

# Alcatel-Lucent 9500 MXC: Microwave Cross-Connect

## BROADBAND WIRELESS TRANSPORT FOR THE EDGE AND HUBS

### O V E R V I E W

The 9500 MXC is a State-of-the-Art split architecture radio platform aimed at fulfilling the needs of a wide range of wireless point-to-point applications. It provides highly reliable communications for transmission of TDM, SONET and Ethernet traffic. The 9500 MXC offers capacities from 6 Mbps to 311 Mbps, in the 6 GHz to 23 GHz frequency bands.

The innovative Nodal concept and Terminal configurations of the 9500 MXC provide a single platform solution for point-to-point applications, resulting in a dramatic reduction of the total cost of ownership for wireless access and backhaul providers. The highly scalable, software-configurable architecture of the 9500 MXC allows operators to take complete control of their networks, to adapt to constantly changing environments and to anticipate future traffic evolution.

### A P P L I C A T I O N S

The 9500 MXC supports multiple applications including those for mobility, private and carrier network infrastructures. By utilizing simple plug-in card upgrades the 9500 MXC

provides the flexibility to grow from low capacity TDM interfaces (as low as 4 DS1), to high capacity OC-3, and Ethernet, using the same Intelligent Node Unit (INU). The operator has complete flexibility to mix and match ANY interface within the radio. This allows the 9500 MXC to act as an integrated access device, drastically lowering CAPEX and simplifying network design while increasing network reliability.

The highly flexible INU allows interconnection with up to six (6) Outdoor Units (ODU's). Software selectable modulation, from QPSK to 256 QAM, offers flexibility with capacity, RF bandwidth and spectral efficiency. Non-standby and hot-standby RF protection options, with integrated and non-integrated ODU/antenna configurations, are all available options.

The 9500 MXC is available for deployment today in FCC and Industry Canada Frequency bands of L6, U6, 7-8, 10.5, 11, 15, 18, and 23 GHz. The 9500 MXC can be configured with DS1, DS3, OC-3 or Ethernet tributary interfaces, with the operator having the ability to mix and match as needed. Additionally, the DS3 can be equipped as a clear channel or have an integrated M13 multiplexer while the OC-3 card has the ability to be configured as a SONET ADM.

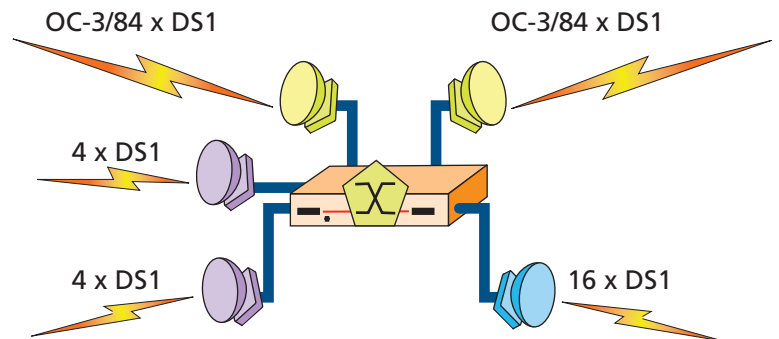


## KEY FEATURES

- Scalable Capacity
- Wireless Node and Terminal Platforms
- Node is software configurable for link capacities from 4 to 100 DS1
  - ↳ DS3, OC-3 and Ethernet traffic options available
- Built-in traffic routing with DS1 cross-connect feature
- Compact IDU, INU and ODU
  - ↳ 1 RU (NS Indoor Unit)
  - ↳ 2 RU (HS Indoor Unit)
- Configurations supported:
  - ↳ Non-Standby
  - ↳ Hot-Standby
  - ↳ Space Diversity
  - ↳ Frequency Diversity
  - ↳ Built in Ring protection
- Co-Channel Cross-Pol operation
- Choice of modulation, capacity and traffic routing via software
- Diagnostic tools for circuit performances
- Simple installation, test and maintenance

