ALCATEL-LUCENT 9500 MPR
MICROWAVE PACKET RADIO
RELEASE 3 ETSI

The Alcatel-Lucent 9500 Microwave Packet Radio (MPR) platform enables the smooth transformation of transport networks from circuit to packet, thus seamlessly transporting TDM, ATM, IP and Ethernet over a Carrier Ethernet infrastructure. As a result, the Alcatel-Lucent 9500 MPR efficiently transports multimedia traffic while guaranteeing the Quality of Service (QoS) that end users require.

Microwave Service Switch-8 (MSS-8)

Microwave Service Switch-4 (MSS-4)

Microwave Service Switch-1c (MSS-1c)

Microwave Packet Transport (MPT): Multipurpose Outdoor Unit (ODU)

The Alcatel-Lucent 9500 MPR packet microwave radio addresses all microwave applications with a single product family – from full outdoor to split-mount and nodal configurations – for hybrid and full-packet traffic, thereby enabling the easy introduction of full IP base-stations such as Long Term Evolution (LTE) while leveraging the existing infrastructure. The operator is now free to maintain its current mode of operation using the TDM/hybrid model, and can start to migrate to packet as data traffic grows (boosted as well by IP-3G nodeBs and HSPA where needed). Mobile service providers, private operators and carriers now have a new platform, adding exceptional functionality to their networks.

FEATURES

- Intelligent nodal IDU that supports up to 12 ODUs in hybrid or packet node
- Hitless switching service-driven adaptive modulation
- Multiservice aggregator with embedded Circuit Emulation Service (CES) (MEF 8) and ATM IMA pseudowire (PWE3) (RFC 4717) capabilities for Carrier Ethernet transport
- Common multipurpose ODU for standalone full outdoor application and split-mount and nodal configurations; XPIC upgradable
- Millimeter wave support
- Multiservice switching capacity greater than 16 Gb/s
- Multiservice Packet Ring ITU-T G.8032v2
- Radio throughput greater than 4 Gb/s and termination of up to 192 x E1

- SDH transport, up to 8 STM1 interfaces
- EoS GFP mapping according to ITU-T G.7041
- Ethernet OAM IEEE 802.1ag
- Support of Synchronous Ethernet (SyncE) +SSM and IEEE 1588v2
- Support of LAG:
  - ¬ radio link (NNI)
  - ¬ Ethernet user interfaces (UNI)
  - ¬ Up to 2G Ethernet throughput over four channels
- Support of XPIC configurations: Up to 1G Ethernet throughput on 56-MHz channel

BENEFITS

- Reduces OPEX
  - ¬ Aggregation of multiple access technologies over Ethernet convergence layer, removing the need of new external equipment
- Protects operators' investments and enables backhaul networks for smooth migration from TDM to IP
  - ¬ Operates in hybrid (Ethernet/PDH/SDH) or packet mode with the same hardware items
- Addresses all microwave applications with common hardware
  - ¬ Backward compatibility with existing hybrid ODU
- Guarantees TDM deterministic behavior for packet transport
  - ¬ Native TDM-like performances
  - ¬ Guarantees high-priority traffic transport even in congested nodes

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- Simplified deployment
  - ¬ Fast pre-provisioning
  - ¬ Quick setup and network planning
- Drastically reduces footprint and rack power dissipation
  - ¬ Highest nodal capability with smallest footprint
  - ¬ Zero footprint in standalone full-outdoor solution to address full IP sites such as IP 3G, LTE or IP DSLAM backhaul; common system used in the split-mount solution
- Improves scalability and availability
  - ¬ End-to-end service-aware management provided by the Alcatel-Lucent 5620 Service Aware Manager (SAM) for the Alcatel-Lucent IP/MPLS Service Router portfolio and the Alcatel-Lucent 1350 Optical Management System (OMS), for the Alcatel-Lucent T-MPLS/MPLS-TP Packet Optical Transport portfolio
- Enhanced performance and reliability with built-in test functionalities
- Embedded synchronization distribution (even in full Ethernet infrastructure)
- Nodal microwave configuration with a single packet matrix switching
- Full redundancy with no single point of failure, including Ethernet matrix switch

TECHNICAL SPECIFICATIONS
Applications
- Hybrid and packet operational mode
- Standalone full outdoor solution
- Mobile backhaul (Super PDH, ATM and Ethernet aggregation)
- Full Ethernet/IP backhaul (IP 3G, LTE, WiMAX®, IP-DSLAM)
- Fixed and private networks

