NOKIA

Nokia UltraHub
Transmission Node

Product Overview

C33880.21 A0

The information in this document is subject to change without notice and describes only the product defined in the introduction of this documentation. This document is intended for the use of Nokia Networks' customers only for the purposes of the agreement under which the document is submitted, and no part of it may be reproduced or transmitted in any form or means without the prior written permission of Nokia Networks. The document has been prepared to be used by professional and properly trained personnel, and the customer assumes full responsibility when using it. Nokia Networks welcomes customer comments as part of the process of continuous development and improvement of the documentation.

The information or statements given in this document concerning the suitability, capacity, or performance of the mentioned hardware or software products cannot be considered binding but shall be defined in the agreement made between Nokia Networks and the customer. However, Nokia Networks has made all reasonable efforts to ensure that the instructions contained in the document are adequate and free of material errors and omissions. Nokia Networks will, if necessary, explain issues which may not be covered by the document.

Nokia Networks' liability for any errors in the document is limited to the documentary correction of errors. Nokia Networks WILL NOT BE RESPONSIBLE IN ANY EVENT FOR ERRORS IN THIS DOCUMENT OR FOR ANY DAMAGES, INCIDENTAL OR CONSEQUENTIAL (INCLUDING MONETARY LOSSES), that might arise from the use of this document or the information in it.

Contents

1 About this document

This document is an overview of the Nokia UltraHub Transmission Node. The document contains the following information:

- an introduction to the Nokia UltraHub Transmission Node product
- an overview of the features of Nokia UltraHub Transmission Node components
- examples of network applications and site configurations
- an introduction to the Nokia Network Management System and the node manager
- details of the mechanical structure of the different components
- relevant technical specifications.

More information on Nokia UltraHub Transmission Node can be found in the *Nokia UltraHub Transmission Node User Manual*.

Also, the following documents include more detailed information on the different Nokia UltraHub Transmission Node components:

- *Nokia FlexiHopper Microwave Radio Product Overview*
- *Marconi Synchronous Multiplex Equipment SMA4 Product Description*
- *DC-PSA Operating Instructions*.

For documentation availability, please contact your local Nokia represetantive.

2 Introduction

Nokia UltraHub Transmission Node is the high capacity transmission solution for Nokia BSC (Base Station Controller) site. Nokia UltraHub Transmission Node combines both microwave radio and SDH transmission environments together with support for the Nokia NMS solutions.

Nokia UltraHub Transmission Node also:

- brings multimedia capability to BSS (Base Station System) access with transmission capacity for future multimedia needs
- meets capacity demand for mobile networks
- provides simple, future-proof, and cost-efficient solutions in a network with increasingly complex functions.

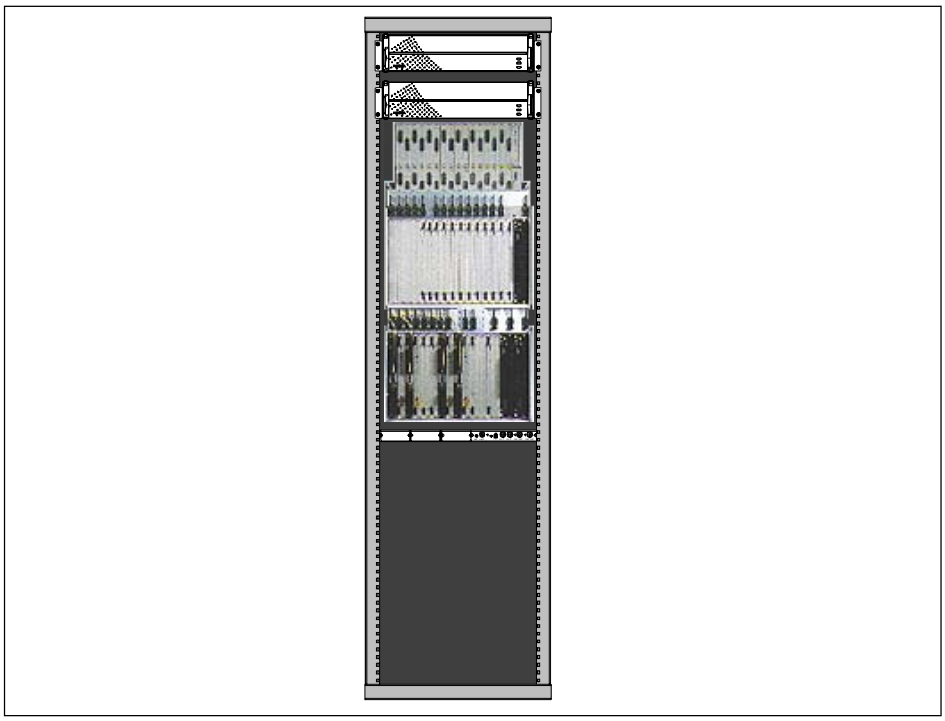


Figure 1. Nokia UltraHub Transmission Node in a rack

3 Features

3.1 General

Nokia UltraHub Transmission Node combines the advanced transmission features of SDH and microwave radio environments. This chapter describes the advantages of these features in more detail.

All these components are installed to an ETSI or IEC standard rack, see construction in Chapter 6.

A Nokia UltraHub Transmission Node is built out of the following main components:

Indoor Unit (FIU 19)

This unit belongs to the Nokia FlexiHopper Microwave Radio product family. FIU 19 enables the radio transmission support for Nokia FlexiHopper and Nokia MetroHopper radio products.

Marconi Synchronous Multiplex Equipment SMA4

This is the SDH node for SDH transmission support, also for STM-1 radio connection via Nokia UltraHopper Microwave Radio.

DC-PSA (DC Power Supply Adapter)

Distributes power to the node components mentioned above.

3.2 Radio support

Nokia UltraHub Transmission Node can be connected to the following Nokia radio products through either the FIU 19 (PDH microwave products) or Marconi SMA4 (SDH STM-1 and STM-1 radio) components.

