

Nokia 7210 SAS-K series

Release 23

The Nokia 7210 SAS K-series routers are used in access networks for network demarcation in enterprise business services, for wholesale services and mobile anyhaul applications. The 7210 SAS-K-series routers extend secure Carrier Ethernet connectivity along with IP/MPLS services and reliability to the network access points.

The 7210 SAS-K-series uses the proven Service Router Operating System (SR OS) for seamless integration into Nokia service router networks. The feature-rich Network Services Platform (NSP) provides fast, efficient, service-level management across the network.

There are three models in the 7210 SAS-K-series to address GE and 10GE access needs. The 7210 SAS-K30 offers three 10GE ports and eight GE ports, the SAS-K12 and SAS-K5 offer twelve and five GE ports, respectively. The 7210 SAS-K30 and SAS-K12 provide IP/MPLS services.

Applications

- 7210 SAS-K-series routers can be used as demarcation devices for wholesale access services. The wholesale customer can be a mobile service provider that requires Carrier Ethernet backhaul or another service provider that is selling retail business services and requires secure Carrier Ethernet backhaul to reach an out-of-region enterprise location.
- 7210 SAS-K-series routers can be used as demarcation devices for enterprise services. For larger enterprises or multi-tenant buildings, they can be deployed throughout a building for access, connecting to a larger aggregation router in the wiring closet.



7210 SAS-K5



7210 SAS-K12



7210 SAS-K12 ETR



7210 SAS-K30

- 7210 SAS-K-series routers can be used for secure access at macro and small cell sites, where only a few GE or Fast Ethernet connections are required.
- 7210 SAS-K-series routers can enable service providers to undertake Carrier Ethernet transformation projects and evolve to packet-based network architectures with converged IP voice, data, and video running over Layer 2 or 3 VPNs. The routers offer enterprises cost-effective access points with highly reliable Ethernet or IP/MPLS routing along with hierarchical quality of service (QoS) to accommodate both mission-critical and business services traffic.

Benefits

Investment protection

7210 SAS-K-series routers use Nokia silicon to deliver unique capabilities required for network interface devices (NIDs), including deep buffers on ingress and egress, hierarchical queuing and shaping, service scaling, as well as precise diagnostics and timing. Having a programmable datapath allows new capabilities to be added in the future, extending device lifetime in the field.

Differentiated service delivery

7210 SAS-K-series routers provide MEF 2.0 Carrier Ethernet services in the access network. The 7210 SAS-K12 and SAS-K30 models allow network operators to extend segment routing and IP/MPLS to their network access points for end-to-end service delivery along with enhanced reliability and management. All 7210 SAS-K-series models offer hierarchical QoS with per-service ingress and egress queuing, allowing operators to differentiate and prioritize customer traffic throughout the network based on application needs. Carrier-grade per-service testing and diagnostics improve reliability and service assurance. Synchronous Ethernet (SyncE) and IEEE 1588v2 provide precise frequency, phase, and time distribution along with precise timestamping for enhanced SLA reporting and management.

Quality of service and network performance

Most data traffic is inherently bursty. To avoid dropped packets, the 7210 SAS-K-series routers are equipped with deep buffers on both ingress and egress, providing hierarchical queuing and shaping. This translates into less packet loss, fewer retransmissions, more efficient use of bandwidth, and greater customer satisfaction. Optional per-SAP policing on ingress allows the service provider to enforce contracted data rates and reduces latency as it avoids buffering in queues. Together, these QoS features deliver more accurate and flexible SLA enforcement than what is provided with simple policing to provide the best quality of experience for all applications.

Reliable service deployment

7210 SAS-K series routers offer reliable, low-maintenance operation in a wide variety of deployment scenarios due to their passive cooling, extended temperature ranges and up to IP50 rating. Redundant power supplies provide further resiliency. As they are typically deployed in customer premises, cell sites and other access locations, their proven reliability avoids truck-roll costs.

Flexible and secure

The routers are equipped with both copper and fiber GE access ports. MACsec provides authentication and encryption for all traffic on Ethernet links.

