ATIS-0300209.2018

Operations, Administration, Maintenance, and Provisioning (OAM&P) – Network Tones and Announcements

AMERICAN NATIONAL STANDARD FOR TELECOMMUNICATIONS

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, 5G, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OFMERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. ATIS SHALL NOT BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES THAT ANY AND ALL USE OF OR RELIANCE UPON THE INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

NOTE - The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to whether use of an invention covered by patent rights will be required, and if any such use is required no position is taken regarding the validity of this claim or any patent rights in connection therewith. Please refer to [http://www.atis.org/legal/patentinfo.asp] to determine if any statement has been filed by a patent holder indicating a willingness to grant a license either without compensation or on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain a license.

ATIS-0300209.2018, *Operations, Administration, Maintenance, and Provisioning (OAM&P) – Network Tones and Announcements*

Is an American National Standard developed by the ATIS **Telecom Management and Operations Committee (TMOC)**.

Published by

Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

ATIS-0300209.2018

(Revision of ATIS-0300209.2013)

American National Standard for Telecommunications

Operations, Administration, Maintenance, and Provisioning (OAM&P) – Network Tones and Announcements

Alliance for Telecommunications Industry Solutions

Approved June 2018

American National Standards Institute, Inc.

Abstract

This standard provides guidance for the provision of network tones and announcements.

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, customers, and manufacturers. The Telecom Management and Operations Committee (TMOC) develops operations, administration, maintenance and provisioning standards, and other documentation related to Operations Support System (OSS) and Network Element (NE) functions and interfaces for communications networks – with an emphasis on standards development related to U.S.A. communication networks in coordination with the development of international standards.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, TMOC, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, TMOC, which was responsible for its development, had the following leadership:

P. Galarza, TMOC Chair (iconectiv)
T. Barrett, Technical Editor (AT&T)

Table of Contents

Table of Figures

Table of Tables

American National Standard for Telecommunications –

Operations, Administration, Maintenance, and Provisioning (OAM&P) – Network Tones and Announcements

1 Scope, Purpose, & Application

1.1 Scope

This standard addresses Tones and Announcements associated with Ineffective call attempts.

Tones addressed include:

- Busy Tone;
- Reorder Tone; and
- Special Information Tones.

Announcements addressed include:

- Reorder;
- No Circuit;
- Vacant Code;
- Intercept; and
- Ineffective Other.

The tones and announcements delineated above are used in the Public Switched Telephone Network (PSTN).

This standard also addresses the mapping of Cause Indicator Values specified for the ISDN User Part (ISUP) and Digital Subscriber Signaling System Number 1 (DSS1) in ATIS-1000113 and ATIS-1000607 and ATIS-1000607.a, respectively, and the tones and announcements identified in this standard. This mapping is for use in call processing involving two or more interconnecting networks (ICNs) when Signaling System Number 7 (SS7) is used for call control. This standard considers the provision of these tones and announcements by originating, intermediate, and terminating ICNs.

All other tones and announcements and the mapping of other Cause Values not included in this standard are candidates for further study for inclusion in this document in the future.

1.2 Purpose

This document provides guidelines intended to standardize the application of tones and announcements to differentiate ineffective call conditions.

This standard also provides guidelines to be used as a basis for the provisioning of tones and announcements in an SS7 environment by ICNs.

1.3 Application

This document is intended to be used by Telecommunication Service Providers and vendors to standardize the use of tones and announcements for the treatment of ineffective call attempts within the PSTN for SS7 and non-SS7 environments.

