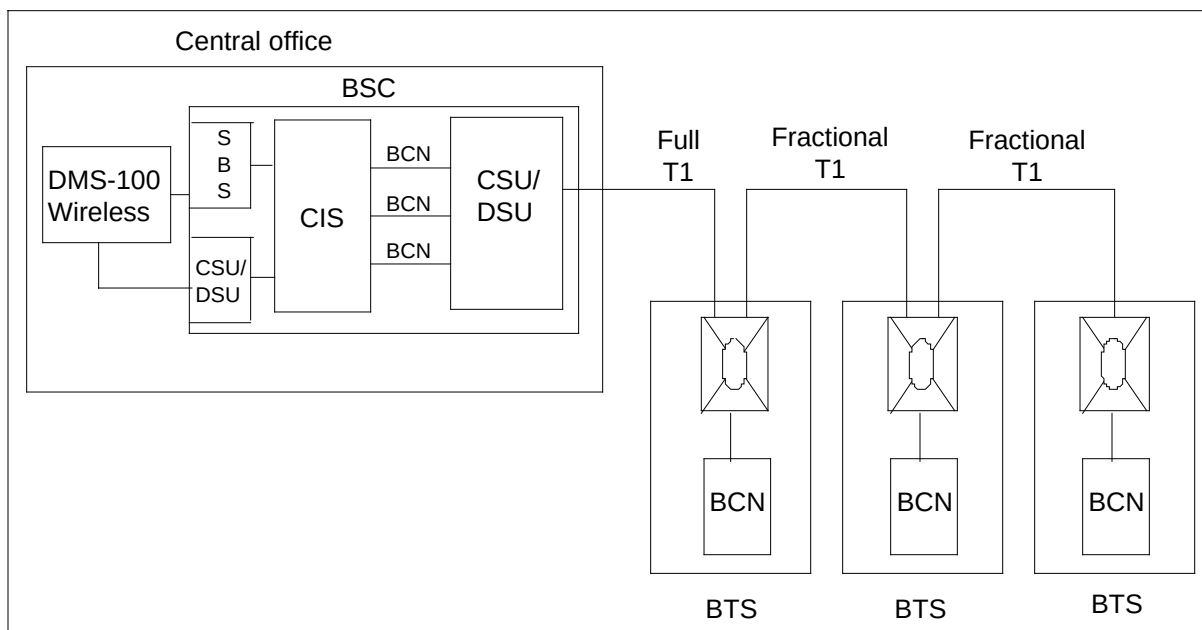
The customer determines placement of the BSM. Note that BSM monitors are larger than MAP terminals and do not always fit on standard office furniture.

BTS installation

Several configurations exist for using fractional T1 links.

Note: The DMS-100 Wireless switch requires separate T1 links for connecting a BSC. (This requirement applies even if the BSC is physically collocated with a cell site.)

Figure 2-2 shows an example of a “daisy-chained BTS.”

Figure 2-2 Daisy-chained BTS

In some configurations, you can daisy-chain several CDMA cell sites. The first T1 interface is a full T1 link, divided into three groups of channels. Each channel group associates with one base station communications network (BCN) interface. The second T1 interface is fractional, and contains two groups of channels. The third T1 interface is also fractional, and contains one channel group.

Note: Remember that you cannot easily change the channel groups after installation.

Grounding

For power and grounding requirements, the DMS-100 Wireless switch includes the following lineups (depending on the radio interfaces operating companies intend to support):

- DMS-The DMS lineup consists of common DMS, wireline DMS, and CDMA-specific DMS equipment (such as the CAU and CIU). DMS equipment can be either frame-based or C42/C28 cabinet-based.
- BSC lineup-The BSC lineup consists of CDMA BSC equipment packaged into a C28 cabinet.
- Meridian lineup-The Meridian lineup consists of equipment installed into Meridian cabinets for TDMA/AMPS radio interface. The cabinets include the following equipment:
 - the Meridian cabinet trunk module-ISDN (MCTMI) (NTNX33CA) for the ICP
 - the Meridian digital signal processor (MDSP) (NTAX82AA) for the DSPM
 - the Meridian enhanced digital processor (MEDP) (NTAX82AB) for the enhanced digital signal processing module (EDSPM).

Since the Meridian cabinet is different than the cabinets that wireline switches use, do not mix TDMA/AMPS-specific DMS equipment with wireline DMS equipment in terms of power and grounding arrangements. The Meridian lineup always begin with an MCAM (NTNX37BA) cabinet.

Equipment ground for the CO frames follows Nortel Networks practices, described in *NTP DMS-100 Family Power Distribution and Grounding Guide*, 297-1001-156.

The DMS-100 Wireless switch includes the following grounding requirements relating to the collocation of radio and switching equipment:

- Remove DC current from all communication links between the radio (BSC/BTS) and DMS equipment. Bond the shield of the shielded twisted pair links (such as T1 links) at one end only. Use one of the following methods to DC isolate all other DC-coupled external links of the DMS-100 Wireless switch:
 - opto-isolator
 - back-to-back modems
 - conversion of the link to a different DC-isolated link
- Do not install switching and radio frames or cabinets into the same lineup. BSC cabinets follow the requirements in ISZX21AA. DMS cabinets follow the requirements in *NTP DMS-100 Family Power Distribution and Grounding Guide*, 297-1001-156.

- Ground the switching and radio equipment to the same single point ground (SPG) if they are to receive power from the same power plant.
- Physically and electrically separate the DMS subsystem (including the Meridian lineup) from the BSC lineup to avoid lightening surges conducted by the global positioning satellite (GPS) antenna.

Central office grounding

Specifically, the equipment's metal frameworks allow for the attachment of grounding cables independent of mechanical connections.

All unit chassis have a grounding stud for termination to system ground.

The ground path is independent of any current carrying return paths of the power or signal distribution cables.

BSC grounding

The BSC is not isolated system ground (ISG) compliant, although it is ISG compatible. This means that even though a connection exists to the same building ground system as the switch equipment, it does not cause this equipment to be non-compliant with ISG.

Digital cross connects isolate the switch equipment grounding network, and the CDMA switching equipment grounding network, for all connections.

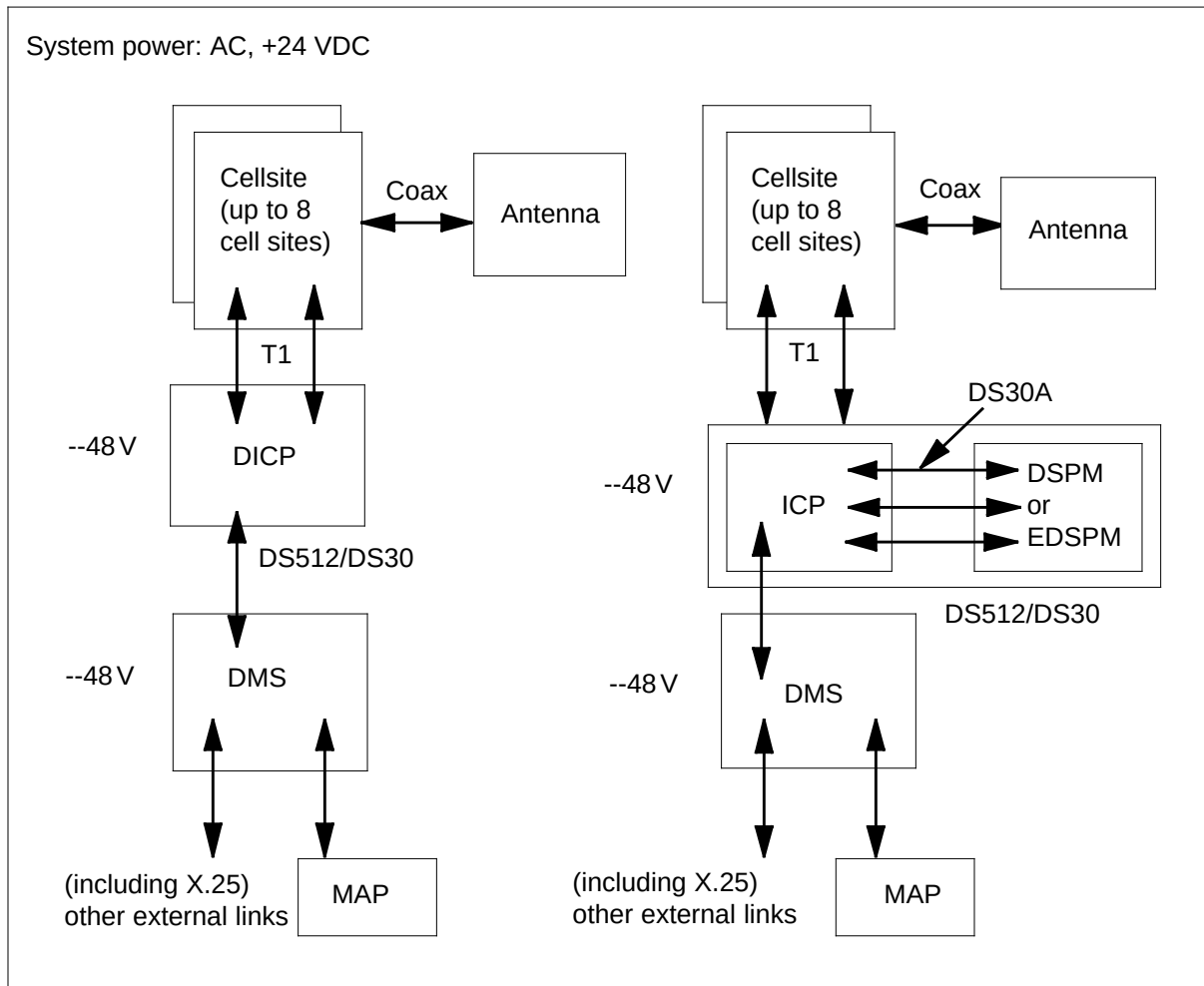
Cell site grounding

All metal frameworks of the BTS equipment permit the attachment of a grounding cable, independent of mechanical connections. All unit chassis have a grounding stud for termination to system ground. This ground path is independent of any current carrying return paths of the power or signal distribution cables.

Operating company personnel can co-locate the indoor CDMA BTS and the indoor AMPS/TDMA cell site with the lineups in a central office (CO) environment. If operating company personnel do not co-locate the DMS-100 Wireless subsystems, each subsystem operates independently.

The AMPS/TDMA cell site equipment uses +24 VDC and commercial AC power.

Figure 2-3 shows the subsystem connectivity for an AMPS/ TDMA system.

Figure 2-3 DMS Wireless connectivity for an AMPS/TDMA system

External power supply

Commercial AC powers the system at the CO and all remote locations.

In the CO, there is no need for special external power supply above and beyond the standard CO power requirements.

The DMS-100 Wireless switch supports both shared and dedicated power plant configurations. Nortel Networks recommends the shared power plant configuration for most applications. The shared power plant configuration allows the same power plant to power other isolated bonding networks and common bonding network equipment without affecting the other equipment.

Figure 2-4 and Figure 2-5 show both shared and dedicated power plant configurations.

Figure 2-4 DMS-100 Wireless layout with shared power plants

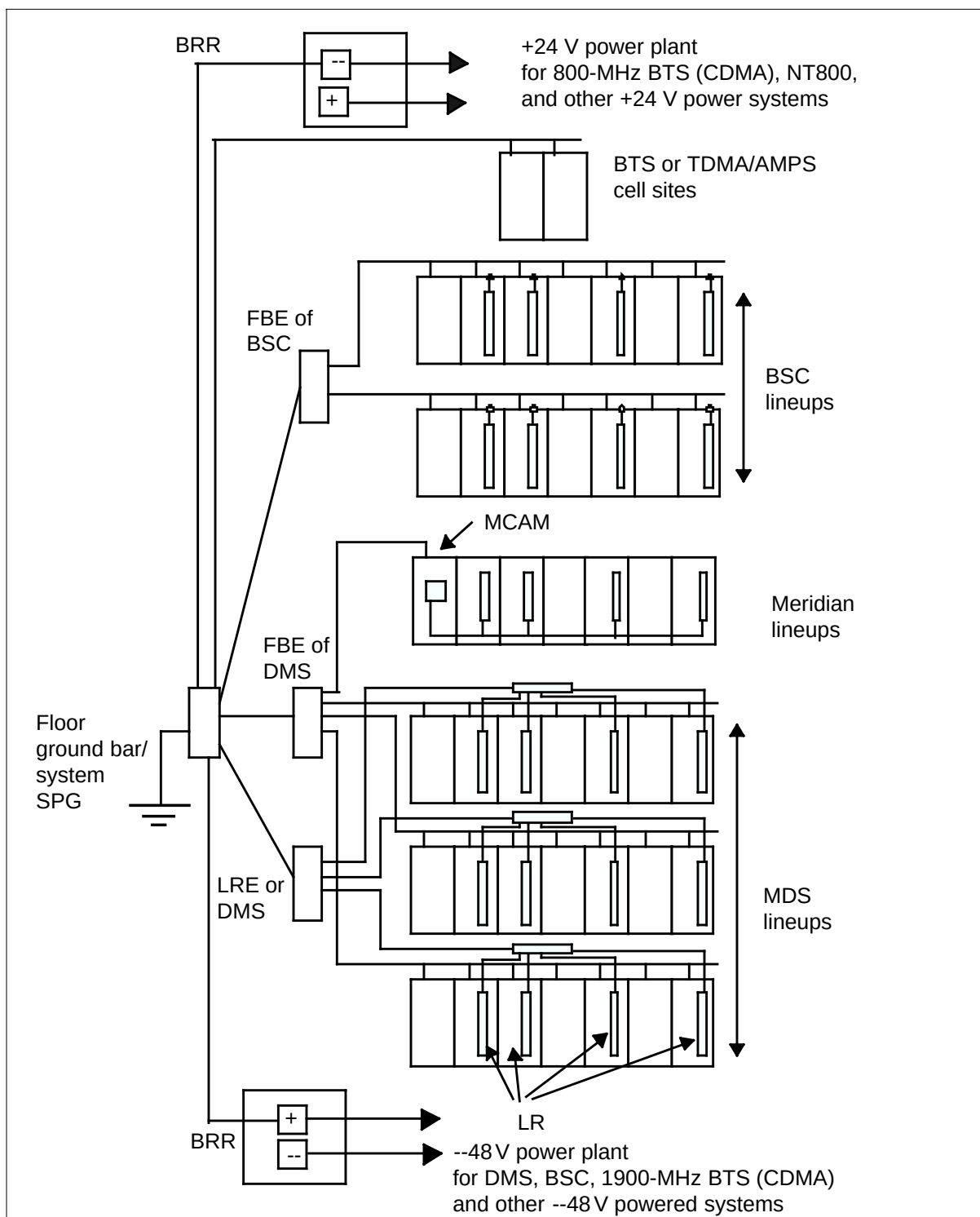
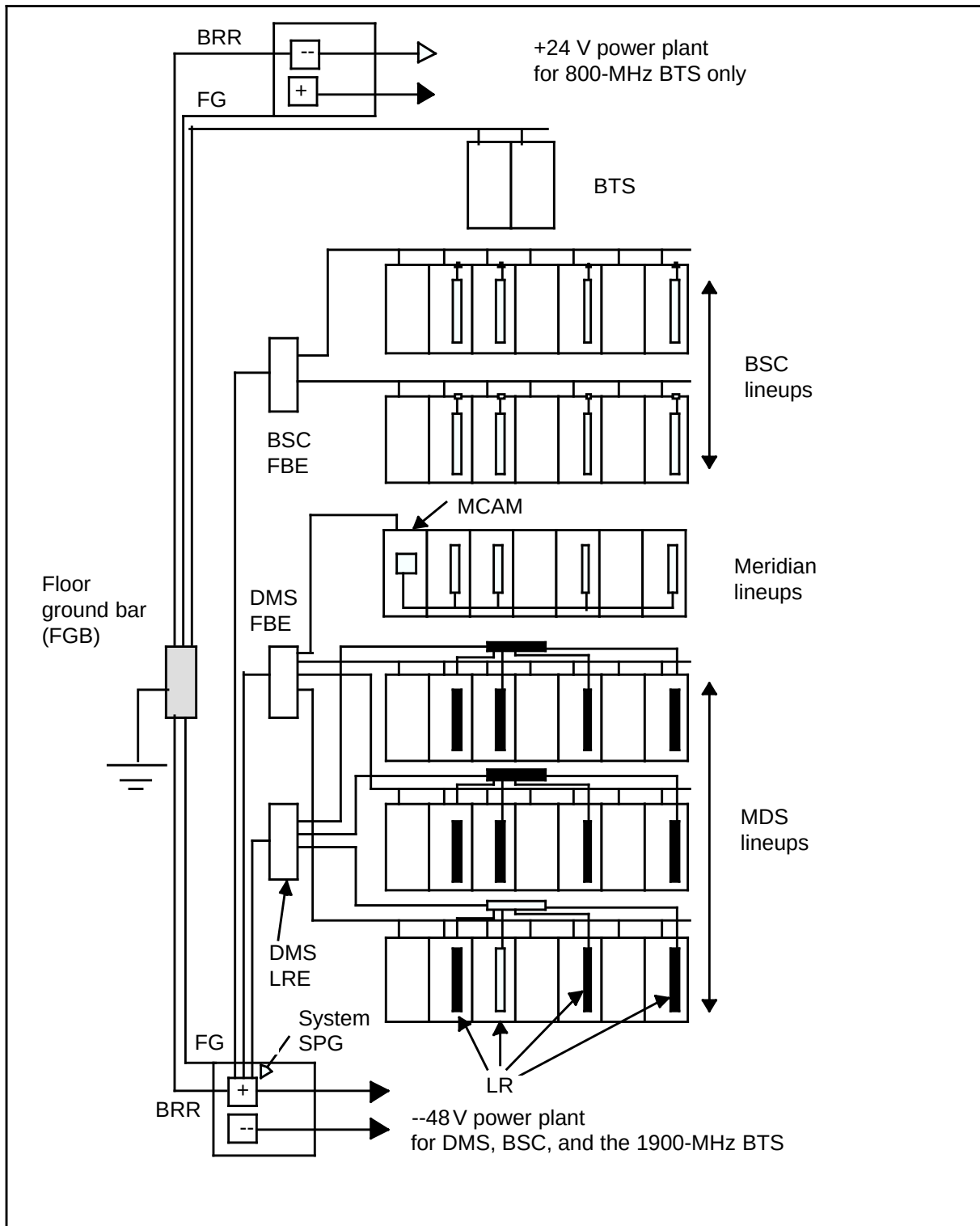


Figure 2-5 DMS-100 Wireless layout with dedicated power plants

Supporting documentation

Refer to the following NTPs for additional information on switch power supply requirements information:

- *DMS-100 Family Power Distribution and Grounding Guide*, 297-1001-156
- *CDMA BSC Theory of Operations Handbook*, 411-2133-101
- *CDMA 800 MHz BTS Functional Operations Technical Overview*, 411-2133-102
- *CDMA 1900 MHz Outdoor BTS Maintenance and Troubleshooting Guide*, 411-2133-500
- *CDMA BSC Maintenance and Troubleshooting Guide*, 411-2133-501
- *CDMA 800 MHz BTS Maintenance and Troubleshooting Technical Guide*, 411-2133-502

Hardware descriptions

This section divides hardware descriptions into the following categories:

- common DMS equipment
- wireline DMS equipment
- wireless CDMA DMS equipment
- wireless CDMA BSC/BTS equipment
- wireless CDMA cell site equipment
- wireless AMPS/TDMA DMS equipment
- wireless AMPS/TDMA cell site equipment

Figure 2-6 shows how each of these groups make up the DMS-100 Wireless switch.

Common DMS equipment

The following subsections list the common DMS equipment that both wireless and wireline functions use in the DMS-100 Wireless switch.

Computing module

For upgrades, the CM requires at least an SN60 processor. Initial releases of the DMS-100 Wireless switch require a BRISC series 70EM full DMS SuperNode or DMS SuperNode SE (SNSE) with 70EM configuration. The DMS-100 Wireless switch also requires an SLM III.

Network

The switch network fabric supports junctored network (JNET) and enhanced network (ENET). The network has two planes for full redundancy.

Note: Nortel Networks only supports JNET in upgrade situations from DMS-100 and DMS-200 switches to DMS-100 Wireless switches. (All initial switches include ENET).

Message switch

The message switch (MS) is a fully-redundant, 32-bit wide, 128 Mb/s message bus that connects all DMS equipment. It has a dual-plane, fully-duplicated architecture. The MS operates in a load-sharing mode. This duplication allows either plane to assume a full messaging load without message loss or service degradation.

LPP and FLIS

For Common Channel Signaling 7 (CCS7) messaging, the common DMS equipment includes an LPP or FLIS cabinet.

The LPP stores one shelf of redundant local MS equipment, and three shelves for application-specific pack provisioning. (For example, application units handle CCS7 messaging from either wireless or wireline software.)

The FLIS platform, which can hold up to 12 application-specific units (ASU) connects to the DMS bus through a fiber connection. The wireless function linked to messaging to the CAU-CIUs requires either a dedicated FLIS or LPP platform.

Input/output equipment (IOE) bay

The IOE bay contains the input/output controller (IOC) and billing shelves. The IOC shelf is common DMS equipment that stores the MAP interface and billing equipment.

Note: The DMS-100 wireless switch also supports an input/output module (IOM) configuration

MAP terminal The MAP terminal controls wireless and wireline switching equipment. It is a terminal that connects to the CO equipment through an interface card in the IOC shelf. The MAP does *not* control the wireless BSC/BTS equipment.

Operations Support Systems (OSS) The OSS connect to the switch through cards in the IOC shelf, or the network LPP or FLIS.

Maintenance trunk module (MTM) The integrated service module (ISM) shelf stores the MTMs and contains the following equipment:

- digital recorded announcements module (DRAM) and enhanced digital recorded announcements module (EDRAM)
- office alarm unit
- conference circuits

DRAM-EDRAM The DMS-100 Wireless switch supports DRAM and EDRAM.

Refer to NTP *DMS-100 Family Digital Recorded Announcement Machine and EDRAM Guide*, 297-1001-527, for additional information on DRAM and EDRAM.

Office alarm unit Wireless and wireline functions share the office alarm unit.

Conference circuits The DMS-100 Wireless switch supports the six-port conference circuit card and the conference trunk module card. Wireless and wireline functions share conference circuits.

Refer to NTP *DMS-100 Family Conference Circuit Guide*, 297-1001-530, for additional information on conference circuits.

Digital trunk controller A common DTC stores a mix of trunk cards that link wireless and wireline trunks. Wireline trunk software controls one end of the ISL trunks, and wireless trunk software controls the other end.

The interface to a SBS uses a universal processor (UP)-based DTC7.

Some digital T1 packs (6X50s) provide interoffice or ISL voice trunks that wireline and wireless software share. These packs reside in common DMS equipment DTCs.

PSAP 911 and E911 service

From the wireline functionality, E911 service uses ACD lines or emergency service (ES) trunks to connect to a public safety answering point (PSAP).

When a wireless end user dials 911, the mobile switching center (MSC) receives the caller's cell location, along with other call processing information. Wireless table E911_CID maps the cell number to the cell and sector identification (ID) numbers. Once the E911 tandem and PSAPs recognize these mapped numbers, pretranslations selector ES in subtable STDPRTCT.STDPRT (Standard Pretranslator) translates the call. A trunk then routes the wireless call to the E911 tandem. Operating companies can configure wireless E911 calls with ISUP or MF trunks.

Figure 2-7 and Figure 2-8 show signaling configurations for wireless calls with ISUP and MF trunks on the DMS-100 Wireless switch.

Figure 2-7 DMS-100 Wireless E911 services with ISUP trunk signaling

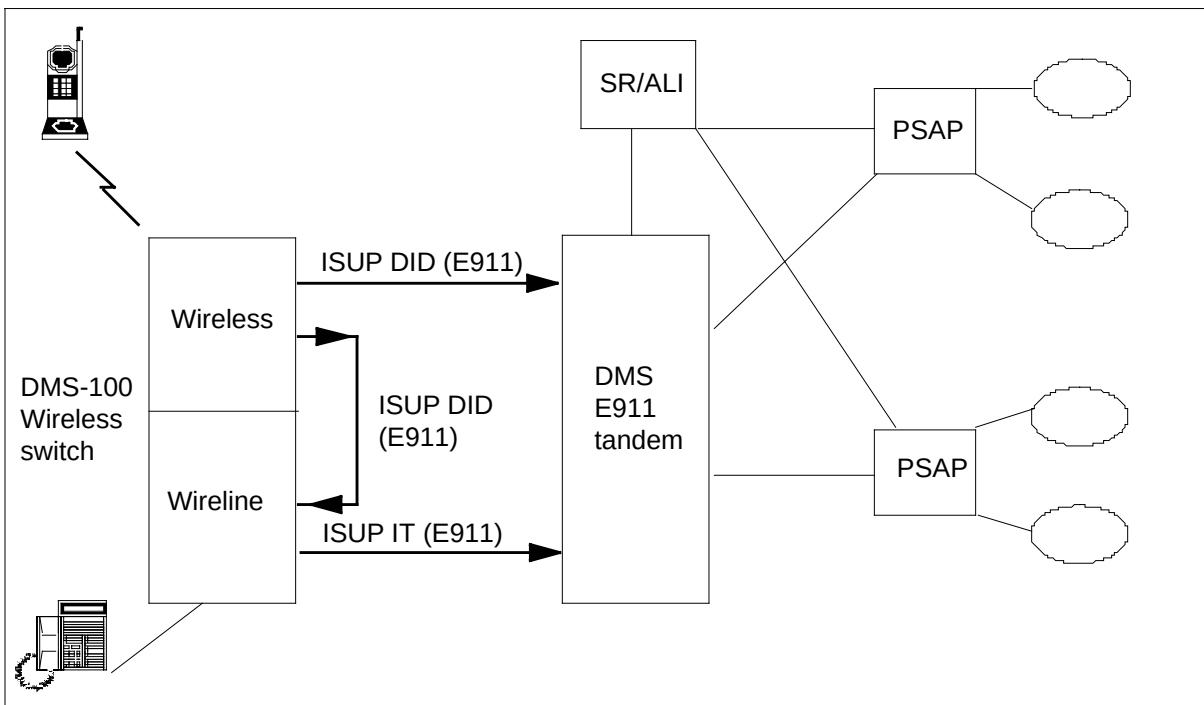
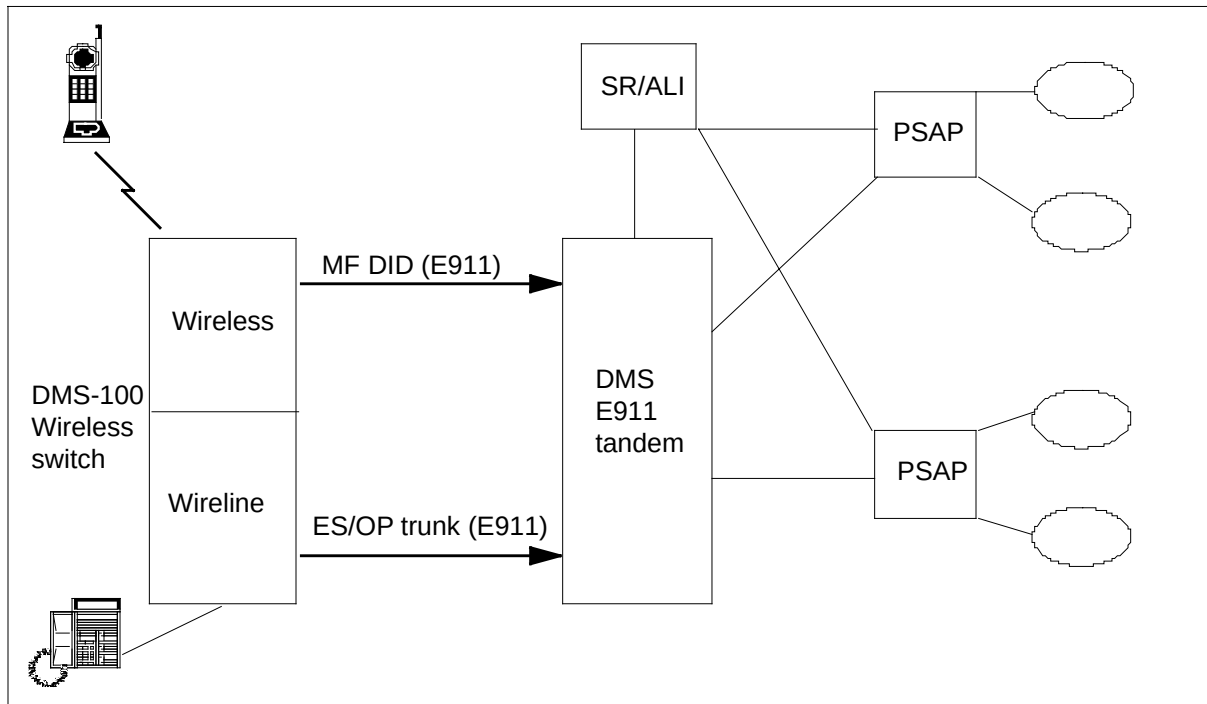


Figure 2-8 DMS-100 Wireless E911 services with MF trunk signaling

Wireless E911 calls on the DMS-100 Wireless switch comply with standards GR-2935 CORE and TIA PN3581. Also, E911 calls on the DMS-100 Wireless switch meet Phase 1 requirements of Federal Communications Commission (FCC) docket 94-102.

Limitations and restrictions

The following limitations and restrictions apply to E911 calls:

- The DMS-100 Wireless switch does not support ORIGHOLD and RINGBACK for wireless or wireline calls over ISUP trunks.
- The DMS-100 Wireless switch does not support type 2C trunks to wireline 911 tandem for wireless calls.

Supporting documentation

Refer to the following NTPs for additional information on E911:

- *DMS-100 Family Provisioning Manual*, Volumes 1-4, PLN-8991-104
- *Customer Data Schema Reference Manual*
- *Translations Guide*

Wireline DMS equipment

Wireline equipment for the DMS-100 Wireless switch includes all peripheral equipment that the DMS-100 and DMS-200 switches use. This equipment includes line concentrating modules (LCM), maintenance trunk modules, XMS-based PMs (XPM), and remotes.

The DMS-100 Wireless switch does not introduce wireline equipment not found in the existing DMS wireline products.

CDMA equipment

The hardware baseline for the DMS-100 Wireless switch is the existing wireline switch CM and peripherals, plus the wireless elements for CDMA, and AMPS/TDMA radio interfaces.

The DMS-100 Wireless switch uses existing wireline equipment. To support wireless CDMA end users, add a BSC and at least one BTS. The BTSs have a T1 interface into the BSCs. There is no direct interface between the BTSs and the CO switch.

An LPP or FLIS shelf stores the application processor link interface units for CCS7 link interface units (LIU7), CIUs, and CAUs. A separate FLIS/LPP platform isolates the CIU-CAU from other application processors, such as LIU7s.

The BSC connects to the switch equipment through a signaling link to the CIU in the LPP or FLIS, and through a T1 voice link to a DTC7. A DTC7 must have the XPM product life upgrade strategy (XPM Plus) (MX77) configuration.

Use the NT9X10AA series 60 or NT9X10CA series 70EM BRISC processors. The DMS-100 Wireless switch does *not* support the NT9X10BA SR70 BRISC processor. The DMS-100 Wireless switch also requires a system load module (SLM) III NT9X44AD.

Storage of billing data on a magnetic tape drive (MTD) requires a separate tape drive to support the wireless CDR billing records. Connection to downstream processing centers for wireless CDR billing records requires an MPC 1X89 card.

The DMS-100 Wireless switch does *not* support 1X67 cards for wireless voice mail end users. Where wireless and wireline end users share the same voice mail system, the DMS-100 Wireless switch requires a 1X89BA IOC card.

Wireless CDMA DMS equipment

The following subsections describe wireless equipment for the DMS-100 Wireless switch:

- CAU
- CIU
- digital trunks

CAU

The CAUs are redundant load-sharing application processors (a maximum of 14 [7 pairs]). They are responsible for

- CDMA resource allocation
- CDMA call setup
- providing access utilities for applications to access the CDMA configuration data

Each CAU (which uses frame relay interface unit [FRIU] hardware) pairs with another CAU through configuration data, and owns a group of SBSs for call setup. If a single CAU (for example, CAU1) goes down or is manually taken out of service, its mate (for example, CAU2) controls the SBSs from CAU1. While CAU1 is down, CAU2 handles processing for all of the calls that CAU1 originally set up. If both CAUs go down, all calls that the CAUs had set up are taken down.

CIU

The CIUs (which also use the FRIU hardware platform) are redundant load-sharing processors (maximum of 14 [7 pairs]) that provide the messaging interface to the BSC. (The messages can route through the BSC to the BTS.) The interface supports unchannelized T1.

Each CIU mates with another CIU using configuration data. Each CIU accepts messages addressed to it. If a single CIU (for example, CIU1) goes down or operating company personnel take it out of service, its mate (for example, CIU2) continues to accept messages for its own address. CIU2 then begins to accept messages for its mate's (that is, CIU1's) address. If both CIUs go down, the switch takes down all calls that both CIUs set up.

For maintenance information with these links, refer to the following NTPs:

- *DMS-100 Family DMS SuperNode DataSPAN Frame Relay Service Maintenance Guide*, 297-5111-501
- *Alarm and Performance Monitoring Procedures*
- *Card Replacement Procedures*
- *Recovery Procedures*

- *Routine Maintenance Procedures*
- *Trouble Locating and Clearing Procedures*

Digital trunks

The wireless portion of the switch controls digital trunk packs. These trunks connect to other wireless offices, wireline offices, or ISL circuits, and reside in common DMS equipment DTCs.

Digital trunks, other than those described in the previous paragraph, connect to the SBS. Only UP-based DTCs interact with the SBS.

Wireless CDMA BSC/BTS equipment

The BSC/BTS equipment consists of control equipment at the CO (referred to as the BSC), and radio equipment at the cell site (the BTS).

The DMS-100 Wireless switch supports two CDMA BSCs. Traffic limits the number of BTSs for each BSC. At low traffic rates, the number of BTSs for each BSC cannot exceed 132, with two distribution and consolidation (DISCO) shelves in the CDMA interconnect system (CIS).

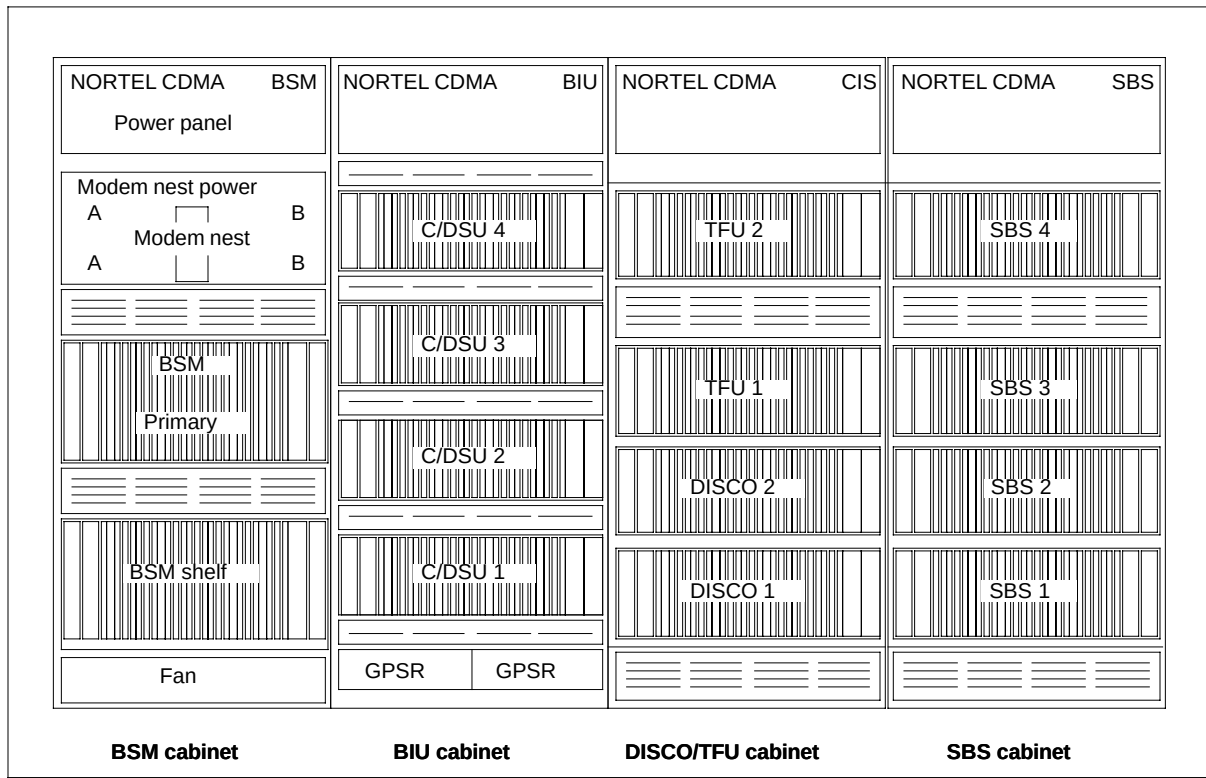
Dedicated, unchannelized T1 links connect the BSC and BTS that carry only BSC/BTS traffic. You can dedicate the BTS T1 links for use by a single BTS, or daisy chain them to two or three BTSs.

Base station controller

The following functional components comprise the BSC:

- base station manager (BSM)
- backhaul interface unit (BIU)
- CDMA interconnect system (CIS)
- selector bank subsystem (SBS)
- power distribution frame

Refer to Figure 2-9 for an illustration of the BSC cabinet layout.

Figure 2-9 BSC cabinets

Base station manager

The BSM is a workstation platform that runs the UNIX operating system. Equipment to interface the BSM is in the BSM frame. You can set up BSM functionality to display on the MAP terminal or on a separate terminal.

The BSM, with a dedicated terminal interface, provides a GUI to the wireless BSC/BTS equipment. With the BSM GUI feature, you can manipulate data with varying levels of access rights or permission levels for different users.

Note: (The DMS-100 Wireless software does not prevent this restriction.)

The following list includes the BSM functions associated with the BSC/BTS:

- performance monitoring
- subsystem testing
- fault management
- maintenance testing
- equipment status
- configuration management
- operational measurement (OM) and log display

You can use the BSM for manual maintenance tests. The BSM also performs the following functions:

- monitors automatic maintenance tests to detect faulty equipment
- dynamically reconfigures the equipment
- generates alarms

The BSM displays the alarm status, which travels to the DMS equipment through the CIU-CAU.

The BSM maintains the current status of all BSC and BTS equipment. While you can automatically take the BSC/BTS equipment out of service, operating company personnel must access the BSM directly to return it to service. Then use the BSM to return components to an active operational state.

A steady-state operating BSM is not necessary for call processing. The BSM is a non-redundant component. If the BSM goes down, call processing continues without interruption.

The following results can occur if the BSM goes down:

- If a device goes out of service, the overall efficiency of the switch degrades. The BSM cannot propagate status changes to other subsystems.
- If a device becomes operational, the switch's efficiency does not improve to coincide with the newly-available resources.
- The BSM (or MAP terminal) does not display all alarms it reports.
- You cannot manually change the operational status of the BSM entities.
- When the CIU-CIS link becomes operational, no call processing begins until the BSM returns to service and sends initialization information to the CM.

Use the BSM to set up system configuration management, based on customer data. The BSM databases configure the BSC and BTS.

The databases have backup mechanisms and administrative files in case of data loss or corruption.

The BSM stores the CDMA database configuration in a master-slave configuration. When the switch makes data changes to the master configuration, the slave configuration also receives those changes. Before the DMS-100 Wireless switch applies data to the master configuration database, both the GUI and table editor interface screen all data. BSM subtending devices (such as the BSC and the BTS) can only have access to the slave configuration databases. The BSM checks for corruption of slave data during

periodic self-generated audits. When the BSM finds corrupted data, the master data re-synchronizes with the slave data to restore uniformity.

Backhaul interface unit

The BIU frame stores up to four control signaling unit (CSU)-data signaling unit (DSU) shelves and two global positioning satellite receivers (GPSR). The CSU-DSU equipment provides links to backhaul messages between the BTS and the CIS, and between the CIS and the LPP.

The CSU-DSU provides a physical interface to support T1 and fractional T1 data communications at rates ranging from 56 to 1.536 kbits/s in 56- or 64-byte increments.

A CSU-DSU exists between the CIS and BTS, and between the CIS and CIU. The connection between the CIS and CIU does not support fractional T1 links. If the CSU-DSU-to-CIU connection fails, the CIU's mate accepts all traffic for both CIUs.

The CSU-DSU itself is non-redundant, but the communication path to the CIU is redundant.

Global positioning satellite receivers

The GPSR provides timing and frequency references to the CIS. The references originate from 24 satellites in 6 inclined orbits. The GPSR synchronizes to the coarse-acquisition code that each satellite broadcasts. The GPSR then derives the satellite atomic clock of 10.23 MHz under the control of a ground master station to analyze the data that a system of monitor stations collected. This derived stratum 1 clock source controls an oscillator in the GPSR to provide the CDMA CO equipment with a stratum 1 level, 10-MHz reference clock. The reference clock also provides a 1-PPS signal to the CDMA CO equipment.

The GPSR has a lightning-protected external antenna. The timing frequency unit (TFU) controller card extracts time-of-day information from the GPSR through the RS-422 interface. The CDMA CO equipment receives the 1-PPS and 10-MHz timing signals.

The CDMA CO equipment has two GPSRs: one for the primary TFU, and the second for backup. If the GPSR timing information is not present, all signaling and traffic (BCN) packet transmission and reception cannot occur.

CDMA interconnect system

The CIS performs the following functions:

- It is the hub through which the BSM, SBS, BTS, and LPP communicate.
- It stores the packet router and provides the connectivity and routes data and signaling between the BTS and the SBS.

- It allows the selector function in the SBS to receive and send variable length packets (frames) between BTSs.
- It routes maintenance and call processing messages from the BSM and BTS, to and from the LPP.
- It has redundant traffic and message hardware but does not have a redundant controller.

The CIS frame stores up to two DISCO shelves and two TFU shelves.

DISCO shelf

The DISCO shelf provides

- consolidation, the process of combining several lower rate physical interfaces into a single higher rate physical interface
- distribution, the process of filtering a higher rate physical interface into a set of lower rate interfaces, based on a given criterion (destination address)

The DISCO has BCN ports to the SBS, BTS, BSM, TFU, and LPP. It includes the BCN, two redundant ATM interface cards, and a universal controller card (UCC).

There is one spare BCN interface card. (Move traffic to the spare card when you replace a faulty card.)

An ATM incoming IC fault causes a large number of lost voice and control packets.

If the UCC fails, the CIS goes into a “loss of control” scenario. In this state, operating company personnel cannot execute operation, administration, and maintenance (OAM) operations on the CIS. (These OAM operations include software download, fault handling, and reconfiguration.)

The TFU provides the DISCO with timing and frequency references. If TFU functionality is lost, all timing information at the CIS is also lost. The switch then cannot route BCN packets (data nor voice).

Selector bank subsystem

The SBS houses the selector and vocoder functions. The transcoder transforms the vocoded signals to PCM and backwards, and routes voice traffic to the DTC.

The CIS links the SBS and the BTS to pass data and signaling information. The selector function maintains soft handoff between multiple base stations.

An SBS frame contains up to four SBS shelves. One office can contain multiple SBS frames.

Each SBS shelf contains the following cards:

- one SBS controller (SBSC) card
- two selector common interface (SCI) cards
- up to 13 selector element cards (SEC) (12 operational cards and 1 card for redundancy)

The SBS is a pooled resource; that is, specific BTSs cannot use SBS resources. It performs radio frequency (RF) management functions, such as mobile power control, to minimize interference.

The SBS also provides load sharing capabilities. The more SBSs you provision, the less the impact of an SBS failure on the availability of overall system call processing. More specifically, each SBS that goes down decreases the number of call processing resources available to its CAU.

The SBS has no backup. It is responsible for routing all traffic and data packets to the appropriate SECs. Therefore, if the SBS fails, all calls on the SBS also fail.

The SCI is an interface that transfers voice from the selector elements to the DS-0s in the T1 links that connect the SBS and the DTC. Although the SBS contains two SCI cards, they are not redundant cards. Therefore, when the SCI fails, all voice connections to the DTC also fail.

Each SEC has eight selector elements (digital signal processors), each of which processes one voice call. If an SEC fails, all eight of its calls drop. One SEC failure does not affect calls to other SECs. The BTS resources associated with the calls that drop are free for other SECs to use.

Wireless CDMA cell site equipment

The BTS comprises the CDMA cell site equipment. The DMS-100 Wireless switch supports the 800-MHz BTS and the 1900-MHz BTS.

800-MHz BTS

The 800-MHz BTS provides the air interface between the DMS-100 Wireless CDMA network and the mobile stations. The BTS interface conforms with the IS-95A CDMA standard. The BTS converts end user unit data to (and from) an RF signal from (and to) a digital baseband CDMA signal. The BTS uses CDMA processing to convert the digital vocoded data into RF signals. It sends the product of this conversion through the BSC as data packets. (This transmission also includes control information between the BTS and the wireless functionality.)

The BTS also

- performs local cell site resource management, such as CDMA frequency assignments, and sectorization
- transmits RF power control, backhaul load management, and control of overhead and traffic channel functionality
- performs network management functions, such as configuration performance, and fault management (For example, the BTS uses frame staggering to optimize the backhaul delay performance.)
- implements a dual diversity receiver structure. It supports softer handoff between two of its sectors.

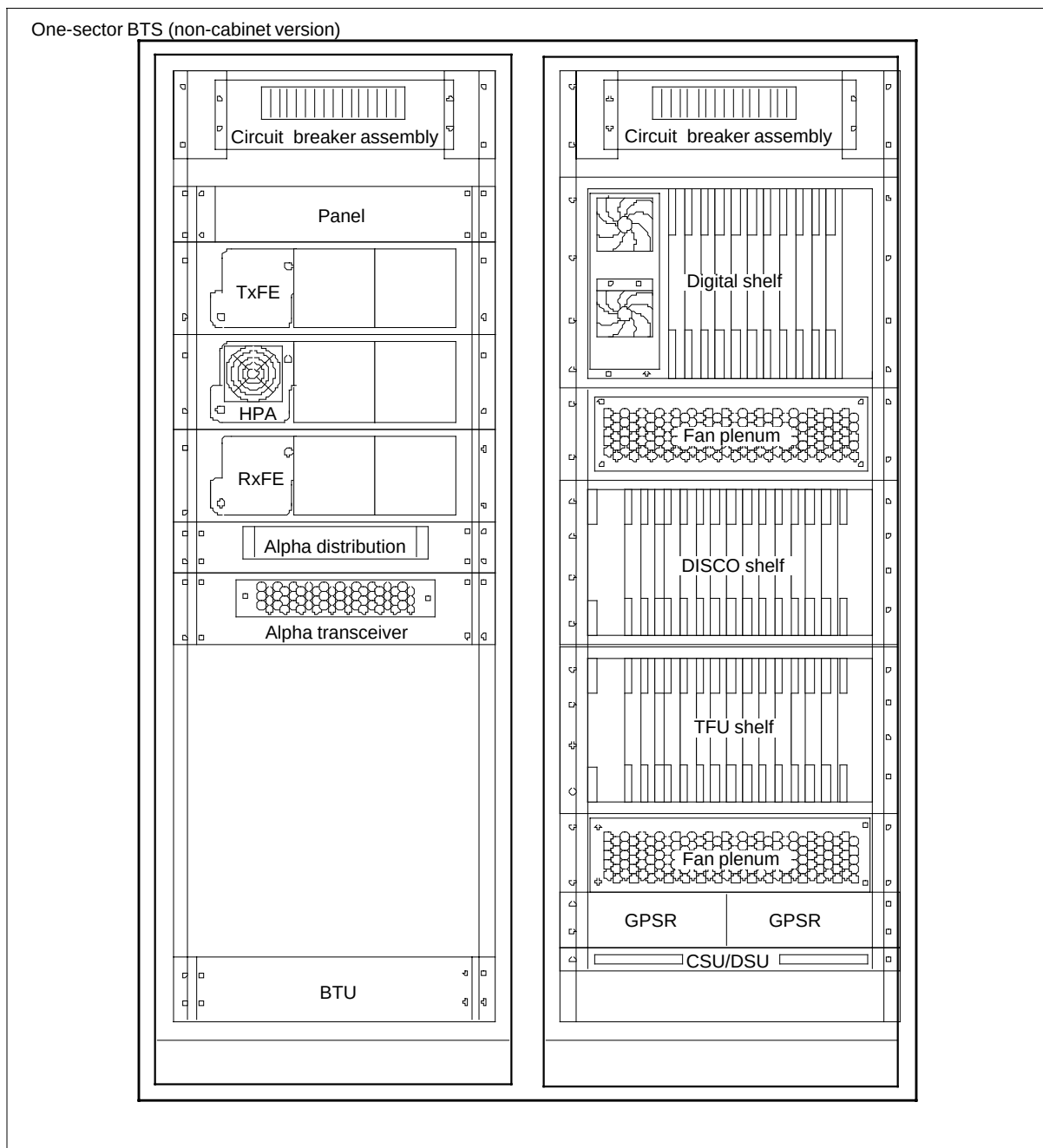
The BTS equipment includes antennas, transmitter, receiver, power amplifier, TFU, and channel signal processing and interface hardware to support the link to the BSC.

The following list includes specific BTS functions:

- over-the-air RF interface with the end user unit
- additional over-the-air functions such as pilot, sync, paging, and access channels
- call processing functions to control the end user unit operation over the paging and access channels
- communication of end user information
- control and management of BTS resources
- control and management communication between the BTS and other base station subsystems

The BTS provides the CDMA radio capability at the cell site. T1 links connect the BTSs to the BSC. You can configure the CDMA cell site as an omni or sectorized cell site. Make sure there is at least one BTS for each site to support CDMA channels in an allocated 1.25-MHz frequency band assignment.

Figure 2-10 shows the shelf and module arrangement of the racks for an 800-MHz BTS.

Figure 2-10 800-MHz BTS shelf arrangement

Refer to the following NTPs for additional information on the 800-MHz BTS:

- *CDMA 800 MHz BTS Functional Operations Technical Overview*, 411-2133-102
- *CDMA 800 MHz BTS Maintenance and Troubleshooting Technical Guide*, 411-2133-502

1900-MHz BTS

The 1900-MHz BTS is also known as the mini-BTS. It uses CDMA technology to provide the air interface to the mobile end user stations.

T1 links connect the BTSs to the BSC. Mini-BTS configurations include omni (one sector), two sectors, and three sectors. Each site requires only one mini-BTS to support CDMA channels in an allocated 1.25-MHz frequency band assignment.

The mini-BTS consists of one to three radio frequency front end (RFFE) enclosures and one mini-BTS enclosure.

Figure 2-11 shows the 1900-MHz outdoor BTS enclosure.

Figure 2-11 1900-MHz outdoor BTS enclosure

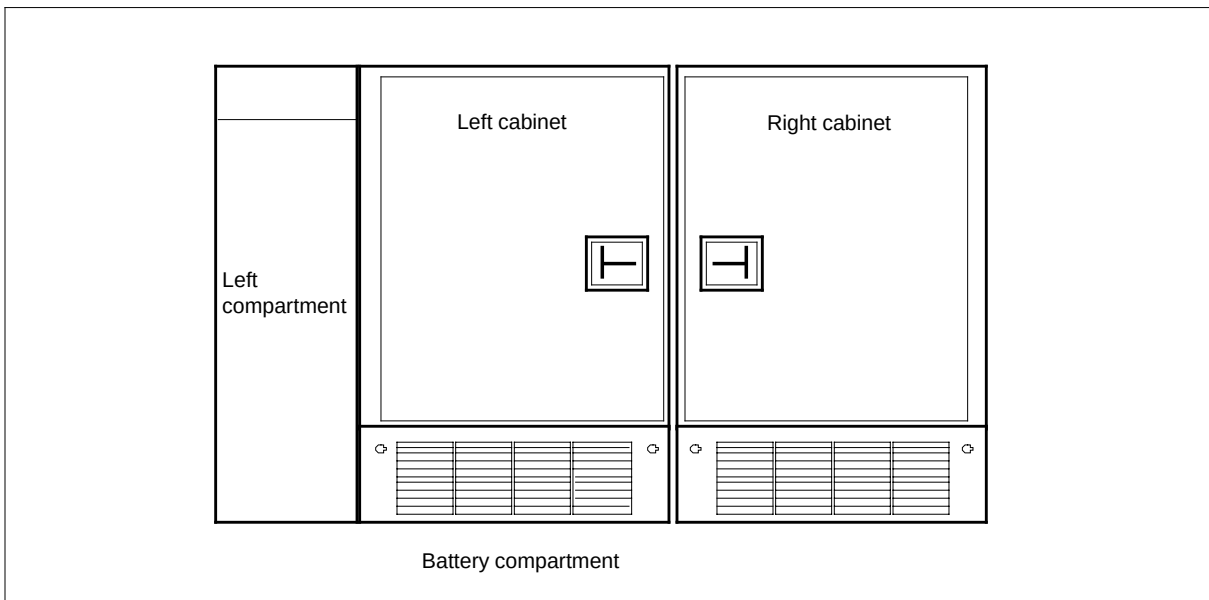
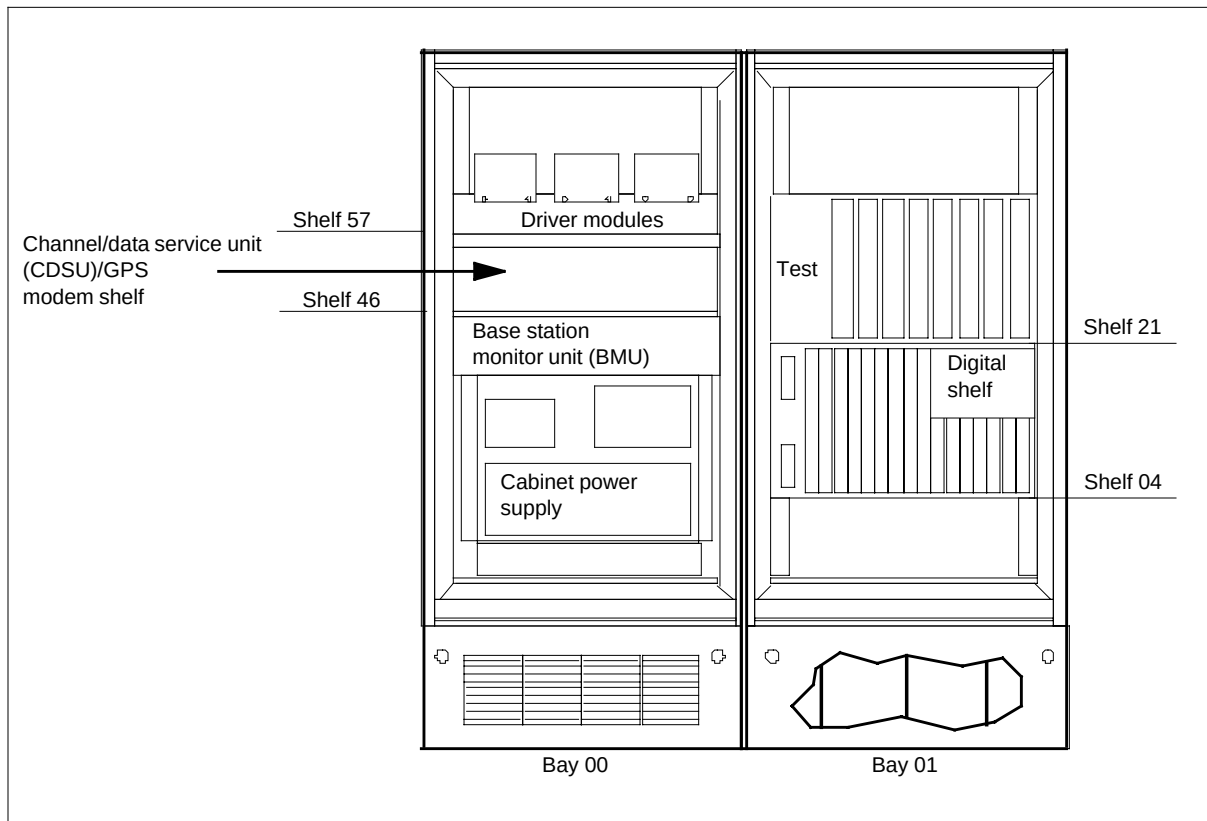


Figure 2-12 shows the shelf layout for a 1900-MHz outdoor BTS.

Figure 2-12 1900-MHz outdoor BTS shelf layout

RFFE enclosure Each RFFE enclosure stores equipment for one sector. Coaxial cable connects the RFFE enclosure to the mini-BTS enclosure. You can place the RFFE enclosure remotely (up to 15 dB) from the mini-BTS enclosure.

You can install its equipment outdoors, on rooftops, building walls, or poles. Each RFFE associates with one transmit-receive antenna and one receive-only antenna (for receiver diversity).

Mini-BTS enclosure The mini-BTS enclosure stores the two frames of equipment, plus batteries and environmental controls.

One frame stores the following equipment:

- RF driver modules
- GSP receiver
- CSU-DSUs
- modem

- battery and power monitoring unit
- rectifier

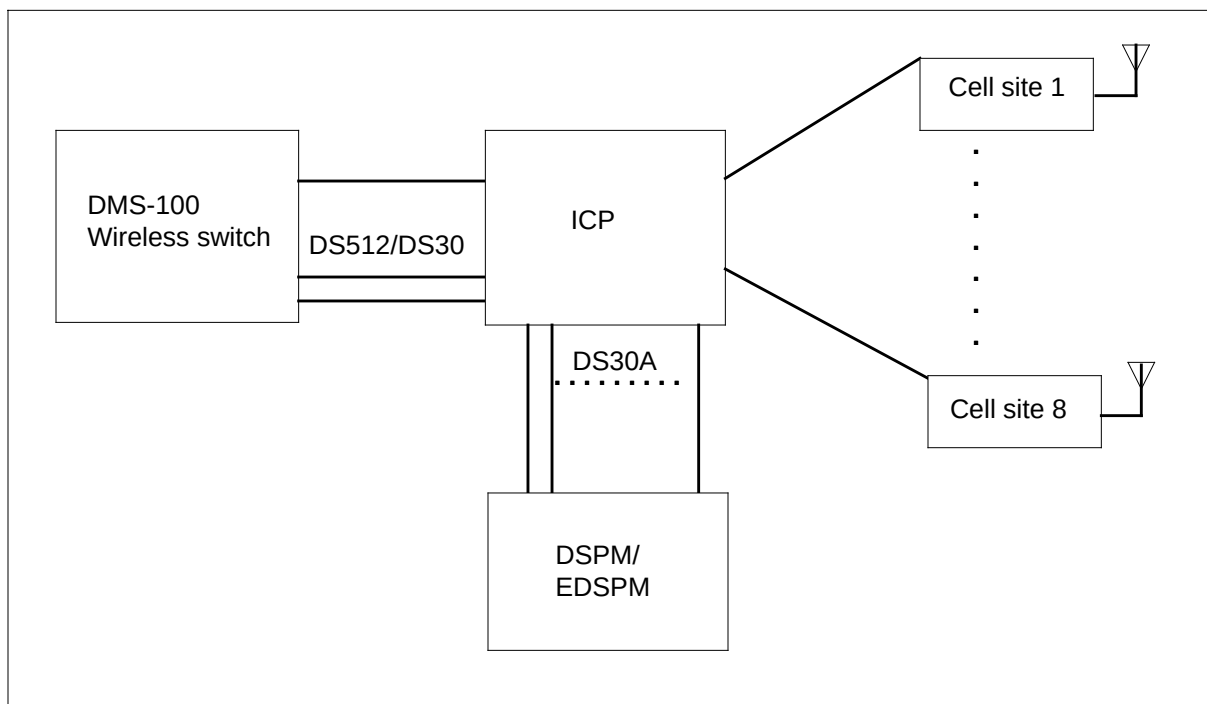
The other frames store a three-sector transceiver shelf and a mini-BTS digital shelf.

Wireless AMPS/TDMA DMS equipment

The AMPS/TDMA DMS equipment of the DMS-100 Wireless switch consists of the ICP and the DSPM/EDSPM.

Figure 2-13 shows the configuration of the ICP and the DSPM/EDSPM in the DMS-100 Wireless switch

Figure 2-13 ICP and DSPM/EDSPM in the DMS-100 Wireless switch



ICP

The ICP is a CSC, which is based on the ISDN digital trunk controller (DTCI). The ICP supports A/B bit signalling trunks to the PSTN, voice trunks, and D-channels to the cell sites. The ICP connects to the network module through DS30 or DS512 links. Each ICP can be configured with 8 to 16 DS30 links. (The TDMA-3 requires 16 links.) Each ICP can support a maximum of eight cell sites.

ICP Metro The ICP Metro is for use in high-traffic, metropolitan-system applications. The increased processor speed of the ICP Metro allows more calls to complete and improves subscriber service.

ICP Metro ES The ICP Metro ES features an enhanced signal processor card (NTBX01CA), messaging ISDN signalling processor (MISP). The MISP card is an upgraded version of the existing Enhanced ISDN Signalling Processor (EISP) card. The ICP Metro ES MISP replaces the EISP in the ICP Metro.

DSPM

The DSPM is a PM equipped with the DSDC (NTAX81AA) transcoder circuit pack. This circuit pack resides in either the AX7601 shelf or the AX7604 enhanced shelf.

The DSPM performs low bit rate speech coding and decoding. The DSPM also provides TDMA frame synchronization. The DSPM communicates with the DMS-100 Wireless switch through the ICP. The DS30A links transfer all communications between the ICP and the DSPM. One DSPM processes a maximum of 24 digital voice channels and supports a maximum of 8 dualmode radio units (DRU).

The DSPM consists of the following components:

- a digital speech control processor (DSCP)
- from one to four DSDC packs
- a DSP bus terminator (DSBT)

One digital speech power pack can support the power requirements of up to two DSPMs. Four DSPMs reside in each DSPM shelf. The digital intelligent cellular peripheral (DICP) contains two DSPM shelves.

Note: Only TDMA applications require the DSPM/EDSPM.

Refer to the following NTPs for additional information on DSPMs:

- *DMS-MTX Cell Site Hardware Product Guide*, 411-2131-100
- *DMS-MTX Digital ICP and EDSPM Technical Description*, 411-2131-127

Wireless AMPS/TDMA cell site equipment

Nortel Networks' AMPS/TDMA cell site equipment consists of the following models:

- NT800 Digital Ready (DR) for 800-MHz spectrum applications
- NT1900 for 1900-MHz spectrum applications

NT800DR

The NT800DR handles analog and digital cellular operations at 800 MHz. The NT800DR consists of the following two types of equipment frames:

- the common equipment (CE) frame, which consists of either a CE01 frame or a CE02 frame
- RF frame

The DMS-100 Wireless switch supports the following types of NT800DR cell site equipment:

- macrocell
- metrocell
- minicell
- urbancell
- microcell
- single-bay macrocell

CE01 frame

All cell configurations require a CE01 frame. The CE01 frame contains the following peripherals:

- dualmode radio unit monitor (DRUM)
- alarm control unit (ACU)
- high stability master oscillator (HSMO)
- cell site monitor (CSM)
- one to three receiver multicoupler (RMC) shelves
- an optional remote cellular multiplexer interface (RCMI)
- integrated cellular remote module (ICRM)

The ICRM cell site peripherals serve as an interface between the ICP and the radio transmission subsystems. The hardware for the ICRM resides on the main, expansion, and remote module frame supervisor (RMFS) shelves.

The ICRM also provides voice circuit and message multiplexing for digital streams directed to single radio units. It also provides packet multiplexing for control messages that one of the DS0 channels in each DS1 link carries. The ICRM synchronizes to the DS1 link to validate digital control messages and connect cell site equipment. The software of the ICP controls connections to the terminals.

The ICRM supports analog and digital call processing. The ICRM interacts with the DRU at the cell site and with the ICP at the host switch. The ICRM connects with radio channel units (RCU) through the remote module Manchester port (RMMP) card and with the BTS through the remote module radio port (RMRP) card. The ICRM also supports BTS, configured with a channel bank and an RCMI.

CE02

The CE02 frame provides mounting space for three more RMC shelves. In addition to the CE01 frame, 60-degree sectorized transmit-sectorized receive (STSR) cell configurations require the CE02 frame.

Also, the following configurations require a CE02 frame for duplexers and mounting space for the global control and locate (GCL) shelf:

- 120-degree omni transmit-sectorized receive (OTSR)
- 60-degree OTSR

Other cell configurations do not require a CE02 frame.

RF frame

The RF frame stores two transmit receive unit/modulating power amplifier (TRU/MPA) shelves, one 16-channel transmitter combiner (or two 8-channel combiners), and one TX/RX duplexer. Each RF frame provides space for a maximum of 16 analog transceivers (BTSS) or 16 DRUs. You can add up to 16 RF frames if you require more capacity.

DRU

The DRU is a cell site transceiver and power amplifier combination that operates in the TDMA (digital) mode or AMPS (analog) mode.

The transceiver portion of the DRU, the transmit receive unit (TRU), consists of the following three TRU versions:

- TRU-I
- TRU-II
- TRU-III

The NT800DR cell site uses both TRU-I and TRU-II versions. The DMS-100 Wireless switch primarily supports the TRU-III version, which complies with IS-136A standard. The TRU-III radio hardware meets and exceeds the requirements of the TRU-II hardware.

Table 2-1 summarizes the AMPS/TDMA radio equipment the DMS-100 Wireless switch uses.

Table 2-1 Summary of DMS-100 Wireless supported AMPS/TDMA radio equipment

Radio equipment	Supported radio interface	Operating frequency range	External standards compliance
R2/P3	AMPS only	800 MHz	EIA-533
TRU-II	AMPS only TDMA only AMPS/TDMA	800 MHz	IS-54, IS-56, EIA-553, IS-20, IS-91
TRU-III (Note 1)	AMPS only TDMA only AMPS/TDMA	800 MHz	IS-136 Rev. A IS-138 (Note 2) IS-137 (Note 3)
TRU-1900	TDMA only	1900 MHz	IS-136 Rev. A
Picrocell-1900	TDMA only	1900 MHz	IS-136 Rev. A
Note 1: Phase 1 of TRU-III supports TDMA. Phase 2 of TRU-III supports AMPS, TDMA, and AMPS/TDMA.			
Note 2: <i>Base Station Minimum Performance Specification</i> , November 1994.			
Note 3: <i>Mobile Station Minimum Performance Specification</i> , November 1994.			

NT800DR macrocell

The NT800DR dualmode macrocell cell site equipment handles analog and digital cellular operations. Common equipment at the cell site includes control, test, and interface equipment. Radio frequency equipment includes radio units, duplexers, and transmitter combiners. The dualmode macrocell site equipment is compatible with Nortel Networks' BTS and DRUs.

You can configure a dualmode macrocell with a BTS only, a DRU only, or with a combination of BTSs and DRUs. The digital-ready CE and RF frame design allows analog and digital cell site functions to exist in the same frame.

Note: The DRU and BTS cannot exist in 60-degree sectored cells because of the spatial and angular differences with the DRU and BTS, respectively.

Metrocell (mid-power macrocell) The metrocell cell equipment works best in high-density, small-radius cells in areas that demand large traffic capacity. The metrocell can exist independently or you can add it to existing cells for increased coverage. The metrocell provides a reduced power output for urban applications. The typical power output of the power amplifier is 22 watts (43.5 dBm).

A metrocell consists of at least two equipment frames: a universal CE and a metro RF frame. You can expand or sectorize the cell site by adding more metro RF frames as traffic grows. The cell site configuration and the channel capacity determine the number of metro RF frames.

Operating company personnel can configure dualmode metrocell equipment in either of the following ways:

- 60-degree STSR
- 120-degree STSR
- onmi-directional transmit and receive

Refer to NTP *DMS-MTX NT800DR Single Bay Cell Site Implementation Guide*, 411-2131-111, for a list of the major components in dualmode metrocell cell site equipment.

Minicell (outdoor OMNI) A minicell is a low-power, outdoor cell site that can increase a macrocell's coverage. A minicell site can enhance a macrocell where the macrocell's coverage is inadequate, by providing system relief to areas of high traffic.

A minicell consists of the following hardware:

- minicell control and alarm (MCA) module (an integrated component of the Compact Simplex ICRM [CSI] and alarm control module)
- a maximum of 24 TRU-II radios
- one multi-channel power amplifier (MCPA)
- a maximum of CSUs
- Compact Simplex Master Oscillator (CSMO)
- RMC
- hybrid combiners
- two duplexers
- alternating current (AC) power supply and backup batteries
- heat exchanger and other environmental control equipment

An environmentally controlled cabinet (75 inches tall, 56.5 inches long, and 30 inches deep) holds all the equipment.

Refer to NTP *DMS-MTX DualMode Minicell Operations and Maintenance Manual*, 411-2031-501, for additional information on minicell cell site configurations.

Urbancell (low-power macrocell) The dualmode urbancell is an indoor cell site, which uses MCPA technology and allows the operating company to specify the required channel count and power level. The urbancell cell site minimizes the cost of each channel and maximizes equipment re-use over the available configurations. The urbancell cell site is easy to deploy and more suitable for low-power, high-channel count applications.

The urbancell works best in high-density, small-radius cells in areas that require high traffic capacity. The urbancell also provides additional capacity to the macrocell and metrocell (Nortel Networks' higher power cell sites) or in cold spot areas which need fill-in coverage.

The urbancell is compatible with Nortel Networks' NT800DR CE frame. Operating company personnel can install the urbancell with a stand-alone CE bay or co-locate it with the NT800DR or metrocell RF frames.

Refer to *NTP DMS-MTX Cell Site Hardware Product Guide*, 411-2131-100, for additional information on urbancell cell site equipment.

Microcell The microcell is a small cell that can increase a macrocell's coverage. A microcell site can enhance a macrocell where the macrocell's coverage is inadequate by providing system relief to high-traffic areas. Operating companies can install microcells in wiring closets or environmentally controlled shelters. The microcell supports TRU-II radios with indoor or outdoor coverage.

The microcell hardware consists of the following three functional areas:

- CSI
- clusters of microcell base stations (MBS)
- antenna systems

The CSI is a low-density simplex version of an ICRM. Like the ICRM, the CSI provides the messaging interface to the radios.

The CSI also performs the following functions:

- loads the radios
- uses link maintenance to the ICRM
- provides alarm point detection
- eliminates the need for separate ACU hardware

The CSI+ version of the CSI has enhanced processor capabilities. You can upgrade a CSI to a CSI+ by replacing the remote module control processor (RMCP) (NTAX89AA) and the remote module time switch (RMTS)

(NTAX88AA) cards with a remote module time switch controller (RMTC) (NTAX88CA) card.

Note: Only the CSI+ is available for order with the current and future releases of the DMS-100 Wireless switch.

The CSI+ consists of the following hardware components:

- AC and direct current (DC) power converter
- DS1 interface
- remote module digital port (RMDP)
- RMTC
- compact alarm and control unit (CACU)

The MBS platform supports a maximum of four TRUs with each MBS connected to one antenna system. Operating companies can collocate a maximum of 4 MBSs to support 16 TRUs on a common antenna system.

The MBS consists of the following components:

- MBS system package (maximum of four TRU-IIs)
- antenna matrix (AM)
- local alarm card
- power supply (original equipment manufacturer [OEM])

Refer to the following NTPs for additional information on dualmode microcells:

- *DMS-MTX DualMode Microcell Installation Manual*, 411-2011-200
- *DMS-MTX DualMode Microcell Operation and Maintenance User Manual*, 411-2011-500

Single-bay macrocell The single-bay macrocell works in low-traffic areas where a maximum of eight transceivers can service the traffic. The single-bay macrocell also helps to reduce the cell site footprint by 50 percent. This cell site repackages the CE and RF frame components into one CE/RF combined frame. Operating company personnel can add one to five more RF frames to a single-bay macrocell for extra channel capacity.

The interfaces between the single-bay cell site and the ICP, and between the single-bay cell site and the cellular subscribers, match the NT800DR cell site. The single-bay macrocell matches the features of an Omni cell site for an NT800DR cellular system, including call origination, completion, termination, and hand-off.

The single-bay cell site requires the following hardware:

- new dual CE/RF rack interface panel (RIP)
- duplexer
- ICRM
- ACU
- HSMO
- autotune combiner (ATC)
- dualmode cell site monitor (DCSM)
- RMC
- P3 or DRU transceivers

Operating companies can deploy this configuration at a site with low-capacity requirements. Later, operating companies can expand the site to include a maximum of five more RF frames as site capacity increases.

Refer to NTP *DMS-MTX NT800DR Single Bay Cell Site Implementation Guide*, 411-2131-111, for additional information on the components in the CE/RF frame.

NT1900

The NT1900 cell complies with IS-136A standard for cell sites in the 1900-MHz range. The NT1900 cell consists of a CE frame and from one to six RF frames. A microwave or digital trunk links the cell site hardware to the DMS-100 Wireless switch.

The following lists the differences between the NT1900 cell site equipment and the NT800DR cell site equipment.

- The NT1900 cell site equipment uses a remote receiver module (RRM) to amplify receive band signals from the antenna before distribution to the coaxial cable.
- The NT1900 cell site equipment uses simplified inter-bay cabling, which keeps each sector in the same horizontal plane. One 4.8-MHz cable routes to each RF frame and splits at the frame to each shelf. The backplane splitters divide this signal and the four receive RF signals to each TRU in the shelf.

Note: The NT1900 cell site equipment does not support 60-degree STSR because the TRUs use only four receive-input antennas.

The DMS-100 Wireless switch supports the following types of NT1900 cell site equipment:

- NT1900 macrocell
- NT1900 picocell

NT1900 macrocell

The NT1900 macrocell operates in the 1900-MHz PCS band in compliance with Telecommunications Industry Association (TIA) standard IS-136, Revision A.

The NT1900 macrocell cell site uses the following two types of equipment frames:

- CE frame (NTTG50AA)
- RF frame (NTTG10AA)

The minimum configuration of the NT1900 macrocell requires one CE frame and one RF frame. Operating companies can expand the NT1900 macrocell with a maximum of five more RF frames as traffic capacity grows.

Refer to the following NTPs for additional information on NT1900 macrocells:

- *DMS-MTX TDMA 1900 Macrocell Cell Site Description*, 411-6201-111
- *DMS-MTX TDMA 1900 Macrocell CE Frame Description*, 411-6201-112
- *DMS-MTX TDMA 1900 Macrocell RF Frame Description*, 411-6201-113

1900 picocell

Nortel Networks' picocell is an indoor ceiling or wall-mounted base station, which operates in the 1900-MHz spectrum in compliance with IS-136 standards.

The picocell provides localized capacity and spot coverage for the following applications:

- public cellular networks
- virtual private networks
- wireless private branch exchange (PBX) support
- other hybrid public and private applications

Note: With its internal antenna and twisted pair connection, operating companies can use the 1900 picocell for in-building applications.

The picocell TRU consists of two PC boards. One board provides baseband function, and RF operations use the other board.

Picocell software supports any combination of the following two digital communications applications:

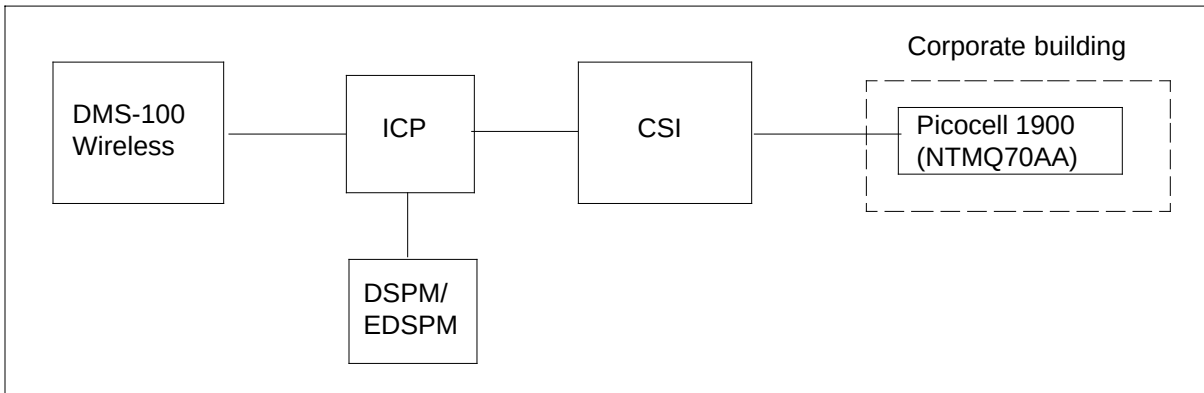
- 2T+C-one RF channel that supports one full-rate digital control channel (DCCH) and two simultaneous digital telephone calls using full-rate TDMA
- 3T-one RF channel that supports three simultaneous digital telephone calls using full-rate TDMA

The picocell base station provides two RF channels in one of the following configurations:

- five digital traffic channels (DTC) and one full-rate DCCH, or
- six DTCs with no DCCH

Figure 2-14 shows the TDMA picocell configuration in the DMS-100 Wireless switch.

Figure 2-14 TDMA picocell configuration for the DMS-100 Wireless switch



Picocell summary Table 2-2 summarizes picocell capabilities.

Table 2-2 Summary of picocell capabilities (Sheet 1 of 2)

Capability	Supported?
Microcell (CSI/ICRM)	Yes
Term loadable	Yes
Supports 400 MHz	No
Supports 800 MHz	No
Supports 1900 MHz	Yes
Analog capable	No

Table 2-2 Summary of picocell capabilities (Sheet 2 of 2)

Capability	Supported?
Digital capable	Yes
OMNI cell	Yes
120-degree cell	Yes
60-degree cell	No
Dynamic frequency allocation (DFA) capable	Yes (voice channel only)
AC U	No
Cell test unit	No
Locating channel receiver	No

AMPS/TDMA cell configuration summary

Table 2-3 lists the AMPS/TDMA cell configurations the DMS-100 Wireless switch supports.

Table 2-3 AMPS/TDMA cell configurations supported (Sheet 1 of 3)

Cell type	Configurations	Transceiver/ PA combination	Applications
Macrocell	OMNI	P3/PA	The dualmode macrocell is a high-power product that provides analog and digital operations.
	180-degree STSR	P3/FMPA	
	120-degree STSR	TRU-II/FMPA+ (analog)	
	60-degree STSR	TRU-II/SCLPA-800	
		TRU-III/SCLPA-800	
Single-bay cell	OMNI	P3/PA	The single-bay product works in low-traffic areas where a maximum of 8 transceivers service the traffic. The cell site footprint is a consideration.
		P3/FMPA	
		TRU-II/FMPA+ (analog)	
		TRU-II/SCLPA-800	
Note: Microcell applications do not use an external power amplifier.			

Table 2-3 AMPS/TDMA cell configurations supported (Sheet 2 of 3)

Cell type	Configurations	Transceiver/ PA combination	Applications
Metrocell	OMNI 120-degree STSR 60-degree STSR	TRU-II/DPA TRU-II/SCLPA-800	The metrocell is a dual-mode cell that works in analog and digital modes. The metrocell works in high-density, small-radius cells in areas where large traffic capacity occurs. The metrocell exists independently. Operating companies can add it to existing cells for increased coverage.
Urbancell	OMNI 120-degree STSR	TRU-II/MCPA	The urbancell works in high-density, small-radius cells in areas that require large traffic capacity.
Microcell (Note)	Indoor outdoor low power	TRU-II (Note)	The microcell uses small MBSs to supply cellular coverage inside buildings or low-power cell sites.
Minicell	OMNI	TRU-II/MCPA	The minicell is a small sized, small-channel count, low-power cell site in an outdoor enclosure.
Note: Microcell applications do not use an external power amplifier.			

Table 2-3 AMPS/TDMA cell configurations supported (Sheet 3 of 3)

Cell type	Configurations	Transceiver/ PA combination	Applications
NT1900 Macrocell	120-degree STSR	TRU-1900/ SCLPA 1900	The 1900 macrocell works in the TDMA interface in compliance with IS-136, Rev. A standard.
Picocell	OMNI	Picocell 1900	The picocell is an indoor ceiling or wall-mounted base station. It provides localized capacity and spot coverage for public cellular networks, virtual networks, and wireless PBX support.
Note: Microcell applications do not use an external power amplifier.			

Supporting documentation

Refer to the following NTPs for additional information on AMPS/TDMA equipment and operation:

- *DMS-MTX DualMode Cell Site Monitor Technical Description*, 411-0810-511
- *DMS-MTX DualMode Microcell Installation Manual*, 411-2011-200
- *DMS-MTX DualMode Microcell Operation and Maintenance User Manual*, 411-2011-500
- *DMS-MTX DualMode Metrocell Planning and Engineering Guidelines*, 411-2021-100
- *DMS-MTX DualMode Metrocell Radio Frequency (RF) Frame Description*, 411-2021-113
- *DMS-MTX DualMode Minicell Operation and Maintenance Manual*, 411-2031-501
- *DMS-MTX 800 MHz DualMode Minicell RF Deployment Guide*, 411-2031-010
- *DMS-MTX TDMA Deployment Guidelines for 800 MHz Cellular Systems*, 411-2131-005
- *DMS-MTX Microcellular Implementation Notes*, 411-2131-030
- *DMS-MTX and Cell Site Hardware Product Guide*, 411-2131-100

- *DMS-MTX ICP and EDSPM Technical Description*, 411-2131-127
- *DMS-MTX NT800DR DualMode Radio Unit Technical Description*, 411-2131-165
- *DMS-MTX TDMA 1900 Macrocell Cell Site Description*, 411-6201-111
- *DMS-MTX TDMA 1900 Macrocell CE Frame Description*, 411-6201-112
- *DMS-MTX TDMA 1900 Macrocell RF Frame Description*, 411-6201-113
- *DMS-MTX TDMA 1900 Macrocell RF Deployment Guide*, 411-6201-200
- *DMS-MTX TDMA 1900 Macrocell Installation Methods*, 411-6201-201

Packaging descriptions

All systems meet network equipment building system (NEBS) Zone 4 seismic requirements.

The desktop BSM is *not* NEBS compliant. It does not meet the requirements in regard to disk drives, digital audio tape drives, and CD-ROM drives dropped from a 4-inch height. (Otherwise, it meets NEBS requirements.)

BSC packaging

The BSC is NEBS compliant. Table 2-4 lists the physical specifications of the BSC.

Table 2-4 BSC physical specifications

Subsystem type	Height m (ft)	Width mm (in.)	Depth mm (in.)	Weight kg (lb)	Floor loading* kg/sq m (lb/sq ft)	Thermal output kW (kBUT/hr)
CIS	2.1	750	790	254	217	1.4
(2 DISCOs)	(7.0)	(29.5)	(31.1)	(562)	(45)	(4.8)
TFU	2.1	750	790	235	207.4	2.5
(1 TF shelf)	(7.0)	(29.5)	(31.1)	(520)	(42)	(8.5)
SBS (3 SBS shelves)	2.1	750	790	338	284.5	3.2
	(7.0)	(29.5)	(31.1)	(735)	(59)	(10.8)
Note: For the floor loading measurements, assume half of a 3-ft front aisle and half of a 2-ft rear aisle.						

These weight and power dissipation figures depend on the particular BSC frame configuration. (A fully loaded system also determines the precise weight.)

The BSC floor loading meets the maximum 115 lbs/sq ft requirement, as Bellcore specification NEBS TR-NWT-000063 states.

The NEBS maximum floor loading specification of 150 lb/sq ft total consists of the following measurements:

- equipment loading of 115 lb/sq ft
- a 10 lb/sq ft transient loading
- a 25 lb/sq ft cable distribution system and light fixture loading

BTS packaging

1900-MHz outdoor BTS

Environmental cabinets protect the 1900-MHz outdoor BTS from outdoor use. The BTS is remote from the DMS-100 Wireless CO environment. Therefore, it does not fall under the NEBS (TR-NWT-000063) requirements, but is subject to TA-NWT-000487, *Generic Requirements for Electronic Equipment Cabinets*.

Areas of non-compliance with TA-NWT-000487 include

- main enclosure
 - R-77: battery chamber temperature range
 - R-89: acoustical noise suppression
- RFFE remote from main enclosure
 - R-130: maximum internal air space temperature
 - R-133: cabinet impact resistance
 - R-134: cabinet bullet proof
 - R-139: cabinet fire resistance

The 1900-MHz outdoor BTS consists of an enclosure and one to three RFFEs. The RFFEs allow remote antenna location from the equipment enclosure. The enclosure stores the CDMA electronic and associated power, and environmental control equipment. The RFFE stores the high-power and low-noise amplifiers (LNA).

1900-MHz indoor BTS

The 1900-MHz indoor BTS has two physical components: a mini-BTS and an RFFE enclosure. Each cell site requires one mini-BTS, and each sector requires an RFFE (up to three maximum).

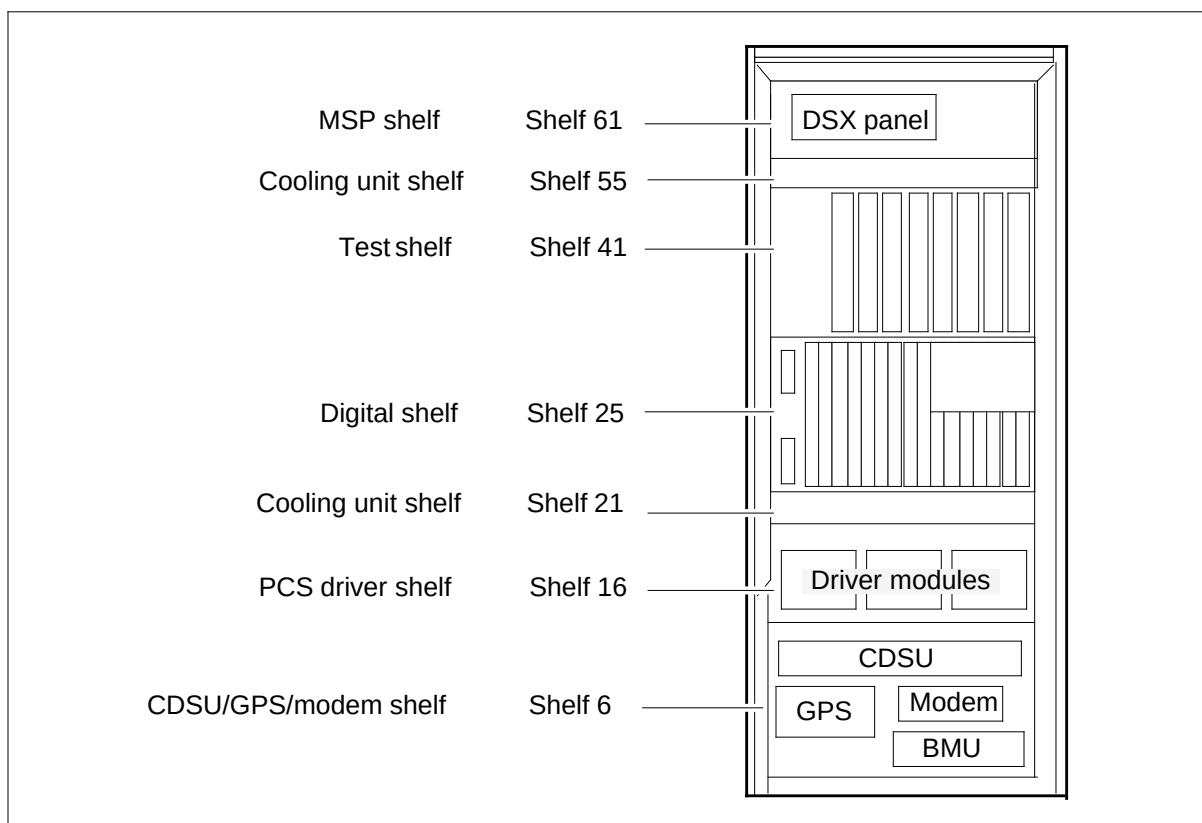
The indoor BTS, housed in a C-28 cabinet, consists of

- equipment cabinet 00 (left side)
- equipment cabinet 01 (right side)

- lower compartment with battery drawer (left side)
- lower compartment (right side)
- end compartment (left end)

Figure 2-15 shows the 1900-MHz indoor BTS cabinet.

Figure 2-15 1900-MHz indoor BTS cabinet



The cabinet has an attached air-to-air heat exchanger for environmental control. The cabinet is modular in design with two front doors measuring 76.260 in. wide, 63.125 in. high, and 30 in. (without heat exchangers) or 40.5 in. (with heat exchangers) deep. A sliding tray on the left side at the bottom of the cabinet stores the back-up batteries. When you close the battery tray, it creates a separate and sealed compartment in the cabinet. The approximate weight of the indoor BTS cabinet with batteries (4-hr backup) is 2800 lbs.

The RFFE enclosure weighs no more than 80 lbs.

**CAUTION**

The Occupational Health and Safety Act prohibits the manual handling and carrying of equipment over 50 lbs in weight up and down a pole.

Use a machine to help in RFFE installation or removal from its mount on a pole or on the side of a building.

800-MHz BTS

The radio frequency unit (RFU) and digital racks store the BTS equipment. The RFU and digital racks can be either cabinetized or non-cabinetized.

Each rack contains a number of shelves, modules and a chassis. A shelf mounts into a rack by means of a pair of mounting tabs. A module is any unit in a chassis with a backplane. A chassis is any unit having a backplane, with rack-mounted modules.

The BTS contains the following shelves and modules:

- timing and TFU shelf
- GPS shelf
- digital shelf (DS)
- transceiver shelf
- distribution shelf (non-cabinetized version only)
- BTU shelf
- DISCO shelf
- integrated CSU-DSU shelf
- circuit breaker (CB) shelf
- air intake fan plenum (FP) shelf
- air intake and exhaust FP shelf
- integrated CB-FP shelf
- receive front end (RxFE) module
- equipment racks
- HPA module
- transmit front end (TxFE) module
- site alarm panel

Refer to NTP *CDMA 800 MHz BTS Functional Operations Technical Overview*, 411-2133-102, for packaging and model information.

AMPS/TDMA packaging

Table 2-5 lists the physical specifications for the AMPS/TDMA cell site equipment.

Table 2-5 AMPS/TDMA equipment specifications (Sheet 1 of 4)

Equipment	Frame
NT800DR macrocell	CE frame: Height: 84 in. Width: 27 in. (outer), 23 in. (inner) Depth: 26 in. Frame weight: 400 lbs. Floor loading: Fully equipped=80 lbs./sq. ft. Seismic: Does not meet earthquake standards. RF frame: Height: 84 in. Width: 24.375 in. Depth: 24 in. Frame weight: 832 lbs. Floor loading: Fully equipped=96 lbs./sq. ft. Seismic: Does not meet earthquake standards.
NT800DR single-bay cell	CE/RF frame: Height: N/A Width: 24 in. Depth: 24 in. Frame weight: N/A
Note 1: Because this equipment exceeds the NEBS specification of 115 lbs./sq. ft. loading maximum for each frame, make sure that you have enough space for each frame and adjacent equipment. Note 2: The ICRM and related cards are maple brown, but this piece of equipment has a removeable grey cover.	

Table 2-5 AMPS/TDMA equipment specifications (Sheet 2 of 4)

Equipment	Frame
NT800DR urban cell	Floor loading: N/A Seismic: Does not meet earthquake standards. CE frame: Height: 84 in. Width: 24 3/8 in. Depth: 24 in. Frame weight: 400 lbs. Floor loading: 80 lbs./sq. ft. Seismic: Does not meet earthquake standards. RF frame: Height: 84 in. Width: 26 in. Depth: 24 in. Frame weight: 382 lbs. Floor loading: 117 lbs./sq. ft. (Note 1) Seismic: Meets NEBS Zone 4 earthquake requirements.
NT800DR metrocell	CE frame: Height: 84 in. Width: 24 3/8 in. (outer) Depth: 24 in. Frame weight: 400 lbs. Floor loading: 80 lbs./sq. ft. (fully equipped)
Note 1: Because this equipment exceeds the NEBS specification of 115 lbs./sq. ft. loading maximum for each frame, make sure that you have enough space for each frame and adjacent equipment. Note 2: The ICRM and related cards are maple brown, but this piece of equipment has a removeable grey cover.	

Table 2-5 AMPS/TDMA equipment specifications (Sheet 3 of 4)

Equipment	Frame
NT800DR microcell	Seismic: Does not meet earthquake standards. RF frame: Height: 84 in. Width: 22 in. (outer) Depth: 24 in. Frame weight: 1136 lbs. (fully equipped) Floor loading: 138 lbs./sq. ft (fully equipped) (Note 1) Seismic: Meets NEBS Zone 4 earthquake requirements.
	CE frame: Height: 84 in. Width: 22 in. Depth: 24 in. Frame weight: 400 lbs. Floor loading: 80 lbs./sq. ft. Seismic: Does not meet earthquake standards. RF frame: Height: 84 in. Width: 22 in. (outer) Depth: 24 in. Frame weight: 950 lbs. Floor loading: 115 lbs./sq. ft. Seismic: Meets NEBS Zone 4 earthquake requirements.
Note 1: Because this equipment exceeds the NEBS specification of 115 lbs./sq. ft. loading maximum for each frame, make sure that you have enough space for each frame and adjacent equipment. Note 2: The ICRM and related cards are maple brown, but this piece of equipment has a removeable grey cover.	

Table 2-5 AMPS/TDMA equipment specifications (Sheet 4 of 4)

Equipment	Frame
TDMA 1900 macrocell	CE frame: Height: 84 in. Width: 26 in. Depth: 36 in. (including cables) Frame weight: N/A Floor loading: N/A Seismic: Meets Zones 1 and 2 earthquake requirements, as Bellcore standard TR-NWT-000063 requires. Color: Dolphin grey (Note 2) RF frame Height: 84 in. Width: 26 in. Depth: 36 in. Frame weight: N/A Floor loading: N/A Seismic: Meets Zones 1 and 2 earthquake requirements, as Bellcore standard TR-NWT-000063 requires. Color: Dolphin grey (Note 2)
Note 1: Because this equipment exceeds the NEBS specification of 115 lbs./sq. ft. loading maximum for each frame, make sure that you have enough space for each frame and adjacent equipment. Note 2: The ICRM and related cards are maple brown, but this piece of equipment has a removeable grey cover.	

Trunk configurations

CCS7 signaling configuration

The DMS-100 Wireless provides XPM and CM software for calls between two agents. They are interworked.

The DMS-100 Wireless switch supports the following types of CCS7 signaling for call processing:

- CCS7 ISUP signaling for wireline-based trunks
- CCS7 ISUP signaling for wireless-based trunks
- TCAP queries for wireline calls for applications such as E800 and CLASS
- TCAP IS-41 messages for mobile calls, for HLR and VLR updates and interoffice handoff

Hardware requirements

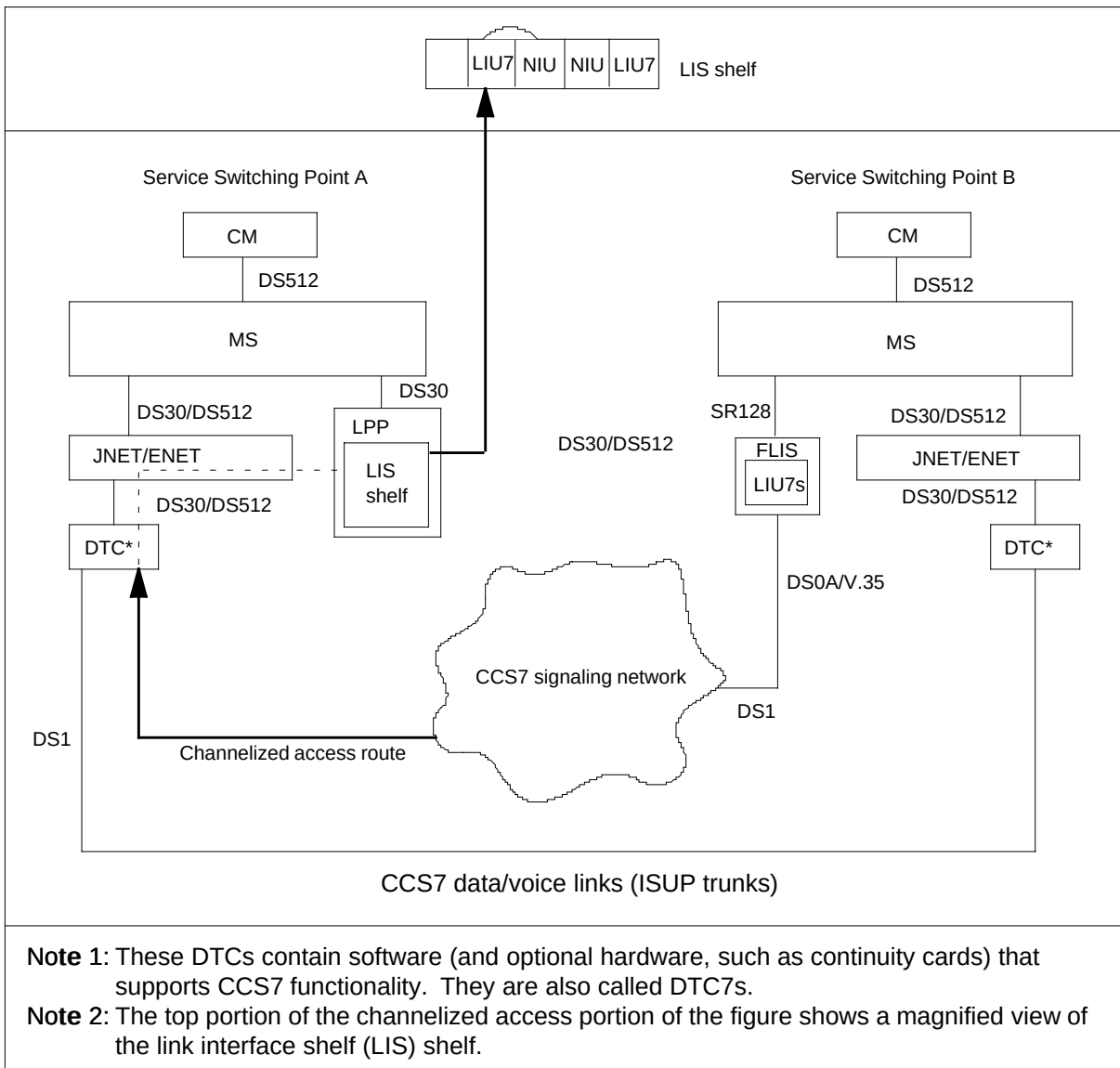
From a hardware perspective, the same signaling links can receive either of the four types of signaling messages. You need an LIU7 in the LPP for each signaling link that an office supports. Configure the wireless LIU7s for ISUP and IS41 signaling the same as for wireline ISUP and TCAP signaling.

Voice channels for ISUP and NWK trunks terminate as T1 links on a DTC. The configuration of logical trunk groups for ISUP and NWK trunks determines how to configure channel allocation.

Channelized access

The DMS-100 Wireless switch also supports a channelized access configuration.

Figure 2-16 shows the hardware configurations for CCS7 signaling. The left portion of the figure reflects channelized access connectivity. Also note that the LIU7s can exist in either an LPP or in an FLIS.

Figure 2-16 CCS7 hardware configuration

Use the CCS7 signaling links for both the wireline and wireless ISUP messaging, if you configure the voice channels into separate trunk groups. Send wireline TCAP messages (for CLASS and E800) and wireless TCAP messages (for HLR queries and interswitch handoff) on the same CCS7 signaling link. Follow the existing wireline and wireless provisioning rules for the CCS7 tables and data structures.

Refer to the following NTPs for additional information on CCS7

- *DMS-100 Family Common Channel Signaling 7 Maintenance Reference Manual*, 297-1001-531
- *DMS-100 Family Common Channel Signaling 7 Maintenance Guide*, 297-8991-545

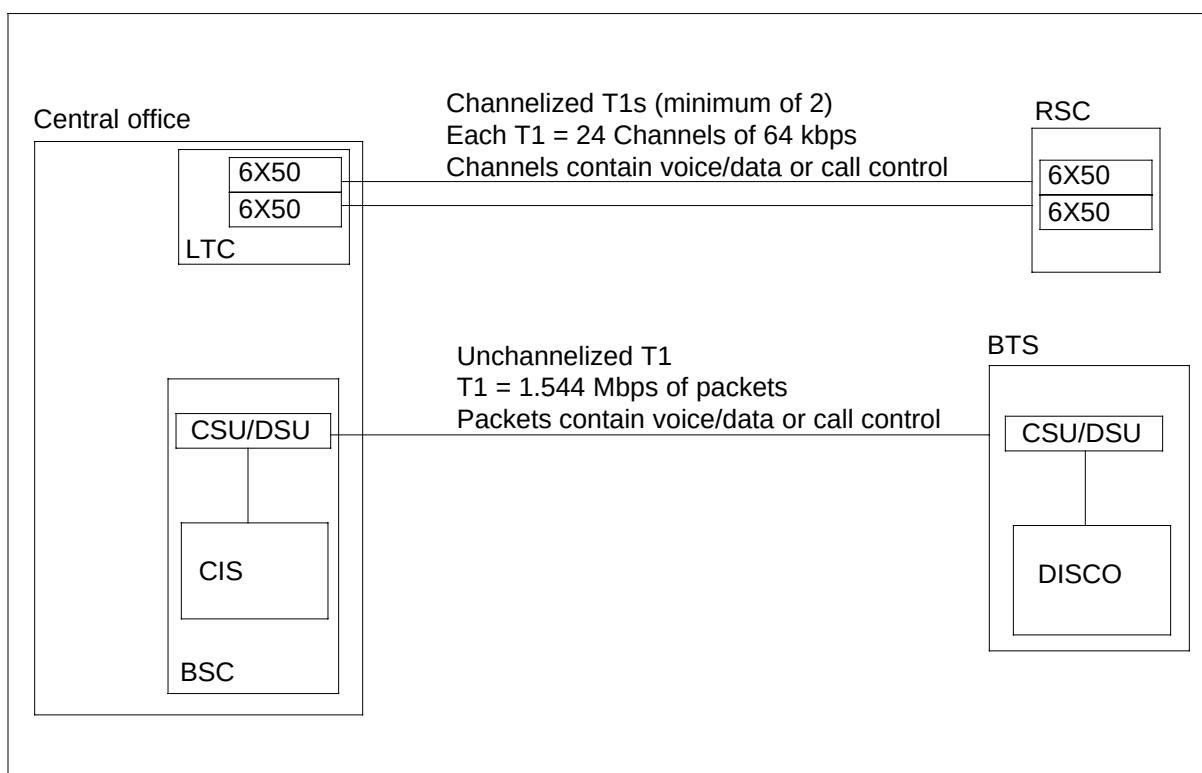
Host remote configuration

The BTS/BSC connection uses T1 links. Some connections do not need the full 1.544 MHz of bandwidth available in a T1.

Use separate T1 links for remote switching center (RSC)-CO connections, and BSC/BTS connections. RSC-CO connections and BSC/BTS connections do not share the bandwidth of a T1 link.

The following figure shows an example of the host remote configuration.

Figure 2-17 Host remote configuration

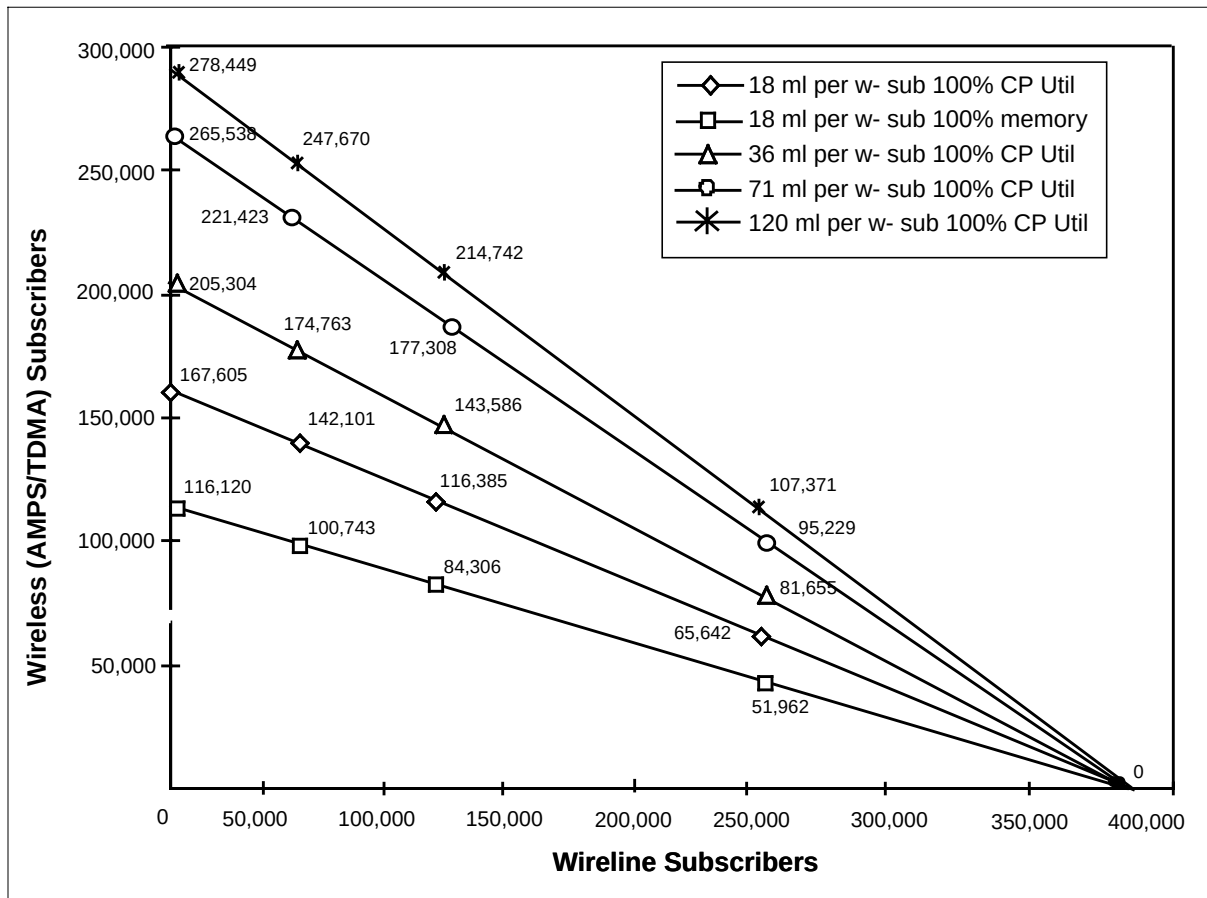


System capacity

The DMS-100 Wireless switch capacity depends on several factors, such as traffic assumptions and the number of wireless and wireline users on the network.

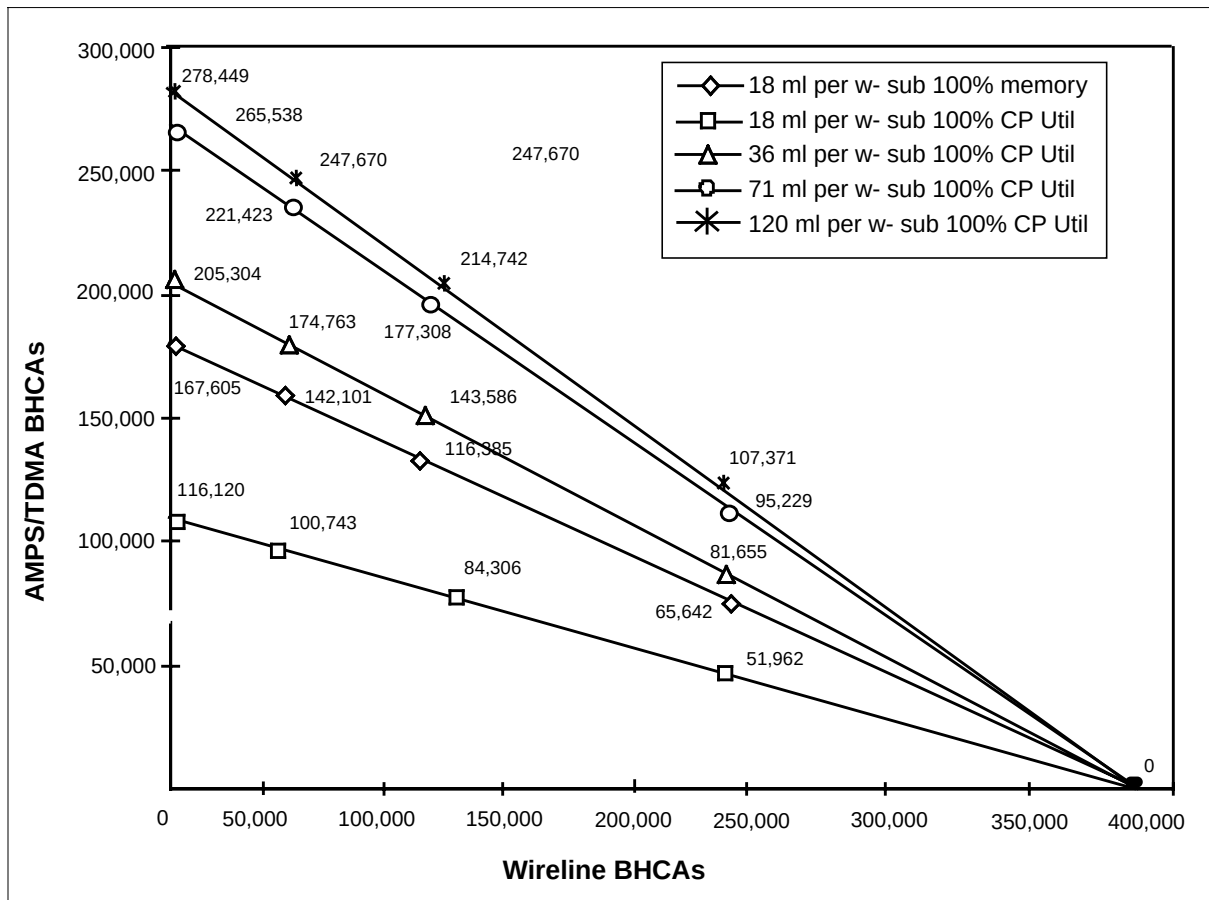
The following figures, Figure 2-18 to Figure 2-25, show system capacity at either 100% call processing (CP) utilization or 100% memory utilization for low mobility AMPS/TDMA and CDMA traffic in residential and business offices.

