

High Selectivity Digital 700MHz Repeater

Product Description and User's Manual for Axell 3307D Repeater

THIS DOCUMENT IS VALID FOR THE FOLLOWING REPEATER MODELS:

D-SBR 3307
D-SBR 3307-12



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About This Manual

This Product Manual provides the following information:

- Description of the Repeater
- Procedures for setup, configuration and checking the proper operation of the Repeater
- Maintenance and troubleshooting procedures

For whom it is Intended

This Product Manual is intended for experienced technicians and engineers. It is assumed that the customers installing, operating, and maintaining Axell Wireless Repeaters are familiar with the basic functionality of Repeaters.

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Safety Instructions and Warnings

Throughout this manual, important safety warnings and admonishments are included to warn of possible hazards to persons or equipment. A safety warning identifies a possible hazard and then describes what may happen if the hazard is not avoided. The safety warnings – in the form of Dangers, Warnings and Cautions must be followed at all times. These warnings are flagged by the use of a warning icon, usually the triangular alert icon seen below. The exclamation point within the triangular alert icon is intended to warn the operator or service personnel of operation and maintenance from factors relating to the product and its operating environment, which could pose a safety hazard.

General Safety Warnings Concerning Use of This System

Always observe standard safety precautions during installation, operation and maintenance of this product. Only a qualified and authorized personnel should carry out adjustment, maintenance or repairs to the components of this equipment.



Danger: Electrical Shock

To prevent electrical shock when installing or modifying the system power wiring, disconnect the wiring at the power source before working with un insulated wires or terminals.



Caution: RF Exposure

Installation of an antenna must comply with the FCC RF exposure requirements.

Exclusive Remedies

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1 Introduction

Axell 3307D is a 700 MHz, band LTE technology selective indoor mid-repeater that simultaneously supports the LTE lower and upper frequency range: Lower 700MHz A,B,C and Upper 700MHz C.

The Repeater supports advanced digital filtering capabilities. Up to 8 or 12 (model dependent) LTE non-contiguous sub-bands can be selected via simple intuitive GUI, where each sub-band is independently tunable across the entire LTE band. The gain and output power can be set individually in each of these sub-bands. This provides an optimal solution for operators that have non-contiguous spectrum.

The repeater provides highly accurate out-of-band-rejection and simple, GUI based procedures for adjusting the pass band according to the 700 MHz spectrum.

3307D includes the SmartALC power control algorithm that automatically optimizes the gain setting by learning the actual range of RSSI levels over a user-specified period of time. The SmartALC algorithm prevents oscillations, reduces the amount of isolation required by the system and optimizes the system to minimize noise rise at the donor cell site.

GUI based web management is supported through both Ethernet and remote wireless connections (wireless connection provided by an integrated modem). Local setup can be performed through a connection to the Ethernet port using a cross-cable.



Figure 1. Axell 3307D Repeater

1.1 Features

- Indoor Repeater supporting simultaneously the LTE band: Lower A,B,C and Upper C 700MHz
- Up to 8 or 12 (model dependent) software selectable non-contiguous sub-bands in any combination
- Each sub-band can be set over the full LTE band for the following bandwidths: 1.4MHz, 3MHz, 5MHz, 10MHz or 15MHz or 20MHz to meet the LTE 36.106 standard
- Individual gain and power settings for each sub-band
- Composite downlink Output Power: + 33 dBm;
- Composite uplink Output Power: + 27 dBm
- RF Gain: 82 dB
- High linear amplification, high spectral purity and excellent out-of-band interference prevention
- SmartALC™ technology:
 - Automatically sets optimum gain
 - Prevents oscillations and balances coverage
 - Ensures transparent network operation
- Highly accurate frequency selection
- Configuration backup and restore via simple, intuitive GUI options
- Wallmount
- Simple setup via an intuitive GUI application
- Supports SMS and SNMP fault notification
- Remote Web access monitoring and control via either an integrated Wireless CDMA or GSM/GPRS modem (supporting Packet Switch)
- Simultaneous support for both static and dynamic address allocation (two independent IPs)

1.2 Modem Support

The Repeater supports two types of integrated modems that required different setup procedures:

- GSM/GPRS – insert SIM card according to section 3.6 and setup up modem according to section 4.7.2.
- CDMA – modem is continuously ON. Setup according to section 4.7.4

1.3 Smart-ALC Function

The Smart Automatic Level Control (Smart-ALC) is an innovative algorithm for automatic repeater gain adjustment. Combined with advanced control algorithms, SALC is capable of learning the traffic load characteristics and adjusting the Repeater RF Gain to the desired value. *Smart ALC eliminates the need to perform initial settings for maximal traffic load conditions and on-site gain adjustments.*

Smart-ALC maintains the Uplink/Downlink gain balance for system transparency. In addition, Smart-ALC prevents oscillations that may occur due to insufficient isolation while maintaining the gain in a linear range operation by adjusting the repeater paths' gain accordingly.

IMOP (Isolation Measurement and Oscillation Prevention) algorithm effectively reduces oscillation problems. The repeater's power amplifier includes power-monitoring circuits with Automatic Level Control (ALC) that prevents excessive output power while maintaining the power amplifier linearity.

1.4 3307D Interfaces

The repeater's interfaces are located on the front panel. These include Ethernet port, Mobile and Base antenna connections, Alarm I/O, LED indicators, and power connection.

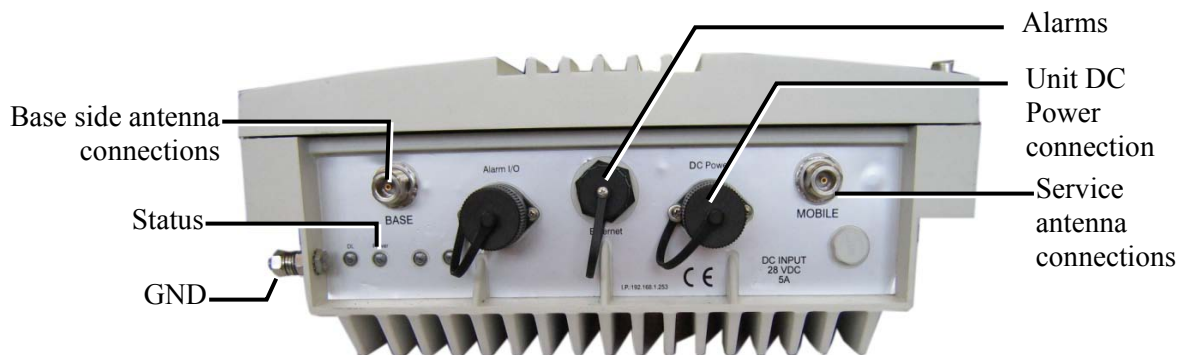


Figure 2. Axell 3307D Front Panel Interfaces

The following table provides a description of the front panel ports and connections.

Port	Description
Base	Connection to Base side (donor) antenna
Mobile	Connection to mobile side antenna
Ethernet	Connection to Ethernet network
Alarms	Two external alarms and one dry-contact relay. See section 3.11 .
DC Power	Input via externally mounted AC to DC converter that is connection to an AC outlet.
GND	Grounding lug

Front panel indicators. For detailed troubleshooting procedures, refer to section 6.3

LED	Description
DL	N/A
Power	Service status LED: one per service.

2 Antenna Requirements

This chapter provides information on the specifications of the donor and service antennas suitable for operation with this repeater, and on the installation requirements of the antennas.

2.1 Base (Donor) Antenna

The Base (Donor) antenna is usually installed outdoors and is either a directional antenna such as a Yagi or a Panel antenna.

2.1.1 Required Antenna Information

You will require the following antenna information

- Antenna type and characteristics
- Height
- Length and type of coaxial cable required for connecting the Donor antenna to the Repeater and the attenuation.

2.1.2 Donor Antenna specifications

- Yagi type or similar – 12 to 20 dBi gain, very sharp beam pointed to the BTS.
- Cable and jumper loss is at least 2dB.
- Example of antenna's typical specifications:

Gain: 8 dBd (=10.1 dBi)
VSWR: < 1:5:1
Impedance: 50 ohm

2.1.3 Installation Criteria

NOTE: Verify that the antennas meet requirements described in section 2.1.

Installation requirements:

- Select a location for the Donor antenna and verify that there is enough signal strength at that location.
- Install the Donor Antenna at the designated height.
- The antenna should point to the direction of the base station for maximum input power.
- Verify that the antenna is in the base stations line of sight (raise the antenna if necessary).
- Install the donor antenna at a higher level (i.e. floor) than the mobile antenna.
- Must be installed at a minimum distance of 1 meter from any personnel within the area.

2.2 Mobile (Service) Antenna

The Mobile (Service) antenna is installed indoors, where the type of antenna depends on the application.

2.2.1 Required Antenna Information

The following antenna requirements, specifications and site considerations should be met.

- Service area type and size
- Antenna type and characteristics
- Height
- Length and type of coaxial cable required for connecting the Donor antenna to the Repeater and the attenuation.

2.2.2 Recommended Antennas

The following describes the requirements for an omni-directional mobile used for indoor applications.

Specifications:

- One or a combination of the following antennas can be used: Ceiling Mount Patch antenna, Wall Mount Patch antenna, Corner Reflector.
- Omni directional antenna with a 0 to 2 dBi typical gain, or wide beam with up to 10 dBi gain.
- Example of omni-directional antenna specifications:
 - Gain: 0 to 2 dBi
 - VSWR: < 2:1
 - Impedance: 50 ohm
- Choose an antenna with high side lobe attenuation which enables maximum isolation from the service/ mobile antenna.

2.2.3 Mobile (Service) Antenna Installation Criteria

Determine the antenna installation configuration, according to the transmission requirements and the installation site conditions.

Installation requirements:

- An indoor antenna should be installed at a convenient location. It should be free of metallic obstruction.
- Install the Service Antenna at the designated height and tune it roughly toward the Service coverage area.
- Installation of this antenna must provide a minimum separation distance of 20 cm from any personnel within the area.

Note: If the power is divided into more than 5 antennas that have a large coverage area than the separation distance can be less than 20 cm.

- Cable and jumper loss is at least 2dB.

2.3 High Isolation Requirements - Antenna Considerations

High isolation configurations

There are four typical configurations for high isolation installations – two vertical and two horizontal. The configurations described above are detailed in the following sections.

2.3.1 Vertical Separation Configuration

The Vertical Separation configuration is recommended in cases where the BTS is relatively far and the service coverage area is relatively small.

In Vertical Separation configuration, the Donor antenna can be installed either above or below the Service antenna on a COMMON tower. It is required to set the distance between them to achieve maximum isolation. The figures below illustrate the two types of installations.



Figure 3. Service above Donor Antenna



Figure 4. Donor above Service Antenna

2.3.2 Horizontal Separation Configuration

In the Horizontal Separation configuration, the Donor and Service antennas are installed on two separate towers at approximately the same height. The towers can be either on the same side of the building or on different sides of the building as shown below.

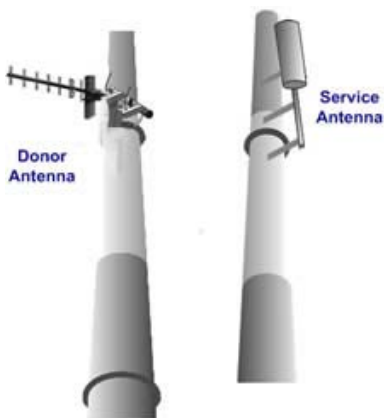


Figure 5. Donor and Service Antennas Installed on Separate Towers



Figure 6. Service and Donor Antennas Installed on Opposite Sides of the Building

3 Installing the Repeater

3.1 Repeater Pre-Installation Requirements

3.1.1 Safety Guidelines

Before installing the Repeater, review the following safety information:

- Follow all local safety regulations when installing the Repeater.
- Only qualified personnel are authorized to install and maintain the Repeater.
- Ground the Repeater with the grounding bolt located on the external lower side of the Repeater).
- Do not use the grounding bolt to connect external devices.
- Follow Electro-Static Discharge (ESD) precautions.
- Use low loss cables to connect the antennas to the Repeater.

3.1.2 Required BTS Information

Required BTS Information

- BTS channels
- BTS output power per channel
- BTS antenna gain
- BTS antenna height
- Distance from Repeater site to BTS

3.1.3 Criteria for Repeater Installation Location

The following criteria should be considered when selecting the Repeater installation site location:

- Application type
- General surroundings
- Available installation
- Install the Repeater in a shielded, ventilated, and easy-to-reach area.
- Verify that there is a minimum of a 50 cm (20") radius of space around the Repeater, enabling easy access to the repeater for maintenance and on-site inspection.
- Distance from antenna site - It is recommended that the installation location be as close as possible to the antenna site in order to maintain the cable loss to a minimum.
- The Repeater is convection cooled so airflow and alternation should be possible.
- Follow Electro-Static Discharge (ESD) precautions.
- Install the Repeater close to the service area to monitor the output power.
- Use low loss cables to connect the antennas to the Repeater.

