

AWS RRH User Manual

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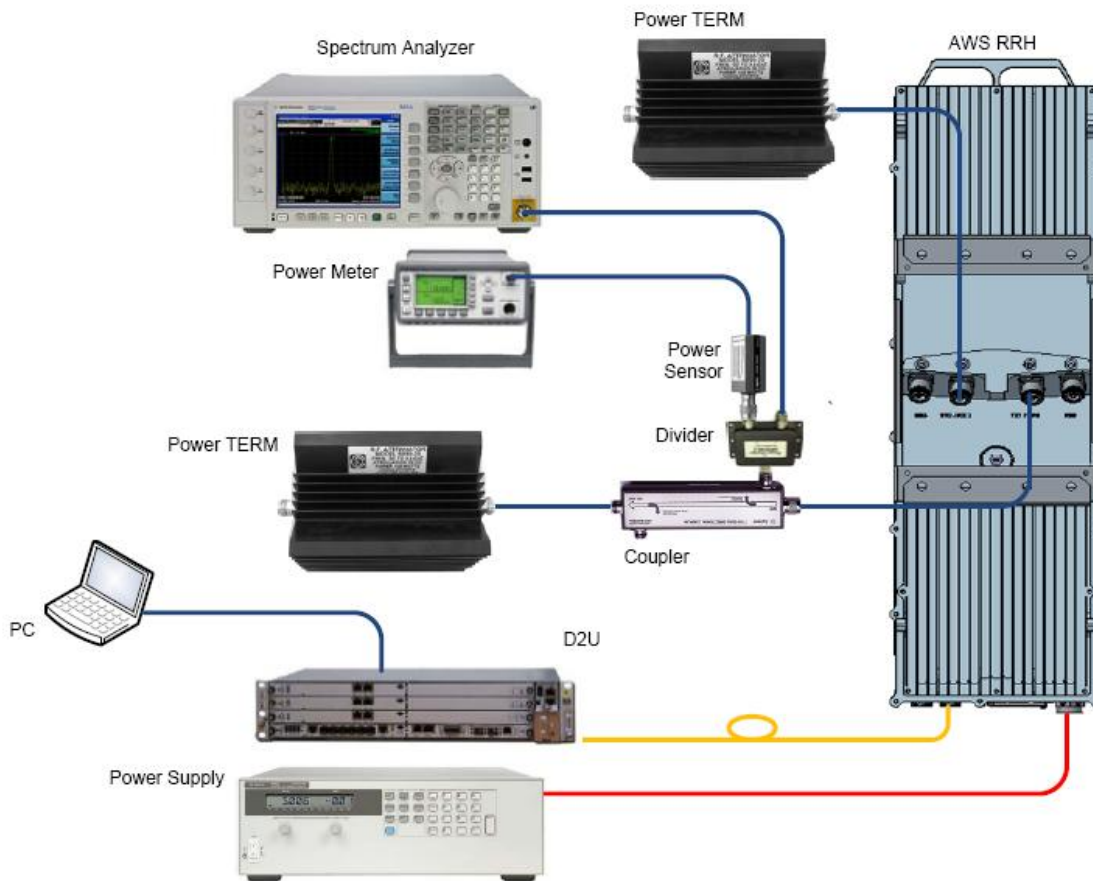
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1. Test Environment

1.1. Preperation List

- KMW AWS RRH (Remote Radio Head 2110 ~ 2155MHz)
- PSU (Power Supply Unit)
- D2U (Alacaltel Lucent)
- Optic transceiver 2EA Optic Cable
- Ehternet Cable
- Laptop computer

1.2. Testing Environement Configuration



- PSU Setting Table

Voltage	Current Limit
Normal : -48V	14 A

1.3. RRH Setup Procedure

- Checke PSU Power 48V off
- Connect PSU power to RRH Power connector
- Connect D2U and RRH with Optic transceiver and Optic cable
- Turn on PSU to power up RRH
- Make sure computer to join RRH and D2U network.

If the computer joined the same network which BBU joined, it is able to access RRH network from the GUI.

2. Network Configuration

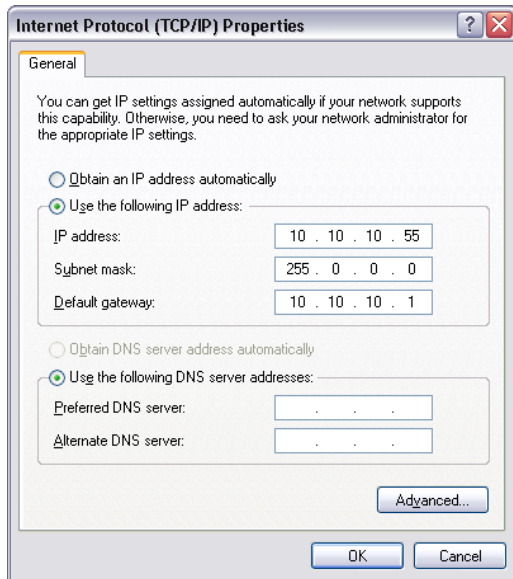
- Setup computer network configuration

IP: **assigned by ALU** (ex; 10.10.10.55)

Subnet mask: **255.0.0.0**

Default gateway: **assigned by ALU** (ex; 10.10.10.1)

