Prepared (also subject responsible if other)		No.		
/ XSNSIXI		198/1551-LZA 701 0001 Uen		
Approved	Checked	Date	Rev	Reference
CBC/XRX/M (Kai Lian)		2011-05-05	C	

RBS Product Description

RBS 2111 Second Generation

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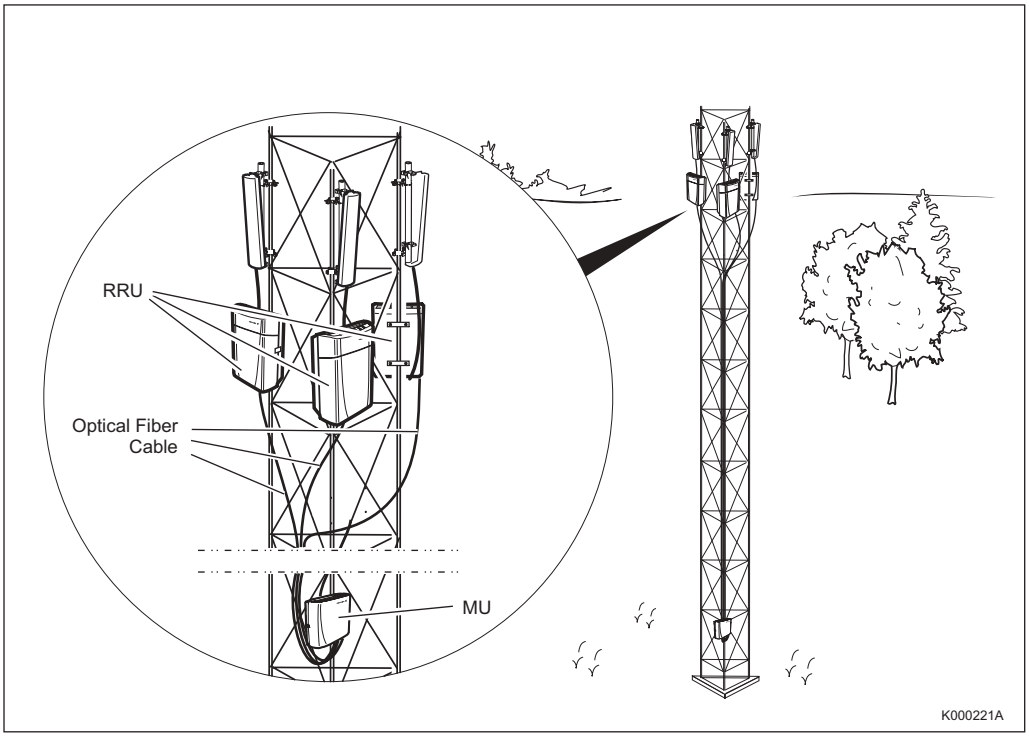
1 Introduction

The RBS 2111 Second Generation, a member of the RBS 2000 family, is a 6-Transceiver (TRX) radio base station for indoor and outdoor applications.



2 Product Overview

The RBS 2111 Second Generation is a Main-Remote RBS that consists of a Main Unit (MU) and one to three Remote Radio Unit-Ns (RRU-Ns) that are designed to be located near the antenna. An optical fiber cable connects each RRU-N to the MU. The RBS 2111 Second Generation is high coverage, configured for up to three sectors with two carriers per sector, developed especially for rural applications with medium capacity.

The RBS 2111 Second Generation can consist of the following MU:

- MU-12

The RBS 2111 Second Generation can consist up to three of the following RRU-Ns:

- RRUN8-22
- RRUN9P-22

- RRUN9E-22
- RRUN18-22
- RRUN19-22

2.1 Main Features

The main features of RBS 2111 Second Generation are follows:

- Radio configurations supported on GSM 800, E-GSM 900, P-GSM 900, GSM 1800, and GSM 1900
- Discontinuous transmission/reception
- Duplex filters
- Supports encryption/ciphering
- Dynamic power regulation
- Frequency hopping
- Two-way RX diversity
- External alarms
- EDGE
- Expansion by Transceiver Group (TG) synchronization
- The RRU-N is mounted close to the antenna.
- Can be equipped with two T1/E1, 100 Ω. 120 Ω or 75 Ω transport network interfaces.
- Can be equipped with up to three RRU-Ns, each with a maximum available output power of 20 W per carrier for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 or GSM 1900, providing macro coverage and can be configured for 1 – 3 sectors, with two carriers per sector.
- Macro coverage with less power consumption than macro RBSes.

Note: RBS 2111 Second Generation cannot support GPS as external synchronization source.

2.2 Variants

The MU or RRU-N supports –48 V DC (Standard).

The RBS 2111 Second Generation can be equipped with optional PSU-AC kits to use AC power.

2.3 Optional Equipment

The following equipment is optional and can be ordered separately. It is not necessary for basic RBS functions.

The optional equipment described in this section is situated outside the RBS.

2.3.1 Optional Equipment for MU

At least one of the optional equipment should be ordered separately. It is necessary for MU installation.

The following mounting equipment alternatives exist:

Wall-Mounting Equipment for MU

Equipment for mounting the MU on a wall.

Pole-Mounting Equipment for MU

Equipment for mounting the MU on a pole or a mast.

19 inch Rack-Mounting Equipment for MU

Equipment for mounting the MU in a 19 inch rack.

2.3.2 Optional Equipment for RRU-N

At least one of the optional equipment should be ordered separately. It is necessary for RRU-N installation.

The following mounting equipment alternatives exist:

Wall-Mounting Equipment for RRU-N

Equipment for mounting the RRU-N on a wall.

Pole-Mounting Equipment for RRU-N

Equipment for mounting the RRU-N on a pole or a mast.

2.3.3 Optional Equipment

External Splitter

The external splitter can be connected to one antenna port of the RRU-N to support highway configuration.

PSU-AC Kits

The RBS 2111 Second Generation can be equipped with PSU-AC kits to adopt AC power.

External Hybrid Combiner Unit (EHCU)

The EHCU can be connected to RRU-Ns to provide combined functionality for antenna saving.

3 Dimensions

This chapter describes the size, weight, and colour of the RBS.

3.1 Dimensions of MU

The MU dimensions (with the sunshield) are shown in the table and the figure below.

Table 1 The MU Dimensions

Unit	Dimensions (mm)
Height	373
Width	460
Depth with the mounting bracket	143

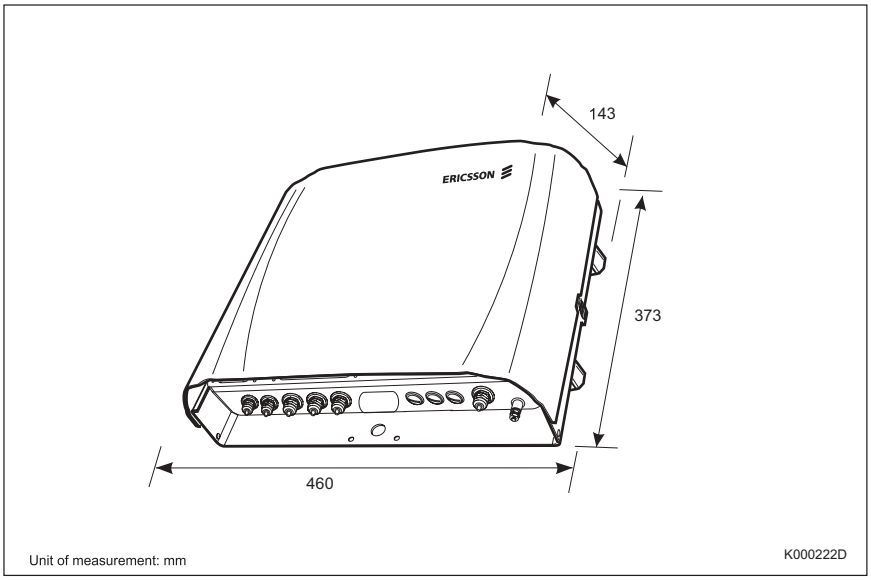


Figure 1 Dimensions of MU

The MU weight is shown in the table below.

Table 2 The MU Weight

Unit	Weight (kg)
MU Including Sunshield	6.8

The MU colour is shown in the table below.

Table 3 The MU Colour

Colour	Reference Number
Grey	NCS S2502–R

Surface quality is according to Ericsson standard class A3.

3.2 Dimensions of RRU-N

The RRU-N dimensions (with the sunshield) are shown in the table and the figure below.

Table 4 The RRU-N Dimensions

Unit	Dimensions (mm)
Height	433
Width	372
Depth	239

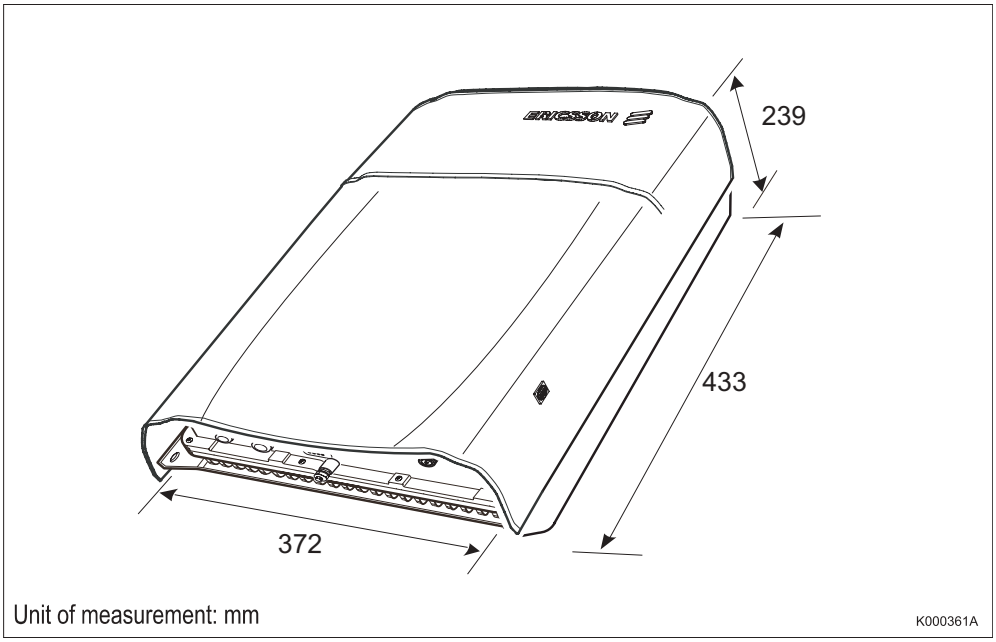


Figure 2 Dimensions

The RRU-N weight is shown in the table below.

Table 5 The RRU-N Weight

Unit	Weight (kg)
RRU-N Including Sunshield	16.5

The RRU-N colour is shown in the table below.

Table 6 The RRU-N Colour

Colour	Reference Number
Grey	NCS S2502–R

Surface quality is according to Ericsson standard class A3.

4 Space Requirements for MU

This chapter describes the space requirements for the different ways of mounting the MU. The MU can be mounted as follows:

- On a wall

- On a pole
- In a 19 inch rack

The distance between MU and RRU-N is limited by the maximum length of the optical fiber connecting the two units, which is 500 m. The RBS 2111 Second Generation supports a length up to 3 km.

Note: When mounting the MU on a pole, it is recommended that the front sunshield is positioned such that the MU is protected from the sun as much as possible.

4.1 Space Requirements for Wall-Mounting of MU

This section describes the installation requirements, drill pattern and site layout.

4.1.1 Installation Requirements for Wall-Mounting

The MU must always be vertically mounted.

The wall must have a fairly level surface. The wall gradient must not exceed 5 mm/m.

The drill patterns are shown in the figures below. A drilling template for wall-mounting is delivered with the wall-mounting kit for the MU.

