Nokia 7750 Service Router Mobile Gateway

Release 11

The Nokia 7750 Service Router (SR) Mobile Gateway is a service-aware platform optimized to deliver enhanced mobile broadband and Internet of Things (IoT) services with exceptional performance and scalability. With its comprehensive 3GPP mobile gateway feature set that supports cellular, Wi-Fi® and fixed access, plus its inherent IP/MPLS multi-functional capabilities, the Nokia 7750 SR Mobile Gateway dramatically simplifies the mobile network core architecture and operations.

The Nokia 7750 SR Mobile Gateway is part of the Cloud Packet Core solution, which helps communications service providers (CSPs) profitably deliver converged broadband, IoT and machine type communication while confidently evolving to 5G.

Overview

The Nokia 7750 SR Mobile Gateway performs the user plane gateway functions in the mobile network Evolved Packet Core (EPC) and 5G Core. It has been designed from inception to concurrently deliver multiple services to massive numbers of subscribers. Using as a base the industry-leading Nokia 7750 Service Router (SR) with its advanced FP network processing silicon, the 7750 SR Mobile Gateway is uniquely optimized for the rigorous service demands of 4G/LTE and the evolution to 5G. It provides independent and concurrent packet processing in three dimensions: control (messages), data (high-throughput packet processing) and advanced data processing (Layer 4-Layer 7 packet inspection and analysis). This multi-dimensional processing capability provides the high performance needed to support the delivery of voice, data, multimedia and IoT services, each with its own unique service requirements.
The 7750 SR Mobile Gateway provides deployment flexibility and service agility with concurrent support for multiple packet core functions in cellular licensed and unlicensed spectrum, Wi-Fi and fixed access networks. This flexibility simplifies the network design and results in increased operational efficiency by consolidating many essential IP/MPLS and mobile networking functions onto the same platform while also supporting the evolution to network functions virtualization (NFV) and cloud-based architectures.

The Nokia 7750 SR Mobile Gateway can be deployed in a distributed control and user plane separation (CUPS) architecture as the Gateway user plane (GW-U) in the EPC or User Plane Function (UPF) in the 5G Core along with the Cloud Mobile Gateway (CMG) as the virtualized gateway control plane/Session Management Function (GW-C/SMF) to support 4G/5G high-capacity or low-latency services (see Figure 1).

The 7750 SR Mobile Gateway also provides integrated application awareness (Layer 4-Layer 7 packet inspection and policy enforcement) and Subscriber Services Gateway (SSG) functions on the SGi-LAN interface (see Figure 2), enabling the CSP to identify and differentiate applications to generate new revenues and manage network congestion.

The Nokia Network Services Platform (NSP) provides end-to-end service-aware management for the entire Cloud Packet Core and IP/MPLS transport network.

**Figure 1. CUPS architecture with 7750 SR Mobile GW as GW-U/UPF**

**Figure 2. 7750 SR Mobile GW as the Subscriber Services Gateway (SSG)**

**Benefits**

**Increase revenue with an IP-optimized approach**

CSPs are looking to scale their networks to meet the rising demand for enhanced consumer mobile broadband services while also expanding into IoT and low-latency services for new revenue opportunities. However, the network requirements and performance metrics to support this expanded range service set are both varied and challenging. A different and more robust approach to packet processing is required.

The 7750 SR Mobile Gateway is a highly scalable and flexible platform that is design-optimized to meet these differing service requirements, ensuring that CSPs can maximize revenues now and well into the future.
Simplify the network and reduce costs

Today’s operational environment for the CSP is challenging because many different IP functions are required in the network in addition to mobile gateway functionality. The 7750 SR Mobile Gateway helps CSPs to simplify their operational model and reduce costs by providing IP routing, IP aggregation and MPLS capabilities concurrently while also performing mobile gateway functions for both radio and fixed access networks.

Flexibly and efficiently grow and evolve the network

The 7750 SR Mobile Gateway scales across a massive number of IP service packet flows to provide the capacity to support the massive growth of subscribers, mobile devices and applications while supporting new user behavior and quality expectations. As networks continue to grow and evolve, CSPs will seek cost savings and operational benefits from cloud architectures and NFV.

