Huawei CX710 Switch Module
V100R001C10

White Paper

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About This Document

Overview

This white paper describes the CX710 40GE converged switch module in terms of the functions, advantages, appearance, specifications, internal chassis networking, and standards and certifications compliance. You can learn about the CX710 by reading this document.

Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
⚠ DANGER	Indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury.
⚠ WARNING	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ CAUTION	Indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
⊙⚍ TIP	Provides a tip that may help you solve a problem or save time.
📖 NOTE	Provides additional information to emphasize or supplement important points in the main text.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 08 (2017-03-27)

This issue is the eighth official release.

Mode	Change Description
Added	Added product model descriptions to 1.3 Appearance.

Issue 07 (2017-02-17)

This issue is the seventh official release.

Mode	Change Description
Modified	Changed the altitude in 1.8 Technical Specifications.

Issue 06 (2016-11-22)

This issue is the sixth official release.

Mode	Change Description
Added	Added the description about the working temperature's compliance with the ASHRAE Class A3 standard in 1.8 Technical Specifications.

Issue 05 (2016-05-12)

This issue is the fifth official release.

Mode	Change Description
Modified	Updated the supported mezzanine cards, pluggable modules, and cables in 1.7 Software and Hardware Compatibility.
	Updated the supported standards and communication protocols in 2.1 Standards Compliance.

Issue 04 (2015-07-17)

This issue is the fourth official release.

Mode	Change Description

Mode	Change Description
Modified	Added the throughput description to 1.8 Technical Specifications.

Issue 03 (2015-03-20)

This issue is the third official release.

Mode	Change Description
Modified	Updated the supported pluggable modules and cables in 1.7 Software and Hardware Compatibility.

Issue 02 (2015-02-16)

This issue is the second official release.

Mode	Change Description
Modified	Added the networking assistant description to 1.6 Internal Chassis Networking.

Issue 01 (2014-10-24)

The issue is the first official release.

Contents

1 Overview

About This Chapter

This topic describes the CX710 40GE converged switch module in terms of the functions, protocols, and ports.

This topic describes the advantages of the CX710: high performance and high port density; high specifications and support for large-scale data center networks; high-performance stacking and ease of deployment and maintenance; abundant data center features.

This topic describes the CX710 in terms of its appearance, panel, and installation positions in the chassis.

This topic describes the features, numbering rules, names, types, and quantities of the CX710 ports.

This topic describes the names, meanings, colors and status of the indicators on the CX710.

This topic describes connection relationships between the CX710 and mezzanine cards on compute nodes.

This topic describes mezzanine cards that can work with the CX710 and pluggable modules and cables supported by ports on the CX710 panel.

This topic describes the physical, environmental, power, and network switching specifications of the CX710.

1.1 Functions

This topic describes the CX710 40GE converged switch module in terms of the functions, protocols, and ports.

The CX710 40GE converged switch module (hereinafter referred to as CX710) is the switching control unit that provides data switching for server blades and provides external service and management ports in a centralized manner.

The CX710s are installed in the rear slots of the E9000 chassis. Through the E9000 chassis midplane, the CX710s are connected to the compute nodes and management modules to implement switching for internal data packets and management packets, providing high-speed data transmission for users.

Table 1-1 describes the functions of the CX710.

Table 1-1 40GE converged switching plane function description

Function		Description
Ethernet features	Ethernet	- Operating modes of full-duplex and auto-negotiation - Ethernet ports support: 10GE, 40GE. **NOTE** - Ports connecting to compute nodes support dynamic configuration of 40GE/10GE. 40GE optical ports on the panel support multi-mode optical cables, single-mode optical cables, and passive cables. Each 40GE optical port can be dynamically divided into four 10GE optical ports. - Port traffic control - Jumbo frames - Link aggregation - Load balancing among links within a trunk - Interface isolation and forwarding restrictions - Broadcast storm suppression
	Virtual Local Area Network (VLAN)	- Access modes of access, trunk, and hybrid - VLAN assignment: port-based, MAC address-based, IP subnet-based VLAN assignment - VLAN aggregation - Multiplex VLAN (MUX VLAN) - Transparent Transmission of Protocol Packets in a VLAN
	802.1Q in 802.1Q (QinQ)	- Basic QinQ - Selective QinQ
	VLAN Mapping	1 to 1 VLAN mapping. 2 to 1 VLAN mapping.

Function		Description
		• 2 to 2 VLAN mapping.
	Media Access Control (MAC)	• Secure MAC addresses • Automatic learning and aging of MAC addresses • Static, dynamic, and blackhole MAC address entries • Packet filtering based on source MAC addresses • Interface-based MAC learning limits
	Link Layer Discovery Protocol (LLDP)	Support for LLDP
Ethernet loop protection	Multiple Spanning Tree Protocol (MSTP)	• Spanning Tree Protocol (STP) • Rapid Spanning Tree Protocol (RSTP) • MSTP • Bridge protocol data unit (BPDU) protection, root protection, and loop protection • Partitioned STP and Layer 2 protocol transparent transmission
IP features	Address Resolution Protocol (ARP)	• Static and dynamic ARP entries • ARP in a VLAN • Aging of ARP entries • ARP and Reverse Address Resolution Protocol (RARP) • ARP proxy • Auto-detection
	IPv6	• IPv4/IPv6 dual-stack • Neighbor Discovery (ND) • IPv6 over IPv4 Manual Tunnel • IPv6 over IPv4 Generic Routing Encapsulation (GRE) Tunnel • 6to4 Tunnel
	Dynamic Host Configuration Protocol (DHCP)	• DHCP server • DHCP snooping • DHCP relay • DHCPv6 Relay
IP forwarding	Unicast routing features	• IPv4/IPv6 static routing • Routing Information Protocol version 1 (RIP-1), RIP-2, and RIP next generation (RIPng) • Open Shortest Path First (OSPF), including

