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3RD GENERATION
PARTNERSHIP
PROJECT 2
"3GPP2"

All-IP Network Emergency Call Support

Stage 1 Requirements

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1 INTRODUCTION

This document specifies the system requirements for All-IP Network Emergency Call Support as described in [1]. With the introduction of VoIP in HRPD [2], WLAN [6], or other air interfaces, it is important to add support for emergency calls. As described in the Work Item worksheet [1], the intention is to develop the generic emergency call system capability in an All-IP Network which can be used to support the “Emergency Call” in accordance with any regional regulatory requirements, if so desired. It is important to note that the development of such a system capability itself should not be construed as a regional regulatory issue.

The intent of this specification is to provide a general set of functionality with the flexibility needed to support variances in regional regulatory requirements.

Note, that “Emergency Call” can be defined as a call requiring connection to a public safety authority, for example, a “Public Safety Answering Point (PSAP).”

1.1 REFERENCES

- [1] 3GPP2 Work Item 3GPP2-00130 “HRPD and MMD Emergency Call Support”
- [2] C.S0024-A cdma2000 High Rate Packet Data Air Interface Specification
- [3] C.S0001~0006 Radio Interface Specifications for cdma2000 Spread Spectrum System
- [4] 3GPP2 X.S0013-003 All-IP Core Network Multimedia Domain; IP Multimedia Session (IMS) Handling; IP Multimedia (IM) Call Model
- [5] 3GPP2 S.R0108 HRPD-3G1X Interoperability for Voice and Data
- [6] 3GPP2 S.R0087-A cdma2000 – WLAN Interworking
- [7] 3GPP2 X.S0013-000-A All-IP Core Network Multimedia Domain

1.2 DEFINITIONS AND ABBREVIATIONS

28 29	All-IP	A wireless network that uses IP transport for all signaling and bearer traffic.
30	AN	Access Network
31 32 33 34	Authorized UE	The originator of an emergency services call using VoIP technology, that has been authenticated and authorized for IP services and has an application level service profile for VoIP
35	cdma2000-1X	A set of radio air interfaces compliant with C.S0001~0006
36	CS	Circuit-Switched

1	HRPD	High Rate Packet Data – radio interface complying with
2		C.S0024 specifications
3	IP	Internet Protocol
4	MMD	Multi-Media Domain – Core network capable of supporting
5		multimedia services via IP
6	PSTN	Public Switched Telephone Network
7	PSAP	Public Safety Answering Point
8	R-UIM	Removable User Identity Module
9	Serving System	The network that provides the IP access point for the
10		emergency caller. If the caller is roaming, the serving
11		system is the visited network. If the caller is not roaming,
12		the serving system is the home network.
13	SIP	Session Initiation Protocol
14	SRD	System Requirements Document
15	TEL URI	URI complying with Telephony numbering plans
16	UE	User Equipment
17	URI	Universal Resource Identifier
18	VoIP	Voice over Internet Protocol
19	WLAN	Wireless Local Area Network

20

21 **2 GENERAL DESCRIPTION**

22 Emergency calls are not a subscribed service of the caller. Emergency call
 23 services are provided by the local area, from which the caller accesses the
 24 network. Emergency calls may require priority treatment such as providing a
 25 high quality bearer path regardless of subscription. The initial capability
 26 provided by this feature includes support for VoIP emergency calls to legacy
 27 emergency call centers accessed via the PSTN. When a VoIP emergency call is
 28 initiated, it is routed to an appropriate emergency call center serving the
 29 geographic area of the caller.

30 **3 SCOPE**

31 **3.1 CALL ROUTING AND EMERGENCY CALL CENTER CAPABILITY**

32 Within the limitations of current positioning technology, emergency calls should
 33 be routed to the emergency call center that has jurisdiction over the area that
 34 the call is coming from and that is best able to process the call.

35 For the current phase of emergency call support as represented in this
 36 document, it is assumed that emergency call centers support only Circuit-

1 Switched (CS) calling capability, i.e. they are not equipped for SIP based (VoIP)
2 call origination and termination. In the future, IP-capable emergency call
3 centers may come into being which will have SIP based call handling and VoIP
4 support, and possibly also have the capability to send and receive other types of
5 media (e.g. pictures with escape routes, video, etc). This may be the subject of
6 a future revision of this and other associated documents.

7 Although the subject of the current set of requirements supports VoIP
8 emergency calls to legacy emergency call centers accessed via the PSTN, this
9 should not preclude forward compatibility to support end-to-end VoIP calls.

10 **3.2 APPLICABLE RADIO INTERFACES**

11 Emergency call access via the following radio interfaces is supported:

- 12 ▪ HRPD [2]
- 13 ▪ cdma2000-1X [3]
- 14 ▪ WLAN [6]

15 Definition of the air interface for WLAN is out of scope for 3GPP2.

16 **3.3 NETWORK AUTHORIZATION**

17 The network is only required to support emergency calls from Authorized UE's.

18 **3.4 MMD FACILITIES**

19 MMD core network facilities (see [4] and [7]) can be reused and/or enhanced for
20 VoIP emergency call support.

21 **3.5 FUTURE SCOPE EXTENSIONS**

22 Considerations for future extension of this document include:

- 23 ▪ Emergency calls to IP-Based emergency call centers.
- 24 ▪ Support for additional media during an emergency call (e.g., text
25 messaging, sending and receiving pictures and video signals).
- 26 ▪ Support for improved voice quality enabled by means of a wideband
27 codec over VoIP.

