COMMUNICATIONS ALLIANCE LTD

INDUSTRY SPECIFICATION

G557.5:2021

Location Information for Emergency Calls

Part 5: Push Mobile Location Information (MoLI) Interface to Emergency Call Person Platform (ECPP)

G557.5:2021 Location Information for Emergency Calls Part 5: Push Mobile Location Information (MoLI) Interface to Emergency Call Person Platform (ECPP) Industry Specification

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INTRODUCTORY STATEMENT

The ***Push Mobile Location Information (MoLI) Interface to Emergency Call Person Platform (ECPP)*** Specification (G557.5:2021) replaces the ***Push Mobile Location Information (MoLI) Interface to Enhanced Calling Line Identification Processing System (ECLIPS)*** Specification (G557.5:2014). The Specification defines:

- an interface for the transfer of Push MoLI between a Mobile Carrier and Emergency Call Person Platform (ECPP) for an Emergency Call to 000 or 112 originating from Customer Equipment (CE) that communicates with the Base Transceiver Station (BTS) of a Mobile Carrier while the Emergency Call is in progress; and

- a test plan template to enable a Mobile Carrier to conduct an end-to-end test to validate the delivery of Push MoLI to the ECPP while an Emergency Call to 000 or 112 is in progress.

The purpose of the changes is to:

- update the document references from ECLIPS to the current emergency calling arrangements;

- include 4G mobile technology;

- Include support of international CLI; and

- update the document references to the current *Telecommunications (Emergency Call Service Determination) 2019*.

Michael Ryan
Chair
Mobile Location Revision *Working Committee*

APRIL 2021

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1 GENERAL

1.1 Introduction

1.1.1 The Push Mobile Location Information (MoLI) Interface to Emergency Call Person Platform (ECPP) Specification (the Specification) provides the technical requirements to enable a Mobile Carrier to deliver Push MoLI to the Emergency Call Person Platform (ECPP) while an Emergency Call to 000 or 112 is in progress.

NOTE: Refer to Section 3 for the technical requirements and to Appendix B for a template for a test plan.

1.1.2 At present, while delivering Emergency Calls XPOI, the Mobile Carrier's network appends a Standardised Mobile Service Area (SMSA) code (refer to G557.2) to provide MoLI. The SMSA code is derived from the SMSA Register (refer to G557.2). These SMSAs can range in size from 2,000 to 500,000 square kilometres and are not granular enough by themselves to assist Emergency Service Organisations (ESOs) to find someone in an emergency.

1.1.3 Due to advances in mobile technology, it is now possible to address this situation through provision of Advanced Mobile Location (AML) (refer to G557.6) as well as provision of mobile network derived Push MoLI about Customer Equipment (CE) that communicates with the Base Transceiver Station (BTS) of a Mobile Carrier with a higher degree of accuracy than that provided by the SMSA based MoLI.

1.1.4 The Australian Communications and Media Authority (ACMA), through its *Telecommunications (Emergency Call Service) Determination 2019* (the Determination) requires that when an ESO asks the Mobile Carrier to provide location information about an Emergency Call a Mobile Carrier must give the ESO "*the most precise location information available about the location of the customer equipment from which the emergency call originated, as soon as practicable after the request is received*".

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

1.1.6 The Specification should be read in the context of other relevant codes, specifications and documents, including the other parts of G557.

1.1.7 The Specification should be read in conjunction with related legislation and regulation, including:

(a) the Act; and

(b) the Determination.

1.1.8 If there is a conflict between the requirements of the Specification and any requirements imposed on a Mobile Carrier by legislation, the Mobile Carrier will not be in breach of the Specification by complying with the requirements of the legislation.

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

1.1.10 Statements in boxed text are a guide to interpretation only and not binding as Specification rules.

1.2 Scope

1.2.1 The Specification applies to:

(a) the Emergency Call Person (ECP) for 000 and 112; and

(b) Mobile Carriers.

1.2.2 The Specification does not apply to the ECP for 106.

1.2.3 The Specification defines an interface for the transfer of Push MoLI between a Mobile Carrier and ECPP for an Emergency Call to 000 or 112 originating from a CE that communicates with the BTS of a Mobile Carrier while the Emergency Call is in progress.

1.2.4 The Specification does not deal with Push MoLI requirements for Emergency Calls originating from CE that communicates with a BTS of a Mobile Carrier which does not have any CID or a SAC/LAC including a closed mode femtocell CE.

NOTE: Mobile Carriers do not assign a unique identifier to their BTS which are CE. However, where a Mobile Carrier is able to supply Push MoLI for Emergency Calls from BTS which are CE, it should do so consistent with this Specification.

1.2.5 The Specification does not deal with Push MoLI requirements for Emergency Calls:

(a) to 106;

(b) from services which are not PMTS;

(c) from VoIP services that are PMTS but operate independently of a MSC Server (MSS) (e.g. 'over the top' of an underlying mobile data service, such as Wi-Fi based voice services);

(d) from Voice over LTE (VoLTE) PMTS;

NOTE: Where a Mobile Carrier is able to supply Push MoLI for VoLTE, it should do so consistent with this Specification.

(e) from CE for which the Mobile Carrier is unable to determine the unique CLI, e.g. No SIM or SIM not authorised to roam on the visited PLMN;

(f) International Authorised Roamers (inbound or outbound) calling via a 4G VoLTE PMTS; and

NOTE: The exclusion does not apply to 3G PMTS based Emergency Calls from inbound Authorised Roamers.

(g) from 5G core network based 5G voice PMTS.

1.2.6 The Specification does not deal with situations where a Mobile Carrier is technically unable to provide Push MoLI due to a matter beyond its control, including:

(a) when the network(s) of the Mobile Carrier are experiencing major faults such as the failure of a MSS, a GMLC, a E-SMLC or data links to ECPP; or

(b) there is a level of Emergency Call traffic above the forecast of a Mobile Carrier.

NOTE: When a Mobile Carrier is unable to provide Push MoLI, the MoLI based on G557.2, G557.4 and G557.6 would still be available.

1.2.7 The Specification does not deal with the specification and testing of Push MoLI requirements between the ECP and ESOs.

1.3 Objectives

The objective of the Specification is to define an interface for the transfer of Push MoLI between a Mobile Carrier and ECPP for an Emergency Call to 000 or 112 originating from CE that communicates with the BTS of a Mobile Carrier while the Emergency Call is in progress.

1.4 Specification review

The Specification will be reviewed after 5 years and every 5 years subsequently, or earlier in the event of significant developments that affect the Specification or a chapter within the Specification.

2 ACRONYMS, DEFINITIONS AND INTERPRETATIONS

2.1 Acronyms

For the purposes of the Code:

3G

means the third generation of mobile phone technologies.

4G

means the fourth generation of mobile phone technologies.

5G

means the fifth generation of mobile phone technologies.

ACM

means Address Complete Message.

ACMA

means the Australian Communications and Media Authority.

AML

means Advanced Mobile Location.

BTS

means Base Transceiver Station.

CE

means Customer Equipment.

CID

means Cell Identifier.

CLI

means Calling Line Identification.

CSP

means Carriage Service Provider.

DMSH

means Degrees Minutes Seconds Hemisphere.

ECP

means Emergency Call Person.

ECPP

means Emergency Call Person Platform.

E-SMLC

means Evolved Serving Mobile Location Centre.

ESO

means Emergency Service Organisation.

FQDN

means Fully Qualified Domain Name.

GMLC

means Gateway Mobile Location Centre.

HTTP

means Hypertext Transfer Protocol.

HTTPS

means Secure Hypertext Transfer Protocol.

ID

means Identifier.

IMSI

means International Mobile Subscriber Identity.

LCS

means Location Client Service.

LTE

means Long Term Evolution.

MLP

means Mobile Location Protocol.

MoLI

means Mobile Location Information.

MSC

means Mobile-services Switching Centre.

MSISDN

means Mobile Services Integrated Services Digital Number.

MSS

means MSC Server.

NI-LR

means Network Induced Location Request.

OMA

means Open Mobile Alliance.

PLMN

Means Public Land Mobile Network.

PMTS

means Public Mobile Telecommunications Service.

RAN

means Radio Access Network.

SAC/LAC

means Service Area Code/Location Area Code.

SIM

means Subscriber Identity Module.

SMSA

means Standardised Mobile Service Area.

SSL

means Secure Sockets Layer.

USIM

means Universal SIM.

UTC

means Coordinated Universal Time.

VoIP

means Voice over the Internet Protocol.

VoLTE

means Voice over LTE.

VPN

means Virtual Private Network.

XML

means Extensible Markup Language.

XPOI

means across the point of interconnect.

2.2 Definitions

For the purposes of the Code:

Act

means the *Telecommunications Act 1997 (Cth)*.

Authorised Roamer

means a subscriber whose PLMN is present in roaming agreements at the gateway station to which the subscriber is attempting to reregister.

NOTE: Refer to ETSI TS 101 376-3-19.

Base Transceiver Station

means a Carrier's Network Equipment with a CID or SAC/LAC as the unique identifier.

Carriage Service Provider

has the meaning given by section 87 of the Act.

Carrier

has the meaning given by section 7 of the Act.

Customer Equipment

has the meaning given by section 21 of the Act.

Degrees Minutes Seconds Hemisphere
means a coordinate for latitude or longitude where:

(a) Degrees is an integer in the range 0 to 360;

(b) Minutes is an integer in the range 0 to 60;

(c) Seconds is a real number of 5 digits with 3 decimal points in the range 00.000 to 60.000; and

(d) Hemisphere is a single letter, either N, S, E or W.

NOTES: The value of 'Hemisphere' for Emergency Calls within Australia is expected to be either 'E' or 'S' only. All four compass points are possible values, for consistency with OMA TS-MLP V3.3.

Determination

means the *Telecommunications (Emergency Call Service) Determination 2019 (Cth)*.

ECP Platform

means the platform of the Emergency Call Person for 000 and 112.

Emergency Call

has the meaning given by the Determination.

Emergency Call Person

has the meaning given by section 7 of the Act.

Emergency Call Person for 000 and 112

has the meaning given by the Determination.

NOTE: At time of publication, the ECP for 000 and 112 is Telstra.

Emergency Call Person for 106

has the meaning given by the Determination.

NOTE: At time of publication, the ECP for 106 is Concentrix Services Pty Ltd (ACN 166 171 991).

Emergency Service Organisation

has the meaning given by the Determination.

Evolved Serving Mobile Location Centre (E-SMLC)

(a) has the meaning given by 3GPP 23.271, or

(b) means a platform, or group of platforms, used by a Mobile Carrier to resolve or provide Push MoLI for 4G voice telephony services to the GMLC.

First Delivery Attempt Duration

means the elapsed time (t_1-t_0) between:

(a) when an Emergency Call is first detected by the MSS as recorded by the MSS (t_0); and

(b) the time of sending XML code from the GMLC/E-SMLC to the ECPP for a first delivery attempt (t_1).

Gateway Mobile Location Centre (GMLC)

(a) has the meaning given by 3GPP TS 23.078, or

(b) means a platform, or group of platforms, used by a Mobile Carrier to resolve or provide Push MoLI for 3G and 4G voice telephony services to the ECPP.

Inner Radius

has the meaning given by Sec 5.3.34 of OMA TS-MLP V3.3 and is an integer in metres.

Mobile Carrier

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

Mobile-services Switching Centre (MSC)

means the interface between the radio system of a mobile network and a fixed network [refer to 3GPP TS 23.002].

NOTE: A MSC performs necessary functions to handle the circuit switched services to and from the mobile stations. It is used in a 3G network.

MSC Server (MSS)

means a server for the call control and mobility control parts of a MSC [refer to 3GPP TS 23.002].

Network Induced Location Request

has the meaning given by 3GPP TS 23.271.

Outer Radius

has the meaning given by Sec 5.3.59 of OMA TS-MLP V3.3 and is an integer in metres.

Public Mobile Telecommunications Service

has the meaning given by section 32 of the Act.

Push MoLI

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

Radius

has the meaning given by Sec 5.3.67 of OMA TS-MLP V3.3 and is an integer in metres.

