

ACX Series Universal Access Routers



Product Overview

ACX Series Universal Access Routers bring operational intelligence to the access and aggregation layers, providing the option to deploy Ethernet or IP/MPLS infrastructure. High-precision synchronization technology, industry-leading security, and high availability features enhance QoE, while extensive OAM, built-in advanced SLA management, and zero touch deployment capabilities reduce TCO. ACX Series platforms address a variety of service provider use cases—including mobile backhaul, residential and business access, and metro Ethernet aggregation—as well as enterprise use cases for power utilities, oil and gas, mining, transportation, and defense and public safety industries.

Product Description

Juniper Networks® ACX Series Universal Access Routers are Juniper’s response to a shift in metro network architecture where the access and aggregation layer is extending the operational intelligence from the service provider edge to the access network. The ACX Series simplifies access and aggregation architectures by eliminating unnecessary layers and network overlays, dramatically reducing CapEx and OpEx. Based on architectural simplification and cost reduction, service providers and enterprises can adopt the true universal access paradigm enabled by the ACX Series. In addition to MEF CE2.0 compliance for supporting both Ethernet and IP/MPLS, the ACX Series provides high capacity and scalability while delivering industry-leading performance with a range of port densities and interface types. Table 1 provides a snapshot of interfaces supported on each ACX Series model. The flexibility and upgradability (mix and match of interface types) makes the ACX Series ideal for a wide range of use cases applications.

Metro Ethernet

Carrier Ethernet services have been growing at double-digit rates over the past several years, and the trend is expected to continue—projected to reach over \$70 billion revenue globally by 2020. Unabated network traffic growth driven by video and mobility, the continued shift from legacy TDM to IP, increased adoption of cloud services, and the arrival of smart cities and IoT (Internet of Things) all drive the demand for more Ethernet services given its lower cost per bit and bandwidth scalability. Meanwhile, Carrier Ethernet services are being provided by a wide range of service providers, and the increased competition has been putting pressure on the services price. To maintain profitability and compete effectively, service providers need a scalable universal metro Ethernet infrastructure to serve multiple customer segments with differentiated services.

- **Business Services**—The ACX500, ACX1000 line, and ACX2000 line can be deployed as a CPE or NID to provide L2/3 business access, direct Internet access, and IP services such as IP VPN. The ACX Series features robust OAM and SLA control capabilities; together with automation and zero touch provisioning, the ACX Series enables seamless migration from 1GbE to 10GbE.
- **Residential Aggregation**—The ACX5000 is a perfect candidate as a versatile metro aggregation platform. It supports high port densities and rich features such as Ethernet OAM for E-LINE, E-LAN, E-TREE over Ethernet or IP/MPLS, and IP VPN. The ACX5000 is also an excellent choice as a converged FTTH and metro Ethernet Services solution.
- **Wholesale Mobile Backhaul**—In addition to MEF CE 2.0 compliance, supporting both Ethernet and IP/MPLS, the ACX Series provides high capacity and scalability, complete timing and synchronization, and integrated security and SLA tools that wholesale operators could use to differentiate for mobile backhaul services. Additionally, the ACX500 could be used as a last-mile deployment solution for a small cell as-a-service offering.



- **Ethernet Exchange**—High capacity, low power consumption in combination with rich MEF and IP feature set, all make the ACX5000 a good fit as the aggregation platform for an Ethernet Exchange service provider.

Mobile Backhaul and Fronthaul

The accelerating speed of innovation is forcing mobile operators to start planning for migration to LTE-Advanced now and 5G in the near future. LTE-Advanced and 5G place more stringent requirements for capacity, latency, synchronization, and security on the network infrastructure.

Equipped with 1GbE/10GbE interfaces and providing up to 60 Gbps of throughput, the ACX Series satisfies LTE-Advanced and 5G capacity requirements. In addition to high capacity and density to address scaling requirements, the ACX Series also addresses end-user quality requirements through high-precision timing, advanced security features, and enhanced SLA management capabilities.

Today, the ACX Series supports all mobile services profiles including 2G/3G HSPA, 4G LTE, LTE-Advanced, and Small Cell. In a typical backhaul deployment scenario, the ACX500 is used as a small cell router and grandmaster, whereas the ACX1000

line, ACX2000 line, or ACX4000 are macro cell site routers. The backhaul traffic carried over Ethernet or IP/MPLS is aggregated by the ACX5000 before it hits the mobile core. In a C-RAN deployment scenario, the ACX5000 could be used for fronthaul in a BBU model.

Enterprise Networking and Field Area Network

As enterprises and governments are embarking on their digital transformation journey, they need to deploy and upgrade their mission-critical communications networks, some of which are located in demanding and harsh environments such as the field area networks for providing SCADA system connectivity. These include power utilities, oil and gas, mining, rail and transportation, defense and public safety industries, etc.

