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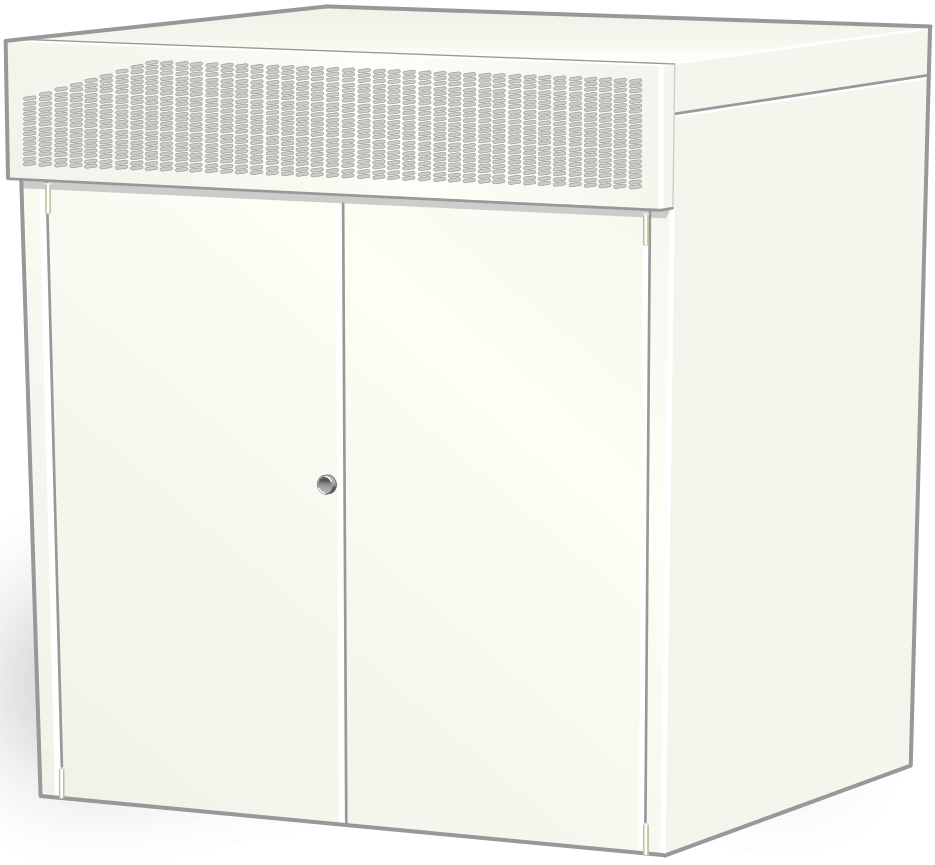
RBS Description

RBS 6102

DESCRIPTION



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Contents

1 Introduction

This document is a general description of the RBS 6102.

2 Product Overview

The RBS 6102 is an outdoor macro RBS and a member of the RBS 6000 family.

The Figure 1 shows the RBS.

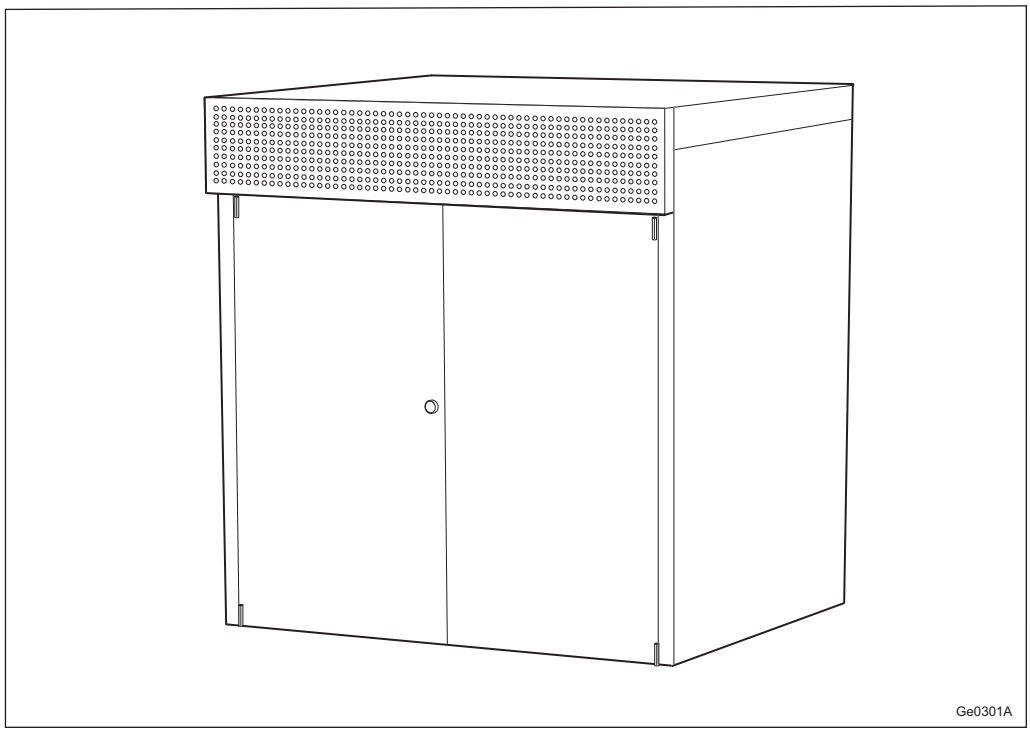

Figure 1 RBS Cabinet

2.1 Main Features

This section describes the main features of the RBS.

Note: Not all features are supported by all RBS configurations. Current RBS configurations can be found in *RBS Configurations*.

The main features of the RBS 6102 are the following:

- Supports GSM, WCDMA, and LTE.
- Supports Multi-Standard Single Mode (MSSM).
- Complete RBS including transmission equipment and internal battery backup.
- Can be equipped with various Digital Units (DUs) and Radio Units (RUs).
- Can be configured with up to 12 RUs and digital subrack with one Control Base Unit (CBU) or up to three RUs and baseband cassette with one CBU.
- Has the following power supply alternatives:
  - 200–250 V AC
  - −48 V DC (two-wire)
- Supports up to 6 U transmission spaces.
- Global Positioning System (GPS) as a synchronization source.
- Ethernet-based site Local Area Networks (LAN) (optional).
- Supports external alarms.

2.1.1 Optional Features

Hub-RBS

The RBS can optionally be used as a Hub-RBS in the transport network. A Hub-RBS will handle switching to cascaded RBSs or be connected in star configuration. The switching could either be ATM cross connect or AAL2-switching. The switching function is provided by the platform, extra ET boards are needed and the capacity is limited since the number of slots is limited. It is also possible to use transmission equipment to realize this function.

2.2 Optional Equipment

The equipment presented in this section is optional and can be ordered separately. It is not necessary for basic RBS functions.

The description of optional equipment located inside the RBS is included in Section 4 on page 14.

Transmission Equipment

Space for transmission equipment internally in the RBS is only available in configurations without the second battery shelf.

Figure 8 shows the location for the transmission equipment.

The RBS supports the following transmission solutions within the TM space.

- MINI-LINK TN 2p
- MINI-LINK TN 6p
- MINI-LINK TN 1p/MMU2Cs
- T750
- OMS 846
- OMS 860
- A mix of one MINI-LINK and one OMS, listed above
- SIU

Site Installation Alternatives

The RBS can be mounted directly to site ground, Global Base Frame (GBF) GBF 6102 or Battery Base Unit (BBU) BBU 6102.

For backward compatibility an adapter frame must be used for mounting the RBS 6102 to site ground, GBF 9250 or BBU 9500.

More information on drill pattern can be found in Section 3.2.2 on page 6.

ASC, TMA, RETU, and RIU

The following mast-mounted units are placed close to the antenna:

- GSM or WCDMA TMA
- Antenna System Controller (ASC)
- RETU
- RET Interface Unit (RIU)

The TMA and the ASC are uplink amplifiers and improve the RX sensitivity.

The RETU enables remote tilt of the antenna system. An ASC or an RIU is required to enable the RBS to communicate with the RETU.

The RBS also supports AISG 2.0/3GPP.

Battery Backup

Battery backup can either be external or internal. The external batteries are connected to an optional DC filter (PCF) inside the RBS. The maximum distance between the RBS and the external batteries is 10 m.

SAU

The Support Alarm Unit (SAU) is an alarm and connection unit that is internally mounted in the RBS. It is connected to the OVPs that also serve as external connections.

3 Technical Data

This section describes the physical characteristics, environmental data, and the power supply of the RBS.

3.1 Dimensions

Table 1 lists the dimensions, weight, and color of the RBS.

Table 1 Dimensions, Weight, and Color

Dimensions	
Height	1450 mm
Width	1300 mm
Depth	700 mm
More information about dimensions can be found in Figure 2.	
Weight	
RBS standard equipped, without backup batteries	330 kg
Color	
Grey	Reference number: RAL 7035, glossy

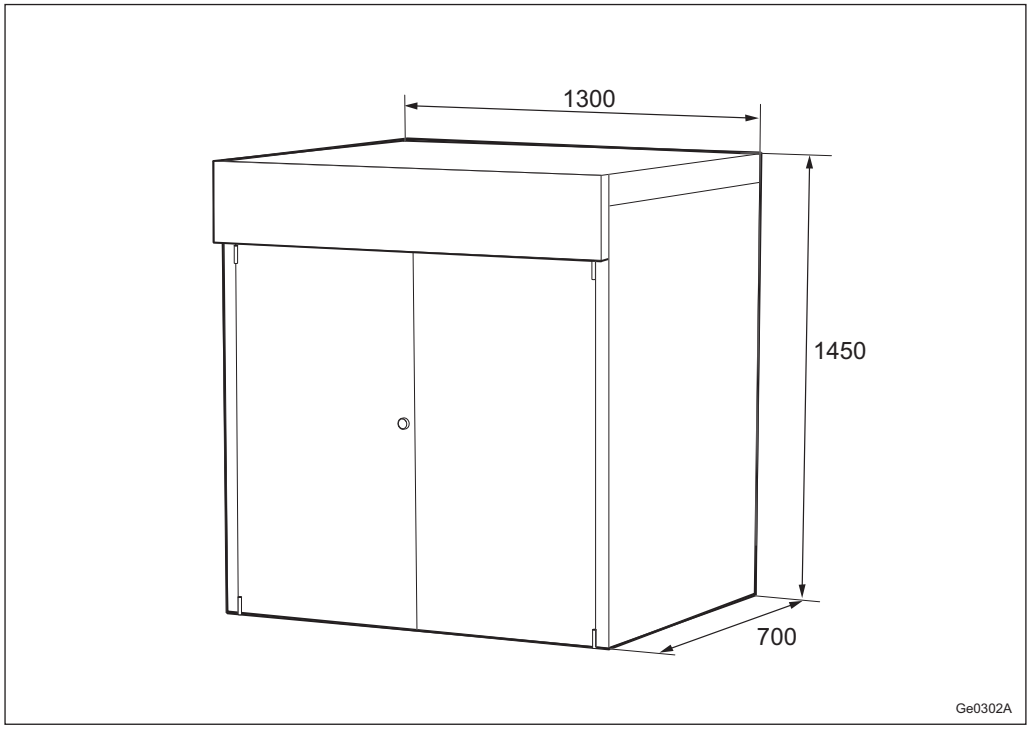

Figure 2 Dimensions

3.2 Space Requirements

This section describes the RBS space requirements and use.

3.2.1 Minimum Distances

Minimum distances to provide adequate working space and to ensure sufficient airflow can be found in Figure 3 and Figure 4 .

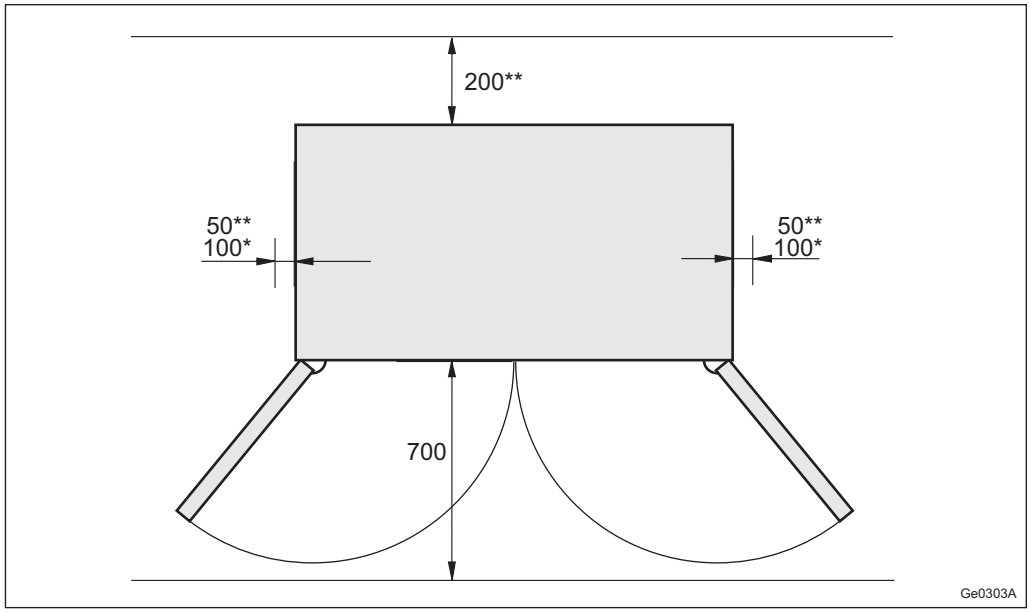

Figure 3 Earthquake and Climate Requirements

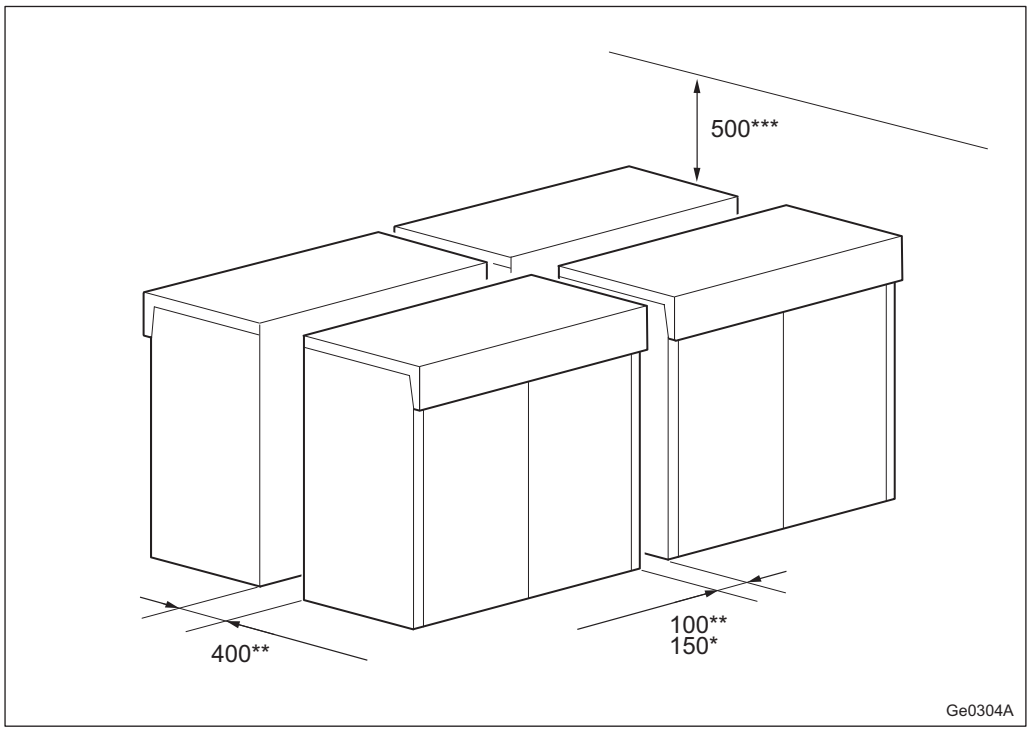

Figure 4 Climate and Maintenance Requirements

* For earthquake installation, the RBS is certified in accordance with Telcordia Bellcore GR-63-CORE requirements for Zone 4 Seismic environments.

** For climate requirements.

*** For maintenance requirements.

3.2.2 Drill Pattern for the RBS

Figure 5 shows drill pattern for the RBS.

