

1 — FCC part 15 subpart B

1.1 — 9500 MPR-A unlicensed radio

The JF6-9558H/6933B-9500MPT (MPT-HL) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada requirements) allow immediate turn-up. After the license is received, the unlicensed MPT-HL radio can be easily converted to the lower 6 GHz licensed band.

The JF6-9558L/6933B-9558L and JF6-9558L-D/6933B-9558L-D (MPT-HLC) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada requirements) allow immediate turn-up. After the license is received, the unlicensed MPT-HLC radio can be easily converted to the lower 6 GHz licensed band.

The JF6-9558HC/6933B-9558HC (9558HC) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada requirements) allow immediate turn-up. The 9558HC unlicensed radio can not be upgraded to licensed operation.

The JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D unlicensed radio operates in the 5725-5850 Information, Scientific, and Medical (ISM) band in accordance with FCC Part 15.247 and IC RSS-210. This unlicensed radio, although operating in the same band as a spread spectrum radio, operates using narrower bandwidths than spread spectrum.

The 9558HC 5.8 Unlicensed band (JF6-9558HC/6933B-9558HC) has been certified by the FCC and Industry Canada as of August 7, 2012.

1.2 — FCC Class B compliance statement

The JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D unlicensed radio have been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and IC RSS-210. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This

equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1.3 — FCC Class B requirements

This device complies with part 15 of the FCC Rules and IC RSS-210. Operation is subject to the following three conditions: (1) this device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation. (3) This device must be professionally installed.

Cet appareil radio est conforme à IC RSS-210. Son fonctionnement respecte les trois conditions suivantes: 1) cette radio ne cause pas d'interférences néfastes, 2) cette radio peut recevoir des interférences, ainsi que des interférences qui peuvent causer des opérations non désirées, et 3) cette radio doit être installée par des Professionnels.



Caution: Changes or modifications not expressly approved by Alcatel-Lucent could void the authority to operate the JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D (unlicensed) radio.



Caution: Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D (unlicensed) radio require strict adherence for continued part 15 of the FCC Rules and IC RSS-210 compliance.



Warning: Regulatory compliance warning: Physical changes or modifications to the JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D (unlicensed) radio are strictly prohibited.

Avertissement pour conformité réglementaire: changements physiques ou modifications sur les radios JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D (sans licence) sont strictement interdit.

The MPT-HLC 5.8 Unlicensed band JF6-9558L/6933B-9558L and JF6-9558L-D/6933B-9558L-D is not available for quote, sale, or deployment until certification is received.

- IETF RFC 2474
- IETF RFC 2475
- IETF RFC 3550
- IETF RFC 0793
- IETF RFC 0791
- IETF RFC 1157
- IETF RFC 768
- IETF RFC 2616
- ITU-T G.664
- ITU-T G.703
- ITU-T G.704
- ITU-T G.706
- ITU-T G.775
- ITU-T G.823
- ITU-T G.8261
- ITU-T G.826
- ITU-T G.921
- ITU-T Recommendation K20
- ITU-T Recommendation K21
- ITU-T Recommendation K45
- ITU-T Recommendation K44
- MEF 8
- NAR EIA-310
- Safety (Canada)
- SR-332
- TR NWT 000499
- TR TSY 000191

3.7 — JF6-9558H and JF6-9558HC (unlicensed) radio

The JF6-9558H/6933B-9500MPT (MPT-HL) and JF6-9558HC/6933B-9558HC (MPT-HC) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada requirements) allow immediate turn-up. After the license is received, the unlicensed radio can be easily converted to the lower 6 GHz licensed band.

The JF6-9558H/6933B-9500MPT and JF6-9558HC/6933B-9558HC unlicensed radio operates in the 5725-5850 Information, Scientific, and Medical (ISM) band in accordance with FCC Part 15.247 and IC RSS-210. This unlicensed radio, although operating in the same band as a spread spectrum radio, operates using narrower bandwidths than spread spectrum.

The MPT-HC 5.8 Unlicensed band (JF6-9558HC/6933B-9558HC) is currently being certified and is not available for quote, sale, or deployment.

3.7.1 — FCC class B compliance statement

The JF6-9558H/6933B-9500MPT and JF6-9558HC/6933B-9558HC unlicensed radio have been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and IC RSS-210. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

3.7.2 — FCC class B requirements

This device complies with part 15 of the FCC Rules and IC RSS-210. Operation is subject to the following three conditions: (1) this device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation. (3) This device must be professionally installed.