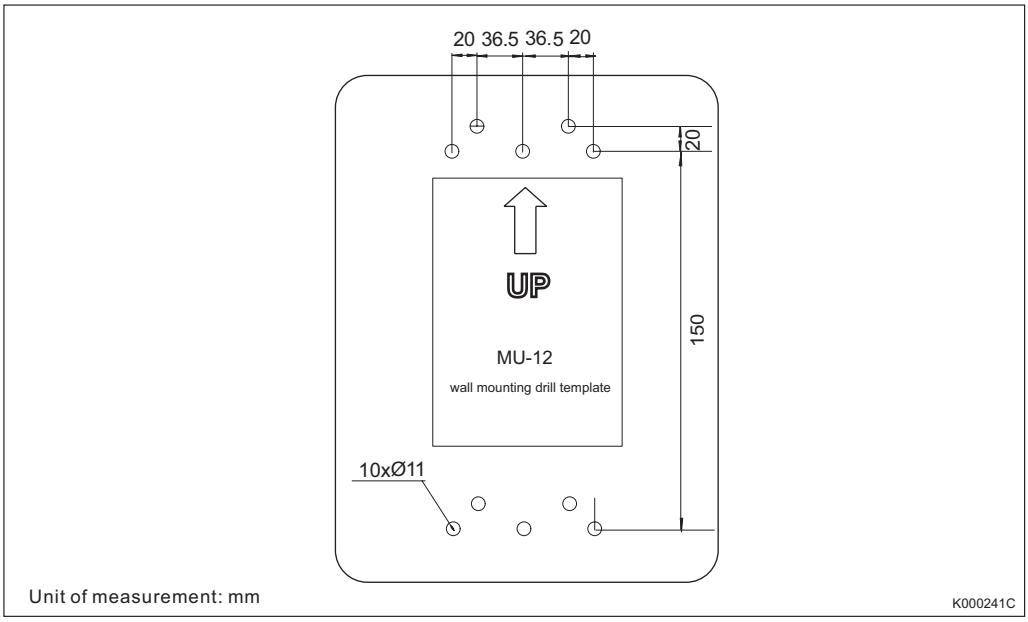


Figure 3 Drill Pattern

4.1.2 Site Layout

The 200 mm of free space above and 250 mm below the MU are recommended to ensure sufficient airflow. It is recommended that the space between two MUs side by side is 250 mm, and the space between an MU and a corner is 500 mm.

The space of 1000 mm is recommended in front of the MU to provide adequate workspace.

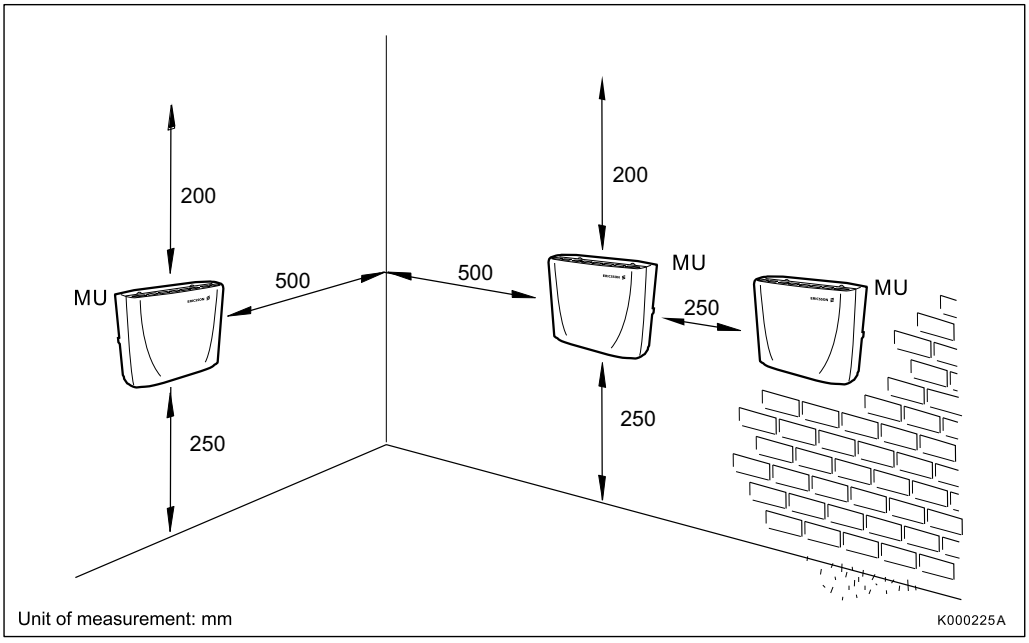


Figure 4 Site Layout

4.2 Space Requirements for Pole-Mounting of MU

This section describes the installation requirements and site layout.

4.2.1 Installation Requirements for Pole-Mounting

The MU must always be vertically mounted.

The pole diameter must be 60 – 120 mm.

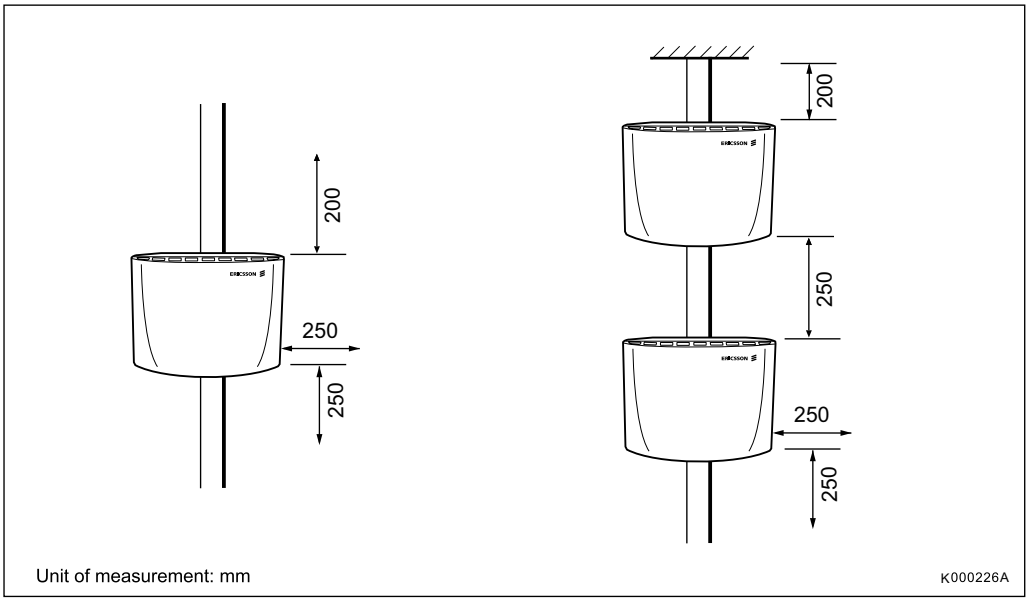


Figure 5 Installation Requirements for Pole-Mounted MU

4.2.2 Site Layout

The 200 mm of free space above and 250 mm below the MU are recommended to ensure sufficient airflow. It is recommended that the space between two MUs side by side is 250 mm.

The minimum space of 1000 mm is recommended in front of the MU to provide adequate workspace.

4.3 Space Requirements for Rack-Mounting of MU

This section describes the installation requirements and site layout.

4.3.1 Installation Requirements for Rack-Mounting

The minimum free rack space height is 89 mm (2 U), which includes space for cables.

The totally minimum required installation depth is 410 mm. The minimum 19 inch rack depth is 290 mm, and the 120 mm of free space in front of the 19 inch rack is required.

The mounting brackets on the both side of MU can be adjusted, but there must be a minimum 50 mm free space in front of the cable glands.

The installation requirements are shown in the figures below.

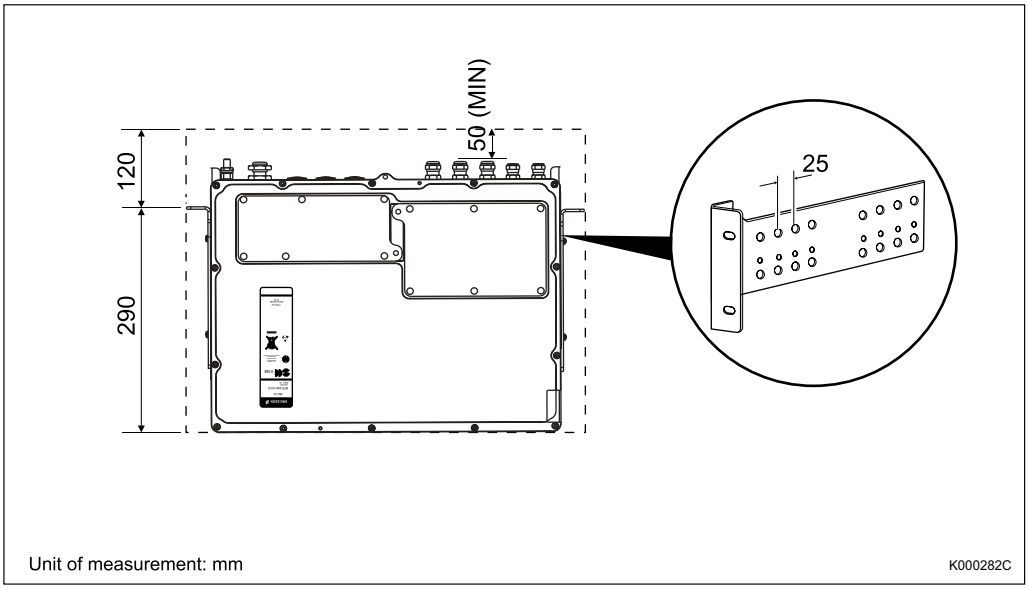


Figure 6 Installation Requirements for Rack-Mounted MU

MUs can be mounted above each other in a rack.

The distance between the ceiling and the cable ladder must be 300 mm, while the distance between the cable ladder and the top of the rack must be at least 200 mm.

The installation requirements are shown in the figure below.

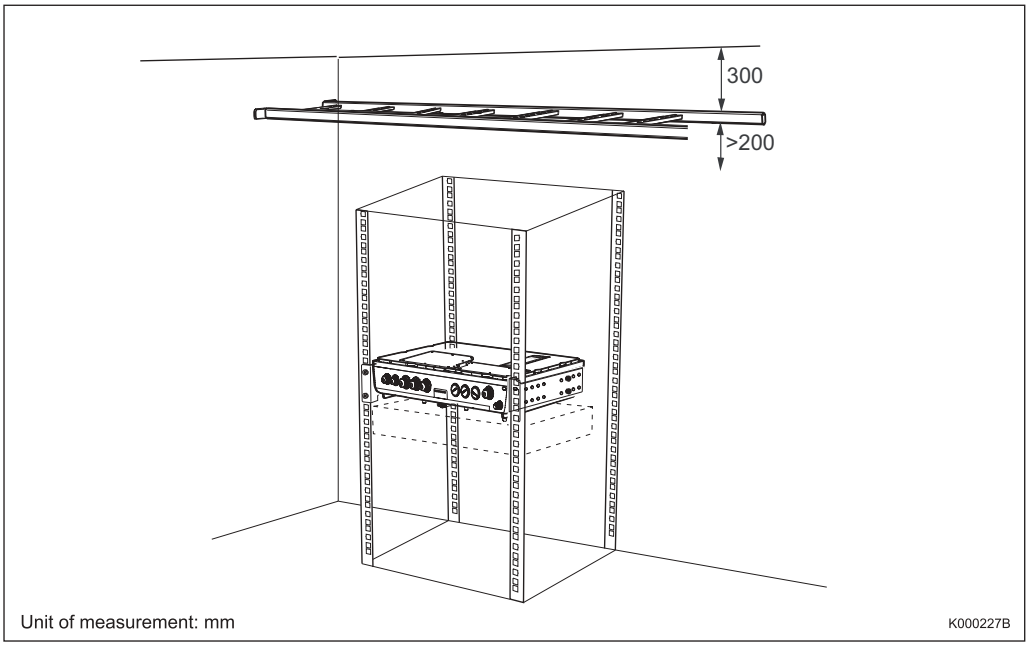


Figure 7 Installation Requirements for Rack-Mounted MU

4.3.2 Site Layout

A minimum space of 1000 mm is recommended in front of the cabinet to provide adequate workspace.

Note: Space for future expansion must be considered, as indicated by the dotted line in the figure below.

The site layout is shown in the figure below.

