

11.2.8 Technical Specifications for RRU3928

Adopting the software-defined radio (SDR) technology, RRU3928 modules can work in different modes with different configurations.

Supported Modes and Frequency Bands

Table 11-107 shows the modes and frequency bands supported by an RRU3928.

Table 11-107 Modes and frequency bands supported by an RRU3928

Type	Mode	Frequency Band (MHz)	Receive Frequency Band (MHz)	Transmit Frequency Band (MHz)
RRU3928	GSM	900	890-915	935-960
	UMTS LTE GSM + UMTS	1800	1710-1785	1805-1880

RF Specifications

Table 11-108 shows RF specifications for an RRU3928.

 **NOTE**

- The receiver sensitivity of GSM, as recommended in 3GPP TS 51.021, is measured in the central band (80% of the entire operating band, excluding the edge band) at the antenna connector on the 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 the condition that the channel rate is 12.2 kbit/s and the BER is not higher than 0.001.
- The receiver sensitivity of LTE should be obtained from the LTE marketing personnel.
- The RRU3928 complies with ETSI EN 301 908 V5.2.1 standards.
- **A and B using separated PA** indicates that A data is carried on one transmit channel of an RF module while B data is carried on the other transmit channel of the RF module.

Table 11-108 RF specifications for an RRU3928

Type	Transmit and Receive Channels	Capacity	Receiver Sensitivity (dBm)			Output Power	Power Consumption
			1-Way Receiver Sensitivity (dBm)	2-Way Receiver Sensitivity (dBm)	4-Way Receiver Sensitivity (dBm)		
RRU3928 V2	2T2R	GSM: 8 carriers UMTS: 4 carriers LTE: 1 x (1.4, 3, 5, 10, 15, 20 MHz) per PA	GSM: ● 900: -113.7 ● 1800: -114 UMTS (900/1800): -125.8	GSM: ● 900: -116.5 ● 1800: -116.8 UMTS (900/1800): -128.6	GSM: ● 900: -119.2 ● 1800: -119.5 UMTS (900/1800): -131.3	Output Power of an RRU3928 (900 MHz/1800 MHz, GSM and UMTS using separate PA)	Power consumption of the DBS3900 (configured with RRU3928, 900 MHz) Power consumption of the DBS3900 (configured with RRU3928, 1800 MHz)

 **NOTE**

- Power sharing assumes a random distribution of UEs in the cell.
- The output power is 1 dB lesser than the standard power when the RRU3928 is located at a height of 3500 m to 4500m; and is 2 dB lesser than the standard power when the RRU3928 is located at a height of 4500 m to 6000m.
- The GSM power is measured when the modulation scheme is GMSK. If the modulation scheme is 8PSK, the output power is 1.8 dB less than that in GMSK mode.
- Factors such as the site-to-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, power sharing cannot be used together with functions concentric cell, Co-BCCH, tight BCCH frequency reuse, or enhanced measurement report. In GBSS9.0, power sharing can be used together with functions concentric cell, Co-BCCH, tight BCCH frequency reuse, and enhanced measurement report. In GBSS8.1 and GBSS9.0, power sharing cannot be used together with IBCA, dynamic MAIO, RAN sharing, or double-slot cell.

Table 11-109 Output Power of an RRU3928 (900 MHz/1800 MHz, GSM and UMTS using separated PA)

Mode	Number of GSM Carriers	Number of UMTS Carriers	Number of LTE Carriers	Output Power per GSM Carrier (W)	Output Sharing Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE Carrier (W)
GSM	1	0	0	40	40	0	0
	2	0	0	40	40	0	0
	3	0	0	20	20	0	0
	4	0	0	20	20	0	0
	5	0	0	13	15	0	0
	6	0	0	13	15	0	0
	7	0	0	10	13	0	0
	8	0	0	10	13	0	0
UMTS	0	1	0	0	0	40	0
	0	2	0	0	0	40	0
	0	3	0	0	0	20	0
	0	4	0	0	0	20	0
	0	1 (MIMO)	0	0	0	2x40	0

Mode	Number of GSM Carriers	Number of UMTS Carriers	Number of LTE Carriers	Output Power per GSM Carrier (W)	Output Sharing Power per GSM Carrier (W)	Output Power per UMTS Carrier (W)	Output Power per LTE Carrier (W)
	0	2 (MIMO)	0	0	0	2x20	0
	0	3 (MIMO)	0	0	0	2x10	0
	0	4 (MIMO)	0	0	0	2x10	0
LT E	0	0	1	0	0	0	2x40
G S M + U M T S (G S M a n d U M T S u s i n g s e p a r a t e d P A)	1	1	0	40	0	40	0
	2	1	0	20	0	40	0
	3	1	0	13	0	40	0
	4	1	0	10	0	40	0
	1	2	0	40	0	20	0
	2	2	0	20	0	20	0
	3	2	0	13	0	20	0
	4	2	0	10	0	20	0

 **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 and power control and DTX are enabled. 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 is a value obtained when the LTE load reaches 50%. The maximum power consumption is a value obtained when the LTE load reaches 100%. The 2x2 MIMO configuration is applied to RF modules working in LTE mode and the power of each carrier is 40 W.
- The power consumption for GSM is calculated based on the sharing power.

