ZXSDR RSU82C

Radio System Unit of CDMA with 2T4R

User Manual

Version: 1.00

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LEGAL INFORMATION

Revision History

Revision No.	Revision Date	Revision Reason
R1.0	25/10/2010	First Edion
R1.1	25/12/2010	Modify RF and Power Indices
R1.2	08/08/2011	Add the notes of the typical loss of the RF cable

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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, **and** (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.

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 4m between the radiator & your body.

Declaration of RoHS Compliance

To minimize the environmental impact and take more responsibility to the earth we live, this document shall serve as formal declaration that ZXSDR RSU82C manufactured by ZTE CORPORATION are in compliance with the Directive 2002/95/EC of the European Parliament - RoHS (Restriction of Hazardous Substances) with respect to the following substances:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent Chromium (Cr (VI))
- PolyBrominated Biphenyls (PBB's)
- PolyBrominated Diphenyl Ethers (PBDE's)

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The ZXSDR RSU82C manufactured by ZTE CORPORATION meet the requirements of EU 2002/95/EC; however, some assemblies are customized to client specifications. Addition of specialized, customer-specified materials or processes which do not meet the requirements of EU 2002/95/EC may negate RoHS compliance of the assembly. To guarantee compliance of the assembly, the need for compliant product must be communicated to ZTE CORPORATION in written form. This declaration is issued based on our current level of knowledge. Since conditions of use are outside our control, ZTE CORPORATION makes no warranties, express or implied, and assumes no liability in connection with the use of this information.

Chapter 1
Safety Description

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1.1 Safety Specifications Guide

These safety instructions must be considered as supplementary for local safety regulations. The priority must be given to local safety regulations if there is any conflict between the two.

The maintenance personnel must have the knowledge of safety operations and maintenance with required qualification and technical background.

Warning!

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

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The equipment is intended for installation in RESTRICTED ACCESS LOCATIONS.

All the operation and maintenance personnel must follow the safety precautions and instructions provided by ZTE Corporation to avoid any accident.

Note:

ZTE Corporation does not bear any liabilities incurred because of violation of the universal safety operation requirements, or violation of safety standards for designing, manufacturing and using the equipment.

1.2 Safety Symbols

Table 1-1 lists safety symbols. They are to prompt the user of the safety precautions to be observed during ZXSDR RSU82C operation and maintenance.

Table 1-1 Safety Symbols Description

Safety Symbols	Meaning
	No smoking: Smoking is forbidden
	No flammables: No flammables can be stored.
	No touching: Do not touch.
	Universal alerting symbol: General safety attentions.
	Electric shock: Risk of electric shock.
	Electrostatic: The device may be sensitive to static electricity.
	Microwave: Beware of strong electromagnetic field.
	Laser: Beware of strong laser beam.
	Scald: Beware of scald.

Amongst these safety symbols, the universal alarm symbols are classified into three levels: danger, warning, and caution. The formats and meanings of the three levels are described as below:

 **Danger!**

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury of people, or equipment damages and breakdown.

Warning!

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Caution!

Indicates a potentially hazardous situation which, if not avoided, could result in serious injuries, equipment damages or interruption of part services.

1.3 Safety Instructions

This section describes the safety instructions related to electrical safety, antistatic, heavy objects and modules.

Electrical Safety Instructions

The following are the electrical safety instructions about tools, high voltage, power cables, holes and lightning:

- **Tools**

  Use special tools rather than common tools for high-voltage and AC operations.

- **High Voltage**

  Danger!

  High voltage is hazardous. Direct or indirect contact with high voltage or main supply using a wet object could result in death.

  → Strictly follow local safety rules to install AC power devices.

  → Installation staff must be qualified for performing high-voltage and AC operations.

  → Do not wear any watch, hand chain, bracelet, ring or any other conductive objects during such operations.

  → Prevent moisture from accumulating on the equipment during operations in a damp environment.

- **Power Cable**

Warning!

Never install or uninstall power cables while they are live. Otherwise, the power cable, when contacting a conductor, may result in sparks or electric arc causing a fire or even damage to eyes.

→ Make sure of shutting off power supply before installing or disconnecting a power cable.

→ Before connecting the power cable, make sure that the connecting cable and its label are appropriate for the actual installation requirements.

- **Drilling Holes**

Warning!

It is not allowed to drill chassis holes without permission.

→ Unqualified drilling could damage wiring and cables inside the chassis. Additionally, metal pieces inside the chassis created by the drilling could result in a short circuit. Use insulation protection gloves and first move cables inside a chassis away when drilling is necessary on a chassis.

→ Protect eyes during drilling as dust or flying debris may damage eyes.

→ Clean any debris in time after drilling.

- **Lightning**

Danger!

Do not perform high-voltage, AC, iron tower or mast operations in a thunderstorm.

Thunderstorms would give rise to a strong electromagnetic field in the atmosphere. Therefore, the equipment must be grounded and protected in time against lightning strikes.

Antistatic Safety Instructions

Caution!

Static electricity produced by human body can damage static-sensitive components on circuit board, such as large-scale integrated circuits.

- Friction caused by human body activities is the root cause of electrostatic charge accumulation. Static voltage carried by a human body in a dry environment can be up to 30 kV, and can remain there for a long time. An operator with static electricity may discharge electricity through a component when he/she touches the conductor and causing damage.
- Wear an antistatic wrist strap (the other end of wrist strap must be well grounded) before touching the equipment or holding a plug-in board, circuit board, Integrated Circuit (IC) chip or other devices, to prevent human static electricity from damaging sensitive components.
- The antistatic wrist strap used must be subject to regular check. Do not replace the cable of an antistatic wrist strap with any other cables.
- Do not contact static-sensitive modules with any object that easily generates static electricity. For example, friction of package bag, transfer box and transfer belt made from insulation plastic may cause static electricity on components. Discharge of static electricity may damage components when they contact a human body or the ground.
- Modules should only contact materials such as an antistatic bag. Keep modules in antistatic bags during storage and transportation.
- Discharge static electricity of the test device before use, that is, ground the test device first.
- Do not place the module near a strong DC magnetic field, such as the cathode-ray tube of a monitor. Keep the module at least 10 cm away.

Hoisting Heavy Objects

Warning!

When hoisting heavy objects, ensure that nobody is standing or walking under the hoisted object.

- Ensure the hoister can meet hoisting requirements when disassembling heavy equipment, or moving and replacing equipment.
- The installation personnel must be duly trained and qualified for hoisting operations.
- Hoisting tools must be inspected and complete before service.

- Make sure that hoisting tools are fixed firmly on a sufficiently secured object or wall before the hoisting operation.
- Give brief oral instructions during hoisting operations to prevent any mishap.

Unplugging/Plugging a Module

- Never plug a module with excessive force, to ensure that the pins on the backplane do not get deformed.
- Plug the module right into the slot and make sure module circuit faces do not contact each other lest any short circuit may occur.
- Keep hands off the module circuit, components, connectors and cable trough when holding a module.

Rack Mount Safety Instructions

Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Other Safety Instructions

NOTE **Note:**

Do not perform maintenance or debugging independently, unless a qualified person is present.

- Perform an airtight test before RRU delivery, and prohibit disassembling the RRU on site.

- Replacing any parts or making any changes to the equipment might result in an unexpected danger. Therefore, be sure not to replace any parts or perform any changes to the equipment unless authorized otherwise.
- Due to that RRU is in high temperature during running, the RRU should be installed in some regions out of operators' reach or strictly restricted.
- Contact ZTE office if you have any question, to ensure your safety.