Function		Description
		• OSPFv2 and OSPFv3
		• Intermediate System to Intermediate System (IS-IS)
		• Border Gateway Protocol 4.0 (BGP4) and Border Gateway Protocol for IPv6 (BGP4+)
		• Routing protocol
		• Policy-based routing
		• Unicast Reverse Path Forwarding (URPF) check
	Virtual Private Network (VPN) features	• Multi-VPN-Instance CE (MCE) and IPv6 MCE
		• GRE Tunnel
	Multicast routing features	• Internet Group Management Protocol version 1/2/3 (IGMPv1/v2/v3)
		• Protocol Independent Multicast - Sparse Mode (PIM-SM) for IPv4 and IPv6
		• Protocol Independent Multicast Source-Specific Multicast (PIM-SSM) for IPv4 and IPv6
		• Multicast Listener Discovery version 1 and 2 (MLDv1 and MLDv2)
		• MLD Source-Specific Multicast (SSM) Mapping
		• Multiprotocol BGP (MBGP)
		• Multicast Source Discovery Protocol (MSDP)
		• Multicast routing policies
		• Reverse Path Forwarding (RPF)
		• Bidirectional PIM (IPv4) and Bidirectional PIM (IPv6)
Device reliability	Bidirectional Forwarding Detection (BFD)	• BFD (IPv4) and BFD (IPv6)
		• Association between BFD and Eth-Trunk
		• Association between BFD and OSPF
		• Association between BFD and OSPFv3
		• Association between BFD and IS-IS
		• Association between BFD and IS-IS IPv6
		• Association between BFD and BGP
		• Association between BFD and BGP4+
		• Association between BFD and PIM (IPv4)
		• Association between BFD and PIM (IPv6)
		• Association between BFD and static routing (IPv4)
		• Association between BFD and static routing

Function		Description
		(IPv6)
		• Association between BFD and Virtual Router Redundancy Protocol (VRRP)
		• Association between BFD and VRRP6
	Others	• Virtual Router Redundancy Protocol (VRRP) and VRRP6
		• Device Link Detection Protocol (DLDP)
		• Smart Link
		• Smart Channel
		• Ethernet in the First Mile (EFM), defined in 802.3ah
Layer 2 multicast features	Layer 2 multicast features	• IGMP snooping
		• IGMP proxy
		• Fast leave
		• Multicast traffic control
		• Multicast VLAN
Quality of Service (QoS) features	Traffic classification	• Traffic classification based on combination of the L2 protocol header, IP 5-tuple, outbound interface, and 802.1p priority
		• Traffic classification based on the C-VID and C-PRI of QinQ packets
	Traffic behavior	• Access control after traffic classification
		• Traffic policing based on traffic classifiers
		• Re-marking based on the traffic classification result
		• Class-based packet queuing
		• Association between traffic classifiers and traffic behavior (actions)
	Queue scheduling	• Priority queuing (PQ) scheduling
		• Deficit round robin (DRR) scheduling
		• PQ+DRR scheduling
		• Weighted round robin (WRR) scheduling
		• PQ+WRR scheduling
	Congestion avoidance	Weighted Random Early Detection (WRED)
	Rate limiting on outbound interfaces	Rate limiting on outbound interfaces
Virtualization	Many-to-one virtualization	• Intelligent Stack (iStack)
		• Stack split and merge

Function		Description
		• Dual-active detection • Version and configuration synchronization
Data center features	Transparent Interconnection of Lots of Links (TRILL)	• TRILL features • TRILL Non-Stop Routing (NSR) • TRILL Equal-Cost Multi-Path (ECMP) • IGMP over TRILL • TRILL multi-homing active-active
	Data Center Bridging (DCB)	• Data Center Bridging Exchange Protocol (DCBX) • Priority-based Flow Control (PFC) • Enhanced Transmission Selection (ETS)
	Fibre Channel over Ethernet (FCoE)	FCoE Initialization Protocol Snooping Bridge (FSB)
	Network Load Balancing (NLB) server cluster	Network Load Balancing (NLB) server cluster • Association between virtual IP addresses of NLBs and multicast MAC addresses • Association between one multicast MAC address and multiple outbound interfaces
	Forwarding mode based on Virtual Ethernet Port Aggregator (VEPA)	Forwarding mode based on VEPA
Configuration and maintenance	Terminal service	• Configuration using command lines • Error messages and online help in English and Chinese • Login through console and Telnet terminals • Send function and data communications between terminal users
	File system	• Directory and file management • File upload and download using File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP) and Secure File Transfer Protocol (SFTP)
	Debugging and maintenance	• Unified management of logs, alarms, and debugging information • Electronic labels • User operation logs • Detailed debugging information for network fault diagnosis • Network test tools such as tracert and ping

Function		Description
		• commands • Port mirroring and traffic mirroring
	Version upgrade	• Device software loading and in-service software loading • In-service upgrade using the basic input/output system (BIOS) menu • In-service patching **NOTE** To ensure secure service application, periodically upgrade the switch module software version.
Security and management	System security	• Hierarchical command-line protection based on user levels, preventing unauthorized users from using commands to access switch modules • Secure Shell (SSH) • Remote Authentication Dial-In User Service (RADIUS) authentication over IPv4 or IPv6 for login users • Huawei Terminal Access Controller Access Control System (HWTACACS) authentication over IPv4 or IPv6 for login users • Access control list (ACL) filtering • Dynamic ARP inspection (DAI) • DHCP packet filtering (appending the Option 82 field) • Defense against control packet attacks • Defense against attacks of source address spoofing, LAND, SYN flood (TCP SYN), smurf, ping flood (Internet Control Message Protocol Echo), teardrop, and ping of death • Logs about attacking MAC addresses
	Network management	• Internet Control Message Protocol (ICMP)-based ping and tracert • Simple Network Management Protocol version 1/2c/3 (SNMPv1/v2c/v3) • Standard management information base (MIB) • Remote network monitoring (RMON) • NetStream, with output statistics packets in the V5, V8, or V9 format • sFlow • Network quality analysis(NQR)

1.2 Advantages

This topic describes the advantages of the CX710: high performance and high port density; high specifications and support for large-scale data center networks; high-performance stacking and ease of deployment and maintenance; abundant data center features.

High Performance and High Port Density

Underpinned by the leading hardware platform, the CX710 provides high port density and wire-speed forwarding. It supports next-generation server applications that require super high performance and density.

The CX710 provides eight 40GE QSFP+ optical ports for connecting to uplink access aggregation or core switches, 16 40GE ports for connecting to the mezzanine cards of the high-performance blades, two 40GE ports for interconnecting switch modules, and two 10GE ports for connecting to the MM910.

The CX710 provides low-latency forwarding and provides 2.08 Tbit/s switching capacity (throughput). The forwarding latency for layer 2 Ethernet frames in cut through mode is less than 1.0 us (40GE port).

