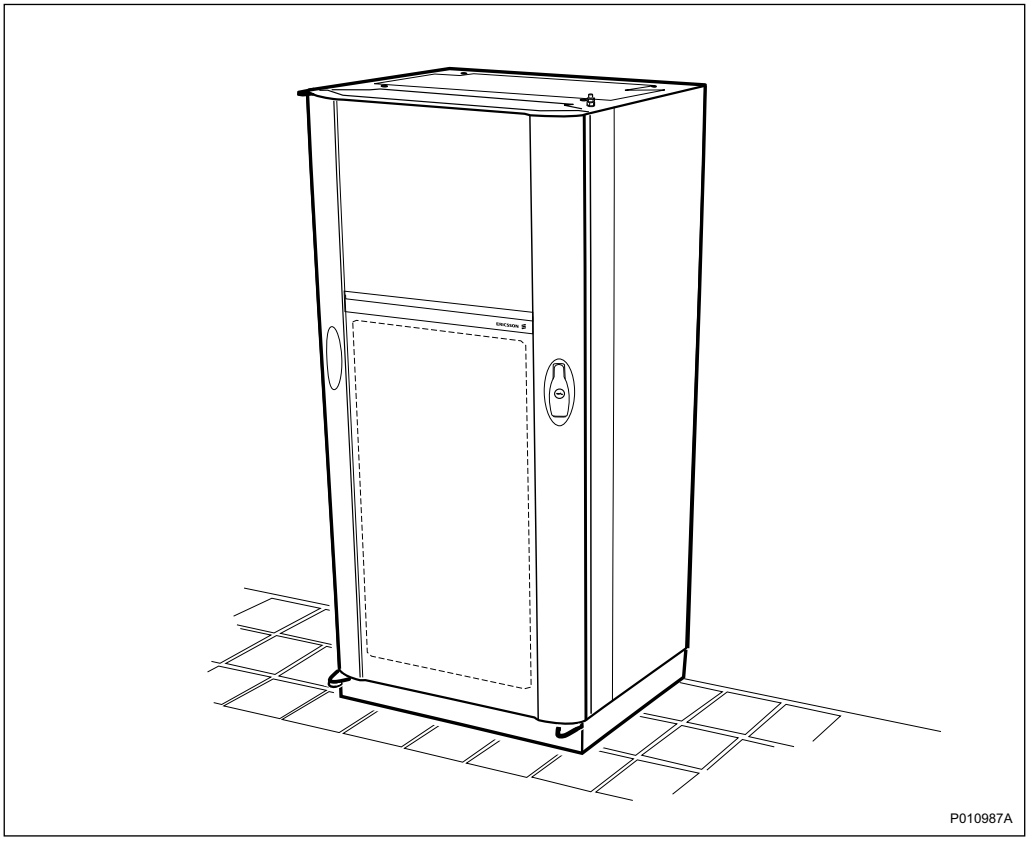
RBS 2207

Radio Base Station
Product Description

The RBS 2207, a member of the RBS 2000 family, is a 6–TRX radio base station for indoor applications. This cabinet covers the same floor area as the RBS 2202 and RBS 2206, but the cabinet height is lower.



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Contents

1 Product Overview

The RBS 2207 is a medium capacity indoor base station. It is used for indoor applications, with up to three double Transceiver Units (dTRU). The RBS 2207 is designed to be transported as a fully-assembled cabinet to the site. All interior units 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.

1.1 Main Features

The RBS 2207 can support the following features:

- 1, 2 or 3 sectors in one cabinet using CDU-G and/or CDU-J
- Discontinuous transmission/reception
- Duplex filters
- Dynamic power regulation
- Encryption/ciphering
- EDGE
- Expansion by tranceiver group (TG) synchronization
- External alarms
- Frequency hopping
- Global positioning system (GPS) synchronization
- Radio configurations supported on 800, 900, 1800 and 1900 MHz
- Receiver diversity
- Transmission Interface: The following transport network interface alternatives exist:

  - T1 1.5 Mbit/s, 100 Ω, with internal synchronization

  - E1 2 Mbit/s, 75 Ω, with PCM synchronization

  - E1 2 Mbit/s, 120 Ω, with PCM synchronization
- Wide range power input 120 - 250 V AC
- Wide range power input -48 to -60V DC

1.2 Variants

There are three RBS 2207 cabinet versions:

- -48 to -60 V DC
- 120 - 250 V AC, 50 to 60 Hz, +24 V DC, with optional battery back-up
- +24 V DC (without PSUs)

1.3 Optional Equipment

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

- Battery back-up (in a separate cabinet)
- Bias injectors
- dual duplex Tower Mounted Amplifier (ddTMA)
- External synchronization bus (ESB)
- Distribution Frame (DF) with OVP
- TMA-CM
- Transmission Adapter (TA)
- GPS receiver

2 Dimensions

The following section describes the measurements of the RBS 2207.

Table 1 Weight

Unit	Weight
RBS cabinet (fully equipped including base frame)	180 kg (397 lbs.)
Base frame	8 kg (18 lbs.)

Table 2 Color

Color	Reference No.
Grey	NCS 1002-R

3 Space Requirements

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

Free Space above the RBS Cabinet

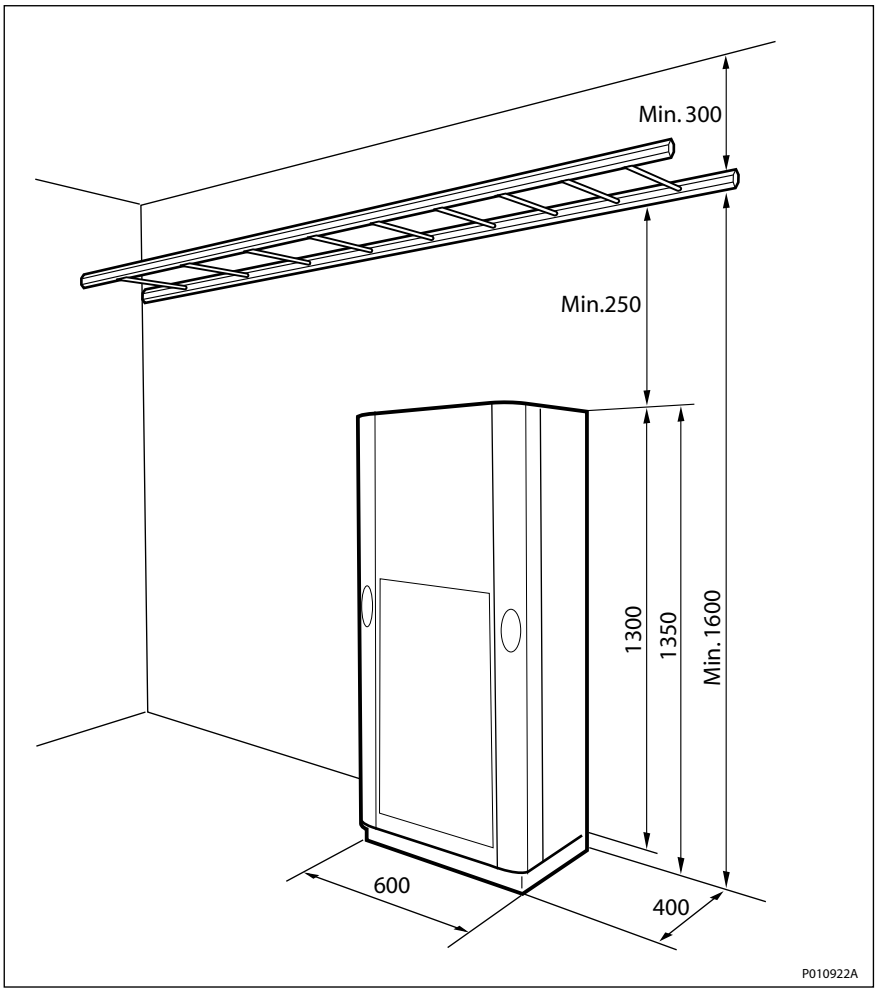

Figure 1 RBS 2207, free space above the cabinet

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, in order to simplify the cable installation work.

The door projects 70 mm in front of the cabinet.

Layout for RBS Cabinets

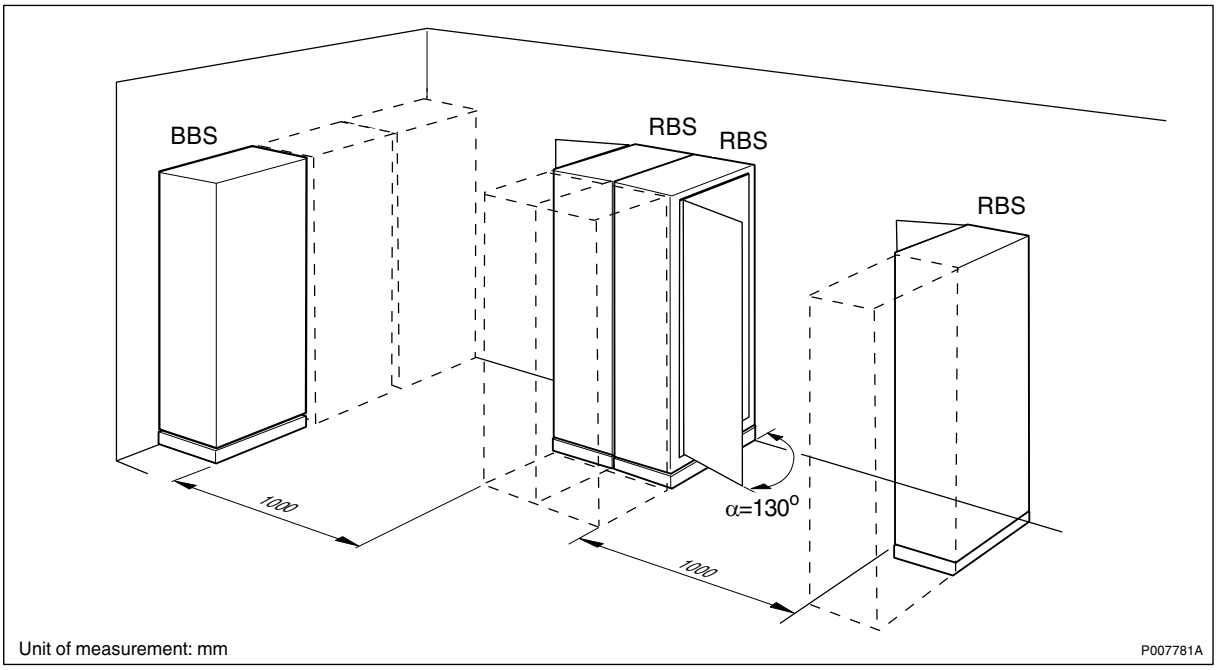

Figure 2 Floor layout and space requirements

The RBS cabinets and battery back-up 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.

Additional cabinets and racks can be positioned to the left or right of the first installed cabinet. However, expansion to the right is recommended in order to follow the same global standard.

A distance of 1000 mm in front of the cabinets and racks for maintenance work 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 is to fulfill 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.

Footprint

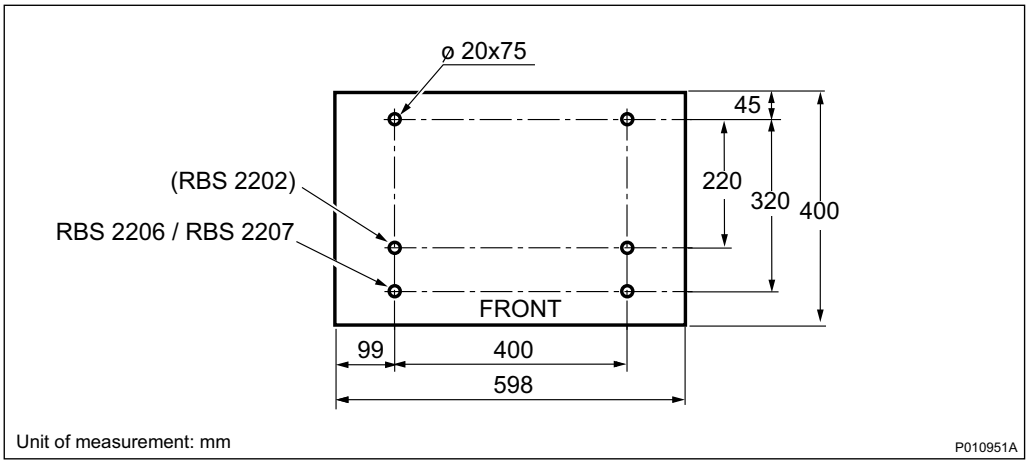

Figure 3 Hole pattern overview

The RBS 2207 has the same footprint as the RBS 2202 and 2206 cabinets. The base frame can be used as a template to mark new holes. If an RBS 2202 or an RBS 2206 is being replaced by an RBS 2207, the holes for the old cabinet can be used for the new cabinet.

4 Environment

The RBS 2207 is designed to operate within limits stated for climatic requirements, and also to have a limited effect on the environment.

4.1 Operating Environment

The climatic requirements the RBS 2207 has on the site are shown in the table below.

Table 3 Environmental specifications

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

(1) Normal operation describes the environmental conditions where all units function as specified.
(2) 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 maximum period of 96 consecutive hours, and a maximum total of 5.5 days in a three-year period.

Ground Vibrations

The RBS 2207 is tested to withstand random vibrations of up to 0.2 m^2/s^2. It is also tested for single shocks up to 40 m/s^2. The cabinet is tested for seismic exposure with a test frequency of 1 - 35 Hz. Maximum test level of the Required Response Spectrum (RRS) is 50 m/s^2 within 2 - 5 Hz. The shape of RRS is defined by the ETSI standard.

Levelling

For cabinet levelling purposes, the floor must be level to within ±3 mm/2000 mm and the floor gradient be within ±0.1°.

4.2 Environmental Impact

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

Heat Dissipation

The RBS 2207 generates an average heat load of 1000 W. The exact figure is dependent upon confguration, equipment and site-specific conditions.

4.3 Compliance Distances for Electromagnetic Exposure

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

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

Ericsson has performed a free-space near-field RF exposure assessment of typical configurations of RBS 2207 with a recommended antenna. The resulting dimensions, in meter, 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 center 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.

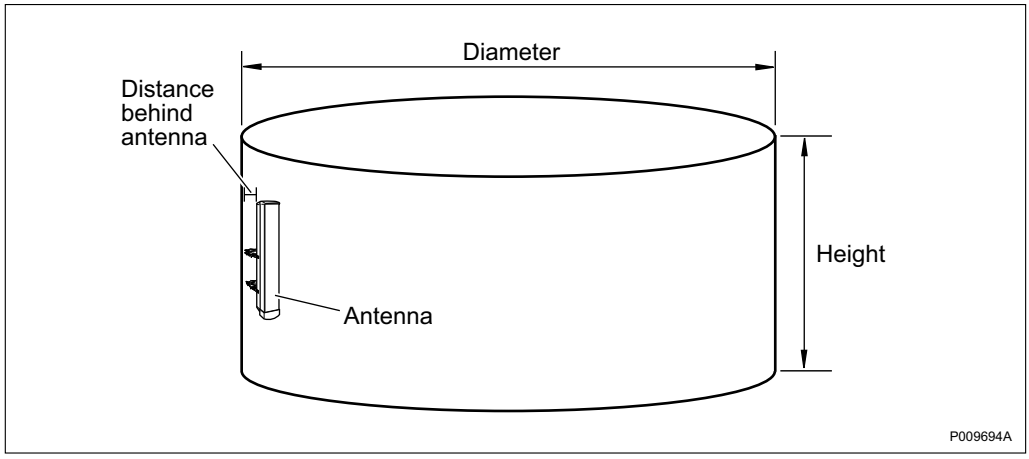

Figure 4 Compliance boundary cylinder

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 Site Installation Engineering Manual	*EN/LZN 720 0069*

Table 4 Compliance boundary dimensions for the general public (GP) and occupational (O) exposure for typical configurations.

		Dimensions of cylindrical compliance boundary in meter (m)					
		Diameter		**Height**		**Distance behind**	
Frequency (MHz)	**RBS configuration**	**GP**	**O**	**GP**	**O**	**GP**	**O**
900	3x2 uncombined	7	3	1.7	1.4	0.1	0.1
1800	3x2 uncombined	5	1	1.6	1.4	0.1	0.05
900	3x2 combined	4	1	1.5	1.4	0.1	0.1
1800	3x2 combined	2	0.5	1.4	1.4	0.1	0.05
900	3x1 comb. TCC	6	3	1.7	1.4	0.1	0.1
1800	3x1 comb. TCC	5	1	1.6	1.4	0.1	0.05

Compliance distances to the side of the antenna for occupational exposure are 0.15 m for all configurations above. For characteristics of an antenna recommended for typical configurations of an RBS 2207, *see Table 5.*

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	65 degrees
Vertical half-power beam width	14.5 degrees at 900 MHz, 7.8 degrees at 1800 MHz
Antenna gain	14 dBi at 900 MHz, 16.5 dBi at 1800 MHz
Downtilt	0 degrees

The maximum power fed to the antenna, as a function of the number of transceiver units (TRUs) per antenna and maximum power (including tolerances and transmission loss) per TRU, for RBS 2207, are given in *Table 6*.

Table 6 Maximum power to antenna for various RBS 2207 configurations

RBS configurations	Frequency (MHz)	Nominal output power per TRU (dBm)/(W)	Maximum power into antenna[1] (dBm)/(W)
3x2 uncombined	900	45.5/35	47.5/56.2
	1800	44.5/28	46.5/44.7
3x2 combined	900	42/16	44/25
	1800	41/13	43/20
3x1 combined TCC	900	48/63	47/50
	1800	47/50	46/40

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

4.4 Materials

All Ericsson products fulfill 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.

5 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 2207 cabinet contains the radio equipment, power supply and the climate equipment (fans). All required transmission equipment and battery back-up 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.

5.1 Standard Hardware Units

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

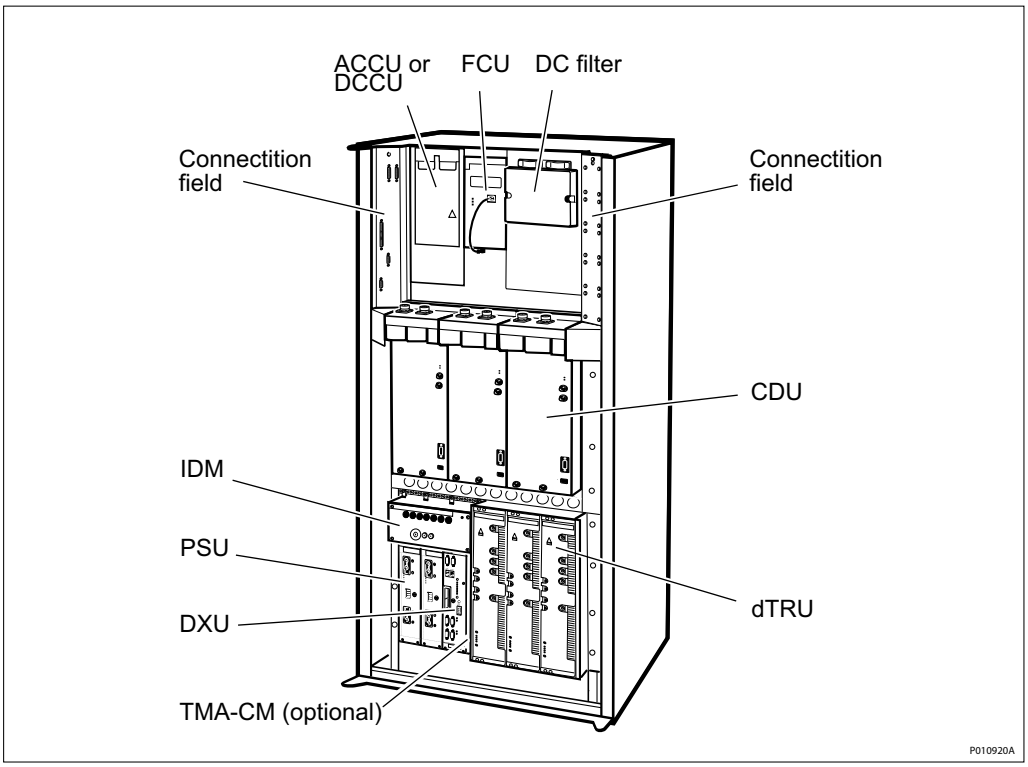

Figure 5 Standard hardware units

ACCU - AC Connection Unit

The ACCU distributes the incoming AC power supply voltages to the PSUs. The unit also contains AC filter equipment.

