

Exhibit 8 Manual

Prepared (also subject responsible if other) / XSNSIXI		No. 19/1551-LZA 701 0001 Uen		
Approved CBC/ XRX/M (Kai Lian)	Checked	Date 2011-05-05	Rev G	Reference

RBS Product Description

RBS 2206

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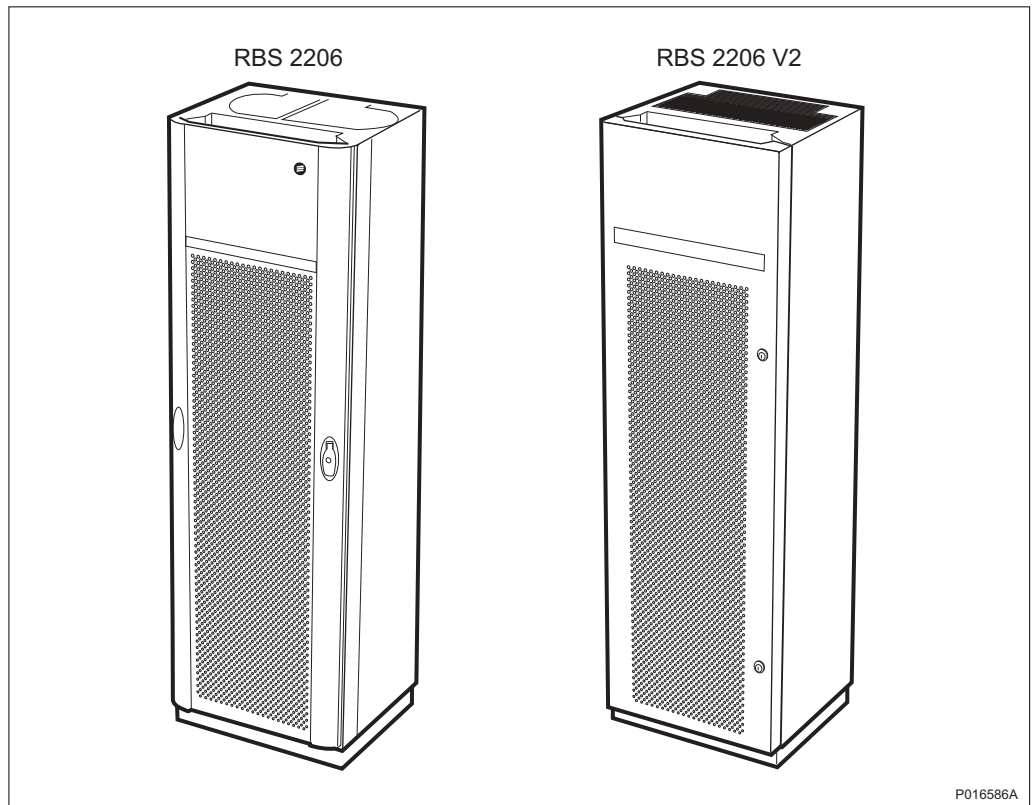
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1 Introduction

The RBS 2206, a member of the RBS 2000 family, is a 12-Transceiver (TRX) radio base station for indoor applications. This cabinet covers the same floor area as the RBS 2202, its predecessor, and has double capacity. The RBS 2206 V2 is a variant of the RBS 2206, that has a new Electromagnetic Compatibility (EMC) topology and several new Replaceable Units (RU).



1.1 Revision Information

Other than editorial changes, this document has been revised as follows:

- Section Transmission: Information about SIU added

2 Product Overview

The RBS 2206 is a high-capacity indoor base station. It is used for indoor applications, with up to six double Transceiver Units (dTRU). The RBS 2206 is designed to be transported as a fully assembled cabinet to the site. All units in

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the cabinet are easily accessible from the front of the cabinet, which means that the cabinets can be mounted side by side with their backs against a wall.

2.1 Main Features

The RBS 2206 supports the following features:

- 1, 2 or 3 sectors in one cabinet using Combining and Distribution Unit CDU-F, CDU-G, or CDU-K (RBS 2206 V2)
- Co-siting (antenna sharing) with GSM, TDMA, or WCDMA systems
- Discontinuous transmission/reception
- Duplex filters
- Dynamic power regulation
- Encryption/ciphering
- Enhanced Data Rate for Global Evolution (EDGE)
- Expansion by TG synchronization
- External alarms
- Frequency hopping
- Link Access Procedures on D-Channel (LAPD) concentration and LAPD multiplexing are used to make the transmission resource more efficient
- Global Positioning System (GPS) synchronization
- Radio configurations supported on 400 (RBS 2206 V2), 800, 900, 1800 and 1900 MHz
- Receiver diversity
- Transmission Interface: The following transport network interface alternatives exist:
 - T1 1544 kbps, 100 Ω , with PLM synchronization
 - E1 2048 kbps, 75 Ω , with PCM synchronization
 - E1 2048 kbps, 120 Ω , with PCM synchronization
- Wide-range power input 120 – 250 V AC

2.2 Variants

Three versions of the RBS 2206 and RBS 2206 V2 cabinets are available:

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- -48 to -60 V DC
- 120–250 V AC (50/60 Hz) and +24 V DC
- +24 V DC, without Power Supply Unit (PSU)

2.3 Optional Equipment

The equipment listed below is available, but is not necessary for basic functionality.

- Antenna Sharing Unit (ASU)
- Splitter unit
- Battery backup, external only
- Bias injectors
- Distribution Frame (DF), externally mounted
- Dual-Duplex Tower-Mounted Amplifier (ddTMA), externally mounted
- Digital Cross-Connect (DXX), transmission equipment
- External Synchronization Bus (ESB)
- Hybrid Combiner Unit (HCU)
- Redundant PSU
- Tower-Mounted Amplifier Control Module (TMA-CM)
- Transmission Adapter (TA), 75–120 Ω

3 Dimensions

This section describes the physical characteristics of the RBS.

For dimensions, see Figure 1.

Weight

Table 1 Weights

Unit	Weight
RBS cabinet ⁽¹⁾	230 kg (507 lbs)
Base frame	12 kg (26 lbs)

(1) Fully equipped including base frame.

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Colour

Table 2 Colour

Colour	Reference Number
White	NCS S 1002-R

4 Space Requirements

The following sections describe the required space and recommended floor layout.

