COMMUNICATIONS ALLIANCE LTD

INDUSTRY GUIDELINE

G669:2024

TRANSPORT OF SESSION INITIATION PROTOCOL (SIP) INFORMATION ASSOCIATED WITH MOBILE ORIGINATED EMERGENCY CALLS

***G669:2024 Transport of Session Initiation Protocol (SIP) Information Associated With Mobile Originated Emergency Calls* Industry Guideline**

First published as G669:2021
This edition published as G669:2024

Communications Alliance Ltd was formed in 1997 to provide a unified voice for the Australian communications industry and to lead it into the next generation of converging networks, technologies and services.

Disclaimers

1) Notwithstanding anything contained in this Industry Guideline:

   a) Communications Alliance disclaims responsibility (including where Communications Alliance or any of its officers, employees, agents or contractors has been negligent) for any direct or indirect loss, damage, claim, or liability any person may incur as a result of any:

      i) reliance on or compliance with this Industry Guideline;

      ii) inaccuracy or inappropriateness of this Industry Guideline; or

      iii) inconsistency of this Industry Guideline with any law; and

   b) Communications Alliance disclaims responsibility (including where Communications Alliance or any of its officers, employees, agents or contractors has been negligent) for ensuring compliance by any person with this Industry Guideline.

2) The above disclaimers will not apply to the extent they are inconsistent with any relevant legislation.

Copyright

INTRODUCTORY STATEMENT

The ***Transport of Session Initiation Protocol (SIP) Information Associated With Mobile Originated Emergency Calls*** Guideline (G669:2024) replaces the ***Transport of Session Initiation Protocol (SIP) Information Associated With Emergency Calls*** Guideline (G669:2021).

The purpose of the change is to:

- Add SIP recommendations or requirements for P-Asserted-Identity; and
- Clarify content about location information from mobile Customer Equipment.

The ***Transport of Session Initiation Protocol (SIP) Information Associated With Mobile Originated Emergency Calls*** Guideline (G669:2024) is designed to enable, when a SIP interface is used for the delivery of Emergency Calls, the transfer of data associated with Emergency Calls received from mobile Customer Equipment (CE) in accordance with AS/CA S042.1 and from the Mobile Carrier's network to the Emergency Call Person (ECP) for 000 and 112, in SIP fields including:

- International Mobile station Equipment Identity (IMEI)/Permanent Equipment Identifier (PEI);
- International Mobile Subscriber Identity (IMSI) (or equivalent service identifier);
- Calling Line Identification (CLI);
- location information; and
- device type (i.e. user agent info).

James Duck
Chair
SIP Transport for Emergency Calls *Working Committee*

FEBRUARY 2024

TABLE OF CONTENTS

1 GENERAL

1.1 Introduction

1.1.1 The development of the Guideline has been facilitated by Communications Alliance through a Working Committee comprised of representatives from the telecommunications industry.

1.1.2 The Guideline should be read in the context of other relevant codes, guidelines and documents.

1.1.3 The Guideline should be read in conjunction with related legislation, including:

(a) the *Telecommunications Act 1997* (the Act); and

(b) The *Telecommunications (Emergency Call Service) Determination 2019* (the Determination).

1.1.4 If there is a conflict between the requirements of the Guideline and any requirements imposed on a Carrier by statute, the Carrier will not be in breach of the Guideline by complying with the requirements of the statute.

1.1.5 Compliance with this Guideline does not guarantee compliance with any legislation. The Guideline is not a substitute for legal advice.

1.1.6 Statements in boxed text are a guide to interpretation only.

1.2 Scope

1.2.1 The Guideline applies to the Carrier sections of the telecommunications industry under section 110 of the Act.

1.2.2 It deals with the following telecommunications activities as defined in section 109 of the Act:

(a) carrying on business as a Carrier; or

(b) supplying goods or service(s) for use in connection with the supply of a Listed Carriage Service.

1.2.3 The Guideline only applies to:

(a) Mobile Carriers; and

(b) the Emergency Call Person (ECP) for 000 and 112.

1.2.4 The Guideline does not apply to Emergency Service Organisations (ESOs).

1.2.5 The Guideline does not apply to the ECP for 106.

1.2.6 The Guideline does not apply to CE suppliers.

NOTE: A CE supplier may be obliged to comply with other requirements for Emergency Calls e.g. AS/CA S042.1.

1.2.7 The Guideline deals with Emergency Calls that:

(a) are to Emergency Service Numbers (ESNs) 000 and 112;

(b) are originating inside Australia;

(c) are from mobile CE that comply with AS/CA S042.1 and

(d) access 4G and 5G Public Mobile Telecommunications Service (PMTS) designed for voice communications.

1.2.8 The Guideline does not deal with calls that do not activate the Emergency Call procedure, including:

(a) voice calls that are not Emergency Calls (e.g. 'regular' voice traffic); or

(b) non-voice emergency communications (e.g. calls to 106, Short Message Service (SMS) to 000 or 112).

NOTE: The Telecommunications Numbering Plan 2015 specifies 000, 106 and 112 as ESNs and notes the 106 ESN is for use with teletypewriters (TTYs) i.e. 106 is for non-voice emergency communications.

