# ZXSDR BS8802 C100

## ZXSDR CDMA Basestation-8802

## User Guide

Version: 1.00

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## LEGAL INFORMATION



## Revision History

| Revision No. | Revision Date | Revision Reason |
|---|---|---|
| R1.1 | 2011–10–25 | Updated the “FCC & IC STATEMENT” and “FCC Radiation Exposure Statement”. |
| R1.0 | 2011–04–25 | First edition |

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# Content

# 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. And this device must accept any interference received, including interference that may cause undesired operation.

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**Note:**

This equipment has been tested and found to comply with the limits for a Class B 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.

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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.

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**Caution!**

Changes or modifications to this unit not expressly approved by the party responsible for compliance will void the user's authority to operate the equipment. Any change to the equipment will void FCC and IC grant.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to the FCC and IC Rules. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

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# 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.

This equipment generates RF electromagnetic energy during transmit mode.

This radio is designed for and classified as “Occupational Use Only”, meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards. This radio is NOT intended for use by the “General Population” in an uncontrolled environment.

This radio has been tested and complies with the FCC RF exposure limits for “Occupational Use Only”.

In addition, the equipment complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans:

1. FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
2. American National Standards Institute (C95.1-1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
3. American National Standards Institute (C95.3-1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields– RF and Microwave.
4. The following accessories are authorized for use with this product. Use of accessories other than those (listed in the instruction) specified may result in RF exposure levels exceeding the FCC requirements for wireless RF exposure.

# About This Manual

## Purpose

This manual describes the features and operation of ZXSDR BS8802 C100 CDMA indoor multi-carrier Pico Base Transceiver Station.

## Intended Audience

This document is intended for:

- Engineering technical engineer
- Installation engineer

## Prerequisite Skill and Knowledge

To use this document effectively, users should have a general understanding of the CDMA technology. Familiarity with the following is helpful:

- cdma2000 fundamental
- Software basic knowledge

## What is in This Manual

This manual contains the following chapters.

| Section | Summary |
|---|---|
| Chapter 1 System Description | Gives an overview, function, and interfaces of ZXSDR BS8802 C100. |
| Chapter 2 System Structure | Describes the system structure of ZXSDR BS8802 C100, including hardware structure and software structure. |
| Chapter 3 Indices | Describes the indices of ZXSDR BS8802 C100. |
| Chapter 4 Networking | Describes the networking mode of ZXSDR BS8802 C100. |
| Chapter 5 Application | Describes the application scenarios of ZXSDR BS8802 C100. |
| Chapter 6 Hardware Installation | Describes the installation procedure of ZXSDR BS8802 C100. |

## Conventions

ZTE documents employ the following typographical conventions.

| Typeface | Meaning |
|---|---|
| Italics | References to other Manuals and documents. |
| “Quotes” | Links on screens. |

| Typeface | Meaning |
| --- | --- |
| Bold | Menus, menu options, function names, input fields, radio button names, check boxes, drop-down lists, dialog box names, window names. |
| CAPS | Keys on the keyboard and buttons on screens and company name. |
|   | Note: Provides additional information about a certain topic. |
|  | Checkpoint: Indicates that a particular step needs to be checked before proceeding further. |
|   | Tip: Indicates a suggestion or hint to make things easier or more productive for the reader. |

# Chapter 1
# System Description

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## 1.1 System Background

As a 3G mobile communication system, CDMA2000 is the mainstream system and widely used in the whole world. It comprises MSS, BSS, and MS. BSS comprises BTS and BSC.

With the optimization and improvement of CDMA network, all operators focus more attention on blind spot coverage and support of enterprise services. In current and future network construction, the focus goes to enterprise radio service, service balancing in hot spots, family radio communication, and other blind fields, and solution and optimization scheme for building coverage.

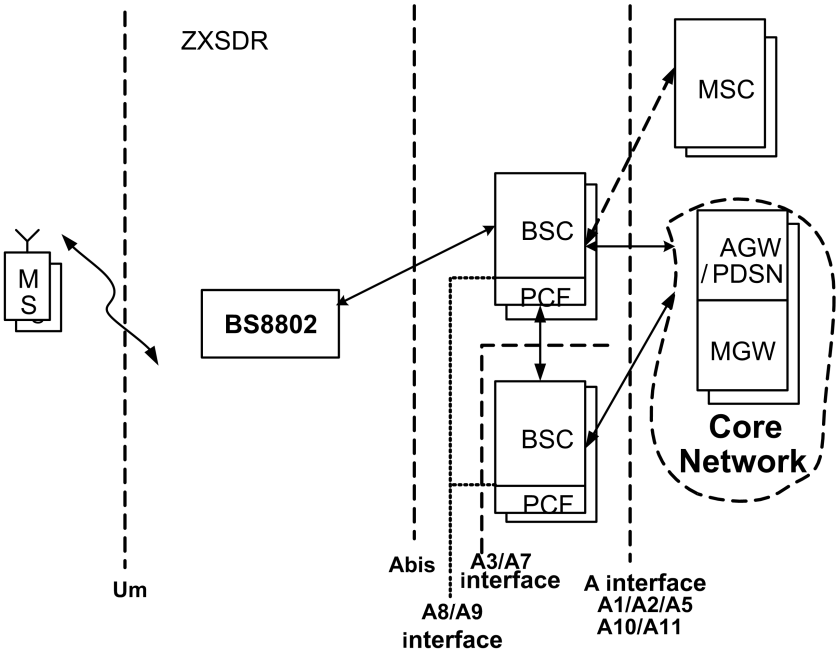
Under this background, ZTE launches the ZXSDR BS8802 C100 Pico Cell BTS and network solution. ZXSDR BS8802 C100 is an indoor multi-carrier Pico Base Transceiver Station, with low cost and low power. It is based on ALL-IP architecture, which facilitates the construction of flexible cross-area network modes and virtual wireless network.

ZXSDR BS8802 C100 is mainly used to cover a particular indoor area and provide CDMA service access. In addition, ZXSDR BS8802 C100 can manage radio resources in conjunction with remote BSC.

## 1.2 System Position

ZXSDR BS8802 C100 is an indoor multi-carrier Pico BTS. In the CDMA mobile communication network, its relationship with other related entities is shown in Figure 1-1.

**Figure 1-1 Position of ZXSDR BS8802 C100 in CDMA system**




ZXSDR BS8802 C100 is in the position of wireless access, connecting the mobile station and Base Station Controller (BSC). Its corresponding system interfaces are:

- Abis interface

  ZXSDR BS8802 C100 communicates with BSC through the Abis interface. The Abis interface is an interior interface of the system, supporting IP Over Ethernet interface.

- Um interface

  Um interface is the interface connecting the access terminal AT and ZXSDR BS8802 C100, following IS-2000 ReleaseA series standards and IS-856-A standard.

# 1.3 Appearance

Figure 1-2 shows ZXSDR BS8802 C100 appearance.

**Figure 1-2 ZXSDR BS8802 C100 Appearance**


ZXSDR BS8802 C100 product is fashionable and graceful in appearance. The product cover adopts engineering plastic modulation and the bottom adopts aluminum alloy modulation.

# 1.4 System Functions

ZXSDR BS8802 C100 is a super-mini IP-based BTS designed with the all-IP technology, applicable to indoor scenarios. Besides the basic functions of BTS such as base band modulation and demodulation, RF signal transmission and demodulation, radio resources allocation, call processing, power control and soft handoff, it is characterized by auto IP capturing, public network traversing, simple transmission back path, several clock synchronization, and easy installation, etc.

ZXSDR BS8802 C100 is based on all-IP platform design. A single site can support three carriers and one pseudo pilot maximally, including one 1x carrier, two DO carriers, and one 1x pseudo pilot. It supports the baseband processing of CDMA2000 1X and 1x EV-DO services, and the radio frequency capacity of 600 mW. By upgrading software, it can upgrade from EV-DO Rev.A to EV-DO Rev.B (including EV-DO Rev.B Phase II).

It is featured by small size, light weight, low power consumption, easy installation, low matching requirements and multiple clocks, etc. It is applicable to small-capacity indoor scenarios, and can be mounted on the wall, pole or ceiling, etc.

Table 1-1 shows the main functions provided by ZXSDR BS8802 C100.