The environmentally hardened small form factor ACX Series platforms deliver comprehensive routing and security services, application awareness and control, with high availability to ensure business continuity and resiliency, and they are perfect choices for supporting such mission-critical communications networks. The ACX Series enables seamless migration from legacy TDM/SONET to Ethernet/IP, with support of legacy services.

Table 1: Built-In Interface Options for Various ACX Series Models

Model	TDM (T1/E1)	OC3 (STM1)/ OC12 (STM4)	GbE (copper)	GbE (combo)	GbE (SFP)	10GbE (SFP+)	40GbE (QSFP)
ACX500	-	-	-	4 (PoE+ support on 3 ports)	2	-	-
ACX500-O	-	-	3	-	3	-	-
ACX500-O-POE	-	-	3 with PoE+ support	-	3	-	-
ACX1000	8	-	8	4	-	-	-
ACX1100	-	-	8	4	-	-	-
ACX2100	16	-	4	4	2	2*	-
ACX2200	-	-	4	4	2	2*	-
ACX4000	Up to 32**	Up to 8/2**	-	8 (PoE++ support on 2 ports)	Up to 14**	2*	-
ACX5048	-	-	-	-	-	48*	6
ACX5096	-	-	-	-	-	96*	8

* SFP+ ports can be configured to be 1GbE ports and accept 1GbE small form-factor pluggable transceiver (SFP);

** When equipped with appropriate I/O MIC modules. See table with "Ordering Information"

Architecture and Key Components

Powered by Juniper Networks Junos® operating system, the ACX Series routers complement Juniper Networks MX Series 3D Universal Edge Routers through a flexible and scalable service provider and enterprise branch routing portfolio optimized to support rapidly growing mobile, video, and cloud computing applications. The ACX Series introduces Juniper's proven IP/MPLS leadership from core and edge into the access layers of the network. Maintaining relative simplicity in the access network, the ACX Series supports a rich suite of L2, L3, and IP/MPLS functionality to allow large-scale seamless MPLS networks with simplified service provisioning and operations.

- **Seamless MPLS**—ACX Series routers support both Ethernet bridging and MPLS. Growing demands in bandwidth are accompanied by network growth in terms of number of nodes. In some cases, we can see demands to scale a network up to tens of thousands of nodes. Seamless MPLS architecture enables scale and service flexibility by decoupling physical topology for transport and service layers. With a seamless MPLS architecture, service providers can leverage the existing investment of MPLS in the core and edge and extend the operational benefit into the access layer, enabling higher network service flexibility and higher scaling parameters of the MAN where metro Ethernet services can span across multiple network segments and be seamlessly terminated at any point of the network or cloud.
- **Junos OS**—Junos OS is a reliable, high-performance, modular network operating system that is supported across all of Juniper's physical and virtual routing, switching, and security platforms. Junos OS improves network operations and increases service availability, performance, and security with features like low-latency multicast, comprehensive QoS, unified in-service software upgrade (unified ISSU), and Junos Continuity, which eliminates the risk and complexity of OS upgrades. Junos OS comes with embedded scripting tools and APIs, which enable automation of many routines and allow integration practically with any operator's back-end management tools. With secure programming interfaces, the Juniper Extension Toolkit (JET), versatile scripting support, and integration with popular orchestration frameworks, Junos OS offers flexible options for DevOps-style management that can unlock more value from the network.
- **Management**—Junos Space Network Management Platform provides comprehensive management with broad fault, configuration, accounting, performance, and security management (FCAPS) capabilities, for both device and service-level management. For device management, it supports NETCONF, CLI, SNMP v1/v2/v3 protocols, and its northbound APIs support easy integration with existing network management systems (NMS) and operations/business support systems (OSS/BSS). Running on the Junos Space Management Platform, Junos Space

Connectivity Services Director ensures effortless end-to-end service provisioning of TDM, ATM, Carrier Ethernet (E-LINE, E-LAN, E-TREE, E-Access), VPLS, L3VPN, and MPLS, using a simple interface to design, validate, and manage these services. Another application of Junos Space, Cross Provisioning Platform (CPP) helps service providers provision E-LINE, Layer 2/3 VPN services, and virtual private LAN service (VPLS) between Juniper devices and those from third-party vendors.

Features and Benefits

The ACX Series delivers new levels of programmability, reliability, and scalability to the service provider and enterprise networks. The ACX Series portfolio improves customer satisfaction while lowering the total cost of operating, maintaining, and updating the network infrastructure.