Caution: Changes or modifications not expressly approved by Alcatel-Lucent could void the authority to operate the JF6-9558H/6933B-9500MPT and JF6-9558HC/6933B-9558HC unlicensed radio.



Caution: Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the JF6-9558H/6933B-9500MPT and JF6-9558HC/6933B-9558HC unlicensed radio require strict adherence for continued part 15 of the FCC Rules and IC RSS-210 compliance.

For the management of mono-directional radio links, different configurations are needed on each side of the link.

On the node where the link works in Tx only:

- ATPC, ACM should not be enabled: they cannot work
- LAG L1, Ring should not be created: they cannot work
- Radio PM should not be enabled: they work Rx side
- Link Identifier should not be enabled: it works Rx side
- PPP must be disabled (otherwise a PPP Failure alarm will be raised)
- For monodirectional links with the MPT-HLS, the space diversity combiner should not be equipped on the transmitter side.
- For monodirectional links with the MPT-HLS, the RF switch should be mounted and connected.
- “No Rx Radio Alarms” alarm profile must be configured in the radio panel (otherwise all the Rx Radio alarms will be raised)

On the node where the link works in Rx only:

- Transmitter must be muted with a TX Mute command
- ATPC, ACM should not be enabled: they cannot work
- LAG L1, Ring should not be created: they cannot work
- PPP must be disabled (otherwise a PPP Failure alarm will be raised)
- For monodirectional links with the MPT-HLS, the space diversity combiner should be equipped only on the receiver side.
- For monodirectional links with the MPT-HLS, the RF switch should be mounted and connected.
- “No Tx Radio Alarms” alarm profile must be configured in the radio panel (otherwise all the Tx Radio alarms will be raised)

8.2.28 — Unlicensed radio for MPT-HL, MPT-HLC and 9558HC in the ANSI market

The JF6-9558H/6933B-9500MPT (MPT-HL) unlicensed radio provide fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada (IC) requirements) allow immediate Turn-Up. After the license is received, the unlicensed MPT-HL radio can be easily converted to the lower 6 GHz licensed band.

The JF6-9558L/6933B-9558L and JF6-9558L-D/6933B-9558L-D (MPT-HLC) unlicensed radio provides fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada requirements) allow immediate turn-up. After the license is received, the unlicensed MPT-HLC radio can be easily converted to the lower 6 GHz licensed band.

The JF6-9558HC/6933B-9558HC (9558HC) unlicensed radio provide fast deployment of service with microwave radio. No license and small antennas (no FCC and Industry Canada (IC) requirements) allow immediate Turn-Up. The 9558HC unlicensed radio can not be upgraded to licensed operation.



Caution: Changes or modifications not expressly approved by Alcatel-Lucent could void the authority to operate the JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D (unlicensed) radio.



Caution: Installation, Turn-Up, Maintenance, and Operation Instruction supplied with the JF6-9558H/6933B-9500MPT, JF6-9558HC/6933B-9558HC, JF6-9558L/6933B-9558L, and JF6-9558L-D/6933B-9558L-D (unlicensed) radio require strict adherence for continued part 15 of the FCC Rules and IC RSS-210 compliance.

Table 8.25 — Unlicensed radio

Transceiver	FCC ID	Industry Canada ID
9558HC	JF6-9558HC	6933B-9558HC
MPT-HL	JF6-9558H	6933B-9500MPT
MPT-HLC	JF6-9558L	6933B-9558L
MPT-HLC	JF6-9558L-D	6993-9558L-D

Refer to 9500 MPR-A Equipping Options drawing, found in *Alcatel-Lucent 9500 MPR-A Engineering Support Documentation* for unlicensed radio configurations and equipping options.

The MPT-HL/HLC and 9558HC unlicensed radio operate in the 5725-5850 Information, Scientific, and Medical (ISM) band in accordance with FCC Part 15.247 and IC RSS-210. 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:

Advantages:

- Fast installation and Turn-Up
- Between 6.6 — 185 Mb/s user configurable data payload capacity consisting of a combination of E1/DS1, DS3, STM-1/OC-3, and/or Ethernet traffic
- Field convertible to lower 6 GHz licensed band (MPT-HL/HLC)

- Field expandable to higher capacities.
- Common network management with licensed radios.
- Common spares and training with licensed radios
- Adaptive Modulation - automatic interference countermeasures

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.