1.2.9 The Guideline does not deal with voice calls originating outside Australia.

NOTE: An attempt to call 000 ESN from outside Australia is usually blocked by the recipient Transit CSP and will not be transferred to the Relevant Termination Point.

1.2.10 The Guideline does not deal with Emergency Calls from mobile CE that:

(a) access a 3G PMTS;

(b) access a Satellite Service; or

(c) are payphones that access a 3GPP technology; or

(d) use Voice over the Internet Protocol (VoIP) services that are PMTS but operate independently of a Mobile Carrier's voice core network (e.g. 'over the top' of an underlying mobile data service).

1.3 Objectives

The objectives of the Guideline are to:

(a) help identify and locate mobile CE making an Emergency Call that has emergency attached to the Mobile Carrier's network.

(b) identify and capture the data associated with Emergency Calls received from mobile CE in accordance with AS/CA S042.1 and from the Mobile Carrier's network such as identity and location information;

NOTE: AS/CA S042.1:2022 recommends but does not require mobile CE to provide a geolocation Header Field and PIDF-LO information.

(c) identify and capture mobile CE identity and location identifiers that can be used by the ECP for 000 and 112 to:

(i) identify and flag Non-genuine Calls or Distributed Denial of Service (DDoS) Emergency Calls presented with a Default CLI;

(ii) identify and flag Non-genuine Calls or DDoS Emergency Calls presented with the CLI associated with the Identity Module; and

(iii) conduct automated validation checks against the information it receives from other channels (e.g. Push MoLI, Advanced Mobile Location (AML) and the Integrated Public Number Database) with the goal of eventually removing the requirement on ESOs to obtain verbal confirmation from emergency caller about their location; and

(d) propose standard/non-standard SIP Header Fields for conveyance of identity and location information by the Mobile Carriers to the ECP for 000 and 112.

1.4 Guideline review

The Guideline will be reviewed every 5 years, or earlier in the event of significant developments that affect the Guideline.

2 ACRONYMS, DEFINITIONS AND INTERPRETATIONS

2.1 Acronyms

For the purposes of the Guideline:

3G

3rd Generation
(of mobile phone technologies covered by the ITU IMT family).

3GPP

3rd Generation Partnership Program.

4G

4th Generation
(of mobile phone technologies covered by the ITU IMT family).

5G

5th Generation
(of mobile phone technologies covered by the ITU IMT family).

ACMA

Australian Communications and Media Authority.

AML

Advanced Mobile Location.

CLI

Calling Line Identification.

CSP

Carriage Service Provider.

DDoS

Distributed Denial of Service.

ECP

Emergency Call Person.

ESN

Emergency Service Number.

ESO

Emergency Service Organisation.

ETSI

European Telecommunications Standard Institute.

E-UTRA

Evolved Universal Terrestrial Radio Access.

IEEE

Institute of Electrical and Electronic Engineers.

IETF RFC

Internet Engineering Task Force Request for Comment.

IMEI

International Mobile station Equipment Identity.

IMEISV

IMEI and Software Version Number.

IMS

IP Multimedia Subsystem.

IMT

International Mobile Telecommunications.

IMSI

International Mobile Subscription Identity.

IP

Internet Protocol.

ITU

International Telecommunications Union.

ITU-T

ITU Telecommunications standardisation sector.

MCC

Mobile Country Code.

MoLI

Mobile Location Information.

MNC

Mobile Network Code.

NR

New Radio.

PANI

P Access Network Identifier.

PEI

Permanent Equipment Identifier.

PIDF

Presence Information Data Format.

PIDF-LO

Presence Information Data Format Location Object.

PLMN

Public Land Mobile Network.

PMTS

Public Mobile Telecommunications Service.

SIP

Session Initiation Protocol

TR

Technical Report.

TS

Technical Specification.

VoWiFi

Voice over Wi-Fi.

Wi-Fi

Wireless Fidelity.

2.2 Definitions

For the purposes of the Guideline:

3G / Universal Mobile Telecommunications Service (UMTS)

means the third generation of mobile phone technologies covered by the ITU IMT family.

3GPP technologies

means 3GPP technologies as specified by the 3GPP.

4G / Long Term Evolution (LTE)

means the fourth generation of mobile phone technologies covered by the ITU IMT family.

5G

means the fifth generation of mobile phone technologies covered by the ITU IMT family.

Act

means the *Telecommunications Act 1997 (Cth)*.

Advanced Mobile Location

means location information derived by mobile CE using its built-in positioning methods, including:

(a) assisted global navigation satellite system;

(b) global navigation satellite system;

(c) Wi-Fi; or

(d) cellular.

Refer to ETSI TS 103 625 and G557.6.

Calling Line Identification

means the data generated by a Telecommunications Network which relates to the Public Number of the A-Party.

NOTES:

1. A CLI delivered by a Mobile Carrier to the ECP for 000 and 112 may be in one of several formats, including a:

(a) 9-digit national mobile number;

(b) 10-digit national mobile number including a leading zero;

(c) 10-digit national local number (e.g. for some fixed-to-mobile convergence voice telephony services); or

(d) full 15-digit international number (e.g. a number for an international inbound roamer that is consistent with ITU-T Recommendation E.164).

