



ZXSDR R8862A

Macro Radio Remote Unit

Product Description

Version: V1.0

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Revision History

Revision No.	Revision Date	Revision Reason
R1.1	2015-09-15	Updated the following information: ● R8862A functions in <i>2.1 Product Positioning</i> ● <i>5.1 Physical Specifications</i> ● <i>5.2 Performance Specifications</i> ● <i>5.3 Power Consumption</i>
R1.0	2015-08-21	First edition

Serial Number: SJ-20150203110107-040

Publishing Date: 2015-09-15 (R1.1)

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About This Manual

Purpose

This manual provides information about the ZXSDR R8862A, including functions, structures, maintenance, and technical specifications.

Intended Audience

This manual is intended for:

- Equipment installation engineers
- Maintenance engineers

What Is in This Manual

This manual contains the following chapters.

Chapter 1, Product Positioning and Features	Describes the positioning and features of the ZXSDR R8862A.
Chapter 2, Product Structure	Describes the software, hardware, and logical structures of the ZXSDR R8862A.
Chapter 3, Operation and Maintenance	Describes the operation and maintenance methods for the ZXSDR R8862A.
Chapter 4, Technical Specifications	Describes the technical specifications of the ZXSDR R8862A.
Chapter 5, Environment Requirements	Describes environment requirements of the ZXSDR R8862A.

Related Documentation

The following documentation is related to this manual:

- *ZXSDR R8862A Macro RRU Hardware Description*
- *ZXSDR R8862A Macro RRU Engineering Installation Guide*
- *ZXSDR R8862A Macro RRU Parts Replacement Guide*

Conventions

This manual uses the following conventions.

	Caution: indicates a potentially hazardous situation. Failure to comply can result in moderate injury, equipment damage, or interruption of minor services.
	Note: provides additional information about a topic.

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Chapter 1

Product Positioning and Features

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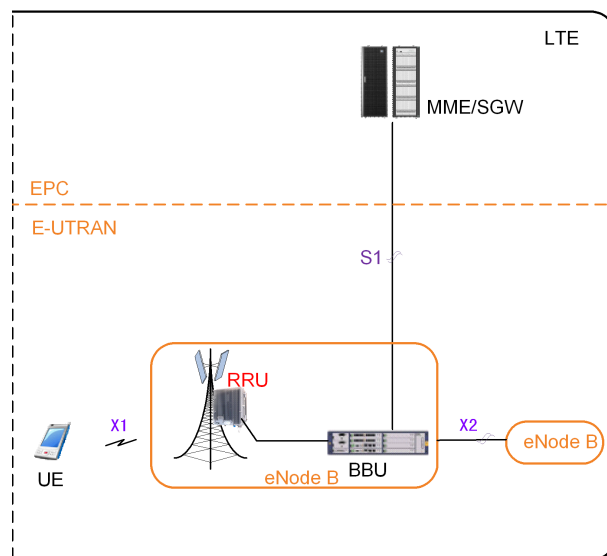
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1.1 Product Positioning

The ZXSDR R8862A is an outdoor remote radio unit in a ZTE base station. The ZXSDR R8862A and a **BBU** form a complete base station, implementing radio transmission in the coverage area and controlling radio channels.

Figure 1-1 shows the position of the ZXSDR R8862A (an **RRU**) in a wireless network.

Figure 1-1 Position of the ZXSDR R8862A in a Wireless Network



The ZXSDR R8862A supports the following functions:

- Supporting the **LTE** configuration of 1.4 MHz/3 MHz/5 MHz/10 MHz/15 MHz/20 MHz scalable bandwidth
- Supporting the **UMTS** configuration of 5 MHz/4.8 MHz/4.6 MHz/4.4 MHz/4.2 MHz channel interval of each carrier
- Operating frequency bands: AP700 MHz, 850 MHz, 1800 MHz, 2100 MHz, and 2600 MHz

- Supporting 2T4R(S7200/S8500/S1800/S2100/S2600) in one box which can optimize spectrum efficiency greatly and improve network uplink performance
- LTE uplink and downlink 64QAM modulation
- Transmit power reporting of each carrier
- Load protection for the Power Amplifier (PA)
- Transmit channel switching on and off
- RRU power consumption reporting
- Energy saving (dynamic voltage adjustment and symbol shutdown)
- Immune to software faults when cascaded to the software