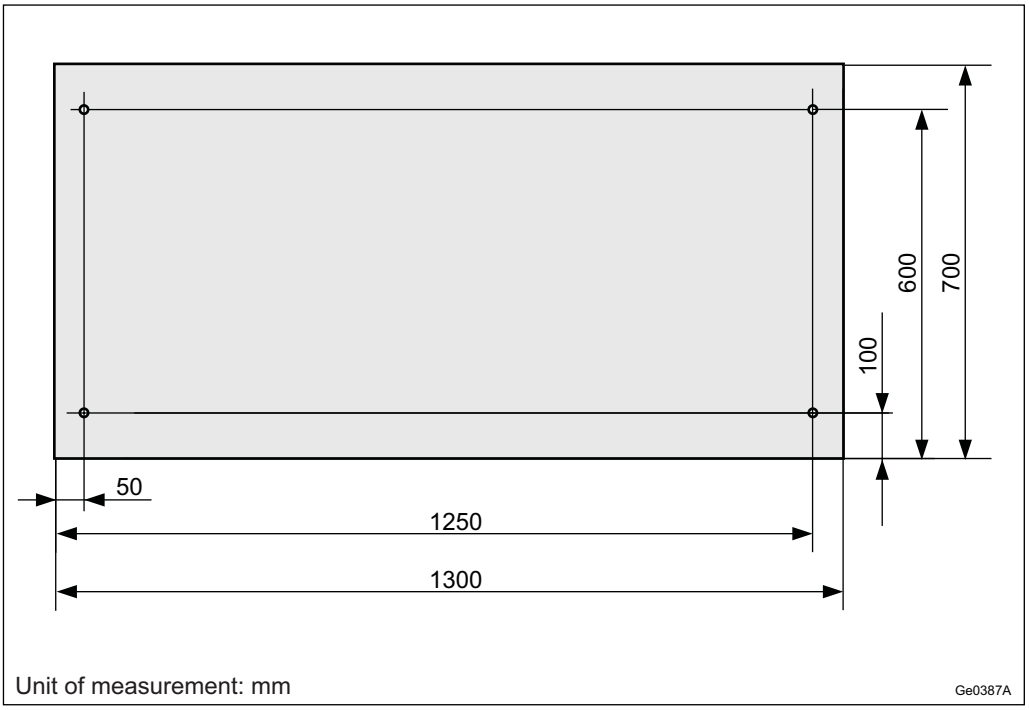

Figure 5 Drill Pattern

3.3 Acoustic Noise Summary

Table 2, Table 3 and Table 4 shows the sound pressure levels according to EN ISO 11201, at a bystander position 1 meter from the cabinet and 1.5 meter above the floor. The calculations are valid for a free field installation. If the RBS is located in a room, the sound pressure level will be higher than indicated in Table 2, Table 3 and Table 4. The calculations are in accordance with EN ISO 11203.

Table 2 shows the values for typical sub configurations for AC-powered RBS with standard climate.

Table 2 Sound Pressure Level, Bystander Position Measured at 20°C

No. of RUs	RF output dBm	Sound Pressure level at Bystander Position of 1 meter, L_{pa}dB				
		Front	Left	Right	Back	Top
6	47.8	44	37	38	42	38

Table 3 shows the values for an RBS configured up to the design maximum heat load capacity with standard climate.

Table 3 Sound Pressure Level, Bystander Position, with standard climate

Operating Condition	Sound Pressure level at Bystander Position of 1 meter, L_{pa}dB			
	Front	Left	Right	Back
20°C	51	45	46	49
25°C	55	47	49	50
30°C	58	49	49	55
45°C	67	56	56	62

Table 4 shows the values for an RBS configured up to the design maximum heat load capacity with extended climate.

Table 4 Sound Pressure Level, Bystander Position, with extended climate

Operating Condition	Sound Pressure level at Bystander Position of 1 meter, L_{pa}dB			
	Front	Left	Right	Back
20°C	53	46	46	51
25°C	55	48	47	53
30°C	58	50	50	55
45°C	70	60	60	65

Detailed information about acoustic noise emission can be found in Section 9 on page 52.

3.4 Environmental Characteristics

This section describes the environmental characteristics of the RBS.

3.4.1 Operating Environment

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

Temperature	-33 to +45°C (with heater)(1)
	+-0 to +45°C (without heater)
Relative humidity	15 to 100%
Absolute humidity	0.26 to 25 g/m3
Maximum temperature change	0.5°C/min
Normal temperature inside the cabinet	+5 to +55°C(2)

(1) For a DC-powered RBS, cold start up has a lower limit of -25° C.
(2) Generally the temperature is higher inside the cabinet compared to outside the cabinet.

3.4.2 Heat Dissipation

The heat dissipation values listed below are intended only to form the basis of the dimensioning of a site-cooling system. The value represents the worst-case heat dissipation of a fully equipped RBS, taking into account optional equipment and future expansion.

Maximum heat dissipation, with up to 12 RUs, with Power Supply Unit (PSU)(1)	5,900 kW
Maximum heat dissipation, with up to 12 RUs, without PSU	5,100 kW

(1) PSUs are not needed for -48 V DC, two-wire.

3.4.3 Ground Vibration

The RBS is designed to resist ground vibration.

The following is a list of values for the RBS:

Random vibration, normal operation	Maximum 0.05 m^2/s^3
Random vibration, exceptional operation	Maximum 0.10 m^2/s^3
Random vibration, non-destruction	Maximum 0.20 m^2/s^3
Shock	Maximum 50 m/s^2

The RBS is designed to resist seismic exposure according to IEC/EN 60 068-2-57.

Seismic exposure, maximum level of Required Response Spectrum (RRS)(1)	50 m/s^2 within 2 to 5 Hz
Seismic exposure, test frequency	1 to 35 Hz
Seismic exposure, time history	Verteq II

(1) Defined in EN 300-019-2-3.

3.4.4 Materials

The materials in the RBS are managed through the Ericsson lists of banned and restricted substances, based on legal and market requirements.

3.5 Mains Supply Characteristics

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

3.5.1 AC Power Supply Characteristics

The AC mains source must provide protection for overcurrent, short circuit, and earth-ground fault.

The sum of impedances of AC mains source, distribution wiring, and overcurrent protection devices between the AC mains source and the RBS input terminal must be low enough to allow the overcurrent protection devices to clear an internal fault in the RBS within the time requirements stated in national wiring regulations.

Note: Different requirements may apply in TN, TT and IT power systems.

The AC-powered RBS is available for split-, single- or three-phase AC power system. Voltage values and ranges are listed in Table 5.

Table 5 AC Power Supply

Conditions	Values and Ranges
Nominal voltage(1)	200 to 250 V AC
Operating voltage(1)	180 to 275 V AC
Non-destructive voltage	0 to 300 V AC
Operating frequency	45 to 65 Hz
Maximum current	63 A
Maximum cross-section al cable area	16 mm^2

(1) Phase to phase or phase to neutral.

Fuse and Circuit Breakers for an AC-Powered RBS

The RBS external AC mains fusing must meet the following characteristics:

- Fuse, type `gL-gG-gD` in accordance with *IEC/EN 60 269-1* or *UL 248-8*.
- Circuit breaker in accordance with *IEC 60 947-2* or *UL 489*.

All power supply sources, both AC and DC, must have a circuit breaker with adequate breaking capacity in the supply circuit.

The fuse and circuit breaker recommendations given in Table 6 are based on peak power consumption and give no information about power consumption during normal operation.

Table 6 Fuse and Circuit Breaker Recommendations for a AC-Powered RBS

Voltage range[1]	3 x PSU without heater	3 x PSU with heater	4 x PSU without heater	4 x PSU with heater
180-275 V AC, single phase	40	50	50	60/63
90-132 V AC, split phase	40	50	50	60/63
108-275 V AC, three phase	15/16	30/35	30/35	30/35

(1) Single phase value

3.5.2 DC Power Supply Characteristics

The DC-powered RBS is available with a two-wire −48 V DC supply. Voltage values and ranges are listed in Table 7.

Table 7 Two-wire −48 V DC Power Supply

Conditions	Values and Ranges
Nominal voltage	−48 V DC
Operating voltage	−40 to −57.6 V DC[1]
Non-destructive voltage	0 to −60 V DC

(1) For configurations with more than 9 RUs the lower voltage value is −43 V DC.

Fuse and Circuit Breakers for a DC-Powered RBS

The RBS external DC mains fusing must meet the following characteristics:

- Fuse, type `gL-gG-gD` in accordance with *IEC/EN 60 269-1* or *UL 248-8*.
- Circuit breaker in accordance with *IEC 60 947-2* or *UL 489*.

The fuse and circuit breaker recommendations given in Table 8 are based on peak power consumption and give no information about power consumption during normal operation.

Table 8 Fuse and Circuit Breaker Recommendations for a DC-Powered RBS

DC Mains	Number of RUs	Fuse Rating Recommended for Reliable Operation (A)(1)	Recommended Cross-Sectional Cable Area	Maximum Allowed Fuse Rating (A)(2)	Maximum Cross-Sectional Cable Area
DC-powered −48 V, two-wire	3 RU	50	16 mm^2	160	95 mm^2
	6 RU	80	25 mm^2		
	9 RU	150	50 mm^2		
	12 RU(3)	160	95 mm^2		

(1) The recommended fuse rating corresponds to peak load. For an RBS with an internal fuse or circuit breaker, selectivity is granted.

(2) The maximum fuse class in accordance with RBS design restrictions.

(3) The minimum voltage value is −43 V DC.

3.5.3 Power Consumption

The power consumption values for a DU-based RBS given in Table 9, Table 10, and Table 11 refer to a typical operation during traffic and in Climate Zone Frankfurt.

The power consumption values for a CBU-based RBS given in Table 12 are preliminary and refer to a typical operation during traffic and at +25°C.

Note: For RBS with PSUs, increase the power consumption by 10%.

Table 9 Typical Power Consumption for GSM with RUS

Number of RUs	Radio Configuration	DU variant	Power Supply	Traffic Load(1)	Power Consumption	
					Excluding Optional SW Features	Including SW Features(2)
3	3 × 4 RUG (at Maximum Power Level 43 dBm TOC(3))	DUG 20	−48 V DC	30%	680 W	660 W
6	3 × 8 RUG (at Maximum Power Level 43 dBm TOC(3))	DUG 20	−48 V DC	30%	1,240 W	1,120 W

(1) Traffic load in percent is defined as delivered traffic, in Erlang, in relation with the dimensioned traffic load in a cell for a given GoS (2%).

(2) SW features enabled: DTX and BTS DL Power Control.

(3) With Intelligent Power Management (IPM).

Table 10 Typical Power Consumption for LTE

Number of RUs	Radio Configuration	DU variant	Power Supply	RF Load[1]	Power Consumption
2	1 × 20 MHz MIMO 2 × 2, 60 + 60 W (splitter-omni)	DUL 20	–48 V DC	15%	380 W
6	3 × 20 MHz MIMO 2 × 2, 20 + 20 W	DUL 20	–48 V DC	15%	730 W
	3 × 20 MHz MIMO 2 × 2, 40 + 40 W	DUL 20	–48 V DC	15%	830 W
	3 × 20 MHz MIMO 2 × 2, 60 + 60 W	DUL 20	–48 V DC	15%	960 W

(1) Typical RF load (20 hours at 10% RF load, 2 hours at 25% RF load, and 2 hours at 50% RF load).

Table 11 Typical Power Consumption for WCDMA (DU-based RBS)

Number of RUs	Radio Configuration	DU variant[1] [2]	Power Supply	RF Load[3]	Power Consumption
3	3 × 1 20 W	DUW 20	–48 V DC	30%	550 W
	3 × 1 40 W	DUW 20	–48 V DC	25%	610 W
	3 × 1 60 W	DUW 20	–48 V DC	25%	700 W
1	1 × 1 60 W (splitter-omni)	DUW 20	–48 V DC	40%	390 W
6	3 × 2 20 W	DUW 20	–48 V DC	30%	930 W
	3 × 2 40 W	DUW 20	–48 V DC	25%	1,050 W
	3 × 2 60 W	DUW 20	–48 V DC	25%	1,230 W
3	3 × 2 10 W	DUW 20	–48 V DC	40%	590 W
	3 × 2 20 W	DUW 20	–48 V DC	30%	640 W
	3 × 2 30 W	DUW 20	–48 V DC	30%	750 W
6	3 × 4 10 W	DUW 20	–48 V DC	30%	1,040 W
	3 × 4 20 W	DUW 20	–48 V DC	25%	1,180 W
	3 × 4 30 W	DUW 20	–48 V DC	25%	1,340 W

(1) To get the power consumption values for DUW 10; remove 50 W.
(2) To get the power consumption values for DUW 30; add 40 W.
(3) Typical RF load for the specific configuration.

Table 12 Typical Power Consumption for WCDMA (CBU-based RBS)

Number of RUs	Power Class	Variant	Power Supply	Power Consumption
3	60 W	CBU	–48 V DC	760 W
	30 W	CBU	–48 V DC	780 W

Number of RUs	Power Class	Variant	Power Supply	Power Consumption
6	60 W	CBU	–48 V DC	1,390 W
	30 W	CBU	–48 V DC	1,460 W

3.6 System Characteristics

This section describes the system characteristics of the RBS.

3.6.1 RF Electromagnetic Exposure

General information about Radio Frequency (RF) Electromagnetic Fields (EMF) 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*.

3.6.2 Software

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

3.6.3 Radio Configurations

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

4 Hardware Architecture

This section contains an overview on both mandatory and optional hardware units regardless of configuration or frequency.

Figure 6 shows the options for the optional cabinet spaces.

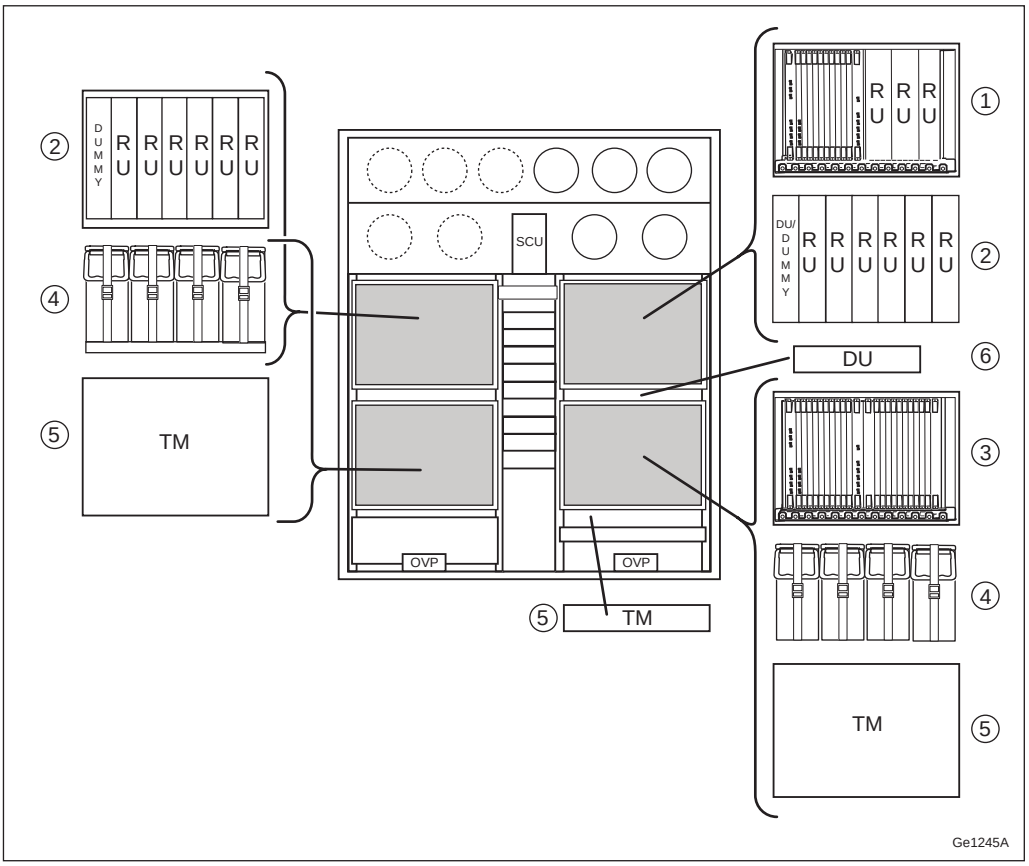

Figure 6 Cabinet Shelf Options

1 Baseband cassette

2 Radio subrack with or without DU

3 Digital subrack

4 Backup batteries

5 Transmission equipment

6 DU

Note: Some hardware units may not yet be available and the maximum number of boards and units may refer to future expansion. The currently available configurations are described in *RBS Configurations*.

