BTS3900 GSM
Installation Guide

HUAWEI TECHNOLOGIES Co., Ltd.

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Safety Information

Following All Safety Precautions

Before any operation, read the instructions and precautions in this document carefully to minimize the possibility of accidents.
The Danger, Caution, and Note items in the documents do not cover all the safety precautions that must be followed. They only provide the generic safety precautions for operations.

Complying with the Local Safety Regulations

When operating the device, comply with the local safety regulations. The safety precautions provided in the documents are supplementary. You must comply with the local safety regulations.

Qualified Personnel Only

The personnel in charge of installation and maintenance must be trained and master the correct operating methods and safety precautions before beginning work.

Symbols

DANGER	*This symbol indicates that casualty or serious accident may occur if you ignore the safety instruction.*
CAUTION	*This symbol indicates that serious or major injury may occur if you ignore the safety instruction.*
NOTE	*This symbol indicates that the operation may be easier if you pay attention to the safety* instruction.

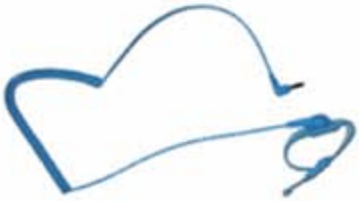
Safety of Personnel

- The high voltage power supply provides power for running the system. Direct contact with the high voltage power supply or contact through damp objects may result in fatal danger.
- Non-standard and improper high voltage operations may result in fire and electric shock.
- In a thunderstorm, do not perform operations on high voltage and AC power supply facilities or on a steel tower and mast.
- Ground the device before powering on the device. Otherwise, the personnel and device are in danger.
- Power off the device before performing operations on the power supply equipment.
- High power radio-frequency signals are harmful to human body. Before installing or maintaining an antenna on a steel tower or mast with a large number of transmitter antennas, the operator should coordinate with all parties to ensure that the transmitter antennas are shut down.
- When handling optical fibers, do not stand close to, or look into the optical fiber outlet with unaided eyes.
- Protect yourself when drilling holes. Flying dust may hurt your eyes or you may inhale the dust.
- Power off the batteries before connecting the cables to the batteries. Otherwise, casualties may occur.
- When working at a height, be cautious about falling objects.

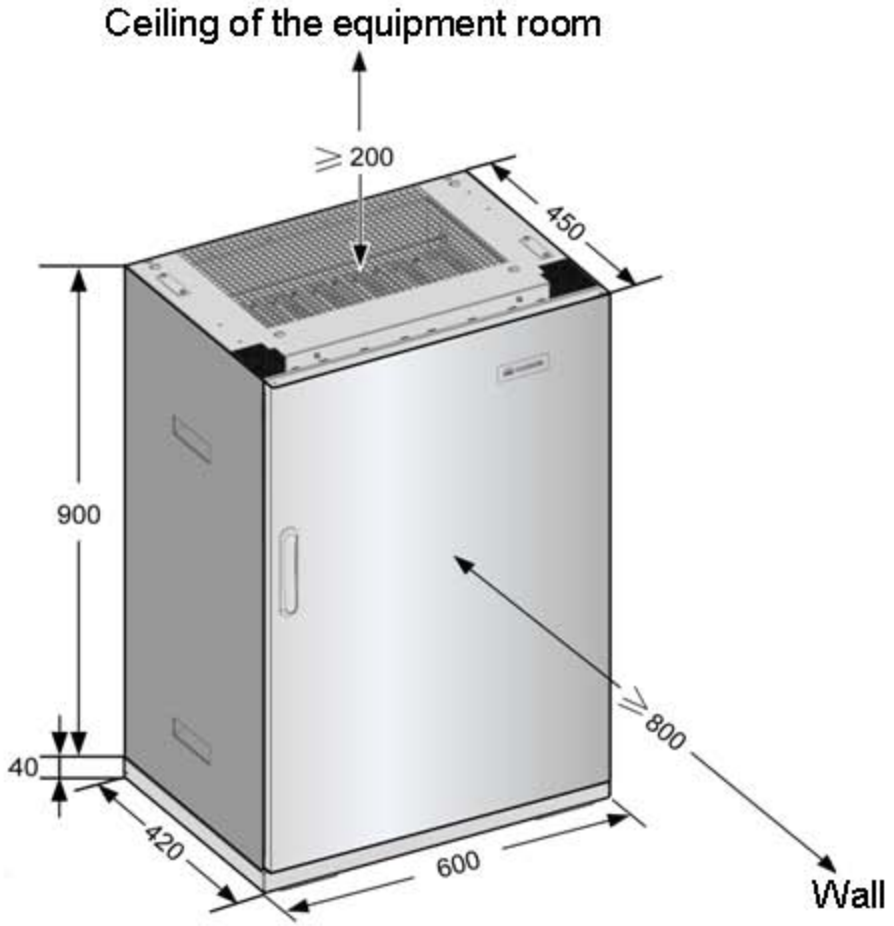
Device Safety

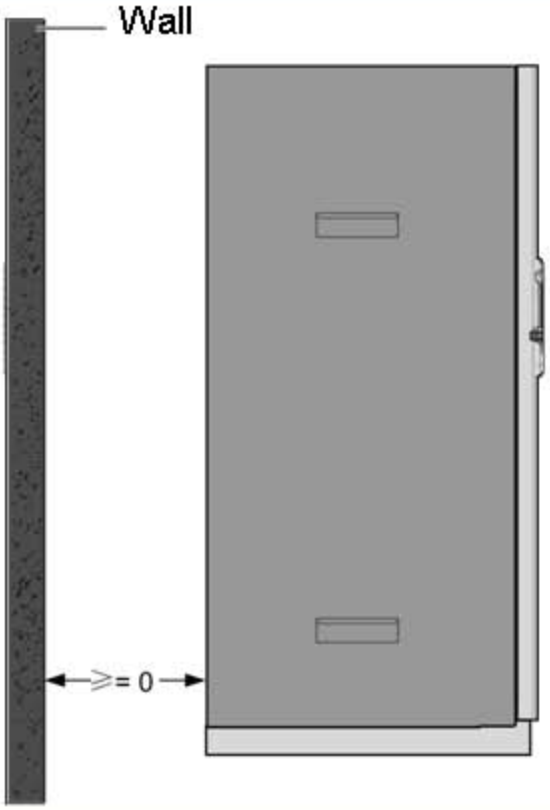
- Check the electrical connection of the device before operation and ensure that the device is reliably grounded.
- The static electricity generated by the human body may damage the electrostatic sensitive components on the circuit board, such as the large-scale integrated circuit (LIC). Wear an ESD wrist strap or ESD gloves when performing the operation.
- When working on batteries, take measures to prevent short circuits in the batteries and electrolyte spill/loss. The electrolyte may erode metal and boards, or even cause rust of the equipment or short circuits in the boards.
- The BTS3900. must be powered on within one week after installation.

Installation Tools and Instruments

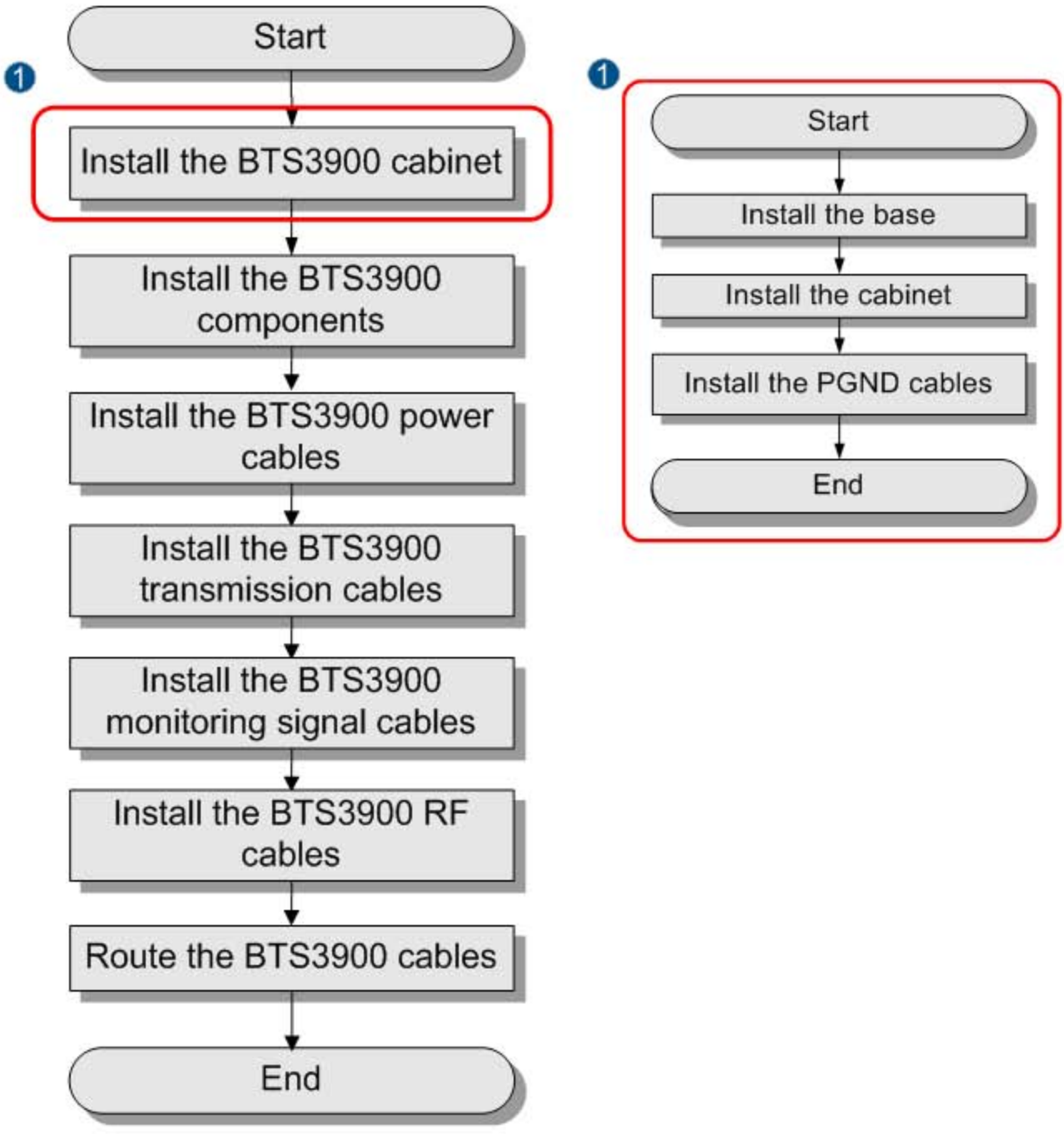
 Long measuring tape	 Phillips screwdriver (M3~M6)	 Flat-head screwdriver (M3~M6)
 Wrench	 Socket wrench	 Percussion drill
 ESD wrist strap	 Vacuum cleaner	 Cable peeler
 Torque wrench	 Marking pen	 Level bar
 Claw hammer	 RJ-45 crimping pliers	 Multimeter
 Power cable crimping pliers	 Wire cutter	 ESD gloves

Space Requirements of the BTS3900 (Unit: mm)





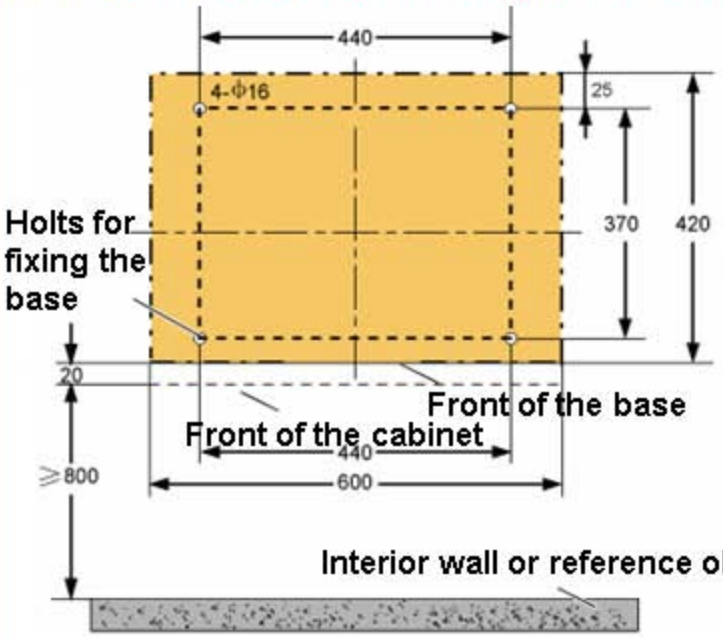
Procedure for Installing the BTS3900

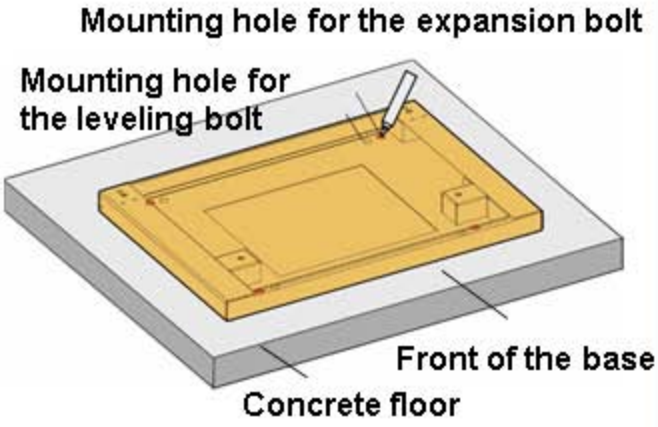


Installing the BTS3900 Cabinet

a Installing the Base

1 Determine the installation position of the cabinet.

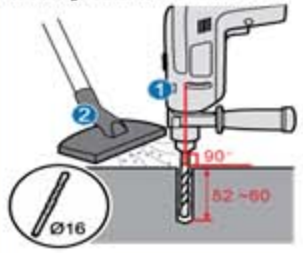


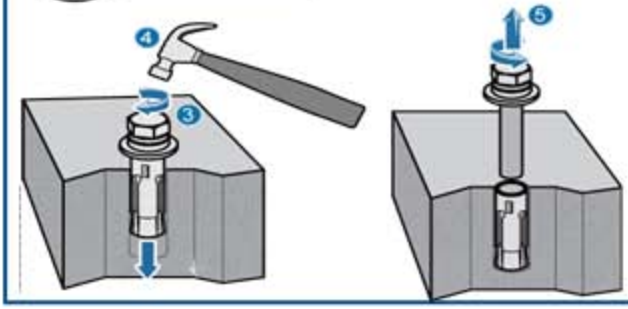


2 Drill holes at anchor points and install expansion bolt assemblies.

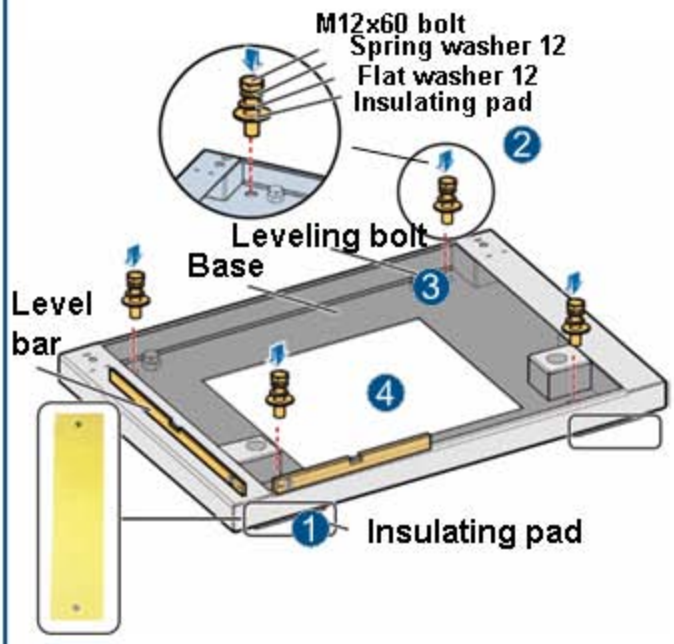
CAUTION

- You need to take proper safety measures to protect your eyes and respiratory tract against the dust before drilling holes.
- The depth of the holes must be within the range from 52 mm to 60 mm. All the holes must be in the same depth.
- The expansion tube must be fully buried into the floor to ensure that the cabinet can stand steady on the floor.



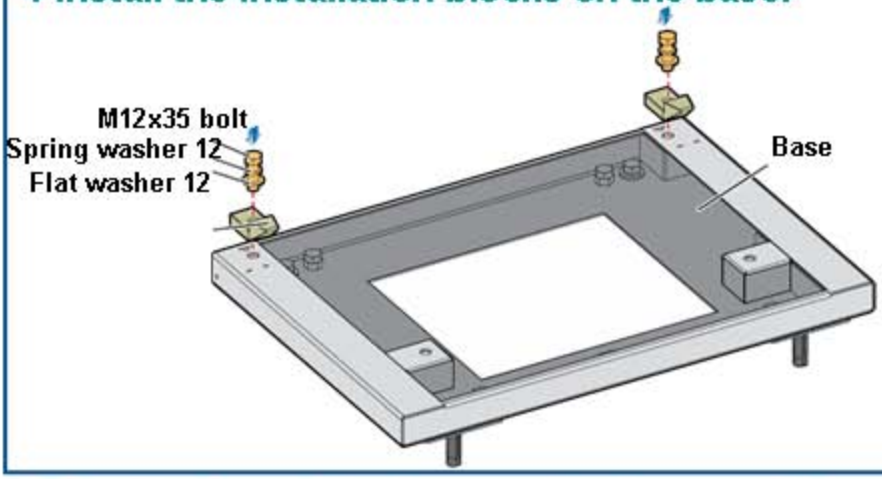


3 Install the base on the floor.



- Use the torque wrench to diagonally tighten the bolts used to fix the base.
- Do not tighten the expansion M12x60 bolt when installing it, tighten it after leveling the base.
- Use the leveling M12x25 bolt to level the base.

4 Install the installation blocks on the base.



NOTE

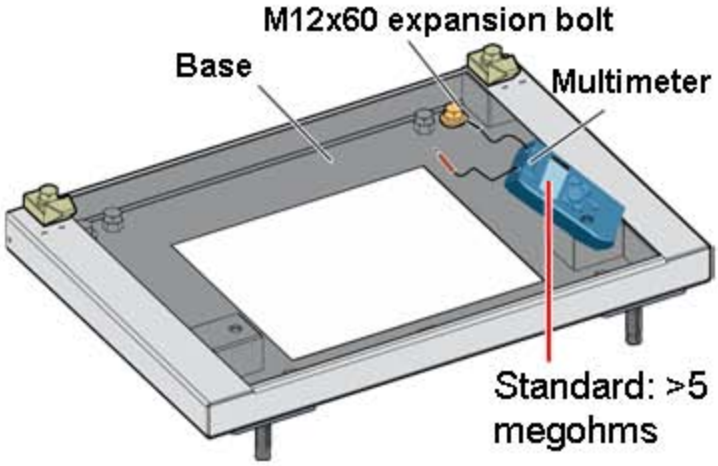
The installation blocks should be securely installed on the base through the expansion bolts.

5 Test the insulation between the base and the expansion bolts.

NOTE

•The insulation test must be conducted at all the four corners.

•If the resistance is lower than 5 megohms, you can infer that the base is not insulated from the ground. In this case, remove the expansion bolts and check whether the insulating pads are missing or damaged. If the insulating pads are missing or damaged, reinstall them and level the base.



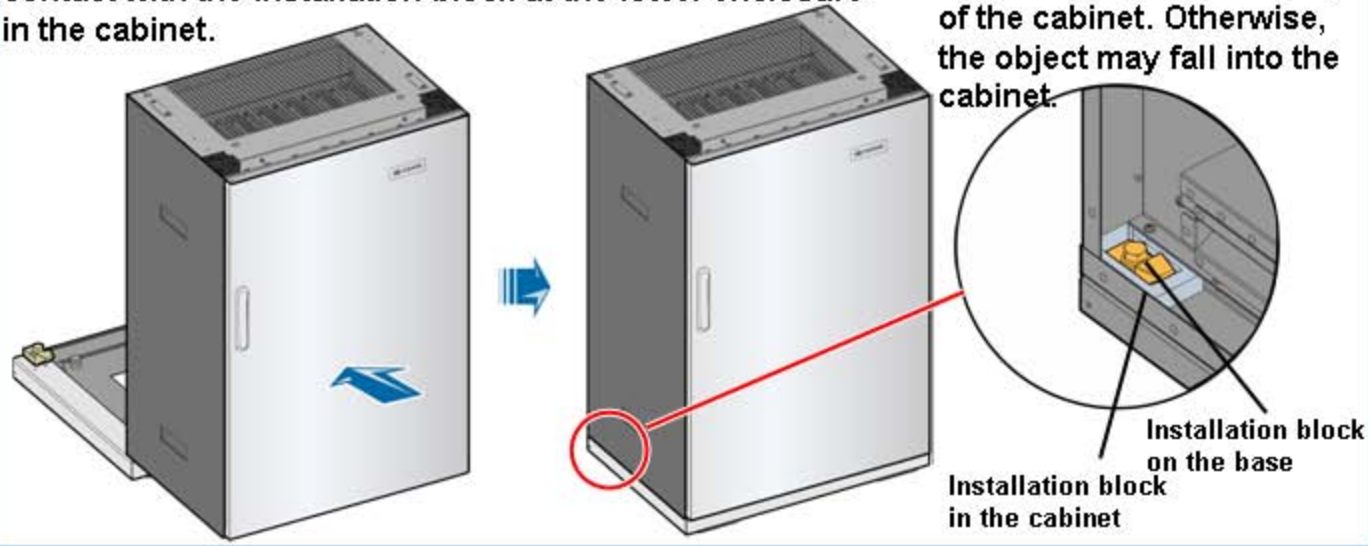
b Installing the Cabinet

1 Place the cabinet on the base.

Put the cabinet on the base, and push the cabinet so that the installation block on the base is in complete contact with the installation block at the lower enclosure in the cabinet.

NOTE

During the installation, do not place any object on top of the cabinet. Otherwise, the object may fall into the cabinet.

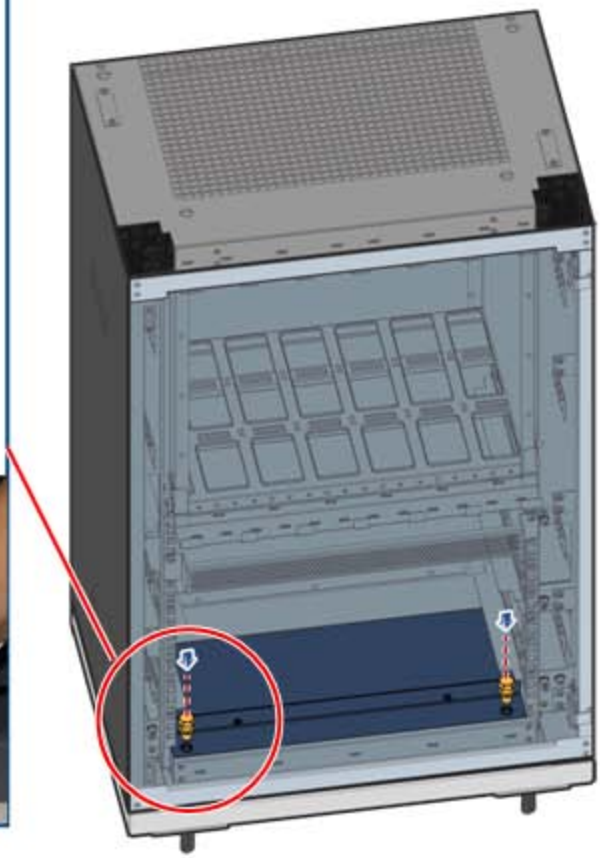


2 Fix the cabinet on the base.

Install the installation blocks securely on the base by using the expansion bolts.

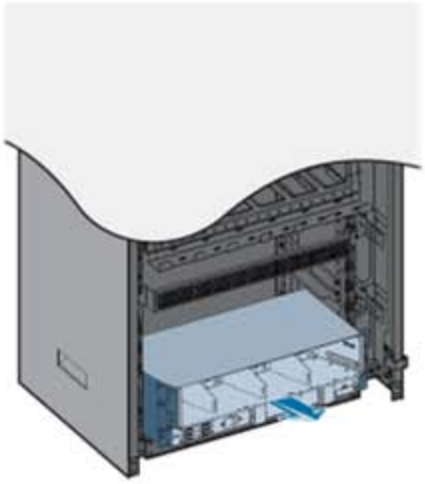
1

2



CAUTION

If the power subrack is positioned in the cabinet when the cabinet is delivered, you need to remove the power subrack before tightening the screws. After installing the cabinet, reinstall the power subrack.

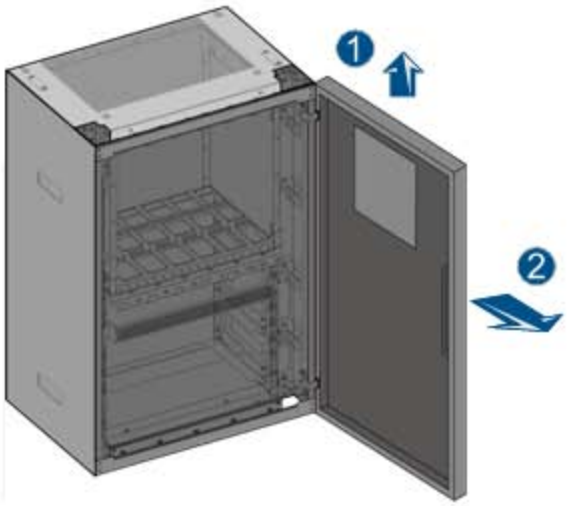


C Installing the PGND Cables in the Cabinet

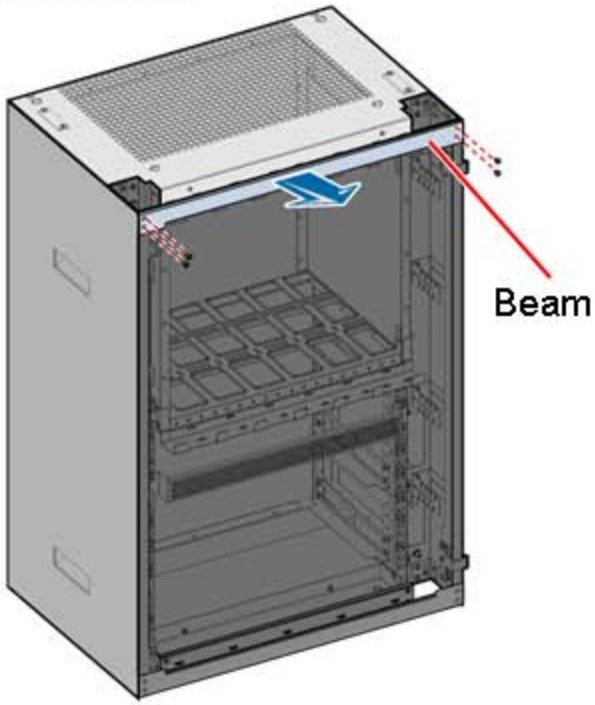
1 Remove the cabinet door.

