

eCNS280
V100R005C00
Product Overview

Issue **02**
Date **2018-03-30**

Copyright © Huawei Technologies Co., Ltd. 2018. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Huawei Technologies Co., Ltd.

Trademarks and Permissions



and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: <http://www.huawei.com>

Email: support@huawei.com

Contents

About This Document	1
1 Positioning and Highlights	1
1.1 Positioning	1
1.2 Highlights	2
1.2.1 Advanced Architecture.....	3
1.2.2 Excellent Service Experience	3
2 Product Description	4
2.1 Physical Architecture.....	4
2.2 Services and Functions	6
2.3 Hardware Ports.....	7
2.4 Software Architecture.....	7
2.4.1 Overall Software Structure.....	7
2.4.2 Host Software.....	8
2.4.3 Background Software	9
2.5 Product Security	10
3 Applications	11
4 Operation and Maintenance	13
4.1 Overview	13
4.2 Highlights	13
5 Technical Specifications	15
6 Standards Compliance and Certification	17
6.1 Interface Protocol Compliance Standards	17
6.2 Certification	18
7 Glossary	19

About This Document

Date	Version	Modified Chapter	Description	Prepared By
2018-03-30	02	1.1 Positioning	Deleted the PCRF information.	Gao Yu
2017-10-25	02	<ul style="list-style-type: none">• 1.1 Positioning• 6.1 Interface Protocol Compliance Standards	<ul style="list-style-type: none">• Modified the networking diagram.• Added the note.	Gao Yu
2017-07-28	01	Entire document.	Added the entire document.	Gao Yu

1 Positioning and Highlights

About This Chapter

Broadband Multimedia Digital Trunking Radio System is a solution that uses the most advanced LTE technology. It is developed to meet the needs of customers in industries such as public security, transportation, and energy by providing an end-to-end solution from chips to terminals, to network and to applications. In a network, with a single terminal, Broadband Multimedia Digital Trunking Radio System provides various modes of multimedia communication such as professional PTT voice services, broadband data transmission, and high-definition video streams. Besides, Broadband Multimedia Digital Trunking Radio System has a strong technological advantage in terms of network security, reliability, scalability and customization. The eCNS280 is a trunking cloud core network device in the broadband multimedia digital trunking system.

[1.1 Positioning](#)

[1.2 Highlights](#)