2 References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

2.1 Normative References

ATIS-1000113, *Signalling System No. 7 (SS7) - Integrated Services Digital Network (ISDN) User Part*.[1]

ATIS-1000607, *Integrated Services Digital Network (ISDN) - Layer 3 Signaling Specification for Circuit Switched Bearer Services for Digital Subscriber Signaling System Number 1 (DSS1)*.[1]

ATIS-1000607.a, *Supplement to ATIS-1000607.*[1]

TIA/EIA-825, *A Frequency Shift Keyed Modem For Use On The Public Switched Telephone Network*.[2]

2.2 Informative References

ATIS-0600401, *Network to Customer Installation Interfaces - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling*.[1]

ATIS-1000609, *Interworking between the ISDN User-Network Interface Protocol and the Signalling System Number 7 ISDN User Part*.[1]

ITU-T Recommendation E.180, *Technical Characteristics of Tones for The Telephone Service*.[3]

ITU-T Recommendation E.182, *Application of Tones and Announcements in Telephone Services*.[3]

GR-674-CORE*, LLSGR: Special Information Tones (FSD 20-06-0500), Issue 1 (Telcordia)*. [4]

Telcordia SR-2275, *Telcordia Notes on the Networks, Issue 4*.[4]

Telcordia FR-64, *LATA Switching System Generic Requirements (LSSGR)*.[4]

ATIS-0300019, Next Generation Interconnection Interoperability Forum (NGIIF), *NGIIF Reference Document, Version 12*, Part 3 *Installation, Testing and Maintenance Responsibilities for SS7 Links and Trunks*, *Attachment H, SS7 Cause Code and Tones & Announcements*.[1]

---

[1] This document is available from the Alliance for Telecommunications Industry Solutions, 1200 G Street N.W., Suite 500, Washington, DC 20005. < http://www.atis.org >

[2] This document is available from the Telecommunications Industry Association (TIA). < http://www.tiaonline.org/standards/overview.cfm >

[3] This document is available from the International Telecommunications Union. < http://www.itu.int/ITU-T/ >.

[4] Telcordia documents are available via < http://telecom-info.telcordia.com >.

3 Abbreviations, Acronyms, & Definitions

3.1 Abbreviations & Acronyms

CAMA	Centralized Automatic Message Accounting
dB	decibel
DSS1	Digital Subscriber Signaling System Number 1
ICN	InterConnecting Networks
INT	Intercept
IO	Ineffective Other
IPM	Interrupts per Minute
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LATA	Local Access Transport Area
ms	millisecond
NC	No Circuit
NC'	No Circuit prime
NC"	No Circuit double prime
NIIF	Network Interconnection Interoperability Forum
NPA	Numbering Plan Area
PSTN	Public Switched Telephone Network
RO	ReOrder
RO'	ReOrder prime
RO"	ReOrder double prime
SIT	Special Information Tone
SS7	Signaling System Number 7
TTY	Text Teletype Device
VC	Vacant Code

3.2 Definitions

The cause value definitions are provided in ATIS-1000113, clause 2, and ATIS-1000607.

Other terms used in the context of this standard are as follows:

3.2.1 Ineffective Other (IO): A call-disposition category for a call attempt that did not complete due to improper user action.

3.2.2 Intercept (INT): A call-disposition category for a call attempt to a nonoperating number.

3.2.3 InterConnecting Networks (ICNs): Two or more networks connected for purposes of call processing.

3.2.4 Local Access Transport Area (LATA): A defined geographical territory for exchange and intraexchange service complying with the Modified Final Judgment.

3.2.5 No Circuit (NC): A call-disposition category for a call attempt that does not find an available outgoing trunk.

3.2.6 No Circuit prime (NC'): An SIT classification for call attempts that fail to find an available Local Service Provider outgoing trunk.

3.2.7 No Circuit double prime (NC"): An SIT classification for call attempts that fail to find an available Long Distance Service Provider outgoing trunk.

3.2.8 Numbering Plan Area (NPA): A defined geographic area identified by a unique three-digit code used in the North American Number Plan Area.

3.2.9 NXX: Digits 4,5, and 6 of a ten-digit telephone number used within the North American Number Plan.

3.2.10 Out-of-area: An area not included in the subscribed service. An area may be defined in terms of a State/Province, NPA, LATA, etc.

3.2.11 Provinces: The provinces and territories of Canada.

3.2.12 Public Switched Telephone Network (PSTN): A switched network accessible by the public for the purpose of originating and terminating telecommunications messages.