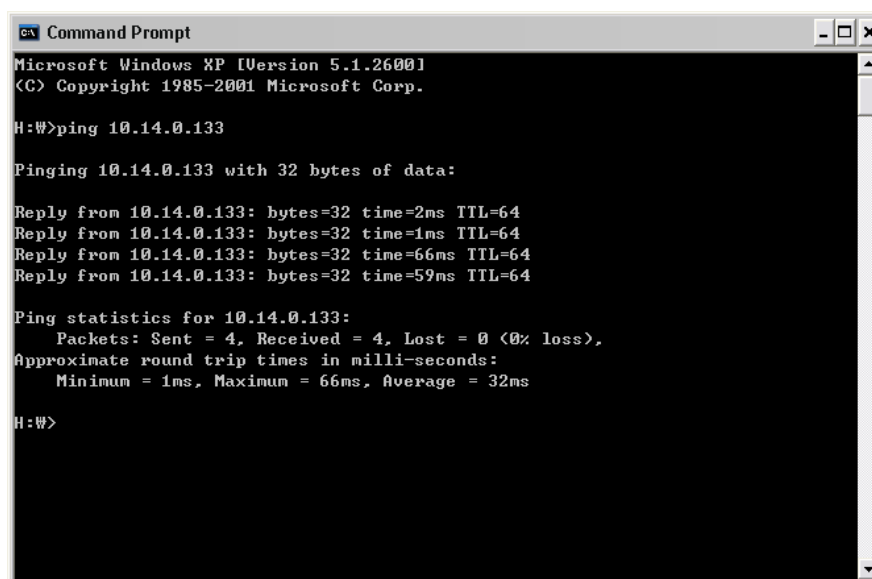
DNS: **assigned by ALU**



- Test network configuration

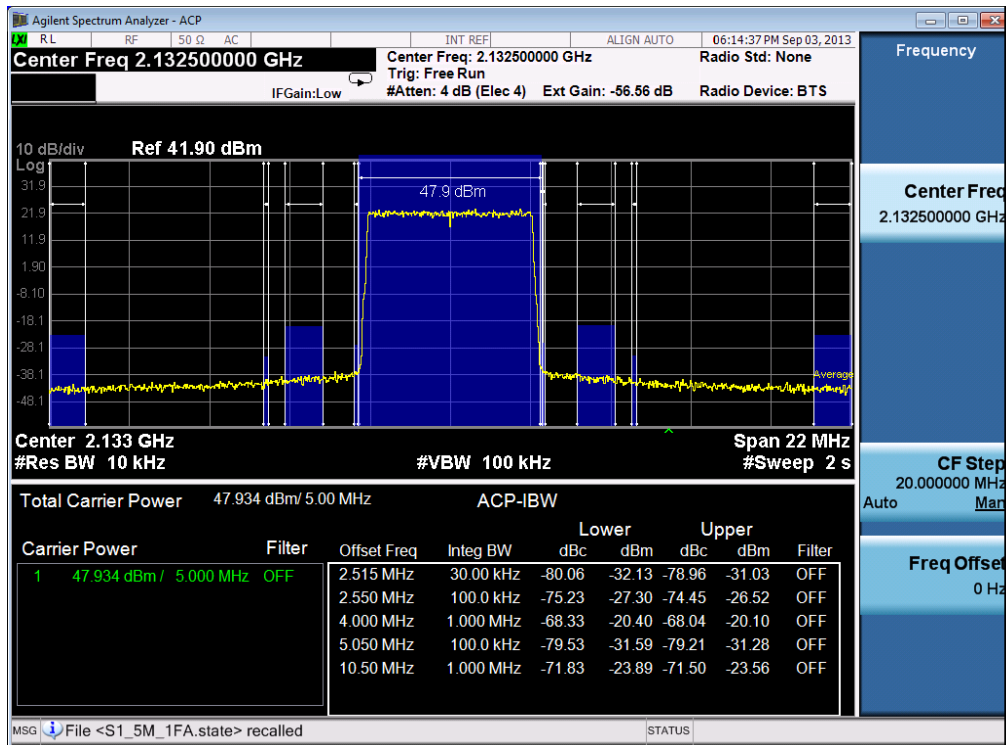
Windows Start > Run > CMD [Enter]

C:\> ping RRH IP(**10.14.0.196**) [Enter]



3. Output Spectrum

- If you set up Signal Analyzer, you can monitor carrier power just like below image.



4. Install Guide

Alcatel-Lucent RRH2x60-B4 Installation Guide



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Issue	Date	Change
0.01	March 3, 2014	First draft
0.02	March 10, 2014	Updated for comments

Alcatel-Lucent RRH 2x60-B4 Installation Guide

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Mandatory documents

Document number	Title
3MN-01520-0001-RJZZA	Alcatel-Lucent RRH2x60-B4 - Site Preparation Guidelines

Related Documents

Document number	Title
3MN-01520-0003-DEZZA	Alcatel-Lucent RRH2x60-B4 - Technical Description

Terminology

In this document, Alcatel-Lucent Remote Radio Head 2x60-B4 is referred to by its abbreviated name, “Alcatel-Lucent RRH2x60-B4,” its shortened name, “RRH2x60-B4,” and may be generically referred to as the Remote Radio Head (RRH).

Technical support

If you are unable to successfully complete any of the product-specific installation procedures in this document, contact Alcatel-Lucent technical support before proceeding.

For technical support, contact your local Alcatel-Lucent customer support team. See the Alcatel-Lucent Support web site (<http://www.alcatel-lucent.com/support/>) for contact information.

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1. Safety - General precautions for installation procedures

The following general precautions must be observed for installation procedures.



WARNING

Personal injury hazard

Failure to observe these safety precautions may result in personal injury or damage to equipment.

To avoid personal injury or damage to equipment, observe the following instructions:

- *Read and understand all instructions.*
- *Follow all warnings and instructions marked on this product.*
- *Installation and maintenance procedures must be followed and performed by trained personnel only.*
- *Grounding and circuit continuity is vital for safe operation of the equipment. Never operate the equipment with grounding/bonding conductor disconnected.*
- *The equipment must be provided with a readily accessible disconnect device as part of site preparation.*
- *This equipment is intended for installation in restricted access locations where access is controlled or where access can only be gained by service personnel.*

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1. Safety - Specific hazards



DANGER

Laser hazard

This equipment operates with invisible laser radiation. Laser radiation can cause considerable injuries to the eyes.

Never look into the end of an exposed fiber or into an open optical connector when the optical source is switched on. Always observe the laser warning instructions.



CAUTION

Laser hazard

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

Do not view directly into the laser beam with optical instruments such as a fiber microscope because viewing of laser emission in excess of Class 1 limits significantly increases the risk of eye damage.

Never look into the end of an exposed fiber or an open connector as long as the optical source is switched on.

Ensure that the optical source is switched off before disconnecting optical fiber connectors.



DANGER

Electric shock hazard

Working in severe weather can result in personal injury or death and damage to the equipment.

Never install or perform maintenance during severe weather (high winds, lightning, blizzards, hurricane etc.).



WARNING

Electric shock hazard

Some parts of all electrical installations are energized. Failure to follow safe work practices and the safety warnings may lead to bodily injury and property damage.

For this reason, only trained and qualified personnel (electrical workers as defined in IEC 60215 or EN 60215 + A1 or in the National Electrical Code or in ANSI/NFPA No. 10) may install or service the installation.



DANGER

Lightning strike hazard

Lightning strikes are possible during stormy weather, and could result in death or severe injury.

Do not work on the installation itself or on the power supply lines or antenna feeders of an antenna during stormy weather.

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1. Safety - Specific hazards (continued)



DANGER

Noxious-substance hazard

Use of unspecified cleaning agents can result in personal injury.

Use only specified cleaning agents. Never use flammable solvents.

Always ensure there is adequate ventilation in the work area and wear the appropriate personal protective equipment.



NOTICE

Corrosive-substance hazard

Cleaning plastic containers and lids with abrasive and aggressive cleaning agents may cause permanent damage.

Do not use solvents, paraffin, abrasive or aggressive cleaning fluids, abrasive or aggressive antiseptic agents or abrasive or aggressive materials.



CAUTION

Lifting hazard

Lifting this equipment by yourself can result in injury due to the size and weight of the equipment.

Always use at least two people or a lifting device to move or position this equipment.

NOTICE

Tools hazard

Tools left in the working area can cause short circuits during operation which can lead to the destruction of units.

Make sure after finishing your work that no tools, testing equipment, flashlights, etc., have been left in or on the equipment.

Equipment safety

Safety information for this equipment can be found on various Caution, Warning, Danger, information labels or instructions affixed to or included with the Alcatel-Lucent RRH2x60-B4, its internal assemblies or included within this document. Informational and cautionary labels may appear near the item they address or may be grouped in a single location on the equipment. Warnings are typically adjacent to the hazard that is noted on the label. The instructions, cautions and warnings found on these labels must be understood and observed by all personnel involved with the equipment installation and maintenance.