Zero Touch Deployment (ZTD)

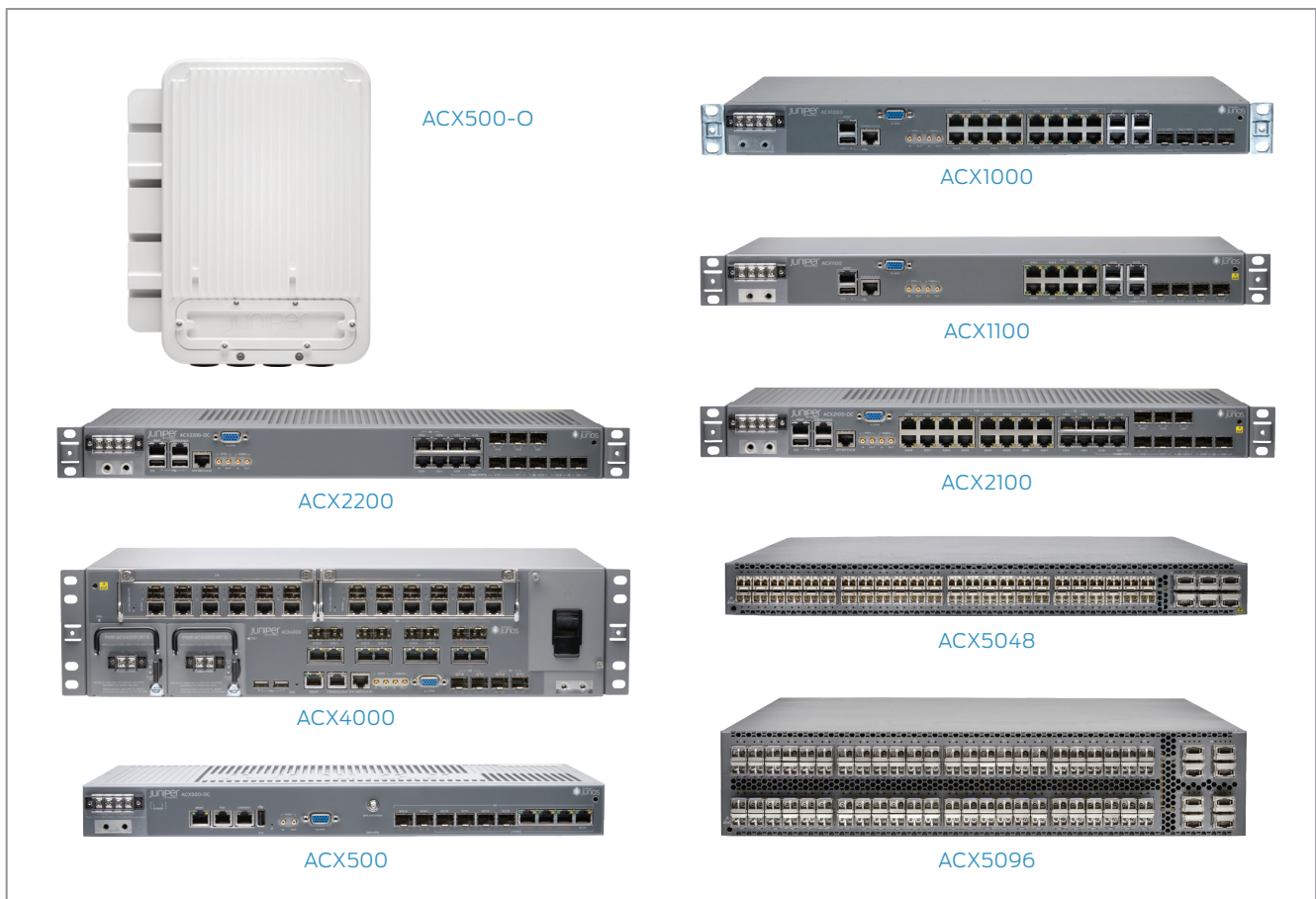
Based on Junos OS automation capabilities, ACX Series routers support a zero touch deployment (ZTD) model. The ZTD model significantly minimizes the time for any new equipment installation and provisioning, resulting in lower OpEx and TCO and improved operational efficiency. In addition, the zero touch deployment model reduces the traditional complexity of deploying MPLS in the access.

Integrated High-Precision Timing

The ACX Series incorporates highly scalable and reliable hardware-based timing technology, based on Juniper Networks intellectual property that meets the strictest LTE-A requirements for frequency and phase synchronization. Providing an accurate timing reference is one of the most significant technical and operational challenges for deployment of LTE radio access networks. ACX Series routers support Synchronous Ethernet for frequency as well as Precision Time Protocol (PTP) for both frequency and phase synchronization. Furthermore, the ACX Series allows Synchronous Ethernet and PTP to be used in a hybrid mode for the highest level of frequency (10 ppb) and phase (<500 nS) accuracy required for LTE-A. The ACX500, ACX500-O, and ACX500-O-PoE also provide an integrated GPS receiver and can act as a grandmaster (GM) clock for a distributed PTP implementation, making them an ideal choice for the aggregation of small cell traffic when the backhaul is transported over the Internet.