3.2.13 ReOrder (RO): A call-disposition category for a call processing failure.

3.2.14 ReOrder prime (RO'): An SIT classification for a Local Service Provider call processing failure.

3.2.15 ReOrder double prime (RO"): An SIT classification for a Long Distance Service Provider call processing failure.

3.2.16 Service Provider. Any provider of public telecommunication service(s).

3.2.17 Special Information Tone (SIT): SITs comprise three precise sequential frequencies used to identify recorded announcements.

3.2.18 TTY: A Baudot-based text telephone primarily used by the deaf and hard of hearing to communicate over the telephone network

3.2.19 Vacant Code (VC): A call-disposition category for a call attempt to an unassigned NPA or NXX.

3.2.20 Wink: A start pulse sent from a switching system when it is ready to receive call processing information from another switching system.

4 Tones

Tones are audible nonverbal messages that provide information and stimulate action.

4.1 Busy

This tone indicates that the called customer's line(s) or equipment is not available. The busy tone is a low-frequency tone provided at 60 interrupts per minute (IPM) and should be applied under the following conditions:

1. Station busy;
2. Paging equipment busy;
3. Direct Inward Dial trunk busy;
4. Network access lines busy; and
5. Network Management controls for mass calling

4.2 ReOrder (RO)

This tone indicates that the calling customer's call has been blocked. The RO tone is a low-frequency tone provided at 120 IPM and should be applied under the following conditions:

1. Internal switching blockage;
2. Failure to receive wink on an interoffice call attempt;
3. Insufficient or mutilated digits;
4. Failure to find an available resource;

5. Interoffice signaling link failure;
6. All announcement trunks busy;
7. Switching equipment congestion; and
8. Protocol errors.

5 Special Information Tones

Special Information Tones (SITs) are three precise sequential tones. They precede and are used to identify recorded announcements provided for ineffective call attempts in the PSTN. SITs should be used with announcements when practical. These tones enable automated call detection and analysis systems to classify ineffective call attempts. The classifications of call-disposition categories are:

1. No Circuit (NC);
2. Reorder (RO);
3. Vacant Code (VC);
4. Intercept (INT); and
5. Ineffective Other (IO).

In the SS7 environment, a similar capability to SITs is available by using the cause value and location indicators contained in the SS7 message as described in ATIS-1000113.2015. The mapping of Cause Values and location indicators to specific SITs is for further study.

5.1 Encoding Scheme

The encoding scheme consists of three tone segments with precisely defined frequencies and durations as depicted in Figure 5.1. These are consistent with ITU-T Recommendation E.180 (see Annex A).

The first and second tone segments may be short or long duration in either the lower or higher part of the frequency band. The third segment may be of short or long duration, but only the lower frequency should be used. The single frequency in the third segment provides a reference frequency for automated detection and analysis systems. The number of possible encodings allowed by this scheme is 32.