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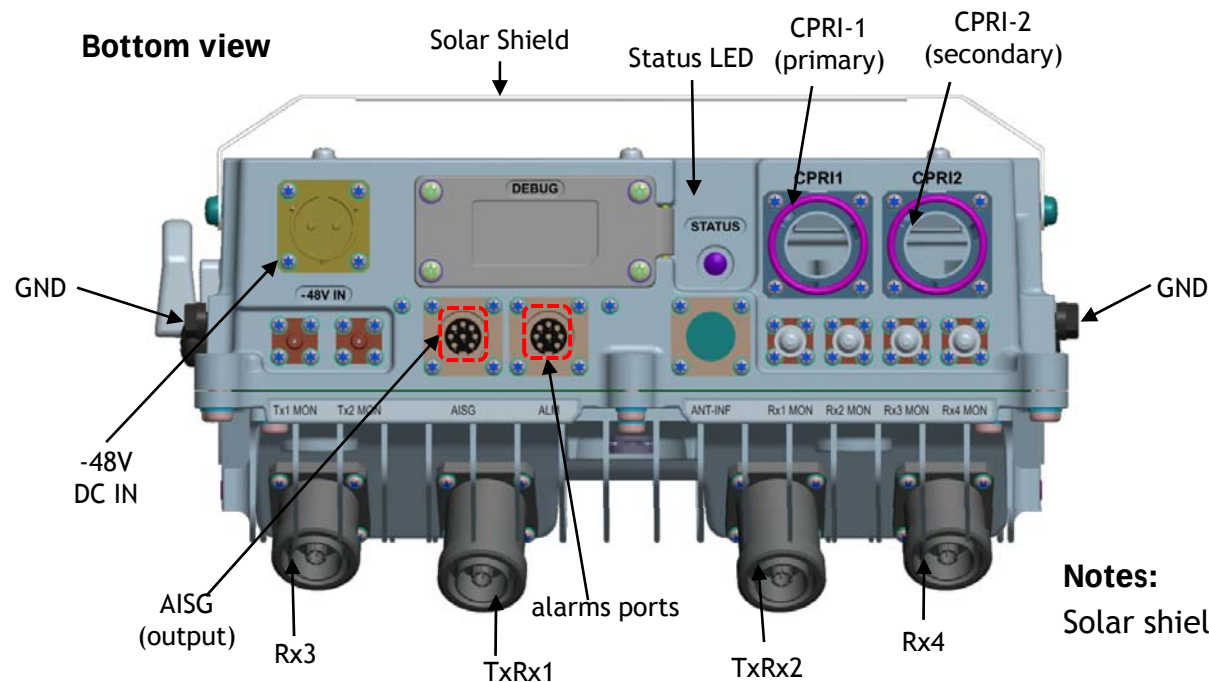
3. Tools, materials, and prerequisites - Required materials, supplies needed

The following is an alphabetical master list of all supplies that may be utilized during the installation of the RRH:

- Antioxidant compound
- Cable labels (to label both ends of cables before routing and installing cables)
- Lacing cord, waxed #50
- Power cable (customer provided, must meet product-specific DC power requirements)
- Red tape or tags – 145C or equivalent, for tagging of DC power cables
- Silicone caulk
- Tape – Electrical
- Tie wraps
- Twine
- Wall anchors

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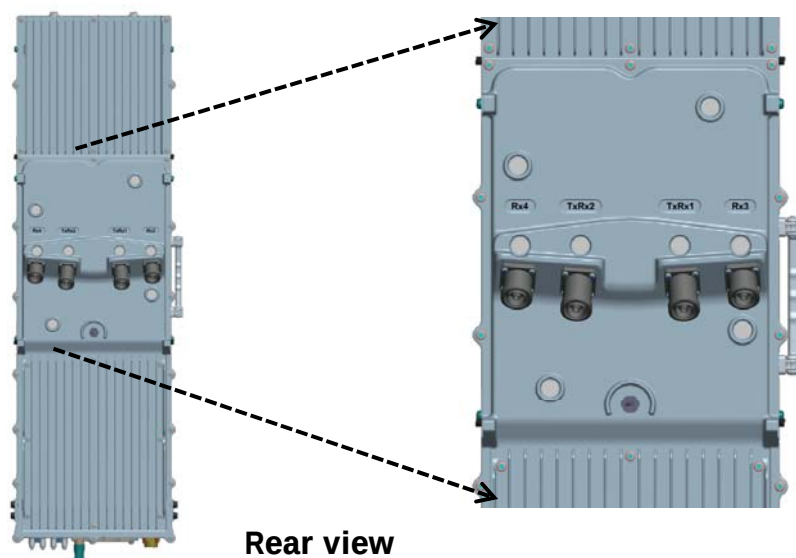
2. Product overview - physical interfaces



Notes:

Solar shield now shown in these views

GND = Protective Earth (PE) ground, located on lower right side and lower right side of RRH (when facing front of RRH)



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3. Tools, materials, and prerequisites - Required tools

The following is an alphabetical master list of all tools that may be utilized during the installation of the external interfaces:

- Crimping tools 22-16 gauge, 10-4/0 gauge (5-120 mm²) for installation of terminal lugs and c-taps
- Electrical conduit installation equipment and materials • ESD wrist strap
- Eye protection gear – Safety goggles or glasses (R-3055)
- Gloves – Low-voltage rubber lineman's gloves (R-4285)
- Heat gun for heat shrink tubing • Insulated hand tools (for completing electrical connections)
- M10 eye bolts or hoisting rings • Measuring tape
- Nut driver set (Imperial) with 10-inch extension • Nut driver set (metric) with 250-mm extension
- Ohmmeter (multi-meter, volt/ohmmeter, or equivalent)
- Screwdrivers (power and manual), flat-blade, Phillips and Torx
- Small, regular, slip-joint pliers • Tongue-and-groove, slip-joint pliers
- Socket sets (Imperial and metric) various drives, including 1/4" socket for security bit
- Stripping tool (for LDF4 antenna jumper cables) - part number 74Z-0-12-15 for Huber Suhner connectors;
- part number ITE-7189 for Andrew connectors.
- Tie wrap tool • Torque wrenches, 2 - 34 N·m(17.7 - 300 lbf-in)
- Torque wrenches, 6 - 200 N·m (4.4 - 150 lbf-ft)
- Wire cutter [capable of cutting up to 50 mm² (1/0 AWG)] • Wire stripper
- Wrench – Adjustable, (20 mm / 3/4 inch) open-end wrench (or set of fixed open-end wrenches)
- If fixed open end wrenches are used, both metric (mm) and Imperial system (in) wrenches will be needed.

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3. Tools, materials, and prerequisites - Required materials, parts list

Required installation parts list

Item	Part No.	Description	Qty.	Comments
1	3JR52709AA	Alcatel-Lucent RRH2x60-B4	1	Includes RRH with Solar shields and mounting bracket
2	See note 1	Pole mounting kit	1	Optional: Required only for pole mounting
3	1AB435070001	DC power plug, circular, 2-pin	1	1 required per RRH, used with power cable
4	301022679	Ground lug kit (kit WES bag)	1	Required for protective Earth (PE) ground
5	See note 2	SFP transceiver, SMDF or MMDF, LC connector	1	1 required per CPRI connection
6	See note 3	Optical fiber, SMDF or MMDF, LC-LC connectors	1	1 required per CPRI connection
7	1AB027220001	R2CT weatherized plug	1	1 required per CPRI connection
8	See note 3	RF cable, coax, DIN male-DIN male/loose	1 to 4	1 required for each antenna connection used
9	See note 3	User alarm cable, 4 pair, circular DIN male on one end	1 or 2	Optional: Required for external user alarms
10	See note 3	AISG connection cable, 8-pin circular DIN	1	Optional: Required for AISG daisy-chain connection
11				
12				

Notes:

1. Part number depends on pole size
2. Part number depends on CPRI rate required
3. Part number depends on length required

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3. Tools, materials, and prerequisites - Prerequisites

Verify site preparation and physical installation are completed: (see *Alcatel-Lucent RRH2x60-B4 – Site Preparation Guidelines*, 3MN-01520-0001-RJZZA):

Before installation of the Alcatel-Lucent RRH2x60-B4 site can begin, site preparation must be completed.

