



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	2016-04-08	V4.15.10.20 Those topics have been modified: ● Product Features ● Logical Architecture ● Physical Specifications ● Performance Specifications ● Power Consumption ● Operating Environment Requirements
R1.0	2015-08-21	First edition

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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.

FCC Statement



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.



Note:

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.



Note:

FCC Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 400 cm between the radiator & your body.

Chapter 1

Product Positioning and Features

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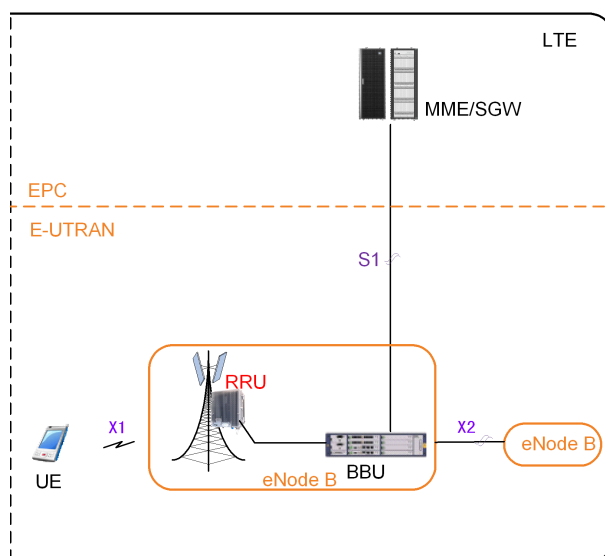
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1.1 Product Positioning

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:

- Multiple bandwidth configurations, such as 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz
- Operating frequency bands: 850 MHz, 1800 MHz, 2100 MHz, and 2600 MHz
- Two transmitting channels and four receiving channels
- 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 ZXSDR R8862A is an RRU based on the SDR platform. In the same frequency band, a GSM/UMTS/CDMA RRU can be smoothly transitioned to an LTE RRU through software upgrade. Multimode is supported in the same frequency band to meet the requirements of operators for multimode network deployment and long term evolution at a low cost.

- 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

Figure 2-1 shows an external view of the ZXSDR R8862A.

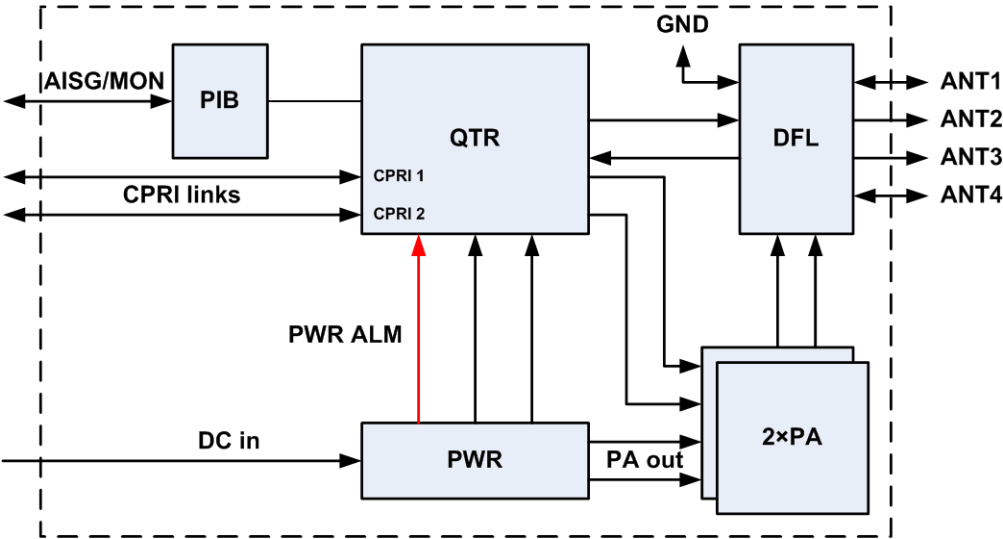
Figure 2-1 External View of the ZXSDR R8862A



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](#).

