

NEXUS FT STRAND MOUNT

INSTALLATION AND SERVICE MANUAL

DRAFT



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This Powerwave product is designed to operate within the Normal Operating (typical operating) ranges or conditions specified in this document. Operation of this equipment beyond the specified ranges in this document may cause (1) spurious emissions that violate regulatory requirements; (2) the equipment to be automatically removed from service when maximum thresholds are exceeded; or (3) the equipment to not perform in accordance with its specifications. It is the Operator's responsibility to ensure this equipment is properly installed and operated within Powerwave operating specifications to obtain proper performance from the equipment and to comply with regulatory requirements.

The rated output power of a FT Strand mount is for multiple carriers. As long as the composite power does not exceed the rated power (20W for North America), derating is not required for multiple carriers. For situations where regulatory requirements require reduced interference to adjacent band users, the rating would have to be reduced by 3 dB. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device. Input power is rated at 115/230VAC, 50/60Hz, and should be protected based on the power and fuse specifications in Chapter 5 of this manual. Power strips should, at a minimum, conform to this requirement to prevent equipment damage and possible overload.
Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to CRF47 part 15 of the FCC rules. This equipment is also certified to CRF47 part 24 (PCS) of the FCC Rules depending on the band of operation. Changes or modifications not expressly approved by Powerwave Technologies, Inc. for compliance could void the user's authority to operate this equipment. 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.

This device complies with the technical standards governing mobile radio devices in accordance with FCC Rules. This device is intended to facilitate the reception and transmission of mobile radio devices in the cellular, PCS or other mobile services, and its operation by end users or others requires carrier consent under FCC rules.

Industry Canadian Requirements

All Powerwave apparatus introduced in the Canadian market meet all requirements of the Canadian Interference-Causing Equipment Regulations. The -20dB bandwidth at 1900 MHz band is 80 MHz. The output impedance of the unit referenced in this document is 50 Ohms. The input signal is optical so input impedance requirements are not applicable.

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Revision Record

Revision Letter	Date of Change	Reason for Change
A	June 2008	New (original)

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Safety

Any personnel involved in installation, operation, or service of units included in a Powerwave Distributed Antenna System (DAS) must understand and follow the points below.



- ❑ Powerwave Nexus FT systems are designed to receive and amplify signals from one or more base stations and retransmit the signals to one or more mobile stations. And, also to act the other way round, that is to receive signals from one or more mobile stations, amplify and retransmit the signals to the base stations. Powerwave Nexus FT systems must be used exclusively for this purpose and nothing else.



- ❑ Units supplied from the mains must be connected to grounded outlets and in conformity with the local prescriptions.



- ❑ Power supply units supplied from the mains contain dangerous voltage that can cause electric shock. Disconnect the mains prior to any work in such a unit. Local regulations are to be followed when servicing such units. Only authorized service personnel are allowed to service units while the mains are connected.

- ❑ All RF transmitting units, including Nexus FTs, will generate radio signals and thereby give rise to electromagnetic fields that may be hazardous to the health of any person who is extensively exposed close to an antenna.

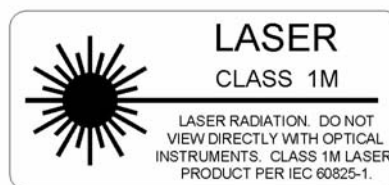


- ❑ A lithium battery is permanently mounted on the CU and FON PCBAs. Due to the risk of explosion, this battery must only be removed from the board by a Powerwave authorized service technician.

- ❑ NiCd batteries are mounted on the FON PCBAs. These batteries contain environmental poisonous substances. If replaced, the old batteries should be disposed of as stated in the local prescriptions.

- ❑ The FON unit contains a Class 1M laser transmitter that emits 2—4 mW invisible laser radiation at 1550 nm during operation and is intended for a restricted location. Avoid direct exposure from a disconnected laser transmitter or fiber cord. For example, do not view directly with optical instruments (magnifiers) and do not view directly with non-attenuating optical instruments.

- ❑ The FON Unit has this label attached:



- ❑ Do not power up the FON unit if a fiber cable is not connected to the fiber output UL port, or if a fiber cable is connected to the port but disconnected at the other end.

- ❑ **Never look at the end of a fiber cable.** The 1310nm and 1550nm laser light is not visible. Always use an instrument, such as a power meter, to detect signaling.

