Remote Radio Unit Description

RRUS 01

Description

49/1551-LZA 701 6001/1 Uen A

Contents

1 Introduction

This document describes the Remote Radio Unit multi-Standard (RRUS) 01.

Note: Remote Radio Unit (RRU) is often used as a generic expression for a remotely installed Radio Unit (RU). It is also the name of models prior to the RRUS versions described in this document, for example Remote Radio Unit Wideband (RRUW).

1.1 Warranty Seal

The unit is equipped with a warranty seal sticker.

Note: Seals that have been implemented by Ericsson shall not be broken or removed, as it otherwise will void warranty.

2 Product Overview

The RRUS remotely extends the reach of the RBS by up to 40 km. The RRUS is designed to be located near the antenna. A fiber optic cable connects the RRUS to the RBS main unit or an expanded macro RBS. The RRUSs can be connected in a star configuration or in a cascade configuration with optical cable links as shown in Figure 1 .

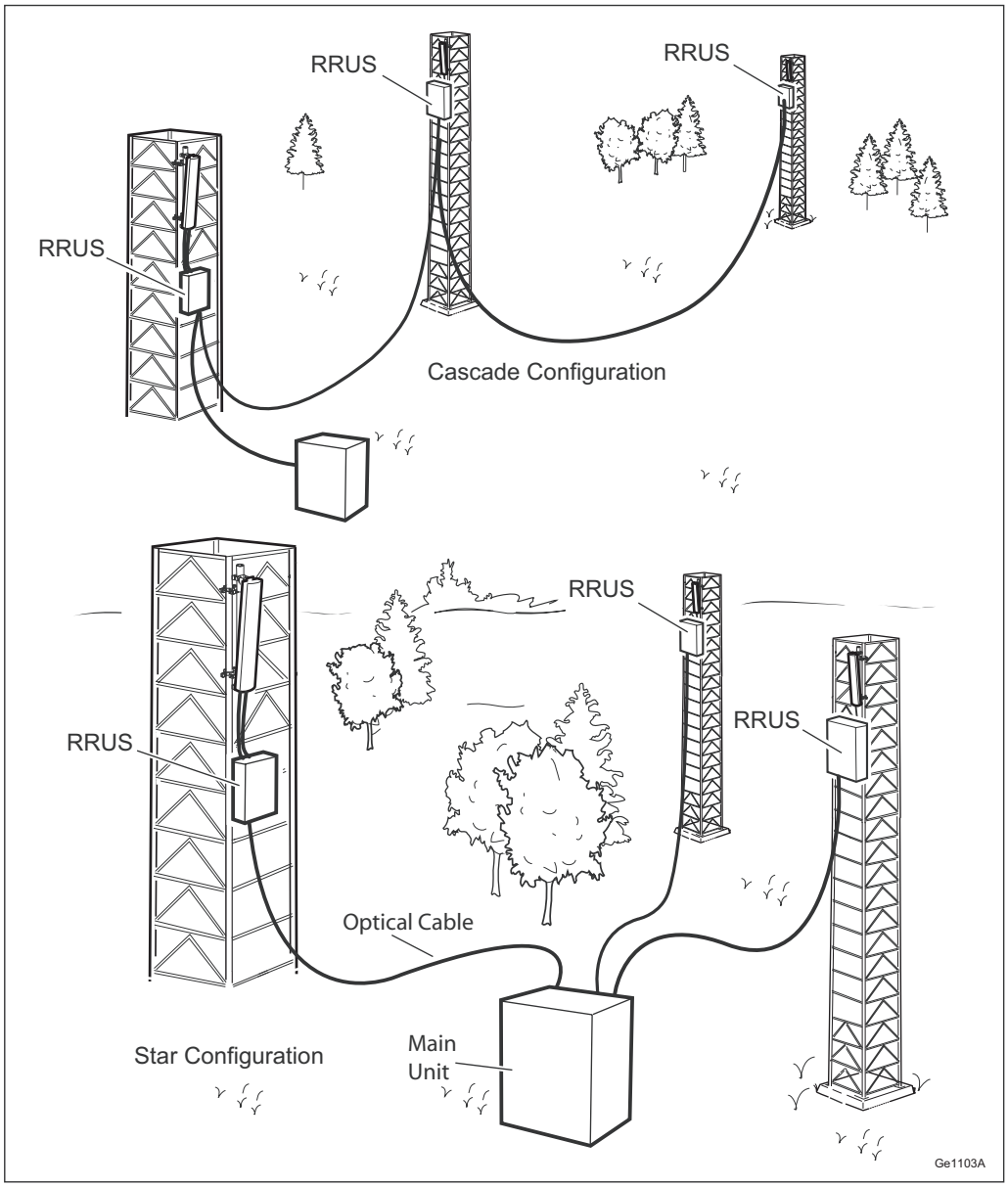


Figure 1 RRUSs in Star and Cascade Configurations

2.1 Main Features

Depending on the software application, the RRUS supports the Antenna System Controller (ASC), the Tower Mounted Amplifier (TMA), the Frequency Shifting Tower Mounted Amplifier (TMF), or the Remote Electrical Tilt Unit (RETU). The RETU can be connected either through the ASC or the RET Interface Unit (RIU) over the antenna interface or directly using the RRUS Antenna Line Device (ALD) or Remote Electrical Tilt (RET) control interface.

The RET interface on the RRUS is the link to the antenna communication system. See Table 14 for information about the RRUS connection interface for ALD (RET).

RRUS 01 supports GSM, WCDMA and LTE FDD (depending on frequency band). It has one duplex RX/TX branch and one uplink RX branch and supports cross connection of RX ports with other RRUs.

RRUS 01 can be used together with an RRUS A2 to provide a four RX branch implementation for Main Remote applications. For more information, refer to *Remote Radio Unit Description* of RRUS A2.

2.2 Optional Equipment

The optional equipment for the RRUS is the following:

- Wall installation equipment
- Pole installation equipment
- Power Supply Unit (PSU)
- Alternating Current Connection Unit (ACCU)
- Radio Frequency (RF) monitoring port

3 Technical Data

This section contains information about the physical characteristics, environmental data, and the power supply of the RRU.

3.1 Dimensions

This section contains information about the technical data and dimensions for the RRUS 01.

Table 1 lists the technical data and Figure 2 shows the dimensions for the RRUS 01.

Table 1 RRUS 01 Technical Data

Description	Value
Maximum nominal output power, subject to license handling.(1) (2)	B0, B9: 20 W, 40 W, and 60 W B1, B2, B3, B5, B8: 20 W, 40 W, 60 W, and 80 W Hardware Activation Code (HWAC) is required for total output power over 20 W.
Number of carriers, subject to license handling.(1)	1 to 4 carriers

Description	Value
Frequency[3]	890 to 915 MHz uplink 935 to 960 MHz downlink B0 for GSM, WCDMA, and LTE
	1,920 to 1,980 MHz uplink 2,110 to 2,170 MHz downlink B1 for WCDMA and LTE
	1,850 to 1,910 MHz uplink 1,930 to 1,990 MHz downlink B2 for GSM, WCDMA, and LTE
	1,710 to 1,785 MHz uplink 1,805 to 1,880 MHz downlink B3 for GSM, WCDMA, and LTE
	824 to 849 MHz uplink 869 to 894 MHz downlink B5 for GSM, WCDMA and LTE
	880 to 915 MHz uplink 925 to 960 MHz downlink B8 for GSM, WCDMA, and LTE
	1,749.9 to 1,784.9 MHz uplink 1,844.9 to 1,879.9 MHz downlink B9 for WCDMA and LTE
Dimensions without Solar Shield	
Height	600 mm
Width	350 mm
Depth	112 mm
Dimensions with Solar Shield	
Height	636 mm
Width	383 mm
Depth	169 mm
Weight	
RRUS 01	20 kg
Color	
Gray	

(1) Detailed information about LTE licenses can be found in License Management and Manage Licenses.
(2) Detailed information about output power can be found in the Output Power user guides.
(3) Information about Instantaneous Bandwidth (IBW) can be found in RBS Configurations.

The RRUS size, height, width, and depth with solar shield, is shown in Figure 2 .

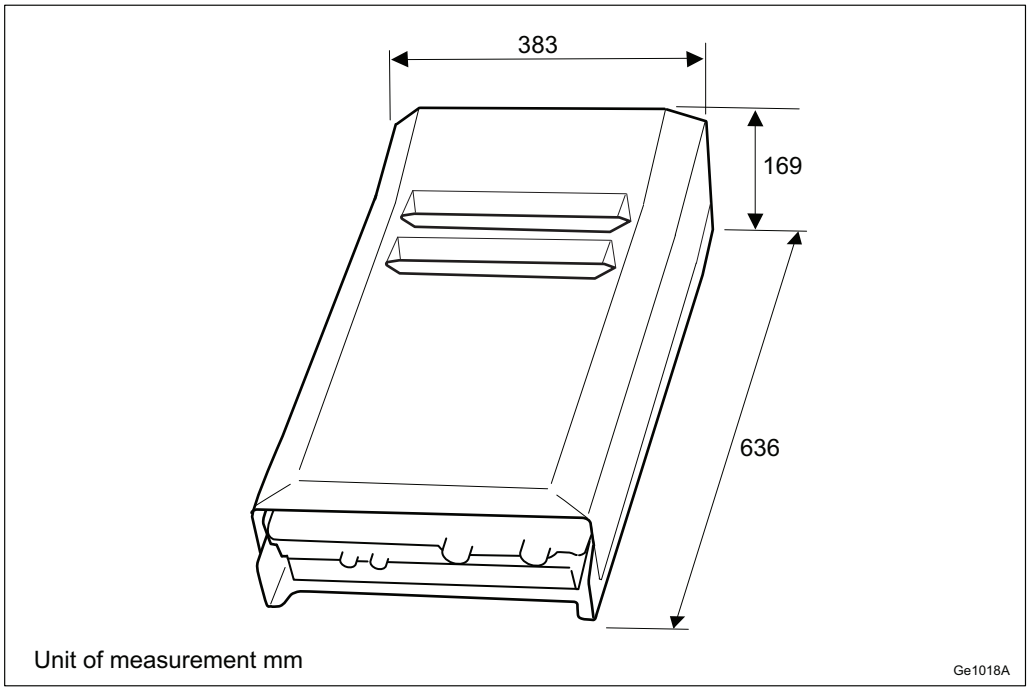


Figure 2 RRUS 01 Height, Width, and Depth with Solar Shield

3.2 Installation Recommendations

To achieve reliable operation, and maximum performance, an appropriate installation location must be chosen.

