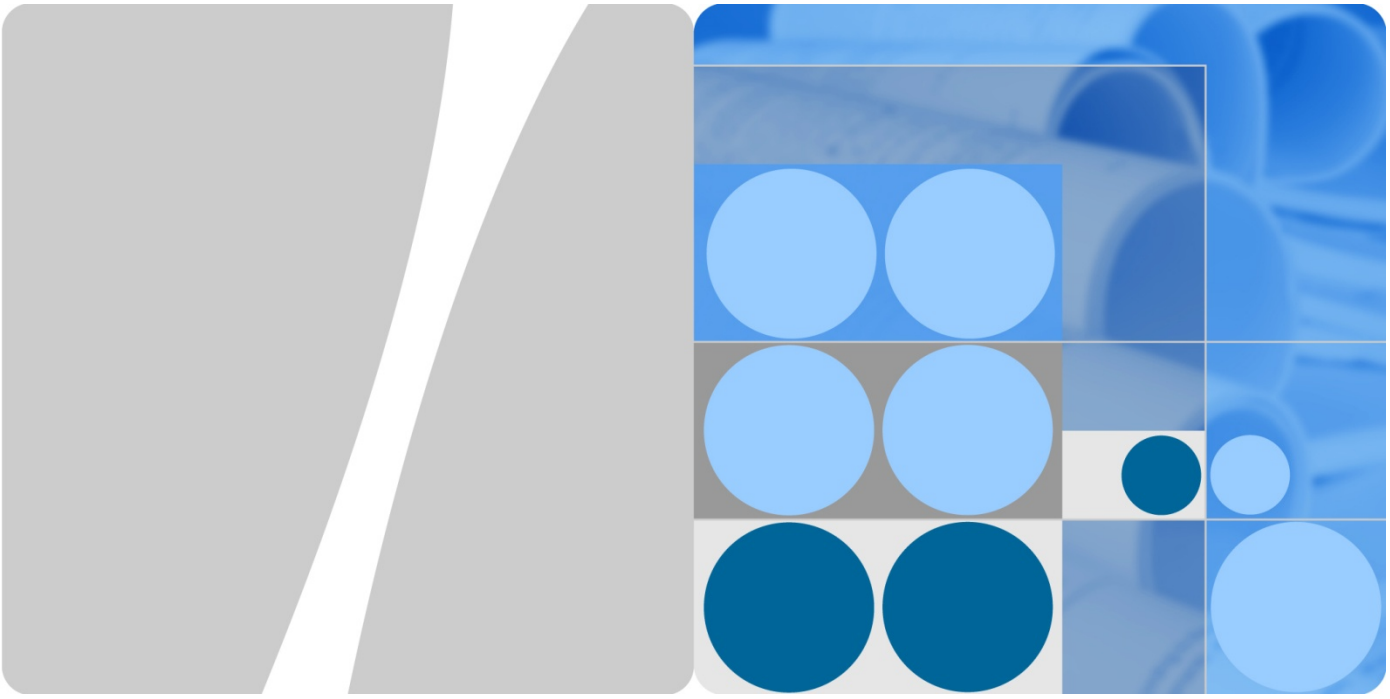

RRU3952 Description

Issue 08

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Contents

1 Overview

The RRU3952 is an outdoor remote radio unit which is powered by a power cabinet. It is the RF module of a distributed base station and is installed close to the antenna. The RRU3952 performs modulation, demodulation, data processing, and combination and division of baseband signals and RF signals. With the Software Defined Radio (SDR) technology, the RRU3952 supports the dual-mode operation of GU, GL, UL, GUL, GM, UM, LM, GUM, or ULM.

Adopting an innovative design, RRU3952 is able to work in 2 Tx+4 Rx mode and therefore supports higher output power and larger carrier capacity.

The software version of the RRU3952 (850 MHz, not including LTE (NB-IoT)) is SRAN10.1, which is compatible with the N-1 and N-2 versions of MBTS, MBSC, and OSS NEs. Therefore, the RRU3952 can be used with products of SRAN8.0, SRAN9.0 and SRAN10.0 versions. All these three versions include the RRU3952 software components. The RRU3952 used in SRAN8.0, SRAN9.0 and SRAN10.0 has no impact on the KPI of products.

The software version of the RRU3952 (850 MHz, including LTE (NB-IoT)) is SRAN12.1.

The software version of the RRU3952 (2100 MHz) is SRAN11.1, which is compatible with the N–1 and N–2 versions of MBTS, MBSC, and OSS NEs. Therefore, the RRU3952 can be used with products of SRAN9.0, SRAN10.1 and SRAN11.1 versions. All these three versions include the RRU3952 software components. The RRU3952 used in these versions has no impact on product KPIs.

1.1 Appearance

Figure 1-1 shows the appearance of an RRU3952 (850 MHz). Figure 1-2 shows the appearance of an RRU3952 (2100 MHz).