The following site preparation general requirements must be met before the installation of the Alcatel-Lucent RRH2x60-B4 can begin:

- Adequate clearance must be provided for service access
- DC electric service (with a readily accessible disconnect device) must be installed
- User alarm facilities must be installed • Grounding electrode system must be installed and tested
- RF and antenna runs must be installed (if required) • Surge protection for antennas must be installed (if required)
- Tower light power must be installed (if required) • Tower light alarm must be installed (if required)
- The environment must comply with limits listed under **Environmental requirements** in the *Alcatel-Lucent RRH2x60-B4 – Site Preparation Guidelines*, 3MN-01520-0001-RJZZA
- Cable supports and racks must be installed • Conduit for DC power must be installed when applicable

Installation procedure checklist

Done	N/A	Task
		5-1: Install RRH on a pole
		5-2: Install RRH on a wall
		5-3: Procedure to change from Type A configuration to Type B
		5-4: Connect protective earth (PE) ground
		5-5: Connect optical fiber cables
		5-6: Route and connect user alarm cables (optional)
		5-7: Route and connect AISG cable (optional)
		5-8: Route and connect RF cables (optional)
		5-9: Connect DC power cable
		5-10: Final checks prior to installation

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4-1. Pre-installation steps - Preparing the RRH

Step 1

Remove the optical port cover.

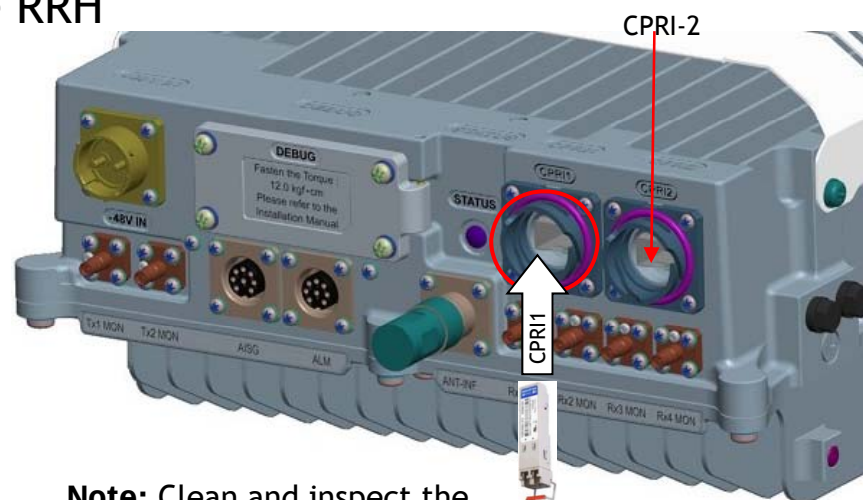
Step 2

Install the optical transceiver in the right slot.

NOTE: if only one optical port is used, insert the transceiver in CPRI1

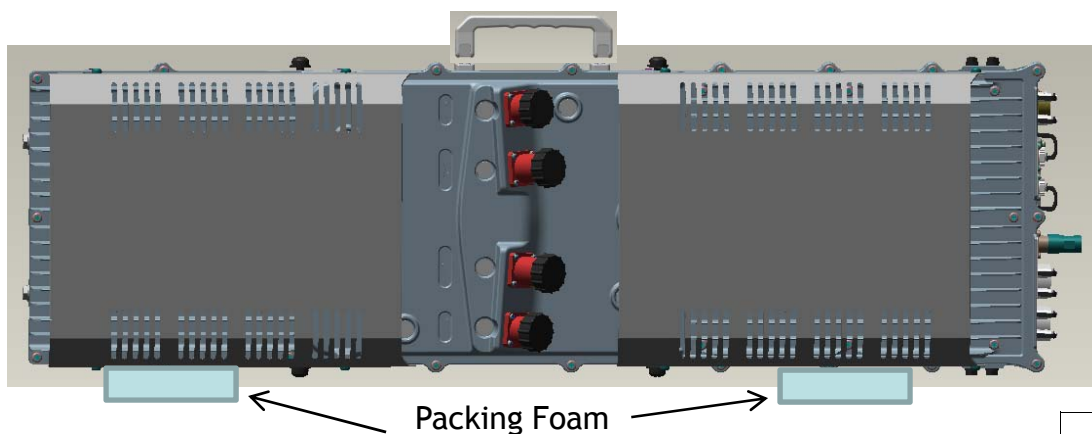
Step 3

Place the cover of the optical port back to protect the port.



Note: Clean and inspect the LC connectors on the CPRI fiber optic cable before connecting to SFP.

4-2. Handling the RRH



- 1- Always use the handle fitted onto the RRH body
- 2- Protect the side facing the ground with packing foam

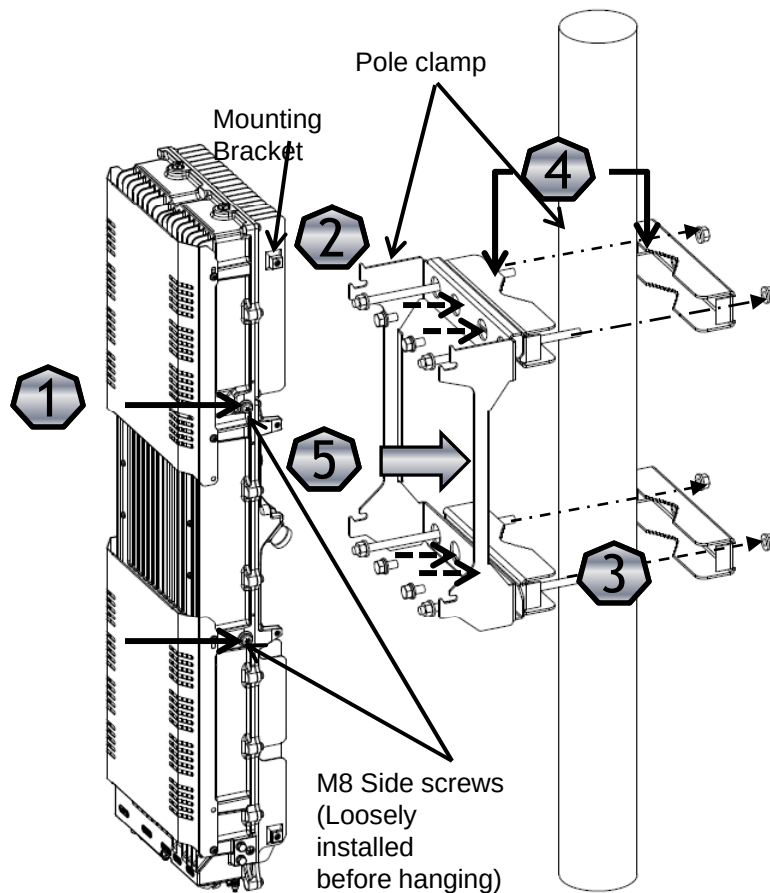
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5-1. Install RRH on a pole

Note: The RRH is shipped with the Wall Mounting Bracket and the solar shields installed (in Type A configuration.)

Step 1

Remove the mounting bracket from the RRH by loosening the four M8 side screws (see arrows). Do not completely remove the screws from the holes.



Step 2

Attach half of each pole clamp to the back of the Mounting Bracket using two M10x25 screws in the center holes, upper and lower.

Step 3

With the M10 flanged nut installed on one end of the M10 threaded rod, pass the threaded rod through both the upper and lower outer holes of the Mounting Bracket.

Step 4

Place the assembly against the pole and place the rear halves of each pole clamp, and secure with M10 flanged nuts.

Note: Ensure the mounting bracket is level.

Step 5

Hang the RRH on the Mounting Bracket and tighten the four M8 side screws.

