International Telecommunication Union

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# Series Q

**Supplement 62**

(02/2014)

SERIES Q: SWITCHING AND SIGNALLING

---

# Overview of the work of standards development organizations and other organizations on the emergency telecommunications service

ITU-T Q-series Recommendations – Supplement 62

ITU-T Q-SERIES RECOMMENDATIONS

**SWITCHING AND SIGNALLING**

| | |
|---|---|
| SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE | Q.1–Q.3 |
| INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING | Q.4–Q.59 |
| FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN | Q.60–Q.99 |
| CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS | Q.100–Q.119 |
| SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4, 5, 6, R1 AND R2 | Q.120–Q.499 |
| DIGITAL EXCHANGES | Q.500–Q.599 |
| INTERWORKING OF SIGNALLING SYSTEMS | Q.600–Q.699 |
| SPECIFICATIONS OF SIGNALLING SYSTEM No. 7 | Q.700–Q.799 |
| Q3 INTERFACE | Q.800–Q.849 |
| DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 | Q.850–Q.999 |
| PUBLIC LAND MOBILE NETWORK | Q.1000–Q.1099 |
| INTERWORKING WITH SATELLITE MOBILE SYSTEMS | Q.1100–Q.1199 |
| INTELLIGENT NETWORK | Q.1200–Q.1699 |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000 | Q.1700–Q.1799 |
| SPECIFICATIONS OF SIGNALLING RELATED TO BEARER INDEPENDENT CALL CONTROL (BICC) | Q.1900–Q.1999 |
| BROADBAND ISDN | Q.2000–Q.2999 |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR THE NGN | Q.3000–Q.3999 |

*For further details, please refer to the list of ITU-T Recommendations.*

# Supplement 62 to ITU-T Q-series Recommendations

## Overview of the work of standards development organizations and other organizations on the emergency telecommunications service


### Summary

Supplement 62 to ITU-T Q-series Recommendations provides a convenient reference to assist ITU-T Study Groups and other national and international standards development organizations (SDOs) as they develop Recommendations and standards for emergency telecommunications services (ETS). It identifies published ETS related Recommendations and standards as well as those currently in work programmes.



### History

| Edition | Recommendation | Approval | Study Group | Unique ID* |
|---|---|---|---|---|
| 1.0 | ITU-T Q Suppl. 62 | 2011-01-28 | 11 | 11.1002/1000/11335 |
| 2.0 | ITU-T Q Suppl. 62 | 2014-02-21 | 11 | 11.1002/1000/12161 |

### Keywords

ETS, program coordination, program management.


---

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

## FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

In this publication, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this publication is voluntary. However, the publication may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the publication is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the publication is required of any party.

## INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this publication may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the publication development process.

As of the date of approval of this publication, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this publication. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

## Table of Contents

## Introduction

Study Group 11 is responsible for coordination of emergency telecommunications service (ETS) activities for NGN and future networks so that the implementation of specific capabilities can be defined in an integrated fashion. This supplement is the vehicle which is used to fulfil this coordination obligation and is developed to make available a convenient reference to assist ITU-T Study Groups and other national and international SDOs as they develop Recommendations and Standards for ETS. The intent of this supplement is to encourage coordination and cooperation in the development of an internationally applicable set of inter-workable ETS implementations.

# Supplement 62 to ITU-T Q-series Recommendations

## Overview of the work of standards development organizations and other organizations on the emergency telecommunications service

### 1 Scope

Emergency telecommunications service (ETS) is a national service providing priority telecommunications to the ETS authorized users in times of disaster and emergencies.

This supplement identifies both completed and ongoing work related to ETS occurring in various ITU-T Study Groups, as well as the status of their work. This roadmap captures the results from an analysis of existing work activities related to ETS. Specifically, it identifies the study tasks that have been added to the work plans of individual questions of the relevant Study Groups and their status. It captures identified gaps that exist, as well as the plans which show how these gaps will be addressed.

National standards support the origination and termination of ETS calls in national networks. (This document recognizes that ETS calls may include ETS voice, video and data calls originating or terminating in: the PSTN, wireless networks and NGN/future networks.)

These national standards complement the ETS related ITU-T Recommendations, which are intended to support the extension of national ETS calls across international boundaries. It is understood that the ITU-T Recommendations must address situations where invocation of ETS is restricted to users authorized by their respective governments and, where international agreements are needed to honour authorization in the originating network when delivering the call in a destination network which is a different national network from the network in which the invocation of the service occurred.

Provision has been made to capture relevant ETS related national standards, and other SDO international ETS related standards, in this document. However as these other SDO standards are not the ITU-T's responsibility, the ITU-T takes no position with regards to their integrity or completeness. This document may identify the dependencies of ITU-T ETS work on activities that are, or which should be, underway in other external SDOs.

Individual-to-authority communications are outside the scope of this supplement, e.g., calls from the general public using national, regional or local emergency and public safety services to seek assistance.

Activities related to the support of emergency telecommunications, which are not explicitly related to ETS, are outside the scope of this supplement.

### 2 References

#### 2.1 ITU-T published Recommendations and supplements

| | |
|---|---|
| [ITU-T E.106] | Recommendation ITU-T E.106 (2003), *International Emergency Preference Scheme (IEPS) for disaster relief operations.* |
| [ITU-T E.107] | Recommendation ITU-T E.107 (2007), *Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS*. |
| [ITU-T E.412] | Recommendation ITU-T E.412 (2003), *Network management controls*. |

[ITU-T H.246] Recommendation ITU-T H.246 (2006), *Interworking of H-series multimedia terminals with H-series multimedia terminals and voice/voiceband terminals on GSTN, ISDN and PLMN*.

[ITU-T H.248.1] Recommendation ITU-T H.248.1v3 (2013), *Gateway control protocol: Version 3*.

[ITU-T H.248.81] Recommendation ITU-T H.248.81 (2011), *Gateway control protocol: Guidelines on the use of the international emergency preference scheme (IEPS) call indicator and priority indicator in ITU-T H.248 profiles*.

[ITU-T H.248.82] Recommendation ITU-T H.248.82 (2013), *Gateway control protocol: Explicit congestion notification support*.

[ITU-T H.361] Recommendation ITU-T H.361 (2006), *End-to-end quality of service (QoS) and service priority signalling in H.323 systems*.

[ITU-T H.361 A1] Recommendation ITU-T H.361 Amendment 1 (2008), *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] Recommendation ITU-T H.460.4 (2007), *Call priority designation and country/international network of call origination identification for H.323 priority calls*.

[ITU-T H-Sup.9] ITU-T H-series Recommendations – 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 J.160] Recommendation ITU-T J.160 (2005), *Architectural framework for the delivery of time-critical services over cable television networks using cable modems*.

[ITU-T J.163] Recommendation ITU-T J.163 (2007), *Dynamic quality of service for the provision of real-time services over cable television networks using cable modems*.

[ITU-T J.170] Recommendation ITU-T J.170 (2005), *IPCablecom security specification*.

[ITU-T J.260] Recommendation ITU-T J.260 (2005), *Requirements for preferential telecommunications over IPCablecom networks*.

[ITU-T J.261] Recommendation ITU-T J.261 (2009), *Framework for implementing preferential telecommunications in IPCablecom and IPCablecom2 networks*.

[ITU-T J.262] Recommendation ITU-T J.262 (2009), *Specifications for authentication in preferential telecommunications over IPCablecom2 networks*.

[ITU-T J.263] Recommendation ITU-T J.263 (2009), *Specification for priority in preferential telecommunications over IPCablecom2 networks*.

[ITU-T J.360] Recommendation ITU-T J.360 (2006), *IPCablecom2 architecture framework*.

[ITU-T J.366.2] Recommendation ITU-T J.366.2 (2010), *IPCablecom2 IP Multimedia Subsystem (IMS): Session handling – IM call model – Stage 2 specification*.

[ITU-T J.366.3] Recommendation ITU-T J.366.3 (2010), *IPCablecom2 IP Multimedia Subsystem (IMS): Stage 2 specification*.

[ITU-T J.366.4] Recommendation ITU-T J.366.4 (2010), *IPCablecom2 IP Multimedia Subsystem (IMS): Session Initiation Protocol (SIP) and Session Description Protocol (SDP) – Stage 3 specification*.

[ITU-T J.366.7] Recommendation ITU-T J.366.7 (2010), *IPCablecom2 IP Multimedia Subsystem (IMS): Access Security for IP-based services*.

[ITU-T M.3350] Recommendation ITU-T M.3350 (2004), *TMN service management requirements for information interchange across the TMN X-interface to support provisioning of Emergency Telecommunication Service (ETS)*.

[ITU-T Q.761] Recommendation ITU-T Q.761 (1999), *Signalling System No. 7 – ISDN User Part functional description*.

[ITU-T Q.761 A3] Recommendation ITU-T Q.761 Amendment 3 (2006), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.762] Recommendation ITU-T Q.762 (1999), *Signalling System No. 7 – ISDN User Part general functions of messages and signals*.

[ITU-T Q.762 A3] Recommendation ITU-T Q.762 Amendment 3 (2006), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.763] Recommendation ITU-T Q.763 (1999), *Signalling System No. 7 – ISDN User Part formats and codes*.

[ITU-T Q.763 A4] Recommendation ITU-T Q.763 Amendment 4 (1999), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.764] Recommendation ITU-T Q.764 (1999), *Signalling system No. 7 – ISDN user part signalling procedures*.

[ITU-T Q.764 A4] Recommendation ITU-T Q.764 Amendment 4 (2006), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.767] Recommendation ITU-T Q.767 (1991), *Application of the ISDN User Part of CCITT signalling system No. 7 for international ISDN interconnections*.

[ITU-T Q.767 A1] Recommendation ITU-T Q.767 Amendment 1 (2002), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.1902.1] Recommendation ITU-T Q.1902.1 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Functional description.*

[ITU-T Q.1902.1 A2] Recommendation ITU-T Q.1902.1 Amendment 2 (2006), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.1902.2] Recommendation ITU-T Q.1902.2 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: General functions of messages and parameters*.

[ITU-T Q.1902.2 A3] Recommendation ITU-T Q.1902.2 Amendment 3 (2006), *Support for the International Emergency Preference Scheme.*

[ITU-T Q.1902.3] Recommendation ITU-T Q.1902.3 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: Formats and codes*.

[ITU-T Q.1902.3 A3] Recommendation ITU-T Q.1902.3 Amendment 3 (2006), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.1902.4] Recommendation ITU-T Q.1902.4 (2001), *Bearer independent call control protocol (Capability Set 2): Basic call procedures*.

[ITU-T Q.1902.4 A3] Recommendation ITU-T Q.1902.4 Amendment 3 (2006), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.1950] Recommendation ITU-T Q.1950 (2002), *Bearer independent call bearer control protocol*.

[ITU-T Q.1950 A1] Recommendation ITU-T Q.1950 Amendment 1 (2006), *New Annex G – Call bearer control – International Emergency Preference Scheme*.

[ITU-T Q.2630.3] Recommendation ITU-T Q.2630.3 (2003), *AAL type 2 signalling protocol – Capability Set 3.*

[ITU-T Q.2630.3 A1] Recommendation ITU-T Q.2630.3 (2006) Amendment 1, *Support for the International Emergency Preference Scheme*.

[ITU-T Q.2761] Recommendation ITU-T Q.2761 (1999), *Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7*.

[ITU-T Q.2761 A1] Recommendation ITU-T Q.2761 Amendment 1(2002), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.2762] Recommendation ITU-T Q.2762 (1999), *General functions of messages and signals of the B-ISDN User Part (B-ISUP) of Signalling System No. 7*.

[ITU-T Q.2762 A1] Recommendation ITU-T Q.2762 Amendment 1(2002), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.2763] Recommendation ITU-T Q.2763 (1999), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes*.

[ITU-T Q.2763 A1] Recommendation ITU-T Q.2763 Amendment 1(2002), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.2764] Recommendation ITU-T Q.2764 (1999), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures*.

[ITU-T Q.2764 A1] Recommendation ITU-T Q.2764 Amendment 1(2002), *Support for the International Emergency Preference Scheme*.

[ITU-T Q.2931] Recommendation ITU-T Q.2931 (1995), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.

[ITU-T Q.2931 A5] Recommendation ITU-T Q.2931 Amendment 5 (2006), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control – Amendment 5 – Support for the International Emergency Preference Scheme*.

[ITU-T Q.3301.1 v3] Recommendation ITU-T Q.3301.1 v3 (2013), *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] Recommendation ITU-T Q.3303.3 v3 (2013), *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-Sup.47] ITU-T Q-series Recommendations – Supplement 47 (2003), *Emergency services for IMT-2000 networks – Requirements for harmonization and convergence*.

[ITU-T Q-Sup.53] ITU-T Q-series Recommendations – Supplement 53 (2005), *Signalling requirements to support the International Emergency Preference Scheme (IEPS)*.

[ITU-T Q-Sup.57] ITU-T Q-series Recommendations – Supplement 57 (2008), *Signalling requirements to support the emergency telecommunications service (ETS) in IP networks*.

[ITU-T Q-Sup.61] ITU-T Q-series Recommendations – Supplement 61 (2010), *Evaluation of signalling protocols to support ITU-T Y.2171 admission control priority levels*.

[ITU-T Q-Sup.63] ITU-T Q-series Recommendations – Supplement 63 (2013), *Signalling protocol mappings in support of the Emergency Telecommunications Service in IP Networks*.

[ITU-T X.674] Recommendation ITU-T X.674 (2011), *Procedures for the registration of arcs under the Alerting object identifier arc*.

[ITU-T X.1303] Recommendation ITU-T X.1303 (2007), *Common alerting protocol (CAP 1.1)*.

[ITU-T Y.1271] Recommendation ITU-T Y.1271 (2004), *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit- switched and packet-switched networks*.

[ITU-T Y.2006] Recommendation ITU-T Y.2006 (2008), *Description of capability set 1 of NGN release 1*.

[ITU-T Y.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.

[ITU-T Y.2111] Recommendation ITU-T Y.2111 (2011), *Resource and admission control functions in next generation networks*.

[ITU-T Y.2171] Recommendation ITU-T Y.2171 (2006), *Admission control priority levels in Next Generation Networks*.

[ITU-T Y.2172] Recommendation ITU-T Y.2172 (2007), *Service restoration priority levels in Next Generation Networks*.

[ITU-T Y.2201] Recommendation ITU-T Y.2201 (2009), *Requirements and capabilities for ITU-T NGN*.

[ITU-T Y.2205] Recommendation ITU-T Y.2205 (2011), *Next Generation Networks – Emergency telecommunications – Technical considerations*.

[ITU-T Y.2262] Recommendation ITU-T Y.2262 (2006), *PSTN/ISDN emulation and simulation.*

[ITU-T Y.2271] Recommendation ITU-T Y.2271 (2006), *Call server-based PSTN/ISDN emulation*.

[ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.

[ITU-T Y.2702] Recommendation ITU-T Y.2702 (2008), *Authentication and authorization requirements for NGN release 1*.

[ITU-T Y.2704] Recommendation ITU-T Y.2704 (2010), *Security mechanisms and procedures for NGN*.

[ITU-T Y.2705] Recommendation ITU-T Y.2705 (2013), *Minimum security requirements for the interconnection of the Emergency Telecommunications Service (ETS).*

[ITU-T Y.2720] Recommendation ITU-T Y.2720 (2009), *NGN identity management framework.*

[ITU-T Y.2721] Recommendation ITU-T Y.2721 (2010), *NGN identity management requirements and use cases.*

[ITU-T Y.2722] Recommendation ITU-T Y.2722 (2011), *NGN identity management mechanisms*.

[ITU-T Y-Sup.2] ITU-T Y-series Recommendations – Supplement 2 (2006), *Session/border control (S/BC) functions*.

[ITU-T HSTP-AMSR] HSTP-AMSR Technical paper: AMS Requirements (2011).

## 2.2 Other references

### 2.2.1 3GPP references

#### 2.2.1.1 3GPP published references

[3GPP TS 22.101] *Service Aspects; Service Principles, Release 11*

[3GPP TS 22.153] *Multimedia Priority Service, Release 11*

[3GPP TR 22.950] *Priority Service Feasibility Study, Release 11*

[3GPP TR 22.952] *Priority Service Guide, Release 11*

[3GPP TS 23.401] *General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access, Release 11*

[3GPP TS 23.203] *Policy and charging control architecture, Release 11*

[3GPP TS 23.228] *IP Multimedia Subsystem (IMS); Stage 2, Release 11*

[3GPP TS 29.212] *Policy and charging control over Gx reference point, Release 11*

[3GPP TS 29.213] *Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping, Release 11*

[3GPP TS 29.214] *Policy and charging control over Rx reference point, Release 11*

[3GPP TS 24.301] *Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 11*

[3GPP TS 24.008] *Mobile radio interface Layer 3 specification; Core network protocols; Stage 3, Release 11*

[3GPP TS 29.118] *Mobility Management Entity (MME) – Visitor Location Register (VLR) SGs interface specification, Release 11*

[3GPP TS 29.274] *3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3, Release 11*

[3GPP TS 36.331] *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 11*

[3GPP TS 36.413] *Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP) , Release 11*

[3GPP TS 23.008] *Organization of subscriber data, Release 11*

[3GPP TS 24.229] *IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3, Release 11*

[3GPP TS 29.228] *IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents, Release 11*

[3GPP TS 29.229] *Cx and Dx interfaces based on the Diameter protocol; Protocol details, Release 11*

[3GPP TS 29.230] *Diameter applications; 3GPP specific codes and identifiers, Release 11*

[3GPP TS 29.272] *Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol, Release 11*

[3GPP TS 29.328] *IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents, Release 11*

[3GPP TS 29.329] *Sh interface based on the Diameter protocol; Protocol details, Release 11*

[3GPP TS 29.162] *Interworking between the IM CN subsystem and IP networks, Release 11*

[3GPP TS 29.163] *Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks, Release 11*

[3GPP TS 29.232] *Media Gateway Controller (MGC) – Media Gateway (MGW) interface, Release 11*

[3GPP TS 29.238] *Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface, Ix interface, Release 11*

[3GPP TS 29.292] *Interworking between the IP Multimedia (IM) Core Network (CN) subsystem (IMS) and MSC Server for IMS Centralized Services (ICS), Release 11*

[3GPP TS 29.332] *Media Gateway Control Function (MGCF) – IM Media Gateway; Mn interface, Release 11*

[3GPP TS 29.333] *Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface, Release 11*

[3GPP TS 29.334] *IMS Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW); Iq Interface, Release 11*

[3GPP TS 23.333] *Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface: Procedures descriptions, Release 11*

[3GPP TS 23.334] *IP Multimedia Subsystem (IMS) Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW) interface: Procedures descriptions, Release 11*

### 2.2.2 3GPP2 references

#### 2.2.2.1 3GPP2 published references

[S.R0117-A v1.0] *Multimedia Priority Service (MMPS) for MMD-based Networks – Stage 1 Requirements*

[3GPP2 X.S0011-E v1.0] *cdma2000 Wireless IP Network Standard*

[3GPP2 X.S0057-B v1.0] *E-UTRAN – eHRPD Connectivity and Interworking: Core Network Aspects*

[3GPP2 X.S0058-0 v2.0] *WiMAX-HRPD Interworking: Core Network Aspects*

[3GPP2 X.S0062-0 v1.0] *Policy and Charging Control (PCC) for cdma2000 1x and HRPD*

[3GPP2 C.S0005] *Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems*

[3GPP2 C.S0015] *Short Message Service (SMS) for Wideband Spread Spectrum Systems*

[3GPP2 C.S0024] *cdma2000 High Rate Packet Data Air Interface Specification*

[3GPP2 C.S0063] *cdma2000 High Rate Packet Data Supplemental Services*

[3GPP2 A.S0022-A v2.0] *Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN)*

[3GPP2 A.S0008-C v4.0] *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network*

[3GPP2 A.S0009-C v4.0] *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function*

### 2.2.3 ATIS references

#### 2.2.3.1 ATIS published references

[A-1000005] ATIS-1000005 (2005), *Service Description of ETS*

[A-1000006] ATIS-1000006 (2005), *Signalling System No.7 (SS7) – Emergency Telecommunications Service (ETS).*

[A-1000010] ATIS-1000010 (2006), *Support of Emergency Telecommunications Service (ETS) in IP Networks*.