Figure 2-18 DMS-100 Wireless residential model for low-mobility AMPS/TDMA by subscribers



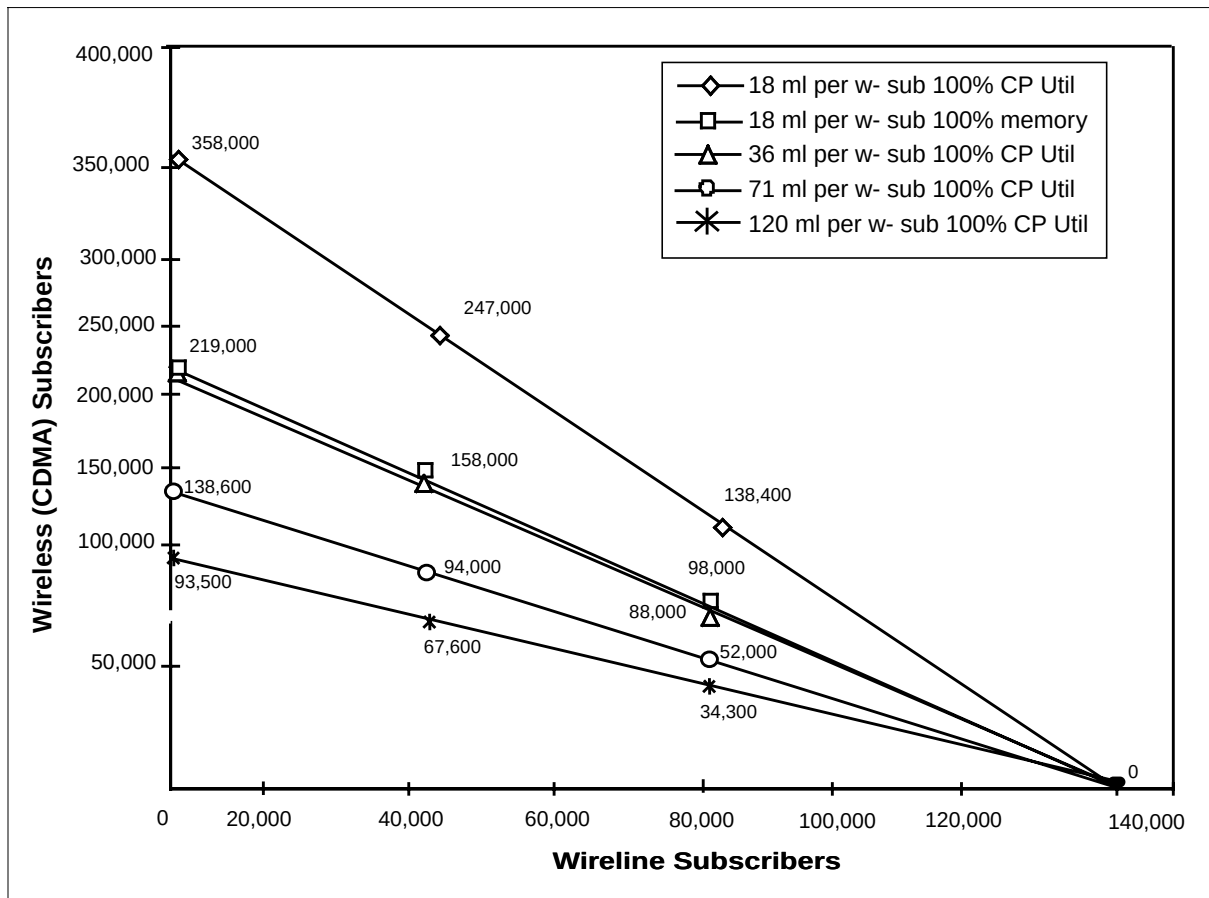
Traffic assumptions for Figure 2-18:

- DMS-100 Wireless residential office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 16%
- Wireless low mobility model with 100% TDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-19 DMS-100 Wireless residential model for low-mobility AMPS/TDMA by system BHCAs

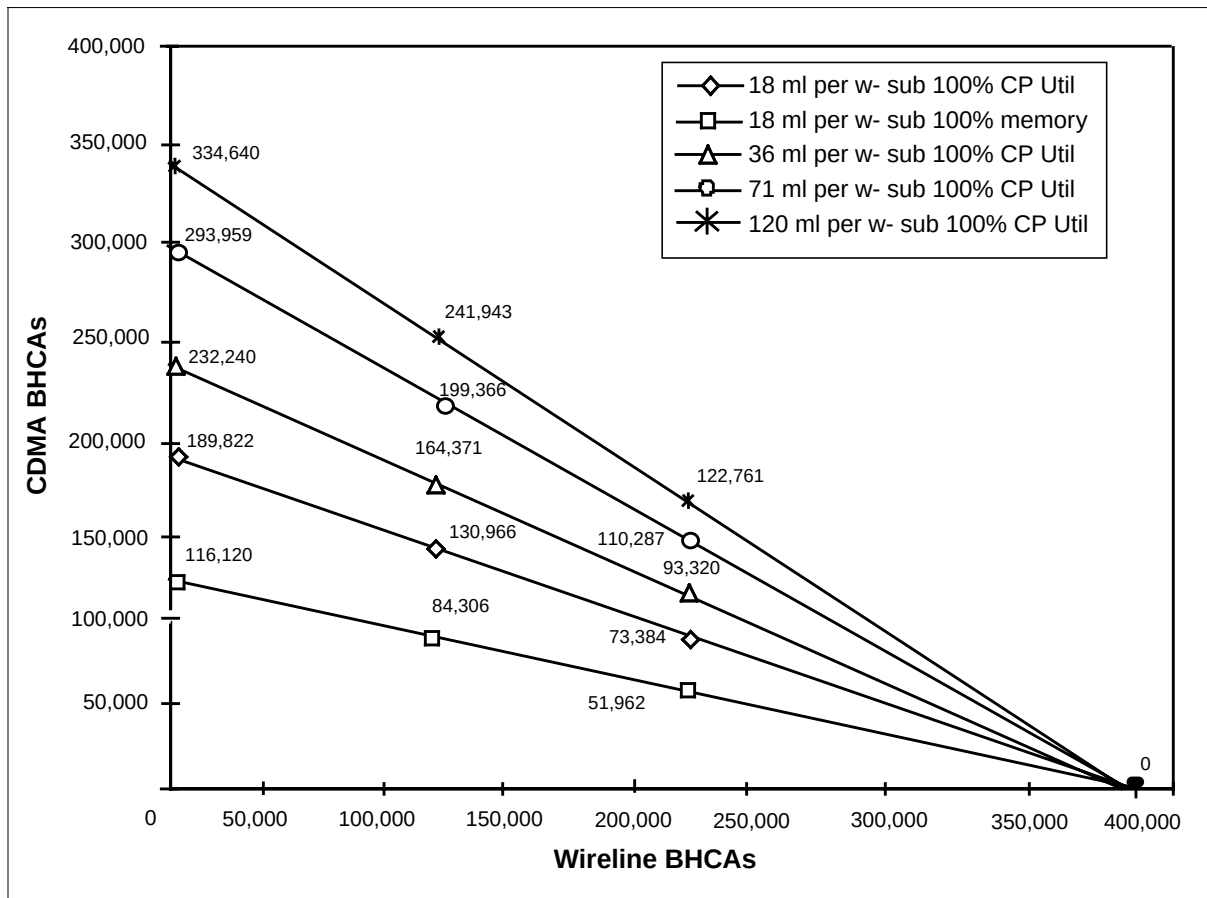
Traffic assumptions for Figure 2-19:

- DMS-100 Wireless residential office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 16%
- Wireless low mobility model with 100% TDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-20 DMS-100 Wireless residential model for low-mobility CDMA by subscribers

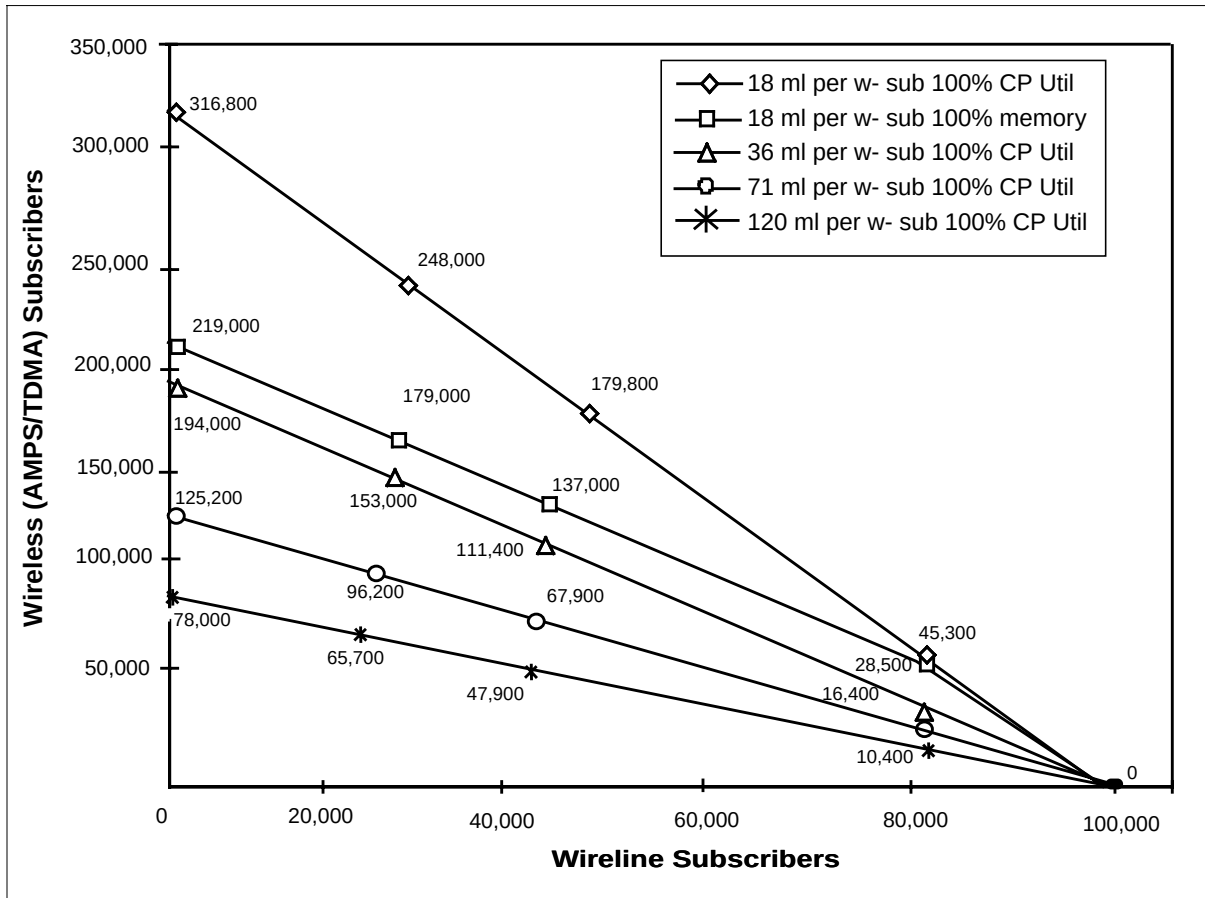
Traffic assumptions for Figure 2-20:

- DMS-100 Wireless residential office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 16%
- Wireless low mobility model with 100% CDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-21 DMS-100 Wireless residential model for low-mobility CDMA by system BHCAs

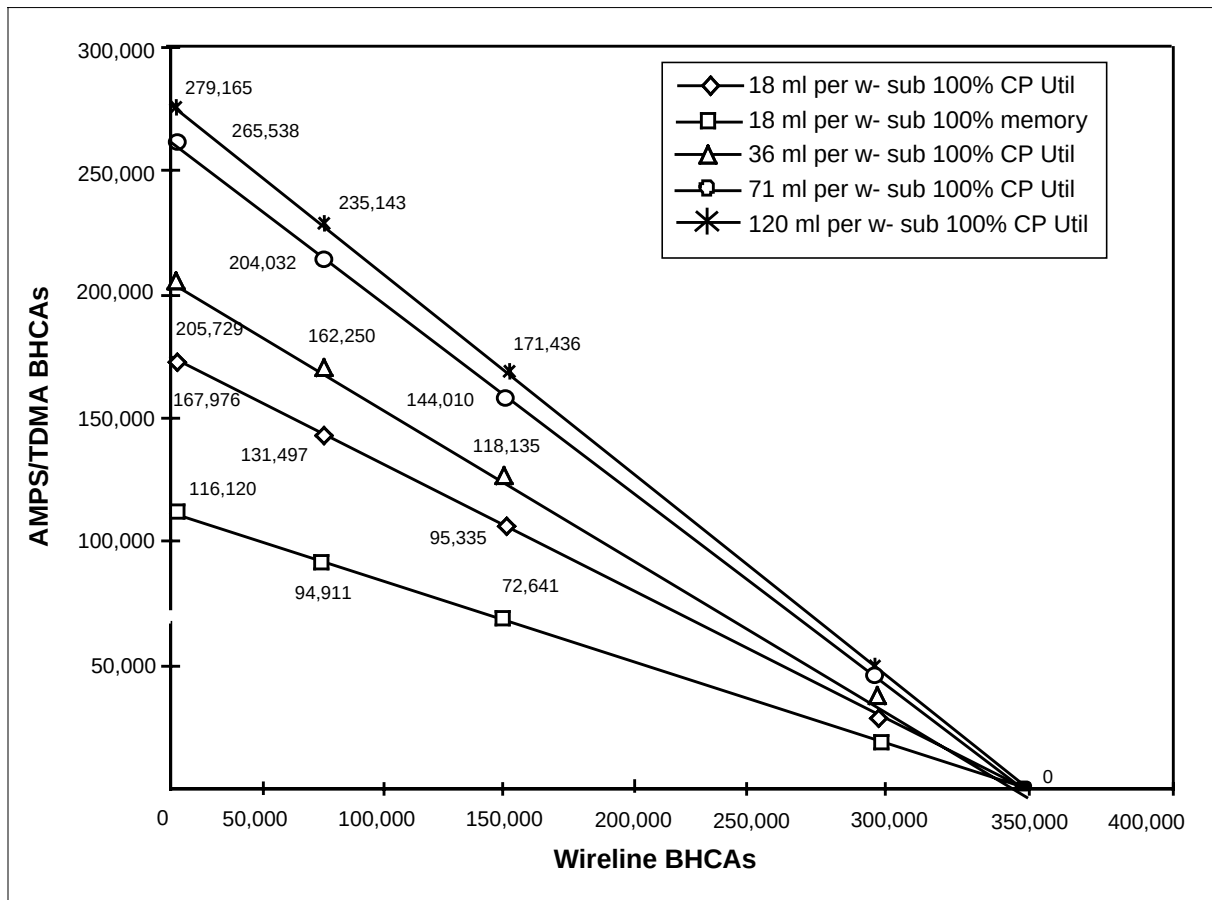
Traffic assumptions for Figure 2-21:

- DMS-100 Wireless residential office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 16%
- Wireless low mobility model with 100% CDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-22 DMS-100 Wireless business model for low-mobility AMPS/TDMA by subscribers

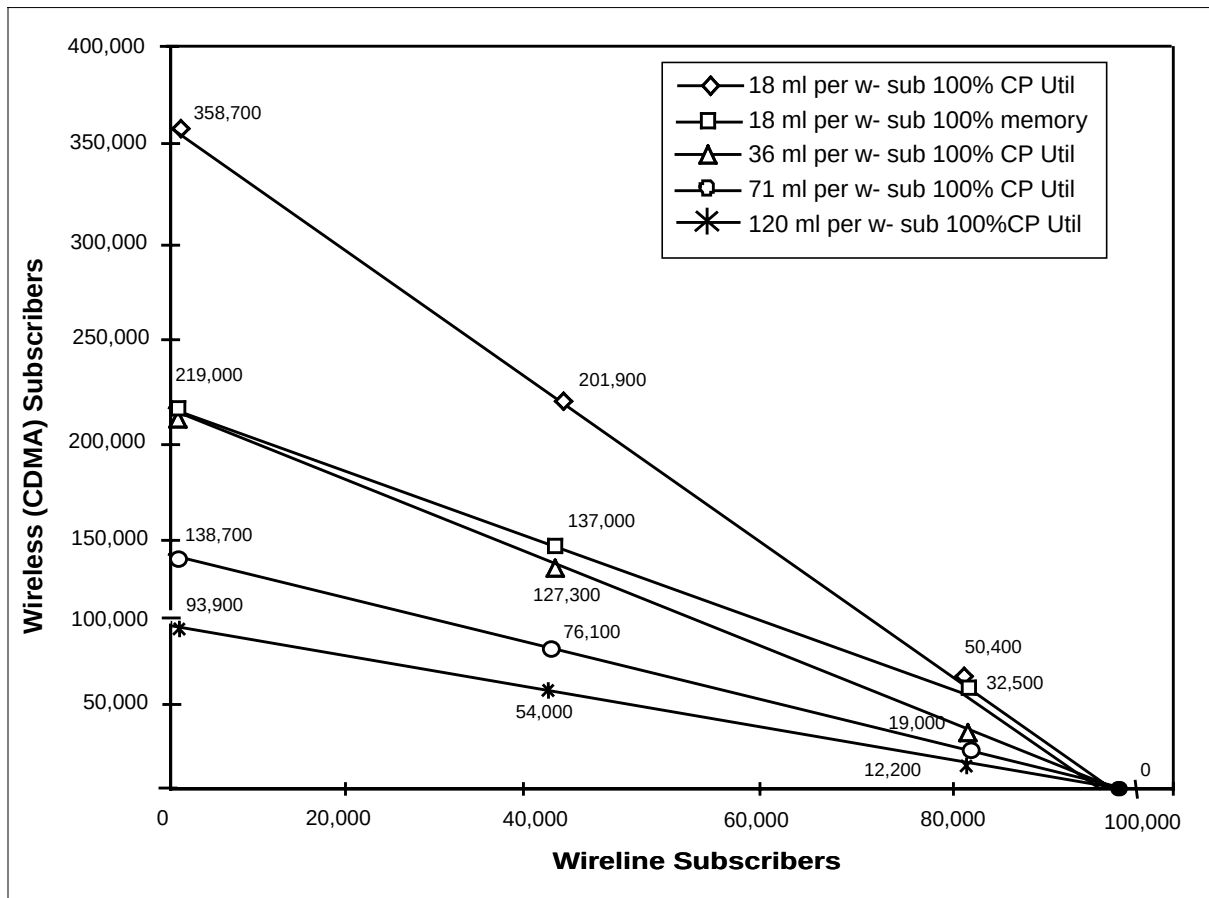
Traffic assumptions for Figure 2-22:

- DMS-100 Wireless business office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 48.6%
- Wireless low mobility model with 100% TDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-23 DMS-100 Wireless business model for low-mobility AMPS/TDMA by system BHCAs

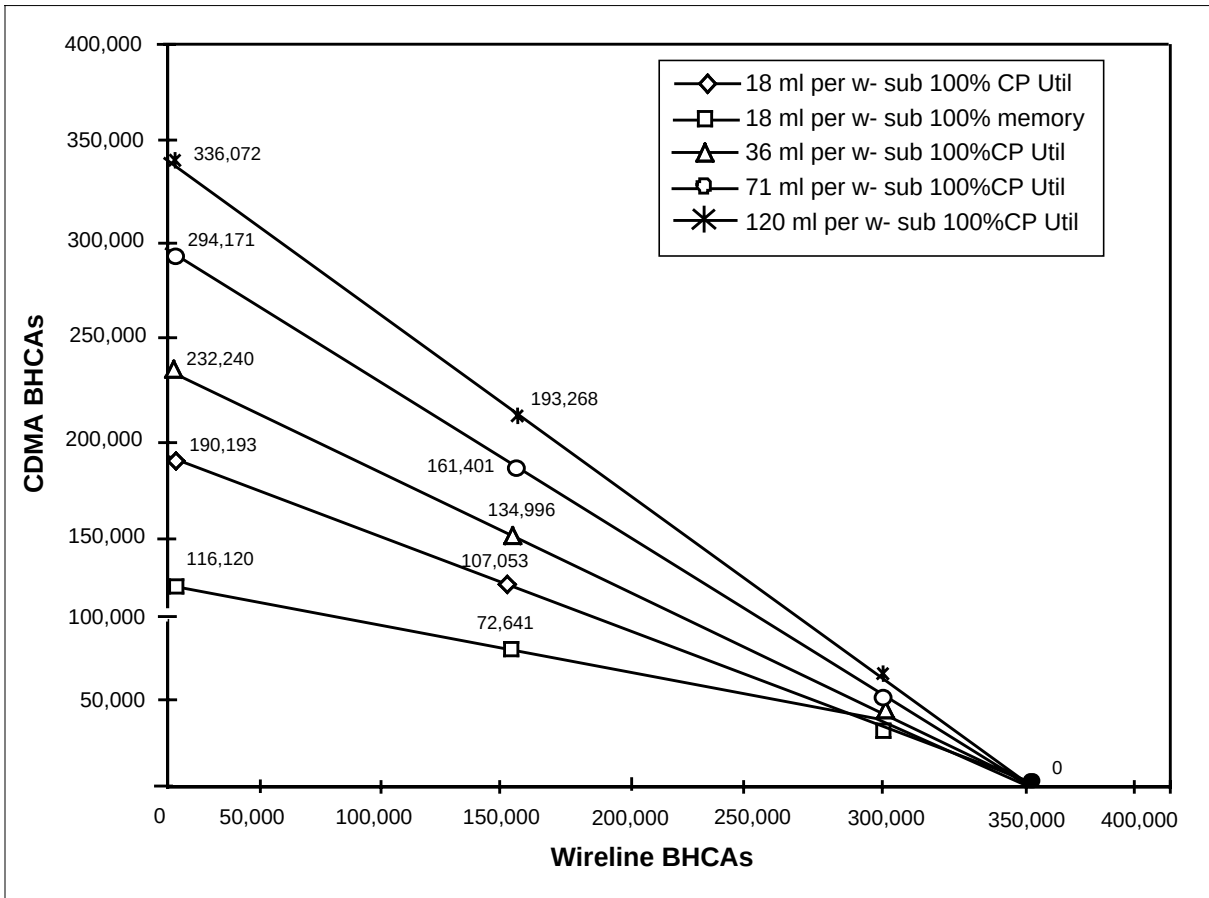
Traffic assumptions for Figure 2-23:

- DMS-100 Wireless business office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 48.6%
- Wireless low mobility model with 100% TDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-24 DMS-100 Wireless business model for low-mobility CDMA by subscribers

Traffic assumptions for Figure 2-24:

- DMS-100 Wireless business office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 48.6%
- Wireless low mobility model with 100% CDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

Figure 2-25 DMS-100 Wireless business model for low-mobility CDMA by system BHCAs

Traffic assumptions for Figure 2-25:

- DMS-100 Wireless business office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 48.6%
- Wireless low mobility model with 100% CDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR70EM with 77% CM engineering point

SR60 burst mode

Burst mode operation is a memory access protocol that increases sequential read and write access to and from the backplane memory. Burst mode operation uses a caching system based on a line architecture. Office parameter SR60_BURST_MODE_SUPPORTED controls the burst mode feature.

If the burst mode memory for this office parameter equals Y (enabled), the switch can experience matcher transient mismatches (MTM). (Matcher transient mismatches are potential contributors to system outages.) Office parameter SR60_BURST_MODE_SUPPORTED has a value of N (disabled)

for all SR60 offices. Operating company personnel cannot change this value to Y without contacting Nortel Networks.

The following two tables, Tables 2-6 and 2-7, show the SR60 memory limits with the burst mode enabled and disabled.

Table 2-6 Enabled burst mode values

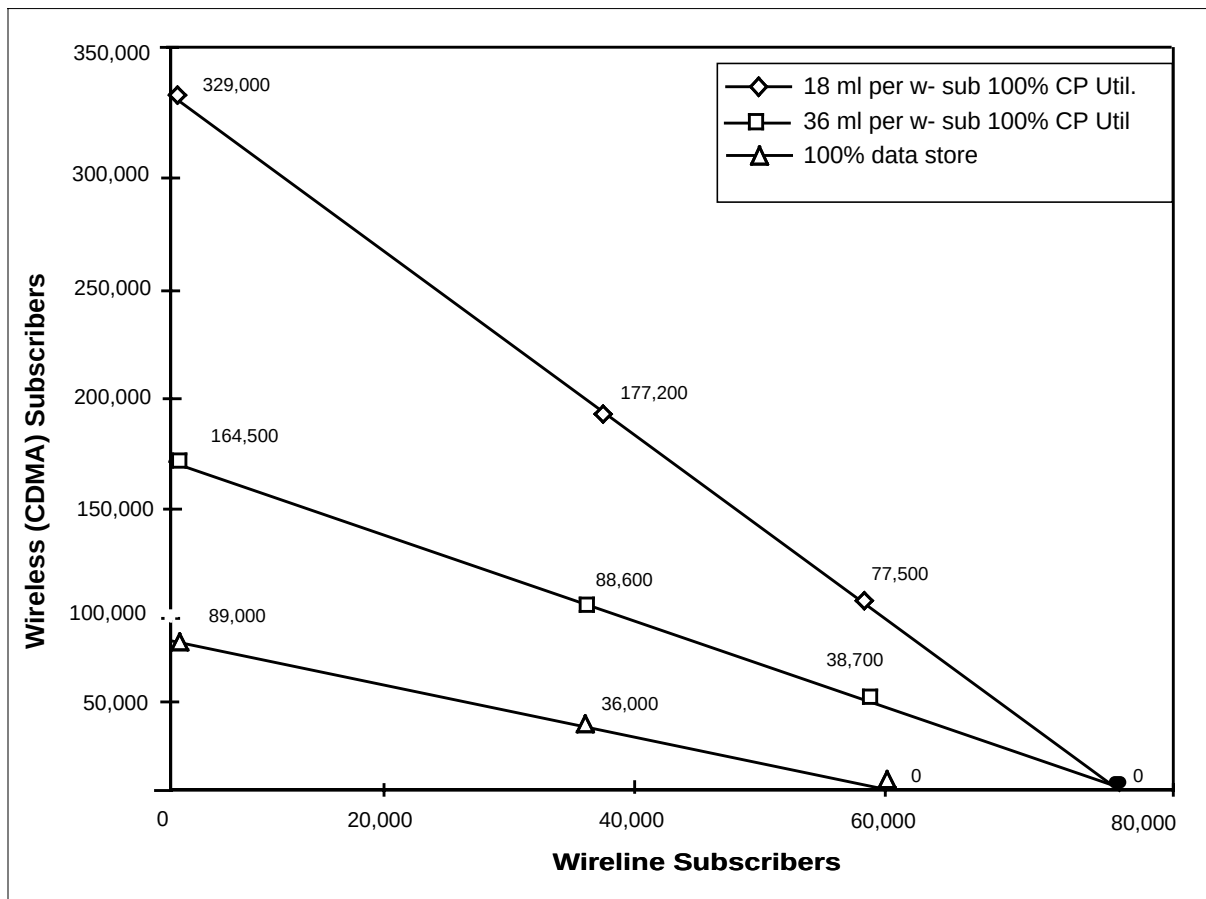
Store type	Memory limit for SN	Memory limit for SNSE
Data store	544	416
Program store	256	256
Total	608	480

Table 2-7 Disabled burst mode values

Store type	Memory limit for SN	Memory limit for SNSE
Data store	336	336
Program store	256	256
Total	592	480

Figure 2-26 and Figure 2-27 show residential and business models on how a data store limit of 336 Mb with a disabled burst mode affects system capacity. Based on the traffic assumptions in this figure, the DMS-100 Wireless SR60 system capacity can exhaust the data store resource before the CM real time (RT).

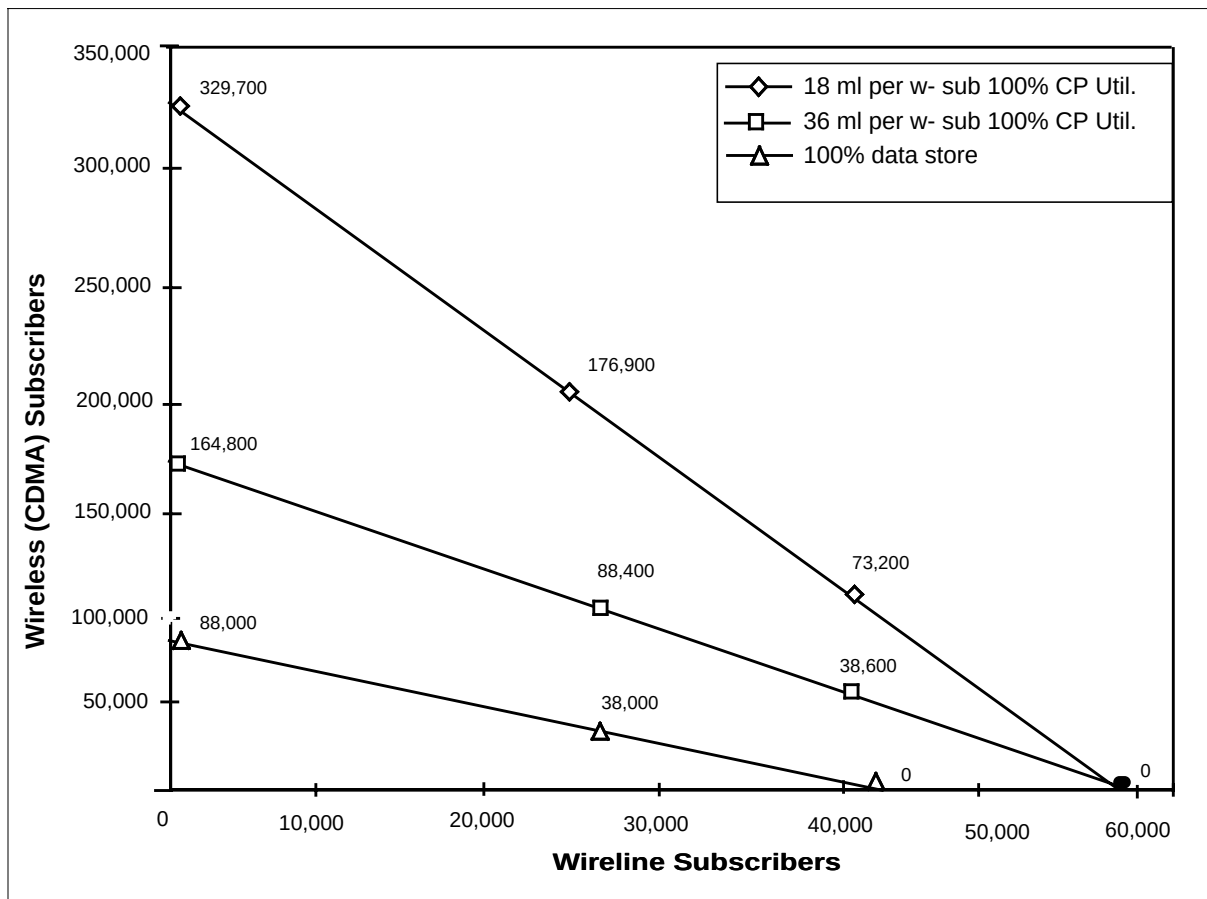
Figure 2-26 DMS-100 Wireless residential model for low mobility CDMA SR60 CM capacity and data store limit



Traffic assumptions for Figure 2-26:

- DMS-100 Wireless residential office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 16%
- Wireless low mobility model with 100% CDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR60 with 74% CM engineering point, burst mode OFF. Data store is 336 Mb

Figure 2-27 DMS-100 Wireless business model for low-mobility CDMA SR60 CM capacity and data store limit



Traffic assumptions for Figure 2-27:

- DMS-100 Wireless business office model with wireline 180s AHT, 4 CCS Res, 6 CCS IBN, pbx 48.6%
- Wireless low mobility model with 100% CDMA, 120s AHT, 256k VLR, local HLR, combined PSTN trunking
- LWW0006 G 2 RTs
- SR60 with 74% CM engineering point, burst mode OFF. Data store is 336 Mb.

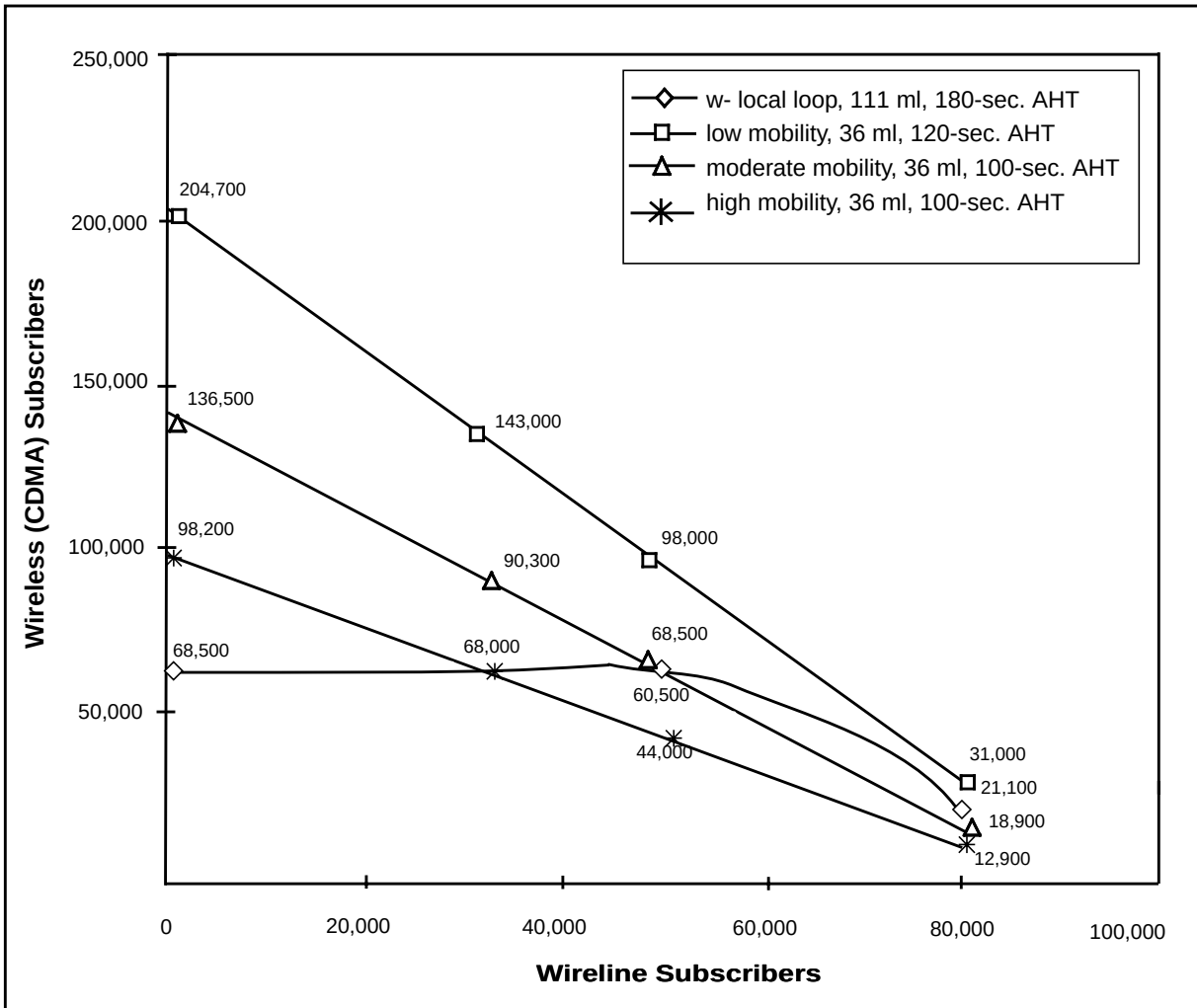
LWW0007 system capacity forecasts

The following figures show system capacity estimates for various processor, wireless/wireless subscribers, and mobility levels. These estimates assume CLEC office model, combined PSTN trunking, local HLR, and fixed traffic levels for each subscriber. Changing any of these assumptions can result in significant impacts to system capacity.

For SN70EM, it is recommended that wireless and wireline subscribers be a trigger for switch capacity study, especially for high-mobility installations.

Heavy wireless local loop deployment uses SBS shelves. High-mobility TDMA/AMPS installations can trigger at 85K subscribers (SN70EM) due to high AWT over CDMA.

These figures do not reflect SNSE. However, Nortel Networks does not recommend the use of SR60 with SNSE for LWW0007 due to low memory capacity. Figure 2-28 shows the LWW0007 capacity forecast using CDMA SR70EM CM.

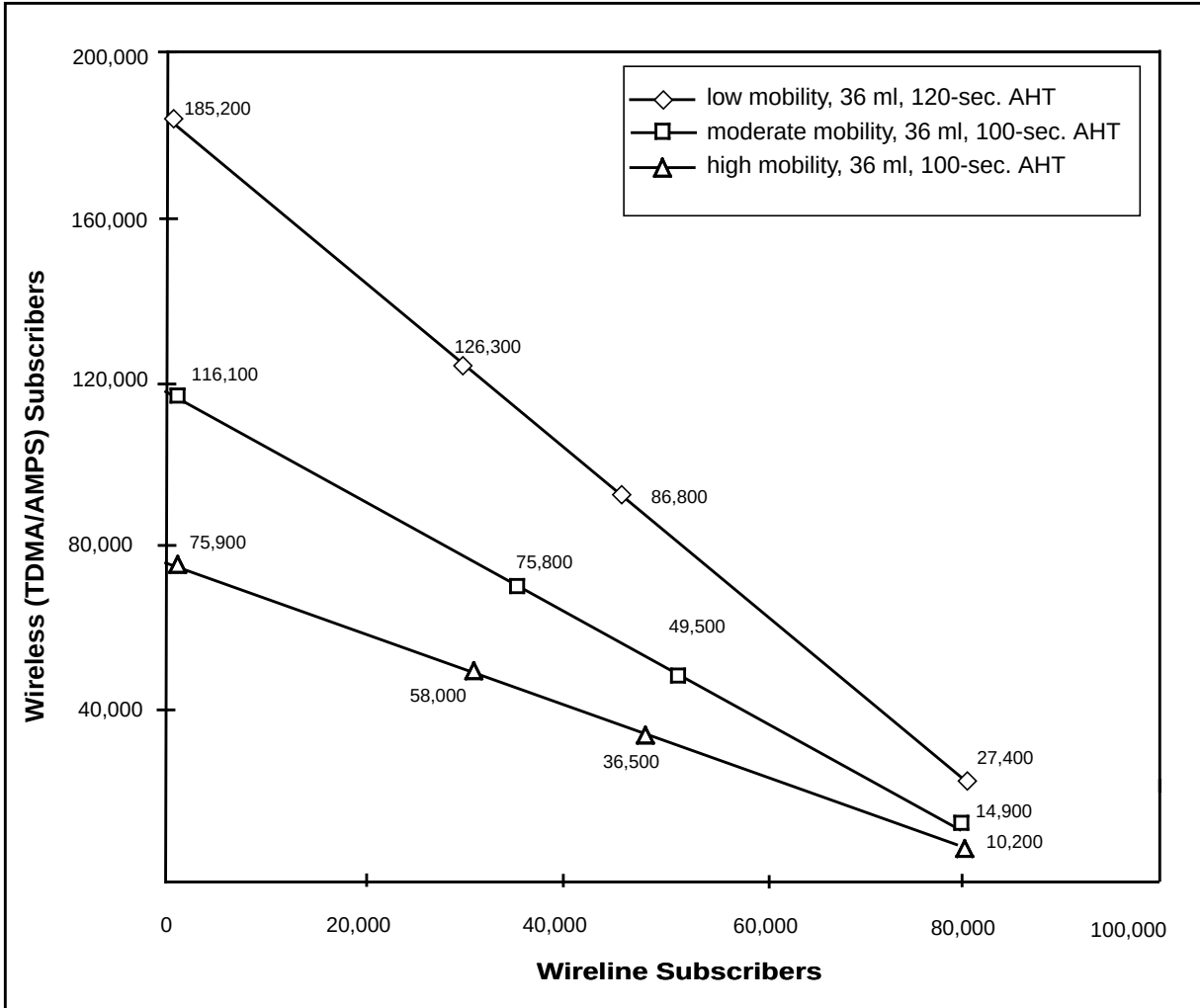
Figure 2-28 DMS-100 Wireless CDMA SR70EM CM capacity forecast (LWW0007)

Traffic assumptions for Figure 2-28:

- DMS-100 Wireless CLEC office model with wireline
4 CCS Res, 6 CCS IBN, 12 CCS BRI, 180-sec. AHT
- Wireless joint product CDMA with 256k VLR, local HLR, basic w-
call models
- SR70EM with 77% CM engineering point
- LWW0007 IMP CM capacity forecast:
 - MTX09 G2 call timings
 - NA013 IMP call timings

Figure 2-29 shows the LWW0007 capacity forecast using TMDA/AMPS SR70EM CM.

Figure 2-29 DMS-100 Wireless TDMA/AMPS SR70EM CM capacity forecast (LWW0007)

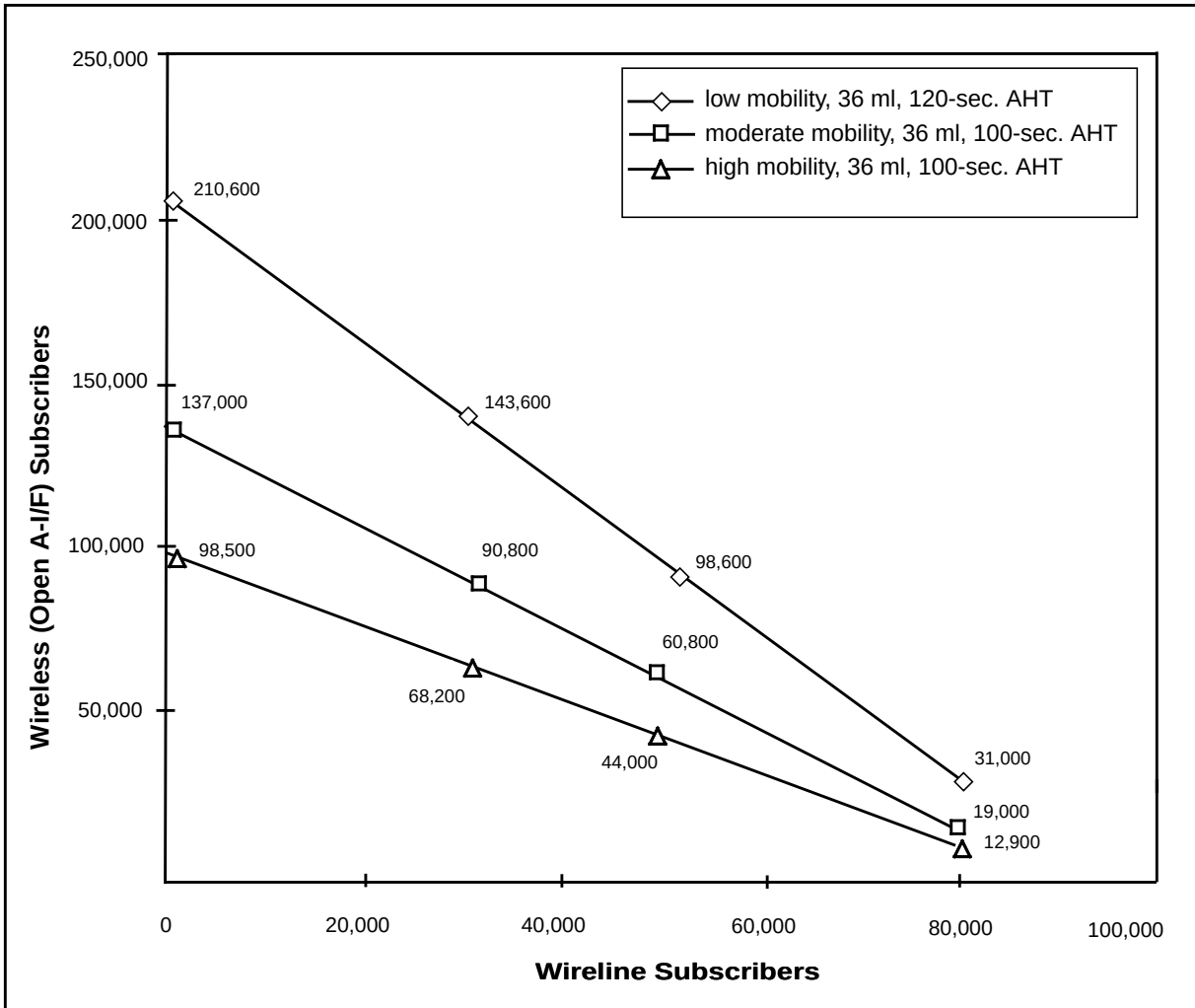


Traffic assumptions for Figure 2-29:

- DMS-100 Wireless CLEC office model with wireline 4 CCS Res, 6 CCS IBN, 12 CCS BRI, 180-sec. AHT
- Wireless Nortel TDMA/AMPS with 256k VLR, local HLR, basic w-call models
- SR70EM with 77% CM engineering point
- LWW0007 CHK IMP CM capacity forecast:
 - MTX09 G2 call timings
 - NA013 IMP call timings

Figure 2-30 shows the LWW0007 capacity forecast using open A-I/F SR70EM.

Figure 2-30 DMS-100 Wireless Open A-I/F capacity (IMP) SR70EM forecast (LWW0007)



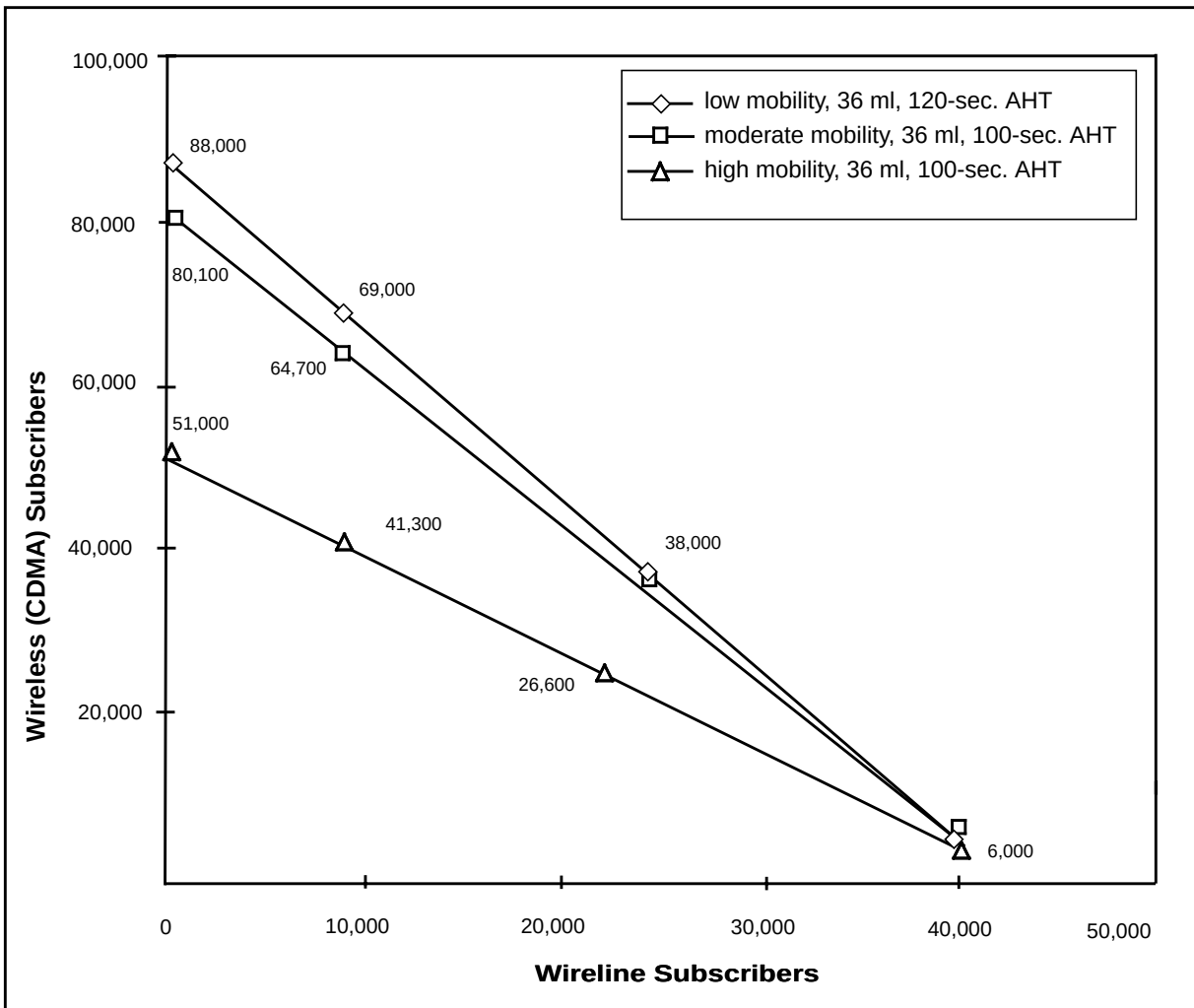
Traffic assumptions for Figure 2-30:

- DMS-100 Wireless CLEC office model with wireline
4 CCS Res, 6 CCS IBN, 12 CCS BRI, 180-sec. AHT
- Wireless Open A-I/F with 256k VLR, local HLR, basic w- call models
- SR70EM with 77% CM engineering point
- LWW0007 IMP CM capacity forecast:
 - MTX09 G2 call timings
 - NA013 IMP call timings

SN60 can support a smaller deployment of LWW0007, as Figure 2-31 shows. (In this case data store memory can be the bottleneck instead of CPUtil.)

Figure 2-31 shows the LWW0007 capacity forecast using CDMA SR60.

Figure 2-31 DMS-100 Wireless CDMA SR60 capacity (IMP) forecast (LWW0007)



Traffic assumptions for Figure 2-31:

- DMS-100 Wireless CLEC model with wireline
4 CCS Res, 6 CCS IBN, 12 CCS BRI, 180-sec. AHT
- Wireless joint product CDMA with 256k VLR, local HLR, basic w-
call models
- SR60 with 74% CM engineering point
- LWW0007 CHK CM capacity forecast:
 - MTX09 G2 call timings
 - NA013 IMP call timings

Traffic capacity

This subsection provides background and methods to enable system planners to calculate key performance metrics for the DMS-100 Wireless switch.

Operations measurements (OM) for the various call types, which the DMS-100 Wireless switch supports, can affect performance metrics. These metrics also provide system performance, grade of service offered, connecting facilities, and traffic levels of various internal and external system elements.

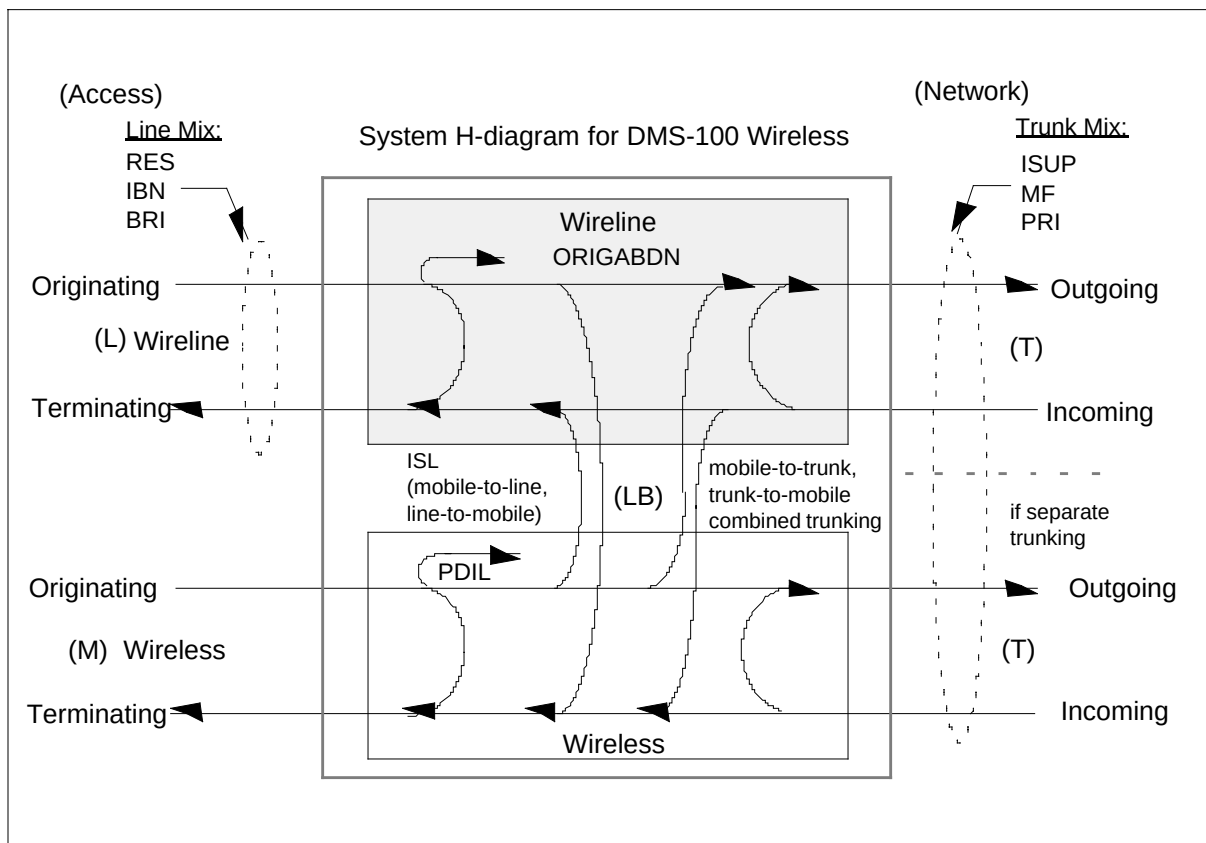
This subsection also includes traffic fundamentals and modeling information including a modified H-diagram that incorporates both wireline and wireless traffic.

Traffic modeling overview

An H-diagram is the most commonly used technique of traffic modeling for call processing nodes. The DMS-100 Wireless traffic model combines H-diagrams from the wireline and wireless functionalities.

Figure 2-32 shows an example of an H-diagram for the DMS-100 Wireless switch.

Figure 2-32 DMS-100 Wireless system H-diagram



The dual H-diagrams act independently. Traffic engineering personnel cannot apply the percentage of call mix in the wireline H-diagram to wireless agents.

Likewise, they cannot apply the percentage of call mix in the wireless H-diagram to the wireline agents.

Treat the wireless traffic as the access side of the H-diagram to calculate traffic. The wireless call control, however, treats the wireless end user as a trunk agent. Thus, the switch pegs originations from a wireless agent as incoming calls (that is, NINs) in the OM group OFZ. The DMS-100 Wireless switch also requires other wireless OMs, such as group OMMTX, for the wireline Flexible Advanced Capacity Engineering Tool (FACET) REAL:TIME tool to normalize OFZ OMs for both H-diagrams.

As the previous figure shows, the DMS-100 Wireless switch requires a set of ISL trunk call types, which connect both H-diagrams. The switch uses ISDN user part (ISUP) ISL trunks to route wireline-to-wireless calls, or wireless-to-wireline calls. The switch treats a wireline-to-wireless call as an originating outgoing (ORIGOUT) call from the wireline portion of the switch, and an incoming-to-terminating (INCTRM) call from the wireless portion of the switch.

The DMS-100 Wireless switch also supports separate trunking. The following wireless calls must route through ISUP ISL trunks to the wireline portion of the switch:

- wireless-to-primary rate interface (PRI)
- wireless-to-private branch exchange (PBX)
- wireless-to-equal access (EA) intertoll (IT), or access-to-carrier (ATC)

A set of percentage of call mixes (one set for each call flow that the H-diagram defines) determines the traffic pattern of a call processing node. The percentage of call mix allows traffic engineers to specify traffic patterns. It also distributes traffic loads from system level to individual call flows (that is, originating-to-outgoing).

A set of call types further defines the traffic pattern for a system. This set of call types (also known as traffic model) represents the majority of call processing traffic on the modeled offices.

To develop a traffic model, identify a set of call types. The real switches measure their call timing and track the call volume. To support these activities, the DMS-100 Wireless switch provides a set of OMs, (including OM groups OFZ, OTS, RTLTSUM) and on-switch tools (such as CPSTAT and Calltrak) to measure and provide traffic data.

After traffic engineers collect and analyze field and lab data, they can normalize call distribution and assign a weighting factor for each call type. The call type weighting factor is the percentage of call time that the call type

contributes to the average work time (AWT). A computed AWT_c is the sum of contributed RT from each call type in the model.

The following equation expresses

$$AWT_c = \text{Sum}(\% \text{weighting}_i * RT_i) + \text{features\_AddOn\_cost};$$

where $i=1$ to n th call type

That is, the AWT_c is the average RT required for a call processing node to process a call.

Use the following equation to validate (or align) the computed AWT_c :

$$AWT_a = (\text{CPOccupancy}_a * 3,600,000 \text{ ms}) / \text{BHCA}_a$$

where BHCA_a (busy hour call attempts) is the number of calls (as the OFZ OMs peg) that the CM has processed and CPOccupancy_a is the actual CP RT it spent. (Ideally, AWT_a should match the AWT_c . This equation uses an estimate because no real offices exist that are 100% identical to the model office.)

System capacity planning and forecast mainly uses AWT_c , as the following equation shows.

$$\text{BHCA}_e = (\text{CPOccu}_{e(\text{engineering limit})} * 3,600,000 \text{ ms}) / \text{AWT}_c$$

where BHCA_e , also known as engineered call capacity, is the system engineered capacity for a given configuration and grade of service.

The capacity erosion analysis is another important AWT_c application. The AWT_c provides a quantifiable indication of capacity erosion to initiate the capacity recovery activities.

ISL trunks

The DMS-100 Wireless switch requires ISUP ISL trunks to route the following wireline and wireless calls:

- intraswitched wireless-to-wireline calls
- wireless calls to access interexchange carriers
- wireless calls to access operator services
- wireless calls to access 911/411/611 services
- wireless calls to access voicemail services

The wireline portion of the switch acts as an access tandem switch when it receives wireless traffic.

Note: Refer to chapter 5, “Translations and call processing,” for additional information on how ISL trunks affect translations.

The use of ISL trunks implies that the DMS-100 Wireless switch pegs OM registers NIN or NORIG, or both, twice. To determine accurate call attempt data, subtract the ISUPUSAG OM pegs from NIN and NORIG OM pegs for ISUP ISL trunks.

CM capacity model

The CM is the core of the switch. The CM processes all the calls before a connection occurs. Also, vertical features, such as Call Forwarding, offer some load on the CM.

A CM capacity model can consist of the following call event categories:

- land-to-mobile (L-M) calls
- mobile-land (M-L) calls
- mobile-mobile (M-M) calls

Sub-events divide each of the previous call event categories. The OMs correspond to sub-events. Multiply the sub-events by the weights to determine the length of time.

The OSS uses the previous CM capacity model to show different activities of CM. These activities indicate the events that occur in the CM.

CM activity computations

This section contains the formulas for computing CM activities and defines the variables that the formulas use.

CM variables

The formulas in the next section include the following variables related to CM activity. Operational measurements in the CM frequently determine the names of these variables.

- BHCA refers to the number of call attempts in the busy hour for the CM.
- Call attempts refers to the actual number of times the switch tries to complete a call.

Call attempts=NIN + NORIG - ISL trunk duplication

Since L-M and M-L calls use ISL trunks between both portions of the switch, the formula counts the call attempts twice. (Consider this double count in the sum by subtracting the ISL trunk duplication quantity. The switch does not peg this quantity as an OM.)

- Number of L-M call attempts refers to the number of land-to-mobile call attempts made.
L-M call attempts=LMATTTS (total of all cells on the switch)
- Number of successful L-M call attempts refers to the number of land-to-mobile call attempts that terminated on the mobile unit.
Successful L-M call attempts=LMCOMPS (total of all cells on the switch)
- Number of M-L call attempts refers to the number of call attempts a mobile unit made to the PSTN network.
Number of M-L call attempts=MLATTTS (total of all cells on the switch)
- Number of successful M-L call attempts refers to the number of mobile-to-land call attempts that terminated.
Number of successful M-L call attempts=MLCOMPS (total of all cells on the switch)
- Number of M-M call attempts refers to the number of calls attempts made from a mobile to a mobile DN.
Number of M-M call attempts=MMATTTS (total of all cells on the switch)
- Number of successful M-M call attempts refers to the number of mobile-to-mobile call attempts that terminated. (In this case, the subscriber could or could not have answered the call.)
Number of successful M-M call attempts=MMCOMPS (total of all cells on the switch)
- Number of L-L call attempts refers to the number of land-to-land call attempts, according to existing wireline functionality.
- Number of successful L-L call attempts refers to the number of land-to-land call attempts that terminated. (This measurement considers the possibility that the subscriber could have answered the call.)
- Number of handoff attempts (in the switch) refers to the number of calls a mobile unit handed off from its serving cell.
Number of handoff attempts=HOATTTS (total of all cells on the switch)
- Number of successful handoff attempts (in the switch) refers to the number of successful calls mobile unit handed off from its serving cell.
Number of successful handoff attempts=HOCOMPS (total of all cells on the switch)

- Number of inter-switch handoff attempts (incoming) refers to the number of interswitch handoffs attempted, with handoff to the current switch.
Number of interswitch handoff attempts (incoming)=IHATTSIC (total of all cells on the switch)
- Number of successful interswitch handoff attempts (incoming) refers to the number of interswitch handoffs that the switch completed.
Number of successful interswitch handoff attempts (incoming)=IHCOMPIC (total of all cells on the switch)
- Number of inter-switch handoff attempts (outgoing) reports the number of interswitch handoffs that the switch attempted to a neighboring switch.
Number of outgoing interswitch handoff attempts (outgoing)=IHATTSOG (total of all cells on the switch)
- Number of successful interswitch handoff attempts (outgoing) refers to the number of interswitch handoff attempts that a servicing switch successfully completed to a neighboring switch.
Number of successful interswitch handoff attempts (outgoing)=IHCOMPOG (total of all cells on the switch)
- Authentication origination refers to the number of originations from the authentication capable mobiles if their VLR entry exists and the system is configured for authentication.
Authentication originations=MATHORIG
- Authentication registration refers to the number of registration requests for which the system performs authentication.
Authentication registration=MATHREG
- Authentication SSD update refers to the number of SSD update operations that the AC requested for a mobile involved in a call.
Authentication SSD update=MSSDUPIN
- SMS successful refers to the number of SMS messages received successfully. It indicates the number of SMS RACH SPACH confirmations that the ICP received.
SMS successful=DSMSCONF (total over all sectors on the switch)
- SMS failure DCCH refers to the number of SMS RACH R-DATA rejections that the ICP received.
SMS failure (DCCH)=DSMSRJCT (total of all sectors on the switch)
- SMS failure overload refers to the number of SMS pages that the ICP discarded due to an overload condition.
SMS failure overload=ICPOVLD2 (total of all sectors on the the switch)

- SAT DVCC refers to the digital verification color code (DVCC) that distinguishes digital traffic channels from other co-channel digital traffic channels for TDMA. This value equals the supervisory audio tone (SAT) for analog voice channels in AMPS cellular systems. The DVCC can have 255 codes. A call drops when the time-out threshold expires.
- Erlang Traffic refers to the total traffic (land plus mobile) in erlangs.

$$\text{Erlang Traffic} = (\text{TRU}/36) * (3600/\text{collectionPeriod})$$
summed over all sectors on the switch
- Average hold time refers to the average hold time (land plus mobile) in seconds.

$$\text{Average hold time} = (\text{erlang\_traffic}) / (2 * \text{NIN} / \text{collectionPeriod})$$
- Cell erlang traffic refers to the mobile traffic (in erlangs) that trunks carry from cells to the wireless portion of the switch.

$$\text{Cell (mobile) erlang traffic} = (\text{TRUICP}/36) * (3600/\text{collectionPeriod})$$
where TRUICP is the sum of TRU register value for all the trunks carrying traffic from cells to the wireless portion of the switch
- Cell average hold time refers to the mobile average hold time in seconds.

$$\text{Cell (mobile) average hold time} = ((\text{cell\_erlang\_traffic}) / (\text{NIN} / \text{collectionPeriod}))$$
- DTC erlang traffic refers to the land traffic in erlangs that the trunks carry from the DMS-100 Wireless switch to the PSTN (DID trunk types).

$$\text{DTC (land) erlang traffic} = (\text{TRUDID}/36) * (3600/\text{collectionPeriod})$$
where TRUDID is the sum of TRU register value for trunk type DID
- The DTC average hold time refers to the DTC (land) average hold time in seconds.

$$\text{The DTC (land) average hold time} = ((\text{dtc\_erlang\_traffic}) / (\text{NIN} / \text{collectionPeriod}))$$
- RealCost (x) refers to the CM RT cost associated with event x. The set of events includes those for successful (that is, completed calls) and unsuccessful (that is, time-out, incomplete calls,) and call activities.

Operational measurement background

Many formulas for calculating the RT cost of call type events in the use OM register pegs. The CM occupancy formulas for the DMS-100 Wireless use the following wireless OM registers:

- ADMOBORG = add mobile origination
- REGATTS = registration attempts pegs

- REGNIVIC = registration pegs
 - REGNIVIC_self is the value of REGNIVIC for the home switch.
 - REGNIVIC_other is the value of REGNIVIC for the total IS-41 links without REGNIVIC_self.
- REGNIVOG = registration pegs
 - REGNIVOG_self is the value of REGNIVOG for the serving switch.
 - REGNIVOG_other is the value of REGNIVOG for the total IS-41 links without REGNIVOG_self.
- RGCNIVIC = registration notification and cancellation pegs
 - RGCNIVIC_self is the value of RGCNIVIC for the home switch.
 - RGCNIVIC_other is value of RGCNIVIC for the total IS-41 links without RGCNIVIC_self.

The following OM registers belong to MTXNWKIC for incoming messages, and MTXNWKOG for outgoing messages.

- Network boundary paging related: NBPREQIC, NBPRSPIC, NBPREQOG, NBPRSPOG
- Remote feature control related: RFCREQIC, RFCRESIC, RFCREQOG, RFCRESOG, QDIRIVIC, QDIRRRIC, PDIRIVIC, PDIRRRIC, QDIRIVOG, QDIRRROG, PDIRIVOG, PDIRRROG
- Call redirection related: REDRIVIC, REDRRRIC, TRANIVIC, TRANRRIC, REDRIVOG, REDRRROG, TRANIVOG, TRANRROG
- CSS inactive and deregistration related: CSSIIVIC, CSSIRRIC, CSSIIVOG, CSSIRROG
- Networking OA & M related: OAMIC_SUM, OAMOG_SUM
- Vertical feature invocation on intersystem handoff related: FLSHIVIC, FLSHIVOG, STINIVIC, STINRRIC, STINIVOG, STINRROG

The formulas also use existing wireline OM registers.

CM formulas

Use the following formulas to calculate CM occupancy values.

L-M calls To determine the land-to-mobile calls, use the following formula.

L-M Call = * (RealCost(LM CALL COMPLETE) + RealCost(ISL TRUNKING)) / NIN] + [(LMATTS - LMCOMPS) * (RealCost(LM CALL SAT DVCC TIMEOUT) + RealCost(ISL TRUNKING)) / NIN] + [(SYSREQ - SYSRESP) * LMATTS * (RealCost(LM CALL PAGE TIMEOUT) + RealCost(ISL TRUNKING)) / ((LMATTS + MMATTS) * NIN)] + [TFRMBIA * LMATTS * (RealCost(CALL INACTIVE) + RealCost(ISL TRUNKING)) / ((LMATTS + MMATTS) * NIN)] * NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds), summed over all cells on switch

M-L calls To determine the mobile-to-land call, use the following formula.

M-L Call = - ADMOBORG) * (RealCost(ML CALL IN VLR COMPLETE) + RealCost(ISL TRUNKING)) / NIN] + [ADMOBORG * (RealCost(ML CALL OUT VLR COMPLETE) + RealCost(ISL TRUNKING)) / NIN] + [(MLATTS - MLCOMPS) * (RealCost(ML CALL INCOMPLETE) + RealCost(ISL TRUNKING)) / NIN] * NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)), summed over all cells on switch

M-M calls To determine the mobile-to-mobile calls, use the following formula.

M-M Call = * RealCost(MM CALL COMPLETE) / NIN] + [(MMATTS - MMCOMPS) * RealCost(MM CALL SAT DVCC TIMEOUT) / NIN] + [(SYSREQ - SYSRESP) * MMATTS * RealCost(MM CALL PAGE TIMEOUT) / ((LMATTS + MMATTS) * NIN)] + [TFRMBIA * MMATTS * RealCost(MM CALL INACTIVE) / ((LMATTS + MMATTS) * NIN)] * NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)), summed over all cells on switch

L-L calls To determine the land-to-land calls, use the same formula that the existing wireline switch uses.

L-L Call = average real-time for each L-L call

Call delivery To determine call delivery, use the following formula.

Call Delivery = * (RealCost(CALL DELIVERY CD SEND SUCCESSFUL) + 2 * RealCost(ISL TRUNKING)) / NIN] + [(LOCREQOG + RTEREQIC - RTEREQOG) - (LMATTS + MMATTS) - (SYSREQ - SYSRESP) - TFRMBIA * (RealCost(CALL DELIVERY CD SEND UNSUCCESSFUL) + 2 * RealCost(ISL TRUNKING)) / NIN] + [RTEREQIC * (RealCost(CALL DELIVERY CD RECEIVED) + 2 * RealCost(ISL TRUNKING)) / NIN] * NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)), summed over all cells on switch

Other call types To determine other call types, use the following formula.

Other Call Types = * RealCost(OTHER TYPES GET BILLING BLOCK) /
(10 * NIN)* NIN * 100 / (Hardware_Factor * OM Collection Period
(in secs) * 1000000 microseconds)

Incoming VLR registration To determine the incoming VLR registration, use the following formula.

Incoming VLR Registration = - sum over all other links
(REGNIVOG) * RealCost(IN VLR REGISTRATION) / NIN* NIN * 100 /
(Hardware_Factor * OM_Collection_Period (in secs) * 1000000
microseconds)), summed over all cells on switch

Outgoing VLR registration To determine the outgoing VLR registration, use the following formula.

Outgoing VLR Registration = Link (REGNIVIC) * RealCost (OUT VLR
REGISTRATION AT HOME SWITCH) / NIN] + [Sum over all other Links
(REGNIVOG) * RealCost(OUT VLR REGISTRATION AT SERVING SWITCH) /
NIN] + [Self Link (RGCNIVIC) * RealCost(OUT VLR NOTIFICATION
CANCELED AT HOME SWITCH) / NIN] + [Sum over other links
(RGCNIVIC) * RealCost(OUT VLR REGISTRATION CANCELED AT SERVING
SWITCH) / NIN] + [sum over other Links (REGNIVIC) - Self Link
(RGCNIVIC) * RealCost (OUT VLR REGISTRATION NOTIFICATION
CANCELED AT HLR) / NIN]* NIN * 100 / (Hardware_Factor *
OM_Collection_Period (in secs) * 1000000 microseconds)

Handoffs To determine handoff, use the following formula.

Handoff = * RealCost(HANDOFF IN SWITCH NO RESPONSE) / NIN] +
[(HOATTS - HOCOMPS) * RealCost(HANDOFF IN SWITCH UNSUCCESSFUL)
/ NIN] + [HOCOMPS * RealCost(HANDOFF IN SWITCH SUCCESSFUL) /
NIN] + [(IHATTSIC - IHCOMPIC) * RealCost(HANDOFF INTERSWITCH
INCOMING UNSUCCESSFUL) / NIN] + [IHCOMPIC) * RealCost(HANDOFF
INTERSWITCH INCOMING SUCCESSFUL) / NIN] + / NIN] + [IHCOMPIC)
* RealCost(HANDOFF INTERSWITCH OUTGOING SUCCESSFUL) / NIN]* NIN
* 100 / (Hardware_Factor * OM_Collection_Period (in secs) *
1000000 microseconds)), summed over all cells on switch

IS-41 messages To determine IS-41 message. use the following formula.

IS-41 Messages = + MEASRRIC + MEASIVOG + MEASRROG) *
RealCost(IS41 MESSAGES: INTERSWITCH RSSI REQUEST RELATED) /NIN]
+ [(NBPREQIC + NBPRSPIC + NBPREQOG + NBPRSPOG) * RealCost (IS41
MESSAGES NETWORK BOUNDARY PAGING RELATED) / NIN] + [(RFCREQIC +
RFCRESIC + RFCREQOG + RFCRESOG + QDIRIVIC + QDIRRRIC + PDIRIVIC

+ PDIRRRIC + QDIRIVOG + QDIRRROG + PDIRIVOG + PDIRRROG) * RealCost(IS41 MESSAGES: REMOTE FEATURE CONTROL RELATED) / NIN] + [(REDRIVIC + REDRRRIC + TRANIVIC + TRANRRIC + REDRIVOG + REDRRROG + TRANIVOG + TRANRROG) * RealCost(IS41 MESSAGES: CALL REDIRECT RELATED) / NIN] + [(CSSIIVIC + CSSIRRIC + CSSIIVOG + CSSIRROG) * RealCost (IS41 MESSAGES: CSS INACTIVE DEREGISTERED RELATED) / NIN] + [(FLSHIVIC + FLSHIVOG + STINIVIC + STINRRIC + STINIVOG + STINRROG) * RealCost(IS41 MESSAGES: VERTICAL FEATURES INVOCATION ON INTERSYSTEM HANDOFF RELATED) / NIN] + [(All OM Registers in NWKOAMIC and NWKOAMOG) * RealCost(IS41 MESSAGES NETWORKING OAM RELATED) / NIN]* NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)), summed over all cells on switch

Paging To determine paging, use the following formula.

Paging = - SYSRESP * Zone Paging Probability * 0.95) * RealCost (PAGING CM - ICP REPAGE EVENTS) / NIN] + [SYSREQ * (No of ICPs * Cells per Zone / No of Cells - 1) + SYSREQ - SYSRESP * zone Paging probability * 0.95 * (No of ICPs - 1) * RealCost(PAGING ADDITIONAL BROADCAST MESSAGES) / NIN]* NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)

RSSI features To determine the RSSI feature, use the following formula.

RSSI Features = * Average No of ICPs / Average No of Partitions * RealCost(RSSI REQUEST CM - ICP MESSAGES) / NIN] + [LCRREQS - LCRRSPS * Average No of ICPs / Average No of Partitions * RealCost(RSSI REQUEST ADDITIONAL PARTS) / NIN]* NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)

Vertical features To determine the vertical feature, use the following formula.

Vertical Features = * RealCost (VERTICAL FEATURE: CALL FORWARD UNCONDITIONAL) / NIN] + [MCFDOFRD * RealCost (VERTICAL FEATURE: CALL FORWARD DO NO ANSWER) / NIN] + [TWCSTART * RealCost(VERTICAL FEATURE: THREE WAY CALLING) / NIN] + [CWTATT * RealCost (VERTICAL FEATURE: CALL WAITING) / NIN]* NIN * 100 / (Hardware_Factor * OM_Collection_Period (in secs) * 1000000 microseconds)

Authentication origination To determine the authentication origination, use the following formula.

$$\text{Authentication Origination} = \text{ORIGINATION} * \text{RealCost}(\text{AUTHORIZATION ORIGINATION}) / \text{NIN}$$

Authentication registration To determine the authentication registration, use the following formula.

$$\text{Authentication Registration} = \text{REGISTRATION} * \text{RealCost}(\text{AUTHORIZATION REGISTRATION}) / \text{NIN}$$

Authentication SSD update To determine the authentication SSD update, use the following formula.

$$\text{Authentication SSD} = \text{SSDUPDATE} * \text{RealCost}(\text{AUTHORIZATION SSD UPDATE}) / \text{NIN}$$

SMS To determine the SMS, use the following formula.

$$\text{SMS} = * \text{RealCost}(\text{SUCCESSFUL AIRLINK}) + (\text{FAILURE\_DCCH} * \text{RealCost}(\text{FAILURE: DCCH}) + (\text{FAILURE\_BUSYRESOURCES} * \text{RealCost}(\text{FAILURE: BUSY RESOURCES})) \text{summed over all cells on switch}$$

AWT To determine the AWT, use the following formula.

$$\begin{aligned} \text{AWT} = & \text{L-M Call} + \text{M-L Call} + \text{M-M Call} + \text{L-L Call} + \text{Call Delivery} \\ & + \text{Other Call Types} + \text{Other Call Types} + \text{Incoming VLR} \\ & \text{Registration} + \text{Outgoing VLR Registration} + \text{Handoff} + \text{IS41} \\ & \text{Messages} + \text{Paging} + \text{RSSI Features} + \text{Vertical Features} + \\ & \text{Authentication Origination} + \text{Authentication Registration} + \\ & \text{Authentication SSD SMS} \end{aligned}$$

Network performance summary

This section lists performance metrics for the wireline portion, the wireless portion, and the overall DMS-100 Wireless switch. (Subscript notations

“w+”, “w-”, and “lww” refer to the wireline, wireless, and overall switches, respectively.)

Wireline performance metrics

The following list includes system performance metrics for the wireline portion of the DMS-100 Wireless switch:

- $\text{System BHCA}_{w+} = \text{NIN}_{w+} + \text{NORIG}$
- $\text{Completions Ratio} = 100 * \text{LLCOMPS} / \text{System BHCA}_{w+}$ (same as the wireline functionality)
- $\text{Origination Completion Ratio}$: (same as the wireline functionality)
- $\text{Termination Completion Ratio}$: (same as the wireline functionality)
- $\text{Origination Attempts Ratio}$: (same as the wireline functionality)
- $\text{Termination Attempts Ratio}$: (same as the wireline functionality)

Wireless performance metrics

The following list includes system performance metrics for the wireless portion of the DMS-100 Wireless switch:

- $\text{System BHCA}_{w-} = \text{NIN}_{w-}$
- $\text{Completions Ratio} = 100 * (\text{MMCOMPS} + \text{MLCOMPS} + \text{LMCOMPS}) / \text{System BHCA}_{w-}$
- $\text{Mobile Origination Completions Ratio} = 100 * (\text{MMCOMPS} + \text{MLCOMPS}) / \text{System BHCA}_{w-}$
- $\text{Mobile Terminations Completions Ratio} = 100 * (\text{LMCOMPS} + \text{MMCOMPS}) / \text{System BHCA}_{w-}$
- $\text{Mobile Origination Attempts Ratio} = 100 * (\text{MMATTS} + \text{MLATTS}) / \text{System BHCA}_{w-}$
- $\text{Mobile Outgoing Completions Ratio} = 100 * \text{MLCOMPS} / \text{System BHCA}_{w-}$
- $\text{Mobile Terminations Attempts Ratio} = 100 * (\text{LMATTS} + \text{MMATTS}) / \text{System BHCA}_{w-}$
- $\text{Mobile Outgoing Attempts Ratio} = 100 * \text{MLATTS} / \text{System BHCA}_{w-}$
- $\text{Dropped Handoffs} = \text{DROPHO}$
- $\text{Dropped Handoff Percentage} = 100 * \text{DROPHO} / \text{HOCOMPS}$
- $\text{Handoff Completions} = \text{HOCOMPS} - \text{DDROPHO}$

Overall system performance metrics

The following list includes system performance metrics for the entire DMS-100 Wireless switch:

- $\text{System BHCA}_{\text{IWW}} = \text{System BHCA}_{\text{W}+} + \text{System BHCA}_{\text{W}-} - \text{ISL\_ISUPUSAG} = \text{NIN}_{\text{W}+} + \text{NORIG} + \text{NIN}_{\text{W}-} - \text{ISL\_ISUPUSAG}$
- $\text{Completions Ratio} = 100 * (\text{MMCOMPS} + \text{MLCOMPS} + \text{LMCOMPS} + \text{LLCOMPS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Mobile Origination Completions Ratio} = 100 * (\text{MMCOMPS} + \text{MLCOMPS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Mobile Terminations Completions Ratio} = 100 * (\text{LMCOMPS} + \text{MMCOMPS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Mobile Origination Attempts Ratio} = 100 * (\text{MMATTS} + \text{MLATTS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Mobile Terminations Attempts Ratio} = 100 * (\text{LMATTS} + \text{MMATTS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Land Origination Completions Ratio} = 100 * (\text{LLCOMPS} + \text{LMCOMPS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Land Terminations Completions Ratio} = 100 * (\text{LLCOMPS} + \text{MLCOMPS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Land Origination Attempts Ratio} = 100 * (\text{LLATTS} + \text{LMATTS}) / \text{System BHCA}_{\text{IWW}}$
- $\text{Land Terminations Attempts Ratio} = 100 * (\text{LLATTS} + \text{MLATTS}) / \text{System BHCA}_{\text{IWW}}$

where, “LLCOMPS” and “LLATTS” refer to the completed and attempted L-L calls, respectively.

Network system overview

This section lists system metrics for the wireline portion, the wireless portion, and the overall DMS-100 Wireless switch.

Wireline system metrics

From the wireline half perspective, all calls are land-to-land calls.

Wireless system metrics

The following list includes system performance metrics for the wireless portion of the DMS-100 Wireless switch:

- Mobile-to-Land % = $100 * \text{SUM}(\text{MLCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}))$
- Mobile-to-Mobile % = $100 * \text{SUM}(\text{MMCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}))$
- Land-to-Mobile % = $100 * \text{SUM}(\text{LMCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}))$

Overall system metrics

The following list includes system metrics for the entire DMS-100 Wireless switch:

- Mobile-to-Land % = $100 * \text{SUM}(\text{MLCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}) + \text{SUM}(\text{LLCOMPS}))$
- Mobile-to-Mobile % = $100 * \text{SUM}(\text{MMCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}) + \text{SUM}(\text{LLCOMPS}))$
- Land-to-Mobile % = $100 * \text{SUM}(\text{LMCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}) + \text{SUM}(\text{LLCOMPS}))$
- Land-to-Land % = $100 * \text{SUM}(\text{LLCOMPS}) / (\text{SUM}(\text{MLCOMPS}) + \text{SUM}(\text{MMCOMPS}) + \text{SUM}(\text{LMCOMPS}) + \text{SUM}(\text{LLCOMPS}))$

Recommendations

Call blocking

Call blocking performance reflects how well the system accepts new call originations, call terminations, and hard handoff attempts from other cells. Unavailable network resources, such as access trunks, SBS selector elements (for CDMA), and BTS channels, can produce network-related call blocking.

For wireless calls, the normal engineered performance goal is 2% blocking, caused by resource shortage.

Provision additional resources if pegged OMs indicate the percentage of blocked calls exceeds the engineered goal. (The additional resources depend on whether BTS channels, SBS resources, or access trunks change the OMs.) Also, other OMs can indicate potential RF problems.

Dropped call performance

Dropped calls include calls that arrived on the traffic channel, but disconnected for a reason other than one of the parties went on-hook.

The performance goal for dropped calls depends on whether the call drop occurs in one of the following areas:

A switch blocks calls whenever the network demand exceeds capacity. How the switch handles this excess demand and how often it blocks calls are performance criterion that falls within the control of the system engineering.

- core coverage
- hard handoff
- CDMA-AMPS or AMPS-CDMA handoff

An estimate for dropped calls runs from 1% to 2% when a caller dials from within a core coverage area. When a caller dials from on the fringe of the core coverage area, the estimate for dropped calls runs from 1% to 5%. (On the fringe of the core coverage area can include a hard handoff area, a CDMA-AMPS, or an AMPS-CDMA handoff area.)

The following list includes possible causes of excessive dropped calls:

- pilot datafill error
- configuration of handoff parameters
- RF problems
- state mismatches between entities (such as, BTS, SBS, DTC, ICM)

Handoff performances

The following sections provide information on how hard and soft handoffs affect traffic capacity.

Hard handoff An unsuccessful hard handoff results in a dropped call for CDMA and AMPS/TDMA.

For intrasystem and intersystem hard handoffs involving all groups of CDMA and AMPS/TDMA calls, at least 95% to 99% of hard handoffs should succeed.

Possible causes for excessive unsuccessful hard handoff include lack of resources, (that is. channels) and message time-outs. For message time-out handoffs, refer to IS-41 messaging OMs in addition to the handoff OMs in the CM.

Soft handoff Unlike hard handoff for CDMA and AMPS/TDMA, an unsuccessful soft handoff does not result in a dropped call. However, an unsuccessful soft handoff means that operating company personnel must add RF capacity to maintain the call. (A call does not complete with inadequate RF capacity.)

Less than 0.5% to 1% of all soft handoffs can fail. Do not have a prescribed percentage of all mobiles in one sector in soft handoff with another sector. The percentage varies between 15% to 100%, depending on the number of mobile units and geography of the sectors.

Note: The CM does not provide OMs for soft handoff performance.

CM occupancy

The CM measures occupancy using CPOcc. The CPOcc measurement is the percentage of total available RT that call processing classes use.

The relationship between CPOcc, AWT, and BHCA is as follows:

$$\text{CPOcc}(\%) = \text{AWT}(\text{ms}) \times \text{BHCA} \times 100\% / 60 \text{ mins} \times 60 \text{ secs} \times 1000 \text{ millisecs}$$

or,

$$\text{CPOcc}(\%) = \text{AWT}(\text{ms}) \times \text{BHCA} / 36,000$$

where BHCA is the number of calls that a node can process at a specified central processing unit (CPU) occupancy (such as, the engineering limit).

For a given percentage mix of call processing and mobility management activities, CPOcc increases with the system BHCA. In non-BNR reduced instruction set computer (BRISC) systems, this relationship is substantially linear. But in BRISC systems, the relationship of CPOcc to BHCA is non-linear. This is because the caching of instructions interacts with a processor speed-up effect at higher occupancies.

Cellular operators can track traffic growth with the growth in CM call processing occupancy. Together with estimates of how future developments affect the AWT, this estimate allows cellular operators to plan for processor upgrades or network reconfigurations to keep CPOcc measurements within an engineering limit. The engineering limit for the DMS-100 Wireless switch is 77%.

To off-load the CM RT occupancy levels, Nortel Networks offers the following recommendations:

- Optimize switch parameters to prevent unnecessary CM workload. Primary areas for attention include the following parameters:
 - RF parameters
 - handoff parameters
 - registration parameters
 - paging options and parameters
- Move cell sites to another switch.
- Optimize inter-switch boundaries to minimize boundary crossing.
- Select the most appropriate home system for subscribers in a networked system.
- Upgrade to a more powerful CM processor.

Network compatibility

Network management

Network management (NWM) supervises and controls telephone switching networks to guarantee the maximum flow of traffic under adverse or overload conditions. These conditions can occur when the demand from the switching office exceeds the ability of trunk groups or common control equipment (or both) to provide satisfactory service.

DMS-100 Wireless NWM controls allow operating companies to block or reroute all or some traffic. This call traffic can be destined for, or have originated from, a particular trunk group, based on the number dialed.

You can manually activate NWM controls from the NWM MAP level or from the command interpreter (CI) level. You can activate the NWM controls in response to internal overload conditions in the switch, or to overload signals from scan (SC) points from other offices. The DMS-100 Wireless switch can also signal its own overload condition to other offices using signal distribution (SD) points.

Reroute controls

Reroute controls allow you to reroute a percentage (1-100%) of traffic from a designated route list to another list in the routing chain (out-of-chain routing). You can set up a maximum of 1024 controls, each with up to 16 subroute lists. Only one subroute is active for each reroute control at a time.

To reroute traffic, create the alternate route list (with percentage for reroute) in table REROUTE (Network Management Reroute Control). Then add selector RRTE in the existing translations route list to point to it. Control activation occurs when the RTECTRL level of the NWM MAP issues the APPLY RRTE command with the correct route and subroute numbers.

Auto controls

There are three separate types of automatic controls:

- internal dynamic overload control (IDOC)
- preplanned (PPLN) control
- automatic out-of-chain reroute (AOCR) control

Internal dynamic overload control IDOC is an automatic control that reacts to traffic overload conditions in the switch. IDOC transmits control signals to other offices that indicate the switch's condition. IDOC also informs other offices to direct traffic away from this office. IDOC does not affect internal traffic flow.

The switch sends three levels of IDOC signals in response to the following triggering events:

- Level 1—when the MF receiver queue length exceeds a preset threshold
- Level 2—when CPU occupancy exceeds a preset threshold
- Level 3—by a dead system (usually a restart)

Pre-planned control Also known as remote DOC, signals received on SC points from other offices activate PPLN controls.

Most PPLN controls block partial or all traffic to outgoing trunk groups. The exception is the incoming trunk busy (ITB) control. If the group has option RMB (remote make busy), the switch removes a percentage of the trunks in an incoming (or two-way) group out of service.

The available outgoing controls are:

- Directional reservation equipment (DRE) applies to selected two-way trunk groups. DRE gives priority to incoming traffic by reserving a number of idle trunks in a group. If the number of idle trunks drops below the threshold in the datafill, the switch route-advances all traffic attempting to terminate to this group. (This process is also known as skip-routing.)
- Protective reservation equipment (PRE) applies to selected two-way and outgoing trunk groups. PRE is similar to DRE in that it reserves a given number of idle trunks for incoming calls. The exception is that PRE only acts on alternate-routed (AR) traffic.

- Cancel to (CANT) applies to selected two-way and outgoing trunk groups. CANT blocks traffic to the group by sending calls to NCA, EA1, or EA2 treatment. Set CANT to control either a percentage of AR traffic, or all AR, and a percentage of direct-routed (DR) traffic.
- Cancel from (CANF) applies to selected two-way and outgoing trunk groups. CANF prevents trunk group overflow traffic from continuing to the next group in the route list. It blocks a percentage of overflow traffic from this trunk group by sending the traffic to NCA, EA1, or EA2 treatment.
- Skip (SKIP) applies to selected outgoing trunk groups. SKIP causes a percent of AR or DR traffic to advance to the next group in the route list.
- Selective trunk reservation (STR) is an extension of DRE and PRE, and works with hard-to-reach (HTR) codes. (See subsection “Code controls” in this section for information on HTR.) STR has two idle trunk threshold levels and one datafillable blocking percentage.

The blocks call to the designated trunk group, as Table 2-8 shows.

Table 2-8 STR blocking levels

Traffic type	Level 1% blocked	Level 2% blocked
HTR-DR	X%	75%
HTR-AR	X%	100%
Other-DR	none	X%
Other-AR	none	100%

- Flexible reroute (FRR) allows separate datafillable percentage levels for re-routing AR and DR traffic. You can select EA, non-EA, or both call types. Flexible reroute allows you to enter a VIA route list (that is, common language location identifiers [CLLI] to where the traffic is to be rerouted) in the command line without making any changes to existing translations tables.

Set up all preplanned controls in table NWMPPLN (Network Management Preplan Control) and table PREPLANS (Network Management Preplans).

Automatic out-of-chain re-reroute AOCC is an automatic control that provides extended routing for calls that overflow their in-chain final trunk groups. First enter datafill for an overflow route in table REROUTE, then add control AOCC to table NWMAOCC (Network Management Automatic Out-of-Chain Reroute). When the amount of traffic that overflows the activating CLLI exceeds the activating percentage, traffic diverts to the REROUTE route. If traffic starts to spill over the overflow CLLI and exceeds the overflow percentage, the switch deactivates the control. AOCC activation

and deactivation runs in a background process, which checks the overflow rate of the selected trunks every 5 minutes.

Group controls

The group control (GRPCTRL) level of the NWM MAP is the manual equivalent of the automatic PPLN controls. The same set of trunk group controls is available (DRE, PRE, CANT, CANF, SKIP, ITB, STR, and FRR). You cannot set up these trunk group controls ahead of time in data tables. You must first use the SELECT command to pick a trunk group. Then use the APPLY command to apply the desired control. Enter the required parameters on the command line.

Code controls

The CODECTRL level of the NWM MAP selectively blocks calls to area codes, country codes, prefixes, or any dialed-digits string. It can also selectively block calls from a specific area code to the selected destination code.

Code blocking Code blocking (CBK) limits a percentage or rate of traffic from entering a network, according to the destination code (digits dialed). The blocked traffic routes to EA1, EA2, or NCA treatment. The percentage setting ranges from 1 to 100%. Call gapping blocks a specified rate of traffic. It has a range of 0 to 600 seconds set in one-tenth second- increments. (For example, a setting of 10 allows 1 call every 10 seconds to reach the destination code.)

Preroute peg Preroute peg (PRP) is a code control for studying traffic levels to destination codes. PRP maintains a count of all calls to a specified number. It does not block or reroute any calls. View the counts in either the NWM MAP level or OM register group PRP. Operating companies use these pegs to determine when to activate code blocking controls.

Hard-to-reach flag Hard-to-reach flag (HTRF) is a code control that flags certain destination numbers as hard to reach. Set HTRF for all calls to a certain number, or just calls from a specific numbering plan area (NPA) to this number. To flag a call, set a boolean in the call condense block (CCB) (CCB.CHB.XLAB.HTRC) to true. HTRF does not block or reroute calls by itself.

Support for point code

CCS7 signaling uses assigned point codes to identify the nodes that send and receive signaling messages. A point code consists of three parts: network, cluster, and member identifier. Bellcore administers North American point codes.

Use table C7NETWRK (CCS7 Network) to define each network to which the DMS node has CCS7 signaling connectivity. Each tuple in the table provides the following identifiers:

- name of the network
- network indicator
- originating point code used when signaling over this network

Figure 2-33 shows sample datafill for table C7NETWRK.

Figure 2-33 MAP display example for table C7NETWRK

NETNAME	NODETYPE	PTCODE	NI	SLSROT	TFR	MCS	CLUSTERS	RCTEST	MTPRES
C7NETWRK1	SSP	ANSI7 54 55 56		NATL	Y		Y	3	Y
	Y	Y							

Both wireless and wireline functionalities use the base CCS7 software to restrict the number of definable point codes for the DMS node for a network indicator.

The DMS-100 Wireless switch supports CCS7 signaling to at least two different networks. IS-41 signaling (built on top of transaction capabilities application part [TCAP]) requests end user information from other cellular nodes while processing originations from wireless sets. Calls that use out-of-band signaling route to other nodes, which require CCS7 signaling to the PSTN.

The DMS-100 Wireless switch uses the same point code for signaling to both the NACN and the PSTN. Make sure that the other connected carrier networks have updated service switching point (SSP) and signaling transfer point (STP) routing tables to reflect the node's point code of the DMS-100 Wireless switch.

DMS-100 Wireless CAVU and CSD EIU provisioning

The DMS-100 Wireless switch supports mobile authentication and CDMA circuit switched data (CSD) features for wireless subscribers. To support mobile authentication and CDMA CSD, the LPP (or FLIS) includes two new ASUs: the CAVU and the CSD Ethernet interface unit (EIU).

This section describes system engineering-related issues for mobile authentication and CDMA CSD, including the following items:

- the impact to the DMS-100 Wireless system capacity
- cellular authentication and voice privacy unit (CAVU) provisioning
- CSD EIU provisioning

LPP frames

The current release of the DMS-100 Wireless switch adds the CAVU and CSD EIU applications to the networking LPP.

The LPP frame is a cabinet that holds a link interface module (LIM) and multiple computing components called application specific units (ASU).

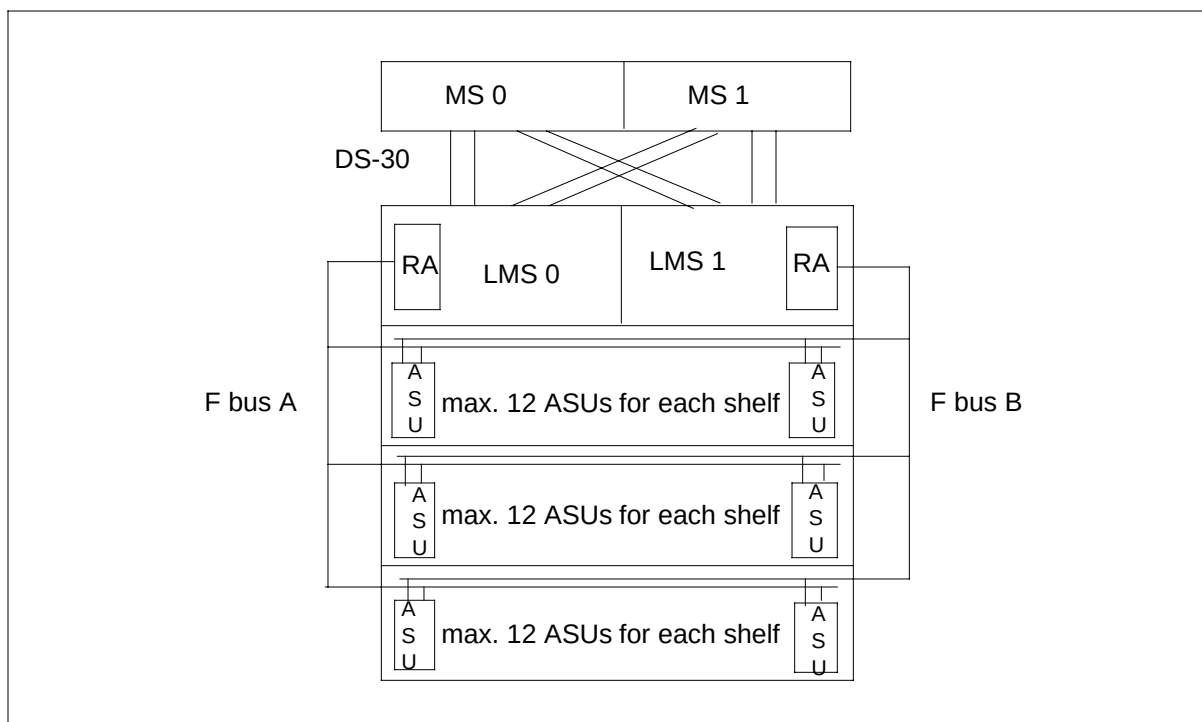
The LPP provides a hardware platform for several carrier-based signaling types including the following types:

- the CCS7
- frame relay
- X.25/X.75
- Ethernet
- CDMA applications
- RT intense applications, such as cellular authentication and voice encryption (CAVE)

The top shelf in an LPP contains a duplicated local message switch (LMS), which links individual ASUs with the DMS CORE through the DMS bus in a fully redundant manner. An LPP connects to each side of the DMS bus through four 2.56 Mbit/s DS30 links in a load-sharing arrangement.

Figure 2-34 shows a block diagram of an LPP frame.

Figure 2-34 LPP hardware block diagram



The current release of the DMS-100 Wireless switch supports the following three ASU shelf configurations:

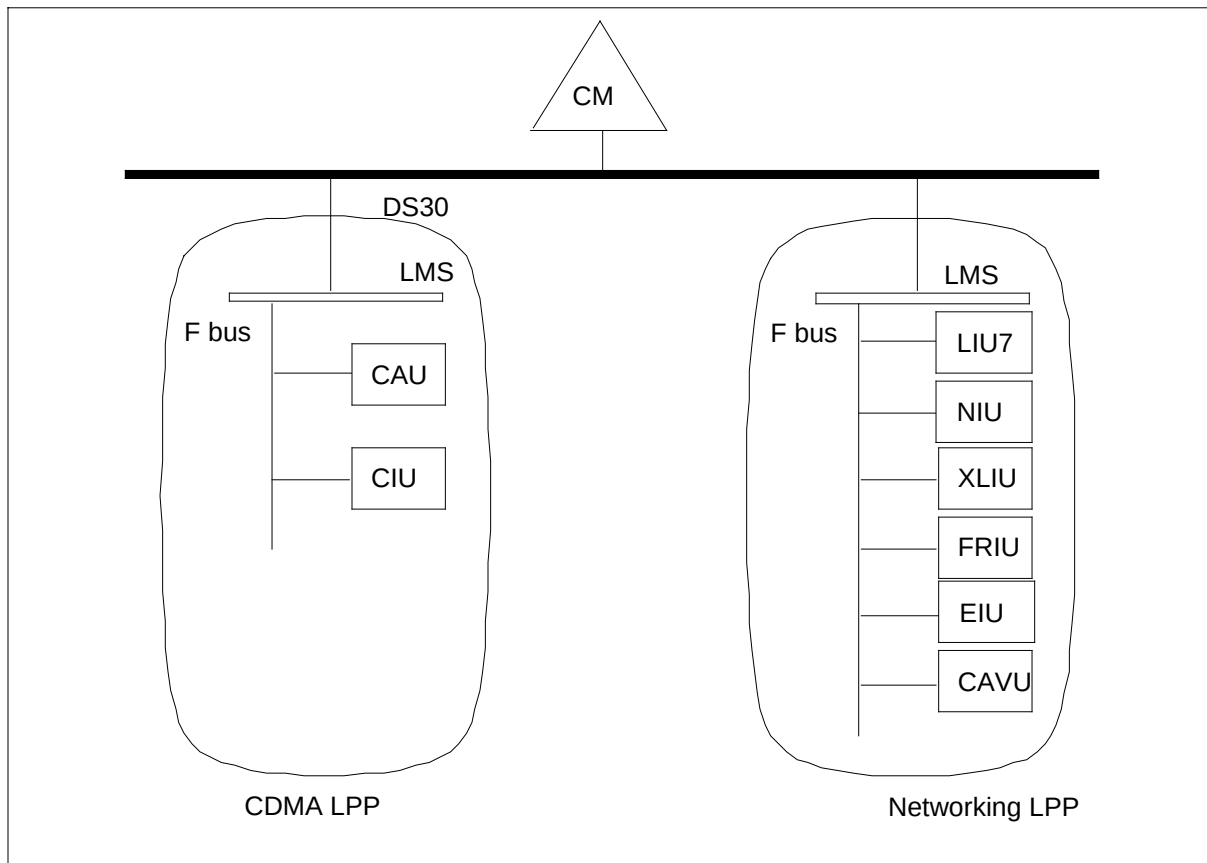
- LPP frame
- single-shelf FLIS
- SNSE LIS

The single-shelf FLIS and the SNSE LIS are two types of LPP shelf packaging. The FLIS and LIS provide alternates for customers with lower capacity requirements.

The current release of the DMS-100 Wireless switch requires two separate LPPs, as Figure 2-35 shows:

- one CDMA LPP
- one networking LPP

Figure 2-35 DMS-100 Wireless LPPs



Note: The single multi-application LPP, which supports both CDMA and networking applications on the same LPP, is not available in the current DMS-100 Wireless release.

ASU types

An ASU is a combination of hardware and software components that perform select functions on the signals the the channel buses (C bus) and frame transport buses (F bus) carry in an LPP.

The current release of the DMS-100 Wireless switch supports the following types of ASUs:

- CAU for CDMA (wireless)
- CIU for CDMA (wireless)

- LIU7 (CCS7) used for
 - CCS7 ISUP, TCAP messages (wireline and wireless)
 - IS-41 messages (wireless)
 - Short message service (SMS)/message waiting indicator (MWI) (wireless)
- NIU (network interface unit) used for DMS network I/F to LIU7
- XLIU (packet handler interface unit) for X.25/X.75 (wireline)

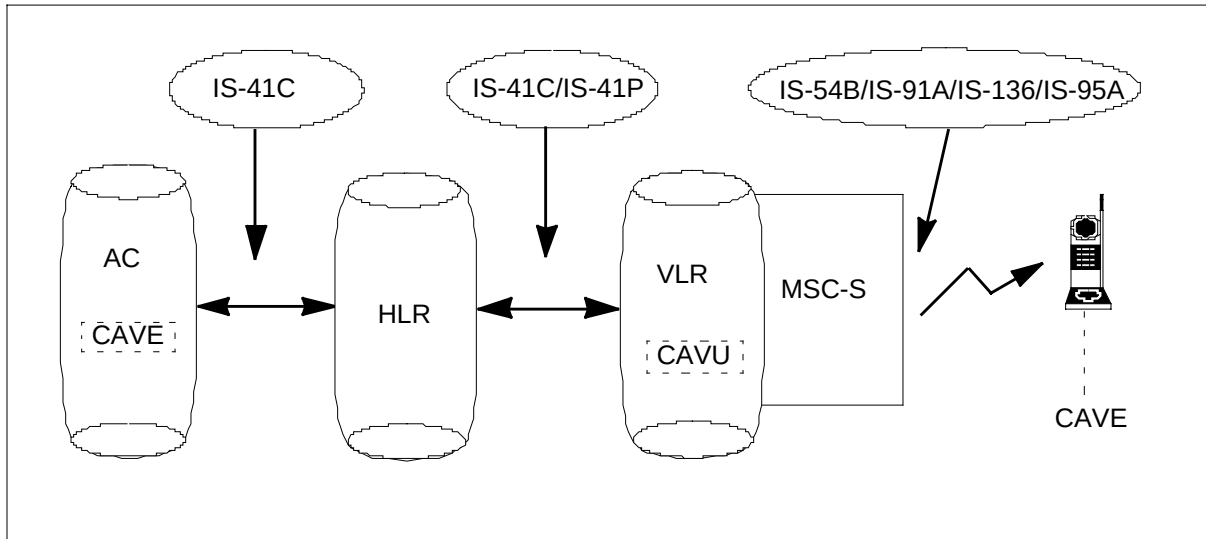
Note: The current release of the DMS-100 Wireless switch does not support CDPD.

- FRIU (wireline)
- EIU used for
 - Internet Protocol (IP) routing for interworking function (IWF) signaling for CDMA CSD calls
 - MDS IP interface for OMs, logs, and billing data transfer (wireless)
- CAVU used for running the CAVE algorithm for mobile authentication

Authentication and CAVU provisioning

Authentication is the process in which the mobile station and the entity that performs the authentication exchange information to confirm the identity of a mobile subscriber. The DMS-100 Wireless switch enables service providers to combat cellular terminal fraud on mobile originations, registrations, and flash requests.

Authentication adds a network entity, called an authentication center (AC), which standard IS-41, revision C, defines. Figure 2-36 shows a high-level IS-41 network architecture for authentication.

Figure 2-36 Authentication network overview

The CAVU executes the CAVE algorithm in the switch. The CAVE algorithm runs whenever a mobile unit accesses the system and the serving mobile switching center (MSC-S) requests validation of the mobile's access. Both the mobile unit and the AC must be equipped to run CAVE.

The MSC-S also provides for an authentication-capable system by determining if a mobile must generate authentication parameters before system access. The MSC-S also provides some input parameters the mobile needs to verify for authentication.

The VLR is co-located with the MSC. The VLR bears many of the responsibilities of the AC to reduce the network messaging overhead of AC communication with each mobile's access. Standard IS-41C provides this concept, called shared secret data (SSD). When the VLR contains the SSD, it can check the authentication of the mobile subscriber. To perform authentication functions, the VLR must have the mobile's SSD and a CAVU to run the CAVE algorithm.

To activate a mobile subscriber, a service provider must perform the following functions:

- assign a confidential A-key (password) to each mobile
- store the A-key in the AC database
- enter the A-key in the mobile station (MS)

CAVE, which exists in the AC, VLR, and MS, authenticates the mobile. The AC cannot run CAVE for every call in the network, especially for mobiles roaming away from their home system. Standard IS-41C provides SSD to

allow the serving MSC/VLR to execute CAVE locally. The SSD then authenticates the mobile subscriber without having to communicate constantly with the AC. Since the A-key cannot be compromised by knowledge of the SSD, the AC and the serving system VLR can share SSD when the MS is roaming.

CAVU provisioning guidelines

The CAVU is an ASU type used as an off-board processing unit that executes the RT intense CAVE algorithm.

The number of CAVUs that each DMS-100 Wireless needs depends on several factors, including the following:

- the number of authentication-capable mobiles in a switch
- peak traffic information

Each switch requires enough CAVUs to handle all CAVE requests. If the DMS-100 Wireless switch does not have enough CAVUs, the switch could lose CAVE requests. When the switch loses a CAVE request, system access corresponding to the request is granted. Also, when the switch loses a request, the MAP display lists or pegs all logs and OMs. If a large number of these logs appear, operating company personnel can provision more CAVUs.

Table 2-9 lists the CAVU engineering parameters the switch uses to determine the number of required CAVUs.

Table 2-9 DMS-100 Wireless engineering parameters for number of required CAVUs

CAVU engineering parameters	Value	Engineering rules/ description-EX22CA
CAVU_CPOcc	75%	Engineered %CPOccu
Single-fault redundancy	N+1	(N+1) sparing

Note: The CAVUs do not contain any built-in redundancy. The switch selects CAVUs for CAVE requests based on availability. If one CAVU goes out of service, the other CAVUs then receive the evenly distributed requests.

Refer to the Table 2-10 listing the design parameters that determine the number of CAVEs the switch requires.

Table 2-10 DMS-100 Wireless design parameters for number of required CAVEs

CAVE design parameters	Value	Description
CAVE_AWT	3.00	AWT of CAVU (in ms.) for each CAVE request
Number of CAVE requests/SSD update	3	u1=3 CAVE_requests for each SSD update for co-located MSC/HLR/AC
Number of CAVE requests/SSD update	2	u2=2 CAVE_requests for each SSD update for MSC/HLR co-located with external AC and shared SSD
CAVE_request_Msg_Size	74	bytes/message, including MTS and FTS overhead
CAVE_response_Msg_Size	114	bytes/message, including MTS and FTS overhead
Selective authorization (1 in N_originations)	5	N_originations=Selective_Auth_Orig_Period This parameter specifies how often the switch authenticates originations. Note: The switch activates selective authorization if the CPU usage exceeds the Selective_Auth_CPU_Threshold.
MSC, HLR, AC network config.	Config. 1	Config_1=for co-located MSC/VLR, HLR, and AC components
	Config. 2	Config_2=for MSC/HLR co-located with external AC and shared SSD

Sample of CAVE traffic and CAVU provisioning worksheet

Figure 2-37 shows a sample of CAVE traffic and CAVU provisioning.

Figure 2-37 CAVE traffic and CAVU provisioning example

CAVE traffic parameters	Value	Description
Wireless traffic model	LM_c	DMS-100 Wireless model
L-M call attempts (%)	30.78	a = % L-M call attempts
M-M call attempts (%)	8.02	b = % M-M call attempts
M-L call attempts (%)	53.77	c = % M-L call attempts
Initial registration/BHCA	7.15	d = % periodic registrations with no VLR entry (depending on VLR audit timer) for each BHCA
IS-41 Reg/BHCA (no VLR entry)	35.20	e = % IS-41 registrations (out of VLR reg's @home, @Serving and noti.@HLR)
SSD update frequency (each day)	0.143	f = the frequency of SSD updates each day for wireless subscriber (that is, 1 each 7 days)
Subscribers making 1st call/DBH (%)	20.00	g = % of wireless subscribers making their 1st call of the day during a busy hour
SSD update failure rate (%)	20.00	h = % SSD update failure rate
Authentication failure rate (%)	10.00	i = % authentication failure rate
Authentication-capable mobiles (%)	100.00	j = % authentication-capable mobiles
Wireless system_BHCA	172,555	B = wireless system busy hour call attempts
Total wireless subscribers	271,197	S = total number of wireless subscribers
CM % CPUutil (%)	87.97	% Cp utilized (In this case, the maximum 736 Mb CM memory memory limits system capacity.)
CAVU provisioning worksheet	Value	Comment/provisioning rules
For MSC/HLR/AC collocated (Configuration 1):		
CAVE requests/BH (for CallP)	197,659	$A1 = B * (b+c+d+e) * (1+i) * j$
CAVE requests/BH (SSD update)	27,894	$A2 = S * f * g * (1+h) * u1 * j$
Total CAVE requests/BH	225,554	$A = A1 + A2$
Total Bps of CAVE requests	11,779	$Bps = A * (cave\_request\_Msg\_Size + cave\_response\_Msg\_Size) / 3600$
Number of CAVUs w/o sparing	0.251	$n = A * CAVE\_AWT / (3,600,000 * CAVU\_CPOcc)$
# CAVUs Req'd (w/ N+1 sparing)	2	N_CAVU for collocated MSC/HLR/AC
For MSC/HLR collocated with external AC and shared SSD (Configuration 2):		
CAVE requests/BH (for CallP)	117,278	$A1 = B * (b+c) * (1+i) * j$
CAVE requests/BH (SSD update)	18,596	$A2 = S * f * g * (1+h) * u2 * j$
Total CAVE requests/BH	135,874	$A = A1 + A2$
Total Bps of CAVE requests	7,096	$Bps = A * (cave\_request\_Msg\_Size + cave\_response\_Msg\_Size) / 3600$
Number of CAVUs w/o sparing	0.151	$n = A * CAVE\_AWT / (3,600,000 * CAVU\_CPOcc)$
Req'd # CAVUs (w/ N+1 sparing)	2	N_CAVU for collocated MSC/HLR with external AC and shared SSD

CAVU summary

Operating company personnel must provision two CAVUs on the DMS-100 Wireless switch to support authentication for the co-located AC and the external AC configurations. Based on the DMS-100 Wireless traffic models and system capacity forecast, this calculation requires no incremental CAVU provisioning.

CM system capacity impact

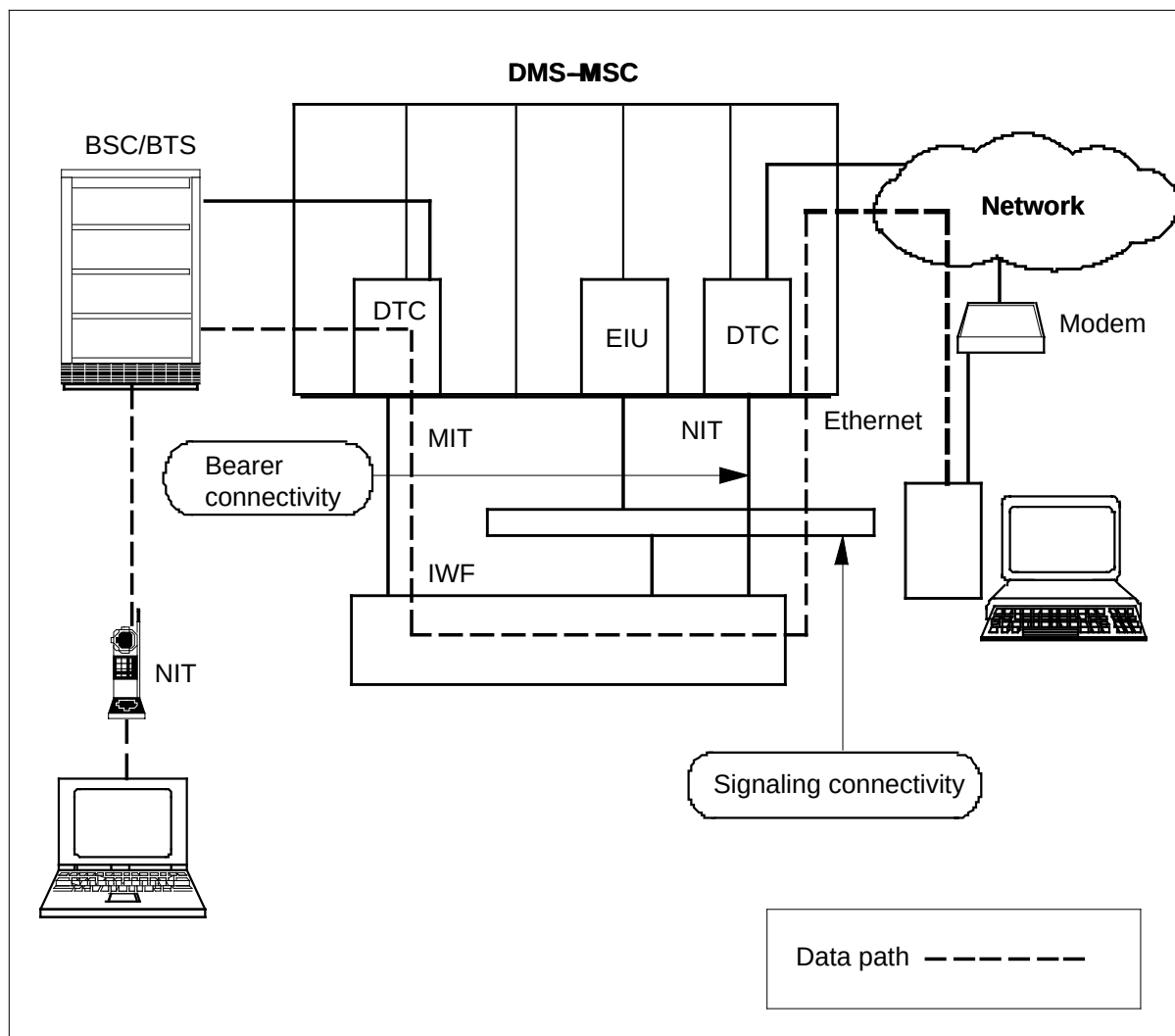
With a 100% penetration rate, mobile authentication affects CM RT capacity for about 10 to 20% degradation. (This result depends on the traffic model and (N+1) selective authentication, and about 11.8 kbyte/s additional data traffic on LPP DS30 links.)

CSD and EIU provisioning overview

The CSD, like circuit switched voice, sets up an end-to-end circuit connection before it transmits data. This circuit remains in use until the end user terminates the connection. The provider charges the end user, based on call duration and not by the amount of transferred data.

Figure 2-39 shows an overview of the CDMA CSD network in the DMS-100 Wireless switch.

Figure 2-38 CDMA CSD network overview



For every CSD call, the DMS-100 Wireless switch allocates two trunks to the IWF component. These trunks perform protocol conversion between the wireless and PSTN networks, as follows.

- The mobile-side IWF trunk (MIT) connects the IWF to the cell site equipment and the mobile.
- The network-side IWF trunk (NIT) connects the IWF to the PSTN.

The EIU LAN connection to the IWF communicates CSD call control (such as call establish, maintain and disconnect) signaling between the DMS-100 Wireless switch and the IWF.

The CDMA CSD feature supports the following two data services:

- Asynchronous data service, which provides a dedicated path between the data service and the dialed endpoint for the duration of the call. This connection is an asynchronous duplex connection that provides point-to-point connectivity.
- Group 3 fax services, which provide fax service on a dedicated path between the mobile and the PSTN endpoint (fax machine).

The CDMA CSD data rate is either 9.6 (Rate Set 1) or 14.4 kbit/s (Rate Set 2) at the air-interface.

CSD impact on CM switching capacity

The CDMA CSD traffic reduces CM switching capacity. During a data call, the CM must set up extra circuit switched connections. Also, the CM must process more messages than before. The processing time for some existing messages also increases.

Figure 2-39 shows CSD data call connection types.

Figure 2-39 Types of CSD data call connections

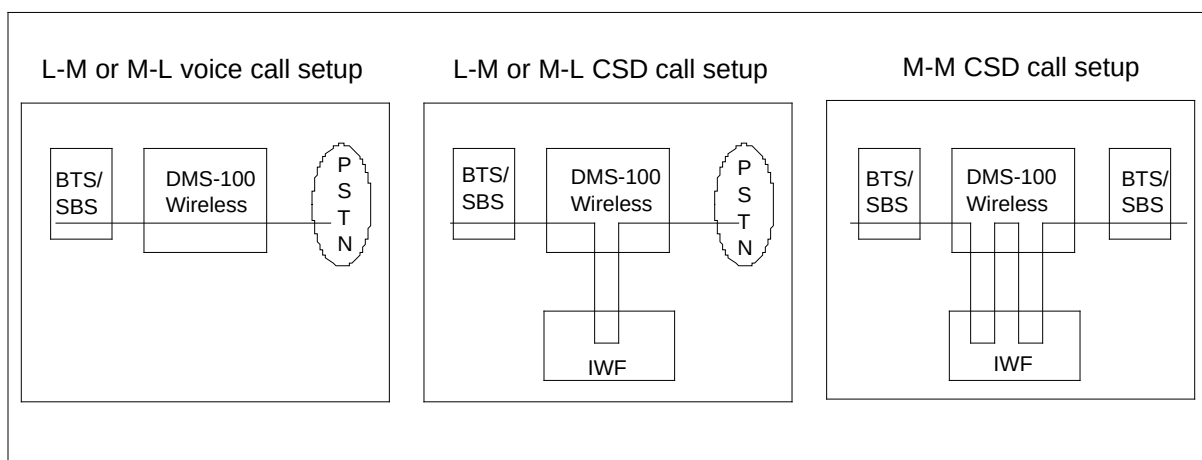


Table 2-11 lists the number of messages for CDMA voice and CSD calls.

Table 2-11 Number of messages-CDMA voice and CSD calls

Call type	CDMA voice	CDMA CSD
L-M	7	13
M-L	6	11
M-M	7	18
Note: L-M refers to land-to-mobile calls. M-L refers to mobile-to-land calls. M-M refers to mobile-to-mobile calls.		

Assume the same traffic model for voice and data calls in the network. Let AWT_v and AWT_d be the average work times for pure voice and pure CSD traffic. The following formula shows the CM RT capacity, in BHCAs, if p is the percentage of data traffic in the mixed traffic environment.

