

Everon™ 6000 G2 v1.0

User Manual

CORNING

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Communications

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Everon™ 6000 G2 v1.0

User Manual

Warranties

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agents or representatives are not authorized to make commitments on warranty returns.

Returns

above warranty, the following procedure shall be followed:

1. Return authorization is to be received from Corning prior to returning any unit. Advise Corning of the model, serial number, and discrepancy. The unit may then be forwarded to Corning, transportation prepaid. Devices returned collect or without authorization may not be accepted.
2. Prior to repair, Corning will advise the customer of our test results and any charges for repairing customer-caused problems or out-of-warranty conditions etc.
3. Repaired products are warranted for the balance of the original warranty period, or at least 90 days from date of shipment.

Limitations of Liabilities

Corning's liability on any claim, of any kind, including

negligence for any loss or damage arising from, connected with, or resulting from the purchase order, contract, quotation, or from the performance or breach thereof, or from the design, manufacture, sale, delivery, installation, inspection, operation or use of any device covered by or furnished under this contract, shall in no case exceed the purchase price of the device which gives rise to the claim.

Except as expressly provided herein, Corning makes no warranty, expressed or implied, with respect to any goods, parts and services provided in connection with this agreement including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Corning shall not be liable for any other damage including, but not limited to, indirect, special or consequential damages arising out of or in connection with furnishing of goods, parts and service hereunder, or the performance, use of, or inability to use the goods, parts and service.

Reporting Defects

The units were inspected before shipment and found to be free of mechanical and electrical defects. Examine the units for any damage that may have been caused in transit. If damage is discovered, file a claim with the freight carrier immediately. Notify Corning as soon as possible in writing.

Note: Keep all packing material until you have completed the inspection.

Warnings and Admonishments

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.

The device has been designed and constructed to prevent, as far as reasonably, practicable danger. Any work activity on or near device 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.

Device provided for the purpose of protecting individuals from electrical risk must be suitable for the purpose and properly maintained and used. This covers a range of activities including lifting, lowering, pushing, pulling, carrying, moving, holding or restraining an object, animal or person from the equipment. It also covers activities that require the use of force or effort, such as pulling a lever, or operating power tools.

Where some of the abovementioned activities are required, the device must be handled with care to avoid being damaged.

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.



WARNINGS!

According to the device type:

- **For DLRU-678, dHRU-dHPAM-7, dHRU-dHPAM-85:**
- **WARNING: THIS IS A 90.219 CLASS B DEVICE.** 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 License to operate this device. You MUST register Part 90 Class B signal booster (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of

\$100,000 for each continuing violation.

- **For DLRU-G2-17192325, DLRU-G2-25, DLRU-G2-35, dHRU-dHPAM-6, dHRU-dHPAM-17, dHRU-dHPAM-19, dHRU-dHPAM-23, dHRU-dHPAM-25, DMRU-G2-678, DMRU-G2-1719, DMRU-G2-2325, DMRU-G2-25, DMRU-35:**
- **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 License to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.

For all devices:

Warning info: Preclude indications that the device supports home/personal use

Caution: for use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP restrictions is not permitted.

Antenna type and permitted max antenna gain: External Dedicated Antenna with gain 5 dBi or less.

For **dMRU** and dHRU:

- For pluggable equipment, the electrical outlet shall be easily accessible.
- The product shall have connection of the device protective earthing conductor to the installation protective earthing conductor (for example, by means of a power cord connected to an electrical outlet with earthing connection).

RF Safety

To comply with FCC RF exposure compliance requirement, adhere to the following warnings:

Warning! Antennas used for this product must be fixed mounted on indoor permanent structures, providing a separation distance of at least 120 and above cm from all persons during normal operation.

Warning! Each individual antenna used for this transmitter must be installed to provide a minimum separation distance of 50 cm or more from all persons and must not be co-located with any other antenna for meeting RF exposure requirements.

Warning! Antenna gain should not exceed 5 dBi.

Warning! The design of the antenna installation needs to be implemented in such a way so as to ensure RF radiation safety levels and non-environmental pollution during operation.

Compliance with RF Safety Requirements:

CAUTION! Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Power Requirements for DC Inputs

Warning! Only use a special DC supply cable with connector

Warning! Always keep DC IN connectors connected during the product operation

Warning! Disconnect all power from the device by means of an external circuit breaker before connecting or disconnecting the DC IN connectors.

RF Parameters

| Frequency Range Name | Uplink | Downlink |
|----------------------------|---------------------|---------------|
| 600-band 71 | 663-698 MHz | 617-652 MHz |
| 700L (Lower Band)- band 12 | 698-716 MHz | 728-746 MHz |
| 700U (Upper Band)-band 13 | 776-787 MHz | 746-757 MHz |
| FirstNet (700)-band 14 | 788-798 MHz | 758-768 MHz |
| 800/850 -band 26 | 817-849 MHz | 862-894 MHz |
| 1900 (PCS)-band 25 | 1850-1915 MHz | 1930-2020 MHz |
| EAWS-band 66 | 1695-1780 MHz | 2110-2200 MHz |
| WCS-band 30 | 2305-2315 MHz | 2350-2360 MHz |
| 2500-band 41 | 2496-2690 MHz (TDD) | |
| 3500-band 77 | 3450-3980 MHz (TDD) | |

Revision History

| Revision | Date | Created by | Reviewed by | Changes |
|----------|----------|------------|-------------|-------------|
| 0.1 | Sep 2022 | | | First issue |
| | | | | |

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1. Introduction

Corning Everon™ 6000 G2 is an advanced cellular service solution for small, medium, and large size venues, supporting a broad range of cellular generations, including 3G, 4G and 5G.

Corning Everon™ 6000 G2 is based on venues, advanced digital transport and processing, and channelized implementation, enabling efficient utilization of digital links. It is designed to support multi-band, multi-technology, and multi-operator networks through the single fiber-based infrastructure.

Corning Everon™ 6000 G2 is a high bandwidth distribution architecture that provides preparedness for future radio technologies, broader spectrum, and new frequency bands. Due to its modular design and configuration flexibility, this solution is highly scalable in terms of supported capacity (number of sectors, frequency bands, channels) and remote units (coverage), and can be easily configured to support a large variety of deployment scenarios including single and multi-building (“campus”) network topologies.

This solution offers multiple types of digital remote units, supporting a variety of frequency band combinations, with different power levels ranging from 20 dBm per band to 46 dBm per band. Advanced network configuration and management capabilities enable on-site and remote end-to-end configuration, system diagnostics, maintenance, and support network operations center (NOC) connectivity.

1.1 Key Features and Capabilities




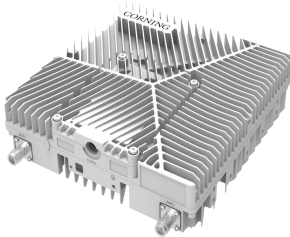

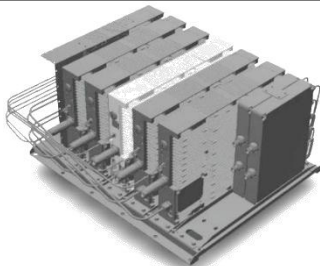
- **Comprehensive service Support** - 600 MHz, 700 MHz, FirstNet, 800/850 MHz, 1900 MHz (PCS), 2100 MHz (EAWS), 2300 MHz (WCS), 2500 MHz (TDD), 3500 MHz (TDD). Supports MIMO services, FDD and TDD. Supports 3G, 4G, and 5G technologies.
- **Multi-X system** - Supports multi-operator, multi-band, multi-technology services through a single infrastructure. Supports single and multi-building (“campus”) network solutions.
- **Highly modular/ Highly scalable** - Can be easily expanded to support additional capacity: sectors, frequency bands, channels, and coverage areas, by increasing the number of remotes.
- **Advanced Digital Signal Processing** - Provides higher dynamic range, enables per-channel granularity, delivers enhanced overall power efficiency, and improves overall system performance.
- **Digital CPRI based Transport** - Provides robust signal distribution with flexible scalability.
- **Digital Service and capacity routing** - Enables advanced capacity and coverage management through flexible routing configuration management.
- **Carrier-grade network management** - Network configuration and management capabilities enable on-site and remote end-to-end configuration, system diagnostics, maintenance, support management and control by network management system.

1.2 Terminology, Acronyms, and Abbreviations

Table 1 Abbreviations

| Abbreviation | Full Name |
|--------------|--|
| RIU | Radio Interface Unit |
| DCU | Digital Conversion Unit |
| DEU | Distributed Extension Unit |
| DLRU | Digital low Power Remote Unit |
| DMRU | Digital Medium power Remote Unit |
| DHRU | Digital High-power Remote Unit |
| NOC | Network Operation Center |
| SMV | Small Medium Venues |
| CPRI | Common Public Radio Interface |
| DSP | Digital Signal Processing |
| EARFCN | E-UTRA Absolute Radio Frequency Channel Number |
| EPC | Evolved Packet Core |
| EUTRA | Evolved Universal Terrestrial Radio Access |
| EUTRAN | Evolved Universal Terrestrial Radio Access Network |
| FPGA - | Field Programmable Gate Array |
| GE / GigE | Gigabit Ethernet |
| GPS | Global Positioning System |
| LTE | Long Term Evolution |
| MNO | Mobile Network Operator |
| PLMN | Public Land Mobile Network |
| RF | Radio Frequency |
| SNMP | Simple Network Management Protocol |
| TCP | Transmission Control Protocol |
| UDP | User Datagram Protocol |
| UE | User Equipment |
| UL | Uplink |
| UTRAN | Universal Terrestrial Radio Access Network |
| UDP | User Datagram Protocol |

Table 2 Images

| Abbreviation | Image |
|--------------|--|
| RIU |  |
| DCU |  |
| DEU |  |
| DLRU |  |
| DMRU |  |
| DHRU |  |

1.3 Everon™ 6000 G2 Architecture Overview

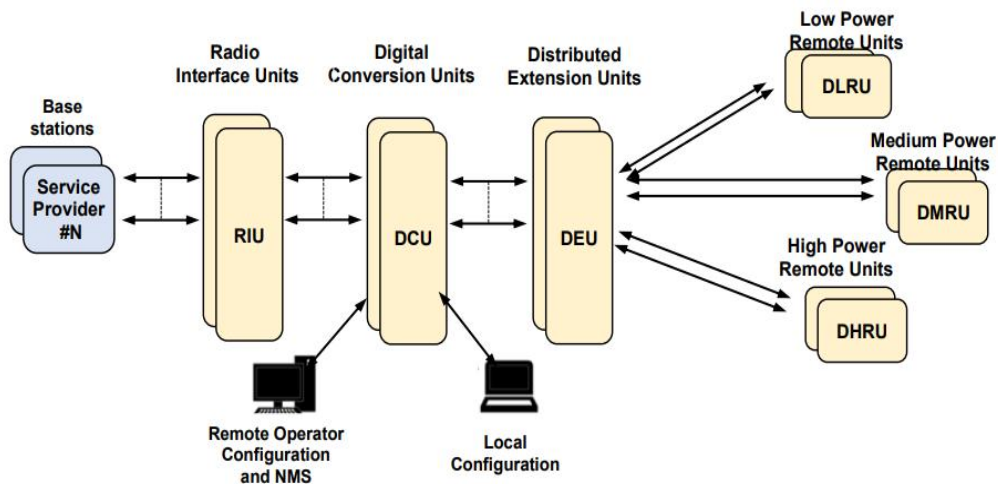


Figure 1 Architecture diagram

Corning Everon™ 6000 G2 features a fully advanced digital system, which incorporates the RIU (Radio Interface Unit), DCU (Digital Conversion Unit), DEU (Distributed Extension Unit) and multi-type of remotes. All the devices in the system are managed via a web session to the DCU, which provides local and remote management capabilities for all connected system devices using both web GUI (HTTPs) and SNMP interfaces.

1.4 Internal Sub-units

1.4.1 RIU



Figure 2. RIU image

Radio Interface Units (RIU) are modular design used for radio-radio interface between the base stations and the Everon™ 6000 G2. The RIU interfaces up to 8 RF duplexed ports to the base station, and up to 8 simplex ports to the Digital Conversion Unit (DCU) with the following functions:

- Signal combination: the RIU combines different base station signals into one wideband signal, the combination matrix of which is software-controllable, listed as figure 3 to figure 5.
- Downlink/Uplink attenuation: With an embedded fixed attenuator with 30dB in downlink and 40dB in uplink, the RIU bears up to 37dBm average input power (with PARP no more than 10dB).
- Gain control: In addition to the fixed attenuator, the RIU includes an internal digital attenuator controlling the gain between the input and output in the range of 0-25dB.
- Device management: Remote control and monitor of RIU is available on the DCU via the 2xRJ45 connections. In the case of multiple RIU applications, the management can be achieved with a cascading topology, shown in figure 6.

Figure 7 and figure 8 shows the RIU interfaces. Table 3 lists the interfaces description.

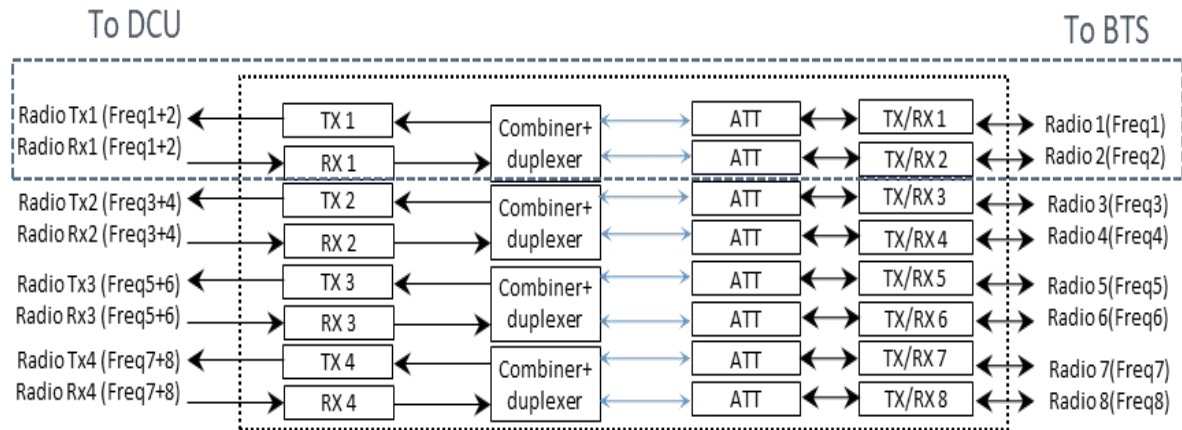
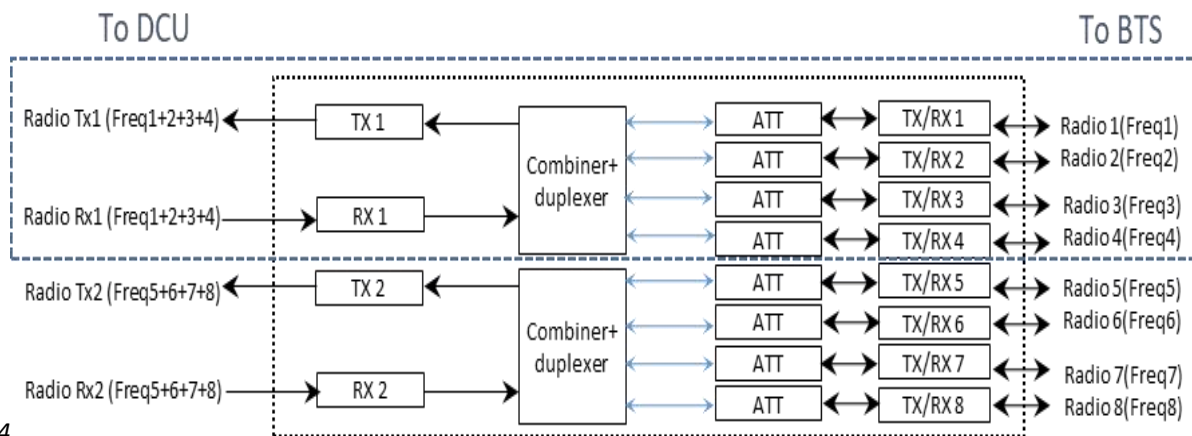