Advanced Security Services

One of the significant challenges in the rollout of small cells is to address the security threats from easily accessible locations. The ACX500 enables advanced security services such as IPsec, MACsec, NAT, and TPM to protect against potential vulnerabilities to the network as well as subscriber traffic. Hardware acceleration through a purpose-built services engine enhances the scalability of these computational-intensive services to support a large-scale small cell deployment.



Enhanced Service Assurance, SLA Management, and Ethernet OAM

The ACX Series routers provide the most comprehensive set of features. Using 802.3ah, 802.1ag, Y.1731, Two-Way Active Measurement Protocol (TWAMP) and RFC2544, mobile operators and wholesale service providers can make sure that the services being offered through ACX Series routers are meeting the desired service-level agreements.

Environmentally Hardened Design

Most of the ACX Series models such as ACX500, ACX1x00, and ACX2x00, are temperature hardened and support passive cooling for outdoor deployments in extreme weather conditions. The ACX500-O and ACX500-O-PoE are based on environmentally hardened, ruggedized chassis and are IP65 compliant for outdoor deployments with no need for an enclosure or cabinet. These are designed to be pole or strand mounted alongside outdoor small cells.

High Availability and Reliability

Junos Continuity and unified ISSU features remove the downtime risks associated with implementing new hardware or upgrading operating systems. Junos Continuity eliminates OS upgrades and system reboots when adding new hardware to ACX Series routers—a plug-in package provides the drivers and support files needed to bring the hardware online. Unified ISSU reduces the risks associated with OS upgrades by enabling upgrades between two different Junos OS releases (major or minor) with no control plane disruption and minimal traffic disruption on the forwarding plane.

MEF CE 2.0 Compliant

The ACX Series routers are all MEF CE 2.0 compliant and could support all Carrier Ethernet services, which include E-LINE, E-LAN, E-TREE, and E-ACCESS.

Full Feature Set of L2, L3, IP/MPLS

The ACX Series routers support a full feature set of L2, L3, and IP/MPLS. Service providers can not only monetize Layer 2 Ethernet services, but also Layer 3, IP/IP-VPN services, etc., for greater monetization.

Table 2: ACX Series Platform Feature Matrix

Features	ACX500, ACX500-O, ACX500-O-POE	ACX1000, ACX1100	ACX2100, ACX2200	ACX4000	ACX5048, ACX5096
Throughput	Up to 60 Gbps	Up to 60 Gbps	Up to 60 Gbps	Up to 60 Gbps	1.44/2.56 TBps
Layer 2	IEEE 802.3 bridging	✓	✓	✓	✓
	IEEE 802.1q	✓	✓	✓	✓
	IEEE 802.1ad (Q-in-Q)	✓	✓	✓	✓
	VLAN id manipulation for outer/inner: swap/ pop/push	✓	✓	✓	✓
	RSTP/VSTP/MSTP	✓	✓	✓	✓
	ERPS G.8032v1	✓	✓	✓	✓
	ERPS G8032v2				✓
	LACP	✓	✓	✓	✓
	Enhanced load balancing based on L2-L4 header info	✓	✓	✓	✓
	LLDP	✓	✓	✓	✓
Layer 2 BPDU tunneling/ MAC rewrite	✓	✓	✓	✓	
Layer 3	IPv4	✓	✓	✓	✓
	IPv6	✓	✓	✓	✓
	RPF	✓	✓	✓	✓
	ECMP	✓	✓	✓	✓
	Enhanced load balancing based on L2-L4 header info	✓	✓	✓	✓
	OSPF	✓	✓	✓	✓
	ISIS	✓	✓	✓	✓
	BGP	✓	✓	✓	✓
Indirect/composite next hop	✓	✓	✓	✓	
MPLS and Seamless MPLS	RSVP	✓	✓	✓	✓
	LDP	✓	✓	✓	✓
	PCEP	✓	✓	✓	✓
	RSVP-TE	✓	✓	✓	✓
	BGP-LU	✓	✓	✓	✓
	LDP-RSVP	✓	✓	✓	✓
	RSVP FRR	✓	✓	✓	✓
Services	IEEE 802.3 bridge domain	✓	✓	✓	✓
	PWE (T-LDP)	✓	✓	✓	✓
	L2VPN (BGP)	✓	✓	✓	✓
	VPLS (T-LDP/BGP/ LDP autodiscovery)				✓
	Layer 3 VPN	✓	✓	✓	✓
	Circuit emulation SATO P/CESoPSN/ ATM o MPLS		✓ ¹	✓ ¹	✓
	Integrated Routing and Bridging (IRB)	✓	✓	✓	✓
Stateless filters L2-L4	✓	✓	✓	✓	

¹See Table 2 for E1/T1/STM/OC ports support per each platform.

