ATIS Standard on –

Emergency Telecommunications Service (ETS) Roadmap

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ATIS Standard on

Emergency Telecommunications Service (ETS) Roadmap

Alliance for Telecommunications Industry Solutions

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Abstract

This Technical Report provides a roadmap view of the subtending suite of ATIS standards, technical reports, and requirements documents showing the applicability of particular standard specifications in the context of enabling deployment of the needed National Security/Emergency Preparedness (NS/EP) priority related functions and capabilities supporting end-to-end priority communications in Next Generation Networks (NGNs).   The ATIS set of standards includes national specific applications of 3rd Generation Partnership Project (3GPP), Internet Engineering Task Force (IETF), and International Telecommunications Union – Telecommunications (ITU-T) specifications for the support of ETS. This document includes a roadmap of the dependent 3GPP, IETF, and ITU-T specifications and standards.

Foreword

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, customers, and manufacturers. The Packet Technologies and Systems Committee (PTSC) develops and recommends standards and technical reports related to services, architectures, and signaling, in addition to related subjects under consideration in other North American and international standards bodies. PTSC coordinates and develops standards and technical reports relevant to telecommunications networks in the U.S., reviews and prepares contributions on such matters for submission to U.S. ITU-T and U.S. ITU-R Study Groups or other standards organizations, and reviews for acceptability or per contra the positions of other countries in related standards development and takes or recommends appropriate actions.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes a optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, PTSC, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, PTSC, which was responsible for its development, had the following leadership:

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1 Scope, Purpose, & Application

1.1 Scope

There are numerous industry standards, technical reports, and requirements documents addressing various aspects for Emergency Telecommunications Service (ETS) support in Next Generation Networks (NGNs). For an end-to-end National Security/Emergency Preparedness (NS/EP) priority communication session in an NGN, priority mechanisms need to be supported over various interfaces and protocols and priority processing needs to be supported within functional elements spanning across various network domains (e.g., wireless access, fixed access, and core network segments), across network boundaries, and within Internet Protocol (IP) transport networks. The deployment of NS/EP priority services (e.g., voice) requires applicability of the particular standard specification in context to the specific interface and protocol, functional element, network domains (e.g., wireless access, fixed access, and core network segments), for the support of NS/EP priority communications in the end-to-end NGN infrastructure.

This Technical Report (TR) provides a roadmap view of the subtending suite of ATIS standards, technical reports, and requirements documents showing the applicability of particular standard specifications in the context of enabling deployment of the needed NS/EP priority related functions and capabilities supporting end-to-end priority communications in NGNs. The ATIS set of standards includes national specific applications of 3rd Generation Partnership Project (3GPP), Internet Engineering Task Force (IETF), and International Telecommunications Union – Telecommunications (ITU-T) specifications for the support of ETS. For example, the ATIS standards further define the national specific aspects of the 3GPP protocols and capabilities supporting ETS. This TR includes a roadmap of the dependent 3GPP, IETF, and ITU-T specifications and standards.

1.2 Purpose

The purpose of this TR is to consolidate various ETS related specifications and provide a roadmap view to enable ETS deployment in NGNs. The objective is to provide a roadmap view showing the applicability of particular specifications to specific network layer, network procedure, interfaces or network element functional capabilities, and segments making up the end-to-end NGN infrastructure.

1.3 Application

This document is applicable to the support of NS/EP priority services (e.g., Government Emergency Telecommunications Service (GETS), Wireless Priority Service (WPS), and NGN Priority Services) in the public NGN infrastructure.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ATIS[1]

[ATIS-1000065] Emergency Telecommunications Service (ETS) Evolved Packet Core (EPC) Network Element Requirements

[ATIS-1000060] Emergency Telecommunications Service (ETS): Long Term Evolution (LTE) Access Network Security Requirements for National Security/Emergency Preparedness (NS/EP) Next Generation Network (NGN) Priority Services.

[ATIS-1000609] Interworking between the ISDN User-Network Interface Protocol and the Signalling System Number 7 ISDN User Part

[ATIS-1000057] Service Requirements for Emergency Telecommunications Service (ETS) in Next Generation Network (NGN)

[ATIS-1000055] Emergency Telecommunications Service (ETS): Core Network Security Requirements

[ATIS-1000023] ETS Network Element Requirements for A NGN IMS Based Deployments

[ATIS-1000679] Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part

[ATIS-1000049] End-to-End NGN GETS Call Flows

[ATIS-1000047] Signaling System 7 (SS7) and Internet Protocol (IP) Transport Networks Signaling Interworking and Compatibility

[ATIS-1000017] Interworking between the ISDN User – Network Interface Protocol and the Session Initiation Protocol (SIP) with ANSI Extensions to the Narrowband Signaling Syntax (NSS)

[ATIS-1000026] Session Border Controller Functions and Requirements

[ATIS-1000009] IP Network – To Network Interface (NNI) Standard for VoIP

[ATIS-1000010] Support of Emergency Telecommunications Service ETS in IP Network

[ATIS-1000005] Service Description of ETS

[ATIS-1000631] Signaling Systems No. 7 (SS7) – High Probability of Completion (HPC) Network Capability

[ATIS-1000006] Signalling Systems No. 7 (SS7) – Emergency Telecommunications Service (ETS)

[ATIS-1000061] LTE Access Class 14 for National Security and Emergency Preparedness (NS/EP) Communications

[ATIS-1000053] Emergency Telecommunications Service (ETS) Profile and Tests for IP Network-to-Network Interconnection

[ATIS-1000056] Access Networks Architecture Technical Report

[ATIS-0100036] Media Plane Performance Security Impairments for Evolving VoIP/Multimedia Networks

[ATIS-0100031] A Method to Display Metrics Related to the Robustness of the Undersea Cable Infrastructure

[ATIS-0100022] Priority Classification Levels for Next Generation Networks

[ATIS-1000029] Security Requirements for NGN

[ATIS-1000020] ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism

[ATIS-1000018] NGN Architecture

[ATIS-0100011] Priority for NS/EP Services in NGN/ IP Environment – Role of TSP

[ATIS-0100010] Security for Next Generation Networks – An End User Perspective

[ATIS-0100004] Availability & Restorability Aspects of Emergency Telecommunications Service (ETS)

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[1] Available from the Alliance for Telecommunications Industry Solutions (ATIS), 1200 G Street NW, Suite 500, Washington, D.C., 20005, at: < https://www.atis.org/docstore/default.aspx >.

[ATIS-1000011] ETS Packet Priority for IP NNI Interfaces – Use of Existing DiffServ Per Hop Behaviors

[ATIS-0100009] Overview of Standards in Support of Emergency Telecommunications Service (ETS)

[ATIS-0100006] Service Restoration Priority Levels for IP Networks

[T1.TR.84]   IP Network Traffic Priorities and ETS

[ATIS-0100003] User Plane Priority Levels for IP Networks and Services

[ATIS-0100001] User Plane Security Guidelines and Requirements for ETS

[ATIS-1000066] Emergency Telecommunications Service (ETS) Network Element Requirements for IMS-based Next Generation Network (NGN) Phase 2

3GPP[2]

[TR 22.950]   Priority service feasibility study

[TR 22.952]   Priority service guide

[TR 22.953]   Multimedia priority service feasibility study

[TS 22.011]   Service accessibility

[TS 22.153]   Multimedia priority service

[TR 23.854]   Enhancements for Multimedia Priority Service (MPS)

[TS 23.203]   Policy and charging control architecture

[TS 23.228]   IP Multimedia Subsystem (IMS); Stage 2

[TS 23.272]   Circuit Switched (CS) fallback in Evolved Packet System (EPS); Stage 2

[TS 23.333]   Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface: Procedures descriptions

[TS 23.334]   IP Multimedia Subsystem (IMS) Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW) interface: Procedures descriptions

[TS 23.401]   General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access

[TS 23.402]   Architecture enhancements for non-3GPP accesses

[TS 29.162]   Interworking between the IM CN subsystem and IP networks

[TS 29.163]   Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks

[TS 29.292]   Interworking between the IP Multimedia (IM) Core Network (CN) subsystem (IMS) and MSC Server for IMS Centralized Services (ICS)

[TS 36.300]   Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2.

[TS 23.008]   Organization of subscriber data

[TS 24.008]   Mobile radio interface Layer 3 specification; Core network protocols; Stage 3

[TS 24.301]   Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3

[TS 25.331]   Radio Resource Control (RRC); Protocol specification.

[TS 25.413]   UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling

[TS 29.018]   General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) – Visitors Location Register (VLR); Gs interface layer 3 specification

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[2] Available from the 3rd Generation Partnership Project (3GPP) at: < http://www.3gpp.org/ >.

[TS 29.060]	GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface

[TS 29.118]	Mobility Management Entity (MME) – Visitor Location Register (VLR) SGs interface specification

[TS 29.212]	Policy and Charging Control (PCC); Reference points

[TS 29.213]	Policy and charging control Signalling flows and Quality of Service (QoS) parameter mapping

[TS 29.214]	Policy and charging control over Rx reference point

[TS 29.230]	Diameter applications; 3GPP specific codes and identifiers

[TS 29.272]	Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol

[TS 29.273]	Evolved Packet System (EPS); 3GPP EPS AAA interfaces

[TS 29.274]	3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3

[TS 29.277]	Optimised handover procedures and protocol between EUTRAN access and non-3GPP accesses (S102); Stage 3.

[TS 36.331]	Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification

[TS 36.413]	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)

[TS 36.414]	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport

[TS 36.423]	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 application protocol (X2AP)

[TS 36.424]	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 data transport

[TS 24.229]	IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3

[TS 29.163]	Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks

[TS 29.228]	IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents

[TS 29.229]	Cx and Dx interfaces based on the Diameter protocol; Protocol details

[TS 29.232]	Media Gateway Controller (MGC) – Media Gateway (MGW) interface; Stage 3

[TS 29.238]	Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface, Ix interface; Stage 3

[TS 29.328]	IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents

[TS 29.329]	Sh interface based on the Diameter protocol; Protocol details

[TS 29.332]	Media Gateway Control Function (MGCF) – IM Media Gateway; Mn interface

[TS 29.238]	Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface, Ix interface; Stage 3

[TS 29.328]	IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents

[TS 29.329]	Sh interface based on the Diameter protocol; Protocol details

[TS 29.332]	Media Gateway Control Function (MGCF) – IM Media Gateway; Mn interface

[TS 29.333]	Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface; Stage 3

[TS 29.334]	IMS Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW); Iq Interface; Stage 3

IETF[3]

[RFC 4412]   Communications Resource Priority for the Session Initiation Protocol (SIP)

[RFC 4542]   Implementing an Emergency Telecommunications Service (ETS) for Real-Time Services in the Internet Protocol Suite

[RFC 5865]   A Differentiated Services Code Point (DSCP) for Capacity-Admitted Traffic

[RFC 3689]   General Requirements for Emergency Telecommunication Service (ETS)

[RFC 3690]   IP Telephony Requirements for Emergency Telecommunication Service (ETS)

[RFC 4375]   Emergency Telecommunications Services (ETS) Requirements for a Single Administrative Domain

[RFC 4958]   A Framework for Supporting Emergency Telecommunications Services (ETS) within a Single Administrative Domain

[RFC 5115]   Telephony Routing over IP (TRIP) Attribute for Resource Priority

[RFC 6710]   Simple Mail Transfer Protocol for Message Priorities

[RFC 6758]   Tunneling of SMTP Message Transfer Priorities

[RFC 6735]   Diameter Priority Attribute Value Pairs

[draft-ietf-dime-drmp]   Diameter Routing Message Priority

[RFC 6679]   Explicit Congestion Notification (ECN) for RTP over UDP

[RFC 7339]   SIP Overload Control

[RFC 5559]   Pre-Congestion Notification (PCN) Architecture

[RFC 5670]   Metering and Marking Behaviour of PCN-Nodes

ITU-T[4]

[ITU-T E.107]   Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS

[ITU-T E.106]   International Emergency Preference Scheme (IEPS) for disaster relief operations

[ITU-T E.412]   Network management controls

[ITU-T M.3350] TMN service management requirements for information interchange the TMN X-interface to support provisioning of Emergency Telecommunication Service (ETS)

[ITU-T Q Sup 57]   Signalling requirements to support the emergency telecommunications service (ETS) in IP networks

[ITU-T Q Sup 47]   Emergency services for IMT 2000 networks – Requirements for harmonization and convergence

[ITU-T Q Sup 53]   Signalling requirements to support the International Emergency Preference Scheme (IEPS)

[ITU-T Q.Sup 63]   Signalling Protocol Mappings in Support of the Emergency Telecommunications Service in IP Networks

[ITU-T Q.1902.1 A2]   Interworking between Signalling System No. 7 ISDN user part and the Bearer Independent Call Control protocol – Amendment 2 – Support for the International Emergency Preference Scheme

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[3] Available from the Internet Engineering Task Force (IETF) at: < https://www.ietf.org/ >.

[4] Available from the International Telecommunications Union - Telecommunication Standardization Sector (ITU-T) at: < http://www.itu.int/en/ITU-T/publications/Pages/recs.aspx >.

[ITU-T Q.1902.2 A3]   Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: General functions of messages and parameters – Amendment 3 – Support for the International Emergency Preference Scheme

[ITU-T Q.1902.3 A3]   Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: Formats and codes – Amendment 3 – Support for the International Emergency Preference Scheme

[ITU-T Q.1902.4 A3]   Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures – Amendment 3 – Support for the International Emergency Preference Scheme

[ITU-T Q.2630.3 A1]   AAL type 2 signalling protocol – Capability Set 3 AAL type 2 signalling protocol – Capability Set 3 – Amendment 1 – Support for the International Emergency Preference Scheme

[ITU-T Q.1950 A1]   Bearer independent call bearer control protocol – New Annex G – Call bearer control – International Emergency Preference Scheme

[ITU-T Q.2761 A1]   Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7 – Amendment 1 – Support for the International Emergency Preference Scheme

[ITU-T Q.2762 A1]   General functions of messages and signals of the B-ISDN User Part (B-ISUP) of Signalling System No. 7 – Amendment 1- Support for the International Emergency Preference Scheme

[ITU-T Q.2763 A1]   Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes – Amendment 1 – Support for the International Emergency Preference Scheme

[ITU-T Q.2764 A1]   Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures

[ITU-T Q.2931]   Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control

[ITU-T Q.761 A3]   Signalling System No. 7 – ISDN User Part functional description – Amendment 3 – Support for the International Emergency Preference Scheme

[ITU-T Q.762 A3]   Signalling System No. 7 – ISDN User Part general functions of messages and signals – Amendment 3 – Support for the International Emergency Preference Scheme

[ITU-T Q.763 A4]   Signalling System No. 7 - ISDN user part formats and codes – Amendment 4 – Support for the International Emergency Preference Scheme

[ITU-T Q.764 A4]   Signalling system No. 7 – ISDN user part Signalling procedures – Amendment 4 – Support for the International Emergency Preference Scheme

[ITU-T Q.767 A1]   Application of the ISDN User Part of CCITT Signalling system No. 7 for international ISDN interconnections – Amendment 1 – Support for the International Emergency Preference Scheme

[ITU-T Q.3301.1 v3]   Resource control protocol No. 1, version 3 – Protocol at the Rs interface between service control entities and the policy decision physical entity

[ITU-T Q.3303.3 v3]   Protocols at the Rw interface between a Policy Decision Physical Entity (PD-PE) and a Policy Enforcement Physical Entity (PE-PE): Diameter Profile version 3

[ITU-T Q.Supp.62]   Supplement TRQ.ETS-overview (Supp.62) to ITU-T Q series Recommendations "Overview of Standards Development Organizations (SDOs) and Other Organizations' Work on Emergency Telecommunications Service (ETS)"

[ITU-T Q.Sup 61]   Evaluation of signalling protocols to support ITU-T Y.2171 admission control priority levels

[ITU-T Y.1271] Framework(s) on Network Requirements and Capabilities to Support Emergency Telecommunications over Evolving Circuit Switched and Packet Switched Networks

[ITU-T Y.2205   Next Generation Networks – Emergency Telecommunications – Technical considerations

[ITU-T Y.2171]   Admission Control Priority Levels in Next Generation Networks

[ITU-T Y.2111]   Resource and admission control functions in Next Generation Networks

[ITU-T Y.2705] ITU-T Recommendation Y.2705, Minimum Security Requirements for Interconnection of Emergency Telecommunications Service (ETS)

[ITU-T Y.2262] PSTN/ISDN emulation and simulation

[ITU-T Y.2271] Call server based PSTN/ISDN emulation

[ITU-T Y.2172] Service Restoration Priority Levels in Next Generation Networks

[ITU-T Y.2701] Security requirements for NGN release 1

[ITU-T Y.2702] Authentication and authorization requirements for NGN release 1

[ITU-T Y.2704] Security mechanisms and procedures for NGN

[ITU-T Y.2720] NGN identity management framework

[ITU-T Y.2721] NGN identity management requirements and use cases

[ITU-T Y.2722] ITU-T Recommendation Y.2722, NGN Identity Management Mechanisms and Procedures

[ITU-T H.Sup 9] ITU-T H.Series Supplement 9 (2008), Gateway control protocol: Operation of H.248 with H.225, SIP, and ISUP in support of emergency telecommunications service (ETS)/international emergency preference scheme (IEPS)

[ITU-T H.246] Interworking of H-series multimedia terminals with H-series multimedia terminals and voice/voiceband terminals on GSTN and ISDN

[ITU-T H.361 A1]   End-to-end quality of service (QoS) and service priority signalling in H.323 systems - Amendment 1 - New Annex A "IntServ/RSVP support for H.323 systems", Annex B "DiffServ support for H.323 systems" and Annex C "Priority support for H.323 systems"

[ITU-T H.460.4] Call priority designation and country/international network of call origination identification for H.323 priority calls

[ITU-T H.248.1] Gateway control protocol: Version 3

[ITU-T HSTP-AMSR]   HSTP-AMSR Technical paper: AMS Requirements

[H.248.1v3 Amendment 2]   H.248.1v3 Amendment 2 "Gateway Control Protocol: Version 3: New Appendix IV, plus corrections and clarifications"

[ITU-T H.248.81]   H.248.81"Gateway Control Protocol: Guidelines on the Use of the IEPS Call Indicator and Priority Indicator in H.248 Profiles"

[ITU-T H.248.82]   H.248.82 "Gateway control protocol: Explicit Congestion Notification (ECN) Support"

3   Acronyms & Abbreviations

For a list of common communications terms and definitions, please visit the *ATIS Telecom Glossary*, which is located at < http://www.atis.org/glossary >.

1XRTT	Single-Carrier Radio Transmission Technology
3GPP	3rd Generation Partnership Project
AAA	Authentication Authorization and Accounting
AC	Access Class
AMS	Advanced Multimedia System
APN	Access Point Name
ARP	Allocation and Retention Priority
ATIS	Alliance for Telecommunications Industry Solutions

AVP	Attribute-Value Pair
BICC	Bearer Independent Call Control
CS	Circuit Switched
CSCF	Call Session Control Function
CSFB	Circuit Switched Fallback
DRMP	Diameter Routing Message Priority
DSCP	DiffServ Code Point
DSL	Digital Subscriber Loop
EBI	EPS Bearer ID
ECN	Explicit Congestion Notification
eHRPD	evolved High Rate Packet Data
eMLPP	Enhanced Multi Level Precedence and Pre-emption
eNB	eNodeB
EPC	Evolved Packet Core
EPS	Evolved Packet System
ETS	Emergency Telecommunications Service
E-UTRA	Evolved Universal Terrestrial Radio Access
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
FCC	Federal Communications Commission
GBR	Guaranteed Bit Rate
GCSNA	Gateway GPRS Support Node
GERAN	GSM EDGE Radio Access Network
GETS	Government Emergency Telecommunications Service
GETS-AN	GETS Access Number
GETS-FC	GETS Feature Code
GPRS	General Packet Radio Service
GTP	GPRS Tunnelling Protocol
HPC	High Probability of Completion
HSS	Home Subscriber Server
IBCF	Interconnection Border Control Functions
IdM	Identity Management

IEPS	International Emergency Preference Scheme for Disaster Relief Operations
IETF	Internet Engineering Task Force
IM	IP Multimedia
IM-MGW	IMS Media Gateway
IMS	IP Multimedia Service
IMS-AGW	IMS Access Gateway
IMS-ALG	IMS Application Level Gateway
IP	Internet Protocol
IP CAN	IP Connectivity Access Network
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunications
LIR	Location-Info-Request
LTE	Long-Term Evolution
MGC	Media Gateway Controller
MGCF	Media Gateway Control Functions
MGW	Media Gateway
MLPP	Multi-Level Precedence and Preemption
MME	Mobility Management Entity
MPS	Multimedia Priority Service
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
MTP	Message Transfer Part
NAS	Non-Access-Stratum
NGN	Next Generation Network
NGN GETS	Next Generation Network GETS
NGN-PS	Next Generation Network Priority Service
NNI	Network-to-Network Interconnection
NS/EP	National Security/Emergency Preparedness
NSS	Narrowband Signaling Syntax
PCC	Policy and Charging Control
PCN	Pre-Congestion Notification

PCRF	Policy and Charging Rules Function
PD-PE	Policy Decision Physical Entity
PE-PE	Policy Enforcement Physical Entity
PMIP	Proxy Mobile IP
PP	Priority Paging
PSTN	Public Switched Telephone Network
QCI	QoS Class Identifier
QoS	Quality of Service
RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RRC	Radio Resource Control
RTP	Real Time Protocol
SAR	Server-Assignment-Request
S-CSCF	Serving CSCF
SDO	Standard Development Organization
SDP	Session Description Protocol
SG	Study Group
SGSN	Serving GPRS Support Node
SIP	Session Initiation Protocol
SS7	Signaling System Number 7
TPS	Telecommunications Priority System
TR	Technical Report
TrGW	Transition Gateway
TRIP	Telephony Routing over IP
TSG	Technical Specification Group
UDP	User Datagram Protocol
UDR	User-Data-Request
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
VLR	Visitors Location Register
VoIP	Voice over IP

WPS	Wireless Priority Service

4 Roadmap Overview

This section describes the methodology used to categorize and provide a roadmap view of the applicable documents.

4.1 End-to-End Reference Model
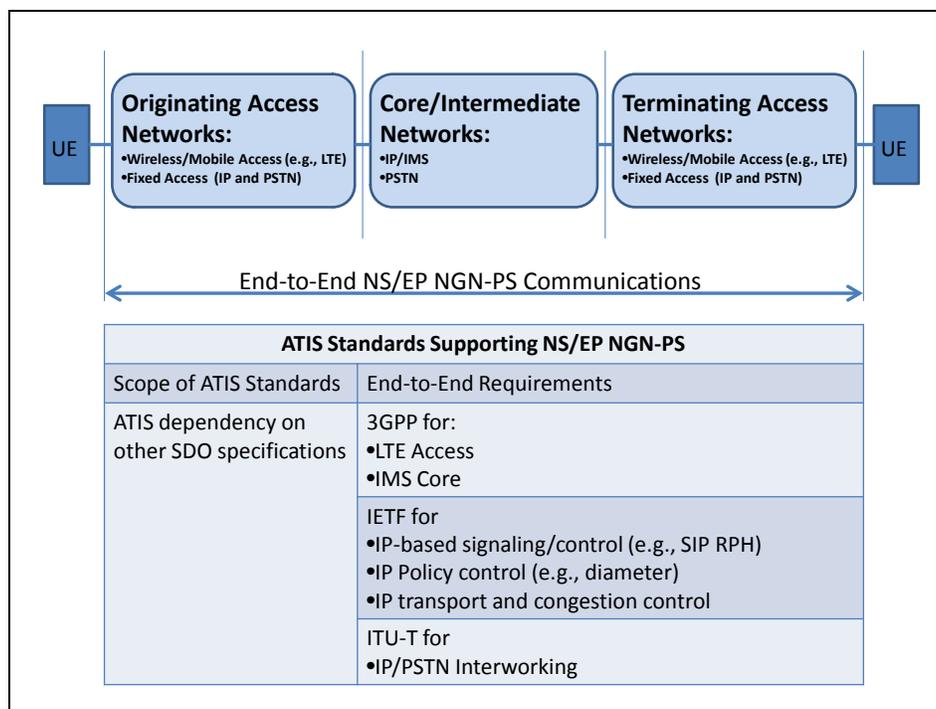
Figure 4.1 – End-to-End Reference Model

Figure 4.1 shows a reference network model for supporting end-to-end NS/EP Next Generation Network Priority Service (NGN-PS) calls/session in an NGN environment consisting of multiple providers and different network domains and types. This general reference model is used to organize the roadmap of ATIS documents providing requirements for the priority mechanisms, protocols, and network node functions that need to be supported in each network segment/domain and at the different vertical layers (e.g., service, signaling/control, and transport). The end-to-end reference network model consists of the following:

- Originating and Terminating Access: This includes wireless/mobile (e.g., Long-Term Evolution [LTE]), fixed IP (e.g., xDSL), and Public Switched Telephone Network (PSTN) access network segments or domains.

- Core/Intermediate Networks: This includes IP-based, IMS-based, and PSTN core/intermediate network segments or domains.

4.2 Organization & Categorization

The documents in this roadmap are organized based on the Standard Development Organization (SDO) or industry forum responsible for the document:

1. ATIS (Section 5).

2. 3GPP (Section 6).

3. IETF (Section 7).

4. ITU-T (Section 8).

The documents are then further organized for each SDO or industry forum and are categorized based on the specification type (e.g., architecture, interface, protocol), area of applicability (e.g., access, core, end-to-end), and specific NS/EP mechanisms, features, or capabilities (e.g., priority access control, priority paging, priority handover, priority signaling control, priority bearer establishment, priority IP/transport, policy control, NS/EP security).

5 ATIS

The ATIS documents are organized into two tables as follows:

- Documents providing normative requirements and/or protocols for support of ETS.

- Documents providing guidance for implementation, deployment, and management/operations of ETS.

Each table is organized as follows:

1. **Document #:** Provides the ATIS reference number.

2. **Title**: Provides the document title.

3. **Specific/General:** Indicates whether the document is specific to ETS (i.e., the entire content or scope of the document limited to ETS) or is a broader document that includes specific capabilities or content in support of ETS (e.g., a VoIP Interconnection profile includes a profile for ETS).

4. **Type:** Indicates the type of technical information:

   - Architecture.

   - Interface or Interconnection.

   - Protocol.

   - Requirement.

   - Deployment Guidelines.

   - Management/Operational Guidelines.

5. **Applicability:** Indicates the specific area or reference point in the NGN architecture for which the document applies:

   - Access (LTE or Fixed [IP or PSTN]).

   - Core/Intermediate.

   - Interface or Reference Point, Interworking.

   - Signaling/control.

   - IP/Transport.

   - End-to-end.

6. **Key NS/EP Mechanisms/Features:** Indicates key NS/EP mechanisms, features or capability specified in the document (e.g., priority access control, priority paging, priority handover, priority signaling control, priority bearer establishment, priority IP/transport, policy control, NS/EP security).

Table 5.1 – Normative Requirements and/or Protocols for Support of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
ATIS-1000065.2015	Emergency Telecommunications Service (ETS) Evolved Packet Core (EPC) Network Element Requirements	ETS Specific	ETS Requirements	LTE Access	Specifies ETS requirements for an Evolved Packet System (EPS) consisting of the Evolved Universal Mobile Telecommunications System (UMTS) Terrestrial Radio Access Network (E-UTRAN) and the Evolved Packet Core (EPC) for support of NGN GETS Voice, NGN GETS Video, NGN GETS Guaranteed Bit Rate (GBR) Data, and NGN GETS Data Transport.
ATIS-1000060.2014	Emergency Telecommunications Service (ETS): Long Term Evolution (LTE) Access Network Security Requirements for National Security/Emergency Preparedness (NS/EP) Next Generation Network (NGN) Priority Services	ETS Specific	NS/EP Security Requirements	LTE Access	Provides a minimum set of requirements for the security protection of NS/EP NGN-PS in LTE Access Networks.
ATIS-1000609.2014	Interworking between the ISDN User-Network Interface Protocol and the Signalling System Number 7 ISDN User Part	General	Protocol	PSTN Signaling Interworking	This standard includes protocol mapping for NS/EP priority calls.
ATIS-1000057.2014	Service Requirements for Emergency Telecommunications Service (ETS) in Next Generation Network (NGN)	ETS Specific	Service Requirements	End-to-End	Describes service requirements and use case examples for NGN-PS Voice, Video and Data communications in Next Generation Network (NGN).
ATIS-1000055.2013	Emergency Telecommunications Service (ETS): Core Network Security Requirements	ETS Specific	ETS Security Requirements	Core and End-to-end	Provides a minimum set of common (i.e., independent of network type or technology) and core network security requirements for the protection of ETS in a multi-provider NGN environment.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
ATIS-1000023.2013	ETS Network Element Requirements for A NGN IMS Based Deployments	ETS Specific	ETS Requirements	End-to-End	Defines network element requirements to ensure that ETS is implementable and interoperable in a multi-vendor environment for an NGN IMS-based network deployment. These requirements further refine the procedures defined in the ETS in IP Networks Phase 1 standard [ATIS-1000010].
ATIS-1000679.2013	Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part	General	Protocol	PSTN Signaling Interworking	This general document includes protocol interworking for ETS.
ATIS-1000049.2011	End-to-End NGN GETS Call Flows	ETS Specific	ETS Call Flow Guidance	End-to-End	Provides end-to-end call/session flows for various wireline and wireless access technologies, in addition to the IMS Core Network call/session flows for NGN GETS (Emergency Telecommunications Service (ETS)).
ATIS-1000047.2011	Signaling System 7 (SS7) and Internet Protocol (IP) Transport Networks Signaling Interworking and Compatibility	General	Interface/Inter connection	PSTN Interconnection	This general standard provides requirements and guidelines for signaling interworking and compatibility between traditional Signaling System Number 7 (SS7) transport networks and IP-based transport networks. This document provides guidance to minimize NGN/SS7 transport management (i.e., SS7 over IP and Message Transfer Part [MTP] management interworking) impacting NS/EP priority calls.
ATIS-1000017.2008 (R2013)	Interworking between the ISDN User – Network Interface Protocol and the Session Initiation Protocol (SIP) with ANSI Extensions to the Narrowband Signaling Syntax (NSS)	General	Interface/Inter connection Protocol	PSTN Interconnection	This general document includes protocol interworking in support of NS/EP priority calls.
ATIS-1000026.2008	Session Border Controller Functions and Requirements	General	Signaling Requirements	Access and Core	This general document provides SBC node requirements and includes features in

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
(R2013)					support of ETS
ATIS-1000009.2006 (R2011)	IP Network – To Network Interface (NNI) Standard for VoIP	General	Interface	IP Interconnection	This general document providing IP NNI requirements includes features for ETS support.
ATIS-1000010.2006 (R2011)	Support of Emergency Telecommunications Service ETS in IP Network	ETS Specific	Requirements	End-to-End	Defines the procedures and capabilities required to support ETS within and between IP-based service provider networks.
ATIS-1000005.2005	Service Description of ETS	ETS Specific	Requirements	End-to-End	Provides a service description of ETS.
ATIS-1000631.2005 (R2010)	Signaling Systems No. 7 (SS7) – High Probability of Completion (HPC) Network Capability	General	Protocol	PSTN Signaling/Control	Provides the protocol standard for the High Probability of Completion (HPC) network capability to be applied during the call setup of NS/EP calls by providing for an identifier for those calls on the SS7 network protocol.
ATIS-1000006.2005 (R2010)	Signalling Systems No. 7 (SS7) – Emergency Telecommunications Service (ETS)	ETS Specific	Protocol	PSTN Signaling/Control	Builds upon the HPC Network Capability as described in T1.631-1993 (R1999). The ETS service is expanded to address bearer networks and the ITU-T Recommendation E.106, International Emergency Preference Scheme for Disaster Relief Operations (IEPS).

Table 5.2 – Guidelines for Implementation, Deployment, & Management/Operations of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
ATIS-1000061.2015	LTE Access Class 14 for National Security and Emergency Preparedness (NS/EP) Communications	ETS Specific	Guidelines	LTE Access	Provides guidance on the allocation of LTE Access Class 14 for National Security and Emergency Preparedness (NS/EP).
ATIS-1000053, August 2014	Emergency Telecommunications Service (ETS) Profile and Tests for IP Network-to-Network Interconnection	ETS Specific	Interface/Inter connection	IP NNI	Provides ETS profile and tests for IP Network-to-Network interconnection.
ATIS-1000056.2013	Access Networks Architecture Technical Report	General	Architecture	Access	This general TR describing NGN wireline access networks/technologies provides a reference architecture for ETS wireline access requirements.
ATIS-0100036.2013	Media Plane Performance Security Impairments for Evolving VoIP/Multimedia Networks	ETS Specific	Guidance	ETS Security, End-to-End	Provides information regarding the use of security mechanisms in support of NGN NS/EP Services. Provides guidance on use of security mechanisms (e.g., IPSec) in Evolving Voice over Internet Protocol (VoIP)/Multimedia Networks to avoid impairments introduced or exacerbated by these security mechanisms.
ATIS-0100031.2012	A Method to Display Metrics Related to the Robustness of the Undersea Cable Infrastructure	General	Reliability Guidance	Transport Infrastructure	This general document provides guidance on metrics to indicate the robustness of the Undersea Cable Infrastructure. Relevance based on reliability of the underlying infrastructure supporting NS/EP.
ATIS-0100022.2008 (R2013)	Priority Classification Levels for Next Generation Networks	General	Operations/R estoration	End-to-End	This standard formalizes a set of priority classification levels for admission control and service restoration in NGNs. The highest priority classifications are reserved for ETS.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
ATIS-1000029.2008 (R2013)	Security Requirements for NGN	General	Security	End-to-End	This general document provides security requirements for NGN and includes requirements for ETS security protection.
ATIS-1000020.2007	ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism	ETS Specific	Requirements	IP Transport	Provides requirements for a separate Expedited Forwarding (EF) mechanism that can recognize a class of traffic for preferential treatment via a unique DiffServ Code Point (DSCP) for ETS.
ATIS-1000018.2007	NGN Architecture	General	Architecture	End-to-End	This general document is used as the reference architecture for ETS requirements and protocol capabilities.
ATIS-0100011.2007	Priority for NS/EP Services in NGN/ IP Environment – Role of TSP	ETS Specific	Management/ Operations	End-to-end	Provides guidance regarding the applicability and usage of the Telecommunications Service Priority (TSP) codes for NS/EP in an NGN/IP environment.
ATIS-0100010.2007	Security for Next Generation Networks – An End User Perspective	General	Security	End-to-End	This general document providing user plane security includes guidance for ETS.
ATIS-0100004.2006	Availability & Restorability Aspects of Emergency Telecommunications Service (ETS)	ETS Specific	Reliability	End-to-End	Provides functional requirements for Availability and Restorability of ETS.
ATIS-1000011.2006	ETS Packet Priority for IP NNI Interfaces – Use of Existing DiffServ Per Hop Behaviors	ETS Specific	Interface	IP Transport	Provides guidelines for the application of existing Differentiated Services (DiffServ) Per Hop Behaviors (PHB) and their associated DSCP when ETS Voice over IP (VoIP) packets are transported in the media stream at Network-Network (NNI).

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
ATIS-0100009.2006	Overview of Standards in Support of Emergency Telecommunications Service (ETS)	ETS Specific	Guidelines	End-to-End	Provides a high-level service description of the Emergency Telecommunications Services (ETS), its requirements and objectives, and standardization initiatives with a focus on forums and committees of the Alliance for Telecommunications Industry Solutions.
ATIS-0100006.2006	Service Restoration Priority Levels for IP Networks	General	Management/ Restoration	End-to-End	Provides three levels of service restoration priority for traffic in IP networks and recommends that all emergency communications (e.g., ETS and E911) be included in the highest priority for service restoration. Also provides guidance on restoration compliance with the Telecommunications Priority System (TPS) as mandated by the Federal Communications Commission (FCC).
T1.TR.84-2004	IP Network Traffic Priorities and ETS	ETS Specific	Guidance	IP Transport	This TR identifies the need for establishing a set of priorities for traffic over IP networks. It recommends that communications services over IP networks be prioritized such that critical services have a higher probability of successful session set up and completion than other types of services.
ATIS-0100003.2004	User Plane Priority Levels for IP Networks and Services	General	Guidance	IP Transport	This TR recommends three levels of connection admission control priority for the user plane communications traffic in IP networks. It also recommends that all emergency communications (e.g., ETS and E911) be given the highest priority for call/session setup.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
ATIS-0100001.2004 (R2013)	User Plane Security Guidelines and Requirements for ETS	ETS Specific	Requirements	End-to-End	Provides a set of user plane security guidelines and requirements for ETS over IP networks. The scope is intended to address security as it relates to user plane performance, reliability, and availability of ETS.
ATIS-1000066.2016	Emergency Telecommunications Service (ETS) Network Element Requirements for IMS-based Next Generation Network (NGN) Phase 2	ETS Specific	Requirements	End-to-End	This document further refines the procedures defined in the ETS Phase 1 Network Element Requirements for NGN IMS based Deployments standard [ATIS-1000023.2008].

6   3GPP

Figure 6.1 shows the architecture for 3GPP LTE access to the EPC, and interconnection with the GSM EDGE Radio Access Network (GERAN)/UTRAN, Single-Carrier Radio Transmission Technology (1XRTT) RAN, IMS Core Network, and Wireline Access network. Functional entities associated with the LTE RAN or the EPC are shown with a wider outline. Functional entities and interfaces associated with 1XRTT are blue.
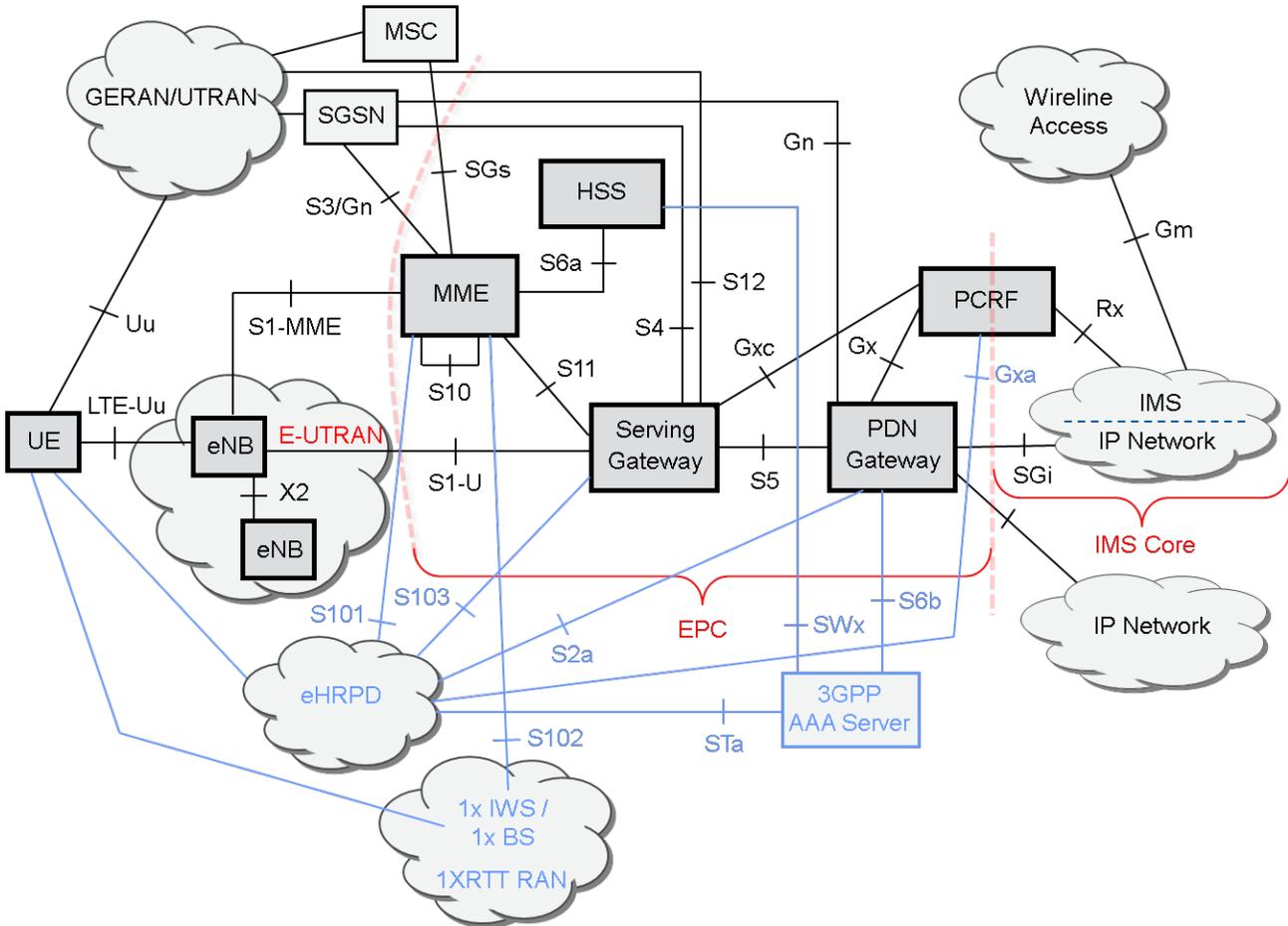
Figure 6.1 – 3GPP Architecture for LTE Access to the EPC, and Interconnection with the GERAN/UTRAN, 1XRTT RAN, the IMS Core Network, and the Wireline Access Network

NOTE: The Gm application interface to IMS Core is applicable for both wired and wireless access.

The 3GPP architecture for LTE access to the IMS in Figure 6.1 shows the E-UTRAN, EPC (including the PCC FEs), and the IMS Core Network.

The 3GPP specifications are organized into 4 tables as follows:

- Stage 1 documents,
- Stage 2 documents,
- Stage 3 documents not specific to the IMS Core: LTE Access (E-UTRAN), EPC, PCC, and subscription information not-specific to IMS, and
- Stage 3 documents supporting additional functionality in the IMS Core Network.

Each of the following Tables provide a roadmap of ATIS standards for ETS. Each of the table is organized as follows:

1. **Specification #:** Provides the 3GPP reference number.

2. **Title:** Provides the document title.

3. **MPS Specific:** Indicates whether the document is specific to MPS (i.e., the entire content or scope of the document limited to MPS) or is a broader document that includes specific capabilities or content in support of MPS.

    NOTE: MPS is the corresponding 3GPP term for ETS.

4. **TSG:** Indicates the Technical Specification Group (TSG) within 3GPP responsible for the document:

5. **Applicability:** Indicates the specific area and when applicable, reference point in the 3GPP architecture for which the document applies:

   - **LTE Access:** Indicates whether the document includes LTE Access (E-UTRAN) technology aspects that are relevant to MPS. Where applicable, particular 3GPP reference point interfaces are identified.

   - **UMTS access**: Indicates whether the document includes UTRAN technology aspects that are relevant to MPS. Where applicable, particular 3GPP reference point interfaces are identified.

   - **EPC:** Indicates whether the document includes EPC technology aspects that are relevant to MPS. Where applicable, particular 3GPP reference point interfaces are identified.

   - **GPRS core:** Indicates whether the document includes GPRS Core technology aspects that are relevant to MPS. Where applicable, particular 3GPP reference point interfaces are identified.

   - **PCC:** Indicates whether the document includes Policy and Charging Control (PCC) aspects that are relevant to MPS. Where applicable, particular 3GPP reference point interfaces are identified.

   - **IMS Core:** Indicates whether the document includes IMS Core Network aspects that are relevant to MPS. Where applicable, particular 3GPP reference point interfaces are identified. The Gm application interface to IMS Core is applicable for both wired and wireless access.

   - **Gen:** Indicates that specification is general (e.g., architecture independent Stage 1 specification) and is not specific to one of the domains listed above.

   - **Interface/Reference Point:** Indicates the applicable reference point or interface in the 3GPP architecture.
     NOTE: If no Reference Point is listed, the specification spans multiple 3GPP Interfaces.

6. **NS/EP Mechanism/Feature:** Indicates specific NS/EP mechanisms, features, or capability specified in the document (e.g., priority access control, priority paging, priority handover, priority signaling control, priority bearer establishment, priority IP/transport, policy control, NS/EP security).

   - **PP:** Indicates whether the document includes Priority Paging (PP) aspects that are relevant to MPS.

   - **Sig:** Indicates whether the document includes signaling aspects that are relevant to MPS (Subscription, Call Control, Priority Treatment in the EPC, Priority Treatment as part of PCC, and Priority Treatment in IMS signaling).

7. **Release:** Indicates the 3GPP release in which the document first includes any specification for the transport of NS/EP priority indication, or the support of NS/EP processing.

Table 6.1 – 3GPP Stage 1 Documents Relevant to MPS

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TR 22.950	Priority service feasibility study	X	SA1	*Gen*	Provides technical report documenting results of priority service feasibility study. Includes priority services use cases.	6
TR 22.952	Priority service guide	X	SA1	*Gen*	Provides guidance for priority service.	6
TR 22.953	Multimedia priority service feasibility study	X	SA1	*Gen*	Provides technical report documenting results of MPS feasibility study. Includes use cases for MPS Voice, Video, and Data.	7
TS 22.011	Service accessibility		SA1	*LTE Access:* LTE-Uu	Provides Stage 1 requirements for access class barring procedure. Release 10 adds stage 1 requirement for a unique Access Class value for MPS.	R99
TS 22.153	Multimedia priority service	X	SA1	*Gen*	Provides service description and stage 1 requirements for MPS. Release 9 adds specification for MPS invocation and the marking of MPS requests when signaling the network. Release 10 expands the scope of MPS to include video and data communications, and provides requirements on priority data. It also specifies that priority in the terminating network can be based on the caller's priority. Release 11 adds priority treatment during handover, and exemptions to network congestion and overload controls. Release 14 adds a detailed MPS description, and requirements on anonymity and security, policy control, and advance priority, CS fallback, QoS and service code.	8

Table 6.2 – 3GPP Stage 2 Documents Relevant to MPS

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TR 23.854	Enhancements for Multimedia Priority Service (MPS)	X	SA2	*Gen*	Describes three priority service scenarios: 1) IMS Multimedia Priority Service, 2) Priority EPS Bearer Service, and 3) Circuit Switched Fallback (CSFB).	11
TS 23.203	Policy and charging control architecture		SA2	*PCC*	Defines priority parameters (IMS Signaling Priority, MPS EPS Priority, and MPS Priority Level) as input to PCC decisions. Specifies Policy and Charging Rules Function (PCRF) rules for modifying the Allocation and Retention Priority (ARP) and/or QoS Class Identifier (QCI) values of the default bearer and for PCC rules mapped to the default bearer when the Priority EPS Bearer Service is invoked/revoked. Specifies procedures for modifying the IMS signaling bearer. Specifies procedures for setting up of IP Connectivity Access Network (IP CAN) session (for media bearers) with ARP and/or QCI appropriate for IMS MPS.	10
TS 23.228	IP Multimedia Subsystem (IMS); Stage 2		SA2	*IMS Core*	Section 5.21 defines IMS MPS procedures impacting PCC. Defines MPS behavior changes to the Serving CSCF (S-CSCF), the registration procedure, and the policy triggers for call originations and terminations.	10
TS 23.272	Circuit Switched (CS) fallback in Evolved Packet System (EPS); Stage 2		SA2	*LTE Access and EPC*	In support of CSFB priority for MPS, specifies CSFB priority call handling based on the "highPriorityAccess" establishment cause and/or the User Equipment's (UE's) MPS CS Priority. Specifies use of "CS Fallback High Priority" indication in the RRC Release message to support MPS priority when CSFB RRC connection release with redirection is used.	10
TS 23.333	Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface: Procedures descriptions		CT4	*IMS Core:* Mp	Specifies priority information description for an MPS H.248 context on the interface between the MRFC and MRFP (stage 2/3).	11

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 23.334	IP Multimedia Subsystem (IMS) Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW) interface: Procedures descriptions		CT4	*IMS Core: Iq*	Specifies priority information description for an MPS H.248 context on the interface between the IMS-ALG and IMS-AWG (stage 2/3).	11
TS 23.401	General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access		SA2	*LTE Access, EPC, and PCC*	Release 8 provides the QoS framework and procedures that are applied in support of MPS. High level Release 10 requirements for each of the three service scenarios from TR 23.854. Specifies Stage 2 MPS requirements related to overload and congestion control. PP: In Release 10, priority Indication is conveyed from the Serving Gateway to the MME to notify the MME that an IP packet associated with MPS is buffered in the Serving Gateway. Lower priority paging for a UE is stopped and replaced by MPS priority paging. Priority indication is conveyed from the MME to each eNodeB (eNB) where the UE will be paged to ensure that the eNB treats the page in a manner appropriate for MPS.	8
TS 23.402	Architecture enhancements for non-3GPP accesses		SA2	*Gen, EPC: S5/S8, S2a*	Provides procedures for delivery of MPS priority indication over Proxy Mobile IP (PMIP)-based S5/S8 and S2a interfaces. Provides procedures for handover (with MPS priority maintained) between 3GPP and non-3GPP access.	8
TS 29.162	Interworking between the IM CN subsystem and IP networks		CT3	*IMS Core: Ix*	Specifies priority information description for an MPS H.248 context on the interface between the IBCF and TrGw (Stage 2/3).	11
TS 29.163	Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks		CT3	*IMS Core: Mn*	Specifies priority information for an MPS context on the interface between the MGCF and IMS Media Gateway (IM-MGW) (Stage 2/3). As TS 29.163 also specifies support for the Resource Priority Header on IMS Core/Mg and Mj interfaces in support of MPS, it is also included in the IMS Stage 3 table, Table 4.	11

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 29.292	Interworking between the IP Multimedia (IM) Core Network (CN) subsystem (IMS) and MSC Server for IMS Centralized Services (ICS)		CT3	*IMS Core:* Mc	Specifies priority information description for an MPS H.248 context on the interface between the MSC Server and the CS-MGW (Stage 2/3).	11
TS 36.300	Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2.		RAN2	*Gen*	Provides procedure for X2 handover. Provides procedure for non-contention based random access. Provides procedure for S1 interface overload control.	8

Table 6.3 – 3GPP Stage 3 Non-IMS-Specific Documents (E-UTRAN, EPC, PCC, and Subscription) Relevant to MPS

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 23.008	Organization of subscriber data		CT4	*LTE Access and EPC*	Addition of the Extended Priority information in the Home Subscriber Server (HSS), P-CSCF, and S-CSCF to support one or more namespaces with their associated priority levels.	10
TS 24.008	Mobile radio interface Layer 3 specification; Core network protocols; Stage 3		CT1	*LTE Access and EPC:* LTE-Uu and S1-MME	PP: In support of priority for delivery of mobile terminated CSFB for MPS, the Release Cause "cs-FallBackHighPriority" is mapped to the UMTS "Terminating High Priority Signaling" Establishment Cause.	10

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 24.301	Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3		CT1	*LTE Access and EPC:* LTE-Uu and S1-MME	PP: Special handling is specified (in the MME) for the paging process for MPS. Specifies Stage 3 MPS requirements related to exemptions from overload and congestion control for NAS EMM and ESM procedures. Exemptions are provided to MPS as it is assigned an access class in the range AC 11-15. This access class assignment is signaled to the MME via the "highPriorityAccess" value of the S1-AP "RRC Establishment Cause" IE.	10
TS 25.331	Radio Resource Control (RRC); Protocol specification.		RAN2	*UMTS access:* Uu	Provides for MPS usage for the "Establishment Cause" within the RRC "RRC Connection Request" message. Specific values of interest include the "Originating High Priority Signalling" and "Terminating High Priority Signalling" values.	8
TS 25.413	UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling		RAN3	*UMTS access: Iu; GPRS Core: Iu; LTE Access and EPC:* S1-AP, S3	Specifies usage of the "CSFB High Priority" value of the "CSFB Information" IE within the "Source RNC to Target RNC Transparent Container" IE to mark a PS Handover supporting priority CSFB as entitled to priority treatment.	9
TS 29.018	General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) – Visitors Location Register (VLR); Gs interface layer 3 specification		CT1	*GPRS Core:* Gs	Specifies the "eMLPP Priority" IE contained in the SGs "SGsAP-Paging-Request" message sent from the UMTS MSC to the MME. This is used as part of CSFB from LTE to UTRAN/GERAN.	8
TS 29.060	GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface		CT4	*EPC, GPRS Core:* Gn, and Gp	Specifies transfer of priority indication between an MME and a Gn/Gp SGSN via the ARP parameter. In the case where the Evolved ARP (added in Release 9) is used within the GPRS Core, the ARP is carried in the "Evolved Allocation/Retention Priority II" IE. In the case where the Legacy ARP (available in Release 8) is used within the GPRS Core, the ARP is carried in the "Quality of Service (QoS) Profile" IE.	8

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 29.118	Mobility Management Entity (MME) – Visitor Location Register (VLR) SGs interface specification		CT1	*EPC:* SGs	PP: Specifies priority processing by the MME upon receipt of a Paging Request with priority indication (e.g., Enhanced Multi Level Precedence and Pre-emption [eMLPP] priority) from an MSC.	10
TS 29.212	Policy and Charging Control (PCC); Reference points		CT3	*PCC:* Gx, Gxa, and Gxc	Defines MPS support over the Gx interface (between the PCRF and the PCEF) to support both IMS MPS and Priority EPS Bearer Services. Modified the PCRF procedures to indicate that only the ARP (i.e., not the QCI) should be updated for the default bearer and for the IMS signaling bearer upon IMS MPS invocation/revocation. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message.	10

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 29.213	Policy and charging control Signalling flows and Quality of Service (QoS) parameter mapping		CT3	*PCC:* Gx, Gxa, Gxc, and Rx	IP-CAN session establishment and modification procedures updated to allow the PCRF to consider MPS EPS Priority, MPS Priority Level, and IMS Signalling Priority in PCC decisions. Gateway control session establishment procedure modified to allow MPS related subscription information (MPS EPS Priority, MPS Priority Level, and IMS Signalling Priority) to be downloaded from the SPR to the PCRF. Modified the PCRF procedures to indicate that only the ARP (i.e., not the QCI) should be updated for the default bearer and for the IMS signaling bearer upon IMS MPS invocation/revocation. Updated the QoS parameter mapping functions at the PCRF, to incorporate the new MPS-Identifier AVP as a further input, along with the Reservation-Priority AVP, to the corresponding mapping information (for derivation of QCI and ARP values). Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message. The DRMP AVP is not considered by the QoS parameter mapping function at the PCRF. The PCRF uses the DRMP AVP to prioritize other PCC interfaces related to that IP-CAN session.	10
TS 29.214	Policy and charging control over Rx reference point		CT3	*PCC:* Rx	Added a new MPS-Identifier AVP in the AA-Request (AAR) command (sent from the AF to the PCRF via Rx) to identify an MPS call/session, and defined corresponding MPS related procedures over the Rx interface including initial provisioning of session information, modification of session information, and AF session termination. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message.	10

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 29.230	Diameter applications; 3GPP specific codes and identifiers		CT4	*PCC:* Gx, Gxa, Gxc, and Rx *EPC:* S9 *IMS Core:* Cx, and Dx	Sig: Specifies the Session-Priority AVP as a 3GPP-specific AVP for use on interfaces around the HSS in support of MPS. On the Cx/Dx Interface, the Session-Priority AVP is included in the Server-Assignment-Request (SAR) and Location-Info-Request (LIR) commands. On the Sh/Dh Interface, the Session-Priority AVP is included in the User-Data-Request (UDR) command.	9
TS 29.272	Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol		CT4	*EPC:* S6a, and S13	Sig: Includes the MPS-Priority AVP, an indicator for MPS Subscription from the HSS. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message.	10
TS 29.273	Evolved Packet System (EPS); 3GPP EPS AAA interfaces		CT4	*EPC:* SWx, S6b, SWd, and STa	Specifies a means for evolved High Rate Packet Data (eHRPD) access to the EPC to achieve Advance Priority during Attach over a PMIP S2a interface. Priority information is carried on the SWx, S6b, and STa interfaces as part of the "APN-Configuration" AVP; in the case of roaming, it is also carried on the SWd interface. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message.	8
TS 29.274	3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3		CT4	*EPC:* S4, S5. S8, S10, S11, and S12	PP: The ARP and the EPS Bearer ID (EBI) information elements are included in the Downlink Data Notification message over the S4 and S11 Interfaces.	10
TS 29.277	Optimised handover procedures and protocol between EUTRAN access and non-3GPP accesses (S102); Stage 3.		CT4	*EPC:* S102	In support of CSFB to 1XRTT, priority indication is provided over the S102 Interface via the "Call Priority" bits of the "GCSNA Status" IE.	11

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 36.331	Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification		RAN2	*LTE Access:* LTE-Uu	As MPS is assigned a unique access class in the range AC 11-15, Access Class Barring can be applied to selectively exempt MPS traffic from the access barring check. As the MPS access class is unique as per TS 22.011, the system can be configured to provide the highest priority to MPS. By virtue of assignment to an access class in the range AC 11-15, MPS UEs signal the network using the "highPriorityAccess" value of the RRC "Establishment Cause" which entitles the UE to preferential treatment in the assignment of SRB1 resources by the eNB. This treatment is equivalent for all UEs assigned to an access class in the range AC 11-15. PP: In Release 10, to support CSFB in a network that does not support PS handover, but instead uses the redirection method, the RRC "RRCConnectionRelease" message includes a new "ReleaseCause" value. The "cs-FallBackHighPriority" value marks the MPS priority needs.	8

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 36.413	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)		RAN3	*LTE Access and EPC:* S1-MME	By virtue of assignment to an access class in the range AC 11-15, MPS UEs signal the network using the "highPriorityAccess" value of the RRC "Establishment Cause" which triggers the eNB to include the S1-AP "RRC Establishment Cause" IE when signaling the MME using the S1-AP "Initial UE message" message. As part of MME overload control via S1-AP, the MME provides an "Overload Action" IE which identifies which "Establishment Cause" values are to be allowed and which are to be rejected. By avoiding "Overload Action" values that reject the "highPriorityAccess" value of the "Establishment Cause" before other values, priority can be provided to MPS. The MME can provide priority handling of the "Initial UE message" by virtue of inclusion of the "highPriorityAccess" value of the S1-AP "RRC Establishment Cause" IE. These treatments provide the same priority to all UEs that are a member of AC 11-15. PP: In Release 10, a new Paging Priority indicator is included in the S1-AP Paging message. The setting of the Paging indicator by the MME depends upon the level of priority required by the ARP received in the Downlink Data Notification. The MME must be configured to recognize those ARP values which require inclusion of the Paging-Priority indicator, and the particular value of the Paging Priority indicator to apply.	8
TS 36.414	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport.		RAN3	*LTE Access and EPC:* S1-U	Specifies the DSCP marking used on the S1 interface is derived from the QCI and other E-UTRAN traffic parameters.	8
TS 36.423	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 application protocol (X2AP).		RAN3	*LTE access:* X2	Specifies the transfer of MPS indication during X2 handover.	8

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 36.424	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 data transport.		RAN3	*LTE access:* X2	Specifies the DSCP marking used on the X2 interface is derived from the QCI and other E-UTRAN traffic parameters.	8

Table 6.4 – 3GPP Stage 3 IMS-Core-Specific Documents Relevant to MPS

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 24.229	IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3		CT1	*IMS Core*	Aligned with RFC 4412 on the use of the Resource-Priority header field and RFC 4412 namespaces (in particular, related to namespaces used for NGN GETS). Introduced the concept of a temporarily authorized Resource-Priority header field, a Resource Priority header field that has been temporarily approved by the P-CSCF in an INVITE request only, and applied only in the direction P-CSCF to S-CSCF to AS, or IBCF to S-CSCF to AS. Inclusion of overview material describing various options for detecting the need for priority treatment, including options based on analysis of the dialed digits (e.g., for supporting GETS Feature Code [GETS-FC] and GETS Access Number [GETS-AN]), and related priority mechanisms in the IM CN subsystem. Procedures at the P-CSCF and IBCF concerning the detection of the need for priority treatment based on dialed digits and the handling of the temporarily authorized Resource-Priority header field. Procedures at the S-CSCF concerning the detection of the need for priority treatment based on dialed digits, and the handling of the temporarily authorized Resource-Priority header field. These procedures allow the S-CSCF to recognize the need for priority treatment via analysis of the dialed digits, in the case where a P-CSCF in the visiting network is not MPS compliant and there is no IBCF in the call path.	10
TS 29.163	Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks		CT3	*IMS Core: Mg and Mj*	Specifies support for the Resource Priority Header on these interfaces in support of MPS. As TS 29.163 also specifies priority information for an MPS context on the H.248 interface between the MGCF and IM-MGW, it is also included in the Stage 2 table, Table 2.	11

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 29.228	IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents		CT4	*IMS Core:* Cx, and Dx	Sig: Specifies the Session-Priority AVP in support of MPS. The Session-Priority AVP is included in the SAR and LIR commands to indicate the session's priority to the HSS. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message. When both the Session-Priority AVP and DRMP AVP are present, the DRMP AVP takes precedence.	8
TS 29.229	Cx and Dx interfaces based on the Diameter protocol; Protocol details		CT4	*IMS Core:* Cx, and Dx	Sig: Specifies the Session-Priority AVP in support of MPS. The Session-Priority AVP is included in the SAR and LIR commands to indicate the session's priority to the HSS. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message. When both the Session-Priority AVP and DRMP AVP are present, the DRMP AVP takes precedence.	8
TS 29.232	Media Gateway Controller (MGC) – Media Gateway (MGW) interface; Stage 3		CT4	*IMS Core:* Mc	Specifies priority information for an MPS H.248 context on the interface between the Media Gateway Controller (MGC) and MGW.	11
TS 29.238	Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface, Ix interface; Stage 3		CT4	*IMS Core:* Ix	Specifies priority information for an MPS H.248 context on the interface between the IBCF and TrGW.	11
TS 29.328	IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents		CT4	*IMS Core:* Sh and Dh	Sig: Specifies the Session-Priority in support of MPS. The Session-Priority AVP is included in the UDR command to indicate the session's priority to the HSS. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message. When both the Session-Priority AVP and DRMP AVP are present, the DRMP AVP takes precedence.	8

Spec #	Title	MPS Specific	TSG	Applicability: Reference Point	NS/EP Mechanisms or Features	Release
TS 29.329	Sh interface based on the Diameter protocol; Protocol details		CT4	*IMS Core:* Sh and Dh	Sig: Specifies the Session-Priority AVP in support of MPS. The Session-Priority AVP is included in the UDR command to indicate the session's priority to the HSS. Release 13 specifies use of the DRMP AVP in support of MPS to allow a DIAMETER node to indicate the relative priority of a DIAMETER message. When both the Session-Priority AVP and DRMP AVP are present, the DRMP AVP takes precedence.	8
TS 29.332	Media Gateway Control Function (MGCF) – IM Media Gateway; Mn interface		CT4	*IMS Core:* Mn	Specifies priority information for an MPS H.248 context on the interface between the MGCF and IM-MGW.	11
TS 29.333	Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface; Stage 3		CT4	*IMS Core:* Mp	Specifies priority information for an MPS H.248 context on the interface between the MRFC and MRFP.	11
TS 29.334	IMS Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW); Iq Interface; Stage 3		CT4	*IMS Core:* Iq	Specifies priority information for an MPS H.248 context on the interface between the IMS-ALG and IMS-AWG.	11

7 IETF

This section provides a roadmap of dependent IETF RFCs. The IETF RFCs are organized into two tables as follows:

- Documents providing normative requirements and/or protocols for support of ETS.
- Documents providing general IP capabilities or features that can be used to benefit ETS.

Each table is organized as follows:

1. **Document #:** Provides the IETF reference number.

2. **Title:** Provides the document title.

3. **Specific/General:** Indicates whether the document is specific to ETS (i.e., the entire content or scope of the document limited to ETS) or is a broader document that includes specific capabilities or content in support of ETS (e.g., a VoIP Interconnection profile includes a profile for ETS).

4. **Key NS/EP Mechanisms/Features:** Indicates key NS/EP mechanisms, features or capability specified in the document (e.g., priority signaling control, and priority IP/transport).

Table 7.1 – IETF RFCs Providing Requirements and/or Protocols for ETS

Document #	Title	Specific/General	Key NS/EP Mechanisms/Features
RFC 4412	Communications Resource Priority for the Session Initiation Protocol (SIP)	General	Defines the Resource Priority Header and namespaces (ETS, WPS) for NS/EP.
RFC 4542	Implementing an Emergency Telecommunications Service (ETS) for Real-Time Services in the Internet Protocol Suite	ETS Specific	Provides guidance for supporting ETS in the context of the U.S. Government and NATO focusing on the Multi-Level Precedence and Preemption (MLPP) and Government Emergency Telecommunications Service (GETS).
RFC 5865	A Differentiated Services Code Point (DSCP) for Capacity-Admitted Traffic	ETS Specific	Defines an EF DSCP for use by NS/EP traffic.
RFC 3689	General Requirements for Emergency Telecommunication Service (ETS)	ETS Specific	Defines general ETS requirements.
RFC 3690	IP Telephony Requirements for Emergency Telecommunication Service (ETS)	ETS Specific	Defines Internet Protocol requirements for ETS traffic.
RFC 4375	Emergency Telecommunications Services (ETS) Requirements for a Single Administrative Domain	ETS Specific	Defines ETS requirements in a single domain such as one carrier's domain.
RFC 4958	A Framework for Supporting Emergency Telecommunications Services (ETS) within a Single Administrative Domain	ETS Specific	Supplements RFC 4375 from a framework perspective.
RFC 5115	Telephony Routing over IP (TRIP) Attribute for Resource Priority	General	Defines Telephony Routing over Internet Protocol in concern with resource priority.
RFC 6710	Simple Mail Transfer Protocol for Message Priorities	ETS Specific	Provides a protocol for Email priority.
RFC 6758	Tunneling of SMTP Message Transfer Priorities	ETS Specific	Provides tunneling when Email priority is not supported in a domain.

Document #	Title	Specific/General	Key NS/EP Mechanisms/Features
RFC 6735	Diameter Priority Attribute Value Pairs	General	Defines Attribute-Value Pair (AVP) containers for various priority parameters for use with Diameter and the Authentication Authorization and Accounting (AAA) framework. References 3GPP defined Diameter AVPs that support prioritization of sessions for priority services.
draft-ietf-dime-drmp	Diameter Routing Message Priority	General	This document is defining a mechanism to indicate the relative priority of Diameter transactions. With this information Diameter nodes can factor that priority into routing, resource allocation, and overload abatement decisions.

Table 7.2 – IETF RFCs Providing Capabilities Benefiting for ETS

Document #	Title	Specific/General	Key NS/EP Mechanisms/Features
RFC 6679	Explicit Congestion Notification (ECN) for RTP over UDP	General	Defines an ECN mechanism that can be used for real time communications congestion control. This general mechanism can be used to benefit ETS.
RFC 7339	SIP Overload Control	General	Provides guidance for SIP overload conditions. This general mechanism can be used to benefit ETS.
RFC 5559	Pre-Congestion Notification (PCN) Architecture	General	Provides architecture for pre-congestion notices and can be used to benefit ETS.
RFC 5670	Metering and Marking Behaviour of PCN-Nodes	General	Provides marking for Pre-Congestion Notification (PCN) and can be used to benefit ETS.

8 ITU-T

The ITU-T documents are organized based on the responsible Study Group (SG) as follows:

- ITU-T SG2 (Operational aspects of service provision and telecommunications management).

- ITU-T SG9 (Television and sound transmission and integrated broadband cable networks).
- ITU-T SG11 (Signalling requirements, protocols, and test specifications).
- ITU-T SG13 (Future networks including mobile and NGN).
- ITU-T SG16 (Multimedia coding, systems, and applications).

The documents of each SG are organized into two tables as follows:

- Documents providing normative requirements and/or protocols for support of ETS.
- Documents providing guidance for implementation, deployment and management/operations of ETS.

Each table is organized as follows:

1. **Document #:** Provides the ITU-T reference number.

2. **Title:** Provides the document title.

3. **Specific/General:** Indicates whether the document is specific to ETS (i.e., the entire content or scope of the document limited to ETS) or is a broader document that includes specific capabilities or content in support of ETS (e.g., a VoIP Interconnection profile includes a profile for ETS).

4. **Type:** Indicates the type of technical information:

   - Architecture.
   - Interface or Interconnection.
   - Protocol.
   - Requirement.
   - Deployment Guidelines.
   - Management/and operational Guidelines.

5. **Applicability:** Indicates the specific area or reference point in the NGN architecture for which the document applies:

   - Access (LTE or Fixed [IP or PSTN]).
   - Core/Intermediate.
   - Interface or Reference Point, Interworking.
   - Signaling/control.
   - IP/Transport.
   - End-to-end.

6. **Key NS/EP Mechanisms/Features:** Indicates key NS/EP mechanisms, features, or capability specified in the document (e.g., priority access control, priority paging, priority handover, priority signaling control, priority bearer establishment, priority IP/transport, policy control, NS/EP security).

8.1 ITU-T SG2

Table 8.1 – Requirements and/or Protocols for Support of ETS

Document#	Title	General/Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T E.107]	Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS	ETS Specific	Requirements	End-to-end	Service definition.
[ITU-T E.106]	International Emergency Preference Scheme (IEPS) for disaster relief operations	ETS Specific	Requirements	End-to-end	Service definition.

Table 8.2 – Guidelines for Implementation, Deployment & Management/Operations of ETS

Document#	Title	General/Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T E.412]	Network management controls	General	Management	End-to-end	General network management controls that can be used for ETS management.
[ITU-T M.3350]	TMN service management requirements for information interchange the TMN X-interface to support provisioning of Emergency Telecommunication Service (ETS)	ETS Specific	Management	TMN X-interface	Information exchange for ETS provisioning.

8.2 SG9

For further study.

8.3 SG11

Table 8.3 – Requirements and/or Protocols for Support of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Q Sup 57]	Signalling requirements to support the emergency telecommunications service (ETS) in IP networks	ETS Specific	Requirements	Signaling/con trol	Signaling requirements to support IEPS.
[ITU-T Q Sup 47]	Emergency services for IMT 2000 networks – Requirements for harmonization and convergence	General	Requirements	Signaling/con trol	Signaling requirements to support IEPS in IMTS systems.
[ITU-T Q Sup 53]	Signalling requirements to support the International Emergency Preference Scheme (IEPS)	ETS Specific	Requirements	Signaling/con trol	Signaling requirements to support IEPS.
[ITU-T Q Sup 57]	Signalling requirements to support the emergency telecommunications service (ETS) in IP networks	ETS Specific	Requirements	Signaling/con trol	Signaling requirements to support ETS.
[ITU-T Q.Sup 63]	Signalling Protocol Mappings in Support of the Emergency Telecommunications Service in IP Networks	ETS Specific	Interworking	Signaling/con trol	Signaling protocol mapping to support ETS.
[ITU-T Q.1902.1 A2]	Interworking between Signalling System No. 7 ISDN user part and the Bearer Independent Call Control protocol – Amendment 2 – Support for the International Emergency Preference Scheme	ETS Specific	Interworking	Signaling/con trol	Extensions to support IEPS.
[ITU-T Q.1902.2 A3]	Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: General functions of messages and parameters – Amendment 3 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/con trol	Extensions to support IEPS.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Q.1902.3 A3]	Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: Formats and codes – Amendment 3 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/control	Extensions to support IEPS.
[ITU-T Q.1902.4 A3]	Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures – Amendment 3 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/control	Extensions to support IEPS.
[ITU-T Q.2630.3 A1]	AAL type 2 signalling protocol – Capability Set 3 AAL type 2 signalling protocol – Capability Set 3 – Amendment 1 – Support for the International Emergency Preference Scheme	ETS Specific	Transport Protocol	Signaling/control	Extension of AAL2 to support IEPS.
[ITU-T Q.1950 A1]	Bearer independent call bearer control protocol – New Annex G – Call bearer control – International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/control	Extension of Bearer Independent Call Control (BICC) to support IEPS.
[ITU-T Q.2761 A1]	Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7 – Amendment 1 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/control	Extension to support IEPS.
[ITU-T Q.2762 A1]	General functions of messages and signals of the B-ISDN User Part (B-ISUP) of Signalling System No. 7 – Amendment 1- Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/control	Extension to support IEPS.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Q.2763 A1]	Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes – Amendment 1 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/con trol	Extension to support IEPS.
[ITU-T Q.2764 A1]	Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures	ETS Specific	Protocol	Signaling/con trol	Extension to support IEPS.
[ITU-T Q.2931]	Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control	ETS Specific	Protocol	Signaling/con trol	Extension to support IEPS.
[ITU-T Q.761 A3]	Signalling System No. 7 – ISDN User Part functional description – Amendment 3 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/con trol	ISUP support for provision of capability for identifying a call as an IEPS call.
[ITU-T Q.762 A3]	Signalling System No. 7 – ISDN User Part general functions of messages and signals – Amendment 3 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/con trol	ISUP new parameter and parameter information for IEPS.
[ITU-T Q.763 A4]	Signalling System No. 7 - ISDN user part formats and codes – Amendment 4 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/con trol	ISUP new calling category parameter and IEPS parameter name.
[ITU-T Q.764 A4]	Signalling system No. 7 – ISDN user part Signalling procedures – Amendment 4 – Support for the International Emergency Preference Scheme	ETS Specific	Protocol	Signaling/con trol	Actions to be taken at international exchanges when support of IEPS is requested.
[ITU-T Q.767 A1]	Application of the ISDN User Part of CCITT Signalling system No. 7 for international ISDN interconnections – Amendment 1 – Support for the International Emergency Preference	ETS Specific	Protocol	Signaling/con trol	Interconnection of non-heterogeneous Integrated Service Digital Networks (ISDNs) that support IEPS.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
	Scheme				
[ITU-T Q.3301.1 v3]	Resource control protocol No. 1, version 3 – Protocol at the Rs interface between service control entities and the policy decision physical entity	General	Protocol	Rs Interface	ETS signaling aspects for policy control
[ITU-T Q.3303.3 v3]	Protocols at the Rw interface between a Policy Decision Physical Entity (PD-PE) and a Policy Enforcement Physical Entity (PE-PE): Diameter Profile version 3	General	Protocol	Rw Interface	ETS signaling aspects for policy control

Table 8.4 – Guidelines for Implementation, Deployment & Management/Operations of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Q.Supp.62]	Supplement TRQ.ETS-overview (Supp.62) to ITU-T Q series Recommendations "Overview of Standards Development Organizations (SDOs) and Other Organizations' Work on Emergency Telecommunications Service (ETS)"	ETS Specific	Roadmap		Provides an ETS roadmap for ITU-T and other SDOs.
[ITU-T Q.Sup 61]	Evaluation of signalling protocols to support ITU-T Y.2171 admission control priority levels	General	Deployment Guidelines	Signaling/con trol	Guidance on how existing signalling protocol extensions can be used to designate the admission control priority requirements in support of ETS.

8.4 SG13

Table 8.5 – Requirements and/or Protocols for Support of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Y.1271]	Framework(s) on Network Requirements and Capabilities to Support Emergency Telecommunications over Evolving Circuit Switched and Packet Switched Networks	General	Requirements	End-to-end	General Framework for Priority Capabilities.
[ITU-T Y.2205]	Next Generation Networks – Emergency Telecommunications – Technical considerations	General	Requirements	End-to-end	General Network Functional Requirements for IEPS/ETS Support.
[ITU-T Y.2171]	Admission Control Priority Levels in Next Generation Networks	General	Requirements	Access	Resource admission control.
[ITU-T Y.2111]	Resource and admission control functions in Next Generation Networks	General	Requirements	Access	Resource admission and control functions related to IEPS support.
[ITU-T Y.2705]	ITU-T Recommendation Y.2705, Minimum Security Requirements for Interconnection of Emergency Telecommunications Service (ETS)	ETS Specific	Requirements	Security	Security requirements addressing integrity, confidentiality, and availability protection for ETS communications across network boundaries (i.e., between different national networks).

Table 8.6 – Guidelines for Implementation, Deployment & Management/Operations of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Y.2262]	PSTN/ISDN emulation and simulation	General	Requirements	Interworking	General Network Functional Requirements for IEPS Support.
[ITU-T Y.2271]	Call server based PSTN/ISDN emulation	General	Requirements	Interworking	General Network Functional Requirements for IEPS Support.

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T Y.2172]	Service Restoration Priority Levels in Next Generation Networks	General	Management	End-to-end	Service restoration.
[ITU-T Y.2701]	Security requirements for NGN release 1	General	Security	End-to-end	Overall Functional Security Requirements. Appendix I – provides security objectives and guidelines for interconnection of emergency telecommunications services.
[ITU-T Y.2702]	Authentication and authorization requirements for NGN release 1	General	Security	End-to-end	Authentication and Authorization requirements. Appendix II provides information on ETS authentication and authorization.
[ITU-T Y.2704]	Security mechanisms and procedures for NGN	General	Security	End-to-end	Security mechanisms to fulfill NGN security requirements. Appendix II – provides guidance on network provided security for ETS.
[ITU-T Y.2720]	NGN identity management framework	General	Security	End-to-end	Structured approach for designing, defining, and implementing IdM solutions. Can be used to benefit ETS.
[ITU-T Y.2721]	NGN identity management requirements and use cases	General	Security	End-to-end	IdM objectives, requirements, guidelines, and example use cases for the NGN. Appendix III – provides ETS related IdM use cases.
[ITU-T Y.2722]	ITU-T Recommendation Y.2722, NGN Identity Management Mechanisms and Procedures	General	Requirements	End-to-end	IdM mechanisms and capabilities for NGN. Can be used to benefit ETS.

8.5 SG16

Table 8.7 – Requirements and/or Protocols for Support of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T H.Sup 9]	ITU-T H.Series Supplement 9 (2008), Gateway control protocol: Operation of H.248 with H.225, SIP, and ISUP in support of emergency telecommunications service (ETS)/international emergency preference scheme (IEPS)	ETS Specific	Protocol	Interworking	Interworking of H.248 with H.225, SIP, and ISUP in support of ETS and IEPS.
[ITU-T H.246]	Interworking of H-series multimedia terminals with H-series multimedia terminals and voice/voiceband terminals on GSTN and ISDN	General	Protocol	Interworking	Protocol interworking of H.series protocols with Q.931 and Q.763 protocols.
[ITU-T H.361 A1]	End-to-end quality of service (QoS) and service priority signalling in H.323 systems - Amendment 1 - New Annex A "IntServ/RSVP support for H.323 systems", Annex B "DiffServ support for H.323 systems" and Annex C "Priority support for H.323 systems"	General	Protocol	Access	IntServ/RSVP QoS support for H.323 systems.
[ITU-T H.460.4]	Call priority designation and country/international network of call origination identification for H.323 priority calls	General	Protocol	Access	Call Marking. Country/international network of call origin. Definition of messages to be used. Priority levels.
[ITU-T H.248.1]	Gateway control protocol: Version 3	General	Protocol	Access	Support of IEPS/ETS capability.
[ITU-T HSTP-AMSR]	HSTP-AMSR Technical paper: AMS Requirements	General	Requirements	Access	Includes requirements for Priority Services (e.g., ETS) in Advanced Multimedia System (AMS) (Project "H.325").

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
H.248.1v3 Amendment 2	H.248.1v3 Amendment 2 "Gateway Control Protocol: Version 3: New Appendix IV, plus corrections and clarifications"	General	Protocol	Access	Provides specifications supporting consistent use of "IEPS call indicator" and "Priority indicator".

Table 8.8 – Guidelines for Implementation, Deployment & Management/Operations of ETS

Document#	Title	General/ Specific	Type	Applicability	Key NS/EP Mechanisms/Features
[ITU-T H.248.81]	H.248.81"Gateway Control Protocol: Guidelines on the Use of the IEPS Call Indicator and Priority Indicator in H.248 Profiles"	ETS Specific	Deployment Guidelines	Access	Provides guidelines on the Use of the IEPS Call Indicator and Priority Indicator in H.248 Profiles.
[ITU-T H.248.82]	H.248.82 "Gateway control protocol: Explicit Congestion Notification (ECN) Support"	General	Protocol	Access	ECN can be used to benefit ETS.