Nokia 7250 IXR-X series Interconnect Routers

Release 26

The Nokia 7250 Interconnect Router-X (IXR-X)[1] series delivers up to 25.6 Tb/s full duplex (FD) capacity and support 10GE to 800GE interfaces in a compact 1RU form factor. They are highly scalable, with deep buffers, advanced security, and operational simplicity, and are designed for data center spine-and-leaf and multi-access edge-computing, as well as access, aggregation, and 5G interconnect applications for AI and cloud providers, telecommunication providers, and mission-critical enterprise environments.

Overview

AI, high-performance computing (HPC), cloud and other data-intensive workloads are driving the need for greater speed, capacity and scalability in data center networks. Network operators need reliable, fixed-configuration, high-performance platforms with high-speed interfaces and comprehensive networking capabilities to support evolving network architectures and flexible connectivity within and across data centers.

In wide-area networks, increasingly distributed-edge and converged-edge locations require support for next generation IP mobile transport (anyhaul), fixed-mobile convergence, residential and business access and aggregation applications.

Members of the 7250 IXR-X series—the 7250 IXR-X1b, IXR-X3b, and IXR-X4—are fixed-configuration routers that scale capacity from 7.2 Tb/s FD to 25.6 Tb/s FD in a 1RU form factor. They support energy-efficient 800G OSFP, 800G QSFP-DD, and 400G QSFP-DD optics, along with flexible optical breakouts, to deliver high-density 800GE, 400GE, 100GE, 40GE, 25GE, and 10GE interfaces.

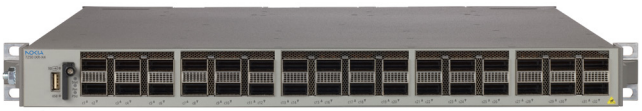
Powered by the Nokia SR Linux network operating system (NOS), the 7250 IXR-X series provides a secure, robust networking foundation and value-added capabilities for cloud-native architectures, offering scalable automation and unmatched extensibility.



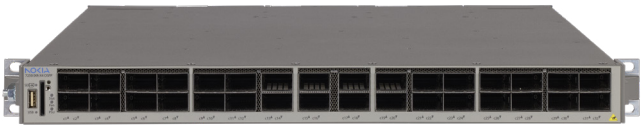
7250 IXR-X1b



7250 IXR-X3b



7250 IXR-X4 (QSFP-DD)



7250 IXR-X4 (OSFP)

1 The 7250 IXR-X series is part of the 7250 IXR product family. An additional data sheet is available for the SR OS-based IXR-X variants in the 7250 IXR-X series.

Platform variants

With line rate switching capacity and deep buffers, the Nokia 7250 IXR-X series provides versatility, offering a full range of speeds, flexible breakout capabilities, and an extensive portfolio of pluggable optics for maximum configuration options – all in 1RU form factor.

- 7250 IXR-X1b
  - 7.2 Tb/s FD, fixed system, 1RU
  - 24 x 100G QSFP28 connectors
  - 12 x 400G QSFP-DD connectors
  - Optical breakout options include 4 x 10GE, 4 x 25GE, 2 x 100GE, 4 x 100GE[2]
  - Mesh air intakes for superior cooling
  - 8 GB packet buffer
- 7250 IXR-X3b
  - 14.4 Tb/s FD, fixed system, 1RU
  - 36 x 400G QSFP-DD connectors
  - Optical breakout options include 4 x 10GE, 4 x 25GE, 2 x 100GE, 4 x 100GE[2]
  - Mesh air intakes for superior cooling
  - 16 GB packet buffer
- 7250 IXR-X4 (two variants)
  - 7250 IXR-X4 (QSFP-DD)
    - 25.6 Tb/s FD, fixed system, 1RU
    - 32 x 800G QSFP-DD connectors
  - 7250 IXR-X4 (OSFP)
    - 25.6 Tb/s FD, fixed system, 1RU
    - 32 x 800G OSFP connectors
  - Optical breakout options include 8 x 25GE, 2 x 100GE, 8 x 100GE, 2 x 400GE[2]
  - Mesh air intakes for superior cooling
  - 32 GB packet buffer

Universal connectors

The 7250 IXR-X series design enables seamless integration of a broad range of optics, maximizing configuration options and empowering operators to tailor network designs to their evolving needs.

