ZXSDR R8984E

4 Path Remote Radio Unit

Product Description

Version: V1.0

ZTE CORPORATION
No. 55, Hi-tech Road South, ShenZhen, P.R.China
Postcode: 518057
Tel: +86-755-26771900
Fax: +86-755-26770801
URL: http://support.zte.com.cn
E-mail: 800@zte.com.cn

LEGAL INFORMATION

Copyright © 2016 ZTE CORPORATION.

The contents of this document are protected by copyright laws and international treaties. Any reproduction or distribution of this document or any portion of this document, in any form by any means, without the prior written consent of ZTE CORPORATION is prohibited. Additionally, the contents of this document are protected by contractual confidentiality obligations.

All company, brand and product names are trade or service marks, or registered trade or service marks, of ZTE CORPORATION or of their respective owners.

This document is provided “as is”, and all express, implied, or statutory warranties, representations or conditions are disclaimed, including without limitation any implied warranty of merchantability, fitness for a particular purpose, title or non-infringement. ZTE CORPORATION and its licensors shall not be liable for damages resulting from the use of or reliance on the information contained herein.

ZTE CORPORATION or its licensors may have current or pending intellectual property rights or applications covering the subject matter of this document. Except as expressly provided in any written license between ZTE CORPORATION and its licensee, the user of this document shall not acquire any license to the subject matter herein.

ZTE CORPORATION reserves the right to upgrade or make technical change to this product without further notice.

Users may visit the ZTE technical support website http://support.zte.com.cn to inquire for related information.

The ultimate right to interpret this product resides in ZTE CORPORATION.

Revision History

Revision No.	Revision Date	Revision Reason
R1.0	2016-06-06	First edition

Serial Number: SJ-20150330163204-001

Publishing Date: 2016-06-06 (R1.0)

Contents

This page intentionally left blank.

About This Manual

Purpose

This manual describes the features, architecture, specifications, network architecture, and operation and maintenance of the ZXSDR R8984E.

Intended Audience

This manual is intended for:

- Network planning engineers
- Software debug engineers
- System maintenance engineers

What Is in This Manual

This manual contains the following chapters.

Chapter 1, FCC Statement	Describes the FCC statement related to the device.
Chapter 2, Product Positioning and Highlights	Describes the positioning and highlights of the ZXSDR R8984E.
Chapter 3, Product Structure	Describes the hardware structure and software structure of the ZXSDR R8984E.
Chapter 4, Operation and Maintenance System	Describes the operation and maintenance system of the ZXSDR R8984E.
Chapter 5, Product Features	Describes the features of the ZXSDR R8984E.
Chapter 6, Network Topologies	Describes the typical network topologies of the ZXSDR R8984E.
Chapter 7, Technical Specifications	Describes the technical specifications of the ZXSDR R8984E.
Chapter 8, Environmental Specifications	Describes the environmental specifications of the ZXSDR R8984E.

This page intentionally left blank.

Chapter 1
FCC Statement

NOTE **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 **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 **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 18.9 cm between the radiator & your body.

This page intentionally left blank.

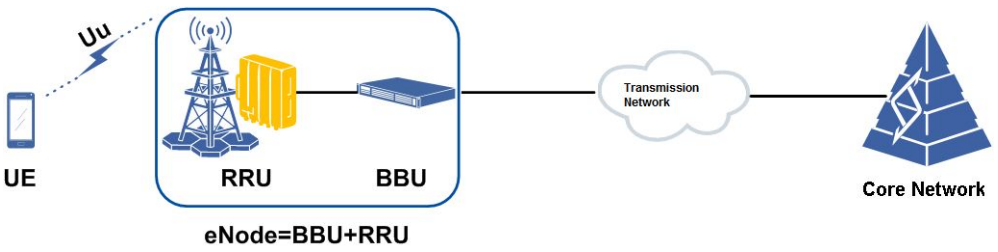
Chapter 2
Product Positioning and Features

Table of Contents

2.1 Positioning

The ZXSDR R8984E, an RRU developed by ZTE, supports the single-mode OFDM MIMO Access Point 4-path 4-carrier technology, and is used to construct indoor and outdoor macro networks and fill coverage holes. For the positioning of the ZXSDR R8984E in a radio network, see Figure 2-1. Here, the yellow RRU is the ZXSDR R8984E.

