

Comba

RX-8139

**850MHZ CDMA AND UMTS
DUAL MODE WIRELESS
BAND SELECTIVE REPEATER**

USER MANUAL

RX-8139 QE: 1-0-0

Comba Telecom Ltd.

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0.3 HISTORY

| Change No. | ENU | Details Of Change |
|-------------------|------------|---|
| 1 | 1-0-0 | RX-8139 user manual first created in June 2012 and referred to its Chinese manual RX-8139-1001YH. |

0.4 GLOSSARY OF TERMS

| | |
|------|--|
| ALC | Automatic Level Control |
| ATT | Attenuation |
| AFC | Antenna Feedback Cancellation |
| BTS | Base Transceiver Station |
| dB | Decibel |
| dBm | Decibels relative to 1 milliwatt |
| DL | Downlink |
| DPX | Duplexer |
| DT | Donor Terminal |
| FSK | Frequency Shift Keying |
| GSM | Global Standard for Mobile Communication |
| Hz | Hertz |
| ID | Identification |
| LNA | Low Noise Amplifier |
| MCU | Main Control Unit |
| MHz | Megahertz |
| MT | Mobile Terminal |
| MTBF | Mean Time Between Failures |
| NF | Noise Figure |
| OMC | Operation & Maintenance Center |
| OMT | Operation & Maintenance Terminal |
| OP | Optical Fiber |
| PA | Power Amplifier |
| PLL | Phase Locked Loop |
| PSU | Power Supply Unit |
| RF | Radio Frequency |
| RX | Receive |
| SMA | Sub-Miniature "A" Connector |
| SIU | Slide-In-Unit |
| TX | Transmit |
| UL | Uplink |
| VAC | Volts Alternating Current |
| VSWR | Voltage Standing Wave Ratio |

0.5 SAFETY NOTICES AND ADMONISHMENTS

This document contains safety notices in accordance with appropriate standards. In the interests of conformity with the territory standards for the country concerned, the equivalent territorial admonishments are also shown.

Any installation, adjustment, maintenance and repair of the equipment must only be carried out by trained, authorized personnel. At all times, personnel must comply with any safety notices and instructions.

Specific hazards are indicated by symbol labels on or near the affected parts of the equipment. The labels conform to international standards, are triangular in shape, and are coloured black on a yellow background. An informative text label may accompany the symbol label.

Hazard labeling is supplemented by safety notices in the appropriate equipment manual. These notices contain additional information on the nature of the hazard and may also specify precautions.

Warning:

These draw the attention of personnel to hazards that may cause death or injury to the operator or others. Examples of use are cases of high voltage, laser emission, toxic substances, point of high temperature, etc.

Alert:

These draw the attention of personnel to hazards that may cause damage to the equipment. An example of use is the case of static electricity hazard.

Caution notices may also be used in the handbook to draw attention to matters that do not constitute a risk of causing damage to the equipment but where there is a possibility of seriously impairing its performance, e.g. by mishandling or gross maladjustment. Warnings and Cautions within the main text do not incorporate labels and may be in shortened form.

CAUTION: danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.

Caution:

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. 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.

To comply with FCC RF exposure requirements, the device and the antenna for this device must be installed to ensure a minimum separation distance of 1.9 meters or more from a person's body. Other operating configurations should be avoided.

End of Section

1 GENERAL INFORMATION

RX-8139 850MHz CDMA and UMTS Dual Mode Wireless Band Selective Repeater (hereinafter called "RX-8139") is designed for 850MHz network. Working frequency and working system can be customized for flexible configuration.

Characteristics of RX-8139 are as follows:

- Supports 7.5 MHz of CDMA subband and 5 MHz of WCDMA subband.
- Allows DL VSWR alarm, DL input field intensity detect and output power detect functions, easy for installation.
- Automatic gain temperature compensation function which can maintain regular operation among working temperature.
- Local Operation and Maintenance Terminal (OMT): operating status and parameters can be set or monitored by OMT PC locally. It can also check the downlink power and download the latest OMT version.
- Operation Maintenance Center (OMC): system working parameters and communication configuration can be set or inquired remotely through Ethernet cable.
- Designed for all weather outdoor application – waterproof, damp-proof and Omni-sealed.