Features		ACX500, ACX500-O, ACX500-O-POE	ACX1000, ACX1100	ACX2100, ACX2200	ACX4000	ACX5048, ACX5096
Class of Service (CoS)	8 queues per port with schedulers and shaping	√	√	√	√	√
	Classification based on 802.1p, DSCP, IP-precedence, Exp bit	√	√	√	√	√
	Single-rate policer ingress/egress	√	√	√	√	√
	Two-rate three-color policer ingress/egress	√	√	√	√	√
OAM and SLA Management	BFD	√	√	√	√	√
	CFM	√	√	√	√	√
	Y.1731	√	√	√	√	√ ²
	RFC2544	√	√	√	√	√ ³
	TWAMP	√	√	√	√	
Multicast	PIM	√	√	√	√	√
	IGMP	√	√	√	√	√
	IGMP snooping	√	√	√	√	√
Timing and Sync	BITS/1pps/10MHz	√	√	√	√	
	1588v2 BC	√	√	√	√	
	1588v2 Transparent					√
	1588v2 over IP	√	√	√	√	√
	1588v2 over Ethernet	√	√	√	√	√
	Synchronous Ethernet	√	√	√	√	
	Hybrid mode	√	√	√	√	
Embedded GM	√					
Security	L2 storm control	√	√	√	√	√
	IPsec	√ ⁴	√ ⁴			
	NAT	√ ⁴	√ ⁴			
Configuration, Management and Automation	CLI	√	√	√	√	√
	NETCONF	√	√	√	√	√
	SNMP v2/v3	√	√	√	√	√
	SLAX/Python on-box scripting tools	√	√	√	√	√
	Zero Touch Deployment	√	√	√	√	√
	YANG	√	√	√	√	√

² SLM and DM are supported.

³ RFC2544 reflector mode only.

⁴ Some restrictions are applicable. See technical documentation for details.

Specifications

This section lists basic specifications for the ACX Series routers. For further details, please refer to the hardware installation manuals at www.juniper.net/techpubs.

Specifications	ACX500, ACX500-O, ACX500-O-POE	ACX1000, ACX1100	ACX2100, ACX2200	ACX4000	ACX5048, ACX5096
Dimensions (W x H x D)	ACX500: 17.5x1.75x9.4 in (44.5x4.4x24 cm) ACX500-O: 8x12.3x4.3 in (20.3x31.2x10.9 cm) ACX500-O-POE: 10x16x4.7 in (25.4x40.6x11.9 cm)	17.5x1.75x9.4 in (44.5x4.4x24 cm)	17.5x1.75x9.4 in (44.5x4.4x24 cm)	17.5x4.35x9.25 in (44.5x11x23.5 cm)	ACX5048: 17.36x1.72x20.48 in (44.09x4.37x52.02 cm) ACX5096: 17.36x3.46x22.44 in (44.09x8.8x57 cm)
Weight (lb/kg) fully configured	ACX500-DC: 8.6 lb (3.9 kg) ACX500-AC: 9.26 lb (4.2 kg) ACX500-O-DC: 11 lb (5 kg) ACX500-O-AC: 11.68 lb (5.3 kg) ACX500-O-POE-DC: 13.66 lb (6.2 kg) ACX500-O-POE-AC: 14.33 lb (6.5 kg)	ACX1000: 6.5 lb (2.94 kg) ACX1100: 7.8 lb (3.54 kg)	8.3 lb (3.77 kg)	23.8 lb (10.82 kg) (Fully configured with two power supply units, two Modular Interface Cards (MICs))	ACX5048: 21.8 lb (9.9 kg) ACX5096: 32.5 lb (14.74 kg)
Power (DC)	-48 V nominal or -60 V telco nominal or +24 VDC nominal	-48 V nominal or -60 V telco nominal or +24 VDC nominal	-48 V nominal or -60 V telco nominal or +24 VDC nominal	-48 V nominal or -60 V telco nominal or +24 VDC nominal	-36 to -72 VDC power
Power (AC)	90-240 V	90 to 240 VAC for ACX1100-AC* only	90 to 240 VAC for ACX2100-AC* only	90 to 240 VAC	110-240 V
Maximum power draw	65 W + PoE power (80 W) (ACX500) 55 W (ACX500-O) 55 W + PoE power (80 W) (ACX500-O- POE)	50 W (ACX1000); 35 W (ACX1100-AC); 40 W (ACX1100-DC)	70 W (ACX2000); 60 W (ACX2100-AC); 80 W (ACX2100-DC)	150 W (w/o MICs); 45 W for each MIC; 65 W for each PoE++ port	~350 W (with optical SFPs) (ACX5048) ~550 W (with optical SFPs) (ACX5096)
Operating temperature	-40° to 149° F (-40° to 65° C)	-40° to 149° F (-40° to 65° C)	-40° to 149° F (-40° to 65° C) full featured	-40° to 149° F (-40° to 65° C)	32° to 104° F (0° to 40° C)
Humidity	95% RH noncondensing	95% RH noncondensing	95% RH noncondensing	95% RH noncondensing	5%-90% RH noncondensing