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Space above the RBS Cabinet

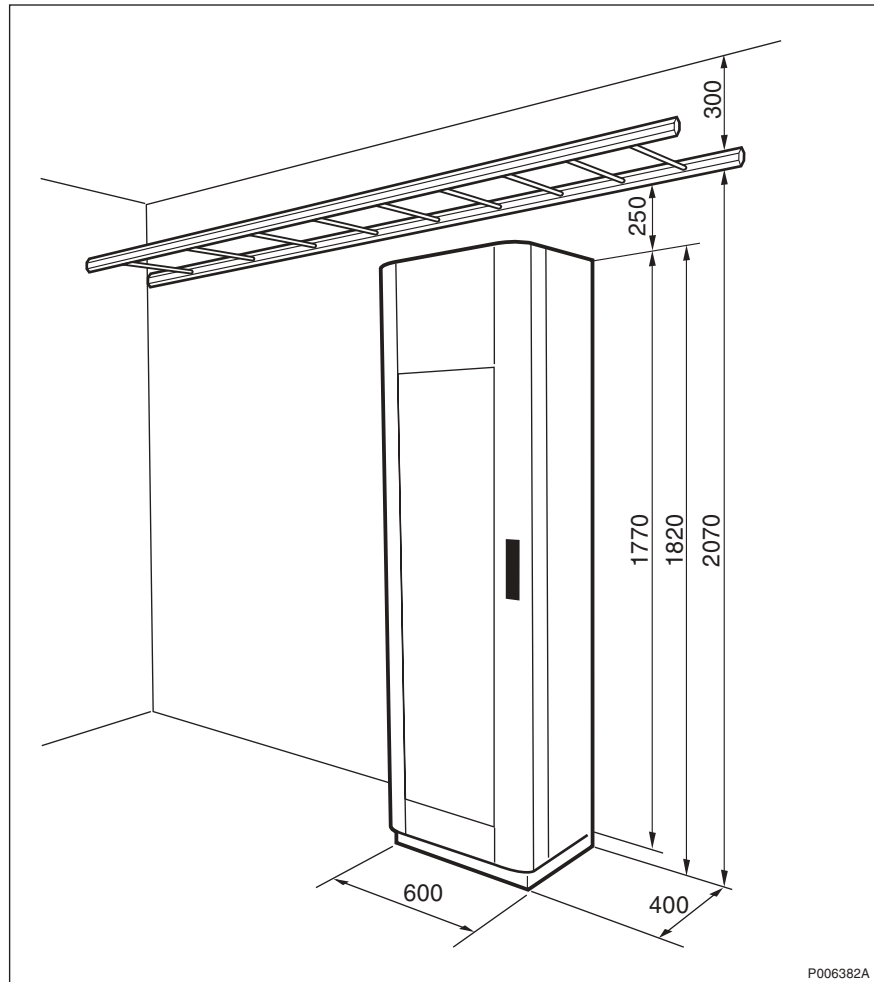


Figure 1 Cabinet Dimensions

The recommended distance between the cabinet and cable ladder is 250 mm. A shorter distance makes it difficult to exchange fans and may restrict the air flow. A space of 300 mm is recommended above the cable ladder to make cable installation work easier.

RBS 2206:

Depth of cabinet including door is 470 mm, of which the door is 70 mm.

RBS 2206 V2:

Depth of cabinet including door is 470 mm, of which the door is 20 mm.

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Layout for RBS Cabinets

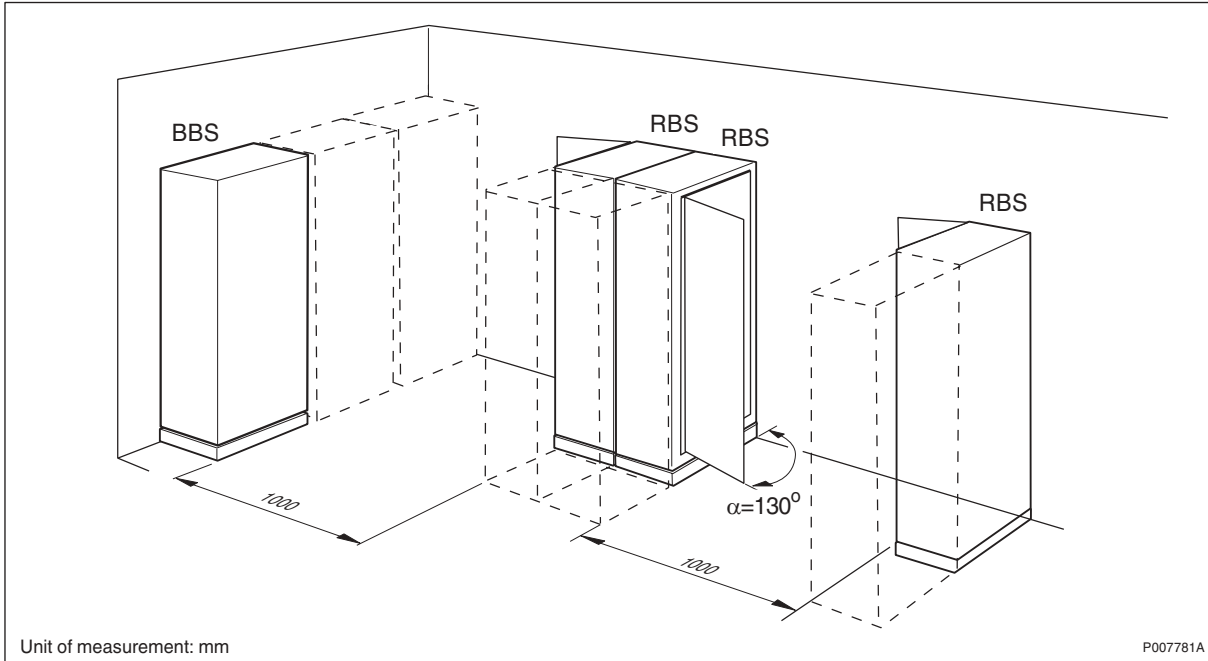


Figure 2 Floor Layout and Space Requirements

The RBS cabinets and Battery Backup System (BBS) racks are mounted on the floor, and may be positioned against a wall, back to back, or free standing without contact with other cabinets.

Expansion cabinets and racks can be positioned to the left or to the right of the master cabinet. However, expansion to the right is recommended in order to follow the same standard globally.

For maintenance a distance of 1000 mm in front of the cabinets and racks is recommended.

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

Earthquake Requirements

If the RBS cabinet shall fulfil the requirements for earthquake protection, the space between wall and cabinet is to be at least 100 mm and between cabinets at least 150 mm.

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Footprint

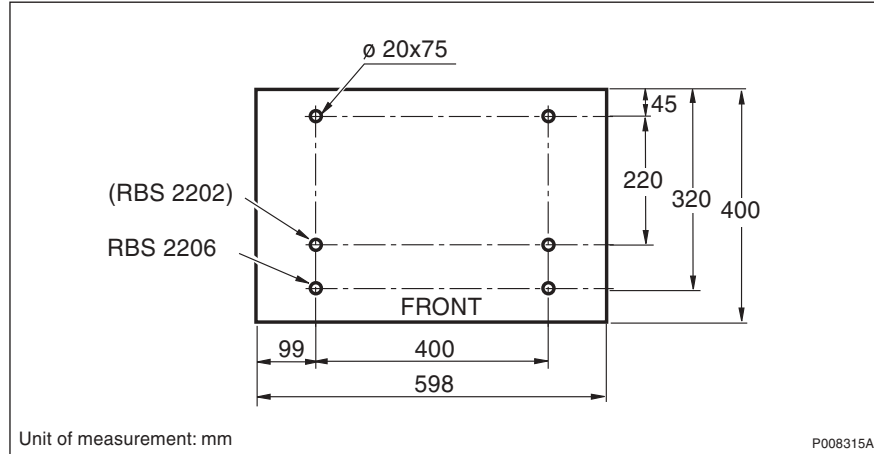


Figure 3 Drilling Pattern

The RBS 2206 has the same footprint as the RBS 2202 cabinet. The base frame is used as a template to mark new holes. If an RBS 2202 is being replaced by an RBS 2206, the holes for the old cabinet can be used for the new cabinet.

The RBS 2206 V2 uses the same base frame as the RBS 2206.

5 Environment

The RBS is designed to operate within limits stated for climatic requirements and also to have a limited effect on the environment.

5.1 Operating Environment

The climatic requirements for the RBS on the site are shown in the table below.

