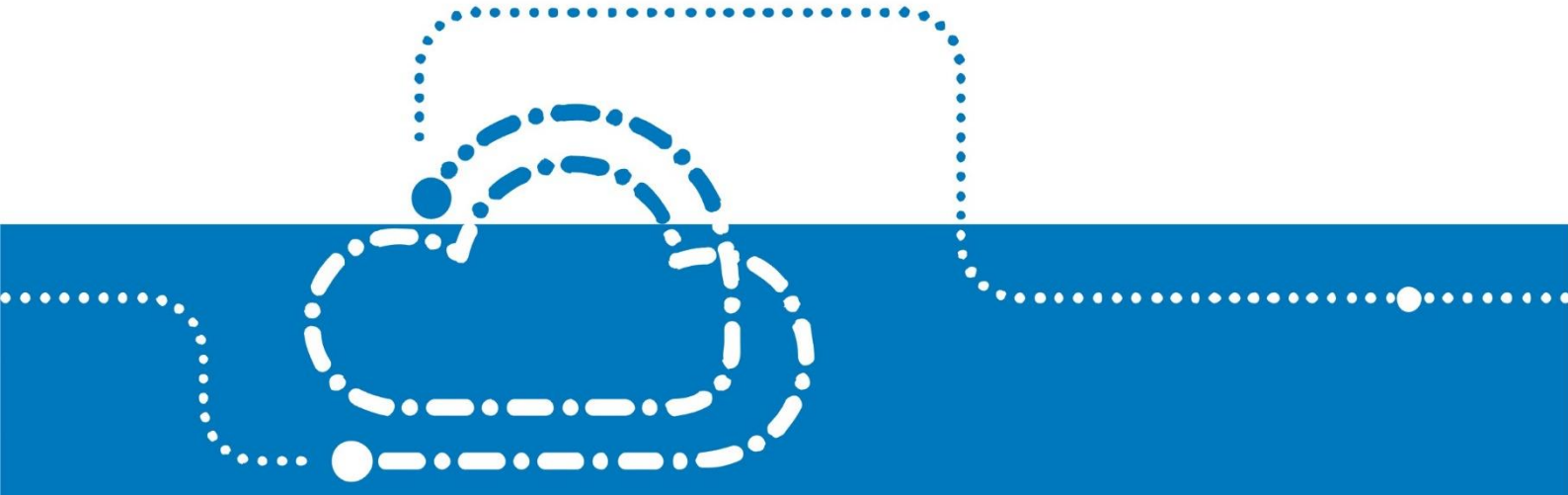
Operator Logo

ZXSDR R8854E Product Description

UniRAN 17



ZXSDR R8854E Product Description

Version	Date	Author	Reviewer	Notes
V1.00	2018/07/14	Yang Lisha		Not open to the third party
V1.10	2018/09/13	Yang Lisha		1. Revise GSM/LTE dual-mode capacity 2. Revise power supply range
V1.20	2018/11/09	He Li		1. Add Band 2 specification 2. Update document architecture 3. Revise power consumption

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1 Overview

1.1 Introduction

This document provides a high level description of ZTE ZXSDR R8854E (hereinafter R8854E), which is the new high output power 4T4R RRU (Remote Radio Unit) used in ZTE wireless total solution. R8854E provides four-way transmission and four-way reception to implement LTE 4T4R.

Figure 1-1 Physical Appearance

In this document, R8854E S1800 and R8854E S1900 are introduced. R8854E S1800 works in LTE single mode or GSM/LTE dual-mode in band 3. R8854E S1900 works in LTE single-mode in band 2. The document introduces an overview of R8854E characteristics, its key benefits, the architecture, functionalities, services and the system capabilities.

NOTE: To be compliant with Radio Equipment Directive (RED) of European Union, this device is restricted to use and put into service due to the need for a spectrum license and/or the conditions attached to authorization for the use of frequencies within all European Union countries (BE/BG/CZ/DK/DE/EE/IE/EL/ES/FR/HR/IT/CY/ LV/LT/LU/HU/MT/NL/AT/PL/PT/RO /SI/SK/FI/SE/UK).