Number of units: 0 - 1

CDU - Combining and Distribution Unit

The 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 is a maximum of three CDUs in one RBS 2207.

The CDU distributes the received signal to several transceivers. The CDU supports EDGE. Both CDU-G and CDU-J is used in the RBS 2207. CDU-G and CDU-J can be configured either for high capacity or for high coverage. It is a combiner that can be used for synthesizer hopping. To achieve capacity, the

CDU uses the hybrid combiner in the dTRU. To achieve coverage, the CDU is used in a configuration when the hybrid combiner in the dTRU is not used.

Number of units: 1 - 3

DCCU - DC Connection Unit

The DCCU distributes the incoming DC power supply voltages to the PSUs. The unit also contains DC filter equipment.

Number of units: 0 - 1

dTRU - double Transceiver Unit

The dTRU contains two TRXs for 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 is also prepared for four-branch RX diversity, for further improvements in sensitivity.

Number of units: 1 - 3

DXU-21 - Distribution Switch Unit

The 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 for the RBS. It has a removable compact flashcard, which makes it possible to replace a faulty DXU without the need for loading RBS software from the BSC. It can handle both 2 Mbit (E1) and 1.5 Mbit (T1) PCM links.

Number of units: 1

FCU - Fan Control Unit

The FCU controls the four fans in the cooling system by regulating fan speed. The FCU is controlled by the DXU.

Number of units: 1

IDM-02 - Internal Distribution Module

The IDM contains circuit breakers for distribution of the internal +24 V DC power to the various units.

Number of units: 1

PSU - Power Supply Units

The PSUs are available in two versions, PSU AC for connection to AC mains, or PSU DC for connection to -48 to -60 V DC power supply. The PSU AC converts 120 - 250 V to regulated +24 V DC. The PSU DC converts -48 to -60 V DC to regulated +24 V DC.

Number of units: 0 - 2

DC Filter

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

Number of units: 0 - 1

5.2 Optional Hardware Units

This section describes the optional RBS 2207 hardware units.

Bias injector

The bias injector is used to provide the ddTMA with DC power, from the TMA-CM, over the RX/TX feeder cables. Six bias injectors can be connected to one TMA-CM. The BIAS-IC is mounted outside the cabinet, as close to the RF output as possible.

Number of units: 0 - 6

BBS

The RBS 2207 can be provided with battery back-up from an external cabinet, either a BBS 2000 or a BBS 2202 equipped with BFU-21 or BFU-22.

ddTMA - dual duplex Tower Mounted Amplifier

The ddTMA is to be mast-mounted and placed close to the antenna. It improves the receiver sensitivity. The ddTMA saves feeder cables by duplexing RX and TX signals to the same cable.

Number of units: 0 - 6

TMA-CM - Tower Mounted Amplifier - Control Module

The Control Module is used to provide up to six ddTMAs with 15 V DC power through the bias injector. It is also used to identify TMA faults and forward this information to the alarm module in the RBS.

Number of units per cabinet: 0 - 1

6 Interfaces

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

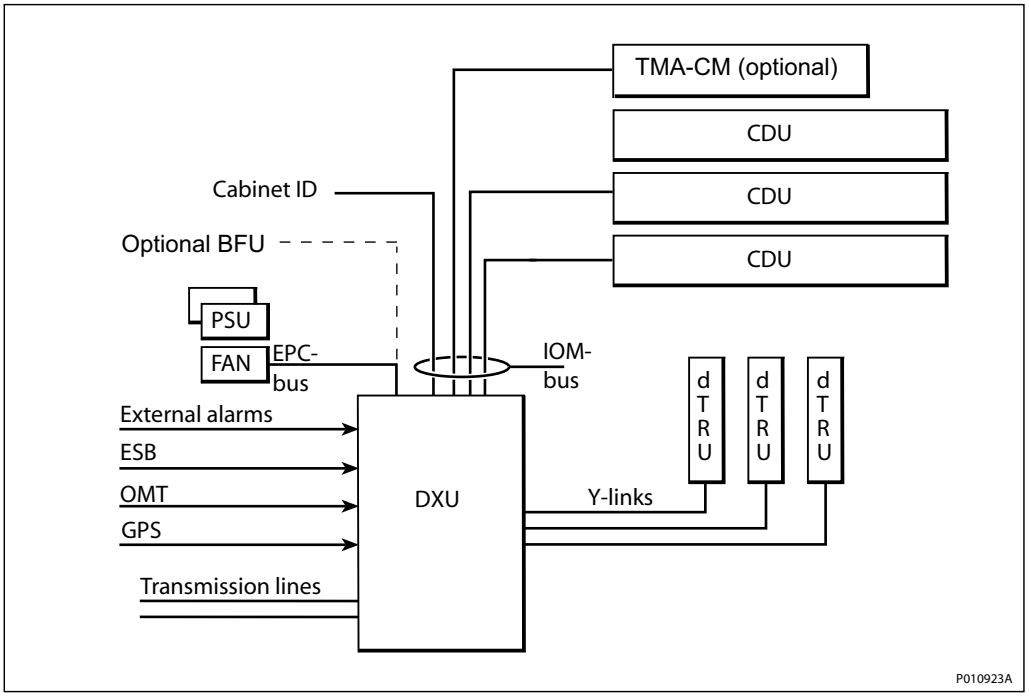

Figure 6 Block diagram showing internal power and signal paths

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.

6.1 External Connections

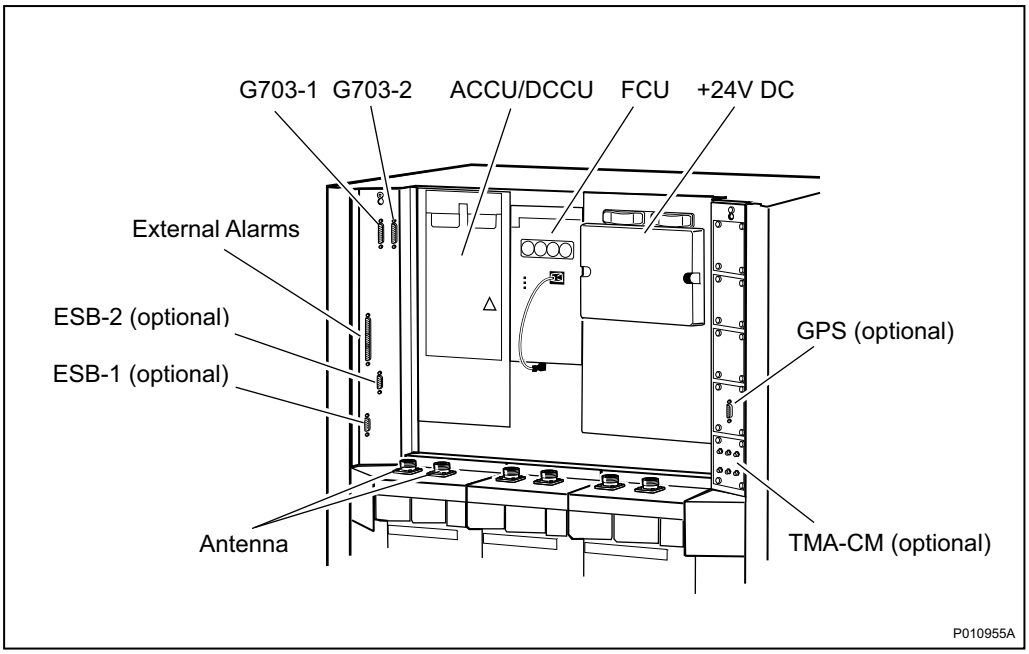

Figure 7 External connectors

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

Table 7 External connections

Connection Name	Description	Connector Type
CDU	Feeder (and bias injector) connection to antennas	7-16 female connector
G703-1	Transmission Link 1	15-pin female, D-sub
G703-2	Transmission Link 2	15-pin female, D-sub
External Alarms	External alarm inputs to 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
FCU RD	Optical cable connector from the BBS	Opto connector
FCU TD	Optical cable connector to the BBS	Opto connector

Table 7 External connections

+24 V DC	DC filter + connection	Cable clamp
+24 V DC	DC filter - connection	Cable clamp
Earth	Earth stud M8 to main earth cable	M8 stud
ACCU 1 - 2	Mains connection to PSU-AC 1 - 2	Screw terminal
DCCU 1 - 2	-48 V connection to PSU-DC 1 - 2	Screw terminal

6.2 Test Interface

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.

6.3 Operator Interface

The Man Machine Interface (MMI) in the RBS 2207 is based on visual indicators and buttons located on the hardware units in the cabinet.

Internal Indicators

Battery mode	Indicates that the RBS is running on battery
RBS fault	One or more faults are detected on RUs in the RBS
EPC bus fault	Indicates the state of the EPC bus
Ext alarm	One or more supervised external alarms are active
Fault	Fault detected and localised to the RU
Local mode	The RU is in local mode
Operational	The RU is operational
Test result	Indicates the result of tests
Transmission OK	Indicates state of transmission on ports A - D
RF off	RF not enabled

Buttons

dTRU reset	Resets the dTRU
DXU reset	Resets all subunits
Local/remote mode	Changes RU mode to local or remote
Test call	Initiates the test operation function

Barcode

The barcode for product identification is readable without disturbing the RBS function.

7 Power System

The power system of the RBS 2207 depends on the choice of power supply and may include a number of units outside the RBS.

The RBS 2207 can be connected either to AC mains supply voltage or to DC supply voltage.

Table 8 Power supply voltage alternatives

Nominal voltage	PSU
120 - 250 V AC, 50 - 60 Hz	PSU-AC
+24 V DC	PSU not needed
-48 to -60 V DC	PSU-DC

Note: It is mandatory that a readily accessible disconnect device is incorporated in the fixed wiring. The disconnect device must disconnect all live wires from the cabinet.

7.1 AC mains supply voltage

AC mains supply voltage is connected to the cabinet using two AC cables. If the power supply does not meet the AC power requirements, then filters and stabilisers must be installed to protect the equipment and ensure proper operation.

There are two ways to connect power to the RBS. They are:

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

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

Table 9 AC mains power requirements

Voltage range for specified Performance (phase voltage)	**120 - 250 V AC**
Voltage range	90 - 275 V AC (1)
Frequency	45 - 65 Hz
Inrush current, max.	30 A (1 - 30 ms)
Maximum AC power	1.4 kW x 2
Non-destructive range	0 - 275 V AC
Overvoltage <20 ms	325 V(2)
Maximum ground leakage current	10 mA x 2

(1) 1) 90 - 108 V AC with reduced output power. 1000 W per PSU

(2) 2) Install external filter and stabiliser if not met.

Mains Fuses

Table 10 Mains fuses recommendation

Minimum for Safe Function	**Recommended for Maximum Selectivity**	**Maximum Allowed Fuse Rating**
2x10 A /16 A(1)	2x16 A	2x20 A

(1) 1) For 200 - 250 V range only.

External Earth Fault Circuit Breakers

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

7.2 +24 V DC Supply Voltage

Table 11 DC power requirements

Nominal	+24 V DC
Default	+27.2 V DC
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)

Fuses

Table 12 +24 V DC fuse recommendation

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
1x80 A(1)	1x100 A	1x200 A

(1) May be used when no transmission and/or optional equipment is installed.

7.3 -48 to -60 V DC Supply Voltage

Table 13 DC supply voltage requirements

Nominal	-48 to -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)

Fuses

Table 14 -48 to -60 V DC fuse recommendation

Minimum for Safe Function	Recommended for Maximum Selectivity	Maximum Allowed Fuse Rating
2x32 A	2x35 A	2x40 A

7.4 Battery Back-up

Battery back-up can be used to power the site during mains failure and to protect the site from interruptions in the AC mains supply. It is available in an external cabinet.

In the event of mains failure, the batteries in the BBS 2000 or BBS 2202 deliver the necessary power to the radio cabinet as well as to the transmission equipment, if used. This enables the radio system to continue operating during mains failure. The transmission equipment is provided with power supply longer than the RBS.

Battery back-up can be delivered for at least 1, 2, 4, 6 or 8 hours back-up time, depending on the chosen configuration of the RBS. The BBS can feed +24 V DC or -48 V DC to transmission equipment. The -48 V DC supply requires an internal DC/DC converter in the BBS. It is possible to share battery back-up between an RBS 2202 or 2206 and an RBS 2207.

7.5 Power Consumption

The power consumption figures in the table below show peak load. The figures in the table have been rounded off.

Table 15 Power consumption

RBS 2207 Cabinet (fully equipped)	**Power Supply Voltage**		
	120 -250 V AC	+24 V DC	-48 V DC
Maximum power consumption	1.7/2.9[(1)]kW	1.4 kW	1.7 kW

(1) Power consumption during maximum battery charging

8 Transmission

The RBS 2207 is normally connected to a Distribution Frame (DF) that serves as an interface for the transmission (PCM) lines. Two PCM cables are connected to the ports on the connection field of the RBS. The RBS 2207 supports two transmission standards:

- T1 1.5 Mbit/s, 100 Ω balanced PCM line
- E1 2 Mbit/s, 75 Ω unbalanced (Transmission Adapter used), or 120 Ω balanced line

Link access procedures on C-channel (LAPD) concentration and LAPD multiplexing can be used to make the transmission resource more efficient.

PCM Overvoltage Module

This module is mounted in the DF and contains overvoltage protection for the PCM lines. If the PCM lines are terminated in equipment outside the RBS equipment room, these lines must then be protected by overvoltage protectors (OVP) in the DF. Failure to do so might damage the DXU-21, if a voltage transient is transported along the cable. The RBS 2207 is designed for 100/120 Ω balanced (twisted pair) cable. When a 75 Ω unbalanced (coaxial) cable is to be connected, the module contains a balun card that converts 75 Ω unbalanced to 100/120 Ω balanced line.

Optional Transmission Equipment

The cabinet can be connected to optional transmission equipment that is mounted externally. The optional transmission equipment used is:

- Transmission adapter to connect 75 Ω unbalanced line directly to the RBS

- Mini-link
- TMR 9202

9 Alarms

The RBS 2207 can be connected to a maximum of 16 external alarms. The DF is used for external alarm connection. Each alarm connection is provided with over-voltage protection. (One OVP module protects two alarm connections.) The alarm device can set the alarm by either an open or closed circuit.

The alarm device connected to the screw terminals should be isolated relay contacts. A closed contact (logic zero) is required to be below 2 kΩ, and an open contact (logic one) above 100 kΩ. The current through a closed 0 Ω contact is 1.2 mA. The voltage between terminals with an open contact is 24 V DC. The external alarms are defined during installation either using the Operation and Maintenance Terminal (OMT) or from the BSC.

10 Standards, Regulations and Dependability

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

10.1 Safety Standards

In accordance with the market requirements, the RBS 2207 complies with the following product safety standards:

- 73/23/EEC Low voltage directive
- IP 20 according to IEC/EN 60529
- Federal Communications Commission (FCC) rules, part 68
- EN 60950 / IEC 60950
- EN 60215 / IEC 60215
- UL 1950 / CSA C22.2 No.950

10.2 Other Standards and Regulations

Marking

The product is marked with signs to show 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 Conformité Européenne (CE) and FCC signs to show compliance to the legal requirements in respective region.

Electromagnetic Compatibility (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 to the legal requirements in each respective region.

Dependability

The RBS 2207 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 (cleaned if necessary) every year. The lifetime is estimated to be at least 7 years.
Air filters	The air filters must be regularly inspected and cleaned (interval depends on the environmental conditions at the site).

Vandal Resistance

Unauthorised access is not possible without damaging the unit.

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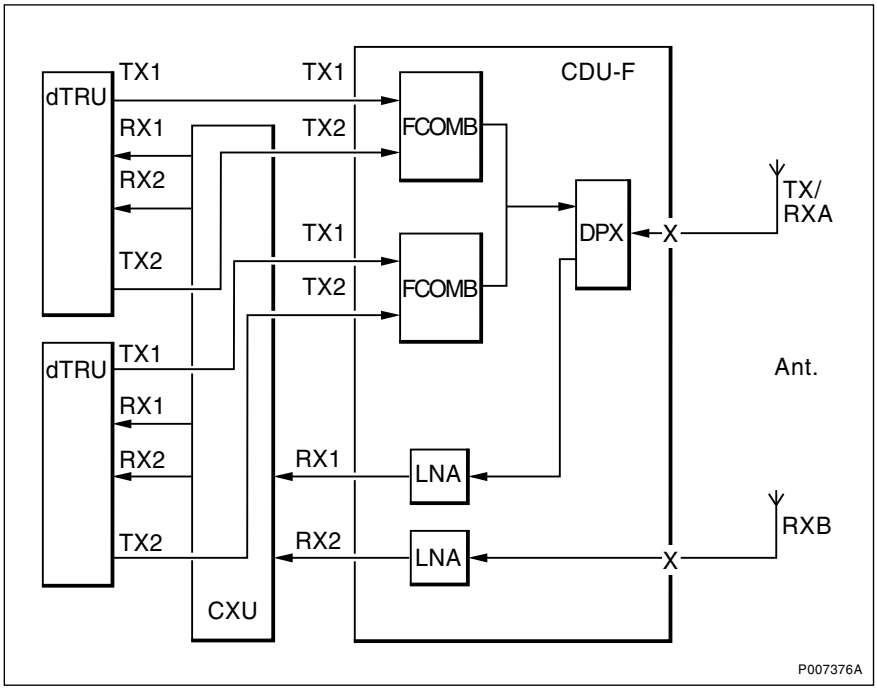
RBS 2106 and RBS 2206
Radio Configurations
Description

This document describes the radio configurations for RBS 2106 and RBS 2206.



Contents

1 Introduction

The radio configurations described are valid for RBS 2106 and RBS 2206, equipped with a maximum of six dTRUs/12 TRXs per cabinet. The descriptions include basic configurations, site cell configurations, and co-siting. They also include information about configurations with CDU-G and CDU-F as well as valid GSM frequencies (the GSM 800 configurations are valid from BSS R9).

1.1 Mobile Telephone System

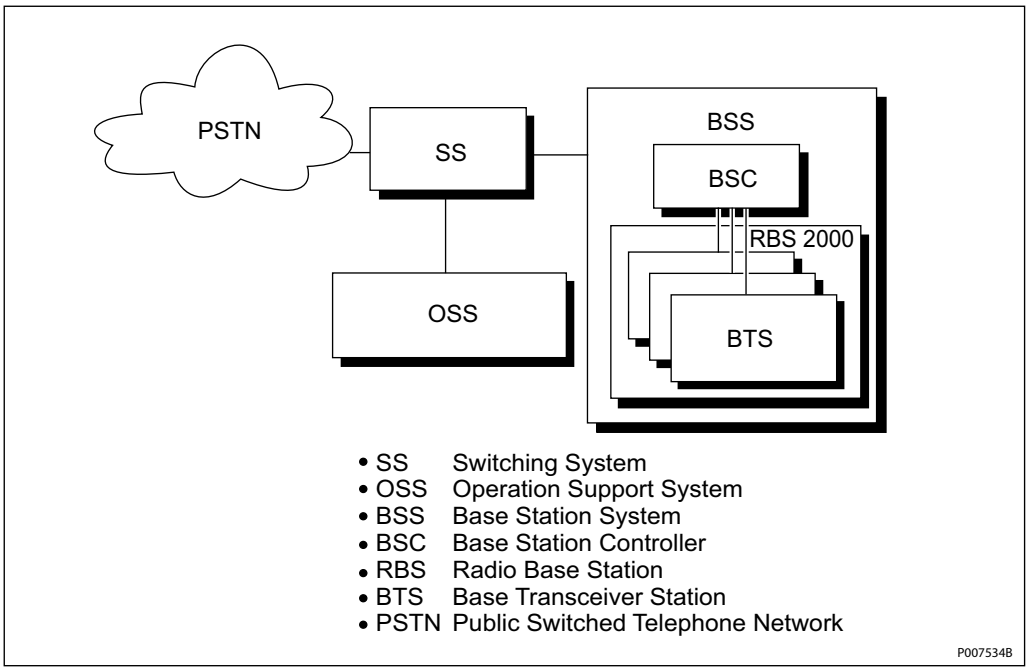


Figure 1 RBS 2000 in the Ericsson GSM System

The Base Station System (BSS) contains two functional entities; the Base Station Controller (BSC) and the Base Transceiver Station (BTS).

The BSC handles radio-related functions, such as handover, management of the radio network resources, and cell configuration data. It also controls radio frequency power levels in RBSs and MSs.

