



# ZXSDR R8984E

## TDD 4 Path Remote Radio Unit

### Product Description

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# About This Manual

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

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# Chapter 1

## Product Positioning and Features

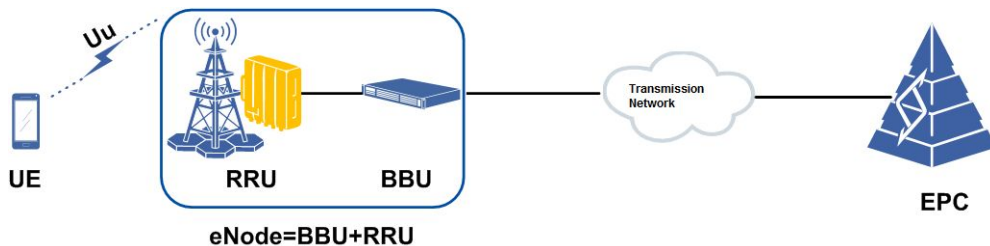
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## 1.1 Positioning

The ZXSDR R8984E, an RRU developed by ZTE, supports the single-mode TD-LTE 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 1-1. Here, the yellow RRU is the ZXSDR R8984E.

Figure 1-1 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.
EPC	IP-based core network, which is located between an LTE network and other networks. On the user plane, the EPC is connected to an LTE network through the SGW. On the control plane, the EPC is connected to an LTE network through the MME.

## 1.2 Highlights

The highlights of the ZXSDR R8984E are as follows:

- United platform

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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 20 MHz+20 MHz+10 MHz bandwidth for TD-LTE. 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 1 W ( 4\*250 mw ) output power, satisfying power requirements in large-capacity and large-coverage scenarios.



# Chapter 2

# Product Structure

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## 2.1 Hardware Structure

Figure 2-1 shows an external view of the ZXSDR R8984E.

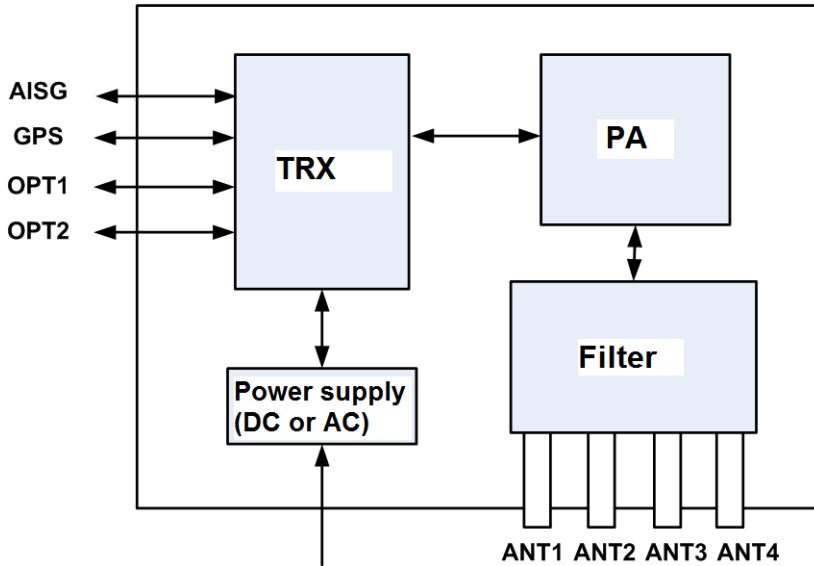
Figure 2-1 External View



## 2.2 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 2-2](#).

**Figure 2-2 Logical Architecture**



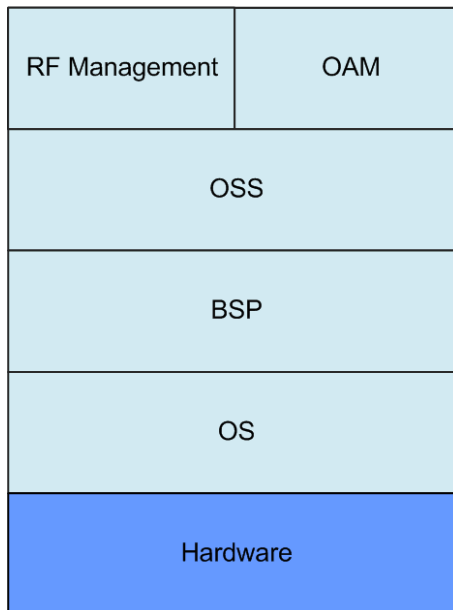
For a description of the modules, refer to [Table 2-1](#).