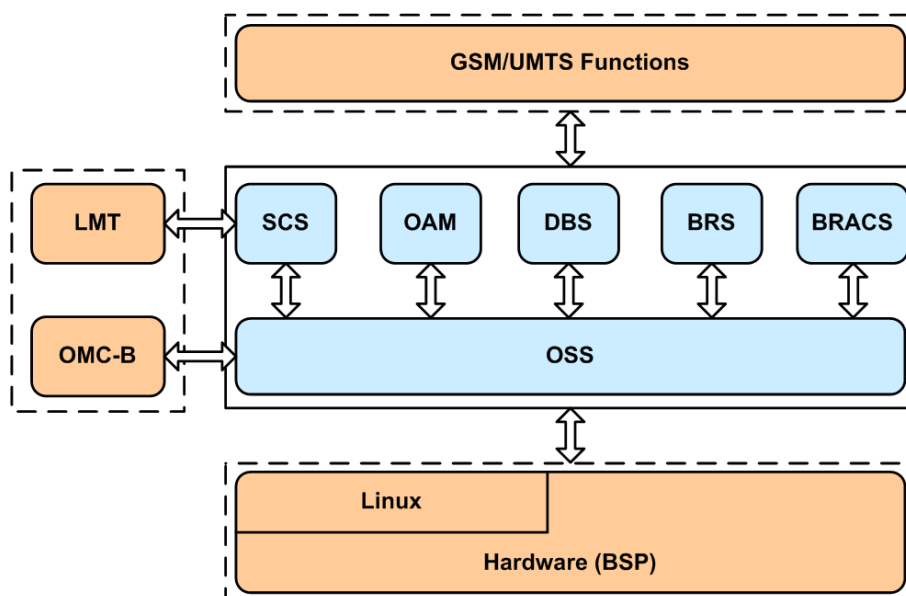
Table 2-1 ZXSDR R8862A Module Description

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 duplexer, and integrates the low-noise amplifier.
Diplexer filter	Consists of two duplexers and one filter, implementing the receive diversity function.
Protecting Interface Board	Integrated lightning protect unit for the AISG and dry contacts

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

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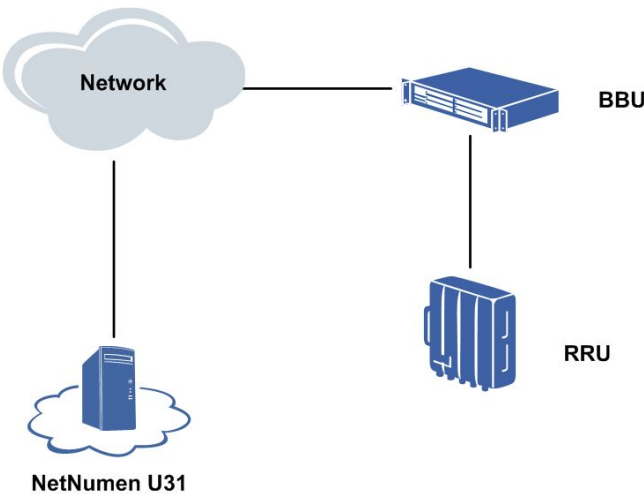
Maintenance3-1

3.1 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.

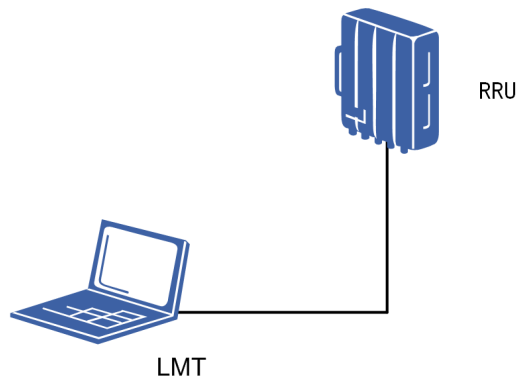
Figure 3-1 Remote Operation and Maintenance



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

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4.1 Physical Specifications

- For a description of the physical specifications of the ZXSDR R8862A S8500/S1800/ S2100/ S2600.

Item	Specification
Volume	422 mm × 218 mm × 133 mm (Height × Width × Depth) 12 L
Weight	15 kg
Color	Silvery grey

- For a description of the physical specifications of the ZXSDR R8862A S7200.