NOTE

By default, a grounding cable is connected to the cabinet door before delivery. Therefore, remove the grounding cable before removing the cabinet door.



2 Remove the horizontal beam from the cabinet.

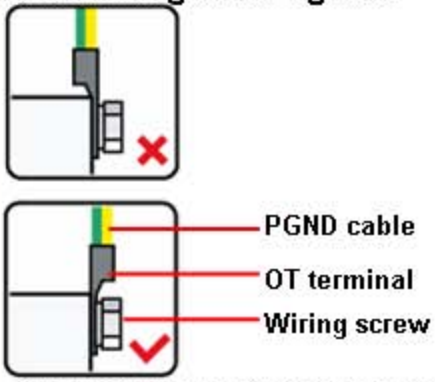


3 Install the PGND cables.

NOTE

Specifications:

PGND cables: 25 mm²
Equipotential cables: 16 mm²
Perform the following steps to install the components only after the other end of the PGND cable is connected to the external grounding bar.

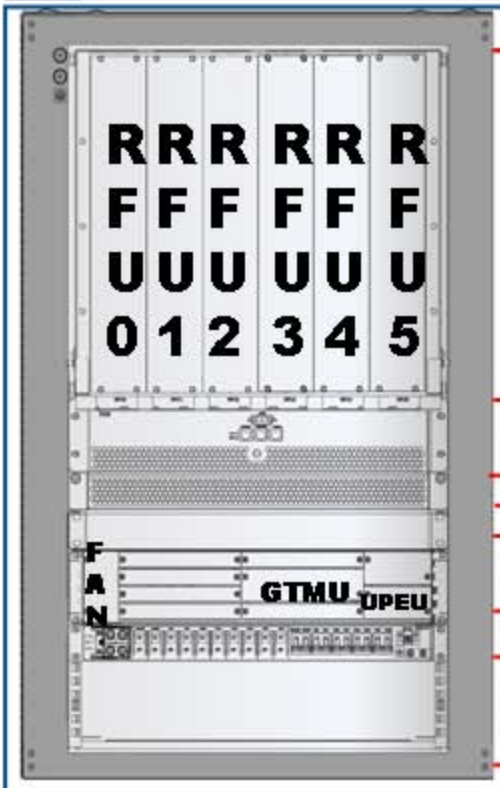


The OT terminals (14170020) at both ends of a PGND cable should be made and securely crimped on site. When two cabinets are stacked, each cabinet has one PGND cable. In addition, the two cabinets are connected through an equipotential cable.

Installing the BTS3900 Components

NOTE Wear gloves when installing all the boards and modules.

a Slots in the BTS3900 Cabinet



-48 V cabinet

9 U for RFUs (to be installed)

2 U for FAN unit (installed)

1 U for Air inlet (installed)

1 U (available for GATM)

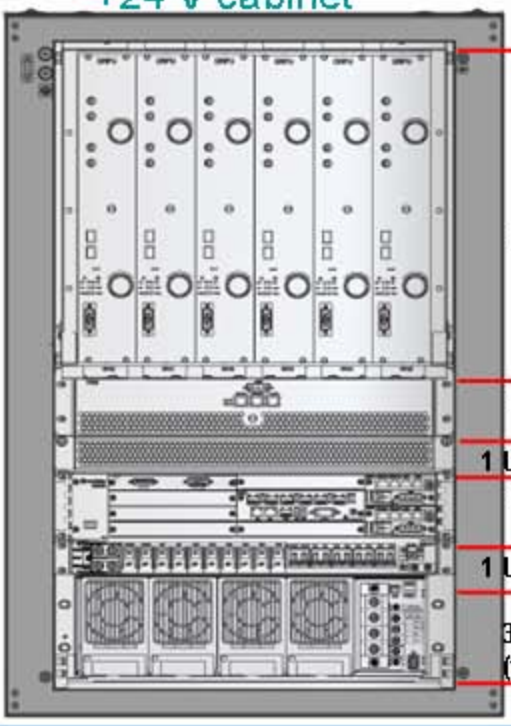
2 U for BBU (to be installed)

1 U for DCDU-01 (installed)

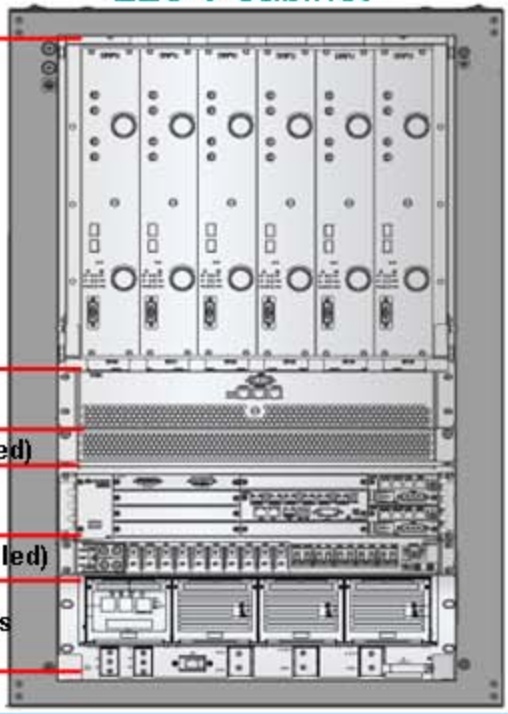
2 U for transmission equipment

When the DRFU is configured in the cabinet, you need to configure the GATM if the RET antenna or Tower Mounted Amplifier is selected. The GRFU integrates the function of controlling the RET antenna and TMA. Therefore, you do not need to configure the GATM when configuring the GRFU.

+24 V cabinet



220 V cabinet



9 U for RFUs (to be installed)

2 U for FAN unit (installed)

1 U for Air inlet (installed)

2 U for BBU (to be installed)

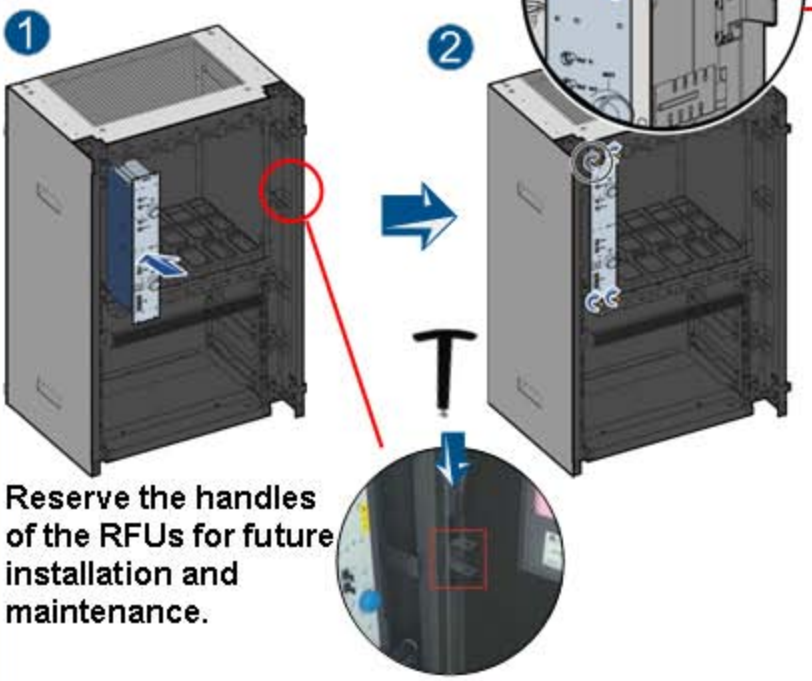
1 U for DCDU-01 (installed)

3 U for PMU and PSUs (to be installed)

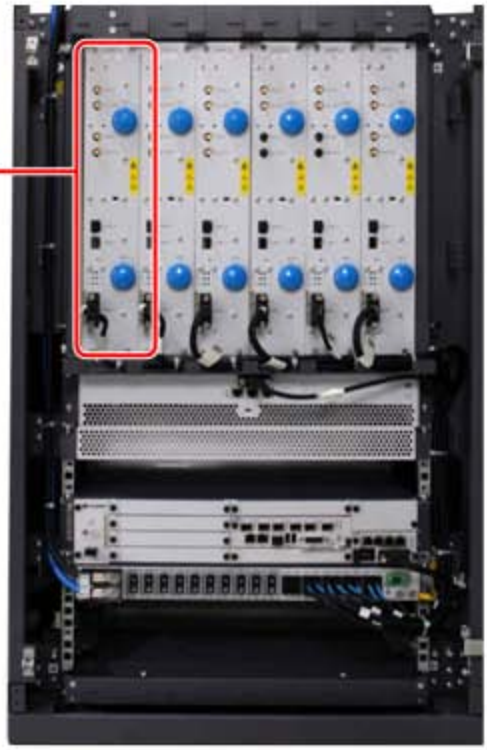
b Installing the DRFUs

The DRFUs should be securely installed in the cabinet.

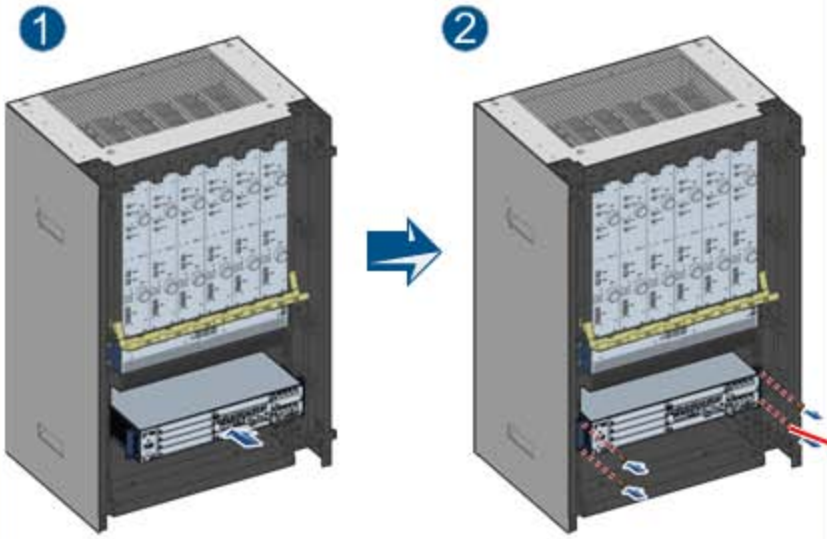
The installation of GRFU is the same as that of DRFU.

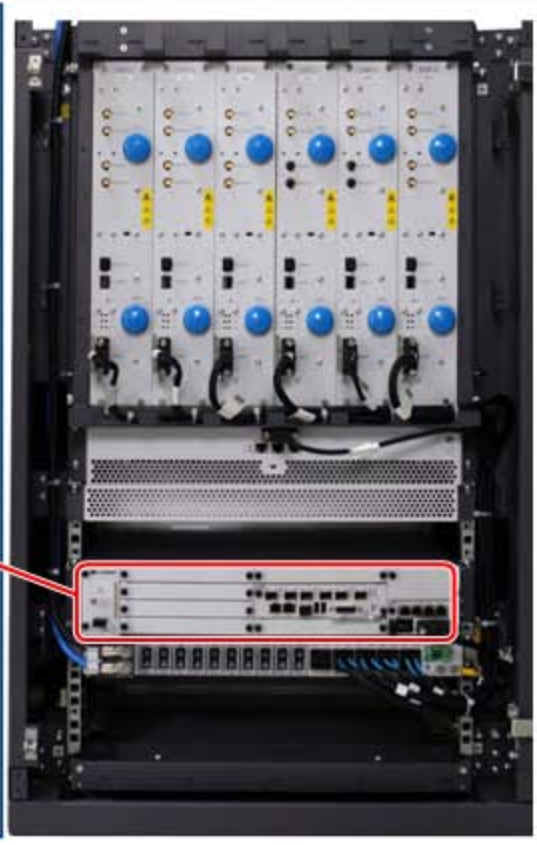


Reserve the handles of the RFUs for future installation and maintenance.



c Installing the BBU





d Installing the PMU and PSUs (Optional)

NOTE

•In a +24 V cabinet, you need to install the PSUs (DC/DC).

•In a 220 V cabinet, you need to install the PMU and PSUs (AC/DC).

The procedure for installing a PSU is similar to that for installing the PMU. The following procedure takes the PMU as an example. Note that step 1 is applicable to only the PMU.

1 Set the DIP switch on the PMU.

NOTE

•If one PMU is configured, bit 1 and bit 2 of the DIP switch is set to ON and the other bits are set to OFF.

•If two PMUs are configured and two monitoring signals of the PMUs are connected to the MON0 or MON1 port on the UPEU/UEIU panel on the BBU, the DIP switch on the first PMU is set in the same way as that on the PMU when only one PMU is configured; bit 3 of the DIP switch on the second PMU is set to ON, and the other bits are set to OFF. If one monitoring signal cable is connected to the MON0 port and the other signal is connected to the MON1 port, the settings of the DIP switches on the PMUs can be the same. For details, see the settings of a single PMU.

2 Loosen screws on the panel.

3 Loosen the handle.

4 Insert the PMU into the slot.

Installing the BTS3900 Power Cables

a Installing the Power Cables in a -48 V Cabinet

NOTE Before routing the cables, attach labels to the cables.

1 Install the input power cables.

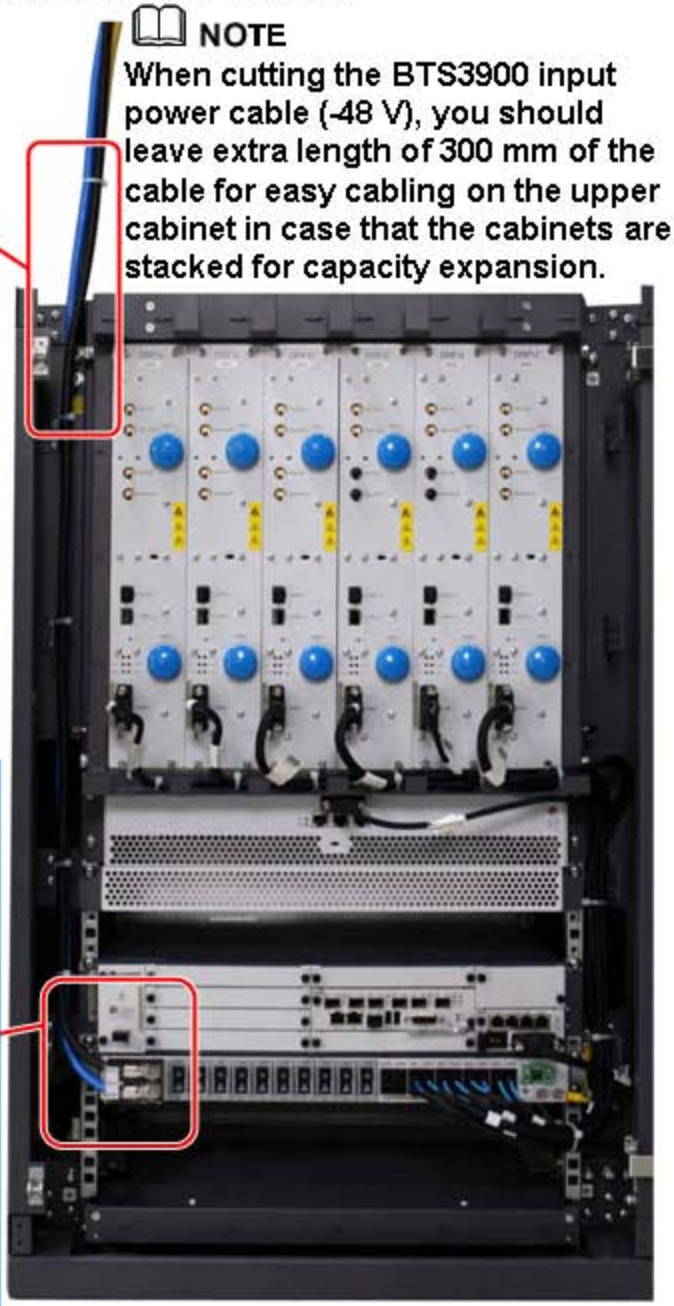
All cable ties should be bound at even intervals and in the same direction.

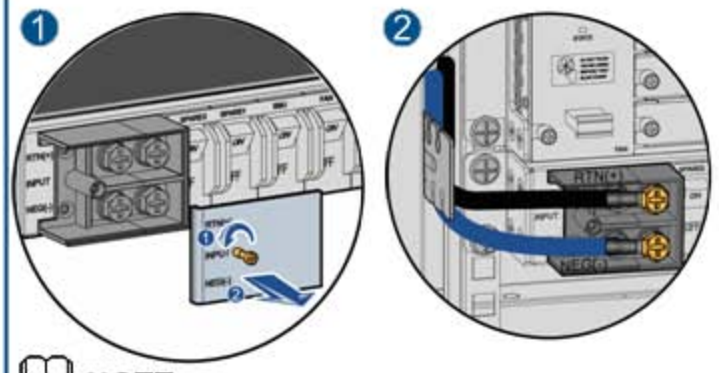
Correct:

Bind the installed power cables and PGND cable together.

NOTE

When cutting the BTS3900 input power cable (-48 V), you should leave extra length of 300 mm of the cable for easy cabling on the upper cabinet in case that the cabinets are stacked for capacity expansion.





NOTE

The OT terminal should be connected to the wiring terminals on the right. Ensure that the power cables are bent smoothly at the curves.

Cable (BOM)	Installation Position		Appearance
	One End	The Other End	
Input power cable (-48 V) (25030430/ 25030428)	External power supply	Power input terminal block on the DCDU-01, with the blue cable to the NEG(-) terminal and the black terminal to the RTN(+) terminal.	

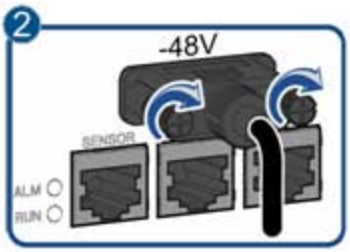
a Installing the Power Cables in a -48 V Cabinet

2 Install the power cables between the DCDU-01 and the modules.

1. The power cable between the DCDU and the RFU is bound before delivery. You only need to link the 3V3 connector to the PWR port on the RFU on site. Labels must be consistent with the slot numbers.

NOTE

In the case of -48 V DC input, the maximum input current is 83 A. Then, the upper-level MCB should be a 80 A to 100 A type. The 80 A type is recommended.

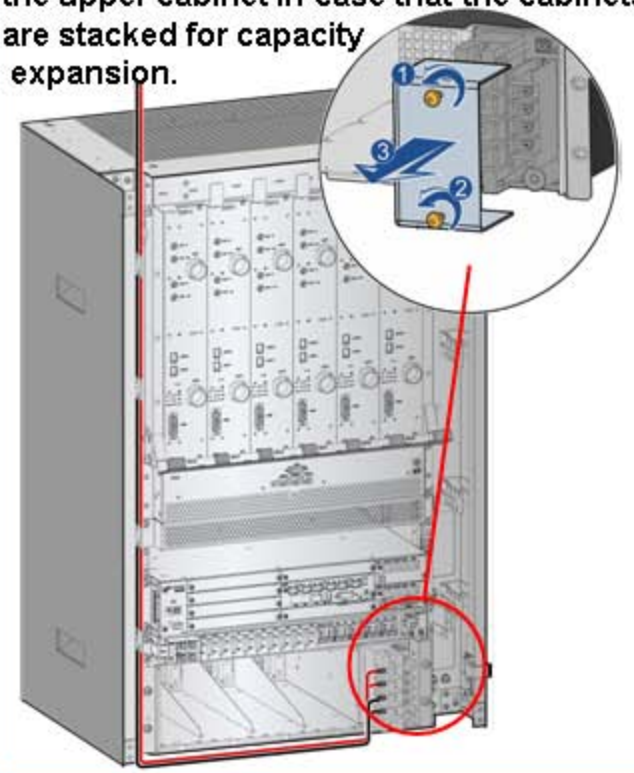


Cable (BOM)	Installation Position		Appearance
	One End	The Other End	
1 Power cable between the DCDU and the RFU (04150029/04150030)	RFU port on the DCDU-01 panel	PWR port on the RFU	
2 Power cable between the DCDU and the FAN unit (04150029)	FAN port on the DCDU-01 panel	-48V port on the FAN unit	
3 Power cable between the DCDU and the BBU (04150065)	BBU port on the DCDU-01 panel	PWR port on the UPEU in the BBU	

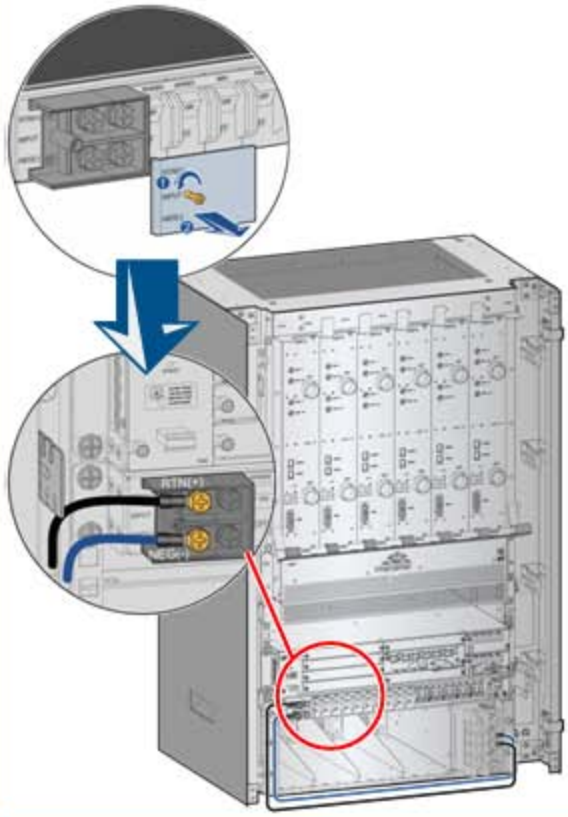
b Installing the Power Cables in a +24 V Cabinet

1 Install the input power cables.

When cutting the BTS3900 input power cable (+24 V), you should leave extra length of the cable for ease of cabling on the upper cabinet in case that the cabinets are stacked for capacity expansion.



2 Install the power cables between the wiring unit and the DCDU-01.



3 Install the power cables between the DCDU-01 and the modules.

For details, see page 13.

NOTE

In the case of +24 V DC input, the maximum total input current is 180 A. Due to the parallel connection of two power inputs, the upper-level MCB should be two thermomagnetic breakers or fuses between 90 A to 100 A. Two 100 A thermomagnetic breakers or fuses are recommended.

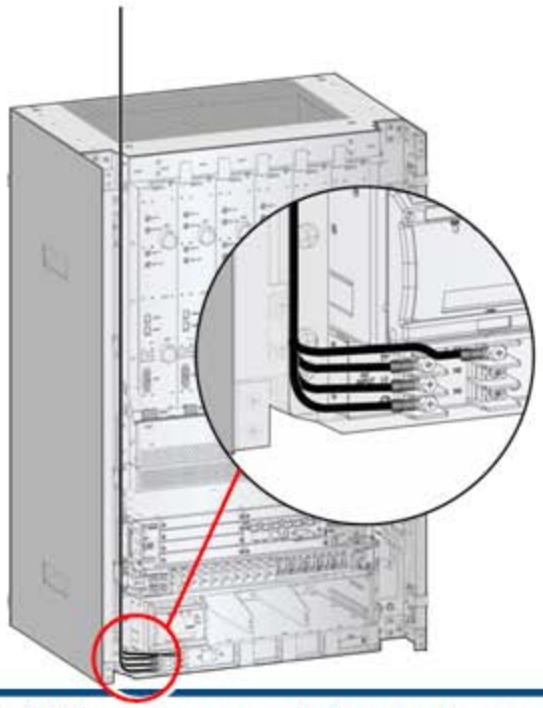
Cable (BOM)	Installation Position		Appearance
	One End	The Other End	
Input power cable (+24 V)	External power supply	+ and - terminals on the wiring unit of the power subrack	
Power cable between the PSU (DC/DC) and the DCDU (black: 04150056; blue: 04150057)	Wiring unit of the power subrack, with the blue cable to the LOAD terminal and the black cable to the RTN terminal	Power input terminal block on the DCDU-01, with the blue cable to the NEG(-) terminal and the black cable to the RTN(+) terminal	-

C Installing the Power Cables in a 220 V Cabinet

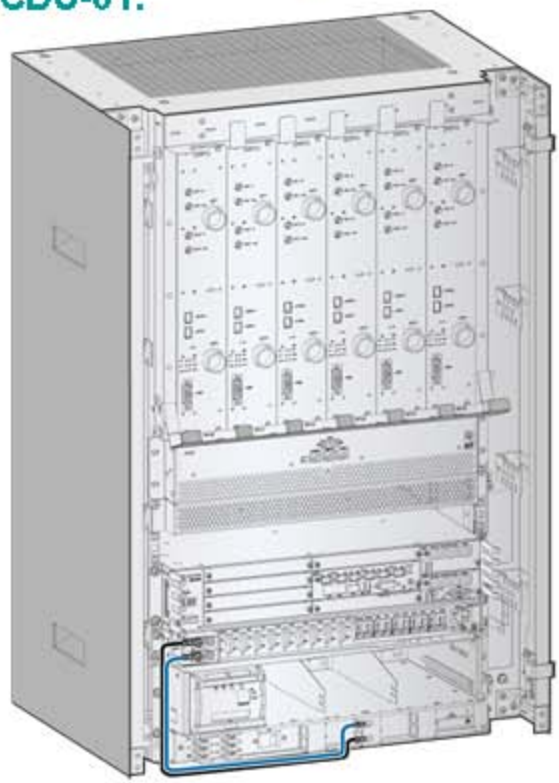
1 Install the input power cables.

NOTE When cutting the BTS3900 input power cable (220 V), you should leave extra length of the cable for ease of cabling on the upper cabinet in case that the cabinets are stacked for capacity expansion. The left table list the colors of power cables.