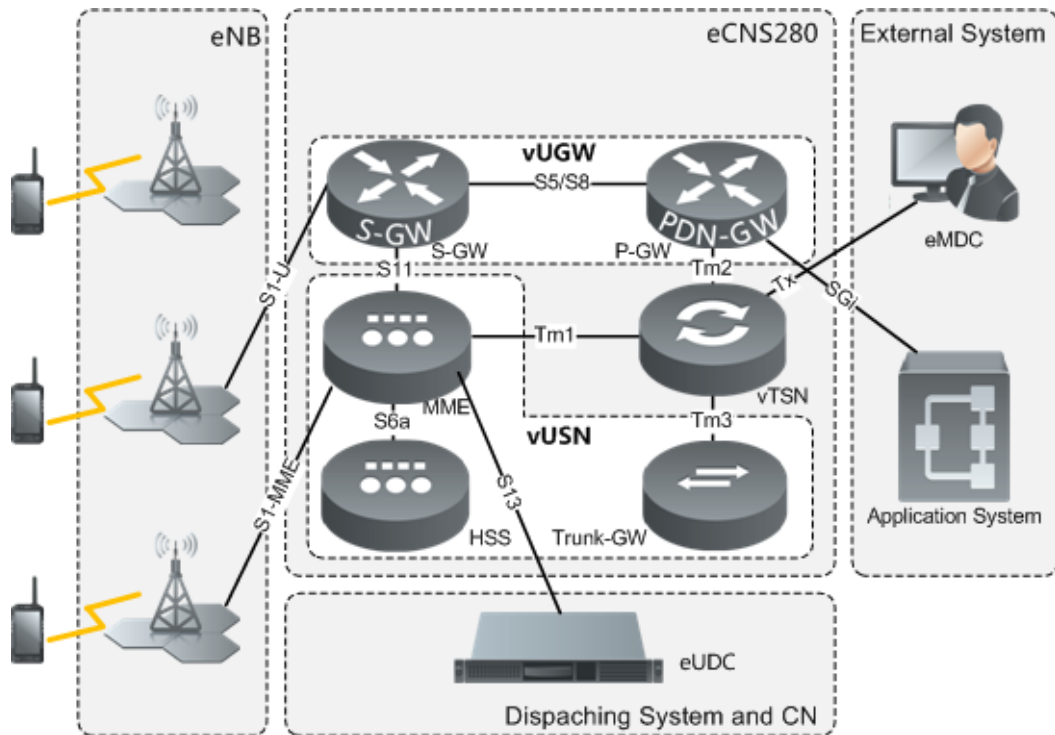
1.1 Positioning

The trunking cloud core network device eCNS280 is the core of the wireless trunking system.

The eCNS280 is developed based on network functions virtualization (NFV) and features a cloudification architecture. Therefore, besides traditional core network functions, the eCNS280 is able to provide on-demand capacity configuration through NE function virtualization and standard hardware sharing among NEs. This significantly shortens time in capacity expansion or reduction, and increases the service rollout efficiency.

An LTE wireless trunking system mainly consists of the core network subsystem (eCNS), DBS3900, eUDC, eUE, and eMDC. The eCNS280 carries functions of the core network subsystem, as shown in [Figure 1-1](#).

Figure 1-1 Position of the eCNS280 in the network



Logically, the eCNS280 consists of a vUGW, a vUSN, and a vTSN. The CGP platform functions as CloudOS to provide hardware management, and equipment management.

The vUGW includes the S-GW, and P-GW. The vUSN includes the MME, HSS, and Trunk-GW. The vUGW and vUSN are called eCore in this document.

In a cloud-based architecture, these entities can be deployed on the same physical entity or be separately deployed on different physical entities.

- The MME provides the following functions: mobility management on UEs accessing the eCNS, encryption and authentication, and session management and call floor dispatching as the control center in trunking services.
- The HSS manages user and group subscription data, and provides user authentication.
- The S-GW processes user data transmitted to the eNodeB, including voice data and multimedia data.
- The P-GW connects application servers on the external public data network (PDN).
- The vTSN performs trunking services.

The eCNS280 contains two external devices, the dispatching system and the eUDC. The dispatching system consists of the eMDC and eDC. The eMDC provides interfaces to the eDC, allowing the trunking system to dispatch and manage voice and video services. The eUDC manages the user operation and UE device data.

1.2 Highlights

This section describes the highlights of an eCNS280, which are simple hardware platform, low power consumption, ease of deployment, and quick delivery.

1.2.1 Advanced Architecture

Cutting-edge Hardware Platform

The eCNS280 adopts the standard *NFV* architecture by incorporating the MME, HSS, S-GW, P-GW, and TSN into one service layer. In addition, it employs the OSTA5.0 as its bottom-layer hardware platform to ensure reliability of heavy-traffic services. The eCNS280 features a small footprint and can share a subrack with other eCN devices.

High Integrity

The eCNS280 is highly integrated and can be managed centrally to:

- Save costs and labor in device maintenance.
- Simplify network management with fewer NEs deployed.
- Reduce power consumption and rent.

1.2.2 Excellent Service Experience

The eCNS280 delivers excellent service experience by the following virtues.

High Reliability

The carrier-class hardware platform OSTA5.0 (3 U) supports 1+1 device redundancy in the subrack. To be specific, services are not interrupted in event of board replacement or exceptions. Service boards work in load-sharing or N+1 mode and switch boards work in 1+1 redundancy mode. Any subrack component can be replaced without affecting services: Power modules work in 1+1 redundancy mode. The eCNS280 tolerates a short-term failure of a single fan or fan tray. It also supports in-depth error detection and correction and has a low failure rate to ensure 99.999% availability.

Flexible Deployment

The eCNS280 allows different NE combinations to adapt to various application scenarios as required by the site condition and customer.