[A-1000011] ATIS-1000011 (2006), *ETS Packet Priority for IP NNI Interfaces – Use of Existing DiffServ Per Hop Behaviors*.

[A-1000020] ATIS-1000020 (2007), *ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism*.

[A-1000023] ATIS-1000023 (2013), *ETS Network Element Requirements for NGN IMS-based Deployments*.

[A-0300202] ATIS-0300202 (2009), *Guidelines for Network Management of the Public Switched Networks under Disaster Conditions*.

[ATIS-1000034] *Next Generation Network (NGN): Security Mechanisms and Procedures*.

[ATIS-1000044] *ATIS Identity Management: Requirements and Use Cases Standard*.

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

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

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

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

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

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

[ATIS-0100004] *Availability & Restorability Aspects of Emergency Telecommunication Services (ETS).*

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

[ATIS-0100009] *Overview of Standards in Support of Emergency Telecommunication Service (ETS).*

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

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

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

[ATIS-0300100] *IP Network Disaster Recovery Framework*.

[T1.TR.84-2004] *IP Network Traffic Priorities and ETS*.

#### 2.2.3.2 Draft ATIS references

[DA ETS SR] Draft TR*: Service Requirements of ETS in NGN*

[DA ETS WAR] Draft Standard*: ETS Wireline Access Requirements*

[DA ETS NER] Draft Standards*: ETS Phase 2 Network Element Requirements*

### 2.2.4 ETSI references

#### 2.2.4.1 ETSI published references

[ETSI TS 102 181] *Requirements for communication between authorities/organizations during emergencies*

[ETSI TS 102 182] *Requirements for communication from authorities to citizens during emergencies*

### 2.2.5 IETF references

#### 2.2.5.1 IETF published references

[RFC 4412] IETF RFC 4412 (2006), *Communications Resource Priority for the Session Initiation Protocol (SIP).*

[RFC 4542] IETF RFC 4542 (2006), *Implementing an Emergency Telecommunications Service (ETS) for Real-Time Services in the Internet Protocol Suite*.

[RFC 5865] IETF RFC 5865 (2010), *A Differentiated Services Code Point (DSCP) for Capacity-Admitted Traffic.*

[RFC 6679] IETF RFC 6679, *Explicit Congestion Notification (ECN) for RTP over UDP*.

[RFC 6710] IETF RFC 6710, *Simple Mail Transfer Protocol extension for Message Priorities*.

[RFC 6735] IETF RFC 6735, *Diameter Priority Attribute Value Pairs*.

### 2.2.6 TMF references

#### 2.2.6.1 Published TMF references

[GB 917] Guide Book (GB) 917, *SLA Management Handbook – Release 3.1*

[GB 934] Guide Book GB 934, *Best Practice: Application Note to the SLA Management Handbook – Voice over IP – Release 2.0*

[GB 971] Guide Book (GB) 971, *ETS SLA Application Note*

### 2.2.7 TIA references

#### 2.2.7.1 Published TIA references

[TIA-917] Wireless Priority Service Enhancements for CDMA Systems

[TIA TSB-16] *Assignment of Access Overload Classes in the Cellular Telecommunications Services*

[TIA-835-E] cdma2000 Wireless IP Network Standard

[TIA-1163-B] *E-UTRAN – eHRPD Connectivity and Interworking: Core Network Aspects*

[TIA-1164-1] *WiMAX-HRPD Interworking: Core Network Aspects*

[TIA-1187] *Policy and Charging Control (PCC) for cdma2000 1x and HRPD*

[TIA-2000.5] *Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems*

[TIA-637] *Short Message Service (SMS) for Wideband Spread Spectrum Systems*

[TIA-856] *High Rate Packet Data Air Interface Specification*

[TIA-1054] *cdma2000 High Rate Packet Data Supplemental Services*

[TIA-1140] *WiMAX™ – HRPD Interworking: Air Interface Specification*

[TIA-1142-A] *Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN)*

[TIA-878-D] *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network*

[TIA-1878-D] *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function*

### 2.2.8 WiMAX references

#### 2.2.8.1 Published WiMAX references

[WFM Stage 1-r1] WiMAX Forum – WFM-T31-122-R016v01: Service Provider Working Group (SPWG) ETS Phase 1 Requirements for Release 1.6, Feb., 2009.

[WFM Stage 1-r2] WiMAX Forum – WFM-T31-122-R020v01: ETS Phase 2 stage 1 Requirements, Release 2.0, Nov. 2009.

[WFM Stage 2-a1] WiMAX Forum – WFM-T32-001-R016v01: Architecture – Architecture Tenets, Reference Model and Reference Points, Base Specification, Release 1.6, ETS Stage 2 Specification (Section 7.14) November 2010.

[WFM Stage 3-a1] WiMAX Forum – WFM-T33-001-R016v01: Architecture – Detailed Protocols and Procedures, Base Specification, Release 1.6, ETS Stage 3 Specification (Section 4.19) November 2010.

[WFM Stage 2-a2] WiMAX Forum – WFM-T32-001-R020v01: Network Architecture – Architecture Tenets, Reference Model and Reference Points, Base Specification, Release 2.0, ETS Stage 2 Specification (Section 7.14), April 2012.

[WFM Stage 3-a2] WiMAX Forum – WFM-T33-001-R020v01: Network Architecture – Detailed Protocols and Procedures, Base Specification, Release 2.0, ETS Stage 3 Specification (Section 4.19), April 2012.

### 2.2.9 Broadband Forum references

[TR-134] Broadband Forum – TR-134: Broadband Policy Control Framework (BPCF), Issue 1, Corrigendum 1, January 2013.

[TR-203] Broadband Forum – TR-203: Interworking between Next Generation Fixed and 3GPP Wireless Access, Issue 1, August 2012.

## 3 Definitions

### 3.1 Terms defined elsewhere

This supplement uses the following terms defined elsewhere:

**3.1.1 emergency telecommunications service (ETS)** [ITU-T E.107]: A national service providing priority telecommunications to the ETS authorized users in times of disaster and emergencies.

**3.1.2 ETS user** [ITU-T E.107]: A user authorized to obtain priority telecommunications in national and/or international emergency situations.

**3.1.3 IPCablecom** [ITU-T J.162]: An ITU-T project that includes an architecture and a series of Recommendations that enable the delivery of time-critical interactive services over cable television networks.

**3.1.5 international emergency preference service (IEPS)** [ITU-T E.106]: The IEPS enables the use of public telecommunications by national authorities for emergency and disaster relief operations. It allows users, authorized by national authorities, to have access to the International Telephone Service, as described in [ITU-T E.105], while this service is restricted either due to damage, congestion or faults, or any combination of these.

**3.1.6 priority treatment capabilities** [ITU-T E.107]: Capabilities that provide priority in the use of telecommunications network resources, allowing a higher probability of end-to-end telecommunications and use of telecommunication applications.

## 3.2 Terms defined in this supplement

This supplement defines the following term:

**3.2.1** IPCablecom2 (based on [ITU-T J.360]): IPCablecom2 is a cable industry effort based on IMS architecture, designed to support the convergence of voice, video, data and mobility technologies. Definition.

# 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

| | |
|---|---|
| 3GPP | 3rd Generation Partnership Project |
| 3GPP2 | 3rd Generation Partnership Project2 |
| ANI | Application to Network Interface |
| ANSI | American National Standards Institute |
| ATIS | Alliance for Telecommunications Industry Solutions |
| BICC | Bearer Independent Call Control |
| B-ISUP | Broadband ISUP |
| ECN | Explicit Congestion Notification |
| EDGE | Enhanced Data rates for GSM Evolution |
| ENI | ETS National Implementation |
| ET | Emergency Telecommunications |
| ETS | Emergency Telecommunication Service |
| ETSI | European Telecommunications Standards Institute |
| ETSMS | ETS Management Service |
| GSM | Global System for Mobile communications |
| IEMS | International Emergency Multimedia Service |
| IEPS | International Emergency Preference Scheme |
| IETF | Internet Engineering Task Force |
| IMS | IP Multimedia Subsystem |
| IP | Internet Protocol |
| ISDN | Integrated Services Digital Network |
| ISUP | Integrated Services User Part |
| ITU | International Telecommunications Union |
| ITU-T | ITU Telecommunication Standardization Sector |
| LTE | Long Term Evolution |
| MLPP | Multi-Level Precedence and Pre-emption |
| MPS | Multimedia Priority Service |

| | |
|---|---|
| NNI | Network to Network Interface |
| NS/EP | National Security/Emergency Preparedness |
| PRQC | Performance, Reliability, and Quality of Service |
| PTSC | Packet Technologies and Systems Committee |
| QoS | Quality of Service |
| RACF | Resource Admission and Control Function |
| RFC | Request for Comments |
| S/BC | Session/Border Control |
| SDO | Standards Development Organization |
| SIP | Session Initiation Protocol |
| SS7 | Signalling System No. 7 |
| TDR | Telecommunication for Disaster Relief |
| TIA | Telecommunications Industry Association |
| TMForum | Telecommunications Management Forum |
| TMN | Telecommunications Management Network |
| TSP | Telecommunications Service Priority |
| UMTS | Universal Mobile Telecommunications System |
| UNI | User Network Interface |
| WiMAX | Worldwide Interoperability for Microwave Access |

## 5 Conventions

1 In this supplement the term "ETS" is typically used as a noun.

2 In clause 2 References typically only the base Recommendations have been identified. Readers should assume that this reference is intended to implicitly refer to all related in force amendments, corrigenda, and implementer's guides. However, in cases where an amendment has been explicitly generated to support ETS or IEPS, and labelled as such, it will be listed separately in the reference clause.

3 As this supplement is intended to be a management oriented document, it is formatted and structured as follows:

- Clause 6 provides pointers to example service descriptions
- Clause 7 provides pointers to example functional requirements
- Clause 8 provides pointers to example capability documents
- Clause 9 provides a list of SDO's and other organizations that have or are producing ETS related standards
- Appendix I provides a summary of the standards listed in clause 2

4 In clauses 6, 7 and 8 provision has been made for the identification of ITU-T Recommendations. In some instances one or more Recommendations have been identified. In these cases, the reader should understand that this is not considered to be an all-inclusive list. Rather there may be other equally applicable Recommendations that have not been captured in this document. In some instances there are no Recommendations identified. The readers should understand that there may be one or more applicable Recommendations that

exist and which have not been captured in this supplement or that this may truly be a gap, i.e., no Recommendation addresses this particular item.

5 In those cases where other SDOs or other organization standards are indicated, it should be noted that the ITU-T has not reviewed the standards to determine its integrity or if the mapping is correct, takes no position as to the correctness of reference and has not approved their contents.

6 A Recommendation which addresses a number of topics may appear more than once in clauses 7, 8 and 9.

## 6 ETS service description

### 6.1 General

ETS, as defined in [ITU-T E.107], is a national implementation utilizing the features, facilities and applications available in national public networks and service offerings. Implementation of ETS by definition is a national matter, however ETS national implementations are likely to exhibit some of the following characteristics:

a) ETS users should be able to use their normal telecommunication terminals to initiate ETS calls, sessions or telecommunication during times of crisis or agreed emergency situations.

b) An originating national network may use various methods to identify an ETS user request for ETS telecommunication.

c) As a national capability, ETS is specifically designed to serve the telecommunication needs of authorized ETS users. ETS user authentication and authorization is a national matter.

d) An ETS call, session or telecommunication provides end-to-end priority treatment beyond that offered to the general public. The priority treatment is applied during the call/session establishment phase and should continue to be applied for the duration of the call, session or telecommunication. The priority treatment consists of priority mechanisms and features applicable to various aspects (e.g., signalling, control, routing, and media traffic) that are essential for the establishment and continuation of the telecommunication, including:

   - **Priority treatment**: Priority treatment mechanisms may include priority call/session set-up (e.g., priority queuing schemes for network resources), access to additional resources (e.g., via alternate routing) and exemption from restrictive network traffic management controls (e.g., call gapping). Pre-emption in the public network (i.e., terminating any established telecommunication to release resources to serve a new ETS call/session request) is a national matter.
   - **Network interconnection and protocol interworking**: The signalling of ETS indicators transmitted across network boundaries (e.g., between a circuit-switched network and an NGN) and the ETS priority treatment should also be ensured to be interoperable across the relevant networks.

e) An ETS user should be able to communicate with any other available user. For example, any restrictions to call/session completion should be overridden.

f) A national government/administration decides whether user priority levels will be assigned to ETS users, and if assigned, how many levels will be used and the assignment criteria.

g) If a network or network element is not able to distinguish an ETS call/session request from a normal call request, then the routing of an ETS requested call should proceed as a normal call and any ETS markings or indicators associated with the call should be maintained and transmitted if technically feasible.

## 6.2 Standards related to service descriptions

This clause provides a list of example standards that contain information on ETS service descriptions. The status of each is identified.

NOTE – The documents cited in this sub-clause may contain information other than service description related information.

### 6.2.1 ITU-T Recommendations

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

Status: Published

Addresses: Service definition

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

Status: Published

Addresses: Service definition

# 7 ETS functional requirements

## 7.1 General

This clause provides a list of example standards that contain functional requirements for ETS. The examples are organized based on overall, systems and subsystems as well as for different topic areas like management, bearer mobility, resource admission control, security, signalling, and transport.

NOTE – Some of the documents cited in this clause are not ETS specific documents. For example, some of the documents have a broader scope, but include functional requirements pertaining to ETS. In addition, some documents cited may include topics other than functional requirements.

## 7.2 Overall functional requirements

This clause captures pointers to standards that contain overall functional requirements.

### 7.2.1 ITU-T

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

Status: Published

Addresses: Overall functional requirements

[ITU-T D E.TDR] Draft ITU-T Recommendation E.TDR, *Service and operational framework for the provision of telecommunication for disaster relief (TDR).*

Status: Draft

Addresses: Overall functional requirements

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuits-witched and packet-switched networks*

Status: Published

Addresses: General network requirements

[ITU-T Y.2006] *Description of capability set 1 of NGN release 1*

Status: Published

Addresses: General network requirements

[ITU-T Y.2012] *Functional requirements and architecture of next generation networks*

Status: Published

Addresses: General functional requirements

[ITU-T Y.Sup2] *Functional requirements and architecture of next generation networks – Session/border control (S/BC) functions*

Status: Published

Addresses: General Functional requirements

[ITU-T Y.2201] *Requirements and capabilities for ITU-T NGN*

Status: Published

Addresses: General network requirements

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

Status: Published

Addresses: General network functional requirements for IEPS/ETS support

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

Status: Published

Addresses: General Network Functional Requirements for IEPS Support

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

Status: Published

Addresses: General network functional requirements for IEPS support

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

Status: Published

Addresses: Overall functional requirements

## 7.3 System and subsystem functional requirements

### 7.3.1 General

This clause provides pointers to example standards that contain system or subsystem functional requirements. Standards are mapped to the functional requirements.

### 7.3.2 Bearer

#### 7.3.2.1 ITU-T

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

Status: Published

Addresses: Priority queuing schemes

[ITU-T J.260] *Requirements for preferential telecommunications over IPCablecom networks*

Status: Published

Addresses: Support for priority

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Support for priority

[ITU-T Y.2171] *Admission control priority levels in Next Generation Networks*

Status: Published

Addresses: Support for priority

### 7.3.3 Management

#### 7.3.3.1 ITU-T

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

Status: Published

Addresses: Bilateral agreements
Exemption from restrictive management controls

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

Status: Published

Addresses: Bilateral agreements

[ITU-T E.412] *Network management controls*

Status: Published

Addresses: Network management controls

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

Status: Published

Addresses: Network management controls

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: General network management requirements

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

Status: Published

Addresses: Network rerouting

[ITU-T D E.TDR] *Service and Operational framework for the provision of Telecommunication for Disaster Relief (TDR).*

Status: Draft

Addresses: Network operations

### 7.3.4 Mobility

#### 7.3.4.1 ITU-T

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Mobility

### 7.3.5 Resource admission and control

#### 7.3.5.1 ITU-T

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

Status: Published

Addresses: Resource admission and control functions related IEPS support

[ITU-T Y.2111] *Resource and admission control functions in next generation networks*

Status: Published

Addresses: Resource admission and control functions related IEPS support

[ITU-T Y.2171] *Admission control priority levels in Next Generation Networks*

Status: Published

Addresses: Resource admission control

### 7.3.6 Security

#### 7.3.6.1 ITU-T

[ITU-T D E.TDR] *Draft ITU-T Recommendation E.TDR, Service and Operational framework for the provision of Telecommunication for Disaster Relief (TDR).*

Status: Draft

Addresses: General security requirements

[ITU-T J.260] *Requirements for preferential telecommunications over IPCablecom networks*

Status: Published

Addresses: General authentication

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

Status: Published

Addresses: 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*

Status: Published

Addresses: Authentication and authorization requirements. Appendix II provides information on ETS authentication and authorization.

