

**COMMSCOPE®**

# **PSR 700/800 MHz**



## **Public Safety Repeaters**

**Manual**

**MF0123A1A**

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Andrew Wireless Systems GmbH, 02-August-2019

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# 1. General

## 1.1. Used Abbreviations

3GPP	3 <sup>rd</sup> Generation Partnership Project
AC/DC	Alternating current / Direct Current
AIMOS	Andrew Integrated Management and Operating System
ALC	Automatic Level Control
BITE	Built-In Test Equipment
BTS	Base Transceiver Station
CE	"Conformité Européenne" ("European Conformity")
CD	Compact Disk
CFR	Code of Federal Regulations
DL	Downlink
DoC	Declaration of Conformity
EDGE	Enhanced Data Rates for GSM Evolution
EN	European Norm
ESD	Electrostatic Discharge
ETS	European Telecommunication Standard
GSM	Global System for Mobile Communication
GND	Ground
GUI	Graphical User Interface
ICP3	Intercept Point 3rd order
ID No	Identification Number
ION	Intelligent Optical Network
IP	Ingress Protection
ISDE	Innovation, Sciences et Développement économique Canada
ISED	Innovation, Science and Economic Development Canada; formerly IC / Industry Canada
ISO	International Organization for Standardization
LED	Light Emitting Diode
LMT	Local Maintenance Terminal
LTE	Long Term Evolution
MIMO	Multiple Input Multiple Output
MS	Mobile Station
MU	Main Unit
NF	Noise Figure
PG	Packing Gland
PIM	Passive Intermodulation
PSR	Public Safety Repeater
R&TTE	Radio & Telecommunications Terminal Equipment
RF	Radio Frequency
RX	Receiver
SNMP	Simple Network Management Protocol
TBS	Tetra Base Station
TX	Transmitter
UL	Uplink
UMTS	Universal Mobile Telecommunication System
UPS	Uninterruptible Power Supply
WCDMA	Wideband Code Division Multiple Access
WDM	Wavelength Division Multiplex
WEEE	Waste Electrical and Electronic Equipment (Directive)

## 1.2. Health and Safety

-  1. **Danger:** Electrical hazard. Danger of death or fatal injury from electrical current. Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.
-  2. **Danger:** Electrical hazard. Danger of death or fatal injury from electrical current inside the unit in operation. Before opening the unit, disconnect mains power.
-  3. **Caution:** High frequency radiation in operation. Risk of health hazards associated with radiation from the unit's inner conductor of the antenna port(s). Disconnect mains before connecting or replacing antenna cables.
-  4. **Caution:** High frequency radiation in operation. Risk of health hazards associated with radiation from the antenna(s) connected to the unit. Implement prevention measures to avoid the possibility of close proximity to the antenna(s) while in operation.

## 1.3. Property Damage Warnings

1. **Attention:** Due to power dissipation, the psr may reach a very high temperature. Do not operate this equipment on or close to flammable materials. Use caution when servicing the unit.
2. **Attention:** Only authorized and trained personnel are allowed to open the unit and get access to the inside.
3. **Notice:** Although the PSR is internally protected against overvoltage, it is strongly recommended to ground (earth) the antenna cables close to the antenna connectors of the PSR for protection against atmospheric discharge. In areas with strong lightning, it is strongly recommended to install additional lightning protection.
4.  4. **Notice:** ESD precautions must be observed. Before commencing maintenance work, use the available grounding (earthing) system to connect ESD protection measures.
5. **Notice:** Only suitably qualified personnel are allowed to work on this unit and only after becoming familiar with all safety notices, installation, operation and maintenance procedures contained in this manual.
6. **Notice:** Keep operating instructions within easy reach and make them available to all users.
7. **Notice:** Read and obey all the warning labels attached to the unit. Make sure that all warning labels are kept in a legible condition. Replace any missing or damaged labels.
8. **Notice:** Only license holders for the respective frequency range are allowed to operate this unit.

9. Do not disassemble the unit.

**10. Notice:** Make sure the repeater settings are correct for the intended use (refer to the manufacturer product information) and regulatory requirements are met. Do not carry out any modifications or fit any spare parts, which are not sold or recommended by the manufacturer.

## 1.4. Compliance

**1. Notice:** For installations, which have to comply with FCC RF exposure requirements, the antenna selection and installation must be completed in a way to ensure compliance with those FCC requirements. Depending on the RF frequency, rated output power, antenna gain, and the loss between the repeater and antenna, the minimum distance D to be maintained between the antenna location and human beings is calculated according to this formula:

$$D_{[cm]} = \sqrt{\frac{P_{[mW]}}{4 * \pi * PD_{[mW/cm^2]}}}$$

where

- P (mW) is the radiated power at the antenna, i.e. the max. rated repeater output power in addition to the antenna gain minus the loss between the repeater and the antenna.
- PD (mW/cm<sup>2</sup>) is the allowed Power Density limit acc. to 47 CFR 1.1310 (B) for general population / uncontrolled exposures which is
  - F (MHz) / 1500 for frequencies from 300MHz to 1500MHz
  - 1 for frequencies from 1500MHz to 100,000MHz

RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of 1.1307(b)(3).

**2. Notice:** For installations which have to comply with European EN50385 exposure compliance requirements, the following Power Density limits/guidelines (mW/cm<sup>2</sup>) according to ICNIRP are valid:

- 0.2 for frequencies from 10 MHz to 400 MHz
- F (MHz) / 2000 for frequencies from 400 MHz to 2 GHz
- 1 for frequencies from 2 GHz to 300 GHz

**3. Notice:** Installation of this equipment is in full responsibility of the installer, who has also the responsibility, that cables and couplers are calculated into the maximum gain of the antennas, so that this value, which is filed in the FCC Grant and can be requested from the FCC data base, is not exceeded. The industrial boosters are shipped only as a naked booster without any installation devices or antennas as it needs for professional installation.

**4. Notice:** For installations which have to comply with FCC/ISED requirements:**English:**

This device complies with FCC Part 15. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device complies with Health Canada's Safety Code 6. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php).

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Antenna Stmt for ISED:**

This device has been designated to operate with the antennas having a maximum gain of 9 dBi. Antennas having a gain greater than 9 dBi are prohibited for use with this device without consent by ISED regulators. The required antenna impedance is 50 ohms.

The antenna(s) used for this transmitter must be installed to provide a minimum separation distance (as specified in table 1-1) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

**French:**

Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues: [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-fra.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-fra.php)

**Antenne Stmt pour ISDE:**

Ce dispositif a été désigné pour fonctionner avec les antennes ayant un gain maximal de 9 dBi. Antennes ayant un gain plus grand que 9 dBi sont interdites pour une utilisation avec cet appareil sans le consentement des organismes de réglementation d'ISDE. L'impédance d'antenne requise est 50 ohms.

L'antenne (s) utilisé pour cet émetteur doit être installé pour fournir une distance de séparation minimale (comme indiqué dans le table 1-1) par rapport à toute personnes et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur. Les utilisateurs et les installateurs doivent être fournis avec des instructions d'installation de l'antenne et des conditions de fonctionnement de l'émetteur pour satisfaire la conformité aux expositions RF.

**5. Notice:** The unit complies with Overvoltage Category II. It also complies with the surge requirement according to EN 61000-4-5 (fine protection); however, installation of an additional medium (via local supply connection) and/or coarse protection (external surge protection) is recommended depending on the individual application in order to avoid damage caused by overcurrent.

For Canada and US, components used to reduce the Overvoltage Category shall comply with the requirements of IEC 61643-series. As an alternative, components used to reduce the Overvoltage Category may comply with ANSI/IEEE C62.11, CSA Certification Notice No. 516, CSA C22.2 No. 1, or UL 1449. Suitability of the component for the application shall be determined for the intended installation.

**6. Notice:** Corresponding local particularities and regulations must be observed.

**7. Note:** For a Class A digital device or peripheral:

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.

**8. Note:** For a Class B digital device or peripheral:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced RF technician for help.

**9. Note:** This unit complies with European standard EN62368-1.

### Equipment Symbols Used / Compliance

Please observe the meanings of the following symbols used in our equipment and the compliance warnings:

Symbol	Compliance	Meaning / Warning
---	FCC	<p>For industrial (Part 90) signal booster: This is a 90.219 Class B device.</p> <p>WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at <a href="http://www.fcc.gov/signal-boosters/registration">www.fcc.gov/signal-boosters/registration</a>.</p> <p>Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.</p>
---	ISED	<p>WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.</p> <p>AVERTISSEMENT: Ce produit N'EST PAS un appareil de CONSOMMATION. Il est conçu pour être installé par un installateur approuvé par un titulaire de licence d'ISDE. Pour utiliser cet appareil, vous DEVEZ détenir une LICENCE d'ISDE ou avoir obtenu le consentement exprès d'un titulaire de licence autorisé par ISDE.</p>
CE	CE	<p>To be sold exclusively to mobile operators or authorized installers – no harmonized frequency bands, operation requires license. Intended use: EU and EFTA countries</p> <p>Indicates conformity with the RED directive 2014/53/EU and/or RoHS directive 2011/65/EU.</p>
CE 0700	CE	Indicates conformity with the RED directive 2014/53/EU and RoHS directive 2011/65/EU certified by the notified body no. 0700.

### Required Antenna Distances

Model	Antenna gain without cable loss [dBi]	Maximum Distance DL				Maximum Distance UL			
		FCC		ISED		FCC		ISED	
		m	inches	m	inches	m	inches	m	inches
PSR 700/800	9	0.687	27.05	0.999	39.33	0.345	13.58	0.502	19.76

table 1-1 Required antenna distances

### WEEE Recycling

Country specific information about collection and recycling arrangements per the Waste Electrical and Electronic Equipment (WEEE) Directive and implementing regulations is available on CommScope's website.

<http://www.commscope.com/About-Us/Corporate-Responsibility-and-Sustainability/Environment/#recycling>

## 1.5. About CommScope

*CommScope* is the foremost supplier of one-stop, end-to-end radio frequency (RF) solutions. Part of the *CommScope* portfolio are complete solutions for wireless infrastructure from top-of-the-tower base station antennas to cable systems and cabinets, RF site solutions, signal distribution, and network optimization. For patents see [www.cs-pat.com](http://www.cs-pat.com).

*CommScope* has global engineering and manufacturing facilities. In addition, it maintains field engineering offices throughout the world.

*Andrew Wireless Systems GmbH* based in Buchdorf/Germany, which is part of *CommScope*, is a leading manufacturer of coverage equipment for mobile radio networks, specializing in high performance, RF and optical repeaters. Our optical distributed networks and RF repeater systems provide coverage and capacity solution for wireless networks in both indoor installations and outdoor environments, e.g. tunnels, subways, in-trains, airport buildings, stadiums, skyscrapers, shopping malls, hotels and conference rooms.

*Andrew Wireless Systems GmbH* operates a quality management system in compliance with the requirements of ISO 9001 and TL 9000. All equipment is manufactured using highly reliable material. To maintain highest quality of the products, comprehensive quality monitoring is conducted at all fabrication stages. Finished products leave the factory only after a thorough final acceptance test, accompanied by a test certificate guaranteeing optimal operation.

Hereby *Andrew Wireless Systems* declares that the radio equipment type Repeater is in compliance with Directive 2014/53/EU.

The full text of the EU declaration is available at the following internet address: [www.commscope.com/collateral/Declarations\\_of\\_Conformity/](http://www.commscope.com/collateral/Declarations_of_Conformity/).

**According to the DoC, our “CE”-marked equipment can be used in all member states of the European Union.**

**Note:** **Exceptions of and national deviations from this intended use may be possible. To observe corresponding local particularities and regulations, please refer to the respective documents (also in national language) which are included in the manual CD delivered.**

To make the most of this product, we recommend you carefully read the instructions in this manual and commission the system only according to these instructions.

For technical assistance and support, please refer to the *CMS Technical Support* contact information in the next chapter.

## 1.6. Contacting CommScope

### 1.6.1. CommScope Mobility Solutions (CMS) Technical Support

For additional information, please contact CMS Technical Support:

**Telephone Helplines:** Call one of the Telephone Helpline numbers listed below to get live support, 24 hours a day.

#### Global 24X7

+1 888-297-6433  
(Toll free for U.S. and Canada)

#### EMEA 8:00-17:00 (UTC +1)

+ 800 73732837  
(Toll free for parts of EMEA and Australia)  
+ 49 909969333  
(Toll charge incurred)

Calls to an EMEA Helpline outside of the 8:00 to 17:00 time frame will be forwarded to the 24x7 Helpline.