Nokia UltraHopper Microwave Radio

- STM-1 radio
  - 18, 23, and 26 GHz
- Standard STM-1 (S-1.1) optical signal

Nokia FlexiHopper Microwave Radio

- Low capacity radio (max. 16 x 2 Mbit/s) for short and medium haul applications
  - 13, 15, 18, 23, 26, and 38 GHz; all as 1+0 or 1+1

Nokia MetroHopper Radio

- Low capacity radio (4 x 2 Mbit/s) for very short haul applications
  - 58 GHz

3.3 SDH support

Nokia UltraHub Transmission Node is connected to the SDH environment through the Marconi SMA4 SDH node. The SDH signals can be either from the access or backbone optical network, or from Nokia UltraHopper STM-1 radio signal.

See the Marconi Synchronous Multiplex Equipment SMA4 features in Section 4.2.2.

4 Applications

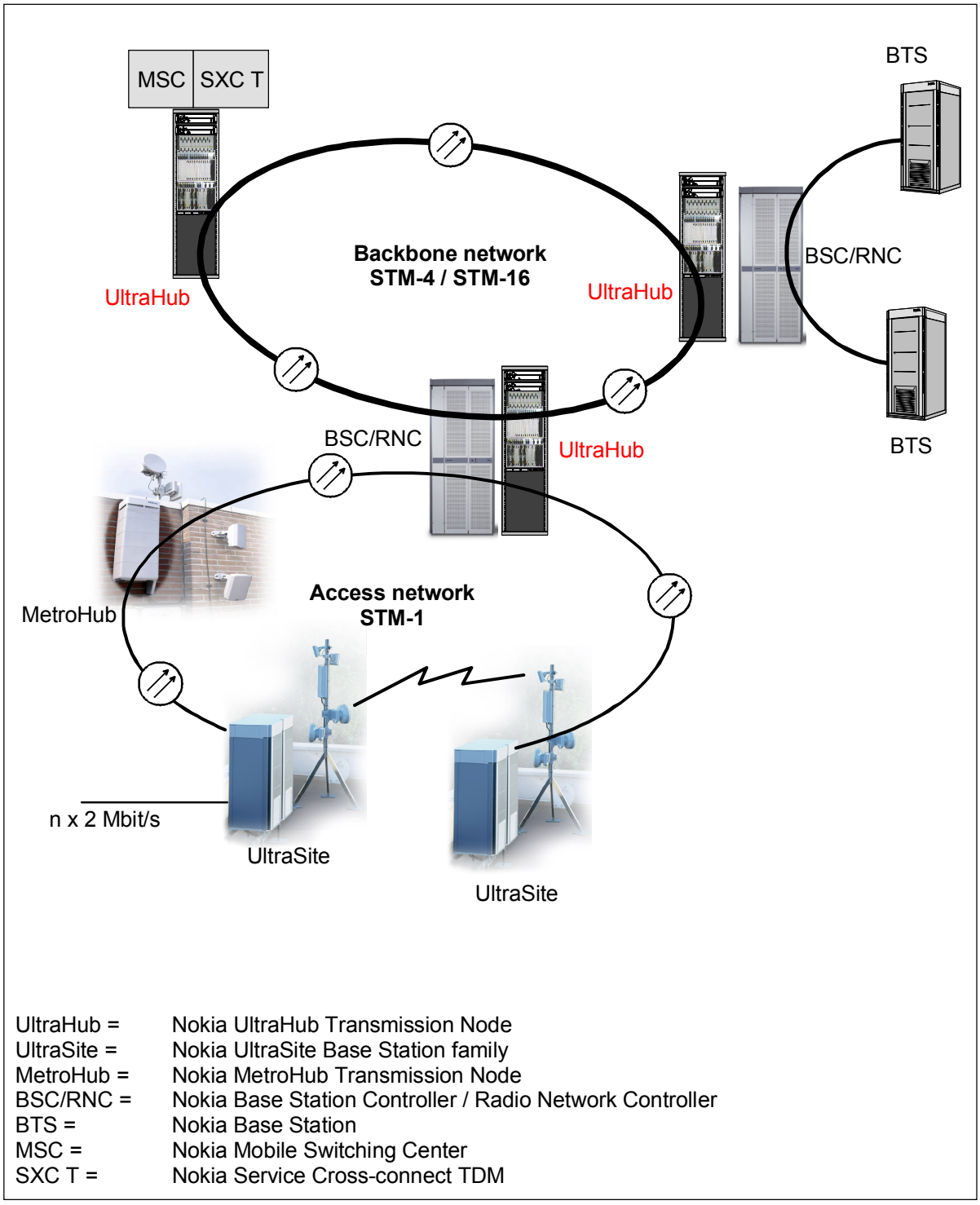
Nokia UltraHub Transmission Node is the optimal solution to a wide range of different access needs in various mobile (GSM, EDGE, and WCDMA) network environments.

Typical applications which can use Nokia UltraHub Transmission Node include:

- as an access node for Nokia UltraSite BTS or Nokia MetroSite BTS
- in other cellular transmission applications
  - BTS to BTS
  - BTS to BSC (base station controller)
  - BSC to MSC (mobile switching centre).

4.1 Network applications

Figure 2 shows an example of transmission in a network implementing Nokia UltraHub Transmission Node. Nokia UltraHub Transmission Node can be used also as a hubbing point in star topology networks for collecting radio traffic from BTS sites. Node configuration possibilities are explained in more detail in Section 4.2.



UltraHub =	Nokia UltraHub Transmission Node
UltraSite =	Nokia UltraSite Base Station family
MetroHub =	Nokia MetroHub Transmission Node
BSC/RNC =	Nokia Base Station Controller / Radio Network Controller
BTS =	Nokia Base Station
MSC =	Nokia Mobile Switching Center
SXC T =	Nokia Service Cross-connect TDM

Figure 2. Nokia UltraHub Transmission Node in a network

4.2 Node configuration

Figure 3 shows an example of a Nokia UltraHub Transmission Node.