## KEY BENEFITS

- Low cost of ownership
- Software configurable for capacity, modulation & traffic
- No stranded investment
  - ↳ Radio expands as your network evolves
- Modular architecture
- Comprehensive Network Management
  - ↳ Built in SNMP protocol
- Java based craft terminal
- Nodal capability supports multiple RF paths
- Built-in traffic routing
- Mixed data and TDM traffic



Multi-direction RF hub with full bandwidth management

## Transmit Power, Receiver Threshold, and System Gain – Typical Values

Frequency Bands	Spacing MHz	Interface	Modulation	RF BW MHz	Transmit Power (typical) dBm	Receiver Threshold (10 <sup>6</sup> typ) dBm	System Gain (10 <sup>6</sup> typical) dBm
6 GHz	160/252.04	8 DS1	32 QAM	3.75	26.0	-85.0	111.0
6 GHz	160/252.04	16 DS1	128 QAM	5	24.5	-77.5	102.0
6 GHz	160/252.04	28 DS1	64 QAM	10	25.5	-77.5	103.0
6 GHz	160/252.04	70 DS1	128 QAM	20	24.5	-71.5	96.0
6 GHz	160/252.04	84 DS1	64 QAM	30	25.5	-72.5	98.0
6 GHz	160/252.04	100 DS1	128 QAM	30	24.5	-69.5	94.0
6 GHz	160/252.04	1 DS3	64 QAM	10	25.5	-77.5	103.0
6 GHz	160/252.04	3 DS3	64 QAM	30	25.5	-72.5	98.0
6 GHz	160/252.04	1 OC3	128 QAM	30	24.5	-69.5	94.0
7-8 GHz	150/175/300	4 DS1	QPSK	5	28.5	-94.0	122.5
7-8 GHz	150/175/300	8 DS1	QPSK	10	28.5	-91.5	120.0
7-8 GHz	150/175/300	16 DS1	QPSK	20	28.5	-88.0	116.5
7-8 GHz	150/175/300	16 DS1	16 QAM	10	26.5	-84.5	111.0
7-8 GHz	150/175/300	28 DS1	QPSK	30	28.5	-86.0	114.5
7-8 GHz	150/175/300	28 DS1	16 QAM	20	26.5	-82.0	108.5
7-8 GHz	150/175/300	28 DS1	64 QAM	10	25.5	-77.5	103.0
7-8 GHz	150/175/300	32 DS1	16 QAM	20	26.5	-81.5	108.0
7-8 GHz	150/175/300	70 DS1	32 QAM	30	26.0	-75.5	101.5
7-8 GHz	150/175/300	70 DS1	128 QAM	20	24.5	-71.5	96.0
7-8 GHz	150/175/300	84 DS1	64 QAM	30	25.5	-72.5	98.0
7-8 GHz	150/175/300	100 DS1	128 QAM	30	24.5	-69.5	94.0
7-8 GHz	150/175/300	1 DS3	QPSK	30	28.5	-86.0	114.5
7-8 GHz	150/175/300	1 DS3	64 QAM	10	25.5	-77.5	103.0
7-8 GHz	150/175/300	3 DS3	64 QAM	30	25.5	-72.5	98.0
7-8 GHz	150/175/300	1 OC3	128 QAM	30	24.5	-69.5	94.0
10.5 GHz	65	8 DS1	32 QAM	3.75	23.5	-83.0	106.0
10.5 GHz	65	16 DS1	128 QAM	5	22.0	-76.0	98.0
11 GHz	490/500	8 DS1	32 QAM	3.75	21.5	-84.5	106.0
11 GHz	490/500	16 DS1	128 QAM	5	20.0	-77.5	97.5
11 GHz	490/500	28 DS1	64 QAM	10	21.0	-77.5	98.5
11 GHz	490/500	70 DS1	32 QAM	30	21.5	-75.5	97.0
11 GHz	490/500	70 DS1	128 QAM	20	20.0	-71.0	91.0
11 GHz	490/500	84 DS1	32 QAM	40	21.5	-77.0	98.5
11 GHz	490/500	84 DS1	64 QAM	30	21.0	-72.5	93.5
11 GHz	490/500	100 DS1	32 QAM	40	21.5	-74.5	96.0
11 GHz	490/500	100 DS1	128 QAM	30	20.0	-69.5	89.5
11 GHz	490/500	127 DS1	128 QAM	40	20.0	-69.5	89.5
11 GHz	490/500	1 DS3	64 QAM	10	21.0	-77.5	98.5
11 GHz	490/500	3 DS3	64 QAM	30	21.0	-72.5	93.5
11 GHz	490/500	4 DS3	64 QAM	40	21.0	-72.5	93.5
11 GHz	490/500	1 OC3	64 QAM	40	21.0	-74.0	95.0
11 GHz	490/500	1 OC3	128 QAM	30	20.0	-69.5	89.5