2. There may be cases where the CLI for an Emergency Call is not consistent with ITU-T Recommendation E.164 or the Telecommunications Numbering Plan 2015 e.g. calls from some international inbound roamers.

Carriage Service Provider

has the meaning given by section 87 of the Act.

Carrier

has the meaning given by section 7 of the Act.

Cell ID

means an identifier of a Mobile Carrier's base station.

Customer Equipment

has the meaning given by section 21 of the Act.

Determination

means the Telecommunications (Emergency Call Service) Determination 2019.

Emergency Call

has the meaning given by the Determination.

Emergency Call Person for 000 and 112

has the meaning given by the Determination.

Emergency Service Number

has the meaning given by section 30 of the *Telecommunications Numbering Plan 2015*.

Emergency Service Organisation

has the meaning given by section 147 of the *Telecommunications (Consumer Protection and Service Standards) Act 1999*.

Header Field

has the meaning given by IETF RFC 3261.

Identity Module

means a Subscriber Identity Module (SIM), a Universal Subscriber Identity Module (USIM) or an IP Multimedia Services Identity Module (ISIM) or an Embedded Universal Integrated Circuit Card (eUICC) which is used in the authentication procedures and contains the subscriber identity as well as other subscriber data.

NOTE: eUICC is commonly known as Embedded Subscriber Identity Module or eSIM.

International Mobile Equipment Identity

means a unique number which is allocated to each individual mobile station (MS) equipment in the public land mobile network (PLMN) and

unconditionally implemented by the MS manufacturer at the time of manufacture.

Refer to 3GPP 22.016

International Mobile Subscriber Identity

means a string of decimal digits that identifies a unique mobile terminal or mobile subscriber internationally.

Refer to ETSI TR 102 300-5.

Mobile Carrier

means a Carrier that owns or operates a controlled network or controlled facility used to supply a PMTS.

Non-genuine Call

has the meaning given by the Determination.

Permanent Equipment Identifier

means to identify a 5G CE by the network, comprising of a PEI type and an identifier dependent on the value of the PEI type.

Refer to 3GPP 23.003 and 3GPP 24.501.

Public Mobile Telecommunications Service

has the meaning given by section 32 of the Act.

Public Number

means a number specified in the *Telecommunications Numbering Plan 2015*.

Push MoLI

means MoLI associated with an Emergency Call that is pushed from the Mobile Carrier to the ECP.

Refer to G557.5.

Relevant Termination Point

has the meaning given by the Determination.

Resource Priority

has the meaning given by IETF RFC 7135.

Satellite Service

has the meaning given by the Determination.

Session Initiation Protocol (SIP)

has the meaning given by IETF RFC 3261.

SIP Priority

has the meaning given by "Priority" in IETF RFC 3261.

Telecommunications Network

has the meaning given by section 7 of the Act**.**

2.3 Interpretations

In the Guideline, unless the contrary appears:

(a) headings are for convenience only and do not affect interpretation;

(b) a reference to a statute, ordinance, code or other law includes regulations and other instruments under it and consolidations, amendments, re-enactments or replacements of any of them;

(c) words in the singular includes the plural and vice versa;

(d) words importing persons include a body whether corporate, politic or otherwise;

(e) where a word or phrase is defined, its other grammatical forms have a corresponding meaning;

(f) mentioning anything after include, includes or including does not limit what else might be included;

(g) words and expressions which are not defined have the meanings given to them in the Act; and

(h) a reference to a person includes a reference to the person's executors, administrators, successors, agents, assignees and novatees.

3 BACKGROUND INFORMATION

3.1 Introduction

Emergency Calls from mobile CE without an Identity Module are a concern for multiple reasons including:

(a) the Mobile Carrier cannot authenticate a service for the mobile CE. Therefore, the Mobile Carrier cannot associate the correct CLI with the call and forwards the call with a Default CLI to the ECP for 000 and 112. The CLI is a vital piece of information used by the ESOs to automatically retrieve and then validate the calling party and address information.

(b) their use in Non-genuine Calls. This diverts resources of an ESO from responding to a genuine Emergency Call.

(c) valid mobile CE and service identifiers can assist ESOs to identify the emergency caller and despatch resources in an efficient and timely manner.

3.2 Regulatory Obligations

3.2.1 Section 23 of the Determination requires Carriers and CSPs to forward "the most precise location information available" associated with an Emergency Call. This is to help:

(a) the ECP identify the appropriate ESOs to respond to a request for assistance; and

(b) the ESO(s) to locate the caller for a timely response to a request for assistance.

3.2.2 Section 23 of the Determination requires that Carriers and CSPs must, as far as practicable, "transfer information about the public number" from which an Emergency Call is made i.e. the A-party CLI.

NOTE: The B-party number for Emergency Calls to the ECP for 000 and 112 is ESN 000 or 112 (sent in the appropriate number format).

3.2.3 Section 21 of the Determination requires that CSPs should ensure an Emergency Call "is transferred to the Relevant Termination Point with the highest priority". This implies a CSP should not unnecessarily delay Initiating an Emergency Call e.g. to wait for a position estimate.

3.3 Mobile Network Generations

3.3.1 Emergency Calls from different generations of mobile networks do not deliver the same equipment identifier, service identifier and mobile CE operating system.

3.3.2 Refer to Table 1 for background information on the variations in information transferred from different mobile network generations.

