

RRU3959&RRU3959w Description

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Contents

1 Overview	1
1.1 Appearance.....	1
1.2 Physical Ports.....	2
2 Technical Specifications.....	4
2.1 Frequency Band.....	4
2.2 Capacity.....	4
2.3 Receiver Sensitivity.....	5
2.4 Output Power	7
2.5 Power Consumption	24
2.6 Input Power.....	26
2.7 Equipment Specifications	26
2.8 CPRI Port Specifications	26
2.9 Environment Specifications	27
3 Acronyms and Abbreviations.....	28

1 Overview

The RRU3959/RRU3959w is an outdoor remote radio unit which is powered by a power cabinet. It is the RF module of the distributed base station and is installed close to the antenna. The RRU3959/RRU3959w performs modulation, demodulation, data processing, and combination and division of baseband signals and RF signals. By using the software-defined radio (SDR) technology, the RRU3959 can work in GU, GL, UL, GM, UM, GUM, LN, or GLN mode through software configurations, the RRU3959w can work in GL dual-mode through software configurations.

The RRU3959/RRU3959w has a dual-transmitter and dual-receiver design, which further improves the output power and the carrier capacity.

The software version of the RRU3959(900MHz (not including LTE (NB-IoT))/1800MHz) is SRAN10.1, which is compatible with the N-1 and N-2 versions of MBTS, MBSC, and OSS NEs. Therefore, the RRU3959 can be used with products of SRAN8.0, SRAN9.0 and SRAN10.1 versions. All these three versions include the RRU3959 software components. The RRU3959 used in SRAN8.0, SRAN9.0 and SRAN10.1 has no impact on the KPI of products.

The software version of the RRU3959(2100MHz) is SRAN11.0, which is compatible with the N-1 and N-2 versions of MBTS, MBSC, and OSS NEs. Therefore, the RRU3959 can be used with products of SRAN9.0, SRAN10.1 and SRAN11.0 versions. All these three versions include the RRU3959 software components. The RRU3959 used in SRAN9.0, SRAN10.1 and SRAN11.0 has no impact on the KPI of products.

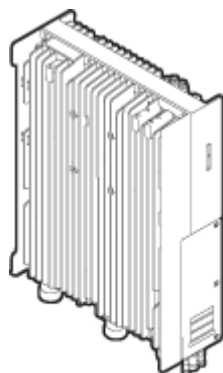
The software version of the RRU3959(900MHz, including LTE (NB-IoT)) is SRAN12.0.

The software version of the RRU3959w is SRAN10.1, which is compatible with the N-1 versions of MBTS, MBSC, and OSS NEs. Therefore, the RRU3959w can be used with products of SRAN9.0 and SRAN10.1 versions. All these two versions include the RRU3959w software components. The RRU3959w used in SRAN9.0 and SRAN10.1 has no impact on the KPI of products.

1.1 Appearance

Figure 1-1 shows the appearance of the RRU3959/RRU3959w.