Figure 3. 2 TO 1 matrix



4

Figure 4. 4 TO 1 matrix

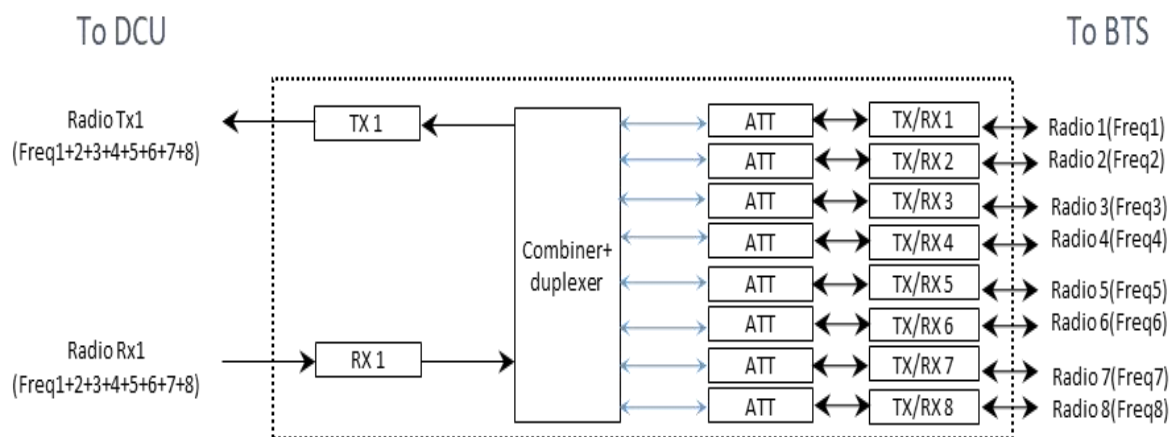


Figure 5. 8 TO 1 matrix

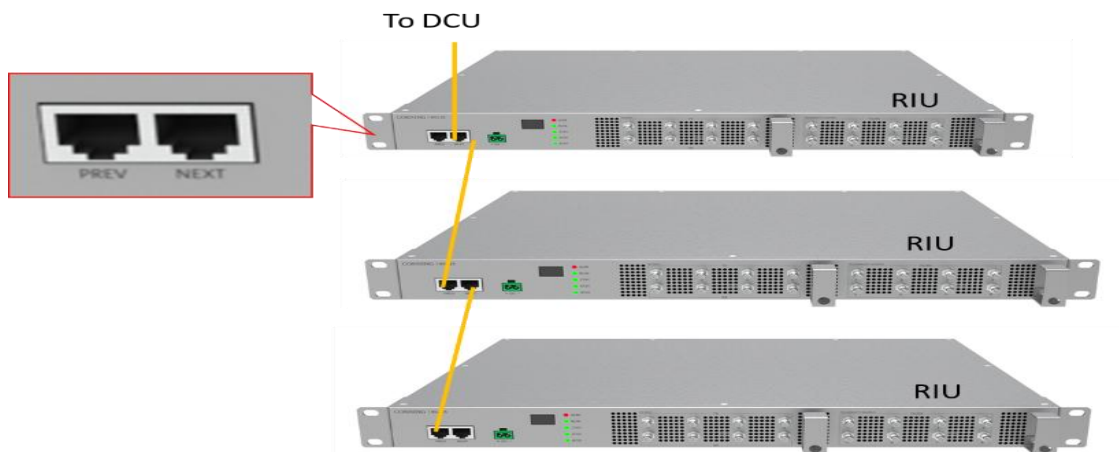


Figure 6. RIU monitoring diagram

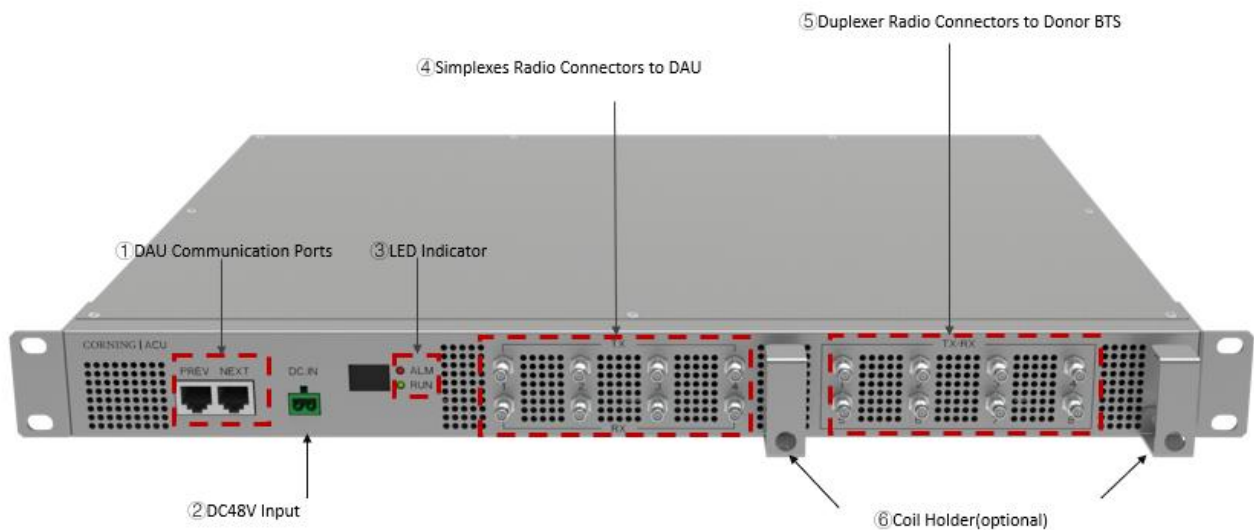


Figure 7. RIU Interface(front view)



Figure 8. RIU Interface (back view)

Table 3. RIU Interfaces

| SN | Interface | Interface Type | Silk Screen | Description |
|----|---------------------------------|---|------------------|---|
| 1 | DCU communication port | RJ45 x 2 | PREV NEXT | PREV: Upper cascade port to DCU or upper level RIU NEXT: Lower cascade port to other RIU |
| 2 | DC input | Phoenix connector x 1 | DC_IN | 48V DC |
| 3 | LED indicator | LED x 2 | ALM RUN | Please check the "RIU LED Definition" (table 4) for the color definition |
| 4 | Radio connectors to DCU | QMA x 8 | TX 1~4 RX 1~4 | Simplex QMA interface to DCU |
| 5 | Radio connector to donor signal | 4.3-10 x 8(FDD RIU) QMA x 8(TDD RIU) | TX/RX 1~8 | Duplex QMA interface to BTS, small cells or other donor signals |
| 6 | Coil holder | Coil holder x 2 | | The holder for the cable roasting |
| 7 | GND | Two holes M4 x 2 | GND | Connect to the ground |

Table 4. RIU LED Definitions

| LED | Description | Color | State |
|---------------|---|-------|------------------|
| ALM | Alarm | Red | Solid |
| | Device detection (Identified and controlled by the DCU) | Red | Flash (1Hz, 10s) |
| | No alarm | OFF | Off |
| RUN | The system is up and running | Green | Flash(1Hz) |
| | Software or hardware failure | OFF | Off |
| 2TO1 | Working mode: 2 TO 1 | Green | Solid |
| | Other working modes | OFF | Off |
| 4TO1 | Working mode: 4 TO 1 | Green | Solid |
| | Other working modes | OFF | Off |
| 8TO1 | Working mode: 8 TO 1 | Green | Solid |
| | Other working modes | OFF | Off |
| LED displayer | Cascade level, displayed as "1" or "2" 1 - First cascade level 2 - Secondary cascade level A maximum of 16 devices can be cascaded | - | - |

1.4.2 DCU



Figure 9. DCU

Digital Conversion Units (DCU) is the Everon™ 6000 G2 central controller. The DCU interfaces between the RIU and DEU, implementing signal processing and routing to the Distributed Extension Unit (DEU), major functionalities of which include:

- RF signal processing and routing: The DCU transfers the RIU radio signal to digital signal in CPRI format. One DCU supports up to 8 RIUs of different bands with 2x2 MIMO, and configures all the radio signal features including frequency, attenuation, operation mode (TDD/FDD).
- Optical port router controlling: The DCU controls the digital signals of different DEUs at different CPRI line rates of 10Gbps or 25Gbps.
- TDD synchronization: The DCU introduces a TDD baseband signal processing module, demodulates TDD-LTE or NR RF signals and recovers the TDD switch time in the remote units. For a fast detection and commissioning, parameters in table 5 and table 6 are needed.
- Center management of the complete system: the DCU is the main management entity of the entire system. All the device and operation information are centrally collected by the DCU, and the DCU interfaces to operators' management system through the SNMP interface.
- Flexible networking for different deployment strategies: The DCU supports daisy chain and/or star connections* as shown in figure 10 and figure 11, where distributed deployments can be enabled, e.g., remote slave site deployment.

Figure 12 and figure 13 shows the DCU interfaces. Table 9 lists the interfaces description.

**Note: please check the software release note for the DCU daisy chain/star connection limitations and supported version.*

Table 5. Uplink-Downlink configurations

| Uplink-downlink configuration | Downlink-to-Uplink Switch-point periodicity | Subframe number | | | | | | | | | |
|-------------------------------|---|-----------------|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 5 ms | D | S | U | U | U | D | S | U | U | U |
| 1 | 5 ms | D | S | U | U | D | D | S | U | U | D |
| 2 | 5 ms | D | S | U | D | D | D | S | U | D | D |
| 3 | 10 ms | D | S | U | U | U | D | D | D | D | D |
| 4 | 10 ms | D | S | U | U | D | D | D | D | D | D |
| 5 | 10 ms | D | S | U | D | D | D | D | D | D | D |
| 6 | 5 ms | D | S | U | U | U | D | S | U | U | D |

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Table 6. Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

| Special subframe configuration | Normal cyclic prefix in downlink | | | Extended cyclic prefix in downlink | | |
|--------------------------------|----------------------------------|--------------------------------|----------------------------------|------------------------------------|--------------------------------|----------------------------------|
| | DwPTS | UpPTS | | DwPTS | UpPTS | |
| | / | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink | / | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink |
| 0 | $6592 \cdot T_s$ | $2192 \cdot T_s$ | $2560 \cdot T_s$ | $7680 \cdot T_s$ | $2192 \cdot T_s$ | $2560 \cdot T_s$ |
| 1 | $19760 \cdot T_s$ | | | $20480 \cdot T_s$ | | |
| 2 | $21952 \cdot T_s$ | | | $23040 \cdot T_s$ | | |
| 3 | $24144 \cdot T_s$ | | | $25600 \cdot T_s$ | | |
| 4 | $26336 \cdot T_s$ | | | $7680 \cdot T_s$ | $4384 \cdot T_s$ | $5120 \cdot T_s$ |
| 5 | $6592 \cdot T_s$ | $4384 \cdot T_s$ | $5120 \cdot T_s$ | $20480 \cdot T_s$ | | |
| 6 | $19760 \cdot T_s$ | | | $23040 \cdot T_s$ | | |
| 7 | $21952 \cdot T_s$ | | | - | - | - |
| 8 | $24144 \cdot T_s$ | | | - | - | - |

| Special subframe configuration | Normal cyclic prefix in downlink | | |
|--------------------------------|----------------------------------|----|-------|
| | DwPTS | GP | UpPTS |
| 0 | 3 | 10 | 1 |
| 1 | 9 | 4 | 1 |
| 2 | 10 | 3 | 1 |
| 3 | 11 | 2 | 1 |
| 4 | 12 | 1 | 1 |
| 5 | 3 | 9 | 2 |
| 6 | 9 | 3 | 2 |
| 7 | 10 | 2 | 2 |
| 8 | 11 | 1 | 2 |

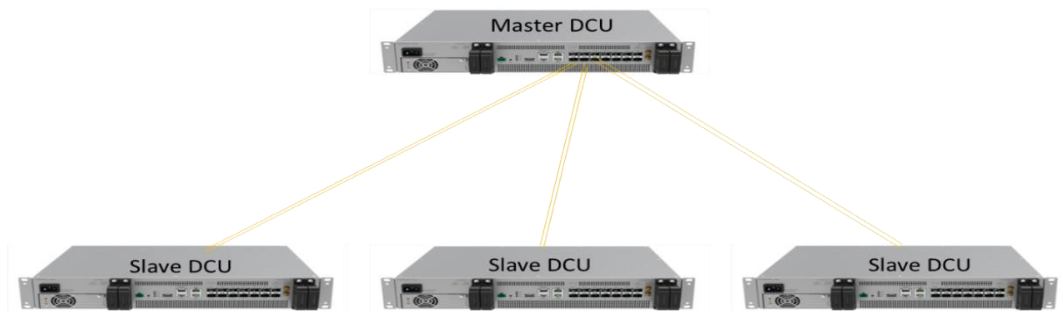


Figure 10. DCU Star Connection



Figure 11. DCU Daisy Connection

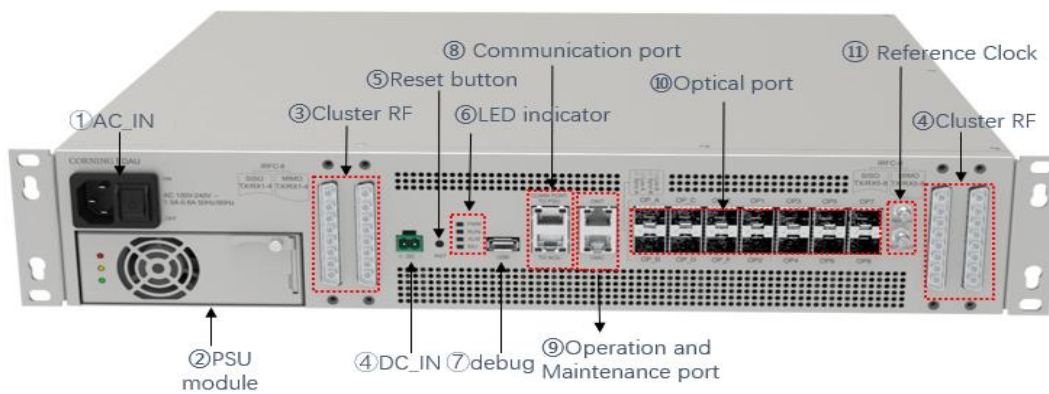


Figure 12. DCU Interface (front view)



Figure 13. DCU interface (back view)

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Table 7. DCU Interface Introduction

| SN | Interface | Interface Type | Silk Screen | Description |
|----|--------------------------------|--------------------------|---|---|
| 1 | AC_IN | US Type socket | AC IN 100V~240V, 3A, 50/60Hz | AC input connector with switch, 100~240V |
| 2 | PSU Module | PSU module x 1 | | PSU module with replaceable design |
| 3 | Cluster RF connector | Cluster RF connector x 4 | IRFC1~4 SISO TX/RX 1~4 SISO TX/RX 5~8 MIMO TX/RX 1~4 MIMO TX/RX 5~8 | IRFC: Integrated Radio Frequency Cluster There are totally 4 pcs of cluster and each one has 8 radio ports. The operation frequency range of each radio port is listed in table 10 |
| 4 | DC_IN | Phoenix connector | DC_IN | 48V DC input |
| 5 | Reset button | Button x 1 | RST | Reset button for the system setup to factory config |
| 6 | LED indicator | LED x 4 | PWR/ALM/RUN/PRI | Please check the 'Appendix B' for LED definition |
| 7 | Debug | USB | USB | For internal debug purpose |
| 8 | Communication port | RJ4 5 x 2 | COMM Port/RIU/PSU | Communication port for RIU and PSU |
| 9 | Operation and Maintenance port | RJ45 x 2 | OMT OMC | 1 for local monitor and config (OMT), 1 for remote monitor (OMC) |
| 10 | Optical port | SFP x 14 | OP_A~OP_F (LOS A~F / SYNC A~F) OP1~OP8 (LOS 1~8 / SYNC 1~8) | 24.3 Gbps CPRI interface, connects to DEU (port 1~8) or cascade DCU (port A~F) Please check the 'Appendix B' for Optical LED definition |
| 11 | Reference clock | QMA x 2 | REF_IN REF_OUT | 10MHz reference signal, input and output clock |
| 12 | GND | Two holes M4 x 2 | GND | Connect to the ground |

Table 8. Radio Spec of Cluster RF port

| DCU Input Port | Cluster RF Port number | IBW | Frequency Range |
|---------------------|------------------------|--------|-----------------------|
| SISO/MIMO TX/RX 1~2 | 4 | 300MHz | 1710~4000MHz, TDD/FDD |
| SISO/MIMO TX/RX 3~4 | 4 | 300MHz | 1710~4000MHz, TDD/FDD |
| SISO/MIMO TX/RX 5~6 | 4 | 200MHz | 600~2700MHz, TDD/FDD |
| SISO/MIMO TX/RX 7~8 | 4 | 200MHz | 600~2700MHz, TDD/FDD |

1.4.3 DEU



Figure 14 DEU diagram

Distributed Extension Units (DEU) is the central Hub and Distribution element. The DEU interfaces between the DCU modules and the remote unit, enabling to receive the operators service signals in CPRI format, and to route these signals to the remote units. The DEU supports all Corning digital remote antenna units' styles, for all services, power levels and antenna configurations. Each DEU includes 4 F/O CPRI ports connected to the DCUs or cascaded DEUs, and 24 F/O CPRI ports for connection to the remote units. When additional remote antenna units are needed, the system can be scaled up easily by adding additional system modules, major functionalities of which include:

- Channelization function: The DEU is the channel controller of Everon™ 6000 G2 system. Tables 5(TDD 2.5GHz + TDD 3.5GHz) and Table 6(Full FDD + TDD 2.5GHz) list the possible channel capacities of the DEU.
- CPRI signal router and transfer: The DEU transfers the dedicated carrier signal to dedicated remote units*. DEU supports 10Gbps or 25Gbps line rate and various kinds of remote units. The line rates and remote units supported are listed in table 11.
- Flexible network architecture: One DCU supports up to 16 DEUs* by star and/or daisy chain connections, which meets flexible site deployment requirement. The DEU connection topology is shown in figure 15.
- The DEU manages all connected remote radios which can be monitored and controlled by the user via SNMP trap.

Figure 16 and figure 17 shows the DEU interfaces. Table 12 lists the interfaces description.