Table 3 Environmental Specifications

Environmental Parameters	Normal Operation ⁽¹⁾	Safe Function ⁽²⁾	Non-destructive Conditions ⁽³⁾
Temperature	+5 to +40 C°	0 to +45 C°	-10 to +55 C°
Relative Humidity	5 – 85%	5 – 90%	5 – 90%

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- (1) Normal operation describe the environmental conditions where all units function as specified.
- (2) Environmental stress above the limits for normal operation where all units shall continue to function during the stress, but performance or capacity may be reduced. When the environmental stress has dropped to normal conditions, function as specified shall automatically be achieved. Safe function refers to a period of not more than 72 consecutive hours, and a total of not more than 15 days in one year.
- (3) Non-destructive conditions describe environmental stress above the limits for normal conditions with no function guaranteed and unspecified degradation. When the environmental stress has dropped to normal conditions, restoring full RBS performance requires no manual intervention on site. Non-destructive conditions refer to a period of maximum 96 consecutive hours, and a total of maximum 5.5 days in a three-year period.

Acoustic Dispersion

The cabinet noise dispersion for an RBS with four fans is shown in the two figures below. The figures show the noise dispersion generated by a free-standing cabinet and by a cabinet mounted against a wall.

Note: The acoustic noise dispersion values for a free-standing cabinet and a cabinet installed against a wall were tested according to the ISO 9614-2 standard, however deviations from these values may be experienced due to the nature of materials in the environment where the cabinet is installed. Objects may reflect or absorb sound and will affect acoustic dispersion.

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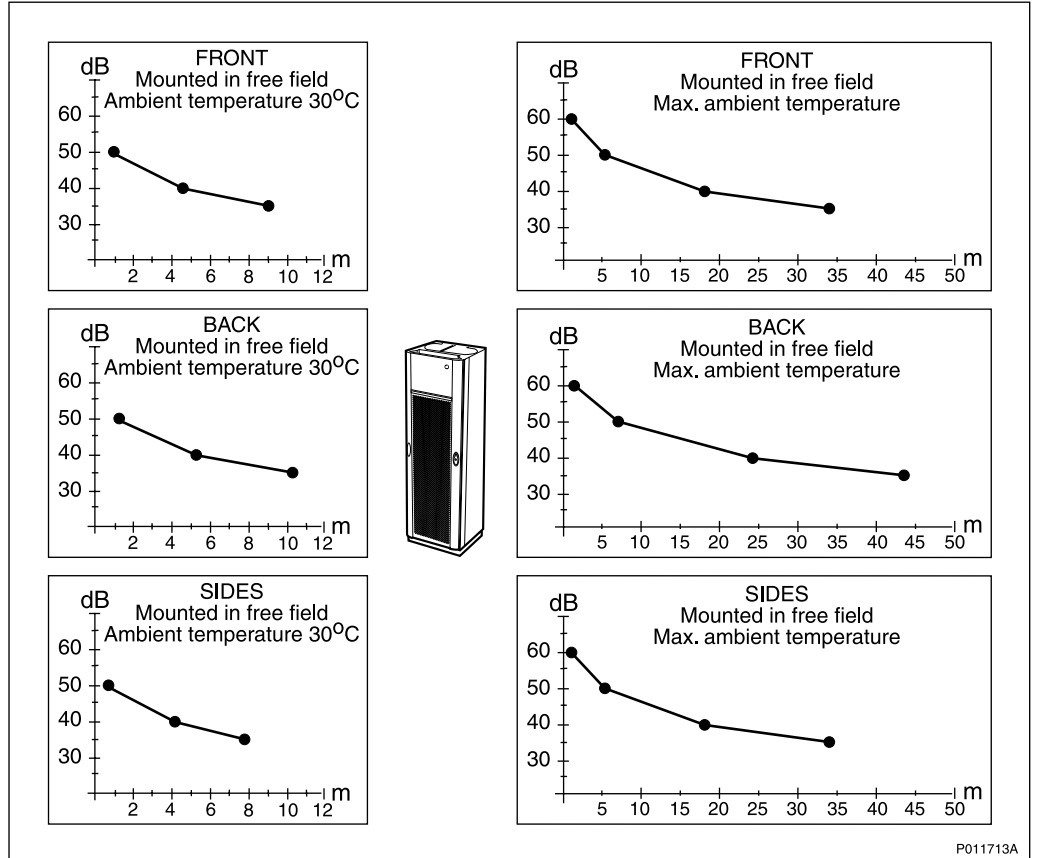


Figure 4 Acoustic Dispersion for Free-Standing RBS 2206

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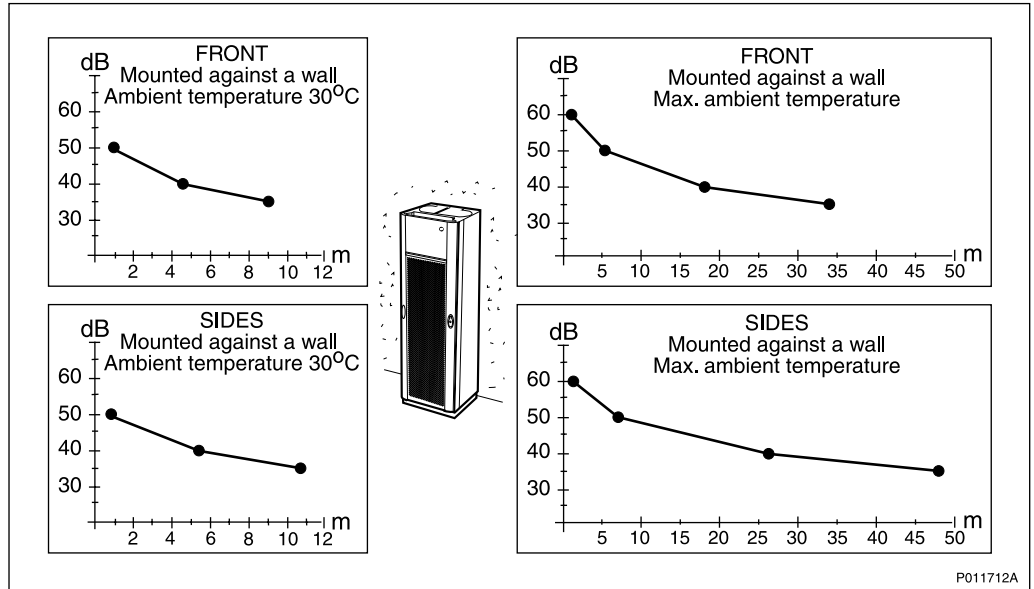


Figure 5 Acoustic Dispersion for RBS 2206 Positioned against a Wall

Ground Vibrations

The RBS is designed to withstand random vibrations of up to $0.15 \text{ m}^2/\text{s}^3$, and its resistance to single shocks of up to 40 m/s^2 and seismic activity at test frequencies of 1–35 Hz is tested.

The maximum test level of the Required Response Spectrum (RRS) is 50 m/s^2 within 2–5 Hz. The shape of the RRS is defined by the relevant ETSI standard.

Levelling

For cabinet levelling purpose, the floor must be level to within $\pm 3 \text{ mm}/2000 \text{ mm}$ and the floor gradient be within $\pm 0.1^\circ$.

5.2 Environmental Impact

This section describes the effects that the cabinet has on the environment.

Heat Dissipation

The RBS generates an average heat load of 1500 W. The exact figure is dependent upon configuration, equipment and site-specific conditions.

5.3 Compliance Distances for Electromagnetic Exposure

The compliance distance is the minimum separation that should be kept between the antenna and a person in order to ensure that the ICNIRP RF exposure limits are not exceeded.