The following figure shows the enclosure of the RX-8139.

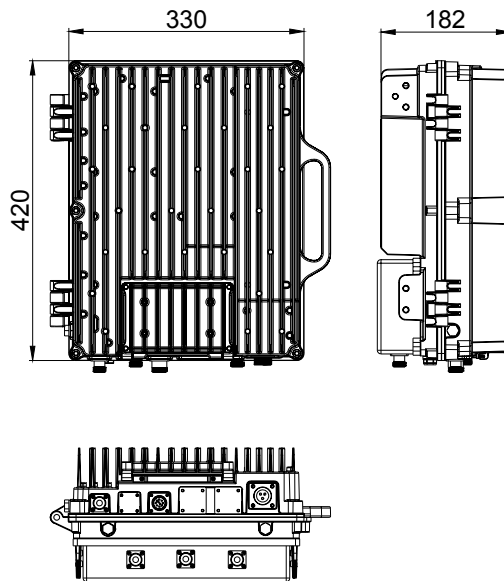


Figure 1: Views of RX-8139 Enclosure

End of Section

2 EQUIPMENT DESCRIPTION

2.1 EQUIPMENT LAYOUT

The following figure shows RX-8139 internal layout.

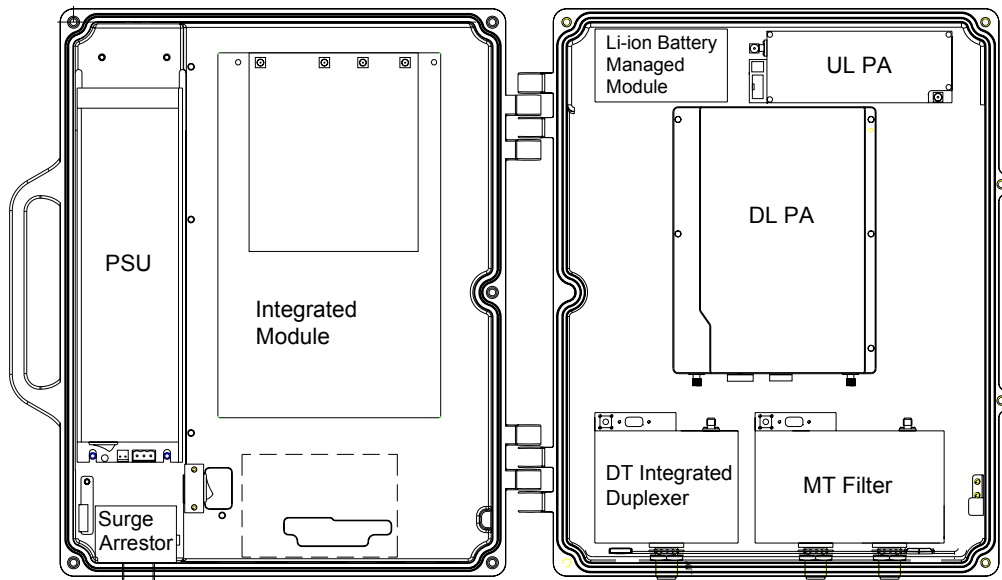


Figure 2: RX-8139 Internal Layout

2.2 KIT OF PARTS

For this system, the following are shipped:

Table 1: Equipment KOP

| Product Identifier | Description | Quantity |
|---|---------------------------------|----------|
| RX-8139 manual | This equipment manual on CD-Rom | 1 |
| CPC Connector | X14J7P | 1 |
| Ethernet Cable | 2m | 1 |
| Masonry Bolt | M8x80 | 4 |
| U Bolt (with 2 nuts, flat washer, spring washer per bolt) | M10x85x110 | 2 |
| Power Supply Cable | n/a | 1 |
| T-shape Pentagon Screw Wrench | 5mm | 1 |
| OMT V5.0 or above | OMT software on CD-Rom | 1 |
| Factory Test Report | N/A | 1 |

End of Section

3 INSTALLATION

3.1 WARNINGS AND ALERTS

Radio Frequency Energies

There may be situations, particularly for workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or actions may be necessary to ensure the safe use of RF energy.