*Note: please check the software release note for the DEU signal router features and its supporting range of remote units

**Note: please check the software release note for the DEU cascade features and limitation on each software version*

Table 9. Carrier Config Option 1. Full FDD band + TDD 2.5GHz band

| Band | Maximum Carrier Number (2T2R) | | | | Maximum Total Carrier Number | Maximum Total BW |
|--------------------------|-------------------------------|-------------|--------------|------------|------------------------------|------------------|
| | 10/20MHz | 30/40/50MHz | 60/80/100MHz | 150/200MHz | | |
| 2.5GHz | 3 | 2 | 2 | 0 | 5 | 190MHz |
| 3.5G-A (3450~3700MHz) | 8 | 3 | 3 | 1 | 8 | 250MHz |
| 3.5G-B (3700~3980MHz) | 8 | 3 | 3 | 1 | 8 | 280MHz |

Table 10. Carrier Config Option 2. Full FDD band + TDD 2.5GHz band

| Type | Band | Maximum Carrier Number (2T2R) | | | Maximum Total Carrier Number | Maximum Total BW |
|-----------------------------|-----------|-------------------------------|----------|-----------------|------------------------------|------------------|
| | | 5/10MHz | 15/20MHz | 40/60/80/100MHz | | |
| DMRU –678 DLRU-678 | 600M | 3 | 1 | 0 | 12 | 35MHz |
| | 700L+700U | 4 | 1 | 0 | | 40MHz |
| | 850M | 3 | 1 | 0 | | 32MHz |
| DMRU –1921 DLRU-19212325 | PCS | 4 | 4 | 0 | 14 (Each sub-band ≤8) | 90MHz |
| | EAWS | 4 | 4 | 0 | | 90MHz |
| DMRU-2325 DLRU-19212325 | WCS | 1 | 0 | 0 | 6 | 10MHz |
| | 2500M | 0 | 3 | 2 | | 190MHz |

Table 11. DEU Line Rate Application

| DEU Line Rate | Remote Unit Type |
|---------------|--|
| 10Gbps | DLRU-G2-678/DLRU-G2-17192125/DHRU-G2-600/DHRU-G2-700/DHRU-G2-800/DHRU-G2-1900/DHRU-G2-2100/DHRU-G2-2300 |
| 25Gbps | DLRU-G2-25/DLRU-G2-35/DMRU-G2-678/DMRU-G2-1719/ DMRU-G2-2325/DMRU-G2-25/DMRU-G2-35/DHRU-G2-25/DHRU-G2-35 |

1. DEU supports flexible network architecture of 4 level daisy chain connections as shown in figure 15.

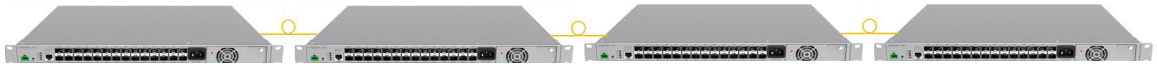


Figure 15. DEU Daisy chain connection

**Note: Please check the software release note for the DEU cascading features and limitation of each software version.*

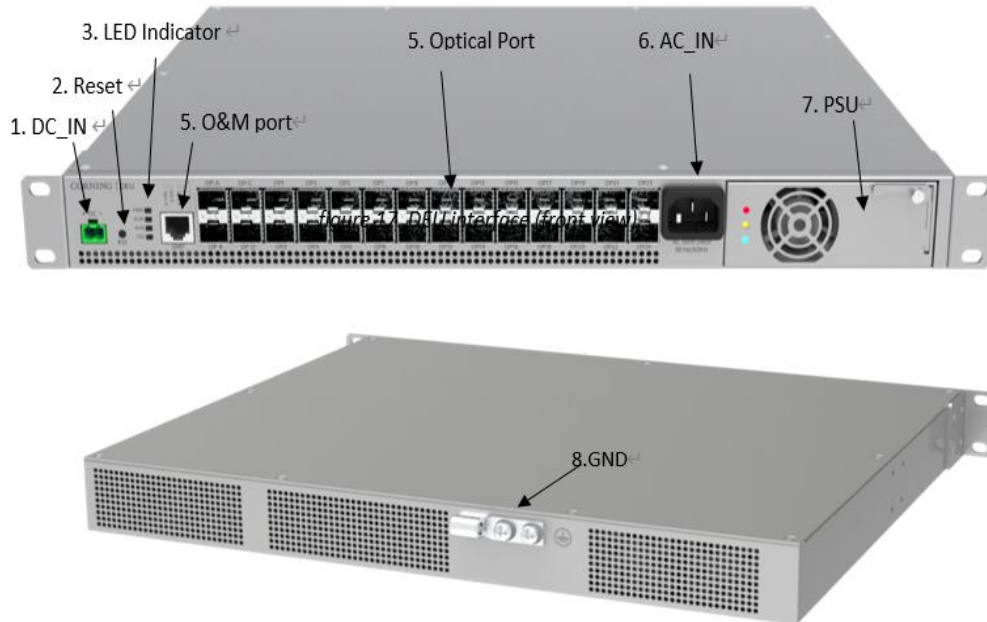


Figure 17. DEU interface (back view)

Table 12. DEU interface introduction

| NO. | Interface | Interface Type | Silk Screen | Description |
|-----|--------------------------------|-----------------------------|-----------------------------------|---|
| 1 | DC_IN | Phoenix connector | DC_IN | 48V DC input |
| 2 | Reset Button | Button x 1 | RST | Reset button for the system reset to factory config |
| 3 | LED Indicator | LED x 4 | PWR RUN ALM 25G | ALM/RUN/PWR: Indicates the DEU working mode and alarm status 25G: Indicates the DEU is running in 24.3Gbps line rate |
| 4 | Operation and Maintenance port | RJ45 x 1 | OMT | Ethernet connection for a local setup session |
| 5 | Optical Port | SFP x 28 | OP_A~OP_D OP1~OP24 | 24 ports (1~24) for RU connection, 10.1Gbps/24.3 Gbps CPRI interface, 2 ports(A~B) for upper unit connection, 2 ports(C~D) for lower unit cascade, 24.3 Gbps CPRI interface, |
| 6 | AC_IN | US Type socket + Switch x 1 | AC IN 100V~240V, 3A,50/60Hz | AC input connector, Max current 3A, 100~240V |
| 7 | PSU Module | PSU module x 1 | POWER MODULE | PSU module with easy assembly installation design |
| 8 | GND | Two holes M4 x 2 | GND | Connect to the ground |

1.4.4 Remote Units

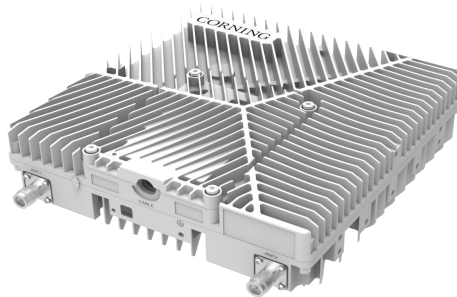


Figure 18. DLRU image



Figure 19. DLRU image

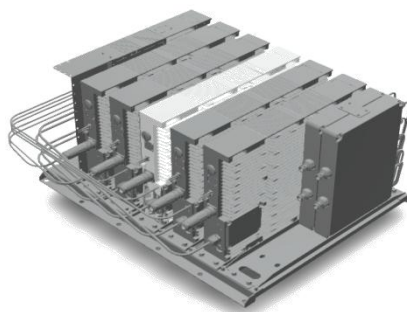


Figure 20. DLRU image

Remote Unit (RU) is the radio coverage unit located at the end of the DAS system. The Remote unit interfaces between DEU and the UE (User Equipment), enabling to receive the operator service signals in CPRI format, transfer to RF signal and send to UE. Corning digital remote antenna units includes three power level types: DLRU/DMRU/DHRU. The power levels vary from 20dBm to 43dBm to meet different coverage scenarios. The major functionalities include:

- Digital and analog signal transfer: the RU transfer digital and analog signal between DEU and antenna port. The DU supports up to 530 IBW signal in C-band with its powerful transceiver
- Multi-band signal process: The RU supports multiple band signal of the single unit. One DLRU supports up to 4 bands, one DMRU supports up to 2 bands and one DHRU supports single band.
- Channel control function: The RU config all emission channels including power level, ON/OFF status and working mode (UL/DL/TDD).
- Control and management function: The RU can be remotely upgraded and monitored. All RU's parameters including the alarm, device status and emission power are all transferred to DEU via CPRI lines in optical ports.

Table 13 shows RU band, CPRI line rate and optical port number.

The DLRU interfaces and the description are shown in figure 21 and table 14.

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Table 13. RU Band, CPRI, Optical port list

| RU Type | RU | Operation band | CPRI Line Rate | Optical Fiber Number |
|---------|------------------|--|----------------|----------------------|
| DLRU | DLRU-G2-678 | 600 700L 700U FirstNet 800/850MHz | 10Gbps | 1 |
| | DLRU-G2-19212325 | 1900(PCS) 2100(EAWS) 2300(WCS) 2500 TDD | 10Gbps | 2 |
| | DLRU-G2-25 | 2500 TDD | 25Gbps | 1 |
| | DLRU-G2-35 | 3500 TDD | 25Gbps | 2 |
| DMRU | DMRU-G2-678 | 600 700L 700U FirstNet 800/850MHz | 25Gbps | 1 |
| | DMRU-G2-1921 | 1900(PCS) 2100(EAWS) | 25Gbps | 1 |
| | DMRU-G2-2325 | 2300(WCS) 2500 TDD | 25Gbps | 1 |
| | DMRU-G2-25 | 2500 TDD | 25Gbps | 1 |
| | DMRU-G2-35 | 3500 TDD | 25Gbps | 2 |
| DHRU | DHRU-G2-06 | 600 | 10Gbps | 1 |
| | DHRU-G2-07 | 700L/700U/FirstNet | 10Gbps | 1 |
| | DHRU-G2-08 | 800/850MHz | 10Gbps | 1 |
| | DHRU-G2-19 | 1900(PCS) | 10Gbps | 1 |
| | DHRU-G2-21 | 2100(EAWS) | 10Gbps | 1 |
| | DHRU-G2-23 | 2300(WCS) | 10Gbps | 1 |
| | DHRU-G2-25 | 2500 TDD | 10Gbps | 1 |

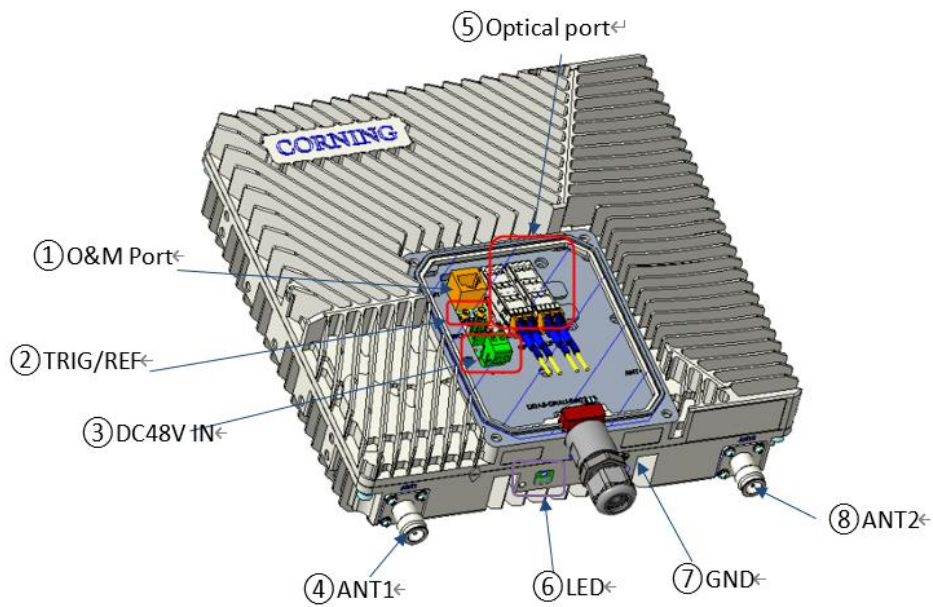


Figure 21. DLRU interface image

Table 14. DLRU interface introduction

| NO. | Item | Interface Type | Silk Screen | Description |
|-----|--------------------------------|------------------|-------------|--|
| 1 | Operation and Maintenance port | RJ45 | OMT | Ethernet connection for the local setup |
| 2 | TRIG/REF | MCX interface | TRIG/REF | Synchronous trigger signal, used for device test |
| 3 | DC48V IN | Power input port | DC48V IN | Power input port, voltage input range 38V~58V, PWR1 and PWR2 will be combined inside the device before supplying power to the device |
| 4/8 | ANT | 4.3-10 interface | ANT1 | RF input and output, used for external antenna connection |
| | | | ANT2 | |
| 5 | Optical Port | SFP optical port | OP1/OP2 | 24.3/9.8 Gbps CPRI interface for DEU connection |
| 6 | Status | LED indicator | STAT | Indicating the operation status of the equipment |
| 7 | GND | GND interface | | Used for grounding the chassis and the earth, single hole |



Figure 22. DMRU Interfaces

Table 15. DMRU Interface Introduction

| NO. | Item | Interface Type | Silk Screen | Description |
|-----|--------------------------------|------------------|-------------|---|
| 1 | ANT | 4.3-10 interface | ANT1 | RF input and output, used for external antenna connection |
| | | | ANT2 | |
| 2 | Couple port | SMA | Couple 2 | RF couple port, used for signal test and debug |
| 3 | Optical port | SFP optical port | OP1/OP2 | 24.3 Gbps CPRI interface for DEU connection |
| 4 | Operation and Maintenance port | RJ45 | OMT | Ethernet connection for the local setup |
| 5 | LED | LED indicator | STAT | The operation status of the equipment |
| 6 | AC IN | Power input port | AC IN | Power input port, voltage input range 100V~240V, 3A |

1.4.5 System topology and gain assignment

The system topology contains the following network elements:

- One master DCU- All the configs and alarms of RIUs, DCUs, DEUs and remote units are transferred to it, and also interfaces the SNMP server of DAS system.
- Slave DCU - one master DCU connects to 3 slave DCUs
- RIUs – each DCU can connect up to 16 RIUs
- DEU –one master DCU connects up to 4 DEUs, and each DEU connects to 4 DEU in cascade, so that one master DCU supports 16 DEUs
- Remote units – each DEU connects to 12 or 24 remote units, depending on the types and line rates of the remote unit. For more detail, please refer to Table 11.

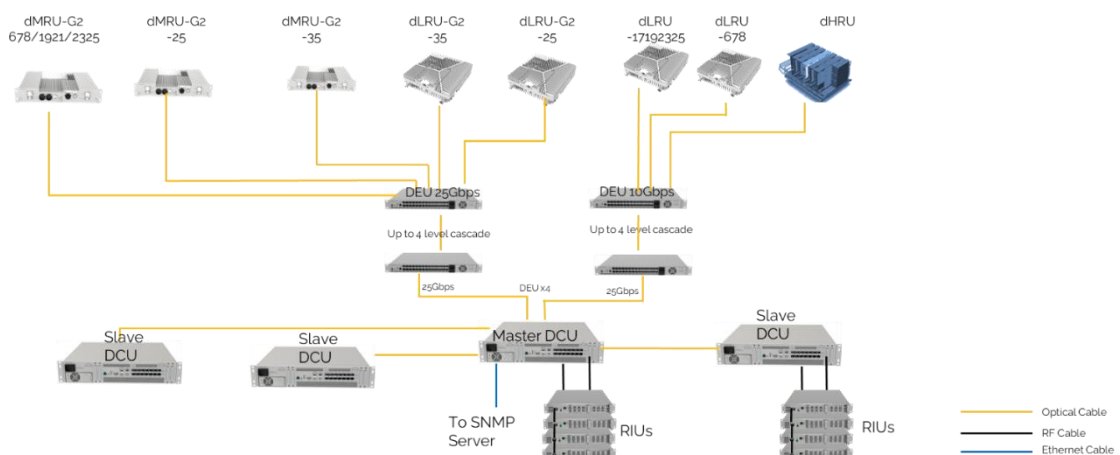


Figure 23. System topology

Two switches for gain control are available in the system— RIU high gain mode switch and DCU high gain mode switch. The suggestions for the switches are listed in the following table.

- The RIU high gain mode will add 30dB insert loss while switching to OFF status
- The DCU high gain mode will add 12dB insert loss while switching to OFF status

Table 16. Gain setting guide

| Base station power | RIU high gain mode switch | DCU high gain mode switch | RIU input power | DCU input power | DCU output power | DLRU output power |
|--------------------|--|---------------------------|---|---|------------------------------------|-------------------|
| | 30dB IL while OFF; -7dB IL while ON | 12dB gain while OFF | RIU ATT range (0~20dB) | DCU ATT range (0~20dB) | -7dBFS mapping to max output power | |
| 37dBm | OFF -30dB | OFF 0 | 37dBm (RIU ATT set to 14, total IL=44dB) | -7dBm (DCU ATT set to 0) | -7dBFS | 24dBm |
| 23~37dBm | OFF -30dB | OFF 0 | 23~37dBm (RIU ATT set to 0~14, total IL=30~44dB) | -7dBm (DCU ATT set to 0) | -7dBFS | 24dBm |
| 0~23dBm | ON -7dB | OFF 0 | 0~23dBm (RIU ATT set to 0~20, IL=7~27dB) | -7~-4dBm (DCU ATT set to 0~3 dB) | -7dBFS | 24dBm |
| -10~0dBm | ON -7dB | ON +12dB | -10~0dBm (RIU ATT set to 0~12, IL=7~19dB) | -17~-19dBm (DCU ATT set to 0~2dB, gain=10~12 dB) | -7dBFS | 24dBm |

2. System Installation

This chapter provides installation instructions for the system units. Refer to the specific elements required in your deployment:

- Head End (HEU, HIU), see 2.1
- DRU, see 2.5.
- Remote Units Installation:
- LRU, see 2.5
- MRU, see 2.6.

*Note: Refer to chapter 6 for dimensions and specifications.

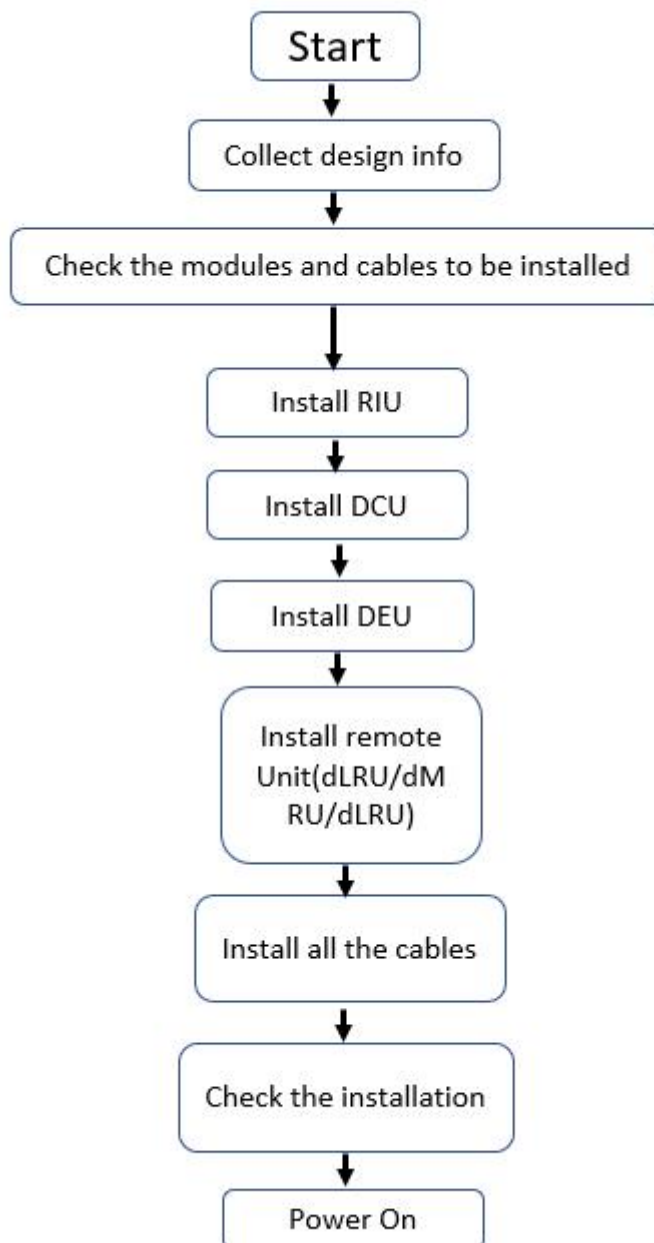


Figure 24 The installation process

2.1 Head End Units – Architecture Example

Example: 2X2 MIMO, 1 Operator

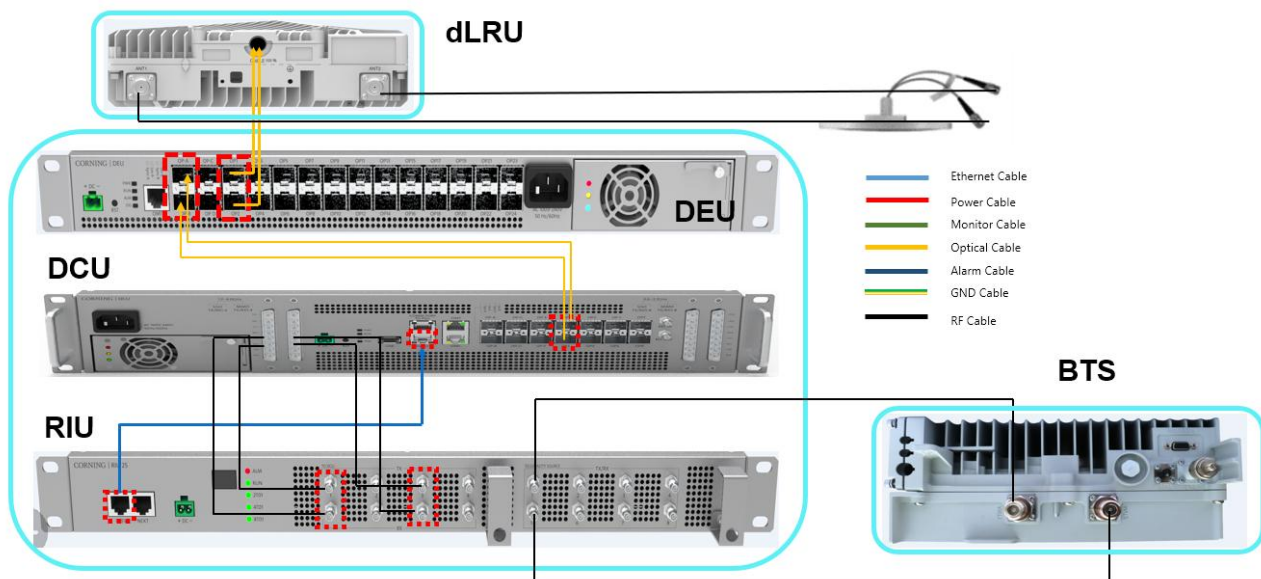


Figure 25 dLRU architecture image

2.2 RIU Installation

➤ Example of system connection

See 2.1 example: 2x2 MIMO

Contact the site designer for cable connection topology of the system.

