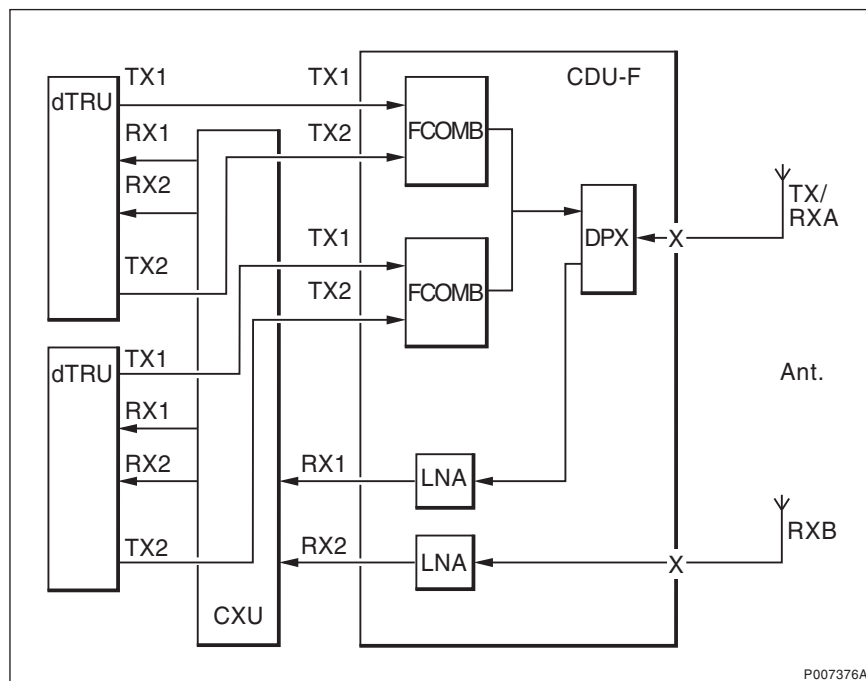


# RBS 2106 and RBS 2206

## Radio Configurations

### Description

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



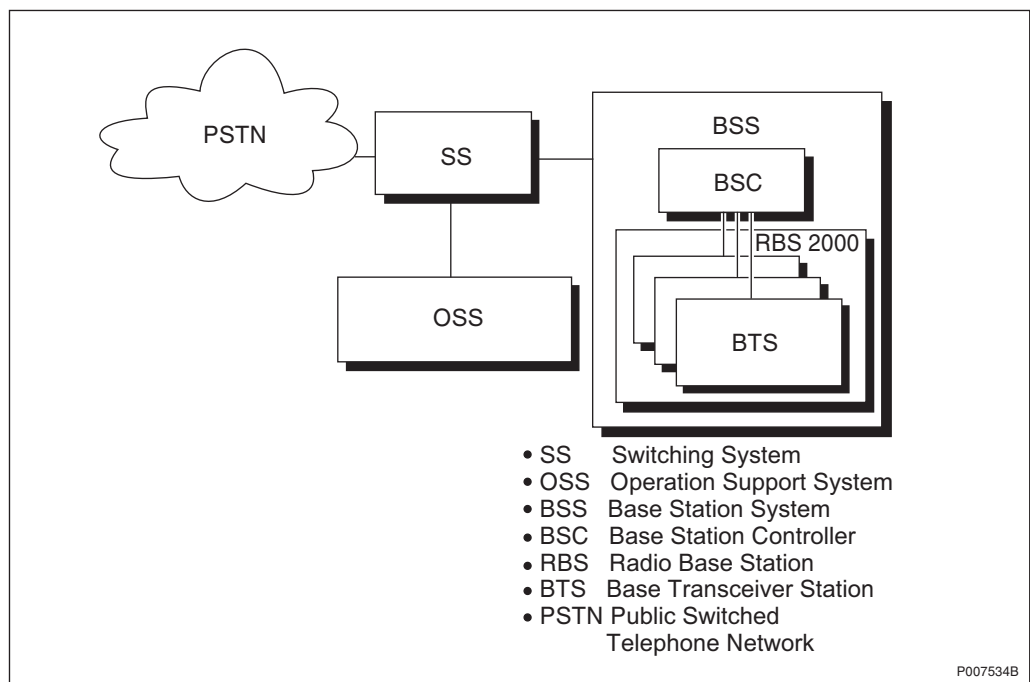
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# 1 Introduction

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.

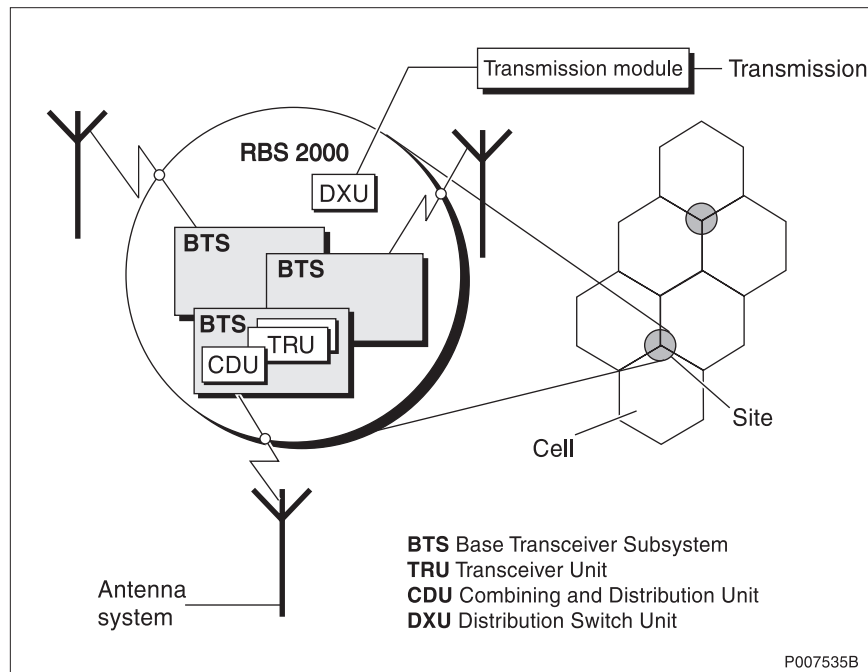


Figure 2 An example of an RBS 2000 servicing a three-cell site

## 1.2 Radio Base Station

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

## 2 References

**GSM:05.05** GSM Requirements 05.05 phase 2+ Radio Transmission and Reception.

**GSM:05.08** GSM Requirements 05.08 phase 2+ Radio Subsystem Link Control.

### 3 Definitions

#### Tower Mounted Amplifier (TMA)

The 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 12 TRX 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.

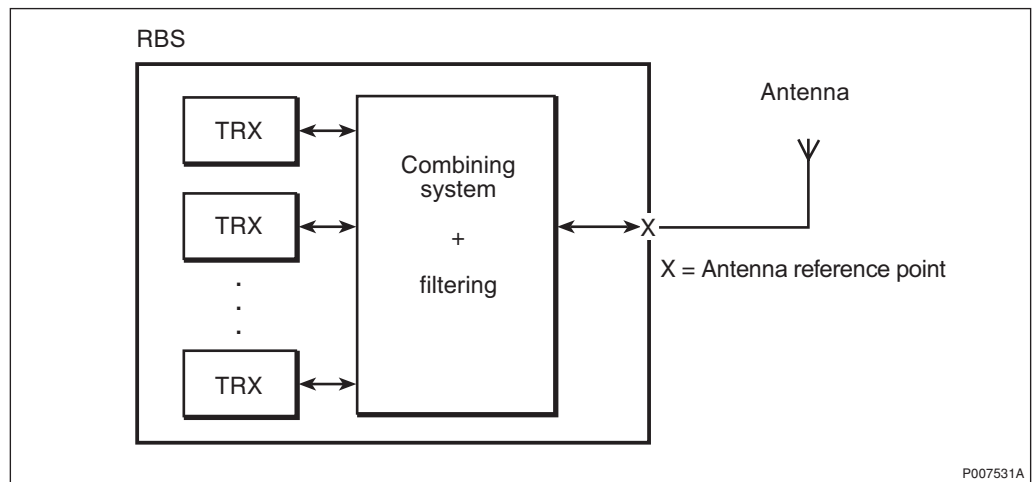


Figure 3 Antenna reference point

#### Antenna System

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

#### Antenna Sharing Unit (ASU)

An ASU is used for sharing RX antennas between RBSs.

## Base Transceiver Station (BTS)

A BTS is a unit operating on a set of frequencies in one cell.

### Basic Configuration

A basic configuration is a specified set of transceivers, CDUs, 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 needed site equipment.

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

## Radio Base Station (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.

## Site Cell Configuration (SCC)

The 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:

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

### 3.1 Cabinet Types

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

### 3.2 Configurations Identity

The figure below shows how a basic configuration identity is constructed.

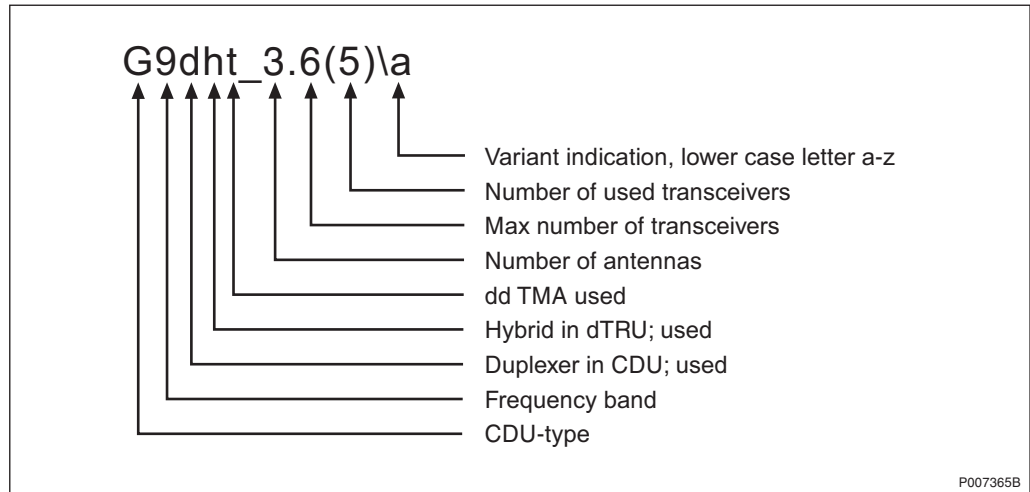


Figure 4 Basic configuration identity

## 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 with typically 3 dB, if separate TX antennas are used. The configurations that support SW power boost are listed in Section 6.3 on page 42.

