

MINI-LINK™ TN release 4

Ericsson's market leading microwave transmission node



Ericsson has more than 30 years of microwave experience. Over 1.7 million radio units have been delivered to more than 150 countries. MINI-LINK TN is produced in the world's largest microwave production facility and is renowned for its reliability. Ericsson is the market leader in microwave transmission.

MINI-LINK TN is a unique microwave transmission node, handling single hops and access sites as well as complex hub sites for large networks that are optimized for traffic aggregation and capacity savings.

Our customers use MINI-LINK TN in a number of different situations:

- **New roll-out of mobile backhaul networks.**

MINI-LINK TN fully supports all IP RAN over Ethernet Backhaul preferred in new mobile networks, with the necessary Ethernet quality of service.

- **Evolution of mobile backhaul networks.**

With the current increase of data traffic in the mobile network, MINI-LINK TN is a perfect fit.

It supports Native Ethernet as well as Native TDM or a mix of them. This allows our customers to start with TDM traffic, add Ethernet when data traffic increases, and move to all Ethernet when required.

- **Fixed Broadband over Microwave** utilizes the integrated solutions for both Carrier and best effort Ethernet. Backhaul of broadband access over microwave, close to the end user, is a proven cost efficient solution.

- Our **Enterprise, Broadcasting and National security customers** successfully deploy both single hops, and complete backhaul networks.

MINI-LINK TN is a high performance radio link. With the best in class radio output power, it provides longer hops with smaller antennas. MINI-LINK TN is able to send twice the capacity in a single frequency channel using XPIC, for Ethernet, PDH as well as SDH. The new Compact node makes end- and access sites more cost efficient.

MINI-LINK TN is a Hybrid Node, perfect for TDM to packet migration. The Hybrid Radio Link transports both Native Ethernet and Native PDH simultaneously over the same hop.

MINI-LINK TN provides a complete packet and TDM solution with PDH, SDH, Ethernet and ATM in the same node over the same hop with the required quality of service.

The unique networking capability of MINI-LINK TN gives speed to revenue when introducing new services. The traffic routing enables remote reconfiguration of the traffic. When the network grows and the capacity needs increases, the capacity is easily upgraded remotely. The integrated Ethernet switch enables

aggregation of Ethernet traffic with substantial capacity and cost savings. SDH and ATM traffic aggregation is equally possible. MINI-LINK TN is a perfect fit in an SDH ring due to the integrated ADM.

MINI-LINK TN's market leading reliability includes a field proven MTBF of typically more than 70 years. The integrated cross connect and switching function minimizes cabling and reduces the site complexity. MINI-LINK TN has the extensive protection necessary for carrier class equipment.

MINI-LINK TN is the worlds mostly deployed multiservice microwave system!



Backplane Traffic Routing

Up to 800 Mbit/s for PDH traffic on shared bus, non-blocking switching.

Up to 2 Gbit/s Ethernet (full duplex) traffic on High Speed Bus.

Integrated SDH terminal Multiplexer and ADM

Terminal Multiplexer with 63xE1 capacity.

ADM with 21xE1 drop capacity and Ethernet over SDH functionality with Graceful degradation.

ATM aggregation

ATM Aggregation Unit with capacity for up to 1500 ATM VCC and up to 100 VPC.

Ethernet Switching

Integrated non-blocking Gigabit Ethernet switch (IEEE 802.1D, 801.2Q compliant) QoS aware with 8 priority queues. RSTP functionality.

Network Synchronization

The Network Synchronization provides selection of clock source for the node and SSM propagation on outgoing interfaces (not PDH) when network synchronization is enabled. Mainly used in SDH nodes, Ethernet nodes and/or with ATM aggregation.

Hybrid Radio Link

Native Ethernet and Native PDH are supported over the microwave radio link. The maximum net rate over one radio is 310 Mbps per radio and the HW is prepared to handle up to 680 Mbps per channel using XPIC.

XPIC

The Radio Link can offer XPIC support for SDH traffic and for a combination of Native PDH and Native Ethernet traffic.

HW prepared for Adaptive modulation

The Radio Link is HW prepared to support hitless adaptive modulation for 4-256 QAM over 7-56 MHz channels.