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 8.26](#).
 - Flat antennas, See [Table 8.26](#).
- Gain and 3 dB Beamwidth

This device has been designed to operate with the antennas listed below, and having a maximum gain of 42.5 dB. Antennas not included in this list or having a gain greater than 42.5 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 8.26 – 5.8 GHz unlicensed antenna options

PARABOLIC	FLAT
MPT-HL/HLC/9558HC	MPT-HL/HLC/9558HC
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°	—

These antennas can only be used in a fixed point-to-point configuration.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

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.



Caution: 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.

Frequency Plan:

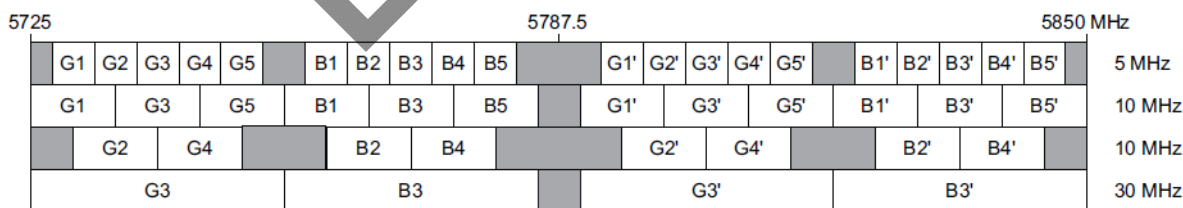
- For MPT-HL frequency plan for the 5.725 and 5.850 GHz unlicensed band, refer to [Figure 8.77](#).
- For MPT-HLC frequency plan for the 5.725 and 5.850 GHz unlicensed band, refer to [Figure 8.78](#).
- For 9558HC frequency plan for the 5.725 and 5.850 GHz unlicensed band, refer to [Figure 8.79](#).

Output Power: A requirement of operating in the unlicensed band is to limit transmit output power to not more than +30.0 dBm at the antenna port. It is the responsibility of the user to transmit not more than +30.0 dBm.



Note: To meet FCC part 15 requirements, output power for 9558HC 30 MHz 4QAM and 8QAM channels must not be provisioned greater than 24 dBm. This is not enforced by the user interface and is the responsibility of the operator to guarantee provisioning of the radio transmit power. For transmit power specification, refer to the *9500 MPR-A MPT-HL/HLC Engineering Specifications*.

Figure 8.77 — Frequency plan MPT-HL: 5.725 to 5.850 GHz unlicensed band (FCC Part 15 and IC RSS-210)



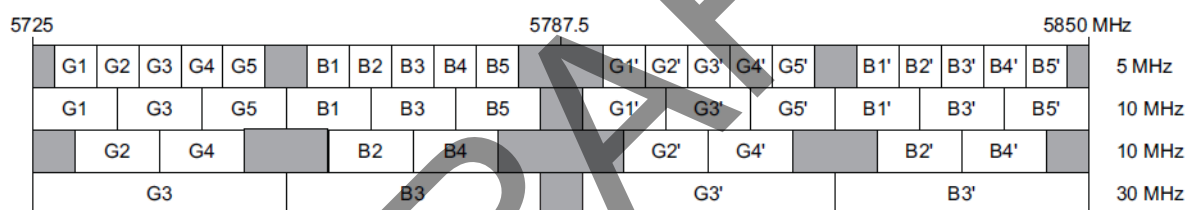
Transmit Channel	Frequency (MHz)	Receive Channel	Frequency (MHz)
G1	5730	G1'	5795
G2	5735	G2'	5800
G3	5740	G3'	5805
G4	5745	G4'	5810
G5	5750	G5'	5815

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 channels used by the JF6-9558H/5933B-9558MPT radio. Gray channels are designated “G”. Blue channels are designated “B”. Transmit and receive channels have a 65 MHz separation.
2. RF filters are centered on channels G3, B3, G3', and B3'.
3. The flexibility of the JF6-9558H/6933B-9500MPT allows any radio to grow to 183 Mb/s without a hardware upgrade.