1.2 Product Features

- Small size for easy installation and deployment

The small size facilitates the transportation and installation and decreases the load-bearing requirement and operating expense when it is installed on a pole, tower, or wall.
- Multimode RRU

The RRU is based on common ZTE compacted RRU platform, and can work in GSM, CDMA, UMTS or LTE single mode or Multi-Mode at the same frequency band.
- Multiple transmitting channels and multiple receiving channels

The ZXSDR R8862A supports two transmitting channels and four receiving channels, improving the spectral efficiency and uplink network performance and offering better user experience.
- Low cost and high efficiency

The PA efficiency of the ZXSDR R8862A can be up to 45%.

The ZXSDR R8862A supports a dynamic auto-sensing PA power supply based on the output power, reducing the overall power consumption.

Natural heat dissipation of the ZXSDR R8862A contributes to quite low power consumption and zero noise.
- Integrated lightning protection module

The ZXSDR R8862A has an integrated lightning protection module with the protection level of 20 kA.

Chapter 2

Product Structure

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2.1 Hardware Architecture

There are two types of dimensions for different categories of bands. [Figure 2-1](#) shows an external view of the ZXSDR R8862A.

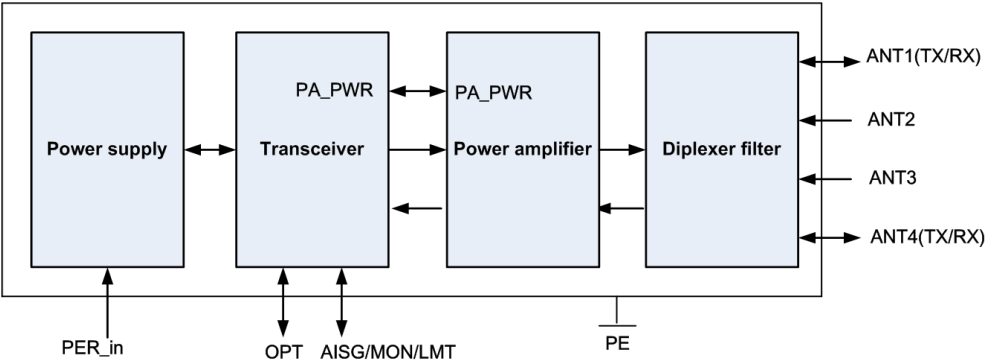
Figure 2-1 External View of the ZXSDR R8862A



2.2 Logical Architecture

The ZXSDR R8862A consists of a power supply, transceiver, power amplifier, and diplexer filter. [Figure 2-2](#) shows the logical structure of the ZXSDR R8862A.

Figure 2-2 Logical Structure of the ZXSDR R8862A



For the function description of the modules, refer to [Table 2-1](#).

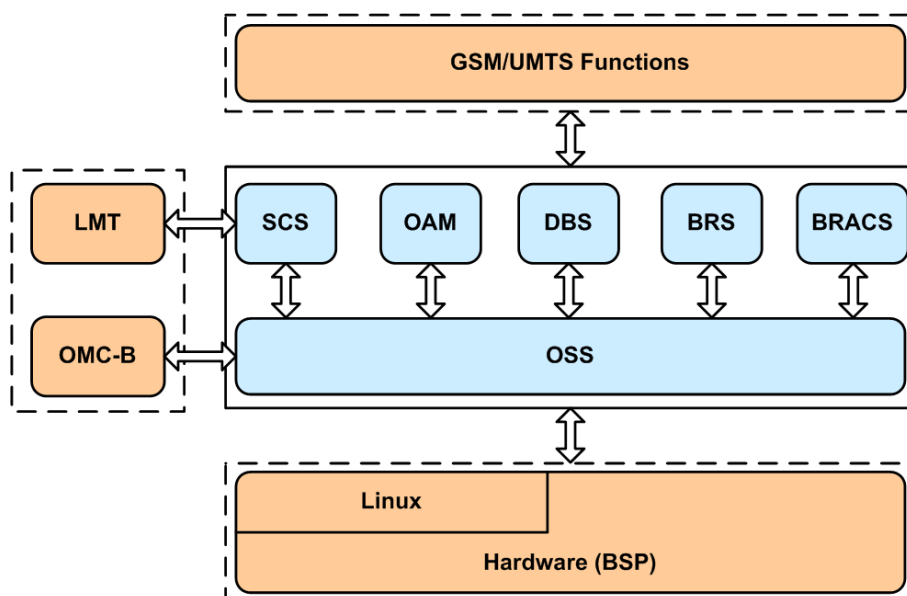
Table 2-1 ZXSDR R8862A Module Description