The section is divided as follows:

- Section 4.1 on page 16 describes the hardware units for a DU-based RBS.
- Section 4.2 on page 17 describes the hardware units for a CBU-based RBS.
- Section 4.3 on page 20 describes the climate system.

- Section 4.4 on page 21 describes the power units.

4.1 RBS Overview for a DU-based RBS

This section contains an overview of the standard hardware units required, regardless of configuration or frequency.

Figure 7 shows the unit locations and Table 13 describes the hardware units in the RBS.

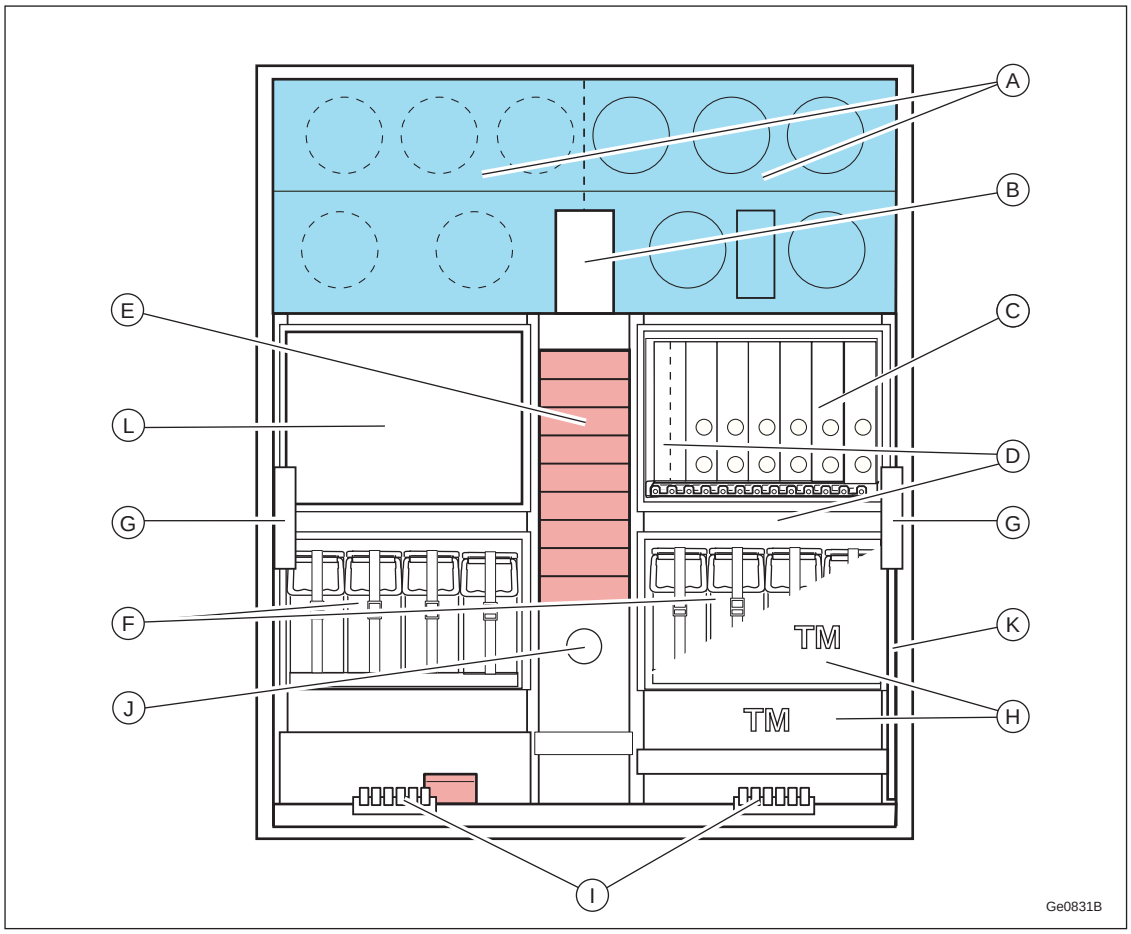

Figure 7 Hardware Units for RBS 6102

Table 13 Hardware Units

Position	Name of Units	Number of Units	Description
A	Climate system	1-2	In the standard solution, the climate system are placed in the right bay. In the extended solution, climate system are added in the left bay.[1] See Section 4.3 on page 20 for a description of the units. The extended climate solution is optional. More information about climate system can be found in *Climate Unit Description*.

Table 13 Hardware Units

Position	Name of Units	Number of Units	Description
B	Support Control Unit (SCU)	1	The SCU controls the climate system and is the central control unit of the RBS support system. The SCU executes the main part of the control functions in the RBS support system. More information about the SCU can be found in *SCU Description*.
C	RUs	1–12	The RU receives digital data and converts it to analog signals. It also receives radio signals and converts these to digital signals. More information about the RU can be found in *Radio Unit Description*.
D	DU	1–2	More information on DU can be found in *Digital Unit Description*.
E	Power units (including the power subrack)	1	See Section 4.4 on page 21 for a description of the power units. More information can be found in *Non-RF Connections*.
F	Batteries	0-3	The RBS battery capacity is 1 to 3 times 90-100 Ah depending on RBS configuration.
G	SAU	0-1	The SAU is an alarm connection panel that connects external alarms and transmission through the OVP. See Section 8 on page 51. More information on the SAU can be found in *SAU Description*.
H	Space for optional transmission equipment	0-6 U	A space for optional 19"-equipment is provided that can be used for optional transmission equipment. The capacity with battery installed on the right-hand side is 3 U. The allowed capacity when no battery is installed on the right-hand side is 6 U. The equipment could extend 250 mm behind and 50 mm in front of the 19-inch mounting rails. There are 40 mm spaces for cables at the front and the rear. 500 W is reserved in the power consumption budget and 300 W for heat dissipation.
I	OVP	0-12	12 OVP positions (12 inlets for twisted pair) for transmission or external alarms.
J	Smoke detector	1	A smoke detector failure alarm is connected to the smoke detector.
K	Internal light	0-1	The lighting for internal maintenance is activated by the opening of the door.
L	Space for a second radio shelf or batteries		

(1) No extra SCU is needed for the extended version.

4.2 RBS Overview for a CBU-based RBS

Figure 8 shows the unit locations and Table 14 describes the hardware units in an RBS with digital subrack.

Figure 9 shows the unit locations and Table 14 describes the hardware units in an RBS with baseband cassette.

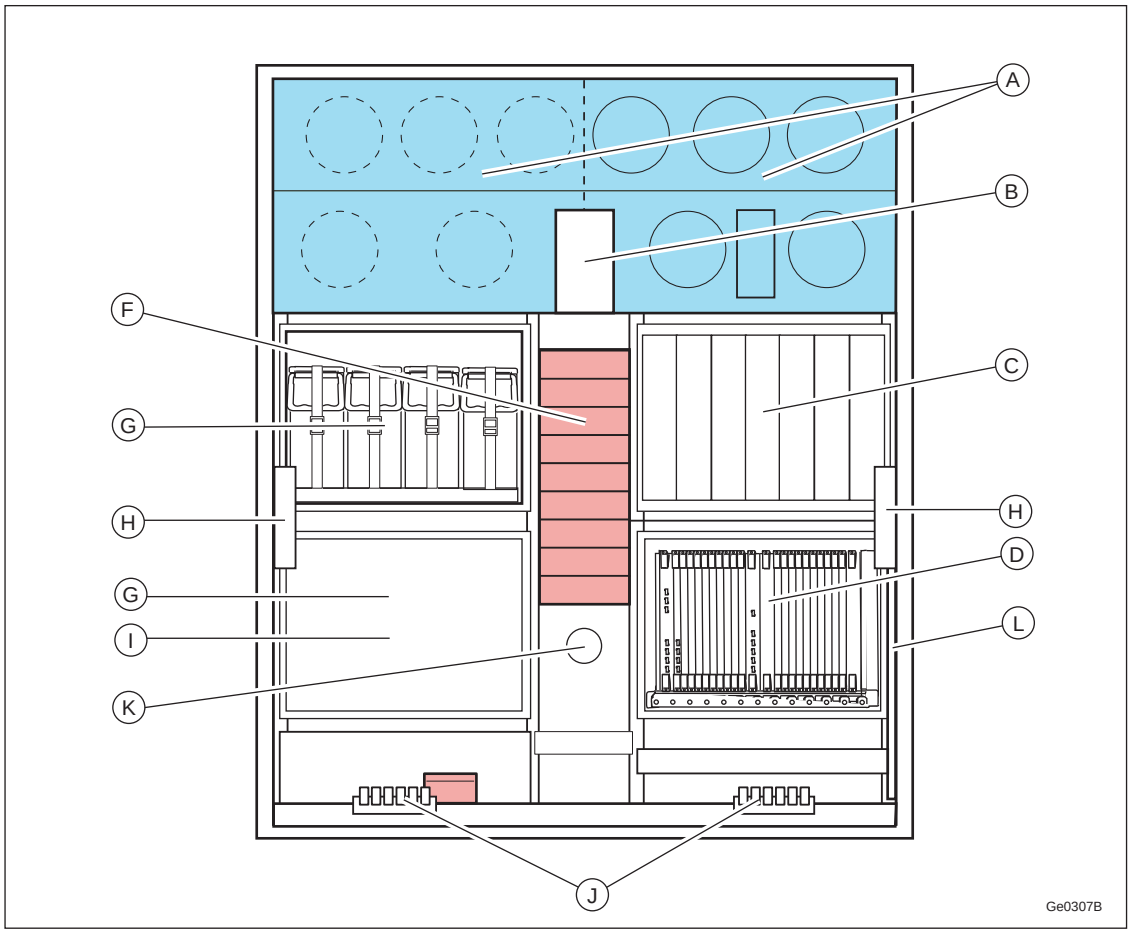

Figure 8 Example of Hardware Units for RBS 6102 with Digital Subrack

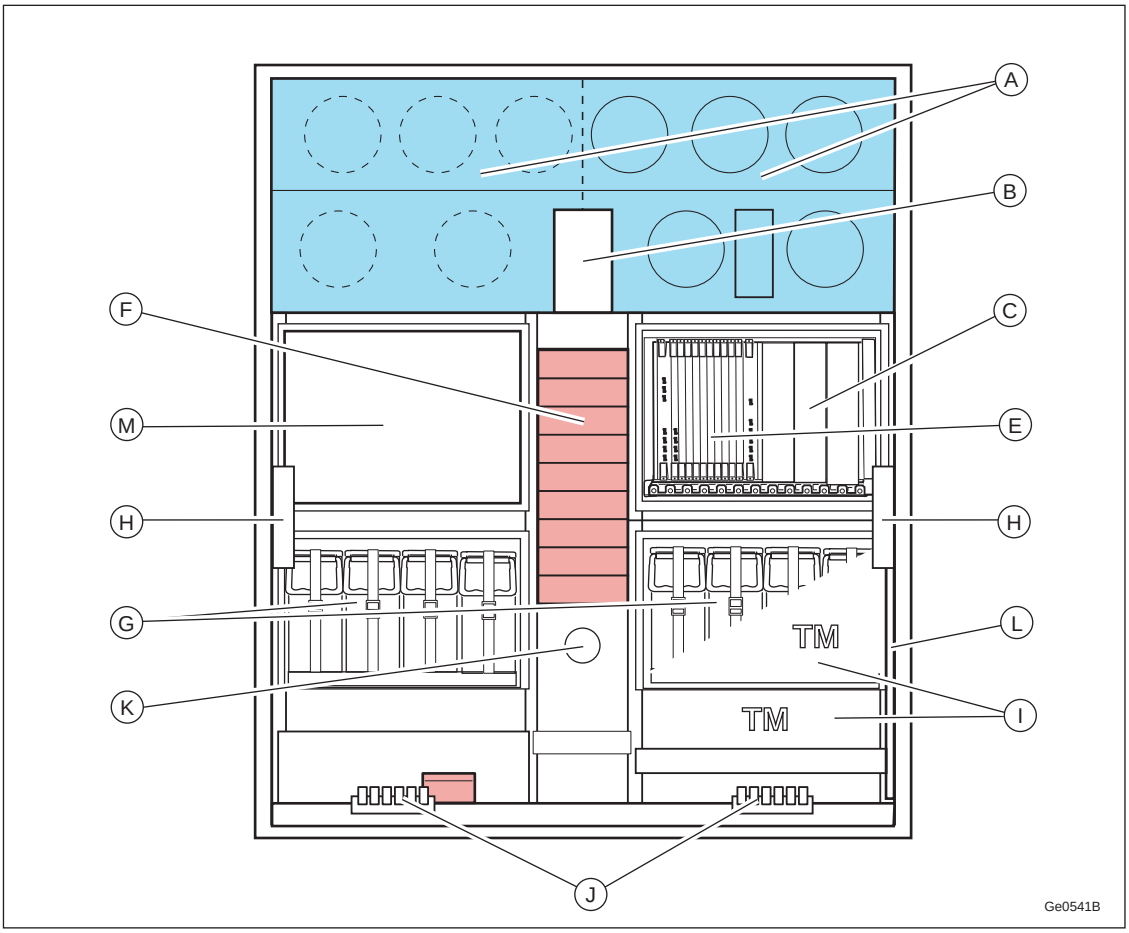

Figure 9 Example of Hardware Units for RBS 6102 with Baseband Cassette

Table 14 Hardware Units

Position	Name of Units	Number of Units	Description
A	Climate system	1-2	In the standard solution, the climate system are placed in the right bay. In the extended solution, climate system are added in the left bay.(1) See Section 4.3 on page 20 for a description of the units. The extended climate solution is optional. More information about climate system can be found in *Climate Unit Description*.
B	Support Control Unit (SCU)	1	The SCU controls the climate system and is the central control unit of the RBS support system. The SCU executes the main part of the control functions in the RBS support system. More information about the SCU can be found in *SCU Description*.
C	RUs	1–12	The RU receives digital data and converts it to analog signals. It also receives radio signals and converts these to digital signals. More information about the RU can be found in *Radio Unit Description*.

Table 14 Hardware Units

Position	Name of Units	Number of Units	Description
D	Digital subrack	1	The digital subrack can contain the following boards (number of boards within parentheses): • CBU (1) • ET (0–4) • Random Access and Receiver (RAX) (1–9) • Transmitter (TX) (1–4) • Radio Unit Interface (RUIF) (1–2)
E	Baseband cassette		The baseband cassette can contain the following boards and units (number of boards within parentheses): • CBU (1) • ET (0–4) • Random Access and Receiver (RAX) (1–6) • Transmitter (TX) (1–2) • Radio Unit Interface (RUIF) (1)
F	Power units (including the power subrack)	1	See Section 4.4 on page 21 for a description of the power units. More information can be found in *Non-RF Connections*.
G	Batteries	0-3	The RBS battery capacity is 1 to 3 times 90-100 Ah depending on RBS configuration.
H	SAU	0-1	The SAU is an alarm connection panel that connects external alarms and transmission through the OVP. See Section 8 on page 51. More information on the SAU can be found in *SAU Description*.
I	Space for optional transmission equipment	0-6 U	A space for optional 19"-equipment is provided that can be used for optional transmission equipment. The capacity with battery installed on the right-hand side is 3 U. The allowed capacity when no battery is installed on the right-hand side is 6 U. The equipment could extend 250 mm behind and 50 mm in front of the 19-inch mounting rails. There are 40 mm spaces for cables at the front and the rear. 500 W is reserved in the power consumption budget and 300 W for heat dissipation.
J	OVP	0-12	12 OVP positions (12 inlets for twisted pair) for transmission or external alarms.
K	Smoke detector	1	A smoke detector failure alarm is connected to the smoke detector.
L	Internal light	0-1	The lighting for internal maintenance is activated by the opening of the door.
M	Space for a second radio shelf or batteries		

(1) No extra SCU is needed for the extended version.

4.3 Climate System

Figure 10 shows the unit locations and Table 15 describes the climate hardware.