➤ To install the RIU, follow these steps:

1. Verify the box contents, see 2.2.1
2. Mount the RIU, see 2.2.2
3. Connection RIU cable, see 2.2.3






2.2.1 Verify Box Contents

Open the package and verify that all items in the table below are available.

**Notes:*

- Refer to APPENDIX B: Ordering information for details.
- See the example of package unpacking under the table.

Table 1: RIU Package Items List

| Item | Quantity | Image | Part Number |
|--|----------|--|--|
| HARDWARE – provided in the box | | | |
| RIU unit | 1 |  | |
| Ethernet Communication Cable | 1 |  | Connected to the DCU or RIU of next slave device |
| DC Power Adapter | 1 |  | |
| HARDWARE – not provided | | | |
| 4 screws #8 or 4mm (For attachment to rack) | 4 |  | |
| SOFTWARE | | | |
| NA | | | |
| Required TOOLS | | | |
| Cross Screwdriver | |  | |

2.2.2 Mount the RIU

Place the RIU horizontally in the 19-inch rack, align the four holes on the lugs on both sides of the equipment with the nuts, install the M6 screws and fasten them.

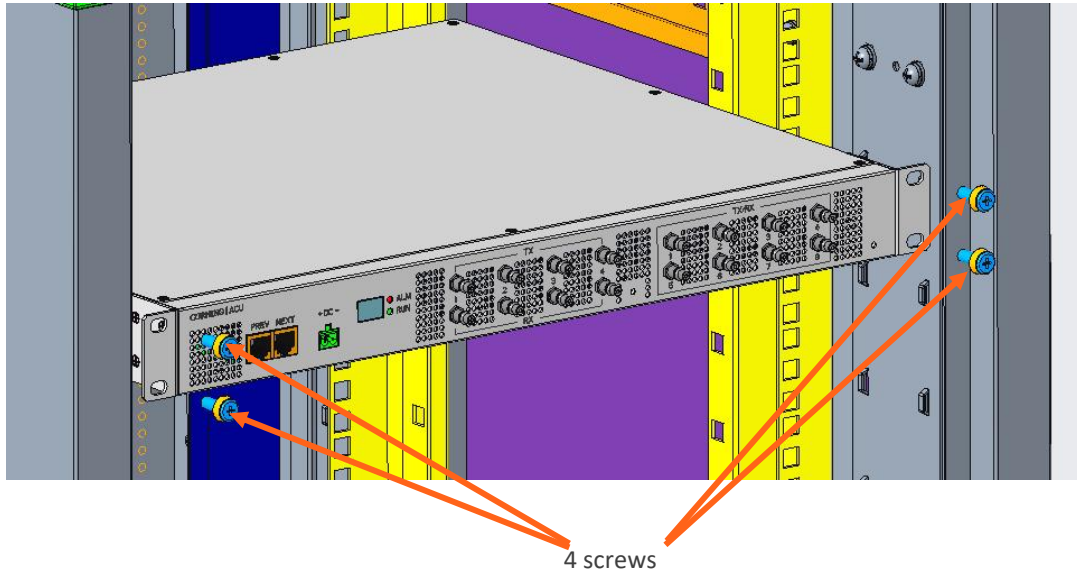


Figure 26. RIU rack Installation

- 1) Connect the RF cables on the chassis with M3 screws, and sort out the RF cables.

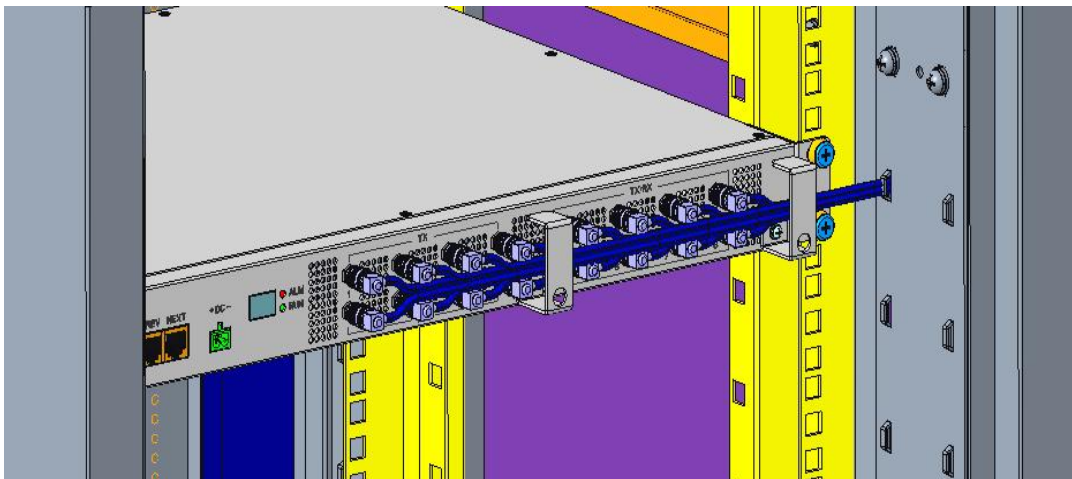


Figure 27 RIU rack Installation with cables

2.2.3 RIU Cable Connection

Connect the external cable as the following diagram shows.

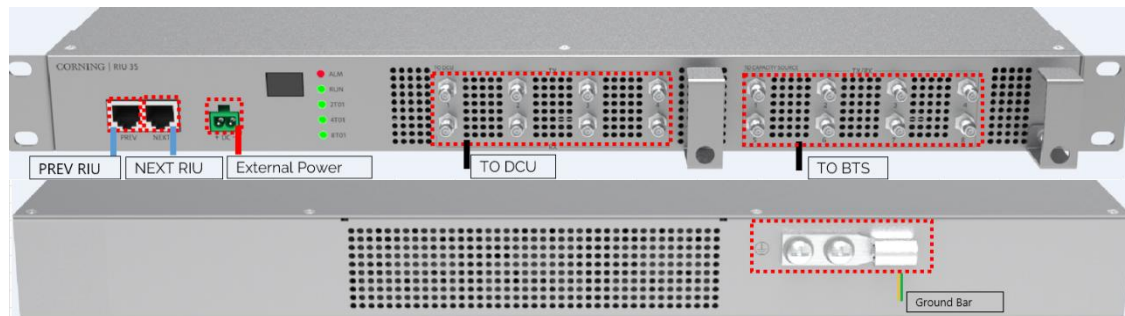


Figure 28 RIU cable connection

| Cable list for RIU | | | | |
|------------------------------|-------------------------------|---|-------------------------------|--|
| Cable | One End | | The Other End | |
| | Connector | Connected to... | Connector | Connected to... |
| GND cable | OT terminal (M4) | Ground screw on the RIU | OT terminal (M4) | Ground terminal on the external ground bar |
| DC power cable (indoor) | Phoenix connector | DC power input socket on the RIU | 2-pin plug | External power input socket |
| RF cable | QMA connector | Simplex radio connectors | Cluster RF connector | DCU |
| | QMA connector | Duplexer radio connectors | Required for BTS | BTS |
| Ethernet communication cable | Communication port (RJ45 x 2) | PREV: Upper cascading port to DCU or upper level RIU NEXT: Lower cascade port to other RIU | Communication port (RJ45 x 2) | RIU/DCU |

2.3 DCU Installation

➤ Example of system connection

See 2.1 for the installation example (2x2 MIMO).

➤ Follow these steps to install the DCU:








1. Verify the box contents, see 2.3.1
2. Mount the DCU, see 2.3.2
3. Connect the DCU cable, see 2.3.3

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2.3.1 Verify Box Contents

Open the package and verify that all the items in the table below are available:

Table: DCU Package Items List

| Item | Quantity | Image | Part Number |
|---|----------|---|-------------|
| HARDWARE – provided in the box | | | |
| DCU unit | 1 |  | |
| Ethernet Communication Cable | 1 |  | |
| DC Power Adapter | 1 |  | |
| HARDWARE – not provided | | | |
| 4 Screws #8 or 4mm (For ceiling mounting) | 4 |  | |
| SFP+ Pluggable transceivers (Hot-pluggable optical transceiver module) Support 24.3 Gbps line rate, single mode | 1 |  | |
| Optical cables Up to 10km LC/UPC SM DX | 1~14 |  | |
| SOFTWARE | | | |
| NA | | | |
| Required Tools | | | |
| Cross Screwdriver | 1 |  | |

2.3.2 Mount the DCU

Step 1: Take the DCU out of the package.



Figure 29 DCU image

Step 2: Put the DCU horizontally into the rack, tighten the M6 screws as shown below, and the installation is completed.

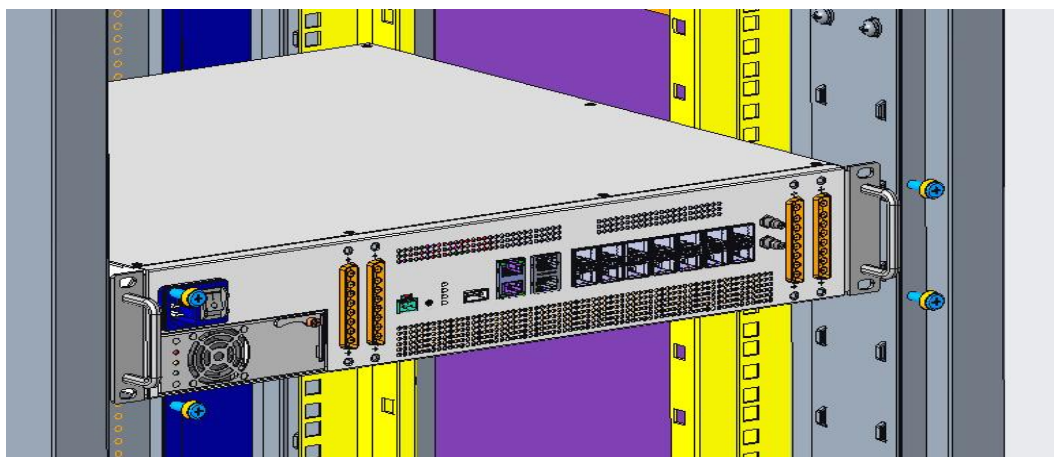


Figure 30 Installation diagram of DCU in the Rack

Step 3: Plug in the RF cable plug (RF cable not shown in the below), as shown in Figure 31.



Figure 31 DCU RF cable plug installation

Corning Restricted - Controlled content (R2)

2.3.3 DCU Cable Connection

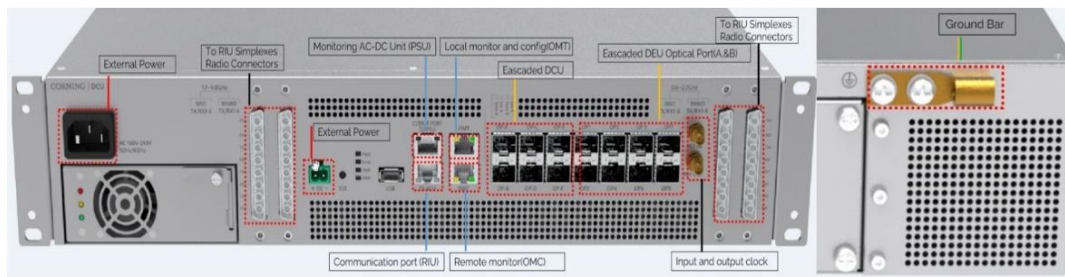


Figure 32 DCU cable connection

| Cable List of Dual DCU | | | | |
|-------------------------|-----------------------------|----------------------------------|---------------------------|---|
| Cable | One End | | The Other End | |
| | Connector | Connected to... | Connector | Connected to... |
| GND cable | OT terminal (M4) | Ground screw on the RIU | OT terminal (M4) | Ground terminal on the external grounding bar |
| DC power cable (indoor) | Phoenix connector | DC power input socket on the RIU | 2-pin plug | External power input socket |
| AC power cable (indoor) | US Type socket + Switch x 1 | AC IN | Depending on power device | External power device |
| | | 100V~240V, 1.3A-0.6A, 50/60Hz | (100V-240V, 50Hz/60Hz) | (100V-240V, 50Hz/60Hz) |
| RF Cable | Cluster RF connector | IRFC1~8 | QMA Connector | RIU |
| | | SISO TX/RX 1~4 | | |
| | | SISO TX/RX 5~8 | | |
| | | MIMO TX/RX 1~4 | | |
| | | MIMO TX/RX 5~8 | | |

2.4 DEU Installation

➤ Example of system connection

See 2.1 for the installation example (2x2 MIMO).

➤ To install the HEU, follow these steps:







- Verify the box contents, see 2.4.1
- Mount the DEU, see 2.4.2
- Connect the DEU cable, see 2.4.3

Corning Restricted - Controlled content (R2)

2.4.1 Verify Box Contents

1. Open the package and verify that all items the table below are available:

Table 1: DEU Package Items List

| Item | Quantity | Image | Part Number |
|---|----------|--|-------------|
| HARDWARE – provided in the box | | | |
| DEU unit | 1 |  | |
| DC Power Adapter | |  | |
| HARDWARE – not provided | | | |
| 4 Screws #8 or 4mm (For ceiling mounting) | 4 |  | |
| SFP+ Pluggable transceivers (Hot-pluggable optical transceiver module) Support for 24.3 Gbps line rate, single mode | 1 |  | |
| Optical cables Up to 10k meters LC/UPC SM DX | |  | |
| SOFTWARE | | | |
| NA | | | |
| TOOLS Required | | | |
| Cross Screwdriver | |  | |

2.4.2 Mount the DEU

1. Take the DEU out of the package.



Figure 32. Rack Installation -Step1

2. Mount the DEU in the rack with 4 pcs of M6 screws.



Figure 33. Rack Installation- Step 2

3. Install the DEU in the rack.



Figure 34 Rack Installation Step- 3

2.4.3 DEU Cable Connection

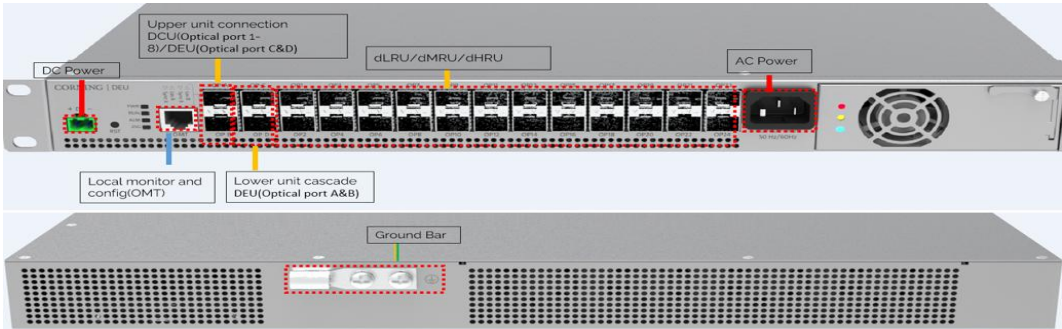


Figure 35 DEU cable connection


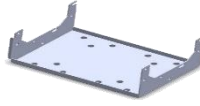






| Cable List of Dual DEU | | | | |
|-------------------------|-----------------------------|------------------------------|---------------------------|-------------------------------------|
| Cable | One End | | The Other End | |
| | Connector | Connected to... | Connector | Connected to... |
| GND cable | OT terminal (M4) | Ground screw on the RIU | OT terminal (M4) | Ground terminal on the external bar |
| AC power cable (indoor) | US Type socket + Switch x 1 | AC IN | Depending on power device | AC Power device |
| | | 100V~240V, 1.3A-0.6A,50/60Hz | (100V-240V,50Hz/60Hz) | (100V-240V,50Hz/60Hz) |
| Fiber Cable | Optical port | Optical module | Optical port | dLRU/dMRU/dHRU or DEU |
| | | | | DCU or DEU |

2.5 dLRU Installation

2.5.1 Verify box Contents

1. Open the package and verify that all items in the following table are available:

Table 17: dLRU Package Items List

| NO. | Description | Model | Image | Quantity |
|-----|----------------------|---|--|----------|
| 1 | dLRU-2.5/3.5 Unit | dLRU unit |  | 1 |
| 2 | | Wall mounting bracket (may also be used for pole) |  | 1 |
| 3 | | Left side brackets for dual-unit configuration |  | 1 |
| 4 | | Right side brackets for dual-unit configuration |  | 1 |
| 5 | | Hinge |  | 1 |
| 6 | | Combiner – for dual unit configuration |  | 1 |
| 7 | | RF jumper cables |  | 1 |
| 8 | | DC power adapter |  | 1 |

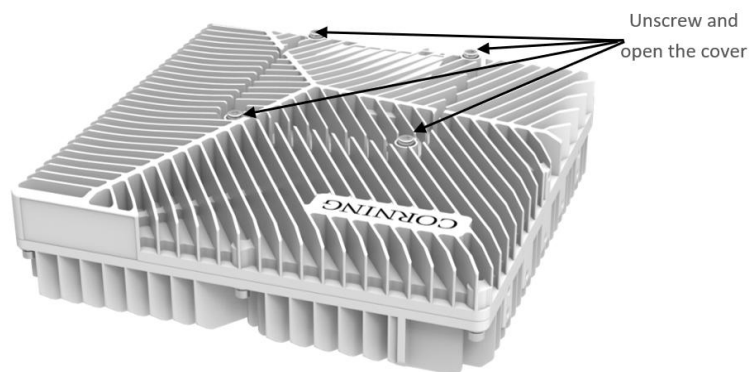
2.5.2 Mount the dLRU

The LRU may be mounted on a wall or on a pole: single or dual.