	L1	L2	L3	N1
China	Yellow	Green	Red	Blue
Europe and other parts of Asia	Brown	Black	Gray	Blue



2 Install the power cables between the wiring unit and the DCDU-01.



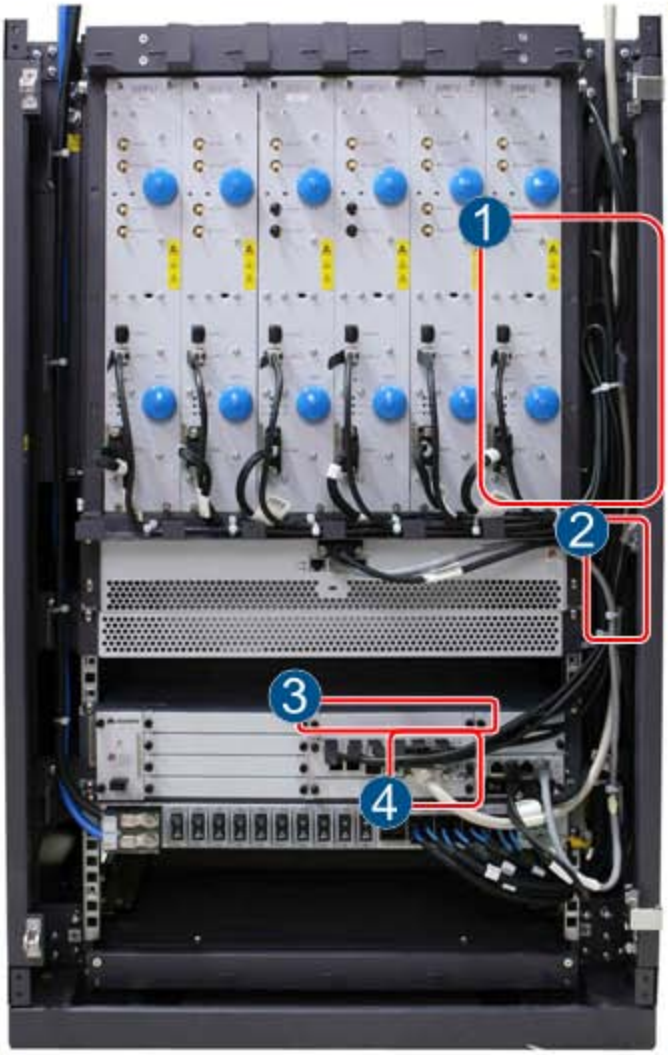
3 Install the power cables between the DCDU-01 and the modules.

For details, see page 13.

Cable (BOM)	Installation Position		Appearance
	One End	The Other End	
Input power cable (220 V)	External power supply	L and N terminals on the wiring unit of the power subrack	
Power cable between the PSU (AC/DC) and the DCDU (black: 04150056; blue: 04150057)	Wiring unit of the power subrack, with the blue cable to the LOAD2(-) or LOAD1(-) terminal and the black cable to the RTN(+) cable	Power input terminal block on the DCDU-01, with the blue cable to the NEG(1) terminal and the black cable to the RTN(+) terminal	-

Installing the BTS3900 Transmission Cables

NOTE Before routing the cables, attach the labels to the cables.



1

Redundant cables should be neatly coiled in the cabinet and bound with cable ties.

The bound CPRI and power cables should be routed below the edge of the cable trough.

2

Bind the CPRI cable next to the power cable.

The E1 cable should be bound at the innermost position.

The CPRI and E1 cables should be routed in the cable trough and along the right side of the cabinet.

4

Install the E1 cable.

3

Ensure that the CPRI cables are curved smoothly at the bend.

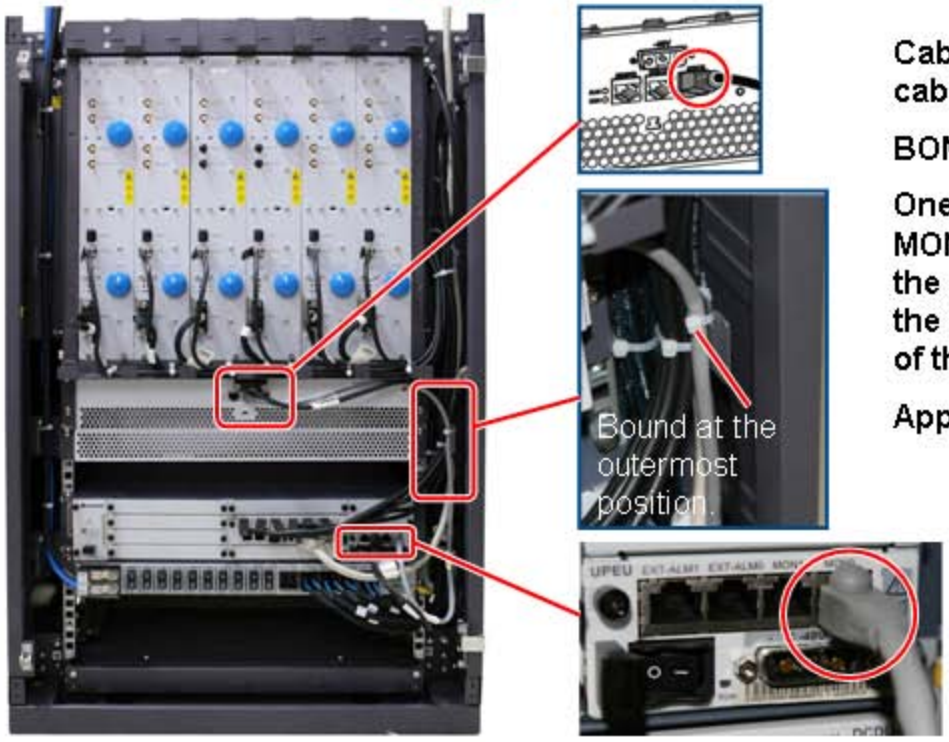
Cable (BOM)	Installation Position		Appearance
	One End	The Other End	
E1 cable (04120023)	E1/T1 port on the GTMU	Associated auxiliary device	
CPRI cable	One of the CPRI0 to CPRI5 ports on the GTMU in the BBU	CPRI1 port on the DRFU or CPRI0 port on the GRFU	

Installing the BTS3900 Monitoring Signal Cables

NOTE Before routing the cables, attach the labels to the cables.

a Installing the Monitoring Signal Cables in a -48 V Cabinet

1 Install the monitoring signal cable for the FAN unit.



Cable: monitoring signal cable for the FAN unit

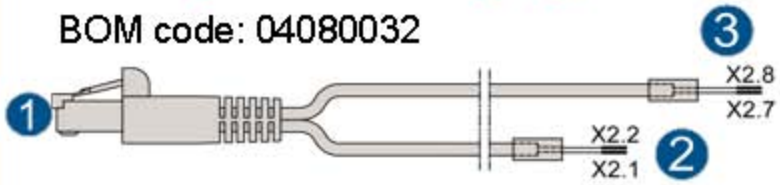
BOM code: 04070025

One end is connected to the MON0 port on the UPEU, and the other end is connected to the COM IN port on the panel of the FAN unit.

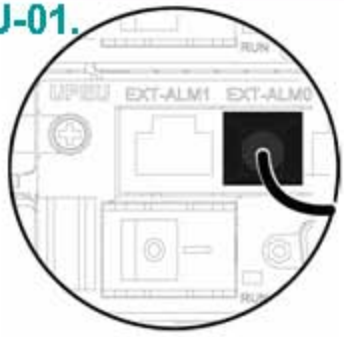
Appearance of the cable:

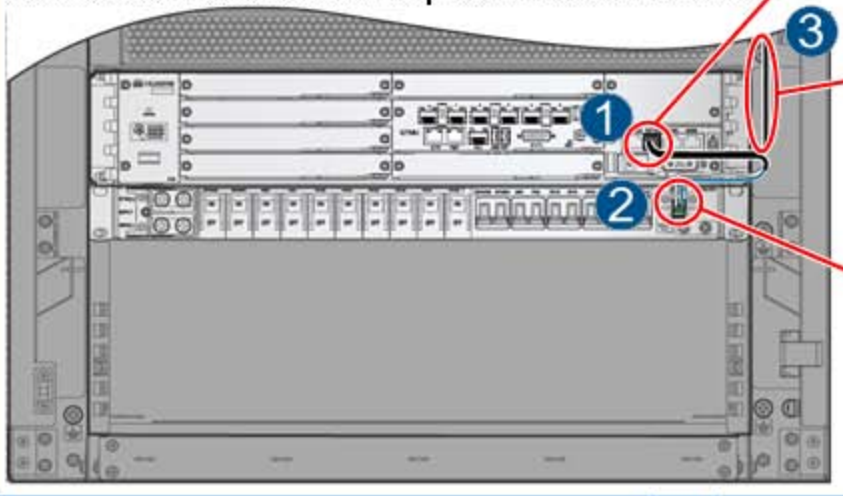
2 Installing the monitoring signal cable for the DCDU-01.

BOM code: 04080032



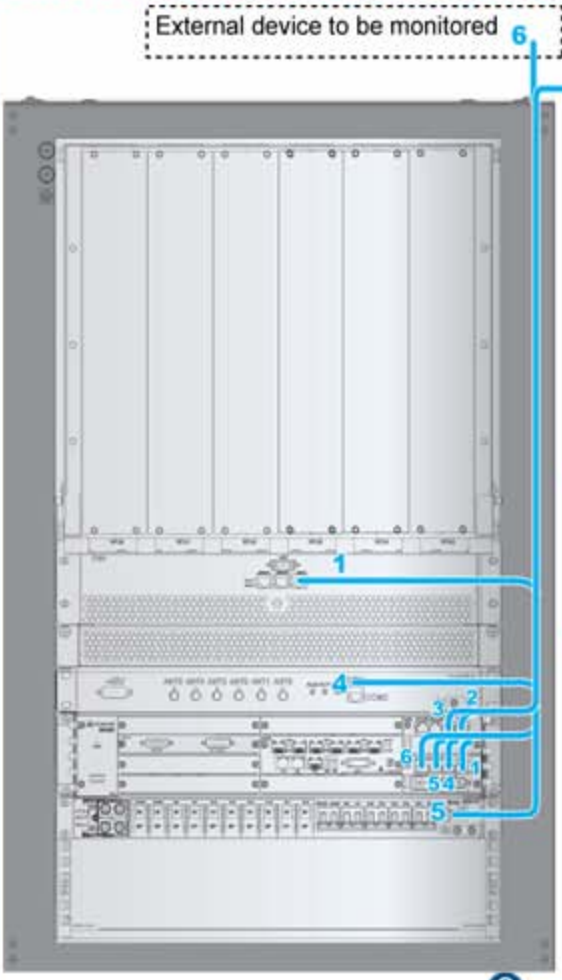
One end of the cable is connected to the EXT-ALM0 port on the UPEU panel, and the other end is connected to the SPD ALM port on the DCDU-01.





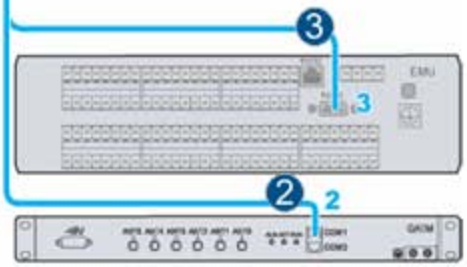
Inserted into the cabling space on the right side of the cabinet

3 Install the monitoring signal cables when the -48 V cabinet is configured with one UPEU and one UEIU.



NOTE

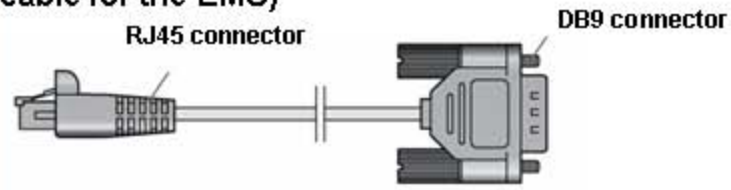
If the -48 V cabinet is configured with one UPEU and one UEIU, pay attention to the installation of signal cables 2 and 3. The installation of signal cable 1 (monitoring signal cable for the FAN unit) and signal cable 5 (monitoring signal cable for the DCDU-01) is the same as that of the cabinet configured with one UPEU. For details, see page 17.



2 Appearance of signal cable 2 (monitoring signal cable for the GATM)

One end is connected to the MON0 port on the UEIU panel, and the other end is connected to the COM1 port on the GATM panel.

3 Appearance of signal cable 3 (monitoring signal cable for the EMU)



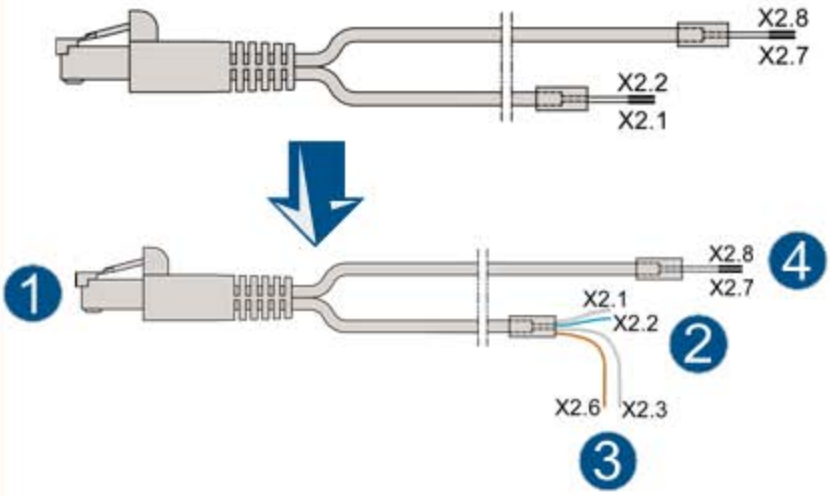
The RJ45 connector is linked to the MON1 port on the UEIU panel, and the DB9 connector is linked to the RS485 port on the EMU panel.

b Installing the Monitoring Signal Cables in a +24 V Cabinet

1 Install the monitoring signal cable for the FAN unit.

For details, see page 17.

2 Installing the monitoring signal cable for the PSU (DC/DC).

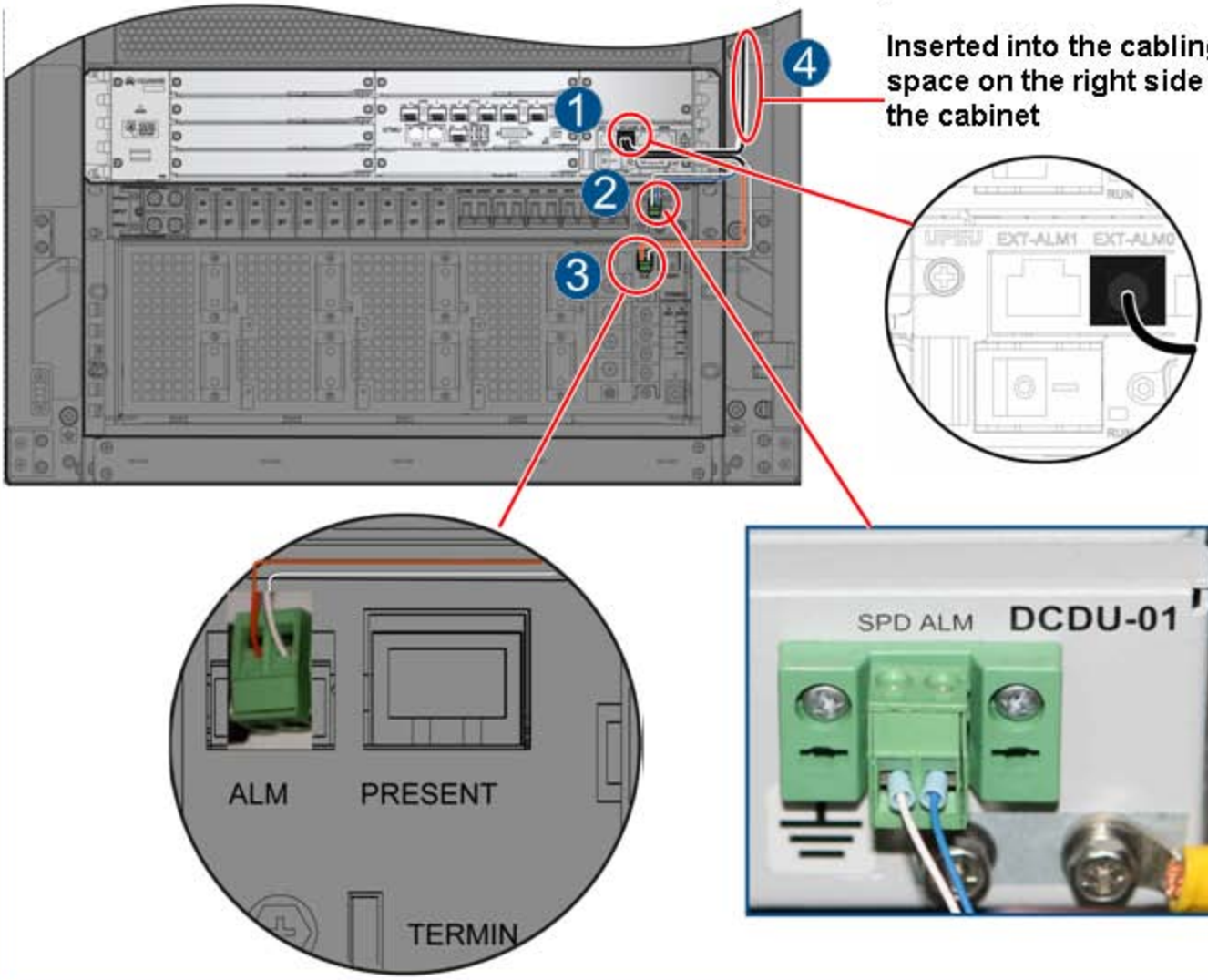


Cable: monitoring signal cable for the PSU (DC/DC)

BOM code: 04080032

At one end, the cable is connected to the EXT-ALM0 port on the UPEU.

At the other end, pins 1 and 2 are connected to the SPD ALM port on the DCDU-01, and pins 3 and 6 are connected to the ALM port on the wiring unit of the PSU (DC/DC).

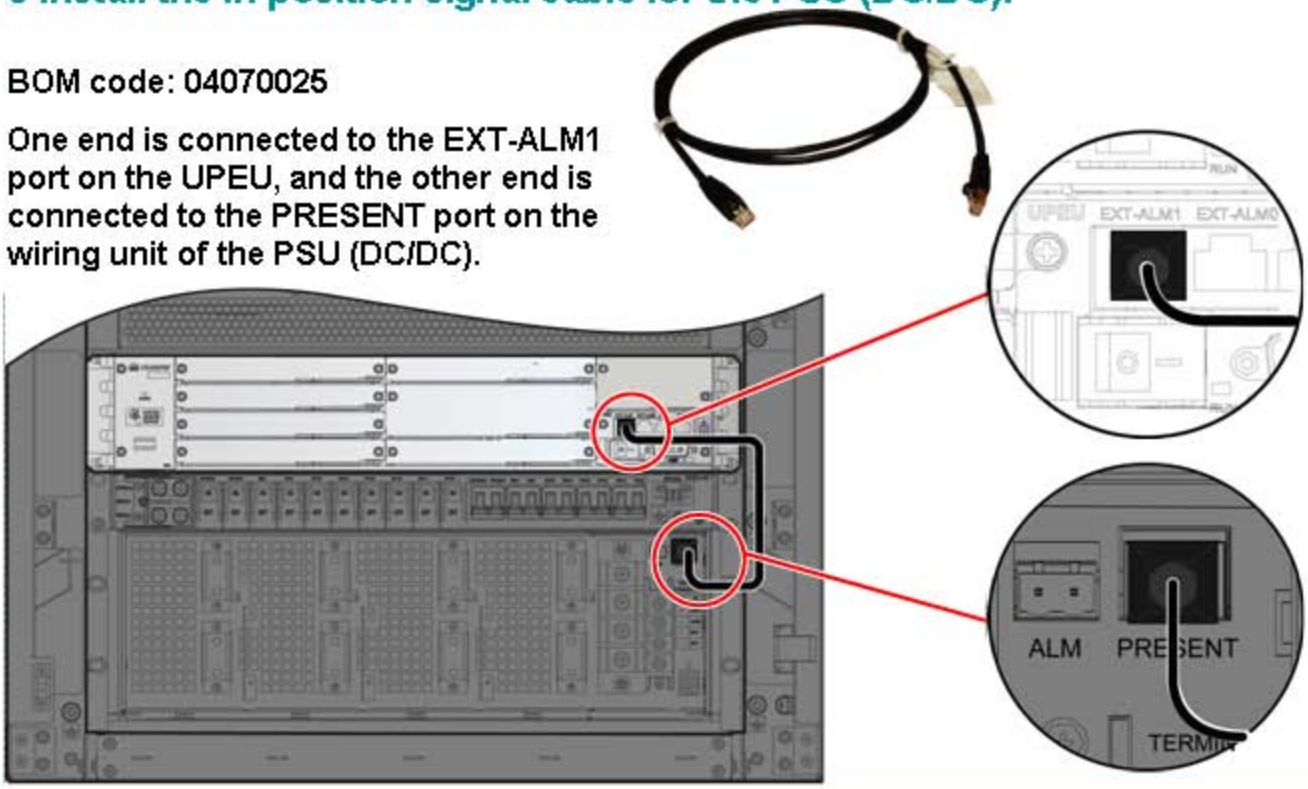


Inserted into the cabling space on the right side of the cabinet

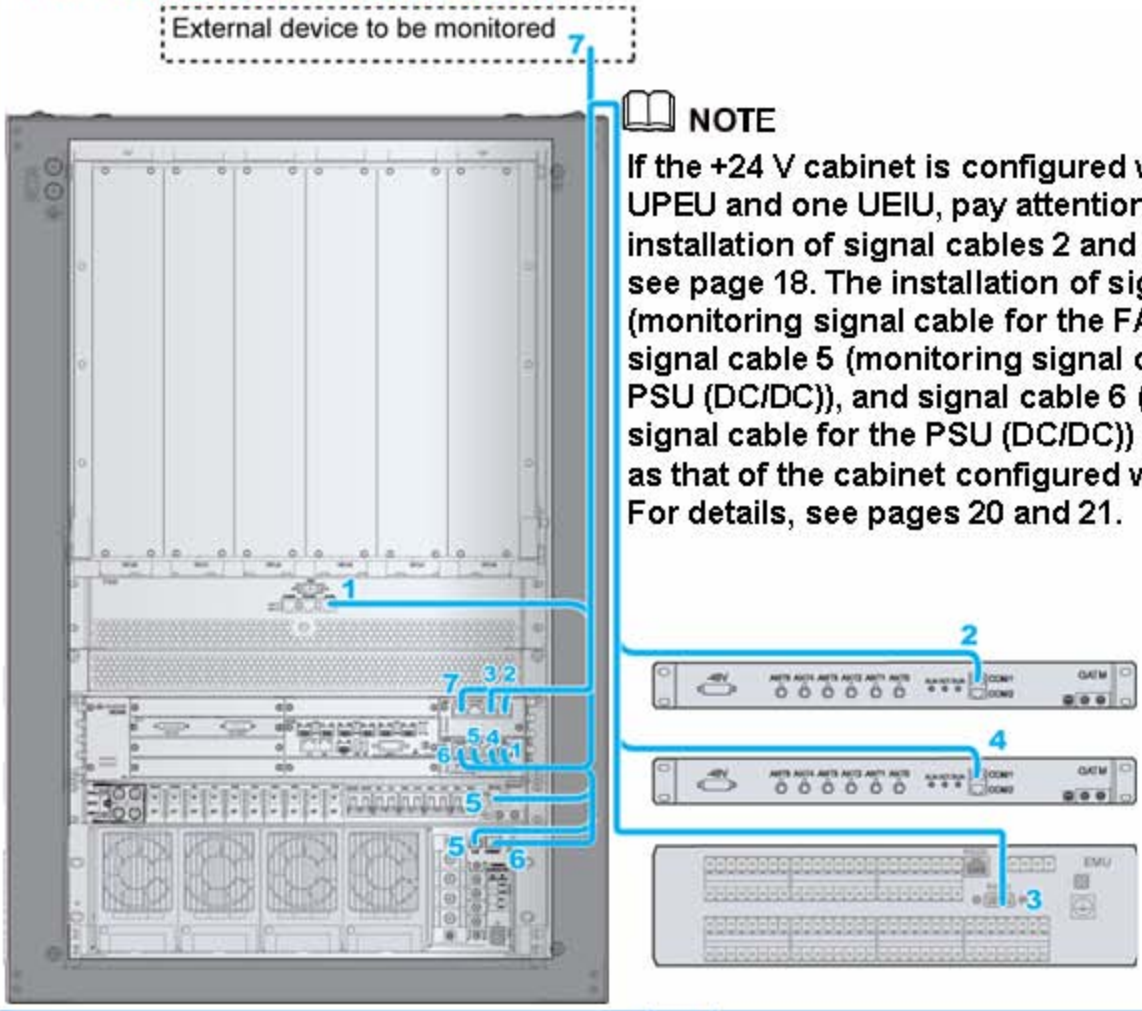
3 Install the in-position signal cable for the PSU (DC/DC).

BOM code: 04070025

One end is connected to the EXT-ALM1 port on the UPEU, and the other end is connected to the PRESENT port on the wiring unit of the PSU (DC/DC).



4 Install the monitoring signal cables when the +24 V cabinet is configured with one UPEU and one UEIU.

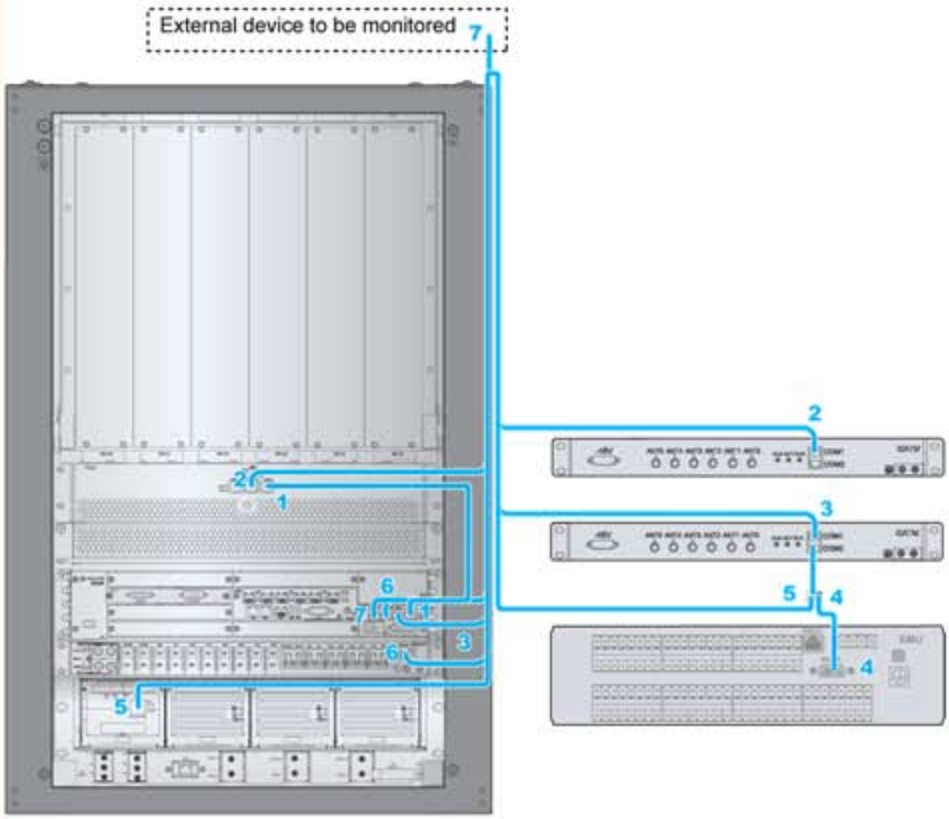


NOTE

If the +24 V cabinet is configured with one UPEU and one UEIU, pay attention to the installation of signal cables 2 and 3. For details, see page 18. The installation of signal cable 1 (monitoring signal cable for the FAN unit), signal cable 5 (monitoring signal cable for the PSU (DC/DC)), and signal cable 6 (in-position signal cable for the PSU (DC/DC)) is the same as that of the cabinet configured with one UPEU. For details, see pages 20 and 21.