High Specifications and Support for Large Data Center Networks

The CX710 provides high specifications: up to 294,912 MAC addresses (large MAC address table mode) and 256,000 FIBs (large FIB table mode, which precludes the large MAC address table mode and large ARP table mode).

High-Performance Stacking, Easy Deployment, and Simple Maintenance

The CX710 supports a stack system of four devices. It has the following advantages:

- High performance: A stack system provides over 24 40GE ports (Four devices stacked in a ring with the 80G stack bandwidth.)
- High bandwidth: The 240 Gbit/s stack bandwidth is supported.
- Easy deployment and maintenance
    - Pre-deployment and offline configuration are supported. The system can be pre-planned and pre-configured. Devices can be added as required.
    - The slot ID of a device is the ID in the stacking system, facilitating identification and maintenance.
    - Indicators on the front panel indicate the role and status of a stacking system. The stacking system can be maintained without a terminal.
- Simple upgrade operations: The stacking system supports quick and automatic software upgrades, simplifying upgrade operations and reducing the upgrade workload.
    - Rapid software upgrade: When two switch modules are stacked, the standby switch module is upgraded before the active switch module. This ensures that at least one switch module is operating.
    - Automatic software upgrade: When two switch modules are stacked, the software version is automatically synchronized from the active switch module to the standby one.

Abundant Data Center Features

- Supports fiber channel over Ethernet (FCoE) and Data Center Bridging (DCB).

Supports FCoE, DCBX, 802.1Qbb-compliant priority-based flow control (PFC), and 802.1Qaz-compliant Enhanced Transmission Selection (ETS). With these features, the FC architecture can run on the lossless enhanced Ethernet to achieve a converged network and reduce networking costs.

- Supports VM access.

  Supports server virtualization, improving data center utilization.

- Supports the Transparent Interconnection of Lots of Links (TRILL) protocol.

  - Complying with the Internet Engineering Task Force (IETF) standard, the TRILL protocol supports ultra-large networks and flexible networking modes.

  - The TRILL protocol supports load balancing between paths, so that traffic can be shared by multiple paths according to service requirements.

  - The TRILL protocol supports fast network convergence. Any changes on the network can be quickly sensed and fast convergence is performed.

- Supports convergence of the Ethernet and storage networks.

  Convergence of the Ethernet and storage networks reduces switching planes and network interface cards (NICs) and facilitates network management. FSB is supported.

1.3 Appearance

This topic describes the CX710 in terms of its appearance, panel, and installation positions in the chassis.

Appearance

Figure 1-1 shows a CX710.

Figure 1-1 Appearance

Installation position

The CX710 can be installed in one of the four slots at the rear of the E9000 chassis. The four slots are 1E, 2X, 3X, and 4E, as shown in Figure 1-2.

Figure 1-2 Installation positions and slot numbers
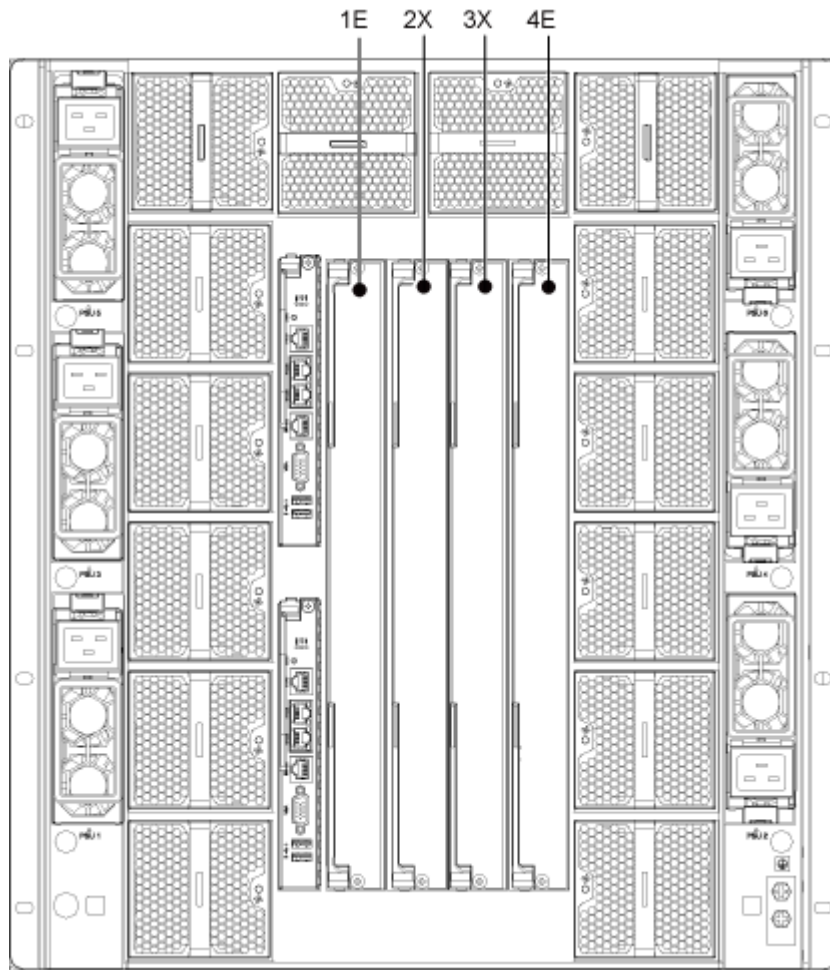
Front Panel

Figure 1-3 shows the CX710 front panel.