Efficient O&M

- Ease of maintenance
 - All configuration data is saved to hard disks and is accessible after power-on.
 - Fast startup is supported. After a restart due to a fault, services are immediately restored.
 - Fault management based on alarms, tracing logs, system logs, and operation logs is supported.
- Easy management

Users can manage the eCNS280 through a portable PC running the Web eLMT client.

2 Product Description

About This Chapter

- 2.1 Physical Architecture
- 2.2 Services and Functions
- 2.3 Hardware Ports
- 2.4 Software Architecture
- 2.5 Product Security

2.1 Physical Architecture

The eCNS280 adopts the 3-U OSTA5.0 as its standard hardware platform. [Figure 2-1](#)

Figure 2-1 Appearance and dimensions (unit: mm) of an OSTA5.0

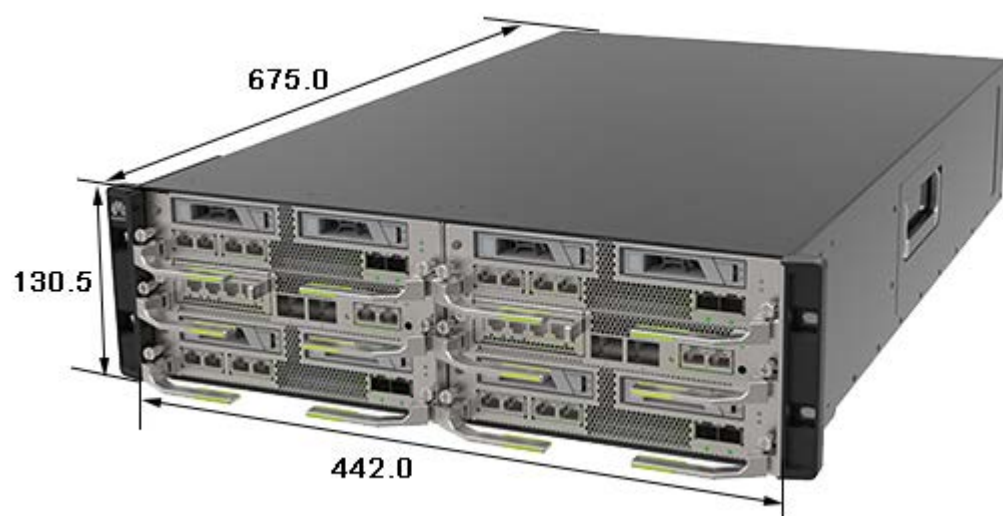
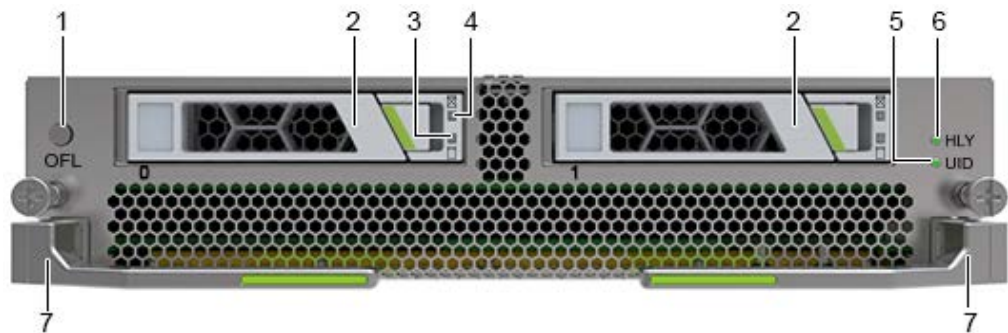


Table 2-1 Specifications of an OSTA5.0 (3 U)

Component	Quantity	Remarks
Power supply	-	AC/DC
Typical power consumption	-	1300 W
Multi-function switch board (MSXA)	2	The multi-function switch board implements system operation and maintenance. Two such boards are installed in slots 2 and 5 to work in active/standby mode. Each board provides two 1GE Base ports and two 40GE eFabric ports.
Service board (GPUB9)	4	The service boards are service processing units and can be installed in slots 1, 3, 4, and 6. The service boards in any two slots can be configured in active/standby mode.
Power entry module (PEM)	2	Two PEMs are configured in 1+1 redundancy mode, which prevents single point of failures (SPOFs) for power input.
Fan tray	2	The eCNS280 subrack is configured with two fan trays. Air goes into the subrack from the front and is dissipated from the back of the subrack.