Second Delivery Attempt Duration

means the elapsed time (t_2-t_1) between:

(a) the time of sending XML code from the GMLC to ECPP for the first delivery attempt (t_1).

(b) the time of sending XML code from the GMLC to ECPP a second delivery attempt (t_2).

StartAngle

has the meaning given by Sec 5.3.83 of OMA TS-MLP V3.3 and is an integer in degrees.

StopAngle

has the meaning given by Sec 5.3.85 of OMA TS-MLP V3.3 and is an integer in degrees.

Voice over LTE

means a packet voice service over IP based upon LTE for access and IMS for call completion

2.3 Interpretations

In the Specification, 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 SOLUTION REQUIREMENTS AND OVERVIEW

3.1 Introduction

3.1.1 The responsibility for producing Push MoLI lies with the Mobile Carrier on whose PLMN the Emergency Call to 000 or 112 originates. This includes Emergency Calls made by national inbound Authorised Roamers. In the case of a national inbound Authorised Roamer, the responsibility for producing Push MoLI lies with the visited PLMN not the home PLMN.

3.1.2 At the time of publication, the basic Push MoLI expected to be consistently available from all Mobile Carriers are the latitude and longitude values of the first BTS associated with an Emergency Call to 000 or112 plus a radius value (for coverage area of that BTS) i.e. Circular Area shape.

3.1.3 Alternate information with more precision than the Circular Area shape (such as CircularArc area shape (inner and outer radius, start and stop angles) or Polygon shape related to the cell coverage area associated with an Emergency Call to 000 or 112) is typically not expected to be consistently available from all Mobile Carriers. However, this alternate information may be made available on an optional basis in specific circumstances by some Mobile Carriers depending upon the technical capabilities of their respective networks.

3.1.4 Alternate information with more precision than the Circular Area shape (such as Point or Elliptical area) related to the geographic or physical location of the CE from which the Emergency Call to 000 or 112 originated) is typically not expected to be consistently available from all Mobile Carriers. However, this alternate information may be made available on an optional basis in specific circumstances by some Mobile Carriers depending upon the technical capabilities of their respective networks.

3.2 Solution Requirements

3.2.1 The telecommunications link between a Mobile Carrier and the ECP for 000 and 112 shall be via a secure transport layer (refer to Figure 1).

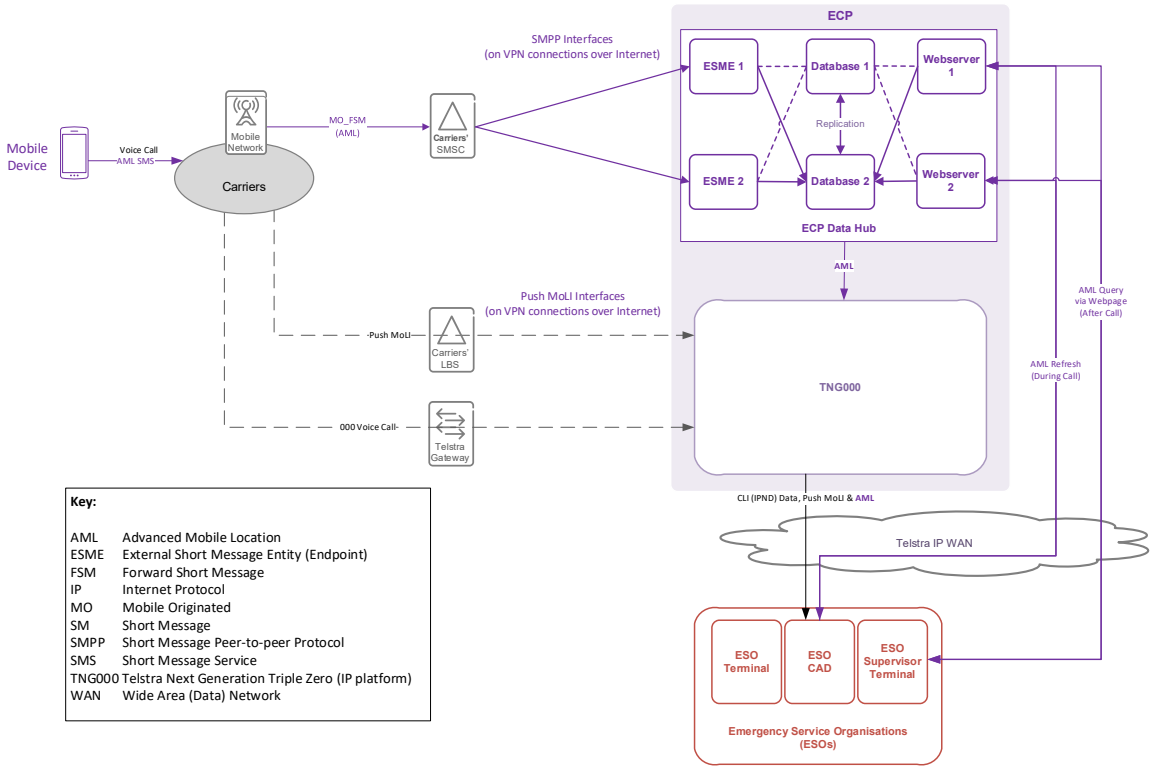

FIGURE 1

Inter Carrier AML and Push MoLI Architecture for Australia

3.2.2 Refer to Tables 1 to 11 for a list of solution requirements for Push MoLI.

3.2.3 Refer to sections 3.3 and 3.4 for details of the recommended and alternate ECPP failover processes, respectively.

3.2.4 Refer to Figure 2 for a simplified ECPP failover process flow.

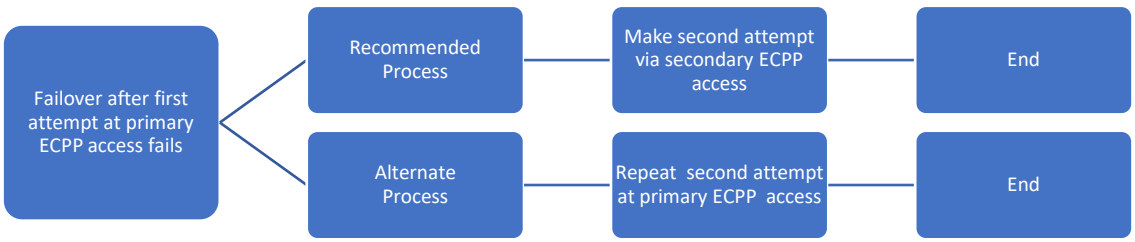

FIGURE 2

Failover Process Flow for ECPP Access on an Emergency Call

3.3 Recommended ECPP Failover Process

3.3.1 The GMLC is to attempt delivery of Push MoLI data to an ECPP server for each Emergency Call.

3.3.2 If, within 3 seconds, the GMLC's first attempt to deliver Push MoLI data to an ECPP server fails, then the GMLC is to make a second attempt to deliver Push MoLI data to the secondary ECPP server.

3.3.3 After the second delivery attempt, no further delivery attempt is required for that Emergency Call.

NOTES:

1. It has been estimated that an Emergency Call will take approximately 6 seconds to reach the ECP terminal, followed by the terminal application query to the ECPP server for Push MoLI data.

2. To allow for a three seconds timeout between the first delivery attempt and the second delivery attempt, the target timeout duration for the first delivery attempt (t1-t0) should be less than or equal to three seconds.

3. While Mobile Carriers will make best endeavours to meet the 3 seconds target for the delivery of Push MoLI , it may not be possible for every Emergency Call due to factors such as:

(a) extra time required to setup the data tunnel between GMLC and ECPP if the session has remained inactive or has been broken; and

(b) the number of sessions supported by the GMLC. Refer to Appendix A for more information on how each Mobile Carrier needs to dimension the number of sessions required on its GMLC as per the number of simultaneous Emergency Calls in its network.

(c) transmission delays in the cases of:
(i) long terrestrial distances between a remote BTS site and a MSS; or
(ii) a remote BTS site connected to a MSS via satellite backhaul link(s).

4. The ECP operates two ECPP servers.
The GMLC may access any available ECPP server of these two ECPP servers for the delivery of Push MoLI for an Emergency Call.
The ECPP server which is accessed for the first Push MoLI delivery attempt for a specific Emergency Call by the GMLC is treated as the primary ECPP server by the GMLC.
The other ECPP server is treated as the secondary ECPP server by the GMLC for the second Push MoLI delivery attempt if a retry is required.

3.3.4 Examples of failures (refer Appendix D) that would result in failover include:

(a) Unable to connect to ECPP server;

(b) Unsuccessful response from ECPP server; and

(c) No response from ECPP server within the timeout period.

3.4 Alternate ECPP Failover Process

3.4.1 The GMLC is to attempt delivery of Push MoLI data to the primary ECPP server for each Emergency Call.

3.4.2 If, within 3 seconds, the GMLC's first attempt to deliver Push MoLI data to the primary ECPP server fails, then the GMLC is to make a second attempt to deliver Push MoLI data to the primary ECPP server.

3.4.3 After the second delivery attempt, no further delivery attempt is required for that Emergency Call.

NOTE: Refer to the notes under clause 3.3.3.

3.4.4 Examples of failures (refer Appendix D) that would result in failover include:

(a) Unable to connect to ECPP server;

(b) Unsuccessful response from ECPP server; and

(c) No response from ECPP server within the timeout period.

TABLE 1

Mobile Carrier Requirements for Push MoLI

Component Name	Description	Requirements
Mobile Subscriber ID (msid)	Field with a mobile subscriber ID (e.g. a mobile phone number) sent by the GMLC to the ECPP server as the CLI for the associated Emergency Call. The ECP Terminal application queries the ECPP server using the mobile subscriber ID of an Emergency Call as a unique CLI key to extract the associated Push MoLI data.	Refer to OMA TS-MLP V3.3 Sec 5.3.51 msid. Mobile Carrier to deliver the mobile subscriber ID to the ECPP server as either: - a 9 digit national mobile number; - a 10 digit national mobile number including a leading zero; - a 10 digit national local number (Note 2); or - a full 15 digit international (i.e. E.164) MSISDN (Note 3). Note 1: ECPP stores national number data as 10 digit number (i.e. with a leading 0) and international number data as 15 digit number. Note 2: Some Fixed-to-Mobile convergence voice telephony services are PMTS but are based on a 10 digit national local number instead of a national mobile number. Note 3: Amdt No. 1/2020 to ACIF G500:2000 enables the passing of the 15 digit E.164 full international CLI XPOI by Mobile Carriers for Emergency Calls made by International Inbound Roamers. Note 4: Where an Emergency Call is made under emergency camping or from a CE where only the IMEI is sent by the CE to the Mobile Carrier, the GMLC solutions will be unable to deliver the mobile subscriber ID to the ECPP server and a dummy CLI will be delivered in lieu to the ECPP server.

Component Name	Description	Requirements
Date and Time	Field with year, month, date, hour, minute and second. Time zone may be included, as an offset from UTC or if not included defaults to UTC.	Refer to OMA TS-MLP V3.3 Sec 5.3.90 time. Date and time of sending XML code from the GMLC to ECPP as recorded in the XML code timestamp. The GMLC time must be synchronised to UTC.
Geodetic Datum	Field for the datum, WGS84.	Refer to OMA TS-MLP V3.3 Sec 5.3.10.2 srsName.
Shape	Field with a shape of the identified area. This shape can be either Circular Area or Point or CircularArc Area or Polygon or Elliptical Area.	Refer to OMA TS-MLP V3.3: Sec 5.3.15 Circular Area, Sec 5.3.61 Point, Sec 5.3.14 CircularArc Area, Sec 5.3.62 Polygon; or Sec 5.3.24 Elliptical Area Note: Also refer to corresponding Tables 2, 3, 4, 5 or 6.