**Online Support:** Click on the following URL link to submit tickets using the online CMS Technical Support Form:

<http://www.commscope.com/wisupport>

Alternatively, enter the preceding URL into your web browser, and then press ENTER on your keyboard or scan the QR code.



### 1.6.2. Accessing DCCS User Documentation

Scan the QR Code to the right or go to [www.mycommscope.com](http://www.mycommscope.com) to access the Customer Portal of DCCS (Distributed Coverage and Capacity Solutions). Follow the prompts and click DCCS to open the site. A user account and password are required. Please register for an account if you don't have one. Once you have access, click to select a product line link to access the documentation for that product.



### 1.6.3. CMS Technical Training

To Access the CommScope Mobility Solutions Institute, scan the QR Code to the right or go to <http://commscope.netexam.com/>. Both online and classroom training is available for CMS products.



For training related questions, please contact the CommScope DAS and Small Cell Institute at one of the following emails, as appropriate for your location:

**Americas:** [DASTrainingUS@CommScope.com](mailto:DASTrainingUS@CommScope.com)

**EMEA:** [DASTrainingEMEA@CommScope.com](mailto:DASTrainingEMEA@CommScope.com)

## 2. Introduction

### 2.1. Purpose

This manual contains information and procedures for the operation of the Commscope Public Safety Repeaters PSR 700/800 MHz 0.5/2W Class A and Class B. The purpose of this document is to provide a step-by-step procedure to help experienced technicians or engineers install and commission an in-building wireless enhancement system using Commscope repeater. Follow the instructions in this guide to minimize risks associated with modifying a live system and preclude service interruptions. This document assumes the technician or engineer understands the basic principles and functionality involved with repeater and in-building systems. This guide has been written to address the practical concerns of the installer.

### 2.2. PSR 700/800 MHz 0.5/2W

This pick-up repeater comes in two variants, one is a digital, channelized Class A or Class B repeater and the second is an analogue Class B repeater. Both can be used stand-alone or in combination with an Era™ system.

They are designed to cover the 700 and 800 MHz public safety bands and can be used to establish a wireless connection between a BTS and a passive or active DAS. Via feature keys, this repeater can be configured as a single- or dual-band version with an output power of 0.5 W or 2 W per band. With its battery backup support (only available in combination with a UPS), NEMA 4x housing, dry alarm contacts and its integrated oscillation detection and healing mechanism a fully NFPA 72 and IFC compliance can be guaranteed.

The implemented time-slot-based muting functionality prevents desensitization of the BTS by switching off UL channels without traffic. The class A supports up to 32 channels in a range between 12.5 kHz and 10 MHz, where every channel can be muted while no traffic is active. A detailed filter description can be found in chapter 2.2.3 Digital Filter. With the class B variant, the operator can choose between 3, 10 and 18 MHz pass band bandwidths, where every pass band can be muted while no traffic is active.

#### Features at a glance

- Easy installation
- Individual control is possible with using GUI
- Automatic level control
- PA Protection
- Under/over voltage protection
- Alarm notification
- Repeater output can be set to 0.5W or 2W using license key
- Band Selection function

### 3. Functional Description

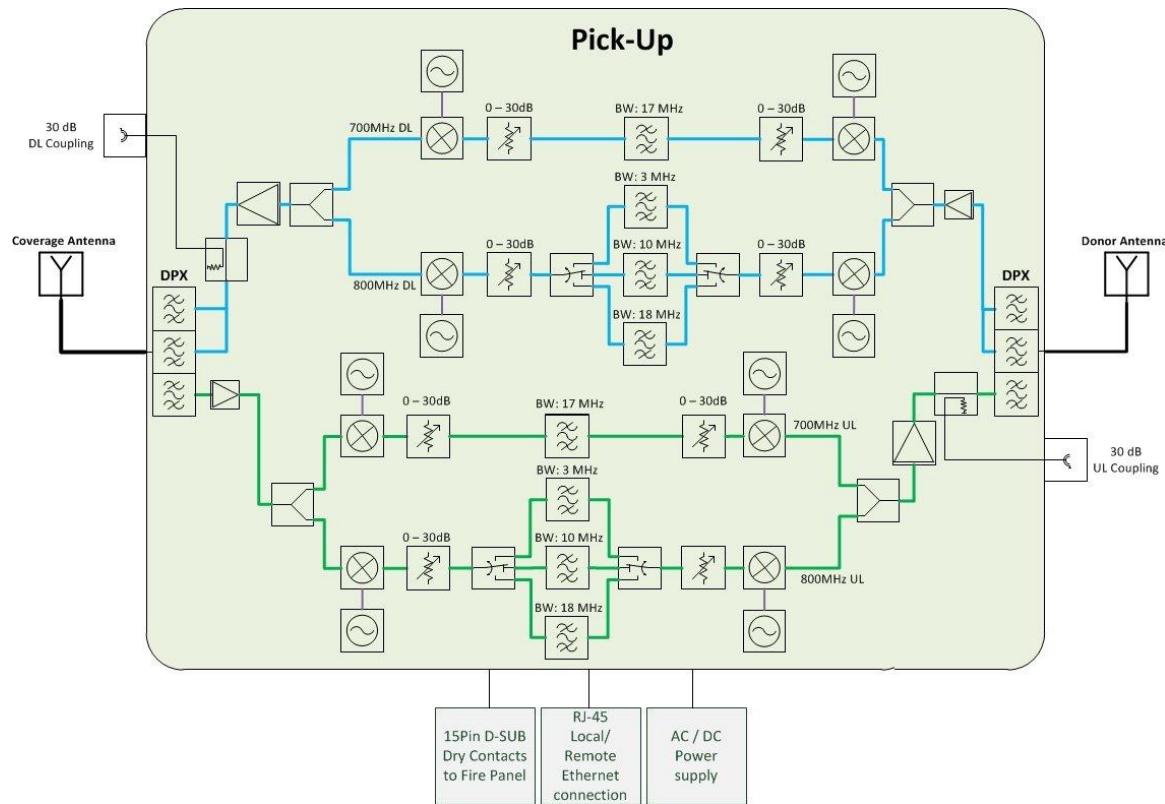


figure 3-1 Configuration of a PSR 700/800 MHz 0.5/2W, analogue variant

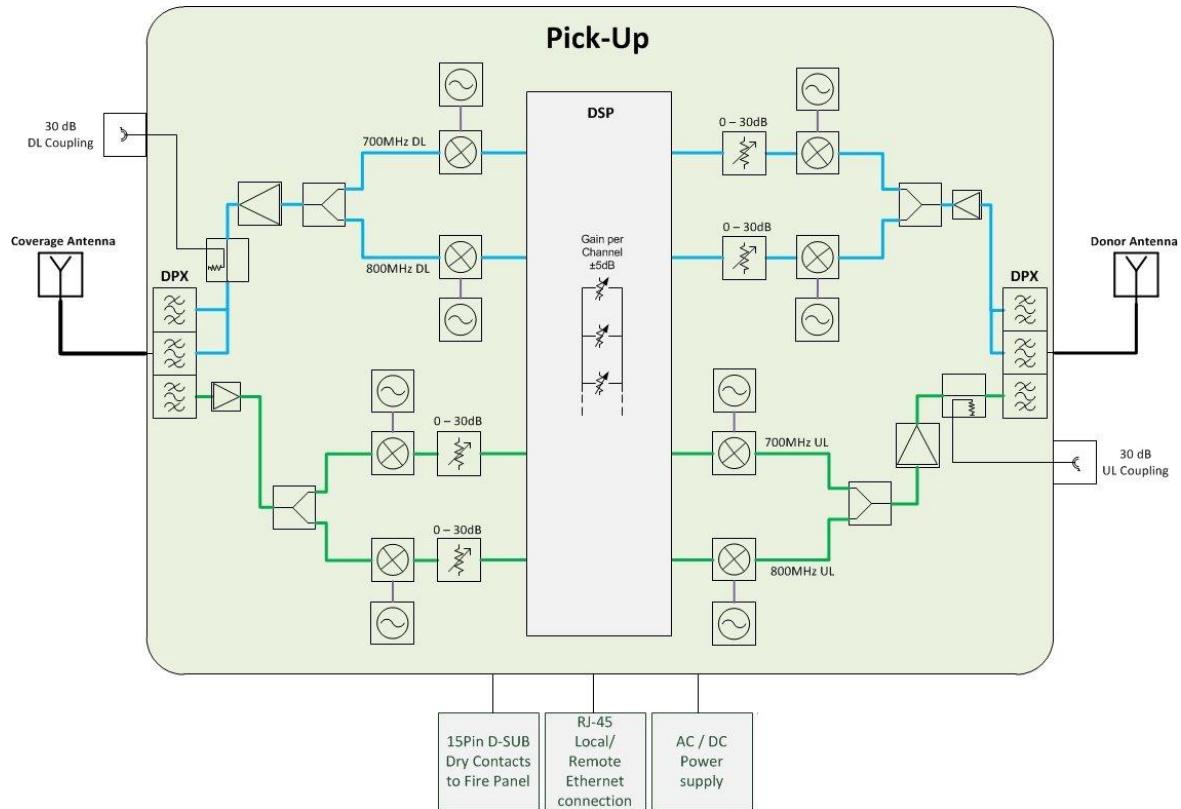


figure 3-2 Configuration of a PSR 700/800 MHz 0.5/2W, digital variant

## 4. Commissioning

Read and observe the health, safety, and property damage warnings as well as the description carefully to avoid mistakes and proceed step-by-step as described.

- **Attention:** Do not operate the PSR without terminating the antenna connectors. The antenna connectors may be terminated by connecting them to their respective antennas or to a dummy load.
- **Notice:** Only qualified personnel should carry out the electrical, mechanical, commissioning, and maintenance activities that require the unit to be powered on when open.
- When opening the PSR do not damage the warranty labels on the internal devices. The warranty is void if the seals are broken.
- Ensure that all connections have been performed according to chapter 4.2.3 *Connections*.
- To safeguard correct operation, a device that guarantees uninterruptible power supply (e.g. an appropriate UPS) has to be connected at the POWER connector (see figure 4-1 Connectors of PSR 700/800 MHz).

Unless otherwise agreed to in writing by CommScope, CommScope's general limited product warranty (<http://www.commscope.com/Resources/Warranties/>) shall be the warranty governing the PSRs, including the installation, maintenance, usage and operation of the PSRs.

### 4.1. Mechanical Installation

#### 4.1.1. Health and Safety for Mechanical Installation

- 1. **Caution:** Risk of injury by the considerable weight of the unit falling. Ensure there is adequate manpower to handle the weight of the system.
- 2. **Caution:** Risk of serious personal injury by equipment falling due to improper installation. The installer must verify that the supporting surface will safely support the combined load of the electronic equipment and all attached hardware and components. The screws and dowels (wall anchors) used should also be appropriate for the structure of the supporting wall.
- 3. **Caution:** Explosive atmospheres. To avoid explosion or fire, do not operate this equipment in the presence of flammable gases or fumes.
- 4. **Caution:** Lightning danger. Do not install or make adjustments to this equipment during an electrical storm.

#### 4.1.2. Property Damage Warnings for Mechanical Installation

- 1. **Attention:** Do not install the unit in a way or at a place where the specifications outlined in the Environmental and Safety Specifications leaflet of the supplier are not met. Otherwise, the lifespan and performance of the repeater may be reduced.
- 2. **Attention:** Due to power dissipation, the unit may reach a very high temperature. Ensure sufficient airflow for ventilation.
- 3. **Attention:** The repeater must be installed in a vertical position.
- 4. **Notice:** Exceeding the specified load limits may cause the loss of warranty.

5. **Notice:** Do not place cables or tools that may damage the repeater in close proximity to it.
6. **Notice:** Do not wear jewelry or metal accessories when installing this repeater.
7. **Notice:** When connecting and mounting the cables (RF, optical, mains, ...) ensure that no water can penetrate into the unit through these cables.
8. **Notice:** Check all cables for shorts and opens. Verify that there are no cables with loose or poor connections. RF leakage could cause oscillation to occur under some conditions.
9. **Notice:** If any different or additional mounting material is used, ensure that the mounting remains as safe as the mounting designed by the manufacturer. The specifications for stationary use of the Unit must not be exceeded. Ensure that the static and dynamic strengths are adequate for the environmental conditions of the site. The mounting itself must not vibrate, swing or move in any way that might cause damage to the Unit.
10. **Notice:** A spacing of 40 mm (1.58 inch) around the unit is required.