3.2.1 Indoor Installation Environments to Avoid

Although the unit is designed for outdoor use, it can be used indoors. For indoor locations Ericsson recommends to operate according to ETSI 300 019-1-3 class 3.1 and 3.3. This does not cover installation with heat traps or installation in lofts, where air ventilation does not exist. To ensure smooth performance of the product, it is recommended to ensure that the planned installation site for the unit is not a potential microclimate location. This typically occurs in places such as unventilated lofts, sites with heat traps, or sites where the product is exposed to direct sunlight through windows. Avoid installing the equipment under glass covers or skylight windows without proper ventilation.

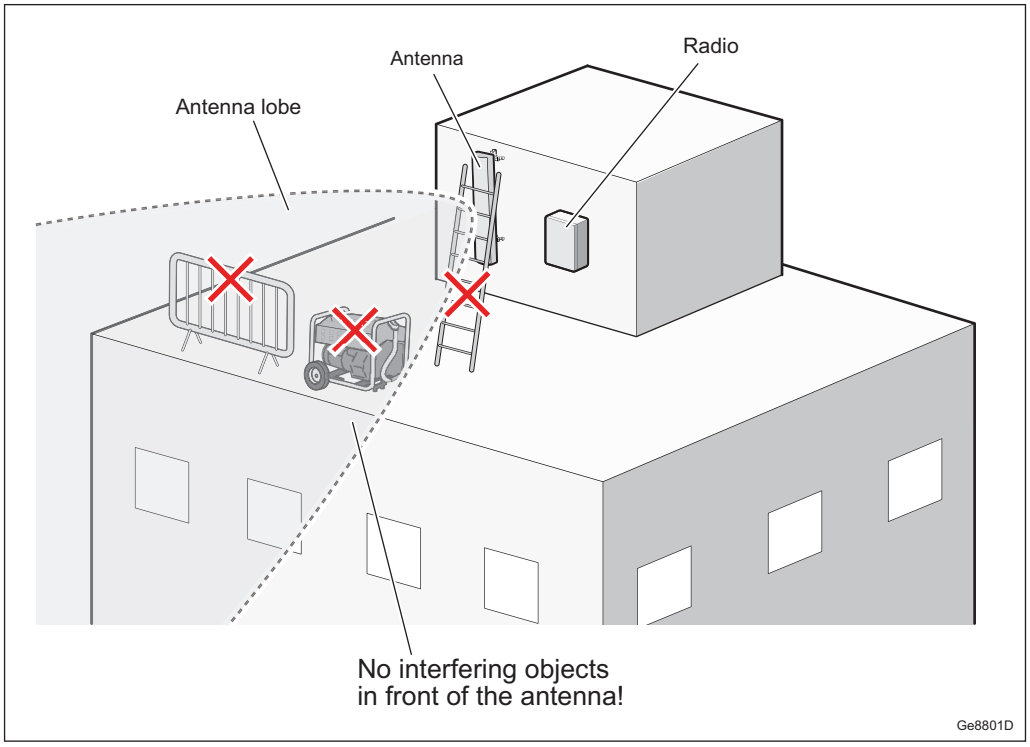
3.2.2 Outdoor Installation Environments to Avoid

The RRU is designed for outdoor use but to ensure optimal operation avoid the following:

- Hot microclimates caused, for example, by heat radiated or reflected from dark or metallic walls or floors
- Chimney mouths or ventilation system outlets
- Large glass or concrete surfaces

Avoid radio interference by keeping the area directly in front of the antenna clear of the following:

- Metal surfaces or objects such as railings, ladders or chains
- Equipment generating electromagnetic fields, such as electric motors in air conditioners or diesel generators
- RBS equipment



3.2.3 Painting Limitations

Ericsson does not recommend painting the RRU as it may affect radio performance of the unit.

Ericsson will apply limitations to the warranty and service contract if the RRU is painted.

3.2.3.1 Technical Limitations

If the RRU is painted, be aware of the technical limitations below:

- Sunlight on dark paint may increase the temperature of the RRU causing it to shut down.
- The plastic surfaces and the plastic covers are suited for painting with normal commercially available one or two component paints.
- Never use metallic paint or paint containing metallic particles.
- Ensure that ventilation and drainage holes are free from paint.
- Ensure proper adhesion of the paint.

3.2.3.2 Commercial Limitations

If the RRU is painted, the commercial limitations below apply:

- Failure modes directly related to overheating due to painting are not valid for repair within the scope of the warranty or standard service contract.
- Product failures related to paint contamination of components of the unit are not valid for repair within the scope of warranty or standard service contract.
- When a painted unit is repaired, it will be restored to the standard color before being returned to the market. It is not possible to guarantee the same unit being sent back to the same place. This is also valid for units repaired under a service contract.
- For repairs within the warranty period or a standard service contract, the customer will be charged the additional costs for replacing all painted parts of the unit or the complete unit.

3.3 Space Requirements

This section describes the space requirements for installing the RRUS.

The RRUS with cable connections running downwards can be installed as follows:

- On a wall
- On a pole

Both wall and pole installations can be indoors or outdoors.

Pole installations can be on monopoles, masts, or towers. Figure 3 shows example pole installations (left to right: single unit on a monopole, two units on a tower on different struts, and three units on a monopole).

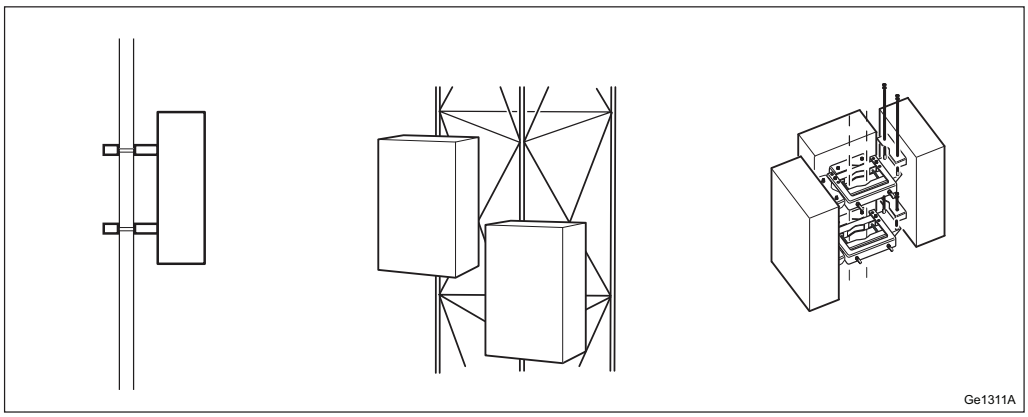


Figure 3 Sample Site Layout for Pole Installation

3.3.1 Generic Requirements

The RRUS is installed with the cable connections facing downwards.

Note: If no other possibilities are available, under exceptional conditions, the RRUS can be installed horizontally with the front downwards. This installation alternative limits the power supply options and the maximum output power. See *Install Remote Radio Units* for details regarding optional actions.

Allow a sufficient working space in front of the RRUS.

It is recommended that the RRUS is installed below the antenna. The minimum distance between the RRU and the antenna, and between two RRUs are shown in Figure 4 , Figure 5 , Figure 6 , and Figure 7 .

Note: The distance between the antenna and the RRU needs to be increased if the antenna azimuth is in the direction of the RRU.

3.3.2 Pole Installation

Figure 4 shows the installation requirements when installing the RRU on a pole.