Human Exposure to RF Radiation

Safe distances must be kept when working around antennas. The following paragraphs describe the cautions to be aware of during the installation and maintenance of antenna systems and how to calculate safety distances needed for RF radiation at different antenna power and frequencies.

Antennas

To be able to receive and transmit signals, a Nexus FT RM ORD is connected to a donor antenna directed towards the base station and a service antenna directed towards the coverage area. A fiber optic cable from the base station might, however, be substituted for the donor antenna.

Installation and Maintenance of Antenna Systems

Installation and maintenance of all antenna systems must be performed with respect to the radiation exposure limits for public areas. The antenna radiation level is affected by Nexus FT RM ORD output power, antenna gain, and transmission devices such as cables, connectors, splitters and feeders. Also have in mind the system minimum coupling loss, typically between 25dB and 35dB, is determined by a standard with the purpose to protect base stations from noise and other performance dropping effects.

Radiation Exposure

The World Health Organization (WHO) and International Commission on Non-Ionising Radiation Protection (ICNIRP) have determined recommendations for radiation exposure. ICNIRP recommends not to exceed the following radiation power for public exposure:

Frequency Radiation power

800/900 MHz	4.5W/m ²
1800/1900 MHz	9.0W/m ²
2100 MHz	10.0W/m ²

For antennas larger than 20cm the maximum radiation power can be calculated by using the following formula:

$$S = P / (4\pi r^2)$$

S = Radiation power in W/m²
 P = Output power in W
 r = Distance between antenna and human in meters

Electrostatic Discharge (ESD)



ESD can severely damage essential parts of the equipment if not handled carefully. Parts on printed circuit board assemblies (PCBA) as well as other parts in the equipment are sensitive to ESD. Never touch the PCBA or uninsulated conductor surfaces unless absolutely necessary.

If you must handle the PCBAs or uninsulated conductor surfaces, use ESD protective equipment or first touch the chassis with your hand. Never let your clothes touch PCBAs or uninsulated conductor surfaces and always store PCBAs in ESD-safe bags.

Chapter 1

Product Description

Introduction

This manual contains information and procedures for installation, operation, and maintenance of the Nexus FT Strand Mount repeater, referred to in this manual as the Nexus FT SM. The manual is organized into chapters as follows:

- ❑ Chapter 1 - Product Description
- ❑ Chapter 2 - Controls and Indicators
- ❑ Chapter 3 - Installation
- ❑ Chapter 4 - Maintenance
- ❑ Chapter 5 - Specifications

Scope of Manual

This manual is intended for use by service technicians familiar with similar types of equipment. It contains service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date may be incorporated by a complete manual revision or alternatively as additions.

Overview

Powerwave Nexus FT SM repeaters work as bi-directional on-frequency amplifiers used to extend coverage into uncovered areas in wireless mobile systems such as base station fringe areas, tunnels, convention centers, airports and buildings. It receives, amplifies, and transmits signals to/from a Base Transceiver Station (BTS) to/from Mobile Stations (MS) with both directions being served simultaneously. Connections to the Nexus FT SM are made with N-type or 7/16" male connectors.

Nexus FT SMs are microprocessor controlled. Operational parameters, such as gain and power levels are set using a PC running Powerwave OM-Online software which communicates with the Nexus FT SMs either locally or remotely via modem. Remote operation can be performed via PSTN or a GSM net. The Operation and Maintenance System (OMS) provides for Network Operations Center (NOC) configuration and alarm monitoring.

Nexus FT SMs can be configured in many combinations depending on the wireless system, single or double system operation, and output power.

Chassis Design

Enclosure

The Nexus FT SM is housed in an aluminum enclosure, approved for outdoor use. The enclosure contains the repeater circuitry, with 2 hanger clips for positioning and securing the Nexus FT SM repeater along a cable.



Figure 1-1 Nexus FT SM Repeater

Chapter 2

Controls, and Indicators

Introduction

This chapter contains descriptions of the controls, indicators and connectors for the Nexus FT SM.

Indicators

Figure 2-1 External Indicators

Two LEDs, shown in Figure 2-1, are located on the front cover to provide easy identification of a fault in the system. The amber operation LED lights up approximately 15 seconds after the main power is switched on. When the LED is steady, the Nexus FT SM is ready for operation. The red alarm LED indicates a system error alarm when flashing and a critical alarm when steady.