3.1.4 RF Cable Installation Guidelines

Required:

- For all coaxial connections to/from the Repeater - high performance, flexible, low loss 50Ω coaxial communications cable.
- All cables shall be weather-resistant type.
- Cable length - determined by the Repeater installation plan. When calculating the cable length, take into account excess cable slack so as not to limit the insertion paths.

3.1.5 Power Requirements

3.1.5.1 Overcurrent Protection

A readily accessible, listed branch circuit over current protective device, rated 20 A, must be incorporated in the building wiring.

3.1.5.2 North American Power Wiring

Select a power supply cord that is UL Listed and CSA Certified: 3 - conductor, 18 AWG, terminated in a molded on plug cap rated 125 V, 15 A, with a minimum length of 1.5m [six feet] but no longer than 4.5m.

3.1.6 Grounding Wires Requirements

Requirements for grounding wires

- Protective grounding conductor - should be aluminum with cross-section 10AWG.
- Lug of the protective grounding conductor - should be aluminum
- Washers and screw - should be high Cr stainless steel, or 12% Cr stainless steel, or Cr on, Ni on steel, tin on steel

3.2 Overview of the Installation Procedure

NOTE: *The Donor and Mobile antennas can be positioned and installed (without connection to the Repeater) at any time either before or after mounting and grounding the Repeater.*

1. Unpack the Repeater kit.
2. Mount the Repeater on the wall.
3. For GPS/GPRS modems - open the Repeater and insert the SIM card.
4. Ground the Repeater.
5. If you have not already done so, position and install the Base and Mobile antennas in the relevant locations.
6. **Before powering up the Repeater:**
 - Verify isolation between the donor and mobile antennas
 - Verify link between the BTS and Base Repeater.
7. Connect the antennas to the Repeater.
8. Power-up the Repeater.
9. **Optional** - connect the external alarms. This can be done at any time, before or after powering up the Repeater.

3.3 Required Tools and Materials





The following tools are required for the 3307D installation procedure:

- Standard professional tool box (not supplied)
- Adjustable wrench (not supplied)
- Power Drill Driver (not supplied) - supporting 12 mm concrete drills
- Allen screwdriver (supplied)

3.4 Unpacking

Upon receiving the 3307D unit, perform the following:

- Examine the shipping container for damage before unpacking the unit.
- Perform a visual inspection to reveal any physical damage to the equipment.
- Verify that all of the equipment (listed below) is included (see also the following page). Otherwise contact Axell Wireless.

3307D single-band Repeater	
Ethernet RJ-45 LAN cable	
CD with documentations	
Mounting Bracket with AC to DC power converter.	
RS-232 to CDMA modem interface Cable	Only supplied with unit including CDMA modem

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Additional (supplied) installation components:		
No.	Description	Qty.
1	Flange nut, 5/16	4
2	Wedge anchor, Ø 12 x 65 mm	4
3	Hex washer head screw, Ø 8 mm	4
4	Washer, spring, Ø 8 mm	4
5	Washer, flat, Ø 8 mm	2
6	Clamp	2
7	Washer, flat, Ø 28 mm	4
8	Screwdriver, Allen	1



Figure 7. Installation Components

3.5 Mounting the 3307D

3.5.1 Pre-Mounting Procedure

1. Choose the location of the Repeater on the wall according to the following criteria:
 - *The location should be at normal eye level height, above ground.*
 - Be sure to allow easy access to the Repeater for maintenance and on-site inspection.
2. Place the Mounting Bracket against the wall and mark the *four* holes to be drilled at the extreme four corners of the bracket (additional optional installation holes are also provided).
3. Drill four holes 12mm in diameter and 65mm in depth.

The following illustration shows the bracket with the bracket pins.

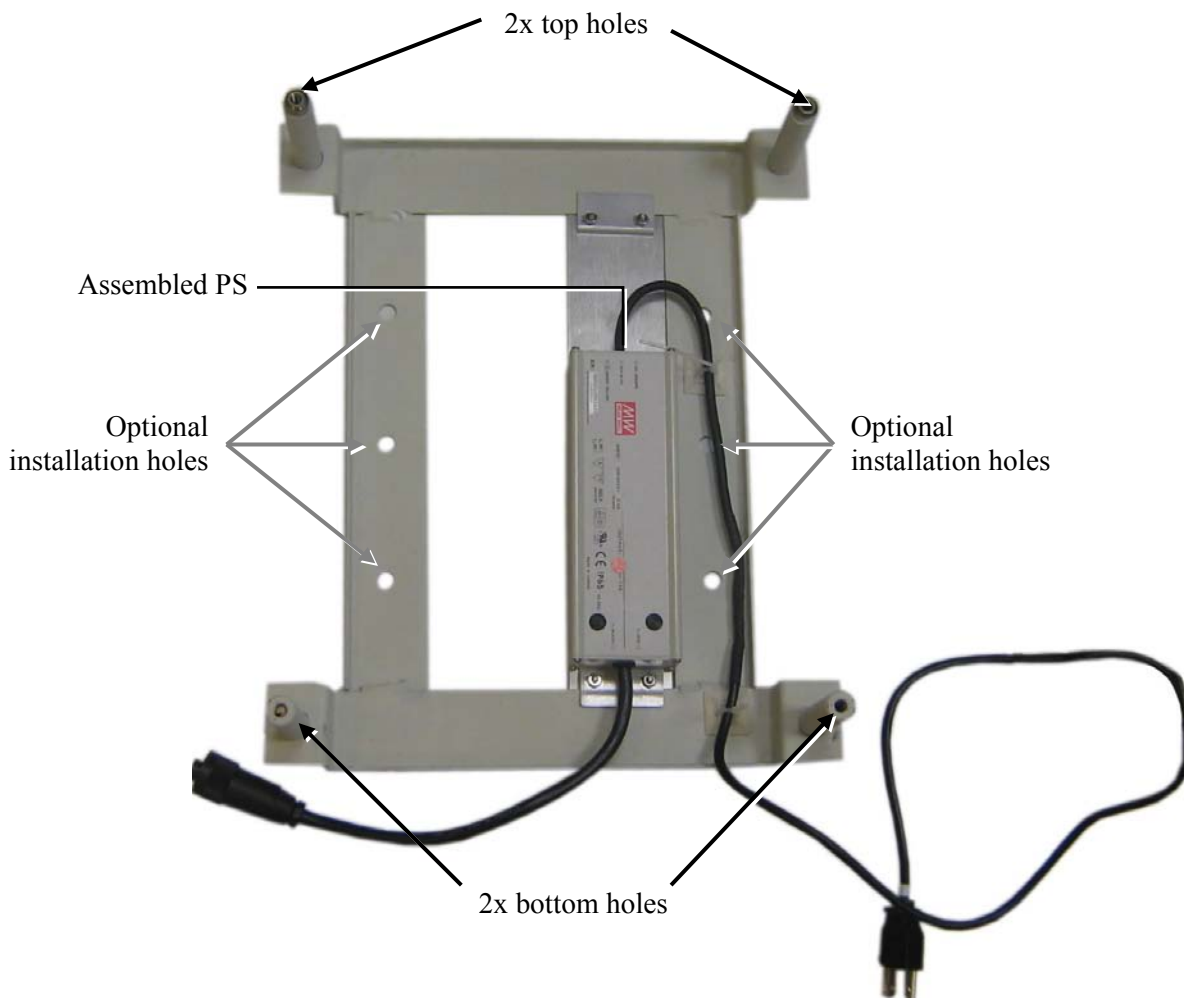


Figure 8. 3307D Mounting Holes and Pins

3.5.2 Installing the Mounting Bracket

To install the mounting bracket

1. Insert the four wedge anchors (see item no. 2 in Figure 7. Installation Components) into the drilled holes and secure them with an adjustable wrench.
2. Remove the hex nut, spring washer and flat washer from each wedge anchor, revealing a screw from each anchor.
3. Insert a flat washer 28mm in diameter in each of the anchors (see item 7 in Figure 7. Installation Components).
4. Fit the support bracket on to the anchors (see installation direction in Figure 7. Installation Components) and secure with the flat washers, spring washers and hex nuts removed in step 2.
5. Verify that the bracket is firmly mounted.
6. Connect the power cable to the power supply and route it to the bottom of the bracket, connect it to the repeater power input.
7. Connect the AC power cable to the AC power input *when instructed to do so*.

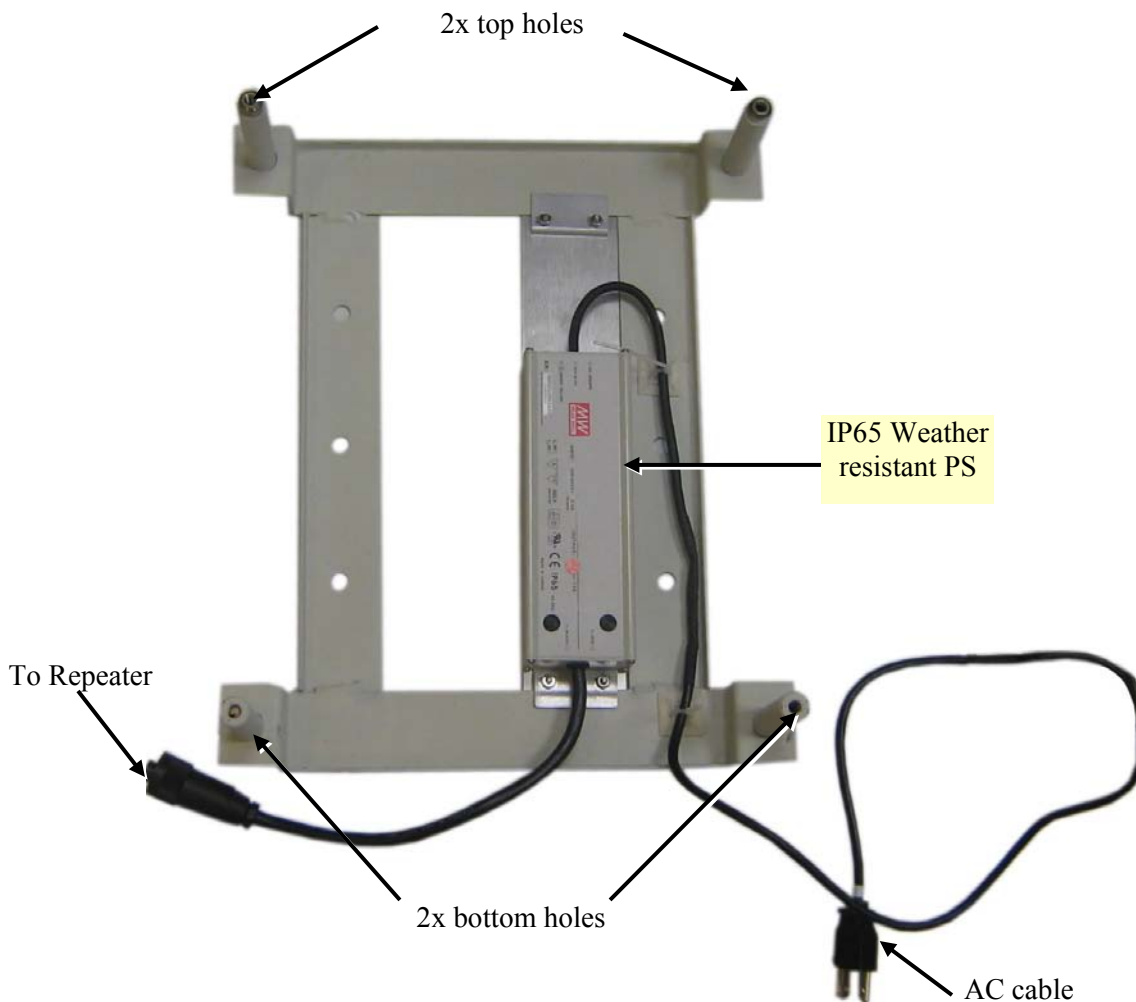


Figure 9. 3307D Mounting Holes and Pins

3.5.3 Mounting the Repeater

1. Pick up the Repeater and align the Repeaters' four installation holes with the Mounting Brackets' pins (see Figure 7. Installation Components).
2. Slide the brackets pins through the Repeater holes until the upper side is locked with the installation head nuts at the top of the bracket. See Figure 7. Installation Components.
3. Release the four captive screws locking the Repeater cover.