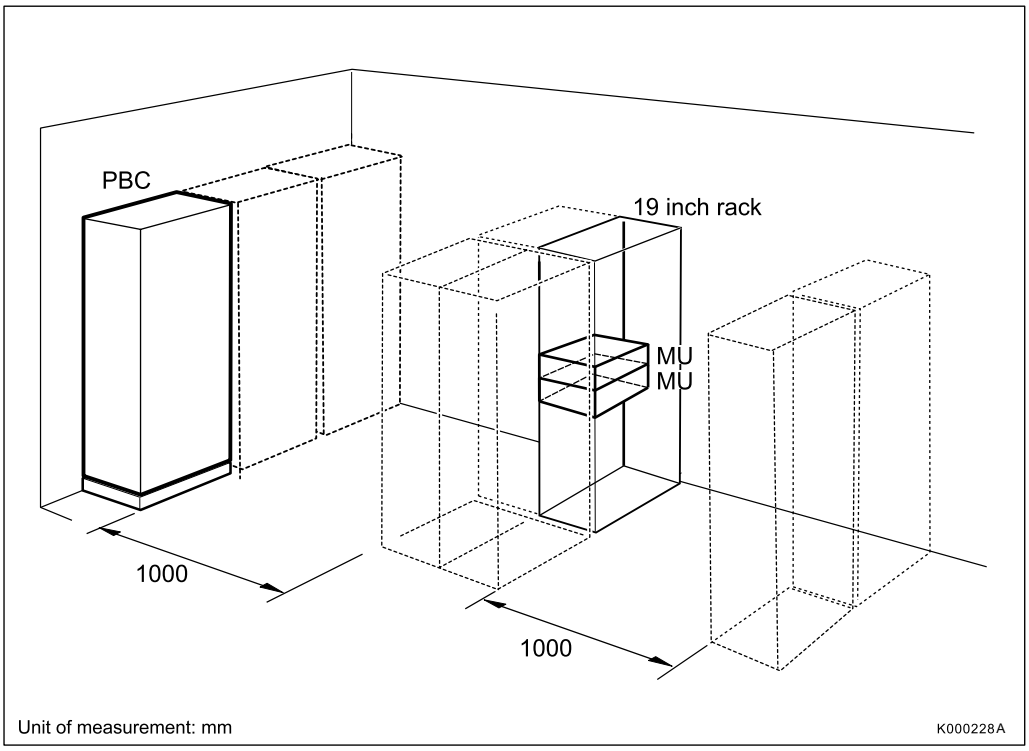


Figure 8 Site Layout

5 Space Requirements for RRU-N

This chapter describes the space requirements for the different ways of mounting the RRU-N. The RRU-N can be mounted on a pole or a mast.

The distance between MU and RRU-N is limited by the maximum length of the optical fiber connecting the two units, which is 3 km.

Note: When mounting the RRU-N on a pole, it is recommended that the front sunshield is positioned such that the RRU-N is protected from the sun as much as possible.

5.1 Space Requirements for Wall-Mounting of RRU-N

This section describes the installation requirements, drill pattern and site layout.

5.1.1 Installation Requirements for Wall-Mounting

The RRU-N must always be vertically mounted and close to the antenna.

The wall must have a fairly level surface. The wall gradient must not exceed 5 mm/m.

The drill pattern is shown in the figure below. A drilling template for wall-mounting is delivered with the wall-mounting kit for the RRU-N.

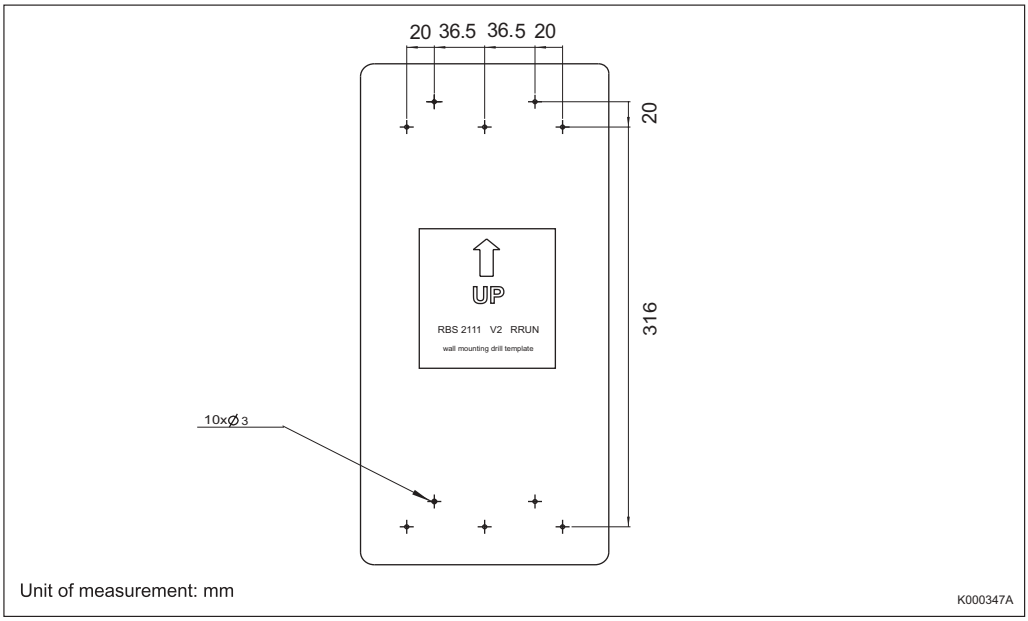


Figure 9 Drill Pattern

5.1.2 Site Layout

There must be at least 300 mm of free space above and 250 mm below the RRU-N to ensure sufficient airflow. The space between two RRU-Ns side by side must be at least 250 mm, and the space between an RRU-N and a corner must be at least 500 mm.

Note: If two RRU-Ns are vertically mounted above each other, the distance must be at least 550 mm.

A space of 1000 mm is recommended in front of the RRU-N to provide adequate workspace.

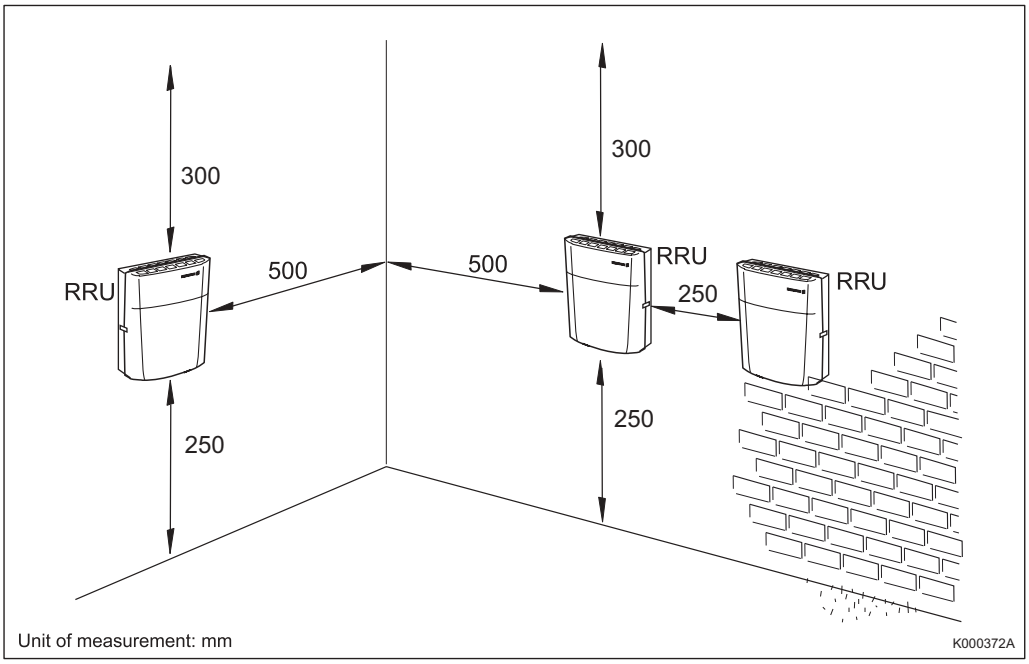


Figure 10 Site Layout

5.2 Space Requirements for Pole-Mounting of RRU-N

This section describes the installation requirements and site layout.

5.2.1 Installation Requirements for Pole-Mounting

The RRU-N must always be vertically mounted and close to the antenna.

The pole diameter must be within 60 – 120 mm.

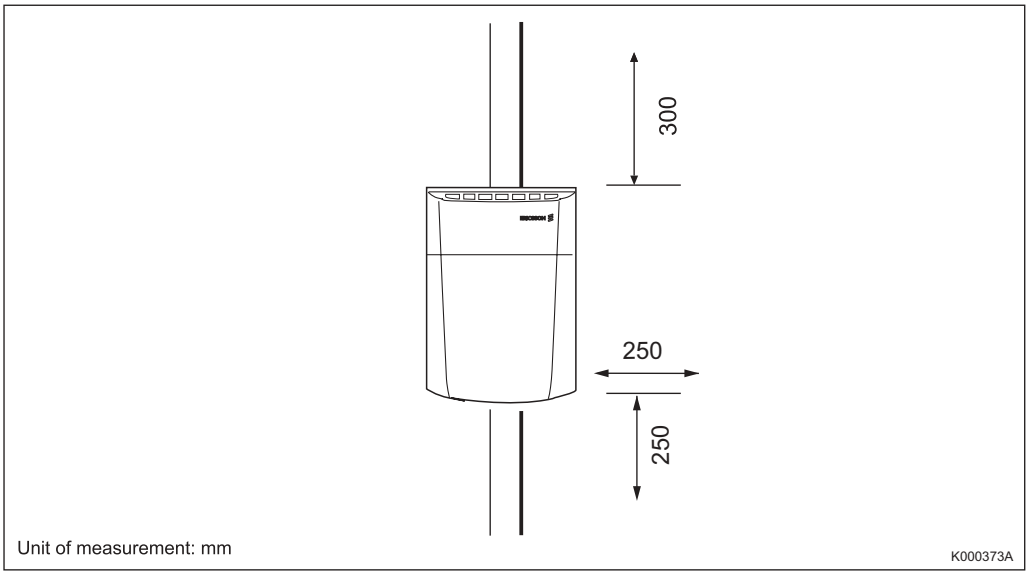


Figure 11 Installation Requirements for Pole-Mounted RRU-N

5.2.2 Site Layout

There must be at least 300 mm of free space above and 250 mm below the RRU-N to ensure sufficient airflow. The space between two RRU-Ns positioned side by side must be at least 250 mm. No free space is needed for two RRU-Ns positioned back to back.

Note: If two RRU-N are vertically mounted above each other, the distance must be at least 550 mm.

A minimum space of 1000 mm is recommended in front of the RRU-N to provide adequate workspace.

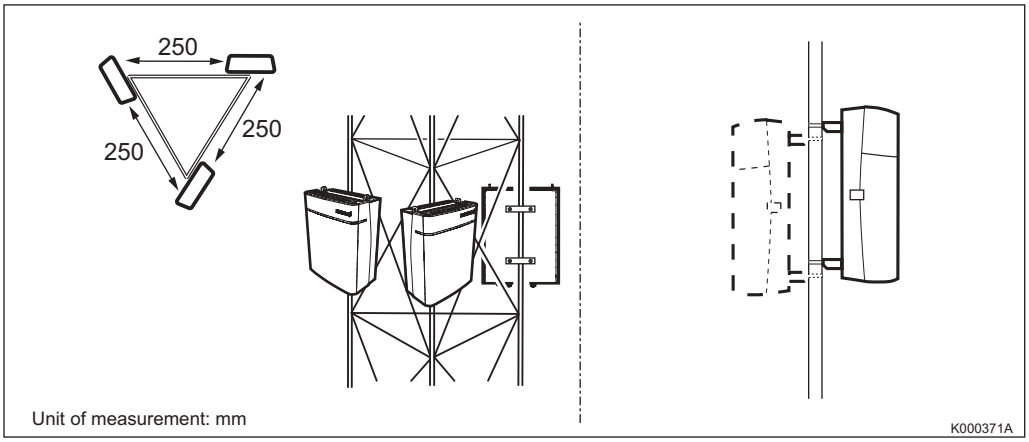


Figure 12 Site Layout

6 Environment

This chapter provides information about environmental data and requirements.

6.1 Operating Environment

The operating conditions for the MU and the RRU-N are the same.

The RBS 2111 Second Generation is designed to conform with the requirements for outdoor equipment, in accordance with: IEC 60721–3–4 classes 4K2 / 4Z5 / 4Z7.

Times for Cold Start-up and Restart at -33°C for RBS 2111 Second Generation:

Table 7 Times for Cold Startup and Restart

	MU or RRU-N
Cold Start-up (-33°C)	< 0.5 h

The outdoor MU and RRU-N normal operating conditions are shown in the table below.

Table 8 Normal Conditions During Outdoor Operation

Description	**Temperature**	**Relative Humidity**
Operation Conditions	-33°C to +50°C	15 – 100%
Transport	-40°C to +70°C	5 – 100%

Description	Temperature	Relative Humidity
Storage	-25°C to +55°C	10 – 100%
Handling	-40°C to +70°C	5 – 100%

6.2 Mast Vibrations

This section describes the mast vibration tolerance supported by the MU and RRU-N.

The equipment complies with the following:

- IEC 721-3-4 class /4M5/
- ETSI EN 300 019-1-4 class 4.1

Table 9 Mechanical Conditions During Outdoor Operation

Environmental Parameter		Unit	Value		
Vibration sinusoid:(1)	frequency	Hz	2 – 9		9 – 200
	displacement	mm	0.6		
	acceleration	m/s²			2
Vibration random:	ASD (2)	m²/s³	0.05	0.1	0.2
	frequency	Hz	5 – 200		
	duration of exposure	min			30/direction
	no. of test directions			3	
Shock:	peak acceleration	m/s²		100(3) (4)	
	duration	ms		11	

(1) These requirement shall be used for verification of structural sustainability only, for functional verification random vibration shall be used.
(2) ASD = Acceleration Spectral Density.
(3) The requirement belong to 'Exceptional/Safe function' with the exemption: performance of the RBS shall be verified as 'no loss of calls' or 'loss of establish radio link.
(4) The shock requirement shall be used for RBS's mechanical and structural strength test, and functional verification of RBSs that are allowed to be mounted on non ground-based foundations. The random vibration requirement already cover all possible excitations that ground-based foundation installation can be subjected to.