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Chapter 2
Product Description

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2.1 Overview

ZTE Software Defined Radio (SDR) uses an architecture of separating the baseband part from the Radio Frequency (RF) part. This architecture features high integration, low consumption, flexible configuration and convenient installation & maintenance. The new generation ZTE CDMA Base Station (BS) products based on the SDR is the first SDR-based CDMA BS in the industry. It is able to help the operators have qualitative leap. The form of this product can be distributed BBU + RRU or BBU + RSU. The product form of ZTE SDR can be distributed BBU + RRU or BBU + RSU, macro BS or micro BS.

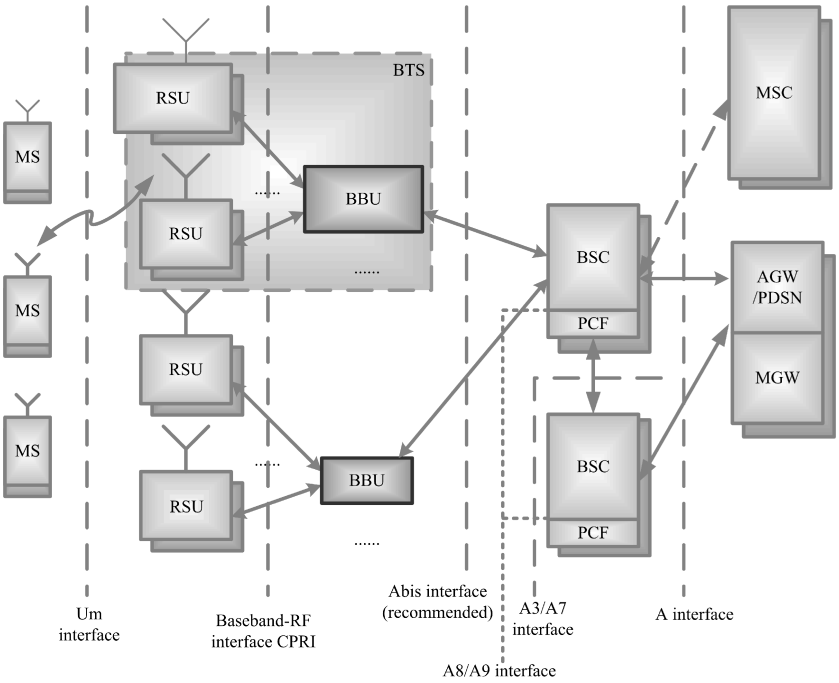
ZXSDR RSU82C is the RSU part of ZTE CDMA2000 distributed SDR Common BTS Platform Solution. It provides functions including RF modulation/demodulation, forward power amplification, reverse low noise amplification, RF performance measurement and carrier power control etc.

With a smaller size and lighter weight, the ZXSDR RSU82C has significant advantages for saving space, relocations, installation flexibility, and power savings. It designed for both indoor and outdoor applications.

2.2 Position in a Network

In CDMA mobile communication network, the relationship between ZXSDR RSU82C and other network entities is shown in Figure 2-1.

Figure 2-1 ZXSDR RSU82C Position in a Network

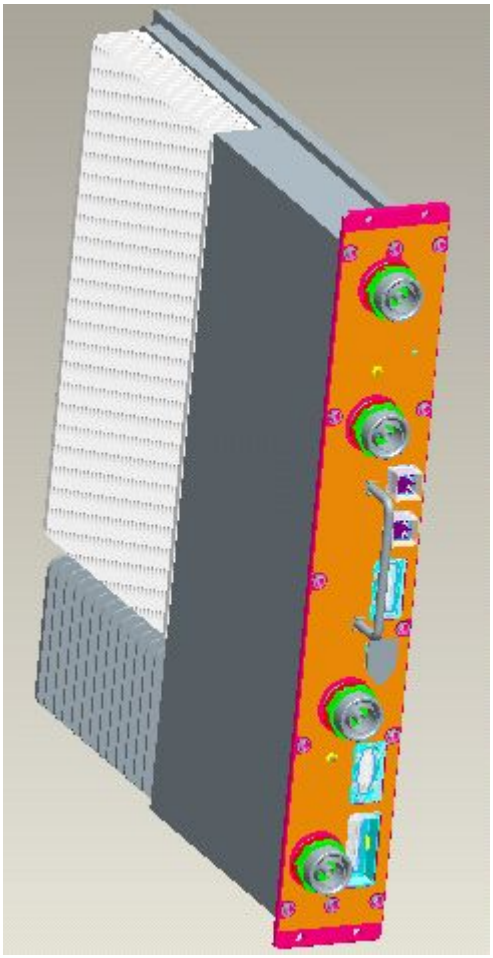


The ZXSDR RSU82C is an independent RF subsystem. Together with BBU , it forms the complete BTS.The BTS implements radio transmission with the MS through the CDMA2000 air interface. In addition, the BTS implements control of radio channels and communication with the BSC

2.3 Outer View

Figure 2-2 shows the outer view of ZXSDR RSU82C.

Figure 2-2 Outer View of ZXSDR RSU82C



2.4 Production Functions

ZXSDR RSU82C provides primary functions is shown as Table 2-1.

Table 2-1 The Primary Functions of ZXSDR RSU82C

Function	Description
RF	Band: 800MHz/1.9GHz/2.1GHz
	RF modulation/demodulation
	RF transceiver duplexer
	Low noise amplification for received RF signal
	Amplification for transmitted RF signal
	RF transceiver
Interface	Baseband-RF interface: compliant with Common Public Radio Interface (CPRI) protocol
	Air interface: compliant with IS-2000 Release A and IS-856-A

Function	Description
Equipment maintenance and test	Electronic label
	Remote upgrade of software version for FPGA/BOOT/DSP/CPU
	Remote reset of service boards
	RSSI query
	Automatic calibration
	Reverse spectrum query: querying the reverse received signal spectrum of each carrier
	Power amplification control and protection: over-power, over-temperature, and standing wave alarm
Reliability	Reverse voltage protection
Scenario	Indoor and outdoor applications

2.5 Production Features

Here are the product features of ZXSDR RSU82C：

- It adopts multiple new technologies in heat dissipation and connection mode; hence it features high integration and compact structure.
- It adopts the single-sided design in which dual duplexers carry the transceiver, power module, and power amplification module.
- It is the first RSU that supports the 2T4R application in the industry.
- Easy transportation and installation will save labor and building costs
- Suitable for complicated base station environments

  Supports star and chain networks between baseband and RF to provide more convenient solutions for complicated base station environments.

Chapter 3
Technical Description

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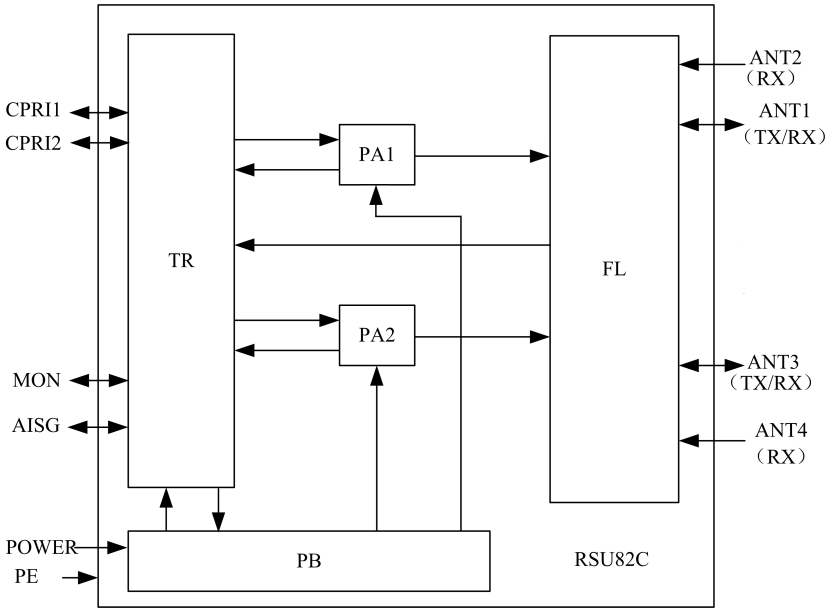
3.1 System Architecture

The ZXSDR RSU82C comprises transceiver unit (TR), power amplifier unit (PA), duplexer unit(FL), and power unit (PB).Figure 3-1 illustrates the ZXSDR RSU82C's system architecture.