Module	Function
Power supply	Outputs power and protects the power supply equipment.
Transceiver	Transceives the digital intermediate frequency and radio frequency, and controls the clocks, power supply, and power amplifier.
Power amplifier	Amplifies the downlink RF signals, outputs the RF signals to the diplexer, and integrates the low-noise amplifier.
Diplexer filter	Consists of two duplexers and one filter, implementing the receive diversity function.

2.3 Software Architecture

[Figure 2-3](#) shows the software architecture of the ZXSDR R8862A.

Figure 2-3 Software Architecture of the ZXSDR R8862A



The hardware platform is operating on the Linux operating system. The Board Support Package (BSP) is a set of software closely related to board hardware and supports the RealTime Operating System (RTOS) to operate on boards. The operating support layer provides the following functions: OSS, SCS, OAM, DBS, BRS, and BRACS.

- As a support layer of the entire software subsystem, the Operation Support Sub-system (OSS) provides a hardware-independent platform for the entire software architecture. It also provides some basic software functions, including scheduling, timers, memory management, inter-module communication, sequence control, monitoring, alarm reporting, and logging.
- The System Control Sub-system (SCS) controls the power supply and the switchover between active and standby power supplies.
- The Operating And Maintenance subsystem (OAM) provides the configuration, alarm management, and performance measurement functions.
- The Data Base Sub-system (DBS) stores and manages system data.
- The Barrier Sub-system (BRS) is used for protocol stack processing.
- The Barrier Access Control Sub-system (BRACS) controls access to the bearer layer.

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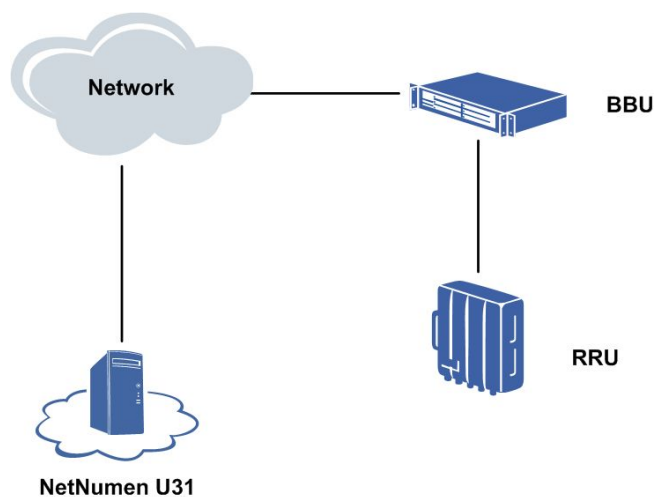
Chapter 3

Operation and Maintenance

Remote Maintenance

The radio **NE** management system (NetNumen U31) is connected to a **BBU** and then to the ZXSDR R8862A through a **CPRI** interface for remote operation and maintenance. [Figure 3-1](#) shows a diagram of remote operation and maintenance.

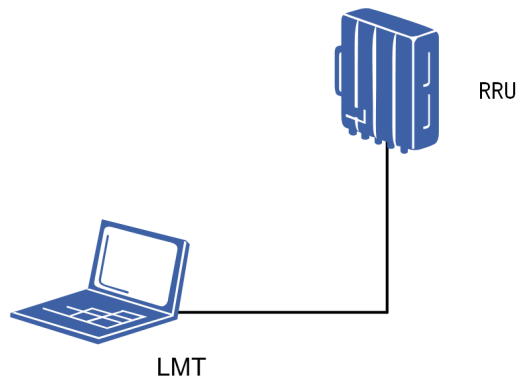
Figure 3-1 Remote Operation and Maintenance



In remote maintenance mode, the NetNumen U31 system is connected to NEs through the **TCP/IP** protocol. One NetNumen U31 system can maintain multiple base stations at the same time.