Figure 1-1 Appearance of an RRU3952 (850 MHz)

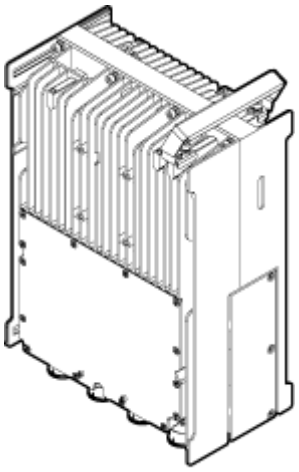
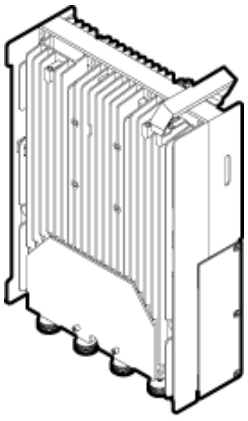


Figure 1-2 Appearance of an RRU3952 (2100 MHz)



1.2 Physical Ports

The RRU has a modular design. Its external ports are located at the bottom of the module and in the cabling cavity.

Figure 1-3 and Table 1-1 show the physical ports on the RRU3952 (850 MHz). Figure 1-4 and Table 1-2 show the physical ports on the RRU3952 (2100 MHz).

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Figure 1-3 Physical ports on the RRU3952 (850 MHz)

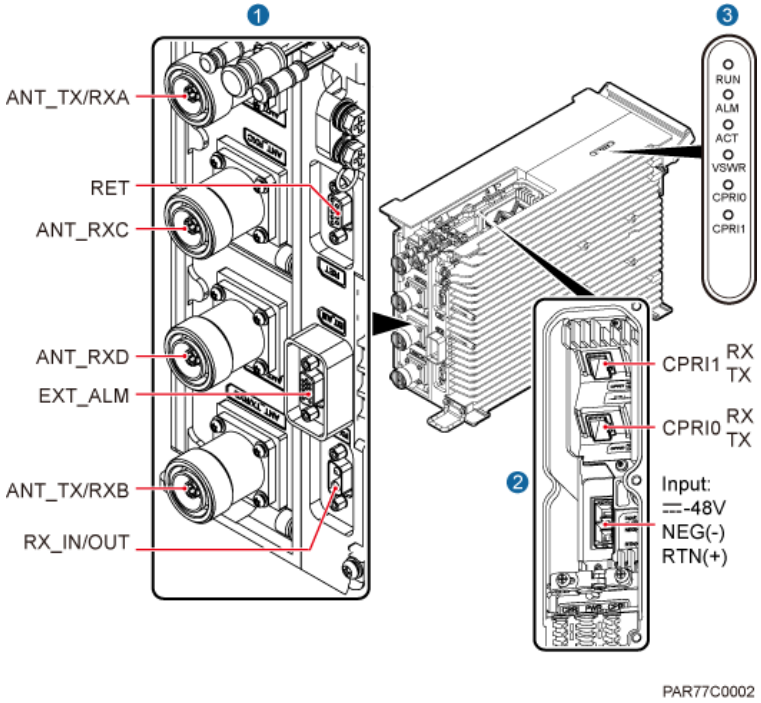

Table 1-1 Physical ports on the RRU3952 (850 MHz)

Port	Connector	Quantity	Description
RF port	DIN	4	Connects to the antenna
Interconnection port for receiving RF signals	DB2W2	1	Connects to another RF module
Common public radio interface (CPRI) port	DLC	2	Connects to the baseband unit (BBU)
Power supply socket	Easy power receptacle (pressfit type)	1	Receives –48 V DC power
RET port	DB9	1	Connects to a remote control unit (RCU)
Alarm port	DB15	1	Port for monitoring and maintenance

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Figure 1-4 Physical ports on the RRU3952 (2100 MHz)