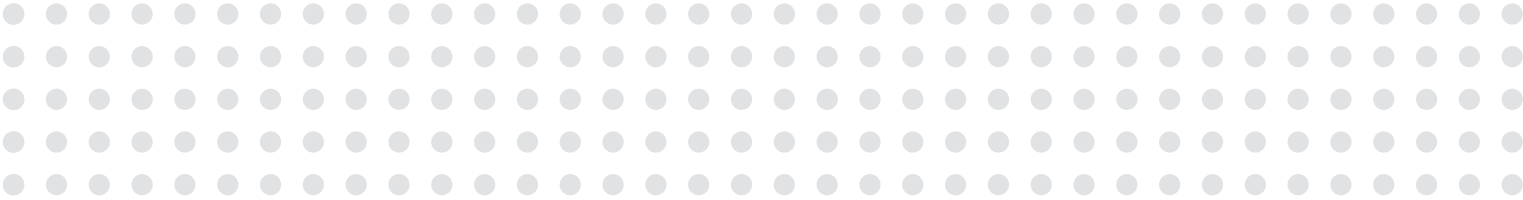
## Transmit Power, Receiver Threshold, and System Gain – Typical Values

Frequency Bands	Spacing MHz	Interface	Modulation	RF BW MHz	Transmit Power (typical) dBm	Receiver Threshold (10 <sup>s</sup> typ) dBm	System Gain (10 <sup>s</sup> typical) dBm
15 GHz	475	4 DS1	QPSK	5	22.0	-93.5	115.5
15 GHz	475	8 DS1	QPSK	10	22.0	-91.0	113.0
15 GHz	475	8 DS1	16 QAM	5	20.0	-87.0	107.0
15 GHz	475	16 DS1	QPSK	20	22.0	-87.5	109.5
15 GHz	475	16 DS1	16 QAM	10	20.0	-84.0	104.0
15 GHz	475	28 DS1	QPSK	30	22.0	-85.5	107.5
15 GHz	475	28 DS1	16 QAM	20	20.0	-81.5	101.5
15 GHz	475	28 DS1	64 QAM	10	19.0	-77.0	96.0
15 GHz	475	32 DS1	QPSK	40	22.0	-87.0	109.0
15 GHz	475	32 DS1	16 QAM	20	20.0	-81.0	101.0
15 GHz	475	70 DS1	16 QAM	40	20.0	-80.0	100.0
15 GHz	475	70 DS1	32 QAM	30	19.5	-75.0	94.5
15 GHz	475	70 DS1	128 QAM	20	18.0	-71.0	89.0
15 GHz	475	84 DS1	32 QAM	40	19.5	-77.0	96.5
15 GHz	475	84 DS1	64 QAM	30	19.0	-72.0	91.0
15 GHz	475	100 DS1	32 QAM	40	19.5	-74.5	94.0
15 GHz	475	100 DS1	128 QAM	30	18.0	-69.0	87.0
15 GHz	475	127 DS1	128 QAM	40	18.0	-69.5	87.5
15 GHz	475	1 DS3	QPSK	30	22.0	-85.5	107.5
15 GHz	475	1 DS3	64 QAM	10	19.0	-77.0	96.0
15 GHz	475	3 DS3	64 QAM	30	19.0	-72.0	91.0
15 GHz	475	4 DS3	64 QAM	40	19.0	-72.5	91.5
15 GHz	475	1 OC3	64 QAM	40	19.0	-73.5	92.5
15 GHz	475	1 OC3	128 QAM	30	18.0	-69.0	87.0
18 GHz	1560	4 DS1	QPSK	5	19.5	-93.0	112.5
18 GHz	1560	8 DS1	QPSK	10	19.5	-90.5	110.0
18 GHz	1560	8 DS1	16 QAM	5	17.5	-87.0	104.5
18 GHz	1560	16 DS1	QPSK	20	19.5	-87.5	107.0
18 GHz	1560	16 DS1	16 QAM	10	17.5	-83.5	101.0
18 GHz	1560	28 DS1	QSPK	30	19.5	-85.0	104.5
18 GHz	1560	28 DS1	16 QAM	20	17.5	-81.5	99.0
18 GHz	1560	28 DS1	64 QAM	10	16.5	-77.0	93.5
18 GHz	1560	32 DS1	QSPK	40	19.5	-87.0	106.5
18 GHz	1560	32 DS1	16 QAM	20	17.5	-80.5	98.0
18 GHz	1560	70 DS1	16 QAM	40	17.5	-80.0	97.5
18 GHz	1560	70 DS1	32 QAM	30	17.0	-75.0	92.0
18 GHz	1560	70 DS1	128 QAM	20	15.5	-70.5	86.0
18 GHz	1560	84 DS1	32 QAM	40	17.0	-76.5	93.5
18 GHz	1560	84 DS1	64 QAM	30	16.5	-72.0	88.5
18 GHz	1560	100 DS1	16 QAM	50	17.5	-75.0	92.5
18 GHz	1560	100 DS1	32 QAM	40	17.0	-74.0	91.0
18 GHz	1560	100 DS1	128 QAM	30	15.5	-69.0	84.5
18 GHz	1560	127 DS1	128 QAM	40	15.5	-69.0	84.5