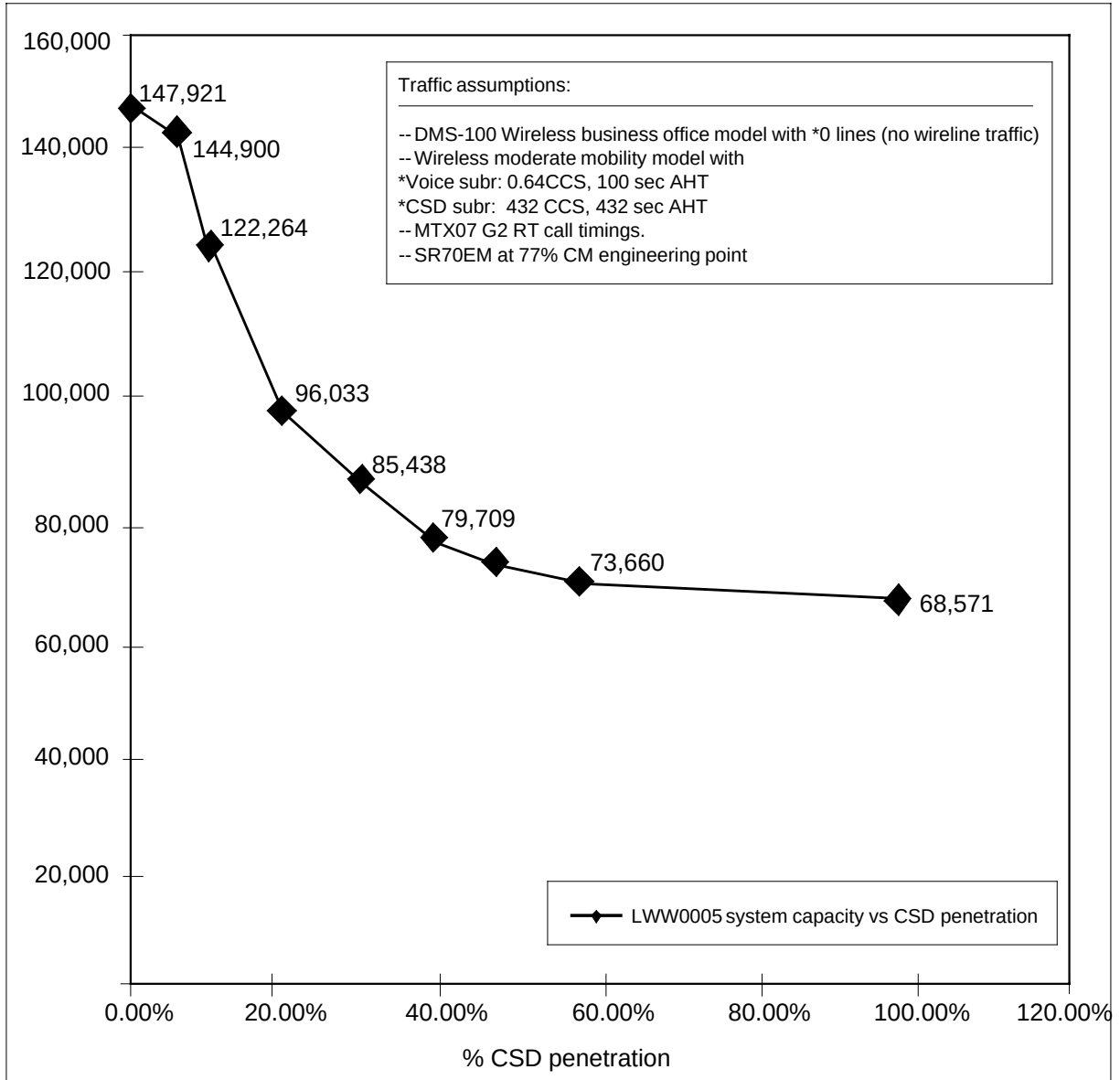
$$CM\_BHCA = (3,600,000 * \%CM\_EngPt) / ((1-p)*AWT_v + p*AWT_d)$$

where, $\%CM\_EngPt$ is the % of CM engineering point

For the current release of the DMS-100 Wireless switch, 77% is the default value of percentage of CM_EngPt for SR70EM.

Figure 2-40 shows system capacity usage for CDMA CSD in a business model.

Figure 2-40 CDMA CSD impact on DMS-100 Wireless system capacity



The default 432 seconds (average holding time [AHT]) for CSD calls in the previous figure uses the market assumptions that Table 2-12 lists.

Table 2-12 Relative data call frequencies and durations

Call type	Call frequency	Call duration (minutes)
Email	80%	4
FTP	10%	10
Web surfing	10%	20

CDMA CSD cell capacity impact

Data call information at the physical layer is essential in estimating cell capacity. To determine the affect of a CSD data call, first compute the ratio of the RF interference that a data call causes to the ratio of interferences that a voice call causes. (This ratio depends on the rate sets where data call and the voice call operate.)

Note: A duty cycle (DC) of a voice or data call is the ratio of the average RF interference that a call causes under the following conditions:

- when the call operates at fixed full rate
- when the call operates at normal variable rate

For example, if Data_DC/Voice_DC equals 1.5, and the cell capacity is 15 voice calls, then the same cell can support ten data calls. Table 2-13 and Table 2-14 compare data call DC to voice call DC for rate sets 1 and 2.

Table 2-13 Comparison of data call DC and voice call DD-rate set 1

	Forward link	Reverse link
Data call DC	46%	62%
Voice call DC	40%	40%
Data DC/voice DC	1.15	1.54

Table 2-14 Comparison of data call DC and voice call DD-rate set 2

	Forward link	Reverse link
Data call DC	45%	61%
Voice call DC	52%	52%
Data DC/voice DC	0.86	1.17

CSD EIU provisioning

The CSD EIU is the EIU that service providers provision for CDMA CSD. The DMS-100 Wireless switch uses the CSD EIU for signaling to the IWF.

Refer to the following table, listing the engineering parameters that determine the number of EIUs, the switch requires.

Table 2-15 DMS-100 Wireless engineering parameters for number of required EIUs

EIU engineering parameters	Value	Engineering rules/description-EX22CA
EIU_CPOcc	75%	Engineered EIU CPOcc
EIU_Cap	315,000	EIU_Cap=the EIU IP routing capacity in Bps. The EIU can route about 315 kbyte/s with large packets (1518 bytes) at IP level, that is, about 25% of Ethernet bandwidth.
LPP DS30 link capacity	109,000	Bps for each DS30 link. The LPP has 8 DS30 links to the DMS bus. Each link can handle about 109 kbyte/s.
Max. # of datafillable EIUs	8	The switch can contain a maximum of 8 EIUs (table LIUINV datafill limit). Operating company personnel can configure each EIU on a LAN. However, EIUs configured on the same LAN can provide simple load balancing of IP traffic between EIUs and fault tolerance to EIU failures.
Max. # of EIUs for each LPP	4	A limit of 4 EIUs on an LPP (EIU platform limit) exists. The FLIS can have up to 8 EIUs.

Table 2-16 DMS-100 Wireless design parameters for number of required EIUs (Sheet 1 of 2)

CSD EIU design parameters	Value	Description
Single fault redundancy	N+1	(N+1)sparing
# messages for each M-L data call	11	n_msgs_ML=msg/call for mobile-originated-(MO)-to-land data call
# messages for each M-L data call	13	n_Msgs_LM=msg/call for land-to-mobile termination (MT) data call
# messages for each M-L data call	18	n_Msgs_MM=msg/call for MO-to-land data call
Avg. # bytes for each M-L data call	566	s_ML=total # bytes that the EIU processes for each M-L IWF data call (estimated)

Table 2-16 DMS-100 Wireless design parameters for number of required EIUs (Sheet 2 of 2)

CSD EIU design parameters	Value	Description
Avg. # bytes for each M-L data call	566	s_ML=total # bytes that the EIU processes for each M-L IWF data call (estimated)
Avg. # bytes for each M-L data call	566	s_ML=total # bytes that the EIU processes for each M-L IWF data call (estimated)

Sample of CSD traffic and EIU provisioning worksheet

Figure 2-41 shows a sample of CSD traffic and EIU provisioning.

Figure 2-41 CSD traffic and EIU provisioning example

CSD EIU traffic parameters	Value	Description
N_CSD_subrs	3,033	# CSD subscribers
CSD_penetration (%)	5.00	% CSD penetration wrt total mobile subscribers
CSD_AHT	432	AHT, in seconds, for CSD Call Attempt. See Relative data call frequencies and durations table for default 432 sec. AHT.
CSD_CCS	4.32	CCS for each CSD subscriber. (Assumed one CSD call attempt @ 432s AHT.
CSD_Model	LM_c	DMS-100 Wireless traffic model used for wireless CSD traffic. (The wireless traffic on the DMS-100 Wireless switch defines three traffic models: low mobility [LM], moderate mobility [MM], and high mobility [HM].)
LM (%)	30.78	LM= % land-to-mobile call attempts
MM (%)	8.02	MM= % mobile-to-mobile call attempts
ML (%)	53.77	ML= % mobile-to-land call attempts
MT_LM (%)	23.35	MT_LM= % LM calls with PAGE RESPONSE msg received
MO_ML (%)	53.77	MO_ML= % ML calls with SAT_PRESENT msg received
CSD EIU provisioning worksheet	Value	Comment/provisioning rules
# CSD BHCA (Orig & Term.)	3,033	BHCA= (N_CSD_subrs*CSD_CCS) / CSD_AHT*100
# CSD BHCA (Orig & Inc.)	3,015	sys_BHCA= CSD_BHCA / (%LM + 2 * %MM + %ML)
CM %CPUTil	14.4%	CM RealTime %CPUTil
Mobile Orig. to Land data calls	1,621	n_MO_ML_CAs = sys_BHCA * %MO_ML
Land to Mobile Term data calls	704	n_MT_LM_Cas= sys_BHCA * %MT_LM.
# Mobile Orig. to Mobile data calls	242	n_MO_MM_CAs= sys_BHCA * %MM.
EIU_BHCA	2,567	EIU_BHCA= n_MO_ML + n_MT_LM + n_MO_MM
Total EIU IP msgs /BH CSD calls	31,337	m= n_msgs_ML * n_MO_ML + n_msgs_LM * n_MT_LM + n_msgs_MM * n_MO_MM
Total Bps of IP msgs for CSD calls	404	t= (s_ML * n_MO_ML + s_LM * n_MT_LM + s_MM * n_MO_MM) /3600 bytes/second
Number of CSD EIUs w/o sparing	0.002	n= t / (EIU_Cap * EIU_CPOcc)
EIUs Req'd for CSD (/w N+1 sparing)	2	N_EIU_iwf

Sample of EIU IP throttling calculation worksheet

Figure 2-42 shows a sample EIU IP throttling calculation.

Figure 2-42 EIU IP throttling calculation example

EIU IP traffic	Value	Traffic description
Max Bps of EIU @ 100% CPUutil	19,075	Tr=# Bps of EIU IP msgs of CSD calls @ CM 100% CPUutil (432 AHT, about 121K EIU_BHCAs, which exceeds dual-BSC limit)
Max Bps of EIU @ dual-BSC limit	8,072	Tb=Bps of EIU IP msgs of CSD calls @ max. dual_BSC (432s AHT, about 51K EIU_BHCAs)
Max Bps of EIU @ dual-BSC limit	12,578	TC=Bps of EIU IP msgs of CSD calls @ max. dual_BSC (277s AHT, about 80K EIU_BHCAs)
Max Bps of EIU @ dual-BSC limit	13,948	Tb=Bps of EIU IP msgs of CSD calls @ max. dual_BSC (250s AHT, about 88K EIU_BHCAs)
EIU IP throttling	15,722	Bps= (12578 Bps of Tc for max. EIU_BHCAs at AHT 277s)/ (80% of effective msg. throughput)
EIU iwf IPTHRON	16,000	Round up to 16 kbyte/s for max. utilization of dual-BSC capacity.

CSD EIU provisioning summary

To provide a (N+1) redundancy, provision two EIUs with IPTHRON set to 16,000 Bps for DMS-100 Wireless CDMA CSD service. Based on the DMS-100 Wireless traffic models and system capacity forecast, this calculation requires no incremental CSD EIU provisioning.

With the current estimates of CSD penetration, which is lower than 5%, the CSD EIU can add about 0.5 kbyte/s to LPP F bus and DS30 link. The CSD impact to LPP F bus and DS30 links is less than 0.5%.

Feature packaging

The DMS-100 Wireless switch defines the deliverable content, including the wireline functionality and wireless CDMA functionality. The software optionality control (SOC) manages the access to optional wireline and wireless functionality. SOC allows operating company personnel to activate an optional functionality through an electronic control file from Nortel Networks.

SOC options

The DMS-100 Wireless switch supports SOC for wireline and wireless functionality options.

Wireline SOC's are adopted, as defined by the NA PCL prime, and are managed on individual established NA processes.

Wireless SOC's include

- State-same management strategy used for wireline SOC's
- Usage-remains consistent with the defined wireline strategy. Nortel Networks sets the orderable limit designations for the wireless usage SOC's to "monitored."

Note 1: The DMS-100 Wireless switch only supports SOC options that apply to a serving MSC/HLR, a serving MSC only (if the switch is configured with an external HLR), and an HRL/serving MSC/gateway MSC. The switch does not support SOC options for stand-alone only HLR, gateway-only MSC, nor HLR/gateway-only MSC configurations.

Note 2: Stand-alone wireless capabilities that Nortel Networks deployed as Munch-controlled options in its stand-alone wireless switch are all delivered in an activated "ON" state in the DMS-100 Wireless switch.

Network interworking

The DMS-100 Wireless switch supports the following network interfaces:

- PSTN network—MF and CCS7 trunks (types 1, 2A, and 2B) to the PSTN. An end user in the PSTN network can make and receive calls from a PCS end user.
 - type 1, to an end office, carries traffic run in tandem through the end office
 - type 2A is to an wireline tandem
 - type 2B is to an end office carrying traffic originating and terminating only on that end office
- all specific wireline interfaces (including POTS, ISDN and P-phone lines). The switch also supports wireline centrex capabilities.
- cellular networks—MF and CCS7 trunks to cellular switches (types 1, 2A and 2B). A cellular end user can make and receive calls from a PCS end user.
- PCS networks—MF and CCS7 trunks to other wireless switches in the same or different PCS network. These trunks handle call handoff.
- wireline 911 tandem—type 2C trunks to wireline 911 tandem trunks route 911 emergency calls
- STP interface—CCS7 links to an STP
- service control point (SCP) interface—CCS7 links to SCP and VLR elements (including advanced intelligent network [AIN] 0.1/0.2 over TCAP)
- ISUP trunks—according to TR-317 procedures, to other wireline switches

- IEC networks—MF and CCS7 (according to TR-394) trunks to IEC networks
- voice mail interface with Simplified Message Desk Interface (SMDI) links
- OAM interfaces—required OSS interfaces

Performance

The introduction of wireless functionality into the wireline load does not degrade the operation, quality and performance of the wireline switch, as measured and reported in *Reliability and Quality Measurements for Telecommunications Systems (RQMS)*.

The wireline switch has no more than 1.25 cutoffs each 10,000 calls. It does not have an individual line or trunk out of service more than 28 minutes each year. The wireline product has no individual D-channel out of service for more than 20 minutes each year. The wireline switch has no more than 3 minutes of unplanned downtime each year.

3 Operations support systems

Table 3-1 lists the design changes that the DMS-100 Wireless switch requires for operations support systems (OSS). This chapter describes each topic listed in this table in detail.

Table 3-1 Index to DMS-100 Wireless OSS changes (Sheet 1 of 2)

Section with required changes	Description
Trunk maintenance and testing	Wireless interoffice tests and T1 testing interface cards match wireline trunks and T1 interfaces. The only exception is when the trunk is between the CDMA interface unit (CIU) and the base station controller (BSC).
Remote office test line	The DMS-100 Wireless switch does not support remote office test line (ROTL) testing on wireless and wireline direct inward dial (DID) trunks 103 and 105.
OMs	For hardware and software resources unique to wireless and wireline functions, the associated wireless and wireline software generates separate OMs. The registers in DMS-100 Wireless operational measurement (OM) group BRSTAT include CDMA mobility messages in their calculations. (Refer to section "Tools Resolution for DMS-100 Wireless" in chapter 4 for details.) To support additional OMs, expand the capabilities of the engineering and administration data acquisition system (EADAS).
Network management	The DMS-100 Wireless switch does not support the following trunks: • NWK • wireless DOD with line type of signaling (DOL) • wireless (voice links to radio units)

Table 3-1 Index to DMS-100 Wireless OSS changes (Sheet 2 of 2)

Section with required changes	Description
Service analysis	The DMS-100 Wireless switch does not support service analysis for wireless calls.
Service provisioning	The DMS-100 Wireless switch does not support OSS flow-through provisioning for wireless DNs. But you can manually perform wireless provisioning with Mobile Service Order System (MSERVORD) on a remote MAP terminal. (Refer to section "DMS-100 Wireless MAP Display Conflict Resolution" in chapter 4 for details.)

Introduction

A switching network element (NE) provides call processing. The OAM functionality transforms an NE from a capital investment into a revenue-generating unit. An OSS is a computer-based system by which operating companies (OC) manage the OAM functions of NEs in their networks. The DMS-100 Wireless switch minimizes any impact to the OSS network of an OC.

An OSS provides

- a common interface to the NEs
- management of all NEs in an area
- automation to reduce the number of OC personnel and skill level requirements
- operating area reports for regulatory bodies and OC management

Many regional Bell operating companies (RBOC) use wireline OSSs. Large independent operating companies (IOC) have their own OSS versions to support a centralized OAM.

Note 1: If an OSS requires new OAM functions to support mobile services, then add new or extend existing components from your OSS network.

Note 2: This chapter presents these changes to adapt into your OSS infrastructure before network deployment. These guidelines minimize the time between network introduction and service revenue generation. The immediate impact is the provisioning of wireless services to the existing services portfolio. This chapter also shows OSS figures and examples for *case-study purposes only*. Since OSSs vary widely from OSS vendor to OSS vendor, this chapter does *not* intend to offer configuration instructions for your OSS. This chapter does identify any changes that an OSS would require for use with the DMS-100 Wireless switch.

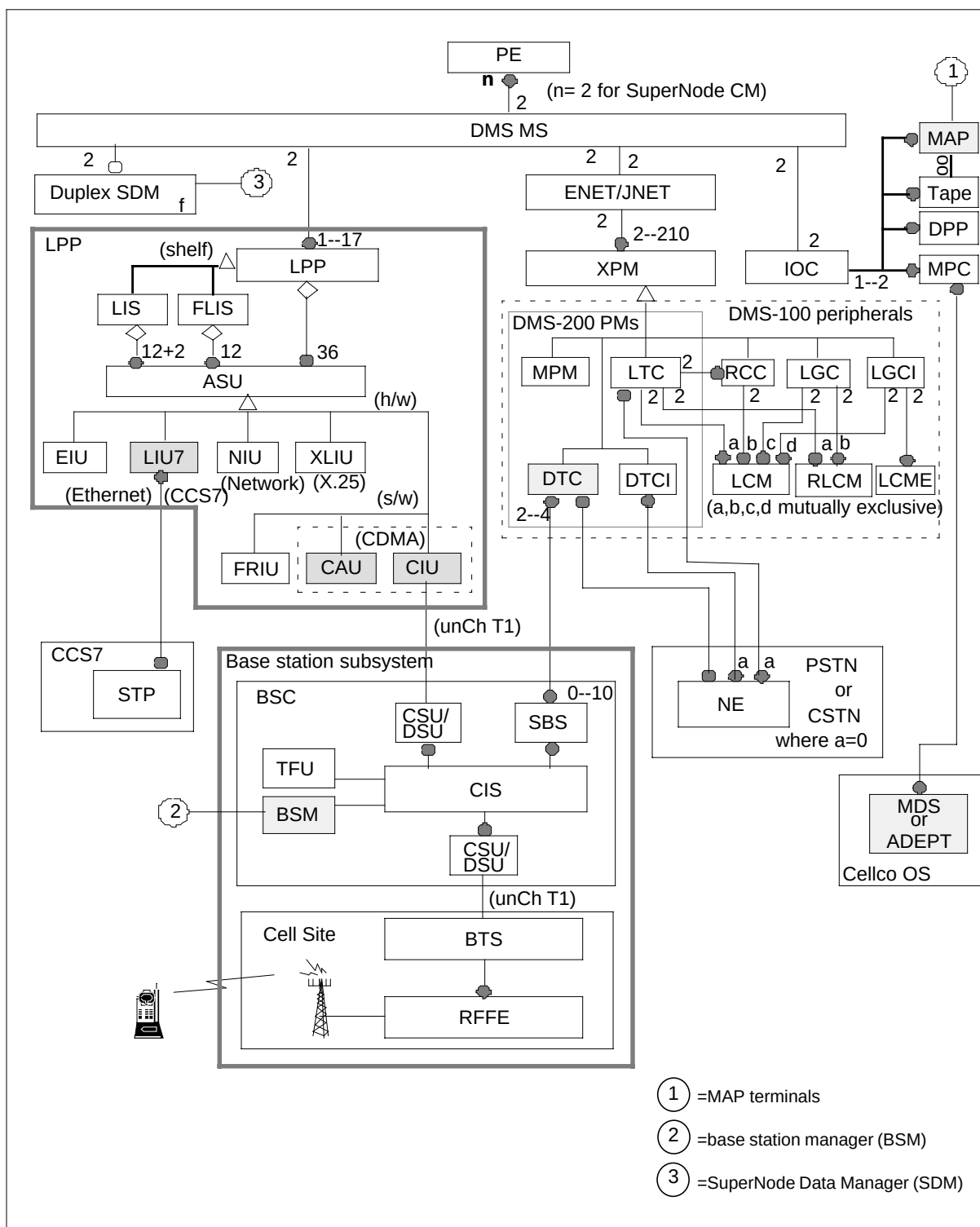
DMS-100 Wireless system

The DMS-100 Wireless switch requires two link peripheral processors (LPP) or fiber link interface shelf (FLIS). One LPP is for Common Channel Signaling 7 (CCS7) link interface units. Another LPP is for CIU and CDMA application units (CAU).

Figure 3-1 shows a model block diagram of the DMS-100 Wireless system object.

3-4 Operations support systems

Figure 3-1 DMS-100 Wireless system object model



The MAP terminal, BSM, and SDM roles in OAM

The following paragraphs briefly describe how the MAP terminal, BSM, and SDM interact with the OAM of the DMS-100 Wireless switch. (In the previous figure, circled numbers correspond to these OAM components.)

MAP terminals

Figure 3-1 identifies the MAP terminal that allows OC personnel to perform various OAM functions on the switch.

Position the MAP terminal locally or remotely. The DMS-100 Wireless MAP introduces minor changes to existing wireline and wireless MAP use.

Base station manager

For the DMS-100 Wireless switch, the CDMA BSM complements the MAP terminal for base station subsystem OAM functions.

The BSM supports the following user interfaces:

- graphical user interface (GUI)
- command line interface (CLI)
- data analysis interface

The interface supports file transfer protocol for bulk BSM OAM data transfer to OSS. The BSM also supports dial-up access with a modem.

SuperNode Data Manager

The SDM is a nodal level OAM platform that provides a single, common point for post-processing and distribution of DMS-100 Wireline switch OAM data.

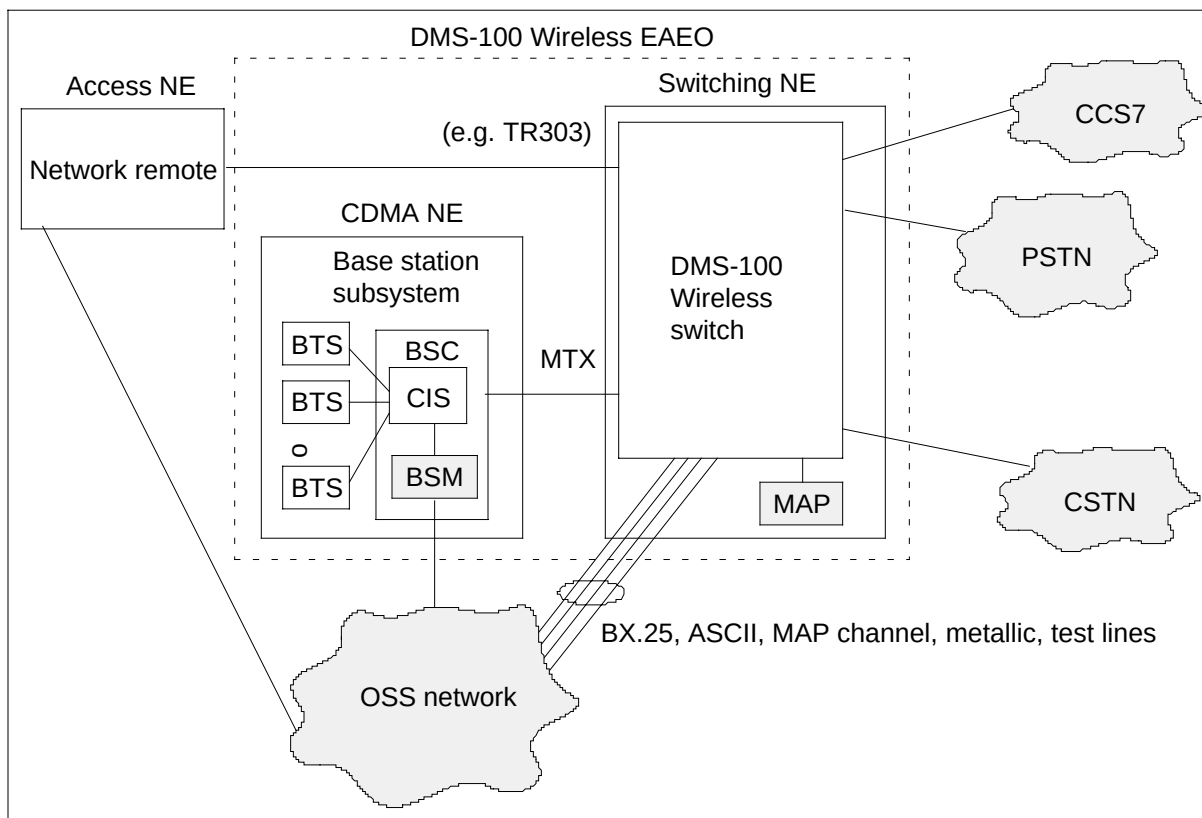
OSS network view of DMS-100 Wireless switch

The wireless base station subsystem is not an embedded component in the switching NE, like a remote switching center.

A separate NE enhances the visibility of base station subsystem status and performance by improving its resources in engineering, planning, and analysis.

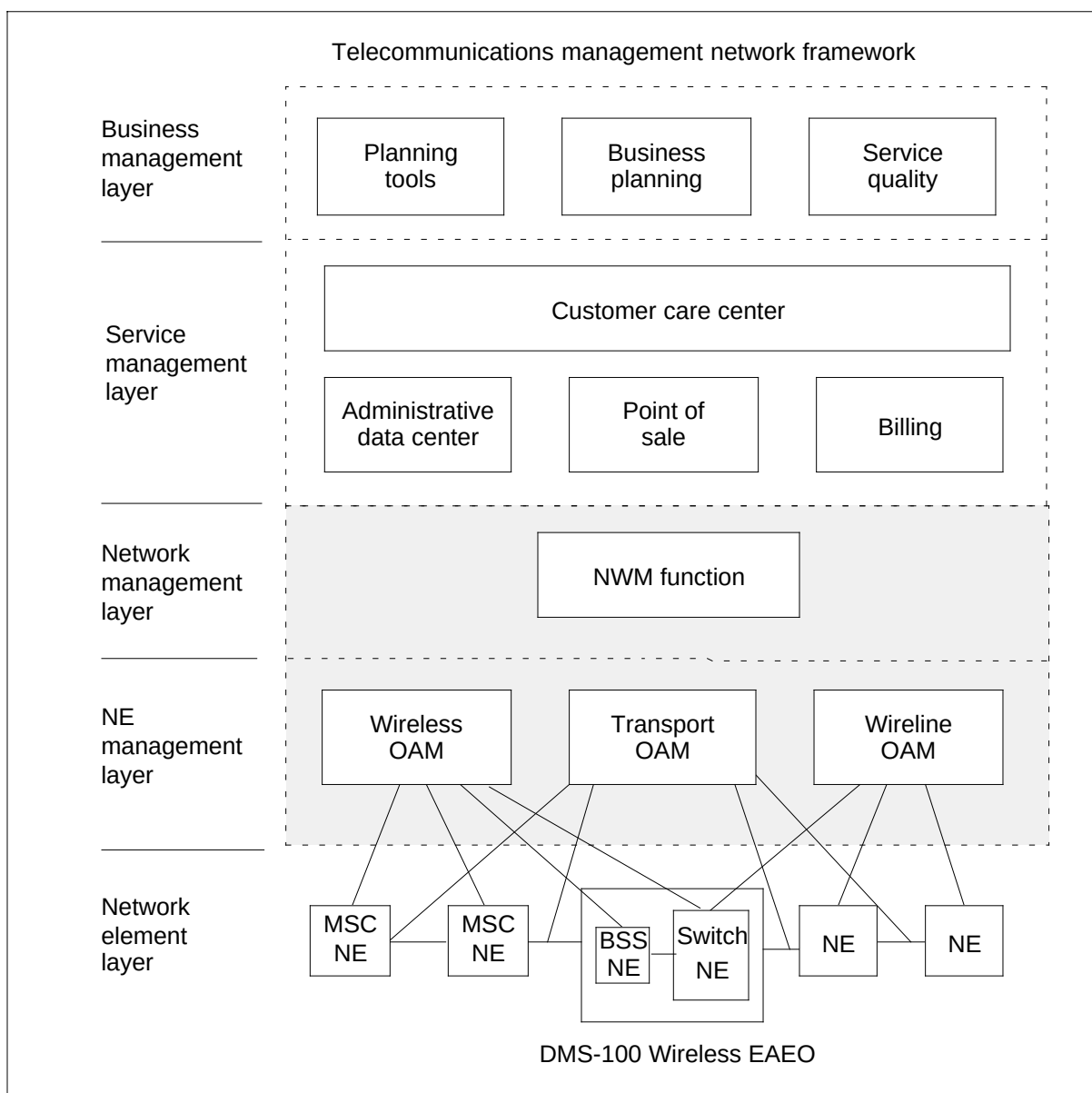
Figure 3-2 shows the OSS view of a DMS-100 Wireless switch as a combination of a switching NE and a subtending base station subsystem NE. (The base station subsystem resides towards the left-center part of this figure.)

Figure 3-2 OSS view of the DMS-100 Wireless switch



TMN model and OSS support summary

Figure 3-3 shows that the DMS-100 Wireless equal access end office (EAEO) falls under the telecommunications management network framework of the NE layer of the International Telecommunications Union (ITU)-Telecommunications Standardization section. The telecommunications management network model shows the areas that compose the structure of a service provider.

Figure 3-3 DMS-100 Wireless switch EAEO and telecommunications management network model

An OSS includes the following two categories:

- Business operations systems-consisting of the business management and service manager layers, which include customer care, billing, and directories
- Network operations systems-consisting of the network management and NE management layers, which include provisioning, planning and engineering, network management (NWM), and trouble and repair
 - The DMS-100 OAM features support the wireline OAM for switching NE.
 - The DMS-MTX OAM supports the following wireless-specific OAM features for an NE:
 - MSERVORD provisioning
 - mobile billing (call detail recording [CDR])
 - mobile specific operational measurements (OM) (separate OM accumulation class)
 - The BSM OAM features support wireless OAM specific for base station subsystem NE.

Note: Network management is a network traffic control to prevent the spread of congestion. This control results in more efficient use of network resources. To prevent congestion, use a series of NWM controls to alter or restrict the telephone traffic pattern between a switch and the switching NEs connected to it.

OSS interfaces and support

This section explains the differences, if any, between the requirements for wireline and wireless operations. It discusses the following types of operations:

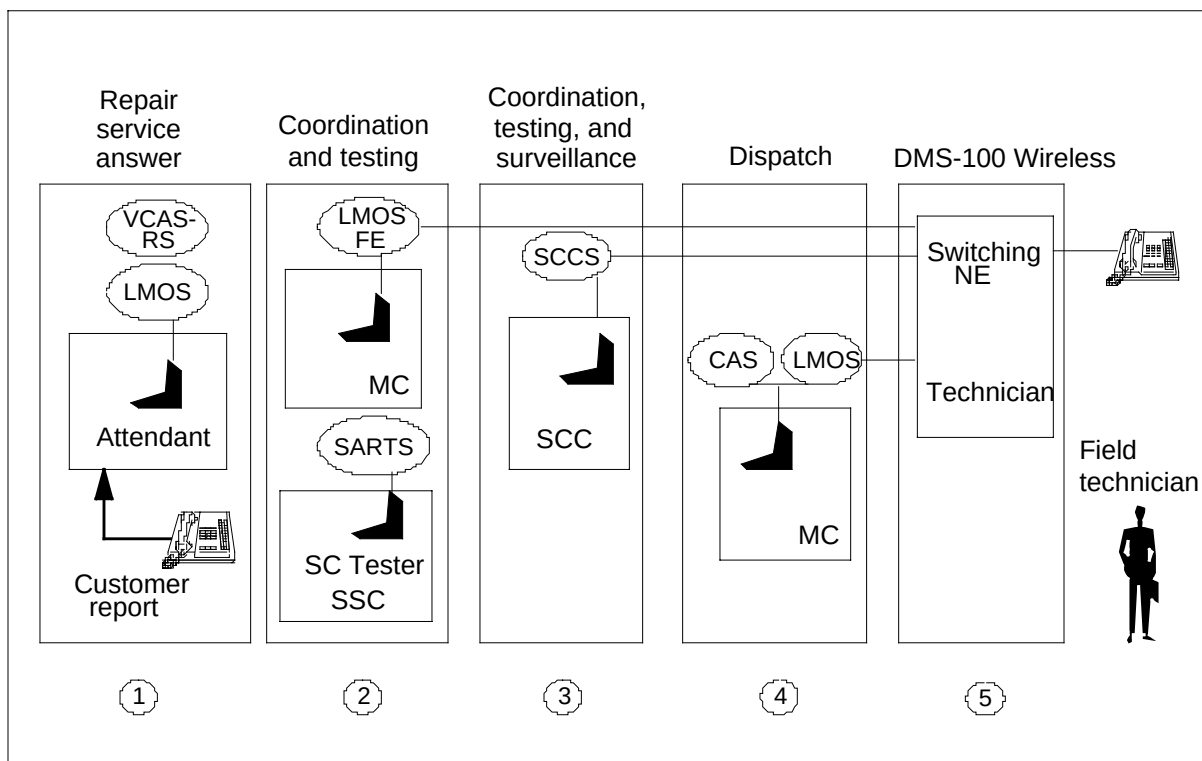
- maintenance
- surveillance
- line maintenance and testing
- trunk maintenance and testing
- OMs
- network management
- service analysis
- network administration
- service provisioning

- billing
- software downloading

Maintenance operations

Figure 3-4 shows an example of the repair process from the viewpoint of a customer who reports a trouble. (In this figure, circled numbers refer to the following steps in the trouble reporting process.)

Figure 3-4 Maintenance operations



For both wireline and wireless maintenance operations, the trouble reporting process is as follows.

1. A customer or NE reports the trouble. Customers can report troubles to a repair service attendant (by dialing 411), or directly to voice customer access system-repair service (VCAS-RS) with their telephone.
2. While the customer is still on-line, the attendant coordinates mechanized loop tester (MLT) verification tests with the loop maintenance operations system-functional element (LMOS-FE). (An attendant can also run other MLT tests while the customer is off-line.)
3. If the trouble is not a transient or customer premises equipment (CPE) problem, the attendant opens a trouble report, and gives a repair commitment time.

4. When the attendant locates the trouble, the attendant places the report in a dispatch queue, or routes it to the maintenance center (MC) for more testing. The LMOS mapper assigner capability dispatches the trouble report.
5. Field technicians obtain their next work assignment item (trouble ticket) by using the craft administration system (CAS) to log into LMOS. Technicians use a hand-held terminal to receive the next trouble ticket, call up tests, and close out tickets.

An NE can report a trouble by analyzing automatic line insulation testing (ALIT) messages with outside plant cable and pair information. When this occurs, the outside plant failure alerting system (PREDICTOR) provides maintenance personnel with information to perform preventive maintenance tasks.

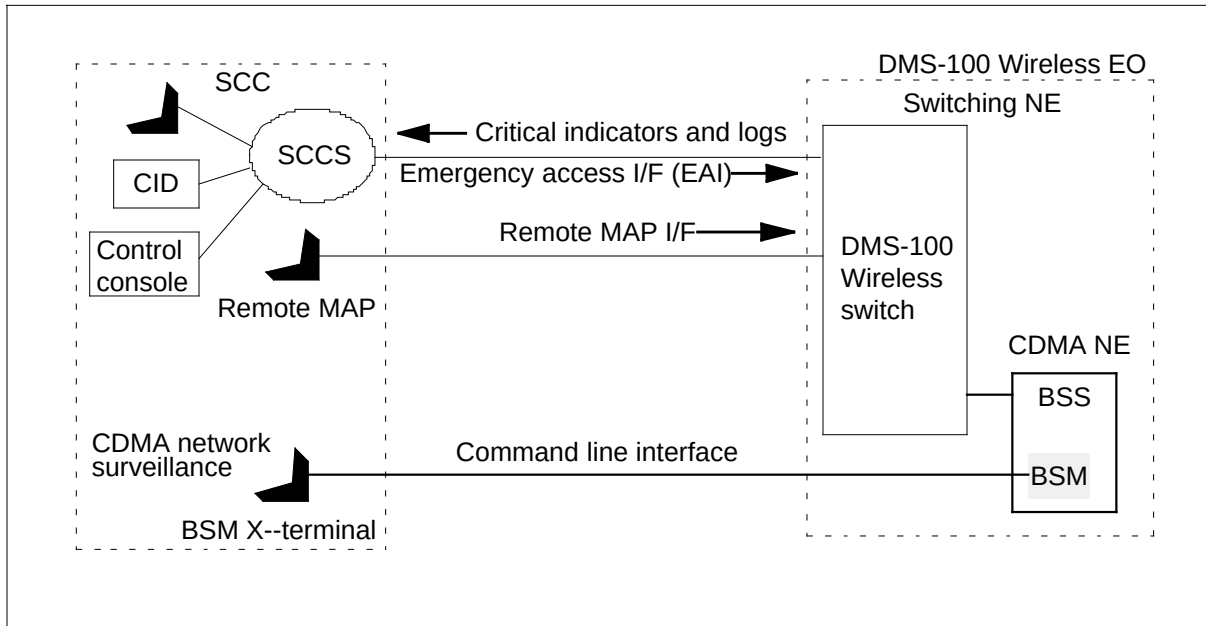
The LMOS host serves as a line record database for customer service history. The LMOS host passes data to the cable repair administrative system (CRAS) for cable force administration and cable trouble analysis. Automated cable expertise (ACE) searches the CRAS database for recurring customer trouble reports on a cable complement. The ACE performs system analysis to diagnose the nature, location, and cause of the cable trouble.

Surveillance

Switch surveillance is the real time (RT) monitor of network components to detect and correct performance degradations or failures.

The switching control center system (SCCS) acts with other NEs to provide centralized surveillance, control, administration, and maintenance of stored program control (SPC) switches and digital transport NEs.

Figure 3-5 shows the SCCS interface to the switching NEs over a remote MAP terminal or a mobile control center channel. The NE sends critical indicators and logs to the SCCS for system analysis and archival. Switching control center (SCC) personnel access the NE using the control console through the emergency access interface to re-initialize the switch. The critical indicator display (CID) shows these indicators.

Figure 3-5 DMS-100 Wireless end office surveillance**Switch maintenance**

The DMS-100 Wireless switch supports partial OAM integration. Since the radio equipment (BSC-BTS) is a separate NE from the switch, only the switch OAM is integrated.

For switch maintenance, the combination of the wireless and wireline MAP displays provide a consistent interface for maintenance displays, commands, and alarms. The DMS-100 Wireless switch includes logs and OMs from both platforms.

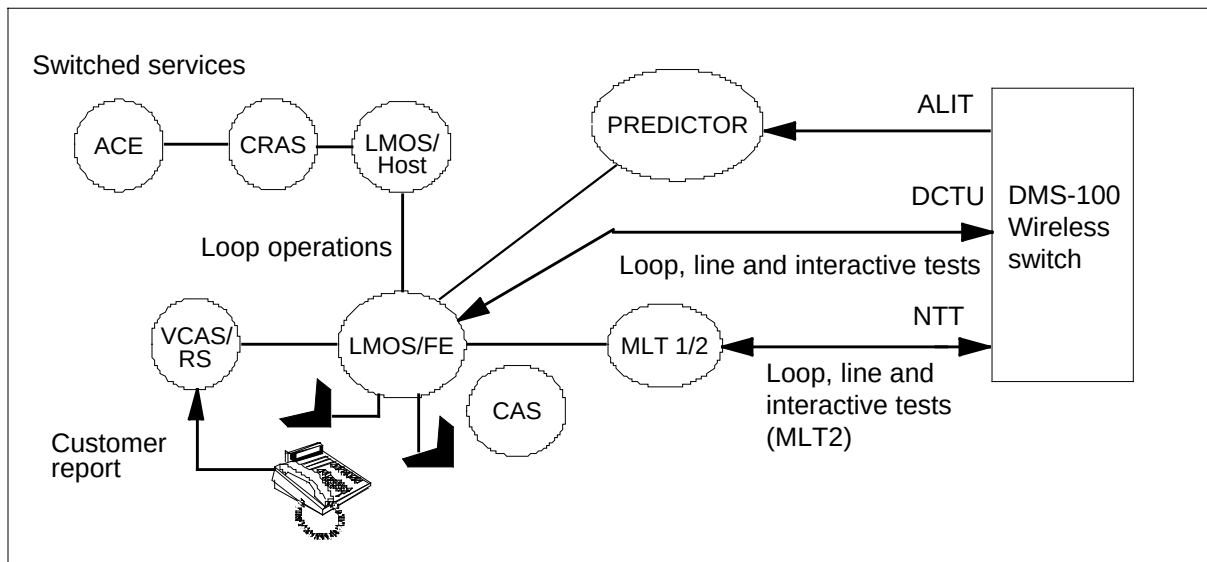
Note: Refer to chapter Chapter 4, “User interface,” for additional information on the MAP terminal display. Refer to chapter Chapter 9, “Operational measurements, alarms, and logs,” for additional information on logs and OMs.

The lower-right corner of Figure 3-5 shows the access of base station subsystem component alarms in the CDMA NE through the BSM. This figure does not show the computing module (CM). If the SCC also monitors the CDMA NE, there must be a BSM X-terminal window with the CLI to BSM.

Line maintenance and testing

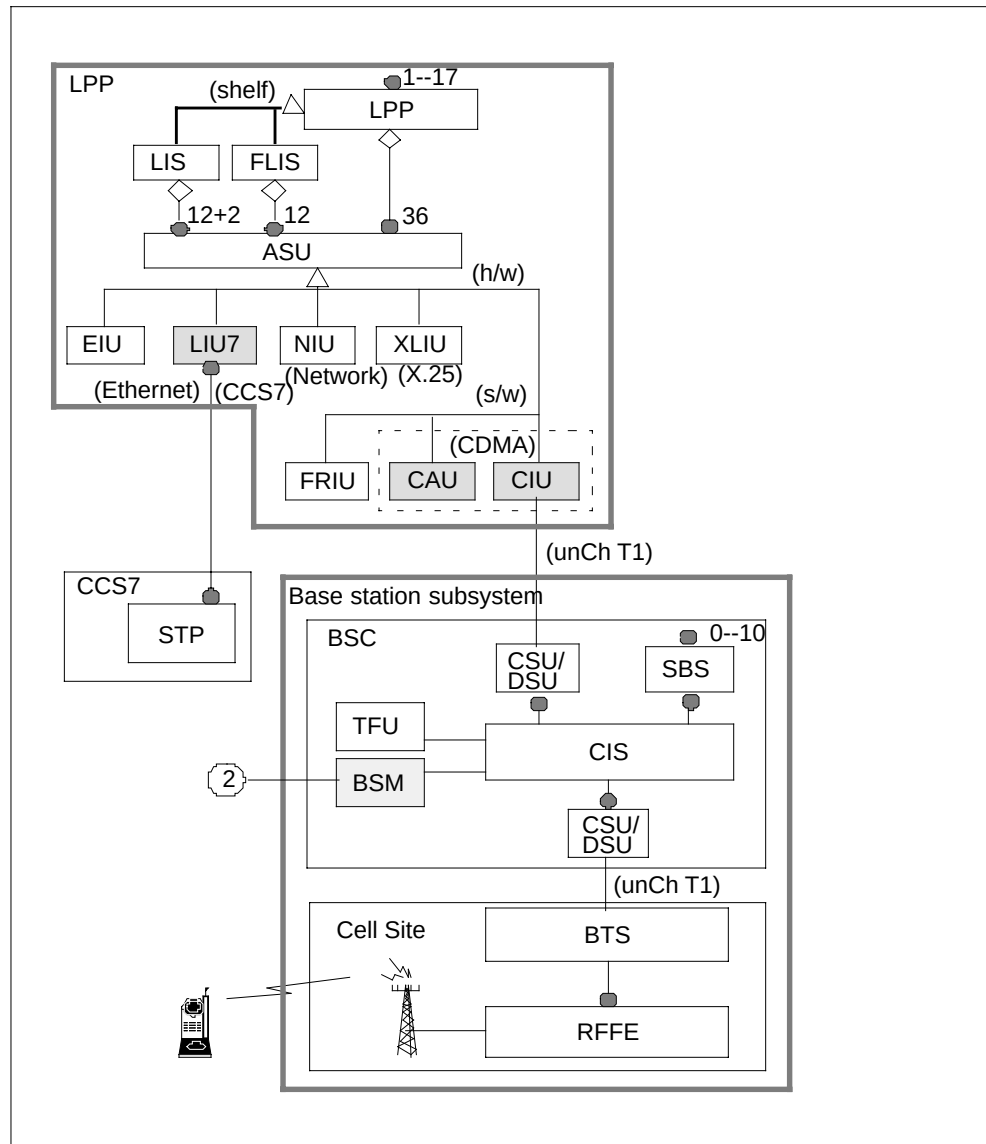
The OC line maintenance and testing operations, as in Figure 3-6 apply to the DMS-100 Wireless switch. The DMS-100 Wireless switch does not change line maintenance and testing.

Figure 3-6 Line maintenance and testing



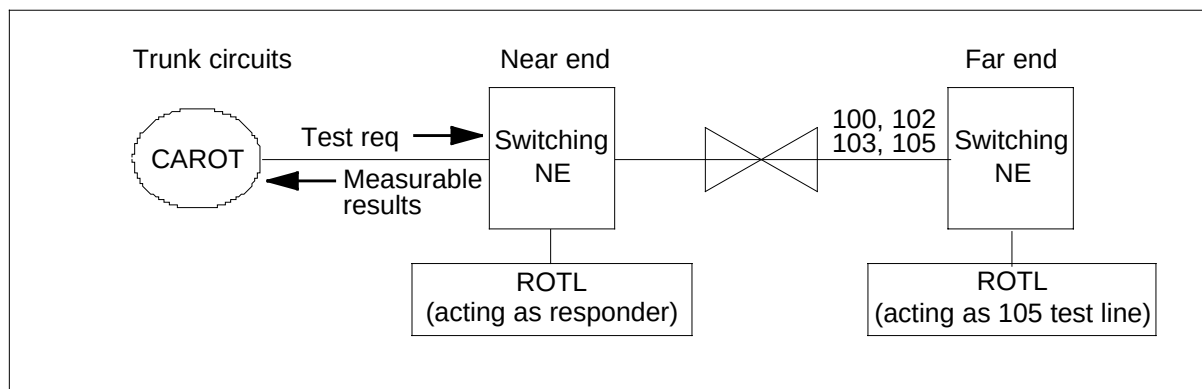
Trunk maintenance and testing

Wireless interoffice tests and T1 testing interface cards (6X50s) match wireline trunks and T1 interfaces. Only when the trunk is between the CIU and BSC, as in Figure 3-7 do maintenance operations differ.

Figure 3-7 Partial section of the DMS-100 Wireless system object model**The remote office test line**

The DMS-100 Wireless switch does not support ROTL testing on wireless DID trunks 103 and 105.

For trunk testing, Figure 3-8 shows that the centralized automatic reporting on trunks (CAROT) processor requests ROTL testing on a specific trunk through the switched telephone network.

Figure 3-8 Trunk testing (routine)

The near-end NE connects the chosen trunk to the test port. The ROTL, acting as the responder, seizes the trunk and outpulses digits over the trunk to the far-end ROTL. The far-end ROTL acts as 105 test line termination. The CAROT receives the test results. The ROTL also supports 100, 102, 103, and 105, non-synchronous and synchronous test lines.

OMs

The DMS-100 Wireless OMs (peg counts and usage measurements) are available for wireline, wireless, and common equipment.

Calls that involve ISL trunks and span wireless and wireline boundaries appear as two calls. One call comes from the originating circuit to the outgoing ISL trunk. The other call is from the ISL trunk to the terminating circuit. The switch pegs all call processing OMs for events (such as trunks originations and terminations) on ISL trunk calls, and to the wireless and wireline originations and terminations. These pegs help properly engineer the office, since calls on ISL trunks use more call processing resources.

Note: Refer to chapter 9, “Operational measurements, alarms, and logs,” for additional information on OMs.

Wireline OMs

Whenever wireless and wireline functions in the office share hardware or software resources, the switch generates an OM. For example, the switch generates one central processor call processing occupancy value rather than one value for the wireless calls, and another value for wireline calls. The office traffic measurement section shows the total number of line-to-trunk calls rather than one value for the number of wireless line-to-trunk calls, and another value for the wireline calls. Calls that route through ISL trunks generate OMs equal to two calls. The switch generates an originating call to an outgoing trunk (ISL trunk), and an incoming call from a ISL trunk to a terminating circuit.

For hardware and software resources unique to wireless or wireline functions, the associated wireless or wireline software generates separate OMs.

The registers in DMS-100 Wireless OM group BRSTAT include CDMA mobility messages in their calculations.

Wireless OMs

The BSM allows OC personnel to decide which OMs to poll in the radio equipment (BSC-BTS), and at what interval.

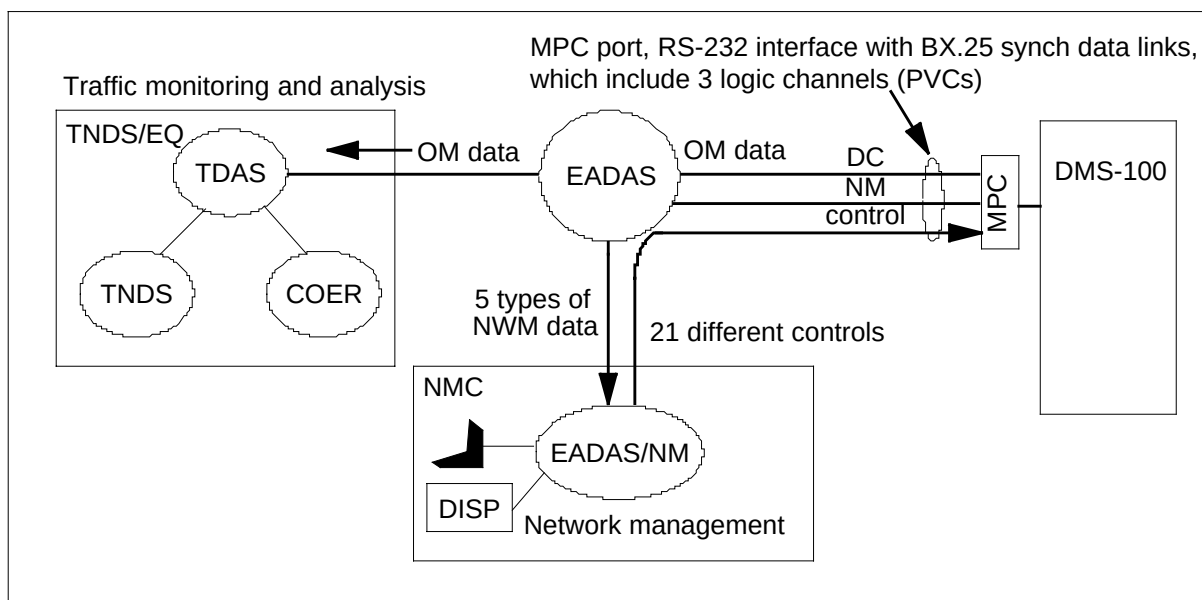
The SBS generates statistics and metrics relating to errors, delays, and volumes of traffic signaling, and control data. The BTS collects statistics relating to

- mobile station access
- paging access
- backhaul use
- forward and reverse loop power control
- fault messages

The DMS-100 Wireless switch does *not* store this information. Only the BSM receives this information for storage and evaluation of system performance.

EADAS interfaces

The EADAS, as in Figure 3-9, is a central data acquisition system that collects traffic data from several switching NEs. The EADAS uses a single, dedicated, synchronous, low-speed BX.25 data link with three BX.25 permanent virtual circuits (PVC). The OM data collection (EADAS/DC interface) uses one PVC. The NWM application (EADAS/NM interface) uses the other two PVCs. At the DMS side of link, it terminates to a modem that links with a RS-232 interface on a multi-protocol controller (MPC).

Figure 3-9 Network traffic management and analysis

The EADAS polls the switching NE for OM data over the EADAS/DC interface in half-hour, 1-hour, and 24-hour intervals. The EADAS records the OM data, generates near RT reports, and makes raw data available to other OSs for further processing and analysis.

A total network data system (TNDS) is one such OS. The TNDS equipment is a group of component OSs that collects and processes data to generate reports for network administrators. The TNDS equipment transmits the data to downstream systems, such as the central office equipment report.

OM data collection and processing

The DMS-100 Wireless OMs include wireless call types, transactions, and mobility events. The OM changes can fall into one of the following categories:

- OMs specific for wireless events (for example, OMMTX)
- common OMs with same name and same definition, but including additional usages or pegs for wireless events, for example, OFZ, BRSTAT
- tuples in the common OM group for wireless facilities (for example, TRK group with tuples for DMS-100 Wireless and NWK trunk groups)

Note: To support additional OMs, you *must* expand the capabilities of EADAS.

Network management

To protect the switch from overloads from the public network and the network from switch overloads, the DMS-100 Wireless switch uses NWM controls.

The DMS-100 Wireless NWM supports DID trunks.

The DMS-100 Wireless NWM does *not* support the following trunks:

- NWK
- wireless DOD with line type of signaling (DOL)
- wireless (voice links to radio units)

Blocking controls block calls. The switch software sends the call to generalized no circuit treatment instead of the datafill treatment that operating company personnel entered for NWM control. (This also applies to auto pre-planned and automatic out-of-chain routing [AOCR] controls.)

Table 3-2 lists those NWM controls that the DMS-100 Wireless switch supports.

Table 3-2 DMS-100 Wireless NWM controls (Sheet 1 of 2)

EADAS/NM	Wireline equivalent	Supported
Reroute	RRTE	Yes (Note 1)
Immediate reroute	FRR	Yes (Note 1)
Trunk subgroup access restrictions		
Selective cancellation key		
Cancel from	CANF	Yes (Note 1)
Cancel to	CANT	Yes (Note 1)
Call gapping	CBK (Note 2)	
Skip routes	SKIP	Yes (Note 1)
Code blocks	CBK	Yes (Note 1)
Directionalization		
Trunk make busy	ITB	Yes
Trunk reservation	STR	Yes (Note 1)
Protectional reservation equipment	PRE	Yes (Note 1)
Directional reservation equipment	DRE	Yes (Note 1)
Note 1: Trunk types MTX and NWT do not support this control.		
Note 2: Call gapping is an option on code block (CBK).		

Table 3-2 DMS-100 Wireless NWM controls (Sheet 2 of 2)

EADAS/NM	Wireline equivalent	Supported
Short sender timing		
Recorded announcement		
Selective incoming load control		
Dynamic overload control (receive, send)	DOC	Yes
Circuit busy announcement trunks		
Hard-to-reach	HTRK	
Note 1: Trunk types MTX and NWT do not support this control.		
Note 2: Call gapping is an option on code block (CBK).		

CDMA equipment

The CDMA peripheral equipment has no network traffic management capabilities. The equipment is not subtended from multiple NEs, and cannot contribute or react to network overload. CDMA peripheral equipment operates on the access side. Apply any network traffic management functions at the single NE from which it subtends.

Service analysis

To perform service analysis, use a MAP terminal and an audio circuit. A service analyst uses the MAP terminal to specify the calls presented for analysis. An analyst uses the audio circuit to monitor the specified calls.

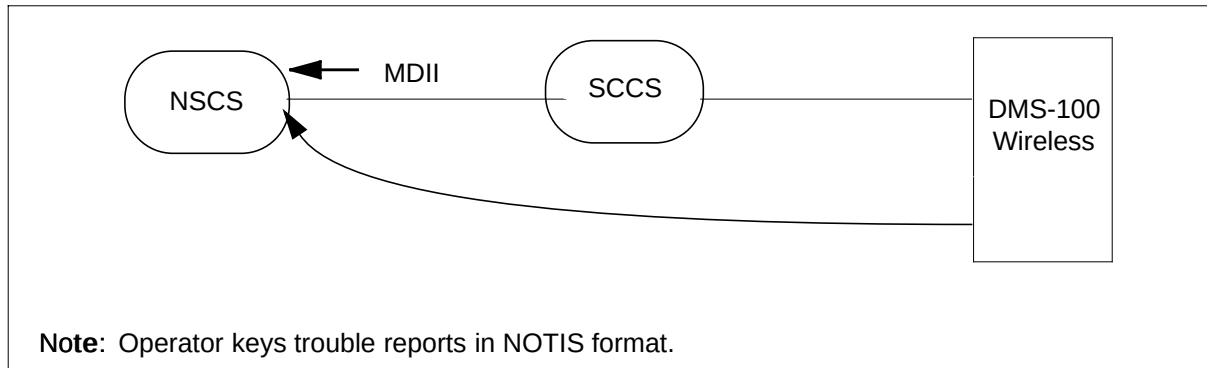
When the analyst specifies a call type (such as 0+), the switch cannot capture processing on the wireless side of the call for analysis. A service analyst can specify ISL trunks on the wireline portion of the office.

Note: The DMS-100 Wireless switch does not support service analysis for wireless calls.

Network administration

The DMS-100 Wireless switch does not change network administration.

Figure 3-10 shows how the switching NE sends machine-detected interoffice irregularities (MDII) to the network service center system (NSCS) through the SCCS. The NSCS receives operator-keyed trouble reports in network operations trouble information system (NOTIS) format. The switch uses this data to execute trouble analysis, administration, and service monitoring at the network level.

Figure 3-10 Network administration

Service provisioning

To provision lines and services, use the following separate command interfaces:

- Service Order System (SERVORD) for wireline subscribers
- Mobile Service Order System (MSERVORD) for wireless subscribers

Note: Refer to chapter 6, “Line provisioning,” for additional information on wireline and wireless service order operations.

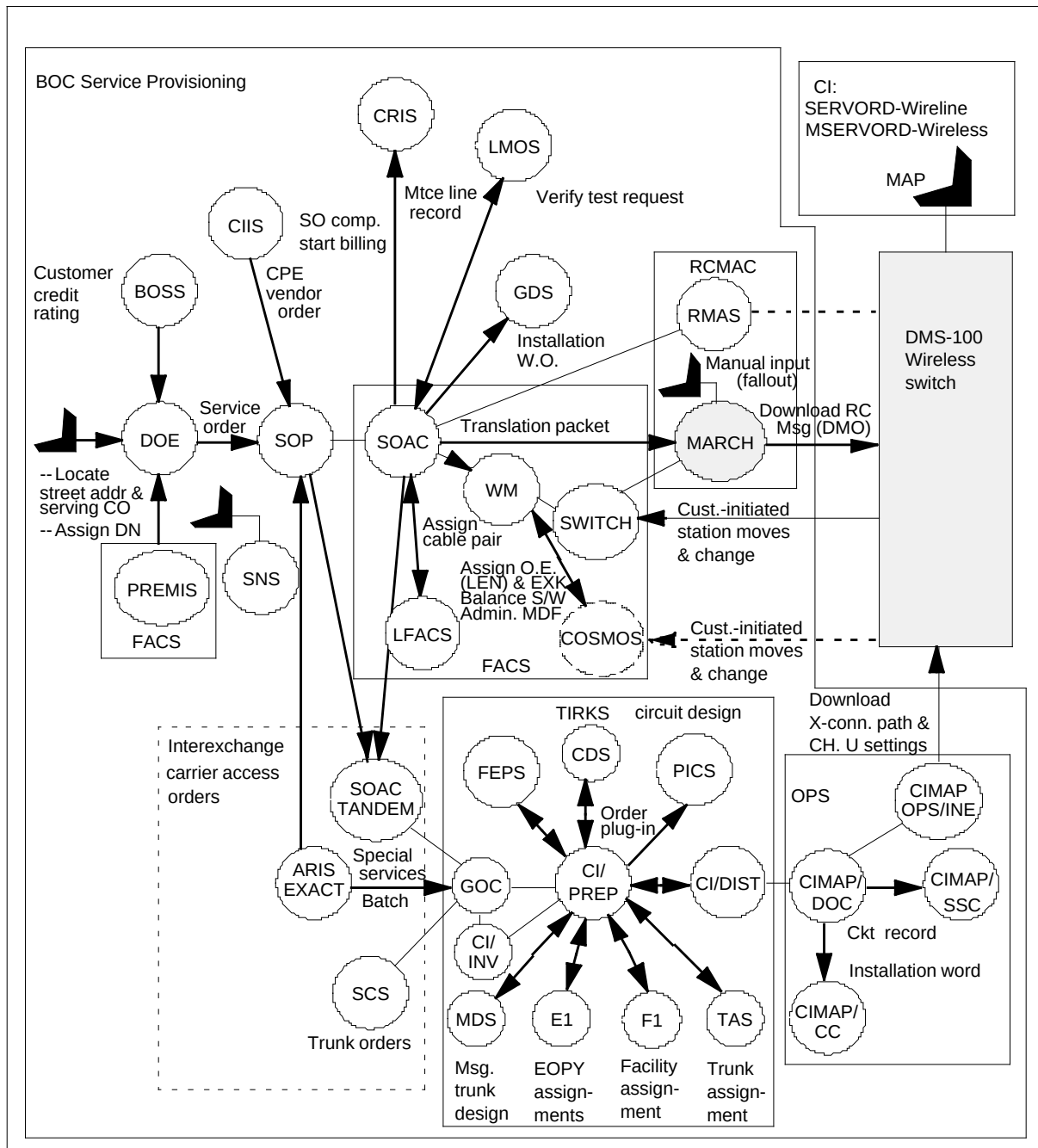
Table 3-3 lists the provisioning commands that the DMS-100 Wireless switch supports..

Table 3-3 DMS-100 Wireless provisioning applications

Provisioning application	Wireline command	Wireless command
Service order	SERVORD	MSERVORD
Query command for DNs	QDN	QDN, or QHLR (Note)
Query command for unassigned DNs	QDNSU	Not applicable
Query command for working (assigned) DNs	QDNWRK	Not applicable
Query command for network class of service	QNCOS	Not applicable
Query command for LEN	QLEN	Not applicable
Query command for line type	QLT	Not applicable
Note: The QDN command input must be 10 digits. The error response “The DN Entered is Not Unique. Please Enter the Full National DN” displays if you enter a DN with less than 10 digits.		

For OC OSS, flow-through provisioning does not change for wireline DNs. The DMS-100 Wireless switch does not support OSS flow-through provisioning for wireless DNs. You can manually perform wireless provisioning using MSERVORD on a remote MAP terminal.

Figure 3-11 shows a sample of a BOC provisioning OSS. (Note that the upper-right corner of this figure shows that you can use MSERVORD for wireless provisioning.)

Figure 3-11 OC service provisioning process and the DMS-100 Wireless switch

Billing

Wireline and wireless calls generate billing records in different formats. These records require different tape devices, or billing streams, if the records are spooled to tape. Set up two separate billing streams. Set up one stream for wireless billing. Set up another stream for wireline billing. A magnetic tape

drive (MTD) for billing storage in an office requires two separate drives. Billing media converters (BMC) also require two separate drives.

Both streams can share the same device if the office uses a hard disk or other device that can have multiple files open simultaneously to store billing information.

The type of billing record that the DMS-100 Wireless switch generates depends on the end users involved in the call. Calls that involve ISL trunks and span wireless and wireline boundaries appear as two calls. If each side of the call generates a record, two independent billing records result. Calls that involve ISL trunks and span wireless and wireline boundaries appear as two calls.

Note: Refer to chapter 8, “Billing,” for additional billing information.

Wireline billing

For wireline calls, configure the office to use either Northern Telecom (NT) or Bellcore automatic message accounting (AMA) format record.

You can use combinations of disk drives and MTDs to store billing records, depending on the configuration. In some configurations, you can store billing records on an MTD. Or you can physically carry the tape spools to remote locations, called revenue accounting offices (RAO), or host office collectors (HOC) for processing. In other configurations, you can store the information locally, and then route it electronically to RAOs or HOCs using BMCs, distributed processing peripherals (DPP), or AMA teleprocessing system links.

Wireless billing

Billing for wireless calls uses CDR records in NT format.

Each CDR record contains the following call-specific information:

- an origination cell
- the trunk used for the call
- the call duration

The CDR subsystem collects individual call billing information, and stores it on a user-defined storage medium. (Wireless billing, like wireline billing, uses the device independent recording package.) The storage medium can be a redundant 220-Mbyte disk drive, or a 1600-bpi MTD. Use the MTD to transfer the CDR information from a disk drive to the off-board billing system. Wireless and wireline billing cannot share the same MTD. Use X.25 to electronically transmit CDR records to the billing center.

The following types of calls generate CDR records:

- collect calls
- third-party billing calls
- 800 calls

(The forward leg of a forwarded call from a wireless subscriber also generates a CDR record.)

A wireless subscriber can pre-subscribe to an interexchange carrier (IEC). If so, the forward leg of forwarded calls uses the pre-subscribed IEC. (The wireless subscriber can prevent forwarded call charges with the Roaming Do Not Disturb feature.)

When a roaming subscriber makes a toll call that requests an IEC, the switch selects the carrier prescribed at home. If that carrier is not available, call routing uses the default IEC carrier of the switch.

The DMS-100 Wireless switch allows roaming subscribers to have the same supplementary services that they subscribed to with their home area service provider.

The IS-41P subscribers receive the same services when they are roaming in an IS-41P network. The IS-41B subscribers receive the same services when they are roaming *except* those that IS-41B messaging does not support.

A RT billing feature allows the operator to obtain billing information for specific mobile calls at call completion. The DMS-100 Wireless switch generates a log that lists the mobile ID number, and the start and completion time of the call.

A split ticket billing feature allows the cellular OC to separate billing for each service area to accommodate different rate structures. As a mobile subscriber travels between serving areas, the billing record closes, and another opens. An optional audible signal notifies the subscriber of the change in serving areas.

Originations use an account code billing feature. Associate the call with a three-digit user, and place it in the billing record. Call terminations do not include account codes.

The CDR determines the originating or terminating cell, or both cells. You can determine the frequency spectrum in which the call originated because each cell supports traffic channels in only one hyperband.

Software downloading

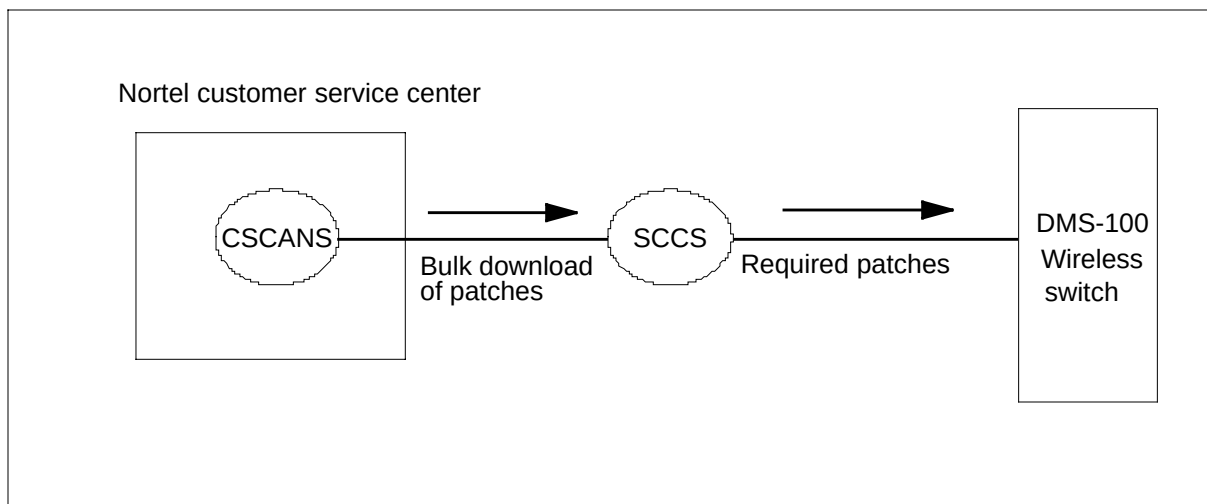
The following paragraphs briefly describe the effect of software downloading for wireline and wireless calls in an OSS.

Wireline software downloading

Customer services computer access network standards (CSCANS) downloads patch administrative information and DMS patches from the Nortel Networks customer service center to the SCCS. The OC personnel then perform patch calculation and application to the switch.

Figure 3-12 shows an example of the path that the SCCS receives patch information for the switch.

Figure 3-12 Software downloading



Wireless software downloading

The BSM handles base station subsystem software download, upgrade, patch and version control.

4 User interface

Table 4-1 lists the design changes that the DMS-100 Wireless switch requires for user interface. This chapter describes each topic listed in this table in detail.

Table 4-1 Index to DMS-100 Wireless user interface changes

Section with required changes	Description
MTX and LNS alarm banner conflict	Wireless code division multiple access (CDMA) alarms appear under the PM alarm banner. Also the MTX menu option occupies slot 7 in the MTC level menu.
MTXCDR menu option conflict	DMS-100 Wireless MAP changes MTXCDR alarm from priority 5 to priority 3. Also RAL alarm changes from priority 3 to priority 2.
Tools Resolution for DMS-100 Wireless switch	CPSTAT command includes the CDMA MOBILITY measurement.
Operational measurements	Operational measurement (OM) registers BRSTAT and BRSCMPLX factor CDMA mobility processes when the switch calculates a register's value.
TRAVER on the DMS-100 Wireless switch	DMS-100 Wireless MAP display includes wireless MX and DID TR originators.
Supporting documentation	This section lists additional NTPs that apply to wireline and wireless user interface procedures.

MAP terminal

The MAP terminal is the primary interface between telephone operating company personnel and a DMS switch. Operating company personnel can access system test, data interrogation and modification, and trouble analysis functions from a MAP terminal. In addition, use the MAP terminal to access performance tools.

Operating company personnel can control, maintain, and administer most DMS-100 Wireless equipment from a MAP terminal.

The DMS-100 Wireless MAP display contains the same content as both displays from the wireline and wireless switches.

Maintenance system

Like the Nortel Networks wireline and wireless functionalities, the DMS-100 Wireless switch includes a maintenance system to detect, analyze, correct, and report software and hardware faults. The DMS-100 Wireless maintenance system uses a telescoping method of MAP displays that examines the operation of the switch. Telescoping MAP displays detail system status or faults, starting at the maintenance (MTC) level and descending to lower levels and sub-levels until the fault is traced to a component level.

Operating company personnel enter successive commands and parameters on the MAP terminal to access each system level or sub-level. It is at the MTC level that telephone operating company personnel identify and correct switch operations. The MTC level of the DMS-100 Wireless switch also can display wireline trunk and line testing.

The DMS-100 Wireless switch also provides the CDMA maintenance subsystem. This maintenance subsystem enables operating company personnel to monitor the number of CDMA application units (CAU) and CDMA interface units (CIU) currently in and out of service.

To access the MTC level at the MAP terminal, type the following command:

CI>MAPCI;MTC

To return to the command interpreter (CI) level at the MAP terminal, type the following command:

>QUIT MAPCI

Alarms

Each alarm class is assigned an alarm level that lists the severity of the alarm. A critical alarm is the most severe, followed in decreasing order with a major alarm, and finally a minor alarm.

Table 4-2 describes what conditions generate CAU alarms displayed in the DMS-100 Wireless alarm banner.

Table 4-2 DMS-100 Wireless CAU alarms

CAU	Its mate	Pair-wise status	Alarm condition
Offline	Offline	Offline	None
Offline	Ready	Ready	Major
Offline	Not ready	Not ready	Major
Ready	Offline	Ready	Major
Ready	Not ready	Ready	Major
Ready	Ready	Ready	None
Not ready	Offline	Not ready	Major
Not ready	Ready	Ready	Major
Not ready	Not ready	Not ready	Critical
Note: The DMS-100 Wireless alarm banner also displays a critical CAU alarm if more than 50% of the CAU pairs are not ready.			

Table 4-3 describes what conditions generate CIU alarms displayed in the DMS-100 Wireless alarm banner.

Table 4-3 DMS-100 Wireless CIU alarms (Sheet 1 of 2)

CIU	Its mate	Pair-wise status	Alarm condition
Offline	Offline	Offline	None
Offline	Ready	Ready	Major
Offline	Not ready	Not ready	Major
Ready	Offline	Ready	Major
Ready	Not ready	Ready	Major
Ready	Ready	Ready	None
Not ready	Offline	Not ready	Major
Note: The DMS-100 Wireless alarm banner also displays a critical CIU alarm if more than 25% of the CIU pairs are not ready.			

Table 4-3 DMS-100 Wireless CIU alarms (Sheet 2 of 2)

CIU	Its mate	Pair-wise status	Alarm condition
Not ready	Ready	Ready	Major
Not ready	Not ready	Not ready	Critical
Note: The DMS-100 Wireless alarm banner also displays a critical CIU alarm if more than 25% of the CIU pairs are not ready.			

In addition, the alarm banner displays a major base station manager path (BSMP) alarm when the computing module (CM) detects that a logical path to the base station manager (BSM) is not available.

Supporting documentation

Refer to the following NTPs for additional information on MAP terminal operation and maintenance:

- *DMS-100 Family Maintenance System Man-Machine Interface Description*, 297-1001-520
- *DMS-100 Family Common Channel Signaling 7 Maintenance Reference Manual*, 297-1001-531
- *DMS-100 Family Input/Output Devices Maintenance Guide*, 297-1001-590
- *DMS-100 Family Networks Maintenance Guide*, 297-1001-591
- *DMS-100 Family Peripheral Modules Maintenance Guide*, 297-1001-592
- *DMS-100 Family External Devices Maintenance Guide*, 297-1001-593
- *DMS-100 Family Lines Maintenance Guide*, 297-1001-594
- *DMS-100 Family Trunks Maintenance Guide*, 297-1001-595
- *DMS-MTX Maintenance and Administration Position Commands Reference Manual*, 411-2131-809

DMS-100 Wireless MAP Display Conflict Resolution

Although the DMS-100 Wireless switch supports all wireline and wireless MAP functionality and commands, conflicts would arise because MAP displays differ in both existing functionalities. To support all wireline and wireless MAP operations, the DMS-100 Wireless MAP display also differs from the existing wireline and wireless MAP displays.

The DMS-100 Wireless MAP display differs from both existing wireline and wireless MAP displays to resolve the following conflicts at the MTC level:

- MTX and lines (LNS) alarm banner conflict
- MTX and LNS menu conflict
- MTXCDR (MTX Call Detail Recording) menu option (in MTC;IOD level) conflict

Note: The following section describes another DMS-100 Wireless MAP display conflict between the CPSTATUS and MTXPERF tools display. Refer to “Tools Resolution for DMS-100 Wireless” for additional information on the resolution of this MAP display conflict.

Figure 4-1 shows the DMS-100 Wireless MAP display.

Figure 4-1 DMS-100 Wireless MTC level MAP display

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
CM Flt	Clock	NO AMA	.	2 TPC	1 RS	.	52 CC	2Crit	.
M	M	*C*		*C*	*C*		*C*	*C*	
MTC									
MTC:									
0	Quit								
2	Activity								
3	MTCNA								
4	SRSTATUS								
5	BERP								
6	CPSTATUS								
7	MTX								
8									
9	CM								
10	MS								
11	IOD								
12	Net								
13	PM								
14	CCS								
15	Lns								
16	Trks								
17	Ext								
18	APPL								
TEAM24									
Time 10:49 >									

MTX and LNS alarm banner conflict

The DMS-100 Wireless MAP display includes both MTX and LNS alarm banners under separate locations. Wireless-specific CDMA alarms exist under the PM alarm banner because they are peripheral alarms.

The priorities in which the DMS-100 Wireless switch displays PM alarms (including wireless-specific CDMA alarms) in the MTC alarm banner run from least to most important:

- system alarms (certain percentage are sys_busy, OFFL, man_busy, etc.)
- OPM (outside plant module) alarms
- CDMA, wireless-specific alarms
- agency alarms (in order of listing of node_types)
- IPML (interperipheral message link) alarms
- PMLDTCI alarms (The switch generates a PMLOADS alarm at the user level of the MAP display when a problem exists with the user datafilled files.)
- FMT (fiber multiplex terminal) alarms

The switch displays the most severe alarm categories first. A critical alarm is the most severe, followed in decreasing order with a major alarm, and finally a minor alarm.

MTX and LNS menu conflict

The wireless-specific CDMA alarms appear in the PM alarm banner for the DMS-100 Wireless MAP display. The MTX menu option that occupied slot 15 in the MTC level menu of the wireless MAP display moves. In the DMS-100 Wireless MAP display, the MTX menu option occupies slot 7 in the MTC level menu. (Refer to the DMS-100 Wireless MTC level MAP display figure.)

To access the wireless MAP display that was available under menu option 15, select menu option 7 in the DMS-100 Wireless MTC level MAP display. (Or type **MTX** at the MTC level to access the MTX level.)

MTXCDR menu option (in MTC;IOD level) conflict

Another potential MAP conflict involved the priorities of IOD alarms. The DMS-100 Wireless switch displays the alarm with the highest priority in the IOD alarm banner. Multiple alarms of equal criticality that occur at the same time prevent the DMS-100 Wireless switch from displaying alarms with duplicate priorities.

Table 4-4 lists several IOD alarm priorities from the wireline and wireless functionalities.

Table 4-4 Partial list of wireless and wireline IOD alarm priorities

Alarm name	Priority	Originating functionality
RAL (Remote alarm)	3	Wireless
MPCLNK (Multiple protocol controller)	4	Wireless, wireline
MTXCDR (no alarm)	5	Wireless
SCAIX25 (Switch-computer application interface)	5	Wireline
NOP (Network operations protocol)	6	Wireless, wireline

In Table 4-4, a potential conflict exists because the wireline SCAIX25 alarm has the same priority (5) as the wireless MTXCDR alarm.

An MTXCDR alarm does not exist in the DMS-100 Wireless switch. However, a *priority* for this alarm exists in the wireless software to bind the MTXCDR option in the IOD menu. To avoid a collision with another alarm of equal criticality, the DMS-100 Wireless MAP display changes the priority of the MTXCDR alarm.

Table 4-5 lists the same group of IOD alarms with their rearranged priorities in the DMS-100 Wireless switch.

Table 4-5 DMS-100 Wireless IOD alarm priorities

Alarm name	Priority	Originating functionality
RAL (Remote alarm)	2	Wireless
MTXCDR (no alarm)	3	Wireless
MPCLNK (Multiple protocol controller)	4	Wireless, wireline
SCAIX25 (Switch-computer application interface)	5	Wireline
NOP (Network operations protocol)	6	Wireless, wireline

Changes to alarm priorities for the DMS-100 Wireless product include:

- RAL priority moves from priority 3 to 2.
- MTXCDR priority moves from priority 5 to 3.

Figure 4-2 shows the DMS-100 Wireless MTC IOD level.

Figure 4-2 DMS-100 Wireless MTC IOD level MAP display

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
CM Flt M	MSpair *C*	NO AMA *C*	4Pair *C*	1LIM *C*	7 RS *C*	▪	276 GC *C*	1 Maj M	▪
MTC		IOD							
0 Quit		IOC 0 1 2 3 4							
2		STAT C C C C C							
3									
4 ListDev_		DIRP: NO AMA XFER: ▪ SLM : SLMB SY NX25: ▪ MLP ▪							
5		NOP: ▪ DPPP: AMA LK DPPU: ▪ SCAI: ▪							
6									
7		MTC:							
8 SCAIX25		IOD:							
9 MTXCDR									
10 NX25CI									
11 DPP_									
12 SLM_									
13 DIRP									
14 Trnsl_									
15 Xfer									
16 Trks									
17 IOC_									
18									
A									

Accessing CDMA, wireless-specific alarms

To access wireless-specific CDMA alarms from the DMS-100 Wireless MAP display, step through the MAP display to the MTC level using the following command sequence:

CI>MAPCI;MTC

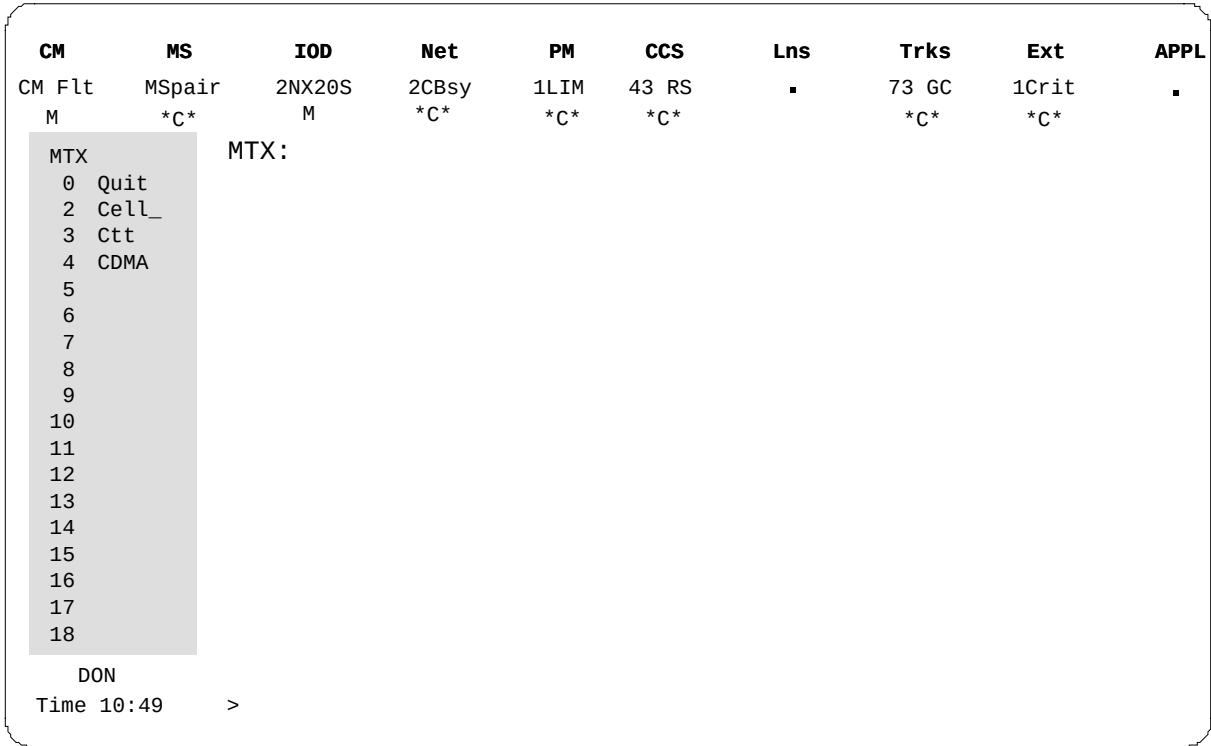
Then select menu slot 7 (MTX) from the MTC level MAP display.

Note: Or use the following direct MAP command sequence to access MTX alarms:

CI>MAPCI;MTC;MTX

Figure 4-3 shows the MTX level of the DMS-100 Wireless MAP display.

Figure 4-3 DMS-100 Wireless MTX level MAP display



The MTX level of the DMS-100 Wireless MAP display contains options cell, Ctt, and CDMA. (Cell and Ctt [menu slots 2 and 3] apply to AMPS/ TDMA only.) To display the CMDA level, select menu slot 4 (CDMA) from the MTX level of the DMS-100 Wireless MAP display.

Figure 4-4 shows the CDMA level of the DMS-100 Wireless MAP display.

Figure 4-4 DMS-100 Wireless CDMA level MAP display

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
CM Flt	MSpair	2NX20S	2CBSy	1LIM	43 RS		73 GC	1Crit	
M	*C*	M	M	*C*	*C*	▪	*C*	*C*	▪
			Ready		Not Ready				
CDMA 0 Quit 2 3 CAU 4 CIU 5 BSM PATH 6 BSM Reported Alarms : 7 Crit: Maj: Min: Warn: Info: 8 CDMA: 9 10 11 12 13 Status_ 14 15 16 17 18 CAU pair CIU pair CAU CIU BSM PATH BSM Reported Alarms : Crit: Maj: Min: Warn: Info: CDMA:									
DON Time 09:48 >									

Under the CMDA level, operating company personnel can choose to display or query the status on the following CDMA subsystems:

- the number of CIUs and CAUs in and out of service
- the BSM (that is, the number of critical, major and minor alarms that the BSM generated)
- the CIS

Limitations and restrictions

The following limitations and restrictions apply to DMS-100 Wireless MAP display.

- The DMS-100 Wireless MAP display cannot display a wireless alarm under the MTX alarm banner if a PM alarm with a higher priority already exists.
- To check the status of MTX alarms under the PM alarm banner, access the PM MAP level to view the alarms. This method to view alarms occurs at the MTC level.
- The DMS-100 Wireless MAP display and the BSM only support display in the English language.

Note: Or type **MTX** from the PM level to access MTX alarms. This command transfers the MAP display from the PM level to the MAPCI;MTC;MTX level.

AMPS/TDMA-related MAP screen displays

The following figures (Figure 4-5, Figure 4-6, and Figure 4-7) show MAP screen display examples of posting AMPS/TDMA peripheral modules (PM).

Figure 4-5 DMS-100; Wireless MAP display for posting an integrated cellular peripheral (ICP)

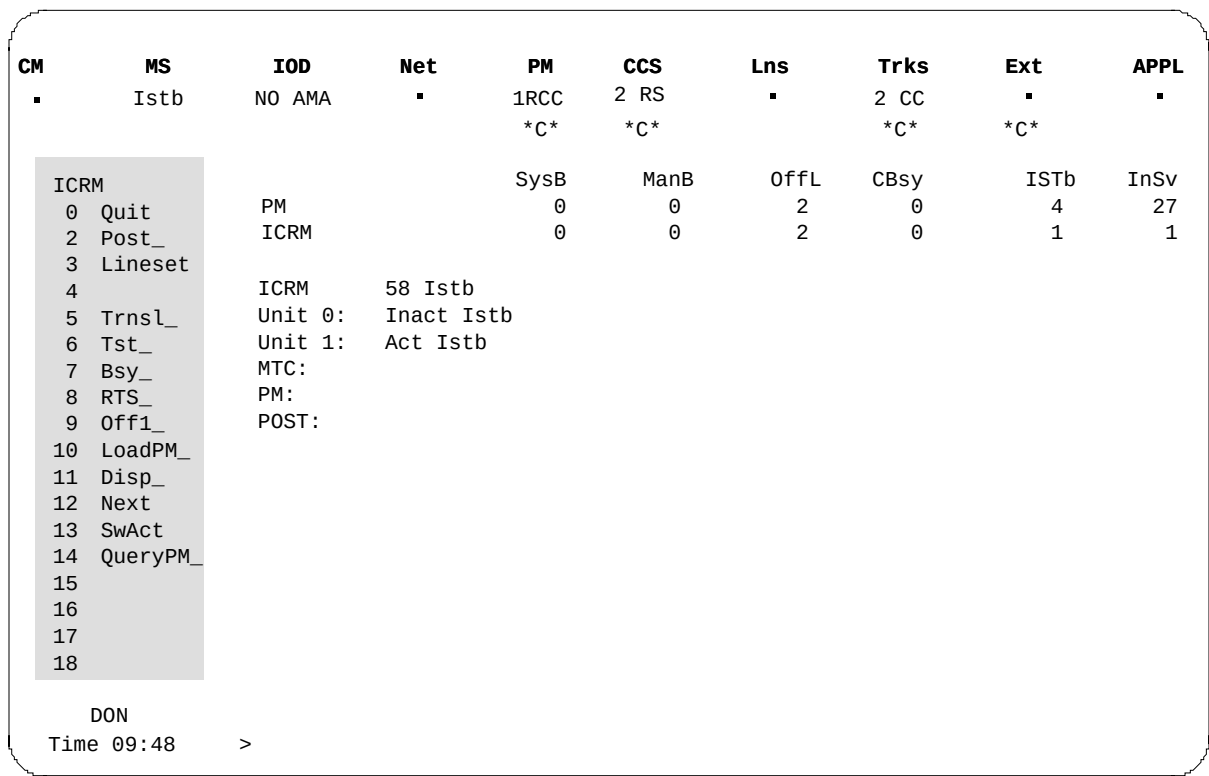


Figure 4-6 DMS-100; Wireless MAP display for posting an integrated cellular remote module (ICRM)

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
▪	Istb	NO AMA	▪	1RCC *C*	2 RS *C*	▪	2 CC *C*	▪ *C*	▪
CTU									
0 Quit									
2 Post_		Cell 58	(STSR)	CELL 58		Minor	CSPM	ICRM 58	Istb
3									
4		CTU 0	Offl						
5 TrnsL_			(CSM_ICRM)		CSM				
6 Tst_		MTC:							
7 Bsy_		MTX:							
8 RTS_		CELL:							
9 Offl_		CTU:							
10 LoadTRM_									
11 Disp_									
12 Next									
13									
14 QueryDev									
15 Mon_									
16									
17									
18									
DON									
Time 09:50 >									

Figure 4-7 DMS-100; Wireless MAP display for posting an alarm control unit (ACU)

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
▪	Istb	NO AMA	▪	1RCC *C*	2 RS *C*	▪	2 CC *C*	▪ *C*	▪
ACU									
0 Quit									
2		Cell 58	(STSR)	CELL 58		Minor	CSPM	ICRM 58	Istb
3									
4		ACU	Offl						
5 TrnsL_			(ACU_ICRM)						
6 Tst_		MTC:							
7 Bsy_		MTX:							
8 RTS_		CELL:							
9 Offl_		ACU:							
10									
11									
12									
13									
14 QueryDev									
15 ListALM									
16 ListCtrl									
17 AltCtrl_									
18									
DON									
Time 09:54 >									

Supporting documentation

Refer to the following NTPs for additional information on wireless PMs:

- *DMS-MTX NT800DR Integrated Cellular Remote Module Technical Description*, 411-2131-163
- *DMS-MTX Peripheral Module Software Release Document Supporting PRSM Guide*, 411-2131-598

Tools Resolution for DMS-100; Wireless

The Tools Resolution for DMS-100 Wireless feature resolves conflicts between the following tools and associated commands for the DMS-100 Wireless switch:

- CPSTATUS and MTXPERF MAP tools
- CPSTAT and MTXSTAT CI commands
- BRSTAT OM group

The DMS-100 Wireless MAP display resembles the existing wireline CPSTATUS MAP tool and CI CPSTAT command. (CPSTAT is a CI command that displays the status of switch activity.) This command, and its syntax, resemble and display the same information as the wireline BRISC CPSTATUS MAP tool.

However, the DMS-100 Wireless CPSTAT command includes a CDMA MOBILITY measurement. (The MOBILITY measurement equals the ratio of worktime spent in processes other than call processing [CP], such as CDMA mobility processes, and the total worktime in CP.) The DMS-100 Wireless MAP displays includes the MOBILITY measurement with the existing CPSTATUS/CPSTAT measurements.

The algorithm that determines MOBILITY is as follows:

$$\text{MOBILITY} = \frac{(\text{CP class worktime} - \text{CALLP worktime})}{\text{CP class worktime}}$$

The CDMA mobility processes that use CPU time include

- MTXNWKP-processing incoming messages
- CMCDMAMP-processing incoming CAU messages
- MTXDATAP-processing short message service (SMS) messages

Note: Call mix can vary these processes.

CPSTATUS display

To access the CPSTATUS screen from the DMS-100 Wireless MAP display, step through the MAP display to the MTC level using the following command:

CI>MAPCI;MTC

Then select menu slot 6 (CPSTATUS) from the MTC level MAP display.

Note: Or operating company personnel can access the CPSTATUS screen using the following direct MAP command sequence:

CI>MAPCI;MTC;CPSTATUS

Figure 4-8 shows the MOBILITY measurement on the CPSTATUS display.

Figure 4-8 DMS-100 Wireless CPSTATUS MAP display

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
CM Flt	Clock	.	.	PMLOAD		. *	8 CC	1 Min	
M	M						*C*	*C*	
CPSTATUS									
0	Quit	CATMP/HR	UTIL	ENG CATMP	MAXCATMP	COMPLEX	ENGLEVEL	CCOVRD	IDLE
2	Parms	225560	75	300000	340000	212	BELOW	OFF	YES
3	SchedMap								
4		MOBILITY							
5		39							
6									
7		CPSTATUS:							
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
ADMIN									
Time 09:48 >									

The MOBILITY measurement occupies the same position on the DMS-100 Wireless displays:

- the CPSTATUS SCHEDMAP sub-level
- the PARMS subcommand
- the CI CPSTAT command

(Other than displaying the MOBILITY measurement, the SCHEDMAP display and the output from the PARMS subcommand display are no different than the existing wireline functionality.)

SCHEDMAP sub-level display

To access the SCHEDMAP sub-level screen from the DMS-100 Wireless MAP display, step through the MAP display to the MTC level with the following command:

```
CI>MAPCI;MTC;CPSTATUS
```

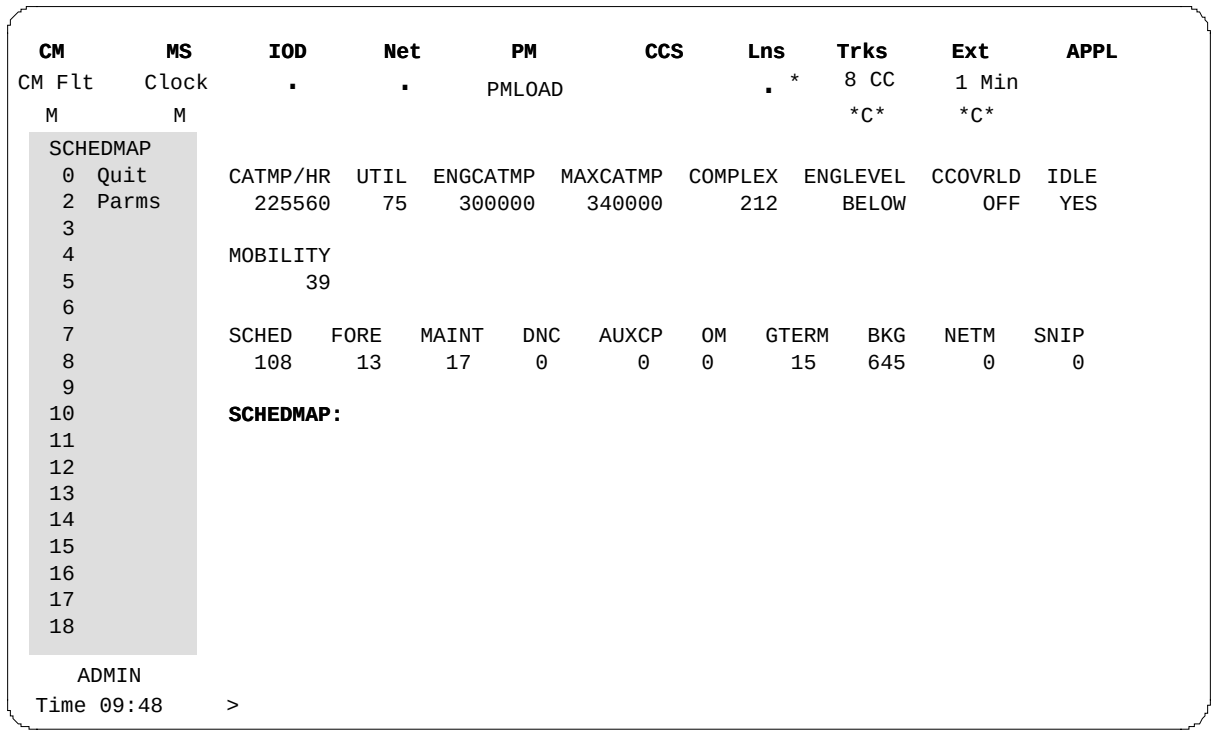
Then select menu slot 3 (SCHEDMAP) from the CPSTATUS level.

Note: Alternately, operating company personnel can access the SCHEDMAP sub-level display with the following direct MAP command sequence:

```
CI>MAPCI;MTC;CPSTATUS;SCHEDMAP
```

Figure 4-9 shows the MOBILITY measurement on the DMS-100 Wireless CPSTATUS SCHEDMAP sub-level display.

Figure 4-9 DMS-100 Wireless CPSTATUS SCHEDMAP sublevel display



PARMS subcommand display

To access the PARMS subcommand screen from the DMS-100 Wireless MAP display, step through the MAP display to the MTC level with the following command:

CI>MAPCI;MTC;CPSTATUS; SCHEDMAP

Then select menu slot 2 (PARMS) from the SCHEDMAP sublevel.

Note: Or operating company personnel can access the CPSTATUS screen with the following direct MAP commands:

CI>MAPCI;MTC;CPSTATUS;SCHEDMAP;PARMS

Figure 4-10 shows output from the DMS-100 Wireless PARMS subcommand display.

Figure 4-10 DMS-100 Wireless PARMS subcommand display

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
CM Flt	Clock	.	.	PMLOAD		.	8 CC	1 Min	
M	M					*	*C*	*C*	
SCHEDMAP									
0	Quit	CATMP/HR	UTIL	ENGCATMP	MAXCATMP	COMPLEX	ENGLEVEL	CCOVRD	IDLE
2	Parms	225560	75	300000	340000	212	BELOW	OFF	YES
3									
4		MOBILITY							
5		39							
6									
7		SCHED	FORE	MAINT	DNC	AUXCP	OM	GTERM	BKG
8		108	13	17	0	0	0	15	645
9									
10		Parms							
11		Guaranteed_Terminal_CPU_Share							
12		AUXCP_CPU_Share							
13		CC_Englevel_Warning_Threshold							
14		NETM share setting							
15		DNC share setting							
16		SNIP share setting							
17		1% CPU allocation							
18									
ADMIN									
Time 09:48 >									

Also use the CI CPSTAT command on the DMS-100 Wireless switch to display the same information as the CPSTATUS display, including the MOBILITY measurement.

Figure 4-11 shows a MAP display example output by the CI CPSTAT command on the DMS-100 Wireless switch.

Figure 4-11 DMS-100 Wireless CI CPSTAT command display example

```

> CPSTAT PARMS
CATMP/HR   UTIL   ENGCATMP   MAXCATMP   COMPLEX   ENGLEVE   CCOVRLD   IDLE
456321    45%    1200000    1345000    112      BELOW    OFF       NO

MOBILITY
39%

SCHED   FORE   MAINT   DNC   AUXCP   OM   GTERM   BKG   NETM   SNIP
95%    100%   80%    0%   50%    50%  540%   0%   0%    0%

Guaranteed_Terminal_CPU_Share = 2%
AUXCP_CPU_Share                = 1%
CC_Englevel_Warning_Threshold = 100%
NETM share setting              = 0%
DNC share setting               = 3%
SNIP share setting              = 0%
1% CPU allocation               = 12000 CATMP/HR

```

Operational measurements

The BRSTAT OM group closely resembles its wireline counterpart, but the BRSTAT (BRSCAP [Call Capacity] and BRSCMPLX [Call Complexity Ratio]) registers factor CDMA mobility processes when calculating a register's value. (The DMS-100 Wireless switch does not change any other OM registers.)

Refer to NTP *DMS-MTX Maintenance and Administration Position Commands Reference Manual*, 411-2131-809, for additional information on wireless MAP terminal operation.

Refer to NTP *Commands Reference Manual* for additional information on wireline MAP terminal operation.

TRAVER on the DMS-100 Wireless switch

Translations verification (TRAVER) is a tool that enables operating company personnel to examine the translation and routing of a call. This low-level diagnostic tool identifies translations errors, oversights, or misdirection, for debugging and testing software.

Existing wireline and wireless TRAVERS

The wireline functionality and the wireless functionality each provide different versions of the TRAVER tool. While both functionalities use TRAVER to examine the translations and routing of a specified call, this tool supports different parameters specific to wireline or wireless call processing.

Operating company personnel must have entered datafill in table MTXTRAVER (MTX Translations Verification) before executing TRAVER on wireless calls. Figure 4-12 shows sample datafill for table MTXTRAVER.

Figure 4-12 MAP display example for table MTXTRAVER

PROFNAME XLATYPE	MSR CARRIER	HECUST	ROAMCUST	DIMACUST	XLANUM	HOMEXLA
MOBILE	2	2	2	2	1	1
NAXL	N					

The wireline TRAVER tool supports various origination types and optional parameters. The following figures, Figure 4-13 through Figure 4-15, show an example of the origination types and the parameters that the wireline TRAVER supports.

Figure 4-13 Wireline TRAVER command example

> TRAVER

```

Next par is: <ORIG> {MX <OPTION> {MOBORIG}
               <PROFNAME> STRING
               [<CELL> {CELL <CELLSTR> STRING}],
RR <SWID> {1 TO 127}
   <TERMTRK> {1 TO 8191}
   <TRACE> {NT,
            T,
            B},
MS <MSISDN> STRING
   [<XLATE_ON> {MSRN,
               CFN,
               HON}]
   [<LAC> {LAC <LAC> {0 TO 65535}}]
   [<CELL ID> {CID <CID> {0 TO 65535}}]
   [<CUSTGRP> {CUSTGRP <CUSTGRP> {0 TO 4095}}]
   [<NCOS> {NCOS <NCOS> {0 TO 511}}]
   [<PIC> {PIC <PIC> STRING}]
   [<ODB> {ODB <ODBNAM> {BAOC,
                        BOIC,
                        BOICEXHC,
                        PREMINFO,
                        PREMENT,
                        OPS1,
                        OPS2,
                        OPS3,
                        OPS4}}],
TA <TABLE> {SERVICE <RTEREF> {1 TO 99}},
AVLNP <CLLI> STRING
   <MEMBER> {0 TO 9999},
R <TABLE> {HNPART <HNPA> {0 TO 999}
          <RTEREF> {1 TO 1023},
          FNPART <FNPA> {0 TO 999}
          <RTEREF> {1 TO 1023},
          STSRTE <FNPA> {0 TO 999}
          <STS> {0 TO 999}
          <RTEREF> {1 TO 1023},

```

Figure 4-14 Wireline TRAVER command example (continued)

```

OFRT <RTEREF> {1 TO 1023},
IBNRTE <RTEREF> {1 TO 1023},
PXRTE <XLANAME> STRING
      <RTEREF> {1 TO 1023},
FARTE <XLANAME> STRING
      <RTEREF> {1 TO 1023},
OFCRTE <XLANAME> STRING
      <RTEREF> {1 TO 1023},
CTRTE <XLANAME> STRING
      <RTEREF> {1 TO 1023},
IBNRT2 <RTEREF> {1 TO 1023},
IBNRT3 <RTEREF> {1 TO 1023},
IBNRT4 <RTEREF> {1 TO 1023},
OFR2 <RTEREF> {1 TO 1023},
OFR3 <RTEREF> {1 TO 1023},
OFR4 <RTEREF> {1 TO 1023}},
C <CONSOLE> STRING,
V <VFG> STRING
  [<OPT> {OW <ZONE> STRING}],
L <LINE> STRING
  [<CALL_TYPE> {VI,
                CMD,
                PMD}]
  [<FLASH> {FLASH}]
  [<NSC> {NSC}],
TR <CLLI> STRING
  [<CLLIOPT> {SAT <BOOL> "TRUE" or "FALSE"}]
  [<MBGOPTS> {MBG <TYPE> {LOCAL,
                          NATL}
              <ID> {0 TO 4294967295}
              <LP> {0 TO 255}
              <GAP> STRING}]
  [<TRIGOPT> {TRIG <PIC> {ALL,
                          ORIG,
                          COLLECT}
              <ACCESS_TYPE> {FGD [<INFODIGS_OPTION> {
INFODIGS <INFODIGS_VALUE> STRING}],
                          FGDSNC [<INFODIGS_OPTION>
{INFODIGS <INFODIGS_VALUE> STRING}],
                          FGDCUT [<INFODIGS_OPTION>
{INFODIGS <INFODIGS_VALUE> STRING}],
                          FGDTRANS [<INFODIGS_OPTION>
{INFODIGS <INFODIGS_VALUE> STRING}],
                          UAAUTH [<INFODIGS_OPTION>
{INFODIGS <INFODIGS_VALUE> STRING}],

```


Figure 4-15 Wireline TRAVER command example (continued)

```

{INFODIGS <INFODIGS_VALUE> STRING}],
                                UACARD [<INFODIGS_OPTION>
                                PRI,
                                DAL,
                                EDAL,
                                ONAL,
                                ONAT,
                                GTWIMT,
                                ESNPRI,
                                OTHER,
                                ESP,
                                IMT}
                                <CALL_TYPE> {ONNET,
                                OFFNET,
                                IDDD,
                                N00,
                                I800,
                                TIE,
                                WATS,
                                IVPN,
                                ZPLUSOFFNET,
                                ZPLUSONNET,
                                INTOA,
                                IGA,
                                IDA,
                                GVPN,
                                UNDETERMINED,
                                OTHER}
                                <CRITERIA> {NIL,
                                TRI,
                                REDIRECTION,
                                CONFERENCE}}]}
Enter: <ORIG> <DIGITS OR N FOR NO DIGITS> [<CDNIE>] [<NSF>] [<TNSIE>]
[<OSAIE>] [<BC>] [<SR>] [<PI>] [<TRI>] [<NETINFO>] [<FINFO>]
[<RPOAP>] [<RPOAS>] [<NOA>] [<AINCHG>] [<AIN_INFO>]

```

The wireless TRAVER does not use many of the origination types and parameters that the wireline TRAVER uses. Instead, the wireless TRAVER accepts only mobile subscriber (MX) or direct inward dialing (DID) trunk (TR) originations. It also does not support many of the wireline optional parameters and only contains the origination, digits, and trace parameter options.

Figure 4-16 shows an example of the origination types and the parameters that the wireless TRAVER supports.

Figure 4-16 Wireless TRAVER command parameter example

```
>HELP TRAVER
PERFORMS TRANSLATION VERIFICATION ON <DIGITS>
AS IF RECEIVED ON ORIGINATOR <ORIG>. TRACE GIVES A TRACE
OF THE TRANSLATION TABLES IF <T>, AND GIVES THE ROUTE
AND DIGIT-TO-OUTPULSE DISPLAY IF <NT>
Parms: <ORIG> {MX <OPTION> {NOBORIG}
              <PROFNAME> STRING
              [<CELL> {CELL <CELLSTR> STRING}]},
        TR <CLLI> STRING}
<DIGITS OR N FOR NO DIGITS> STRING
<TRACE> {T,
         NT,
         B}
```

Figure 4-17 and Figure 4-18 show an example of a wireless TRAVER.

Figure 4-17 Wireless TRAVER example

```

> TRAVER MX MOBORG MOBMD ORIGIN 6137641000 7647112 b
TABLE MTXTRAV
MOBMD 2 3 3 0 1 1 NAXL N

+++TRAVER: ORIGINATING MIN RECEIVED ON COMMAND LINE+++
6137641000
+++TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST+++
+++TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMODDIG RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
PMODDIG (1) (0) 1
.SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
.7647112 7647112 MODDIGS 7 7 DD 0 PREPEND NPA SKIP P PMX2 0 0
DD 0 $ P NPRT
MODDIGS CONVERTED 7647112 TO 6137647112
.SUBTABLE AMAPRT
.KEY NOT FOUND
.DEFAULT VALUE IS: NONE OVRNONE N
TABLE STDPRTCT
PMX2 (1) (0) 3
.SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
.6 910 N DD 0 NA
.SUBTABLE AMAPRT
.KEY NOT FOUND
.DEFAULT VALUE IS: NONE OVRNONE N
TABLE HNPACONT
000 Y 111 0 (3) (1) (0) (0) 2$
.SUBTABLE HNPACODE
.613 613 HNPA 0
.764 764 DN 613 764

```

Figure 4-18 Wireless TRAVER example (continued)

```
TABLE TOFCNAME
613 764 $
TABLE DNINV
613 764 7112 CLLR 0 0 0
TABLE LATAXLA
L123 613 INTRA INTRA NON_EA

+++TRAVER: SUCCESSFUL CALL TRACE+++
DIGIT TRANSLATION ROUTES

1          7647112      ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++TRAVER: SUCCESSFUL CALL TRACE+++
```

TRAVER originator limitations

A potential conflict would emerge since both existing functionalities support trunk translations with identical selectors but for different translations behavior.

The wireless TRAVER tool accepts only MX and DID TR originators. The wireline TRAVER tool accepts numerous originators. The MX originator does not apply to wireline use. Also, wireline functionality does not support DID TR originators.

The TRAVER tool on the DMS-100 Wireless switch accepts all the originators that the DMS-100 switch accepts. The DMS-100 Wireless switch also includes all DMS-MTX functionality by supporting the MX and DID TR originators.

Continuous TRAVER

On the DMS-100 Wireless switch, TRAVERS can display the full verification of a routing call that terminates to an outgoing ISL trunk. Continuous TRAVERS automatically display the full translations verification information from the incoming ISL trunk until translations encounters a non-ISL terminating facility. (Continuous TRAVER operation requires specific ISL datafill for table C7ISL [C7 ISDN User Part Signaling Loopback].)

Limitations and restrictions

The following limitations and restrictions apply to continuous TRAVERS:

- Continuous TRAVER applies only to calls that involve ISL trunks.
- Operating company must have entered datafill into table C7ISL.

- Continuous TRAVER only selects the first ISL trunk member of the route advance list as the originating agent for the next TRAVER.
- A continuous TRAVER can consist of a maximum of eight TRAVERs.
- Continuous TRAVER only works if all intermediate trunks are ISL trunks.
- Continuous TRAVER does not support extended parameters.

Note: Refer to chapter 5, “Translations and call processing,” for additional information on how ISL trunks affect translations. Chapter 5 also includes two examples of continuous TRAVERs in the description of wireless centrex translations.

Command CMXMON

Feature Integrated Wireless Centrex adds CI command CMXMON to the DMS-100 Wireless user interface. This command is an audit tool that checks the number of provisioned centrex mobile subscribers on a DMS-100 Wireless switch with an on-board HLR. Command CMXMON displays the total of all mobile identification numbers (MIN) from table CELLULAR (Cellular Subscriber Database) that match the MIN ranges in table MOBCENT.

Figure 4-19 shows an example of the command CMXMON.

Figure 4-19 DMS-100 Wireless command CMXMON

>CMXMON

WARNING: Executing the DUMPALL command may cause a degradation of the switch performance.

DO YOU WANT TO CONTINUE?

Please confirm ("YES," "Y," "NO," "N"):

> YES

Current Number of Wireless Centrex subscribers: 50

>HELP CMXMON

CMXMON: ++++++ Command to monitor the number of provisioned centrex subscribers

Note: Refer to the description of feature “Integrated Wireless Centrex” in chapter 12, “Wireless centrex,” for additional information on command CMXMON.

Supporting documentation

Wireless end users should refer to existing wireline documentation to familiarize themselves with TRAVER operation on the DMS-100 Wireless switch.

Refer to the following NTPs for additional information on TRAVER operation:

- *DMS-MTX Basic Cellular Translations*, 411-2131-220
- *DMS-MTX Universal Cellular Translations*, 411-2131-305
- *DMS-MTX Customer Data Schema Reference Manual*, 411-2131-451
- *Basic Translations Tools Guide*, 297-1001-360

5 Translations and call processing

Table 5-1 lists the design changes that the DMS-100 Wireless switch requires for translations. This chapter describes each topic listed in this table in detail.

Table 5-1 Index to DMS-100 Wireless translations changes (Sheet 1 of 3)

Section with required changes	Description
Introduction	This section lists the four categories of calls that flow through DMS-100 Wireless translations.
Datafill requirements	
ISL trunks	Nortel Networks recommends that operating company personnel use specified datafill names for all integrated service link (ISL) trunks.
Separate serving translations scheme	Use ISUP (ISDN user part) ISL trunk translations for wireline-to- wireless calls and wireless-to-wireline calls. If wireline and wireless directory numbers (DN) share the same numbering plan area (NPA), define a separate serving translations scheme (STS) for wireless calls in table HNPACONT (Home Numbering Plan Area Code).
Office parameter MOBILE_NPA_OR_STS_IN_CDR	Enter datafill for these office parameters under the following conditions: - to record a serving numbering plan area (SNPA) or STS in the call detail recording (CDR) for wireless calls - to define a default EA carrier or treatment (MOBILE_DEFAULT_CARRIER_OR_TREAT) for wireless end users.
Equal access	Enter datafill in table TRKGRP (Trunk Group) to define equal access (EA) translations for ISL trunks.

Table 5-1 Index to DMS-100 Wireless translations changes (Sheet 2 of 3)

Section with required changes	Description
Wireless feature selectors	Nortel Networks recommends that you add FEAT LOCMS in subtable HNPACONT.HNPACODE for terminating wireless DNS. Do not allow wireline and wireless DNS to share the same NPA-NXX code.
Voice mail	Do not set option NONMS in table SLLNKDEV (SL-100 Link Device) for simplified message desk interface (SMDI) calls.
Gateway MSC: Resolve DNTRIG Conflicts	Feature Gateway MSC: Resolve DNTRIG Conflicts introduces feature selector MTXDNTRIG to table DNROUTE (Directory Number Routing).
Wireless network restriction fast feature	This section describes how to enforce mobile service region (MSR) restrictions. The DMS-100 Wireless switch adds the following options: • NWKRESSV to wireless table NWKOPT (Network Options) • MTXNRS to wireless table SERVCHNG (Service Exchange)
Operator-assisted national and international calls	This section defines the additional, specific translations that operator-assisted (OA) calls (national and international) require.
Wireless centrex translations	This section describes how to enter datafill for wireless centrex calls. Each wireless centrex group requires a separate entry in table STDPRTCT (Standard Pretranslation).
Datafill restrictions	This sections lists restrictions that affect various datafill requirements for the DMS-100 Wireless switch.
Datafill sequence	This section lists the data schema tables that require datafill for the DMS-100 Wireless switch.
Datafill examples	This section shows sample datafill for wireline and wireless calls on the DMS-100 Wireless switch.
Datafill example for table CELLCUST	The subsection for this datafill table notes that DMS-100 Wireless customer group index numbers are not the same as Meridian Digital Centrex (MDC) customer groups.
Datafill example for subtable STDPRTCT	The subsection for this datafill subtable notes that you can specify feature access codes in this table.

Table 5-1 Index to DMS-100 Wireless translations changes (Sheet 3 of 3)

Section with required changes	Description
Datafill example for table LINEATTR	The subsection for this datafill table notes that you can define both wireless- and wireline- specific line options.
TRAVER	This section shows different wireline and wireless examples from the translations verification (TRAVER) tool.
Supporting documentation	This section lists additional Nortel Networks publications (NTP) that apply to wireless and wireline translations.

Introduction

Translations for the DMS-100 Wireless switch determines the destination of a dialed number, digit manipulation and blocking wrong numbers (screening). This involves processing the data in a number of datafill tables.