Figure 8.78 — Frequency plan 9558HLC: 5.725 to 5.850 GHz unlicensed band (FCC Part 15 and IC RSS-210)



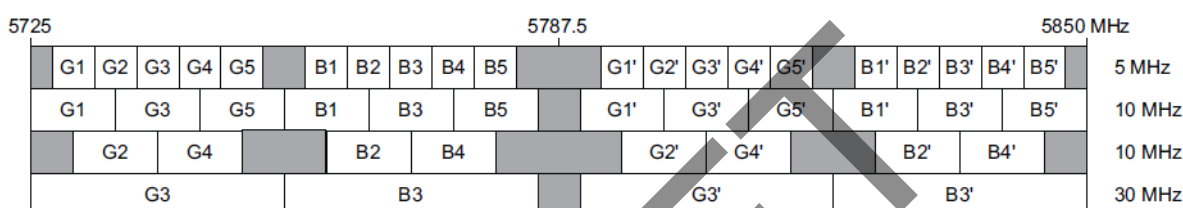
Transmit Channel	Frequency (MHz)	Receive Channel	Frequency (MHz)
G1	5731	G1'	5794
G2	5736	G2'	5799
G3	5741	G3'	5804
G4	5746	G4'	5809
G5	5751	G5'	5814
B1	5761	B1'	5824
B2	5766	B2'	5829
B3	5771	B3'	5834
B4	5776	B4'	5839
B5	5781	B5'	5844

Notes:

1. The drawing above shows the 5 MHz channels used by the F6-9558L-D/6933B-9558L-D radio. Gray channels are designated “G”. Blue channels are designated “B”. Transmit and receive channels have a 63 MHz separation.
2. RF filters are centered on channels G3, B3, G3’, and B3’.
3. The flexibility of the F6-9558L-D/6933B-9558L-D allows any radio to grow to 183 Mb/s without a hardware upgrade.

The MPT-HLC 5.8 Unlicensed band JF6-9558L/6933B-9558L and JF6-9558L-D/6933B-9558L-D is not available for quote, sale, or deployment until certification is received.

Figure 8.79 — Frequency plan 9558HC: 5.725 to 5.850 GHz unlicensed band (FCC Part 15 and IC RSS-210)



Transmit Channel	Frequency (MHz)	Receive Channel	Frequency (MHz)
G1	5730.5	G1'	5794.5
G2	5735.5	G2'	5799.5
G3	5740.5	G3'	5804.5
G4	5745.5	G4'	5809.5
G5	5750.5	G5'	5814.5
B1	5760.5	B1'	5824.5
B2	5765.5	B2'	5829.5
B3	5770.5	B3'	5834.5
B4	5775.5	B4'	5839.5
B5	5780.5	B5'	5844.5

Notes:

1. The drawing above shows the 5 MHz channels used by the JF6-9558HC/6933B-9558HC radio. Gray channels are designated “G”. Blue channels are designated “B”. Transmit and receive channels have a 64 MHz separation.
2. RF filters are centered on channels G3, B3, G3’, and B3’.
3. The flexibility of the JF6-9558HC/6933B-9558HC allows any radio to grow to 185 Mb/s without a hardware upgrade.

46 — UDS-129 MPT-HLC transceiver

Table 46.1 — MPT-HLC transceiver

PART NUMBER/ MNEMONIC	NAME	CLEI	ECI/ BAR CODE	CPR	STATUS
3DB76123AA	MPT-HLC Transceiver U4, HP, WO/Diversity 4400 - 5000 MHz	N/A	N/A	N/A	Active
3DB76123BA	MPT-HLC Transceiver U4, HP, W/Diversity 4400 - 5000 MHz	N/A	N/A	N/A	Active
3DB19060AA	MPT-HLC Transceiver L6, WO/Diversity 5725-6425 MHz	N/A	N/A	N/A	Active
3DB19060BA	MPT-HLC Transceiver L6, W/ Diversity 5725-6425 MHz	N/A	N/A	N/A	Active
3DB19060CA	MPT-HLC Transceiver L6, HP, WO/Diversity 5725-6425 MHz	N/A	N/A	N/A	Active
3DB19060DA	MPT-HLC Transceiver L6, HP, W/Diversity 5725-6425 MHz	N/A	N/A	N/A	Active
3DB76047AA	MPT-HLC Transceiver U6, WO/Diversity 6425-7125 MHz	N/A	N/A	N/A	Active
3DB76047BA	MPT-HLC Transceiver U6, W/ Diversity 6425-7125 MHz	N/A	N/A	N/A	Active
3DB76047CA	MPT-HLC Transceiver U6, HP, WO/Diversity 6425-7125 MHz	N/A	N/A	N/A	Active
3DB76047DA	MPT-HLC Transceiver U6, HP, W/Diversity 6425-7125 MHz	N/A	N/A	N/A	Active
3DB76048AA	MPT-HLC Transceiver 7, WO/ Diversity 7125-7775 MHz	N/A	N/A	N/A	Active
3DB76048BA	MPT-HLC Transceiver 7, W/ Diversity 7125-7775 MHz	N/A	N/A	N/A	Active