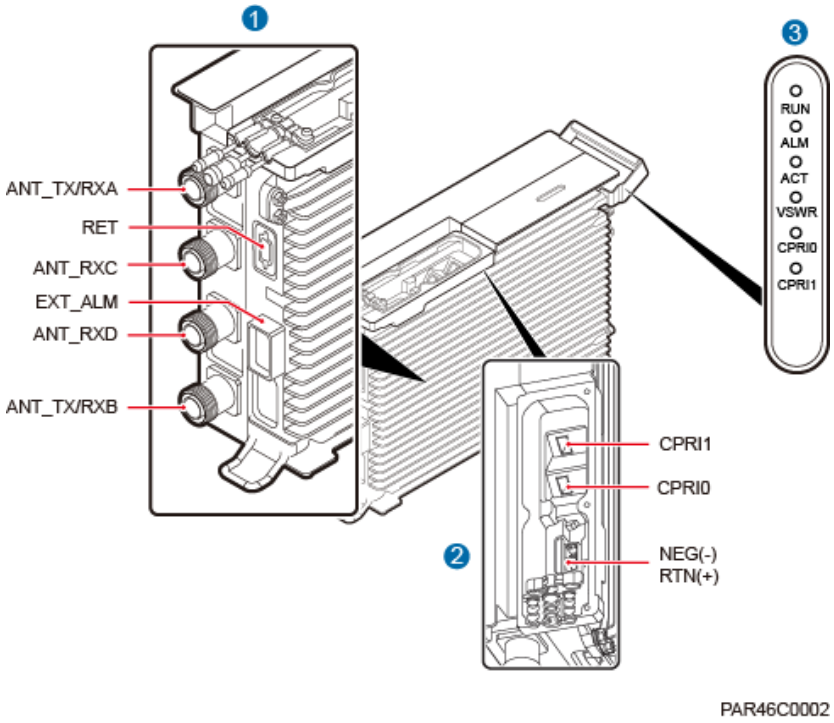

Table 1-2 Physical ports on the RRU3952 (2100 MHz)

Port	Connector	Quantity	Description
RF port	DIN	4	Connects to the antenna
Common public radio interface (CPRI) port	DLC	2	Connects to the baseband unit (BBU)
Power supply socket	Easy power receptacle (pressfit type)	1	Receives –48 V DC power
RET port	DB9	1	Connects to a remote control unit (RCU)
Alarm port	DB15	1	Port for monitoring and maintenance

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2 Technical Specifications

2.1 Frequency Band

Table 2-1 Frequency band supported by an RRU3952

Type	Frequency Band (MHz)	Receive Frequency Band (MHz)	Transmit Frequency Band (MHz)	IBW (MHz)
RRU3952	850	824 to 849	869 to 894	25
	2100	1920 to 1980	2110 to 2170	60

2.2 Capacity

Table 2-2 Single-mode capacity

Mode	Capacity
GSM	(Only 850 MHz frequency band supported)Each RRU3952 supports 8 carriers.
UMTS	Each RRU3952 supports: • Non-MIMO: 6 carriers • MIMO: 4 carriers
LTE FDD	Each RRU3952 supports 2 carriers. The LTE FDD bandwidth is 1.4, 3, 5, 10, 15, or 20 MHz.
LTE (NB-IoT)	Each RRU3952 supports 1 carrier.

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Table 2-3 Multi-mode capacity

Mode	Capacity
GSM+UMTS	(Only 850 MHz frequency band supported)For detailed specifications, see Table 2-6, Table 2-7, Table 2-12, and Table 2-13.
GSM+LTE FDD	(Only 850 MHz frequency band supported)For detailed specifications, see Table 2-8 and Table 2-14.
UMTS+LTE FDD	For detailed specifications, see Table 2-9 and Table 2-16.
GSM+UMTS +LTE FDD	(Only 850 MHz frequency band supported)For detailed specifications, see Table 2-10.
GSM+LTE (NB-IoT)	For detailed specifications, see Table 2-18.
UMTS+ LTE (NB-IoT)	For detailed specifications, see Table 2-19.
LTE FDD+ LTE (NB-IoT)	For detailed specifications, see Table 2-20.
GSM+UMTS + LTE (NB-IoT)	For detailed specifications, see Table 2-21.
UMTS+LTE FDD+ LTE (NB-IoT)	For detailed specifications, see Table 2-22.

2.3 Receiver Sensitivity

Table 2-4 Receiver sensitivity

Mode	Frequency Band (MHz)	1-Way Receiver Sensitivity (dBm)	2-Way Receiver Sensitivity (dBm)	4-Way Receiver Sensitivity (dBm)
GSM	850	-113.4	-116.2	-118.9
UMTS	850	-125.5	-128.3	-131.0
	2100	-126.1	-128.9	-131.6
LTE FDD	850	-106.0	-108.8	-111.5
	2100	-106.9	-109.7	-112.4
LTE (NB-IoT)	850	-127.3	-130.1	-132.8

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NOTE

- The receiver sensitivity of GSM, as recommended in 3GPP TS 51.021, is measured in the central band at the antenna connector on condition that the channel rate is 13 kbit/s and the bit error rate (BER) is not higher than 2%.
- The receiver sensitivity of UMTS, as recommended in 3GPP TS 25.104, is measured in the entire operating band at the antenna connector on condition that the channel rate reaches 12.2 kbit/s and the Bit Error Rate (BER) is not higher than 0.001.
- The receiver sensitivity of LTE FDD, as recommended in 3GPP TS 36.104, is measured under a 5 MHz channel bandwidth based on the FRC A1-3 in Annex A.1 (QPSK, R = 1/3, 25 RBs) standard.
- LTE (NB-IoT) receiver sensitivity is measured, as recommended in 3GPP TS 36.104, under a 200 KHz channel bandwidth and a 15 KHz subcarrier spacing based on the FRC A14-1 in Annex A.14 (π/2 BPSK, R = 1/3, 1 RB) standard.

