Alcatel-Lucent 9500 Microwave Packet Radio

NORTH AMERICAN MARKETS | RELEASE 2

The Alcatel-Lucent 9500 Microwave Packet Radio (MPR) is changing the world of wireless transmission; it provides seamless Internet Protocol (IP) migration for microwave networks. Mobile service providers, private operators and carriers now have a new platform adding exceptional functionality to their networks. The Alcatel-Lucent 9500 MPR handles traffic by packets natively, using IP instead of being locked into TDM formats, yet it still fully supports TDM circuits, providing a means to gracefully and seamlessly migrate to an all-IP infrastructure. The Alcatel-Lucent 9500 MPR offers the lowest total cost of ownership (TCO) by reducing both fixed capital expenditures and recurring operational expenses.

Outdoor Units (ODU)

Microwave Packet Transport (MPT-HL)

Microwave Service Switch (MSS)

Key features and benefits

- Multiservice aggregation layer
  - ¬ Provided by a fully scalable 10 Gigabit Microwave Service Switch (MSS) with DS1, DS3 and Ethernet interfaces
  - ¬ Allows operators to adopt IP backhaul without abandoning existing TDM-based services
  - ¬ With Ethernet as the convergence layer, any kind of traffic can be carried, independent of the type of interface
- Service awareness
  - ¬ Encapsulates all traffic as packets, then queues and prioritizes packets by service type, criticality and Quality of Service (QoS) requirements before transporting packets across the radio link
  - ¬ Eliminates the potential for backhaul to become a choke point with limited growth for new data services while still supporting QoS requirements of existing voice services
- Service-driven adaptive modulation
  - ¬ This giant step forward in radio technology hitlessly adapts to changing link conditions to improve availability
  - ¬ Fully exploits the air link by allocating transport capacity according to dynamically varying bandwidth and QoS requirements for different services
  - ¬ Improves use of the premium microwave spectrum, boosts link performance and reduces antenna size requirements

- Multi-reach packet node
  - ¬ Combines up to 12 short-haul and long-haul radio transceivers plus a 10 Gigabit core switching matrix into a single network element
  - ¬ Provides optical Gigabit Ethernet (1 GigE) and metallic uplinks
  - ¬ Packets can be transported over any media in any direction
  - ¬ Dramatically reduces the TCO by eliminating service aggregation bottlenecks, serving a wide range of distances, connecting in several directions, minimizing space requirements, eliminating messy intershelf cabling, and simplifying operation

Technical specifications

Applications
- Backhaul and backbone transport for mobile service providers
- Interconnection of private land mobile radios for public safety and industry
- Wide area network (WAN) connectivity for enterprises, Internet service providers (ISPs) and carriers

Configuration options
- Radio terminal
- Radio repeater
- Multidirectional radio node
- Aggregation shelf (no radio frequency [RF])

Radio-to-MSS connections
- ODU: Up to 6 NSB or 3 MHSB
- MPT-HL: Up to 8 NSB or 4 MHSB
- Or a combination of the above

Operating frequencies
- ODU: Lower and upper 6 GHz, 7/8 GHz, 11 GHz, 15 GHz, 18 GHz and 23 GHz
- MPT-HL: 5.8 GHz, lower and upper 6 GHz, and 10/11 GHz

Radio frequency transceiver
- Synthesized source

Microwave service switch
- TDM encapsulation: MEF 8
- Switching capacity: Greater than 10 Gb/s
- Aggregate radio throughput: Greater than 2 Gb/s

Traffic interfaces
- 100% front access for:
  - ¬ DS1 access card: 32 x DS1
  - ¬ DS3 access card: 2 x DS3
- Control and switching module
  - ¬ 4 x 10/100/1000 BaseT
  - ¬ 2 x Small Form Factor Pluggable (SFP)
- 8 x Ethernet access card:
  - ¬ 4 x 10/100/1000 BaseT
  - ¬ 4 x SFP

Power requirements
- Input voltage range
  - ¬ MSS - Standard: -48 V DC to -60 V DC ± 20%
  - ¬ MPT-HL: ±24 V DC to ±60 V DC ± 20%
  - ¬ ODU: Powered over intermediate frequency (IF)/coaxial cable