TABLE 1

Background on mobile network generations

Mobile Generation	Mobile CE Identifier	Service / Subscriber Identifier	Mobile CE Operating System type / software version
4G	IMEI	IMSI, CLI	Delivered in user agent data
5G	PEI i.e. IMEI or IMEISV (Note)	IMSI, CLI Refer: 3GPP 23.501	Delivered in user agent data

NOTE: Delivery of IMEISV in an Emergency Call requires:

(a) The mobile CE being able to send it to the Mobile Carrier;

(b) All network(s) involved in the Emergency Call to transfer it to the ECP for 000 and 112; and

(c) The terminating endpoint (e.g. ECP for 000 and 112, ESO) being able to receive it.

3.4 Security

Mobile Carriers should refer to the C536 industry code which obliges Carriers and CSPs to:

(a) make every effort to identify potential calls associated with a cyber-attack (e.g. DDoS attack); and

(b) have processes in place to detect, investigate and eliminate (i.e. remove or block) Non-genuine Calls to the ECP centres as soon as practicable.

4 REQUIREMENTS

4.1 Information for transport

4.1.1 A SIP INVITE or UPDATE for an Emergency Call to the ECP for 000 and 112 should include as many of the following data fields as possible:

(a) a SIP Priority Header Field;

(b) a Resource Priority Header Field;

(c) mobile network originated location information;

(d) mobile CE originated location information (where available); and

(e) available service or CE identifiers if provided to the Mobile Carrier by the mobile CE in accordance with AS/CA S042.1 e.g. IMSI, IMEI.

NOTES:

1. An initial position estimate could assist with connecting the Emergency Call by the ECP for 000 and 112 to the appropriate ESO answer point.

2. As inferred in 3.1.2, an Emergency Call SIP INVITE should not be delayed unnecessarily e.g. to wait several seconds for an initial estimation of location information. Location information, either an initial or improved estimate, could be conveyed in a SIP UPDATE.

3. A Mobile Carrier is not able to provide or pass on this information where the information is not available from mobile CE as a data source e.g. IMSI would be unavailable when there is no Identity Module in the mobile CE, or from new mobile CE not previously set up with a service.

4. Some mobile CE may not have a capability to originate and supply location information.

4.1.2 Where the mobile CE does not supply the information listed in 4.1.1 in the Emergency Call set up message (i.e. SIP INVITE), a Mobile Carrier should not fail the Emergency Call and should continue to deliver the Emergency Call to the ECP for 000 and 112.

4.1.3 When:

(a) using a SIP interface for the delivery of Emergency Calls to the ECP for 000 and 112; and

(b) sending or forwarding either a SIP INVITE or a SIP UPDATE associated with an Emergency Call;

a Mobile Carrier should:

(c) forward without modification a SIP INVITE or SIP UPDATE received from mobile CE as a data source; and

(d) include as part of a SIP INVITE or SIP UPDATE data associated with an Emergency Call that was received from a mobile network as a data source.

4.1.4 When sending or forwarding either a SIP INVITE or SIP UPDATE associated with an Emergency Call a Mobile Carrier should do so in a manner consistent with Table 2.

4.2 Location Information

4.2.1 Location information associated with an Emergency Call provided by:

(a) mobile CE and transferred by a Mobile Carrier; or

(b) a Mobile Carrier;

to the ECP for 000 and 112, in a SIP request, should include:

(c) Latitude;

(d) Longitude;

(e) Shape information;

(f) Confidence level;

(g) Timestamp; and

(h) Location source (mobile CE or mobile network).

4.2.2 Location information should be conveyed using SIP Header Field "geolocation" which points to a location object (i.e. PIDF-LO) containing actual location information.

4.2.3 Location information in a SIP Header Field may include enhanced information such as an altitude or a civic address.

NOTE: Enhanced location information the mobile network could provide (e.g. an altitude, a civic address) is for future study.

4.3 Alignment with Standards

Information forwarded in SIP Header Fields by the Mobile Carriers should align with relevant standards (e.g. IETF RFCs, 3GPP TSs).

4.4 Information from Customer Equipment

4.4.1 Mobile Carriers should pass through, unmodified, any SIP messages originating from mobile CE e.g. SIP INVITE, SIP UPDATE.

NOTE: Location information that originates from mobile CE can give a high level of accuracy and precision which is valuable to an ESO responding to an Emergency Call.

4.4.2 Refer to Table 2 for more information on general requirements.

TABLE 2
General requirements

	Mobile CE as Data Source	Mobile Network as Data Source	Potential Use by ECP for 000 and 112	Potential Use by ESO	Example(s) / Comments	Reference / source document
Uniform Resource Name (URN)	✓		✓		service:sos / emergency call identifier	IETF RFC 5031
Priority	✓	✓	✓		Priority: emergency	IETF RFC 3261
Resource Priority		✓	✓		Resource-Priority: esnet.4	IETF RFC 7135
Equipment Identifier	✓		✓	✓	IMEI, PEI	3GPP TS 23.003 3GPP TS 22.016 IETF RFC 8464
Service Identifier	✓		✓	✓	IMSI may not be available from all CE. (Note 4)	3GPP
User-Agent	✓		✓	✓	iOS/14.1, Android/11 (software version)	IETF RFC 3840 Proprietary
Geolocation	✓		✓	✓	Device location	IETF RFC 6442
Presence Information Data Format Location Object (PIDF-LO)	✓	✓	✓	✓	Origin of location data PIDF-LO can be provided by mobile CE and/or a mobile network. (Note 5) Refer to Table 3 for more details on PIDF-LO.	IETF RFC 4119 IETF RFC 5491 (Note 3) IETF RFC 5139 IETF RFC 6442