The BTS is a network component which serves one cell and is controlled by the BSC. The BTS contains a number of transceivers. It consists of the radio transceivers and all the digital signal processing equipment. RBS 2000 contains equipment for 1 – 3 BTSs.

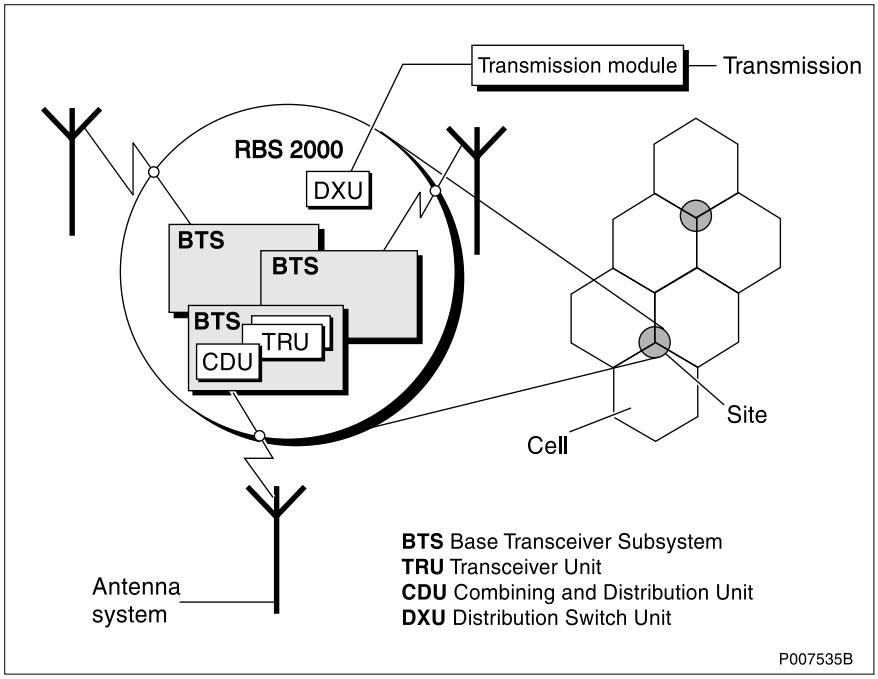


Figure 2 An Example of an RBS 2000 Servicing a Three-Cell Site

1.2 Radio Base Station

The Radio Base Station 2000 (RBS 2000) is Ericsson's second generation of RBS, developed to meet the GSM specifications for BTSs.

2 References

GSM:05.05 3GPP TS 45.005 release 4 Radio Transmission and Reception.

GSM:05.08 3GPP TS 45.008 release 4 Radio Subsystem Link Control.

3 Definitions

TMA

The Tower Mounted Amplifier (TMA) compensates for signal loss in the receiver antenna cables, reduces system noise and improves uplink sensitivity. The TMA can consist of a duplex filter. Duplex is the function that allows communication in two directions (sending and receiving) on one channel.

The TMA used for dTRU based products is dual duplex TMA (ddTMA).

Some configurations can use a TMA designed for reception only (rTMA).

Antenna Reference Point

The antenna reference point is the point where the radio signal crosses the RBS border, that is, the connector for the antenna feeder. See the figure below.

Note: The TMA is inside the RBS border.

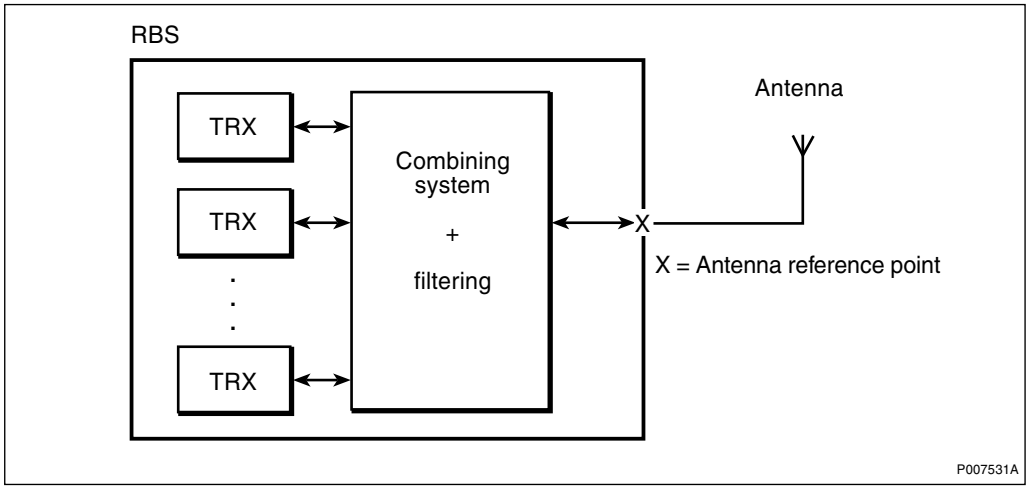


Figure 3 Antenna Reference Point

Antenna System

The antenna system is constituted by all RF transmission and reception antennas, directed to cover the same area or multi-casting configurations.

ASU

An Antenna Sharing Unit (ASU) is used for sharing RX antennas between RBSs.

BTS

A Base Transceiver Station (BTS) is a unit operating on a set of frequencies in one cell.

Basic Configuration

A basic configuration is a specified set of transceivers, Combining and Distribution Unit (CDU) (and in some cases) TMAs, connected to one antenna system.

A basic configuration can be multiplied or used in combination with other basic configurations to build the required site equipment.

Variations of a basic configuration may exist, differing in cable lengths. This depends on factors such as implementation in different cabinets.

RBS

An RBS is all equipment in an Ericsson base station, and may be comprised of several BTSs.

Each RBS has one DXU, controlling a maximum of 12 TRXs.

SCC

The Site Cell Configuration (SCC) is a geographical concept describing how an area around one RBS site is divided into radio traffic areas. The following types of site are defined:

Omni-site	Radio coverage in one 360 degree sector, that is in one area, using one BTS.
2-sector site	Radio coverage in two sectors, that is two distinct areas, using two BTSs.
3-sector site	Radio coverage in three sectors, that is three distinct areas, using three BTSs.

3.1 Cabinet Types

RBS 2106	Outdoor cabinet with a maximum of six dTRUs/12 TRXs per cabinet
RBS 2206	Indoor cabinet with a maximum of six dTRUs/12 TRXs per cabinet

4 Frequency Bands

GSM 800	Uplink:	824 – 849 MHz
	Downlink:	869 – 894 MHz
P-GSM 900	Uplink:	890 – 915 MHz
	Downlink:	935 – 960 MHz
E-GSM 900	Uplink:	880 – 915 MHz
	Downlink:	925 – 960 MHz

GSM 1800	Uplink:	1710 – 1785 MHz
	Downlink:	1805 – 1880 MHz
GSM 1900	Uplink:	1850 – 1910 MHz
	Downlink:	1930 – 1990 MHz

These frequency bands are supported by the configurations described in this document.

5 Basic Configurations

The GSM 800, GSM 900, GSM 1800 and GSM 1900 configurations meet the GSM requirements, except where otherwise stated.

The capacity of a configuration is defined at the TX and RX antenna reference points at the RBS border. There is an X close to every reference point in the following figures. The RBS border is not included in the figures.

The equivalent output power with SW power boost (TX diversity) configured is the original output power specified for the basic configuration increased by typically 3 dB, if separate TX antennas are used. The configurations that support SW power boost are listed in Section 6.3 on page 49.

Functional views of radio signal paths for various configurations are shown in Figure 4 on page 8 up to and including Figure 21 on page 40. Only components necessary to illustrate the configuration are shown.

In some configurations, the radio signal paths can differ depending on where in the cabinet the basic configuration is used. The figures show fully-equipped cabinets with two or three BTSs, that is two or three basic configurations are shown in the same figure. These are different physical implementations of the same basic configuration, not different configurations. The second BTS is drawn with dotted lines to show how an SCC in a fully-equipped cabinet is connected.

5.1 dTRU Topology

Configuration of Hybrid Combiner

The dTRU can be configured with or without the hybrid combiner, using two external cables.

Later versions of the dTRU do not use external hybrid cables, *see Figure 5 on page 9.*

RX Signals Distributed from Two Ports

The RX signals can be distributed from the RX1 and RX2 ports to all four receivers when both transceivers are connected to the same antenna system.

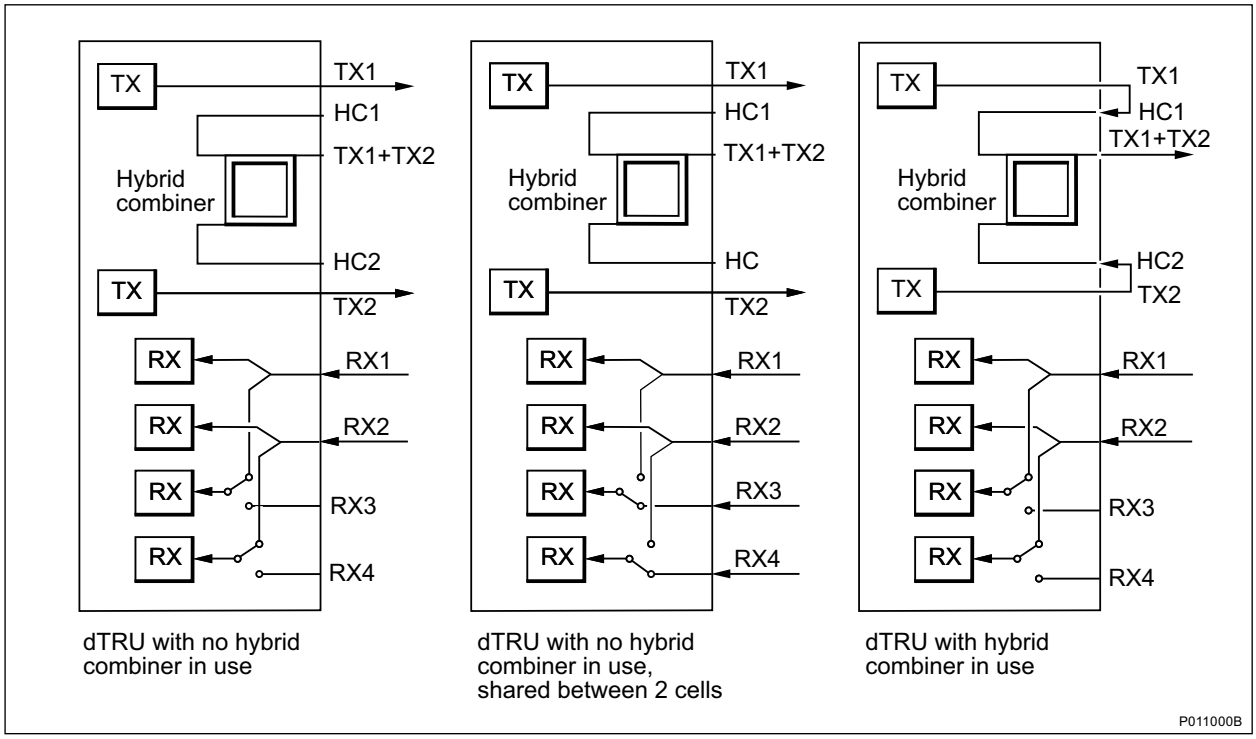


Figure 4 dTRUs with and without Hybrid Combiners in Use

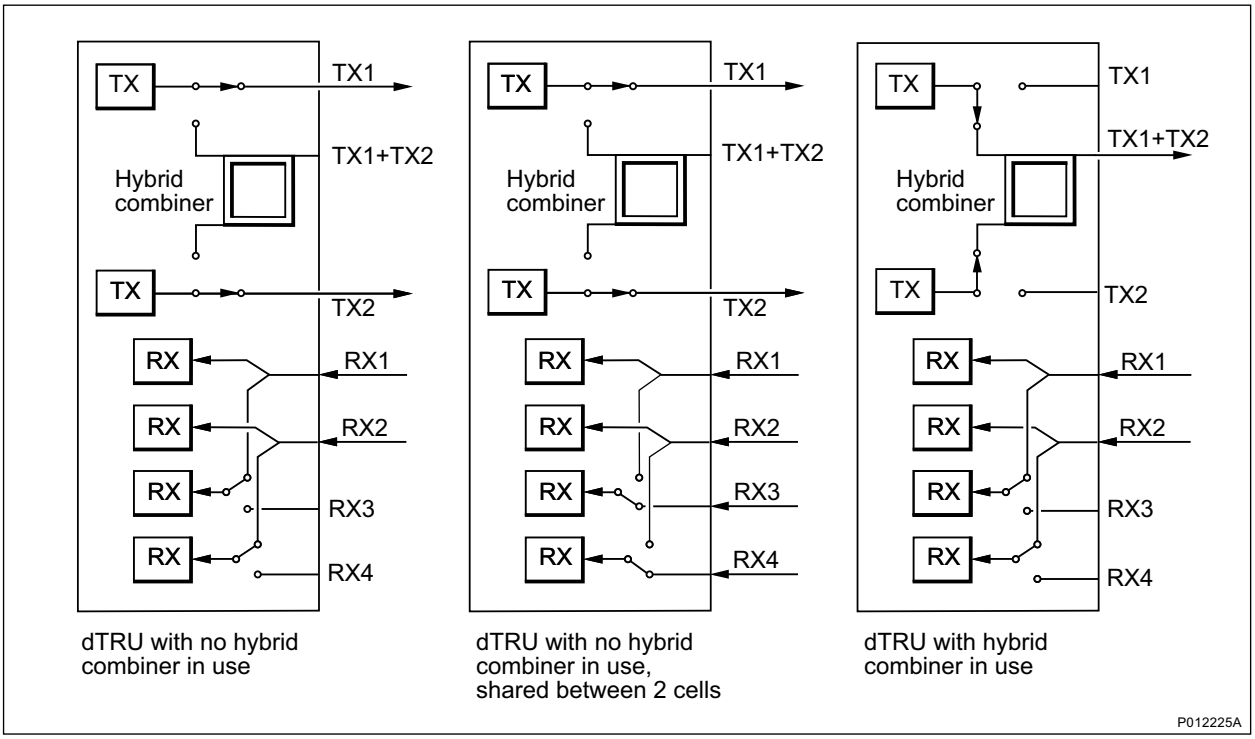


Figure 5 dTRUs with Internal Switch for Hybrid Combining

5.2 CDU-F Configurations

Configuration 1x4 CDU-F

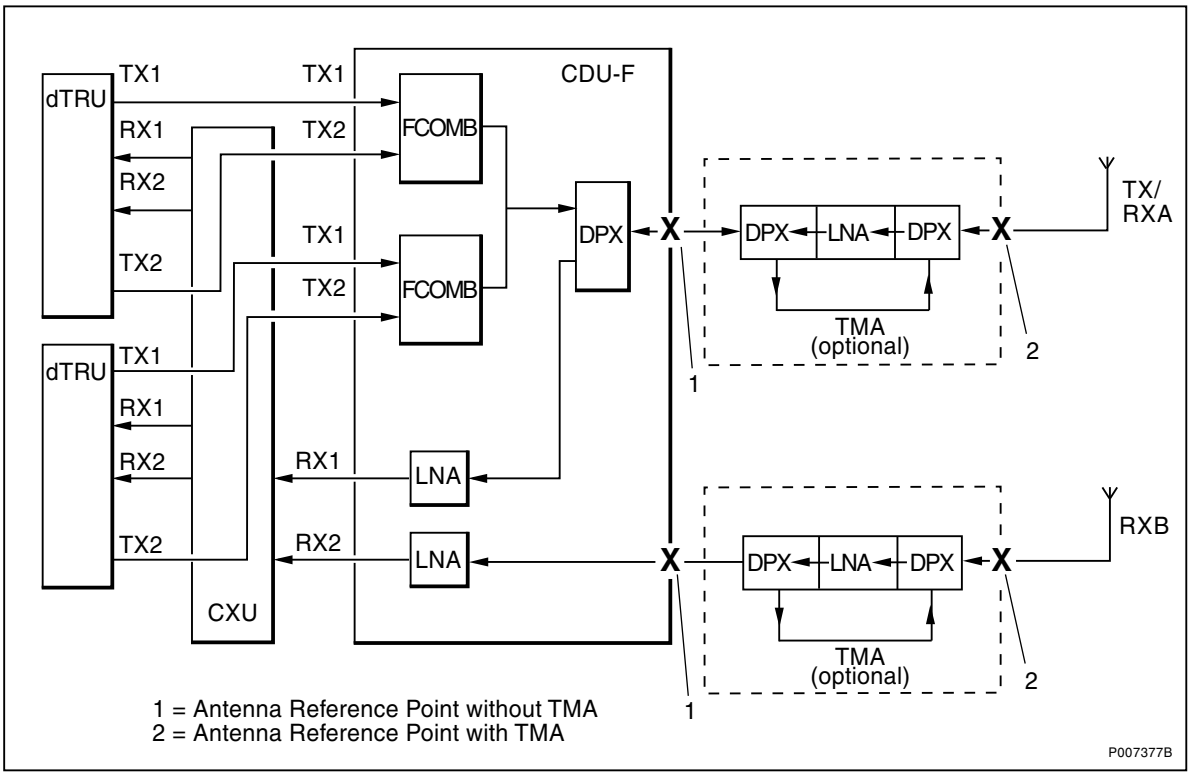


Figure 6 1x4 CDU-F

Characteristics

Number of CDUs	1	
Frequency band	E-GSM	(F9dt_2.4)
	GSM 1800	(F18dt_2.4)
Max. number of TRXs	4	
Number of feeders	2	
Number of antennas	2	
Antenna configuration	TX/RX + RX	
TMA configuration	ddTMA + ddTMA or ddTMA + rTMA	

Table 1 3 x 4 Configurations with CDU-F

Cell	Antenna	TMA No. (TMA Config. Only)	CDU No./Connector	CXU/dTRU No./Connector
1	TX/RXA	1	1/TX/RX	1/RX1, 2/RX1
	RXB	2	1/RX	1/RX2, 2/RX2
2	TX/RXA	3	2/TX/RX	3/RX2, 4/RX2
	RXB	4	2/RX	3/RX1, 4/RX1
3	TX/RXA	5	3/TX/RX	5/RX2, 6/RX2
	RXB	6	3/RX	5/RX1, 6/RX1

Configuration 2x6 CDU-F

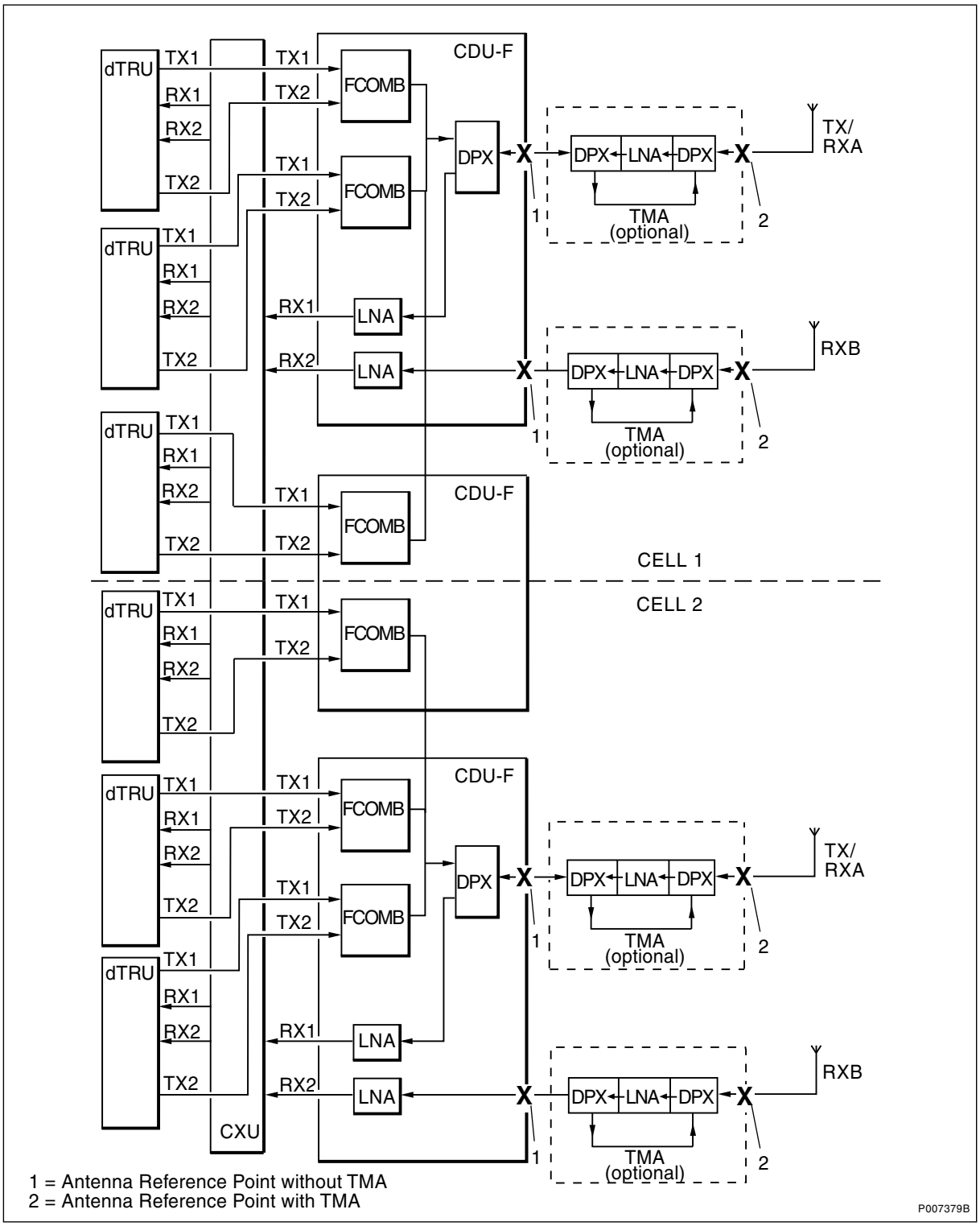


Figure 7 2x6 CDU-F

Characteristics

Number of CDUs	2[(1)]
Frequency band	E-GSM
	GSM 1800
Max. number of TRXs	6
Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + RX
TMA configuration (optional)	ddTMA + ddTMA or ddTMA + rTMA