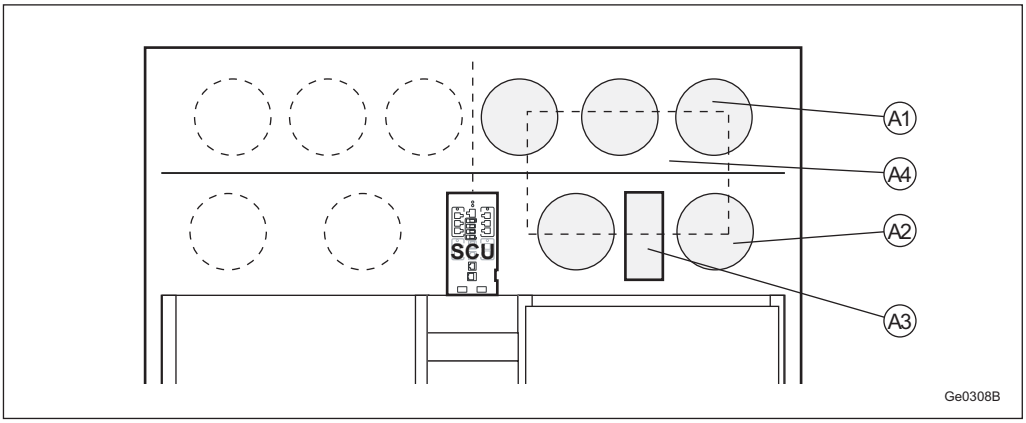

Figure 10 Climate Units

Table 15 Climate Units

Position	Name of Units	Number of Units	Description
A1	External fans	3x2	The external-air fans draw in exterior air through the front of the cabinet top, force it through a heat exchanger to cool the circulating internal air, and expel it through the rear of the cabinet top. More information about the external fans can be found in *Climate Unit Description*.
A2	Internal fans	2x2	The internal-air fans maintain a cooling airflow inside the cabinet by forcing inside air through the heat exchanger, where it is cooled by the exterior airflow, and expelling it through the front openings back into the cabinet. More information about the internal fans can be found in *Climate Unit Description*.
A3	Heater	0-1	The heater is used to heat the interior of an outdoor RBS. More information about the heater can be found in *Climate Unit Description*.
A4	Heat exchange module	1-2	Used for both Standard and extended climate system. More information about the heat exchange module can be found in *Climate Unit Description*.

4.4 Power Units

Figure 11 shows the location of the power units and Table 16 describes the units.

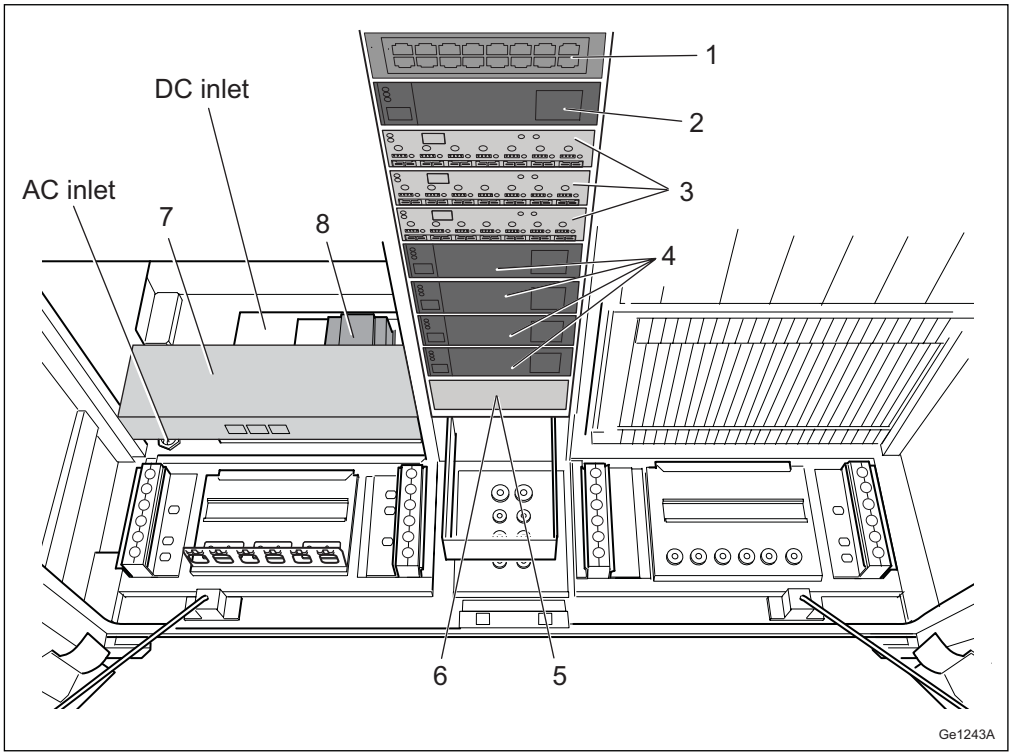

Figure 11 Power Units

Table 16 Power Units

Position	Name of Units	Number of Units	Description
1	Support Hub Unit (SHU)	1	The SHU connects peripheral units such as PSUs, PDUs, SCU, BFU, and DU/CBU to the EC bus. The SHU is required if the RBS is equipped with PSUs. More information about the SHU can be found in *SHU Description*.
2	Power Filter Unit (PFU)	0–1	The PFU is used for an −48 V DC-powered RBS and AC with external battery backup. A PFU is used when the RBS is equipped with more than six RUs. More information about the PFU can be found in *PFU Description*.
3	Power Distribution Unit (PDU)	1–3	The PDU distributes fused −48 V DC power to the units in the RBS. More information about the PDU can be found in *PDU Description*.
4	Power Supply Unit (PSU)	0–4	The PSU converts incoming voltage to −48 V DC system voltage. The PSU is available for 200-250 V AC. More information about the PSU can be found in *PSU Description*.
5	DC Power Connection Unit (PCU DC)	0–1	The PCU DC is an internal Power Connection Unit. More information about the PCU can be found in *PCU Description*.

Table 16 Power Units

Position	Name of Units	Number of Units	Description
5	Battery Fuse Unit (BFU)	0–1	The BFU supervises, connects, and disconnects the battery backup. More information about the BFU can be found in *BFU Description*.
6	AC Power Connection Unit (PCU AC)	0–1	The PCU AC is the AC interface for RBS and also the internal RBS AC distribution. More information about the PCU can be found in *PCU Description*.
7	Power Connection Filter (PCF)	0–1	The PCF connects −48 V DC power from the site DC power or the external battery backup to the RBS. The PCF is an interface for AC with external battery backup. More information about the PCF can be found in *PCF Description*.

The capacity of the power subrack is nine units.

5 Using MSSM

MSSM allows an RBS to be configured with two radio access systems within the same cabinet. The nodes must always be configured as primary or secondary nodes. Each radio access system node is managed separately using its own radio standard tools but only the primary node controls and supervises the support system.

Each node calculates its own cooling requirement, however, the primary node determines the fan speed according to the highest cooling requirement.

Figure 12 shows an overview of MSSM.

More information on MSSM can be found in *Expanding to Multi-Standard Single Mode* and *RBS Configurations*.

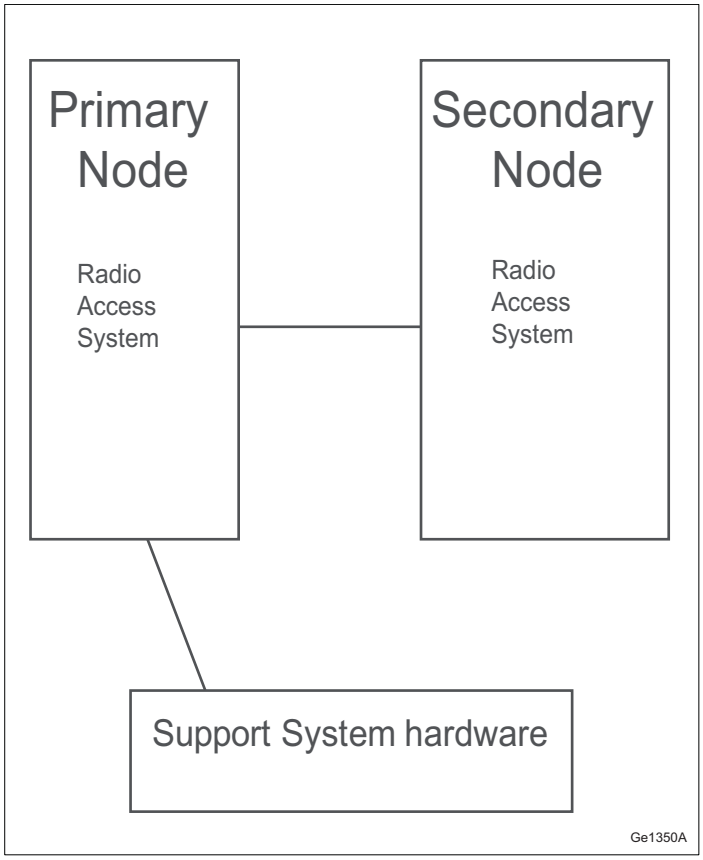

Figure 12 MSSM Overview

6 Connection Interfaces

This section contains information about the connection interfaces of the RBS, including the cable inlets.

Figure 13 shows the location and Table 17 describes the connection interfaces.

Figure 14 shows the location and Table 18 describes the cable inlets connections.

Note: Information on Site LAN and GPS connection interfaces for CBU-based RBS can be found in Section 6.10 on page 35.

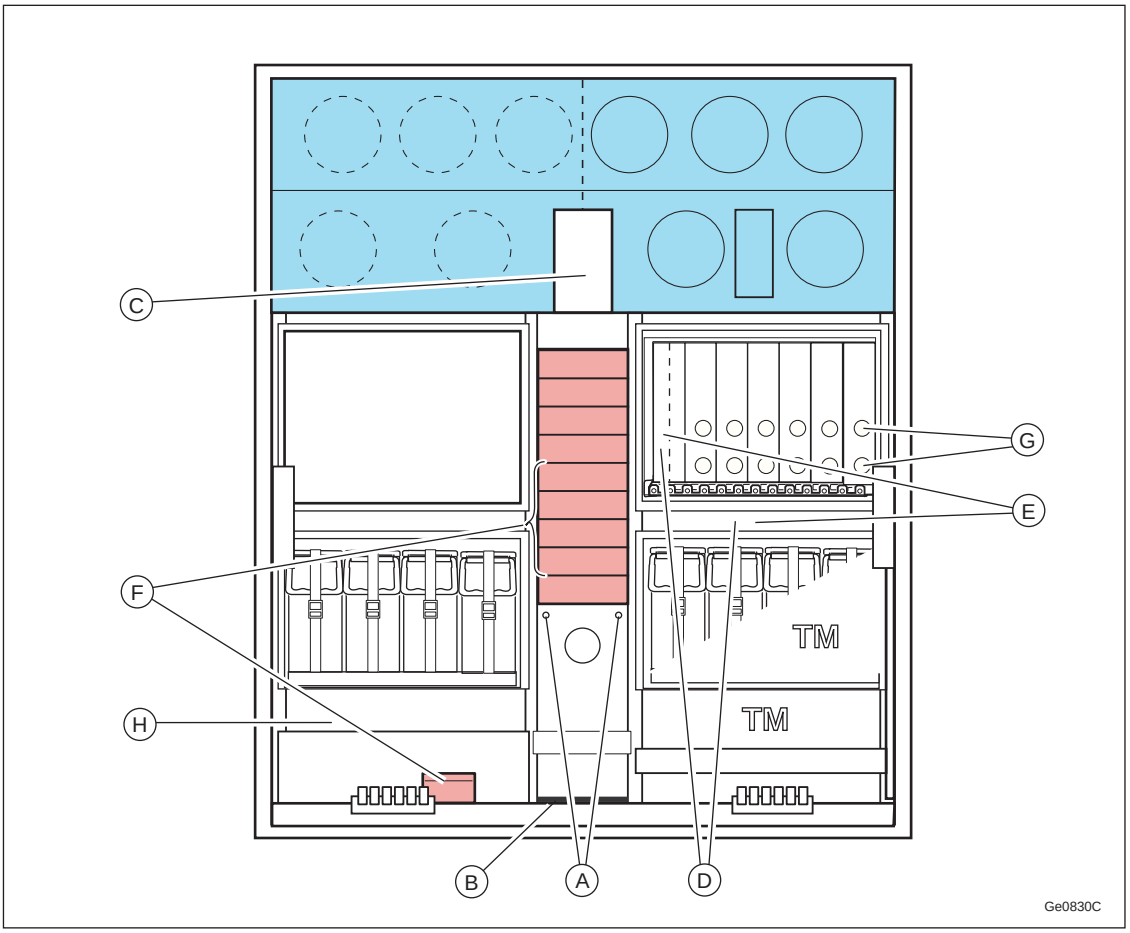

Figure 13 Connection Interfaces

Table 17 Connection Interfaces

Position	Comment
A	Electrostatic Discharge (ESD) wrist strap interface
B	Equipotential Bounding Terminal (EBT) interface
C	SAU interface
D	Site LAN interface
E	GPS interface
F	Power connection interface
G	Antenna interface
H	Service Outlet interface
I	ESB Interface

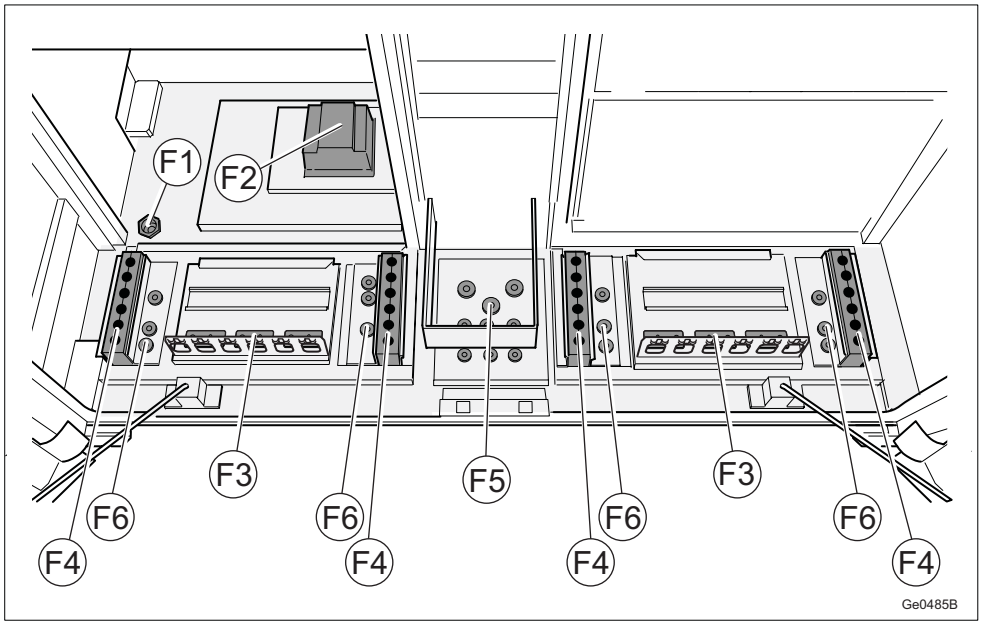

Figure 14 Cable Inlets

Table 18 Cable Inlets

Position	Comment
F1	AC inlet
F2	DC inlet
F3	OVP inlet, GPS receiver inlet
F4	RF inlet (antenna)
F5	TM inlet
F6	Co-site inlet

6.1 Position A - ESD Wrist Strap Interface

The ESD wrist strap interface provides two connection points each consisting of a BS 3/8-inch input for the ESD wrist strap as shown in Figure 15. The wrist strap protects boards and units from being damaged by ESD from the person working with the board or unit.

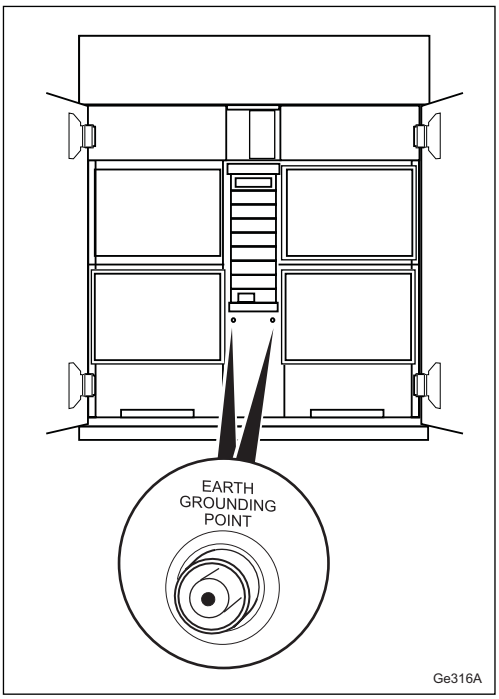

Figure 15 ESD Interface

6.2 Position B - EBT Interface

All equipment must be connected to the same site Main Earth Terminal (MET) at the site, using a 35 mm^2 cable connected to the EBT as shown in Figure 16.