The QSFP-DD and OSFP connectors are universal and fully backward compatible to allow for multi-speed and breakout flexibility. Pluggable Digital Coherent Optics (DCO) 100G/400G/800G ZR/ZR+ are also supported depending on the platform variant.

IP network security

The 7250 IXR-X series provides user plane protection through low-latency, line-rate encryption capabilities based on IEEE 802.1AE MACsec. This guarantees the security of data against unauthorized access or tampering by any intermediate device or network. Furthermore, it supports IPsec without requiring dedicated appliances.[3]

This platform, with Root-of-Trust (RoT) features, offers a multi-core x86e CPU that delivers control plane scalability and performance, crucial for data center leaf-spine designs. The platform's features include an integrated 80G SSD and a discrete trusted platform module. It is designed to meet all demanding performance benchmarks.

The RoT enables Secure Boot to ensure the system executes trusted software. The Trusted Platform Module (TPM 2.0) is pre-provisioned with Nokia Initial Device Identity (IDevID) and Initial Attestation Key (IAK). TPM 2.0 technology supports secure boot and measured boot, using hardware-based security keys for enhanced security over software-based keys.

2 Some breakout options require future software support and specific DAC cables

3 IPsec supported in a future software release

Advanced timing and synchronization

The Nokia 7250 IXR-X series is equipped with a high-precision clock to meet the strict timing requirements of applications such as 5G transport. These routers support both ITU-T Sync-E and IEEE1588, offering precise timing synchronization for various applications.

Innovative hardware design

The 7250 IXR-X series design uses a component-minimizing approach to ensure that only essential components are used. This approach optimizes system layouts, leveraging Nokia intellectual property throughout. Fewer components increase system reliability and reduce power consumption.

The intellectual property integrated into the hardware design includes the integration of the Bell Labs 1588 algorithm and honeycomb mesh air intakes. This design leverages these capabilities to their maximum potential. The net result includes leading low power consumption, a design optimized for the supply chain, and inherent support for highly sustainable networks.

Honeycomb mesh air intakes not only create a 90% open faceplate, compared to a 50% - 60% open faceplate with holes punched in bent metal, but also creates a full Faraday cage for the platform. This ensures that electromagnetic interference (EMI) is always well isolated platform-to-platform.

This platform shares common fans and power supply units (PSUs) and offer redundant fans and PSUs to enhance network availability.

Nokia Service Router Linux

Ground-up, model-driven architecture delivers extensibility

In cloud-scale data center networks, the primary challenges are scalability and/or ease of operations. SR Linux is designed from the ground up with a management architecture that meets the demands of a model-driven world where visibility—and the scalability and granularity of that visibility— are paramount.

SR Linux features a completely model-driven architecture for flexible and simplified management and operations. SR Linux delivers an extensible and open infrastructure that allows applications to define and declare their own schemas, enabling the retrieval of fine-grained system state and setting of configuration.

Modular, state-sharing architecture

SR Linux uses an unmodified Linux kernel as the foundation on which applications share state via a publish/subscribe (pub/sub) architecture. The Nokia pub/sub architecture is implemented using generalized Remote Procedure Call (gRPC), protocol buffers (protobufs) and the Nokia Impart Database (IDB). The Nokia IDB is a lightweight database that is optimized to handle high volumes of messages while protecting against any one application slowing down the whole system.