TABLE 2

Additional Mobile Carrier Requirements for Push MoLI where Shape field is Circular Area (Centre and Radius only) (refer Figure 3)

Attribute Name	Description	Requirements
Latitude Coordinate X	Field with the latitude of the first BTS from where the Emergency Call originated in DMSH e.g. 24 52 33.052S.	Refer to OMA TS-MLP V3.3 Sec 5.3.98 X.
Longitude Coordinate Y	Field with the longitude of the first BTS from where the Emergency Call originated (in DMSH) e.g. 152 21 28.231E.	Refer to OMA TS-MLP V3.3 Sec 5.3.99 Y.
Radius	If using Shape value of "Circular Area", then this is a field with radius of the cell coverage, in metres e.g. 2000 m.	Refer to OMA TS-MLP V3.3 Sec 5.3.67 radius.

TABLE 3

Additional Mobile Carrier Requirements for Push MoLI where Shape field is Point (Centre only) (refer Figure 3)

Attribute Name	Description	Requirements
Latitude Coordinate X	Field with the latitude of the approximate location of the CE from where the Emergency Call originated (in DMSH). e.g. 24 52 33.052S.	Refer to OMA TS-MLP V3.3 Sec 5.3.98 X.
Longitude Coordinate Y	Field with the longitude of the approximate location of the CE from where the Emergency Call originated (in DMSH) e.g. 152 21 28.231E.	Refer to OMA TS-MLP V3.3 Sec 5.3.99 Y.

TABLE 4

Additional Mobile Carrier Requirements for Push MoLI where Shape field is 'CircularArc Area' (refer Figure 4)

Attribute Name	Description	Requirements
Latitude Coordinate X	Field with the latitude of the first BTS from where the Emergency Call originated (DMSH) e.g. 24 52 33.052S.	Refer to OMA TS-MLP V3.3 Sec 5.3.98 X.
Longitude Coordinate Y	Field with the longitude of the first BTS from where the Emergency Call originated (DMSH) e.g. 152 21 28.231E.	Refer to OMA TS-MLP V3.3 Sec 5.3.99 Y.
Inner Radius	If using Shape value of "CircularArc Area", then this is a field with inner radius of the cell coverage, in metres e.g. 500 m.	Refer to OMA TS-MLP V3.3 Sec 5.3.34 inRadius and Sec 5.3.14 CircularArc Area.
Outer Radius	If using Shape value of "CircularArc Area", then this is a field with outer radius of the cell coverage, in metres e.g. 1000 m.	Refer to OMA TS-MLP V3.3 Sec 5.3.59 outRadius and Sec 5.3.14 CircularArc Area.
Start Angle	If using Shape value of "CircularArc Area", then this is a field with start angle, in degrees measured from True North.	Refer to OMA TS-MLP V3.3 Sec 5.3.83 startAngle and Sec 5.3.14 CircularArc Area.
Stop Angle (Included Angle)	If using Shape value of "CircularArc Area", then this is a field with stop angle between the first and second defined radius in degrees.	Refer to OMA TS-MLP V3.3 Sec 5.3.85 stopAngle and Sec 5.3.14 CircularArc Area.

TABLE 5

Additional Mobile Carrier Requirements for Push MoLI where Shape field is 'Polygon' (refer Figure 5)

Attribute Name	Description	Requirements
Polygon Coordinate X	Field with the latitude of a polygon coordinate for the cell coverage from where the Emergency Call originated (in DMSH) e.g. 24 52 33.052S.	Refer to OMA TS-MLP V3.3 Sec 5.3.98 X.
Polygon Coordinate Y	Field with the longitude of a polygon coordinate for the cell coverage from where the Emergency Call originated (in DMSH) e.g. 152 21 28.231E.	Refer to OMA TS-MLP V3.3 Sec 5.3.99 Y.

NOTE: The number of vertices used to define a polygon is a minimum of 3 and maximum of 15. For each Push MoLI event, the number of pairs of X and Y coordinates passed across the Mobile Carrier-ECPP interface is a minimum of 4 and maximum of 16. Refer to clause 5.7.5.5 of OMA TS-MLP V3.3 which states in part "The last coordinate must be coincident with the first coordinate and at least four coordinates are required (the three to define a ring plus the fourth duplicated one)." *and* "… to conform to [23.032] the maximum number of points allowed in an exterior boundary is 15."

TABLE 6

Additional Mobile Carrier Requirements for Push MoLI where Shape field is 'Elliptical Area' (refer Figure 6)

Attribute Name	Description	Requirements
Latitude Coordinate X	Field with the latitude of the approximate location of the CE from where the Emergency Call originated (in DMSH) e.g. 24 52 33.052S.	Refer to OMA TS-MLP V3.3 Sec 5.3.98 X.
Longitude Coordinate Y	Field with the longitude of approximate location of the CE from where the Emergency Call originated (in DMSH) e.g. 152 21 28.231E.	Refer to OMA TS-MLP V3.3 Sec 5.3.99 Y.
Angle	If using Shape value of "Elliptical Area", then this is a field with the angle of rotation of an ellipse, in degrees measured clockwise between True North and Semi-Major Axis.	Refer to OMA TS-MLP V3.3 Sec 5.3.5 angle and Sec 5.7.5.3 Ellipsoid point with uncertainty ellipse.
Semi-Major Axis (r1)	If using Shape value of "Elliptical Area", then this is a field with the length of the Semi-Major Axis of an ellipse, in metres, as shown in figure 6.	Refer to OMA TS-MLP V3.3 Sec 5.3.75 semiMajor and Sec 5.7.5.3 Ellipsoid point with uncertainty ellipse.
Semi-Minor Axis (r2)	If using Shape value of "Elliptical Area", then this is a field with the length of the Semi-Minor Axis of an ellipse, in metres, as shown in figure 6.	Refer to OMA TS-MLP V3.3 Sec 5.3.76 semiMinor and Sec 5.7.5.3 Ellipsoid point with uncertainty ellipse.

TABLE 7

Requirements for Mobile Carrier Access to ECPP Servers

Component Name	Description	Requirements
Primary ECPP Server Access	Access to the ECPP server designated as the Primary ECPP server by the ECP.	Required - refer to Sec 3.3 and 3.4
Secondary ECPP Server Access	Back up access to the second ECPP server designated as the Secondary ECPP server by the ECP.	Optional - refer to Sec 3.3 and 3.4.
Delivery Attempt	GMLC to attempt delivery of Push MoLI data to the Primary ECPP server for each Emergency Call.	Required - refer to Sec 3.3 and 3.4.
ECPP Failover Process	Failover process for ECPP server access by a Mobile Carrier for each Emergency Call.	Required - refer to Sec 3.3 and 3.4.
Primary Access Session Capability	Number of simultaneous Sessions between the GMLC and the Primary ECPP server.	Each Mobile Carrier needs to dimension the number of sessions required on its GMLC as per the number of simultaneous Emergency Calls in its network - refer Appendix A.
Secondary Access Session Capability	Number of simultaneous sessions between the GMLC and the Secondary ECPP server (applies to Mobile Carriers implementing the "recommended" process in Sec 3.3).	Each Mobile Carrier needs to dimension the number of sessions required on its GMLC as per the number of simultaneous Emergency Calls in its network- refer Appendix A.
Session Hold Time	Maximum holding time per Session.	6 seconds (3 seconds Primary Access + 3 seconds Secondary/ Primary Access, if required).

TABLE 8

Mobile Carriers' Requirements for Data Delivery, Failover processes, Data Format and Data Structure

Component Name	Description	Requirements
Number of delivery attempts	Number of attempts to deliver Push MoLI to ECPP server for an Emergency Call.	Maximum of two attempts.
First Delivery Attempt Duration	Duration for the first delivery attempt of Push MoLI to ECPP server for an Emergency Call.	Less than or equal to 3 seconds. Refer to Sections 3.3 and 3.4.
Second Delivery Attempt Duration	Duration for the second delivery attempt of Push MoLI to ECPP server for an Emergency Call.	Less than or equal to 3 seconds. Refer to Sections 3.3 and 3.4.
Total duration for delivery attempt(s)	Total duration for multiple attempts to deliver Push MoLI to ECPP server for an Emergency Call.	Less than or equal to 6 seconds. Refer to Sections 3.3 and 3.4.
XML format	Format of Mobile Carrier Push MoLI data delivered to ECPP server. (Refer to Note).	Refer to OMA TS-MLP V3.3.
XML code	Data structure for communicating Push MoLI between a Mobile Carrier and ECPP server. (Refer to Note).	Refer to OMA TS-MLP V3.3 Document Type Definition.

NOTE: Refer to Appendix C for examples of XML format and XML code.

TABLE 9

ECP Requirements for Push MoLI Data performance

Component Name	Description	Requirements
Send time	Mobile Carrier Push MoLI Data GMLC send time as recorded in the XML code timestamp	The ECPP server records the send time as part of the customer call records. Date and time of sending XML code from the GMLC to ECPP server as recorded in the XML code timestamp.
Received time	ECPP server Push MoLI data received time.	The ECPP server records the received time as part of the customer call records. The ECPP server time must be synchronised to UTC.
Querying time	ECPP server Push MoLI data querying time. Note: This time is the same as the arrival time of the Emergency Call at the ECPP terminal.	The ECPP server records the querying time as part of the customer call records. The ECPP server time must be synchronised to UTC.
Query result	A 'successful query' is where Push MoLI data is found in a query of ECPP server from the ECPP Terminal, when the ECP Terminal receives an Emergency Call, using the unique mobile subscriber ID for the Emergency Call as the key. An 'unsuccessful query' is a query that is not a successful query.	The ECPP Terminal records the query result (i.e. either a successful query or an unsuccessful query) as part of the customer call records.

NOTES:

1. This table addresses the availability of Push MoLI data delivered from a Mobile Carrier network, while the Emergency Call is in progress.

2. Emergency Calls will be delivered via the ECPP voice network to the ECPP terminal and Push MoLI data will be directly delivered to the ECPP server over the Mobile Carrier – ECPP interface.

TABLE 10
Requirements for Data Transport between Mobile Carriers and ECPP Servers

Component Name	Description	Requirements
Network Connectivity	For communicating Push MoLI between a Mobile Carrier and ECPP servers (see Appendix A).	IP Sec VPN over the Internet for data layer security between a Mobile Carrier's GMLC and ECPP servers. Separate VPNs will be established between: - a Mobile Carrier's Model GMLC and Model ECPP servers; and - a Mobile Carrier's Production GMLC and Primary Production ECPP servers. A Mobile Carrier implementing the recommended failover process in section 3.3 may establish a VPN between its Production GMLC and Secondary Production ECPP server.
Data Transport	The transport layer mapping to be used to transfer the Push MoLI data between GMLC and ECPP servers.	Push MoLI will use the default HTTP transport mapping defined in OMA TS-MLP V3.3 A 200 (i.e. 'OK' status code in RFC 2616) response will be used by ECPP servers `to indicate a successful response. A 5xx (i.e. 'server error' status code in RFC 2616), response will be used by ECPP servers to indicate a unsuccessful response requiring retry of Push MoLI data delivery by GMLC. The HTTPS mapping must be used if the Push MoLI data contains real location information for a real user. The HTTP mapping may only be used in the case of testing using Push MoLI test data not related to real users.

Component Name	Description	Requirements
Port Choice	ECPP TCP/IP Port to be used for Push MoLI communication by GMLC.	For HTTPS, Push MoLI will use Port 50006 (for production). For HTTP, Push MoLI will use Port 50005 (for testing). Notes: 1. The default ports specified in OMA TS-MLP V3.3 will not be supported for Push MoLI. 2. All Mobile Carriers will need to use the same ECPP ports as above. 3 No Mobile Carrier specific ports will be made available on ECPP.
URLs	URLs to be used by the GMLC for addressing the two ECPP servers.	The ECP will advise each Mobile Carrier the URLs to be used for the two ECPP servers. Note: These URLs may be changed at some future time. Any change to the URLs will be done as a planned change with each Mobile Carrier, allowing adherence to each Mobile Carrier's requirements for change management control in accordance with their associated Telstra Operations and Maintenance (OAM) documents to support Push MoLI.
HTTPS	ECPP security requirements for the HTTPS connection between the GMLC and the ECPP server.	- SSL (Secure Sockets Layer) v3.0 will be used to establish a secure connection between a client (i.e. Carrier GMLC) and the server (i.e. ECPP server); - Certificate based client (i.e. GLMC) – server (i.e. ECPP server) mutual (i.e. two way) authentication will be used; - The ECPP server certificate will be signed by VeriSign CA (i.e. a globally trusted CA) and the GMLC client certificates will be signed by Telstra RSS CA; and - Telstra will manage the certificates, renewal and revocation process in line with the Telstra RSS CA Certification Practice Statement (CPS) V 1.3; and - The client (i.e. the GMLC) is not required to support server (i.e. ECPP server) certificate revocation lists.