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5-2. Procedure to change from Type A configuration to Type B

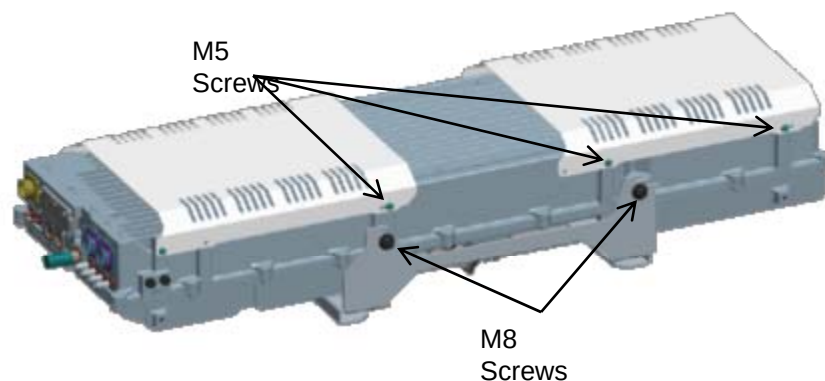
Note: The RRH is shipped with the Mounting Bracket installed in Type A configuration (on the same side as the antenna connectors). To convert to Type B configuration (Mounting Bracket on opposite side of antenna connectors).

Step 1

Remove the mounting bracket from the RRH by loosening the four M8 side screws. Do not completely remove the screws from the holes.

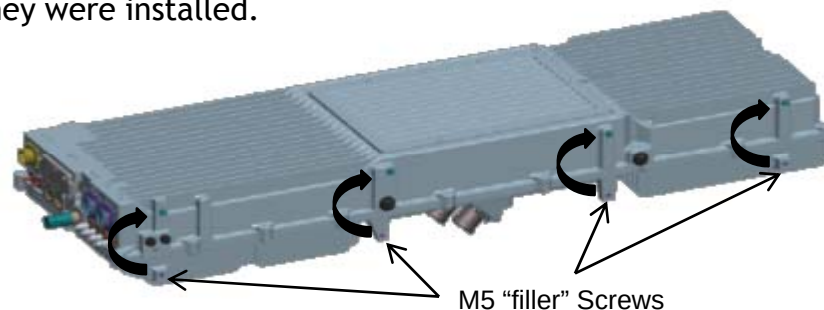
Step 2

Remove the solar shields by removing four M5 screws for each solar shield. Keep the screws.



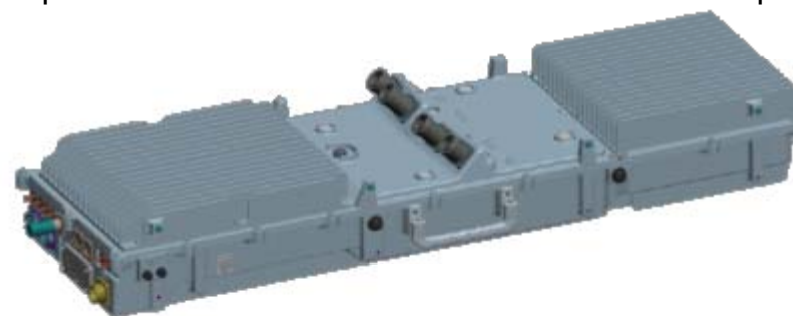
Step 3

Remove the 8 M5 “filler” screws, then insert the 8 M5 “filler” screws in the holes in the locations above where they were installed.



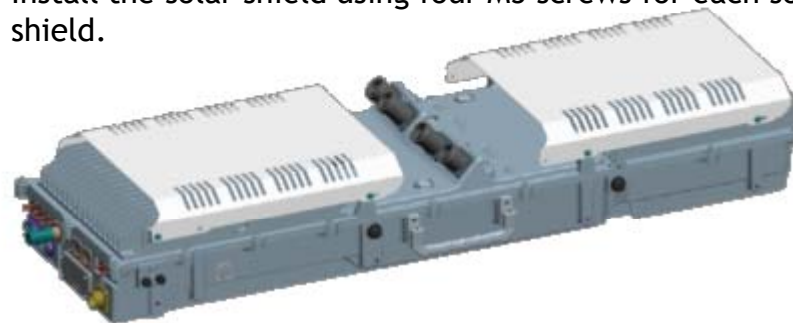
Step 4

Flip over the RRH so the antenna connector side is up.



Step 5

Install the solar shield using four M5 screws for each solar shield.



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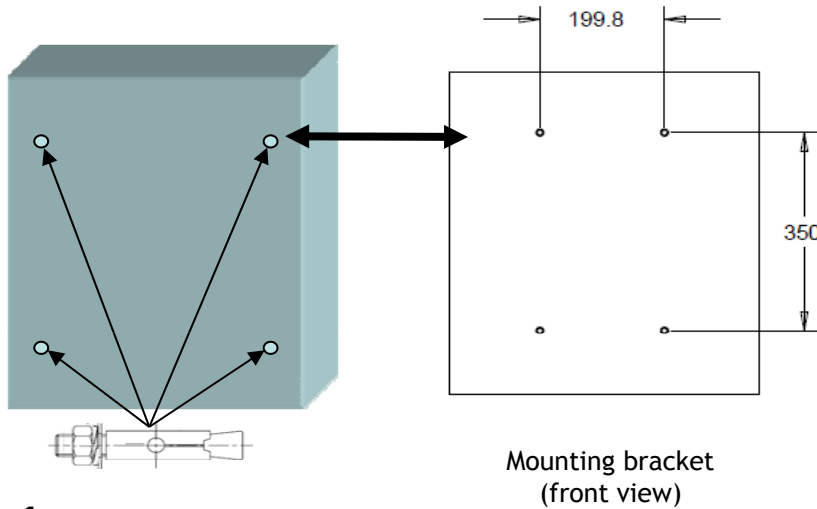
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5-3. Install RRH on a wall

Note: The RRH is shipped with the wall Mounting Bracket installed (in Type A configuration). For wall mounting, the Mounting Bracket must be converted to Type B configuration. See 4-2 Procedure to change from Type A configuration to Type B.



Step 1

Install a wall anchor in each mounting hole, tighten each anchor nut to secure anchor to wall, and remove anchor nut and washers.

Step 2

Install wall mounting bracket on anchor studs, install anchor washers and nuts, tighten each anchor nut to secure wall mounting bracket to wall.

Note: Ensure the mounting bracket is level.

Step 3

Loosely install M8 side mounting screws on both sides of the RRH.

Step 4

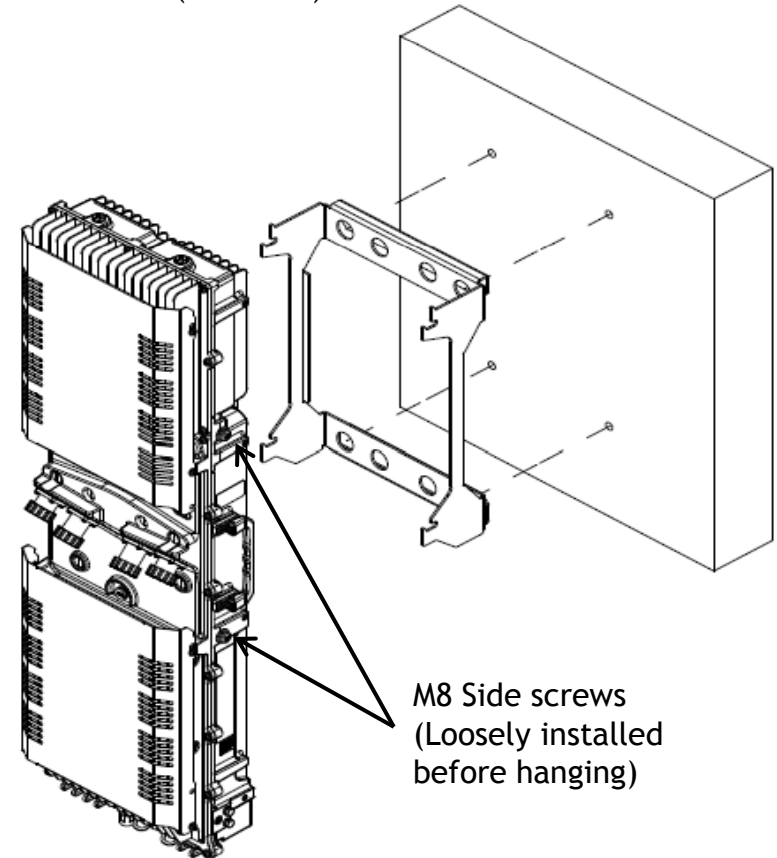
Carefully raise RRH into position on mounting by inserting the M8 side screws into the slots on mounting bracket.