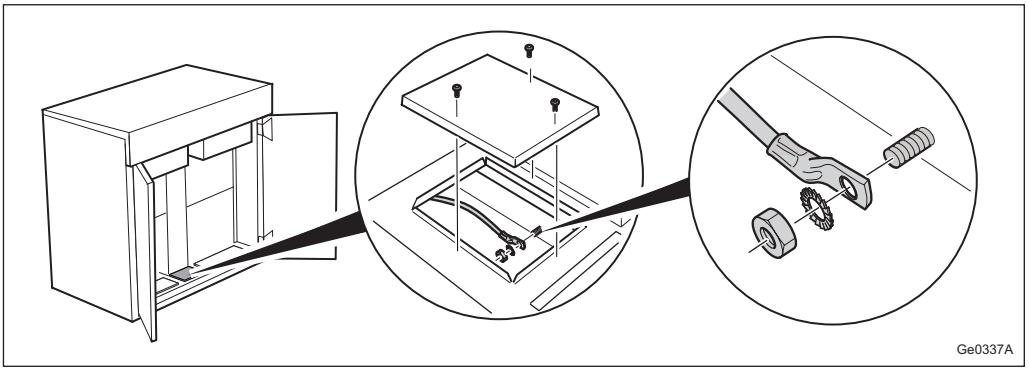

Figure 16 EBT Interface

6.3 Position C - SAU Interface

The SAU is connected to the SCU board and power is supplied to the SAU along with the Enclosure Control Bus (ECB) through the 10 pole RJ-45 connector as shown in Figure 17.

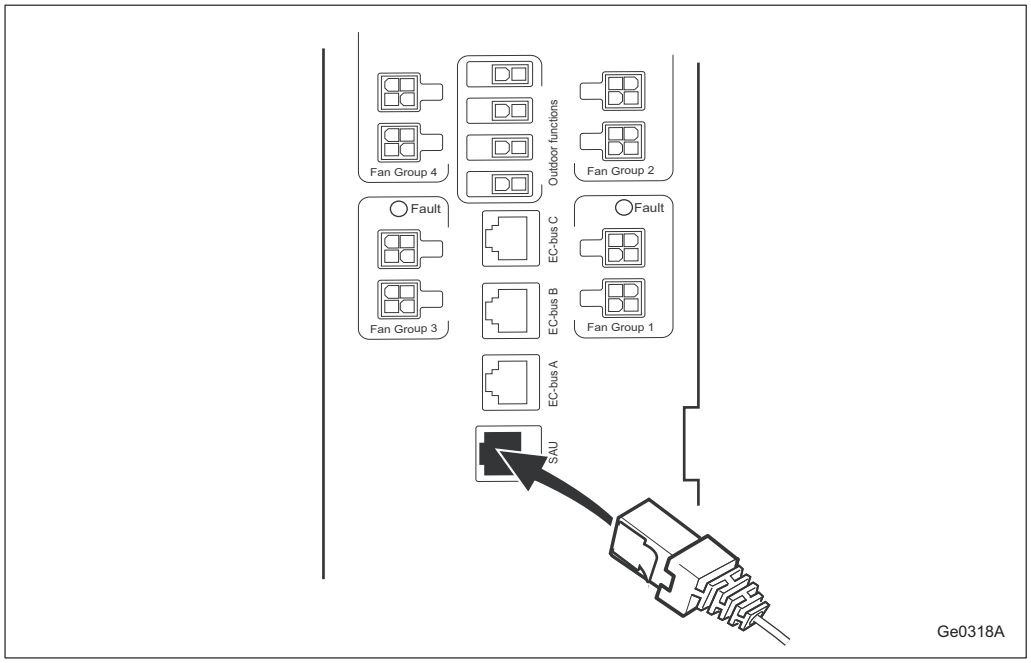

Figure 17 SAU Power Interface

6.4 Position D - Site LAN Interface (Optional)

In WCDMA and LTE, Site LAN is used to communicate with the RBS Element Manager (EM). A client can be connected to the DU for configuration and service purposes through the RBS EM.

In GSM, Site LAN communicates with the Operation and Maintenance Terminal (OMT).

The Site LAN from the DU must be routed through the TM inlet as shown in Figure 14.

A shielded cable is required and the shield must be grounded at the cabinet entry.

The DU Site LAN interface is shown in Figure 18.

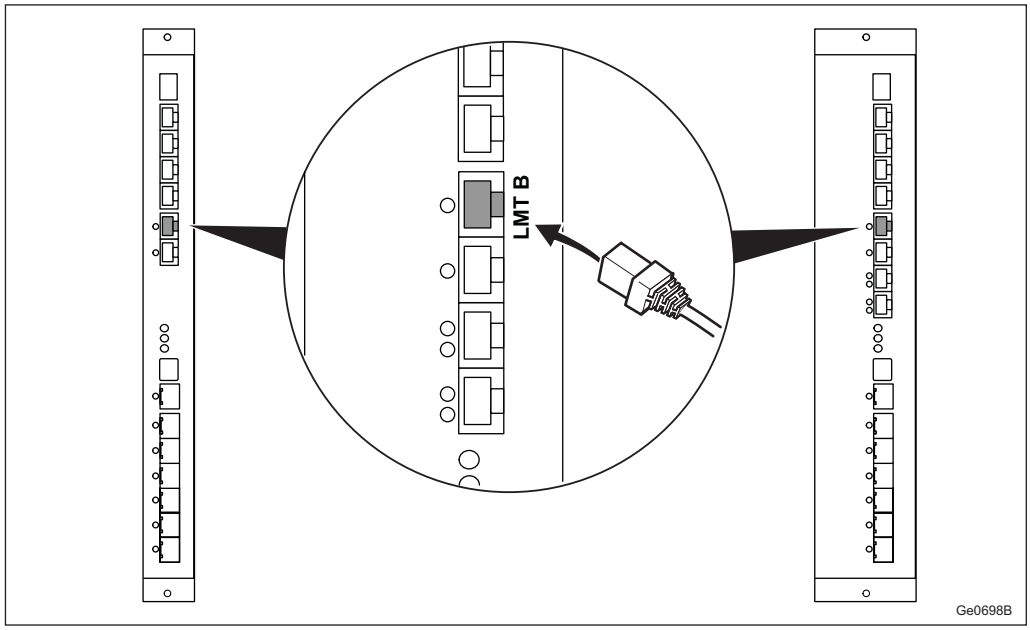

Figure 18 Site LAN Interface

6.5 Position E - GPS Interface (Optional)

The RBS can be optionally connected to a GPS unit that is used for timing synchronization of the RBS.

The DU supplies the GPS with +8 V to +13 V.

The GPS from the DU must be routed via the GPS receiver inlet as shown in Figure 14.

The GPS interface on the DU is shown in Figure 19.

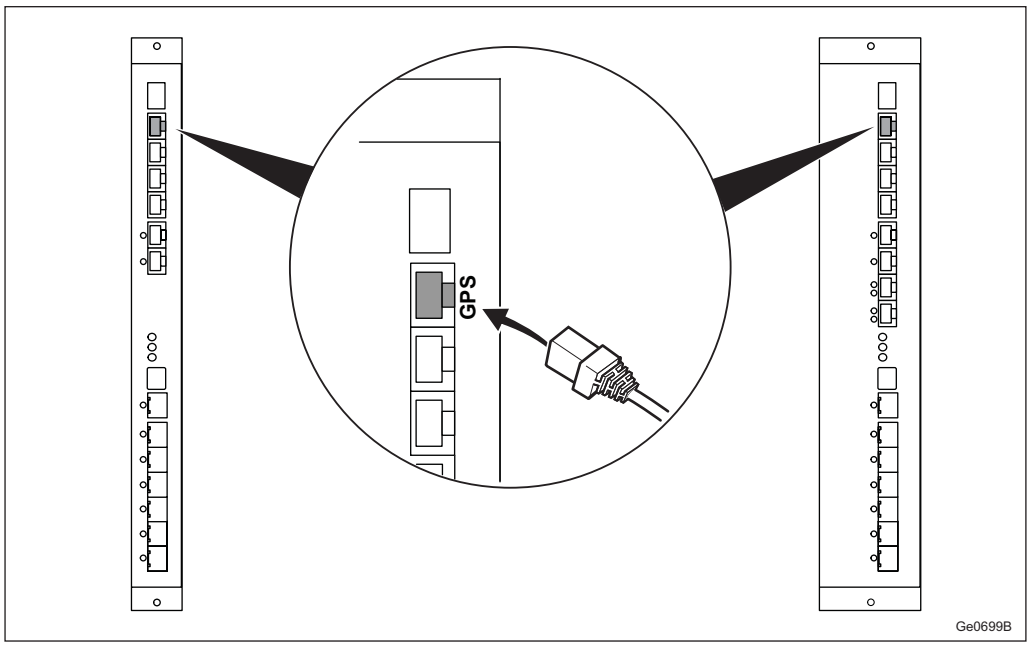

Figure 19 GPS Interface

Detailed information on the DU can be found in *Digital Unit Description*.

6.6 Position F - Power Connection Interface

Several power connection interfaces are currently available and described in this section.

6.6.1 200-250 V AC

AC mains is routed through the AC inlet to the PCU AC as shown in Figure 14. Parallel AC mains and DC main feed is not supported.

Incoming AC power including protective earth are connected by screw terminals in the PCU AC. The terminals accepts cables with an area between 2.5 mm^2 and 16 mm^2. The connection interface is shown in Figure 20.

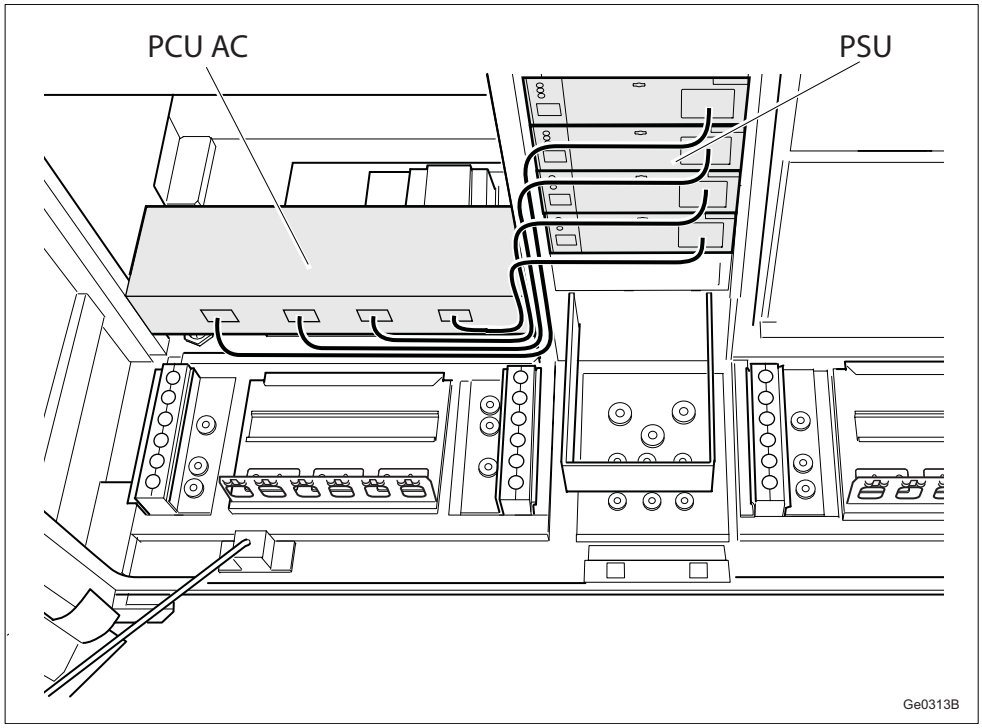

Figure 20 PCU AC Connection

6.6.2 −48 V DC

Incoming DC power (two-wire) are connected by terminals in the PCF. The terminals accepts cables with an area between 16 mm^2 and 95 mm^2. More detailed information on cross-sectional cable areas and fuse sizes can be found in Section 3.5.2 on page 11.

The connection interfaces are shown in Figure 21.

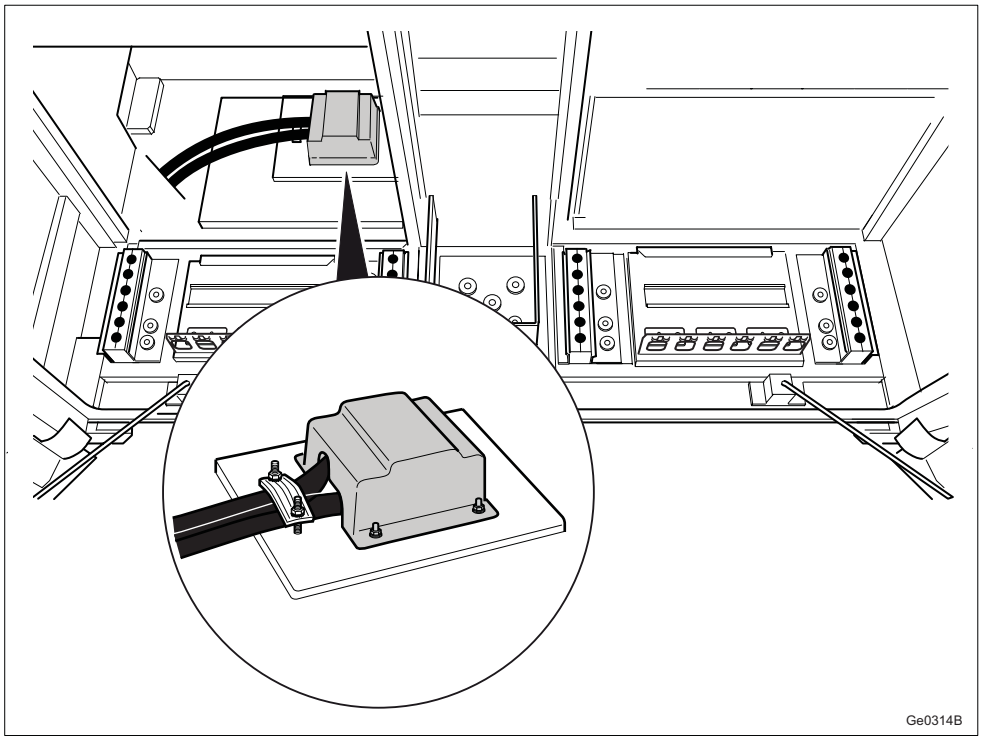

Figure 21 –48 V DC PCF Connection

6.7 Position G - Antenna Interface

For the antenna jumpers, the cable inlets have 24 environmentally sealed RF inlets, 12 in each bay, that are connected directly to the RU as shown in Figure 14.

The antenna connection interface on the RU consists of two 7/16 connectors.

The connection interfaces for an RBS with digital subrack are shown in Figure 22.

The connection interfaces for an RBS with baseband cassette are shown in Figure 23.