Software features on all models

All models in the 7210 SAS-K-series provide Layer 2 Carrier Ethernet services, advanced timing, and OAM features. Additional segment routing and IP/MPLS-based features on the 7210 SAS-K12 and SAS-K30 are outlined in the following section. Please refer to 7210 SAS technical documentation for the features supported on each product model.

Network services and protocols

- Layer-2 virtual private network (VPN) services – virtual leased line (VLL) and virtual private LAN service (VPLS)
- IEEE 802.1Q (VLAN) and 802.1ad (QinQ)

Load balancing and resiliency

- IEEE 802.3.ad Link Aggregation Group (LAG)
- ITU-T G.8032v2
- IEEE Spanning Tree Protocol (STP)/Rapid Spanning Tree Protocol (RSTP)/Multiple Spanning Tree Protocol (MSTP)

Quality of Service

- Service ingress packet classification based on MAC and IP criteria (IPv4 and IPv6), MPLS EXP on network ingress.
- Hierarchical per-service ingress and egress policing, queuing, and shaping
- Deep buffering
- RED slope
- Ethernet bandwidth notification (ETH-BN) for transport over microwave links

OAM

- IEEE 802.3ah Ethernet in the first mile with Dying Gasp support
- IEEE 802.1ag Ethernet OAM and ITU-T Y.1731 for fault and performance management
- Service mirroring (local/remote)
- Two-Way Active Measurement Protocol (TWAMP), TWAMP light
- ITU-T Y.1564 test head with multiple streams (with EMIX/IMIX frame-size) and service performance measurement
- Per port loopback
- Per service loopback with MAC swap
- Link Layer Discovery Protocol (LLDP)

- NETCONF/YANG
- SNMPv1, v2c, v3
- Ethernet and IP tools for performance monitoring with MEF 35-based binning and availability
- PTP-based timestamps for service level agreement measurements
- Remote SR OS upgrade
- Auto-configuration (plug-and-play)

Security

- Secure Shell (SSH) v4 and v6 for management
- SSH with public key infrastructure (PKI)
- IEEE 802.1x on access ports
- Control plane security
- Management access filters
- Remote Authentication Dial-In User Service (RADIUS) client
- Terminal Access Concentrator Access Control Server Plus (TACACS+)
- User profile management
- VPLS security
- Access control lists

Additional 7210 SAS-K12 and SAS-K30 features

Services

- IP VPN services (IPv4 and IPv6)
- Internet Enhanced Service (IPv4 and IPv6)
- Ethernet VPN (EVPN)
 - VPLS
 - Multihoming with single active and all active options
- Routed VPLS with IES and virtual private routed network (VPRN) IPv4 interfaces
- IPv4 multicast

Networking protocols

- Segment routing
 - Intermediate System-to-Intermediate System (IS-IS) and Open Shortest Path First (OSPF)
 - Loop-free alternate (LFA) and remote LFA (RLFA)
- Path Computation Element Protocol (PCEP)
 - Resource Reservation Protocol (RSVP)
- MPLS Label Edge Router (LER) and LSR
 - Label Distribution Protocol (LDP) and Targeted LDP (T-LDP)
 - Resource Reservation Protocol — Traffic Engineering (RSVP-TE)
- IP routing
 - Intermediate System-to-Intermediate System (IS-IS) (IPv4 and IPv6), including traffic engineering (TE) support for IPv4
 - Open Shortest Path First (OSPFv2 and OSPFv3) including TE support for IPv4
 - IPv4 unnumbered with MPLS
 - Border Gateway Protocol (BGP)
 - BGP label unicast routes as defined in RFC 3107 with Accumulated Interior Gateway Protocol (AIGP) support
 - BGP-AD for VPLS auto-discovery
 - BGP pseudowire routing for multi-segment pseudowires
- Protocol Independent Multicast (PIM) – Sparse mode (SM), Source Specific Multicast (SSM) and IGMPv1/2/3
- IGMPv1/2/3 snooping