Figure 3-1 Frame Structure of ZXSDR RSU82C



The functions of ZXSDR RSU82C's subsystem is shown as Table 3-1.

Table 3-1 The functions of subsystem

Part	Description
TR	TR, the unit that integrates the processor, clock, CPRI interface, DPD digital predistortion, RF transmitting and receiving functions, is the core unit of the ZXSDR RSU82C.

Part	Description
PA	• Amplifies downlink RF signal input via the TR and then sends the signal to the FL • Provides digital pre-distortion feedback signals for the TR • Provides a PA output enable/disable interface
FL	• Performs filtering and low noise amplification of the reverse CDMA signal from the antenna • Filters the forward RF signal to be sent • Reports LNA alarms to the TR • In the case of main/diversity combined cabinets, the main receive LNA output end of the FL has the power splitter function and reserves an external port (Rx out)
PB	Converts -48V DC input power supply to DC power supply required by the PA, TR, or FL

3.2 Signal Processing Flow

The internal signal processing flow of ZXSDR RSU82C is as below:

- Forwardlink processing

  The business data from BBU enters the TR, and then for intermediate frequency processing. After the power amplification sent to the antenna for transmission.

- Reverselink processing

  The reverse CDMA signals from the antenna are converted to baseband digital signal by TR, then send to BBU.

3.3 Technical Specifications

3.3.1 Physical Indices

3.3.1.1 Dimension

The dimensions of ZXSDR RSU82C in mm are : 482.6(H) × 88 (W) × 360.0 (D).

3.3.1.2 Weight

Weight of a ZXSDR RSU82C : < 15 kg (33.1 pounds).

3.3.2 Power Indices

- Power Supply

-48V DC Voltage range: -40V~-57V.

- Power Consumption

  In the case of 2S-2T, 4C/S, 15W/C, the total power consumption of the equipment is 600 W.

3.3.3 Capacity Indices

ZXSDR RSU82C Capacity Indices is shown as Table 3-2

Table 3-2 ZXSDR RSU82C Capacity Indices

Item	Carriers supported
1	4C 1X + 4C 1X
2	4C 1X + 4C DO
3	4C DO + 4C DO
4	the MAX 8C/2S-2T

3.3.4 Temperature and Humidity

Temperature: -40 ℃~+55 ℃. The change frequency must be less than 0.5 ℃/min.

Relative humidity: 5% ~95%

3.3.5 Environmental Classes

- Grade Of Protection: IP55
- Grounding Requirements: Joint grounding resistance less 1W; BTS grounding resistance less 5 W.
- Noise: Noise of working environment: less 65 dBA

3.3.6 Reliability Indices

- Mean Time Between Failures (MTBF) : > 100,000 hours
- MTTR (Mean Time To Repair): < 0.5 hour
- Availability: > 99.999%

3.3.7 RF Indices

RF indices of the ZXSDR RSU82C comply with *3GPP2 C.S0010-C, Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Station* and *3GPP2 C.S0032-A, Recommended Minimum Performance Standards for CDMA2000 High Rate Packet Data Access Network*.

Table 3-3 illustrates the 1.9 GHz transmitter indices.

Table 3-3 1.9 GHz Transmitter Indices

Name	Index
Operating band	1.9 GHz (1930MHz~1950MHz)
Transmitter output frequency tolerance	± 0.01 ppm
Occupied channel bandwidth	1.25 MHz
Output power at the Top of Cabinet (TOC)	60W
Total transmit power	The total transmit power is within +2 dB and -2 dB of the manufacturer's rated power.
Modulation mode	Quadrature amplitude modulation
Conducted spurious emission and radiated spurious emission suppression	< -45dBc @±885 kHz offset Center Freq (RBW 30kHz) < -55 dBc @±1.98 MHz offset Center Freq (RBW 30kHz) > 4 MHz OFFSET: < -36 dBm (RBW 1kHz) @ 9KHz < f < 150 kHz < -36 dBm (RBW 10kHz) @ 150 kHz < f < 30 MHz < -36 dBm (RBW 100kHz) @ 30 MHz < f < 1 GHz 4-16 MHz OFFSET: < -30 dBm (RBW 30kHz) @ 1 GHz < f < 12.5 GHz 16M-19.2M OFFSET: <-30dBm(RBW 300kHz) @ 1GHz < f < 12.5GHz >19.2MHz OFFSET: <-30dBm(RBW 1MHz) @ 1GHz < f < 12.5GHz
Transmitter intermodulation performance	If one BTS transmits at the rated power but another BTS' output power is 30 dB less than the former's rated power. When the powers of two BTSs are combined on the antenna port, the generated intermodulation spurious emission meets the conducted spurious emission requirement. The IF difference of the transmit signals of two BTSs is 1.25 M.
Pilot time tolerance	The PN time tolerance falls within 3 us and the inter-carrier tolerance falls within 1 us.
Time Tolerance/phase tolerance of pilot channel to other channels	Time difference: < ±50 ns
	Phase difference: < 0.05 rad
Waveform quality	Rho is greater than 0.990 dBm under the configuration of a single pilot.
Pilot code domain power	With the standard 9CH configuration, the pilot code domain power is in the range of -7.0±0.5 dB.

Name	Index
Inactive channel code domain power	With the standard 9CH configuration, the inactive channel code domain power is less than -27 dB.
DO MAC inactive channel code domain power	With configuration of 13 FLUSs, the MAC inactive channel code domain power is less than -29.5 dB (type 2).
DO DATA channel code domain power	With configuration of 13 FLUSs at the rate of 614.44 kbs (test 1), the DATA channel code domain power is in the range of -15.5 dB to -14.5 dB.
Wave quality of DO channels	Pilot channel: Rho > 0.97
	MAC channel: Rho > 0.912
	DATA channel: Rho > 0.97
Radio frequency Front End SWR	< 2.0

Table 3-4 illustrates the 1.9 GHz receiver indices.

Table 3-4 1.9 GHz Receiver Indices

Name	Index
Operating band	1.9G Hz (1850MHz~1870MHz)
Receiver sensitivity	< -115 dBm
Receiver dynamic range	When the lower limit is the receiver sensitivity and the upper limit (noise level) equals - 55 dBm/1.23 MHz (Eb/N0 = 10dB±1dB), the Frame Error Rate (FER) is lower than 1%.
Noise figure	< 3
Adjacent channel selection (ACS)	Band Class 6:> - 53dBm (± 2.5M)
Single tone desensitization	In the presence of a single tone that is 50 dB above the CDMA signal level, and is at offset of ± 750 kHz from the center frequency, the output power of the MS increases by no more than 3 dB ,and the FER is less than 1.5%. In the presence of a single tone that is 75 dB above the CDMA signal level, and is at offset of ± 900 kHz from the center frequency, the output power of the MS increases by no more than 3 dB, and the FER is less than 1.5%.
Intermodulation spurious response attenuation	In the presence of two interfering tones that are 60 dB above the CDMA signal level, and are at offsets of 1.25 MHz and 2.05 MHz, and -1.25 MHz and -2.05 MHz from the center frequency, the output power of the MS increases by no more than 3 dB, and the FER is less than 1.5%.