**Table 1-1 ZXSDR BS8802 C100 Functions**

| Function Category | Function Description |
|---|---|
| Basic Baseband Function | Modulation/demodulation |
| | Radio resource management |
| | Call processing |
| | Handoff control |
| | Power control |
| | RGPS, GPS timing and synchronization |
| Basic RF Function | Band: 800 MHz, 1.9 GHz |
| | RF modulation/demodulation |
| | RF reception and transmission |
| | Low noise amplification for received RF signal |
| | Amplification for transmitted RF signal |
| Interface | Abis interface: supports IP Over Ethernet access |
| | Air interface: supports IS-2000 Release A and IS-856-A standards |
| | Antenna interface: supports RF transmission and reception |
| | Power interface: DC 12 V ~ 13 V |
| | LMT interface: supports local maintenance |
| | GPS interface: supports GPS |
| | RGPS interface: supports RGPS |
| | USB interface: reserved interface which is not used at present |
| | RST interface: supports hardware reset |
| DHCP | Automatic IP obtaining |
| IPsec | Supporting IPsec |
| IEEE1588 | Supporting IEEE1588; ZXSDR BS8802 C100 can be used as primary clock server, which allocates clocks to other ZXSDR BS8802 C100 devices in the same Ethernet; it also supports the clocks allocated by external 1588 clock server |
| Networking | Star |

| Function Category | Function Description |
|---|---|
| Equipment Maintenance and test | Supports local maintenance |
| | Supports remote upgrade of software version for FPGA/BOOT/DSP/CPU |
| | Remote reset, power off, and local hard reset of service boards |
| | Electronic label |
| | Power query: baseband power, RF power |
| | RSSI query |
| | Power amplification control and protection: over-power, over-temperature protection |
| | Fault self-healing |
| Scenario | Indoor applications |

# 1.5 System Features

ZXSDR BS8802 C100 enables operators to easily solve Features the signal coverage in the residential area, basements, and commercial office buildings, etc. It is the first choice of operators to build quality network, and to solve the hot-spot area coverage problems quickly with low cost, especially the coverage problems cannot solved by traditional base stations.

ZXSDR BS8802 C100 solution is forward-looking and has fully considered the actual requirements of operators. It has the following characteristics:

- Small size, light weight

  It is 2.7 L in size and less than 2 kg in weight. One person can easily transport, carry and install it. It can save the transportation and labor cost, and achieve fast deployment.

- Flexible installation

  It can be mounted on the wall, pole, or ceiling. The installation is simple and takes little time. The sites can be set up quickly, greatly reducing the engineering construction fee.

- Zero footprint

  Since it hardly occupies any indoor space, there is no need to rent equipment room especially. To mount the ZXSDR BS8802 C100 on the wall, ceiling or pole can greatly reduce the fee on renting and coordination.

- Low requirements on power supply

It supports 110 V and 220 V AC power supply. It only needs the AC socket, and does not need additional power system. It can be installed inside the buildings of large and middle cities. It needs no batteries as slave power.

- GPS (or RGPS) distributed installation

  For a building with several ZXSDR BS8802 C100 devices, only one GPS/RGPS needs to be installed. Adopt the power splitter or one ZXSDR BS8802 C100 device as main server, which then distributes clock to other ZXSDR BS8802 C100 devices. It is simple in installation and saves GPS\RGPS, feeder cable, and costs.

- Low-cost IP transmission

  It adopts Ethernet for transmission, and can access multiple access devices such as ADSL, Cable Modem, switch, xPON, and satellite transmission. It abandons expensive E1/T1 and optic fiber transmission, greatly saving the investment cost on transmission.

- Large capacity

  It supports 1x and DO services simultaneously, and can evolve to EV-DO Rev.B through software upgrade.

- Environment protection

  It has small transmission power and low power consumption, thus saving the electricity fee. It satisfies the RoSH requirements.

- Easy maintenance and operation

  It supports remote or local maintenance. The maintenance personnel can upgrade the software via U disk, and can make troubleshooting through the indicator light on the panel.

As for the indoor coverage, ZXSDR BS8802 C100 has many advantages and can complement the existing indoor coverage solutions. It can help operators to raise indoor coverage quality and enhance market competitive force on the foundation of low-cost networking.

# 1.6 External Interfaces

The external interfaces of ZXSDR BS8802 C100 are located on the rear panel. The layout is as shown in Figure 1-3.

**Figure 1-3 External Interfaces**

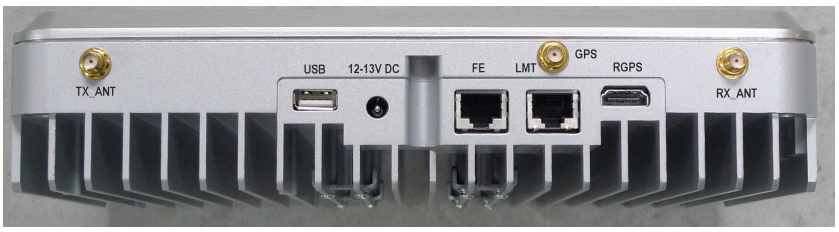



Table 1-2 shows a description of the ZXSDR BS8802 C100 external interfaces.

**Table 1-2 External Interfaces**

| Interface | Description |
|---|---|
| TX_ANT | Antenna interface for send |
| RX_ANT | Antenna interface for receive |
| USB | Reserved interface which is not used at present |
| FE | Ethernet interface for Abis interface |
| LMT | Ethernet interface for LMT operation and maintenance |
| GPS | GPS interface for GPS antenna |
| RGPS | GPS interface for remote GPS antenna |
| 12–13V DC | DC input |

# 1.7 Standards Complied

ZXSDR BS8802 C100 complies with the following standards:

- 3GPP2 C.S0063-A, *cdma2000 High Rate Packet Data Supplemental Services*
- 3GPP2 C.S0063-0, *cdma2000 High Rate Packet Data Supplemental Services*
- 3GPP2 A.S0008-A.*Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces With Session Control in the Access Network*
- 3GPP2 A.S0008 (TIA/EIA IS-878), *IOS Specification for High Rate Packet Data (HRPD) Radio Access Network Interfaces*.
- 3GPP2 C.S0024-B (TIA/EIA IS-856-B): cdma2000 High Rate Packet Data Air Interface Specification
- 3GPP2 C.S0024 (TIA/EIA IS-856): *CDMA2000 High Rate Packet Data Air Interface Specification,* October 2002.
- 3GPP2 C.S0024-A (TIA/EIA IS-856-A): *CDMA2000 High Rate Packet Data Air Interface Specification,* August 2005.
- CDG RF36, *Markov Service Option for Wideband Spread Spectrum Communications Systems.*
- TIA/EIA/IS-707-A-2 *Data Service Options for Spread Spectrum Systems Addendum 2,* 2000.
- TIA/EIA/IS-637, *Short Message Services for Wideband Spread Spectrum Cellular Systems,* 1997.
- TIA/EIA/IS-95, *Mobile Station-Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular Systems.*
- TIA/EIA/IS-127, *Enhanced Variable Rate Codec Speech Service Option 3 for Wideband Spread Spectrum Digital Systems,* 1996.
- TIA/EIA/IS-658, *Data Service Interworking Function Interface for Wideband Spread Spectrum Systems.*

- TIA/EIA/IS-95-A, *Mobile Station-Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular Systems.*
- ANSI J-STD-008, *Personal Station-Base Station Compatibility Requirement for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Communications System*, 1996.
- TIA/EIA/TSB-58, *Administration Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards,* 1995.
- 3GPP2 C.S0004-A version 6.0 (TIA/EIA IS-2000.4-A-2): *Signaling Link Access Control (LAC) Specification for CDMA2000 Spread Spectrum Systems - Release A.*
- TIA/EIA/IS-725, *Over-the-Air Service Provisioning of Mobile Stations in Wideband Spread Spectrum Systems,* 1997.
- 3GPP2 C.S0001-A version 5.0: *Introduction to CDMA2000 Standards for Spread Spectrum Systems - Release A.*
- TIA/EIA/TSB-74, *Support for 14*.4 Kbps Data Rate and PCS Interaction for Wideband Spread Spectrum Cellular System, 1995.
- TIA/EIA/IS-728, *Inter-System Link Protocol.*
- 3GPP2 C.S0005-A version 6.0 (TIA/EIA IS-2000.5-A-2): *Upper Layer (Layer 3) Signaling Standard for CDMA2000 Spread Spectrum Systems - Release A, Addendum 2.*
- TIA/EIA/IS-733, *High Rate Speech Service Option 17 for Wideband Spread Spectrum Communication Systems.*
- 3GPP2 C.S0002-A version 6.0 (TIA/EIA IS-2000.2-A-2): *Physical Layer Standard for CDMA2000 Spread Spectrum Systems - Release A.*
- 3GPP2 C.S0003-A version 6.0 (TIA/EIA IS-2000.3-A-2): *Medium Access Control (MAC) Standard for CDMA2000 Spread Spectrum Systems - Release A, Addendum 2.*
- TIA/EIA/IS-707, *Data Service Options for Wideband Spread Spectrum Systems,* 1998.

# Chapter 2
# System Structure

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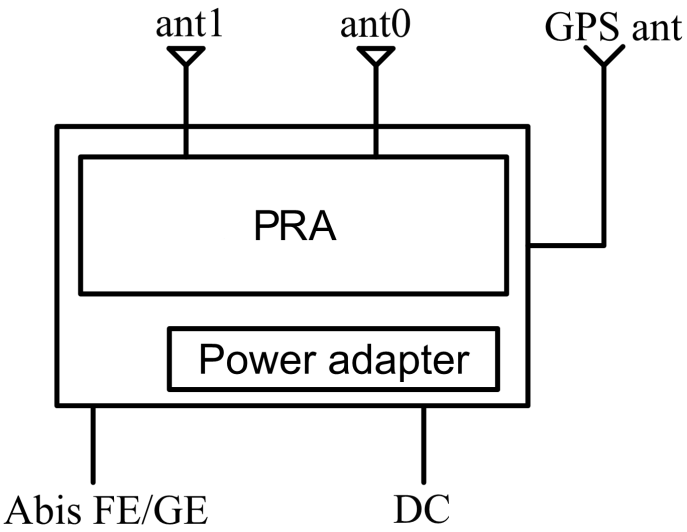
## 2.1 System Architecture

As a highly integrated ultra-small base station, ZXSDR BS8802 C100 integrates the radio frequency part, baseband section, power section, and control section to achieve the functions of the whole base station. ZXSDR BS8802 C100 is featured by high integration and small size. The product is forward-looking and competitive. The system diagram is shown as Figure 2-1.