Specified torques must be observed for certain mounting procedures according to the following table:

Type	Pins	Hex nuts	Screws
Thread	M 6	M 6	M6
Specified torques	3.3 Nm	3.3 Nm	3.3 Nm

*table 4-1 Specified torques*

#### 4.1.3. Mounting Procedure

Use the enclosed screws and screw anchors to mount the unit to a wall through the holes of the four mounting brackets at the unit (two at the top, two at the bottom):



## 4.2. Electrical Installation

### 4.2.1. Health and Safety for Electrical Installation

Read and observe chapter 1.2 *Health and Safety*.



1. **Danger: Electrical hazard.** Danger of death or fatal injury from electrical current. Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.
2. **Danger: Electrical hazard.** Danger of death or fatal injury from electrical current inside the unit in operation. Before opening the unit, disconnect mains power.

### 4.2.2. Property Damage Warnings for Electrical Installation

1. **Attention:** It is compulsory to ground (earth) the unit before connecting the power supply. A grounding bolt is provided on the cabinet to connect the ground-bonding cable.
2. **Attention:** If the mains connector of the PSR is not easily accessible, a disconnect device in the mains power circuit must be provided within easy reach.
3. **Attention:** A connection of the mains supply to a power socket requires the power socket to be nearby the PSR.
4. **Attention:** Before connecting or disconnecting the mains connector at the PSR, ensure that mains power supply is disconnected.
5. **Attention:** Make sure that an appropriate circuit breaker acting as a disconnect device (as required by IEC/EN60950-1) and an overcurrent limiting device are connected between mains power and the PSR.
6. **Attention:** Incorrectly wired connections can destroy electrical and electronic components.
7. **Notice:** To avoid corrosion at the connectors caused by electrochemical processes, the material of the cable connectors must not cause a higher potential difference than 0.6 V (see electrochemical contact series).
8. **Notice:** Use an appropriate torque wrench for the coupling torques:  
for 4.3-10 type connectors (5 Nm, 44 in lb) with 22mm (7/8) in opening,  
e.g. item no. TW-4310  
Do NOT use your hands or any other tool (e.g. a pair of pliers). This might cause damage to the connector and lead to a malfunction of the PSR.
9. **Notice:** For unstabilized electric networks, which frequently generate spikes, the use of a voltage limiting device is advised.
10. **Notice:** Observe the labels on the front panels before connecting or disconnecting any cables.
11. **Notice:** Unused connectors must be closed with their protective covers to ensure water tightness.

### 4.2.3. Connections

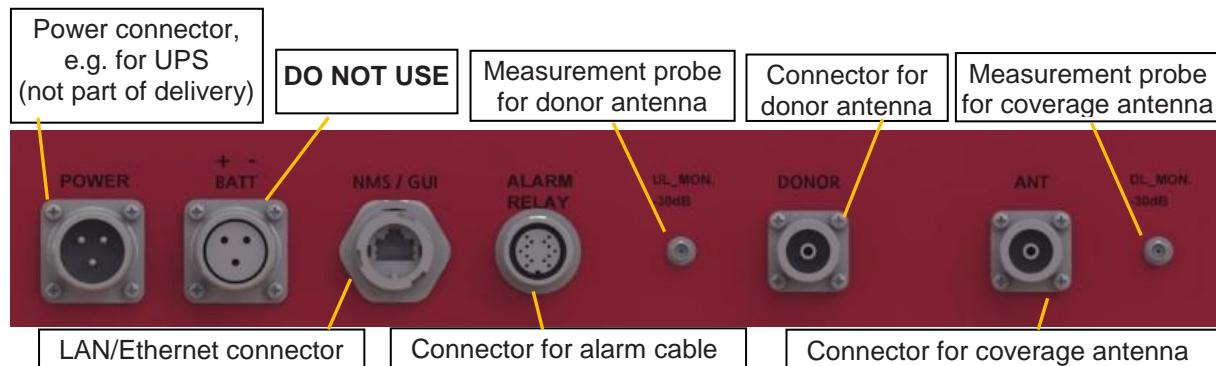


figure 4-1 Connectors of PSR 700/800 MHz

### 4.2.4. Grounding (Earthing)

Grounding must be carried out. Connect an earth-bonding cable to the M6 grounding connections provided at the outside of the repeater. Do not use the grounding connections to connect external devices.

The repeater is designed to operate under AC (88-264 VAC),DC (-62 - -33 VDC) / max load 300W. A Ground wire needs to be connected correctly without removing or changing the Ground lug of the power code.

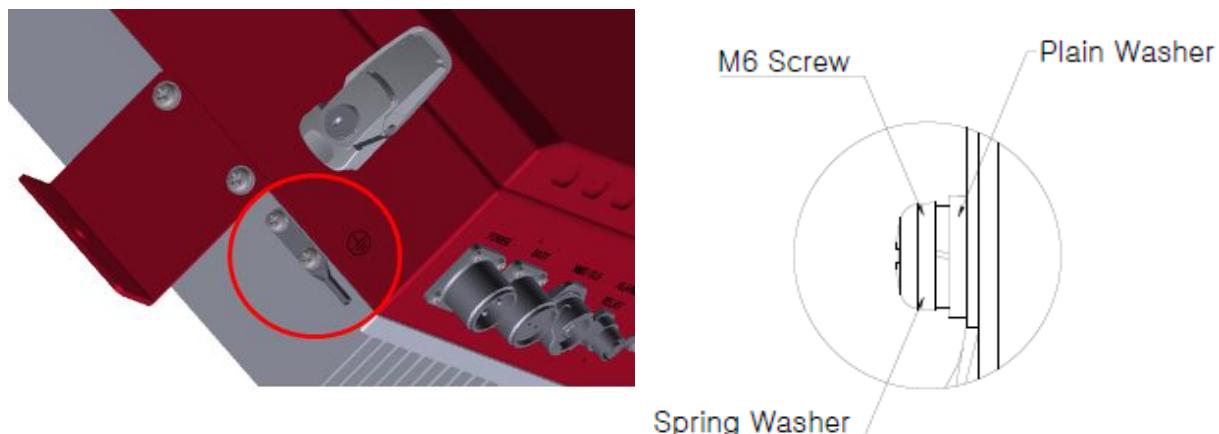


figure 4-2 Grounding bolts (left) and schematic view (right)

After loosening the M6 screw, connect the earth-bonding cable between the two washers as illustrated in the above. Then, fasten all parts again with the M6 screw.

**☞ Note:** Ground of a second unit has to be connected to the same equipotential bonding terminal as the repeater. Use bonding cables of the same length, as short as possible and with a large wire cross section. Follow local electrical code practices.

#### 4.2.5. Connection of the Antenna Cables

The PSR has 4.3-10-type antenna connector. Please refer to section 4.2.3 for its location. Refer to the corresponding documentation of the connector manufacturer for mounting the cable connectors.

The bending radius of the antenna cables must remain within the given specifications.

Choose the type of cable best suited for the antenna. Consider that a cable with higher loss is less expensive but impairs performance.

**Notice:** Use an appropriate torque wrench for the coupling torques:

- for 4.3-10 type connectors (5 Nm, 44 in lb) with 22 mm (7/8) in opening, e.g. item no. TW-4310

Do NOT use your hands or any other tool (e.g. a pair of pliers)! This might cause damage to the connector and lead to a malfunction of the RU.

**Attention:** To minimize passive inter-modulation (PIM) distortion, attention has to be paid to the physical condition of the connector junctions:

- Do not use connectors that show signs of corrosion on the metal surface.
- Prevent the ingress of water or dirt into the connector.
- Use protective caps for the connectors when not mounted.
- Before mounting clean the connectors with dry compressed air.
- Before mounting clean the mating surfaces of the connector with a lint-free alcohol-drenched cloth on a wooden or non-metallic item.
- Attach and torque the connectors properly.
- Avoid metallic abrasion when mounting the connectors by only screwing the connecting nut, but not turning the whole connector.
- Use a torque wrench to fasten the connector, see above.
- Clean the protective caps before mounting for antenna cable replacement.

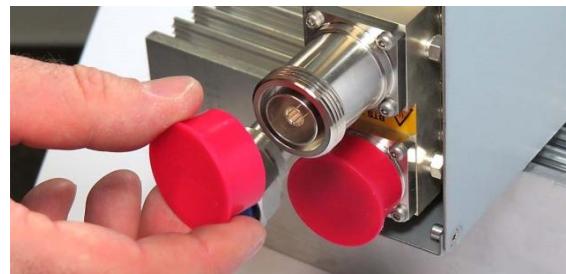
#### 4.2.6. Cleaning Procedure for RF Cable Connectors

The figures in this chapter illustrate the cleaning procedure and do not show the actual unit.

1. What is needed for the cleaning?
  - a. Isopropyl alcohol
  - b. Compressed air
  - c. Lint-free wipe
  - d. Cotton buds

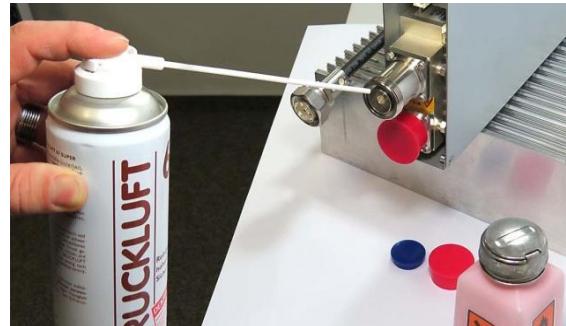


2. Remove protective cap from the RF connector.



**⚠ Caution:** Risk of injury by flying particles when compressed air is used. Wear protective clothing, especially protective glasses.

3. Remove metal chips and small particles from the mating and inner surfaces of the connector using compressed air.



**⚠ Warning:** Flammable material. Risk of fire. Keep away from sources of ignition.

**⚠ Caution:** Eye irritant product. Risk of eye irritation. Avoid contact with eyes and skin. Wear protective clothing, especially protective glasses.

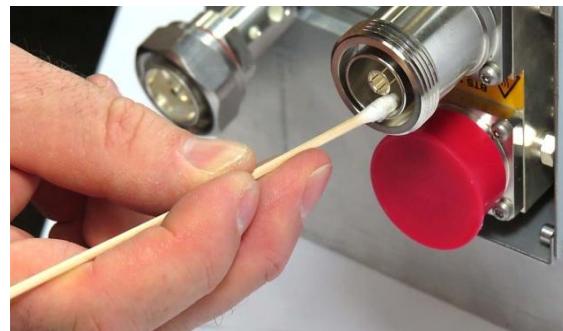
4. Clean the connector winding with lint-free wipe drenched with isopropyl alcohol.



5. Clean the lip of the inner ring with a cotton bud drenched with isopropyl alcohol.



6. Clean the inside surface of the inner ring with a cotton bud drenched with isopropyl alcohol.



7. Clean the inside of the center conductor spring tines with a cotton bud drenched with isopropyl alcohol.



8. Clean in the similar way the connector of the connected cable. Remove protective caps from the unit connector first.



9. Remove metal chips and small particles from the mating and inner surfaces of the connector using compressed air.



10. Continue with the winding area using lint-free wipe drenched with isopropyl alcohol.



11. Continue with the inside mating surface of the inner ring.



12. Clean the outside surface of the center pin.



#### 4.2.7. Antenna Cable Connector Assembly

The figures in this chapter illustrate the connection procedure and do not show the actual unit.

1. What is needed for the connector assembly?
  - a. Torque wrench.
  - b. (Adjustable) counter wrench



2. Join the connectors and turn the coupling nut until the thread grips.



3. Push in the connector until it clicks.

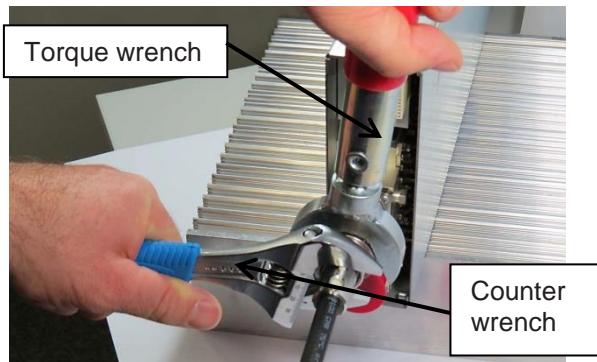


4. Fasten the coupling nut hand-tight. Do not turn the connector but the coupling nut only.



5. Retain the cable connector with the counter wrench and fasten the coupling nut with the torque wrench until the torque is applied (torque wrench clicks).

For angled antenna connectors use your hand to retain the cable connector and fasten the coupling nut with the torque wrench. Make sure only the coupling nut is turned, not the cable connector.