Functional views of radio signal paths for various configurations are shown in Figure 5 on page 10 up to and including Figure 17 on page 33. 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.

#### 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.

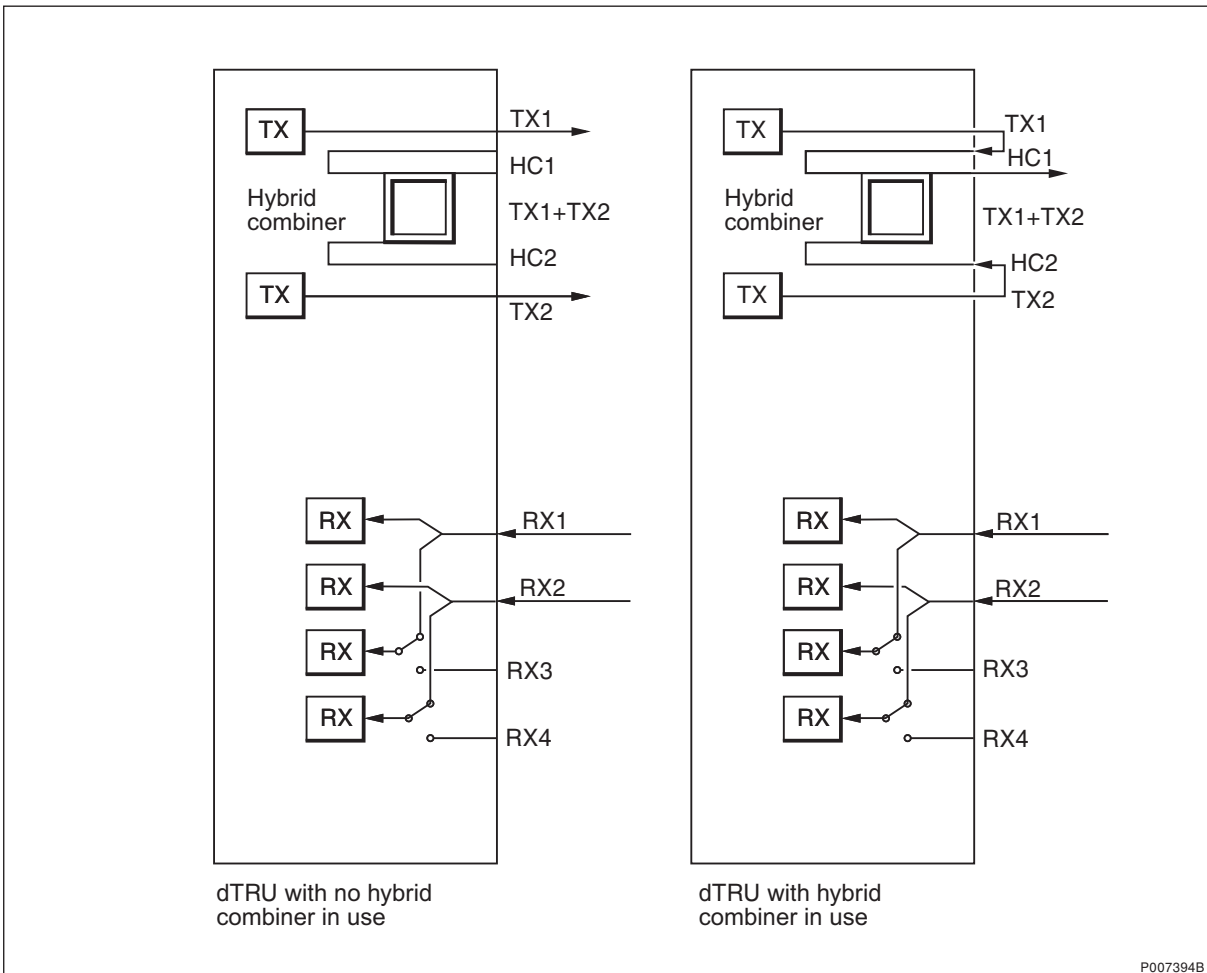


Figure 5 dTRU with and without hybrid combiner in use

## 5.2 CDU-F Configurations

### Configuration 1x4 CDU-F

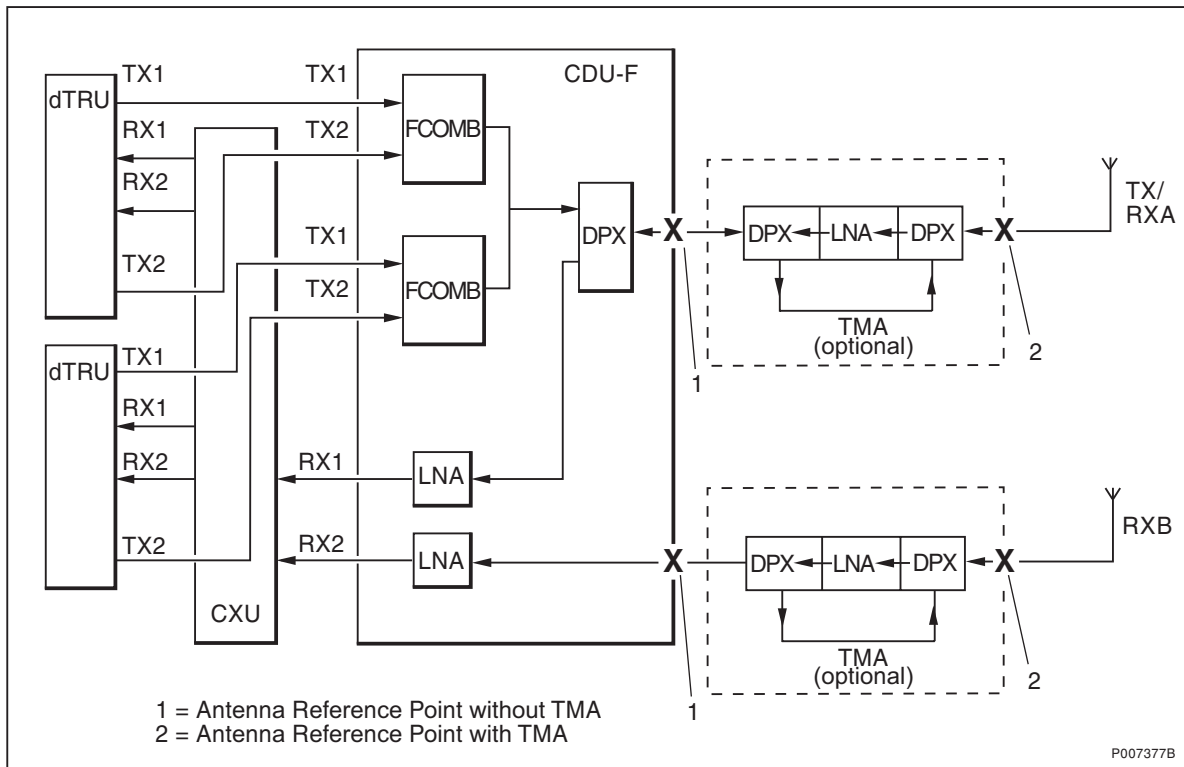


Figure 6 1x4 CDU-F

#### 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*

<b>Cell</b>	<b>CDU No. / Connector</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX	1	TX/RXA
	1 / RX	2	RXB
2	2 / TX/RX	3	TX/RXA
	2 / RX	4	RXB
3	3 / TX/RX	5	TX/RXA
	3 / RX	6	RXB

**Configuration 2x6 CDU-F**

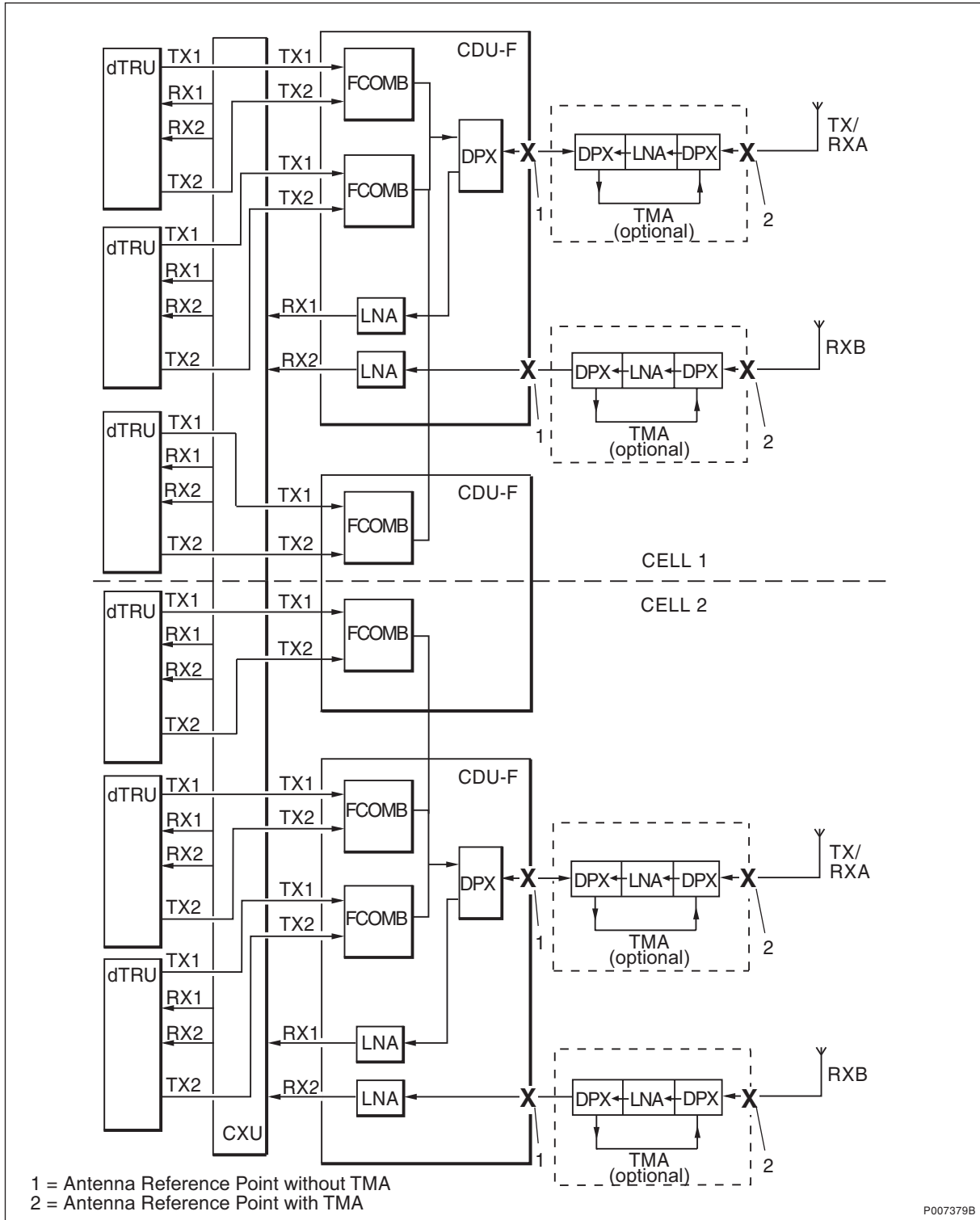


Figure 7 2x6 CDU-F

**Characteristics**

Number of CDUs	2*
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

\* Three CDU-Fs support two sectors.