Figure 2-1 Positioning of the ZXSDR R8984E in a Network



System	Description
UE	User equipment.
BBU	Achieves GPS synchronization, control, and baseband processing.
RRU	Transmits and receives signals.
core network	IP-based core network, which is located between an OFDM MIMO Access Point network and other networks. On the user plane, the core network is connected to an OFDM MIMO Access Point network through the SGW. On the control plane, the core network is connected to an OFDM MIMO Access Point network through the MME.

2.2 Highlights

The highlights of the ZXSDR R8984E are as follows:

- United platform

  The ZXSDR R8984E is developed based on the unified SDR platform, which supports a smooth evolution to the new technologies in the future, and protects the operators' investment to the maximum extent.

- Green and energy saving

  → Small is size and light in weight, the ZXSDR R8984E is a compact RRU.

  → Uses multiple efficient power amplifier technologies, for example, CFR, DPD, and Doherty, and uses energy-saving technologies, for example, power amplifier voltage adjustment, decreasing the power consumption.

  → Uses natural heat dissipation without noise. Compared with traditional dissipation using air conditioners, it decreases the power consumption and saves cost on electricity.

- Multiple carriers and MIMO.

  → Supports up to 4×20 MHz bandwidth for OFDM MIMO Access Point. Increases the system capacity by using the CA technology and realizes flexible usage of frequency resources.

  → Increases the frequency usage and improves user experience by using the MIMO technology.

- High power

  Supports up to 0.64 W (4×160 mw) output power, satisfying power requirements in large-capacity and large-coverage scenarios.

Chapter 3
Product Structure

Table of Contents

3.1 Hardware Structure

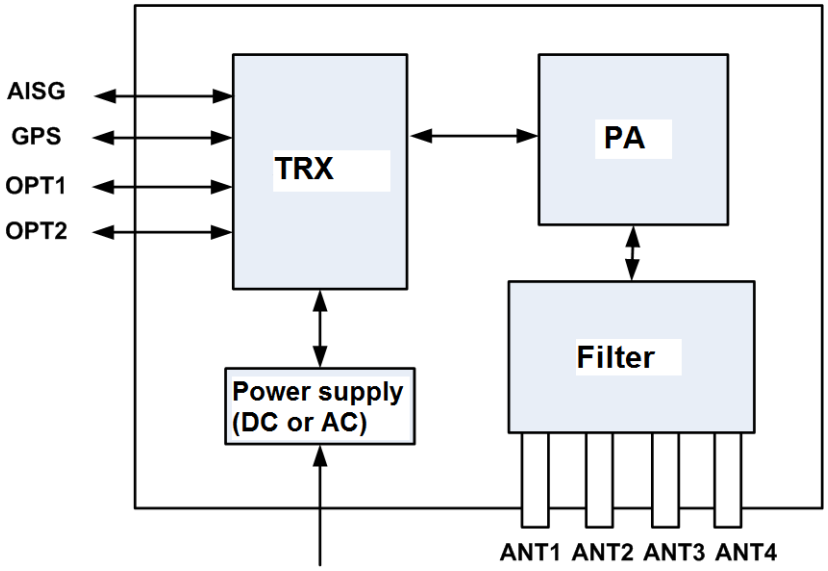
Figure 3-1 shows an external view of the ZXSDR R8984E.

Figure 3-1 External View

3.2 Logical Architecture

The ZXSDR R8984E is composed of a transceiver, a power amplifier, a duplex filter, and a power supply module. For the logical architecture of the ZXSDR R8984E, see Figure 3-2.

Figure 3-2 Logical Architecture



For a description of the modules, refer to Table 3-1.