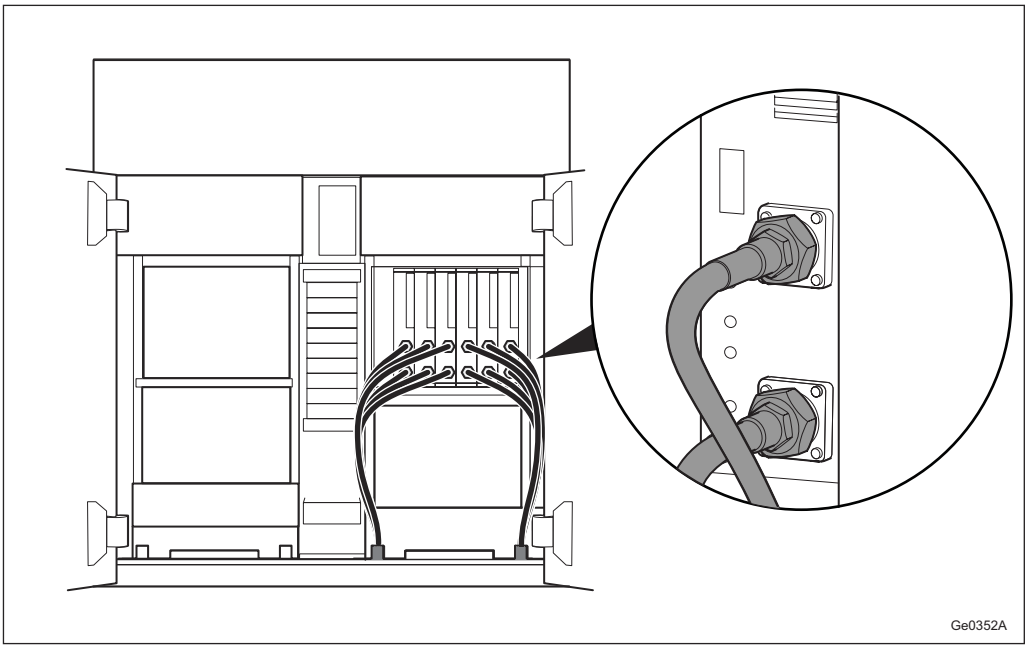

Figure 22 Antenna Interface for RBS with 6 RUs

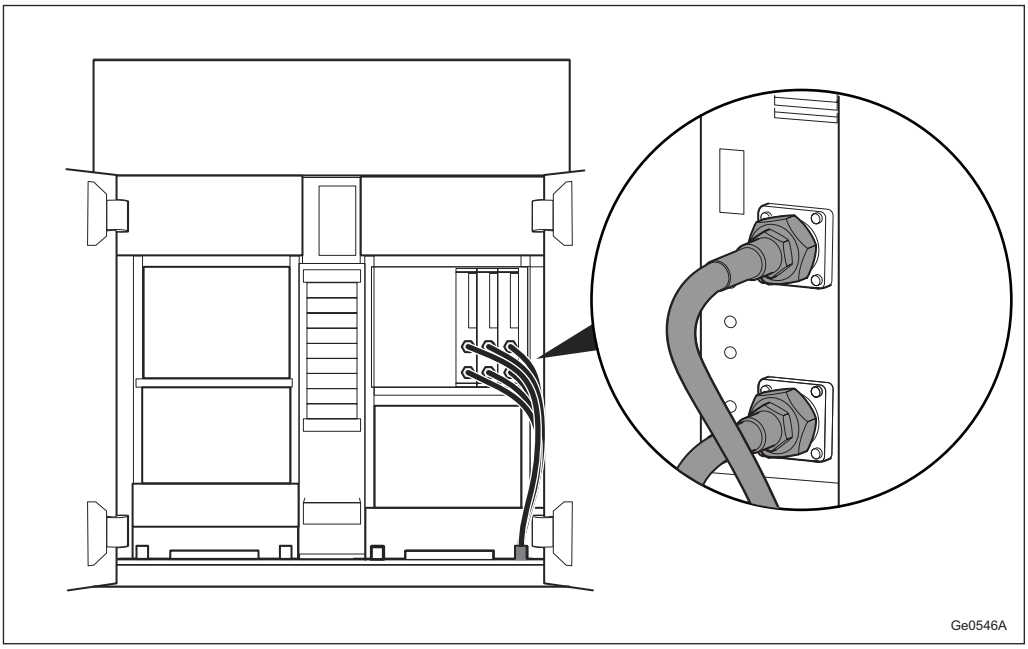

Figure 23 Antenna Interface for RBS with 3 RUs

Information about connections for various configurations can be found in *Antenna and RF Connections*.

6.8 Position H - Service Outlet Interface (optional)

The service outlet is provided with a 10 A two-pole circuit breaker and Residual Current Breaker (RCB). The maximum current available in the service outlet is 8 A. Only double-insulated equipment is allowed to be connected to the service outlet at temperatures below −25°C. This is because the built-in RCB functions cannot be guaranteed at temperatures below −25°C. The service outlet is optional. The location is shown in Figure 26.

There are four types of service outlet, depending on the following national standards: UK, CH, EU and US. The different types of service outlet are shown in Figure 24.

Note: The service outlet is only available for AC-powered RBS with PCU AC.

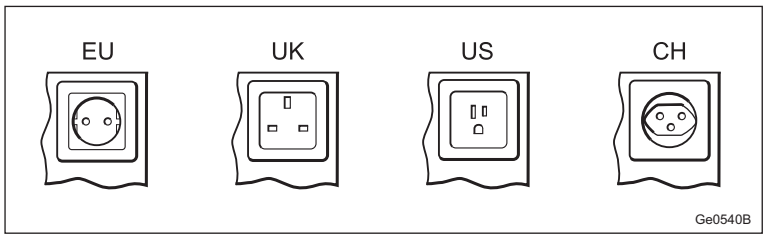

Figure 24 Service Outlet Types

6.9 Position I, ESB Interface (Optional)

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 DUs that support TG synchronization.

The ESB interface in the DU occupies port ESB and consists of an RJ-45 connector as shown in Figure 25.

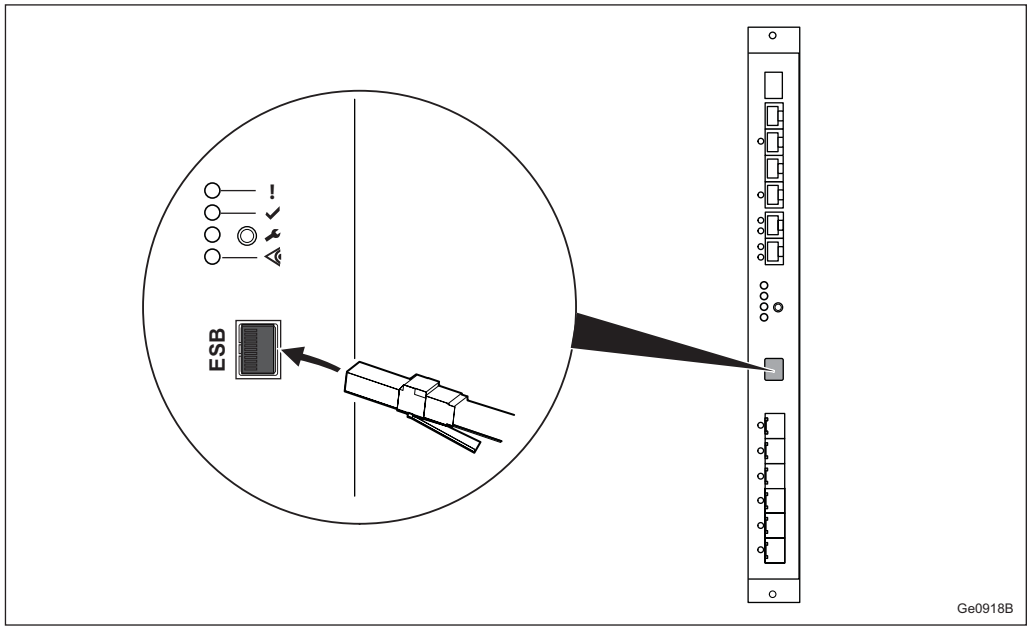

Figure 25 ESB Interface

Detailed information on the DU can be found in *Digital Unit Description*.

6.10 Connection Interfaces for a CBU-based RBS

This section describes which interfaces to use when having a CBU-based RBS.

Figure 26 shows the location and Table 19 describes the connection interfaces for RBS 6102 with digital subrack.

Figure 27 shows the location and Table 19 describes the connection interfaces for RBS 6102 with baseband cassette.

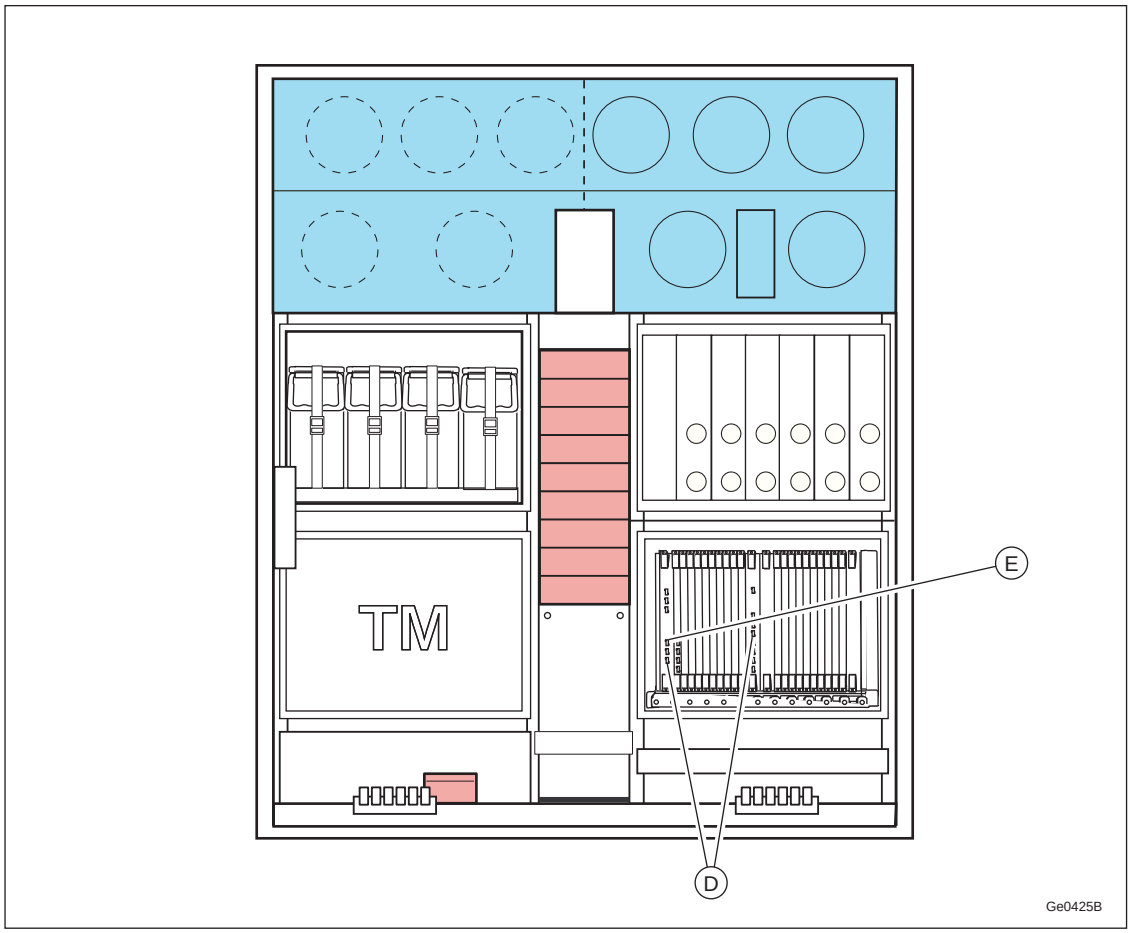

Figure 26 Connection Interfaces for RBS 6102 with Digital Subrack

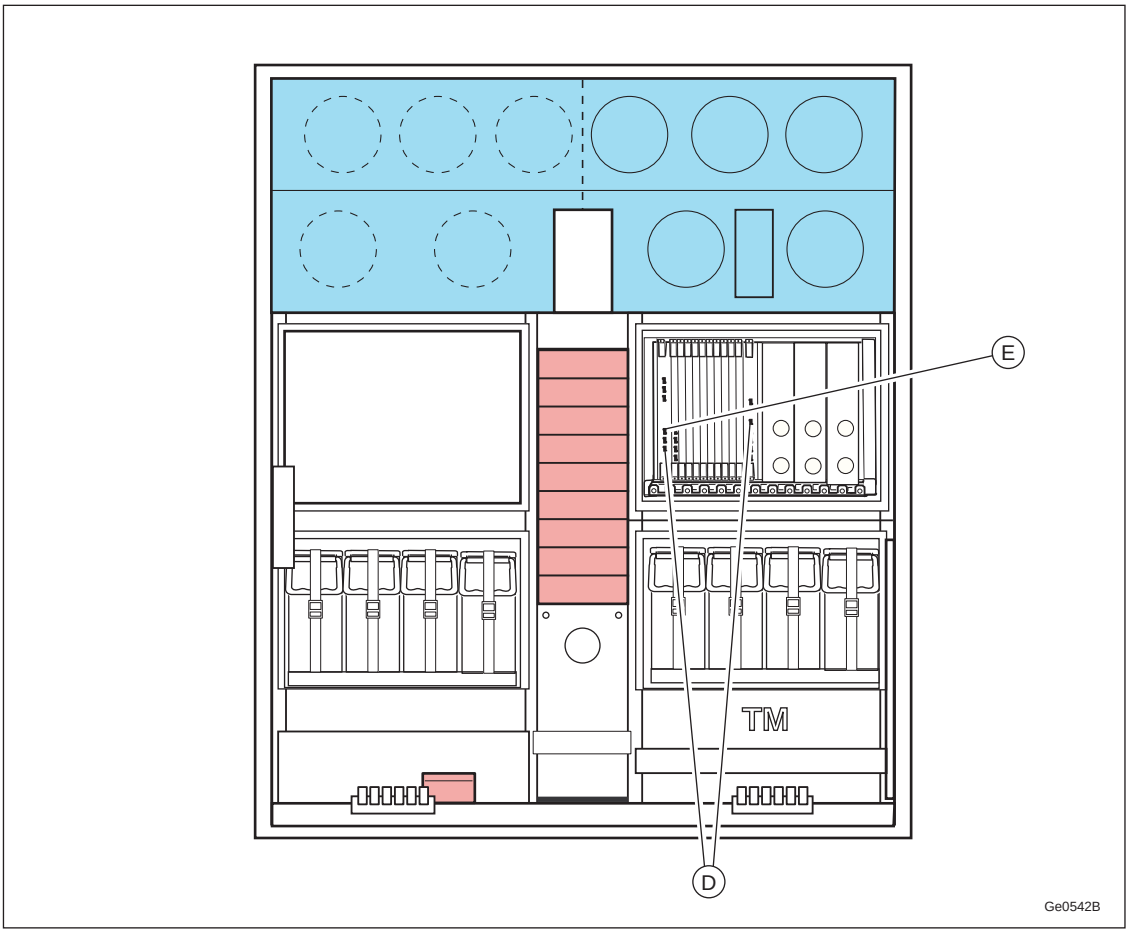

Figure 27 Connection Interfaces for RBS 6102 with Baseband Cassette

Table 19 CBU Connection Interfaces

Position	Comment
D	Site LAN interface
E	GPS interface

6.10.1 Position D - Site LAN Interface (Optional)

Site LAN is used to communicate with the RBS Element Manager (EM).

The Site LAN from the CBU or ET-MFX11 must be routed through the TM inlet as shown in Figure 14.

If the RBS is configured with ET-MFX11 board, the optional Ethernet Site LAN must be connected to ET-MFX11 electrical port Ethernet D as shown in Figure 28. A shielded cable is required and the shield must be grounded at the cabinet entry.

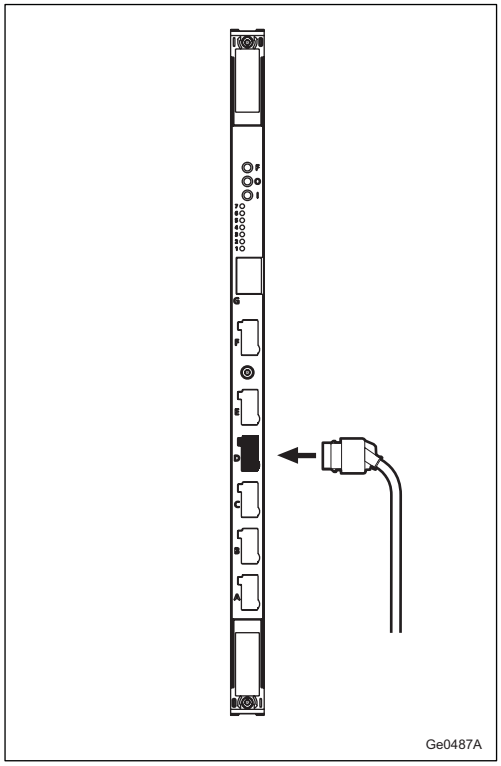

Figure 28 ET-MFX11 Site LAN Interface

The CBU Site LAN interface is shown in Figure 29.

If the RBS 6102 is a Dual Stack RBS and an ATM Site LAN connection is preferred, the Ethernet Site LAN should be connected to the CBU.