Figure 1-3 Front panel
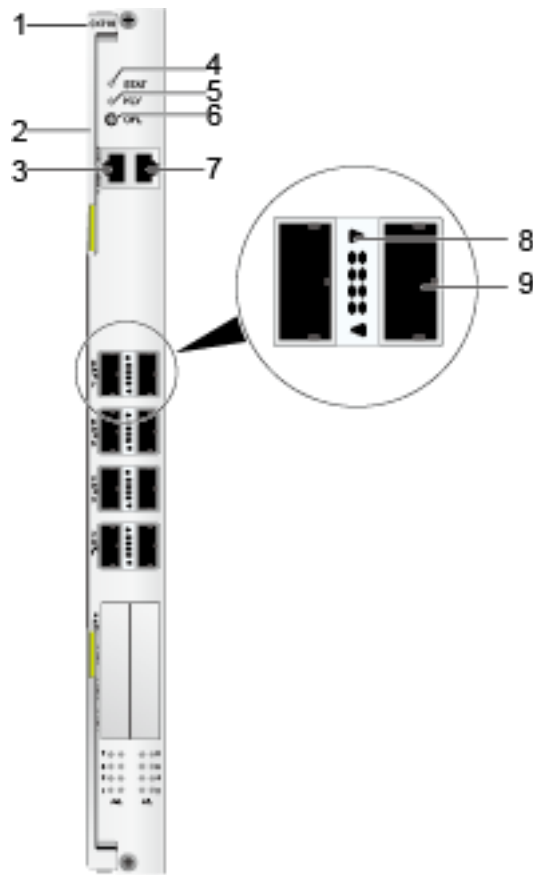
1	Product Model	2	Slide-out information label (with an ESN label)
3	BMC serial port	4	Stacking status indicator
5	Health indicator	6	Offline button/indicator
7	SYS serial port	8	40GE optical port indicator
9	40GE optical port	-	-

NOTE

The numbers on the left of the panel are port numbers. The triangle mark directions indicate the port positions.

ESNs

An Equipment Serial Number (ESN) is a string that uniquely identifies a server. An ESN is required when you apply for technical support from Huawei.

Figure 1-4 shows the ESN format.

Figure 1-4 ESN example

No.	Description
1	Indicates the ESN ID (two digits).
2	Indicates the item identification code (eight characters).
3	Indicates the vendor code (two characters).
4	Indicates the year and month (two characters). The first character indicates the year. The digits 1 to 9 indicate 2001 to 2009, and the letters A to Z indicate 2010 to 2035. The second character indicates the month. The digits 1 to 9 indicate January to September, and the letters A to C indicate October to December.
5	Indicates the sequence number (six digits).
6	Indicates RoHS compliance (one character).
7	Indicates the internal model number of the board.

1.4 Ports

This topic describes the features, numbering rules, names, types, and quantities of the CX710 ports.

The CX710 provides ports for users to operate and configure. The ports are used to send and receive data.

The CX710 Ethernet ports are numbered in *Slot number/Subcard number/Port number* format.

- *Slot number*: indicates the slot number of the current switch module. The value ranges from 1 to 4, mapping to slot numbers 1E, 2X, 3X, and 4E. The slot number is equal to the stacking ID. You can set or modify the stacking ID as required.
- *Subcard number*: indicates the number of a subcard supported by service ports. The value ranges from 1 to 19.
- *Port number*: indicates the serial number of the port on the subcard.

For details about the values, see Figure 1-5, Table 1-2, and Table 1-3.

For example, if the CX710 is in slot 2X, the first GE port on the upper right on the panel is numbered 40GE 2/17/8, as shown in Figure 1-5.

Figure 1-5 Port numbers
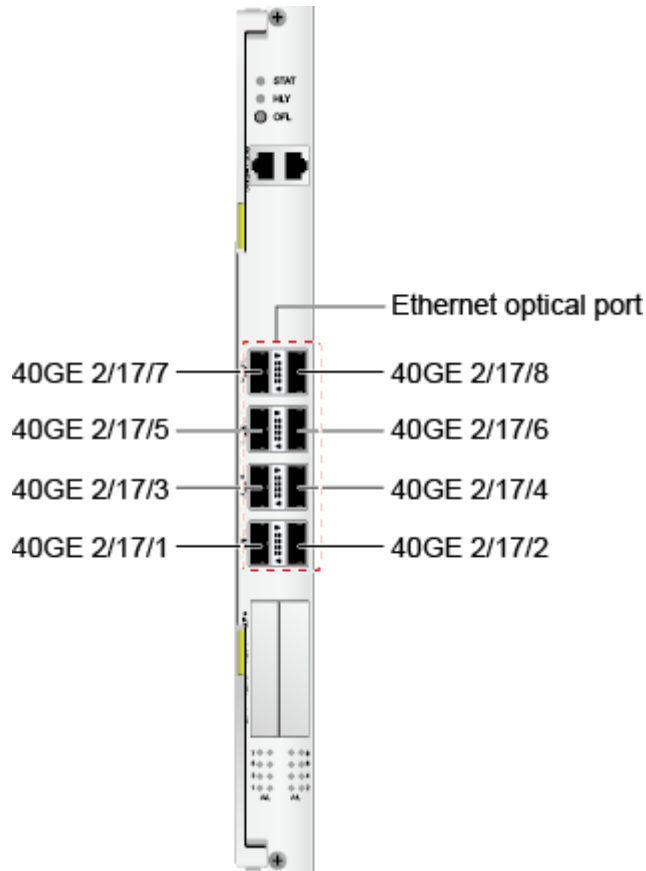
Table 1-2 lists the external ports on the CX710.

Table 1-2 External ports

Name	Type	Quantity	Subcard Number	Port Number	Description
Serial port	RJ45	2	-	-	The serial ports include a BMC port and a SYS port. These two ports comply with RS232 and have no indicators. • BMC port: used to log in to the BMC CLI. • SYS serial port: used to locally manage, maintain, and commission the 40GE converged switching plane. The serial port baud rate of the BMC and 40GE converged switching plane is 115200 bit/s.

Name	Type	Quantity	Subcard Number	Port Number	Description
40GE optical port	QSFP+	8	17	The port number ranges from 1 to 8. The ports are numbered in ascending order from bottom to top.	Used to connect to external networks or stack switch modules. Each port provides one indicator. Ports 1 to 6 can be split into four 10GE ports. Ports 7 and 8 cannot be split.

Table 1-3 describes the internal ports on the CX710.

Table 1-3 Internal ports

Name	Type	Quantity	Subcard Number	Port Number	Description	Example
40GE port	-	16	1 to 16	The port number is 1.	The ports are connected to front half-width slots 01 to 16. The 16 subcard numbers of the ports map to the 16 front slot numbers.	If the CX710 is in slot 2X, the port connected to the compute node in slot 1 is numbered 40GE 2/1/1.
40GE port	-	2	18	The port number ranges from 1 to 2.	The port is used to interconnect the switch modules in slots 1E and 4E or in slots 2X and 3X. This port can be used as a stack port.	If the CX710 is in slot 2X, the ports are numbered 40GE 2/18/1 and 40GE 2/18/2.
10GE port	-	2	19	The port number ranges from 1 to 2.	The two 10GE ports connect to and communicate with two MM910s. The two ports can communicate with the MM910s only when the switch module is in slot 2X or 3X.	If the CX710 is in slot 2X, the ports are numbered 10GE 2/19/1 and 10GE 2/19/2.