User interfaces
- E3 SFP module
- 32-port E1
- 2E1 port SFP module
- 16-port E1 Any Service, Any Port (ASAP)
- Embedded 4 x GE electrical and 2 x GE electrical/optical on SFP
- 8 x GE ports card
- Auxiliary card (2 x V11 64 kb/s service channels or V28; housekeeping in/out)
- Native ATM IMA termination and ATM PWE3 generation (IETF RFC 4717)
- MEF 8 circuit emulation for TDM E1 Carrier Ethernet transport
- 2xSTM1 ports
- EoSDH SFP module (G.7041)

Indoor/outdoor connection
- Single coaxial cable for split-mount configuration
- ¬ Length: Up to 300m (984 ft)
- GigE electrical or optical cable
  - ¬ Length: Up to 450 m

Synchronization
- Any synchronization solutions in hybrid and packet mode (performances according to ITU-T G.813/ G. 823/ G.8264)
- Clock distribution options
  - ¬ E1/STM-1
  - ¬ External reference sync-in/ sync-out (2 MHz, 5 MHz, 10 MHz)
  - ¬ Synchronous Ethernet (Sync E) + SSM G.8264
  - ¬ Built-in Stratum 3 clock
  - ¬ STM-1 line clock
  - ¬ IEEE 1588v2
- Line clock recovery
  - ¬ ACR, DCR, node timing

Dimensions and weight
- IDU (rack, desk or wall-mount)
  - ¬ MSS-8 (2 RU)
  - ¬ MSS-4 (1 RU)
  - ¬ MSS-1c (height: 1 RU; width: 1/2 RU)
  - ¬ Weight
    - Fully equipped: <6 kg (13.2 lb)
    - Basic configuration: 2.5 kg (5.5 lb)
- ODU
  - ¬ Weight: 5 kg (11 lb) average

Power supply
- Standard: -48 V DC to -60 V DC
- Optional: -24 V DC to -60 V DC

Services
- Network design and planning
- Hotline
- Express repair and return, swap and repair, and spare parts management
- On-site visits, urgent interventions, and technical assistance
- Training from theory to installation
  - ¬ Alcatel-Lucent University
  - ¬ Customer premises
- Bundled services during warranty period and warranty extensions

Standards compliance
- EMC: EN 55022 Class B, EN 301 489-1/ EN 301 489-4
- Safety: EN 60950-1
- Ecological: ECMA TR/70
- Temperature
  - ¬ IDU: -40°C to +65°C (-40°F to +149°F)
  - ¬ ODU: -33°C to +55°C (-27°F to +131°F)
- IEEE 802.1p/Q VLAN tagging
- IEEE 802.3 CSMA/CD
- IEEE 802.3u 100BaseTX
- IEEE 802.3x Flow Control
- IEEE 802.3z 1000BaseSX/LX
- IEEE 802.1d Bridging
- IEEE 802.1ad link aggregation
- IEEE 802.1ag Ethernet OAM
- 1000BaseT per 802.3ab
- MEF 8
- MEF 9
- MEF 14
- ITU-T G.7041
- ITU-T G.8032v2
- ITU-T G.813
- ITU-T G.823
- ITU-T G.8264

Network and element management
- Integrated network management in Windows environment
- Embedded Web browser for NE supervision
- Software-based configuration by PC
- Intuitive supervision systems
- SNMP agent with TCP/IP rerouting capability
- Interoperable with all Alcatel-Lucent wireless microwave and transmission equipment
- Alcatel-Lucent 1350 OMS
- Alcatel-Lucent 5620 SAM

Traffic management and QoS
- Marking based on:
  - ¬ Layer 2 (IEEE 802.1p)
  - ¬ Layer 3 (DiffServ)

Operating frequencies
Refer to Tables 1 and 2 for typical values for microwave packet transport and system frequencies

Table 1. Microwave Packet Transport radio-frequency specifications: Typical values