NOTE:

1. Refer to Appendix A for more information on the delivery of Push MoLI between a Mobile Carrier and ECPP servers.

2. Refer to the Symantec document 'Symantec Trust Network (STN) Certification Practice Statement' and the Telstra document 'Telstra RSS CA Certification Practice Statement (CPS) V 1.3' for more information on the processes to sign, manage, renew and revoke certificates.

3. Updates to the processes to sign, manage, renew and revoke certificates will be managed by via the bilateral operations and maintenance agreements between Telstra and the Mobile Carrier.

3.5 Solution Overview

Figure 3 below illustrates how the Push MoLI is determined when an Emergency Call is in progress. The steps in Figure 2 are:

(a) A mobile user calls 000 or 112. The Emergency Call is picked up by a BTS of a Mobile Carrier and flagged as an Emergency Call to the MSS. (step 1)

(b) The MSS routes the Emergency Call to Telstra (as the ECP for 000 and 112) in line with the current Emergency Call routing procedure as per ACIF G500:2000 with Amdt No. 1/2020 to ACIF G500:2000 along with SMSA based MoLI (refer to G557.2). (step 2)

(c) At or before receipt of the Address Complete Message (ACM) signalling message in accordance with ACIF G500:2000 with Amdt No. 1/2020 to ACIF G500:2000, Part D (see Figure B.3/Q.764) XPOI from Telstra, the MSS or E-SMLC derives location information based upon either a Network Induced Location Request (NI-LR) or any other method and forwards it to the GMLC. Location information includes data specified in Table 1 requirements.

(d) The GMLC acknowledges receipt of the location information to the MSS/E-SMLC and delivers the Push MoLI to the ECPP Server via the IP Sec VPN connection (step 5);

  (i) The MSS/E-SMLC sends another message to the GMLC, which includes an indication of the Emergency Call termination; and

  (ii) The GMLC acknowledges the MSS/E-SMLC notification.

NOTE: Some GMLC solutions also send an Emergency Call release notification to the ECPP server.

(e) The ECPP Server stores the Push MoLI in a table.

(f) The ECP Terminal application queries the ECPP Server using the mobile subscriber ID (refer Table 1) as a unique key and extracts the CLI data with the Push MoLI. (step 6)

(g) The ECP Terminal conferences the call with the caller requested ESO. (step 7a)

(h) The ECP Terminal sends the CLI data with the Push MoLI to the ESO via Telstra's wide area network as per the current process. (step 7b)

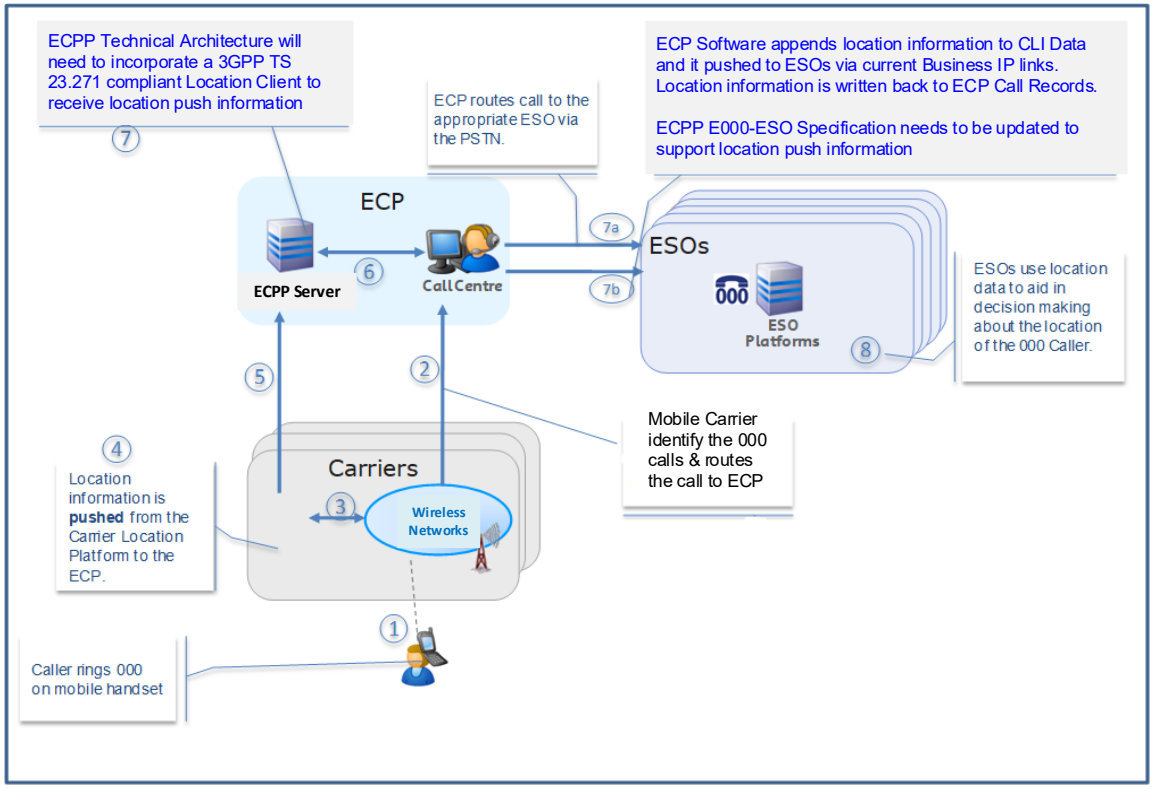

FIGURE 3

End to End Push MoLI Data Overview

4 PUSH MOBILE LOCATION DATA SHAPES AND FIELDS

4.1 Circular Area Shape

4.1.1 For Circular Area shape, the ECPP server will store the following information:

(a) CircularArea -> Shape,

(b) Mobile Subscriber ID,

(c) UTC_TIME_STAMP,

(d) Centre; X[latitude of the BTS],

(e) Centre Y[longitude of the BTS],

(f) Outer Radius in meters, and

(g) Geodetic Datum.

4.1.2 Refer to Figure 3 for a pictorial view of the Push MoLI where Circular Area shape information is only the centre point coordinates and an outer radius (for ECPP server recording purpose).

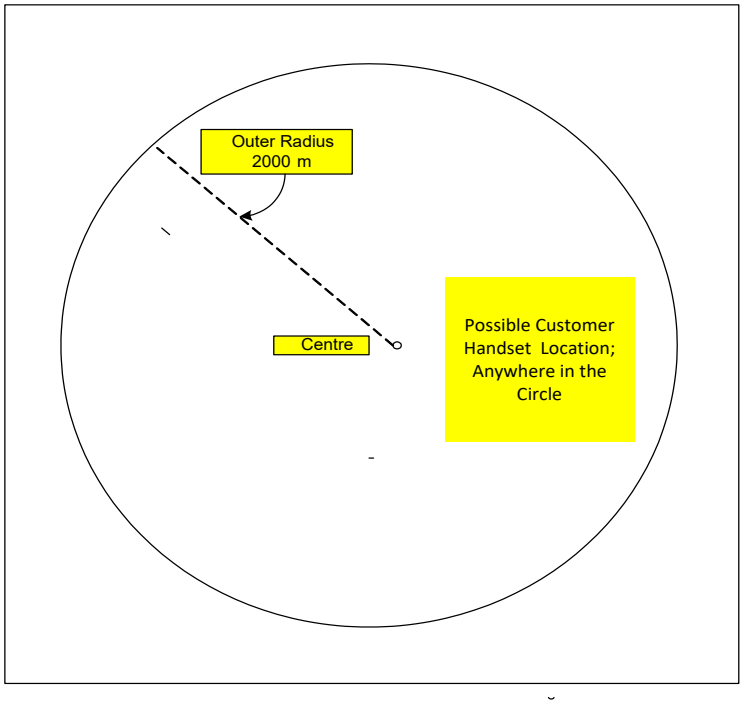

FIGURE 4

Pictorial View of Push MoLI with point coordinates and Outer radius

4.2 CircularArc Area Shape

4.2.1 For CircularArc Area shape, the ECPP server will store the following information:

(a) CircularArc Area -> Shape,

(b) Mobile Subscriber ID,

(c) UTC_TIME_STAMP,

(d) Centre; X[latitude of the BTS],

(e) Centre Y[longitude of the BTS],

(f) Inner Radius in meters,

(g) Outer Radius in meters,

(h) Start Angle in degrees,

(i) Stop Angle in degrees, and

(j) Geodetic Datum.

4.2.2 Refer to Figure 5 for a pictorial view of the Push MoLI where CircularArc Area shape information is available.

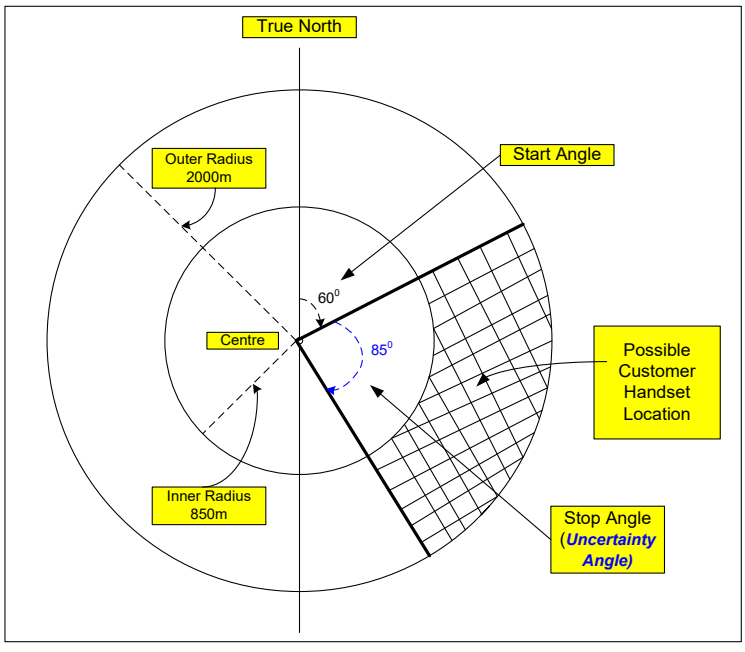

FIGURE 5

Pictorial View of Push MoLI with point coordinates, radii and angles

4.3 Point Shape

For Point shape, the ECPP server will store the following information:

(a) Point -> Shape,

(b) Mobile Subscriber ID,

(c) UTC_TIME_STAMP,

(d) Centre; X[latitude of the CE],

(e) Centre Y[longitude of the CE] and

(f) Geodetic Datum.

4.4 Polygon Shape

4.4.1 For Polygon shape, the ECPP server will store the following information:

(a) Polygon -> Shape,

(b) Mobile Subscriber ID,

(c) UTC_TIME_STAMP,

(d) Point 1 of the Polygon; X[latitude],

(e) Point 1 of the Polygon Y[longitude],

(f) Point 2 of the Polygon; X[latitude],

(g) Point 2 of the Polygon Y[longitude],

(h) Point 3 of the Polygon; X[latitude],

(i) Point 3 of the Polygon Y[longitude],

(j) Point 4 of the Polygon; X[latitude],

(k) Point 4 of the Polygon Y[longitude],

(l) Point 5 of the Polygon; X[latitude],

(m) Point 5 of the Polygon Y[longitude],

(n) Point 6 of the Polygon; X[latitude],

(o) Point 6 of the Polygon Y[longitude], and

(p) Geodetic Datum.