**Figure 2-1 ZXSDR BS8802 C100 System Structure**




ZXSDR BS8802 C100 consists of PRA, AC-DC power adapter, and external transmitting and receiving antenna:

- Integration unit-PRA

  PRA is the unit with integrated functions such as control, clock, access, baseband, and radio frequency. It is the core unit of ZXSDR BS8802 C100.

- Power adapter

  The power unit of ZXSDR BS8802 C100 consists of AC-DC power adapter and electric cables.

- External transmitting and receiving antenna

  The external transmitting and receiving antenna consists of two independent RF antennae.

# 2.2 PRA Structure

PRA, as the core unit of ZXSDR BS8802 C100, consists of radio frequency unit, baseband unit, control unit, clock unit, and power unit. Figure 2-2 shows the PRA structure of ZXSDR BS8802 C100.

**Figure 2-2 PRA Structure**

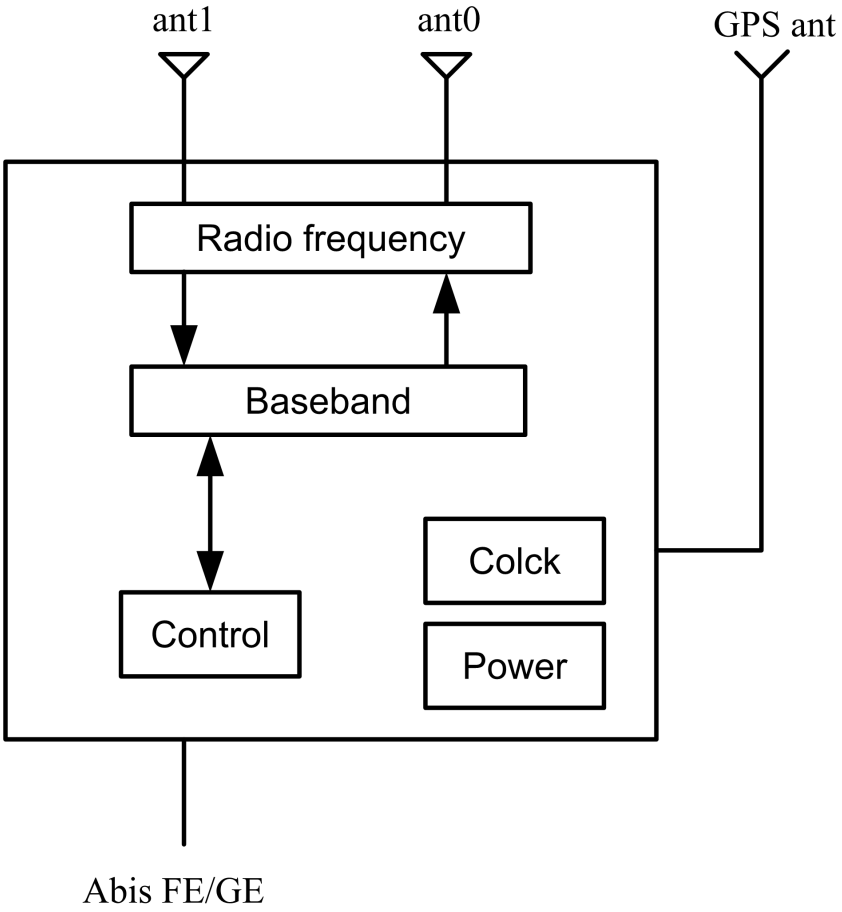



Table 2-1 describes the functions of PRA modules.

**Table 2-1 ZXSDR BS8802 C100 Modules and Their Functions**

| Name | Function |
|---|---|
| Radio frequency | • Provides RF signal modulation and demodulation;<br>• Provides transmission RF signal amplification. |

| Name | Function |
|---|---|
| Baseband | ● Provides CDMA1X and EV-DO modulation and demodulation;<br>● Provides the interface with RF link and intermediate frequency processing. |
| Control | ● Provides FE\GE Ethernet access;<br>● Provides controls over units inside the system. |
| Clock | ● Receives GPS satellite signals, provides system clock and RF reference clock.<br>● Provides various clocks used by the system internally. |
| Power | Provides system power distribution. |

# 2.3 Signal Processing Flow

The internal signal processing flow of ZXSDR BS8802 C100 is as below:

- Forward link processing

  The business data from BSC enters the baseband unit through the control unit, and then for CDMA modulation and intermediate frequency processing. After the power amplification of TX unit RF link, it is sent to the antenna for transmission.

- Reverse link processing

  The reverse CDMA signals from the antenna are converted to baseband digital signal after being processed by RX unit. After signal processing, it is processed by the control unit and packed into Ethernet frame. It is finally transmitted to the BSC via Ethernet.

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# Chapter 3
# Indices

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## 3.1 Physical Indices

Dimension: 260 mm ×180 mm ×58 mm (L×W×H)

Weight: less than 2 Kg (standard, excluding power adapter and installation kits)

## 3.2 Capacity Indices

ZXSDR BS8802 C100 capacity indices is shown as Table 3-1.

**Table 3-1 ZXSDR BS8802 C100 Capacity Indices**

| Item | Carriers supported | Application |
|---|---|---|
| 1 | 1C 1X + 2C DO + 1 Pseudo Pilot | Supporting 1x, DOrA, DOrB applications |
| 2 | 1C 1X + 1C DO + 2 Pseudo Pilots | Supporting 1x, DOrA, DOrB applications |
| 3 | 2C DO | Only applicable to data service, not supporting hardware upgrade |
| 4 | 1C 1X + 1 Pseudo Pilot | Only applicable to voice service, not supporting hardware upgrade |

## 3.3 Reliability Indices

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

# 3.4 Power Indices

Local power voltage range: 85 V AC to 264 V AC.

The typical power consumption is 33 W.

# 3.5 Temperature and Humidity

Temperature: -20 ℃ to +45 ℃. The change frequency must be less than 0.5 ℃/min.

Relative humidity: 5% to 95%

# 3.6 Environmental Classes

- Grade Of Protection: IP30.
- Grounding Requirements: Joint grounding resistance less 1 Ω; BTS grounding resistance less 5 Ω.
- Noise: Noise of working environment: less 65 dBA.

# 3.7 RF Indices

RF indices of the ZXSDR BS8802 C100 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 3-2 illustrates the 800 MHz transmitter indices.

**Table 3-2 800 MHz Transmitter Indices**

| Name | Index |
|---|---|
| Operating band | 800 MHz (Band Class 0) |
| Transmitter output frequency tolerance | ± 0.01 ppm |
| Occupied channel bandwidth | 1.23 MHz (Band Class 0) |
| Output power at the Top of Cabinet (TOC) | 600 mW |
| Total transmit power | The total transmit power is within +2 dB and -4 dB of the manufacturer's rated power. |
| Modulation mode | Quadrature amplitude modulation |

| Name | Index |
|---|---|
| Conducted spurious emission and radiated spurious emission suppression | < -45dBc @±750kHz offset Center Freq (RBW 30kHz)<br>< -60dBc @±1.98MHz offset Center Freq(RBW 30kHz)<br>>4MHz OFFSET:<br>< -36dBm(RBW 1kHz) @ 9KHz < f < 150KHz<br><-36dBm(RBW 10kHz) @ 150KHz < f < 30MHz<br><-30dBm(RBW 1MHz) @ 1GHz < f < 12.5GHz<br>4-6.4MHz OFFSET:<br><-36dBm(RBW 1kHz) @ 30MHz < f < 1GHz<br>6.4M TO 16M OFFSET:<br><-36dBm(RBW 10kHz) @ 30MHz < f < 1GHz<br>>16MHz OFFSET:<br><-36dBm(RBW 100kHz) @ 30MHz < f < 1GHz |
| 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 1.25M. |
| 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 0.970 dBm with 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. |
| 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 3-3 illustrates the 1.9 GHz transmitter indices.

**Table 3-3 1.9 GHz Transmitter Indices**

| Name | Index |
|---|---|
| Operating band | 1.9 GHz (Band Class 1) |
| Transmitter output frequency tolerance | ± 0.01 ppm |
| Occupied channel bandwidth | 1.25 MHz |
| Output power at the Top of Cabinet (TOC) | 600 mW |
| 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)<br>< -55 dBc @±1.98 MHz offset Center Freq (RBW 30kHz)<br>> 4 MHz OFFSET:<br>< -36 dBm (RBW 1kHz) @ 9KHz < f < 150 kHz<br>< -36 dBm (RBW 10kHz) @ 150 kHz < f < 30 MHz<br>< -36 dBm (RBW 100kHz) @ 30 MHz < f < 1 GHz<br>4-16 MHz OFFSET:<br>< -30 dBm (RBW 30kHz) @ 1 GHz < f < 12.5 GHz<br>16M-19.2M OFFSET:<br><-30dBm(RBW 300kHz) @ 1GHz < f < 12.5GHz<br>>19.2MHz OFFSET:<br><-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 800 MHz receiver indices.