C Installing the Monitoring Signal Cables in a 220 V Cabinet

1 Monitoring signal cable connections of the 220 V cabinet configured with one UPEU



SN	Cable Name
1	Monitoring signal cable for the FAN unit
2	Monitoring signal cable for the GATM
3	Monitoring signal cable for the GATM
4	Monitoring signal cable for the EMU
5	Monitoring signal cable for the PMU
6	Monitoring signal cable for the DCDU-01
7	BBU alarm cable

2 Install the monitoring signal cable for the FAN unit.

For details, see page 17.

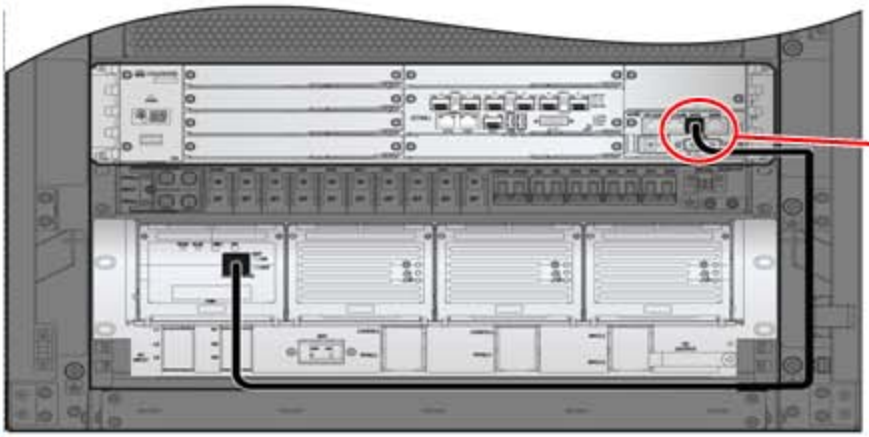
3 Install the monitoring signal cable for the DCDU-01.

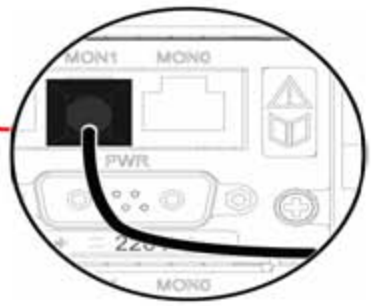
For details, see page 17.

4 Install the monitoring signal cable for the PMU.

BOM code: 04070023

One end is connected to the MON1 port on the UPEU, and the other end is connected to the RS232/RS422 port on the PMU.

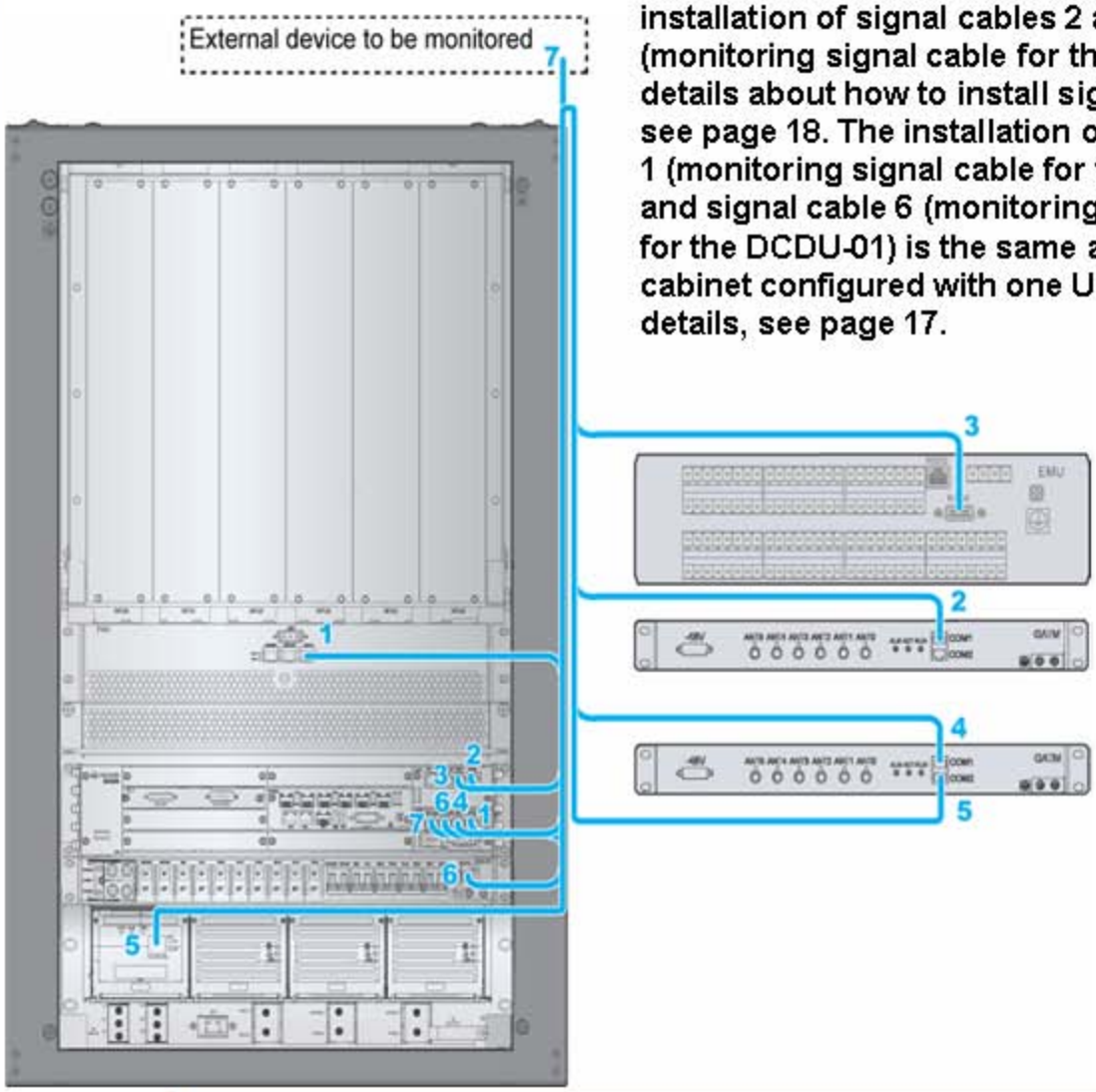




5 Install the monitoring signal cables when the 220 V cabinet is configured with one UPEU and one UEIU.

NOTE

If the 220 V cabinet is configured with one UPEU and one UEIU, pay attention to the installation of signal cables 2 and 4 (monitoring signal cable for the GATM). For details about how to install signal cable 3, see page 18. The installation of signal cable 1 (monitoring signal cable for the FAN unit) and signal cable 6 (monitoring signal cable for the DCDU-01) is the same as that of the cabinet configured with one UPEU. For details, see page 17.



Appearance of signal cable 5 (monitoring signal cable for the PMU)

One end is connected to the RS232/RS422 port on the PMU panel, and the other end is connected to the COM2 port on the GATM1.

Installing the BTS3900 RF Cables

NOTE Before routing the cables, attach the labels to the cables.

a Attaching Color Rings

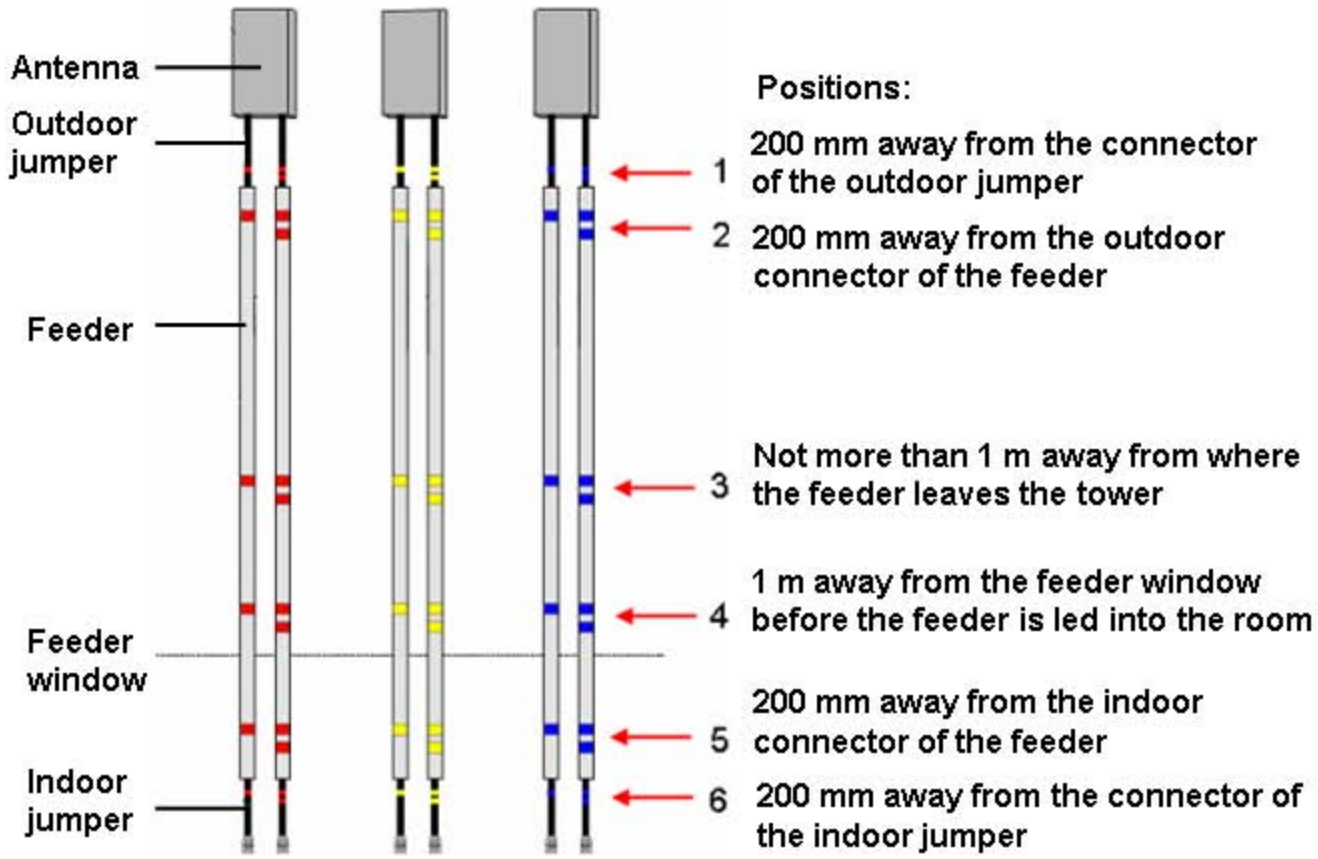
Cable (BOM)	Installation Position		Appearance
	One End	The Other End	
RF jumper	Jumper connector of the feeder	ANT port on the RFU	
Inter-RFU RF signal cable (99040SAR/ 99040SAS)	RX IN port on one RFU	RX OUT port on the other RFU	

NOTE

•To distinguish sectors and RF channels, you can attach color rings of different colors and quantities to feeders and jumpers .

•Make plans before attaching color rings, and check the color rings after attaching them.

1 Positions of Color Rings



2 Attach color rings.

NOTE

The attachment of color rings should follow the local standard. The color rings should be wrapped correctly and in the same direction. For each ring, two or three layers are required, and the upper layer should cover the lower layer. The spacing between two rings should be within the range of 10 mm to 15 mm.

3 Color ring schemes

Typical Scheme

Sector	Main	Diversity
1	Two red rings	One red ring
2	Two yellow rings	One yellow ring
3	Two blue rings	One blue ring

Other Schemes

If two antennas of one antenna system serve the same site, the color rings attached to the other antenna should follow the scheme listed in the following table.

Sector	Main (Antenna 2)	Diversity (Antenna 2)
1	Four red rings	Three red rings
2	Four yellow rings	Three red rings
3	Four blue rings	Three blue rings

If two antenna systems serve the same site, the color rings attached to the other antenna system should follow the scheme listed in the following table.

Sector	Main (Antenna System 2)	Diversity (Antenna System 2)
1	One white ring + two red rings	One white ring + one red ring
2	One white ring + two yellow rings	One white ring + one yellow ring
3	One white ring + two blue rings	One white ring + one blue ring

NOTE If an antenna system serves six sectors, the colors of the rings for sectors 4, 5, and 6 are purple, orange, and green respectively.

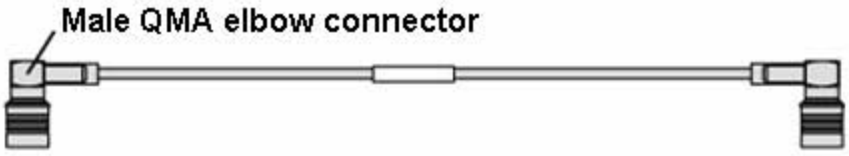
b Installing the RF Jumpers

NOTE

- When installing the RF jumper for a single cabinet, route the RF jumper along the left and right cable troughs.
- When cutting the BTS3900 RF jumper, you should leave 300 mm of the jumper for ease of cabling on the upper cabinet in case that the cabinets are stacked for capacity expansion.
- When linking the DIN connector, use a wrench to tighten the connector with the torque 25 N•m~35 N•m.
- The feeder connectors should be correctly prepared and securely linked to the module.
- Bending radius of the jumper:
  1/2“ super flexible jumper > 50 mm, 1/2” ordinary jumper > 127 mm.

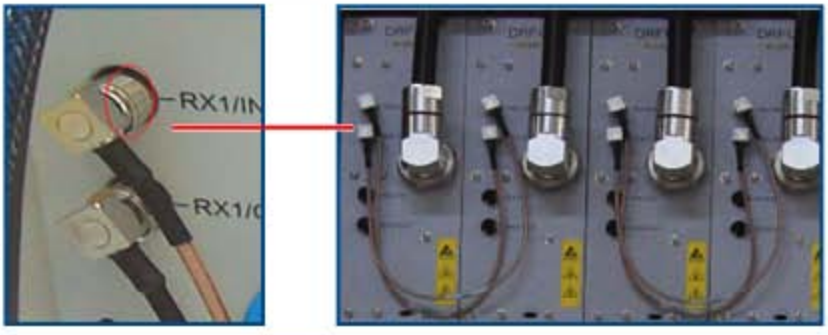
Connections of RF jumpers in a single cabinet

Appearance of the inter-RFU RF signal cable, both ends of which are male QMA elbow connectors:



NOTE

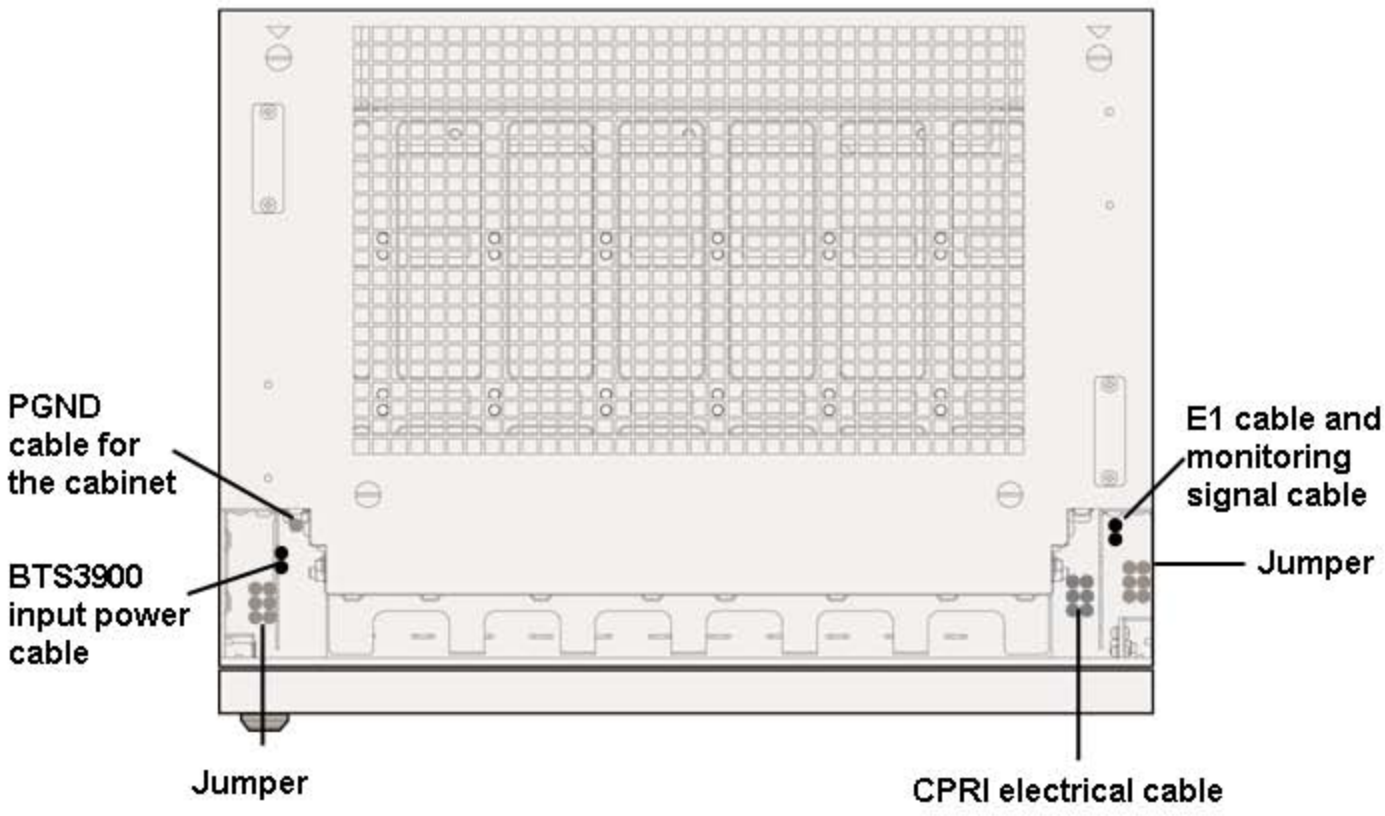
When removing a male QMA elbow connector, pull out the part marked by the red circle in the right figure.



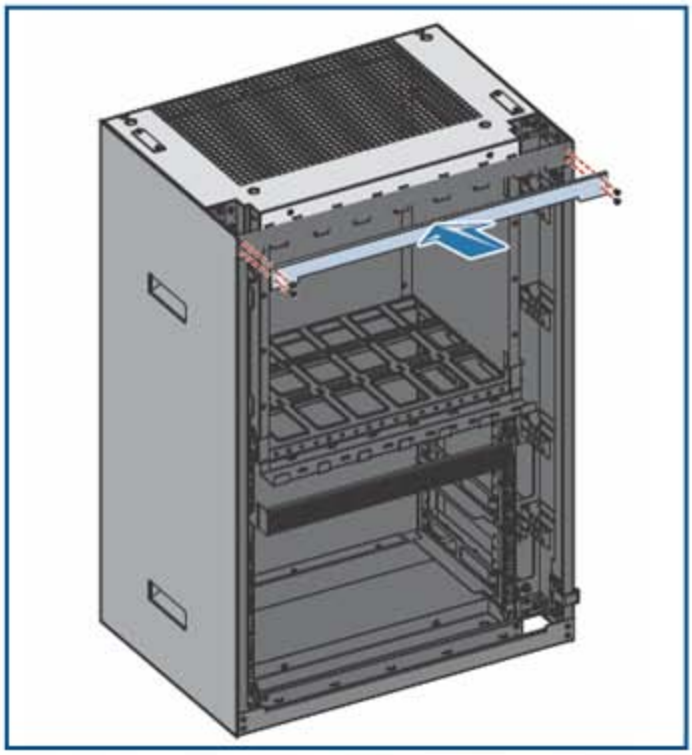
Routing the BTS3900 Cables

a. Route the power cables from the DCDU-01 to the modules in the cabinet along the right side of the cabinet, and then bind the power cables with cable ties.
b. Route the SFP high-speed cables next to the DCDU-01 power cables, and then bind the high-speed cables with cable ties.
c. Route the monitoring signal cables next to the SFP high-speed cables, and then bind the monitoring signal cables with cable ties.
d. Put the six feeders on the right into the cabling space on the right side of the cabinet, and then bind the feeders with cable ties.
e. Route the BTS3900 input power cables (-48 V, +24 V, and 220 V), the power cable between the PSU (DC/DC) and the DCDU (for the +24 V cabinet), and the power cable between the PSU (AC/DC) and the DCDU (for the 220 V cabinet) in the internal cabling space on the left side of the cabinet, and then bind the power cables with cable ties.
f. Route the E1 cable along the external cabling space on the right side of the cabinet.
g. Put the six feeders on the left into the cabling space on the left side of the cabinet, and then bind the feeders with cable ties.

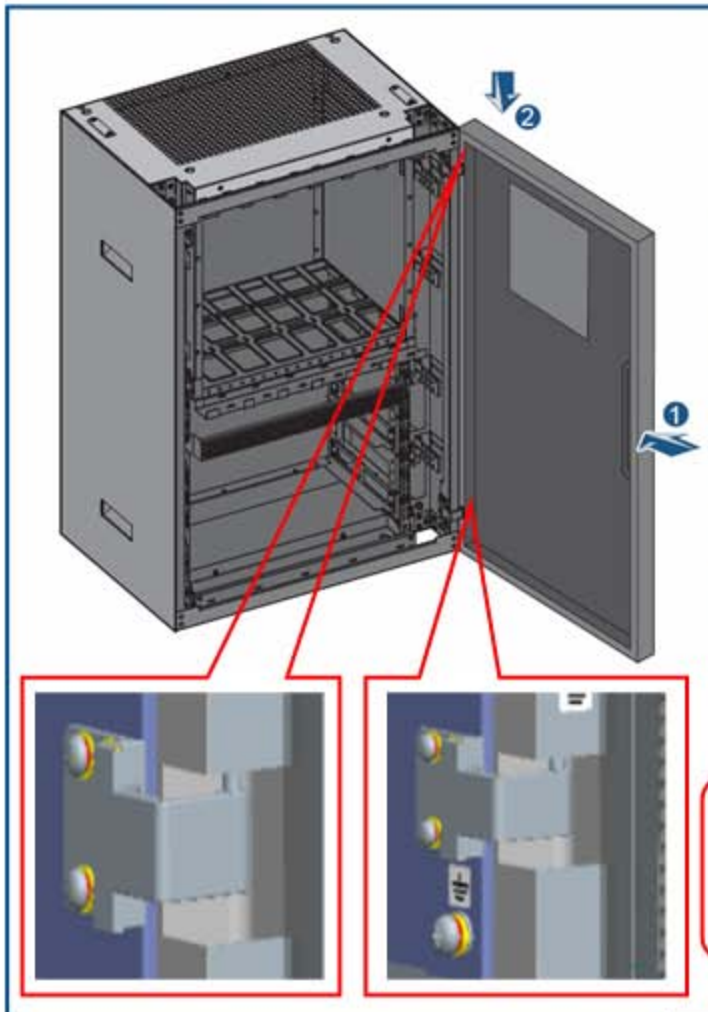
Top view of a single cabinet



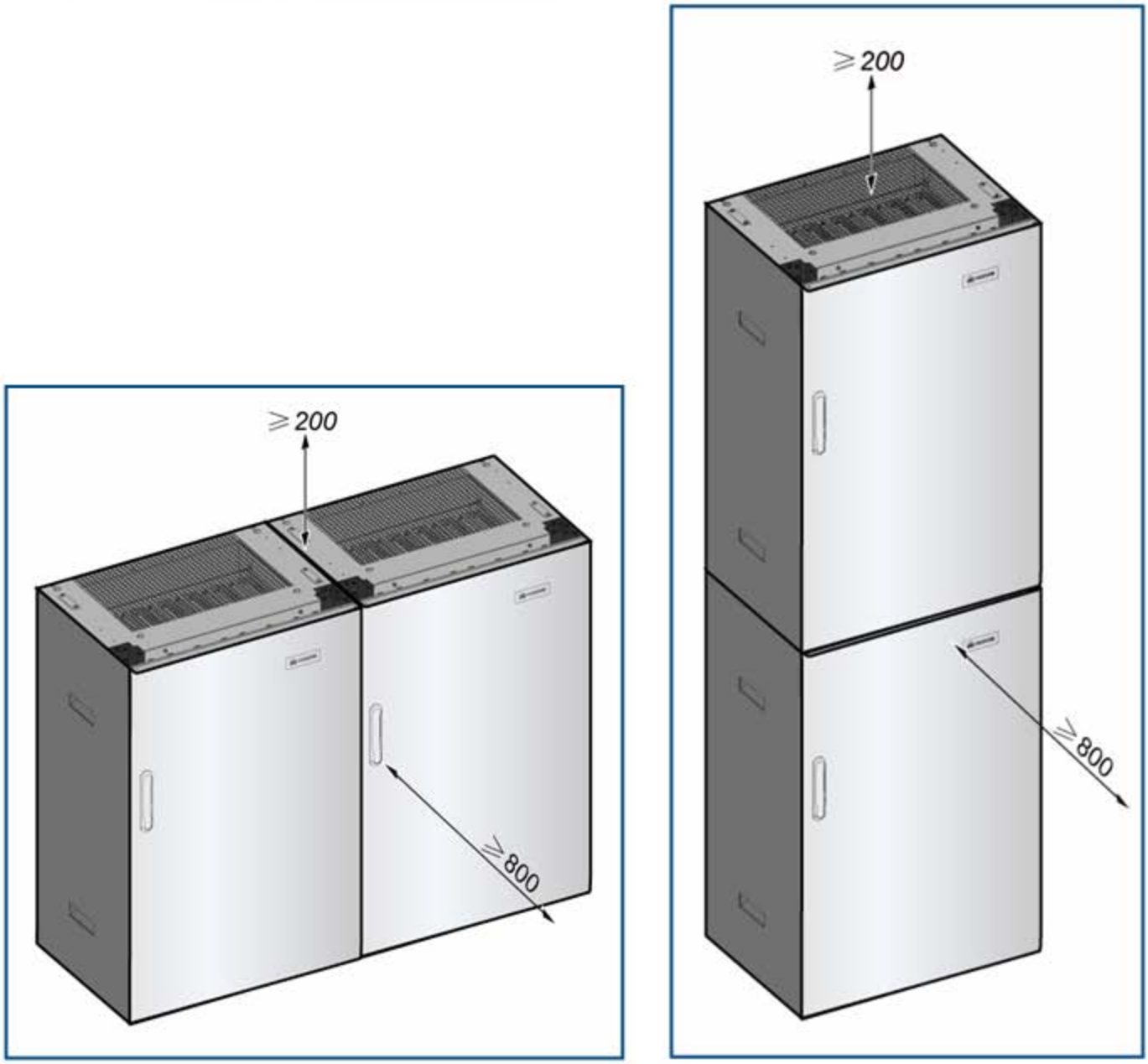
Installing the Horizontal Beam



Installing the Front Door and Its PGND Cable



Installation Space for Two BTS3900 Cabinets (Unit: mm)



Installing Two BTS3900 Cabinets

a **Installing the Base** For details, see page 5.