NOTE: A polygon can consist of between 3 and 15 Vertices points (inclusive). These Points are derived from cell coverage area.

4.4.2 Refer to Figure 6 for a pictorial view of the Push MoLI where Polygon information is available.

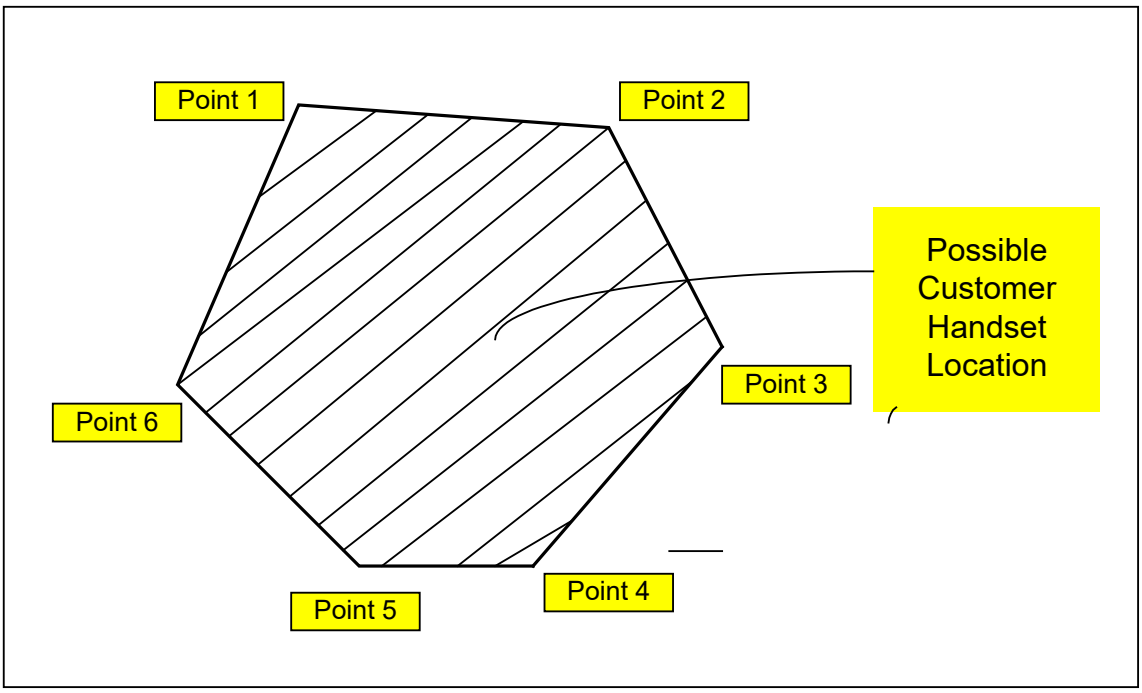

FIGURE 6
Pictorial View of Push MoLI with Polygon coordinates

4.5 Elliptical Area Shape

4.5.1 For the Elliptical Area shape, the ECPP server will store the following information:

(a) Elliptical Area -> Shape,

(b) Mobile Subscriber ID,

(c) UTC_TIME_STAMP,

(d) Centre; X[latitude of the CE],

(e) Centre Y[longitude of the CE],

(f) Semi-Major axis of length (r1) in meters,

(g) Semi-Minor axis of length (r2) in meters,

(h) Angle in degrees, and

(i) Geodetic Datum.

4.5.2 Refer to Figure 7 for a pictorial view of the Push MoLI where elliptical area information is available.

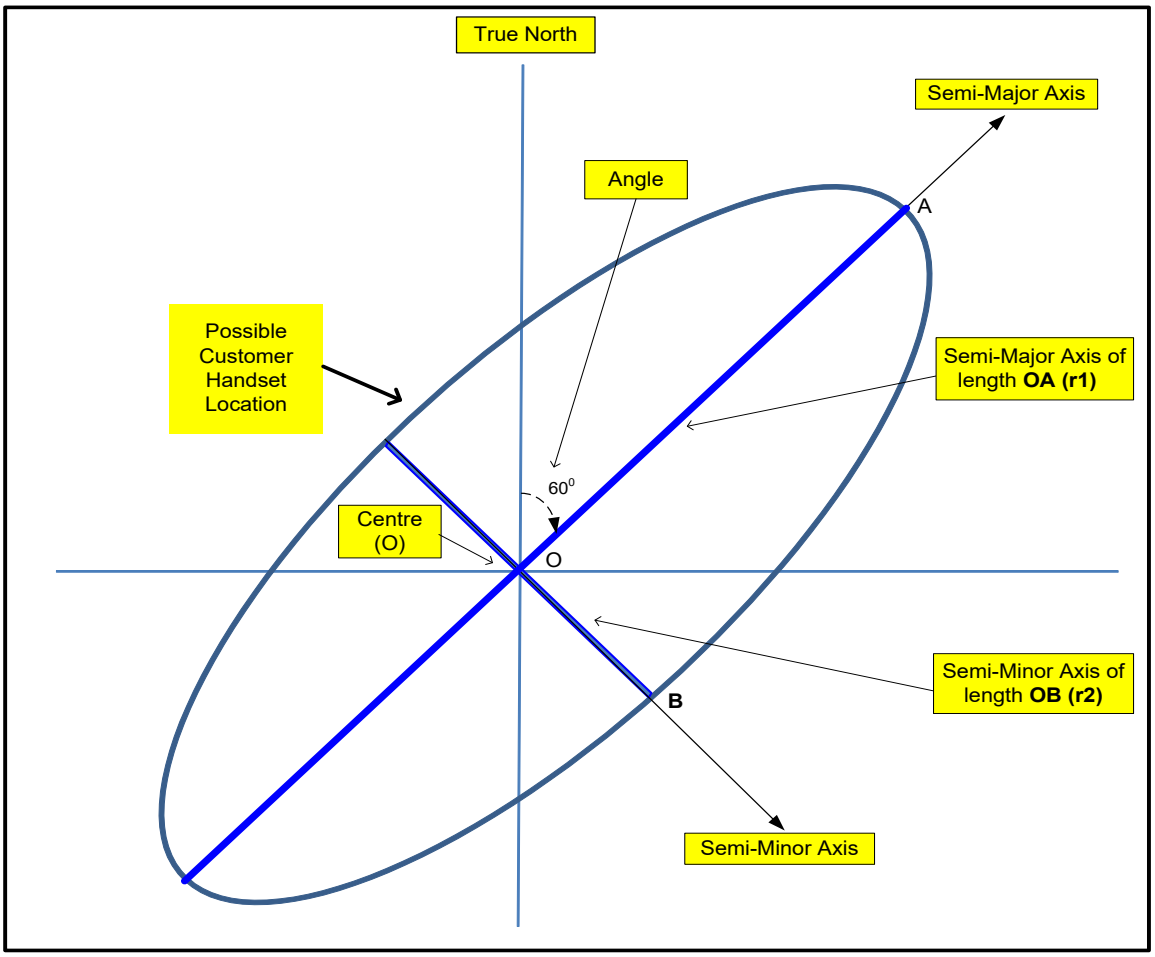

FIGURE 7

Pictorial View of Push MoLI with Polygon coordinates

5 REFERENCES

Publication	Title
Australian Standard	
AS/CA S042.1:2020	Requirements for connection to an air interface of a Telecommunications Network - Part 1: General https://www.commsalliance.com.au/Documents/all/Standards/s042.1
International Specifications and Standards	
3GPP TS 23.002	Technical Specification Group Services and System Aspects; Network architecture http://www.3gpp.org/DynaReport/23002.htm
3GPP TS 23.078	Technical Specification Group Services and System Aspects; Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 4; Stage 2 http://www.3gpp.org/DynaReport/23078.htm
3GPP TS 23.271	Technical Specification Group Services and System Aspects; Functional stage 2 description of Location Services (LCS) http://www.3gpp.org/DynaReport/23271.htm
ETSI TS 101 376-3-19 V2.2.1 (2005-03)	GEO-Mobile Radio Interface Specifications (Release 2) General Packet Radio Service; Part 3: Network specifications; Sub-part 19: Optimal Routing technical realization; GMPRS-1 03.297 http://www.etsi.org/deliver/etsi_ts/101300_101399/1013760319/02.02.01_60/ts_1013760319v020201p.pdf
ITU-T E.164 (11/2010)	The international public telecommunication numbering plan https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=10688
OMA TS-MLP V3,3	OMA Mobile Location Protocol (MLP) Version 3.3, dated 19 July 2011 https://www.openmobilealliance.org/release/MLS/V1_2-20110719-A/OMA-TS-MLP-V3_3-20110719-A.pdf

IETF RFC 2616	Hypertext Transfer Protocol -- HTTP/1.1 https://tools.ietf.org/html/rfc2616
IETF RFC 2660	The Secure HyperText Transfer Protocol https://tools.ietf.org/html/rfc2660
WGS84	World Geodetic System 1984 http://www.ga.gov.au/earth-monitoring/geodesy/geodetic-datums/other/wgs84.html
Industry Guidelines and Specifications	
ACIF G500:2000 with Amdt No. 1/2020 to ACIF G500:2000	Signalling System No. 7 - Interconnection ISUP http://commsalliance.com.au/Documents/all/Specifications/G500_2000
G557:2021	Standardised Mobile Service Area and Location Indicator Specifications and Guidelines Part 1: Index Part 2: Standardised Mobile Service Area and Location Indicator Register Part 3: Location Independent Communications Service Location Indicator for Emergency Services Signalling Specification Part 4: Mobile Location Information (MoLI) Processes for Emergency Calling and Rescue Coordination Part 5: Push Mobile Location Information (MoLI) Interface To Emergency Call Person Platform (ECPP) Part 6: Advanced Mobile Location http://commsalliance.com.au/Documents/all/guidelines/g557
Other Industry Documents	
Telstra RSS CA CPS	Telstra RSS CA Certification Practice Statement (CPS) V 1.3 http://www.telstra-pki.pki.telstra.com.au/Telstra_RSS_CPS.pdf
Symantec Trusted Network CPS	Symantec Trust Network (STN) Certification Practice Statement. Version 3.8.14 https://www.symantec.com/content/en/us/about/media/repository/stn-cps.pdf

Legislation and Regulation

Telecommunications Act 1997 https://www.legislation.gov.au/Series/C2004A05145
Telecommunications (Emergency Call Service) Determination 2019 https://www.legislation.gov.au/Series/F2019L01509

APPENDIX

A PUSH MOLI: ECPP SERVER – MOBILE CARRIER DATA TRANSMISSION

Based on the Mobile Carriers call volume (approximately 600,000 Emergency Calls per month from mobile phones to 000 or 112) at the time of publication, each Mobile Carrier needs to dimension the number of sessions required on its GMLC as per the number of simultaneous Emergency Calls in its network for their GMLC to send Push MoLI data to ECPP server as shown on Figure 8.

NOTE: Mobile Carriers implementing the "alternate process" in Sec 3.4 are not required to establish data links between their GMLC and the Secondary ECPP server.