**Table 3-4 800 MHz Receiver Indices**

| Name | Index |
|---|---|
| Operating band | 800 MHz (Band Class 0) |
| Receiver sensitivity | < -121 dBm |
| Receiver dynamic range | When the lower limit is the receiver sensitivity and the upper limit (noise level) equals 55 dBm/1.23MHz (Eb/N0 = 10 dB±1dB), the Frame Error Rate (FER) is lower than 1%. |
| Noise figure | < 3 |
| 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%.<br>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 | BAND 0:<br>In the presence of two interfering tones that are 60 dB above the CDMA signal level, and are at offsets of +900 kHz, +1.7 MHz, -900 kHz and -1.7 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%. |
| Conducted spurious emissions and radiated spurious emissions | < -80 dBm, measured within the BTS receive band<br>< -60 dBm, measured within the BTS transmit band |
| Radio frequency Front End SWR | < 2.0 |

Table 3-5 illustrates the 1.9 GHz receiver indices.

**Table 3-5 1.9 GHz Receiver Indices**

| Name | Index |
|---|---|
| Operating band | 1.9G Hz (Band Class 1&14) |
| Receiver sensitivity | < -121 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%.<br>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%. |
| Conducted spurious emissions and radiated spurious emissions | < -80 dBm, measured within the BTS receive band<br>< -60 dBm, measured within the BTS transmit band |
| Radio frequency Front End SWR | < 2.0 |

# 3.8 BTS Clock Technical Parameters

- BTS clock technical parameters

  Frequency benchmark: 10 MHz, in locked GPS status, the accuracy of the frequency is superior to $10^{-10}$; in holding status, the accuracy of the frequency is superior to $10^{-10}$.

  Temperature characteristics: < ± $1\times10^{-8}$

- Clock synchronous source

  If the clock synchronous source is lost temporarily or the base station clock falls out of step, to keep the short-term stability of the clock, the HOLDOVER algorithm can be adopted to assure the normal operation of the base station when the sync signal gets lost, so that the phase drift within 4 hours is superior to 10μs.

- Clock system performance

  Frequency difference: < 0.05 ppm

  Phase difference: < 10 us

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# Chapter 4
# Networking

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## 4.1 Overview

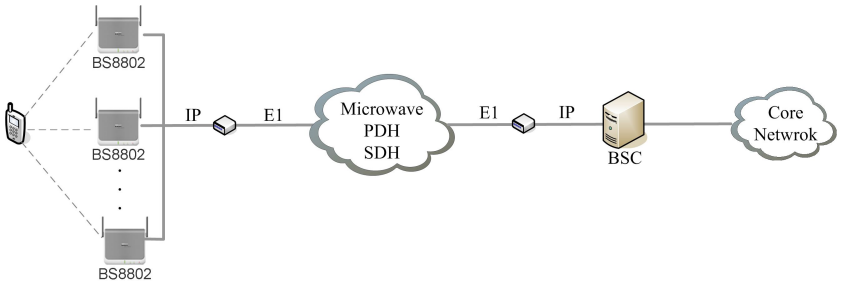
The transmission link between ZXSDR BS8802 C100 and BSC uses IP packets. Therefore, ZXSDR BS8802 C100 networking can make full use of the rich IP network resources. In this way, the investment on dedicated circuit transmission network is saved.

The following part describes three networking modes using different transmission resources.

## 4.2 Existing Transmission Resource

If there are idle transmission timeslots between target coverage area and BSC, the networking mode shown in Figure 4-1 can be used to make full use of existing transmission resources. In actual practice, as E1 transmission link always exists between coverage site and BSC, use a pair of G.703-V.35 protocol converter to convert IP signals and E1 signals.

**Figure 4-1 Existing Transmission Resource**



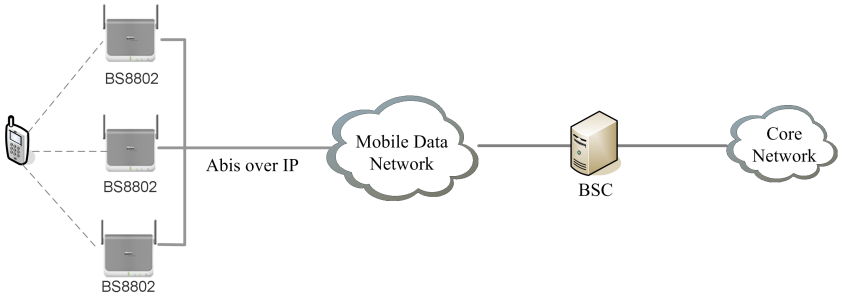

Advantage: It guarantees the transmission quality and utilizes the operator's existing resources.

Disadvantage: It does not make use of the advantage of IP transmission, and signal conversion introduces delay loss.

# 4.3 Mobile Data Network

If the operators have their own data network between the target coverage area and BSC, preferably use the networking mode shown in Figure 4-2. In this mode, G.703-V.35 protocol converter is not required as both the transmission network and signals to be sent are in IP mode.

**Figure 4-2 Mobile Data Network**



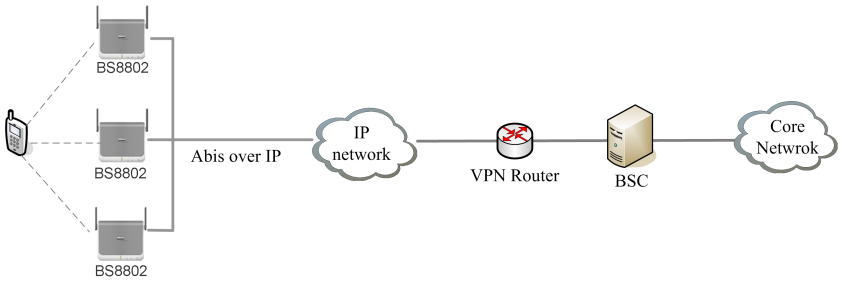

Advantage: The QoS is guaranteed during data transmissions through operator's own data network.

Disadvantage: Few operators have their own data network.

# 4.4 Public Network Resource

As the signals are IP-based, ZXSDR BS8802 C100 can make full use of public network resources such as the Internet to transmit signals. The networking mode is as shown in Figure 4-3.

**Figure 4-3 Public Network Resource**




Advantage: Flexible and convenient, and rich network resources.

Disadvantage: Unstable QoS, as affected by network capacity due to transmission delay on the public network.

# Chapter 5
# Application

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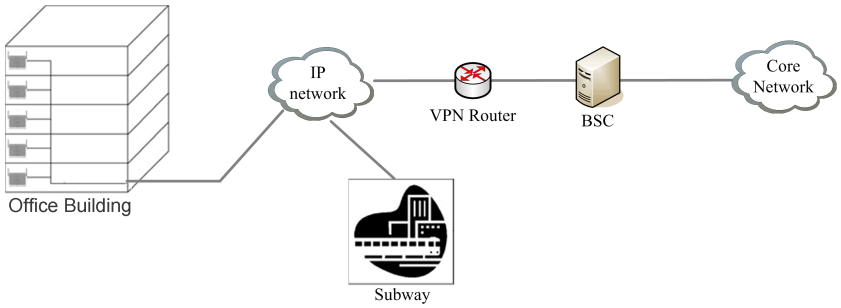
## 5.1 Overview

As a compact, highly effective, and quiet indoor pico cell BTS, ZXSDR BS8802 C100 is mainly used for indoor coverage. It can be fixed on wall and is harmonious with various indoor decoration styles. Moreover, its ultra low power output makes it meet the strict environment protection requirement.

ZXSDR BS8802 C100 supports 1X, EV-DO. It is compatible with subsequent evolution and supports broadband user experience, thus becoming the preferred equipment for cost effective indoor coverage.

Figure 5-1 shows the indoor coverage networking solution.

**Figure 5-1 Indoor Coverage**



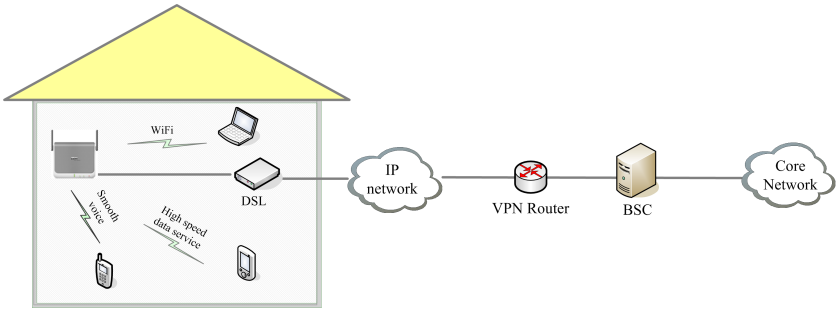

In different indoor scenarios, ZXSDR BS8802 C100 has different applications. The following part describes some typical application solutions.