Field-proven protocol stacks

SR Linux leverages field-proven protocol stacks from the Nokia Service Router Operating System (SR OS), which has a strong pedigree in IP routing. AI and cloud providers, telecommunications providers, and mission-critical enterprise data center networks are increasingly adopting leaf-spine fabric designs that use enhanced IP routing with Multiprotocol-Border Gateway Protocol (MP-BGP), EVPN, Virtual Extensible LAN (VXLAN), MPLS and segment routing protocols. By leveraging field-proven protocol stacks, data center planning and operations teams can immediately benefit from the stability, scalability and interoperability of a resilient NOS.

For Wide Area Networks (WAN), SR Linux delivers a rich set of IP routing, MPLS and Segment Routing labeled-forwarding capabilities together with EVPN-VXLAN for both IP and MAC-VRF transport supporting data center gateway, Provider Edge and Border Router applications. These capabilities include extensive EVPN and OAM features that can power the most demanding, dynamic, and reliable Ethernet and IP/MPLS networks.

Scalable streaming telemetry

SR Linux was built with an open, scalable telemetry framework at its core, internally using gRPC, gRPC Network Management Interface (gNMI) and protobufs. Because SR Linux is natively model driven, it is immediately ready for streaming telemetry without requiring any translation layers.

Support for differentiated services

The Nokia 7250 IXR-X series provides advanced QoS for low-latency applications while also providing large buffer memory for delay-tolerant applications.

Superior CLI programmability and integration of third-party applications

Operations teams can leverage command line interface (CLI) plugins to completely customize the way the CLI operates, plugging in Linux commands or pulling the state/configuration from various locations.

SR Linux allows third-party applications to be fully integrated into the system and given all the same benefits as Nokia applications. This includes consistent configuration via YANG, telemetry support, life-cycle management and visibility of system resources.

SR Linux offers a state-of-the-art NetOps Development Kit (NDK) for data center teams to develop new applications and operational tools in the language of their choice with deep programmatic access to, and control of, the entire system.

AI data center networking

The Nokia AI data center networking solution provides the reliability, simplicity and flexibility you need to build and deploy network infrastructures that can meet the requirements of current and future AI workloads.

Nokia is at the forefront of defining and testing the evolution of Ethernet for AI. Nokia is an active member of the Ultra Ethernet Consortium (UEC) which is bringing enhancements that make Ethernet the best choice for AI network infrastructures. Nokia's solution is AI-ready and UEC-compatible with support for Remote Direct Memory Access over Converged Ethernet (RoCEv2) and Data Center Quantized Congestion Notification (DCQCN). Nokia is also implementing key features within the latest UEC spec.

Nokia also follows and participates in Open Compute Project (OCP) which is driving various new standards for Ethernet. One notable specification is Multipath Reliable Connection (MRC) that builds upon the existing RoCEv2 Ethernet framework to enable scalable, high-performance AI/ML workloads over multipath best-effort networks by specifying architectural extensions for multipath load balancing, reliability, and congestion control.

Network automation

The 7250 IXR-X series, powered by the SR Linux NOS, can be deployed across a wide range of applications. Nokia's network automation platforms deliver solutions that meet the requirements of every network domain.

The Nokia Event-Driven Automation (EDA) is a Kubernetes-native, declarative, intent-based automation platform that automates the entire data center fabric lifecycle—from Day 0 design through to Day 2+ operations.

Built on a cloud-native microservices architecture, the EDA continuously reconciles desired and observed state using real-time streaming telemetry to ensure the network operates as intended. It abstracts multivendor complexity, enables networkwide transactional changes with rollback, and embeds a real-time Digital Twin for safe validation before deployment. It complements SR Linux and SR OS, delivering reliable, simplified, and adaptable operations for AI, cloud, and enterprise data center environments.

The Nokia Network Services Platform (NSP) provides IP network automation, a consistent user experience, and management capabilities across all Nokia IP routing platforms. It reduces risk and accelerates implementation with prepackaged software and services.

Nokia is the right partner to accompany you on your journey to network automation in all network domains.