	Mobile CE as Data Source	Mobile Network as Data Source	Potential Use by ECP for 000 and 112	Potential Use by ESO	Example(s) / Comments	Reference / source document
P Access network Information (PANI)	✓	✓	✓	✓	Refer to Table 4 for more details on PANI. See Notes 5, 6 and 7. Examples for 3GPP Release 15 and later: **For VoWiFI:** IEEE-802.11;country=AU;i-wlan-node-id=fffffffffffff;local-time-zone="2016-07-29T15:08:18+10:00" **For E-UTRA (4G):** 3GPP-E-UTRAN-FDD;utran-cell-id-3gpp=50502cb2512b1e33 The access network id for the PLMN in the above example contains the mobile country code (MCC) of 505 for Australia and a mobile network code (MNC) of 02. See Appendices A and B for more information.	3GPP 24.229 IETF RFC 7315 IETF RFC 7913
P-Visited Network ID	✓	✓	✓	✓	Scenarios include: (i) National roaming. (ii) International inbound roaming. (iii) Possibly erroneous international outbound roaming e.g. a VoWiFi call routed to a home network and which has not been blocked by the Mobile Carrier. The visited network id for the PLMN contains the MCC of 505 for Australia and a MNC. See Note 5	IETF RFC 7315 IETF RFC 7913

	Mobile CE as Data Source	Mobile Network as Data Source	Potential Use by ECP for 000 and 112	Potential Use by ESO	Example(s) / Comments	Reference / source document
P-Asserted-Identity (PAI)	✓	✓	✓	✓	Access network provider, Carriers, MVNOs, Telematics Provider, Relay Provider and Privacy Indicator.	IETF RFC 3325 IETF RFC 3261

NOTES:

1. IETF RFC 5491 on geopriv is for future study. It includes making "recommendations on how to constrain, represent, and interpret locations in a PIDF-LO".

2. IMSI is desirable for diagnostic use by the ECP e.g. to assess call traffic for Non-genuine Calls.

3. Where a Mobile Carrier is able to supply PIDF-LO, PANI or P-Visited Network ID, it should do so consistent with this Guideline.

4. The PANI supplied by mobile CE as data source may contain Cell ID and radio access technology information i.e. 4G/5G etc. This information (e.g. on radio access network type) can be useful for managing a DDOS attack.

5. The Cell ID information is considered to be sensitive information both commercially and from a security viewpoint by Mobile Carriers. Accordingly, some Mobile Carriers may not be in a position to provide any more information or clarifications or validations to the ECP for 000 and 112 or to an ESO about the Cell ID supplied by mobile CE as data source in the PANI delivered to the ECP for 000 and 112 or to an ESO.

5 REFERENCES

Publication	Title
AS/CA Standards	
AS/CA S042.1:2022	Requirements for connection to an air interface of a Telecommunications Network Part 1: General https://www.commsalliance.com.au/Documents/all/Standards/s042.1
Industry Codes	
C536:2020	Emergency Call Service Requirements https://www.commsalliance.com.au/Documents/all/codes/c536
Industry Guidelines	
G557.5:2021 G557.6:2021	Location Information for Emergency Calls Part 5: Push Mobile Location Information (MoLI) Interface To Emergency Call Person Platform (ECPP) Part 6: Advanced Mobile Location (AML) https://www.commsalliance.com.au/Documents/all/guidelines/g557
3GPP Technical Specifications	
3GPP TS 22.016 V15.0.0 (2018-06)	Technical Specification Group Services and System Aspects; International Mobile station Equipment Identities (IMEI) (Release 15) https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=567
3GPP TS 23.003 V15.10.0 (2020-09)	Technical Specification Group Core Network and Terminals; Numbering, addressing and identification (Release 15) https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=729
3GPP TS 23.501 V15.12.0 (2020-12)	Technical Specification Group Services and System Aspects; System architecture for the 5G System (5GS); Stage 2 (Release 15) https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3144

3GPP TS 24.229 V15.13.0 (2021-03)	Technical Specification Group Core Network and Terminals; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (Release 15) https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=1055
3GPP TS 24.501 V15.6.0 (2019-12)	Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3 (Release 15) https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3370
ETSI Technical Reports	
ETSI TR 102 300-5 V1.4.1 (2015-06)	Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Designers' guide; Part 5: Guidance on numbering and addressing https://www.etsi.org/deliver/etsi_tr/102300_102399/10230005/01.04.01_60/tr_10230005v010401p.pdf
ETSI Technical Standards	
ETSI TS 103 625 V1.1.1 (2019-12)	Emergency Communications (EMTEL); Transporting Handset Location to PSAPs for Emergency Calls - Advanced Mobile Location https://www.etsi.org/deliver/etsi_ts/103600_103699/103625/01.01.01_60/ts_103625v010101p.pdf
IETF RFCs	
RFC 3261	SIP: Session Initiation Protocol https://www.rfc-editor.org/info/rfc3261
RFC 3325	Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks https://www.rfc-editor.org/info/rfc3325
RFC 3840	Indicating User Agent Capabilities in the Session Initiation Protocol (SIP) https://www.rfc-editor.org/info/rfc3840
RFC 4119	A Presence-based GEOPRIV Location Object Format https://www.rfc-editor.org/info/rfc4119