SYSTEM														
	L6/U6 GHz	7 GHz	8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz	80 GHz
Frequency range (GHz)	5.925 to 6.425 / 6.425 to 7.11	7.125 to 7.9	7.725 to 8.5	10.15 to 10.68	10.7 to 11.7	12.75 to 13.25	14.4 to 15.35	17.7 to 19.7	21.2 to 23.632	24.52 to 26.483	27.5 to 29.5	31.8 to 33.4	37.0 to 33.4	71.250 to 75.750 / 81.250 to 85.750
POWER OUTPUT, NOMINAL (dBm)														
	L6/U6 GHz	7 GHz HP	8 GHz HP	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz	80 GHz
BPSK QPSK														19.0
QPSK 8PSK	26.0	26.0	26.0	26.0	25.0	25.0	25.0	22.0	20.0	18.0	15.0	18.0	18.0	–
16-QAM 32-QAM	25.0	25.0	25.0	24.0	23.0	23.0	23.0	20.0	19.0	16.0	13.0	16.0	16.0	–
64-QAM 128-QAM	22.0	24.0	24.0	23.0	21.0	21.0	22.0	19.0	17.0	14.0	12.0	15.0	14.0	–
256-QAM	22.0	24.0	24.0	20.0	20.0	19.0	20.0	18.0	17.0	13.0	9.0	12.0	13.0	–

Table 2. System specifications: Typical values

SYSTEM GAIN AT 10-3 (dBm)	CS (MHz)	L6 GHz	U6 GHz	7 GHz HP	8 GHz HP	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz	80 GHz	CAPACITY (Mb/s) TYPICAL	MAXIMUM
QPSK	7	122.5	122.5	121.5	121.5	119.0	120.5	119.5	120.5	116.5	115.0	112.0	107.0	110.0	110.0	–	10	>15
16-QAM		116.0	116.0	115.0	115.0	110.0	113.0	112.5	113.0	109.0	108.5	104.5	98.0	100.5	102.5	–	20	>32
64-QAM		106.5	106.5	107.5	107.5	103.0	104.5	104.0	105.5	101.5	100.0	96.0	91.5	94.0	94.0	–	30	>47
QPSK	14	119.5	119.5	118.5	118.5	116.0	117.5	117.0	117.5	113.5	112.0	109.0	104.0	106.5	107.0	–	20	>32
16-QAM		113.5	113.5	112.5	112.5	108.0	110.5	109.5	110.5	106.5	106.0	102.0	94.5	97.5	100.0	–	40	>65
64-QAM		103.5	103.5	104.5	104.5	100.5	101.5	101.0	102.5	98.5	97.0	93.0	87.5	90.0	91.0	–	60	>98
QPSK	28	117.0	117.0	116.0	116.0	113.5	115.0	114.0	115.0	111.0	109.5	106.5	101.0	103.5	104.5	–	40	>68
16-QAM		110.0	110.0	109.0	109.0	105.5	107.0	107.0	107.0	103.0	102.5	98.5	92.0	94.5	96.5	–	80	>137
32-QAM		106.0	106.0	105.0	105.0	101.5	103.0	103.0	103.0	99.0	98.5	94.5	88.0	90.5	92.5	–	100	>168
64-QAM		100.5	101.5	101.5	101.5	97.5	98.5	98.0	99.5	95.5	94.0	90.0	84.5	87.0	88.0	–	125	>201
128-QAM		96.5	97.5	97.5	97.5	94.0	94.5	94.5	95.5	91.5	90.0	86.0	79.0	81.5	84.0	–	150	>237
256-QAM		93.5	93.5	94.5	94.5	89.0	90.5	89.5	90.5	87.5	87.0	82.0	74.0	76.5	80.0	–	180	>281
16-QAM	56	108.0	108.0	107.0	107.0	103.0	104.8	104.5	104.8	100.8	100.3	96.3	89.5	92.0	94.3	–	165	>252
128-QAM		94.5	95.5	95.5	95.5	89.5	92.0	92.0	93.0	89.0	87.5	83.5	74.5	77.0	81.5	–	300	>465
256-QAM		91.5	91.5	93.0	93.0	84.5	88.5	87.5	88.5	85.5	85.0	80.0	69.5	72.0	78.0	–	340	>530
BPSK	250	–	–	–	–	–	–	–	–	–	–	–	–	–	–	91.0	–	>120
QPSK		–	–	–	–	–	–	–	–	–	–	–	–	–	–	88.0	–	>240
BPSK	1000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	86.0	–	>600
QPSK		–	–	–	–	–	–	–	–	–	–	–	–	–	–	83.0	–	>1200

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