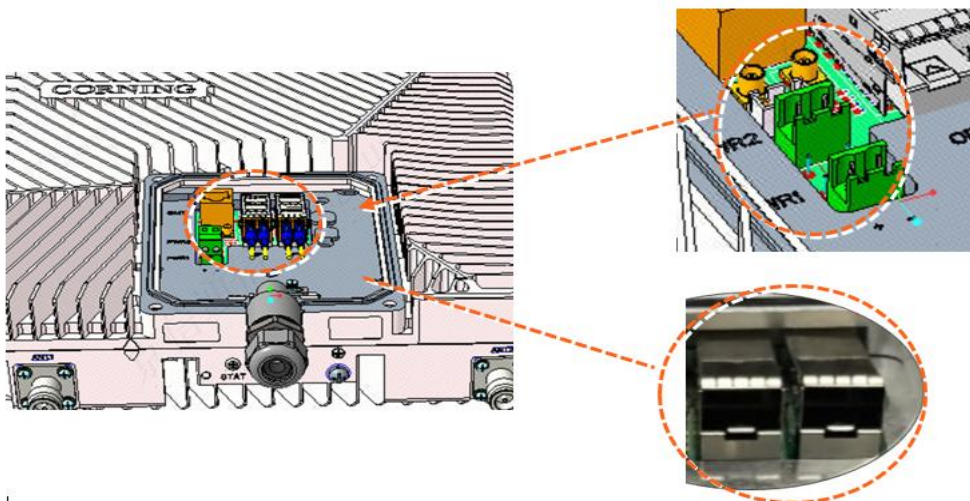
Select the configuration related to your deployment.

**Note: For dual unit installations, the internal cable must be connected before connected between the units.*

1. Open the cover by unscrewing 4 screws



2. Connect the DC wire pair (48V) to any one of the two power connectors, via the DC power adapter (terminal block connector)
3. Remove the rubber stopper from the SFP+ connector located in the dLRU cable port. Connect the SFP+ LC/UPC SM DX optic cable to the dLRU optic connector.



Power Socket /optical ports in dLRU

2.5.2.1 Wall Installation

- For a single unit

- 1) Connect the bracket to the wall with 4 screws, as shown in the figure below:

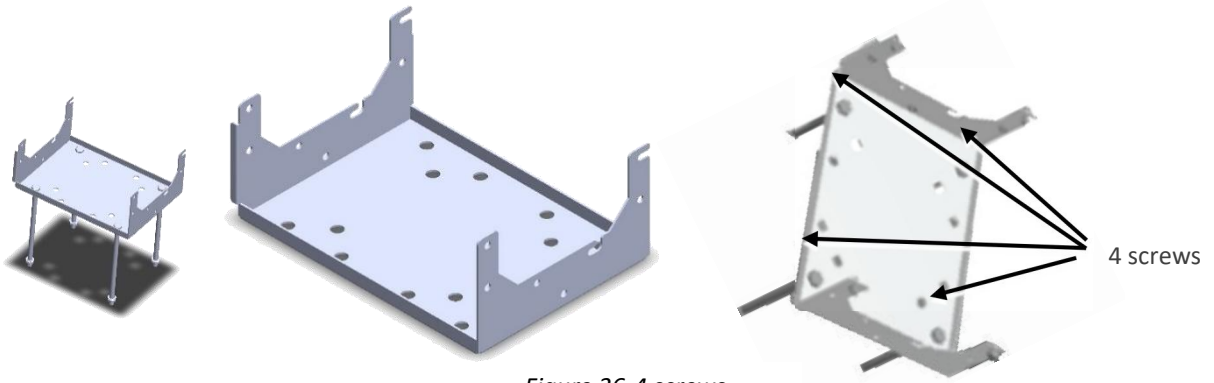


Figure 36-4 screws

- 2) mount the LRU on the bracket with 4 screws.

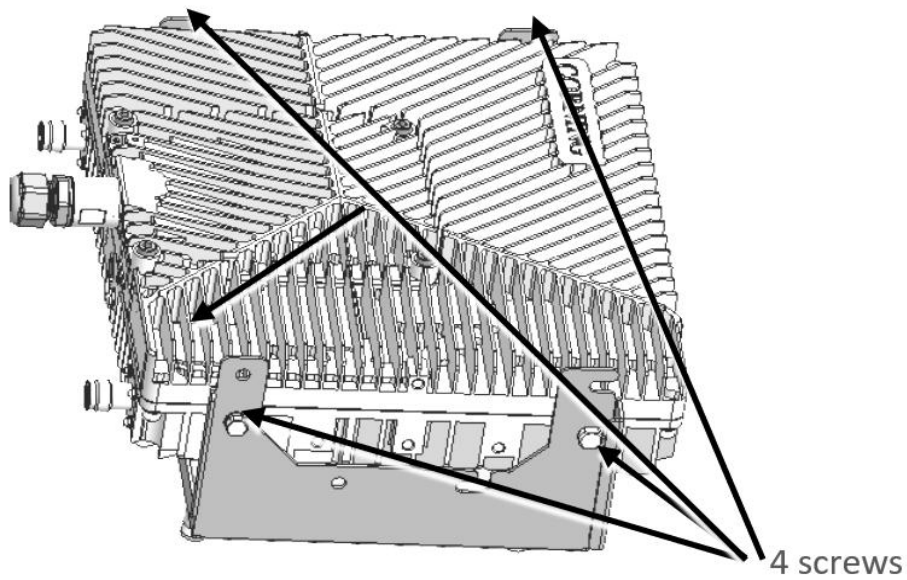


Figure 37-4 screws

- **For a dual unit:**

- 1) Connect the combiner to the mounting bracket with 4 screws.

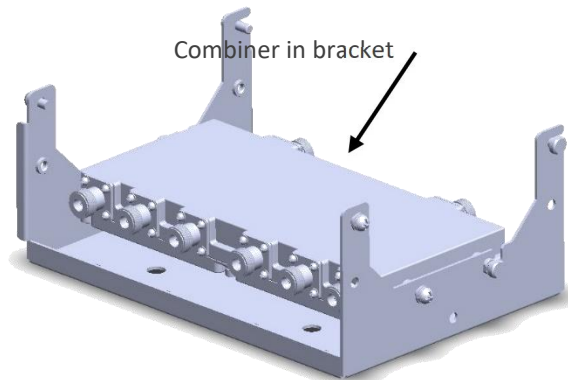


Figure 38 Combiner in the bracket

- 2) Connect between the low band and mid-band units with the side bracket:

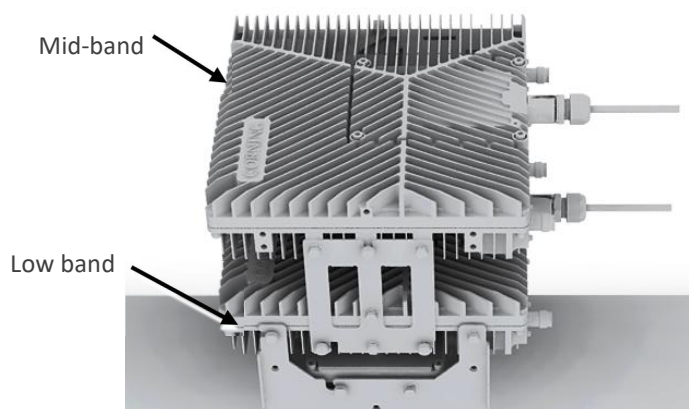


Figure 39 Combiner in the bracket

**Note: Ensure that the low band device is connected at the bottom, and the mid-band at the top.*

Connect between the two devices and the bracket (already carrying the combiner) with 4 screws.

2.5.2.2 Ceiling Installation

- **Single unit ceiling installation**

**Note: The ceiling needs to be cement board or hard wood board which enables to bear the weight of 18 pounds.*

The installation is shown in Figure 41:

- 1) Drill holes on the ceiling at a distance of 200mm*160mm according to the size of the mounting holes of bracket, then drive the expansion bolts into the holes, install the mounting bracket, pad gaskets, and lock the nuts.
- 2) Tighten the M6 bracket screws on the left and right sides of the upper part of the dLRU, and then hang the device on the mounting bracket.
- 3) Lock the device on the mounting frame with M6 combination screws, as shown below

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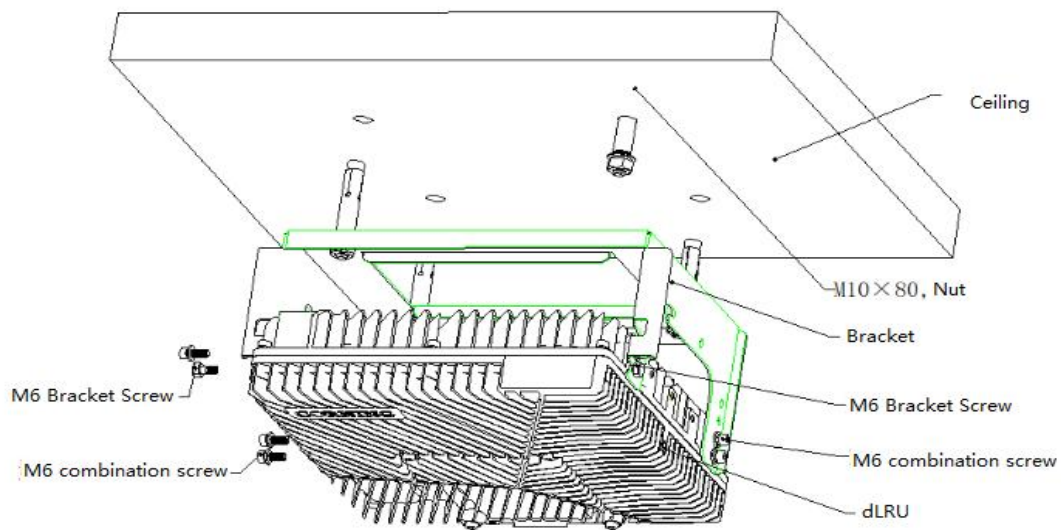


Figure 41 Single unit ceiling installation

- **Dual unit combined ceiling installation**

If the application scenario requires the use of low frequency and intermediate frequency devices, it is suggested to use the cascading installation.

**Note: The ceiling needs to be cement board or hard wood board which enables to bear the weight of 45 pounds.*

The installation steps are as follows:

- 1) Assembly of right bracket and hinge

The installation of the right bracket and hinge is shown in Figure 42.

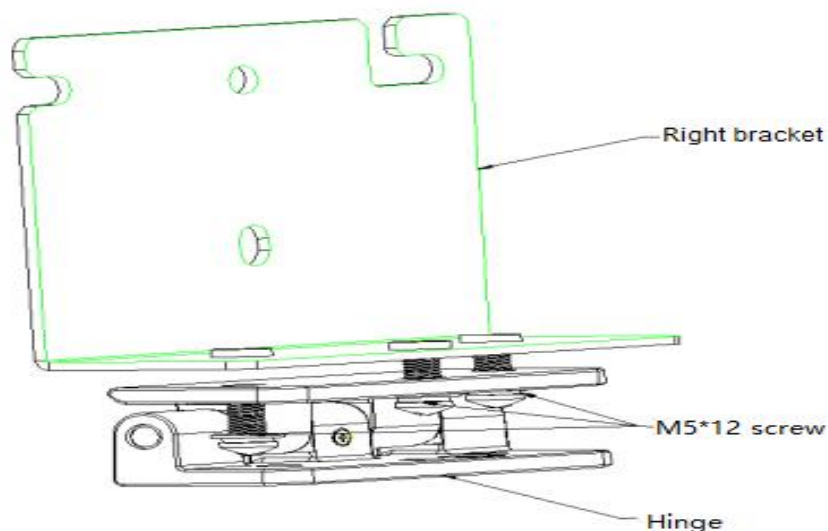


Figure 42 Right bracket and hinge installation

- 2) Assembly of left bracket, right bracket and equipment, as shown in Figure 43.

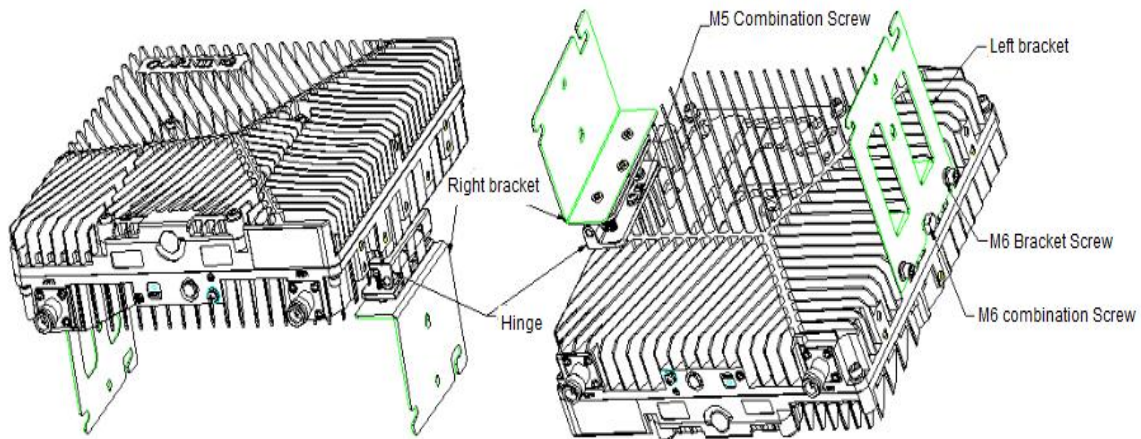


Figure 43 Installation of the left and right brackets and device bracket

- 3) Bracket installation:

Drill holes on the ceiling at a distance of 200mm*160mm according to the size of the mounting holes of bracket, then drive the expansion bolts into the holes, install the mounting bracket, pad gaskets, and lock nuts, as shown in Figure 44.

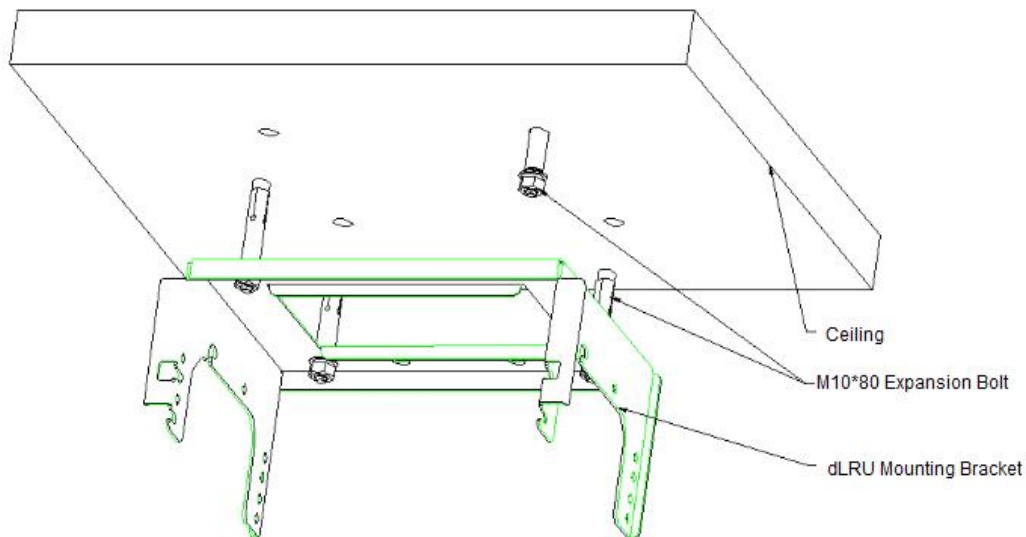


Figure 44 Mounting bracket installation diagram

- 4) Combiner Installation:

Tighten the M6 bracket screws in advance in the left and right screw holes on the upper side of the combiner (the upper side with two RF outlets). Then hang it in the mounting bracket as shown in Figure 45, and fasten it with M6×15 pentagonal combination screws.

**Note: If the device is installed outdoors, please connect the RF jumper cable before installing the combiner, and take waterproof measures for the connector in advance. Otherwise, it is inconvenient to take waterproof measures for the connector after the device is installed.*

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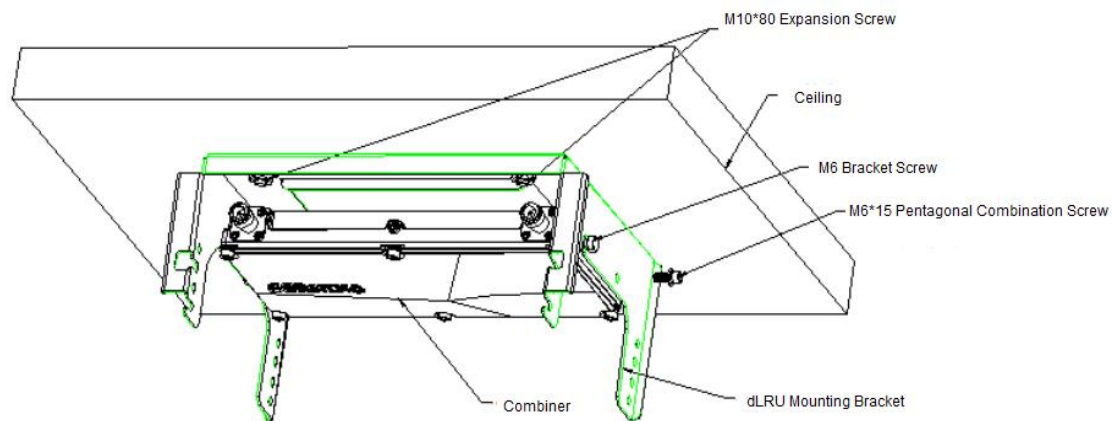


Figure 45 Combiner installation diagram

- **Low Band dLRU installation**

Tighten the M6 bracket screws on the left and right sides of the upper part of the dLRU, and then hang the device on the mounting bracket. as shown in the figure below.