Technical specifications

Table 1. Nokia 7250 IXR-X1b, 7250 IXR-X3b and 7250 IXR-X4 specifications

Feature	7250 IXR-X1b	7250 IXR-X3b	7250 IXR-X4
System throughput: Full duplex	7.2 Tb/s	14.4 Tb/s	25.6 Tb/s
Connectors	• 12 x 400G QSFP-DD • 24 x 100G QSFP28	• 36 x 400G QSFP-DD	• 32 x 800G QSFP-DD or • 32 x 800G OSFP
Supported optics	• QSFP-DD, QSFP56-DD, QSFP28-DD, QSFP28, QSFP+	• QSFP-DD, QSFP56-DD, QSFP28-DD, QSFP28, QSFP+	• QSFP112-DD, QSFP56-DD, QSFP112, QSFP28-DD, QSFP28, QSFP+, QSFP or • OSFP, OSFP112
Control interfaces	1 x Console, 1 x management (1000 Mb/s), 1x USB 2.0, 1x SD slot with security cover		
Security	• MACsec/IPsec* • Root-of-Trust TPM2.0 • Secure boot		
Timing and synchronization	• Stratum 3E oscillator** • ITU-T Synchronous Ethernet (SyncE)** • IEEE 1588v2 PTP** – Boundary clock (BC) – Profiles: ITU-T G.8275.1, G.8275.2 – PTP encapsulation: Ethernet, IPv4/IPv6		
CPU speed, number of cores	2.5 GHz, 8 cores	2.5 GHz, 8 cores	2.5 GHz, 8 cores
System memory	32 GB	32 GB	32 GB
Packet forwarding rate per system (max)	2.7 Bpps	5.4 Bpps	9.6 Bpps
Internal storage	80 GB SSD	80 GB SSD	80 GB SSD
Memory buffer size	8 GB	16 GB	32 GB
Dimensions	• Height: 1RU, 4.5 cm (1.75 in) • Depth: 54.6 cm (21.5 in) • Width: 44.45 cm (17.5 in)	• Height: 1RU, 4.5 cm (1.75 in) • Depth: 64.7 cm (25.5 in) • Width: 44.45 cm (17.5 in)	• Height: 1RU, 4.5 cm (1.75 in) • Depth: 64.7 cm (25.5 in) • Width: 44.45 cm (17.5 in)
Common equipment redundancy	Power supplies (1+1), cooling fans (n+1)		
Power supply options	Modular AC or DC power supplies		
Power requirements	• HV AC input (rated): 200 V AC to 240 V AC, 50 Hz to 60 Hz • DC input (rated): -48 V DC/-60 V DC		
Cooling	• Modular replaceable fans (3 total) • Front-to-back airflow		
Normal operating temperature range	0°C to +40°C (32°F to +104°F) sustained		
Normal operating altitude	Up to 13,123 ft (4000 m)***		
Shipping and storage temperature	-40°C to +70°C (-40°F to +158°F)		
Normal humidity	5% to 95%, non-condensing		

* Future software capability. Contact Nokia for details.
** Supported on the IXR-X1b and IXR-X3b only
*** Check installation guide for implementation

Table 2. Nokia 7250 IXR-X1b, 7250 IXR-X3b and 7250 IXR-X4 maximum density

Ethernet speed	7250 IXR-X1b	7250 IXR-X3b	7250 IXR-X4
10GE*	96	144	-
25GE*	96	144	256
40GE*	36	36	32
100GE	72	144	256
400GE	12	36	64
800 GE	-	-	32

* Planned future software support

SR Linux YANG Models

Supported data models available at https://yang.srlinux.dev/

Software features

The 7250 IXR-X series supports, but is not limited to, the following SR Linux software features:[4]

Open Linux support

- Support for unmodified Linux kernel
- Access to Linux tools, patching and packaging
- Third party containers running on SR Linux
- Linux control groups (cgroupsv2)