Figure 2-2 shows the appearance of the GPUB9 of an OSTA5.0 (3 U). Table 2-2 lists its specifications.

Figure 2-2 Appearance of a GPUB9



1. OFL indicator/button	2. Hard disk	3. Hard disk active indicator	4. RAID/Fault indicator
5. UID indicator	6. HLY indicator	7. Ejector lever	-

Table 2-2 Specifications

Specification	Remarks
CPU	Supports two Intel® Broadwell-EP Xeon® E5-2600 v4 series processors.
Memory	Provides eight <i>DDR3</i> memory channels. The actual memory capacity is 128 <i>GB</i> .
Storage	Supports two 2.5-inch 800 GB SSDs.
Internal exchange	Provides two 10GE Base ports for communicating with Base planes of the multi-function switch board through the backplane. Provides two 40GE Fabric ports for communicating with the <i>Fabric</i> plane.

2.2 Services and Functions

The eCNS280 provides group call and multicast services and industry services:

- PTT services
 - Establishes PTT services that are initiated by the dispatching system.
 - Establishes PTT services that are initiated by the terminals.
 - Completes PTT functions such as closing call groups, floor application.
- Data services
 - Supports data services at various rates.
 - Supports a variety of concurrent services, such as PS services, PTT calls and P2P calls.
 - Supports inter-cells and inter-eNodeBs handovers.
 - Supports data roaming.
- Geographic redundancy

Supports active/standby backup (geographic redundancy). If one eCNS280 becomes faulty, services on it are interrupted and the other eCNS280 starts and take over the services.
- PS pool

The eCNS280 supports PS pool disaster recovery (DR). In the PS pool DR scenario, two eCNS280s are deployed on two cabinets of the same specifications.
- User and group management

Manages user and group information and synchronizes network elements.
- Public services
 - Completes user registration and user deregistration during switch-on and switch-off.
 - Completes mobile management and periodical tracking area update of idle terminals.
- Networking

The eCNS280 supports VLANs and IPv4 routes.

- O&M
Supports operations and maintenance on the eCNS through the eLMT.
- Transmission services
Allows up to 2500 eNodeBs to be configured and reduces end-to-end delay for voice services.
- Transmission configuration function
 - Supports network port parameter configuration; through MML, the eCNS280 is able to configure rate, duplex mode, and adaptive modulation parameters.
VLAN configuration: configures the VLAN ID and the VLAN priority of a network port through MML.
 - Supports configuration, deletion and inquiry of the IPV4 routing.

2.3 Hardware Ports

This section describes the eCNS280 physical ports.

[Table 2-3](#) lists eCNS280 hardware ports.