Figure 1-1 Appearance of the RRU3959/RRU3959w



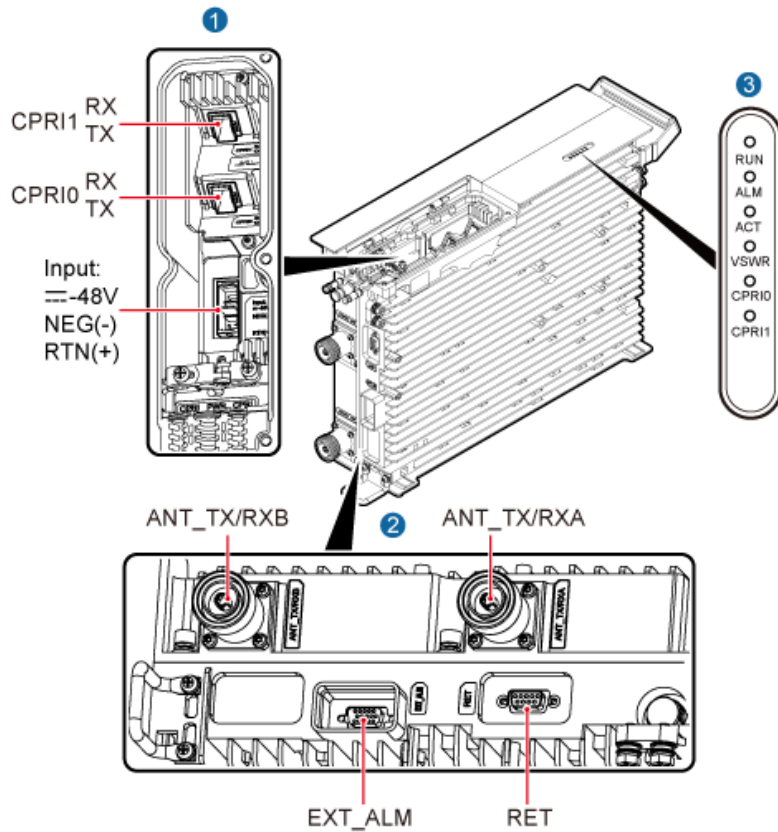
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1.2 Physical Ports

RRUs have a modular design. Its external ports are located in the cabling cavity or at the bottom of the module.

Figure 1-2 shows the physical ports on the RRU3959/RRU3959w and Table 1-1 describes these ports.

Figure 1-2 Physical ports on the RRU3959/RRU3959w



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Table 1-1 Physical ports on the RRU3959/RRU3959w

Port	Connector	Quantity	Description
RF port	DIN	2	Connects to the antenna system.
CPRI port	DLC	2	Connects to the baseband unit (BBU).
Power supply port	Tool-less female connector (pressfit type)	1	Supplies -48 V DC power input.
RET port	DB9	1	Connects to the remote control unit (RCU).
Alarm port	DB15	1	Receives alarm signals from the external devices.

2 Technical Specifications

2.1 Frequency Band

Table 2-1 RRU3959/RRU3959w frequency band

Type	Frequency Band (MHz)	RX Frequency Band (MHz)	TX Frequency Band (MHz)	IBW (MHz)
RRU3959	P900	890 to 915	935 to 960	25
	E900	880 to 915	925 to 960	35
	1800	1710 to 1785	1805 to 1880	45
	2100	1920 to 1980	2110 to 2170	60
RRU3959w	1800	1710 to 1785	1805 to 1880	75

2.2 Capacity

Table 2-2 Single-mode capacity

Mode	Capacity
GSM	(Only 900/1800 MHz frequency band supported)Each RRU3959/RRU3959w supports eight TRXs.
UMTS	(Only 900/2100 MHz frequency band supported) Each RRU3959 supports: <ul style="list-style-type: none"> • Six carriers without MIMO • Four carriers with MIMO
LTE (FDD)	Each RRU3959(900MHz/1800MHz) supports two carriers. The LTE (FDD) bandwidth is 1.4, 3, 5, 10, 15, or 20 MHz. Each RRU3959(2100MHz) supports two carriers. The LTE (FDD) bandwidth is 5, 10, 15, or 20 MHz. Each RRU3959w supports two carriers. The LTE (FDD) bandwidth is 5, 10, 15, or 20 MHz.

LTE (NB-IoT)	(Only 900 MHz frequency band supported) Each RRU3959 supports 1 carrier.
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Table 2-3 Multi-mode capacity

Mode	Capacity
GSM+UMTS	For detailed specifications, see Table 2-6, Table 2-7, Table 2-15 and Table 2-16.
GSM+LTE (FDD)	For detailed specifications, see Table 2-9 and Table 2-17.
UMTS+LTE (FDD)	For detailed specifications, see Table 2-10 and Table 2-13.
GSM+UMTS+LTE (FDD)	For detailed specifications, see Table 2-11.
GSM+ LTE (NB-IoT)	For detailed specifications, see Table 2-19.
UMTS+ LTE (NB-IoT)	For detailed specifications, see Table 2-20.
GSM+UMTS + LTE (NB-IoT)	For detailed specifications, see Table 2-21.
LTE (FDD)+NR	For detailed specifications, see Table 2-22.
GSM +LTE (FDD)+NR	For detailed specifications, see Table 2-23.