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

Status: Published

Addresses: Security mechanisms to fulfil NGN security requirements. Appendix II – provides guidance on network provided security for ETS

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

Status: Published

Addresses: Structured approach for designing, defining, and implementing IdM solutions

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

Status: Published

Addresses: IdM objectives, requirements, guidelines and example use cases for the NGN. Appendix III – provides ETS related IdM use cases.

[ITU-T Y-Sup.12] *Supplement on NGN identity management mechanisms*

Status: Published

Addresses: IdM mechanisms and capabilities for NGN.

**[**ITU-T Y.2722] Recommendation ITU-T Y.2722, *NGN identity management mechanisms*

Status: Published

Addresses: IdM mechanisms and capabilities for NGN

[ITU-T Y.2705] Recommendation ITU-T Y. 2705, *Minimum security requirements for the interconnection of the Emergency Telecommunications Service (ETS)*

Status: Published

Addresses: Security requirements addressing integrity, confidentiality and availability protection for ETS communications across network boundaries (i.e., between different national networks).

### 7.3.7 Signalling

#### 7.3.7.1 ITU-T

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

Status: Published

Addresses: Call marking
Priority call setup
Priority dial tone

[ITU-T J.260] *Requirements for preferential telecommunications over IPCablecom networks*

Status: Published

Addresses: Support for authentication

Support for priority

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

Status: Published

Addresses: Signalling requirements to support IEPS in IMTS systems

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

Status: Published

Addresses: Signalling requirements to support IEPS

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

Status: Published

Addresses: Signalling requirements to support IEPS

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Signalling priority

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

Status: Published

Addresses: Signalling priority

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

Status: Published

Addresses: Guidance on how existing signalling protocol extensions can be used to designate the admission control priority requirements in support of ETS

### 7.3.8 Transport

#### 7.3.8.1 ITU-T

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

Status: Published

Addresses: Priority queuing schemes
Transparency of path to content

## 8 Standards mapped to capabilities for ETS support

### 8.1 General

This clause provides example ETS related standards mapped to capabilities identified to support ETS by the ITU-T Study Groups responsible for that particular topic area. The examples are mapped to capability topics that include: admission control, authentication, interworking, management,

preferential treatment, preferred routing priority, security, signalling in support of IEPS, Quality of Service, and transport.

NOTE – Some of the documents cited in this clause are not ETS specific documents. For example, some of the documents has a broader scope, but includes capabilities pertaining to ETS. Also, some documents cited may include topics other than the capability topics cited.

## 8.2 Admission control

### 8.2.1 ITU-T

[ITU-T J.170] *IPCablecom security specification*

Status: Published

Addresses: Access control

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Priority protection against misuse

## 8.3 Authentication

As a national capability, ETS is specifically designed to serve the telecommunication needs of authorized ETS users. How ETS users are authenticated and authorized is a national matter.

### 8.3.1 ITU-T related Recommendations

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

Status: Published

Addresses: Authentication and Authorization requirements. Appendix II provides information on ETS authentication and authorization.

[ITU-T J.160] *Architectural framework for the delivery of time-critical services over cable television networks using cable modems*

Status: Published

Addresses: Authentication

[ITU-T J.170] *IPCablecom security specification*

Status: Published

Addresses: Authentication

[ITU-T J.261] *Framework for implementing preferential telecommunications in IPCablecom and IPCablecom2 networks*

Status: Published

Addresses: Authentication

[ITU-T J.262] *Specifications for authentication in preferential telecommunications over IPCablecom2 networks*

Status: Published

Addresses: Authentication

## 8.4 Interworking

### 8.4.1 Bearer interworking

#### 8.4.1.1 ITU-T

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

Status: Published

Addresses: Gateway interworking of media streams established using ITU-T H.series protocols, ITU-T Q.931 and ITU-T Q.2931 protocols

### 8.4.2 Protocol interworking

#### 8.4.2.1 BICC – ISUP

##### 8.4.2.1.1 ITU-T

[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*

Status: Published

Addresses: 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*

Status: Published

Addresses: Extensions to support IEPS

[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*

Status: Published

Addresses: 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*

Status: Published

Addresses: Extensions to support IEPS

#### 8.4.2.2 Gateway

##### 8.4.2.2.1 ITU-T

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

Status: Published

Addresses: Interworking of H.248 with H.225, SIP, and ISUP

#### 8.4.2.3 H series

##### 8.4.2.3.1 ITU-T

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

Status: Published

Addresses: Protocol interworking of ITU-T H.series protocols with ITU-T Q.931 and ITU-T Q.763 protocols

### 8.5 Management

#### 8.5.1 ITU-T

For further study.

### 8.6 Preferential treatment

#### 8.6.1 ITU-T

[ITU-T J.261] *Framework for implementing preferential telecommunications in IPCablecom and IPCablecom2 networks*

Status: Published

Addresses: Priority and preferential treatment

[ITU-T J.263] *Specification for priority in preferential telecommunications over IPCablecom2 networks*

Status: Published

Addresses: Priority and preferential treatment

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Priority and preferential treatment

### 8.7 Preferred routing

#### 8.7.1 ITU-T

For further study.

### 8.8 Priority

#### 8.8.1 ITU-T

[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"*

Status: Published

Addresses: DiffServ support for ITU-T H.323 systems
Priority support for ITU-T H.323 systems

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

Status: Published

Addresses: Call marking
Country/international network of call origin
Definition of messages
Level of priority

[ITU-T J.163] *Dynamic quality of service for the provision of real-time services over cable television networks using cable modems*

Status: Published

Addresses: Priority

[ITU-T J.261] *Framework for implementing preferential telecommunications in IPCablecom and IPCablecom2 networks*

Status: Published

Addresses: Priority and preferential treatment

[ITU-T J.263] *Specification for priority in preferential telecommunications over IPCablecom2 networks*

Status: Published

Addresses: Priority and preferential treatment

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Priority

## 8.9 Security

### 8.11.1 ITU-T

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

Status: Published

Addresses: Security mechanisms.

[ITU-T J.170] *IPCablecom security specification*

Status: Published

Addresses: Security

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: Authorization
Confidentiality of content and location

[ITU-T X.674] *Procedures for the registration of arcs under the Alerting object identifier arc*

Status: Published

Addresses: Provides for the registration of object identifier (OID) arcs which enable identification of different kinds of alerts and alerting agencies

[ITU-T X.1303] *Common alerting protocol (CAP 1.1)*

Status: Published

Addresses: Common alerting protocol (CAP), which is a simple but general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks.

### 8.10 Signalling to support IEPS/ETS

#### 8.10.1 AAL2 (Capability Set 3) protocol

##### 8.10.1.1 ITU-T

[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*

Status: Published

Addresses: Extension of AAL2 to support IEPS

#### 8.10.2 BICC protocol

##### 8.10.2.1 ITU-T

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

Status: Published

Addresses: Extension of BICC to support IEPS

#### 8.10.3 B-ISUP and DSS2

##### 8.10.3.1 ITU-T

[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*

Status: Published

Addresses: 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*

Status: Published

Addresses: Extension to support IEPS

[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*

Status: Published

Addresses: Extension to support IEPS

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

Status: Published

Addresses: 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*

Status: Published

Addresses: Extensions to support IEPS

### 8.10.4 Gateway control protocol

#### 8.10.4.1 ITU-T related Recommendations

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

Status: Published

Addresses: Support of IEPS/ETS capability

### 8.10.5 ISUP

#### 8.10.5.1 ITU-T

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

Status: Published

Addresses: ISUP support for provision of capability for identifying 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*

Status: Published

Addresses: 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*

Status: Published

Addresses: 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*

Status: Published

Addresses: 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 Scheme*

Status: Published

Addresses: Interconnection of non-heterogeneous ISDNs which support IEPS

### 8.10.6 ITU-T H.323

#### 8.10.6.1 ITU-T

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

Status: Published

Addresses: Call Marking
Country/international network of call origin
Definition of messages to be used
Priority levels

## 8.11 Quality of service

### 8.11.1 ITU-T

[ITU-T H.361 A1] *End-to-end quality of service (QoS) and service priority signalling in H.323 systems – 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"*

Status: Published

Addresses: IntServ/RSVP QoS support for ITU-T H.323 systems

## 8.12 Transport capabilities

### 8.12.1 ITU-T

[ITU-T Y.1271] *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*

Status: Published

Addresses: General network requirements

## 8.13 Policy control

### 8.13.1 ITU-T

[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*

Status: Published

Addresses: ETS signalling aspects for policy control

[ITU-T Q.3303.3 v3] *Protocols at the Rw interface between a pPolicy dDecision pPhysical eEntity (PD-PE) and a pPolicy eEnforcement pPhysical eEntity (PE-PE): Diameter pProfile version 3*

Status: Published

Addresses: ETS signalling aspects for policy control

## 9 List of SDOs and other organizations involved with ETS

This clause provides an alphabetical list of standard development organizations (SDOs) and other organizations involved in ETS activities. A table identifying ETS related work that is either published or under development is provided for the SDOs. Some of the documents identified in this clause are also identified in clause 8. They are repeated in this clause to provide the reader with an organizational view based on SDOs.

### 9.1 3GPP

The original scope of the 3rd Generation Partnership Project (3GPP) was to produce technical specifications and technical reports for a 3G mobile system based on evolved GSM core networks and the radio access technologies that they support (i.e., universal terrestrial radio access (UTRA) both frequency division duplex (FDD) and time division duplex (TDD) modes). The scope of 3GPP was amended to include the maintenance and development of the global system for mobile communication (GSM) technical specifications and technical reports including evolved radio access technologies (e.g., general packet radio service (GPRS) and enhanced data rates for GSM evolution (EDGE)).

3GPP SA working group (WG) 1 has developed a stage 1 technical specification for multimedia priority service (MPS) that supports voice, video, and priority data bearer service for MPS.

Based on the 3GPP stage 2 requirements, 3GPP CT and RAN will specify changes to the existing stage 3 specifications to support MPS.

Access technologies of interest are universal mobile telecommunications system (UMTS) and long term evolution (LTE).

3GPP has ETS related work activities in the context of radio access network (RAN) and IP multimedia subsystem (IMS) core network technologies.

**Table 1 – Example 3GPP documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [3GPP TS 22.101] | Service Aspects; Service Principles, Release 11 | Stage 1 | Published |
| [3GPP TS 22.153] | Multimedia Priority Service, Release 11 | Stage 1 | Published |
| [3GPP TR 22.950] | Priority Service Feasibility Study, Release 11 | | Published |
| [3GPP TR 22.952] | Priority Service Guide, Release 11 | | Published |
| [3GPP TS 23.401] | General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access, Release 11 | Stage 2; MPS; policy control; paging priority | Published |
| [3GPP TS 23.203] | Policy and charging control architecture, Release 11 | Stage 2; Policy control | Published |
| [3GPP TS 23.228] | IP Multimedia Subsystem (IMS); Stage 2, Release 11 | Stage 2; Policy control | Published |
| [3GPP TS 29.212] | Policy and charging control over Gx reference point, Release 11 | Stage 3; Policy control | Published |
| [3GPP TS 29.213] | Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping, Release 11 | Stage 3; Policy control | Published |
| [3GPP TS 29.214] | Policy and charging control over Rx reference point, Release 11 | Stage 3; Policy control | Published |

**Table 1 – Example 3GPP documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [3GPP TS 24.301] | Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 11 | Stage 3; paging priority | Published |
| [3GPP TS 24.008] | Mobile radio interface Layer 3 specification; Core network protocols; Stage 3, Release 11 | Stage 3; paging priority | Published |
| [3GPP TS 29.118] | Mobility Management Entity (MME) – Visitor Location Register (VLR) SGs interface specification, Release 11 | Stage 3; paging priority | Published |
| [3GPP TS 29.274] | 3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3, Release 11 | Stage 3; paging priority | Published |
| [3GPP TS 36.331] | Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 11 | Stage 3; paging priority | Published |
| [3GPP TS 36.413] | Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP), Release 11 | Stage 3; paging priority | Published |
| [3GPP TS 23.008] | Organization of subscriber data, Release 11 | Stage 3; MPS subscription and IMS priority treatment. | Published |
| [3GPP TS 24.229] | IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |
| [3GPP TS 29.228] | IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |
| [3GPP TS 29.229] | Cx and Dx interfaces based on the Diameter protocol; Protocol details, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |
| [3GPP TS 29.230] | Diameter applications; 3GPP specific codes and identifiers, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |

**Table 1 – Example 3GPP documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [3GPP TS 29.272] | Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |
| [3GPP TS 29.328] | IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |
| [3GPP TS 29.329] | Sh interface based on the Diameter protocol; Protocol details, Release 11 | Stage 3; MPS subscription and IMS priority treatment | Published |
| [3GPP TS 29.162] | Interworking between the IM CN subsystem and IP networks, Release 11 | Stage 2; Requirements for MPS over Ix interface | Published |
| [3GPP TS 29.163] | Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks, Release 11 | Stage 2; Requirements for MPS over Mn interface | Published |
| [3GPP TS 29.232] | Media Gateway Controller (MGC) – Media Gateway (MGW) interface, Release 11 | Stage 3; Procedures for MPS over Mc interface for ICS | Published |
| [3GPP TS 29.238] | Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface, Ix interface, Release 11 | Stage 3, Procedures for MPS calls/sessions over Ix interface | Published |
| [3GPP TS 29.292] | Interworking between the IP Multimedia (IM) Core Network (CN) subsystem (IMS) and MSC Server for IMS Centralized Services (ICS), Release 11 | Stage 2; Requirements for MPS over Mc interface for ICS | Published |
| [3GPP TS 29.332] | Media Gateway Control Function (MGCF) – IM Media Gateway; Mn interface, Release 11 | Stage 3; Procedures for MPS over Mn interface | Published |
| [3GPP TS 29.333] | Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface, Release 11 | Stage 3; Procedures for MPS over Mp interface | Published |
| [3GPP TS 29.334] | IMS Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW); Iq Interface, Release 11 | Stage 3; Procedures for MPS calls/sessions over Iq interface | Published |

**Table 1 – Example 3GPP documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [3GPP TS 23.333] | Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface: Procedures descriptions, Release 11 | Stage 2; Requirements for MPS over Mp interface | Published |
| [3GPP TS 23.334] | IP Multimedia Subsystem (IMS) Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW) interface: Procedures descriptions, Release 11 | Stage 2; Requirements for MPS over Iq interface | Published |

## 9.2 3GPP2

The 3rd Generation Partnership Project 2 (3GPP2) is a collaborative 3G telecommunications standards-setting project comprising North American and Asian interests developing global specifications for ANSI/TIA/EIA-41 "Cellular Radiotelecommunication Intersystem Operations network evolution to 3G, and global specifications for the Radio Transmission Technologies (RTTs) supported by ANSI/TIA/EIA-41".

3GPP2 was born out of the ITU's IMT-2000 initiative, covering high speed, broadband, and IP-based mobile systems featuring network-to-network interconnection, feature/service transparency, global roaming and seamless services independent of location. IMT-2000 is intended to bring high-quality mobile multimedia telecommunications to a worldwide mass market by achieving the goals of increasing the speed and ease of wireless communications, responding to the problems faced by the increased demand to pass data via telecommunications and providing "anytime, anywhere" services.

3GPP2's specifications are developed within in the project's four technical specification groups (TSGs) comprised of representatives from the project's individual member companies. The TSGs are:

- TSG-A (access network interfaces),
- TSG-C (cdma2000 air interface),
- TSG-S (services and systems aspects),
- TSG-X (core networks).

The access network interfaces TSG (TSG-A) is responsible for the specification of interfaces between the radio access network and core network, as well as within the access network. TSG-A is also responsible for interworking between 3GPP2 technologies and with other radio access technologies. While there are no MMPS specific work activities in the Committee, several capabilities such as updating of bearer priority levels were introduced and adopted in network interface standards, and these capabilities may be used for providing MMPS.

The radio access TSG (TSG-C) is responsible for the radio access part, including its internal structure, of systems based on 3GPP2 specifications. While there are no MMPS specific work activities in the Committee, several capabilities such as queuing were introduced and adopted in the air interface standards and these capabilities may be used for providing MMPS.

The services and systems aspects TSG (TSG-S) is responsible for the development of service capability requirements for systems based on 3GPP2 specifications. It is also responsible for high level architectural issues, as required, to coordinate service development across the various TSGs. Multimedia priority service (MMPS) stage 1 requirements were developed in TSG-S and published as 3GPP2 S.R0117-0 v1.0.

The core networks TSG (TSG-X) is responsible for the specifications of the core network part of systems, based on 3GPP2 specifications. Currently TSG-X does not have any active work items in support of MMPS.