Platform features

- Dynamic Ternary Content Addressable Memory (TCAM) table allocation

Layer 2 features

- Dot1q and untagged sub-interfaces
- Ethernet IEEE 802.1Q (VLAN) with support for jumbo frames
- Ethernet IEEE 802.1ad (QinQ) with support for jumbo frames
- Link aggregation: Link Aggregation Group (LAG and Link Aggregation Control Protocol (LACP)
- Link Layer Discovery Protocol (LLDP) on all interfaces
- Media access control (MAC) loop prevention
- MAC Virtual routing and forwarding (VRF): MAC-VRF
- MAC-VRF network instance with IRB interface
- Internet Group Management Protocol (IGMP) snooping and Multicast Listener Discovery (MLD) snooping in Layer 2 broadcast domains

Layer 3 features

- IPv4/v6 routing
  - Static, aggregate routes
  - IP unnumbered interfaces
  - Dual-stack Interior Gateway Protocol (IGP)
  - Multi-topology IS-IS v4/v6
  - Open Shortest Path First (OSPFv2 and OSPFv3)
  - Multiprotocol BGP (MP-BGP)
- BGP with iBGP/eBGP: Support for IPv4/v6, including:
  - Core Prefix Independent Convergence (PIC)
  - 4-byte autonomous system number
  - Route reflector
  - Dynamic BGP
  - BGP unnumbered
  - eBGP multi-hop
  - Add-paths for IPv4 and IPv6 routes
  - BGP maintenance modes
  - BGP route flap damping
- Graceful restart client for IS-IS
- Equal cost multi-path (ECMP) with consistent and resilient hashing and configurable hash fields

4 This section provides an overview of key features supported. Some platforms may have feature exclusions or exceptions. Consult Nokia documentation for detailed feature support and interdependencies.

- IPv6 flow label hashing
- VRF: Multiple VRF support
- Layer 3 VPNs:
  - IP-VRF: Multiple VRF support
  - IP-VPN (VPN-IPv4 and VPN-IPv6 families) and EVPN Interface-less (EVPN-IFL) support EVPN Interface-less (EVPN-IFL) support
  - Multi-instance IP-VRF and EVPN-IFL in the same IP VPN
  - Inter-AS option B and Next Hop Self RR support
  - EVPN IFL IP Aliasing and unequal ECMP
- ARP/ND synchronization via EVPN on L3 interfaces (draft-ietf-bess-evpn-l3mh-proto)
- Routing policy:
  Structured rules for accepting, rejecting and modifying routes that are learned and advertised to routing peers
  - Routes can be matched based on prefix lists, autonomous system (AS) path regular expressions, BGP communities, Address Family Indicator/Subsequent Address Family Indicator (AFI/SAFI) protocol, etc.
  - Policy-based forwarding based on DiffServ Code Point (DSCP) and/or IP protocol
  - Route leaking between network instances
- Layer 3/Layer 4 access control lists (ACLs) with validation; accept, reject and log actions

Network virtualization

- EVPN with VXLANv4 encapsulation
- EVPN Layer 2 and Layer 3 connectivity
- EVPN all-active multi-homing; single-active multi-homing for Layer 2 and Layer 3
- EVPN Anycast multi-homing (draft-rabnag-bess-evpn-anycast-aliasing)
- EVPN host route mobility
- Provider edge-to-customer edge (PE-CE BGP path attribute propagation in EVPN
- EVPN IP aliasing
- Gateway-IP based load balancing for EVPN IP Prefix routes
- Service Gateway for inter-domain connectivity (EVPN-VXLAN to EVPN-VXLAN/MPLS, EVPNVXLAN to IP-VPN)
- EVPN with MPLS encapsulation support
- EVPN VPWS service support with MPLS encapsulation
- IP VPN support (v4/v6) over MPLS
- EVPN and IP-VPN Next Hop Self Route Reflector and Inter-AS model B
- EVPN-IFL with LSP ping and traceroute for SR/MPLS
- SMET based IGMP/MLD proxy, including multi-homing synchronization for EVPN-VXLAN (RFC9251)
- Optimized Inter-Subnet Multicast (OISM) for EVPN-VXLAN (RFC9625