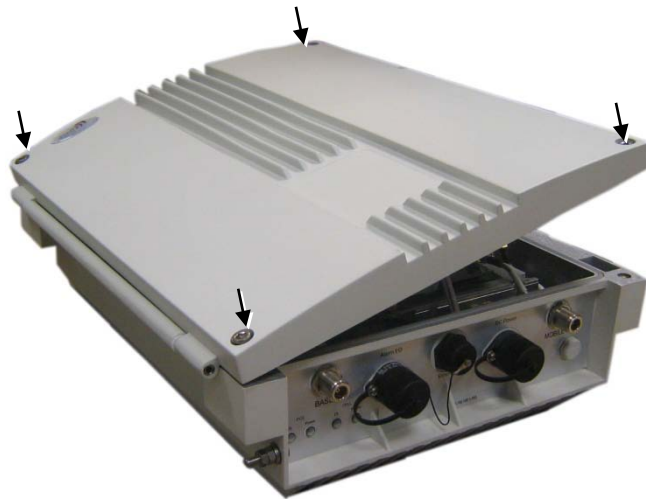


Figure 10. Loosen Captive Screws and Swing Open Door

4. Swing the top cover open.



Figure 11.3307D Mounted on Support Bracket

5. Set both clamps with a hex washer head screw (item 3 in Figure 7. Installation Components).

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6. Insert the clamps including the screws in to the upper orifices leading inside the Repeater.

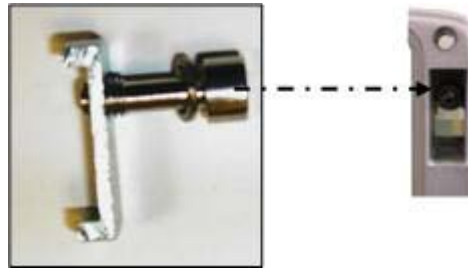


Figure 12. Locking Clamp

7. Using the Allen screwdriver (item 8 in Figure 7. Installation Components), tighten the hex screw of the clamp.
8. Insert two hex washer head screws (item 3 in Figure 7. Installation Components) including spring washers (item 4 in Figure 7. Installation Components) and flat washers (item 5 in Figure 7. Installation Components) into the lower orifices of leading inside the Repeater.

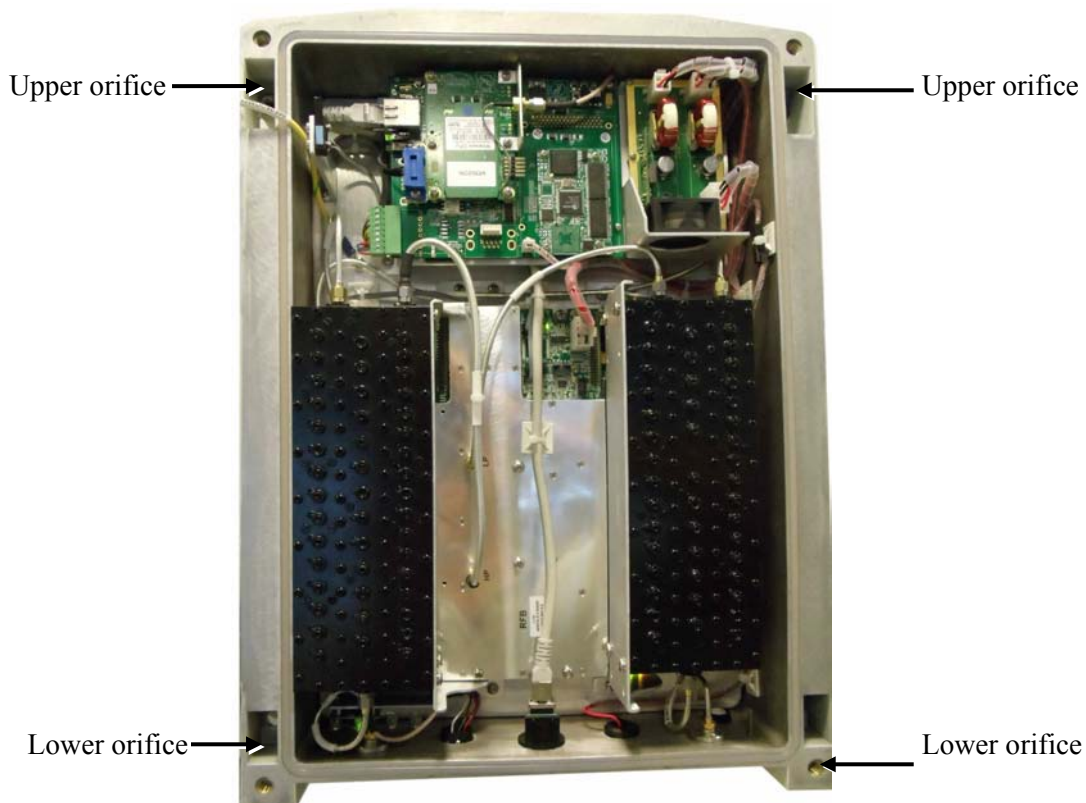


Figure 13. Example of Upper and Lower Orifices

9. Use the Allen screwdriver (8 in Figure 7. Installation Components) to tighten the hex screws.
10. Verify that the Repeater is firmly mounted.
11. Install the SIM card according to the following section; otherwise, close the Repeater cover and lock it with the four captive hex screws.

3.6 For GPS/GPRS Modems - Inserting SIM Card

NOTE: This section is only relevant to units in which GPS/GPRS modems are installed. For units in which CDMA modems are installed, configure according to section 4.7.4.

**WARNING!!! BEFORE INSERTING OR REMOVING THE SIM CARD
BE SURE THAT THE REPEATER IS POWERED OFF
(DISCONNECT THE DC POWER CONNECTOR)**

1. If the Repeater door is not open, open the Repeater door by releasing the four captive screws.

Note: The internal view shown in the following figure is only an EXAMPLE. The internal view of your unit may differ from this view.

2. (The SIM Card interface is internal.) PRESS the protrusion to extract the tray, place the SIM card in the tray and push the tray in gently *until it clicks*.

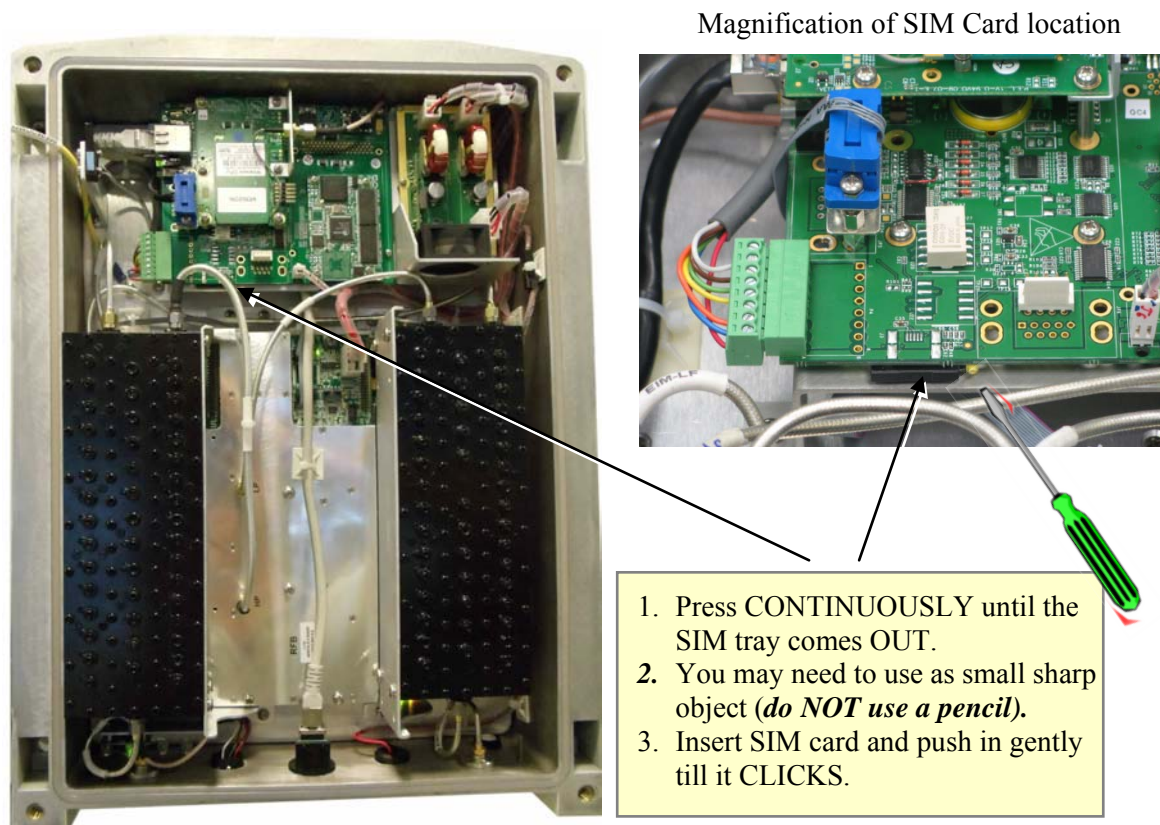


Figure 14. Example of SIM Insertion Location

3. Close the cover and tighten the captive screws.

3.7 Grounding

Requirements for grounding wires

- Protective grounding conductor - should be aluminum with cross-section 10AWG.
- Lug of the protective grounding conductor - should be aluminum
- Washers and screw - should be high Cr stainless steel, or 12% Cr stainless steel, or Cr on, Ni on steel, tin on steel
- The protective grounding conductor is copper with a 10AWG cross-section.

To ground repeater

Connect main ground to Repeater grounding lug.



3.8 Before Connecting the Antennas or Power

Before connecting the antennas or power perform the following procedures described in this section:

- Verify isolation between the donor and mobile antennas
- Verify link between the BTS and the Repeater

3.8.1 Verifying Isolation between Donor and Mobile Antennas

The isolation between the Base/Donor and Mobile/Service antennas is critical especially for high gain, outdoor applications.

- For proper operation of the Repeater, it is recommended that the isolation between the Donor and Service antennas be at least 12dB higher than the Repeaters set gain.
- Insure proper vertical or horizontal distance separation between Donor and Service antennas

NOTE: Lower isolation can lead to high in-band ripple, oscillations and low signal quality.

To measure the isolation, proceed as follows:

1. Inject a known signal from a signal generator into one antenna (preferably the Donor antenna).
2. Measure the coupled output from the Service antenna, using the Spectrum analyzer and LNA if applicable.
3. Perform this procedure across the frequency range of both the Uplink and Downlink bands.
4. Register the lower result for system operation.

3.8.2 Verify Link between BTS and Repeater

WARNING!

PERFORM THIS PROCEDURE BEFORE CONNECTING THE ANTENNAS TO THE REPEATER OR POWERING ON THE REPEATER. THE REPEATER SHOULD NOT BE OPERATED PRIOR TO THE VERIFICATION OF THE OPERATING PARAMETER IN ITS INSTALLATION ENVIRONMENT.

Before connecting the antennas or powering up the Repeater, verifying the Link between the BTS and the Repeater

This test checks the signal strength from the BTS antenna to the Repeater.

Proceed as follows:

1. Using a Spectrum analyzer, measure the received signal from BTS at the Donor antenna port near the Repeater.
2. Adjust the Donor antenna direction to receive the maximum signal strength.
3. Compare the received signal strength with the calculated signal strength from the design phase.
In case of discrepancy, check for one of the following:
 - Antenna out of direction
 - Antenna tuned to side lobe instead of main lobe
 - Antenna connector or antenna cable faulty
 - Line-of-sight problem (obstruction), etc.
4. Register the signal strength of the downlink channel for the system operation phase.

3.9 Antenna Connections

CAUTION!

DO NOT CONNECT THE ANTENNA CABLES TO THE REPEATER BEFORE VERIFYING THE INSTALLATION PARAMETERS.

DO NOT POWER-UP THE REPEATER WITHOUT EITHER THE ANTENNAS BEING CONNECTED OR THE ANTENNA CONNECTIONS TERMINATED WITH DUMMY LOADS.

To connect the antennas to the Repeater

NOTE: If the coaxial cables are NOT weather-resistant type, wrap the exterior coaxial cables with insulation and holding tape (Type 3M Rubber splicing tape) for environmental protection and to ensure longer lifetime.

1. Install the antenna cables along their path to the Repeater, and connect them to the Antennas.

Note: Be sure to use low loss cables.

2. Connect the Donor antenna to the Repeater BASE port. (Donor antenna specifications and installation criteria are described in section 2.1).
3. Connect the Service antenna to the Repeater MOBILE port. (Mobile antenna specifications and installation criteria are described in section 2.2).
4. Verify all RF connectors are tightened and the cables and antennas are secured.

3.10 Power-on

Power-on the Repeater by simply connecting the power cable to the front panel.

