UNLICENSED RADIO

3.7 The JF6-9558H unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC requirements) allow immediate Turn-Up. After the license is received, the unlicensed radio can be easily converted to the lower 6 GHz licensed band.

3.8 Refer to 9500 MPR Engineering Support Documentation manual (PN 3EM23957AA) and see drawing 3EM227840000BJZZA, Equipping Options Drawing for unlicensed radio configurations and equipping options.

3.9 The JF6-9558H unlicensed radio operates in the 5725-5850 Information, Scientific, and Medical (ISM) band in accordance with FCC Part 15.247. This unlicensed radio, although operating in the same band as a spread spectrum radio, operates using narrower bandwidths than spread spectrum. Advantages, disadvantages, and antenna recommendations for the unlicensed radio follow:

3.10 Advantages:

- Fast installation and Turn-Up
- 18, 26, 37, 53, 114, 160, or 183 Mb/s data payload capacity consisting of a combination of DS1, DS3, and/or Ethernet traffic
- Field convertible to lower 6 GHz licensed band
- Field expandable to higher capacities.
- Common network management with licensed radios.
- Common spares and training with licensed radios

3.11 Disadvantages:

- Interference from other 5725-5850 ISM band transmissions are possible
- Operating restrictions
- 5.725 to 5.850 GHz band
- Performance could deteriorate due to interference as the frequency band becomes congested.

3.12 Antenna Recommendations:

- Frequency – 5.8 GHz
- Size and Type – 2, 4, 6, 8, or 10 foot parabolic; 1 or 2 foot flat panel.
  - Parabolic antennas, See Table 3-A.
  - Flat antennas, See Table 3-A.
- Gain and Beamwidth (3 dB)

Table 3-A. 5.8 GHz Unlicensed Antenna Recommendation

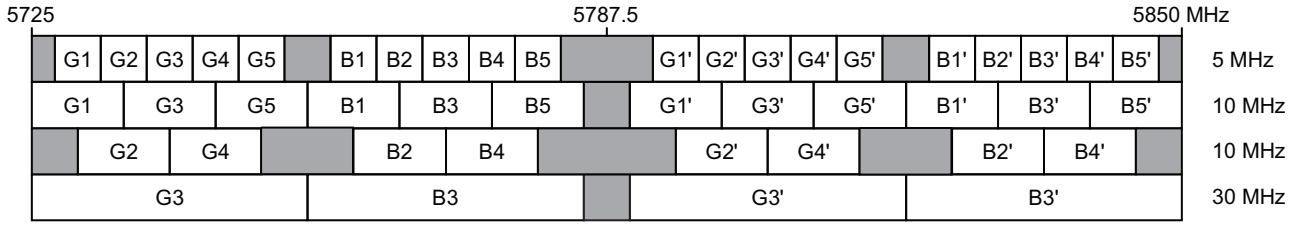
PARABOLIC	FLAT
2 ft parabolic – 29 dB/6°	1 ft flat panel – 23 dB/9°
4 ft parabolic – 35 dB/3°	2 ft flat panel – 28 dB/3.5°
6 ft parabolic – 38 dB/2°	
8 ft parabolic – 41 dB/1.5°	
10 ft parabolic – 42.5 dB/1.2°	

3.13 The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 12 meters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

DANGER **Possibility of personal injury. Danger of public exposure to long term RF radiated energy. When using a 1 ft flat panel antenna with a 1 watt (+30 dBm) output power, the antenna must be located in an area that does not allow the general population access to within 12 meters (5.8 Ghz) of the antenna.**

3.14 Frequency Plan: Refer to Figure 3-1 for the frequency plan for the 5.725 and 5.850 GHz unlicensed band.

Figure 3-1. Frequency Plan: 5.725 to 5.850 GHz Unlicensed Band (FCC Part 15)



Transmit Channel	Frequency MHz	Receive Channel	Frequency MHz
G1	5730	G1'	5795
G2	5735	G2'	5800
G3	5740	G3'	5805
G4	5745	G4'	5810
G5	5750	G5'	5815
B1	5760	B1'	5825
B2	5765	B2'	5830
B3	5770	B3'	5835
B4	5775	B4'	5840
B5	5780	B5'	5845

Notes:

1. The drawing above shows the 5 MHz bandwidth channels used by the JF6-9558H radio. Gray channels are designated "G". Blue channels are designated "B". Transmit and receive channels have a 65 MHz frequency separation.
2. RF filters are centered on channels G3, B3, G3', and B3'.
3. The flexability of the JF6-9558H allows any radio to grow to 183 Mb/s without a hardware upgrade.

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Alcatel-Lucent 9500 MPR

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 Time Division Multiplexing (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 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

- Multi-service 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 total cost of ownership 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: Metro Ethernet Forum 8 (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 network element (NE) supervision
- Software-based configuration by personal computer (PC)
- Intuitive supervision systems
- Simple Network Management Protocol (SNMP) agent with Transmission Control Protocol (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, 1340 Integrated Network Controller (INC), and 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

STATIC MODULATION INDOOR OPTION (MPT-HL)							
RF BAND	RADIO TYPE	CHANNEL BANDWIDTH (MHZ)	MODULATION (QAM)	RADIO CAPACITY (MB/S)	TRANSMIT POWER (DBM)	THRESHOLD (DBM)	SYSTEM GAIN NS (DB)
5.8 GHz Unlicensed	MPT-HL	5	32	18.255	30	-83.00	113.0
	MPT-HL	5	128	25.757	29	-77.00	106.0
	MPT-HL	10	32	37.323	30	-80.50	110.5
	MPT-HL	10	128	52.640	29	-74.00	103.0
	MPT-HL	30	32	114.220	30	-75.50	105.5
	MPT-HL	30	128	160.170	29	-69.50	98.5
	MPT-HL	30	256	183.302	26	-65.50	91.5
Lower 6 GHz	MPT-HL	5	32	18.255	30	-83.50	113.5
	MPT-HL	5	128	25.757	29	-77.50	106.5
	MPT-HL	10	32	37.323	30	-81.00	111.0
	MPT-HL	10	128	52.640	29	-74.50	103.5
	MPT-HL	30	32	114.220	30	-76.00	106.0
	MPT-HL	30	128	160.170	29	-69.50	98.5
	MPT-HL	30	256	183.302	26	-66.00	92.0
Upper 6 GHz	MPT-HL	5	32	18.255	30	-83.00	113.0
	MPT-HL	5	128	25.757	29	-77.00	106.0
	MPT-HL	10	32	37.323	30	-80.00	110.0
	MPT-HL	10	128	52.640	29	-74.00	103.0
	MPT-HL	30	32	114.220	30	-75.50	105.5
	MPT-HL	30	128	160.170	29	-69.00	98.0
	MPT-HL	30	256	183.302	26	-65.50	91.5