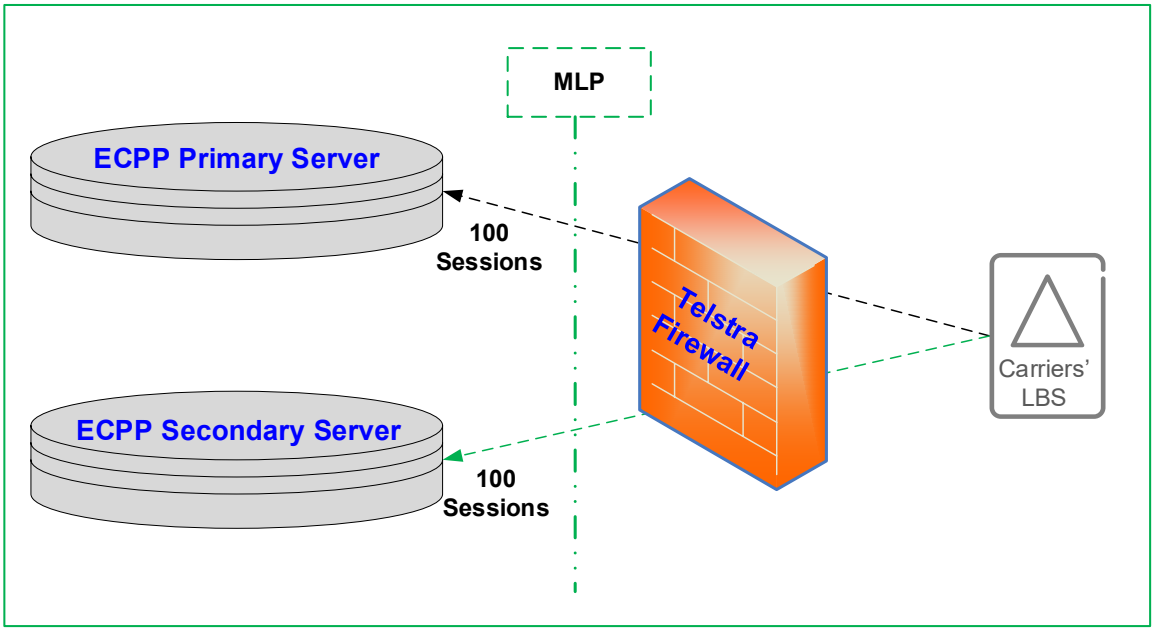

FIGURE 8
Push MoLI: ECPP Server – Mobile Carrier Data Transmission

APPENDIX

B TEST PLAN TEMPLATE

B1 Introduction

B.1.1 Scope

This document is the detailed test plan for the Push MoLI project and addresses the testing to be performed.

This document specifies the test conditions, required as a pre-requisite to start testing and test cases required to meet the project requirements as defined in this Specification.

B.1.2 Objectives

The objectives of the Testing are to:

(a) Validate the capability of a Mobile Carrier's networks and GMLC to support the Push MoLI capability;

(b) Confirm a Mobile Carrier can deliver the Push MoLI to ECPP server within 6 seconds from the time an Emergency Call was first detected by its MSS/E-SMLC i.e. at or before the Mobile Carrier receives the ACM signalling message from the ECP; and

(c) Confirm interoperability standards to support the Push MoLI capability. This will enable seamless integration between Mobile Carriers and ECPP servers.

B.1.3 Purpose

The purpose of this document is to provide:

(a) Items for test;

(b) Input specifications;

(c) Output specifications;

(d) Environment needs;

(e) Configuration requirements;

(f) Test case identifier; and

(g) Test case traceability to requirements.

B2 Test Phases

The testing will be divided into 2 phases.

B.2.1 Test Phase 1 (Mobile Carrier test GMLC to ECPP Model)

Following the satisfactory completion of Phase 1, and once all firewall burns have been completed and data has been inserted into the test GMLC, and the model ECPP servers have been modified to accept Push MoLI, a subset of tests will be undertaken to ensure that 000 and 112 calls made in the Mobile Carrier's test GMLC environment result in transfer of the correct Push MoLI to ECPP.

B.2.2 Test Phase 2 (Mobile Carrier production GMLC to production ECPP)

Install all functionality and analysis into the Mobile Carrier production GMLC environment.

Confirm that the production GMLC is receiving a message to transfer Push MoLI, for all possible combinations that are "In Scope / Inclusions" as listed in Phase 1.

"Out of Scope / Exclusions" may also be tested, to establish what actually occurs in production, and noted in the findings.

Commencement of this phase requires that Phase 1 has been completed.

This phase will also allow the performance of MSS/E-SMLC, GMLC and network components to be observed and quantified, to ensure that the Mobile Carrier networks can actually handle Push MoLI in the form expected to be rolled out, should this prove successful.

No training or customer communications is required for this Project, as there will be no externally discernable changes.

B3 Testing Pre-requisites

B.3.1 Environment Requirements

The following table contains all the necessary environment requirements in order to perform testing, in each of the phases.

B.3.2 Phase 1

Refer to Table 11 for requirement descriptions for the test environment.

TABLE 11

Requirement Descriptions for Test Environment

Environment	Description of Requirements
Test MSS / E-SMLC s	Each type of test MSS/E-SMLC to be running with the same software version and release as its production equivalent, with the exception of Push MoLI being enabled.
Test GMLC	Test GMLC to be running with the same software version and release as its production equivalent.
Test Core Network	Test Core network to be in full working order. Any variances to normal to be noted at the time of testing.
Model ECPP server	Model ECPP server to be running with the same software version and release as its production equivalent.

B.3.3 Phase 2

Refer to Table 12 for requirement descriptions for the production Mobile Carrier network.

TABLE 12

Requirement Descriptions for Production Mobile Carrier Network and Production ECPP Servers

Environment	Description of Requirements
Production MSS / E-SMLC	Each type of production MSS/E-SMLC type to be running satisfactorily. Push MoLI is enabled.
Production GMLC	GMLC to be running satisfactorily.
Production Core Networks	Production Core network to be in full working order.
Pre-Production and Production ECPP server	Pre-Production and Production ECPP server to be in full working order.

B.3.4 Test Resources

Refer to table 13 for descriptions of testing resource requirements.

TABLE 13

Descriptions of Testing Resource Requirements

Resource Role	No. Required
Mobile Test Manager, incorporating Test Environment Co-ordinator, Tester, Test Document Writer and Defect Manager.	1
ECPP Test Manager / Test Specialist	1
Assistance from platform and product specialists.	As required

B.3.5 Test Tools

Test tools are to include:

(a) Specified hand held CE (4G and 3G), and

(b) Specified services (SIM/USIM cards of Mobile Carriers).

B4 Test Case and Results

As this testing involves the same basic test setup, repeated numerous times with different individual components, a table will be used to illustrate all testing combinations.

In the case of non-compliance (or unexpected results), notes detailing the issue, and any appropriate prevailing conditions, will be added following the table.

B.4.1 Phase 1

The tests in Table 14 are to be repeated 3 times to confirm the reliability of the data.

TABLE 14
Phase 1 Test Cases

		MSS/E-SMLC Location Data trigger for 000 Calls	MSS/E-SMLC Location Data trigger for 112 Calls
Test Case	Test handset	Expected Results	Expected Results
4	Mobile Carrier's USIM + 3G/4G CE	Refer to Section 3.2	Refer to Section 3.2

B.4.2 Phase 2

The MSS/E-SMLC to be provisioned with the Push MoLI functionality is to be decided by the Mobile Carrier.

The tests in Table 15 are to be repeated 3 times to confirm the reliability of the data.

TABLE 15
Phase 2 Test Cases

		MSS Location Data trigger for 000 Calls	MSS Location Data trigger for 112 Calls
Test Case	Test Handset	Expected Results	Expected Results
4	Mobile Carrier's USIM + 3G/4G CE	Refer to Section 3.2	Refer to Section 3.2

APPENDIX

C Examples of Sample XML Codes for Push MoLI

C1 Circular Area Shape

C.1.1 Sample XML code for Push MoLI that includes Circular Area shape information with centre coordinates and a radius is:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0"><emerep ver="3.0.0">
<eme_event eme_trigger="EME_ORG">
<eme_pos pos_method="CELL">
<msid type="MSISDN" enc="ASC">041234xxxx</msid>
<pd>
<time utc_off="+0000">20210321161715</time>
<shape>
<CircularArea srsName="www.epsg.org#4283">
<coord>
<X>33 49 07S</X>
<Y>151 00 26E</Y>
</coord>
<radius>500</radius>
</CircularArea>
</shape>
<lev_conf>0</lev_conf>
</pd>
</eme_pos>
</eme_event>
</emerep>
</svc_result>
```

C2 CircularArc Area Shape

C.2.1 Sample XML code for Push MoLI that includes CircularArc Area shape information with point coordinates, radii and angles is:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0">
<emerep ver="3.0.0">
<eme_event eme_trigger="EME_ORG">
<eme_pos pos_method="CELL">
<msid type="MSISDN" enc="ASC">041234xxxx</msid>
<pd>
<time utc_off="+1100">20210321162415</time>
<shape>
<CircularArcArea srsName="www.epsg.org#4326">
<coord>
<X>36 22 23S</X>
<Y>145 24 26E</Y>
</coord>
<inRadius>850</inRadius>
<outRadius>2000</outRadius>
<startAngle>60</startAngle>
<stopAngle>85</stopAngle>
</CircularArcArea>
</shape>
<lev_conf>0</lev_conf>
</pd>
</eme_pos>
</eme_event>
</emerep>
</svc_result>
```

NOTE: Where point, radii and angle information is not available, the Mobile Carrier will supply Circular Area shape information – refer to the examples in C.1.1.

C3 Point Shape

C.3.1 Sample XML code for Push MoLI that includes Point shape information is:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0">
<emerep ver="3.0.0">
<eme_event eme_trigger="EME_ORG">
<eme_pos pos_method="CELL">
<msid type="MSISDN" enc="ASC">041234xxxx</msid>
<pd>
<time utc_off="+1100">20210322160855</time>
<shape>
<Point srsName="www.epsg.org#4283">
<coord><X>33 49 07S</X><Y>151 00 26E</Y></coord>
</Point>
</shape>
<lev_conf>0</lev_conf>
</pd>
</eme_pos>
</eme_event>
</emerep>
</svc_result>
```

NOTE: Where point information is not available, the Mobile Carrier will supply Circular Area shape information – refer to the examples in C.1.1.

C4 Polygon Shape

C.4.1 Sample XML code for Push MoLI that includes Polygon shape information is:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0"><emerep ver="3.0.0">
<eme_event eme_trigger="EME_ORG">
<eme_pos pos_method="CELL">
<msid type="MSISDN" enc="ASC">041234xxxx</msid>
<pd>
<time utc_off="+1100">20210321154055</time>
<shape>
<Polygon srsName="www.epsg.org#4326">
<outerBoundaryIs>
<LinearRing>
<coord><X>36 21 50.234S</X><Y>145 24 38.018E</Y></coord>
<coord><X>36 22 23S</X><Y>145 24 26E</Y></coord>
<coord><X>36 22 48S</X><Y>145 23 59E</Y></coord>
<coord><X>36 21 55S</X><Y>145 23 36E</Y></coord>
<coord><X>36 21 05S</X><Y>145 23 40E</Y></coord>
<coord><X>36 20 48S</X><Y>145 24 10E</Y></coord>
<coord><X>36 21 09S</X><Y>145 24 28E</Y></coord>
</LinearRing>
</outerBoundaryIs>
</Polygon>
</shape>
<lev_conf></lev_conf>
</pd>
<esrd></esrd>
<esrk></esrk>
```

```
</eme_pos>

</eme_event>

</emerep>

</svc_result>
```

NOTE: Where Polygon information is not available, the Mobile Carrier will supply Circular Area shape information – refer to the examples in C.1.1.

C5 Elliptical Area Shape

C.5.1 Sample XML code for Push MoLI that includes Elliptical Area shape information is:

```
<?xml version="1.0" ?>

<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">

<svc_result ver="3.2.0">

<emerep ver ="3.0.0">

<eme_event eme_trigger="EME_ORG">

<eme_pos>

<msid  enc="ASC">041234xxxx</msid>

<pd>

<time utc_off="+1100">20210321162715</time>

<shape>

<EllipticalArea srsName="www.epsg.org#4326">

<coord>

<X>33 28 14.719S</X>

<Y>151 06 27.123E</Y>

</coord>

<angle>305</angle>

<semiMajor>134</semiMajor>

<semiMinor>121</semiMinor>

<angularUnit>Degrees</angularUnit>

<distanceUnit>meter</distanceUnit>
```

```
</EllipticalArea>
</shape>
</pd>
<esrd type="NA">00002</esrd>
<esrk type="NA">0481669</esrk>
</eme_pos>
</eme_event>
</emerep>
</svc_result>
```

NOTES:

1: Where Elliptical area information is not available the Mobile Carrier will supply Circular Area shape information – refer to the examples in C.1.1.