High Voltage

The equipment has been designed and constructed to prevent, as far as reasonably, practicable danger. Any work activity on or near equipment involving installation, operation or maintenance must be, as far as reasonably, free from danger.

Where there is a risk of damage to electrical systems involving adverse weather, extreme temperatures, wet, corrosive or dirty conditions, flammable or explosive atmospheres, the system must be suitably installed to prevent danger.

Protective Earthing

Equipment provided for the purpose of protecting individuals from electrical risk must be suitable for the purpose and properly maintained and used.

Handling Precautions

This covers a range of activities including lifting, lowering, pushing, pulling, carrying, moving, holding or restraining an object, animal or person. It also covers activities that require the use of force or effort, such as pulling a lever, or operating power tools.

Electrostatic Discharge (ESD)

Observe standard precautions for handling ESD-sensitive devices. Assume that all solid-state electronic devices are ESD-sensitive. Ensure the use of a grounded wrist strap or equivalent while working with ESD-sensitive devices. Transport, store, and handle ESD-sensitive devices in static-safe environments.

3.2 SITE PLANNING CONSIDERATIONS

Site Considerations

The site considerations are listed below:

- The distance between the donor antenna and the BS should satisfy line of sight requirements for maximum coverage area. The received spots accept field intensity at least -70dBm.
- Make sure that TX and RX antennas isolation should more than the max gain that of -15dB.
- Supply power near by the BS and easily access to the grounding spot.

Installation Location

Mounting surface shall be capable of supporting the weight of the equipment.

In order to avoid electromagnetic interference, a proper Mounting location must be selected to minimize interference from electromagnetic sources such as large electrical equipment.

Chassis output interface should install higher 1.2m than the ground.

Environmental

Humidity has an adverse effect on the reliability of the equipment. It is recommended to install the equipment in locations having stable temperature and unrestricted air-flow which should under the temperature that of -33°C ~+55°C and relative humidity of maximal 95%.

The installation location for the product should be well ventilated. The equipment has been designed to operate at the temperature range and humidity level as stated in the product specifications in the datasheet.

Direct sun light exposure to the equipment should be avoided. Provide additional shelter if necessary.

Powering

The power supply unit (PSU) provides power to all modules within the equipment. Depending on the product variant, it is recommended that the PSU operates on a dedicated circuit breaker or fused circuit.

Grounding Requirement

Verify that the equipment has been well grounded. This includes antennas and all cables connected to the system. Ensure lightning protection for the antennas is properly grounded.

Cable Routing

Depending on equipment configuration, a variety of types of cables are required. Where applicable, ensure cables are properly routed and secured so that they are not damaged.

Cable requirements are as follow:

Table 2: Cable Connection

| Cable | Connection | Description |
|---------------------------|------------|--|
| Coaxial Cable | N to N | Connect BS cable to DT port |
| Coaxial Cable | N to N | Connect serve antenna cable to MT port |
| Local Commissioning Cable | RJ45 | Connect with PC to realize local commissioning |

Manual Handling

During transportation and installation, take necessary handling precautions to avoid potential physical injury to the installation personnel and the equipment.

3.3 INSTALLATION PROCEDURES

3.3.1 GOODS INWARDS INSPECTION

- Verify the number of packages received against the packing list.
- Check all packages for external damage; report any external damage to the shipping courier. If there is damage, a shipping agent should be present before unpacking and inspecting the contents because damage caused during transit is the responsibility of the agent.
- Open and check each package against the packing list. If any items are missing, please contact Comba.
- Do not remove items from antistatic packing until ready for installation. If damage is discovered at the time of installation, contact the shipping agent.

3.3.2 TOOLS

See Appendix A for a full list of the recommended tools required for installation and maintenance.

3.3.3 PREPARATION

- Wall mounting with the masonry bolts supplied, which make use of the outer holes.
- Pole Mounting with the clamp kit supplied, which make use of the inner holes.