Cabinet Indicators

Figure 2-2 Cabinet Internal Indicators

FON

Figure 2-7 shows the locations of the connectors on the FON and Table 2-7 lists the port numbers, connector types, and port usage.

Table 2-1 FON Connectors

Port	Description
P101	SMA, electrical RF input port (to the optical TX port)
P102	SMA, electrical RF output port (from the optical RX port)
P103	SMA, electrical RF output port (15dB below the P102 port)
RX	DIN/APC, optical input port (to the P102 and P103 RF ports)
TX	DIN/APC, optical output port (from the P101 RF port)
P104	Used only for development and debugging
P105	4-pin male, door LED indicators. Used for the yellow and red LED indicators located on the front cabinet door
P106	9-pin D-sub female, RS-232 used for local PC communication
P108/116	6-pin male, parallel connected power ports for the FON
P109	7-pin male, used for external alarm sensors
P110	W-link jumper, used to terminate units in a W-link. It has to be set in the parking state for all units except for the first and last units in a W-link. The Parking state (P) has the jumper between the center and bottom pins. The opposite state, with the jumper between the tip and center pins, terminates(T) the W-link
P111/112	5-pin male, WLI ports used for interconnecting nodes in WLI-nets (IP or R2R networks). They are identical and connected in parallel. One of the connectors is intended to be used from the previous node and the other connector to the next node in the network. Either can be used for the first and the last unit in the net chain
P113	2-pin male, used for the on-PCBA backup batteries
P114	Backup power output jumper, sets the backup power output state. The OFF state has jumper between the center and left pins. This jumper has to be in the OFF state when used in an OCM. Otherwise, it shall be in the ON state
P115	3-pin male, intended for future use
P117	SMA, electrical RF output port (15dB below the P101 port)
P130	34-pin, 2-line male, RCU port used for connecting an RCU. The connector contains both the modem connection and RCU power supply

Software and Hardware Compatibility

There are different versions of CU PCBA software which can be combined with PCBAs of various revisions. These have unique part numbers and revision information. Table 2-8 lists the software currently available in combination with CU PCBA revisions.

Table 2-2 Hardware / Software Compatibility

CU PCBA part number	CU Software part number
500-13817-001 (previously K103/3)	D631-18072-001 D631-18072-003

This information is accurate as of 06/31/2007. As new versions of hardware and software are released without prior notice, contact your Powerwave sales representative for information on the latest revision.

For detailed information, refer to the release notes for the CU software to be downloaded (normally found in the readme.txt file provided with the program files).

Chapter 3 Installation

Introduction

This chapter contains unpacking, inspection and installation instructions for installing and powering up the Nexus FT SM.

Site Survey

Powerwave recommends that a site survey be performed prior to equipment ordering or installation. Performing a detailed site survey reduces or eliminates installation and turn-up delays. Pay particular attention to power plant capacity, cooling needs, floor space, and RF/DC cabling/breaker requirements. Cabinet dimensions and weights are listed in Chapter 5.

Unpacking and Inspection

This equipment has been operated, tested, and calibrated at the factory. Carefully open containers to remove equipment. Retain all packing material that can be reassembled in the event unit must be returned to the factory. Perform the following steps:

- Visually inspect equipment for damage that may have occurred during shipment. If possible, in the presence of the delivery person.
- Check for evidence of water damage, bent or warped chassis, loose screws or nuts, or extraneous packing material in connectors.

If equipment is damaged, file a claim with the carrier once the extent of any damage is assessed.

If equipment must be returned to factory, please contact factory for a Return Material Authorization (RMA), see Chapter 4.

Nexus FT SM Location

The Nexus FT SM is designed with a weather proof outdoor cabinet that can be mounted without any kind of shelter from rain, snow or hail. The same unit can be installed indoors. A preferable site for the Nexus FT SM is a location free of obstructions, easily accessible and allows for proper air-flow and ventilation.

If a Nexus FT SM is installed outdoors and can be exposed to direct sunshine, it is essential that air circulates around the Nexus FT SM with no obstacles. The operating temperature must not exceed 131°F (55°C). A shelter can be used to shade the Nexus FT SM from direct sunshine..

Mounting

The Nexus FT SM is designed for mounting on a cable using the hangar clips attached to the top of the unit.