Required materials

Part No.	Description	Qty.
3JR52709AA	Alcatel-Lucent RRH2x60-B4	1
N/A	Wall anchors (customer provided)	4

Step 5

Torque each M8 side screw (4 total) to 15.3 Nm (135 in-lb).



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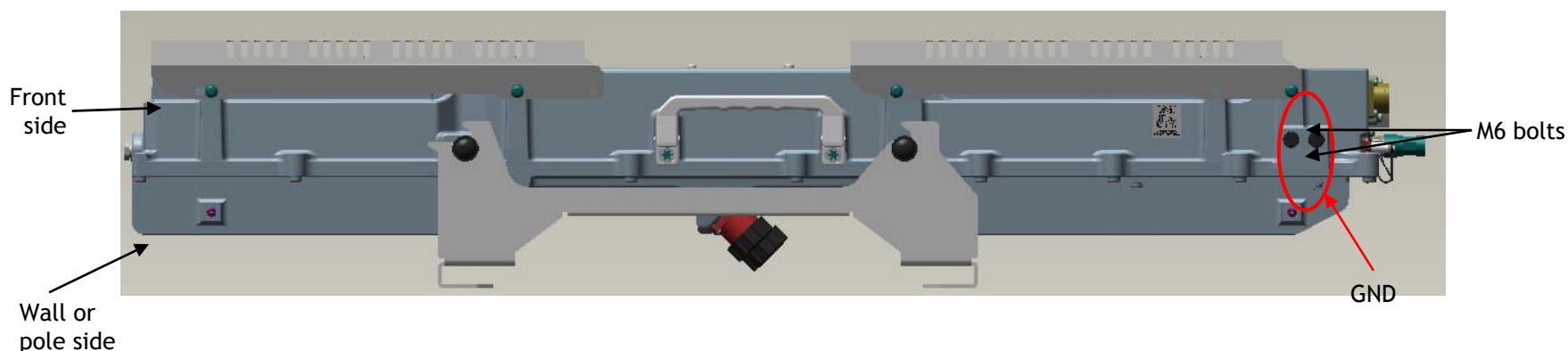
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4-4. Connect protective Earth (PE) ground

Step 1

Route the 35 mm² (#2 AWG) ground cable pigtail from the ground system (installed during site preparation) to the PE ground pad located on the lower right side or the lower left side of the RRH.

Alcatel-Lucent RRH 2x60-B4 PE ground



Step 2

At the RRH end, cut the ground cable to the proper length and strip the end of the cable.

Step 3

Crimp the 35 mm² (#2 AWG) two-hole lug (from the ground lug kit) onto the end of the ground cable. Clean the contact surface area and use antioxidant to prevent oxidation.

Step 4

Connect the ground lug to the RRH PE ground pad using the supplied M6 bolts, lock washers, and flat washers. Use antioxidant at the ground pad.

Step 5

Torque each bolt to 5.6 N·m (50 lbf-in).

Required materials		
Part No.	Description	Qty.
301022679	Ground lug kit (kit WES bag)	1

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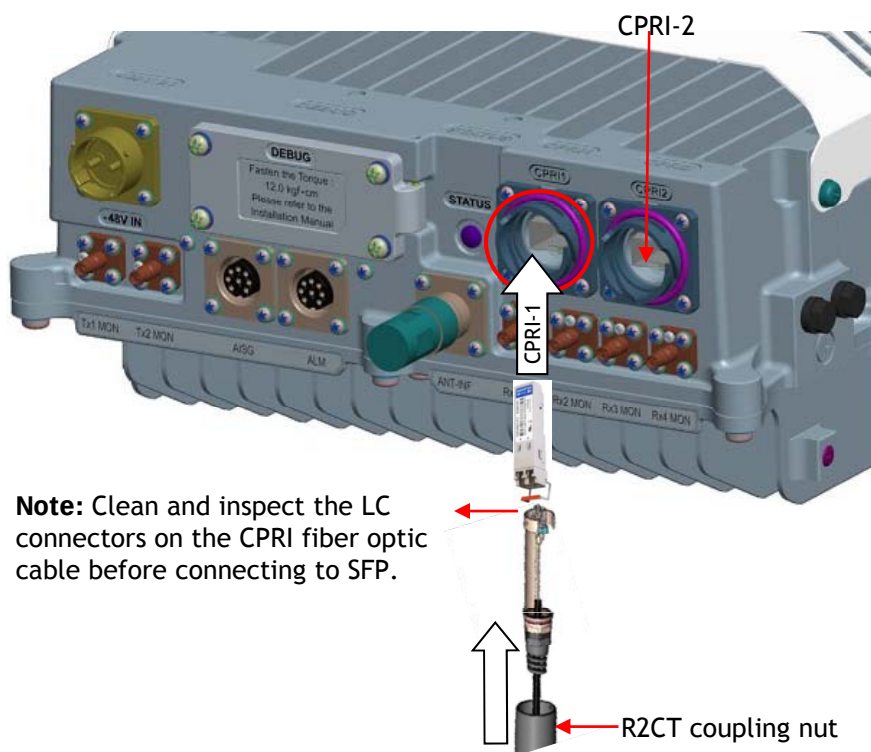
4-5. Connect optical fiber cables

NOTICE

Protect fiber cable

Mishandling fiber optic cable can result in damaged and non-functioning cables.

The optical cable is very sensitive, take the maximum precaution when installing it. The optical fiber should be protected in solid pipe. Do not use cable ties on the fiber cable. Do not cut this cable on site, excess length should be coiled inside the eNodeB. The fiber optic connector should be protected by a cap when not being used. Respect the bending radius during the manipulation of optical cable (82.5 mm).



Note: Clean and inspect the LC connectors on the CPRI fiber optic cable before connecting to SFP.

CPRI-2

CPRI-1

R2CT coupling nut

Required materials

Part No.	Description	Qty.*
	SFP transceiver, SMDF or MMDF , LC connector	1
Depends on length	Optical fiber, SMDF, LC-LC connectors	1
1AB027220001	R2CT weatherized plug	1

*Notes:

1. The CPRI daisy chain configuration is not supported in the initial release (LR14.1.L); it will be supported in a future release.
2. When the CPRI daisy chain configuration is supported and needed, Qty = 2 for all items and repeat Steps 1 through 3 to connect the CPRI-2 port to the next RRH.

Step 1

If not previously installed, install and route a fiber optic cable from the **CPRI-1** port on the bottom of the RRH to the eNodeB.

Note: The **CPRI-1** port is accessed with the left hand from the rear (pole-side) of the RRH.

Step 2

Remove protective cover from **CPRI-1** port.

Step 3

If not previously installed, remove protective cover from SFP, insert into **CPRI-1** port, and lock SFP into place.

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5-4. Connect optical fiber cables (continued)

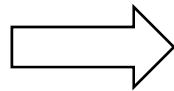
Step 4

Using the assembly instructions provided with the R2CT weatherized plug, assemble the R2CT plug onto the SMDF optical fiber and connect to **CPRI-1** port.