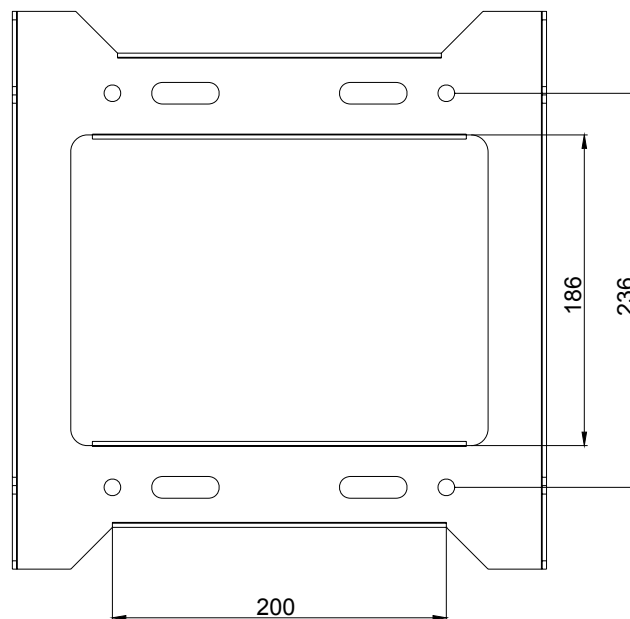


Figure 3: Mounting Rack Overview

3.3.4 WALL MOUNTING

- Drill holes on the wall by using the position of the four round holes on the Mounting rack as a guide.
- Insert the masonry bolts through the round holes and tighten them to take the weight of the entire enclosure.
- Hook the enclosure up onto the mounting rack and align the hole positions to that of the mounting rack, then installed the hex socket bolt to complete the installation.

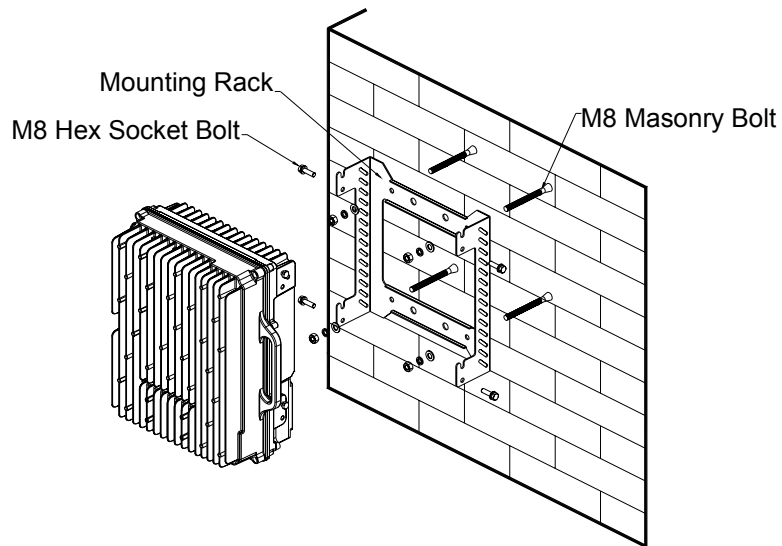


Figure 4: Wall Mounting

3.3.5 POLE MOUNTING OF MOUNTING RACK

- The equipment can be mounted on a pole of about 60~75mm in diameter.
- Insert and tighten the two U bolts to secure the mounting rack onto the pole.
- The remaining installation to secure the enclosure to the mounting rack is identical to wall mounting.