2.3 Receiver Sensitivity

Table 2-4 RRU3959/RRU3959w receiver sensitivity

Mode	Frequency Band (MHz)	1-Way Receiver Sensitivity (dBm)	2-Way Receiver Sensitivity (dBm)	4-Way Receiver Sensitivity (dBm)
GSM	900	-113.7	-116.5	-119.2 (theoretical value)
	1800	-114.0	-116.8	-119.5 (theoretical value)
UMTS	900	-125.8	-128.6	-131.3
	2100	-126.1	-128.9	-131.6
LTE (FDD)	900	-106.3	-109.1	-111.8
	1800	-106.6	-109.4	-112.1
	2100	-106.9	-109.7	-112.4

LTE (NB-IoT)	900	-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 ($\pi/2$ BPSK, R = 1/3, 1 RB) standard.

2.4 Output Power

NOTE

- RRU3959/RRU3959w working in GSM mode and in the 900 MHz/1800 MHz frequency band comply with the standard EN 301 502 V9.2.1. RRU3959/RRU3959w modules working in UMTS, LTE (FDD) or multi-standard radio (MSR) mode and in the 900 MHz/1800 MHz frequency band comply with the standards ETSI EN 301 908 V5.2.1, 3GPP TS 37.104 and 3GPP TS 37.141.
- For the RRU3959/RRU3959w 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 less than the standard power when the RRU3959/RRU3959w is located at a height of 3500 m to 4500 m; and is 2 dB less than the standard power when the RRU3959/RRU3959w 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 the 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 tables indicates the maximum output power supported by 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.)
- For RRU3959w, the scenario where the third-order intermodulated signal falls in the receive frequency range of a configured carrier is not supported.

Table 2-5 Typical output power for the RRU3959 (900 MHz, single-mode)

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE (FDD) Carriers	Output Power per GSM Carrier (W)	Output Power per GSM Carrier (W) in the Dynamic Power Sharing Mode	Output Power per UMTS Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (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	/

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE (FDD) Carriers	Output Power per GSM Carrier (W)	Output Power per GSM Carrier (W) in the Dynamic Power Sharing Mode	Output Power per UMTS Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (MHz)
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	1 (MIMO)	0	0	0	2x40	0	/
0	2	0	0	0	60	0	/
0	2 (MIMO)	0	0	0	2x30	0	/
0	3	0	0	0	30	0	/
0	3 (MIMO)	0	0	0	2x20	0	/
0	4	0	0	0	30	0	/
0	4 (MIMO)	0	0	0	2x15	0	/
0	5	0	0	0	20	0	/
0	6	0	0	0	20	0	/
0	0	1 (MIMO)	0	0	0	2x40	1.4, 3
0	0	1 (MIMO)	0	0	0	2x60	5, 10, 15, 20
0	0	2 (MIMO)	0	0	0	2x30	1.4, 3, 5, 10, 15, 20
0	0	2 (MIMO)	0	0	0	Carrier1: 2x20 Carrier2: 2x40	1.4, 3, 5, 10, 15, 20

Table 2-6 Typical output power for the RRU3959 (1800 MHz, single-mode)