6.3 Heat Dissipation

The heat dissipation value given in this section is dependent upon configuration, equipment and site-specific conditions. The value represents the worst-case power consumption of a fully equipped RBS. For power consumption during traffic, see Section 10.2 on page 42, where maximum power consumption is given.

The maximum heat dissipation from the RBS is described in the table below.

Table 10 Heat Dissipation

Unit		Maximum Heat Dissipation (W)
MU		27
RRU-N	GSM 800	170
	P-GSM 900	170
	E-GSM 900	170
	GSM 1800	180
	GSM 1900	180

6.4 Acoustic Noise

No acoustic noise from the RBS 2111 Second Generation (MU and RRU-N)

6.5 Radio Frequency Electromagnetic Exposure

This section provides information on Radio Frequency (RF) Electromagnetic Field (EMF) exposure from a typical antenna connected to the RBS 2111 Second Generation.

6.5.1 Compliance Boundaries for Electromagnetic Exposure

The compliance boundary defines the minimum separations that must be kept between the antenna and a person to ensure that the ICNIRP Reference [1] and FCC Reference [2] Reference [3] RF exposure limits are not exceeded.

Ericsson has performed RF exposure assessments of typical configurations with the RBS 2111 Second Generation and with three recommended antennas. The resulting dimensions, in meters, for a compliance boundary for both public and occupational exposure are shown in Table 11.

The compliance boundary is defined as a cylinder surrounding the antenna, see Figure 13. A directional antenna is not located at the center of the cylinder. Instead it is located almost at the edge, facing towards the center of the cylinder. The distance between the back of the antenna and the cylinder is the “Distance behind antenna”. The height of the cylinder is the antenna height plus equal distances above and below the antenna.

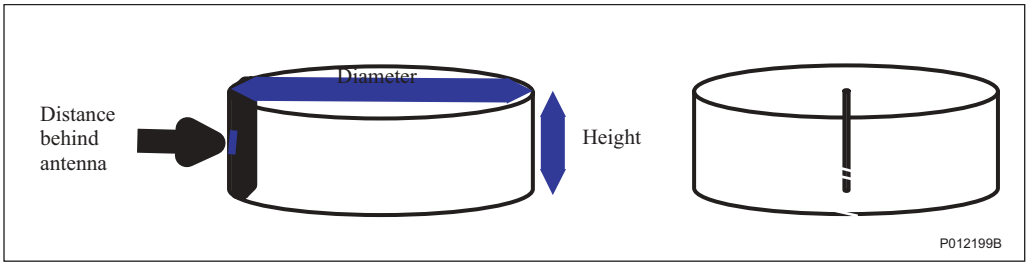


Figure 13 Cylindrical Compliance Boundary. Directional Antenna (left) and Omni-directional Antenna (right)

Table 11 Compliance Boundary Dimensions for General Public (GP) and Occupational (O) Exposure for Typical Configurations

RBS configuration		**Dimensions of cylindrical compliance boundary (m)**					
		Diameter		**Height**		**Distance behind antenna**	
		GP	**O**	**GP**	**O**	**GP**	**O**
1x2, 2x2, 3x2, uncombined directional antenna	GSM 800	3.9	0.9	2.9	2.7	<0.1	<0.1
1x2, uncombined omni-directional antenna	GSM 800	1.0	0.3	3.1	3.1	NA	NA
1x4, 1x6, EHCU combined directional antenna	GSM 800	3.6	0.7	2.8	2.6	<0.1	<0.1
1x2, 2x2, 3x2, uncombined directional antenna	PGSM 900	3.7	0.7	2.9	2.6	<0.1	<0.1
1x2, uncombined omni-directional antenna	PGSM 900	1.0	0.3	3.1	3.1	NA	NA
1x4, 1x6, EHCU combined directional antenna	PGSM 900	3.2	0.6	2.9	2.6	<0.1	<0.1

1x2, 2x2, 3x2, uncombined directional antenna	GSM 1800	4.3	0.7	1.5	1.4	<0.1	<0.1
1x4, 1x6, EHCU combined directional antenna	GSM 1800	3.7	0.6	1.5	1.4	<0.1	<0.1
1x2, 2x2, 3x2, uncombined directional antenna	GSM 1900	4.0	0.7	1.5	1.4	<0.1	<0.1
1x4, 1x6, EHCU combined directional antenna	GSM 1900	3.3	0.7	1.5	1.4	<0.1	<0.1

Note: Table 11 shows examples for the specified typical antennas. As the antenna field distributions will differ, complete calculations or measurements may be necessary to establish the compliance boundary for other configurations chosen by the customer. For further information on calculation methods, see document Radio frequency electromagnetic fields, RBS 2000 and RBS 3000, guidelines, Safety information, EN /LZT 720 0399.

Note: The expanded uncertainty (k=2) is ±2 dB for the underlying calculations of the power density used for assessment of the compliance boundary dimensions listed in Table 11.

Note: The combined configuration can be achieved with an external EHCU.

Characteristics of the antennas recommended for typical RBS configurations with the RBS 2111 Second Generation are listed in Table 12.

Table 12 Characteristics for the Typical Antenna

Antenna specifications	KRE 101 1399/1 V-pol macro RBS omni-directional antenna	KRE 101 1420/1 X-pol macro RBS directional antenna	KRE 101 1985/1 X-pol macro RBS directional antenna
Antenna dimensions H×W×D (mm)	3050×Ø51	2580×262×116	1302×155×69
Tested frequenc y range (MHz)	869–894, 925–960	869–894, 925–960	1805–1880, 1930–1990

Half-power beam width	Omni-directional, Vertical 7°	Horizontal 65–68°, Vertical 7.0–7.5°	Horizontal 66–67°, Vertical 6.5–6.8°
Antenna gain	11 dBi	17.5–18.0 dBi	17.7–17.9 dBi
Down tilt	0 degrees	0 degrees	0 degrees

The total power fed to the antennas for the RBS 2111 Second Generation (including tolerances and transmission losses) is given in Table 13.

Table 13 Total Power to the Antenna for Typical RBS Configurations with the RBS 2111 Second Generation

RBS configuration		**Output power per carrier (dBm / W)**	**Total power delivered to antenna(1) (dBm)/(W)**
1x2, 2x2, 3x2, uncombined, directional antenna	GSM 800	43.0	46.5/44.7
1x2, uncombined omni-directional antenna	GSM 800	43.0	43.5/22.4(2)
1x4, 1x6, EHCU combined directional antenna	GSM 800	39.2	45.7/37.2(3)
1x2, 2x2, 3x2, uncombined, directional antenna	PGSM 900	43.0	46.5/44.7
1x2, uncombined , omni-directional antenna	PGSM 900	43.0	43.5/22.4(2)
1x4, 1x6, EHCU combined, directional antenna	PGSM 900	39.2	45.7/37.2(3)
1x2, 2x2, 3x2, uncombined, directional antenna	GSM 1800	43.0	46.5/44.7
1x4, 1x6, EHCU combined, directional antenna	GSM 1800	39.2	45.7/37.2(3)

1x2, 2x2, 3x2, uncombined, directional antenna	GSM 1900	43.0	46.5/44.7
1x4, 1x6, EHCU combined directional antenna	GSM 1900	39.2	45.7/37.2(3)

(1) The sum of all carriers to the antenna including transmission losses of 0.5 dB and power tolerances.
(2) The power is distributed to two antennas (equal amount to both antennas)
(3) The power is distributed to two antennas (45.7 dBm for the antenna with the highest input power)

6.6 Materials

All Ericsson products fulfill the legal, market and Ericsson requirements regarding:

- Declaration of materials
- Fire resistance of materials, components, wires and cables
- Recycling
- Use of restricted and banned materials

7 Hardware Units RBS 2111 Second Generation

This chapter provides information about hardware units comprised in RBS 2111 Second Generation Main Unit (MU), Remote Radio Unit (RRU-N) and Optical fiber.

7.1 Hardware Units MU

This section briefly describes the hardware units required to support MU functions, regardless of configuration or frequency. The different parts of the MU are shown in the figure below and in Table 14. After the table, descriptions of the hardware units are given.

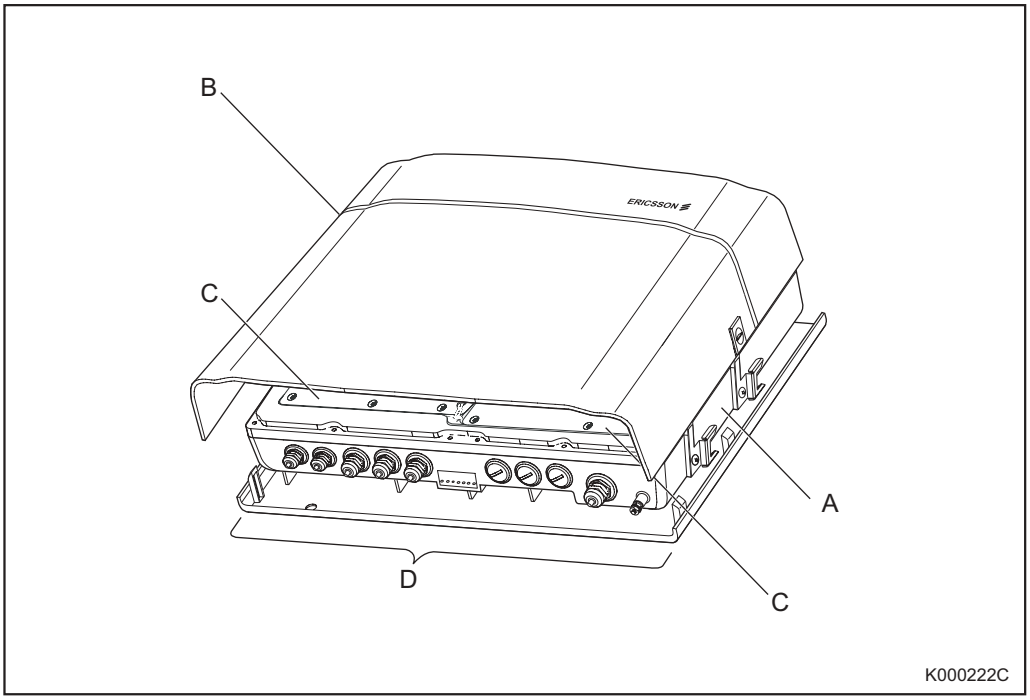


Figure 14 Hardware Units MU

Table 14 Hardware Units

A	Main Unit (MU)
B	Sun shield
C	Cover plate
D	Connection interfaces
E	Operator interface

7.1.1 MU

The Main Unit (MU) has the following main functions:

- Provides the RBS with the interfaces to the transport network through two E1/T1 transmission ports
- Handles incoming traffic, controls and supervises information and sends it to its destination within the RBS
- The OVP (Overvoltage Protection module) protects the RBS equipment from overvoltage and overcurrent that may occur in external lines
- The MU-12 is installed with the internal SPD (Surge Protective Devices).

- OMT connection

7.1.2 Cover Plate

The cover plate protects the connections for transmission, external alarm, optical fiber and power.

7.1.3 Connection Interfaces

The connection interfaces for the MU are described in Page 28.

7.2 Hardware Units RRU-N

This section briefly describes the standard hardware units required to support RRU-N functions, regardless of configuration or frequency. The different parts of the RRU-N are shown in the figure below and in Table 15. After the table, descriptions of the hardware units are given.