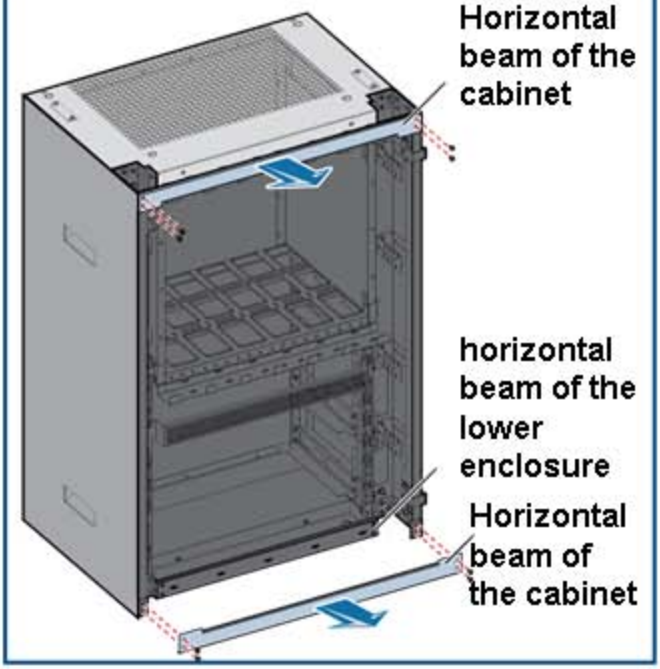
b **Installing a Single Cabinet on the Base** For details, see page 6.

C Installing the Cabinets in Stack Mode

1 Remove the horizontal beam of the upper cabinet.

NOTE

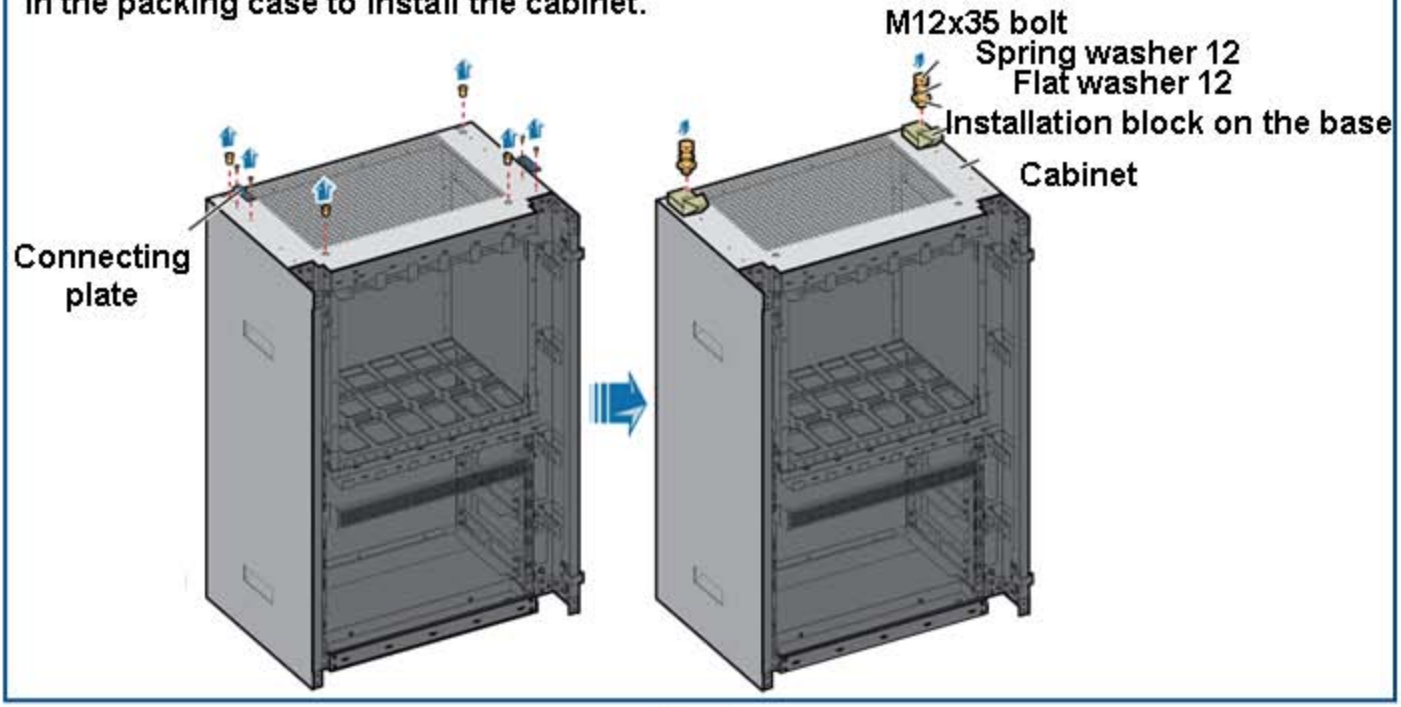
For a newly deployed BTS, you should remove the horizontal beam of the lower enclosure in the lower cabinet if the lower cabinet is configured with the power subrack. In other cases, you does not need to remove the horizontal beam of the lower enclosure in the lower cabinet or the horizontal beam of the lower enclosure in the upper cabinet. When stacking the cabinets for capacity expansion, you should remove the upper and lower horizontal beams of the upper cabinet. In other cases, you does not need to remove the beams of the cabinet.



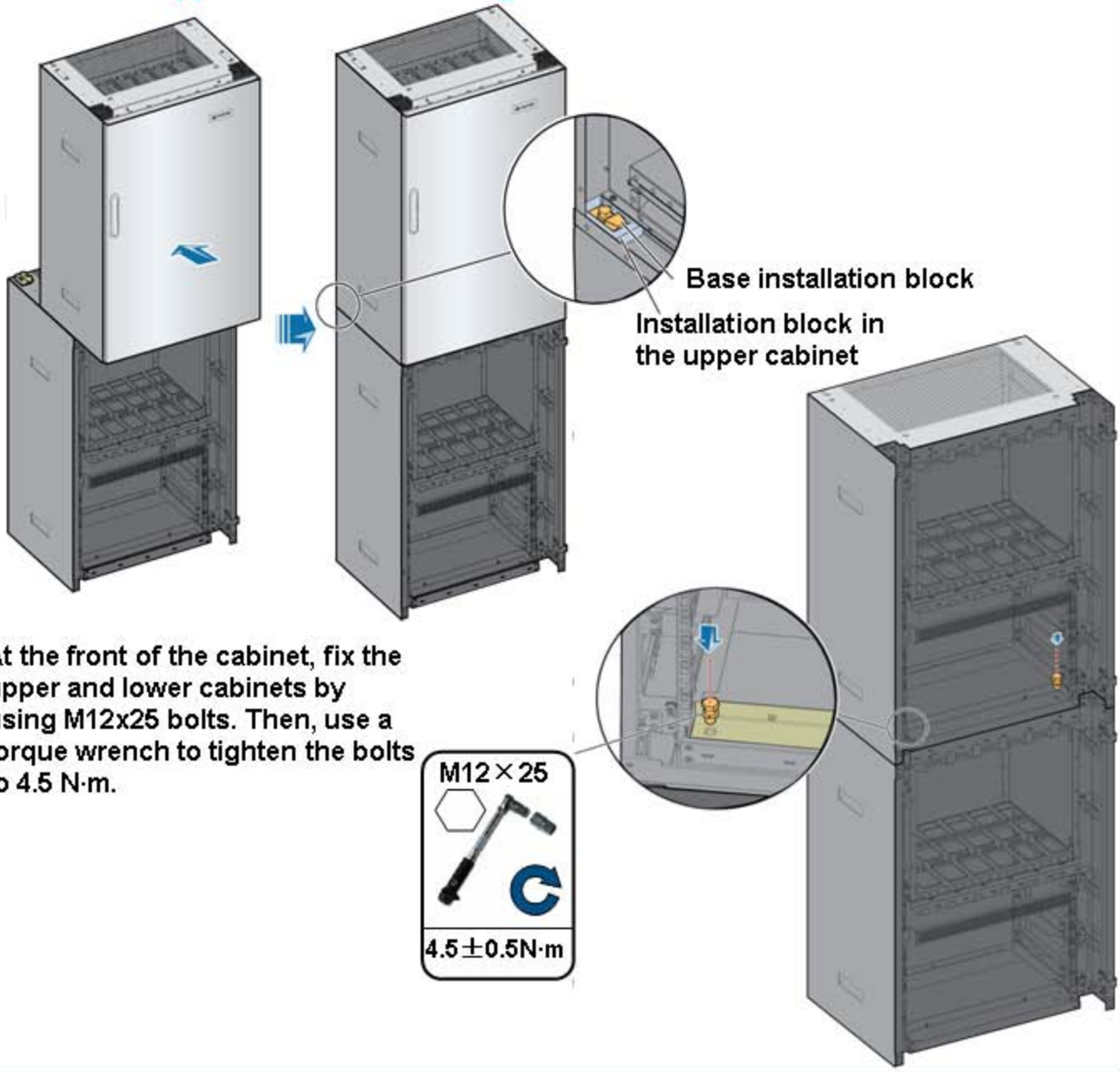
2 Remove the fillers and connecting plates from the top of the lower cabinet and install the installation block on the base.

NOTE

The installation blocks are delivered with the base. You must use the installation blocks in the packing case to install the cabinet.



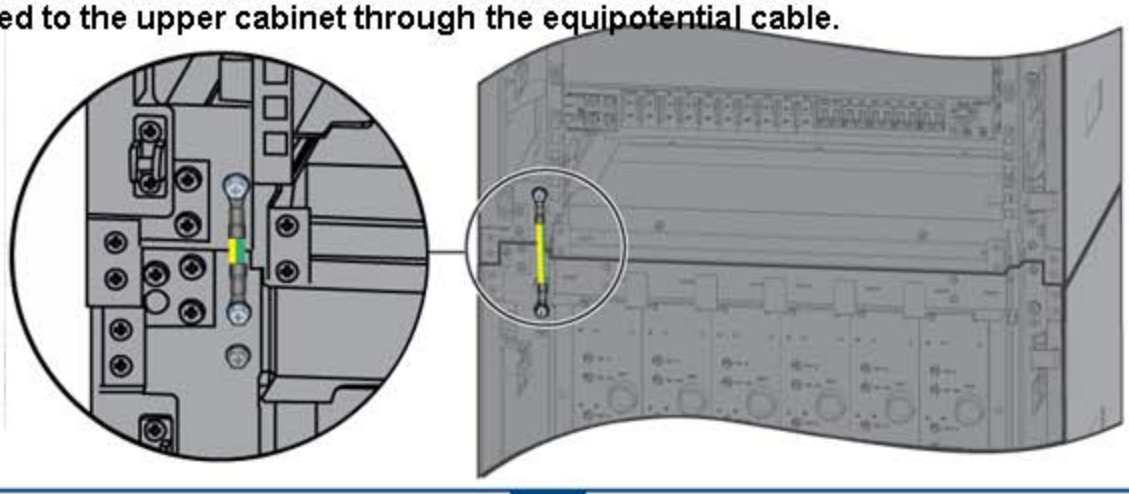
3 Stack the upper cabinet and fixing the two cabinets.



At the front of the cabinet, fix the upper and lower cabinets by using M12x25 bolts. Then, use a torque wrench to tighten the bolts to 4.5 N·m.

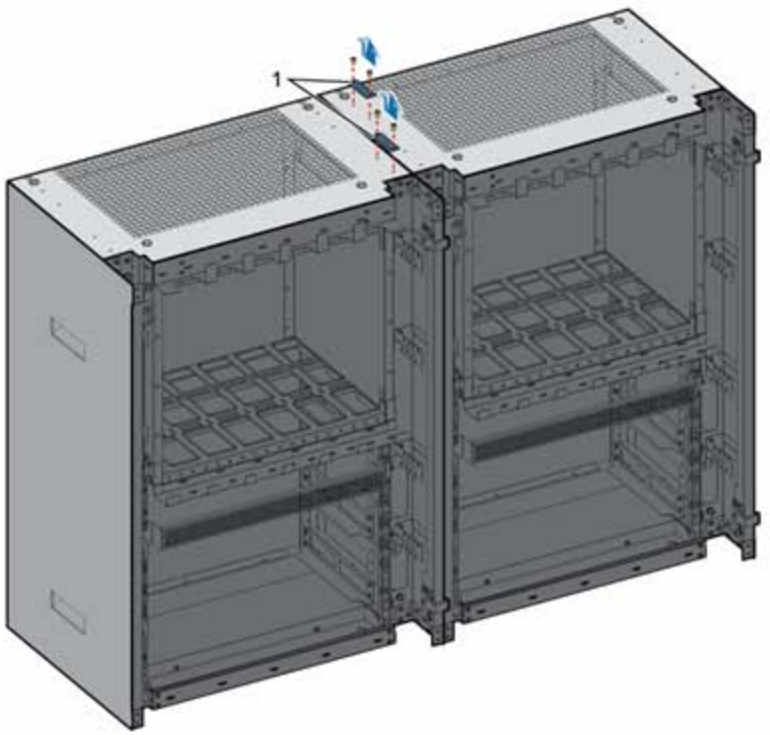
4 Install the equipotential cable for the cabinet.

When two cabinets are installed in stack mode, only the upper cabinet needs to be connected to the grounding bar. For details, see page 8. The lower cabinet is connected to the upper cabinet through the equipotential cable.

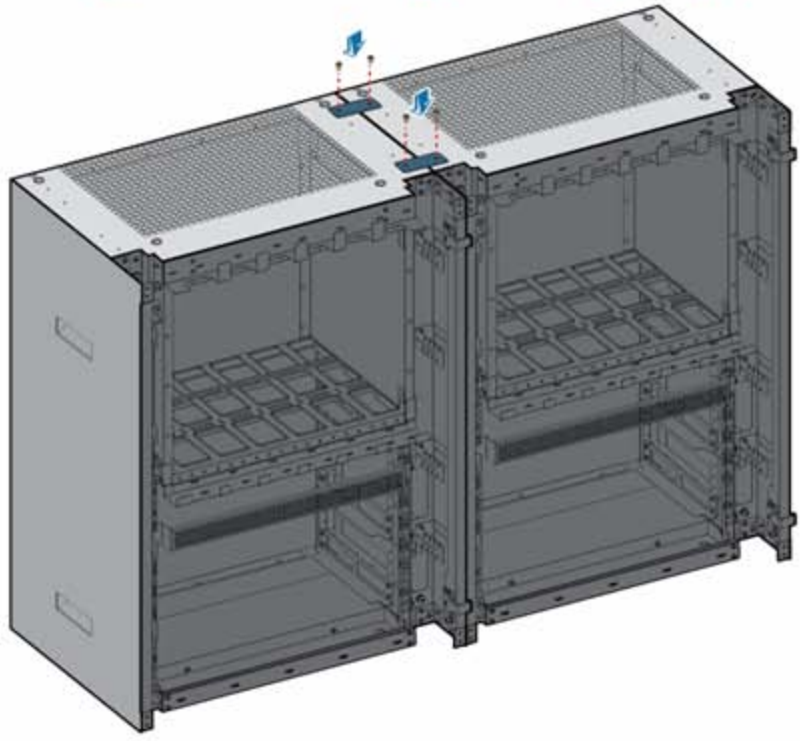


d Installing the Cabinets in Side-by-Side Mode

1 Remove the connecting plates on the top of each cabinet.



2 Rotate the connecting plates 90° to connect to the other cabinet, and then tightening the connecting plates by using the screws.



Installing the Components in Two BTS3900 Cabinets

a Slots in the BTS3900 Cabinet — For details, see page 9.

b Installing the DRFUs — For details, see page 10.

c Installing the BBU — For details, see page 10.

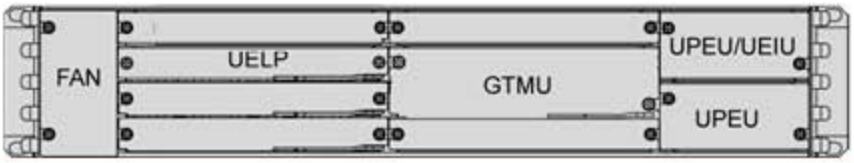
1 Remove the GTMU and UELP from the slots in the BBU.

NOTE

Before removing or installing a board, wear an ESD wrist strap.

NOTE

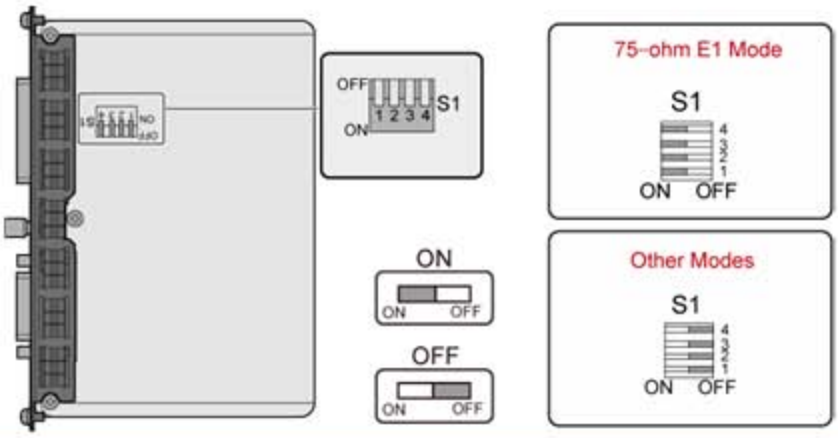
The following figure shows the slots in the BBU.



2 Check the DIP switches on the GTMU.

For details, see page 53.

3 Check the DIP Switches on the UELP.



4 Insert the GTMU and UELP into the slots in the BBU.

For details, see step 1.

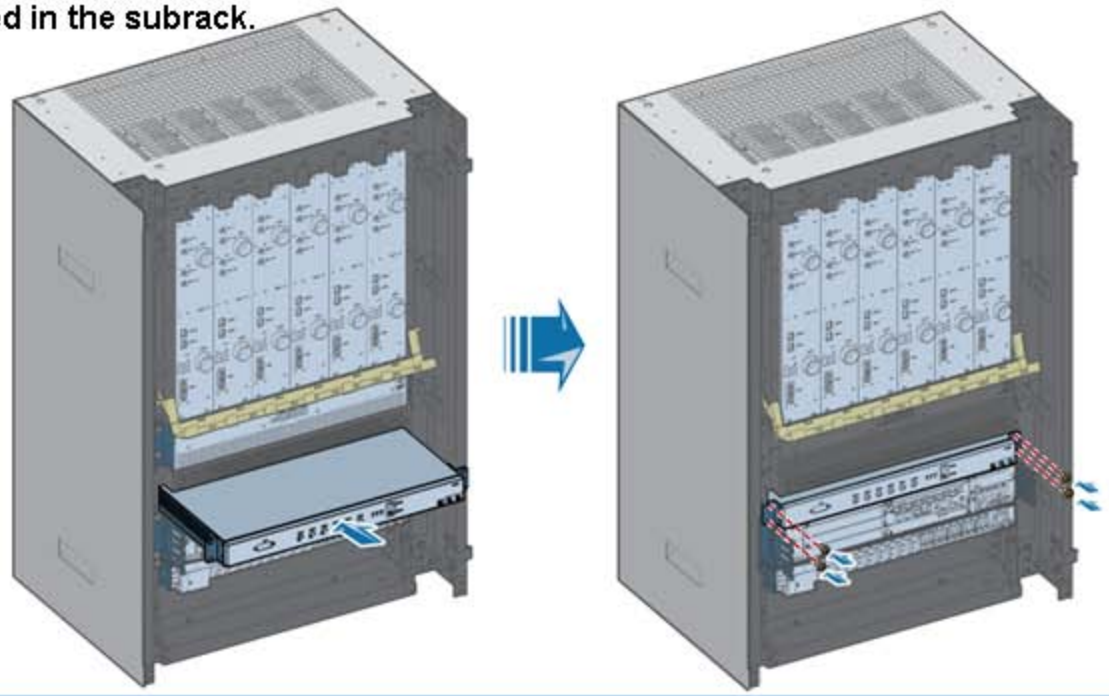
d Installing the GATM (Optional)

a. If the GRFU is installed, the GATM does not need to be installed.

b. If the BTS needs to support the RET antenna, you should install the GATM.

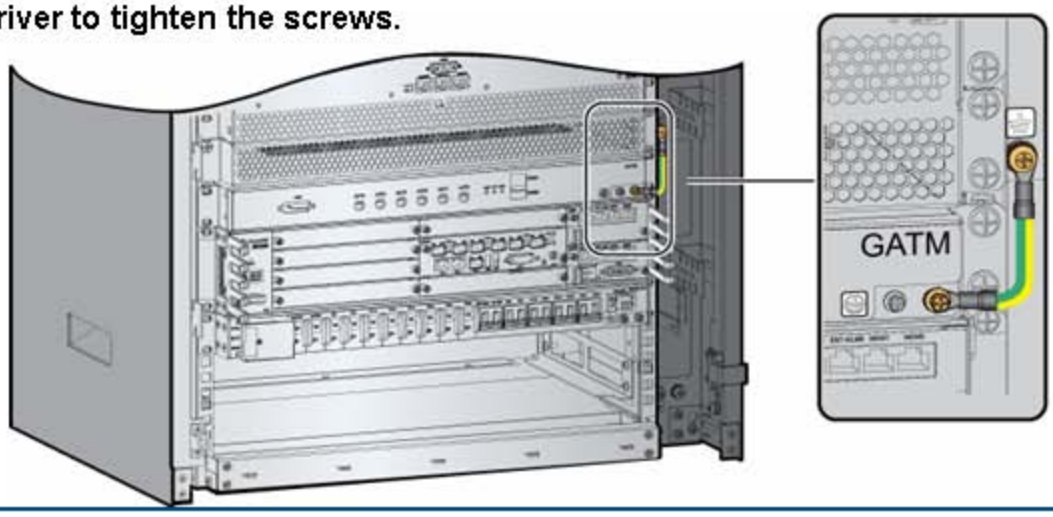
c. In the case of a -48 V cabinet, the GATM should be installed in a position 2 U away from the FAN unit. In the case of a +24 V or 220 V cabinet, the GATM should be installed outside the cabinet.

d. Align the holes on each mounting ear with the corresponding mounting holes on the cabinet. Then, push the GATM into the BTS3900 cabinet. On both sides of the module, use a Phillips screwdriver to tighten the four screws so that the module is fixed in the subrack.



e Installing the PGND Cable for the GATM (Optional)

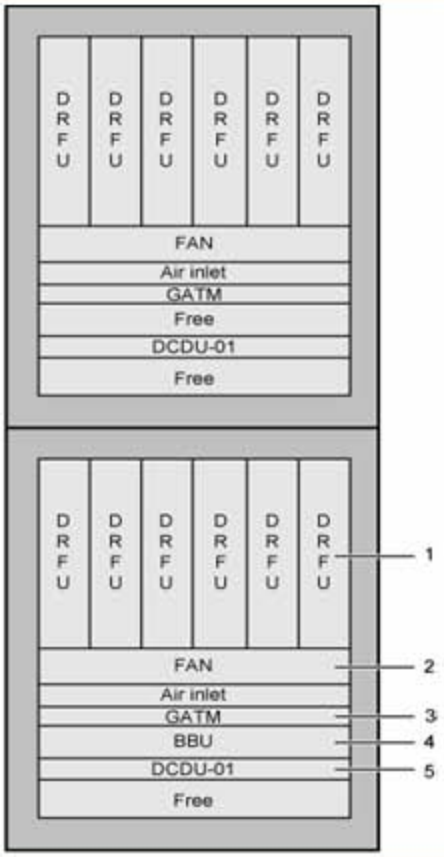
Connect one end of the PGND cable to the grounding screw on the BTS3900 cabinet, and the other end to the grounding bar in the lower right corner of the GATM panel. Then, use a Phillips screwdriver to tighten the screws.



f Installing the PMU and PSUs (Optional)

For details, see page 11.

g Installing the Components in Two Stacked -48 V Cabinets

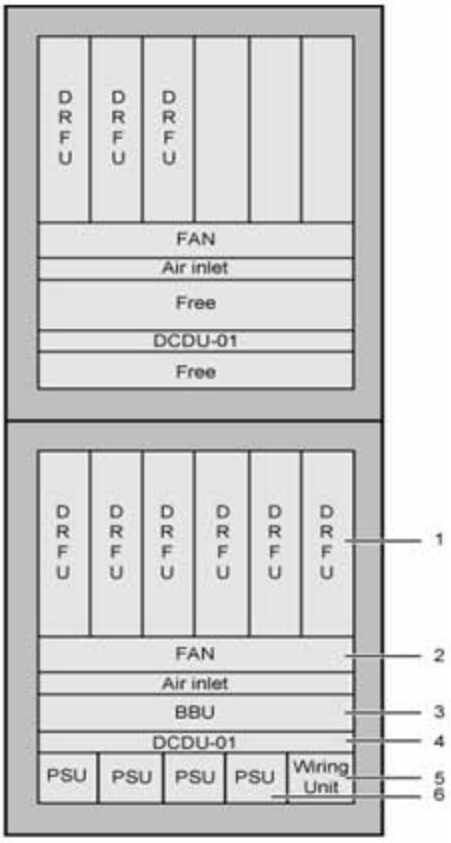


NOTE

When two -48 V BTS3900 cabinets are installed in stack mode, only the lower cabinet should be configured with the BBU. The BBU serves the two cabinets as the baseband processing unit.