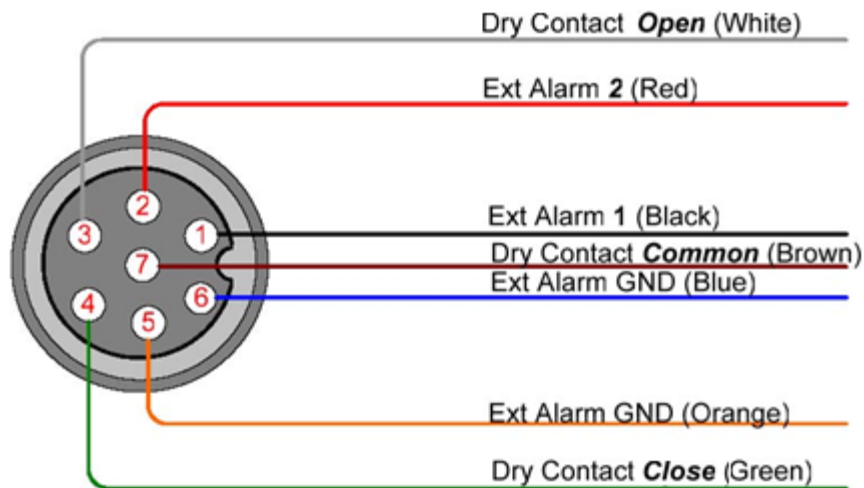
3.11 External Alarms and Relay Connections

The front panel **Alarm** port (see 1.4) supports two alarm connections from external sources (incoming outputs) and one dry-contact alarm.

Note the following:

- The alarms can be connected any time, before or after the system is powered-on.
- You can use the supplied alarms cable (Axell catalog part number 300WEC70500)
- The connections must conform to load restrictions as described in section 3.11.1.
- After being connected, the External Alarms must be enabled from the Web Management application (see 4.5).

The color configuration of the alarm wires is as follows



The following table provides a description of the Alarm connector pinout and the corresponding cable wire color-match pin.

Description	Pin No.	Operation
External Alarm_1	1	Triggers Alarm ID 1 (if set in the External Alarms tab).
GND	5	Ground, galvanic short to Repeater chassis.
External Alarm_2	2	Triggers Alarm ID 2 (if set in the External Alarms tab).
GND	6	Ground, galvanic short to chassis
Dry contact relay Normally Open (NO)	3	Normally Open to the relay common port. The contact is open during normal operation closes when either a Major Alarm is detected or the Repeater is switched off.
Dry contact relay Normally Closed (NC)	4	Normally Closed to the relay common port. The contact is closed during normal Repeater operation and opens when either a Major Alarm is detected or the Repeater is switched off.
Dry contact-common	7	Dry contact relay common port

3.11.1 Load Restrictions

3.11.1.1 Alarm Dry Contact Output Restrictions

- Maximum switching voltage: 220 VDC, 125 VAC
- Maximum switching current: 2A

3.11.1.2 External Alarm Input Restrictions

- Maximum repetitive reverse voltage: 28 V
- Impedance load: 470 Ohm: 0 = 0V; 1 = 3.8V - 28V

4 Initial Setup and Commissioning

This section provides the setup procedures for the 3307D Repeater. The Repeater is designed for simple plug-and-play operation, only requiring the setup of a number of parameters (such as DL Output Power, bandwidth, and gain) through a local Web connection and verifying that the system is operating properly.

The setup procedure consists of the following steps:

1. Open a local Web session to the Repeater (this requires configuring the communication parameters of the computer used).

If you are not familiar with the Axell Web Access application, we suggest you quickly review the section on Navigating the Web GUI Application. It is only a couple of pages and you will find it useful.

2. Adjust the signal levels and configuring the sub-bands.
3. After the required coverage is attained for the location, verify that no Alarms are generated before connecting to the main control center.
4. Set the Repeater time and date.
5. Configure the external alarms.
6. Configure the communication and system parameters.

4.1 Open a Local WEB Session to the Repeater

4.1.1 Connecting to the Repeater

To connect Repeater to computer

Interconnect the computer and the Repeaters' front panel **Ethernet** ports with the supplied Ethernet cross-cable as shown below.

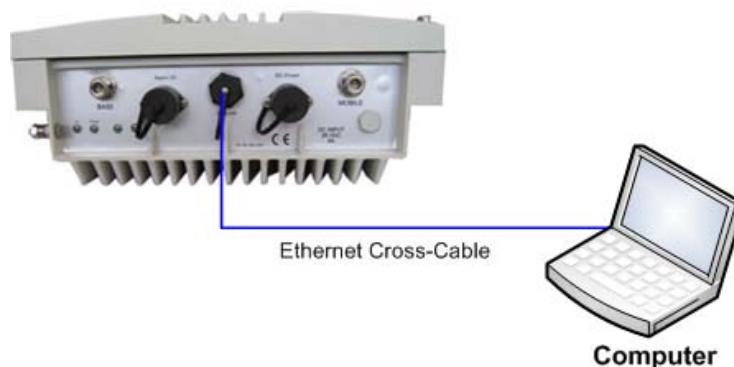


Figure 15. Local Ethernet Connection

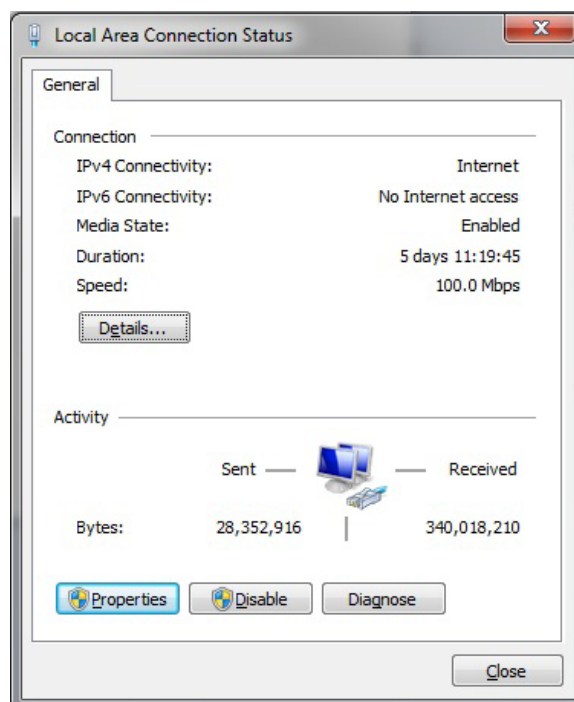
4.1.2 Configure the Computer Network Parameters

Configure the computer network parameters to communicate with the Repeater. Note that the procedure may vary slightly depending on the operating system installed on your computer. The following procedure is for Windows 7.

To configure the computer's network parameters:

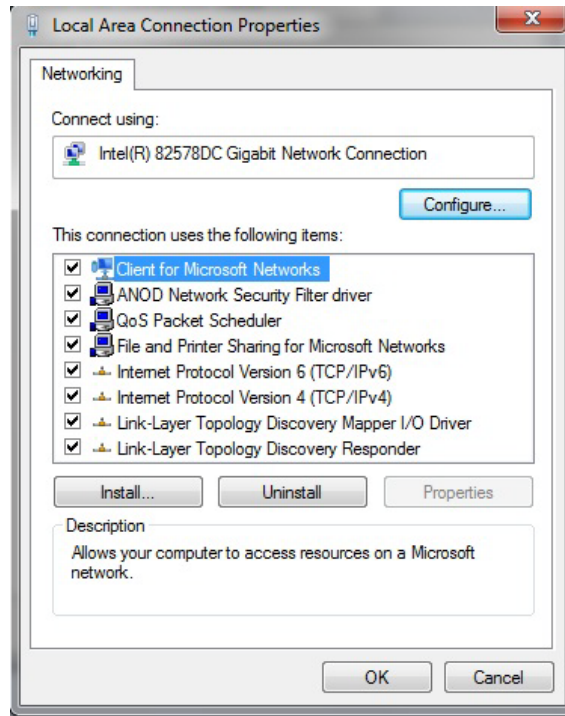
1. Click the **Start** menu and choose **Control Panel**.
2. In the **Control Panel**, click **Network and Internet**.
3. Click **Network and Sharing Center** and then click **Local Area Connection**.

The **Local Area Connections Status** dialog appears with the General tab displayed by default.



4. Click the **Properties** button in the displayed **Local Area Connection Status** dialog.

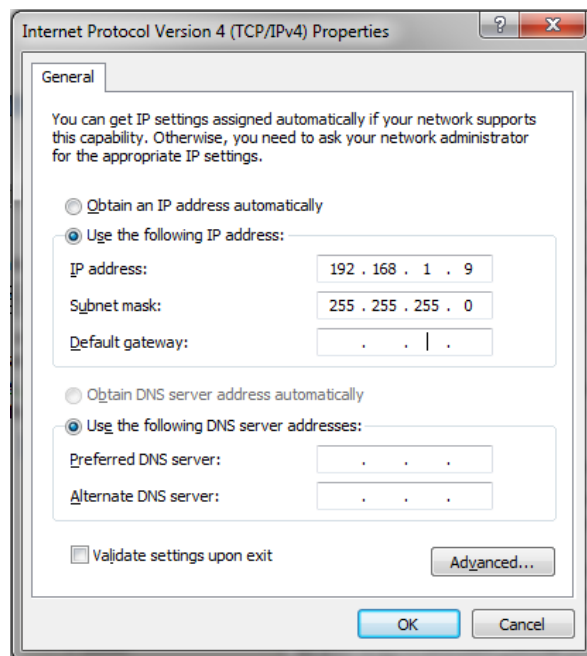
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5. In the Items list, double-click the **Internet Protocol Version 4 (TCP*IPv4)** item. The **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog appears.

Note: The Repeater is supplied with the default IP address 192.168.1.253.

6. Assign your computer an IP address in the same subnet, in order to communicate with the unit.
 - In the IP address area:
 - Enter the IP address 192.168.1.x, where 'x' can be any number between 2 and 250 inclusive. For example, (192.168.1.9)
 - Define the subnet mask as shown (255.255.255.0)



- Click **OK**. The computer communication parameters are now defined and you can open a session to the Repeater.

4.1.3 Login to the Repeater

NOTE: The Repeater is factory assigned the address 192.168.1.253. Initial login is performed using this address; however it is recommended to make the necessary modifications according to information provided by your network administrator.

To login to the Repeater

1. Open one of the Flash-enabled browsers listed in the system requirements.
2. In the address line, enter the IP address of the Repeater. <http://192.168.1.253>. A session will be established with the Repeater and the login dialog appears.



3. Type the default User Name **admin** and the default Password **admin**.

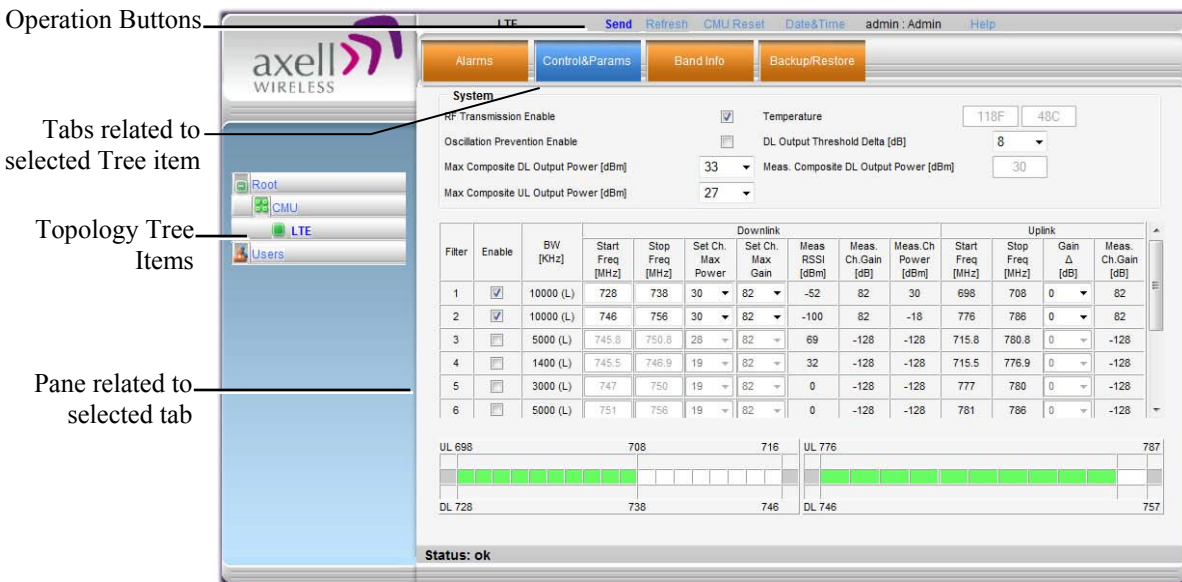
Note that both are case sensitive and must be entered with lower case letters.

4. Click **Login**. The application main window appears.
5. Quickly review the following section describing the application window and then proceed to configure the signal levels according to section 4.30.

4.2 Navigating the Web GUI Application

This section describes how to navigate the Web Management application. The Web Access interface provides three groups of options, listed in the left side Topology Tree items:

- **CMU** – management, monitoring , configuration and administration options at the Repeater level.
- **LTE (or band name)** – band level RF parameters control and monitoring options.
- **Users** – user definition and management options and enables changing user passwords.



4.2.1 Operation Buttons

The following Operation buttons are available.