**Table 2-1 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.

## 2.3 Software Architecture

For the software architecture of the ZXSDR R8984E, see [Figure 2-3](#).

**Figure 2-3 Software Architecture**

For a description of the software architecture of the ZXSDR R8984E, refer to [Table 2-2](#).

**Table 2-2 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.

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# Chapter 3

# Operation and Maintenance System

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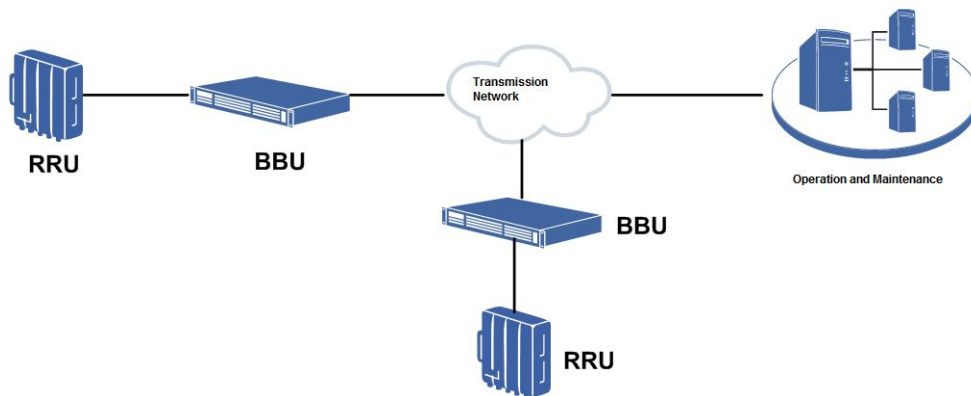
## 3.1 Network Architecture

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 3-1.

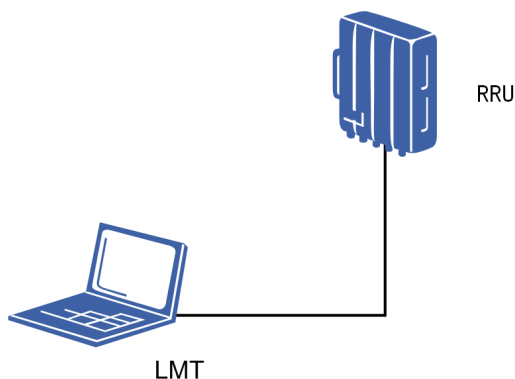
Figure 3-1 Remote Maintenance Mode



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 3-2.

**Figure 3-2 Local Maintenance Mode**

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

## 3.2 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 4

## Product Features

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The ZXSDR R8984E supports the following features:

- TD-LTE 10 MHz, 15 MHz, and 20 MHz bandwidth configurations
- Operating frequency band of 3650 MHz–3700 MHz
- Four TD-LTE Tx/Rx paths and [MIMO](#)
- Downlink/uplink time slot configuration
- [RGPS](#) backhaul technology
- RET antennas
- TD-LTE [lr](#) and up to four-level ZXSDR R8984E cascading