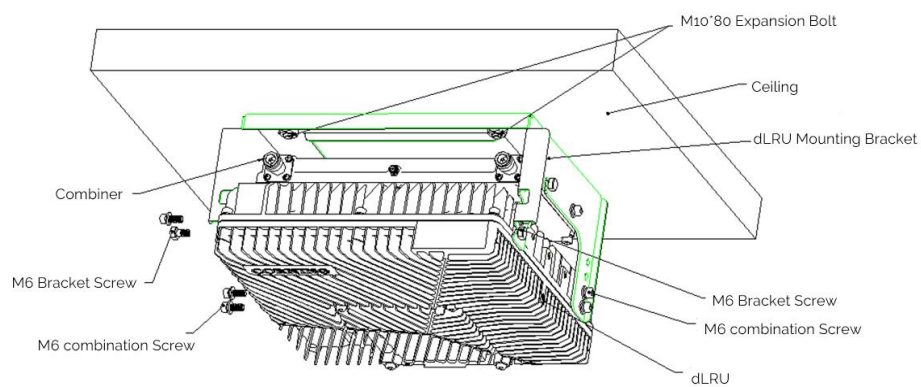


Figure 46 Low band dLRU installation

- **Hang the combination**

Hang the combination of the left and right brackets with four M6 bracket screws, and then use M6×15 pentagonal combination screws to fastened the second dLRU as shown in the figure below.

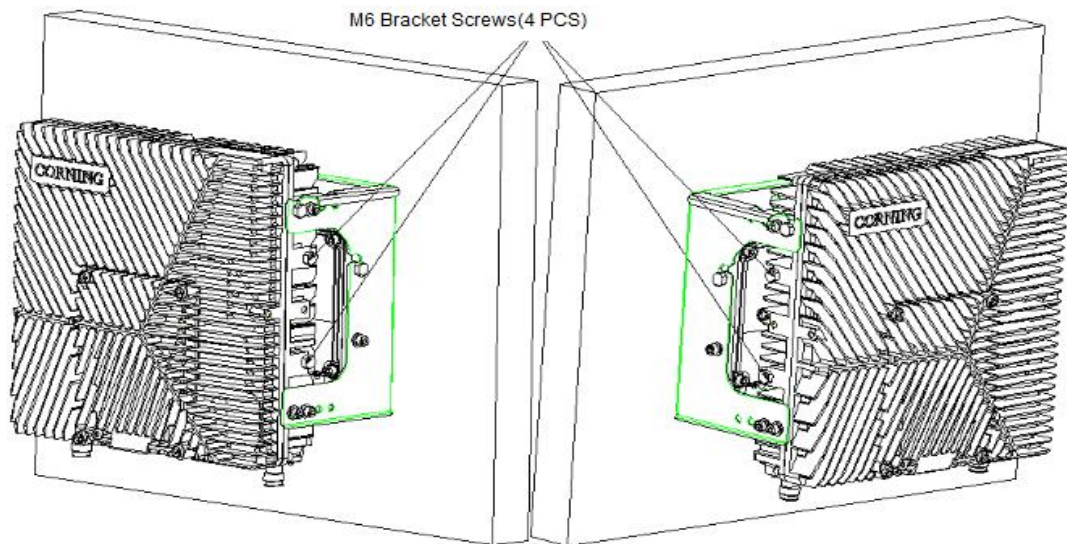


Figure 47 M6 bracket screw holes

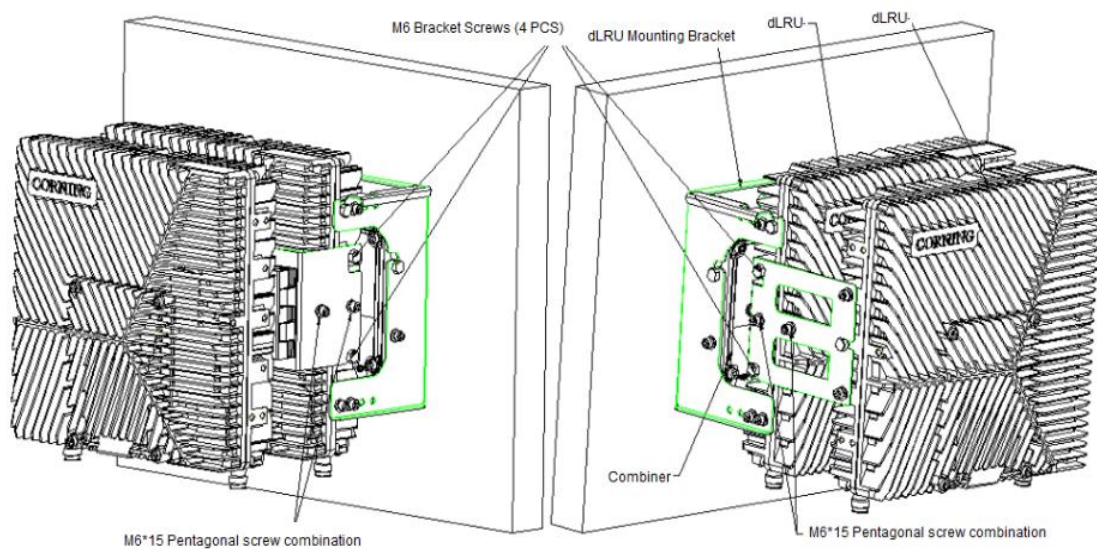


Figure 48 dLRU installation diagram

2.5.2.3 Pole Installation

➤ Single unit pole installation

The pole mounting installation of all device is the same as the wall mounting installation above, except that the equipment is installed on a pole. As shown in Figure 49, M10 bolts, M10 nuts, elastic flat washers, and pole mounting brackets are required. They can be installed on poles from $\phi 65\text{mm}$ to $\phi 140\text{mm}$ depending on the length of the M10 bolts selected (the recommended length is 12cm and 20cm).

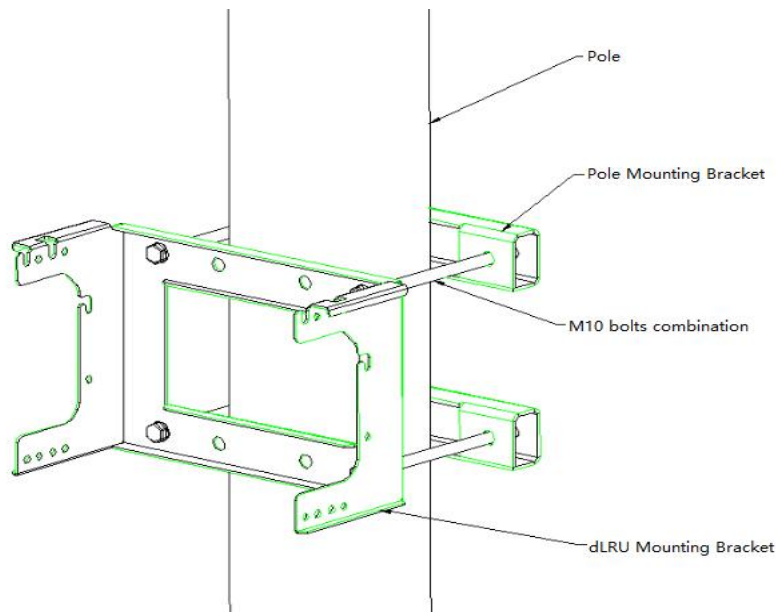


Figure 49 Pole mounting diagram

Tighten the M6 mounting screws on the left and right sides of the upper part of the device, then hang the device on the corresponding positions of the dLRU mounting bracket, and finally tighten the M6 combination screws as shown in Figure 51.

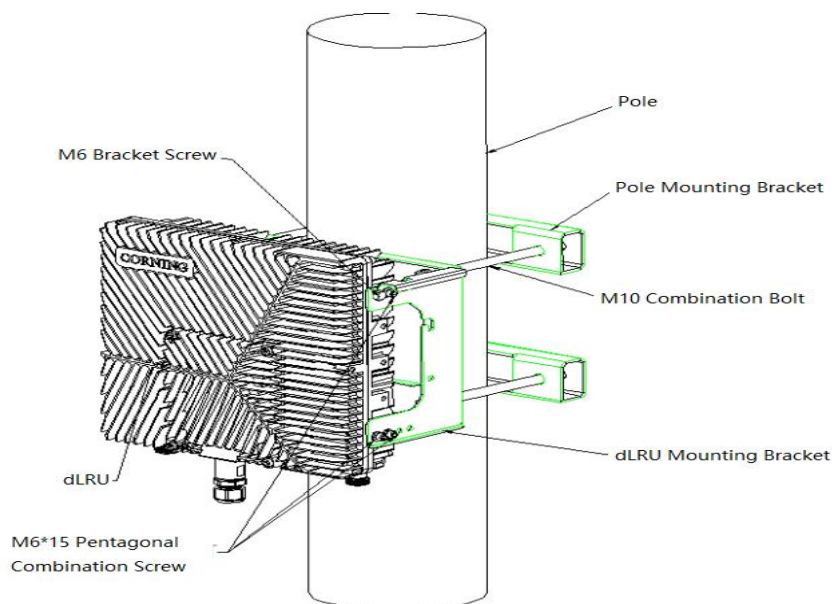


Figure 50 Diagram of pole installation for single unit

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➤ Dual unit pole installation

Before installing the bottom device, please install the combiner first. Put the M6 bracket screws on the left and right sides of the combiner, and then hang the combiner on the mounting bracket. Finally, tighten the M6×15 pentagonal combination screws, as shown in the figure below.

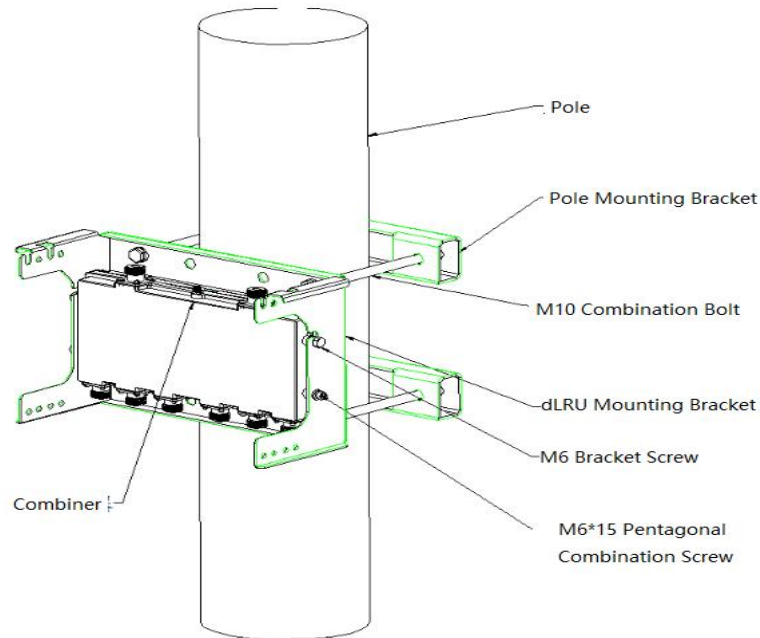


Figure 51 Installation diagram of the combiner

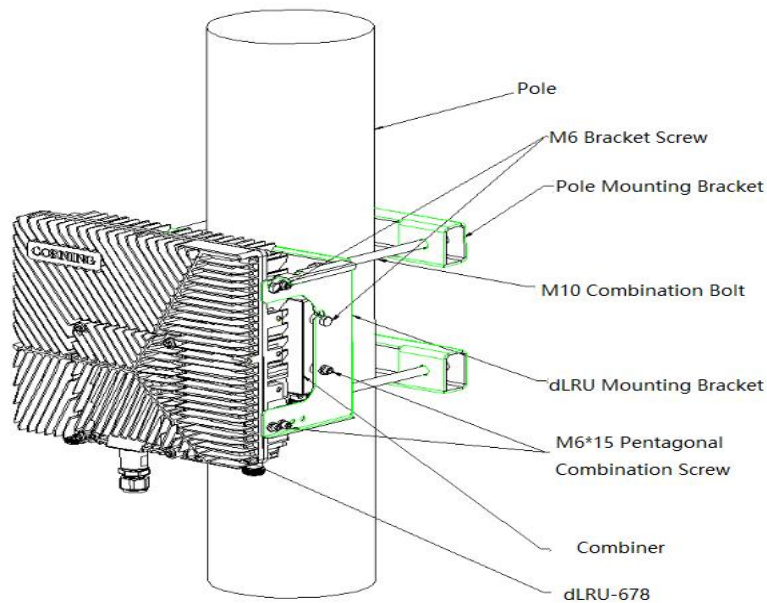


Figure 52 Installation diagram of dLRU pole

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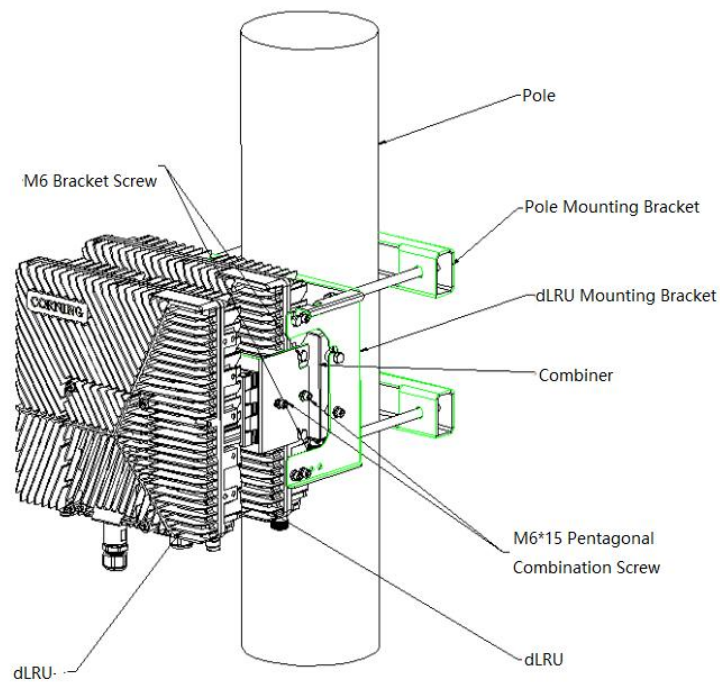


Figure 53 Dual unit installation diagram

2.5.3 Power+ SPF+ Cable

For each unit, open the cover by removing 4 screws:

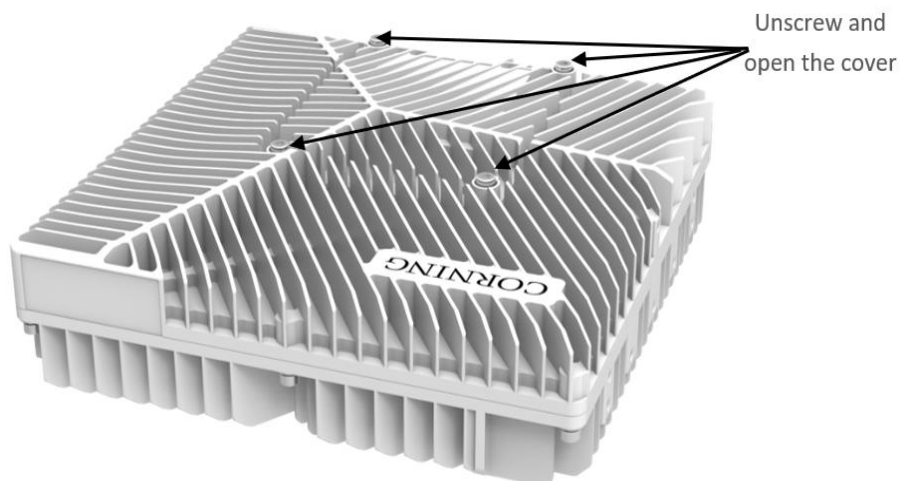


Figure 54 Connection of two units and a combiner

For each unit, connect the internal (under-cover) cables as follows:

- Power socket, see Figure 55.
- SFP+, see Figure 56.

The voltage range of the device power supply is DC36V~57V.

Remove the rubber plug from the SFP+ connector located in the LRU RF port.

Connect the SFP+ LC/UPC SM DX optical cable to the LRU optical connector.

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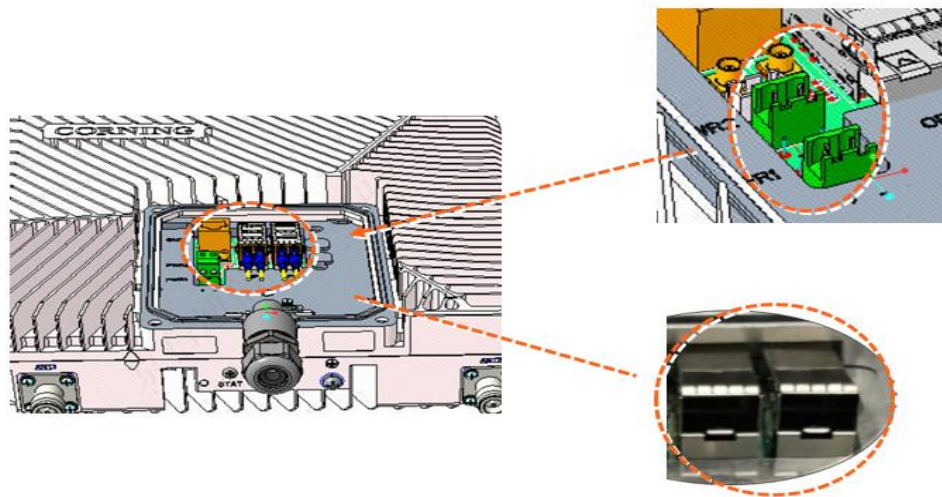


Figure 55 Power socket



Figure 56 Remove rubber plug from the port and insert the SFP+ Pluggable Transceivers (hot-pluggable optical transceiver module) into it.