2.4 Typical Output Power

NOTE

- RRU3952 working in GSM mode and in the 850 MHz frequency band comply with the 3GPP TS 45.005 V10.2.0 and 3GPP TS 51.021 V10.2.0 standards. The RRU3952 that works in UMTS, LTE FDD, or multi-standard radio (MSR) mode and operates in the 850 MHz frequency band complies with the 3GPP TS 37.104 V10.4.0 and TS 37.141 V10.4.0 standards.
- For the RRU3952 working in GSM mode: When the S1 or S2 configuration is used and the maximum output power is 60 W per carrier, the corresponding 60 W power license must be obtained.
- The output power is 1 dB lesser than the standard power when the RRU3952 is located at a height of 3500 m to 4500 m; and is 2 dB lesser than the standard power when the RRU3952 is located at a height of 4500 m to 6000 m.
- Factors such as the inter-site distance, frequency reuse factor, power control algorithm, and traffic model affect the gain achieved by dynamic power allocation. Therefore, in most cases, the network planning can be based on the power specification achieved by dynamic power allocation.
- In power sharing mode, the power control and DTX functions must be enabled. In GBSS8.1, the dynamic power sharing feature is mutually exclusive with the GBFD-113201 Concentric Cell, GBFD-114501 Co-BCCH Cell, GBFD-118001 BCCH Dense Frequency Multiplexing, and GBFD-117501 Enhanced Measurement Report (EMR) features. In GBSS9.0 and later versions, the dynamic power sharing feature can be used together with these features. However, the dynamic power sharing feature currently cannot be used together with the GBFD-117002 IBCA (Interference Based Channel Allocation), GBFD-117001 Flex MAIO, GBFD-118701 RAN Sharing, and GBFD-114001 Extended Cell features in GBSS8.1, GBSS9.0, and later versions.
- Power sharing assumes a random distribution of UEs in the cell.
- The **output power per carrier** in the output power table provides the maximum output power possible while ensuring the network performance.
- When two LTE FDD carriers are configured, it is recommended that the power spectrum density (PSD) of the two carriers be set to the same value.
- Power spectrum density = Carrier output power/Carrier bandwidth (1.4 MHz and 3 MHz bandwidths are considered as 5 MHz bandwidth in this formula.)

The RRU3952 supports 2 x 60 W or 40 W+80 W configuration. The "40 W+80 W" configuration does not apply to typical scenarios. When this configuration is used, only power of channel B can be 80 W. Table 2-5, Table 2-6, Table 2-7, Table 2-8, Table 2-9, Table 2-10, Table 2-17, Table 2-18, Table 2-19, Table 2-20, and Table 2-21 show the typical output power of RRU3952 in 2 x 60 W configuration scenarios. Table 2-11, Table 2-12, Table 2-13, and Table 2-14 show the output power of RRU3952 in 40 W+80 W configuration scenarios.

Table 2-15, and Table 2-16 show the typical output power of RRU3952 (2100 MHz) working in UO, LO, or UL mode.

Table 2-5 Typical output power of RRU3952 (2 x 60 W, 850 MHz, single-mode)

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Sharing Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
1	0	0	60	60	0	0	/
2	0	0	60	60	0	0	/
3	0	0	30	30	0	0	/
4	0	0	30	30	0	0	/
5	0	0	20	25	0	0	/
6	0	0	20	25	0	0	/
7	0	0	15	20	0	0	/
8	0	0	15	20	0	0	/
0	1	0	0	0	60	0	/
0	2	0	0	0	60	0	/
0	3	0	0	0	30	0	/
0	4	0	0	0	30	0	/
0	5	0	0	0	20	0	/
0	6	0	0	0	20	0	/
0	1 (MIMO)	0	0	0	2x40	0	/
0	2 (MIMO)	0	0	0	2x30	0	/
0	3 (MIMO)	0	0	0	2x20	0	/
0	4 (MIMO)	0	0	0	2x15	0	/
0	0	1 (MIMO)	0	0	0	2x60	5, 10, 15, 20
0	0	1 (MIMO)	0	0	0	2x40	1.4, 3
0	0	2 (MIMO)	0	0	0	2x30	1.4, 3, 5, 10, 15, 20

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Number of GSM Carriers	Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Sharing Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
0	0	2 (MIMO)	0	0	0	Carrier1: 2x20 Carrier2: 2x40	1.4, 3, 5, 10, 15, 20

Table 2-6 Typical output power of RRU3952 (2 x 60 W, 850 MHz, GU Non-MSR)

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
1	1	60	60
1	2	60	30
1	3	60	20
2	1	30	60
2	2	30	30
2	3	30	20
2	4	30	15
3	1	20	60
3	2	20	30
3	3	20	20
3	4	20	15
4	1	15	60
4	2	15	30
4	3	15	20
4	4	15	15
5	1	10	60
5	2	10	30
5	3	10	20
6	1	7	60