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

Ericsson has performed a free-space near-field RF exposure assessment of typical configurations of the RBS with a recommended antenna. The resulting dimensions, in metres, for a compliance boundary for both public and occupational exposure are shown in Table 4.

The compliance boundary is defined as a cylinder around the antenna, see figure below. The antenna is not located at the centre of the cylinder. Instead it is located almost at the edge, facing towards the centre of the cylinder. The distance between the antenna's rear and the edge of the cylinder is the "Distance behind antenna". The height of the cylinder is the antenna height plus equal distances above and below the antenna. The cylinder shape overestimates the compliance distances right beside the antenna.

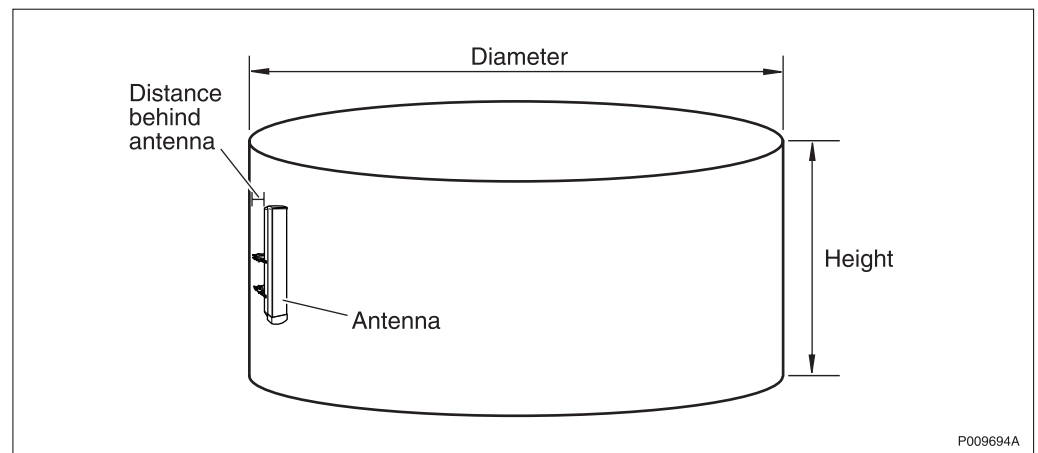


Figure 6 Compliance Boundary Cylinder

Note: Table 4 shows an example for a typical antenna. As the antenna field distributions will differ, complete calculations or measurements may be necessary in order to establish the compliance boundary for other configurations chosen by the customer. For further information on calculation methods, see Radio Frequency Electromagnetic Fields.

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Table 4 Compliance Boundary Dimensions for the General Public (GP) and Occupational (O) Exposure for Typical Configurations

Configuration	Frequency (MHz)	Dimensions of Cylindrical Compliance Boundary in Meter (m)					
		Diameter		Height		Distance Behind Antenna	
		GP	O	GP	O	GP	O
3x2 no hybrid	900	6	3	1.7	1.5	0.1	0.1
	1800	5	1	1.6	1.4	0.1	0.05
3x4 combined	900	6	3	1.7	1.5	0.1	0.1
	1800	5	1	1.6	1.4	0.1	0.05
3x2 TCC	900	9	4	1.9	1.6	0.1	0.1
	1800	7	2	1.6	1.5	0.1	0.1
1x12 filter combiner	900	12	5	2.3	1.6	0.1	0.1
	1800	10	4	1.9	1.6	0.1	0.1

The cylinder shape overestimates the compliance distances right beside the antenna. In reality the occupational compliance distance by the side, in line with the front of the antenna, is less than 0.1 metre for output power levels below 56 W and less than 0.3 metre for the other power levels reported here. For characteristics of an antenna recommended for typical configurations of an RBS 2206, see table below.

Table 5 Characteristics for a Typical Antenna (KRE 101 1916/1)

Antenna Specifications	X-pol macro RBS sector antenna
Antenna Height	1.3 m
Horizontal Half-power Beam Width	60 degrees
Vertical Half-power Beam Width	15 degrees at 900 MHz 7 degrees at 1800 MHz
Antenna Gain	14.5 dBi at 900 MHz 17 dBi at 1800 MHz
Down Tilt	0 degrees

The nominal maximum power fed to the antenna, as a function of the number of Transceiver Units (TRU) per antenna and the maximum power (including tolerances and transmission loss) per TRU, for RBS at 900 MHz and 1800 MHz, are given in Table 6.

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Table 6 Maximum Power to Antenna for Various RBS Configurations

Configuration	Frequency (MHz)	Nominal Output Power per TRU (dBm)/(W)	Maximum Power into Antenna ⁽¹⁾ (dBm)/(W)
3x2 no hybrid	900	45.5 / 35	47.5 / 56
	1800	44.5 / 28	46.5 / 45
3x4 combined	900	42 / 16	47 / 50
	1800	41 / 13	46 / 40
3x2 TCC	900	48 / 63	50 / 100
	1800	47 / 50	49 / 79
1x12 filter combiner	900	43 / 20	53 / 190
	1800	42 / 16	52 / 151

(1) Including power tolerance level (+2 dB) and transmission losses (-3 dB).

5.4 Materials

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

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

Package Material

The package material is recyclable.

6 Hardware Units

A high level of availability is achieved using strict functional modularity with a system of standardized units. A failed unit can easily be replaced by a new one.

The RBS cabinet contains the radio equipment, power supply and the climate equipment (fans). All required transmission equipment and battery backup must be housed outside the cabinet.

Outside equipment is listed under optional units. Not all HW units are covered in this section, only those directly related to the RBS.

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6.1 RBS 2206 Standard Hardware Units

This section briefly describes the standard hardware units required for functionality, irrespective of configuration or frequency.

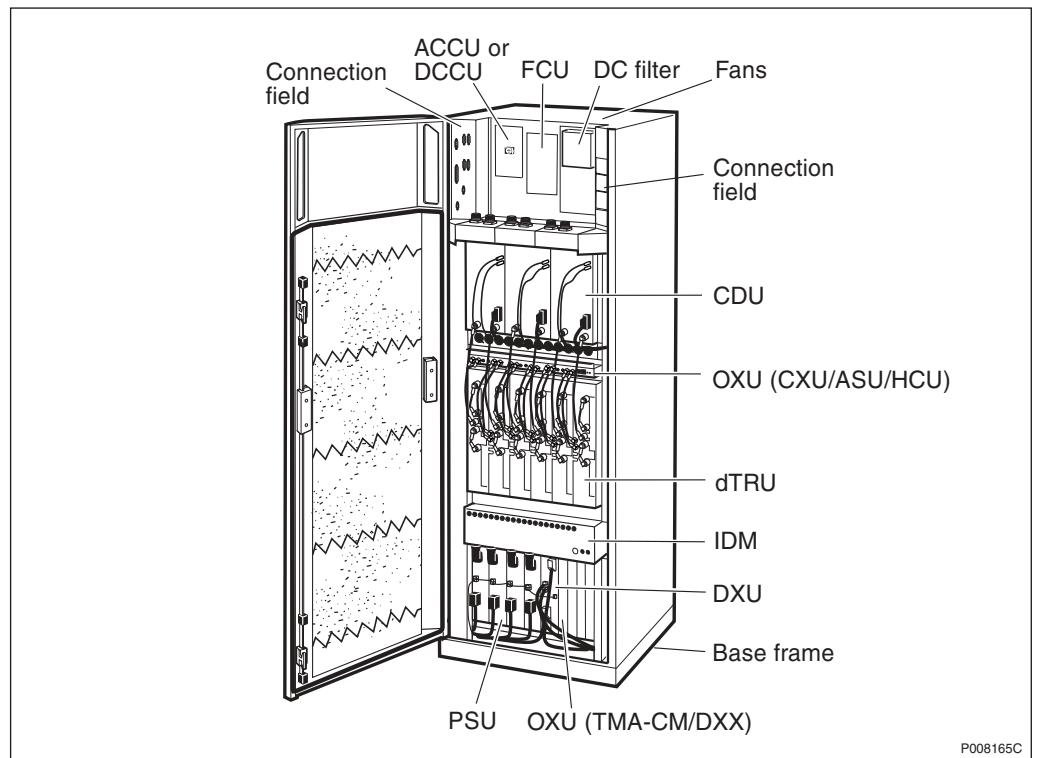


Figure 7 RBS 2206 Standard Hardware Units

ACCU-01

This version of the AC Connection Unit (ACCU-01) connects, disconnects, and distributes the incoming AC power supply to the PSUs.