Load balancing and resiliency

- Multi-chassis (MC) LAG
- Pseudowire redundancy
- Primary and Secondary LSPs
- BGP Prefix Independent Convergence (PIC)
- Fast reroute (FRR)
 - LDP with loop-free alternate (LFA) policies
 - RSVP
 - Segment routing with LFA and RLFA
- Equal-cost multi-path (ECMP) load balancing for LDP LSR/LER, IPv4 and L3 VPN tunnels
- Virtual Router Redundancy Protocol (VRRP)
- Bidirectional fault detection (BFD) with 10ms timer
- Shared Risk Link Group (SRLG) recovery
- Entropy (pseudowire hash) label

Quality of service

- Service egress reclassification based on IP DSCP, IP precedence, Dot1p
- Self-generated traffic marking

OAM

- MPLS OAM for in-service performance management (delay, jitter, and packet loss) and fault management
- IPv6 for management

Security

- Per-port MAC security (MACsec)
- Strict unicast Reverse Path Forwarding (uRPF)

Hardware overview

Table 1. 7210 SAS-K-series specifications

	7210 SAS-K30 ETR	7210 SAS-K12 (2 variants: standard and ETR)	7210 SAS-K5 (2 variants: standard and ETR)
System throughput Full duplex, IMIX traffic	30 Gb/s wire speed	9 Gb/s wire speed	5 Gb/s wire speed
Network transport	IP/MPLS/Ethernet	IP/MPLS/Ethernet	Ethernet
Interfaces	<ul style="list-style-type: none"> • 3 x SFP+ 10GE • 8 x Combo SFP/RJ-45 10/100/1000 Mb/s 	<ul style="list-style-type: none"> • 2 x SFP 100/1000 Mb/s • 4 x RJ-45 10/100/1000 Mb/s • 6 x Combo SFP/RJ-45 10/100/1000 Mb/s 	<ul style="list-style-type: none"> • 2 x SFP 100/1000 Mb/s • 2 x RJ-45 10/100/1000 Mb/s • 1 x Combo SFP/RJ-45 10/100/1000 Mb/s
Timing and synchronization	<ul style="list-style-type: none"> • ITU-T SyncE with Ethernet Synchronization Messaging Channel (ESMC) • IEEE 1588v2 <ul style="list-style-type: none"> – Boundary Clock (BC), Ordinary Clock (OC) - slave – User Datagram Protocol (UDP)/IP and Ethernet encapsulation – Profiles: IEEE 1588v2 default, ITU-T G.8265.1, G.8275.1 • 1PPS 	<ul style="list-style-type: none"> • ITU-T SyncE with ESMC • IEEE 1588v2 <ul style="list-style-type: none"> – BC, OC-slave – UDP/IP and Ethernet encapsulation – Profiles: IEEE 1588v2 default, ITU-T G.8265.1, G.8275.1 • 1PPS on ETR variant 	<ul style="list-style-type: none"> • ITU-T SyncE with ESMC • IEEE 1588v2 <ul style="list-style-type: none"> – BC, OC-slave – UDP/IP encapsulation – Profiles: IEEE 1588v2 default, G.8265.1
MACsec	Yes	ETR variant	No
Extended buffering and shaping	Ingress, egress 512 MB buffer	Ingress, egress 64 MB buffer	Ingress, egress 64 MB buffer
IP rating	IP20	7210 SAS-K12: IP50 7210 SAS-K12 ETR: IP20	IP50 (both variants)
Dimensions	<ul style="list-style-type: none"> • Height: 8.8 cm (3.5 in) 2RU • Width: 43.8 cm (17.2 in) • Depth: 25.2 cm (9.9 in) 	7210 SAS-K12: <ul style="list-style-type: none"> • Height: 3.5 cm (1.4 in) 1RU • Width: 29.5 cm (11.6 in) • Depth: 21.8 cm (8.6 in) 7210 SAS-K12 (ETR): <ul style="list-style-type: none"> • Height: 6.6cm (2.6 in) 1.5RU • Width: 33.9cm (13.35in) • Depth: 24.0cm (9.45in - ETSI) 	7210 SAS-K5: <ul style="list-style-type: none"> • Height: 3.5 cm (1.4 in) 1RU • Width: 18.4 cm (7.2 in) • Depth: 21.8 cm (8.6 in) 7210 SAS-K5 (ETR): <ul style="list-style-type: none"> • Height: 4.1 cm (1.6 in) 1RU • Width: 18.4 cm (7.2 in) • Depth: 21.8 cm (8.6 in)
Power supply options	<ul style="list-style-type: none"> • Two feeds. Two fixed internal AC power supplies and one fixed internal DC power supply. 	<ul style="list-style-type: none"> • 7210 SAS-K12: One feed. External AC or DC power supply • 7210 SAS-K12 (ETR): Two feeds. External AC or DC power supplies. Supports concurrent use of AC and DC power • AC, -48 V DC and +24 V DC power supplies are available 	<ul style="list-style-type: none"> • 7210 SAS-K5: One feed. External AC or DC power supply • 7210 SAS-K5 (ETR): Two feeds. External AC or DC power supplies. Supports concurrent use of AC and DC power • AC, -48 V DC and +24 V DC power supplies are available
Power requirements	<ul style="list-style-type: none"> • AC input: 100 V to 240 V, 50 Hz to 60 Hz • DC input: -18 V DC to -72 V DC 	<ul style="list-style-type: none"> • AC input: 100 V to 240 V, 50 Hz to 60 Hz • DC input: -36 V DC to -72 V DC 	<ul style="list-style-type: none"> • AC input: 100 V to 240 V, 50 Hz to 60 Hz • DC input: -36 V DC to -72 V DC • DC input: +20 V DC to +28 V DC
Cooling	Passive cooling	Passive cooling	Passive cooling
Temperature operating range	-40°C to +65°C (-40°F to +149°F)	<ul style="list-style-type: none"> • 7210 SAS-K12: 0°C to 40°C (32°F to 104°F) • 7210 SAS-K5 (ETR): -40°C to +65°C (-40°F to +149°F) 	<ul style="list-style-type: none"> • 7210 SAS-K5: 0°C to 40°C (32°F to 104°F) • 7210 SAS-K5 (ETR): -40°C to +65°C (-40°F to +149°F)