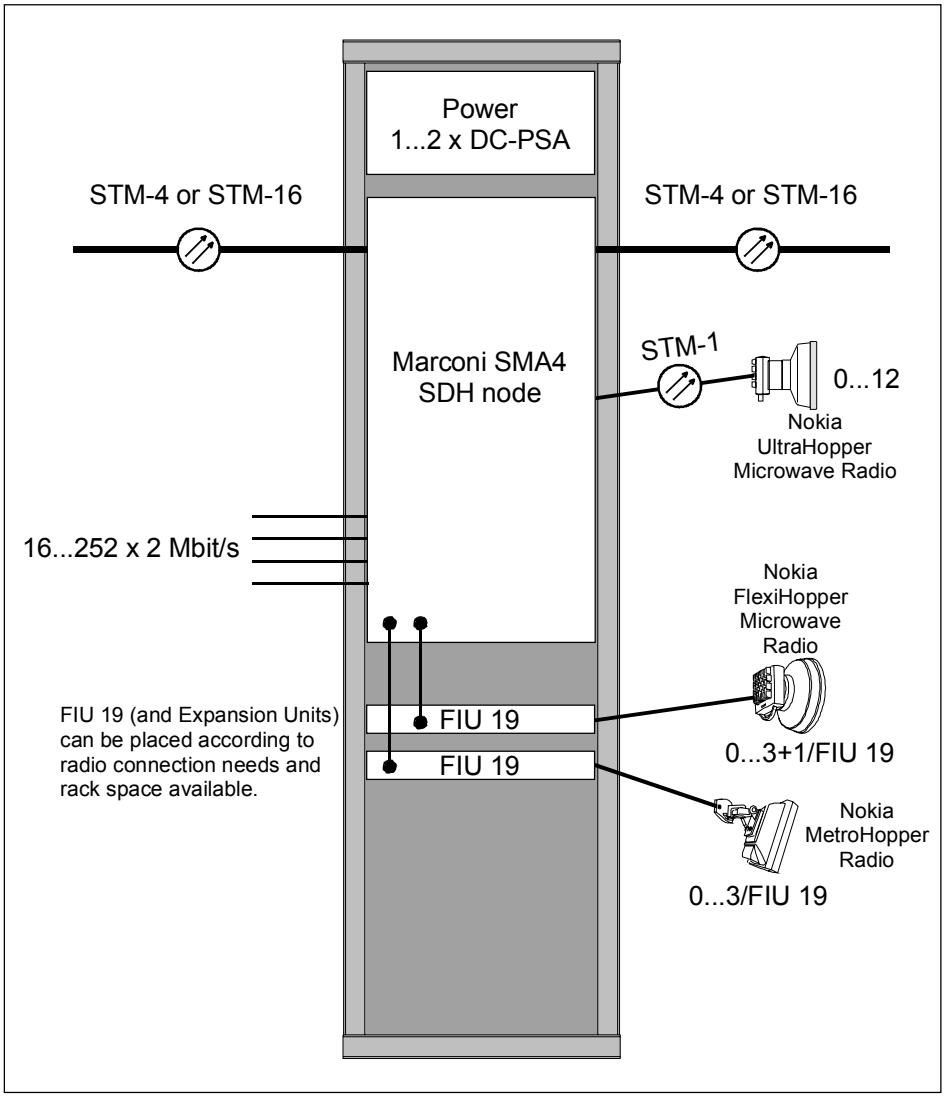


Figure 3. An example of a Nokia UltraHub Transmission Node

4.2.1 FIU 19 Indoor Unit

FIU 19 is the indoor unit for 19-inch mechanics applications. One FIU 19 can support up to four radio outdoor units. FIU 19 can feed power to two radio outdoor units via the Flexbus connections. When more than two radio outdoor units are used, a Flexbus plug-in unit with its own power supply is required. When four radio outdoor units are connected, one of the transmission paths must be protected. So transmission to a maximum of three directions can be achieved with one FIU 19 indoor unit.

FIU 19 has a modular construction, with optional plug-in units and an expansion unit. These allow different site configurations to be implemented flexibly and economically. See document *Nokia FlexiHopper Microwave Radio Product Overview* for details of chaining stations, branching stations, and protected use. FIU 19 is managed using a node manager, which allows the user to specify control, monitoring, and alarm channels.

Mechanical construction is presented in Section 6.2.

4.2.2 Marconi SMA4 SDH Node

The SMA4 (Add/Drop Multiplexer) is part of the family of Marconi Communications SMA synchronous multiplexers for use in networks based on the Synchronous Digital Hierarchy (SDH) or on the Plesiochronous Digital Hierarchy (PDH) multiplexing standard. Its main application is in the adding and dropping of combined 1.5 Mbit/s, 2 Mbit/s, 34 Mbit/s, 45 Mbit/s, 140 Mbit/s, or 155 Mbit/s (STM-1) tributary signals within an aggregate STM-4 (622 Mbit/s) or STM-16 (2.5 Gbit/s) through traffic line signal.

Options are available for equipping the tributary positions with optical STM-4 or either optical or electrical STM-1 (Synchronous Transport Module) ports.

Various options are offered for card, port and connection protection schemes to meet network operator’s requirements for circuit availability, in a wide range of network topologies.

Some of the key features are:

- Basic configuration for STM-1 or STM-4 add/drop multiplexer and flexible upgrade path to STM-16 operation
- Wide range of optical and electrical interfaces available at speeds from E1 to STM-16
- Up to 256 x 2 Mbit/s access per single subrack
- Provides full connectivity for VC-4, VC-3, VC-2, and VC-1 granularities
- ATM/IP over SDH support ready for 3G networks
- Single fibre working for fibre cost saving
- 64 kbit/s switching capability within VC-12 (Combiner)

- Unit protection: 1:1 and 1:n (n<8) tributary protection
- Traffic protection:
  - Multiplex Section Protection (1+1 MSP)
  - Sub Network Connection Protection (SNCP)
- Automatic Laser Shutdown (ALS) for optical safety
- IS-IS routing

Further information can be found in the *Marconi SMA4 Product Description*.

Mechanical construction is presented briefly in Section 6.3.