Approvals

	ACX500	ACX500-O	ACX500-O- POE	ACX1000	ACX1100	ACX2100	ACX2200	ACX4000	ACX5048, ACX5096
Safety Approvals									
CAN/CSA-C22.2 No. 60950-1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL 60950-1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN 60950-1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IEC 60950-1—CB Scheme	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN 60825-1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL 60950-22, IEC 60950-22, CSA 60950-22: Safety equipment to be installed outdoors	-	Yes	Yes	-	-	-	-	-	-

	ACX500	ACX500-O	ACX500-O-POE	ACX1000	ACX1100	ACX2100	ACX2200	ACX4000	ACX5048, ACX5096
EMC									
AS/NZS CISPR22 Class A	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
EN55022 Class A	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
VCCI Class A	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
FCC Part 15 Class A	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
IECS-003 Issue 4	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
BSMI CNS 13438 and NCC C6357 Taiwan Radiated Emissions	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
KN 22, Class A	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
CISPR 32/EN55032: 2012 European Radiated Emissions Class A	Yes	-	-	Yes	Yes	Yes	Yes	Yes	-
AS/NZS CISPR22 Class B	-	Yes	Yes	-	-	-	-	-	-
EN55022 Class B	-	Yes	Yes	-	-	-	-	-	-
VCCI Class B	-	Yes	Yes	-	-	-	-	-	-
FCC Part 15 Class B	-	Yes	Yes	-	-	-	-	-	-
IECS-003 Issue 4 Class B	-	Yes	Yes	-	-	-	-	-	-
BSMI CNS 13438 and NCC C6357 Taiwan Radiated Emissions	-	Yes	Yes	-	-	-	-	-	-
KN 22, Class B	-	Yes	Yes	-	-	-	-	-	-
CISPR 32/EN55032: 2012 European Radiated Emissions Class B	-	Yes	Yes	-	-	-	-	-	-
Immunity									
EN-61000-3-2 Power Line Harmonics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN-61000-3-3 Voltage Fluctuations and Flicker	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN-61000-4-2 ESD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN-61000-4-3 Radiated Immunity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN-61000-4-4 EFT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN-61000-4-5 Surge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Immunity									
EN-61000-4-6 Low Frequency Common Immunity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN-61000-4-11 Voltage Dips and Sags	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CISPR 24/EN55024 Information Technology Equipment Immunity Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ETSI (European Telecommunications Standardization Institute)									
EN 300 386 V1.6.1 Telecommunication Network Equipment, Electromagnetic Compatibility Requirements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ETSI EN 300 019-2-1 (2000)—Storage, Class T1.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	ACX500	ACX500-O	ACX500-O-POE	ACX1000	ACX1100	ACX2100	ACX2200	ACX4000	ACX5048, ACX5096
ETSI (European Telecommunications Standardization Institute)									
ETSI EN 300 019-2-2 (1999)—Transportation, Class T2.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ETSI EN 300 019-2-3 (2003)—Stationary Use at Weather Protected Locations, Class T3.4	-	-	-	-	Yes	Yes	Yes	-	-
ETSI EN 300 019-2-3 (2003)—Stationary Use at Weather Protected Locations, Class T3.2	Yes	-	-	-	-	-	-	-	Yes
ETSI EN 300 019-2-4 (2003)—Stationary Use at Non-Weather Protected Locations, Class 4.1	-	Yes	Yes	-	-	-	-	Yes	-
ETSI EN 300 019-2-4 (2003)—Stationary Use at Non-Weather Protected Locations, Class 4.1E	-	-	-	Yes	-	-	-	-	-
ETSI EN 300 019-2-4 (2003)—Stationary Use at Non-Weather Protected Locations, Class 4.2H	-	-	-	-	-	-	-	-	-
ETS 300753 (1997)—Acoustic Noise Emitted by Telecommunications Equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other EMC Requirements									
IEEE 1613 Class 2 Environmental and Testing Requirements for Communications Networking									
Devices in Electric Power Substations	Yes	Yes	Yes	-	-	-	-	-	-
IEC 61850-3 Communication networks and systems for power utility automation	Yes	Yes	Yes	-	-	-	-	-	-
EN50121-4 Railway applications	Yes	Yes	Yes	-	-	-	-	-	-
ETSI EN 300 440-1/-2 GPS spurious emission	Yes	Yes	Yes	-	-	-	-	-	-
Deutsche Telekom ITR9 (2008) EMC Specification	Yes	Yes	Yes	Yes	-	-	-	-	Yes
British Telecom EMC Immunity Requirements (2007)	Yes	Yes	Yes	Yes	-	-	-	-	Yes
ITU-T K.21 (2011) Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents	Yes	Yes	Yes	-	-	-	-	-	-
ITU-T K.20 (2011) Resistibility of telecommunication equipment installed in telecom centers to overvoltages and overcurrents	Yes	Yes	Yes	-	-	-	-	-	-