Table 2 2 x 6 Configurations with CDU-F

Cell	Antenna	TMA No. (TMA Config. Only)	CDU No./Connector	CXU/dTRU No./Connection
1	TX/RXA	1	1/TX/RX	1/RX1, 2/RX1, 3/RX1
	RXB	2	1/RX	1/RX2, 2/RX2, 3/RX2
2	TX/RXA	5	3/TX/RX	4/RX1, 5/RX2, 6/RX2
	RXB	6	3/RX	4/RX2, 5/RX1, 6/RX1

Configuration 1x8 CDU-F

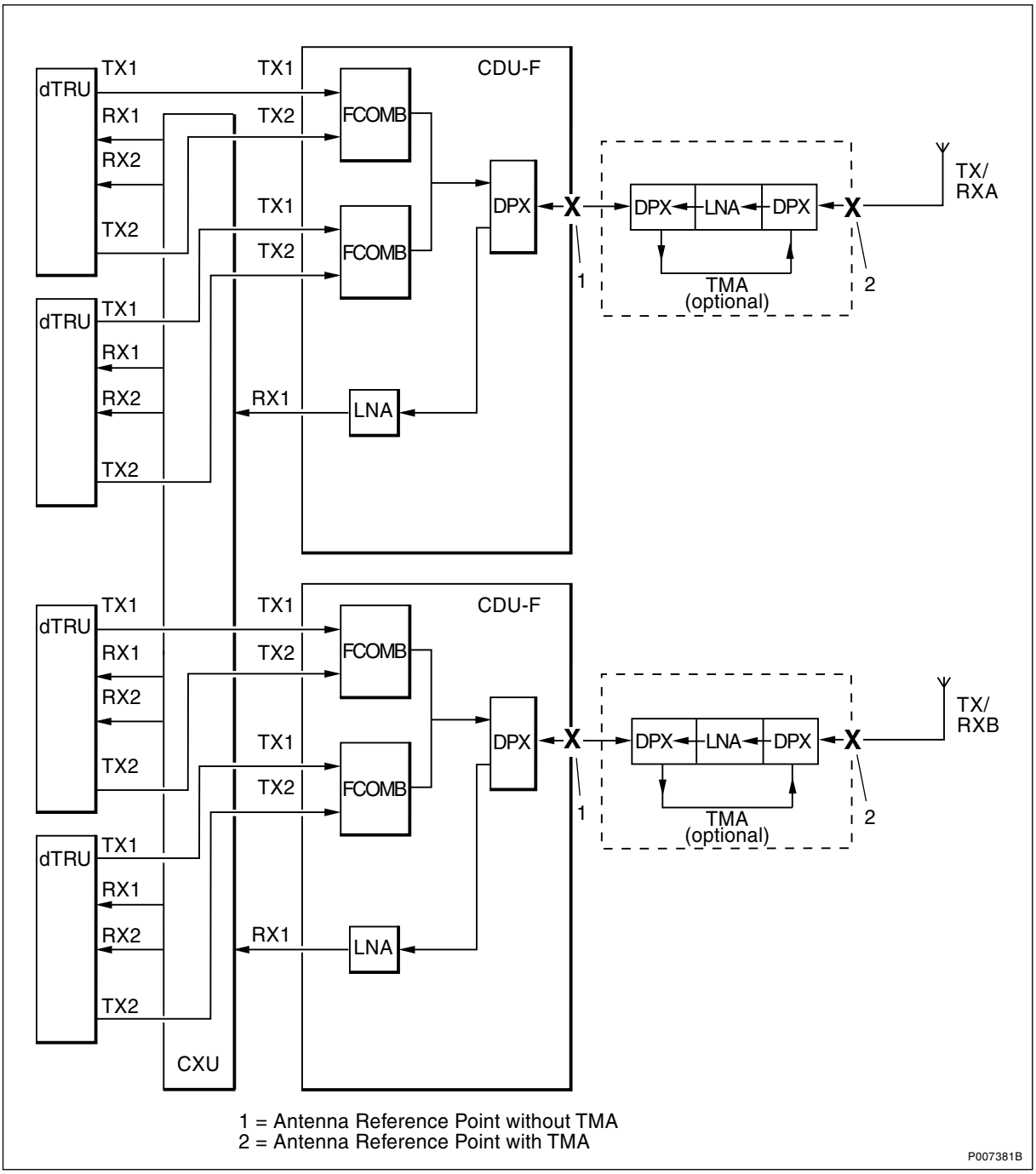


Figure 8 1x8 CDU-F

Characteristics

Number of CDUs	2

Characteristics

Frequency band	E-GSM
	GSM 1800
Max. number of TRXs	8
Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + TX/RX
TMA configuration (optional)	ddTMA + ddTMA

Table 3 Configurations with CDU-F and Maximum 8 TRXs per Cell

Cell	**Antenna**	**TMA** **No. (TMA Config. Only)**	**CDU** **No./Connector**	**CXU/dTRU** **No./Connection**
1	TX/RXA	1	1/TX/RX	1/RX1, 2/RX1, 3/RX1, 4/RX1
	TX/RXB	3	2/TX/RX	1/RX2, 2/RX2, 3/RX2, 4/RX2
Alt. 1	TX/RXA	3	2/ TX/RX	3/RX2, 4/RX2, 5/RX1, 6/RX1
	TX/RXB	5	3/TX/RX	3/RX1, 4/RX1, 5/RX2, 6/RX2

Configuration 1x8 CDU-F Shared between Two Cabinets

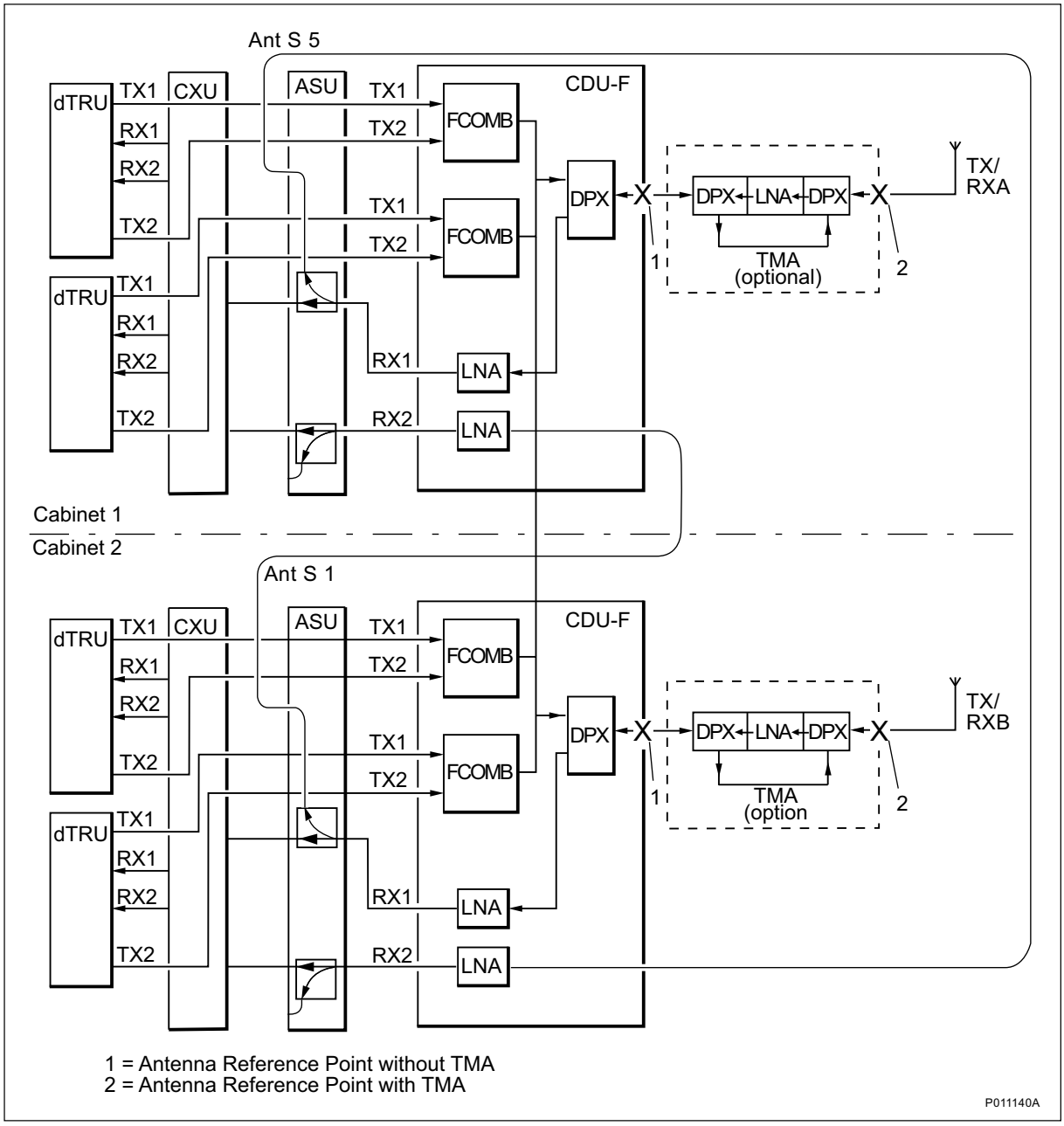


Figure 9 1 x 8 CDU-F Configuration, Mid-Sector

Characteristics

Number of CDUs	1 per cabinet
Frequency band	E-GSM

Characteristics

	GSM 1800
Max. number of TRXs	4 per cabinet
Number of feeders	2 + co-siting cables
Number of antennas	2
Antenna configuration	TX/RX + TX/RX
TMA configuration (optional)	ddTMA + ddTMA

Table 4 1 x 8 CDU-F (mid-sector)

Cell	Antenna	TMA No. (TMA Config. Only)	CDU No./Connector	CDU/dTRU No./Connector
2 Cabinet 1	TX/RXA	5	3/TX/RX	5/RX2, 6/RX2
	RXB(1)		3/RX	5/RX1, 6/RX1
2 Cabinet 2	TX/RXB	1	1/TX/RX	1/RX1, 2/RX1
	RXA(1)		1/RX	1/RX2, 2/RX2

(1) Via co-siting cable

Configuration 1x12 CDU-F

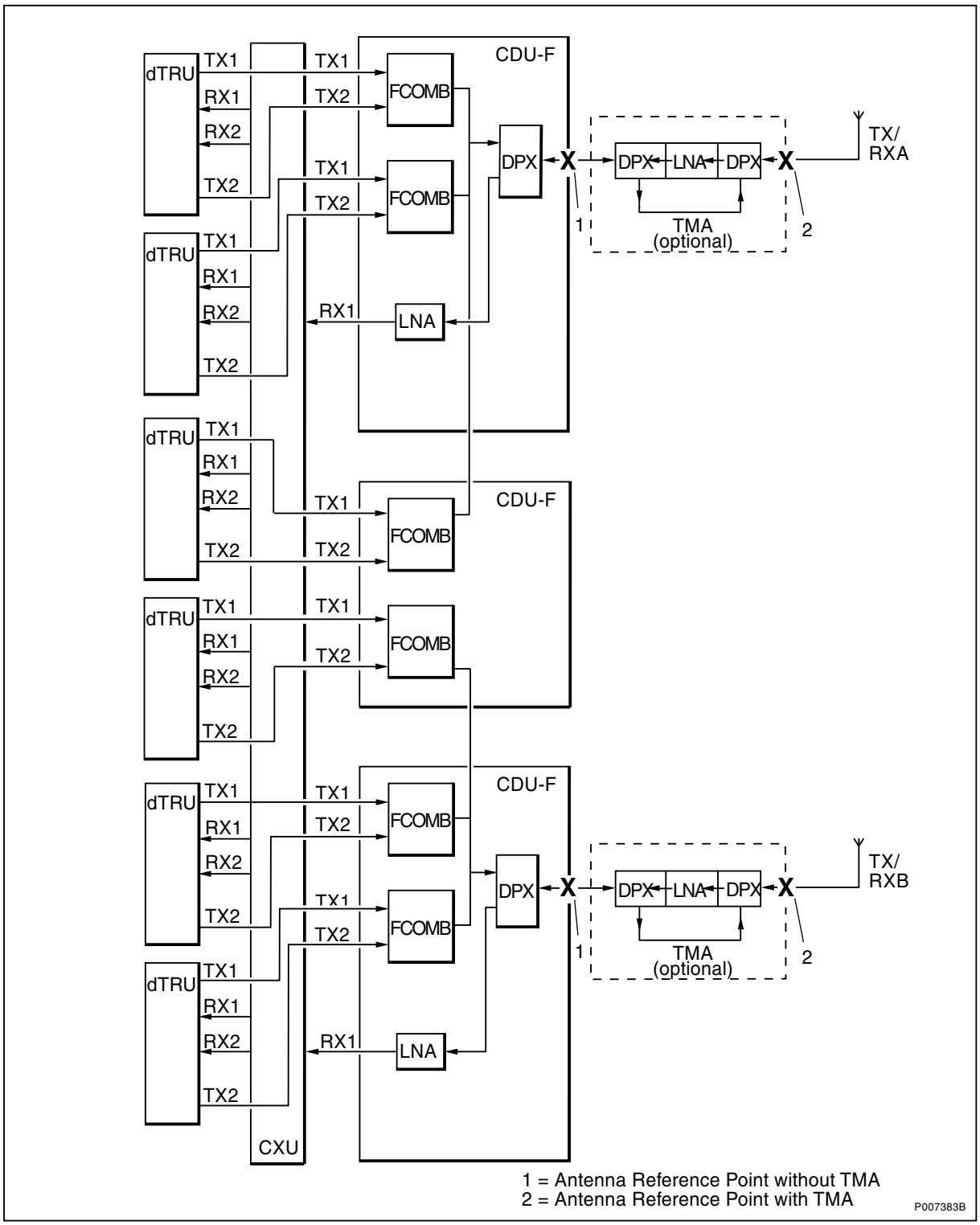


Figure 10 1x12 CDU-F

Table 5 Configurations with CDU-F and 12 TRXs per Cell

Antenna	TMA No. (TMA Config. Only)	CDU No./Connector	CXU/dTRU No./Connection
TX/RXA	1	1/TX/RX	1..6/RX1
TX/RXB	5	3/TX/RX	1..6/RX2

5.3 CDU-G Configurations

Configuration 2x1 CDU-G without Hybrid Combiner

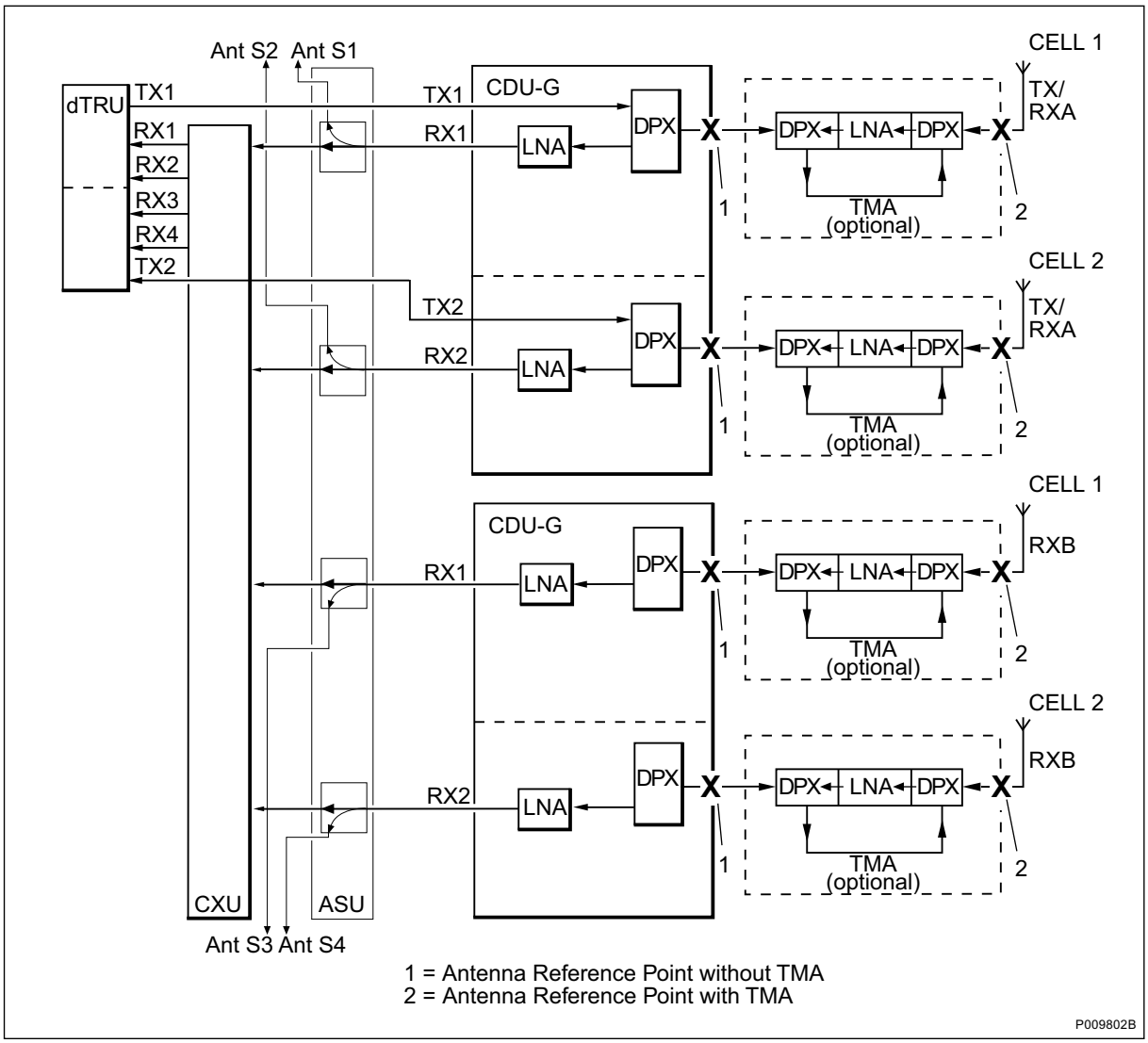


Figure 11 2x1 CDU-G Uncombined

In the figure above, Ant S1 – S4 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 6 on page 20.*

Characteristics

Number of CDUs	2 (2 CDUs support two sectors)
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
	GSM 1800
	GSM 1900
Max. number of TRXs	1 (1 dTRU supports two sectors)
Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + RX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 6 2x1 Configurations with CDU-G