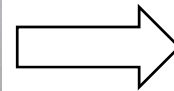
Step 4A

Using your left hand, connect the R2CT plug body to the **CPRI-1** port receptacle as follows:

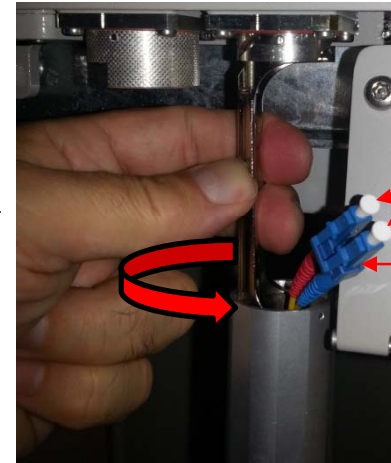
Align arrow on plug body with alignment mark on receptacle.



Insert plug body bayonet pins into slots on receptacle.



Rotate the plug body counter-clockwise to lock it into place.



Protective covers
LC connector

The base of the plug body should be on the left, as shown in the picture.

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5-5. Connect optical fiber cables - Step 4 (continued)

Step 4B

Remove the protective covers from the LC connector. Clean and inspect the LC connectors on the CPRI fiber optic cable.

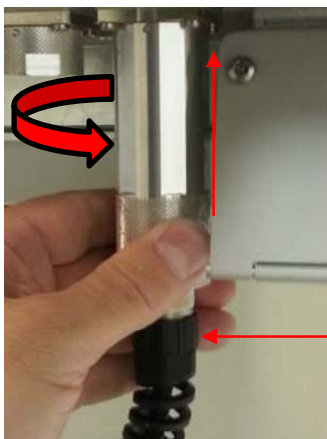
Step 4C

Using your left hand, connect the fiber optic cable to the **CPRI1** port SFP transceiver as follows:



Gently insert the LC connector into the SFP transceiver until it “clicks” into place.

Gently pull on the LC connector to verify that it is locked into place.



Step 4D

Using your left hand, carefully slide the coupling nut over the R2CT plug body and rotate counter-clockwise to lock it into place on the **CPRI1** port receptacle.

Step 4E

If not secured previously, manually thread the nut spiral onto the R2CT plug body and torque to approximately 3.5 N·m (31 lbf-in).

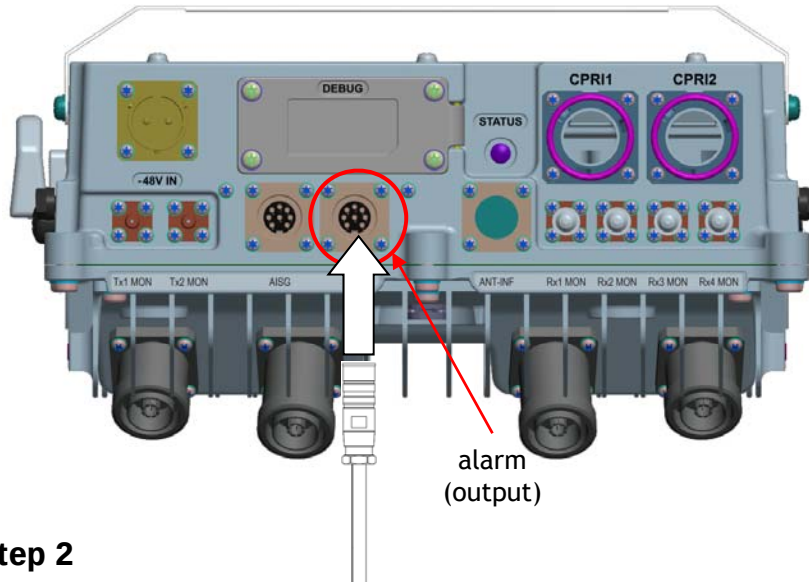
Nut spiral

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5-6. Route and connect user alarm cables (optional)

Step 1

Install and route the alarm cables from the alarm ports to the alarm distribution frame.



Step 2

Connect the alarm cables to the distribution frame.

Step 3

Using an ohmmeter or multi-meter, verify the continuity between the alarm cable connector pins and the distribution frame (DF).

Note: This measurement is performed on the alarm cable connector (RRH side) with a loop back of each pair (one by one) on the alarm DF side. Using a multi-meter, check that no short circuit appears between each pair and the shielding wires.

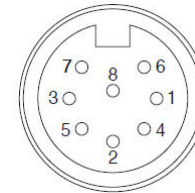
Step 4

Remove the protective cover from the alarm ports on the RRH.

Required materials

Part No.	Description	Qty.
Depends on length	User alarm cable, 4 pair, circular DIN male on one end	1 or 2

Connector pin configuration



Step 5

Plug the alarm cable connectors into the alarm ports and hand tighten the outer connector shell to secure the cables.

Alarm cable terminal configuration

Pin	Designation
1	User_ALM_4_P
2	User_ALM_3_RTN
3	User_ALM_1_P
4	User_ALM_2_RTN
5	User_ALM_2_P
6	User_ALM_4_RTN
7	User_ALM_3_P
8	User_ALM_1_RTN

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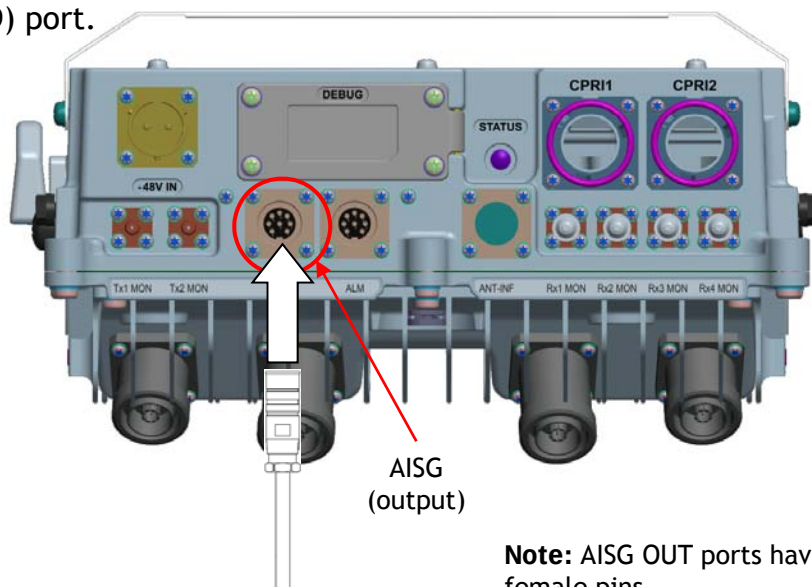
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5-7. Route and connect AISG cable (optional)

Step 1

Install and route the AISG cable from the **AISG** port on the bottom of the RRH to the respective AISG controller or external antenna line device (ALD) port.



Note: AISG OUT ports have female pins.

Step 2

Remove the protective cover from the AISG port on the RRH.

Note: To connect an AISG cable to the AISG port, plug the AISG cable into the AISG port and hand tighten the outer connector shell to secure the cable.

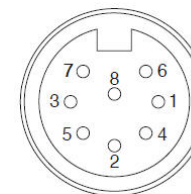
Step 3

Connect the **AISG** output port to the **AISG IN** port of another ALD.

Required materials

Part No.	Description	Qty.*
Depends on length	AISG connection cable, 8-pin circular DIN	1

Connector pin configuration



AISG cable terminal configuration

Pin	Designation
1	+12 V DC output
2	-48 V DC output
3	RS485 B
4	RS485 GND
5	RS485 A
6	+10 V to +30 V DC output
7	DC return
8	N/C

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5-8. Route and connect RF cables (optional)

Step 1

Install and route the RF cables to the RF ports on the top of the RRH.