Figure 3-1 Cable Mounting

Connections

This section describes general examples of how to connect the input and output ports on the WRH.

Main Power and Grounding

Local regulations need to be followed for the main power connection. Nexus FT SMs are approved in accordance with EN and UL/cUL regulations. This is, however, only valid if a classified power cord is used. For the Nexus FT SM to meet these regulations you must select one of the following classified and approved cord types:

- EN – H 05 W5 - F HMR
- UL – AWM Style 2587
- CSA– AWM 1 A/B 11 A/B

For outdoor use, the power cord should meet at least IP65 encapsulation requirements. Do not turn the main power on until you are ready to commission the WRH.



WARNING: For Nexus FT SMs supplied from the main power source, the main outlet must be grounded.

Fiber Optic and RF Connections

Fiber optic and RF cable connections should be verified both internally and externally before powering up the equipment. This section illustrates the general internal connections of the Nexus FT SM. Verify these connections with the as-built drawings and documents for your specific system configuration. Table 3-1 lists the steps to add the external connections to the Nexus FT SM.

Table 3-1 Cable Connection Procedure

Step	Action
1	
2	
3	
4	

Nexus FT SM

Figure 3-6 illustrates the connections for the Nexus FT SM.



Figure 3-2 Nexus FT SM Cable Connections

Optional Connections

Alarms

Alarm signals from external sensors are received by an ALI or RCI which forwards them to the CU. The RCI is used if the Nexus FT SM has an RCU, otherwise the ALI is used. The software on the CU can activate acoustic or visual alarms or direct the alarm to the P33 alarm port for forwarding via an RCU through OM-Online. Alarms can also be handled by the FON. Alarms are configured through OM-Online.

Commissioning

Before proceeding, carefully read the Safety section and check all connections made during the installation. To fulfill the IP65 weather protective requirements, ensure cable strain relief bushings are properly tightened. Also, ensure gaskets at cable inlets and on the cabinet are properly fitted and not damaged.

A Nexus FT SM can be configured locally with OM-Online by connecting a standard serial cable from the COM port on the PC to the P31 PC port (RS-232) located to the right in the cabinet as shown in Figure 3-9. The P31 PC port is described in Chapter 2. Details on using OM-Online are described in the OM-Online User Manual.

Initial Startup

To complete the initial start-up of the Nexus FT SM, follow the steps listed in Table 3-3.

Table 3-2 Initial Statup Procedure

Step	Action
1	
2	
3	
4	

Passive Intermodulation (PIM) Testing

PIM is the non-linear effect of passive RF components in a desired RF transmission band. As higher per-carrier transmit power levels are applied to duplexed passive RF networks, PIM becomes an increasingly significant factor in potential receiver desensitization. A PIM tester may be used on the RF network prior to turn-on and commissioning of the unit, but if a PIM tester is not available, the following may be used:

The following equipment is required to test for PIM:

- Anritsu Site eMaster or equivalent RF Spectrum Analyzer
- Agilent ESG4432B or equivalent Multi-Signal Generator (or commissioned BTS)
- Guaranteed/calibrated PIM load capable of handling 20W composite power
- Low-PIM RF cable adaptors such as N-N female, Din male to N femaile, DIN-DIN, SMA-SMA female, and N male to SMA female
- Installed and operational Nexus FT SM unit
- Installed passive RF network under test
- Torque wrenches for DIN and N connectors

Two different types of setup are available, depeding on equipment availability and testing methods. Figure 3-10 shows PIM testing with two carriers over one Nexus FT SM, and Figure 3-11 shows PIM testing with one carrier over each of two Nexus FT SMs.

Chapter 4 Maintenance

Introduction

This chapter contains periodic maintenance and performance test procedures for the WRH.

Periodic Maintenance

Periodic maintenance requirements are listed in Table 4-1, as well as the intervals at which the tasks should be performed.

Table 4-1 Recommended Periodic Maintenance

Task	Interval	Action
Inspection of cables and connectors	12 months	Inspect power, RF and Fiber cables for signs of damage or wear (frayed insulation, cracks, punctures, etc.) Check connections to be sure they are tight
	Optional	Perform cable sweeps
Clean equipment	Clean as required depending on operating environment	

Troubleshooting

The sections that follow contain a list of problems that could occur and a few suggested actions that might correct each problem. If the suggested corrective action does not eliminate the problem, please contact your Powerwave field representative or help line for further instruction.