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Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
6	2	7	30

Table 2-7 Typical output power of RRU3952 (2 x 60 W, 850 MHz, GU MSR)

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
1	2	30	30
1	2	20	40
2	1	40	20
2	1	30	30
2	2	40	20
2	2	30	30
2	2	20	40
3	1	30	30
3	1	20	40
3	2	20	20
3	2	15	30
4	1	20	40
4	2	20	20
4	2	15	30
5	1	20	20
5	1	15	30
5	2	13	20
6	1	15	30
6	2	12	20
7	1	10	20
1	1 (MIMO)	20	2x40
1	1 (MIMO)	30	2x30
1	1 (MIMO)	40	2x20
2	1 (MIMO)	20	2x40

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Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
2	1 (MIMO)	30	2x30
2	1 (MIMO)	40	2x20
3	1 (MIMO)	20	2x20
3	1 (MIMO)	15	2x30
4	1 (MIMO)	20	2x20
4	1 (MIMO)	15	2x30
1	2 (MIMO)	20	2x20
2	2 (MIMO)	20	2x20
2	2 (MIMO)	30	2x15
3	2 (MIMO)	20	2x10
3	2 (MIMO)	15	2x15
3	2 (MIMO)	10	2x20
4	2 (MIMO)	20	2x10
4	2 (MIMO)	15	2x15
4	2 (MIMO)	10	2x20

Table 2-8 Typical output power of RRU3952 (2 x 60 W, 850 MHz, GL MSR)

Number of GSM Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
1	1 (MIMO)	20	2x40	1.4, 3, 5, 10, 15, 20
1	1 (MIMO)	30	2x30	1.4, 3, 5, 10, 15, 20
1	1 (MIMO)	40	2x20	1.4, 3, 5, 10, 15, 20
2	1 (MIMO)	20	2x40	1.4, 3, 5, 10, 15, 20
2	1 (MIMO)	30	2x30	1.4, 3, 5, 10, 15, 20
2	1 (MIMO)	40	2x20	1.4, 3, 5, 10, 15, 20

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Number of GSM Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
3	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
4	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
4	1 (MIMO)	15	2x30	1.4, 3, 5, 10, 15, 20
5	1 (MIMO)	12	2x20	1.4, 3, 5, 10, 15, 20
6	1 (MIMO)	12	2x20	1.4, 3, 5, 10, 15, 20
1	2 (MIMO)	20	Carrier 1: 2x20 Carrier 2: 2x20	1.4, 3, 5, 10
1	2 (MIMO)	20	Carrier 1: 2x10 Carrier 2: 2x30	1.4, 3, 5, 10
1	2 (MIMO)	30	Carrier 1: 2x20 Carrier 2: 2x10	1.4, 3, 5, 10
2	2 (MIMO)	20	Carrier 1: 2x10 Carrier 2: 2x30	1.4, 3, 5, 10
2	2 (MIMO)	20	Carrier 1: 2x20 Carrier 2: 2x20	1.4, 3, 5, 10
3	2 (MIMO)	10	Carrier 1: 2x20 Carrier 2: 2x20	1.4, 3, 5, 10
3	2 (MIMO)	15	Carrier 1: 2x20 Carrier 2: 2x10	1.4, 3, 5, 10
4	2 (MIMO)	20	Carrier 1: 2x10 Carrier 2: 2x10	1.4, 3, 5, 10
4	2 (MIMO)	10	Carrier 1: 2x20 Carrier 2: 2x20	1.4, 3, 5, 10
4	2 (MIMO)	15	Carrier 1: 2x20 Carrier 2: 2x10	1.4, 3, 5, 10

Table 2-9 Typical output power of RRU3952 (2 x 60 W, 850 MHz, UL MSR)

Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
1 (MIMO)	1 (MIMO)	2x30	2x30	1.4, 3, 5, 10, 15, 20
1 (MIMO)	1 (MIMO)	2x20	2x40	1.4, 3, 5, 10, 15, 20
1 (MIMO)	1 (MIMO)	2x40	2x20	1.4, 3, 5, 10, 15, 20
2	1 (MIMO)	30	2x30	1.4, 3, 5, 10, 15, 20
2 (MIMO)	1 (MIMO)	2x20	2x20	1.4, 3, 5, 10, 15, 20
3	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
3 (MIMO)	1 (MIMO)	2x15	2x15	1.4, 3, 5, 10, 15, 20
4	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
4 (MIMO)	1 (MIMO)	2x10	2x20	1.4, 3, 5, 10, 15, 20
2+1 (MIMO)	1 (MIMO)	Non-MIMO carrier: 20 MIMO carrier: 2x10	2x20	1.4, 3, 5, 10, 15, 20