Power consumption
- MSS (dependent on actual cards installed)
  - ¬ Control switching module: 15 W
  - ¬ 32 x DS1 access card: 16 W
  - ¬ 2 x DS3 access card: 16 W
  - ¬ Radio access card: 23 W
  - ¬ 8 x Ethernet access card: 15 W
  - ¬ Fan: 8 W
- MPT-HL: 110 W per RF transceiver
- ODU: 35 W maximum

Dimensions
- MSS
  - ¬ Height: 88 mm (3.46 in.)
  - ¬ Width: 444 mm (17.48 in.)
  - ¬ Depth: 250 mm (9.84 in.)
- MPT-HL
  - ¬ Height: 108 mm (4.25 in.)
  - ¬ Width: 438 mm (17.25 in.)
  - ¬ Depth: 362 mm (14.25 in.)
- ODU
  - ¬ Height: 287 mm (11.29 in.)
  - ¬ Width: 287 mm (11.29 in.)
  - ¬ Depth: 119 mm (4.69 in.)

Weight
- MSS: Less than 5.98 kg (13.2 lb) fully loaded
- MPT-HL
  - ¬ 1+1 and 2+0: 12.7 kg (28 lb)
  - ¬ 1+0: 8.85 kg (19.5 lb)
- ODU: 5.98 kg (13.2 lb)

Operating environment
- MSS: -5°C to +55°C (23°F to 131°F)
- MPT-HL: 0°C to +55°C (32°F to 131°F)
- ODU guaranteed: -33°C to +55°C (-27°F to +131°F)
- NEBS Level 3
- Telcordia GR-63
- Telcordia GR-1089

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
- Fully compatible with the Alcatel-Lucent Transmission System Manager (TSM) 8000, Alcatel-Lucent 1340 Integrated Network Controller (INC), and Alcatel-Lucent 5620 Service Aware Manager (SAM)

Synchronization
- External reference timing
- DS1 line timing
- Adaptive/Differential clock recovery
- Built-in Stratum-3 clock

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

Standards compliance
- IEEE 802.1p/Q VLAN tagging
- IEEE 802.3 10BaseT
- IEEE 802.3u 100BaseTX
- IEEE 802.3x Flow Control
- IEEE 802.3z 1000BaseSX/LX
- IEEE 802.1d Bridging

Table 1. Modulation options

MPT-HL (INDOOR) WITH STATIC MODULATION							
RF BAND	RADIO TYPE	CHANNEL BANDWIDTH (MHz)	MODULATION (QAM)	RADIO CAPACITY (Mb/s)	TRANSMIT POWER[1] (dBm)	THRESHOLD[2] (10^{-6} BER) (dBm)	SYSTEM GAIN[3] (dB)
5.8 GHz unlicensed	MPT-HL	5	32	18.255	30.0	-85.0	115.0
	MPT-HL	5	128	25.757	30.0	-79.0	109.0
	MPT-HL	10	32	37.323	30.0	-82.5	112.5
	MPT-HL	10	128	52.640	30.0	-76.0	106.0
	MPT-HL	30	32	114.220	30.0	-77.5	107.5
	MPT-HL	30	128	160.170	30.0	-71.0	101.0
	MPT-HL	30	256	183.302	28.0	-67.5	95.5
Lower 6 GHz standard power	MPT-HL	5	32	18.255	32.0	-85.0	117.0
	MPT-HL	5	128	25.757	31.0	-79.0	110.0
	MPT-HL	10	32	37.323	32.0	-82.5	114.5
	MPT-HL	10	128	52.640	31.0	-76.0	107.0
	MPT-HL	30	32	114.220	32.0	-77.5	109.5
	MPT-HL	30	128	160.170	31.0	-71.0	102.0
	MPT-HL	30	256	183.302	28.0	-67.5	95.5
Lower 6 GHz high power	MPT-HL	5	32	18.255	34.0	-85.0	119.0
	MPT-HL	5	128	25.757	33.0	-79.0	112.0
	MPT-HL	10	32	37.323	34.0	-82.5	116.5
	MPT-HL	10	128	52.640	33.0	-76.0	109.0
	MPT-HL	30	32	114.220	34.0	-77.5	111.5
	MPT-HL	30	128	160.170	33.0	-71.0	104.0
	MPT-HL	30	256	183.302	30.0	-67.5	97.5
Upper 6 GHz standard power	MPT-HL	5	32	18.255	32.0	-85.0	117.0
	MPT-HL	5	128	25.757	31.0	-79.0	110.0
	MPT-HL	10	32	37.323	32.0	-82.5	114.5
	MPT-HL	10	128	52.640	31.0	-76.0	107.0
	MPT-HL	30	32	114.220	32.0	-77.5	109.5
	MPT-HL	30	128	160.170	31.0	-71.0	102.0
	MPT-HL	30	256	183.302	28.0	-67.5	95.5
Upper 6 GHz high power	MPT-HL	5	32	18.255	34.0	-85.0	119.0
	MPT-HL	5	128	25.757	33.0	-79.0	112.0
	MPT-HL	10	32	37.323	34.0	-82.5	116.5
	MPT-HL	10	128	52.640	33.0	-76.0	109.0
	MPT-HL	30	32	114.220	34.0	-77.5	111.5
	MPT-HL	30	128	160.170	33.0	-71.0	104.0
	MPT-HL	30	256	183.302	30.0	-67.5	97.5
10.5 GHz	MPT-HL	5	32	18.255	30.0	-85.0	115.0
	MPT-HL	5	128	25.757	29.0	-79.0	108.0
	MPT-HL	10	32	37.323	30.0	-82.5	112.5
	MPT-HL	10	128	52.640	29.0	-76.0	106.0
11 GHz	MPT-HL	5	32	18.255	30.0	-85.0	115.0
	MPT-HL	5	128	25.757	29.0	-79.0	108.0
	MPT-HL	10	32	37.323	30.0	-82.5	112.5
	MPT-HL	10	128	52.640	29.0	-76.0	105.0
	MPT-HL	30	32	114.220	30.0	-77.5	107.5
	MPT-HL	30	128	160.170	29.0	-71.0	100.0
	MPT-HL	30	256	183.302	26.0	-67.5	93.5