Item	Description / Values
<i>Selected Tree Item</i>	Shows the currently selected topology tree item. Values: CMU, Band (i.e. LTE), Users
Send	Click after completing the new data input and values update in any screen in order to insert the new values into the Repeater, and implement the changes
Refresh	Click to refresh the current screen and update the displayed data
CMU Reset	Click to reset the Web Access application, in case of failure or display problems
Date and Time	Accesses the Repeater Date and Time settings.
Help	Click Help to display an e-guide line for the system operation. This Help is general by its nature and some features may not be included.

4.2.2 Band Pane and Tabs

The upper area of each selected pane shows the tabs corresponding to the selected band (i.e. LTE).



Item	Description / Values
Alarms	Repeater level alarms.
Control and Params	RF parameters and configuration of sub-channels for the band
Band Info	Information on hardware relevant to this band.
Backup/Restore	Configuration files management options. (configuration files can be stored on the Repeater for access).

4.2.3 CMU Pane and Tabs

When the CMU item is selected in the Topology Tree, the following menu items are available.



Item	Description / Values
Axell CMU Info	Shows Repeater level information such as SW and HW versions and identification number. In addition, enables setting minimum alarm levels.
Axell CMU Configuration	Used to set IP, fault notification and modem communication parameters
Alarms Log	Log of past and current alarms
CMU Alarms	System alarms
External Alarms	Not relevant for this unit.
CMU SW Upgrade	Options for CMU software upgrade.

4.3 Signal Levels and Channel Configuration

This section provides a description of the RF Gain setting criteria (set via the Controls and Params Pane), a full description of the Control and Params pane, and a step-by-step procedure of the signal level and channel configuration procedure.

4.3.1 RF Gain Setting Criteria

The RF Gain is set automatically by the Repeater's SALC function. The function sets the optimum gain without exceeding the isolation limit.

The gain range is up to 82dB for the LTE band and is set by default to its maximum value.

The gain will then be modified automatically to its optimum value by the SALC mechanism. This mechanism performs gradual learning of traffic load characteristics and adjusts the Repeater RF Gain accordingly. (See section 1.3 for more information on the SALC mechanism).

4.3.2 Adjusting the Signal Levels and Configuring Channels

The **Control and Params** (parameters) window is used to configure each of the 700 MHz sub-bands and Max UL/DL Power. This section describes each of the fields.

Up to 8 or 12 sub-bands referred to as *filters* can be defined, where each sub-band is *individually* defined by setting the following:

- Bandwidth (start and stop frequency) - each sub-band can be set over the full LTE for the following bandwidths: 1.4MHz, 3MHz, 5MHz, 10MHz or 15MHz
- Maximum power
- Maximum gain
- Gain delta

The defined sub-bands are displayed in the lower part of the screen for reference.

To adjust the signal levels and configure the channels

1. In the topology tree, click **Root** and click **LTE**.
2. Click the **Control and Params** tab. The corresponding pane appears.

The window is divided into the following areas:

- System – overall parameters for the *selected service*.
- Filter definitions – used to define up to 8/12 sub-bands and their RF parameters.
- Sub-bands view – graphical display of defined sub-bands for the service. The view is divided into two: lower A,B,C band (left) and Upper C band (right)

The screenshot shows the 'Control&Params' window for LTE. At the top, there are tabs for 'System', 'Control&Params', 'Band Info', and 'Backup/Restore'. The 'System' section includes parameters like 'RF Transmission Enable', 'Oscillation Prevention Enable', 'Max Composite DL Output Power [dBm]', and 'Max Composite UL Output Power [dBm]'. Below this is a table of filter definitions with columns for Filter, Enable, BW [KHz], Start Freq [MHz], Stop Freq [MHz], Set Ch. Max Power, Set Ch. Max Gain, Meas. RSSI [dBm], Meas. Ch. Gain [dB], Meas. Ch. Power [dBm], Start Freq [MHz], Stop Freq [MHz], Gain Δ [dB], and Meas. Ch. Gain [dB]. The table lists four filters with various bandwidths and frequencies. At the bottom, a graphical view shows the sub-bands on a frequency spectrum, with 'DL 728' and 'UL 776' labels. Callouts point to specific areas: 'Service level parameters' points to the System section, 'Click Send with each change' points to the 'Send' button, 'Sub-band definition options' points to the filter table, 'Defined Lower A,B,C band channels' points to the lower part of the frequency spectrum, and 'Defined Upper C band channels' points to the upper part of the frequency spectrum.

*Note: Be sure to click **Send** with each change.*

3. Set the System Level parameters:

- Verify that the **RF Transmission Enable** parameter is checked.
- Set the **Max Composite DL Output Power** according to your site requirements and click **Send**. The Measured Composite DL Output Power is displayed in the adjacent field.
If the composite output power exceeds the defined value, the Smart ALC feature begins working.
- Set the **Max Composite UL Output Power** according to your site requirements.

Additional parameters (not required for initial setup) are:

- Oscillation Prevention Enable - Enables oscillation detection mechanism that maintains repeater functionality.
- Temperature - Displays Repeater ambient temperature.
- DL Output Threshold Delta (dB) - the delta from the set Composite Output Power, below which the alarm 'Donor power is too low' is activated.
For example, if the DL Output Threshold value is set to 8dB, when the *Measured* Composite DL output power is 8dB less than the *set* Composite Output Power, an alarm is generated.
- Meas. Composite DL Output Power – displays the currently measured output signal level.

4. To configure each sub-band:

- Checkmark **Enable**. The configuration parameters in that row will be available.
- In the Downlink area, set the **Start** and **Stop** DL Frequency (MHz). (The Uplink Start and Stop frequencies will be automatically allocated.)
The defined BW will be displayed in the BW KHz column (to the left of the Start Frequency).
Be sure to choose Start/Stop values that provide any of the following bandwidths: 1.4MHz, 3MHz, 5MHz, 10MHz or 15MHz.
- Set the (Downlink) Max Gain as follows: by default, the **MAX Gain** (DL) parameter is set to its highest level (82dB). Change the **Channel Max Gain** (DL) according to the measured/calculated input power and isolation measurements.
The recommended Maximum Gain setting is approximately 15 dB less than the isolation between the service and donor antennas.

5. If the site NOISE LEVEL is high enough to cause interference, adjust the noise level as follows:

- Adjust the **Gain Delta** parameter – this sets the delta between the uplink and downlink gain (so the uplink gain is relatively lower than the downlink gain).
- Click **Send**. The defined sub-band will appear in the display in the appropriate area: Lower A,B,C (left side) or upper C (right side).
- Repeat the procedure until the desired coverage is achieved.

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6. More information on parameters for the *selected* sub-band:

- DL Set Ch. Max. Gain Sets the power for the antennas. The value is about 15 dB less than the isolation between the donor antenna and the mobile antenna.
The Value defined in the DL path is reflected in the UL path, however to define different UL and DL path values the Gain Delta parameter is used and its defined value is added to the UL value.
- DL Measured RSSI - measured DL signal.
- DL Measured Ch. Gain - measured DL Gain (dB) for the selected sub-band.
- DL Measured Ch. Power - measured Power (dBm) for the selected sub-band.
- UL Gain Δ - used for noise control. Sets the difference between UL and DL gain.
- UL Measured Ch. Gain - measured UL Gain (dB) for the selected sub-band.

7. Click **Send** (top window area option).

8. After the channels have been configured and the required coverage is attained for the location, verify that no Alarms are generated:

- Click the **Alarms** tab
- Verify that all the indicators are GREEN in the Alarms tab.



4.4 Setting Date and Time

It is important to set the correct date and time on the unit since this provides the timestamp for each logged event and alarm.

To set the Repeaters date and time

1. Click on **CMU** in the tree pane.
2. Click on **Date & Time** in the menu bar. The following dialog appears.



Set CMU Date and Time

Year: 2007
 Month: 11
 Day: 15
 Hour: 15
 Minute: 37

Set

Please note: after changing date and time you need to reset CMU!

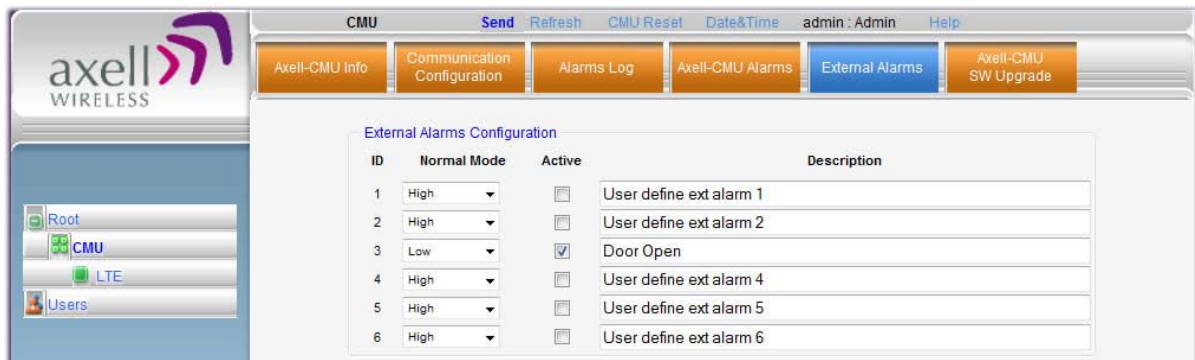
3. Set the date and time parameters and click on **Set**.
4. **Reset** the CMU (as described in the following section).

4.5 Configuring the External Alarms

Any connected alarms (section 3.11) must be enabled and configured according to the instructions provided in this section.

To configure external alarms

1. Click on **CMU** in the tree pane.
2. Click the **External Alarms** tab. The following dialog appears.



axell WIRELESS

CMU Send Refresh CMU Reset Date&Time admin: Admin Help

Axell-CMU Info Communication Configuration Alarms Log Axell-CMU Alarms External Alarms Axell-CMU SW Upgrade

External Alarms Configuration

ID	Normal Mode	Active	Description
1	High	<input type="checkbox"/>	User define ext alarm 1
2	High	<input type="checkbox"/>	User define ext alarm 2
3	Low	<input checked="" type="checkbox"/>	Door Open
4	High	<input type="checkbox"/>	User define ext alarm 4
5	High	<input type="checkbox"/>	User define ext alarm 5
6	High	<input type="checkbox"/>	User define ext alarm 6

3. For each connected alarm:
 - Checkmark the **Active** checkbox.
 - Set the alarm **Normal Mode** as High or Low.
 - In the **Description** field, assign the alarm an identifiable name.

4.6 Communication and System Parameters

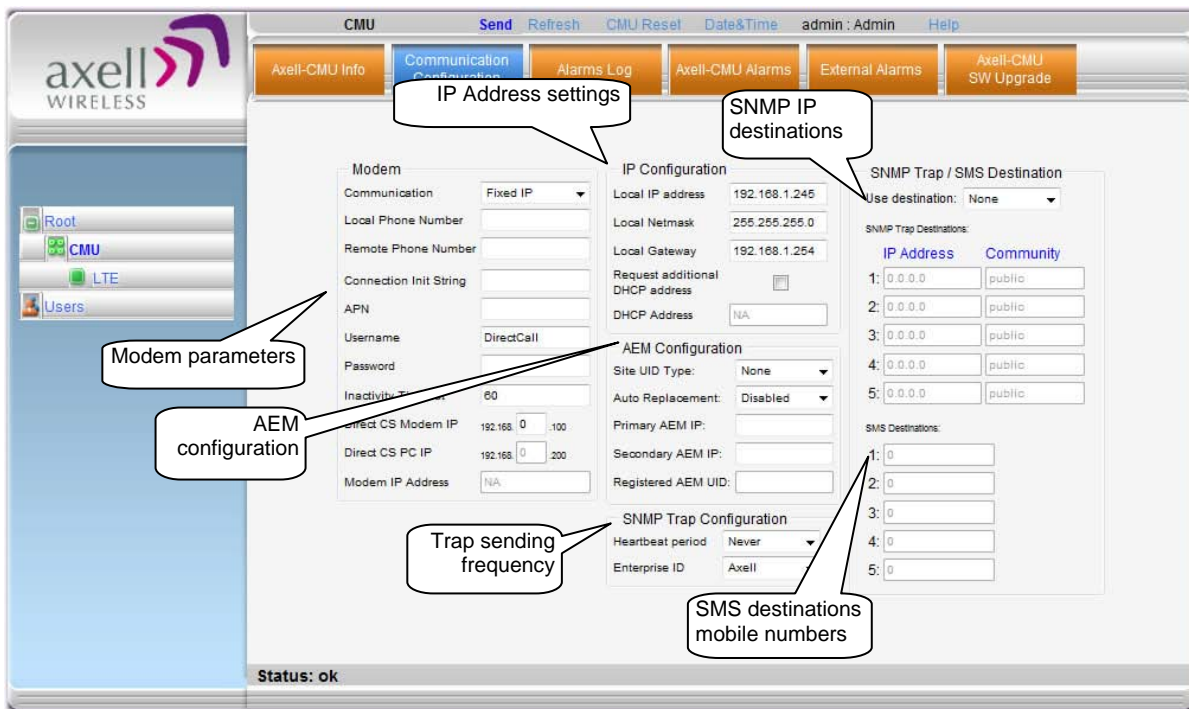
The Communication Configuration tab provides the Modem, IP, AEM and SNMP trap configuration parameters.