	ACX500	ACX500-O	ACX500-O-POE	ACX1000	ACX1100	ACX2100	ACX2200	ACX4000	ACX5048, ACX5096
NEBS									
SR-3580 NEBS Criteria Levels (Level 3 Compliance)	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
GR-63-CORE: NEBS, Physical Protection	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
GR-1089-CORE: EMC and Electrical Safety for Network Telecommunications Equipment (Issue 6 compliant)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GR-3108-CORE: Generic Requirements for Network Equipment in the Outside Plant (OSP)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
GR 487 - Core - Issue 4 Electronic equipment cabinets	-	Yes	Yes	-	-	-	-	-	-
Ingress Protection									
IEC 60529 - Degree of protection provided by Enclosure (IP 65)	-	Yes	Yes	-	-	-	-	-	-
Telecomm Compliance									
RTTE Directive 1995/5/EC	-	-	-	Yes	-	Yes	-	Yes	-
T1 and XDSL Interfaces FCC Part 68	-	-	-	Yes (T1 Only)	-	Yes	-	Yes (T1 Only)	-
Industry Canada CS-03	-	-	-	Yes	-	Yes	-	Yes	-
JATE Green Book	-	-	-	Yes	-	Yes	-	Yes	-
TBR 21 (XDSL only)	-	-	-	No	-	No	-	No	-
E1 Interface TBR 12/13	-	-	-	Yes	-	Yes	-	Yes	-
ACA TS016	-	-	-	Yes	-	Yes	-	Yes	-
G.703	-	-	-	Yes	-	Yes	-	Yes	-
Telecomm Compliance									
Device management: NETCONF, CLI, SNMP v1/v2/v3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Comprehensive fault, configuration, accounting, performance, and security (FCAPS) management through Junos Space Network Management Platform: device-level configuration, software upgrade, alarms, script management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
End-to-end provisioning of ELINE, emulated LAN (ELAN), Layer 3 VPN (L3VPN), Synchronous Ethernet, IEEE1588-2008 (PTP), Operation, Administration, and Maintenance (OAM), class of service (CoS)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	ACX500	ACX500-O	ACX500-O-POE	ACX1000	ACX1100	ACX2100	ACX2200	ACX4000	ACX5048, ACX5096
Telecomm Compliance									
Device and service-level fault management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Device and service-level performance management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Metro Ethernet Forum (MEF)									
MEF CE2.0 compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Juniper Networks Services and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit www.juniper.net/us/en/products-services.

Ordering Information

Product Number	Name
ACX500-AC	ACX500 indoor unit 2x1GbE (SFP) + 4x1GbE (combo) with single AC PS, 1 U, temperature hardened, passive cooling, rack mounting options, PoE support, Junos OS
ACX500-DC	ACX500 indoor unit 2x1GbE (SFP) + 4x1GbE (combo) with single DC PS, 1 U, temperature hardened, passive cooling, rack mounting options, PoE support, Junos OS
ACX500-O-AC	ACX500 outdoor unit 3x1GbE (SFP) + 3x1GbE (Cu) with single AC PS, IP65 complaint for outdoor installation, pole/wall mounting options, no Power over Ethernet (PoE) support, Junos OS
ACX500-O-DC	ACX500 outdoor unit 3x1GbE (SFP) + 3x1GbE (Cu) with single DC PS, IP65 complaint for outdoor installation, pole/wall mounting options, no PoE support, Junos OS
ACX500-O-POE-AC	ACX500 outdoor unit 3x1GbE (SFP) + 3x1GbE (Cu) with single AC PS, IP65 complaint for outdoor installation, pole/wall mounting options, PoE support, Junos OS
ACX500-O-POE-DC	ACX500 outdoor unit 3x1GbE (SFP) + 3x1GbE (Cu) with single DC PS, IP65 complaint for outdoor installation, pole/wall mounting options, PoE support, Junos OS
ACX500-LIC-GPS	ACX500 license to activate GPS receiver
ACX500-LIC-SEC	ACX500 license to activate IPsec and NAT features
ACX1000-DC	ACX1000 unit, 8xT1/E1, 8xGbE copper, 4xGbE combination (copper or SFP), 1 U, ETSI 300, dual feed DC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX1100-DC	ACX1100 unit, 8xGbE copper and 4xGbE combination (copper or SFP), 1 U, ETSI 300, redundant DC power supplies, temperature hardened, passively cooled, Junos OS (optics sold separately)