Number of units: 0–1.

CDU

The Combining and Distribution Unit (CDU) is the interface between the transceivers and the antenna system. All signals are filtered before transmission and after reception by means of bandpass filters. The CDU allows several dTRUs to share antennas. There are a maximum of three CDUs in one RBS.

The CDU combines transmitted signals from several transceivers, and distributes the received signal to several transceivers. Two different CDU types are used in the RBS to support all configurations:

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- **CDU-F** is a filter combiner intended for high capacity solutions.
- **CDU-G** can be configured either for high capacity or for high coverage. It is a combiner that can be used for synthesizer hopping.

Number of units: 1–3

CXU-10

This variant of the Configuration Switch Unit (CXU) cross-connects the CDU and the dTRU in the receiver path. The CXU makes it possible to expand or reconfigure a cabinet without moving or replacing any Receiver (RX) cables. The RX inputs/outputs on the dTRU and the CDU are positioned so that they minimize the number of cable types needed to connect the CXU with the dTRUs and the CDUs. The CXU is configured by means of software.

Number of units: 1–2

DCCU-01

This variant of the DC Connection Unit (DCCU) connects, disconnects, and distributes the incoming DC power supply to the PSUs and the climate unit.

Number of units: 0–1.

dTRU

The Double Transceiver Unit (dTRU) contains two TRXs for the transmission and reception of two radio carriers. It has a built-in combiner with the optional possibility of combining two TX signals into one TX output. It can also be configured for four-branch RX diversity for further improvements in sensitivity. Variants of the dTRU support GMSK, 8-PSK, 16-QAM and 32-QAM, as well as Voice services over Adaptive Multi-user channels on One Slot (VAMOS).

Number of units: 1–6

DXU-21

This variant of the Distribution Switch Unit (DXU) is the central control unit for the RBS. It supports the interface to the Base Station Controller (BSC), and it collects and transmits alarms. The DXU controls the power and climate equipment of the RBS. It has a removable compact flash card that makes it possible to replace a faulty DXU without the need for loading RBS software from the BSC. The DXU also has four ports for transmission interfaces. It can handle both 2048 kbps (E1) and 1544 kbps (T1) transmission interfaces. The DXU supports EDGE on 12 TRXs.

Number of units: 1

FCU

The Fan Control Unit (FCU) controls the fans in the cooling system by regulating fan speed. The FCU is controlled by the DXU.

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Number of units: 1

IDM-01

The Internal Distribution Module (IDM) is a panel for distributing the internal +24 V DC power to the various units. Each distribution circuit in the cabinet is connected to a circuit breaker in the IDM.

Number of units: 1

PSU

The Power Supply Unit (PSU) are available in two versions, PSU AC for connection to AC mains, or PSU DC for connection to –48 or –60 V DC power supply.

- The PSU-AC converts 120–250 V to regulated +24 V DC
- The PSU-DC converts –48 or –60 V DC to regulated +24 V DC

Number of units: 0, 2, 3, 4

DC Filter-01

The DC filter unit is the interface for +24 V DC power supply or battery backup.

Number of units: 0–1

6.2 RBS 2206 V2 Standard Hardware Units

This section briefly describes the standard hardware units required for functionality, irrespective of configuration or frequency.

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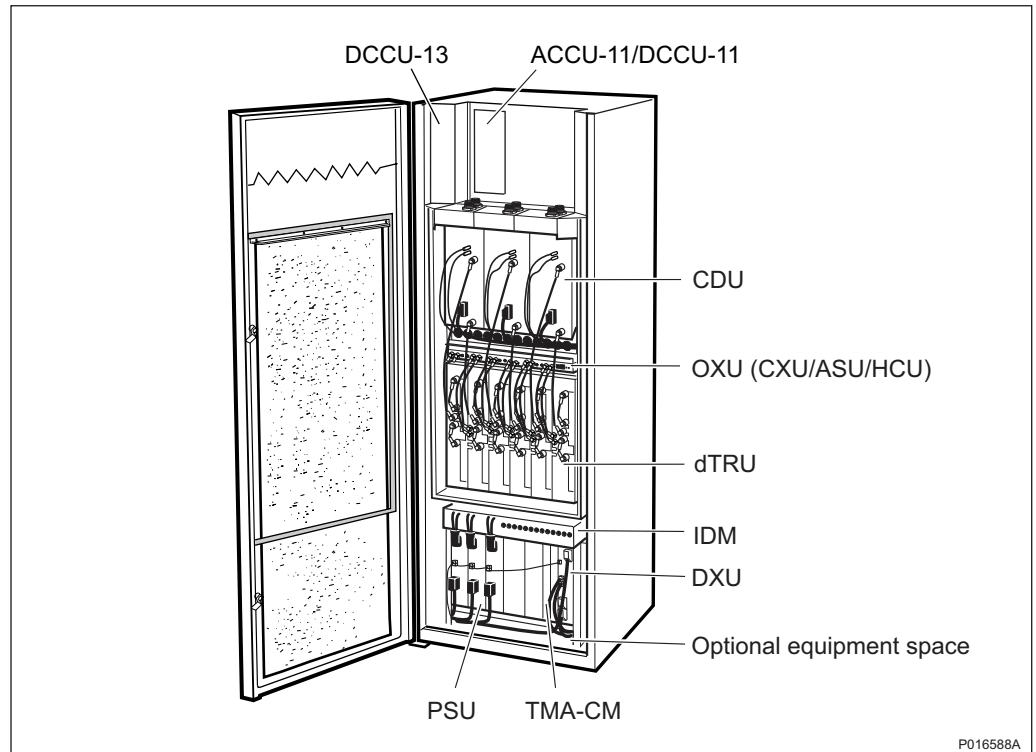


Figure 8 RBS 2206 V2 Standard Hardware Units

ACCU-11

The AC Connection Unit (ACCU) distributes the incoming AC power to the PSUs.

Number of units: 0–1.

CDU

The Combining and Distribution Unit (CDU) is the interface between the transceivers and the antenna system. All signals are filtered before transmission and after reception by means of bandpass filters. The CDU allows several dTRUs to share antennas.

The CDU combines transmitted signals from several transceivers and distributes received signals to several transceivers. The RBS uses three CDU types to support all configurations:

- **CDU-F** – a filter combiner intended for high capacity solutions.
- **CDU-G** which can be configured for either high capacity or high coverage and used for synthesizer hopping

Number of units: 1–3

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- **CDU-K** can be configured for large capacity or large coverage, with 12 transceivers uncombined in one cabinet. It also allows dual band configurations with 6 transceivers for each frequency. Configurations with 4-way receiver diversity in three sectors can also be built in one cabinet.