Item	Specification
Volume	422 mm × 218 mm × 165 mm (Height × Width × Depth) 15 L
Weight	17 kg
Color	Silvery grey

- For a description of the physical specifications of the ZXSDR R8862A S7000.

Item	Specification
Volume	425 mm × 220 mm × 165 mm (Height × Width × Depth) 13.8 L
Weight	17 kg
Color	Silvery grey

- For a description of the physical specifications of the ZXSDR R8862A S9000.

Item	Specification
Volume	422 mm × 218 mm × 143 mm (Height × Width × Depth) 13.2 L
Weight	17 kg
Color	Silvery grey

- For a description of the physical specifications of the ZXSDR R8862A S2601.

Item	Specification
Volume	422 mm × 218 mm × 133 mm (Height × Width × Depth) 12.4 L
Weight	16 kg
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 4-1](#).

Table 4-1 Operating Frequency Band

Model	Band	Operating Frequency Band
R8862A S7200	B28 AP700 MHz	Tx: 758 MHz–803 MHz Rx: 703 MHz–748 MHz
R8862A S7000	AP700 MHz	Tx: 728 MHz–746 MHz Rx: 698MHz–716 MHz
R8862A S8500	B5 850 MHz	Tx: 869 MHz---894 MHz Rx:824 MHz---849 MHz
R8862A S9000	B8 900 MHz	● Type1: Tx: 925 MHz – 960 MHz Rx: 880 MHz – 915 MHz ● Type2: Tx: 934 MHz – 960 MHz Rx: 889 MHz – 915 MHz

Model	Band	Operating Frequency Band
R8862A S1800	B3 1800 MHz	● Type1: Tx: 1805 MHz – 1860 MHz Rx: 1710 MHz – 1765 MHz ● Type2: Tx: 1825 MHz – 1875 MHz Rx: 1730 MHz – 1780 MHz ● Type3: Tx: 1830 MHz – 1880 MHz Rx: 1735 MHz – 1785 MHz
R8862A S2100	B1 2100 MHz	Tx: 2110 MHz---2170 MHz Rx:1920 MHz---1980 MHz
R8862A S2600 R8862A S2601	B7 2600 MHz	Tx: 2620 MHz---2690 MHz Rx:2500 MHz---2570 MHz

Cabinet-Top Output Power

For a description of the maximum cabinet-top output power of the ZXSDR R8862A, refer to [Table 4-2](#).

Table 4-2 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 S9000	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
R8862A S2601	2 × 75 W	2 × 60 W
R8862A S7000	-	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 4-3](#).

Table 4-3 Receiving Sensitivity

Mode	Frequency Spectrum(MHz)	Single Antenna (dBm)	Dual Antennas (dBm)	Four Antennas (dBm)
GSM	900/1800	-113.5	-115.5	N/A
UMTS	2100	-126.5	-129.2	N/A
LTE	AP700/850/900	-106.6	-109.4	-112.2
	1800/2100/ 2600	-106.4	-109.2	-112

4.3 Power Consumption

R8862A Power Consumption in LTE Single Mode

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

Module	Average PC (W)	Peak PC (W)
R8862A S7200	220	440
R8862A S8500	210	430
R8862A S9000	210	415
R8862A S1800	220	370
R8862A S2100	210	440
R8862A S2601	240	470

R8862A Power Consumption in U/L Dual-mode

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

Module	Average PC (W)	Peak PC (W)
R8862A S2100	250	420

R8862A Power Consumption in G/L Dual-mode

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

Module	Average PC (W)	Peak PC (W)
R8862A S9000	290	415
R8862A S1800	245	370

4.4 EMC Specifications

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

Table 4-4 EMC Specifications

Item	Specification
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 4-5](#).

Table 4-5 Reliability Specifications

Item	Specification
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

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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

Item	Specification
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

Item	Specification
Temperature	–40°C to +55°C
Relative humidity	5%–95%
Protection level	IP65
Grounding resistance	≤ 5 Ω (< 10 Ω 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.

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Glossary

64QAM

- 64 Quadrature Amplitude Modulation

AC

- Alternating Current

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

DC

- Direct Current

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