4.2.3 DC-PSA

The DC-PSA is a user interface point for battery voltages and station alarm outputs. The DC-PSA unit provides polarity and overvoltage protection.

Interfaces

- Battery voltage inputs for 48/60 V_{DC}, 90 A battery voltages
- Nine outputs with power and alarm connectors and overcurrent switches for distributing:
  - central battery voltage (48/60 V_{DC}, max 15 A / output, total max 90 A)
  - alarm information
  - +5 V_{DC} voltage (through alarm lines)
- Two battery voltage inputs can be used as voltage distribution sources
- Two auxiliary voltage outputs (48/60 V_{DC}), fuse protection (6.3 A)

Protection functions

- Central battery voltage inputs polarity protected.
- Voltage dependent resistor (VDR) protection in each power input.
- Enhanced transient protection (ETP) circuit for suppressing voltage spikes and controlling the charging and discharging of the unit's aluminium electrolytic capacitors.

Mechanical construction is presented in Section 6.4.

5 Management

This chapter describes the management of Nokia UltraHub Transmission Node with:

- the Nokia NMS Network Management System
- Nokia UltraHub Agent

5.1 Nokia Network Management System

Remote control, alarm and performance data collection of Nokia UltraHub Transmission Node is done using Nokia NMS Network Management System.

Nokia NMS incorporates a full range of functions from fault, performance, and configuration management to transmission, trouble, and security management.

Nokia UltraHub Agent is an NMS compatible node manager and therefore Nokia UltraHub Transmission Node can be remotely controlled by NMS.

For more information, please refer to Nokia NMS documentation.

5.2 Nokia UltraHub Agent

Nokia UltraHub Agent is a PC-based software application used for controlling and monitoring Nokia UltraHub Transmission Node. It belongs to the Nokia product range of node managers and it is specially designed to manage the cross-connections of the whole node in an easy way. Local management access is possible without disturbing Nokia NMS, nor is any special arrangement needed.

Nokia UltraHub Agent runs on a PC-compatible computer under Microsoft Windows 95 or Microsoft Windows NT 4.0. The manager has an easy-to-use graphical user interface with a commissioning wizard that guides the user through commissioning tasks.

Nokia UltraHub Agent is used when:

- commissioning the node, the units inside the node or the connected radios
- providing a local or, through Nokia NMS, a remote management connection to Nokia UltraHub Transmission Node equipment
- creating, editing and deleting cross-connections
- monitoring the alarm status of the node and units
- viewing and changing the settings of the units
- downloading and activating software on the units
- viewing online help system.

Nokia UltraHub Agent connects to Nokia UltraHub Transmission Node through the Local Management Port of the node or accesses the node remotely through an embedded Nokia Q3 bus. Nokia UltraHub Transmission Node is a Nokia Q3-managed equipment.

Nokia UltraHub Agent can be used both online and offline which means flexible working methods. Offline working is a superb way of creating the node settings at the office, storing them in a file, and downloading to the node when in the field. When online management is performed, the settings are read from the node or sent to it. In case of offline management, the settings are loaded from a file or saved to it.

6 Construction and power supply

This chapter is an overview of the mechanical structure of:

- FIU 19 Indoor Unit from the FlexiHopper product family
- Marconi's SMA4 Synchronous Multiplex Equipment
- DC-PSA power supply adapter.

6.1 Nokia UltraHub Transmission Node components in a rack

Nokia UltraHub Transmission Node components can be installed to the following mechanical environments:

- ETSI (500 mm) -sized racks
- IEC (19 inch) -sized racks
- Nokia BSC racks.

Figure 4 shows how the Nokia UltraHub Transmission Node components are laid out in the rack. The DC-PSA unit(s) are installed to the top of the rack. The Marconi SMA4 SDH Node is installed underneath the DC-PSA unit(s). FIU 19 (and the possible Expansion Units) are installed into the rack space available underneath the SDH node. The number of FIU 19 and Expansion Units depends on the radio transmission needs of the Nokia UltraHub Transmission Node.