(1) DRFU	(2) FAN unit
(3) GATM	(4) BBU
(5) DCDU-01	

h Installing the Components in the Stacked -48 V Cabinet and +24 V Cabinet



NOTE

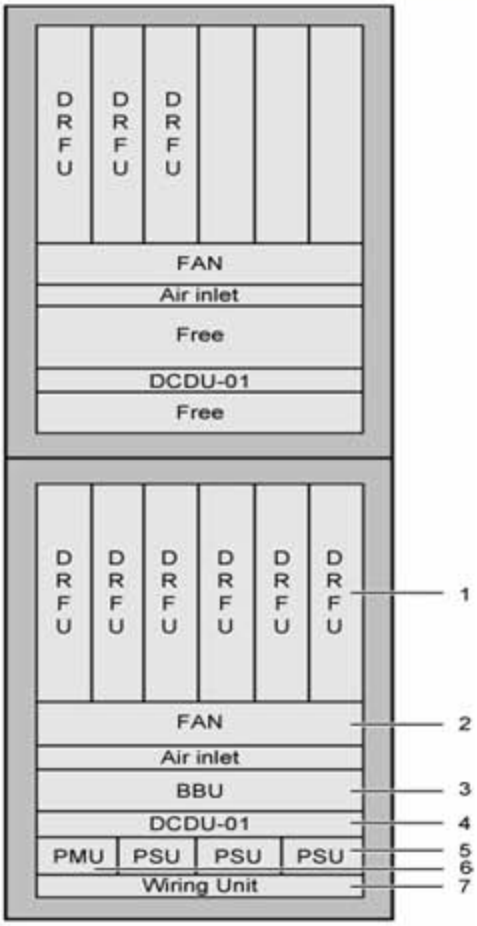
In stack mode, the -48 V BTS3900 cabinet should be installed on the other cabinet.

A maximum of nine DRFUs can be installed in the two cabinets.

Only the lower cabinet should be configured with the BBU. The BBU serves the two cabinets as the baseband processing unit.

(1) DRFU	(2) FAN unit	(3) BBU
(4) DCDU-01	(5) Wiring unit	(6) PSU

i Installing the Components in the Stacked -48 V Cabinet and 220 V Cabinet



NOTE

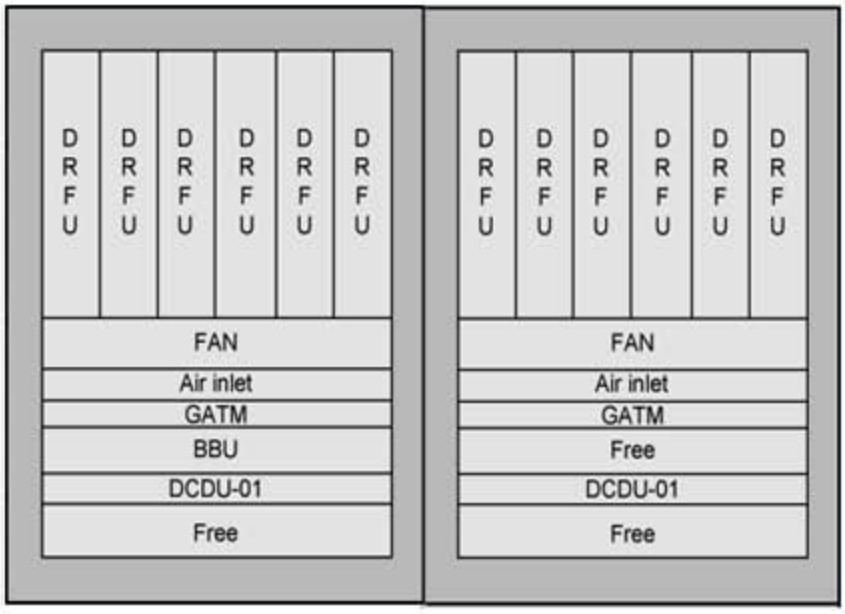
In stack mode, the -48 V BTS3900 cabinet should be installed on the other cabinet.

A maximum of nine DRFUs can be installed in the two cabinets.

Only the lower cabinet should be configured with the BBU. The BBU serves the two cabinets as the baseband processing unit.12

(1) DRFU	(2) FAN unit	(3) BBU
(3) DCDU-01	(5) PSU (AC/DC)	(6) PMU
(7) Wiring unit		

j Installing the Components in Two Combined -48 V Cabinets



NOTE

In side-by-side mode, only the left cabinet should be configured with the BBU. The BBU serves the two cabinets as the baseband processing unit.

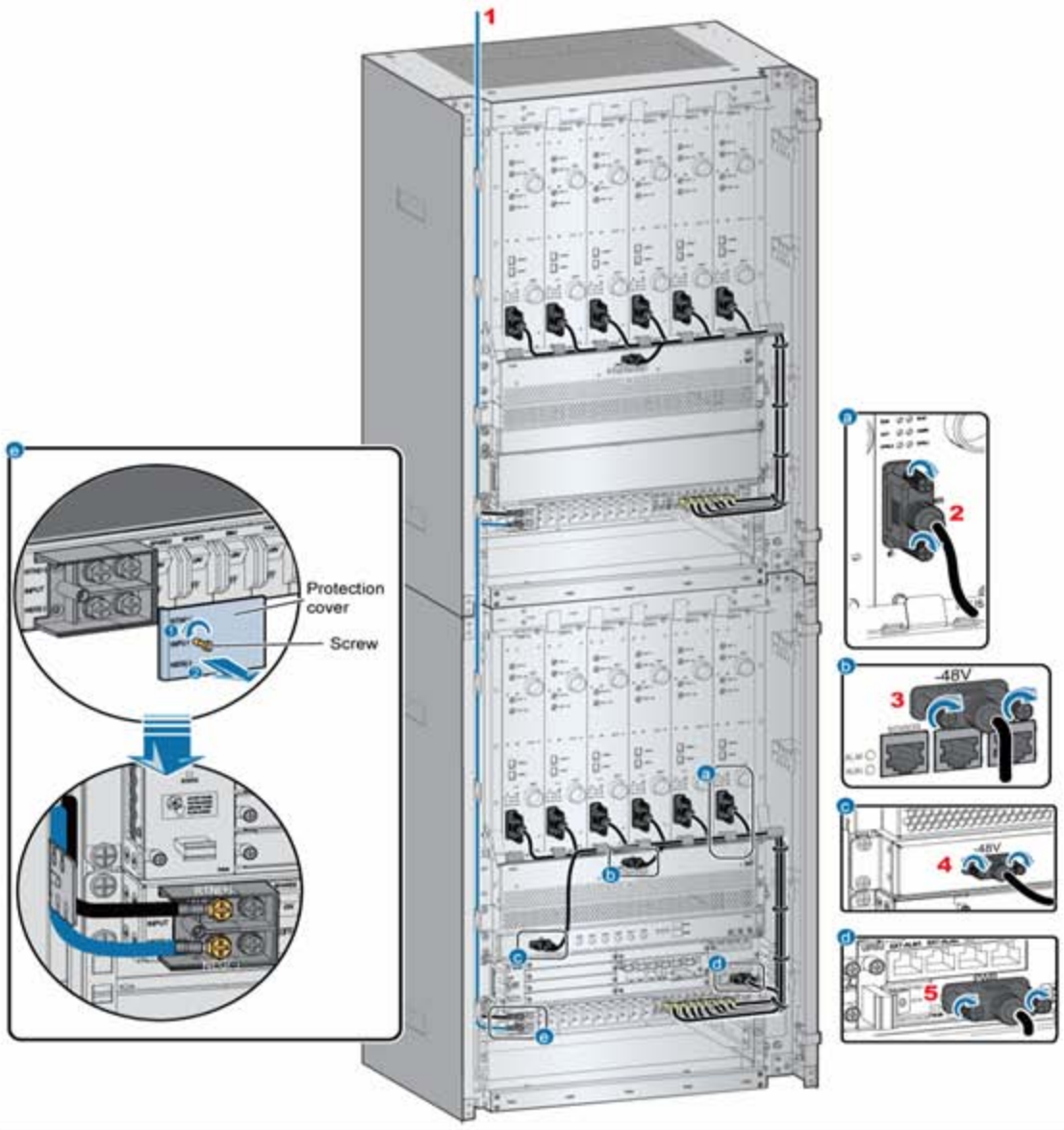
Installing the Power Cables of the BTS3900 Stacked Cabinets

a Installing the Power Cables of the -48 V Stacked Cabinet

To install the power cables, perform the following steps:

a. Install the input power cables of the BTS3900.

b. Install the power cables between the DCDU-01 and the modules in the cabinet.



SN	Cable
1	Input power cable (-48 V)
2	Power cable between the DCDU and the RFU
3	Power cable between the DCDU and the FAN subrack
4	Power cable between the DCDU and GATM
5	Power cable between the DCDU and the BBU

Installing the Transmission Cables of the Stacked BTS3900 Cabinets

a Installing the E1 Cables and E1 Surge Protection transfer Cable

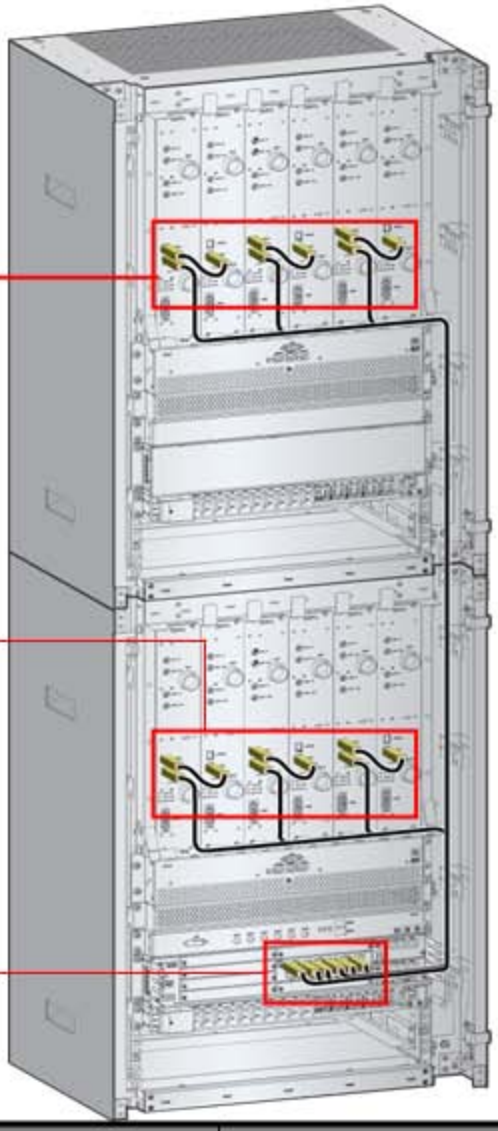
For details, see page 16.

b Installing the CPRI Cable and DRFU Cascading Signal Cable

NOTE

The installation of CPRI cables for the stacked cabinets are the same as that of the CPRI cables for a single cabinet.

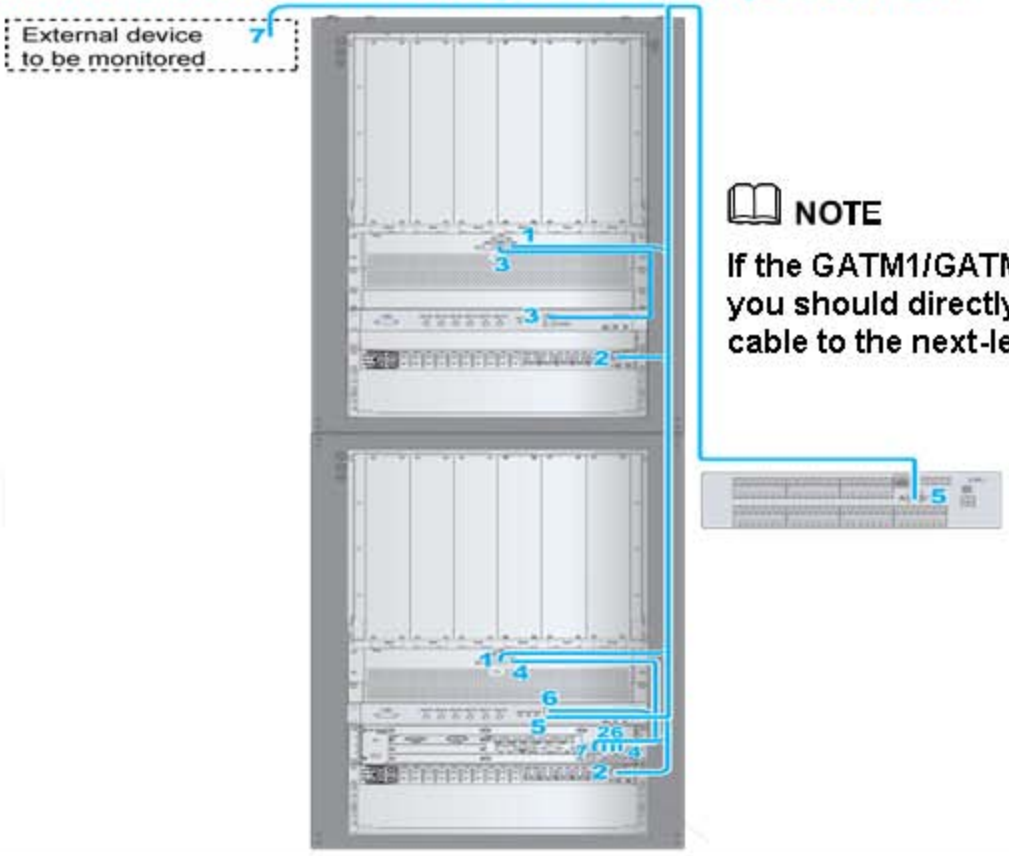
That is, route the cables on the right of the cabinet and bind the cabinet to the cable trough.



BOM	Cable	Installation Position		Appearance
		One End	The Other End	
04050097	CPRI cable	To one of the ports CPRI0 to CPRI5 on the GTMU in the BBU	To the CPRI1 port on the DRFU or the CPRI0 port on the GRFU	
04050099/ 04050100	DRFU cascading signal cable	To the CPRI0 port on the upper-level DRFU	To the CPRI1 port on the DRFU	

Installing the Monitoring Signal Cables for the BTS3900 Stacked Cabinets

1. Install the monitoring signal cables when the -48 V cabinets are stacked and the BBU is configured with only one UPEU.

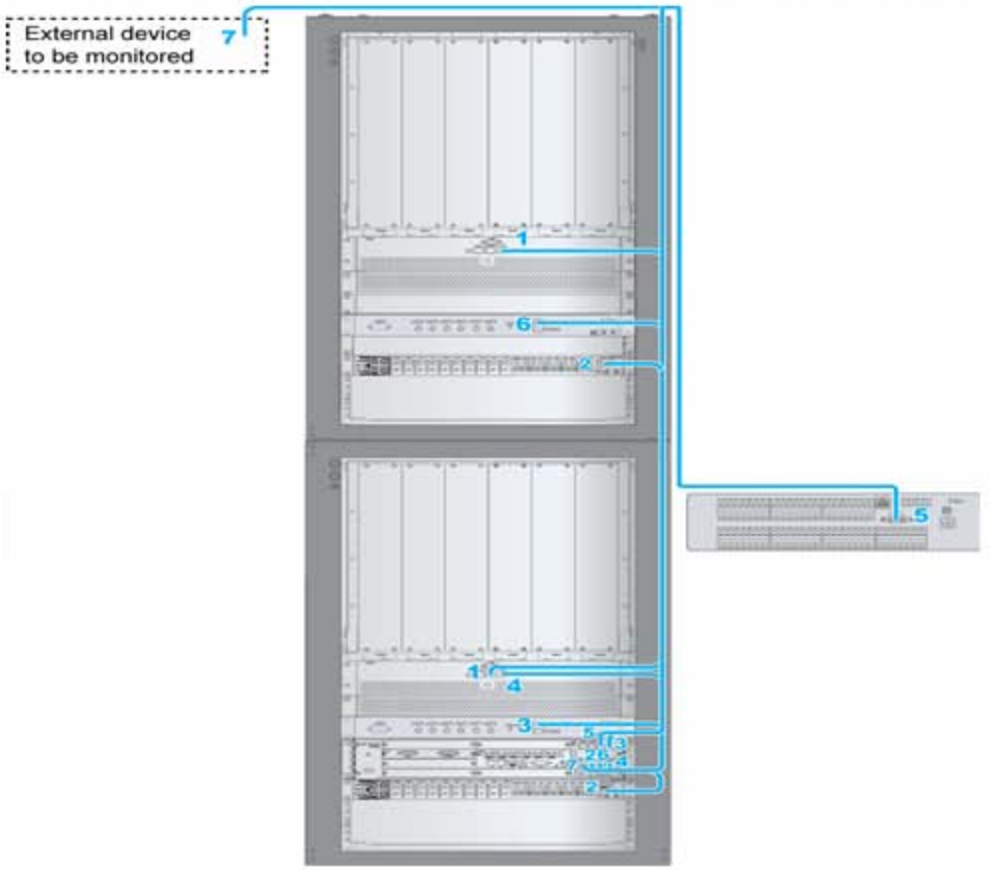


NOTE

If the GATM1/GATM2 is not configured, you should directly connect the signal cable to the next-level equipment.

SN	Cable	Installation Description
1	FAN cascading signal cable	One end is connected to the COM IN port on the fan in the upper cabinet, and the other end is connected to the COM OUT port on the fan in the lower cabinet.
2	DCDU-01 monitoring signal cable	One end is connected to the EXT-ALM0 port on the UPEU. At the other end, pins 1 and 2 are connected to the SPD ALM port on the DCDU-01 in the lower cabinet, and pins 7 and 8 are connected to the bare wire through the interconnection terminal and then connected to the SPD ALM port on the DCDU-01 in the upper cabinet.
3	GATM monitoring signal cable	One end is connected to the COM OUT port on the FAN in the upper cabinet, and the other end is connected to the COM1 port on the GATM2.
4	FAN monitoring signal cable	One end is connected to the COM IN port on the FAN in the lower cabinet, and the other end is connected to the MON0 port on the UPEU.
5	EMU monitoring signal cable	The DB9 connecter is linked to the RS485 port on the EMU, and the RJ45 connecter is linked to the COM2 port on the GATM1.
6	GATM monitoring signal cable	One end is connected to the MON1 port on the UPEU, and the other end is connected to the COM1 port on the GATM.
7	BBU alarm cable	One end is connected to the EXT-ALM1 port on the UPEU, and the other end is connected to the external alarm device.

2. Install the monitoring signal cables when the -48 V cabinets are stacked and the BBU is configured with one UPEU and one UEIU.



SN	Cable	Installation Description
1	FAN cascading signal cable	One end is connected to the COM IN port on the FAN in the upper cabinet, and the other end is connected to the COM OUT port on the FAN in the lower cabinet.
2	DCDU-01 monitoring signal cable	One end is connected to the EXT-ALM0 port on the UPEU. At the other end, pins 1 and 2 are connected to the SPD ALM port on the DCDU-01 in the lower cabinet, and pins 7 and 8 are connected to the bare wire through the interconnection terminal and then connected to the SPD ALM port on the DCDU-01 in the upper cabinet.
3	GATM monitoring signal cable	One end is connected to the MON0 port on the UEIU, and the other end is connected to the COM1 port on the GATM.
4	FAN monitoring signal cable	One end is connected to the COM IN port on the FAN in the lower cabinet, and the other end is connected to the MON0 port on the UPEU.
5	EMU monitoring signal cable	The DB9 connecter is linked to the RS485 port on the EMU, and the RJ45 connecter is linked to the MON1 port on the UEIU.
6	GATM monitoring signal cable	One end is connected to the MON1 port on the UPEU, and the other end is connected to the COM1 port on the GATM.
7	BBU alarm cable	One end is connected to the EXT-ALM1 port on the UPEU, and the other end is connected to the external alarm device.

b Examples for Installing the Signal Cables

1. Install the monitoring signal cable for the DCDU-01 in the Stacked -48 V Cabinet and 24 V Cabinet.

Pin assignment of the monitoring signal cable for the DCDU-01 (04080032)

Pin at X2 End (Cable Split)	Connector at X1 End	Color	Description
W1	2	Blue	Twisted pair
	1	White	
	6	Orange	Twisted pair
	3	White	
W2	4	Blue	Twisted pair
	5	White	
	8	Orange	Twisted pair
	7	White	

a. Link the RJ45 connector on one end of the monitoring signal cable to the EXT-ALM0 port on the UPEU.

b. Insert the pins 2 and 1 (blue/white) of W1 into the SPD ALM port on the DCDU-01 in the lower cabinet.

c. Strip W1 of the monitoring signal cable to expose pins 6 and 3 (orange/white).

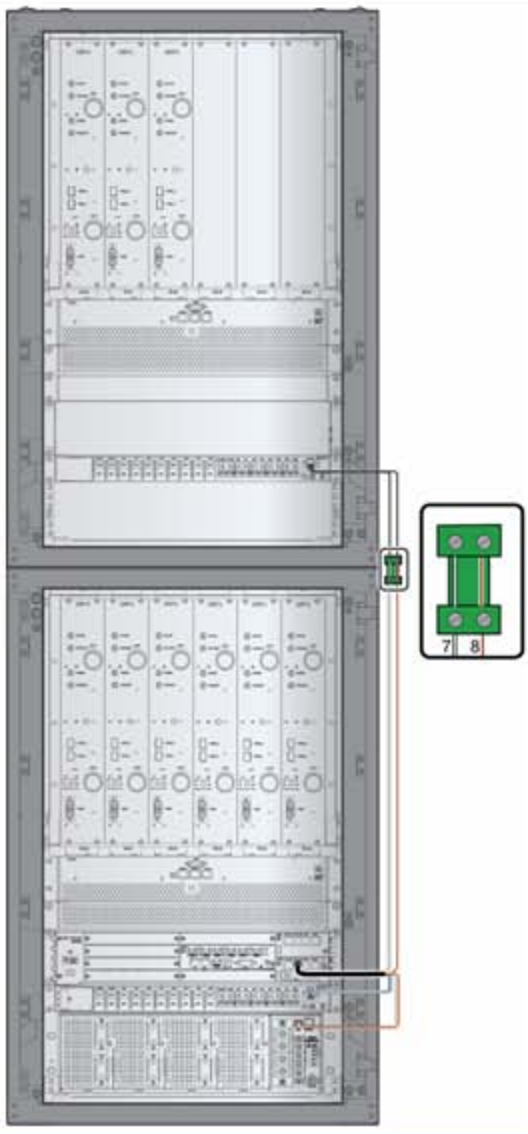
d. Insert the pins 6 and 3 (orange/white) of W1 into the ALM port on the PSU in the lower cabinet.

e. Insert pins 8 and 7 (orange/white) of W2 into the interconnection terminals.

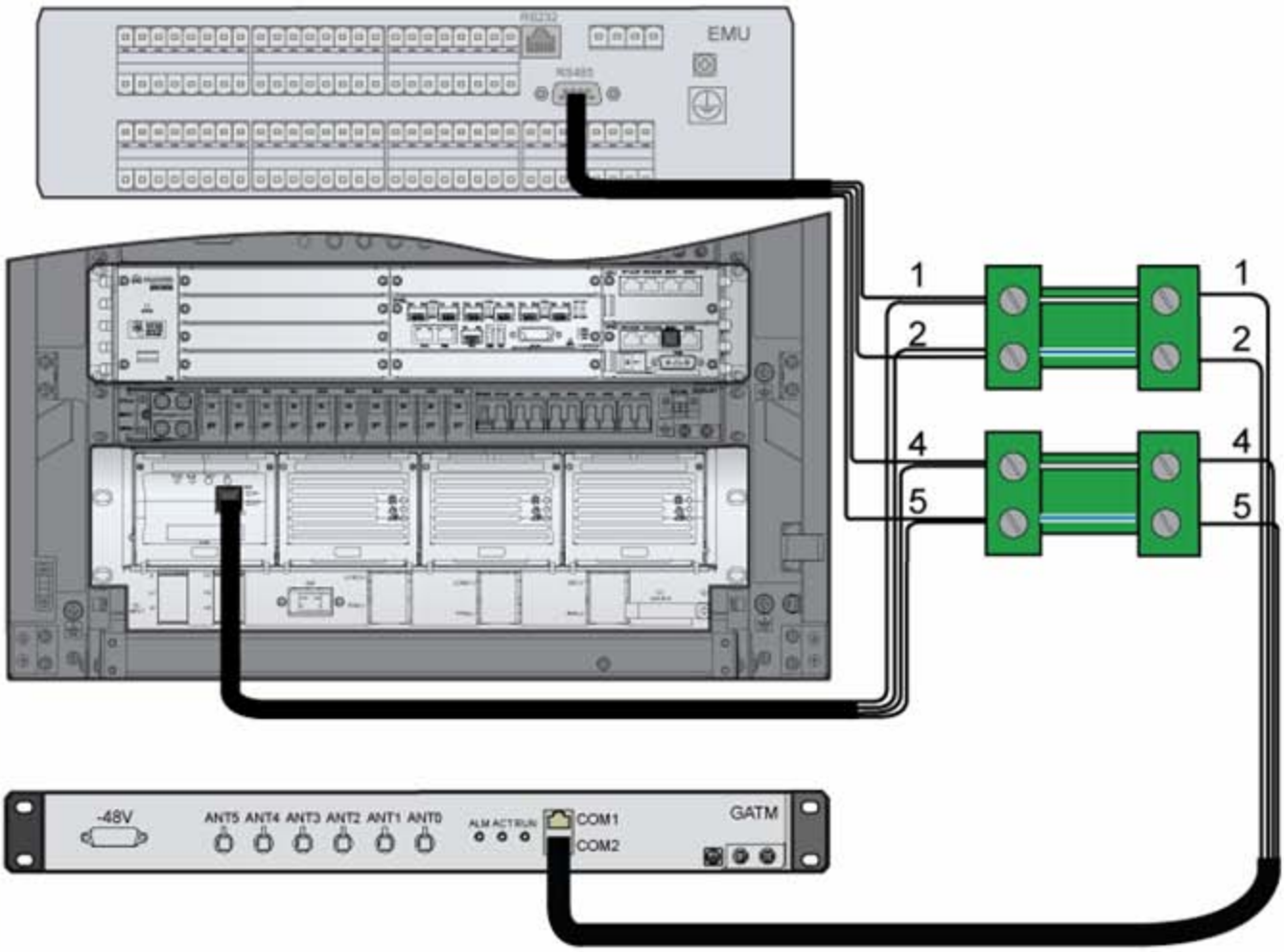
f. Insert one end of the bare wire (04080036) into the interconnection terminal.

g. Insert the other end of the bare wire into the SPD ALM port on the DCDU-01 in the upper cabinet.

h. Bind the interconnection terminal along the cable trough on the right of the cabinet.