Number of units: 1–6

CXU-10

This variant of Configuration Switch Unit (CXU) cross-connects the CDU and the dTRU in the receiver path. The CXU makes it possible to expand or reconfigure a cabinet without moving or replacing any RX cables. The RX inputs/outputs on the dTRU and the CDU are positioned so that they minimize the number of cable types needed to connect the CXU with the dTRUs and the CDUs. The CXU is configured by means of software.

Number of units: 1–2

DCCU-11

This variant of the DC Connection Unit (DCCU) distributes incoming DC power to the PSUs.

Number of units: 0–1.

DCCU-13

This variant of the DC Connection Unit is the interface for +24 V DC power or battery backup.

Number of units: 0–1

dTRU

This variant of the Double Transceiver Unit (dTRU) contains two TRXs for transmission and the reception of two radio carriers. It has a built-in combiner with the optional possibility of combining two TX signals into one TX output. It can also be configured for four-branch RX diversity for further improvements in sensitivity. Variants of the dTRU support GMSK, 8-PSK, 16-QAM and 32-QAM.

Number of units: 1–6

DXU-23

This variant of the Distribution Switch Unit (DXU) is the central control unit for the RBS. It supports the interface to the BSC, and it collects and transmits alarms. The DXU controls the power and climate equipment of the RBS. It has a removable compact flash card that enables a faulty DXU to be replaced without needing to load RBS software from the BSC. The DXU is also the external interface for transmission, GPS Synchronization (GPS), ESB, and alarms. Four ports can handle both 2048 kbps (E1) and 1544 kbps (T1) transmission. The DXU supports EDGE.

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The fan control is integrated in the DXU and controls the fans in the cooling system by regulating fan speed.

Number of units: 1

IDM-11

This variant of the Internal Distribution Module (IDM) is a panel for distributing the internal +24 V DC power to the various units. Each distribution circuit in the cabinet is connected to an IDM circuit breaker.

Number of units: 1

PSU

Two types of Power Supply Unit (PSU) are available:

- PSU-AC-32, a variant of the PSU that converts AC to DC (PSU-AC), which converts 120–250 V AC to regulated +24 V DC
- PSU-DC-32, a variant of the PSU that converts DC to DC (PSU-DC), which converts –48 V DC or –60 V DC to regulated +24 V DC

Number of units: 0–3

6.3 Optional Hardware Units

This section describes the optional hardware units available for the RBS 2206 and RBS 2206 V2.

ASU-01

The Antenna-Sharing Unit (ASU) is part of co-siting, that is, using another cabinet together with a GSM RBS cabinet in the same sector. The ASU allows a TDMA (or other) cabinet and a GSM RBS cabinet to share RX antennas.

Number of units: 0–1

Bias Injector

The bias injectors are mounted directly on the CDU antenna connectors.

Number of units: 0–6

BBS

The RBS can be provided with a Battery Backup System (BBS) from an external cabinet.

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ddTMA

The Dual-Duplex Tower-Mounted Amplifier (ddTMA) is installed on a mast, close to the antenna. The ddTMA improves receiver sensitivity and saves feeder cables by duplexing RX and TX signals to the same cable.

DXX

A one- or two-card Digital Cross-Connect (DXX) plug-in unit can be installed in a space for optional equipment (OXU) on the PSU/DXU subrack in the RBS 2206 (not RBS 2206 V2). The one-card version has four G.703/G.704 ports. The two-card version has four G.703/G.704 ports and one slot for two to four additional interfaces that can be G.703/G.704 ports, High Bit Rate Digital Subscriber Line (HDSL), LTE, or optical fibre.

Number of units: 0–1

DF

The Distribution Frame (DF) is the termination point for incoming PCM, ESB, GPS, and alarm cables. It contains overvoltage protection for the external cables.

Number of units: 1

ESB

Transceiver Group (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 DXUs.

Number of units: 0–1

HCU

The Hybrid Combiner Unit (HCU) contains three hybrid combiners. Each hybrid combines two RF signals, delivered from two dTRUs, into one.

Number of units: 0–1

19-inch Space for Optional Equipment

A 2U-high 19-inch space for optional equipment, for which the RBS provides climate control.

OXU

The following space for optional expansion (OXU) is available:

- Four positions (RBS 2206) or two positions (RBS 2206 V2) in the DXU/PSU subrack
- A 1U-high 19-inch OXU position is available between the CXU and the dTRU subrack.

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RUs which typically are located in the OXU slots include the DXX and the TMA-CM. The 19-inch position above the CXU is used for ASUs, HCUs, and splitters.

Splitter

The splitter splits an RX signal from the CDU into two outputs. Six RX signals can be split into 12 outputs.

Number of units: 0–1

TMA-CM-01

The TMA-CM-01 is used to provide up to six ddTMAs with 15 V DC power through bias injectors in the RBS 2206. It is also used to identify TMA faults and forward this information to the DXU. The TMA-CM-01 is mounted in an OXU position.

Note: RBS 2206 only.

Number of units per cabinet: 0–2

TMA-CM-02

The TMA-CM-02 is used to provide up to six ddTMAs with 15 V DC power through bias injectors in the RBS 2206 and RBS 2206 V2. It is also used to identify TMA faults and forward this information to the DXU. The TMA-CM-02 is mounted in an OXU position.

Number of units per cabinet: 0–2

7 Interfaces

This section describes the external connections for RBS 2206.

In this section all external and internal connections are listed, as well as the test interface and the operator interface.

The connection field for external connectors is located at the top of the radio cabinet inside the door. Internal connections, the test interface and operator interface are located on some hardware units.

7.1 RBS 2206 External Connections

This section describes the external connections for RBS 2206.

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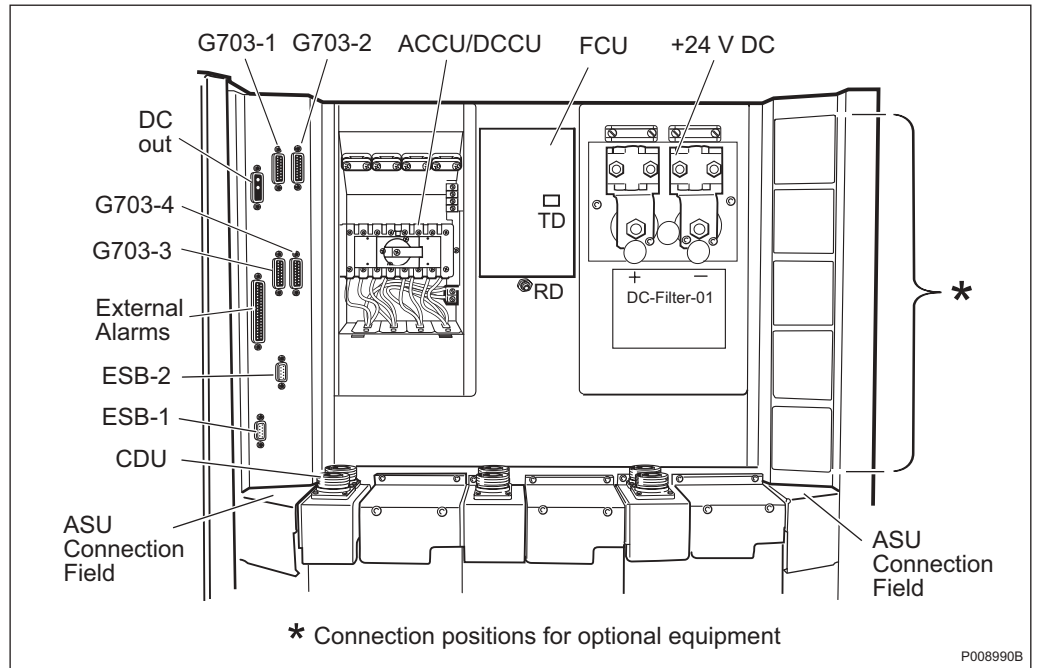


Figure 9 RBS 2206 External Connectors

Antenna feeders are directly connected to the CDUs. If bias injectors are used, these are connected directly to the CDU and the antenna feeders are connected to the bias injector.