Name	Index
Conducted spurious emissions and radiated spurious emissions	< -80 dBm, measured within the BTS receive band < -60 dBm, measured within the BTS transmit band
Radio frequency Front End SWR	< 2.0

3.3.8 Interface Indices

The interface indices of ZXSDR RSU82C is shown as Table 3-5.

Table 3-5 Description of ZXSDR RSU82C's interfaces

Type	Description	Index
CPRI	Fiber/Cable	2 CPRI interfaces: 1 CPRI for BBU or upper-level RSU，1 CPRI for lower-level RSU
UE	Um interface	2 Tx/Rx，2 diversity receivers

Chapter 4
Hardware Decsripition

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4.1 Function

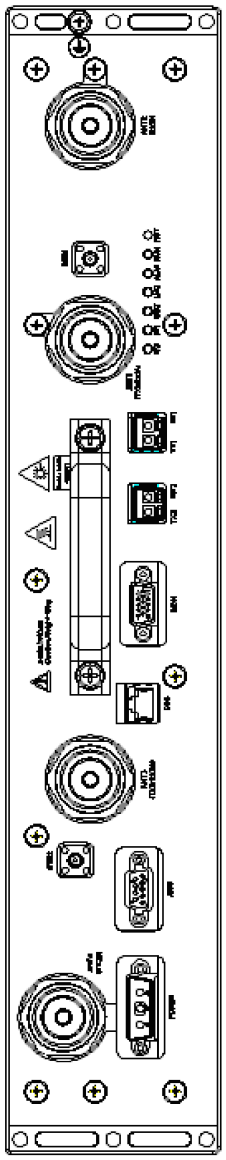
RSU provides the following functions:

- Communication with the baseband subrack
- Conversion between air interface RF signals and digital signals
- RF signal amplification, transmission, and reception
- Clock synchronization.

4.2 Panel

Figure 4-1 illustrates the ZXSDR RSU82C panel.

Figure 4-1 ZXSDR RSU82C Panel



4.3 Button

There is only one button (RST) on the ZXSDR RSU82C panel.Table 4-1 describes the button.

Table 4-1 ZXSDR RSU82C Panel Button Description

Button	Description
RST	Reset button

4.4 Indicators

Table 4-2 describes ZXSDR RSU82C panel indicators.

Table 4-2 ZXSDR RSU82C Panel Indicator Description

Indicator	Color	Meaning	Description
RUN	Green	RSU running indicator	On when RSU is being reset or started. Blinks in 1Hz when RSU runs normally. Blinks in 5 Hz when the version is being downloaded. Off when Self test fails.
ALM	Red	RSU alarm indicator	Off when RSU runs normally or is being reset or started, or RSU version is being downloaded. Blinks in 5 Hz when a critical alarm is generated. Blinks in 1 Hz when a minor alarm is generated.
LNK1	Green	Indicator of the first optical port/electrical port connection	A: Constantly on. The optical fiber connection is normal. B: Flashes quickly (1 Hz). It indicates that the optical port communication is abnormal. C: Off. It indicates that there is no optical module or there is no optical signal. (During the power-on process, the indicator is in this state by default.) This indicator is used mainly to check whether the optical fiber link is connected on the field. If the indicator flashes or the indicator is on, it indicates that the physical connection of the optical fiber is normal.
LNK2	Green	Indicator of the second optical port/electrical port connection	A: Constantly on. The optical fiber connection is normal. B: Flashes quickly (1 Hz). It indicates that the optical port communication is abnormal. C: Off. It indicates that there is no optical module or there is no optical signal. (During the power-on process, the indicator is in this state by default.) This indicator is used mainly to check whether the optical fiber link is connected on the field. If the indicator flashes or the indicator is on, it indicates that the physical connection of the optical fiber is normal.

Indicator	Color	Meaning	Description
RF1	Red/Green	RF signal abnormal indicator of the first antenna port	A: The green indicator is constantly on. It indicates that the RF output is normal. B: The red indicator is constantly on. It indicates the antenna standing wave alarm. C: The green indicator is off. It indicates that there is no RF output (or the power amplifier is shut off.) (During the power-on process, the two indicators are off by default.)
RF2	Red/Green	RF signal abnormal indicator of the second antenna port	A: The green indicator is constantly on. It indicates that the RF output is normal. B: The red indicator is constantly on. It indicates the antenna standing wave alarm. C: The green indicator is off. It indicates that there is no RF output (or the power amplifier is shut off.) (During the power-on process, the two indicators are off by default.)

4.5 Panel Interfaces

Table 4-3 describes ZXSDR RSU82C panel interfaces.

Table 4-3 ZXSDR RSU82C Panel Interface Description

Interface	Entity at end A	Entity at end B	Description
ANT1 (TX1/RX1A)	RSU	The first Tx antenna	The first Tx/Rx antenna feeder interface
ANT2(RX1B)	RSU	The first Rx antenna	The first receive diversity antenna feeder interface
ANT3(TX2/ RX2A)	RSU	The second Tx antenna	The second Tx/Rx antenna feeder interface
ANT4(RX2B)	RSU	The second Rx antenna	The second receive diversity antenna feeder interface
TX1 RX1	RSU	BBU or the upper level cascaded RSU	Connected to the CPRI interface of BBU or upper level cascaded RSU
TX2 RX2	RSU	Lower level cascaded RSU	Connected to the CPRI interface of the lower level cascaded RSU
DBG	RSU	PC and test device (test board)	Debug interface and test interface

Interface	Entity at end A	Entity at end B	Description
MON	RSU	Peripheral	Provides input interface for four channels of dry contact signals and RS 485 environment monitoring interface
AISG	RSU	Antenna feeder	Connected to antenna feeder AISG interface
POWER	RSU front panel	RF power supply in the power distribution subrack	-48 V DC power input interface

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Chapter 5
Hardware Installation

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5.1 Installing the RSU Module

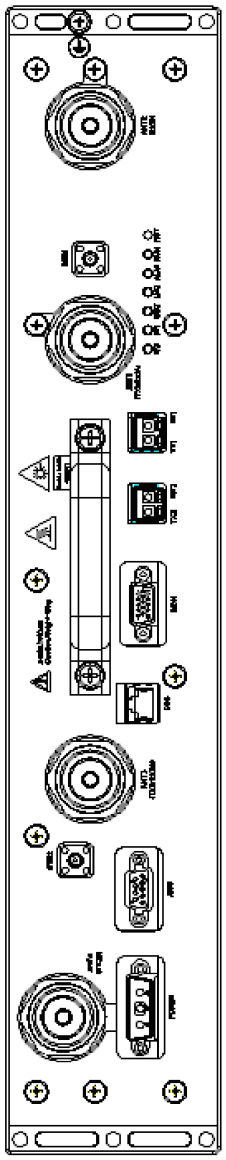
Prerequisites

- Before installing the RF module, wear the ESD wrist strap to avoid damaging the RF module.
- The RF cabinet has already been installed.

Context

Figure 5-1 shows the front panel of a ZXSDR RSU82C.