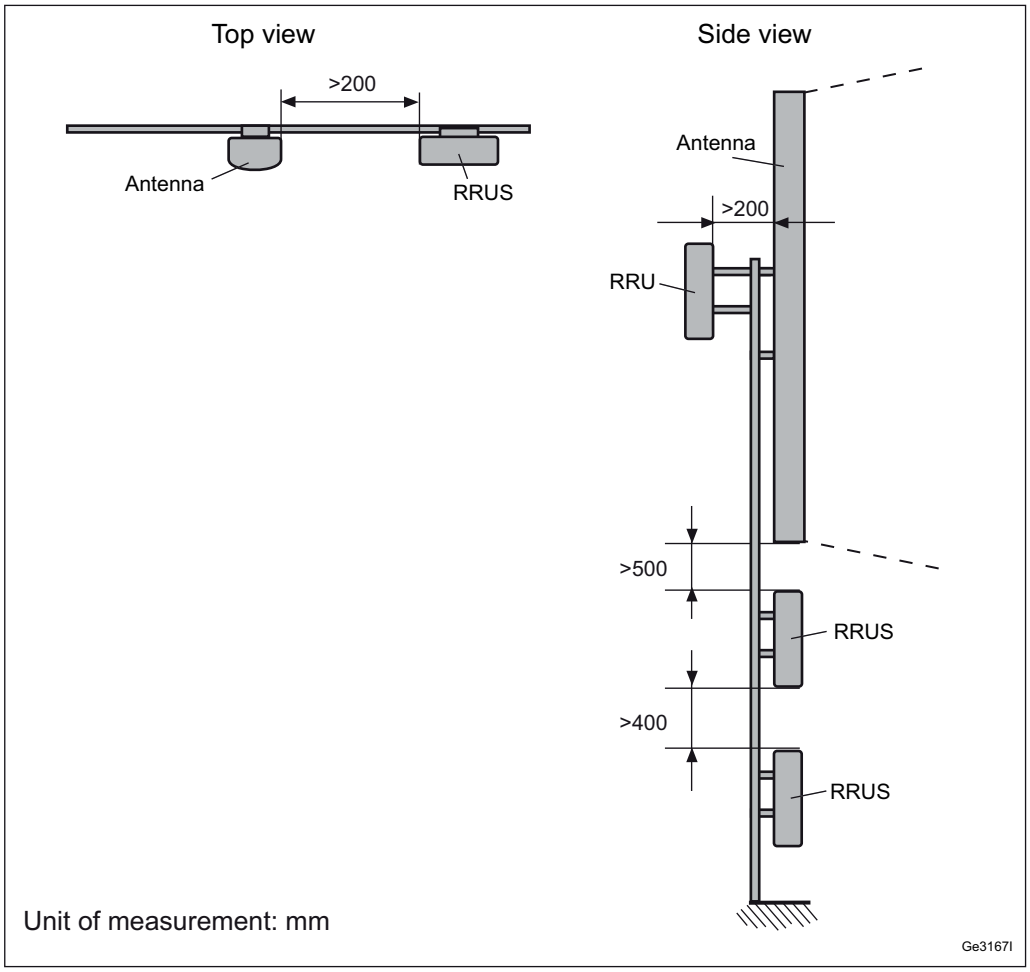


Figure 4 RRU Pole Installation Requirements

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between RRUSs installed vertically on a pole. Allow a minimum vertical distance of 500 mm between RRUS and antenna, if installed above or below an antenna. Allow a minimum of 200 mm free space between RRUSs installed side by side. The minimum distance from the bottom of the RRUS to the floor is 300 mm.

Note: An RRU can not be installed in the uppermost top position of a pole or mast.

For an RRUS with AC power supply, the mounting bracket supports only two RRUS units.

The supported pole diameters are listed in Table 2 .

Table 2 Pole Diameters

Mounting Equipment	Pole Diameter	Supported RRUSs
Single fixture	60 – 120 mm	All types

Mounting Equipment	Pole Diameter	Supported RRUSs
Mounting bracket	35 – 155 mm	All types

3.3.3 Wall Installation

This section describes the installation requirements when installing the RRU on a wall.

3.3.3.1 RRU Installation on Outdoor Wall

The installation requirements if installing the RRU outdoor on a wall are shown in Figure 5 .

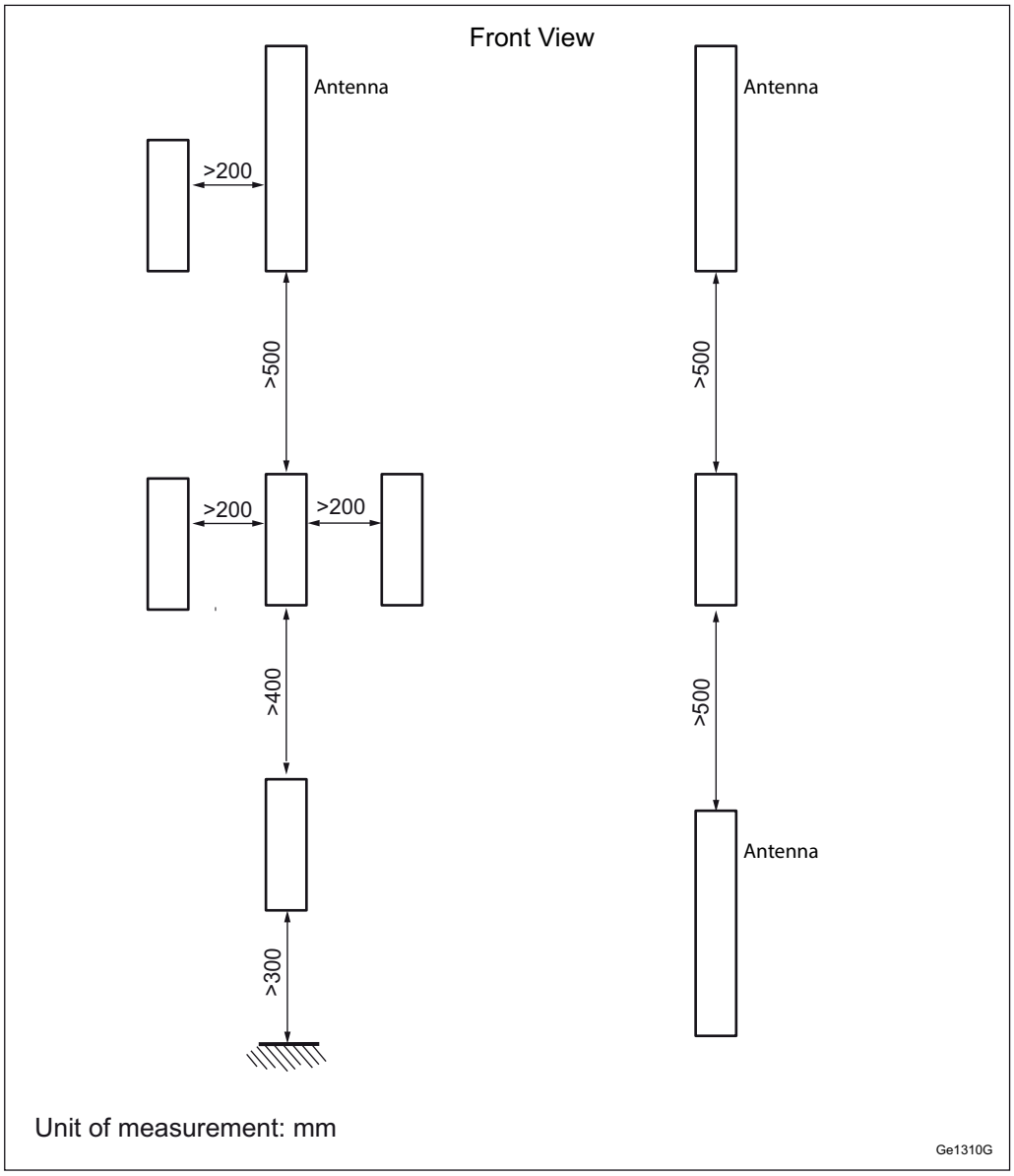


Figure 5 RRU Outdoor Wall Installation Requirements

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between RRUSs installed vertically on a wall. Allow a minimum vertical distance of 500 mm between RRUS and antenna, if installed above or below an antenna. Allow a minimum of 200 mm free space between RRUSs installed side by side. The minimum distance from the bottom of the RRUS to the floor is 300 mm.

Note: An RRUS can not be installed in the uppermost top position on a wall.

3.3.3.2 RRU installation on Indoor Wall

The installation requirements if installing the RRU on an indoor wall are shown in Figure 6 .