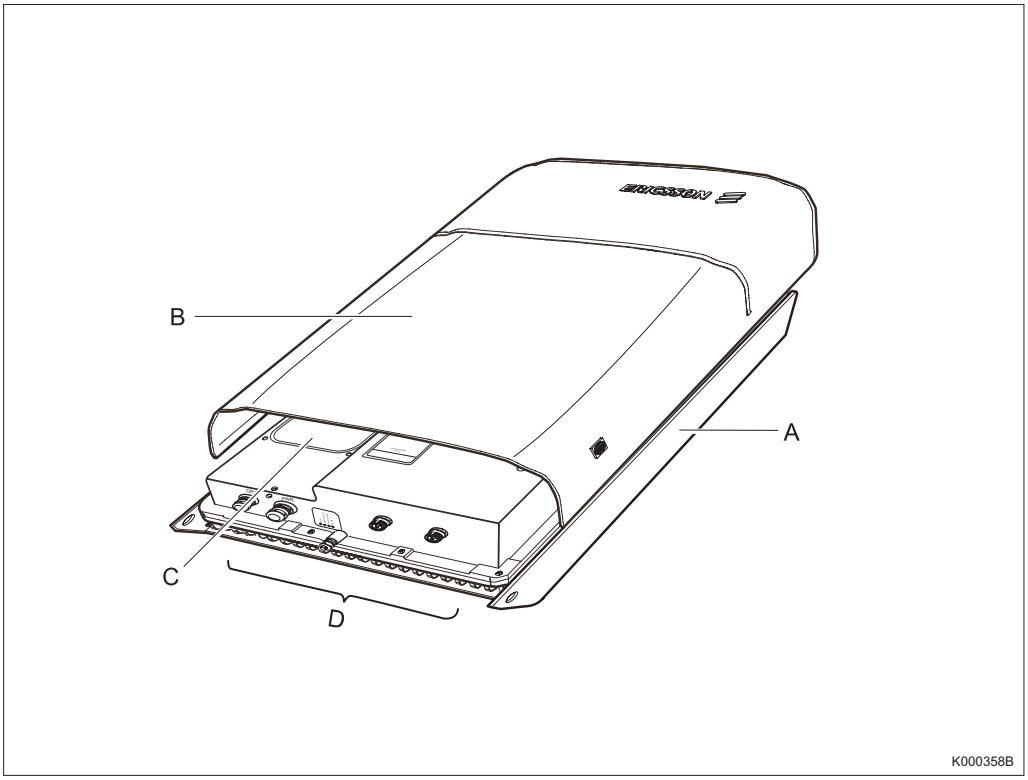


Figure 15 Hardware Units RRU-N

Table 15 Standard Hardware Units

A	Remote Radio Unit-N (RRU-N)
B	Sun shield
C	Cover plate
D	Connection interfaces

7.2.1 RRU-N

The Radio Remote Unit-N (RRU-N) has the following main functions:

- Transmits and receives two radio carriers
- Two receivers per TRX for RX diversity
- The RRU-Ns are installed with the internal SPD.

The RRU supports GMSK, 8-PSK, 16-QAM and 32-QAM, as well as Voice services over Adaptive Multi-user channels on One Slot (VAMOS).

7.2.2 Cover Plate

The cover plate protects the connections for optical fibers and power cables.

7.2.3 Connection Interfaces

The connection interfaces for the RRU-N are described in Page 36.

7.3 Optical Fiber

An optical fiber makes the connection between the MU and the RRU-N. There are four different lengths available for the optical cables: 20 m, 50 m, 100 m and 500 m. The optical fiber must have zero-dispersion in the wavelength range 1310 nm.

The maximum supporting length of the optical fiber cable is 3 km, which can be built by the user according to the cable specifications:

- The cable contains two strain-relieved fibers. The fibers are well protected at the fan-out end.
- It is recommended to use swell-able tape, or another similar solution. It is not recommended to use the filling jelly.
- The strength member can be fiber reinforced plastic (FRP) rod or Aramide yarn to fulfill the mechanical requirements.
- The maximum outer diameter is 10 mm.
- Mechanical Requirements

Temperature Range	Operation	-40°C to +60°C
Temperature Range	Storage	-40°C to +70°C
Temperature Range	Handling	-15°C to +40°C
Bending radius	Maximum	50 mm
Crush resistance	Maximum	1 kN/100 mm
Tensile force permanent	Maximum	300 N
Pulling force during installation	Maximum	450 N

8 MU Connection Interfaces

This chapter provides information about the interfaces on the MU. The connection interfaces described in this section are shown in the figure below and in Table 16. After the table, follows descriptions of the MU connection interfaces.

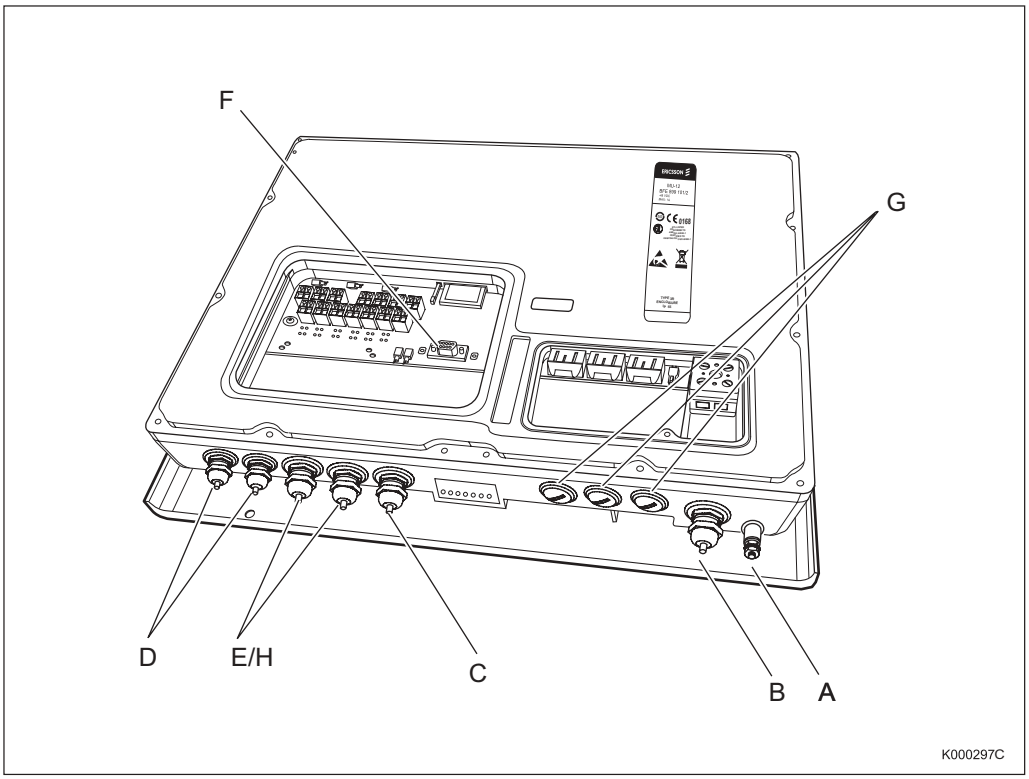


Figure 16 Connection Interfaces

Table 16 MU Connection Interfaces

A	Grounding interface
B	Power interface
C	External alarm interface
D	External Synchronization Bus
E	Transmission: E1 120 Ω or 75 Ω
F	Operator interface
G	Optical fiber interface
H	Transmission: T1 100 Ω

8.1 Grounding Interface

The MU must be grounded to prevent any damage that may result from overvoltage or lightning.

Earth grounding point for the MU is a M8 threaded stud. The figures below show the power interface.

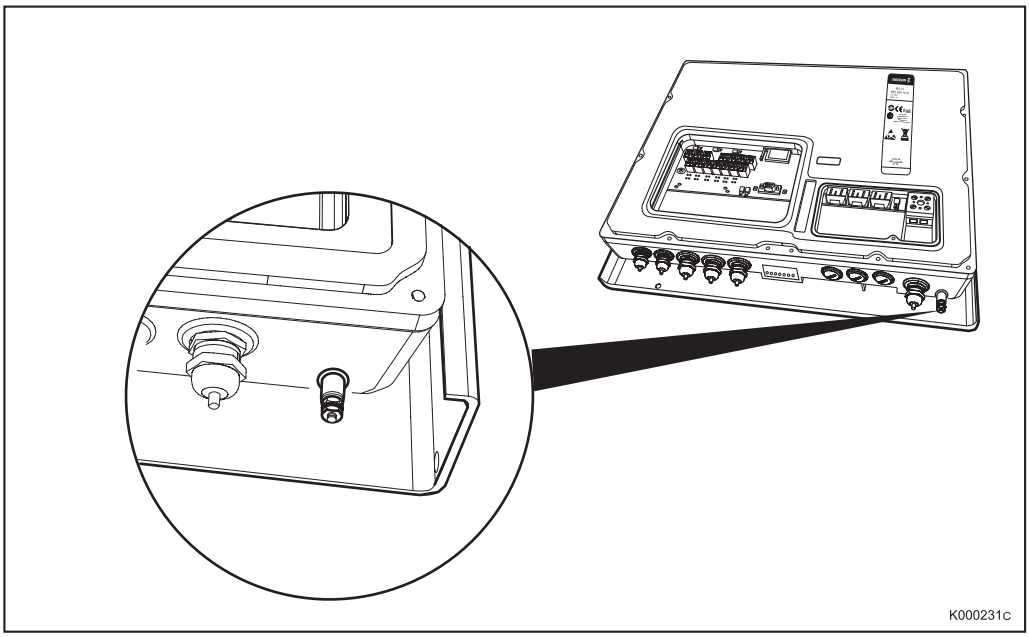


Figure 17 Grounding Interface

8.2 –48 V DC Power Interface

The interface accepts a cable area of 2 x 6 mm². The cable gland for the MU with TG synchronization accepts a cable diameter of 6 – 12 mm.

It is recommended to use a cable area of 2 x 6 mm² for power cable lengths up to 60 m. The maximum voltage drop of the cable should be less than 5 V DC. A shielded power cable connected to the MU must be used, which is connected to the ground on both the MU and the power supply equipment side, otherwise the overvoltage and lightning protection function of the MU will fail.

The figures below show the power interface.

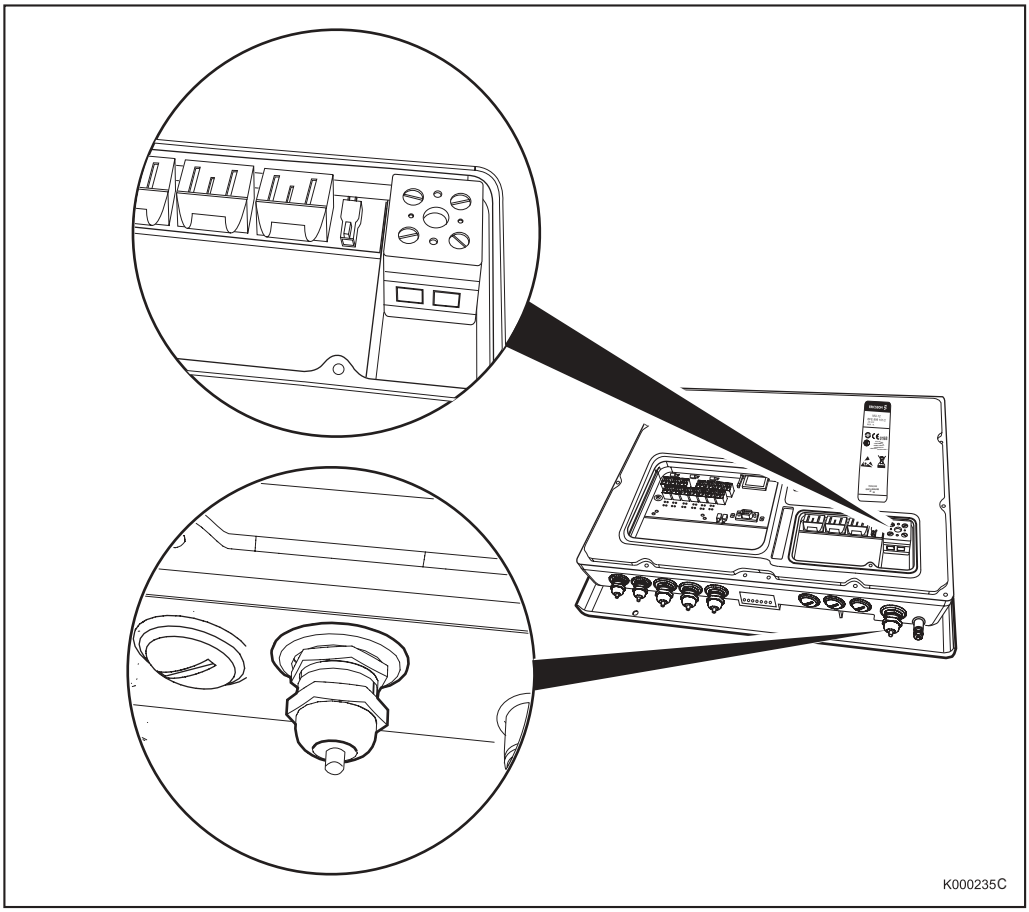


Figure 18 DC Power Interface

8.3 Transmission Interface

RBS 2111 Second Generation supports three transmission standards:

- E1 2048 kbit/s, 75 Ω, coaxial, with PCM synchronisation
- E1 2048 kbit/s, 120 Ω twisted pair, balanced lines, with PCM synchronisation
- T1 1.544 Mbit/s, 100 Ω twisted pair, balanced lines, with PCM synchronisation (for MU-12 only)

E1/T1, 75 Ω,120 Ω or 100Ω

The MU is provided with two connections for transmission interface. The transmission cable is routed through the connection interface to the OVP in the MU. An internal connection is made from the OVP to the DXU main board.