## Transmit Power, Receiver Threshold, and System Gain – Typical Values

Frequency Bands	Spacing MHz	Interface	Modulation	RF BW MHz	Transmit Power (typical) dBm	Receiver Threshold (10 <sup>6</sup> typ) dBm	System Gain (10 <sup>6</sup> typical) dBm
18 GHz	1560	127 DS1	64 QAM	50	16.5	-71.5	88.0
18 GHz	1560	1 DS3	QPSK	30	19.5	-85.0	104.5
18 GHz	1560	1 DS3	64 QAM	10	16.5	-77.0	93.5
18 GHz	1560	3 DS3	64 QAM	30	16.5	-72.0	88.5
18 GHz	1560	4 DS3	64 QAM	40	16.5	-72.0	88.5
18 GHz	1560	1 OC3	16 QAM	50	17.5	-75.0	92.5
18 GHz	1560	1 OC3	64 QAM	40	16.5	-73.5	90.0
18 GHz	1560	1 OC3	128 QAM	30	15.5	-69.0	84.5
18 GHz	1560	2 OC3	256 QAM	50	13.5	-63.0	76.5
23 GHz	1200	4 DS1	QPSK	5	19.5	-93.0	112.5
23 GHz	1200	8 DS1	QPSK	10	19.5	-90.5	110.0
23 GHz	1200	8 DS1	16 QAM	5	17.5	-86.5	104.0
23 GHz	1200	16 DS1	QPSK	20	19.5	-87.0	106.5
23 GHz	1200	16 DS1	16 QAM	10	17.5	-83.5	101.0
23 GHz	1200	28 DS1	QPSK	30	19.5	-85.0	104.5
23 GHz	1200	28 DS1	16 QAM	20	17.5	-81.0	98.5
23 GHz	1200	28 DS1	64 QAM	10	16.5	-76.5	93.0
23 GHz	1200	32 DS1	QPSK	40	19.5	-86.5	106.0
23 GHz	1200	32 DS1	16 QAM	20	17.5	-80.5	98.0
23 GHz	1200	70 DS1	16 QAM	40	17.5	-79.5	97.0
23 GHz	1200	70 DS1	32 QAM	30	17.0	-74.5	91.5
23 GHz	1200	70 DS1	128 QAM	20	15.5	-70.5	86.0
23 GHz	1200	84 DS1	32 QAM	40	17.0	-76.5	93.5
23 GHz	1200	84 DS1	64 QAM	30	16.5	-71.5	88.0
23 GHz	1200	100 DS1	16 QAM	50	17.5	-75.0	92.5
23 GHz	1200	100 DS1	32 QAM	40	17.0	-74.0	91.0
23 GHz	1200	100 DS1	128 QAM	30	15.5	-68.5	84.0
23 GHz	1200	127 DS1	128 QAM	40	15.5	-69.0	84.5