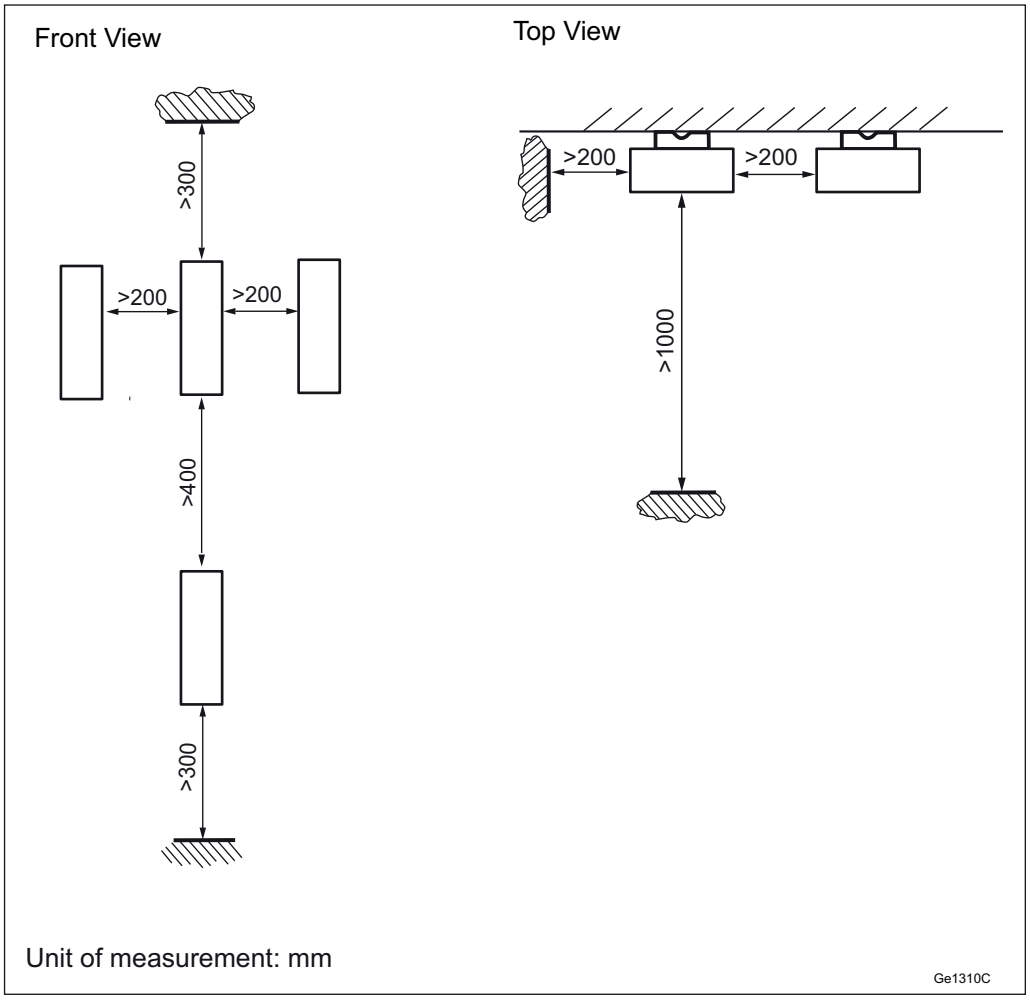


Figure 6 RRU Indoor Wall Installation Requirements

To ensure adequate airflow between the units, allow a minimum of 400 mm free space between RRUSs installed vertically on a wall. Allow a minimum of 200 mm free space between RRUSs installed side by side. The minimum distance from the bottom of the RRUS to the floor is 300 mm.

3.3.4 RRU Back to Back Installation

In addition to all the above installation requirements, allow a minimum of 200 mm free space to ensure adequate airflow between two pairs of dual mounted RRUs installed back to back, as shown in Figure 7 . Recommended free space is 500 mm.

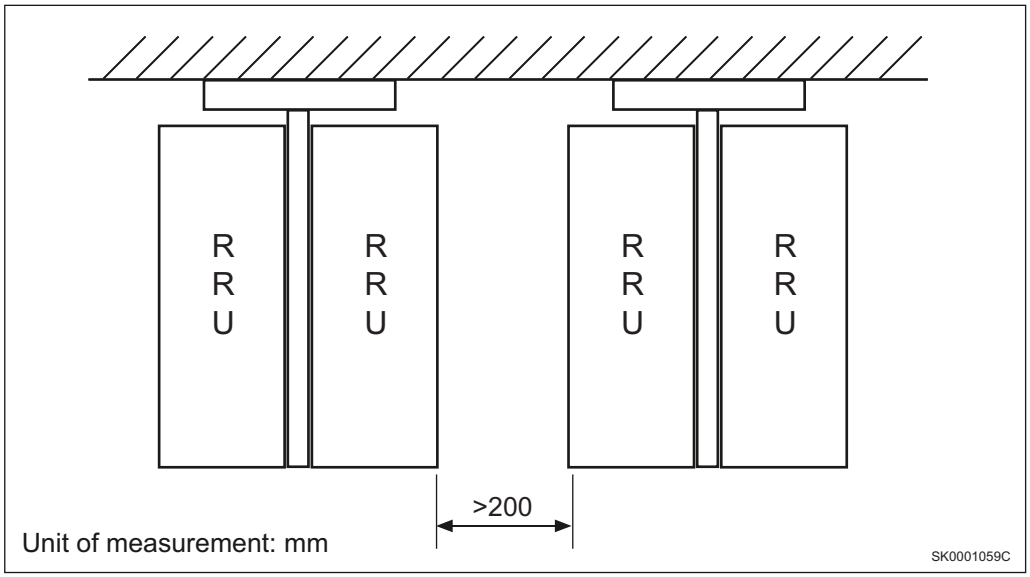


Figure 7 RRUS Back to Back Installation Requirements

3.4 Acoustic Noise

The RRUS does not generate acoustic noise.

3.5 Environmental Characteristics

This section contains RRUS operating environment data.

3.5.1 Operating Environment

The following is a list of values for the RRUS normal operating environment:

Temperature	-40 to +55 °C
	-40 to +45 °C (RRUS 01 B2 and B3 in high load scenario: 80 W)
Solar radiation	≤ 1,120 W/m²
Relative humidity	5 to 100%
Absolute humidity	0.26 to 40 g/m^3
Maximum temperature change	1.0°C/min
Maximum wind load at 50 m/s (pole installed single case)	480 N (front)

3.5.2 Heat Dissipation

The RRUS is convection cooled and designed for outdoor installation. The values shown in Table 3 are meant to give an idea of heat dissipation when the unit is installed indoor or around other RRUs. Indoor installation in a room without adequate ventilation and cooling must be avoided.

Table 3 RRUS Heat Dissipation

Unit	Output Power	Maximum Heat Dissipation
RRUS 01	60 W	0.32 kW
RRUS 01	80 W	0.35 kW

3.5.3 Vibration

This section describes the RRUS tolerance to vibrations. The RRUS operates reliably during seismic activity as specified by test method IEC 60 068-2-57 Ff.

Maximum level of Required Response Spectrum (RRS)	50 m/s^2 within 2-5 Hz for DR=2%
Frequency range	1–35 Hz
Time history signal	Verteq II

The RRUS operates reliably during random vibration as specified by test method IEC 60 068-2-64 Fh method 1

Random vibration, normal operation	0.5 m^2/s^3

The RRUS operates reliably during shock as specified by test method IEC 60 068-2-27 Ea

Peak acceleration	40m/s^2
Duration	22 ms

3.5.4 Materials

All Ericsson products fulfill the legal and market requirements regarding:

- Material declaration
- Fire resistance, components, wires, and cables of materials
- Recycling

- Restricted and banned material use

3.6 Power Supply Characteristics

This section describes the power supply requirements, power consumption, and fuse and circuit breaker recommendations for the RRUS.

The power for multiple RRUSs can be supplied from different power systems if required.

3.6.1 DC Power Supply Characteristics

The power supply voltage for the RRUS is -48 V DC. The power supply requirements are listed in Table 4 .

Table 4 RRUS DC Power Supply Requirements

Conditions	Values and Ranges
Nominal voltage	-48 V DC
Operating voltage range	-40.0 to -57.6 V DC
Non-destructive range	0 to -60 V DC

Fuse and Circuit Breaker Recommendations

External fuse and circuit breaker capabilities for the RRUS are listed in Table 5 .

The recommendations given in this section are based on peak power consumption and give no information on power consumption during normal operation.

The recommended melting fuse type is gG-gL-gD in accordance with IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, in accordance with IEC 609 34.

The RRUS has a built-in Class 1 (Type 1) Surge Protection Device (SPD) to protect the equipment in case of lightning and network transients. The recommended fuse or circuit breaker rating is therefore dimensioned to not trip the fuse or circuit breaker in case of most SPD operation. The minimum fuse rating could be taken into account only if it is accepted that fuses or circuit breakers trip in such situations.

Table 5 RRUS Fuse or Circuit Breaker Recommendations

Unit (DC Powered)	Output Power	Minimum Fuse Rating (1)	Fuse Rating Recommended for Reliable Operation (2)	Maximum Allowed Fuse Rating(3)
RRUS 01	80 W	14 A	25 A	32 A
	60 W	13 A		
	40 W	8 A		
	20 W	6 A		

(1) These fuse ratings can only be used if it is acceptable that fuses trip due to lightning or network transients.

(2) The recommended fuse rating takes into account the fact that external fuses are not to trip due to lightning or network transients.

(3) The absolute maximum fuse class in accordance with RRUS design restrictions.

Note:

If a fuse or circuit breaker rating above minimum fuse rating is selected, cable dimensioning rules in Section 5.3 on page 29 are to be reconsidered to make sure that the fuse or circuit breaker tripping criteria are met.

3.6.2 AC Power Supply Characteristics

The RRUS AC accepts 100 to 250 V AC if it is used together with the optional PSU. The power supply requirements are listed in Table 6 .

Table 6 RRUS AC Power Supply Requirements

Normal Voltage Range	Tolerance Range
200 to 250 V	180 to 275 V AC (1)
100 to 127 V	108 to 130 V AC (1)
100 V	90 to 110 V AC (1)
Connection	Phase-neutral
Frequency range	50 to 60 Hz
Voltage harmonics	< 10% at full load (2)
Shut-off allowance	At undervoltage or overvoltage (3)
Inrush current peak	< 40 A
Inrush current duration	< 10 ms

(1) AC connected through ACCU optionally and PSU AC 02

(2) Must comply with IEC 61000-3-2

(3) Alarm raised at 70 ± 5 V, ceased at 80 ± 5 V (phase voltage)

Fuse and Circuit Breaker Recommendations

External fuse and circuit breaker capabilities for the RRUS are listed in Table 7 .

The recommendations given in this section are based on peak power consumption and gives no information on power consumption during normal operation.

The recommended melting fuse type is gG-gL-gD in accordance with IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, in accordance with IEC 609 34.

The ACCU and PSU AC 02 have a built-in Class 1 (Type 1) SPD to protect the equipment in case of lightning and network transients. The recommended fuse or circuit breaker rating is therefore dimensioned for not to trip the fuse or circuit breaker in case of most SPD operation. The minimum fuse rating could be taken into account only if it is accepted that fuses or circuit breakers trip in such situations. The PSU and the ACCU are described in Section 4.6 on page 23 and Section 4.6.1 on page 23.