Cell	Antenna	TMA	CDU No./Connector	Antenna Sharing Connector (Co-siting Only)	dTRU/CXU No./Connector
1	TX/RXA	1	1/TX/RX1	1	1/RX1
	RXB	3	2/TX/RX1	3	1/RX2
2	TX/RXA	2	1/TX/RX2	2	1/RX4
	RXB	4	2/TX/RX2	4	1/RX3

For cell 3, see Figure 12 on page 21 or Figure 16 on page 30

Configuration 1x2 CDU-G without Hybrid Combiner

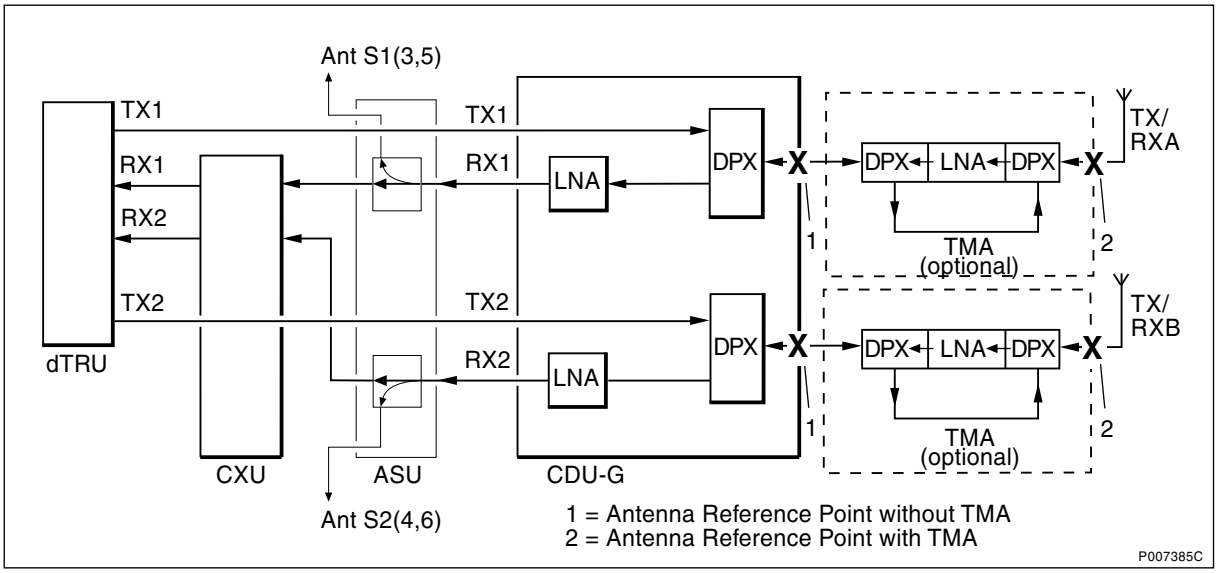


Figure 12 1x2 CDU-G Uncombined

In the figure above, Ant S1 and Ant S2 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 7 on page 22.*

Characteristics

Number of CDUs	1
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
	GSM 1800
	GSM 1900
Max. number of TRXs	2
Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + TX/RX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 7 Configurations with CDU-G 2 Uncombined TRXs per cell

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Connector	dTRU/CXU No./Connector
1	TX/RXA	1	1	1/TX/RX1	1/RX1
	TX/RXB	2	2	1/TX/RX2	1/RX2
2	TX/RXA	3	3	2/TX/RX1	3/RX2
	TX/RXB	4	4	2/TX/RX2	3/RX1
3	TX/RXA	5	5	3/TX/RX1	5/RX2
	TX/RXB	6	6	3/TX/RX2	5/RX1

Configuration 1x4 CDU-G without Hybrid Combiner

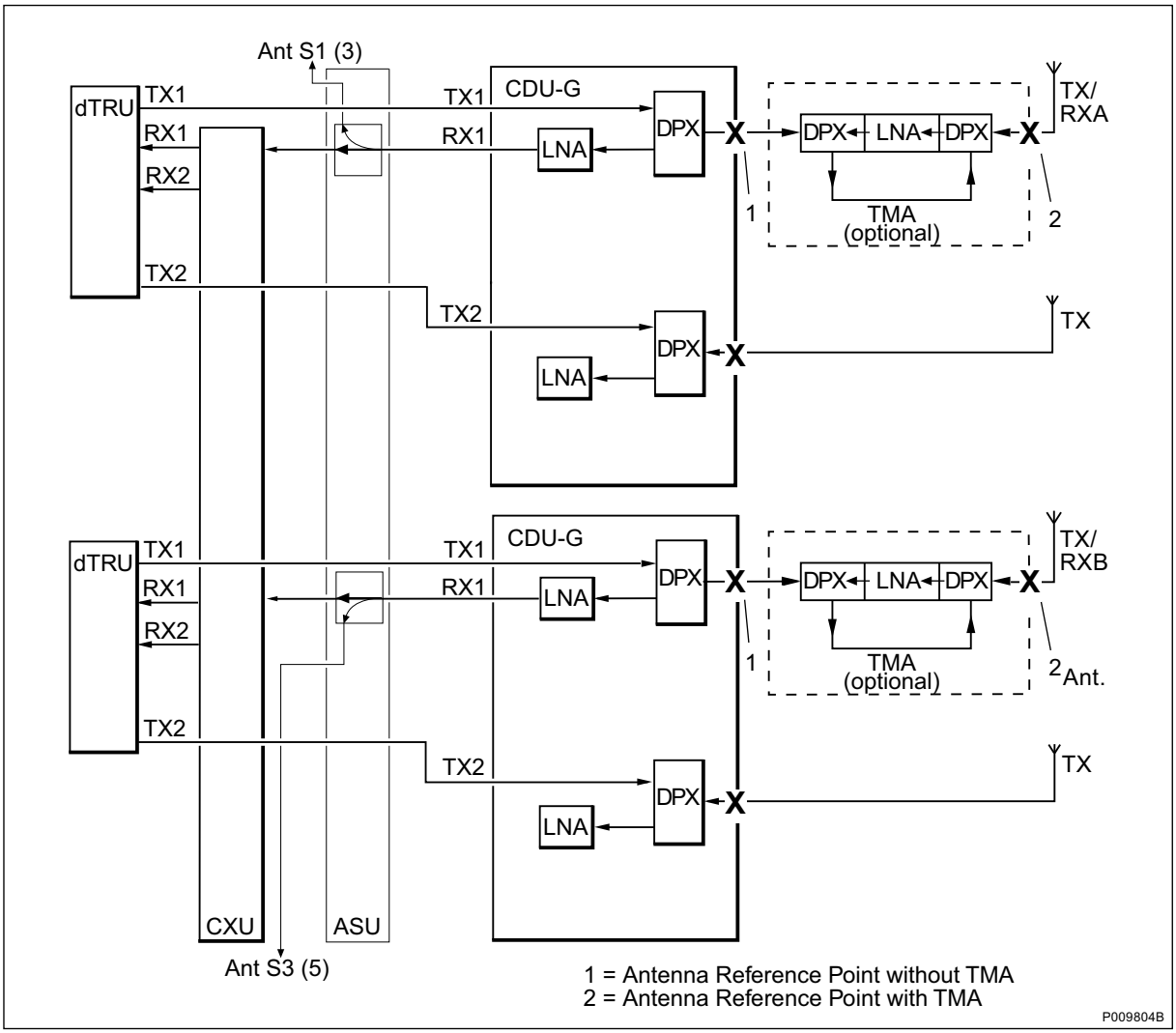


Figure 13 1x4 CDU-G Uncombined

In the figure above, Ant S1 and Ant S3 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 8 on page 24.*

Characteristics

Number of CDUs	2
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
	GSM 1800

Characteristics

	GSM 1900
Max. number of TRXs	4
Number of feeders	4
Number of antennas	4
Antenna configuration	TX/RX + TX + TX/RX + TX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 8 1 x 4 Configurations with CDU-G, 4 Uncombined TRXs per Cell

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Connector	dTRU/CXU No./Connector
1	TX/RXA	1	1	1/TX/RX1	1/RX1, 3/RX1
	TX/RXB	3	3	2/TX/RX1	1/RX2, 3/RX2

Configuration 1x6 CDU-G without Hybrid Combiner

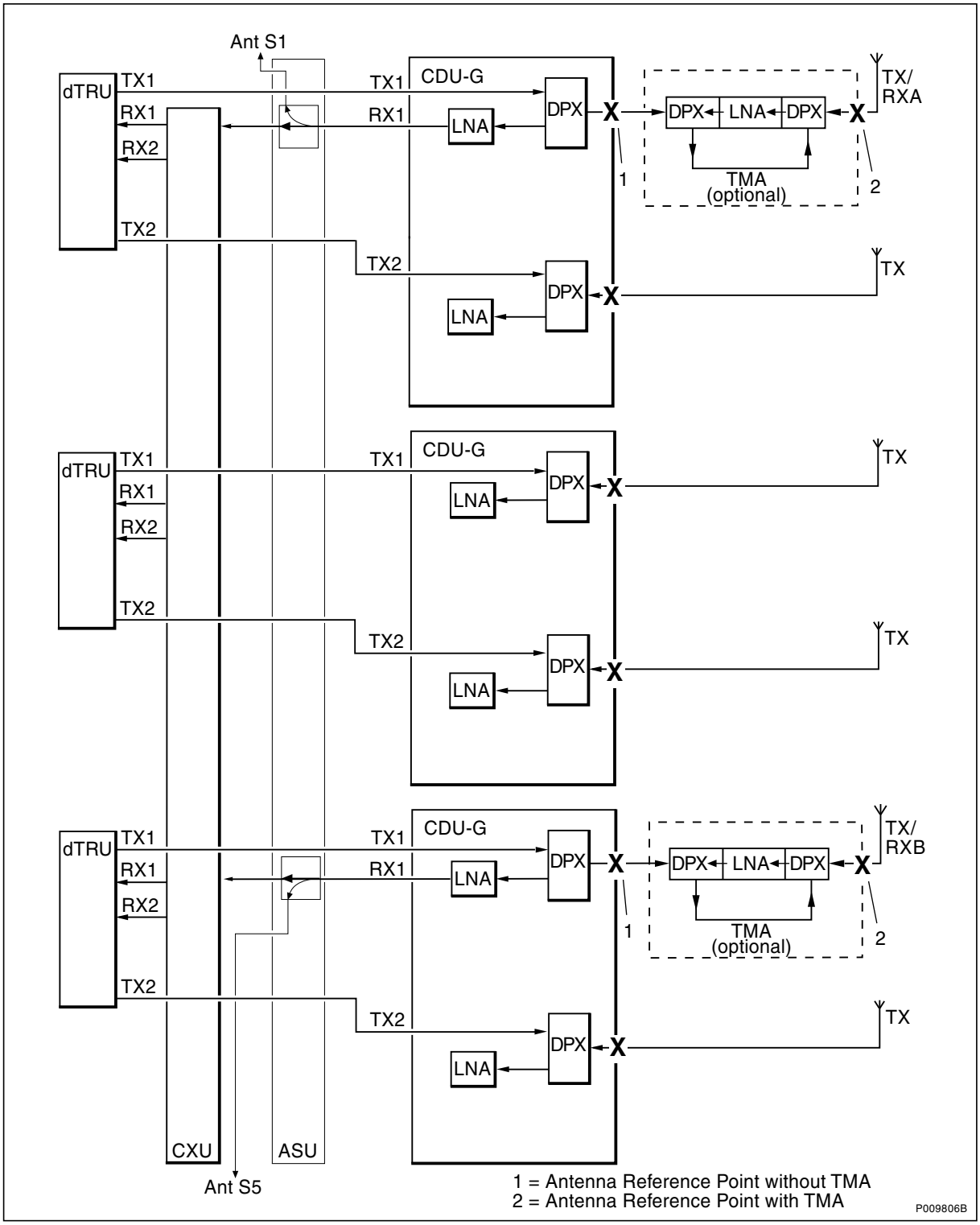


Figure 14 1x6 CDU-G Uncombined

In the figure above, Ant S1 and Ant S2 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 9 on page 27*

Characteristics

Number of CDUs	3
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
	GSM 1800
	GSM 1900
Max. number of TRXs	6
Number of feeders	6
Number of antennas	6
Antenna configuration	TX/RX + TX + TX + TX + TX/RX + TX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 9 Configurations with CDU-G and 6 Uncombined TRXs per Cell

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Connector	dTRU/CXU No./Connector
1	TX/RXA	1	1	1/TX/RX1	1/RX1, 3/RX1, 5/RX1
	TX/RXB	5	5	3/TX/RX1	1/RX2, 3/RX2, 5/RX2

Configuration 2x3 CDU-G

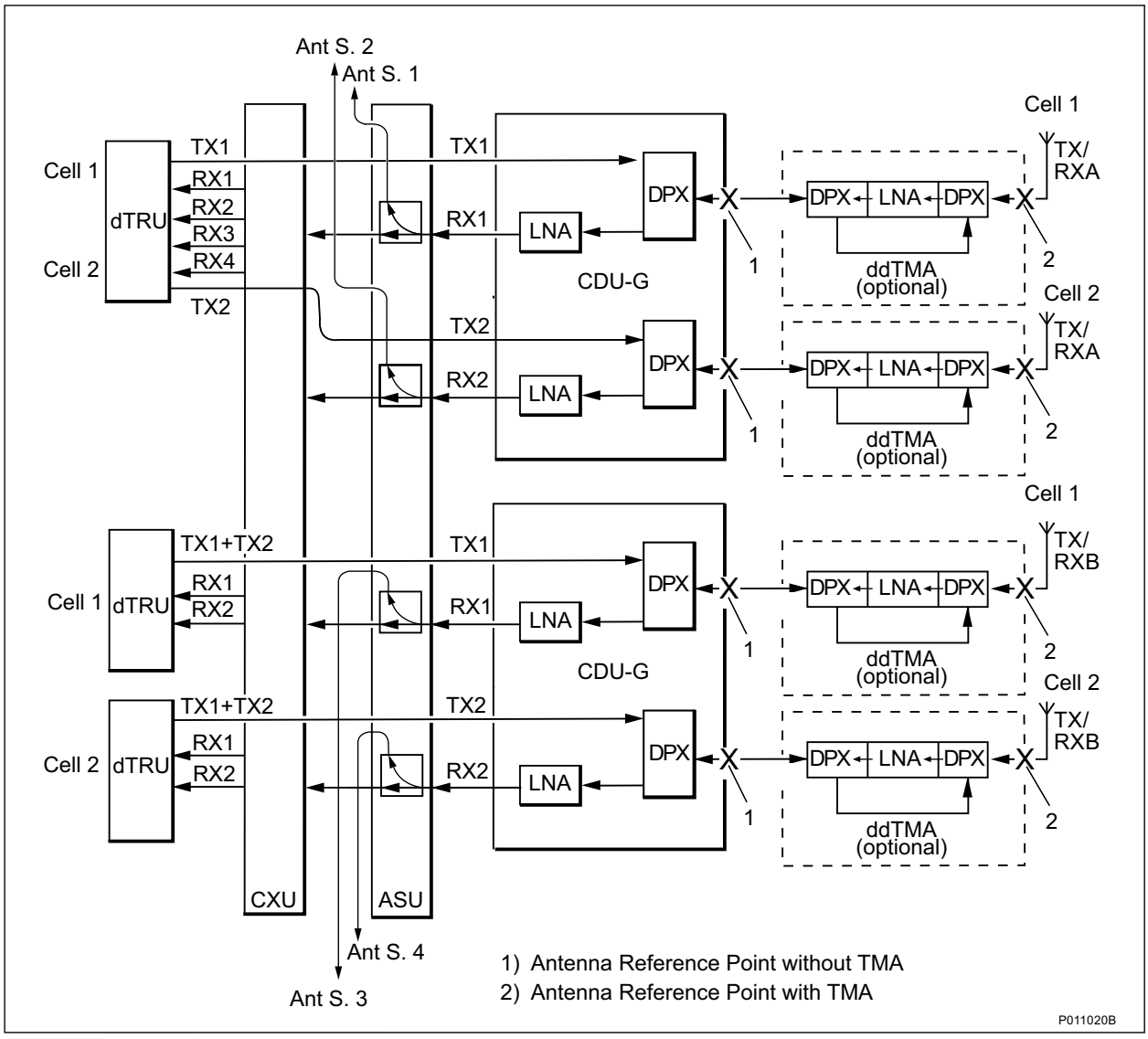


Figure 15 2 x 3 CDU G

In the figure above, Ant S1 — S4 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, see the table below.

Characteristics

Number of CDUs	2
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900

Characteristics

	GSM 1800
	GSM 1900
Max. number of TRXs	6
Number of feeders	4
Number of antennas	4
Antenna configuration	TX/RXA + TX/RXB + TX/RXA
TMA configuration (optional)	ddTMA + ddTMA + ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 10 2x3 CDU-G Configuration

Cell	Antenna	TMA No (TMA configurations only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Conn.	dTRU
1	TX/RX A	1	1	1/TXRX1	1/RX1, 3/RX1
	TX/RX B	3	2	2/TX/RX1	1/RX2, 3/RX2
2	TX/RX A	2	3	1/TX/RX2	1/RX4, 4/RX2
	TX/RX B	4	4	2/TX/RX2	1/RX3, 4/RX1

Configuration 1x4 CDU-G with Hybrid Combiner

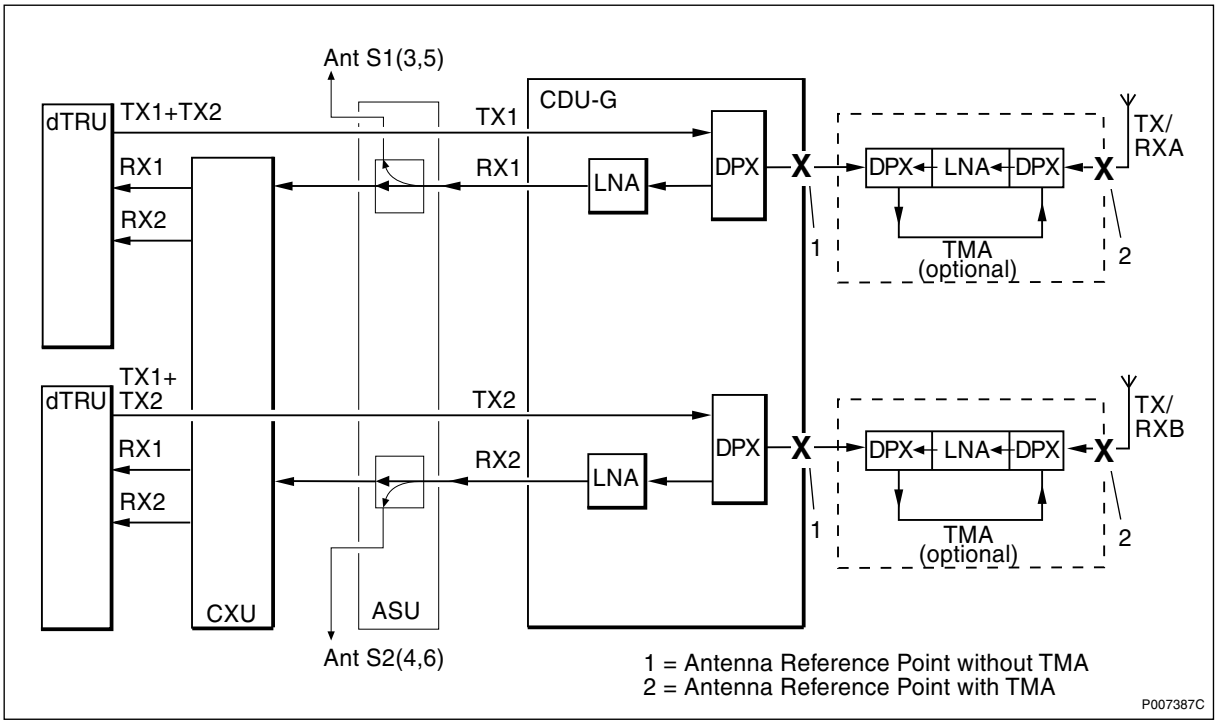


Figure 16 1x4 CDU-G Combined

In the figure above, Ant S1 and Ant S2 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 11 on page 31.*

Characteristics

Number of CDUs	1
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
	GSM 1800
	GSM 1900
Max. number of TRXs	4
Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + TX/RX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 11 Configurations with CDU-G and 4 Combined TRXs per Cell