1.5 Indicators

This topic describes the names, meanings, colors and status of the indicators on the CX710.

By observing the indicators, you can determine the current operating status of the CX710. Table 1-4 describes the indicators on the CX710 panel.

Table 1-4 Indicator description

Label	Meaning	Color	Description
STAT	Stacking status indicator	Green	• Off: The CX710 is not powered on. • Blinking green for 10 times: The CX710 is being powered on. • Blinking green: The CX710 is in the standby or slave state in a stack and is operating properly. • Steady green: The CX710 is in the active state in a stack or is not stacked, and is operating properly.
HLY	Health indicator	Red and green	• Off: The CX710 is not powered on. • Steady green: The CX710 is operating properly or has minor alarms. • Blinking red (1 Hz): A major alarm is generated. • Blinking red (at 5 Hz): A critical alarm is generated for the CX710, or the CX710 is not securely installed.
OFL	Offline button/indicator (reserved)	N/A	None.
◀ and ▶	40GE optical port indicator	Green	• Off: No data is being transmitted over or the port is not connected. • Blinking green: Data is being sent or received over the port. • Steady green: The port is properly connected.

1.6 Internal Chassis Networking

This topic describes connection relationships between the CX710 and mezzanine cards on compute nodes.

For details about the networking of the CX710 and Mezz cards on compute nodes, see *E9000 Blade Server Mezz Module-Switch Module Interface Mapping Tool*.

Figure 1-6 shows the internal chassis networking between the CX710 and compute nodes. Compute node ports for connecting to the CX710 are provided by two mezzanine cards as follows:

- The mezz1 slot connects to the 40GE converged switching planes of the CX710s in slots 2X and 3X.
- The mezz2 slot connects to the 40GE converged switching planes of the CX710s in slots 1E and 4E.

Figure 1-6 Mapping between the CX710s and mezzanine cards on a compute node
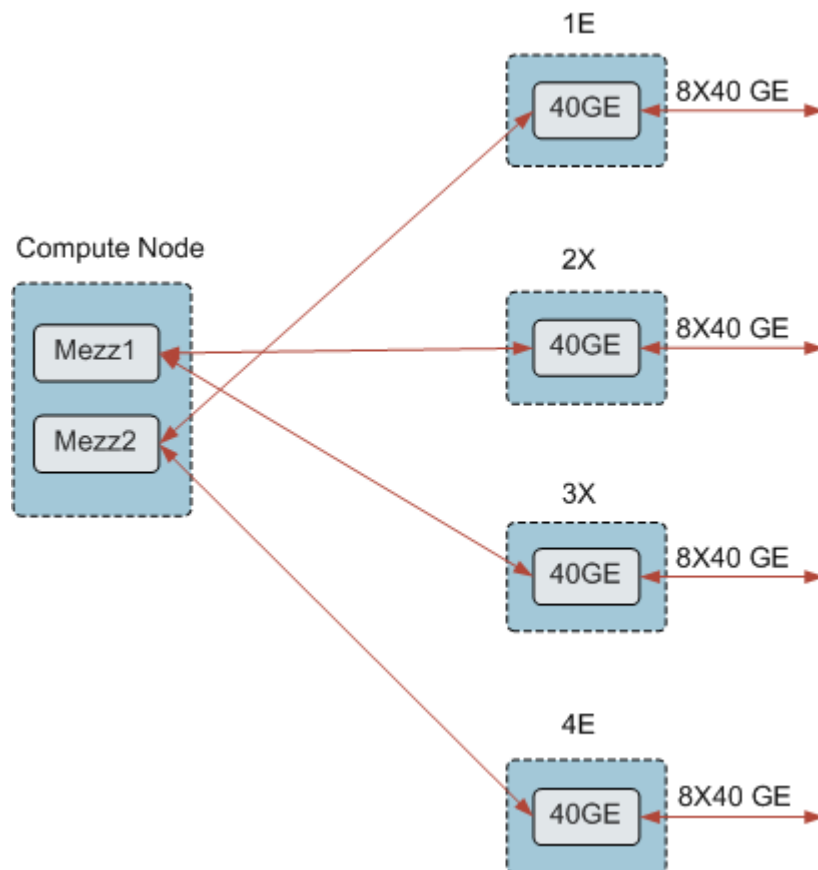
NOTE

If a compute node uses the ports provided by four mezzanine cards to connect to the CX710, slots Mezz1 and Mezz3 connect to switch module slots 2X and 3X respectively, and slots Mezz2 and Mezz4 connect to switch module slots 1E and 4E respectively.

The following describes the mapping between the CX710s and mezzanine cards by assuming that the CX710s are installed in slots **2X** and **3X** and connect to Mezz 1. If the CX710s are installed in slots **1E** and **4E**, the CX710s connect to Mezz 2.

Mapping Between the CX710s and Ports on Mezzanine Cards

Mapping between the CX710s and ports on the MZ311

The ports can be connected to the MZ311s only when the 40GE port on the CX710 backplane is used as two 10GE ports.

The MZ311 provides four 10GE ports (ports 1 to 4). Ports 1 and 3 map to the 40GE converged switching plane of the CX710 in slot 2X, and ports 2 and 4 map to the 40GE converged switching plane of the CX710 in slot 3X, as shown in Figure 1-7.

Figure 1-7 Mapping between the CX710s and ports on the MZ311

Mapping between the CX710s and ports on the MZ510

The ports can be connected to the MZ510s only when the 40GE port on the CX710 backplane is used as two 10GE ports.

The MZ510 provides two 10GE ports (ports 1 and 2). Ports 1 and 2 map to the 40GE converged switching planes of the CX710s in slots 2X and 3X respectively, as shown in Figure 1-8.