The 7750 SR Mobile Gateway supports 3GPP CUPS architecture by performing the user plane function while the Nokia CMG performs the control plane function. This gives CSPs the flexibility to independently scale either the control or user plane for service applications that require either high subscriber session connectivity or high capacity and throughput with no degradation in performance.

Features

Purpose-built silicon and architecture

Nokia has a proven track record as an innovator in network processor silicon technology. At the heart of the 7750 SR is the Nokia award-winning FP network processing silicon built specifically for the rigorous demands of high-touch, high-volume packet processing (including filtering, forwarding, high-volume quality of service (QoS), accounting, charging and reporting) for each individual IP packet flow with uncompromising scalability and performance. This same silicon is used in the 7750 SR Mobile Gateway.

Dedicated CPU for control plane processing

The 7750 SR Mobile Gateway provides dedicated and independent processing of control plane packets separate from data plane (user) packets. The Nokia Control Plane Integrated Services Adapter (CP-ISA) performs the rigorous mobile gateway control plane processing, including GPRS Tunneling Protocol for Control Plane (GTP-C); authentication, authorization and accounting (AAA); policy and charging control (PCC); and charging data records for the online charging system (OCS). This dedicated control plane processing dramatically increases scalability and performance, to meet emerging IoT service demands. Alternatively, in a CUPS architecture, the Nokia CMG can perform this control-plane processing, providing the session management and OAM functions when applications such as IoT require massive control plane processing.

Dedicated CPU for advanced packet processing and service intelligence

To further differentiate services, the Nokia Application Assurance Integrated Services Adapter (AA-ISA) provides independent and concurrent processing in the advanced data plane. The processing capabilities include L4–L7 in-line inspection and analysis plus advanced packet processing of specific application-level IP traffic flows. These capabilities, collectively known as Application Assurance (AA), leverage embedded subscriber, service and application intelligence to provide deeper levels of integrated service capabilities. This capability extends the 3GPP Traffic Detection Function (TDF) while integrating it on a single enforcement point within the existing PCC framework.

The AA-ISA extends the GGSN/PGW metering and policy control capabilities to include application-based rules. Compared with dedicated network appliances, the AA-ISA provides tighter management integration and higher performance and scalability—and consumes less energy.

Concurrent multi-functional IP network capabilities

The 7750 SR Mobile Gateway inherits many IP routing capabilities, including Open Shortest
Path First (OSPF), Border Gateway Protocol (BGP), MPLS and Bidirectional Forwarding Detection (BFD). In addition, with Routed Virtual Private LAN Service (R-VPLS) the 7750 SR Mobile Gateway can terminate VPLS provider edge functionality normally done in the backhaul network onto the mobile gateway.

**High availability**

The 7750 SR Mobile Gateway offers complete intra-shelf and inter-shelf geo-redundancy, with full redundancy of control/switching elements and line cards. In addition, the Mobile Gateway Operating System (MG-OS) supports numerous features that minimize service disruption. These features include nonstop routing, nonstop services, stateful failover and in-service software upgrade (ISSU). With its comprehensive suite of high-availability features, the 7750 SR Mobile Gateway is the industry’s most reliable platform for offering nonstop applications and services.

**Advanced Hierarchical Quality of Service**

With LTE supporting a mix of voice, data and multimedia services, it is critical that each individual IP packet flow be given the proper QoS treatment through the mobile gateway. The 7750 SR Mobile Gateway sets the standard with its advanced and highly flexible Hierarchical QoS (H-QoS) implementation.

Hardware support for multi-tiered shaping and policing hierarchies provides granular QoS down to a per-subscriber, per-bearer and per-application (IP packet flow) basis. Because it is designed as a service delivery platform, the 7750 SR Mobile Gateway provides the tools to define and deliver the most stringent service level agreements (SLAs) for high-value, differentiated services.

**Service-aware management**

The 7750 SR Mobile Gateway is managed by the Nokia NSP for assured, simplified and integrated operations across both network and service management domains, including NFV operating environments. The 7750 SR Mobile Gateway supports both traditional telco TL1/SNMP and IT NETCONF/YANG management environments.

The NSP is designed to manage services and provides service-level visibility into the network and interfaces to the Virtual Network Function Manager (VNFM) in cloud networking deployments. Moreover, the management offering streamlines network operations and aids in the provisioning and management of all connectivity and advanced networking services.

**Network functions**

The 7750 SR Mobile Gateway can perform multiple 3GPP mobile packet core functions either separately or in combination.

- Packet Data Network Gateway (PGW)
- Gateway GPRS Support Node (GGSN)
- Home Agent (HA) (3GPP2)
- Serving Gateway (SGW)
- Evolved Packet Data Gateway (ePDG)
- Trusted Wireless Access Gateway/Proxy (TWAG/TWAP)
- Subscriber Services Gateway (SSG)
- User Plane Function (UPF)

As an SGW, the 7750 SR Mobile Gateway routes and forwards user data packets while also acting as the mobility anchor for the user plane during inter-eNodeB handovers as well as handovers between LTE and other 3GPP technologies.

As a combined PGW and GGSN for 2G/3G/4G, the 7750 SR Mobile Gateway provides connectivity for user equipment to external packet data networks (PDNs) and is the IP anchor point. The PGW/GGSN performs policy enforcement, packet filtering, charging support, lawful interception and packet screening for each packet flow.

In 4G/5G networks, the 7750 SR Mobile Gateway supports the UPF, providing a common data packet forwarding function across cellular and Wi-Fi access networks. As the anchor point for inter-mobility and inter-RAT mobility and the interconnect to the data network, the 7750 SR Mobile Gateway as the UPF provides packet forwarding and routing within the mobile network and externally to it. The 7750 SR Mobile Gateway performs packet inspection...
and user plane policy enforcement as well as lawful intercept user plane collection. It performs QoS, uplink/downlink rate enforcement, uplink classification and uplink/downlink marking at the transport level.

As an ePDG, the 7750 SR Mobile Gateway aggregates mobile subscriber traffic from untrusted Wi-Fi access networks through secure IPSec tunneling and forwards this traffic to the 4G/LTE EPC while providing Diameter access to AAA servers. This enables seamless mobility between 3G/4G and untrusted Wi-Fi access networks. It also supports integrated network address translation (NAT) and NAT traversal with local breakout for direct PDN access to data services.

As a TWAG, the 7750 SR Mobile Gateway aggregates subscriber traffic from trusted Wi-Fi access networks through a variety of secure tunneling protocols, such as Layer 2 over Generic Routing Encapsulation, and forwards this traffic to the LTE while providing AAA proxy authentication. This enables seamless mobility between 3G/4G and trusted Wi-Fi access networks. It also supports integrated NAT with Non-Seamless WLAN Off-load (NSWO) for direct PDN access to data services.

In addition to the gateway functions, the 7750 SR Mobile Gateway can optionally provide Nokia Mobile AA capabilities to deliver a range of high-touch packet processing functions. These capabilities can be deployed in the PGW/UPF as integrated Application Detection and Control (ADC) with policy and charging enforcement or in the SSG as a standalone 3GPP traffic detection function (TDF) along with other SSG functions.

Nokia Mobile AA provides Layer 4–Layer 7 packet inspection, classification, control and charging capabilities for advanced packet processing and service intelligence as well as traffic optimization, dynamic congestion control and Layer 7 stateful firewall. AA provides classification of flows into applications and app-groups, in addition to using machine learning heuristics to classify flow attribute additional metadata for all flows, including encrypted traffic.

By enabling Mobile AA within the PGW or UPF Policy and Charging Enforcement Function (PCEF) enforcement together with AA capabilities provide a single subscriber policy charging and control (PCC) point. This enables seamless coupling and unification of PCC between both the bearer and application layers.

The 7750 SR Mobile Gateway as an SSG function is located on the mobile operator SGi-LAN interface and provides service classification and enhanced traffic steering features that optimize the mobile end-user experience and generate new service revenue opportunities. In addition to the traffic identification capabilities of the TDF, the 7750 SR Mobile Gateway also supports:

- Layer 7 charging
- TCP optimization
- Multipath TCP hybrid-access gateway
- RAN congestion detection and control (Dynamic Experience Management)
- Carrier-grade NAT
- Firewall
- Policy-driven traffic steering and service chaining

It can be deployed as a standalone function for use when needed with external PGW /UPF functions to deliver new value-added services.

Hardware overview

The Nokia 7750 SR Mobile Gateway is available in two different chassis types: the SR-12 and the SR-7. See Table 1 in the Technical Specifications section for a summary of each chassis.

The Nokia 7750 SR Mobile Gateway supports a wide range of media and service adapters that are optimized to address different network and application requirements.

**Integrated Services Module Mobile Gateway (ISM-MG)**

This full-length module provides the hardware needed for the mobile gateway capabilities: GGSN, SGW and PGW. Each ISM-MG is equipped with a CP-ISA and an AA-ISA for specialized processing.
Control Plane Integrated Services Adapter (CP-ISA)
This adapter functions as a dedicated CPU for the logical and physical separation of control plane processing requirements (e.g., GTP-C, AAA, PCC, OCS) from data plane packet processing.

Application Assurance-Integrated Services Adapter (AA-ISA)
This adapter functions as a dedicated CPU for the logical and physical separation of advanced data plane processing. It performs sophisticated Layer 4-Layer 7 in-line inspection, analysis and processing called Application Assurance.

Input/Output Modules (IOMs)
IOMs are supported on the 7750 SR-12 and SR-7 and are optimized for flexibility in deploying a variety of mobile multiservice applications. Each IOM supports up to two MDAs and can also be used to house ISAs.

Media Dependent Adapters (MDAs)
MDAs are supported on all platforms and provide physical interface connectivity. MDAs are available in a variety of interface and density configurations. See Table 2 for the list of MDA support.

Integrated Media Modules (IMMs)
IMMs are line cards providing integrated processing and physical interfaces on a single full-length board and are supported on the 7750 SR-7 and SR-12. See Table 2 for the list of IMM support.

Integrated Service Modules (ISMs)
ISMs are line cards that provide additional processing for compute-intensive operations and are supported on the 7750 SR-7 and SR-12. See Table 2 in the following section for the list of ISM support.

Technical specifications

Table 1. Hardware specifications for the 7750 SR Mobile Gateway chassis

<table>
<thead>
<tr>
<th></th>
<th>7750 SR-7</th>
<th>7750 SR-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>System throughput</td>
<td>Switch Fabric/Control Processing Module: 400 Gb/s system throughput</td>
<td>Switch Fabric/Control Processing Module: 800 Gb/s system throughput</td>
</tr>
<tr>
<td>Number of SFMs</td>
<td>2 for fabric redundancy (1 for simplex fabric)</td>
<td>2 for fabric redundancy (1 for simplex fabric)</td>
</tr>
<tr>
<td>Maximum number of IOMs or IMMs per chassis</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Maximum number of ISM-MGs per chassis</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Number of MG-ISMs per chassis</td>
<td>4 (2 pairs in 1+1 redundancy mode)</td>
<td>8 (4 pairs in 1+1 redundancy mode)</td>
</tr>
<tr>
<td>Common equipment redundancy</td>
<td>SF/CPMs, PEMs, fans</td>
<td>SF/CPMs, PEMs, fans</td>
</tr>
<tr>
<td>Hot-swappable modules</td>
<td>SF/CPMs, IOMs, IMMs, MDAs, ISAs</td>
<td>SF/CPMs, IOMs, IMMs, MDAs, ISAs</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Height: 35.6 cm (14 in) Width: 44.5 cm (17.5 in) Depth: 64.8 cm (25.5 in)</td>
<td>Height: 62.2 cm (24.5 in) Width: 44.5 cm (17.5 in) Depth (without cable management): 64.5 cm (25.4 in) Depth (with cable management): 76.5 cm (30.1 in)</td>
</tr>
<tr>
<td>Weight</td>
<td>Empty: 41 kg (90.2 lb) chassis weight with factory-installed fan tray and air filter Loaded: 70.5 kg (155 lb)</td>
<td>Empty: 56.4 kg (124 lb) Loaded: 155.7 kg (342.5 lb)</td>
</tr>
</tbody>
</table>
### 7750 SR-7

- Power:
  - -40 V DC to -72 V DC
  - 52 V AC to 92 V AC
  - 1+1 redundancy
  - AC options available

- Cooling: Side-to-back air flow

### 7750 SR-12

- Power:
  - -40 V DC to -72 V DC
  - 90 V AC to 162 V AC
  - 1+1 redundancy
  - AC options available

- Cooling: Front-to-back air flow

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**Table 2. 7750 SR Mobile Gateway IMMs/ISAs/ISMs/MDAs supported**

<table>
<thead>
<tr>
<th>Description</th>
<th>Ports</th>
<th>Connector type</th>
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</thead>
<tbody>
<tr>
<td>IMM 48-port GW copper/TX</td>
<td>48</td>
<td>RJ-45</td>
</tr>
<tr>
<td>IMM 12-port 10GE</td>
<td>12</td>
<td>SFP+L3HQ</td>
</tr>
<tr>
<td>IMM 1-port 100GE CFP</td>
<td>1</td>
<td>CFP+L3HQ</td>
</tr>
<tr>
<td>IMM 12-port 10GE</td>
<td>12</td>
<td>SFP+L3HQ</td>
</tr>
<tr>
<td>IMM 1-port 100GE CFP</td>
<td>1</td>
<td>CFP+L3BQ</td>
</tr>
<tr>
<td>IMM 48-port GE SFP</td>
<td>48</td>
<td>SFP+L3BQ</td>
</tr>
<tr>
<td>IMM 5-port 10GE XFP</td>
<td>5</td>
<td>XFP+L3BQ</td>
</tr>
<tr>
<td>IMM 48-port GE SFP</td>
<td>48</td>
<td>SFP+L3HQ</td>
</tr>
<tr>
<td>IMM 5-port GE XFP</td>
<td>5</td>
<td>XFP+L3HQ</td>
</tr>
<tr>
<td>IMM 12-port 10GE SFP</td>
<td>12</td>
<td>SFP+L3HQ</td>
</tr>
<tr>
<td>IMM 12-port 10GE SFP</td>
<td>12</td>
<td>SFP+L3BQ</td>
</tr>
<tr>
<td>IMM 1-port 100GE FP3 CFP</td>
<td>1</td>
<td>CFP+L3HQ</td>
</tr>
<tr>
<td>IMM 1-port 100GE FP3 CFP</td>
<td>1</td>
<td>CFP+L3BQ</td>
</tr>
<tr>
<td>IMM 2-port 100GE FP3 CFP</td>
<td>2</td>
<td>CFP+L3HQ</td>
</tr>
<tr>
<td>IMM 2-port 100GE FP3 CFP</td>
<td>2</td>
<td>CFP+L3BQ</td>
</tr>
<tr>
<td>IMM 6-port 40GE FP3 QSFP</td>
<td>6</td>
<td>QSFP+3HQ</td>
</tr>
<tr>
<td>IMM 10-port 10GE SFP+ and 20-port GE FP3 SFP</td>
<td>10+20</td>
<td>SFP/SFP+L3HQ</td>
</tr>
<tr>
<td>IMM 10-port 10GE SFP+ and 20-port GE FP3 SFP</td>
<td>10+20</td>
<td>QSFP/SFP+L3BQ</td>
</tr>
<tr>
<td>IMM 3-port 40GE QSFP + 20-port GE FP3 SFP</td>
<td>3+20</td>
<td>QSFP/SFP+L3HQ</td>
</tr>
<tr>
<td>IMM 3-port 40GE QSFP + 20-port GE FP3 SFP</td>
<td>3+20</td>
<td>QSFP/SFP+L3BQ</td>
</tr>
<tr>
<td>IMM ISA2 + 1-port 100GE CFP</td>
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<td>CFP+L3BQ</td>
</tr>
<tr>
<td>IMM ISA2+1-port 100GE CPF</td>
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<td>CFP+L3HQ</td>
</tr>
<tr>
<td>IMM ISA2 + 10-port 10GE SFP</td>
<td>10</td>
<td>SFP+L3HQ</td>
</tr>
<tr>
<td>IMM ISA2 + 10-port 10GE SFP</td>
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<td>SFP+L3BQ</td>
</tr>
<tr>
<td>ISA Multiservice</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>ISA2 Multiservice</td>
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<td>NA</td>
</tr>
<tr>
<td>ISA2-E Multiservice</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ISM MG-B Bundle</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ISM MG-C Multiservice FP3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ISM MG-C Multiservice FP3 (no encryption)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>MDA 10-port GE XP</td>
<td>10</td>
<td>XP</td>
</tr>
<tr>
<td>MDA-e 2-port 100GE CFP4</td>
<td>2</td>
<td>CFP4</td>
</tr>
<tr>
<td>MDA-e 10-port 10GE SFP+</td>
<td>10</td>
<td>SFP+</td>
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### Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Ports</th>
<th>Connector type</th>
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<tr>
<td>MDA-e 1-port 100GE CFP2</td>
<td>1</td>
<td>CFP2</td>
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<tr>
<td>MDA-e 20-port GE SFP/40 port GE cSFP</td>
<td>20/40</td>
<td>SFP/cSFP</td>
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<tr>
<td>MDA-e 2-port 100GE QSFP28</td>
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<td>QSFP28</td>
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<tr>
<td>MDA-XP 1-port 10GBase XFP</td>
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<td>XFP</td>
</tr>
<tr>
<td>MDA-XP 2-port 10GBase XFP</td>
<td>2</td>
<td>XFP</td>
</tr>
<tr>
<td>MDA-XP 4-port 10GBase XFP</td>
<td>4</td>
<td>XFP</td>
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<tr>
<td>MDA-XP 10-port GE SFP</td>
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<td>SFP</td>
</tr>
<tr>
<td>MDA-XP 20-port GE SFP</td>
<td>20</td>
<td>SFP</td>
</tr>
</tbody>
</table>

### Environmental specifications

- Operating temperature: 5° C to 40° C (41° F to 104° F)
- Operating relative humidity: 5% to 85%
- Operating altitude: Up to 4000 m (13,000 ft.) at 30° C (86° F)

### Standards compliance

#### Safety

- CSA/UL 60950-1 2nd Ed NRTL
- EN 60950-1 2nd Ed CE-Mark
- FDA CDRH 21-CFR 1040
- IEC 60950-1 2nd Ed CB Scheme
- IEC/EN 60825-1
- IEC/EN 60825-2

#### EMC emission

- AS/NZS CISPR 22
- BSMI Class A
- CISPR 22 Class A
- EN 55022 Class A
- FCC Part 15 Class A
- ICES-003 Class A
- IEC/EN 61000-3-2 Power Line Harmonics
- IEC/EN 61000-3-3 Voltage Fluctuations and Flicker
- VCCI Class A

#### EMC immunity

- EN 300 386
- EN 55024
- 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 61000-4-8 Magnetic Immunity
- IEC/EN 61000-4-11 Voltage Interruptions

#### Telecom

- ANSI T1.105.03
- ANSI T1.105.06
- ANSI T1.105.09
- ANSI T1.403 (DS1)
- ANSI T1.404 (DS3)
- IEEE 802.3 (Gigabit Ethernet, Ethernet)
- ITU-T G.703
- ITU-T G.707
- ITU-T G.813
- ITU-T G.823
- ITU-T G.824
- ITU-T G.825
- ITU-T G.957
- Telcordia GR-253-CORE
Environmental
- China CRoHS
- ETS 300 019-1-1 Storage Tests, Class 1.2
- ETS 300 019-1-2 Transportation Tests, Class 2.3
- ETS 300 019-1-3 Operational Tests, Class 3.2
- ETS 300 019-2-4, pr A 1 Seismic
- ETSI EN 300 132-2 Power Supply Interface
- ETSI EN 300 753 Acoustic
- RoHS
- WEEE

Network Equipment Building System (NEBS)
- NEBS Level 3 compliant
  - Telcordia GR-63-CORE
  - Telcordia GR-295-CORE
  - Telcordia GR-1089-CORE

3GPP standards compliance
The 7750 SR Mobile Gateway supports the message types and procedures defined in the 3GPP Release 13 December 2016 versions of most specifications. It also supports the message types and procedures defined in 3GPP Release 15 March 2018 for the 5G Core UPF function:

<table>
<thead>
<tr>
<th>3GPP Specification</th>
<th>Other 3GPP Specification</th>
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<tbody>
<tr>
<td>TS 23.060</td>
<td>TS 29.275</td>
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<tr>
<td>TS 23.203</td>
<td>TS 29.281</td>
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<tr>
<td>TS 23.234</td>
<td>TS 32.251</td>
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<td>TS 23.401</td>
<td>TS 32.295</td>
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<td>TS 23.402</td>
<td>TS 32.297</td>
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<td>TS 23.501</td>
<td>TS 32.298</td>
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<td>TS 23.502</td>
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<td>TS 24.302</td>
<td>TS 33.102</td>
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<td>TS 29.060</td>
<td>TS 33.106</td>
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<td>TS 29.212</td>
<td>TS 33.107</td>
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<td>TS 29.274</td>
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