Clearing Alarm Faults

Table 4-2 lists the alarms that can be generated in the WRH. Critical, Error and Warning alarms are sent automatically from a WRH-V to OM-Online, stored and then viewed in the Alarm window.

Table 4-2 Alarm Troubleshooting

ID	Alarm Text	Alarm Unit	Alarm	Description
1	Power	PSU	Critical	PSU1 in the cabinet does not work properly. A sum signal from the PSU1 indicates that at least one voltage output has dropped. If no mains breakdown relay is used, then the alarm will also be sent at mains breakdown
			Ceasing	PSU1 in the cabinet works properly again. Ceasing is sent if the PSU1 works at start-up, and there is a corresponding critical PSU1 alarm logged in the Events log. The WRH-V will restart when the power is back and this alarm will be sent
		PSU	Critical	PSU2 in the cover does not work properly. A sum signal from the PSU2 indicates that at least one voltage output has dropped. If no mains breakdown relay is used, then the alarm will also be sent at mains breakdown

Table 4-2 Alarm Troubleshooting (Continued)

ID	Alarm Text	Alarm Unit	Alarm	Description
			Ceasing	PSU2 in the cover works properly again. Ceasing is sent if the PSU2 works at start-up, and there is a corresponding critical PSU2 alarm logged in the Events Log. The WRH-V will restart when the power is back and this alarm will be sent
	Power	FON	Error	The FON 10 Volt charger voltage is below limit. Suggested remedy: Replace the FON
			Ceasing	The cause of the alarm has ceased
2	WRH-V restart	CU	None	Power on start, or user ordered reboot. Logged to indicate a normal power up, or a restart ordered by the operator
			Warning	Software error restart, 1st – 7th time. Restart 1st to 7th time during a 14 day period. The counter is reset every 14th day, counted from power up
			Error	Software error restart 8th – 10th time. Restart 8th to 10th time during the 14 day period. At the 11th time, the SW bank will be blocked and not used anymore until a user ordered reset is performed, or power is switched off/on
3	Mains breakdown	External	Critical	The mains power is gone. Used with an external relay indicating mains breakdown. The external relay should be connected to External Alarm 1 and the WRH-V configured to indicate this alarm. If no relay is used, a mains breakdown will be reported as a PSU fault
			Ceasing	The mains power is back. Sent if there is a corresponding critical mains breakdown alarm logged in the Events Log. The WRH-V will restart when the power is back
4	Alarm reset	CU	None	Alarm reset by the user. All alarms are reset. The cause of the alarm will be re-evaluated and reported, if still active
5	Local bus error	WBA #, MCPA#	Error	Error when communicating on the bus. The CU has no contact with the WBA, or MCPA PCBA, which is taken out of service
6	Main bkd w backup	External	Error	Used to indicate that the mains is no longer available. WRH-V is powered by external battery backup unit. Suggested remedy: Check the mains power
			Ceasing	The cause of the alarm has ceased
7	Err in AD-converter		Warning	The analog-to-digital converter on the CU PCBA does not give reliable values
8	New unit detected		None	Compared to the last power on, the CU has recognized at least one additional hardware unit
9	Inst. unit lost		Error	Compared to the last power on, the CU lacks at least one hardware unit
10	EEPROM error	CU	Error	EEP read or write fail. Data cannot be written or read from the EEPROM on the CU PCBA. User parameters are stored in the EEPROM
11	Log memory fault		Error	Log memory fault. Indicates that the log memory on the CU PCBA is faulty. The WRH-V will not work. Not available in all CU software versions

Table 4-2 Alarm Troubleshooting (Continued)