NOTE: In this document, G is short for GSM, U is short for UMTS and L is short for FDD LTE.

1.2 Benefits

- **4*4 MIMO Ready, High Output Power, Better Performance**

  Based on new compact RRU platform, R8854E is designed with high efficiency Power Amplifier technology. It has better performance in smaller volume. With four-way transmitting channels and four-way receiving channels, it supports LTE 4T4R to improve coverage, data throughput and peak download speed.

  It also supports 4*60W output power. Compared with previous 4*40W of hardware version, R8854E provides wider coverage and higher peak download speed than before.

- **Faster deployment**

  R8854E is 18 L in volume and 20 kg in weight. It is portable to transport and flexible to install on the pole, tower and wall, thus reducing OPEX.

- **High Efficiency, Lower TCO**

  It supports dynamic adaptive PA power supply due to the output power, which reduces power consumption.

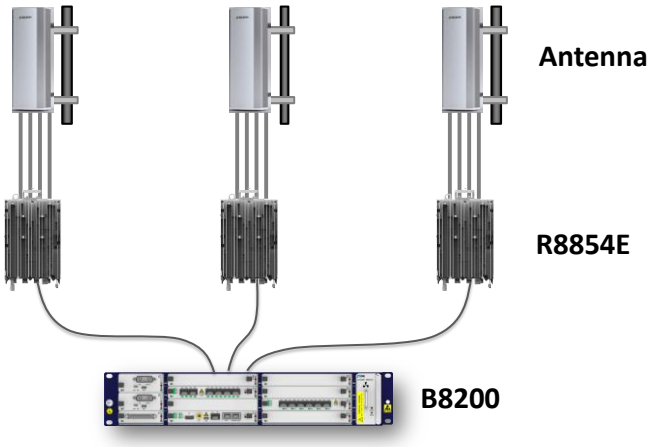
  The passive dissipation solution helps to save power consumption and reduce environment noise.

1.3 Application Scenarios

R8854E and baseband unit comprise distributed macro ZXSDR BS8700. It supports GSM/UMTS/LTE multi-mode of indoor/outdoor macro coverage, especially useful for LTE application with high order MIMO requirements.

Typical application scenario of R8854E is shown in the following figure.

Figure 1-2 Application Scenarios



1.4 Functionality

R8854E is the remote radio unit of distributed base station. The signal is transmitted and received through R8854E to and from base band processing unit for further processing via standard CPRI interface. The antenna should be installed and operated with minimum distance 4.55m between the radiator and human body.

By applying the distributed system, the feeder loss will be eliminated when the radio unit is positioned close to the antenna. The coverage is enlarged with this solution.

The functions of R8854E include:

- Supports frequency bands of band 3 and band 2.
- Supports the LTE channel bandwidth of 1.4/3/5/10/15/20 MHz in band 3 and 5/20MHz in band 2.
- Supports 4T4R in one box which can optimize spectrum efficiency greatly and improve network uplink performance.
- Supports 256QAM modulation in LTE downlink and 64QAM in LTE uplink.
- Supports transmit power report function for every carrier.

- Supports overload protection function for power amplifier.
- Supports transmit channel switching on/off function.
- Supports non-disruptive system services of BBU and other RRUs in case of software failure in R8854E connecting with hardware mentioned before.

2 Technical Specifications

2.1 Physical Specifications

Table 2-2-1 Physical Specifications

Item	Specifications
Size (Length*Width*Depth)	415 * 296 * 145 mm, 17.8 L
Weight	20 kg
Color	Silver gray

2.2 Performance Specifications

2.2.1 Operation Frequency Band

Table 2-2-2 Operation Frequency Band

RRU Type	Operation Radio Frequency Band
R8854E S1800	Tx: 1805 MHz - 1880 MHz Rx: 1710 MHz - 1785 MHz
R8854E S1900	Tx: 1930 MHz - 1990 MHz Rx: 1850 MHz - 1910 MHz