Notes:
Not all profiles may be available in current software release
[1] Transmit power is measured at the output of the power amplifier
[2] Typical, as measured at the input to the radio receiver
[3] Typical, as measured from transmitter to receiver

These specifications are subject to change without notice

ODU WITH STATIC MODULATION							
RF BAND	RADIO TYPE	CHANNEL BANDWIDTH (MHz)	MODULATION (QAM)	RADIO CAPACITY (Mb/s)	TRANSMIT POWER (dBm)	THRESHOLD[1] (10^{-6} BER) (dBm)	SYSTEM GAIN[1] (dB)
Lower 6 GHz	ODUv2	10	128	52.640	24.5	-74.0	98.5
	ODUv2	30	128	160.170	24.5	-69.3	93.8
	ODUv2	30	256	183.302	22.5	-65.5	88.0
Upper 6 GHz	ODUv2	10	128	52.640	24.5	-74.0	98.5
	ODUv2	30	128	160.170	24.5	-69.3	93.8
	ODUv2	30	256	183.302	22.5	-65.5	88.0
11 GHz	ODUv2	10	128	52.640	20.0	-73.5	93.5
	ODUv2	30	32	114.220	21.5	-75.0	96.5
	ODUv2	30	128	160.170	20.0	-69.0	89.0
	ODUv2	30	256	183.302	18.0	-65.0	83.0
	ODUv2	40	32	152.293	21.5	-74.0	95.5
	ODUv2	40	128	213.935	20.0	-67.5	87.5
	ODUv2	40	256	245.194	18.0	-64.0	82.0
15 GHz	ODUv2	10	32	37.323	19.5	-79.0	98.5
	ODUv2	10	128	52.640	18.0	-72.5	90.5
	ODUv2	30	32	114.220	19.5	-74.0	93.5
	ODUv2	30	128	160.170	18.0	-68.0	86.0
	ODUv2	30	256	183.302	16.0	-65.0	81.0
	ODUv2	40	32	152.293	19.5	-73.0	92.5
	ODUv2	40	128	213.935	18.0	-66.5	84.5
	ODUv2	40	256	245.194	16.0	-63.0	79.0
	ODUv2	50	32	190.804	19.5	-72.0	91.5
	ODUv2	50	128	267.700	18.0	-65.5	83.5
18 GHz	ODUv2	10	32	37.323	17.0	-78.5	95.5
	ODUv2	10	128	52.640	15.5	-72.0	87.5
	ODUv2	30	32	114.220	17.0	-73.5	90.5
	ODUv2	30	128	160.170	15.5	-67.5	83.0
	ODUv2	30	256	183.302	13.5	-63.5	77.0
	ODUv2	40	32	152.293	17.0	-72.5	89.5
	ODUv2	40	128	213.935	15.5	-66.0	81.5
	ODUv2	40	256	245.194	13.5	-62.5	76.0
	ODUv2	50	32	190.804	17.0	-71.5	88.5
	ODUv2	50	128	267.700	15.5	-65.0	80.5
	ODUv2	50	256	306.774	13.5	-61.5	75.0
23 GHz	ODUv2	10	32	37.323	17.0	-78.0	95.0
	ODUv2	10	128	52.640	15.5	-71.5	87.0
	ODUv2	30	32	114.220	17.0	-73.0	90.0
	ODUv2	30	128	160.170	15.5	-67.0	82.5
	ODUv2	30	256	183.302	13.5	-63.0	76.5
	ODUv2	40	32	152.293	17.0	-72.0	89.0
	ODUv2	40	128	213.935	15.5	-65.5	81.0
	ODUv2	40	256	245.194	13.5	-62.0	75.5
	ODUv2	50	32	190.804	17.0	-71.0	88.0
	ODUv2	50	128	267.700	15.5	-64.5	82.0
	ODUv2	50	256	306.774	13.5	-61.0	74.5