Technical specifications¹

Environmental specifications

- ATT-TP-76200
- ETSI EN 300 019-2-1 Storage
- ETSI EN 300 019-2-2 Transportation
- ETSI EN 300 019-2-3 Operational
- GR-63-CORE
- VZ.TPR.9205
- RoHS 6/6 design

Safety

- IEC/EN 60825-1
- IEC/EN 60825-2
- AS/NZS 60950-1
- IEC/EN/UL/CSA 60950-1 Ed2
- AS/NZS 62368-1
- IEC/EN/UL/CSA 62368-1 Ed2

Electromagnetic compatibility

- AS/NZS CISPR 32 Class A
- BSMI CNS13438 Class A²
- BT GS-7²
- EN 55024
- EN 55032 Class A
- ETSI EN 300 132-2 (LVDC)²
- ETSI EN 300 132-3 (AC)²
- ETSI EN 300 386
- ETSI ES 201 468
- FCC Part 15 Class A
- GR-1089-CORE
- ICES-003 Class A
- IEC CISPR 24
- IEC CISPR 32 Class A

- IEC/EN 61000-3-2 Power line harmonics²
- IEC/EN 61000-3-3 Voltage fluctuations²
- 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
- IEC/EN 61000-4-11 Voltage Interruptions
- IEC/EN 61000-6-2 Industrial²
- IEC/EN 61000-6-4²
- KCC Korea-Emission & Immunity (in accordance with KN32/KN35)
- VCCI Class A

Power utility substations

- IEC 61850-3³
- IEEE 1613³

Railway

- EN 50121-4²
- IEC 62236-4²

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
- NEBS Level 3
- MEF 3.0
- Australia - RCM Mark
- China RoHS - CROHS
- Europe - CE Mark
- Japan - VCCI Mark
- South Korea - KC Mark

¹ System design intent is according to the listed standards. Certifications vary on different models. Certifications applicable to specific models are noted. Refer to product documentation for detailed compliance status.

² Applicable to specific models

³ Applicable to ETR models



About Nokia

At Nokia, we create technology that helps the world act together.

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.

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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