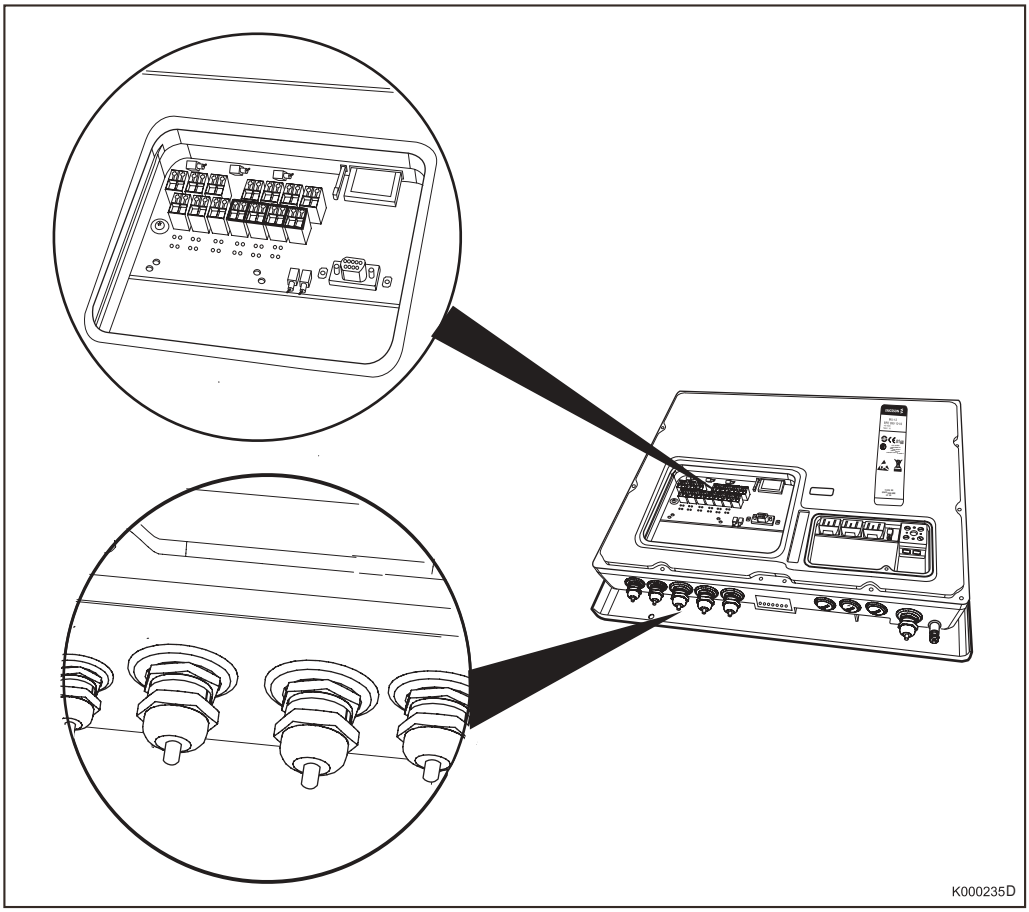


Figure 19 E1/T1, Transmission Interface

For information about the transmission switch, see Page 35.

8.4 External Alarm Interface

The RBS 2111 Second Generation supports a maximum of four external alarms. The alarm device is routed through the access cable hole to the screw terminals of the OVP in the MU. The external alarms are defined during installation. They are defined by using the Operation and Maintenance Terminal (OMT) or from the BSC using the remote OMT.

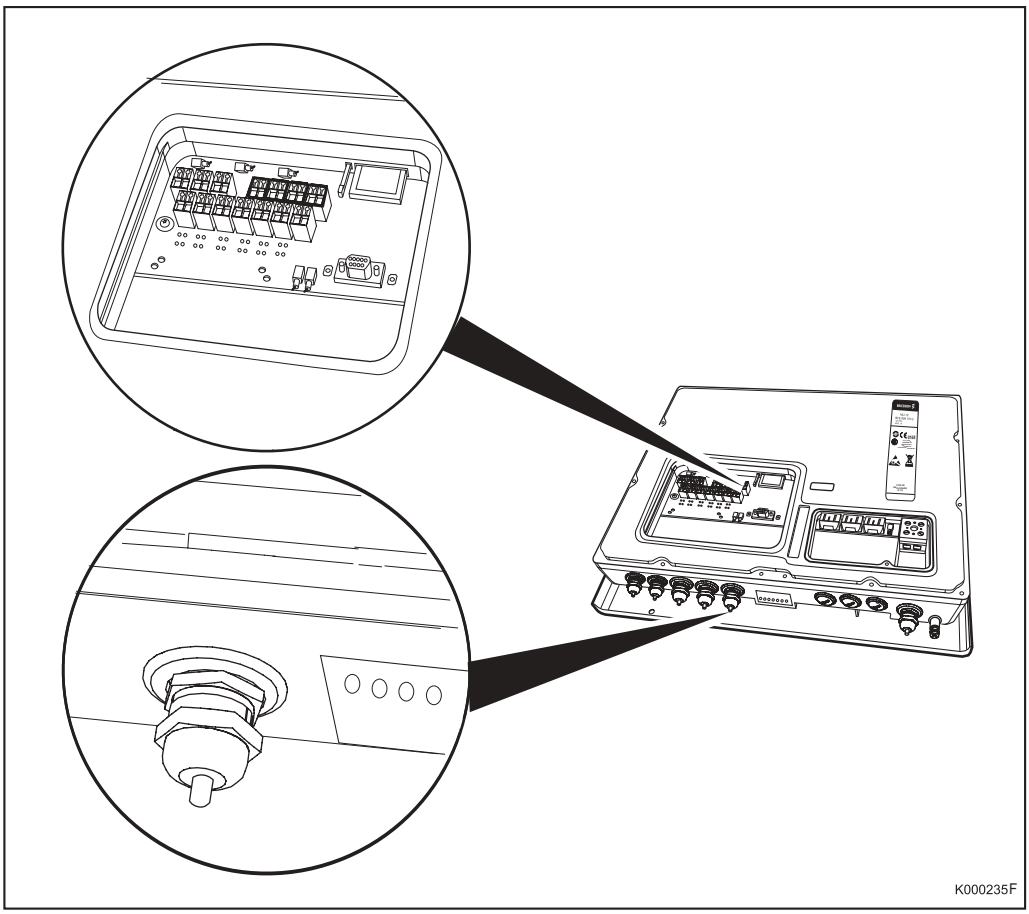


Figure 20 MU-12 External Alarm Interface

8.5 ESB Interface

TG synchronization is the technology used to expand one RBS cabinet with another RBS cabinet in the same cell. The External Synchronization Bus (ESB) is the cable connected between the MUs that supports TG synchronization. The ESB interface is shown in the figures below.

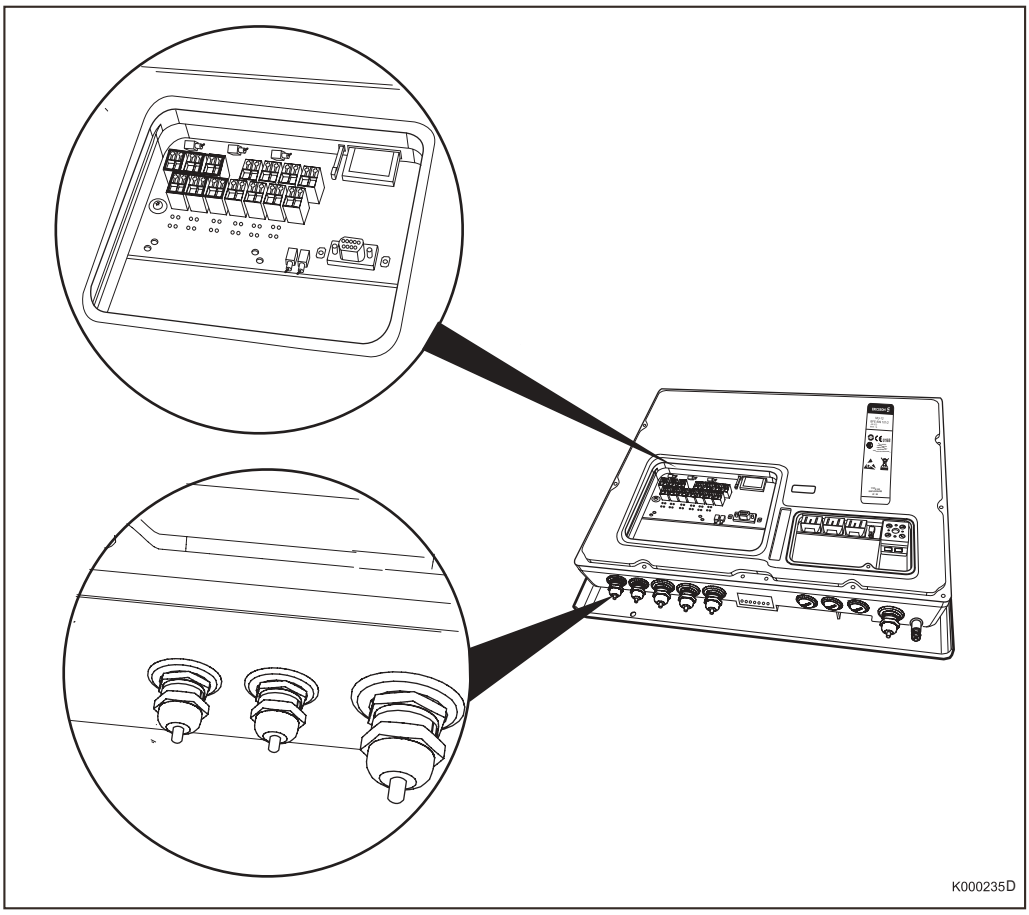


Figure 21 ESB Interface

8.6 OMT Interface

The Operation and Maintenance Terminal (OMT) port is used to communicate with the Operation and Maintenance Terminal. The OMT is connected through a 9-pin D-sub female connector. The OMT interface is shown in the figures below.

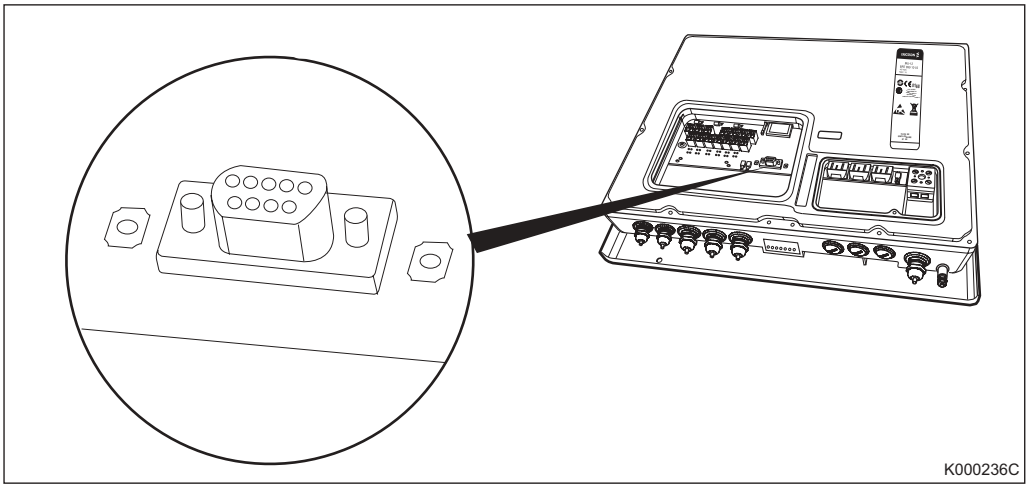


Figure 22 OMT Interface

8.7 Replaceable Flash Card for MU-12

The flash card on MU-12 is replaceable. See Setting IDB Parameters for more information.

8.8 Operator Interface

The Man Machine Interface (MMI) is based on visual indicators and buttons located on the hardware units in the MU.

For more information about the operator interface, see Optical Indicators and Switches.

8.9 Optical Fiber Interface

The optical fiber carries traffic and timing signals between the MU and each RRU-N. The optical cable is routed to the IF card-MU through up to three holes of the MU. The cable gland for the optical cable is delivered mounted on the optical cable. See the figures below.