Antennas	0.2/0.3/0.6/0.9/1.2/1.8 m single polarized antennas for integrated and separate installation 2.4/3.0/3.7 m single polarized antennas for separate installation 0.3/0.6 m dual polarized antennas for integrated and separate installation 1.2/1.8/2.4/3.0/3.7 m dual polarized antennas for separate installation
Integrated power splitters	Av ailable in symmetrical and asymmetrical versions
Protection	1+1 Radio equipment and propagation protection, MSP 1+1 Equipment protection, ELP Protection, EEP Protection, SNCP Network protection
Power supply	-48 V DC and +24 V DC
Power consumption	
Radio Terminal	30-110 W (depending on configuration)
Basic Node: AMM 1p/2p/6p/20p	0W ¹ /11W ¹ / 27W ¹ / 37W ¹ ¹ including node processor, power filtering and fan (AMM 6p)
Weights and Dimensions (HxWxD)	
Radio unit 6L/6U GHz	7 kg, 411x326x144 mm
Radio unit 7/8/10/11/13/15/18/23/26/28/32/38 GHz	4 kg, 321x260x97 mm
Basic Node: AMM 1p/2p/6p/20p	1.3 kg, 39x344x263 mm / 2.4 kg ¹ , 44x(448/438) ³ x240 ⁴ mm / 6.4 kg ¹ , 133x438 ³ x240 ⁴ mm / 7 kg ¹ , 300 ² x448 ³ x240 ⁴ mm
Plug-in unit	0.5-0.7 kg, 265x225x20 mm ¹ Not including node processor, power filtering and fan. 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 Partially filled STM-1 10/100/1000 BASE-T IEEE802.3 Optical GbitE via 1000 BASE-LX 1000 BASE-ZX IEEE802.3
Maintenance interface	USB
Diagnostic functions	Line, local, and connection loops. Built-in Bit Error Rate Test on all circuits or boards
Standards and recommendations	CEN/CENELEC, ETSI, ITU, IEC, IEEE, IETF
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 10/100 BASE-T, E1, E0 In-bound transport over STM-1 and Microwave

Technical data: (for MINI-LINK TN release 4.1)

Frequency (GHz)	6L*	7	10	11	13	18	26*	28*	32*	38*
	6U*	8			15	23				
Max. RF output power (dBm)										
128 QAM	+24	+26	+21	+23	+21	+18 +23**	+17	+15	+15	+14
64 QAM	+24	+26	+21	+23	+21	+18 +23**	+17	+15	+15	+14
16 QAM	+26	+27	+22	+24	+22	+19 +24**	+19	+17	+17	+16
4 QAM	+28	+29	+24	+26	+24	+21	+21	+19	+19	+18
C-QPSK	+30	+30	+25	+26	+25	+24 +26**	+23	+17	+20	+19

* RAU N ** RAU X HP

Min. RF output power (dBm)										
All modulation schemes	+8	-5	-10	-8	-10	-10	-5	-3	-3	-5

Receiver threshold BER 10-6 (dBm)												
Net Throughput		Frequency (GHz)	6L	7	10	11	13	18	26	28	32	38
			6U	8			15	23				
Ethernet [Mbps]	TDM											
3.8**	2E1	C-QPSK/3.5 MHz	-91	-91	-91	-91	-90	-90	-90	-89	-88	-88
7.5**	4E1	C-QPSK/7 MHz	-88	-88	-88	-88	-87	-87	-87	-86	-85	-85
10	5E1	4QAM/7 MHz	-91	-91	-91	-91	-90	-90	-90	-89	-88	-88
15**	8E1	16QAM/7 MHz	-86	-86	-86	-86	-85	-85	-85	-84	-83	-83
30	15E1	64QAM/7 MHz	-77	-77	-77	-77	-76	-76	-76	-75	-75	-74
15**	8E1	C-QPSK/14 MHz	-85	-85	-85	-85	-84	-84	-84	-83	-82	-82
20	10E1	4QAM/14 MHz	-88	-88	-88	-88	-87	-87	-87	-86	-85	-85
30**	17E1	16QAM/14 MHz	-83	-83	-83	-83	-82	-82	-82	-81	-80	-80
45	22E1	16QAM/14 MHz	-81	-81	-81	-81	-80	-80	-80	-79	-78	-78
75	35E1	128QAM/14 MHz	-73	-73	-73	-73	-72	-72	-71	-70	-70	-69
30**	16E1	C-QPSK/28 MHz	-82	-82	-82	-82	-81	-81	-81	-80	-79	-79
60**	32E1	16QAM/28 MHz	-80	-80	-80	-80	-79	-79	-79	-78	-77	-77
90	46E1	16QAM/28 MHz	-78	-78	-78	-78	-77	-77	-77	-76	-75	-75
155*	75E1	128QAM/28 MHz	-70	-70	-70	-70	-69	-69	-68	-67	-67	-66
155*/**	STM-1											
150**	STM-1	64QAM/40 MHz	NA	NA	NA	-74	NA	NA	NA	NA	NA	NA
			-74									
150**	STM-1	16QAM/56 MHz	-78	-78	-78	-78	-77	-77	-77	-76	-75	-75
310	80E1	128QAM/56 MHz	-65	-65	-65	-65	-64	-64	-64	-63	-62	-62

*X-PIC support for SDH (MMU2 F 155), and for PDH/Ethernet (MMU2 H)

** Ethernet over TDM

ATPC Available in all frequencies

Frequency stability ± 10 ppm

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