2.5.4 Connect the Ground and Antenna Cables

2.5.4.1 Ground

**Note: Ground according to local regulations.*

The following additional (not supplied) tools and components are required for connecting the system ground:

- The size of ground shall meet the local and national installation requirements. The provided ground lug supports 14 AWG to 10 AWG stranded copper (or 12 AWG to 10 AWG solid) wire conductors.
- Use a wire-stripping tool to remove approximately 0.4 inch (10.9 mm) of the covering from the end of the ground.
- Insert the stripped end of the ground into the open end of the ground lug.
- Crimp the ground in the barrel of the ground lug. Verify that the ground is securely attached to the ground lug by holding and gently pulling on it.
- Prepare the other end of the ground and connect it to an appropriate ground point.

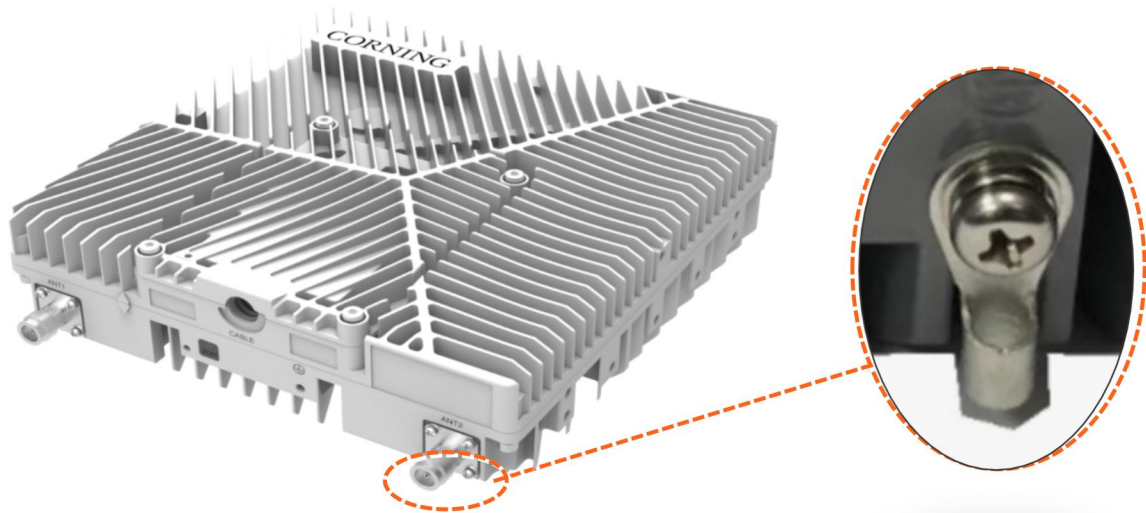


Figure 57 The ground

2.5.4.2 Antenna

Connect the MRU male 4.3-10 Type duplexed RF ANT port to the broadband antenna(s) with proper cables.

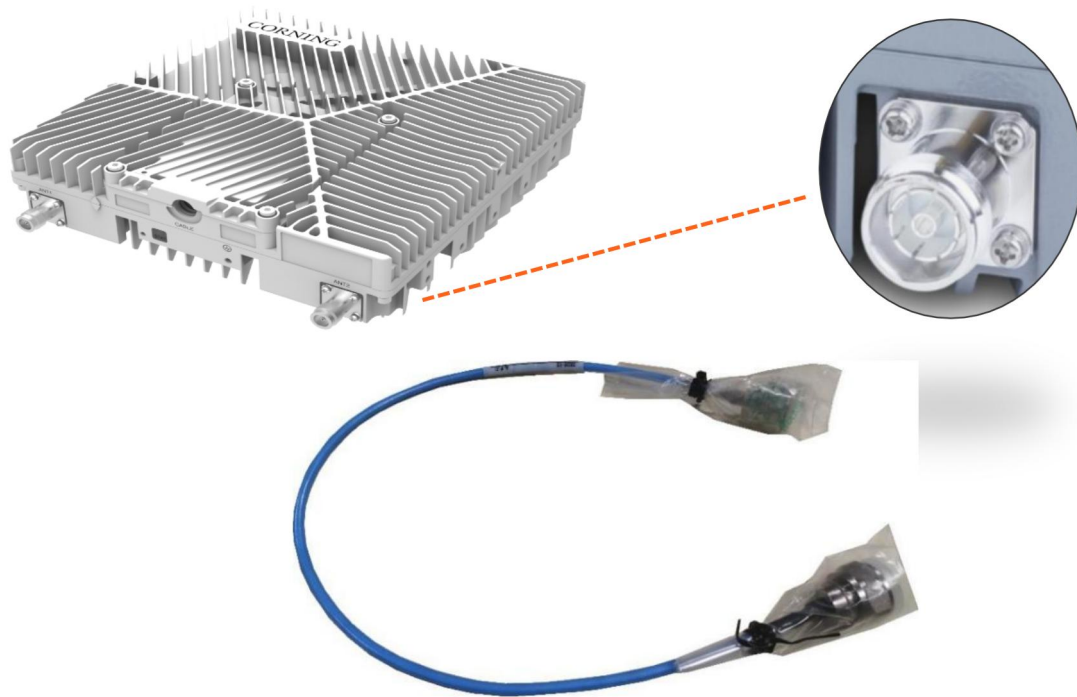


Figure 58 Antenna

**Notes:*

- To avoid MIMO disruption, ensure that the antennas are connected correctly according to the combiner labels.
- There may be some configurations/use-cases which are not required for the combiner, as there is only one type of unit (either low or mid band).

2.5.5 Combiner cables

Connect the Antenna cables as the figure shows below.

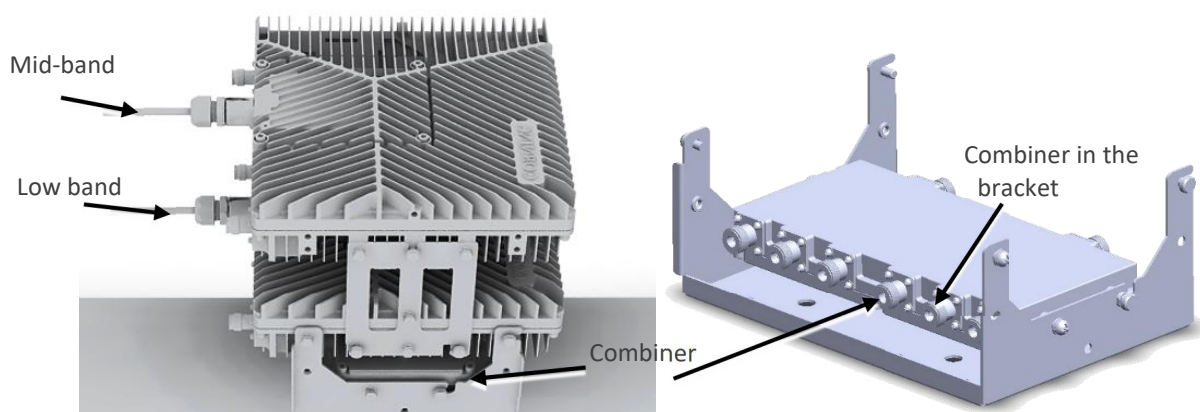
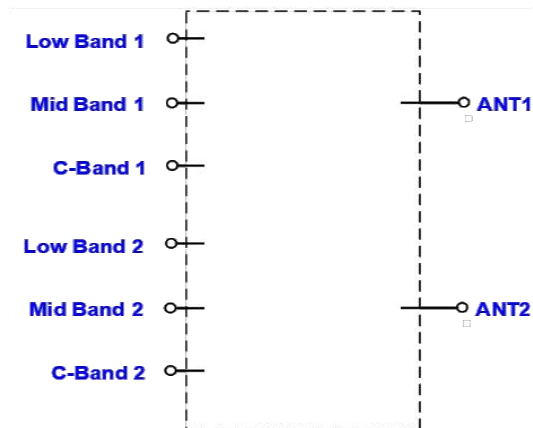
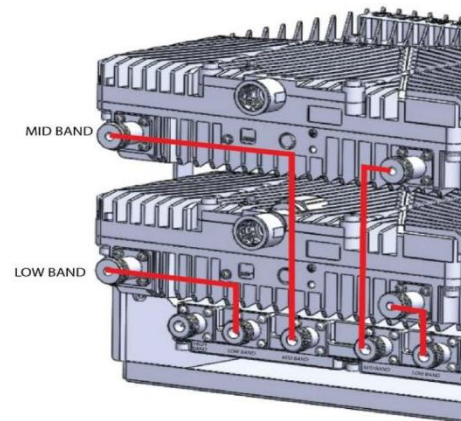


Figure 59 Combiner in the bracket

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Figure



60 The entire system connection

*Notes:

- To avoid MIMO disruption, ensure that the antennas are connected correctly according to the combiner labels.
- There may be some configurations/use-cases which are not required for the combiner as there is only one type of the unit (either low or mid band).

2.5.6 Verify normal operation

The LED indicator is located on the side panel of the dLRU, as shown in the figure below.



Figure 61 LED Indicator

The indicator status description is shown in table below.

Table 4-1 dLRU Low Power Remote unit LED Indicator

| LED Indicator | Status | Description |
|---------------|-------------------------------|--|
| STAT | Green | Power on or chip configuration process |
| | Green flashes (1time /second) | Normal operation |
| | Green flashes (2time /second) | Identify |
| | Red flashes (1time /second) | Over temperature alarm |
| | Red | Hardware alarm |

3. GUI – General Description

This section provides general guidelines and tools for navigating the system GUI:

- Screen layout, see 3.1
- Main menu options, see 3.2.
- Default network settings, see 3.3.
- Supported access options, see 3.3

3.1 Screen Layout

The information board (located at the top of the window) lists the device information.

The Navigation board (located on the left down of the window) lists the device and their functions.

The Control board (located on the right down of the window) lists the control functions.

Information board

Equipment Model: RIU-G2-25
 Equipment SN: 2
 System Version: Everon_6000_RIU_P2.V01.00.00.05
 Hardware Version: 1
 Band: 2500T

Navigation board

Overview | RIU 1

| More | CH. | Work Mode | High Gain Mode | Max. Pwr_In | DL P_in | RF Switch | UL ATT | DL ATT | ALC Switch | ALC Level | DL I |
|------|-----|-----------|----------------|-------------|---------|-----------|--------|--------|------------|-----------|------|
| > | 1 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 2 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 3 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 4 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 5 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 6 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 7 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |
| > | 8 | Tx/Rx | ON | 37dBm | -25dBm | OFF | 20dB | 20dB | ON | 37dBm | |

Control board

Figure 62 RIU screen layout

3.2 Function Options

The function options on the Web-GUI are listed in the following table.

| Function | Description |
|-----------------|---|
| Device info | View the system topology and info about different system elements |
| Reset | Software reset for the selected device |
| Firmware | Upgrade or downgrade the firmware |
| Alarm Setting | Set the alarm including alarm enable/disable, alarm threshold |
| Import & Export | Import or export the config file |
| Log | Import or export the log file |
| Comm. Setting | Communication setting on the SNMP parameters |
| IP Setting | IP setting for the device |
| Site Report | Site information inventory |

3.3 Supported Access Options

This section describes the HW and SW required for connecting to the HCM.

First, connecting to the HCM should be done with a laptop or a tablet.

The following browsers are supported:

- Microsoft Internet Explorer 11.0 and above
- Mozilla Firefox 42.0, 43.0 and above
- Google Chrome 45.0, 46.0 and above

After the initial configurations are done, it is recommended to establish remote access to the HCM by using the following:

LAN Ethernet connection to the HCM with a minimum connectivity and throughput capability of 256 Kbps

4. Session Access and first-time settings

When all the system elements are installed, the system administrator can login the system GUI and perform initial configurations.

It is recommended to start using Corning® Everon™ 6000 and the specific steps are as follows:

- **Open a local session to the DCU**, see chapter 4.1.
- **Configure the LAN IP settings** (remote management) to enable remote access, see chapter 4.2.
- **Perform the initial configurations (commissioning)** using the system GUI, see chapter 5.

4.1 Open a Local Session

The following are the instructions for opening a local management session to perform basic system configurations via the system GUI.

➤ To Open the system GUI

- 1) Connect a computer (e.g., laptop) to the DCU OMT port via an RJ45 Cat 5 Ethernet cable as follows:

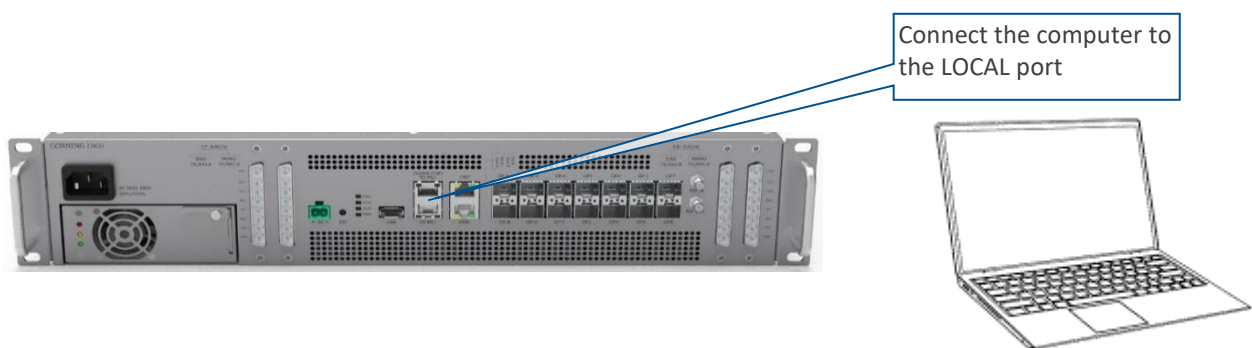


Figure 63 GUI connection

*Notes:

- *The LOCAL port is set to a static IP Address by default: 192.168.8.101; Subnet Mask: 255.255.0.0. Your laptop/tablet network parameters must be set to match the subnet of the default IP address.*
 - *The laptop/tablet IP address must be different from the LOCAL port IP address.*
- 2) Set up your laptop/tablet network parameters by following the steps below (the steps may vary slightly depending on the OS version used):
 - a. Click **Start → Settings → Network & Internet**

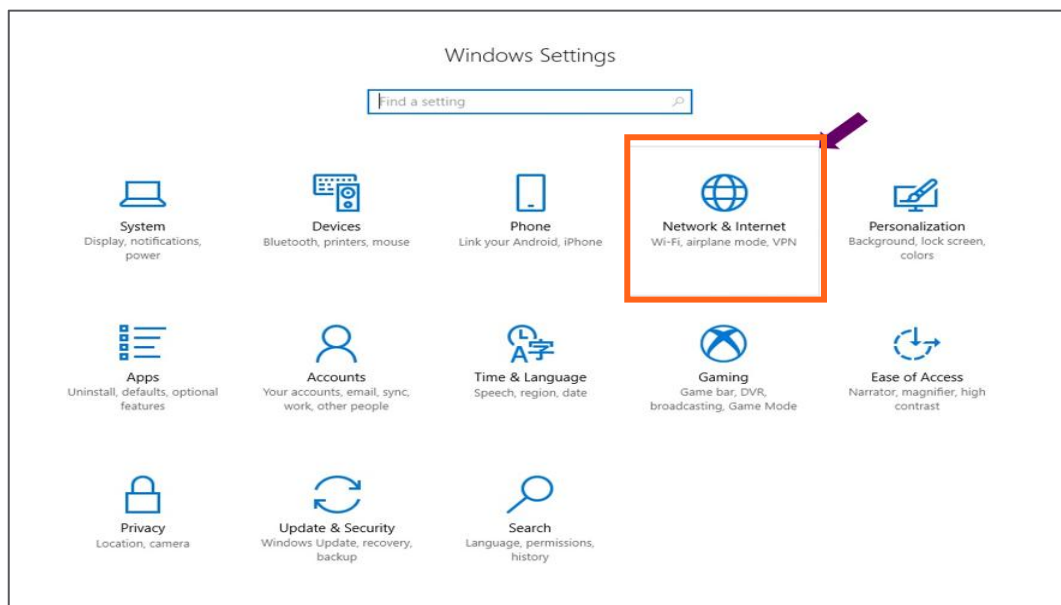


Figure 64 Network & Internet setting

b. Select **Ethernet** → **Change adapter options**

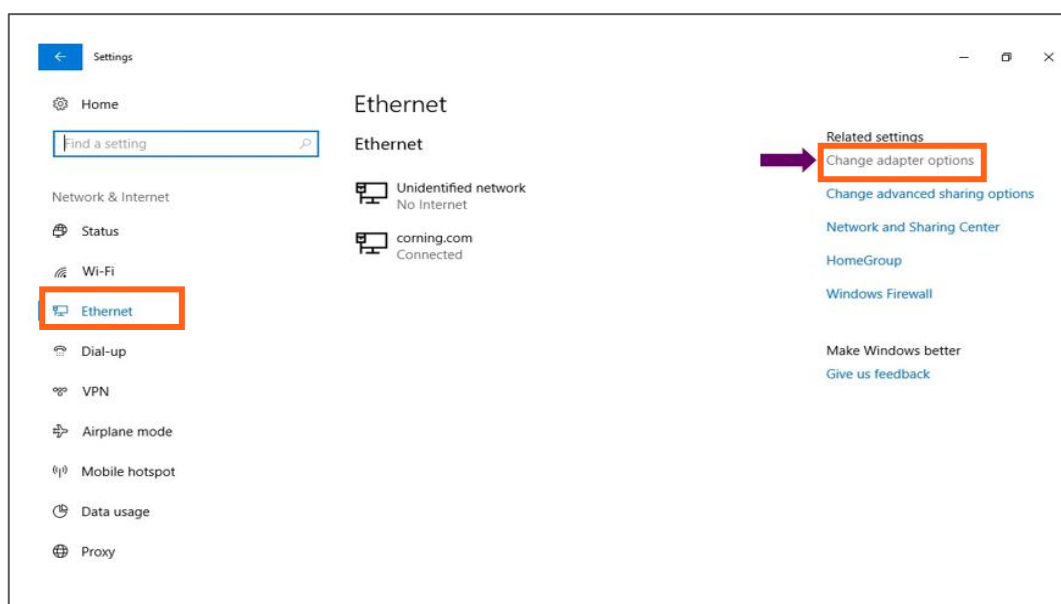


Figure 65 Ethernet setting

c. Right click **Ethernet 3** and select **Properties**.