This section describes how to access the dialog. The following sub-sections provide detailed information on each configuration option.

4.6.1 The Communication Configuration Tab

To access the Communication Configuration tab

In the left tree pane, click **CMU**. From the available tabs in the work area, choose the **Communication Configuration** tab.



4.6.2 IP Address Configuration

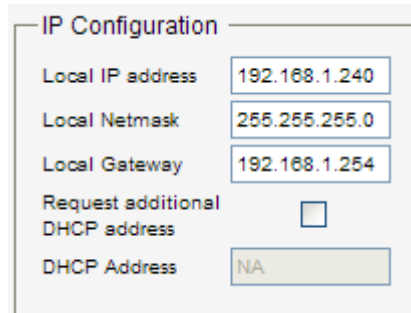
The Repeater supports both Static and DHCP addresses. A unique technology enables applying both types to the *same* Ethernet port. Both addresses may enable local and remote management.

- Local IP Address – Static IP assigned by the user to the system. The default Static IP address is 192.168.1.253. It is highly recommended to preserve this setup. In case of a change, make sure you record the newly assign IP.
- DHCP Address – address assigned by DHCP server – used for remote management via an Ethernet connection.

To assign the unit IP address

1. Access the **Communication Configuration** tab according to section 4.6.1.
2. To assign the unit addresses:
 - Local address - in the **IP Configuration** area, assign the unit the IP address, Netmask and Gateway parameters provided by your system administrator.

- DHCP server address – checkmark the option **Request Additional DHCP Address**. The assigned address can be seen in the DHCP Address field.



IP Configuration

Local IP address: 192.168.1.240

Local Netmask: 255.255.255.0

Local Gateway: 192.168.1.254

Request additional DHCP address:

DHCP Address: NA

4.6.3 Configuring Notification Method - SNMP Trap or SMS

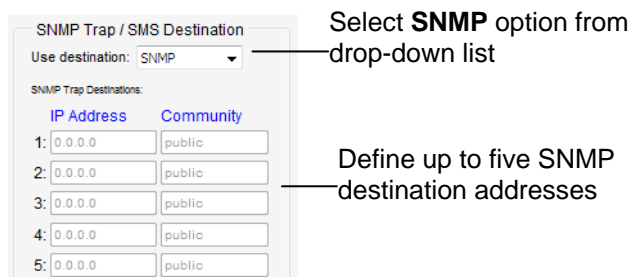
The Repeater can be configured provide fault notification *either* by sending traps to defined IP addresses *or* by sending an SMS message to configured destinations (only *one* option can be selected).

4.6.3.1 Configuring SNMP Trap Destinations

You may configure traps to be sent to five destination addresses each time a fault is triggered. The traps are sent at the defined heartbeat frequency.

To set SNMP Trap Destination parameters

1. In the **Use Destination** field, select the **SNMP** option
2. For each destination:
 - Enter the IP Address (where the IP addresses should be in the same subnet as the repeater).
 - Define the Community names (default = public) of the computers to which traps will be sent.



SNMP Trap / SMS Destination

Use destination: SNMP

SNMP Trap Destinations:

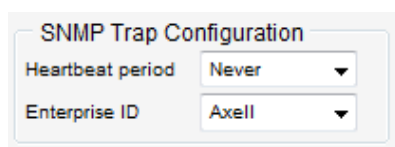
	IP Address	Community
1:	0.0.0.0	public
2:	0.0.0.0	public
3:	0.0.0.0	public
4:	0.0.0.0	public
5:	0.0.0.0	public

Select **SNMP** option from drop-down list

Define up to five SNMP destination addresses

3. In the **SNMP Trap Configuration** area, in the **Heartbeat Period** field, define the frequency (in minutes) at which traps will be sent.

NOTE: It is recommended to maintain the Enterprise ID as Axell.



SNMP Trap Configuration

Heartbeat period: Never

Enterprise ID: Axell

4. Click **Send**.

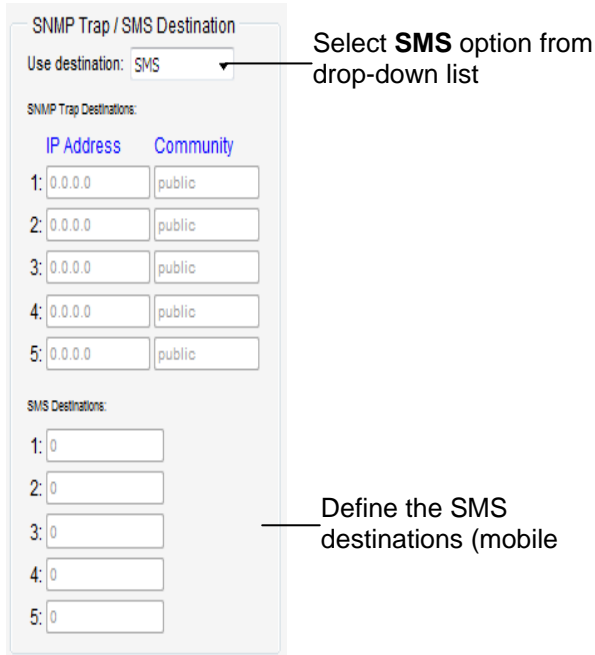
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4.6.3.2 Configuring SMS Notification Destinations

You may configure up to five SMS destinations (mobile numbers).

To set SMS Destination parameters

1. In the **Use Destination** field, select the **SMS** option from drop-down list.



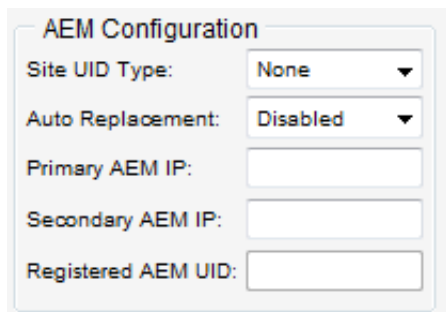
Select **SMS** option from drop-down list

Define the SMS destinations (mobile)

2. Define up to five SMS destinations (for example, + xxx541234567):
3. Click **Send**.

4.6.4 AEM (Axell Element Manager) Configuration

Configure the AEM parameters provided by the system administrator so that the 3307D Repeater is integrated in the network and can be centrally managed.



4.7 Modem Communication Setup

The Repeater modem supports both a Packet Switch and a Direct Circuit Switch connection. This section describes how to configure the modem according to the required communication mode.

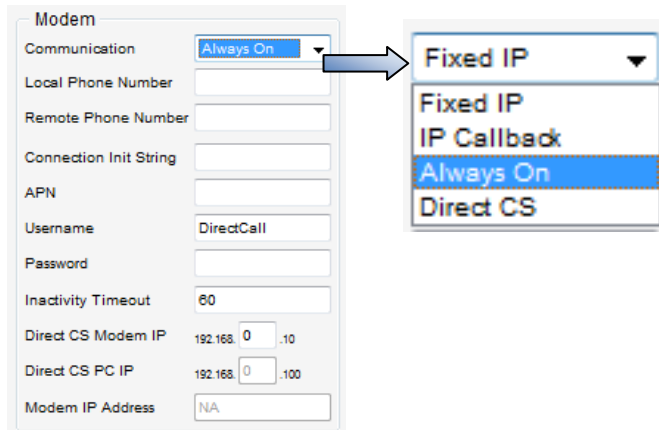
NOTE: For GPRS modems, it is assumed that the SIM card is already installed according to section 3.6.

4.7.1 Available Modem Parameter Options

To define the modem parameters

Click **CMU** in the left tree pane and select the **Communication Configuration** pane.

In the **Modem** area, select the **Communication** mode and define any additional parameters according to the table below. (Any defined fields in the figure below are only an *example!*)



In the communication field, select ...	For this communication mode.
Fixed IP.	Modem OFF
Always ON.	Packet Switch mode. (CDMA, GPS/GPRS, etc.). For GPRS Modem, see section 4.7.2. For CDMA modem configuration, see section 4.7.4 <i>NOTE: After the modem connects to the network, the Modem IP Address is displayed.</i>
Direct CS.	Direct Circuit Switch, see section 4.7.3.
IP Callback	Special mode for specific installation types.

4.7.2 GPRS Modem

For GSM/GPRS communication, GSM/GPRS modems are installed. These modems support both a Packet Switch and a Direct Circuit Switch connection.

NOTE: It is assumed that the SIM card is already installed according to section 3.6

To define the modem parameters

1. Click **CMU** in the left tree pane and select the **Communication Configuration** pane.
2. In the **Modem** area, set the **Communication** mode as **Always ON**.
3. Define any additional parameters as required by your operator.

4.7.3 Direct Circuit Switch Connection

A. On the Repeater, set the Repeater Modem parameters (above) as follows:

- Communication - **Direct CS**
- To provide security, set the **User Name** and **Password** for the repeater (the same User Name and Password will be defined on the dial-up connection).

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- You *may* modify (optional) the **Direct CS Modem IP** – this is the Web address used to open a Repeater session. Otherwise, the default displayed value can be used.

B. On your computer, set up a dial-up connection as follows:

1. Via **Network Connections**, create a **Dial-up** connection on your computer (Connect using a dial-up modem). The procedure may vary slightly depending on your Operating System.
2. Define the parameters as follows:
 - ISP connection name – user defined, recognizable name for this connection for future reference.
 - Phone Number – the number corresponding to the SIM card installed on the Repeater.
 - User Name and Password – the User Name and Password (if assigned) that you allocated in the Modem parameters in the Communication dialog (see previous section).

C. Open a session to the Repeater:

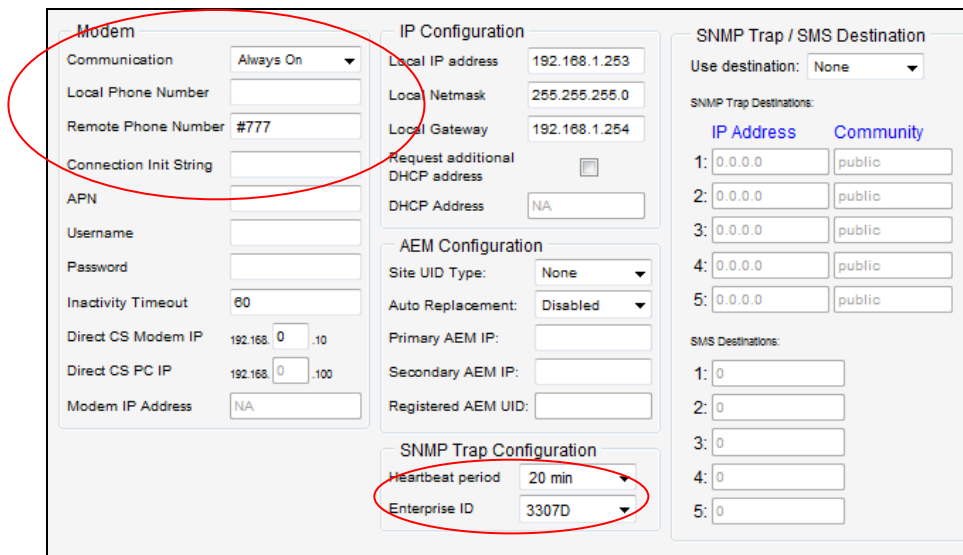
1. On your computer, click the relevant dial-up connection item or the icon, to open a dial-up route to the Repeater.
1. Open a Web Browser and enter the **Direct CS Modem IP** that is defined in the Modem parameters on your Repeater. A session will be opened to the Repeater.

4.7.4 CDMA Modem

4.7.4.1 Configuring for CDMA Modem

To configure for a CDMA modem

1. In the **Modem** area above, verify that:
 - Modem Communication = **Always On**
 - Remote Phone Number = **#777 (Verizon)**
 - Connection Init String = *empty field (blank)*
 - Enterprise ID = **3307**.