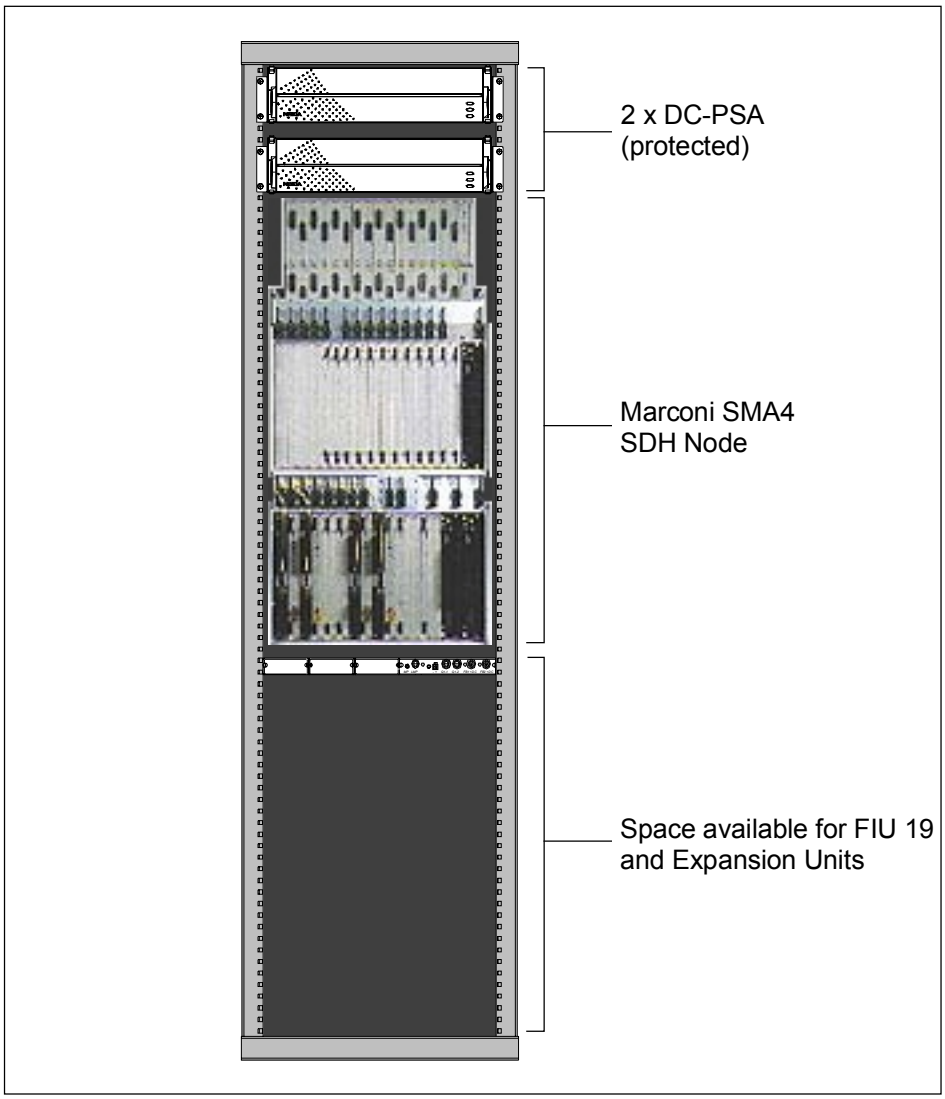


Figure 4. Nokia UltraHub Transmission Node in a rack

6.2 FIU 19 Indoor Unit construction

The FIU 19 indoor unit is only 2/3 U (29 mm) high. The maximum interface capacity of the main unit is 12 x 2 Mbit/s. Interface capacities over 12 x 2 Mbit/s can be implemented by installing the 16 x 2 Mbit/s expansion unit underneath the main unit. Protected use with two indoor units is implemented using two identical FIU 19 main units and the expansion unit, so the interface

capacity will always be 16 x 2 Mbit/s. The expansion unit has the same external dimensions as the main unit.

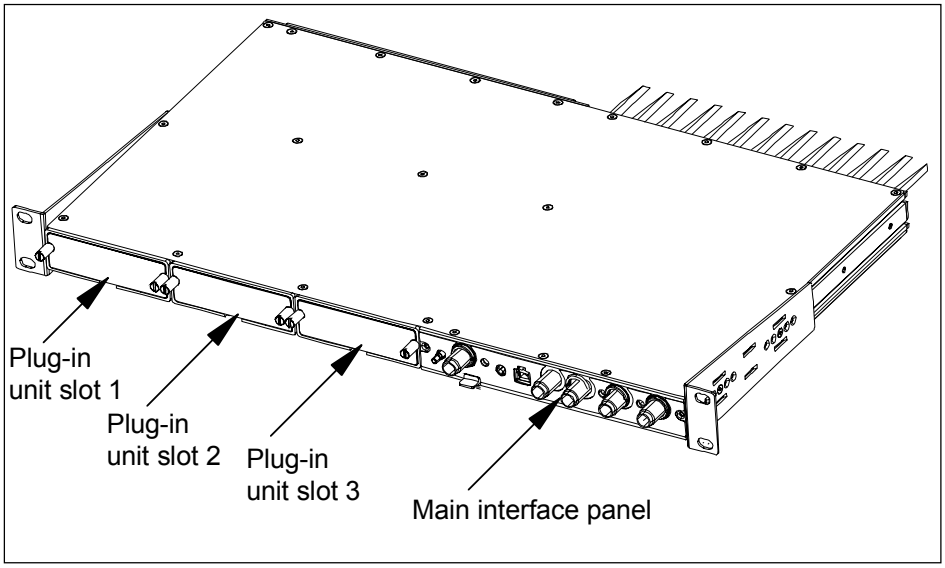


Figure 5. FIU 19 Indoor Unit construction

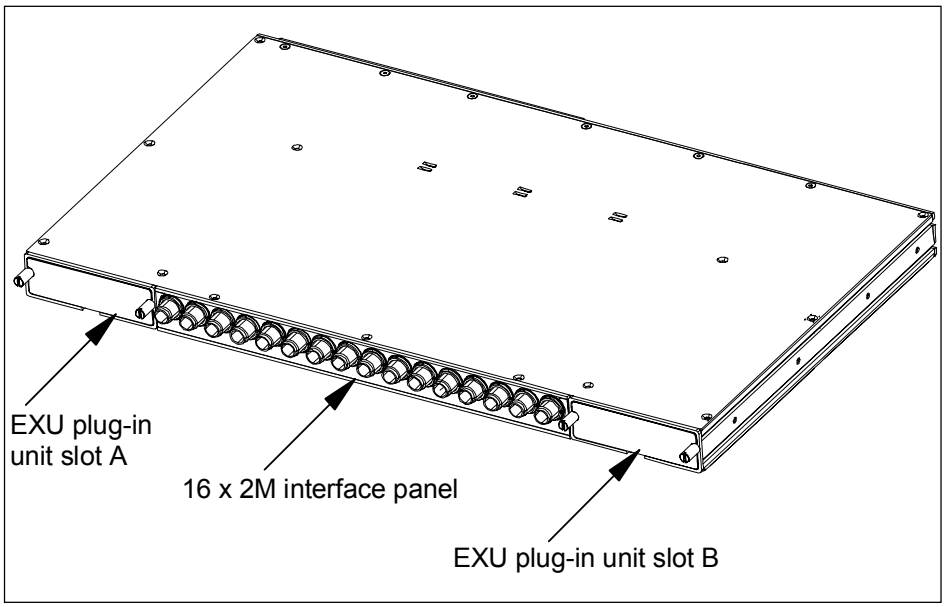


Figure 6. FIU 19 Expansion unit with 16 x 2 Mbit/s balanced interfaces

Connectors and cabling

FIU 19 main unit has two Flexbus interfaces (FB1, FB2) on the front panel. These interfaces also feed power to the OUs connected through them. When outdoor units are connected through interfaces on a Flexbus plug-in unit (FB3, FB4), an additional power feed to the plug-in unit is needed.