2.2.2 Capacity

Table 2-2-3 Capacity

RRU Type	Mode	RRU Capacity
R8854E S1800	LTE single mode	2*20 MHz 4T4R cells
		2*20 MHz 2T4R cells
		4*20 MHz 2T2R cells
	GSM/LTE dual-mode	4 GSM TRXs + LTE 1*20 MHz 4T4R cell (IBW=75 MHz)
		8 GSM TRXs + LTE 2*20 MHz 4T4R cells (IBW=47.5 MHz)
R8854E S1900	LTE single mode	2*5 MHz 4T4R cells 2*20 MHz 4T4R cells

2.2.3 Bandwidth

R8854E supports all LTE channel bandwidth.

Table 2-2-4 LTE Channel Bandwidth

E-UTRA Operating Band	LTE Channel Bandwidth
Band 3	1.4/3/5/10/15/20 MHz
Band 2	5/20 MHz

2.2.4 ToC Output Power

Table 2-2-5 ToC Output Power

RRU Type	TOC Output Power
R8854E S1800/S1900	4*60 W

Note: The TOC here means the max capability of the hardware. The specific TOC output power is limited by the license.

2.2.5 Receiver Sensitivity

The receiver sensitivity of R8854E is shown as following table.

Table 2-2-6 Receiver Sensitivity

Mode	E-UTRA Operating Band	Single Antenna	Dual Antennas	Four Antennas	Note
GSM	Band 3	-113.5 dBm	-115.5 dBm	N/A	N/A
LTE	Band 3/Band 2	-106.4 dBm	-109.2 dBm	-112.0 dBm	N/A

2.3 Power Specifications

2.3.1 Power Requirements

The following table describes the power supply and the fluctuation range.

Table 2-2-7 Power Supply

Item	Specifications
Power Supply	DC: -48 V (-37 V - -57 V)

R8854E supports integrated lightning protection module for DC power supply. Its protection level is 20 KA.

2.3.2 Power Consumption

Power consumption of R8854E in LTE single mode is shown in the table below.

For LTE mode, the average power consumption is measured at 50% system load. The peak power consumption is measured at 100% system load.

Table 2-2-8 Power Consumption in LTE Single Mode

Configuration: 2L 4*4 MIMO, 4 PA, 30 W/LTE, Total 4*60 W		
RRU Type	**Average Power Consumption**	**Peak Power Consumption**
R8854E S1800\R8854E S1900	415 W	665 W

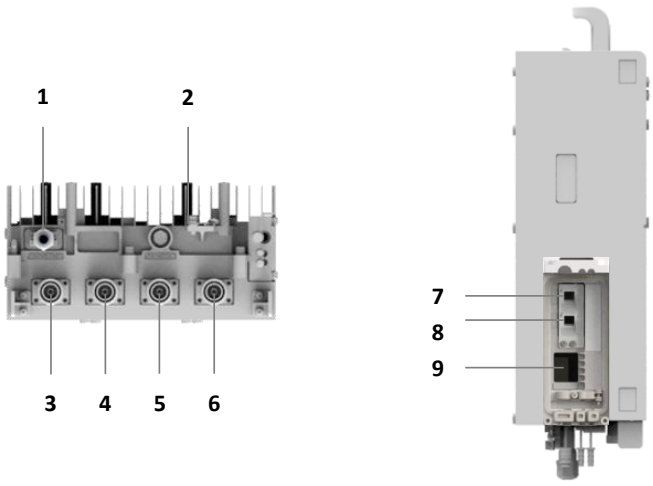
Table 2-2-9 Power Consumption in G/L Dual-mode

Configuration: 8G+1L 4*4 MIMO, 4 PA, 20 W/LTE, 20 W/GSM TRX, Total 4*60 W		
RRU Type	**Average Power Consumption**	**Peak Power Consumption**
R8854E S1800	425 W	675 W

2.4 Interface Specifications

The external interfaces of the R8854E are located at the bottom and on the front side of the module.