23 GHz	1200	127 DS1	64 QAM	50	16.5	-71.0	87.5
23 GHz	1200	1 DS3	QPSK	30	19.5	-85.0	104.5
23 GHz	1200	1 DS3	64 QAM	10	16.5	-76.5	93.0
23 GHz	1200	3 DS3	64 QAM	30	16.5	-71.5	88.0
23 GHz	1200	4 DS3	64 QAM	40	16.5	-72.0	88.5
23 GHz	1200	1 OC3	16 QAM	50	17.5	-75.0	92.5
23 GHz	1200	1 OC3	64 QAM	40	16.5	-73.0	89.5
23 GHz	1200	1 OC3	128 QAM	30	15.5	-68.5	84.0
23 GHz	1200	2 OC3	256 QAM	50	13.5	-63.0	76.5

Modem Profiles								
Payload	Modulation	BW	INU/INUE			IDU		
			30 MHz RF	>30 MHz RF	XPIC	IDU 20 DS1	IDU OC3	IDU ES
4 x DS1	QPSK	5 MHz	✓			✓		
8 x DS1	QPSK	10 MHz	✓			✓		
8 x DS1	16 QAM	5 MHz	✓			✓		
8 x DS1	32 QAM	3.75 MHz	✓			✓		
16 x DS1	QPSK	20 MHz	✓			✓		
16 x DS1	16 QAM	10 MHz	✓			✓		
16 x DS1	128 QAM	5 MHz	✓			✓		
28 x DS1	QPSK	30 MHz	✓					
28 x DS1	16 QAM	20 MHz	✓					
28 x DS1	64 QAM	10 MHz	✓					✓
32 x DS1	QPSK	40 MHz		✓				✓
32 x DS1	16 QAM	20 MHz	✓					✓
70 x DS1	16 QAM	40 MHz		✓				✓
70 x DS1	32 QAM	30 MHz	✓		✓			✓
70 x DS1	128 QAM	20 MHz						✓
84 x DS1	16 QAM	50 MHz		✓				
84 x DS1	32 QAM	40 MHz		✓				
84 x DS1	64 QAM	30 MHz	✓		✓			
100 x DS1	16 QAM	50 MHz		✓				✓
100 x DS1	32 QAM	40 MHz		✓				✓
100 x DS1	128 QAM	30 MHz	✓		✓			✓
127 x DS1	128 QAM	40 MHz						✓
127 x DS1	64 QAM	50 MHz						✓
1 x DS3	QPSK	30 MHz	✓					
1 x DS3	64 QAM	10 MHz	✓					
3 x DS3	64 QAM	30 MHz	✓					
4 x DS3	64 QAM	40 MHz		✓				
4 x DS3	256 QAM	30 MHz	✓					
1 x OC-3	16 QAM	50 MHz		✓			✓	
1 x OC-3	64 QAM	40 MHz		✓			✓	
1 x OC-3	128 QAM	30 MHz	✓	✓	✓		✓	
2 x OC-3	256 QAM	50 MHz		✓				