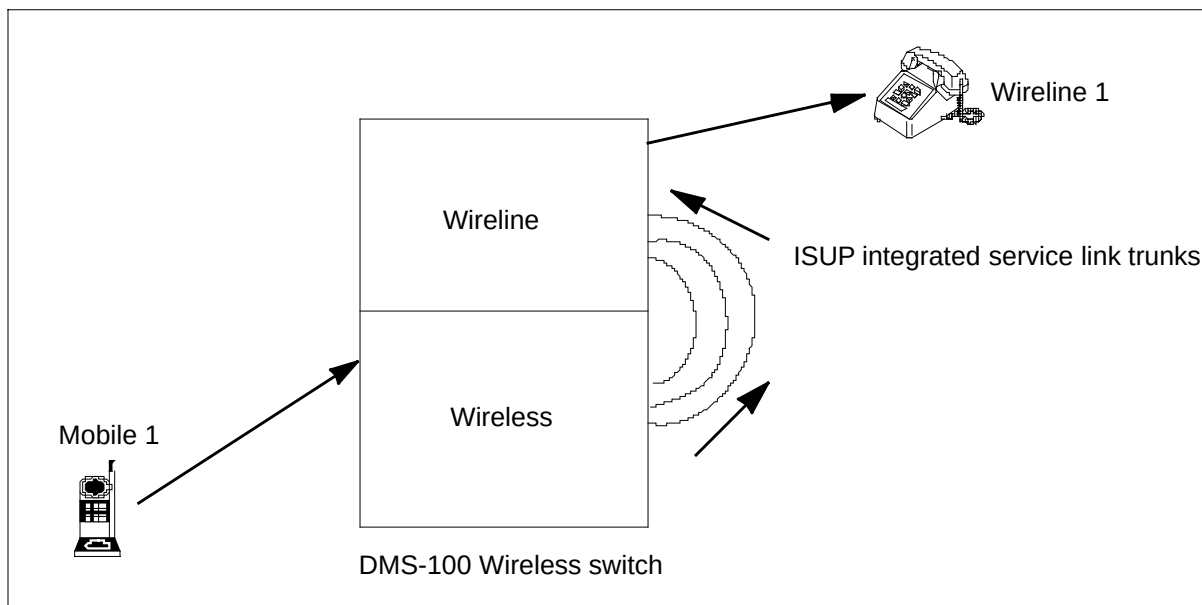
The calls made on a DMS-100 Wireless switch can be broadly classified into the following categories:

- wireline-to-wireline calls
- wireless-to-wireless calls
- wireline-to-wireless calls
- wireless-to-wireline calls

DMS-100 Wireless calls that originate and terminate in the same call processing domain (a wireline or wireless network) adhere to existing translations operations. (That is, DMS-100 Wireless wireless-to-wireless calls follow standard wireless translations. DMS-100 Wireless wireline-to-wireline calls follow standard wireline translations.)

Figure 5-1 shows a basic configuration for routing calls on the DMS-100 Wireless switch over different call processing domains (from a wireless end user to a wireline end user).

Figure 5-1 Wireless-to-wireline call configuration on the DMS-100 Wireless switch



Note: Throughout this chapter, several examples show datafill in boldface text. Boldface text indicates datafill that is specific to particular features, or helps with quick table identification (as in a TRAVER example).

Datafill requirements

Operating company personnel must execute additional steps to route calls spanning another call processing domain. This chapter addresses the specific translations and routing of calls between wireline and wireless networks.

ISL trunks

As mentioned earlier in this NTP, Nortel Networks strongly recommends that operating company personnel use standard datafill names for all ISL trunks.

For example, this chapter uses the following datafill names for ISL trunk groups.

- For ISL trunk groups that carry wireless-to-wireline and wireline-to-wireless calls:
 - MOB_TO_LAND (for ISUP calls on the wireless portion of an ISL trunk)
 - LAND_TO_MOB (for ISUP calls on the wireline portion of an ISL trunk)
- For ISL trunk groups that carry MF OA signaling from mobile subscribers, Nortel Networks recommends datafill names depending on the following conditions:
 - if the wireline portion uses private exchange (PX) trunks:
 - MOB_TO_OPER_PX (for MF PX calls on the wireless portion of an ISL trunk)
 - OPER_PX_TO_MOB (for MF PX calls on the wireline portion of an ISL trunks)
 - if the wireline portion uses SuperCama (SC) trunks:
 - MOB_TO_OPER_SC (for MF SC calls on the wireless portion of an ISL trunk)
 - OPER_SC_TO_MOB (for MF SC calls on the wireline portion of an ISL trunk)

Note: Use SC trunks to allow the mobile to route feature group C (FGC) signaling to an OP trunk from the wireline portion of the office. (Refer to chapter 10, “Equal access and trunking,” for details on FGC.)

- For ISL trunk groups that carry Wireless Centrex calls:
 - MOB_TO_XXXXXXXX (for ISUP calls on the wireless portion of an ISL trunk)
 - XXXXXXXXX_TO_MOB (for ISUP calls on the wireline portion of an ISL trunk)

Note 1: Each wireless centrex trunk group requires a dedicated trunk group to handle originating calls from mobile subscribers. (You can use LAND_TO_MOB or names for terminating calls to mobile subscribers.)

Note 2: The previous naming convention limits the string to 16 characters, 9 of which indicate the name of the centrex group.

Separate serving translations scheme

To translate calls between wireless and wireline end users over ISL trunks, operating company personnel *must* define a separate different STS for wireless and wireline DN's. The STS for wireline calls must correspond to the wireless end user's NPA.

Therefore, if wireless and wireline DN's share the same NPA, define a *unique*, unused STS for wireless calls. Set up a separate STS for wireless translations, which does not conflict with any of the NPAs that wireline translations reference.

Table CELLULAR (Cellular Subscriber Database) defines the DN for each wireless end user (including the NPA), along with a customer group number. This customer group number and the translations number (from table CDMPART [Code Division Multiple Access Partition-specific Data]) indexes into table CELLCUST (Cellular Customer) to obtain the XLAPLAN index. The XLAPLAN index number then indexes into table XLAPLAN (Translation Plan) to determine the STS for translations.

Office parameter MOBILE_NPA_OR_STS_IN_CDR

Office parameter MOBILE_NPA_OR_STS_IN_CDR determines if the DMS-100 Wireless switch is to write an SNPA or STS to the CDR unit for wireless calls.

This office parameter enables operating company personnel to choose either an STS or an SNPA to write to the CDR unit for all CDR records that an office produces. If a mobile end user originates a call, the mobile identification number (MIN) in the visitor location register (VLR) determines the SNPA. If a call originates from a trunk, the trunk group data can also determine the SNPA.

Select the default value of STS to add this entry into field STS for all CDR records produced in an office. Or select SNPA to add this entry into field STS for all CDR records that an office produces. Changes to this parameter impact all wireless CDR records that an office generates.

Equal access

For EA datafill, set refinement RTEVIAAT to Y in table TRKGRP for the wireless portion of an ISUP ISL trunk as a direct inward dial (DID) trunk group type.

Enter datafill for the wireline portion of the ISUP ISL trunk as an IT trunk type. Set option CELL to 2A to support North American EA ISL terminations. Designate a distinct billable number for option BILLNO so that the

downstream processor can distinguish the automatic message accounting (AMA) records that wireless DID ISL trunks and non-ISL trunks generated.

Note: Refer to chapter 10, “Equal access and trunking,” for details on EA.

Screening tables

A separate wireless STS *cannot* conflict with any of the NPAs that wireline translations in table HNPACONT reference. This STS, along with other identifiers, also indexes into the following screening tables:

- table CLSVSCRC (Class of Service Screening Control) and subtable CLSVSCRC.CSVSCR (Class of Service Screening)
- table LCASCRCN (Local Calling Area Screening Control) and subtable LCASCRCN.LCASCRC (Local Calling Area Screening)
- table PFXTREAT (Prefix Treatment)

Table CLSVSCRC

Table CLSVSCRC and subtable CLSVSCRC.CSVSCR provide class of service screening for wireline and wireless end users.

The following factors determine this screening:

- the SNPA
- the class of service (COS)
- the type of call
- the digits dialed

The switch can route calls that do not pass screening to treatment or to an operator position. For example, direct dial calls can be screened in toll denied scenarios. The key to this table is two part: the serving translations scheme and screening class (SCRNCL) entries from table XLAPLAN. You can define separate entries for wireless and wireline end users without affecting any datafill conflicts.

Table LCASCRCN

Table LCASCRCN determines if the called number is in the local calling area. This table has a two-part key: the serving translations scheme entry from table XLAPLAN and the local calling area name (LCANAME) entry from table RATEAREA.

The switch checks if the called number exists in subtable LCASCRCN.LCASCRC in one of two ways. If the end user dials seven digits, the switch checks for the exchange code (NXX). If the end user dials ten digits, then the switch checks for the NPA. If the NPA exists, then the switch also checks the NXX. If no entry exists, non-local is the default value.

Also, if operating company personnel had set field PFXFOR10 to Y, then the end user must dial a prefix digit on ten digits (that is, 1+NPA-NXX-XXXX).

Table PFXTREAT

Table PFXTREAT consists of a three-part key:

- the prefix selector from table LCASCRCN
- the type of call from STDPR1 (direct dial, no prefix, operator assisted, or nil)
- a bool indicating if the tuple exists in subtable LCASCRCN.LCASCRC

If a tuple exists in table PFXTREAT with a key that matches the information found for the particular call, then the tuple specifies what the call type should be changed to. Operating company personnel can specify a treatment if the call should route to treatment.

Wireless feature selectors

For wireline DNs, enter datafill in table TOFCNAME (Terminating Office Name). The switch then automatically enters datafill into table DNINV (Directory Number Inventory) when you assign the DNs in line tables, such as table LENLINES (Line Assignment) through the Service Order System (SERVORD).

Note: For wireless DNs, Nortel Networks strongly recommends that operating company personnel *not* enter datafill in table TOFCNAME. Instead, add FEAT LOCMS to subtable HNPACONT.HNPACODE with feature selectors SST (for switching serving translation scheme) or LOCMS (for locating message) for terminating wireless DNs. This alternate datafill procedure reduces the risk of provisioning too many DNs and depleting the digilator blocks in table DNINV.

Figure 5-2 shows sample datafill for subtable HNPACONT.HNPACODE.

Figure 5-2 MAP display example for subtable HNPACONT.HNPACODE feature selector LOCMS

FROMDIGS	TODIGS	CD
975	975	FEAT LOCMS 0 619 Y Y \$

Figure 5-3 show sample TRAVER output that verifies a wireless call on the DMS-100 Wireless switch.

Figure 5-3 TRAVER output example for a wireless call with FEAT LOCMS

```

>TRAVER MX MOBORIG MOBILE 9751008 B
TABLE MTXTRAV
MOBILE 2 2 2 2 1 1 NAXL N

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCUST
2 1 000_PMX2_8 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMX2 RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
PMX2 ( 1) (65021) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 97 99 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
TABLE HNPACONT
000 Y 715 0 ( 6) ( 1) ( 0) ( 0) 3
. SUBTABLE HNPACODE
. 975 975 FEAT LOCMS 0 619
SENDING LOCREQ FOR NUMBER :           6199751008
TABLE CLSVSCRC
TABLE LATAULA
L123 000975 INTRA INTRA NON_EA

+++ TRAVER: SUCCESSFUL CALL TRACE +++

Warning: SNPA of originator not resolved for standard-outpulsing.
Reason: No NPA in dialed digits and no cell number specified.
Outpulsing digits shown may not be correct.

DIGIT TRANSLATION ROUTES

1                               9751008           ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Note: Also to reduce the risk of storing duplicate DNs, do not allow wireline and wireless DNs to share the same NPA-NXX code. Carefully track the assigned DN ranges to make sure that you do not reuse wireless DNs for wireline DN ranges.

Supporting documentation

Refer to NTP *Basic Cellular Translation*, 411-2131-220, for additional information on datafilling these wireless-specific feature selectors.

Voice mail

The DMS-100 Wireless switch supports existing configurations for either wireless or wireline voice mail operation. Or with the DMS-100 Wireless's integrated architecture, operating companies can use a single voice mail system (VMS) configuration to provide seamless voice mail communication between wireline and wireless end users.

The wireless functionality of the DMS-100 Wireless switch uses multifrequency (MF) trunks to store and retrieve voice traffic for its VMS. It also outpulses all wireless call-related information on trunks, instead of Simplified Message Desk Interface (SMDI) links, for signaling.

Both existing functionalities use incoming SMDI links from the VMS to indicate a message waiting. (A message waiting can be either a lit lamp on the telephone or a stuttered dialtone.)

The switch passes call-related information on ISUP ISL trunks, if you do *not* set subfield OPTION to NONMS (for no network message service) in table SLLNKDEV for SMDI links. The remainder of call processing resembles the wireline DN voice mail procedure. That is, uniform call distribution (UCD) lines carry the voice traffic and the SMDI links carry the signaling information to the VMS.

Add this option on a single multi-protocol card (MPC) basis (1X89). If you must set this option on an existing MPC card, use a different 1X89 card for wireless end users without option NONMS. (Be sure to assign a different UCD group for wireless end users.)

Gateway MSC: Resolve DNTRIG Conflicts

Feature Gateway MSC: Resolve DNTRIG Conflicts introduces feature selector MTXDNTRIG to table DNROUTE. The DMS-100 Wireless switch uses this selector to trigger a Gateway MSC (mobile switching center) query to a home location register (HLR).

The DMS-100 Wireless switch requires this selector because the existing wireline and wireless switches both use feature selector DNTRIG in table

DNROUTE for triggering different services. (Selector DNTRIG is still bound to Advanced Intelligent Network [AIN] service control point [SCP] queries.)

Figure 5-4 shows sample datafill for table DNROUTE.

Figure 5-4 MAP display example for table DNROUTE feature selector MTXDNTRIG

AREACODE	OFCODE	STNCODE	DNRESULT
613	764	1031	FEAT MTXDNTRIG MTX LOCMS \$

Note: Refer to NTPs *Translations Guide* and *Customer Data Schema Reference Manual* for additional AIN datafill examples.

Wireless network restriction fast feature

Operating company personnel can enforce MSR restrictions on mobile units using either of the following wireless options.

- Add line option MTXNRS to a DN in field OPTIONS of table SERVCHNG, or
- Add NWKRESSV to subfield OPTION of table NWKOPT for the network option name to be restricted. Then assign the same previously specified network option name (from table NWKOPT) to field NWKOPTNM of table SERVCHNG. This entry determines which DNs restricted roaming is to be applied.

Note: Be sure to assign all mobile service areas (MSA) to an MSR in table MSERVE (Mobile Serving Region) before entering data in tables SERVCHNG and NWKOPT.

When MSR restrictions are in effect (as previously described) and a mobile unit makes or receives a call, the following events occur:

- The switch checks the MSA of the cell in which the mobile unit exists against the MSA list of the home service exchange MSR.
- If the switch finds the MSA, the call proceeds. Otherwise, the call receives one of the following treatments:
 - unregistered mobile (UMOB), if the mobile unit originated the call
 - mobile page timeout (PGTO), if the mobile unit received the call

Operator-assisted national and international calls

To route national and international OA calls on the DMS-100 Wireless switch, first assign a dedicated ISL trunk with a DID trunk group type as the wireless (MTX) agent. Then assign an SC trunk group type as the wireline (NA100) agent. Operator-assisted calls from wireless originators route over the ISL trunk first. The OA calls exit the end office (EO) on the existing operator (OP) trunk. (Be sure that the OA call routes out of the wireline part of the DMS-100 Wireless switch.)

Note: In this setup, the switch does *not* generate an AMA record (for example, call code 110) to record the carrier connect time between the EO and the carrier.

To route OA calls from a mobile unit, set up translations as shown in the examples in the next section, especially for the following tables:

- table POSITION (Position)
- table CCTR (Country Code)
- table BILLCODE (Billing Code)

Note: In the following examples, trunk group MFOP_SAGE represents the OP trunk to the FGC carrier.

Operator-assisted datafill examples

The following figures show sample datafill for trunk and translations tables that route OA calls to a FGC carrier using existing OP trunks.

From the MAP display, access table CLLI (Common Language Location Identifier) to define the ISL and OP trunks.

Figure 5-5 shows sample datafill for table CLLI.

Figure 5-5 MAP display example for table CLLI

CLLI	ADNUM	TRKGRSIZ	ADMININF
MOB_TO_OPER_SC	790	10	DID_TRK \$
OPER_SC_TO_MOB	791	10	SC_TRK \$
MFOP_SAGE	793	10	OP_TRUNK_TO_CARRIER \$

Access table OCCNAME to add the carrier name (C112).

Figure 5-6 shows sample datafill for table OCCNAME.

Figure 5-6 MAP display example for table OCCNAME

OCCNAME

C112 \$

Access table OCCINFO to define the attributes for carriers that serve the switch.

Figure 5-7 shows sample datafill for table OCCINFO, including FGC operating signaling (FGRPC).

Figure 5-7 MAP display example for table OCCINFO

```

CARRNAME CARRNUM ACCESS ORIGCARR INTER INTNTL INTRA ANI FANI ONISCRN
AD1 OVERLAP INTERS INTRAS TERMREC OCCSEPNO OPSIG PICIND NA0950 INNCCPN
DTMFIND OPSERV CACBLOCK CTDOA CCMON SCRNWATS CRMCRA ATPINCL INTRAOPR
INCASA INTRCOIN ARBLKPVT
-----
C112 0112 EAP Y Y Y Y Y N N Y N Y Y LONG 0 FGRPC N N Y N Y N N Y N Y N
Y N N Y $

```

Table TRKGRP contains information about trunk groups.

Figure 5-8 shows sample datafill for table TRKGRP, including automatic number identification (ANI)-specific datafill.

Note: This table TRKGRP example reflects datafill for EA calls (that is, subfield GRPTYPE equals OSS). The DMS-100 Wireless switch also supports non-EA calls (that is, subfield GRPTYPE equals SUPER).

Figure 5-8 MAP display example for table TRKGRP

GRPKEY GRPINFO

```

-----
MOB_TO_OPER_SC DID 0 ELO NCIT 2W MIDL 7 CELL2 N ANIVAR 7 AFTER_ANSWER DN
Y Y Y OSS NAXL 613 PRT NSCR 619 000 Y N $
OPER_SC_TO_MOB SC 0 ELO NCRT NIL N 613 POT2 RTE1 DD OFFHKWK OFFHKWK 5 5
5 IC MIDL 0 BELL OSS CAMA RTE1 REV Y N $
MFOP_SAGE OP 0 NPDGP NCRT NIL MIDL COMB MIX REV TERMHOLD Y OG Y N N $

```

Table TRKSGRP (Trunk Subgroup) lists the supplementary information for each subgroup that operating company personnel had assigned to a trunk group in table TRKGRP.

Figure 5-9 shows sample datafill for table TRKSGRP.

Figure 5-9 MAP display example for table TRKSGRP

```
SGRPKEY CARDCODE SGRPVAR
-----
MOB_TO_OPER_SC 0 DS1SIG STD 2W MF WK N 7 10 MF WK 7 0 N NO NO N N N M
70 UNEQ $
OPER_SC_TO_MOB 0 DS1SIG STD IC MF WK N 12 12 NO NO N N N M UNEQ $
MFOP_SAGE 0 DS1SIG STD OG MF WK 7 0 NO NO N N N 70 UNEQ $
```

Table OFRT is a route reference table.

Figure 5-10 shows sample datafill for table OFRT.

Figure 5-10 MAP display example for table OFRT

```
RTE                                     RTELIST
-----
15 CND EA INTNL SK 2 N D MOB_TO_OPER_SC 0 0 N CND ALWAYS SK 1 N D
MOB_TO_OPER_SC 0 N N $
334 N D MFOP_SAGE 0 N N $
```

Table STDPRTCT lists the names for each standard pretranslator subtable (in this case, STDPRTCT.STDPRT). (Add tuples P112, PMX2, and POT2 to table STDPRTCT.)

Access table STDPRTCT and position on tuple P112. Enter subtable STDPRTCT.STDPRT. Subtable STDPRTCT.STDPRT is the first table that the received leading digits index into, provided that table XLAPLAN or table TRKGRP specifies a pretranslator name other than NPRT (no pretranslator).

Figure 5-11 shows sample datafill for tuple P112 of subtable STDPRTCT.STDPRT with pretranslator selector EA and call type OA.

Figure 5-11 MAP display example for subtable STDPRTCT.STDPRT (P112)

FROMDIGS	TODIGS	PRETRTE

0715	0715	
EA OA 1 T NA C112 Y OFRT 15 5 14 N \$		

From subtable STDPRTCT.STDPRT, position on tuple PMX2.

Figure 5-12 shows sample datafill for subtable STDPRTCT.STDPRT for tuple PMX2 with pretranslator selector EA and call type DD.

Figure 5-12 MAP display example for subtable STDPRTCT.STDPRT (PMX2)

FROMDIGS	TODIGS	PRETRTE

10112	10112	
EA DD 5 P P112 C112 Y OFRT 15 5 20 Y \$		

From subtable STDPRTCT.STDPRT, position on tuple POT2.

Figure 5-13 shows sample datafill for subtable STDPRTCT.STDPRT for tuple POT2 with pretranslator selector T and call type OA. (Datafill in this example applies to SC trunks.)

Figure 5-13 MAP display example for subtable STDPRTCT.STDPRT (POT2)

FROMDIGS	TODIGS	PRETRTE

07	07	
T OA 1 OFRT 334 1 11 NONE \$		

Table TRKMEM (Trunk Member) lists the data for each trunk specified in tables TRKGRP and TRKSGRP.

Figure 5-14 shows sample datafill for table TRKMEM.

Figure 5-14 MAP display example for table TRKMEM

CLLI	EXTRKNM	SGRP	MEMVAR
MOB_TO_OPER_SC	0	0	DTC 0 16 5 \$
MOB_TO_OPER_SC	1	0	DTC 0 16 6 \$
OPER_SC_TO_MOB	0	0	DTC 0 18 5 \$
OPER_SC_TO_MOB	1	0	DTC 0 18 6 \$
MFOP_SAGE	0	0	DTC 0 15 6 \$

Access table HNPACONT and position on tuple 000. Enter subtable HNPACONT.RTEREF. Table HNPACONT lists all valid HNPA's or STS numbers. Subtable HNPACONT.RTEREF contains the route references associated with the HNPA's in subtable HNPACONT.HNPACODE.

Figure 5-15 shows sample datafill for tuple 000 of subtable HNPACONT.RTEREF.

Figure 5-15 MAP display example for subtable HNPACONT.RTEREF

RTE	RTELIST						
715	N	D	MOB_TO_OPER_SC	0	N	N	\$

Access subtable HNPACONT.HNPACODE. Subtable HNPACONT.HNPACODE lists the following items in each SNPA or STS number assigned in table HNPACONT:

- route
- treatment
- table that translations route to for each of the 1000 three-digit codes (000 to 999)

Figure 5-16 shows sample datafill for tuple 000 of subtable HNPACONT.HNPACODE with code type FRTE.

Figure 5-16 MAP display example for subtable HNPACONT.HNPACODE

FROMDIGS	TODIGS	CDRRTMT
715	715	FRTE 715 \$

Table MTXTRAV stores mobile subscriber profiles for TRAVER use.

Figure 5-17 shows sample datafill for table MTXTRAV.

Figure 5-17 MAP display example for table MTXTRAV

PROFNAME	MSR	HOME CUST	ROAM CUST	DIMACUST	XLANUM	HOME XLA
XLATYPE		CARRIER				
C112	2	2	2	2	1	1
NAXL		Y	C112	Y		

Table LATAXLA defines the attributes of domestic calls such as inter-local access and transport area (LATA) or intra-LATA, and interstate or intrastate.

Figure 5-18 shows sample datafill for table LATAXLA.

Figure 5-18 MAP display example for table LATAXLA

LATACODE	LATA	STATE	EATYPE
L123 715	INTER	INTER	STD \$

Table CKTDIGIT allows the EO to map a particular 0ZZ, 1NX code into a transit network selector (TNS) when originating an EA call to an access tandem (AT) over Common Channel Signaling 7 (CCS7) trunking.

Figure 5-19 shows sample datafill for table CKTDIGIT.

Figure 5-19 MAP display example for table CKTDIGIT

KEY	CKTDIGS

C112 8	051 \$
C112 9	052 \$

In table OFRT (Office Route), use route OFRT 100 to specify an OA national call. Do not prefix a “1” digit to refinement PFRXDIGS for the national route. (Enter N to refinement PRFXDIGS in table OFRT.)

Figure 5-20 shows sample datafill for table OFRT.

Figure 5-20 MAP display example for table OFRT

RTE	RTELIST

100	(N D MFOP_SAGE 0 N N) \$
101	(N D MFOP_SAGE 0 1 N) \$

Table POSITION stores the types of positions that the switching unit contains and their associated routes.

Figure 5-21 shows sample datafill for table POSITION.

Figure 5-21 MAP display example for table POSITION

POS	PRTE

RTE1	C T OFRT 100 T OFRT 101 \$

In Figure 5-21, field POS in wireless table POSITION shows RTE1 for an MF DID SC trunk. When translations finds the specified international call tuple in table CCTR, the RTE1 tuple begins the routing. This RTE1 tuple includes a conditional route.

If a call is national, translations selects the first route (that is, OFRT 100 in table POSITION). If a call is international, translations selects the second route (that is, OFRT 101 in table POSITION). The office route can prefix digits before the country code (if required) before outpulsing on the OP trunk.

Local, toll, or combined local and toll switching units for direct dial overseas routing require table CCTR.

Figure 5-22 shows sample datafill for table CCTR.

Figure 5-22 MAP display example for table CCTR

CCNAME	GIVENC	MINDIGSR	MAXDIGSR	TMTORRTE
53 T	053	7	15	T OFRT 100 Y \$

Access table STDPRTCT and position on tuple P112. Enter subtable STDPRTCT.STDPRT. Figure 5-23 shows sample datafill for tuple P112 of subtable STDPRTCT.STDPRT with pretranslator selector EA and call type OA.

Figure 5-23 MAP display example for subtable STDPRTCT.STDPRT (P112)

FROMDIGS	TODIGS	PRETRTE
01	01	
EA OA 1 T IN C112 Y	OFRT 15 5 14 N	\$

From subtable STDPRTCT.STDPRT, position on tuple POT2. Figure 5-24 shows sample datafill for subtable STDPRTCT.STDPRT for tuple POT2 with pretranslator selector N and call type OA.

Figure 5-24 MAP display example for subtable STDPRTCT.STDPRT (POT2)

FROMDIGS	TODIGS	PRETRTE
12	19	
	N OA 1 IN	\$

Table BILLCODE list the following information for each NXX central office code, special billing code, and wide area telephone service (WATS) originating code:

- name of the local calling area screening subtable
- name of the class of service screening subtable

- code and NPA on the AMA tape
- code charge class

Figure 5-25 shows sample datafill for table BILLCODE.

Figure 5-25 MAP display example for table BILLCODE

CLLI	BILLCODE	LCANAME	SCRNCL	ACTUALBC	CHGCLSS

OPER_SC_TO_MOB	764	NLCA	NSCR	613764	NONE \$

Operator-assisted TRAVER examples

Operating company must set up OA datafill differently for calls that access EA and for calls that do not access EA. The following subsections contain TRAVER examples for wireless OA calls with and without EA.

Operator-assisted, EA calls When you configure datafill for table TRKGRP, set subfield GRPTYPE to OSS for wireless, EA calls over the SC trunk. This value designates that the DID trunk is to send two ANI digit information for a EA call.

Figure 5-26 through Figure 5-28 show sample TRAVER output that verifies an OA national call on the DMS-100 Wireless switch. This example consists of both halves of a call-from a wireless caller over an MF DID-to-SC ISL trunk, then over an OP trunk to a wireline end user.

Note 1: In the second half of the OA national TRAVER example, table OFRT shows tuple 101. Since this indicates an international call, translations selects tuple 100 instead for national calls.

Note 2: Also at the end of the second half of this TRAVER example, RTE1 from table POSITION is the route over which translations sends the call.

Figure 5-26 TRAVER output example for first half of an OA national, wireless call over an MF DID-to-SC ISL trunk

```

>TRAVER MX MOBORIG C112 07157641000 B N ST3P 007641001 ST
TABLE MTXTRAV
C112 2 2 2 2 1 1 NAXL Y C112 Y

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_4 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMX2 RTE2 N $$
TABLE RATEAREA
NLCA_L123_4 NLCA NIL L123 $
TABLE STDPRTCT
PMX2 ( 1) (65021) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 07 09 N OA 1 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
TABLE HNPACONT
000 Y 715 0 ( 4) ( 1) ( 0) ( 0) 2
. SUBTABLE HNPACODE
. 715 715 FRTE 715
. SUBTABLE RTEREF
. 715 N D MOB_TO_OPER_SC 0 N N
. EXIT TABLE RTEREF
EXIT TABLE HNPACONT
TABLE CLSVSCRC
TABLE LATAULA
L123 715 INTER INTER STD
TABLE OCCINFO
C112 0112 EAP Y Y Y Y Y N N Y N Y Y LONG 0 FGRPC N N Y N Y N N Y N Y N
Y N N Y
TABLE STDPRTCT
PMX2 ( 1) (65021) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.

```

Figure 5-27 TRAVER output example for first half of an OA national, wireless call over an MF DID-to-SC ISL trunk (continued)

```

. 10112 10112 EA DD 5 P P112 C112 Y OFRT 15 5 20 Y
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
. . TABLE OFRT
. . . 15 CND EA INTNL SK 2
. . . N D MOB_TO_OPER_SC 0 0 N
. . . CND ALWAYS SK 1
. . . N D MOB_TO_OPER_SC 0 N N
. . EXIT TABLE OFRT
. TABLE STDPRTCT
. P112 ( 1) ( 0) 2
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. . 0715 0715 EA OA 1 T NA C112 Y OFRT 15 5 14 N
. . . TABLE OFRT
. . . . 15 CND EA INTNL SK 2
. . . . N D MOB_TO_OPER_SC 0 0 N
. . . . CND ALWAYS SK 1
. . . . N D MOB_TO_OPER_SC 0 N N
. . . EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MOB_TO_OPER_SC                07157641000                ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-28 TRAVER output example for second half of an OA national, wireless call over an MF DID-to-SC ISL trunk

```

>TRAVER TR OPER_SC_TO_MOB 07157641000 B N ST3P 007641001 ST
TABLE TRKGRP
OPER_SC_TO_MOB SC 0 ELO NCRT NIL N 613 POT2 RTE1 DD OFFHKWK OFFHKWK 5
5 5 IC MIDL 0 BELL OSS CAMA RTE1 REV Y N $
TABLE STDPRTCT
POT2 ( 1) ( 0) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 07 07 T OA 1 OFRT 334 1 11 NONE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
. . TABLE OFRT
. . 334 N D MFOP_SAGE 0 N N
. . EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
LNP00100 SOC Option is IDLE.
POSITION SET DUE TO ANI FAILURE, ONI, OR ST DIGIT
TABLE POSITION
RTE1 C T OFRT 100 T OFRT 101
TABLE OFRT
101 N D MFOP_SAGE 0 1 N
EXIT TABLE OFRT
TABLE OFRT
100 N D MFOP_SAGE 0 N N
EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MFOP_SAGE 7157641000 ST3P

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

POSITION ROUTES. POSITION IS: RTE1
1 MFOP_SAGE

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-29 through Figure 5-31 show sample TRAVER output that verifies an OA international call on the DMS-100 Wireless switch. This example consists of both halves of a call-from a wireless caller over an MF DID-to-SC ISL trunk, then over an OP trunk to a wireline end user.

Note: At the end of the second half of the OA international TRAVER example, the digits appear as “532221652.” However, translations from table POSITION actually adds the “1” to this number.

Figure 5-29 TRAVER output example for first half of an OA international, wireless call over an MF DID-to-SC ISL trunk

```
>TRAVER MX MOBORIG C112 01532221562 B N ST3P 007641008 ST
TABLE MTXTRAV
C112 2 2 2 2 1 1 NAXL Y C112 Y

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_4 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMX2 RTE2 N $$
TABLE RATEAREA
NLCA_L123_4 NLCA NIL L123 $
TABLE STDPRTCT
PMX2 ( 1) (65021) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 015 019 N OA 2 IN
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
TABLE CCTR
53 T 053 7 15 T OFRT 100 Y
TABLE OFRT
100 N D MFOP_SAGE 0 N N
EXIT TABLE OFRT
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
TABLE OCCINFO
C112 0112 EAP Y Y Y Y Y N N Y N Y Y LONG 0 FGRPC N N Y N Y N N Y N Y
N Y N N Y
TABLE STDPRTCT
PMX2 ( 1) (65021) 3
```

Figure 5-30 TRAVER output example for first half of an OA international, wireless call over an MF DID-to-SC ISL trunk (continued)

```

. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 10112 10112 EA DD 5 P P112 C112 Y OFRT 15 5 20 Y
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
. . TABLE OFRT
. . 15 CND EA INTNL SK 2
. . N D MOB_TO_OPER_SC 0 0 N
. . CND ALWAYS SK 1
. . N D MOB_TO_OPER_SC 0 N N
. . EXIT TABLE OFRT
. TABLE STDPRTCT
. P112 ( 1) ( 0) 2
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. . 01 01 EA OA 1 T IN C112 Y OFRT 15 5 14 N
. . . TABLE OFRT
. . . 15 CND EA INTNL SK 2
. . . N D MOB_TO_OPER_SC 0 0 N
. . . CND ALWAYS SK 1
. . . N D MOB_TO_OPER_SC 0 N N
. . . EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MOB_TO_OPER_SC 1532221562 ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-31 TRAVER output example for second half of an OA international, wireless call over an MF DID-to-SC ISL trunk

```

>TRAVER TR OPER_SC_TO_MOB 1532221562 B N ST3P 007641008 ST
TABLE TRKGRP
OPER_SC_TO_MOB SC 0 ELO NCRT NIL N 613 POT2 RTE1 DD OFFHKWK
OFFHKWK 5 5 5 IC MIDL 0 BELL OSS CAMA RTE1 REV Y N $
TABLE STDPRTCT
POT2 ( 1) ( 0) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 15 19 N OA 1 IN
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE CCTR
53 T 053 7 15 T OFRT 100 Y
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
TABLE OFRT
100 N D MFOP_SAGE 0 N N
EXIT TABLE OFRT
POSITION SET DUE TO ANI FAILURE, ONI, OR ST DIGIT
TABLE POSITION
RTE1 C T OFRT 100 T OFRT 101
TABLE OFRT
101 N D MFOP_SAGE 0 1 N
EXIT TABLE OFRT
TABLE OFRT
100 N D MFOP_SAGE 0 N N
EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MFOP_SAGE          532221562          ST3P

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

POSITION ROUTES.  POSITION IS: RTE1
1 MFOP_SAGE

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```


Operator-assisted, non-EA calls When you configure datafill for table TRKGRP, set subfield GRPTYPE to SUPER for wireless, non-EA calls over the SC trunk. This value designates that the DID trunk is to send one ANI digit information for a non-EA call.

Figure 5-32 and Figure 5-33 show sample TRAVER output that verifies an OA, non-EA, national call on the DMS-100 Wireless switch. This example consists of both halves of a call—from a wireless caller over an MF DID-to-SC ISL trunk, then over an OP trunk to a wireline end user.

Figure 5-32 TRAVER output example for first half of an OA, non-EA, national, wireless call over an MF DID-to-SC ISL trunk

```

>TRAVER MX MOBORIG MTX1 06195213005 B N ST3P 09648000 ST
TABLE MTXTRAV
MTX1 2 9 9 9 2 1 NAXL N

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMX2 RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
PMX2 ( 1) (65021) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 06 07 T OA 0 OFR2 50 11 11 NONE
. . TABLE OFR2
. . 50 N D MOB_TO_OPER 0 N N
. . EXIT TABLE OFR2
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
LNP00100 SOC Option is IDLE.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MOB_TO_OPER          06195213005          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-33 TRAVER output example for second half of an OA, non-EA, national, wireless call over an MF DID-to-SC ISL trunk

```

>TRAVER TR OPER_SC_TO_MOB 06195213005 B N ST3P 09648000 ST
TABLE TRKGRP
OPER_SC_TO_MOB SC 0 ELO NCRT NIL N 619 POT2 CAMA DD OFFHKWK OFFHKWK 5 5 5
IC MIDL
    0 BELL SUPER CAMA CAMA WK Y N $
TABLE STDPRTCT
POT2 ( 1) (65021) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 0 0 T OA 0 OFRT 111 1 12 NONE
. . TABLE OFRT
. . 111 N D TEMP_OPR 0 N N
. . S D ACRJANN
. . EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
LNP00100 SOC Option is IDLE.
TABLE BILLCODE
OPER_SC_TO_MOB 964 NLCA NSCR 619964 NONE
POSITION SET DUE TO ANI FAILURE, ONI, OR ST DIGIT
TABLE POSITION
CAMA S TEMP_OPR
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Info Analyzed TDP: no subscribed trigger.
DETERMINE IF THE ROUTE SHOULD BE REPLACED WITH A NEW EQUAL ACCESS ROUTE
TABLE TRKLATA
TUPLE NOT FOUND
ORIGINATING TRUNK DOES NOT CARRY LEAS TRAFFIC.
LEAVE XLA RESULT UNCHANGED.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 TEMP_OPR                06195213005                ST3P
2 ACRJANN

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB

POSITION ROUTES.  POSITION IS: CAMA
1 TEMP_OPR

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Wireless centrex translations

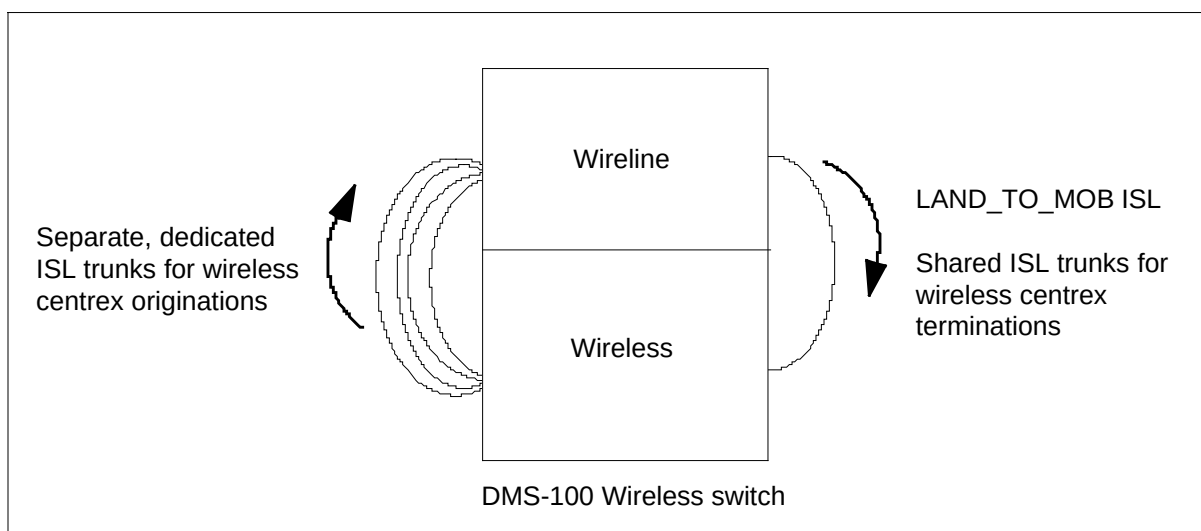
Operating company personnel can configure North American centrex groups on the DMS-100 Wireless switch to include wireless subscribers for whom the same switch serves. This configuration allows the wireless subscribers to use the centrex dialing plan for extension dialing. This configuration also allows a wireline centrex group member to reach a wireless member by dialing an abbreviated extension.

Each centrex group requires a dedicated ISL group, which handles all call originations from the wireless members. Operating company personnel can configure the ISL groups to support wireless-to-wireline traffic in the centrex group.

However, all calls which terminate to wireless members of the centrex group can use a shared ISL group, such as the LAND_TO_MOB ISL.

Figure 5-34 shows a basic configuration for routing wireless centrex calls on the DMS-100 Wireless switch over ISL trunks.

Figure 5-34 Wireless-to-wireline call configuration on the DMS-100 Wireless switch



Each centrex group that has wireless members requires a unique, wireless customer group number. Operating company personnel provision this customer group number in the HLR as a part of the standard datafill for each of the wireless members.

Table CELLCUST takes the line attribute index from the customer group of the originator and the translation number from the cell that originated the call. Table CELLCUST can limit the centrex dialing capabilities to specific cells and permit the public dialing plan on all other calls.

You must enter a dedicated standard pretranslator for each wireless centrex group to route all calls that the mobile subscriber dials to a dedicated ISL trunk. Translations and routing can pass the dialed digits across the ISL trunk to the wireline portion of the DMS-100 Wireless switch, which performs IBN translations.

The XLAPLAN index (from table CELLCUST) accesses table XLAPLAN. The tuple in table XLAPLAN identifies the dedicated standard pretranslator name, which routes the wireless originators across the ISL trunk.

Note: Each centrex group with wireless members requires a separate entry in table STDPRTCT.

The following subsections show examples of wireless centrex TRAVERS for these call configurations:

- mobile-to-wireline call
- wireline-to-mobile call
- mobile-to-mobile call

Mobile-to-wireline wireless centrex call

The following TRAVER example shows how the switch translates a call on the wireless portion of the switch (first half of the call). The DMS-100 Wireless switch then routes the call across an ISL trunk to the wireline portion of the switch (second half of the call), where the call meets centrex translations.

Figure 5-35 TRAVER output example for first half of a mobile-to-wireline intragroup call

```

>TRAVER MX MOBORG MOBCEM 2001 B
TABLE MTXTRAV
MOBCEM 2 6 6 6 1 1 NAXL N

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 NORTELST RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
NORTELST ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 2 2 T NP 0 OFRT 159 4 10 NONE
. . TABLE OFRT
. . 159 S D MOB_TO_NORTEL
. . EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
LNP00100 SOC Option is IDLE.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

Warning: SNPA of originator not resolved for standard-outpulsing.
Reason: No NPA in dialed digits and no cell number specified.
Outpulsing digits shown may not be correct.

DIGIT TRANSLATION ROUTES

1 MOB_TO_NORTEL          2001          ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-36 TRAVER output example for second half of a mobile-to-wireline intragroup call

```

>TRAVER TR NORTEL_TO_MOB 2001 B
TABLE TRKGRP
NORTEL_TO_MOB IBNT2 0 ELO NCRT DEMO 0 MIDL 0 N ANSDISC 0 Y N N N
N N Y 0 0 N 0 0 0
      0 N N N N N N N N N NATL $
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE NCOS
DEMO 0 0 0 UNREST ( XLAS BNRUREST FEATXLA BNRDIG) ( CBQ 3 3 Y 2)
( ERWT ) ( IDDDARS N)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
DEMO NXLA DEMOXLA FEATXLA 1 BNRDIG
TABLE DIGCOL
BNRDIG 2 COL S 1
TABLE IBNXLA: XLANAME BNRUREST
TUPLE NOT FOUND
Default is to go to next XLA name.
CUST PRELIM XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME DEMOXLA
DEMOXLA 20 EXTN N Y 613 523 4 $ $
TABLE TOFCNAME
613 523 $
TABLE DNINV
613 523 2001 L HOST 01 0 00 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE          6135232001      ST

TREATMENT ROUTES.  TREATMENT IS: GNCT 1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Wireline-to-mobile wireless centrex call

When a wireline subscriber dials a wireless subscriber in the same centrex group, IBN translations can route the call to the shared ISL for termination to the wireless subscriber. Operating company personnel can expand the called number on the ISL trunk to either the seven- or ten-digit number of the wireless subscriber. When the call enters the wireless portion of the switch on the MOB_TO_LAND ISL, the DMS-100 Wireless switch translates and terminates the call to the mobile subscriber.

The following continuous TRAVER example shows translations for a call when a wireline centrex member dials a wireless member in the same centrex group.

Figure 5-37 Continuous TRAVER output example for a wireline-to-mobile intragroup call

```

>TRAVER L 5232001 7000 B
TABLE IBNLINES
HOST 01 0 00 02 0 DT STN IBN 5232001 DEMO 0 0 613 (3WC) $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
DEMO 0 0 0 UNREST ( XLAS BNRUREST FEATXLA BNRDIG) ( CBQ 3 3 Y 2) ( ERWT )
( IDDDARS N)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
DEMO NXLA DEMOXLA FEATXLA 1 BNRDIG
TABLE DIGCOL
BNRDIG 7 RPT
TABLE IBNXLA: XLANAME BNRUREST
TUPLE NOT FOUND
Default is to go to next XLA name.
CUST PRELIM XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME DEMOXLA
DEMOXLA 70 ROUTE N N 0 N 4 10 NDGT Y T OFRT 160 $
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE OFRT
160 N D LAND_TO_MOB 0 764 N
EXIT TABLE OFRT
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LAND_TO_MOB          7647000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-38 Continuous TRAVER output example for a wireline-to-mobile intragroup call (continued)

```

>TRAVER MX MOBORG MOBCEM 7000 B
TABLE MTXTRAV
MOBCEM 2 6 6 6 1 1 NAXL N

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCEM
3 1 000_M0DDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_M0DDIG_108 SMX2 000 NORTELST RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
NORTELST ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 70 70 T NP 0 OFRT 159 4 10 NONE
. . TABLE OFRT
. . 159 S D MOB_TO_NORTEL
. . EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
LNP00100 SOC Option is IDLE.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

Warning: SNPA of originator not resolved for standard-outpulsing.
Reason: No NPA in dialed digits and no cell number specified.
Outpulsing digits shown may not be correct.

DIGIT TRANSLATION ROUTES

1 MOB_TO_NORTEL          7000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Mobile-to-mobile wireless centrex call

When a wireless subscriber dials another wireless subscriber in the same centrex group, the call routes through a dedicated ISL trunk to the wireline portion of the switch. The call encounters IBN translations, after which it routes through the common LAND_TO_MOB ISL trunk back to the wireless portion of the switch. At the wireless portion of the switch, the call terminates on the wireless member.

The following TRAVER example shows both halves of a call when a wireless member dials another wireless member in the same centrex group. The first half of the TRAVER shows IBN translations that occur on the wireline portion of the switch. The second half of the TRAVER is a continuous TRAVER, which shows the translations that occur on the wireless portion of the switch when the MOB_TO_LAND ISL trunk receives the call.

Figure 5-39 TRAVER output example for first half of a mobile-to-mobile intragroup call

```

>TRAVER TR NORTEL_TO_MOB 7000 B
TABLE TRKGRP
NORTEL_TO_MOB IBNT2 0 ELO NCRT DEMO 0 MIDL 0 N ANSDISC 0 Y N N
N N N Y 0 0 N 0 0 0
      0 N N N N N N N N N NATL $
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE NCOS
DEMO 0 0 0 UNREST ( XLAS BNRUREST FEATXLA BNRDIG) ( CBQ 3 3 Y
2) ( ERWT ) ( IDDDARS N)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
DEMO NXLA DEMOXLA FEATXLA 1 BNRDIG
TABLE DIGCOL
BNRDIG 7 RPT
TABLE IBNXLA: XLANAME BNRUREST
TUPLE NOT FOUND
Default is to go to next XLA name.
CUST PRELIM XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME DEMOXLA
DEMOXLA 70 ROUTE N N 0 N 4 10 NDGT Y T OFRT 160 $
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE OFRT
160 N D LAND_TO_MOB 0 764 N
EXIT TABLE OFRT
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LAND_TO_MOB          7647000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-40 Continuous TRAVER output example for second half of a mobile-to-mobile intragroup call

```
=====
INVOKING CONTINUOUS TRAVER NO. 2
>TRAVER TR MOB_TO_LAND 7647000 B
=====

TABLE TRKGRP
MOB_TO_LAND DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL 613
NPRT NSCR
    613 000 Y N $
TABLE HNPACONT
000 Y 111 0 ( 3) ( 1) ( 0) ( 0) 2 $
    . SUBTABLE HNPACODE
    . 764 764 DN 613 764
TABLE TOFCNAME
613 764 $
TABLE DNINV
613 764 7000 CLLR 0 0 0

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1          7647000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 5-41 Continuous TRAVER output example for second half of a mobile-to-mobile intragroup call (continued)

```

=====
INVOKING CONTINUOUS TRAVER NO. 2
>TRAVER TR MOB_TO_LAND 7647000 B
=====
TABLE TRKGRP
MOB_TO_LAND DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL 613
NPRT NSCR
    613 000 Y N $
TABLE HNPACONT
000 Y 111 0 ( 3 ) ( 1 ) ( 0 ) ( 0 ) 2 $
    . SUBTABLE HNPACODE
    . 764 764 DN 613 764
TABLE TOFCNAME
613 764 $
TABLE DNINV
613 764 7000 CLLR 0 0 0

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1          7647000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

911 emergency services

The DMS-100 Wireless switch supports the following emergency service features:

- Enhanced Emergency Services (E911)
- Enhanced 911 via Wireless Intelligent Network (W911)

E911

For E911, an EO of the DMS-100 Wireless switch sends out the location of the cell site receiving the wireless 911 call to an E911 tandem or a public safety access point (PSAP). This feature complies with the Federal Communication Commission's (FCC) Report and Order Phase 1 requirements, as PN-3581, Emergency Services, provides.

Signaling protocols The DMS-100 Wireless switch supports the following signaling protocols between the EO and the E911 tandem or PSAP:

- ISDN user part (ISUP)
- multifrequency feature group D (MF FGD)
- centralized automatic message accounting (CAMA)

The DMS-100 Wireless switch and an E911 tandem or PSAP can have one of the following signaling protocols:

- ISUP
- MF FGD
- MF CAMA

These signaling protocols serve the following purposes:

- to route E911 calls
- to send out the cell and sector ID information
- to send out the caller's DN or MIN

For ISUP signaling, E911 uses optional parameters Calling Party Number (CPN) and Generic Digits Parameter (GDP) in the ISUP initial address message (IAM). The CPN parameter carries the DN or MIN of the calling party that the PSAP or E911 tandems require for callback purposes. The GDP carries information on the cell site and selector ID in the form of digits, type of digits, and encoding method indication.

Note: Ensure that office parameter MTX_CNIP_MIN_OR_DN in table OFCVAR (Office Variable) is datafilled as DN to send out the DN as a CPN with ISUP signaling.

For MF FGD signaling, E911 uses the ANI to store the caller's DN or MIN for callback purposes, and replaces the dialed digits with the cell and sector ID information.

For CAMA signaling, E911 uses ANI to store the caller's DN for callback purposes, and replaces the dialed digits with the cell or sector ID information.

Datafill E911 on the DMS-100 Wireless switch requires feature-specific datafill entry in the following tables:

- table EXTCID (External Cell ID) – Enter datafill in table EXTCID to map every cell site (down to the sector and tier levels) to a globally defined cell and sector ID that the E911 tandem and PSAPs use. With ISUP signaling,

the IAM parameter GDP carries the cell and sector ID. For MF FGD and CAMA signaling, the dialed digits carry the cell and sector ID.

- table TRKGRP – Nortel Networks recommends entering the following signaling-specific datafill in table TRKGRP, to send out the caller's DN with CAMA signaling:
 - enter ANIVAR in subfield DIGITFMT
 - enter AFTER_WINK in subfield SPILL_TIME
 - enter DN in subfield SPLTYPE

To send out the caller's DN with MF FGD signaling:

- enter any value other than NOANI in subfield DIGITFMT
- enter AFTER_WINK in subfield SPILL_TIME
- Enter DN in subfield SPLTYPE
- table TRKSGRP – Enter MF in subfield OPULSTYP. Enter STDFGD in subfield OPTIONS. (The default outpulsing format for MF trunks is CAMA.)
- table OFRx (where x=T, 2, 3, 4) (Office Routing)
- subtable STDPRTCT.STDPRT – Enter pretranslation route selector ES in subfield PRERTSEL. Enter E911 in subfield FEATCODE.

Note 1: Enter datafill in table PARTDATA (Partition Data) for TDMA and AMPS, and table CDMA PART (CDMA Partition Data) for CDMA before entering datafill in table EXTCID.

Note 2: Enter datafill in table CLLI and TRKGRP before entering datafill in table TRKSGRP.

Feature interactions E911 on the DMS-100 Wireless switch interacts with the following features:

- E911 on the DMS-100 Wireless switch overrides Calling Number Identification Restricted (CNIR) for all E911 calls.
- E911 on the DMS-100 Wireless switch prevents a mobile user who originates an E911 call from putting the call on hold to make a three-way call (3WC).
- When a caller performs an intersystem handoff and then initiates an E911 call as the second leg of a 3WC, the serving MSC sends the anchor MSC the cell and section ID. This procedure routes the call to the appropriate PSAP. (The link between the anchor MSC and the serving MSC must be IS41P parameter ESRD. To set up an IS41P in field MSGFMT in table SYSCON [System Connection] for the local switch.)

Limitations and restrictions The limitations that follow apply to E911 on the DMS-100 Wireless switch:

- E911 applies to North American translations only.
- TRAVER does not support pretranslation route selector ES.
- The DMS-100 Wireless switch does not treat tandem 911 calls as E911 calls.
- E911 is software optionality code-(SOC) controlled.

W911

For W911, the DMS-100 Wireless switch queries the WIN E911 database using IS-41 signaling (an origination request [ORREQ] message) to route WIN E911 calls to the closest W911 E911 tandem or PSAP. W911 uses the Digits (Routing) parameter in the ORREQ message to send the P_Routing_Digits information, which the WIN E911 database assigned, to the switch. As with E911, W911 on the DMS-100 Wireless switch does not require the intervention of an operator.

Signaling protocols W911 on the DMS-100 Wireless switch uses IS41P signaling, as well as ISUP, MF FGD, and CAMA signaling protocols.

W911 on the DMS-100 Wireless switch uses IS41P signaling for the following reasons:

- to send the ORREQ messages to the WIN E911 database with the cell and sector ID information in the Location Area ID parameter
- to receive and process the ORREQ return result message from the WIN E911 database with the P_Routing_Digits information in the Digits (Routing) parameter

With ISUP signaling, W911 uses the GDP in the ISUP IAM. The GDP carries on the P_Routing_Digits in the form of digits, type of digits, and encoding method indication.

Note: As with E911, set office parameter MTX_CNIP_MIN_OR_DN in table OFCVAR to DN to send out the DN as a CPN with ISUP signaling. The DN is only available on the MSC-S where the messaging type between the HLR and the MSC-S is IS41P, or where the HLR and the VLR are co-located. The DN is not available for transient roamers.

With MF FGD signaling, W911 sends the P_Routing Digits from the WIN E911 database as the dialed digits.

Note: The DN is only available on the MSC-S where the messaging type between the HLR and the MSC-S is IS41P, or where the HLR and the VLR are colocated. The DN is not available for transient roamers.

With CAMA signaling, W911 send the P_Routing Digits from the 911 database as the ANI.

Datafill W911 on the DMS-100 Wireless switch requires the following feature-specific datafill entry in subtable STDPRTCT.STDPRT.

- Enter pretranslation route selector ES in subfield PRERTSEL.
- Enter W911 in subfield FEATCODE.
- Enter PCSSN (for PC/SSN) or WINGTT (for WIN global title translations) in subfield ADDRTYPE.
- If PCSSN is entered in subfield ADDRTYPE, also enter ANSI7 in subfield NETTYPE.

Note: For W911, enter datafill in the following tables before subtable STDPRTCT.STDPRT:

- table C7RTESET (CCS7 Routeset)
- table SYSCON
- table TRKGRP (for TDMA/AMPS) or table CDMAPART (for CDMA)
- table OFRx (where x=T, 2, 3, 4)

Office parameter Office parameter E911_ORREQ_ROUTE was deleted from table OFCVAR.

Feature interactions W911 on the DMS-100 Wireless switch interacts with the following features.

- The second leg of a 3WC does not support W911 calls. The default route with basic 911 signaling is used instead. Also, 3WC is disabled on the origination side when a mobile caller originates a WIN E911 call.
- W911 on the DMS-100 Wireless switch overrides CNIR for all W911 calls.
- End users can activate Call Waiting (CWT) when W911 is active.
- End users cannot activate the following features when a W911 call is in progress:
 - Account Code Billing (ACC)
 - Automatic Line (AUL)
 - Credit Card Mobile Phone (CCMP)
 - Two-Stage Dialing (TSD)
 - Surveillance (SURV)

Limitations and restrictions The limitations that follow apply to W911 on the DMS-100 Wireless switch:

- W911 requires the ANSI ISUP software (TR-317) for ISUP signaling to the E911 tandem or PSAP.
- W911 applies to North American translations only.
- W911 is SOC controlled.
- The emergency pretranslator must be datafilled to trigger WIN E911.
- If a WIN E911 call arrives from an E911 tandem, the call routes using basic 911 functionality.

Datafill restrictions

The following limitations and restrictions apply to specific datafill for the DMS-100 Wireless switch:

- Add the following tuple to table VRINV (Version Registry Inventory) during verification of the dumpside of a pre-LWW0005 release before operating company personnel upgrade the CDMA application units (CAU/CIU). (This tuple instructs the CAU/CIU of the correct message format to use when it sends messages to the computer module [CM].)

Figure 5-42 MAP display example for table VRINV

VUKEY	CLASSVAR
MTX LAYER NIL (7 0 BR CM UNIT_0) \$	

Loadbuild on the restore side of a pre-LWW0005 release automatically adds the following tuple to the NOD load. of table VRINV.

Figure 5-43 MAP display example for table VRINV

TREATMT	LOG	FSTRTE
BUSY	Y	S T120

- Do not use wireless DNs for wireline services or line table options, unless operating company personnel had defined the service to work with DNs across the network.
- Be sure that office parameter MINIMUM_CHARGE_DURATION in table OFCENG (Office Engineering) specifies default value 208 for wireless-originated EA calls with a duration of 3 seconds or less.
- Set office parameter CPSTACKSIZE in table OFCSTD (Office Standard) to a value high enough for a roaming mobile phone to return to its HLR. Nortel Networks recommends that you set CPSTACKSIZE to a default value of 6000 to allow the mobile phone to roam back to its home switch.
- Add a busy treatment to table TMTCNTL (Treatment Control) to prevent wireless callers from receiving a software error (SWERR), and a call death. If you do not add a busy treatment to table TMTCNTL, the

DMS-100 Wireless switch generates these unexpected results under the following conditions:

- A wireless caller without Call Waiting assigned to the line dials a wireline called party. The wireline called party answers.
- Another wireless caller calls the first wireless caller and receives a busy tone. When the busy tone ends, the second wireless caller receives the SWERR, and then the call death.

Figure 5-44 shows sample datafill with a busy treatment for table TMTCNTL. (This example shows positioning on CELL2.)

Figure 5-44 MAP display example for table TMTCNTL: CELL2

TREATMT	LOG		FSTRTE
BUSY	Y	S	T120

- For 611 wireless calls where the end user dials 10XXX+11 digits, be sure that a tuple in table OFR2 (Office Route 2) includes selector RT.

Figure 5-45 shows sample datafill for table OFRT.

Figure 5-45 MAP display example for table OFRT selector RT

RTE	RTELIST
805	(RT 007 NP LCL 5415000 N N) \$

- The word “HOST” must exist in a tuple in table LNINV (Line Circuit Inventory) when you try to position on host tuples and query lines. If the word “HOST” does not exist in table LNINV, make sure to enter it in field NAME of table SITE (Site).

Figure 5-46 shows sample datafill for table SITE.

Figure 5-46 MAP display example for table SITE

NAME	LTDSN	MODCOUNT	OPVRCLLI	ALMDATA
HOST	00	2	VER90	\$

- Use the following datafill procedures to prevent a wireline-to-wireless call from routing to reorder (RODR) treatment. (In this case, the wireless called party has turned off the phone or is out of range, and the call does not route to an announcement.)
 - In table ANNS (Announcement), enter a CLLI (for example, MOBINAC) and specify STND for standard announcement for field ANTYPE.

Figure 5-47 shows sample datafill for table ANNS.

Figure 5-47 MAP display example for table ANNS

CLLI	ANTYPE	TRAFSNO	MAXCONN	CYTIME	MAXCYC
MOBINAC	STND	0	30	7	1 \$

- Enter the same CLLI (that is, MOBINAC) from table ANNS in table CLLI. Also enter ANNOUNCEMENTS for field ADMININF.

Figure 5-48 shows sample datafill for table CLLI.

Figure 5-48 MAP display example for table CLLI

CLLI	ADNUM	TRKGRSIZ	ADMININF
MOBINAC	56	10	ANNOUNCEMENTS

- In subtable TMTCNTL.TREAT, enter MBIA as the treatment code for field TREATMT. (This entry provides a custom tone or recorded announcement to an incoming call that is associated with an inactive wireless unit.) Enter S to specify that the treatment is to be a CLLI, *not*

a routing table. Again, enter the same CLI from tables ANNS and CLI for subfield CLI.

Figure 5-49 shows sample datafill for subtable TMTCNTL.TREAT.

Figure 5-49 MAP display example for subtable TMTCNTL.TREAT

TREATMT	LOG	FSTRTE	
MBIA	Y	S	MOBINAC

- In table TMTMAP, enter Q764 for American National Standards Institute (ANSI) ISUP protocol. Then enter MBIA as the treatment code for subfield TMT. Enter LOCAL as the treatment selector for subfield TMTPROC.

Figure 5-50 shows sample datafill for table TMTMAP.

Figure 5-50 MAP display example for table TMTMAP

TMTMPKEY			TMTMPVAR	
Q764	MBIA	ALLBC	ISUP	LOCAL

This datafill guarantees that the call routes over an ISUP DID trunk and the wireline caller receives a mobile inactive announcement.

- To generate log TRK138 with originating service suspension (ORSS) treatment, check the serial number of the mobile unit that has suspended service. If a mismatch exists, use the Mobile Service Order System (MSERVORD) to change the serial number to the number in log CELL100.

Figure 5-51 shows an example of log TRK138.

Figure 5-51 MAP display example for log TRK138 with ORSS treatment

```

TRK138 AUG26 16:08:09 5304 INFO TRMT
      CKT          SBS11    30
      TREATMENT SET = ORSS    CALLED NO = 9641010
      CALLID = 0193 0001

```

- Use the following datafill procedures to verify that a caller (wireless or wireline) receives the same announcement whenever a call terminates to a wireless phone.
 - Be sure that the treatment you enter in subfield TRTMNT of table TRKGRP matches the value in field TRTMNT of table CELLCUST.
 - In table TMTMAP, enter Q764 for ANSI ISUP protocol. Enter LOCAL as the selector in subfield TMTPROC for all mobile treatments.

Datafill sequence

Table 5-2 lists the data schema tables that require datafill for the DMS-100 Wireless switch.

Note 1: This table does not reflect every cellular table required for wireless datafill. This table lists only those tables that relate to code division multiple access (CDMA).

Note 2: Due to the complexity of some datafill tables associated with wireless and wireline calls, refer to existing translations NTPs (as listed at the end of this chapter) for complete descriptions on datafill procedures.

Note 3: Refer to chapter 8, “Billing,” for information on additional datafill tables that billing requires. Also refer to chapter 10, “Equal access and trunking,” for information on additional datafill tables required to support EA.

Table 5-2 Datafill tables required for the DMS-100 Wireless switch (Sheet 1 of 3)

Table	Purpose of table
CLLI	Common Language Location Identifier. This table identifies the far end of each announcement, tone, trunk group, test trunk, national milliwatt test line, and service circuit.
CARRMTC	Carrier Maintenance Control. This table contains maintenance control information for peripheral modules (PM), out-of-service limits for alarms, and system return-to-service occurrences.
LTCINV	Line Trunk Controller Inventory. This table contains information about PMs.

Table 5-2 Datafill tables required for the DMS-100 Wireless switch (Sheet 2 of 3)

Table	Purpose of table
LTCPSINV	Line Trunk Controller P-Side Link Inventory. This table contains the P-side link assignments for the ISDN digital trunk controller (DTCI).
LIUINV	Line Interface Unit Inventory. This table defines the configuration for each frame relay interface unit (FRIU) or other application specific unit (ASU) in a link peripheral processor (LPP).
PVDNCUST	Private Virtual Data Network Customer. This table stores the private virtual data network (PVDN) customers' FRS agents and connections.
PVDNAGEN	Private Virtual Data Network Agent. This table defines the FRS agents in the PVDN database.
PVDNCHAN	Private Virtual Data Network Channel. This table defines the relationship between FRS agents and the physical FRIU channels.
HNPACONT	Home Numbering Plan Area Code. This table lists all valid home numbering plan areas (HNPA) or STS numbers.
HNPACONT. HNPACODE	Home Numbering Plan Area Code Subtable. This subtable lists the route, treatment, or table that translations route to each of the 1000 three-digit codes (000 to 999) in each of the SNPA or STS numbers assigned in table HNPACONT.
HNPACONT. RTEREF	Home Numbering Plan Area Route Reference Subtable. This subtable contains the route references associated with the HNPAs in subtable HNPACONT.
TOFCNAME	Terminating Office Name. This table defines all terminating office numbers (NPA-NXX pattern) in the switch.
STDPRTCT	Standard Pretranslator Control. This table lists the names of each of the standard pretranslator subtables, as assigned by telephone operating company personnel.
STDPRTCT. STDPRT	Standard Pretranslator Control Subtable. This table is the first table to be indexed by the received leading digits provided that the originating line attribute (from table LINEATTR) or trunk (from table TRKGRP) specifies a pretranslator name other than no pretranslator (NPRT) name.
TRKGRP	Trunk Group. This table contains information about trunk groups.
TRKSGRP	Trunk Subgroup. This table lists the supplementary information for each subgroup that operating company personnel had assigned to a trunk group in table TRKGRP.
TRKMEM	Trunk Member. This table defines the attributes of the B-channels in each trunk group.

Table 5-2 Datafill tables required for the DMS-100 Wireless switch (Sheet 3 of 3)

Table	Purpose of table
LINEATTR	Line Attribute. This table defines line attribute indexes applicable to an office. It determines indexing into screening tables and defines the type of line generating the call.
XLAPLAN	Translation Plan. This table stores NAXLA data previously found in table LINEATTR (pre-NA011).
RATEAREA	Rate Area. This table stores billing area fields previously found in table LINEATTR (pre-NA011).
TLDNPOOL	Temporary Local Directory Number Pool. This table identifies each temporary local directory number (TLDN) pool and the range of the TLDNs assigned to the pool.
MSACON	Mobile Service Area Control. This table contains the information for each MSA.
MSERVE	Mobile Service Region. This table lists the MSRs that comprise groups of MSAs to which a mobile end user subscribes.
CDMACONF	Code Division Multiple Access Components in LPP/FLIS. This table provides information on the various code division multiple access (CDMA) components in the link peripheral processor/fiberized link interface shelf (LPP/FLIS).
CDMACELL	Code Division Multiple Access Cell-specific Data. This table defines CDMA information for an entire cell. This information is common over all sectors of a cell.
CDMAPART	Code Division Multiple Access Partition-specific Data. This table contains information used in the configuration and operation of a CDMA cell partition.
SBSINV	Selector Band Subsystem Inventory. This table provides information on the selector bank systems (SBS) and the associated mobile components. This table also defines the controlling CAU for the SBSs and the voice span connections between the SBSs and the DTCs.
CELLCUST	Cellular Customer. This table enables multiple line attributes to be assigned to a single mobile end user. (Wireless-originated calls index into table LINEATTR with the customer index number you specify in table CELLCUST.)
CELLULAR	Cellular Subscriber Database. This table specifies specific information for each cellular end user in the switch, such as the mobile identification number (MIN), the serial number, the MSR, the various options that the end user is authorized to access, and advanced services.
CELLFEAT	Cellular Feature. This table stores additional information for some wireless features, based on the forwarding DN.
SERVCHNG	Service Exchange. This table specifies groups of mobiles, categorized by the MIN, which are allowed local or roaming service in a particular switch.

Datafill examples

The following sections show sample datafill for translating wireline and wireless calls on the DMS-100 Wireless switch. In these examples, directory numbers (DN) are assigned to wireline and wireless lines as follows:

- wireline POTS DNs:
 - 619-520-2100
 - 619-521-0100
- wireline MDC DNs:
 - 619-720-2721
 - 619-721-2721
- wireless DNs:
 - 619-964-1000
 - 619-964-1001

Datafill example for table CLLI

Table CLLI identifies the far end of each announcement, tone, trunk group, test trunk, national milliwatt test line, and service circuit.

Figure 5-52 shows sample datafill for table CLLI.

Figure 5-52 MAP display example for table CLLI

```
CLLI ADNUM TRKGRSIZ ADMININF
-----
SBS11 75 96 CDMA
SBS21 SBS21 76 96 CDMA
LAND_TO_MOB 96 48 NA_TO_MTX_LOOP_AROUND_TRK
MOB_TO_LAND 97 48 MTX_TO_NA_LOOP_AROUND_TRK
```

Datafill example for table CARRMTC

Table CARRMTC contains maintenance control information for PMs, out-of-service limits for alarms, and system return-to-service occurrences.

Figure 5-53 shows sample datafill for table CARRMTC. In this example, FRIU is assigned as the PM type, DEFAULT is assigned as the CAU, and FRIU1 is assigned as the CDMA interface unit (CIU).

Figure 5-53 MAP display example for table CARRMTC

```

CSPMTYPE TEMPLNM RTSML RTSOL ATTR
-----
DTC DEFAULT 255 255 DS1 NT6X50AA MU_LAW SF ZCS BPV NILD N 250 1000 50
50 150 1000 3 6 864 100 17 511 4 255
DTC CDMA 255 255 DS1 NT6X50AB MU_LAW ESF B8ZS BPV NILD N 250 1000 50
50 150 1000 3 6 864 100 17 511 4 255
LTC DEFAULT 255 255 DS1 NT6X50AA MU_LAW SF ZCS BPV NILD N 250 1000 50
50 150 1000 3 6 864 100 17 511 4 255
LGC DEFAULT 255 255 DS1 NT6X50AA MU_LAW SF ZCS BPV NILD N 250 1000 50
50 150 1000 3 6 864 100 17 511 4 255
FRIU DEFAULT 255 255 FRT1 NTEX30AA SF BPV N 250 1000 50 50 150 1000 6
8 864 100 BERS 17 511
FRIU FRIU1 255 255 FRT1 NTEX30AA ESF CRC6 N 250 1000 50 50 150 1000 6
8 864 100 BERS 0 0

```

Datafill example for table LTCINV

Table LTCINV contains information about PMs.

Figure 5-54 shows sample datafill for table LTCINV.

Figure 5-54 MAP display example for table LTCINV

```

LTCNAME ADNUM FRTYPE FRNO SHPOS FLOOR ROW FRPOS EQPEC LOAD EXECTAB
CSLNKTAB OPTCARD TONESET PECS6X45 E2LOAD OPTATTR PEC6X40 EXTINFO
-----
DTC 0 1003 DTE 1 18 1 AA 54 6X02AA ED707BI
(ABTRK DTCEX) (ABMTX DMSMTX) $ (0 10 1 0) (0 10 1 1)
(0 10 1 2) (0 10 1 3) (0 10 1 4) (0 10 1 5) (0 10 1 6) (0 10 1 7)
(0 10 1 8) (0 10 1 9) (0 10 1 10) (0 10 1 11) (0 10 1 12) (0 10 1 13)
(0 10 1 14) (0 10 1 15) $ (CONTINUITY ) (UTR15 ) (MSG6X69 ) $
NORTHAM MX77AA MX77AA MX77NB03 (CCS7) $ 6X40FA N

```

Datafill example for table LTCPSINV

Table LTCPSINV contains the P-side link assignments for the DTCL.

Figure 5-55 shows sample datafill for table LTCPSINV. In this example, the DEFAULT value from table CARRMTC changes to CDMA for CDMA spans.

Figure 5-55 MAP display example for table LTCPSINV

```
LTCNAME PSLNKTAB
```

```
-----
DTC 0 N (0 DS1 DEFAULT N) (1 DS1 DEFAULT N)
(2 DS1 DEFAULT N) (3 DS1 DEFAULT N) (4 DS1 CDMA N)
(5 DS1 CDMA N) (6 NILTYPE) (7 NILTYPE) (8 DS1 CDMA N)
(9 DS1 CDMA N) (10 NILTYPE) (11 NILTYPE) (12 NILTYPE )
(13 NILTYPE ) (14 NILTYPE ) (15 NILTYPE ) (16 NILTYPE )
(17 NILTYPE ) (18 NILTYPE ) (19 NILTYPE ) $
```

Datafill example for table LIUINV

Table LIUINV defines the CIUs and CAUs by load type name and datafill.

Figure 5-56 shows sample datafill for table LIUINV. In this example, CAU is set to DEFAULT, FBUS; and the CIU is set to FRIU1, EXTERNAL.

Figure 5-56 MAP display example for table LIUINV

```
LIUENAME LOCATION LOAD PROCINFO CARDINFO
```

```
-----
FRIU 101 MS 21 1 1 10 CIX05BHP NTEX22BB NTEX31BA NTEX30AA EXTERNAL
UNCHAN DS1_LLEQ_250 FRIU1 N B8ZS
FRIU 102 MS 21 1 1 12 CIX05BHP NTEX22BB NTEX31BA NTEX30AA EXTERNAL
UNCHAN DS1_LLEQ_250 FRIU1 N B8ZS
FRIU 103 MS 21 1 1 14 CAX05BHP NTEX22BB NTEX31BA NTEX30AA FBUS UNCHAN
DS1_LLEQ_250 DEFAULT N B8ZS
FRIU 104 MS 21 1 1 16 CAX05BHP NTEX22BB NTEX31BA NTEX30AA FBUS UNCHAN
DS1_LLEQ_250 DEFAULT N B8ZS
```

Datafill example for table PVDNCUST

Table PVDNCUST defines the customer for table PVDNAGEN.

Figure 5-57 shows sample datafill for table PVDNCUST.

Figure 5-57 MAP display example for table PVDNCUST

```
CUSTOMER
```

```
-----
1
2
3
4
5
```

Datafill example for table PVDNAGEN

Table PVDNAGEN defines the agent for each CIU.

Figure 5-58 shows sample datafill for table PVDNAGEN.

Figure 5-58 MAP display example for table PVDNAGEN

```

AGENTKEY AGTTYPE SPEED ABSIGN CONDEV TUNING      LMI  ITS
-----
1 ACCESS VALID 12245678001 NATL 1 LS_1536KBS N NIL (INVERSION N) (ERAM
N) (CTRL_IDX 0) $ (KARXTIME 0) $ (KATXTIME 0) $
2 ACCESS VALID 12245678002 NATL 1 LS_1536KBS N NIL (INVERSION N) (ERAM
N) (CTRL_IDX 0) $ (KARXTIME 0) $ (KATXTIME 0) $

```

Datafill example for table PVDNCHAN

Table PVDNCHAN relates the CIU back to the agent from table PVDNAGEN and the customer from table PVDNCUST.

Figure 5-59 shows sample datafill for table PVDNCHAN.

Figure 5-59 MAP display example for table PVDNCHAN

```

CHANKEY DEVAREA
-----
1 FRIU 101 1
2 FRIU 102 1

```

Datafill examples for table HNPACONT

Table HNPACONT lists all valid HNPAAs or STS numbers.

Figure 5-60 shows sample datafill for table HNPACONT. The following subtables, HNPACONT, HNPACODE and HNPACODE.RTEREF, show additional translations for both tuples in this example.

Figure 5-60 MAP display example for table HNPACONT

```

STS NORTREFS NOAMBIGC RTEREF HNPACODE ATTRIB RTEMP
-----
619 911 8 (1) (1) (0) (0)
000 111 0 (1) (1) (0) (0)

```

Datafill example for subtable HNPACONT.HNPACODE on tuple 619 911 8 (1) (1) (0) (0)

Subtable HNPACONT.HNPACODE lists the following items in each SNPA or STS number assigned in table HNPACONT:

- route
- treatment
- table that translations route to for each of the 1000 three-digit codes (000 to 999)

Figure 5-61 shows sample datafill for subtable HNPACONT.HNPACODE on the wireline tuple translated in table HNPACONT.

Figure 5-61 MAP display example for subtable HNPACONT.HNPACODE

```
FROMDIGS TODIGS CDRRTMT
```

```
-----
520 520 DN 619 520
521 521 DN 619 521
720 720 DN 619 720
721 721 DN 619 721
964 964 LRTE 1
```

Datafill example for subtable HNPACONT.RTEREF on tuple 619 911 8 (1) (1) (0) (0)

Subtable HNPACONT.RTEREF contains the route references associated with the HNPAs in subtable HNPACONT.HNPACODE.

Figure 5-62 shows sample datafill for subtable HNPACONT.RTEREF on the wireline tuple translated in table HNPACONT.

Figure 5-62 MAP display example for subtable HNPACONT.RTEREF

```
RTE RTELIST
```

```
-----
1 (N D LAND_TO_MOB 0 N N) $
```

Datafill example for subtable HNPACONT.HNPACODE on tuple 000 111 0 (1) (1) (0) (0)

Figure 5-63 shows sample datafill for subtable HNPACONT.HNPACODE on the wireless tuple translated in table HNPACONT.

Figure 5-63 MAP display example for subtable HNPACONT.HNPACODE

```
FROMDIGS TODIGS CDRRTMT
```

```
-----
520 521 LRTE 1
720 721 LRTE 1
964 964 DN 619 964
```

Datafill example for subtable HNPACONT.RTEREF on tuple 000 111 0 (1) (1) (0) (0)

Figure 5-64 shows sample datafill for subtable HNPACONT. RTEREF on the wireless tuple translated in table HNPACONT.

Figure 5-64 MAP display example for subtable HNPACONT.RTEREF

```
RTE RTELIST
```

```
-----
1 (N D MOB_TO_LAND 0 N N) $
```

Datafill example for table TOFCNAME

Table TOFCNAME defines all terminating office numbers (NPA-NXX pattern) in the switch.

Figure 5-65 shows sample datafill for table TOFCNAME.

Figure 5-65 MAP display example for table TOFCNAME

AREACODE	OFCCODE	OPTIONS
619	520	\$
619	521	\$
619	720	\$
619	721	\$
619	964	\$
613	722	(NONNATIVE) \$

Note: Option NONNATIVE applies only to wireline ported DN's for Local Number Portability (LNP). Do not try to enter datafill for area and office codes of wireless end users with this option.

Datafill examples for subtable STDPRTCT.STDPRT

Subtable STDPRTCT.STDPRT is the first table that the received leading digits index, provided that the originating line attribute or trunk specifies a pretranslator name other than no pretranslator name.

Wireless features contain default deactivation codes. To deactivate a feature, dial the access code plus "0." The following lists shows two examples how to activate and deactivate Call Forwarding.

- CFW activation *21
- CFW deactivation *210

Enter datafill for wireless feature access codes in subtable STDPRTCT.STDPRT.

Figure 5-66 through Figure 5-68 show sample datafill for subtable STDPRTCT.STDPRT.

Figure 5-66 MAP display example for subtable STDPRTCT.STDPRT (POT1:STDPRT)

FROMDIGS TODIGS PRETRTE

02 0910 P 0A 1 NA RTE1
 0911 0911 N NP 1 NA
 0912 099 P 0A 1 NA RTE1
 15551212 15551212 P DD 1 NA RTE1
 1911 1911 N NP 1 NA
 2 9 N NP 0 NA

Figure 5-67 MAP display example for subtable STDPRTCT.STDPRT (BNR:STDPRT)

```

FROMDIGS TODIGS PRETRTE
-----

00 00 N OA 1 NA
02 0910 P OA 1 NA RTE1
0911 0911 N NP 1 NA
12 1407484 N DD 1 NA
14075 14075 N DD 1 NA
146 146 N DD 1 NA
150 151 N DD 1 NA
15551212 15551212 P DD 1 NA RTE1
1619 1619 N NP 1 NA
1911 1911 N NP 1 NA
2 611 N NP 0 NA
613 614 N NP 0 NA
619 713 N NP 0 NA
812 820 N NP 0 NA
829 910 N NP 0 NA
951 998 N NP 0 NA

```

Figure 5-68 MAP display example for subtable STDPRTCT (PMX2:STDPRT)

```

FROMDIGS TODIGS PRETRTE
-----

011 011 N DD 3 IN
012 019 N OA 2 IN
02 09 N OA 1 NA
12 19 N DD 1 NA
2 9 N NP 0 NA

```

Datafill example for table TRKGRP

Table TRKGRP contains information about trunk groups.

Figure 5-69 shows sample datafill for table TRKGRP.

Figure 5-69 MAP display example for table TRKGRP

```
GRPKEY GRPINFO
```

```
-----
SBS11 MTX 0 ELO NCIT Y MIDL N NAXL 619 E911
SBS21 MTX 0 ELO NCIT Y MIDL N NAXL 619 E911
LAND_TO_MOB IT 0 ELO NCRT 2W NIL MIDL 619 BNR NSCR 619 000 N N (CELL
2A) (BILLNO 1234567890) $
MOB_TO_LAND DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL 619
NPRT NSCR 619 999 Y N
```

Datavill example for table TRKSGRP

Table TRKSGRP lists the supplementary information for each subgroup that operating company personnel had assigned to a trunk group in table TRKGRP.

Figure 5-70 shows sample datafill for table TRKSGRP.

Figure 5-70 MAP display example for table TRKSGRP

```
SGRPKEY CARDCODE SGRPVAR
```

```
-----
SBS11 0 DS1SIG STD 2W NP WK N 7 10 NP IM 0 0 Y NO NO F N N M 70 UNEQ
SBS21 0 DS1SIG STD 2W NP WK N 7 10 NP IM 0 0 Y NO NO F N N M 70 UNEQ
LAND_TO_MOB 0 DS1SIG C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL
CIC
LAND_TO_MOB 1 DS1SIG C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL
CIC
MOB_TO_LAND 0 DS1SIG C7UP 2W N N UNEQ NONE Q764 THRH 0 C7NODE $ NIL CIC
MOB_TO_LAND 1 DS1SIG C7UP 2W N N UNEQ NONE Q764 THRH 0 C7NODE $ NIL CIC
```

Datavill example for table TRKMEM

Table TRKMEM defines the attributes of the B-channels in each trunk group.

Figure 5-71 shows sample datafill for table TRKMEM.

Figure 5-71 MAP display example for table TRKMEM

CLLI	EXTRKNM	SGRP	MEMVAR

SBS11	0 0	DTC	0 4 1
SBS11	1 0	DTC	0 4 2
SBS21	0 0	DTC	0 8 1
SBS21	1 0	DTC	0 8 2
LAND_TO_MOB	0 0	DTC	0 1 1
LAND_TO_MOB	1 0	DTC	0 1 2
MOB_TO_LAND	0 0	DTC	0 3 1
MOB_TO_LAND	1 0	DTC	0 3 2

Datafill example for table LINEATTR

Table LINEATTR is a pointer table that provides information pointing to tuples in other tables. Table CELLCUST provides the index into table LINEATTR.

Feature “Line Data and SERVORD Fold-in” removes table LINEATTR from wireless use. During a one night process (ONP), existing wireless tuples from table LINEATTR move to tables XLAPLAN, CELLCUST, and RATEAREA. Use tables for future datafill entries beginning with software release LWW0006.

Note: Refer to subsection “Table LINEATTR” on page 7-16 for details.

Table LINEATTR supports wireline-specific line options in field OPTIONS. Wireline-related line class codes (LCC) support only wireline-specific line options.

Figure 5-72 shows sample datafill for table LINEATTR.

Figure 5-72 MAP display example for table LINEATTR

LNATTIDX	LCC	CHGCLSS	COST	LTG	TRAFSNO	SFC	MDI	
IXNAME	DGCLNAME	FANIDIGS		DFLTCLP			DFLTRA	OPTIONS
0		1FR NONE	NT	0	0	NILSFC	0	
NIL	NIL	00	619_POT1_0			LPOT_L123_0		\$
1		1MR NONE	NT	0	0	NILSFC	0	
NIL	NIL	00	619_POT2_1			LPOT_L123_1		\$
2		1FR NONE	NT	2	0	NILSFC	0	
NIL	NIL	00	619_POT1_2			LPOT_L123_1		\$
3		IBN NONE	NT	0	0	NILSFC	0	
NIL	NIL	00	001_BNR_3			NLCA_NILLA_3		\$
4		1FR NONE	NT	0	0	NILSFC	0	
NIL	NIL	00	619_POT1_4			LPOT_L123_0		\$

Table XLAPLAN

Table XLAPLAN stores NAXLA data previously found in table LINEATTR (pre-NA011).

Figure 5-73 shows sample datafill for table XLAPLAN.

Figure 5-73 MAP display example for table XLAPLAN

XLAPIDX	SCRNCL	HSTS	PRTNM	ZEROMPOS	RESINFO	OPTIONS	
							ADMININF
000_MODDIG_108	SMX2	000	PMODDIGS	RTE2	N	\$	\$

Table RATEAREA

Table RATEAREA stores billing area fields previously found in table LINEATTR (pre-NA011).

Enter datafill in field LATANM with the LATA name for an EA call. If you enter datafill in this field with NILLATA, then the switch treats the call as a non-EA call.

Figure 5-74 shows sample datafill for table RATEAREA.

Figure 5-74 MAP display example for table RATEAREA

RTAIDX	LCANAME	MRSA	LATANM	ADMININF

NLCA_L123_8	NLCA	NIL	L123	\$

Datafill example for table TLDNPOOL

Table TLDNPOOL identifies each TLDN pool and the range of the TLDNs assigned to the pool.

Figure 5-75 shows sample datafill for table TLDNPOOL.

Figure 5-75 MAP display example for table TLDNPOOL

TLDNPNUM	TOLLAREA	FROMDIGS	TODIGS	INTL	OVFLPOOL	ADMININF

4 1	6199642000	6199642050	N 1	TOLLA		

Datafill example for table MSACON

Table MSACON defines system characteristics of an MSA for CDMA calls.

Figure 5-76 shows sample datafill for table MSACON.

Figure 5-76 MAP display example for table MSACON

MSANO	SID	SWNO	SIDNAME	MCC	MRTM	S	HZAREA

1	1262	1	RTP8 619 165	Y	CDMA		
2	1263	1	RTP8A 619 165	Y	CDMA		
NWKMSA	1262	1	RTP8 619 165	Y	CDMA		

Datafill example for table MSERVE

Table MSERVE defines the list of MSAs that make up an MSR.

Figure 5-77 shows sample datafill for table MSERVE.

Figure 5-77 MAP display example for table MSERVE

```
MSR MSALIST MSCIDLST
```

```
-----  
1 (1) (2) $ $  
2 (1) (2) $ $
```

Datafill example for table CDMACONF

Table CDMACONF defines CAU and CIU pairs.

Figure 5-78 shows sample datafill for table CDMACONF.

Figure 5-78 MAP display example for table CDMACONF

```
CDMAFRME CAUINFO CIUINFO REPGAMPS CAUPGTO
```

```
-----  
CDMA_1 (0 FRIU 103 104) $ (0 FRIU 101 102) $ N 6
```

Datafill example for table CDMACELL

Table CDMACELL defines CDMA information for an entire cell, which is common to all sectors of a cell.

Figure 5-79 shows sample datafill for table CDMACELL.

Figure 5-79 MAP display example for table CDMACELL

```
CELLNO MSANO CELLCNFG BILLZONE
```

```
-----  
1 2 SECTORED 3 0  
2 2 SECTORED 3 0  
3 2 SECTORED 3 0  
4 2 SECTORED 3 0  
5 2 SECTORED 3 0  
6 2 SECTORED 3 0  
8 1 SECTORED 3 0
```

Datafill example for table CDMAPART

Table CDMAPART contains information used in the configuration and operation of a CDMA cell partition. Each tuple in table CDMAPART represents the smallest logical partition of a CDMA cell, which can receive and transmit radio frequency signals. It is used as a geographical basis for translations, call delivery, and handoffs.

The customer group number and the translations number are used to index into table CELLCUST to obtain the line attribute number.

For Enhanced 911 Emergency (E911) calls, a 911 pretranslator must be defined for each cell partition in table CDMAPART. The called DN can then be manipulated, along with the special route.

Figure 5-80 shows sample datafill for table CDMAPART.

Figure 5-80 MAP display example for table CDMAPART

```
SUBCELL PILOTPN XLANUM TLDNPNUM CNIPBLK TRANSL
-----
```

```
8X 45 1 4 N NAXL 619 E911
```

```
8Y 45 1 4 N NAXL 619 E911
```

```
8Z 45 1 4 N NAXL 619 E911
```

Datafill example for table SBSINV

Table SBSINV relates the SBSs to the DTC span that is assigned to a primary FRIU (CAU).

Figure 5-81 shows sample datafill for table SBSINV.

Figure 5-81 MAP display example for table SBSINV

```
SBSNOKEY TRUNKGRP SCISLTNO PRIMECAU
-----
```

```
11 SBS11 (0 DTC 0 4) (1 DTC 0 5) $ FRIU 103
```

```
21 SBS21 (0 DTC 0 8) (1 DTC 0 9) $ FRIU 104
```


Datafill example for table CELLCUST

Table CELLCUST provides an index of a given customer group to a mobile end user.

The key field in table CELLCUST is the group translation number (GRPXLA). This field contains the customer group index number. The entry used also contains an XLAPLAN index number corresponding to the entry in table XLAPLAN.

Note: Do not relate this customer group index number to MDC customer group translations.

Figure 5-82 shows sample datafill for table CELLCUST.

Figure 5-82 MAP display example for table CELLCUST

GRPXLA	XLAIDX	RATEIDX	IXNAME	TRTMNT
2 1	000_PMX2_8	NLCA_L123_8	NIL	CELL2
2 2	000_PMX2_8	NLCA_L123_8	NIL	CELL2
2 3	000_PMX2_8	NLCA_L123_8	NIL	CELL2
2 5	000_PMX2_8	NLCA_L123_8	NIL	CELL2
7 7	002_AMX1_17	NLCA_L123_8	NIL	CELL7

Datafill example for table CELLULAR

Table CELLULAR provides information about each cellular end user.

Figure 5-83 shows sample datafill for table CELLULAR.

Figure 5-83 MAP display example for table CELLULAR

DIRNO	SERIAL	MSR	CUSTGRP	ROAMER	CARRIER	RFPIN	OPTLIST	SVCLIST
619	964	1000	1	10012846	2 2	N N	\$ (SND) (CDW) (ARW)	\$ \$
619	964	1001	1	10012906	2 2	N N	\$ (SND) (CDW) (ARW)	\$ \$
619	964	1002	143	10002	2 2	N N	\$ (SND) \$ \$	

Datafill example for table CELLFEAT

Table CELLFEAT provides additional wireless information necessary for individual end users.

Figure 5-84 shows sample datafill for table CELLFEAT.

Figure 5-84 MAP display example for table CELLFEAT

DRNMFEAT DATA									

904	964	2998	CFB	CFB	N	N	9642997		

Datafill example for table SERVCHNG

Table SERVCHNG provides a list of all end users and end user types (such as, local and network roamer).

Figure 5-85 shows sample datafill for table SERVCHNG.

Figure 5-85 MAP display example for table SERVCHNG

FROMMIN TOMIN MSR CUSTGRP HOMEMSA HOMEXLA TLDNPNUM TOLLAREA NWKOPTNM													
ROAMDATA OPTIONS													

6199641000	619964300	2	2	1	2	4	1	DEFAULT	LOCAL	(TCA)	\$		

Datafill for wireline-to-wireless calls over ISUP ISL trunks

Table 5-3 lists the tables that require datafill for wireline-to-wireless calls over ISUP ISL trunks.

Table 5-3 Datafill tables required for wireline-to-wireless calls over ISUP ISL trunks (Sheet 1 of 2)

Table	Purpose of table
CLLI	Common Language Location Identifier. This table uniquely identifies the far end of each announcement, tone, trunk group, test trunk, national milliwatt test line, and service circuit.
TRKGRP	Trunk Group. This table contains information about trunk groups.
TRKSGRP	Trunk Subgroup. This table lists the supplementary information for each subgroup that was assigned to one of the trunk groups in table TRKGRP.
TRKMEM	Trunk Member. This table defines the attributes of the B-channels in each trunk group.
C7TIMER	Common Channel Signaling 7 Timer. This table contains the timers for message transfer part (MTP) levels two and three. The table is divided into three sets, or groups, of tuples: Q703, Q704, and Q707.

Table 5-3 Datafill tables required for wireline-to-wireless calls over ISUP ISL trunks (Sheet 2 of 2)

Table	Purpose of table
C7NETWRK	Common Channel Signaling 7 Network. This table describes the signaling networks in use in a switching office. Data from this table is used to refine the identities of all route sets in a switching office for network information.
C7LKSET	Common Channel Signaling 7 Linkset. This table defines the characteristics of a linkset. (A linkset is a set of links grouped to provide one logical path between adjacent nodes.) This table also defines attributes that are common to all links in the linkset.
C7RTESET	Common Channel Signaling 7 Routeset. This table supports a logical association between linksets used as routes for each signaling point in a network. The information in this table records which routesets and linksets can carry the signaling information to the destination signaling point.
C7LINK	Common Channel Signaling 7 Link. This table associates the physical equipment from a link with the logical view of the link as a member of a linkset.
ISUPDEST	CCS7 ISDN User Part Destination. This table enables operating company personnel to datafill the part of a signaling network identifier (SNID) that is logically associated with tables TRKGRP and TRKSGRP, separately from the entries in table C7TRKMEM.
C7TRKMEM	Common Channel Signaling 7 Trunk Member. Common Channel Signaling 7 uses this table to relate the circuit identification code (CIC) part of the SNID to the CLLI and trunk member number.
C7ISL	C7 ISDN User Part Signaling Loopback. This table allows operating companies to define the two endpoints that make up an ISL facility. Table C7ISL also identifies those ISUP facilities with ISL capabilities.

The following examples show sample datafill for the data schema tables associated with wireline-to-wireless calls over ISUP ISL trunking for the DMS-100 Wireless switch.

Datafill example for table CLLI

Table CLLI identifies the far end of each announcement, tone, trunk group, test trunk, national milliwatt test line, and service circuit.

Figure 5-86 shows sample datafill for table CLLI.

Figure 5-86 MAP display example for table CLLI

```
CLLI ADNUM TRKGRSIZ ADMININF
```

```
-----  
LAND_TO_MOB 96 48 NA_TO_MTX_LOOP_AROUND_TRK  
MOB_TO_LAND 97 48 MTX_TO_NA_LOOP_AROUND_TRK
```

Datafill example for table TRKGRP

Figure 5-87 shows sample datafill for table TRKGRP.

Figure 5-87 MAP display example for table TRKGRP

```
GRPKEY GRPINFO
```

```
-----  
LAND_TO_MOB IT 0 ELO NCRT 2W NIL MIDL 619 BNR NSCR 619 000 N N $  
MOB_TO_LAND DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL 619  
NPRT NSCR 619 000 N N
```

Datafill example for table TRKSGRP

Table TRKSGRP lists the supplementary information for each subgroup that operating company personnel had assigned to a trunk group in table TRKGRP.

Figure 5-88 shows sample datafill for table TRKSGRP.

Figure 5-88 MAP display example for table TRKSGRP

```
SGRPKEY CARDCODE SGRPVAR
```

```
-----  
LAND_TO_MOB 0 DS1SIG C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL CIC  
LAND_TO_MOB 1 DS1SIG C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL CIC  
MOB_TO_LAND 0 DS1SIG C7UP 2W N N UNEQ NONE Q764 THRH 0 C7NODE $ NIL CIC  
MOB_TO_LAND 1 DS1SIG C7UP 2W N N UNEQ NONE Q764 THRH 0 C7NODE $ NIL CIC
```

Datafill example for table TRKMEM

Table TRKMEM defines the attributes of the B-channels in each trunk group.

Figure 5-89 shows sample datafill for table TRKMEM.

Figure 5-89 MAP display example for table TRKMEM

```
CLLI EXTRKNM SGRP MEMVAR
```

```
-----
LAND_TO_MOB 0 0 DTC 0 1 1
LAND_TO_MOB 1 0 DTC 0 1 2
MOB_TO_LAND 0 0 DTC 0 3 1
MOB_TO_LAND 1 0 DTC 0 3 2
```

Datafill example for table C7TIMER

Table C7TIMER contains the timers for MTP levels 2 and 3.

Figure 5-90 shows sample datafill for table C7TIMER.

Figure 5-90 MAP display example for table C7TIMER

```
TIMEKEY TIMEDATA
```

```
-----
Q703 0 ANSI703 130 118 118 6 23 12 30 100
Q704 0 ANSI704 10 10 10 10 10 10 15 10 30 30 10 10 3 2 20
10 60 8 90 90
Q707 0 ANSI707 30 60
```

Datafill example for table C7NETWRK

Table C7NETWRK describes the signaling networks in a switching office.

Figure 5-91 shows sample datafill for table C7NETWRK.

Figure 5-91 MAP display example for table C7NETWRK

```
NETNAME PTCODE NI SLSROT TFR MCS CLUSTERS RCTEST
```

```
-----
C7NETWRK1 ANSI7 54 55 56 NATL Y Y 3 Y N
C7NETWRK2 ANSI7 51 52 53 INTLSPARE Y Y 3 Y N
```

Datafill example for table C7LKSET

Table C7LKSET defines linkset characteristics, and attributes that are common to all links in the linkset.

Figure 5-92 shows sample datafill for table C7LKSET.

Figure 5-92 MAP display example for table C7LKSET

```
LINKSET LSTYPE NETNAME FEPC FECLLI SIGLKTST RSTEST INHTEST Q704
CNGSTN NUMFLAGS
```

```
-----
C7LKSET1 ALINK C7NETWRK1 ANSI7 51 52 53 C7LKSET1 N N N 0 0 1
C7LKSET2 ALINK C7NETWRK2 ANSI7 54 55 56 C7LKSET2 N N N 0 0 1
```

Datafill example for table C7RTESET

Table C7RTESET supports an association between linksets used as routes for each signaling point in a network.

Figure 5-93 shows sample datafill for table C7RTESET.

Figure 5-93 MAP display example for table C7RTESET

```
ROUTESET NETNAME TFPBCAST DPC ROUTES
```

```
-----
C7RTESET1 C7NETWRK1 N ANSI7 (51) (52) (53) $
(C7LKSET1 0) $
C7RTESET2 C7NETWRK2 N ANSI7 (54) (55) (56) $
(C7LKSET2 0) $
```

Datafill example for table C7LINK

Table C7LINK associates the physical equipment from a link with the logical view of the link as a member of a linkset.

Figure 5-94 shows sample datafill for table C7LINK.

Figure 5-94 MAP display example for table C7LINK

```
LINKNAME LINKDATA Q703 Q707 LINKOPT
```

```
-----  
  
C7LKSET1 0 LIUBASIC LIU7 0 0 0 $  
C7LKSET2 0 LIUBASIC LIU7 1 0 0 $
```

Datafill example for table ISUPDEST

Table ISUPDEST enables operating company personnel to datafill the part of a SNID that is associated with tables TRKGRP and TRKSGRP.

Figure 5-95 shows sample datafill for table ISUPDEST.

Figure 5-95 MAP display example for table ISUPDEST

```
DESTKEY ISUPROUT
```

```
-----  
  
LAND_TO_MOB 0 C7RTESET1  
MOB_TO_LAND 0 C7RTESET2
```

Datafill example for table C7TRKMEM

Common Channel Signaling 7 uses table C7TRKMEM to relate the CIC part of the SNID to the CLLI and trunk member number.

Figure 5-96 shows sample datafill for table C7TRKMEM.