Table 2-10 Typical output power of RRU3952 (2 x 60 W, 850 MHz, GUL MSR)

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
1	1	1 (MIMO)	40	40	2x20	5, 10
1	1	1 (MIMO)	30	30	2x30	5, 10
2	1	1 (MIMO)	20	40	2x20	5, 10
2	1	1 (MIMO)	15	30	2x30	5, 10
3	1	1 (MIMO)	12	40	2x20	5, 10

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Number of GSM Carriers	Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
4	1	1 (MIMO)	10	40	2x20	5, 10
1	2	1 (MIMO)	40	20	2x20	5, 10
1	2	1 (MIMO)	30	15	2x30	5, 10
2	2	1 (MIMO)	20	20	2x20	5, 10
2	2	1 (MIMO)	15	15	2x30	5, 10
3	2	1 (MIMO)	12	20	2x20	5, 10
4	2	1 (MIMO)	10	20	2x20	5, 10

Table 2-11 Typical output power of RRU3952 (40 W+80 W, 850 MHz, single-mode)

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Sharing Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
1	0	80	80	0
2	0	40	40	0
3	0	40	40	0
4	0	27	27	0
5	0	20	20	0
6	0	20	20	0
7	0	16	20	0
8	0	13	15	0
0	1	0	0	80
0	3	0	0	40
0	6	0	0	20

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Table 2-12 Typical output power of RRU3952 (40 W+80 W, 850 MHz, GU Non-MSR)

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
1	1	80	40
1	1	40	80
1	2	80	20
1	2	40	40
1	3	80	10
1	3	40	25
1	4	80	10
2	1	40	40
2	1	20	80
2	2	40	20
2	2	20	40
2	3	40	10
2	3	20	25
2	4	40	10
2	4	20	20
3	1	27	40
3	1	13	80
3	2	27	20
3	2	13	40
3	3	27	10
3	3	13	25
3	4	27	10
3	4	13	20
4	1	20	40
4	1	10	80
4	2	20	20
4	2	10	40
4	3	20	10
4	3	10	25

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Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
4	4	20	10
4	4	10	20
5	1	16	40
5	2	16	20
5	3	16	10
6	1	12	40
6	2	12	20
7	1	6	40

Table 2-13 Typical output power of RRU3952 (40 W+80 W, 850 MHz, GU MSR)

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
1	1 (MIMO)	40	2x40
1	2 (MIMO)	40	2x20
1	2	40	40
1	3	40	20
1	4	40	20
2	1 (MIMO)	30	2x20
2	1	40	40
2	2 (MIMO)	20	2x20
2	2	40	20
2	3	30	20
3	1	20	40
3	2	20	30
3	2	13	40
4	1 (MIMO)	20	2x20
4	2 (MIMO)	10	2x10
5	1	20	20
6	1	10	20

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Table 2-14 Typical output power of RRU3952 (40 W+80 W, 850 MHz, GL MSR)

Number of GSM Carriers	Number of LTE FDD Carriers	Output Power per GSM Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
5	1 (MIMO)	12	2x20	5, 10, 15, 20
6	1 (MIMO)	15	2x10	5, 10, 15, 20
7	1 (MIMO)	12	2x10	5, 10, 15, 20
7	1 (MIMO)	10	2x20	5, 10, 15, 20
8	1 (MIMO)	10	2x10	5, 10, 15, 20

Table 2-15 Typical output power of the RRU3952 (2100 MHz, single-mode)

Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of an LTE FDD Carrier (MHz)
1	0	60	0	/
2	0	60	0	/
3	0	30	0	/
4	0	30	0	/
5	0	20	0	/
6	0	20	0	/
1 (MIMO)	0	2x60	0	/
2 (MIMO)	0	2x30	0	/
3 (MIMO)	0	2x20	0	/
4 (MIMO)	0	2x15	0	/
2 + 1 (MIMO)	0	MIMO: 30 Non-MIMO: 2x30	0	/
4 + 1 (MIMO)	0	MIMO: 20 Non-MIMO: 2x20	0	/
6 + 1 (MIMO)	0	MIMO: 15 Non-MIMO: 2x15	0	/

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Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of an LTE FDD Carrier (MHz)
2 + 2 (MIMO)	0	MIMO: 20 Non-MIMO: 2x20	0	/
4 + 2 (MIMO)	0	MIMO: 15 Non-MIMO: 2x15	0	/
2 + 3 (MIMO)	0	MIMO: 15 Non-MIMO: 2x15	0	/
0	1 (MIMO)	0	2x60	5, 10, 15, 20
0	2 (MIMO)	0	2x30	5, 10, 15, 20

Table 2-16 Typical output power of the RRU3952 (2100 MHz, UL MSR)