MPLS and segment routing (SR)

- Interface LDP over IPv4/IPv6
  - LFA and remote-LFA (IPv4) for LDP
- MPLS LSR ECMP based on label stack, source/destination IP, source/destination port, and TEID
- SR-ISIS over IPv4/v6
- SR-TE
- Colored SR-MPLS TE-Policy
- Uncolored SR-MPLS TE-Policy
- BGP shortcuts
- Traffic engineering (SR-TE) policies with active/standby LSP redundancy
  - sBFD
  - SRLG
  - Admin-tag for constraint based SVC/shortcut to tunnel binding
- LSP ping and trace for LDP and SR-ISIS tunnels
- Topology Independent Loop Free Alternate for SR-ISIS and SR-TE tunnels
- LDP (LFA) fast re-route, Remote-LFA including auto-LFA
- Protocol Independent Multicast - Any Source Multicast/Protocol Independent Multicast - Source Specific Multicast (PIM-ASM/SSM)

- Internet Group Management Protocol/Multicast Listener Discovery (IGMP/MLD)

QoS

- Intelligent packet classification, including IPv4 and IPv6 match-criteria-based classification
- MPLS QoS via EXP to forwarding class mapping
- Queuing/scheduling:
  - Strict priority
  - Weighted round robin (WRR)
  - Weighted Random Early Detection (WRED)
  - Explicit Congestion Notification (ECN)
- QoS classification and marking based on DSCP
- QoS classification and marking based on IEEE 802.1p
- Priority Flow Control (PFC)

Flow monitoring

- IPFIX

Operations, administration and maintenance

- Bidirectional Forwarding Detection (BFD), micro BFD (uBFD)
- Link Layer Discovery Protocols (LLDP)
- Ethernet Connectivity Fault Management (CFM)
- Two-Way Active Measurement Protocol (TWAMP)
- Simple TWAMP (STAMP)
  - Link measurement
  - Performance monitoring
- Service Activation Testhead (SAT)
- Mirroring Sources from interface/sub-interface or ingress ACL
- Mirroring Destinations to Local interface or remote interface

System management and automation

- Native model-driven architecture, configuration candidates, exclusive mode, checkpoints and rollbacks
  - Support for SR Linux and OpenConfigdata models
- Management interfaces: gNMI, gRPC Routing Information Base Interface (gRIBI), NETCONF, JSON-RPC and CLI (transactional, Python CLI and CLI plugins)
- YANG modeled actions (CLI, NETCONF, gRPC and JSON-RPC)
- gRPC network operations interface (gNOI)
- gRPC Network Security Interface (gNSI)
- P4 runtime packet extraction and injection
- Global and per-user CLI environment configuration
- Local Authentication, Authorization and Accounting (AAA) with Role Based Access Control (RBAC)
- Remote Authentication Dial-In User Service (RADIUS) support for AAA
- Terminal Access Controller Access Control System (TACACS+) AAA with VSAs or privilege levels
- Password complexity policies and lockout management
- Access to common Linux utilities: Bash, cron and Python
- Logging infrastructure for local and remote logs including Syslog RFC 5424 support
- Telemetry
  - Subscription-based telemetry for modeled data structures, either on change or sampled
  - sFlow
- Telemetry-driven event management
- Python-based Zero Touch Provisioning (ZTP)
- Address management: Dynamic HostConfiguration Protocol (DHCP) v4/v6 relay
- DHCP v4/v6 server with static allocations

NetOps Development Kit (NDK)

- gRPC and protobuf-based interface for tight integration
- Leverages SR Linux model-driven architecture
- Direct access to other application functionality, e.g., forwarding information base (FIB), LLDP and BFD
- Native support for streaming telemetry