**Table 2 – Example 3GPP2 documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [S.R0117-A v1.0] | Multimedia Priority Service (MMPS) for MMD-based Networks – Stage 1 Requirements | | Published |
| [3GPP2 X.S0011-E v1.0] | cdma2000 Wireless IP Network Standard | | Published |
| [3GPP2 X.S0057-B v1.0] | E-UTRAN – eHRPD Connectivity and Interworking: Core Network Aspects | Support of MMPS included | Published |
| [3GPP2 X.S0058-0 v2.0] | WiMAX-HRPD Interworking: Core Network Aspects | Support of MMPS included | Published |
| [3GPP2 X.S0062-0 v1.0] | Policy and Charging Control (PCC) for cdma2000 1x and HRPD | Support of MMPS included | Published |
| [3GPP2 C.S0005] | Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems | Support of access overload class 12 on the air interface for priority mobiles | Published |
| [3GPP2 C.S0015] | Short Message Service (SMS) for Wideband Spread Spectrum Systems | Priority level indicator in messaging | Published |
| [3GPP2 C.S0024] | cdma2000 High Rate Packet Data Air Interface Specification | Mapping between 1x access overload classes and HRPD | Published |
| [3GPP2 C.S0063] | cdma2000 High Rate Packet Data Supplemental Services | Includes queuing on the EV-DO air interface for priority sessions | Published |
| [3GPP2 A.S0022-0v2.0] | Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN) | Includes new information elements for priority flows | Published |

**Table 2 – Example 3GPP2 documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [3GPP2 A.S0008-C v4.0] | Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network | Includes new information elements for priority flows | Published |
| [3GPP2 A.S0009-C v4.0] | Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function | Includes new information elements for priority flows | Published |

## 9.3 ATIS technical committees

### 9.3.1 PTSC

PTSC develops and recommends standards and technical reports related to services, architectures, and signalling, in addition to related subjects under consideration in other North American and international standards bodies.

The PTSC works on applicable services, architectures, signalling and associated security related aspects of ETS including wireline access.

### 9.3.2 Performance, reliability and quality of service (PRQC)

The ATIS PRQC works on performance, reliability, quality of service (QoS) and associated security related aspects of ETS.

PRQC develops and recommends standards, requirements and technical reports related to the performance, reliability, and associated security aspects of communications networks, as well as the processing of voice, audio, data, image and video signals and their multimedia integration.

The ATIS PRQC works on applicable performance, reliability, quality of service (QoS) and associated security related aspects of ETS.

### 9.3.3 WTSC

WTSC develops and recommends standards and technical reports related to wireless and/or mobile services and systems, including service descriptions and wireless technologies. WTSC develops and recommends positions on related subjects under consideration in other North American, regional and international standards bodies.

WTSC works on ETS related issues applicable to wireless and/or mobile services and systems and wireless technologies.

### 9.3.4 TMOC

The TMOC develops operations, administration, maintenance and provisioning standards, and other documentation related to operations support system (OSS) and network element (NE) functions and interfaces for communications networks with an emphasis on standards development related to North American communication networks in coordination with the development of international standards.

TMOC works on ETS related issues applicable to operations, administration, maintenance and provisioning.

### 9.3.5 ATIS documents

**Table 3 – Example ATIS documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [A-1000005] | ATIS-1000005 (2005), Service Description of ETS | | Published |
| [A-1000010] | ATIS-1000010 (2006), Support of Emergency Telecommunications Service (ETS) in IP Networks | | Published |
| [A-1000023] | ATIS-1000023 (2013), ETS Network Element Requirements for NGN IMS-based Deployments | | Published |
| [A-1000020] | ATIS-1000020 (2007), ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism. | | Published |
| [A-1000006] | Signalling System No.7 (SS7) – Emergency Telecommunications Service (ETS) | | Published |
| [ATIS-1000053] | Emergency Telecommunications Service (ETS) Profile and Tests for IP Network-to-Network Interconnection | ETS test plan for IP NNI interconnection | Published |
| [DA ETS SR] | Draft TR: Service Requirements of ETS in NGN | | Draft |
| [DA ETS WAR] | Draft Standard: ETS Wireline Access Requirements. | | Draft |
| [DA ETS NER] | Draft Standards: ETS Phase 2 Network Element Requirements | | Draft |
| [A-1000011] | ATIS-1000011 (2006), ETS Packet Priority for IP NNI Interfaces – Use of Existing DiffServ Per Hop Behaviors | | Published |
| [A-0300202] | ATIS-0300202 (2009), Guidelines for Network Management of the Public Switched Networks under Disaster Conditions | | Published |
| [ATIS-1000049] | End to End NGN GETS Call Flows | End-to-end call flows for ETS showing various access and core network scenarios | Published |
| [ATIS 1000679] | Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part | In support of ETS, SIP RPH to ISUP priority information (i.e., CPC NS/EP and precedence parameter) is specified | Published |

**Table 3 – Example ATIS documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [ATIS-1000034] | Next Generation Network (NGN): Security Mechanisms and Procedures | Appendix II of this standard provides information on emergency telecommunications service (ETS) interconnection security | Published |
| [ATIS-1000044] | ATIS Identity Management: Requirements and Use Cases Standard | Appendix III of this standard provides a set of ETS related use case examples on identity management | Published |
| [ATIS-1000055] | Emergency Telecommunications Service (ETS): Core Network Security Requirements | Framework and requirements for ETS authentication and authorization | Published |
| [ATIS-0100001] | User Plane Security Guidelines and Requirements for ETS | | Published |
| [ATIS-0100003] | User Plane Priority Levels for IP Networks and Services | | Published |
| [ATIS-0100004] | Availability & Restorability Aspects of Emergency Telecommunication Services (ETS) | | Published |
| [ATIS-0100006] | Service Restoration Priority Levels for IP Networks | | Published |
| [ATIS-0100009] | Overview of Standards in Support of Emergency Telecommunication Service (ETS) | | Published |
| [ATIS-0100011] | Priority for NS/EP Services in NGN/IP Environment – Role of TSP | | Published |
| [ATIS-0100022] | Priority Classification Levels for Next Generation Networks | | Published |
| [T1.TR.84-2004] | IP Network Traffic Priorities and ETS | | Published |
| [ATIS-0100036] | Media Plane Performance Security Impairments for Evolving VoIP/Multimedia Networks | Performance impact on the use of security mechanisms for ETS. | Published |
| [ATIS-0300100] | IP Network Disaster Recovery Framework | | Published |

## 9.4 Broadband Forum

The Broadband Forum (BBF) is the central organization responsible for developing broadband wireline solutions and empowering converged packet networks worldwide to better meet the needs of vendors, service providers and their customers.

The BBF develops multi-service broadband packet networking specifications addressing interoperability, architecture and management. This work enables home, business and converged broadband services encompassing customer, access and backbone networks.

The End-to-End Architecture Working Group has developed policy related specifications for policy-based decision making in wireline access domains [TR-134]. This group has also engaged in developing a policy-based wireless-wireline interworking specification jointly with the 3GPP [TR-203]. Policy rules apply to the application of quality of service (QoS), security, and charging rules. Several wireline and wireless-wireline interworking use cases have been developed to drive the requirements for these specifications. Emergency telecommunications service (ETS) is a critical use case that has been accepted for driving these requirements.

## 9.5 ETSI

The European Telecommunications Standards Institute (ETSI), produces globally-applicable standards for information and communications technologies (ICT) including fixed, mobile, radio, converged, broadcast and internet technologies. They are officially recognized by the European Union as a European standards organization.

**Table 4 – Example ETSI documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [ETSI TS 102 181] | Requirements for communication between authorities/organizations during emergencies | Published |
| [ETSI TS 102 182] | Requirements for communication from authorities to citizens during emergencies | Published |

## 9.6 IEEE

For further study.

## 9.7 IETF

The IETF is an international organization that develops standards and specifications applicable to the Internet. They primarily deal with very specific issues and do not concern themselves with systems, service or architectural aspects. Many ETS-related contributions have been submitted in the form of Internet-drafts (IDs) and some of these have become RFCs. The following IETF working groups are involved in addressing ETS aspects as a secondary function of their major work.

### 9.7.1 SIPCore Working Group

The Session Initiation Protocol Core (SIPCore) Working Group is chartered to maintain and continue the development of the core SIP specifications. The SIPCore working group defined [RFC 4412] for RPH in support of ETS.

### 9.7.2 TSVWG Working Group

The Transport Services Working Group (TSVWG) takes on work that is involved in the transport area. The TSVWG Working Group defined [RFC 5865] for a differentiated services code point (DSCP) for capacity-admitted traffic in support of ETS.

### 9.7.3 DIME Working Group

The Diameter Maintenance and Extensions Working Group focuses on maintenance and extensions to the Diameter protocol required to enable its use for authentication, authorization, accounting and provisioning in network access as well as for other applications environments (e.g., IP telephony, mobility). The DIME Working Group defined diameter AVPs for the Diameter protocol.

### 9.7.4 IETF documents

**Table 5 – Example IETF documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [RFC 4542] | Implementing an Emergency Telecommunications Service (ETS) for Real-Time Services in the Internet Protocol Suite | Published |
| [RFC 4412] | Communications Resource Priority for the Session Initiation Protocol (SIP) | Published |
| [RFC 5865] | A Differentiated Services Code Point (DSCP) for Capacity-Admitted Traffic | Published |
| [RFC 6735] | Diameter Priority Attribute Value Pairs | Published |
| [RFC 6679] | Explicit Congestion Notification (ECN) for RTP over UDP | Published |
| [RFC 6710] | Simple Mail Transfer Protocol extension for Message Priorities | Published |

## 9.8 ITU-T

The International Telecommunication Union Standardization Sector (ITU-T) has a number of Study Groups (SGs) that deal with various aspects of standardization.

### 9.8.1 SG2 – Operational aspects of service provision and telecommunications management

SG2 is the lead study group for service definition, numbering and routing. It is also the lead study group on telecommunication for disaster relief/early warning and on telecommunication management.

**Table 6 – Example SG2 documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [ITU-T E.107] | Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS | Published |
| [ITU-T E.106] | International Emergency Preference Scheme (IEPS) for disaster relief operations | Published |
| [ITU-T D E.TDR] | Draft ITU-T Recommendation E.TDR, Service and Operational framework for the provision of Telecommunication for Disaster Relief (TDR). | Draft |
| [ITU-T E.412] | Network management controls | Published |
| [ITU-T M.3350] | TMN service management requirements for information interchange across the TMN X-interface to support provisioning of Emergency Telecommunication Service (ETS) | Published |

### 9.8.2 SG9 – Television and sound transmission and integrated broadband cable networks

SG9 is the lead study group on integrated broadband cable and television networks.

**Table 7 – Example SG9 documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [ITU-T J.260] | Requirements for preferential telecommunications over IPCablecom networks | Published |
| [ITU-T J.170] | IPCablecom security specification | Published |
| [ITU-T J.261] | Framework for implementing preferential telecommunications in IPCablecom and IPCablecom2 networks | Published |
| [ITU-T J.262] | Specifications for authentication in preferential telecommunications over IPCablecom2 networks | Published |
| [ITU-T J.263] | Specification for priority in preferential telecommunications over IPCablecom2 networks | Published |
| [ITU-T J.163] | Dynamic quality of service for the provision of real-time services over cable television networks using cable modems | Published |
| [ITU-T J.366.2] | IPCablecom2 IP Multimedia Subsystem (IMS): Session handling – IM call model – Stage 2 specification | Published |
| [ITU-T J.366.3] | IPCablecom2 IP Multimedia Subsystem (IMS): Stage 2 specification | Published |
| [ITU-T J.366.4] | IPCablecom2 IP Multimedia Subsystem (IMS): Session Initiation Protocol (SIP) and Session Description Protocol (SDP) – Stage 3 specification | Published |
| [ITU-T J.366.7] | IPCablecom2 IP Multimedia Subsystem (IMS): Access Security for IP-based services | Published |

### 9.8.3 SG11 – Signalling requirements, protocols and test specifications

SG11 is the lead study group on signalling and protocols. It is also the lead study group on intelligent networks and test specifications.

**Table 8 – Example SG11 documents and work items related to ETS/IEPS**

| Reference | Title | Status |
|---|---|---|
| [ITU-T Q Sup.57] | Signalling requirements to support the emergency telecommunications service (ETS) in IP networks | Published |
| [ITU-T Q Sup.47] | Emergency services for IMT 2000 networks – Requirements for harmonization and convergence | Published |
| [ITU-T Q Sup.53] | Signalling requirements to support the International Emergency Preference Scheme (IEPS) | Published |
| [ITU-T Q-Sup.57] | Signalling requirements to support the emergency telecommunications service (ETS) in IP networks | Published |
| [ITU-T Q-Sup.61] | Evaluation of signalling protocols to support ITU-T Y.2171 admission control priority levels | Published |
| [ITU-T Q-Sup.63] | Signalling Protocol Mappings in Support of the Emergency Telecommunications Service in IP Networks | Published |
| [ITU-T Q.1902.1 A2] | Interworking between Signalling System No. 7 ISDN user part and the Bearer Independent Call Control protocol – | Published |

**Table 8 – Example SG11 documents and work items related to ETS/IEPS**

| Reference | Title | Status |
|---|---|---|
| | Amendment 2 – Support for the International Emergency Preference Scheme | |
| [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 | Published |
| [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 | Published |
| [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 | Published |
| [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 | Published |
| [ITU-T Q.1950 A1] | Bearer independent call bearer control protocol – New Annex G – Call bearer control – International Emergency Preference Scheme | Published |
| [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 | Published |
| [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 | Published |
| [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 | Published |
| [ITU-T Q.2764 A1] | Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures | Published |
| [ITU-T Q.2931] | Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control | Published |
| [ITU-T Q.761 A3] | Signalling System No. 7 – ISDN User Part functional description – Amendment 3 – Support for the International Emergency Preference Scheme | Published |
| [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 | Published |
| [ITU-T Q.763 A4] | Signalling System No. 7 – ISDN user part formats and codes – Amendment 4 – Support for the International Emergency Preference Scheme | Published |
| [ITU-T Q.764 A4] | Signalling system No. 7 – ISDN user part Signalling procedures – Amendment 4 – Support for the International Emergency Preference Scheme | Published |

**Table 8 – Example SG11 documents and work items related to ETS/IEPS**

| Reference | Title | Status |
|---|---|---|
| [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 | Published |
| [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 | Published |
| [ITU-T Q.3303.3 v3] | Protocols at the Rw interface between a pPolicy dDecision pPhysical eEntity (PD-PE) and a pPolicy eEnforcement pPhysical eEntity (PE-PE): Diameter pProfile version 3 | Published |

### 9.8.4 SG12 – Performance, QoS and QoE

SG12 is the lead study group on quality of service and quality of experience.

SG12 has no direct activity to report in support of ETS.

### 9.8.5 SG13 – Future networks including mobile and NGN

SG13 is the lead study group for future networks and NGN. It is also the lead study group on mobility management and fixed-mobile convergence.

**Table 9 – Example SG13 documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [ITU-T Y.1271] | Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks | Published |
| [ITU-T Y.2006] | Description of capability set 1 of NGN release 1 | Published |
| [ITU-T Y.2201] | Requirements and capabilities for ITU-T NGN | Published |
| [ITU-T Y.2205] | Next Generation Networks – Emergency Telecommunications – Technical considerations | Published |
| [ITU-T Y.2262] | PSTN/ISDN emulation and simulation | Published |
| [ITU-T Y.2271] | Call server-based PSTN/ISDN emulation | Published |
| [ITU-T Y.2171] | Admission control priority levels in Next Generation Networks | Published |
| [ITU-T Y.2172] | Service Restoration Priority Levels in Next Generation Networks | Published |
| [ITU-T Y.2111] | Resource and admission control functions in next generation networks | Published |
| [ITU-T Y.2701] | Security requirements for NGN release 1 | Published |
| [ITU-T Y.2702] | Authentication and authorization requirements for NGN release 1 | Published |
| [ITU-T Y.2704] | Security mechanisms and procedures for NGN | Published |
| [ITU-T Y.2720] | NGN identity management framework | Published |
| [ITU-T Y.2721] | NGN identity management requirements and use cases | Published |
| [ITU-T Y-Sup.12] | Supplement on NGN identity management mechanisms | Published |

**Table 9 – Example SG13 documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [ITU-T Y.2722] | ITU-T Recommendation Y.2722, NGN identity management mechanisms | Published |
| [ITU-T Y.2705] | ITU-T Recommendation Y.2705, Minimum security requirements for the interconnection of the Emergency Telecommunications Service (ETS) | Published |

### 9.8.6 SG15 – Optical transport networks and access network infrastructures

SG15 is the lead study group on access network transport, optical technology, and optical transport networks.

SG15 has no direct activity to report in support of ETS.

### 9.8.7 SG16 – Multimedia coding, systems and applications

SG16 is the lead study group on multimedia coding, systems and applications. It is also the lead study group on ubiquitous applications ("e-everything", such as e-health) and telecommunication/ICT accessibility for persons with disabilities.

**Table 10 – Example SG16 documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [ITU-T H-Sup.9] | ITU-T H-series Recommendation – 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) | | Published |
| [ITU-T H.246] | Interworking of H-series multimedia terminals with H-series multimedia terminals and voice/voiceband terminals on GSTN, ISDN and PLMN | | Published |
| [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" | | Published |
| [ITU-T H.460.4] | Call priority designation and country/international network of call origination identification for H.323 priority calls | | Published |
| [ITU-T H.248.1] | Gateway control protocol: Version 3 | | Published |
| [ITU-T H.361 A1] | End-to-end quality of service (QoS) and service priority signalling in H.323 systems – 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" | | Published |

**Table 10 – Example SG16 documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [ITU-T HSTP-AMSR] | HSTP-AMSR Technical paper: AMS Requirements | Includes requirements for Priority Services (e.g., ETS) in AMS (Project "H.325") | Published |
| H.248.1v3 Amendment 2 | H.248.1v3 Amendment 2 "Gateway Control Protocol: Version 3: New Appendix IV, plus corrections and clarifications" | Provides specifications supporting consistent use of "IEPS call indicator" and "Priority indicator" for ETS. | |
| [ITU-T H.248.81] | H.248.81"Gateway control protocol: Guidelines on the use of the international emergency preference scheme (IEPS) call indicator and priority indicator in ITU-T H.248 profiles " | | Published |
| [ITU-T H.248.82] | H.248.82 " Gateway control protocol: Explicit congestion notification (ECN) support " | | Published |

### 9.8.8 SG17 – Security

SG17 is the lead study group on telecommunication security, identity management (IdM) and languages and description techniques.

SG17 has no direct activity to report in support of ETS.