Modem		IP Configuration		SNMP Trap / SMS Destination	
Communication	Always On	Local IP address	192.168.1.253	Use destination:	None
Local Phone Number		Local Netmask	255.255.255.0	SNMP Trap Destinations:	
Remote Phone Number	#777	Local Gateway	192.168.1.254	IP Address	Community
Connection Init String		Request additional DHCP address	<input type="checkbox"/>	1:	0.0.0.0 public
APN		DHCP Address	NA	2:	0.0.0.0 public
Username		AEM Configuration		3:	0.0.0.0 public
Password		Site UID Type:	None	4:	0.0.0.0 public
Inactivity Timeout	60	Auto Replacement:	Disabled	5:	0.0.0.0 public
Direct CS Modem IP	192.168.0.10	Primary AEM IP:		SMS Destinations:	
Direct CS PC IP	192.168.0.100	Secondary AEM IP:		1:	0
Modem IP Address	NA	Registered AEM UID:		2:	0
SNMP Trap Configuration				3:	0
Heartbeat period	20 min			4:	0
Enterprise ID	3307D			5:	0

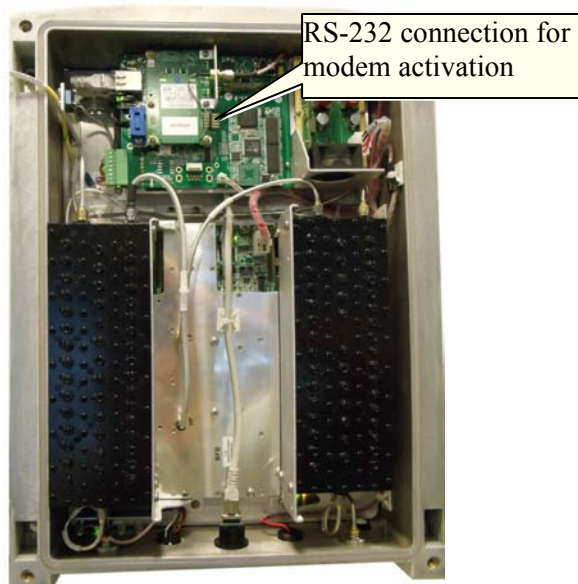
2. Activate the modem in the Verizon network according to the following section.

4.7.4.2 Activating the modem in the Verizon network

WARNING!!! SETTINGS OF THE MODEM ARE SENSITIVE TO CHANGES. INSERT VALUES AND PARAMETERS WITH PARTICULAR CARE IN ORDER TO ENABLE THE REMOTE CONNECTION.

Below is the activation procedure for the modem in the Verizon Wireless Network.

1. Open the Repeater and connect the RS-232 cable (provided in the accessory kit) to the CMU card.



2. Open HyperTerminal with (or equivalent program)
3. Set connection speed to 115,200, no flow control.
4. Type AT → and you should get a response OK.
5. Use the command ATD*22899; (ensure there is a semi-colon “;” after the dial string, otherwise you will make a circuit data call). This will start your OTASP (Over-The-Air, Service Provisioning) session.

The following messages should be displayed:

- +WOT1: “Programming in Progress”
- +WOTS: “SPL unlocked”
- +WOTP: “PRL download OK”
- +WOTM: “MDM download OK”
- +WOTC: “Commit successful”
- +WOT2: “Programming Successful!”

IMPORTANT* After programming, remove the RS-232 cable for proper modem function on the Verizon network.

6. After a few minutes, a Modem IP Address should appear on the CMU GUI screen. This indicates the modem is functioning on the Verizon Network. The module is then set up for both voice and data.

5 Administrative Operations

The following administrative operations are described in this section:

- User Management – defining and changing users and passwords.
- Viewing the Repeater information such as software and hardware versions, serial number, etc.
- Repeater software upgrade
- Configuration files backup and restore

5.1 User Management

This section describes how to perform the user management operations. By default, *two* users belonging to one of three authentication levels are defined on the Repeater.. You may add new users, modify or delete existing users.

5.1.1 User Levels

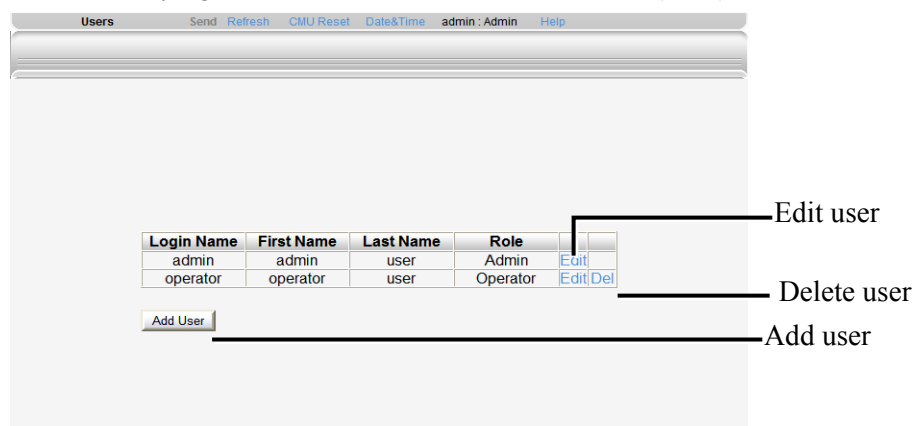
Two user levels are available:

- Admin – has access to all administration and configuration options, including user management. (Default Password **admin** and default User Name **admin**.)
- Operator – has access to all configuration options *except* for the Users list or the Loaders screen.

5.1.2 Viewing the List of Defined Users

To display the User Administration pane

From the **Tree Pane**, select **Users**. The list of users is displayed in the Configuration Pane according to the identifying information and authentication level (Role).



The following table provides a description of the Users dialog options.

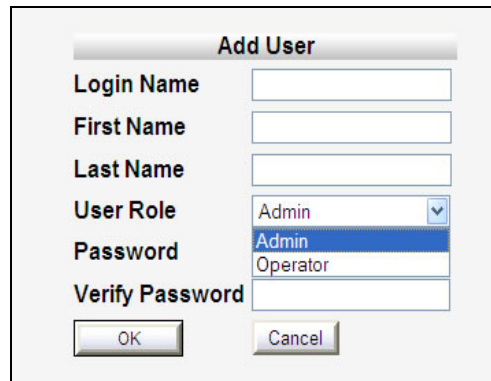
Option	Description
Add User (button)	Adds a new user with to user defined access level and password.
Del(ete)	Deletes a selected user from the list.
Edit	Enables changing the definitions of an existing user.

5.1.3 Adding Users

NOTE: User name and password entries are case sensitive.

To add a user

1. From the Tree Pane, select **Users**. The list of users is displayed in the User's Pane.
2. From the User's Pane, click **Add User**. The Add User dialog box is displayed.

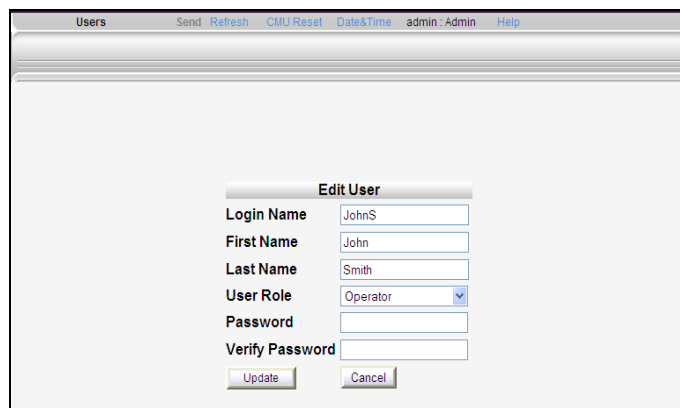


3. Enter the **Login Name** – name used by user to login.
4. Type the user's **First Name** and **Last Name** – used to identify the user.
5. Select the **User Role** – access level. This defines the operations that the user will be able to perform.
6. Enter the **Password** and in **Verify Password** enter the password again for verification.
7. Click **OK**.

5.1.4 Editing a User

To modify user definitions

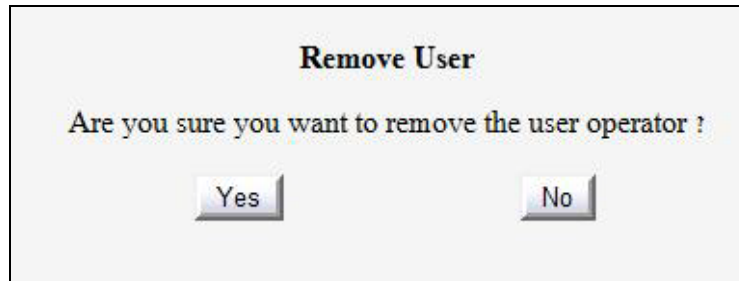
1. From the **Tree Pane**, select **Users**. The list of users is displayed in the **User's Pane**.
2. Select the **User** to be edited in the list.
3. Click **Edit**. The user definitions dialog appears.
4. Make the required changes and click **OK**.



5.1.5 Deleting a User

To delete a user

1. From the Tree Pane Select **Users**. The list of users is displayed in the User's Pane.
2. Select the User to be deleted in the list.
3. From the User's Pane, click **Del**. An authorization message dialog box is displayed.



4. Click **Yes**. The User's name is removed from the list.

5.2 Viewing Band Information

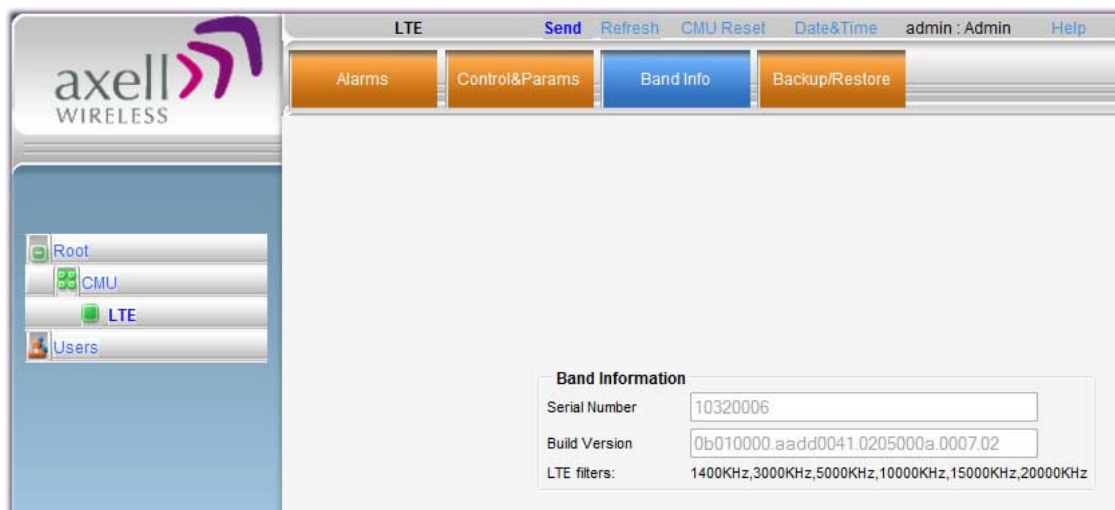
Use the **Band Information** screen to view the hardware and software versions of the Axell 3307D Repeater band and to assign it a serial number.

NOTE: Grayed-out fields indicate that the display is Read-only. Active fields indicate that the parameter values can be defined.

To access the Band Information window

1. From the Tree Pane, select **LTE**.
2. Select the **Band Info** tab. The relevant parameters are displayed.

*NOTE: The **Serial Number** field can be used to assign the module a recognizable name corresponding to the technology.*



5.3 Repeater Software Upgrade

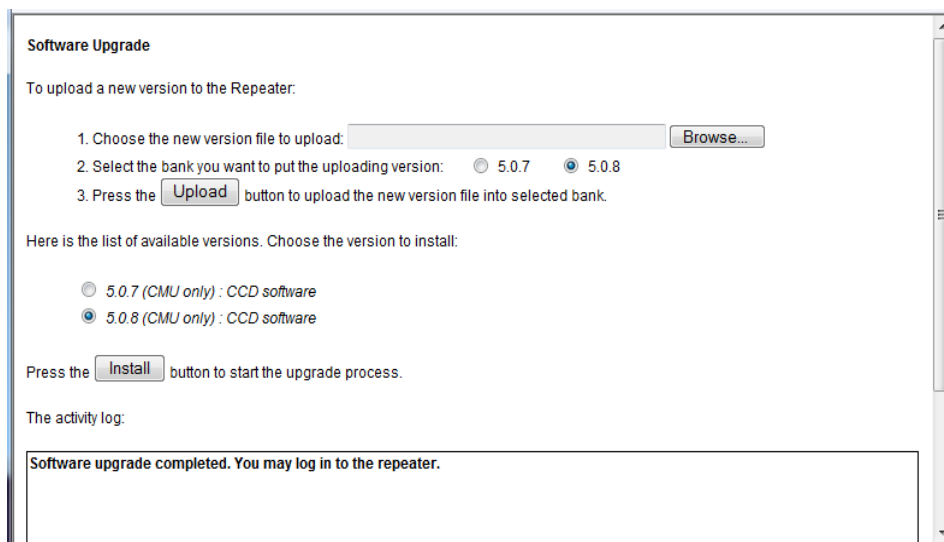
The procedure described in this section is used to upgrade the repeater CMU.

Note: This procedure is performed for every new management version.

The CMU (Repeater) SW upgrade procedure consists of loading the available updated versions and installing it in the Repeater.

To Upgrade the CMU SW

1. From the Tree Pane, select **CMU**.
2. Select the **Axell CMU SW Upgrade** tab. The CMU SW Upgrade screen shown below appears.
3. Choose the version to upload and perform the procedure according to the instructions in the screen.