Table 7 RRUS Fuse/Circuit Breaker Recommendations

Unit (AC powered)	Minimum Fuse Rating (1)	Fuse Rating Recommended for Reliable Operation (2)	Maximum Allowed Fuse Rating (3)
RRUS 01 60 W and 80 W	• 7 A (100 to 127 V AC) • 4 A (200 to 250 V AC)	32 A	32 A

(1) These fuse ratings can only be used if it is acceptable that fuses trip due to lightning or network transients.

(2) The recommended fuse rating takes into account the fact that external fuses are not to trip due to lightning or network transients.

(3) The absolute maximum fuse class in accordance with RRUS design restrictions.

3.6.3 Power Consumption

For information on power consumption, refer to *Power Consumption Guideline for RBS 6000*.

3.7 System Characteristics

This section describes the system characteristics of the RBS.

3.7.1 RF Electromagnetic Exposure for RBS 6000

General information on RF Electromagnetic Fields (EMF) for RRUSs connected to an RBS from the 6000 family can be found in *Radio Frequency Electromagnetic Fields*.

Information about radio access specific compliance boundaries for electromagnetic exposure can be found in *Radio Frequency Electromagnetic Exposure*.

3.7.2 Software

Information on software dependencies can be found in *Compatibilities for Hardware and Software*.

3.7.3 Radio Configurations

Information about available radio configurations can be found in *RBS Configurations*.

4 Hardware Architecture

This section describes the RRUS hardware structure regardless of configuration or frequency. The RRUS components are shown in Figure 8 and listed in Table 8 .

Note: The supported configurations are described in *RBS Configurations*.

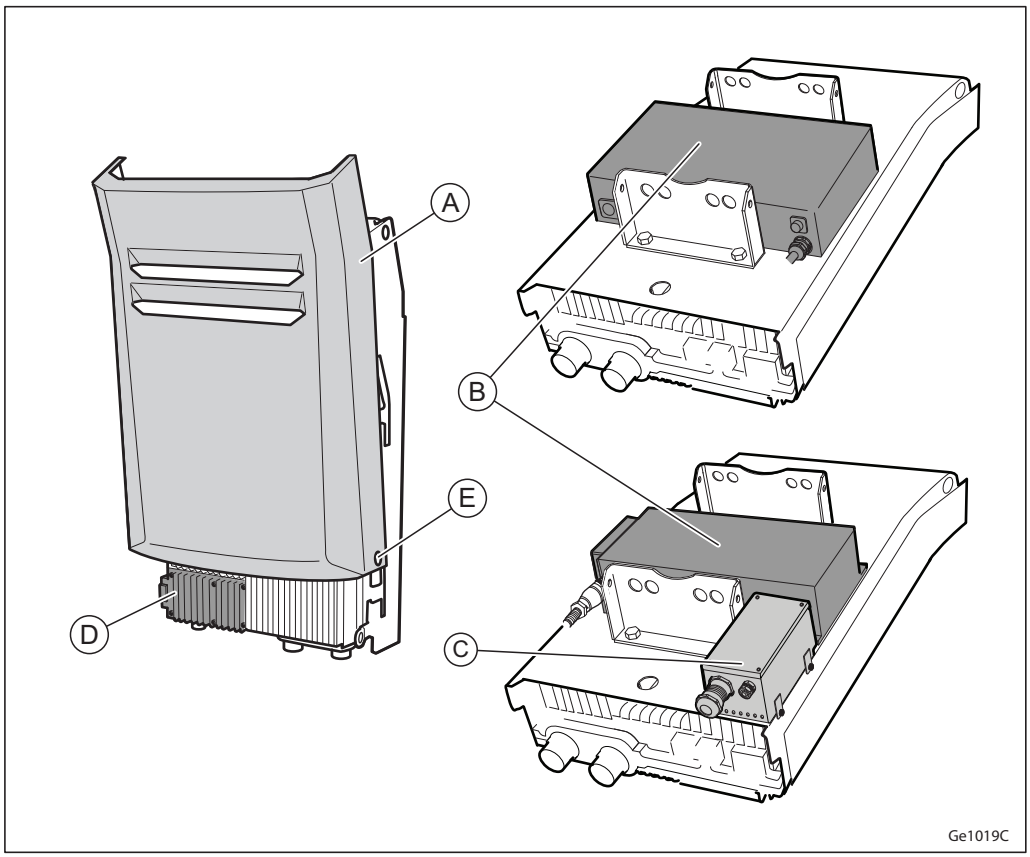


Figure 8 RRUS 01 Components

Table 8 Key to RRUS Components

Position	Component
A	Solar shield
B	PSU (optional)
C	ACCU (optional)
D	Installation cover
E	Hole for padlock

4.1 RRUS Overview

The RRUS contains most of the radio processing hardware. The following sections describe the component units inside the RRUS.

4.1.1 TRX

The Transmitter and Receiver (TRX) provides the following:

- Analog/Digital (A/D), Digital/Analog (D/A) conversion
- Channel filtering
- Delay and gain adjustment
- Digital predistortion
- RF modulation and demodulation
- Optical cable interface termination
- Two receivers for RX diversity
- RET receiver (the antenna system communication link)

4.1.2 PA

The Power Amplifier (PA) is the linear power amplifier for the RF carrier. The RRUS has one PA.

4.1.3 FU

The Filter Unit (FU) consists of band-pass filters and low-noise amplifiers.

In the RRUS, the FU also provides the following:

- Power and supervision for the ASC, the TMA, the TMF, or the RIU
- Voltage Standing Wave Ratio (VSWR) supervision

4.1.4 DC SPD

The DC SPD board protects the DC power input from lightning currents.

4.1.5 ALD (RET) SPD

An SPD provides overvoltage/overcurrent protection for the ALD (RET) port.

4.1.6 External Alarm SPD

An SPD provides overvoltage/overcurrent protection for the external alarm ports.

4.2 Solar Shield

The solar shield protects the RRUS from solar radiation. The solar shield is also part of the cooling design. Figure 8 shows the solar shield.

Note: Always attach the solar shield to the RRUS regardless of whether the RRUS is installed in a shady or in a sunny location.

4.3 Installation Cover

The installation cover hides, for example, the optical indicators.

More information can be found in Section 5 on page 27.

4.4 Optical Indicators and Buttons

The RRUS is equipped with optical indicators that show system status. The optical indicators are located underneath the installation cover. Table 9 describes how to interpret the optical indicators for RRUS when WCDMA and LTE controlled.

Table 9 RRUS Optical Indicators WCDMA or LTE Controlled

Marking	Indicator	Color	Mode	Indicates
!	Fault	Red	Off	No fault detected in RRUS
			On	Fault detected in RRUS
✔	Operational	Green	Off	RRUS not operational
			On	Power present
			Blink (2 Hz)	Load or testing in progress
			Blink (0.5 Hz)	Dependent resource missing
🔧	Maintenance	Blue (1)	Off	RRUS not in maintenance mode
			On	RRUS in maintenance mode
			Blink (0.5 Hz)	Shutdown in progress

Marking	Indicator	Color	Mode	Indicates
⊶1, ⊶2	Interface	Green	Off	Disconnected
			On	Connected
LMT	–	–	–	Not used
Button:				
🔧	Maintenance	–	–	Switch RRUS mode between Remote and Maintenance

(1) The color can also be yellow. The yellow optical indicator can blink busy.

4.4.1 Maintenance Button Function

For WCDMA and LTE, the maintenance button can be used to lock, unlock, or restart an RU. More information about the functions can be found in *Indicators, Buttons, and Switches*.

4.5 Hole for Padlock (Optional)

The RRUS solar shield can be locked by inserting a padlock through the hole.

4.6 AC/DC PSU (Optional)

The AC/DC PSU is required for the AC power input option. The AC/DC PSU converts RRUS input main power 100 - 250 V AC to -48 V DC and is installed on the back of the RRUS. Figure 9 shows the AC/DC PSU.

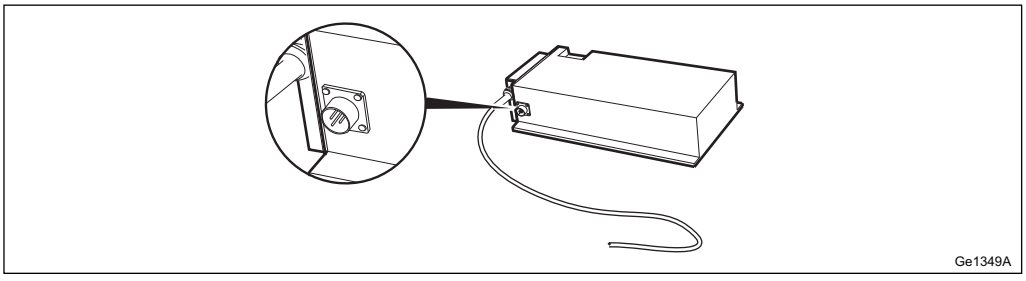


Figure 9 AC/DC PSU Showing AC Connector (Blowup) and DC Cable

4.6.1 ACCU (Optional)

The ACCU is required when the PSU is used and the RRUS is installed outdoors. The ACCU houses the SPD and is installed on the back of the RRUS. The ACCU components are shown in Figure 10 and listed in Table 10 .