Table 46.1 — MPT-HLC transceiver (Continued)

PART NUMBER/ MNEMONIC	NAME	CLEI	ECI/ BAR CODE	CPR	STATUS
3DB76048CA	MPT-HLC Transceiver 7, HP, WO/Diversity 7125-7775 MHz	N/A	N/A	N/A	Active
3DB76048DA	MPT-HLC Transceiver 7, HP, W/Diversity 7125-7775 MHz	N/A	N/A	N/A	Active
3DB76049AA	MPT-HLC Transceiver 8, WO/ Diversity 7725-8500 MHz	N/A	N/A	N/A	Active
3DB76049BA	MPT-HLC Transceiver 8, W/ Diversity 7725-8500 MHz	N/A	N/A	N/A	Active
3DB76049CA	MPT-HLC Transceiver 8, HP, WO/Diversity 7725-8500 MHz	N/A	N/A	N/A	Active
3DB76049DA	MPT-HLC Transceiver 8, HP, W/Diversity 7725-8500 MHz	N/A	N/A	N/A	Active
3DB76078AA	MPT-HLC Transceiver 10.5, HP, WO/Diversity 10400- 10700 MHz	N/A	N/A	N/A	Active
3DB76078BA	MPT-HLC Transceiver 10.5, HP, W/Diversity 10400- 10700 MHz	N/A	N/A	N/A	Active
3DB76050AA	MPT-HLC Transceiver 11, WO/Diversity 10700-11700 MHz	N/A	N/A	N/A	Active
3DB76050BA	MPT-HLC Transceiver 11, W/ Diversity 10700-11700 MHz	N/A	N/A	N/A	Active
3DB76050CA	MPT-HLC Transceiver 11, HP, WO/Diversity 10700-11700 MHz, TX LO	N/A	N/A	N/A	Active
3DB76050DA	MPT-HLC Transceiver 11, HP, W/Diversity 10700-11700 MHz, TX LO	N/A	N/A	N/A	Active
3DB76050EA	MPT-HLC Transceiver 11, HP, WO/Diversity, TX HIGH	N/A	N/A	N/A	Active
3DB76050FA	MPT-HLC Transceiver 11, HP, W/Diversity, TX HIGH	N/A	N/A	N/A	Active

46.1 — Features and application notes

- High-capacity, long-haul RF transmission shelf
- Supported on EASv2, P8ETH, Core-E, CorEvo, and MSS-1 SFP ports in 1+0 and 1+1 configurations, L1 and L2 Radio LAG ports
- Support for the following RF configurations when connected to Core-E, CorEvo, EASv2, P8ETH and MSS-1 SFP ports:
 - Non-Standby
 - Non-Standby with Space Diversity
 - Hot Standby
 - Hot Standby with Space Diversity
 - Frequency Diversity
 - 2+0 LAG
 - 2+0 LAG with Space Diversity
 - 2x(1+0) single shelf repeater with and without Space Diversity
 - Up to 8+0 LAG, with and without Space Diversity
 - XPIC
- Support for the following channel plans:
 - 5.8 GHz unlicensed
 - Lower 6 GHz
 - Upper 6 GHz
 - 7 GHz
 - 8 GHz
 - 10.5 GHz
 - 11 GHz
- Support for the following fixed radio profiles (fixed and adaptive modulations, Std and XPIC):
 - 30 MHz 4/16/32/64/128/256/512/1024 QAM
 - 40 MHz 4/16/32/64/128/256/512/1024 QAM
 - 60 MHz 4/16/32/64/128/256/512/1024 QAM
- 1+1 HSB, 1+1 SD, 1+1 FD, 2x(1+0) XPIC, 4x(1+0), XPIC, 2x(1+1) HSB XPIC radio configuration support with XPIC license
- Automatic Transmit Power Control (ATPC) support
- Gigabit Ethernet connection to 9500 MPR MSS indoor unit using standard SFPs
- Diversity variants provide an optional second receiver (SD)

For modem profile information, see *Alcatel-Lucent 9500 MPR-A MPT-HL Engineering Specifications*.

46.2 — Description

The MPT-HLC Transceiver card is a microprocessor controlled RF transceiver that interfaces the Core-E card, CorEvo card, EASv2 card, P8ETH card, or MSS-1 unit MPT-HLC port with the antenna. The MPT-HLC Transceiver microprocessor manages transmit and receive frequencies, transmit power, alarming, and performance monitoring. The MPT-HLC Transceiver resides in the MPT-HL shelf.