#### 4.2.8. Alarms Connection

For the location of the ALARM RELAY connector, refer to chapter 4.2.3. The corresponding alarms cable is part of the delivery:

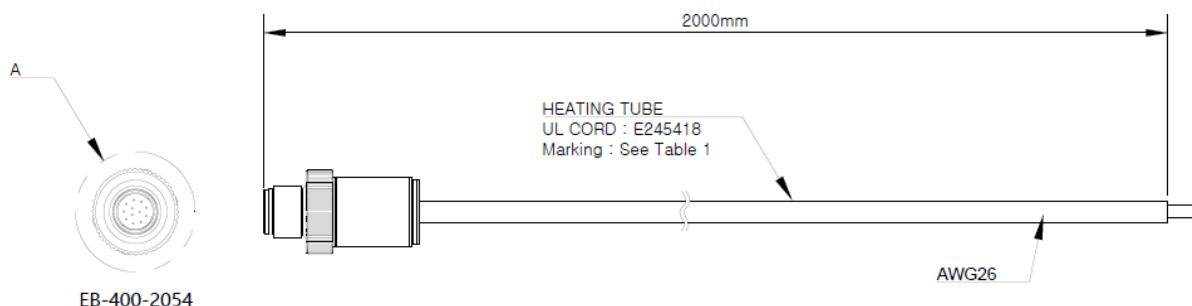


figure 4-3 Alarms cable

#### Technical Parameters

##### Electrical Characteristics

Rated current : 1.5A

Contacts resistance :  $\leq 5 \text{ m}\Omega$

Insulation resistance :  $\geq 100 \text{ M}\Omega$

Rated voltage : 30V

##### Mechanical Characteristics

Coupling : thread locking

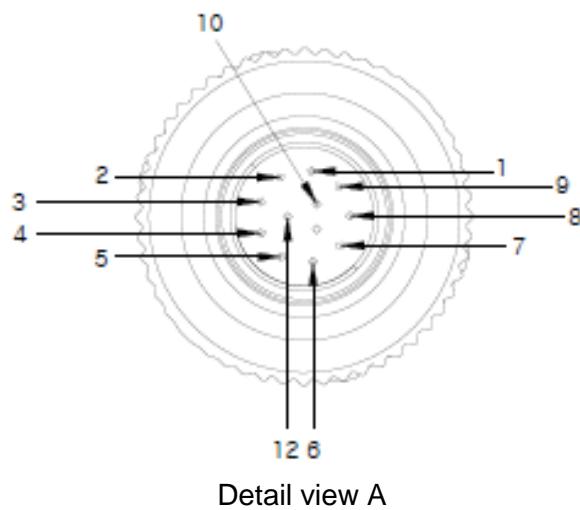
##### Environmental Characteristics

Ambient temperature :  $-40^{\circ}\text{C} \sim +90^{\circ}\text{C}$

IP rating : IP67

art	Material	Finish
Connector	Brass	Gold
Coupling nut/screw	Brass	Nickel
Insert/Housing	TPU	-
Sealing	Epoxy	-

Material:

Pinning of M12 Circular Plug-12P (male)

Pin	Name	Color
1	NC	brown
2	NO	blue
3	CC	white
4	NC	green
5	NO	pink
6	CC	yellow
7	NC	black
8	NO	gray
9	CC	red
10	NC	violet
11	NO	red/blue
12	CC	gray/pink

Dry Contacts Alarm Information

Dry Contacts	Relay 1	Relay 2	Relay 3	Relay 4	Alarm Monitoring
Alarm Information	1,2,3	4,5,6	7,8,9	10,11,12	
AC Fail Alarm	NO+CC	NC+CC	NC+CC	NC+CC	Power Failure (loss of normal AC power supply)
DL Shutdown Alarm	NC+CC	NO+CC	NC+CC	NC+CC	
UL Shutdown Alarm	NC+CC	NO+CC	NC+CC	NC+CC	
PLL Lock Detector Alarm	NC+CC	NO+CC	NC+CC	NC+CC	System Failure (failure of critical system components)
Isolation Alarm	NC+CC	NO+CC	NC+CC	NC+CC	
DL VSWR Alarm	NC+CC	NC+CC	NO+CC	NC+CC	Antenna Failure (malfunction of the donor/service antennas)
UL VSWR Alarm	NC+CC	NC+CC	NO+CC	NC+CC	
DL HPA Fail Alarm	NC+CC	NC+CC	NC+CC	NO+CC	PA Failure (failure of active RF-emitting devices)
UL HPA Fail Alarm	NC+CC	NC+CC	NC+CC	NO+CC	
Manual Amp Off	NC+CC	NC+CC	NC+CC	NO+CC	

Alarm Status. Normal (NC+CC), Alarm (NO+CC)

Relay Contact: NC → 1,4,7,10 / NO → 2,5,8,11 / CC → 3,6,9,12

**4.2.9. LAN Connection**

For local access to the PSR, connect an RJ45 network cable to the NMS/GUI connector (location see *figure 4-1*). Make sure that your local PC meets the requirements specified in chapter 6.1 LAN Settings at Local PC.

#### 4.2.10. Power Connection

Before connecting electrical power to the RU, the system must be grounded as described in section 4.2.4 *Grounding (Earthing)*.

Connect the power supply plug of the power supply cable that is part of the delivery at the POWER connector of the unit (see section 4.2.3). Depending on the location / requirements of your site, one of the following cables is provided:

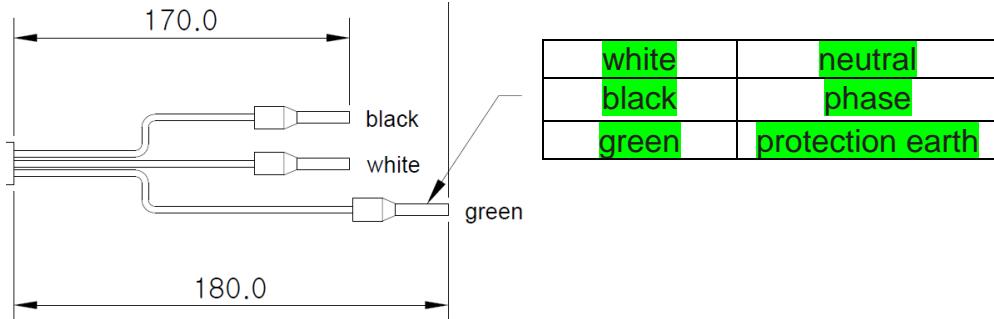


figure 4-4 Power supply cable (AC)

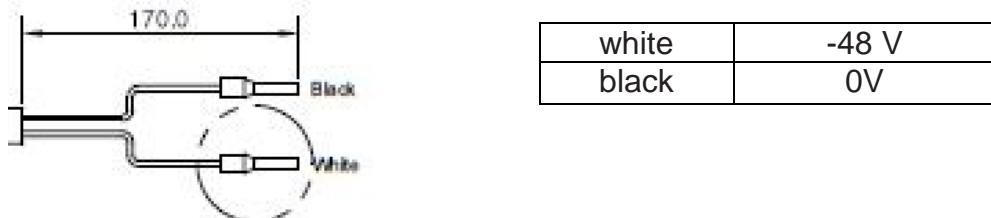


figure 4-5 Power supply cable (DC)

Connect the cable ends (shown above) of the power cable to your local power supply.

- ☞ **Note:** Observe the applicable national regulations regarding loop impedance, voltage drop, and methods of installation. Make sure to connect the correct voltage to the unit.
- ☞ **Note:** Do not connect or disconnect the power cord at the POWER connector while power is on. Turn off mains power \* before connecting the power cord at the PSR, then, engage mains again.

\* Mains power must be interruptible with an external delay-actions mains breaker. For the mains breaker, observe the following recommendation:

120 Volt / 20 Amp max. or 240 Volt / 16 Amp, single-phase, 50 / 60 Hz AC service is needed, i.e. the external AC breaker should be 20 Amps max. for 120-Volt service or 13 to 16 Amps for 240-Volt service. Always make sure that your local requirements are kept.

For the DC power supply, observe the local regulations of the DC service provider.

## 5. Status LEDs, Alarms, and Troubleshooting

For local supervision, three multi-color LEDs (Power, OSC, and Alarm) are part of the front panel to display unit status information.

During booting and SW update, all three LEDs blink green, indicating that initialization and isolation measurement are in process. When the boot process is finished, and the repeater works properly, all three LEDs are green to indicate normal operation.

The table below shows possible alarm conditions indicated by the LEDs as well as possible countermeasures.

Status LED	Indication	Alarm condition	Trouble & Status condition	Possible countermeasure
Power LED	Red	AC Fail Alarm	During normal operation (after a correct installation) this LED should always show a green light as due the obligatory usage of a UPS, power-related alarms cannot occur; simulation of these alarms via SW, however, is possible.	
	Red Blinking	Battery Alarm		
OSC LED	Red Blinking	Isolation Alarm	Insufficient isolation between antennas	Increase isolation between donor and coverage antenna above gain + 20dB.
	Green Blinking	VSWR Alarm	UL/DL Alarm, failure	VSWR Antenna Check for proper connection between antennas and antenna ports. Check for obstacles close to antennas. Check for short-circuit of antenna cables.
OSC & Alarm LED	Red Blinking	PLL Lock Detector Alarm	PLL is unlocked	Reset unit via <i>Reset</i> button in Web GUI*. If the alarm is still present, contact your supplier.
Alarm LED	Red	HPA Fail Alarm	UL/DL High Power Amplifier failure	Reset unit via <i>Reset</i> button in Web GUI*. If the alarm is still present, contact your supplier.
	Red Blinking	Shutdown Alarm	UL/DL Shutdown Temperature Alarm	Check if the RF input power exceeds maximum allowed level. Check if the ambient temperature exceeds allowed temperature range.
	Green Blinking	Manual Amp Off	Amplifier turned off by factory setting or by user.	Turn amplifier on via Web GUI.

\* Do not use the HW Reset button in the unit for this purpose, as it will set back all data to factory defaults. Only use HW button (as described in the following) if the IP address or password was inadvertently changed or forgotten.

*table 5-1 Status LED indication and troubleshooting*

Troubleshooting in case of unknown IP address or password:

If the IP address or password was inadvertently changed or forgotten so that access to the Web GUI is not possible, a Reset button inside the unit is provided.

**Note:** Be aware that this button will set back all data to factory defaults.

**Notice:** As using the Reset button requires the unit to be in operation while open, only suitably qualified personnel are allowed carry out the procedure described in the following and only after becoming familiar with all safety notices, installation, operation and maintenance procedures contained in this manual.



**Danger: Electrical hazard. Danger of death or fatal injury from electrical current. Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.**

Use the key provided with the unit to unlock both locks at the left side of the cabinet and unlatch them. Then, you can open the cabinet door.



**Danger: Electrical hazard. Danger of death or fatal injury from electrical current inside the unit in operation. Make sure not to touch anything but the Reset button.**

The Reset button is located on the Control Board (located in the top right corner of the repeater):

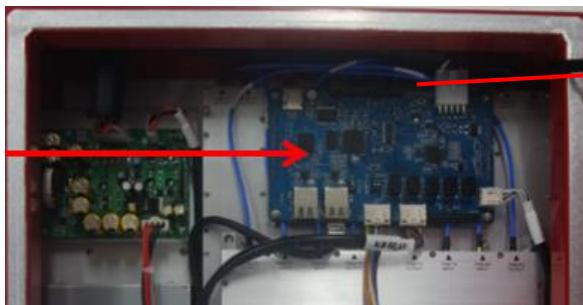


figure 5-1 Location of Control Board

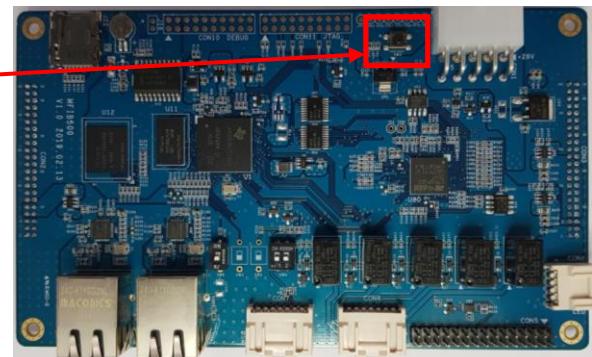


figure 5-2 Reset button on Control Board

Press the button for 5 seconds and a restart of the Web GUI will be initiated, setting back the settings to the factory defaults:

IP Address: 192.168.1.150	OMC Connection IP Address: 0.0.0.0
Heartbeat ON	Heartbeat Interval: 30min

Thus, you can login to the Web GUI with the default password again.