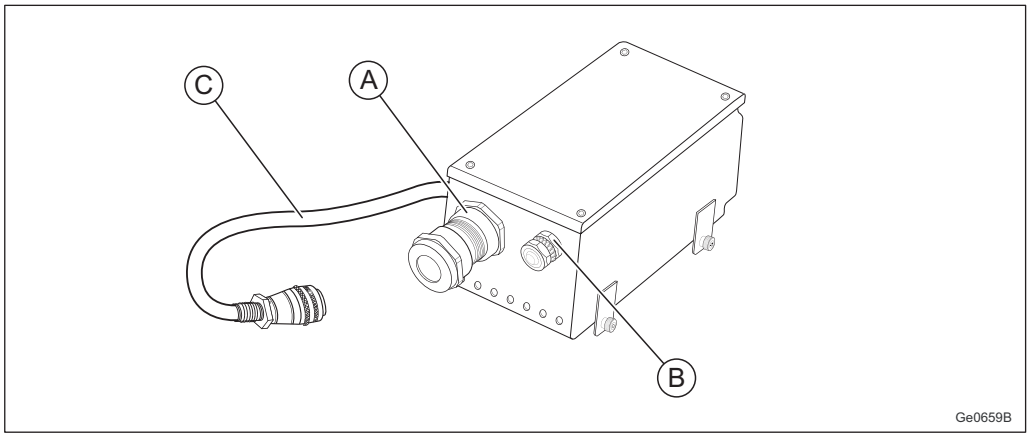


Figure 10 ACCU

Table 10 ACCU Overview

Position	Interface
A	AC power supply cable (input gland)
B	Grounding
C	AC power RF cable to AC/DC PSU

Note: The wire color code for the external AC power supply cable is market dependent.

4.7 PSU AC 02 (Optional)

The PSU AC 02 can replace the PSU AC described in Section 4.6 on page 23 and the PSU AC 02 has a built-in SPD which means that no ACCU is needed.

The PSU AC 02 components are shown in Figure 11 and listed in Table 11 .

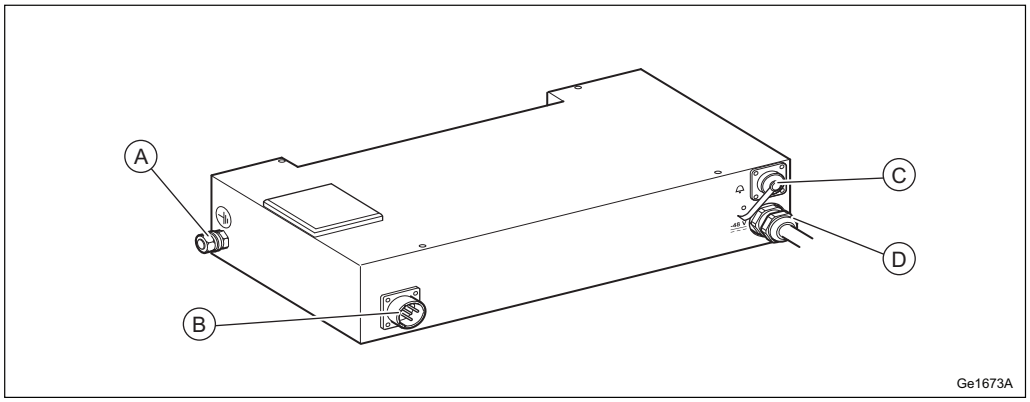


Figure 11 PSU AC 02

Table 11 PSU AC 02 Connection Interfaces

Position	Interface
A	Grounding interface
B	AC power interface
C	Interface for future use
D	DC power interface

For more information about PSU AC 02, see *PSU Description*.

4.8 PSU 48 02 (Optional)

The PSU 48 02 converts -48 V DC 3-wire to -48 V DC 2-wire.

The PSU 48 02 components are shown in Figure 12 and listed in Table 12 .

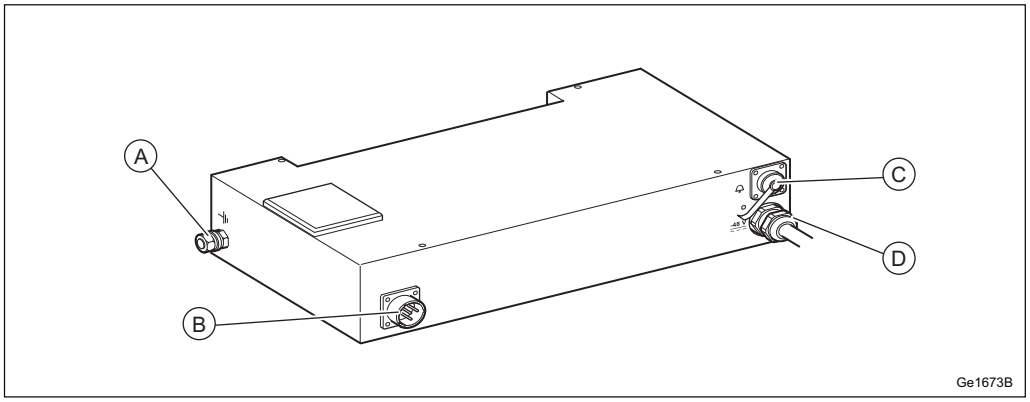


Figure 12 PSU 48 02

Table 12 PSU 48 02 Connection Interfaces

Position	Interface
A	Grounding interface
B	DC power interface (3-Wire)
C	Interface for future use
D	DC power interface (2-Wire)

For more information about PSU 48 02, see *PSU Description*.

4.9 RF Monitoring Port (Optional)

The RF monitoring port can be used to monitor the RRUS downlink RF output power without interrupting service. The RF monitoring port components are shown in Figure 13 and listed in Table 13 .

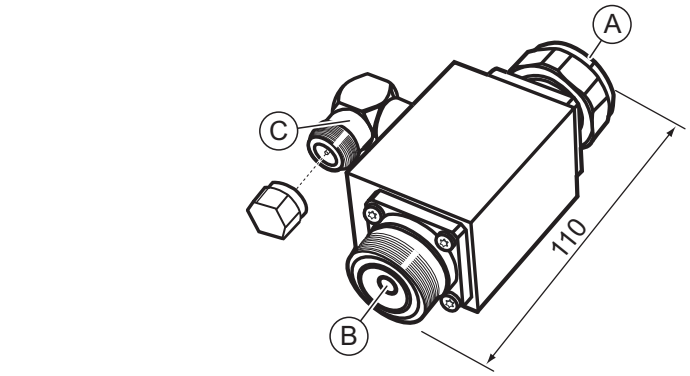


Figure 13 RF Monitoring Port

Table 13 RF Monitoring Port Overview

Position	Interface
A	7/16 RF connector used for connecting to A interface
B	7/16 RF connector for connecting the RF cable
C	N-type RF connector for pairing with connector on monitoring equipment (including metal protective cap to be used when the interface is not in use)

The RF monitoring port is connected to the A antenna interface on the RRUS connection interface panel at the bottom of the RRUS. The A interface supports bidirectional, RX/TX traffic, but only the TX direction can be monitored.

Using the RF monitoring port does not affect RRUS performance. RF leakage due to connecting the antenna cables through the monitoring port does not exceed that of a standard RF cable. Insertion loss between port A and port B is less than 0.2 dB.

5 Connection Interfaces

This section contains information about the RRUS connection interfaces. The RRUS connection interfaces are shown in Figure 14 , and listed in Table 14 .

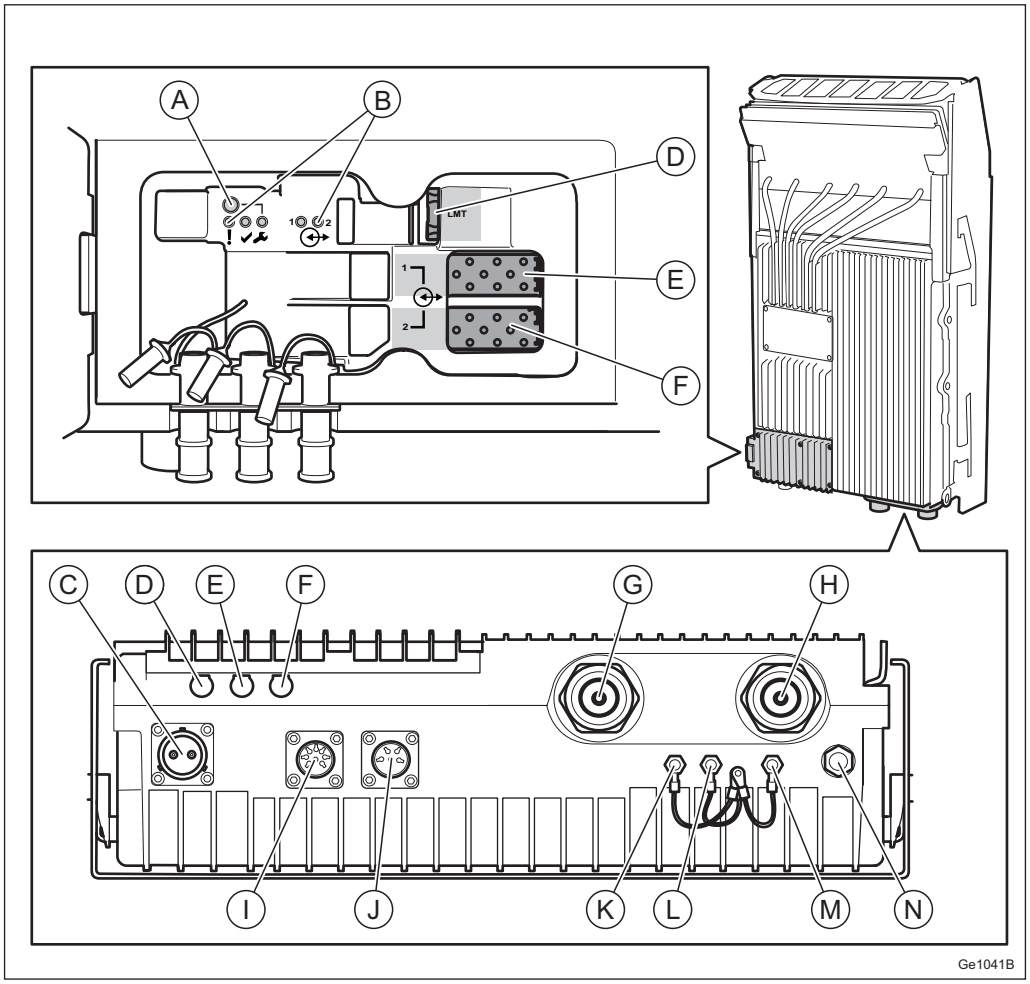
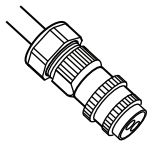
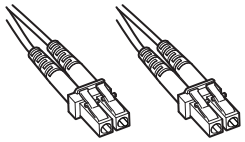
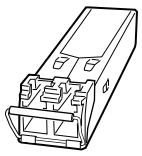
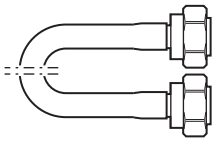
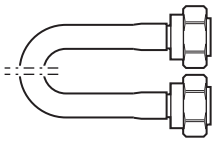
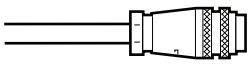
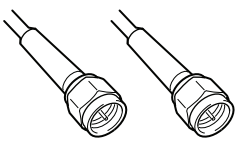