Figure 5-1 ZXSDR RSU82C Panel



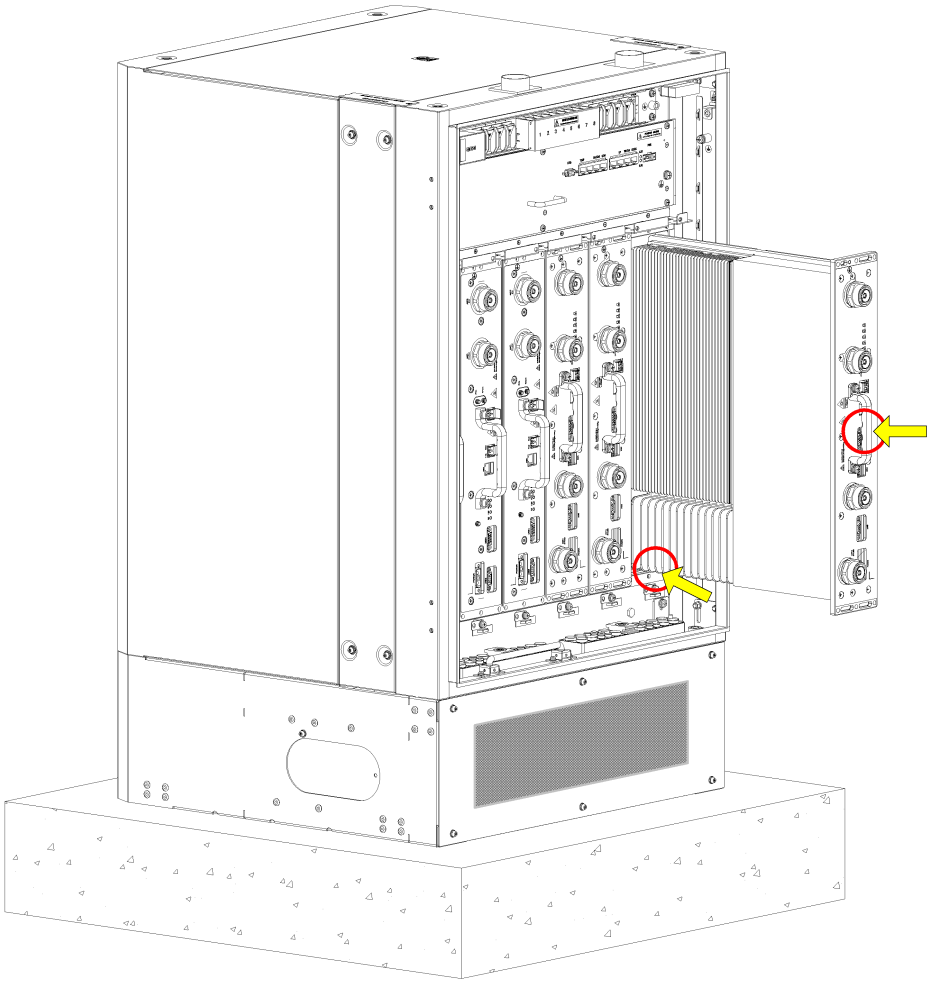
NOTE **Note:**

When a ZXSDR RSU82C is used in a single-sector and high-carrier scenario, the RF jumper connects only to the ANT1 and ANT3 interfaces.

Steps

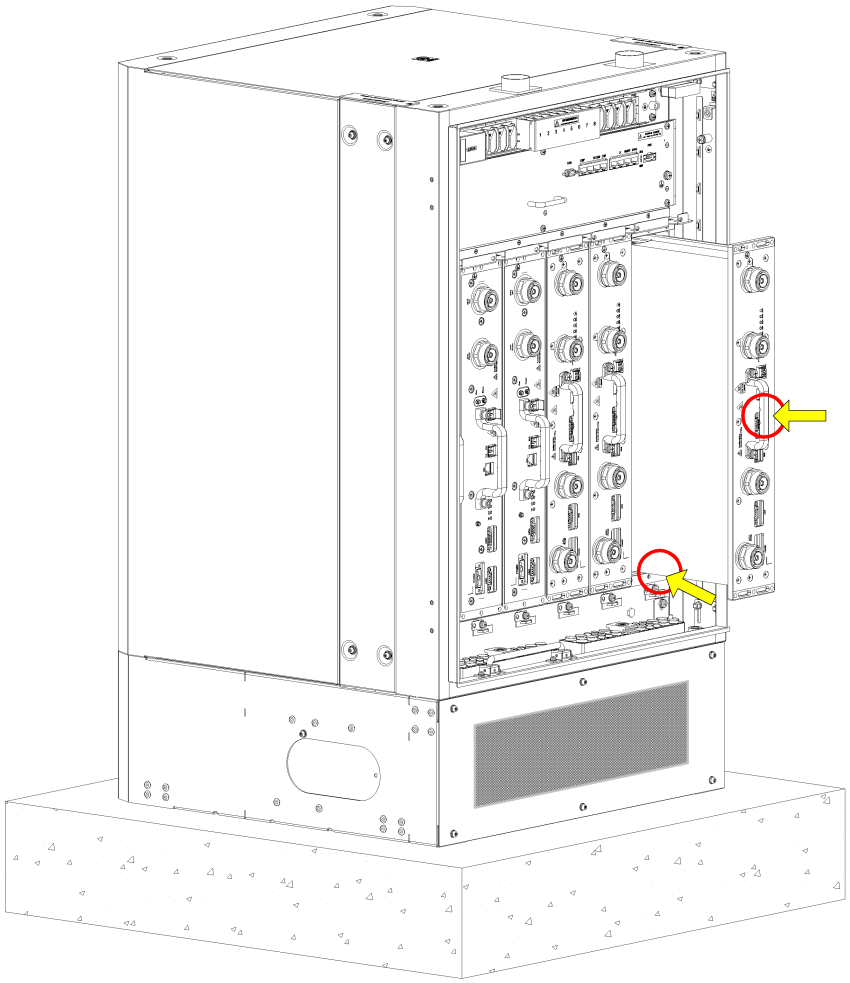
1. Determine the target slot, hold the handle of the module with one hand, support the lower back of the module with the other hand, and try to make parallel the module and the guiding plane, as shown in Figure 5-2.

Figure 5-2 Step 1



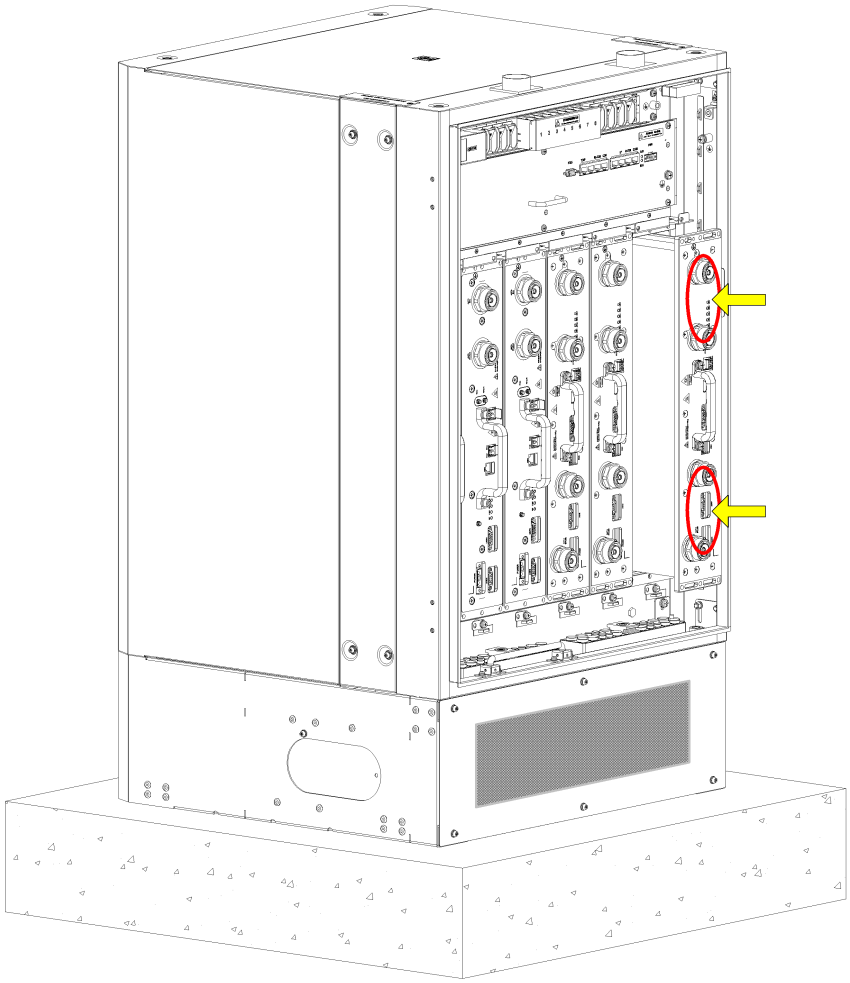
2. Push the module slightly into the slot to more than half the depth of the slot, as shown in Figure 5-3.