Table 7 RBS 2206 External Connections

Connection	Description	Connector Type
CDU	Feeder (and bias injector) connection to antennas	7/16 female connector
G.703-1	Transmission Link 1	15-pin female, D-sub
G.703-2	Transmission Link 2	15-pin female, D-sub
G.703-3	Transmission Link 3	15-pin female, D-sub
G.703-4	Transmission Link 4	15-pin female, D-sub
DC out	+24 V DC to external equipment	3-pole female, D-sub
External Alarms	External alarm inputs from DF	37-pin female, D-sub
ESB-1	ESB to co-sited cabinets	9-pin female, D-sub
ESB-2	ESB to co-sited cabinets	9-pin female, D-sub

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Connection	Description	Connector Type
FCU RD	Optical cable connector from the BBS	Opto connector
+24 V DC	DC filter	Cable clamp
Earth	Earth stud M8 to main earth cable	M8 stud
ACCU	Mains connection to PSU-AC	Screw terminal
DCCU	-48 V connection to PSU-DC	Screw terminal
ASU	Antenna sharing connections	SMA-connector
TMA-CM	DC power supply through bias injectors to the TMAs	SMA-connector
DXX	Transmission link	TNC-connector
GPS	Synchronization signal from GPS antenna	9-pin female, D-sub

7.2 RBS 2206 V2 External Connections

This section describes the external connections of the RBS 2206 V2.

The RBS does not have connection fields on the upper right- and left-hand sides of the cabinet. Cables are instead connected directly to the DXU.

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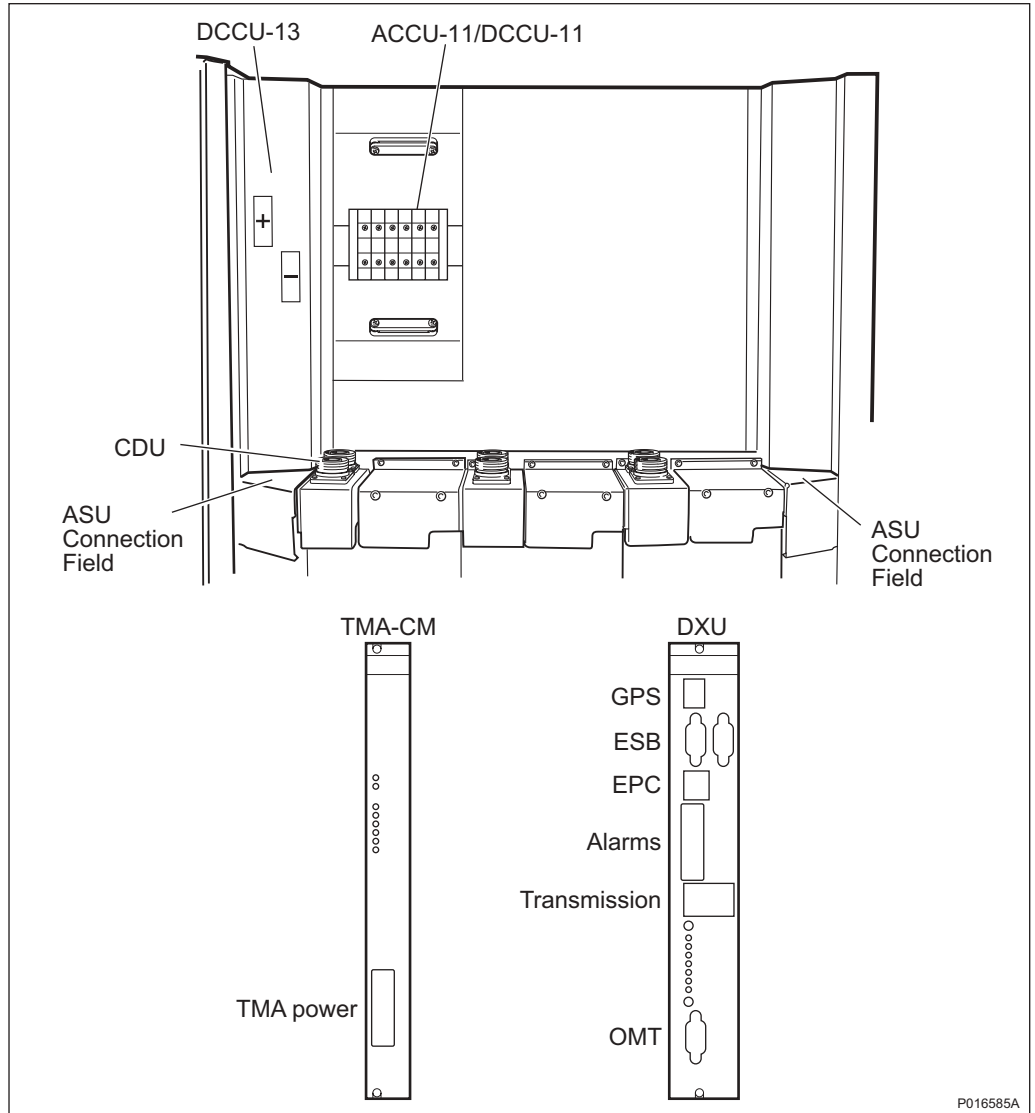


Figure 10 RBS 2206 V2 External Connections

Antenna feeders are directly connected to the CDUs. If bias injectors are used, then they are connected directly to the CDU, and the antenna feeder is connected to the bias injector.

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Table 8 RBS 2206 V2 External Connections

Connection	Description	Connector Type
CDU	Feeder (and bias injector) connection to antennas	Female 7/16 connector
G.703-1, G.703-2	Transmission links 1 and 2	RJ-45 (on DXU)
G.703-3, G.703-4	Transmission links 3 and 4	RJ-45 (on DXU)
External alarms	External alarm inputs from DF	Champ .050 (on DXU)
ESB-1	ESB to co-sited cabinets	Female 9-pin D-sub (on DXU)
ESB-2	ESB to co-sited cabinets	Female 9-pin D-sub (on DXU)
DCCU-13	+24 V DC battery backup	2 terminals
Earth	Main earth terminal	M8 stud (cabinet top)
ACCU-11	AC power to PSU-AC-32	Screw terminals
DCCU-11	-48 V DC power to PSU-DC-32	Screw terminals
ASU	Antenna sharing connections	SMA connector
TMA power	DC power supply through bias injectors to the TMAs	Female 15-pin D-sub (on TMA-CM)
GPS	Synchronization from GPS antenna	RJ-45 (on DXU)

7.3 Test Interface

The test interface for the RBS is on the front panel of the DXU unit. The Operation and Maintenance Tool (OMT) port is used to connect the OMT to the RBS. A remote OMT can also be used from the BSC, which sends signals over the Abis interface.