Number of GSM Carriers	Number of LTE (FDD) Carriers	Output Power per GSM Carrier (W)	Output Power per GSM Carrier (W) in the Dynamic Power Sharing Mode	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (MHz)
1	0	60	60	0	/
2	0	60	60	0	/
3	0	30	30	0	/
4	0	30	30	0	/
5	0	20	25	0	/
6	0	20	25	0	/
7	0	15	20	0	/
8	0	15	20	0	/
0	1 (MIMO)	0	0	2x40	1.4, 3, 5, 10, 15, 20
0	1 (MIMO)	0	0	2x60	5, 10, 15, 20
0	2 (MIMO)	0	0	2x30	1.4, 3, 5, 10, 15, 20
0	2 (MIMO)	0	0	Carrier1: 2x20 Carrier2: 2x40	1.4, 3, 5, 10, 15, 20

Table 2-7 Typical output power for the RRU3959 (900 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
2	1	30	60
3	1	20	60
4	1	15	60
5	1	10	60
6	1	7	60

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

Table 2-8 Typical output power for the RRU3959 (900 MHz, GU MSR)

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

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
2	2	40	20
2	2	30	30
2	2	20	40
3	2	20	20
3	2	15	30
4	2	20	20
4	2	15	30
5	2	13	20
6	2	13	20
1	1 (MIMO)	20	2x40
1	1 (MIMO)	30	2x30
1	1 (MIMO)	40	2x20
2	1 (MIMO)	20	2x40
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 2-9 Typical output power for the RRU3959 (900 MHz/1800 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 Supported by the LTE (FDD) (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
3	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
3	1 (MIMO)	15	2x30	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
5	1 (MIMO)	7.5	2x30	1.4, 3, 5, 10, 15, 20
6	1 (MIMO)	12	2x20	1.4, 3, 5, 10, 15, 20
6	1 (MIMO)	7.5	2x30	1.4, 3, 5, 10, 15, 20
1	2 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
1	2 (MIMO)	20	Carrier1: 2x30 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
1	2 (MIMO)	30	Carrier1: 2x20 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
2	2 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
2	2 (MIMO)	20	Carrier1: 2x30 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
3	2 (MIMO)	10	2x20	1.4, 3, 5, 10, 15, 20
3	2 (MIMO)	15	Carrier1: 2x20 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
4	2 (MIMO)	20	2x10	1.4, 3, 5, 10, 15, 20
4	2 (MIMO)	10	2x20	1.4, 3, 5, 10, 15, 20
4	2 (MIMO)	15	Carrier1: 2x20 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20

Table 2-10 Typical output power for the RRU3959(900MHz, 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 Supported by the LTE (FDD) (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
3	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
4	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20

Table 2-11 Typical output power for the RRU3959(900MHz, GUL MSR)

	Number of UMTS Carriers	Number of LTE (FDD) Carriers		Output Power per UMTS Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (MHz)
2	1	1 (MIMO)	20	20	2x20	5

Table 2-12 Typical output power for the RRU3959(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 Supported by the LTE (FDD) (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	/

Number of UMTS Carriers	Number of LTE (FDD) Carriers	Output Power per UMTS Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (MHz)
1 (MIMO)	0	2x40	0	/
2 (MIMO)	0	2x30	0	/
3 (MIMO)	0	2x20	0	/
4 (MIMO)	0	2x15	0	/
2+1 (MIMO)	0	Non-MIMO Carrier: 30 MIMO Carrier: 2x30	0	/
2+2 (MIMO)	0	Non-MIMO Carrier: 20 MIMO Carrier: 2x20	0	/
2+3 (MIMO)	0	Non-MIMO Carrier: 15 MIMO Carrier: 2x15	0	/
4+1 (MIMO)	0	Non-MIMO Carrier: 20 MIMO Carrier: 2x20	0	/
4+2 (MIMO)	0	Non-MIMO Carrier: 15 MIMO Carrier: 2x15	0	/
6+1 (MIMO)	0	Non-MIMO Carrier: 15 MIMO Carrier: 2x15	0	/
0	1 (MIMO)	0	2x60	5, 10, 15, 20
0	2 (MIMO)	0	2x30	5, 10, 15, 20