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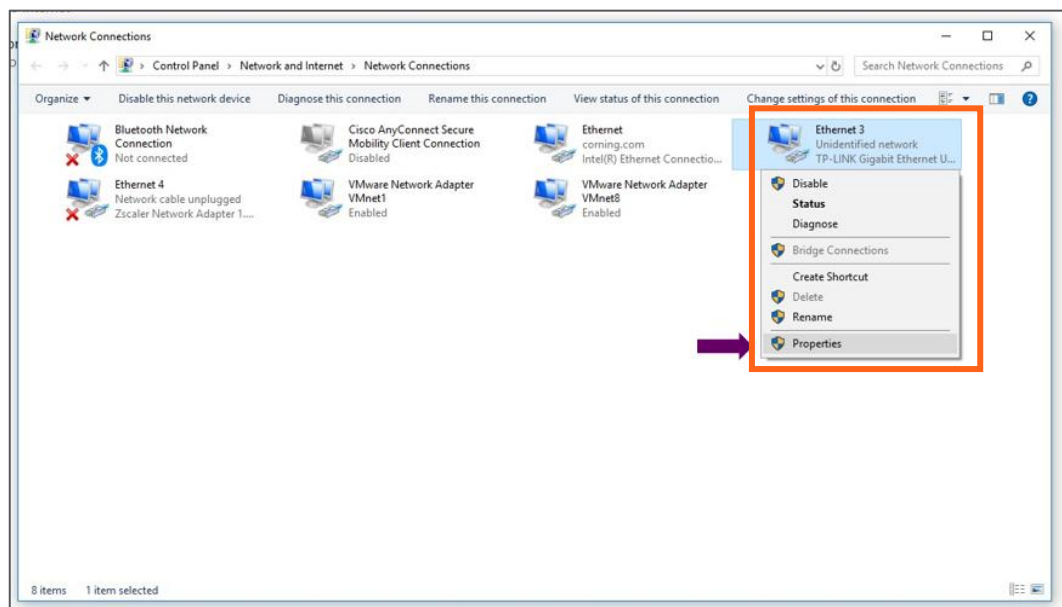


Figure 66 Ethernet 3

- d. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**

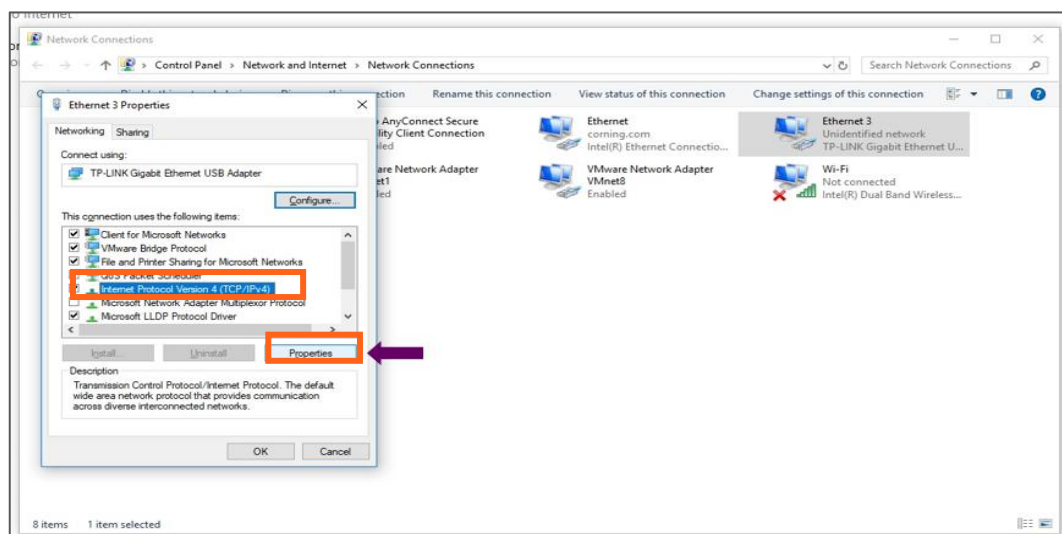


Figure 67 Ethernet 3 properties

- i. Type in the properties: 192.168.8.3 255.255.0.0 → click **OK**
- ii. Examples of IP addresses:

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- **Allowed: 192.168.8.3**
 - **Not allowed: 192.168.8.101 (this IP is used by the LOCAL port).**
- iii. Click **OK** and close the control panel

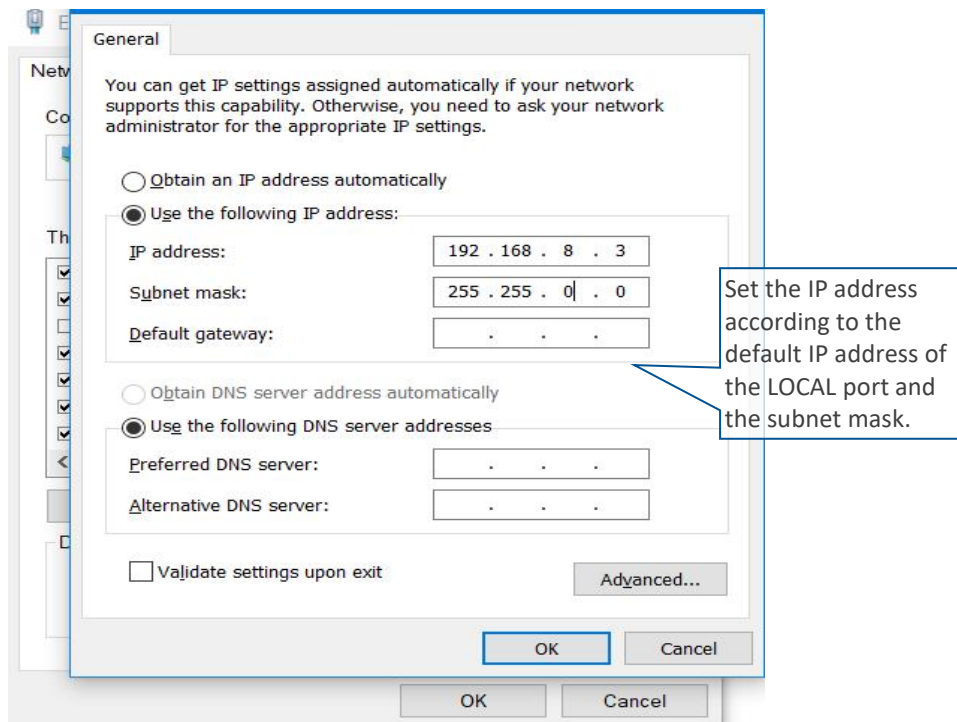


Figure 68 General setting

- 3) When the connection is established (can be verified by accessing through command prompt: cmd → ipconfig), open a browser and type in the LOCAL port default IP address in the address bar: 192.168.8.3. Ping the IP address also works. See section 4.2 for instructions on how to continue.

5. Commissioning

Configure the DAS for each frequency during the commissioning process which requires a basic understanding of link, budgets and RF technology. Most system commissioning scenarios are covered and the process should be adjusted based on the site requirements and instructions of Corning Support.

webGUI Workflow

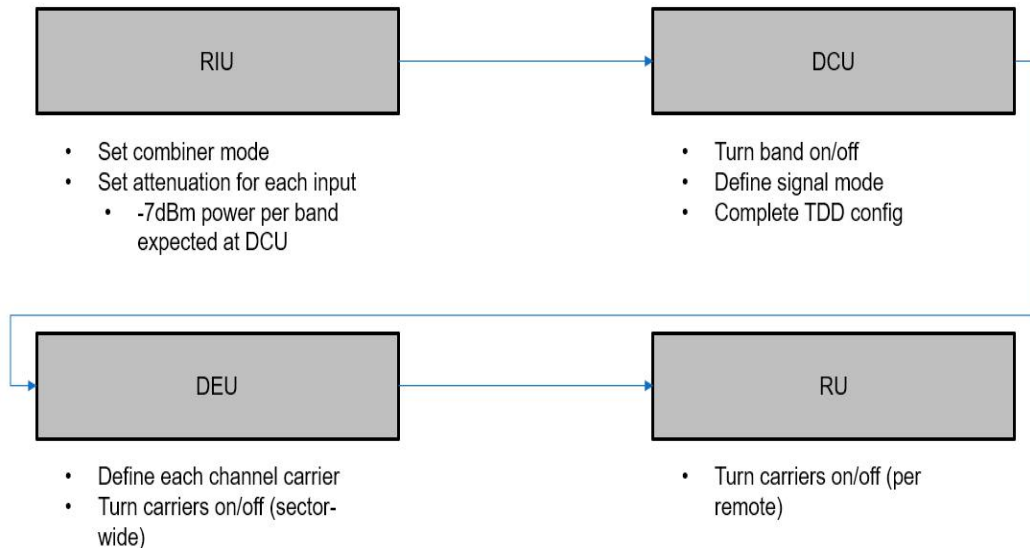


Figure 69 webGUI Workflow

**Note: In order to protect the whole system, please don't input eNodeB signal before commissioning.*

Commissioning tools:

| Tools | Description |
|---------------|----------------------------------|
| Laptop | Debug tool |
| Network cable | Connect DCU OMT port with laptop |

5.1 RIU Config

5.1.1 RIU WEB overview

Click RIU on the left side shown in the figure below to enter the RIU overview control interface where the information (e.g., RIU alarm) can be viewed. Drag the scroll bar under the information list box or the arrow in the column of More to view more.

Configure the following parameters:

- Band: Read Only. This shows the current frequency band supported by the RIU

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- Combiner Mode: 8TO1/4TO1/2TO1

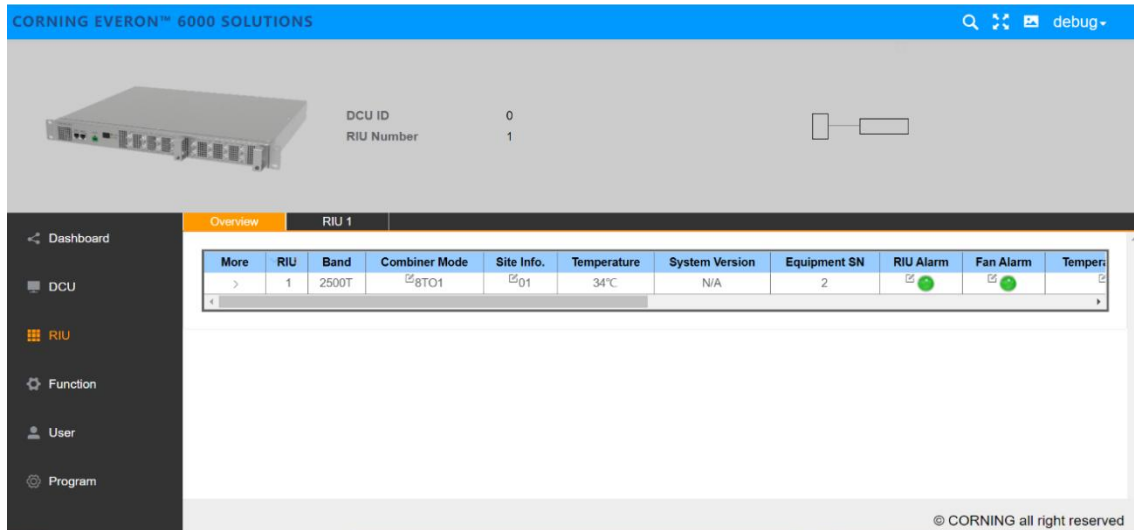


Figure 70 RIU overview

5.1.2 RIU Parameter Config

RIU parameters:

| SN | RIU parameters | Ranges | Recommend values |
|----|----------------|------------|------------------|
| 1 | Work Mode | TxRx/Tx/Rx | TxRx |
| 2 | High Gain Mode | On/Off | On |
| 3 | DL P_in | Read only | Read only |
| 4 | RF Switch | On/Off | On |
| 5 | UL ATT | 0-30dB | 20 |
| 6 | DL ATT | 0-30dB | 20 |

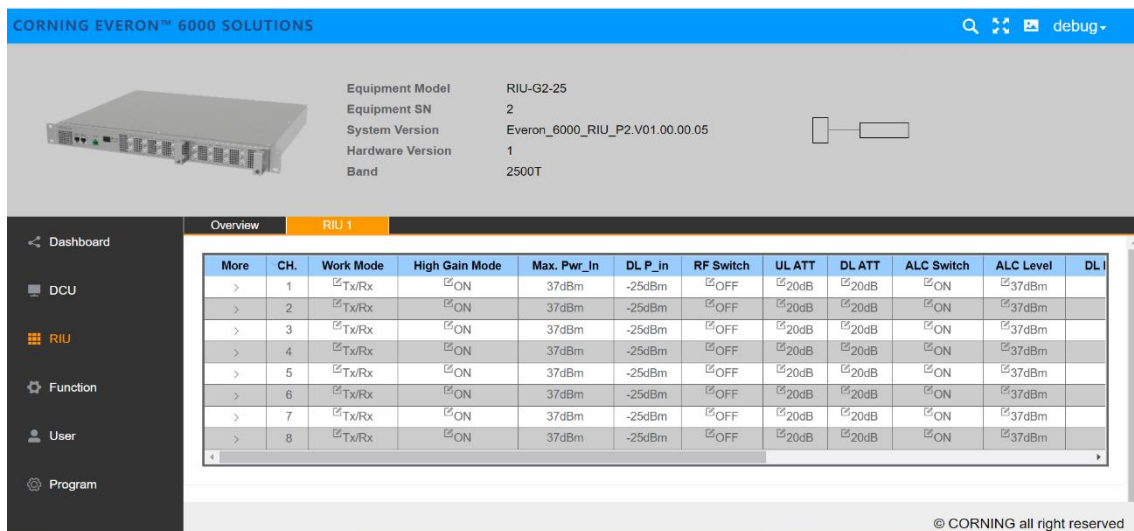


Figure 71 RIU RF information

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5.2 DCU Config

5.2.1 DCU -> Dashboard

Click the Dashboard navigation button to enter the dashboard page shown in the figure below, where you can query the full topology of all the dependent NE connected to the DCU unit. Click NE ID in the topology, and switch to the info query and configuration management page of other NE to facilitate the user.

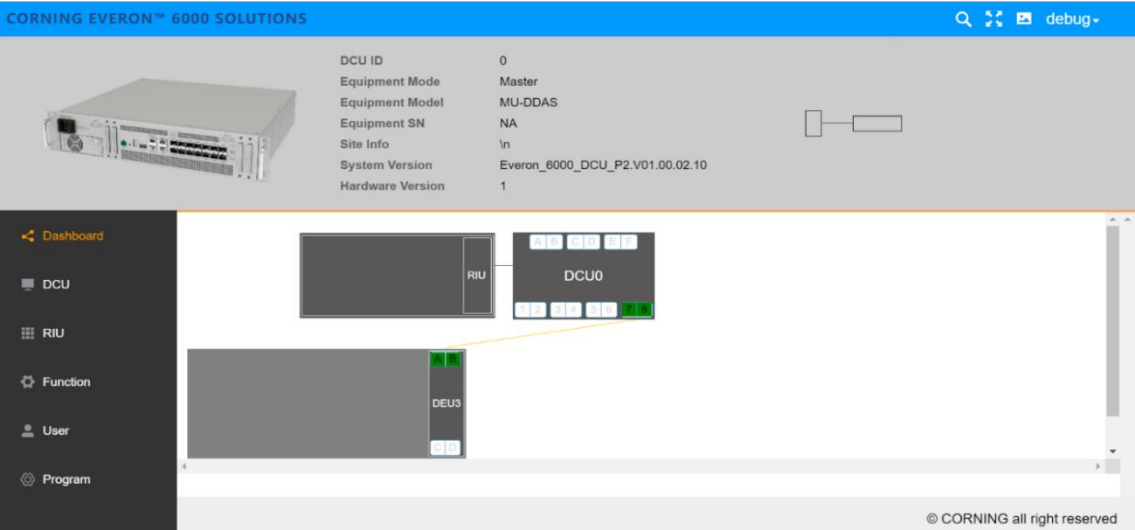


Figure 72 DCU dashboard

5.2.2 DCU Alarm

On the left navigation page of the DCU unit, click DCU → Alarm shown in the figure below. On this page, all alarm quantities of the device are displayed to facilitate the user to query and monitor the alarm info.

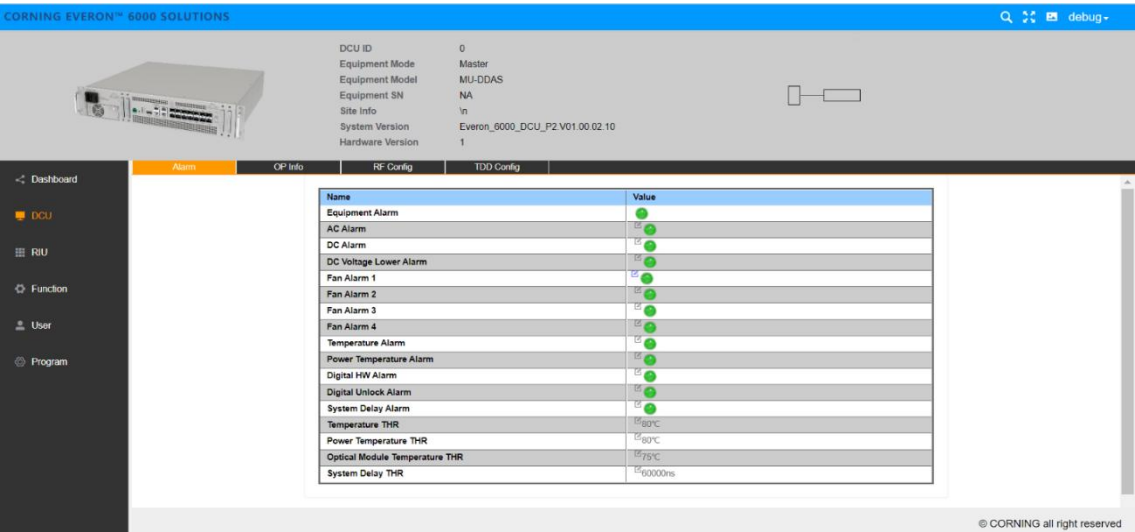


Figure 73 DCU alarm info

5.2.2.1 DCU OP Info

Click the left navigation button DCU→OP Info, as shown in the figure: