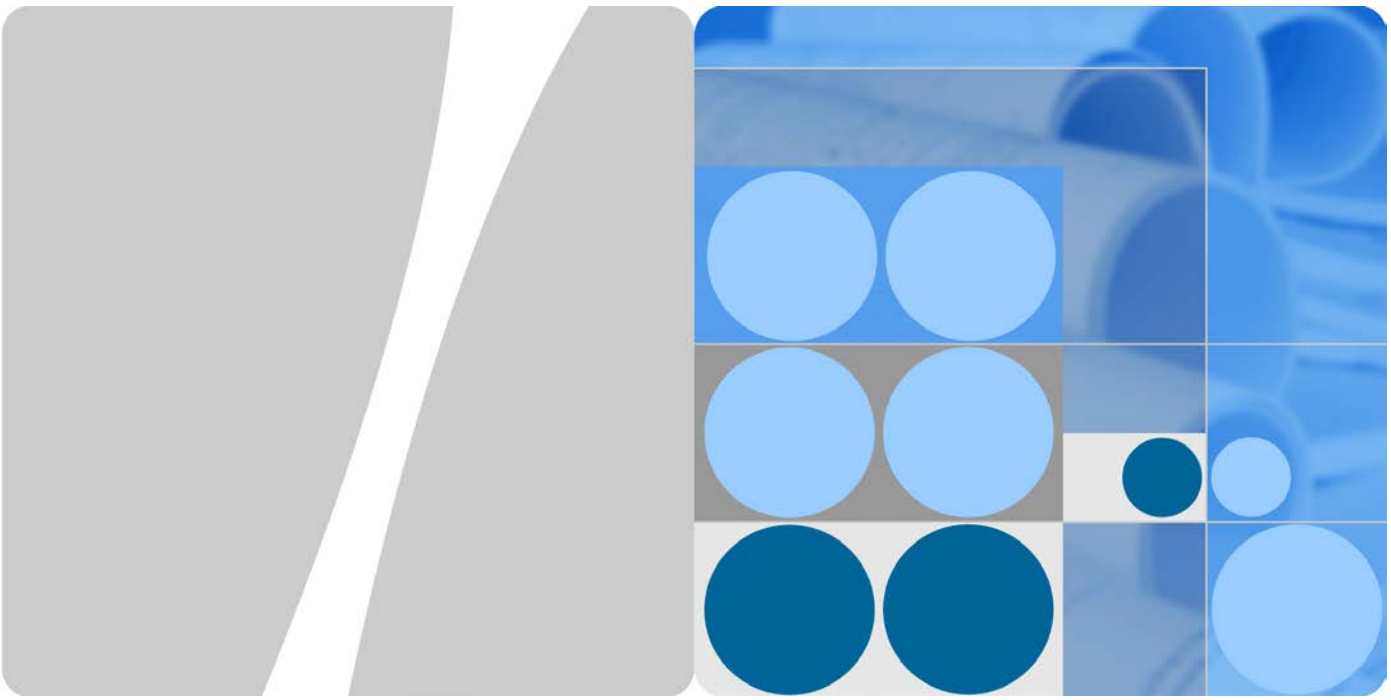

BBU3900

Description

Issue 22

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Contents

1 Introduction 1
1.1 Functions 1
1.2 Exterior 1
1.3 Boards 2
1.3.1 GTMU 2
1.3.2 WMPT 5
1.3.3 LMPT 6
1.3.4 UMPT 7
1.3.5 WBBP 12
1.3.6 LBBP 14
1.3.7 UBBP 15
1.3.8 UBRI 17
1.3.9 UTRP 18
1.3.10 UCIU 21
1.3.11 USCU 22
1.3.12 UELP 24
1.3.13 UFLP 25
1.3.14 USLP2 26
1.3.15 UPEU 27
1.3.16 UEIU 29
1.3.17 FAN 30
1.3.18 UCCU 31
1.4 Board Configuration 33
1.4.1 Board Configuration for a Single-RAT BBU3900 33
1.4.2 Board Configuration for a BBU3900 Working in Separate-MPT Scenarios 33
1.4.3 Board Configuration for a BBU3900 Working in Co-MPT Scenarios 36
2 Technical Specifications 38
2.1 Baseband Specifications 38
2.1.1 GSM Baseband Specifications 38
2.1.2 UMTS Baseband Specifications 39
2.1.3 LTE Baseband Specifications 40
2.1.3.1 LTE FDD Baseband Specifications 40

2.1.3.2 LTE NB-IoT Baseband Specifications 44
2.1.3.3 LTE FDD+NB-IoT Baseband Specifications 48
2.1.3.4 LTE TDD+NB-IoT Baseband Specifications 51
2.1.4 Co-BBP Baseband Specifications 52
2.2 Capacity Specifications 58
2.2.1 GSM Capacity Specifications 58
2.2.2 UMTS Capacity Specifications 59
2.2.3 LTE Capacity Specifications 59
2.2.3.1 LTE FDD Capacity Specifications 59
2.2.3.2 LTE NB-IoT Capacity Specifications 60
2.2.3.3 LTE FDD+NB-IoT Capacity Specifications 61
2.2.3.4 LTE FDD+TDD Capacity Specifications 62
2.2.4 Multi-RAT Capacity Specifications 63
2.3 Signaling Specifications 65
2.3.1 LTE Signaling Specifications 65
2.3.1.1 LTE FDD Signaling Specifications 65
2.3.1.2 LTE NB-IoT Signaling Specifications 67
2.3.1.3 LTE FDD+NB-IoT Signaling Specifications 68
2.3.1.4 LTE FDD+TDD Signaling Specifications 68
2.3.1.5 LTE TDD+NB-IoT Signaling Specifications 69
2.3.2 Multi-RAT Signaling Specifications 69
2.4 CPRI Specifications 71
2.5 Transmission Port Specifications 74
2.6 Equipment Specifications 76
2.7 LTE Traffic Model 77
2.7.1 LTE FDD Traffic Model 77
2.7.2 LTE NB-IoT Traffic Model 80
3 Acronyms and Abbreviations 83

1 Introduction

NOTE

- Unless otherwise specified, in this document, "LTE" refers to LTE FDD, LTE NB-IoT, LTE FDD+NB-IoT, and LTE FDD+TDD.
- In this document, "G" is short for GSM, "U" for UMTS, "L" for LTE FDD, "T" for LTE TDD, and "M" for LTE NB-IoT.

1.1 Functions

1.2 Exterior

1.3 Boards

1.4 Board Configuration

1.1 Functions

The BBU3900 is a baseband control unit that performs the following functions:

- Manages the entire base station system in terms of operation and maintenance (OM) and system clock.
- Processes signaling messages.
- Provides physical ports for information exchange between the base station and the transport network.
- Provides an OM channel between the base station and the LMT, SMT, or U2000.
- Processes uplink and downlink baseband signals, and provides common public radio interface (CPRI) ports for communication with radio frequency (RF) modules.
- Provides ports for receiving and transmitting signals from environment monitoring devices.

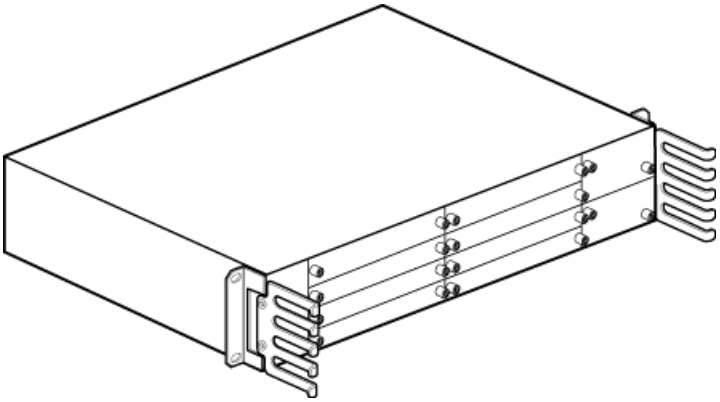
A base station can be configured with a maximum of two interconnected BBU3900s, or one BBU3900 interconnected with one BBU3910 to provide higher processing capabilities.

1.2 Exterior

The BBU3900, 19 inches wide and 2 U high, is a baseband unit with a case structure. The BBU3900 can be installed in an indoor or outdoor protective cabinet.

Figure 1-1 shows the exterior of the BBU3900.

Figure 1-1 BBU3900 exterior



1.3 Boards

The BBU3900 can be configured with the following boards and units:

- Main control and transmission board: GSM transmission and timing and management unit (GTMU), WCDMA main processing and transmission unit (WMPT), LTE main processing and transmission unit (LMPT), or universal main processing and transmission unit (UMPT)
- Baseband processing board: WCDMA baseband processing unit (WBBP), LTE baseband processing unit (LBBP), or universal baseband processing unit (UBBP)
- Universal baseband radio interface unit (UBRI)
- Universal inter-connection infrastructure unit (UCIU)
- Universal transmission processing unit (UTRP)
- Universal satellite card and clock unit (USCU)
- Surge protection unit: universal E1/T1 lightning protection unit (UELP), universal FE lightning protection unit (UFLP), or universal signal lightning protection unit 2 (USLP2)
- Universal power and environment interface unit (UPEU)
- Universal environment interface unit (UEIU)
- Fan unit (FAN)
- Universal inter-connection combo unit (UCCU)

1.3.1 GTMU

The GTMU is the main control and transmission board for the GSM network. The GTMU has three types: GTMU, GTMUb, and GTMUc. The GTMUc is available as of SRAN9.0.

Panel

Figure 1-2 shows the GTMU panel.

Figure 1-2 GTMU panel

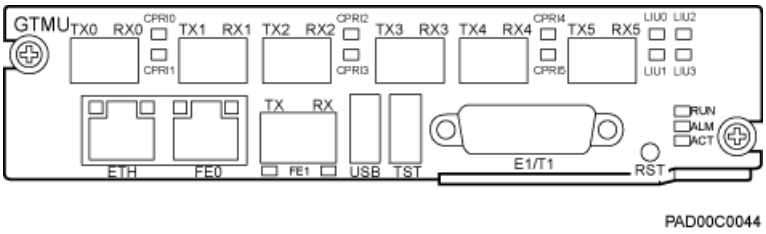


Figure 1-3 shows the GTMUb panel.

Figure 1-3 GTMUb panel

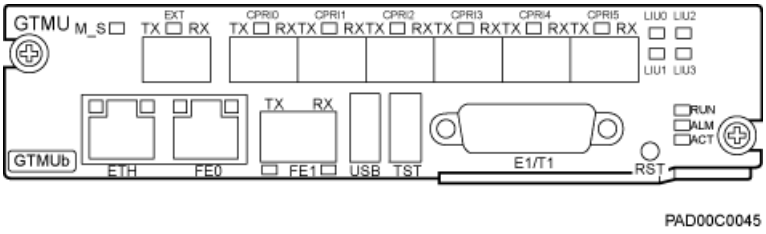
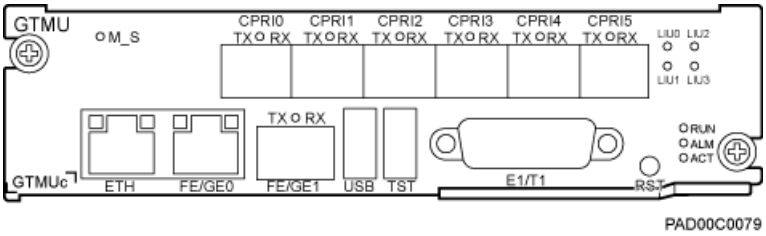


Figure 1-4 shows the GTMUc panel.

Figure 1-4 GTMUc panel



Functions

The GTMU performs the following functions:

- Controls and manages the entire base station in terms of configuration, equipment, performance, security, and radio resources.
- Processes signaling messages.
- Provides a reference clock, an alarm input port, CPRI ports, transmission ports, and an OM channel to the LMT, SMT, or U2000.

Ports

Table 1-1 lists the ports on the GTMU.

Table 1-1 Ports on the GTMU

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.
ETH	RJ45	1	Local maintenance and commissioning port
FE0	RJ45	1	FE electrical port
FE1	DLC	1	FE optical port
USB	USB	1	Software loading port
TST	USB	1	Clock test port
E1/T1	DB26 female	1	E1/T1 port providing input and output of four E1s/T1s
RST	N/A	1	Reset button

Table 1-2 describes the ports on the GTMUb.

Table 1-2 Ports on the GTMUb

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.
EXT	SFP female	1	Reserved port
ETH	RJ45	1	Local maintenance and commissioning port
FE0	RJ45	1	FE electrical port
FE1	DLC	1	FE optical port
USB	USB	1	Software loading port
TST	USB	1	Clock test port
E1/T1	DB26 female	1	E1/T1 port providing input and output of four E1s/T1s
RST	N/A	1	Reset button

Table 1-3 describes the ports on the GTMUc.

Table 1-3 Ports on the GTMUc

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.
ETH	RJ45	1	Local maintenance and commissioning port
FE0	RJ45	1	FE electrical port
FE1	DLC	1	FE optical port
USB	USB	1	Software loading port
TST	USB	1	Clock test port
E1/T1	DB26 female	1	E1/T1 port providing input and output of four E1s/T1s
RST	N/A	1	Reset button

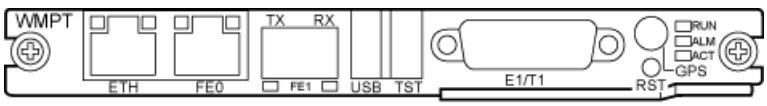
1.3.2 WMPT

The WMPT is the main control and transmission board for the UMTS network.

Panel

Figure 1-5 shows the WMPT panel.

Figure 1-5 WMPT panel



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Functions

The WMPT performs the following functions:

- Controls and manages the entire base station in terms of configuration, equipment, performance monitoring, radio resources, and active/standby switchovers.
- Processes signaling messages.

- Provides a reference clock, transmission ports, and an OM channel to the LMT or U2000.

Ports

Table 1-4 describes the ports on the WMPT.

Table 1-4 Ports on the WMPT

Silkscreen	Connector	Quantity	Description
E1/T1	DB26 female	1	E1/T1 port providing input and output of four E1s/T1s
FE0	RJ45	1	FE electrical port
FE1	SFP female	1	FE optical port
USB	USB	1	USB loading port
TST	USB	1	USB commissioning port
ETH	RJ45	1	Local maintenance and commissioning port
GPS	SMA	1	Reserved port
RST	-	1	Reset button

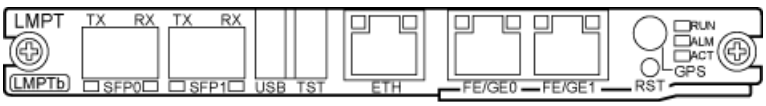
1.3.3 LMPT

The LMPT is the main control and transmission board for the LTE network.

Panel

Figure 1-6 shows the LMPT panel.

Figure 1-6 LMPT panel



Functions

The LMPT performs the following functions:

- Controls and manages the entire base station in terms of configuration, equipment, performance monitoring, and radio resources.

- Processes signaling messages.
- Provides a reference clock, transmission ports, and an OM channel to the LMT or U2000.

Ports

Table 1-5 describes the ports on the LMPT.

Table 1-5 Ports on the LMPT

Silkscreen	Connector	Quantity	Description
SFP0 to SFP1	SFP female	2	FE/GE optical ports
FE/GE0 to FE/GE1	RJ45	2	FE/GE electrical ports
USB	USB	1	USB loading port
TST	USB	1	USB commissioning port
ETH	RJ45	1	Local maintenance and commissioning port
GPS	SMA	1	Used for receiving GPS signals
RST	N/A	1	Reset button

1.3.4 UMPT

The UMPT is a universal main control and transmission board, which can be applied to different radio access technologies (RATs). The UMPT falls into the following types: UMPTa1, UMPTa2, UMPTa6, UMPTb1, UMPTb2, UMPTb3, UMPTb9, UMPTe1, UMPTe2, and UMPTe.

- UMPTa1:
  - Pre-configured with the UMTS software
  - Supporting UMTS in RAN14.0 and SRAN7.0
  - Supporting GSM, UMTS, and LTE as of SRAN8.0
  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTa2:
  - Pre-configured with the LTE software
  - Supporting LTE in eRAN3.0 and SRAN7.0
  - Supporting GSM, UMTS, and LTE as of SRAN8.0
  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTa6:
  - Pre-configured with the LTE software
  - Supporting LTE as of eRAN3.0 and SRAN7.0

  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTb1:
  - Pre-configured with the multi-RAT software
  - Supporting UMTS only in RAN14.0
  - Supporting GSM, UMTS, and LTE FDD as of SRAN8.0
  - Supporting GSM, UMTS, LTE FDD, and LTE TDD when used together with the USCU as of SRAN9.0
  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTb2:
  - Pre-configured with the multi-RAT software
  - Supporting GSM, UMTS, and LTE as of SRAN8.0
  - Supporting GSM, UMTS, LTE FDD, and LTE TDD as of SRAN9.0
  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTb3:
  - Pre-configured with the multi-RAT software
  - Supporting GSM, UMTS, LTE FDD, and LTE TDD as of SRAN10.1
  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTb9:
  - Pre-configured with the multi-RAT software
  - Supporting GSM, UMTS, LTE FDD, and LTE TDD as of SRAN10.1
  - Supporting LTE NB-IoT as of SRAN12.1
- UMPTe:
  - Pre-configured with the multi-RAT software
  - Supporting GSM, UMTS, LTE FDD, and LTE TDD as of SRAN11.1
  - Supporting LTE NB-IoT as of SRAN12.1

Panel

Figure 1-7 shows the UMPTa1 panel.

Figure 1-7 UMPTa1 panel

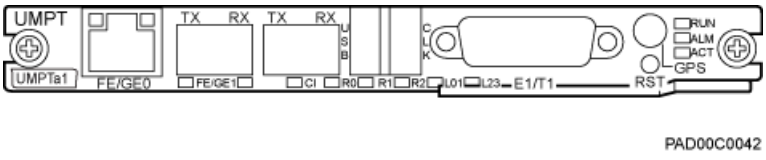


Figure 1-8 shows the UMPTa2 panel.

Figure 1-8 UMPTa2 panel

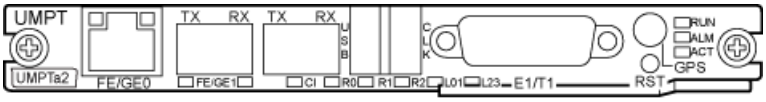


Figure 1-9 shows the UMPTa6 panel.

Figure 1-9 UMPTa6 panel

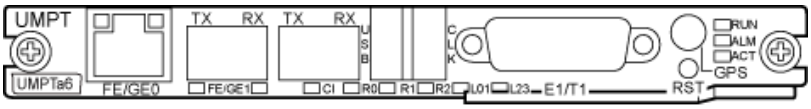


Figure 1-10 shows the UMPTb1 panel.

Figure 1-10 UMPTb1 panel

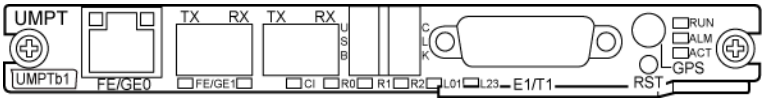


Figure 1-11 shows the UMPTb2 panel.

Figure 1-11 UMPTb2 panel

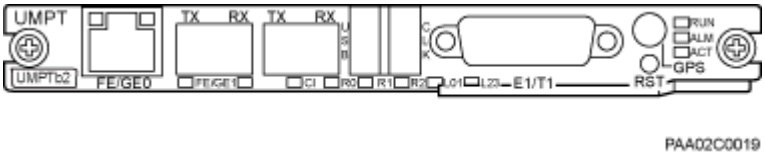


Figure 1-12 shows the UMPTb3 or UMPTb9 panel.

Figure 1-12 UMPTb3 or UMPTb9 panel

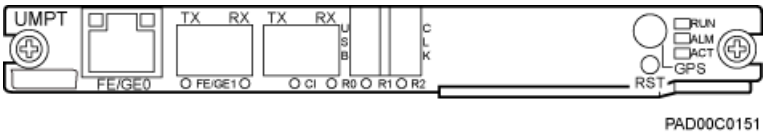
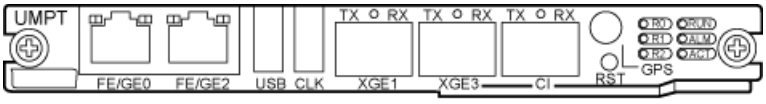


Figure 1-13 shows the UMPTe panel.

Figure 1-13 UMPTe panel



Functions

The UMPT performs the following functions:

- Controls and manages the entire base station in terms of configuration, equipment, performance monitoring, radio resources, and active/standby switchovers.
- Processes signaling messages.
- Provides a reference clock, transmission ports, and an OM channel to the LMT or U2000.
- Connects with the UCIU board in another BBU3900 to exchange control information, transmission information, and clock information.

Ports

Table 1-6 describes the ports on the UMPTa1, UMPTa2, UMPTa6, UMTPb1, or UMPTb2.

Table 1-6 Ports on the UMPTa1, UMPTa2, UMPTa6, UMTPb1, or UMPTb2

Silkscreen	Connector	Quantity	Description
FE/GE0	RJ45	1	FE/GE electrical port
FE/GE1	SFP	1	FE/GE optical port
CI	SFP female	1	Connects to the UCIU
USB	USB	1	A USB flash drive can be inserted into the port for software upgrade and base station commissioning.
CLK	USB	1	Used for multiplexing the time of day (TOD) clock and test clock
E1/T1	DB26 female	1	E1/T1 port providing input and output of four E1s/T1s
GPS	SMA	1	• The GPS port on the UMPTa1, UMPTa2, or UMPTb1 is reserved. • The GPS port on the UMPTa6 or UMPTb2 is used for transmitting RF signals received from the antenna to the

Silkscreen	Connector	Quantity	Description
			satellite card.
RST	-	1	Reset button

Table 1-7 describes the ports on the UMPTb3 or UMPTb9.

Table 1-7 Ports on the UMPTb3 or UMPTb9

Silkscreen	Connector	Quantity	Description
FE/GE0	RJ45	1	FE/GE electrical port
FE/GE1	SFP	1	FE/GE optical port
CI	SFP female	1	Connects to the UCIU
USB	USB	1	A USB flash drive can be inserted into the port for software upgrade and base station commissioning.
CLK	USB	1	Used for multiplexing the TOD clock and test clock
GPS	SMA	1	• The GPS port on the UMPTb3 is reserved. • The GPS port on the UMPTb9 is used for transmitting RF signals received from the antenna to the satellite card.
RST	-	1	Reset button

Table 1-8 describes the ports on the UMPTe.

Table 1-8 Ports on the UMPTe

Silkscreen	Connector	Quantity	Description
FE/GE0, FE/GE2	RJ45	2	FE/GE electrical ports
XGE1, XGE3	SFP	2	XGE optical ports
CI	SFP female	1	Connects to the UCIU
USB	USB	1	A USB flash drive can be inserted into the port for software upgrade and base station commissioning.
CLK	USB	1	Used for multiplexing the

Silkscreen	Connector	Quantity	Description
			TOD clock and test clock
GPS	SMA	1	Used for transmitting RF signals received from the antenna to the satellite card.
RST	-	1	Reset button

1.3.5 WBBP

The WBBP, a WCDMA baseband processing unit, falls into the following four types: WBBPa, WBBPb, WBBPd, and WBBPf. The WBBPa and WBBPb are available as of RAN10.0. The WBBPd is available as of RAN12.0 and SRAN5.0. The WBBPf is available as of RAN14.0 and SRAN7.0.

Panel

Figure 1-14 shows the WBBPa panel.

Figure 1-14 WBBPa panel

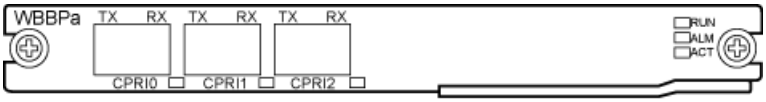


Figure 1-15 shows the WBBPb panel.

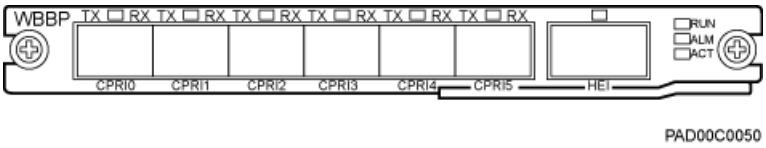
Figure 1-15 WBBPb panel

Figure 1-16 shows the WBBPd panel.

Figure 1-16 WBBPd panel

Figure 1-17 shows the WBBPf panel.

Figure 1-17 WBBPf panel



Functions

The WBBP performs the following functions:

- Provides CPRI ports for communication with RF modules and supports 1+1 backup mode for CPRI ports.
- Processes uplink and downlink baseband signals.
- The WBBPd supports interference cancellation (IC) within the board.
- When a WBBPd board is installed in slot 2 or 3, it supports the IC of uplink data. When an RRU carries a cell with the IC feature enabled, this RRU must be connected to a CPRI port on the WBBPd.
- When WBBPf boards are installed in slot 2 or 3, they can be interconnected across BBUs to achieve baseband resource sharing.

Ports

Table 1-9 describes the ports on the WBBPa.

Table 1-9 Ports on the WBBPa

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI2	SFP female	3	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.

Table 1-10 describes the ports on the WBBPb.

Table 1-10 Ports on the WBBPb

Silkscreen	Connector	Quantity	Description
CPRI0/EIH0 to CPRI2/EIH2	SFP female	3	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.

Table 1-11 describes the ports on the WBBPd.

Table 1-11 Ports on the WBBPd

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI2, CPRI3/EIH0, CPRI4/EIH1, and CPRI5/EIH2	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support electrical and optical signal input and output.

Table 1-12 describes the ports on the WBBPf.

Table 1-12 Ports on the WBBPf

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.
HEI	QSFP	1	Port that interconnects baseband processing boards for data communication

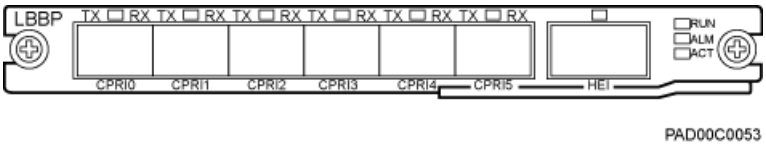
1.3.6 LBBP

The LBBP, an LTE baseband processing unit, falls into the following three types: LBBPd1, LBBPd2, and LBBPd3.

Panel

The LBBPd1, LBBPd2 and LBBPd3 have the same panels, as shown in Figure 1-18.

Figure 1-18 LBBPd1, LBBPd2, or LBBPd3 panel



Functions

The LBBP performs the following functions:

- Provides CPRI ports for communication with RF modules.
- Processes uplink and downlink baseband signals.

Ports

The LBBPd1, LBBPd2 and LBBPd3 have the same ports, as shown in Table 1-13.

Table 1-13 Ports on the LBBPd1, LBBPd2, or LBBPd3

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.
HEI	QSFP	1	Port that interconnects baseband processing boards for data communication

1.3.7 UBBP

The UBBP, a universal baseband processing unit, falls into the following two types:

- UBBPd, including UBBPd1, UBBPd2, UBBPd3, UBBPd4, UBBPd5, and UBBPd6
- UBBPe, including UBBPe1, UBBPe2, UBBPe3, and UBBPe4

NOTE
- The UBBPd is available as of SRAN9.0.
- The UBBPe1, UBBPe2, UBBPe3, UBBPe4 are available as of SRAN11.1.

The following table lists RATs supported by the UBBPd and UBBPe boards.

Table 1-14 RATs supported by the UBBPd and UBBPe boards

Board	Supported RAT
UBBPd1	GSM, UMTS, GU
UBBPd2	GSM, UMTS, GU
UBBPd3	GSM, UMTS, LTE FDD, LTE NB-IoT, GU, GL, LM
UBBPd4	GSM, UMTS, LTE FDD, LTE NB-IoT, GU, GL, LM
UBBPd5	GSM, UMTS, LTE FDD, LTE NB-IoT, GU, GL, LM
UBBPd6	GSM, UMTS, LTE FDD, LTE NB-IoT, GU, GL, UL, UM, LM, GUL, ULM
UBBPe1	UMTS, LTE FDD, LTE NB-IoT, LM
UBBPe2	UMTS, LTE FDD, LTE NB-IoT, LM

Board	Supported RAT
UBBPe3	UMTS, LTE FDD, LTE NB-IoT, UL, UM, LM, ULM
UBBPe4	UMTS, LTE FDD, LTE NB-IoT, UL, UM, LM, ULM, TM

NOTE

- The UBBPd1, UBBPd2, UBBPd3, and UBBPd4 boards support only UMTS as of RAN15.0 SPC350.
- LTE NB-IoT, LM, and UM are available as of SRAN12.1.
- The UBBPe4, and UBBPe2 boards support TM as of SRAN13.1.
- ULM co-BBP is supported as of SRAN13.1.

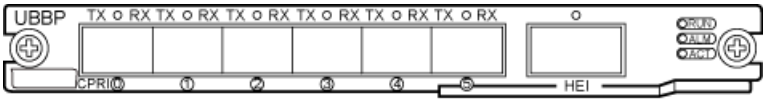
Panel

The UBBPd1, UBBPd2, UBBPd3, UBBPd4, UBBPd5, and UBBPd6 have the same panel, as shown in Figure 1-19.

Figure 1-19 UBBPd panel

The UBBPe1, UBBPe2, UBBPe3, and UBBPe4 have the same panel, as shown in Figure 1-20.

Figure 1-20 UBBPe panel



Functions

The UBBP performs the following functions:

- Provides CPRI ports for communication with RF modules.
- Supports deployment of multiple RATs on one UBBP.

Ports

Table 1-15 describes the ports on the UBBPd or UBBPe.

Table 1-15 Ports on the UBBPd or UBBPe

Silkscreen	Connector	Quantity	Description

Silkscreen	Connector	Quantity	Description
CPRI0 to CPRI5	SFP female	6	Data transmission ports that interconnect with RF modules. These ports support input and output of electrical and optical signals.
HEI	QSFP	1	Port that interconnects baseband processing boards for data communication

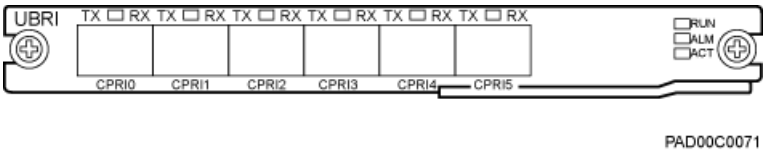
1.3.8 UBRI

The UBRI, a universal baseband radio interface board, is available as of SRAN3.0. The UBRIb is available as of SRAN8.0.

Panel

Figure 1-21 shows the UBRI or UBRIb panel.

Figure 1-21 UBRI or UBRIb panel



Functions

The UBRI performs the following functions:

- Provides extended CPRI electrical or optical ports.
- Provides CPRI convergence and forwarding.
- Connects to CPRI fiber optic cables of any RAT combination in co-MPT multi-RAT scenarios when the UBRIb is installed in slot 0 or 1 and used together with the WBBPf or LBBPd. For example, in a co-MPT GL base station, the UBRIb can connect to GO, LO, or GL RF modules using CPRI fiber optic cables.

Ports

Table 1-16 describes the ports on the UBRI or UBRIb.

Table 1-16 Ports on the UBRI or UBRIb

Silkscreen	Connector	Quantity	Description
CPRI0~CPRI5	SFP	6	Data transmission ports that interconnect with

Silkscreen	Connector	Quantity	Description
			RF modules. These ports support input and output of electrical and optical signals.

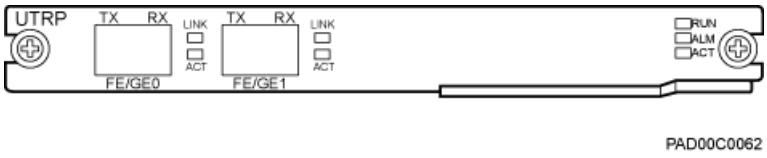
1.3.9 UTRP

The UTRP, a universal transmission processing unit, falls into the following seven types: UTRP2, UTRP3, UTRP4, UTRP6, UTRP9, UTRPc, and UTRPa.

Panel

Figure 1-22 shows the UTRP2 panel.

Figure 1-22 UTRP2 panel



The UTRP3 and UTRP4 have the same panel, as shown in Figure 1-23.

Figure 1-23 UTRP3 or UTRP4 panel

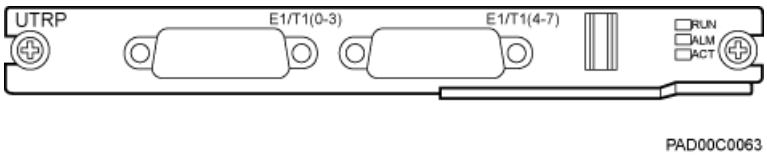


Figure 1-24 shows the UTRP6 panel.

Figure 1-24 UTRP6 panel

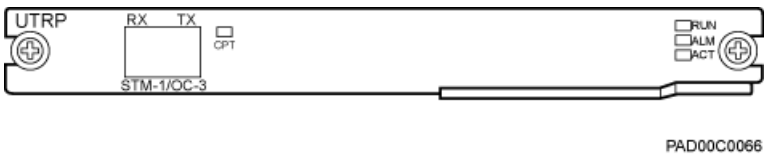


Figure 1-25 shows the UTRP9 panel.

Figure 1-25 UTRP9 panel

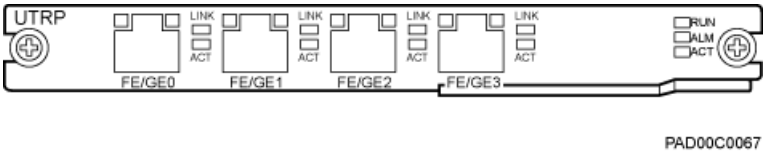


Figure 1-26 shows the UTRPc panel.

Figure 1-26 UTRPc panel

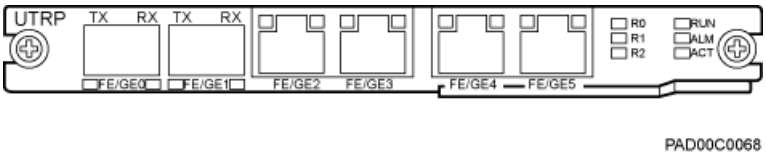
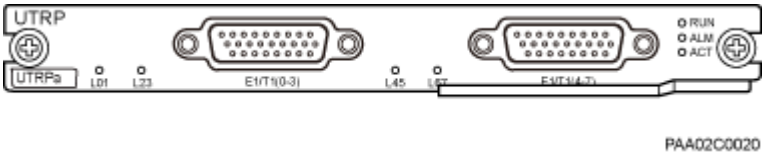


Figure 1-27 shows the UTRPa panel.

Figure 1-27 UTRPa panel



Functions

- The UTRP2 is an extended transmission board for the UMTS network and is available as of RAN11.0 and SRAN3.0. There are two FE/GE optical ports on the UTRP2. Each of the two ports provides a data rate of 100 Mbit/s or 1000 Mbit/s and performs Ethernet Media Access Control (MAC) layer functions, which include sending and receiving Ethernet link data and parsing MAC addresses.
- The UTRP3 is an extended transmission board for the UMTS network and is available as of RAN10.0. It provides eight E1/T1 links, where ATM cell flows are inversely multiplexed and de-multiplexed.
- The UTRP4 is an extended transmission board for the UMTS network. It provides eight E1/T1 links, performs HDLC deframing and framing, and allocates and controls 256 HDLC timeslots.
- The UTRP6 is an extended transmission board for the UMTS network and is available as of RAN10.0 and SRAN3.0. The UTRP6 provides an unchannelized STM-1/OC-3 port.
- The UTRP9 is an extended transmission board for the UMTS network and is available as of RAN11.0 and SRAN3.0. It provides four FE/GE electrical ports at a data rate of 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. These ports perform the Ethernet MAC and physical layer functions.
- The UTRPc is available as of GBSS14.0, RAN14.0, eRAN3.0, and SRAN7.0. The UTRPc performs the following functions:

  - Provides transmission for the GSM, UMTS, and LTE networks and enables theses networks to share the same IPsec tunnel.
  - Provides two 100 Mbit/s or 1000 Mbit/s Ethernet optical ports and performs Ethernet MAC layer functions, which include sending and receiving Ethernet link data and parsing MAC addresses.
  - Provides four 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s Ethernet electrical ports and performs the functions of the MAC layer and physical layer.
  - Supports co-transmission of GSM, UMTS, and LTE.
  - Enhances the signaling processing capability of the UMTS network.
- The UTRPa is an extended transmission board for the UMTS network and is available as of RAN15.1. The UTRPa provides eight E1/T1 links where ATM cell flows are inversely multiplexed and de-multiplexed, performs HDLC deframing and framing, and allocates and controls 256 HDLC timeslots.

Ports

Table 1-17 describes the ports on the UTRP2.

Table 1-17 Ports on the UTRP2

Silkscreen	Connector	Quantity	Description
FE/GE0 to FE/GE1	SFP female	2	FE/GE optical ports

The UTRP3 and UTRP4 have the same ports, as shown in Table 1-18.

Table 1-18 Ports on the UTRP3 or UTRP4

Silkscreen	Connector	Quantity	Description
E1/T1 (0 to 3)	DB26 female	1	E1/T1 ports providing four E1s/T1s numbered from 0 to 3
E1/T1 (4 to 7)	DB26 female	1	E1/T1 ports providing four E1s/T1s numbered from 4 to 7

Table 1-19 describes the ports on the UTRP6.

Table 1-19 Ports on the UTRP6

Silkscreen	Connector	Quantity	Description
STM-1/OC-3	SFP female	1	One STM-1/OC-3 signal input and output

Table 1-20 describes the ports on the UTRP9.

Table 1-20 Ports on the UTRP9

Silkscreen	Connector	Quantity	Description
FE/GE0 to FE/GE3	RJ45	4	FE/GE electrical ports

Table 1-21 describes the ports on the UTRPc.

Table 1-21 Ports on the UTRPc

Silkscreen	Connector	Quantity	Description
FE/GE0 to FE/GE1	SFP female	2	FE/GE optical ports
FE/GE2 to FE/GE5	RJ45	4	FE/GE electrical ports

Table 1-22 describes the ports on the UTRPa.

Table 1-22 Ports on the UTRPa

Silkscreen	Connector	Quantity	Description
E1/T1 (0 to 3)	DB26 female	1	E1/T1 ports providing four E1s/T1s numbered from 0 to 3
E1/T1 (4 to 7)	DB26 female	1	E1/T1 ports providing four E1s/T1s numbered from 4 to 7

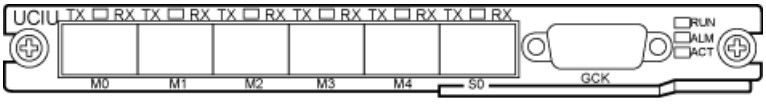
1.3.10 UCIU

The UCIU, a universal inter-connection infrastructure unit, is available as of SRAN7.0.

Panel

Figure 1-28 shows the UCIU panel.

Figure 1-28 UCIU panel



PAD00C0072

Functions

The UCIU performs the following functions:

- Connects with the UMPT board in another BBU to exchange control information, transmission information, and clock information between two BBUs.
- Interconnects a BTS3012 with a co-sited BTS3900 or interconnects a BTS3012AE with a co-sited BTS3900A.

Ports

Table 1-23 describes the ports on the UCIU.

Table 1-23 Ports on the UCIU

Silkscreen	Connector	Quantity	Description
M0 to M4	SFP female	5	Primary ports, which connect to the secondary ports on the other BBU
S0	SFP female	1	Secondary port, which connects to the primary port on the other BBU
GCK	DB15	1	Clock port, which provides clock synchronization for the interconnected 3900 series base station and 3012 series base station located at the same site

1.3.11 USCU

The USCU, a universal satellite card and clock unit, falls into the following three types: USCUb11, USCUb14, and USCUb22.

Panel

The USCUb11 and USCUb14 have the same panel, as shown in Figure 1-29.

Figure 1-29 USCUb11 or USCUb14 panel

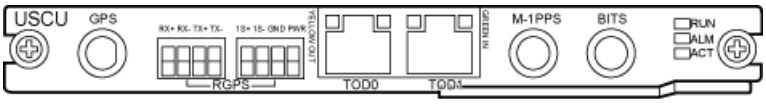
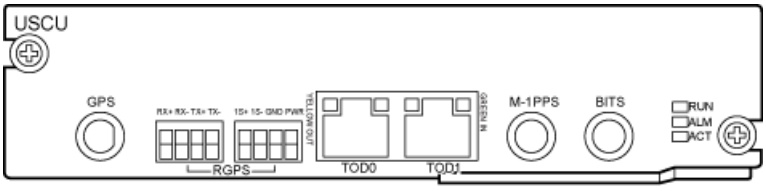


Figure 1-30 shows the USCUb22 panel.

Figure 1-30 USCUb22 panel



Functions

The USCU performs the following functions:

- The USCUb11 provides ports to communicate with the RGPS (for example the reused equipment of the customer) and BITS equipment. It does not support GPS signals.
- The USCUb14 does not support RGPS signals. It contains a UBLOX satellite card.
- The USCUb22 does not support RGPS signals. It uses a Naviors satellite card, which must be purchased locally and installed onsite.

Ports

The USCUb11, USCUb14, and USCUb22 have the same ports, as shown in Table 1-24.

Table 1-24 Ports on the USCUb11, USCUb14, or USCUb22

Silkscreen	Connector	Quantity	Description
GPS	SMA	1	The GPS port on the USCUb14 or USCUb22 receives GPS signals. The GPS port on the USCUb11 is reserved and cannot

Silkscreen	Connector	Quantity	Description
			receive GPS signals.
RGPS	PCB welded wiring terminal	1	The RGPS port on the USCUb11 receives RGPS signals. The RGPS ports on the USCUb14 and USCUb22 are reserved and cannot receive RGPS signals.
TOD0	RJ45	1	Receives or transmits 1PPS+TOD signals.
TOD1	RJ45	1	Receives or transmits 1PPS+TOD signals, and receives TOD signals from the M1000.
M-1PPS	SMA	1	Receives 1PPS signals from the M1000.
BITS	SMA	1	Receives BITS clock signals, and supports adaptive input of 2.048 MHz and 10 MHz clock sources.

NOTE
GSM and UMTS do not support 1PPS+TOD clock signals.

1.3.12 UELP

The UELP is a universal E1/T1 lightning protection unit.

Panel

Figure 1-31 shows the UELP panel.

Figure 1-31 UELP panel

Functions

One UELP can provide lightning protection for four E1s/T1s.

Ports

Table 1-25 describes the ports on the UELP.

Table 1-25 Ports on the UELP

Silkscreen	Connector	Quantity	Description
INSIDE	DB25 female	1	Connects to a transmission board of the base station
OUTSIDE	DB26 female	1	Connects to an external transmission device

1.3.13 UFLP

The UFLP, a universal FE lightning protection unit, falls into the following two types: UFLP and UFLPb. The UFLP provides lightning protection for two FEs. The UFLPb provides lightning protection for two FEs/GEs.

Panel

Figure 1-32 shows the UFLP panel.

Figure 1-32 UFLP panel

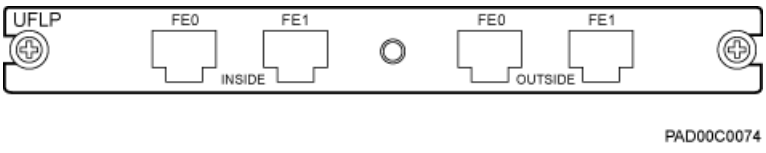
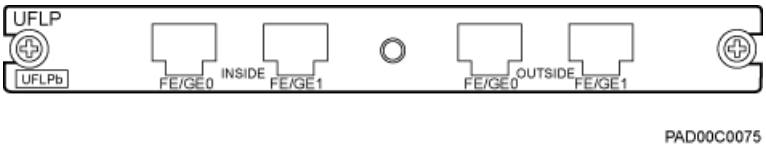


Figure 1-33 shows the UFLPb panel.

Figure 1-33 UFLPb panel



Functions

The UFLP performs the following functions:

- The UFLP provides lightning protection for two FEs.
- The UFLPb provides lightning protection for two FEs/GEs.

Ports

Table 1-26 describes the ports on the UFLP.

Table 1-26 Ports on the UFLP

Silkscreen		Connector	Quantity	Description
INSIDE	FE0 and FE1	RJ45	2	Connects to a transmission board of the base station
OUTSIDE	FE0 and FE1	RJ45	2	Connects to an external transmission device

Table 1-27 describes the ports on the UFLPb.

Table 1-27 Ports on the UFLPb

Silkscreen		Connector	Quantity	Description
INSIDE	FE/GE0 and FE/GE1	RJ45	2	Connects to a transmission board of the base station
OUTSIDE	FE/GE0 and FE/GE1	RJ45	2	Connects to an external transmission device

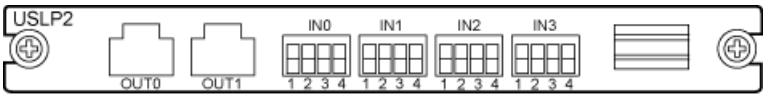
1.3.14 USLP2

The USLP2 is a universal dry contact signal lightning protection unit.

Panel

Figure 1-34 shows the USLP2 panel.

Figure 1-34 USLP2 panel



Functions

The USLP2 provides lightning protection for monitoring signals.

Ports

Table 1-28 describes the ports on the USLP2.

Table 1-28 Ports on the USLP2

Silkscreen	Connector	Quantity	Description
IN0, IN1, IN2, and IN3	4-pin	4	Input ports, which connect to customized alarm devices
OUT0 and OUT1	RJ45	2	Output ports, which connect to EXT-ALM ports of the UPEU or UEIU in the cabinet

1.3.15 UPEU

The UPEU, a universal power module for the BBU3900, falls into three types: UPEUa, UPEUc, and UPEUd.

Panel

Figure 1-35 shows the UPEUa panel.

Figure 1-35 UPEUa panel

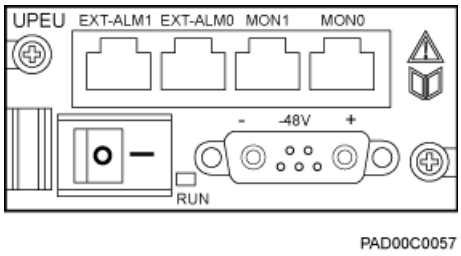


Figure 1-36 shows the UPEUc panel.

Figure 1-36 UPEUc panel

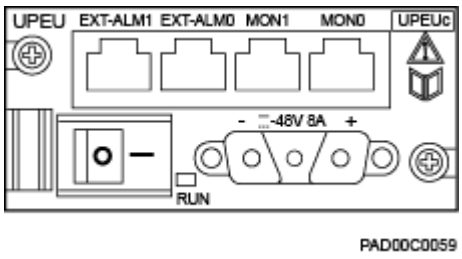
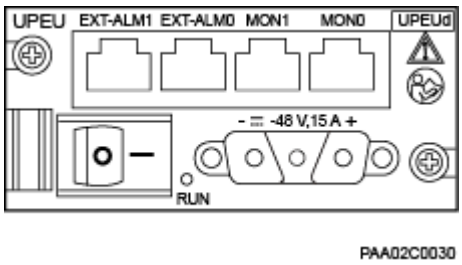


Figure 1-37 shows the UPEUd panel.

Figure 1-37 UPEUd panel



Functions

The UPEU performs the following functions:

- The UPEUa converts –48 V DC input power into +12 V DC and provides an output power of 300 W.
- The UPEUc converts –48 V DC input power into +12 V DC. A UPEUc provides an output power of 360 W. Two UPEUc boards provide a combined output power of 650 W.
- The UPEUd converts –48 V DC input power into +12 V DC and provides an output power of 650 W.
- Provides two ports with each transmitting one route of RS485 signals and two ports with each transmitting four routes of Boolean signals. The Boolean signals can only be dry contact or open collector (OC) signals.

Ports

Table 1-29 describes the ports on the UPEU.

Table 1-29 Ports on the UPEU

Silkscreen	Connector	Quantity	Description
UPEUa: –48 V	7W2	1	Port for –48 V DC power input
UPEUc or UPEUd: –48 V	3V3	1	Port for –48 V DC power input
EXT-ALM0	RJ45	1	Port for Boolean inputs 0 to 3
EXT-ALM1	RJ45	1	Port for Boolean inputs 4 to 7
MON0	RJ45	1	Port for RS485 input 0
MON1	RJ45	1	Port for RS485 input 1

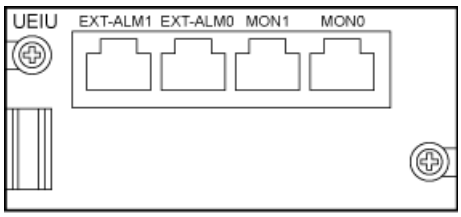
1.3.16 UEIU

The UEIU, a universal environment interface unit, transmits information reported by the environment monitoring device and alarm information to the main control board.

Panel

Figure 1-38 shows the UEIU panel.

Figure 1-38 UEIU panel



Functions

The UEIU performs the following functions:

- Provides two ports, each transmitting one route of RS485 signals.
- Provides two ports, each transmitting four routes of Boolean signals, which can only be dry contact or OC signals.
- Transmits information reported by the environment monitoring device and alarm information to the main control board.

Ports

Table 1-30 describes the ports on the UEIU.

Table 1-30 Ports on the UEIU

Silkscreen	Connector	Quantity	Description
EXT-ALM0	RJ45	1	Port for Boolean inputs 0 to 3
EXT-ALM1	RJ45	1	Port for Boolean inputs 4 to 7
MON0	RJ45	1	Port for RS485 input 0
MON1	RJ45	1	Port for RS485 input 1

1.3.17 FAN

The FAN is a fan unit for the BBU3900 and falls into two types: FAN and FANc.

Panel

Figure 1-39 shows the FAN panel.

Figure 1-39 FAN panel

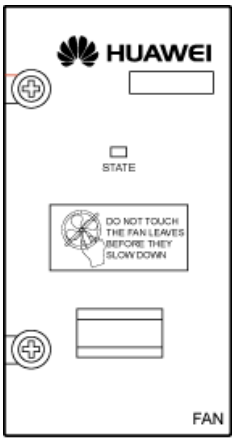
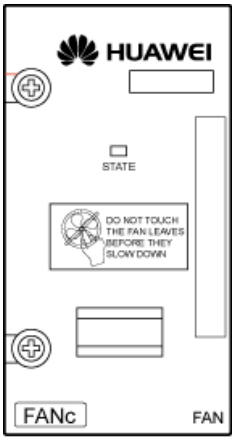


Figure 1-40 shows the FANc panel.

Figure 1-40 FANc panel



Functions

The FAN performs the following functions:

- Controls the rotation speed of the fans and monitors the temperature of the fan module.
- Reports the status of the fans and the fan module to the BBU and dissipates heat from the BBU.

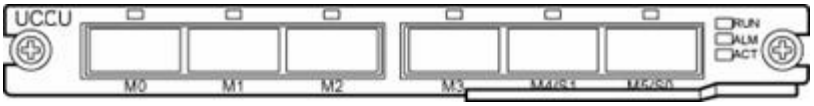
1.3.18 UCCU

The UCCU, a universal inter-connection combo unit, allows a long-distance connection between the BBU and USU in BBU interconnection scenarios.

Panel

Figure 1-41 shows the UCCU panel.

Figure 1-41 UCCU panel



Functions

The UCCU exchanges baseband data between BBUs, allowing a long-distance connection between the BBU and USU in BBU interconnection scenarios.

Ports

Table 1-31 lists the ports on the UCCU.

Table 1-31 Ports on the UCCU

Silkscreen	Connector	Quantity	Description
M0 to M3	QSFP	4	Function as primary interconnection ports and connect to secondary interconnection ports. Each optical port has two CPRI TX/RX channels with a maximum rate of 10.1376 Gbit/s and two SRIO TX/RX channels with a maximum rate of 6.25 Gbit/s.
M4/S1	QSFP	1	Functions as a primary interconnection port and connects to a secondary interconnection port. Has two CPRI TX/RX channels with a maximum rate of 10.1376 Gbit/s and two SRIO TX/RX channels with a maximum rate of 6.25 Gbit/s.
M5/S0	QSFP	1	Functions as a secondary interconnection port and connects to a primary interconnection port. Has four 10GE TX/RX channels.

1.4 Board Configuration

1.4.1 Board Configuration for a Single-RAT BBU3900

Figure 1-42 Typical board configuration for a BBU3900 working in GSM

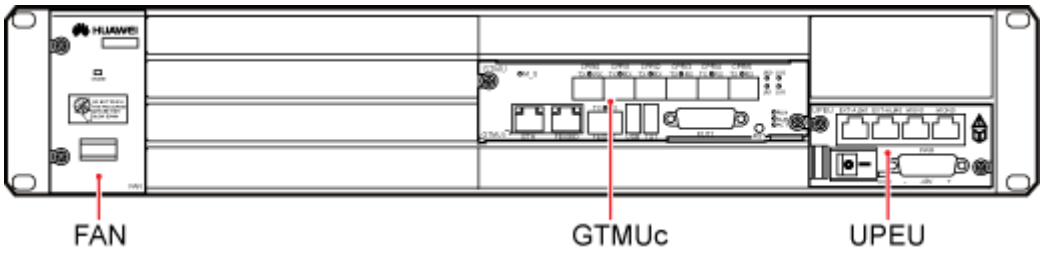


Figure 1-43 Typical board configuration for a BBU3900 working in UMTS

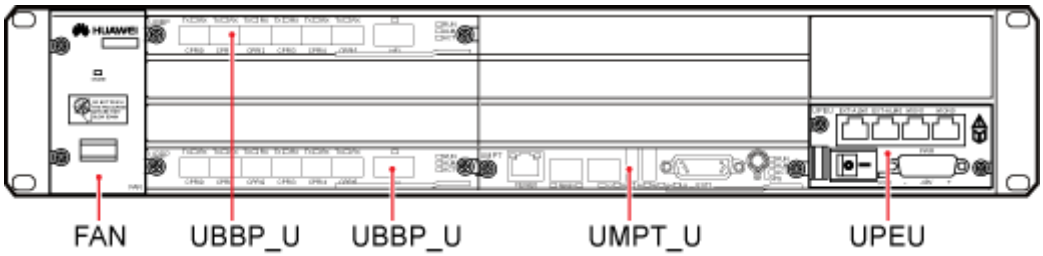
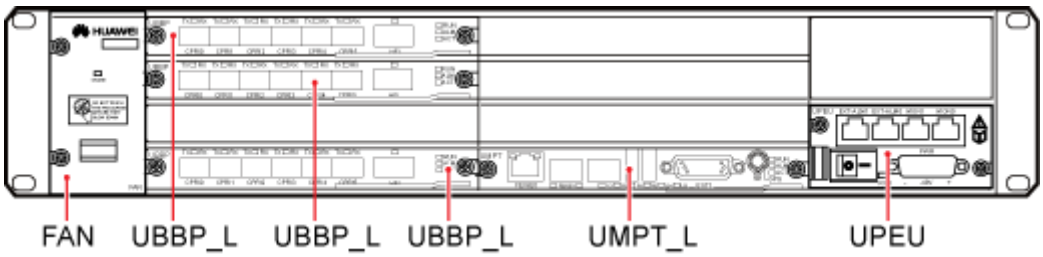


Figure 1-44 Typical board configuration for a BBU3900 working in LTE



1.4.2 Board Configuration for a BBU3900 Working in Separate-MPT Scenarios

Typical Configurations of a Single BBU

The following figures show the typical board configurations for a BBU working in GU, GL, and UL.

NOTE

GU: indicates the BBU shared by GSM and UMTS. Other RAT combinations are the same.

Figure 1-45 Typical board configuration for a BBU3900 working in GU

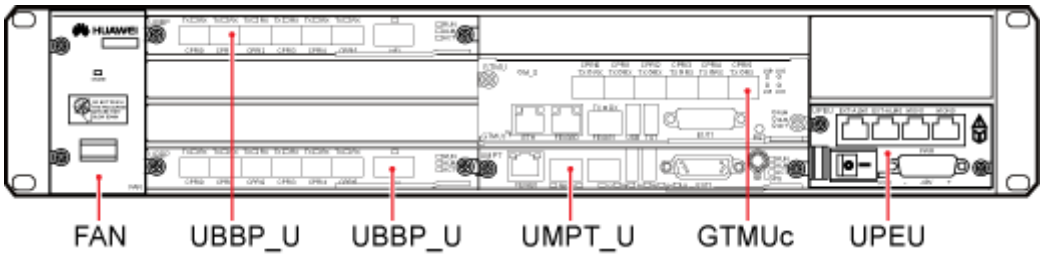


Figure 1-46 Typical board configuration for a BBU3900 working in GL

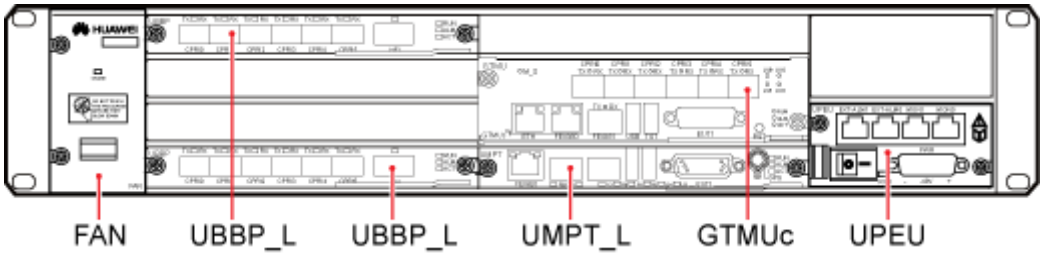
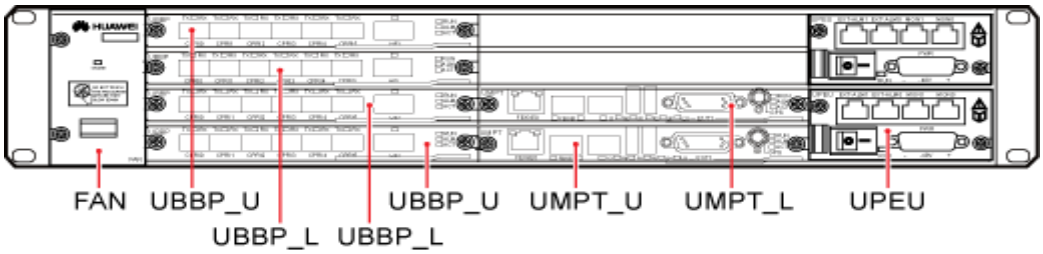


Figure 1-47 Typical board configuration for a BBU3900 working in UL



Typical Configurations of Two BBUs

The following figures show the typical board configuration for two interconnected BBUs in a multi-RAT base station.

NOTE

- A BBU3900 can be interconnected with another BBU3900 or a BBU3910 through UCIU+UMPT or UMPT+UMPT.
- When a BBU3900 is interconnected with a BBU3910, the root BBU must be the BBU3900.
- For GU+L (UCIU+UMPT) or GL+U (UCIU+UMPT), the UCIU in one BBU is interconnected with the UMPT in the other BBU by using a control and clock signal cable to transmit control data, transmission data, and clock signals between the two BBUs.
- BBU interconnection through UMPT+UMPT is available as of SRAN9.0. For GU+L (UMPT+UMPT) or GL+U (UMPT +UMPT), the UMPT in one BBU is interconnected with the UMPT in the other BBU by using a control and clock signal cable to transmit control data, transmission data, and clock signals between the two BBUs.

Figure 1-48 Typical board configuration for a BBU3900 working in GU+L (UCIU+UMPT)

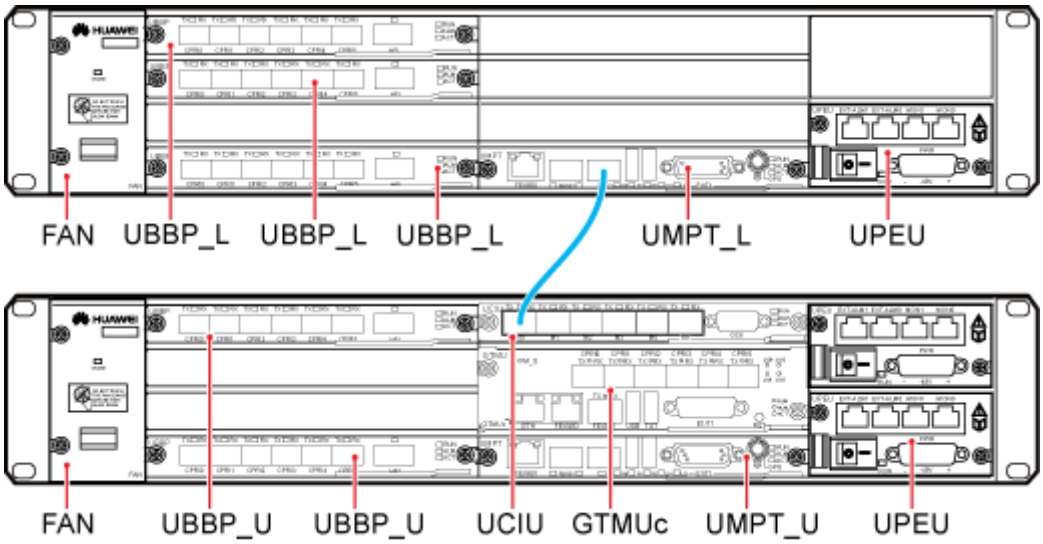


Figure 1-49 Typical board configuration for a BBU3900 working in GL+U (UCIU+UMPT)

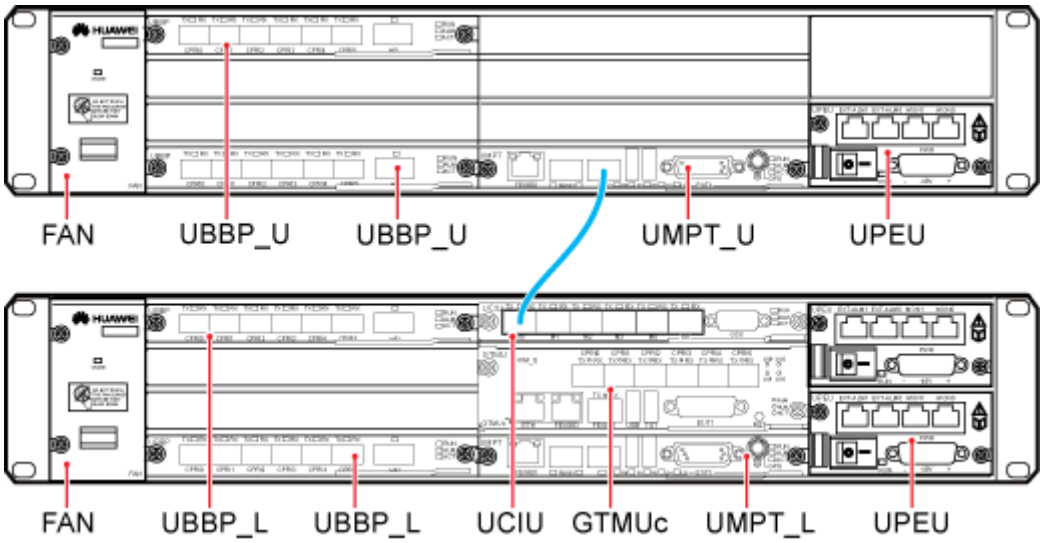


Figure 1-50 Typical board configuration for a BBU3900 working in GU+L (UMPT+UMPT)

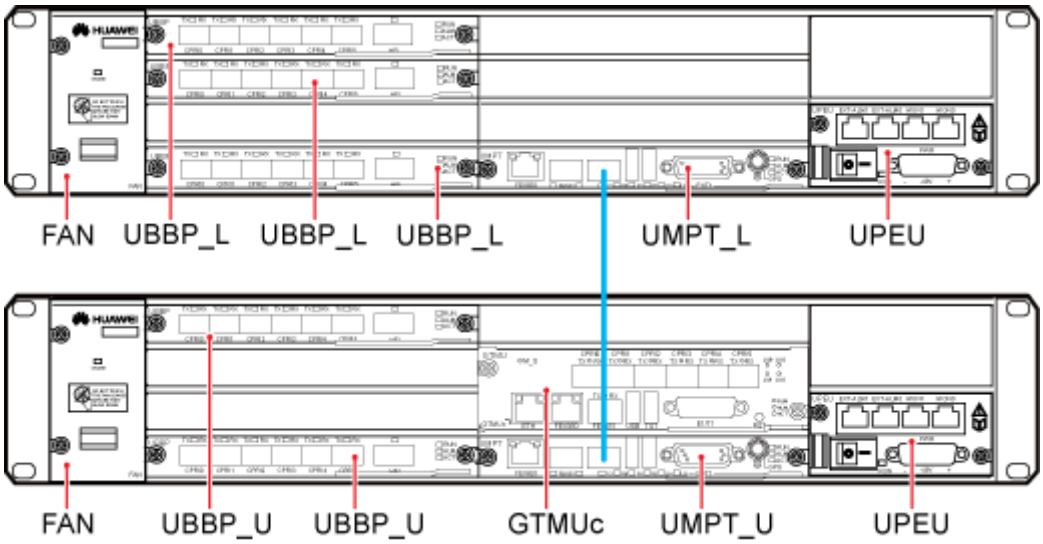
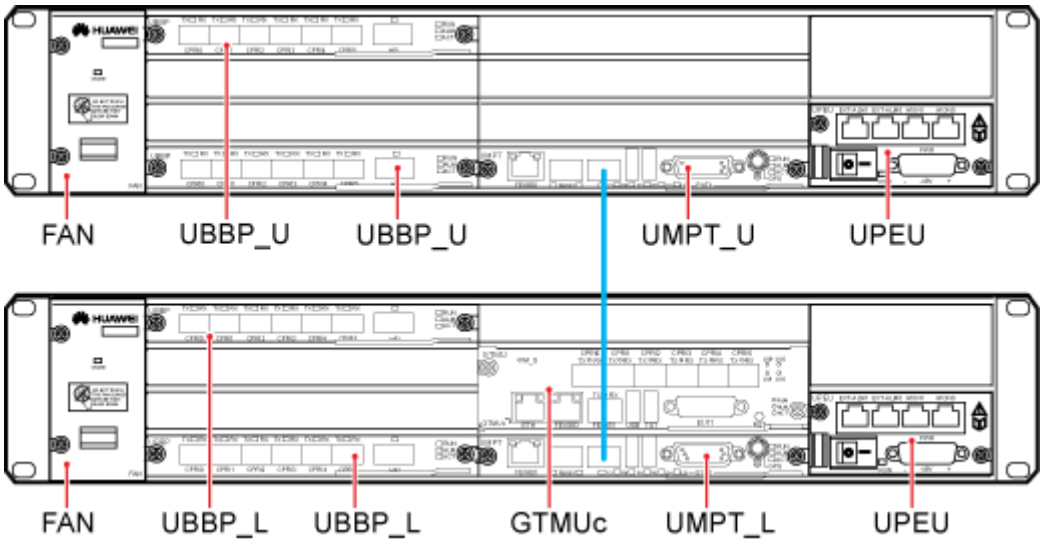


Figure 1-51 Typical board configuration for a BBU3900 working in GL+U (UMPT+UMPT)



1.4.3 Board Configuration for a BBU3900 Working in Co-MPT Scenarios

In a co-MPT multi-RAT base station, different RATs share a main control board.

The GU, GL, UL, and GUL co-MPT base stations are supported as of SRAN8.0. Their typical board configurations are shown in the following figures.

NOTE

- UMPT_GU indicates that GSM and UMTS share one UMPT. This rule also applies to UMPT_GL and UMPT_UL.
- UMPT_GUL indicates that GSM, UMTS, and LTE share one UMPT.

Figure 1-52 Typical board configuration for a BBU3900 with a UMPT_GU

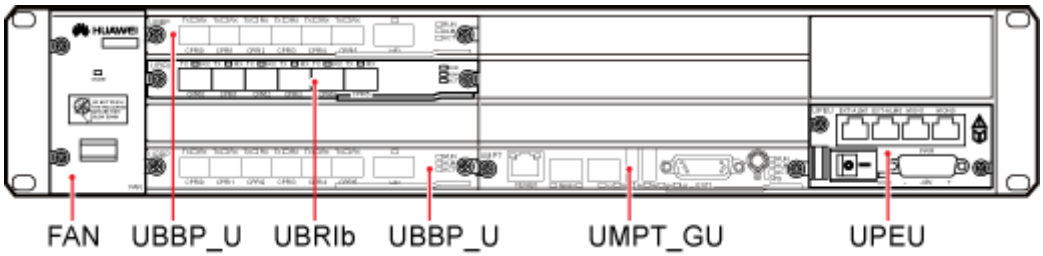


Figure 1-53 Typical board configuration for a BBU3900 with a UMPT_GL

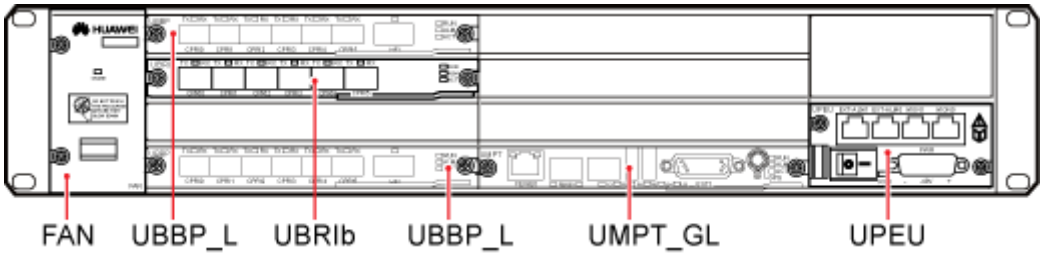


Figure 1-54 Typical board configuration for a BBU3900 with a UMPT_UL

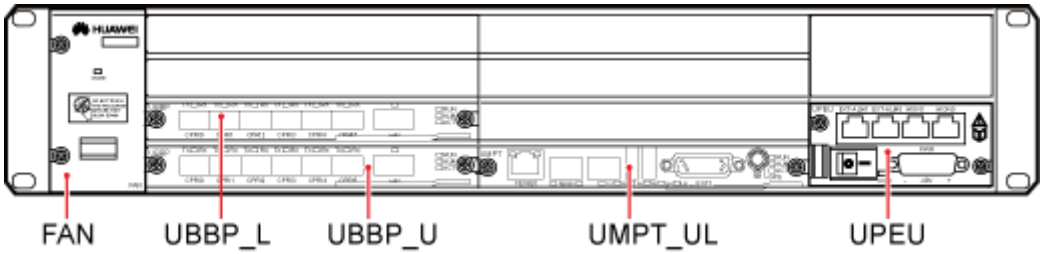
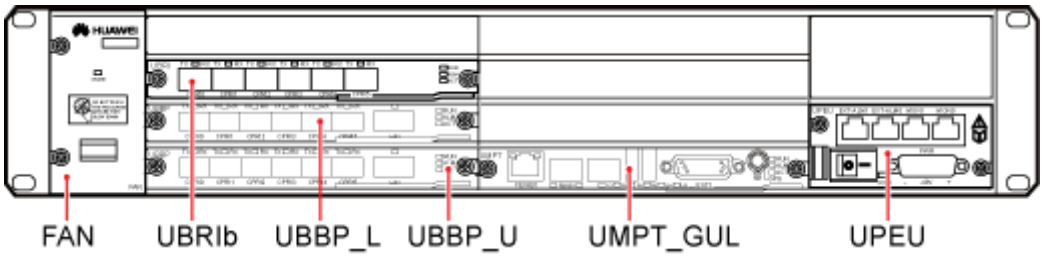


Figure 1-55 Typical board configuration for a BBU3900 with a UMPT_GUL



2 Technical Specifications

2.1 Baseband Specifications
2.2 Capacity Specifications
2.3 Signaling Specifications
2.4 CPRI Specifications
2.5 Transmission Port Specifications
2.6 Equipment Specifications
2.7 LTE Traffic Model

2.1 Baseband Specifications

2.1.1 GSM Baseband Specifications

Table 2-1 GSM baseband specifications

Board	GSM TRX
UBBPd1	24
UBBPd2	24
UBBPd3	24
UBBPd4	24
UBBPd5	36
UBBPd6	48

2.1.2 UMTS Baseband Specifications

Table 2-2 UMTS baseband specifications (per WBBP board)

Board	Number of Cells	Number of Uplink CEs	Number of Downlink CEs	Number of HSDPA Codes	Number of HSDPA UEs	Number of HSUPA UEs
WBBPa	3	128	256	3x15	96	60
WBBPb1	3	64	64	3x15	64	64
WBBPb2	3	128	128	3x15	128	96
WBBPb3	6	256	256	6x15	144	96
WBBPb4	6	384	384	6x15	144	96
WBBPd1	6	192	192	6x15	128	96
WBBPd2	6	384	384	6x15	144	144
WBBPd3	6	256	256	6x15	144	96
WBBPf1	6	192	256	6x15	144	144
WBBPf2	6	256	384	6x15	192	192
WBBPf3	6	384	512	6x15	256	256
WBBPf4	6	512	768	6x15	384	384

Table 2-3 UMTS baseband specifications (per UBBP board)

Board	Number of Cells	Number of Uplink CEs	Number of Downlink CEs	Number of HSDPA Codes	Number of HSDPA UEs	Number of HSUPA UEs
UBBPd1	6	384	512	6x15	288	288
UBBPd2	6	512	768	6x15	384	384
UBBPd3	6	384	512	6x15	288	288
UBBPd4	6	512	768	6x15	384	384
UBBPd5	6	768	768	6x15	512	512
UBBPd6	12	1024	1024	12x15	768	768
UBBPe1	6	384	512	6x15	288	288
UBBPe2	6	512	768	6x15	384	384
UBBPe3	12	768	768	12x15	512	512

Board	Number of Cells	Number of Uplink CEs	Number of Downlink CEs	Number of HSDPA Codes	Number of HSDPA UEs	Number of HSUPA UEs
UBBPe4	12	1024	1024	12x15	768	768

2.1.3 LTE Baseband Specifications

2.1.3.1 LTE FDD Baseband Specifications

Table 2-4 Number of LTE FDD cells (per LBBP board)

Board	Number of Cells
LBBPd1	3x20 MHz 2T2R
LBBPd2	3x20 MHz 4T4R
LBBPd3	6x20 MHz 2T2R

NOTE

- Any hybrid configurations of 1R and 2R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 2R cells.
- The LBBPd2 supports hybrid configurations of 1R and 4R cells or 2R and 4R cells when it works in LTE FDD. In these configurations, a maximum of three cells are supported.
- If the LBBPd3 works in LTE FDD and the length of the CPRI fiber optic cable from a BBU to an RRU ranges from 20 km to 40 km, the LBBPd3 board supports a maximum cell configuration of 3x20 MHz 2T2R.

Table 2-5 Number of LTE FDD cells (per UBBP board)

Board	Number of Cells
UBBPd3	3x20 MHz 2T2R
UBBPd4	3x20 MHz 4T4R
UBBPd5	• 6x20 MHz 2T2R • 3x20 MHz 4T4R
UBBPd6	6x20 MHz 4T4R
UBBPe1	3x20 MHz 2T2R
UBBPe2	3x20 MHz 4T4R
UBBPe3	• 6x20 MHz 2T2R • 3x20 MHz 4T4R
UBBPe4	• 6x20 MHz 4T4R • 3x20 MHz 8T8R

NOTE

- Any hybrid configurations of 1R and 2R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 2R cells.
- As of SRAN11.1, the UBBPd4 supports hybrid configurations of 1R and 4R cells or 2R and 4R cells. In these configurations, a maximum of three cells are supported.
- As of SRAN9.0 (V100R009C00SPC210), the UBBPd5 supports hybrid configurations of 1R and 4R cells or 2R and 4R cells. In these configurations, a maximum of three cells are supported.
- As of SRAN9.0 (V100R009C00SPC210), the UBBPd6 supports hybrid configurations of 1R and 4R cells or 2R and 4R cells. In these configurations, a maximum of three 2R cells and a maximum of three 4R cells are supported. As of SRAN11.1, a total of six cells are supported in hybrid configurations.
- The UBBPe supports hybrid configurations of 1R and 4R cells or 2R and 4R cells. In these configurations, the total number of cells cannot exceed the maximum number of 4R cells.

Table 2-6 Number of LTE FDD UEs (per cell)

Cell Bandwidth (MHz)	Maximum Number of UEs in RRC Connected Mode per Cell	Maximum Number of Uplink Synchronized UEs per Cell
1.4	168	• LBBPd: 100 • UBBP: 168
3	360	360
5	600	600
10/15/20	1200	1200

Table 2-7 Number of LTE FDD UEs (per MPT board)

Board	Maximum Number of UEs in RRC Connected Mode	Maximum Number of Uplink Synchronized UEs
LMPT	5400	5400
UMPTa	10800	10800
UMPTb	10800	10800
UMPTe	14400	14400

Table 2-8 Number of LTE FDD UEs (per LBBP board)

Board	Cell Bandwidth (MHz)	Maximum Number of UEs in RRC Connected Mode	Maximum Number of Uplink Synchronized UEs
LBBPd1/LBBPd	1.4	504	300

Board	Cell Bandwidth (MHz)	Maximum Number of UEs in RRC Connected Mode	Maximum Number of Uplink Synchronized UEs
2	3	1080	1080
	5	1800	1200(1)
	10/15/20	3600	1200(1)
LBBPd3	1.4	1008	600
	3	2160	1200(1)
	5/10/15/20	3600	1200(1)

NOTE

(1): The maximum number of uplink synchronized UEs supported by an LBBPd1/LBBPd2/LBBPd3 can reach 3600 through the setting of the **MaxSyncUserNumPerBbi** parameter. The increasing number of UEs, however, may deteriorate user experience and system performance. Therefore, it is not recommended that this parameter be used to increase the number of supported UEs to over 1200.

Table 2-9 Number of LTE FDD UEs (per UBBP board)

Board	Cell Bandwidth (MHz)	Maximum Number of UEs in RRC Connected Mode	Maximum Number of Uplink Synchronized UEs
UBBPd3/ UBBPd4	1.4	504	504
	3	1080	1080
	5	1800	1800
	10/15/20	3600	3600
UBBPd5/ UBBPd6	1.4	1008	1008
	3	2160	2160
	5/10/15/20	3600	3600
UBBPe1/ UBBPe2	1.4	504	504
	3	1080	1080
	5	1800	1800
	10/15/20	3600	3600
UBBPe3/ UBBPe4	1.4	1008	1008
	3	2160	2160
	5/10/15/20	3600	3600

Table 2-10 LTE FDD throughput (per cell)

Cell Bandwidth (MHz)	Maximum Downlink Throughput per Cell (2x2 MIMO, 64QAM) (Mbit/s)	Maximum Uplink Throughput per Cell (2x2 MU-MIMO, 64QAM) (Mbit/s)	Maximum Uplink Throughput per Cell (1x4 SIMO, 64QAM) (Mbit/s)	Maximum Uplink Throughput per Cell (2x4 MU-MIMO, 64QAM) (Mbit/s)
1.4	8.7	8.784	4.392	8.784
3	22	22.128	11.064	22.128
5	36	36.672	18.336	36.672
10	73	73.392	36.696	73.392
15	110	110.112(3)	55.056	110.112(3)
20	150	150.752(3)	75.376	150.752(3)

NOTE

(3): The maximum uplink throughput per cell supported by an LBBPc board is 100 Mbit/s.

Table 2-11 LTE FDD throughput (per UE)

Cell Bandwidth (MHz)	Maximum Downlink Throughput per UE (2x2 MIMO, 64QAM) (Mbit/s)	Maximum Uplink Throughput per UE (1x2 SIMO/1x4 SIMO, 64QAM) (Mbit/s)
1.4	8.7	4.392
3	22	11.064
5	36	18.336
10	73	36.696
15	110	55.056
20	150	75.376

Table 2-12 LTE FDD throughput (per LBBP board)

Board	Maximum Throughput (Mbit/s)
LBBPd1	DL: 450; UL: 225
LBBPd2	DL: 600; UL: 225
LBBPd3	DL: 600; UL: 300

Table 2-13 LTE FDD throughput (per UBBP board)

Board	Maximum Throughput (Mbit/s)
UBBPd3	DL: 450; UL: 225
UBBPd4	DL: 600; UL: 225
UBBPd5	DL: 600; UL: 300
UBBPd6	• eRAN8.1 DL: 900; UL: 450 • eRAN11.0 and later versions DL: 1200; UL: 600
UBBPe1	DL: 450; UL: 225
UBBPe2	DL: 600; UL: 300
UBBPe3	DL: 600; UL: 300
UBBPe4	DL: 1200; UL: 600

2.1.3.2 LTE NB-IoT Baseband Specifications

The following table describes cell specifications of an LBBP working in LTE NB-IoT mode.

Table 2-14 Maximum number of LTE NB-IoT cells per LBBP board

Board	Number of Cells
LBBPd1	6x200 kHz 2T2R
LBBPd1	3x400 kHz 2T2R
LBBPd2	6x200 kHz 2T2R
LBBPd2(1)	3x400 kHz 2T2R
LBBPd3	9x200 kHz 2T2R
LBBPd3(2)	3x400 kHz+3x200 kHz 2T2R

NOTE

- If the distance between a BBU and an RF module ranges between 20 km and 40 km, the LBBPd3 board supports a maximum of three 200 kHz 2T2R cells.
- Any hybrid configurations of 1R and 2R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 2R cells.
- (1): If more than three 200 kHz cells have been set up, no 400 kHz cell can be set up.
- (2): A maximum of three 400 kHz cells is configured. If a 400 kHz cell has been set up, the total number of cells cannot exceed six. If more than six 200 kHz cells have been set up, no 400 kHz cell can be set up.

The following table describes cell specifications of a UBBP working in LTE NB-IoT mode.

Table 2-15 Maximum number of LTE NB-IoT cells per UBBP board

Board	Number of Cells
UBBPd3	6x200 kHz 2T2R
UBBPd3(3)	3x400 kHz 2T2R
UBBPd4	6x200 kHz 4T4R
UBBPd4(4)	3x400 kHz 4T4R
UBBPd5	• 9x200 kHz 2T2R/2T4R • 6x200 kHz 4T4R
UBBPd5(4)	3x400 kHz 4T4R
UBBPd5(4)	3x200 kHz+3x400 kHz 2T2R
UBBPd6	9x200 kHz 4T4R
UBBPd6(5)	3x200 kHz+3x400 kHz 4T4R
UBBPe1	6x200 kHz 2T2R
UBBPe1	6x400 kHz 2T2R
UBBPe2	6x200 kHz 4T4R
UBBPe2	6x400 kHz 4T4R
UBBPe3	• 9x200 kHz 2T2R/2T4R • 6x200 kHz 4T4R
UBBPe3(6)	6x400 kHz 4T4R
UBBPe4	9x200 kHz 4T4R
UBBPe4(7)	6x400 kHz 4T4R

NOTE

- Any hybrid configurations of 1R and 2R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 2R cells.
- Hybrid configurations of 1R and 4R cells or 2R and 4R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 4R cells.
- (3): If a 400 kHz cell has been set up, the total number of cells cannot exceed three. If more than three 200 kHz cells have been set up, no 400 kHz cell can be set up.
- (4):
- For 4T4R cells: If a 400 kHz 4T4R cell has been set up, the total number of 4T4R cells cannot exceed three. If more than three 200 kHz 4T4R cells have been set up, no 400 kHz cell can be set up.
- For 2T4R cells: If more than six 2T4R cells have been set up, no 4T4R cell can be set up. If a 400 kHz 2T4R cell has been set up, the total number of cells cannot exceed six and the total number of 400 kHz cells cannot exceed three. If more than six 200 kHz 2T4R cells have been set up, no 400 kHz cell can be set up.
- (5): If a 400 kHz cell has been set up, the total number of cells cannot exceed six and the total number of 400 kHz cells cannot exceed three. If more than six 200 kHz cells have been set up, no 400 kHz cell can be set up.

- (6): If a 400 kHz cell or a 4T4R cell has been set up, the total number of cells cannot exceed six. If more than six 2T4R cells have been set up, neither 400 kHz cells nor 4T4R cells can be set up.
- (7): If a 400 kHz cell has been set up, the total number of cells cannot exceed six. If more than six 200 kHz cells have been set up, no 400 kHz cell can be set up.

The following table lists the maximum number of UEs supported by an LTE NB-IoT cell.

Table 2-16 Number of LTE NB-IoT UEs per cell

Board	Maximum Number of UEs in RRC Connected Mode per Cell	Maximum Number of UEs per Cell
LBBPd	600	50000 (cell bandwidth: 200 kHz)
	600 1200(9)	80000 (cell bandwidth: 400 kHz)
UBBPd	600	50000 (cell bandwidth: 200 kHz)
	600 1200(9)	80000 (cell bandwidth: 400 kHz)
UBBPe	600	50000 (cell bandwidth: 200 kHz)
	600 1200(9)	80000 (cell bandwidth: 400 kHz)

NOTE

(9): When Enhanced Multi-Carrier(NB-IoT) is supported, a single 400 kHz NB-IoT cell supports a maximum of 1200 UEs in RRC connected mode.

The following table lists the maximum number of UEs supported by a main control board working in LTE NB-IoT.

Table 2-17 Number of LTE NB-IoT UEs per main control board

Board	Maximum Number of UEs in RRC Connected Mode	Maximum Number of UEs
LMPT	5400	690000
UMPTa	10800	920000
UMPTb	10800	1150000
UMPTe	14400	5200000

The following table lists the maximum number of UEs supported by a baseband processing board working in LTE NB-IoT.

Table 2-18 Number of LTE NB-IoT UEs per baseband processing board

Board	Maximum Number of UEs in RRC Connected Mode	Maximum Number of UEs
LBBPd1/LBBPd2	3600 (6x200 kHz 2T2R) 1800 (3x400 kHz 2T2R)	400000
LBBPd3	3600	460000
UBBPd3/UBBPd4	3600 (6x200 kHz 2T2R) 1800 (3x400 kHz 2T2R)	865000
UBBPd4	3600	865000
UBBPd5/UBBPd6	3600	1270000
UBBPe1/UBBPe2	3600	865000
UBBPe3/UBBPe4	3600	1385000

The following table lists the maximum number of LTE NB-IoT UEs based on the typical board combination.

Table 2-19 Number of LTE NB-IoT UEs based on the typical board combination

Board Combination	Maximum Number of UEs in RRC Connected Mode	Maximum Number of UEs
1 UMPTb+3 LBBPd2	10800	1150000
1 UMPTb+3 UBBPd5	10800	3810000

NOTE
Specifications in the preceding tables are provided based on the assumption that the cell bandwidth is 200 kHz.

The following table provides the uplink and downlink LTE NB-IoT throughput per baseband processing board.

Table 2-20 LTE NB-IoT throughput per baseband processing board

Board	Maximum Downlink Throughput per Baseband Processing Board (Mbit/s)	Maximum Uplink Throughput per Baseband Processing Board (Mbit/s)
LBBPd1/LBBPd2	0.636 (6x200 kHz 2T2R) 0.666 (3x400 kHz 2T2R)	1.2
LBBPd3	0.954 (9x200 kHz 2T2R) 0.984 (3x400 kHz+3x200	1.8

Board	Maximum Downlink Throughput per Baseband Processing Board (Mbit/s)	Maximum Uplink Throughput per Baseband Processing Board (Mbit/s)
	kHz 2T2R)	
UBBPd3/UBBPd4	0.636 (6x200 kHz) 0.666 (3x400 kHz)	1.2
UBBPd5	0.954 (9x200 kHz 2T2R) 0.666 (3x300kHz 4T4R)	1.8 (9x200 kHz 2T2R) 1.2 (3x400 kHz 4T4R)
UBBPd6	0.954	1.8
UBBPe1	0.636 (200 kHz) 1.332 (400 kHz)	1.2 (200 kHz) 2.4 (400 kHz)
UBBPe2	0.636 (200 kHz) 1.332 (400 kHz)	1.2
UBBPe3/UBBPe4	0.954 (9x200 kHz) 1.332 (6x400 kHz)	1.8 (200 kHz) 2.4 (400 kHz)

2.1.3.3 LTE FDD+NB-IoT Baseband Specifications

Table 2-21 Number of LTE FDD or NB-IoT cells

Board	Maximum Number of LTE FDD Cells	Maximum Number of LTE NB-IoT Cells
LBBPd1	3x10 MHz 2T2R	3x200 kHz 2T2R
LBBPd2	3x10 MHz 4T4R	3x200 kHz 2T2R
LBBPd3	3x20 MHz 2T2R+3x10 MHz 2T2R	3x200 kHz 2T2R
LBBPd3	3x20 MHz 2T2R	3x400 kHz 2T2R
UBBPd3	3x10 MHz 2T2R	3x200 kHz 2T2R
UBBPd4	3x10 MHz 4T4R	3x200 kHz 4T4R
UBBPd5	3x20 MHz 2T2R+3x10 MHz 2T2R	3x200 kHz 2T2R
	3x10 MHz 4T4R	3x200 kHz 4T4R
UBBPd5	3x20 MHz 2T2R	3x400 kHz 2T2R
UBBPd6	3x20 MHz 4T4R+3x10 MHz 4T4R	3x200 kHz 4T4R
UBBPd6	3x20 MHz 4T4R	3x400 kHz 4T4R
UBBPe1	3x20 MHz 2T2R	3x200 kHz 2T2R
UBBPe1	3x20 MHz 2T2R	3x400 kHz 2T2R

Board	Maximum Number of LTE FDD Cells	Maximum Number of LTE NB-IoT Cells
UBBPe2	3x20 MHz 4T4R	3x200 kHz 4T4R
UBBPe2	3x20 MHz 4T4R	3x400 kHz 4T4R
UBBPe3	6x20 MHz 2T2R/2T4R	3x200 kHz 2T2R/2T4R
	3x20 MHz 4T4R	3x200 kHz 4T4R
UBBPe3	6x20 MHz 2T2R	3x400 kHz 2T2R
	3x20 MHz 4T4R	3x400 kHz 4T4R
UBBPe4	6x20 MHz 4T4R	3x200 kHz 4T4R
UBBPe4	6x20 MHz 4T4R	3x400 kHz 4T4R

NOTE

- Any hybrid configurations of 1R and 2R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 2R cells.
- Hybrid configurations of 1R and 4R cells or 2R and 4R cells are supported. In these configurations, the total number of cells cannot exceed the maximum number of 4R cells.
- If a UBBPd/LBBPd is configured with LTE NB-IoT cells, the maximum board throughput will decrease and the proportion of the maximum throughput to the total LTE cell bandwidth will decrease.
- If a UBBPe/LBBPd/UBBPd is configured, one LTE FDD cell can be associated with one in-band LTE NB-IoT cell. (If a UBBPd is configured and **Standard Ratio** is set to **FDD_ENHANCE**, the LTE FDD cells cannot be associated with in-band LTE NB-IoT cells.)

Table 2-22 Number of LTE FDD+NB-IoT UEs (per cell)

Maximum Number of UEs in RRC Connected Mode per Cell	Maximum Number of UEs per Cell
600	50000 (cell bandwidth: 200 kHz) 80000 (cell bandwidth: 400 kHz)

Table 2-23 Number of LTE FDD+NB-IoT UEs (per main control board)

Board	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum Number of LTE FDD+NB-IoT UEs
LMPT	5400	3700+200000
UMPTa	10800	7500+270000
UMPTb	10800	7500+345000
UMPTe	14400	11500+1040000

Table 2-24 Number of LTE FDD+NB-IoT UEs (per LBBP board)

Board	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum Number of LTE FDD+NB-IoT UEs
LBBPd1	1800	2500+120000
LBBPd2	1800	2500+120000
LBBPd3	1800	2500+120000

Table 2-25 Number of LTE FDD+NB-IoT UEs (per UBBP board)

Board	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum Number of LTE FDD+NB-IoT UEs
UBBPd3/UBBPd4	1800	2500+250000
UBBPd5/UBBPd6	1800	2500+380000
UBBPe1/UBBPe2	1800	2500+250000
UBBPe3/UBBPe4	1800	2500+410000

NOTE

The maximum number of UEs supported by a board is affected by the traffic model. The maximum number of UEs in the preceding tables is provided based on the LTE NB-IoT traffic model. For details about the LTE NB-IoT traffic model, see 2.7 LTE Traffic Model.

Table 2-26 LTE FDD+NB-IoT throughput (per LBBP board)

Board	Maximum Throughput (Mbit/s)
LBBPd1	DL: 225; UL: 150
LBBPd2	DL: 300; UL: 150
LBBPd3	DL: 450; UL: 225

Table 2-27 LTE FDD+NB-IoT throughput (per UBBP board)

Board	Maximum Throughput (Mbit/s)
UBBPd3	DL: 225; UL: 150
UBBPd4	DL: 300; UL: 150

Board	Maximum Throughput (Mbit/s)
UBBPd5	DL: 450; UL: 225
UBBPd6	DL: 900; UL: 450
UBBPe1	DL: 450; UL: 225
UBBPe2	DL: 600; UL: 300
UBBPe3	DL: 600; UL: 300
UBBPe4	DL: 1200; UL: 600

2.1.3.4 LTE TDD+NB-IoT Baseband Specifications

Table 2-28 Maximum number of LTE TDD or NB-IoT cells

Board	Maximum Number of LTE TDD Cells	Maximum Number of LTE NB-IoT Cells
UBBPe4	6x20 MHz 4T4R	3x400 kHz 4T4R

NOTE
The preceding specifications are supported only when uplink-downlink subframe configuration 1 or 2 is used for TDD.

Table 2-29 Number of LTE TDD+NB-IoT UEs (per cell)

Maximum Number of UEs in RRC Connected Mode per Cell	Maximum Number of UEs per Cell
600	50000

Table 2-30 Number of LTE TDD+NB-IoT UEs

Board	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum Number of LTE TDD+NB-IoT UEs
UBBPe4	1800	2500+410000

Table 2-31 LTE TDD+NB-IoT throughput

Board	Maximum Throughput (Mbit/s)
UBBPe4	DL: 1200 x downlink subframe ratio UL:

Board	Maximum Throughput (Mbit/s)
	• 450 x uplink subframe ratio (subframe configuration 1) • 600 x uplink subframe ratio (subframe configuration 2)

2.1.4 Co-BBP Baseband Specifications

Table 2-32 GU co-BBP baseband specifications

Board	Number of GSM TRXs	Number of UMTS Cells	Number of UMTS Uplink CEs	Number of UMTS Downlink CEs	Number of UMTS HSDPA Codes	Number of UMTS HSDPA UEs	Number of UMTS HSUPA UEs
UBBPd1	12	6	192	256	6x15	144	144
UBBPd2	12	6	256	384	6x15	192	192
UBBPd3	12	6	192	256	6x15	144	144
UBBPd4	12	6	256	384	6x15	192	192
UBBPd5	18	6	384	512	6x15	288	288
UBBPd6	24	6	512	768	6x15	384	384

NOTE
As of SRAN11.1, in GL, UL, and GUL co-BBP scenarios, the UBBP board supports hybrid configurations of 1R and 4R cells or hybrid configurations of 2R and 4R cells working in LTE.

Table 2-33 GL co-BBP baseband specifications

Board	Number of GSM TRXs	Number of LTE FDD Cells	Maximum Number of LTE FDD UEs in RRC Connected Mode	Maximum LTE FDD Throughput (Mbit/s)
UBBPd3	12	3x10 MHz 2T2R	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10 MHz bandwidth: 3600	• DL: 225 • UL: 112.5
UBBPd4	12	3x10 MHz 2T2R	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800	• DL: 220 • UL: 112.5

Board	Number of GSM TRXs	Number of LTE FDD Cells	Maximum Number of LTE FDD UEs in RRC Connected Mode	Maximum LTE FDD Throughput (Mbit/s)
			• 10 MHz bandwidth: 3600	
UBBPd5	18	3x20 MHz 4T4R	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10/15/20 MHz bandwidth: 3600	• DL: 600 • UL: 225
UBBPd6	24	3x20 MHz 4T4R	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10/15/20 MHz bandwidth: 3600	• DL: 600 • UL: 225

Table 2-34 UL co-BBP baseband specifications

Board	Number of UMTS Cells	Number of UMTS Uplink CEs	Number of UMTS Downlink CEs	Number of UMTS HSDPA Codes	Number of UMTS HSDPA UEs	Number of UMTS HSUPA UEs	Number of LTE FDD Cells	Maximum Number of LTE FDD UEs in RRC Connected Mode	Maximum LTE FDD Throughput (Mbit/s)
UBBPd6	6	512	768	6x15	384	384	3x20 MHz 4T4R	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10/15/20 MHz bandwidth: 3600	DL: 600 UL: 225

Board	Number of UMTS Cells	Number of UMTS Uplink CEs	Number of UMTS Downlink CEs	Number of UMTS HSDPA Codes	Number of UMTS HSDPA UEs	Number of UMTS HSUPA UEs	Number of LTE FDD Cells	Maximum Number of LTE FDD UEs in RRC Connected Mode	Maximum LTE FDD Throughput (Mbit/s)
UBBPe3	6	384	512	6x15	288	288	3x20 MHz 2T2R	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10/15/20 MHz bandwidth: 3600	DL: 450 UL: 225
UBBPe4	6	512	768	6x15	384	384	3x20 MHz 4T4R		DL: 600 UL: 225

Table 2-35 UM co-BBP baseband specifications

Board	Number of UMTS Cells	Number of UMTS Uplink CEs	Number of UMTS Downlink CEs	Number of UMTS HSDPA Codes	Number of UMTS HSDPA UEs	Number of UMTS HSUPA UEs	Maximum Number of LTE NB-IoT Cells	Maximum Number of LTE NB-IoT UEs	Maximum LTE NB-IoT Signaling Specifications	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum LTE NB-IoT Throughput (Mbit/s)
UBBPd6	6	512	768	6x15	384	384	3x200 kHz 4T4	520000	243000	1800	DL: 0.318

Board	Number of UMTS Cells	Number of UMTS Uplink CEs	Number of UMTS Downlink CEs	Number of UMTS HSDPA Codes	Number of UMTS HSDPA UEs	Number of UMTS HSUPA UEs	Maximum Number of LTE NB-IoT Cells	Maximum Number of LTE NB-IoT UEs	Maximum LTE NB-IoT Signaling Specifications	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum LTE NB-IoT Throughput (Mbit/s)
							R				UL: 0.6
UBBPe3	6	384	512	6x15	288	288	3x200 kHz 2T2R In SRAN13.1 and later versions: 3x400 kHz 2T4R	635000	297000	1800	DL: 0.318 UL: 0.6
UBBPe4	6	512	768	6x15	384	384	3x200 kHz 4T4R In SRAN13.1 and later versions:	635000	297000	1800	DL: 0.318 UL: 0.6

Board	Number of UMTS Cells	Number of UMTS Uplink CEs	Number of UMTS Downlink CEs	Number of UMTS HSDPA Codes	Number of UMTS HSDPA UEs	Number of UMTS HSUPA UEs	Maximum Number of LTE NB-IoT Cells	Maximum Number of LTE NB-IoT UEs	Maximum LTE NB-IoT Signaling Specifications	Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	Maximum LTE NB-IoT Throughput (Mbit/s)
							3x400 kHz 4T4R				

In SRAN13.1 and later versions, the following boards support ULM co-BBP and their co-BBP specifications are described in the following table.

Table 2-36 ULM co-BBP specifications (UBBPd6/UBBPe3/UBBPe4)

Board	UBBPd6	UBBPe3	UBBPe4
Number of UMTS Cells	6 (2T2R/2T4R)	• 6 (2T2R) • 3 (2T4R)	6 (2T2R/2T4R)
Number of UMTS Uplink CEs	512	384	512
Number of UMTS Downlink CEs	768	512	768
Number of UMTS HSDPA Codes	6x15	6x15	6x15
Number of UMTS HSDPA UEs	384	288	384
Number of UMTS HSUPA	384	288	384

UEs			
Number of LTE FDD Cells	3x10 MHz 4T4R	3x10 MHz 2T2R	3x10 MHz 4T4R
Maximum Number of LTE FDD UEs in RRC Connected Mode	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10 MHz bandwidth: 2520	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10 MHz bandwidth: 2520	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10 MHz bandwidth: 2520
Maximum LTE FDD Throughput (Mbit/s)	DL: 300 UL: 112.5	DL: 225 UL: 112.5	DL: 300 UL: 112.5
Maximum Number of LTE NB-IoT Cells	3x200 kHz 4T4R	3x200 kHz 2T2R	3x200 kHz 4T4R
Maximum Number of LTE NB-IoT UEs	635000	635000	635000
Maximum LTE NB-IoT Signaling Specifications	297000	297000	297000
Maximum Number of LTE NB-IoT UEs in RRC Connected Mode	1800 which can be shared with LTE FDD; ≤ 3600 in total	1800 which can be shared with LTE FDD; ≤ 3600 in total	1800 which can be shared with LTE FDD; ≤ 3600 in total
Maximum LTE NB-IoT Throughput (Mbit/s)	DL: 0.318 UL: 0.6	DL: 0.318 UL: 0.6	DL: 0.318 UL: 0.6

Table 2-37 GUL co-BBP baseband specifications

Board		UBBPd6
GSM	Number of GSM TRXs	12
UMTS	Number of Cells	6
	Number of Uplink CEs	256
	Number of Downlink CEs	384
	Number of HSDPA Codes	6x15

	Number of HSDPA UEs	192
	Number of HSUPA UEs	192
LTE	Number of Cells	3x20 MHz 4T4R
	Maximum Number of UEs in RRC Connected Mode	• 1.4 MHz bandwidth: 504 • 3 MHz bandwidth: 1080 • 5 MHz bandwidth: 1800 • 10/15/20 MHz bandwidth: 3600
	Maximum Throughput (Mbit/s)	DL: 600; UL: 225

2.2 Capacity Specifications

2.2.1 GSM Capacity Specifications

Table 2-38 Capacity specifications of a BBU working in GSM

Specifications	Board Configuration
In GBSS15.0, GBSS16.0, GBSS17.1, GBSS18.1, and later versions: A single site supports a maximum of 32 cells and each cell supports a maximum of 24 TRXs. • TDM transmission: 126 TRXs • IP over FE transmission: 60 TRXs • IP over E1 transmission: 48 TRXs	• TDM transmission 1 GTMUb/GTMUc+1 UTRPb4+1 UBRIb (optional) • IP transmission 1 GTMUb/GTMUc+1 UBRIb (optional)
In GBSS15.0, GBSS16.0, GBSS17.1, GBSS18.1, and later versions: A single site supports a maximum of 12 cells and each cell supports a maximum of 24 TRXs. • IP over FE transmission: 72 TRXs • IP over E1 transmission: 48 TRXs	1 UMPTb+2 UBRIb In GBSS 18.1 and later versions: 1 GTMUc+1 UBRIb
In GBSS17.1, GBSS18.1, and later versions: A single site supports a maximum of 24 TRXs and a maximum of 12 cells. A single cell supports a maximum of 24 TRXs.	eGBTS: 1 GTMUb+1 UBRIb (optional)

2.2.2 UMTS Capacity Specifications

Table 2-39 Capacity specifications of a BBU working in UMTS

Specifications	Board Configuration
In RAN15.0: 24 cells (uplink: 3072 CEs; downlink: 4608 CEs)	1 UMPT+6 WBBPf4
In RAN16.0, RAN17.1, RAN18.1, and later versions: 24 cells (uplink: 6144 CEs; downlink: 6144 CEs)	1 UMPT+6 UBBPd6

2.2.3 LTE Capacity Specifications

2.2.3.1 LTE FDD Capacity Specifications

Table 2-40 Capacity specifications of a BBU working in LTE FDD

Item	Specifications
Maximum number of cells	• One LMPT: 18 cells (2T2R/2T4R/4T4R, 20 MHz) • One UMPTa/UMPTb: **In eRAN7.0:** 36 cells (2T2R/2T4R, 20 MHz) or 18 cells (4T4R, 20 MHz) **In eRAN8.1, eRAN11.1, and later versions:** 36 cells (2T2R/2T4R/4T4R, 20 MHz) • One UMPTe: 72 cells (2T2R/2T4R/4T4R, 20 MHz)
Maximum throughput	• One LMPT: The uplink data rate at the MAC layer is 300 Mbit/s. The downlink data rate at the MAC layer is 450 Mbit/s. • UMPTa/UMPTb1/UMPTb2: **In eRAN7.0, eRAN8.1, and eRAN11.1 and later versions:** One UMPTa/UMPTb1/UMPTb2 board: The sum of uplink and downlink data rates at the MAC layer is 1.5 Gbit/s. **In eRAN8.1, eRAN11.1, and later versions:** Two UMPTa/UMPTb1/UMPTb2 boards: The sum of uplink and downlink data rates at the

Item	Specifications
	MAC layer is 3 Gbit/s. • UMPTb3/UMPTb9: One UMPTb3/UMPTb9 board: The sum of uplink and downlink data rates at the MAC layer is 2 Gbit/s. Two UMPTb3/UMPTb9 boards: The sum of uplink and downlink data rates at the MAC layer is 4 Gbit/s. **NOTE** When two main control boards are configured, transmission extension is supported only if the two main control boards are UMPTa/UMPTb. When one UMPTa/UMPTb board and one LMPT board are configured, transmission extension is not supported. • One UMPTe: The sum of uplink and downlink data rates at the MAC layer is 10 Gbit/s.
Maximum number of UEs in RRC connected mode	• One LMPT: 5400 • One UMPTa/UMPTb: 10800 • UMPTe: One UMPTe board: 14400 Two UMPTe boards: 28800
Maximum number of data radio bearers (DRBs) per LTE FDD eNodeB	• One LMPT: 16200 • One UMPTa/UMPTb: 32400 • One UMPTe: 43200

2.2.3.2 LTE NB-IoT Capacity Specifications

Table 2-41 Capacity specifications of a BBU working in LTE NB-IoT

Item	Specifications
Maximum number of cells	• One LMPT: 18 cells (2T2R/2T4R/4T4R, 200 kHz) • One UMPTa/UMPTb: 36 cells (2T2R/2T4R/4T4R, 200 kHz) • One UMPTe: 72 cells (2T2R/2T4R/4T4R, 200 kHz)
Maximum throughput	• One LMPT: The uplink data rate at the MAC layer is 3.6 Mbit/s. The downlink data rate at the MAC layer is 1.9 Mbit/s. • One UMPTa/UMPTb:

Item	Specifications
	The uplink data rate at the MAC layer is 7.2 Mbit/s. The downlink data rate at the MAC layer is 3.8 Mbit/s. • One UMPTe: The uplink data rate at the MAC layer is 14.4 Mbit/s. The downlink data rate at the MAC layer is 7.6 Mbit/s.
Maximum number of UEs in RRC connected mode	• One LMPT: 5400 • One UMPTa/UMPTb: 10800 • One UMPTe: 14400

2.2.3.3 LTE FDD+NB-IoT Capacity Specifications

Table 2-42 Capacity specifications of a BBU working in LTE FDD+NB-IoT

Item	Specifications
Maximum number of cells	• One LMPT: 18 cells (2T2R/2T4R/4T4R, 20 MHz/200 kHz) • One UMPTa/UMPTb: 36 cells (2T2R/2T4R/4T4R, 20 MHz/200 kHz) • One UMPTe: 72 cells (2T2R/2T4R/4T4R, 20 MHz/200 kHz)
Maximum throughput	• One LMPT: The uplink data rate at the MAC layer is 300 Mbit/s. The downlink data rate at the MAC layer is 450 Mbit/s. • UMPTa/UMPTb1/UMPTb2: The sum of uplink and downlink data rates at the MAC layer is 1.5 Gbit/s. • UMPTb3/UMPTb9: The sum of uplink and downlink data rates at the MAC layer is 2 Gbit/s. • One UMPTe: The sum of uplink and downlink data rates at the MAC layer is 10 Gbit/s.
Maximum number of UEs in RRC connected mode	• One LMPT: 5400 • One UMPTa/UMPTb: 10800 • One UMPTe: 14400

NOTE
After NB-IoT is available, LTE capacity specifications of the main control board are affected. LTE FDD and NB-IoT share the maximum number of LTE cells and UEs on the main control board.

2.2.3.4 LTE FDD+TDD Capacity Specifications

Table 2-43 Capacity specifications of a BBU working in LTE FDD+TDD

Item	Specifications
Maximum number of cells	• One LMPT: 18 cells • One UMPTa/UMPTb: 36 cells • One UMPTe: 72 cells
Maximum throughput	• One LMPT: The uplink data rate at the MAC layer is 300 Mbit/s. The downlink data rate at the MAC layer is 450 Mbit/s. • UMPTa/UMPTb1/UMPTb2: – One UMPTa/UMPTb1/UMPTb2 board: The sum of uplink and downlink data rates at the MAC layer is 1.5 Gbit/s. – Two UMPTa/UMPTb1/UMPTb2 boards: The sum of uplink and downlink data rates at the MAC layer is 3 Gbit/s. • UMPTb3/UMPTb9: – One UMPTb3/UMPTb9 board: The sum of uplink and downlink data rates at the MAC layer is 2 Gbit/s. – Two UMPTb3/UMPTb9 boards: The sum of uplink and downlink data rates at the MAC layer is 4 Gbit/s. **NOTE** When two main control boards are configured, transmission extension is supported only if the two main control boards are UMPTa/UMPTb. When one UMPTa/UMPTb board and one LMPT board are configured, transmission extension is not supported. • When configured with a UMPTe: The sum of uplink and downlink data rates at the MAC layer is 10 Gbit/s.
Maximum number of UEs in RRC connected mode	• One LMPT: 5400 • One UMPTa/UMPTb: 10800 • UMPTe: One UMPTe board: 14400 Two UMPTe boards: 28800
Maximum number of DRBs for a single eNodeB	• One LMPT: 16200 • One UMPTa/UMPTb: 32400

Item	Specifications
	• One UMPTe: 43200

NOTE

- LTE FDD and TDD dynamically share the specifications of the main control board.
- LTE FDD cells support 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, or 20 MHz bandwidth.
- For details of bandwidths supported by LTE TDD cells, see *DBS3900 LTE TDD Product Description*.

2.2.4 Multi-RAT Capacity Specifications

NOTE

As listed in Table 2-44, Table 2-45, and Table 2-46:

- (1): If GSM is configured with 72 TRXs (G24/24/24), each TRX can be configured with one Standalone Dedicated Control Channel (SDCCH) only. If GSM is configured with 24 TRXs (G8/8/8), each TRX can be configured with three SDCCHs.
- (2): If the GTMUb serves as the main control board of eGBTS, the GSM capacity specification is S8/8/8.
- The capacity specifications of a UL base station are the same as those of a GUL base station.
- LTE FDD and LTE TDD dynamically share the specifications of the main control board.
- In typical GL, UL, or GUL scenarios where the specifications of GSM and UMTS remain unchanged, LTE capacity specifications of the main control board are affected after LTE NB-IoT is available. LTE FDD and NB-IoT share the maximum number of original LTE FDD cells and UEs in RRC connected mode on the main control board.

Table 2-44 Capacity specifications of a BBU working in GU

Specifications	Board Configuration
In SRAN8.0: GSM G24/24/24+UMTS 3x8 (UL: 2560 CEs; DL: 3840 CEs)	• 1 GTMU+1 UMPT+5 WBBPf4 • 1 UMPT+1 UBRIb+5 WBBPf4
In SRAN9.0, SRAN10.1, SRAN11.1, and later versions: GSM G24/24/24(2)+UMTS 3x8 (UL: 5120 CEs; DL: 5120 CEs)	• 1 GTMUb+1 UMPT+5 UBBPd6 • 1 GTMUc+1 UMPT+5 UBBPd6
In SRAN9.0, SRAN10.1, SRAN11.1, and later versions: GSM G24/24/24(1)+UMTS 3x8 (UL: 5120 CEs; DL: 5120 CEs)	1 UMPTb+5 UBBPd6

Table 2-45 Capacity specifications of a BBU working in GL

Specifications	Board Configuration
In SRAN8.0: GSM G24/24/24+LTE 18 cells (2T2R, 20 MHz bandwidth, sum of uplink and downlink data rates at the MAC layer	1 GTMU+1 UMPT+4 LBBPd3

Specifications	Board Configuration
per eNodeB: 1500 Mbit/s)	
In SRAN8.0: GSM G24/24/24(1)+LTE 12 cells (2T2R, 20 MHz bandwidth, sum of uplink and downlink data rates at the MAC layer per eNodeB: 1500 Mbit/s)	1 UMPT+1 UBRIb+4 LBBPd1
In SRAN9.0, SRAN10.1, SRAN11.1, and later versions: GSM G24/24/24(2)+LTE 30 cells (2T2R, 20 MHz bandwidth, sum of uplink and downlink data rates at the MAC layer per eNodeB: 1500 Mbit/s)	• 1 GTMUb+1 UMPTb+5 UBBPd6 • 1 GTMUc+1 UMPTb+5 UBBPd6
In SRAN9.0, SRAN10.1, SRAN11.1, and later versions: GSM G24/24/24(1)+LTE 36 cells (2T2R, 10/15/20 MHz bandwidth, 7200 UEs in RRC connected mode, sum of uplink and downlink data rates at the MAC layer per eNodeB: 1500 Mbit/s)	1 UMPTb+6 UBBPd6
GSM G24/24/24(2)+LTE 60 cells (2T2R, 20 MHz bandwidth, sum of uplink and downlink data rates at the MAC layer per eNodeB: 10 Gbit/s)	
GSM G24/24/24(1)+LTE 72 cells (2T2R, 10/15/20 MHz bandwidth, 14400 UEs in RRC connected mode, sum of uplink and downlink data rates at the MAC layer per eNodeB: 10 Gbit/s)	

Table 2-46 Capacity specifications of a BBU working in GUL

Specifications	Board Configuration
In SRAN8.0: GSM G12/12/12+UMTS 18 cells (3 cells x 2 carriers+3 cells x 4 carriers)+LTE 12 cells (2 x (6 x 20 MHz), 2T2R)	• 1 UMPT+1 UBRIb+3 WBBPf4+2 LBBPd3 • 1 GTMU+1 UMPT_UL+3 WBBPf4+2 LBBPd3
In SRAN9.0, SRAN10.1, SRAN11.1, and later versions: GSM G24/24/24(1)+UMTS 18 cells+LTE 18 cells (2T2R, 10/15/20 MHz bandwidth, 7200 UEs in RRC connected mode)	1 UMPTb+3 UBBPd5_U+3 UBBPd5_L
In SRAN9.0, SRAN10.1, SRAN11.1, and later versions:	• 1 GTMUb+1 UMPTb_UL+3 UBBPd6_U+2 UBBPd5_L

Specifications	Board Configuration
GSM G24/24/24(2)+UMTS 18 cells+LTE 12 cells (2T2R, 10/15/20 MHz bandwidth, 7200 UEs in RRC connected mode)	• 1 GTMUc+1 UMPTb_UL+3 UBBPd6_U+2 UBBPd5_L
In SRAN11.1 and later versions: GSM G24/24/24(1)+UMTS 18 cells (3 cells x 2 TRXs+3 cells x 4 TRXs)+LTE 18 cells (2T2R, 10/15/20 MHz bandwidth, 7200 UEs in RRC connected mode)	1 WMPT+1 UMPTb_GL+3 UBBPd5_U+3 UBBPd5_L

2.3 Signaling Specifications

2.3.1 LTE Signaling Specifications

Busy hour call attempt (BHCA) is the number of calls attempted at the busiest hour of a day. Signaling procedures required for completing a call may include the following: call setup, call release (including CSFB if it occurs), handover, tracking area update (TAU), DRB setup and release, and transition from the uplink-synchronized state to the uplink-asynchronized state. BHCA indicates the signaling processing capabilities of a system.

A busy-hour call initiated on different operators' networks involves different types and numbers of signaling procedures, and therefore consumes different amount of eNodeB resources. As a result, the BHCA capability varies with the traffic model.

2.3.1.1 LTE FDD Signaling Specifications

The following table lists the signaling specifications of main control boards and baseband processing boards working in LTE FDD based on the definition of one BHCA in Table 2-74.

Table 2-47 Signaling specifications of main control boards and baseband processing boards

Board	Specifications (BHCA)
LMPT	• eRAN7.0: 162000 • eRAN8.1 and later versions: 216000
UMPTa	• eRAN7.0: 198000 • eRAN8.1 and later versions: 288000
UMPTb	• eRAN7.0: 270000 • eRAN8.1 and later versions: 360000
UMPTe	eRAN11.1 and later versions: 1620000

Board	Specifications (BHCA)
LBBPd1/LBBPd2	• eRAN7.0: 108000 • eRAN8.1 and later versions: 126000
LBBPd3	• eRAN7.0: 126000 • eRAN8.1 and later versions: 144000
UBBPd3/UBBPd4	eRAN7.0: 252000 eRAN8.1 and later versions: 270000
UBBPd5/UBBPd6	• eRAN7.0: 324000 • eRAN8.1 and later versions: 396000
UBBPe1/UBBPe2	eRAN11.1 and later versions: 270000
UBBPe3/UBBPe4	eRAN11.1 and later versions: 432000

In eRAN7.0, the signaling specifications of an eNodeB cannot exceed 480000 BHCAs.

In eRAN8.1, the signaling specifications of an eNodeB cannot exceed 1440000 BHCAs.

In eRAN11.1 and later versions, the signaling specifications of an eNodeB cannot exceed 3240000 BHCAs.

The following table lists the signaling specifications of an eNodeB based on typical board configuration and the definition of one BHCA in Table 2-74

Table 2-48 LTE FDD eNodeB signaling specifications based on the typical board configuration

Board Combination	Specifications (BHCA)
1 LMPT+2 LBBPc	• eRAN7.0: 108000 • eRAN8.1 and later versions: 126000
1 LMPT+1 LBBPc+2 LBBPd3	• eRAN7.0: 162000 • eRAN8.1 and later versions: 216000
1 UMPTb+2 LBBPd3	• eRAN7.0: 252000 • eRAN8.1 and later versions: 288000
1 UMPTb+1 LBBPc+2 LBBPd3	• eRAN7.0: 270000 • eRAN8.1 and later versions: 351000
1 UMPTb+2 UBBPd5	• eRAN7.0: 480000 • eRAN8.1 and later versions: 792000
1 UMPTb+1 LBBPd3+2 UBBPd5	• eRAN7.0: 480000 • eRAN8.1 and later versions: 936000
1 UMPTb+1 LBBPc+1 LBBPd3+1 UBBPd5	• eRAN7.0: 480000 • eRAN8.1 and later versions: 603000
1 UMPTb+4 UBBPd5	• eRAN7.0: 480000

Board Combination	Specifications (BHCA)
	• eRAN8.1 and later versions: 1440000
1 UMPTb+1 LMPT+1 LBBPc+1 LBBPd3+2 UBBPd5	eRAN8.1 and later versions: 999000
2 UMPTb+1 LBBPc+1 LBBPd3+1 UBBPd5	eRAN8.1 and later versions: 603000

2.3.1.2 LTE NB-IoT Signaling Specifications

Table 2-49 Signaling specifications of main control boards and baseband processing boards

Board	Specifications (BHCA)
LMPT	324000
UMPTa	432000
UMPTb	540000
UMPTe	2430000
LBBPd1/LBBPd2	189000
LBBPd3	216000
UBBPd3/UBBPd4	405000
UBBPd5/UBBPd6	594000
UBBPe1/UBBPe2	405000
UBBPe3/UBBPe4	648000

The following table lists the signaling specifications supported by an NB-IoT eNodeB based on typical board combinations.

Table 2-50 Signaling specifications supported by an NB-IoT eNodeB

Board Combination	Specifications (BHCA)
1 UMPTb+2 LBBPd3	432000
1 UMPTb+2 UBBPd5	1188000
1 UMPTb+1 LBBPd3+2 UBBPd5	1404000
1 UMPTb+4 UBBPd5	2160000

NOTE
The signaling specifications of an eNodeB cannot exceed 4860000 BHCAs.

2.3.1.3 LTE FDD+NB-IoT Signaling Specifications

The following table lists the signaling specifications of main control boards and baseband processing boards working in LTE FDD+NB-IoT.

Table 2-51 Signaling specifications of main control boards and baseband processing boards

Board	Specifications (BHCA)
LMPT	151000+96000
UMPTa	201000+129000
UMPTb	252000+161000
UMPTe	1296000+484000
LBBPd1/LBBPd2	88000+56000
LBBPd3	100000+64000
UBBPd3/UBBPd4	189000+121000
UBBPd5/UBBPd6	277000+177000
UBBPe1/UBBPe2	189000+121000
UBBPe3/UBBPe4	302000+193000

NOTE
The signaling specifications of an eNodeB cannot exceed 4860000 BHCAs.

2.3.1.4 LTE FDD+TDD Signaling Specifications

The following table lists the signaling specifications of main control boards working in LTE FDD+TDD.

Table 2-52 Signaling specifications of main control boards

Board	Specifications (BHCA)
LMPT	216K
UMPTa	288K
UMPTb	360K
UMPTe	1620K

NOTE
In eRAN11.1 and later versions, the signaling specifications of an eNodeB cannot exceed 3,240,000 BHCAs.

2.3.1.5 LTE TDD+NB-IoT Signaling Specifications

The following table lists the signaling specifications of main control boards and baseband processing boards working in LTE TDD+NB-IoT.

Table 2-53 Board signaling specifications

Board	Specifications (BHCA)
UBBPe4	302000+193000

2.3.2 Multi-RAT Signaling Specifications

The following tables list the signaling specifications of co-MPT GU, GL, UL, and GUL base stations.

NOTE

- If GSM is configured with 72 TRXs (S24/24/24), each TRX can be configured with one SDCCH only; if GSM is configured with 24 TRXs (S8/8/8), each TRX can be configured with three SDCCHs.
- Common NodeB Application Protocol (CNBAP) indicates the signaling traffic of a NodeB over the Iub interface. The NBAP is defined in 3GPP specifications, and one CNBAP indicates one radio link (RL) establishment procedure.
- In a typical GL, UL, and GUL scenario where the signaling specifications of GSM and UMTS remain unchanged, LTE signaling specifications (BHCA) of the main control board are affected after LTE NB-IoT is available. LTE FDD and NB-IoT share LTE signaling processing specifications of the main control board. For commercial networks, it is recommended that 30% of the LTE signaling processing specifications be allocated to LTE NB-IoT.

Table 2-54 Signaling specifications of a co-MPT GU base station

Product Version	Typical Specifications	Recommended Board Configuration
SRAN8.0	24 TRXs+1000 CNBAPS	1 UMPTb1+5 WBBPf3+1 UBRIb
	48 TRXs+500 CNBAPS	1 UMPTb1+2 WBBPf3+1 UBRIb
SRAN9.0, SRAN10.1, SRAN11.1, and later versions	24 TRXs+1000 CNBAPS	1 UMPTb1+5 UBBPd1 SRAN11.1 and later versions 1 UMPTe+5 UBBPd1
	48 TRXs+500 CNBAPS	1 UMPTb1+2 UBBPd1+1 UBRIb SRAN11.1 and later versions 1 UMPTe+2 UBBPd1+1 UBRIb

Table 2-55 Signaling specifications of a co-MPT GL base station

Product Version	Typical Specifications	Recommended Board Configuration
SRAN8.0	18 TRXs+90 CAPS	1 UMPTb1+2 LBBPd1+1 UBRIb

Product Version	Typical Specifications	Recommended Board Configuration
	24 TRXs+80 CAPS	1 UMPTb1+2 LBBPd3+1 UBRIb
	48 TRXs+40 CAPS	1 UMPTb1+1 LBBPd1+1 UBRIb
SRAN9.0	18 TRXs+140000 BHCAs	1 UMPTb1+2 LBBPd2
	48 TRXs+70000 BHCAs	1 UMPTb1+1 LBBPd3+1 UBRIb
	48 TRXs+90000 BHCAs	1 UMPTb1+1 UBBPd3+1 UBRIb
	48 TRXs+180000 BHCAs	1 UMPTb1+2 UBBPd3
SRAN10.1, SRAN11.1, and later versions	18 TRXs+234000 BHCAs	1 UMPTb1+2 LBBPd2
	24 TRXs+180000 BHCAs	1 UMPTb1+2 LBBPd2
	48 TRXs+108000 BHCAs	1 UMPTb1+1 LBBPd3+1 UBRIb
	48 TRXs+414000 BHCAs	1 UMPTb1+2 UBBPd3
	48 TRXs+270000 BHCAs	1 UMPTb1+2 UBBPd3+1 UBRIb
SRAN11.1 and later versions	48 TRXs+1170000 BHCAs	1 UMPTe+6 UBBPd3
	24 TRXs+1350000 BHCAs	1 UMPTe+6 UBBPe4

Table 2-56 Signaling specifications of a co-MPT UL base station

Product Version	Typical Specifications	Recommended Board Configuration
SRAN9.0	350 CNBAPS+120000 BHCAs	1 UMPTb1+1 UBBPd2+2 LBBPd2
	350 CNBAPS+90000 BHCAs	1 UMPTb1+1 UBBPd2_U+1 UBBPd3_L
	350 CNBAPS+180000 BHCAs	1 UMPTb1+1 UBBPd2_U+2 UBBPd3_L
SRAN10.1, SRAN11.1, and later versions	350 CNBAPS+180000 BHCAs	1 UMPTb1+1 UBBPd2_U+2 LBBPd2
	350 CNBAPS+270000 BHCAs	1 UMPTb1+1 UBBPd2_U+1 UBBPd3_L
	350 CNBAPS+504000 BHCAs	1 UMPTb1+1 UBBPd2_U+2 UBBPd3_L
SRAN11.1 and later versions	350 CNBAPS+1350000 BHCAs	1 UMPTe+1 UBBPd6_U+5 UBBPd3_L
	600 CNBAPS+1206000 BHCAs	1 UMPTe+2 UBBPd6_U+4 UBBPe4_L

Table 2-57 Signaling specifications of a co-MPT GUL base station

Product Version	Typical Specifications	Recommended Board Configuration
SRAN8.0	18 TRXs+500 CNBAPS+60CAPS	1 UMPTb1+2 WBBPf3+1 LBBPd1+1 UBRIb
	24 TRXs+800 CNBAPS+30 CAPS	1 UMPTb1+4 WBBPf3+1 LBBPd1+1 UBRIb
SRAN9.0	18 TRXs+500 CNBAPS+70000 BHCAs	1 UMPTb1+2 UBBPd2_U+1 LBBPd3
	18 TRXs+500 CNBAPS+90000 BHCAs	1 UMPTb1+2 UBBPd2_U+1 UBBPd3_L
	24 TRXs+800 CNBAPS+35000 BHCAs	1 UMPTb1+4 UBBPd1_U+1 LBBPd2
	24 TRXs+800 CNBAPS+90000 BHCAs	1 UMPTb1+4 UBBPd1_U+1 UBBPd3_L
SRAN10.1, SRAN11.1, and later versions	18 TRXs+500 CNBAPS+108000 BHCAs	1 UMPTb1+2 UBBPd2_U+1 LBBPd3
	18 TRXs+500 CNBAPS+270000 BHCAs	1 UMPTb1+2 UBBPd2_U+1 UBBPd3_L
	24 TRXs+800 CNBAPS+45000 BHCAs	1 UMPTb1+4 UBBPd1_U+1 LBBPd2
	24 TRXs+800 CNBAPS+234000 BHCAs	1 UMPTb1+4 UBBPd1_U+1 UBBPd3_L
SRAN11.1 and later versions	24 TRXs+350 CNBAPS+1170000 BHCAs	1 UMPTe+1 UBBPd6_U+5 UBBPd3_L
	24 TRXs+600 CNBAPS+900000 BHCAs	1 UMPTe+2 UBBPd6_U+4 UBBPe4_L

2.4 CPRI Specifications

Maximum Distance Between the BBU and RRUs

Table 2-58 Maximum distance between the BBU and RRUs (single-RAT)

RAT	Maximum Distance Between the BBU and RRUs
GSM	40 km
UMTS	40 km
LTE	The maximum distances from different LTE baseband processing boards are as

RAT	Maximum Distance Between the BBU and RRUs
	follows: **eRAN7.0 and eRAN8.1:** • LBBPd1/UBBPd3: 20 km • LBBPd2/UBBPd4: 40 km • LBBPd3/UBBPd5/UBBPd6: – 40 km (cell quantity ≤ 3) – 20 km (cell quantity ≥ 4) **In eRAN11.1 and later versions:** • LBBPd1: 20 km • LBBPd2/UBBPd/UBBPe: 40 km • LBBPd3: – 40 km (cell quantity ≤ 3) – 20 km (cell quantity ≥ 4)

Table 2-59 Maximum distance between the BBU and RRUs (multi-RAT)

RAT	Maximum Distance Between the BBU and RRUs
GU	40 km
GL UL GUL	The maximum distances from different LTE baseband processing boards are as follows: **In SARN9.0 and SRAN10.1:** • LBBPd1/UBBPd3: 20 km • LBBPd2/UBBPd4: 40 km • LBBPd3/UBBPd5/UBBPd6: – 40 km (cell quantity ≤ 3) – 20 km (cell quantity ≥ 4) **In SRAN11.1 and later versions:** • LBBPd1: 20 km • LBBPd2/UBBPd/UBBPe: 40 km • LBBPd3: – 40 km (cell quantity ≤ 3) – 20 km (cell quantity ≥ 4)

CPRI Ports

Table 2-60 CPRI port specifications

Board	Number of CPRI Ports	CPRI Port Rate (Gbit/s)	Topology

Board	Number of CPRI Ports	CPRI Port Rate (Gbit/s)	Topology
GTMU	6	1.25	Star, chain, and ring
GTMUb/GTMUc	6	1.25/2.5	Star, chain, and ring
UBRI	6	1.25/2.5	Star, chain, and ring
UBRIb	6	1.25/2.5/4.9/6.144/9.8	Star, chain, and ring
WBBPa	3	1.25	Star, chain, and ring
WBBPb	3	1.25/2.5	Star, chain, and ring
WBBPd	6	1.25/2.5	Star, chain, and ring
WBBPf	6	1.25/2.5/4.9/6.144	Star, chain, and ring
LBBPd	6	1.25/2.5/4.9/6.144/9.8	Star, chain, and ring
UBBPd/UBBPe	6	1.25/2.5/4.9/6.144/9.8	Star, chain, and ring

CPRI Bandwidth Access Capability

Table 2-61 Mapping between the CPRI port rate and the number of cells in a UMTS scenario

CPRI Port Rate (Gbit/s)	Number of 1T2R/2T2R* Cells
1.25	4
2.5	8
4.9	16
6.144	24
9.8	32

NOTE
* indicates that the number of supported cells is reduced by half if the 2T2R cell supports VAM and the two TX antennas are configured on two RF modules in two CPRI links for VAM.

Table 2-62 Mapping between the CPRI port rate and the number of cells in an LTE FDD scenario

CPRI Port Rate (Gbit/s)	Number of 2T4R/4T4R Cells	Number of 1T2R/2T2R Cells
1.25	4x4 MIMO cells are not recommended because of the limited transmission bandwidth of the CPRI ports.	• 4 (cell bandwidth ≤ 3 MHz) • 2 (cell bandwidth ≤ 5 MHz) • 1 (cell bandwidth ≤ 10 MHz)

CPRI Port Rate (Gbit/s)	Number of 2T4R/4T4R Cells	Number of 1T2R/2T2R Cells
2.5	1 (cell bandwidth ≤ 10 MHz)	• 4 (cell bandwidth ≤ 5 MHz) • 2 (cell bandwidth ≤ 10 MHz) • 1 (cell bandwidth = 15 MHz or 20 MHz)
4.9	• 2 (cell bandwidth ≤ 10 MHz) • 1 (cell bandwidth = 15 MHz or 20 MHz)	• 4 (cell bandwidth ≤ 10 MHz) • 2 (cell bandwidth = 15 MHz or 20 MHz)
6.144	• 2 (cell bandwidth ≤ 10 MHz) • 1 (cell bandwidth = 15 MHz or 20 MHz)	• 4 (cell bandwidth ≤ 10 MHz) • 2 (cell bandwidth = 15 MHz or 20 MHz)
9.8	• 4 (cell bandwidth ≤ 10 MHz) • 2 (cell bandwidth = 15 MHz or 20 MHz)	• 8 (cell bandwidth ≤ 10 MHz) • 4 (cell bandwidth = 15 MHz or 20 MHz)

Table 2-63 Mapping between the CPRI port rate and the number of cells in an LTE NB-IoT scenario

CPRI Port Rate (Gbit/s)	Number of 2T4R/4T4R Cells	Number of 1T2R/2T2R Cells
1.25	2	4
2.5	4	8
4.9	8	16
9.8	16	32

2.5 Transmission Port Specifications

Table 2-64 GSM Transmission port specifications

Board	Specifications
GTMU/GUMUb	1 E1/T1 port (transmitting 4 E1s/T1s), 1 FE electrical port, and 1 FE optical port
GTMUc	1 E1/T1 port (transmitting 4 E1s/T1s), 1 FE/GE electrical port, and 1

Board	Specifications
	FE/GE optical port
UMPTa/UMPTb1/UMPTb2	1 E1/T1 port (transmitting 4 E1s/T1s), 1 FE/GE electrical port, and 1 FE/GE optical port
UMPTb3/UMPTb9	1 FE/GE electrical port and 1 FE/GE optical port
UMPTe	2 FE/GE electrical ports and 2 XGE optical ports
UTRPc	4 FE/GE electrical ports and 2 FE/GE optical ports **NOTE** As of SRAN13.0, when a GTMU/GTMUb/GTMUc is used as the main control board in a BBU, GSM cannot serve as the primary RAT of the UTRPc in the same BBU.

NOTE
The GTMU used in a base station of a version earlier than GBSS14.0 supports a maximum of 8 E1s/T1s. The GTMU used in a base station of GBSS14.0 supports a maximum of 12 E1s/T1s.

Table 2-65 UMTS transmission port specifications

Board	Specifications
WMPT	1 E1/T1 port (transmitting 4 E1s/T1s), 1 FE electrical port, and 1 FE optical port
UMPTa/UMPTb1/UMPTb2	1 E1/T1 port (transmitting 4 E1s/T1s), 1 FE/GE electrical port, and 1 FE/GE optical port
UMPTb3/UMPTb9	1 FE/GE electrical port and 1 FE/GE optical port
UMPTe	2 FE/GE electrical ports and 2 XGE optical ports
UTRP2	2 FE/GE optical ports
UTRP3	2 E1/T1 ports (transmitting 8 E1s/T1s)
UTRP4	2 E1/T1 ports (transmitting 8 E1s/T1s)
UTRP6	1 STM-1/OC-3 port
UTRP9	4 FE/GE electrical ports
UTRPc	4 FE/GE electrical ports and 2 FE/GE optical ports
UTRPa	2 E1/T1 ports (transmitting 8 E1s/T1s)

Table 2-66 LTE transmission port specifications

Board	Specifications

Board	Specifications
LMPT	2 FE/GE electrical ports, 2 FE/GE optical ports, or 1 FE/GE optical port+1 FE/GE electrical port
UMPTa/UMPTb1/UMPTb2	1 E1/T1 port (transmitting 4 E1s/T1s), 1 FE/GE electrical port, and 1 FE/GE optical port
UMPTb3/UMPTb9	1 FE/GE electrical port and 1 FE/GE optical port
UMPTe	2 FE/GE electrical ports and 2 XGE optical ports
UTRPc	4 FE/GE electrical ports and 2 FE/GE optical ports

NOTE

This section describes only the transmission ports on a BBU working in a single RAT. The number of transmission ports on a BBU working in multiple RATs equals the sum of the transmission ports on the boards in each RAT.

2.6 Equipment Specifications

Table 2-67 Input power

Item	Specifications
Input power	UPEUc: –48 V DC Voltage range: –38.4 V DC to –57 V DC

Table 2-68 Dimensions and weight

Item	Specifications
Dimensions (H x W x D)	86 mm × 442 mm × 310 mm
Weight	**In SRAN8.0, SRAN9.0 and SRAN10.1 versions:** • BBU3900 in full configuration: ≤ 12 kg • BBU3900 in typical configuration: ≤ 7 kg **In SRAN11.1 and later versions:** • BBU3900 in full configuration: ≤ 15 kg • BBU3900 in typical configuration: ≤ 7 kg

Table 2-69 Heat dissipation

Configuration	Specifications

Configuration	Specifications
FAN	350 W
FANc	650 W

Table 2-70 Environment

Item	Specifications
Operating temperature	–20ºC to +55ºC (long term) +55ºC to +60ºC (short term)
Relative humidity	5% RH to 95% RH
Protection class	IP20
Atmospheric pressure	70 kPa to 106 kPa
Noise power level	ETS 300 753 3.1 ≤7.2 bels
Storage time	The product must be installed and put into use within a year after being delivered; otherwise, it may malfunction.

2.7 LTE Traffic Model

2.7.1 LTE FDD Traffic Model

On live networks, the service capacity of an LTE FDD eNodeB depends on system processing capabilities and the traffic model. This section describes two traffic models.

- Traffic model 1 derives from a typical LTE network where smartphones account for a large proportion of all UEs accessing the network. UEs in this traffic model are characterized by short online duration, frequent network access and release, high mobility, and a large number of small-packet data services.
- Traffic model 2 derives from a typical LTE network where data cards account for a large proportion of all UEs accessing the network. LTE dongle and customer premises equipment (CPE) are examples of such data cards. UEs in this traffic model are characterized by long online duration, low mobility, and a large number of large-packet data services.

The traffic model of the control plane (CP) for models 1 and 2 is illustrated as follows:

NOTE

(1): Traffic models described in the following table are obtained in busy hours. @BH refers to at busy hour.

Table 2-71 CP specifications for traffic models 1 and 2

CP Signaling Process	Specifications for Traffic Model 1	Specifications for Traffic Model 2
PS Call Attempt Number per User @BH(1) (times) For example, PS Call Density	180	20
Dedicated Bearer Attempt Number per User @BH (times)	5	1
TAU & Attach & Detach per User @BH (times)	30	5
Intra-eNodeB Handover Number per User @BH (times)	10	1
Inter-eNodeB X2 Based Handover Out Attempt Number per User @BH (times)	40	2
Inter-eNodeB X2 Based Handover In Attempt Number per User @BH (times)	40	2
Inter-eNodeB S1 Based Handover Out Attempt Number per User @BH (times)	0	0
Inter-eNodeB S1 Based Handover In Attempt Number per User @BH (times)	0	0
Inter-RAT Handover Attempt Number per User @BH (times)	3	0
Inter-RAT Redirection Attempt Number per User @BH (times)	12	0
CSFB Based Inter-RAT Handover Attempt Number per User @BH (times)	0	0
CSFB Based Inter-RAT Redirection Attempt Number per User @BH (times)	5	0
CA Scell Configuration Update Attempt Number per User @BH (times)	10	0
Syn2Unsyn Attempt Number per User @BH (times)	0	0
Unsyn2Syn Attempt Number per User @BH (times)	0	0
RRC Re-Establish Number per User	2	0

CP Signaling Process	Specifications for Traffic Model 1	Specifications for Traffic Model 2
@BH (times)		
Paging number @BH (times)	1260000	100000

The following table describes the user plane (UP) specifications for traffic model 1.

Table 2-72 UP specifications for traffic model 1

Service Type	PS Call Attempt Ratio (%)	DL Traffic Volume per PS Call (KB)	DL: UL Traffic Volume Ratio
Web browsing & E-mail	35.00	250	15
Video downloading, uploading & streaming	0.35	20000	50
SNS	15.00	200	4
IM	15.00	5	0.7
Music & APP downloading & Streaming	0.50	5000	30
File sharing & Storage	0.10	400	0.1
Video Call	0.20	3000	1
Heart beat	25.00	0.1	1
Other	8.85	50	1

The following table describes the UP specifications for traffic model 2.

Table 2-73 UP specifications for traffic model 2

Service Type	PS Call Attempt Ratio (%)	UL Traffic Volume per PS Call (KB)	DL Traffic Volume per PS Call (KB)
FTP	100	600	6000

Based on the definition of traffic model 1, one BHCA, for example, one combined PS call, is defined by taking every item in traffic model 1 divided by the PS call density. The details of one BHCA are listed below.

Table 2-74 Definition of one BHCA

Definition of a Combined Call or One BHCA	Times
PS Call Attempts	1
Dedicated Bearer Attempts	0.0278
TAU & Attach & Detach Attempts	0.1667
Intra-eNodeB Handover Attempts	0.0556
Inter-eNodeB X2 Based Handover Out Attempts	0.2222
Inter-eNodeB X2 Based Handover In Attempts	0.2222
Inter-eNodeB S1 Based Handover Out Attempts	0
Inter-eNodeB S1 Based Handover In Attempts	0
Inter-RAT Handover Attempts	0.0167
Inter-RAT Redirection Attempts	0.0167
CSFB Based Inter-RAT Handover Attempts	0
CSFB Based Inter-RAT Redirection Attempts	0.0278
CA Scell Configuration Update Attempts	0.0556
Syn2Unsyn Attempts	0
Unsyn2Syn Attempts	0
RRC Re-Establish Attempts	0.0111

2.7.2 LTE NB-IoT Traffic Model

On live networks, the service capacity of an NB-IoT eNodeB depends on system processing capabilities and the traffic model. This section describes the LTE NB-IoT traffic models defined in the 3GPP TR 45.820 protocol.

Table 2-75 Packet interval

Access Interval (Hour)	User Ratio
24	40%
2	40%
1	15%
0.5	5%

Table 2-76 User distribution

Coverage Class	Ratio
0 (0 dB)	100%
1 (10 dB)	0%
2 (20 dB)	0%

Average packet length is 100 bytes.

Table 2-77 CP traffic model specifications

CP Signaling Process	Traffic Model Specifications
PS Call Attempt Number per User @BH(1) (times)	0.467
Dedicated Bearer Attempt Number per User @BH (times)	0
TAU & Attach & Detach per User @BH (times)	0.00322(2)
Intra-eNodeB Handover Number per User @BH (times)	0
Inter-eNodeB X2 Based Handover Out Attempt Number per User @BH (times)	0
Inter-eNodeB X2 Based Handover In Attempt Number per User @BH (times)	0
Inter-eNodeB S1 Based Handover Out Attempt Number per User @BH (times)	0
Inter-eNodeB S1 Based Handover In Attempt Number per User @BH (times)	0
Inter-RAT Handover Attempt Number per User @BH (times)	0
Inter-RAT Redirection Attempt Number per User @BH (times)	0
CSFB Based Inter-RAT Handover Attempt Number per User @BH (times)	0
CSFB Based Inter-RAT Redirection Attempt Number per User @BH (times)	0
CA Scell Configuration Update Attempt Number per User @BH (times)	0
Syn2Unsyn Attempt Number per User @BH (times)	0

CP Signaling Process	Traffic Model Specifications
Unsyn2Syn Attempt Number per User @BH (times)	0
RRC Re-Establish Number per User @BH (times)	0
Paging number @BH (times)	400

NOTE

- (1): Traffic models described in the preceding table are obtained in busy hours. @BH refers to at busy hour.
- (2): Periodic TAU timer is extended to 310 hours.

Table 2-78 UP traffic model specifications

Service Type	PS Call Attempt Ratio (%)	UL Traffic Volume per PS Call (KB)	DL Traffic Volume per PS Call (KB)
Uplink data	100	0.1	0

3 Acronyms and Abbreviations

Table 3-1 Acronyms and abbreviations

Acronym or Abbreviation	Full Name
ATM	Asynchronous Transfer Mode
BBU	Baseband Unit
BITS	Building Integrated Timing Supply System
CAPS	Call Attempt Per Second
CE	Channel Elements
CNBAPS	Common NodeB Application Parts
CPRI	Common Public Radio Interface
DL	Downlink
EDGE	Enhanced Data rates for GSM Evolution
FE	Fast Ethernet
GE	Gigabit Ethernet
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
GSM	Global Service Mobile
GTMU	GSM Timing and Main control Unit
HDLC	High-level Data Link Control
HSDPA	High Speed Downlink Packet Access
IC	Interference Cancellation
IP	Internet Protocol
LBBP	LTE BaseBand Processing unit
LMPT	LTE Main Processing Transmission unit

Acronym or Abbreviation	Full Name
LMT	Local Maintenance Terminal
LTE	Long Term Evolution
MAC	Media Access Control
MIMO	Multi-input and Multi-output
NB-IoT	Narrow Band-Internet of Things
OC-3	Optical Carrier Level 3
OM	Operation and Maintenance
OMC	Operation and Maintenance Center
RGPS	Remote Global Positioning System
SMT	Site Maintenance Terminal
STM-1	Synchronous Transport Mode-1
TOD	Time of Day
UBRI	Universal Baseband Radio Interference Board
UCIU	Universal inter-Connection Infrastructure Unit
UEIU	Universal Environment Interface Unit
UL	Uplink
UMTS	Universal Mobile Telecommunications System
UMPT	Universal Main Processing and Transmission Unit
UPEU	Universal Power and Environment Interface Unit
USCU	Universal Satellite card and Clock Unit
UTRP	Universal Transmission Processing Unit
WBBP	WCDMA Baseband Processing Unit
WMPT	WCDMA Main Processing Transmission Unit