Figure 5-3 Step 2



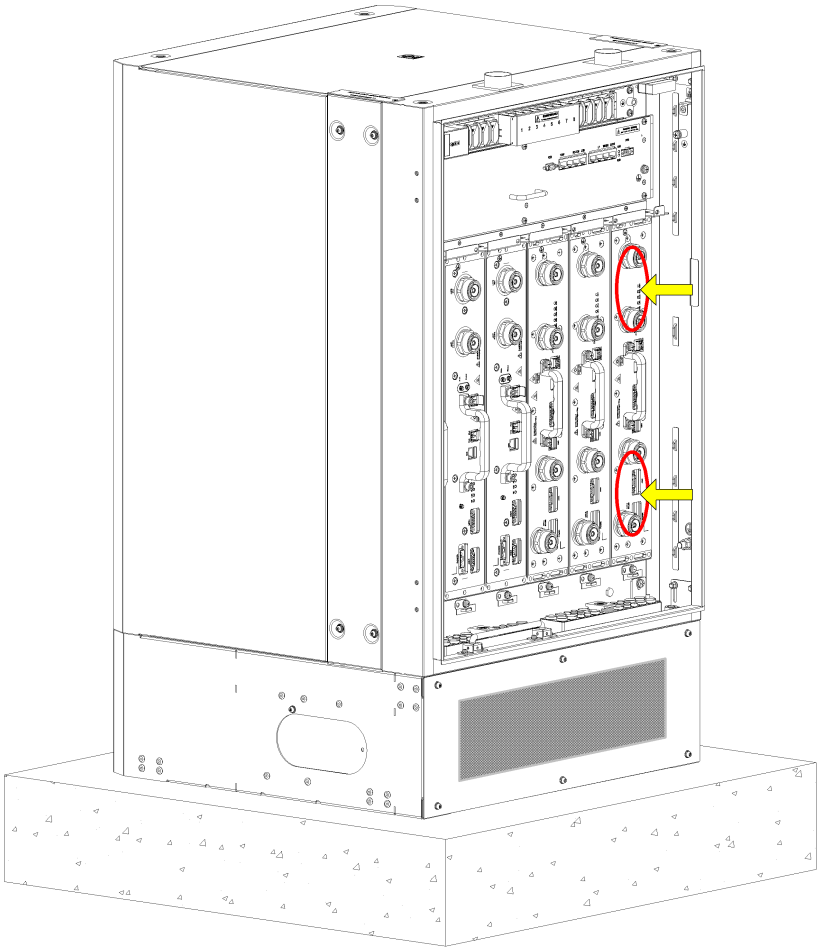
3. Change the place where exercise force and then push further the module with even force, as shown in Figure 5-4.

Figure 5-4 Step 3



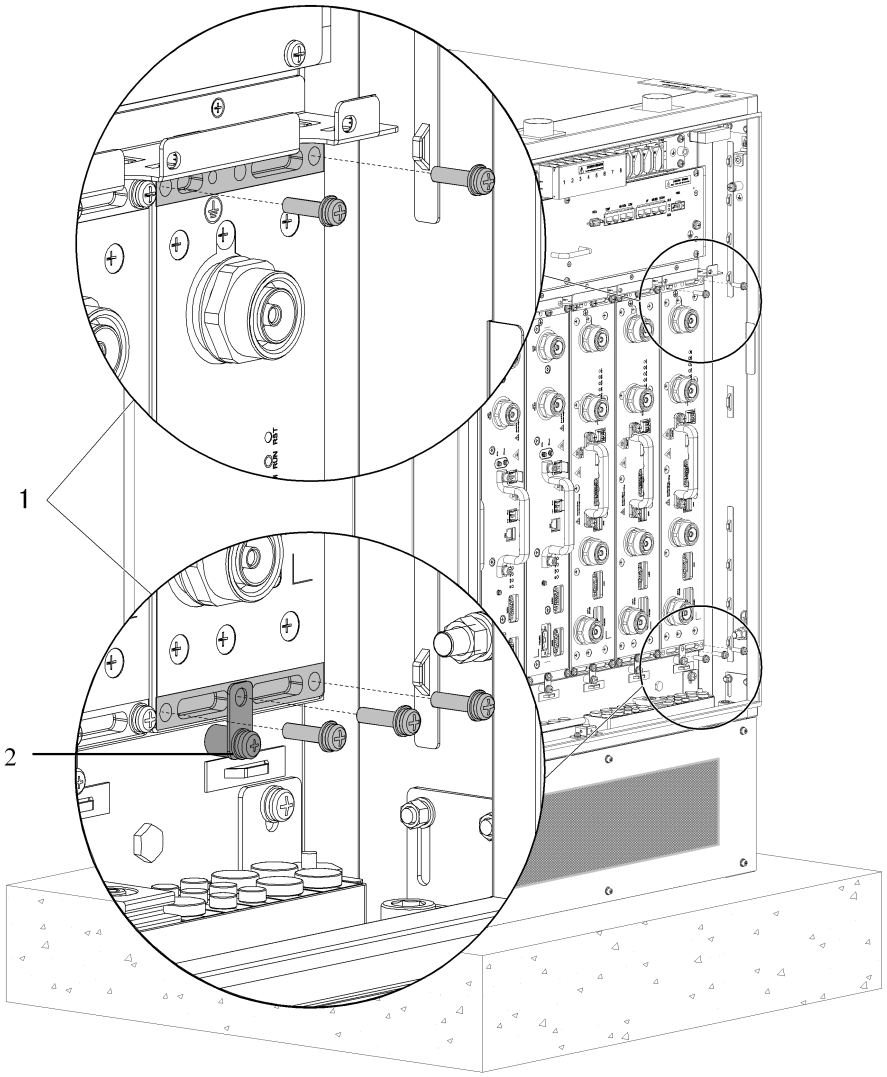
4. Push the module until the inner side of the front panel closely touch the vertical shaft, as shown in Figure 5-5.