2 Install the monitoring signal cables for the PMU/EMU after the cable is split.



a. Link the DB9 male connector on one end of the monitoring signal cable for the EMU to the RS485 port on the EMU, and then tighten the bolt.

b. Link the RJ45 connector on one end of the monitoring signal cable for the PMU to the RS232/RS422 port on the PMU.

c. Cut off the other end of the monitoring signal cable for the EMU and that of the monitoring signal cable for the PMU.

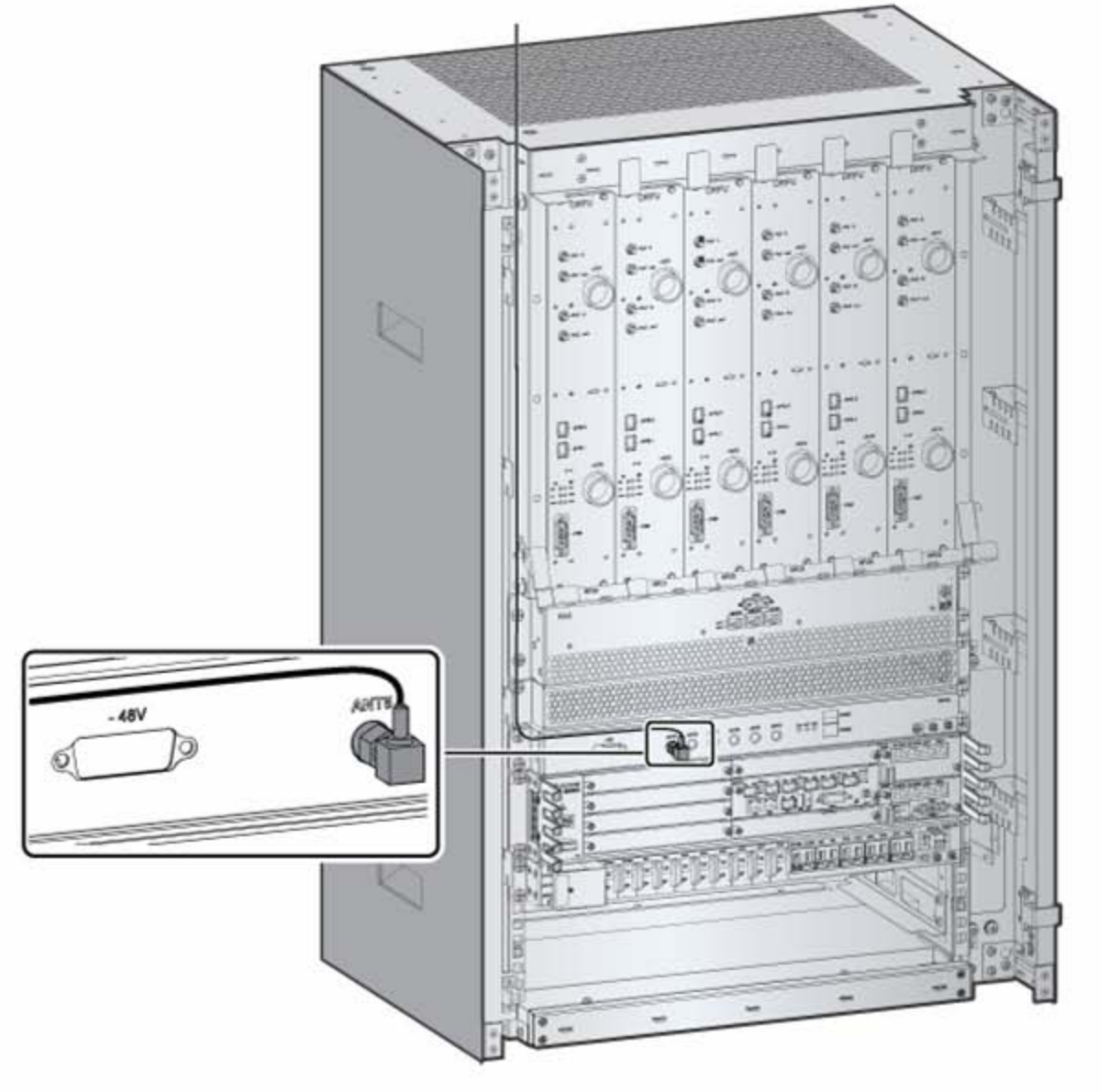
d. Insert pins 1 and 2 of the monitoring signal cable for the EMU and those of the monitoring signal cable for the PMU into 2-pin interconnection terminal 1.

e. Insert pins 4 and 5 of the monitoring signal cable for the EMU and those of the monitoring signal cable for the PMU into 2-pin interconnection terminal 2.

f. Cut off one end of the Ethernet cable. Insert pins 1 and 2 into interconnection terminal 1 and pins 4 and 5 into interconnection terminal 2.

g. Insert the RJ45 connector on the other end of the Ethernet cable into the COM2 port on the GATM1.

3 Install the RET control signal cable.



a. Insert the male SMA elbow connector at one end of the cable into the ANT port on the GATM.
b. Insert the male SMA elbow connector at the other end of the cable into the SMA port on the Bias-Tee on the top of the cabinet.

Installing the RF Signal Cables for the BTS3900 Stacked Cabinets

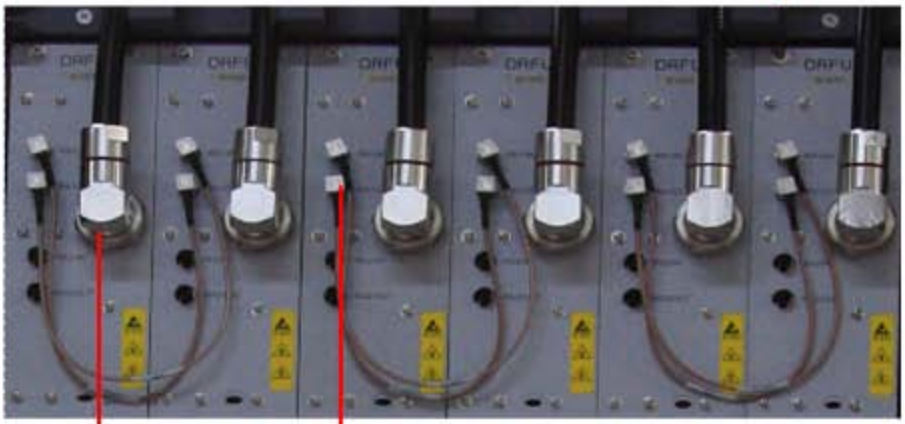
a Attaching Color Rings

For details, see pages 24 and 25.

b Installing the RF Jumpers

NOTE

If two cabinets are stacked, the RF jumpers in the lower cabinet are routed along the left and right cable troughs, and the RF jumpers in the upper cabinet are routed in front of the RFU panels.



RF jumper

RFU RF interconnection jumper

For the cable list of the RF signal cables, see Page 23.

For the methods and procedures of cable installation, see Page 25.

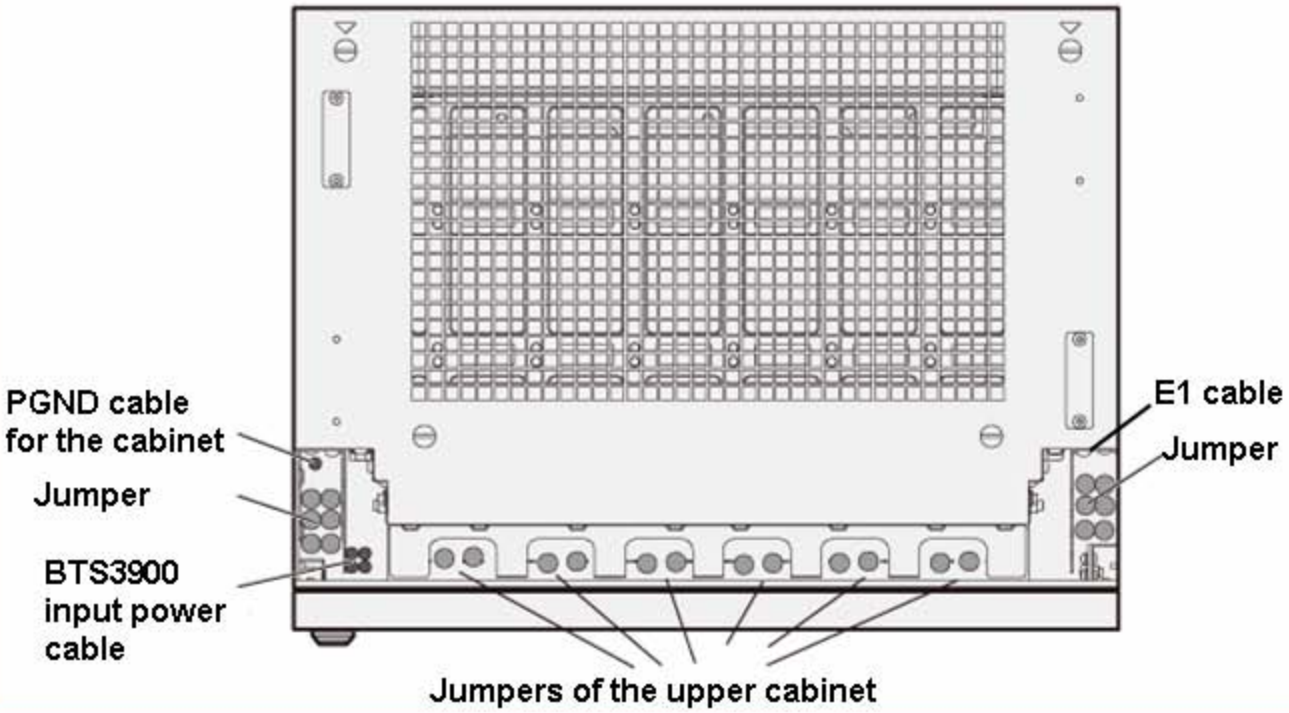
Connections of RF jumpers for stacked cabinets

Routing the Cables for the BTS3900 Cabinets

a Routing the Cables for the -48 V Stacked Cabinets

a. Route and bind the cables. For details, see page 26.
b. Lead the 12 feeders in the upper cabinet upwards until they are out of the cabinet.

Top view of the cable connections of the upper -48 V cabinet



b Routing the Cables in the +24 V Cabinets

a. Route the power cables from the DCDU-01 to the modules in the cabinet along the right side of the cabinet, and then bind the power cables with cable ties.

b. Route the SFP high-speed cables next to the DCDU-01 power cables, and then bind the high-speed cables with cable ties.

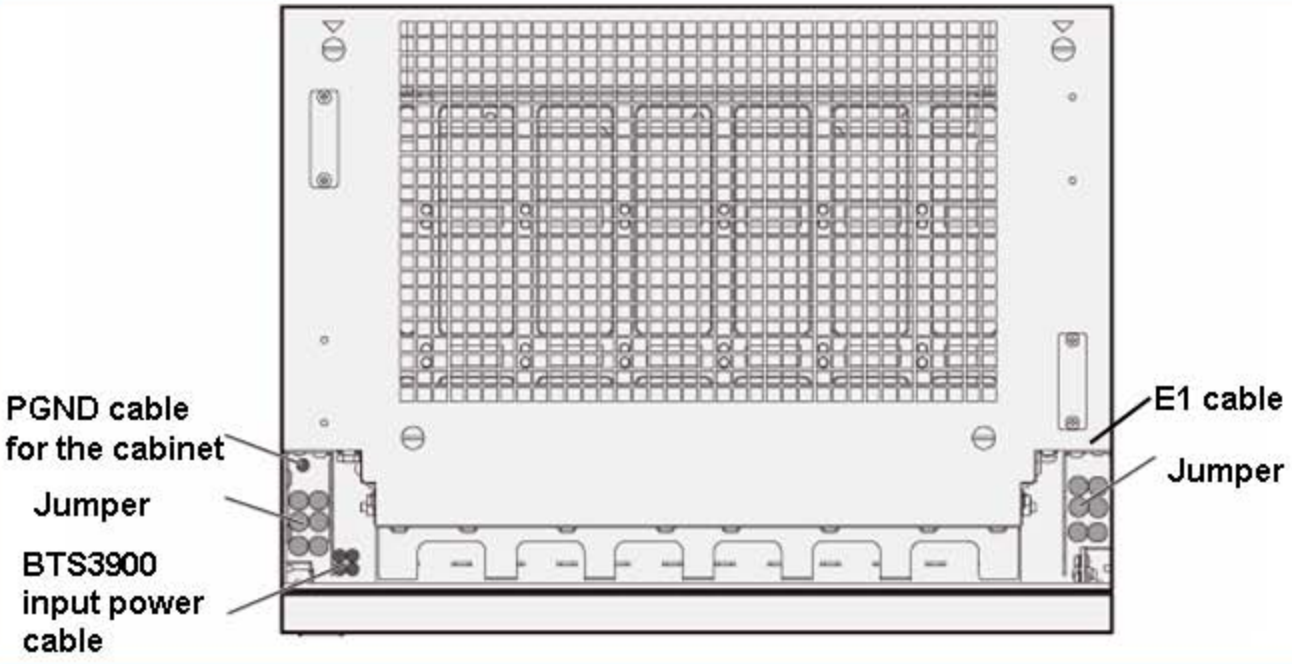
c. Route the monitoring signal cables next to the SFP high-speed cables, and then bind the monitoring signal cables with cable ties.

d. Put the six feeders on the right into the cabling space on the right side of the cabinet, and then bind the feeders with cable ties.

e. Route the BTS3900 +24 V input power cables and the power cable between the PSU (DC/DC) and the DCDU in the internal cabling space on the left side of the cabinet, and then bind the power cables with cable ties.

f. Route the E1 cable along the external cabling space on the right side of the cabinet.

g. Lead the six feeders on the left along the external cable trough on the left of the cabinet, and then bind the feeders by using cables ties.



C Routing the Cables in the 220 V Cabinets

a. Route the power cables from the DCDU-01 to the modules in the cabinet along the right side of the cabinet, and then bind the power cables with cable ties.

b. Route the SFP high-speed cables next to the DCDU-01 power cables, and then bind the high-speed cables with cable ties.

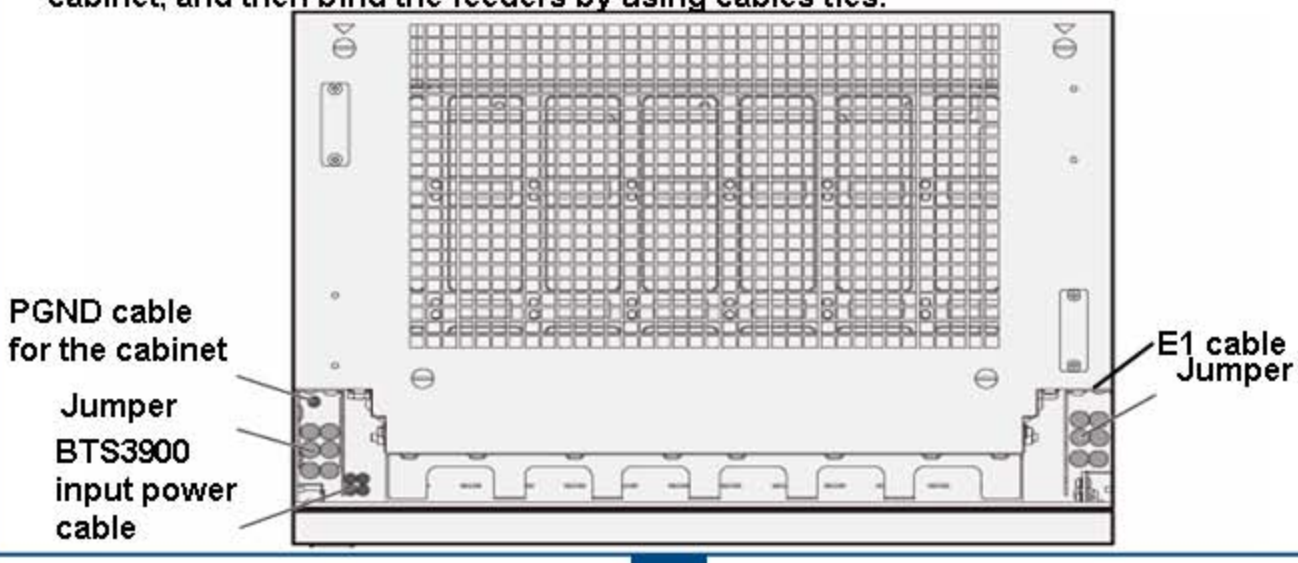
c. Route the monitoring signal cables next to the SFP high-speed cables, and then bind the monitoring signal cables with cable ties.

d. Put the six feeders on the right into the cabling space on the right side of the cabinet, and then bind the feeders with cable ties.

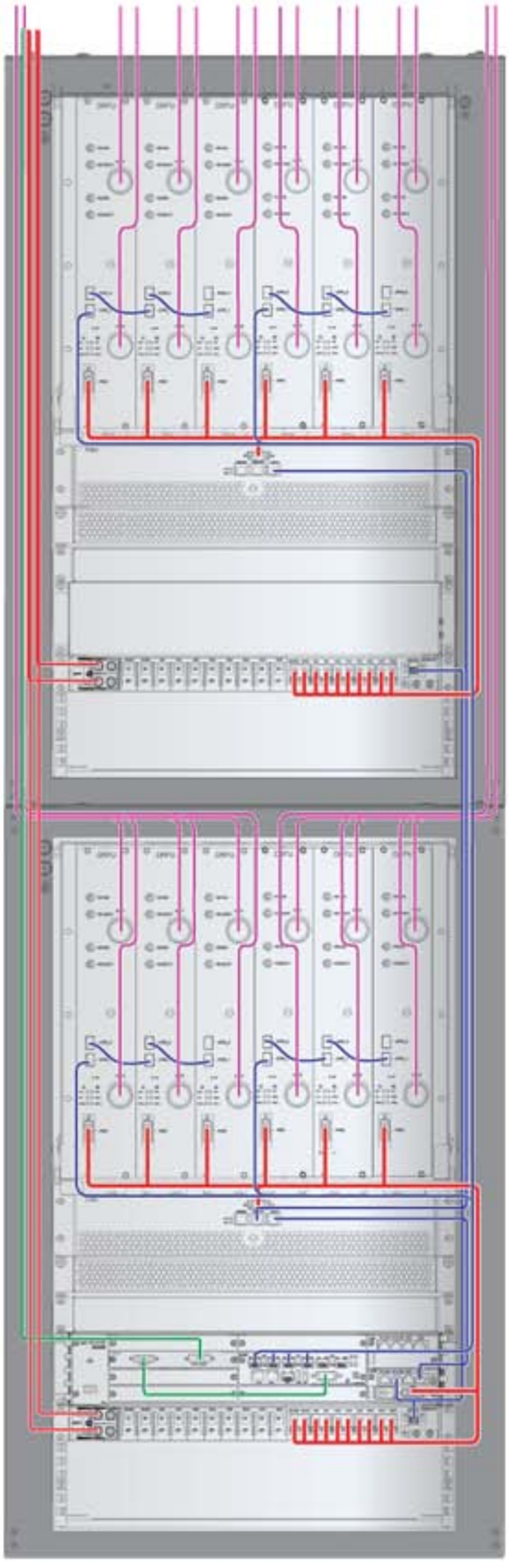
e. Route the BTS3900 220 V input power cables and the power cable between the PSU (AC/DC) and the DCDU in the internal cabling space on the left side of the cabinet, and then bind the power cables with cable ties.

f. Route the E1 cable along the external cabling space on the right side of the cabinet.

g. Lead the six feeders on the left along the external cable trough on the left of the cabinet, and then bind the feeders by using cables ties.



d Example of Cable Routing in Stacked -48 V Cabinets



E1 cable and E1 surge protection transfer cable

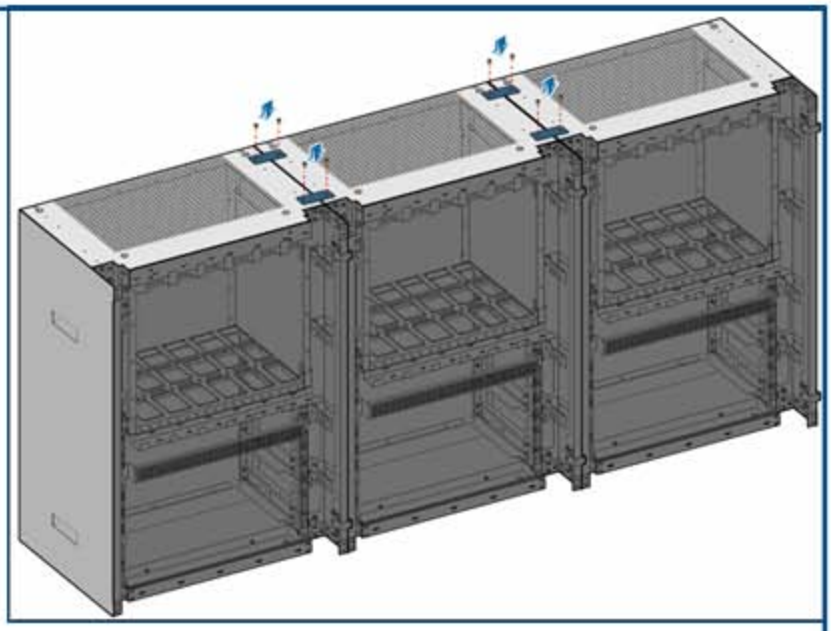
Power cable

Signal cable

RF cable

Installing Three BTS3900 Cabinets and Cables

1. Install three empty cabinets.



NOTE

For details about how to install the base, see the base installation of a single cabinet.

2. Install three PGND cables and two equipotential cables.

NOTE

For details on the grounding cable connections, see the installation of a single cabinet.

For details on the equipotential cable connections and the installation of connecting plates, see the installation of two cabinets in side-by-side mode.

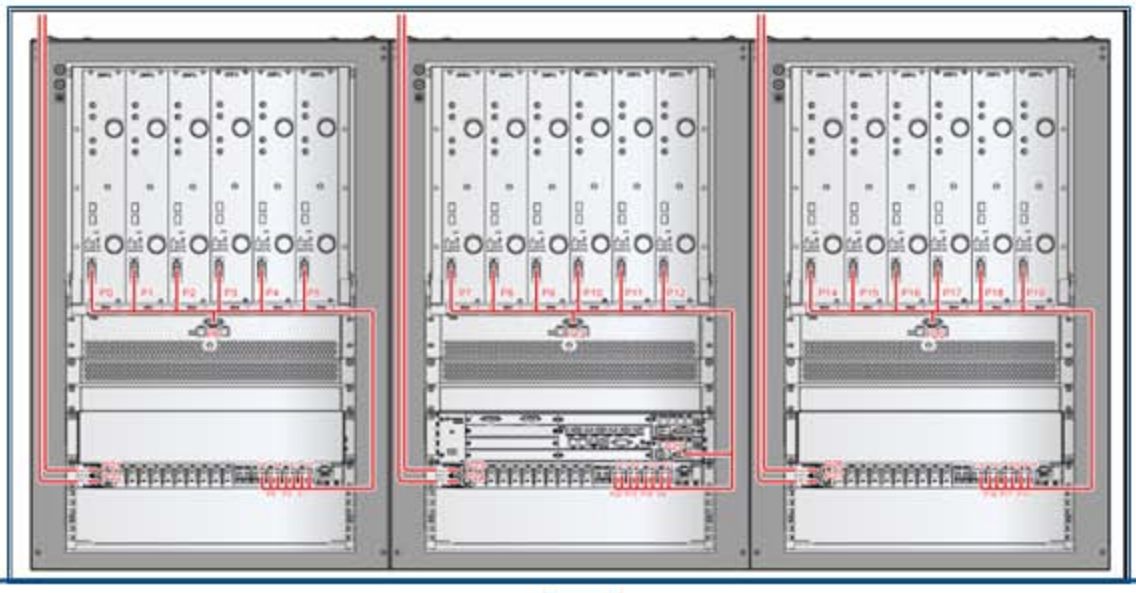
3. Install the components.

NOTE

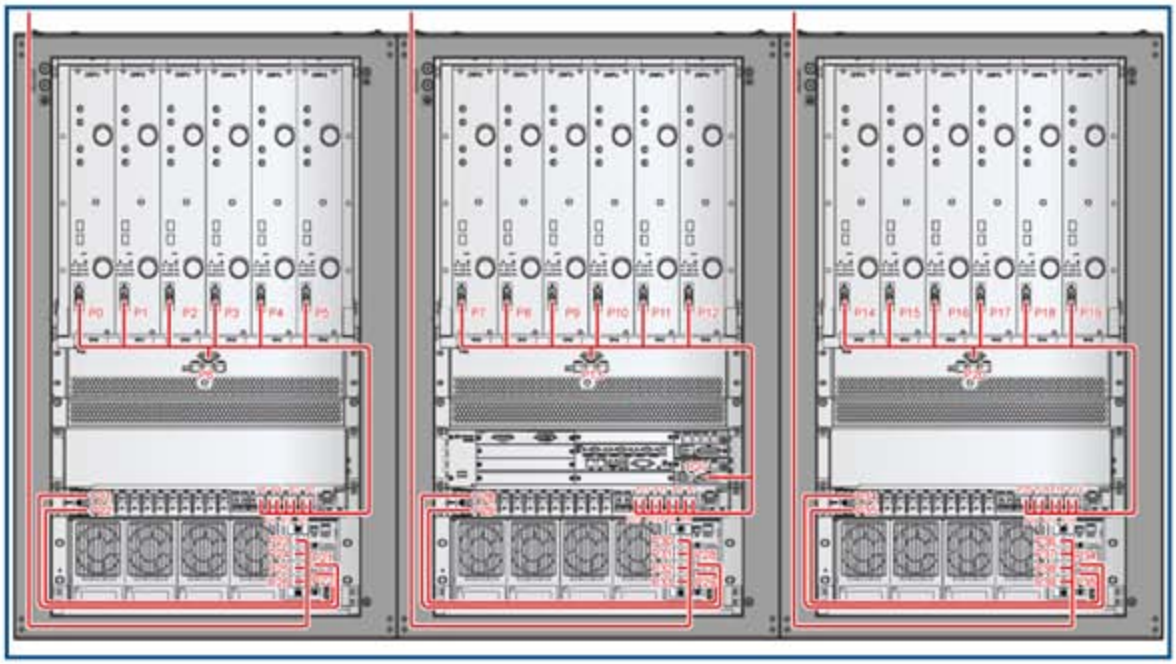
The cabinet needs to be configured with the DRFUs, BBU, DCDU-01s, GATM (optional), and power conversion system (EPS90-4830A for the 220 V cabinets and EPS24S48100D for the +24 V cabinets).

4. Install the power cables. All power cables have the same codes as those of the power cables used for a single cabinet.