Table 2-13 Typical output power for the RRU3959(2100MHz, 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 Supported by the LTE (FDD) (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
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
6	1 (MIMO)	15	2x15	5, 10, 15, 20
2	2 (MIMO)	20	2x20	5, 10, 15, 20
4	2 (MIMO)	15	2x15	5, 10, 15, 20

Table 2-14 Typical output power for the RRU3959w (1800 MHz, single-mode)

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE (FDD) Carriers	Output Power per GSM Carrier (W)	Output Power per GSM Carrier (W) in the Dynamic Power Sharing Mode	Output Power per UMTS Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (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	/

Number of GSM Carriers	Number of UMTS Carriers	Number of LTE (FDD) Carriers	Output Power per GSM Carrier (W)	Output Power per GSM Carrier (W) in the Dynamic Power Sharing Mode	Output Power per UMTS Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (MHz)
0	1	0	0	0	60	0	/
0	1 (MIMO)	0	0	0	2x40	0	/
0	2	0	0	0	60	0	/
0	2 (MIMO)	0	0	0	2x30	0	/
0	3	0	0	0	30	0	/
0	3 (MIMO)	0	0	0	2x20	0	/
0	4	0	0	0	30	0	/
0	4 (MIMO)	0	0	0	2x15	0	/
0	5	0	0	0	20	0	/
0	6	0	0	0	20	0	/
0	0	1 (MIMO)	0	0	0	2x40	1.4, 3
0	0	1 (MIMO)	0	0	0	2x60	5, 10, 15, 20
0	0	2 (MIMO)	0	0	0	2x30	1.4, 3, 5, 10, 15, 20
0	0	2 (MIMO)	0	0	0	Carrier1: 2x20 Carrier2: 2x40	1.4, 3, 5, 10, 15, 20

Table 2-15 Typical output power for the RRU3959w (1800 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
2	1	30	60
3	1	20	60
4	1	15	60
5	1	10	60
6	1	7	60
1	2	60	30
2	2	30	30
3	2	20	30
4	2	15	30
5	2	10	30
6	2	7	30
1	3	60	20
2	3	30	20
3	3	20	20
4	3	15	20
5	3	10	20
2	4	30	15
3	4	20	15
4	4	15	15

Table 2-16 Typical output power for the RRU3959w (1800 MHz, GU MSR)

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
2	1	40	20
2	1	30	30
3	1	30	30
3	1	20	40

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

Number of GSM Carriers	Number of UMTS Carriers	Output Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)
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 2-17 Typical output power for the RRU3959w (1800 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 Supported by the LTE (FDD) (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
3	1 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
3	1 (MIMO)	15	2x30	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
5	1 (MIMO)	7.5	2x30	1.4, 3, 5, 10, 15, 20
6	1 (MIMO)	12	2x20	1.4, 3, 5, 10, 15, 20
6	1 (MIMO)	7.5	2x30	1.4, 3, 5, 10, 15, 20
1	2 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
1	2 (MIMO)	20	Carrier1: 2x30 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20

Number of GSM Carriers	Number of LTE (FDD) Carriers	Output Power per GSM Carrier (W)	Output Power per LTE (FDD) Carrier (W)	Bandwidth Supported by the LTE (FDD) (MHz)
1	2 (MIMO)	30	Carrier1: 2x20 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
2	2 (MIMO)	20	2x20	1.4, 3, 5, 10, 15, 20
2	2 (MIMO)	20	Carrier1: 2x30 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
3	2 (MIMO)	10	2x20	1.4, 3, 5, 10, 15, 20
3	2 (MIMO)	15	Carrier1: 2x20 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20
4	2 (MIMO)	20	2x10	1.4, 3, 5, 10, 15, 20
4	2 (MIMO)	10	2x20	1.4, 3, 5, 10, 15, 20
4	2 (MIMO)	15	Carrier1: 2x20 Carrier2: 2x10	1.4, 3, 5, 10, 15, 20

Table 2-18 Typical output power of RRU3959 (900 MHz, LTE (NB-IoT))