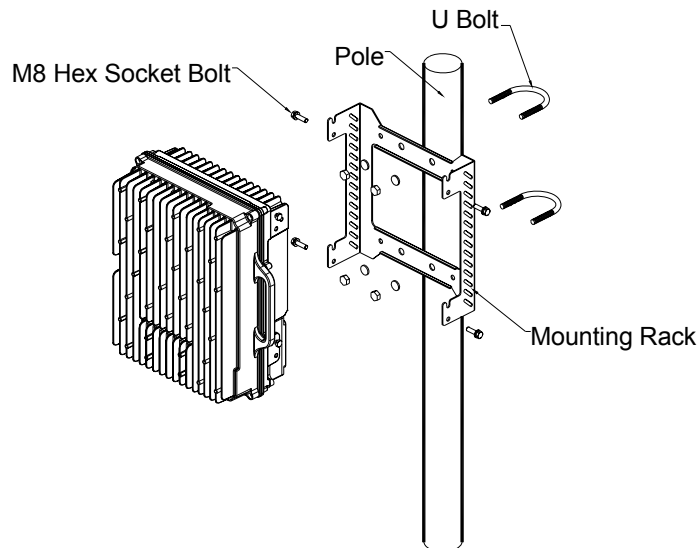


Figure 5: Pole Mounting Overview

3.3.6 DRIP-LOOP

Comba recommends that every horizontal cable entry to the equipment forms a 'U' before its entry to the equipment. Water on the cable will drip down at the bottom of the loop and will not accumulate at the equipment connectors.

3.4 EQUIPMENT CONNECTORS

3.4.1 CONNECTORS

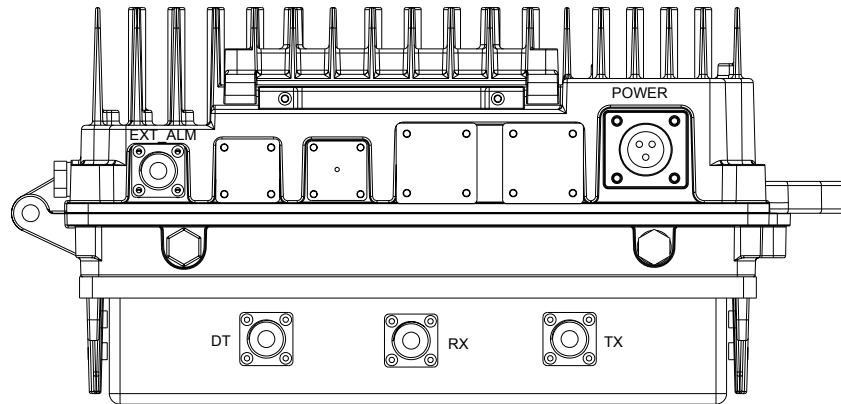


Figure 6: Bottom Panel Interface Diagram

3.4.2 GROUNDING CONNECTION

Ground Connection

To ensure safe operation of the product, a ground (earth) connection is required. For single phase AC power source, the product must be grounded by connecting the “earth wire” of the power cord to the ground terminal of the AC supply.

3.4.3 RF CONNECTION

- **Donor antenna connection:** Connect the cable form donor antenna to DT port
- **Mobile antenna connection:** Connect the cable form mobile antenna to MT port

3.4.4 EXTERNAL ALARM CONNECTION

The external alarm port is used to connect with other external equipment and alarm ports. Connection is not must in case there is no external alarm port.

End of Section

4 COMMISSIONING

4.1 PRE-COMMISSIONING TASKS

After equipment installation, perform the following steps before equipment powering and commissioning, check that the expected voltage, current, and power levels do not violate any ratings. Double check all connections including ground before applying power. Do not manipulate circuits or make changes when power is applied:

- Visually inspect the power connection within the equipment. Ensure that the power cable is correctly and securely connected, including grounding wire, RF cable and optical cable.
- Check grounding connection and verify that the ground resistance is less than 5Ω.
- Connect the equipment to the PC installed with OMT software.
- Check antenna system return loss which working frequency band return loss should less than -14dB (VSWR < 1.5)
- The online commissioning can be commenced with following the commissioning steps.