Figure 5-96 MAP display example for table C7TRKMEM

```
MEMKEY CIC
```

```
-----  
  
LAND_TO_MOB 0 0  
MOB_TO_LAND 0 0
```

TRAVER

The figures in this section show sample TRAVER output to verify the following types of calls accessible on the DMS-100 Wireless switch:

- Figure 5-97, “TRAVER output example for land-to-land call (POTS line),”
- Figure 5-98 and Figure 5-99, “TRAVER output example for a wireline-to-wireline call (RES) LINE”
- Figure 5-100 and Figure 5-101, “TRAVER output for a wireline-to-wireline call (dialing 9 on an IBN line)”
- Figure 5-102, “TRAVER output example for a wireline-to-wireline call (using 6-digit extension dialing on an IBN line)”
- Figure 5-103, “TRAVER output example for a mobile-to-mobile call,”
- Figure 5-104 and Figure 5-105, “TRAVER output example for both halves of a land-to-mobile call (from the wireline caller over an ISL trunk, and from the ISL trunk to the wireless end user)”
- Figure 5-106 and Figure 5-107 “TRAVER output example for both halves of a mobile-to-land call (from the wireless caller over an ISL trunk, and from the ISL trunk to the wireline end user)”
- Figure 5-108 and Figure 5-109 “TRAVER output example for a mobile-to-mobile E911 call”

Figure 5-97 TRAVER output example for land-to-land call (POTS line)

```

>TRAVER L 5202100 5210100 B
TABLE LINEATTR
0 1FR NONE NT 0 0 NILSFC 0 NIL NIL 00 619_POT1_0 LPOT_L123_0 $
TABLE XLAPLAN
619_POT1_0 NSCR 619 POT1 RTE1 Y RES1 0 0 $ $
TABLE RATEAREA
LPOT_L123_0 LPOT NIL L123 $
TABLE DNATTRS
619 520 2100
(PUBLIC ( NAME SUPERMAN) $)$ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
POT1 ( 1) (65021) 0
. SUBTABLE STDPRT
. 5 9 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HNPACONT
619 911 8 ( 2) ( 1) ( 0) ( 0) 0
. SUBTABLE HNPACODE
. 521 521 DN 619 521
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
TABLE TOFCNAME
619 521
TABLE DNINV
619 521 0100 L 00 0 00 05
TABLE LCASCRCN
619 LPOT ( 5) OPTL N
. SUBTABLE LCASCR
. 521 521
TABLE PFXTREAT
OPTL NP Y NP UNDT
+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES
1 LINE 6195210100 ST
TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120
+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-98 TRAVER output example for a wireline-to-wireline call (RES line)

```

>TRAVER L 5202100 5210100 B
TABLE LINEATTR
0 1FR NONE NT 0 0 NILSFC 0 NIL NIL 00 619_POT1_0 LPOT_L123_0 $
TABLE XLAPLAN
619_POT1_0 NSCR 619 POT1 RTE1 Y RES1 0 0 $ $
TABLE RATEAREA
LPOT_L123_0 LPOT NIL L123 $
TABLE DNATTRS
619 520 2100
(PUBLIC ( NAME SUPERMAN) $)$ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
POT1 ( 1) (65021) 0
. SUBTABLE STDPRT
. 5 9 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HNPACONT
619 911 8 ( 2) ( 1) ( 0) ( 0) 0
. SUBTABLE HNPACODE
. 521 521 DN 619 521
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
TABLE TOFCNAME
619 521
TABLE DNINV
619 521 0100 L 00 0 00 05
TABLE LCASCRCN
619 LPOT ( 5) OPTL N
. SUBTABLE LCASCR
. 521 521
TABLE PFXTREAT
OPTL NP Y NP UNDT
+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES
1 LINE 6195210100 ST
TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120
+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-99 TRAVER output example for a wireline-to-wireline call (RES line) (continued)

```

>TRAVER L 5213002 5202100 B
TABLE IBNLINES
01 0 01 07 0 DT STN RES 5213002 0 (COT) $
TABLE LINEATTR
0 1FR NONE NT NSCR 0 619 POT1 LPOT RTE1 0 NIL NILSFC L123 0 NIL
NIL 00 Y RES1 0 0 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RES1 0 0 0 RSNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
RES1 NXLA RES1XLA RESFEAT 1 RES1DIG
TABLE DIGCOL
TUPLE NOT FOUND
Default is RPT
NCOS PRELIM XLA name is NIL. Go to next XLA name.
CUST PRELIM XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME RES1XLA
TUPLE NOT FOUND
Default from table XLANAME:
RES1XLA
      (NET N N N 0 N NDGT N N GEN ( LATTR 0) (EA NILC Y 0) (LPIC
NILC) $ $)$ 9
WARNING: if using a carrier with a 4-digit CIC
      15-digit international calls may not complete
      with more than 3 IBN prefix digits.
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
0 1FR NONE NT NSCR 0 619 POT1 LPOT RTE1 0 NIL NILSFC L123 0 NIL
NIL 00 Y RES1 0 0 $

```

Figure 5-100 TRAYER output example for a wireline-to-wireline call (dialing 9 on an IBN line)

```

TABLE STDPRTCT
POT1 ( 1) (65021) 0
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 5 9 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
TABLE HNPACONT
619 911 8 ( 1) ( 1) ( 0) ( 0) 0
. SUBTABLE HNPACODE
. 520 520 DN 619 520
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
TABLE TOFCNAME
619 520
TABLE DNINV
619 520 2100 L 00 0 00 02
TABLE LCASCRN
619 LPOT ( 5) MAND N
. SUBTABLE LCASCR
. 520 521
TABLE PFXTREAT
TUPLE NOT FOUND.  DEFAULT IS TO LEAVE XLA RESULT UNCHANGED

+++ TRAYER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                6195202100          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAYER: SUCCESSFUL CALL TRACE +++

```

Figure 5-101 TRAVER output example for a wireline-to-wireline call (dialing 9 on an IBN line)(continued)

```

>TRAVER L 7202721 95202100 B
TABLE IBNLINES
00 0 00 03 0 DT STN IBN 7202721 BNR 0 0 619 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
619 720 2721 2721
(PUBLIC ( NAME DNGRPS_PUBLIC) $)
(PRIVATE ( NAME DNGRPS_PRIVATE) $)$
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
BNR 0 0 0 UNREST ( XLAS BNRUREST FEATXLA BNRDIG) ( CBQ 3 3 Y 2) ( ERWT)
(IDDDARS N)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
BNR NXLA BNRXLA FEATXLA 1 BNRDIG
TABLE DIGCOL
BNRDIG 9 POTS Y
TABLE IBNXLA: XLANAME BNRUREST
TUPLE NOT FOUND
Default is to go to next XLA name.
CUST PRELIM XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME BNRXLA
BNRXLA 9 NET Y Y N 1 Y POTS N N GEN ( LATTR 3)$ $
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
0 1FR NONE NT 0 0 NILSFC 0 NIL NIL 00 619_POT1_0 LPOT_L123_0 $

```

Figure 5-102 TRAVER output example for a wireline-to-wireline call (using 6-digit extension dialing on an IBN line)

```

TABLE STDPRTCT
BNR ( 1) (65021) 0
. SUBTABLE STDPRT
. 5 611 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
TABLE HNPACONT
001 911 8 ( 1) ( 1) ( 0) ( 0) 0
. SUBTABLE HNPACODE
. 520 520 DN 619 520
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
TABLE TOFCNAME
619 520
TABLE DNINV
619 520 2100 L 00 0 00 02

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                6195202100          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-103 TRAVER output example for a mobile-to-mobile call

```

>TRAVER MX MOBORIG MOBILE 9641000 B
TABLE MTXTRAV
MOBILE 2 2 2 0 1 1 NAXL Y C333 N

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST
+++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM
+++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMODDIG RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
Table STDPRTCT
PMODDIG ( 1) ( 0) 0
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. KEY NOT FOUND
. DEFAULT VALUE IS:   N NP 0 NA
TABLE HNPACONT
000 111 0 (1) (1) (0) (0)
. SUBTABLE HNPACODE
. 964 964 DN 619 964
TABLE TOFCNAME
619 964
TABLE DNINV
619 964 1000 CLLR 0 0

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1                               6199641000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NOCKT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-104 TRAVER output example for first half of a land-to-mobile call (from wireline end user to the ISL)

```

>TRAVER L 5202100 9641000 B
TABLE LINEATTR
0 1FR NONE NT 0 0 NILSFC 0 NIL NIL 00 619_POT1_0 LPOT_L123_0 $
TABLE XLAPLAN
619_POT1_0 NSCR 619 POT1 RTE1 Y RES1 0 0 $ $
TABLE RATEAREA
LPOT_L123_0 LPOT NIL L123 $
TABLE DNATTRS
619 520 2100
(PUBLIC ( NAME SUPERMAN) $)$ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
POT1 ( 1) (65021) 0
. SUBTABLE STDPRT
. 9 9 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HNPACONT
619 911 8 ( 2) ( 1) ( 0) ( 0) 0
. SUBTABLE HNPACODE
. 964 964 LRTE 1
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
. SUBTABLE RTEREF
. 1 N D LAND_TO_MOB 0 N N
. EXIT TABLE RTEREF
EXIT TABLE HNPACONT
TABLE LCASCRCN
619 LPOT ( 5) OPTL N
. SUBTABLE LCASCR
. 964 964
TABLE PFXTREAT
OPTL NP Y NP UNDT
+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES
1 LAND_TO_MOB 9641000 ST
TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```


Figure 5-105 TRAVER output example for second half of a land-to-mobile call (from the ISL to wireless end user)

```
>TRAVER TR MOB_TO_LAND 9641000 B
TABLE TRKGRP
MOB_TO_LAND DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL
619 NPRT
NSCR 619 000 N N
TABLE HNPACONT
000 111 0 (1) (1) (0) (0)
. SUBTABLE HNPACODE
. 964 964 DN 619 964
TABLE TOFCNAME
619 964
TABLE DNINV
619 964 1000 CLLR 0 0

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1                6199641000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NOCKT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 5-106 TRAVER output example for first half of a mobile-to-land call (from mobile end user to the ISL)

```

>TRAVER TR MOB_TO_LAND 9641000 B
TABLE TRKGRP
MOB_TO_LAND DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL
619 NPRT
NSCR 619 000 N N
TABLE HNPACONT
000 111 0 (1) (1) (0) (0)
. SUBTABLE HNPACODE
. 964 964 DN 619 964
TABLE TOFCNAME
619 964
TABLE DNINV
619 964 1000 CLLR 0 0

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1                6199641000          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NOCKT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-107 TRAVER output example for second half of mobile-to-land call (from the ISL to wireline end user)

```

>TRAVER MX MOBORG MOBILE 5202100 B
TABLE MTXTRAV
MOBILE 2 2 2 0 1 1 NAXL Y C333 N

+++ TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST +++
+++ TRAVER: XLANUM FROM TABLE MTXTRAV FIELD XLANUM      +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMODDIG RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
PMODDIG ( 1) ( 0) 0
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. KEY NOT FOUND
. DEFAULT VALUE IS:   N NP 0 NA
TABLE HNPACONT
000 111 0 (1) (1) (0) (0)
. SUBTABLE HNPACODE
. 520 521 LRTE 1
. SUBTABLE RTEREF
.   1 N D MOB_TO_LAND 0 N N $
. EXIT TABLE RTEREF
EXIT TABLE HNPACONT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MOB_TO_LAND                5202100                ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NOCKT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Figure 5-108 TRAVER output example for an E911 call

```
>TRAVER TR LAND_TO_MOB 5202100 B
TABLE TRKGRP
LAND_TO_MOB IT 0 ELO NCRT 2W NIL MIDL 619 BNR NSCR 619 000 N N $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE STDPRTCT
BNR ( 1) (65021) 0
. SUBTABLE STDPRT
. 5 611 N NP 0 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS:  NONE OVRNONE  N
TABLE HNPACONT
619 911 8 ( 2) ( 1) ( 0) ( 0) 0
. SUBTABLE HNPACODE
. 520 520 DN 619 520
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
TABLE TOFCNAME
619 520
TABLE DNINV
619 520 2100 L 00 0 00 02

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                6195202100          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 5-109 TRAVER output example for an E911 call (continued)

```

>TRAVER MX MOBORIG MOBILE CELL 10X 911 B
TABLE MTXTRAV
MOBILE 2 2 2 0 1 1 NAXL Y C222 N
TABLE CDMACELL
10 1 SECTORED 3 0 CDMA 0
TUPLE NOT FOUND
TABLE CDMAPART
10X 204 1 4 N NAXL 619 E911 $
TABLE MSERVE
2 (2) $ $

+++ TRAVER: EMERGENCY PRE-TRANSLATIONS FOR TRUNK +++

TABLE STDPRTCT
E911 ( 1) (65021) 0
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 911 911 T OA 0 OFRT 91 3 3 NONE
. . TABLE OFRT
. . 91 N D MOB_TO_LAND 3 3504911 N
. . EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 MOB_TO_LAND          3504911          ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB

+++ TRAVER: SUCCESSFUL CALL TRACE +++

=====
INVOKING CONTINUOUS TRAVER NO. 2
>TRAVER TR LAND_TO_MOB 3504911 B
=====

TABLE TRKGRP
LAND_TO_MOB IT 0 ELO NCRT 2W NIL MIDL 619 MAT1 NSCR 619 000 N N
(CELL 2A)
(BILLNO 6194567890) $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE STDPRTCT
MAT1 ( 1) (65021) 2
. SUBTABLE STDPRT

```

Supporting documentation

Refer to the following NTPs for additional information on translations and TRAVER operation:

- *Basic Translations Tools Guide*, 297-1001-360
- *Customer Data Schema Reference Manual*
- *Translations Guide*
- *DMS-MTX Basic Cellular Translations*, 411-2131-220
- *DMS-MTX Customer Data Schema Reference Manual*, 411-2131-451

6 Line provisioning

Table 6-1 lists the design changes that the DMS–100 Wireless switch requires for line provisioning. This chapter describes each topic listed in this table in detail.

Table 6-1 Index to DMS–100 Wireless line provisioning changes

Section with required changes	Description
Provisioning wireline and wireless data	Use the Mobile Service Order System (MSERVORD) to provision wireless data. Use the Service Order System (SERVORD) to provision wireline data.
Querying wireline and wireless DNs	Use the following commands to query wireline and wireless directory numbers (DN): • QDN for wireline and wireless DNs • QHLR for wireless DNs in a single–string format Do <i>not</i> use the following query commands for wireless DNs: • QDNSU • QDNWRK • QNCOS The DMS–100 Wireless switch does not support the use of command MQDN to query wireless DNs.
Datafill tables	The DMS–100 Wireless switch introduces datafill table MLCCOPT (Mobile Line Class Code Option) and table MOPTOPT (Mobile Incompatible Options).
Office parameters	The DMS–100 Wireless switch introduces office parameters SO_BULK_DMO_MOB and SO_ECHO_MOB.
Supporting documentation	This section lists additional Nortel Networks publications (NTP) that apply to wireline and wireless SERVORD operation.

Provisioning for the DMS-100 Wireless switch

The SERVORD interface provides operating company personnel with the ability to add, change, or delete line options and services on end users' lines. Also, operating company personnel can check the status of DNs or line equipment numbers (LEN) using SERVORD query commands.

The existing wireline and wireless environments both have their own versions for SERVORD operation. The DMS-100 Wireless switch supports both versions of wireless and wireline SERVORD.

Provisioning for the DMS-100 Wireless includes the following functions:

- wireline and wireless data
- wireline and wireless DN querying
- support of existing wireline and wireless line options

Provisioning wireline and wireless data

The DMS-100 Wireless switch enables operating company personnel to provision both wireline and wireless data.

Wireline provisioning remains unaffected by this development. Operating company personnel can provision wireline data without detecting any change in SERVORD operation.

To provision wireless data with the DMS-100 Wireless switch, use MSERVORD. The MSERVORD tool operates exactly as the wireless version of SERVORD, except enter the command "MSERVORD" instead of "SERVORD."

Note: Because the DMS-100 Wireless switch does not modify wireline SERVORD, the Memory Administration Recent Change (MARCH) system also is unchanged. Use MARCH to provision wireline data on either the DMS-100 Wireless switch or the DMS-100 switch in the same method.

Figure 6-1 shows how to access provisioning for wireline and wireless data on the DMS-100 Wireless switch. (Note the use of the command "MSERVORD" for wireless data.)

Figure 6-1 SERVORD and MSERVORD interaction on the DMS-100 Wireless switch

```

CI:
>SERVORD
SO:
> HELP
HELP IS AVAILABLE FOR THE COMMANDS:
HELP, ADD, ADO, CDN, CICIP, CLN, ABNN, DBNN, DEL, DEO, EST, NEW,
OUT, PLP, RES, SUS, NEWDN, OUTDN, SWAP, BULK, CHF, DSP, CHG, ADA,
DEA, CKLN, SLT, DELCF, SUSGRP, RESGRP, SADO, SDEO, CLTG, SDNA,
SETPH, ADDPH, CHAPH, DELPH, SWLT, CISG, CHDN, NEWACD, CHL,
COPYSET, EXBEST, EXBADD, EXBDELM, EXBADO, EXBDEO, EXBCHG, EXBDELG,
CAPSORD
TYPE HELP CMDNAME FULL FOR SYNTAX
TYPE HELP CMDNAME fieldname FOR SYNTAX OF A FIELD
> HELP NEW
Service Order Command-NEW in line
Establishes initial service for all non-hunt lines
>SERVORD
ALREADY IN SERVORD
>MSERVORD
MSO:
> HELP
HELP IS AVAILABLE FOR THE COMMANDS:
HELP, ADO, DEO, NEW, OUT, RES, SUS, BULK, ECHO, STOPECHO, CSN,
CCG, CHPIN, CEPGRP, DELGRP, CEPMEM, DELMEM, CSV
TYPE HELP CMDNAME FULL FOR SYNTAX
TYPE HELP CMDNAME fieldname FOR SYNTAX OF A FIELD
> HELP NEW
Service Order Command-New
Establishes initial service for Cellular Subscribers
>MSERVORD
ALREADY IN MSERVORD

```

Note: The error response **ALREADY** in **SERVORD** [or **MSERVORD**] displays if you try to re-access the same provisioning tool that you already have accessed.

Querying wireline and wireless DNs

The DMS-100 Wireless switch allows operating company personnel to query both wireline and wireless DNs.

To query wireline and wireless DNs, use one of the following **SERVORD** commands (depending on the type of line):

- **QDN** (query line data) for wireline and wireless DNs
- **QHLR** (query home location register) for wireless DNs in a single string format. This command provides the same functionality as it does on the

wireless switch. That is, QHLR displays system and services associated with a mobile end user.

The DMS-100 Wireless switch does not support the MQDN command for the query of wireless DNs.

The DMS-100 Wireless switch also supports the following common query commands for wireline DNs:

- QDNSU (query unassigned DNs)
- QDNWRK (query assigned DNs)
- QNCOS (query network class of service)

The DMS-100 Wireless switch does *not* support these commands for wireless DNs.

Note: Enter these commands from the command interpreter (CI) level or from within SERVORD or MSERVORD.

DMS-100 Wireless output from the QDN and QHLR commands directs the user to a more correct command. For example, if you execute the QDN command on a wireline DN, it displays the same information as a wireline DN on the wireline switch.

Figure 6-2 shows examples of using the QDN command to query a blank DN and a wireline DN. In this figure, 6199641009 is the blank DN, and 6195202101 is the wireline DN.

Figure 6-2 Examples of the QDN command on the DMS-100 Wireless switch (wireline and blank DNs)

```
CI:
>SERVORD
SO:
> QDN 6199641009
-----
DN:      6199641009
TYPE: UNASSIGNED
-----
>QDN 6195252101
-----
DN:      5202101
TYPE: SINGLE PARTY LINE
SNPA: 619 SIG: DT LNATTIDX: 0
LINE EQUIPMENT NUMBER:      HOST 00 0 00 00
LINE CLASS CODE:      1FR
LINE TREATMENT GROUP:      0
CARDCODE: 6X17AC GND: N PADGRP: STDLN BNV: NL MNO: N
PM NODE NUMBER :      48
PM TERMINAL NUMBER :      2
OPTIONS:
DGT AUL 5212100
-----
>
```

Figure 6-3 shows an example of using the QDN command to query a wireless DN.

Figure 6-3 Example of the QDN command on the DMS-100 Wireless switch (wireless DN)

```

MSO:
>QDN 6199641000
MOBILE SERIAL NUMBER:
  MANUFACTURER: 1
  UNIT: 10012846
DIGITAL SCM / CDMA SCM : 1NN
TERMINAL TYPE:      NIL_TYPE
MOBILE SERVING REGION: 2
CUSTGRP: 2          NOTIFY SERVICES PLATFORM: N
WIN NOTIFY SERVICE PLATFORM: SP1: N SP2: N SP3: N SP4: N
SERV IN CAPABILITY: N
SERV SEGMENT CAPABILITY: N
MOBILE REGISTERED: N
MOB_INACT_AT_VLR: N
LAST ROUTE          : NIL
PC_SSN              : N
SERVING_MSCID       : 1262 1
HOME                :
ROAMER: N
ALTERNATE DN(S):
PICSEL: N
RFPIN: $
MESSAGES WAITING: 0
SPINA_ACTIVE: N
SPINA_AUTOLOCKED: N
SERVING MSC IS SMS CAPABLE: N
SMS DELIVERY PENDING FLAG: N
SMS TERMINATION ACTIVE: Y
OATS DELIVERY PENDING FLAG: N
OPTIONS:
  CDW
  ARW
  CNIP
SERVICE LIST: EMPTY
CALLING CATEGORY: REG          CALLED SERVICES: CHARGE
BILLING CATEGORY: REG
MOBILITY: FULL                HOME CELL: N/A SECTOR: N/A
-----
>

```

Figure 6-4 shows an example of using the QDN command to query a wireless DN with FEAT LOCMS.

Figure 6-4 Example of the QDN command on the DMS-100 Wireless switch (wireless DN with FEAT LOCMS)

```

MSO:
>QDN 6199751001
MOBILE SERIAL NUMBER:
  MANUFACTURER: 1
  UNIT: 10012490
DIGITAL SCM / CDMA SCM : 1NN
TERMINAL TYPE:      NIL_TYPE
MOBILE SERVING REGION: 2
CUSTGRP: 2          NOTIFY SERVICES PLATFORM: N
WIN NOTIFY SERVICE PLATFORM: SP1: N SP2: N SP3: N SP4: N
SERV IN CAPABILITY: N
SERV SEGMENT CAPABILITY: N
MOBILE REGISTERED: N
MOB_INACT_AT_VLR: N
LAST ROUTE          : NIL
PC_SSN              : N
SERVING_MSCID       : 1262 1
HOME                :
ROAMER: N
ALTERNATE DN(S):
PICSEL: N
RFPIN: $
MESSAGES WAITING: 0
SPINA_ACTIVE: N
SPINA_AUTOLOCKED: N
SERVING MSC IS SMS CAPABLE: N
SMS DELIVERY PENDING FLAG: N
SMS TERMINATION ACTIVE: Y
OATS DELIVERY PENDING FLAG: N
OPTIONS:
  SND
SERVICE LIST: EMPTY
CALLING CATEGORY: REG          CALLED SERVICES: CHARGE
BILLING CATEGORY: REG
MOBILITY: FULL                HOME CELL: N/A SECTOR: N/A
-----
>QDN 9751001
You have entered a seven digit DN that cannot be resolved
Please Enter the Full National DN
>

```

Table DNINV (Directory Number Inventory) does not contain wireless feature locating message (FEAT LOCMS) DNs.

Figure 6-5 shows examples of using the QHLR command to query a wireless DN.

Figure 6-5 Examples of the QHLR and QDN commands on the DMS-100 Wireless switch**>QHLR 9043935000**

```

-----
MOBILE SERIAL NUMBER:
  MANUFACTURER: 146
  UNIT: 100000
DIGITAL SCM / CDMA SCM : 1NN
TERMINAL TYPE: IS95
MOBILE SERVING REGION: 1
CUSTGRP: 2          NOTIFY SERVICES PLATFORM: N
WIN NOTIFY SERVICE PLATFORM: SP1: N SP2: N SP3: N SP4: N
SERV IN CAPABILITY: N
SERV SEGMENT CAPABILITY: N
MOBILE REGISTERED: N
MOB_INACT_AT_VLR: N
LAST ROUTE      :
PC_SSN          : Y 252 75 8 7
SERVING_MSCID   : 1262 1
HOME            : MTXAV
ROAMER: N
ALTERNATE DN(S):
PICSEL: N
RFPIN: $
MESSAGES WAITING: N
SPINA_ACTIVE: N
SPINA_AUTOLOCKED: N
SERVING MSC IS SMS CAPABLE: N
SMS DELIVERY PENDING FLAG: N
SMS TERMINATION ACTIVE: Y
OATS DELIVERY PENDING FLAG: N
OPTIONS:
  CWT
  3WC
SERVICE LIST: EMPTY
CALLING CATEGORY: REG          CALLED SERVICES: CHARGE
BILLING CATEGORY: REG
MOBILITY: FULL                HOME CELL: N/A SECTOR: N/A
-----

```

Support of existing wireline and wireless line options

The DMS-100 Wireless switch supports the provisioning of all line options from the existing wireless and wireline environments. Use MSERVORD to provision the wireless line options that belong to line type MTX_OPTION. Or use SERVDORD to provision the wireline line options that belong to line type LINE_OPTION.

Some DMS-100 Wireless switch line options are common to both SERVORD and MSERVORD operation. These common line options maintain their original prompts for the DMS-100 Wireless switch. For example, one set of wireline prompts display when you add option Call Forwarding (CFW) to a wireline DN. Another set of wireless prompts display when you add CFW to a wireless DN.

Figure 6-6 and Figure 6-7 show how to add option CFW to a wireline DN and a wireless DN on the DMS-100 Wireless switch. In Figure 6-6, 613 6211565 is the wireline DN.

Figure 6-6 SERVORD example for adding CFW to a wireline DN in prompt mode

```
S0:  
> ADO  
SONUMBER: NOW 97 6 30 AM  
> $  
DN_OR_LEN:  
> 6211565  
OPTION:  
> CFW  
CFWTYPE:  
> C  
SCRNCL:  
> NSCR  
NUMCALLS:  
> 1  
OPTION:  
> $
```

In Figure 6-7, 9043935000 is the wireless DN.

Figure 6-7 MSERVORD example for adding CFW to a wireless DN in prompt mode

```
MSO:
> ADO
SONUMBER: NOW 97 6 30 AM
> $
NPA:
> 904
DN_OR_LEN:
> 3935000
OPTION:
> CFW
CFWDN:
> 6211565
REMOTE:
> Y
ACTIVE:
> Y
FMR:
> N
OPTION:
> $
```

Both SERVORD and MSERVORD share the following DMS-100 Wireless provisioning commands:

- ADO-add option
- BULK-verify or update a batch of service orders
- DEO-delete option
- ECHO-activate echo feature
- HELP-SERVORD help
- NEW-establish service
- OUT-remove service
- RES-restore service from suspension
- STOPECHO-stop echo feature

Limitations and restrictions

The following limitations and restrictions apply to line provisioning on the DMS-100 Wireless switch.

- Do not use SERVORD to provision wireless lines. Likewise, do not use MSERVORD to provision wireline lines.
- Do not use wireless DNs for wireline services or line table options, unless you had defined a service to work with DNs across the network.

Datafill tables

Provisioning for the DMS-100 Wireless switch introduces datafill tables MLCCOPT and MOPTOPT. Operating company personnel cannot modify these two read-only tables.

When you use MSERVORD to add lines, the switch references these tables to ensure compatibility between line class codes (LCC) and options. The switch also ensures that operating company personnel had not added incompatible options to the same line.

The switch does not reference these tables when it bulk datafills line tables.

Table MLCCOPT

Table MLCCOPT stores the mobile LCCs, and all supported wireless options that operating company personnel can assign to the mobile LCC. This table serves the same purpose for wireless lines as table LCCOPT (Line Class Code Option) does for wireline lines. Table MLCCOPT also serves the same purpose as table LCCOPT does for the wireless switch.

Table 6-2 lists the datafill for table MLCCOPT.

Table 6-2 Table MLCCOPT field descriptions

Field	Subfield	Entry	Explanation and action
LCC		MOB	Line class code. This key field contains one LCC for each record.
COMPAT	ABRD, ACC, ARW, AUTH, CCBK, CCMP, CCW, CDACT, CDW, CEP, CLF, CNIP, CNIR, CNRA, CNRD, CSO, CWT, CXR, DFLTGP, DND, DOR, DRL, DTM, ECNP, FMR, FWI, FWT, IHO, IMTX, INTL, MAC, MAHD, MCT, MOBICPT, ACB, ACF, AUL, CFB, CFDF, CFNA, CFR, CFU, DR, SCA, SCD, MWI, MWT, NAUT, NCDA, NFWI, NSP, NTD, NTXT, 1WRDPG, ORVR, PGA, PIC, PSRS, RDND, RFP, RLG, RMA, RSUS, RTB, RVR, SMC, SND, STB, SUS, TBE, TBT, TDN, TDO, 3WC, UNPGM, UZONE, WINSVC, TCA	vector COMPAT_M_LCC_OPTION_COMPAT of up to 1024 mobile line option compatibilities	Compatible line options. This field contains all options that are compatible with the wireless LCC specified in field LCC.

Field LCC in table MLCCOPT serves the same purpose for wireless lines as field LCC in table LCCOPT does for the wireless switch. It contains the valid wireless LCCs. In this field, MOB is the only value.

Likewise, field COMPAT in table MLCCOPT serves the same purpose for wireless lines as field COMPAT in table LCCOPT. However, its type is COMPAT_M_LCC_OPTION_LIST, and is a vector of the type M_LINE_OPTION_COMPAT. This field lists all compatible options for the specified wireless LCC.

Figure 6-8 shows default datafill for table MLCCOPT.

Figure 6-8 MAP display example for table MLCCOPT

LCC	COMPAT
MOB (ABRD) (ACC) (ARW) (AUTH) (CCBK) (CCMP) (CCW) (CDACT) (CDW) (CEP) (CLF) (CNIP) (CNIR) (CNRA) (CNRD) (CSO) (CWT) (CXR) (DFLTGP) (DND) (DOR) (DRL) (DTM) (ECNP) (FMR) (FWI) (FWT) (IHO) (IMTX) (INTL) (MAC) (MAHD) (MCT) (MOBICPT) (ACB) (ACF) (AUL) (CFB) (CFDF) (CFNA) (CFR) (CFU) (DR) (SCA) (SCD) (MWI) (MWT) (NAUT) (NCDA) (NFWI) (NSP) (NTD) (NTXT) (1WRDPG) (ORVR) (PGA) (PIC) (PSRS) (RDND) (RFP) (RLG) (RMA) (RSUS) (RTB) (RVR) (SMC) (SND) (STB) (SUS) (TBE) (TBT) (TDN) (TDO) (3WC) (UNPGM) (UZONE) (WINSVC) (TCA) \$	

Table MOPTOPT

Table MOPTOPT stores incompatibilities associated with selected wireless options. This table serves the same purpose for wireless lines as table OPTOPT (Incompatible Options) does for wireline lines. Table MOPTOPT also serves the same purpose as table OPTOPT does for the wireless switch.

Table 6-3 lists the datafill for table MOPTOPT.

Table 6-3 Table MOPTOPT field descriptions

Field	Subfield	Entry	Explanation and action
OPTION		M_LINE_OPTION_ COMPAT	Line option. This key field contains the wireless options with their incompatibilities.
INCOMPAT		vector M_COMPAT_ OPTION_LIST_ of up to 158 mobile line option compatibilities	Incompatible options. This field contains all options that are incompatible with the wireless line option specified in the key field.

Table MOPTOPT contains no incompatibilities nor does it require any modifications.

Line data storage

As with wireline DNs with SERVORD, the use of MSERVORD to provision wireless DNs automatically updates appropriate wireless line tables.

Figure 6-9 shows examples of line tables that operating company personnel would enter datafill into before they enter the NEW command. In the first tuple, SERVORD provisions a POTS wireline line with option CFW.

Figure 6-9 Sample wireline line table datafill before provisioning**Table DNINV**

AREACODE	OFCCODE	STNCODE	DNRESULT

613	621	1565	D BLDN \$

Table LNINV

LEN	CARDCODE	PADGRP	STATUS	GND	BNV	MNO	CARDINFO

HOST 0 0 6 5	6X17BA	STD LN	HASU	N	NL	N	NIL \$

Table LENLINES

No initial datafill for wireline line

Table CFW

No initial datafill for wireline line

Figure 6-10 shows datafill in the same line tables after operating company personnel use the SERVORD NEW command to provision a POTS wireline line with option CFW.

Figure 6-10 Sample wireline line table datafill after provisioning

Table DNINV											
AREACODE		OFCCODE		STNCODE		DNRESULT					
613		621		1565		L HOST 0 0 6 5 6\$					
Table LNINV											
LEN		CARDCODE		PADGRP		STATUS		GND		BNV MNO CARDINFO	
HOST 0 0 6 5		6X17BA		STD LN		HASU		N NL N		NIL \$	
Table LENLINES											
LEN		PTY		RINGCODE		DN		SIGTYPE		LNATTIDX OPTLIST	
HOST 00 0 06 05		S		0		6211565		DP		32 \$	
Table CFW											
CFZKEY						CFZINFO					
1											
LCL 613 6211565 NSCR Y C 1 I \$ N N											

Note: Table LNINV (Line Circuit Inventory), table LENLINES (Line Assignment), and table CFW (Regular and Remote Call Forwarding) do not apply to wireless lines.

Figure 6-11 shows an example of wireless line tables that operating company personnel would datafill before they enter the NEW command. In the first example, MSERVORD provisions a wireless line with option CFW.

Figure 6-11 Sample wireless line table datafill before provisioning**Table DNINV**

AREACODE	OFCCODE	STNCODE	DNRESULT		
904	393	5000	D	BLDN	\$

Table CELLULAR

No initial datafill for wireless line

Table CFW

No initial datafill for wireless line

Figure 6-12 shows how the datafill would appear in the same line tables after operating company personnel had used the MSERVORD NEW command to provision a wireless line with option CFW.

Figure 6-12 Sample wireless line table datafill after provisioning**Table DNINV**

AREACODE	OFCCODE	STNCODE	DNRESULT		
904	393	5000	CLLR	0	0\$

Table CELLULAR

DIRNO	SERIAL		MSR	CUSTGRP	ROAMER	CARRIER	RFPIN
	OPTLIST		SVCLIST				
904	393	5000	111	10000	1	1	N
		\$		\$	\$		N

Table CELLFEAT

DRNMFEAT	DATA						
904	393	5000	CFW	CFW	Y	N	Y 6211565
							\$

Note: Tables CELLULAR and CELLFEAT do not apply to wireline lines.

Office parameters

Office parameters SO_BULK_DMO_MOB and SO_ECHO_MOB apply to MSERVORD to separate the wireline and wireless provisioning applications. These office parameters enable operating company personnel to control SERVORD commands BULK and ECHO separately for SERVORD and MSERVORD. In this way, one office parameter's status cannot interfere with the other provisioning application.

SO_BULK_DMO_MOB

Office parameter SO_BULK_DMO_MOB of table OFCOPT (Office Option) specifies whether the switching unit has the bulk input to MSERVORD. (Use this office parameter to provision wireless data and to avoid a conflict with the wireline office parameter, SO_BULK_DMO.)

Values

The default value of SO_BULK_DMO_MOB is N. The DMS-100 Wireless switch does not recognize the command BULK during MSERVORD operation if you set SO_BULK_DMO_MOB to N.

When operating company personnel set this parameter to Y, the DMS-100 Wireless switch recognizes the command BULK during MSERVORD operation. Telephone operating company personnel can then prepare a tape that contains mobile service orders for a bulk input.

Dump and restore

Operating company personnel should copy the existing value of this parameter when they execute a dump and restore.

SO_ECHO_MOB

Office parameter SO_ECHO_MOB of table OFCOPT determines if mobile service orders can be output to another terminal in a local switching unit. (Use this office parameter to provision wireless data and to avoid a conflict with the wireline office parameter, SO_ECHO.)

Values

The default value of SO_ECHO_MOB is N. The DMS-100 Wireless switch cannot output mobile service orders to another terminal, nor can it recognize the command ECHO during MSERVORD operation.

When operating company personnel set this parameter to Y, the DMS-100 Wireless switch can output mobile service orders to another terminal. The switch recognizes the ECHO command during MSERVORD operation.

Dump and restore

Copy the existing value of this parameter when executing a dump and restore.

Supporting documentation

Refer to NTP *SERVORD Reference Manual* for additional information on wireline SERVORD operation.

Refer to NTP *DMS–MTX Maintenance and Administration Position Commands Reference Manual*, 411–2131–809, for additional information on wireless SERVORD operation.

7 Frame relay and table control support

Table 7-1 lists the design changes that the DMS-100 Wireless switch requires for frame relay and table control support. This chapter describes each topic listed in this table in detail.

Table 7-1 Index to DMS-100 Wireless frame relay and table control support changes

Section with required changes	Description
Frame Relay Software Support for DMS-100 Wireless	The frame relay interface unit (FRIU) serves both wireline and wireless applications on the DMS-100 Wireless switch. For wireless applications, the FRIU acts as a CDMA interface unit (CIU) or a CDMA application unit (CAU).
Feature description	Different MAP maintenance system responses display if the FRIU is wireline or wireline.
BSY FORCE command	The DMS-100 Wireless MAP terminal displays the warning message FRIU carrier will be affected by this mtc action. Please confirm ("YES," "Y," "NO," or "N"): if operating company personnel use the BSY FORCE command on an FRIU or a CIU with the carrier in service.
Supporting documentation	This section lists additional Northern Telecom publications (NTP) that apply to wireline and wireless FRIU, CIU, and CAU operation.
Non-Frame Relay Software Support: Table Control	When operating company personnel add line options, the switch ensures that wireline services apply to wireline tables. The switch also ensures that wireless services apply to wireless tables.
Supporting documentation	This section lists additional NTPs that apply to wireline and wireless datafill tables.

Frame Relay Software Support for DMS-100 Wireless

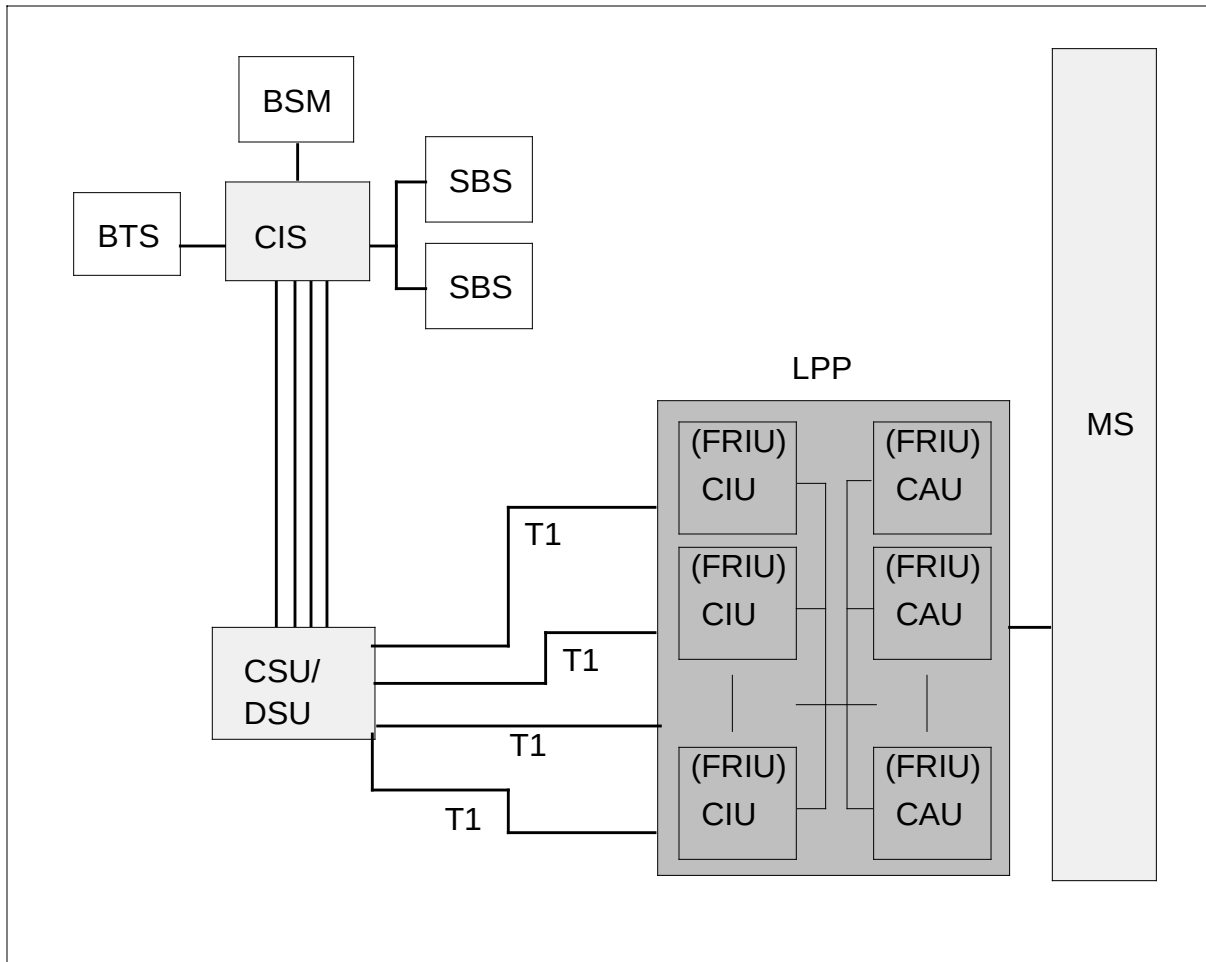
The DMS-100 Wireless switch also contains any frame relay functionality that the wireline or the wireless environments contain.

The FRIU is an application-specific unit (ASU), which is based on the link peripheral processor (LPP). The FRIU was originally designed as a frame relay of a single channelized, unchannelized, or fractional T1 circuit for the wireline product line.

The wireless switch requires unchannelized, T1 connections to the CDMA interconnect system (CIS) to support call processing and maintenance messages. An FRIU acts as a CIU if it provides CDMA system T1 connectivity and supports other CIU-defined tasks. The wireless switch also needs an ASU to perform call processing operations (mainly call setup), which requires no CDMA system T1 connectivity. The FRIU that doesn't use T1 connectivity acts as a CAU.

For the DMS-100 Wireless switch, the FRIU serves wireline and wireless functionalities. For wireless applications, however, the FRIU serves only as a CIU or a CAU.

Figure 7-1 shows the assignment of the FRIU as a CIU or a CAU.

Figure 7-1 FRIU CIU/CAU assignment

Feature description

Feature Frame Relay Software Support for DMS-100 Wireless provides frame relay functionality that enables the FRIU to serve both wireline and wireless applications. For wireless applications, the FRIU serves as a CIU or a CAU.

Both wireless and wireline FRIUs use the existing FRIU MAP (maintenance and administration position) level. Operating company personnel use the same MAP commands for maintenance operations. In some occurrences, the FRIU assignment (wireline or wireless) determines those commands operating company personnel enter.

The DMS-100 Wireless switch recognizes the FRIU assignment by its ASU type. It is the ASU type that identifies if the FRIU is a wireline FRIU, or a CIU or CAU. The DMS-100 Wireless switch executes the specified actions, depending on whether the FRIU is a wireline FRIU, a CIU, or a CAU. In some cases, the switch does not execute any action and blocks the command.

Table 7-2 summarizes the different system responses that display when operating company personnel execute common MAP maintenance (MTC) commands on the DMS-100 Wireless switch. These system responses can differ if the FRIU is wireline or wireless.

Table 7-2 Differences between wireline FRIU and wireless FRIU/CIU/CAU (Sheet 1 of 3)

Command	Wireline FRIU	Wireless FRIU/CIU/CAU
MAPCI;MTC;PM;POST FRIU # BSY (FRIU)	The DMS-100 Wireless switch executes the command.	If operating company personnel attempt to busy an INSV/Ready CIU or CAU in a mated pair, the DMS-100 Wireless switch generates the following message: Warning: This FRIU is defined as part of [CIU, CAU] pair If you continue, redundancy will be attempted on [CIU, CAU] pair Do you want to continue?Please confirm ("YES," "Y," "NO," "N"): If operating company personnel attempt to busy an FRIU used as a CIU or CAU and it is the only INSV/Ready CIU or CAU in a mated pair, the DMS-100 Wireless switch generates the following message: Warning: This FRIU is the only INSV/Ready [CIU, CAU] of [CIU, CAU] pair [CIU, CAU] redundancy cannot be attempted on [CIU, CAU] pair BSY FRIU will impact CDMA CALLP. Do you want to continue?Please confirm ("YES," "Y," "NO," "N"):

Table 7-2 Differences between wireline FRIU and wireless FRIU/CIU/CAU (Sheet 2 of 3)

Command	Wireline FRIU	Wireless FRIU/CIU/CAU
		If operating company personnel attempt to busy an FRIU that is used as a CIU or a CAU and it is the last INSV/Ready CIU or CAU in the system, the DMS-100 Wireless switch generates the following message: Warning: This FRIU is the last INSV/Ready [CIU, CAU] in the CDMA system. [CIU, CAU] redundancy cannot be attempted on pair BSY FRIU will terminate CDMA CallP. Do you want to continue?:Please confirm ("YES," "Y," "NO," "N"):
MAPCI;MTC;PM;POST FRIU ALL; BSY ALL	The DMS-100 Wireless switch executes the command.	If operating company personnel attempt to busy all posted FRIUs, the DMS-100 Wireless switch generates the following message: Warning: All posted FRIU/CAUs and FRIU/CIUs in the CDMA system will be BSYed. BSY ALL may affect CDMA cellsite communications and CallP. Do you want to continue?Please confirm ("YES," "Y," "NO," "N"):
MAPCI;MTC;PM;POST FRIU #;CARR BSY	The DMS-100 Wireless switch executes the command.	The DMS-100 Wireless switch generates the following warning messages for each corresponding FRIU/CIU condition. If operating company personnel attempt to busy the T1 carrier of an INSV/Ready FRIU of a mated CIU pair, the DMS-100 Wireless switch generates the following message: Warning: This FRIU is defined as part of CIU pair If you continue, redundancy will be attempted on CIU pair Do you want to continue?Please confirm ("YES," "Y," "NO," "N"):

Table 7-2 Differences between wireline FRIU and wireless FRIU/CIU/CAU (Sheet 3 of 3)

Command	Wireline FRIU	Wireless FRIU/CIU/CAU
		If operating company personnel attempt to busy a T1 carrier of the only INSV/Ready FRIU of a mated CIU pair, the DMS-100 Wireless switch generates the following message: Warning: This FRIU is the only INSV/Ready CIU of CIU pair (#). CIU redundancy cannot be attempted on pair BSY CARRIER will impact CDMA CallP. Do you want to continue? Please confirm ("YES," "Y," "NO," "N"): If operating company personnel attempt to busy the T1 carrier on the last INSV/Ready CIU in the system, the DMS-100 Wireless switch generates the following message: Warning: This FRIU is the last INSV/Ready CIU in the CDMA system. CIU redundancy cannot be attempted on CIU pair BSY CARRIER will impact CDMA cellsite communication and CallP. Do you want to continue? Please confirm ("YES," "Y," "NO," "N"):
MAPCI;MTC;PM;POST FRIU #;CARR; BSY	The DMS-100 Wireless switch executes the command.	The DMS-100 Wireless switch generates the following warning message for a FRIU/CAU condition: Warning: This FRIU is a CAU of CAU pair Because a CAU has no CDMA T1 carrier connection, all CI commands for a T1 carrier are blocked.

Deleting FRIUs

Operating company personnel cannot delete an FRIU from a wireless tuple in table LIUINV (Link Interface Unit Inventory) if the same FRIU exists in table CDMACONF (Code Division Multiple Access Components in LPP/FLIS [fiberized link interface shelf]). Delete the FRIU in table CDMACONF first. This conflict does not apply to wireline tuples because table CDMACONF is a wireless data schema table.

BSY FORCE command

When operating company personnel execute the BSY FORCE command on an FRIU or a CIU, when its carrier is in service, the DMS-100 Wireless switch displays the additional warning message:

FRIU carrier will be affected by this mtc action.
Please confirm ("YES," "Y," "NO," or "N"):

Select Y to confirm the action. The MAP terminal responds with the following message:

Confirmed...:

Select N to cancel the action. The MAP terminal responds with the following message:

No Action Taken...:

Figure 7-2 shows how this MAP message appears when the posted FRIU is in service after operating company personnel execute the BSY FORCE command.

Figure 7-2 FRIU BSY FORCE warning message

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
■	■	■	■	■	■	■	■	■	■
FRIU									
0	Quit		SysB	ManB	OffL	CBsy	ISTb	InSv	
2	Post_	PM:	0	0	0	0	0	9	
3	ListSet	FRIU	0	0	0	0	0	1	
4		FRIU 201	InSv	Rsvd					
5									
6	Tst								
7	Bsy								
8	Rts	bsy force							
9	OffL								
10	LoadPM	FRIU carrier will be affected by this mtce action.							
11	Disp_	Please confirm ("YES," "Y," "NO," or "N"):							
12	Next								
13									
14	QueryPM								
15									
16									
17									
18	Carr								
MAP171									
Time 17:45_>									

Note: Refer to the "Peripheral modules level commands" chapter in NTP *DMS-MTX Maintenance and Administration Position Commands Reference Manual*, 411-2131-809, for information on wireless warning messages associated with the FRIU.

Limitations and restrictions

One FRIU cannot serve wireline and wireless applications simultaneously.

Supporting documentation

Refer to the following NTPs for additional information on wireline FRIU, and wireless CIU and CAU operation:

- *DMS SuperNode DataSPAN Frame Relay Service Maintenance Guide*, 297-5111-501
- *DMS-100 Family Provisioning Manual*, PLN-8991-104
- *DMS-MTX Maintenance and Administration Position Commands Reference Manual*, 411-2131-809
- *CDMA Application Guide*, 411-2131-571

Non-frame Relay Software Support: Table Control

The DMS-100 Wireless switch provides the same wireline table control that the wireline functionality provides. Similarly, the wireless table control of the DMS-100 Wireless switch is the same as that which the wireless functionality provides.

Any table that exists in either the DMS-100 switch or the DMS-MTX switch also exists on the DMS-100 Wireless switch. Although all these tables store information about services, this feature ensures that only wireline tables store wireline information. Only wireless tables store wireless information.

Feature description

The DMS-100 Wireless Non-frame Relay Support feature provides access to all wireline-specific line tables on the DMS-100 Wireless including:

- table LENLINES (Line Assignment)
- table LENFEAT (Line Feature)
- table IBNLINES (IBN Line Assignment)
- table IBNFEAT (IBN Line Feature)
- table KSETLINE (Business Set and Data Unit Line Assignment)
- table KSETFEAT (Business Set and Data Unit Feature)

Note: The wireline-specific line table that you enter datafill for depends on the type of line to which you are adding the option. If the option being assigned belongs to a directory number (DN) in a POTS group, then enter datafill for tables LENLINES and LENFEAT through the Service Order System (SERVORD). If the option being assigned belongs to a DN in a single-line business set group, then enter datafill for tables IBNLINES and IBNFEAT through SERVORD. If the option being assigned belongs to a DN in a multi-line business set group, then enter datafill for tables KSETLINE and KSETFEAT in SERVORD.

In addition, this feature provides access to the following wireless-specific tables on the DMS-100 Wireless switch:

- table CELLULAR (Cellular Subscriber Database)
- table SERVCHNG (Service Exchange)
- table CELLFEAT (Cellular Feature)

Although all line tables store information about services, this feature ensures that only wireline services apply to wireline tables (that is, tables LENLINES and LENFEAT, or tables IBNLINES and IBNFEAT, or tables KSETLINES and KSETFEAT). This feature also ensures that only wireless services apply to wireless tables (that is, tables CELLULAR, SERVCHNG, and CELLFEAT).

Figure 7-3 through Figure 7-7 compare the data stored in these datafill line tables.

Figure 7-3 Datafill range for wireline table LENLINES

```
>TABLE LENLINES
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LENLINES
>RANGE
 1 LEN          EXT_LEN
 2 PTY          PARTY
 3 RINGCODE     RINGING_CODE
 4 DN           DN_DIGIT_REGISTER
 5 SIGTYPE      LINE_SIGNALLING_TYPE
 6 LNATTIDX     LINE_ATTRIBUTES_INDEX
 7 OPTLIST      OPTIONS_LIST
LOGICAL TUPLE TYPE: LINES_LOG_TUPLE
...
TYPE OF OPTLIST IS LINE_OPTION
TYPE IS LINE_OPTION {AAB, AAK, ACB, ACBAMA, ACD, ACDNR, ACOU, ACRJ,
ADSI, AEMK, AFC, AIN, AINDN, AIOD, ALI, AMATEST, APS, AR, ARAMA,
ARDDN, ASL, ASP,ATC, AUD, AUL, AUTODISP, AUTOHF, AVT, BC, BCLID,
BCONF, BLF,BLOCKCDN, BLOCKCGN, BNN, CAG, CALLOG, CBE, CBI, CBU,
CCSA, CCV, CCW, CDC, CDE, CDI, CDT, CDU, CD0, CD1, CD2, CD3, CD4,
CD5, CD6, CD7,CD8, CD9, CFB, CFBL, CFD, CFDA, CFDVT, DCF, CFF,
CFGD, CFGDA, ...}
```

Figure 7-4 Datafill range for wireless table CELLULAR

>TABLE CELLULAR

MACHINES NOT IN SYNC - DMOS NOT ALLOWED

JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED

TABLE: CELLULAR

>RANGE

1 DIRNO	DIRECTORY_NUMBER
2 SERIAL	MOBILE_SERIAL_NO
3 MSR	MSR_NUMBER
4 CUSTGRP	CELLULAR_CUSTGRP_INDEX
5 ROAMER	ROAMER_TUPLE
6 CARRIER	CARRIER_TUPLE
7 RFPIN	MTX_RFPIN
8 OPTLIST	CELLULAR_OPTIONS_LIST
9 SVCLIST	SERVICE_LIST_VECTOR
10 CLNGCAT	MTX_ORIG_PSTN_CATEGORY_TYPE
11 CLDSVC	MTX_CALLED_SERVICE_TYPE
12 MOBILITY	MOBILITY_DATA
13 BLNGCAT	MTX_ORIG_PSTN_CATEGORY_TYPE

LOGICAL TUPLE TYPE: CELLULAR_LOGICAL_TUPLE

...

TYPE OF OPTLIST IS MTX_LINE_OPTION

TYPE IS MTX_LINE_OPTION (ABRD) (ACC) (ARW) (AUTH) (CCBK) (CCMP) (CCW)
 (CDACT) (CDW) (CEP) (CLF) (CNIP) (CNIR) (CNRA) (CNRD) (CSO) (CWT)
 (CXR) (DFLTGP) (DND) (DOR) (DRL) (DTM) (ECNP) (FMR) (FWI) (FWT) (IHO)
 (IMTX) (INTL) (MAC) (MAHD) (MCT) (MOBICPT) (ACB) (ACF) (AUL) (CFB)
 (CFDF) (CFNA) (CFR) (CFU) (DR) (SCA) (SCD) (MWI) (MWT) (NAUT) (NCDA)
 (NFWI) (NSP) (NTD) (NTXT) (1WRDPG) (ORVR) (PGA) (PIC) (PSRS) (RDND)
 (RFP) (RLG) (RMA) (RSUS) (RTB) (RVR) (SMC) (SND) (STB) (SUS) (TBE)
 (TBT) (TDN) (TDO) (3WC) (UNPGM) (UZONE) (WINSVC) (TCA)

Figure 7-5 Datafill range for wireline table LENFEAT

```
>TABLE LENFEAT
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LENFEAT
>RANGE
 1 LEN          EXT_LEN
 2 PTY          PARTY
 3 DF           DATA_FEATURE
 4 FEATURE      DATA_FEATURE
 5 DATA        AREA_REFINEMENTS
LOGICAL TUPLE TYPE:  LENFEAT_LOG_TUPLE
...
TYPE OF FEATURE IS DATA_FEATURE
TYPE IS DATA_FEATURE {SHU, RMB, ESL, AUL, SPB, SSAC, RMS, OUTWT,
CLI, SC1, SC2, ACD, FRO, RSUS, CSDDS, FRS, SLU, WML, SDY, RMP,
AIOD, PIC, SEC, CFDVT, CTD, GIC, SCS, SCL, CPU, CFX, DIN, DND,
SUPR, CNF, AUD, CXR, MWT, SMDI, MPB, SDN, ESDN, UCDS, GRP, 3WCPUB,
SOR, EWAL, CDT, EMW, TBO, GIAC, DRING, SCMP, MBK, BCLID, ALI, QCK,
OBS, ACRJ, PREANSOP, SACB, LPIC, WUCR, XXTRG, CALLOG, NFA, AIN,
DENY, SETMODEL, SLQ, CSMI, ECM, ISA, ASP, CFTB, CFTD, FCTDNTER,
FCTDNTRA, VMEADN, EWALI, INTPIC}
```

Figure 7-6 Datafill range for wireless table SERVCHNG

```

>TABLE SERVCHNG
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: SERVCHNG
>RANGE
 1 FROMMIN          SERVCHNG_KEY
 2 TOMIN            SERVCHNG_VECTOR
 3 ADMINFO          TEN_CHARACTER_VECTOR
 4 MSR              MSR_NUMBER
 5 CUSTGRP          CELLULAR_CUSTGRP_INDEX
 6 HOMEMSA          MSA_NUMBER
 7 HOMEXLA          TRANSLATION_NUMBER
 8 TLDNPNUM         TLDNPOOL_NUMBER
 9 TOLLAREA         TOLLAREA_NUMBER
10 NWKOPTNM         NWKOPT_INDEX_RANGE
11 ROAMDATA         ROAMER_TYPE_DATA
12 SVCLIST          SERVCHNG_SERVICE_LIST_VECTOR
13 OPTIONS          SERVCHNG_OPTIONS_LIST
LOGICAL TUPLE TYPE: SERVCHNG_LOGICAL_TUPLE
...
TYPE OF OPTLIST IS MTX_LINE_OPTION
TYPE IS MTX_LINE_OPTION {ABRD, ACC, ARW, AUTH, CCBK, CCMP, CCW, CDACT,
CDW, CEP, CLF, CNIP, CNIR, CNRA, CNRD, CSO, CWT, CXR, DFLTGP, DND,
DOR, DRL, DTM, ECNP, FMR, FWI, FWT, IHO, IMTX, INTL, MAC, MAHD, MCT,
MOBICPT, ACB, ACF, AUL, CFB, CFDF, CFNA, CFR, CFU, DR, SCA, SCD, MWI,
MWT, NAUT, NCDA, NFWI, NSP, NTD, NTXT, 1WRDPG, ORVR, PGA, PIC, PSRS,
RDND, RFP, RLG, RMA, RSUS, RTB, RVR, SMC, SND, STB, SUS, TBE, TBT,
TDN, TDO, 3WC, UNPGM, UZONE, WINSVC, TCA}

```

Figure 7-7 Datafill range for wireless table CELLFEAT

```

>TABLE CELLFEAT
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: CELLFEAT
>RANGE
 1 DRNMFEAT          CELLFEAT_KEY
 2 DATA             CELLFEAT_DATA
LOGICAL TUPLE TYPE: CELLFEAT_LOGICAL_TUPLE
...
TYPE OF DATA IS MTX_DATA_FEATURE
TYPE IS MTX_DATA_FEATURE {CFB, CFD, CFW, AUL, RTB, MSV, MAC, CEP,
DFLTGP, PSRS, RVR}

```

Figure 7-8 through Figure 7-12 show sample datafill for the same five tables on the DMS-100 Wireless switch.

Figure 7-8 Sample datafill for table LENLINES on the DMS-100 Wireless switch

```
>TABLE LENLINES
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LENLINES
>LIST 3
LEN PTY RINGCODE DN SIGTYPE LNATTIDX OPTLIST
-----
RCU0 00 0 06 17 R1 1 5506842 DT 54 (ONI) $
HOST 05 1 08 17 S 0 5501211 DT 42 (CWT) $
HOST 05 1 08 20 R1 1 5501222 DT 53 $
```

In Figure 7-8, table LENLINES is a wireline-specific datafill table. Therefore, the DMS-100 Wireless switch "recognizes" options CWT and ONI as wireline options in two wireline tuples.

Figure 7-9 Sample datafill for table CELLULAR on the DMS-100 Wireless switch

```
>TABLE CELLULAR
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: CELLULAR
>LIST 4
DIRNO SERIAL MSR CUSTGRP ROAMER CARRIER RFPIN OPTLIST SVCLIST CLNGCAT
CLDSVC MOBILITY BLNGCAT
-----
904 393 1002 142 969757 13 2 N N $ $ $ REG CHARGE FULL REG
904 393 2000 144 100000 1 2 N N $ (CWT) (3WC) (CXR) (SND) (CDW) (ARW)
$ $
REG CHARGE FULL REG
904 393 5025 146 100025 1 2 N N $ (CDW) (ARW) $ $ REG CHARGE FULL REG
904 824 4108 111 123456 1 2 N N $ (CWT) (3WC) (CXR) (SND) (CDW) (ARW)
(CNIP)(CNIR) $ $ REG CHARGE FULL REG
>RANGE 8
TYPE IS CELLULAR_OPTIONS_LIST VECTOR OF UP TO 20 MTX_LINE_OPTIONS
```

In Figure 7-9, field OPTLIST in the wireless-specific table CELLULAR is a vector of up to 20 M_LINE_OPTIONS for the DMS-100 Wireless switch. It is at SERVORD or Mobile Service Order System (MSERVORD) where operating company personnel enter either a line option or a mobile line option. (Refer to chapter 6, "Line provisioning," for additional information on these two provisioning services.)

Figure 7-10 Sample datafill for table LENFEAT on the DMS-100 Wireless switch

```

>TABLE LENFEAT
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LENFEAT
>LIST 3
LEN PTY DF FEATURE DATA
-----
HOST 00 0 00 17 S WML WML N N 6219999 15
HOST 01 0 00 17 S PIC PIC C541 Y
HOST 00 1 09 16 S AUL AUL 6210726

```

Figure 7-11 Sample datafill for table SERVCHNG on the DMS-100 Wireless switch

```

>TABLE SERVCHNG
TABLE: SERVCHNG
>LIST 3
FROMMIN      TOMIN      ADMINFO MSR CUSTGRP HOMEMSA HOMEXLA TLDNPNM
TOLLAREA NWKOPTNM                                ROAMDATA      SVCLIST
                                           OPTIONS
-----
9043935015 9043935015      2    2    2    1    2    2
1          DEFAULT  NWK_ROAM RTP1C7 N PROCEED      $
                                           ( 3WC)$
9043935016 9043935016      2    2    2    2    2    4
1          DEFAULT                                LOCAL      $
                                           ( 3WC)$
9043932000 9043932099      3    3    2    2    2    4
1          DEFAULT                                LOCAL      $
                                           ( 3WC)$

```

Figure 7-12 Sample datafill for table CELLFEAT on the DMS-100 Wireless switch

```

>TABLE CELLFEAT
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: CELLFEAT
>LIST 3
DRNMFEAT DATA
-----
904 393 5015 CFW CFW Y N N $
904 393 5016 CFB CFB Y N $
904 393 5016 AUL AUL 3935015

```

Table LINEATTR

Before LWW0006 feature “Line Data and SERVORD Fold-in,” existing wireline and the wireless functionalities both used table LINEATTR (Line Attribute) to store information for wireless and wireline tuples. (This table also identifies the options that can be assigned to a given line class code [LCC].)

Feature “Line Data and SERVORD Fold-in” removes table LINEATTR from wireless use.

During a one night process (ONP), existing wireless tuples from table LINEATTR split into the following tables:

- XLAPLAN (Translation Plan)
- table RATEAREA (Rate Area)
- table CELLUST (Cellular Customer)

Use these tables for future datafill entries.

Operating company personnel can still add wireline tuples to table LINEATTR. Wireline table LINEATTR includes fields DFLTXLP and DFLTRA.

Figure 7-13 shows a range on the fields in table LINEATTR on the DMS-100 Wireless switch.

Figure 7-13 Field range for table LINEATTR on the DMS-100 Wireless switch

```
>TABLE LINEATTR
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LINEATTR
>RANGE
 1 LNATTIDX          LINEATTR_KEY
 2 LCC               LINE_CLASS_CODE
 3 CHGCLSS           CHARGE_CLASS
 4 COST              CLASS_OF_SERVICE_TONE
 5 LTG               LINE_TREATMENT_GROUP
 6 TRAFSNO           TRAFAN_NUMBER
 7 SFC               SUBSCRIBER_FEATURE_CLASS
 8 MDI               METERING_DATA_INDEX
 9 IXNAME            XLA_TAB_REF_AREA
10 DGCLNAME          DGCOLL_TABNAME
11 FANIDIGS          TWO_DIGIT_CODE
12 DFLTXLP           XLAPLAN_KEY
13 DFLTRA            RATEAREA_KEY
14 OPTIONS           LINEATTR_OPT_LIST
```


Figure 7-14 shows sample datafill for table LINEATTR on the DMS-100 Wireless switch.

Figure 7-14 Sample datafill for table LINEATTR on the DMS-100 Wireless switch

```
>TABLE LINEATTR
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LINEATTR
>LIST 5
TOP
  LNATTIDX      LCC CHGCLSS  COST  LTG  TRAFSNO  SFC  MDI
  IXNAME      DGCLNAME FANIDIGS      DFLTXP      DFLTRA
                                OPTIONS
-----
   0          1FR NONE      NT   0      0  NILSFC  0
  NIL          NIL   00    619_POT1_0      LPOT_L123_0
                                $
   1          1MR NONE      NT   0      0  NILSFC  0
  NIL          NIL   00    619_POT2_1      LPOT_L123_1
                                $
   2          1FR NONE      NT   2      0  NILSFC  0
  NIL          NIL   00    619_POT1_2      LPOT_L123_1
                                $
   3          IBN NONE      NT   0      0  NILSFC  0
  NIL          NIL   00      001_BNR_3      NLCA_NILLA_3
                                $
   4          1FR NONE      NT   0      0  NILSFC  0
  NIL          NIL   00    619_POT1_4      LPOT_L123_0
                                $
```

The value you enter in field LCC determines if wireline or wireless options are valid for field OPTION. Table control prevents operating company personnel from attempting to add a wireline-specific option to a wireless LCC. Likewise, operating company personnel cannot add a wireless-specific option to a wireline LCC.

Pre-ONP check for table LINEATTR A conflict can arise after an upgrade to software release LWW0006 if an LCC previously had been set to MOB. During an ONP, the data for all MOB tuples (that used to exist in table LINEATTR) moves to tables XLAPLAN, RATEAREA, and CELLCUST. Any pre-LWW0006 tuples in table XLANAME that indexed tuples in table LINEATTR with an LCC of MOB are lost during the ONP.

Therefore, use the following procedure *before* executing an ONP to prevent datafill loss.

Procedure 7-1 Pre-LWW0006 ONP check

At the MAP display

- 1 Check each tuple in table XLANAME to see if a LATTR index exists.
- 2 Check table LINEATTR to see if the tuple that corresponds to the LATTR index has an LCC of MOB.
- 3 Change the LATTR index in table XLANAME to point to a tuple in table LINEATTR that is not datafilled with MOB. (That is, if the LCC equals MOB, change the tuple in table XLANAME to a LINEATTR tuple that does not equal MOB.)

Limitations and restrictions

The following limitations and restrictions apply to the Non-frame Relay Support: Table Control feature.

- All table control and SERVORD restrictions stated in the NTPs still apply to the DMS-100 Wireless switch. For example, to provision a service on a line, use SERVORD or MSERVORD instead of table control.
- Tables CELLULAR, SERVCHNG, and CELLFEAT share numerous wireless line options. Although operating company personnel can display all the same line options in each table, you cannot add all line options to each table. If operating company personnel try to add an option that isn't available to a particular table, the following error response displays.

TYPE IS MTX_LINE_OPTION XXX, . . .

where XXX refers to all the available line options for the selected table.

Supporting documentation

Refer to the following NTPs for detailed, additional information on datafilling wireline and wireless tables:

- *Customer Data Schema Reference Manual*
- *DMS-MTX Customer Data Schema Reference Manual*, 411-2131-451

8 Billing

Table 8-1 lists the design changes that the DMS-100 Wireless switch requires for billing. This chapter describes each topic listed in this table in detail.

Table 8-1 Index to DMS-100 Wireless billing changes (Sheet 1 of 2)

Section with required changes	Description
SuperNode Data Manager billing support	The DMS-100 Wireless switch supports combined SuperNode Data Manager (SDM) product loads. This capability also supports both wireless call detail recording (CDR) and wireline Bellcore AMA format (BAF) billing records.
AMA streams	The DMS-100 Wireless switch creates two different automatic message accounting (AMA) streams when it generates wireline BAF and mobile CDR billing records in NT format. When operating company personnel configure the AMA streams, one of the following results occur. • The switch generates wireless CDR records in NT format and wireline BAF records in Bellcore format. (In this case, the switch uses two different recording streams to capture the data.) • The switch generates both wireless CDR and wireline BAF billing records in NT format.
Separate billing streams	Nortel Networks recommends separating wireline and wireless billing streams. This section describes how to separate wireline and wireless billing streams using the Device Independent Recording Package (DIRP) or the SDM.

Table 8-1 Index to DMS-100 Wireless billing changes (Sheet 2 of 2)

Section with required changes	Description
Required datafill	Enter datafill into the following tables: • table TOLLENTC (Entry Code) • table DIRPPPOOL (Device Independent Recording Package Pool) • table DIRPSSYS (Device Independent Recording Package System) • table CRSFMT (Call Record Stream Format) • table CRSMAP (Call Record Stream Mapping)
Integrated service link trunks	All calls between wireline and wireless end users require an integrated service link (ISL) trunk to connect the call.
Integrated service link trunk terminations	When a call terminates on an ISL trunk, the billing record that the DMS-100 Wireless switch generates depends on the originating end user. If a wireless end user originated the call, the switch generates a CDR record in NT format. If a wireline end user originated the call, the switch generates a BAF-formatted record.
Wireline (and Wireless) ISL trunk originations	The DMS-100 Wireless call generates two calls when a wireless end user originates a call to a wireline end user. The first call is from the wireless end user to the ISL trunk. The second call is from the ISL trunk to the wireline end user. (For wireless ISL trunk originations, the reverse situation is true.)
Supporting documentation	This section lists additional NTPs that apply to wireline and wireless billing. This section also lists billing sections of other chapters in this NTP.

SuperNode Data Manager billing support

The DMS-100 Wireless switch supports combined SDM product loads, beginning with wireless DMS-MTX08 (SDMX08) and wireline DMS-100 NA012 (SDMN12) releases in the SDM12 base.

Feature Integrated Wireline/Wireless SDM Load, which introduced support for SDM, supports both wireless CDR and wireline BAF billing records.

Integrated Wireline/Wireless SDM Load requires a SuperNode Data Manager with 256 Mbytes of dynamic random-access memory (DRAM). The central processor unit (CPU) modules use PowerPC 604e/200-MHz processors.

The limitations and restrictions that follow apply to feature Integrated Wireline/Wireless SDM Load.

- The automatic file transfer (AFT) requires the billing stream identifier MTX for the wireless CDR billing stream. The AFT does *not* support BAF records.
- This feature does *not* support DMS Data Management System (DDMS).

Supporting documentation

Refer to the following NTPs for additional information on SDM:

- *DMS-100 Family SuperNode Data Manager Billing Application Guide*, 297-5051-300
- *DMS-100 Family SuperNode Data Manager Upgrade User Guide*, 297-5051-304
- *DMS-100 Family SuperNode Data Manager Translations Guide*, 297-5051-350
- *DMS-100 Family SuperNode Data Manager Alarm Clearing Performance Monitoring Procedures*, 297-5051-543
- *DMS-100 Family SuperNode Data Manager Feature Description Reference Manual*, 297-5051-801
- *DMS-100 Family SuperNode Data Manager Log Report Reference Manual*, 297-5051-840
- *DMS-100 Family SuperNode Data Manager Enhanced Terminal Access User Guide*, 297-5051-904
- *DMS-100 Family SuperNode Data Manager ASCII Terminal Access User Guide*, 297-5051-905
- *DMS-100 Family SuperNode Data Manager Exception Reporting User Guide*, 297-5051-912
- *DMS-100 Family SuperNode Data Manager Secure File Transfer User Guide*, 297-5051-913
- *DMS-100 Family SuperNode Data Manager Fault-tolerant User Guide*, 297-5061-906
- *DMS-100 Family SuperNode Data Manager DCE Troubleshooting User Guide*, 297-5061-908
- *Wireless Solutions DMS-MTX SuperNode Data Manager (SDMX) SuperNode Billing Application (SBA) User Guide*, 411-2131-902
- *SuperNode Data Manager/Fault Tolerant (SDM/FT) System Engineering Bulletin*, SEB-96-02-001

Billing formats

Wireless calls generate CDR billing records in NT format. Wireline calls generate billing records in BAF or NT format. The NT format records are of a fixed block length, whereas BAF records are of a variable block length.

The DMS-100 Wireless switch supports the storage of both billing record formats.

Figure 8-1 shows a sample wireline AMA record.

Figure 8-1 Sample wireline AMA record

```
*HEX ID:AA STRUCTURE CODE:00076C CALL CODE:026C SENSOR TYPE:036C
SENSOR ID:0619351C REC OFFICE TYPE:036C REC OFFICE ID:0619351C
DATE:61029C TIMING IND:00000C STUDY IND:0000000C CLD PTY OFF-HK:0C
SERVICE OBSERVED:0C OPER ACTION:0C SERVICE FEATURE:010C ORIG NPA:613C
ORIG NUMBER:6217708C CONNECT TIME:1552123C ELAPSED TIME:000000089C
TRUNK LEGS USED:0C

*HEX ID:AA STRUCTURE CODE:40500C CALL CODE:006C SENSOR TYPE:036C
SENSOR ID:0619351C REC OFFICE TYPE:036C REC OFFICE ID:0619351C
DATE:61029C CLD PTY OFF-HK:1C SERVICE FEATURE:000C ORIG NPA:909C
ORIG NUMBER:5500000C OVERSEAS IND:0C TERM NPA:00613C
TERM NUMBER:6215001C CONNECT TIME:1444298C ELAPSED TIME:000000000C
MODULE CODE:025C CIRCUIT DATE:61029C CIRCUIT TIME:1444477C
MODULE CODE:000C
```

Figure 8-2 shows a sample wireless CDR record.

Figure 8-2 Sample wireless CDR record

```

*REC CODE:F7 ENTRY CODE:60 ORIG Feature Code:00000000
TERM Feature Code:00000000 CALLING NUMBER:9047244201BBBBBBBBBBBBBB
CALLING SYSTEM ID:01262 ORIG MSA:006 ORIG ROAMER:3
Orig Station Class: 00 Calling Party Cat: B Orig CH Type Cap: 00
Orig CH Used: 00 CALLING SERIAL NO.:00000283994 Called Serv: B
Credit Card Number: BBBBBBBBBBBBBBBB
DIALED_NUMBER: 9048244200BBBBBBBBBBBBBBBBBBBB
CALLED NUMBER:8244200BBBBBBBBBBBBBBBBBBB CALLED SYSTEM ID:BBBBB
TERM MSA:BBB TERM ROAMER:B Term Station Class: 00 FILLER:B
Term CH Type Cap: 00 Term CH Used: 00 CALLED SERIAL NO.:BBBBBBBBBB
CALL TYPE:1 BILLING NO:BBBBBBBBBBBBBBBBBBBBBBB Account Code: BBB
Billing Cat: B AUTH CODE:BBBBBBB Orig PSID RSID Type: B
TREATMENT CODE: 000 Term PSID RSID Type: B Billing Serial No: BBBBBBBBBBB
EVENT INFO DIGIT:2 Orig NWK Billing ID: BBBBBBBBBBBBBBBBBBBB
Orig MTX Call Type: 2 Term NWK Billing ID: BBBBBBBBBBBBBBBBBBBB
Term MTX Call Type: B ORIG TRUNK: 0863 MEMBER: 000F
PREV ORIG TRUNK: BBBB MEMBER: BBBB Last Orig Trunk: 0863 Member: 000F
Orig Time: 303171843 HANDOFFS:BBB TERM TRUNK: 0713 MEMBER: 0002
PREV TERM TRUNK: BBBB MEMBER: BBBB Last Term Trunk: 0713 Member: 0002
DISC TIME:303171853 STS:904 ELAPSED TIME=BBBBBB Orig Serv ID:00
Orig Hold Time: BBBBBB IX:BB Term Hold Time: BBBBBB COMPLETION CODE: 00
Orig Time Ext to Sys:BBBBBB ANSWER TYPE: BB Term Time Ext to Sys:BBBBBB
Term Serv ID:00 Orig CDMA Serv Option: 0008 Term CDMA Serv Option: 0000
Orig PSID RSID: 0000 Term PSID RSID: 0000

```

Note: Nortel Networks strongly recommends separating wireline and wireless billing streams. (Refer to subsection “Separate billing streams” for additional information and instructions.)

AMA streams

If the switch generates wireline BAF and mobile CDR billing records using NT format, then two different AMA streams occur. In this case, the wireless CDR and the wireline BAF records are logged separately. Use the default AMA stream for wireline AMA records in the Bellcore format, and establish a second stream (MTX) for wireless CDR records in the NT format. (This approach matches the existing recommendations in table CRSMAP that the centralized automatic message accounting [CAMA] and local automatic message accounting [LAMA] data types map to the default AMA stream.)

If the switch generates both wireline AMA records and wireless CDR records using the NT-fixed block length format, then one AMA billing stream is used for these records.

When the DMS-100 Wireless switch configures AMA streams, one of the following two scenarios occurs.

- The switch generates wireless CDR records in the NT format and wireline BAF billing records in Bellcore format.
- The switch generates both the wireless CDR and wireline BAF billing records in NT format.

However, if the DMS-100 Wireless switch generates NT format for the wireless CDR records and Bellcore format for the wireline AMA records, then two different recording streams capture the data. This is because NT format uses a fixed block length, while the Bellcore format uses a variable block length. These two streams must map to the corresponding call data type. Use the DIRP to store each stream to a device.

DIRP

If the switch generates NT format for both the wireless CDR and wireline AMA records, then the AMA stream and DIRP datafill is followed. Set up one AMA stream to map MTX, CAMA, and LAMA data types. The AMA process accesses the appropriate format that constructs the record based on the type of recording unit it receives.

To separate AMA and CDR records onto different tapes, Nortel Networks recommends the following procedure.

1. Access the DIRP level from the command interpreter (CI) level by typing the following command sequence at the MAP display.

MAPCI>MTC;IOD;DIRP

2. Mount the tape onto the tape drive.
3. Copy the AMA or Station Message Detail Recording (SMDR) file onto the tape using the DIRCOPY command.
4. Demount and change the tape from the drive.
5. Repeat steps 2 and 3 for the CDR file.

This process does not require any table changes nor restarts.

Separate billing streams

Nortel Networks recommends separating wireline and wireless billing streams. Set up one stream to support AMA records for wireline billing in BAF. Set up the other stream to support CDR records for wireless billing in NT format.

The wireline (AMA) stream supports wireline toll charges and carrier connect time. The wireless (CDR) stream supports mobile airtime and toll charges, and feature use.

A DIRP or an external SDM, or both, support this two-stream separation.

DIRP

The use of the DIRP to separate wireline and wireless billing streams does not change the existing datafill processes for tables DIRPPool, DIRPSSYS, CRSFMT, and CRSMAP.

Refer to *NTP Customer Data Schema Reference Manual* for additional information on these datafill tables.

SDM

The process of separating wireline and wireless billing streams using an external SDM consists of a combination of datafill entry and MAP CI commands.

1. Enter datafill into table TOLLENTC.
2. Enter datafill into table CRSFMT.
3. Enter datafill into table CRSMAP.
4. Configure the stream in the SDM.
5. Send billing records to the SDM.
6. Set up the SDM to receive the streams.

The following datafill tables and MAP commands show how to set up one stream (AMA) for wireline BAF records, and another stream (AMA2) for wireless, NT-format CDR records using an external SDM.

Table TOLLENTC Enter required datafill into table TOLLENTC to define a CDR entry code.

Figure 8-3 shows sample datafill for table TOLLENTC.

Figure 8-3 MAP display example for table TOLLENTC

CHGCLASS	ECANDCHG
NONE	31 Y
MOBL	11 Y
MOB0	13 Y
MOB1	23 Y
LLOR	14 Y

Table CRSFMT The SDM does not change the existing datafill process for table CRSFMT.

Table CRSMAP The SDM does not change the existing datafill process for table CRSMAP.

Configure the stream in SDM To configure a stream in the SDM, enter the MAP CI commands as follows. (The configuration specifies which local disk holds the billing records before transfer to the SDM.)

CI>MAPCI

MAPCI>MTC;APPL;SDMBIL

SDMBIL>CONF SET AMA S00DAMA \$

SDMBIL>CONF SET AMA2 S00DAMA2 \$

Send billing records to SDM After you have configured the billing streams in the SDM, redirect the DMS-100 Wireless switch to send the streams to the SDM. From the SDMBIL level of the MAP display, enter the SDMBCTRL commands as follows.

SDMBIL>SDMBCTRL AMA ON

SDMBIL>SDMBCTRL AMA2 ON

Set up SDM to receive streams To configure the SDM to receive billing streams, specify a location and transfer mechanism to downstream billing processors.

Figure 8-4 shows sample MAP display input and output for configuring the SDM to receive the billing streams.

Figure 8-4 MAP CI example of configuring SDM to receive billing streams

```

SDM>BILLMTC
CONFSTRM
>ADD
Stream Record Format: [] {NT SMDR BC} nt
Stream Name: [] ama2
File Format [] {DNS DIR}: dirp
Please specify the logical Volume [./ama2]: /ama2
File Transfer Mode [OUTBOUND] {INBOUND OUTBOUND}:
Do you want the files renamed with close date [NO] {NO YES}:
Do you want the files closed for file transfer and amabakup [NO] {NO YES}:
Do you want the files closed based on time [NO] {NO YES}:
Do you want to dump data group records to billing files [NO] {NO YES}:
Number of records per day[0]:
Maximum Number of records per file [5000000] {100000-5000000}:
Maximum Number of Bytes per file [200000000] {10000000-200000000}:

Stream Record Format: [] {NT SMDR BC} bc
Stream Name: [] ama
File Format [] {DNS DIRP}: dirp
Please specify the logical Volume [./ama]: /ama
File Transfer Mode [OUTBOUND] {INBOUND OUTBOUND}:
Do you want the files renamed with close date [NO] {NO YES}:
Do you want the files closed for file transfer and amabakup [NO] {NO YES}:
Do you want the files closed based on time [NO] {NO YES}:
Do you want to dump data group records to billing files [NO] {NO YES}:
Number of records per day[0]:
Maximum Number of records per file [5000000] {100000-5000000}
Maximum Number of Bytes per file [200000000] {10000000-200000000}

```

Required datafill

Enter datafill into the following tables to configure the output stream and the device to which the stream is to be written. The highlighted datafill in the following examples shows requirements used to configure one stream (AMA) for wireline BAF records, and a second stream (AMA2) for wireless NT-format CDR records.

Table TOLLENTC If operating company personnel do not enter datafill into table TOLLENTC, the CDR entry code is inaccurate.

Figure 8-5 shows sample datafill for table TOLLENTC.

Figure 8-5 MAP display example for table TOLLENTC

CHGCLASS	ECANDCHG	
NONE	31	Y
MOBL	11	Y
MOB0	13	Y
MOB1	23	Y
LLOR	14	Y

Table DIRPPOOL Table DIRPPOOL lists the collection, or pool, of recording devices allocated to each contributing subsystem. This table contains up to 64 pools. Each pool contains up to 24 recording volumes. Each entry in table DIRPSSYS points to a pool in table DIRPPOOL. However, only one contributing subsystem references each pool in table DIRPPOOL.

Figure 8-6 shows sample datafill for table DIRPPPOOL.

Figure 8-6 MAP display example for table DIRPPPOOL

[illegible]

In the previous example, the AMADISK pool stores wireline AMA records on disk, and the AMA2DISK pool stores wireless CDR records on disk. Parallel pools can be defined for each pool used for AMA data. (This example does not reflect these parallel pools.)

Table DIRPSSYS Table DIRPSSYS defines the operating parameters of each contributing subsystem. Each entry in table DIRPSSYS points to a pool in table DIRPPool. However, each pool in table DIRPPool is referenced by only one contributing subsystem.

Figure 8-7 shows sample datafill for table DIRPSSYS.

Figure 8-7 MAP display example for table DIRPSSYS

```

SSYSNAME READRITE NUMFILES MINFILES POOLNAME FILENAME ALARM0 ALARM1 ALARM2
ALARM3 RETPD CRETPD PARLPOOL PARCONC MANDPALM FILEDATE SHEDDAYS SHEDBASE
SHEDINCR ROTACLOS AUTOXFER SPACROTE MAXDFSIZ PRIORTIO
-----
AMA Y 2 1 AMADISK DMS100 CR MJ NA NA 30 30 $ N NA OPENED NNNNNNN 0
NOROTATE NONE NONE N 64 Y

JF Y 1 0 JFPOOL $ NA NA NA NA 499 499 $ N NA OPENED NNNNNNN 0 NOROTATE
NONE NONE N 64 Y

DLOG Y 2 1 DLOGPOOL $ MN MN NA NA 0 0 $ N NA OPENED NNNNNNN 0 NOROTATE
BOTH NONE N 64 N

OM Y 1 0 OMPPOOL $ NA NA NA NA 30 30 $ N NA OPENED NNNNNNN 0 NOROTATE NONE
NONE N 64 Y

TTRF Y 1 0 TTRF $ NA NA NA NA 30 30 $ N NA OPENED NNNNNNN 0 NOROTATE NONE
NONE N 64 Y

KT Y 1 0 KTPPOOL $ NA NA NA NA 30 30 $ N NA OPENED NNNNNNN 0 NOROTATE NONE
NONE N 64 Y

SMDR Y 2 1 SMDRPOOL DMS100 CR MJ NA NA 30 30 $ N NA OPENED NNNNNNN 0
NOROTATE NONE NONE N 64 Y

AMA2 N 1 0 AMA2DISK $ NA NA NA NA 0 0 $ N NA OPENED NNNNNNN 0 NOROTATE
NONE NONE N 5 N

```

Table CRSFMT Table CRSFMT defines the format for each stream (subsystem).

Figure 8-8 shows sample datafill for table CRSFMT.

Figure 8-8 MAP display example for table CRSFMT