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

Table 2-19 Typical output power of RRU3959 (900 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	40	2x10
2	1	40	2x10
3	1	20	2x5
4	1	20	2x5
5	1	15	2x5
6	1	15	2x5

Table 2-20 Typical output power of RRU3959 (900 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	50	2x10
1	1	50	2x3.5
2	1	50	2x10
2	1	50	2x3.5
3	1	25	2x10
4	1	25	2x10
1	1	55	2x5
2	1	55	2x5
3	1	27	2x5
4	1	27	2x5

Table 2-21 Typical output power of RRU3959 (900 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	2x10
2	1	1	30	30	2x10
3	1	1	20	30	2x5
6	1	1	10	20	10
1	1	1	30	20	2x10
1	1	1	20	30	2x10
1	1	1	25	25	2x10
1	1	1	25	30	2x3.5
1	1	1	30	25	2x3.5
2	2	1	30	20	2x10
2	2	1	20	30	2x10
2	2	1	25	25	2x10
2	2	1	25	30	2x3.5

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)
2	2	1	30	25	2x3.5
3	1	1	20	10	2x10
3	1	1	15	20	2x10
3	1	1	13	24	2x10
4	2	1	20	10	2x10
4	2	1	15	20	2x10
4	2	1	13	24	2x10
5	1	1	14	7	2x10
5	1	1	10	20	2x10
6	2	1	14	7	2x10
6	2	1	10	20	2x10
1	1	1	35	20	2x5
1	1	1	30	25	2x5
1	1	1	25	30	2x5
1	1	1	20	35	2x5
2	2	1	35	20	2x5
2	2	1	30	25	2x5
2	2	1	25	30	2x5
2	2	1	20	35	2x5
3	1	1	20	15	2x5
3	1	1	17	20	2x5
3	1	1	15	25	2x5
3	1	1	12	30	2x5
3	1	1	10	35	2x5
4	2	1	20	15	2x5
4	2	1	17	20	2x5
4	2	1	15	25	2x5
4	2	1	12	30	2x5

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)
4	2	1	10	35	2x5
5	1	1	14	7	2x5
5	1	1	11	22	2x5
6	2	1	14	7	2x5
6	2	1	11	22	2x5

Table 2-22 Uplink frequency spectrum sharing of the RRU3959 (1800 MHz, LN, 2R)

Number of LTE (FDD) Carriers	Number of NR Carriers	Bandwidth of LTE (FDD) Carrier (MHz)	Bandwidth of NR Carrier (MHz)
2	1	15, 20	15, 20

Table 2-23 Uplink frequency spectrum sharing of the RRU3959 (1800 MHz, GLN, 2R)

Number of GSM Carriers	Number of LTE (FDD) Carriers	Number of NR Carriers	Bandwidth of LTE (FDD) Carrier (MHz)	Bandwidth of NR Carrier (MHz)
2	2	1	15, 20	15, 20
3	1	1	15, 20	15, 20

2.5 Power Consumption

NOTE

- The typical power consumption and the maximum power consumption are measured when the base station works at a temperature of 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 reached when the base station works with 40% load. The maximum power consumption for UMTS is reached when the base station works with 100% load.
- The typical power consumption for LTE (FDD) is reached when the base station works with 50% load. The maximum power consumption for LTE (FDD) is reached when the base station works with 100% load.
- 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 2-24 Power consumption of the DBS3900 (Ver.D) (–48 V) (configured with the RRU3959, 900 MHz)

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
GSM	S2/2/2	20	490	580
	S4/4/4	20	650	920
	S6/6/6	20	755	1205
UMTS	3x1	20	475	515
	3x2	20	530	650
GSM+UMTS	GSM S2/2/2 + UMTS 3x1	GSM: 20 UMTS: 20	685	830
	GSM S3/3/3 + UMTS 3x1	GSM: 20 UMTS: 20	790	1030
	GSM S4/4/4 + UMTS 3x1	GSM: 20 UMTS: 20	840	1170