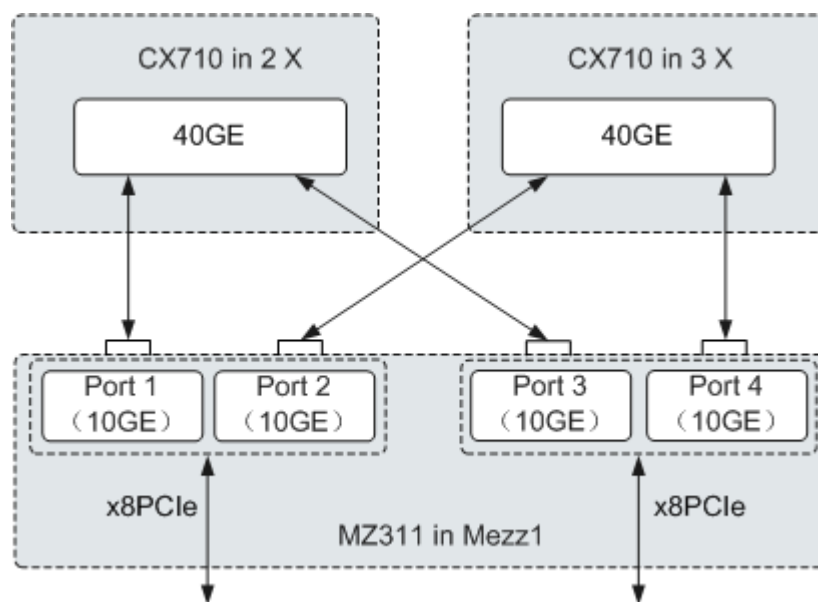**Figure 1-8** Mapping between the CX710s and ports on the MZ510

Mapping between the CX710s and ports on the MZ512

The ports can be connected to the MZ512s only when the 40GE port on the CX710 backplane is used as two 10GE ports.

The MZ512 provides four 10GE optical ports (ports 1 to 4). Ports 1 and 3 map to the 40GE converged switching plane of the CX710 in slot 2X, and ports 2 and 4 map to the 40GE converged switching plane of the CX710 in slot 3X, as shown in Figure 1-9.

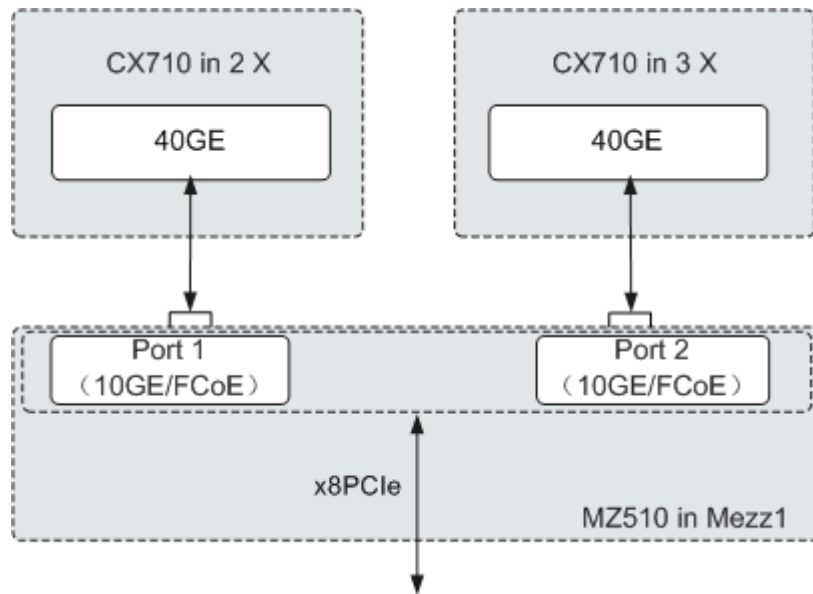**Figure 1-9** Mapping between the CX710s and ports on the MZ512

Mapping between the CX710s and ports on the MZ710

The MZ710 provides two 40GE ports (ports 1 and 2). Ports 1 and 2 map to the 40GE converged switching planes of the CX710s in slots 2X and 3X respectively, as shown in Figure 1-10.

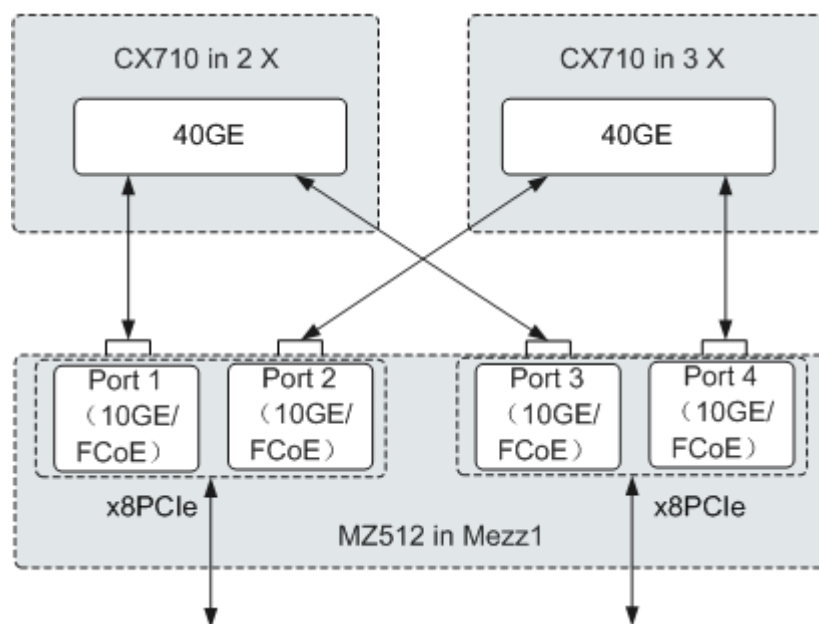**Figure 1-10** Mapping between the CX710s and ports on the MZ710
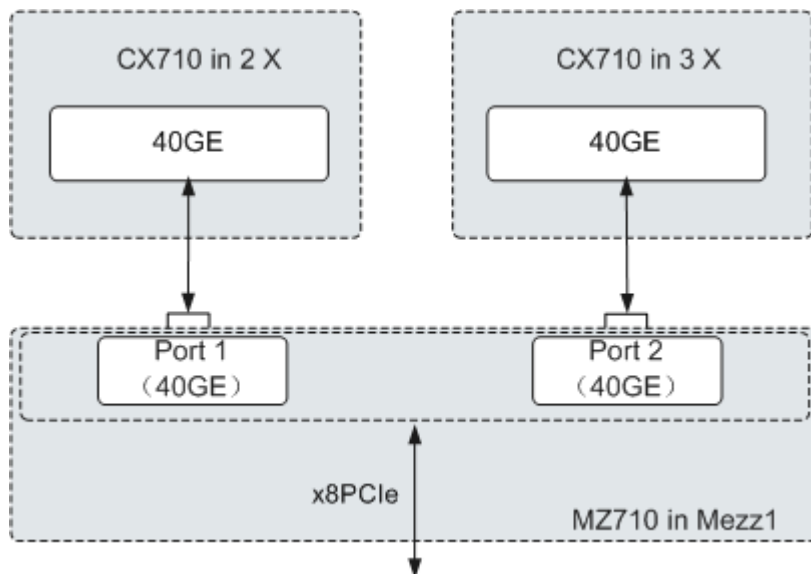
1.7 Software and Hardware Compatibility