**Table 11 – Example SG17 documents and work items indirectly related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [ITU-T X.674] | Procedures for the registration of arcs under the Alerting object identifier arc | X.674 provides for the registration of object identifier (OID) arcs which enable identification of different kinds of alerts and alerting agencies. This Recommendation specifies the information and justification to be provided when requesting an OID for alerting purposes, and the procedures for the operation of the Registration Authority. | Published |

**Table 11 – Example SG17 documents and work items indirectly related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [ITU-T X.1303] | Common alerting protocol (CAP 1.1) | X.1303 specifies the common alerting protocol (CAP) which is a simple but general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks. CAP allows a consistent warning message to be disseminated simultaneously over many different warning systems, thus increasing warning effectiveness while simplifying the warning task. CAP also facilitates the detection of emerging patterns in local warnings of various kinds, such as might indicate an undetected hazard or hostile act. CAP also provides a template for effective warning messages based on best practices identified in academic research and real-world experience.X.1303 is technically equivalent and compatible with the OASIS Common Alerting Protocol, V1.1 standard. | Published |

### 9.8.9 Telecommunications Industry Association (TIA)

TIA is a leading association in the telecommunications and information technology industry. Three TIA technical standards groups, TR-8, TR-41, and TR-45, have issues related to ETS.

TR-8 develops and maintains standards for private radiocommunications systems and equipment for both voice and data applications. Within the telecommunications industry, TR-8 addresses all technical matters for systems and services including definitions, interoperability, compatibility and compliance requirements used in systems such as emergency services.

TR-41 deals with standardizing network interfaces from a terminal equipment perspective. TR-41's current standards development centres on two types of interfaces: 1) interfaces to enterprise networks and 2) interfaces to users.

TR-45 deals with the issues associated with wireless communications. The activity interfaces with international work on this subject in ITU-T on IMT-2000 and beyond and in 3GPP2.

**Table 12 – Example TIA documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [TIA-917] | Wireless Priority Service Enhancements for CDMA Systems | | Published |
| [TIA TSB-16] | Assignment of Access Overload Classes in the Cellular Telecommunications Services | Support allocation of access overload class 12 for priority mobiles | Published |
| [TIA TIA-835-E] | cdma2000 Wireless IP Network Standard | | Published |
| [TIA-1163-B] | E-UTRAN – eHRPD Connectivity and Interworking: Core Network Aspects | | Published |

**Table 12 – Example TIA documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [TIA-1164-1] | WiMAX-HRPD Interworking: Core Network Aspects | | Published |
| [TIA-1187] | Policy and Charging Control (PCC) for cdma2000 1x and HRPD | | Published |
| [TIA-2000.5] | Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems | | Published |
| [TIA-637] | Short Message Service (SMS) for Wideband Spread Spectrum Systems | | Published |
| [TIA-856] | High Rate Packet Data Air Interface Specification | | Published |
| [TIA-1054] | cdma2000 High Rate Packet Data Supplemental Services | | Published |
| [TIA-1140] | WiMAX™ – HRPD Interworking: Air Interface Specification | | Published |
| [TIA-1142-A] | Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN) | | Published |
| [TIA-878-D] | Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network | | Published |
| [TIA-1878-D] | Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function | | Published |

### 9.8.10 TM Forum

The TM Forum is the world's leading industry association focused on improving business effectiveness for service providers and their suppliers, including the production of best practices and standards.

**Table 13 – Example TMF documents and work items related to ETS**

| Reference | Title | Status |
|---|---|---|
| [GB 917] | Guide Book (GB) 917, SLA Management Handbook – Release 3.1 | Published |
| [GB 934] | Guide Book GB 934, Best Practice: Application Note to the SLA Management Handbook – Voice over IP – Release 2.0 | Published |
| [GB971] | Guide Book GB 971, ETS SLA Application Note | Published |

### 9.8.11 WiMAX Forum

The WiMAX Forum is an industry-led, not-for-profit organization formed to specify WiMAX air interface system profiles and network specifications and certify and promote the compatibility and interoperability of broadband wireless products based upon the harmonized IEEE 802.16/ETSI HiperMAN standard.

**Table 14 – Example WiMAX documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [WFM Stage 1-r1] | Service Provider Working Group (SPWG) ETS Phase 1 Requirements for Release 1.6, Feb., 2009. | | Published |
| [WFM Stage 1-r2] | WiMAX Forum – WMF-T31-122-R020v01 ETS Phase 2 Stage 1 Requirements, Release 2.0, Nov. 2009. | Extends the use cases and system requirements for IEEE 802.16m air interface | Published |
| [WFM Stage 2-a1] | WiMAX Forum – WFM-T32-001-R016v01: Network Architecture – Architecture Tenets, Reference Model and Reference Points, Base Specification, Release 1.6, ETS Stage 2 Specification (Section 7.14), November, 2010. | Includes ETS subscription types, their relationship with ETS invocation and network entry, high level priority indication flows, and high level priority treatment procedures in network entry, ETS service invocation, handover, and paging | Published |
| [WFM Stage 3-a1] | WiMAX Forum – WFM-T33-001-R016v01: Network Architecture – Detailed Protocols and Procedures, Base Specification, Release 1.6,ETS Stage 3 Specification (Section 4.19), November, 2010 | Includes priority indication procedures for network entry, AAA-based ETS invocation/revocation, handover, paging, transporting IP packets, priority treatment mechanisms based on priority resource allocation, scheduling/routing, queuing R1 connection resource requests; as well as priority related R3/R4/R6 messages and parameters | Published |
| [WFM Stage 2-a2] | WiMAX Forum – WFM-T32-001-R020v01: Network Architecture – Architecture Tenets, Reference Model and Reference Points, Base Specification, Release 2.0, ETS Stage 2 Specification (Section 7.14), April, 2012. | Includes PCC-based ETS in the architecture using the 3GPP Gxa interface between the WiMAX ASN gateway and the 3GPP PCRF | Published |

**Table 14 – Example WiMAX documents and work items related to ETS**

| Reference | Title | Notes | Status |
|---|---|---|---|
| [WFM Stage 3-a2] | WiMAX Forum – WFM-T33-001-R020v01: Network Architecture – Detailed Protocols and Procedures, Base Specification, Release 2.0,ETS Stage 3 Specification (Section 4.19), April, 2012 | Includes PCC-based ETS invocation and revocation, detailed data structure of the priority indication field, including allocation priority, pre-emption capability, and pre-emption vulnerability bits besides the priority indicator bit specified in IEEE 802.16; PCC interworking priority handling procedures for the WiMAX-3GPP interworking | Published |

# Appendix I

# Summaries of referenced standards

## I.1 ITU-T references and associated summaries

### I.1.1 Published Recommendations and supplements

[ITU-T E.106] Recommendation ITU-T E.106 (2003), *International Emergency Preference Scheme (IEPS) for disaster relief operations*.

This Recommendation describes an international preference scheme for the use of public telecommunications by national authorities for emergency and disaster relief operations. The international emergency preference scheme (IEPS) for disaster relief operations is needed when there is a crisis situation causing an increased demand for telecommunications when use of the international telephone service may be restricted due to damage, reduced capacity, congestion or faults. In crisis situations there is a requirement for IEPS users of public telecommunications to have preferential treatment.

[ITU-T E.107] Recommendation ITU-T E.107 (2007), *Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS.*

There is a potential for bilateral/multilateral agreement between cooperating countries/administrations to link their respective emergency telecommunications service (ETS) systems. This Recommendation provides guidance that will enable telecommunications between one ETS national implementation (ENI) and another ENI, in addition to providing a description of ETS.

[ITU-T E.412] Recommendation ITU-T E.412 (2003), *Network management controls*.

Network management controls provide the means to alter the flow of traffic in the network in support of the network management entities given in [ITU-T E.410]. Most network management controls are taken by or in the exchange (see [ITU-T Q.542]), but certain actions can be taken external to exchange. This Recommendation provides specific information on network management controls and gives guidance concerning their application. However, it should be noted that the suggested use for each network management control is given only for the purpose of illustration. Other controls, separately or in combination, may be more appropriate in any given situation.

[ITU-T H.246] Recommendation ITU-T H.246 (2006) Interworking of H-series multimedia terminals with H-series multimedia terminals and voice/voiceband terminals on GSTN, ISDN and PLMN.

This Recommendation describes gateways which provide protocol interworking between H-series multimedia terminals and other H Series multimedia terminals, voice/voiceband terminals on GSTN or ISDN, V.70 terminals on the GSTN, and multi-call applications on the GSTN. ITU-T H.246 gateways provide the required translation of control and media streams to allow interworking between terminals running different protocols.

[ITU-T H.248.1] Recommendation ITU-T H.248.1 (2013), *Gateway control protocol: Version 3*.

To achieve greater scalability, this Recommendation decomposes the ITU-T H.323 gateway function defined in [ITU-T H.246] into functional subcomponents and specifies the protocols these components use to communicate. This allows implementations of ITU-T H.323 gateways to be highly scalable and encourages leverage of widely deployed switched circuit network (SCN) capabilities such as SS7 switches. This also enables ITU-T H.323 gateways to be composed of components from multiple vendors distributed across multiple physical platforms. The purpose of this Recommendation is to add capabilities currently defined for ITU-T H.323 systems and is intended to provide new ways of performing operations already supported in ITU-T H.323.

This revision contains a number of clarifications on:

– Signal behaviour on new Streams;

– time based Statistics and their applicability to multi flow streams;

– the impact of the Mode property on Statistics;

– Event behaviour with respect to new Streams;

– ServiceChange version handling.

[ITU-T H.248.81] Recommendation ITU-T H.248.81, *Gateway control protocol: Guidelines on the use of the international emergency preference scheme (IEPS) call indicator and priority indicator in ITU-T H.248 profiles*.

In support of priority services (e.g., emergency telecommunications service (ETS), multimedia priority service (MPS)), this Recommendation provides guidelines on the use of the international emergency preference scheme (IEPS) call indicator and priority indicator in ITU-T H.248 profiles for ITU-T H.323 and NGN systems. These guidelines may be used by other standards developing organizations (SDOs) when defining their ITU-T H.248.1 profiles in support of priority services (e.g., ETS). Amendment 1 to [ITU-T H.248.81] introduces the additions and corrections to [ITU-T H.248.81]. It also adds Appendix II, "Use of Explicit Congestion Notification (ECN) in the context of ETS traffic".

[ITU-T H.248.82] Recommendation ITU-T H.248.82, *Gateway control protocol: Explicit congestion notification (ECN) support*.

This Recommendation defines a package to allow ITU-T H.248 controlled media gateways to support explicit congestion notification (ECN). ECN is a mechanism to provide indications of incipient congestion affecting an RTP stream to a receiver and, usually, to a sender. ECN when used with an RTP stream over UDP uses the RTP Control Protocol to provide feedback of ECN congestion markings to an RTP sender. The mechanism allows senders and/or receivers to react in order to reduce congestion in real-time communications. This Recommendation only describes the use of ECN in RTP over UDP streams.

[ITU-T H.361] Recommendation ITU-T H.361 (2006), *End-to-end quality of service (QoS) and service priority signalling in ITU-T H.323 systems*.

This Recommendation defines the ITU-T H.323 quality of service (QoS) and service priority signalling for exchanging, negotiating and controlling QoS and service priority parameters among the ITU-T H.323 entities in a call. These calls may involve multiple network operator domains, multiple service domains, and heterogeneous transport mechanisms (e.g., mixed IP, ATM, and MPLS environments). In a single network operator domain or ITU-T H.323 service domain, the QoS policies and mechanisms are usually homogenous and therefore the negotiation and establishment of QoS for a call is relatively simple. However, the same is relatively more complex when a call has to traverse multiple service or network domains each of which has its own set of policies and mechanisms. This Recommendation describes the QoS and priority signalling to enable an ITU-T H.323-based call to acquire QoS irrespective of the number of domains it traverses.

[ITU-T H.361 A1] Recommendation ITU-T H.361 Amendment 1 (2008), *End-to-end quality of service (QoS) and service priority signalling in ITU-T H.323 systems – Amendment 1 – New Annex A "IntServ/RSVP support for H.323 systems", Annex B "DiffServ support for ITU-T H.323 systems" and Annex C "Priority support for ITU-T H.323 systems"*.

Amendment 1 to Recommendation ITU-T H.361 introduces three new annexes.

Annex A describes the procedures of ITU-T H.323 quality of service (QoS) signalling when RSVP-based QoS signalling is used in the transport plane. Resource reservation protocol (RSVP) is the QoS signalling protocol used in the integrated services (IntServ) architecture. RSVP is a path-based QoS mechanism which is used to reserve resources for both individual flows and flow aggregates. RSVP can be used in a pure IntServ architecture or can be coupled with differentiated services architecture (DiffServ) to provide IntServ operation over DiffServ network. Annex A describes the procedures for ITU-T H.323 QoS to allow the use of RSVP in the transport plane.

Annex B describes the procedures of ITU-T H.323 QoS signalling under the differentiated services (DiffServ) architecture in the transport plane. DiffServ is a class-based QoS architecture which supports in-band signalling. The signalling occurs via a value defined in the differentiated services (DS) field of the IP header. This value is referred to as the differentiated services code point (DSCP). The packet forwarding treatment given to a packet in a network device is based on the DSCP value.

Annex C describes the QoS service priority support signalling used for ITU-T H.323 systems. The service priority mechanism defines procedures and constructs within the signalling plane that are used to prioritize bearer traffic during periods of resource contention. This allows traffic of higher priority to receive preferred QoS treatment.

[ITU-T H.460.4] Recommendation ITU-T H.460.4 (2007), *Call priority designation and country/international network of call origination identification for ITU-T H.323 priority calls*.

There is a desire to provide higher than normal priority call services to support several different applications. These applications include calls by authorized emergency personnel during disaster relief efforts, emergency calls by the public, or calls governed by service level agreements which specify a higher than normal probability of call completion. In order to provide these priority call services, it is necessary to signal to network elements such as gatekeepers, border elements and gateways that a call requires priority handling. This Recommendation defines messages and procedures necessary to signal the desired priority and country/international network of call origination for an ITU-T H.323 priority call.

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

Supplement 9 to ITU-T H-series Recommendations defines the operation of ITU-T H.248.1, version 3, with ITU-T H.225, session initiation protocol (SIP) and integrated services digital network user part (ISUP) in support of emergency telecommunications service (ETS)/international emergency preference scheme (IEPS) priority information.

[ITU-T J.160] Recommendation ITU-T J.160 (2002), *Architectural framework for the delivery of time-critical services over cable television networks using cable modems*.

This Recommendation provides the architectural framework that will enable cable television operators to provide time-critical services over their networks that have been enhanced to support cable modems.

[ITU-T J.163] Recommendation ITU-T J.163 (2007), *Dynamic quality of service for the provision of real-time services over cable television networks using cable modems*.

ITU-T Recommendation J.163 addresses requirements for a client device to obtain access to network resources. In particular, it specifies a comprehensive mechanism for a client device to request a specific quality of service from the DOCSIS network. Extensive examples illustrate the use of this Recommendation. The scope of this Recommendation is to define the QoS architecture for the "Access" portion of the IPCablecom network, provided to requesting applications on a per-flow basis. The access portion of the network is defined to be between the multimedia terminal adapter (MTA) and the cable modem termination system (CMTS), including the DOCSIS network. The method of QoS allocation over the backbone is unspecified in this Recommendation. Interface to the managed IP backbone and issues related to IP multicast are not within the scope of this Recommendation. This Recommendation also recognizes that per-flow reservations may be required within the customer premises, and the protocol developed addresses this potential need.

[ITU-T J.170] Recommendation ITU-T J.170 (2005), *IPCablecom security specification*.

This Recommendation defines the IPCablecom Security architecture, protocols, algorithms, associated functional requirements and any technological requirements that can provide for the security of the system for the IPCablecom network.

[ITU-T J.260] Recommendation ITU-T J.260 (2005), *Requirements for preferential telecommunications over IPCablecom networks*.

This Recommendation defines requirements for preferential telecommunications over IPCablecom networks. The essential aspects of preferential telecommunications over IPCablecom that this Recommendation covers can be grouped into two areas: prioritization and authentication. These two areas include capabilities to support telecommunications in IPCablecom that may require preferential treatment (e.g., telecommunications for disaster relief and emergency telecommunications service).

The implementation of priority and authentication is necessary for the support of preferential telecommunications in IPCablecom networks.

[ITU-T J.261] Recommendation ITU-T J.261 (2009), *Framework for implementing preferential telecommunications in IPCablecom and IPCablecom2 networks*.

This Recommendation provides a framework for implementing preferential capabilities in IPCablecom and IPCablecom2 networks.

The approach of this Recommendation is to define a framework for capabilities that can be utilized to meet the requirements in [ITU-T J.260] and forms the basis for detailed IPCablecom and IPCablecom2 Recommendations in support of preferential telecommunications.

[ITU-T J.262] Recommendation ITU-T J.262 (2009), *Specifications for authentication in preferential telecommunications over IPCablecom2 networks*.

This Recommendation is one of a series of Recommendations to enable support for preferential telecommunications services over IPCablecom networks. It defines the specifications for authentication in Preferential Telecommunications over IPCablecom2 networks. These specifications satisfy the requirements defined in [ITU-T J.260]. The essential aspects of Preferential Telecommunication over IPCablecom2 can be grouped into two areas: prioritization and authentication. This Recommendation defines specifications for authentication only. Authentication must be utilized to prevent unauthorized use of premium services and for emergency services in IPCablecom2 that may require preferential treatment (e.g., telecommunications for disaster relief and emergency telecommunications service).

User authentication is necessary to determine whether to authorize a request for preferential telecommunications services. This Recommendation covers only authentication and does not address which services the authenticated user is authorized to use.

[ITU-T M.3350] Recommendation ITU-T M.3350 (2004), *TMN service management requirements for information interchange across the TMN X-interface to support provisioning of Emergency Telecommunication Service (ETS).*

This Recommendation provides the basic functional requirements, framework, and use-cases for interchange of service management information across the TMN X-interface between a service customer and service provider, both officially authorized, associated with provision of emergency telecommunication service (ETS). This capability is called the emergency telecommunication service (ETS) management service (ETSMS).

[ITU-T J.263] Recommendation ITU-T J.263 (2009), *Specification for priority in preferential telecommunications over IPCablecom2 networks*.