## 5.2 Family Coverage

ZXSDR BS8802 C100 is small-sized, light, and easy to install. By utilizing the existing indoor broadband system, it can easily meet the requirement of community inhabitants on multiple services. In addition to improve family coverage, its WLAN function enables ZXSDR BS8802 C100 to provide an all-round high rate data access service to the family.

Therefore, ZXSDR BS8802 C100 can be used as an important means for family coverage. Figure 5-2 shows the solution.

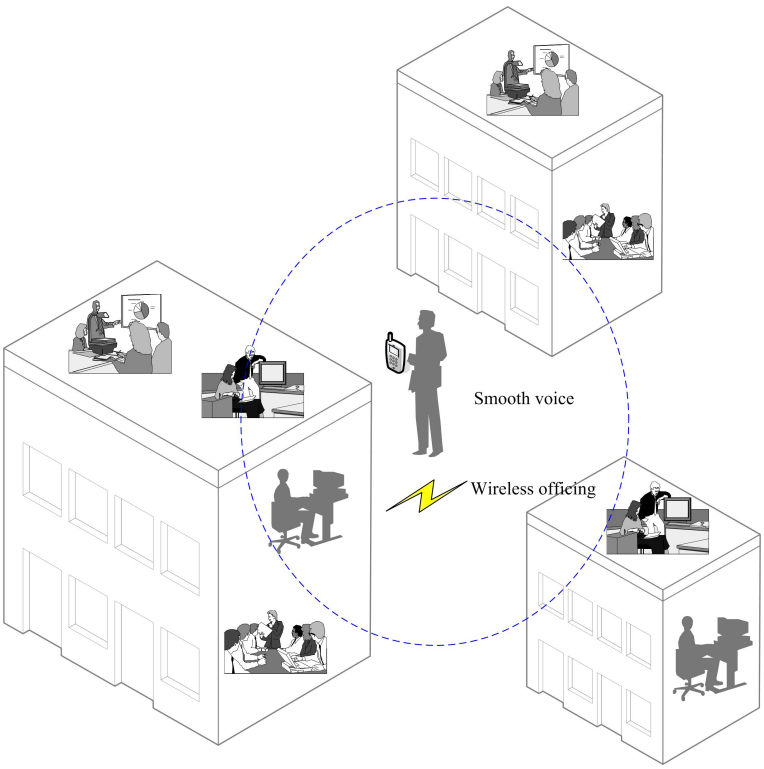
**Figure 5-2 Family Coverage**




# 5.3 Enterprise Application

In this solution, ZXSDR BS8802 C100 covers enterprise area with radio signals so that all employees in motion can perform communication based on various services in real time. This facilitates the cooperation and frequent communication of employees in different districts of an enterprise with large span. With this solution, various customized service can be realized inside an enterprise, such as integrated digital office platform. Figure 5-3 shows the solution.

**Figure 5-3 Enterprise Solution**



# 5.4 Hot Spot and Blind Area Coverage

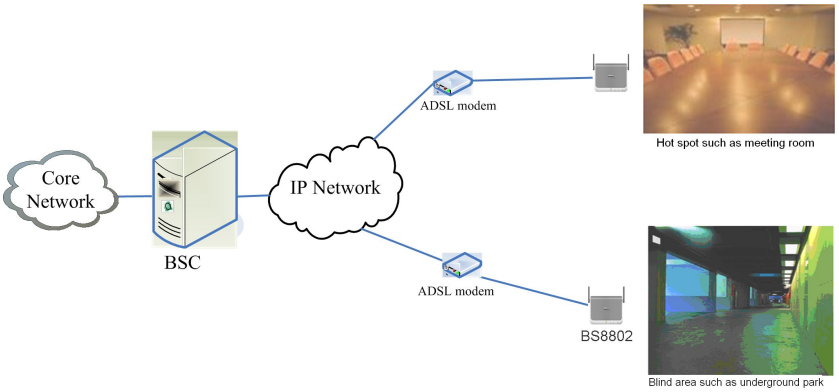
ZXSDR BS8802 C100 has the function of intelligent frequency planning. This makes ZXSDR BS8802 C100 a good solution for temporarily unblocking traffic congestion in hot spots. Through the intelligent frequency search function, ZXSDR BS8802 C100 can temporally cover the areas with traffic peak and serve as supplementary network introduction. If high traffic lasts for a long time, such measures as macro BTS replacement can be used to optimize the network in the future.

In some traffic burst hot spots, for example, fair and promotion activities, ZXSDR BS8802 C100 can be used for coverage. In areas with rich network resources, ZXSDR BS8802 C100 can replace an emergency vehicle, and in areas with insufficient network resources, ZXSDR BS8802 C100 can assist an emergency vehicle to realize a perfect coverage.

In addition, as ZXSDR BS8802 C100 is flexible and convenient to handle, it can also provide perfect solution in blind areas which are difficult to be covered by common solution, for example, elevator, underground parking lot, and metro platform.

Figure 5-4 shows the coverage of hot spots and blind areas.

**Figure 5-4 Hot Spot and Blind Area Coverage**




# 5.5 Special Applications Solution

In addition to the previous typical applications, ZXSDR BS8802 C100 is used in some special public mobile communication system, such as ship, train, and airplane in motion. Even if the data link is of small capacity, ZXSDR BS8802 C100 can provide excellent mobile communication service for the moving enclosed vehicles.

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# Chapter 6
# Hardware Installation

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## 6.1 Safety Instruction

### 6.1.1 Safety Overview

Read safety instructions before installation of ZXSDR BS8802 C100 equipment. These instructions are supplementary to local safety regulations in place. In case of any conflict, local safety regulations shall prevail.

Installation personnel should have preliminary knowledge about safety operations and must have received training on installing ZTE equipment.

Observe related equipment precautions and special safety instructions during maintenance, provided by ZTE.

Some important safety instructions are discussed in this chapter. ZTE shall not bear any liabilities incurred by violation of universal safety operation requirements, or violation of safety standards for designing, manufacturing, and equipment usage.

### 6.1.2 Safety Symbols

Table 6-1 lists safety symbols.

**Table 6-1 Safety Symbols Description**

| Safety Symbol | Meaning |
|---|---|
|  | Universal alerting symbol: General safety attentions. |
|  | Electrostatic: Device may be sensitive to static electricity. |
|  | Electric shock: There is a risk of electric shock. |

| Safety Symbol | Meaning |
|---|---|
|  | High temperature: Surface is hot and may cause personal injury if touched. |
|  | Laser: Beware of strong laser beam. |
|  | Microwave: Beware of strong electromagnetic field. |
|  | No smoking: Smoking is forbidden. |
|  | No Flammables: No flammable materials can be stored. |
|  | No touching: Do not touch. |

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

**Danger!**

Indicates an imminently hazardous situation, which, if not avoided, could result in death or serious injury. Limit its use to only extreme situations.

**Warning!**

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

**Caution!**

Indicates a potentially hazardous situation, which, if not avoided, could result in moderate injuries, equipment damages or partial service interruption.

**Note:**

Indicates helpful information which if ignored, could result in minor injuries, equipment damages or partial service interruption.

Every safety symbol has a text description of its safety level and a detailed description of its contents.

## 6.1.3 Safety Specifications

### Electrical Safety

**Danger!**

Never install or uninstall power cables while they are live because when touched with a conductor may produce sparks, resulting in fire or damage to eyes.

Do shut off power supply before connecting or disconnecting a power cable.

Before connecting a cable, make sure that the cable and its label meet the actual installation requirements.

**Warning!**

It is not allowed to drill cabinet holes without permission. Unqualified drilling could damage wiring inside the cabinet. Additionally, the metal pieces inside the cabinet created by drilling could result in a shorted circuit board.

### Antistatic

**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 in 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.

### Laser

**Warning!**

Avoid looking straight at the laser beam from the outlet of the optical transceiver or inside the optical fiber to avoid eye damage.

### High Temperature

**Danger!**

Avoid touching the surface area of some devices due to high temperature to avoid a scald injury.

### Fans

**Warning!**

Do not put fingers or any tools in the running fan to avoid an injury. Keep tools away from the running fan.

Sticking finger inside a running fan may cause hurt.

Put parts, screws, and tools away from the fan when replacing related parts, to avoid damage to the fan or related devices.

Keep fingers and board away from the fan when replacing devices around the fan, to avoid damage to the equipment or fingers.

## Hoisting Heavy Objects

**Warning!**

Do not walk or stay under the hoisted objects during hoisting operations.

- Ensure a proper hoisting capability of the hoister when disassembling heavy equipment moving, and replacing equipment.
- The operator must receive the training and qualification for hoisting operations. Inspect and complete the hoisting tools before getting into service.
- Make sure to fix the hoisting tools firmly on a sufficiently secured object or wall before the hoisting operation.
- Use brief oral instructions during the hoisting operations to prevent mistaken operation.

## Plugging/Unplugging Modules

The modules mentioned in this document include front board, rear board, and fan module.

**Caution!**

- Avoid inserting a module forcibly. Otherwise, the pin on the backplane may bent.
- Align the module with the guide rail and push it gently to the backplane. Plug the module properly into the slot to prevent short circuit due to contact between the module and the circuit surface.
- Avoid touching the circuits, components, connectors, and cable troughs when holding a module.
- RF module turns hot when running. Avoid being scalded when plugging and unplugging an RF module.