*Table 2 2 x 6 configurations with CDU-F*

<b>Cell</b>	<b>CDU No. / Connector</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX	1	TX/RXA
	1 / RX	2	RXB
2	3 / TX/RX	5	TX/RXA
	3 / RX	6	RXB

**Configuration 1x8 CDU-F**

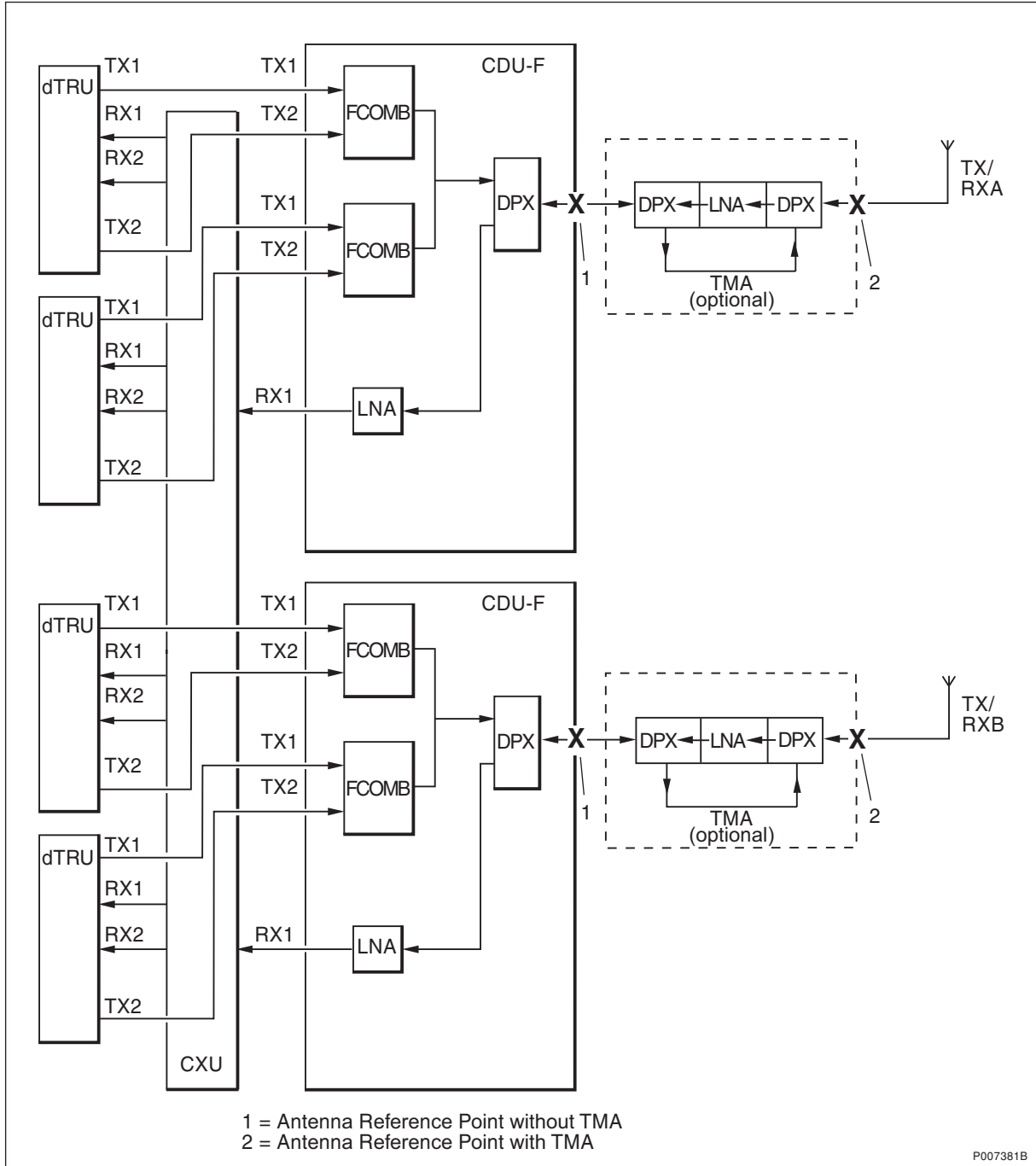


Figure 8 1x8 CDU-F

**Characteristics**

Number of CDUs	2
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 max 8 TRXs per cell*

<b>Cell</b>	<b>CDU No. / Connector</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX	1	TX/RXA
	2 / TX/RX	3	TX/RXB
Alt. 1	2/ TX/RX	3	TX/RXA
	3 / TX/RX	5	TX/RXB



**Configuration 1x12 CDU-F**

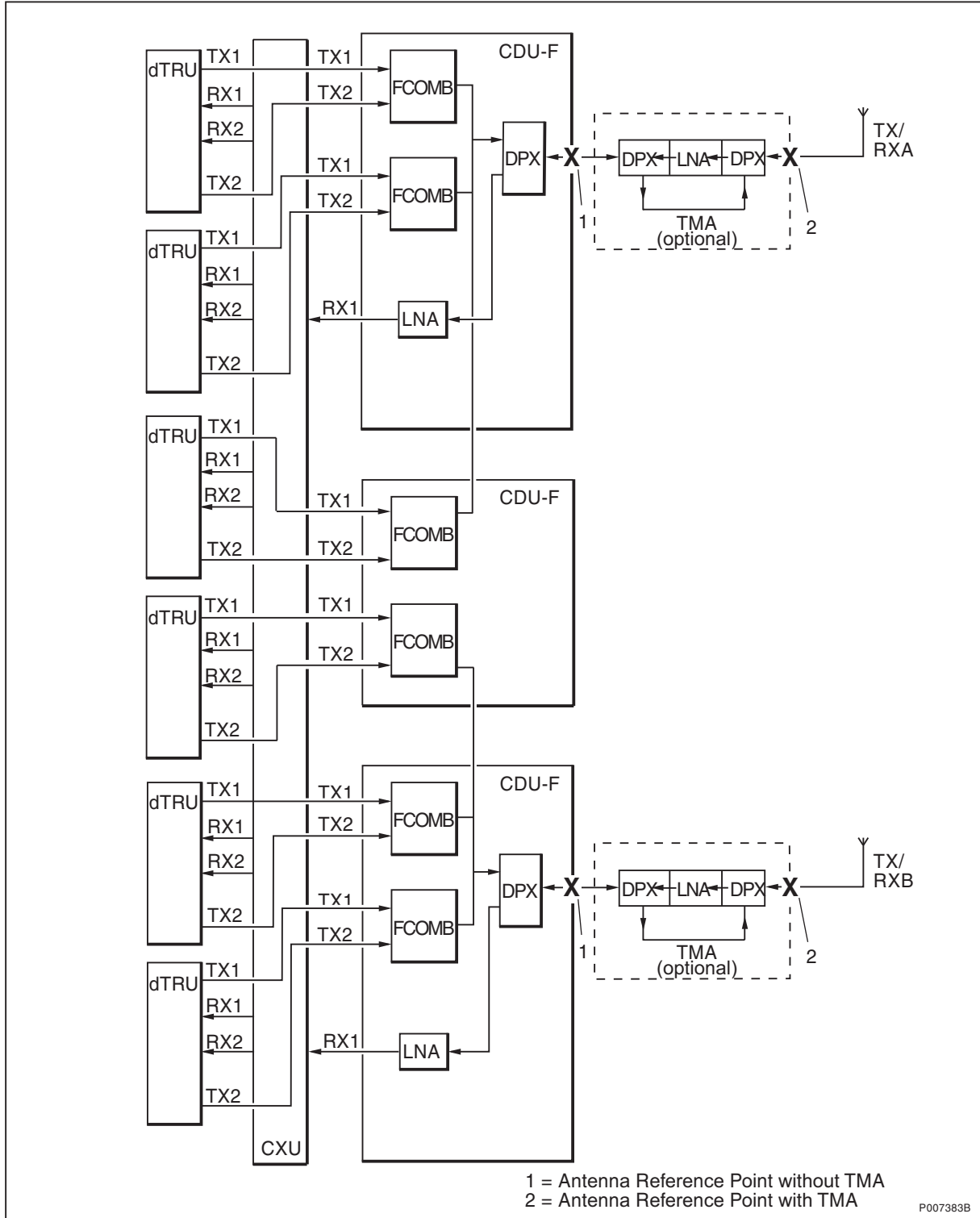


Figure 9 1x12 CDU-F

**Characteristics**

Number of CDUs	3
Frequency band	E-GSM GSM 1800
Max. number of TRXs	12
Number of feeders	2
Number of antennas	2
Antenna configuration	TX/RX + TX/RX
TMA configuration (optional)	ddTMA + ddTMA

*Table 4 Configurations with CDU-F, and 12 TRXs per cell*

<b>CDU No. / Connector</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1 / TX/RX	1	TX/RXA
3 / TX/RX	5	TX/RXB

### 5.3 CDU-G Configurations

#### Configuration 2x1 CDU-G without hybrid combiner

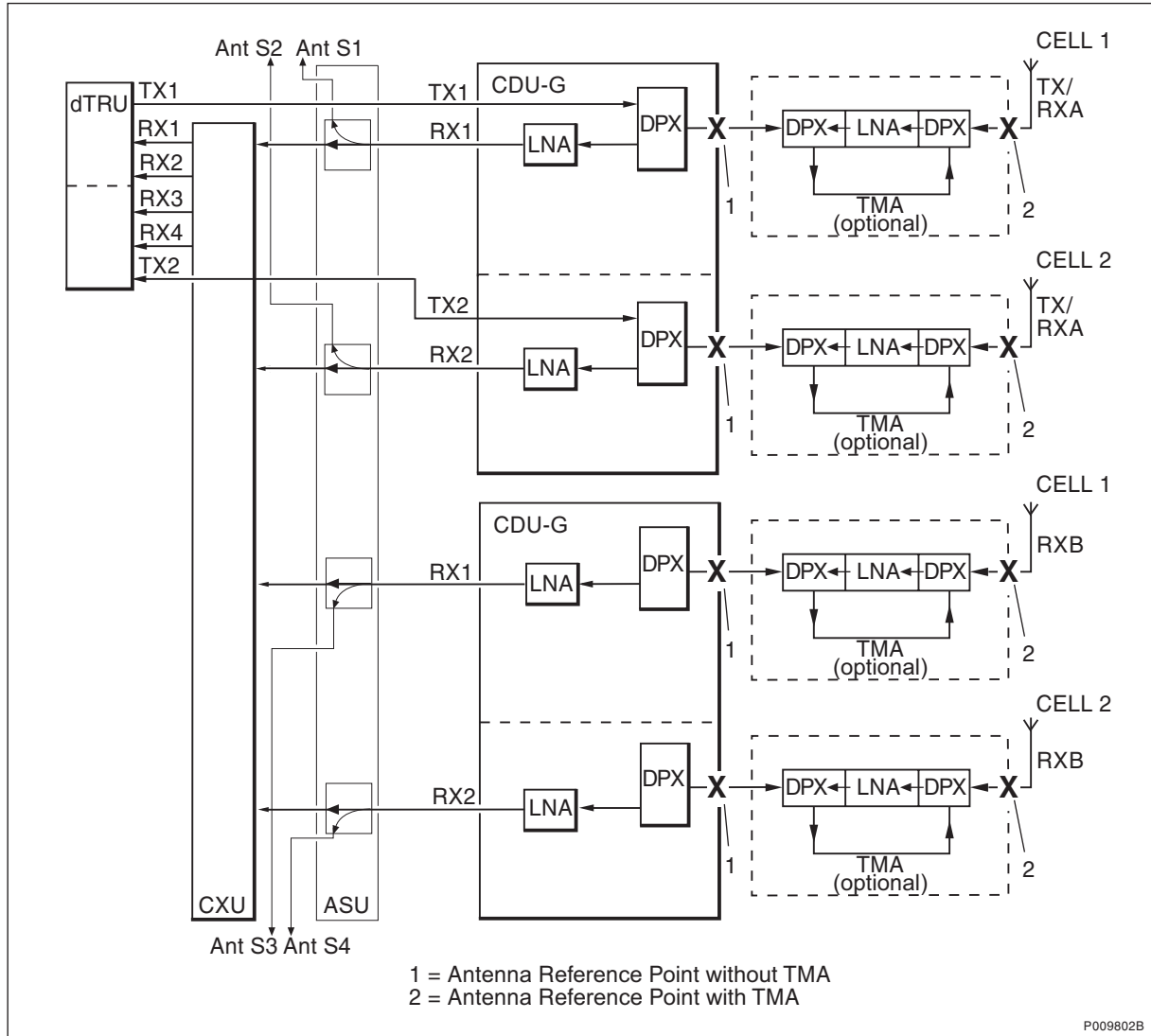


Figure 10 2x1 CDU-G uncombined

In the figure above, Ant S1 – S4 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see Table 5 on page 20.

**Characteristics**

Number of CDUs	2 (2 CDUs support two sectors)
Frequency band	GSM 800 E-GSM 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 5 1 + 1 + 2 configurations with CDU-G*

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

### Configuration 1x2 CDU-G without hybrid combiner

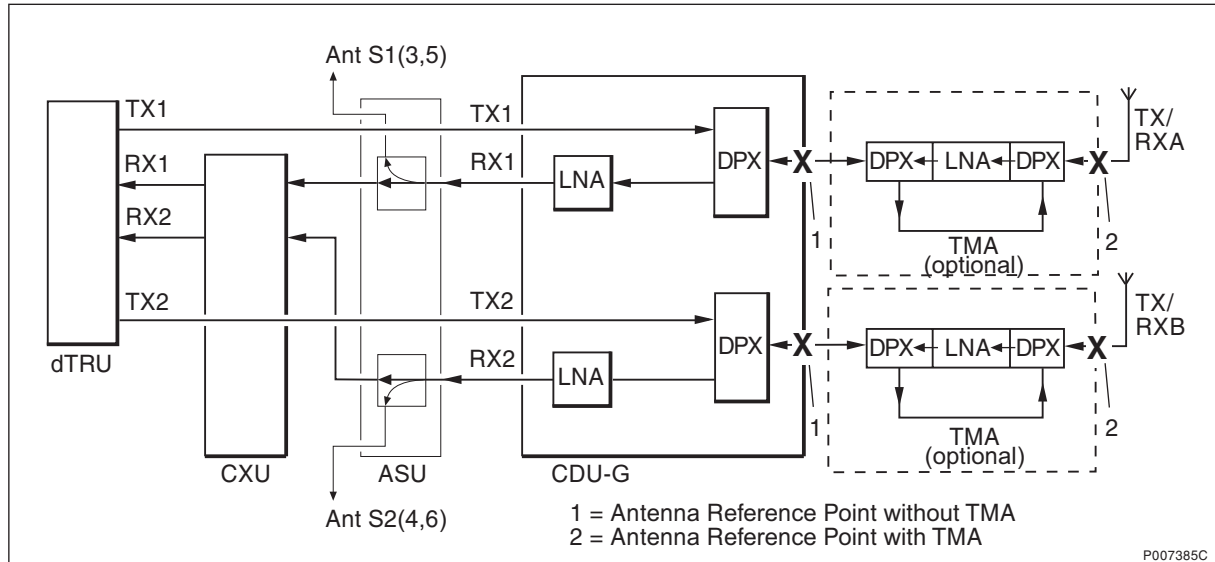


Figure 11 1x2 CDU-G uncombined

In the figure above, Ant S1 and Ant S2 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see *Table 6 on page 22*.

#### Characteristics

Number of CDUs	1
Frequency band	GSM 800 E-GSM 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 6 Configurations with CDU-G, and 4 combined or 2 uncombined TRXs per cell*

<b>Cell</b>	<b>CDU No. / Connector</b>	<b>Antenna Sharing Connector (Co-siting only)</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX1	1	1	TX/RXA
	1 / TX/RX2	2	2	TX/RXB
2	2 / TX/RX1	3	3	TX/RXA
	2 / TX/RX2	4	4	TX/RXB
3	3 / TX/RX1	5	5	TX/RXA
	3 / TX/RX2	6	6	TX/RXB

**Configuration 1x4 CDU-G without hybrid combiner**

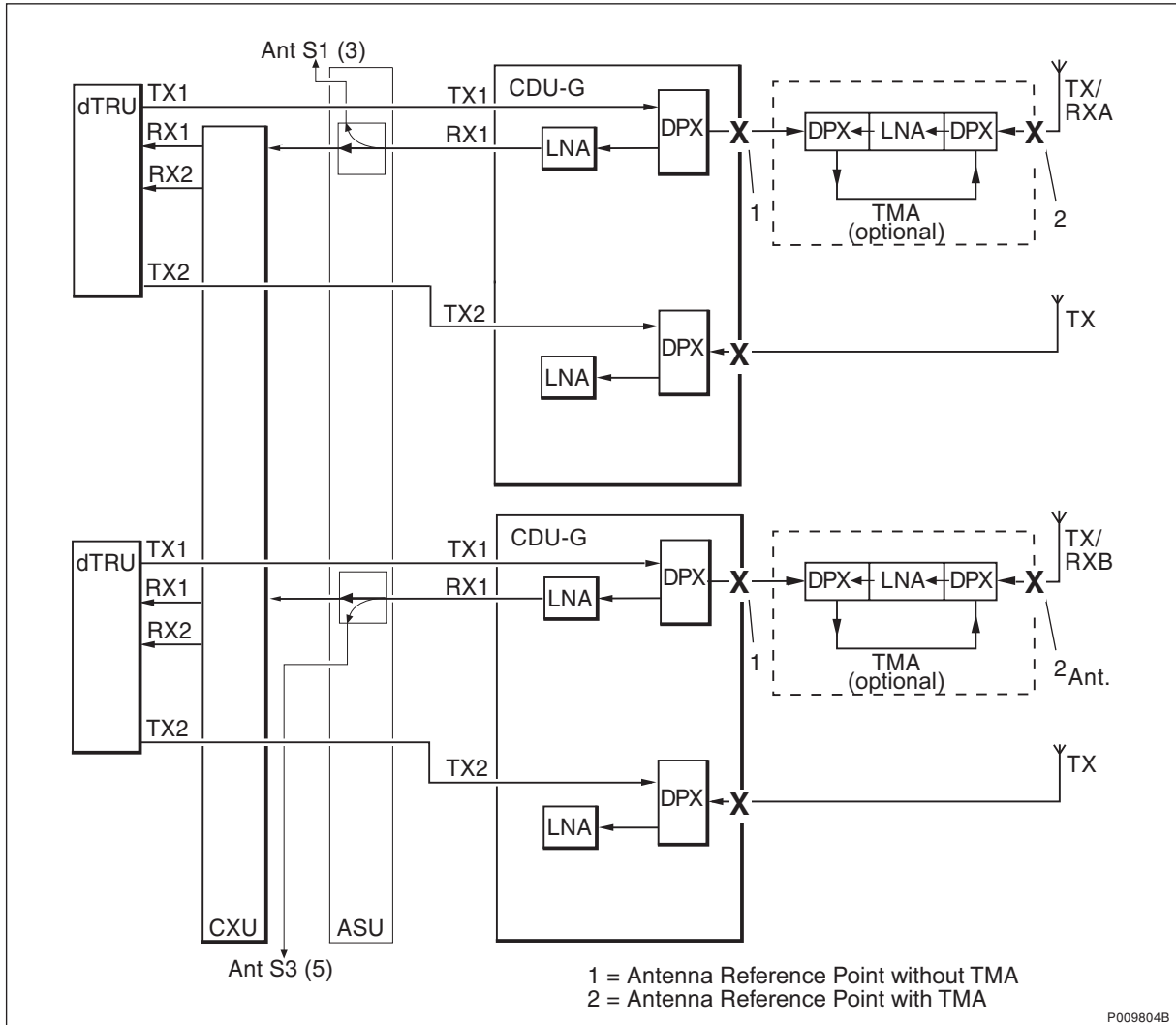


Figure 12 1x4 CDU-G uncombined

In the figure above, Ant S1 and Ant S3 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see Table 7 on page 24.

**Characteristics**

Number of CDUs	2
Frequency band	GSM 800 E-GSM GSM 1800 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 7 1 x 8 Configurations with CDU-G, and 8 combined or 4 uncombined TRXs per cell*

<b>Cell</b>	<b>CDU  No. / Connector</b>	<b>Antenna Sharing Connector  (Co-siting only)</b>	<b>TMA  No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX1	1	1	TX/RXA
	2 / TX/RX1	3	3	TX/RXB
Alt.1	2 / TX/RX1	3	3	TX/RXA
	3 / TX/RX1	5	5	TX/RXB



**Configuration 1x6 CDU-G without hybrid combiner**

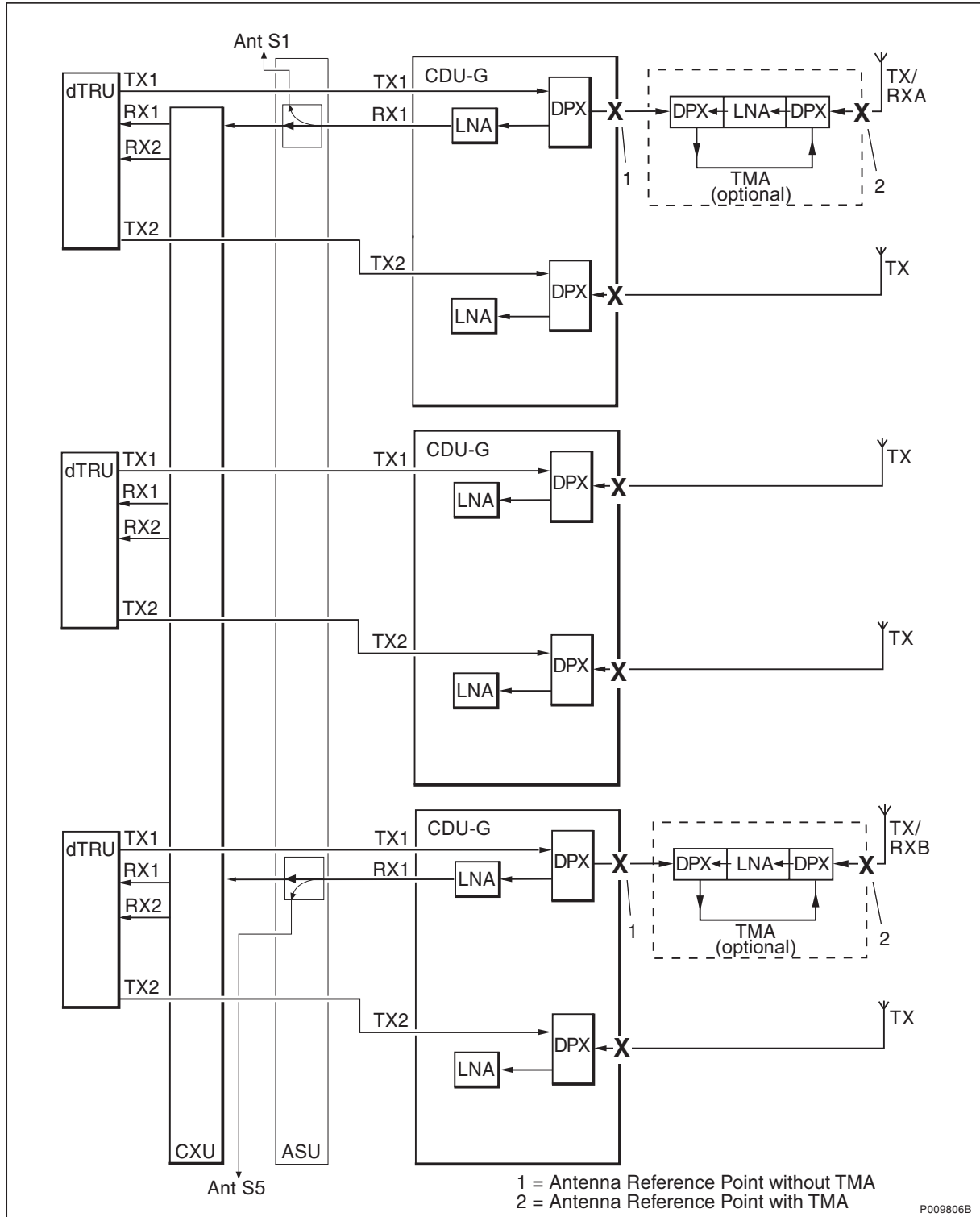


Figure 13 1x6 CDU-G uncombined

In the figure above, Ant S1 and Ant S2 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see *Table 8 on page 26*.

### Characteristics

Number of CDUs	3
Frequency band	GSM 800 E-GSM 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 8 Configurations with CDU-G, and 12 combined or 6 uncombined TRXs per cell*

CDU No. / Connector	Antenna Sharing Connector (Co-siting only)	TMA No. (TMA config. only)	Antenna
1 / TX/RX1	1	1	TX/RXA
3 / TX/RX1	5	5	TX/RXB

### Configuration 1x4 CDU-G with hybrid combiner

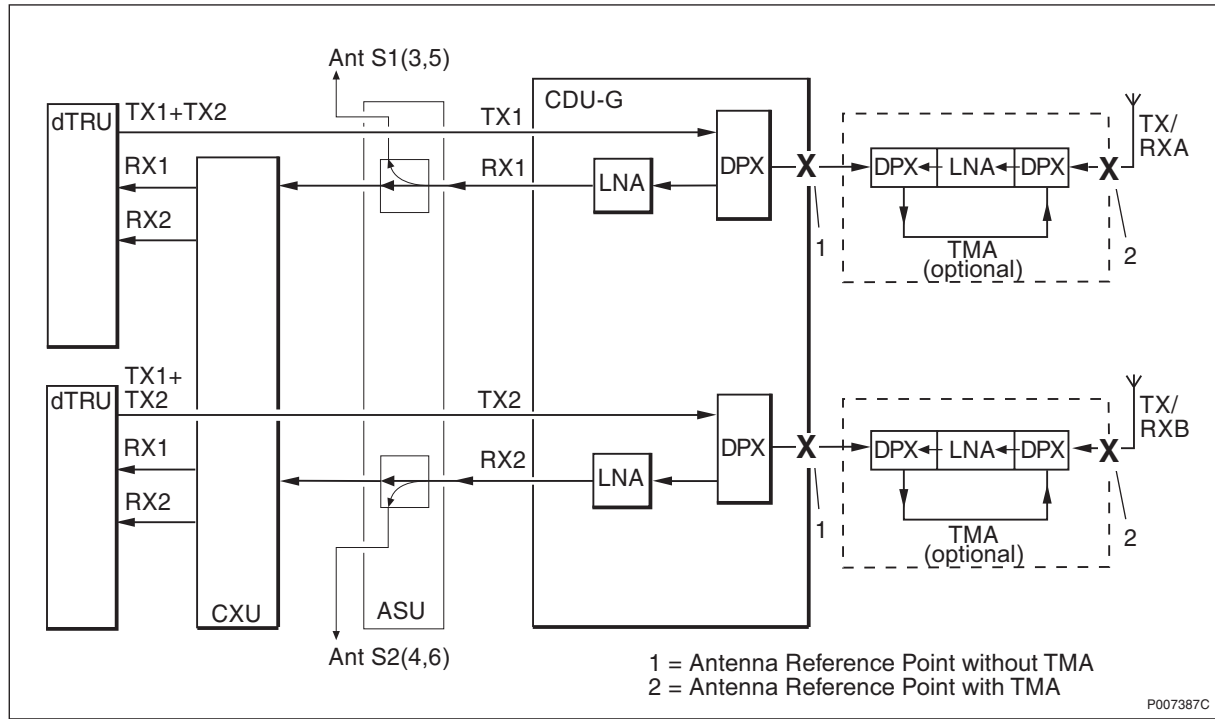


Figure 14 1x4 CDU-G combined

In the figure above, Ant S1 and Ant S2 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see *Table 9 on page 28*.

#### Characteristics

Number of CDUs	1
Frequency band	GSM 800 E-GSM 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 9 Configurations with CDU-G, and 4 combined or 2 uncombined TRXs per cell*

<b>Cell</b>	<b>CDU No. / Connector</b>	<b>Antenna Sharing Connector (Co-siting only)</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX1	1	1	TX/RXA
	1 / TX/RX2	2	2	TX/RXB
2	2 / TX/RX1	3	3	TX/RXA
	2 / TX/RX2	4	4	TX/RXB
3	3 / TX/RX1	5	5	TX/RXA
	3 / TX/RX2	6	6	TX/RXB