ID	Alarm Text	Alarm Unit	Alarm	Description
12	High temp	CU	Warning	The CU PCBA temperature is higher than 90°C
			Ceasing	The CU PCBA temperature has fallen below 90°C
13	REFO error		Error	Significant REFO drift or error detected by CU
14	Ext REFO error		Warning	Suggested remedy: Check the reference source and the cables
15	CU battery fault	CU	Warning	CU RAM battery fault. The battery for the RAM on the CU PCBA has a voltage outside the normal 2.7 to 3.5 Volt. An alarm may be initiated at start-up if the WRH-V has been stored out of power for a long time. Suggested remedy: Ensure jumper P3 on the CU PCBA is mounted to charge the battery
			Ceasing	The cause of the alarm has ceased
16	SW load error	CU	Error	Software load error. An error has occurred during a software load process. The flash memory does not contain a proper software. Suggested remedy: Check the CU software using the OM-Online SW Manager. Do NOT restart the WRH
17	Log cleared	CU	None	Log memory has been cleared. The check sum in the Events Log memory is faulty. The log is cleared. Can be caused of a bad RAM battery backup or low voltage to the RAM
18	RTC restarted	CU	None	The time is changed by the operator (logged to keep track of changes made to the RTC)
			Warning	Time reset to 1994-01-01. The RTC was unable to keep track of the time and did a reset. Suggested remedy: Ensure jumper P3 on the CU PCBA is mounted to charge the battery
19	RTC error		Error	RTC does not operate. The CU has detected an error in the RTC operation which makes the time unreliable. Suggested remedy: Replace the CU PCBA
20	Door open alarm	External	Config	The door has been open 30 seconds without disabling the alarm
			Ceasing	The door has been closed 30 seconds, or the alarm is disabled
21	External alarm 1	External	Config	External alarm input EA1 active more than 1 second
			Ceasing	External alarm input EA1 no longer active
22	External alarm 2	External	Config	External alarm input EA2 active more than 1 second
			Ceasing	External alarm input EA2 no longer active
23	External alarm 3	External	Config	External alarm input EA3 active more than 1 second
			Ceasing	External alarm input EA3 no longer active
24	External alarm 4	External	Config	External alarm input EA4 active more than 1 second
			Ceasing	External alarm input EA4 no longer active

Table 4-2 Alarm Troubleshooting (Continued)

ID	Alarm Text	Alarm Unit	Alarm	Description
30	No modem found	Remote ctrl	None	No modem found, that is no answer is returned on a poll string to the modem
33	No connection	Remote ctrl	None	No connection at callback. The WRH-V has tried to call as many times as stated in the alarm call settings. No connection was established.
			Warning	No connection at alarm call. The WRH-V has tried to call as many times as stated in the alarm call settings. No connection was established. This alarm does not generate a new attempt to report alarm by alarm call.
34	Login failed		None	Invalid WRH-V password
35	Remote connection	Remote ctrl	None	Modem connection to OM-Online opened. Not logged on CU2. Login Registry gives the same function and more information about CU2
36	Modem init failed	Remote ctrl	None	Initiation string to modem not OK. The initiation string sent to the modem is not OK. The string may contain commands not recognized by the modem. An alarm might be sent anyway. Suggested remedy: Check the modem using the OM-Online or OMS modem debugger
37	Remote timeout	Remote ctrl	Warning	The time limit of 20 minutes is exceeded without extending the timer. The modem connection is terminated by the WRH
38	PIN code failed	Remote ctrl	Warning	The PIN code sent to MS is incorrect. To unlock the MS/SIM card, the PUK code will probably be needed
			Ceasing	The cause of the alarm has ceased
39	No phone detected	Remote ctrl	Warning	When using a PC-card together with the MS, the alarm indicates contact with the PC-card, but MS is not present or turned off. Note: A Nokia MS does not power-up after power failure. Suggested remedy: Ensure the cellular phone is connected
			Ceasing	The cause of the alarm has ceased
40	Battery fault	RCU, FON charger	Error	The backup battery on the RCU or the FON PCBA does not work properly. Suggested remedy: Check cables or replace battery
			Ceasing	The cause of the alarm has ceased
42	Antenna isolation	WBA #, Channel #, UL/DL	Warning	Low antenna isolation. The antenna isolation is lower than the gain set. Gain is reduced by 10dB – 13dB below the oscillation point. Suggested remedy: Decrease gain or increase antenna isolation
			Error	Low antenna isolation at lowest gain. The gain has been reduced as much as possible but the oscillation still remains. The amplifier is turned off. Suggested remedy: Decrease gain or increase antenna isolation
			Ceasing	Normal operation again, that is no oscillation can be detected 13dB above the gain set
48	Battery backup fault	External	Error	If a battery backup unit alarm is connected to external alarm 2, then the operator can configure the WRH-V to display this alarm when the battery backup unit indicates alarm

Table 4-2 Alarm Troubleshooting (Continued)