Table 2-3 Port specifications

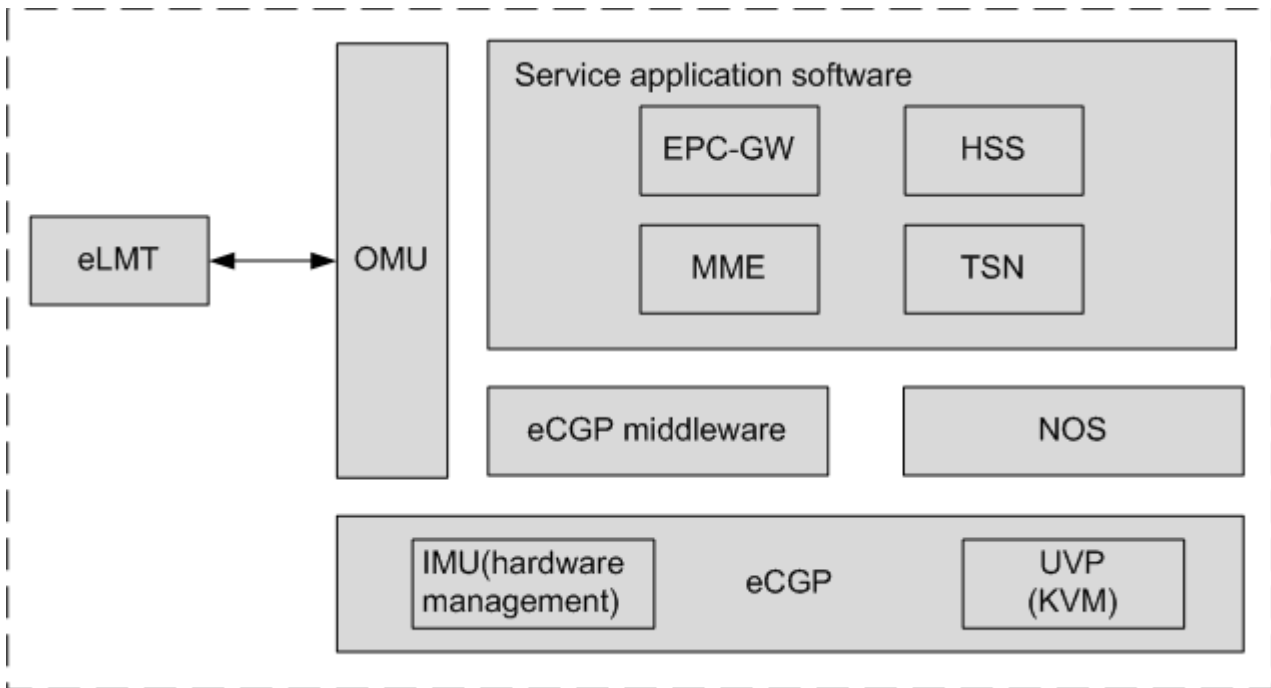
Physical Unit	Specification
MSX	Provides two 1GE Base port and two 40GE eFabric ports.
GPUB9	Provides two 10GE Base ports and two 40GE Fabric ports.

2.4 Software Architecture

2.4.1 Overall Software Structure

The software of an eCNS280 consists of the eCGP platform software and service application software. See [Figure 2-3](#).

Figure 2-3 Overall software architecture



2.4.2 Host Software

The host software runs on boards in OSTA5.0 subbracks. It provides the following functions:

- Receives and processes signaling messages.
- Processes calls.
- Controls services.
- Manages resources.
- Responds to operation commands delivered by maintenance personnel through cooperation background software.
- Performs data management, device management, alarm management, performance measurement, and signaling trace for the host.

The host software consists, from lower layer to upper layer, of the operating system (OS), middleware, and application software.

OS

The host software uses the *Linux* real-time operating system (RTOS).

Middleware

The middleware DOPRA_C is used between the OS and the application software. It isolates the upper-layer application software from the lower-layer OS and the platform.

The middleware facilitates software function portability among different platforms and reduces changes in the application software.

Service Application Software

Application software is the functional part of the eCNS280's NE software. Loaded with different software, processes can provide different functions. Application software can be classified into the following types:

- Signaling bearer software: receives broadband and narrowband signaling and processes lower-layer protocols.
- Service processing software: processes signaling, and manages sessions, mobility, and resources.
- Database software: manages switch data and dynamic subscriber data.
- System support software: manages the eCNS280 system and interconnect devices.
- Operation & Maintenance software: receives operation commands from the OMU and responds with results.

2.4.3 Background Software

The background software adopts the *client/server (C/S)* model and runs on the OMU and Web eLMT. The *OMU* server software is installed on an *OMU* board and functions as the server. The eLMT software is installed on a workstation and functions as the client.

The background software provides a man-machine interface, which enables the maintenance personnel to implement functions, such as data management, equipment management, alarm management, performance statistics, and signaling tracing on the host in cooperation with the host software.