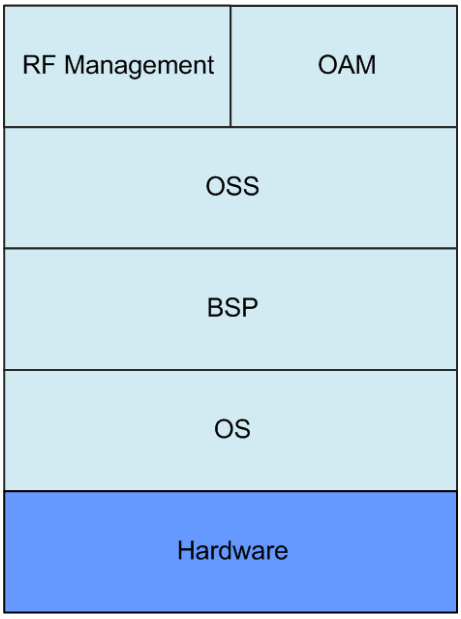
Table 3-1 Module Descriptions

Module	Function
Transceiver	Implements digital IF, RF signal transmission and reception, control, clock, power control, and power amplifier functions.
Power amplifier	Amplifies downlink RF signals and output RF signals to duplex filters, and implements the LNA function for four reception paths.
Filter	Combines and filters RF signals.
Power supply	Provides power for the system.

3.3 Software Architecture

For the software architecture of the ZXSDR R8984E, see Figure 3-3.

Figure 3-3 Software Architecture



For a description of the software architecture of the ZXSDR R8984E, refer to Table 3-2.

Table 3-2 Software Architecture Descriptions

Software	Description
RF Management	Implements the RF management function, including RF control and RF path management.
OAM	Provides an operation and maintenance adaptor interface. Implements the following operation and maintenance functions: configuration management, version management, performance management, test management, security management, diagnosis testing, system control, and communication processing.
OSS	Uses the SDR platform architecture. Implements scheduling management, memory management, and timer management.
BSP	Provides board-based packages. Uses the united architecture. Uses the united interface to connect the upper layer.
OS	Manages hardware and software resources of the system.

This page intentionally left blank.

Chapter 4
Operation and Maintenance System

Table of Contents

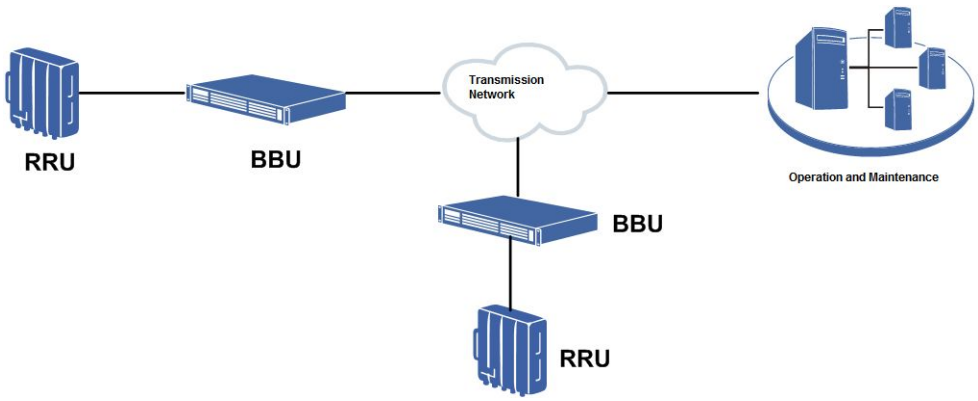
4.1 Network Architecture

The OAM for the ZXSDR R8984E can be implemented either locally or remotely.

Remote Maintenance Mode

In this mode, the NetNumen U31 provides the operation and maintenance of the ZXSDR R8984E remotely. The NetNumen U31 is connected to the ZXSDR R8984E through a transmission network and a BBU, see Figure 4-1.

Figure 4-1 Remote Maintenance Mode

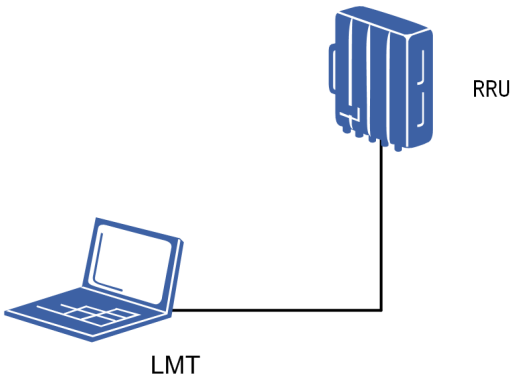


In remote maintenance mode, the network management system is connected to NEs through the TCP/IP protocol. One network management system can maintain multiple base stations.