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Connector	CXU/dTRU No./Connector
1	TX/RXA	1	1	1/TX/RX1	1/RX1, 2/RX1
	TX/RXB	2	2	1/TX/RX2	1/RX2, 2/RX2
2	TX/RXA	3	3	2/TX/RX1	3/RX2, 4/RX2
	TX/RXB	4	4	2/TX/RX2	3/RX1, 4/RX1
3	TX/RXA	5	5	3/TX/RX1	5/RX2, 6/RX2
	TX/RXB	6	6	3/TX/RX2	5/RX1, 6/RX1

Configuration 2x6 CDU-G with Hybrid Combiner

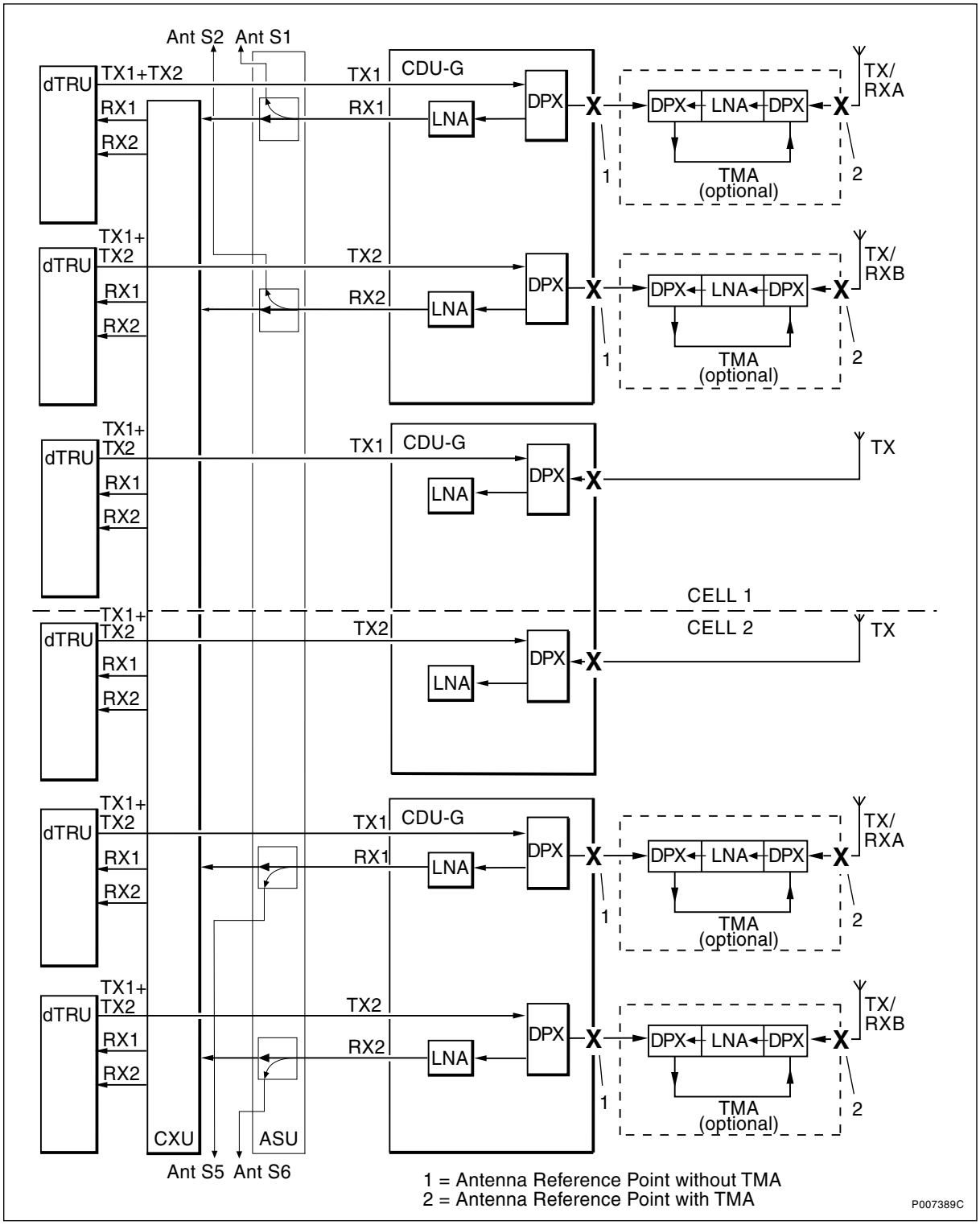


Figure 17 2x6 CDU-G Combined

In the figure above, Ant S1, Ant S2 and so on represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 12 on page 33.*

Characteristics

Number of CDUs	2[1]
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
	GSM 1800
	GSM 1900
Max. number of TRXs	6
Number of feeders	3
Number of antennas	3
Antenna configuration	TX/RX + TX/RX + TX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 12 2 x 6 Configurations with CDU-G

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Connector	CXU/dTRU No./Connector
1	TX/RXA	1	1	1/TX/RX1	1/RX1, 2/RX1, 3/RX1
	TX/RXB	2	2	1/TX/RX2	1/RX2, 2/RX2, 3/RX2
2	TX/RXA	5	5	3/TX/RX1	4/RX1, 5/RX2, 6/RX2
	TX/RXB	6	6	3/TX/RX2	4/RX2, 5/RX1, 6/RX1

Configuration 1x8 CDU-G with Hybrid Combiner

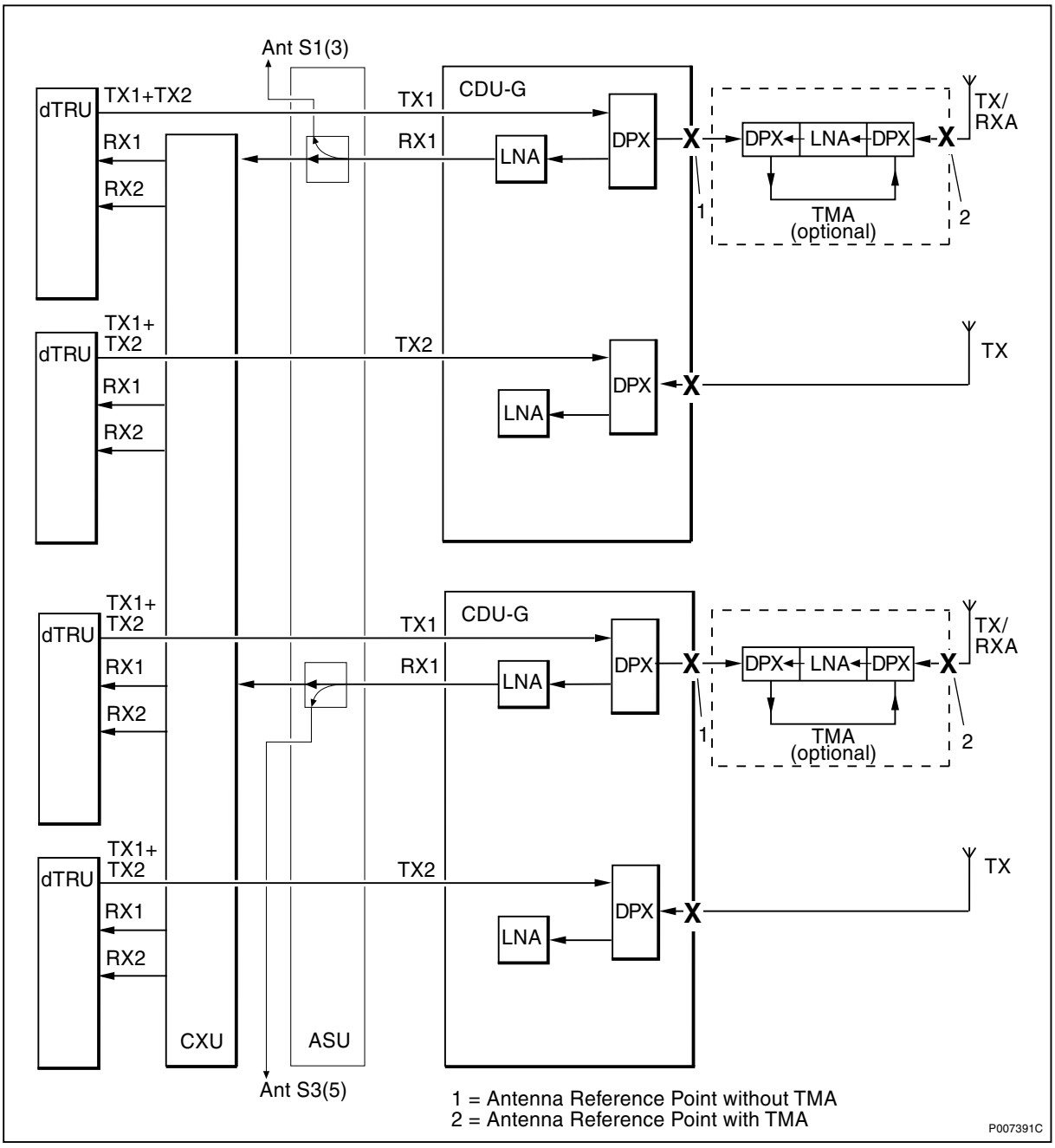


Figure 18 1x8 CDU-G with Hybrid Combiner

Characteristics

Number of CDUs	2
Frequency band	GSM 800

Characteristics

	P-GSM 900
	E-GSM 900
	GSM 1800
	GSM 1900
Max. number of TRXs	8
Number of feeders	4
Number of antennas	4
Antenna configuration	TX/RX + TX + TX/RX + TX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 13 1 x 8 Configurations with CDU-G with HCU and 8 TRXs per Cell

Cell	**Antenna**	**TMA** **No. (TMA Config. Only)**	**Antenna Sharing Connector** **(Co-siting Only)**	**CDU** **No./Connec-tor**	**CXU/dTRU** **No./Connec-tor**
1	TX/RXA	1	1	1/TX/RX1	1..4/RX1
	TX/RXB	3	3	2/TX/RX1	1..4/RX2
Alt.1	TX/RXA	3	3	2/TX/RX1	3/RX2, 4/RX2 5/RX1, 6/RX1
	TX/RXB	5	5	3/TX/RX1	3/RX1, 4/RX1 5/RX2, 6/RX2

Configuration 1x8 CDU-G with HCU

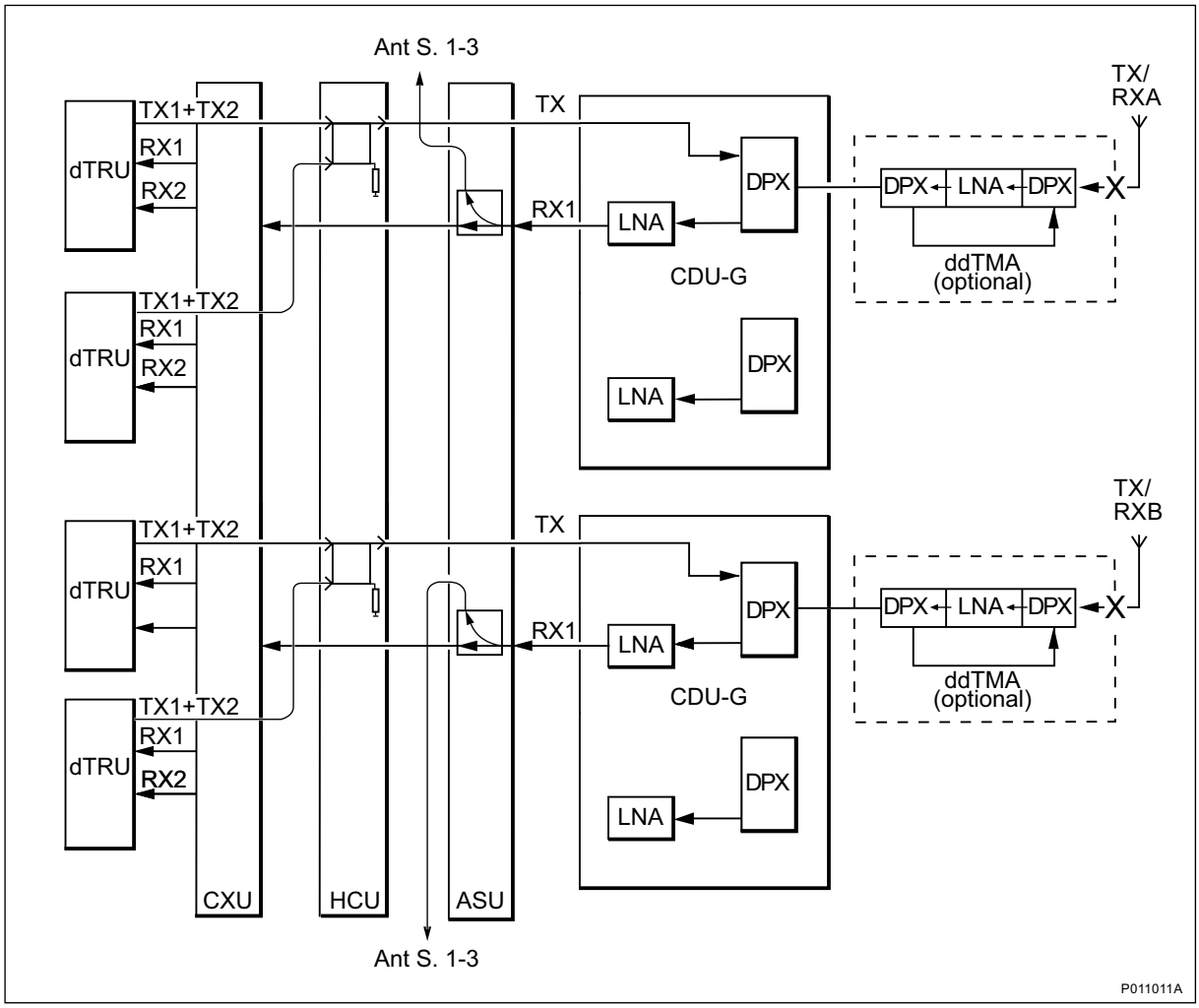


Figure 19 1x8 CDU-G with HCU

In the figure above, Ant S1 and Ant S3 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 15 on page 39.*

Characteristics

Number of CDUs	2
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
Max. number of TRXs	8

Characteristics

Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + TX/RX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 14 1 x 8 Configurations with CDU-G with HCU

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector (Co-siting Only)	CDU No./Connec-tor	CXU/dTRU No./Connec-tor
1	TX/RXA	1	1	1/TX/RX1	1..4/RX1
	TX/RXB	3	3	2/TX/RX1	1..4/RX2
Alt.1	TX/RXA	3	3	2/TX/RX1	3..4/RX2, 5..6/RX1
	TX/RXB	5	5	3/TX/RX1	3..4/RX1, 5..6/RX2

1x8 CDU-G with HCU Shared Between two Cabinets

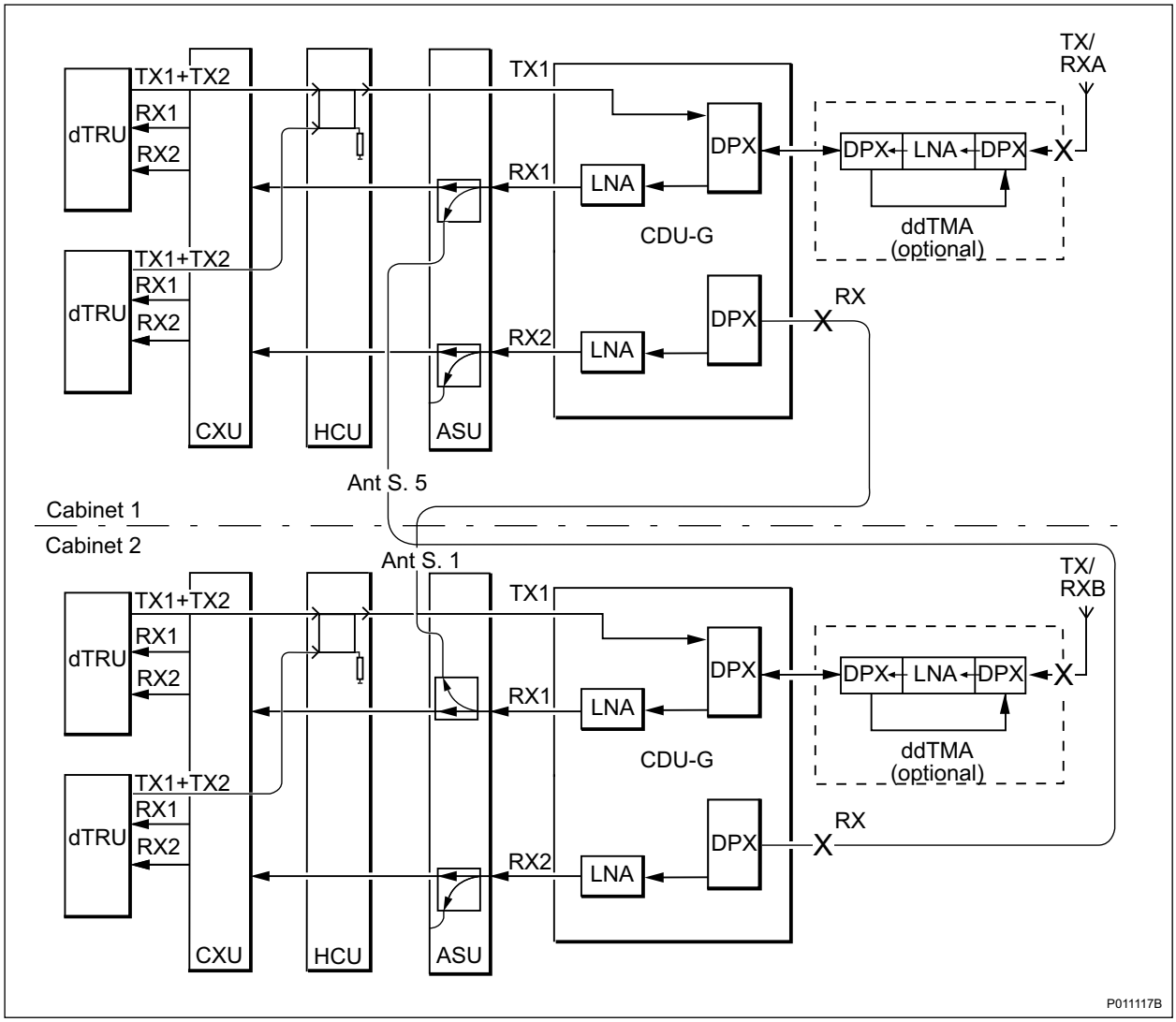


Figure 20 1x8 CDU with HCU (Mid-sector)

Characteristics

Number of CDUs	2
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
Max. number of TRXs	8 (4 in each cabinet)
Number of feeders	2 (plus co-siting cable)

Characteristics

Number of antennas	2
Antenna configuration	TX/RX + RX + TX/RX + RX
TMA configuration (optional)	ddTMA + ddTMA

Note: RX is used Through the co-sited cabinet.

Table 15 1 x 8 CDU-G with HCU (Mid-sector)

Cell	Antenna	TMA No. (TMA Config. Only)	Antenna Sharing Connector	CDU No./Connector	CXU/dTRU No./Connector
2 cab. 1	TX/RXA	5	—	3/TX/RX1	5/RX2, 6/RX2
	RXB(1)	—	—	3/TX/RX2	5/RX1, 6/RX1
2 cab. 2	TX/RXB	1	—	1/TX/RX1	1/RX1, 2/RX1
	RXA(1)	—	—	1/TX/RX2	1/RX2, 2/RX2

(1) Through co-siting cable.