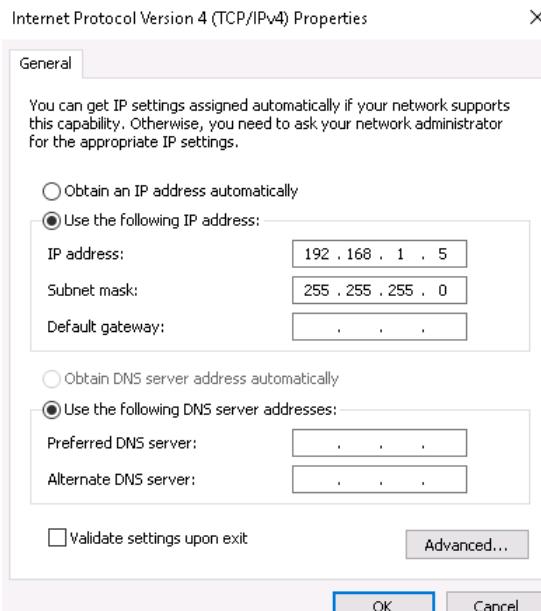
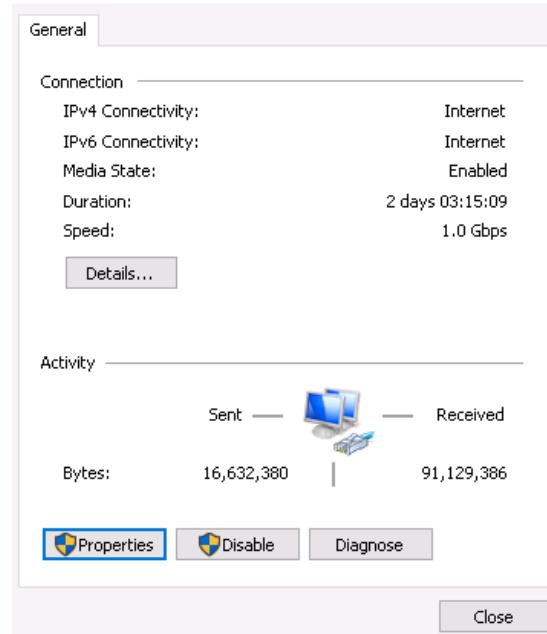
**Note:** Do not forget to close the cabinet, latch the two locks and lock them with the key.

## 6. Description of Web GUI

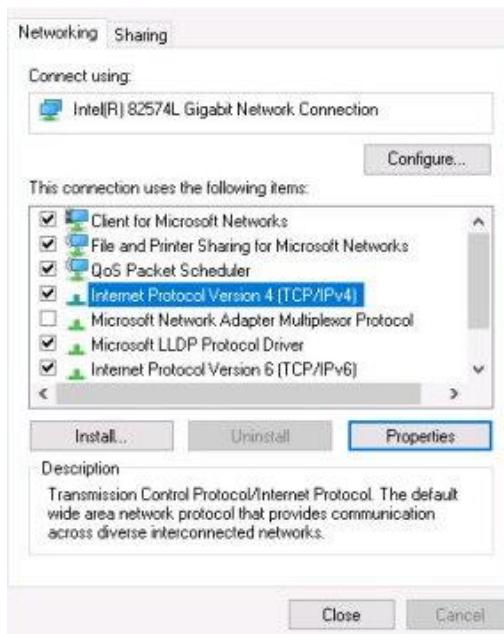
### 6.1. LAN Settings at Local PC

In order to have access to the Web GUI, the following network adapter settings need to be set at the local PC. Setting a static IP address in the same address range (see below 192.168.1.5) is required:

Access the LAN settings of your local PC and click **Properties**:



Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**:



→ Enter the IP address and click **OK**.

## 6.2. Required Software

The Web GUI uses Ethernet TCP/IP communication and Protocol uses RFM Protocol. SNMPv2 MIB Protocol.

Default Ethernet telecommunication specification.

- URL Address: <http://192.168.1.150>
- Default Username: admin
- Default Password: admin
- Browser: Chrome Internet Browser

## 6.3. EULA Acceptance Page

When a user connects first time or after a factory reset, the EULA Acceptance page appears.

### End User License Agreement (EULA)

End User License Agreement(EULA)

For Owners, end users  
If you are a member of the end user organization (typically the owner organizations)  
please read and accept the EULA.  
The acceptance dialog will reappear after login until a member of the End User Organization has  
checked the EULA Acceptance box.

COMMSCOPE  
End-User License Agreement  
=====

Last updated: April 22, 2019

Please read this End-User License Agreement ("Agreement") carefully before  
clicking the "I Agree" button, downloading or using Pickup Repeater Web UI  
("Application").

By clicking the "I Agree" button, downloading or using the Application, you  
are agreeing to be bound by the terms and conditions of this Agreement.

This Agreement is a legal agreement between you (either an individual or a  
single entity) and Pickup Repeater Web UI and it governs your use of the  
Application made available to you by Pickup Repeater Web UI.

If you do not agree to the terms of this Agreement, do not click on the "I  
Agree" button and do not download or use the Application.

The Application is licensed, not sold, to you by Pickup Repeater Web UI for  
use strictly in accordance with the terms of this Agreement.

License  
=====

Pickup Repeater Web UI grants you a revocable, non-exclusive, non-  
transferable, limited license to download, install and use the Application  
solely for your personal, non-commercial purposes strictly in accordance with

Accept the EULA

[Continue](#)

If you do not Accept the EULA, login to the repeater is not possible.

## 6.4. Login Page

Username: admin

Password: \*\*\*\*\*

Sign In

Enter Username and password exactly.

If you enter Username and password incorrectly, the message is shown below.

Sign In

Login Failed : Invalid Username / Password

If you typed username and password wrongly more than 3 times, input of username and password input will be locked for 30 seconds.

## 6.5. Main Page

System Settings

License Upgrade

Software Update

Restore Factory Defaults

My Account Management

IP Setting

OMC Connection

Alarm Setting

General RF Setting

700MHz Channels

800MHz Channels

Site Location

Time and Date

- System Reboot Button : The entire system is rebooted (about 10 seconds are required.)
- Logout Button : System logging out.

- Display Version: Indicated with Version 01.00.00.XX
- Alarm Status : : If more than one critical alarm is generated, mark it as Critical. If No alarm status, mark is as Clear.
- Main Menu : It is configured with the System Settings / System Operation menu.
- Temperature : It display system temperature.

## 6.6. System Settings

### 6.6.1. License Upgrade

The screenshot shows the 'License Upgrade' page within the 'System Settings' menu. The 'Device Information' section contains fields for Device ID (7831758-0011), MAC Address (38.D2.69.5C.F6.6F), Part No. (RS78M3390ACPSD), Serial No. (190513AA0004), and S/W version (01.00.00.44). The 'Update License Key' section has a text input field and a 'Save' button. The 'Band Authorization' and 'Power Level Authorization' sections display tables with two rows each, showing authorization status for single and dual bands, and power levels for 0.5W/27 dBm and 2W/33 dBm.

Band Authorization			Power Level Authorization		
Band	Authorization Status	Expiration	Power Level	Authorization Status	Expiration
Single Band	Unlocked	Permanent	0.5W/27 dBm	Unlocked	Permanent
Dual Band	Unlocked	Permanent	2W/33 dBm	Unlocked	Permanent

- Device Information indicates as below.  
Device ID, MAC Address, Part No, Serial No, S/W Version
- Update License Key (= SW Feature Key)  
If you want to upgrade license, you can enter the new license key and click the Save button. For a list of available license keys, see chapter 8.3 Available Configurations and SW Feature Keys.
- Band/Power Level authorization status.  
If dual band is unlocked, single band is automatically unlocked as well. If Power level 2 W is unlocked, 0.5W is automatically unlocked.

## 6.6.2. Software Upgrade

Click the Choose file button and select Software update file, open it  
Press the Update button to update the Software.

Once Software Uploading is complete (this will take around 1 minute), proceed as follows

**Updating software. Please wait it will take a few minutes**

**Do NOT turn off the power**

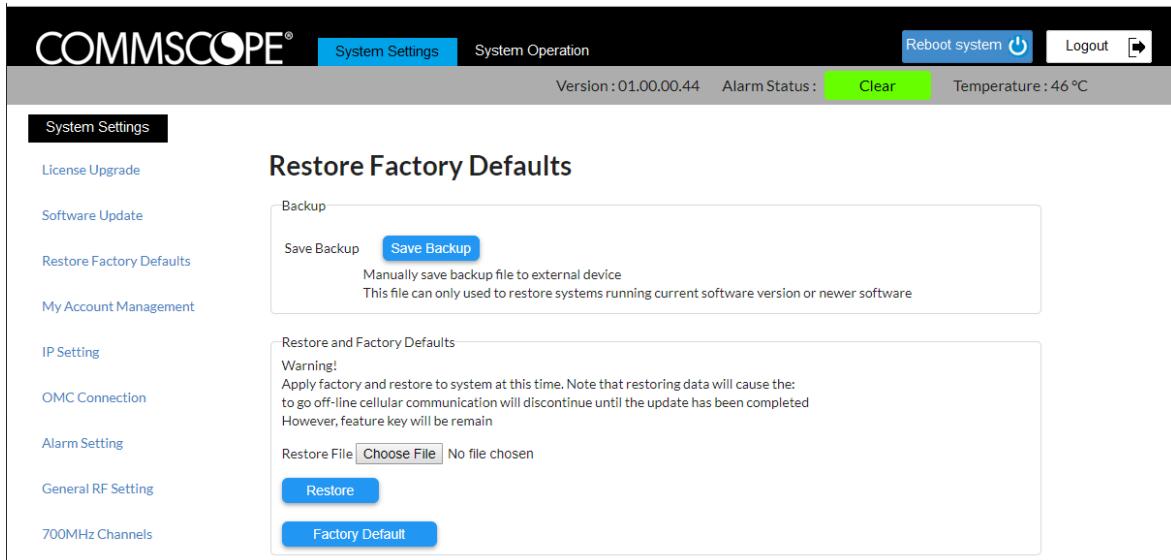


When Software Updating is complete, you automatically move to the Login page.

**NOTE:** Do not turn off the device during software updates.

### 6.6.3. Restore Factory Defaults

**Note:** Be aware that only RF Settings will be saved in the backup file and that after the restore all ALC buttons will be set to ON and all Amplifier buttons will be set to OFF irrespective of the settings made before.



**Save Backup Button:** When you click the button, the system's RF Setting information is downloaded to your PC as backup.dat file.

**Restore File Choose File Button:** Click the Button and select the Backup file to open.

**Restore Button:** Click the Button, the RF Setting information restore to Backup file.

**Factory Default Button:** Click the Button, the RF Setting information restore to Factory Default status. Both the Alarm History log and Event History log files are deleted, and the system is rebooted.

### 6.6.4. My Account Management

**System Settings**

**My Account Infomation**

**My Information**

Username :	admin
Company :	Commscope
Contact Number :	714-4544-1234
Email Address :	admin@commscope.com
Role :	super user

**Change Password**

Password :  Minimum 8 characters

Confirm Password :

Password Requirements:  
\* Between 8-16 characters long  
\* Contain only Latin based alphanumeric characters  
\* Must contain at least one capital letter, one small letter and one number

**Change Password**

Software Update  
Restore Factory Defaults  
My Account Management  
IP Setting  
OMC Connection  
Alarm Setting  
General RF Setting  
700MHz Channels  
800MHz Channels  
Site Location  
Time and Date

#### My Information:

You can update Username, Company, Contact Number, Email Address, and Role information.

Change Password Button: You can change Password.

Password must be at least eight characters and must contain Latin / alphanumeric characters.

Also, you must include at least one Capital letter/small letter/number.

### 6.6.5. IP Settings

#### Factory Default IP Setting

- IP Address : 192.168.1.150
- Subnet Mask : 255.255.255.0
- Broadcast : 192.168.1.255
- Gateway : 192.168.1.1
- Primary DNS : 168.126.63.1
- Secondary DNS : 168.126.63.2

If you press Save button after changing IP Address, the following message appears:

Click OK button to IP Settings and then System will be reboot.

**System will reboot in few minutes...**



### 6.6.6. OMC Connection

COMMSCOPE®
System Settings
System Operation
Reboot system 
Logout

Version : 01.00.00.44
Alarm Status : 
Clear
Temperature : 46 °C

System Settings

License Upgrade
Software Update
Restore Factory Defaults
My Account Management
IP Setting
OMC Connection
Alarm Setting
General RF Setting
700MHz Channels
800MHz Channels
Site Location
Time and Date

OMC Connection

OMC Server IP Address

Main OMC IP Address [A]:

Backup OMC IP Address [B]:

OMC IP Address [C]:

OMC IP Address [D]:

OMC IP Address [E]:

Warning!