This Recommendation is one of a series of Recommendations to enable support for preferential telecommunication services over IP Cablecom2 networks. It defines the specifications for priority for preferential telecommunications services over IPCablecom2 networks. These specifications satisfy the [ITU-T J.260] requirements. The essential aspects of preferential telecommunication over IPCablecom2 can be grouped into two areas: prioritization and authentication. This Recommendation provides specifications for priority only. Prioritization may be utilized for premium services and for emergency services in IPCablecom2 that may require preferential treatment (e.g., telecommunications for disaster relief and emergency telecommunications service).

The implementation of priority and authentication is necessary for the support of preferential telecommunications services in IPCablecom networks. This Recommendation only covers technical aspects for achieving priority treatment in IPCablecom2 networks.

[ITU-T Q.761] Recommendation ITU-T Q.761 (1999), *Signalling System No. 7 – ISDN User Part functional description*.

The ISDN user part is the signalling system No. 7 protocol which provides the signalling functions required to support basic bearer services and supplementary services for voice and non-voice applications in an integrated services digital network.

The ISDN user part is also suited for application in dedicated telephone and circuit switched data networks and in analogue and mixed analogue/digital networks. In particular, the ISDN user part meets the requirements defined by the ITU-T for worldwide international semi-automatic and automatic telephone and circuit switched data traffic.

The ISDN user part is furthermore suitable for national applications. Most signalling procedures, information elements and message types specified for international use are also required in typical national applications. Moreover, coding space has been reserved in order to allow national Administrations and recognized operating agencies to introduce network specific signalling messages and elements of information within the internationally standardized protocol structure.

[ITU-T Q.761 A3] Recommendation ITU-T Q.761 Amendment 3 (2006), *Signalling System No. 7 – ISDN User Part functional description – Amendment 3 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the need for the implementation of the International Emergency Preference Scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.761] (1999) in order to accommodate these needs. This amendment should be read in conjunction with Amendment 3 to [ITU-T Q.762], Amendment 4 to [ITU-T Q.763], and Amendment 4 to [ITU-T Q.764]. This amendment incorporates Amendment 2 to [ITU-T Q.761] and provides enhancements.

[ITU-T Q.762] Recommendation ITU-T Q.762 (1999), *Signalling System No. 7 – ISDN User Part general functions of messages and signals*.

This Recommendation ITU-T describes the messages, parameters and the signalling information contained within parameters used by the ISDN user part protocol, and their function.

[ITU-T Q.762 A3] Recommendation ITU-T Q.762 Amendment 3 (2006), *Signalling System No. 7 – ISDN User Part general functions of messages and signals – Amendment 3 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.762] (1999) in order to accommodate these needs. This amendment should be read in conjunction with Amendment 3 to [ITU-T Q.761], Amendment 4 to [ITU-T Q.763], and Amendment 4 to [ITU-T Q.764]. This amendment incorporates Amendment 1 to [ITU-T Q.762] and provides enhancements.

[ITU-T Q.763] Recommendation ITU-T Q.763 (1999), *Signalling System No. 7 – ISDN user part formats and codes*.

This Recommendation specifies the formats and codes of the ISDN user part messages and parameters required to support basic bearer services and supplementary services.

[ITU-T Q.763 A4] Recommendation ITU-T Q.763 Amendment 4 (1999), *Signalling System No. 7 – ISDN user part formats and codes – Amendment 4 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. This amendment contains the modifications to [ITU-T Q.763] (1999) in order to accommodate these needs. It should be read in conjunction with Amendment 3 to [ITU-T Q.761], Amendment 3 to [ITU-T Q.762], and Amendment 4 to [ITU-T Q.764]. This amendment incorporates Amendment 2 to [ITU-T Q.763] and provides enhancements.

[ITU-T Q.764] Recommendation ITU-T Q.764 (1999), *Signalling system No. 7 – ISDN user part signalling procedures*.

This Recommendation describes the ISDN user part signalling procedures of the set-up and clear down of national and international ISDN connections used for "ISUP 2000". Actions common for all types of exchanges are described only once. Different or additional actions required in an exchange are specified in a separate clause applicable to that type of exchange. The procedures specified in clause 2 relate to basic call (i.e. calls not involving supplementary services and IN).

[ITU-T Q.764 A4] Recommendation ITU-T Q.764 Amendment 4 (2006), *Signalling system No. 7 – ISDN user part signalling procedures – Amendment 4 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.764] (1999) in order to accommodate these needs. This amendment should be read in conjunction with Amendment 3 to [ITU-T Q.761], Amendment 3 to [ITU-T Q.762], and Amendment 4 to [ITU-T Q.763]. This amendment incorporates Amendment 2 to [ITU-T Q.764] and provides enhancements.

[ITU-T Q.767] Recommendation ITU-T Q.767 (1991), *Application of the ISDN User Part of CCITT signalling system No. 7 for international ISDN interconnections*.

ISDN international interconnections have to be realized between non homogeneous ISDNs that differ in terms of services supported, national network signalling system and national access protocol.

In order to perform such international ISDN interconnections, it is required to specify unambiguously and without options:

- the service capabilities of the international signalling system;
- the international signalling interface, i.e., the signalling information elements and messages sent and received on the international signalling section and the related procedures;
- all additional information, which is not specifically signalling system related, but which is needed to absorb the potential differences between the national networks.

Section 2

NOTE – This is abridged text.

[ITU-T Q.767 A1] Recommendation ITU-T Q.767 Amendment 1 (2002), *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*.

This amendment was produced to meet the urgent need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. This amendment contains the modifications to [ITU-T Q.767] (1991) in order to accommodate these needs.

[ITU-T Q.1902.1] Recommendation ITU-T Q.1902.1 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Functional description*.

This Recommendation provides a functional description of the Bearer Independent Call Control (BICC) protocol for the support of narrowband ISDN services independent of the bearer technology and signalling message transport technology used.

[ITU-T Q.1902.1 A2] Recommendation ITU-T Q.1902.1 Amendment 2 (2006), *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*.

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.1902.1] (2001) in order to accommodate these needs. This amendment should be read in conjunction with Amendment 3 to [ITU-T Q.1902.2], Amendment 3 to [ITU-T Q.1902.3], and Amendment 3 to [ITU-T Q.1902.4]. This amendment incorporates Amendment 1 to [ITU-T Q.1902.1] and provides enhancements.

[ITU-T Q.1902.2] Recommendation ITU-T Q.1902.2 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: General functions of messages and parameters*.

This Recommendation describes the messages, parameters and the signalling information contained within parameters used by the Bearer Independent Call Control (BICC) protocol and the ISDN user part, and their functions.

[ITU-T Q.1902.2 A3] Recommendation ITU-T Q.1902.2 Amendment 3 (2006), *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.*

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.1902.2] (2001) in order to accommodate these needs. This amendment should be read in conjunction with Amendment 2 to [ITU-T Q.1902.1], Amendment 3 to [ITU-T Q.1902.3], and Amendment 3 to [ITU-T Q.1902.4]. This amendment incorporates Amendment 1 to [ITU-T Q.1902.2] and provides enhancements.

[ITU-T Q.1902.3] Recommendation ITU-T Q.1902.3 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No.7 ISDN User Part: Formats and codes*.

This Recommendation specifies the formats and codes of the bearer independent call control (BICC) protocol for the support of narrow-band ISDN services independent of the bearer technology and signalling message transport technology used. It also specifies ISDN user part messages and parameters required to support basic bearer services and supplementary services according to ITU-T Q.761. Where a message, a parameter, a parameter field or a parameter field value is

not supported by one of the two protocols or they interpret a code point differently, it is indicated in this Recommendation.

[ITU-T Q.1902.3 A3] Recommendation ITU-T Q.1902.3 Amendment 3 (2006), *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*.

This Amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.1902.3] in order to accommodate these needs. This amendment should be read in conjunction with Amendment 2 to [ITU-T Q.1902.1], Amendment 3 to [ITU-T Q.1902.2], and Amendment 3 to [ITU-T Q.1902.4]. This amendment incorporates Amendment 1 to [ITU-T Q.1902.3] and provides enhancements.

[ITU-T Q.1902.4] Recommendation ITU-T Q.1902.4 (2001), *Bearer independent call control protocol (Capability Set 2): Basic call procedures*.

This Recommendation describes the bearer independent call control (BICC) basic call procedures for the support of narrow-band ISDN services independent of the bearer technology and signalling message transport technology used (Capability Set 2).

[ITU-T Q.1902.4 A3] Recommendation ITU-T Q.1902.4 Amendment 3 (2006), *Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures – Amendment 3 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) for disaster recovery operations as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.1902.4] in order to accommodate these needs. This amendment should be read in conjunction with Amendment 2 to [ITU-T Q.1902.1], Amendment 3 to [ITU-T Q.1902.2], and Amendment 3 to [ITU-T Q.1902.3]. This amendment incorporates Amendment 1 to [ITU-T Q.1902.4] and provides enhancements

[ITU-T Q.1950] Recommendation ITU-T Q.1950 (2002), *Bearer independent call bearer control protocol*.

This Recommendation provides the procedures, commands, parameters, messages and signalling information of the bearer independent call bearer control (CBC) protocol for the support of narrow-band ISDN services independent of the bearer technology and signalling message transport technology used.

[ITU-T Q.1950 A1] Recommendation ITU-T Q.1950 Amendment 1 (2006), *Bearer independent call bearer control protocol – New Annex G – Call bearer control – International Emergency Preference Scheme*.

This amendment contains the procedures, formats and codes with regard to the call bearer control (CBC) function to support the international emergency preference scheme (IEPS), which is specified in [ITU-T E.106], in bearer independent call control (BICC) based networks.

[ITU-T Q.2630.3] Recommendation ITU-T Q.2630.3 (2003), *AAL type 2 signalling protocol – Capability Set 3*.

This Recommendation specifies the inter-node protocol and nodal functions that control AAL type 2 point-to-point connections.

The AAL type 2 signalling protocol specified in this Recommendation is usable in switched and non-switched environments and can operate in public or private networks over a range of signalling transport protocol stacks.

It also provides maintenance capabilities, carriage of user-plane protocol stack information and carriage of an identifier to link the connection control protocol with other higher layer control protocols.

[ITU-T Q.2630.3 A1] Recommendation ITU-T Q.2630.3 (2006) Amendment 1, *AAL type 2 signalling protocol – Capability Set 3- Amendment 1 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.2630.3] in order to accommodate these needs. This amendment is designed to be compatible with implementations conforming to [ITU-T Q.2630.3].

[ITU-T Q.2761] Recommendation ITU-T Q.2761 (1999), *Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7*.

This Recommendation is one of a set of Recommendations that describe the broadband ISDN user part. It specifies an overview of the signalling capabilities and functions required to support basic call and bearer services, additional features and supplementary services for B-ISDN applications.

The scope of the B-ISDN user part covers international B-ISDN networks. However, the B-ISDN user part is suitable for national applications. Most signalling procedures, information elements and message types specified for international use are also required in typical national applications.

[ITU-T Q.2761 A1] Recommendation ITU-T Q.2761 Amendment 1(2002), *Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7 – Amendment – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the urgent need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. This amendment contains the modifications to [ITU-T Q.2761] in order to accommodate these needs. This amendment should be read in connection with the related amendments to [ITU-T Q.2762], [ITU-T Q.2763], and [ITU-T Q.2764].

[ITU-T Q.2762] Recommendation ITU-T Q.2762 (1999), *General functions of messages and signals of the B-ISDN User Part (B-ISUP) of Signalling System No. 7*.

This Recommendation is one of a set of Recommendations that describe the broadband ISDN user part. It describes the elements of signalling information and their function used by the B-ISDN user part protocol

to support basic bearer services and supplementary services for Capability Set 1 B-ISDN applications.

[ITU-T Q.2762 A1] Recommendation ITU-T Q.2762 Amendment 1(2002), *General functions of messages and signals of the B-ISDN User Part (B-ISUP) of Signalling System No. 7 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the urgent need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. This amendment contains the modifications to [ITU-T Q.2762] in order to accommodate these needs. This amendment should be read in connection with the related amendments to [ITU-T Q.2761], [ITU-T Q.2763], and [ITU-T Q.2764].

[ITU-T Q.2763] Recommendation ITU-T Q.2763 (1999), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes*.

This Recommendation ITU-T is one of a set of ITU-T Recommendations that describe the broadband ISDN user part. It specifies the formats and codes of the B-ISDN user part messages and parameters required to support basic bearer services and supplementary services.

The scope of the B-ISDN user part covers international B-ISDN networks. However, the B-ISDN user part is suitable for national applications. Most messages and parameters specified for international use are also required in typical national applications.

[ITU-T Q.2763 A1] Recommendation ITU-T Q.2763 Amendment 1(2002), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes – Amendment 1 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the urgent need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. This amendment contains the modifications to [ITU-T Q.2763] in order to accommodate these needs. This amendment should be read in connection with the related amendments to [ITU-T Q.2761], [ITU-T Q.2762], and [ITU-T Q.2764].

[ITU-T Q.2764] Recommendation ITU-T Q.2764 (1999), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures*.

This ITU-T Recommendation is one of a set of Recommendations that describe the broadband ISDN user part for broadband signalling capability Set 1 and beyond.

This ITU-T Recommendation describes the procedures relating to:

- Basic call setup and clear down;
- Maintenance facilities.

[ITU-T Q.2764 A1] Recommendation ITU-T Q.2764 Amendment 1(2002), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures – Amendment 1 – Support for the International Emergency Preference Scheme*.

This amendment was produced to meet the urgent need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. This amendment contains the modifications to [ITU-T Q.2764] in order to accommodate these needs. This amendment should be read in connection with the related amendments to [ITU-T Q.2761], [ITU-T Q.2762], and [ITU-T Q.2763].

[ITU-T Q.2931] Recommendation ITU-T Q.2931 (1995), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.

This Recommendation specifies the procedures for the establishing, maintaining and clearing of network connections at the B-ISDN user network interface. The procedures are defined in terms of messages exchanged.

This Recommendation is intended to specify the essential features, procedures and messages required for call/connection control. However, there are some details of procedure which have not yet been specified, and which will be subject to further study.

[ITU-T Q.2931 A5] Recommendation ITU-T Q.2931 Amendment 5 (2006), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control – Amendment 5 – Support for the International Emergency Preference Scheme*.

[ITU-T Q.2931] provides basic call and connection control for point-to-point connections in a B-ISDN. This amendment was produced to meet the need for the implementation of the international emergency preference scheme (IEPS) as specified in [ITU-T E.106]. It contains the modifications to [ITU-T Q.2931] in order to accommodate these needs. This amendment is designed to be compatible with implementations conforming to [ITU-T Q.2931] and its Amendments 1, 2, 3 and 4.

[ITU-T Q.3301.1 v3] Recommendation ITU-T Q.3301.1 v3 (2013), *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.3301v3] specifies the rcp1 protocol, a protocol between service control entities (SCEs) in the services stratum and the policy decision physical entity (PD-PE) in the resource and admission control function block. This protocol can be used to request and commit transport resources, to retrieve address mapping information that can be used to modify application signalling, and to receive reports on transport resource usage for charging. It satisfies the requirements for information flows across the Rs reference point as specified in clause 8.1 of [ITU-T Y.2111].

Addresses: ETS signalling aspects for policy control

[ITU-T Q.3303.3 v3] Recommendation ITU-T Q.3303.3 v3 (2013), *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.3303.3 v3] provides the stage 3 specification of the interface between policy decision physical entities (PD-PE) and the Policy Enforcement Physical Entity (PE-PE) using the Diameter protocol. The functional requirements and the stage 2 specification for this interface are defined in [ITU-T Y.2111]. The Diameter profile version 3 specified in this document has additional attribute-value pairs to comply with the additional requirements indicated in [ITU-T Y.2111] and support emergency telecommunication service (ETS) requirements.

[ITU-T Q-Sup.47] ITU-T Q-series Recommendations – Supplement 47 (2003), *Emergency services for IMT-2000 networks – Requirements for harmonization and convergence.*

This supplement is an "information" document and is intended to outline the requirements and provisions for emergency services for IMT-2000 systems. This is a compilation from sources outside the ITU (e.g., administrations, standards development organizations (SDOs), and the Third Generation Partnership Projects (3GPP and 3GPP2)). The scope includes any relevant discussion concerning the provisioning of emergency services specifically addressing the IMT-2000 systems during harmonization and convergence periods.

[ITU-T Q-Sup.53] ITU-T Q-series Recommendations – Supplement 53 (2005), *Signalling requirements to support the International Emergency Preference Scheme (IEPS).*

This supplement is an information document intended to identify the signalling requirements required to support the international emergency preference scheme (IEPS). IEPS is described in [ITU-T E.106] and allows authorized users to have access to the international telephone service while the service is restricted due to damage, congestion, and/or other faults. IEPS capabilities provide authorized users with preferential call and connection handling.

[ITU-T Q-Sup.57] ITU-T Q-series Recommendations – Supplement 57 (2008), *Signalling requirements to support the emergency telecommunications service (ETS) in IP networks.*

This supplement identifies the signalling requirements to support preferential capabilities within IP networks for the emergency telecommunications service (ETS).

[ITU-T Y.1271] Recommendation ITU-T Y.1271 (2004), *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*.

Many challenges and considerations need to be addressed in defining and establishing the functional capabilities to support emergency telecommunications in evolving circuit- and packet-switched telecommunications networks. This Recommendation presents an overview of the basic requirements, features, and concepts for emergency telecommunications that evolving networks are capable of providing.

[ITU-T Y.2006] Recommendation ITU-T Y.2006 (2008), *Description of capability set 1 of NGN release 1*.

Recommendation ITU-T Y.2006 provides brief descriptions of capability set 1 of NGN release 1 in terms of the overall requirements and a high-level overview of the functional features to be addressed. The descriptions are from the aspects of environment, capabilities, architecture, and technical specifications.

[ITU-T Y.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.

The objective of Recommendation ITU-T Y.2012 is to describe the functional requirements and architecture of the next generation network (NGN), taking into account the requirements and capabilities for ITU-T NGN as described in [ITU-T Y.2201]. The functional architecture provided in this Recommendation allows a clear distinction between the definition and specification aspects of services provided by the NGN, and the actual specification of the network technologies used to support those services. In line with [ITU-T Y.2011] principles, an implementation-independent approach is adopted.