7.4 Operator Interface

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

Indicators	Description
Battery mode	Indicates that the RBS is running on battery
RBS fault	One or more faults are detected on RUs in the RBS

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Indicators

EPC bus fault	Indicates the state of the EPC bus
Ext alarm	One or more supervised external alarms are active
Fault	Fault detected and localized to the RU
Local mode	The RU is in local mode
Operational	The RU is operational
Transmission OK	Indicates state of transmission on ports A – D
RF off	RF not enabled

Buttons

Description

TRU reset	Resets the dTRU
DXU reset	Resets the DXU
Local/remote mode	Changes RU mode to local or remote

8 Power System

The power system of the RBS depends on the choice of power supply and may include a number of units outside the RBS.

The RBS can be connected either to an AC power supply or to a DC power supply.

8.1 AC Power

AC power is supplied to the ACCU through one cable for each PSU. If the power source does not meet the AC power requirements, then filters and stabilizers must be installed to protect the equipment and ensure proper operation.

There are two ways to connect power to the RBS, as follows:

- Single phase, line to neutral
- Single phase, line to line

Note: When single phase line to line is used, each supply cable requires two circuit breakers or fuses.

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Table 9 AC Power Requirements

Characteristic	Description
Voltage for specified performance (phase voltage)	120–250 V AC
Voltage	90–275 V AC ⁽¹⁾
Frequency	45–65 Hz
Maximum inrush current	30 A (1–30 ms)
Maximum AC power, RBS 2206	4 × 1.4 kW
Maximum AC power, RBS 2206 V2	3 × 1.7 kW
Non-destructive range	0–275 V AC

(1) Install external filter and stabilizer if the requirement is not met.

RBS 2206 AC Fuses

Table 10 Fuse Specifications

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
4 × 10 A ⁽¹⁾	4 × 16 A	4 × 20 A

(1) For 200–250 V range only.

RBS 2206 V2 AC Fuses

Table 11 Fuse Specifications

120–127 V AC (Nominal)	200–250 V AC (Nominal)	Maximum Allowed Fuse Rating
3 × 16 A	3 × 10 A	3 × 16 A

External Earth Fault Circuit Breakers

If external earth fault (ground fault) circuit breakers are used, then the recommended minimum trip value is 100 mA.

8.2

+24 V DC Power

Table 12 +24 V DC Power Requirements

Characteristic	Description
Nominal	+24 V DC
Default	+27.2 V DC

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Characteristic	Description
Range	+20.5 to +29.0 V DC
Non-destructive range	+0 to +32 V DC
Inrush current	Max. 500 A (0.1–10 ms)

RBS 2206 +24 V DC Fuses

Table 13 Fuse Specifications

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
1 x 160 A ⁽¹⁾	1 x 200 A	1 x 250 A

(1) Can be used when no transmission or optional equipment is installed.

RBS 2206 V2 +24 V DC Fuses

Table 14 Fuse Specifications

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
1 x 160 A	1 x 200 A	1 x 300 A

8.3

–48 V DC to –60 V DC Power

Table 15 Requirements

Characteristic	Description
Nominal	–48 or –60 V DC
Range	–40.0 to –72.0 V DC
Non-destructive range	+0 to –80 V DC
Inrush current	200 A (0.1–5 ms)

RBS 2206 –48 V DC to –60 V DC Fuses

Table 16 Fuse Specifications

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
4 x 32 A	4 x 35 A	4 x 40 A

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RBS 2206 V2 –48 V DC to –60 V DC Fuses

Table 17 Fuse Specifications

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
3 × 45 A	3 × 50 A	3 × 50 A

8.4 Power Consumption

The power consumption figures shown in the table below are for dimensioning cables and fuses. The figures in the table have been rounded off.

Table 18 Power Consumption RBS 2206

RBS Cabinet (Fully Equipped)	Power Supply Voltage		
	120–250 V AC	+24 V DC	–48 V DC
Maximum Power Consumption	3.9 / 5.7 kW ⁽¹⁾	3.2 kW	3.8 kW

(1) Power consumption during maximum battery charging.

The RBS can supply transmission equipment with +24 V DC. The maximum power output is 250 W.

Table 19 Power Consumption RBS 2206 V2

RBS Cabinet (Fully Equipped)	Power Supply Voltage			
	120–127 V AC	200–250 V AC	+24 V DC	–48 V DC
Maximum Power Consumption	3.3 / 4.1 kW ⁽¹⁾	3.2 / 5.1 kW	3.0 kW	3.4 kW

(1) Power consumption during maximum battery charging.

9 Transmission

The RBS is normally connected to a DF for transmission. Four transmission cables are connected to the ports on the front of the DXU. The RBS supports two transmission standards:

- T1 1.5 Mbit/s, 100 Ω,
- E1 2 Mbit/s, 75 Ω

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- E1 2 Mbit/s, 120 Ω

Overvoltage Protection Modules

This module contains overvoltage protection for the E1/T1 interfaces. If the E1/T1 interfaces are terminated in equipment outside the RBS equipment room, these lines must be protected by Overvoltage Protection (OVP) modules in the DF.

Optional Transmission Equipment

The cabinet can be connected to transmission equipment that is mounted externally or inside the RBS depending on the transmission equipment. Transmission equipment that can be used is as follows:

- Transmission adapter (not connected to DF) with BNC connector
- AXX 9100
- MINI-LINK
- TMR 9202
- SIU-01

For more information about transmission equipment and configurations, see document Transmission Configurations and Installation, RBS 2206, 151 86-EN/LZT 720 0461.

10 External Alarms

The RBS supports a maximum of 16 external alarms. The external alarm device can set the alarm using either an open or a closed condition.

The alarm device connected to the terminals should be isolated relay contacts. A closed contact (logic zero) is required to be below 2 k Ω , and an open contact (logic one) above 100 k Ω . The current through a closed contact is 1.2 mA. The voltage between terminals with an open contact is 24 V DC.

The inputs must be protected by an overvoltage protection unit.

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

11 Standards, Regulations and Dependability

This section provides a brief overview of standards, type approval, and EMC.

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11.1 Safety Standards

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

- 73/23/EEC Low voltage directive
- IP 20 according to IEC/EN 60529
- FCC rules, part 68
- EN 60950-1 and IEC 60950-1
- EN 60215 and IEC 60215
- ANSI/UL 60950-1 and CSA C22.2 No. 60950-1

The RBS 2206 complies with following standards:

Note: Not applicable for the RBS 2206 V2

- EN 60825-1 and IEC 60825-1
- 21CFR 1040.10

11.2 Other Standards and Regulations

Marking

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

Type Approval Standards

The RBS complies with the European Community and the North America market requirements regarding radio performance. The product has the CE and FCC symbols to indicate compliance with the legal requirements of the respective region.

EMC

The RBS complies with the European Community and the North America market requirements regarding EMC. The product has the CE and FCC signs to show compliance with the legal requirements of the respective region.

Dependability

The RBS is designed for a technical lifetime of 25 years (24-hour operation). The following preventive maintenance conditions must be fulfilled to guarantee the availability of the RBS:

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Fans

The fans must be inspected (and cleaned if necessary) every year.

Air filters

The air filters must be regularly inspected and cleaned (the interval depends on the environmental conditions at the site).

Vandal Resistance

Unauthorized access is not possible without damaging the unit.