Table 11-110 Power consumption of the DBS3900 (configured with RRU3928, 900 MHz)

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
GSM	3x2	20	560	650
	3x4	20	740	1025
UMTS	3x1	20	510	585
	3x2	20	585	720
LTE	3x1	2x40	900	1110
GSM + UMTS	GSM 3x2 + UMTS 3x1	20/20	820	985
	GSM 3x3 + UMTS 3x1	20/20	865	1120
GSM + LTE	GSM 3x2 + LTE 3x1	20/2x40	930	1140
	GSM 3x3 + LTE 3x1	20/2x40	870	1065
	GSM 3x4 + LTE 3x1	20/2x40	885	1140

Table 11-111 Power consumption of the DBS3900 (configured with RRU3928, 1800 MHz)

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
GSM	3x2	20	560	665

Mode	Configuration	Output Power per Carrier (W)	Typical Power Consumption (W)	Maximum Power Consumption (W)
	3x4	20	765	1040
UMTS	3x1	20	525	585
	3x2	20	600	735
LTE	3x1	2x40	915	1125
GSM + UMTS	GSM 3x2 + UMTS 3x1	20/20	835	1000
	GSM 3x3 + UMTS 3x1	20/20	880	1135
GSM + LTE	GSM 3x2 + LTE 3x1	20/2x40	945	1155
	GSM 3x3 + LTE 3x1	20/2x40	885	1095
	GSM 3x4 + LTE 3x1	20/2x40	900	1155

Engineering Specifications

[Table 11-112](#) shows equipment specifications for an RRU3928.

Table 11-112 Equipment specifications for an RRU3928

Type	Power Supply	Dimension (H x W x D)	Weight (kg)
RRU3928	-48 V DC; voltage range: -36 V DC to -57 V DC	400mm x 240mm x 160mm (with the housing)	15 (with the housing)

[Table 11-113](#) shows environment specifications for an RRU3928.

Table 11-113 Environment specifications for an RRU3928

Type	Operating Temperature	Relative Humidity	Absolute Humidity	Atmospheric Pressure	Operating Environment	Shock Protection	Ingress Protection (IP) Rating
RRU3928	-40°C to +50°C (without solar radiation) -40°C to +45°C (with solar radiation)	5% RH to 100% RH	1-30 g/m ³	70 kPa to 106 kPa	The RRU complies with the following standards : <ul style="list-style-type: none"> ● 3G TS25.141 V3.0.0 ● ETSI EN 300019-1-4 V2.1.2 (2003-04) Class 4.1: "Non-weatherprotected locations" 	NEBS GR63 zone4	IP65

Table 11-114 shows the surge protection specifications for the ports on an RRU3928.

 **NOTE**

- Unless otherwise specified, the surge protection specifications depend on the surge waveform of 8/20 μs.
- All the surge current items, unless otherwise specified as **Maximum discharge current**, refer to **Nominal discharge current**.

Table 11-114 Surge protection specifications for the ports on an RRU3928

Port	Usage Scenario	Surge Protection Mode		Specification
DC port	Applicable to all scenarios	Surge	Differential mode	2 kV (1.2/50 μs)

Port	Usage Scenario	Surge Protection Mode		Specification
			Common mode	4 kV (1.2/50 μs)
		Surge current	Differential mode	10 kA
			Common mode	20 kA
AC port	Applicable to the scenario where RF modules are placed indoors	Surge	Differential mode	2 kV (1.2/50 μs)
			Common mode	4 kV (1.2/50 μs)
		Surge current	Differential mode	5 kA
			Common mode	5 kA
	Applicable to the scenario where RRUs are used or RF modules are placed outdoors	Surge	Differential mode	2 kV (1.2/50 μs)
			Common mode	4 kV (1.2/50 μs)
		Surge current	Differential mode	40 kA
			Common mode	40 kA
Antenna port	Applicable to all scenarios	Surge current	Differential mode	8 kA
			Common mode	40 kA
CPRI port	Applicable to all scenarios	Surge		250 A
RGPS port	Applicable to all scenarios	Surge current	Differential mode	3 kA
			Common mode	5 kA
RET antenna port	Applicable to all scenarios	Surge current	Differential mode	3 kA
			Common mode	5 kA

Port	Usage Scenario	Surge Protection Mode		Specification
Dry contact or RS485 alarm port	Applicable to all scenarios	Surge current	Differential mode	3 kA
			Common mode	5 kA
I2C port on a local power monitoring device and an alarm port	Applicable to the scenario where batteries under monitoring and RRUs are installed back to back or the scenario where the distance between them is shorter than 1 m	Surge		250 A

Antenna Capabilities

Table 11-115 shows antenna capabilities for an RRU3928.

Table 11-115 Antenna capabilities for an RRU3928

Type	TMA Capabilites	RET Antenna Capabilities
RRU3928	Supported	Supports AISG2.0

 **NOTE**

For RRUs supporting RET antennas, the feed voltage is 12 V and feed current is 2.3 A.