2 Mbit/s interfaces can be added as plug-in units or as an expansion unit. The interfaces can be either balanced (120 Ω TQ) or unbalanced (75 Ω SMB).

In addition FIU 19 main unit has connectors for network management (Q1), power supply (PWR), local management (LMP), and measurement (MP).

Unit configurations

The following configuration options are possible with FIU 19:

- Plug-in units (3 slots)
  - 4 x 2 Mbit/s balanced or unbalanced interfaces
  - Dual Flexbus interfaces
  - Auxiliary data channel interfaces, digital inputs/outputs
- Expansion units (19-inch unit underneath the main unit)
  - 16 x 2 Mbit/s expansion (balanced or unbalanced)
  - 16 x 2 Mbit/s 1+1 protection (balanced or unbalanced).

See document *Nokia FlexiHopper Microwave Radio Product Overview* for more information.

6.3 SMA4 Synchronous Multiplex Equipment construction

The SMA4 node (see Figure 7) consists of a set of core plug-in units in a subrack. Additional units may be fitted, depending on user application.

The STM-4 Optical Interface Card, the STM-1 Optical Multiplexer Card and the STM-1 Electrical Multiplexer Card can be used either as line or tributary cards.

See document *Marconi Synchronous Multiplex Equipment SMA4 Product Description* for more information.

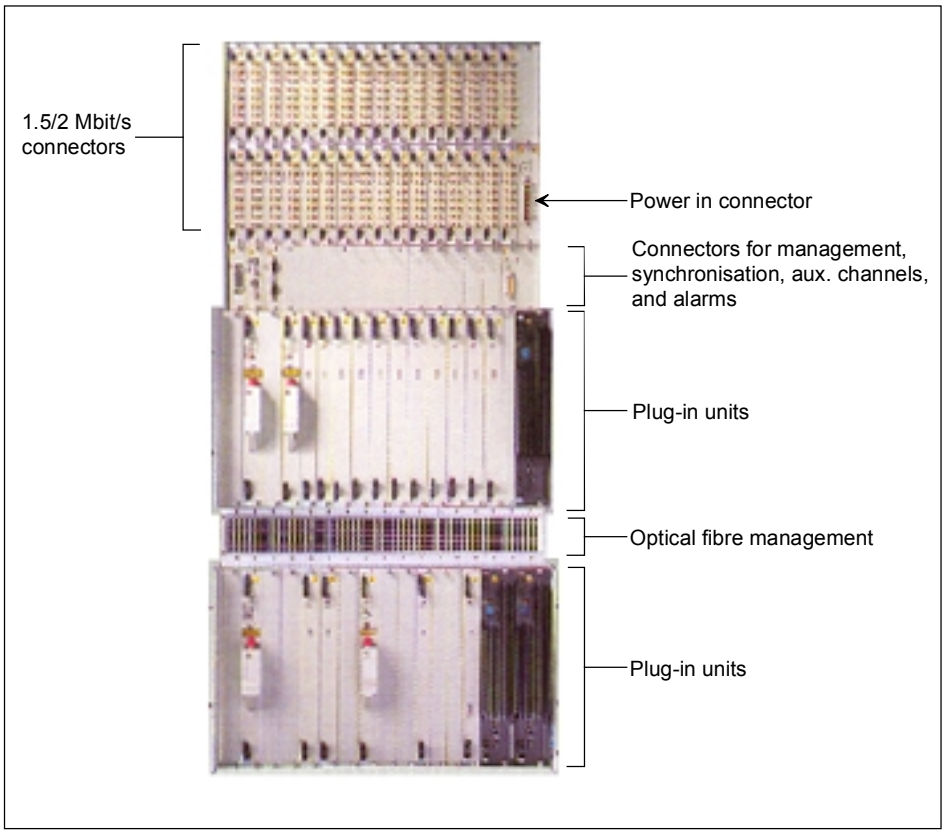


Figure 7. Marconi SMA4 SDH Node construction

6.4 DC-PSA construction

The mechanical dimensions of the DC-PSA unit are 446 mm (width) x 225 mm (depth) x 110 mm (height). The unit can be mounted directly into 19″ wide racks and also into 500 mm wide racks by using the ETSI mounting adapters.

The nine overcurrent switches also work as ON/OFF switches for the outputs.

All connections to the unit are made from the front of the unit, except for the reserve battery voltage connection (connected from the back). A separate decorative cover for the DC-PSA is also available.