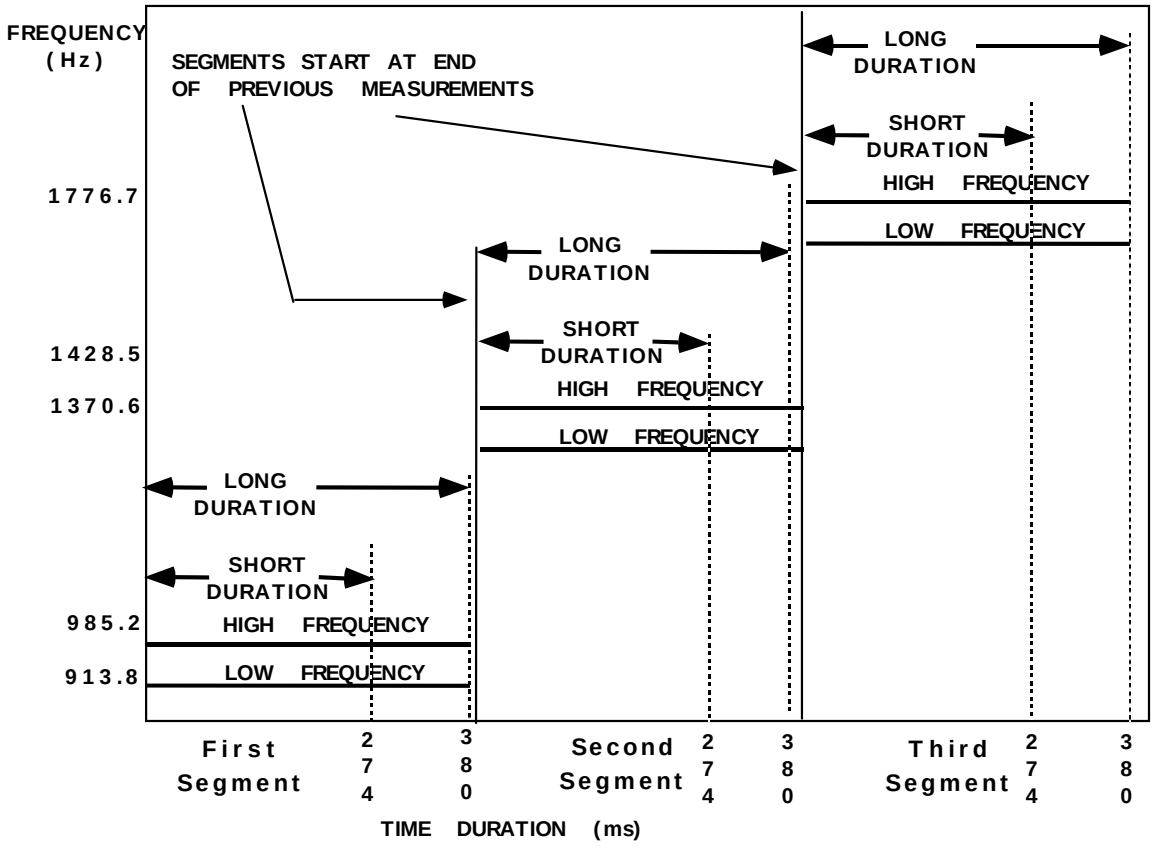

Figure 5.1 – Encoding Scheme for Special Information Tones

5.2 Frequencies & Stability

The frequencies used in the SIT encoding scheme are listed in Table 5.1. These frequencies should be stable within ± 1.5 percent in frequency shift and ± 0.2 percent in frequency flutter.

Table 5.1 – Frequencies for Special Information Tones (SITs)

	First segment (Hz)	Second segment (Hz)	Third segment (Hz)
Low	913.8	1370.6	1776.7
High	985.2	1428.5	-------

5.3 Duration & Stability

The duration of each segment should be stable within ± 5 percent of its value. The duration of each segment for SIT encoding should be:

- *Short duration*: 274 ms
- *Long duration*: 380 ms

5.4 Amplitude Variation Among Tone Segments

The tone level variation among any of the three tone segments should be less than 3 dB.

5.5 Silent Intervals Between Tone Segments

The silent interval between the tone segments should be no greater than 4 ms.

5.6 Tone Segment Faults

Interruptions within a tone segment should be less than 1 ms.

5.7 Distortion

The total power of harmonics and other distortion products in each frequency band should be at least 25 dB below the total tone power at the point of application.

5.8 Coding Assignments

SIT coding frequency assignments are listed in Table 5.2.

Table 5.2 – SIT Coding Assignments

Network Reporting Conditions	1st Segment		2nd Segment		3rd Segment	
	Frequency (Hz)	Duration	Frequency (Hz)	Duration	Frequency (Hz)	Duration
NC'	985.2	380	1428.5	380	1776.7	380
Intercept	913.8	274	1370.6	274	1776.7	380
VC	985.2	380	1370.6	274	1776.7	380
RO'	913.8	274	1428.5	380	1776.7	380
*NC"	913.8	380	1370.6	380	1776.7	380
*RO"	985.2	274	1370.6	380	1776.7	380
IO	913.8	380	1428.5	274	1776.7	380
*SIT associated with interLATA call handling						

5.9 Silent Interval Between Third Segment & Announcement

The silent interval between the third tone segment and the beginning of the announcement should be no greater than 300 ms for prerecorded messages. For locally recorded messages, this requirement may not be achievable, so the silent interval should be no greater than 400 ms.