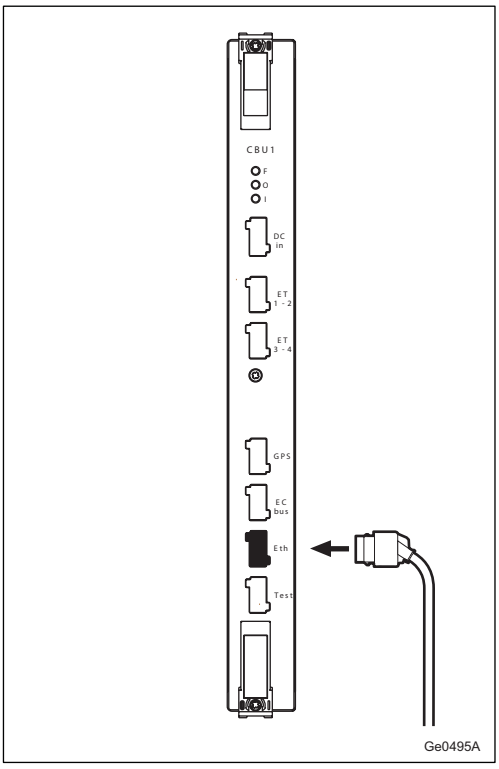

Figure 29 CBU Site LAN Interface

A client can be connected directly to the CBU or ET-MFX11. How to connect a client is described in *Hardware Maintenance Instructions*.

6.10.2 Position E - GPS Interface (Optional)

The RBS can be optionally connected to a GPS unit that is used for timing synchronization of the RBS.

The CBU supplies the GPS with +28 V.

The GPS from the left CBU must be routed via the left OVP inlet as shown in Figure 14.

The GPS interface on the CBU is shown in Figure 30.

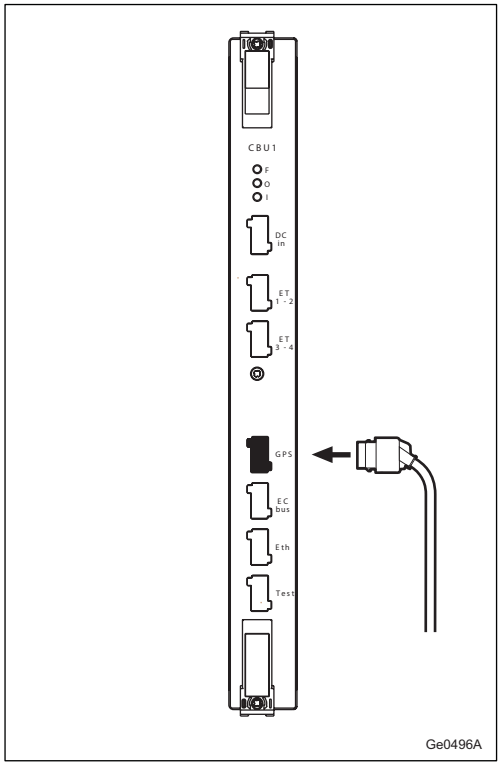

Figure 30 CBU GPS Interface

7 Transmission Standards

This section describes the transmission standards supported by the RBS.

The section is divided as follows:

- Section 7.1 on page 40 describes the transmission alternatives for a DU-based RBS.
- Section 7.2 on page 45 describes the transmission alternatives for a CBU-based RBS.

7.1 Transmission for a DU-based RBS

The following transmission alternatives are available:

- E1/T1/J1 electrical transmission (WCDMA only)
- E1/T1 electrical transmission (GSM only)

- Optical Ethernet transmission
- Electrical Ethernet transmission

The transmission standards are listed in Table 20.

Table 20 Transmission Standards for DU-Based RBS

Transmission Standard	Transmission Capacity (Mbps)	Cable Impedance (Ω)	Cable Type	Physical Layer
E1	2.0	75	Coaxial	G.703 (ITU-T)
	2.0	120, twisted pair	Balanced lines	ETSI G.703 & G.704/G.703 (ITU-T)
T1	1.5	100, twisted pair	Balanced lines	ANSI T1.403/G.703 (ITU-T)
J1	1.5	100, twisted pair	Balanced lines	Japan JT-I.431a/G.703
	1.5	110, twisted pair	Balanced lines	Japan JT-G.703 & JT-G.704/G.703
Ethernet (electrical)	100/1000 Mbps	100 Ω	Balanced lines	IEEE 802.3-10/100/1000Base-T
Ethernet (optical)	1000 Mbps	Max attenuation 0.5 dB/cabling	Optical fiber	Supported SFP connector: • IEEE 802.3-100Base-FX • IEEE 802.3-100Base-LX10 • IEEE 802.3-1000Base-SX • IEEE 802.3-1000Base-LX • IEEE 802.3-1000Base-LX10 • IEEE 802.3-1000Base-LX40 • IEEE 802.3-1000Base-ZX

7.1.1 E1, T1, and J1 (WCDMA only)

The E1, T1, or J1 connection is made through terminal blocks without screws on the TM inlet, situated at the bottom of the cabinet. The TM inlet accept cables with an area of 0.1 - 1.5 mm². Two different TM inlet types are available; one for 100 – 120 Ω, and one for 75 Ω. The transmission cable is routed from the cable inlets to the DU.

There are two E1, T1, J1 connection interfaces on the front of the DU as shown in Figure 31.

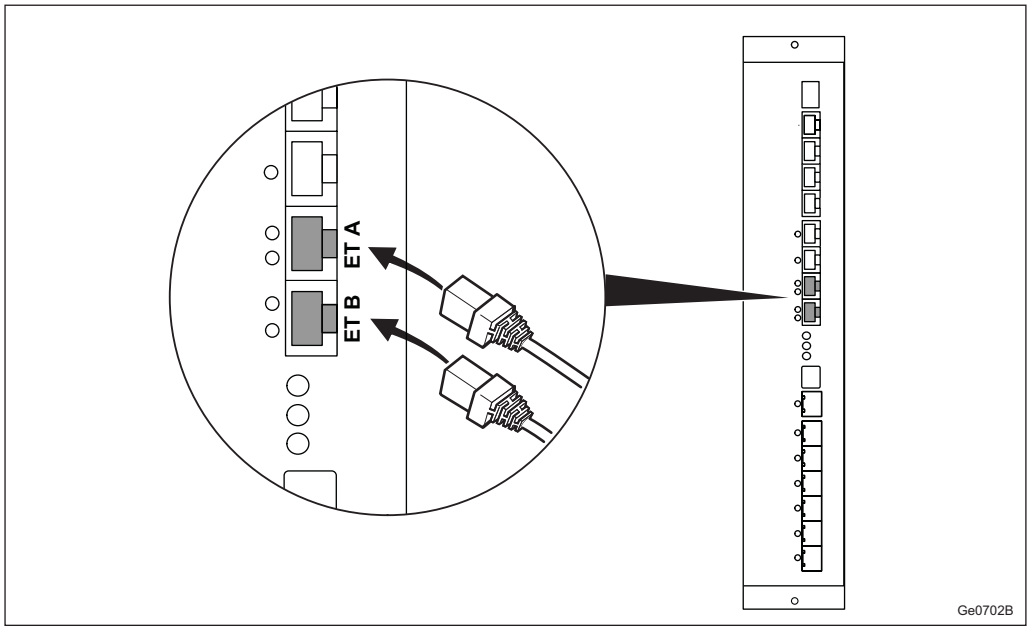

Figure 31 E1, T1, or J1 Transmission Interface for WCDMA

Detailed information on the DU can be found in *Digital Unit Description*.

7.1.2 E1 and T1 (GSM only)

The E1 and T1 connection interface in the DU can be equipped with two female RJ-45 connectors and occupies positions ET A and ET B.

Figure 32 shows the E1 and T1 transmission interfaces.

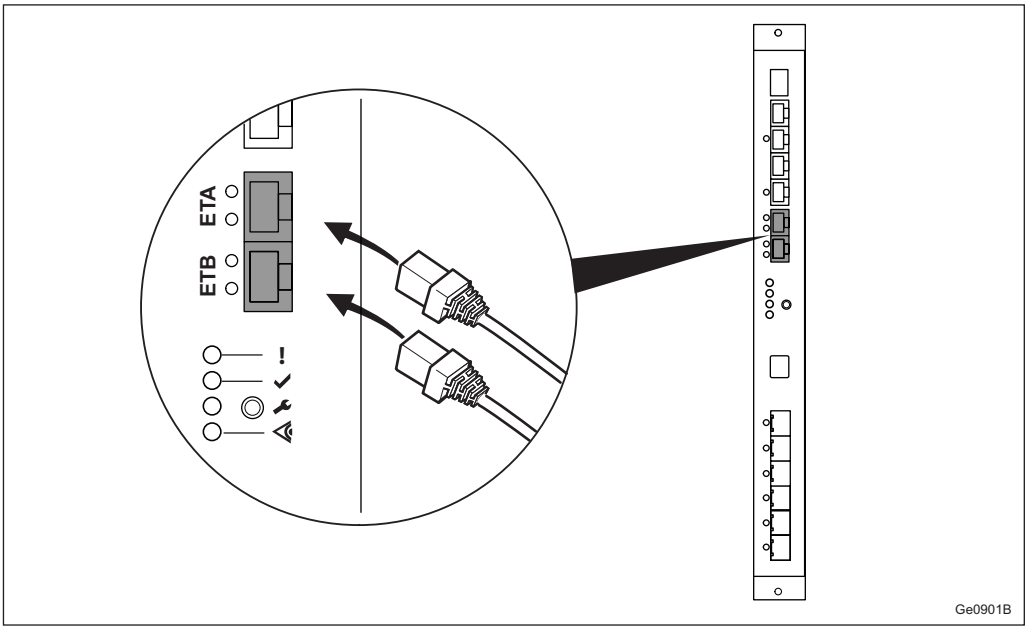

Figure 32 E1 or T1 Transmission Interface for GSM

Detailed information on the DU can be found in *Digital Unit Description*.

7.1.3 Electrical Ethernet (Optional)

The electrical Ethernet transmission interface from the DU must be routed through the TM inlet as shown in Figure 14.

The electrical Ethernet connection interface in the DU is equipped with an RJ-45 female connector and occupies position TN A for LTE and WCDMA, or LMT B for GSM.

Figure 33 and Figure 34 show the electrical Ethernet connection interfaces.

Note: A shielded cable is required and the shield must be grounded at the cabinet entry.

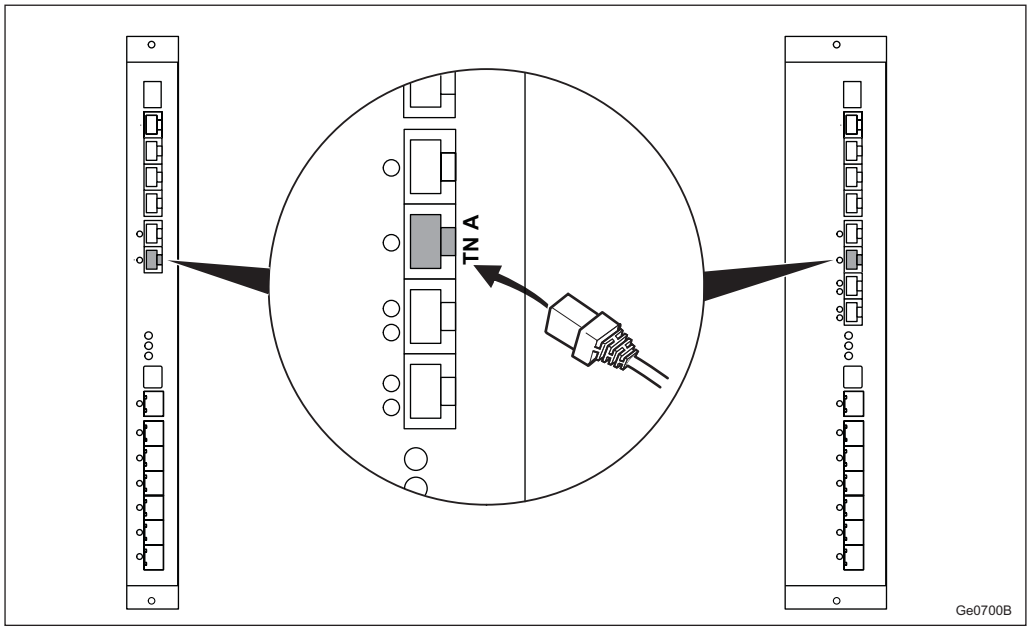

Figure 33 Electrical Ethernet Connection for LTE and WCDMA

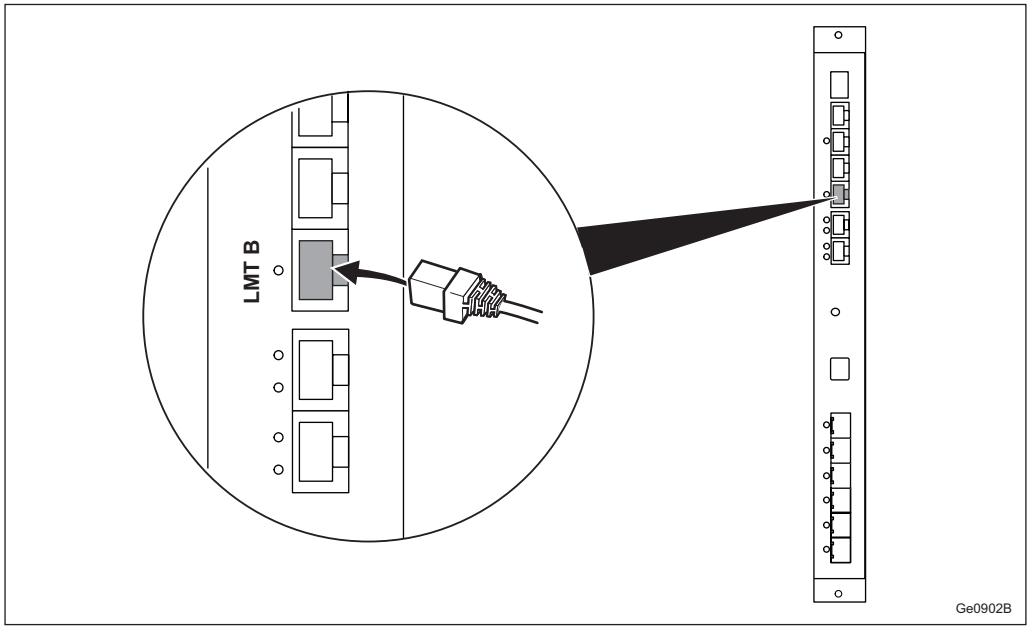

Figure 34 Electrical Ethernet Connection for GSM

Detailed information on the DU can be found in *Digital Unit Description*.

7.1.4 Optical Ethernet (Optional)

The optical Ethernet transmission interface from the DU must be routed through the TM inlet as shown in Figure 14.

There is one optical Ethernet connection interface on the front of the DU as shown in Figure 35. When using a DU with optical transmission, one compatible SFP module is required.

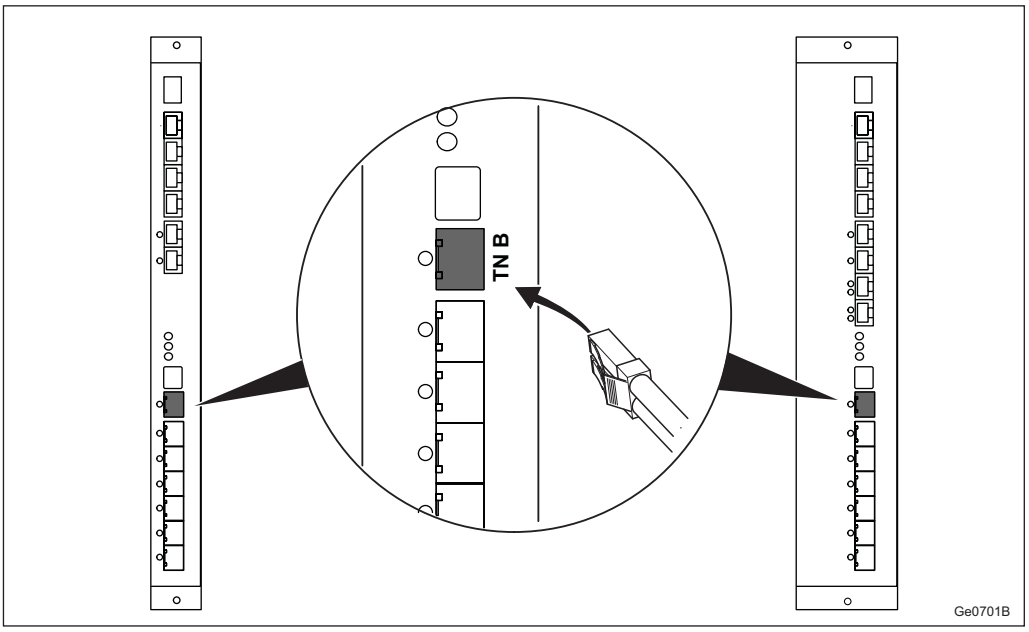

Figure 35 Optical Ethernet Connection

Detailed information on the DU can be found in *Digital Unit Description*.