Notes:
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[1] Typical

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ODU WITH ADAPTIVE MODULATION							
RF BAND	RADIO TYPE	CHANNEL BANDWIDTH (MHz)	MODULATION (QAM)	RADIO CAPACITY (Mb/s)	TRANSMIT POWER (dBm)	THRESHOLD[1] (10^{-6} BER) (dBm)	SYSTEM GAIN[1] (dB)
Lower 6 GHz	ODUv2	10	4	14.191	25.5	-89.5	115.0
	ODUv2	10	16	29.508	25.5	-83.5	109.0
	ODUv2	10	64	44.825	25.5	-77.0	102.5
	ODUv2	30	4	42.950	25.5	-85.0	110.5
	ODUv2	30	16	85.024	25.5	-79.0	104.5
	ODUv2	30	64	131.099	25.5	-72.5	98.0
Upper 6 GHz	ODUv2	10	4	14.191	25.5	-89.5	115.0
	ODUv2	10	16	29.508	25.5	-83.5	109.0
	ODUv2	10	64	44.825	25.5	-77.0	102.5
11 GHz	ODUv2	10	4	14.191	21.0	-89.0	110.0
	ODUv2	10	16	29.508	21.0	-83.0	104.0
	ODUv2	10	64	44.825	21.0	-76.5	97.5
	ODUv2	30	4	42.950	21.0	-84.5	105.5
	ODUv2	30	16	85.024	21.0	-78.5	99.5
	ODUv2	30	64	131.099	21.0	-72.0	93.0
15 GHz	ODUv2	10	4	14.191	18.5	-88.0	106.5
	ODUv2	10	16	29.508	18.5	-82.0	100.5
	ODUv2	10	64	44.825	18.5	-75.5	94.0
	ODUv2	30	4	42.950	18.5	-83.5	102.0
	ODUv2	30	16	85.024	18.5	-77.5	96.0
	ODUv2	30	64	131.099	18.5	-71.0	89.5
18 GHz	ODUv2	10	4	14.191	16.5	-87.5	104.0
	ODUv2	10	16	29.508	16.5	-81.5	98.0
	ODUv2	10	64	44.825	16.5	-75.0	91.5
	ODUv2	30	4	42.950	16.5	-83.0	99.5
	ODUv2	30	16	85.024	16.5	-77.0	93.5
	ODUv2	30	64	131.099	16.5	-70.5	87.0
23 GHz	ODUv2	10	4	14.191	16.5	-87.0	103.5
	ODUv2	10	16	29.508	16.5	-81.0	97.5
	ODUv2	10	64	44.825	16.5	-74.5	91.0
	ODUv2	30	4	42.950	16.5	-82.5	99.0
	ODUv2	30	16	85.024	16.5	-76.5	93.0
	ODUv2	30	64	131.099	16.5	-70.0	86.5

Notes:
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[1] Typical

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