**Configuration 2x6 CDU-G with hybrid combiner**

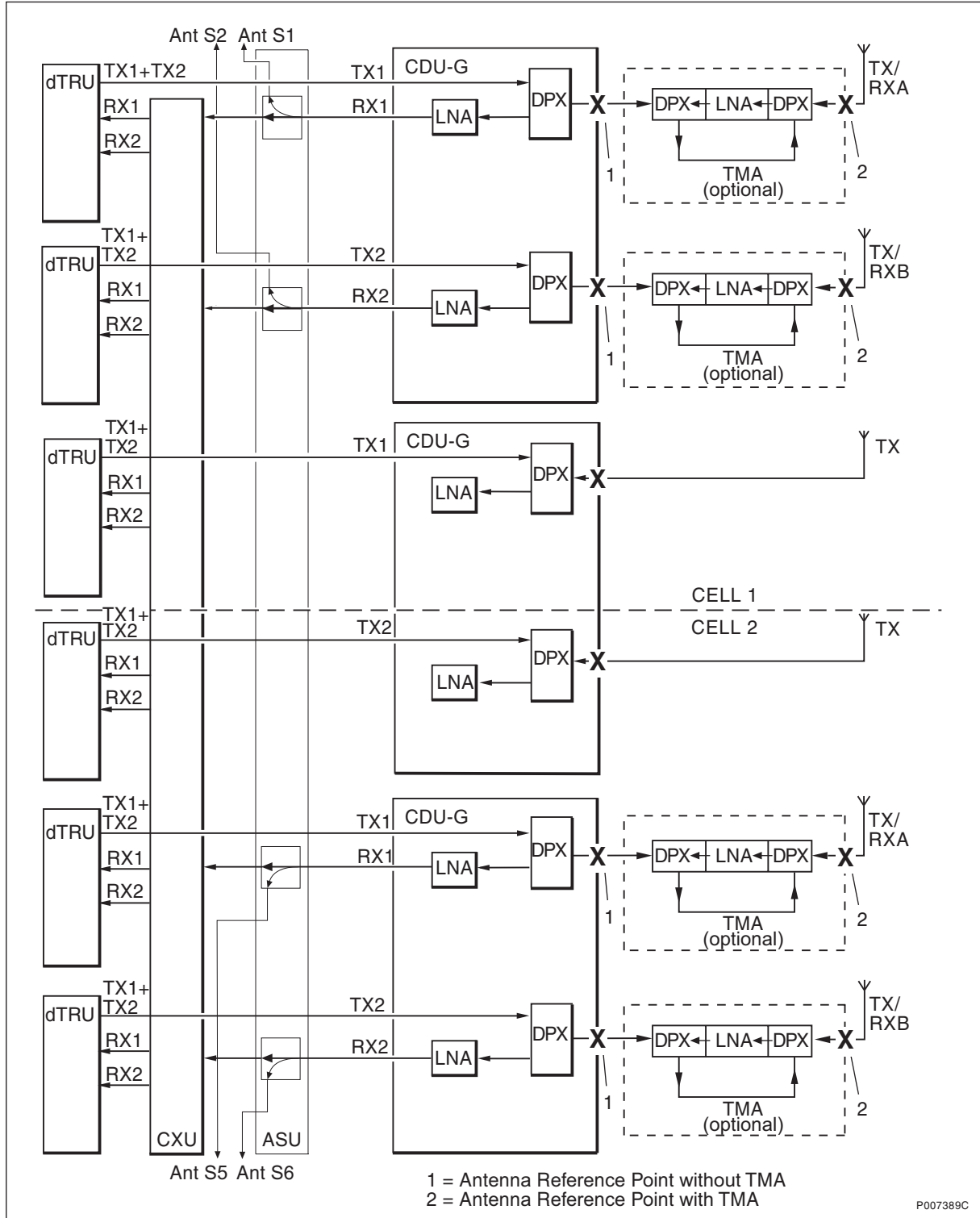


Figure 15 2x6 CDU-G combined

In the figure above, Ant S1, Ant S2 and so on represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see *Table 10 on page 30*.

### Characteristics

Number of CDUs	2*
Frequency band	GSM 800 E-GSM 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

\* Three CDU-Gs support two sectors.

**Note:** The ASU is optional equipment.

*Table 10 2 x 6 configurations with CDU-G*

Cell	CDU No. / Connector	Antenna Sharing Connector (Co-siting only)	TMA No. (TMA config. only)	Antenna
1	1 / TX/RX1	1	1	TX/RXA
	1 / TX/RX2	2	2	TX/RXB
2	3 / TX/RX1	5	5	TX/RXA
	3 / TX/RX2	6	6	TX/RXB

**Configuration 1x8 CDU-G with hybrid combiner**

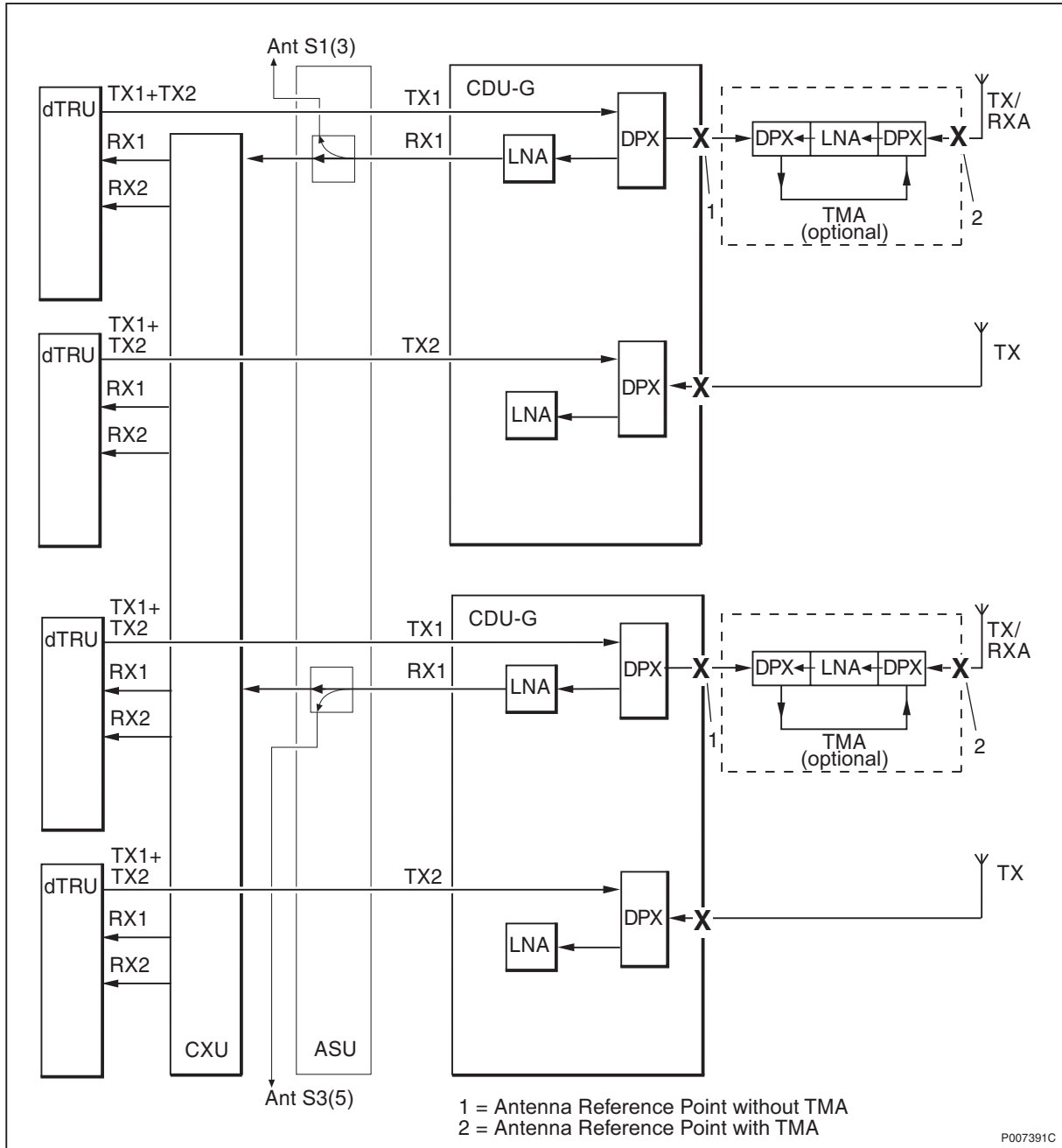


Figure 16 1x8 CDU-G combined

In the figure above, Ant S1 and Ant S3 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see Table 11 on page 32.

**Characteristics**

Number of CDUs	2
Frequency band	GSM 800 E-GSM 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 11 1 x 8 Configurations with CDU-G, and 8 combined or 4 uncombined TRXs per cell*

<b>Cell</b>	<b>CDU No. / Connector</b>	<b>Antenna Sharing Connector (Co-siting only)</b>	<b>TMA No. (TMA config. only)</b>	<b>Antenna</b>
1	1 / TX/RX1	1	1	TX/RXA
	2 / TX/RX1	3	3	TX/RXB
Alt.1	2 / TX/RX1	3	3	TX/RXA
	3 / TX/RX1	5	5	TX/RXB



**Configuration 1x12 CDU-G with hybrid combiner**

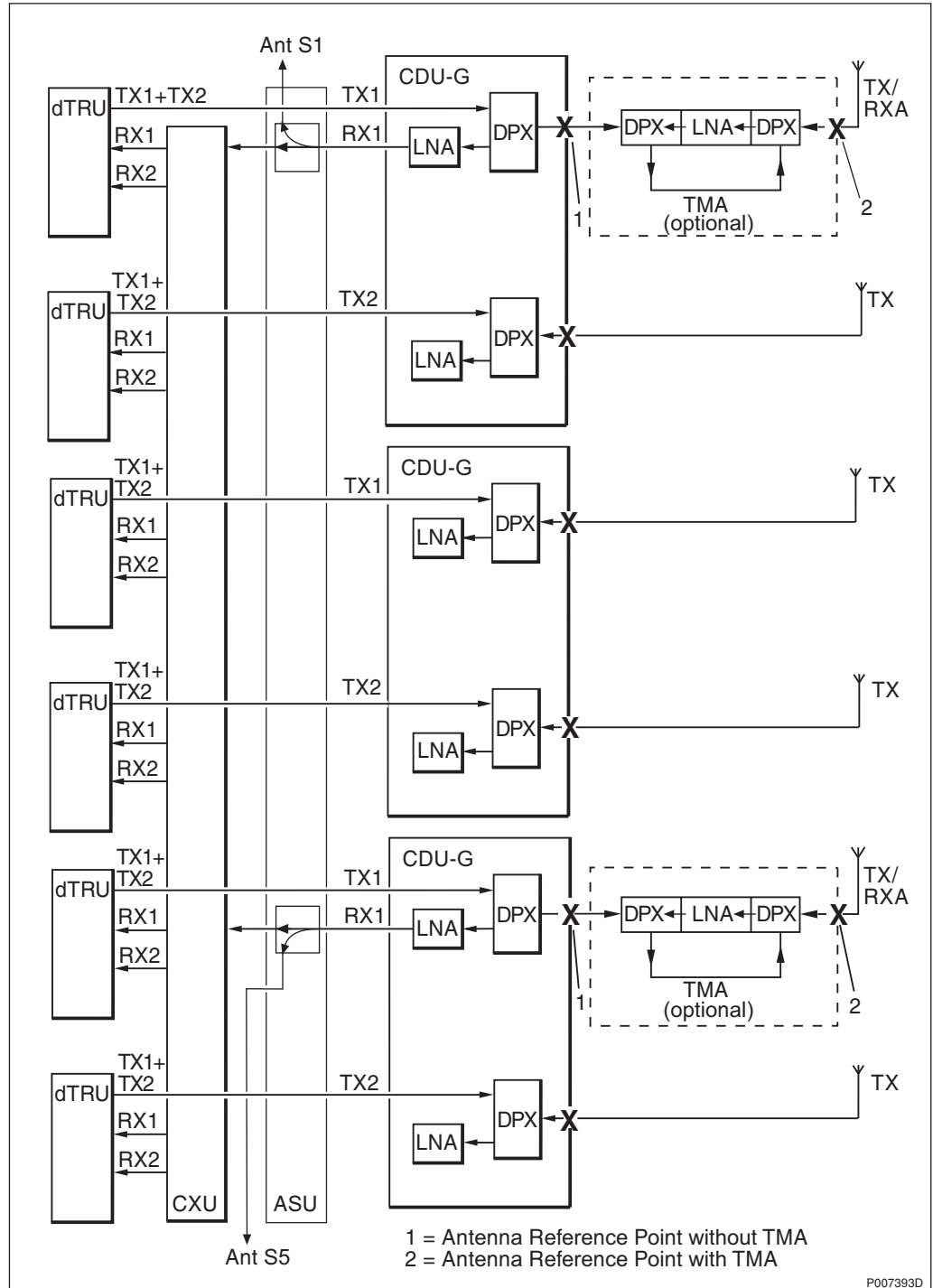


Figure 17 1x12 CDU-G combined

In the figure above, Ant S1 and Ant S5 represent the signal for antenna sharing which goes to the next cabinet. For connector numbers, see *Table 12 on page 34*.