7.2 Transmission for a CBU-based RBS

The following transmission alternatives are available:

- E1, T1, and J1 (electrical transmission)
- STM-1/OC-3c (optical transmission, channelized)
- STM-1/OC-3 (optical transmission, unchannelized)
- Ethernet (optical or electrical transmission)

The transmission standards are listed in Table 21.

Table 21 Transmission Standards for CBU-Based RBS

Transmission Standard	Board	Transmission Capacity (Mbps)	Cable Impedance (Ω)	Cable Type	Physical Layer
E1	ET-MC1	2.0	75	Coaxial	G.703 (ITU-T)
		2.0	120, twisted pair	Balanced lines	ETSI G.703 & G.704/G.703 (ITU-T)
T1		1.5	100, twisted pair	Balanced lines	ANSI T1.403/G.703 (ITU-T)
J1		1.5	100, twisted pair	Balanced lines	Japan JT-I.431a/G.703
		1.5	110, twisted pair	Balanced lines	Japan JT-G.703 & JT-G.704/G.703

Table 21 Transmission Standards for CBU-Based RBS

Transmission Standard	Board	Transmission Capacity (Mbps)	Cable Impedance (Ω)	Cable Type	Physical Layer
STM-1/OC-3c	ET-MC4	155	Single mode	Optical fiber	G.709/S1.1
STM-1/OC-3	ET-MC41s				
Ethernet (electrical)	ET-MFX11	100/1000 Mbps	100 Ω	Balanced lines	IEEE 802.3-10/100/1000Base-T
Ethernet (optical)	ET-MFX11	1000 Mbps	Max attenuation 0.5 dB/cabling	Optical fiber	Supported SFP connector: • IEEE 802.3-100Base-FX • IEEE 802.3-100Base-LX10 • IEEE 802.3-1000Base-SX • IEEE 802.3-1000Base-LX • IEEE 802.3-1000Base-LX10 • IEEE 802.3-1000Base-LX40 • IEEE 802.3-1000Base-ZX

Note: The RBS transmission ports are designed without primary overvoltage and overcurrent protection and must not be exposed to overvoltage that exceeds the values stated in ITU-T K.45.

7.2.1 E1, T1, and J1

The E1, T1, or J1 connection is made through terminal blocks without screws on the TM inlet, situated at the bottom of the cabinet. The TM inlet accept cables with an area of 0.1 - 1.5 mm². Two different TM inlet types are available; one for 100 – 120 Ω, and one for 75 Ω. The transmission cable is routed from the cable inlets to the CBU and any optional ET-MC1 boards in the digital subrack.

Figure 36 shows the CBU and Figure 37 shows the ET-MC1 board connection interfaces.

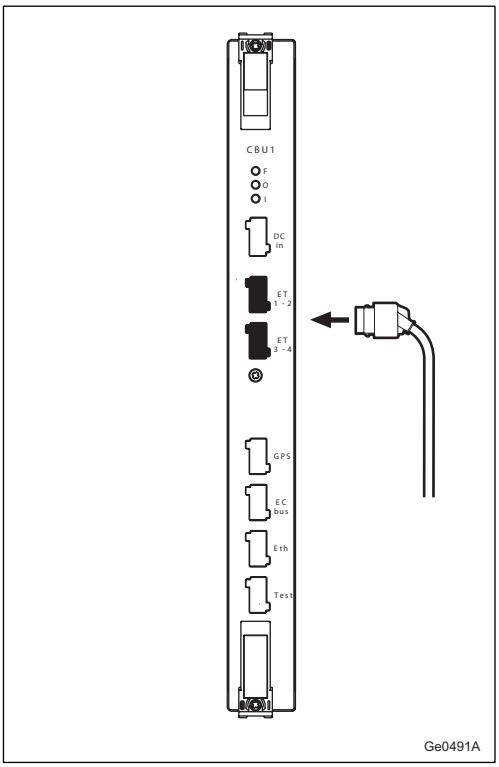

Figure 36 CBU Transmission Interface

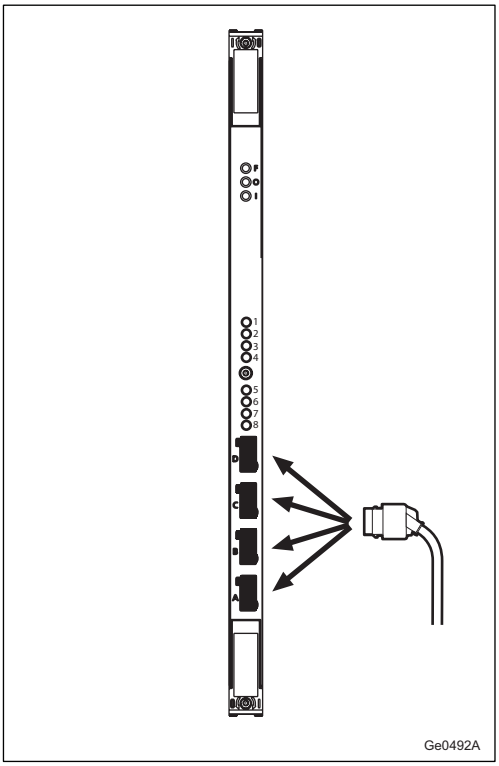

Figure 37 ET-MC1 Transmission Interface

7.2.2 STM-1/OC-3c and STM-1/OC-3 (Optional)

The STM-1/OC-3c and STM-1/OC-3 connection interface is equipped with two cable glands in the TM inlet. The cable is routed to the ET-M4 or ET-MC41s board in the digital subrack.

Figure 38 and Figure 39 shows the ET-M4 and the ET-MC41 board connection interfaces.

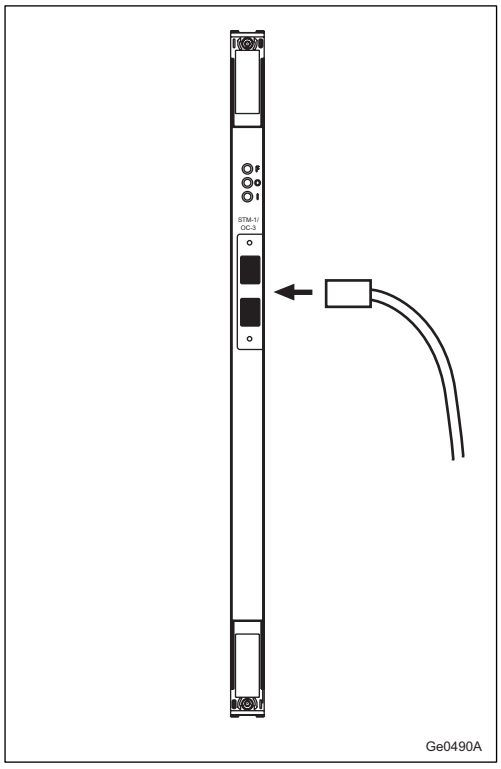

Figure 38 ET-M4 Transmission Interface

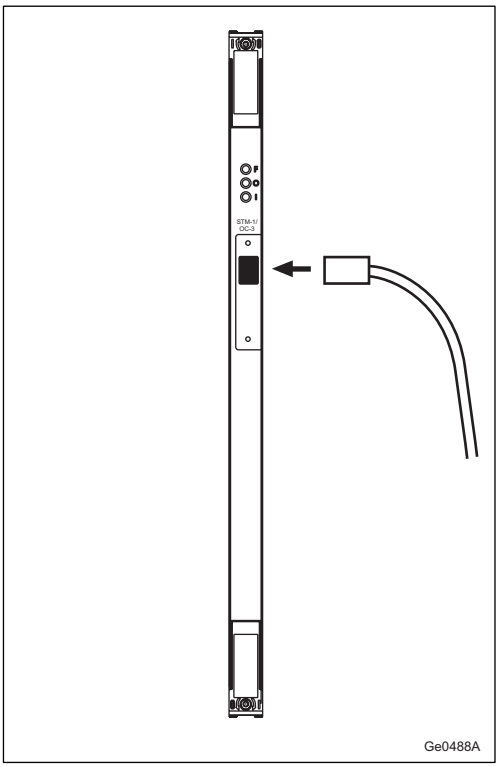

Figure 39 ET-MC41 Transmission Interface

7.2.3 Electrical Ethernet (Optional)

The electrical Ethernet transmission interface from the ET-MFX board must be routed through the TM inlet as shown in Figure 14.

There is one electrical Ethernet connection interface on the front of the ET-MFX board as shown in Figure 40.

Note: A shielded cable is required and the shield must be grounded at the cabinet entry.

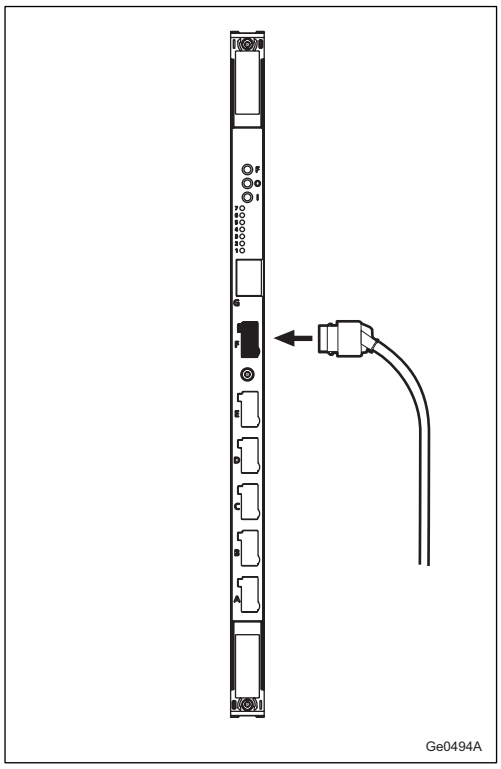

Figure 40 ET-MFX11 Board Electrical Ethernet Interface

7.2.4 Optical Ethernet for ET-MFX Board (Optional)

The optical Ethernet transmission interface from ET-MFX board must be routed through the TM inlet as shown in Figure 14.

There is one optical Ethernet connection interface on the front of the ET-MFX board as shown in Figure 41. When using an ET-MFX board with optical transmission, one compatible SFP module is required.

More information can be found in Unit Description ET-MFX11.

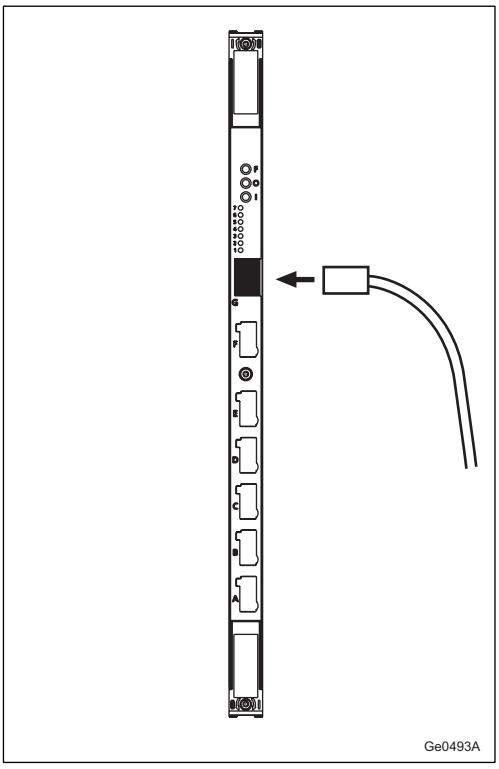

Figure 41 ET-MFX11 Optical Ethernet Interface

8 Alarms

This section describes the alarms that can be available when the RBS is connected to an optional SAU.

8.1 Internal Alarms

The RBS is equipped with the following internal alarms:

- Door alarm
- Fan failure
- Smoke alarm, optional
- Smoke detector failure alarm, optional

8.2 Customer-Specific External Alarms

The optional SAU monitors and controls customer equipment. The SAU can handle up to 32 external alarms.

An alarm can be generated by two alarm conditions:

- Closed loop condition, called Normally Open (NO)

  NO means that an alarm is triggered when an open switch is closed.

- Open loop condition, called Normally Closed (NC)

  NC means that an alarm is triggered when a closed switch is opened. NC is the default alarm condition.

The customer can configure the alarm condition.

More information about the SAU can be found in *SAU Description*.

9 Acoustic Noise Emission

This section contains information about acoustic noise emission from an RBS. Values are given for a free-standing RBS as well as for an RBS placed against a wall.

Note: The acoustic noise emission values for a free-standing RBS and an RBS installed against a wall were tested according to the EN ISO 9614-2 standard and the values calculated in accordance with the EN ISO 11203 standard. The values can vary depending on the relative sound absorbency of the installation environment.

9.1 Acoustic Noise Emission for RBS with Standard Climate

Table 22 and Table 23 shows the sound pressure level at different ambient temperatures, directions and distances from the RBS.

Note: Sound pressure level values below 1 meter are not shown.

All values stated are values for the RBS configured up to the design maximum heat load capacity. Values for sub configured RBSs must be calculated from Table 2.

Note: Measurement for a free-standing RBS also include the rear of the cabinet.

Table 22 Sound Pressure Levels for a Free-Standing RBS

Temp in °C	Sound Pressure Level in dBA	Calculated Distance in Meters				
		Front	Left	Right	Back	Top
20	35	7	6	6	6	6
	40	4	3	3	3	3
	50	<1	<1	<1	<1	<1
	60	<1	<1	<1	<1	<1

Table 23 Sound Pressure Levels for against a wall RBS

Temp in °C	Sound Pressure Level in dBA	Calculated Distance in Meters			
		Front	Left	Right	Top
20	35	8	8	8	8
	40	4	4	5	4
	50	<1	<1	<1	<1
	60	<1	<1	<1	<1

10 Standards, Regulations, and Dependability

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."

10.1 Regulatory Approval

The RBS complies with the following market requirement:

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

10.1.1 Safety Standards Compliance

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

International

- IEC 60 950-1:2001, Ed. 1
- IEC 60 950-1:2005, Ed. 2
- IEC 60 950-22:2006
- IEC 60 215 (1987) and Amd. 2

Europe

- EN 60 215:1989 and Amd. 1 and 2
- EN 60 950-1:2006, Ed. 2
- EN 60 950-22:2006/A11:2008

North-America

- UL 60950-1 Ed. 2 2007
- CSA-C22.2 No.60950-1-07, Ed. 2
- UL 60950-22 Ed. 1 2007
- CSA-C22.2 No. 60950-22-07, Ed. 1

10.1.2 EMC Standards Compliance

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

- 3GPP TS25.113 worldwide
- 3GPP TS36.113 worldwide
- ETSI EN 301 489-1
- ETSI EN 301 489-23
- FCC CFR 47 Part 15

10.1.3 Radio Standards Compliance

The RBS complies with the following standards regarding radio:

- 3GPP TS25.141 worldwide
- 3GPP TS36.141 worldwide
- ETSI EN 301 908-1
- ETSI EN 301 908-3
- ETSI EN 301 908-14
- FCC CFR 47 Part 2 and 27

10.1.4 Marking

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

- CE mark
- ETL/cETL
- FCC mark

10.2 Dependability

The RBS is designed for a technical lifetime of 20 years (24-hour operation).

The following preventive maintenance conditions must be fulfilled to guarantee the availability of the RBS:

- Fans

  The fans must be inspected (and cleaned if necessary) every year. Ericsson recommends replacing the fans every 10 years.

10.3 Spare Parts

The RBS adheres to the Ericsson Serviceability and Spare Part Strategy.

10.4 Vandal Resistance

Unauthorized access is not possible without damaging the unit.