Apply IP address update to system at this time. Note that updating ethernet port will cause the system to go off-line and cellular communication will discontinue until the update has been completed

Alarm Notification

HeartBeat:

HeartBeat Interval:  1440min

Alarm Type: NOTIFICATION [Trap]

SNMP Version: V2.0

#### OMC Server IP Address:

A Total of 5 OMC Server IP Addresses can be inputed.

Factory Default IP Address : 0.0.0.0

#### Alarm Notification:

Heartbeat ON / OFF Function

Heartbeat Interval Time Set Function : 1 ~ 1440min can be set.

Press the Save button after changing the settings, And then OMC Connection setting saved

And Repeater will be reboot for SNMP daemon restarting

**System will reboot in few minutes...**



### 6.6.7. Alarm Settings

Alarm Information		Active
PSU Fail Alarm		<input checked="" type="checkbox"/>
DL Shutdown Alarm		<input checked="" type="checkbox"/>
UL Shutdown Alarm		<input checked="" type="checkbox"/>
Manual AMP Off		<input checked="" type="checkbox"/>
DL VSWR Alarm		<input checked="" type="checkbox"/>
UL VSWR Alarm		<input checked="" type="checkbox"/>
DL HPA Fail Alarm		<input checked="" type="checkbox"/>
UL HPA Fail Alarm		<input checked="" type="checkbox"/>
PLL Lock Detector Alarm		<input checked="" type="checkbox"/>
Isolation Alarm		<input checked="" type="checkbox"/>
Temperature Alarm		<input checked="" type="checkbox"/>

In the Alarm Setting dialog box, you can mask/unMask the alarm. Click the Active button in the Alarm list to set up the ON/OFF Toggle. And then, press the Save button to save the Alarm settings.

- Active ON : When an alarm is triggered, the alarm LED and alarm relay are selected and MIB Notification Alarm is generated.
- Active OFF : When an alarm is triggered, Alarm LED and Alarm Relay are not selected, MIB Notification Alarm is also Masked.

Temperature Alarm Setting is disabled.

### 6.6.8. General RF Settings

General RF Setting

Band	Gain	ALC Level	ALC	User ATTN	HPA	RL Threshold
700MHz	90.0	-57	ON	0.0	ON	10
800MHz	90.0	-57	ON	0.0	ON	

Band	Gain	ALC Level	ALC	User ATTN	HPA	RL Threshold	Broad Mute Level	Narrow Mute Level
700MHz	90.0	-63	ON	0.0	ON	10	-105	-110
800MHz	90.0	-63	ON	0.0				

Analog Band Selection [Class B]  
800MHz Band 851-869 MHz BW 18MHz

Save

Screen for Class A (Digital) 700/800MHz Band Feature  
update of screen shot required

Only the items corresponding to Feature Key ID are *Active* and RF Setting is available.

#### RF Setting:

ALC : ON /OFF

HPA : ON/OFF

User ATTN : User Gain Control (0~ 30dB) / Step 0.5dB

Return Loss Threshold Setting ( 0~30dB)

UL Mute Threshold Level Setting[Broad Band] (-105 ~ -60dBm)

UL Narrow Mute Level : -110 ~ -60

If the Feature Key ID is Single Band, you can select 700 MHz Band **OR** 800 MHz Band.

Once you have finished RF setting, press the Save button to change the settings.

### 6.6.9. 700 MHz Channels (Class A Only)

	CH	Center Freq. [MHz]	Bandwidth [kHz]	DL Gain [dB]	UL Gain [dB]	Set	Start Freq [MHz]	Stop Freq [MHz]
Restore Factory Defaults	Broad CH1		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
My Account Management	Broad CH2		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
IP Setting	Narrow CH3	766.50000	12.5 ▾	0.0	0.0	<input type="button" value="Save"/>	766.49375	766.50625
OMC Connection	Narrow CH4		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
Alarm Setting	Narrow CH5		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
General RF Setting	Narrow CH6		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
700MHz Channels	Narrow CH7		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
800MHz Channels	Narrow CH8		OFF ▾	0.0	0.0	<input type="button" value="Save"/>	-	-
Site Location								
Time and Date								

#### 700 MHz Band Digital Filter Channels Configuration

- Broad Band(LTE) : CH1, CH2 Filter BW : OFF, 5 MHz, 10MHz, 18MHz
- Narrow Band : CH3 ~ CH34 Filter BW : OFF, 12.5, 25, 50, 75, 100, 150, 200 kHz

Center Freq. Setting : Set up the Center Freq. per each Channel.

Center Freq. Range : 758.000000 ~ 775.000000 (MHz) Ref : DL Freq.

Digital Gain Setting : DL/UL Gain Control per each Channel

Digital Gain Control Range : +/- 5 dB Step 0.5 dB

Start Freq. : Calculate Center Freq - (BandWidth/2) (Display Only)

Stop Freq. : Calculate Center Freq + (BandWidth/2) (Display Only)

#### **NOTE:**

However, if LTE Filter BW 18MHz is selected, all other channels will automatically BW Off status.

### 6.6.10. 800 MHz Channels (Class A Only)

CH	Center Freq. [MHz]	Bandwidth [kHz]	DL Gain [dB]	UL Gain [dB]	Set	Start Freq [MHz]	Stop Freq [MHz]
Broad CH1		OFF ▾	0.0	0.0 ▾	Save	-	-
Broad CH2		OFF ▾	0.0	0.0	Save	-	-
Narrow CH3	860.00000	12.5 ▾	0.0	0.0	Save	859.99375	860.00625
Narrow CH4		OFF ▾	0.0	0.0	Save	-	-
Narrow CH5		OFF ▾	0.0	0.0	Save	-	-
Narrow CH6		OFF ▾	0.0	0.0	Save	-	-
Narrow CH7		OFF ▾	0.0	0.0	Save	-	-
Narrow CH8		OFF ▾	0.0	0.0	Save	-	-

#### 800 MHz Band Digital Filter Channels Configuration

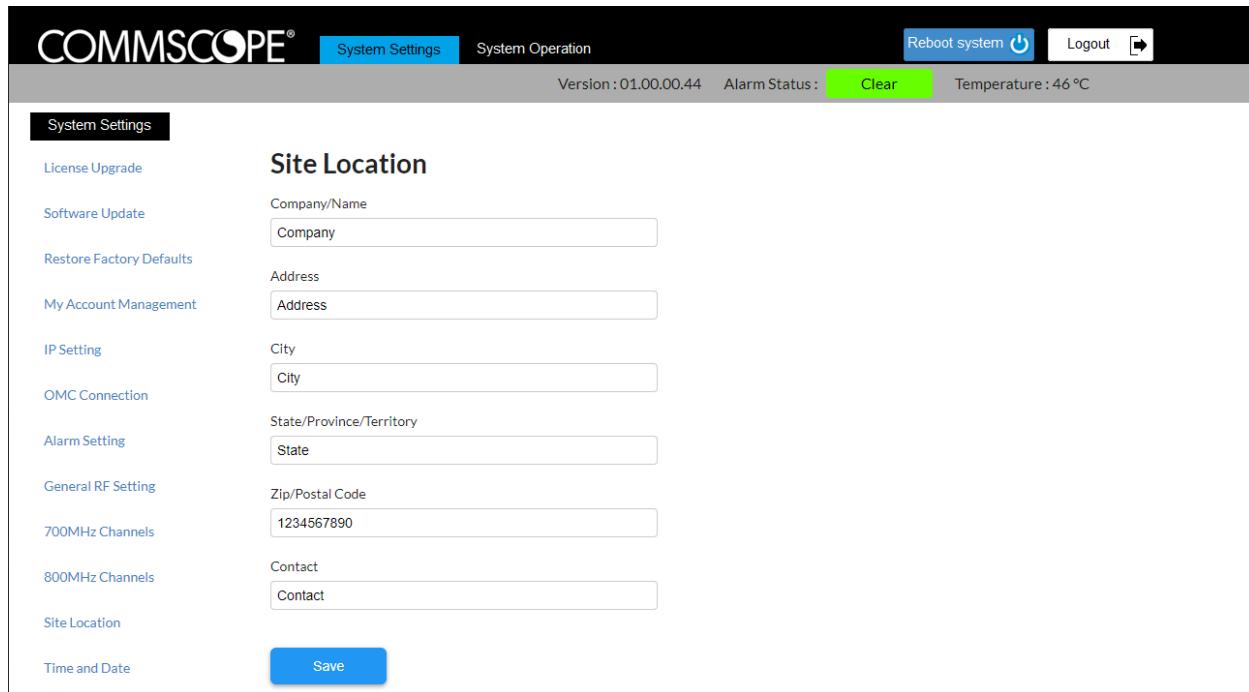
- Broad Band(LTE) : CH1, CH2 Filter BW : OFF, 5 MHz, 10MHz, 18MHz
- Narrow Band : CH3 ~ CH34 Filter BW : OFF, 12.5, 25, 50, 75, 100, 150, 200 kHz
- 

Center Freq. Setting : Set up the Center Freq. per each Channel.  
 Center Freq. Range : 851.000000 ~ 869.000000 (MHz) Ref : DL Freq.  
 Digital Gain Setting : DL/UL Gain Control per each Channel  
 Digital Gain Control Range : +/- 5 dB Step : 0.5dB  
 Start Freq. : Calculate Center Freq. - (BandWidth/2) (Display Only)  
 Stop Freq. : Calculate Center Freq. + (BandWidth/2) (Display Only)

#### **NOTE:**

However, if LTE Filter BW 18MHz is selected, all other channels will automatically BW Off status.

### 6.6.11. Site Location



Site Location

Company/Name  
Address  
City  
State/Province/Territory  
Zip/Postal Code  
Contact

Save

Enter the Site Location information and press the Save button to save the Site Location information on the Device.

CompanyName: You can enter up to 30 characters

Address: You can enter up to 30 characters

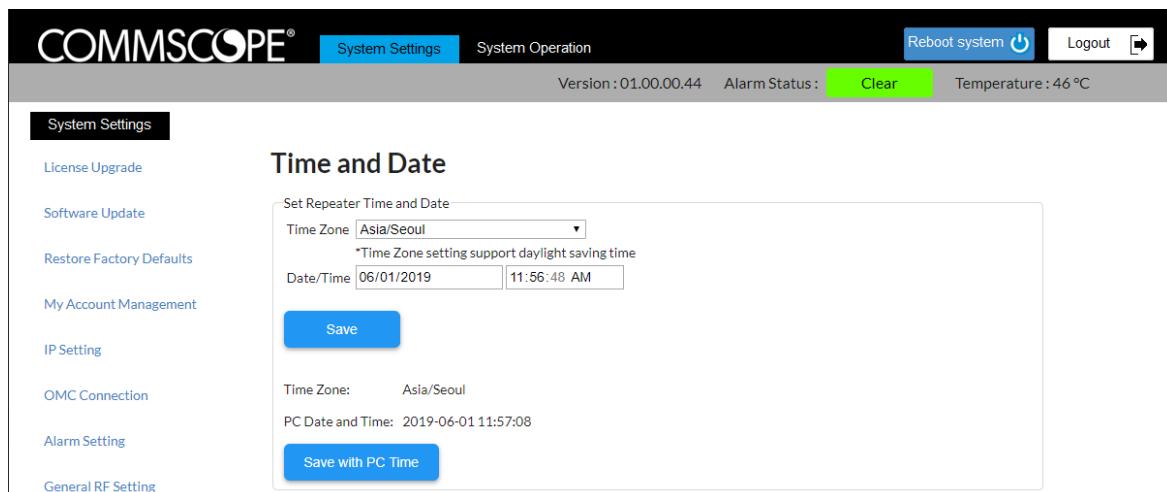
City: You can enter up to 30 characters

State/Province/Territory : You can enter up to 10 characters

Zip Code: You can enter up to 10 characters

Contact: You can enter up to 20 characters

### 6.6.12. Time and Date



Time and Date

Set Repeater Time and Date

Time Zone: Asia/Seoul  
Date/Time: 06/01/2019 11:56:48 AM

Save

Time Zone: Asia/Seoul  
PC Date and Time: 2019-06-01 11:57:08

Save with PC Time

Time Zone Setting: When Time Zone is selected, the daylight saving time is applied.