5.4 Backup/Restore of Repeater Configuration

The 3307D Web GUI management application enables the backup and restore of the repeater configuration files. The procedures are performed via the **Backup/Restore** tab.

A number of configuration files can be stored on the Repeater for access at any time.

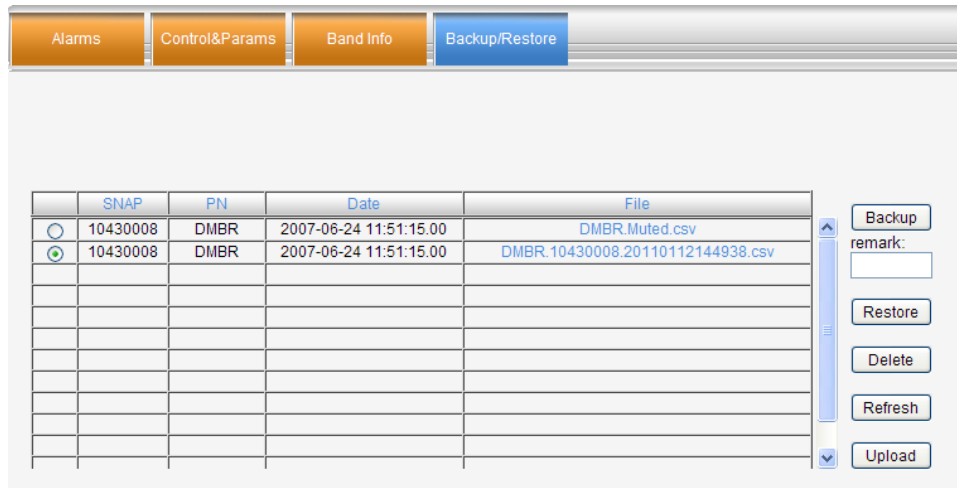
You can perform the following operations:

- Backup of the currently active configuration
- Restoring a previously saved file
- Uploading a configuration file from another location to the Repeater
- Downloading a configuration file from the Repeater to another location

To access Backup/Restore tab

1. From the Tree Pane, select the LTE (band) item.
2. Select the **Backup/Restore** tab. The following tab appears.

*Note: The following figure is only an **example** of the Backup/Restore tab.*



The following table provides a description of the available options (buttons) in the **Backup /Restore** tab shown above.

Button	Description
Backup	Used to backup the current repeater configuration. See section 5.4.1.
Remark	Used to assign the repeater configuration file (to be backed up) a recognizable name. See section 5.4.1.
Restore	Used to restore previous repeater configuration. See section 5.4.2.
Delete	Select file from list and click Delete to remove.
Refresh	Click Refresh to list of available configuration files
Upload	Used to upload new configuration file to repeater. See section 5.4.3.

5.4.1 Backup of Repeater Configuration

To perform backup procedure

1. To assign the configuration file a recognizable name, enter a name in the **remark** field.

Note: This must be performed before performing the backup operation; otherwise the file will automatically be assigned a name according to the backup date and unit ID. The name cannot be modified once the backup has been performed.

2. Click the **Backup** button located on the right-hand side of the tab.
3. The file will be added to the table displayed in the Backup/Restore tab.

5.4.2 Restoring Previous Repeater Configuration

To restore previous configuration

1. Select the required configuration file (enable corresponding radio button) from the available list in the Backup/Restore tab.
2. Click the **Restore** button.
3. Click on the **Control and Params** tab and verify that the required configuration settings have been restored.

5.4.3 Uploading New Configuration File to Repeater

To upload configuration file to Repeater

1. Click the **Upload** button.
2. Select the file from the Browse dialog and click Open.
3. The file appears in the list displayed in the Backup/Restore table.

5.4.4 Saving Configuration File to Computer

To save a configuration file from the available list in the Backup/Restore table to a location in a connected computer:

1. Select file from list.
2. Click the link in the **File** column.
3. Select the location in the Browse dialog.

6 Monitoring and Troubleshooting

3307D provides three types of indications of Repeater failure:

- Alarms screen in Web access application
- Alarms Log – used to view a record of past generated alarms
- Status LEDs on Repeater front panel

The following sections provide a description of the troubleshooting procedures according to the Repeater LED indicators and the Web access Alarms.

6.1 Repeater Alarms and Troubleshooting

The Alarms tab provides the alarms generated by the Repeater, enabling the user to monitor the system operation.

To access the Alarms window

From the Tree Pane, select the **LTE** item and choose the **Alarms** tab. The relevant parameters are displayed.



PRODUCT DESCRIPTION AND USER’S MANUAL

The following table provides a description of the displayed alarms.

Alarm	Fault, most probable cause and recommendation
System Mute	Generates an alarm when Repeater amplification is muted (automatically)
User Mute	Repeater amplification is muted (manually) as a result of an operator action.
Built In Test	Self test.
Temperature	High unit temperature. Most probable cause: Excessive heat. Check the Repeater case for external causes (sun, hot environment, air flow is blocked). Eliminate the reason for excessive heat
Donor Power Too Low	Generates an alarm when the Pre Amplifier current exceeds the allowed limits Fault in the DL or UL path. Most probable cause: Downlink (Uplink) power amplifier module outputs a low current. Check the LEDs in the Repeater
PAmp Current	Generates an alarm when the Power exceeds the allowed limits. Fault in the DL or UL path. Most probable cause: Downlink (Uplink) power amplifier module outputs a low current. Recommendation: Check the LEDs in the Repeater
RSSI	Fault in the DL or UL path Most probable cause: caused by a excessively high input signal Recommendation: Check the LEDs in the Repeater
VSWR	This alarm is triggered when the return loss of the Downlink antenna or cable connection exceeds 3 dB (VSWR 6:1). This alarm provides an indication of the status of the cable connected to the antenna. If a cable is defective, the VSWR is decreased and the alarm is triggered.
Reduced Gain by IMOP	Shows when the IMOP mechanism was activated in order to respond to detected oscillations. GREEN – normal operation – no oscillations were detected. RED – oscillations were detected and the system reduced gain in order to eliminate the oscillations. Check the Donor and Mobile antenna installations for isolation. After isolation is within the required levels, the system will automatically increase gain (since it will no longer affect oscillations and) and the LED will turn GREEN.
Interferer Power Exceeded	Indicates if there is any external interference at a level that may affect the operation of the unit. Green – low or no interference. Unit operation is not affected. Red – high external interference that may affect the operation of the unit. It is recommended to identify the source of the interference and distance the source or the unit from each other.

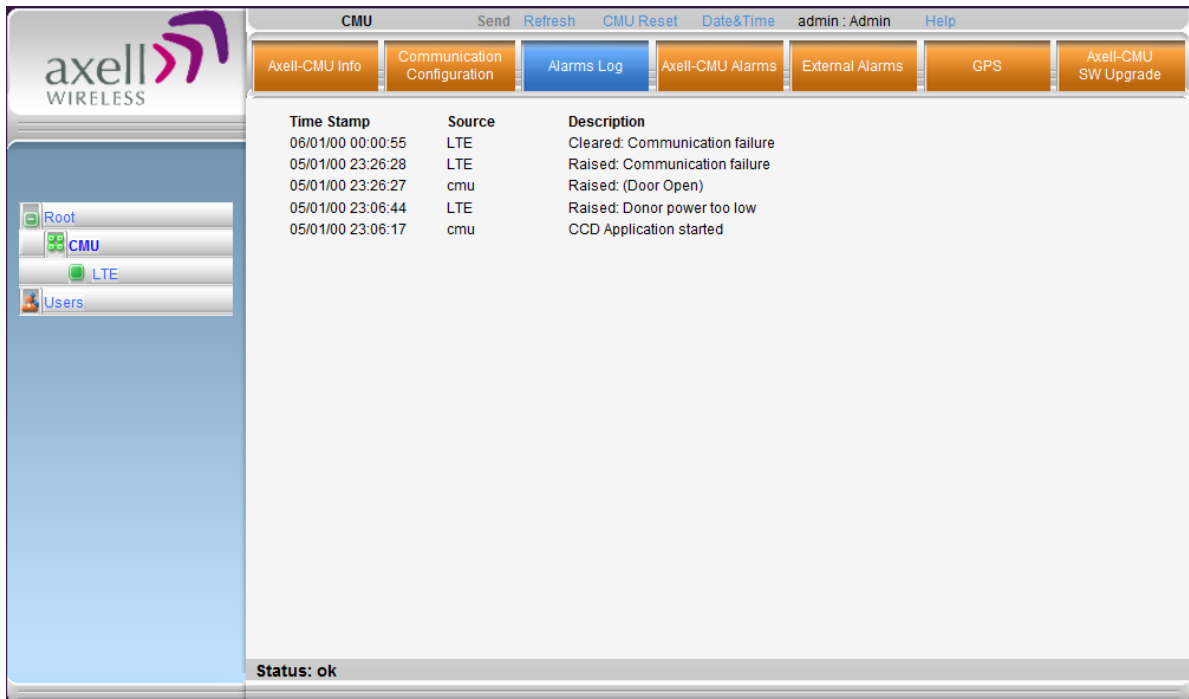
6.2 Viewing the Alarms Log

The Alarms Logs screen lists the alarms (events) that have occurred. The CMU maintains log files listing every alarm triggered and in the Repeater. This screen provides an analysis tool to get information of any event that has occurred, its originator, when, if they return, and their type.

*Note: Set the clock in order to synchronize the events time of occurrence. Click on **Date & Time**.*

To view the CMU log screen:

1. Open and login to the Web application.
2. From the Tree Pane, select **CMU**.
3. Click **Alarms Logs**. CMU displays the Alarms Log Table.



Time Stamp	Source	Description
06/01/00 00:00:55	LTE	Cleared: Communication failure
05/01/00 23:26:28	LTE	Raised: Communication failure
05/01/00 23:26:27	cmu	Raised: (Door Open)
05/01/00 23:06:44	LTE	Raised: Donor power too low
05/01/00 23:06:17	cmu	CCD Application started

Status: ok

Item	Description
Time Stamp	The date and time the alarm was created
Source	ID of Network Element
Description	Description of event that caused the alarm

6.3 3307D LED Troubleshooting

The 3307D Repeater Power LED on its front panel (see 1.4) can be used for troubleshooting. The following table provides a description of the DL and Power LED troubleshooting procedures.

LED	Color	Status, Probable Cause and Recommendation
Service	Green	Normal operation Blinking - DL power below threshold---
	Red	Steady - Major error. <i>Replace the Repeater.</i> Blinking – service muted by user.
	Orange	Blinking - service initiating on power up or reset. Steady – <i>high DL/UL signal or VSWR. This may be due to isolation problem or temperature. Check gain of repeater. If gain is minimum, then it is likely an isolation problem -> improve the isolation.</i> <i>Reset the Repeater by turning if off and on again. If the fault continues, replace the unit.</i>

Appendix: 3307D Specifications

RF Per Band

Parameters	DL	UL
Frequency Range (MHz)	L728-746 U746-757	L698-716 U776-787
Selectable Sub-Bands (Model dependent)	8 to 12 (model dependent)*	8 or 12 (model dependent)*
Passband Gain (max)	82 ±2 dB	82 ±2 dB
Passband Ripple	2dB p-p max for BW<10MHz 4dB p-p max for BW≥10MHz	2dB p-p max for BW<10MHz 4dB p-p max for BW≥10MHz
Gain Adjust Range (in 1dB steps)	0-25 dB	0-25 dB
Composite Output Power	+33dBm	+27dBm
Attenuation range	0 to 30 dB, in 1 dB step	0 to 30 dB, in 1 dB step
Noise Figure @ Maximum Gain (typical)	5 dB	4 dB
Propagation Delay	< 6 µsec	< 6 µsec
Channel Allocation	Adjustable, Non Contiguous	
Conformance Standard	ETSI EN 300 609-4, GSM11.26, 3GPP TS 25.106	

*Supports any BW option 2.5 MHz - 20 MHz in 2.5MHz step by setting the start-stop frequency

Power Supply

Note: Unit is connected to main AC outlet, where the AC voltage is converted to DC (via AC to DC converter preassembled on the bracket) for connection to the unit front panel DC connector.

Parameter	Description
Power Supply AC	110V-220V 50/60Hz
Power Consumption	Max 120 W
Total RF Input Power (No Damage)	+ 10 dBm
Impedance Level	50 Ohm

Mechanical Specifications

Parameter	Description
Size W x H x D	305 mm x 375 x 205 mm (12" x 14.8" x 8.1")
Weight	14Kg (30.8 lbs) max.

Environmental Specifications

Parameter	Description
Environmental conditions	IP65
Operating temperature	-10 to +50 °C (14 to +122 °F)
Storage temperature	-40°F to 185°F (-40°C to +85°C)
Humidity	85%

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Connectors

Connector	Type
RF Connectors: Base/Mobile	N-Type, Female
DC Power	Circular, 4-pin(**)
Communications	RJ-45
Alarms-optional	See 3.11