Local Maintenance

The Local Maintenance Terminal (**LMT**), which is installed on a **PC**, is connected to the ZXSDR R8862A through an Ethernet cable for local operation and maintenance. [Figure 3-2](#) shows a diagram of local operation and maintenance.

Figure 3-2 Local Operation and Maintenance

You can query the following information on the LMT of the ZXSDR R8862A: power, power increase and decrease, and calibration. The LMT is used to maintain a single base station.

Chapter 4

Technical Specifications

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4.1 Physical Specifications

There are two types of dimensions for different categories of bands. For a description of the physical specifications of the ZXSDR R8862A, refer to [Table 4-1](#).

Table 4-1 Physical Specifications

Item	Indices
Volume	422 mm × 218 mm × 133 mm (Height × Width × Depth), 12 L for 850 MHz/1800 MHz/2100 MHz/2600 MHz 425 mm × 220 mm × 165 mm (Height × Width × Depth), , 13.8 L for AP700 MHz
Weight	15 kg for 850 MHz/1800 MHz/2100 MHz/2600 MHz 16 kg for AP700 MHz
Color	Silvery grey

4.2 Performance Specifications

Operating Frequency Band

For a description of the operating frequency bands supported by the ZXSDR R8862A, refer to [Table 4-2](#).

Table 4-2 Operating Frequency Band

Model	Operating Frequency Band
R8862A S7200	AP700 MHz (Tx: 758 MHz–803 MHz; Rx: 703 MHz–748 MHz)
R8862A S8500	850 MHz (Tx: Tx: 869 MHz-894 MHz ; Rx: 824 MHz-849 MHz MHz)

Model	Operating Frequency Band
R8862A S1800	1800 MHz ● Type1: Tx: 1805 MHz–1860 MHz; Rx: 1710 MHz–1765 MHz ● Type2: Tx: 1825 MHz–1880 MHz; Rx: 1735 MHz–1785 MHz ● Type3: Tx: 1825 MHz–1875 MHz; Rx: 1730 MHz–1780 MHz
R8862A S2100	2100 MHz (Tx: 2110 MHz–2170 MHz; Rx: 1920 MHz–1980 MHz)
R8862A S2600	2600 MHz (Tx: 2620 MHz–2690 MHz; Rx: 2500 MHz–2570 MHz)

Capacity

For a description of the capacity of the ZXSDR R8862A, refer to [Table 4-3](#).

Table 4-3 Capacity

System	RRU Capacity
LTE single mode	2 2*4 MIMO carriers, 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz each carrier
GL dual-mode 1800 MHz	6 GSM TRXs + LTE 20 MHz
UL dual-mode 2100 MHz	2 UMTS carriers (MIMO) + 1 20 MHz 2*4 MIMO LTE carrier 4 UMTS carriers (non-MIMO) + 1 20 MHz 2*4 MIMO LTE carrier

Cabinet-Top Output Power

For a description of the maximum cabinet-top output power of the ZXSDR R8862A, refer to [Table 4-4](#).

Table 4-4 Cabinet-Top Output Power

Model	PA Output Power	Cabinet-Top Output Power
R8862A S7200	2 × 75 W	2 × 60 W
R8862A S8500	2 × 75 W	2 × 60 W
R8862A S1800	2 × 75 W	2 × 60 W
R8862A S2100	2 × 75 W	2 × 60 W
R8862A S2600	2 × 50 W	2 × 40 W

Bandwidth

The ZXSDR R8862A supports all LTE bandwidths, including 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz.

Receiving Sensitivity

For a description of the receiving sensitivity of the ZXSDR R8862A, refer to [Table 4-5](#).

Table 4-5 Receiver Sensitivity

Mode	Frequency Spectrum (MHz)	Single Antenna (dBm)	Dual Antennas (dBm)	Four Antennas (dBm)
GSM	1800	-113.5	-115.5	N/A
UMTS	2100	-126.5	-129.2	N/A
LTE	AP700/850	-106.6	-109.4	-112.2
	1800/2100/ 2600	-106.4	-109.2	-112

4.3 Power Consumption

For a description of the power consumption specifications of the ZXSDR R8862A, refer to [Table 4-6](#), [Table 4-7](#) and [Table 4-8](#).