This topic describes mezzanine cards that can work with the CX710 and pluggable modules and cables supported by ports on the CX710 panel.

For details about the software and hardware supported by the CX710, see the Huawei Server Compatibility Checker.

Supported mezzanine cards

The CX710 connects to mezzanine cards of compute nodes. Table 1-5 describes models and specifications of the supported mezzanine cards.

Table 1-5 Supported mezzanine cards

Model	Specifications
MZ710	2–port 40GE RDMA over Converged Ethernet (RoCE) mezzanine card

Supported pluggable modules and cables

Table 1-6 Supported pluggable modules and cables

Type	Specifications

Type	Specifications
QSFP+ multi-mode optical module (40GE)	Supports 40GBASE-SR4.
QSFP+ DAC cable (40GE)	Supports 40GBASE-CR4. The 1 m, 3 m, and 5 m passive DAC cables can be used.
QSFP+ to 4 x SFP+ DAC cable	Supports passive DAC splitter cables of 1 m, 3 m, and 5 m.
MPO to 4 x DLC multi-mode fiber (MMF)	Insert the MPO connector to a QSFP+ optical module, and insert the DLC connectors to SFP+ optical modules.
Multi-mode fiber (MMF)	Supports 850 nm OM1, OM2, and OM3 MPO MMFs.
Single-mode fiber (SMF)	Supports 1310 nm SMFs.
Cat-5 unshielded twisted pair (UTP) cable	Category 5 UTP cables that support RJ45 ports
Cat-5e UTP cable	Category 5e (Category 5 enhanced) UTP cables that support RJ45 ports
Console cable	Supports the RJ45 port and serves as the connection cable for RS232 serial ports.
This table is for reference only. For details about the components that can be purchased, consult the local Huawei sales representatives.	

The CX710 supports multiple pluggable optical modules and fibers. You can choose the modules and cables based on site requirements.

- The CX710 provides the following functions for 10GE applications:

  The 40GE port on the panel can be used as 4 x 10GE ports by connecting to an MPO to 4 x DLC MMF through a QSFP+ optical module, or by connecting to a QSFP+ to 4 x SFP+ DAC cable.

  The 40GE port for connecting to the compute node can be used as 2 x 10GE ports which can connect to the 10GE mezzanine cards, and the port is compatible with the existing 10GE device.

- The CX710 supports the following 40GE applications:
  - Provides QSFP+ optical ports and supports multi-mode QSFP+ optical modules.
  - Supports QSFP+ DAC cables (40GE). 1 m, 3 m, and 5 m passive DAC cables can be used.

1.8 Technical Specifications

This topic describes the physical, environmental, power, and network switching specifications of the CX710.

Table 1-7 describes the technical specifications of the CX710. Network switching specifications are described in Table 1-8.

Table 1-7 Technical specifications

Category	Item	Specifications
Physical specifications	Dimensions (H x W x D)	388.55 mm x 35.06 mm x 272.15 mm (15.30 in. x 1.38 in. x 10.71 in.)
	Color	Silver white
	Weight	2.9 kg
Environmental specifications	Temperature	• Operating temperature: 5 ℃ to 40 ℃ (41 ℉ to 104 ℉) (ASHRAE Class A3 compliant) • Storage temperature: -40 ℃ to +65 ℃ (-40 ℉ to +149 ℉) • Long-term storage temperature: 21 ℃ to 27 ℃ (69.8 ℉ to 80.6 ℉)
	Temperature change rate	15 ℃/h (27 ℉/h)
	Humidity	• Operating humidity: 5% RH to 85% RH (non-condensing) • Storage humidity: 5% RH to 95% RH (non-condensing) • Long-term storage humidity: 30% RH to 69% RH (non-condensing)
	Altitude	At an altitude of 900 m (2952.72 ft), the highest operating temperature is 40 ℃ (104 ℉). When the device is used at an altitude of 900 m to 5000 m, the highest operating temperature decreases by 1 ℃ (1.8 ℉) as the altitude increases by 300 m (984.24 ft).
Input power supply	Rated input voltage	12 V DC
Power consumption	Maximum power consumption	180 W

Table 1-8 Network switching specifications

Attribute	Service Feature	Performance Specifications
Device performance	Number of ports on the panel	• Two serial ports: one BMC port and one SYS port • Eight 40GE optical ports
	Port rate	The ports for connecting to the compute node can be dynamically configured as 1 x 40GE or 2 x 10GE ports, and the 40GE port on the panel can be split into 4 x 10GE ports.
	Service port stacking	Switch modules can be stacked through one 40GE port on the panel or two 40GE internal ports.
	Switching capacity (throughput)	2.08 Tbit/s
Ethernet service	Number of Media Access Control (MAC) addresses	294,912 (in large MAC table mode)
	Number of VLANs	4063 **NOTE** The default value ranges from 4064 to 4094. Generally, 31 VLANs are reserved for a switch module. Reserve consecutive VLANs for easier configuration.
	Number of Eth-Trunk ports	128 (Each Eth-Trunk port supports up to 16 member ports.)
	Number of Address Resolution Protocols (ARPs) for the device	128,000 (in large ARP table mode)
	Jumbo frame length (bytes)	9216
Quality of Service (QoS)	Number of queues per port	8
	Number of CARs	• Ingress: 2048 • Egress: 1024
	Packet cache	12 MB
ACL	ACLv4	• Ingress: 2048 • Egress: 1024
L3VPN	VRF	128 (Multiprotocol Label Switching is not supported).