Repeater Date and Time: Press the Refresh button to get the current repeater date and time; the user can change the Date and Time manually.

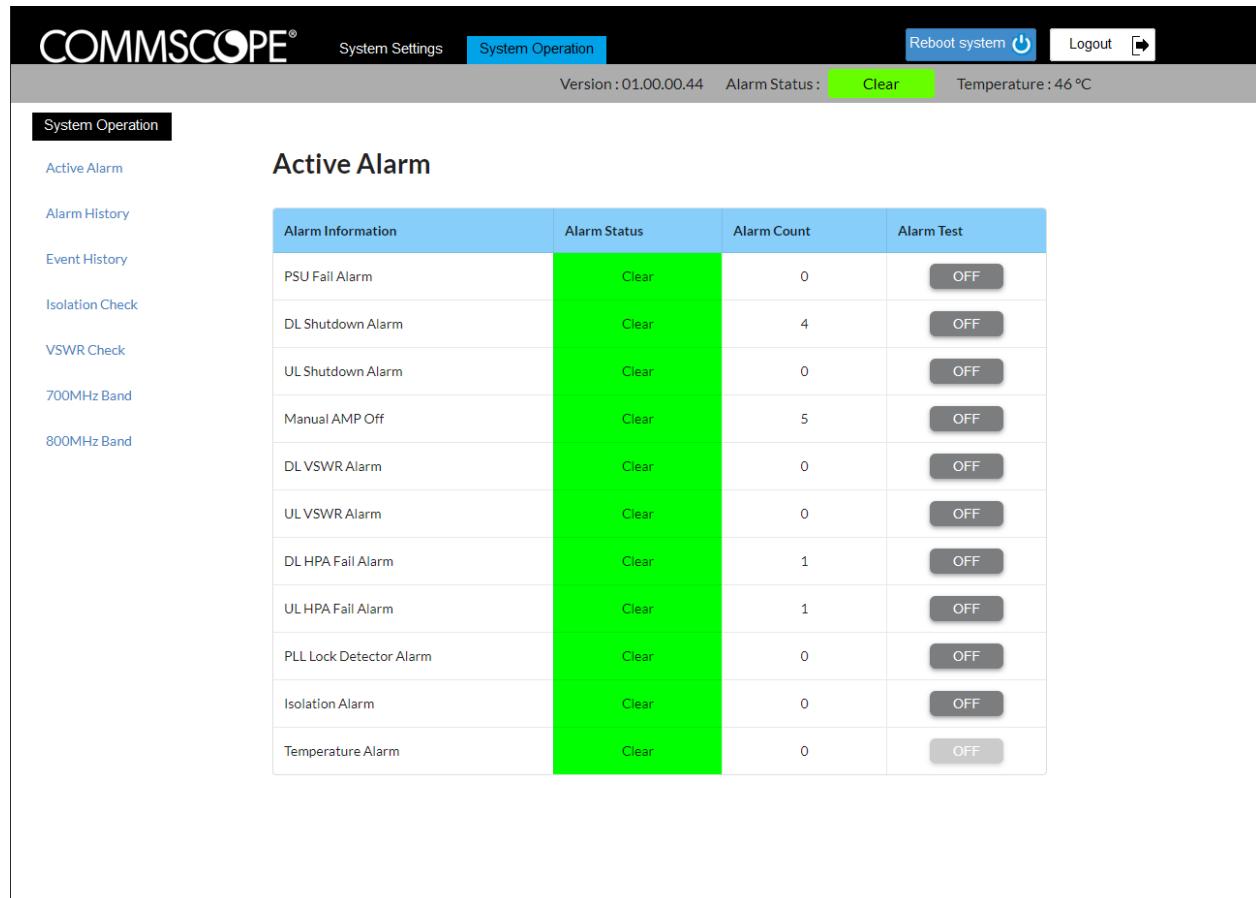
Save Button: Save the changed Date/Time and Time Zone on the Device.

PC Time Set: Save the Date/time of the PC to the device (However, Time Zone should set to item 1).

Note: Date/Time is reset if the repeater power is left off for more than 2 days

## 6.7. System Operation

### 6.7.1. Active Alarm



The screenshot shows the 'System Operation' section of the COMMSCOPE web interface. The 'Active Alarm' tab is selected in the left sidebar. The main content area displays a table titled 'Active Alarm' with the following data:

	Alarm Information	Alarm Status	Alarm Count	Alarm Test
Event History	PSU Fail Alarm	Clear	0	OFF
Isolation Check	DL Shutdown Alarm	Clear	4	OFF
VSWR Check	UL Shutdown Alarm	Clear	0	OFF
700MHz Band	Manual AMP Off	Clear	5	OFF
800MHz Band	DL VSWR Alarm	Clear	0	OFF
	UL VSWR Alarm	Clear	0	OFF
	DL HPA Fail Alarm	Clear	1	OFF
	UL HPA Fail Alarm	Clear	1	OFF
	PLL Lock Detector Alarm	Clear	0	OFF
	Isolation Alarm	Clear	0	OFF
	Temperature Alarm	Clear	0	OFF

update of screen shot required

- 1) You can view the current Active Alarm.
- 2) Alarm test is a function that performs an Alarm Simulation.

When Alarm Test is On status, the Alarm LED and Alarm Relay are selected as the actual Alarm.

Alarm Count: Auto / Manual Alarm count displayed.

Alarm History Storage: When Alarm Test is ON, it should store as a Manual triggered Alarm.

Temperature Alarm test is not available.

### 6.7.2. Alarm History

Event History	Date/Time	Level	Trigger	Alarm Details
Isolation Check	2019-05-29_13:45:25	Clear	Auto	UL HPA Fail
VSWR Check	2019-05-29_13:44:25	Critical	Auto	UL HPA Fail
700MHz Band	2019-05-29_12:29:03	Clear	Auto	DL HPA Fail
800MHz Band	2019-05-29_12:29:02	Clear	Auto	Manual AMP Off
	2019-05-29_12:27:02	Critical	Auto	DL HPA Fail
	2019-05-29_12:13:02	Critical	Auto	Manual AMP Off
	2019-05-29_11:41:33	Critical	Auto	Manual AMP Off
	2019-05-29_11:13:17	Clear	Auto	DL Shutdown
	2019-05-29_11:07:32	Critical	Manual	DL Shutdown
	2019-05-29_11:06:40	Clear	Auto	DL Shutdown

Showing 1 to 10 of 17 entries

Previous 1 2 Next

Download Alarm Logs

- Alarm History Function

If an Alarm occurs in the Repeater, it must be stored in the Alarm History.

If the User switches On the Alarm Test to test the Alarm, the Manual Trigger Alarm Log must be saved.

- Alarm History Log File

Alarm Event file is named as occurred date. And the file saved on System Alarm History Folder.

Ex) 20190226.log

- Alarm History Log File Content

Saved as a Csv file, seperated by commas.

Ex) 2019021613:00:22, Critical,Auto,PSU Fail Alarm

- Download the Alarm History Log File to PC

The User should be able to download the Alarm History log file to PC. And then, perform the download function by compressing all of the Alarm Log files at one time.

- Alarm History Search Function

You can search by Event Date, Alarm Item, Alarm Trigger, and Alarm Level.

At the figure below, you can see that when Manual AMP is entered in the Search window, the detected alarm is displayed.

screen shot missing

### 6.7.3. Event History

Event History

	Date and Time	User	Event Description
Isolation Check	2019-06-01_11:49:30	admin	Uplink 800MHz ALC ON/OFF Changed
VSWR Check	2019-06-01_11:45:34	admin	Login occurred
700MHz Band	2019-06-01_11:43:19		System started
800MHz Band	2019-06-01_10:46:31	admin	Login occurred
	2019-05-31_17:35:34	admin	Login occurred
	2019-05-29_22:50:35	admin	Uplink 700MHz ALC ON/OFF Changed
	2019-05-29_22:47:25	admin	Uplink 700MHz ALC ON/OFF Changed
	2019-05-29_22:47:25	admin	Uplink 800MHz ALC ON/OFF Changed
	2019-05-29_22:07:24	admin	Login occurred
	2019-05-29_22:07:04		System started

Showing 1 to 10 of 52 entries

Previous 1 2 3 4 5 6 Next

Download Event Logs

- Event History Function

The function to store user Logging information and history of changing RF settings

- Event History Log File

Event file is named as occurred date. And the file saved on System Event History Folder.

Ex) 20190226.log

- Event History Log File Content

Saved as a Csv file, seperated by commas.

Ex) 2019021613:00:22,David,logged in

- Download the Event History Log File to PC

The User should be able to download the Event History log file to PC. And then, perform the download function by compressing all of the Event Log files at one time.

- Event History Search Function

You can search by Event Date, Event, and User Name.

### 6.7.4. Antenna Isolation Check

Click the Test button to start the Antenna Isolation Check.

When the Isolation Check is completed, display the Isolation value and Maximum Gain.

Maximum Gain : 90 (Green colour), Maximum Gain : 89~ 60 dB (Orange colour),  
 Maximum Gain : < 60dB (Red colour) – Isolation Fail

### 6.7.5. VSWR Check

Antenna	VSWR [Ratio]	Return Loss [dB]	Threshold [dB]
UL	1.9:1	10.163	10
DL	1.9:1	10.163	10

Press Test Button to display the current VSWR Ratio.

If the Return loss value is less than the Threshold value, the VSWR Fail Alarm is generated. The shading will change from green to red in case of an alarm.

### 6.7.6. 700MHz Band Overview

[Figure: 700 MHz Band Class A RF Overview]

update of screen shot required

Displays the current 700 MHz band setting and the Input/Output Power Level. If you want to check the status again, you can click the 700 MHz Band menu button or F5 refresh key to perform the status check. Automatic gain reduction is indicated by orange color.

### 6.7.7. 800MHz Band Overview

[Figure: 800 MHz Band Class A RF Overview]

Displays the current 800 MHz band setting and the Input/Output Power Level. If you want to check the status again, you can click the 800 MHz Band menu button or F5 Key to perform the status check.

## 7. Maintenance

### 7.1. General

Read and observe chapter 1.2 *Health and Safety*.



**Caution:** The unit reaches high temperature in operation. Risk of burns by hot surface. Do not touch the unit before it has sufficiently cooled down.

- ☞ **Note:** The repeater does not require preventative maintenance measures.
- ☞ **Note:** We recommend checking the cleanliness of the unit and in particular of the heat sink at appropriate intervals depending on the degree of dust and dirt at the installation site. If necessary, any dusty or dirty areas / parts should be cleaned from debris at regular intervals, which also depend on the degree of debris at the installation site.

Unless otherwise agreed to in writing by CommScope, CommScope's general limited product warranty (<http://www.commscope.com/Resources/Warranties/>) shall be the warranty governing the unit, including the installation, maintenance, usage and operation of the units.

No spare parts are available for this repeater.

- ☞ **Note:** When sending back the unit, use appropriate packaging (see also section 8.2.3 Mechanical Specifications for details). Use of the original packaging for shipping the unit is strongly recommended.

### 7.2. Cleaning the Heat Sink

- ☞ **Note:** Read and observe chapter as well as the instructions in section before starting with the replacement procedure. Then, proceed as follows:

Checking the cleanliness of the heat sink is recommended at appropriate intervals depending on the degree of dust and dirt at the installation site. If necessary, any dusty or dirty areas / parts should be cleaned as explained in the following:

Read and observe chapter 1.2 *Health and Safety* as well as the instructions in section 7.1 *General* before starting with the cleaning.