Table 4-6 Power Consumption in LTE Single Mode

Module	Average PC (W)	Peak PC (W)
R8862A S7200	220	440
R8862A S8500	210	430
R8862A S1800	220	370
R8862A S2100	210	440
R8862A S2600	215	360

- Configuration: LTE single carrier, 2 PA, 60 W/LTE

Table 4-7 Power Consumption in U/L Dual-mode

Configuration: 4U+1L 2*2 MIMO, 2PA, 20W/LTE, 20W/UMTS		
Module	Average PC (W)	Peak PC (W)
R8862A S2100	250	420

- Configuration: 4 U+1 L 2*2 MIMO, 2 PA, 20 W/LTE, 20 W/UMTS

Table 4-8 Power Consumption in G/L Dual-mode

Configuration: 4G+1L 2*2 MIMO, 2PA, 20W/LTE, 20W/GSM		
Module	Average PC (W)	Peak PC (W)
R8862A S1800	245	370

- Configuration: 4 G+1 L 2*2 MIMO, 2 PA, 20 W/LTE, 20 W/GSM

4.4 EMC Specifications

For a description of the Electro Magnetic Compatibility (EMC) specifications of the ZXSDR R8862A, refer to [Table 4-9](#).

Table 4-9 EMC Specifications

Electrostatic discharge immunity	Contact discharge: ± 6000 V Air discharge: ± 8000 V
Surge immunity	DC power interface cable (ground): ± 2000 V

4.5 Reliability Specifications

For a description of the reliability specifications of the ZXSDR R8862A, refer to [Table 4-10](#).

Table 4-10 Reliability Specifications

MTBF	DC: $\geq 46,4000$ hours AC: $\geq 44,2000$ hours
MTTR	1 hour
Availability	DC: $\geq 99.999784\%$ AC: $\geq 99.999774\%$
Duration for out-of-service	DC: ≤ 1.133 minutes/year AC: ≤ 1.189 minutes/year

Chapter 5

Environment Requirements

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5.1 Operating Power Supply

For a description of the operating power supply specifications of the ZXSDR R8862A, refer to [Table 5-1](#).

Table 5-1 Operating Voltage Range

DC	–48 V (–37 V to –60V)
AC	220 V / 110 V (90 V to 280 V)

5.2 Operating Environment Requirements

For a description of the operating environment requirements of the ZXSDR R8862A, refer to [Table 5-2](#).

Table 5-2 Operating Environment Requirements

Temperature	–40°C to +55°C
Relative humidity	5%–95%
Protection level	IP66
Grounding resistance	$\leq 5 \Omega$ ($< 10 \Omega$ for the areas where the number of the days with lightning and storm per year is smaller than 20)



Caution!

If the operating environment temperature is higher than 40°C, to avoid burns, never directly touch the equipment surface. If you disassemble the equipment in this case, first switch off its power supply. Do not disassemble the device until it cools down.

FCC & IC STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment



Caution!

This equipment should be installed and operated with minimum distance 4.22 m between the radiator & your body.

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Glossary

64QAM

- 64 Quadrature Amplitude Modulation

BBU

- Base Band Unit

BRACS

- Bearer Access Control Subsystem

BRS

- Bearer Subsystem

BSP

- Board Support Package

CDMA

- Code Division Multiple Access

CPRI

- Common Public Radio Interface

DBS

- Database Server

DBS

- Database Subsystem

GSM

- Global System for Mobile Communications

IP

- Internet Protocol

LMT

- Local Maintenance Terminal

LTE

- Long Term Evolution

MTBF

- Mean Time Between Failures

MTTR

- Mean Time To Recovery

NE

- Network Element

OAM

- Operation, Administration and Maintenance

OAM

- Operating and Maintenance

OSS

- Operation Support Subsystem

PA

- Power Amplifier

PC

- Personal Computer

RRU

- Remote Radio Unit

RTOS

- Real-Time Operating System

SCS

- System Control Subsystem

SDR

- Software Defined Radio

TCP

- Transmission Control Protocol

UMTS

- Universal Mobile Telecommunication System