Number of UMTS Carriers	Number of LTE FDD Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Bandwidth of an LTE FDD Carrier (MHz)
1	1 (MIMO)	30	2x30	5, 10, 15, 20
2	1 (MIMO)	30	2x30	5, 10, 15, 20
3	1 (MIMO)	20	2x20	5, 10, 15, 20
4	1 (MIMO)	20	2x20	5, 10, 15, 20
6	1 (MIMO)	15	2 x 15	5, 10, 15, 20
1 (MIMO)	1 (MIMO)	2x30	2x30	5, 10, 15, 20
2 (MIMO)	1 (MIMO)	2x20	2x20	5, 10, 15, 20
3 (MIMO)	1 (MIMO)	2x15	2x15	5, 10, 15, 20
2	2 (MIMO)	20	2x20	5, 10, 15, 20
4	2 (MIMO)	15	2x15	5, 10, 15, 20

Table 2-17 Typical output power of the RRU3952 (2 x 60 W, 850 MHz, LTE (NB-IoT))

Number of LTE (NB-IoT) Carriers	Output Power per LTE (NB-IoT) Carrier (W)
1	20

Number of LTE (NB-IoT) Carriers	Output Power per LTE (NB-IoT) Carrier (W)
1 (SFB)	2x20

Table 2-18 Typical output power of the RRU3952 (2 x 60 W, 850 MHz, GM MSR)

Number of GSM Carriers	Number of LTE (NB-IoT) Carriers	Output Power per GSM Carrier (W)	Output Power per LTE (NB-IoT) Carrier (W)
1	1	30	10
2	1	30	10
3	1	25	5
4	1	25	5
5	1	15	3.2
6	1	15	3.2
1	1 (SFB)	30	2x10
2	1 (SFB)	30	2x10
3	1 (SFB)	25	2x5
4	1 (SFB)	25	2x5
5	1 (SFB)	15	2x3.2
6	1 (SFB)	15	2x3.2

Table 2-19 Typical output power of the RRU3952 (2 x 60 W, 850 MHz, UM MSR)

Number of UMTS Carriers	Number of LTE (NB-IoT) Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE (NB-IoT) Carrier (W)
1	1	40	15
2	1	40	15
1	1 (SFB)	40	2x15
2	1 (SFB)	40	2x15

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Table 2-20 Typical output power of the RRU3952 (2 x 60 W, 850 MHz, LM MSR)

Number of LTE FDD Carriers	Number of LTE (NB-IoT) Carriers	Output Power per LTE FDD Carrier (W)	Output Power per LTE (NB-IoT) Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
1 (MIMO)	1	2x40	10	5
1 (MIMO)	1	2x40	6.4	10
1 (MIMO)	1	2x40	5	15
1 (MIMO)	1	2x40	3.2	20
1 (MIMO)	1 (SFB)	2x40	2x10	5
1 (MIMO)	1 (SFB)	2x40	2x6.4	10
1 (MIMO)	1 (SFB)	2x40	2x5	15
1 (MIMO)	1 (SFB)	2x40	2x3.2	20

Table 2-21 Typical output power of the RRU3952 (2 x 60 W, 850 MHz, GUM MSR)

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE (NB-IoT) Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE (NB-IoT) Carrier (W)
1	1	1	40	40	10
2	1	1	30	30	10
3	1	1	20	30	5
1	1	1 (SFB)	40	40	2x10
2	1	1 (SFB)	30	30	2x10
3	1	1 (SFB)	20	30	2x5

Table 2-22 Typical output power of the RRU3952 (2 x 60 W, 850 MHz, ULM MSR)

Number of UMTS Carriers	Number of LTE FDD Carriers	Number of LTE (NB-IoT) Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Output Power per LTE (NB-IoT) Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
1	1 (MIMO)	1	30	2x30	2.4	10

Number of UMTS Carriers	Number of LTE FDD Carriers	Number of LTE (NB-IoT) Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE FDD Carrier (W)	Output Power per LTE (NB-IoT) Carrier (W)	Bandwidth of LTE FDD Carrier (MHz)
2	1 (MIMO)	1	20	2x20	2.4	10

2.5 Power Consumption

NOTE

- The typical power consumption and the maximum power consumption are measured when the ambient temperature is 25°C.
- The typical power consumption for GSM is reached when the base station works with 30% load. The maximum power consumption for GSM is reached when the base station works with 100% load.
- The typical power consumption for UMTS is measured when the load is 40%. The maximum power consumption for UMTS is measured when the load is 100%.
- The typical power consumption for LTE FDD is measured when the load is 50%. The maximum power consumption for LTE FDD is measured when the load is 100%.
- This section describes the power consumption of an entire base station. Board configurations in a BBU are as follows:
  - GSM: one GTMU
  - UMTS: one UMPTb1 and one WBBPf3 in 3x1 and 3x2 scenarios, one UMPTb1 and two WBBPf3s in 3 x 3 and 3 x 4 scenarios.
  - LTE FDD: one UMPTb1 and one LBBPd1 when one carrier is configured.