RFC 5031	A Uniform Resource Name (URN) for Emergency and Other Well-Known Services https://www.rfc-editor.org/info/rfc5031
RFC 5139	Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO) https://www.rfc-editor.org/info/rfc5139
RFC 5491	GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations https://www.rfc-editor.org/info/rfc5491
RFC 6442	Location Conveyance for the Session Initiation Protocol https://www.rfc-editor.org/info/rfc6442
RFC 8464	A URN Namespace for Device Identity and Mobile Equipment Identity (MEID), September 2018 https://www.rfc-editor.org/info/rfc8464
RFC 7135	Registering a SIP Resource Priority Header Field Namespace for Local Emergency Communications https://www.rfc-editor.org/info/rfc7135
RFC 7315	Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3GPP https://www.rfc-editor.org/info/rfc7315
RFC 7459	Representation of Uncertainty and Confidence in the Presence Information Data Format Location Object (PIDF-LO) https://www.rfc-editor.org/info/rfc7459
RFC 7913	P-Access-Network-Info ABNF Update https://www.rfc-editor.org/info/rfc7913
ISO Standards	
ISO 8601	Date and Time Format Representations for information interchange https://www.iso.org/iso-8601-date-and-time-format.html

ITU-T Recommendations	
E.164 (11/2010)	The international public telecommunication numbering plan https://www.itu.int/itu-t/recommendations/rec.aspx?rec=10688
Legislation	
Telecommunications Act 1997 *https://www.legislation.gov.au/Series/C2004A05145*	
Telecommunications (Emergency Call Service) Determination 2019 *https://www.legislation.gov.au/Series/F2019L01509*	
Telecommunications Numbering Plan 2015 *https://www.legislation.gov.au/Series/F2015L00319*	
Other	
-	ACMA Register of Other Numbers https://www.acma.gov.au/publications/2019-11/data/register-other-numbers
WGS84	World Geodetic System 1984 https://earth-info.nga.mil/index.php?dir=wgs84&action=wgs84

APPENDIX

A EXAMPLES OF PIDF-LO AND PANI RELATED FIELDS (INFORMATIVE)

A.1.1 Refer to Table 3 for PIDF-LO related fields.

TABLE 3
PIDF-LO related fields

Field / Descriptor	Mobile CE as Data Source	Mobile Network as Data Source	Potential Use by ECP for 000 and 112	Potential Use by ESO	Example(s) / Comments	Reference / source document
pos	✓		✓	✓	Latitude, Longitude and Altitude (in decimal format). -33.856767 151.215411	WGS84
radius	✓		✓	✓	In metres e.g. 130.000000	
confidence	✓		✓	✓	In metres e.g. 95	RFC 7459
positioning method	✓	✓	✓	✓	GPS, Wi--Fi, Cell Spot, Network etc.	
timestamp	✓		✓	✓	Time of Positioning	
civicAddress	✓		✓	✓	Optional – details are for future study. This requires customer to insert a civic address or service address into the CE.	

A.1.2 Refer to Table 4 for PANI related fields.

TABLE 4

PANI related fields

Field / Descriptor	Mobile CE as Data Source	Mobile Network as Data Source	Potential Use by ECP for 000 and 112	Potential Use by ESO	Example(s) / Comments	Reference / source document
Network provided location		✓		✓	**For VoWiFI:** IEEE-802.11;country=AU;i-wlan-node-id=ffffffffffff;local-time-zone="2016-07-29T15:08:18+10:00" **For E-UTRA (4G):** 3GPP-E-UTRAN-FDD;utran-cell-id-3gpp=50502cb2512b1e33	3GPP 24.229
Access-type Cellular-Network-Info Header Field		✓	✓		**Access network type:** 3GPP-UTRAN-FDD 3GPP-NR-FDD 3GPP-NR-U-FDD	3GPP 24.229
local-time-zone (text string)	✓		✓	✓	local-time-zone="2016-07-29T15:08:18+10:00" UTC±[hh]:[mm]. [hh] is two digits, and [mm] is two digits from four values: "00", "15", "30" or "45"	RFC 7315 ISO 8601
daylight-saving-time (within access-info)	✓		✓	✓	[hh]. [hh] is a two digits value from three values "00", "01" or "02" indicating the positive adjustment in hours;	

Field / Descriptor	Mobile CE as Data Source	Mobile Network as Data Source	Potential Use by ECP for 000 and 112	Potential Use by ESO	Example(s) / Comments	Reference / source document
network operator-specific-GI	✓		✓	✓	P-Access-Network-Info: GSTN;operator-specific-GI=001;network-provided P-Access-Network-Info: GSTN;operator-specific-GI="ABC";network-provided	
Mobile Country Code (MCC)		✓	✓	✓	505 505 is the MCC for Australia	ACMA Register of Other Numbers
Mobile Network Code (MNC)		✓	✓	✓	01 02 03	ACMA Register of Other Numbers
Cell ID			✓		cb2512b1e33c	

NOTES:

1. In 3GPP 24.229 refer to:
(i) section 7.2 for "SIP header fields" i.e. cellular network info.
(ii) section 7.2A for "extensions to SIP header fields" e.g. for Wi Fi.