Load balancing and resiliency

- Support for redundant fan and power configurations
- BGP fast reroute using labeled/unlabeled unicast routes
- Graceful restart client for BGPv4/v6
- VRRP v2 and v3 support

Timing and synchronization

- Built-in Stratum 3E clock[5]
- ITU-T Synchronous Ethernet (SyncE)[5]
- IEEE 1588v2 PTP[5]
  - Boundary clock (BC)
  - Profiles: ITU-T G.8275.1, G.8275.2
  - PTP encapsulation: Ethernet, IPv4/IPv6
- RFC 5905 Network Time Protocol (NTP)

Security

- Distributed and aggregated ACLs and policers for control and management plane
- Layer 3, Layer 4 Control Plane Policing (CoPP)
- MAC security (MACsec)
- IPSec[6]
- Secure boot
- Disk encryption

AI backend data center networking[7]

- RDMA over converged Ethernet (RoCEv2)
- Explicit Congestion Notification (ECN)
- Priority Flow Control (PFC)
- Data Center Quantized Congestion Notification (DCQCN)
- Compatibility with evolving UEC and OCP capabilities

Standards compliance[8]

Environmental

- ATIS-0600015.03
- ETSI EN 300 019-2-1; Storage Tests, (Class 1.2)
- ETSI EN 300 019-2-2; Transportation Tests, (Class 2.3)
- ETSI EN 300 019-2-3; Operational Tests, (Class 3.2)
- ETSI EN 300 753 Acoustic Noise (Class 3.2)
- GR-63-CORE
- GR-295-CORE
- GR-3160-CORE
- VZ.TPR.9205
- VZ.TPR.9203 (Data Centers)

Safety

- AS/NZS 62368.1
- IEC/EN 60825-1
- IEC/EN 60825-2
- IEC/EN/UL/CSA 62368-1
- IEC 60529 IP20

Electromagnetic compatibility

- AS/NZS CISPR 32 (Class A)
- ATIS-600315.01.2015
- BT GS-7
- EN 300 386
- BSMI CNS 15936 (Taiwan)
- EN 55035
- EN 55032 (Class A)
- ES 201 468
- ETSI EN 300 132-2 (LVDC)
- ETSI EN 300 132-1 (AC)
- FCC Part 15 (Class A)

5 Supported on the IXR-X1b and IXR-X3b only
6 Future software release
7 Some platforms may have feature exclusions or exceptions.
8 System design intent is according to the listed standards. Refer to product documentation for detailed compliance status.

- GR-1089-CORE
- ICES-003 (Class A)
- IEC 61000-3-2
- IEC 61000-3-3
- IEC CISPR 35
- IEC CISPR 32 (Class A)
- IEC 61000-6-2
- IEC 61000-6-4
- IEC/EN 61000-4-2 ESD
- IEC/EN 61000-4-3 Radiated Immunity
- IEC/EN 61000-4-4 EFT
- IEC/EN 61000-4-5 Surge
- IEC/EN 61000-4-6 Conducted Immunity
- EC/EN 61000-4-11 Voltage Interruptions
- KS C 9832 Class A (Emissions; South Korea)
- KS C 9835 (Immunity; South Korea)
- VCCI CISPR32 Class A (Japan)

Directives, regional approvals and certifications

- DIRECTIVE 2011/65/EU RoHS
- DIRECTIVE 2012/19/EU WEEE
- DIRECTIVE 2014/30/EU EMC
- DIRECTIVE 2014/35/EU LVD
- MEF CE 3.0 compliant
- Australia: RCM Mark
- United Kingdom: UKCA Mark
- China RoHS: CRoHS
- Europe: CE Mark
- Japan: VCCI Mark
- South Korea: KC Mark
- Taiwan: BSMI Mark
- TL9000
- ISO 14001
- ISO 9001

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As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs, which is celebrating 100 years of innovation.

With truly open architectures that seamlessly integrate into any ecosystem, our high-performance networks create new opportunities for monetization and scale. Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

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