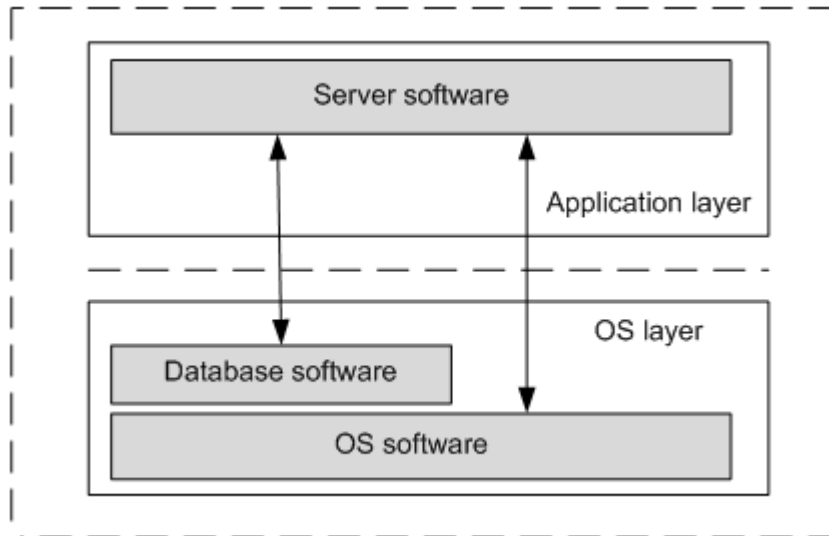
OMU Server Software

The *OMU* server software is the core of the terminal operation. It integrates the functions of a communication server and database server, forwards the operation and maintenance commands from workstations to the host, and returns the responses or operation results from the host to the corresponding workstations.

The *OMU* server software runs on the *Linux* OS. It implements major functions of the terminal OAM software through several parallel service processes (such as the maintenance process, data management process, alarm process, and performance management process).

[Figure 2-4](#)

Figure 2-4 Relationships between the OMU server software, Linux, and database



eLMT Software

The eLMT application software runs on *Windows*. It connects to the *OMU* server as a client and provides an *MML*-based GUI for users. The eLMT can be located locally or remotely. For example, a remote eLMT can connect to the *OMU* server through a wide area network (WAN) in dial-up mode.

The eLMT provides maintenance functions, including data maintenance, device management, alarm management, call and signaling tracing, CDR management, and report generation.

2.5 Product Security

Multiple users can log in to the eCNS280 O&M system simultaneously. For security purposes, the system provides authorization management and log management.

- Authorization management
Different levels of permissions can be specified for operators and maintenance consoles. On the operation and maintenance system of the eCNS280, an *MML* command can be executed only when both the operating personnel and the maintenance console are authorized to run the *MML* command.
- Log management
Users can query *MML* operation records of the eCNS280 O&M system. Based on the operation logs, users can determine whether an operation that may affect the system has been performed.

3 Applications

This section describes the application scenarios of the eCNS280.

Public Security

In a globalized era, government departments need to cooperate to allocate public resources and deliver joint commanding and dispatch to improve efficiency in urban public security management. Administrative departments must be highly responsive to abrupt emergency situations for quick and accurate disaster relief. For this purpose, a unified wireless network platform is required to integrate multimedia communications, including video, voice, and data services, for government departments to perform joint dispatching to achieve right decision-making and effective commands.

Enterprise Network

Industry, mining, public utilities, transportation and other industries are basic and strategic industries for national economic and social development. The enterprise network wireless communication system (including the trunking call system) is a part of the information construction in all walks of life. This system features timeliness, reliability, and flexibility, and applies to various departments, including the production, patrol, dispatching, firefighting, security, and engineering departments in factories, parks, mining areas, and airports. The communication system is indispensable in the production, dispatching, and channel maintenance in factories and is supplementary to the wired communication. In addition, wireless HD video surveillance, wireless sensors, and controllers have been increasingly popular.

For the enterprise network, expensive carrier-class communication devices are not required, and an eCNS280 is enough to provide diversified wireless broadband services by interworking with different types of terminals, applications, and application servers.