Configuration 1x12 CDU-G with HCU

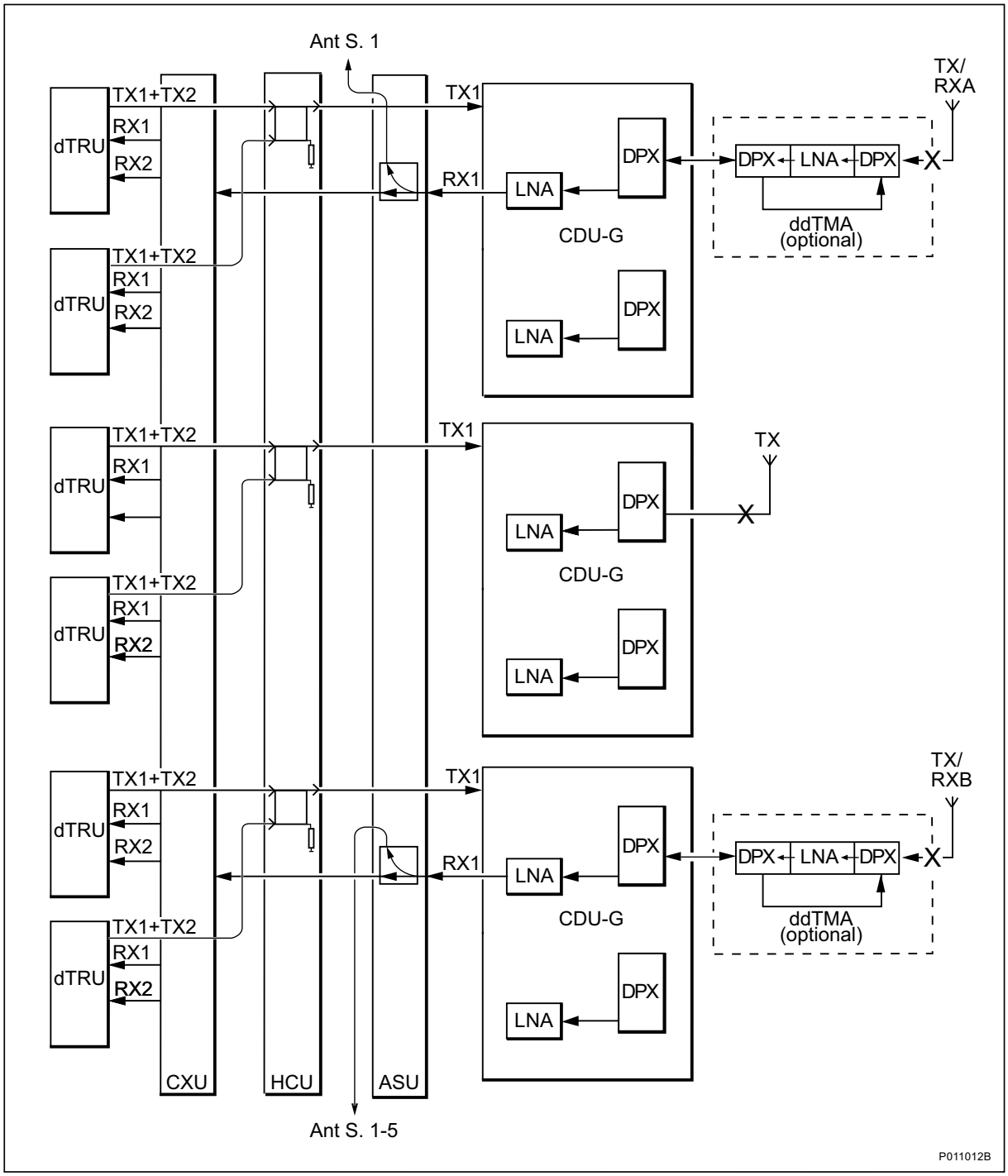


Figure 21 1x12 CDU-G with HCU

In the figure above, Ant S1 and Ant S5 represent the antenna sharing signal which goes to the next cabinet. For connector numbers, *see Table 16 on page 41.*

Characteristics

Number of CDUs	3
Frequency band	GSM 800
	P-GSM 900
	E-GSM 900
Max. number of TRXs	12
Number of feeders	3
Number of antennas	3
Antenna configuration	2 x TX/RX + TX
TMA configuration (optional)	ddTMA + ddTMA

Note: The ASU is optional equipment.

Table 16 Configurations with 1 x 12 CDU-G with HCU

Antenna	**TMA** **No. (TMA Config. Only)**	**Antenna Sharing Connector** **(Co-siting Only)**	**CDU** **No./Connector**	**CXU/dTRU** **No./Connector**
TX/RXA	1	1	1/TX/RX1	1..6/RX1
TX/RXB	5	5	3/TX/RX1	1..6/RX2

6 Site Cell Configurations (SCC)

This section shows SCCs in one RBS. More RBSs can be combined to form larger configurations at a site. Possible expansions, where different RBSs are connected using TG-synchronisation, are described in *Section 7 on page 50.*

The following SCCs are supported by the RBS:

- Specified basic radio configurations
- The RBS with any number of dTRUs within the specified range inserted in the specified position order

6.1 Single Band Configurations

This section describes single band configurations for CDU-F and CDU-G.

CDU-F Single Band Configurations

Table 17 CDU-F Configurations for E-GSM or GSM 1800

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
1	12			2			Figure 10 on page 18
	8			2			Figure 8 on page 14
	4			2			Figure 6 on page 10
2	6	6		2	2		Figure 7 on page 12
	8	4		2	2		Cell 1: Figure 8 on page 14 Cell 2: Figure 6 on page 10
	4	8		2	2		Cell 1: Figure 6 on page 10 Cell 2: Figure 8 on page 14
	4	4		2	2		Figure 6 on page 10
3	4	4	4	2	2	2	Figure 6 on page 10
	8	4		2	1(1)		Cell 1: Figure 8 on page 14 Cell 2: Figure 6 on page 10
		4	8	1(1)	2		Cell1: Figure 6 on page 10 Cell 2: Figure 8 on page 14

(1) One antenna and one co-siting cable from another RBS

CDU-G Single Band Configurations without Hybrid Combiner

Table 18 CDU-G Configurations for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 or GSM 1900

No. of Cells	**Max No. of TRXs Cell:**			**No. of Antennas Cell:**			***See:***
	1	**2**	**3**	**1**	**2**	**3**	
1	6			6			Figure 14 on page 25
	4			4			Figure 13 on page 23
	2			2			Figure 12 on page 21
2	2	2		2	2		Figure 12 on page 21
	1	1		2	2		Figure 11 on page 19
3	2	2	2	2	2	2	Figure 12 on page 21
	1	1	2	2	2	2	Cell 1: Figure 11 on page 19 Cell 2: Figure 11 on page 19 Cell 3: Figure 12 on page 21

CDU-G Single Band Configuration with Hybrid Combiner

This section describes CDU-G single band configurations using the hybrid combiner in the dTRU.

Table 19 CDU-G Configurations for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 or GSM 1900

No. of Cells	**Max No. of TRX Cell:**			**No. of Antennas Cell:**			***See:***
	1	**2**	**3**	**1**	**2**	**3**	
1	12			6			Figure 21 on page 40
	8			4			Figure 19 on page 36
	4			2			Figure 16 on page 30
2	6	6		3	3		Figure 17 on page 32
	8	4		4	2		Cell 1: Figure 19 on page 36 Cell 2: Figure 16 on page 30
	4	8		2	4		Cell 1: Figure 16 on page 30 Cell 2: Figure 19 on page 36

Table 19 CDU-G Configurations for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 or GSM 1900

No. of Cells	Max No. of TRX Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
	4	4		2	2		Figure 16 on page 30
3	4	4	4	2	2	2	Figure 16 on page 30

CDU-G Configurations, two Cabinets with HCU for GSM 800, P-GSM 900 or E-GSM 900

Table 20 CDU-G Configurations, two Cabinets with HCU for GSM 800, P-GSM 900 or E-GSM 900

No. of Cells	Max No. of TRX/Cell			No. of Antenna/Cell			Comment
	1	**2**	**3**	**1**	**2**	**3**	
1	12H(1)			3			
	8H			2			
3	8H	4H		2	1(2)		1st RBS of 3x8
		4H	8H	1(2)	1(2)	2	2nd RBS of 3x8

(1) H=HCU.

(2) One antenna and one co-siting cable from another RBS.

CDU-G with a Mix of Combined, Uncombined or HCU

This section describes CDU-G mixed configurations, where the hybrid combiner in the dTRU is used in the combined sections.

Table 21 CDU-G configurations for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 or GSM 1900

No. of Cells	**Max No. of TRXs Cell:**			**No. of Antennas Cell:**			***See:***
	1	**2**	**3**	**1**	**2**	**3**	
2	8c[1]	2u[2]		4	2		Cell 1: Figure 19 on page 36 Cell 2: Figure 12 on page 21 [1]
	8H[3]	2u		2	2		Cell 1:Figure 19 on page 36 Cell 2: Figure 12 on page 21
	2u	8H		2	2		Cell 1: Figure 12 on page 21 Cell 2: Figure 19 on page 36
	8H	4c		2	2		Cell 1: Figure 19 on page 36 Cell 2: Figure 16 on page 30
	4c	8H		2	2		Cell 1: Figure 16 on page 30 Cell 2: Figure 19 on page 36
	2u	8c		2	4		Cell 1: Figure 12 on page 21 Cell 2: Figure 19 on page 36
	2u	4c		2	2		Cell 1: Figure 12 on page 21 Cell 2: Figure 16 on page 30
	4c	2u		2	2		Cell 1: Figure 16 on page 30 Cell 2: Figure 12 on page 21
	4u	4c		4	2		Cell 1: Figure 13 on page 23 Cell 2: Figure 16 on page 30
	1u+2c	1u+2c		2	2		Cell 1: Figure 15 on page 28 Cell 2: Figure 13 on page 23
3	2u	2u	4c	2	2	4	Cell 1 and 2: Figure 12 on page 21 Cell 3: Figure 16 on page 30
	2u	4c	2u	2	4	2	Cell 1 and 3: Figure 12 on page 21 Cell 2: Figure 16 on page 30
	2u	4c	4c	2	4	4	Cell 1: Figure 12 on page 21 Cell 2 and 3: Figure 16 on page 30
	4c	2u	2u	4	2	2	Cell 1: Figure 16 on page 30 Cell 2 and 3: Figure 12 on page 21
	4c	2u	4c	4	2	4	Cell and 3: Figure 16 on page 30 Cell 2: Figure 12 on page 21
	4c	4c	2u	4	4	2	Cell 1 and 2: Figure 16 on page 30 Cell 3: Figure 12 on page 21

Table 21 CDU-G configurations for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 or GSM 1900

No. of Cells	Max No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
	1u+2c	1u+2c	2u	2	2	2	Cell 1: Figure 15 on page 28 Cell 3: Figure 12 on page 21
	1u+2c	1u+2c	4c	2	2	2	Cell 1: Figure 15 on page 28 Cell 3:Figure 12 on page 21
	1u	1u	4c	2	2	2	Cell 1 and 2: Figure 11 on page 19 Cell 3: Figure 16 on page 30

(1) c = combined.

(2) u = uncombined.

(3) H=HCU.

6.2 Dual Band Configurations

The dual band configuration tables in this section have one frequency (for example 900 MHz) configuration on the left, and another frequency (for example 1800 MHz) configuration on the right. Frequency bands can be located on either the left or right side of the cabinet. The only limitation is that, in the case of three cells, the centre cell (cell 2) must have the same frequency band as one of the adjacent cells.

CDU-F Dual Band Configurations for GSM 900 and GSM 1800

Table 22 Dual Band Configurations with CDU-F

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
2	8	4		2	2		Cell 1: Figure 8 on page 14 Cell 2: Figure 6 on page 10
	4	8		2	2		Cell 1: Figure 6 on page 10 Cell 2: Figure 8 on page 14
	4	—(1)	4	2		2	Figure 6 on page 10

Table 22 Dual Band Configurations with CDU-F

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
3[2]	4	4	4	2	2	2	Figure 6 on page 10
	4	4	4	2	2	2	Figure 6 on page 10

(1) The middle position in the cabinet must be left empty.
(2) TMA can be selected per frequency band. If sector 2 has TMA, then the other sector with the same frequency must also have TMA. If sector 2 does not have TMA, then the other sector with the same frequency band cannot have TMA.

The following frequency band combination is possible: E-GSM/GSM 1800.

CDU-G Dual Band Configurations

In the configurations described in the following table, the hybrid combiner in the dTRU is used.

Dual Band Configurations, CDU-G with Hybrid Combiner

Table 23 Dual Band Configurations, CDU-G with Hybrid Combiner

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
2	8	4		4	2		Cell 1: Figure 19 on page 36 Cell 2: Figure 16 on page 30
	4	8		2	4		Cell 1: Figure 16 on page 30 Cell 2: Figure 19 on page 36
	4	—[1]	4	2		2	Figure 16 on page 30
3[2]	4	4	4	2	2	2	Figure 16 on page 30
	4	4	4	2	2	2	Figure 16 on page 30

(1) The middle position in the cabinet must be left empty.
(2) TMA can be selected per frequency band. If sector 2 has TMA, then the other sector with the same frequency must also have TMA. If sector 2 does not have TMA, then the other sector with the same frequency band cannot have TMA.

The following frequency band combinations are possible: P-GSM 900/GSM 1800, E-GSM 900/GSM 1800, GSM 800/GSM 1800, and GSM 800/GSM 1900.

Dual Band Configurations, CDU-G without Hybrid Combiner

Table 24 CDU-G without Hybrid Combiner

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
2	4[1]	2		4	2		Cell 1: Figure 13 on page 23 Cell 2: Figure 12 on page 21
	2	—[2]	2	2		2	Figure 12 on page 21
3[3]	2	2	2	2	2	2	Figure 12 on page 21
	2	2	2	2	2	2	Figure 12 on page 21

(1) The sector with four TRXs should always be placed to the left.

(2) The middle position in the cabinet must be left empty.

(3) TMA can be selected per frequency band. If sector 2 has TMA, then the other sector with the same frequency must also have TMA. If sector 2 does not have TMA, then the other sector with the same frequency band cannot have TMA.

The following frequency band combinations are possible: P-GSM 900/GSM 1800, E-GSM 900/GSM 1800, GSM 800/GSM 1800, and GSM 800/GSM 1900.

CDU-G Dual Band Configuration with a Mix Hybrid Combiner and Uncombined

Table 25 CDU-G Dual Band Configuration with a Mix Hybrid Combiner and Uncombined

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
2	8c[1]	2u[2]		4	2		Cell 1: Figure 20 on page 38 Cell 2: Figure 12 on page 21
	2u	8c		2	4		Cell 1: Figure 12 on page 21 Cell 2: Figure 20 on page 38
	4c	2u		2	2		Cell 1: Figure 16 on page 30 Cell 2: Figure 12 on page 21
	2u	4c		2	2		Cell 1: Figure 12 on page 21 Cell 2: Figure 16 on page 30
3[3]	2u	2u	4c	2	2	2	Cell 1 and 2: Figure 12 on page 21 Cell 3: Figure 16 on page 30
	4c	2u	2u	2	2	2	Cell 1: Figure 16 on page 30 Cell 2 and 3: Figure 12 on page 21

Table 25 CDU-G Dual Band Configuration with a Mix Hybrid Combiner and Uncombined

No. of Cells	Max. No. of TRXs Cell:			No. of Antennas Cell:			*See:*
	1	**2**	**3**	**1**	**2**	**3**	
	4c	4c	2u	2	2	2	Cell 1 and 2: Figure 16 on page 30 Cell 3: Figure 12 on page 21
	2u	4c	4c	2	2	2	Cell 1: Figure 12 on page 21 Cell 2 and 3: Figure 16 on page 30

(1) c = combined
(2) u = uncombined
(3) TMA can be selected per frequency band. If sector 2 has TMA, then the other sector with the same frequency must also have TMA. If sector 2 does not have TMA, then the other sector with the same frequency band cannot have TMA.

The following frequency band combinations are possible: P-GSM 900/GSM 1800, E-GSM 900/GSM 1800, GSM 800/GSM 1800, and GSM 800/GSM 1900.

6.3 SW Power Boost Configurations with CDU-G

This section does not include any additional site cell configurations. The section specifies which configurations support SW Power Boost (SPB).

A minimum of two TRXs is required in an antenna system to use SW Power Boost. Separate TX antennas must be used for the two transmitters in an SPB configuration.

SPB with CDU-G Configurations without Hybrid Combiner

SW Power Boost is supported in all of the SCCs with CDU-G, specified in *Section 6 Site Cell Configurations (SCC) on page 41,* which fulfill the following conditions:

- The configurations do not use hybrid combiner.
- The configurations have TRX connected to different antennas in the same antenna system.

SPB with CDU-G Configurations with Hybrid Combiner

SW Power Boost is supported in all of the SCCs with CDU-G, specified in *Section 6 Site Cell Configurations (SCC) on page 41,* which fulfil the following conditions:

- The configurations use hybrid combiner.

- The configurations have TRX connected to different antennas in the same antenna system.

One possible application using SPB together with hybrid combiner is creating overlaid and underlaid cells during cell planning, as described below:

1 One underlaid cell consists of the second TRX in the first dTRU and the first TRX in the second dTRU. SPB is used in this cell.

2 One overlaid cell consists of the two other TRXs. SPB is not used in this cell.

6.4 Transmitter Coherent Combining (TCC) Configurations with CDU-G

This section specifies which configurations support Transmitter Coherent Combining (TCC). The section does not include any additional site cell configurations.

A minimum of two TRXs is required in order to support TCC.

TCC with CDU-G Configurations with Hybrid Combiner

TCC is supported in all of the SCCs with CDU-G, specified in *Section 6 Site Cell Configurations (SCC) on page 41,* which fulfill the following conditions:

- The configurations use hybrid combiner.
- The configurations have two TRXs within the same dTRU.

7 Co-Siting with RBS 200 or RBS 2000 Macro Cabinets

This section shows expansions where RBSs, forming an original SCC, are co-sited and use TG-synchronisation to form one new resulting SCC. Antennas are not shared.

7.1 RBS 200 Expanded with 12-TRX Cabinet

Co-siting with RBS 200 Using a Filter Combiner

Table 26 Expansion using Filter Combiner

Result SCC	Original Configuration					Expansion Configuration		
	Original SCC	Cabinet	Combiner	Antennas	TMA	Original SCC	Basic Configuration	Antennas
1 x 16[1]	1 x 4	RBS 200	FCOMB	(3)	No	1x12	F9d_2.12	(2)
		RBS 205	FCOMB	(3)	No		F18d_2.12	(2)
		RBS 205	FCOMB	(3)	M		F18dt_2.12	(2)
		RBS 205	FCOMB & DPX	(2)	No		F18d_2.12	(2)
		RBS 205	FCOMB	(2)	M		F18dt_2.12	(2)
1 x 20[2]	1 x 8	RBS 200	FCOMB	(3)	No	1x12	F9d_2.12	(2)
		RBS 205	FCOMB	(3)	No		F18d_2.12	(2)
		RBS 205	FCOMB	(3)	M		F18dt_2.12	(2)
		RBS 205	FCOMB & DPX	(2)	No		F18d_2.12	(2)
		RBS 205	FCOMB	(2)	M		F18dt_2.12	(2)
3 x 8[3]	3 x 4[4]	RBS 200	FCOMB	(3) (3) (3)	No	3x4	3 x F9d_2.4	(2) (2) (2)
		RBS 205	FCOMB	(3) (3) (3)	No		3 x F18d_2.4	(2) (2) (2)
		RBS 205	FCOMB	(3) (3) (3)	M		3 x F18dt_2.4	(2) (2) (2)

Table 26 Expansion using Filter Combiner

Result SCC	Original Configuration					Expansion Configuration		
	Original SCC	Cabinet	Combiner	Antennas	TMA	Original SCC	Basic Configuration	Antennas
		RBS 205	FCOMB & DPX	(2) (2) (2)	No		3 x F18d_2.4	(2) (2) (2)
		RBS 205	FCOMB	(2) (2) (2)	M		3 x F18dt_2.4	(2) (2) (2)

(1) 1 x 6, 1 x 8, 1 x 10, 1 x 12 and 1 x 14 can be accomplished with a partly-equipped expansion configuration.
(2) 1 x 10, 1 x 12, 1 x 14, 1 x 16 and 1 x 18 can be accomplished with a partly-equipped expansion configuration.
(3) 3 x 6 can be accomplished with a partly-equipped expansion configuration.
(4) When using TG-synchronization, only one RBS 200/RBS 205 can act as master. Therefore the 3 x 4 configuration, which contains three separate RBSs, must be rebuilt to one single RBS; that is, all three sectors of the RBS 200 must be connected to the same TMCB.