4.2 MCU LED INDICATORS

Three diagnostic LEDs are located on integrated module; each indicates the status of a particular function:

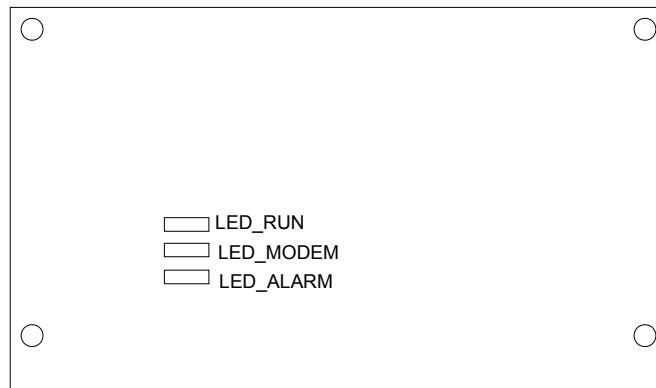


Figure 7: LEDs

Table 3: LED Indicators

| Identifier | Colour | Indication |
|------------|--------|--|
| LED_RUN | Green | Operation indicator – Flashes once every second to indicate normal system operation. |
| LED_ALARM | Red | Alarm indicator. ON = alarm; OFF = no alarm |
| LED_MODEM | Red | N/A |

4.3 COMMISSIONING PROCEDURES

Perform the following procedures for system commissioning.

