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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] 3GPP2 C.S0024-A, cdma2000 High Rate Packet Data Air Interface Specification
- [3] 3GPP2 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-cdma2000-1X 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
- [8] IETF RFC3966, Schulzrinne, *The tel URI for Telephone Numbers*, December 2004

1.2 DEFINITIONS AND ABBREVIATIONS

All-IP	A wireless network that uses IP transport for all signaling and bearer traffic.
AN	Access Network
Authorized UE	The originator of an emergency services call using VoIP technology, that has successfully completed all of the following: authentication of the user’s device, access level authentication of the user, and authorization of the user for an emergency services call.

1	Unauthorized UE	The originator of an emergency services call using VoIP
2		technology, that did not successfully complete one of more
3		of the following: authentication of the user's device, access
4		level authentication of the user, or authorization of the user
5		for an emergency services call.
6	cdma2000-1X	A set of radio air interfaces compliant with C.S0001~0006
7	CS	Circuit-Switched
8	HRPD	High Rate Packet Data – radio interface complying with
9		C.S0024 specifications
10	IP	Internet Protocol
11	MMD	Multi-Media Domain – Core network capable of supporting
12		multimedia services via IP
13	PSAP	Public Safety Answering Point
14	Serving System	The network that provides the IP access point for the
15		emergency caller. If the caller is roaming, the serving
16		system is the visited network. If the caller is not roaming,
17		the serving system is the home network.
18	SIP	Session Initiation Protocol
19	TEL URI	URI compliant with [8]
20	UE	User Equipment
21	URI	Universal Resource Identifier
22	VoIP	Voice over Internet Protocol
23	WLAN	Wireless Local Area Network

24 **2 GENERAL DESCRIPTION**

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

33 **3 SCOPE**

34 **3.1 CALL ROUTING AND EMERGENCY CALL CENTER CAPABILITY**

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

1 For the current phase of emergency call support as represented in this
2 document, it is assumed that emergency call centers support only voice calling
3 capability, i.e., they can receive circuit switched voice calls or packet switched
4 VoIP calls. In the future, IP-capable emergency call centers may come into
5 being which will have the capability to send and receive other types of media
6 (e.g., pictures with escape routes, video). This may be the subject of a future
7 revision of this and other associated documents.

8 Although the subject of the current set of requirements supports VoIP
9 emergency calls to emergency call centers, this should not preclude forward
10 compatibility to support other media and multimedia emergency calls.

11 **3.2 APPLICABLE RADIO INTERFACES**

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

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

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

17 **3.3 NETWORK AUTHORIZATION**

18 The network is required to support emergency calls from both Authorized and
19 Unauthorized UEs, subject to local regulation.

20 **3.4 MMD FACILITIES**

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

23 **3.5 FUTURE SCOPE EXTENSIONS**

24 Considerations for future extension of this document include:

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

29 **4 SYSTEM REQUIREMENTS**

30 **4.1 EMERGENCY CALL ESTABLISHMENT**

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

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

4.2 EMERGENCY CALL ROUTING

[EC-10] It SHALL be possible to route to an emergency call center based on the caller's position information, if available from either the UE or the network.

[EC-11] There may be multiple types of emergency call centers for emergency calls (e.g., police, coast guard, fire, ambulance). The All-IP Network SHALL be able to identify the type of intended emergency call center when the dialing plan provides such identification, and SHALL route accordingly.

4.3 CALLBACK

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

[EC-12] Callback of an IMS Registered UE with an assigned TEL URI SHALL be supported.

4.4 GEOGRAPHICAL LOCATION OF CALLER

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

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

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

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

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

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

4.5 EMERGENCY CALL CONTINUITY

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

- 1 [EC-18] If a non-emergency voice call can be transferred across two access
2 technologies, then the All-IP Network SHALL maintain continuity of
3 the emergency call across those access technologies.
- 4 [EC-19] An emergency call SHALL be identified as such during and after a
5 handoff.
- 6 [EC-20] If position information update request is received from the emergency
7 call center after a handoff, including a handoff to another access
8 technology, the All IP Network SHOULD provide the updated position
9 information of the UE to the emergency call center.

10 **4.6 CALL DETAIL RECORD**

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

13 **4.7 INTERACTIONS WITH OTHER WIRELESS SERVICES**

- 14 [EC-22] Once a UE has initiated an emergency call, the call SHALL NOT be
15 placed on hold (i.e., any attempt of a call hold, 3-way call, call waiting
16 or any service that would cause the emergency call to be put on hold
17 SHALL be ignored).
- 18 [EC-23] An emergency call SHALL take precedence over any other services a
19 UE may be engaged in.