Local Maintenance Mode

The Local Maintenance Terminal (LMT), which is installed on a PC, is physically connected to the debug interface of the ZXSDR R8984E through an Ethernet cable to perform operation and maintenance on the ZXSDR R8984E, see Figure 4-2.

Figure 4-2 Local Maintenance Mode



The local maintenance mode is used to maintain a single base station.

4.2 Function

The GUI of the NetNumen N31 network management system is presented in the form of topology, and information about each NE in the network can be viewed on the GUI. A user can select an NE to be maintained, and view detailed performance data, alarm information, and configuration data of the NE. Operation and maintenance can be performed on a certain type of NEs through the relevant topology. Its main functions are as follows:

- Configuration management

  It enables users to add, query, delete, and modify the physical and radio resource data of base stations, and check data consistency. Both dynamic and static data configurations are supported.

- Security management

  It ensures that only authorized users can perform relevant command group operations.

- Performance management

  It enables users to implement performance analysis, call tracing, and signaling tracing.

- Version management

  It enables users to view the running software and hardware versions through the network management system, through which software can be downloaded and upgraded.

- Fault management

  It includes two parts: alarm management and diagnostic test. It performs centralized monitoring of running status of base stations and collects abnormal information about boards and links in real time. This function makes it convenient for operation and maintenance personnel to perform analysis, make decision, and implement maintenance and repair.

Chapter 5
Product Features

The ZXSDR R8984E supports the following features:

- Supports 10 MHz, 15 MHz, and 20 MHz bandwidth configurations for OFDM MIMO Access Point
- Operating frequency band of 5150 MHz - 5250 MHz
- Four OFDM MIMO Access Point Tx/Rx paths and MIMO
- Downlink/uplink time slot configuration
- RGPS backhaul technology
- RET antennas
- OFDM MIMO Access Point Ir and up to four-level ZXSDR R8984E cascading

This page intentionally left blank.

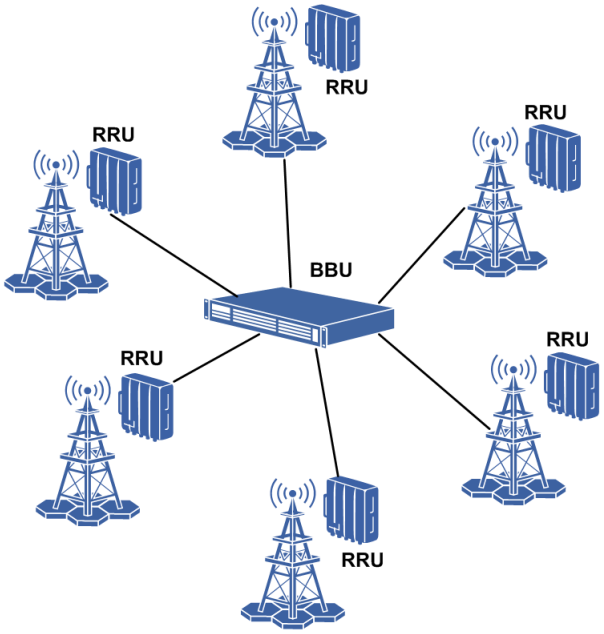
Chapter 6
Network Topologies

Table of Contents

6.1 Star Network Architecture

In a star network, the BBU is directly connected to each ZXSDR R8984E, and ZXSDR R8984E devices are end devices. In this network architecture, both maintenance and engineering are easy. Signals are processed by fewer nodes, and the reliability is high, see Figure 6-1.

Figure 6-1 Star Network Architecture



6.2 Chain Network Architecture

A chain network is applicable to strip-shaped areas with less population density, where optical fibers can be easily deployed, see Figure 6-2.

Figure 6-2 Chain Network Architecture

Chapter 7
Technical Specifications

Table of Contents

7.1 Physical Specifications

For the physical specifications of the ZXSDR R8984E, refer to Table 7-1.