## Personnel

**Caution!**

Do not conduct internal maintenance or equipment debugging without prior permission.

Replacing parts or changing equipment may incur extra danger, therefore, do not replace parts or change the equipment without prior permission. To ensure safety, please contact ZTE in case of any problem.

# 6.2 Installation Preparation

Before the installation, check the environment and ensure that related installation tools, instruments, and documentation are available.

1. Tool, instrument, and documentation

| | |
|---|---|
| Tool | Adjustable wrenches, inner-hexagon spanner, straight screwdriver, cross screwdriver, pliers (sharp-nose pliers, diagonal pliers, and vices), tape measure, antistatic wrist strap, and electric percussion drill |
| Instrument | Gradienter, goniometer, and multimeter |
| Documentation | ZXSDR BS8802 C100 User Guide |

2. Environment check

| | |
|---|---|
| Environment requirement | Indoor installation<br>Working temperature: –20℃~+45℃<br>Relative humidity: 5% ~95% |
| Power requirement | Local power supply: 85 V AC to 264 V AC |
| Facility requirement | Vertical wall, level ceiling, vertical pole |

# 6.3 Chassis Installation

ZXSDR BS8802 C100 is compact in structure and occupies small footprint. Therefore, it can be flexibly installed in various indoor places. In actual application, the most commonly used installation modes are wall-mounted installation, pole installation, and ceiling installation.

## 6.3.1 Pole-Mounting a ZXSDR BS8802 C100

### Context

The diameter of the pole used to install a ZXSDR BS8802 C100 must range from 20 mm to 110 mm.

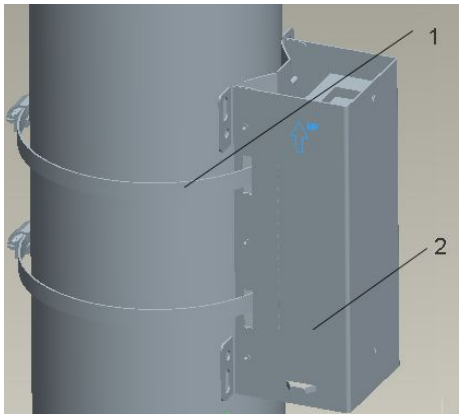
### Prerequisites

The operator is responsible for providing and installing poles while ZTE corporation supplies relevant components and parts for pole-mounted installation only.

### Steps

1. Make sure that the **UP** on the power adapter bracket of the ZXSDR BS8802 C100 faces upward. Bind the power adapter bracket onto the pole with two bar clamps, as shown in Figure 6-1.

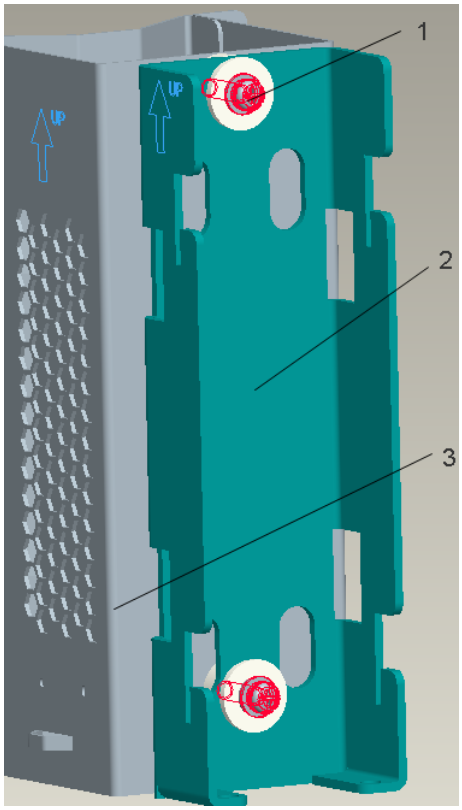
**Figure 6-1 Fixing the Power Adapter Bracket onto the Pole**




1. Bar clasp
2. Power adapter bracket

2. Make sure that the **UP** on the installing bracket faces upward. Insert the installing bracket into the power adapter bracket.
3. Fix the installing bracket onto the power adapter bracket with screws, as shown inFigure 6-2.

**Figure 6-2 Fixing the Installing Bracket**




1. Fixing screws
2. Installing bracket
3. Power adapter bracket

4. Embed the four hooks at the back of the ZXSDR BS8802 C100 into the four slots of the installing bracket, as shown in Figure 6-3.

**Figure 6-3 Hanging the ZXSDR BS8802 C100**


5. Use two screws to fix the ZXSDR BS8802 C100, as shown in Figure 6-4.

**Figure 6-4 Fixing the ZXSDR BS8802 C100**

**– End of Steps –**

## Result

Figure 6-5 shows the ZXSDR BS8802 C100 installed on a pole.

**Figure 6-5 Pole-Mounted Installation**


## 6.3.2 Wall-Mounted Installation

### 6.3.2.1 Wall-Mounting an Overlapped ZXSDR BS8802 C100 and Power Adapter

#### Context

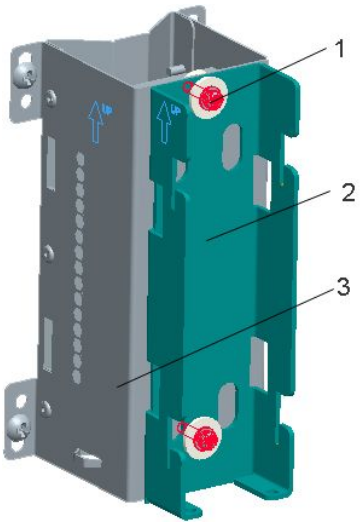
If no sufficient room is available, the power adapter bracket and the installing bracket can overlap to save room, as shown in Figure 6-6.

**Figure 6-6 Overlapped Fixing Brackets**

### Steps

1. Put the power adapter bracket of the ZXSDR BS8802 C100 on the wall and mark the installation holes according to the size of the power adapter bracket.
2. Use a percussive drill to drill Φ6X40mm holes in the marked installation positions, and insert the expansion bolts delivered with the ZXSDR BS8802 C100 into the holes.
3. Fix the power adapter bracket on the wall with fixing screws according to the positions of the installation holes.
4. Make sure that the **UP** on the installing bracket faces upward, and insert the installing bracket into the power adapter bracket, and use two screws to fix the installing bracket, as shown in Figure 6-7.

**Figure 6-7 Inserting the Installing Bracket**




1. Fixing screws
2. Installing bracket
3. Power adapter bracket

5. Insert the four hooks at the back of the ZXSDR BS8802 C100 into the four slots of the installing bracket, as shown in Figure 6-8.

**Figure 6-8 Hanging the ZXSDR BS8802 C100**


6. Use two screws to fix the ZXSDR BS8802 C100, as shown in Figure 6-9.

**Figure 6-9 Fixing the ZXSDR BS8802 C100**


**– End of Steps –**

## 6.3.2.2 Separately Wall-Mounting the ZXSDR BS8802 C100 and Power Adapter

### Context

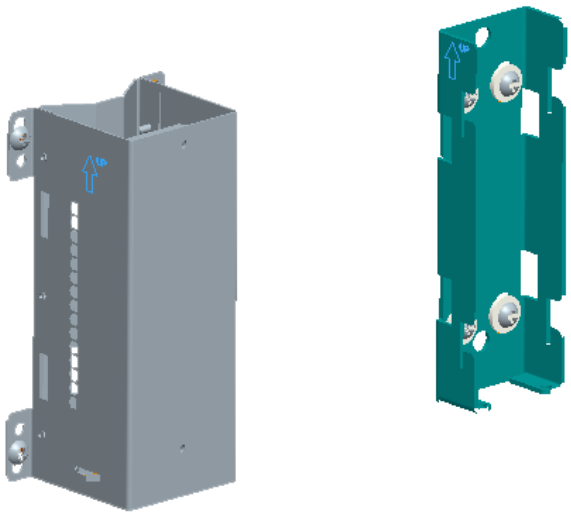
If sufficient room is available, install the power adapter bracket and the installing bracket separately for better heat dissipation, as shown in Figure 6-10.

**Figure 6-10 Separately Wall-Mounted ZXSDR BS8802 C100 and Power Adapter**


## Steps

1. Put the power adapter bracket on the wall and mark the installation positions according to the size of the power adapter bracket.
2. Put the installing bracket 150 mm to 180 mm away from the power adapter bracket at the same horizon of the wall, and mark the installation positions according to the size of the installing bracket, as shown inFigure 6-11.

**Figure 6-11 Deciding the Installation Positions of the Installing Bracket**



3. Use a percussive drill to drill Φ6X40mm holes according to the marked installation positions, and insert the expansion bolts delivered with the ZXSDR BS8802 C100 into the holes.

4. Fix the power adapter bracket on the wall with fixing screws according to its installation positions.
5. Fix the installing bracket on the wall with fixing screws according to its installation positions.
6. Embed the four hooks at the back of the ZXSDR BS8802 C100 into the four slots of the installing bracket, as shown in Figure 6-12.