Enterprise Applications

- Wireless broadband in enterprises

The mainstream wireless broadband services are outdoor LTE services and indoor Wi-Fi services. The development and maturity of *LTE* technologies have made *LTE* chips and terminals affordable and its indoor applications available. By deploying the micro eNodeB and enterprise-level EPC for large-sized enterprises as well as adopting the mechanism of local data access through the local breakout (LBO) technology to achieve the shortest path, carriers can save the EPC backbone network bandwidth and the overall network traffic. This will improve user experience. The small-and medium-sized

enterprises can outsource the wireless network facilities to carriers to trim costs of the IT department and improve reliability as well. This will ensure better indoor coverage and satisfy employees.

- Local service backup

The eCNS280 serves as the backup of the macro EPC. With this solution, wireless base station connects to both the macro *EPC* and eCNS280. When a transmission failure occurs, services served by core network devices in operator equipment room can be switched over to the eCNS280, ensuring uninterrupted enterprise services.

The deployment of the eCNS280 enhances service reliability for enterprises in remote areas and avoids the impact of transmission failure cause by long-distance communication.

4 Operation and Maintenance

About This Chapter

This section describes the operations and maintenance (O&M) functions provided by an eCNS280.

[4.1 Overview](#)

[4.2 Highlights](#)

4.1 Overview

The eCNS280 O&M functions are implemented on the eLMT client.

The eLMT client is used for local O&M of eCNS280. Routine maintenance on a single eCNS280 can be performed through the eLMT.

4.2 Highlights

- Friendly and easy-to-use eLMT graphic user interface (GUI) improves user experience.
The maintenance software eLMT dedicated for the eCNS280 is available. The eLMT client is easy to use and has powerful functions, facilitating the operation and improving user experience.
- Powerful O&M functions, facilitating fault locating and rectification
With the O&M tools, the customer can query device status, configure data, and manage device status.
In case of emergencies, you can reset the board to quickly rectify the fault.
- Advanced software management functions for secure and smooth upgrades
The eCNS280 provides a remote upgrade tool, which enables the operator to upgrade the software at the O&M center without interrupting ongoing services. Key data is backed up in the upgrade process. Therefore, a rollback can be generated immediately when upgrade fails, recovering the system to normal state in a short period of time.
After the upgrade is complete, version consistency check can be performed to verify the version correctness.

- Convenient device installation, commissioning, and upgrading solutions for fast network deployment

The eCNS280 is installed, commissioned, configured with common data, and strictly tested before the delivery. Therefore, the hardware installation on site includes only cabinet installation and cable connecting. After hardware installation is complete, hardware and software commissioning can be performed by loading software and data files.

The O&M Robust security operation mechanism, preventing risks caused by misoperations.

5 Technical Specifications

This section describes main technical specifications of the eCNS280.

System Specifications

Table 5-1 eCNS280 system specifications

Item	Specification	Remarks
Maximum number of managed eNodeBs	2500	None
Maximum number of subscribers	200000	Indicates the maximum number of PS service subscribers, including trunking users.
Maximum number of online subscribers	200000	Indicates the maximum number of online PS subscribers. A maximum of 50000 online trunking users are supported.
Maximum number of online groups	20000	Indicates the number of groups reported to the eCN by online trunking users.
Maximum number of concurrent groups	4000	None
Maximum number of concurrent voice calls	16000	Voice channels in the uplink and downlink are calculated respectively.

Equipment Specifications

[Table 5-2](#) describes the equipment specifications of the eCNS280.

Table 5-2 Equipment specifications of the eCNS280

Item	Specification
Mechanical specifications	Dimension (H x W x D)
	Weight of an empty