Table 2-23 Power consumption of the DBS3900 (Ver.D) (–48 V DC) (configured with RRU3952, 2 x 60 W, 850 MHz)

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
GSM	S2/2/2	20	565	675
	S4/4/4	20	785	1110
	S6/6/6	20	895	1430
UMTS	3 x 1	20	515	595
	3 x 2	20	635	775
LTE FDD	3 x 10 MHz	2x20	780	935
GSM+UMTS	GSM S2/2/2+UMTS 3 x 1	GSM: 20 UMTS: 20	775	940

	GSM S3/3/3+UMTS 3 x 1	GSM: 20 UMTS: 20	935	1205
	GSM S4/4/4+UMTS 3 x 1	GSM: 20 UMTS: 20	1000	1380
UMTS+LTE FDD	UMTS 3 x 1+LTE FDD 3 x 10 MHz	UMTS: 20 LTE FDD: 2 x 20	930	1160
	UMTS 3 x 2+LTE FDD 3 x 10 MHz	UMTS: 20 LTE FDD: 2 x 20	1030	1310
	UMTS 3 x 3+LTE FDD 3 x 10 MHz	UMTS: 20 LTE FDD: 2 x 20	1185	1520

Table 2-24 Power consumption of the DBS3900 (Ver.D) (–48 V) (configured with the RRU3952, 2100 MHz)

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
UMTS	3 x 1	20	465	510
	3 x 2	20	530	630
	3 x 3	20	660	880
	3 x 4	20	810	1050
LTE FDD	3 x 10 MHz, 1 carrier	2x20	595	690
	3 x 10 MHz, 2 carriers	2x20	750	975

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2.6 Input Power

Table 2-25 Input power

Item	Specifications
Input power	-48 V DC; voltage range: -36 V DC to -57 V DC NOTE The RRU3952 supports AC power supply when connected to an external AC/DC power module or an OPM15M. For details, see *AC/DC Power Module User Guide* and *OPM15M User Guide*.

2.7 Equipment Specifications

Table 2-26 Equipment specifications

Item	Specifications
Dimensions (HxWxD)	RRU 3952(850 MHz): 400 mm x 300 mm x 150 mm (without the housing) RRU 3952(2100 MHz):400 mm x 300 mm x 100 mm (without the housing)
Weight	RRU 3952(850 MHz): 20 kg (without the housing) RRU 3952(2100 MHz): 15kg (without the housing)

2.8 CPRI Port Specifications

Table 2-27 CPRI port specifications

Item	Specifications
Quantity of CPRI ports	2
CPRI port rate (Gbit/s)	1.25, 2.5, 4.9, or 9.8
Topology	Star, chain, and dual-star

Cascading level	CPRI MUX: • GU: 6 • GL: 4 • UL: 4 • GM: 4 • UM: 4 • LM: 4 • GUM: 4 • ULM: 4
Maximum distance from the BBU (km)	• GU: 40 km • In GL or UL mode, the maximum distances of the RRUs from the BBU vary with the types of BBP in LTE FDD mode as follows: ▪ LBBPd1/UBBPd3: 20 km ▪ LBBPd2/UBBPd4: 40 km ▪ LBBPd3/UBBPd5/UBBPd6: - Number of LTE FDD cells ≤ 3: 40 km - Number of LTE FDD cells > 3: 20 km • GM/UM/LM/GUM/ULM: 20 km

2.9 Environmental Specifications

Table 2-28 Environmental specifications

Item	Specifications
Operating temperature	–40°C to +50°C (with solar radiation) –40°C to +55°C (without solar radiation)
Relative humidity	5% RH to 100% RH
Absolute humidity	1 g/m^3 to 30 g/m^3
Atmospheric pressure	70 kPa to 106 kPa
Operating environment	The RRU3952 complies with the following standards: • 3GPP TS 25.141 • 3GPP TS 36.141 • 3GPP TS 37.141 • ETSI EN 300019-1-4 V2.1.2 (2003-04) Class 4.1: "Non-weather protected locations."

Anti-seismic performance	NEBS GR63 zone4
Protection rating	IP65

3 Acronyms and Abbreviations

Table 3-1 Acronyms and abbreviations

Acronym and Abbreviation	Full Name
3GPP	3rd Generation Partnership Project
BBU	Baseband Unit
BER	Bit Error Ratio
CPRI	Common Public Radio Interface
DTX	Discontinuous Transmission
GTMU	GSM Timing and Main control Unit
LBBP	LTE BaseBand Processing unit
LTE	Long Term Evolution
MIMO	Multi-input and Multi-output
MSR	Multi-Standard Radio
RAN	Radio Access Network
RRU	Remote Radio Unit
SDR	Software Defined Radio
UBRI	Universal Baseband Radio Interference board
UMPT	Universal Main Processing and Transmission unit
UMTS	Universal Mobile Telecommunications System
WBBP	WCDMA Baseband Processing unit