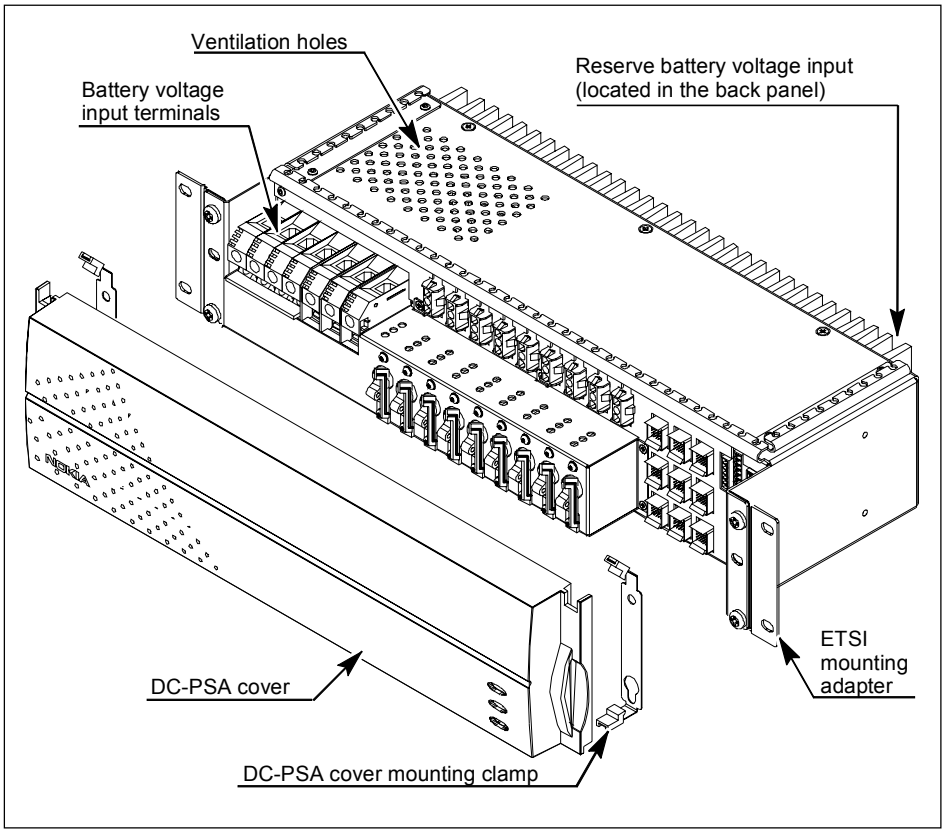


Figure 8. DC-PSA construction

7 Unit alternatives

This chapter lists the different unit alternatives available for the Nokia UltraHub Transmission Node.

7.1 Marconi SMA4 SDH node

Table 1. Obligatory units

SMA4 Core Unit
Power supply units x 3
Power Line Termination Unit
Mux Controller Unit
Switch Unit (see Table 4 for variants)

Table 2. Application dependent units, Optical interface units

Interface unit	**Port**	**Laser type**	**Connector**
STM-1	1	S-1.1, L-1.1, L-1.2	FC/PC, SC, DIN 47256
STM-4	1	S-4.1, L-4.1, L-4.2, L-4.2+	FC/PC, SC, DIN 47256
STM-16	1	S-16.1, L-16.2, L-16.2	FC/PC, SC, DIN 47256

Table 3. Application dependent units, Electrical interface units

Interface unit	Port	Connector
1.5 / 2 Mbit/s	16, 32	1.0/2.3 75 Ω, 16-way D-type 120Ω
34 / 45 Mbits	3	1.0/2.3 75 Ω
34 Mbit/s Transmux	1	1.0/2.3 75 Ω
140 Mbit/s	1	1.0/2.3 75 Ω
STM-1	1	1.0/2.3 75 Ω

Table 4. Application dependent units, Switch Units

Unit alternatives	Switch capacity
SMA4/16C	24 x VC-4
SMA-16c+	32 x VC-4

Table 5. Application dependent units, Communications Unit

Unit alternatives	Features
Standard	8 SOH channels
Extended	20 SOH channels, Ethernet interface

Table 6. Application dependent units, Auxiliary Unit

Unit alternatives	Features
Asynchronous Unit	6 x 9 kbit/s V.11
Async./Sync. Unit	6 x 64 kbit/s V.11 (RS422)
Engineers Order Wire Unit (EOW)	2/4 wire

Table 7. Application dependent units, Line Termination Units (LTU) for ancillary functions

Ethernet Q interface AUI LTU
RS232 interface for local control (LCT)
Three auxiliary access LTUs
User alarm interface
External synchronisation

7.2 FIU 19 Indoor Unit

Table 8. FIU 19 unit alternatives

FIU 19 Single Use (1+0)	**Alternatives**
Main interface capacity	4x2M
	8x2M
	12x2M
	16x2M
Connector	75 Ω
	120 Ω
FIU 19 Protected Use (1+1), always 16x2M	**Alternatives**
Connector	75 Ω
	120 Ω

Table 9. FIU 19 plug-in unit alternatives

FIU 19 4x2M 120 Ω Plug-in Unit
FIU 19 4x2M 75 Ω Plug-in Unit
FIU 19 Flexbus Plug-in Unit
FIU 19 Aux Data Plug-in Unit

Note

Plug-in units and, if applicable, the expansion unit are included in the FIU 19 configurations listed above. For example, the table lists FIU 19 Single use (1+0) configuration with 8x2M 120 Ω interfaces, no auxiliary data interface, and four Flexbus interfaces. This configuration is composed of an FIU 19 main unit, two 4x 2M 120Ω interface plug-in units, and a Flexbus interface plug-in unit.

7.3 DC-PSA

Table 10. DC-PSA unit alternatives

DC-PSA with 15 A switches
DC-PSA with 10 A switches

8 Technical specifications

This chapter lists the most relevant technical specifications for Nokia UltraHub Transmission Node. The detailed specifications for the different components used with Nokia UltraHub can be found in their own documentation.

8.1 FIU 19 indoor unit

8.1.1 Interfaces

Table 11. FIU 19 main unit interfaces

Flexbus interfaces 1 and 2 (FB1, FB2)	TNC connector 50 Ω Up to 16 x 2 Mbit/s signals, OU power supply
Network management interfaces (Q1- 1, Q1-2)	TQ connector Max. 9600 bit/s, V.11
Power supply connector (PWR)	Molex Micro-Fit 3.0
Local management port (LMP)	BQ connector Max. 115 kbit/s RS-232 interface
Measurement point connector (MP)	SMB connector, 75 Ω Digital output for 2 Mbit/s signals and internal frequencies

Table 12. FIU 19 interfaces in the plug-in units and the expansion unit

4 x 2 M plug-in units, 16 x 2 expansion unit	
2M interfaces, n x 2 Mbit/s	SMB connector, 75 Ω OR TQ connector, 120 Ω ITU-T G.703
Flexbus plug-in unit	
Flexbus interfaces 3 and 4 (FB3, FB4)	TNC connector, 50 Ω Up to 16 x 2 Mbit/s signals, OU power supply
OU power supply input (for third and fourth OU)	Molex Micro-Fit 3.0
Aux data plug-in unit	
Auxiliary interfaces (4)	Four RJ-45 modular connectors Aux slow channel Aux fast channel Four TTL-type programmable I/O channels Four relay controls