[ITU-T Y.2111] Recommendation ITU-T Y.2111 (2011), *Resource and admission control functions in next generation networks*.

Recommendation ITU-T Y.2111 specifies the functional architecture and requirements for the resource and admission control functions (RACF) in next generation networks (NGN), which may involve a variety of access and core transport technologies and multiple domains. The RACF provides real-time application-driven and policy-based transport resource management in support of end-to-end quality of service (QoS), gate control, network address translation, and traversal of remote network address translators. The RACF is not service-specific. Services can make use of RACF whether the IP multimedia subsystem is involved or not.

In particular, this edition includes extensions to [ITU-T Y.2111] to address issues related to multicast in support of IPTV services, nomadicity and interactions between CPE/CPN and RACF.

[ITU-T Y.2171] Recommendation ITU-T Y.2171 (2006), *Admission control priority levels in Next Generation Networks*.

Recommendation ITU-T Y.2171 proposes three levels for admission control priority for services seeking entry into next generation networks (NGN). The admission control priority indicator is intended as a guidance in the development of appropriate signalling protocol extensions, and in the development of the necessary priority enabling mechanisms.

[ITU-T Y.2172] Recommendation ITU-T Y.2172 (2007), *Service Restoration Priority Levels in Next Generation Networks*.

Recommendation ITU-T Y.2172 proposes three levels of restoration priority for services in next generation networks (NGN). This indicator is intended as a guidance for the development of appropriate signalling protocol extensions and the restoration/re-route mechanisms.

[ITU-T Y.2201] Recommendation ITU-T Y.2201 (2009), *Requirements and capabilities for ITU-T NGN*.

This Recommendation ITU-T provides high level requirements for services and capabilities of a next generation network (NGN).

[ITU-T Y.2205] Recommendation ITU-T Y.2205 (2011), *Next Generation Networks – Emergency Telecommunications – Technical considerations*.

Recommendation ITU-T Y.2205 specifies technical considerations that may be applied within the next generation network (NGN) to enable emergency telecommunications (ET). In addition, this Recommendation also outlines the underlying technical principles involved in supporting emergency telecommunications.

[ITU-T Y.2262] Recommendation ITU-T Y.2262 (2006), *PSTN/ISDN emulation and simulation*.

Recommendation ITU-T Y.2262 describes principle aspects of evolving PSTN/ISDN to NGN. It discusses emulation and simulation of PSTN/ISDN. Emulation provides PSTN/ISDN service capabilities and interfaces using adaptation to an IP infrastructure while simulation provides PSTN/ISDN-like service capabilities using session control over IP interfaces and infrastructure.

[ITU-T Y.2271] Recommendation ITU-T Y.2271 (2006), *Call server-based PSTN/ISDN emulation*.

The NGN shall support PSTN/ISDN emulation. One mechanism for providing this functionality is the use of a call server-based architecture. This Recommendation identifies service and network capabilities for this call server-based solution.

[ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.

Recommendation ITU-T Y.2701 provides security requirements for next generation networks (NGNs) against security threats. It is achieved by applying the principles of [ITU-T X.805], security architecture for systems providing end-to-end communications to [ITU-T Y.2201], requirements and capabilities for ITU-T NGN and [ITU-T Y.2012], Functional requirements and architecture of the NGN release 1.

[ITU-T Y.2702] Recommendation ITU-T Y.2702 (2008), *Authentication and authorization requirements for NGN release 1*.

Recommendation ITU-T Y.2702 specifies authentication and authorization requirements for next generation networks (NGNs).

[ITU-T Y.2704] Recommendation ITU-T Y.2704 (01/2010), *Security mechanisms and procedures for NGN*.

Recommendation ITU-T Y.2704 highlights some important security mechanisms that can be used to realize the requirements in [ITU-T Y.2701].

[ITU-T Y.2720] Recommendation ITU-T Y.2720 (2009), *NGN identity management framework*.

Recommendation ITU-T Y.2720 provides a framework for identity management (IdM) in next generation networks (NGN). The primary purpose of this framework is to describe a structured approach for designing, defining, and implementing IdM solutions and for facilitating interoperability in a heterogeneous environment.

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

Recommendation ITU-T Y.2721 provides identity management (IdM) objectives, requirements, guidelines and example use cases for the next generation network (NGN) and its interfaces.

[ITU-T Sup.12] ITU-T Y.2720 Supplement 12, *NGN Identity Management Mechanisms*.

This supplement to Recommendation ITU-T Y.2720, NGN identity management framework [ITUT Y.2720] provides descriptions of some example mechanisms that can be used to meet certain identity management (IdM) requirements and deployment needs of NGN.

[ITU-T Y-Sup.2] ITU-T Y-series Recommendations – Supplement 2 (2006), *ITU-T Y.2012 – Session/border control (S/BC) functions*.

This supplement provides the functions and implementation realization associated with the session/border control (S/BC).

[ITU-T Q-Sup.61] ITU-T Q-series Recommendations – Supplement 61 (2010), *Evaluation of signalling protocols to support ITU-T Y.2171 admission control priority levels*.

This supplement provides guidance on how existing signalling protocol extensions can be used to designate the admission control priority classifications for incoming calls/sessions into next generation networks. Specifically, this supplement defines the relationship between the designated values of these protocol extensions and the admission control priority levels/categories defined in [ITU-T Y.2171].

[ITU-T Q-Sup.63] ITU-T Q-series Recommendations – Supplement 63 (2013), *Signalling Protocol Mappings in Support of the Emergency Telecommunications Service in IP Networks*.

This supplement provides guidance for mapping required signalling protocol attributes to support the proper setup and admission of ETS for various protocols. The set of protocols include ISUP, SIP, ITU-T H.248, ITU-T H.225, and Diameter.

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

This document specifies requirements for AMS. It also includes requirements for priority services (e.g., ETS) in AMS (Project "ITU-T H.325").

[ITU-T X.674] Recommendation ITU-T X.674, *Procedures for the registration of arcs under the Alerting object identifier arc*.

This Recommendation provides for the registration of object identifier (OID) arcs which enable identification of different kinds of alerts and alerting agencies. This Recommendation specifies the information and justification to be provided when requesting an OID for alerting purposes, and the procedures for the operation of the registration authority.

[ITU-T X.1303] Recommendation ITU-T X.1303, *Common alerting protocol (CAP 1.1)*

This Recommendation specifies the common alerting protocol (CAP) which is a simple but general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks. CAP allows a consistent warning message to be disseminated simultaneously over many different warning systems, thus increasing warning effectiveness while simplifying the warning task. CAP also facilitates the detection of emerging patterns in local warnings of various kinds, such as might indicate an undetected hazard or hostile act. CAP also provides a template for effective warning messages based on best practices identified in academic research and real-world experience. ITU-T X.1303 is technically equivalent and compatible with the OASIS Common Alerting Protocol, V1.1 standard.

[ITU-T Y.2705] Recommendation ITU-T Y.2705, *Minimum security requirements for the interconnection of the Emergency Telecommunications Service (ETS).*

This Recommendation provides minimum security requirements for internetwork interconnection of ETS. The scope of the security requirements includes integrity, confidentiality and availability protection for ETS communications across network boundaries (i.e., between different national networks).

This purpose of this Recommendation is to provide a minimum set of security requirements that can be used to facilitate the support of ETS across directly or indirectly interconnected networks.

### I.1.2 Work in progress in ITU-T

The service and operational framework for the provision of telecommunication for disaster relief (TDR) is currently under study in ITU-T Study Group 2.

When there is a major disaster it is quite likely that telecommunication within the disaster area and to and from the rest of the national network are disrupted if not destroyed. International calls to the disaster country and disaster site increase at an abnormal rate. The fact that calls to the disaster site cannot be terminated increases congestion with repeat call attempts that cannot be completed. International routes to the disaster country can therefore become overloaded. This congestion could be relieved by the restoration of local communications with and within the disaster site. The congestion of the international routes to the disaster country could be alleviated by the provision of a new direct international route to the disaster area bypassing the 'normal' international links.

Whilst access to and from countries participating in the disaster recovery work is a requirement, this does not necessarily impact the national communications of those countries. The main concern with telecommunications is speed of response and delivery. In the immediate aftermath of a disaster communications of any quality is preferable to no communications. The initial requirement is for telephone service connectivity. However, as disaster relief operations progress the need for additional communications services becomes greater, (e.g., data, email etc.).

Initially there is little or no concern about communications security.

## I.2 3GPP references and associated summaries

### I.2.1 Published 3GPP references

[3GPP TS 22.153] Multimedia Priority Service

This document specifies the service requirements for multimedia priority service (MPS). The scope of this document is to specify those requirements of MPS necessary to provide an end-to-end service and to interwork with external networks where needed. Service interactions with external networks are considered within the scope of this document although these interactions may be specified in other standards.

[3GPP TS 22.101] This document describes the service principles for PLMNs specified by 3GPP.

[3GPP TR 22.950] Priority Service Feasibility Study

This document presents the results of the feasibility study on priority service. The intent of this feasibility study is to assess the ability of 3GPP specifications to meet high-level requirements identified for priority service.

[3GPP TR 22.952] Priority Service Guide

This document addresses the service aspects (service description), network aspects (call flows), and management aspects (operations, administration, maintenance, and provisioning) of priority service, based on existing 3GPP specifications.

## I.3 3GPP2 references and associated summaries

### I.3.1 Published 3GPP2 references

[S.R0117-0 v1.0] Multimedia Priority Service (MMPS) for MMD-based Networks – Stage 1 Requirements

The document contains the Stage 1 requirements that define the MMPS service. This document serves as the basis for any Stage 2 and Stage 3 work related to MMPS in 3GPP2.

[3GPP2 A.S0022-A v1.0] Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN)

This document defines the access network aspects of eHRPD systems that interwork with enhanced universal terrestrial radio access network (E-UTRAN) and evolved packet core (EPC) systems.

[3GPP2 A.S0008-C v4.0] Interoperability Specification (IOS) for High Rate Packet Data 2 (HRPD) Radio Access Network Interfaces with Session Control in the Access Network

This document provides an interoperability specification for a RAN that supports HRPD. The RAN architecture in this document logically locates the session control and mobility management (SC/MM) function in the access network (AN). This document contains message procedures and formats necessary to obtain this interoperability.

[3GPP2 A.S0009-C v4.0] Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function

This document provides an interoperability specification for a RAN that supports HRPD. The RAN architecture in this document logically locates the session control and mobility management (SC/MM) function in the packet control function (PCF). This document contains message procedures and formats necessary to obtain this interoperability.

[3GPP2 C.S0005] Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems

This document details the Layer 3 call processing and procedures, including the requirements for the mobile station and the BS CDMA operation. Section 1 defines the terms and numeric indications used in this document. Section 2 defines requirements that are specific to CDMA mobile station equipment and operation. Section 3 defines requirements that are specific to CDMA BS equipment and operation.

[3GPP2 C.S0015] Short Message Service (SMS) for Wideband Spread Spectrum Systems

This document defines the short message service feature and related procedures.

[3GPP2 C.S0024] High Rate Packet Data Air Interface Specification

This document provides description for high speech packet access.

[3GPP2 C.S0063] cdma2000 High Rate Packet Data Supplemental Services

These technical requirements form a compatibility standard for supplemental services on cdma2000 high rate packet data systems.

[3GPP2 X.S0011-E v1.0] cdma2000 Wireless IP Network Standard

This set of documents defines requirements for support of wireless packet data networking capability on a third generation wireless system based on cdma2000.

[3GPP2 X.S0057-B v1.0] E-UTRAN – eHRPD Connectivity and Interworking: Core Network Aspects

This document provides a specification of the functions and interfaces of the evolved high rate packet data (eHRPD) serving gateway (HSGW) and the IP level interfaces of the eHRPD user equipment (UE).

The eHRPD network provides an IP environment that supports attachment to multiple packet data networks (PDNs) and allocation of IPv4 address or IPv6 address or both IPv4 and IPv6 addresses for each PDN via the 3GPP evolved packet core (EPC). The UE uses network-based mobility and relies on the use of proxy mobile IPv6 (PMIPv6) within the network for mobility management.

[3GPP2 X.S0058-0 v2.0] WiMAX-HRPD Interworking: Core Network Aspects

This document defines the core network aspects of interworking between worldwide interoperability for microwave access (WiMAX) and high rate packet data (HRPD) systems using an mobile station/access terminal (MS/AT) having a single transmitter.

[3GPP2 X.S0062-0 v1.0] Policy and Charging Control (PCC) for cdma2000 1x and HRPD

This document provides a specification for the policy and charging control (PCC) support for cdma2000 1x and HRPD networks. The PCC functions and interfaces supported by various cdma2000 1x and HRPD network entities are specified.

## I.4 ATIS references and associated summaries

### I.4.1 ATIS published references

[A-TR 84] ATIS Technical Report T1.TR.84 (2004), *IP Network Priorities and ETS*.

This Technical Report identifies the need for establishing a set of priorities for traffic over IP networks. It proposes 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. This report also identifies the need for signalling traffic priorities across IP networks and networks of different technologies – e.g., an originating ETS call over a wireless circuit-switched access network transported over an IP backbone, with termination over a circuit-switched wireless egress network. Traffic priority levels over the multiple technologies require mapping agreement, and appropriate signalling protocols will need to be developed such that these levels are recognized.

[A-0100001] ATIS Technical Report 0100001 (2004), *User Plane Security Guidelines and Requirements for ETS*.

This document provides a set of user plane security guidelines and requirements for emergency telecommunications services (ETS) over IP networks. The scope is intended to address security as it relates to user plane performance, reliability, and availability of ETS. ETS does not include E-911.

[A-0100003] ATIS Technical Report 0100003 (2004), *User Plane Priority Levels for IP Networks and Services*.

This Technical Report (TR) was developed as a formal response to a request from the ATIS sub-committee PTSC-SAC for guidance on user plane priority levels in IP networks. This TR proposes three levels of connection admission control priority for the user plane communications traffic in IP networks. It also proposes that all emergency communications (e.g., ETS and E911) be given the highest priority for call/session setup.

[A-0100004] ATIS Technical Report 0100004 (2006), *Availability and Restorability Aspects of Emergency Telecommunications Service (ETS)*.

This Technical Report addresses aspects of the functional requirements of availability and restorability for ETS.

[A-1000005] ATIS-1000005 (2005), *Service Description of ETS*.

This Technical Report contains a service description of the emergency telecommunications service (ETS). It includes an overview of ETS, descriptions of ETS from the end user perspective and in various types of networks. Information flows are included describing the access, intranetwork signalling, and internetwork signalling. A high-level description of security aspects of ETS is also included.

[A-0100006] ATIS Technical Report (2006), *Service Restoration Priority Levels for IP Networks*.

This Technical Report proposes three levels of service restoration priority for traffic in IP networks. It also proposes that all emergency communications (e.g., ETS and E911) be included in the highest priority for service restoration. This report also provides guidance on restoration compliance with the telecommunications priority system as mandated by the Federal Communications Commission. The goal is to formalize restoration priority levels in IP networks such that appropriate signalling requirements can commence.

[A-1000006] ATIS-1000006 (2005), Signalling System No.7 (SS7) – *Emergency Telecommunications Service (ETS)*.

This document builds upon the high probability of completion (HPC) network capability as described in T1.631-1993 (R1999). The ETS service is expanded to address bearer networks and the Recommendation ITU-T E.106, *International Emergency Preference Scheme (IEPS) for disaster relief operations*. This standard specifies ISUP and BICC call control protocol enhancements and procedures to support ETS.

[A-0100009] ATIS Technical Report A-0100009 (2006), *Overview of Standards in Support of Emergency Telecommunications Service (ETS)*.

This technical report provides a high-level service description of the emergency telecommunications services (ETS), its requirements and objectives, and of current standardization initiatives with a focus on forums and committees of the Alliance for Telecommunications Industry Solutions.

[A-1000010] ATIS-1000010 (2006), *Support of Emergency Telecommunications Service (ETS) in IP Networks*.

This document defines the procedures and capabilities required to support ETS within and between internet protocol (IP) based service provider networks.

[A-0100011] ATIS Technical Report A-0100011 (2007), *Priority for National Security/Emergency Preparedness (NS/EP) Services in NGN – Role of Telecommunications Service Priority*.

This document provides guidance regarding the applicability and usage of the telecommunications service priority (TSP) codes for national security/emergency preparedness (NS/EP) in an next generation network (NGN)/IP (internet protocol) environment.

[A-1000011] ATIS-1000011 (2006), *ETS Packet Priority for IP NNI Interfaces – Use of Existing DiffServ Per Hop Behaviors*.

This TR provides guidelines for the application of existing differentiated service (DiffServ) per hop behaviors (PHB) and their associated DiffServ code points (DSCP) when emergency telecommunicationsservice (ETS) voice over IP (VoIP) packets are transported in the media stream at network-network interfaces (NNI). It recommends that public carriers utilize a local/experimental DSCP to differentiate ETS VoIP traffic from other real-time traffic at NNI interfaces between carriers.

[A-1000020] ATIS-1000020 (2007), *ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism*.

This TR provides the 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). This class of traffic includes ETS voice over IP (VoIP) calls/sessions with the requirement of a pre-determined quantity of reserved bandwidth for ETS service.

[A-0100022] ATIS American National Standard 0100022 (2008), *Priority Classification Levels for Next Generation Networks*.

This standard formalizes a set of priority classification levels for admission control and service restoration in next generation networks (NGN). The highest priority classifications are reserved for emergency telecommunications service (ETS).

[A-1000023] ATIS-1000023 (2013), *ETS Network Element Requirements for NGN IMS-based Deployments*.

This document 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 ATIS-1000010. In addition, OA&M requirements are specified.

[A-0300202] ATIS-0300202 (2009), *Guidelines for Network Management of the Public Switched Networks under Disaster Conditions*.

These guidelines encompass the cooperative network management actions (that may be) required of interconnected network operators during emergency conditions associated with disasters that threaten life or property and case congestion in the public telecommunications networks.