Figure 14 RRUS 01 Connection Interfaces

Table 14 RRUS Connection Interfaces

Position	Description	Marking	Connector Types	Cable Types
A	Maintenance button		-	-

Position	Description	Marking	Connector Types	Cable Types
B	Optical indicators	!, ✓, 🔧 1, 2	-	-
C	-48 V DC power supply		Screw terminal connector	
D	–	LMT	-	-
E	Optical cable 1	1	LC (On SFP)	 
F	Optical cable 2	2		
G	Antenna 1	A	7/16 connector	
H	Antenna 2	B		
I	ALD (used for a RET unit for example)	ALD Ctrl	Mini-DIN connector, 8 pin	
J	External alarm	EXT Alarm	Alarm connector	
K	Cross connect RXA	RXA I/O	SMA connector	
L	RXA co-site	RXA Out		
M	Cross connect RXB	RXB I/O		

Position	Description	Marking	Connector Types	Cable Types
N	Grounding	⏚	M8 bolt	

5.1 Position A, Maintenance Button

See *Indicators, Buttons, and Switches* for information about maintenance button.

5.2 Position B, Optical Indicators

Optical indicators show the system status. More information about the optical indicators can be found in *Indicators, Buttons, and Switches* or in Section 4.4 on page 22.

5.3 Position C, -48 V DC Power Supply Interface

The -48 V DC power connector for incoming power accepts cables with various cross-sectional areas, depending on the cable length and the RRU maximum power consumption. For more information on -48 V DC power cable dimensions, see *Main-Remote Installation Products Overview*.

The power cable conductor has a wire for the 0 V DC conductor, and a wire for the -48 V DC conductor. The color codes are market dependent for both wires.

All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding interface in the power supply equipment, otherwise the RRUS overvoltage and lightning protection do not function properly.

5.4 Position D, LMT

Not used.

5.5 Position E and F, Interface for Optical Cable to Main Unit

The ⊶ 1 and ⊶ 2 cables carry traffic and timing signals between the RRUS and the main unit. An Small Form-factor Plugable (SFP) is used to connect the optical cable to the RRUS.

Note: The RRUS uses SFP modules for optical transmission and optical radio interfaces on Data 1 (optical cable 1 in) and Data 2 (optical cable 2 out).

Only use SFP modules approved and supplied by Ericsson. These modules fulfill the following:

- Compliance with Class 1 laser product safety requirements defined in standard IEC 60825-1.
- Certification according to general safety requirements defined in standard IEC 60950-1.
- Functional and performance verified to comply with RBS specifications.

Recommended SFP modules are obtained from the product packages for the RBS and the Main Remote Installation products. See *Spare Parts Catalog* and *Main-Remote Installation Products Overview* for more information.

5.6 Position G and H, Antenna Interface

The antenna interfaces provide RRUS connections to antennas. RF cables connect the RRUS to the antenna.

The antenna connection interface characteristics of these cables are described in Table 15 .

Table 15 RRUS Antenna Connection Interface Characteristics

Connector Type	RF Cable Type	Cable Connector Type	Cable Product Number
7/16 IEC-169-4 insert-receiver type	50 Ω 1/2-inch coaxial	7/16 insert-type on both ends	TSR 951 70

The antenna cables must be connected as described in Table 16 .

Table 16 RRUS Antenna Cable Connectors

RRUS Connectors	Antenna Connectors
A (Antenna 1)	TX/RX
B (Antenna 2)	RX

5.7 Position I, ALD Ctrl Interface

The ALD control (ALD Ctrl) connects an ALD (RET) cable to the RRUS for antenna system communication.

5.8 Position J, Ext Alarm Interface

Two external alarms can be connected to the RRUS external alarm port. RRUS external alarms are currently supported in WCDMA and LTE.

5.9 Position K and M, RXA I/O and RXB I/O Interface

The RXA I/O and RXB I/O interface port is used to cross connect the RRUS for antenna diversity.

Figure 15 shows cross connection of RRUSs.

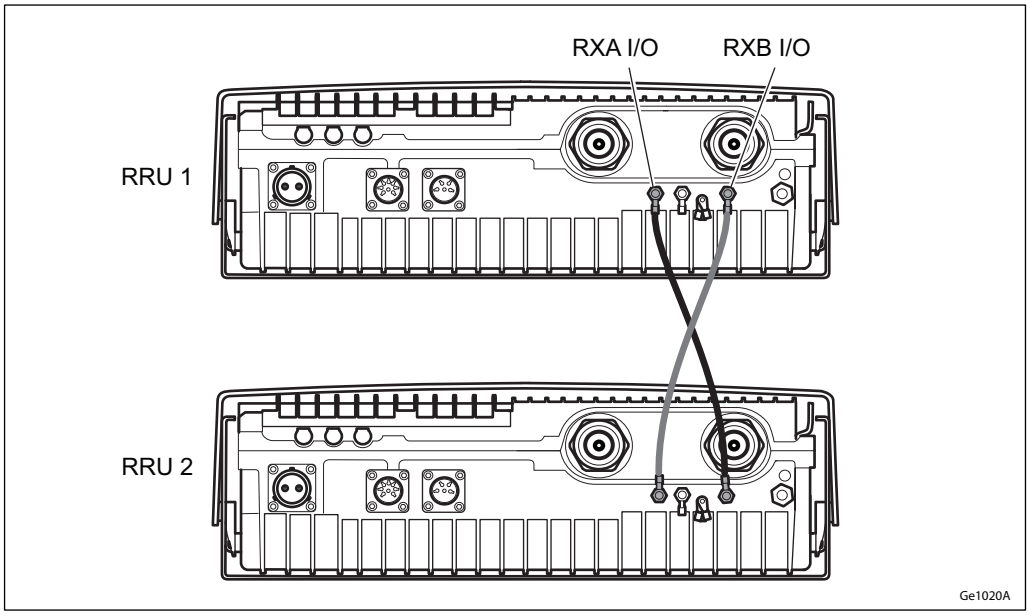


Figure 15 Cross Connecting RRUS

5.10 Position L, RXA Out Interface

The RXA Out interface port is used to co-site RRUSs.

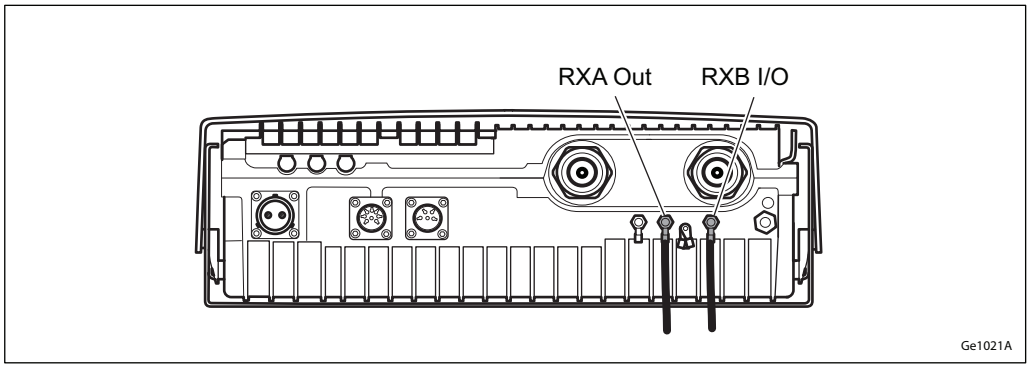


Figure 16 Co-siting RRUS

5.11 Position N, Grounding Interface

The RRUS must be grounded to protect it from overvoltage and lightning strikes. The grounding interface on the RRUS accepts a small cable lug on a short, coated cable. The cable and loop is then bolted into place with an M8 bolt as shown in Figure 17 .