**Figure 6-12 Hanging the ZXSDR BS8802 C100**

7. Use two screws to fix the ZXSDR BS8802 C100, as shown inFigure 6-13.

Figure 6-13 Fixing the ZXSDR BS8802 C100


**– End of Steps –**

## 6.3.3 Ceiling-Mounting the ZXSDR BS8802 C100

### Context

In view of the endurable weight, the cement ceiling is chosen for ceiling installation.

Figure 6-14 shows the ceiling installation mode.

**Figure 6-14 Ceiling Installation**


## Steps

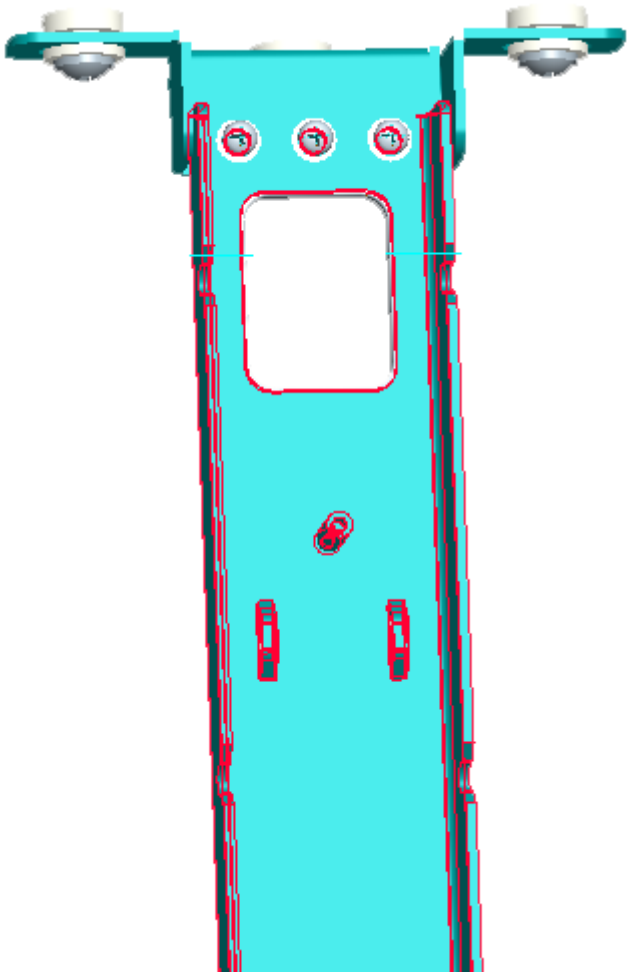
1. Confirm the installation position and put the auxiliary installing part onto the ceiling. Mark the positions of the installation holes on the ceiling according to the size of the auxiliary installing part , as shown in Figure 6-15.

**Figure 6-15 Marking Installation Hole Positions of the Auxiliary Installing Part**

2. Remove the auxiliary installing part and use a percussive drill to drill three Φ6X40mm holes. Then install the expansion bolts delivered with the ZXSDR BS8802 C100 into the holes.

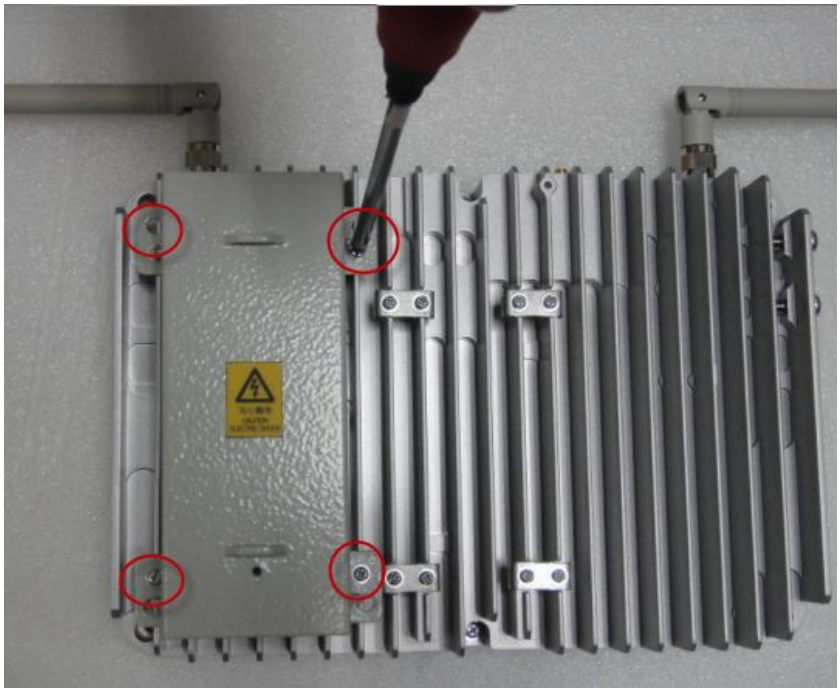
3. Install the auxiliary installing part according to the hole positions and fix it onto the ceiling with fixing screws.
4. Fix the ceiling-mounted bracket onto the auxiliary installing part with three screws, as shown in Figure 6-16.

**Figure 6-16 Ceil-Mounting the Bracket**



5. Use four screws to fix the power adapter bracket at the back of the ZXSDR BS8802 C100, as shown inFigure 6-17.

**Figure 6-17 Fixing the Power Adapter Bracket**



6. Embed the four hooks at the back of the ZXSDR BS8802 C100 into the four slots of the ceil-mounted bracket.

7. Fix the ZXSDR BS8802 C100 with two screws, as shown in Figure 6-18.

Figure 6-18 Fixing the ZXSDR BS8802 C100

**– End of Steps –**

# 6.4 Cable Installation

After installing the ZXSDR BS8802 C100 chassis, connect the cables. The cables to be connected are as follows:

- Ethernet cable
- Power cable
- GPS cable

# 6.5 GPS Antenna Feeder System Installation

## 6.5.1 GPS Antenna Installation

### 6.5.1.1 Installing a GPS Antenna in Vertical Placement

#### Prerequisites

The following tools must be ready.

- Adjustable spanner
- Normal Spanner

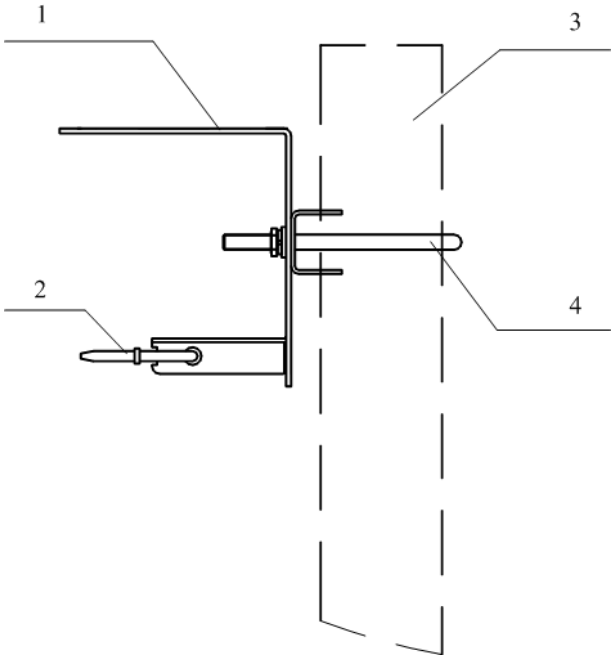
It is recommended to have a pole with a diameter between 30 mm ~ 60 mm (48 mm is recommended). The antenna should not be installed during rain and heavy wind. The pole binding with GPS antenna connected to GND is required.

## Steps

1. Open the package and take out the GPS antenna and GPS rack.
2. Use the U-shaped clamp to install the GPS rack to the mounting pole. Insert a spring washer and washer between the U-shaped clamp and mounting pole.
3. Use a M6 nut to fix the U-shaped clamp and the pole together firmly.

   Figure 6-19 shows the fixing process.

**Figure 6-19 U-shaped Clamp Installation**




1. GPS settled clamp
2. Cable strip
3. Mounting pole
4. U-shaped clamp

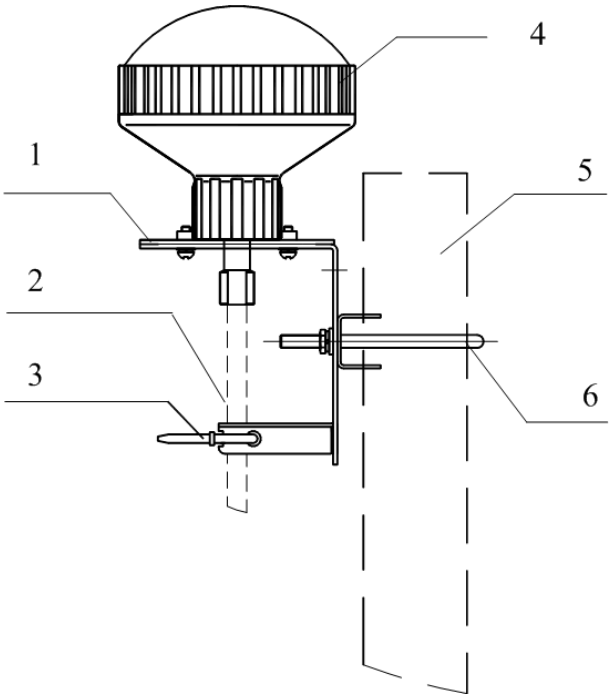
4. Fix the GPS antenna to the GPS settled clamp. Screw the bolt (M4x14) to firmly fix the antenna.

