MINI-LINK™ TN ETSI

Microwave transmission from an end-to-end perspective

MINI-LINK TN provides a platform for flexible, scalable and cost-effective wireless transmission. With microwave nodes optimized for networks, it targets transmission networks for 2G and 3G as well as fixed and broadband applications. MINI-LINK TN offers advantages on all sites with features that allow a flexible network design, fast implementation and high quality networks.

The system provides scalable nodes with integrated traffic routing, PDH and SDH multiplexing and protection mechanisms on both node and network level. Configurations ranges from small end nodes with one single radio terminal to large hub nodes where all the traffic from a number of southbound links is aggregated into one link, microwave or optical, in the northbound direction.

The software configurable traffic routing minimizes the use of cables, improves network quality and facilitates control from a remote location. MINI-LINK TN also offers a TCP/IP and SNMP based management concept. The use of open interfaces ensures inter-operability between different parts and services in the network.

Ericsson can provide one common radio unit for the complete MINI-LINK point-to-point portfolio that supports all capacity and modulation needs.

Key benefits

MINI-LINK TN reduces cost at:

- Initial deployment
- Network expansion
- Network operation

System overview

From a functional and configuration point of view, MINI-LINK TN can be divided in the following parts:

- *Basic Node* - includes the indoor mechanical housing, power distribution, cooling and the system platform providing traffic and system control. It houses functions such as traffic routing, multiplexing, protection mechanisms and management functions. It also provides traffic interfaces, PDH, SDH and Ethernet, for connection to network equipment.
- *Radio Terminal* - consists of modem units as indoor parts and radios and antennas as the outdoor part. These units are interconnected by a single coaxial cable carrying traffic and DC supply. The Radio Terminals can be configured as unprotected (1+0) or protected (1+1) inside the Basic Node. The outdoor part is fully independent of traffic capacity and supplied for various frequency bands.

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MINI-LINK TN has an integrated IP router in each node for handling of the DCN traffic. The IP DCN can also be used as transport channel for other equipment O&M data. A number of different alternatives to connect and transport DCN traffic are supported.

The element management function is implemented as an Embedded Element Manager (EEM) application. The EEM is accessed using a standard web browser. MINI-LINK Manager, the common management system for all Ericsson microwave products, is used for remote supervision of MINI-LINK TN.

Key features

- Any frequency, capacity and modulation
- Nodes designed for networks
- Efficient management systems

The MINI-LINK TN innovative architecture combines all functionality required for microwave transmission into one compact, cost-effective platform. PDH microwave radio terminals of any frequency, capacity and modulation are combined with network-optimized nodes that include cross-connect capability and built-in ring protection. Even more functionality is available in terms of High Capacity PDH, SDH multiplexing and flexible Ethernet functionality. In addition, traffic connections can be set-up between its end-location by simple click on the mouse via an efficient end-to-end management system.

Any frequency, capacity and modulation

MINI-LINK TN provides microwave transmission from 2x2 to 32x2 Mbit/s, operating within the 7 to 38 GHz frequency bands, utilizing C-QPSK and 16 QAM modulation schemes. It can be configured as unprotected (1+0) or protected (1+1) radio terminals.

The advanced microwave technology deployed in MINI-LINK TN includes capacity and modulation agile radio terminals. It means that capacity can be changed via software with no hardware changes. This flexibility together with the powerful bus architecture and traffic routing of MINI-LINK TN makes it easy to re-configure networks from a remote location.

MINI-LINK TN architecture offers High Capacity PDH transmission to fill the gap between 16xE1 and STM-1. High Capacity PDH allows efficient use of 32xE1 and 64xE1 capacities in ring, star and tree topologies. With High Capacity PDH, a smooth capacity-migration can be performed in existing microwave networks.

Nodes designed for networks

MINI-LINK TN provides an end-to-end range of nodes that are scalable in capacity and size, flexible to carry any protocol and protected with powerful mechanisms. In addition the nodes can be easily controlled and managed through built-in traffic routing and end-to-end management.

Three sizes of Basic Nodes are available, providing space for two, five or maximum nineteen radio terminals or other plug-in units. This makes it the optimal solution for all network sites, starting from a single microwave radio link to a fully-fledged radio hub with any combination of radio terminals, interfaces and features.

A microwave hub sites main function is to collect traffic carried over microwave radio links from several sites and to aggregate it into a higher capacity transmission link. MINI-LINK TN provides a powerful high-speed bus architecture that allows traffic to be routed via software between radio terminals and plug-in units.

The elimination of cables and site equipment results in few site visits, fast installation and provisioning, easy capacity expansion and improved network quality. Typically the node concept reduces rack space requirements by up to 70 %.

MINI-LINK TN supports reliable ring and mesh structures with capacities up to 155 Mbit/s. The ring protection mechanism works on E1 level and is media independent.

The nodes has no single point of failure in the traffic handling functions, as the redundant traffic bus is combined with physical link and equipment protection. Furthermore, the separation of traffic and control makes the system very robust and enables, for example, hot-swap of plug-in boards.