## System Level Specifications

### Operating Frequencies

- 6, 7-8, 10.5, 11, 15, 18, and 23 GHz

### Modulation Options

- QPSK, 16, 32, 64, 128, and 256 QAM

### Transmit/Receive source:

- Synthesized

### Capacity Ranges:

- 4, 8, 16, 28, 32, 70, 84, 100 DS1
- 1, 2 or, 3 DS3
- 1 or, 2 OC-3
- 4 x 10/100 Base-T, 4 x 10/100/1000 Base-T

### Platform Options

- Terminal
- Node, Repeater
- Node, Ring
- Node, Aggregation

### Power Requirements

- Input Voltage Range: -40 to -60 Vdc

### Power Consumption

- IDU: 10W
- INU: dependent on actual cards installed:
  - Access Card: 6W
  - Digital Access Card: 3W
  - Node Control Card: 4W
  - Node Protection Card: 4W
  - Fan: 2W

- ODU: 50W max

### Mechanical Dimensions

- IDU : 1.75 x 19 x 12 in (44.5 x 480 x 300mm)
- NS INU: 1.75 x 19 x 12 in (44.5 x 480 x 300mm)
- HS INU: 3.50 x 19 x 12 in (89 x 480 x 300mm)
- ODU: 11.2 x 11.2 x 6.4 in. (284 x 284 x 162mm)

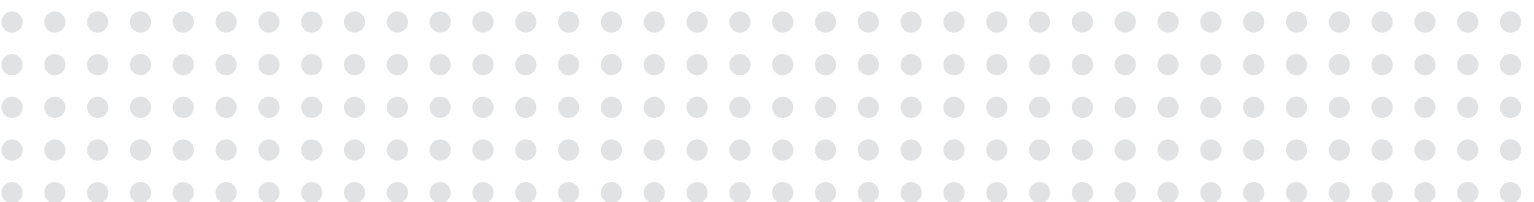
### Weight

- INU: 18 lbs (fully equipped), ODU: 13 lbs

### Environmental

- NS IDU/INU: -5 to +45 C (23 to 113 F)
- ODU Guaranteed: -33 to +55C (-27 to 131F)
- ODU Extended: -50C to +65C (-58 to 149F)

Alcatel-Lucent offers a comprehensive product portfolio for point-to-point microwave transmission. Our complete portfolio includes more useful frequency bands and greater spectrum efficiencies than any other microwave vendor, and supports network/radio configurations for low, medium and high capacity systems. Alcatel-Lucent's wireless transmission products are fully managed by our integrated network management platforms, as well as through the simplified network management protocol for management by external management systems in multi-vendor fixed or mobile environments. In the last five years, Alcatel-Lucent has installed more than 300,000 microwave radios in more than 150 countries. For more information, visit [www.alcatel-lucent.com/microwave](http://www.alcatel-lucent.com/microwave) or call 1-800-ALCATEL.



**[www.alcatel-lucent.com](http://www.alcatel-lucent.com)**

Alcatel, Lucent, Alcatel-Lucent and Alcatel-Lucent logo are trademarks of Alcatel-Lucent. All other trademarks are the property of their respective owners. The information presented is subject to change without notice. Alcatel-Lucent assumes no responsibility for inaccuracies contained herein.  
© 2007 Alcatel-Lucent. All rights reserved. 11-05-07 523-0620255-007A3J