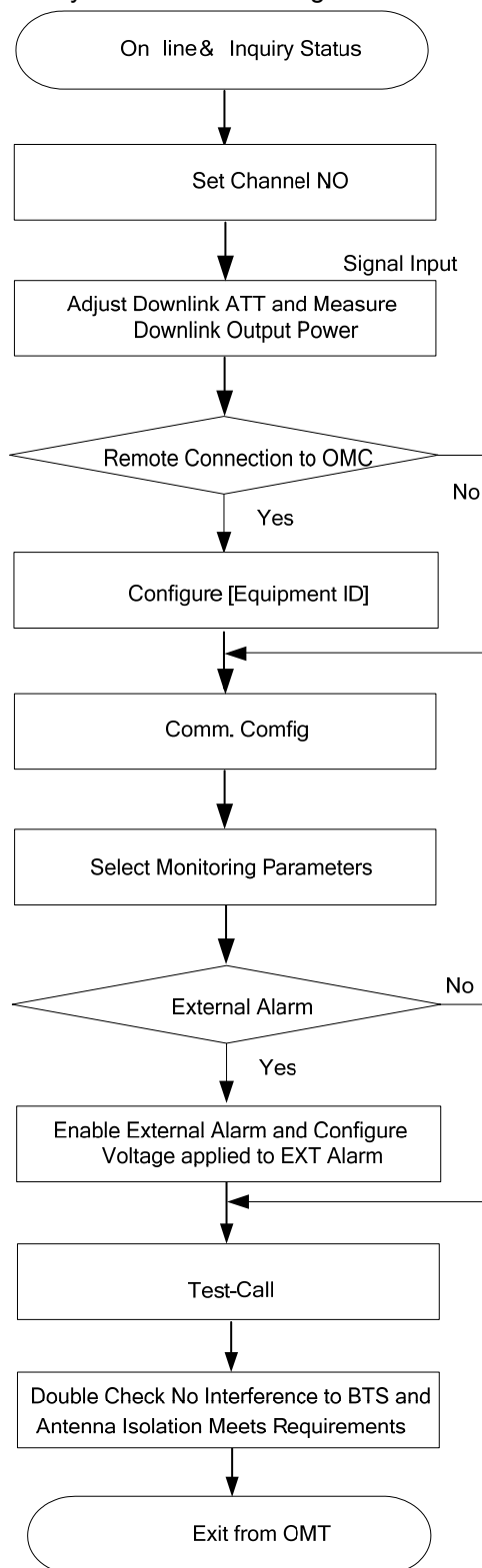


Table 4: Commissioning

| Commissioning Tasks | Observation |
|--|--|
| 1. On-line and Inquiry status | <ul style="list-style-type: none"> ● Activate the OMT Main window. The system Initialization will completed in about 2 minutes. ● Click “Connect” button to enquire the repeater’s status. Proceed if there is no alarm; else check the failure and attend to the alarm. |
| 2. Set Channel No. | <ul style="list-style-type: none"> ● Keep RF switch ON and set the channel number of the repeater’s operating frequency. |
| 3. Adjust Downlink Output Power and align donor antenna | <ul style="list-style-type: none"> ● Observe DL input power from measured value. Align the direction of donor antenna until the DL input power reading is maximized. ● Note: To ensure that the measured DL input power is accurate, one should set the DL ATT to “0” before performing the check. |
| 4. Configure [Equipment ID] | <ul style="list-style-type: none"> ● Go to [Properties Info] and set [Equipment ID]. |
| 5. Comm. Config | <ul style="list-style-type: none"> ● Enable the power supply by selecting “On” in [RF] -> [Switch]; go to [Properties Info.] -> [Comm. Config.] and set OMC Phones No. , the service No. of SMSC, Report Mode. |
| 6. Select Monitoring Parameters | <ul style="list-style-type: none"> ● Select the equipment controlled and monitored parameters. ● If the external devices are connected to the equipment for management, please enable in the [External Alarm Info.] Interface. |
| 7. Test coverage area field intensity and adjust service antenna. | <ul style="list-style-type: none"> ● Use test-handset to verify field intensity within the coverage area. If needed, realign the service antenna to achieve the desired coverage. ● Note: If during operation, the equipment gain could not be set to maximum or the output power is not high enough due to insufficient donor and service antennas isolation, then the antennas’ position should be changed to increase isolation. If the output power is too high and ALC is activated, then adjust the DL ATT to achieve optimal DL Gain. |
| 8. Verify UL gain and ensure test call produces good voice quality and there is no interfering BTS | <ul style="list-style-type: none"> ● Adjust UL gain and perform test calls. Typically, the UL gain is set around 5dB less than DL gain. Perform test calls in the coverage area while adjusting UL gain if required. ● Note: If the repeater is near the BTS and the test call performance is poor, this may be due to UL noise interference to the BTS. Users can calculate and determine if the repeater UL noise will interfere with the BTS. ● Verify again that there is no unacceptable interference to BTS. |

End of Section

5 MAINTENANCE

The RX-8139 repeater is designed for trouble-free operation and generally does not need maintenance. Maintenance activities should only be carried out by trained personnel.

The equipment operation status can be observed remotely through OMC.

Periodic inspection of the repeater equipment(s) is recommended, the recommended tasks includes:

- Inspect and record operation status and output power of the repeater from OMC or OMT.
- Verify the direction and position of antennas. Re-align if necessary.
- Make sure the cable gland and sealing on the RF cable connectors are not damaged.
- Verify lightning and grounding protection is in good condition.

End of Section

6 APPENDICES

6.1 COMMISSIONING PROCEDURES

The following are the recommended list of tools new installation and routine maintenance:

- Slotted screwdriver
- Philips screwdriver
- Ring spanner (Assorted size: 12~20mm)
- Electrically operated drill and masonry drill bits \varnothing 10mm
- Anti-static wrist strap
- Allen key (M5.5)
- Side cutter
- Frequency counter (e.g. FLUKE PM6685R)
- RF Power Meter (e.g. Bird 5000)
- T-shaped Pentagon Key Wrench

6.2 APPENDIX B: RMA (RETURN MATERIAL AUTHORIZATION) FORM



Comba Telecom Ltd.
611 East Wing, No. 8 Science Park West Avenue, Hong Kong Science Park, Tai Po, Hong Kong
Tel: +852 2636 6861 Fax: +852 2637 0966

RMA Request Form

Date:

From:
Address:
Tel: Fax:
E-Mail:
ATTN:

Product Information:

Table with 6 columns: Item, Model, Serial Number, Return Category, Qty, Problem Description. Rows 1-10.

Notes:

- 1. For 'Return Category' column, please select from A: Return of Defective Product, B: Return of Trial Sample, or C: Return of New and Unused Product.
2. If A or C category of return product is chosen, please give short description of the problem or reason for returning.

Transportation Information:

Location of Product:
Transportation Method:
Shipping Forwarder:

Note: Location of Product must be stated, while Transportation Method or Shipping Forwarder can be left blank if not determined.

Signature:

For Comba Use (Only)

Return Merchandise Authorization Number (RMA#):

Recommended Action:

Shipment and Handling Cost to be paid by:

Approved by:

Date: _____

End of Section

End of Document



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