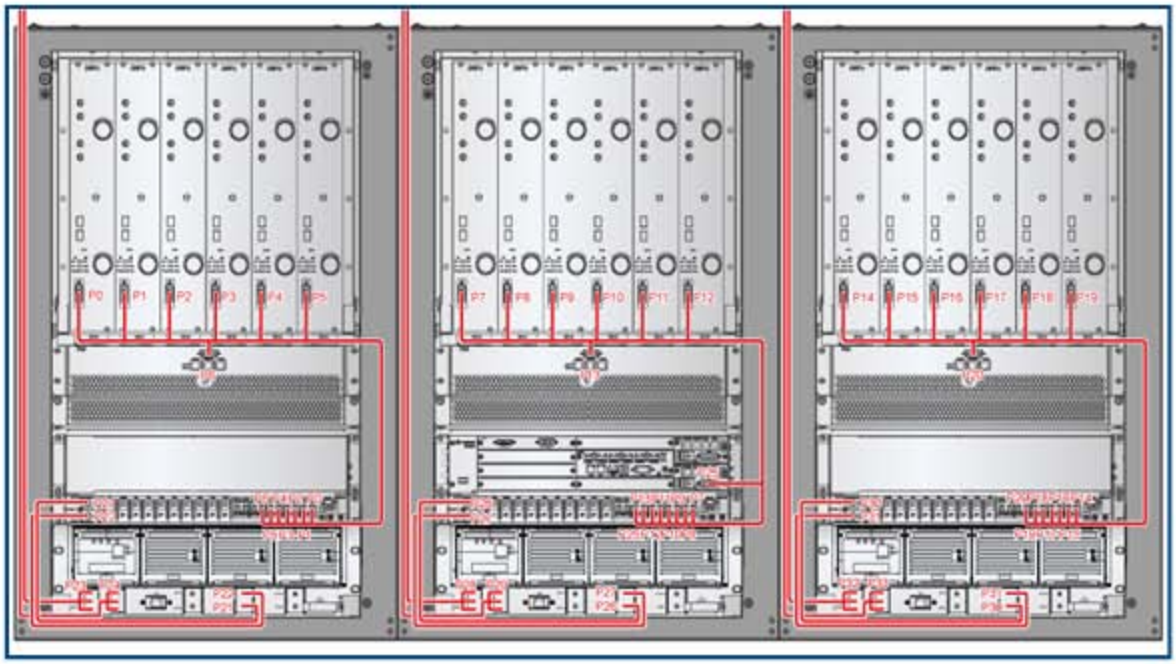
Power cable connections of the -48 V cabinets



Power cable connections of the +24 V cabinets

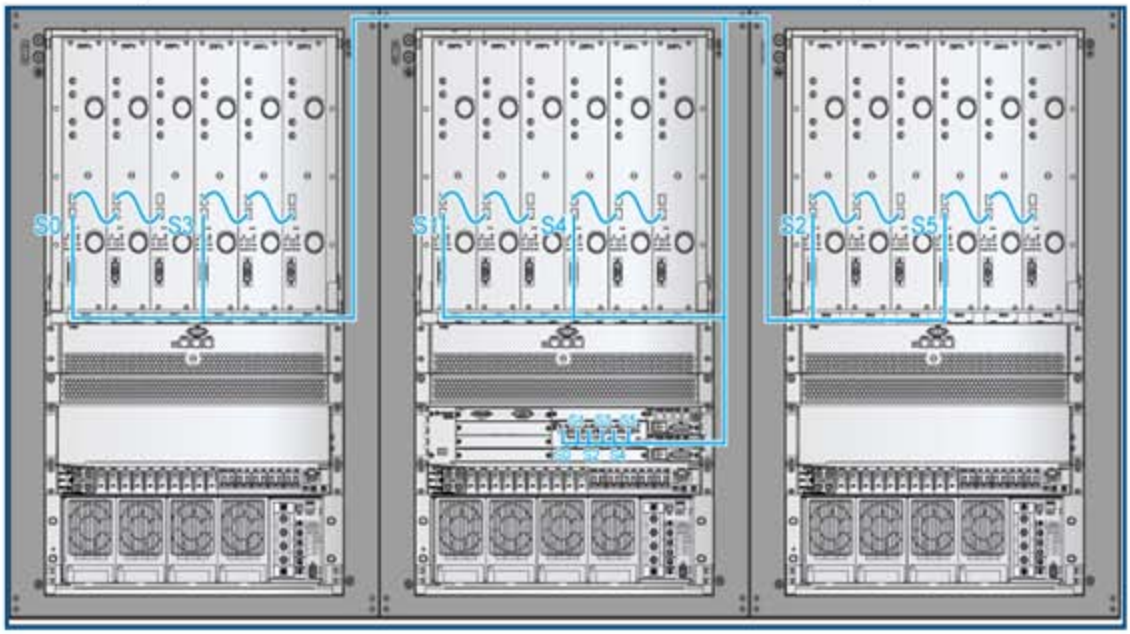


Power cable connections of the 220 V cabinets



5. Install the transmission cables in the main cabinet. For details about how to install transmission cables in a single cabinet, see page 17.

6. Install the CPRI electrical cables and signal cable between cascaded RFUs (-48 V, 220 V, and +24 V cabinets have the same connections).

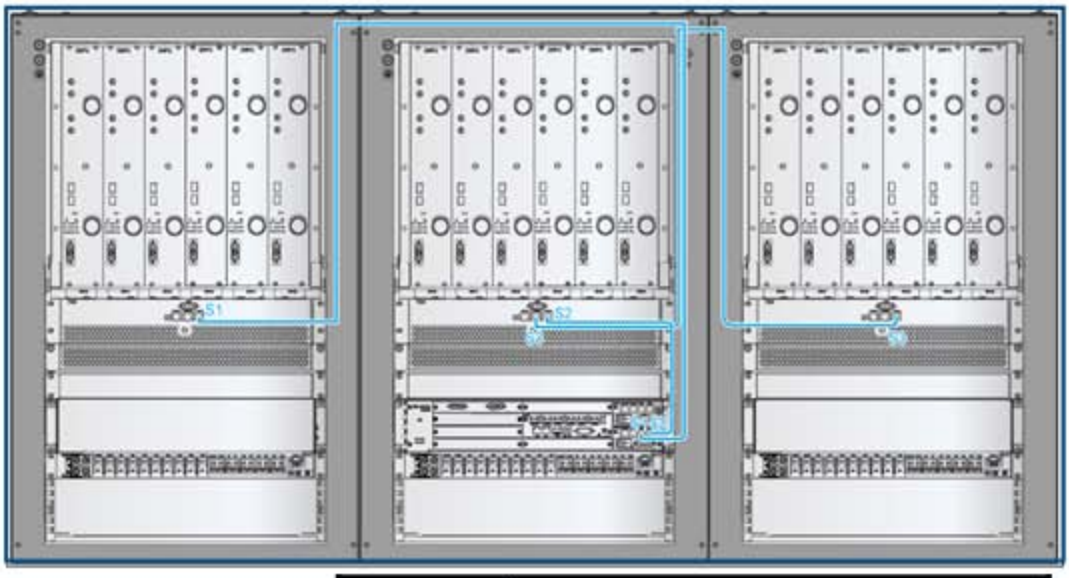


7. Install the FAN units, DCDUs, and monitoring signal cables for the PSUs.

NOTE

Mapping between the CPRI ports on the BBU and the cabinets: The left cabinet corresponds to CPRI0 and CPRI3, the middle cabinet corresponds to CPRI1 and CPRI4, and the right cabinet corresponds to CPRI2 and CPRI5.

Monitoring signal cable connections of the -48 V cabinets

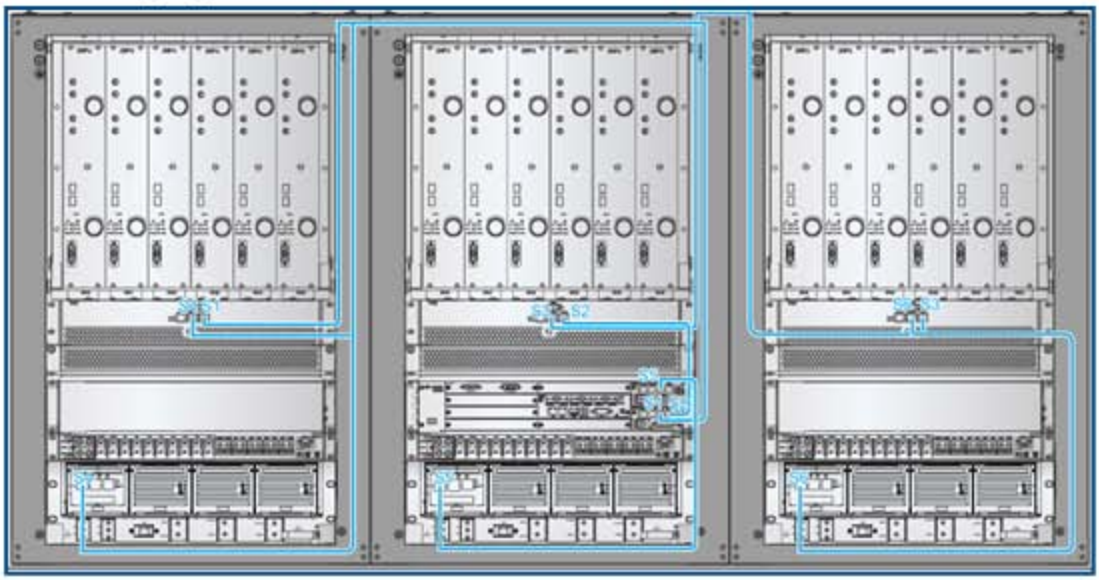


NOTE

When the EMU is configured, connect the monitoring signal cable to the MON1 port.

SN	Cable Code
1, 3	04046809 FAN-BBU, FAN-FAN
2	04070025 FAN-BBU

Monitoring signal cable connections of the 220 V cabinets

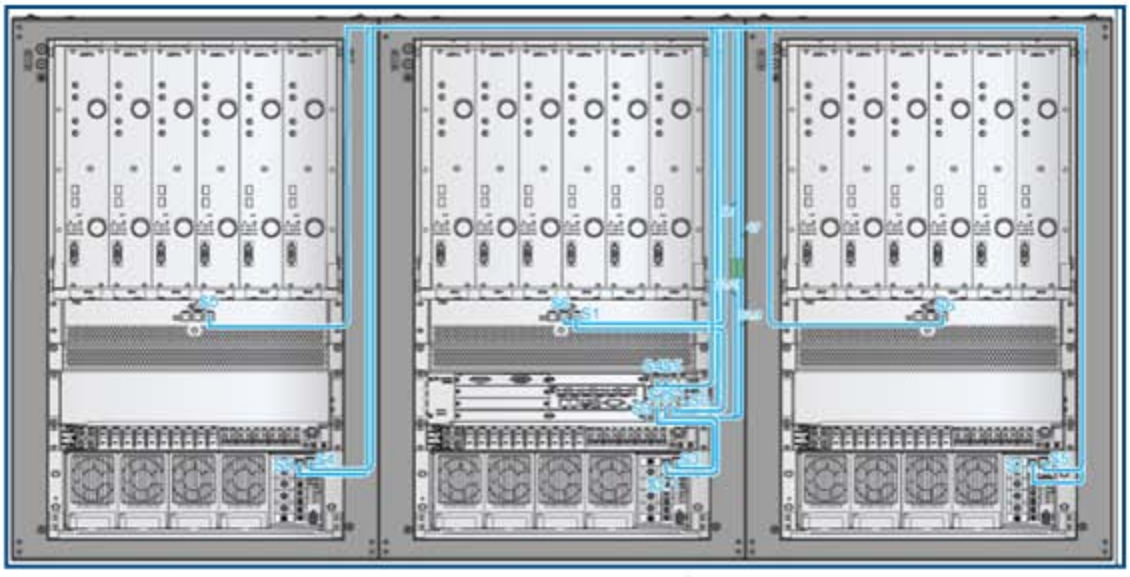


NOTE

When three 220 V cabinets or three +24 V cabinets are installed in side-by-side mode, the UEIU is mandatory.

SN	Cable Code
1, 3	04046809 FAN-BBU, FAN-FAN
2	04070025 FAN-BBU
4, 5, 6	04046009 PMU-FAN, PMU-BBU

Monitoring signal cable connections of the +24 V cabinets



SN	Cable Code
0, 6	04046809 FAN-BBU, FAN-FAN
1, 3	04070025 FAN-BBU, BBU-48100D

SN	Cable Code
2	04080054 BBU-48100D
4, 5	04046809 BBU-48100D
7, 8	25030584 48100D-BBU (2 m)

8. For details about how to attach color rings and install RF jumpers, see the installation of RF jumpers in a single cabinet.

9. Ensure the following items for three cabinets in side-by-side installation:

   1. The main cabinet is placed between the other two cabinets.

   2. The cabinet equipotential cables and connecting plates are correctly installed.

   3. The CPRI cables and monitoring signal cables are correctly connected.

   4. The cabinet grounding cables are correctly connected.

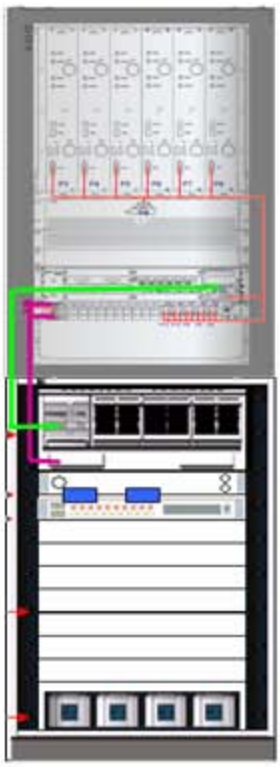
Appendix A PS4890 Power System

The PS4890 power cabinet supports a maximum configuration of S4/4/4+S2/2/2 for the BTS3900.

1. The power cable is routed on the cable rack. The power cable of 8 m is delivered by default.
2. The monitoring signal cable for the power cabinet is routed on the cable rack. The other end is connected to the MON1 port on the BBU.

Battery configuration 1	50 Ah (with 7 U transmission space)
Battery configuration 2	92 Ah (with 7 U transmission space)
Battery configuration 3	184 Ah (without transmission space)

Installation Scenario 2:

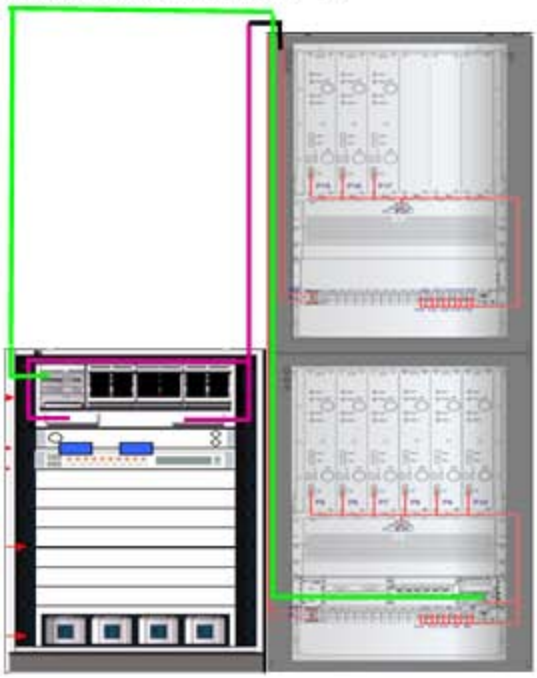


The following installation mode can be applied to a new site. It is recommended to place the power cabinet on the left.

Monitoring signal cable for the power cabinet

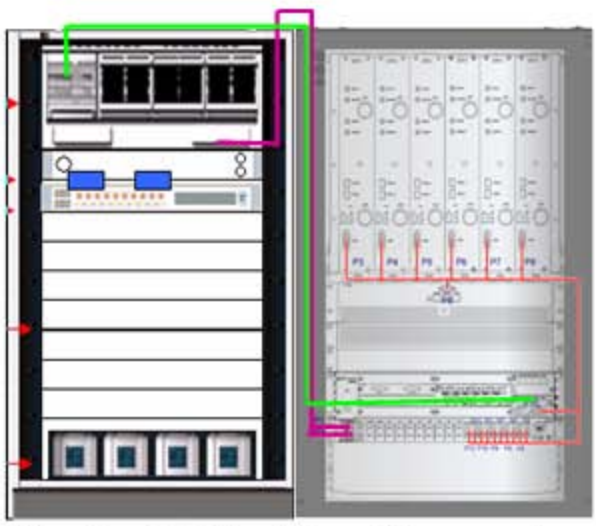
Power cable for the power cabinet

Installation Scenario 1:



When the GATM and the EMU are configured, see the installation of two cabinets in stack mode.

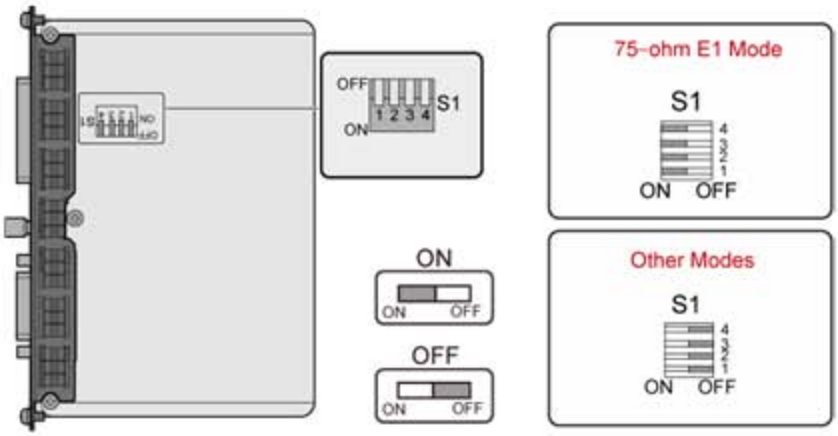
Installation Scenario 3:



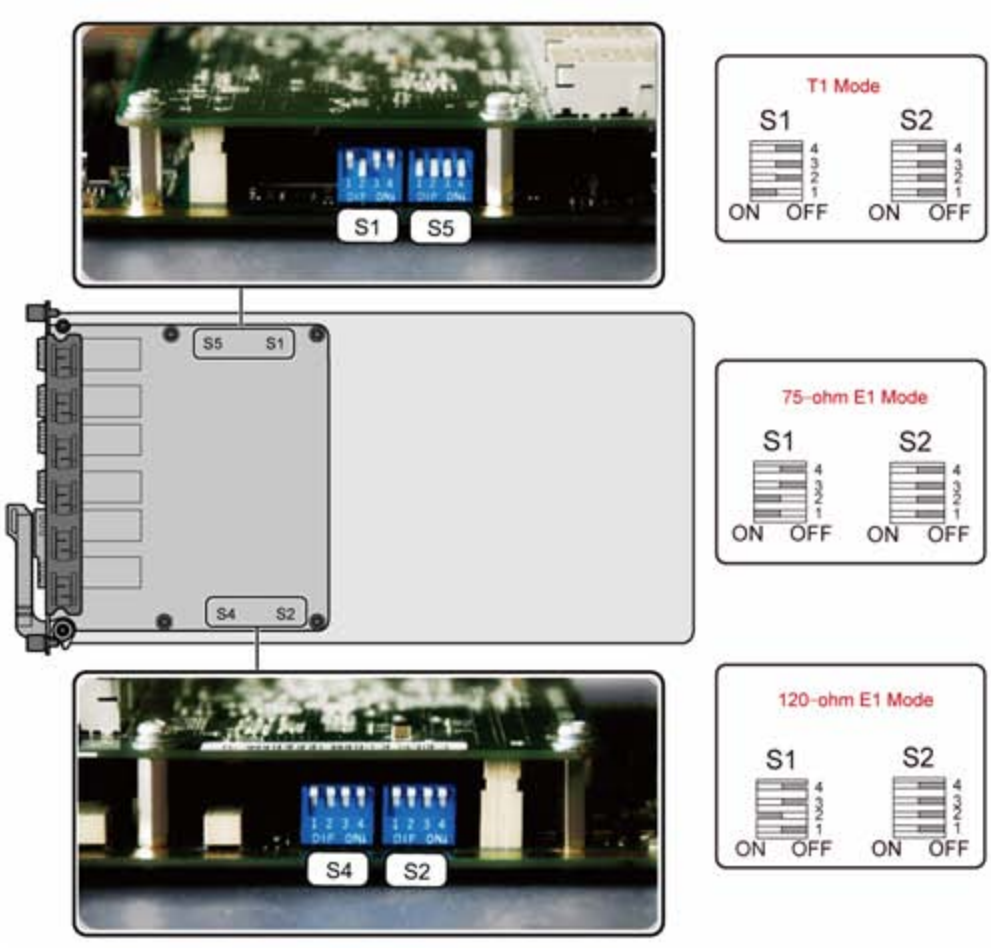
When the GATM and the EMU are configured, see the installation of a single cabinet.

Appendix B Settings of the DIP Switches on the UELP and GTMU

DIP switch on the UELP



DIP switches on the GTMU



All the DIP bits of S2 are set to OFF (balanced mode) by default in 75-ohm E1 mode. When four E1 links are faulty, all the DIP bits of S2 should be set to ON (unbalanced mode) so that the faults are rectified.

Five DIP switches are available on the GTMU. At present, four of them are used and S3 is reserved. Each DIP switch has four bits. There is one DIP switch on the UELP. The DIP switch is used for selecting the matched impedance of the E1/T1 port. The following table describes the DIP status of S1 and S2.

Board	DIP Switch	DIP Status				Description
		1	2	3	4	
GTMU	S1	ON	ON	OFF	OFF	E1 75-ohm mode
		OFF	ON	OFF	OFF	E1 120-ohm mode
	S2	ON	ON	ON	ON	Unbalanced mode
		OFF	OFF	OFF	OFF	Balanced mode
UELP	S1	ON	ON	ON	ON	Unbalanced mode
	S2	OFF	OFF	OFF	OFF	Balanced mode

Whether to enable the E1 bypass function depends on the actual requirements. You can enable or disable the E1 bypass function by setting S4 and S5 on the GTMU.

Board	DIP Switch	DIP Status				Description
		1	2	3	4	
GTMU	S4	ON	ON	ON	ON	The E1 link can be bypassed.
		OFF	OFF	OFF	OFF	The E1 link cannot be bypassed.
	S5	ON	ON	ON	ON	The E1 link cannot be bypassed.
		OFF	ON	ON	OFF	The E1 link of the Level 1 cascaded BTS can be bypassed.
		ON	OFF	ON	OFF	The E1 link of the Level 2 cascaded BTS can be bypassed.
		OFF	OFF	ON	OFF	The E1 link of the Level 3 cascaded BTS can be bypassed.
		ON	ON	OFF	OFF	The E1 link of the Level 4 cascaded BTS can be bypassed.
		OFF	ON	OFF	OFF	The E1 link of the Level 5 cascaded BTS can be bypassed.

Appendix C Installing the Bias-Tee

1 Introduction to the Bias-Tee

The Bias-Tee is a passive component, which couples the DC power or OOK signals into the feeder. The GATM is connected to the antenna through the Bias-Tee.

Connecting the antenna port on the BTS

Connecting the feeder

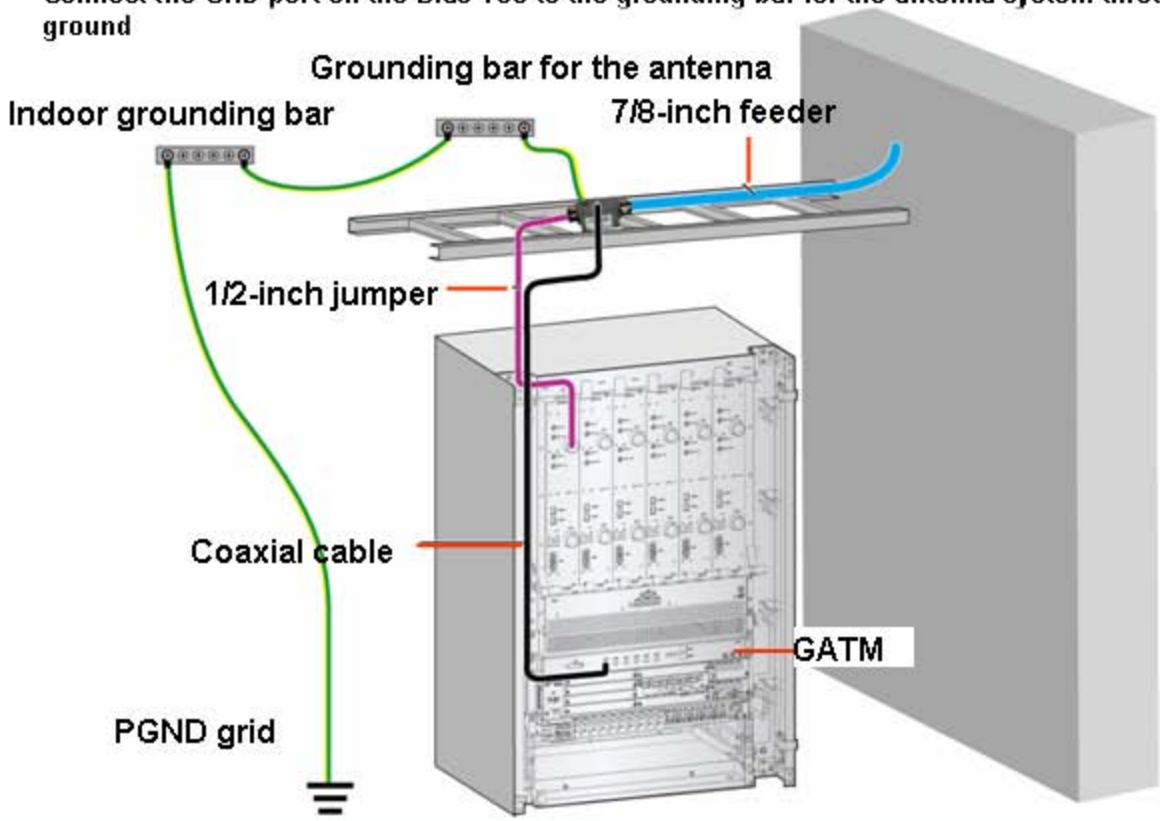
Connecting the ground

Port for the Bias-Tee and RET control signals

Connecting one of the ports from ANT0 to ANT5 on the GATM

2. Installing the Bias-Tee Indoors

a. Connect the ANT port on the Bias-Tee to the 7/8-inch feeder. Fix the Bias-Tee to the cable rack.
b. Connect the BTS port on the Bias-Tee to the RF output port on the DRFU through the 1/2-inch jumper.
c. Connect the DC/OOK port on the Bias-Tee to one of ports from ANT0 to ANT5 on the GATM through the RET control signal cable.
d. Connect the GND port on the Bias-Tee to the grounding bar for the antenna system through the ground



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