MINI-LINK TN will include also point-to-multipoint functionality and the architecture is designed to provide a smooth migration to packet-based traffic.

Efficient management systems

The network control and flexibility provided by the MINI-LINK management systems translate into low operating costs, quick return on investment and a long-term contribution to profitability.

MINI-LINK Manager is a powerful network element manager for centralized operation and maintenance of all microwave radio equipment supplied by Ericsson. It can be used as a stand-alone system, or integrated in a higher level network management environment using standard protocols

MINI-LINK Connexion enables MINI-LINK TN circuit end-points to be interconnected from a single screen, with just a few mouse clicks. This fully utilizes the remote traffic routing capability of MINI-LINK TN. Continuous re-configurations and upgrades to the transmission networks are a big part of operating costs, making the cost-savings from an end-to-end management system significant.

The features of MINI-LINK Connexion are also available over a combined MINI-LINK TN and Ericsson DXX network. It provides end-to-end management functionality over PDH, SDH and microwave nodes from a common management system. The multilayer routing functionality automatically routes traffic over different physical layers from smallest 1/0 cross-connect edge device to largest SDH backbone node.

AMM 6p and 20 p - Scalable microwave nodes designed for networks.

Technical data

Frequency (GHz)	7	8	13	15	18	23	26	28	32	38
C-QPSK										
RF output power (dBm)	+21/28	+20/26	+18/23	+18/25	+17/24	+20/23	+10/18	+17	+17	+17
Receiver threshold (dBm), BER 10^{-3}										
2x2 Mbit/s	-95	-94	-94	-94	-95	-94	-94	-93	-92	-92
4x2 Mbit/s	-92	-91	-91	-91	-92	-91	-91	-90	-89	-89
8x2 Mbit/s	-89	-88	-88	-88	-89	-88	-88	-87	-86	-86
17x2 Mbit/s	-86	-85	-85	-85	-86	-85	-85	-84	-83	-83
16 QAM										
RF output power (dBm)	+26	+22	+18	+18	+17	+18	+17	+17	+17	+14
Receiver threshold (dBm), BER 10^{-3}										
8x2 Mbit/s	-87	-87	-86	-86	-86	-86	-86	-85	-84	-83
17x2 Mbit/s	-84	-84	-83	-83	-83	-83	-83	-82	-81	-80
32x2 Mbit/s	-81	-81	-80	-80	-80	-80	-80	-79	-79	-77

ATPC	Available in all frequency bands				
Channel spacing	2x2	4x2	8x2	17x2	32x2
C-QPSK	3.5 MHz	7 MHz	14 MHz	28 MHz	-
16 QAM	-	-	7 MHz	14 MHz	28 MHz

Frequency stability
± 10 ppm

Antennas
0.2/0.3/0.6/1.2/1.8 m compact antennas for integrated and separate installation
2.4/3.0/3.7 m antennas for separate installation

Integrated power splitters
Available in symmetrical and asymmetrical versions

Protection
1+1 Microwave radio protection, MSP 1+1, 1+1 E1 SNCP, Equipment protection

Power supply
-48 V DC and +24 V DC

Power consumption
Radio Terminal: 30-110 W (depending on configuration)
Basic Node: AMM 2p/6p/20p 11W[1] / 27W[1] / 37W[1]

[1] including node processor, power filtering and fan (AMM 6p)

Weights and Dimensions (HxWxD)
Radio unit 7/8/18 GHz 7 kg/411x326x144 mm
Radio unit 13/15/23/26/28/32/38 GHz 4 kg/321x260x97 mm
Basic Node: AMM 2p/6p/20p 2.4 kg[1]/44x448[3]x236[4] mm / 6.4 kg[1]/133x438[3]x240[4] mm / 7.8 kg[1]/300[2]x448[3]x240[4] mm
Plug-in unit 0.5-0.7 kg/265x225x20

[1] including node processor, power filtering and fan (AMM 6p) [2] 444 mm with fan unit and cable tray [3] 483 mm with mounting brackets [4] 280 mm with mounting brackets and connectors

Traffic interfaces
E1, E3, STM-1 Electrical ITU-T G.703
STM-1 Optical S-1.1 ITU-T G.957
10/100BASE-T IEEE802.3

Maintenance interface
Ethernet 10BASE-T (AMM 6p, 20p) and USB (AMM2p)

Diagnostic functions
Line, local, and connection loops. Built-in Bit Error Rate Testers on all circuit boards.

Standards and recommendations
CEN/CENELEC, ETSI, ITU, IEC, IEEE, IETF

Switching capacity
Non-blocking switching capacity of 820 Mbit/s

Operational temperature
-50°C to + 60°C (outdoor, full functionality)
-25°C to + 55°C (indoor, full functionality)

Data Communication Network
IP DCN and Site LAN service provided by built-in IP router.
DCN interfaces via 10 BASE-T, E1, E0. In-bound transport over STM-1 and Microwave.

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