2. Some GMLC solutions will inject a default dummy numeric value which may be other than zero (e.g. 65 or 57) in the lev-conf parameter for elliptical area information which needs to be ignored by the ECP and ESO.

APPENDIX

D Sequence Diagrams

D.1.1 **General call flow – Emergency call initiated from MS**

Refer to Figure 8 for a high level call flow for an Emergency Call with Push MoLI, covering both the call setup to the ECP and the Push MoLI delivery to ECPP server. Transfer of the call to an ESO is not included in the flow; from the Mobile Carrier's point of view, the responsibility is delivery of the Emergency Call and associated Push MoLI delivery to the ECP; delivery to the ESO is the responsibility of the ECP.

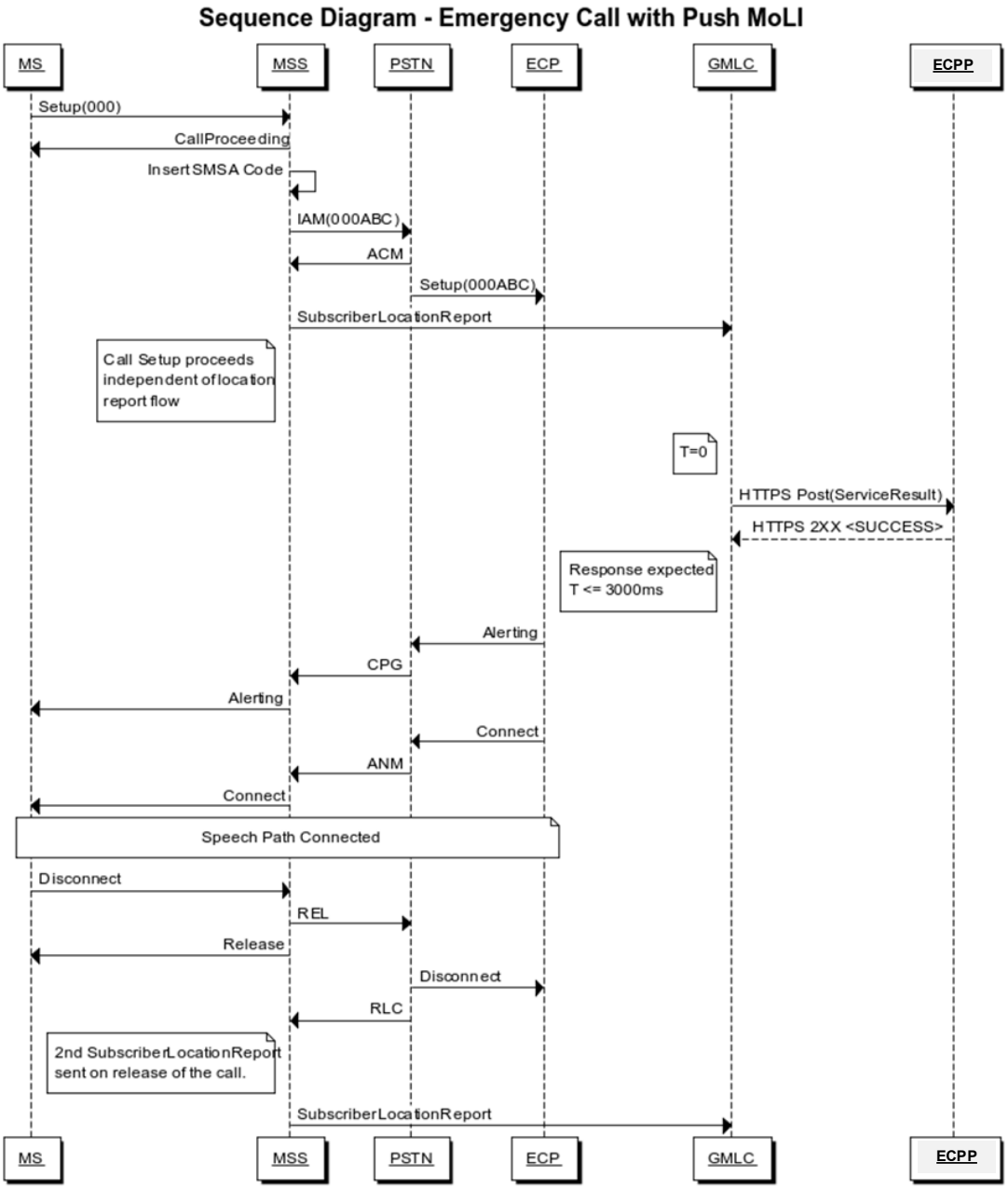

FIGURE 9

High level call flow for an Emergency Call with Push MoLI

D.1.1 **GMLC to ECPP Server Failover Scenarios**

Connection failure to Primary ECPP Server

(a) For Mobile Carriers implementing the "recommended process" in Section 3.3:
If the GMLC is unable to connect to the primary ECPP server, or if for any reason the connection fails, the GMLC will attempt to deliver Push MoLI to the secondary ECPP server instead. Note that there would be no further attempt at Push MoLI delivery if the attempt to the secondary ECPP server fails for any reason.

(b) For Mobile Carriers implementing the "alternate process" in Section 3.4:
If the GMLC is unable to connect to the primary ECPP server, or if for any reason the connection fails, the GMLC will make a second attempt to deliver Push MoLI to the primary ECPP server. Note that there would be no further attempt at Push MoLI delivery if the second attempt to the primary ECPP server fails for any reason.

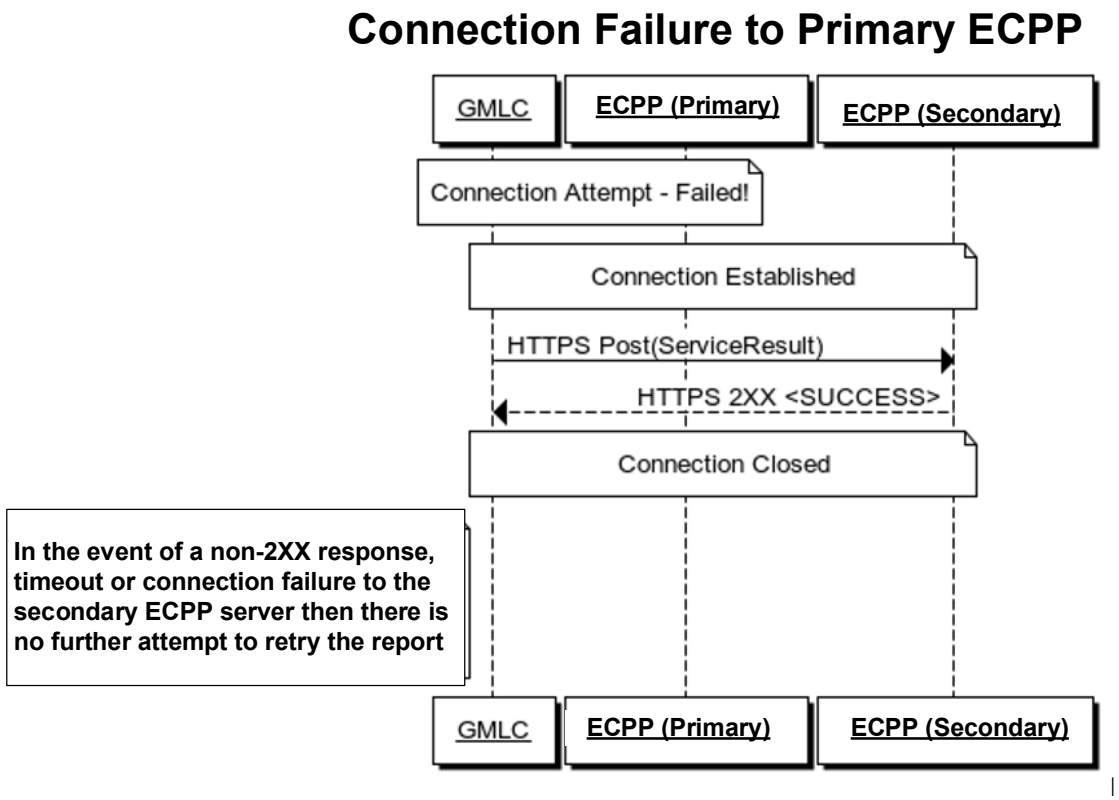

FIGURE 10
Connection Failure to Primary ECPP Server

Connection Failure to Primary ECPP – Alternate Failover

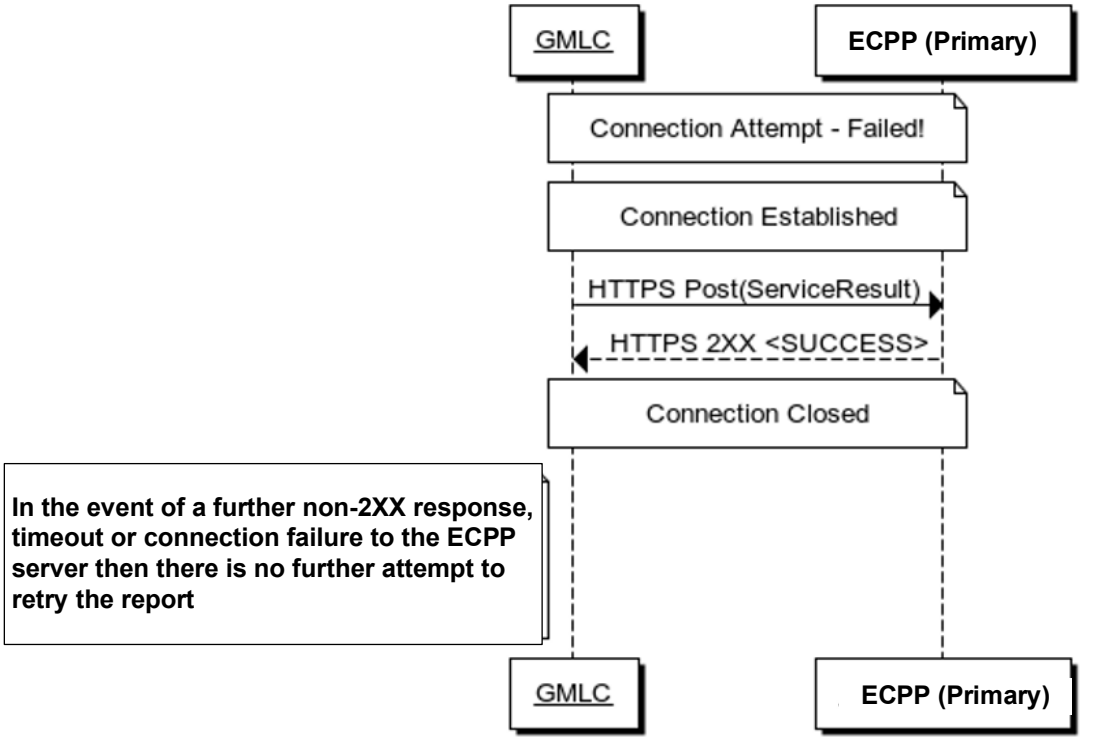

FIGURE 11

Connection Failure to Primary ECPP Server – Alternate Failover

Unsuccessful response from ECPP Server

(a) For Mobile Carriers implementing the "recommended process" in Section 3.3:
In the event of failure in the processing of Push MoLI data, ECPP server will flag the error to the GMLC using any HTTP 5XX response code for requiring retry. Such a response from the primary ECPP server would result in the GMLC attempting to deliver Push MoLI to the secondary ECPP server. Note that there would be no further attempt for Push MoLI delivery if the attempt to the secondary server fails.

(b) For Mobile Carriers implementing the "alternate process" in Section 3.4:
In the event of failure in the processing of Push MoLI data, ECPP will flag the error to the GMLC using any HTTP 5XX response code. Such a response from the primary ECPP server would result in the GMLC making a second attempt to deliver Push MoLI to the primary ECPP server. Note that there would be no further attempt at Push MoLI delivery if the second attempt to the primary ECPP server fails for any reason.