8.1.2 Power supply, dimensions, installation options

Table 13. FIU 19 power supply, dimensions, installation options

Main unit power supply	-40.5 to –72 V_{DC}
Flexbus plug-in unit power supply	+52 to +60 V_{DC}
Power consumption (16 x 2M IU only)	< 17 W
Power consumption (16 x 2M IU + 2 OUs + maximum cable loss)	< 90 W
Dimensions of the main unit and the expansion unit	Height 29 mm (2/3 U) Width 444 mm (with 1 U brackets), 449 mm (with 1.5 U / 2 U brackets) Depth 300 mm (without connectors) Weight 2.8 kg
Dimensions of the plug-in units	Height 25 mm Width 75 mm Depth 160 mm Weight 0.075 - 0.150 kg
Installation options	500 mm rack 19-inch rack

8.2 Marconi SMA4 specifications

Table 14. Line interfaces

Bit rate	
155 Mbit/s, 622 Mbit/s or 2.5 Gbit/s (multiplexing in accordance with ITU-T Rec. G.709).	
Optical Loss Budget	
STM-1 Optical	1310 nm 0…28 dB short haul (S1.1) 1550 nm 0…28 dB long haul (L1.2) 1310 nm 0…28 dB long haul (L1.1)
STM-4 Optical	1550 nm 10…24dB long haul (L4.2) 1550 nm 12…28.5dB long haul (L4.2+) 1310 nm 0…26dB long haul (L4.1) 1310 nm 0…12dB short haul(S4.1)
STM-16 Optical	1550 nm 10…24dB long haul (L16.2) 1310 nm 3…24dB long haul (L16.1) 1310 nm 0…12dB short haul(S16.1) Conforms to ITU-T Recs. G.957 and G.958.

Table 15. Tributary interfaces

1.5/2 Mbit/s	In accordance with ITU-T Rec. G.703 and ANSI T1-102-1993 Up to 16 or 32 ports available. 1.0/2.3 LTU for unbalanced connections, 16 way D-Type for balanced connections.
34/45 Mbit/s	In accordance with ITU-T Rec. G.703. 3 ports available. 1.0/2.3 LTU
34 Mbit/s Transmux	In accordance with ITU-T Rec. G.703. 1 port available. 1.0/2.3 LTU
140 Mbit/s	In accordance with ITU-T Rec. G.703. 1 port available. 1.0/2.3 LTU
STM-1 Electrical	In accordance with ITU-T Rec. G.703. 1 port available. 1.0/2.3 LTU
STM-1 Optical Interface	In accordance with ITU-T Rec. G.957. 1 port available. Seiko FC/PC, Din or SC
STM-4 Unit	In accordance with ITU-T Rec. G.957. 622 Mbit/s as above. 1 port available. Seiko FC/PC, Din or SC

Table 16. Equipment manager interface

Q protocol	In accordance with ITU-T Rec. G.773, Q.811 (between Gateway SMA and Equipment Manager Qecc protocol to ITU-T G.784 for use on Data Communication Channels (DCCs).

Table 17. Local terminal interface

ITU-T	F interface V24 to IBM-compatible PC.

Table 18. Power requirements

-48…-60V_{DC}(nominal)	The SMA4 requires three (optionally two) 48V_{DC} power feeds each supplied via their own circuit breaker. Power consumption is heavily dependent upon shelf configuration but as a guide is typically 250 W for an unprotected ADM configuration with 8 tributary cards.

Table 19. Synchronisation

Synchronisation input	1544/2048 kHz timing signal In accordance with ITU-T Rec. G.703 Section 6.
Synchronisation output	1544/2048 kHz sinewave In accordance with ITU-T Rec. G.703 Section 10.

Table 20. Dimensions

SMA4 subrack	
Height	1000 mm
Width	450 mm
Depth	fits in a 280 mm deep rack

Table 21. Environment

Typical performance maintained over ambient temperature range of -5°C to +45°C with relative humidity of 10…90%. Complies with ETS 300 019-1, 019-2 and 019-3, classes for which are given below:-	
Storage	Classification 1.1 covering weather-protected, partly temperature-controlled storage locations
Transportation	Classification 2.2 covering transportation
Operation	Classification 3.1, which applies to permanently temperature-controlled, enclosed locations where humidity is not usually controlled

Table 22. Compliances

ITU-T Rec. G.703
ITU-T Rec. G.707 to G.709
ITU-T Rec. G.773
ITU-T Rec. G.782 and G.783
ITU-T Rec. G.957 and G.958
ITU-T Rec. Q.811
The EMC and ESD performance of the equipment complies with European Directive EN 55/022, together with IEC 801, 802, 803, 804, 805 and 806. These requirements are met by the equipment while in an operating mode by providing a screened enclosure for the card frame and by each card having a front panel with spring fingers, thus ensuring contact between the front plates of adjacent cards.

8.3 DC-PSA specifications

8.3.1 Electrical specifications

Table 23. Main circuit

Nominal input voltage		48 / 60 V_{DC}	
Input voltage range		-40.5...-75 V_{DC}	
Operating temperature range (°C)		+5...+45	+46...+55
Maximum current to be fed from:	battery inputs to unit power supplies / signalling circuits	90 A max	45 A max
	single output	15 A max (hydro-magnetic circuit breaker)	
	single auxiliary output	5 A max	
Input protection		Two separation diodes (common anode)	
Power loss		< 12 W + 0.85 x I_{load}	

8.3.2 Mechanical dimensions

Table 24. Mechanical dimensions

Height	106 mm (110 with cabling)
Width	482.6 mm (19″)
Depth	225 mm
Weight	5.5 kg

Glossary

Abbreviations

ALS	Automatic Laser Shutdown
BSC	Base Station Controller
BSS	Base Station System
BTS	Base (Transceiver) Station
DC-PSA	DC Power Supply Adapter
EDGE	Enhanced Data rates for Global Evolution
FB	Flexbus
FIU	FlexiHopper Indoor Unit
MSC	Mobile Switching Center
MSP	Multiplex Section Protection
NMS	Network Management System
OU	(Radio) Outdoor Unit
RNC	Radio Network Controller
SDH	Synchronous Digital Hierarchy
SNCP	Sub Network Connection Protection
STM	Synchronous Transport Module
SXC	Service Cross-connect
TDM	Time Division Multiplexing
WCDMA	Wideband Code Division Multiple Access