Item		Specification
	subrack	two power modules)
	Weight of a subrack with full configuration	47.8 kg
Power specifications	Rated input voltage range	<ul style="list-style-type: none"> OSTA5.0(3U) DC subrack: -48 V DC to -60 V DC OSTA5.0(3U) AC subrack: 200 V AC TO 240 V AC
	Rated power	<ul style="list-style-type: none"> OSTA5.0(3U) DC subrack: 2400 W (the rated power of each PEM is 2400 W) OSTA5.0(3U) AC subrack: 2000 W (the rated power of each PEM is 2000 W) <p>NOTE The subrack is configured with two PEMs in 1+1 redundancy mode.</p>
Environment parameters	Temperature	<ul style="list-style-type: none"> OSTA5.0(3U) DC subrack: Long-term operating temperature: 0°C to 45°C (32°F to 113°F) Short-term operating temperature: -5°C to +55°C (23°F to 131°F) OSTA5.0(3U) AC subrack: Operating temperature: 0°C to 40°C (32°F to 104°F)
	Humidity	<ul style="list-style-type: none"> Long-term operating humidity: 5% RH to 85% RH (non-condensing) Short-term operating humidity: 5% RH to 95% RH (non-condensing)
	Altitude	-60 m to +4000 m

6 Standards Compliance and Certification

About This Chapter

This section describes the standards and certifications that the eCNS280 complies with.

6.1 Interface Protocol Compliance Standards

6.2 Certification

6.1 Interface Protocol Compliance Standards

eCNS280 supports a variety of 3rd Generation Partnership Project (3GPP) protocol interfaces, including S1-U, S1-MME, SGi, S5/S8, S10, Ga, AAA RADIUS, Rx interface and S13 interface. Each interface complies with the standards listed in [Table 6-1](#).



NOTE

The current eCNS280 V100R005C00 version does not support eDRX function.

Table 6-1 Interface protocol compliance standards

Interface Name	Standards
S1-U interface	3GPP TS 23.401 General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access 3GPP TS 29.281 General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U) 3GPP TS 36.414 Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport
S1-MME interface	3GPP TS 36.413 Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)
SGi interface	3GPP TS 29.061 Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)
S5/S8 interface	3GPP TS 29.274 Evolved General Packet Radio Service (GPRS); Tunneling Protocol for Control plane (GTPv2-C)

Interface Name	Standards
S10 interface	3GPP TS 29.274 Evolved General Packet Radio Service (GPRS); Tunneling Protocol for Control plane (GTPv2-C)
S11 interface	3GPP TS 29.274 Evolved General Packet Radio Service (GPRS); Tunneling Protocol for Control plane (GTPv2-C)
Ga interface	3GPP TS 32.295 Charging Data Record (CDR) transfer
AAA RADIUS interface	RFC 2865 Remote Authentication Dial In User Service (RADIUS) 3GPP TS 23.401 General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access 3GPP TS 29.061 Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)
Rx interface	3GPP TS 29.214 Policy and Charging Control over Rx reference point
S13 interface	3GPP TS 29.272 Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol

6.2 Certification

This section describes the certification that the eCNS280 has passed.

Table 6-2 Certification list

Certification Name	Description
CE	<p>European Union Notice: Products that bear the Conformity with European (CE) marking comply with the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission.</p> <p>The certificates are:</p> <ul style="list-style-type: none"> • EMC: EN 300 386 • Safety: EN 60950-1 • RoHS Directive: 2011/65/EU

7 Glossary

Glossary	Full Name
3GPP	3rd Generation Partnership Project
eCNS	Enterprise Network Core Network System
eCGP	Evolved carrier grade platform
eNodeB	Evolved Node B
eLMT	Enterprise Network Local Maintenance Terminal
EPC	Evolved Packet Core
eUDC	Enterprise User and Device Controller
HSS	home subscriber server
IP	Internet Protocol
LTE	Long Term Evolution
MME	mobility management entity
MML	Man Machine Language
NTP	Network Time Protocol
O&M	Operation and Maintenance
OSTA	Open Standards Telecom Architecture
PDN	packet data network
P-GW	PDN gateway
PLMN	Public Land Mobile Network
PS	Packet Switched
PTT	Push-To-Talk
QoS	Quality of Service
RAID	Redundant Array of Independent Disks

Glossary	Full Name
RoHS	Restriction of the Use of Certain Hazardous Substances
S-GW	serving gateway
SIP	Session Initiation Protocol
TSN	Trunking Service Node
UE	User Equipment
VLAN	Virtual Local Area Network