Figure 5-5 Step 4



5. Secure the module using five M5 x 20 screws, as shown in Figure 5-6.

Figure 5-6 Step 5



1. Fixing the cabinet with 5 M5x20 screws
2. Fixing the grounding lug

6. Secure the ground lug.

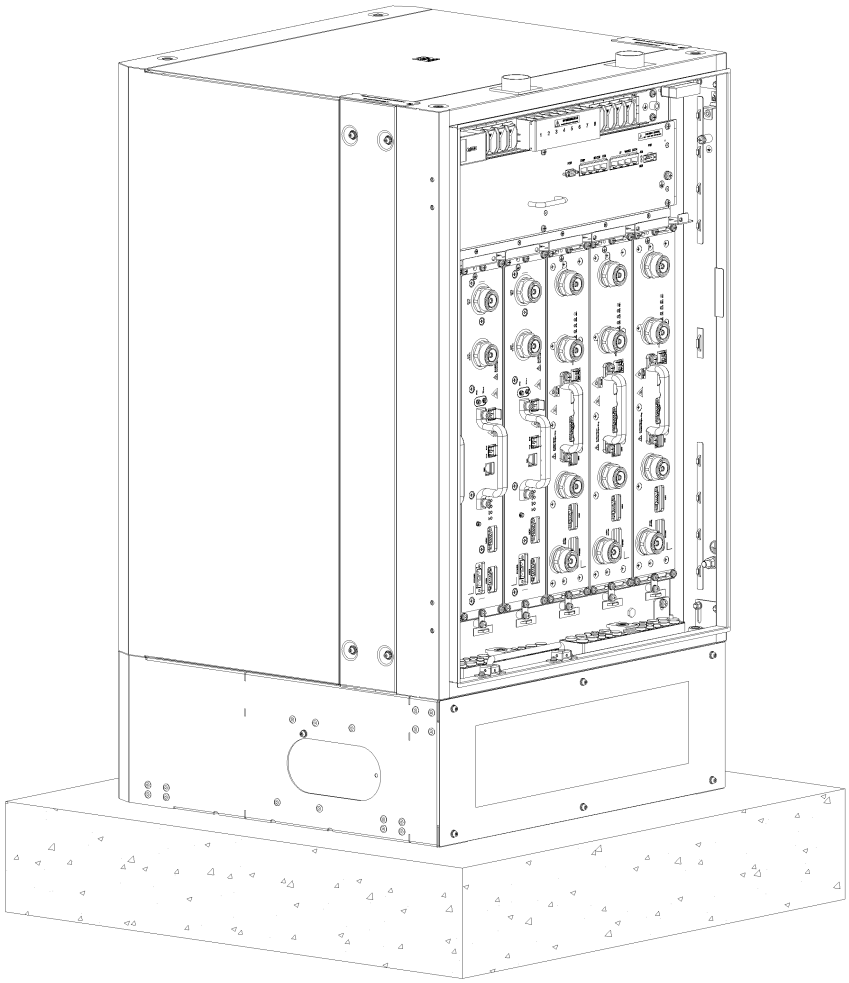
   As shown in Figure 5-6, the M5 x 20 screws secures the ground lug of the RSU module to the ground points.

   – End of Steps –

Result

Figure 5-7 shows the completion of installing the RF module.

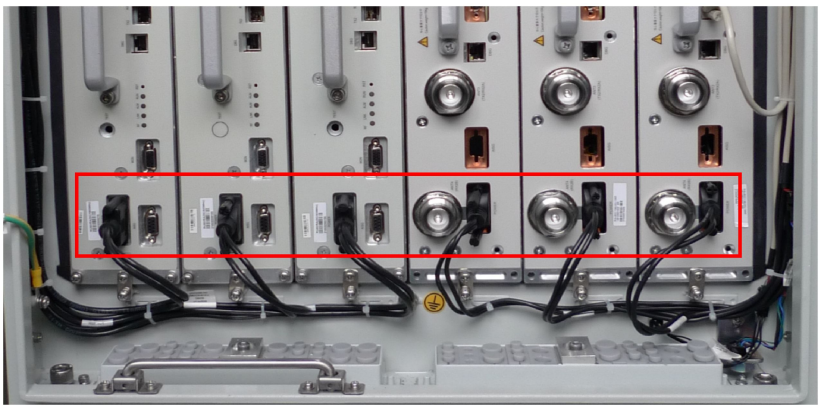
Figure 5-7 RSU Module Installed Completely



Follow-Up Action

After installing RSU modules, connect the RSU power cables to the RSU power interfaces.RSU power cables have been routed to proper slots, as shown in Figure 5-8.

Figure 5-8 Power Cable Connecting the RSU



5.2 Connecting RSU Monitoring Cable

Prerequisites

- ZXSDR RSU82C RF cabinet has already been installed.
- The RSU module has already been installed.

Context

The RSU monitoring cable of the RF cabinet is routed to the right side of the RF cabinet in delivery, as shown in Figure 5-9. After the RSU module is installed, insert the terminal of the RSU monitoring cable to the MON (monitoring) interface of the RSU module.

Figure 5-9 RSU Monitoring Cable

NOTE **Note:**

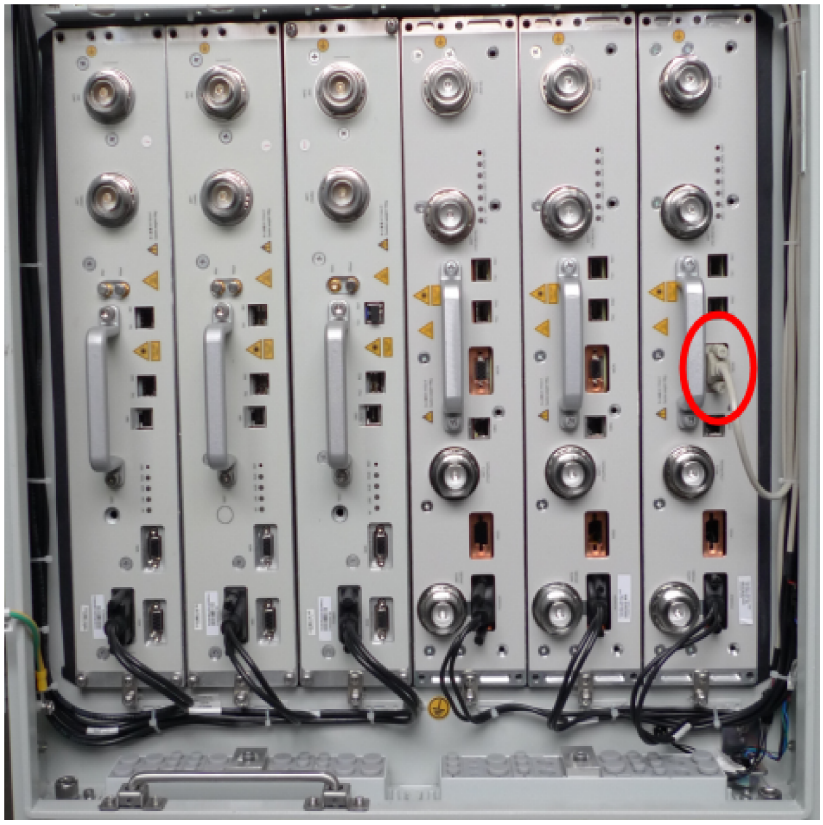
If multiple RSU modules need to be monitored, only one RSU module needs to be connected to the RSU monitoring cable.

Steps

1. Connect one end of the RSU monitoring cable to the MON (monitoring) interface of the RSU module and fasten the screw.
2. Bundle the RSU monitoring cable.

   Figure 5-10 shows the connected RSU monitoring cable.

Figure 5-10 Installing the RSU Monitoring Cable



– End of Steps –

5.3 Installing Optical Fibers Between BBU and RSU

Prerequisites

- The ESD wrist strap must be worn.
- The baseband power cabinet and the RF cabinet have been independently installed.

Context

When the baseband power cabinet and the RF cabinet are installed side by side or they are far away from each other, you need to connect BBU and RSU using optical fibers.

Pay attention to the following points when installing optical fibers:

- Do not damage the optical fiber cladding during operations.
- Protect optical fiber connectors and avoid contaminating them.
- Do not forcibly bundle optical fibers.
- Curve optical fibers at the turning.

Steps

1. Affix a temporary label.

Affix temporary labels to both ends of the new optical fiber to set up a mapping. If more than one optical fiber needs to be installed, use different labels to differentiate optical fibers.

2. Route optical fibers.

   a. Optical fibers go out from the side waterproof module of the baseband module and go through the routing apertures on the base.

   b. Then, optical fibers go through the routing apertures on the base of the RF cabinet, traverse the waterproof modules, and connect to the six optical interfaces for RF modules.

   Figure 5-11 shows how optical fibers traverse the waterproof modules.

Figure 5-11 Waterproof Module through Which Optical Fibers Pass

3. Insert optical fiber connectors.

   Insert optical fiber connectors according to the mapping on temporary labels.