```

KEY FORMAT DATADUMP CDRSRCH ALARMS TIMERDMP TIMERVAL
-----
NIL NTFMT N NIL_FM N N 0
AMA BCFMT N NIL_FM N N 0
SMDR SMDRFMT N NIL_FM N N 0
AMA2 NTFMT N NIL_FM N N 0

```

Table CRSMAP Table CRSMAP identifies the stream that corresponds to each AMA data type. In this example, the CAMA and LAMA data types map

to the (wireline) AMA stream, while the MTX data type maps to the (wireless) AMA2 stream.

Figure 8-9 shows sample datafill for table CRSMAP.

Figure 8-9 MAP display example for table CRSMAP

KEY	STREAM

CAMA	AMA
LAMA	AMA
TOPS	AMA
SMDR	SMDR
MTX	AMA2

Supporting documentation Refer to the following NTPs for additional information on datafill procedures for these tables.

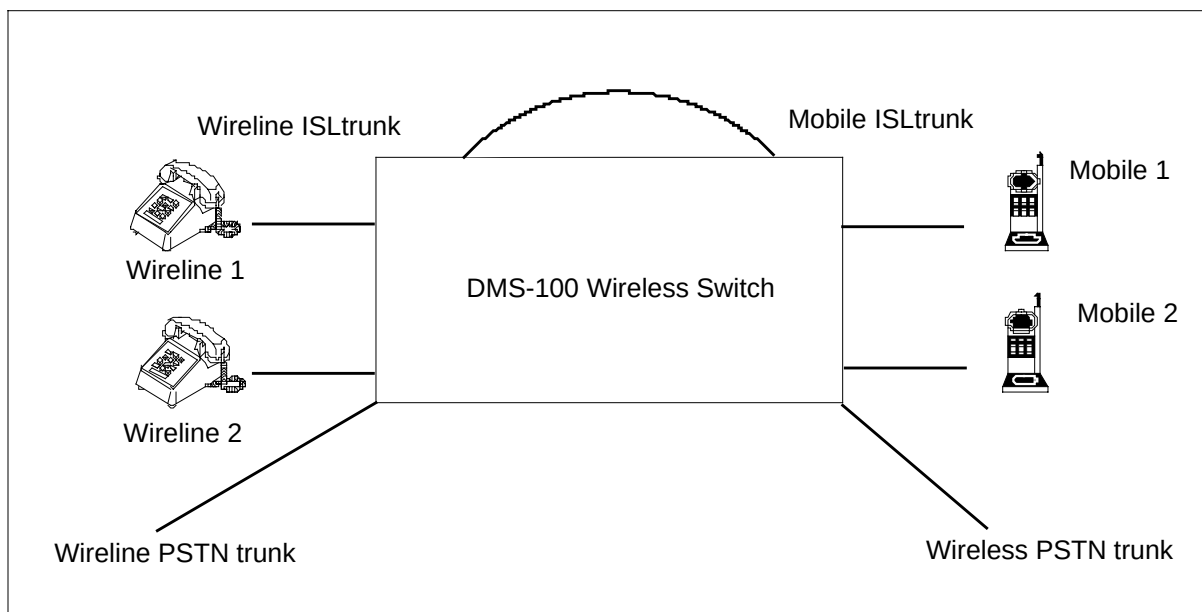
- *Customer Data Schema Reference Manual*
- *Translations Guide*
- *DMS-100 Family SuperNode Data Manager Translations Guide*, 297-5051-350

Integrated service link trunks

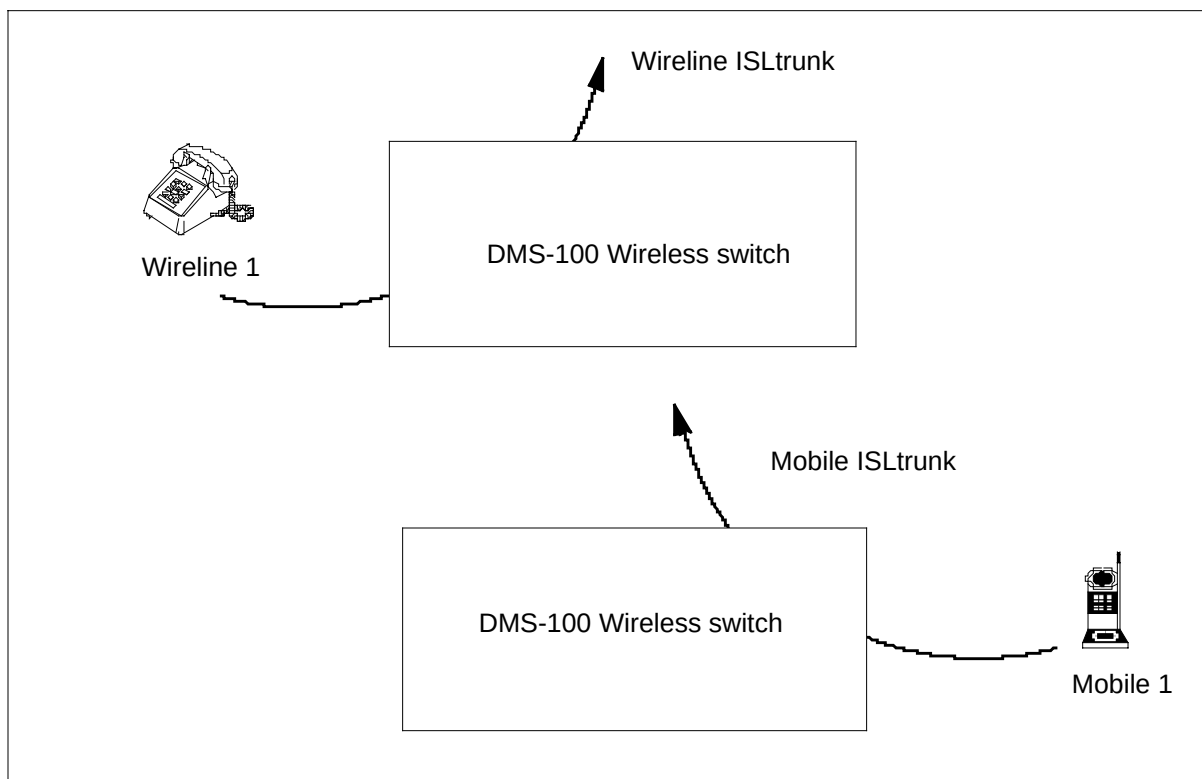
Initially all DMS-100 Wireless calls between wireline and wireless end users require an ISL trunk to connect the calls. This configuration appears as two separate calls. Translations is needed to route the calls to the ISL trunks, as well as to handle originations from the ISL trunks.

Whenever an ISL configuration occurs, billing for the two calls is handled independent from each other. The type of billing record that is generated depends on the end users involved in the call, as well as the associated translations options.

Figure 8-10 and Figure 8-11 show examples of ISL trunking configurations.

Figure 8-10 Sample DMS-100 Wireless ISL trunking configuration

Integrated service link trunk terminations A termination to an ISL trunk can occur if a wireless end user originates a call to a wireline end user. A termination to an ISL trunk can also occur if a wireline end user originates a call to a wireless end user. Figure 8-11 shows both of these scenarios.

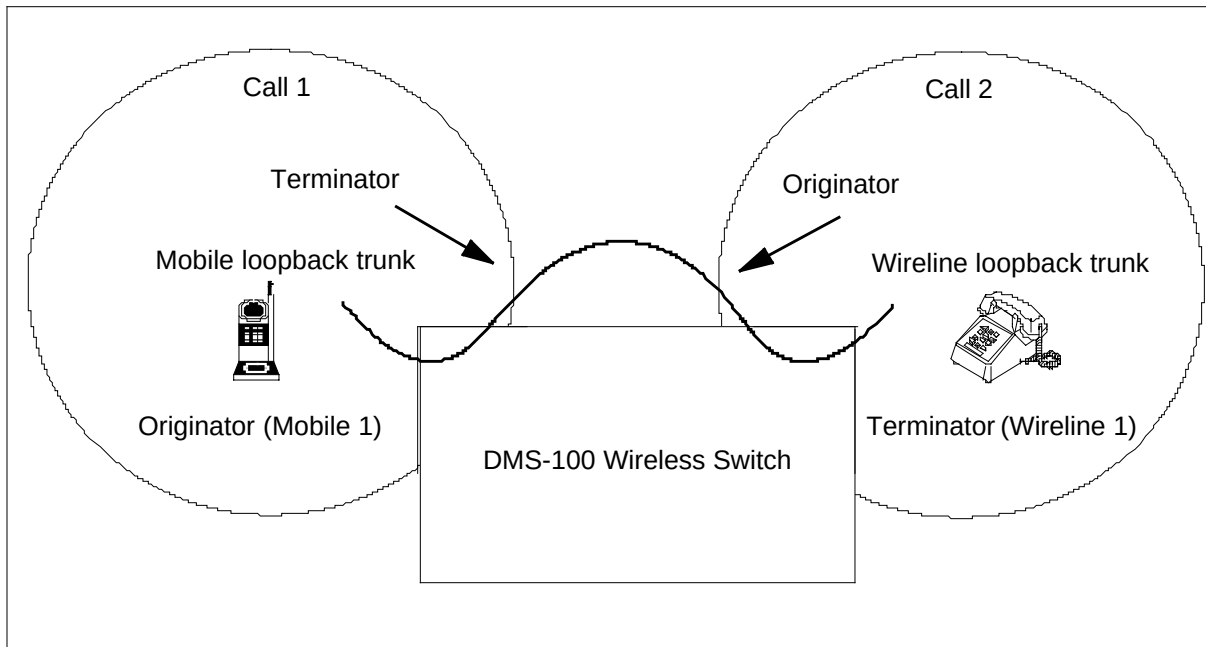
Figure 8-11 Sample DMS-100 Wireless ISL trunking configuration

Note: In the top portion of Figure 8-11, the wireline end user originated a call that terminated to an ISL trunk. In the bottom portion of the figure, a wireless end user originated a call that terminated to an ISL trunk.

When a call terminates on an ISL trunk, the generated billing records depend on the originating end user. If a mobile end user originated the call, then a CDR record using NT format is generated. If a wireline end user originated the call, then a Bellcore format billing record is generated, depending on the AMA information provisioned in subtables STDPRT (Standard Pretranslator) and AMAPRT (Automatic Message Accounting Standard Pretranslator subtable), and table AMAOPTS (Automatic Message Accounting Options). Both the calling and called digits are available for the AMA records.

Wireline ISL trunk originations A wireline origination on an ISL trunk occurs when a wireless end user originates a call destined for a wireline end user. This results in the creation of two calls on the switch: one call from the wireless end user to the ISL trunk, and the second call from the ISL trunk to the wireline end user. The second call involves an origination on the wireline end of the ISL trunk.

Figure 8-12 shows a sample configuration of this wireline origination ISL scenario.

Figure 8-12 Origination from the wireline end of an ISL trunk

When a call originates on the wireline end of the ISL trunk, several types of billing records are generated, depending on how the trunk is configured. Typically, the trunk is configured as an intertoll (IT) ISDN user part (ISUP) trunk with option CELL, or potentially as a CELL trunk group type for multifrequency (MF) signaling.

Table 8-2 lists which billing records are generated under the following conditions when IT trunks are used.

Table 8-2 IT-trunk generated billing records (Sheet 1 of 2)

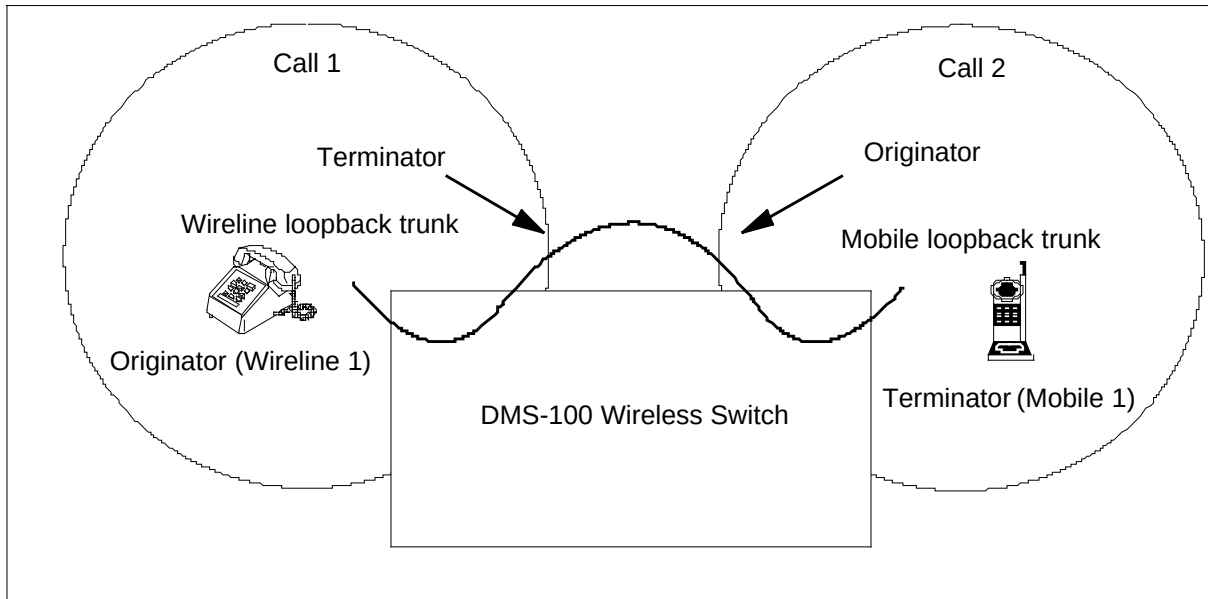
Call code	IT trunk condition
063 (cellular mobile carrier [CMC] originating type 1 or 2B)	For all calls originating to a CMC where a wink from the CMC has been received
064 (CMC originating type 2A)	For an originating call to a CMC
065 (CMC terminating type 1 or 2B)	For a terminating call from a CMC where the switch detects a seizure on the incoming CMC trunk

Table 8-2 IT-trunk generated billing records (Sheet 2 of 2)

Call code	IT trunk condition
066 (CMC terminating type 2A)	For a terminating call from a CMC
950 (trunk group member usage [TGMU])	When the call record for a call routed through a DMS-200 tool office contains trunk information. (This is set up by assigning option TGMU to the trunk group in table AMATKOPT [Automatic Message Accounting Trunk Group Option].)

Wireless ISL trunk originations A wireless origination on an ISL trunk occurs when a wireline end user originates a call destined for a wireless end user. This results in the creation of two calls on the switch: one call from the wireline end user to the ISL trunk, and the second call from the ISL trunk to the wireless end user. The second call involves an origination on the wireless end of the ISL trunk.

Figure 8-13 shows a sample configuration of this wireless origination ISL scenario.

Figure 8-13 Origination from the wireless end of an ISL trunk

When a call originates on the wireless end of the ISL trunk, it appears as a wireless ISUP trunk origination from the public switched telephone network (PSTN). A CDR record is generated for the call, as with any other wireless-ISUP-to-mobile call.

Limitations and restrictions

Adhere to the following limitations and restrictions for billing records on the DMS-100 Wireless:

- Wireline Bellcore AMA billing records and wireless billing records should be recorded in separate billing streams. It is possible to record wireless records to the AMA stream using table CRSMAP. Nortel Networks does not recommend this configuration since wireless records and Bellcore AMA records are not compatible. Special processing at the downstream processor is needed to interpret the resulting billing files.
- Wireless billing records do not peg the AMA operational measurement (OM) registers in the DMS-100 Wireless switch. Automatic message accounting OM registers are only pegged by records generated by the AMA billing stream.
- The wireless billing stream does not have a special menu entry at the DIRP MAP level. (Menu entries enable telephone operating company personnel to type command shortcuts. (For example, “39” is translated as “query ama.”) However, all DIRP level commands are fully functional for the wireless billing stream.
- Command interpreter (CI) commands AMADUMP and CALLDUMP use stream AMA as the default stream parameter. (The wireless stream name, as defined in table CRSFMT, must be explicitly specified when using these commands.)
- The wireless billing MTX stream (NT format) can contain additional translator records, such as C and V, not included in wireless data blocks.

The DMS-100 Wireless switch's downstream processor must recognize that these additional translator records are present, especially if it is a downstream processor that handles wireless billing. The switch generates data blocks only for a billing stream with field DATADUMP in table CRSFMT set to “Y.

Downstream billing

As noted earlier, Nortel Networks recommends separate downstream billing streams for DMS-100 Wireless wireless and wireline records. Wireline BAF-generated records use data processing peripheral (DPP) links to communicate between the DMS-100 Wireless switch and the downstream processing application.

Wireless CDR-generated records use AFT to relay information from the DMS-100 Wireless switch to the downstream processing application using X.25 protocol, which transfers the CDR billing data for mobile telephone switches.

Note: Do not use AFT for wireline BAF records.

Nortel Networks recommends using X.25 protocol for the AFT teleprocessing links.

Supporting documentation

Refer to the “Billing” section in the following chapters of this NTP for billing information specific to:

- chapter 10, “Equal access and trunking,” for details on how equal access (EA) affects billing
- chapter 13, “Trunking configurations,” for details on how trunking configurations affects billing

Also refer to the following NTPs for additional information on billing:

- *DMS-100 Family Automatic Message Accounting (AMA)-Northern Telecom Format Reference Guide*, 297-1001-119
- *Belcore Format Automatic Message Accounting (AMA) Maintenance Guide*, 297-1001-570
- *Belcore Format Automatic Message Accounting Reference Guide* 297-1001-830
- *Automatic Message Accounting (AMA) Tools User Guide*, TAM-1001-017
- *Customer Data Schema Reference Guide*
- *Translations Guide*
- *Wireless Solutions DMS-MTX Billing Management Manual*, 411-2131-204
- *Wireless Solutions DMS-MTX Automatic File Transfer Application Guide*, 411-2131-205

9 Operational measurements, alarms, and logs

Table 9-1 lists the design changes that the DMS-100 Wireless switch requires for operational measurements (OM), alarms, and logs. This chapter describes each topic listed in this table in detail.

Table 9-1 DMS-100 Wireless OM, alarm, and log changes (Sheet 1 of 2)

Section with required changes	Description
Operational measurements and integrated service link trunks	Calls that route over integrated service link (ISL) trunks generate OMs equal to two calls.
Subscriber line usage	The switch collects subscriber line usage (SLU) OMs for wireline calls, but not for wireless calls.
Traffic Separation Measurement System	The Traffic Separation Measurement System (TSMS) monitors only wireline circuits, not wireless circuits.
Switch Performance Monitoring System	The DMS-100 Wireless switch does not support wireless calls on the Switch Performance Monitoring System (SPMS).
System capacity model	The DMS-100 Wireless office model diagram is a combination of H-diagrams from the wireline and wireless functionalities. A set of ISL trunk call types connects both H-diagrams. The dual H-diagrams are independent. The percentage of call mix in the wireline H-diagram cannot be applied to wireless agents. Likewise, the percentage of call mix in the wireless H-diagram cannot be applied to the wireline agents.
System capacity model (continued)	The switch requires a physical ISDN user part (ISUP) ISL trunk for all inter-wireline and wireless agent calls.
Wireless call types	In addition to the existing wireline call types, the switch defines another set of call types for wireless-specific calls for DMS-100 Wireless offices.

Table 9-1 DMS-100 Wireless OM, alarm, and log changes (Sheet 2 of 2)

Section with required changes	Description
REAL::TIME tool	The DMS-100 Wireless switch does not support the wireless-specific analysis, data extraction and performance tool (ADEPT).
Office Type Resolution for the DMS-100 Wireless	The Office Type Resolution for the DMS-100 Wireless feature introduces office type OFFCOMBLWW. Office parameter OFFICETYPE in table OFCSTD (Office Standard) holds office type OFFCOMBLWW.
Alarms	The wireless and wireline functionalities each report alarms in different formats. The DMS-100 Wireless switch also includes the following three alarms added to the wireless functionality: • BSMP • CAU • CIU
Logs	The DMS-100 Wireless switch does not integrate wireline- and wireless-specific logs. Use separate printers for printing wireline and wireless log reports.

Operational measurements

Operational measurements provide operating company personnel with performance data on the DMS-100 Wireless switch. Wireless-specific and wireline-specific OMs include both peg counts and usage measurements.

The DMS-100 Wireless switch generates an OM when wireless and wireline functions in an office share hardware or software resources. (For example, the switch generates one central processor call processing occupancy OM value rather than one OM for wireless calls, and another OM for wireline calls.) Similarly, the office traffic measurement section shows the total number of incoming calls (that is, NIN) rather than one value for the number of wireless calls, and another value for the wireline calls.

The DMS-100 Wireless switch pegs wireless-specific OMs only in the following components:

- control module (CM)
- code division multiple access (CDMA) application unit (CAU)
- CDMA interface units (CIU)
- base station transceiver subsystem (BTS)

The distributed data manager (DDM) transfers the CDMA OMs pegged in the CIU and CAU to the CMs.

For hardware and software resources unique to wireless or wireline functions, the associated wireless or wireline software generates separate OMs.

Note: Wireless-specific OMs do not reflect wireless base station controller (BSC) and BTS equipment measurement.

Operational measurements and ISL trunks

Calls that involve ISL trunks and span wireless and wireline boundaries appear as two calls. One call comes from the originating circuit to the outgoing ISL trunk. The other call is from the incoming ISL trunk to the terminating circuit.

Calls that route over ISL trunks also generate OMs equal to two calls; an originating call to an outgoing trunk (ISL trunk), and an incoming call from an ISL trunk to a terminating circuit.

Note: Integrated service link trunks are not invisible.

Tools affecting OMs

In addition, the following control tools use OMs to monitor performance and capacity measurements on the DMS-100 Wireless switch.

Subscriber line usage

Subscriber line usage (SLU) OMs provide detailed information on the use of subscriber lines. This usage data is collected for marketing, class of service, and load balance studies.

The switch collects SLU OMs for wireline calls, but not for wireless calls. A voice channel trunk assigned to an end user during a wireless call is monitored using the trunk test position (TTP) level of the MAP terminal. Operational measure group TRK, along with the trunk group name (or common language location identifier [CLLI]) and member number, monitors the usage.

Traffic Separation Measurement System

The TSMS collects OMs based on the originating and terminating circuits. Switched traffic is separated on a point-to-point basis. The components of a call that can be measured and separated are the set-up time, the point-to-point attempt peg count, and the point-to-point connect time. This separation system has two functional traffic analysis groups; TFCANA for normal traffic analysis and EATSMS for equal access (EA) traffic analysis.

Note: The TSMS monitors only wireline circuits, not wireless circuits.

Switch Performance Monitoring System

The SPMS is a series of index values that describes how well the switch is operating. The SPMS scores system performance in a hierarchical order from 1 to 100. In this system, a single number is provided at the top of the hierarchy. This number is a rollup of scores at the next layer in the hierarchy, which are rollups of scores from the next lower layer. Index values are computed from switch-generated OMs on a daily- and customer-defined, monthly basis.

Performance results are displayed in a report.

Note: The DMS-100 Wireless switch does not support wireless calls on the SPMS.

Miscellaneous tools

The DMS-100 Wireless switch also supports tools such as OMTOTAL, OMSHOW, and DMSMON with OMs.

CDMA cellular performance metrics

Performance metrics enable telephone operating company personnel to monitor and improve the performance of their cellular systems.

The following performance metrics and the OMs associated with each metric tool to CDMA cellular systems on the DMS-100 Wireless switch include the following.

Call blocking performance This performance metric monitors how well the DMS-100 Wireless switch accepts new voice originations, voice terminations, and hard hand-off attempts from CDMA cells.

The CM uses register TRSGNCT from OM group TRMTRS for call blocking performance metrics.

Note: This OM group is pegged for call blocking, but is not used for the call blocking performance metric calculation.

The following OM groups are used in the CAU for the call blocking performance metric:

- CAUCPSCT-tracks events based on the serving sector
- CAUCPSYS-tracks events on an individual CAU basis
- CAURM-tracks events on an individual CAU basis

For the call blocking performance metric, the BTS is responsible for maintaining its available resources. Failures to allocate resources are communicated to the selector bank subsystem (SBS) and to the CAU through

messaging. Those failures are recorded at the CAU by the CAUERSFL and the CAU*BLKS OMs.

Dropped call performance “Dropped calls” include those calls that were successfully set up (arrived on the traffic channel), but were disconnected for a reason other than one of the parties involved in the call went “on hook.” For the dropped call performance metric, the BTS generates a log or a report on traffic channel usage information.

The CM records all dropped call information on the CAU for CDMA.

The following OM registers are used in the CAU for the dropped call performance metric:

- CAUOSUCC (origination)
- CAUTSUCC (termination)
- CAUHSUCC (handoff)
- CAUDROPR
- CAUDROPN

Hand-off performance This performance metric determines how well the hand-off mechanism operates. A measurement is taken from the time a hand-off-needed condition is detected, until the hand-off process succeeds or fails. The BTS generates a log or a report on traffic channel usage information.

Hardware engineering performance This performance metric monitors how well the CDMA hardware has been provisioned. The hardware engineering performance metric measures provisioning for CDMA peripherals CAU, CIU, SBS, and BTS.

The following registers from OM group CAUPSYS are used in the CAU for the hardware engineering performance metric:

- CAUORIGS
- CAUREGNS
- CAUPGREQ
- CAUHOTRG
- CAUHOSRC
- CAUMRLS
- CAULRLS
- CAUFLASH
- CAUCNICV

- CAUCNITR
- CAUPMWNA
- CAUPMWNC
- CAUPMWNR
- CAUTMWNA
- CAUTMWNC
- CAUTMWNR

Also OM registers CAUHSOFT, CAUVRJCT, and CAUVDSCD are used.

The following registers from OM group CIUPROST are used in the CIU for the hardware engineering performance metric:

- DLRXFRCT
- DLTFRCT
- TLFGRPKT
- TLRMPKT

Paging performance This performance metric measures the paging algorithm. It discusses CDMA paging, as well as slotted mode paging performance. The slotted mode metric measures possible performance differences between slotted mode and non-slotted mode. This metric uses OM groups CAUCPSYS and CAUCPSCT.

RF engineering performance This performance metric measures radio frequency (RF) provisioning for CDMA. The RF engineering performance metric consists of two main tools, individual call data and soft hand-off percentage.

Base station controller and base station transceiver subsystem OMs

The base station manager (BSM) enables the DMS-100 Wireless switch to decide which OMs are polled and at what interval the polling is to occur.

The SBS generates statistics and metrics relating to errors, delays and volumes of traffic, signaling, and control data. The BTS collects these statistics relating to mobile station access, paging, access, backhaul utilization, forward and reverse loop power control, and fault messages. The BSM stores this information to evaluate system performance.

Operational measurements for planning and engineering

The OM groups OFZ (Office Traffic Summary), SOTS (Supplementary Office Traffic Summary), SYSPERF (System Performance), and TRK (Trunk Group) have assigned registers, which depend on the office type.

The DMS-100 Wireless switch does not introduce any OM registers to existing OM groups. Register usage, however, does include wireless traffic events.

Note: Refer to the feature description “Office Type Resolution for DMS-100 Wireless” in this chapter for additional information on this conflict.

BRSTAT and CPSTAT

The monitoring tools BRSTAT and CPSTAT measure CM processor usage.

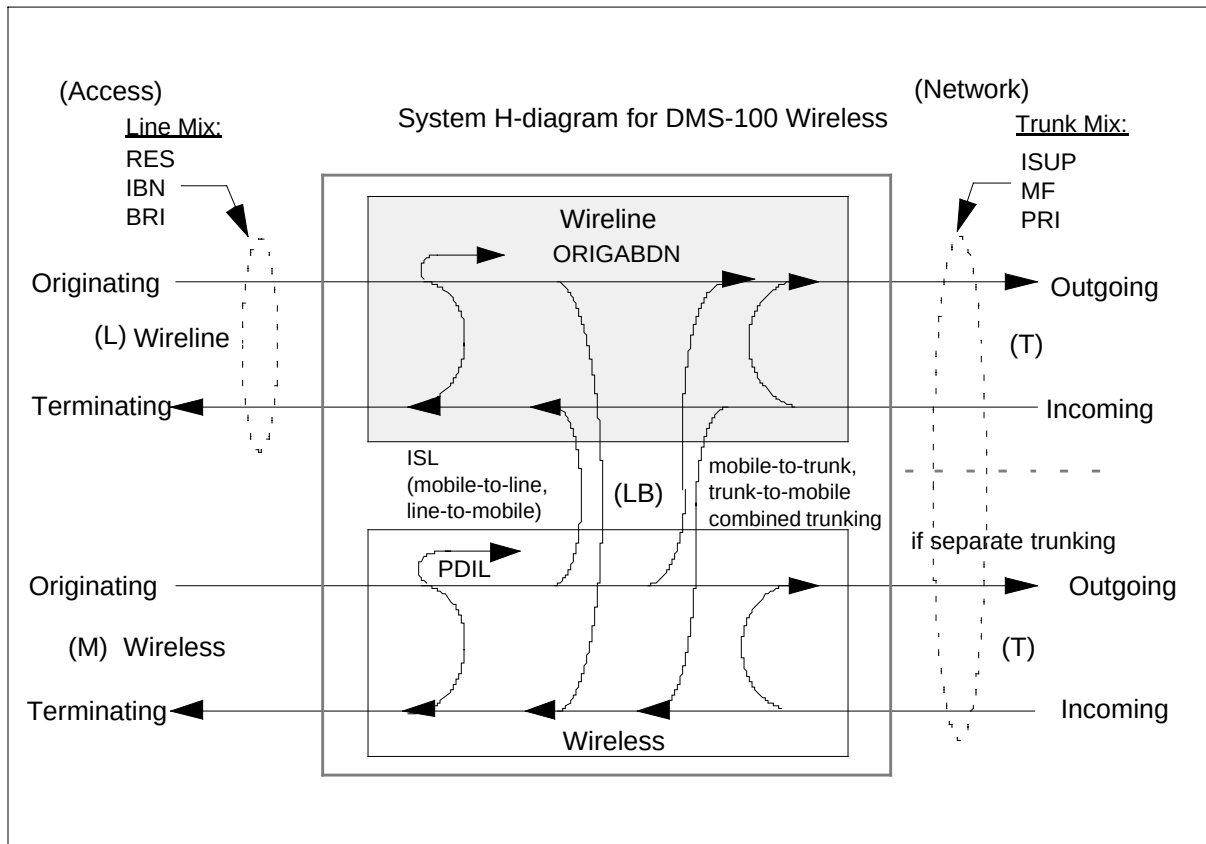
The OM group BRSTAT in the DMS-100 Wireless switch populates its registers differently than OM group BRSTAT in the wireline switch, and the wireless equivalent OM group MTXSTAT. Wireless CDMA mobility messages are included in two registers of OM group BRSTAT.

Note: Refer to chapter 4, “User interface,” for a description of feature “Tools Resolution for the DMS-100 Wireless” addressing this conflict.

System capacity model

System engineers use OM records to ensure that the switch operates efficiently. Operational measurements provide information regarding system performance, grade of service offered, connecting facilities, performance, and traffic levels of various elements internal to and connected to the system.

The system capacity of a DMS-100 Wireless office is modeled from a modified H-diagram, as Figure 9-1 shows. The DMS-100 Wireless office model diagram is a combination of H-diagrams from the wireline and wireless functionalities. A set of ISL trunk call types connects both H-diagrams.

Figure 9-1 DMS-100 Wireless system H-diagram

The dual H-diagrams are treated independently. The percentage of call mix in the wireline H-diagram cannot be applied to wireless agents. Likewise, the percentage of call mix in the wireless H-diagram cannot be applied to the wireline agents.

The wireless traffic is treated as the access side of the H diagram for calculating traffic. The wireless call control, however, treats the mobile end user as a trunk agent. Thus, the originations from the wireless agent are pegged as incoming calls (that is, NINs) in the OFZ OMs. Additional wireless OMs, such as the OMMTX, are required for the wireline FACET real-time tool to normalize OFZ OMs for two H-diagrams.

As shown in the combined H diagram, the switch requires a physical ISUP ISL trunk for all inter-wireline and wireless agent calls. A line-to-mobile call is treated as an originating outgoing (ORIGOUT) call from the wireline portion of the switch, and an incoming- to-terminating (INCTRM) call from the wireless portion of the switch. An ISUP ISL trunk is in between.

The DMS-100 Wireless switch supports separate trunking. However, a mobile-to-primary rate interface (PRI), to-private branch exchange (PBX),

to-EA intertoll (IT) or access-to-carrier (ATC) call must be routed through the ISUP ISL trunks to the wireline portion of the switch.

OMs and wireline system capacity tool

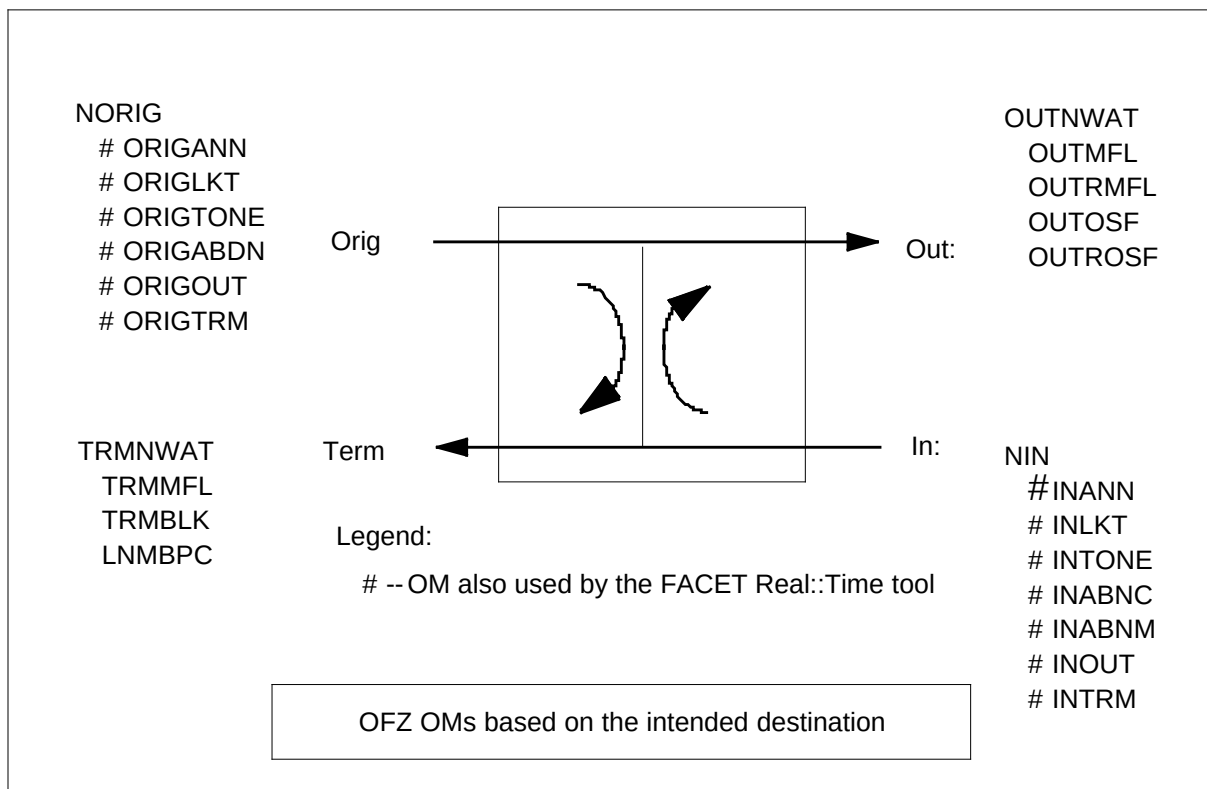
The wireline flexible advanced capacity engineering tool (FACET) obtains the total office traffic and the CM real-time usage from the following OM groups for its alignment phase:

- CPUSTAT (for 68K processor; that is, SR20 to SR40) or BRSTAT (for BRISC processor; that is, SR50 to SR70) provides the measurements of CM call processing occupancy and call processing utilization. The DMS-100 Wireless switch only supports the BRISC-base processor for SR60 or higher.

Note: Refer to chapter 4, “User interface,” for additional information on the BRSTAT changes that incorporate the mobility and additional IS-41 messaging processes for DMS-100 Wireless switch.

OFZ (Office Traffic Summary), as Figure 9-2 shows, provides call attempts for the entire DMS-100 Wireless office.

Figure 9-2 OM group OFZ and RT tool



Note 1: All wireless call attempts are also pegged in the NIN OMs.

Note 2: Refer to chapter 2, “Planning and engineering,” for additional information on system capacity.

This traffic model includes a set of call types that represent the majority of call processing traffic. Their call timings are measured for each major release and their call volume are tracked from live switches. To support these activities, the DMS-100 Wireless switch provides a set of performance OM groups (such as OFZ and RTLTSUM), and on-switch tools (such as CPSTAT, SPMS, Timecall) to measure and provide traffic data.

Wireless call types

In addition to the existing wireline call types that are measured and tracked for each software release, the DMS-100 Wireless switch defines another set of call types for wireless-specific calls. These combined wireless and wireline call types, along with transactions related to mobile registration, handoff, and networking, contribute to the capacity model for a DMS-100 Wireless office.

The following tables list those wireless-specific call types and their corresponding call processing events.

Table 9-2 Intraswitch line-to-mobile calls (unique call types for the DMS-100 Wireless switch)

Call type	Call description
BRI to MTX	BRI to mobile
IBN to MTX	IBN to mobile
RES to MTX	RES to mobile
MTX to BRI	Mobile to BRI
MTX to IBN	Mobile to IBN
MTX to RES	Mobile to RES

Table 9-3 Mobile origination incomplete

Call type	Call description
MTX origination ch acqui. failure	Mobile origination, channel acquisition failure
MTX origination blank DN	Mobile origination, false start (blank DN)
MTX origination partial dial	Mobile origination, partial dial (PDIL)
MTX origination vacant code	Mobile origination, vacant code (VAC)

Table 9-4 Mobile-to-mobile calls

Call type	Call description
MTX to MTX	Mobile to mobile complete
MTX to MTX ch acqui. failure	Mobile to mobile channel acquisition failure
MTX to MTX PGTO	Mobile to mobile page time-out
MTX to MTX inactive	Mobile to mobile inactive

Table 9-5 Mobile-to-trunk calls

Call type	Call description
MTX to NA CCS7 EAS	Mobile, in VLR, to NA CCS7 EAS complete
MTX to NA CCS7 IT	Mobile, in VLR, to NA CCS7 IT complete
MTX to NA CCS7 ATC	Mobile, in VLR, to NA CCS7 ATC complete
MTX to ISUP DID In VLR	Mobile, in VLR, to MTX ISUP DID complete
MTX to ISUP DID incomplete	Mobile, in VLR, to MTX ISUP DID incomplete
MTX to NA CCS7 ITOut VLR	Mobile, Out VLR, to NA CCS7 IT complete
MTX to ISUP DID Out VLR	Mobile, Out VLR, to MTX ISUP DID complete
Note: For the above call types, mobile end users have EA PICs assigned. Also, ISUP ISL trunks were required for all wireline and wireless calls.	

Table 9-6 Trunk-to-mobile calls (Sheet 1 of 2)

Call type	Call description
NA CCS7 EAS to MTX	NA CCS7 EAS to mobile, complete
NA CCS7 IT to MTX	NA CCS7 IT to mobile, complete
NA CCS7 IT to MTX ch acqui. failure	NA CCS7 IT to mobile, channel acquisition failure
NA CCS7 IT to MTX PGTO	NA CCS7 IT to mobile, page time-out
NA CCS7 IT to MTX inactive	NA CCS7 IT to mobile, inactive
ISUP DID to MTX	MTX ISUP DID to mobile, complete
ISUP DID to MTX ch. acqui. failure	MTX ISUP DID to mobile, channel acquisition failure

Table 9-6 Trunk-to-mobile calls (Sheet 2 of 2)

Call type	Call description
ISUP DID to MTX page time-out	MTX ISUP DID to mobile, page time-out
ISUP DID to MTX inactive	MTX ISUP DID to mobile, inactive

Table 9-7 Trunk-to-trunk (roaming calls)

Call type	Call description
NA CCS7 EAS to MTX NWK	NA CCS7 EAS to MTX NWK trunk
MTX NWK to NA CCS7 EAS	MTX NWK trunk to NA CCS7 trunk
MTX ISUP DID TO MTX NWK	MTX ISUP DID to MTX NWK trunk
MTX NWK to MTX ISUP DID	MTX NWK to MTX ISUP DID trunk

Table 9-8 Call delivery (CD)

Call type	Call description
NWK CD send successful	MTX NWK CD send successful (route request sent)
NWK CD send unsuccessful	MTX NWK CD send unsuccessful (route request not sent)
NWK CD receive	MTX NWK CD receive
NWK CD receive block	MTX NWK CD receive block-get billing block

Table 9-9 Wireless (MTX) features (Sheet 1 of 2)

Call type	Call description
NA CCS7 IT to MTX CFU act	NA CCS7 IT to mobile CFU act
NA CCS7 IT to MTX CFU assign	NA CCS7 IT to mobile CFU assign
NA CCS7 IT to MTX CFD act	NA CCS7 IT to mobile CFD act
NA CCS7 IT to MTX CFD assign	NA CCS7 IT to mobile CFD assign
NA CCS7 IT to MTX CWT act	NA CCS7 IT to mobile CWT act
ISUP DID to MTX CFU act	MTX ISUP DID to mobile CFU act
Note: All call types were assumed to have been call forwarded to a voice mail system. "Assign" is only needed if an associated cost is known.	

Table 9-9 Wireless (MTX) features (Sheet 2 of 2)

Call type	Call description
ISUP DID to MTX CFU assign	MTX ISUP DID to mobile CFU assign
ISUP DID to MTX CFD act	MTX ISUP DID to mobile CFD act
ISUP DID to MTX CFD assign	MTX ISUP DID to mobile CFD assign
ISUP DID to MTX CWT act	MTX ISUP DID to mobile CWT act
MTX 3WC act to NA CCS7 IT	MTX 3WC active to NA CCS7 IT outgoing
MTX 3WC act to MTX ISUP DID	MTX 3WC active to mobile ISUP outgoing
Mobile activation	Mobile activation
Mobile deactivation	Mobile deactivation
Note: All call types were assumed to have been call forwarded to a voice mail system. "Assign" is only needed if an associated cost is known.	

The following list reflects those transactions that relate to mobile registration, handoff, and IS-41 network messaging. As noted previously, these transactions, along with the wireline and wireless call types contribute to the capacity model for an office.

- CDMA registration
 - In VLR registration
 - Out VLR registration @ home switch (x1)
 - Out VLR registration @ serving switch (x3)
 - Out VLR registration cancellation @ home switch (x4)
 - Out VLR registration notification & cancellation @ HLR
 - Out VLR registration cancellation @ serving switch (x2)
- Handoff
 - In-switch soft/softer handoff notification
 - In-switch CDMA hard handoff
 - In-switch CDMA AMPS hard handoff
 - Interswitch handoff Inc. unsuccessful
 - Interswitch handoff Inc. successful

- Interswitch handoff OG unsuccessful
- Interswitch handoff OG successful
- Additional IS-41 messages
 - Interswitch RSSI request related
 - Network boundary paging related
 - Remote feature control related
 - Call redirection related
 - CCS7 inactive and deregistration related
 - Networking OA related
 - Vertical feature invocation on intersystem handoff related

REAL::TIME tool

The DMS-100 Wireless switch supports the REAL::TIME tool for capacity planning and engineering. However, the DMS-100 Wireless switch does not support ADEPT.

EADAS

The Engineering and Administration Data Acquisition System (EADAS) consists of two wireline interface packages: EADAS data collection (EADAS/DC) and EADAS Network Management (EADAS/NM).

DMS-100 Wireless OM groups

Table 9-10 lists all OM groups available for the DMS-100 Wireless switch. This table also includes the domain (wireline or wireless) from which each OM group originated, and the tool that applies to each OM group, if applicable.

Table 9-10 DMS-100 Wireless OM groups (Sheet 1 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
ACB	X		REAL::TIME, EADAS
ACDGRP	X		REAL::TIME, OMTOTAL, EADAS
ACDMISPL	X		REAL::TIME, EADAS
ACMS	X		
ACNWK		X	
ACRJ	X		EADAS
ACRTS	X		EADAS

Table 9-10 DMS-100 Wireless OM groups (Sheet 2 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
ACSYSTR	X		EADAS
ACTAKEDN	X		
ACTRBL	X		
AIN	X		REAL::TIME, EADAS
AINACG	X		
AINICOFF	X		
AINICSUB	X		
AINNCR	X		
AINOGOFF	X		
AINOGSUB	X		
AIOD	X		
AMA	X	X	ADEPT SILVER, REAL::TIME, EADAS
ANN	X	X	
APOCCS	X	X	
APSYS	X	X	
AR	X		REAL::TIME, EADAS
ARN	X		
ASR	X		
ASUFBUS	X	X	
ASUMEMUT	X	X	
ATRK	X		
ATTAMA	X	X	EADAS
ATTLAMA	X		
AUTHCAV		X	

Table 9-10 DMS-100 Wireless OM groups (Sheet 3 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
AUTHCTR		X	
AUTHCTR2		X	
AUTHMSC		X	
AUTSPID	X		
AVPNWKIC		X	
AVPNWKOG		X	
BCAPCG	X		EADAS
BCAPOF	X		EADAS
BCLID	X		
BCLIDNL	X		EADAS
BCLIDO	X		
BLUEBOX	X		
BRSTAT	X	X	REALTIME, EADAS
C7CMSRTE		X	
C7DCIS6	X	X	
C7GTLNK	X	X	
C7GTWSCR	X	X	EADAS
C7GWSCCP	X	X	
C7HSLAL1	X	X	
C7HSLAL2	X	X	
C7HSLATM	X	X	
C7HSLCAR	X	X	
C7LINK1	X	X	
C7LINK2	X	X	
C7LINK3	X	X	EADAS

Table 9-10 DMS-100 Wireless OM groups (Sheet 4 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
C7LINK4	X	X	
C7LKSET	X	X	
C7LPP	X	X	
C7LPP2	X	X	
C7MTP	X	X	EADAS
C7MTPRES	X	X	
C7ROUTE	X	X	EADAS
C7ROUTE2	X	X	
C7ROUTER	X	X	EADAS
C7RTESET	X	X	
C7SCCP	X	X	
C7SERVER		X	
C7SCCPCO	X	X	
C7SCCPX	X	X	
C7SROUTE		X	
CALLFWD	X		REAL::TIME, OMTOTAL
CALLHOLD	X		
CALLMIX		X	
CALLOG	X		EADAS
CALLWAIT	X		REAL::TIME, OMTOTAL
CAUAUTH		X	
CAUCPFRQ		X	
CAUCPSCT		X	
CAUCPSYS		X	
CAUDATSC		X	

Table 9-10 DMS-100 Wireless OM groups (Sheet 5 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
CAUDATSY		X	
CAURM		X	
CAUTFCSY		X	
CAVUOVL		X	
CBK	X	X	
CCTOOM	X		
CDCOM	X		
CDMAOAM		X	
CF3P	X	X	
CF6P	X	X	
CFRA	X		EADAS
CFWPOTS	X		REAL::TIME
CIBEROM		X	ADEPT SILVER
CIBEROM2		X	
CIUPROST		X	
CM	X	X	
CMG	X		
CMSGCARR	X		
CMSGGEN	X		
CNAB	X		EADAS
CNAMD	X		REAL::TIME
CND	X		REAL::TIME, EADAS
CNDB	X		REAL::TIME, EADAS
CNDXPM	X		EADAS
COT	X		REAL::TIME, EADAS

Table 9-10 DMS-100 Wireless OM groups (Sheet 6 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
CP	X	X	EADAS
CP2	X	X	
CPICG	X		EADAS
CPICKUP	X		REALTIME, OMTOTAL
CPUSTAT	X	X	EADAS
CSL	X	X	
CSMI	X		
CWTPOTS	X		
DAISGEN	X		
DCADTALG	X		
DCAIA	X		
DCAMCEIA	X		
DCCICPCP		X	ADEPT SILVER
DCM	X	X	
DCRDEST	X		
DCRICTRK	X		
DCRLINK	X		
DCRMISC	X		EADAS
DDU	X	X	
DRCW	X		
DRM	X	X	
DRUBSDPC		X	
DS1CARR	X	X	
DSCWID	X		EADAS
DSINWTS	X		EADAS

9-20 Operational measurements, alarms, and logs**Table 9-10 DMS-100 Wireless OM groups (Sheet 7 of 21)**

OM group	Wireline applicability	Wireless applicability	Tools
DSPRMAN	X		
DTSR	X		EADAS
DTSRPM	X		REAL::TIME, OMTOTAL, EADAS
DUTLGEN	X	X	
EACARR	X	X	EADAS
EASHRTRK	X		
EATSMS	X	X	EADAS
EBSMSGCT	X		
EIUETHER	X	X	EADAS
ECANRMAN	X		
ENETMAT	X	X	EADAS
ENETOCC	X	X	EADAS
ENETPLNK	X	X	EADAS
ENETSYS	X	X	EADAS
ENG640M1	X		EADAS
ESP	X		
ESUP	X	X	
EXNDINV	X	X	
EXT	X	X	REAL::TIME, EADAS
FBTRAFF	X	X	
FC	X		
FCNF	X	X	
FPDABM	X	X	
FPDEVICE	X	X	
FPSCSI	X	X	

Table 9-10 DMS-100 Wireless OM groups (Sheet 8 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
FRSAGENT	X	X	EADAS
FRSPM	X	X	EADAS
FRT1	X	X	EADAS
FTROM	X	X	
FTRQ	X	X	
FTS	X		
GIACGRP	X		
HDBOM	X	X	
HDLCLKOM		X	
HDLCPLOM		X	
HFPOM	X	X	
HLRSCRN		X	
HODACNTR		X	ADEPT SILVER
HODCCNTR		X	ADEPT SILVER
HOLOHOTL		X	
HOLPCPTL		X	
HOPACNTR		X	
HPCBASIC	X		
HPCTRKGP	X		
HUNT	X		EADAS
IBNAC	X		EADAS
IBNGRP	X		REAL::TIME, OMTOTAL, EADAS
IBNSG	X		EADAS
IBNSGLDN	X		
ICPAUTH		X	

9-22 Operational measurements, alarms, and logs**Table 9-10 DMS-100 Wireless OM groups (Sheet 9 of 21)**

OM group	Wireline applicability	Wireless applicability	Tools
ICPCA		X	ADEPT BRONZE, ADEPT SILVER
ICPCELTR		X	
ICPCM		X	
ICPCP		X	ADEPT BRONZE, ADEPT SILVER
ICPCP2		X	ADEPT SILVER
ICPCSDCP		X	
ICPDCP		X	ADEPT BRONZE, ADEPT SILVER
ICPDFA		X	
ICPDFC		X	ADEPT BRONZE, ADEPT SILVER
ICPDHO		X	ADEPT BRONZE, ADEPT SILVER
ICPFC		X	ADEPT BRONZE, ADEPT SILVER
ICPHO		X	ADEPT BRONZE, ADEPT SILVER
ICPHO2		X	ADEPT SILVER
ICPMT1		X	
ICPMT2		X	
ICPMT3		X	
ICPOVLD		X	
ICPOVLD2		X	
ICPSMS		X	

Table 9-10 DMS-100 Wireless OM groups (Sheet 10 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
ICPSMS2		X	
IHOC		X	
IHO CF		X	
IHOHC		X	
IHOPTF		X	
IHORC		X	
ILDBD	X		
ILDBRA	X		
ILDMSGCT	X		
ILDOVLD	X		
ILDSTAT	X		
IOC	X	X	
IOSYS	X	X	
ISA	X		
ISDD	X	X	EADAS
ISDNPDOM	X		
ISGBD	X		EADAS
ISGBRA	X		EADAS
ISG CPU	X		EADAS
ISGOVLD	X		EADAS
ISUPCGRP	X	X	
ISUPCKTA	X	X	
ISUPCONG	X	X	
ISUPCONN	X	X	
ISUPERRS	X	X	

9-24 Operational measurements, alarms, and logs**Table 9-10 DMS-100 Wireless OM groups (Sheet 11 of 21)**

OM group	Wireline applicability	Wireless applicability	Tools
ISUPUSAG	X	X	EADAS
KSHUNT	X		
LDS	X		
LINAC	X		EADAS
LINEHAZ	X		
LM	X		
LMD	X	X	EADAS
LMSCPUST	X	X	
LMSMEM	X	X	
LNP	X		
LNREDIAL	X		
LOGS	X	X	EADAS
LPICHUSG		X	
M20CARR1	X	X	
M20CARR2	X	X	
MACHCONG	X	X	
MAHOCAND		X	
MAHOCMPT		X	
MALOHOTL		X	
MALOPCPT		X	
MASUMCAN		X	
MASUMSRV		X	
MDCWAKUP	X		EADAS
MPB	X		
MPCBASE	X	X	EADAS

Table 9-10 DMS-100 Wireless OM groups (Sheet 12 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
MPCFASTA	X	X	EADAS
MPCICPOM		X	
MPCLINK2	X	X	EADAS
MPCLINK3	X	X	EADAS
MPHCON	X		
MPHGRP	X		
MPICHUSG		X	
MS	X	X	
MSCHAIN	X	X	
MSCHNLK	X	X	
MSFBUS	X	X	
MSFBUSTP	X	X	
MTA	X		
MTU	X	X	
MTXCELTR		X	
MTXDCALL		X	
MTXDCCH		X	
MTXERVOM		X	
MTXHLLR		X	
MTXMSC		X	
MTXMWI		X	
MTXNP		X	
MTXNWKIC		X	ADEPT BRONZE, ADEPT SILVER

Table 9-10 DMS-100 Wireless OM groups (Sheet 13 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
MTXNWKOG		X	ADEPT BRONZE, ADEPT SILVER
MTXOVL		X	
MTXPC1		X	
MTXPC2		X	
MTXPC3		X	
MTXPC4		X	
MTXPC5		X	
MTXPC6		X	
MTXPC7		X	
MTXPC8		X	
MTXRFPIN		X	
MTXRLT		X	
MTXSMS		X	
MTXSMS2		X	
MTXSMS3		X	
MTXSMS4		X	
MTXSRV		X	
MTXSYS1		X	ADEPT SILVER
MTXSYS2		X	
MTXVLR		X	ADEPT SILVER
MTXZONPG		X	
MWICTCAP	X		
MWTCAR	X		REAL::TIME, EADAS
MWTCAR2	X		

Table 9-10 DMS-100 Wireless OM groups (Sheet 14 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
NACDGRP1	X		REAL::TIME, EADAS
NACDGRP2	X		REAL::TIME, EADAS
NARUSAGE	X		
NBHOATTS		X	
NBHOCOMP		X	
NCMCPUST	X	X	EADAS
NDS0CARR	X	X	
NEMASAPL	X	X	
NETMSG	X		EADAS
NIUFBUS	X	X	
NIUMEMUT	X	X	
NMC	X	X	EADAS
NMTCLINK	X	X	
NMTCNODE	X	X	
NMTCTYPE	X	X	
NMTCUNIT	X	X	
NRS	X		EADAS
NSC	X		REAL::TIME
NSCACG	X		
NWKIC2		X	ADEPT BRONZE, ADEPT SILVER
NWKIC3		X	
NWKOAMIC		X	ADEPT SILVER
NWKOAMOG		X	ADEPT SILVER
NWKOG2		X	ADEPT BRONZE, ADEPT SILVER

Table 9-10 DMS-100 Wireless OM groups (Sheet 15 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
NWKOG3		X	
NWMFRRCT	X	X	
NWMFRRTG	X	X	
NWMSILC	X	X	
NWMTGCNT	X	X	
NX25L2	X	X	
NX25L3	X	X	
NX25LNK	X	X	
NX25MLP	X	X	
OFZ	X	X	ADEPT SILVER, REAL::TIME, EADAS
OFZ2	X	X	EADAS
OHBTDTU	X		
OHBTRES	X		
OHBTTYPE	X		
OHQCBQCG	X		EADAS
OHQCBQR2	X		
OHQCBQR3	X		
OHQCBQR4	X		
OHQCBQRT	X		
OMMTX		X	ADEPT SILVER
OMMTX2		X	
OMMTX3		X	
OMMTXHO		X	
OMMTXHO2		X	
OMMTXSYS		X	

Table 9-10 DMS-100 Wireless OM groups (Sheet 16 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
OMMTXSY2		X	
ONI	X		
OTASYS		X	
PCMCARR	X	X	
PCNF	X		
PM	X	X	
PM1	X	X	EADAS
PM2	X	X	EADAS
PMMSGCNT	X		EADAS
PMOVL	X	X	EADAS
PMSTAT	X		EADAS
PMTYP	X	X	EADAS
PRADCHL2	X	X	EADAS
PRAFAC	X	X	EADAS
PRIMWIC	X		
PRISVCS	X		
PRKOM	X		EADAS
PRP	X	X	
RADR	X	X	EADAS
RCF	X		EADAS
RCHDOPT	X		
RCVR	X	X	EADAS
REVALLO	X		
RLCDIS	X		EADAS
RLDBD	X		

Table 9-10 DMS-100 Wireless OM groups (Sheet 17 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
RLDBRA	X		
RLDMSGCT	X		
RLDSTAT	X		
RMANCMR	X		
RMSGOMGP	X		
RND	X		
ROAPPL	X	X	
ROMISC	X	X	
RRTE	X	X	
RSCIR	X		EADAS
RSCIS	X		EADAS
RSDT	X		
RTEASUM	X	X	REAL::TIME, EADAS
RTFEAT	X	X	REAL::TIME, EADAS
RTLTSUM	X	X	REAL::TIME, EADAS
SACB	X		EADAS
SCA	X		REAL::TIME
SCAISERV	X		REAL::TIME, EADAS
SCAISRV2	X		
SCAISRV3	X		
SCAISRV4	X		
SCAITRAN	X		EADAS
SCF	X		REAL::TIME, EADAS
SCPOTS	X		REAL::TIME
SCRJ	X		REAL::TIME, EADAS

Table 9-10 DMS-100 Wireless OM groups (Sheet 18 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
SDS	X		
SEIUTRAN	X		
SETRAF	X		EADAS
SIMRING	X		
SITE	X		EADAS
SITE2	X		
SITE3	X		
SLLCOM	X		
SLLNK	X	X	REAL::TIME, OMTOTAL, EADAS
SLLNKINC	X	X	REAL::TIME, OMTOTAL, EADAS
SLM	X	X	
SLQ	X		
SLVPOPT	X		
SMCOM	X	X	
SME	X		
SMGENOM	X	X	
SMNCOM	X	X	
SMRSICAN		X	ADEPT SILVER
SMRSISRV		X	ADEPT SILVER
SOTS			
SPC	X	X	
SPEEDCAL	X		REAL::TIME, OMTOTAL
SPPIN	X		
SPRING	X		
SRA	X		

9-32 Operational measurements, alarms, and logs

Table 9-10 DMS-100 Wireless OM groups (Sheet 19 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
SRAOM	X		
STN	X	X	EADAS
STORE	X	X	EADAS
SVCT	X	X	EADAS
SYSPERF	X	X	
TCAPERRS	X	X	
TCAPUSAG	X	X	REALTIME, OMTOTAL
TCW	X		
TDPIC1		X	
TDPOG1		X	
TFCANA	X	X	
TLDNPOM		X	
TM	X	X	
TME	X		
TONES	X	X	EADAS
TRA125M1	X		
TRA125M2	X		
TRA250M1	X		
TRK	X	X	ADEPT SILVER, EADAS
TRKVERDS	X		
TRMTCM	X	X	EADAS
TRMTCM2	X	X	
TRMTCU	X	X	EADAS
TRMTCU2	X	X	EADAS
TRMTCU3	X	X	

Table 9-10 DMS-100 Wireless OM groups (Sheet 20 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
TRMTER	X	X	EADAS
TRMTFR	X	X	EADAS
TRMTFR2	X	X	ADEPT SILVER
TRMTFR3	X	X	
TRMTPR	X	X	
TRMTRS	X	X	EADAS
TROUBLEQ	X		
TS	X	X	EADAS
TTCCARR	X	X	
TWCIBN	X		REAL::TIME, OMTOTAL, EADAS
TWCPOTS	X		REAL::TIME
U3WC	X		
UCDGRP	X		REAL::TIME, OMTOTAL, EADAS
UNBCDC	X		
UNBMISC	X		
USAGSAMP	X		
UTR	X	X	EADAS
VFGIWUSE	X		
VFGUSAGE	X		
VMHLROM		X	
WBTRK	X		
WIDEBAND	X		EADAS
XACPOM	X		
XLIUL3	X	X	
XPMLNK	X	X	EADAS

Table 9-10 DMS-100 Wireless OM groups (Sheet 21 of 21)

OM group	Wireline applicability	Wireless applicability	Tools
XPMSGOC	X	X	
XPMOCC	X	X	
XPMOVL	X	X	EADAS

Supporting documentation

Refer to the following NTPs for additional information on OMs:

- *Operational Measurements Reference Manual*
- *Basic Administration Procedures*, 297-1001-300
- *Switch Performance Monitoring System Application Guide*, 297-1001-330
- *DMS-MTX Operational Measurements Reference Manual*, 411-2131-814

Note: Also refer to Appendix A, “DMS-100 Wireless open-A interface,” for a listing of CM-based, wireless OMs.

Office Type Resolution for the DMS-100 Wireless

The Nortel Networks DMS product family consists of switches with different functionalities. Each switch provides unique services for a particular market. To differentiate one switch from the other, each type of switch is assigned a unique identity. (For example, some DMS switches include DMS-100, DMS-MTX, and DMS-250.)

These identities are not just to distinguish one type of switch from another. The switching software also references these identifies to correctly execute switch type dependent code. In most cases, the software uses the office type, which is shared by more than one type of switch. Each switch requires minor deviations in the software.

One functional area that requires different office types is OMs, where each type of office generates its own report, but with minor deviations. Other office types that affect functional areas are billing, switch of activity (SWACT), and call processing.

The office type specifies the type of switch. However, since the software from the DMS-100 Wireless switch is a combination of the wireline and the wireless CDMA functionalities, the software could not distinguish the combination switch from the original switches using existing office types.

Therefore, office type OFFCOMBLWW is added to the DMS-100 Wireless switch to make this distinction.

Feature description

The Office Type Resolution for the DMS-100 Wireless feature introduces office type OFFCOMBLWW to the DMS-100 Wireless switch. This feature also adds office type OFFCOMBLWW to the existing office type checks in the OM, billing, call processing, and SWACT functional areas.

Office Type Resolution for the DMS-100 Wireless does not add any office type checks.

Office parameter

Office parameter OFFICETYPE in table OFCSTD holds office type OFFCOMBLWW.

Operational measurements

Office type OFFCOMBLWW was added to existing office type checks in the following OM groups:

- OFZ
- SOTS
- SYSPERF
- TRK

The addition of this office type does not add any OM groups. Nor does this office type affect any existing OM registers.

Billing

Office type OFFCOMBLWW enables the DMS-100 Wireless billing software to populate fields volume serial number and generic identification in the User Header label 1 on the billing tape.

Conflict Resolution for DMS-100 Wireless

The Conflict Resolution for DMS-100 Wireless feature introduces register AMASCRN (Automatic Message Accounting Screen) to operational measurement (OM) group AMA. Register AMASCRN pegs the number of AMA records screened.

Operating company personnel could screen an AMA record for the following reasons:

- A call disconnects before a minimum billing interval expires.
- The switch only tandems a call from an incoming to an outgoing trunk.

Register AMASCRN does not involve any associated registers, logs, or extension registers.

Alarms

The DMS-100 Wireless switch uses alarms to flag events or problems occurring in the software or hardware.

The wireless and the wireline functionalities each report alarms in different formats. The level of severity for some alarms can be different between the two systems.

Wireless products uses the same alarm severity levels for the alarms. Alarms for wireless-specific hardware components are reported to the BSM. However, they are not reported to the CM.

The DMS-100 Wireless switch also includes the following three alarms added to the wireless functionality:

- BSMP (base station manager path)
- CAU
- CIU

Note: Refer to chapter 4, “User interface,” for a description of feature “Tools Resolution for the DMS-100 Wireless” addressing this conflict. Also refer to chapter 4 for a list of supporting documentation on wireline and wireless alarm use.

Audible wireless alarm hookups are not available for the BSM OAM. However, a paging mechanism exists, coupled with the alarms received at the BSM. For wireless alarms the pager list is an editable attribute, whereby one can enter the pager number and the severity of the alarm along with its class (or subsystem). For example, if a critical alarm occurred on the BTS component, then one page number would be called. Or if a critical alarm occurred on the SBS component, then another pager number would be called. (The page must be text pager in order for the actual alarm text to be sent.)

Logs

The DMS-100 Wireless switch generates log reports whenever a significant event has occurred in the switch or one of its peripherals. Significant events include equipment failure, test results, equipment status transitions, or other events likely to affect the performance of the switch. A log report can be generated by either a system or a manual action.

Wireline logs are classified and directed to various output devices based on the telephone operating company's desired criteria. The DMS CM software

classifies the logs according to such functional areas as system audits, call processing events and cellsite events.

The BSM organizes wireless logs using craft-defined filters and directs the incoming and queried logs.

Note: The DMS-100 Wireless switch does not integrate wireline- and wireless-specific logs. Therefore, use separate printers for printing wireline log reports and wireless log reports that the BSC and BTS equipment generates.

The DMS-100 Wireless switch generates wireless logs associated with alarms for CDMA equipment under the following conditions:

- when the 5-minute timer expires before any communications with the BSM occurs
- when no INSV READY CIUs exist

Recovery management

The DMS-100 Wireless switch also provides recovery management.

The wireless BSC and BTS equipment monitors the health of their components. Results are available using raised alarm and report logs. Any BSC- or BTS-specific system recovery is the responsibility of the craft from the BSM. When the BSC or the BTS detects a fault that results in the component being removed from service, craft intervention is required to recover the device.

However, a different strategy applies to the wireline switching equipment (whether the equipment is specific to wireless, wireline, or common to both functionalities). After wireline equipment detects a fault and removes the faulty component from service, the switch continues testing and returns the component to service after tests are passed.

The following logs are unique to the wireless functionality:

- AUTH-provides information about the authentication capability
- CAU-the switch generates this log when a CAU receives a message that it is not expecting, due to late messages or protocol violations
- CDMA-the switch generates this log when a mobile responds to a page but another mobile has already responded
- CELL-provides information about various facets of a cellular system and call
- CLFL-provides information about call failures

- CPRTE-provides information about call processing application software that runs under the Windows (WIN) call model processing framework
- ERV-provides information about enhanced roamer validation
- ESNF-provides information about electronic serial number fraud
- FCEL-provides information about fixed cellular subscribers
- FRAU-provides information about unauthorized service providers and terminating mobile subscriber units
- HLR-the switch generates this log after the fifth unsuccessful attempt to send an unreliable roamer data directive
- IS41-International Standard 41 log reports provide information relating to transaction segmentation of messages longer than 255 bytes
- LAM-provides information about the location accuracy matrix
- MBPG-provides information about mobile paging
- MCDR-mobile call detail information
- MIWF-provides information about loss of mobile communication
- MTX-provide information about the mobile telephone exchange
- MTXT-mobile telephone exchange text log reports provide information about Cellular Extension Phone services provided to member subscribers
- OVLD-provides overload condition information in the computing module (CM)
- RAD-the switch generates this log on individual call diagnostics when requested for a radio
- RFP-remote feature PIN log provides information relating to a subscriber's activation/deactivation and change status
- RRIF-provides information about remote radio interface for MTX MAP configure/debug/monitor actions
- RSSI-provides information about received signal strength indication
- SRV-provides information about surveillance
- TIER-provides information about cell tiering
- VLR-provides information about visitor locating register.
- XRC-provides system failure or ICP P-side system recovery information

Supporting documentation

Refer to the following NTPs for additional information on logs:

- *Logs Report Reference Manual*
- *DMS-MTX Logs Reference Manual*, 411-2131-510

10 Equal access and trunking

Table 10-1 lists the design changes that the DMS-100 Wireless switch requires for equal access (EA). This chapter describes each topic listed in this table in detail.

Table 10-1 Index to DMS-100 Wireless EA changes (Sheet 1 of 2)

Section with required changes	Description
Introduction	Configure access tandem (AT) translations on the wireline part of the switch to route calls over existing intertoll (IT) or access to carrier (ATC) routes to an interexchange carrier (IEC). For subscribers equipped with multifrequency (MF) facilities only, set up translations to route calls from wireless end users to the AT or to the IEC using wireline MF ISL trunks.
OLI parameter	The Equal Access for the DMS-100 Wireless feature only supports the Cellular Service Type 2 value in the OLI parameter for wireless calls.
CIP	The Equal Access for the DMS-100 Wireless feature does not support ISDN user part (ISUP) direct inward dialing (DID) trunks directly to the IEC.
FGB carrier support	Wireless end users cannot access feature group B carriers with a point of presence at the AT. The wireline part of the DMS-100 Wireless switch does not support IT-to-IT trunk connections for FGB calls.
FGC carrier support	The Equal Access for the DMS-100 Wireless feature provides limited wireless support for feature group C (FGC) carriers. The wireless part of the switch signals the call as if it were a non-EA call. The DMS-100 Wireless switch requires a dedicated ISL trunk for each FGC carrier that wireless end user access.
Datafill tables	This section lists the EA data schema tables that require datafill for the DMS-100 Wireless switch.
Table TRKGRP	Set up the wireless part of an ISUP ISL trunk as a DID trunk group type when adding EA on the DMS-100 Wireless switch. Set refinement RTEVIAAT to Y.

Table 10-1 Index to DMS-100 Wireless EA changes (Sheet 2 of 2)

Section with required changes	Description
	Configure the wireline part of the ISUP ISL trunk as an IT trunk type. Set option CELL 2A to support North American EA ISL terminations.
Table LINEATTR	Assign field LATANM with the local access and transport area (LATA) name for the EA call. If you assign NILLATA to field LATANM, then the switch treats the call as a non-EA call.
Subtable SDTPRTCT.STDPRT	Assign separate pretranslators for wireless and wireline end users.
Table LATANAME	Assign separate LATA names for wireless and wireline end users.
Table LATAOLA	Assign prefix digits for all local calls as non-EA calls for the LATAs defined for wireless end users.
	Do <i>not</i> assign call types PRIV or CORRIDOR LATAs in field EATYPE to wireless end users.
Table OCCINFO	Make sure that all of the fields for a specific carrier are consistent between wireless and wireline platforms.
Office parameter	Use office parameter MOBILE_DEFAULT_CARRIER_OR_TREAT to specify a default carrier name or treatment when a wireless end user dials an EA call without a primary inter-LATA carrier (PIC) or dials a 10XXX or 101XXXX prefix. Use office parameter DEFAULT_CARRIER_OR_TREAT to set treatment for wireline end users.
Supporting documentation	This section lists additional NTPs that apply to wireline and wireless EA.

Introduction

Equal Access for DMS-100 Wireless allows the DMS-100 Wireless switch to route wireline and wireless EA calls using existing trunking facilities. These EA calls can route to either an AT or to an IEC.

Configure the access arrangement for a carrier as feature group D (FGD), feature group B (FGB), or feature group C (FGC).

Wireline end users can access FGD, FGB, or FGC carriers. Nortel Networks recommends that wireless end users use FGD carriers with the existing trunking facilities in an office. Wireless FGD carrier support uses ISUP DID trunks with partial support of GR-394 requirements. Equal Access for DMS-100 Wireless also provides limited support for wireless end users to access FGB and FGC carriers.

Configure AT translations on the wireline part of the switch to route calls over existing IT or ATC routes to the IECs.

Bellcore GR-394-Core defines the requirements for IEC interconnection with ISUP trunks. This specification describes the additional signaling parameters in the ISUP messages. It also includes the protocol and timers for the exit message (EXM).

The DMS100-Wireless switch supports the following ISUP parameters, which GR-394 requires:

- transit network selector (TNS)
- carrier identification parameter (CIP)
- carrier selection (CS)
- originating line information (OLI)
- charge number (CN)
- calling party number (CPN)

Integrated service link trunks route EA calls originating from wireless end users to the wireline part of the DMS-100 Wireless switch. The wireline software then routes the calls using existing trunking facilities to the AT and IEC switches.

Configure the access arrangement for a particular carrier as FGB, FGC, or FGD signaling. Each of these arrangements has different requirements for MF and Common Channel Signaling 7 (CCS7) signaling, and billing record generation. FGD is the most widely used arrangement. Dial a 950XXXX number to access FGB carriers. Calling card calls typically use FGB carriers. Operator traffic typically uses FGC signaling. Equal Access for DMS-100 Wireless provides FGD development and limited support for FGB and FGC traffic using existing functionality. (The following sections describe each of these carrier arrangements in detail.)

The DMS-100 Wireless switch generates automatic message accounting (AMA) record call codes 110 and 119 for FGD support. The switch also generates call codes 134 and 135 for FGB support. The wireline part of the switch generates these records using existing wireline billing capabilities. These records also include carrier connect time for applying access charges. The DMS-100 Wireless switch generates call detail recording (CDR) records to track the access time used by the wireless end users involved in a call.

The DMS-100 Wireless switch uses office parameter `DEFAULT_CARRIER_OR_TREAT` to set default treatment for wireline end users. Office parameter `MOBILE_DEFAULT_CARRIER_OR_TREAT` defines a default carrier or treatment for wireless end users.

For subscribers equipped with MF facilities only, set up translations to route calls from wireless end users to the AT or to the IEC using wireline MF ISL trunks. In each occurrence, the switch does not generate end office (EO) billing to record carrier connection time.

Note: This chapter highlights the EA functionality and specific datafill for the Equal Access for DMS-100 Wireless switch.

Refer to the following NTPs on provisioning EA:

- *DMS-MTX Basic Cellular Translations*, 411-2131-220
- *DMS-MTX Customer Data Schema Reference Manual*, 411-2131-451
- *Customer Data Schema Reference Manual*
- *Translations Guide*

Equal Access for DMS-100 Wireless

Equal Access for DMS-100 Wireless allows wireline and wireless end users to select inter-local access and transport area (LATA) long-distance carriers by presubscription. Or DMS-100 Wireless end users can select individual inter-LATA long-distance carriers for each call.

The following sections describe how Equal Access for DMS-100 Wireless supports feature group carriers.

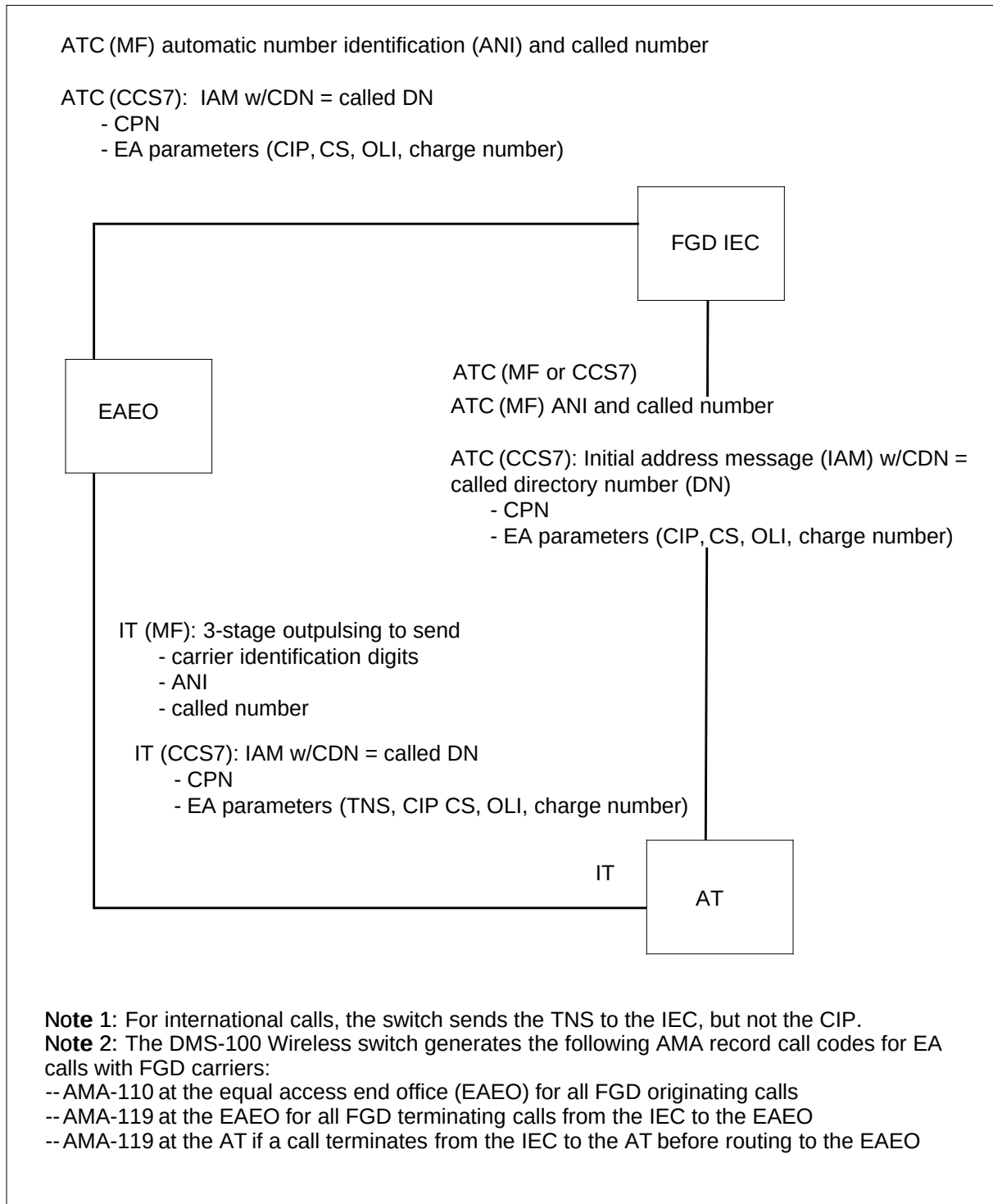
FGD carrier support

Equal Access for DMS-100 Wireless routes wireline and wireless EA calls using FGD over existing trunking facilities to either an AT or an IEC. This feature supports both national and international calls.

Wireline support

Equal Access for DMS-100 Wireless allows wireline end users to access FGD carriers by any method that the wireline DMS-100 switch supports. The DMS-100 Wireless switch routes calls originating from wireline end users directly to an IEC or indirectly through an AT to an IEC.

Figure 10-1 shows the configuration for wireline EA FGD support.

Figure 10-1 Wireline EA FGD configuration

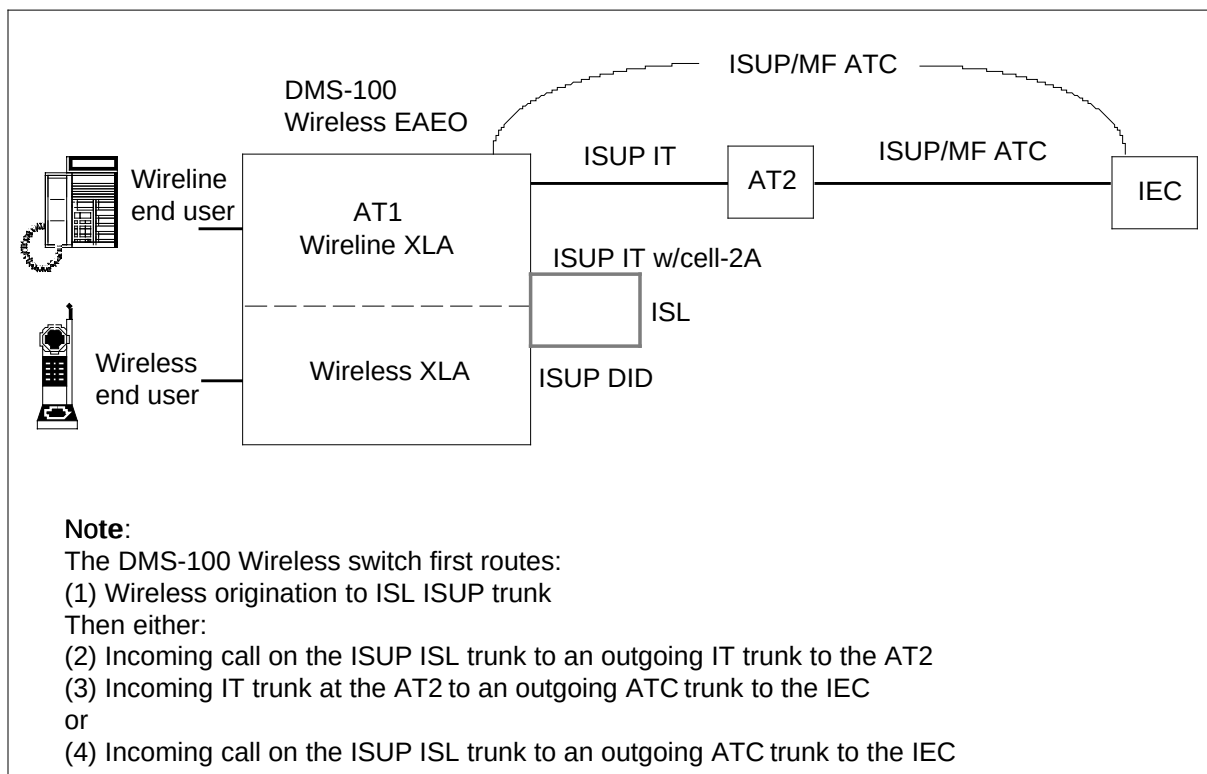
Wireless support

Equal Access for DMS-100 Wireless allows wireless end users to access FGD carriers using the existing trunking facilities in an office. Wireline FGD carrier support uses ISUP DID trunks with partial support of GR-394 requirements. With this feature, ISUP DID trunks signal the TNS, CIP, CS, OLI, and CN parameters. (The switch ignores the ISUP EXM.)

The DMS-100 Wireless switch first routes calls originating from wireless end users into the wireless part of the switch. The calls then route into the wireline part of the switch through an ISL trunk. The calls continue directly to an IEC or indirectly through an AT to an IEC.

Figure 10-2 shows the DMS-100 Wireless FGD trunk configuration for EA.

Figure 10-2 DMS-100 Wireless FGD trunk configuration



In Figure 10-2, the wireless part of the DMS-100 Wireless switch generates CDR records. The wireline part of the DMS-100 Wireless switch generates AMA records (such as AMA-110 and AMA-119).

The wireline part of the DMS-100 Wireless switch (AT1) handles access from the wireless end user with an AT2 or IEC through an IT or an ATC trunk. IT ISL trunks with option CELL 2A execute this routing. The wireline part of the

DMS-100 Wireless switch also generates AMA records that record the carrier connection time.

Wireless ISUP IAM parameter support for FGD

For wireless trunks that support GR-394 FGD signaling, Equal Access for DMS-100 Wireless adds the following ISUP parameters to the IAM.

Table 10-2 DMS-100 Wireless ISUP IAM parameters

Parameter name	Function
CIP	The carrier identification parameter identifies the carrier to which the call belongs.
CN	The charge number parameter provides the ANI to the IEC when the CPN cannot identify the charge address.
CPN	The calling party number parameter carries the address digits of the specific station set that originated the call.
CS	The carrier selection parameter determines if the originator is using a presubscribed carrier or if a carrier code was entered as a part of making the call.
OLI	The originating line information parameter identifies if the ANI is available in the IAM.
TNS	The transit network selector parameter routes the call to the appropriate AT or IEC. Only international calls send this parameter to the IEC.

The TNS parameter from the wireless part of the DMS-100 Wireless switch routes the call to the appropriate AT or IEC on the wireline part of the switch. The switch sends the CIP to the AT or IEC to identify the carrier to which this call belongs. The CS parameter determines if the originator is using a presubscribed carrier or if a carrier code was entered when the call was made. The OLI parameter specifies if the message contains ANI. The switch then attempts to locate the ANI (that is, either from the CPN parameter or the CN parameter). If the switch expects to receive the ANI, which operating company personnel had not specified, the IEC does not complete the call.

The following paragraphs describe each of these wireless trunk parameters in detail.

CPN parameter

The CPN parameter carries the address digits of the specific station set that originated the call. The selected IEC determines whether to include the CPN parameter. Field INCCPN in table OCCINFO (Equal Access Other Common

10-8 Equal access and trunking

Carrier Information) indicates if a specific carrier is to include the CPN parameter.

When the IAM contains the CPN parameter, the wireless part of the DMS-100 Wireless switch adds the ten-digit calling number (that is, the NPA+NXX-XXXX) in the address information field.

Figure 10-3 shows the Bellcore-specified bite structure for a CPN parameter.

Figure 10-3 CPN parameter

Calling party number parameter-definition							
8	7	6	5	4	3	2	1
Odd/ Even	Nature of address indicator						
Spare	Numbering plan			Presentation		Spare	
Address information							

Table 10-3 lists the values that the CPN parameter supports for FGD signaling.

Table 10-3 Supported codes for CPN parameter (Sheet 1 of 2)

Name	Value	Indication
Odd/Even	0	Even number of address digits
	1	Odd number of address digits
Nature of address	0000000	Spare
	0000011	Unique national (significant) number
	1110011	Non-unique national (significant) number
Spare	0	Spare
Numbering plan	000	Unknown
	001	ISDN (telephony) Numbering Plan (Rec. E.164)

Table 10-3 Supported codes for CPN parameter (Sheet 2 of 2)

Name	Value	Indication
Presentation	00	Presentation restricted (default)
	01	Presentation allowed
Spare	00	Spare
Address information	BCD	Binary coded decimal numbers (charge number)

OLI parameter The OLI parameter is the binary equivalent of the II digits that precede the ANI digits of inband signaling “II+ANI.” It indicates the call type of the originating party. The IAM contains the OLI parameter, depending on the class of service and the IEC that receives the IAM.

The IAM can contain the OLI parameter as an IEC option. (Refer to field ANI of table OCCINFO. Field ANI controls the CN and OLI parameters as a pair. For the carrier to receive the indication, set field ANI to Y. Otherwise, set it to N.)

Equal Access for DMS-100 Wireless only supports the Cellular Service Type 2 (#3E) value for wireless calls. This value in the OLI parameter indicates that the wireless call is from the mobile switching center (MSC) to the AT.

Figure 10-4 shows the Bellcore-specified bite structure for an OLI parameter.

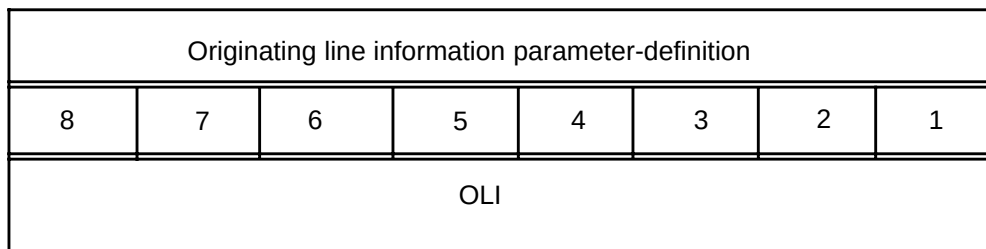
Figure 10-4 OLI parameter

Table 10-4 lists the codes that the OLI parameter supports for FGD signaling.

Table 10-4 Supported codes for OLI parameter

Name	Value	Indication
OLI	00111110	Cellular Service Type 2

CN parameter The CN parameter includes the billable number, and is equivalent to the ANI digits of the “II+ANI” sequence for inband signaling.

The IAM contains the CN parameter, depending on the class of service and the IEC which receives the IAM.

The IAM can contain the CN parameter as a single IEC option. (Refer to field ANI of table OCCINFO. Field ANI controls the CN and OLI parameters as a pair. For the carrier to receive the indication, set field ANI field to Y. Otherwise, set it to N.)

Although the CN and CPN parameters are independent of each other, they can be the same. Use the CN parameter if field ANI equals Y and is different than parameter CPN. Do not use the CN parameter if the CPN parameter is identical to the CN parameter, and the IAM includes the CPN and OLI parameters. The presence of the OLI parameter and the absence of the CN parameter tells the IEC that the CN address agrees with the calling party address.

The IAM contains the CN parameter if both of the following conditions exist:

- if the IEC wants the CN parameter but not the CPN parameter
- if the CN and calling party addresses match

When the IAM includes the CN parameter that the IEC receives, the wireless part of the DMS-100 Wireless switch includes the calling digits in the address information field. Field DIGITMFT in table TRKGRP (Trunk Group) defines the length of the digits for ISUP DID trunks. (Set DID trunks with FGD traffic to ANI10.)

Figure 10-5 shows the Bellcore-specified bite structure for a CN parameter.

Figure 10-5 CN parameter

Charge number parameter-definition							
8	7	6	5	4	3	2	1
Odd/ Even	Nature of address indicator						
Spare	Numbering plan		Spare				
Address information							

Table 10-5 lists the codes that the CN parameter supports for FGD signaling.

Table 10-5 Supported codes for CN parameters

Name	Value	Indication
Odd/even	0	Even number of address digits
	1	Odd number of address digits
Nature of address	0000000	Spare
	0000011	ANI of the calling party; national number
Spare	0	Spare
Numbering plan	000	Unknown
	001	ISDN (telephony) Numbering Plan (Rec. E.164)
Spare	0000	Spare
Address information	BCD	Binary coded decimal numbers (charge number)

TNS parameter The TNS parameter contains the carrier identification code (CIC) to complete the call. The CIC can be one of the following codes:

- the XXX/XXXX code (which the calling party dialed)
- the presubscribed Primary Inter-LATA Carrier (PIC) code, or
- the default system carrier code

The IAM includes the TNS parameter for calls to an international carrier (INC) or calls to an AT. The TNS parameter obtains the XXX/XXXX from table OCCINFO.

Table CICSIZE4 (Carrier Identification Code Size Four) checks if a specific trunk type supports three- or four-digit CICs. The remaining element is the circuit code. The circuit code has two purposes: to identify the 1NX or 1N'X signaling, or to identify the 0ZZ digits for individual IECs.

The following circuit code values help to interpret the information in the 1NX or 1N'X digits:

- 1-“international call, no operator requested”
- 2-“international call, operator requested”

Figure 10-6 shows the Bellcore-specified bite structure for a TNS parameter.

Figure 10-6 TNS parameter

Transit network selection parameter-definition							
8	7	6	5	4	3	2	1
Spare	Type of network ID			Network identification plan			
Digit 2				Digit 1			
Digit 4				Digit 3			
Circuit code				Reserved			

Table 10-6 lists the codes that the TNS parameter supports for FGD signaling.

Table 10-6 Supported codes for TNS parameter

Name	Value	Indication
Spare	0	Spare
Type of network ID	010	National network ID
Network ID plan	0001	Carrier ID code (3-digit XXX code administered by Bellcore)
	0010	Carrier ID code (4-digit XXXX code administered by Bellcore)
Digit 1	BCD	First digit of carrier access code (binary coded decimal digit)
Digit 2	BCD	Second digit of carrier access code (binary coded decimal digit)
Digit 3	BCD	Third digit of carrier access code (binary coded decimal digit)
Digit 4	BCD	Fourth digit of carrier access code (binary coded decimal digit)
Circuit code	0000	Unspecified
	0001	International call; no operator requested
	0010	International call; operator requested
Reserved	0000	Reserved

CIP ISUP connections use the optional CIP in the IAM. The CIP also contains the CIC. The CIC can be one of the following codes:

- the XXX/XXXX code (which the calling party dialed)
- the presubscribed PIC code, or
- the default system carrier code

The IEC requests that the IAM include the CIP for certain call types. The IAM includes the CIP for calls to an AT, but *not* for calls to an INC. Calls to a non-international IEC for a specific trunk group can include or exclude the CIP, as indicated in option CICSET of table TRKGRP. Also, ATC trunk group tuples can have a CIP value set (CICSET) key assigned against them in table TRKGRP. ATC trunk groups without the optional CICSET key do not include the CIP in the IAM. An IT trunk group does not have option CICSET in table TRKGRP because an outgoing IAM always includes the CIP to an IT trunk.

For outgoing DID trunks from the wireless part of the DMS-100 Wireless switch, refinement RTEVIAAT in table TRKGRP determines whether to include the CIP. (This field specifies if the call routes through an AT.)

Note: Equal Access for DMS-100 Wireless does not support ISUP DID trunks directly to the IEC. Set refinement RTEVIAAT to Y for the outgoing DID trunk from the DMS-100 Wireless switch. The IAM always includes the CIP for a DID trunk if you had set refinement RTEVIAAT to Y.

The DMS-100 Wireless switch sends four-digit CICs in the CIP. If the CIC is just three digits, translations prefixes a 0 to change it into a four-digit CIC (0XXX).

Figure 10-7 shows the Bellcore-specified bite structure for a CIP parameter.

Figure 10-7 CIP parameter

Carrier identification parameter-definition							
8	7	6	5	4	3	2	1
Spare	Type of network ID			Network identification plan			
Digit 2				Digit 1 (most significant)			
Digit 4 (least significant)				Digit 3			

Table 10-7 lists the codes that the CIP parameter supports for FGD signaling.

Table 10-7 Supported codes for CIP parameter

Name	Value	Indication
Spare	0	Spare
Type of network ID	010	National network ID
Network ID plan	0010	Carrier ID code (4-digit XXXX code administered by Bellcore)
Digit 1	BCD	First digit of carrier access code (binary coded decimal digit)
Digit 2	BCD	Second digit of carrier access code (binary coded decimal digit)
Digit 3	BCD	Third digit of carrier access code (binary coded decimal digit)
Digit 4	BCD	Fourth digit of carrier access code (binary coded decimal digit)

CS parameter The CS parameter contains the following selected carrier ID information:

- code presubscribed and not input by the calling party
- code presubscribed and input by the calling party
- code not presubscribed and input by the calling party

In all occurrences, the TNS parameter specifies the selected carrier.

You can configure the IAM to include the CS parameter as an IEC option. (Refer to field PICIND in table OCCINFO. Set this field to Y if a carrier is to receive the presubscription indication. If the carrier is not to receive the presubscription indication, set this field to N.)

Figure 10-8 shows the Bellcore-specified bite structure for a CS parameter.

Figure 10-8 CS parameter

Carrier selection parameter-definition							
8	7	6	5	4	3	2	1
Carrier selection information							

Table 10-8 lists the codes that the CS parameter supports for FGD signaling.

Table 10-8 Supported codes for CS parameter

Name	Value	Indication
Carrier selection information	00000000	No indication (default)
	00000001	Selected carrier ID code presubscribed and no input by calling party
	00000010	Selected carrier ID code presubscribed and input by calling party
	00000100	Selected carrier ID code not presubscribed and input by calling party

ISL trunk datafill Configure the wireless part of an ISUP ISL trunk group as a DID trunk group type. Configure the wireline part of the ISUP ISL trunk group as an IT trunk group type with options CELL and BILLNO in table TRKGRP.

Use options CELL and BILLNO for the wireline part of the DMS-100 Wireless switch to generate AMA records, which record the carrier connect time. Option CELL allows operating company personnel to specify if the trunk is a type 2A or type 2B cellular interconnection. (For the DMS-100 Wireless switch, set this option to 2A.) An originating Cell 2A EA call generates AMA records with call codes 066 and 110. A terminating Cell 2A EA call generates AMA records with call codes 064 and 119. Option BILLNO allows operating company personnel to specify a special billing number, which populates the originating number field in AMA record call codes 066 and 110.

The DMS-100 Wireless switch generates AMA record call codes 064 and 066 for ISL trunks when option CELL is set. Turn off fields CMCORIG and CMCTERM in table AMAOPTS (Automatic Message Accounting Options) if the DMS-100 Wireless switch does not provide cellular trunk interconnection to other cellular offices.

However, if the DMS-100 Wireless switch provides cellular trunk interconnections to other end offices, the downstream AMA processing must separate AMA record call codes 064 and 066 generated by ISL trunks.

Use the following procedure to make sure that downstream processing separates these AMA records.

- Configure option BILLNO with a special billing DN in table TRKGRP for ISL DID trunks.
- Configure the ISL trunk in table AMATKOPT (Automatic Message Accounting Trunk Group Option) with option TRKINFO. This generates an extra module attached to AMA record call codes 064 and 066, which contains the trunk group number and trunk group name information.

Note: Turn off fields CMCORIG and CMCTERM in table AMAOPTS to suppress the DMS-100 Wireless switch from generating AMA record call codes 064 and 066 for an entire office.

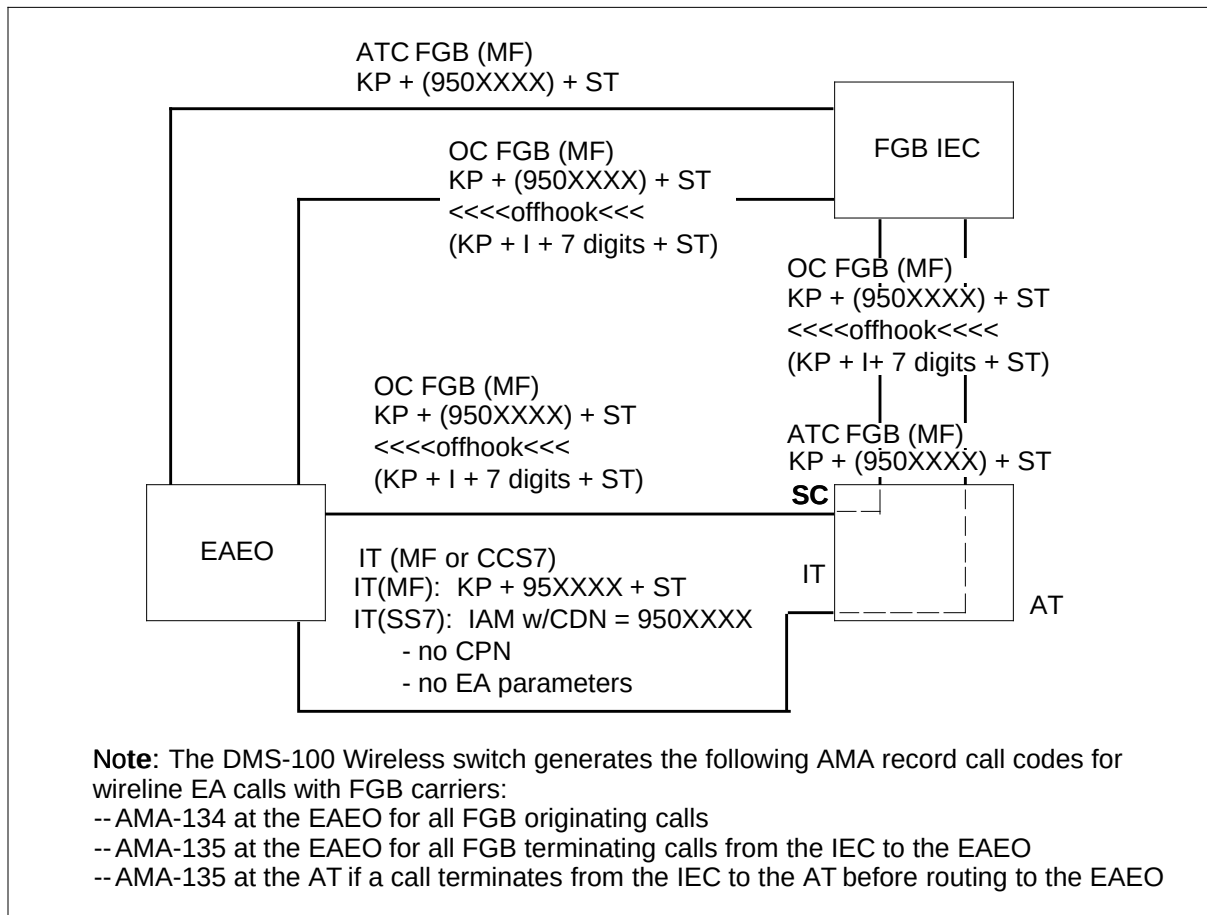
FGB carrier support

The following paragraphs describe how supports FGB carriers for wireline and wireless calls.

Wireline support

Equal Access for DMS-100 Wireless allows wireline end users to access FGB carriers using any mechanism that the wireline DMS-100 switch supports.

Figure 10-9 shows the configuration for wireline EA FGB support.

Figure 10-9 DMS-100 EA FGB configuration

Wireless support

Wireless end users can dial FGB carriers, which have a point of presence at the EO by using ISUP DID ISL trunks.

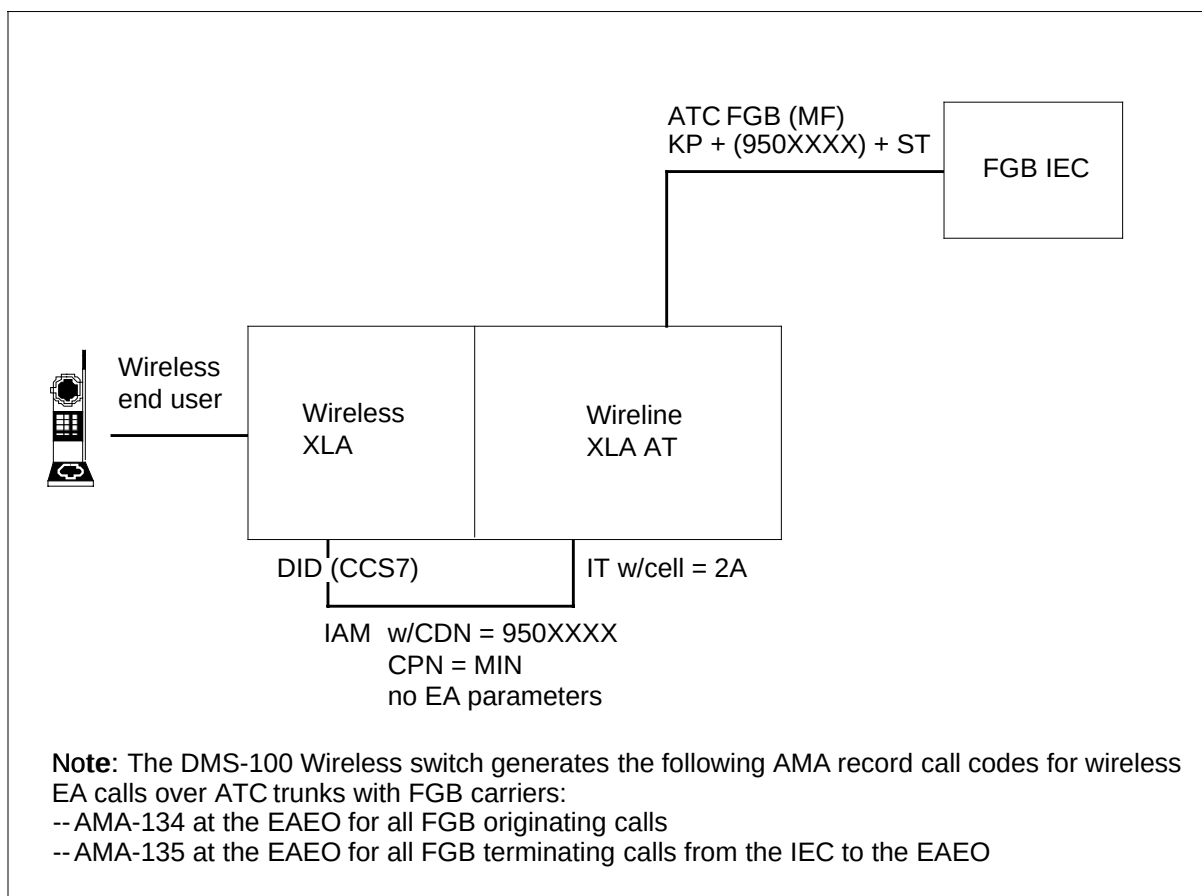
The DMS-100 Wireless switch supports FGB signaling to the existing FGB carriers by treating the wireless end users' 950XXXX calls as regular (that is, non-EA) calls. (These calls route over ISL trunks.)

When the call terminates to the wireline part of the DMS-100 Wireless switch and the switch translates the 950XXXX number, the call routes over one of the following two kinds of trunks:

- ATC trunks to the IEC
- outgoing centralized (OC) AMA trunks to the IEC

Figure 10-10 shows the DMS-100 Wireless switch configuration to support EA FGB carriers when routing wireless calls over ATC trunks to the IEC.

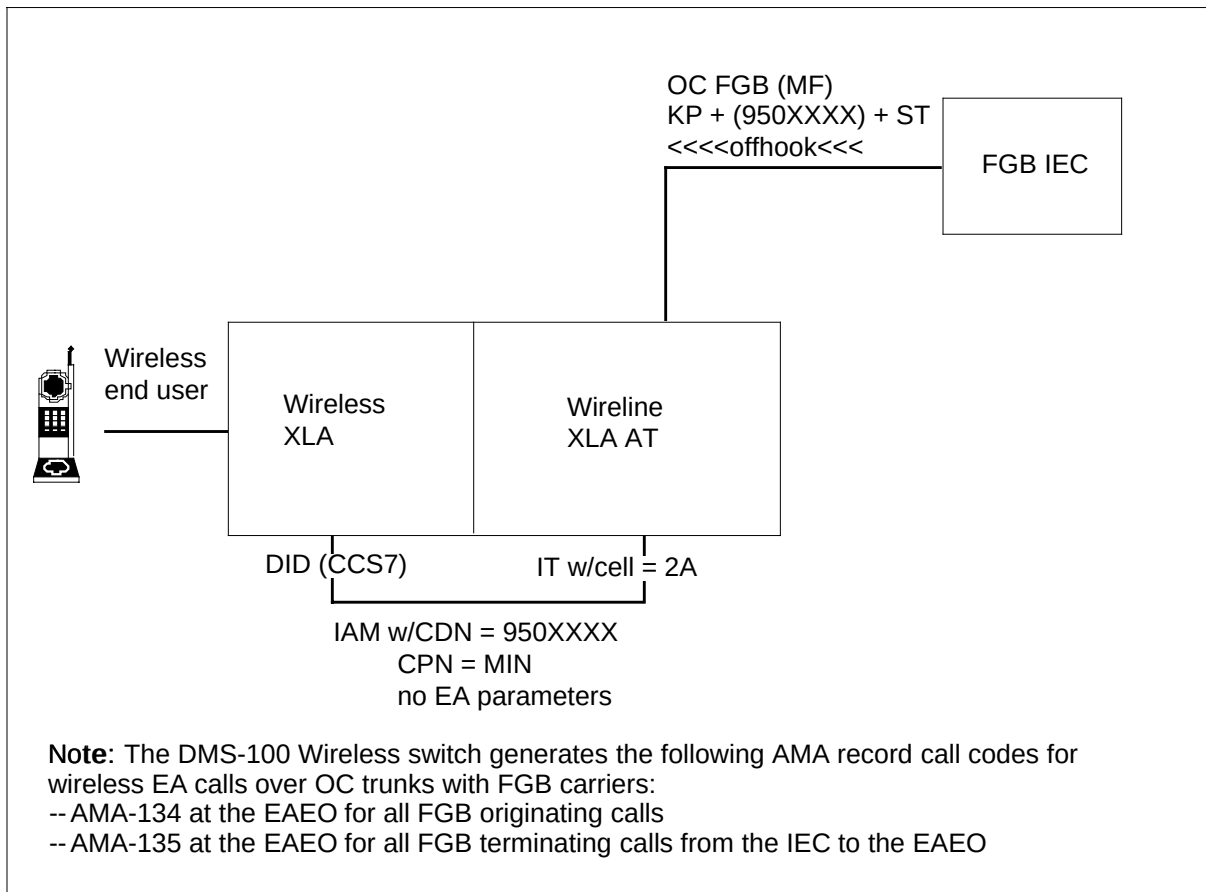
Figure 10-10 DMS-100 Wireless FGB trunk configuration, routing over ATC trunks to the IEC



The DMS-100 Wireless switch generates two AMA records for each call on the wireline part of the switch. Originating calls generate call codes 066 and 134. Terminating calls generate call codes 064 and 135.

Wireless end users of the DMS-100 Wireless switch cannot access FGB carriers with a point of presence at the AT. This limitation is because the wireline side of the DMS-100 Wireless switch does not support IT-to-IT trunk connections for FGB calls. In addition, the wireline part of the DMS-100 Wireless switch does not support EA billing records associated with this configuration.

Figure 10-11 shows how the DMS-100 Wireless switch supports EA FGB carriers when routing wireless calls over OC trunks to the IEC.

Figure 10-11 DMS-100 Wireless FGB trunk configuration, routing over OC trunks to the IEC

Equal Access for DMS-100 Wireless supports only OC trunks with no ANI request. If ANI is not required, then the call routes over an OC trunk to an FGB IEC. Originating calls generate call codes 066 and 134. Terminating calls generate call codes 064 and 135. An ANI failure occurs for each call if ANI is required, but ANI is not present.

FGC carrier support

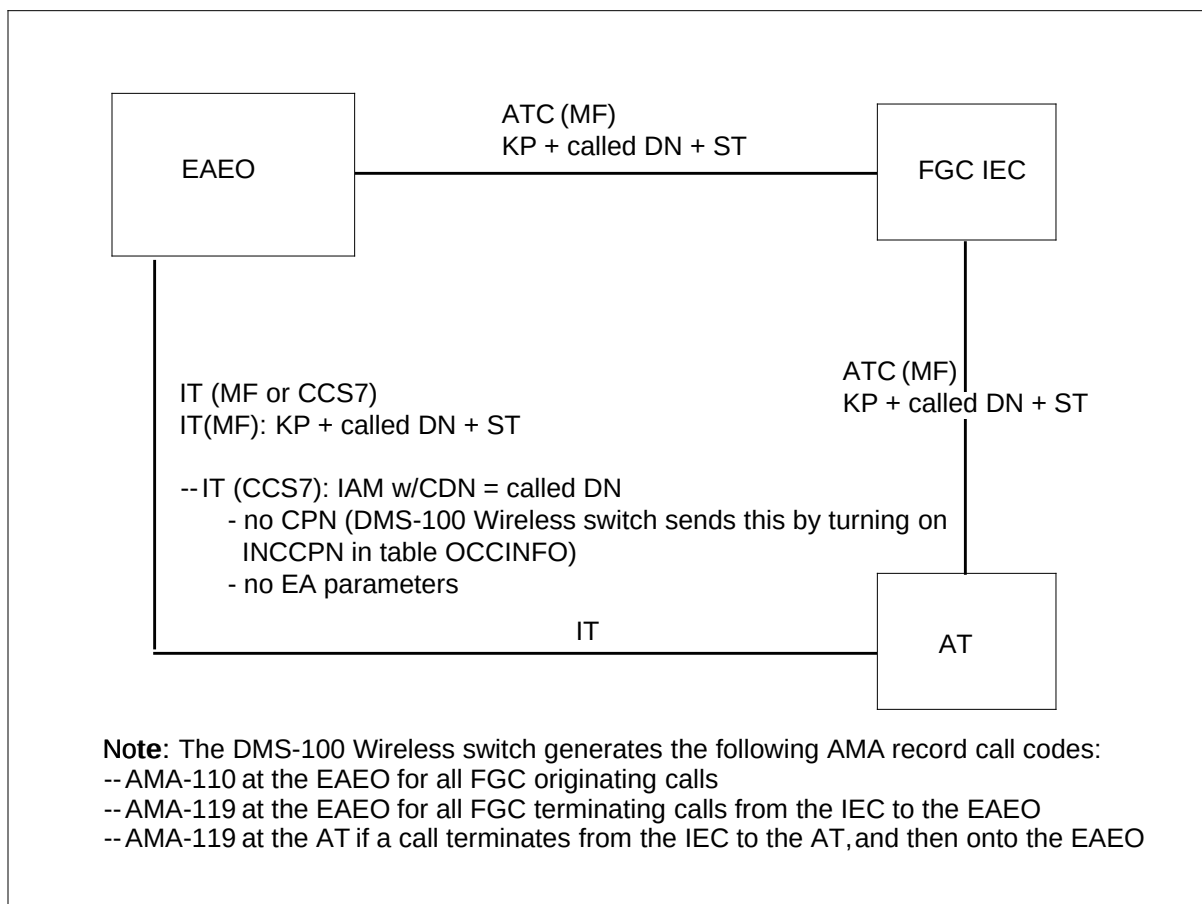
The following paragraphs describe how Equal Access for DMS-100 Wireless supports FGC carriers for wireline and wireless calls.

Wireline support

Equal Access for DMS-100 Wireless allows wireline end users to access FGC carriers using any mechanism that the wireline DMS-100 switch supports.

Figure 10-12 shows the configuration for wireline EA FGC support.

Figure 10-12 DMS-100 EA FGC configuration



When a wireline end user places a call to an FGC carrier, the switch routes the call either directly over ATC trunks, or indirectly through an AT over IT trunks. With FGC signaling, the EO communicates only the called DN to the carrier.

Because the AT does not receive carrier information, the DMS-100 Wireless switch supports only the following configurations.

- Only one IEC is connected to the AT.
- The EO separates FGC EA traffic into different trunk groups, each of which has its own translator at the AT.

Table OCCINFO identifies FGC carriers.

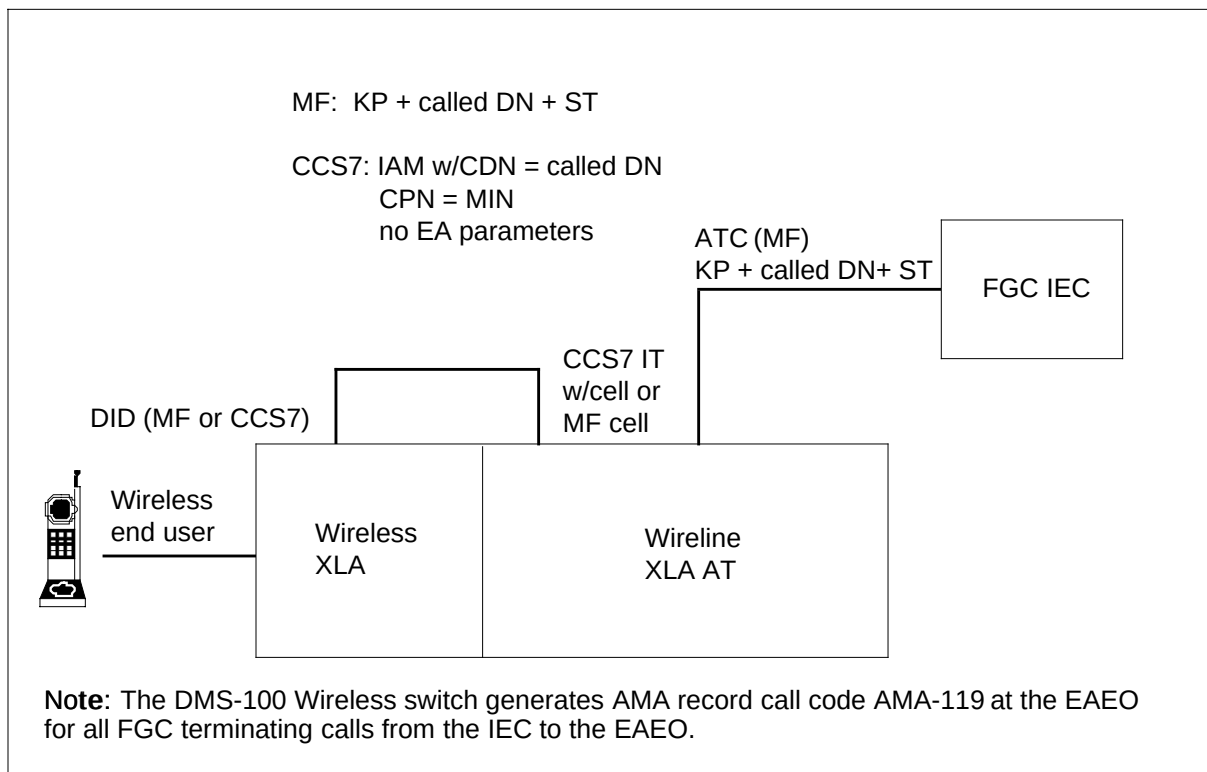
The switch records carrier connect time when the outgoing trunk to the carrier is seized.

Wireless support

Equal Access for DMS-100 Wireless provides limited wireless support for FGC carriers. The wireless part of the switch signals the call as if it were a non-EA call. The result is that the wireline part of the switch does not receive any carrier information over an ISL trunk. Therefore, assign a dedicated ISL trunk for each FGC carrier that is accessible to wireless end users. When calls enter the wireline part of the switch on the dedicated ISL trunk, translations route the call to the specified FGC carrier.

Figure 10-13 shows the configuration for wireless EA FGC support.

Figure 10-13 DMS-100 Wireless EA FGC configuration, routing over ATC to FGC carrier



The switch requires a dedicated ISL trunk for each FGC carrier that wireless end users access. Wireless translations route wireless calls destined for FGC carriers to a DID ISL trunk, using either MF or CCS7 signaling.

The DMS-100 Wireless switch does not generate originating AMA records with call code AMA-110 to record this wireless call as an EA call. However, the switch does generate AMA record call codes 064 and 066 to record the originations to and terminations from the cellular trunk. In addition, the DMS-100 Wireless switch generates a CDR to record the wireless originator or terminator involved in the call.

Limitations and restrictions

The following limitations and restrictions apply to Equal Access for DMS-100 Wireless:

- Equal Access for DMS-100 Wireless does *not* support operator services for EA calls. (This limitation includes operator hold and re-ring capabilities.)
- Equal Access for DMS-100 Wireless does *not* support routing over wireless-originated calls using ISUP DID trunks that terminate directly to an IEC, bypassing the wireline portion of the DMS-100 Wireless switch.

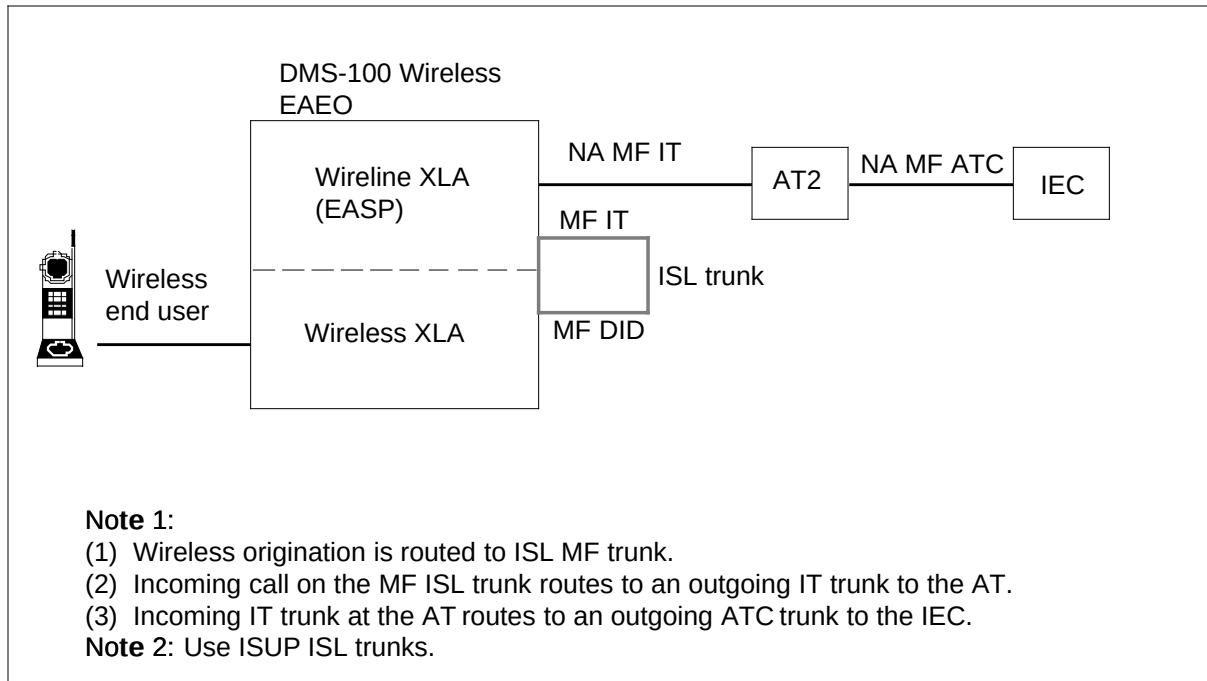
The following paragraphs describe additional limitations and restrictions applicable to each feature group carrier that Equal Access for DMS-100 Wireless supports.

FGD carrier

Use ISUP ISL trunks for FGD carriers. However, the following limitations apply if you use MF ISL trunks for FGD carriers.

- The DMS-100 Wireless switch does not generate AMA record call codes 110 and 119 to record the carrier connect time.
- Calls entering the wireline part of the DMS-100 Wireless switch must exit on MF trunks.
- The wireline part of the DMS-100 Wireless switch requires the following prerequisites:
 - intermediate switch software feature AL0229, Equal Access Alternate Switching Point (EASP)
 - subtable STDPRTCT.STDPRT (Standard Pretranslator) with the ET selector to act as the EASP

Figure 10-14 shows the DMS-100 Wireless switch FGD configuration for MF trunks.

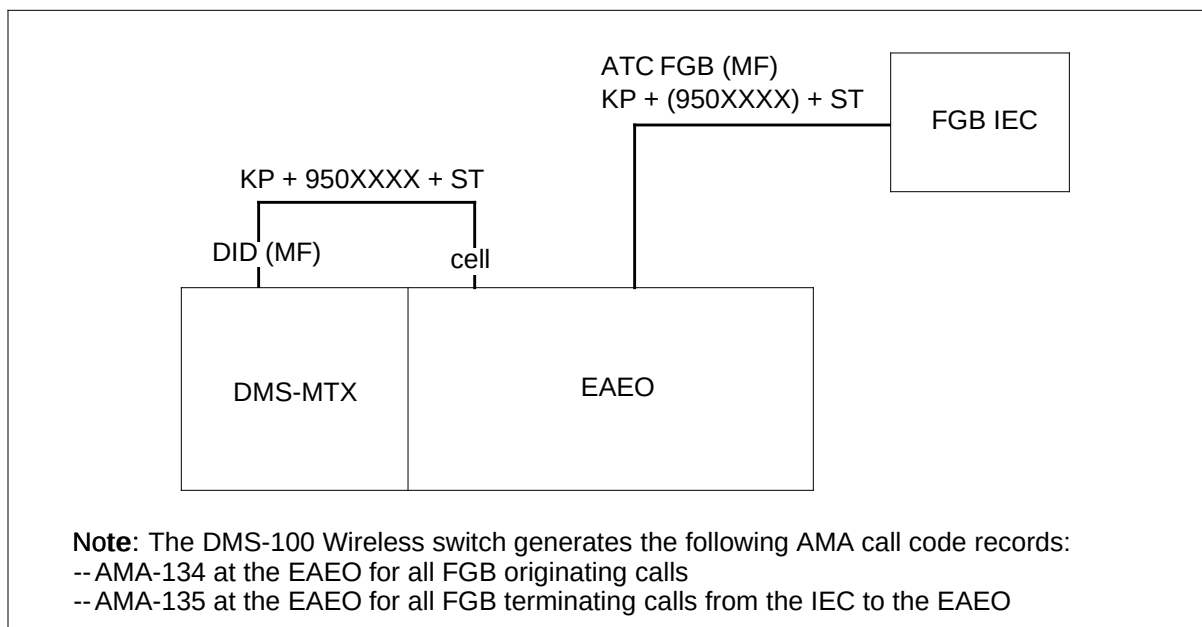
Figure 10-14 Possible DMS-100 Wireless FGD MF trunk configuration**FGB carrier**

Use ISUP ISL trunks for FGB carriers. However, the following limitations apply if you use ISUP or MF ISL trunks for FGB carriers.

- Wireless end users cannot access FGB carriers, which have a point of presence at the access tandem (AT2).
- An FGB carrier does not support OC trunks that require an ANI spill.

However, if you use MF ISL trunks instead of ISUP ISL trunks, make sure that the 950XXXX digits outpulse over MF ISL trunks. Without these digits, the wireline call processing environment cannot determine how to route the call.

Figure 10-15 DMS-100 Wireless FGB trunk configuration using MF ISL trunks routing over ATC to the IEC



FGC carrier

The following limitations and restrictions apply to Equal Access for DMS-100 Wireless for FGC carriers.

- The DMS-100 Wireless switch cannot generate AMA record AMA-110 at the EO to record the call as an EA call.
- Wireless translations must be configured to route the call over an ISL trunk, which has been dedicated for the FGC carrier.
- A separate translator must be datafilled for the wireline end of the dedicated ISL trunk, which routes the call directly to the FGC carrier using ATC trunks.

Billing

Although Equal Access for DMS-100 Wireless does not add new or change existing AMA records, it does generate existing records. This feature uses existing wireline billing functionality to produce the required AMA records.

The DMS-100 Wireless switch generates the following AMA records to record carrier information applicable to EA charges.

- Call code 110 records originations for direct-dialed, station-paid toll calls routed over an inter-LATA carrier facility for FGD carriers.
- Call code 119 records terminations for direct-dialed, station-paid toll calls routed over an inter-LATA carrier facility for FGD and FGC carriers. The switch generates this record automatically for all ATC trunk originations.
- Call code 134 records FGB EA originations.
- Call code 135 records FGB EA terminations.
- Call code 064 records calls originating to a central message controller (CMC) (cellular switch). This record records the time length of the trunk connection to the cellular switch. (Although this is not an EA record, operating company personnel can change some of the information in this record.)
- Call code 066 records calls terminating from a CMC. This record records the time length of the trunk connection to the cellular switch. (Although this is not an EA record in itself, operating company personnel can change some of the information in this record.)

Datavill tables

Table 10-9 lists datavill tables, which operating company personnel must customize to support EA for both wireless and wireline end users.

Note 1: Refer to the “Supporting documentation” section at the end of this chapter for a listing of applicable wireline and wireless NTPs that contain complete datavill procedures.

Note 2: Equal Access for DMS-100 Wireless does not add or change any existing fields in these tables. Only specific datavill is required for these tables that are shared by both wireline and wireless call processing environments to define EA information.

Table 10-9 Datavill tables required for Equal Access for DMS-100 Wireless (Sheet 1 of 2)

Table	Purpose of table
TRKGRP	Trunk Group. This table contains information about trunk groups.
LINEATTR	Line Attribute. This table defines line attribute indexes applicable to an office. It determines indexing into screening tables and defines the attributes of the line generating the call. Note: Table LINEATTR is not available for wireless datavill use beginning with software release LWW0006. Refer to subsection “Table LINEATTR” on page 7-16 for details.

Table 10-9 Datafill tables required for Equal Access for DMS-100 Wireless (Sheet 2 of 2)

Table	Purpose of table
STDPRTCT. STDPRT	Standard Pretranslator Subtable. This subtable is the first table that the received leading digits indexes into, provided that the originating line attribute (in table LINEATTR) or trunk (in table TRKGRP) specifies a pretranslator name other than NPRT (no pretranslator name).
OFRT	Office Route. This table identifies the route for any specific call. It also identifies the circuit that the TNS parameter of the IAM uses.
LATANAME	Equal Access Local Access and Transport Area Name. This table lists the defined LATA names that the switch serves.
LATAXLA	Equal Access Local Access and Transport Area Translation. This table defines the attributes of domestic calls such as inter-LATA or intra-LATA calls, as well as interstate or intrastate calls.
OCCINFO	Equal Access Other Common Carrier Information. This table defines the attributes for carriers serving the switch and screens calls for carrier compatibility.
CICSIZE4	Carrier Identification Code Size Four. This table specifies the trunk group that uses four-digit CICs. (This table only exists if FGD CID expansion is present.)

Table TRKGRP

This feature requires specific datafill for a DID trunk to support EA ISUP originations, and for an IT trunk to support mobile EA ISUP terminations. When you add EA on the DMS-100 Wireless switch, set up the wireless part of an ISUP ISL trunk as a DID trunk group type. Set refinement RTEVIAAT to Y.

Configure the wireline part of the ISUP ISL trunk as an IT trunk type. Set option CELL 2A to support North American EA ISL terminations. Designate a distinct billable number for option BILLNO so that the downstream processor can distinguish the AMA records that the wireless DID ISL and non-ISL trunks generate.

Table 10-10 shows the datafill specific to Equal Access for DMS-100 Wireless for table TRKGRP. Table 10-10 shows only those fields that apply directly to Equal Access for the DMS-100 Wireless switch.

Note: Equal Access for the DMS-100 Wireless switch does not add or change any of the datafill for this table. However, the DMS-100 Wireless

switch requires the following specific datafill to support wireline and wireless end users.

Table 10-10 Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
GRPINFO		see subfields	Variable group information. This field consists of subfields GRPTYP, TRAFSNO, PADGRP, and NCCLS. Note: This feature only affects subfield GRPTYP for EA calls on the wireless part of an ISUP ISL trunk, and subfields GRPTYP and OPTIONS for EA calls on the wireline part of an ISUP ISL trunk.
	GRPTYP	DID, IT	Group type. For EA calls on the wireless part of an ISUP ISL trunk, enter DID for the direct inward dialing group type. Or for EA calls on the wireline part of an ISUP ISL trunk, enter IT for intertoll trunk group type.
	OPTIONS	CELL, BILLNO	Options. Datafill subfield OPTION and refinements CELL and BILLNO for EA calls on the wireline part of an ISUP ISL trunk.
	CELL_SS7_TYPE	2A	Cell. If subfield OPTION equals CELL, enter the configuration of the IT trunk type. For this feature, enter 2A to indicate that the IT trunk is configured as a North American EA ISL terminating trunk.
	BILLNO	up to an 11-digit billing number	Billing number. If subfield OPTION equals BILLNO, enter a distinct billing number that allows the downstream processor to distinguish AMA records generated by wireless DID ISL and those generated by non-ISL trunks.

Datafill example for table TRKGRP

Figure 10-16 shows sample datafill for table TRKGRP.

Figure 10-16 MAP display example for table TRKGRP

GRPKEY GRPINFO

ISUPITDID IT 0 ELO NCRT 2W NIL MIDL 619 BNR NSCR 619000 N N **(CELL 2A)**
(BILLNO 12345667890) \$
ISUPDIDIT DID 0 ELO NCIT 2W MIDL 7 CELL2 N NOANI N Y N STD NAXL 619
 NPRT NSCR 619 999 Y N

Table LINEATTR

Table LINEATTR provides information pointing to tuples in other tables. Table CELLCUST (Cellular Customer) is the index into table LINEATTR.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. Therefore, this table description does not show a datafill procedure for table LINEATTR.

Figure 10-17 shows sample datafill for table LINEATTR.

Figure 10-17 MAP display example for table LINEATTR

LNATTIDX	LCC	CHGCLSS	COST	LTG	TRAFSNO	SFC	MDI	DFLTRA
IXNAME	DGCLNAME	FANIDIGS		DFLTXL				OPTIONS

8	MOB	NONE	NT	0	0	NILSFC	0	
NIL	NIL	00		619_POT1_0			LPOT_L123_0\$	

Note: Software release LWW0006 removes table LINETATTR for wireless use. Wireless datafill entry splits into the following tables:

- table XLAPLAN (Translations Plan)
- table RATEAREA (Rate Area)
- table CELLCUST (Cellular Customer)

Refer to subsection “Table LINEATTR” on page 7-16 for details.

Table XLAPLAN

Table XLAPLAN stores NAXLA data previously found in table LINEATTR (pre-NA011).

Figure 10-18 shows sample datafill for table XLAPLAN.

Figure 10-18 MAP display example for table XLAPLAN

XLAPIDX	SCRNCL	HSTS	PRTNM	ZEROMPOS	RESINFO	OPTIONS	ADMININF

000_MODDIG_108	SMX2	000	PMODDIGS	RTE2	N	\$	\$

Table RATEAREA

Table RATEAREA stores billing area fields previously found in table LINEATTR (pre-NA011).

Assign field LATANM with the LATA name for the EA call. If you assign NILLATA to this field, then the switch treats the call as a non-EA call. Field PRTNM identifies the standard pre-translator for the end user.

Figure 10-19 shows sample datafill for table RATEAREA.

Figure 10-19 MAP display example for table RATEAREA

RTAIDX	LCANAME	MRSA	LATANM	ADMININF
NLCA_L123_8	NLCA	NIL	L123	\$

Subtable SDTPRTCT.STDPRT

Assign separate pretranslators for wireless and wireline end users. This procedure ensures that when wireless end users dial EA calls, the calls route over ISL trunks. Also when wireline end users dial EA calls, the calls route over the trunks to the AT or IEC.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. Therefore, this table description does not show a datafill procedure for subtable SDTPRTCT.STDPRT.

Figure 10-20 shows a sample datafill tuple for subtable SDTPRTCT.STDPRT for a wireless end user. In this case, the carrier code 10111 routes the call using an EA selector. The recursive pre-translator PC111 performs additional screening for the carrier (such as operator, international, and IT prefix digits.)

Figure 10-20 MAP display example for subtable SDTPRTCT.STDPRT for wireless EA calls

FROMDIGS	TODIGS	PRETRTE
10111	10111	EA DD 5 P PC111 C111 OFRT 123 5 20 Y

Figure 10-21 shows a sample datafill tuple for subtable SDTPRTCT.STDPRT from an incoming IT ISL trunk. Configure pre-translations as an AT. The pre-translator uses the 0ZZ+CIC digits.

Figure 10-21 MAP display example for subtable STDPRTCT.STDPRT for wireline EA calls

```
FROMDIGS TODIGS PRETRTE
-----
088111 088111 T NP 6 OFRT 895 6 6 NONE
```

Table OFRT

Table OFRT identifies the route that a specific call takes. It also identifies the OZZ digits, which point to the circuit that the IAM uses for the TNS parameter.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. Therefore, this table description does not show a datafill procedure for table OFRT.

Figure 10-22 shows sample datafill for table OFRT. In the example, the information D088 identifies the OZZ for the circuit code.

Figure 10-22 MAP display example for table OFRT

```
RTE    RTELIST
-----
123    N D      ISUPDIDIT  0 D088 N $
```

Table LATANAME

Table LATANAME lists all defined LATA names that the DMS-100 Wireless switch serves.

ATTENTION

Do *not* use the same LATA name for wireline and wireless end users. Assign separate LATA names for wireless and wireline end users in table LATANAME.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. Therefore, this table description does not show a datafill procedure for table LATANAME.

Figure 10-23 shows sample datafill for table LATANAME. In this example, L803 represents LATA number 803 for wireline end users. LATA number ML803 represents LATA number 803 for wireless end users.

Figure 10-23 MAP display example for table LATANAME

LATANAM	LATANUM
L803	803
L804	804
L805	805
L808	808
ML803	803
ML804	804

Table LATAXLA

Table LATAXLA defines the attributes of domestic calls, such as inter-LATA or intra-LATA calls, as well as interstate or intrastate calls.

To avoid a call type conflict between wireless and wireline EA calls, do *not* use the same LATA name for wireline and wireless end users. Assign separate LATA names in table LATANAME for wireline and wireless end users. (This LATA name is the index into table LATAXLA.)

Wireline call processing checks table LATAXLA to find the EA characteristics of the call using the LATA name and dialed digits. If a tuple exists, then the switch uses the tuple contents as call characteristics. If a tuple does not exist, then the switch treats the call as a non-EA call.

Wireless call processing also checks table LATAXLA to find the EA characteristics of the call using the LATA name and dialed digits. If a tuple exists, then the switch uses the tuple contents as call characteristics. However, if a tuple does not exist, then switch treats the call as a standard (STD) EA call. Therefore, assign prefix digits for all local calls as non-EA calls for the LATAs defined for wireless end users.

Also, the DMS-100 switch supports the PRIV and CORRIDOR call types. Wireless call processing code is incompatible with these call types. Do *not* assign PRIV or CORRIDOR LATAs in field EATYPE to wireless end users.

Seven-digit dialed calls prefix the STS to the digit string for indexing into table LATAXLA. For wireline end users, the STS typically is the same as the

numbering plan area (NPA). For wireless end users, the STS is the unique STS from table LINEATTR.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. However, this feature requires the following datafill to support both wireline and wireless end users for the DMS-100 Wireless switch.

Table 10-11 Datafilling table LATAXLA (Sheet 1 of 2)

Field	Subfield or refinement	Entry	Explanation and action
LATACODE		see subfields	LATA code. This field is the key into table LATAXLA and consists of subfields LATANM and DIGITS. Note: This feature does not affect subfield DIGITS.
	LATANM	alphanumeric(up to 16 characters)	Calling LATA name. Enter the LATA name defined in table LATANAME.
	DIGITS	numeric (up to 18 digits)	Dialed digits. Enter the digits (NPA or NPANXX) that the originator of the call dialed. Enter only those digits for which one of the following sets of attributes applies: • intra-LATA, interstate • inter-LATA, interstate • inter-LATA, intrastate
LATA		INTER or INTRA	LATA call attribute. Enter INTER or INTRA to define an NPA or NPANXX code as either inter-LATA or intra-LATA.

Table 10-11 Datafilling table LATAXLA (Sheet 2 of 2)

Field	Subfield or refinement	Entry	Explanation and action
STATE		INTER or INTRA	State call attribute. Enter INTER or INTRA to define an NPA or NPANXX code as either interstate or intrastate.
EATYPE		STD, CORRIDOR, PRIVILEGE, NON_EA	Equal access call type. Enter the appropriate EA call type to identify the call as standard (STD), CORRIDOR, PRIVILEGE, or NON_EA. Note 1: Assign only inter-LATA calls as CORRIDOR. Assign only intra-LATA calls as NON_EA. Note 2: Assign inter-LATA and intra-LATA calls as PRIVILEGE. Note 3: Assign wireless calls only as STD or NON_EA. Do <i>not</i> define wireless calls as PRIVILEGE or CORRIDOR call type.

Figure 10-24 shows sample datafill for table LATAXLA.

Figure 10-24 MAP display example for table LATAXLA

LATACODE		LATA	STATE	EATYPE
ML803	999	INTRA	INTRA	NON_EA
ML803	619	INTRA	INTRA	NON_EA
L803	704	INTER	INTER	STD
ML803	704	INTER	INTER	STD
L803	703	INTER	INTRA	CORRIDOR
ML803	703	INTER	INTRA	STD

In Figure 10-24, datafill in the first tuple routes all seven-digit dialed calls from end users in LATA ML803 as intra-LATA, intrastate, non-EA calls (assuming that 999 is the unique STS defined for these mobile end users). The second tuple treats all ten-digit calls to NPA 619 from end users in LATA ML803 as intra-LATA, intrastate, non-EA calls. The third and fourth required tuples treat all ten-digit calls to NPA 704 as inter-LATA, interstate STD EA calls for both mobile and wireline end users. The fifth tuple treats ten-digit calls to NPA 703 from wireline end users in LATA L803 as EA type CORRIDOR. The sixth tuple treats ten-digit dialed calls to NPA 703 from mobile end users in LATA ML803 as inter-LATA, interstate, STD EA calls.

Table OCCINFO

Table OCCINFO defines carrier characteristics. Make sure that all of the fields for a specific carrier are consistent between wireless and wireline platforms. For example, if you assign field ACCESS with an access type that the wireless part of the switch does not support, wireless end users cannot use it.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. Therefore, this table description does not show a datafill procedure for table OCCINFO.

Figure 10-25 shows sample datafill for table OCCINFO.

Figure 10-25 MAP display example for table OCCINFO

```
CARRNAME CARRNUM ACCESS ORIGCARR INTER INTNTL INTRA ANI FANI ONISCRN
AD1 OVERLAP INTERS INTRAS TERMREC OCCSEPNO OPSIG PICIND NA0950
INNCCPN DTMFIND OPSERV CACBLOCK CTDOA CMCMON SCRNWATS CRMCRA ATPINCL
INTRAOPR INCASA INTRCOIN ARBLKPVT
-----
C202 0202 TRANS Y Y Y N Y N N Y Y Y N LONG 61 FGRPD N N Y N N N N N
N N N Y N Y
```

Table CICSIZE4

The DMS-100 Wireless switch uses table CICSIZE4 to identify all trunk groups using four digit CICs. (Trunk groups not appearing in CICSIZE4 use three-digit CICs.) Table CICSIZE4 exists only if feature FGD CIC expansion exists.

Note: Equal Access for DMS-100 Wireless does not add or change any of the datafill for this table. Therefore, this table description does not show a datafill procedure for table CICSIZE4.

Figure 10-26 shows sample datafill for table CICSIZE4.

Figure 10-26 MAP display example for table CICSIZE4

TRUNKGRP

TGRPX
TGRPY
TGRPZ

Office parameter

Office parameter MOBILE_DEFAULT_CARRIER_OR_TREAT of table OFCENG (Office Engineering) specifies a default carrier name or treatment when a DMS-100 Wireless mobile end user dials an EA call without a PIC or dials a 10XXX or 101XXXX prefix. Mobile EAEO requires this parameter.

Note: Use office parameter DEFAULT_CARRIER_OR_TREAT to set treatment for wireline end users.

Provisioning rules

If the DMS-100 Wireless switch is to route a call to a carrier, enter C, a blank space, and the carrier name to which the call is to route.

If the switch is to route the call to a treatment, enter T, a blank space, and the treatment name to which the call is to route

Note: Do not use the reserved name USE_PREVIOUS as the carrier or treatment name. The name USE_PREVIOUS indicates that the generic recursive pretranslator is to provide the carrier or treatment. Software Optionality Control (SOC) activates this process.

The default value is T DACD (dial access code), which routes calls made without a PIC or 10XXX or 101XXXX to the treatment DACD in the appropriate treatment table.

Verification

Verification checks if operating company personnel had entered value C or T. The switch displays the following error message if operating company personnel had entered a value other than C or T:

PARAM VALUE IS WRONG TYPE

If telephone operating company had entered C, the DMS-100 Wireless switch verifies if they had entered a valid carrier name in table OCCNAME (Equal Access List of Other Common Carrier Names).

If telephone operating company had entered T, the DMS-100 Wireless switch verifies if they had entered a valid treatment name in table TMTCTL (Treatment Control).

Memory

Memory requires two words.

Dump and restore rules

This parameter can survive a dump and restore, after having been entered in table OFCENG.

Supporting documentation

Refer to the following NTPs for additional information on EA:

- *Basic Translations Tools Guide*, 297-1001-360
- *Customer Data Schema Reference Manual*
- *DMS-100 Equal Access Maintenance Guide*, 297-2101-500
- *Log Report Reference Manual*
- *Office Parameters Reference Manual*
- *Operational Measurements Reference Manual*
- *Translations Guide*
- *DMS-MTX Equal Access*, 411-2131-136
- *DMS-MTX Functionality Description Reference Manual*, 411-2131-197
- *DMS-MTX Basic Cellular Translations*, 411-2131-220
- *DMS-MTX Customer Data Schema Reference Manual*, 411-2131-451
- *DMS-MTX Office Parameters Reference Manual*, 411-2131-455
- *DMS-MTX Functional Group Mapping Reference Manual*, 411-2131-198

11 Maintenance

Table 11-1 lists the design changes that the DMS-100 Wireless switch requires for maintenance. This chapter describes each topic listed in this table in detail.

Table 11-1 Index to DMS-100 Wireless maintenance changes

Section with required changes	Description
Trunk test position MAP commands TST and SEIZE	The MAP terminal displays the following error message if you try to select the test or seize option for a code division multiple access (CDMA) trunk: Command not support for CDMA trunk.
NORESTARTSWACT/MTCSSWACT for DMS-100 Wireless}	The NORESTARTSWACT utility enables operating company personnel to execute a central control (CC) warm switch of activity (SWACT).
Integrated service link trunks	Use wireless test trunks to test integrated service link (ISL) trunks from the wireless side. Use wireline test trunks to test ISL trunks from the wireline side.

DTC maintenance

The wireline functionality and the wireless CDMA functionality of the DMS-100 Wireless switch both use digital trunk controllers (DTC).

When “non-CDMA” DTCs exist (as in the DMS-100 Wireless switch), expect minor changes to CDMA DTC maintenance. In general, maintenance remains unchanged for DTCs, including the DTC links to the selector bank subsystem (SBS) and frame relay interface unit (FRIU) T1 links to the code division multiple access interconnect system (CIS).

Tests for wireless interoffice trunks and T1 interface cards (6X50s) match those for wireline trunks and T1 interfaces. Only when the trunk is between the CIU and BSC is there a difference in maintenance operations.

However, changes exist in trunk maintenance to support traffic trunking between a DTC and a SBS for CDMA, especially when the links transition in and out of service.

In addition, the BSM OAM *must* be notified of a change of state in a trunk.

Relationship between the BSM and trunks

When the BSM receives a request for trunk status associated with a specified SBS, the OAM queries control module (CM) trunk maintenance for the trunk status. The BSM OAM then provides the trunk status to the BSM, which, in turn, provides the status information to the selector bank subsystem resource managers (SRM). The selector element (SE) corresponding with the DTC trunk then becomes available or unavailable for call processing.

When the CM trunk maintenance notifies the BSM OAM of a trunk status change, the BSM OAM propagates the trunk status change information to the BSM. The CM trunk maintenance reports trunk status changes to the BSM OAM on a carrier basis. This means that the notification provides the status for all trunks on a given carrier, even if all the trunks' status did not change.

The CM trunk maintenance notifies the base station manager (BSM) administration, and maintenance (OAM) of the following trunks state changes:

- The trunk state changes resulting from user interactions or other wireless system entities. (This change is required since CDMA trunks do not use A/B bit signaling.)
- Single notification of individual trunk state changes
- Bulk notification for multiple trunk state changes on a carrier by carrier basis.

The BSM OAM translates the DTC trunk identifiers that CM trunk maintenance provides to the SBS trunk identifiers. The SBS and the SRM require these identifiers using table control access to table SBSINV (Selector Bank Subsystem Inventory).

Trunk test position MAP commands TST and SEIZE

Do *not* use the Tst (Test) and Seize commands when the trunk test position (TTP) level posts a CDMA trunk. If you try to select the test or seize option for a CDMA trunk, the MAP terminal displays the following message:

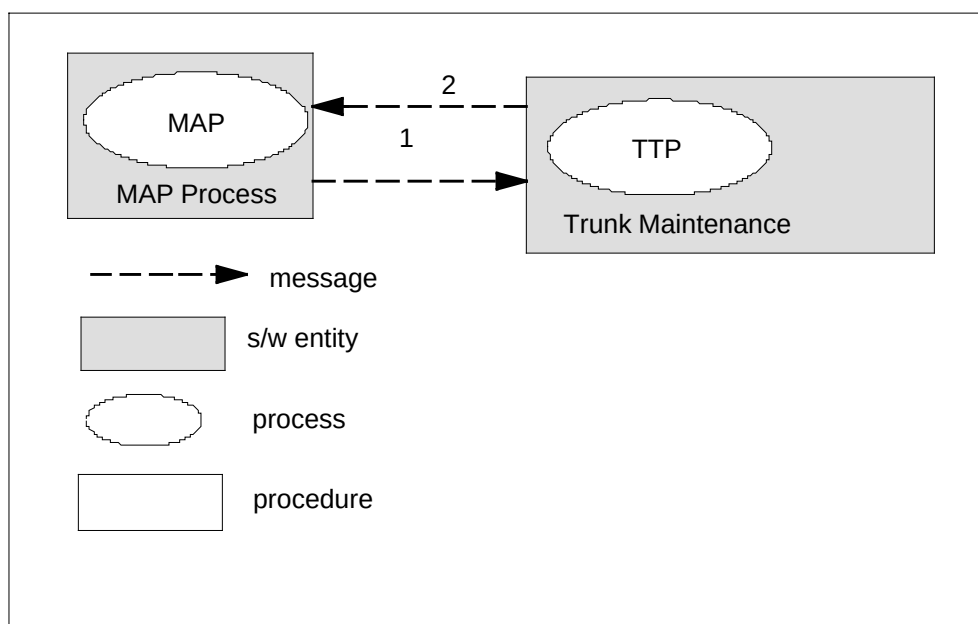
Command not supported for CDMA trunk.

In non-CDMA equipped cell sites, control of trunks is centrally maintained. This change enables all trunk clients to identify the state of a trunk. Central control would be lost for all CDMA-equipped cell sites. The SBS allocates trunks for call processing outside of the standard wireless environment. If a

trunk is seized or if personnel must perform maintenance testing, and if this trunk is allocated to CDMA processing, the SBS cannot identify that the trunk must come out of service. No state change in trunk status exists for these operations. This action can place a trunk in a state where the craft wants to test or seize the trunk. The SBS might allocate this trunk to a call. (These operations are mutually exclusive.) Therefore, this operation is not permitted.

Figure 11-1 shows how the test and seize commands interact at the TTP level.

Figure 11-1 Data flow for Tst and Seize commands at the TTP level



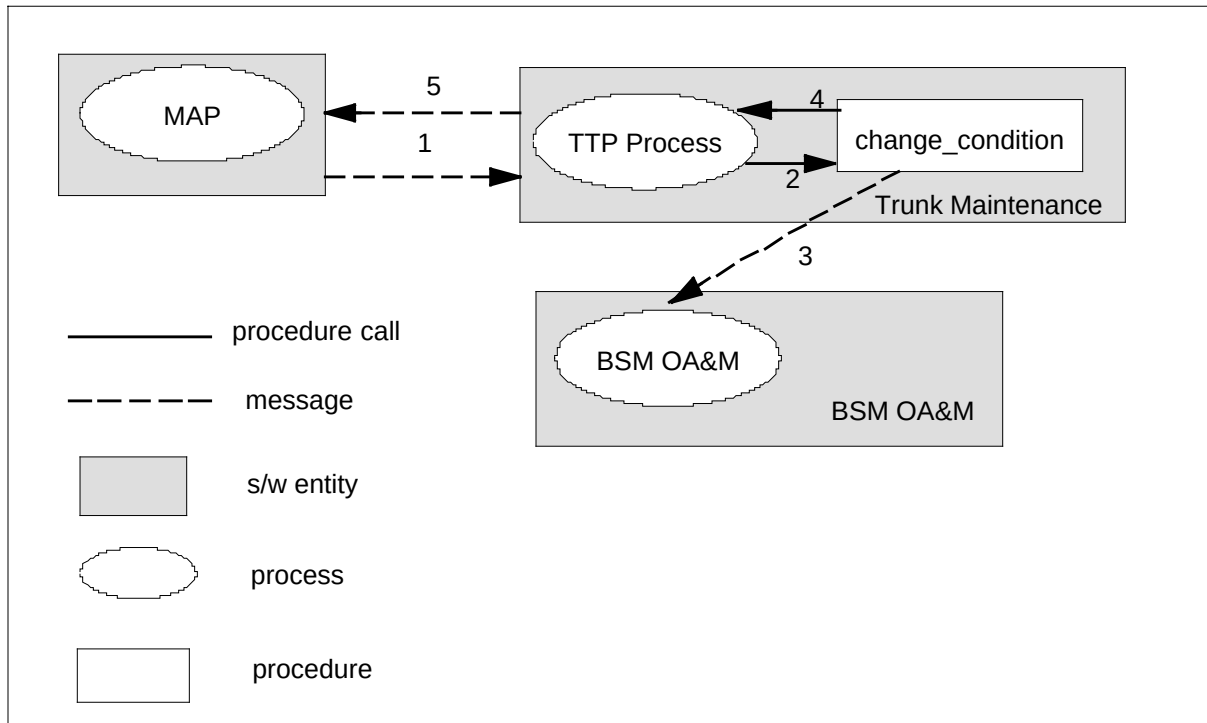
In Figure 11-1, when the TTP level receives a test or seize command, the MAP screen displays the following error message:

Command not supported for CDMA trunk.

Busying and returning an idle trunk to service

When a trunk is busied or is returned to service, the BSM OAM receives a single message to notify it that, if the transition is to be busied, the trunk is no longer available for call processing. The switch also sends this same message if the transition is for a trunk being returned to service. The trunk becomes available for call processing.

Figure 11-2 shows a data flow result for busying or returning an individual trunk to service.

Figure 11-2 Data flow for an individual trunk being busied or returned to service

The following steps occur in Figure 11-2.

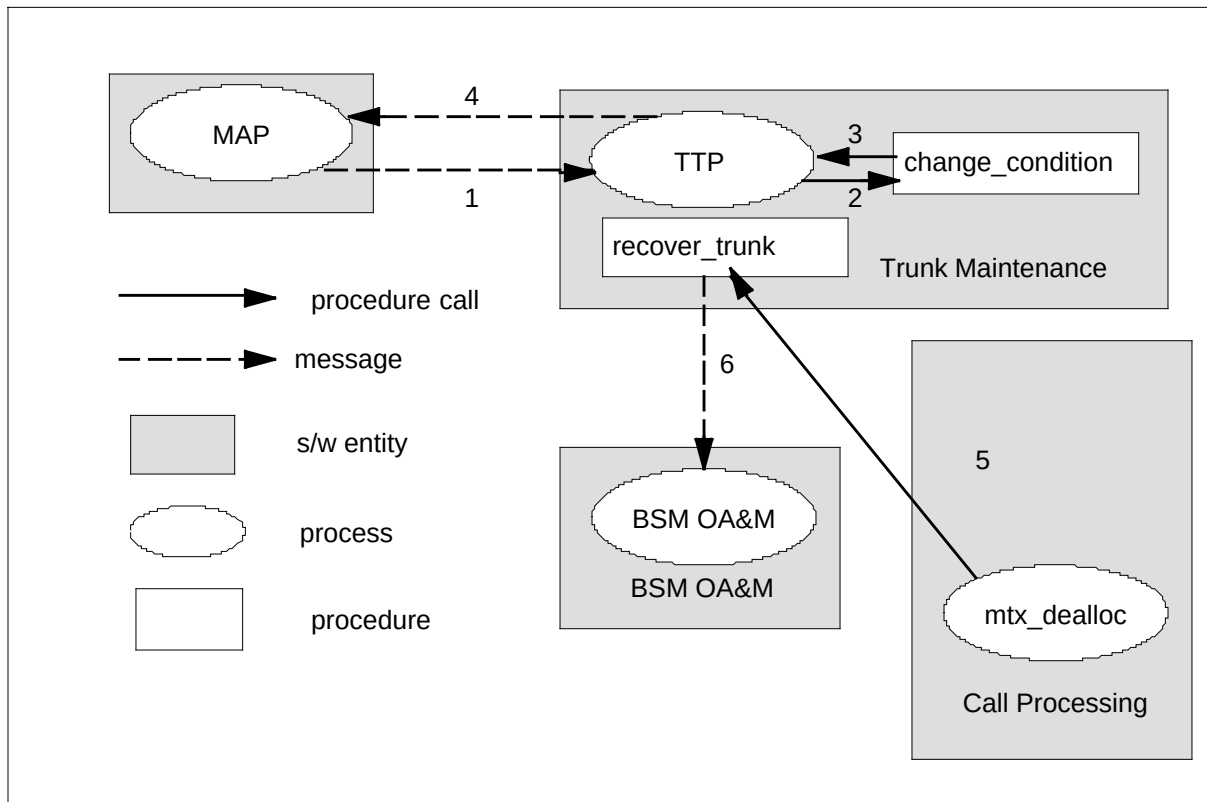
1. The TTP process receives a Bsy or return to service (RTS) command.
2. The TTP process calls procedure change_condition to change the trunk state.
3. In the procedure change_condition, the BSM OAM receives a message verifying that the state change is successful.
4. The calling process receives the trunk state change result.
5. The MAP terminal receives the command result.

Busying a call processing busy trunk

When a trunk is involved in a call and operating company personnel execute a Bsy command against this trunk, the trunk state changes to call processing deload (CPD). In addition, the trunk's pending state changes to manual busy (MB). At this point, the BSM OAM does not receive a message. When the call completes, the call processing software calls the procedure recover_trunk, which changes the trunk state from CPD to MB. Then the BSM OAM receives the message verifying step completion.

Figure 11-3 shows a data flow result for busying a trunk in the call processing busy (CPB) state.

Figure 11-3 Data flow for busying a CPB trunk



The following steps occur in Figure 11-3.

1. The TTP process receives a Bsy command.
2. The TTP process calls procedure `change_condition` to change the trunk state.
3. A FALSE message is returned, indicating that a failure has occurred.
4. The MAP terminal receives the command result.
5. At the conclusion of the call, the call processing deallocator invokes `recover_trunk` to return the trunk to an appropriate state.
6. The `recover_trunk` sends a message to the BSM OAM.

Integrated service link trunks

Use wireless trunk tests to test ISL trunks from the wireless side of the switch. Or use wireline trunk tests to test ISL trunks from the wireline side.

Bit error rate performance (BERP) testing requires a MAP interface and a hardware pack (such as a Integrated Bit Error Rate Tester). The test involves sending a known data bit pattern to the circuit under test where you loop it back

to the tester card for analysis. Refer to Nortel Networks publication (NTP) *Bit Error Rate Performance Testing*, 297-1001-533, for details.

The use of ISL trunks on the DMS-100 Wireless switch affects MAP commands line test position (LTP) and TTP.

Changes to the LTP command POST

To help operating company personnel identify the terminating agent for a call over an ISL trunk, the DMS-100 Wireless MAP display changes the LTP command POST. The LTP command POST shows the terminating trunk or line on the opposite side of an ISL facility (trunk or group) as the linked circuit, instead of the first outgoing ISL trunk to which the posted trunk terminated.

The DMS-100 Wireless MAP display adds display flag ROUTE to the LTP control position. This flag appears whenever a line is in the CPB state and the call involves ISL trunks. Operating company personnel can execute the ROUTE hidden command to complete the call path when this flag appears.

Note: If a line involved in a call uses ISL trunks, the linked circuit for the posted line displays the first non-ISL terminating agent in the linked position.

Additions to the LTP command ROUTE

The LTP level of the DMS-100 Wireless MAP display adds the hidden ROUTE command. If a posted line involves a call that routes over ISL trunks, operating company personnel can expand the call to display all ISL trunks that the switch uses. This display also includes the trunks and lines terminating to both ends of the ISL facilities.

The DMS-100 Wireless switch fails to execute the ROUTE command and displays the error response **Command valid only for C7ISL CPB calls** if the following conditions exist:

- the posted line is not in the CPB state
- the posted line is in the CPB state but the MAP screen does not display the ROUTE flag

Changes to the TTP command POST

To help operating company personnel identify the true logical terminating agent for a call over an ISL trunk, the DMS-100 Wireless MAP display changes the TTP command POST. The TTP command POST shows the true logical terminating trunk or line on the opposite side of an ISL facility as the linked circuit, instead of the first outgoing ISL trunk to which the posted trunk terminated.

Posted ISL trunks at the TTP level of the DMS-100 Wireless MAP screen include the following display flags:

- **ROUTE**-The switch only displays this flag when the posted trunk is in the CPB state or CPD state. This flag indicates that the call routes over ISL facilities. Use the hidden TTP command **ROUTE** to display details on the call. (To use the **ROUTE** command in this case, make sure that the posted trunk is still in the CPB state or CPD state.)
- **ISL**-The switch displays this flag if operating company personnel had entered datafill in table C7ISL (C7 ISDN User Part Signaling Loopback) for a posted ISL trunk. Use the TTP command **CKTINFO** to show the other end of the corresponding ISL trunk pair (regardless of the state of the posted trunk).

Additions to the TTP command ROUTE

The TTP level of the DMS-100 Wireless MAP display adds the hidden **ROUTE** command. Use the TTP command **ROUTE** to cross an ISL call path to identify all the trunks that the switch uses. (This display also includes the originating and terminating trunks and lines, and the intermediate ISL trunks.)

The DMS-100 Wireless MAP screen displays the following error message is the posted trunk is not in the CPB or CPD state:

Trunk not CPB or CPD

If operating company personnel execute the **ROUTE** command and the posted trunk is in either the CPB or CPD state, but the MAP screen does not display the **ROUTE** flag, the following error message displays:

Call not routed through ISL trunks

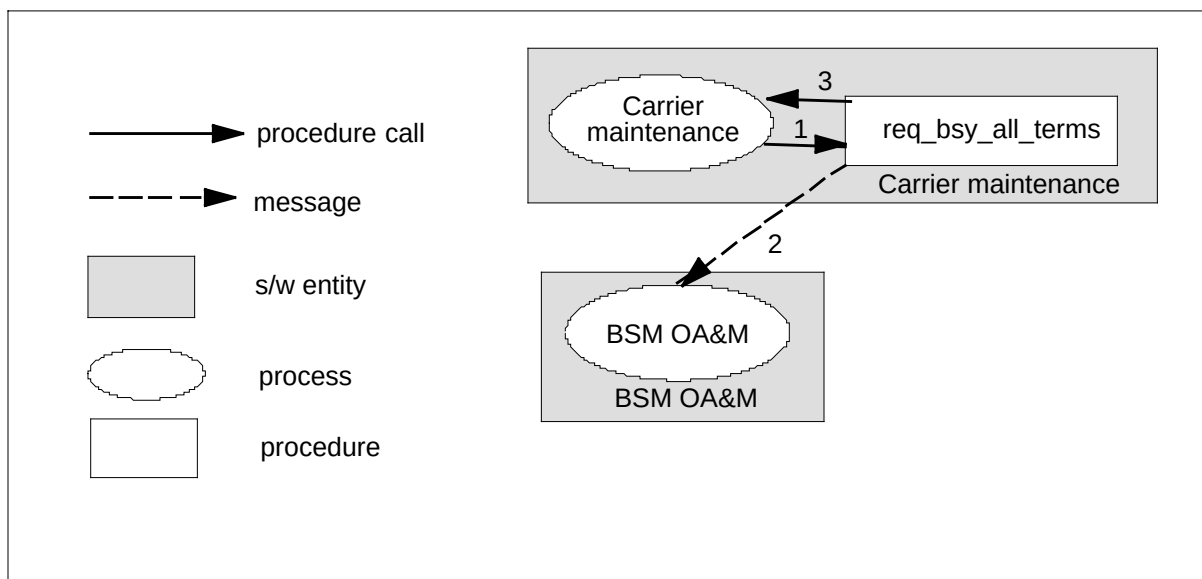
Changes to the TTP command CKTINFO

The **CKTINFO** command at the TTP level of the DMS-100 Wireless MAP display includes a display flag, **ISL**, to identify the physical pair mate of a posted ISL trunk. The posted trunk must be an ISL trunk for the DMS-100 Wireless MAP screen to identify this trunk information.

Out-of-service carrier

When a carrier is out of service, all trunks on this carrier also go out of service. (The trunk state is set at Carrier Failure [CFL].) The carrier maintenance calls the procedure, **req_bsy_all_terms**, which trunk maintenance provides in section TKCPU2 of module TKCPUI. It is this target that verifies that the BSM OAM receives a message after trunk maintenance has set all 24 (T1) trunks to CFL.

Figure 11-4 shows a data flow result for taking a carrier out of service.

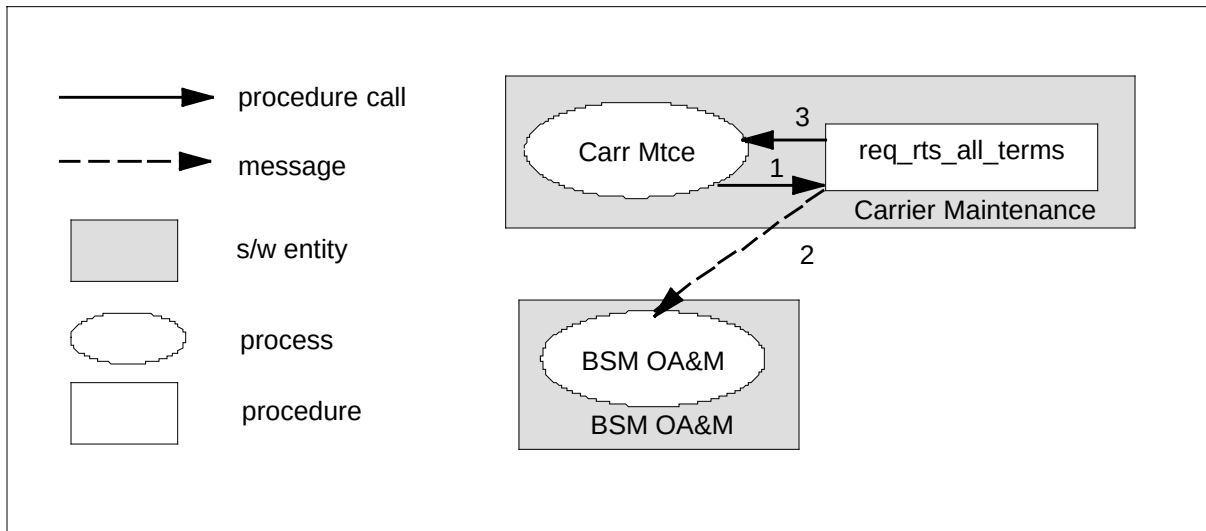
Figure 11-4 Data flow for an out-of-service carrier

The following steps occur in Figure 11-4.

1. The carrier maintenance invokes procedure req_bsy_all_terms to take all trunks out of service.
2. The BSM OAM receives a bulk message, indicating which trunks are out of service.
3. Procedure returns "done."

Back-in-service carrier

When a carrier is returned to service, trunk maintenance goes through all trunks on the carrier and brings them back to service. Procedure req_rts_all_terms in section TKCPU2 of module TKCPUI executes this process. The BSM OAM receives a bulk message confirming this procedure.

Figure 11-5 Data flow for carrier goes into service

The following steps occur in Figure 11-5.

1. Carrier maintenance invokes procedure req_rts_all_terms to bring all trunks back to service.
2. The BSM OAM receives a bulk message verifying certain trunks are in service.
3. Procedure returns “done.”

Out-of-service DTC

When a DTC goes out of service, it prompts carrier maintenance to change the carrier status. The maintenance procedure loops through all carriers, acting on one carrier at a time. The carrier maintenance then calls the target, which trunk maintenance provides, to change the trunk state. (The previous section, “Busying and returning an idle trunk to service,” in this chapter indicates this trunk state change.)

Back-in-service DTC

When a DTC is returned to service, it prompts carrier maintenance to change the carrier status. The maintenance procedure loops through all carriers, acting on one carrier at a time. The carrier maintenance then calls the target, which trunk maintenance provides, to change the trunk state. (The previous section, “Out-of-service DTC,” in this chapter indicates this trunk state change.)

Supporting documentation

Refer to the following NTPs for information on wireline testing:

- *Bit Error Rate Performance Testing*, 297-1001-533
- *Lines Maintenance Guide*, 297-1001-594
- *Trunks Maintenance Guide*, 297-1001-595

Refer to the following NTPs for information on wireless testing:

- *CDMA Application Guide* 411-2131-571
- *CDMA Fault Management-Recovery Guide*, 411-2133-545

NORESTARTSWACT/MTCSWACT for DMS-100 Wireless

The DMS-100 Wireless switch supports the no-restart-switch-of-activity (NORESTARTSWACT) and maintenance switch-of-activity (MTCSWACT) utilities through the NORESTARTSWACT/MTCSWACT for the DMS-100 Wireless feature.

This feature provides the DMS-100 Wireless switch with the following utilities.

- NORESTARTSWACT performs the CC warm SWACT step of the one night process (ONP).
- MTCSWACT replaces the restart command for any maintenance activity that requires an in-sync restart.

NORESTARTSWACT

The NORESTARTSWACT utility enables operating company personnel to execute a CC warm SWACT. This utility prevents a cold restart on the active call processing unit (CPU).

The NORESTARTSWACT utility reduces the call processing outage time that occurs during the ONP. This utility eliminates the cold restart that occurs during the SWACT. NORESTARTSWACT reduces the outage time to less than 30 seconds. Log SWCT101 contains the total system outage associated with the NORESTARTSWACT.

Office parameters and table changes or patch applications, which require a restart, can also use NORESTARTSWACT. The NORESTARTSWACT utility enables operating company personnel to perform the required restart on the inactive CPU. They can then switch the activity to the specified CPU without causing the restart associated with the SWACT.

In addition, the NORESTARTSWACT utility supports the following activities:

- table changes that require restart activation when MTCSWACT is not appropriate
- patch application that requires restart when MTCSWACT is not appropriate
- hardware changes that require restart activation
- ETAS use to switch activity away from faulty CM hardware
- NPA splits or moves that require restart activation

A NORESTARTSWACT also updates peripheral module (PM) executive lineups that table changes or patch application affect. (Use a NORESTARTSWACT if all PMs need to be updated, with the understanding that a system outage occurs.)

MTCSWACT

The MTCSWACT utility is an enhancement to NORESTARTSWACT. This utility replaces the active side restart procedure, which is required after you have activated a restart dependent office parameter.

The MTCSWACT utility performs the restart, which the activity on the inactive side of the switch requires. The total execution time for MTCSWACT is less than 20 minutes.

Ensure that the following conditions exist for MTCSWACT usage while the DMS-100 Wireless switch is in sync.

- You have made the data changes.
- You have started the command.

In addition, use the MTCSWACT utility with the following supported activities while the DMS-100 Wireless switch is in sync:

- table changes that require restart activation
- patch application that requires restart activation

Supporting documentation

Refer to the following NTPs for additional information on the NORESTARTSWACT and MTCSWACT utilities:

- *NORESTARTSWACT/MTCSWACT User's Guide*, 297-1001-546
- *Commands Release Reference Guide*, 297-8981-823
- *DMS-MTX NORESTARTSWACT/MTCSWACT User's Guide*, 411-2131-546

12 Wireless centrex

Wireless centrex services

Wireless centrex services allow operating company personnel to configure wireless subscribers into centrex business groups, and access the dialing plans and services of the groups.

The DMS-100 Wireless switch provides the following services to wireless centrex members:

- Integrated Wireless Centrex feature
- Simultaneous Ringing (SimRing)/“Phone Twinning” feature
- shared private dialing plan
- single integrated voice mail
- wireless business group service

The following subsections describe each feature and service.

Integrated Wireless Centrex

The Integrated Wireless Centrex feature enables wireless subscribers to use centrex dial plans and communicate their groupness to other centrex group members.

This feature introduces the capability to send wireless centrex calls and corresponding business group information to a wireline (DMS-100 or DMS-100 Wireless) node. The wireline node uses the Multi-switch Business Group (MBG) capability to translate the called number. Information from the business group (BG) parameter determines the originating mobile subscriber's business group. The switch uses the dial plan for this business group to translate the called number from the generic address parameter (GAP).

Operating company personnel provision wireless subscribers into centrex business groups in table MOBCENT (Mobile Centrex Provisioning). The switch uses the business group information in this table to populate the BG parameter and the GAP in the ISDN user part (ISUP) trunk signaling protocol.

Pretranslator MOBCNTX in subtable STDPRTCT.STDPRT (Standard Pretranslator) routes the centrex call out of the wireless node to a wireline node, which is an integrated service link (ISL) on an ISUP direct inward dial (DID) trunk.

Hardware requirements

Integrated Wireless Centrex has the following hardware requirements:

- Each customer group must have a DMS-100 or DMS-100 Wireless switch as the home switch that provides the private numbering plan and translations for that group.
- The trunks that connect the DMS-100 Wireless switch to the DMS-100 switch must be type ISUP DID.

Limitations and restrictions

The limitations and restrictions that follow apply to Integrated Wireless Centrex:

- Although you can provision the same customer group across switches, doing so reduces efficiency and increases complexity. For one customer group, each switch requires:
 - the centrex information for each subscriber who originates from that switch as a centrex member
 - the customer group and business group identification (BGID) mapping that matches the same mapping on the home switch for the customer group
- Integrated Wireless Centrex does not apply to calls that require more than 18 digits (such as international calls and some calling card calls). Give these calls a prefix digit in subtable STDPRTCT.STDPRT to differentiate and translate them outside this feature.

Interactions

Integrated Wireless Centrex is partially incompatible with Local Number Portability (LNP). If the local routing number (LRN) is a ported number, LNP takes precedence over Integrated Wireless Centrex. The switch sends the LRN for LNP and discards the wireless centrex information. This eliminates the establishment of groupness for wireless centrex calls and the availability of abbreviated dialing for those mobile subscribers.

If a customer chooses to port the LRN, set the LRN in table MOBCENT to an operator or attendant console within the business. That way, the wireless centrex calls go to an operator within the group.

Datafill

Integrated Wireless Centrex requires datafill in the following order:

- CUSTENG (Customer Group Engineering)
- MOBCENT
- BGDATA (Business Group Data)
- STDPRTCT.STDPRT

Note: Refer to *NTP Customer Data Schema Reference Manual* for the datafill procedures of these tables.

Table CUSTENG Operating company personnel must first specify the customer group name in table CUSTENG. (Otherwise the switch rejects the tuple in table MOBCENT.)

Figure 12-1 shows sample datafill for table CUSTENG.

Figure 12-1 MAP example for table CUSTENG

CUSTNAME	ADNUM	NONCOS	NOIBNTMT	CONSOLES	DOMAIN	GROUPID	OPTIONS
NORTEL	5	30	1	Y	PRIVATE	0	\$

Table MOBCENT Table MOBCENT enables operating company personnel to provision centrex group information against mobile identification number (MIN) ranges. Datafill for table MOBCENT includes wireless subscribers in existing wireline centrex groups.

Figure 12-2 shows sample datafill for table MOBCENT.

Figure 12-2 MAP example for table MOBCENT

FROMMIN	TOMIN	CUSTGRP	SUBGRP	NCOS	PRTNM	RTEDN
6199640000	6199649999	NORTEL	0	0	SPX1	9197631000

The following error messages apply to table MOBCENT.

Table 12-1 Error messages for table MOBCENT

Error message	Explanation and action
TYPE OF CUSTGRP IS CUSTOMER_GROUP	You entered a customer group that does not exist in table CUSTENG. Either use a value that exists in table CUSTENG or add the value to table CUSTENG.
TYPE OF PRTNM IS PRETRANSLATOR_NAME	You entered a pretranslator name that does not exist in table STDPRTCT. Either use a value that exists in table STDPRTCT or add the value to table STDPRTCT.
DUPLICATE OR AMBIGUOUS MIN RANGE PROCESSING ERROR UNEXPECTED ERROR CONDITION	You entered a range of MINs that overlaps the range in an existing tuple. Correct the range of MINs.
KEY ERROR TUPLE ALREADY EXISTS	You entered a range of MINs that is within the range in an existing tuple. Correct the range of MINs.
TABLE IS FULL PROCESSING ERROR UNEXPECTED ERROR CONDITION	You tried to add a tuple when the table is full. Remove any obsolete tuples.
INVALID DIGIT OR DN	You entered a value for FROMMIN, TOMIN, or RTEDN that contains one of the following digits: N, B, C, D, E, or F. Enter a valid value.

Table BGDATA Table BGDATA stores information about MBG groups. The switch uses the information in this table to populate the BG parameter and the GAP in the ISUP signaling protocol.

Figure 12-3 shows sample datafill for table BGDATA.

Figure 12-3 MAP example for table BGDATA

BGID		BGXLA OPTIONS

LOCAL	123	
(NUMDIGS 3) (CUSTGRP	NORTEL Y 5 Y 0 0)	\$
		\$

Subtable STDPRTCT.STDPRT Integrated Wireless Centrex adds pretranslator MOBCNTX to subtable STDPRTCT.STDPRT to route a centrex call out of the wireless node to the wireline node. (The presence of pretranslator MOBCNTX indicates that the originating mobile directory number [DN] belongs to a centrex group.)

Figure 12-4 shows sample datafill for subtable STDPRTCT.STDPRT.

Figure 12-4 MAP example for subtable STDPRTCT.STDPRT

FROMDIGS	TODIGS	PRETRTE
0	910	MOBCNTX

When using the translations verification (TRAVER) tool on the DMS-100 Wireless switch, do not use option CTX in the command line if the TRAVER does not encounter selector MOBCNTX.

Otherwise, the following TRAVER error message displays:

```
+++ TRAVER: EITHER MOBCNTX PRESELECTOR NOT DATAFILLED OR ORIG
MIN NOT DATATAFILLED IN TABLE MOBCENT +++
```

Figure 12-5 shows datafill in subtable STDPRTCT.STDPRT where option CTX is acceptable in the TRAVER command line.

Figure 12-5 MAP example for subtable STDPRTCT.STDPRT with MOBCNTX

FROMDIGS	TODIGS	PRETRTE
0	9	MOBCNTX

The TRAVER command line then would be as follows.

Figure 12-6 TRAVER command line with option CTX

```
> TRAVER MX MOBORG CENTREX CTX 6199741009 916136211001 B
```

Figure 12-7 shows datafill in subtable STDPRTCT.STDPRT where option CTX is not acceptable in the TRAVER command line.

Figure 12-7 MAP example for subtable STDPRTCT.STDPRT with MOBCNTX

FROMDIGS	TODIGS	PRETRTE

0	8	MOBCNTX

The TRAVER command line then would be as follows.

Figure 12-8 TRAVER command line without option CTX

```
> TRAVER MX MOBORG CENTREX 916136211001 B
```

In Figure 12-8, the absence of option CTX does not affect TRAVER because the switch does not consider the call to be a wireless centrex call unless translations encounters selector MOBCNTX.

Service orders

Integrated Wireless Centrex adds mobile centrex information to SERVORD query commands QDN and QHLR for a switch with an on-board HLR.

The SERVORD limitations and restrictions that follow apply to Integrated Wireless Centrex:

- Command QDN displays mobile centrex information only for subscribers on a switch with an on-board HLR.
- Command QHLR displays mobile centrex information only for subscribers on a switch with an on-board HLR.

Logs

Integrated Wireless Centrex adds log reports DFIL622 and DFIL623.

DFIL622 The DMS-100 Wireless switch generates log DFIL622 when both of the following conditions are true.

- A mobile-originated call reaches pretranslator MOBCNTX in subtable STDPRTCT.STDPRT.
- A tuple does not exist in table MOBCENT for the originating MIN.

The caller receives partial dial (PDIL) treatment if log DFIL622 occurs.

To recover from log DFIL622, enter a tuple in table MOBCENT whose range includes the originating MIN.

DFIL623 The DMS-100 Wireless switch generates log DFIL623 when the customer group, to which the mobile originator belongs, is not associated with a business group identifier (BGID) in table BGDATA.

The caller receives PDIL treatment if log DFIL623 occurs. To recover from log DFIL623, enter a tuple in table BGDATA to associate a BGID with the originator's customer group. This tuple must include option CUSTGRP. (Datafill table MOBCENT contains the originator's customer group.)

Note: Refer to *NTPLog Report Reference Manual* for a description of logs DFIL622 and DFIL623.

User interface

Integrated Wireless Centrex adds command CMXMON to the user interface. This command is an audit tool that checks the number of provisioned centrex mobile subscribers on a DMS-100 Wireless switch with an on-board HLR. Command CMXMON displays the total of all MINs in table CELLULAR (Cellular Subscriber Database) that match the MIN ranges in table MOBCENT.

Note: Execution time of command CMXMON depends on the number of entries in tables CELLULAR and MOBCENT.

Figure 12-9 shows an example of the command interpreter (CI) command CMXMON.

Figure 12-9 DMS-100 Wireless CI command CMXMON

```
>CMXMON
WARNING: Executing the DUMPALL command may cause a degradation of
the switch performance.
DO YOU WANT TO CONTINUE?
Please confirm ("YES," "Y," "NO," "N"):
> YES
    Current Number of Wireless Centrex subscribers: 50

>HELP CMXMON
    CMXMON: ++++++ Command to monitor the number of provisioned
centrex subscribers
```

Translation verification tool

This feature also adds the display of mobile centrex information to the output from the TRAVER command.

To use TRAVER for wireless centrex subscribers, add a tuple in wireless table MTXTRAV (MTX Translation Verification) to describe the profile of each subscriber.

Figure 12-10 shows sample TRAVER output with mobile centrex information.

Figure 12-10 TRAVER output example with mobile centrex information

```
>TRAVER MX MOBORIG CENTMOB CTX 9199641000 1002 B
.
.
.
TABLE STDPRTCT
CNTXPRT ( 1 ) 65021) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
. 0 910 MOBCNTX
.
:
TABLE MOBCENT
6199640000 6199649999NORTEL 0 0 SPX1 9197631000
TABLE BGDATA
LOCAL 123 $ (NUMDIGS 3) (CUSTGRP NORTEL Y 5 Y 0 0)$
.
.
.
1 ISUPDIDIT          9197631000          ST
MBG: LOCAL 123    LP: 0    GAP: 1002
```

Shared private dialing plan

The existing wireline centrex group dialing plans allow group members to dial abbreviated extensions when they call other members of the group. The length of the extension ranges from three to six digits, depending on the number of subscribers in the group. Subscribers dial outside access codes (such as 9+ or 6+) to contact numbers outside of the business group, if the subscriber has the capability to make external calls.

The DMS-100 Wireless switch extends these same capabilities to wireless members of a centrex group. With wireless centrex, group members can reach other wireless members of the group by dialing their abbreviated extensions. Wireless members can dial all outside access codes (such as 9+ or 6+) for external access. Like wireline members, wireless members can belong to a

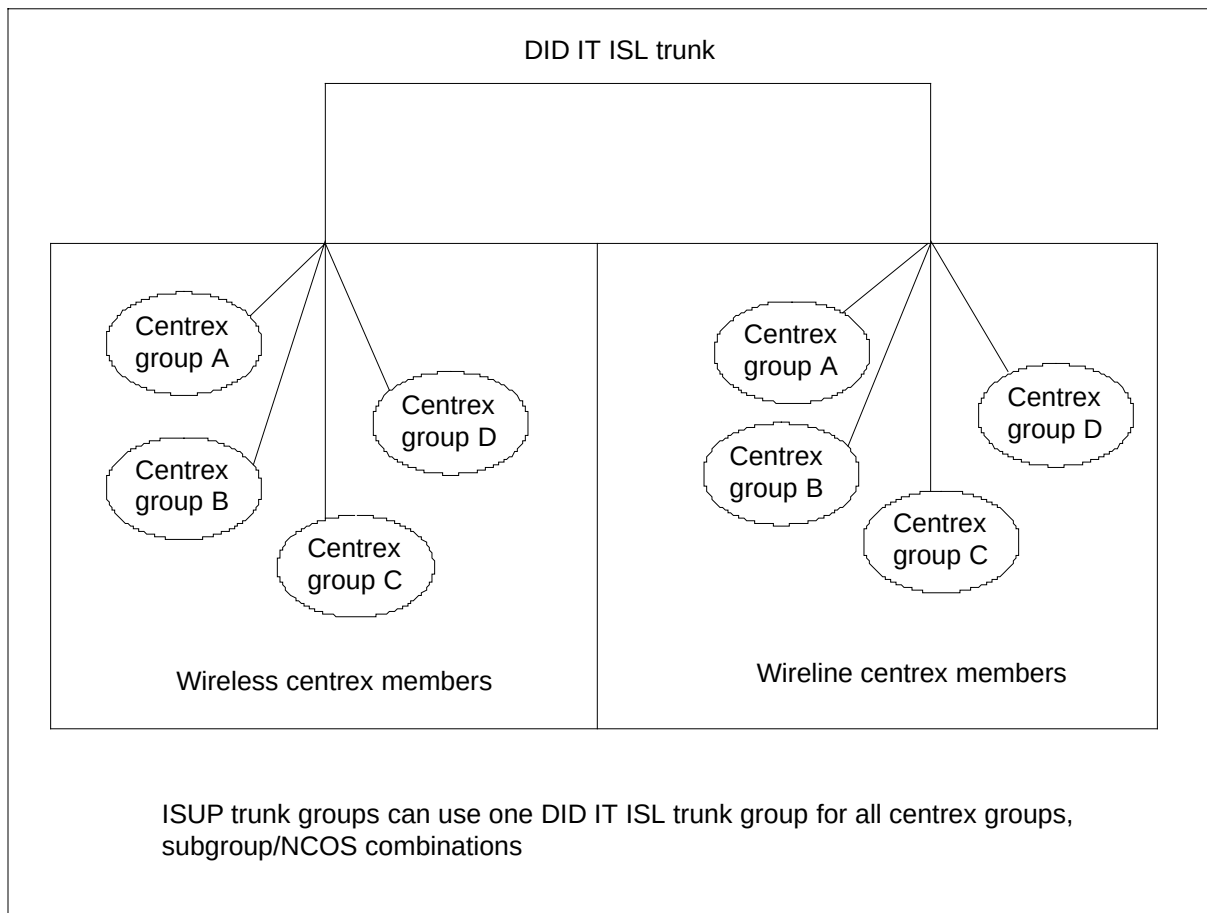
class of service, which limits certain types of calls, including off-network calls, toll calls, and international calls.

To support this wireless centrex capability, the DMS-100 Wireless switch requires an ISL trunk for each centrex group. The switch requires ISLs because wireless originating calls must route to the centrex platform on the wireline portion of the switch.

Wireless subscribers of the DMS-100 Wireless switch can share a private dialing plan with centrex group members of a separate wireline switch. This configuration uses one DID intertoll (IT) ISL trunk group between the DMS-100 Wireless switch and the serving centrex end office (EO) for each customer group/network class of service (NCOS) combination.

Figure 12-11 shows an ISL configuration for the DMS-100 Wireless switch.

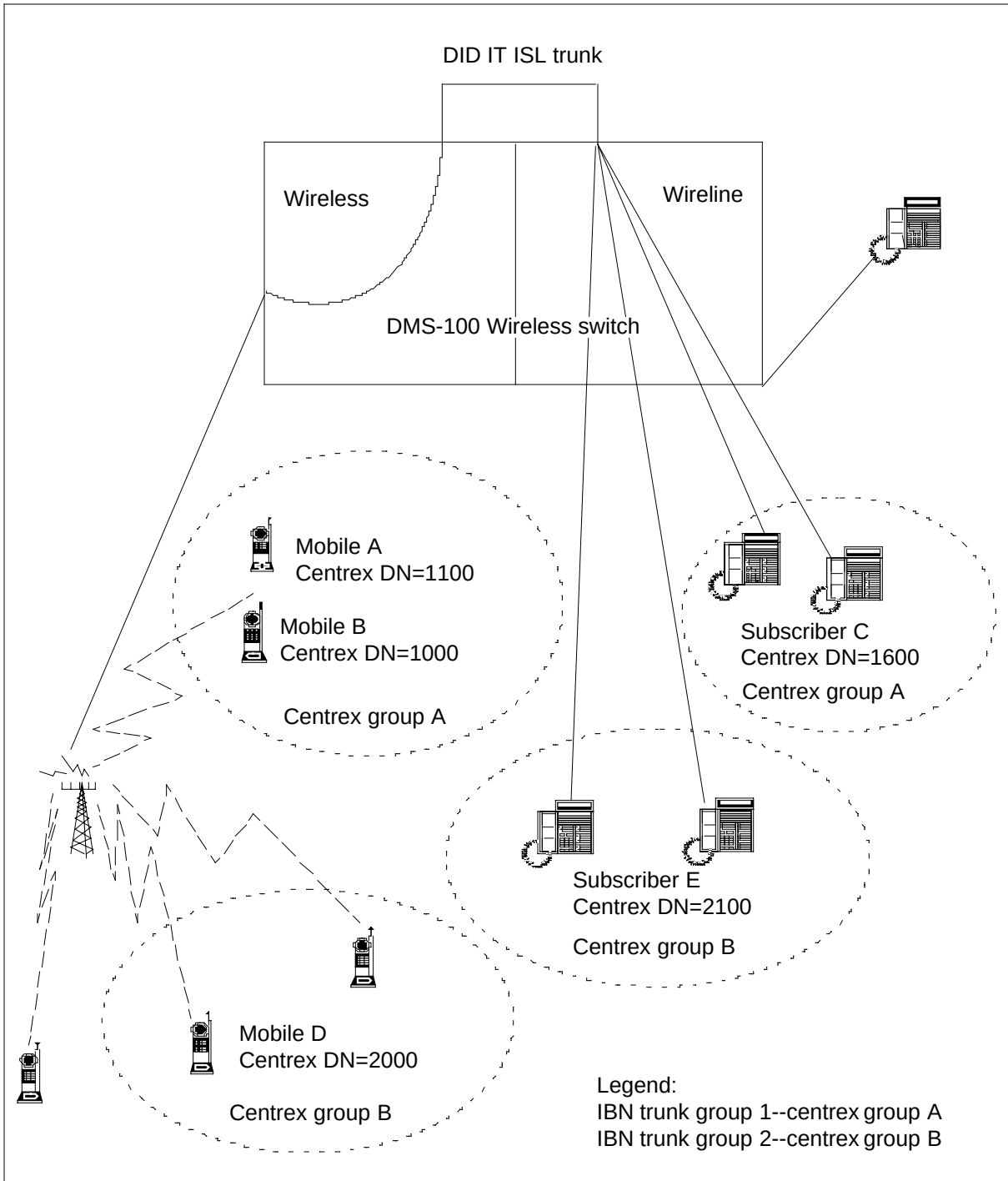
Figure 12-11 DMS-100 Wireless ISL configuration



Shared private dialing plan call scenarios

Figure 12-12 and paragraphs describe the call scenarios for wireless centrex origination with the shared private dialing plan.

Figure 12-12 DMS-100 Wireless centrex private dialing plan call scenario



In the following scenarios, mobile subscribers A and B and wireline subscriber C are members of wireless centrex group A.

Scenario 1: Mobile subscriber A calls wireline subscriber C

Mobile subscriber A dials 1600 to contact wireline subscriber C of the same centrex group. The wireless portion of the DMS-100 Wireless switch analyzes the received digits and performs preliminary digit translation. Translations yield one DID IT ISL trunk to the wireline portion of the switch. The call routes to the wireline portion of the switch with the dialed centrex DN. The MBG capability translates the called number, using the BG parameter to determine the originating mobile subscriber's business group. The switch uses the dial plan for this business group to translate the dialed centrex DN from the GAP and terminates the call to wireline subscriber C.

Scenario 2: Wireline subscriber C calls mobile subscriber A

Wireline subscriber C dials 1100 to contact mobile subscriber A of the same centrex group. The wireline portion of the switch analyzes the received digits and performs IBN translations on the dialed centrex DN. Translations yield one DID IT ISL trunk to the wireless portion of the switch. Before the wireline portion routes the call to the wireless portion of the switch, translations append the NPA-NXX (or how many digits the call needs) of the called mobile to the dialed centrex DN. This addition forms a ten-digit MIN. Once the wireless portion of the switch receives the MIN, translations continue in the same way as for a non-centrex call. The call terminates to mobile subscriber A.

Scenario 3: Mobile subscriber A calls mobile subscriber B

Mobile subscriber A dials 1000 to contact mobile subscriber B of the same centrex group. The wireless portion of the switch analyzes the received digits and performs preliminary digit translations. Translations yield a DID IT ISL trunk to the wireline side of the switch. The call then routes to the wireline portion of the switch with the dialed centrex DN. The MBG capability translates the called number, using the BG parameter to determine the originating mobile subscriber's business group. The wireline portion of the switch performs IBN translations on the dialed centrex DN and determines the call is for a wireless member. The wireline portion of the switch expands the centrex DN to a ten-digit MIN. The call routes over the DID IT ISL trunk, back to the wireless portion of the switch, and terminates to mobile subscriber B.

SimRing/"Phone Twinning" feature

The SimRing/"Phone Twinning" feature is an application of the wireline RES Simultaneous Ringing feature. The SimRing feature associates a wireless terminal with a wireline terminal. A simultaneous notification occurs when the SimRing group pilot directory number (PDN) receives a call. The first notified DN that answers the call connects to the calling party. When the calling party connects to a member DN, the other notified member DNs (MDN) stop ringing.

Operating company personnel must configure an existing wireline number as the PDN of the group. A SimRing group contains one PDN and up to four non-pilot member DNs (NPMDN). Operating company personnel can make up the list of members, or the subscriber using the wireline telephone can manage the list.

A SimRing group can be either a single- or multi-user group. Both setups require ISUP ISL trunks. In a single-user group, a call to the PDN of a SimRing group receives busy treatment if any MDN in the SimRing group is busy. In a multi-user group, a call to a SimRing group PDN receives busy treatment only when all reachable MDNs are busy. Otherwise, idle MDNs receive simultaneous notification, and the calling party receives audible ringing.

A SimRing group PDN can have any of the following line class codes (LCC):

- RES (one-party flat rate [1FR] or one-party message rate [1MR])
- IBN
- Meridian business set (MBS) primary DNs: M5xxx (key 1), except ISDN

Note: Refer to *NTP Translations Guide* for additional information on the RES Simultaneous Ringing feature.

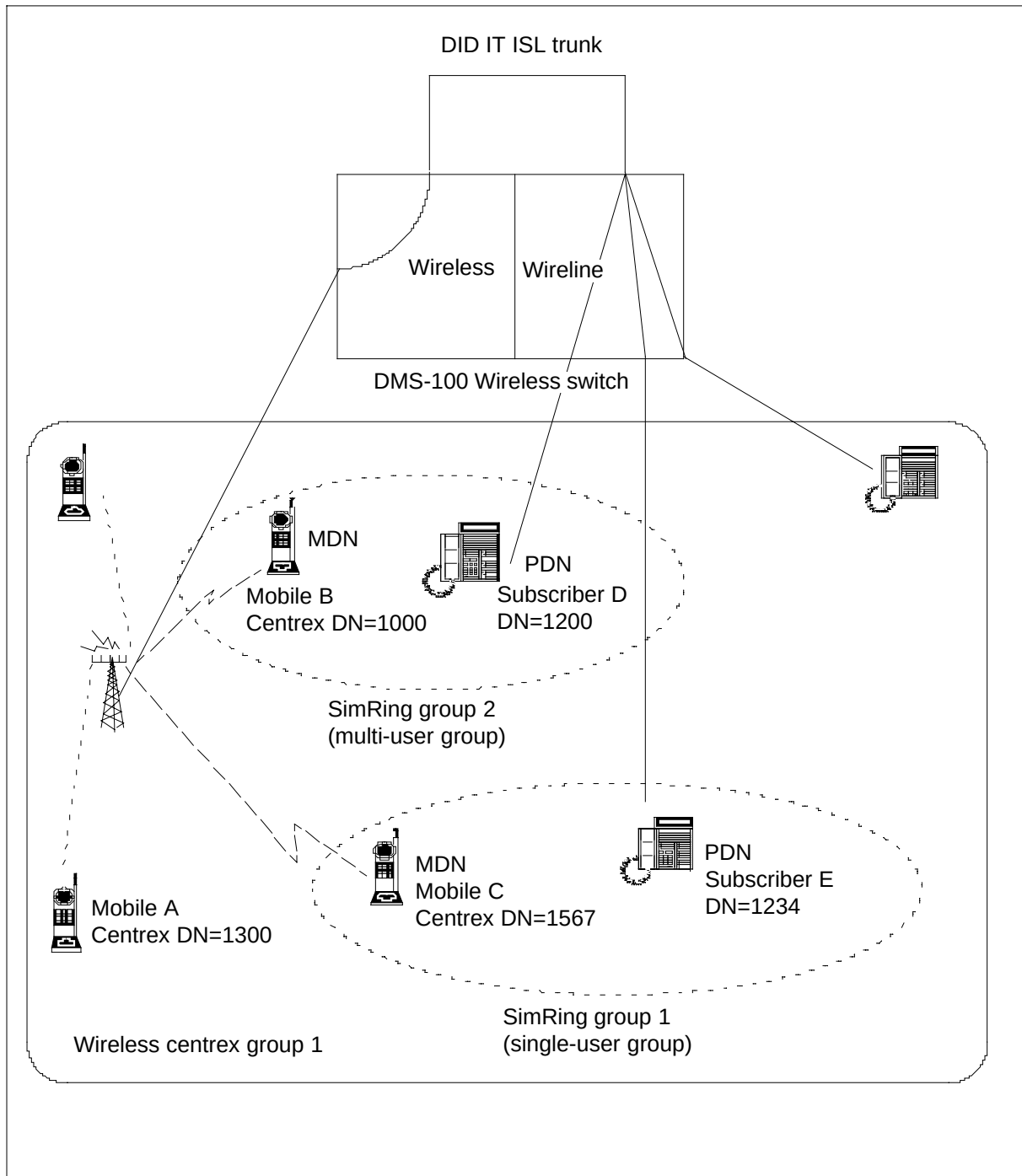
The wireless Cellular Extension Phones (CEP), or group ringing, feature is like the SimRing feature. But the CEP feature requires the wireless DN act as the PDN of the group, instead of the wireline DN. Also with this feature, operating company personnel cannot associate terminating calls with a specific business group. This missing business group association causes centrex service interactions for wireline calls. For these reasons, Nortel Networks recommends the use of the SimRing/“Phone Twinning” feature.

Note: Refer to *NTPWireless Solutions DMS-MTX Software Delta for Planners*, 411-2131-199, for additional information on the CEP feature.

The wireless CEP and wireline RES SimRing features are independent of each other and can interact transparently. For example, operating company personnel can configure a wireless DN in a RES SimRing group as the PDN of a wireless CEP group. Operating company personnel can provision a wireline DN in a wireless CEP group with the RES SimRing feature.

SimRing/“Phone Twinning” call scenarios

Figure 12-13 and the following paragraphs describe the call scenarios for SimRing/“Phone Twinning.”

Figure 12-13 Logical view of SimRing/“Phone Twinning” in a DMS-100 Wireless centrex group

The following conditions exist in the SimRing/“Phone Twinning” call scenarios.

- Mobile subscribers A, B, C and wireline subscribers D and E are members of wireless centrex group 1.
- Subscriber C's mobile telephone is an extension of wireline subscriber E's telephone. Both telephones belong to SimRing group 1, which is a single-user group. (That is, a call to the PDN receives busy treatment if any MDN in the group is busy.)
- Subscriber B's mobile telephone is an extension of wireline subscriber D's telephone. Both telephones belong to SimRing group 2, which is a multi-user group. (That is, a call to the PDN receives busy treatment if all the MDNs in the group are busy or unavailable.)

Scenario 1: Call to a single-user SimRing group Mobile subscriber A dials PDN 1234 of SimRing group 1. The call routes to the wireline portion of the switch for centrex translations. Translations determine the called DN is a PDN of a SimRing group. The wireline portion of the switch then connects the call to subscriber E directly, and to mobile subscriber C through a DID IT ISL trunk circuit. Both terminals receive notification. Mobile subscriber C answers the call, which disconnects subscriber E. A second call to the PDN receives busy treatment even though subscriber E is idle.

Scenario 2: Call to a multi-user SimRing group Mobile subscriber A dials PDN 1200 of SimRing group 2. The call routes to the wireline side for centrex translations. Translations determines the DN is a PDN of a SimRing group. The wireline portion of the switch then connects the call to subscriber D directly, and to mobile subscriber B through a DID IT ISL trunk circuit. Both terminals receive notification. Mobile B answers the call, which disconnects subscriber D. Since mobile subscriber B is busy, subscriber D receives the following PDN call.

Single integrated voice mail

Integrated voice mail allows a wireline subscriber and an associated mobile subscriber to share a mailbox in the same voice mail system (VMS). With integrated voice mail, operating company personnel assign one mailbox DN as the common call forwarding DN for Call Forwarding features. (These Call Forwarding features include Call Forwarding Busy Line [CFB], Call Forwarding Universal [CFU] and Call Forwarding Don't Answer [CFDA]).

The subscriber can then check all messages from either a wireless or wireline terminal.

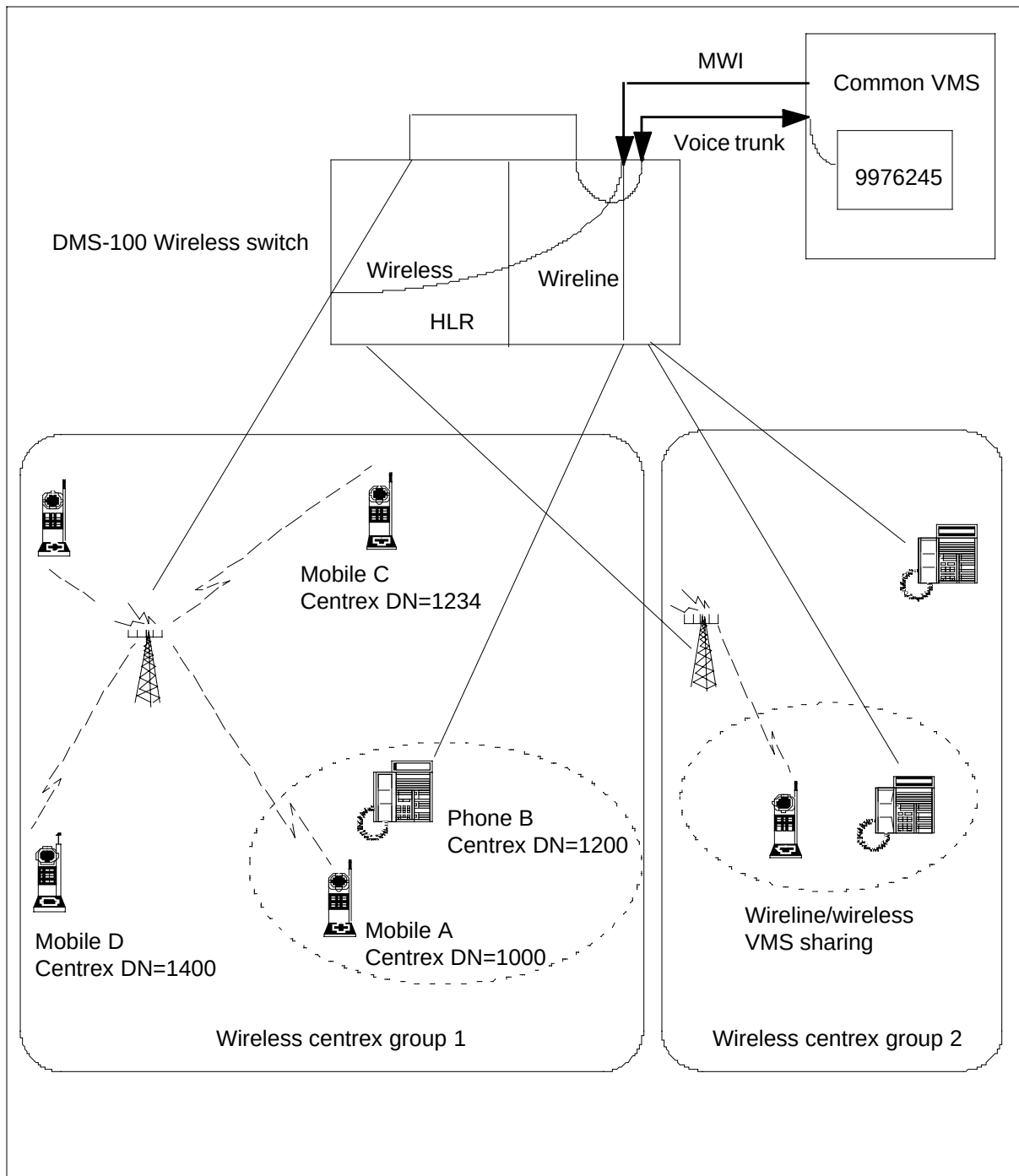
For integrated voice mail, the DMS-100 Wireless switch relies on the VMS to send two notifications, one for wireline calls and one for wireless calls. The notification the wireline subscriber receives operates like the existing wireline

functionality. The DMS-100 Wireless switch receives the notification for the wireless subscriber. The switch notifies an on-board home location register (HLR) to activate or deactivate the message waiting indicators (MWI). If the VMS cannot send two notifications for every deposited voice mail message, only one designated terminal (either wireline or wireless) receives the MWI. The terminal that receives the MWI depends on the mailbox provisioning in the VMS.

Single integrated voice mail call scenarios

Figure 12-14 and the following paragraphs describe the call scenarios for a wireline subscriber and the associated wireless mobile unit sharing a voice mailbox.

Figure 12-14 DMS-100 Wireless common VMS and integrated voice mailbox sharing



The following conditions exist in the integrated voice mail call scenarios.

- The DMS-100 Wireless switch has access to a local or a remote VMS. (A local VMS directly connects to the DMS-100 Wireless switch through a

uniform call distribution [UCD] line and an Simplified Message Desk Interface [SMDI]. A remote VMS is a VMS in the public switched telephone network [PSTN] that the DMS-100 Wireless switch accesses through ISUP and transaction capabilities application part [TCAP] signaling.)

- Mobile subscribers A, C, D and wireline subscriber B are members of centrex group 1. Mobile subscriber A's telephone is associated with wireline Subscriber B. Both mobile subscriber A and wireline subscriber B have features CFDA and CFB assigned to their telephones. The forwarding DN is 997-6245.

Scenario 1: A wireline subscriber and the associated mobile telephone share the same voice mailbox. The VMS returns one MWI.

Assumptions:

- Mobile subscriber A's telephone is idle and wireline subscriber B's telephone is busy.
- The VMS can send only one MWI.

Mobile subscriber C dials centrex DN 1200 to contact wireline subscriber B of the same centrex group. Subscriber B is busy. The call forwards to mailbox 997-6245. Mobile subscriber C leaves a voice mail message for subscriber B. The VMS sends one MWI to subscriber B.

Meanwhile, mobile subscriber D dials centrex DN 1000 to contact mobile subscriber A of the same centrex group. Mobile subscriber A does not answer the call before the ringing timer expires. The switch sends the call to mailbox 997-6245 again. Mobile subscriber D leaves another voice mail message in the mailbox. Since there is a pending voice mail for mailbox 997-6245, mobile subscriber A does not receive an MWI. After wireline subscriber B hangs up, subscriber B's terminal receives the MWI. Subscriber B dials 997-6245 to retrieve the voice mail messages. After subscriber B hears all the messages, the VMS sends a cancel MWI message to the DMS-100 Wireless switch to turn off the indication.

Scenario 2: A wireline subscriber and the associated mobile telephone share the same voice mailbox. The VMS returns two MWIs.

Assumptions:

- Mobile subscriber A's telephone is idle and wireline subscriber B's telephone is busy.
- The VMS can send two MWIs.

Note: Scenario 2 is similar to scenario 1, except the VMS sends two MWIs.

Mobile subscriber C dials centrex DN 1200 to contact wireline subscriber B of the same centrex group. Subscriber B is busy. The call forwards to mailbox 997-6245. Mobile subscriber C leaves a voice mail message for subscriber B. The DMS-100 Wireless switch receives two MWIs: one for subscriber B and another for mobile subscriber A. Mobile subscriber A receives the MWI immediately. The DMS-100 Wireless switch holds the MWI for subscriber B.

Meanwhile, mobile subscriber D dials centrex DN 1000 to contact mobile subscriber A of the same centrex group. Subscriber A does not answer the call before the ringing timer expires. The switch sends the call to mailbox 997-6245 again. Mobile subscriber D leaves another voice mail message in the mailbox. Since there is a pending voice mail for mailbox 997-6245, mobile subscriber A does not receive an MWI. After wireline subscriber B hangs up, the DMS-100 Wireless switch sends the MWI to subscriber B's telephone. Subscriber B dials 997-6245 to retrieve the voice mail messages. After subscriber B hears all the messages, the VMS sends cancel MWI messages to the DMS-100 Wireless switch to turn off the indication on mobile telephone A and wireline telephone B.

Wireless business group service

The wireless business group service allows operating company personnel to provision Call Forwarding features on the centrex DN and the public DN of one terminal. Wireless business group service operation varies depending on whether a call involves two group members using a private dialing plan, or the call originates from a PSTN. For example, operating company personnel can configure Call Forwarding to redirect calls from group members, but not redirect calls from non-group members.

Wireless business group service supports all existing intra-group interactions for wireline members, regardless of whether a wireline or wireless group member originated the call. That is, whenever a wireless member of a wireless centrex group calls a wireline member, the wireline member's centrex service treats the call as an intra-group call.

A wireless business group service does not support intra-group interactions with services assigned to wireless group members. All services work the same way for wireless subscribers, regardless of the mobile terminal called the centrex DN or the PSTN DN.

The following list includes assignable services for both wireline and wireless members of the centrex group:

- Call Forwarding (CFB, CFNA, CFU)

Both wireline and wireless subscribers can forward incoming calls unconditionally, when busy, or when not answered.

- Call Conferencing (for example, 3-Way Calling)

Both wireline and wireless subscribers can set up conferences between multiple parties. Wireline conferencing services support three-way, six-way, and n-way conferencing. Wireless conferencing services support three-way conferencing only.

- Calling Line ID

Both wireless and wireline subscribers can display calling numbers on all sets receiving a call. Wireline subscribers can also accept calling name delivery. Wireless subscribers cannot accept calling name delivery.

- Call Transfer

Both wireline and wireless subscribers can initiate Call Transfer during intra-group and non-centrex calls.

- Call Waiting

Both wireline and wireless subscribers can receive Call Waiting tone and initiate the service during the calls.

Note: Wireless and wireline features support different industry standards: that is, IS-53 for wireless features, and LATA Switching Systems Generic Requirements (LSSGR) for wireline features. Subscribers with a wireline telephone and an associated mobile telephone can experience minor service differences for the same features on different telephones.

Wireless centrex billing

Telephone operating companies must consider the following issues when setting up different billing rate plans for wireless centrex calls within a coverage area.

- Every originating or terminating call that involves wireless centrex members generates a call detail record (CDR). The down-stream processor could use the cell identification field in the CDR to distinguish a wireless centrex call from a wireless non-centrex call.
- The called DN field of the CDR lists the called centrex DN that a wireless member dialed.
- The called DN field in the CDR has a 10-digit MIN for a centrex terminating call, which is the same as a non-centrex call. The cell site identification field identifies the cell that terminated the call.

- Time division multiple access supports private system identifier (PSID) and residential system identifier (RSID) tiered billing. The PSID and RSID tiered billing charges wireless centrex calls differently than non-centrex calls. This type of tiered billing uses a pre-defined PSID and RSID list. The DMS-100 Wireless switch uses IS-41P messaging to support this capability, which requires a Nortel Networks HLR.
- Code division multiple access supports tiered billing for wireless originating and terminating calls. Operating company personnel must use the cell identification from the CDR to determine the billing information. (The move between tiers does not include visual or audio notification.)

Refer to the following documents for additional information on the previously listed features with billing:

- *Wireless Solutions DMS-MTX Software Delta for Planners*, 411-2131-199
- *DMS-100 Family Station Message Detail Recording Reference Guide*, 297-2071-119

AIN trigger support

Operating company personnel can assign Advanced Intelligent Network (AIN) triggers to IBN trunks on the wireline side of an ISL link. The ISL interface only supports the off-hook delay (OFFHKDEL) and encounter termination attempt (TERMATT) triggers.

Wireless centrex provisioning

The DMS-100 Wireless centrex service does not add or change existing provisioning. Use MSERVORD and table control to provision wireless centrex services.

Wireless centrex OA

The DMS-100 Wireless centrex service does not add or change the existing wireline logs, operational measurements (OM), alarms, and MAP functionalities.

Summary of wireless centrex features

Table 12-2 lists wireless centrex features that the DMS-100 Wireless switch supports.

Table 12-2 DMS-100 Wireless centrex supported features (Sheet 1 of 3)

Feature	Supports	Restrictions/ limitations
Shared private dialing plan	DMS-100 Wireless centrex supports the following shared private dialing plan services: • abbreviated centrex dialing between wireline and wireless members • 9+ or 6+ dialing for external access • class-of-service assignment to wireless members to limit off-network, toll, or international calls	Uses a DID IT ISL trunk for a wireless centrex customer group, subgroup, or NCOS combination
SimRing/"Phone Twinning"	DMS-100 Wireless centrex supports the following SimRing/"Phone Twinning" services: • alerts both wireless and wireline members in the SimRing group when the caller dials the PDN • supports single- and multi-user SimRing groups • supports up to 5 members in a SimRing group	DMS-100 Wireless centrex has the following restrictions for SimRing/"Phone Twinning" services: • MADN interactions • BRI line

Table 12-2 DMS-100 Wireless centrex supported features (Sheet 2 of 3)

Feature	Supports	Restrictions/ limitations
Single integrated voice mail	DMS-100 Wireless centrex supports the following single integrated VMS services: • Wireline and wireless extensions can share the same mailbox. • DMS-100 Wireless centrex supports both local VMS and PSTN network VMS.	DMS-100 Wireless centrex has the following restrictions for integrated VMS services: • relies on VMS to deliver MWI to members who share the same mailbox • cannot generate more MWIs for each member who shares the same mailbox if the VMS is to deliver only one MWI • does not support external HLR. (Only supports Nortel Networks on-board HLR.)
Wireless business group service	DMS-100 Wireless centrex supports the following wireless business group services for wireless and wireline members: • Call Forwarding-CFB, CFNA, CFU • Call Conferencing • Calling Line ID • Call Transfer • Call Waiting	DMS-100 Wireless centrex has the following restrictions for wireless business group services: • Does not support intragroup screening for wireless members. • Wireless and wireline group members can experience minor operational differences.

Table 12-2 DMS-100 Wireless centrex supported features (Sheet 3 of 3)

Feature	Supports	Restrictions/ limitations
Wireless centrex billing	DMS-100 Wireless centrex supports the following billing services: • generates CDRs for the wireless portion of the call • generates Station Message Detail Recording (SMDR) network extension call records on the wireline portion of the switch for every wireless centrex call • supports time division multiple access (TDMA) PSID/RSID tiered billing	DMS-100 Wireless centrex has the following restrictions for billing services: • supports TDMA tiered billing for IS-136 mobile stations only • requires Nortel Networks proprietary HLR for TDMA tiered billing through IS-41P messaging. • supports code division multiple access (CDMA) tiered billing based on cell site identification in a CDR. But DMS-100 Wireless centrex does not provide audio or video notification for the between-tier moves.
Wireless centrex provisioning	DMS-100 Wireless centrex supports MSERVORD and table control to provision wireless centrex services	Customer group provisionable services do not apply to wireless members.
OAM	DMS-100 Wireless centrex supports existing wireline and wireless logs, operational measurements, alarms, and MAP functionalities.	None

Air interface support

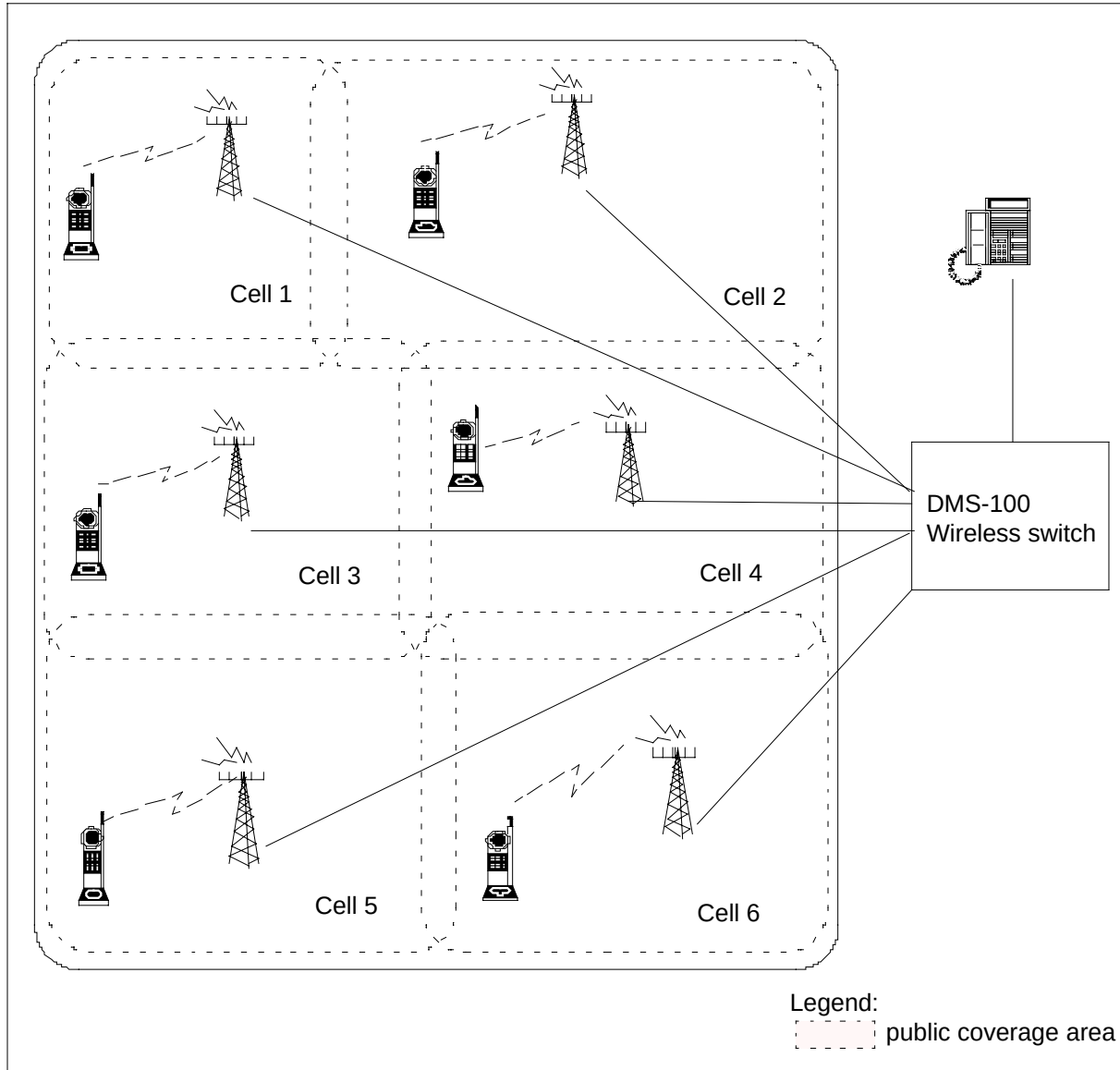
The wireless air interfaces and the features each interface supports can affect integrated wireless centrex in several areas. This sub-section provides guidelines for TDMA, CDMA, and advanced mobile phone service (AMPS) air interfaces under city-wide, campus-wide, and in-building coverage options. A brief description of each coverage option follows.

City-wide coverage

City-wide coverage for integrated wireless centrex provides the features and services for all cell sites the DMS-100 Wireless switch connects. It is possible to extend the integrated wireless centrex capabilities across multiple DMS-100 Wireless switches in a networked environment.

Figure 12-15 shows an example of city-wide coverage for the DMS-100 Wireless switch.

Figure 12-15 DMS-100 Wireless centrex city-wide coverage



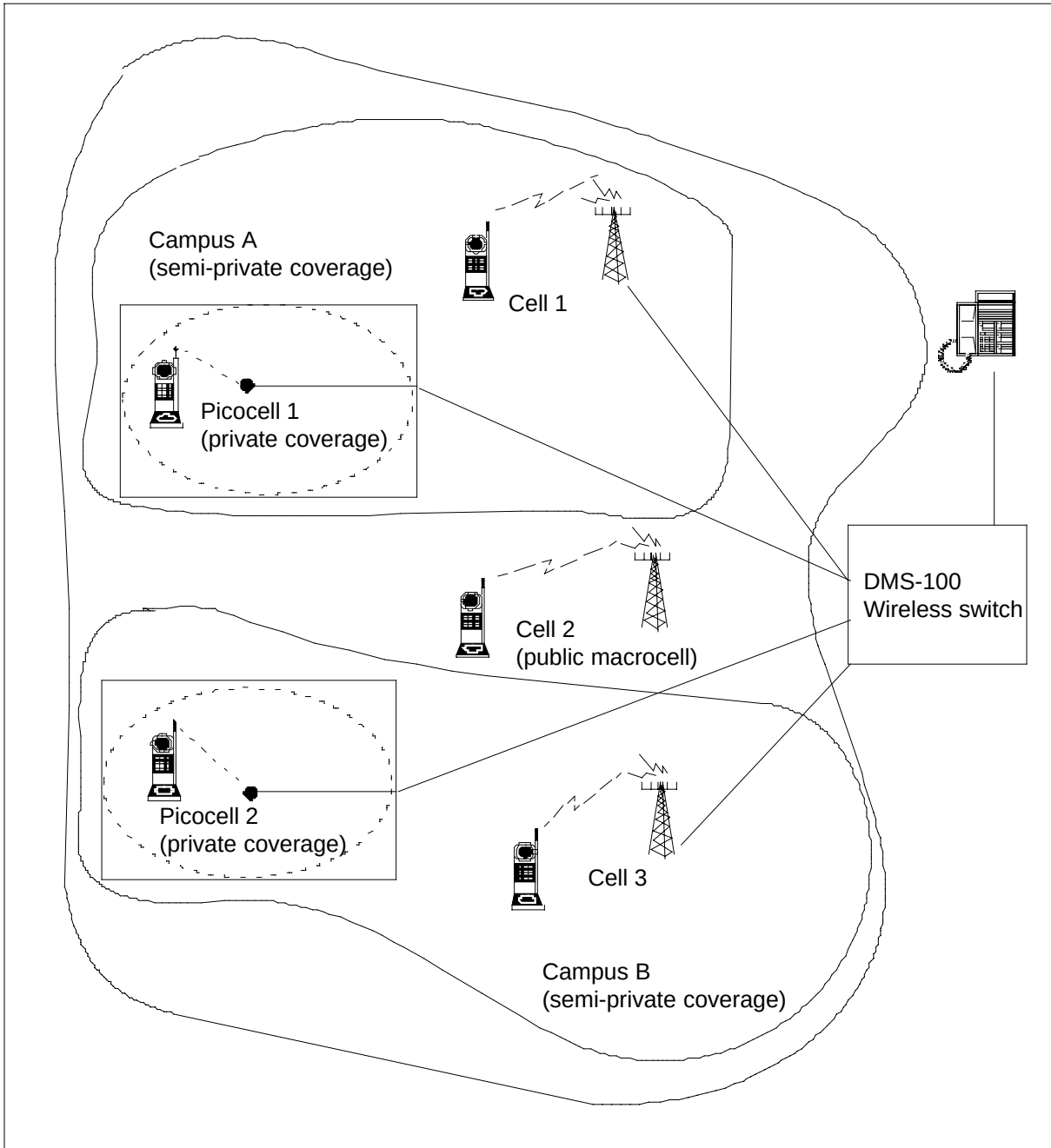
In city-wide coverage, wireless subscribers can access the SimRing/“Phone Twinning” feature, regardless of their location, unless the end user changes the SimRing list to exclude wireless use. A wireless subscriber can also receive the integrated voice mailbox indicator while roaming, unless the roaming network does not support MWI.

Campus/building-wide coverage

Campus or building-wide coverage for integrated wireless centrex provides the features and services for a group of cell sites contained within a campus or building-like environment. As a subscriber moves between the campus and a larger public network, the corporate dialing plan and business group-oriented services are enabled or disabled.

Figure 12-16 shows an example of campus-wide coverage for the DMS-100 Wireless switch.

Figure 12-16 DMS-100 Wireless centrex campus-wide coverage



In campus-wide coverage, wireless subscribers can access the SimRing/“Phone Twinning” feature regardless of their location, unless the end user changes the SimRing list to exclude wireless use. A wireless subscriber can also receive the integrated voice mailbox indicator while roaming, unless the roaming network does not support MWI.

Campus-wide coverage also includes the following two architectures:

- **Private.** A private integrated wireless centrex architecture provides all the previously described services. It also provides dedicated air interface capacity for a business group. General public mobiles cannot access these dedicated capacity resources.
- **Semi-private.** A semi-private integrated wireless centrex architecture provides all the previously described services but uses the air interface capacity resources of the public system. The integrated wireless centrex system and public wireless system also share the resources.

CDMA

City-wide coverage The CDMA interface supports integrated wireless centrex service in the 800- and 1900-MHz frequencies for city-wide coverage.

The DMS-100 Wireless switch supports the existing wireless handoff capability, and air-time billing charges for CDMA city-wide coverage. (Use SMDR records, which the ISLs generate, to facilitate off-net and on-net accounting.)

Campus/building-wide coverage Integrated wireless centrex service can operate in the 800- and 1900-MHz frequencies for in- and out-building, campus-wide coverage. (Private wireless systems can be difficult to deploy because of the radio frequency [RF] characteristics of CDMA.)

The DMS-100 Wireless switch supports the existing wireless handoff capability and air-time billing charges for CDMA campus-wide coverage. (Use SMDR records, which the ISLs generate, to facilitate off-net and on-net accounting.)

As mobile subscribers move in and out of a campus environment, no means exists to notify the subscriber if he or she has accessed the campus system or public system.

Note: Due to the limitations of CDMA radio operation, Nortel Networks does not recommend the use of dedicated in-building radio cell sites for this coverage option. Use only an out-building macrocell.

TDMA IS-136

Standard TDMA IS-136 provides detailed network definitions and capabilities to support tiered architectures and private system solutions, such as wireless centrex. This standard, which supports the concept of PSID and RSID, allows operating company personnel to assign a group of cells for a wireless centrex coverage area. Operating company personnel can also set up different rate plans for centrex subscribers who make or receive calls within a group of cells that a specific PSID or RSID designates.

City-wide coverage The TDMA IS-136 interface supports integrated wireless centrex service in the 800- and 1900-MHz frequencies for city-wide coverage.

The DMS-100 Wireless switch supports the existing wireless handoff capability and air-time billing charges for TDMA city-wide coverage. (Use SMDR records, which the ISLs generate, to facilitate off-net and on-net accounting.)

Campus/building-wide coverage Similar to TDMA city-wide coverage, operating company personnel can assign integrated wireless centrex service to designated cells for campus-wide coverage. Integrated wireless centrex service can operate in the 800- and 1900-MHz frequencies for in- and out-building, campus-wide coverage. The PSID/RSID capabilities associated with Nortel Networks' TDMA IS-136 service covers private and semi-private applications.

The DMS-100 Wireless switch supports the existing wireless handoff capability and air-time billing charges in CDMA city-wide coverage. (Use SMDR records, which the ISLs generate, to facilitate off-net and on-net accounting.)

As mobile subscribers move in and out of the campus environment, the telephone displays text indicating the current service provider. (For example, a Nortel Networks' campus system in Durham, North Carolina could display "NORTEL" when the mobile accesses a campus system. That same system can display "DURHAM" when it accesses the public system in the same city.)

TDMA IS-54/AMPS

City-wide coverage The TDMA (IS-54B) interface supports the city-wide application for the 800-MHz frequency.

The DMS-100 Wireless switch supports the existing wireless handoff capability and air-time billing charges in TDMA city-wide coverage. (Use SMDR records, which the ISLs generate, to facilitate off-net and on-net accounting.)

Campus/building-wide coverage Nortel Networks does not recommend a campus/building-wide coverage for TDMA IS-54B/AMPS interface. Although this configuration is possible, it contains limitations to the standards specifications.

Handoff support

The DMS-100 Wireless switch supports the existing wireless handoff capability, and the TDMA mobile handoff from in-building picocell to out-building public macrocell.

Handset requirements

Table 12-3 lists wireless air interfaces and handsets the DMS-100 Wireless switch supports in various frequencies.

Table 12-3 Air interface standards supported

Standard	Air interface	Frequency
TIA/EIA IS-136, Revision A	TDMA	800-and 1900-MHz
TIA/EIA IS-54B	TDMA	800-MHz
TIA/EIA IS-95A	CDMA	800-MHz
ANSI J-STD-008	CDMA	1900-MHz
EIA-553 or EIA/TIA IS-91	AMPS	800-MHz

System engineering impact

Centrex groups that span the wireless and wireline portions of the DMS-100 Wireless switch require a DID IT ISL trunk group. The IBN trunk group consists of a group of ISL links. Every centrex call that involves wireless members uses at least one ISL link in the DID IT ISL trunk group. Mobile-to-mobile centrex calls or calls that involve features such as SimRing/“Phone Twinning” also require additional ISL links.

The DMS-100 wireless centrex service affects the following system engineering areas:

- CM switching capacity
- ISL link and digital trunk controller (DTC) provisioning
- CM memory capacity

DMS-100 Wireless centrex traffic modeling

All wireless call attempts (CA) from centrex members route to the wireline portion of the switch through DID IT ISL links for centrex translation. Table

12-4 lists the number of ISL links that the DMS-100 Wireless switch requires for each wireless centrex call type.

Table 12-4 Number of required ISL links

Call type	Number of required ISL links	Notes
Basic wireless-to-wireline centrex call	1 centrex, 1 non-centrex	Centrex translations route over wireline portion of switch
Basic wireline-to-wireless centrex call	1 centrex, 1 non-centrex	Centrex translations route over wireline portion of switch
Basic wireless-to-wireless centrex call	2 centrex	Centrex translations route over wireline portion of switch
Call to SimRing group with n wireless extensions	n	Switch considers only termination legs of the call
Switch forwards wireless member calls to VMS, PSTN, or wireline member	1 centrex, 1 non-centrex	Switch considers only forwarding legs of the call
Note: This table does not include additional ISL links on top of basic calls for features, such as 3-Way Calling and Call Transfer.		

From the perspective of the cost of CM RT and ISL links, both scenarios for a centrex call cost about the same for a non-centrex call. For wireless-to-wireless centrex calls, each centrex call requires two ISL links and additional CM RT to handle extra call processing units. A non-centrex call requires no ISL link.

The traffic pattern and traffic density for wireless centrex members (that is, traffic mix, centum call seconds [CCS], and average hold time [AHT]) behave similarly as for wireline centrex members. Based on this assumption, the switch uses 6 CCS for each wireless centrex member and 180 seconds AHT for each centrex CA.

Note: These centrex CCS and AHT values are higher than the DMS-100 Wireless values for a capacity forecast from non-centrex environments in which the CCS and AHT values range from 0.64 to 2.56 CCS, and from 100 to 120 seconds.

Using the existing wireline business model as a base for the model, the centrex traffic has 49.6% for intra-centrex group traffic and the remaining 50.4% for others. (Use the same wireless mobility model for centrex and non-centrex wireless subscribers.)

The following list includes traffic parameters and the steps of traffic calculation for a given wireless centrex group:

- N = the number of members in a given centrex group
- P = the percentage of wireless centrex members; $(1-P)$ is the percentage of wireline members
- C_m = the number CCS for each wireless member (default to 6 CCS)
- C_l = the number CCS for each wireline member (default to 6 CCS)
- AHT_m = the average hold time for wireless centrex call attempts (default to 180 seconds)
- AHT_l = the average hold time for wireline centrex call attempts (default to 180 seconds)
- p_{Intra} = the percentage intra-centrex call attempts (default to 49.6%)
- CCS_m = the wireless centrex CCS = $N * P * C_m$
- CCS_l = the wireline centrex CCS = $N * (1-P) * C_l$
- CCS_a = the total CCS for a given centrex group = $CCS_m + CCS_l$
- CCS_{ISL} = the total ISL CCS = $CCS_m * (1 + p_{Intra} * P) + CCS_l * p_{Intra} * P$

CM switching capacity impact

The average work times (AWT) for mobile-to-line calls for centrex and non-centrex members are about the same. This is also true for the AWTs of line-to-mobile calls for centrex and non-centrex members. The AWT of mobile-to-mobile calls for centrex members is different from the AWT for non-centrex, mobile-to-mobile calls. Let AWT_{ctx} and AWT_r be the average work times of mobile-to-mobile calls for centrex and non-centrex, respectively. They are,

AWT_{CTX} = the RT cost of a centrex mobile-to-mobile call

= the RT cost of (mobile-to-ISL call) + (ISL-to-ISL call) + (ISL-to-mobile call)

AWT_R = the RT cost of a basic mobile-to-mobile call

Use the CCS, AHT, AWT, and traffic parameters to calculate the CM RT impact of a centrex group. Due to the complexity of the traffic model and the number of parameters, use the DMS-100 Wireless capacity forecast tools, such as the System Capacity Analysis Tool (SCAT) and Flexible Advanced Capacity Engineering Tool (FACET) real time tools, to estimate centrex capacity impact.

ISL link and DTC provisioning

Use the “Full Availability erlang B” trunking formula to estimate the number of ISL links that the DMS-100 Wireless requires to handle centrex traffic demands. The provisioning of the system-wide ISL links for non-centrex, wireless-to-wireline traffic also uses the erlang B formula with 1% blocking probability.

Traffic demands CCS_{ISL} , in CCS, using the previous equations and the erlang B formula with a 1% blocking probability affect the provisioning of ISL links for any centrex group. For example, if the computed traffic demands CCS_{ISL} of a given centrex group is 732 CCS, provision 30 ISL links to meet the traffic demands with no more than 1% of ISL blocking probability.

Note: The smaller the ISL group equals the lower the efficiency for each ISL link. For a 200-link ISL group, the individual link efficiency is around 0.9 erlang for each link. For a 20-link ISL group, the individual link efficiency drops to 0.6 (=12.03/20) erlang for each link.

Table 12-5 lists the ISL trunk group traffic capacity to provision ISL links for a given centrex group.

Table 12-5 ISL trunk group traffic capacity-full availability erlang B (Sheet 1 of 2)

Number of ISL links	P=1% blocking CCS	P=1% blocking erlangs	P=2% blocking CCS	P=2% blocking erlangs
1	0.40	0.01	0.70	0.02
2	5.40	0.15	7.90	0.22
3	16.60	0.46	21.60	0.60
4	31.30	0.87	39.20	1.09
5	49.00	1.36	59.80	1.66
6	68.80	1.91	82.10	2.28
7	90.00	2.50	106.00	2.94
8	113.00	3.14	131.00	3.64
9	136.00	3.78	156.00	4.33
10	161.00	4.47	183.00	5.08
11	186.00	5.17	210.00	5.83
12	212.00	5.89	238.00	6.61

Table 12-5 ISL trunk group traffic capacity-full availability erlang B (Sheet 2 of 2)

Number of ISL links	P=1% blocking CCS	P=1% blocking erlangs	P=2% blocking CCS	P=2% blocking erlangs
13	238.00	6.61	267.00	7.42
14	265.00	7.36	295.00	8.19
15	292.00	8.11	324.00	9.00
16	319.00	8.86	354.00	9.83
17	347.00	9.64	384.00	10.67
18	376.00	10.44	414.00	11.50
19	404.00	11.22	444.00	12.33
20	433.00	12.03	474.00	13.17
25	580.00	16.11	630.00	17.50
30	732.00	20.33	789.00	21.92
35	887.00	24.64	951.00	26.42
40	1044.00	29.00	1116.00	31.00
45	1203.00	33.42	1282.00	35.61
50	1364.00	37.89	1449.00	40.25

Each ISL link requires two DS0 ports on the peripheral side (p-side) of a DTC. Each DTC has a maximum of 20 T1s, and each T1 has 24 DS0 ports. To calculate the number of T1s that centrex features require, use the following formula. (Let N_{ISL} equal the total number of ISL links needed for all centrex groups.)

$$\# \text{ of T1s required for centrex features} = \text{ceiling} (N_{ISL} / 24) * 2$$

The number of T1s that wireless centrex calls require is in addition to the T1s that wireless non-centrex calls require. (Include this factor in the calculation of the overall DTCs requirements.)

If operating company personnel do not integrate the centrex and non-centrex ISLs in one DTC, use the following formula to express the number of required DTCs:

$$\# \text{ of required DTCs for centrex feature} = \text{ceiling} [\text{ceiling} (N_{ISL} / 24) * 2] / 20$$

CM memory impact

The CM data store requirement for each centrex group follows the existing wireline centrex group datafill. Centrex CM memory impact depends on the total number of centrex groups in the switch and the size of each group.

Based on the current forecast for wireless centrex penetration, the DMS-100 Wireless estimate is low and the CM memory impact is minimal.

13 Trunking configurations

Introduction

The DMS-100 Wireless switch supports the following options to configure interoffice trunking into the public switched telephone network (PSTN):

- configuration 1: integrated, interoffice traffic routed through wireline call processing
- configuration 2: interoffice traffic routed through wireless call processing
- configuration 3: interoffice traffic separated by wireless and wireline call processing

The following sections describe each of these configuration options in detail.

Configuration 1 - Integrated interoffice traffic routed through wireline call processing

Configuration 1 uses wireline trunk groups to handle all interoffice trunking traffic. Calls that originate and terminate from wireline switch agents can directly access these trunk groups. Calls that originate and terminate from wireless agents use integrated service links (ISL) to route into the wireline call processing portion of the switch. The calls then continue to route with wireline interoffice intertoll (IT) trunk groups.

Note: Use configuration 1 if the switch supports a greater number of wireline subscribers than wireless subscribers. Configuration 1 is also common for incumbent local exchange carriers (ILEC) and competitive local exchange carriers (CLEC) upgrading a wireline DMS-100 or a DMS-10 switch to a DMS-100 Wireless switch.

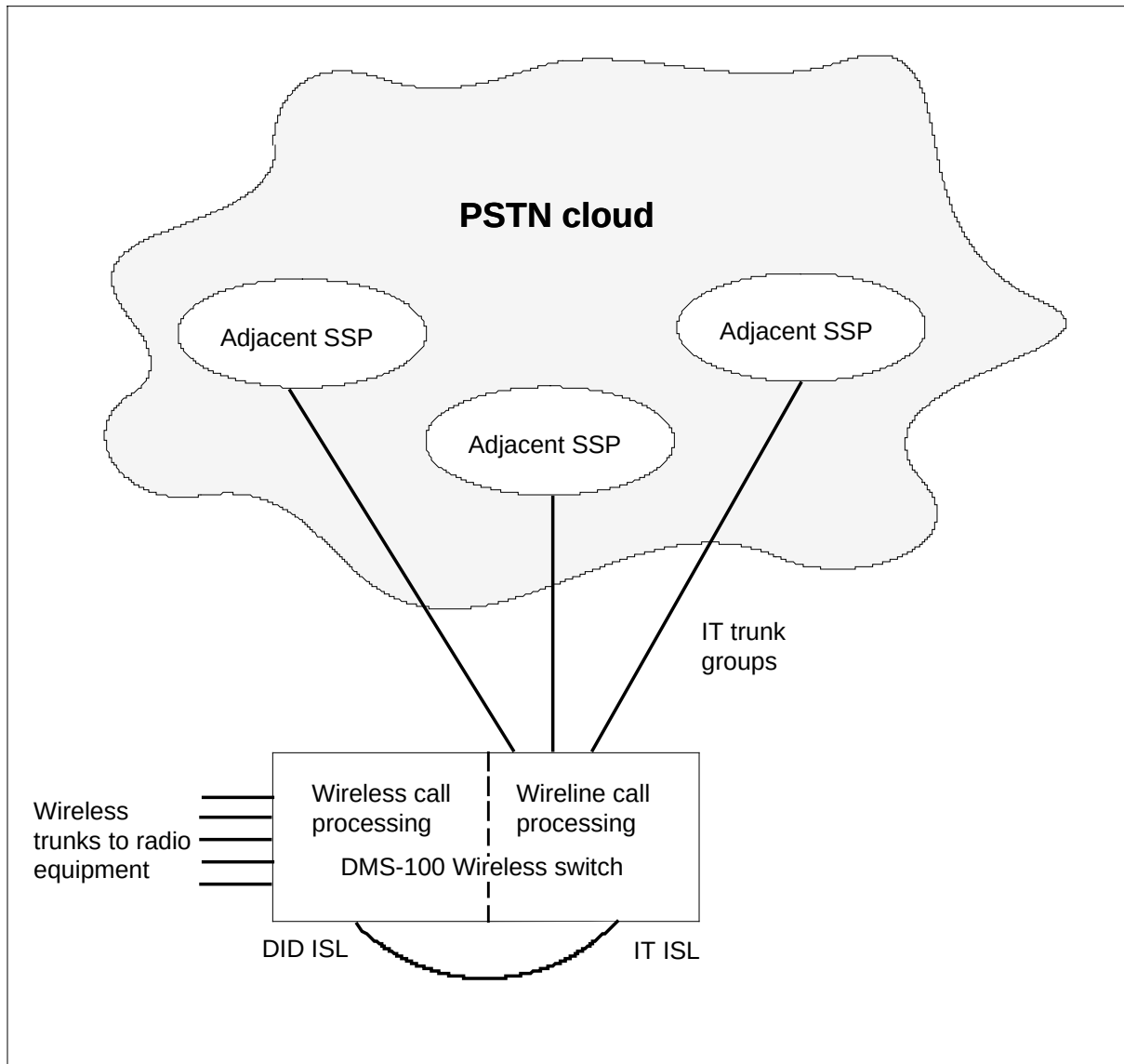
Configuration 1 contains the following elements:

- allows all subscribers on the DMS-100 Wireless switch to use the access tandem (AT) capabilities (such as equal access [EA] and Enhanced 911 Emergency Service [E911] calls), which the wireline call processing platform provides
- allows adjacent service switching points (SSPs) to route all traffic destined to the DMS-100 Wireless switch on an integrating trunk

13-2 Trunking configurations

- prevents adjacent SSPs from separating calls in translations based on if the subscriber uses wireless or wireline services
- allows interoffice traffic to use wireline switch trunk groups
- establishes translations within wireline switch call processing
- establishes translations within wireless call processing to route calls between the wireless agents and the ISLs into wireline switch call processing
- allows the wireline switch to function as an AT as it routes calls to outgoing wireline interoffice IT trunk groups to adjacent nodes

Figure 13-1 shows configuration 1.

Figure 13-1 Configuration 1 - Wireline call processing

Configuration 2 - Interoffice traffic routed through wireless call processing

Configuration 2 routes all interoffice traffic from wireless subscribers over direct inward dialing (DID) interoffice trunk groups into the PSTN. Calls that originate and terminate from wireless agents, including advanced mobile phone service (AMPS), time division multiple access (TDMA), and code

division multiple access (CDMA), can directly access the PSTN through these trunk groups.

Note: Configuration 2 supports only wireless subscribers. Nortel Networks recommends the use of configuration 2 only for short-term use, since it does not support wireline subscribers.

Configuration 2 contains the following elements:

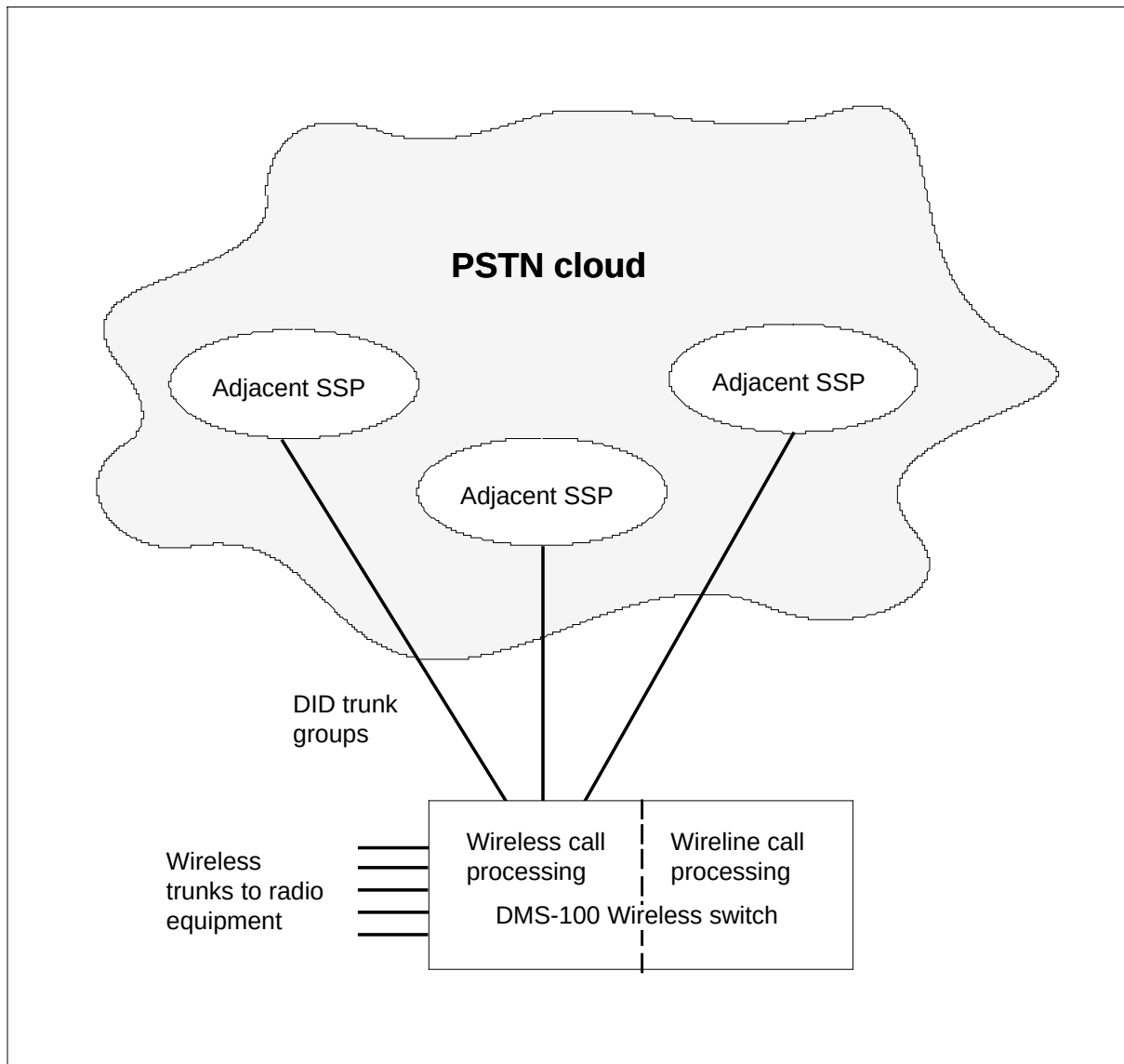
- routes all calls that originate and terminate to wireless subscribers into the PSTN on DID trunk groups
- establishes translations in wireless call processing to route calls between the wireless subscribers and the interoffice DID trunk groups
- supports only feature group D (FGD) EA signaling on calls originating from wireless subscribers

This configuration does not support the following:

- wireline subscribers
- feature group B (FGB) signaling
- feature group C (FGC) signaling

Note: To facilitate future support for wireline subscribers, enter separate serving translations schemes (STS) in table HNPACONT (Home Numbering Plan). Refer to subsection “Separate serving translation scheme” in chapter 5, “Translations and call processing,” for details.

Figure 13-2 shows configuration 2.

Figure 13-2 Configuration 2 - Wireless call processing

Configuration 3 - Interoffice traffic separated by wireless and wireline call processing

Configuration 3 separates interoffice trunking traffic by wireless and wireline call processing.

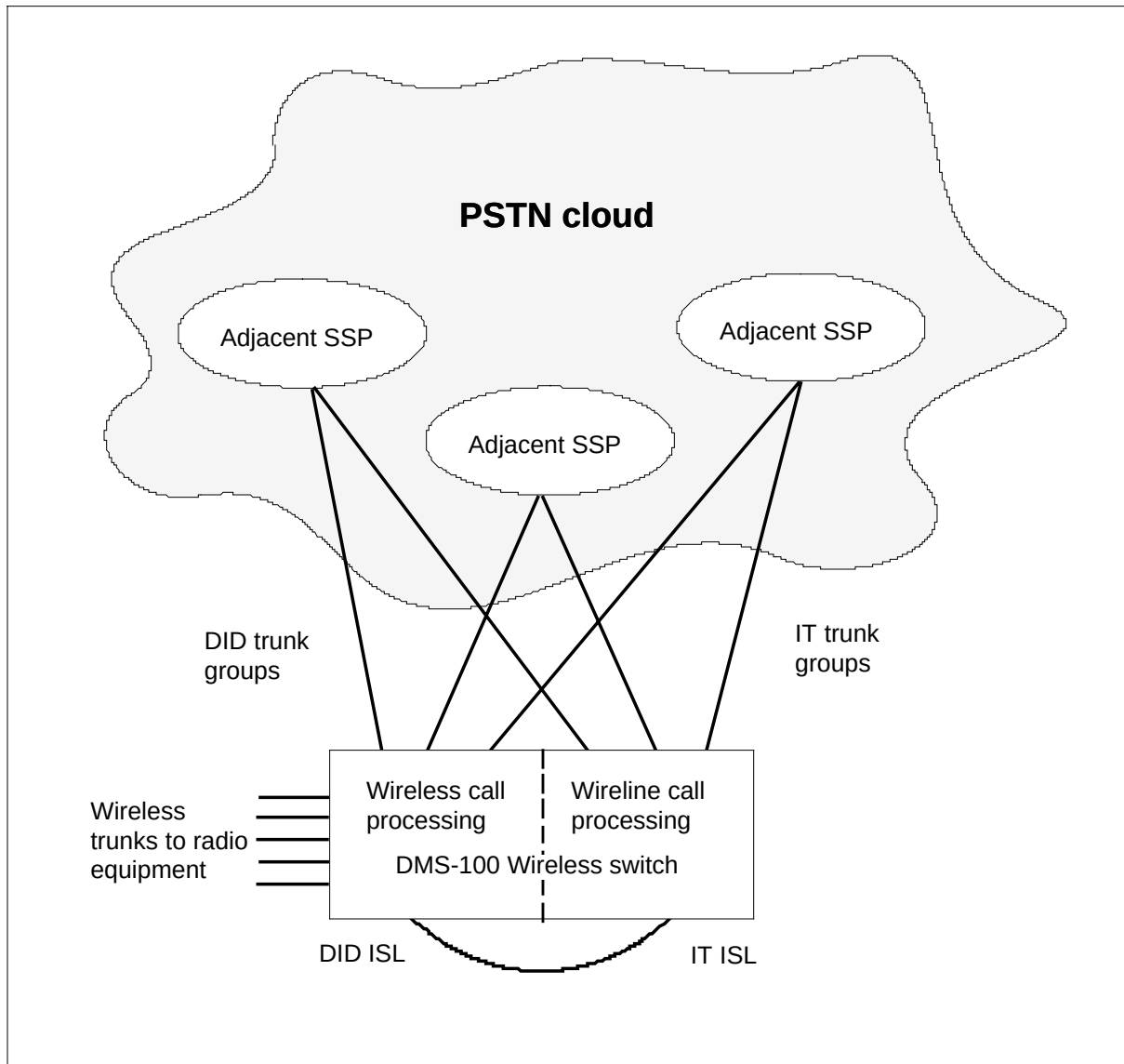
Note: Nortel Networks recommends configuration 3 to maintain separate interoffice trunk groups for wireless and wireline subscribers.

Configuration 3 contains the following elements:

- allows calls that originate and terminate from wireless agents to directly access the PSTN through DID trunk groups
- allows calls that originate and terminate from wireline agents to directly access the PSTN through wireline trunk group types, such as IT trunks
- configures ISLs to support traffic between wireless and wireline subscribers

As with configuration 1, the wireless end of the ISL trunk is a DID trunk. The wireline end of the ISL trunk is an IT trunk. Each adjacent SSP separates incoming traffic by routing wireless calls over interoffice DID trunks, and wireline calls over interoffice IT trunks.

Figure 13-3 shows configuration 3.

Figure 13-3 Configuration 3 - Wireless and wireline call processing

Migration strategies

If the DMS-100 Wireless switch serves primarily wireline or wireless subscribers, then route the interoffice trunking traffic from either the wireline or wireless parts of the switch, respectively. The best configuration depends on if it is correct to link the switch to its adjacent SSPs through integrated trunk groups, or with separate trunk groups for wireless and wireline subscribers.

The sections that follow describe the migration strategies.

Migration strategy from configuration 1 to configuration 3

If the office significantly increases the number of wireless subscribers relative to wireline subscribers, migrate configuration 1 to configuration 3.

Configuration 3 allows the switch to route calls from wireless agents directly into the PSTN without ISLs.

Migrate configuration 1 to configuration 3 with the steps that follow:

- Establish interoffice DID trunk groups between the DMS-100 Wireless switch and adjacent SSPs. If the IT trunk group was engineered with excess capacity, migrate the physical circuits in the DID trunk groups from the existing IT trunk group.
- Modify the translations tables associated with the wireless subscribers to route interoffice calls that originate from wireless agents to the interoffice DID trunks instead of the existing ISLs. Existing translations must still route calls from wireless subscribers to wireline agents, which the DMS-100 Wireless switch serves through the ISLs.
- Set up overflow routing to route calls from wireless subscribers to adjacent SSPs over the existing ISLs into wireline call processing. Then route the calls over interoffice IT trunks to adjacent SSPs. This routing can serve as a backup to the primary DID route directly to the adjacent SSP.
- Update translations in the adjacent SSPs to route calls to wireless subscribers over the interoffice DID trunk groups. Routing can overflow to the existing interoffice IT trunk groups if translations for IT trunks continue to route calls over the ISLs into the wireless call processing part of the switch.

Migration strategy from configuration 2 to configuration 3

Migrate the DMS-100 Wireless switch from configuration 2 to configuration 3 to support the addition of the following capabilities:

- support for line agents, such as POTS, centrex, and basic rate interface (BRI)
- support for trunk agents, such as primary rate interface (PRI)
- integrated wireless centrex services

As you add wireline agents to this configuration, establish separate trunking facilities to route calls between wireline agents and the PSTN. Engineer ISLs to support calls between wireline and wireless subscribers.

Route calls between wireline agents and the PSTN directly out of the switch using wireline trunk groups. Do not route calls over the ISLs into the wireless call processing and then out of the DMS-100 Wireless switch on DID trunks.

Migrate configuration 2 to configuration 3 with the steps that follow:

- Engineer interoffice trunk groups to route calls from the wireline agents into the PSTN. Use IT trunks, or other wireline trunk groups, for this connectivity. Do not use existing DID trunks for wireless subscribers. The DMS-100 Wireless switch does not support direct interworking between wireline call processing agents and DID trunk groups. If the DID trunk group has been engineered with excess capacity, migrate the physical circuits in the DID trunk groups from the existing IT trunk group.
- Route calls for wireless subscribers over the trunk groups that enter the wireless switch as DID trunk groups. Route calls for wireline subscribers over the trunk groups that enter the switch as IT trunk groups. Adjacent SSPs must separate the traffic between these two trunk groups.
- Define the ISLs to support direct calls between wireless and wireline subscribers. For example, the same switch serves a wireless subscriber and a wireline subscriber. If the wireless subscriber calls the wireline subscriber, the call routes over a DID ISL into an IT ISL. The call then terminates to the wireline agent. Likewise, if the wireline subscriber calls the wireless subscriber, the call routes over an IT ISL into a DID ISL. The call then terminates to the wireless agent. Engineer the size of the ISL group to support the expected busy hour call traffic between the wireless and wireline agents.
- Establish translations for the wireline subscribers. (Refer chapter 5, “Translations and call processing,” for additional information.)
- Engineer the size of the interoffice IT trunk groups that wireline call processing agents use as the number of subscribers increases to ensure sufficient capacity.

Billing

The call processing configurations discussed in this chapter can produce the following two types of billing records.

- The DMS-100 Wireless switch generates wireless call detail recording (CDR) records for the wireless portion of the call. These records include air time, wireless services, and handoff information. Configurations 1, 2, and 3 produce CDR records.
- The DMS-100 Wireless switch generates wireline automatic message accounting (AMA) records for wireline toll calls. The switch also generates carrier connect time for IT trunks, which tandem into other networks. Wireline call processing also supports all existing centrex station message detail recording (SMDR) capabilities. Only configurations 1 and 3 generate AMA records.

Note: In configuration 3, the billing records do not record carrier connect time for EA calls that wireless subscribers originate if those calls route directly into the PSTN from DID trunks.

Limitations and restrictions

Limitations and restrictions for the DMS-100 Wireless switch are as follows:

- Nortel Networks does not recommend tandemed interoffice traffic from wireline subscribers over ISLs into wireless call processing, which then route out of the office on interoffice DID trunks. Wireless call processing does not support all the AT capabilities, which wireline call processing supports. This lack of support can cause EA, E911, and operator service issues.
- The DMS-100 Wireless switch does not record carrier connect time in CDR records for wireless calls which route directly to an interexchange carrier (IEC) using a DID trunk. The wireline call processing (configuration 1) must tandem these calls to generate AMA records with this information.

14 LWW0006 functionality

This chapter describes the functionality available with the LWW0006 release. Each of the following sections describes a feature.

Conflict Resolution for DMS-100 Wireless switch

Conflict Resolution for DMS-100 Wireless resolves conflicts that result from the combination of both DMS-100 and DMS-MTX functionalities in the DMS-100 Wireless switch.

Datafill

This feature replaces wireless data schema table TRKCIC (Trunk Carrier Identification Code) with table CICSIZE4 (Carrier Identification Code Size Four). The one night process (ONP) transfers the tuples from table TRKCIC to table CICSIZE4.

Office parameters

Conflict Resolution for DMS-100 Wireless changes the following office parameters:

- Parameter EAEO_FOUR_DIGIT_CIC_STATUS replaces parameter MTX_EA_CIC_STATUS. The ONP transfers the data from parameter MTX_EA_CIC_STATUS to parameter EAEO_FOUR_DIGIT_CIC_STATUS
- Parameter EAEO_TAB_CICSIZE4_OBSOLETE replaces parameter MTX_EA_TRKCIC_OBSOLETE. The ONP transfers the data from parameter MTX_EA_TRKCIC_OBSOLETE to parameter EAEO_TAB_CICSIZE4_OBSOLETE.

CVID Fold-in

CVID Fold-in changes parameter NO_OF_CLONE_TIDS of table OFCENG (Office Engineering). This feature increases the maximum value of this parameter for wireless clone virtual terminal identifiers (TID) from 9999 to 32000.

Logs

CVID Fold-in adds log report CTID600. This log notifies operating company personnel when a request for allocation of a TID exceeds the specified maximum available. Previously, this condition generated a software error report (SWERR) for wireline problems or a DMS_MTX log report for wireless problems.

To recover from this log, increase the maximum number of clone virtual TIDs in parameter NO_OF_CLONE_TIDS of table OFCENG. The maximum value is 32000.

Enhanced 911 via WINGTT

Enhanced 911 via WINGTT provides the following enhancements to the existing wireless intelligent networks (WIN) enhanced 911 (E911) service for the DMS-100 Wireless switch:

- supports WIN global title translations (WINGTT) for routing IS-41 origination request (ORREQ) network messages that occur during E911 calls
- supports a translation type (0 to 255) for WINGTT E911 calls
- provides the option of sending either of the following as global title (GT) digits for WINGTT E911 calls:
 - a carrier-defined GT address
 - the calling agent's mobile identification number (MIN)

Interactions

Enhanced 911 via WINGTT enhances the following features:

- Enhanced 911 via WIN
- WIN Global Title Translations

Note: These are both software optionality control (SOC) features that must be ON to support the WINGTT addressing of Enhanced 911 via WINGTT.

Datafill

Enhanced 911 via WINGTT changes the following data schema tables.

- In subtable STDPRTCT.STDPRT for wireless lines, this feature adds selectors WINGTT and WINGTMIN to selector ES.
- In table C7GTTYPE (CCS7 Global Title Translation Type), this feature adds CUSGTT00 as a value for field GTTID.

Figure 14-1 shows sample datafill for subtable STDPRTCT.STDPRT with selectors WINGTT and WINGTMIN to subfield ADDTYPE. (Datafill in the

first tuple sends fixed GT digits. Datafill in the second tuple sends MIN as GT digits.)

Figure 14-1 MAP display example for subtable STDPRTCT.STDPRT with selectors WINGTT and WINGTMIN

FROMDIGS	TODIGS	PRTRTE					
911	911	ES W911	WINGTT	250	111	222	9000 OFRT 5
911	911	ES W911	WINGTMIN	251	OFRT 8		

Figure 14-2 shows sample datafill for table C7GTTYPE with GTT identifier CUSGTT00.

Figure 14-2 MAP display example for table C7GTTYPE

GTTNAME	GTTYP	GTTID
ESMSCSCP	ANSI7 250	CUSGTT00

Note: Refer to NTP *Customer Data Schema Reference Manual* for the datafill procedures of selectors WINGTT and WINGTMIN in subtable STDPRTCT.STDPRT, and table C7GTTYPE.

Integrated Wireless Centrex

With Integrated Wireless Centrex, wireless subscribers can use centrex dial plans and can communicate their groupness to other centrex group members.

Operating company personnel provision wireless subscribers into centrex business groups in table MOBCENT (Mobile Centrex Provisioning). The switch uses the information in this table to populate the business group (BG) parameter and generic address parameter (GAP) in the ISDN user part (ISUP) trunk signaling protocol.

Note: Refer to chapter 12, “Wireless centrex,” for details on the Integrated Wireless Centrex feature.

Integrated Wireline/Wireless SDM Load

Integrated Wireline/Wireless SDM Load combines SuperNode Data Manager (SDM) product loads from wireless DMS-MTX08 (SDMX08) and wireline DMS-100 NA012 (SDMN12) releases on an SDM12 base. This feature supports both wireless call detail records (CDR) and wireline Bellcore AMA format (BAF) billing records.

Hardware requirements

Integrated Wireline/Wireless SDM Load requires a SuperNode Data Manager with 256 Mbytes of dynamic random-access memory (DRAM). The central processor unit (CPU) modules use PowerPC 604e/200-MHz processors.

Limitations and restrictions

The limitations and restrictions that follow apply to Integrated Wireline/Wireless SDM Load.

- The automatic file transfer (AFT) requires the billing stream identifier AMA for the wireless CDR billing stream. The AFT does *not* support BAF records.
- This feature does *not* support DMS Data Management System (DDMS).

Line Data and SERVORD Fold-in

Line Data and SERVORD Fold-in incorporates the changes to the DMS-100 translation scheme from LINEATTR SERVORD Enhancements and the following features that were offstream:

- MTX07.2 Provisioning Resolution, which was a software update to Provisioning for DMS-100 Wireless
- Line Data Resolution, which was a software update to Non-Frame Relay TC: S/W Support for DMS-100 Wireless

Datafill

Line Data and SERVORD Fold-in incorporates the wireline data schema tables XLAPLAN (Translations Plan) and RATEAREA (Rate Area), which contain fields that were previously in table LINEATTR (Line Attribute). Enter datafill into these new tables before you enter datafill in table LINEATTR.

Note: Refer to chapter 7, “Frame relay and table control support,” for details on how this feature affects provisioning.

Translation verification tool

The TRAVER command displays tables XLAPLAN and RATEAREA where table LINEATTR once appeared.

Provisioning

Line Data and SERVORD Fold-in removed MSERVORD query command MQDN for querying wireless directory numbers (DN) on the DMS-100 Wireless switch. Operating company personnel can query wireless DNs using query command QDN.

Note: Refer to chapter 6, “Line provisioning,” for details on how this feature affects MSERVORD.

Second Dial Tone for Wireless Services

Second Dial Tone for Wireless Services provides a switch-based secondary dial tone for the following wireless services that require the collection of more digits:

- Call forward immediate activation
- Call forward conditional activation
- Cancel call waiting (CCW)
- Calling number identification presentation/restriction
- Three-way call (3WC)
- Call transfer (CXR)

Second Dial Tone for Wireless Services enables these wireless services to function similar to wireline services.

Limitations and restrictions

The limitations and restrictions that follow apply to Second Dial Tone for Wireless Services.

- Support for a second dial tone for access codes applies to only remote feature codes that you datafill with selector MX in table STDPRRT (Standard Pretranslator).
- Support for a second dial tone for access codes applies to only local subscribers and network roamers for which HOMENET=Y in table SERVCHNG (Service Exchange).
- The subscriber cannot use an access code as a forward-to destination for call forwarding.
- The subscriber receives a confirmation tone after the successful activation or deactivation of call forwarding. The subscriber does not receive a dial tone for re-origination.
- For flash-origination features, the following additional limitations and restrictions apply.
- Support for cellular call transfer recall applies to only the terminator of a two-party call.
- The mobile subscriber who flashes must have either CXR or 3WC.
- The DMS-100 Wireless switch does not support a hang-up warning tone.
- Digit strings are 1 to 30 digits.

- The switch ignores flashes for access code features.
- For flash features CXR and 3WC:
 - If the flash occurs before the inter-digital timeout, the switch interprets the flash as an end-of-digits indicator.
 - If the flash occurs after the timeout, the switch ignores the flash until the third party answers or the call receives treatment.

Interactions

Second Dial Tone for Wireless Services has the following interactions with flash-origination features:

- The switch ignores the flash if the call routes from an emergency pretranslator.
- The switch suspends call waiting during a 3WC. However, cancel call waiting is not suspended in case either of the called parties disconnects before the controlling mobile subscriber or in case the system cannot set up the second leg.
- The switch suspends call transfer during a three-way call.
- If the controlling mobile subscriber of a 3WC activates calling number identification presentation/restriction during the setup of the second leg, the activation applies to all subsequent second legs of the original call until the subscriber deactivates it.

Datafill

Second Dial Tone for Wireless Services adds field OPTIONS to data schema table XLAPLAN (Translations Plan). Enter SECDDT in field OPTIONS to enable a secondary dial tone for wireless features that require the subscriber to enter more digits.

Note: Refer to NTP *Customer Data Schema Reference Manual* for the datafill procedure of table XLAPLAN.

Activation/deactivation procedures

The following procedure shows activation for Second Dial Tone on the DMS-100 Wireless switch. In this scenario, mobile caller A's phone is provisioned with CNIR, and SECDDT is on the mobile's translation plan.

Procedure 14-1 Activating Second Dial Tone

At the telephone

- 1 Mobile caller A enters *FC0#, and presses the Send key.
Second dial tone is received.
where FC is the CNIRA feature code that was datafilled with selector MX in table STDPRT

- 2 Mobile caller A enters a valid DN of mobile calling party B.
The second dial tone stops after mobile caller A has entered the first digit.
- 3 Mobile caller A continues to enter the full DN, and finishes the sequence with a # or waits for an interdigit timeout.
Confirmation tone is received.
Calling party B's phone rings and displays mobile caller A's DN.

For this procedure to execute correctly, the caller *must* enter a # after *FC0. This activation sequence differs from other second dial tone activations where the user dial *FC without a 0, and the # sign is optional. This sequence also matches the activation of CNIRA+0 without second dial tone (that is, *FC0# dialed DN where the # is required).

To deactivate CNIR, either use the deactivation feature code or the activation feature code with a 0 modifier digit.

Example

CNIRA+0 # TA

where: CNIRA is the activation feature code for CNIR
0 is a modifier digit

Note 1: The # sign is required between the 0 modifier and the termination address (TA) when the 0 modifier is used to deactivate CNIR.

Note 2: Refer to NTP *DMS-MTX International Tones and Signaling Manual*, 411-2131-441, for details.

SimRing and MADN Compatibility

With the SimRing and MADN Compatibility feature, you can provision both Simultaneous Ringing (SimRing) and Multiple Appearance Directory Number (MADN) service on the same line. The MADN service must be either single call arrangement (SCA) or extension bridging (EXB). The MADN primary member must be the SimRing pilot directory number (PDN).

Limitations and restrictions

The limitations and restrictions that follow apply to SimRing and MADN Compatibility:

- You cannot provision both SimRing and MADN multiple call arrangement (MCA) or SimRing and MADN call appearance/call handling (CACH) on the same line.
- The MADN primary member must be the SimRing PDN.

Service orders

SimRing and MADN Compatibility changes the Service Order System (SERVORD) by adding error messages that indicate when an operating company tries to provision one of the following:

- a MADN non-primary member as a SimRing pilot
- a SimRing pilot as a MADN non-primary member
- a SimRing pilot as a MADN MCA member
- a SimRing pilot as a MADN CACH member

Switch-based Common Voice Mailbox for DMS-100 Wireless

Switch-based Common Voice Mailbox introduces line option MMWI (multi-message waiting indicator). This line option delivers message waiting indications (MWI) to all the terminals that are associated with one voice mailbox.

This feature applies to both nodal and network configurations with a voice mail system (VMS) connected to the wireline part of the DMS-100 Wireless switch. It is available for both a co-located home location register (HLR) and an external HLR.

Limitations and restrictions

The limitations and restrictions that follow apply to Switch-based Common Voice Mailbox:

- All Message Waiting Tone (MWT) limitations apply.
- The primary terminal must be wireline; the secondary terminals can be wireline, wireless, or both.
- This feature requires that the telephone customer have the Message Service-Network Message Waiting feature.
- Enter datafill for line option MMWI and table CMVMWI (Common Voice Mailbox Message Waiting Indicator) only through SERVORD.
- In a network configuration, the primary terminal must be on the DMS-100 Wireless switch.
- Do not assign either option MWI or option MMWI to a non-primary MADN member.
- Do not assign option MMWI to a non-pilot member of a hunt group.
- Increased network usage can occur if all the secondary DN are wireless terminals in an external HLR configuration.

- If end users delete a secondary DN is from a mailbox that has a message, the message indication remains for that terminal.
- Do not remove the MWT feature from a line if the line has option MMWI. Remove option MMWI first.

Datafill

Switch-based Common Voice Mailbox for DMS-100 Wireless adds data schema table CMVMWI (Common Voice Mailbox Message Waiting Indication). This table stores information about the primary and secondary DNs that are associated with one voice mailbox.

Note: Refer to *NTP Customer Data Schema Reference Manual* for the datafill procedure of table CMVMWI.

Service orders

Switch-based Common Voice Mailbox for DMS-100 Wireless makes the following changes to SERVORD.

- This feature adds prompts for the primary and secondary DNs for new option MMWI in commands ADO, CHF, and DEO.
- This feature displays information about the secondary DNs that are associated with the same voice mailbox as the queried primary DN in commands QDN (Query Directory Number) and QLEN (Query Line Equipment Number).

Command QDN for a secondary DN does not update the DN in table CMVMWI.

Figure 14-3 shows a SERVORD example of option MMWI in the prompt mode.

Figure 14-3 Example of the MMVI option in prompt mode

```
>ADO
SONUMBER:      NOW  99 09 01 AM
>
DN_OR_LEN:
>5213000
OPTION:
>MMWI
SECDN:
>6199641000
SECDN:
>6199643000
SECDN:
>$
```

Translation Enhancement to Modify Called DN

Feature patch Translation Enhancement to Modify Called DN allows operating company personnel to modify the dialed digits or the routing digits from the response of the IS-41 origination request. DMS-100 Wireless end users can then access services, such as 7-Digit Dialing and Voice Mail Retrieval, which depend on the originating mobile identification number (MIN) or DN.

Translation Enhancement to Modify Called DN uses the numbering plan area (NPA) from the originator's DN in the visitor location register (VLR).

Datafill

This LWW0006 patch feature adds pretranslations selector MODDIGS to subtable STDPRTCT.STDPRT (Standard Pretranslator). Use pretranslations selector MODDIGS to route special cases (case 1 and case 2) for manipulating the dialed DN using any of the following ways:

- to delete 0 to 18 of the digits dialed
- to add steering digits to the beginning of the digits dialed
- to add steering digits to the end of the digits dialed
- to add the originator's MIN to the beginning digits dialed
- to add the originator's MIN to the end of the digits dialed
- to add the originator's DN to the beginning of the digits dialed
- to add the originator's DN to the end of the digits dialed
- to add the originator's NPA to the beginning of the digits dialed
- to add the originator's NPA to the end of the digits dialed
- to route or retranslate after the modification of the digits dialed

Note: Software release MTX09 replaces pretranslations selector MODDIGS with MD. Refer to the following NTPs for descriptions of selector MD:

- *DMS-MTX Customer Data Schema Reference Manual*, 411-2131-451
- *DMS-MTX MAP Commands Reference Manual*, 411-2131-809

Translation Enhancement to Modify Called DN supports two cases of special manipulation. The switch tries to manipulate the dialed number according to case 1 datafill in subtable STDPRTCT.STDPRT. If the dialed digits are beyond the range for case 1 treatment, the switch tries to manipulate the dialed digits according to case 2 datafill.

With selector MD, operating company personnel can add the originator's NPA to the beginning of the dialed digits for mobile numbers that belong to the same customer group and have the same translation number.

Figure 14-4 shows sample datafill for subtable STDPRTCT.STDPRT with selector MD.

Figure 14-4 MAP display example for subtable STDPRTCT.STDPRT with selector MD

FROMDIGS	TODIGS	PRTRTE
621 NPRT	621	MODDIGS 7 7 DD 0 PREPEND NPA SKIP N 0 0 DD 0 \$ P
764 N NPRT	7647	MODDIGS 7 7 DD 0 PREPEND NPA SKIP P PMX2 00 DD 0 0

Logs

The DMS-100 Wireless switch generates log report MTXT111 when both of the following conditions are true.

- The processing of a call reaches selector MD in subtable STDPRTCT.STDPRT.
- The manipulation that is specified for the dialed digits results in a called DN of more than 18 digits to output. (That is, the number of received, deleted, appended, prepended, or skipped digits exceeded 18.)

If log MTXT111 occurs, the manipulation does not occur, and the called DN does not change. To correct this log, check if any tuples in subtable STDPRTCT.STDPRT with selector MD resulted in a called DN of more than 18 digits.

Note: Refer to *NTP Log Report Reference Manual* for a description of log MTXT111.

Limitations and restrictions

The limitations and restrictions that follow apply to Translation Enhancement to Modify Called DN.

- Pretranslations selectors MD and MOBCNTX are not compatible for translations verification (TRAVR) use.
- This feature patch supports only North American translations.
- Do not allow the number of received, deleted, appended, prepended, or skipped digits to exceed 18. (Otherwise, the switch generates log report MTXT111.)

Translation verification tool

The DMS-100 Wireless switch does not verify originating DNs or MINs in TRAVERs for mobile numbers. The TRAVER tool uses an originating profile instead. Since the manipulation selector MD requires originating information, the TRAVER command line for MX originations accepts optional field ORIGMIN. The MX origination identifies the call that the switch is translating as a mobile origination call.

After the TRAVER receives field ORIGMIN, the switch checks if the number exists in the VLR. If the number does not exist in the VLR, operating company personnel cannot use manipulation selector MD to add a DN or NPA.

Figure 14-5 and Figure 14-6 show sample TRAVER output for Translation Enhancement to Modify Called DN.

Figure 14-5 TRAVER output example for Translation Enhancement to Modify Called DN

```

> TRAVER MX MOBORG MOBMD ORIGIN 6137641000 7647112 b
TABLE MTXTRAV
MOBMD 2 3 3 0 1 1 NAXL N

+++TRAVER: ORIGINATING MIN RECEIVED ON COMMAND LINE+++
    6137641000
+++TRAVER: CUSTGRP FROM TABLE MTXTRAV FIELD HOMECUST+++
+++TRAVER: XLNUM FROM TABLE MTXTRAV FIELD XLNUM +++

TABLE CELLCUST
3 1 000_MODDIG_108 NLCA_L123_8 NIL CELL2
TABLE XLAPLAN
000_MODDIG_108 SMX2 000 PMODDIG RTE2 N $$
TABLE RATEAREA
NLCA_L123_8 NLCA NIL L123 $
TABLE STDPRTCT
PMODDIG (1) (0) 1
.SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
.7647112 7647112 MD      7 7 DD 0 PREPEND NPA SKIP P PMX2 0 0
DD 0 $ P NPRT
MD      CONVERTED      7647112 TO  6137647112
.SUBTABLE AMAPRT
.KEY NOT FOUND
.DEFAULT VALUE IS: NONE OVRNONE N
TABLE STDPRTCT
PMX2 (1) (0) 3
.SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.
CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
.6 910 N DD 0 NA
.SUBTABLE AMAPRT
.KEY NOT FOUND
.DEFAULT VALUE IS: NONE OVRNONE N
TABLE HNPACONT
000 Y 111 0 (3) (1) (0) (0) 2$
.SUBTABLE HNPACODE
.613 613 HNPAC 0
.764 764 DN 613 764

```

Figure 14-6 TRAYER output example for Translation Enhancement to Modify Called DN (continued)

```

TABLE TOFCNAME
613 764 $
TABLE DNINV
613 764 7112 CLLR 0 0 0
TABLE LATAOLA
L123 613 INTRA INTRA NON_EA

+++TRAYER: SUCCESSFUL CALL TRACE+++
DIGIT TRANSLATION ROUTES

1          7647112      ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++TRAYER: SUCCESSFUL CALL TRACE+++

```

The TRAYER error messages that follow apply to the use of selector MD.

Table 14-1 Error messages for selector MD in TRAYER

Error message	Explanation and action
+++TRAYER: WARNING+++ You have entered an ORIG MIN for which no VLR entry exists. This will not allow the MD selector to properly add the NPA or DN to the CALLED NUMBER (DR).	This message displays if a VLR does not exist for the specified MIN in the command line.
+++TRAYER: CENTREX AND ORIGMIN ARE IN CONFLICT. PLEASE USE ONLY ONE OF THEM+++	This message warns that pretranslations selectors MD and MOBCTX are incompatible for TRAYER.

Appendix A DMS-100 Wireless open-A interface

DMS-100 Wireless traffic analysis (AIF CDMA)

This appendix contains traffic metrics and formulas for system planners or network operations center (NOC) engineers to collect and calculate performance indicators for a DMS-100 Wireless open A-interface (AIF) code division multiple access (CDMA) switch. The metrics in this appendix apply to two main applications: the service performance management and the system capacity forecast. Traffic statistics collection, traffic trending and forecasting, capacity planning and network performance studies use these metrics.

This appendix includes the following four categories of traffic metrics:

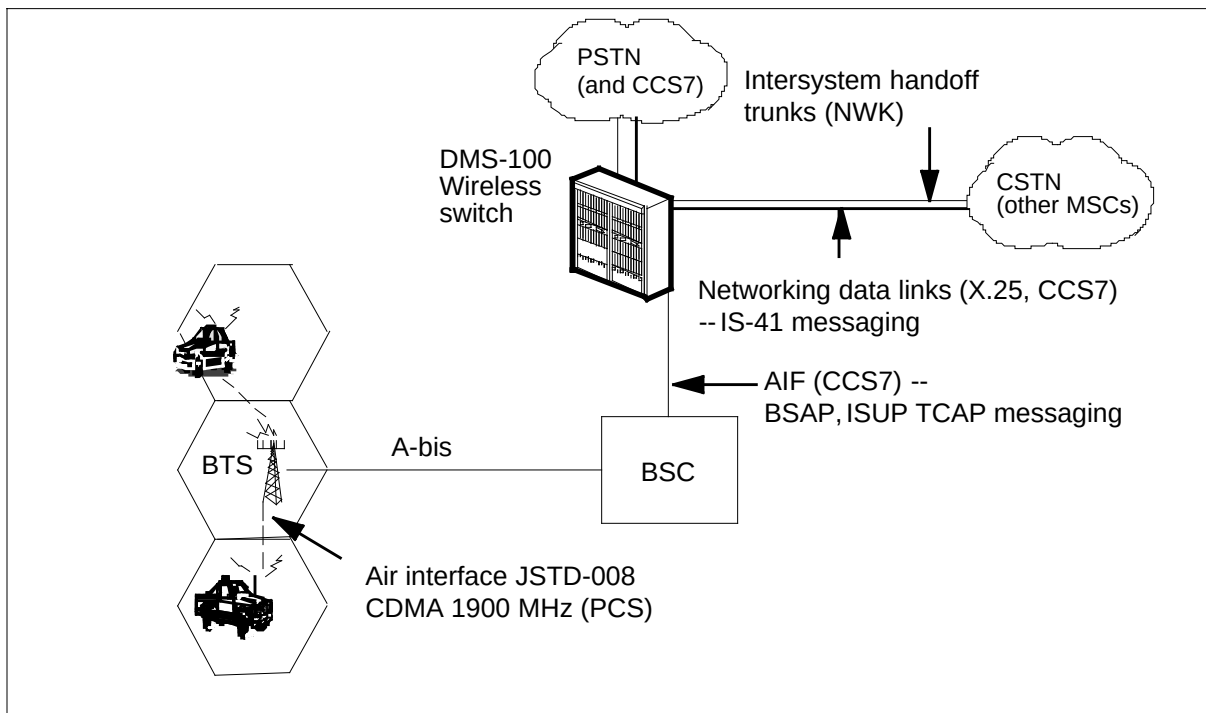
- the DMS-100 Wireless nodal level system call attempts (CA) and call mixes
- the wireless access traffic metrics (CDMA-specific)
- the DMS SuperNode switch Core traffic and capacity metrics
- the traffic metrics for network interfaces

DMS-100 Wireless switch and traffic modeling

The DMS-100 Wireless switch contains the following three types of network interfaces:

- the open AIF to the base station controllers (BSC)
- the interface to land-based public switched telephone network (PSTN) and Common Channel Signaling 7 (CCS7) networks
- the interface to other mobile switching centers (MSC) for IS-41 call delivery (CD) and intersystem handoff

Figure A-1 DMS-100 Wireless open AIF network interfaces



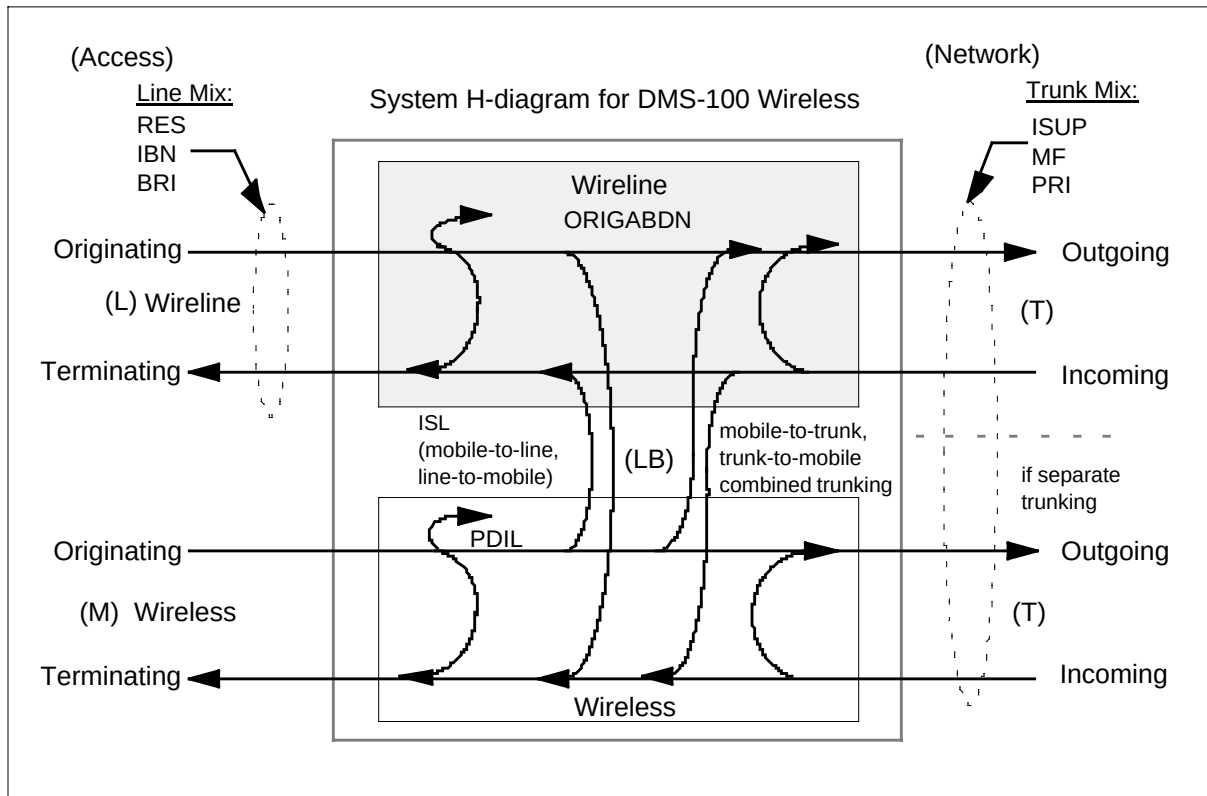
The grade-of-service (GOS) of each type of network interface has different requirements. Nortel Networks recommends a separate set of traffic metrics for each network interface.

Note: Refer to the Telcordia (formally Bellcore) RQMS document GR-929-CORE for GOS requirements.

The DMS-100 Wireless switch provides various operational measurements (OM) in the form of an H-diagram to assist traffic engineers to study traffic patterns. The percentage of call mixes described in this appendix is based on the H-diagram call flows notation.

Figure A-2 shows the dual H-diagram for the DMS-100 Wireless switch.

Figure A-2 DMS-100 Wireless system dual H-diagram



DMS-100 Wireless system call attempts

In this appendix, the total switch CAs in 1 hour (that is, the busy hour CA [BHCA]) refer to the system origination and incoming CAs. (These BHCAs are also known as the O and I BHCAs.) Adjust the OM values in the following traffic formula to an hourly period.

1. DMS-100 Wireless BHCA

The formula for this metric follows.

$$\begin{aligned} \text{LWW\_BHCA} = & (\text{OFZ.NORIG} + 65536 * \text{OFZ.NORIG2}) \\ & + (\text{OFZ.NIN} + 65536 * \text{OFZ.NIN2}) \\ & - \text{Sum}(\text{TRK.INCATOT}) \\ & + \text{CP.CCB0VFL} + \text{CP.CPL00VFL} \end{aligned}$$

Explanation The following list describes the parameters in the previous formula.

- LWW_BHCA = DMS-100 Wireless switch BHCAs (O and I)
- OFZ.NORIG+65536*OFZ.NORIG2 = wireline origination attempts

- $OFZ.NIN + 65536 * OFZ.NIN2$ = wireline and wireless incoming attempts, including wireless origination and integrated service link (ISL) tandem calls
- $Sum(TRK.INCATOT)$ = ISL direct inward dial (DID) and intertoll (IT) trunk groups, excluding ISL tandem calls. Since land-to-mobile and mobile-to-land calls use ISL trunks between both portions of the switch, the number of incoming (NIN) counts the CAs twice. (Consider this doubled count in the sum by subtracting the ISL trunk duplication quantity.) The ISL trunk groups consist of ISDN user part (ISUP) DID trunk groups over the wireless side, and IT trunk groups over the wireline side of the switch.
- $CP.CCBOVFL + CP.CPLOOVFL$ = call condense block (CCB) and call processing letter (CPL) overflow counts. (This value applies mostly to error occurrences or overload condition. This occurrence does not appear under standard operating conditions.)

2. Wireless BHCA

The formula for this metric follows.

$Wls\_BHCA =$

$$\frac{\begin{aligned} &Sum(OMMTX.MBORIGS) \\ &+ Sum(TRK.INCATOT) \text{ of W- PSTN tkg} \\ &+ Sum(TRK.INCATOT) \text{ of ISL DID tkg} \\ &+ (CP.CCBOVFL + CP.CPLOOVFL) * (Wls\_BHCA \\ &0 \\ &/ (Wls\_BHCA \\ &0 \\ &+ Wln\_BHCA \\ &0 \\ &)) \end{aligned}}{0}$$

Explanation The following list describes the parameters in the previous formula.

- Wls_BHCA = system call attempts for the wireless subsystem
- $Sum(OMMTX.MBORIGS)$ = mobile origination attempts
- $Sum(TRK.INCATOT)$ = wireless PSTN incoming attempts, if separate trunking
- $Sum(TRK.INCATOT)$ = ISL ISUP DID trunk group incoming attempts

- $(CP.CCBOVFL + CP.CPLOOVFL) * (Wls\_BHCA_0 /$ = estimated error occurrences for wireless subsystems
- Wls_BHCA_0 and Wln_BHCA_0) = wireless and wireline BHCAs, without CCBOVFL and CPLOOVFL components

Note: Sum(OM Peg) is the sum of all the cells for peg in OM group.

3. Wireline BHCA

The formula for this metric follows.

$$Wln\_BHCA = LW\_BHCA - Wls\_BHCA + \text{Sum}(\text{TRK.INCATOT}) \text{ of ISL DID and IT tkgs}$$

Explanation The following list describes the parameters in the previous formula.

- Wln_BHCA = switch call attempts for wireline subsystem
- LW_BHCA = DMS-100 Wireless switch total call attempts
- Wls_BHCA = wireless BHCAs
- $\text{Sum}(\text{TRK.INCATOT})$ of ISL DID and IT tkgs = includes ISL tandem calls for wireless PSTN calls

Note: $Wln\_BHCA + Wls\_BHCA = LW\_BHCA + (\text{TRK.INCATOT})$ of ISL DID and IT trunk groups

System access call attempts

1. DMS-100 Wireless origination attempts

The formula for this metric follows.

$$\begin{aligned} \text{LW Origination Attempts} = & (\text{OFZ.NORIG} + 65536 \times \text{OFZ.NORIG2}) \\ & + \text{Sum}(\text{OMMTX.MBORIGS}) \\ & + 70\% * (\text{CP.CCBOVFL} + \text{CP.CPLOOVFL}) \end{aligned}$$

Explanation The following list describes the parameters in the previous formula.

- $(\text{OFZ.NORIG} + 65536 \times \text{OFZ.NORIG2})$ = wireline origination attempts
- $\text{Sum}(\text{OMMTX.MBORIGS})$ = mobile origination call attempts, including failures
- $70\% * (\text{CP.CCBOVFL} + \text{CP.CPLOOVFL})$ = estimated CCB overflow occurrences for origination attempts. (Most of these occurrences are error

related or overload conditions. This occurrence does not appear under standard operating conditions.)

2. DMS-100 Wireless termination attempts

The formula for this metric follows.