Table 2-25 Power consumption of the DBS3900 (Ver.D) (-48 V) (configured with the RRU3959, 1800 MHz)


Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
GSM	S2/2/2	20	510	600
	S4/4/4	20	690	960
	S6/6/6	20	785	1235
LTE (FDD)	3x10 MHz	2x20	660	750
GSM+LTE (FDD)	GSM S2/2/2+LTE (FDD) 3x10 MHz	GSM: 20 LTE (FDD): 2x20	870	1055
	GSM S3/3/3+LTE (FDD) 3x10 MHz	GSM: 20 LTE (FDD): 2x20	910	1195
	GSM S4/4/4+LTE (FDD) 3x10 MHz	GSM: 20 LTE (FDD): 2x20	950	1330

Table 2-26 Power consumption of the DBS3900 (Ver.D)(-48 V)(configured with the RRU3959, 2100MHz)

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
UMTS	3x2	20	545	655
UMTS+LTE (FDD)	UMTS 3x2 + LTE (FDD) 3x20 MHz, 1 carrier	UMTS: 30 LTE (FDD): 2x30	1020	1370

2.6 Input Power

Table 2-27 Input power

Item	Specifications
Input power	-48 V DC; voltage range: -36 V DC to -57 V DC  NOTE The RRU3959/RRU3959w supports AC power supply when connected to an external AC/DC power module or an OPM15M. For details, see <i>AC/DC Power Module User Guide</i> and <i>OPM15M User Guide</i> .

2.7 Equipment Specifications

Table 2-28 Equipment specifications

Item	Specifications
Dimensions (H x W x D)	400 mm x 300 mm x 100 mm (without the housing)
Weight	15 kg (without the housing)

2.8 CPRI Port Specifications

Table 2-29 CPRI port specifications

Item	Specifications
Number of CPRI ports	2
CPRI data rate	1.25 Gbit/s, 2.5 Gbit/s, 4.9 Gbit/s, or 9.8 Gbit/s
Topology	Star, chain, or dual-star
Cascading level	CPRI MUX: <ul style="list-style-type: none"> • GU: Six levels • GL: Four levels • UL: Four levels • GM: Four levels • UM: Four levels • GUM: Four levels

Maximum distance from the BBU	<ul style="list-style-type: none"> • GU (dual-star/CPRI MUX): 40 km • In the GL and UL mode (dual-star/CPRI MUX), the maximum distances of the RRUs from the BBU vary with the types of BBP in LTE (FDD) mode as follows: <ul style="list-style-type: none"> ▪ LBBPc, LBBPd1, or UBBPda: 20 km ▪ LBBPd2, UBBPd3, UBBPd4, UBBPd5, or UBBPd6: 40 km ▪ LBBPd3: <ul style="list-style-type: none"> - Number of LTE (FDD) cells \leq 3: 40 km - Number of LTE (FDD) cells $>$ 3: 20 km • GM/UM/GUM: 20 km
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2.9 Environment Specifications

Table 2-30 Environment 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 RRU complies with the following standards: <ul style="list-style-type: none"> • 3GPP TS 45.005 • 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."
Shockproof protection	NEBS GR63 zone4
Protection class	IP65

3 Acronyms and Abbreviations

Table 3-1 Acronyms and abbreviations

Abbreviation	Full Name
3GPP	3rd Generation Partnership Project
BBU	Baseband unit
BER	Bit error rate
CPRI	Common public radio interface
DTX	Discontinuous transmission
GTMU	GSM transmission and timing and management unit
LBBP	LTE baseband processing unit
LTE	Long Term Evolution
MIMO	Multiple-input multiple-output
MSR	Multi-standard radio
RAN	Radio access network
RRU	Remote radio unit
SDR	Software-defined radio
UBRI	Universal baseband radio interface unit
UMTS	Universal Mobile Telecommunications System
WBBP	WCDMA baseband processing unit