Figure 2-2-1 External Interfaces



For a description of the external interfaces at the bottom of the R8854E module, refer to Table 2-1.

Table 2-11 Description of the External Interfaces at the Bottom

No.	Label	Interface	Interface Type/Connector
1	AISG/MON	AISG equipment interface MON external monitoring interface LMT O&M Ethernet interface	DB15 connector
2	GND	Protective grounding interface	16 mm^2 yellow-green round terminal
3	ANT1 (TX/RX)	TX/RX antenna interface Built-in NSBT	50 Ω DIN-mode connector
4	ANT2 (TX/RX)	TX/RX antenna interface	50 Ω DIN-mode connector
5	ANT3 (TX/RX)	TX/RX antenna interface	50 Ω DIN-mode connector
6	ANT4 (TX/RX)	TX/RX antenna interface	50 Ω DIN-mode connector
7	OPT1	Communication between RRU and BBU, or RRU cascading interface	LC-type optical interface (IEC 874)
8	OPT2	RRU cascading interface	LC-type optical interface (IEC 874)
9	PWR	Power input interface	2-pin customized connector

Additionally, R8854E provides six LED indicators on the panel to indicate the operating status of the RRU.

2.5 Transmission

R8854E is connected to BBU through CPRI interfaces. For more information about CPRI interfaces, refer to Table 2-2

Table 2-2-102 CPRI Interfaces

Item	Quantity	Interface Type	Speed	Standard
CPRI interface	2	SFP (LC)	10 Gbps	CPRI V5.0

Note: The speed here refers to the max capability of the hardware. The specific speed depends on the optical module configuration.

2.6 Working Environment Specifications

Table 2-2-113 Environment Specifications

Item	Specifications
Temperature	-40°C - +55°C
Relative Humidity	5% - 100%
Atmosphere pressure	70 kPa - 106 kPa
Waterproof/Dustproof	IP65
Ground	≤5 Ω; earth resistance can be less than 10 Ω in thunder-less area where thunderstorm days is less than 20 per year.

2.7 Electromagnetic Compatibility Specifications

Table 2-2-124 Electromagnetic Compatibility Specifications

Item	Specifications
Static Discharge Immunity	Contact Discharge: ±6000 V Air Discharge: ±8000 V
Surge Impact Immunity	DC Power port Line to line: ±2000 V DC Power port Line to ground: ±4000 V

2.8 Reliability Specifications

Table 2-2-135 Reliability Characteristics

Item	Specifications
MTBF	≥499,000 hours
MTTR	1 hour
Availability	≥99.999800%
Down duration	≤1.053 min/year

3 Glossary

Abbreviations	Full Name
3GPP	3rd Generation Partnership Project
BBU	Base Band processing Unit
BSP	Board Support Package
CAPEX	Capital Expenditure
CPRI	Common Public Radio Interface
DIF	Digital Intermediate Frequency
DL	Downlink
DFL	Duplexer & Filters
DPD	Digital Pre-Distortion
EUTRAN	Evolved Universal Mobile Telecommunications System
GSM	Global System for Mobile communications
HSPA+	HSPA Evolution
LMT	Local Maintenance Terminal
LNA	Low-Noise-Amplifier
LTE	Long Term Evolution
MCPA	Multi-Carrier Power Amplifier
MIMO	Multi Input Multi Output
MTBF	Mean Time Between Failures
MTTR	Mean Time To Recovery
OAM	Operating And Maintenance
OFDMA	Orthogonal Frequency Division Multiple Access
OPEX	Operation Expenditure
OSS	Operation Support Sub-system
PA	Power Amplifier
PWR	Power
QTR	Quad-channel Transceiver
RF	Radio Frequency
RRU	Remote Radio Unit
SC-FDMA	Single Carrier Frequency Division Multiple Access
SDR	Software Defined Radio

Abbreviations	Full Name
ToC	Top of Cabinet
UE	User Equipment
UL	Uplink
VSWR	Voltage Standing Wave Ratio