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

This Standard describes end-to-end call/session flows for various wireline and wireless access technologies, in addition to the IMS core network call/session flows in support of NGN GETS (emergency telecommunications service (ETS)). These call/session flows illustrate how an NGN GETS call/session can be processed, and address call/session set-up, termination, and on-going activities of the call/session for the various NGN GETS service types and access technologies. The call/session flows are based on various wireline and wireless Standards/Specifications.

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

Emergency telecommunications service (ETS) will be supported on IP network-to-network interconnections. There is a need to test and verify the ETS requirements relevant to IP network-to-network interconnection. This Technical Report provides ETS profile and tests for IP network-to-network interconnection.

[ATIS-1000055] ATIS-1000055 (2013), *Emergency Telecommunications Service (ETS): Core Network Security Requirements*.

The integrity, confidentiality, and availability of emergency telecommunication service (ETS) in a multi-provider next generation network (NGN) environment will depend on the security of each individual network involved in an end-to-end communication. To allow network provided security of end-to-end ETS communications in a multi-provider environment, intra-network domain and inter-network domain security requirements for ETS protection are needed. This ATIS standard 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.

[ATIS-1000057] ATIS-1000057 (2014), *Service Requirements for Emergency Telecommunications Service (ETS) in Next Generation Network (NGN)*

This TR develops descriptions of the various services (such as voice, video, email, instant messaging) for which priority capabilities can be provided under the ETS umbrella. This TR provides service requirements from an ETS user's perspective, including methods of invocation of ETS and procedures for ETS authentication. In addition, this TR describes use cases for the application of ETS priority policies from a user and service provider perspective.

[ATIS-1000679] ATIS-1000679 (2013), *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part*.

This standard defines the signalling and interworking between the bearer independent call control (BICC) or ISDN user part (ISUP) protocols and SIP in order to support services that can be commonly supported by BICC and SIP based network domains.

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

This standard provides a set of user plane security guidelines and requirements for emergency telecommunications services (ETS) over IP networks. The scope is intended to address security as it relates to user plane performance, reliability, and availability of ETS. ETS does not include E-911.

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

This Technical Report (TR) was developed as a formal response to a request from the ATIS sub-committee PTSC-SAC for guidance on user plane priority levels in IP networks. This TR proposes three levels of connection admission control priority for the user plane communications traffic in IP networks. It also proposes that all emergency communications (e.g., ETS and E911) be given the highest priority for call/session setup.

[ATIS-0100004] Availability & Restorability Aspects of Emergency Telecommunication Services (ETS)

This Technical Report addresses aspects of the functional requirements of availability and restorability for ETS.

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

This Technical Report proposes three levels of service restoration priority for traffic in IP networks. It also proposes that all emergency communications (e.g., ETS and E911) be included in the highest priority for service restoration. This report also provides guidance on restoration compliance with the telecommunications priority system as mandated by the Federal Communications Commission. The goal is to formalize restoration priority levels in IP networks such that appropriate signalling requirements can commence.

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

This technical report provides a high-level service description of the emergency telecommunications services (ETS), its requirements and objectives, and of current standardization initiatives with a focus on forums and committees of the Alliance for Telecommunications Industry Solutions.

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

This document provides guidance regarding the applicability and usage of the telecommunications service priority (TSP) codes for national security/emergency preparedness (NS/EP) in an next generation network (NGN)/IP (Internet Protocol) environment.

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

This standard formalizes a set of priority classification levels for admission control and service restoration in next generation networks (NGN). The highest priority classifications are reserved for emergency telecommunications service (ETS).

[T1.TR.84-2004] IP Network Traffic Priorities and ETS

This Technical Report (TR) identifies the need for establishing a set of priorities for traffic over IP networks. It proposes 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. This report also identifies the need for signalling traffic priorities across IP networks and networks of different technologies – e.g., an originating ETS call over a wireless circuit-switched access network transported over an IP backbone, with termination over a circuit-switched wireless egress network. Traffic priority levels over the multiple technologies require mapping agreement, and appropriate signalling protocols will need to be developed such that these levels are recognized.

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

This ATIS Standard is intended to provide awareness and information regarding the use of security mechanisms in support of next generation network (NGN) national security and emergency preparedness (NS/EP) services. When introducing network security mechanisms (e.g., IPSec) into evolving voice over Internet Protocol (VoIP)/multimedia networks, one may encounter impairments introduced or exacerbated by those network security mechanisms. One may need to explore tradeoffs between security and QoS to achieve the necessary communication channel during NS/EP conditions.

[ATIS-0300100] IP Network Disaster Recovery Framework

The purpose of this Technical Report is to enumerate potential proactive or automatic policy-driven network traffic management actions that should be performed prior to, during, and immediately following disaster conditions. Disaster conditions cause network overload. Consequently it is important that this document include reference to or documentation of NGN traffic management actions in overload situations whether triggered by disaster or not.

### I.4.2 Work in progress in ATIS

ATIS is currently working on the following documents:

– *ETS Wireline Access Requirements*. This standard will define network element requirements for wireline access in support of emergency telecommunications service (ETS) for DSL, cable, fibre, and metro Ethernet access networks.

– *ETS Phase 2 Network Element Requirements*, which will revise ETS Network Element Requirements (ATIS-1000023.2013) to include: 1) new requirement for additional ATIS NGN Architecture functional entities, 2) revision of existing network elements requirements, and 3) other non-SIP based interfaces.

## I.5 ETSI references and associated summaries

### I.5.1 Published ETSI references

[ETSI TS 102 181] *Requirements for communication between authorities/organizations during emergencies*

This document addresses the requirements for communications between the authorized representatives who can be involved in the responses and actions when handling an emergency. The document describes the functional requirements for communications between the authorized representatives involved in the responses and actions when handling an emergency. The level of precision has been chosen to avoid interaction with the specific local, regional or national organizations and diagrams of relations between authorized representatives.

[ETSI TS 102 182] *Requirements for communication from authorities to citizens during emergencies*

This document gives an overview of the requirements for communication from authorities/organizations to citizens in all types of emergencies. It collects operational and organizational requirements as a basis for a common notification service, including targeting of the area to be notified. Although many of the requirements relate to national public policies and regulation, there are a number of service and technical aspects which are better dealt with on the European level to ensure harmonized access and services over Europe and service effectiveness through increased user awareness by using standardized solutions.

## I.6 IETF RFCs and associated summaries

### I.6.1 Published IETF RFCs and associated summaries

[IETF RFC 4412] IETF RFC 4412 (2006), *Communications Resource Priority for the Session Initiation Protocol (SIP)*.

This document defines two new session initiation protocol (SIP) header fields for communicating resource priority, namely, "Resource-Priority" and "Accept-Resource-Priority". The "Resource-Priority" header field can influence the behaviour of SIP user agents (such as telephone gateways and IP telephones) and SIP proxies. It does not directly influence the forwarding behaviour of IP routers.

[IETF RFC 4542] IETF RFC 4542 (2006), *Implementing an Emergency Telecommunications Service (ETS) for Real-Time Services in the Internet Protocol Suite*.

IETF RFC 3689] and [IETF RFC 3690] detail requirements for an emergency telecommunications service (ETS), of which an internet emergency preparedness service (IEPS) would be a part. Some of these types of services require call preemption; others require call queuing or other mechanisms. IEPS requires a call admission control (CAC) procedure and a per hop behaviour (PHB) for the data that meet the needs of this architecture. Such a CAC procedure and PHB is appropriate to any service that might use ITU-T H.323 or SIP to set up real-time sessions. The key requirement is to guarantee an elevated probability of call completion to an authorized user in time of crisis.

This document primarily discusses supporting ETS in the context of the US Government and NATO, because it focuses on the multi-level precedence and preemption (MLPP) and government emergency telecommunication service (GETS) standards. The architectures described here are applicable beyond these organizations.

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

This document requests one differentiated services code point (DSCP) from the Internet Assigned Numbers Authority (IANA) for a class of real-time traffic. This traffic class conforms to the expedited forwarding per-hop behaviour. This traffic is also admitted by the network using a call admission control (CAC) procedure involving authentication, authorization, and capacity admission. This differs from a real-time traffic class that conforms to the expedited forwarding per-hop behaviour but is not subject to capacity admission or subject to very coarse capacity admission.

[IETF RFC 6679] IETF RFC 6679, *Explicit Congestion Notification (ECN) for RTP over UDP*.

This document specifies how explicit congestion notification (ECN) can be used with the real-time transport protocol (RTP) running over UDP, using the RTP control protocol (RTCP) as a feedback mechanism. It defines a new RTCP extended report (XR) block for periodic ECN feedback, a new RTCP transport feedback message for timely reporting of congestion events, and a session traversal utilities for NAT (STUN) extension used in the optional initialization method using interactive connectivity establishment (ICE). Signalling and procedures for negotiation of capabilities and initialization methods are also defined.

[IETF RFC 6735] IETF RFC 6735, *Diameter Priority Attribute Value Pairs*.

This document defines attribute-value pair (AVP) containers for various priority parameters for use with Diameter and the AAA framework. The parameters are defined in different protocols that operate at either the network or application layer. This document also makes a reference to 3GPP defined several Diameter AVPs that support prioritization of sessions for priority services.

## I.7 TM Forum references and associated summaries

### I.7.1 Published TM Forum references and associated summaries

[GB 917] Guide Book (GB) 917, *SLA Management Handbook – Release 3.1*.

This document defines a framework for planning, design, implementation and operation of SLA management. It also includes a methodology framework for specifying SLAs, as well as use cases to illustrate how the methodology may be applied to specific services (including to ETS).

[GB 934] Guide Book GB 934, *Best Practice: Application Note to the SLA Management Handbook – Voice over IP – Release 2.0*.

This document defines the current best practice for design and monitoring of key quality indicators (KQIs) contained in SLAs for services (including ETS) provided over VoIP technology. The main focus of the document is on two aspects of VoIP service quality: speech quality and call connectivity quality.

[GB 971] Guide Book (GB) 971, *ETS SLA Application Note*.

This application note is intended for ETS service providers desiring to offer a commercially credible SLA and for an ETS customer seeking enterprise-grade SLAs. There are consistent reasonable expectations of both customer and provider. This document delineates those expectations, where they are interesting or unique to ETS. This document deeply examines the relationship between the ETS actors, through scenario descriptions. As a result, this document also provides guidance to ETS integrators with whom any ETS actor may partner with in order to offer ETS services for ETS users.

## I.8 TIA references and associated summaries

### I.8.1 Published TIA references and associated summaries

[TIA-917] *Wireless Priority Service Enhancements for CDMA Systems*

This document defines the enhancements needed to CDMA systems to support wireless priority service. The document presents a recommended plan for implementation of wireless priority service enhancements in service provider networks.

[TIA TSB-16] *Assignment of Access Overload Classes in the Cellular Telecommunications Services*

This document defines a method for the uniform use of access overload classes so that roamers receive the same overload treatment as home mobile stations. This bulletin also provides a definition of an authorized emergency mobile station.

[TIA-835-E] *cdma2000 Wireless IP Network Standard*

This document defines requirements for support of wireless packet data networking capability on a third generation wireless system based on cdma2000Â. This document supports the services and architecture. This document defines the two methods for accessing public networks (Internet) and private networks (intranets): Simple IP and MIP. It describes the required quality of service, security, mobility management, and accounting capabilities needed to support both methods. IETF protocols are widely employed whenever possible to minimize the number of new protocols required and to maximize the utilization of well accepted standards.

[TIA-1163-B] *E-UTRAN – eHRPD Connectivity and Interworking: Core Network Aspects*

The scope of this document covers support for an evolved access terminal (UE) using the eHRPD air interface and the S101 tunnel to access the core network architecture defined in 3GPP TS 23.401 and TS 23.402.

[TIA-1164-1] *WiMAX-HRPD Interworking: Core Network Aspects*

This document defines the core network aspects of interworking between worldwide interoperability for microwave access (WiMAX) and high rate packet data (HRPD) systems using an mobile station/access terminal (MS/AT) having a single transmitter.

[TIA-1187] *Policy and Charging Control (PCC) for cdma2000 1x and HRPD*

The scope of the specifications in this document is limited to cdma2000 1x and HRPD networks. This document covers support for 3GPP TS 23.203 specified policy and charging control (PCC) architecture using cdma2000 1x and HRPD air interfaces and networks. This document is limited to alignment with 3GPP Release 9 specifications.

[TIA-2000.5] *Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems*

This Specification provides the Layer 3 upper layer signalling protocol architecture and functionality.

[TIA-637] *Short Message Service (SMS) for Wideband Spread Spectrum Systems*

This document defines the short message service feature and related procedures.

[TIA-856] *High Rate Packet Data Air Interface Specification*

This document provides description for high speech packet access.

[TIA-1054] *cdma2000 High Rate Packet Data Supplemental Services*

These technical requirements form a compatibility standard for supplemental services on cdma2000 high rate packet data systems.

[TIA-1140] *WiMAX™ – HRPD Interworking: Air Interface Specification*

This document applies to high rate packet data (HRPD) Release A compliant access terminals which are enhanced to support the HRPD interworking with WiMAX using a single transmitter/dual receiver and access networks which are enhanced to support the HRPD interworking with WiMAX.

[TIA-1142-A] *Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN)*

This document provides an interoperability specification for a RAN that supports eHRPD and handoff to and from E-UTRAN. This document contains message procedures and formats necessary to obtain this interoperability.

[TIA-878-D] *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network*

This document provides an interoperability specification for a RAN that supports HRPD. The RAN architecture in this document logically locates the session control and mobility management (SC/MM) function in the access network (AN). This document contains message procedures and formats necessary to obtain this interoperability.

[TIA-1878-D] *Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function*

This document provides an interoperability specification for a RAN that supports HRPD. The RAN architecture in this document logically locates the session control and mobility management (SC/MM) function in the packet control function (PCF). This document contains message procedures and formats necessary to obtain this interoperability.

## I.9 WiMAX references and associated summaries

### I.9.1 Published WiMAX references and associated summaries

[WFM Stage 1-r1] *WiMAX Forum – WFM-T31-122-R016v01: Service Provider Working Group (SPWG) ETS Phase 1 Requirements*

The ETS Phase 1 requirements document describes the ETS use cases and requirements for the WiMAX networks based on the IEEE 802.16 2009 air interface.

[WFM Stage 1-r2] *WiMAX Forum – WFM-T31-122-R020v01: SPWG ETS Requirements, Release 2.0*

The ETS Phase 1 requirements document enhances the ETS use cases and requirements for the WiMAX networks based on the IEEE 802.16m air interface.

[WFM Stage 2-a1] *WiMAX Forum – WFM-T32-001-R016v01: Architecture – Architecture Tenets, Reference Model and Reference Points, Base Specification, Release 1.6ETS Stage 2 Specification (Section 7.14), November,2010.*

This document specifies for ETS the Stage 2 WiMAX network solution framework for Release 1.6 to support the Stage 1 requirements. The framework addresses priority indication and priority treatment for the authentication, authorization, and accounting (AAA) architecture.

[WFM Stage 3-a1] *WiMAX Forum – WFM-T33-001-R016v01: Network Architecture – Detailed Protocols and Procedures, Base Specification, Release 1.6, ETS Stage 3 Specification (Section 4.19), November, 2010.*

The document specifies the Stage 3 WiMAX network procedures and messages for Release 1.6 supporting priority indication and priority treatment, based on the Stage 2 solution framework. A priority indication field is added to the QoS Descriptor parameter of the WiMAX RADIUS and Diameter messages. The priority indication procedures for the AAA architecture, as well as the priority treatment mechanisms in the BS, ASN gateway, and connectivity service network (CSN) functional entities, are also described in this document. The key areas of ETS support in the WiMAX network include initial network entry, handover, paging, and ETS invocation/revocation.

[WFM Stage 2-a2] *WiMAX Forum – WFM-T32-001-R020v01: Network Architecture – Architecture Tenets, Reference Model and Reference Points, Base Specification, Release 2.0, ETS Stage 2 Specification (Section 7.14), April, 2012.*

This document describes the architecture reference model, reference points and protocols and procedures for different end-to-end architecture aspects of WiMAX Forum® Network Architecture. The framework is in response to WiMAX Forum Network Architecture Stage 1 requirements document. It also includes PCC-based ETS in the architecture using the 3GPP Gxa interface between the WiMAX ASN gateway and the 3GPP PCRF.

[WFM Stage 3-a2] *WiMAX Forum – WFM-T33-001-R020v01: Network Architecture – Detailed Protocols and Procedures, Base Specification, Release 2.0, ETS Stage 3 Specification (Section 4.19), April, 2012*

This document describes the detailed procedures, call flows, messages, timers, TLVs and attributes for the WiMAX® end-to-end Network Architecture Specification. It also includes PCC-based ETS invocation and revocation; detailed data structure of the priority indication field, including allocation priority, pre-emption capability, and pre-emption vulnerability bits besides the priority indicator bit specified in IEEE 802.16; PCC interworking priority handling procedures for the WiMAX-3GPP Interworking.

## SERIES OF ITU-T RECOMMENDATIONS

| | |
|---|---|
| Series A | Organization of the work of ITU-T |
| Series D | General tariff principles |
| Series E | Overall network operation, telephone service, service operation and human factors |
| Series F | Non-telephone telecommunication services |
| Series G | Transmission systems and media, digital systems and networks |
| Series H | Audiovisual and multimedia systems |
| Series I | Integrated services digital network |
| Series J | Cable networks and transmission of television, sound programme and other multimedia signals |
| Series K | Protection against interference |
| Series L | Construction, installation and protection of cables and other elements of outside plant |
| Series M | Telecommunication management, including TMN and network maintenance |
| Series N | Maintenance: international sound programme and television transmission circuits |
| Series O | Specifications of measuring equipment |
| Series P | Terminals and subjective and objective assessment methods |
| **Series Q** | **Switching and signalling** |
| Series R | Telegraph transmission |
| Series S | Telegraph services terminal equipment |
| Series T | Terminals for telematic services |
| Series U | Telegraph switching |
| Series V | Data communication over the telephone network |
| Series X | Data networks, open system communications and security |
| Series Y | Global information infrastructure, Internet protocol aspects and next-generation networks |
| Series Z | Languages and general software aspects for telecommunication systems |

Printed in Switzerland
Geneva, 2015