Product Number	Name
ACX1100-AC	ACX1100 unit, 8xGbE copper and 4xGbE combination (copper or SFP), 1 U, ETSI 300, redundant AC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2100-DC	ACX2100 unit, 16xT1/E1, 2x10GbE SFP+, 4xGbE copper, 4xGbE combination (copper or fiber), 2xGbE SFP, 1 U, ETSI 300, redundant DC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2100-AC	ACX2100 unit, 16xT1/E1, 2x10GbE SFP+, 4xGbE copper, 4xGbE combination (copper or fiber), 2xGbE SFP, 1 U, ETSI 300, redundant AC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2200-DC	ACX2200 unit, 2x10GbE SFP+, 4xGbE copper, 4xGbE combination (copper or fiber), 2xGbE SFP, 1 U, ETSI 300, redundant DC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX2200-AC	ACX2200 unit, 2x10GbE SFP+, 4xGbE copper, 4xGbE combination (copper or fiber), 2xGbE SFP, 1 U, ETSI 300, redundant AC power, temperature hardened, passively cooled, Junos OS (optics sold separately)
ACX4000-DC	ACX4000 modular unit, 2x10GbE SFP+, 8xGbE combo (copper/fiber) with PoE++ on two ports, 2xGbE SFP, 2.5 U, ETSI 300, redundant DC power, temperature hardened, Junos OS, two configurable MIC slots (optics sold separately)
ACX4000-AC	ACX4000 modular unit, 2x10GbE SFP+, 8xGbE combo (copper/fiber) with PoE++ on two ports, 2xGbE SFP, 2.5 U, ETSI 300, redundant AC power, temperature hardened, Junos OS, two configurable MIC slots (optics sold separately)
ACX-MIC-6GE-CU-SFP	6xGbE copper/SFP MIC for ACX4000
ACX-MIC-4COC3-1COC12-CE	4xCHOC3/STM-1/1xCHOC12/STM-4 MIC for ACX4000
ACX-MIC-16CHE1-T1-CE	16x T1/E1 MIC for ACX4000
ACX5048-AC-L2-L3	ACX5048, 48 SFP+/SFP ports, 6 QSFP ports, redundant fans and AC power supplies; no right to use IP VPN
ACX5048-DC-L2-L3	ACX5048, 48 SFP+/SFP ports, 6 QSFP ports, redundant fans and DC power supplies; no right to use IP VPN
ACX5096-AC-L2-L3	ACX5096, 96 SFP+/SFP ports, 8 QSFP ports, redundant fans and AC power supplies; no right to use IP VPN

Product Number	Name
ACX5096-DC-L2-L3	ACX5096, 96 SFP+/SFP ports, 8 QSFP ports, redundant fans and DC power supplies; no right to use IP VPN
ACX5K-L-IPVPN	ACX5K Right to use IP VPN
ACX5K-L-1X10GE-S	ACX5K Right to use a single 10GbE port on ACX5K system; enforceable per ACX5K system
ACX5K-L-8X10GE-S	ACX5K Right to use 8 10GbE ports on ACX5K system; enforceable per ACX5K system
ACX5K-L-16X10GE-S	ACX5K Right to use 16 10GbE ports on ACX5K system; enforceable per ACX5K system
ACX5K-L-24X10GE-S	ACX5K Right to use 24 10GbE ports on ACX5K system; enforceable per ACX5K system
ACX5K-L-48X10GE-S	ACX5K Right to use 48 10GbE ports on ACX5K system; enforceable per ACX5K system
ACX5K-L-72X10GE-S	ACX5K Right to use 72 10GbE ports on ACX5K system; enforceable per ACX5K system
ACX5K-L-96X10GE-S	ACX5K Right to use 96 10GbE ports on ACX5K system; enforceable per ACX5K system
ACX5K-L-104X10GE-S	ACX5K Right to use 104 10GbE ports on ACX5K system; enforceable per ACX5K system

About Juniper Networks

Juniper Networks challenges the status quo with products, solutions and services that transform the economics of networking. Our team co-innovates with customers and partners to deliver automated, scalable and secure networks with agility, performance and value. Additional information can be found at [Juniper Networks](#) or connect with Juniper on [Twitter](#) and [Facebook](#).

Corporate and Sales Headquarters
 Juniper Networks, Inc.
 1133 Innovation Way
 Sunnyvale, CA 94089 USA
 Phone: 888.JUNIPER (888.586.4737)
 or +1.408.745.2000
 Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters
 Juniper Networks International B.V.
 Boeing Avenue 240
 1119 PZ Schiphol-Rijk
 Amsterdam, The Netherlands
 Phone: +31.0.207.125.700
 Fax: +31.0.207.125.701



Copyright 2016 Juniper Networks, Inc. All rights reserved. Juniper Networks, the Juniper Networks logo, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners. Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

JUNIPER
 NETWORKS