**– End of Steps –**

## Result

Figure 6-20 shows the antenna fixed in the vertical position.

**Figure 6-20 GPS Antenna Vertical Installation**




1. GPS settled clamp
2. Feeder
3. Feeder strip
4. GPS antenna
5. Mounting pole
6. U-shape clamp

## 6.5.1.2 Installing a GPS Antenna in Horizontal Placement

### Prerequisites

Confirm the installation mode and installation position of GPS antenna.

The following tools must be ready.

- Adjustable spanner
- Normal spanner

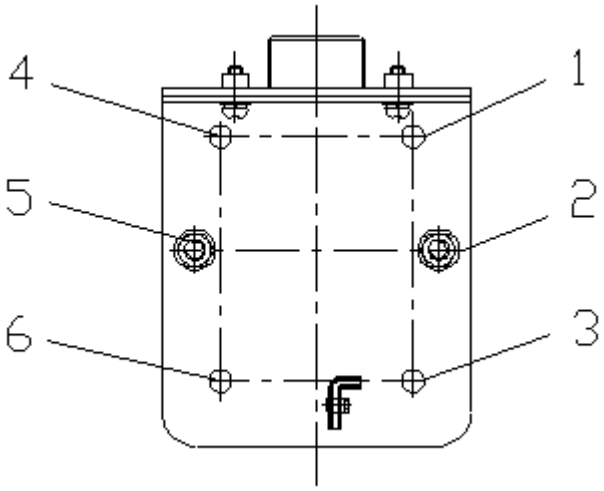
### Context

- It is recommended to have a pole with a diameter between 30 mm ~ 60 mm (48 mm is optimal).
- The pole used to fix the GPS antenna must be grounded well.
- The antenna cannot be installed during rain and heavy wind.

### Steps

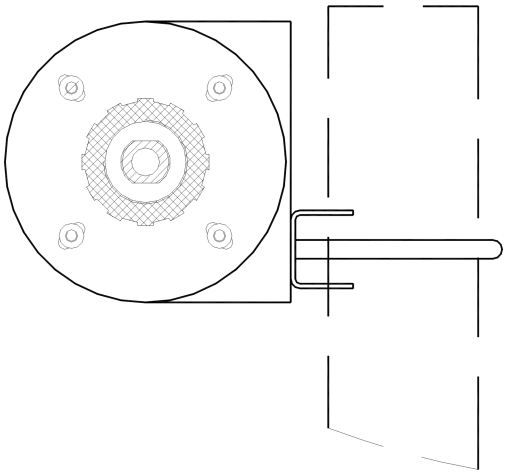
1. Open the package and take out the GPS antenna and GPS rack.
2. Use the U-shape clamp to install the GPS rack to the mounting pole.
3. The installation support of GPS antenna is as shown in Figure 6-21. Align holes on the U-shape clamp with Hole 1 and Hole 3, or Hole 4 and Hole 6 on the installation support. Then cover a spring wash and flat washer respectively on these holes and fasten them with M6 screws, as shown in Figure 6-22.

**Figure 6-21 GPS Antenna Rack Installation Support**




- 1~6 hole position

**Figure 6-22 GPS Rack Installation (Horizontal Placement)**



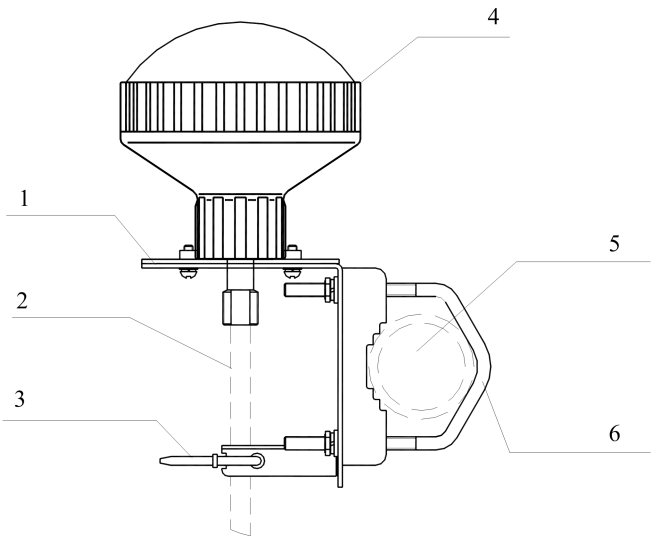
4. Fix the GPS antenna to the GPS settled clamp. Screw down the bolt (M4x14) to firmly fix the antenna.

**– End of Steps –**

## Result

Figure 6-23 shows the GPS antenna fixed horizontally.

**Figure 6-23 GPS Antenna Fixed Horizontally**




1. GPS settled clamp
2. Feeder
3. Feeder strip
4. GPS antenna
5. Mounting pole
6. U-shape clamp

## 6.5.1.3 Wall-Mounting a GPS Antenna

### Prerequisites

The following tools must be ready.

- Adjustable spanner
- Normal spanner
- Hammer
- Expansion anchor bolts (M5x30 or M5x40)

### Context

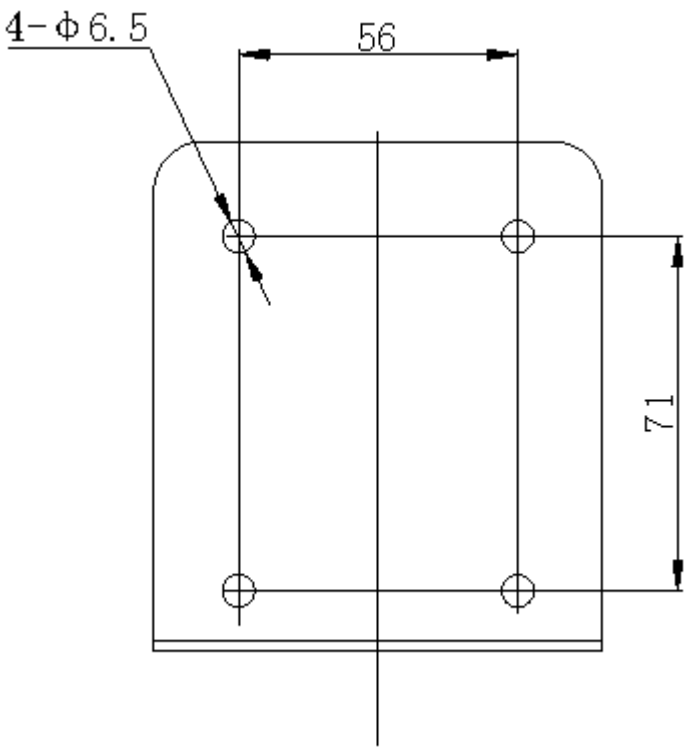
For installing the GPS Antenna on the wall, the U-shape clamp is unnecessary.

### Steps

1. Open the package and take out the GPS antenna and GPS rack.
2. Use the design template for marking holes on the wall. Then drill holes on the wall according to the size of the expansion anchor bolts that are to be used.

   Figure 6-24 shows the design template.

Figure 6-24 Design Template for Marking Holes




3. Insert the expansion bolts, and hammer them to fix properly.
4. Install the GPS antenna rack to the corresponding bolt position.
5. Insert a spring washer and flat washer onto expansion bolts and use the M6 nut to fix the rack on the wall firmly.

NOTE **Note:**

The torque used to fix the clamp is 45 Nm.

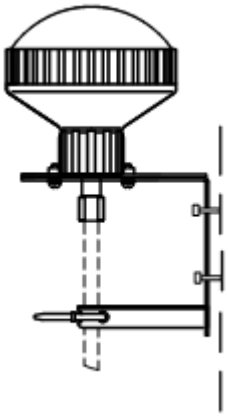
6. Fix the GPS antenna to the GPS settled clamp and screw the M4x14 bolt tightly.

**– End of Steps –**

## Result

Figure 6-25 shows the GPS antenna fixed on the wall.

**Figure 6-25 GPS Antenna Fixed on Wall**



## 6.5.2 GPS Feeder Cable Selection Principle

The selection of GPS feeder cable should be made based on the following 4 conditions:

1. If the feeder length ≤ 80 m, then select an 1/4″ feeder cable.
2. If 80 m  the feeder length ≤ 150 m, then select an 1/2″ feeder cable.
3. If 150 m  the feeder length ≤ 300 m, then select an 1/2" feeder cable + 7/8" feeder cable +1/2" feeder cable.
4. If the feeder length is more than 300 m, contact the local representative office of ZTE Corporation.

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# Figures

# Tables

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# Glossary

**BSC**
- Base Station Controller

**BSS**
- Base Station System

**BTS**
- Base Transceiver Station

**CDMA**
- Code Division Multiple Access

**GPS**
- Global Positioning System

**MSS**
- Mobile Switching System