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# Chapter 5

## Network Topologies

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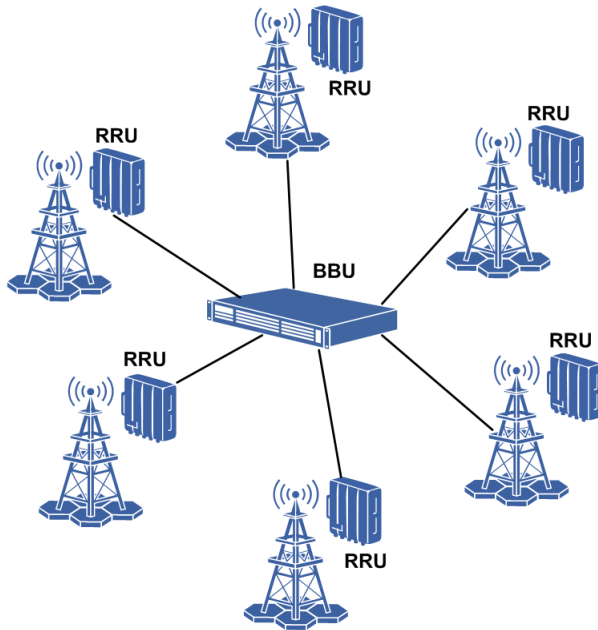
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## 5.1 Star Network Architecture

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 5-1.

Figure 5-1 Star Network Architecture



## 5.2 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 5-2.

**Figure 5-2 Chain Network Architecture**



# Chapter 6

## Technical Specifications

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## 6.1 Physical Specifications

For the physical specifications of the ZXSDR R8984E, refer to [Table 6-1](#).

**Table 6-1 Physical Specifications**

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

## 6.2 Performance Specifications

For the performance specifications of the ZXSDR R8984E, refer to [Table 6-2](#).

**Table 6-2 Performance Specifications**

Item	Specification
Operating frequency band	3650 MHz–3700 MHz
Operating frequency interval	100 kHz
TOC	4*100 mw@20 MHz , 4*250 mw@20+20+10 MHz
Receiver sensitivity	–101.5 dBm
Carrier shift	± 0.05 ppm

## 6.3 Power Consumption Specifications

For the power consumption specifications of the ZXSDR R8984E, refer to [Table 6-3](#).

**Table 6-3 Typical Power Consumption**

Slot Ratio	Typical Power Consumption
DL: UL = 2: 2	200 W
DL: UL = 3: 1	260 W

## 6.4 Reliability Specifications

For the reliability specifications of the ZXSDR R8984E, refer to [Table 6-4](#).

**Table 6-4 Reliability Specifications**

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

# Chapter 7

## Environmental Specifications

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## 7.1 Power Supply Specifications

For the power supply specifications of the ZXSDR R8984E, refer to [Table 7-1](#).

**Table 7-1 Power Supply Specifications**

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

## 7.2 Operational Environment

### Climatic Environment

Item	Specification
Temperature	-40 °C to +55 °C
Relative humidity	4%–100%
Maximum temperature change rate	0.5 °C/min
Air pressure	54 kPa–106 kPa
Maximum solar radiation	1120 W/m <sup>2</sup>
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

## 7.3 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 °C to +70 °C
Relative humidity	5%–100%
Maximum temperature change rate	1 °C/min
Air pressure	70 kPa–106 kPa
Maximum solar radiation	1120 W/m <sup>2</sup>
Condensation	Allowed
Precipitation (rain, snow, and hail)	Allowed
Humidity	Surface humidity allowed
Freezing and frost	Allowed

**Biological Environment**

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

**Chemically Substance**

<b>Item</b>	<b>Specification</b>
Salt fog	Allowed

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# Glossary

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**BBU**

- Base Band Unit

**BSP**

- Board Support Package

**CA**

- Carrier Aggregation

**CFR**

- Crest Factor Reduction

**DL**

- Down Link

**DPD**

- Digital Pre-Distortion

**EPC**

- Evolved Packet Core

**GPS**

- Global Positioning System

**IBW**

- Instantaneous Bandwidth

**IF**

- intermediate Frequency

**IP**

- Internet Protocol

**Ir**

- Radio Interface

**LMT**

- Local Maintenance Terminal

**LNA**

- Low Noise Amplifier

**LTE**

- Long Term Evolution

**MIMO**

- Multiple-Input Multiple-Output

**MME**

- Mobility Management Entity

**MTBF**

- Mean Time Between Failures

**MTTR**

- Mean Time To Recovery

**OAM**

- Operation, Administration and Maintenance

**OBW**

- Occupied Bandwidth

**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