2. 3GPP 24.229 includes "The syntax of the P-Access-Network-Info Header Field is described in RFC 7315 and RFC 7913".

3. The length of the cell identifier is variable, depending on the mobile network generation.

APPENDIX

B EXAMPLES OF MOBILE CE COMMUNICATING WITH A MOBILE NETWORK (INFORMATIVE)

B1 Introduction

This informative Appendix includes some sample content from call traces as examples of the information sent with an Emergency Call via SIP.

B2 Emergency Call without an Identity Module – With IMEI, UE Software version, UE Type

B.2.1 Introduction

The example below is for an Emergency Call without information from an Identity Module (e.g. emergency attached).

In this example the digit string for the IMEI is replaced here with the alphabetical string AABBBBBB-CCCCCC-D so as not to identify the device used for the test.

The format of the IMEI is AA-BBBBBB-CCCCCC-D; where:

(a) AA-BBBBBB is the TAC (Type Allocation Code) code

(b) CCCCCC is the device serial number, and

(c) D is a check digit.

B.2.2 Call trace example

INVITE urn:service:sos SIP/2.0

Contact: <sip:[2405:dc00:37e:1d35:18d7:ec54:e9a8:967f]:5060>;+g.3gpp.icsi-ref="urn%3Aurn-7%3A3gpp-service.ims.icsi.mmtel";+sip.instance="<urn:gsma:imei:AABBBBBB-CCCCCC-D>

User-Agent: iOS/10.2 (14C92) iPhone

P-Access-Network-Info: 3GPP-E-UTRAN-FDD;utran-cell-id-3gpp=50502cb2512b1e33

B3 Emergency Call via VoWifi – with GPS location Information

B.3.1 The example below is for a VoWiFi Emergency Call to 000. It demonstrates the sending of location information.

B.3.2 In the example below the digit string for the service number is replaced here with the alphanumeric string +614NNNNNNNN where:

(a) "61" is the country code for Australia; and

(b) the "4" is the first digit of a mobile number in Australia.

B.3.3 In the example below the alphanumeric strings:

(a) mnc002 indicates the MNC is 002 i.e. Optus; and

(b) mcc505 indicates the MCC is 505 i.e. Australia.

B.3.4 In the example below the civic address field only contains a country field, populated with AU for Australia. There is no additional address information supplied e.g. street, suburb, postcode.

B.3.5 Call trace example

INVITE urn:service:sos SIP/2.0

Geolocation: <sip:+614NNNNNNNN@ims.mnc002.mcc505.3gppnetwork.org>

Geolocation-Routing: yes

P-Access-Network-Info: IEEE-802.11;country=AU;i-wlan-node-id=ffffffffffff;local-time-zone="2016-07-29T15:08:18+10:00"

Content-ID: <sip:+614 NNNNNNNN@ims.mnc002.mcc505.3gppnetwork.org>

Content-Disposition: render; handling=optional

Content-Type: application/pidf+xml

<?xml version="1.0"?>

pidf" xmlns:dm="urn:ietf:params:xml:ns:pidf:data-model"
xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10"
xmlns:gml="http://www.opengis.net/gml"
xmlns:gs="http://www.opengis.net/pidflo/1.0"
xmlns:cl="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
xmlns:con="urn:ietf:params:xml:ns:geopriv:conf" entity="sip:+614
NNNNNNNN@ims.mnc002.mcc505.3gppnetwork.org">

<dm:device id="Wifi">

<gp:geopriv>

<gp:location-info>

<gs:Circle srsName="urn:ogc:def:crs:EPSG::4326">

<gml:pos>-33.856767 151.215411</gml:pos>

<gs:radius uom="urn:ogc:def:uom:EPSG::9001">130.000000</gs:radius>

</gs:Circle>

<con:confidence pdf="normal">95</con:confidence>

<cl:civicAddress>

<cl:country>AU</cl:country>

</cl:civicAddress>

</gp:location-info>

<gp:usage-rules/>

</gp:geopriv>

<dm:timestamp>2016-07-29T05:08:18Z</dm:timestamp>

</dm:device>

</presence>

B4 Emergency Call SIP UPDATE

B.4.1 Introduction

The example below is for a SIP UPDATE during an Emergency Call.

B.4.2 Call trace example of a SIP UPDATE

The example below is for a SIP UPDATE during an Emergency Call. It combines multiple inputs to inform the reader about the data that might be seen in a call trace for an Emergency Call.