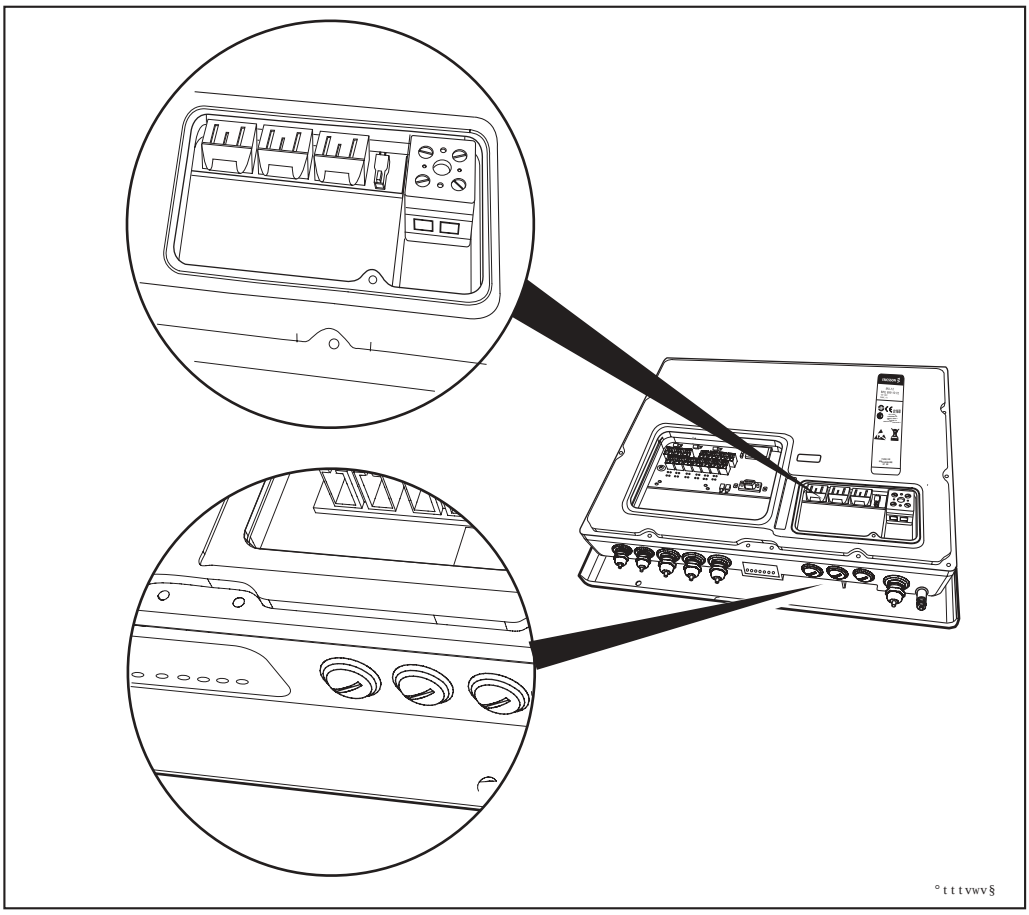


Figure 23 Optical Fiber Interface

RBS Type Switch and Transmission Switch

The RBS type switch should be set to the position marked 11.

The transmission switch is set to 120/100 Ω or 75 Ω, depending on the type of transmission interface used (120 Ω, 100 Ω, or 75 Ω).

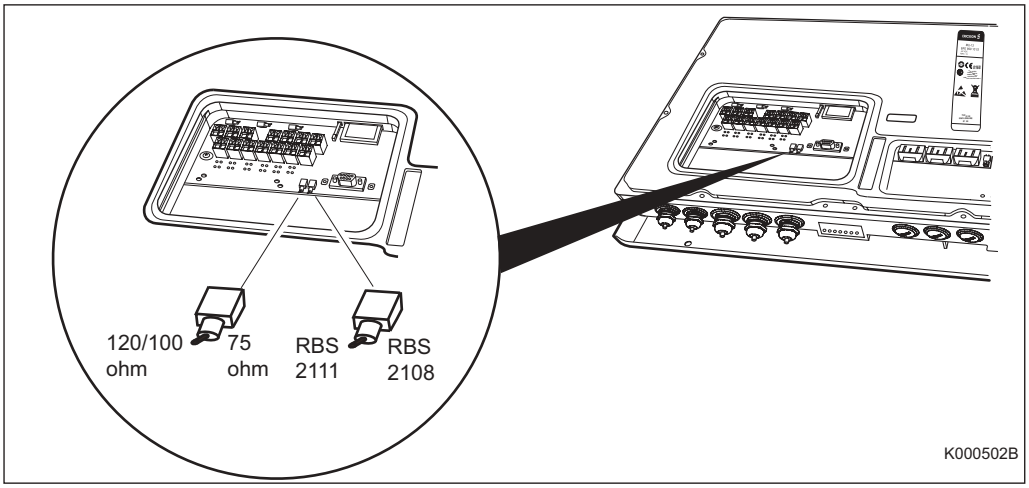


Figure 24 Type Switch and Transmission Switch

9 RRU-N Connection Interfaces

This chapter provides information about the interfaces on the RRU-N. The connection interfaces described in this section are shown in the figure below and in Table 17. After the table, descriptions of the RRU-N connection interfaces are given.

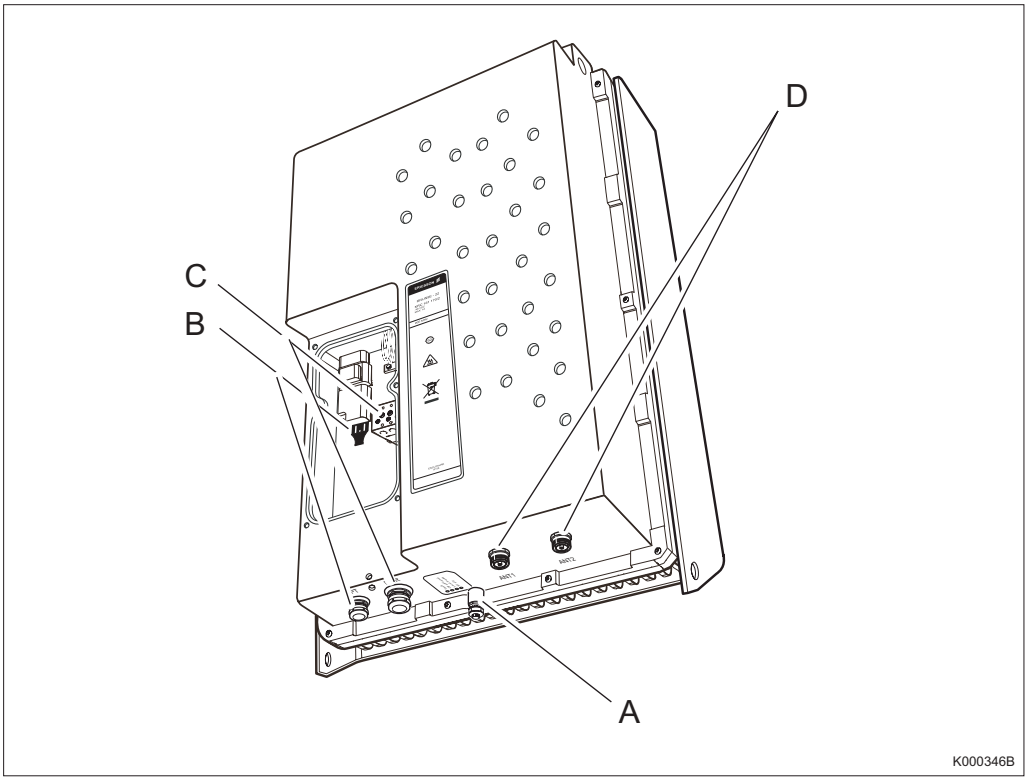


Figure 25 Connection Interfaces

Table 17 RRU-N Connection Interfaces

A	Grounding interface
B	Optical fiber interface
C	Power interface
D	Antenna interface

9.1 Grounding Interface

The RRU-N must be grounded to prevent damage that may result from overvoltage and lightning.

Earth grounding point for the RRU-N is an M8 threaded stud. The figure below shows the grounding interface.

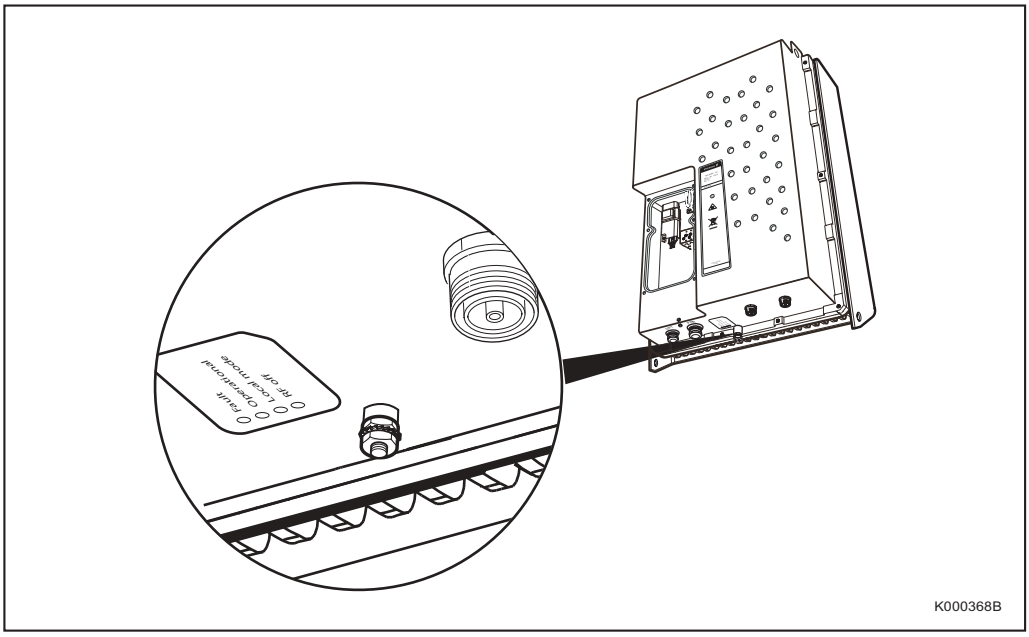


Figure 26 Connection Interfaces

9.2 –48 V DC Power Interface

The interface accepts a cable area of 2 x 6 mm². The cable gland for the RRU-N accepts a cable diameter of 6 – 12 mm.

It is recommended to use a cable area of 2 x 6 mm² for power cable lengths up to 60 m. The maximum voltage drop of the cable should be less than 3 V DC. A shielded power cable connected to the RRU-N must be used, which is connected to the ground on both the RRU-N and the power supply equipment side. Otherwise the overvoltage and lightning protection function of the RRU-N will fail.

The figure below shows the power interface.

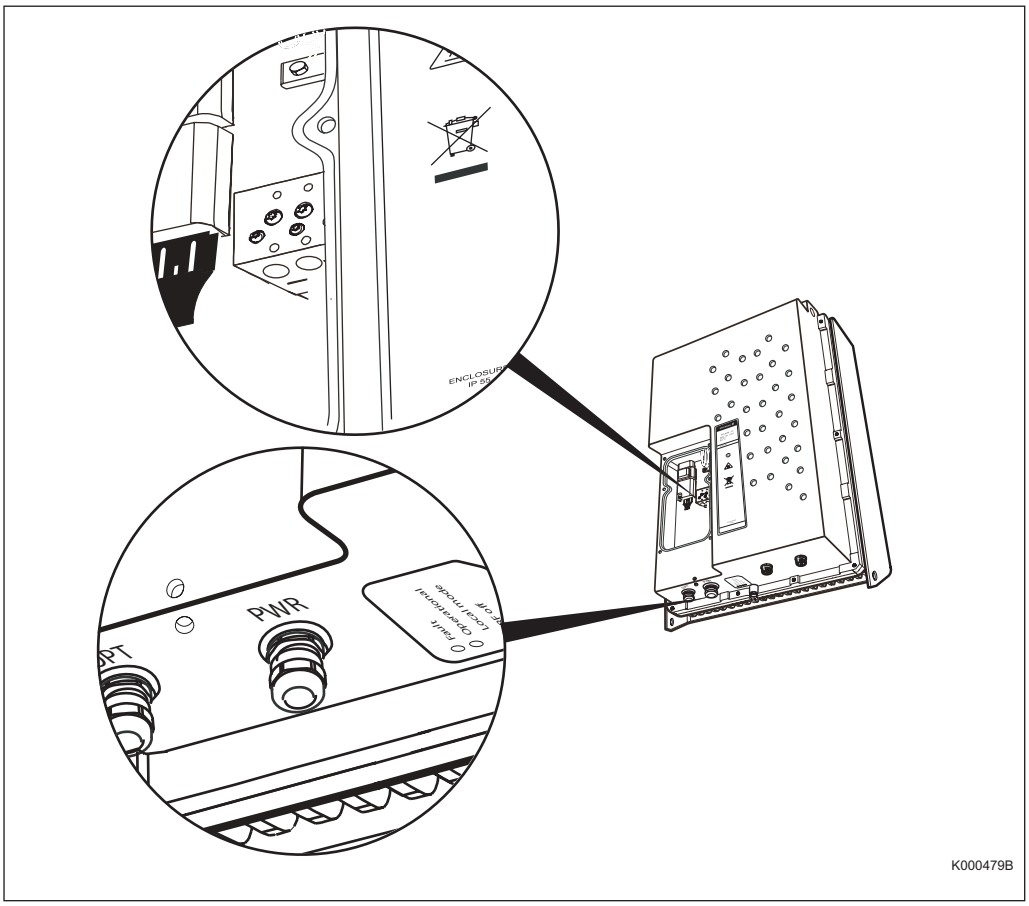


Figure 27 DC Power Interface

9.3 Optical Fiber Interface

The optical fiber interface carries traffic and timing signals between the RRU-N and MU. The cable gland for the optical cable is delivered mounted on the optical cable. The figure below shows the optical fiber interface.