Table 7-1 Physical Specifications

Item	Specification
Dimensions (H x W x D)	425 mm x 300 mm x 150 mm
Volume	< 19 L
Weight	< 19 kg

7.2 Performance Specifications

For the performance specifications of the ZXSDR R8984E, refer to Table 7-2.

Table 7-2 Performance Specifications

Item	Specification
Operating frequency band	5150 MHz - 5250 MHz
Operating frequency interval	100 kHz
TOC	4×160 mw
Receiver sensitivity	–101.5 dBm
Carrier shift	± 0.05 ppm

7.3 Power Consumption Specifications

For the power consumption specifications of the ZXSDR R8984E, refer to Table 7-3.

Table 7-3 Typical Power Consumption

Slot Ratio	Typical Power Consumption
DL: UL = 2: 2	110 W
DL: UL = 3: 1	120 W

7.4 Reliability Specifications

For the reliability specifications of the ZXSDR R8984E, refer to Table 7-4.

Table 7-4 Reliability Specifications

Item	Specification
Protection rating	IP66
Protection mode	Die-casting shell structure
MTBF	> 180000 h
MTTR	< 60 min

Chapter 8
Environmental Specifications

Table of Contents

8.1 Power Supply Specifications

For the power supply specifications of the ZXSDR R8984E, refer to Table 8-1.

Table 8-1 Power Supply Specifications

Item	Specification
DC	–48 V DC (range: –57 V to –37 V)

8.2 Operational Environment

Climatic Environment

Item	Specification
Temperature	–40 ℃ to +55 ℃
Relative humidity	4%–100%
Maximum temperature change rate	0.5 ℃/min
Air pressure	54 kPa–106 kPa
Maximum solar radiation	1120 W/m^2
Condensation	Allowed
Precipitation (rain, snow, and hail)	Allowed
Humidity	Surface humidity allowed
Freezing and frost	Allowed

Note:

When the environment temperature is above 40 degrees celsius, it is prohibited to touch the equipment surface to avoid scald. If it is required to move the equipment, first power off the equipment and wait till the equipment surface is cool.

Biological Environment

Item	Specification
Plants	Mold and fungus allowed
Animals	Rodents and other animals that may damage the product allowed, except termites

Chemically Substance

Item	Specification
Salt fog	Allowed

8.3 Storage Environment

The ZXSDR R8984E must be stored with packaging in protected locations to ensure that the device can operate properly after being installed.

Climatic Environment

Item	Specification
Temperature	–50 ℃ to +70 ℃
Relative humidity	5%–100%
Maximum temperature change rate	1 ℃/min
Air pressure	70 kPa–106 kPa
Maximum solar radiation	1120 W/m^2
Condensation	Allowed
Precipitation (rain, snow, and hail)	Allowed
Humidity	Surface humidity allowed
Freezing and frost	Allowed

Biological Environment

Item	Specification
Plants	Mold and fungus allowed
Animals	Rodents and other animals that may damage the product allowed, except termites

Chemically Substance

Item	Specification
Salt fog	Allowed

This page intentionally left blank.

Glossary

BBU
- Base Band Unit

BSP
- Board Support Package

CA
- Carrier Aggregation

CFR
- Crest Factor Reduction

DL
- Down Link

DPD
- Digital Pre-Distortion

GPS
- Global Positioning System

IF
- intermediate Frequency

IP
- Internet Protocol

Ir
- Radio Interface

LMT
- Local Maintenance Terminal

LNA
- Low Noise Amplifier

MIMO
- Multiple-Input Multiple-Output

MME
- Mobility Management Entity

MTBF
- Mean Time Between Failures

MTTR
- Mean Time To Recovery

OAM
- Operation, Administration and Maintenance

OS
- Operating System

OSS
- Operation Support Subsystem

PC
- Personal Computer

RF
- Radio Frequency

RGPS
- Remote GPS

RRU
- Remote Radio Unit

SDR
- Software Defined Radio

SGW
- Serving Gateway

TCP
- Transmission Control Protocol

TOC
- Top of Cabinet

UE
- User Equipment

UL
- Uplink