### Characteristics

Number of CDUs	3
Frequency band	GSM 800 E-GSM GSM 1800 GSM 1900
Max. number of TRXs	12
Number of feeders	6
Number of antennas	6
Antenna configuration	2 x TX/RX + 4 x TX
TMA configuration (optional)	ddTMA + ddTMA

**Note:** The ASU is optional equipment.

*Table 12 Configurations with CDU-G, and 12 combined or 6 uncombined TRXs per cell*

CDU No. / Connector	Antenna Sharing Connector (Co-siting only)	TMA No. (TMA config. only)	Antenna
1 / TX/RX1	1	1	TX/RXA
3 / TX/RX1	5	5	TX/RXB

## 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-synchronization, are described in *Section 7 on page 44*.

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 13 CDU-F configurations for E-GSM or GSM 1800

No. of cells	Max. no. of TRXs			No. of antennas			See:
	Cell:			Cell:			
	1	2	3	1	2	3	
1	12			2			Figure 9 on page 17
	8			2			Figure 8 on page 15
	4			2			Figure 6 on page 11
2	6	6		2	2		Figure 7 on page 13
	8	4		2	2		Cell 1: Figure 8 on page 15 Cell 2: Figure 6 on page 11
	4	8		2	2		Cell 1: Figure 6 on page 11 Cell 2: Figure 8 on page 15
	4	4		2	2		Figure 6 on page 11
3	4	4	4	2	2	2	Figure 6 on page 11

The following configurations are also possible:

#### SCC 1 x 2

SCC 1 x 2 can be achieved as a subset of SCC 3 x 4 or 2 x 6. It requires one CDU-F.

#### SCC 2 x 2

SCC 2 x 2 can be achieved as a subset of SCC 3 x 4 or 2 x 6. It requires two CDU-Fs.

<b>SCC 2 x 4</b>	SCC 2 x 4 can be achieved as a subset of SCC 3 x 4 or 2 x 6. It requires two CDU-Fs.
<b>SCC 3 x 2</b>	SCC 3 x 2 can be achieved as a subset of SCC 3 x 4. It requires three CDU-Fs.
<b>SCC 1 x 4</b>	SCC 1 x 4 can be achieved as a subset of either SCC 3 x 4 or 2 x 6. It requires one CDU-F.
<b>SCC 1 x 6</b>	SCC 1 x 6 can be achieved as a subset of SCC 2 x 6 or 1 x 12. It requires two CDU-Fs.

### CDU-G Single Band Configurations without Hybrid Combiner

Table 14 CDU-G configurations for GSM 800, E-GSM, GSM 1800 or GSM 1900

No. of cells	Max no. of TRXs			No. of antennas			See:
	Cell:			Cell:			
	1	2	3	1	2	3	
1	6			6			Figure 13 on page 25
	4			4			Figure 12 on page 23
	2			2			Figure 11 on page 21
2	2	2		2	2		Figure 11 on page 21
	1	1		2	2		Figure 10 on page 19
3	2	2	2	2	2	2	Figure 11 on page 21
	1	1	2	2	2	2	Cell 1: Figure 10 on page 19 Cell 2: Figure 10 on page 19 Cell 3: Figure 11 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 15 CDU-G configurations for GSM 800, E-GSM, 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 17 on page 33
	8			4			Figure 16 on page 31
	4			2			Figure 14 on page 27
2	6	6		3	3		Figure 15 on page 29
	8	4		4	2		Cell 1: Figure 16 on page 31 Cell 2: Figure 14 on page 27
	4	8		2	4		Cell 1: Figure 14 on page 27 Cell 2: Figure 16 on page 31
	4	4		2	2		Figure 14 on page 27
3	4	4	4	2	2	2	Figure 14 on page 27

The following configurations are also possible:

- SCC 1 x 2** This can be achieved as a subset of SCC 3 x 4. It requires one CDU-G.
- SCC 2 x 2** This can be achieved as a subset of SCC 3 x 4. It requires two CDU-Gs.
- SCC 3 x 2** This can be achieved as a subset of SCC 3 x 4. It requires three CDU-Gs.
- SCC 1 x 4** This can be achieved as a subset of either SCC 3 x 4 or 2 x 6. It requires one CDU-G.
- SCC 2 x 4** This can be achieved as a subset of SCC 3 x 4 or 2 x 6.
- SCC 1 x 6** This can be achieved as a subset of SCC 2 x 6. It requires two CDU-Gs.

### CDU-G with a mix hybrid combiner and uncombined

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

Table 16 CDU-G configurations for GSM 800, E-GSM, GSM 1800 or GSM 1900

No. of cells	Max no. of TRXs			No. of antennas			See:
	Cell:			Cell:			
	1	2	3	1	2	3	
2	8c <sup>(1)</sup>	2u <sup>(2)</sup>		4	2		Cell 1: Figure 16 on page 31 Cell 2: Figure 11 on page 21
	2u	8c		2	4		Cell 1: Figure 11 on page 21 Cell 2: Figure 16 on page 31
	2u	4c		2	2		Cell 1: Figure 11 on page 21 Cell 2: Figure 14 on page 27
	4c	2u		2	2		Cell 1: Figure 14 on page 27 Cell 2: Figure 11 on page 21
	4u	4c		4	2		Cell 1: Figure 12 on page 23 Cell 2: Figure 14 on page 27
3	2u	2u	4c	2	2	4	Cell 1 and 2: Figure 11 on page 21 Cell 3: Figure 14 on page 27
	2u	4c	2u	2	4	2	Cell 1 and 3: Figure 11 on page 21 Cell 2: Figure 14 on page 27
	2u	4c	4c	2	4	4	Cell 1: Figure 11 on page 21 Cell 2 and 3: Figure 14 on page 27
	4c	2u	2u	4	2	2	Cell 1: Figure 14 on page 27 Cell 2 and 3: Figure 11 on page 21
	4c	2u	4c	4	2	4	Cell and 3: Figure 14 on page 27 Cell 2: Figure 11 on page 21
	4c	4c	2u	4	4	2	Cell 1 and 2: Figure 14 on page 27 Cell 3: Figure 11 on page 21
	1u	1u	4c	2	2	2	Cell 1 and 2: Figure 10 on page 19 Cell 3: Figure 14 on page 27

(1) c = combined

(2) u = uncombined

## 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 may be located on either left or right side of the cabinet. The only limitation is that, in the case of three cells, the center 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 17 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 15 Cell 2: Figure 6 on page 11
	4	8		2	2		Cell 1: Figure 6 on page 11 Cell 2: Figure 8 on page 15
	4	— <sup>(1)</sup>	4	2		2	Figure 6 on page 11
3 <sup>(2)</sup>	4	4	4	2	2	2	Figure 6 on page 11
	4	4	4	2	2	2	Figure 6 on page 11

(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.

Table 18 Dual band configurations, CDU-G with hybrid combiner

No. of cells	Max. no. of TRXs			No. of antennas			See:
	Cell:			Cell:			
	1	2	3	1	2	3	
2	8	4		4	2		Cell 1: Figure 16 on page 31 Cell 2: Figure 14 on page 27
	4	8		2	4		Cell 1: Figure 14 on page 27 Cell 2: Figure 16 on page 31
	4	— <sup>(1)</sup>	4	2		2	Figure 14 on page 27
3 <sup>(2)</sup>	4	4	4	2	2	2	Figure 14 on page 27
	4	4	4	2	2	2	Figure 14 on page 27

(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: E-GSM/GSM 1800, GSM 800/GSM 1800, and GSM 800/GSM 1900.

Table 19 Dual band configurations, CDU-G without hybrid combiner

No. of cells	Max. no. of TRXs			No. of antennas			See:
	Cell:			Cell:			
	1	2	3	1	2	3	
2	4 <sup>(1)</sup>	2		4	2		Cell 1: Figure 12 on page 23 Cell 2: Figure 11 on page 21
	2	— <sup>(2)</sup>	2	2		2	Figure 11 on page 21
3 <sup>(3)</sup>	2	2	2	2	2	2	Figure 11 on page 21
	2	2	2	2	2	2	Figure 11 on page 21

(1) The sector with four TRX 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: E-GSM/GSM 1800, GSM 800/GSM 1800, and GSM 800/GSM 1900.



Table 20 CDU-G configurations for GSM 800, E-GSM, 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 <sup>(1)</sup>	2u <sup>(2)</sup>		4	2		Cell 1: Figure 16 on page 31 Cell 2: Figure 11 on page 21
	2u	8c		2	4		Cell 1: Figure 11 on page 21 Cell 2: Figure 16 on page 31
	4c	2u		2	2		Cell 1: Figure 14 on page 27 Cell 2: Figure 11 on page 21
	2u	4c		2	2		Cell 1: Figure 11 on page 21 Cell 2: Figure 14 on page 27
3 <sup>(3)</sup>	2u	2u	4c	2	2	2	Cell 1 and 2: Figure 11 on page 21 Cell 3: Figure 14 on page 27
	4c	2u	2u	2	2	2	Cell 1: Figure 14 on page 27 Cell 2 and 3: Figure 11 on page 21
	4c	4c	2u	2	2	2	Cell 1 and 2: Figure 14 on page 27 Cell 3: Figure 11 on page 21
	2u	4c	4c	2	2	2	Cell 1: Figure 11 on page 21 Cell 2 and 3: Figure 14 on page 27

(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: E-GSM/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 on page 35*, 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 on page 35*, which fulfill 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 on page 35*, 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-synchronization 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 21 Expansion using filter combiner

Re- sult SCC	Original Configuration					Expansion Configuration		
	Orig- inal SCC	Cabi- net	Combi- ner	Anten- nas	TMA	Orig- inal SCC	Basic Configu- ration	Antennas
1 x 16 *	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 **	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 x 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)
		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)

M = Mandatory

\* 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.

\*\* 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 x 6 can be accomplished with a partly-equipped expansion configuration.

\*\*\*\* 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.

**Co-Siting with RBS 200 Using Hybrid Combiner**

Table 22 Expansion using hybrid combiner

Re- sult SCC	Original Configuration					Expansion Configuration		
	Orig- inal SCC	Cabi- net	Combi- ner	Anten- nas	TMA	Orig- inal SCC	Basic Con- figuration	Antennas
3 x 8 *	3 x 4 **	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)
		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)

M = Mandatory

\* 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.