5.10 Relational Amplitude Between SIT and Announcements

The average level of the SIT segments shall be 2 dB below the average level of the recorded announcement. This requirement minimizes adverse customer reaction to the SIT levels.

6 Announcements

Announcements are considered to be verbal as well as displayed messages providing information when the condition encountered requires an explanation to customers, operators, or maintenance personnel. (The term “displayed messages” as used for announcements takes into account the use of ISDN sets where deployed, as well as the use of TTYs by the deaf and hard of hearing, if supported.) Announcements should convey the type and severity of the condition and suggest the appropriate action to be taken. This standard addresses No Circuit (NC), Reorder (RO), Vacant Code (VC), Intercept (INT), and Ineffective Other (IO) announcements. Announcement messages are preferable to tones. SITs should be used with announcements when practical. If accessibility to announcements by deaf and hard of hearing users is supported, voice announcements should be augmented with TTY messages (an example of how this could be accomplished is provided in Annex A). The specification of TTY tones and coding can be found in TIA/EIA-825.

6.1 No Circuit (NC)

The NC announcements should be applied when there is a failure to find an available trunk or – when appropriate – it may be applied to calls affected by Network Management controls.

The content of the NC announcements should include the following information:

1. No circuit available; and
2. The customer should try the call again later.

6.2 Reorder (RO)

The RO announcements should be applied under the following conditions:

3. Internal switching blockage;
4. Failure to receive wink on an interoffice call attempt;
5. Insufficient or mutilated digits;
6. Failure to find an available resource;
7. Interoffice signaling link failure;
8. All announcement trunks busy;
9. Switching equipment congestion; and
10. Protocol errors.

The content of the RO announcements should include the following information:

a) The call did not go through the network; and
b) The customer should try the call again later.

6.3 Vacant Code (VC)

The VC announcements should be applied under the following conditions:

1. Vacant code;
2. Unauthorized CAMA “1" or “0" plus unauthorized code;
3. Nonworking 911;
4. Out-of-Area;
5. Terminating end-office or terminating tandem receives digits for nonsubtending code;
6. No route to the specified transit network; and
7. No route to destination.

The content of the VC announcements should include the following information:

a) The call cannot be completed as dialed; and
b) Instructions appropriate for the condition encountered.

6.4 Intercept (INT)

The INT announcements should be applied under the following conditions:

1. Number change;
2. Vacant number;
3. Disconnected number;
4. Nonworking number;
5. Temporarily suspended service; and
6. Incoming call restriction.

The content of the INT announcements should include the following information:

a) The reason the call cannot be completed; and
b) Instructions appropriate for the condition encountered.

6.5 Ineffective Other (IO)

The IO announcements should be applied under the following conditions:

1. Prefix or Access code dialing error irregularity;
2. Improper initial coin deposit;
3. Screened line access denial; and
4. Dialing irregularity.

The content of the IO announcements should include the following information:

a) The call cannot be completed as dialed;

b) Instructions for correct dialing procedures; and

c) The customer should try the call again (except for Customer Calling Feature condition).

7 Other Tones & Announcements

This standard acknowledges the existence of other tones and announcements currently being used in the PSTN. They are candidates for future study.

8 Provision of Tones & Announcements in an SS7 Environment Using ISUP

The SS7 protocol provides a means by which Cause Values for unsuccessful call attempts can be passed back to the originating office for application of tones and announcements. This capability allows for the optimal use of the SS7 controlled circuit switched network resources (e.g., trunks) and provides the calling party with an appropriate call disposition.

In the case of an ISDN call, a cause value may be passed back to the originator's customer premise equipment for an appropriate display.

8.1 Goal for Application of Tones & Announcements

Where technology exists, tones and announcements for ineffective call attempts should be applied as close to the originating end of the call as possible.