**Disconnect the mains cable from the POWER connector (see *figure 4-1*).**



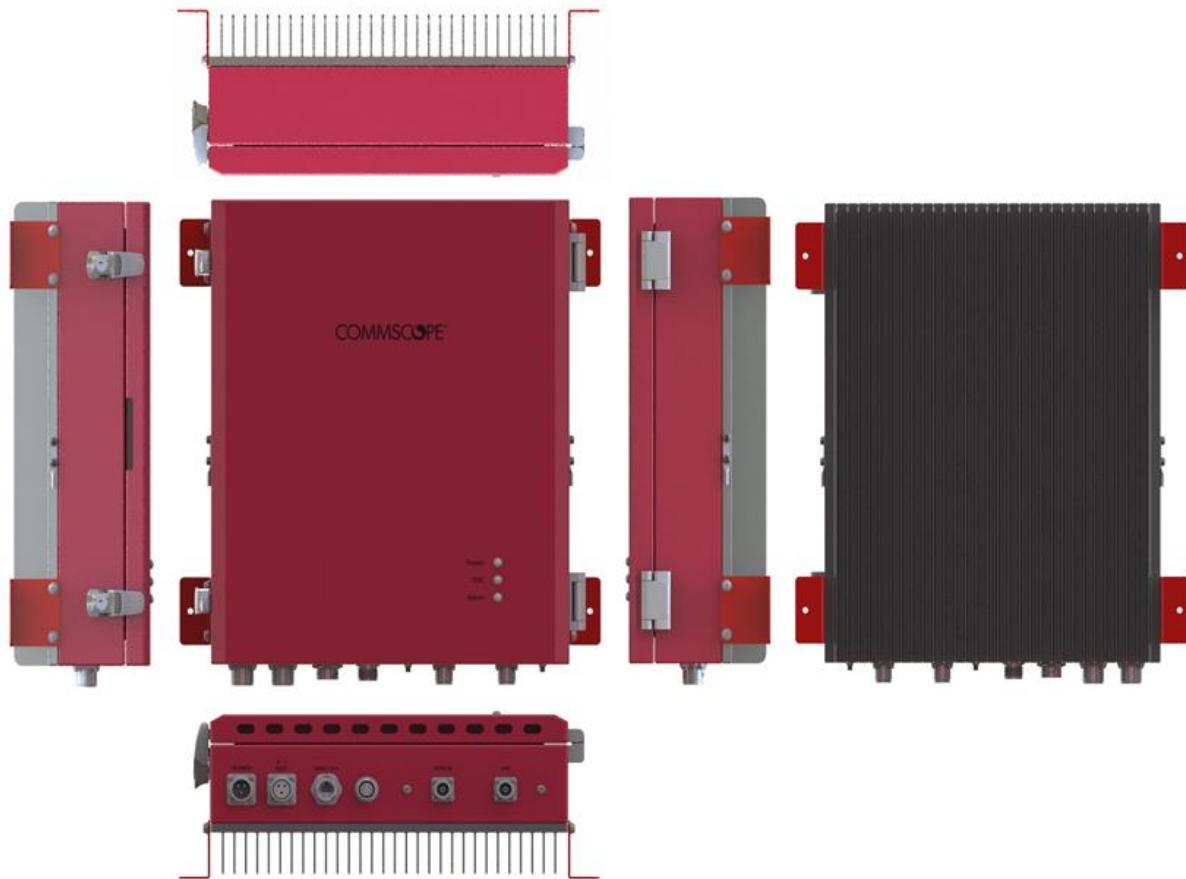
**Caution:** The unit reaches high temperature in operation. Risk of burns by hot surface. Do not touch the unit before it has sufficiently cooled down.

Use a soft brush to remove dust and dirt from the fins of the heat sink.

After cleaning reconnect power cable.

## 8. Appendix

### 8.1. Illustrations



*figure 8-1 External configuration*

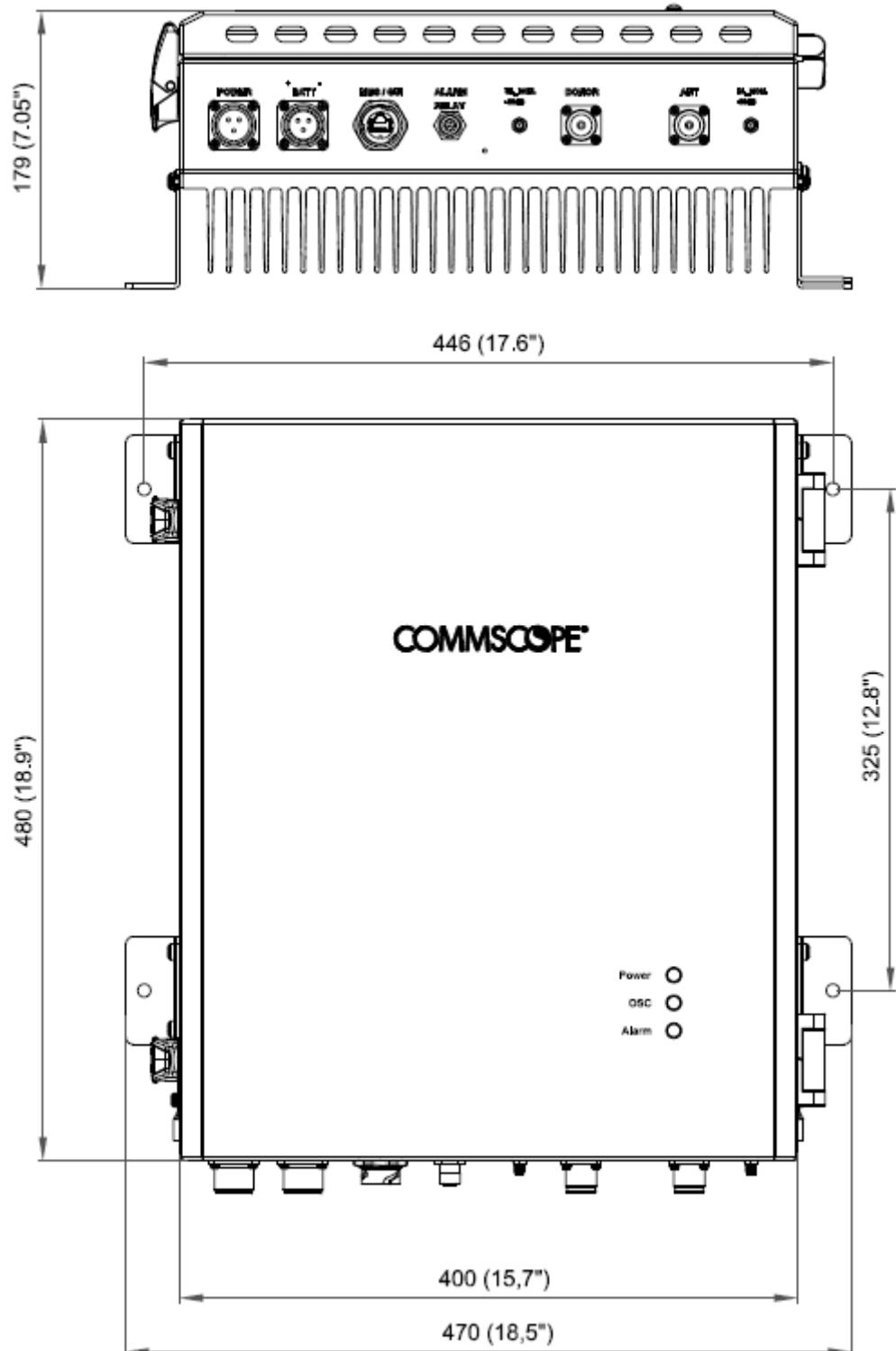


figure 8-2 Cabinet measurements

## 8.2. Specifications

### 8.2.1. RF Performance

700MHz Band	
Frequency range UL	788 to 805 MHz
Frequency range DL	758 to 775 MHz
Instantaneous bandwidth	17 MHz
RF technology	P25 + LTE (758 – 768 MHz)
Duplex	FDD
UL/DL output power max. per band for 2 W type	27/33 dBm / carrier @ 1 carrier 24/30 dBm / carrier @ 2 carriers 21/27 dBm / carrier @ 4 carriers 18/24 dBm / carrier @ 8 carriers
UL/DL output power max. per band for 0.5 W type	21/27 dBm / carrier @ 1 carrier 18/24 dBm / carrier @ 2 carriers 15/21 dBm / carrier @ 4 carriers 12/18 dBm / carrier @ 8 carriers

800MHz Band	
Frequency range UL	806 to 824 MHz
Frequency range DL	851 to 869 MHz
Instantaneous bandwidth	18 MHz
RF technology	P25
Duplex	FDD
UL/DL output power max. per band for 2 W type	27/33 dBm / carrier @ 1 carrier 24/30 dBm / carrier @ 2 carriers 21/27 dBm / carrier @ 4 carriers 18/24 dBm / carrier @ 8 carriers
UL/DL output power max. per band for 0.5 W type	21/27 dBm / carrier @ 1 carrier 18/24 dBm / carrier @ 2 carriers 15/21 dBm / carrier @ 4 carriers 12/18 dBm / carrier @ 8 carriers

### 8.2.2. Power Specifications

Parameter	Value
Power consumption Dual Band	Typ. 140 W, Max. 160 W
Power consumption Single Band	Typ. 100 W, Max. 120 W
AC Power supply	88 ~ 264 VAC / 60 Hz (50 Hz / 60 Hz)
DC Power supply	-62 ~ -33 VDC

All figures are typical values, unless otherwise stated.

**All data is subject to change without notice.**

### 8.2.3. Mechanical Specifications

Parameter	Specification	Remark
Size(mm)	400 x 480 x 170 mm	W x L x H
Weight	19 Kg	
Connectors	Antenna Port	4.3.10(female)
	Monitoring Port	SMA(female) -30dB Coupling
	AC Power Port	MS3102C16-10P
	DC Power Port	MS3102C16-10P
	Battery Back-up Port	MS3102R-16-10S
	Dry Contacts for alarming	M12 12Pin Female Circular Connector Panel Mount
	NMS/Local GUI	RJ-45 Ethernet (17-101754)
Mounting Type	Wall Mounting	
Heat Dissipation	Natural Convection	

\* Spacing required: 40 mm (1.58 in) around unit

**All data is subject to change without notice.**

### 8.2.4. Environmental and Safety Specifications

Environmental	
Air pressure	70 – 106 kPa
Altitude above sea level	1500 m for solar equipment
Sealing class	NEMA 4x / IP66
Wind velocity	50 m/s

<b>Salt mist</b>	EN 60 068
------------------	-----------

<b>Storage (ETS 300 019 –2 –1, class 1.2)</b>	
<b>Temperature</b>	- 25° to + 70° C
<b>Vibration (sinusoidal)</b>	5 – 62 Hz / 0.5 mm displacement 0.2 g @ 62 – 200 Hz, 3 x 5 sweeps
<b>Vibration (random)</b>	0.02 m <sup>2</sup> /s <sup>3</sup> 10 – 50 Hz +12 dB / Oct. 5 – 10 Hz -12 dB / Oct. 50 – 100 Hz 3 x 30 min
<b>Shock</b>	none
<b>Humidity</b>	+ 30° C / 93 % / 96 h
<b>Water</b>	none

All data is subject to change without notice.

## 8.3. Available Configurations and SW Feature Keys

### Feature Keys:

Feature Key ID	Feature Description	Remarks
7835720	2W, Dual Band	
7835721	2W, Single Band	800 MHz only
7835687	0.5W, Dual Band	
7835689	0.5W, Single Band	800 MHz only
785359	Lock Device	

The Feature Key ID does not distinguish between Class A, B and DC, AC type. A detailed list of available configurations is provided in the following.

### Class A:

7831758-0001	PSR 700 OR 800 MHZ 2W CLASS A AC
7831758-0011	PSR 700 AND 800 MHZ 2W CLASS A AC
7831758-0012	PSR 700 OR 800 MHZ 0.5W CLASS A AC
7831758-0013	PSR 700 AND 800 MHZ 0.5W CLASS A AC
7831758-0014	PSR 700/800 MHZ 0.5/2W LOCKED CLASS A AC
7831758-0002	PSR 700 OR 800 MHZ 2W CLASS A DC
7831758-0021	PSR 700 AND 800 MHZ 2W CLASS A DC
7831758-0022	PSR 700 OR 800 MHZ 0.5W CLASS A DC
7831758-0023	PSR 700 AND 800 MHZ 0.5W CLASS A DC
7831758-0024	PSR 700/800 MHZ 0.5/2W LOCKED CLASS A DC

### Class B:

7831851-0001	PSR 700 OR 800 MHZ 2W CLASS B AC
7831851-0011	PSR 700 AND 800 MHZ 2W CLASS B AC
7831851-0012	PSR 700 OR 800 MHZ 0.5 CLASS B AC
7831851-0013	PSR 700 AND 800 MHZ 0.5W CLASS B AC
7831851-0014	PSR 700/800 MHZ 0.5/2W LOCKED CLASS B AC
7831851-0002	PSR 700 OR 800 MHZ 2W CLASS B DC
7831851-0021	PSR 700 and 800 MHz 2W Class B DC
7831851-0022	PSR 700 or 800 MHz 0.5W Class B DC
7831851-0023	PSR 700 AND 800 MHZ 0.5W CLASS B DC
7831851-0024	PSR 700/800 MHZ 0.5/2W LOCKED CLASS B DC

Spare parts are not available for this repeater.

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## 10. List of Changes

<b>Version</b>	<b>Changes</b>	<b>Release Date</b>
MF0123A1A	- first release	02-August-2019 Not yet released

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