\*\* 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.

## 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 23 Expansion using filter combiner

Result SCC	RBS 1			RBS 2		
	Original SCC	Basic Configuration	Antennas	Original SCC	Basic Configuration	Antennas
1 x 18 *	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 **	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 x 8, 1 x 10, 1 x 12, 1 x 14 and 1 x 16 can be accomplished with a partly-equipped RBS 2.

\*\* 1 x 14, 1 x 16, 1 x 18, 1 x 20 and 1 x 22 can be accomplished with a partly-equipped RBS 2.

### Co-Siting with Single TRU-Based RBS 2000 Using Hybrid Combiner

Table 24 Expansion using hybrid combiner

Re- sult SCC	RBS 1			RBS 2		
	Orig- inal SCC	Basic Configuration	Anten- nas	Orig- inal SCC	Basic Configuration	Anten- nas
3 x 8 *	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)

\* 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 25 Expansion using filter combiner

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

\* 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.

\*\* 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 26 Expansion using hybrid combiner

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

\* 3 x 6 is accomplished with a partly-equipped RBS 2.

### Co-Siting with dTRU-Based RBS 2000 without Hybrid Combiner

Table 27 Expansion using CDU-G without hybrid combiner

Result SCC	RBS 1			RBS 2		
	Original SCC	Basic Configuration	Antennas	Original SCC	Basic Configuration	Antennas
3 x 4	3 x 2	3 x G9d_2.2 3 x G9dt_2.2 3 x G18d_2.2 3 x G18dt_2.2 3 x G19dh_2.4 3 x G19dht_2.4	(2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)	3 x 2	3 x G9d_2.4 3 x G9dt_2.4 3 x G18d_2.4 3 x G18dt_2.4 3 x G19dh_2.4 3 x G19dht_2.4	(2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (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.

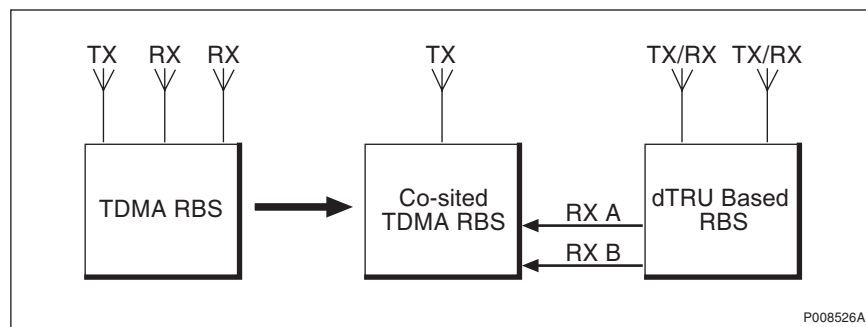


Figure 18 Separate TX and two separate RX antennas, no TMAs

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

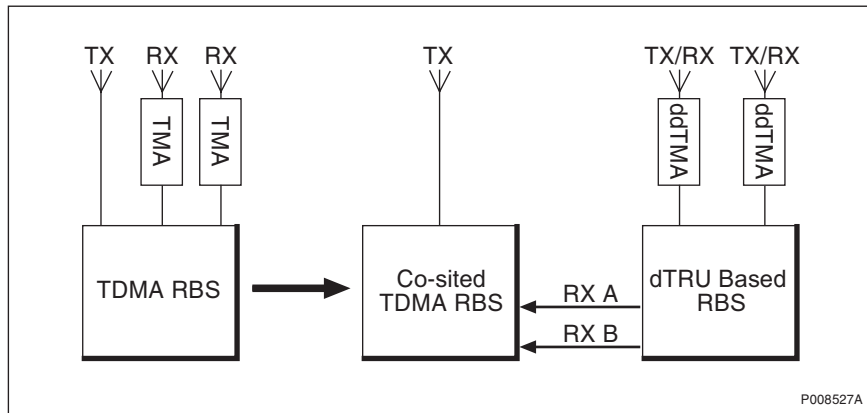


Figure 19 Separate TX and two separate RX antennas, with TMAs

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.

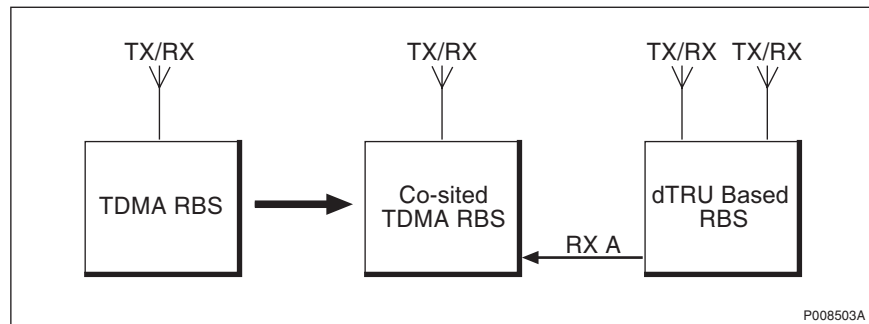


Figure 20 One duplex antenna RX/TX

### 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.

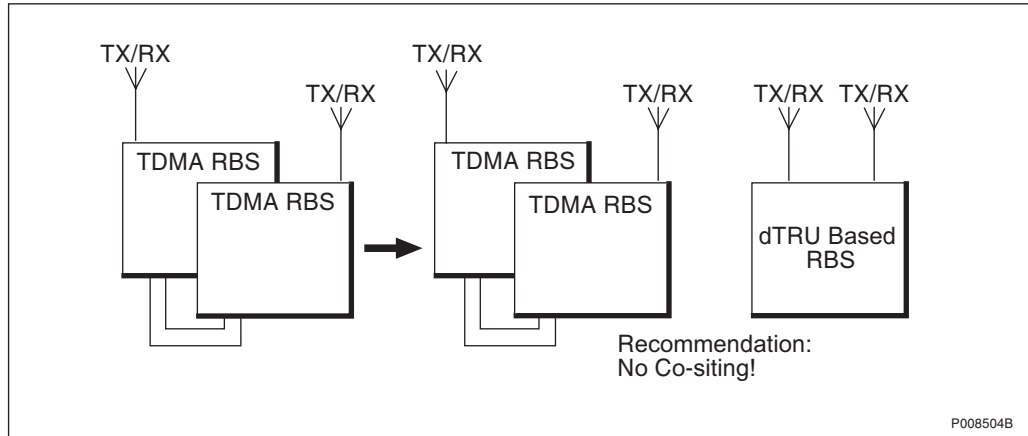


Figure 21 Two separate duplex antennas

## 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 on page 51*.

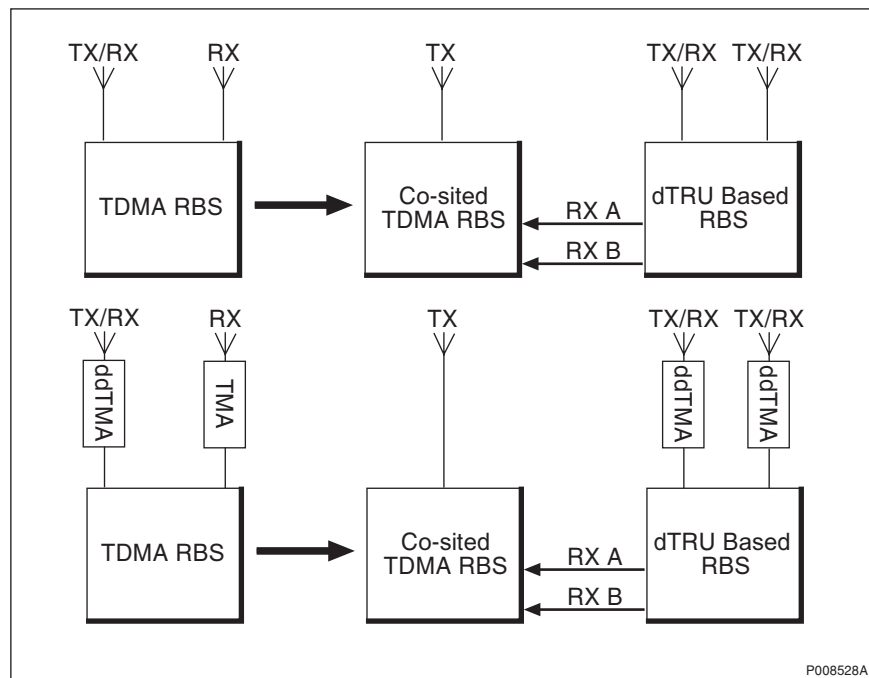


Figure 22 Internal duplex filter

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.





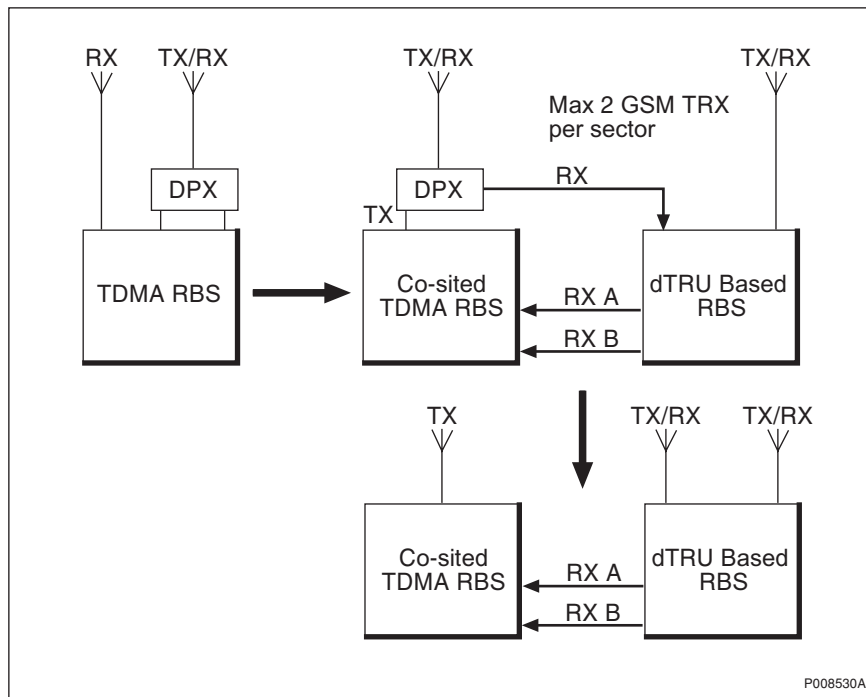


Figure 24 External duplex filter

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