```
LWW Termination Attempts =  
(OFZ.TRMNWAT+65536*OFZ.TRMNWAT2)  
+ MTXSYS1.CDMAPREQ  
+ (CALLMIX.MPGTO+65536* CALLMIX.MPGTO2  
+ CALLMIX.LPGTO+65536* CALLMIX.LPGTO2)  
+ (CALLMIX.MMBIA+65536* CALLMIX.MMBIA2  
+ CALLMIX.LMBIA+65536* CALLMIX.LMBIA2)  
+ 30%*(CP.CCBOVFL+ CP.CPLOOVFL)
```

Explanation The following list describes the parameters in the previous formula.

- LWW Termination Attempts = DMS-100 Wireless (CDMA-specific) termination attempts
- (OFZ.TRMNWAT+65536*OFZ.TRMNWAT2) = wireline termination attempts
- MTXSYS1.CDMAPREQ = All CDMA page requests
- (CALLMIX.MPGTO+65536* CALLMIX.MPGTO2
CALLMIX.LPGTO+65536* CALLMIX.LPGTO2) = mobile page timeouts
- (CALLMIX.MMBIA+65536* CALLMIX.MMBIA2
CALLMIX.LMBIA+65536* CALLMIX.LMBIA2) = mobile inactive
- 30%*(CP.CCBOVFL+ CP.CPLOOVFL) = estimated CCB overflow occurrences for terminations. (Most of these occurrences are error related or overload conditions. This occurrence does not appear under standard operating conditions.)

System traffic flow and percentage of call mix

The traffic flows for the DMS-100 Wireless switch use a dual H-diagram model. The call mix percentages specify the distribution of call flows, in percentage of total system CAs for each call type illustrated in the H-diagram. The sum of all call mix percentages is 100%. System capacity analysis, planning and traffic pattern studies use call mixes.

Wireless percentage of call mix

The DMS-100 Wireless switch collects and reports system call mix OMs through the CALLMIX OM group. The CALLMIX OM group pegs the call flows on a system-wide basis for the following types of CAs:

- land to mobile
- mobile to mobile

- land to land
- land to treatment
- mobile to treatment

The OMIs are pegged when a call has been established, except for the treatment calls that are pegged when the tone card on the XMS-based PMs (XPM) is instructed.

1. Mobile outgoing (M-to-T) calls The formula for this metric follows.

```
% M-to-T CAs =  
(CALLMIX.MLCALLS+ 65536*CALLMIX.MLCALLS2)  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % M-to-T CAs = ratio of mobile outgoing call attempts, including intra-office mobile-to-line calls
- (CALLMIX.MLCALLS+ 65536*CALLMIX.MLCALLS2) = mobile-to-trunk calls
- Wls_BHCA = wireless switch call attempts

2. Intra-office (M-to-M) calls The formula for this metric follows.

```
% M-to-M CAs =  
(CALLMIX.MMCALLS+ 65536*CALLMIX.MMCALLS2  
+ CALLMIX.MPGTO+ 65536*CALLMIX.MPGTO2  
+ CALLMIX.MMBIA+ 65536*CALLMIX.MMBIA2)  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- (CALLMIX.MMCALLS+ 65536*CALLMIX.MMCALLS2 = mobile-to-mobile calls
- CALLMIX.MPGTO+ 65536*CALLMIX.MPGTO2 = mobile-to-page timeout (PGTO) treatments
- CALLMIX.MMBIA+ 65536*CALLMIX.MMBIA2) = mobile to inactive mobile
- Wls_BHCA = wireless switch call attempts

3. Incoming (T-to-M) calls The formula for this metric follows.

```
% T-to-M CAs =  
(CALLMIX.LMCALLS+ 65536*CALLMIX.LMCALLS2  
+ CALLMIX.LPGTO+ 65536*CALLMIX.LPGTO2  
+ CALLMIX.LMBIA+ 65536*CALLMIX.LMBIA2)  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % T-to-M CAs = ratio of incoming trunk-to-mobile call attempts
- (CALLMIX.LMCALLS+ 65536*CALLMIX.LMCALLS2 = trunk-to-mobile calls
- CALLMIX.LPGTO+ 65536*CALLMIX.LPGTO2 = trunk-to-PGTO treatments
- CALLMIX.LMBIA+ 65536*CALLMIX.LMBIA2) = trunk-to-inactive mobile
- Wls_BHCA = wireless switch call attempts

4. Tandem (T-to-T) calls The formula for this metric follows.

```
% T-to-T CAs =  
(CALLMIX.LLCALLS+ 65536*CALLMIX.LLCALLS2)  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % T-to-T CAs = ratio of tandem calls, including CD Send call attempts
- (CALLMIX.LLCALLS+ 65536*CALLMIX.LLCALLS2) = trunk-to-trunk calls
- Wls_BHCA = wireless switch call attempts

5. Mobile ineffective (Minf) attempts The formula for this metric follows.

```
% Minf attempts =  
(CALLMIX.MTRT+ 65536*CALLMIX.MTRT2)  
- (CALLMIX.MPGTO+ 65536*CALLMIX.MPGTO2 +  
CALLMIX.MMBIA+ 65536*CALLMIX.MMBIA2)  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % Minf attempts = ratio of mobile ineffective attempts to treatments other than LPGTO and LMBIA calls
- (CALLMIX.MTRT+ 65536*CALLMIX.MTRT2) = mobile to treatments
- (CALLMIX.MPGTO+ 65536*CALLMIX.MPGTO2 = mobile-to-PGTO treatments
- CALLMIX.MMBIA+ 65536*CALLMIX.MMBIA2) = mobile-to-inactive mobile
- Wls_BHCA = wireless switch call attempts

6. Trunk ineffective (Tinf) attempts The formula for this metric follows.

```
% Tinf attempts =
(CALLMIX.LTRT+ 65536*CALLMIX.LTRT2)
- (CALLMIX.LPGTO+ 65536*CALLMIX.LPGTO2 +
  CALLMIX.LMBIA+ 65536*CALLMIX.LMBIA2)
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % Tinf attempts = ratio of trunk ineffective attempts to treatments other than LPGTO and LMBIA calls
- (CALLMIX.LTRT+ 65536*CALLMIX.LTRT2) = trunk incoming to treatments
- (CALLMIX.LPGTO+ 65536*CALLMIX.LPGTO2 = trunk-to-PGTO treatments
- CALLMIX.LMBIA+ 65536*CALLMIX.LMBIA2) = trunk-to-inactive mobile
- Wls_BHCA = wireless switch call attempts

Wireless networking and mobility metrics

The ratio of mobility events for each CA represents the wireless mobility metrics, which this appendix defines. In addition to the basic CAs listed in the previous section, the wireless mobility events consume a large portion of the system real time (RT) and messaging link capacity. The ratio of the mobility events and the associated add-on costs affect the overall wireless system capacity. The collected mobility metrics are important indicators for mobility study and cell sites optimization.

1. Registrations The formula for this metric follows.

```
% Registrations =
[(OMMTX.REGATTS-MTXNWKOG.REGNIVOG_other-
MTXNWKOG.REGNIVOG_self)
+ MTXNWKIC.REGNIVIC_self
+ MTXNWKOG.REGNIVOG_other
+ NWKIC2.RGCNIVIC_self =
+ NWKIC2.RGCNIVIC_other
+ (MTXNWKIC.REGNIVIC_other- NWKIC2.RGCNIVIC_self)]
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % Registrations = ratio of registrations for each call attempt
- (OMMTX.REGATTS-MTXNWKOG.REGNIVOG_other-MTXNWKOG.REGNIVOG_self) = VLR registration
- MTXNWKIC.REGNIVIC_self = out of VLR, registration @MSC_H
- MTXNWKOG.REGNIVOG_other = out of VLR, registration @MSC_S
- NWKIC2.RGCNIVIC_self = out of VLR, registration notification and cancellation @MSC_H
- NWKIC2.RGCNIVIC_other = out of VLR, registration cancellation @MSC_S
- (MTXNWKIC.REGNIVIC_other- NWKIC2.RGCNIVIC_self)] = out of VLR, registration notification and cancellation @ HLR
- Wls_BHCA = wireless switch call attempts

Note: Where, the

xx_self

Note: denotes the OM register xxx for the self-link, and

xxx_other

Note: denotes the sum of OM registers xxx over all other links.

2. Handoffs

The formula for this metric follows.

```
% Handoffs =
[OMMTXHO.NORESP
+ (OMMTX.HOATTS- OMMTX.HOCOMPS)
+ OMMTX.HOCOMPS
+ (MTXNWKIC.IHATTSIC- MTXNWKIC.IHCOMPIC)
+ MTXNWKIC.IHCOMPIC
+ (MTXNWKOG.IHATTSOG- MTXNWKOG.IHCOMPOG)
+ MTXNWKOG.IHCOMPOG]
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % Handoffs = ratio of handoffs for each call attempt
- OMMTXHO.NORESP = intraswitch handoff no candidate (advanced mobile phone service/time division multiple access [AMPS/TDMA] only)
- (OMMTX.HOATTS- OMMTX.HOCOMPS) = intraswitch handoff unsuccessful
- OMMTX.HOCOMPS = intraswitch handoff successful
- (MTXNWKIC.IHATTSIC- MTXNWKIC.IHCOMPIC) = interswitch handoff IC unsuccessful
- MTXNWKIC.IHCOMPIC = interswitch handoff IC successful
- (MTXNWKOG.IHATTSOG- MTXNWKOG.IHCOMPOG) = interswitch handoff outgoing unsuccessful
- MTXNWKOG.IHCOMPOG = interswitch handoff outgoing successful
- Wls_BHCA = wireless switch call attempts

Note: The T-to-M basic CAs include both the interswitch handoff IC unsuccessful and the interswitch handoff IC successful events.

3. Call delivery

The Call Delivery feature gives mobile subscribers a transparent network access. The cellular network tracks the mobile's location and the identification of the subscriber's profile.

With the CD feature, a mobile subscriber can:

- originate calls in any cellular switch
- receive calls that originate in any cellular switch, regardless of where the subscriber is currently being served
- use and change the status of any of his features (such as Call Forwarding) while roaming

The percentage of CD metric is the ratio of the CD events for each call attempt needed to locate a mobile in the network and complete the incoming call.

The formula for this metric follows.

```
% CD =  
[MTXNWKOG.RTEREQOG  
+ ((MTXNWKOG.LOCREQOG - MTXNWKOG.RTEREQOG) +  
MTXNWKIC.RTEREQIC -  
(OMMTX.LMATTTS + OMMTX.MMATTTS) -  
(MTXSYS1.SYSREQ- MTXSYS1.SYSRESP) -  
TRMTFR2.TFRMBIA)  
+ MTXNWKIC.RTEREQIC]  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % CD = ratio of CD for each call attempt
- MTXNWKOG.RTEREQOG = CD sent successfully (route request sent)
- ((MTXNWKOG.LOCREQOG - MTXNWKOG.RTEREQOG) +
MTXNWKIC.RTEREQIC - (OMMTX.LMATTTS + OMMTX.MMATTTS)
- (MTXSYS1.SYSREQ- MTXSYS1.SYSRESP) -
TRMTFR2.TFRMBIA) = CD sent or received unsuccessfully
(route request not sent)
- MTXNWKIC.RTEREQIC = CD received
- Wls_BHCA = wireless switch call attempts

Note: The T-to-T basic CAs include both the CD send successful and the CD send unsuccessful attempts.

4. Authentication The formula for this metric follows.

```
% Authentication =  
((AUTHMSC.MATHORIG) - (AUTHMSC.MNSELATH)  
+ AUTHMSC.MATHREG  
+ AUTHMSC.MSSDUPIN)  
/ Wls_BHCA
```

Explanation The following list describes the parameters in the previous formula.

- % Authentication = the ratio of authentication events for each call attempt
- (AUTHMSC.MATHORIG) - (AUTHMSC.MNSELATH) = authentication origination
- AUTHMSC.MATHREG = authentication registration

- AUTHMSC.MSSDUPIN) = authentication SSD update
- Wls_BHCA = wireless switch call attempts

5. Local Number Portability

The formula for this metric follows.

$$\% \text{ LNP} = \frac{(\text{NWKOG3.NPQINOG} + \text{NWKIC3.NPQRRIC})}{\text{Wls\_BHCA}}$$

Explanation The following list describes the parameters in the previous formula.

- % LNP = ratio of wireless local number portability (LNP) for each call attempt
- NWKOG3.NPQINOG = LNP queries sent
- NWKIC3.NPQRRIC = LNP queries result received
- Wls_BHCA = wireless switch call attempts

CDMA OMs

The DMS-100 Wireless switch includes many control module (CM)-based call processing (CP) OMs (for example, OMMTX), which are common to AMPS, TDMA, and CDMA. Operational measurements that are organized on an individual sector basis can be separated for CDMA, TDMA, or AMPS by using sector identity.

All OMs that the Nortel-CDMA CAU or the A-I/F ACE peg are CDMA specific. The CAUs (and ACEs) collect those CAU-based OMs and upload them to the CM. The CM combines and consolidates all of the individual CAU OMs into a single sector-based OM group (for example, CAUCPSCT) or node-based OMs (for example, CAUCPSYS). You can use the same mechanism of cell site separation to split OMs between the Nortel-CDMA and AIF CDMA.

Since the existence of queuing latency, the pegging of same event on CM and CAU can span over an OM period. A slight discrepancy between CM-based OMs and CAU-based OMs is possible.

Note: To make traffic formula generic to all switch configurations, the following subsections use the notation *Sum(. . .) of all sectors*. Interpret this notation as the *Sum(. . .) of all XXX cell sites or sectors for the xxx traffic metrics*. XXX represents A-I/F CDMA, Nortel-CDMA, or AMPS/TDMA.

CDMA access traffic metrics**1. Mobile origination attempts**

The formula for this metric follows.

Mobile Origination Attempts =
Sum(CAUCPSCT.CAUOATTS) of all sectors

Explanation The following list describes the parameters in the previous formula.

- Mobile Origination Attempts = Nortel CDMA or AIF CDMA mobile origination call attempts
- Sum(CAUCPSCT.CAUOATTS) of all sectors = All CDMA origination attempts for Nortel CDMA or AIF CDMA

2. Mobile termination attempts

The formula for this metric follows.

Mobile Termination Attempts =
MTXSYS1.CDMAPREQ
+ 30%*(CP.CCBOVFL+ CP.CPLOOVFL) *(Wls_BHCA / (Wls_BHCA +
Wln_BHCA))

Explanation The following list describes the parameters in the previous formula.

- Mobile Termination Attempts = setup of mobile termination call attempts, including page timeouts and mobile inactive
- MTXSYS1.CDMAPREQ = All CDMA page requests (termination attempts)
- 30%*(CP.CCBOVFL+ CP.CPLOOVFL) *(Wls_BHCA / (Wls_BHCA + Wln_BHCA)) = estimated CCB overflow counts. (Most of these occurrences are error related or overload conditions. This occurrence does not appear under standard operating conditions.)

3. Blocks

This metric refers to the setup failures at the switch due to unavailable resources. Unavailable resources include both the radio frequency (RF) and the network-related resources. Unavailable network resources, such as access trunks, BTS channels and CM resources can produce network-related call blocking. The formula for this metric follows.

Mobile CAs Blocked =
Sum(CAUCPSCT.CAUOBLKS) of all sectors
+ Sum(CAUCPSCT.CAUTBLKS) of all sectors
+ Sum(CAUCPSCT.CAUHBLKS) of all sectors
+ 30%*(CP.CCBOVFL+ CP.CPLOOVFL) *(Wls_BHCA / (Wls_BHCA +
Wln_BHCA))

Explanation The following list describes the parameters in the previous formula.

- Mobile CAs Blocked = setup failures at the switch due to unavailable resources
- Sum(CAUCPSCT.CAUOBLKS) of all sectors = number of origination setup failures
- Sum(CAUCPSCT.CAUTBLKS) of all sectors = number of termination setup failures
- Sum(CAUCPSCT.CAUHBLKS) of all sectors = number of hard handoff failures (in target cells)
- $30\% * (CP.CCBOVFL + CP.CPLOOVFL) * (Wls\_BHCA / (Wls\_BHCA + Wln\_BHCA))$ = for T-to-M calls blocked due to no CM CCBs. (Most of these occurrences are error related or overload conditions. This occurrence does not appear under standard operating conditions.)

Note: The CAUOBLKS counts the remaining 70% of CP.CCBOVFL blocked attempts.

4. Origination channel assignment

The formula for this metric follows.

Orig. Channel Assign =
 Sum(CAUCPSCT.CAUOATTS) of all sectors
 - Sum(CAUCPSCT.CAUOBLKS) of all sectors
 - Sum(CAUCPSCT.CAUORODR) of all sectors

Explanation The following list describes the parameters in the previous formula.

- Orig. Channel Assign = mobile origination attempts that have completed the assignments of channel elements
- Sum(CAUCPSCT.CAUOATTS) of all sectors = total origination attempts
- Sum(CAUCPSCT.CAUOBLKS) of all sectors = number of origination blocks
- Sum(CAUCPSCT.CAUORODR) of all sectors = number of origination reorders (invalid mobile)

Note: The percentage of the origination releases (CAUCPSCT.CAUORLS) that occur before channel assignment cannot be determined exactly. Therefore, this formula is an estimate for the metric.

5. Termination channel assignment

The formula for this metric follows.

Term Channel Assign =
MTXSYS1.CDMAPREQ
- Sum(CAUCPSCT.CAUTBLKS) of all sectors

Explanation The following list describes the parameters in the previous formula.

- Term Channel Assign = mobile termination attempts that have completed the assignments of channel elements
- MTXSYS1.CDMAPREQ = total termination attempts
- Sum(CAUCPSCT.CAUTBLKS) of all sectors = number of termination blocks

Note: The percentage of these termination releases (CAUCPSCT.CAUTRLS) that occur before channel assignment cannot be determined exactly. Therefore, this formula is an estimate for the metric.

6. Mobile channel assignment for all types of call setup

The formula for this metric follows.

Number of completed Channel Assignments for all call setups =
[Sum(CAUCPSCT.CAUOATTS) of all sectors
+ MTXSYS1.CDMAPREQ
+ Sum(CAUCPSCT.CAUHATTS) of all sectors]
- [Sum (CAUCPSCT.CAUOBLKS) of all sectors
+ Sum(CAUCPSCT.CAUTBLKS) of all sectors
+ Sum(CAUCPSCT.CAUHBLKS) of all sectors
+ Sum(CAUCPSCT.CAUORODR) of all sectors
+ % Sum(CAUCPSCT.CAUORLS) of all sectors
+ % Sum(CAUCPSCT.CAUTRLS) of all sectors]

Explanation The following list describes the parameters in the previous formula.

- Number of completed Channel Assignments for all call setups = mobile call attempts that have completed the assignments of channel elements
- Sum(CAUCPSCT.CAUOATTS) of all sectors = total origination attempts
- MTXSYS1.CDMAPREQ = total termination attempts
- Sum(CAUCPSCT.CAUHATTS) of all sectors = total hard handoff attempts
- Sum (CAUCPSCT.CAUOBLKS) of all sectors = number of origination blocks
- Sum(CAUCPSCT.CAUTBLKS) of all sectors = number of termination blocks

- $\text{Sum}(\text{CAUCPSCT.CAUHBLKS})$ of all sectors = number of hard handoff blocks
- $\text{Sum}(\text{CAUCPSCT.CAUORODR})$ of all sectors = number of origination reorders
- $\% \text{Sum}(\text{CAUCPSCT.CAUORLS})$ of all sectors = release occurrences before channel assignment for origination attempts
- $\% \text{Sum}(\text{CAUCPSCT.CAUTRLS})$ of all sectors = release occurrences before channel assignment for termination attempts

Again, the percentage of call releases that occur before channel assignment cannot be determined exactly. Therefore, this formula is an estimate.

7. Origination setup failure

This metric refers to mobile origination setup failures due to resource shortage. The formula for this metric follows.

$\text{Orig Setup Failures} = \text{Sum}(\text{CAUCPSCT.CAUOBLKS})$ of all sectors

8. Terminating setup failure

This metric refers to mobile terminating call setup failures due to resource shortage. The formula for this metric follows.

$\text{Term Setup Failures} = \text{Sum}(\text{CAUCPSCT.CAUTBLKS})$ of all sectors

9. Origination established

This metric refers to all mobile-originated calls that successfully arrived on the CDMA traffic channel. This includes all originations placed on the traffic channel to receive treatment. The formula for this metric follows.

$\text{Orig Established} = \text{Sum}(\text{CAUCPSCT.CAUOSUCC})$ of all sectors

10. Termination established

This metric refers to all mobile terminating calls that arrived successfully on the CDMA traffic channel. The formula for this metric follows.

$\text{Term Established} = \text{Sum}(\text{CAUCPSCT.CAUTSUCC})$ of all sectors

11. Dropped calls

Dropped calls are established calls (that is, the calls that arrived on the CDMA traffic channel) but disconnected for a reason other than one of the parties went on hook.

Because of the greater reliability of calls inside a CDMA “core” coverage area, expect a difference in performance.

Nortel Networks recommends the following two categories of dropped call performance:

- call drop performance inside CDMA core coverage
- call drop performance in “transition” areas

where CDMA hard handoffs or CDMA to AMPS handoffs should occur, or in areas of no coverage

For each category, Nortel Network recommends two types of dropped calls: one for RF dropped calls, and one for network dropped calls. Expect a difference in RF performance of and network performance.

The formula for this metric follows.

Dropped Calls, RF-related = Sum(CAUCPSCT.CAUDROPR) of all sectors

The CAU (and ACE) pegs this OM against the primary pilot when the selector bank subsystem (SBS) drops a call due to “loss of traffic” or “Handoff Completion Message (HCM) timeout” for soft or softer handoff.

Dropped Calls, Network-related = Sum(CAUCPSCT.CAUDROPN) of all sectors

The following list identifies reasons why the network-related call drops cause CAUDROPN to be pegged:

- radio link manager (RLM) locked
- traffic channel element (TCE) locked
- trunk problem
- selector problem

The service provider must identify which cells are inside the core area and add the CAUDROPR OM from those sectors. Also, you can add the CAUDROPN into the number of dropped calls. (Most occurrences of this OM are error cases.)

12. Handoff attempts

This metric refers to handoff attempts for mobiles that the switch orders to handoff from the serving subcell. It includes attempts for both types of intra- and inter-system hard handoff (CDMA-AMPS and CDMA-CDMA).

Note: This metric does not include CDMA soft and softer handoff attempts. The BTS stores the measurements of CDMA soft and softer handoff attempts. The CM does not provide the OMs for soft handoff attempts.

The formula for this metric follows.

Hard Handoff Attempts (target-side perspective) =
Sum(CAUCPSCT.CAUHATTS) of all sectors

The CAU (and ACE) pegs CAUHATTS when the CAU receives a ReadyNewCell message from the CM. This message indicates that a hard handoff attempt sequence in a (CDMA) target sector is to begin.

Hard Handoff Attempts (source-side perspective) =
Sum(OMMTXH02.CHOSRCAT) of all sectors

The OM CHOSRCAT is pegged when the CM receives a handoff candidate message (indicating that hard handoff request) from the CAU (and ACE).

13. Handoff blocks

This metric refers to handoff attempts blocked, pegged when the target cells cannot allocate traffic channel or trunk facilities.

The formula for this metric follows.

Hard Handoff Blocks (target-side perspective) =
Sum(CAUCPSCT.CAUHBLKS) of all sectors
Hard Handoff Blocks (source-side perspective) =
Sum(OMMTXH02.CH0BLKS) of all sectors

14. Handoff established

This metric refers to all handoff attempts that successfully arrive on the CDMA traffic channel in the target sector.

The formula for this metric follows.

Hard Handoff Established (target-side perspective)= Sum
(CAUCPSCT.CAUHSUCC) of all sectors

The OM CAUHSUCC is pegged when a mobile hard handoff attempt successfully arrives on the traffic channel in the target sector.

Hard Handoff Established (source-side perspective)= Sum
(OMMTXH02.CHOSRCSU) of all sectors

The OM CHOSRCSU is pegged when the CM receives an indication, an SAT present message either from the CAU (for intra-system handoffs) or from the IS-41 link (for inter-system handoffs), that the mobile arrived on the target traffic channel.

Soft/Softer Handoff Complete = Sum (CAUCPSYS.CAUHSOFT) of all sectors

The OM CAUHSOFT is pegged when a mobile indicates that it has completed a soft or softer handoff and the existing primary serving cell/sector no longer supports that mobile subscriber.

15. Primary traffic

This metric refers to the wireless primary traffic in Erlangs.

The formula for this metric follows.

$$\text{Wls\_Erlangs (AIF CDMA-specific)} = \frac{\text{of all AIF ISUP trunks} * 3600}{\text{collectionPeriod}}$$

Where the traffic busy usage (TRU) register is the usage value for AIF ISUP trunk group carrying traffic from BSC to the wireless portion (that is, the MSC) of the switch.

Note: First convert all (TRK.TRU) values to Erlangs. If the OM is in CCS, then (TRK.TRU)/36.

16. Wireless call completion rate

This metric provides the ratio of established calls against the number of CAs. The formula for this metric follows.

$$\begin{aligned} \text{Total (O and T) CAs} &= \text{Sum(CAUCPSCT.CAUOATTS) of all sectors} \\ &+ \text{MTXSYS1.CDMAPREQ} \\ &+ \text{Sum(CAUCPSCT.CAUHATTS) of all sectors} \\ \text{Total (O and T) established calls} &= \text{Sum(CAUCPSCT.CAUOSUCC) of all sectors} \\ &+ \text{Sum(CAUCPSCT.CAUTSUCC) of all sectors} \\ &+ \text{Sum(CAUCPSCT.CAUHSUCC) of all sectors} \\ \text{Call Completion rate} &= \frac{\text{Total (O and T) established calls}}{\text{Total (O and T) CAs}} \end{aligned}$$

Explanation The following list describes the parameters in the previous formula.

- Total (O and T) CAs = the total number of origination and termination call attempts
- Sum(CAUCPSCT.CAUOATTS) of all sectors = mobile origination call attempts
- MTXSYS1.CDMAPREQ = mobile termination call attempts
- Sum(CAUCPSCT.CAUHATTS) of all sectors = hard handoff call attempts
- Total (O and T) established calls = the total ratio of established calls
- Sum(CAUCPSCT.CAUOSUCC) of all sectors = successful originating calls

- Sum(CAUCPSCT.CAUTSUCC) of all sectors = mobile terminating call attempts
- Sum(CAUCPSCT.CAUHSUCC) of all sectors = successful hard handoffs

17. Wireless registration rate

The formula for this metric follows.

Registration Rate = of all sectors/ (Total (O and T) CAs)

18. Hard handoff successful rate

This metric refers to the successful rate of hard handoffs.

The formula for this metric follows.

Hard handoffs successful rate = (number of succ hard handoffs / number of hard handoff attempts)
 Number of successful hard handoffs = Sum(OMMTXH02.CHOSRCSU) of all sectors
 Number of hard handoff attempts = Sum(OMMTXH02.CHOSRCAT) of all sectors

You can also use the following OM formula to express this metric.

= + Sum(OMMTXH02.CH0BLKS) + Sum(OMMTXH02.CH0SRRLS) +
 Sum(OMMTXH02.CH0NSRCR) +
 Sum(OMMTXH02.CH0SRCFL) of all sectors

Switch core

19. Call processing occupancy

This metric refers to the percentage occupancy of the SuperNode DMS-Core (CM) processor that the CP class uses. Currently, the SuperNode 70EM processor is engineered at 77% of the processor occupancy for the CP class.

The switch does not provide the percentage of CP occupancy through OM registers for CM processor. Use the “ACTIVITY” log to obtain the percentage of CP occupancy.

Also, use the following formula to derive the percentage of CP occupancy by using %CP_eng'g_point and the percentage of CP utilization.

The formula for this metric follows.

% CP_Occupancy = (%CP_Utilization * %CP_eng'g_point) / 100

Where, %CP_eng'g_point = 77% default for DMS-100 Wireless loads running on SR70EM. This value can vary, depending on site configuration; for example, SDM.

20. CP utilization

This metric refers to the utilization of engineered CP class; that is, the percentage of utilization of the engineered CP class (the %CP_eng'g_point).

To determine the average percentage of CP utilization during the accumulation period, divide the value of register BRSCAP by the number of transfer periods.

The formula for this metric follows.

$\% \text{ CP Utilization} = \text{BRSTAT.BRSCAP} / (\text{number of transfer periods for each accumulation period})$

21. CPU maintenance occupancy

The CPU maintenance occupancy is the percentage of CM processor RT that the maintenance processes use.

The related OMs for SuperNode DMS-Core processor are provided in percent utilization; that is, not in the occupancy value.

The formula for this metric follows.

$\% \text{ Maint\_Utilization} = \text{BRSTAT.BRSMaint} / (\text{number of transfer periods for each accumulation period})$

Currently, the maintenance class of SuperNode processor is engineered at 8% of CM RT. The formula for this metric follows.

$\% \text{ Maint\_Occupancy} = (\% \text{ Maint\_Utilization} * 8\%) / 100$

22. Processor high water mark

This metric refers to the CPU high water mark count and usage (CCBHI, SYSWINIT, CPWORKU in 100 seconds).

The following list identifies the high watermark OMs for call processing software resources:

- Call condense block high watermark = CP2.CCBHI
- Number of call processes in use (that is, the number of active calls) high watermark = CP2.CPHI
- DMS-Core CP usage (in CCS) = $\text{CP2.CPWORKU} * (3600/\text{collectionPeriod in sec})$
- Number of system warm initialization = CP2.SYSWINIT

23. High water percentage of CP utilization

The high water mark percentage of CP utilization is the busiest minute of CP usage of an hour. The switch collects this information on hourly basis and saves them for the last 30 days. The data, however, is not reported through the

OMs. Use the following command interpreter (CI) command to obtain this information.

Figure A-3 CI command DMSMON use

```
>DMSMON
DMSMON:
>HIGHCAP
```

Trunk groups

The OM group TRK contains the measurements of trunk group usage and performance. The OM group TRK is a multi-tuple, trunk group- based OMs. Based on the trunk group type, the OMs can be separated and grouped into different categories.

The DMS-100 Wireless switch with AIF CDMA consists of the following three types of network interface:

- the PSTN interface
- the open AIF BSCs
- the CSTN interface (other MSCs using IS-41 NWK trunks)

If the differentiation in performance is expected, then separate the trunk groups for those different network interfaces. Interpret the notation “Sum (&0xbc;) of trunk groups” in the following sections as the “sum (&0xbc;) of all trunk groups for XXX network interface,” where xxx can be the PSTN, AIF and IS-41NWK interface.

The calculation of Erlangs, GOS, and the number of needed trunks are based on the basic ErlangB formula. The number of trunks required can be obtained by the GetTrunks function of ErlangB formula:

$$\text{TrkReq} = \text{GetTrunks}(\text{GradeOfServ}, \text{Erlangs})$$

The default value for grade of service (GOS) is 2% blocking probability for voice channel trunks (radio access), and 1% for PSTN trunks. The GOS for a given traffic load, in Erlangs, and the trunks installed can be expressed by the GetGOS function of ErlangB formula,

$$\text{Grade Of Service (percentage of blocking probability)} = 100 * \text{GetGOS}(\text{Erlangs}, \text{Trunks\_Installed})$$

The following metrics refer to the deficiency and the capacity utilization of a trunk group.

Deficiency = Trunks_Installed - TrkReq
Percentage of Capacity utilized = $100 * (\text{TrkReq} / \text{Trunks\_Installed})$

24. Outgoing attempts

This metric refers to the number of attempts to seize a circuit for the outgoing traffic on the route.

The formula for this metric follows.

Outgoing Attempts = Sum(TRK.NATTMPT) of trunk groups
Or Outgoing Attempts = Sum(TRK.CONNECT + TRK.GLARE + TRK.OUTFAIL) of trunk groups

25. Incoming attempts

This metric refers to the number of attempts for incoming seizures on a trunk group, including seizures that fail or that the switch abandons before routing.

The formula for this metric follows.

Incoming Attempts = sum(TRK.INCATOT) of trunk groups

26. Blocks (outgoing)

This metric refers to the number of bids for outgoing traffic that encounter an all circuits busy condition. With this condition, the call can fail or overflow onto another circuit group. This metric measures the congestion on the switched network.

The formula for this metric follows.

Outgoing call blocks = sum(TRK.NOVFLATB) of trunk groups

27. Outgoing seizures

This metric refers to the number of calls started i.e. successful seizure of a circuit, for outgoing traffic on the route.

The formula for this metric follows.

Outgoing seizures = sum(TRK.CONNECT) of trunk groups

28. Incoming seizures

This metric refers to the number of calls started i.e. successful seizures of a circuit, for incoming traffic on the route.

The formula for this metric follows.

Incoming seizures = $\text{sum}(\text{TRK.INCATOT} - \text{TRK.PRERTEAB} - \text{TRK.INFAIL})$
of trunk groups

29. Answers (outgoing)

This metric refers to the number of calls that receive an answer signal for calls outgoing on the route.

The formula for this metric follows.

Outgoing answered = $\text{sum}(\text{TRK.NANS})$ of trunk groups

30. Answers (incoming)

This metric refers to the number of calls that receive an answer signal for calls incoming on the route.

The formula for this metric follows.

Incoming answered = $\text{Sum}(\text{TRK.INANSWER})$ of trunk groups

31. Traffic

This metric refers to incoming and outgoing traffic usage on the route, measured in Erlangs. This measurement does not include trunks made busy (MBU) by the craftsman, or trunks made busy by the system (SBU).

The formula for this metric follows.

Route_Erlangs = of trunk groups of the route * $(3600 / \text{CollectionPeriod})$

Note: First convert all (TRK.TRU) values to Erlangs. If OM is in CCS (a default value), then Erlangs = $(\text{TRK.TRU})/36$. If OM is in Deci_Erlangs, then Erlangs = $(\text{TRK.TRU})/10$. The \$AD_WORKAREA defines the type of TRU units.

32. Average holding time

This metric refers to the average holding time (AHT) of calls on the route.

The formula for this metric follows.

$\text{Trunk\_AHT (sec)} = 3600 * \text{route\_Erlangs} / ((\text{sum}(\text{TRK.CONNECT}) + \text{sum}(\text{TRK.INCATOT} - \text{TRK.PRERTEAB} - \text{TRK.INFAIL})) * (3600 / \text{CollectionPeriod}))$

33. Trunk count

This metric refers to the number of circuits equipped on the route, for outgoing or incoming traffic, or both.

The OM group TRK provides one tuple for each trunk group. Each tuple contains the following parameters:

- Key field: COMMON_LANGUAGE_NAME
- Info field: OM2TRKINFO has three parts: TRKDIR, NCCT, and NWCCT
- The TRKDIR is the trunk group direction. The following list contains the trunk group directions:
 - incoming trunk (IC)
 - outgoing trunk (OG)
 - two-way trunk (2W)
- The NCCT is the total number of trunk circuits in the group.
- The NWCCT is the number of trunk circuits available for service at the end of the reporting period.

34. Failures

This metric refers to any failures that drop an established call from a trunk perspective (for each trunk group). The DMS-100 Wireless switch does not collect the dropped call OM's on an individual trunk group basis.

The formula for this metric follows.

Number trunks blocked or OOS = $\text{sum}(\text{TRK.NCCT} - \text{TRK.NWCCT})$

Digital trunk controller occupancy

Each digital trunk controller (DTC) has 20 T1 p-side ports (facing the external network) and 16 DS30 c-side ports (facing the internal ENET). Both p- and c-sides of the DTC have a same amount of 480 DS0 termination ports each. The DTC is a non-blocking node. The occupancy of DTC unified processor (UP) is available through OM group XPMOCC. Ensure that you turn on the XPMOCC OM collection option by setting office parameter XPMOCC_OM_CONTROL in table OFCVAR (Office Variable).

The formula for this metric follows.

DTC_half_CAs =
XPMOCC.PMORIGS
+ XPMOCC.PMTERMS
Percentage of DTC UP Occupancy =
 $\text{XPMOCC.AVGCP0CC} / \text{XPMOCC.NUMRPTS}$

Explanation The following list describes the parameters in the previous formula.

- XPMOCC.PMORIGS = total call origination attempts
- XPMOCC.PMTERMS = total call termination attempts
- $\text{XPMOCC.AVGCPOCC} / \text{XPMOCC.NUMRPTS}$ = average percentage of UP occupancy

The DTC UP processor is engineered at 80% of CPU occupancy for call processing. Use the following formula for estimating the use of DTC call processing capacity.

$$\text{Estimated DTC Percentage of CP Utilization} = 100 * (\text{DTC half\_CAs} / 24,000)$$

Where, the 24,000 half_CAs are the estimated DTC7 UP CP capacity for the LWW0006 release.

IS-41 link occupancy

The DMS-100 Wireless switch uses a proprietary version of IS-41 protocol known as “IS-41+.” Protocol IS-41+ is a superset protocol that adds message types and message fields, which Nortel Networks wireless switches use. The IS-41 links are intersystem signaling links between the MSCs, using either the X.25 or/and CCS7 transport.

The formula for this metric follows.

```
% Utilization of IS41 CCS7 Link =
100 * (ResolveNull ((228 * (MTXNWKIC.REGNIVIC +
MTXNWKOG.REGNIVOG)
+ 117 * (NWKIC2.RGCNIVIC + NWKOG2.RGCNIVOG
+ MTXNWKIC.NBPREQIC + MTXNWKOG.NBPREQOG)
+ 78 * (MTXNWKOG.MEASIVOG + MTXNWKIC.MEASIVIC)
+ 66 * (MTXNWKIC.MEASRRIC + MTXNWKOG.MEASRRIC)
+ 192 * (MTXNWKOG.RTEREQOG + MTXNWKIC.RTEREQIC)
+ 358 * (MTXNWKIC.IHATTIC + MTXNWKOG.IHATTIC)
+ 235 * (NWKIC2.QREQIVIC + NWKOG2.QREQIVOG))
* (0.5*(100%+10%+10%)/3600)
/ [7,000 * (number of 7 Kbytes/sec links for the
route)*(0.8/2)])
% Utilization of IS41 X25 Link =
100 * (184 * (MTXNWKIC.REGNIVIC + MTXNWKOG.REGNIVOG)
+ 73 * (NWKIC2.RGCNIVIC + NWKOG2.RGCNIVOG
+ MTXNWKOG.NBPREQOG + MTXNWKIC.NBPREQIC)
+ 56 * (MTXNWKIC.MEASIVIC + MTXNWKOG.MEASIVOG)
+ 44 * (MTXNWKOG.MEASRRIC + MTXNWKIC.MEASRRIC)
+ 152 * (MTXNWKIC.RTEREQIC + MTXNWKOG.RTEREQOG)
+ 244 * (MTXNWKIC.IHATTIC + MTXNWKOG.IHATTIC)
+ 191 * (NWKOG2.QREQIVOG + NWKIC2.QREQIVIC))
* (0.5*(100%+10%+10%)/3600)
/ [(Link speed in Bps)*(number of links n for the
route)*(0.8*(n-1)/n)])
```

Explanation The following list describes the parameters in the previous formula.

- $(0.5 \times (100\% + 10\% + 10\%) / 3600)$ = traffic in bytes for each second, where:
 - 0.5 multiplies the sum of messages, covering both directions of a route, to estimate the messages in one direction
 - one 10% factor allows a margin for any imbalance in traffic levels between each direction
 - the remaining 10% factor allows a margin for minority message types that are not measured
 - the value “3600” converts hourly message counts to per-second average counts
- $1 / [7,000 \times (\text{number of 7 Kbytes/sec links for the route}) \times (0.8/2)] = 0.8$ Erlang for each link engineering limit with 2N redundancy for CCS7 links
- $(0.5 \times (100\% + 10\% + 10\%) / 3600)$ = traffic in bytes for each second, see note
- $1 / [(\text{Link speed in Bps}) \times (\text{number of links } n \text{ for the route}) \times (0.8 \times (n-1)/n)] = 0.8$ Erlang for each link engineering limit with (N+1) redundancy

ACE and BSAP_LIU7 occupancy

With the open AIF, the card that handles the CCS7 interface is the Link Interface Unit #7 (LIU7). The application processor that handles the open AIF protocol and messages is the A-Interface Control Element (ACE). The main function of the ACE is to process and translate the A Interface IOS (Inter-Operability Specifications) messages into the existing MTX ICP messages and in reverse. The LIU7 acts as a router to the ACE nodes to handle call processing messages.

The ACE and BSAP_LIU7 are based on the NTEX22CA card of ASU, which has 32M of memory and uses a 68060 processor. The OM group NCMCPUST provides the CPU usage of non-computing module (CM) SOS-based nodes, including for ACE and BSAP_LIU7 nodes.

The ACE CPU capacity is engineered at 40% for call processing to account for 2N control and mate redundancy. The BASP_LIU7 call processing also is engineered at 40% of CPU occupancy to account for 2N paired redundancy scheme.

The formula for this metric follows.

```
% ACE CP Occupancy = NCMCPUST.NCMCPOCC for ACE xxx
% BSAP_LIU7 CP Occupancy = NCMCPUST.NCMCPOCC for ACE xxx
```

IS-634 (AIF) CCS7 link usage

The software components on the BSAP_LIU7 provide MTP and SCCP protocol handling (CCS7) and the Base Station Application Part Sub-System Instance (BSAP SSI). BSAP SSIs are distributed across LIU7s for reliability. Each SSI can handle up to 2048 simultaneous calls and it must be resident on an LIU7 used by the open AIF product.

The DS0 link of BSAP_LIU7 is engineered at 0.4 Erlang for each link to account for 2N paired redundancy. In most cases, the LIU7 capacity is limited by the IS-634 DS0 link, not by the CPU. The OM groups C7LINK1, C7LINK2 and C7LINK3, which provide CCS7 linkset usage and traffic measurements, apply to the IS-634 CCS7 links.

The formula for this metric follows.

```
Number messages discarded due to CCS7 buffer overflow =
C7LINK3.C7BF0VL
Percentage of Utilization of IS-634 (AIF) CCS7 Link =
100 * (Max [(C7LINK3.C7MSOR + 65,536*C7LINK3.C7MSOR2)
(C7LINK3.C7MSTE + 65,536*C7LINK3.C7MSTE2)]
/ (CollectionPeriod in sec)
/ [7,000 * (number of 7 Kbytes/sec links for the
route)*(0.8/2)])
```

Explanation The following list describes the parameters in the previous formula.

- $(C7LINK3.C7MSOR + 65,536 * C7LINK3.C7MSOR2) =$ number of octets originated (TX)
- $(C7LINK3.C7MSTE + 65,536 * C7LINK3.C7MSTE2) =$ number of octets terminated (RX)
- $[7,000 * (\text{number of 7 Kbytes/sec links for the route}) * (0.8/2)] = 0.8$ Erlang for each link engineering limit with 2N redundancy for CCS7 links

AIF ACE OMs

The OMs that the ACEs collect for AIF CDMA re-use the existing CAU OMs. The AIF CDMA does not introduce any AIF-specific OMs.

Table A-1 lists the wireless CAU OMs that apply to AIF CDMA.

Table A-1 ACE and existing CAU OM groups

Group name (acronym)	Group name (expansion)	Changes	Reason
CAUCPSCT	CAU Call Processing, sector-based OMs	Re-used for ACE	Common to both ACE and CAU.
CAUCPSYS	Call Processing, node-based OMs	Re-used for ACE	Common to both ACE and CAU.
CAUDATSC	Data service OM, sector-based OMs	Re-used for ACE	Common to both ACE and CAU.
CAUDATSY	CAU data service, node-based OMs	Re-used for ACE	Common to both ACE and CAU.
CAUAUTH	CAU Authentication, node-based OMs	Re-used for ACE	Common to both ACE and CAU.
CAUTFCSY	CAU fixed wireless, node-based OMs	Not for ACE	ACE does not support fixed wireless in release MTXCA07.
CAURM	CAU resource manager	Not for ACE	RM is not in ACE. The switch only pegs this OM in CAU and RMU.
CAUCPFRQ	CAU CallP MCTA OMs	Not for ACE	These multi-carrier traffic allocation (MCTA) OMs do not apply to ACE in release MTXCA07.

Table A-2 lists those CAU OMs with their associated register names. This table also indicates whether ACE re-uses the registers for AIF.

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 1 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
CAUCPSCT	CAUPGRES	CAU Page Response	Yes
	CAUPGRRS	CAU Page Retry Response	No
	CAUTSUCC	CAU Termination Successful	Yes
	CAUTBLKS	CAU Termination Blocks	Yes
	CAUEDLOT	CAU Error Drop Loss of Traffic Failure	Yes
	CAUTRLS	CAU Termination Release	Yes
	CAUOATTS	CAU Origination Attempts	Yes
	CAUOSUCC	CAU Origination Successful	Yes
	CAUOBLKS	CAU Origination Blocks	Yes
	CAUORODR	CAU Origination Reorder	Yes
	CAUORLS	CAU Origination Release	Yes
	CAUERSFL	CAU Error Radio Setup Failure	Yes
	CAUERLFL	CAU Error Radio Link Failure	Yes
	SLTPGRES	Slotted Page Response	Yes
	SLTPGRRS	Slotted Page Retry Response	No
	CAUHATTS	CAU Handoff Attempts	Yes
	CAUHLKS	CAU Handoff Resource Allocation Failure	Yes
	CAUHLFL	CAU Handoff Radio Link Failure	Yes
	CAUHSUCC	CAU Handoff Success	Yes

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 2 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
CAUCPSYS	CAUHRLS	CAU Handoff Release	Yes
	CAUDROPR	CAU RF-related Call Drops	Yes
	CAUDROPN	CAU Network Problems	Yes
	CAUESWFL	CAU Error Software Failure	Yes
	CAUNOTCE	BTS No Traffic Channel Element	Yes
	CAUFWCAP	BTS Forward Capacity Full	No
	CAURECAP	BTS Reverse Capacity Full	No
	CAUNOWCD	BTS No Walsh Code	No
	MCTAHRQF	MCTA Capacity Request Failure for Handoff	No
	MCTALLTO	MCTA Capacity Request All Timeout	No
	MCTALLFU	MCTA Capacity All Full	No
	MCTAREQF	MCTA Capacity Request Failure	No
	CAUCPS01	Spare Register	No
	CAUPGREQ	CAU Page Request	Yes
	CAUPGRTY	CAU Page Retry	No
	CAUPGTO	CAU Page Timeout	No
	CAUDUPPG	CAU Duplicate Page Response	Yes
	CAUUNXPG	CAU Unexpected Page Response	Yes
	CAUORIGS	CAU Originations	Yes
	CAUREGNS	CAU Registrations	Yes
	CAUHOSRC	CAU Handoff Source	Yes
	CAUHOTRG	CAU Handoff Target	Yes

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 3 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
	CAUHSOFT	CAU Handoff Soft	Yes
	CAUVDSCD	CAU Version Mismatch Discard	No
	CAUVRJCT	CAU Version Mismatch Reject	No
	CLARTRIG	Conditional Logging and Reporting Triggers	No
	CAUCNICV	CNI on CDMA during Conversation	Yes
	CAUCNITR	CNI on CDMA during Termination	Yes
	CAUPMWNA	MWN Attempt on Paging Channel	No
	CAUPMWNC	MWN Completion on First Attempt on Paging	No
	CAUPMWNR	MWN Completion on Retry on Paging Channel	No
	CAUTMWNA	MWN Attempt on Traffic Channel	Yes
	CAUTMWNC	MWN Completion on First Attempt on Traffic Channel	Yes
	CAUTMWNR	MWN Attempt on Retry on Traffic Channel	Yes
	SLTPGREQ	Slotted Mode Page Request	Yes
	SLTPGRTY	Slotted Mode Page Retry	No
	SLTPGTO	Slotted Mode Page Timeout	No
	CAUCPSY1	Spare	N/A
	CAUFLASH	CAU Flash	Yes
	CTCATTS	CDMA Test Call Attempts	Yes

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 4 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
CAUDATSC	CTCCOMPS	CDMA Test Call Completion	Yes
	CTCPGTO	CDMA Test Call Page Timeouts	No
	CTCOTHFL	CDMA Test Call Other Failures	Yes
	CAUMRLS	Mobile-initiated Call Release	Yes
	CAULRLS	CM Call Release	Yes
	SMSPGRES	SMS Page Response	Yes
	SMSTSCPG	SMS Termination Successful over the Paging Channel	Yes
	SMSTFLPG	SMS Termination Failure over the Paging Channel	Yes
	SMSDVCAT	SMS Delivery in Call Attempts	Yes
	SMSDVCSC	SMS in Call Success	Yes
	SMSTSCTC	SMS Termination Successful over the Traffic Channel to an Idle Mobile	Yes
	SMSTFLTC	SMS Termination Failure over the Traffic Channel to an Idle Mobile	Yes
	SMSTSEFL	SMS Termination Selector Element Failure	Yes
	SMSTSOFL	SMS Termination Service Option Failure	No
	SMSORATS	SMS Order to Channel Attempts	Yes
	SMSORSUC	SMS Order to Channel Success	Yes

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 5 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
CAUDATSY	CAUDSP09- CAUDSP00	CAU Data Processing Sector-based Spare Registers (10 total)	N/A
	SMSPGREQ	SMS Page Request	Yes
	SMSPGTO	SMS Page Timeout	Yes
CAUAUTH	CAUDSP09- CAUDSP00	10 Spare Registers	N/A
	CAUSUCM	CAU SSD Update Request from CM	Yes
	CAUSUT	CAU SSD Update Request on Traffic Channel	Yes
	CAUSUST	CAU SSD Update Success on Traffic Channel	Yes
	CAUSUFT	CAU SSD Update Failure on Traffic Channel	Yes
	CAUUCCM	CDMA Unique Challenge Request from CM	Yes
	CAUUCT	CAU Unique Challenge Request on Traffic Channel	Yes
	CAUUCCT	CAU Unique Challenge Confirmation on Traffic Channel	Yes
	CAUBSCCM	CAU Base Station Challenge Confirmation Received from CM	Yes
	CAUBSCT	CAU Base Station Challenge Received on the traffic channel	Yes
	CAUBSCCT	CAU Base Station Challenge Confirmation Sent over the Traffic Channel	Yes
	CAUSUP	CAU SSD Update Request on Paging Channel	No

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 6 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
CAUTFCSY	CAUSUSA	CAU SSD Update Request on Paging Channel	No
	CAUSUFA	CAU SSD Update Failure on Access Channel	No
	CAUUCP	CAU Unique Challenge Request on Paging Channel	Yes
	CAUUCCA	CAU Unique Challenge Confirmation on Access Channel	Yes
	CAUBSCA	CAU Base Station Challenge Received on the Access Channel	No
	CAUBSCCP	CAU Base Station Challenge Confirmation Sent over the Paging Channel	No
	CAUAORIG	CAU Authenticatable Origination Sent to CM	Yes
	CAUAREG	CAU Authenticatable Registration Sent to CM	Yes
	CAUAPGRS	CAU Authenticatable Page Response sent to CM (not in use)	No
	CAUASP12- CAUASP1	12 Spare Registers	N/A
	CAUMCATT	CAU Subscriber Metering-control Attempt	No
	CAUSMCTO	CAU Subscriber Metering-control Timeout	No
	CAUMCNA	CAU Subscriber Metering-control Negative Acknowledge	No
	CAUFWA01- CAUFWA04	4 Spare Registers	N/A

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 7 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
CAURM	RMOVLD	Resource Manager Overload	No
	RMDEPLT	Resource Manager Deplete	No
	RMNORM	Resource Manager Normal	No
	RMSRMNAK	Resource Manager SRM Negative Acknowledgement	No
	RMSRMTO	Resource Manager SRM Timeout	No
	RMNORREQ	Resource Manager No Resource for Request	No
	RMNOCIU	Resource Manager No CIU Found Ready	No
	RMUNSO	Resource Manager	No
	CAURMS24- CAURMS01	24 Spare Registers	N/A
CAUCPFRQ	MCTREGIS	MCTA Registration	No
	MCTGPRES	MCTA Page Response	No
	MCTORIGS	MCTA Origination	No
	MCTOATTS	MCTA Origination Attempts	No
	MCTTATTS	MCTA Termination Attempts	No
	MCTHATTS	MCTA Hard Handoff Attempts	No
	MCTOSUCC	MCTA Origination Successful	No
	MCTTSUCC	MCTA Termination Successful	No
	MCTHSUCC	MCTA Handoff Successful	No

Table A-2 CAU OM registers re-used for ACE OMs (Sheet 8 of 8)

Group name (acronym)	Register name	Expansion name	ACE re-uses
	MCTNOTCE	MCTA No Traffic Channel Element	No
	MCTFWCAP	MCTA Forward Capacity Full	No
	MCTRECAP	MCTA Reverse Capacity Full	No
	MCTNOWCD	MCTA No Walsh Code	No
	MCTERLFL	MCTA Radio Link Failure	No
	MCTHRLFL	MCTA Hard Handoff Radio Link Failure	No
	MCTDROPR	MCTA Call Drop during Conversation	No
	MCTARQFN	MCTA Fails to Select a Frequency and Capacity is Full	No
	MCTAREQN	Capacity Request Not Available when MCTA Successfully Selects an Alternate Frequency	No
	MCTAREQT	Capacity Request Full/Not Available when MCTA Successfully Selects an Alternate Frequency	No
	MCSPARE3- MCSPARE1	3 Spare Registers	N/A

Table A-3 lists the CAU call processing OM registers that do not apply to ACE.

Table A-3 CAU CallIP OM registers not applicable for ACE

OM group	Register names	Reason
CAUCPSCT	CAUPGRRS	Since the Page retry function moves from the call processing node to the CM, no OMs pegged for page retry in CAU and ACE.
	SLTPGRRS	
	CAUFWCAP	These CAU-specific OMs give details on how the BSC cannot set up the call (origination or termination). The switch pegs these OMs according to the specific CAUSE VALUES returned to CAU for MCTA. The switch does not peg these OMs because ACE follows a different protocol from CAU, and AIF does not support MCTA. ACE does not receive the same CAUSE values.
	CAURECAP	
	CAUNOWCD	
	MCTAHRQF	There is no MCTA functionality in ACE. The MCTA-related OMs do not apply to ACE.
	MCTALLTO	
	MCTALLFU	
	MCTAREQF	
CAUCPSYS	CAUPGRTY	Since the Page retry function moves from the call processing node to the CM, no OMs pegged for page retry in CAU and ACE.
	CAUPGTO	
	SLTPGRTY	
	SLTPGTO	
	CTCPGTO	
	CAUUNXPG	ACE rejects all unexpected messages. The switch generates log ACE304 and rejects invalid page response. No OMs pegged in MTXCA07.
	CAUDUPPG	
	CAUVDSCD	These OMs are specific for the CAU coder/decoder. These OMs do not apply to ACE call processing because ACE uses a different protocol.
	CAUVRJCT	
	CLARTRIG	The switch pegs this OM register for conditional logging and reporting triggers. This OM register does not apply to ACE because no functionality exists in ACE.

List of terms

0ZZ

The domestic identification digits that indicate the call type for direct dial (DD) and operator-assisted (OA) calls (for example, 080).

AC

See alternating current (AC).

access tandem (AT)

A switching system that provides a traffic concentration and distribution function for inter-local access and transport area (LATA) traffic originating or terminating in a LATA. The AT provides the inter-LATA carrier with access to more than one end office (EO) in the LATA. The AT also acts as a toll tandem for intra-LATA traffic. The AT technical functions include automatic message accounting (AMA) recording, routing, and call supervision.

access-to-carrier (ATC)

Trunks that exist between the EO and the service gateway of the interexchange carrier (IEC).

ACD

See Automatic Call Distribution (ACD).

ADEPT

See analysis, data extraction and performance tool (ADEPT).

advanced mobile phone service (AMPS)

A cellular analog system technology designed for voice service that offers 30-kHz bandwidth for each voice channel.

AFT

See automatic file transfer (AFT).

alternating current (AC)

A periodic voltage having a mean value of zero.

AMA

See automatic message accounting (AMA).

American National Standards Institute (ANSI)

A non-profit private-sector organization that is the principle standards-setting body in the United States. Among other tasks, ANSI sets standards that allow telecommunications devices and networks to exchange information. ANSI represents the United States in the International Organization for Standardization (ISO) and advises the U.S. government on matters involving the International Telecommunication Union (ITU).

AMPS

See advanced mobile phone service (AMPS).

analysis, data extraction and performance tool (ADEPT)

A wireless network engineering-supported platform that provides real-time operational measurement (OM) processing.

ANSI

See American National Standards Institute (ANSI).

antenna

An arrangement of conductors, slots, and surfaces that radiates or recovers radio frequency (RF) power.

AOCR

See automatic out-of-chain rerouting (AOCR).

application-specific unit (ASU)

A combination of hardware and software components that carries out a particular function on the signals carried on the channel buses (C-bus) and frame transport buses (F-bus) in a link peripheral processor (LPP). Examples of ASUs are Ethernet interface units (EIU), CCS7 link interface units (LIU7), and network interface units (NIU).

ASU

See application-specific unit (ASU).

AT

See access tandem (AT).

ATC

See access-to-carrier (ATC).

ATC

See autotune combiner (ATC).

attempt

Any action that begins the process of establishing a connection.

authentication

The process whereby an authentication center of a cellular network exchanges messaging information with a mobile station to verify the station's identity for the protection of the network from unauthorized use.

Automatic Call Distribution (ACD)

A set of Meridian Digital Centrex (MDC) features that assigns answering priorities to incoming calls and then queues and distributes the calls to a predetermined group of telephone sets designated as agent positions.

automatic file transfer (AFT)

The AFT log reports provide information about automatic file transfers.

automatic message accounting (AMA)

An automatic recording system that documents all the necessary billing data of subscriber-dialed long distance calls.

automatic out-of-chain rerouting (AOCR)

A network management service that provides extended routing for calls that overflow their in-chain routes.

autotune combiner (ATC)

A cavity/isolator combiner featuring an automatic tuning system that monitors the transmitted RF and automatically tunes itself to that frequency. The ATC resides in the RF frame at a cell site.

average busy season busy hour (ABSBH)

The measurement of busy hour traffic, averaged across the business days of the busy season.

backhaul interface unit (BIU)

The BIU contains the channel service unit/data service unit (CSU/DSU) and performs protocol conversion between the physical layer of the T1/E1 framing and RS-422 formats.

BAF

See Bellcore automatic message accounting format (BAF).

bandwidth

The different range of frequencies necessary to hold a radio signal.

base station communication network (BCN)

base station controller (BSC)

A network component in the public land mobile network (PLMN) that controls one or more base transceiver stations. A BSC is part of a base station system (BSS). It terminates all radio-related messages from the mobile stations. It has two components: the BSS central equipment (BCE) and the transcoding equipment (TCE).

base station manager (BSM)

The BSM provides a graphical user interface (GUI) for operations, administration and maintenance (OAM) of the BSC and base station transceiver subsystem (BTS) components.

base station manager path (BSMP)

A physical communications path from the computing module (CM) to the BSM by an INSV READY CIU.

base station transceiver subsystem (BTS)

The BTS is the interface between the code division multiple access (CDMA) mobile station and the DMS-100 Wireless switch. The BTS supports communication in the form of CDMA calls between mobile subscribers and the DMS-100 Wireless switch.

BCN

See base station communication network (BCN).

Bellcore automatic message accounting format (BAF)

The standard format for automatic message accounting (AMA) data used by Bell operating companies. The format consists of a structure code that identifies the format of the data fields in the call record, a call code that identifies the type of call recorded in the call record, other data fields that define the attributes of the call, and if needed, one or more module codes that identify the format of any additional data appended to the call record.

Bell Northern Research Reduced Instruction Set Computer (BRISC)

A computing module that provides higher performance than previous SuperNode products.

BH

See busy hour (BH).

BIU

See backhaul interface unit (BIU).

BRISC

See Bell Northern Research Reduced Instruction Set Computer (BRISC).

BS

See busy season (BS).

BSC

See base station controller (BSC).

BSM

See base station manager (BSM).

BSMP

See base station manager path (BSMP).

BTS

See base station transceiver subsystem (BTS).

busy hour (BH)

The peak 60-minute period (not necessarily a clock hour) in a business day when a switch handles the largest volume of traffic.

busy season (BS)

Three selected months (not necessarily consecutive), each containing 20 consecutive business days, that have the highest average business day traffic in the time consistent busy hour (TCBH). (Each month uses the same hour.)

call condense block (CCB)

A data block associated with a call from initiation through completion. The CCB contains enough information to describe a basic call and can be extended for calls that require more data.

call detail recording (CDR)

A system that collects and records data on all calls processed by the DMS switch. Call detail recording information is stored on a recording device and used to compile studies on traffic and equipment service, division of revenue, engineering, and fraud.

call forwarding (CF)

A Meridian Digital Centrex (MDC) service that allows a subscriber to have incoming calls to a station's directory number (DN) forwarded to a predetermined DN. There are five types of call forwarding, as follows:

- Call Forwarding Busy (CFB) permits all calls to a busy station to be forwarded to a designated station within the customer group.
- Call Forwarding Don't Answer (CFD) permits an incoming call not answered within a specified length of time to be forwarded to another designated station.

- Call Forwarding Fixed (CFF) permits stations to forward calls to locations determined by the operating company.
- Call Forwarding Intragroup (CFI) permits stations to forward calls only to customer-defined locations within the customer group.
- Call Forwarding Universal (CFU) permits stations to forward calls to locations inside or outside the customer group.

calls

Dialing attempts that the switch processes and bids for service.

CAMA

See centralized automatic message accounting (CAMA).

cancel from (CANF)

A network management control that diverts a preset percentage of traffic attempts overflowing from selected one-way outgoing or two-way trunk groups. The percentage level can be set from 1 to 100.

cancel to (CANT)

A network management control that limits a preset percentage of traffic offered to selected one-way outgoing or two-way trunk groups. The percentage level can be set from 1 to 100.

CANF

See cancel from (CANF).

CANT

See cancel to (CANT).

CAU

See CDMA application unit (CAU).

CAVE

See cellular authentication and voice encryption (CAVE).

CAVU

See cellular authentication and voice encryption unit (CAVU).

CCB

See call condense block (CCB).

CCITT

See Consultative Committee for International Telephony and Telegraphy (CCITT).

CCS

See Centum call seconds (CCS).

CCS7

See Common Channel Signaling 7 (CCS7).

CCS7 link interface unit (LIU7)

A peripheral module (PM) that processes messages entering and leaving an LPP through an individual signaling data link. Each LIU7 consists of a set of cards and a paddle board provisioned in one of the link interface shelves of the LPP. *See also* link interface unit (LIU) and link peripheral processor (LPP).

CDMA

See code division multiple access (CDMA).

CDMA application unit (CAU)

A board that relays messages between the computing module (CM) and the SBS or the BTS. The CAU is an ASU that is responsible for the allocation and deallocation of SBS call processing resources for CDMA calls.

CDMA interconnect system (CIS)

A wireless component that distributes data traffic and signaling through the CDMA cellular land network. The CIS contains the customer service unit/data service unit (CSU/DSU) and the distributor and consolidator (DISCO).

CDMA interface unit (CIU)

A wireless component that provides the hardware and software interface that integrates the DMS-100 Wireless switch, the BSC, and the cell site components. The CIU is located in a link peripheral processor (LPP) or a fiberized link interface shelf (FLIS).

CDMA intersystem hard handoff

A handoff in which the mobile is transitioned between cells on two different MSCs in a way that it breaks communications with the old cell in the source MSC before starting communication with the new cell in the target MSC. Intersystem hard handoff can occur between cells on two different MSCs that have identical CDMA frequency or different CDMA frequencies.

CDMA intersystem soft handoff

A handoff in which the mobile is transitioned between cells on two different MSCs in a way that it starts communications with the new cell in the target MSC while still communicating with the old cell in the source MSC. Intersystem soft handoff can only occur between cells with identical CDMA frequency assignments. The frame offsets for both soft handoff links must also match.

CDMA intrasystem hard handoff

A handoff in which the mobile station is moved between cells using different CDMA frequency assignments or time frames. This could be between different CDMA frequencies in the same band.

CDMA intrasystem soft handoff

A handoff in which the mobile station moves between cells within the same CDMA switch, using the same CDMA frequency assignments.

CDR

See call detail recording (CDR).

CE

See common equipment (CE).

cell site

The cell site provides the radio frequency (RF) interface between the mobile end user and the DMS-100 Wireless switch. Cell site equipment includes switch interface equipment, RF equipment, and test and alarm equipment.

cell site controller (CSC)

A peripheral module (PM) that acts as an interface between the switch and the radio equipment at the cell site.

cell site monitor (CSM)

A cell site peripheral located on the CE frame that monitors the RF equipment operating in the analog mode.

cellular authentication and voice encryption (CAVE)

An algorithm that is run each time a mobile accesses the system and the MSC-S requests that the mobile validates its access. The CAVE algorithm computes the authentication parameter at the mobile station and the authentication center.

cellular authentication and voice encryption unit (CAVU)

The functional entity responsible for executing the cellular authentication and voice encryption algorithm in the DMS-100 Wireless switch.

cellular mobile carrier (CMC)

A utility that provides telephone service to mobile customers by using radio cell sites connected to a CMC switching office.

cellular mobile radio (CMR)

A mobile telephone service in which radio transmit and receive facilities (called cells), which are distributed over an extended area, can pass on or take over the call handling functions associated with a call in progress as the mobile station moves from the vicinity of one cell to another.

centralized automatic message accounting (CAMA)

A system that produces itemized billing details for subscriber-dialed long distance calls. Details are recorded at a central facility serving a number of exchanges. In exchanges not equipped for automatic number identification (ANI), calls are routed to a CAMA operator who obtains the calling number and enters it into the computer for billing. *See also* local automatic message accounting (LAMA).

central office (CO)

A switching office (SO) arranged for terminating subscriber lines and provided with switching equipment and trunks for establishing connections to and from other SOs. Also known as a local office.

central processing unit (CPU)

A hardware entity in the switch that contains the central data processor for the system. The CPU uses the programs and data stored in memory modules to respond to incoming messages from the system. It then sends commands to the system to perform the required actions.

centum call seconds (CCS)

The use in 1 hour that is expressed in units of hundred-call-seconds. (Also called 100 call seconds.)

CF

See call forwarding (CF).

channel service unit/data service unit (CSU/DSU)

The combined channel service unit/data service unit (CSU/DSU) functions as the T1 interface and termination, which conditions the transmission signals for the backhaul between the base station BTS and CIS through the external base station communication network (BCN).

CI

See command interpreter (CI).

CIC

See circuit identification code (CIC)

circuit identification code (CIC)

Information identifying the telephone circuit among those interconnecting the destination and originating points.

CIS

See CDMA interconnect system (CIS).

CIU

See CDMA interface unit (CIU).

class of service (COS)

The categorization of telephone subscribers according to the specific types of service extended. Telephone service distinctions include such items as rate differences between individual and party lines, flat rate and message rate, and restricted and extended area service.

CLI

See command line interface (CLI).

CLIR

See calling line identification restriction (CLIR).

CLLI

See common language location identifier (CLLI).

CM

See computing module (CM).

CMC

See cellular mobile carrier (CMC).

CMR

See cellular mobile radio (CMR).

CO

See central office (CO).

CODEC

See coder/decoder (CODEC).

coder/decoder (CODEC)

An analog-to-digital and digital-to-analog converter that converts analog voice frequency signals to digital bit streams for transmission over a digital medium. At the receiving end, the CODEC converts the digital bit streams back to the analog format.

code division multiple access (CDMA)

A form of digital cellular telephone service that is a spread spectrum technology. CDMA assigns a code to all speech bits, sends scrambled transmission of the encoded speech over the air and reassembles the speech to its original format.

command interpreter (CI)

A component in the Support Operating System (SOS) that functions as the main interface between machine and user. Its principal roles are

- reading lines entered by a terminal user
- breaking each line into recognizable units
- analyzing the units
- recognizing command-item numbers on the input lines
- activating these commands

command line interface (CLI)

An area on a terminal screen that allows the operator to enter instructions from the keyboard and then execute those instructions.

Common Channel Signaling 7 (CCS7)

A digital message-based network signaling standard, defined by the CCITT, that separates call signaling information from voice channels so that interoffice signaling is exchanged over a separate signaling link.

common equipment (CE)

The CE frame at the cell site that houses the control, test, and interface equipment.

common language location identifier (CLLI)

A standard identification method for trunk groups in the following form:

aaaa bb xx yyyy

where:

aaaa

is the city code

bb

is the province or state code

xx

is the trunk group identifier

yyyy

is the trunk number

compact simplex ICRM (CSI)

A small ICRM used with microcells.

computing module (CM)

The processor and memory of the dual-plane combined core (DPCC) used by DMS SuperNode. Each CM consists of a pair of CPUs with associated memory that operate in a synchronous matched mode on two separate planes. Only one plane is active; it maintains overall control of the system while the other plane is on standby.

Consultative Committee for International Telephony and Telegraphy (CCITT)

An international organization of communication carriers, especially government telephone monopolies, that develops and recommends telecommunication standards.

COS

See class of service (COS).

CPU

See central processing unit (CPU).

CSC

See cell site controller (CSC).

CSI

See compact simplex ICRM (CSI).

CSM

See cell site monitor (CSM).

CSU/DSU

See channel service unit/data service unit (CSU/DSU).

DCSM

See dual-mode cell site monitor (DCSM).

D-AMPS

See digital advanced mobile phone service (D-AMPS).

dc

See direct current (dc).

D-channel

A bidirectional channel dedicated to the transmission of control messages. A D-channel transmits at either 16 kb/s or 64 kb/s.

DDM

See distributed data manager (DDM).

Device Independent Recording Package (DIRP)

Software that automatically directs data from the various administrative and maintenance facilities to the appropriate recording devices. A central office (CO) switching system in which all external signals are converted to digital data and stored in assigned time slots. Switching is performed by reassigning the original time slots.

dial pulse (DP)

A method of transmitting signaling information from a telephone set or a trunk circuit. Dial pulses are generated by alternately opening and closing a contact in the telephone through which the direct current flows. Also known as decadic signaling.

DID

See direct inward dialing (DID).

digital advanced mobile phone service (D-AMPS)

Another term for digital cellular radio in North America.

Digital Multiplex System (DMS)

A central office (CO) switching system in which all external signals are converted to digital data and stored in assigned time slots. Switching is performed by reassigning the original time slots.

digital recorded announcements module (DRAM)

A peripheral module (PM), developed for the DMS switch, in which voice messages are stored in digital form, providing access to up to 30 different service voice announcements.

digital service, level 0 (DS0)

A 64-kb/s channel that contains digitized voice. If data uses the channel, 56 kb/s contain data, and signaling and overhead use the remaining 8 kb/s.

digital service, level 1 (DS1)

A 1.54-Mb/s link that contains 24 DS0 channels. The DS1 link is also known as a T1 link.

digital signal processor bus terminator (DSBT)

A port card that contains resistors to electronically terminate backplane signals of the digital signal processor control processor (DSCP). The DSBT reside on the back of the digital signal processing module (DSPM) shelf.

digital signal processor control processor (DSCP)

A circuit card in the DSPM. The DSCP enables control and communication between the digital speech and data coders (DSDC) and the intelligent cellular peripheral (ICP).

digital signal processing module (DSPM)

A digital peripheral module (PM) that performs low bit rate speech coding and decoding. The DSPM also provides time division multiple access (TDMA) frame synchronization. The DSPM resides in either the digital intelligent cellular peripheral (DICP) or the Meridian digital signaling processor (MDSP) cabinet.

digital speech and data coder (DSDC)

A circuit card in the DSPM. The DSDC performs the algorithms that support speech coding, time division multiple access (TDMA) framing, and echo cancellation in a digital cellular system.

digital trunk controller (DTC)

A peripheral module (PM) that connects DS30 links from the network with digital trunk circuits.

direct current (dc)

Electric current that travels continuously in one direction along a conductor.

direct inward dialing (DID)

A service that allows an incoming exchange network call (not foreign exchange [FX] or wide area telephone service [WATS]) to reach a specific private branch exchange (PBX) station line without attendant assistance. When DID is available, central offices (CO) can provide specific station identification to the PBX.

directional reservation equipment (DRE)

A network management (DRE) control applied to two-way trunk groups that gives priority to completing traffic by reserving a number of idle trunks in a group for this traffic. Originating traffic is skip-routed.

directory number (DN)

The full complement of digits required to designate a subscriber's station within one numbering plan area (NPA)—usually a three-digit central office (CO) code followed by a four-digit station number.

DIRP

See Device Independent Recording Package (DIRP).

DISCO

See distribution and consolidation unit (DISCO).

distributed data manager (DDM)

A utility that manages simultaneous updates of data to several DMS nodes.

distributed processing peripheral (DPP)

A peripheral module (PM) that accepts data from the DMS-100, formats the data if necessary, and stores it on disk. On request, the DPP retrieves and sends data to the host office collector.

distribution and consolidation unit (DISCO)

The DISCO unit of the CDMA interconnect system (CIS) performs distribution and consolidation. Consolidation is the process of combining several lower rate physical interfaces into a higher rate physical interface. Distribution is the process of filtering a higher rate physical interface into a set of lower rate interfaces.

DMS

See Digital Multiplex System (DMS).

DMS SuperNode SE (SNSE)

A central control complex (CCC) for the switch. The two major components of DMS SuperNode are the computing module (CM) and the message switch (MS). Both are compatible with the network module (NM), the I/O controller (IOC), and XMS-based peripheral modules (XPM).

DN

See directory number (DN).

DP

See dial pulse (DP).

DPP

See distributed processing peripheral (DPP).

DRAM

See digital recorded announcements module (DRAM).

DRE

See directional reservation equipment (DRE).

DRU

See dual-mode radio unit (DRU).

DS0

See digital service, level 0.

DS1

See digital service, level 1.

DSBT

See digital signal processor bus terminator (DSBT).

DSCP

See digital signal processor control processor (DSCP).

DSDC

See digital speech and data coder (DSDC).

DSPM

See digital signal processing module (DSPM).

DTC

See digital trunk controller (DTC).

DTMF

See dual tone multifrequency (DTMF).

dual-mode cell site monitor (DCSM)

Monitors the digital control channel (DCCH) defined in IS-136 and the existing analog control channels (ACCH) in the wireless switch.

dual-mode radio unit (DRU)

A Nortel Networks cellular radio that operates in either analog or digital mode. The transmit receive unit (TRU) and the modulating power amplifier (MPA) form a DRU that is the complete radio package. The DRU resides in the RF frame at the NT800DR cell site.

dual tone multifrequency

A signaling format that uses pairs of audio tones to represent decimal digits from 0 through 9 and some auxiliaries. DTMF transmits telephone dialing to a private branch exchange (PBX) or central office.

E911

See Enhanced 911 emergency service (E911).

EA

See equal access (EA).

EADAS

See Engineering and Administrative Data Acquisition System (EADAS).

EADAS data collection (EADAS/DC)

The data collection portion of the Engineering and Administrative Data Acquisition System (EADAS). EADAS/DC automatically collects OM data from the DMS-100 switch. EADAS/DC is a front-end collector for the complete operational support system network data system, including EADAS/NM.

EADAS/DC

See EADAS data collection (EADAS/DC).

EADAS network management (EADAS/NM)

The network management (NWM) portion of the Engineering and Administrative Data Acquisition System (EADAS) operational support system network data system. EADAS/NM is used for DMS-100 NMW.

EADAS/NM

See EADAS network management (EADAS/NM).

EAE0

See equal access end office (EAE0).

EIU

See Ethernet interface unit (EIU).

emergency service (ES)

A type of trunk providing end-office-to-tandem connections when the tandem contains Basic 911 Emergency Service (B911) software.

ENET

See enhanced network (ENET).

engineered call capacity

The amount of working equipment necessary to achieve a desired performance level at an expected traffic load. (Also see traffic capacity.)

Engineering and Administrative Data Acquisition System (EADAS)

An operational support system that collects data from many central offices (CO). It has two components: one for data collection (EADAS/DC) and one for network management (EADAS/NM).

Enhanced 911 emergency service (E911)

A set of features that adds selective routing and transfer to Basic 911 services.

enhanced network (ENET)

A channel-matrixed time switch that provides pulse code modulated voice and data connections between peripheral modules (PM). ENET also provides message paths to the DMS-bus components.

equal access (EA)

An operating company tariff offering for local access and transport area (LATA) access equal in type, quality, and price for all connected inter-LATA and international carriers (INC).

equal access end office (EAEO)

A central office (CO) that provides access to several long distance carriers.

Erlang (A)

The usage in 1 hour expressed in percentages of an hour.

The usage measures are interchangeable; that is, 1 Erlang=36 CCS. The usage measures can express both the traffic demand density and traffic capacity density.

ES

See emergency service (ES).

Ethernet interface unit (EIU)

A data networking interface device that connects data terminal equipment to a network.

FACET

See flexible advanced capacity engineering tool (FACET).

fiberized link interface shelf (FLIS)

A single shelf link peripheral processor (SSLPP). An FLIS is one of the three platforms on which an LIU7 can exist. The other two platforms are an LPP and a DMS SuperNode SE link interface shelf (LIS).

flexible advanced capacity engineering tool (FACET)

A platform of automated programs to help in the evaluation and planning for the following DMS-100 Family variables:

- office memory use
- real-time call attempt capacity for the computing module (CM) central processing unit (CPU)
- peripheral processor capacity

FLIS

See fiberized link interface shelf (FLIS).

frame relay interface unit (FRIU)

An ASU on the link peripheral processor (LPP). An FRIU acts as a CIU if it provides CDMA system T1 connectivity and it supports other CIU-defined tasks.

FRIU

See frame relay interface unit (FRIU).

GCL

See global control and locate (GCL) shelf.

global control and locate (GCL) shelf

A shelf that contains radio transceivers that provide control channel (CCH) functions for Omni Transmit Sectorized Receive (OTSR) cells. The GCL shelf resides in the Common Equipment-2 (CE02) frame at the cell site.

global positioning satellite receiver (GPSR)

A receiver that uses satellite radio beacons to identify location coordinates (such as latitude and longitude).

GOS

See grade of service (GOS).

GPSR

See global positioning satellite receiver (GPSR).

grade of service (GOS)

A function of load on the capacity provided. (Also see performance level.)

graphical user interface (GUI)

A display format that allows the user to choose commands, start programs, and view lists of files.

GUI

See graphical user interface (GUI).

handoff

The process of transferring a mobile conversation to a radio frequency (RF) channel located in a cell with a low received signal strength indicator (RSSI) to an RF channel in another cell with a higher RSSI.

hard to reach flag (HTRF)

An option that allows network management in the DMS Family switches (except the DMS-300 switch) to flag certain codes as hard-to-reach. Codes are checked at the time the trunk is selected, and a percentage of traffic is skip-counted.

high day busy hour (HDBH)

The hour with the highest business day traffic throughout the busy season.

high stability master oscillator (HSMO)

A cell site device that provides an accurate temperature-compensated, 4.8-MHz reference signal to the radio transceivers.

HLR

See home location register (HLR).

HNPA

See home numbering-plan area (HNPA).

holding time

The amount of time a call attempt remains in the switch.

home location register (HLR)

A permanent database on the mobile subscriber's home switch that stores subscriber data related to services and features.

home numbering-plan area (HNPA)

The numbering plan area (NPA), or area code, of the switch under consideration.

HRTF

See hard to reach flag (HRTF).

HSMO

See high stability master oscillator (HSMO).

ICP

See intelligent cellular peripheral (ICP).

ICRM

See integrated cellular remote module (ICRM).

IDOC

See internal dynamic overload control (IDOC).

IEC

See interexchange carrier (IEC).

incoming trunk busy (ITB) control

A networked management (NWM) service that allows the network manager to restrict incoming attempts to an overloaded switch. This is done by selectively removing from service a percentage of incoming trunks that have remote make busy (RMB) capability.

integrated cellular remote module (ICRM)

A cell site peripheral that serves as an interface between the ICP and the radio transmission subsystems. The ICRM supports both analog and digital radio frequency (RF) equipment.

integrated service link (ISL) trunks

A trunk that originates and terminates in the same office. Integrated service link trunks have the following characteristics:

- provide cost-effective method of interworking call types
- enable rapid deployment of international standards capabilities and services
- reduce undesirable service interactions with existing interfaces by using a common interworking protocol
- can be re-used as interexchange trunks

integrated services digital network (ISDN)

A set of standards proposed by the CCITT to establish compatibility between the telephone network and various data terminals and devices. ISDN is a fully digital network, in general evolving from a telephone integrated digital network. It provides end-to-end connectivity to support a wide range of services, including circuit-switched voice, circuit-switched data, and packet-switched data over the same local facility.

intelligent cellular peripheral (ICP)

A switch site peripheral that provides an interface between the cell site and the switch. The ICP also oversees the operations of the cell site.

interexchange carrier (IEC)

Any carrier authorized to carry customer transmissions between local access and transport areas (LATA) interstate or intrastate.

internal dynamic overload control (IDOC)

A networked management control in which a signal is generated and transmitted by the controlling office in response to internally detected overload indicators. Its function is to reduce the load offered to the controlling office by requesting selected subtending or continuous offices to implement a predefined set of routing controls.

interperipheral message link (IPML)

The path between the message switch and buffer (MSB), and the DTC.

intertoll (IT) trunk

A trunk between two toll offices.

IOC

See I/O controller (IOC).

I/O controller (IOC)

An equipment shelf that provides an interface between the central message controller (CMC) and up to 36 I/O devices. The IOC contains a peripheral

processor (PP) that independently performs local tasks, thus relieving the load on the CPU.

IOD

See I/O device (IOD).

I/O device (IOD)

A device that allows data to be entered into a data processing system, received from the system, or both.

IPML

See interperipheral message link (IPML).

ISDN

See integrated services digital network (ISDN).

ISDN user part (ISUP)

A Common Channel Signaling 7 (CCS7) message-based signaling protocol that acts as a transport carrier for ISDN services. The ISUP provides the functionality in a CCS7 network for voice and data services.

ISG

See isolated system ground (ISG).

ISUP

See ISDN user part (ISUP).

ISL

See integrated service link (ISL) trunks.

isolated system ground (ISG)

A ground subsystem that is insulated from other ground systems and usually tied to earth ground at one point.

ITB

See incoming trunk busy (ITB) control.

IT trunk

See intertoll (IT) trunk.

JNET

See junctored network (JNET).

junctored network (JNET)

A time-division multiplex system that allows for switching of 1920 channels for each network pair (fully duplicated). Additional channels are established through the use of external junctors, internal junctors, and a digital network

interconnecting (DNI) frame. Channels then can be routed directly, or use alternate routing, through the use of junctors, a DNI frame, and software control.

LAMA

See local automatic message accounting (LAMA).

LAN

See local area network (LAN).

LATA

See local access and transport area (LATA).

LCC

See line class code (LCC).

LCM

See line concentrating module (LCM).

LEC

See local exchange carrier (LEC).

LEN

See line equipment number (LEN).

LIM

See link interface module (LIM).

line class code (LCC)

An alphanumeric code that identifies the class of service assigned to a line.

line concentrating module (LCM)

A peripheral module (PM) that connects the line trunk controller (LTC) or line group controller (LGC) and up to 640 subscriber lines, using two to six DS30A links.

line equipment number (LEN)

A seven-digit functional reference that identifies line circuits (LC). The LEN provides physical location information on equipment such as site, frame number, unit number, line subgroup (shelf), and circuit pack.

line trunk controller (LTC)

A peripheral module (PM) that is a combination of the line group controller (LGC) and the digital trunk controller (DTC) and provides all the services offered by both. It supports line concentrating module (LCM) and AB trunks. *See also* international line trunk controller (ILTC).

link interface module (LIM)

A peripheral module (PM) that controls messaging between link interface units (LIU) in a link peripheral processor (LPP). The LIM also controls messages between the LPP and the DMS-bus component. A LIM consists of two LIM units and two frame transport buses (F-bus). The two LIM units operate in a load-sharing mode with each other. *See also* frame transport bus (F-bus), link peripheral processor (LPP), and local message switch (LMS).

link interface unit (LIU)

A peripheral module (PM) that processes messages entering and leaving a link peripheral processor (LPP) through an individual signaling data link. *See also* CCS7 link interface unit (LIU7).

link peripheral processor (LPP)

The DMS SuperNode equipment frame or cabinet that contains two types of peripheral modules (PM): a link interface module (LIM) and one or more application-specific units (ASU). *See also* application-specific unit (ASU), CCS7 link interface unit (LIU7), and link interface module (LIM).

LIU

See link interface unit (LIU).

LIU7

See CCS7 link interface unit (LIU7).

local access and transport area (LATA)

A geographic area within which an operating company can offer telecommunications-related services.

local area network (LAN)

A network that permits the interconnection and intercommunication of multiple computers, primarily for the sharing of resources such as data storage devices and printers.

local automatic message accounting (LAMA)

A system similar to automatic message accounting (AMA) but providing local collection and recording of billing information. LAMA consists of a combination of AMA equipment and automatic number identification (ANI) equipment in the same office. Such a system can automatically process a subscriber-dialed toll call without operator assistance. *See also* centralized automatic message accounting (CAMA).

local exchange carrier (LEC)

The company that provides local telephone service. LECs also include independent local telephone companies.

LPP

See link peripheral processor (LPP).

LTC

See line trunk controller (LTC).

MADN

See Multiple Appearance Directory Number (MADN).

magnetic tape drive (MTD)

A mechanism for controlling the movement of magnetic tape, commonly used to move magnetic tape past to read head or write head. An MTD also allows automatic rewinding.

maintenance and administration position (MAP)

A group of components that provides a user interface between operating company personnel and the DMS-100 Family switches.

The interface consists of the following components:

- video display unit (VDU) and keyboard
- a voice communications module
- test facilities
- special furniture

maintenance (MTC) level

With the MAP terminal, all actions operating company personnel perform to detect, analyze, and correct errors in the switch.

maintenance trunk module (MTM)

In a trunk module equipment (TME) frame, a peripheral module (PM) that is equipped with test and service circuit cards and contains special buses to accommodate test cards for maintenance. The MTM provides an interface between the DMS-100 Family digital network and the test and service circuits.

MAP

See maintenance and administration position (MAP).

MARCH

See Memory Administration/Recent Change (MARCH).

MBS

See Meridian business set (MBS).

MDSP

See Meridian digital signal processor (MDSP).

Memory Administration/Recent Change

A Bellcore system that provides automated service order flow-through or facilitates the manual entry of service request information into end office switches.

Meridian business set (MBS)

A telephone set that provides subscribers with push-button access to various business features. This set, used by the supervisor, has one more field display than the electronic business set (EBS).

Meridian digital signal processor (MDSP)

A switch site cabinet that contains one to four digital signal processor module (DSPM) shelves.

message switch

An arrangement whereby a message is received, stored until the proper outgoing line is available, and then retransmitted.

message transfer part (MTP)

A CCITT protocol that provides a connectionless transport system for carrying common channel interoffice signaling no. 6 (CCIS6) and Common Channel Signaling 7 (CCS7) signaling messages between user locations or applications functions. Also known as message transport part.

MF

See multifrequency (MF).

MIN

See mobile identification number (MIN).

minutes of use

The length of time that a connection is established between two points.

misdirected local call (MSLC)

A treatment to which the switch routes calls for one of the following reasons:

- A line attempted to originate an operator-assisted call (0+) to codes NPA555, 555, or 800.
- The last four digits on a station ringer call do not match those of the calling line. Also, the call is not defined as no-prefix local in the local calling area and prefix treatment tables.
- The end user had not dialed a prefix digit 0 or 1 on a toll call and the prefix treatment table specifies that a prefix digit is mandatory on toll calls.

mobile identification number (MIN)

The 34-bit number that is a digital representation of the 10-digit directory telephone number assigned to a mobile station.

Mobile Service Order System (MSO)

A provisioning tool for the DMS-100 Wireless switch, which enables operating company personnel to add, change, delete line options and services for wireless DNs.

mobile service region (MSR)

The group of mobile service areas in which a subscriber is permitted service.

mobile subscriber (MX)

The individual who obtains a service from a PLMN operator or an authorized agent and is responsible for payment of all charges and rentals due.

mobile subscriber unit (MSU)

Any registered cellular mobile.

mobile switching center (MSC)

A generic name for the main cellular switching center supporting multiple base stations.

mobile telephone exchange (MTX)

A DMS-100 Family switch configured as a cellular mobile radio switch.

MSC

See mobile switching center (MSC).

MSERVORD

See Mobile Service Order System (MSO).

MSLC

See misdirected local call (MSLC).

MSO

See Mobile Service Order System (MSO).

MSR

See mobile service region (MSR).

MSU

See mobile subscriber unit (MSU).

MTC

See maintenance level (MTC).

MTD

See magnetic tape drive (MTD).

MTM

See maintenance trunk module (MTM).

MTP

See message transfer part (MTP).

MTX

See mobile telephone exchange (MTX).

multifrequency (MF)

A signaling method that makes use of pairs of standard tones to transmit signaling codes, digit pulsing, and coin-control signals.

Multiple Appearance Directory Number (MADN)

A directory number (DN) that appears on more than one Meridian Digital Centrex (MDC) station. The stations that are assigned these numbers are referred to as a MADN group. MADN groups can be configured with either single or multiple call arrangement.

MX

See mobile subscriber (MX).

NE

See network element (NE).

NET

See network (NET).

network (NET)

A combination of circuits and terminals serviced by a single switching or processing center.

network element (NE)

Telecommunications equipment that performs signaling, switching, and transmission functions.

network management (NWM)

Operational control of a DMS-100 network that is performed from the network management (NWM) MAP level. The objective of NWM is to optimize available resources during overload or facility failure.

network operations protocol (NOP)

A protocol that provides an interface between a DMS-100 Family switch and its remote systems.

NOP

See network operations protocol (NOP).

Northern Telecom publication (NTP)

A technical document that helps operating company personnel with the operations, administration, maintenance, and provisioning of Nortel Networks products, including both hardware and software. NTPs contain descriptive and procedural information. NTPs are supplied to an operating company as part of the purchased product.

Each NTP consists of a ten-digit number that includes the following numerical designations:

- a three-digit division number to denote the system (for example, 297 for DMS)
- four-digit layer number to denote the product (for example, 5001 for SuperNode)
- a three-digit key number to denote the document type (for example, 547 for card replacement procedures)

NPA

See numbering plan area (NPA).

NTP

See Northern Telecom publication (NTP).

numbering plan area (NPA)

Any of the designated geographical divisions of the United States, Canada, Bermuda, Caribbean, Northwest Mexico, and Hawaii within which no two

telephones have the same seven-digit number. Each NPA is assigned a unique three-digit area code.

NWM

See network management (NWM).

OA

See operator assisted (OA).

OAM

See operation, administration, and maintenance (OAM).

OM

See operational measurement (OM).

Omni Transmit-Sectored Receive (OTSR)

A cell configuration in which the control channel (CCH) is set to receive the entire cell, while the voice channels (VCH) are set to service specific sectors of the cell.

operation, administration, and maintenance (OAM)

All the tasks necessary for providing, maintaining, or modifying the services provided by a switching system. These tasks include provisioning of hardware, creation of service, verification of new service, and trouble recognition and clearance.

operational measurement (OM)

The hardware and software resources of the DMS-100 Family switches that control the collection and display of measurements taken on an operating system. The OM subsystem organizes the measurement data and manages its transfer to displays and records. The OM data is used for maintenance, traffic, accounting, and provisioning decisions.

operations support systems (OSS)

An interface to a switching NE that helps NEs to manage OAM functions in their networks.

operator assisted (OA)

Calls that the end user dialed, such as 0+ a seven- or ten-digit number, and require help from the operator.

OPM

See outside plant module (OPM).

OSS

See operations support systems (OSS).

OTSR

See Omni Transmit-Sectored Receive (OTSR).

outside plant module (OPM)

A stand-alone weatherproofed enclosure equipped to connect from two to six DS-1 links from a line group controller (LGC) at a host office and up to 640 locally connected subscriber lines. An OPM consists of one line concentrating module (LCM), a remote maintenance module (RMM), a host interface equipment (HIE) shelf, a power supply, environmental control equipment, and a cable cross-connection for up to 1280 pairs.

PBX

See private branch exchange (PBX).

PCL

See product computing-module load (PCL).

PCS

See Personal Communications Service (PCS).

peripheral module (PM)

Any hardware module in the DMS-100 Family switches that provides an interface between external line, trunk, or service facilities. A PM contains peripheral processors (PP), which perform local routines, thus relieving the load on the CPU.

performance level

A function of load on the provided system capacity (Also see grade of service.)

Personal Communications Service (PCS)

Services providing personal, terminal, and service mobility to users. PCS allows users to communicate between wireline stations or as they roam with wireless handsets.

plain old (or ordinary) telephone service (POTS)

Basic telephone service with no special facilities.

PLMN

See public land mobile network (PLMN).

PM

See peripheral module (PM).

POTS

See plain old (or ordinary) telephone service (POTS).

PPLN

See preplanned control (PPLN).

PRE

See protective reservation equipment (PRE).

preplanned control (PPLN)

A network management control that applies remote dynamic overload controls in response to an external signal from a subtending office. This service consists of preplanned controls that are activated by scan point or through the use of the MAP terminal. (Also known as remote dynamic overload control.)

preroute peg count (PRP)

A network management control for studying traffic levels to various destination codes, thus giving an indication of when code blocking controls should be applied.

PRI

See primary rate interface (PRI).

primary rate interface (PRI)

An interface that carries nB+D channels over a digital DS-1 facility (23B+D in North America and 30B+D in Europe). PRI is used to link private networking facilities, such as private branch exchanges (PBX), local area networks (LAN), and host computers with a standardized architecture acting as the bridge between private switching equipment and the public network. Formerly known as primary rate access.

private branch exchange (PBX)

A private telephone exchange, either automatic or attendant operated, serving extensions in an organization and providing access to the public network.

product computing-module load

The total CM software line-up required.

protective reservation equipment (PRE)

A network management (NWM) control similar to directional reservation equipment, but which acts only on alternate-routed traffic offered to a two-way trunk group. Directly routed traffic is allowed full access.

PRP

See preroute peg count (PRP).

PSP

See PCS service provider (PSP).

PSTN

See public switched telephone network (PSTN).

public land mobile network (PLMN)

A mobile telephone communications network established by a provider to facilitate mobile telecommunications services.

public switched telephone network (PSTN)

PSTN, the ordinary dial-up telephone system, refers to data or other non-telephone services carried over a path initially established using normal telephone signaling and ordinary switched long distance telephone circuits. *See also* plain ordinary telephone service (POTS).

radio frequency (RF)

The frequency in the portion of the electromagnetic spectrum that is between the audio frequency portion and the infrared portion.

RAL

See remote alarm (RAL).

radio channel unit

A General Electric (GE) analog transceiver.

radio interface (RIF)

A MAP-based command that operating company personnel use to configure, debug, or monitor a cell site radio.

rack interface panel (RIP)

A passive shelf for signal routing. The RIP provides sixteen 50-pin AMP champ connectors to which inter- and intraframe cables terminate. Breakers and frame grounding connections also reside on the RIP shelf.

RCM

See receive multicoupler (RCM).

RCU

See radio channel unit (RCU).

real time (RT)

The actual time during which the NT40 CPU or DMS-Core SuperNode performs its functions. The time is divided into two main categories: call processing time and non-call processing time.

REAL::TIME

A personal computer (PC) program designed to provide an alignment or planning estimate of the DMS-100 Family CPU RT requirements.

receive multicoupler (RCM)

A shelf that filters, amplifies, and distributes signals from the antennas to the transceiver shelves at the cell site.

remote alarm (RAL)

An alarm that can be observed outside the premises of an alarmed NE.

remote make busy (RMB)

A status signal received on a two-way trunk from the far-end trunk circuit indicating that the affected circuit is classed as made-busy to incoming traffic.

remote module data buffer (RMDB)

A circuit card that provides the interface between the ICRM main shelf and the expansion shelf. The RMDB acts as a clock, frame pulse, and data buffer. It also performs signal termination and data retiming for the expansion shelf.

remote module digital port (RMDP)

A circuit card that provides the interface between the DRUs and the ICRM over time compression multiplex (TCM) links.

remote module frame supervisor (RMFS)

A self-contained unit of the ICRM that provides power to the ICRM power converters and radio port cards. The RMFS also provides the ICRM system alarm interface.

remote module radio port (RMRP)

A circuit card that provides the interface between Nortel Networks BSTs and the ICRM over RS-232 links.

remote module time switch (RMTS)

A circuit card that provides channel connectivity and time switching between the control side (C-side) and peripheral side (P-side) links of the ICRM.

remote switching center (RSC)

A remote common peripheral module (CPM) that provides an interface with a large number of analog lines, digital trunking, or both at a remote location. The RSC also handles remote-off-remote connections from other remote sites.

RF

See radio frequency (RF).

RFFE

See RF front end (RFFE).

RF front end (RFFE)

Provides the forward and reverse signal links between the driver module and the antenna system.

RIF

See radio interface (RIF).

RIP

See rack interface panel (RIP).

RMB

See remote make busy (RMB).

RMDB

See remote module data buffer (RMDB).

RMDP

See remote module digital port (RMDP).

RMFS

See remote module frame supervisor (RMFS).

RMRP

See remote module radio port (RMRP).

RMTS

See remote module time switch (RMTS).

RSC

See remote switching center (RSC).

RT

See real time (RT).

SBS

See selector bank subsystem (SBS).

SC

See scan point (SC) or SuperCAMA (SC).

scan point (SC)

Read-only bits in the trunk logic circuit that indicate the status of the hardware.

SCCP

See signaling connection control point (SCCP).

SCP

See service control point (SCP).

SD

See signal distribution (SD).

SDM

See SuperNode Data Manager (SDM).

SEC

See selector element card (SEC).

sector

A theoretical wedge-shaped part of the coverage area of one site, served by a specific group of directional antennas on specific channels.

sectorized transmit/sectorized receive (STSR)

A cell configuration in which the transmit and receive antennas are set to service specific sectors of the cell.

sectorization

A cell site configuration that consists of two or more sectors in which different control and voice channel assignments are given for each sector. In this arrangement, the datafill and channel assignments are tailored to meet the system operational requirements, providing more flexibility in the cell site configuration compared to an omni configuration, but with a decrease in trunking efficiency.

selective trunk reservation (STR) control

A network management (NWM) capability that dynamically observes the occupancy of an outgoing trunk group and applies one of two level filters to the offered traffic at high levels of trunk group occupancy.

selector bank subsystem (SBS)

The SBS contains resources for CDMA call processing, such as traffic channel elements, and the service option processor (SOP). The SBS also contains multiple selector cards, which have associated service resource manager (SRM) software.

service control point (SCP)

A node in a CCS7 signaling network that supports application databases. The function of an SCP is to accept a query for information, retrieve the requested information from one of its application databases, and send a response message to the originator of the request.

Service Order System (SERVORD)

A user interface consisting of commands used to change, add, or delete subscriber lines. The format used for commands in the SERVORD complies with the standard telephone industry command format; for example, 3WC is three-way calling, ADO is add option, DEL is delete, and CWT is call waiting.

service switching point (SSP)

A CCS7 signaling node which interacts with the service control point (SCP) to implement special service code features.

serving numbering plan area (SNPA)

The first 16 primary numbering plan areas (NPA).

SERVORD

See Service Order System (SERVORD).

signal distribution (SD)

A method of converting digital control messages addressed to a trunk or service circuit into supervisory signals compatible with the characteristics of the associated trunk or service facility.

signaling connection control point (SCCP)

A level of CCS7 layered protocol. It supports advanced services such as E800 and service switching point (SSP) and the Automatic Calling Card Service (ACCS) feature. The main functions of the SCCP include the transfer of signaling units with or without the use of a logical signaling connection and the provisioning of flexible global title translations (GTT) for different applications.

signaling transfer point (STP)

A node in a CCS7 network that routes messages between nodes. Signaling transfer points transfer messages between incoming and outgoing signaling links but, with the exception of NWM information, do not originate or terminate messages. Signaling transfer points are deployed in pairs. If one STP fails, the mate takes over, making sure that service continues without interruption.

single point ground (SPG)

Various pieces of equipment and components having a common ground.

SLM

See system load module (SLM).

SLU

See Subscriber Line Usage (SLU).

SNPA

See serving numbering plan area (SNPA).

SNSE

See DMS SuperNode SE (SNSE).

SOC

See software optionality code (SOC).

software optionality code (SOC)

A utility that provides a user interface to control the activation and deactivation or use of optional DMS software.

SPG

See single point ground (SPG).

SSP

See service switching point (SSP).

STP

See signaling transfer point (STP).

STR

See selective trunk reservation (STR) control.

STS

See serving translation scheme (STS).

STSR

See sectorized transmit/sectorized receive (STSR)

Subscriber Line Usage (SLU)

A feature that is assigned to lines that require a peg count of all originating and terminating calls.

SuperCAMA (SC)

A nondedicated trunk used for overflow 911 and other traffic.

SuperNode Data Manager

Nortel Networks high-performance, UNIX-based computing platform that provides nodal operation, administration maintenance, and provisioning (OAM) services for a DMS SuperNode.

SWACT

See switch of activity (SWACT).

switch of activity (SWACT)

In a DMS fault-tolerant system, a reversal of the states of two identical devices devoted to the same function. A SWACT makes an active device inactive and an inactive device active.

system load module (SLM)

A mass storage system in a DMS SuperNode processor that stores office images. From the SLM, new loads or stored images can be booted into the CM.

TCAP

See transaction capabilities application part (TCAP).

TCBH

See time consistent busy hour (TCBH).

TDMA

See time division multiple access (TDMA).

Telecommunications Industry Association (TIA)

The North American telecommunications standards setting association.

TFU

See timing and frequency unit (TFU).

TGMU

See trunk group member usage (TGMU).

TIA

See Telecommunications Industry Association (TIA).

time consistent busy hour (TCBH)

The hour of day which has the consistently highest average load over the study period.

time division multiple access (TDMA)

A form of digital cellular technology that combines multiple conversations on the same radio frequency (RF) channel. Mobile units take turns transmitting and receiving data on specific time slots of a TDMA frame. TDMA is also called digital AMPS (D-AMPS).

timing and frequency unit (TFU)

The timing and frequency unit provides the DISCO with timing and frequency references.

TOPS

See Traffic Operator Position System (TOPS).

traffic capacity

An estimate of performance at probable loads. Traffic capacity is the amount of working equipment necessary to achieve a desired performance level at an expected traffic load. (Also known as engineered call capacity.)

traffic demand

Consists of both call attempts and holding time. It can be expressed by the equation $A = CAs * AHT$

where A is a measure of traffic density called usage.

The amount of usage (density) can be expressed in two ways:

Traffic Operator Position System (TOPS)

A call processing system made up of a number of operator positions. Each operator position consists of a visual display unit (VDU), a controller, a keyboard, and a headset. (The [__.ProdName {DMS-100 Wireless}] switch does not support TOPS.)

traffic separation measurement system (TSMS)

An OM feature that measures in detail the use of different parts of the DMS-100 Family switches for different types of calls. The TSMS allows division of revenue for long distance calling.

transaction capabilities application part (TCAP)

A service that provides a common protocol for remote operations across the CCS7 network. The protocol consists of message formatting, content rules, and exchange procedures. TCAP provides the ability for the service switching point (SSP) to communicate with a service control point (SCP). TCAP is used by the ISDN layer facility message to transport service information for transaction signaling, not associated with an active call, over primary rate interface (PRI) links.

translations verification (TRAVER)

An application that allows operating company personnel to verify translation tables for end user-dialed calls.

transmit receive unit (TRU)

A transceiver component that functions as a diversity receiver and as the time compression multiplex (TCM) interface between the dualmode radio unit (DRU) subsystems and the ICRM. The TRU also contains the modulating power amplifier (MPA) and oversees the operations of the DRU.

TRAVER

See translations verification (TRAVER).

TRU

See transmit receive unit (TRU).

trunk

Cables that interconnect telephone switching centers and contain many shared telephone circuits. The interconnection from the PSTN throughout the cellular network to support one analog voice channel or three TDMA voice channels.

trunk test position (TTP)

A MAP terminal specially equipped to perform trunk testing.

TSMS

See traffic separation measurement system (TSMS).

TTP

See trunk test position (TTP).

TXFE

See transmit front end (module).

UCC

See universal controller card (UCC).

visitor location register (VLR)

A database on the serving switch that checks the profile of a visiting mobile subscriber.

VLR

See visitor location register (VLR).

WAN

See wide area network (WAN).

wide area network (WAN)

A network that provides communications services to a geographic area larger than that a local area network or a metropolitan area network services. The WAN can use or provide public communication facilities.

XMS-based peripheral module (XPM)

The generic name for peripheral modules (PM) that use the Motorola 68000 microprocessor. An XPM has two processors in a hot-standby configuration: a master processor (MP) and a signaling processor (SP).

XPM

See XMS-based peripheral module (XPM).

DMS-100 Family

DMS-100 Wireless

Service Implementation Guide

electronic mail: cits@nortelnetworks.com

Copyright © 1997 - 2001 Nortel Networks,
All Rights Reserved

NORTEL NETWORKS CONFIDENTIAL: The information contained herein is the property of Nortel Networks and is strictly confidential. Except as expressly authorized in writing by Nortel Networks, the holder shall keep all information contained herein confidential, shall disclose the information only to its employees with a need to know, and shall protect the information, in whole or in part, from disclosure and dissemination to third parties with the same degree of care it uses to protect its own confidential information, but with no less than reasonable care. Except as expressly authorized in writing by Nortel Networks, the holder is granted no rights to use the information contained herein.

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design and components as progress in engineering and manufacturing may warrant.

DMS, MAP, NORTEL, NORTEL NETWORKS, NORTHERN TELECOM, NT, and SUPERNODE are trademarks of Northern Telecom.

Publication number: 297-8091-021
Product release: LWW0007
Document release: Standard 06.02
Date: February 2001
Printed in the United States of America