Attribute	Service Feature	Performance Specifications
	Number of virtual private network (VPN) routes	256,000
IP address unicast	Number of routing table entries	256,000 (in large FIB table mode)
	Number of IPv4 forwarding information bases (FIBs)	256,000 (in large FIB table mode)
	Number of IPv6 forwarding information bases (FIBs)	128,000 (the mask length is not longer than 64)
Multicast	Number of layer 3 multicast forwarding entries	8000
Reliability services	Bidirectional Forwarding Detection (BFD)	• Number of BFD sessions: 128 • Minimum interval for receiving and sending packets: 50 ms
	Virtual Router Redundancy Protocol (VRRP)	• Number of VRRP backup groups: 64 • Number of VRRP management groups: 64 • Number of virtual IP addresses for each VRRP backup group: 16
	Multiple Spanning Tree Protocol (MSTP)	Maximum number of instances in the device: 64
Enhanced Ethernet	Transparent Interconnection of Lots of Links (TRILL)	• Number of network nodes: 512 • Number of CE-VLANs: 4062 • Load-sharing specifications: 16 links

2 Standards and Certifications

About This Chapter

This topic describes the international and industry standards and communication protocols that the CX710 complies with.

This topic describes the certifications that the E9000 has passed.

2.1 Standards Compliance

This topic describes the international and industry standards and communication protocols that the CX710 complies with.

International Standards

Table 2-1 lists the international standards.

Table 2-1 Standards and communication protocols

Standard	Protocol
DCBX	Data Center Bridging eXchange
FC-BB-5	Fibre Channel - Backbone – 5 (FCOE)
IEEE 802.3x	Flow control and Back pressure
IEEE 802.1Qbb	Priority-based Flow Control (PFC)
IEEE 802.1Qaz	Enhanced Transmission Selection (ETS)
IEEE 802.1Q	Virtual Bridged Local Area Networks (VLAN)
IEEE 802.1s	Multiple Spanning Trees (MSTP)
IEEE 802.1w	Rapid Reconvergence of Spanning Tree (RSTP)

Standard	Protocol
IEEE 802.1ab	Station and Media Access Control Connectivity Discovery (LLDP)
IEEE 802.1ad	Virtual Bridged Local Area Networks: Provider Bridges (QinQ)
IEEE 802.3ad	Link Aggregation Control Protocol (LACP)
IEEE 802.1Qbg	Edge Virtual Bridging (VEPA)
SFF-8436	QSFP+ 10 Gbs 4X PLUGGABLE TRANSCEIVER
SFF-8635	QSFP+ 4X 10 Gb/s Pluggable Transceiver Solution (QSFP10)
SFF-8636	Management Interface for Cabled Environments

Industry Standards

Table 2-2 lists the industry standards.

Table 2-2 Industry standards

Organization	Standard
ECMA TR/70	Environmental protection
EN60950	Safety (Europe)
GR-929	Reliability
IEC 812	Failure Mode and Effects Analysis (FMEA)
IEC 863	Reliability, maintainability and availability
IEC60297	Chassis compliance
IEC60950	Safety
IEC60825-1/2/6	Safety
IEC60215	Safety
IEC61000	EMC
Telcordia SR-332	Reliability
UL60950	Safety (North America)

Communication Protocols

Table 2-3 lists the communication protocols.

Table 2-3 Communication protocols

Protocol	Description
ARP	Address Resolution Protocol
BFD	Bidirectional Forwarding Detection
BGP	Border Gateway Protocol
DHCP	Dynamic Host Configuration Protocol
DLDP	Device Link Detection Protocol
FTP	File Transfer Protocol
GMRP	GMRP Multicast Registration Protocol
GVRP	GARP VLAN Registration Protocol
HTTP	Hypertext Transfer Protocol
ICMP	Internet Control Message Protocol
IGMP	Internet Group Management Protocol
IPMI	Intelligent Platform Management Interface
IPv4/IPv6	IPv4 or IPv6 Internet Protocol
MSTP	Multiple Spanning Tree Protocol
NTP	Network Time Protocol
OSPF	Open Shortest Path First
RADIUS	Remote Authentication Dial In User Service
RIP	Routing Information Protocol
RSTP	Rapid Spanning Tree Protocol
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSL	Secure Socket Layer
STP	Spanning Tree Protocol
TCP	Transmission Control Protocol
TELNET	Remote Terminal Protocol
TFTP	Trivial File Transfer Protocol
TRILL	Transparent Interconnection of Lots of Links
UDP	User Datagram Protocol
VRRP	Virtual Router Redundancy Protocol

2.2 Certifications

This topic describes the certifications that the E9000 has passed.

Table 2-4 lists the certifications.

Table 2-4 Certifications

Country /Region	Certification	Standard
Europe	WEEE	2002/96/EC, 2012/19/EU
Europe	RoHS	2002/95/EC, 2011/65/EU, EN 50581: 2012
Europe	REACH	EC NO. 1907/2006
Europe	CE	Safety: EN 60950-1: 2006+A11: 2009+A1: 2010+A12: 2011 EMC: • EN 55022: 2010 • CISPR 22: 2008 • EN 55024: 2010 • CISPR 24: 2010 • ETSI EN 300 386 V1.6.1: 2012 • ETSI ES 201 468 V1.3.1: 2005
China	RoHS	SJ/T-11363-20006 SJ/T-11364-20006 GB/T 26572-2011
China	China Environmental Labeling	GB/T24024: 2001 idt ISO14024: 1999 HJ 2507-2011
Australia	C-tick	AS/NZS CISPR22: 2009
America	UL	UL 60950-1
America	FCC	FCC Part 15 (Class A)
America	NTRL-UL	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No.60950-1-07, 2nd Edition, 2011-12 (Information Technology Equipment-Safety-Part 1: General Requirements)
Canada	IC	ICES-003 Class A
Nigeria	SONCAP	IEC 60950-1: 2005 (2nd Edition) + A1: 2009 EN 60950-1: 2006+A11: 2009+A1: 2010 + A12: 2011
Kingdom of Saudi Arabia	SASO	IEC 60950-1: 2005 (2nd Edition) + A1: 2009 EN 60950-1: 2006+A11: 2009+A1: 2010 + A12: 2011

Country /Region	Certification	Standard
(KSA)		
Global	CB	IEC 60950-1
Japan	VCCI	VCCI V-4: 2012