The application of these tones and announcements is determined by one of the following:

1. If SS7 has been used for the entire connection, all Cause Values which indicate ineffective call attempts should be returned to the originating ICN; or
2. If interworking is encountered anywhere in the connection, Cause Values which indicate ineffective call attempts should be returned as close to the originating ICN as possible. If an ICN has a need not met in the application of tones and announcements as described in this paragraph, local agreements between affected ICNs will need to be developed. These agreements are outside the scope of this standard.

8.2 Cause Value to Tones & Announcements Mapping

The application of a tone or announcement by an ICN is based on a cause value and should be in accordance with the Network Interconnection Interoperability Forum (NIIF) SS7 Cause Codes Matrix, except when specific agreements exist between ICNs. The NIIF SS7 Cause Code Matrix provides a listing of the Cause Values, the Definition, the Expected Treatment and the appropriate Mapping of the Cause Values between interconnected networks.

Annex A
(informative)

A TTY Announcements

The following examples illustrate how SIT voice messages could be augmented with TTY messages. Minimum confusion to hearing users is achieved by the insertion of only 3 TTY characters "_HD" (HOLD in TTY) ahead of the voice announcement. ("HD" is commonly used by TTY users to request that the other party wait for the resumption of the text conversation.) The corresponding TTY announcement is then appended to the end of the voice announcement. This scheme is essentially transparent to hearing users for SIT type messages because they will only hear the short "blip" in addition to the SIT tone before the message. The use of an _HD as a prefix may not be appropriate for messages without a SIT preamble as the presence of a tone may cause the hearing user to disconnect. The TTY code structure and signal requirements can be found in TIA/EIA-825.

#	Name	SIT	TTY	Example Spoken Announcement	Example TTY Announcement
1	Vacant or Disconnected number	IC	_▼HD	We're sorry, you have reached a number that has been disconnected or is no longer in service. If you feel you have reached this recording in error, please check the number and try your call again.	_▼NBR REACHED NOT IN SERVICE PLS CK AND REDIAL SKSK
2	Prefix in Error	VC	_▼HD	We're sorry, it is not necessary to dial a 1 or 0 when calling this number. Will you please hang up and try your call again.	_▼NO NEED TO DIAL ▲1▼ FIRST PLS REDIAL SKSK
3	Prefix Required	VC	_▼HD	We're sorry, you must first dial a 1 or 0 when calling this number. Will you please hang up and try your call again.	_▼MUST DIAL ▲1▼ THEN NBR PLS REDIAL SKSK
4	No Circuit	NC	_▼HD	We're sorry, all circuits are busy now. Will you please try your call again later.	_▼ALL LINES BUSY PLS TRY LATER SKSK
5	Heavy Calling	NC	_▼HD	We're sorry, due to heavy calling we cannot complete your call at this time. Will you please try your call again later.	_▼ALL LINES BUSY PLS TRY LATER SKSK
6	Facility Outage	NC	_▼HD	We're sorry, due to telephone company facility trouble your call cannot be completed at this time. Will you please try your call again later.	_▼PHONE CO TROUBLE PLS TRY LATER SKSK
7	Reorder (Vacant Code)	RO	_▼HD	We're sorry, your call cannot be completed as dialed. Please check the number and dial again.	_▼CANNOT COMPLETE CALL AS DIALED PLS TRY AGAIN SKSK
9	Forced Ten Digit (0/1+NPA req.)	VC	_▼HD	We're sorry, you must first dial a 1 or 0 plus the area code when calling this number. Will you please hang up and try your call again.	_▼PLS REDIAL WITH ▲1▼ PLUS AREA CODE THEN NBR SKSK

NOTES:

- References to dialing "0" in the spoken version have been eliminated in the TTY version as TTY users would dial the relay or the TTY operator, rather than the "0" operator, for assistance.
- "_" (underscore) represents a space.
- "▼" (down arrow) represents the TTY "letters" command.
- "▲" (up arrow) represents the TTY "figures" command.
- "SKSK" is used at end of each announcement to indicate that we are done keying and are disconnecting.