==== [fd3c:a605:fe:2b7:36bc:6376:bde0:cb68]:50417 -->

[fd3c:a605:ff:106::4]: 7777 UPDATE (secure TCP) ====

UPDATE sip:sgc_c@[ffd3c:a605:ff:106::4]:7777;lr;transport=tcp SIP/2.0

Geolocation: sip:+61435999626@ims.mnc002.mcc505.3gppnetwork.org

Geolocation-Routing: yes

Supported: 100rel,path,replaces,timer

Session-Expires: 10805;refresher=uac

To: <urn:service:sos>;tag=h7g4Esbg_mavodi-0-7e-67-1-ffffffff-

_5254009F3A74-c39-7338c700-3c6442-60ba52ea-197a1

Route: sip:[fd3c:a605:ff:106::4]:7777;lr;transport=tcp

From: sip: +61435999626@ims.mnc002.mcc505.3gppnetwork.org;tag=1QTX6EFZTQ

Call-ID: L8FvZbCWygpaqOKrOdIhTuQf

Session-ID: 9916b54068271d4030bd5a7105f95f0a

Contact: sip:[fd3c:a605:fe:2b7:36bc:6376:bde0:cb68]: 49161;

+g.3gpp.icsi-ref="urn%3Aurn-7%3A3gpp-service.ims.icsi.mmtel";

+sip.instance="<urn:gsma:imei:35301711-009009-0>";text

CSeq: 4 UPDATE

Via: SIP/2.0/TCP

[fd3c:a605:fe:2b7:36bc:6376:bde0:cb68]:
49161;branch=z9hG4bKLIbBWmjcAAZVR93;rport Allow:

ACK,BYE,CANCEL,INFO,INVITE,MESSAGE,NOTIFY,OPTIONS,PRACK,REFER,UPDATE

Max-Forwards: 70

User-Agent: iOS/15.0 iPhone

P-Access-Network-Info: 3GPP-E-UTRAN-FDD;utran-cellid-

3gpp=5052603a66140d903

Security-Verify: ipsec-3gpp;alg=hmac-sha-1-96;ealg=null;mod=trans;portc=

65528;port-s=65529;prot=esp;q=0.5;spi-c=2463522928;spi-s=2899386044

Require: sec-agree

Proxy-Require: sec-agree

Content-Type: application/pidf+xml

Content-Length: 791

<?xml version="1.0"?>

<presence xmlns="urn:ietf:params:xml:ns:pidf"

xmlns:dm="urn:ietf:params:xml:ns:pidf:data-model"

xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10" xmlns:gml="http://

www.opengis.net/gml" xmlns:gs=http://www.opengis.net/pidflo/1.0

xmlns:con="urn:ietf:params:xml:ns:geopriv:conf"

entity=sip: +61435999626@ims.mnc002.mcc505.3gppnetwork.org >

<dm:device id="Wifi">

<gp:geopriv>

<gp:location-info>

<gs:Ellipsoid srsName="urn:ogc:def:crs:EPSG:: 4326">

<gml:pos>-33.783286 151.121594</gml:pos>

<gs:semiMajorAxis uom="urn:ogc:def:uom:EPSG::9001">130.000000</

gs:semiMajorAxis>

<gs:semiMinorAxis uom="urn:ogc:def:uom:EPSG::9001">130.000000</

gs:semiMinorAxis>

<gs:verticalAxis uom="urn:ogc:def:uom:EPSG::9001">16.4</

gs:verticalAxis>

<gs:orientation uom="urn:ogc:def:uom:EPSG::9102">0</

gs:orientation>

</gs:Ellipsoid>

<con:confidence pdf="normal">95</con:confidence>

</gp:location-info>

<gp:method>DBH</gp:method>

<gp:usage-rules/>

</gp:geopriv>

<dm:timestamp>2016-07-29T05:08:18Z </dm:timestamp>

</dm:device>

</presence>

PARTICIPANTS

The Working Committee that revised the Guideline consisted of the following organisations and their representatives:

Organisation	Membership	Representative
Optus	Voting	James Dam
Optus	Non-voting	Sam Mangar
Pivotel	Voting	Michael Keeney
Telstra	Voting	Jane Elkington
Telstra	Non-voting	Kandiah Arulventhan
Telstra	Non-voting	Bel Clough
Telstra	Non-voting	Karin Manning
Telstra	Non-voting	Bob Spencer
TPGT	Voting	Alexander Osborne
TPGT	Non-voting	Albert Chittenden
TPGT	Non-voting	Angus Clearie
TPGT	Non-voting	Annie Leahy

This Working Committee was chaired by James Duck of Communications Alliance who also provided project management support.

Communications Alliance was formed in 1997 to provide a unified voice for the Australian communications industry and to lead it into the next generation of converging networks, technologies and services.

In pursuing its goals, Communications Alliance offers a forum for the industry to make coherent and constructive contributions to policy development and debate.

Communications Alliance seeks to facilitate open, effective and ethical competition between service providers while ensuring efficient, safe operation of networks, the provision of innovative services and the enhancement of consumer outcomes.

It is committed to the achievement of the policy objective of the *Telecommunications Act 1997* - the greatest practicable use of industry self-regulation without imposing undue financial and administrative burdens on industry.

Published by:
COMMUNICATIONS
ALLIANCE LTD

Level 12
75 Miller Street
North Sydney
NSW 2060 Australia

Correspondence
PO Box 444
Milsons Point
NSW 1565

T 61 2 9959 9111
F 61 2 9954 6136
E info@commsalliance.com.au
www.commsalliance.com.au
ABN 56 078 026 507