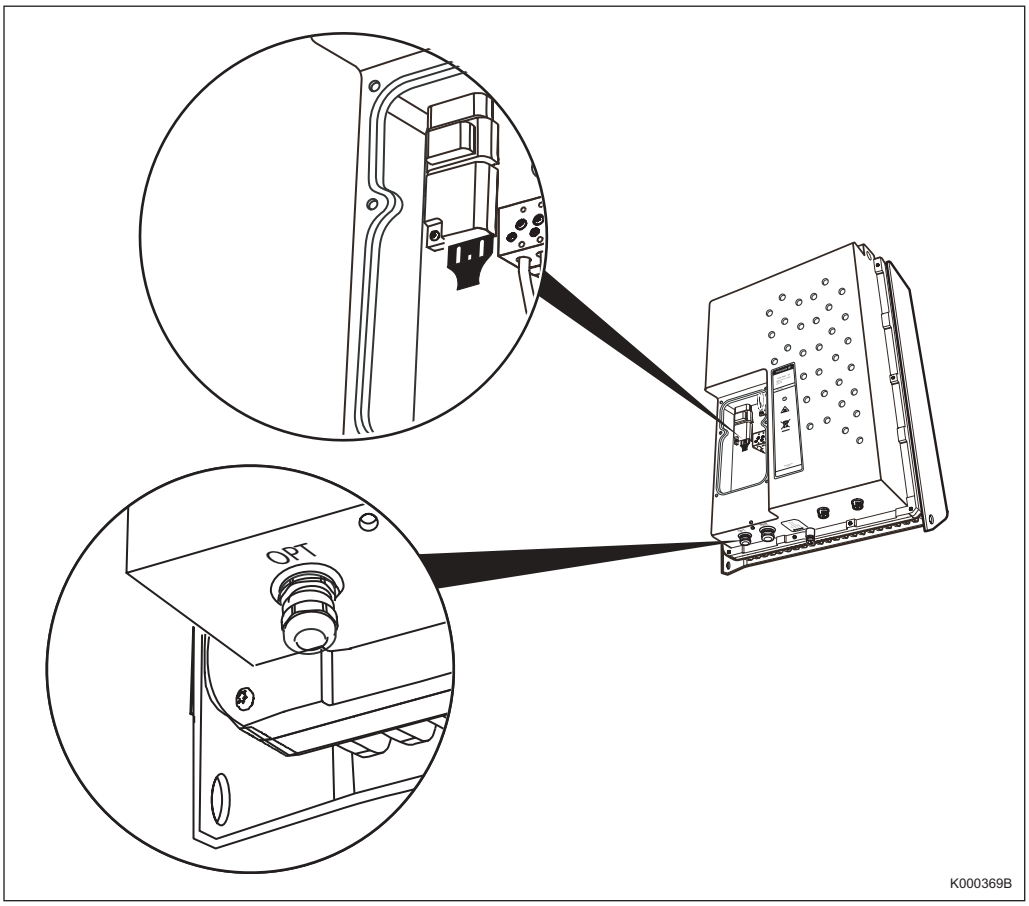


Figure 28 Optical fiber Interface

9.4 Operator Interface

The Man Machine Interface (MMI) is based on visual indicators and buttons located on the hardware units in the RRU-N.

For more information about the operator interface, see Optical Indicators and Switches.

9.5 Antenna Interface

The antenna interface is shown in the figure below.

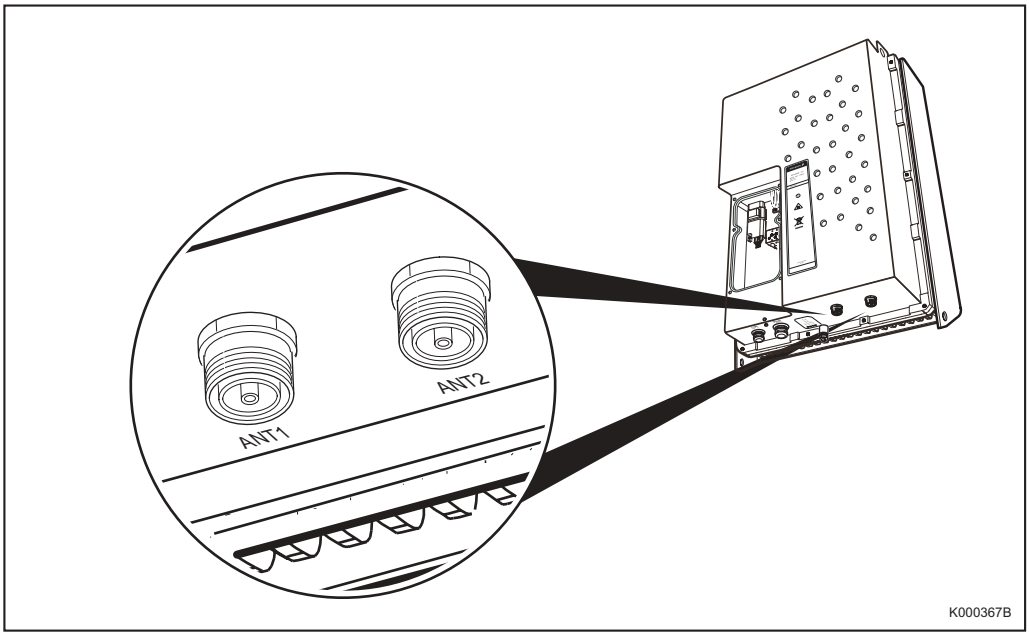


Figure 29 Antenna Interface

The RRU-N is to be placed close to the antenna. The connection from RRU-N to the antenna is normally carried out by jumper cables.

The RRU-N is equipped with two antenna cable connectors. The antenna cables must be connected as shown in the table below.

Table 18 Antenna Connection

Connector RRU-N	Connector Antenna	Type of Connector
ANT1	TX/RX	N female connector IEC 169-16
ANT2	TX/RX	N female connector IEC 169-16

10 Power System

This chapter describes the RBS power system for both the MU and the RRU-N. The values apply to RBSs operating at 800, 900, 1800, and 1900 MHz.

The power for the MU and the RRU-N can be supplied from different power systems if required. For sites with short distances between MU and RRU-N it is recommended that the same power system is used for both MU and RRU-N.

The power supply requirements are described in Table 19.

Table 19 DC Supply Voltage Requirements for MU and RRU-N

Description	MU	RRU-N
Nominal voltage	–48 V DC	–48 V DC
Operating voltage range	–40 to – 57.6 V DC	–40 to – 57.6 V DC
Non-destructive range	0 to – 60 V DC	0 to – 60 V DC

Note: The optional AC PD box can be distributed to up to four PSU-AC users.

Note: The MU and the RRU-N can be equipped with PSU-AC to use AC power. The distance from MU or RRU-N to the PSU-AC should be less than 10 m considering the lightning protection.

10.1 Fuse Recommendations

This section provides information about fuse recommendations. The values stated in this section apply to the worst-case power consumption of a fully equipped RBS. For information on power consumption during traffic, see Section 10.2 on page 42, where maximum power consumption is given.

The MU and the RRU-N must be protected either by an external fuse and a mains switch, or by a circuit breaker. The table below shows the recommendation for both a fuse and circuit breaker.

Table 20 Fuse Recommendation for MU and RRU-N

Unit	Minimum for Safe Function(1)	Recommended for Maximum Selectivity(2)	Maximum Allowed Fuse Rating(3)
MU DC-powered	1 A	1 A	2 A
RRU-N DC-powered	12 A	12 A	16 A

(1) Minimum for Safe Function means that the external fuse is one class larger than the internal fuse.

(2) Recommended for Maximum Selectivity means that the external fuse is chosen so that in all cases the internal fuse will blow before the external one.

(3) Maximum Allowed Fuse Rating means an absolute maximum fuse class according to the design of RBS.

Note: Fuses can be blown by currents or caused by lightning.

10.2 Power Consumption

The table below shows the RBS power consumption figures for AC or DC of the MU and the RRU-N.

Table 21 Power Consumption

Unit		Average Power Consumption (W)	Maximum Power Consumption (W)
MU		10	30
RRU-N	GSM 800/900	160	250
	GSM 1800/1900	180	280

11 Transmission

This chapter describes the transmission standards supported by the RBS 2111 Second Generation.

The RBS can act as an end node of a Transport Network (TN).

For more information about the transmission interface, see Section 8.3 on page 30.

12 External Alarms

This chapter describes the external alarms that are available for the RBS.

Customer-Specific External Alarm

The RBS connected to an OVP provides four external alarm input ports to be used for customer-specific purposes.

It is possible to configure an alarm generated by a closed or open loop condition. A closed loop condition means that an alarm is triggered when an open switch is closed. An open loop condition means that an alarm is triggered when a closed switch is opened. The open loop condition is the default.

The external alarms are defined at the installation. They are defined by using the OMT or from the BSC using the remote OMT.

For more detailed information on the use of the OMT, see OMT User's Manual, EN/LZN 720 0001

Note: For OMT Version R31 and later, the OMT parameters are also included as on-line help.

13 Standards, Regulations and Dependability

In this chapter a brief overview of standards, type approval and electromagnetic compatibility are stated.

13.1 Safety Standards

In accordance with market requirements, the RBS configured for 1800 MHz or 900 MHz complies with the following product safety standards and directives:

- EN 60 950-1 / IEC 60 950-1
- EN 60 950-22 / IEC 60 950-22
- EN 60 215 / IEC 60 215

In accordance with market requirements, the RBS configured for 1900 or 850 MHz comply with the following product safety standards:

- ANSI/UL 60 950-1 / CSA C22.2 No. 60 950-1

13.2 Other Standards and Regulations

All Ericsson devices are designed to be compliant with rules and regulations in locations they are sold and will be labelled as required. Any changes or modifications to Ericsson equipment, not expressly approved by Ericsson, could void the user's authority to operate the equipment.

Marking

The product is marked with symbols to indicate compliance with product safety standards.

Product Approval Standards

The RBS configured for 1800 MHz or 900 MHz complies with the EC (European Community) market requirements regarding radio performance, as well as the R-TTE directive 2004/108/EC. The product is marked with the CE symbol to indicate compliance with the legal requirements.

The RBS configured for 1900 MHz or 850 MHz complies with the NOA (North America) market requirements regarding radio performance. The product is marked with the FCC symbol to indicate compliance with the legal requirements.

EMC

The RBS configured for 1800 MHz or 900 MHz complies with the EC (European Community) market requirements regarding Electromagnetic Compatibility (EMC), as well as the R-TTE directive 2004/108/EC. The product is marked with the CE symbol to indicate compliance with the legal requirements.

The RBS configured for 1900 MHz or 850 MHz complies with the NOA (North America) market requirements regarding Electromagnetic Compatibility (EMC). The product is marked with the FCC symbol to indicate compliance with the legal requirements.

The RBS configured for 1900 MHz or 850 MHz comply with FCC part 24 (1900) and FCC part 22 (850) and FCC part 15 for both. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Dependability

The RBS is designed for a technical lifetime of 15 years (24-hour operation).

Spare Parts

This RBS complies with Ericsson’s Serviceability and Spare Parts Strategy.

Vandal Resistance

Unauthorized access is prevented by the sunshield and using Torx screws.

14 References

[1] *ICNIRP, "Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300GHz)", International Commission on Non-Ionizing Radiation Protection, Health Physics, vol. 74, no. 4, 1998.*

[2] *FCC, Code of Federal Regulations CFR title 47, part 1.1310 "Radio frequency radiation exposure limits", Federal Communications Commission (FCC), August 1997.*

[3] *The values in Table A1 have been determined using the ICNIRP reference levels but are applicable also for the FCC maximum permissible exposure (MPE) limits.*