Caution!

Insert optical fiber connectors tightly.

---

4. Bundle optical fibers.

   Bundle and secure optical fibers along the routing troughs, which complies with relevant regulations.

5. Affix an engineering label to an optical fiber.
   Remove the temporary label for the optical fiber and affix an engineering label.

Caution!

Protect an optical fiber with the winding tube when routing the optical fiber inside the cabinet. Protect an optical fiber with the corrugated pipe when routing the optical fiber outside the cabinet.

– End of Steps –

5.4 Installing the Interconnected Cable Between BBU and RSU

Prerequisites

- The ZXSDR RSU82C cabinet has already been installed.
- The BBU module and RSU module have already been installed.

Context

ZXSDR RSU82CIn the system, optical fibers or SFP cables can be used to connect BBU and RSU. During the stacked installation of the ZXSDR RSU82C, a 2 m SFP high-speed cable is recommended for interconnecting BBU and RSU. Figure 5-12 shows an SFP cable.

Figure 5-12 High-Speed Cable

Steps

1. Affix temporary labels to both ends of the SFR cable, with markings 0-5 to set up one-to-one mapping with interfaces TX0RX0 to TX5RX5 of BBU and six TX/RX interfaces of RSU.
2. Insert one end of the SFP cable to a TX/RX interface of RSU.
3. Route the SFP cable along the routing trough and cabinet sides to the FS module of BBU. The SFP cables connecting to the RSUs in slots 1 to 3 on the RF cabinet go through the left routing apertures and those SFP cables go through the right apertures if connecting to slots 4 to 6 on the RF cabinet, as shown in Figure 5-13 and Figure 5-14.

Figure 5-13 Layout of the SFP Cables in the RF Cabinet

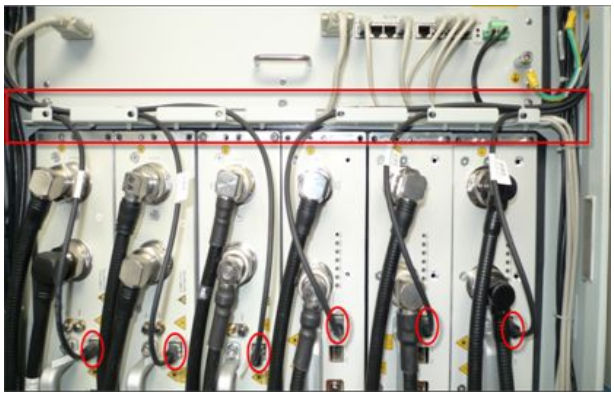
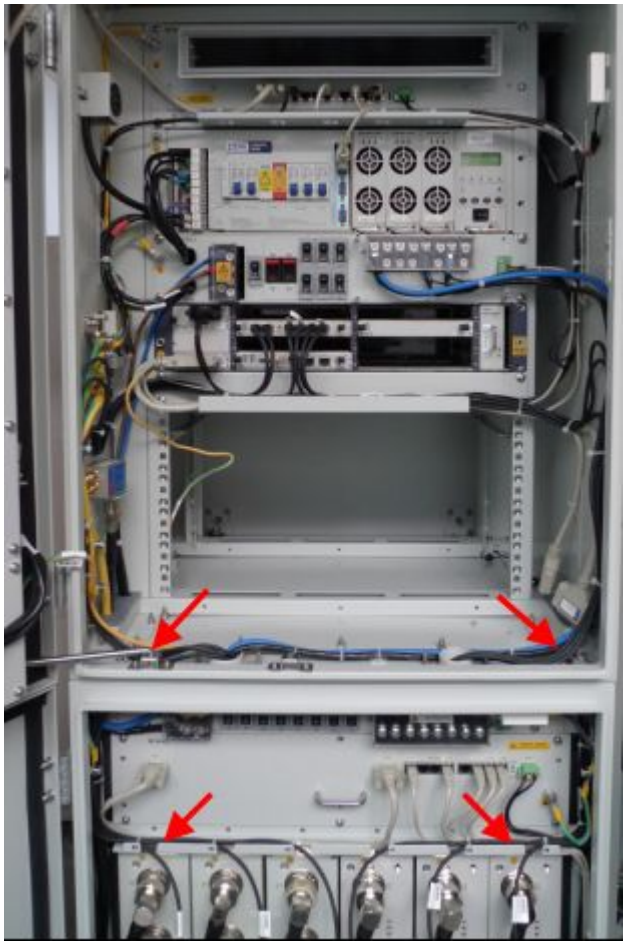


Figure 5-14 SFP Cable Layout



4. Insert SFP cables into the interfaces TX0RX0 to TX5RX5 of the BBU FS board according to the markings 0-5, as shown in Figure 5-15.

Figure 5-15 FS Board Connecting to the BBU

5. Bundle SFP cables.
6. Remove temporary labels and affix engineering labels.

– End of Steps –

5.5 Installing the RF Jumper

Prerequisites

The ZXSDR RSU82C RF cabinet and other modules have already been installed.

Context

The RF jumpers for the three ZXSDR RSU82C go through the waterproof module on the right.

Remove the front baffle of the base before installing the RF jumpers and reseat the front baffle after all jumpers are completely installed.

The typical loss of the RF cable (with the frequency 1.9 GHz and cable length 30 m) is 3.4 dB.

Steps

1. Connect the RF jumpers to ANT1 to ANT4 interfaces of RSU from left to right.
2. Wear the waterproof rubber plug after every two RF jumpers are installed.
3. Insert the horizontal and longitudinal slide blocks and use the hexagon ring wrench to fasten them.

Caution!

Clamp the waterproof rubber plug tightly and make sure that the unused cabling aperture wears the plug.

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4. Repeat the preceding steps to install other RSU-related jumpers.

– End of Steps –

Result

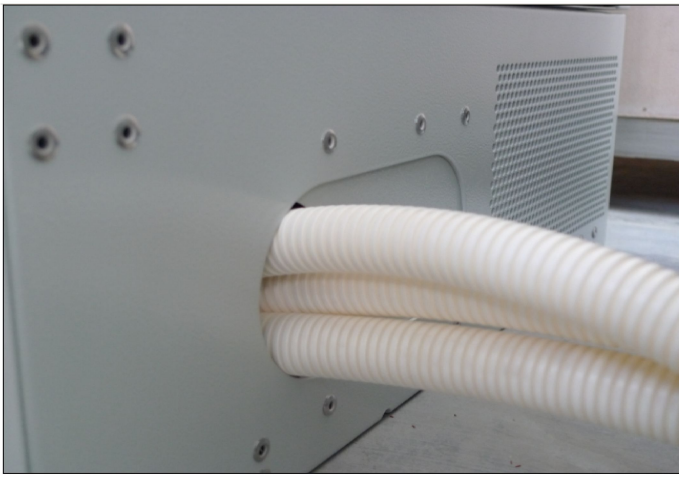
Figure 5-16 shows the completion of installing the RF jumpers.

Figure 5-16 Antenna Feeder Jumper Installed Completely

The RF jumpers go out from the base, as shown in Figure 5-17. The cables between cabinets must be protected with protective tubes, without any exposed part of the cables and the openings at two ends of these cables must be sealed, as shown in Figure 5-18.

Figure 5-17 Lead-Out of the Antenna Feeder Jumper

Figure 5-18 Cables in Tubes



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Figures

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Tables

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Glossary

AISG
- Antenna Interface Standards Group

BBU
- BaseBand Unit

BSC
- Base Station Controller

BTS
- Base Transceiver Station

CPRI
- Common Public Radio Interface

MS
- Mobile Station

RF
- Radio Frequency

RSSI
- Received Signal Strength Indicator

RSU
- RF System Unit

SDR
- Software Defined Radio