ID	Alarm Text	Alarm Unit	Alarm	Description
			Ceasing	The cause of the alarm has ceased
50	Fiberoptical error	FOT fiber optics	Configurable	If a fiber unit alarm is connected to external alarm 3, then the operator can configure the WRH-V to display this alarm when the fiber optical unit indicates alarm
			Ceasing	The cause of the alarm has ceased
70	Bad table alarm	CU	Error	Requested table contains incorrect information (SW error)
71	Table not found	CU	Error	Requested table not found in the database (SW or calibration error)
72	Table database error	CU	Error	Table database not found (calibration error)
80	Antenna SWR alarm	Donor antenna service antenna	Error	Too low antenna return loss, caused either by cables, connectors, or antenna problems. Suggested remedy: Check antenna and cables
			Ceasing	The cause of the alarm has ceased
90	FON power alarm	FON RF	Error	A DC voltage on a FON PCBA is out of range. Suggested remedy: Replace the FON PCBA.
			Ceasing	The cause of the alarm has ceased
91	FON TxStable alarm	FON RF	Error	Laser transmitter control loop voltage out of range. Suggested remedy: Replace the FON PCBA
			Ceasing	The cause of the alarm has ceased
92	FON RxLevel alarm	FON	Warning	Received optical level is below any of the two limits (one for Warning and one for Error). Suggested remedy: Check optical cables
			Error	Received optical level is below any of the two limits (one for Warning and one for Error). Suggested remedy: Check optical cables
			Ceasing	The cause of the alarm has ceased
93	FON SPI alarm	FON F2F	Error	The SPI bus connection to the RF modem does not work properly. Suggested remedy: Replace the FON PCBA
245	Not In Allowed Area	CU	None	WRH-V is moved from the operating area and the RF HW is switched on or off

Remarks:

The Door Open alarm requires an optional door switch described in the Door Open Alarm section of Chapter 3.

The Main power breakdown alarm requires an optional relay described in the Main Power Breakdown Relay section of Chapter 3.

Field Replaceable Units

There are no field replaceable components in the Nexus FT Strand Mount repeater. If any components fail, please contact Powerwave for assistance.

Return For Service Procedures

When returning products to Powerwave, the following procedures will ensure optimum response.

Obtaining an RMA

A Return Material Authorization (RMA) number must be obtained prior to returning equipment to the factory for service. Please contact our Repair Department at +1-714-466-1000 to obtain this number, or FAX your request to +1-714-466-5800. Failure to obtain this RMA number may result in delays in receiving repair service.

Repackaging for Shipment

To ensure safe shipment of the unit, it is recommended that the original package designed for shipping the unit be reused. If it is not available, contact Powerwave's Customer Service Department at 1-800-797-9283, +1-714-466-100 or by e-mail at support@pwav.com for packing material.

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Chapter 5 Specifications

Introduction

This chapter provides specifications for the Nexus FT SM.

Table 5-1 Nexus FT SM Specifications

Electrical	
Frequency band UL	1850 to 1910 MHz (PCS) 1920 to 1980 MHz (UMTS)
Frequency band DL	1930 to 1990 MHz (PCS)
Max absolute delay	
Gain adjustment range (in 1 dB steps)	
Gain Uplink Downlink Variation	
Instantaneous bandwidth	
Uplink AGC limit	
Downlink AGC limit	
Return Loss	
Downlink, Spurious and Emissions level	
Downlink power	
Noise figure excluding fiber optic link	
Fiber-Optic Link Budget	
Receiver input port return loss	
Power supply voltage	
Maximum Current Draw (Single Band)	
Maximum Current Draw (Dual Band)	
Recommended Fuse size Single Band	
Dual Band	
Power consumption	

Table 5-1 Nexus FT SM Specifications (Continued)

Impedance Input Output	
Mechanical	
Dimensions (W x H x D in inches) NYC Repeater NYC Outer Shell	
Weight	
Service Antenna port connector	
Donor Optical port connector	
Environmental	
Operating Temperature Range	
Altitude	
Casing class	
Fiber Optic Node (FON)	
Bandwidth @ 3dB	
Power Consumption, total	
Wavelength	
<i>Transmit</i> Max continuous RF input Optical output power, two levels RF attenuation settable by SW in 1dB steps	
<i>Receive</i> Max optic power input RF attenuation settable by SW in 1dB steps Alarm threshold level, settable warning Alarm threshold level, settable error	

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