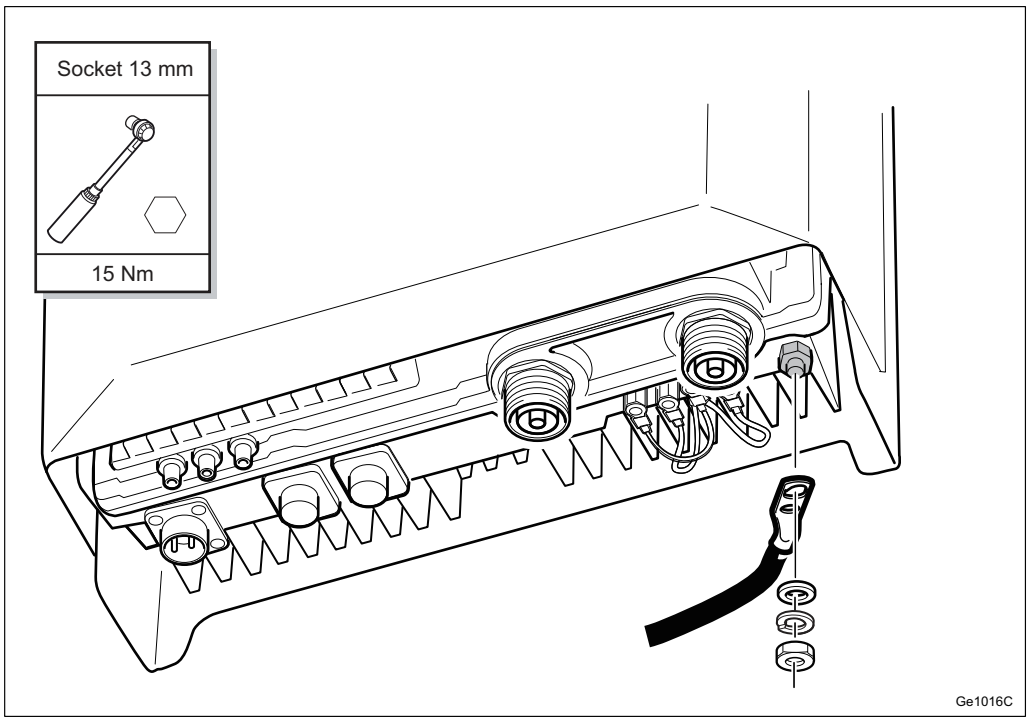


Figure 17 Grounding Interface

5.12 Optional Equipment Interfaces

The equipment presented in this section is optional and can be ordered separately.

5.12.1 ACCU (Optional)

The ACCU uses a screw plinth interface. All cables must be shielded. The shielding must be connected to the site MET on both ends. Each power cable conductor can have a 1.5–4 mm² cross-sectional area.

The ACCU must be grounded to protect it from overvoltage and lightning strikes.

The ACCU is shown in Figure 10 .

5.12.2 PSU AC (Optional)

The PSU AC uses an AC power interface available from Ericsson. The AC cable is connected to the PSU with a contact on the cable. Ericsson can supply a cable kit in different sizes where the AC contact is already attached.

All cables must be shielded. The shielding must be grounded on both the PSU and the power supply equipment side with the site Main Earth Terminal (MET). Each power cable conductor can have a 1.5–4 mm² cross-sectional area.

The PSU is shown in Figure 9 , Figure 11 .

Note: An ACCU is required with the AC/DC PSU when the RRUS is installed outdoors.

The wire color code in the external AC power supply cable is market dependent.

5.12.3 PSU 48 02(Optional)

The PSU 48 uses a DC power interface available from Ericsson.

All cables must be shielded. The shielding must be grounded on both the PSU and the power supply equipment side with the site Main Earth Terminal (MET). Each power cable conductor can have a 2.5–10 mm² cross-sectional area.

The PSU is shown in Figure 12 .

5.12.4 RF Monitoring Port (Optional)

The optional RF monitoring port allows either periodic or continuous downlink RF output power monitoring without interrupting RRUS service. The

monitoring interface can be found on the optional RF monitoring port. The RF monitoring port can be placed on each antenna interface that is a transmitter port.

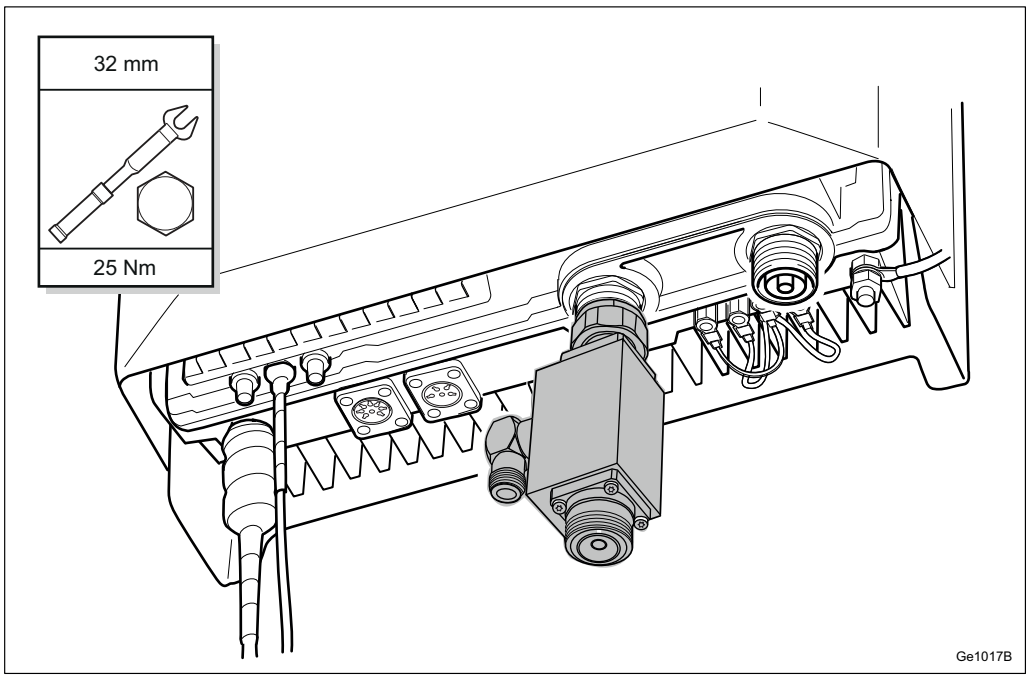


Figure 18 RF Monitoring Interface Connection

6 Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity.

Declaration of Conformity

"Hereby, Ericsson AB, declares that this RBS is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC and 2011/65/EU."

6.1 Regulatory Approval

The RBS complies with the following market requirements:

- European Community (EC) market requirements, R&TTE Directive 1999/5/EC

  CE 0168 ! Alert Mark (Class 2 equipment). Restrictions to use the apparatus may apply in some countries or geographic areas. Individual license to use the specific radio equipment may be required.

  The apparatus may include Radio Transceivers with support for frequency bands not allowed or not harmonized within the EC.

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EU).
- North American market requirements.
- Products containing Radio Equipment outside North America and in countries not recognizing the CE-mark may be labeled according to national requirements or standards.

6.1.1 Environmental Standards Compliance

The RBS complies with the following environmental standard:

Europe

- EN 50 581 (RoHS)

6.1.2 Safety Standards Compliance

In accordance with market requirements, the RBS complies with the following product safety standards and directives:

International

- IEC 60 215
- IEC 60 950-1 Ed2 with amendment A1

Europe

- EN 50 385
- EN 60 215
- EN 60 950-1 Ed2 with amendment A1

North America

- CSA-C22.2 No.60950-1-07 with amendment A1
- FCC CFR 47 Part 1.1310
- Health Canada Safety Code 6
- UL 60950-1

6.1.2.1 Outdoor Specific Requirements

The RBS complies with the following outdoor specific requirements:

International

- IEC 60 529 (IP55)
- IEC 60 950-22

Europe

- EN 60 529 (IP55)
- EN 60 950-22

North America

- CSA-C22.2 No. 60950-22-07

- UL 50E
- UL 60950-22

6.1.3 EMC Standards Compliance

The RBS complies with the following Electromagnetic Compatibility (EMC) standards:

International

- 3GPP TS25.113
- 3GPP TS36.113
- 3GPP TS37.113

Europe

- ETSI EN 301 489-1
- ETSI EN 301 489-8
- ETSI EN 301 489-23

North America

- FCC CFR 47 Part 15 B
- IC ICES-003 B

6.1.4 Radio Standards Compliance

The RBS complies with the following radio standards:

International

- 3GPP TS25.141
- 3GPP TS36.141
- 3GPP TS37.141
- 3GPP TS51.021

Europe

- ETSI EN 301 502
- ETSI EN 301 908-1
- ETSI EN 301 908-3
- ETSI EN 301 908-14
- ETSI EN 301 908-18

North America

- FCC CFR 47 Part 2 (USA)
- FCC CFR 47 Part 22, 24, and 27 (USA frequency dependent)
- IC RSS-132, 133, 139, and 199 (Canada frequency dependent)
- IC RSS-Gen (Canada)

6.1.5 Marking

To show compliance with legal requirements, the product is marked with the following labels:

Europe

- CE mark

North America

- usETL/cETL
- FCC CFR 47 Part 15 Statement
- IC ICES-003 Statement
- FCC ID (located on RRU)
- IC ID (located on RRU)

6.2 Other Standards and Regulations

The standards and regulations in this section are not regulatory approved.

6.2.1 Spare Parts

This RRUS complies with the Ericsson Serviceability and Spare Parts Strategy.

6.2.2 Surface Quality

The surface quality of the RRUS is in accordance with Ericsson standard class A3.

6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the unit.