M = Mandatory

Co-siting with RBS 200 Using Hybrid Combiner

Table 27 Expansion using Hybrid Combiner

Result SCC	Original Configuration					Expansion Configuration		
	Original SCC	Cabinet	Combiner	Antennas	TMA	Original SCC	Basic Configuration	Antennas
3 x 8 (1)	3 x 4 (2)	RBS 200	HCOMB	(3) (3) (3)	No	3 x 4	3 x G9dh_2.4	(2) (2) (2)
		RBS 205	HCOMB	(3) (3) (3)	No		3 x G18dh_2.4	(2) (2) (2)
		RBS 205	HCOMB	(3) (3) (3)	M		3 x G18dht_2.4	(2) (2) (2)

Table 27 Expansion using Hybrid Combiner

Result SCC	Original Configuration					Expansion Configuration		
	Original SCC	Cabinet	Combiner	Antennas	TMA	Original SCC	Basic Configuration	Antennas
		RBS 205	HCOMB & DPX	(2) (2) (2)	No		3 x G18dh_2.4	(2) (2) (2)
		RBS 205	HCOMB	(2) (2) (2)	M		3 x G18dht_2.4	(2) (2) (2)

(1) 3 x 6 can be accomplished with a partly-equipped expansion configuration. 1 x 8 can be accomplished with one RBS 200/RBS 205 and a partly-equipped expansion configuration.
(2) When using TG-synchronization, only one RBS 200/RBS 205 can act as master. Therefore the 3 x 4 configuration, which contains three separate RBSs, must be rebuilt to one single RBS; that is, all three sectors of the RBS 200 must be connected to the same TMCB.

M = Mandatory

7.2 6-TRX RBS 2000 Macro Cabinets Expanded with 12-TRX Cabinet

Co-siting with Single TRU-Based RBS 2000 Using Filter Combiner

Table 28 Expansion using Filter combiner

	RBS 1			RBS 2		
Result SCC	Original SCC	Basic Configuration	Antennas	Original SCC	Basic Configuration	Antennas
1 x 18 (1)	1 x 6	D9d_2.6	(2)	1 x 12	F9de_2.12	(2)
		D18d_2.6	(2)		F18d_2.12	(2)
		D18_2.6	(2)		F18dt_2.12	(2)
1 x 24 (2)	1 x 12	D9d_2.12	(2)	1 x 12	F9de_2.12	(2)
		D18d_2.12	(2)		F18d_2.12	(2)
		D18_2.12	(2)		F18dt_2.12	(2)

(1) 1 x 8, 1 x 10, 1 x 12, 1 x 14 and 1 x 16 can be accomplished with a partly-equipped RBS 2.
(2)

Co-siting with Single TRU-Based RBS 2000 Using Hybrid Combiner

Table 29 Expansion using Hybrid Combiner

	RBS 1			RBS 2		
Result SCC	**Original SCC**	**Basic Configuration**	**Antennas**	**Original SCC**	**Basic Configuration**	**Antennas**
3 x 8 (1)	3 x 4	3 x C+ 9d_2.4	(2) (2) (2)	3 x 4	3 x G9dh_2.4	(2) (2) (2)
		3 x C+ 9d_2.4	(2) (2) (2)		3 x G9dht_2.4	(2) (2) (2)
		3 x C+ 18d_2.4	(2) (2) (2)		3 x G18dh_2.4	(2) (2) (2)
		3 x C+ 18_2.4	(2) (2) (2)		3 x G18dht_2.4	(2) (2) (2)
		3 x C+ 19d_2.4	(2) (2) (2)		3 x G19dh_2.4	(2) (2) (2)
		3 x C+ 19_2.4	(2) (2) (2)		3 x G19dht_2.4	(2) (2) (2)

(1) 3 x 6 is accomplished with a partly-equipped RBS 2.

7.3 12-TRX RBS 2000 Macro Cabinet Expanded with 12-TRX Cabinet

Co-siting with dTRU-Based RBS 2000 Macro Cabinet Using Filter Combiner

Table 30 Expansion using Filter Combiner

	RBS 1			RBS 2		
Result SCC	**Original SCC**	**Basic Configuration**	**Antennas**	**Original SCC**	**Basic Configuration**	**Antennas**
3 x 8(1)	8 + 4	F9d_2.8 + F9d_2.4	(2) (2) (-)	4 + 8	F9d_2.4 + F9d_2.8	(-) (2) (2)
		F9dt_2.4 + F9dt_2.4	(2) (2) (-)		F9dt_2.4 + F9dt_2.8	(-) (2) (2)
		F18d_2.8 + F18d_2.4	(2) (2) (-)		F18d_2.4 + F18d_2.8	(-) (2) (2)
		F18dt_2.8 + F18dt_2.4	(2) (2) (-)		F18dt_2.4 + F18dt_2.8	(-) (2) (2)
1 x 24 (2)	1 x 12	F9d_2.12	(2)	1 x 12	F9d_2.12	(2)
		F9dt_2.12	(2)		F9dt_2.12	(2)

Table 30 Expansion using Filter Combiner

	RBS 1			RBS 2		
Result SCC	**Original SCC**	**Basic Configuration**	**Antennas**	**Original SCC**	**Basic Configuration**	**Antennas**
		F18d_2.12	(2)		F18d_2.12	(2)
		F18d_2.12	(2)		F18dt_2.12	(2)

(1) 3 x 6 can be accomplished with a partly-equipped RBS 1 and RBS 2, although it is more easily performed with 2 x 6 in RBS 1 and 1 x 8 with three dTRUs in RBS 2. TG-synchronization is not required.
(2) 1 x 14, 1 x 16, 1 x 18, 1 x 20 and 1 x 22 are accomplished with a partly-equipped RBS 2.

Co-siting with dTRU-Based RBS 2000 Using Hybrid Combiner

Table 31 Expansion using Hybrid Combiner

	RBS 1			RBS 2		
Result SCC	**Original SCC**	**Basic Configuration**	**Antennas**	**Original SCC**	**Basic Configuration**	**Antennas**
3 x 8 (1)	3 x 4	3 x G9dh_2.4	(2) (2) (2)	3 x 4	3 x G9dh_2.4	(2) (2) (2)
		3 x G9dht_2.4	(2) (2) (2)		3 x G9dht_2.4	(2) (2) (2)
		3 x G18dh_2.4	(2) (2) (2)		3 x G18dh_2.4	(2) (2) (2)
		3 x G18dht_2.4	(2) (2) (2)		3 x G18dht_2.4	(2) (2) (2)
		3 x G19dh_2.4	(2) (2) (2)		3 x G19dh_2.4	(2) (2) (2)
		3 x G19dht_2.4	(2) (2) (2)		3 x G19dht_2.4	(2) (2) (2)

(1) 3 x 6 is accomplished with a partly-equipped RBS 2

Co-siting with dTRU-Based RBS 2000 without Hybrid Combiner

Table 32 Expansion using CDU-G without Hybrid Combiner

	RBS 1			RBS 2		
Result SCC	**Original SCC**	**Basic Configuration**	**Antennas**	**Original SCC**	**Basic Configuration**	**Antennas**
3 x 4	3 x 2	3 x G9d_2.2	(2) (2) (2)	3 x 2	3 x G9d_2.4	(2) (2) (2)
		3 x G9dt_2.2	(2) (2) (2)		3 x G9dt_2.4	(2) (2) (2)
		3 x G18d_2.2	(2) (2) (2)		3 x G18d_2.4	(2) (2) (2)

Table 32 Expansion using CDU-G without Hybrid Combiner

		3 x G18dt_2.2	(2) (2) (2)		3 x G18dt_2.4	(2) (2) (2)
		3 x G19dh_2.4	(2) (2) (2)		3 x G19dh_2.4	(2) (2) (2)
		3 x G19dht_2.4	(2) (2) (2)		3 x G19dht_2.4	(2) (2) (2)

8 Co-siting with TDMA RBS Using an ASU

The ASU is used for co-siting with a TDMA RBS, more specifically RBS 884 for 800 MHz and 1900 MHz, and RBS 882 for 800 MHz only. The unit allows a TDMA cabinet to share receiver antennas with a GSM cabinet. The ASU is installed in a dTRU based GSM cabinet.

The implementation is for 800 and 1900 MHz. The end configuration differs for different site configurations of the TDMA RBS. One-, two- and three-sector sites can be supported. In the case of two- or three-sector sites, the figures below only show one part of the RBS.

8.1 Separate TX and Two Separate RX Antennas

The original antenna configuration of the TDMA RBS is TX + RX + RX. When co-siting is configured, the antennas are moved from the TDMA RBS to the dTRU based RBS. The dTRU based RBS can be prepared for co-siting already at the factory. The RX paths to the TDMA RBS will go through the ASU.

By moving the receiver antennas to the dTRU based RBS, it is possible to benefit from minimum interference with the old equipment.

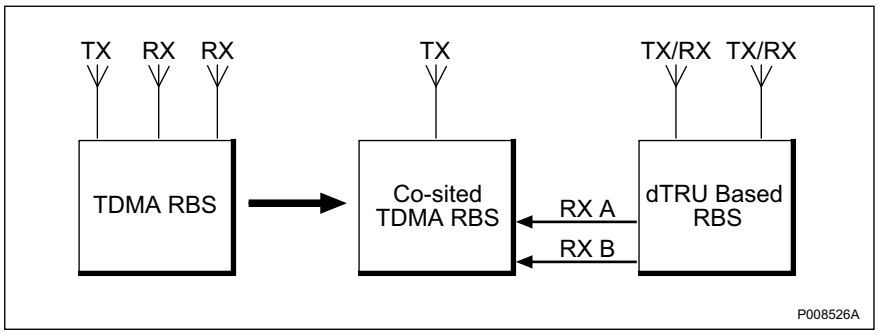


Figure 22 Separate TX and Two Separate RX antennas, no TMAs

If TMAs are used in the original configuration, they are replaced with dual-duplex TMAs (ddTMAs).

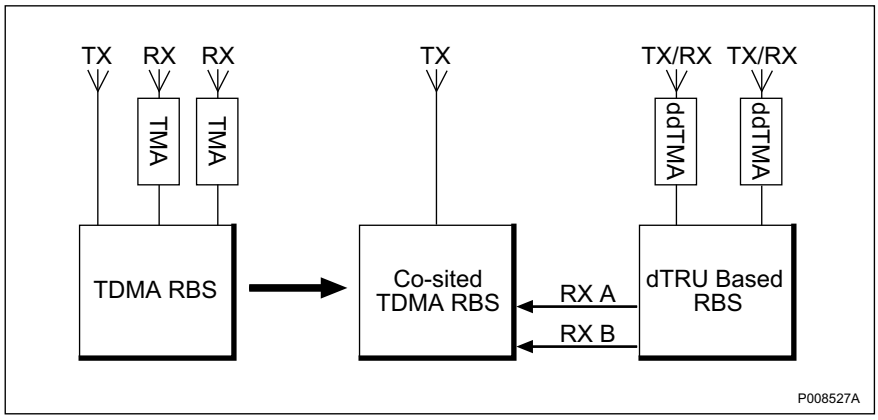


Figure 23 Separate TX and Two Separate RX Antennas, with TMAs

No new antennas are required.

8.2 One Duplex Antenna RX/TX

The TDMA RBS may be equipped with only one TX/RX antenna. The recommendation in this case is to add two antennas for the dTRU based RBS. One RX signal from the dTRU based RBS is supplied to the TDMA RBS, thus adding RX diversity to the TDMA RBS.

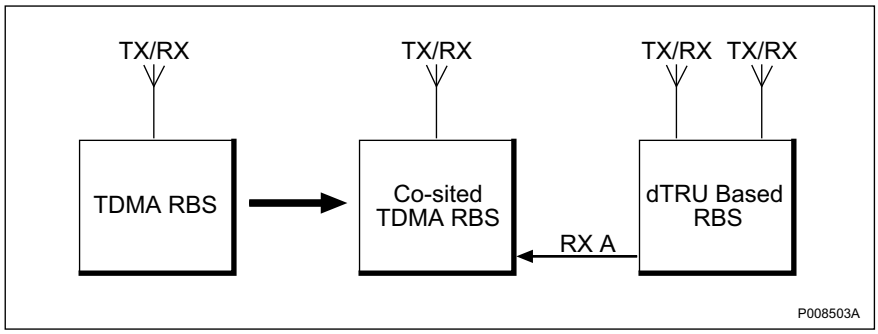


Figure 24 One Duplex Antenna RX/TX

8.3 Two Separate Duplex Antennas

If two separate duplex antennas are already in use, the recommendation is to install new antennas for the dTRU based RBS and not use co-siting at all.

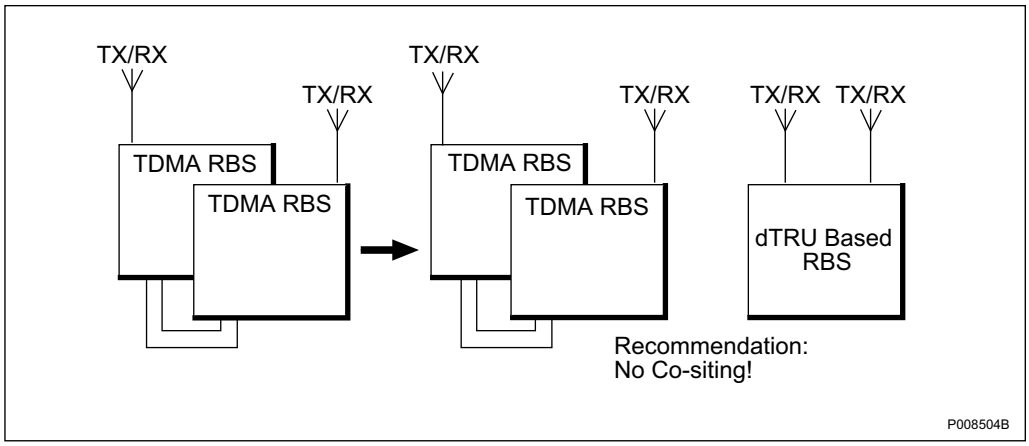


Figure 25 Two Separate Duplex Antennas

8.4 One RX and One Duplex Antenna

If the original antenna arrangement is TX/RX + RX, the recommendation differs for configurations where the duplex filter is mounted internally, without the possibility to access the TX and RX ports separately, and configurations where the RX path is accessible.

Internal Duplex Filter

If the duplex filter is internal and the RX path is not accessible, the recommendation is to add one antenna and rebuild the configuration in the same way as in the case with TX + RX + RX in *Section 8.1 Separate TX and Two Separate RX Antennas on page 56*.

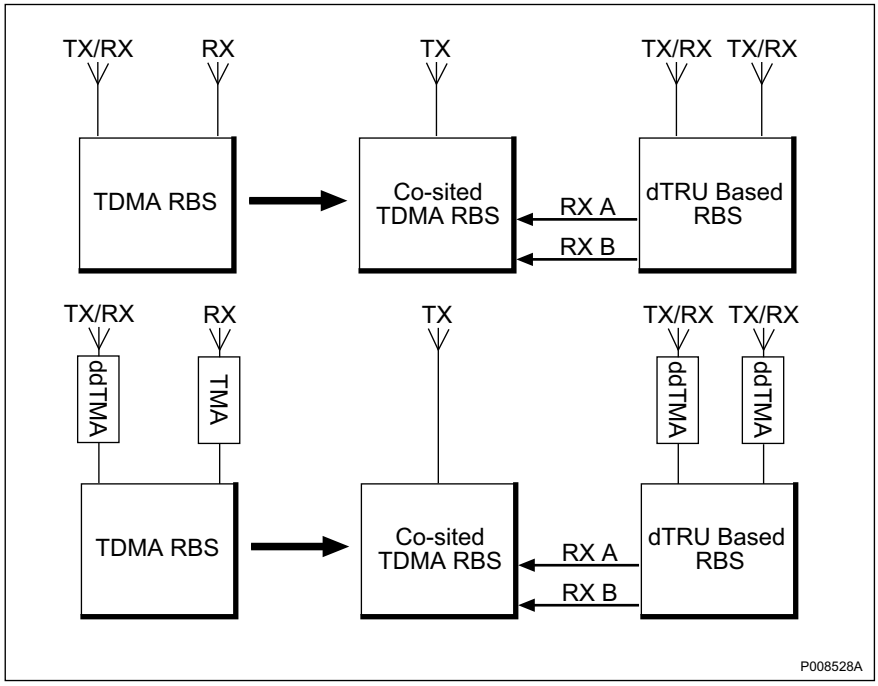


Figure 26 Internal duplex filter

A special case is where only one TX/RX and one RX port are accessible from the outside of the cabinet. In that case the solution stated below can be used. Note that the three duplex filters in series (one internal and two external) will degrade the TX performance of the co-sited RBS.

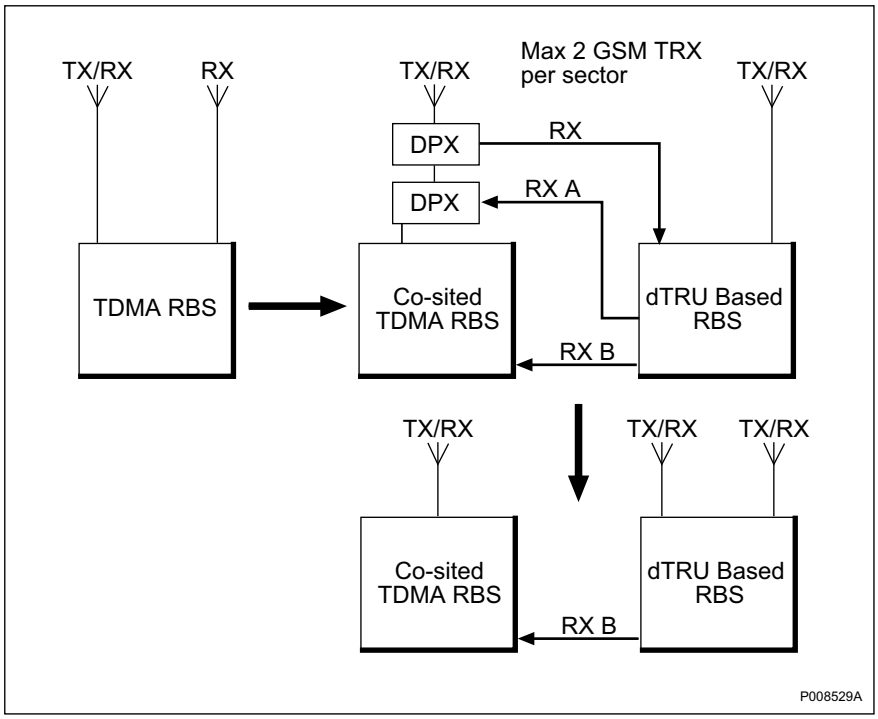


Figure 27 Internal Duplex Filter and only Two Antenna Ports Accessible

External Duplex Filter

If an external duplex filter is used, it is possible to expand the configuration in two steps. The first step does not require any new antennas, but limits the number of GSM TRXs to two (that is, one dTRU) for each sector. Support of more GSM TRXs requires additional antennas.

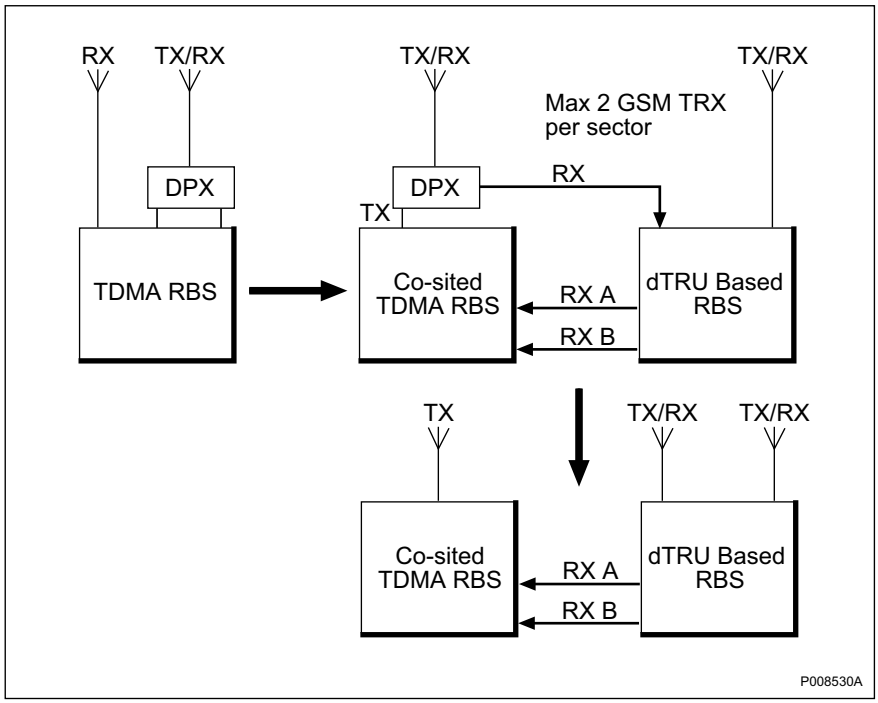


Figure 28 External Duplex Filter

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