Important! Ensure that RF cable shield grounding has been completed for all antenna cables.

Step 2

Providing adequate slack, cut each cable so it reaches its corresponding RF antenna connector or, if applicable, its corresponding RF surge protector.

Step 3

Terminate the end of each cable with the supplied 7/16 DIN connector.

Step 4

Remove the protective covers from the RF ports on the RRH.

Step 5

Connect each RF antenna cable to its corresponding RF port on the RRH.

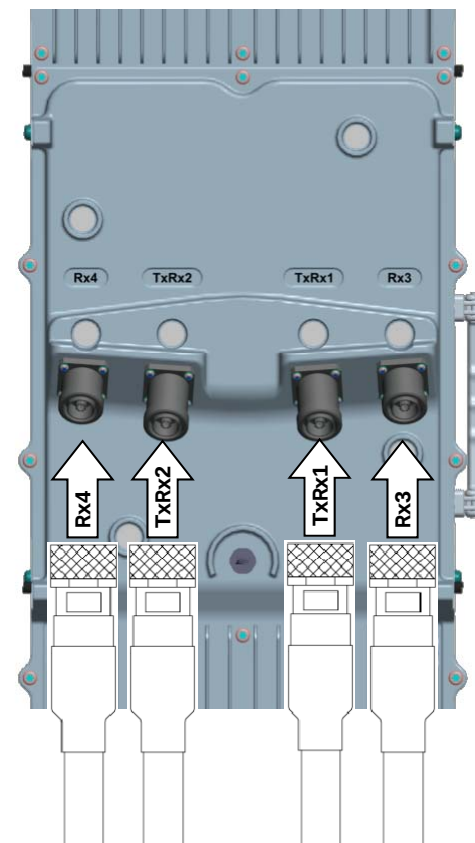
Note: RF surge protectors are optional.

Step 6

Torque each 7/16 male DIN connector to 25 N·m (221 lbf-in), at both ends (RRH and antenna) of each RF cable.

Important! Hold the body of the connector (part connected to the coaxial cable) with a 22 mm open-end wrench. Torque the rotating nut with a 32 mm open-end wrench.

Required materials		
Part No.	Description	Qty.
Depends on length	RF cable, coax, DIN male-DIN male/loose	1 to 4



Step 7

Secure the RF cables along their route.

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5-9. Connect DC power cable

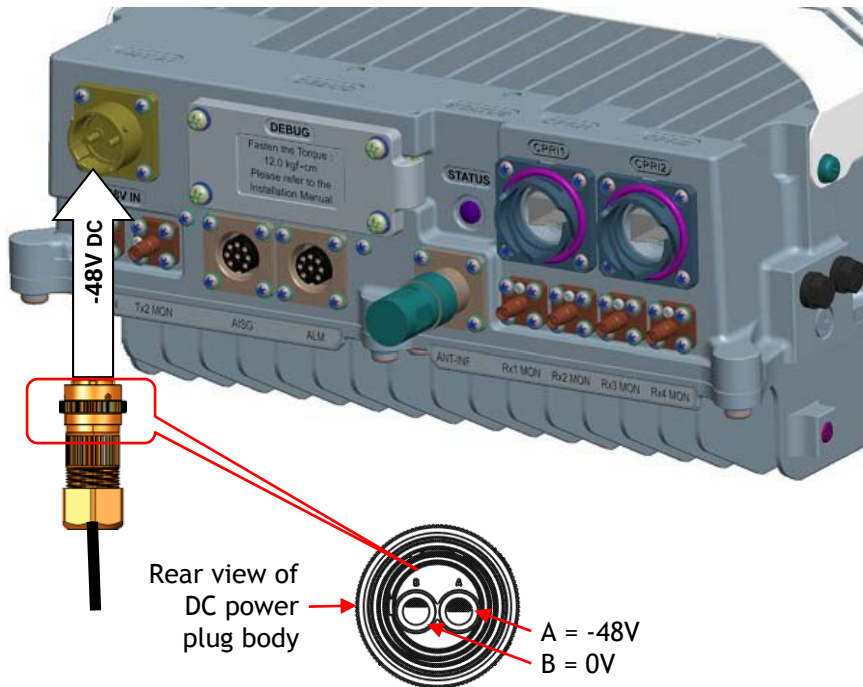


DANGER

Electric shock hazard

Contact with energized network element power supply lines can result in serious personal injury.

Ensure that the DC power is OFF and secured against turn-on before completing this procedure.



Step 1

If not previously installed, route the customer provided DC power cable to the bottom of the RRH.

Required materials

Part No.	Description	Qty.
1AB435070001	DC power plug, circular, 2-pin	1
N/A	Power cable, customer provided	1

Step 2

Conductors must be within an outer jacket to work with this DC plug

Step 3

Cut the DC power cable to an appropriate length and strip the ends of the wires.

Step 4

Using the assembly instructions provided with the DC power plug, attach the DC power cable to the DC power plug as follows :

- Pin A to **-48V**
- Pin B to **0V** (-48V return)

Step 5

Plug the DC power cable into the -48 V DC IN port and hand tighten the outer connector shell to secure the cable.

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5-10. Final checks of installation

Step 1

Inspect site for loose tools, materials, and parts. Remove all such loose tools, materials, and parts.

Step 2

Verify that all the exterior mounting hardware and cable connections are secure.

Step 3

Check the overall appearance of the Alcatel-Lucent RRH2x60-B4.

Note: Verify that nothing is unbalanced, unsecured, or out of alignment and no unintended mechanical alteration of the Alcatel-Lucent RRH2x60-B4, mounting brackets, or support structure has occurred.

Step 4

Fill the site install checklist to be delivered to the integration team.

6. Product conformance statements

For the product conformance statements that apply to the Alcatel-Lucent RRH2x60-B4, see *Alcatel-Lucent Remote Radio Head 2x60-B4 - Site Preparation Guidelines*, 3MN-01520-0001-RJZZA.

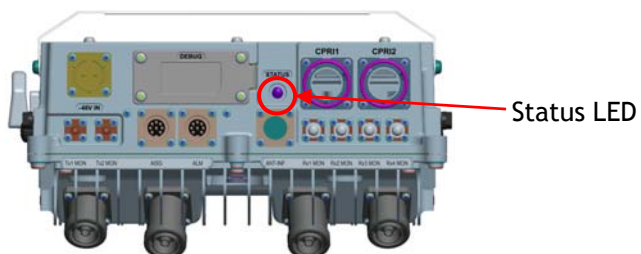
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7. Reference: General status LED states

General status LED states after power up

LED state	Status	Description
Off	No power supplied	No DC power
Solid red	Initial power on	RRH is initializing (if just powered on or reset)
	Non-recoverable critical failure	A critical hardware failure prevents the transmit and/or active receive paths from functioning
	Non-critical non-recoverable failure	Non-critical fault (other than antenna) detected, fault is not recoverable, RF transmission is still ON
Flashing red	Recoverable critical failure	RRH not currently operational due to hardware fault, but should recover (e.g., under-temperature warm up, over-temperature critical shutdown)
	External power supply failure	A recoverable fault is detected and the external connections (power, antenna) should be checked
	Non-critical recoverable failure	Non-critical fault (other than antenna) detected, fault is recoverable, RF transmission is still ON
	External antenna failure	An equipped antenna has a VSWR fault
Flashing yellow	Software download	RRH is downloading software and RF transmission is OFF, but is currently operational
Solid yellow	Slave CPRI link failure	The slave CPRI link (CPRI-1) has failed
Solid green	Normal operation	No critical failures or faults, transmitter is enabled.
Flashing green	Standby	No critical failures or faults, but the transmitter is disabled

Bottom view



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