28 **4 SYSTEM REQUIREMENTS**

29 **4.1 EMERGENCY CALL ESTABLISHMENT**

30 [EC-1] The All-IP Network SHALL support the ability to indicate to the UE
31 that it supports emergency calls.

32 [EC-2] Emergency calls only from Authorized UE's SHALL be supported.

- 1 [EC-3] A UE SHOULD be able to determine that a caller is attempting to
2 make an emergency call (e.g. by evaluating the SIP-URI or the dialed
3 TEL URI). If the UE is able to determine that a call attempt is for an
4 emergency call, then the UE SHALL explicitly indicate the call's
5 emergency nature to the network.
- 6 [EC-4] When an internationally roaming UE attempts to make an emergency
7 call and the UE explicitly indicates the emergency call [EC-3], the
8 network SHALL correctly route the call even if the dialing procedure
9 of the home country executed by the caller is different than that in
10 the visited country.
- 11 [EC-5] If an authorized UE was unable to determine and indicate an
12 emergency call, the network SHALL be able to evaluate the SIP URI or
13 TEL URI and determine the call is an emergency call if the SIP URI or
14 TEL URI represents a valid emergency number in the locality of the
15 caller.
- 16 [EC-6] Support of emergency calls is a local service, not a subscriber service
17 and therefore call control signaling and bearer MAY be handled in the
18 serving network without routing through the home network.
- 19
20 Notes:
21 - It is preferred to have a solution with minimized call setup delay or
22 one with relatively small penalty on call setup delay in return for
23 additional desirable capabilities (e.g. 3-way calling capability).
24 - If any essential services are required from the home system, this
25 may guide the decision (e.g. Voice Call Continuity).
26 - Minimization of routing should be considered in determining the
27 solution.
- 28 [EC-7] Emergency services SHALL be provided when a UE is roaming.
- 29 [EC-8] When an emergency call is established, end-to-end knowledge of an
30 emergency call SHALL be possible and when necessary, intermediate
31 nodes SHALL have this knowledge.
- 32 [EC-9] The calling party address sent to a CS only capable emergency call
33 center SHALL be a TEL URI.

34 **4.2 EMERGENCY CALL ROUTING**

- 35 [EC-10] It SHALL be possible to route to an emergency call center based on
36 the caller's position information, if available from either the
37 authorized UE or the network.
- 38 [EC-11] There may be multiple types of emergency call centers for emergency
39 calls (e.g. police, coast guard, fire, ambulance). The All-IP Network
40 SHALL be able to identify the type of intended emergency call center
41 when the dialing plan provides such identification, and SHALL route
42 accordingly.

1 **4.3 CALLBACK**

2 Once the UE originates and completes the emergency call, a responsible public
3 safety authority (e.g., PSAP) may need to call back to the UE that originated the
4 emergency call.

5 [EC-12] Callback of an Authorized UE with an assigned TEL URI SHALL be
6 supported.
7

8 **4.4 GEOGRAPHICAL LOCATION OF CALLER**

9 It is important to be able to obtain the location of a UE that initiates an
10 emergency call so that it can be routed to the emergency call center assigned to
11 the geographic area of the caller. Depending on the nature of the emergency or
12 mobility of the caller, it may be necessary to obtain an updated location of the
13 caller during the emergency call.

14 [EC-13] The caller's position information SHALL be included in the emergency
15 services request from the UE, if available.

16 [EC-14] It MAY be possible to route the emergency call to a specific emergency
17 call center based on interim/rough position information of the caller.

18 [EC-15] The position information format SHALL be one of the following: a
19 cell/sector identification, a geographic location (e.g.,
20 latitude/longitude), or a civil address.

21 [EC-16] When initial position information is requested by an emergency call
22 center, the All IP Network SHOULD provide the initial accurate (i.e.,
23 not interim) position information of the UE .

24 [EC-17] When updated position information is requested by an emergency call
25 center, the All IP Network SHOULD provide position information of
26 the UE's current position to the emergency call center. The All IP
27 Network SHOULD support updated position information requests
28 throughout the duration of the emergency call.

29 **4.5 EMERGENCY CALL CONTINUITY**

30 UE's that support multiple access technologies and handoffs between the
31 access technologies for non-emergency VoIP sessions are expected to support
32 the same level of session continuity for emergency calls [5], [6].

33 [EC-18] If a non-emergency voice call can be transferred across two access
34 technologies, then the All-IP Network SHALL maintain continuity of
35 the emergency call across those access technologies.

36 [EC-19] An emergency call SHALL be identified as such during and after a
37 handoff.

38 [EC-20] If position information update request is received from the emergency
39 call center after a handoff, including a handoff to another access
40 technology, the All IP Network SHOULD provide the updated position
41 information of the UE to the emergency call center.

1 **4.6 CALL DETAIL RECORD**

2 [EC-21] The creation of call detail records for emergency calls SHALL be
3 supported.

4 **4.7 INTERACTIONS WITH OTHER WIRELESS SERVICES**

5 [EC-22] Once a UE has initiated an emergency call, it SHALL NOT be placed
6 on hold (i.e., any attempt of a call hold, 3-way call, call waiting or any
7 service that would cause the emergency call to be put on hold SHALL
8 be ignored).

9 [EC-23] An emergency call SHALL take precedence over any other services a
10 UE may be engaged in.

11