46.3 — Indicators, connectors, and control

The MPT-HLC Transceiver card has the following indicators, connectors, and controls.

See [Figure 46.1](#) for MPT-HLC Transceiver card front panel indicator and connector locations.

Refer to [Table 46.2](#) for MPT-HLC Transceiver card indicators details.

Refer to [Table 46.3](#) for MPT-HLC Transceiver card connector details.

Refer to [Table 46.4](#) for MPT-HLC Transceiver card control details.

Figure 46.1 — MPT-HLC transceiver



Table 46.2 – MPT-HLC transceiver front panel indicator details

INDICATOR	STATUS	DEFINITION
Status (S)	Off	Card not powered
	Green Blinking	FPGA Downloading, or SW Booting. (Different blink rates identify each step of the startup process.)
	Green	In Service, Normal Operation, and Properly Provisioned. EPS or RPS currently In-Service/Active.
	Yellow	Card Properly Equipped and Provisioned in 1+1, currently in Standby.
	Green/Red Blinking	Card Properly Equipped and Provisioned, Rx signal fault, EPS and RPS in Standby.
	Yellow/Red Blinking	Card Properly Equipped and Provisioned, RX signal Fault, EPS and RPS currently in Standby. Traffic may be affected.
	Red	• HW Card Fail • Power supply failure (Autotest failure) • FPGA failures • LO alarms • Modem Tx sync alarm • PA switch active • Diversity board card fail (only in combiner mode) • RF switch fail (only for the spare MPT-HLC in HSB configuration) In a PA critical temperature condition, the LED remains green.
	Red Blinking	MAP Communication Time-out: Communication between the MPT-HLC Transceiver and the EAS cards is lost. This occurs in split-mount configuration only.
Power Emission	Off	MPT-HLC Transceiver is not emitting power, according to the known configuration, for example, Hot Standby.
	Green	MPT-HLC Transceiver is emitting power as expected according to the known configuration.
	Yellow	MPT-HLC Transceiver is not emitting power due to an operator command, including manual PA PSU switch or Tx mute.
	Red	MPT-HLC Transceiver is abnormally emitting power, in contrast with the known configuration (for example, when Tx power alarm is raised during normal operative mode)
SFP interface LEDs		

Table 46.2 – MPT-HLC transceiver front panel indicator details (Continued)

INDICATOR	STATUS	DEFINITION
Link (L)	Off	Link Down
	On	Link Up
Activity (A)	Off	No Tx/Rx activity
	Blinking	Tx/Rx activity

Table 46.3 – MPT-HLC transceiver front panel connector details

CONNECTOR	TYPE	FUNCTION
Battery Power	D-SUB	MPT-HLC Transceiver Power Input
SFP Port	SFP	Communication link with the EAS card
Craft Terminal/CT	RJ45	Not supported in this release.

Table 46.4 – MPT-HLC transceiver front panel control details

CONTROL	POSITION	FUNCTION
PA	0	Transmit OFF (TxMute)
	1	Transmit ON

46.4 – Functional overview

In the TX direction, the MPT-HLC Transceiver converts Ethernet packet data from the EAS (Ethernet Access Switch - P8ETH or EASv2) card MPT-HL port or Core-E or CorEvo Ethernet port into a modulated IF output signal. The modulated IF signal is converted into a RF signal which is amplified by the Power Amplifier (PA) and routed through a band-pass filter to the antenna.

In the RX direction, the MPT-HLC Transceiver card amplifies the incoming RF signal. Converts the RF signal into a first IF signal. The first IF signal is then converted to a second IF signal. The second IF signal is filtered, demodulated, and converted into Ethernet packet data. The Ethernet packet data is then sent to the EAS card MPT-HL port.

For each frequency two different versions of the MPT-HLC are available and supported in this release: standard and space diversity version. The space diversity version includes a second receiver and a baseband combiner, which provide a combination of main receiver and second receiver signals.

46.5 — RSSI monitoring point

The RSSI is available on the maintenance LEMO connector and is used to manually align the antenna in the field.

The Higher the RSSI voltage is the better the antenna is aligned.

Table 46.5 — Typical RSSI voltage levels with RSL for MPT-HLC

Units	Measurements (with MPT-HLC)								
PRX cord (Vdc)	4.94	4.31	3.72	3.10	2.46	1.86	1.25	0.62	0.26
RSL (dBm)	-20	-30	-40	-50	-60	-70	-80	-90	-100

DRAFT