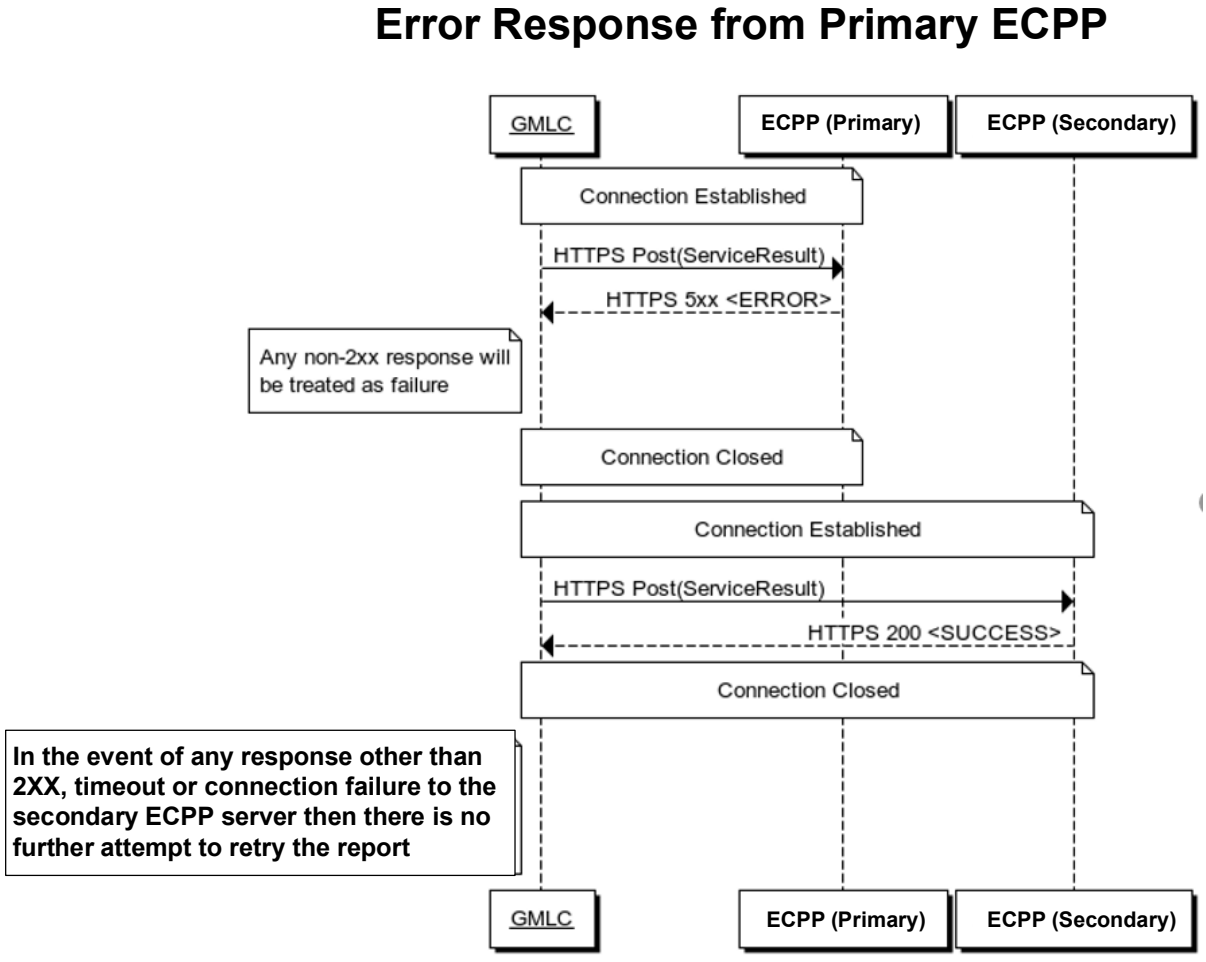

FIGURE 12
Error Response from Primary ECPP Server

Error Response from Primary ECPP – Alternate Failover

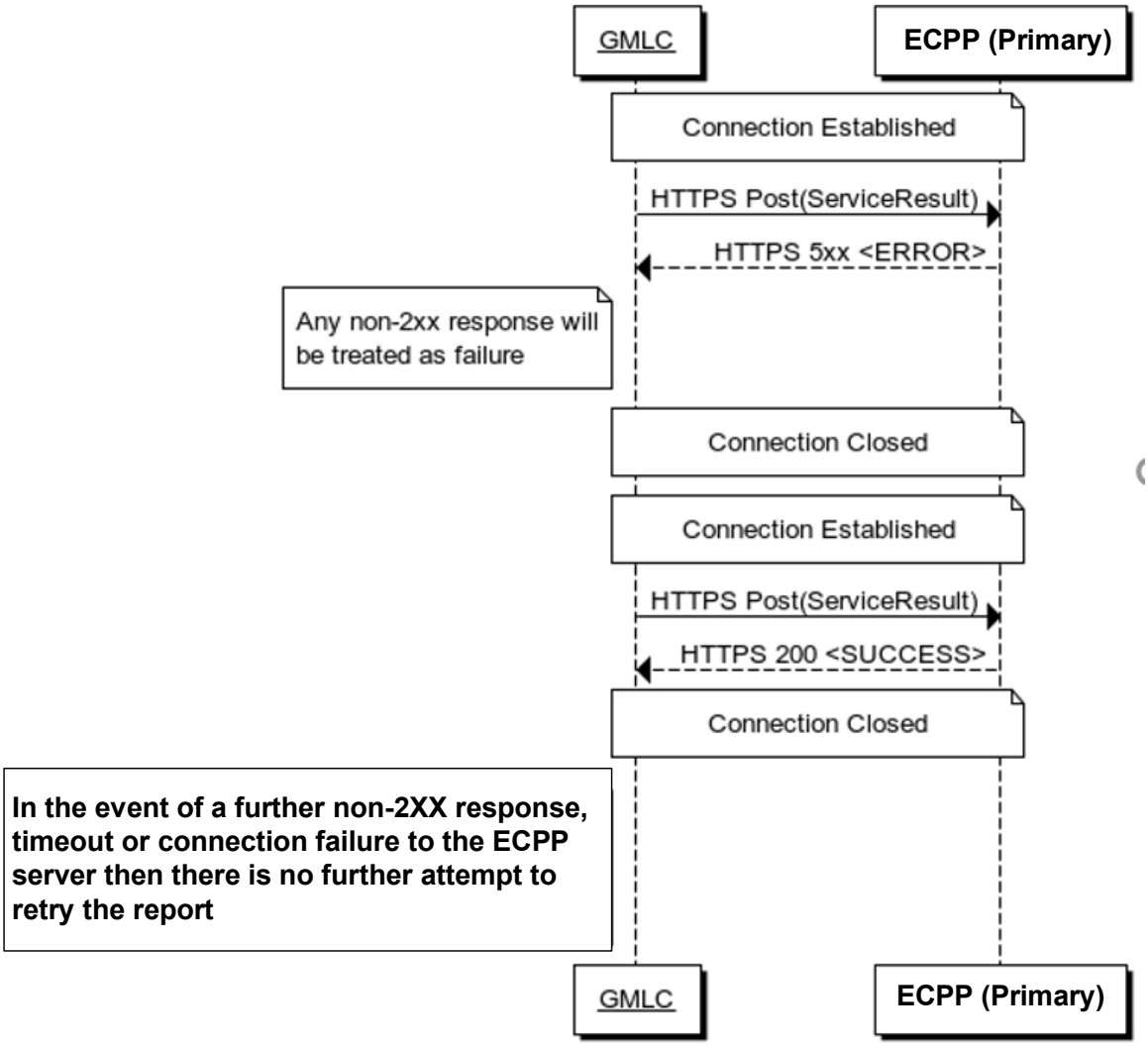

FIGURE 13

Error Response from Primary ECPP Server – Alternate Failover

Timeout on response from ECPP

(a) For Mobile Carriers implementing the "recommended process" in Sec 3.3: The GMLC will monitor for a response from the primary ECPP server within a period of 3 seconds from when Push MoLI is initially sent by the GMLC. If a response is not seen within this period, the Push MoLI delivery will be reattempted by the GMLC to the secondary ECPP server. Note that there would be no further attempt at Push MoLI delivery if the attempt to the secondary ECPP server fails for any reason.

(b) For Mobile Carriers implementing the "alternate process" in Sec 3.4: The GMLC will monitor for a response from the primary ECPP server within a period of 3 seconds from when Push MoLI is initially sent by the GMLC. If a response is not seen within this period, the Push MoLI delivery will be reattempted by the GMLC to the primary ECPP server. Note that there would be no further attempt at Push MoLI delivery if the second attempt to the primary ECPP server fails for any reason.

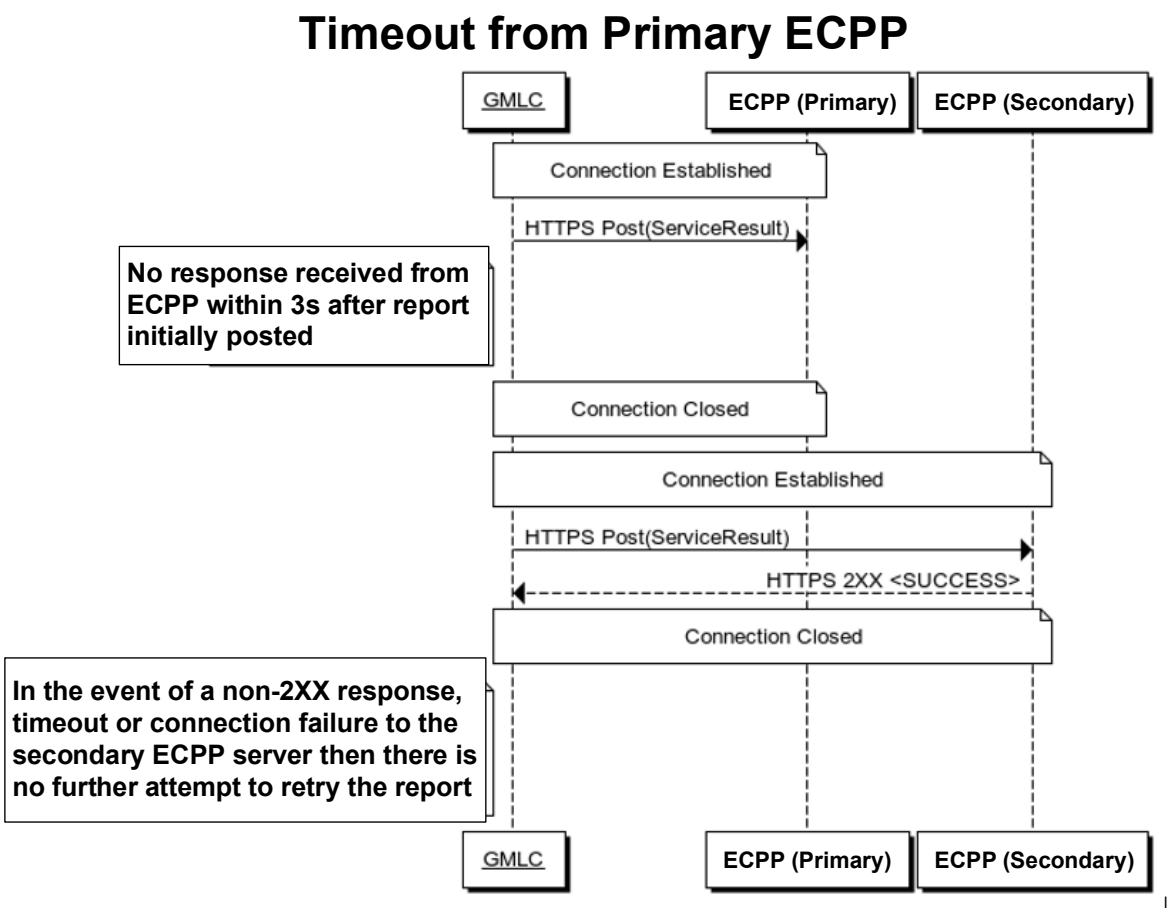

FIGURE 14
Timeout from Primary ECPP Server

Timeout from Primary ECPP – Alternate Failover

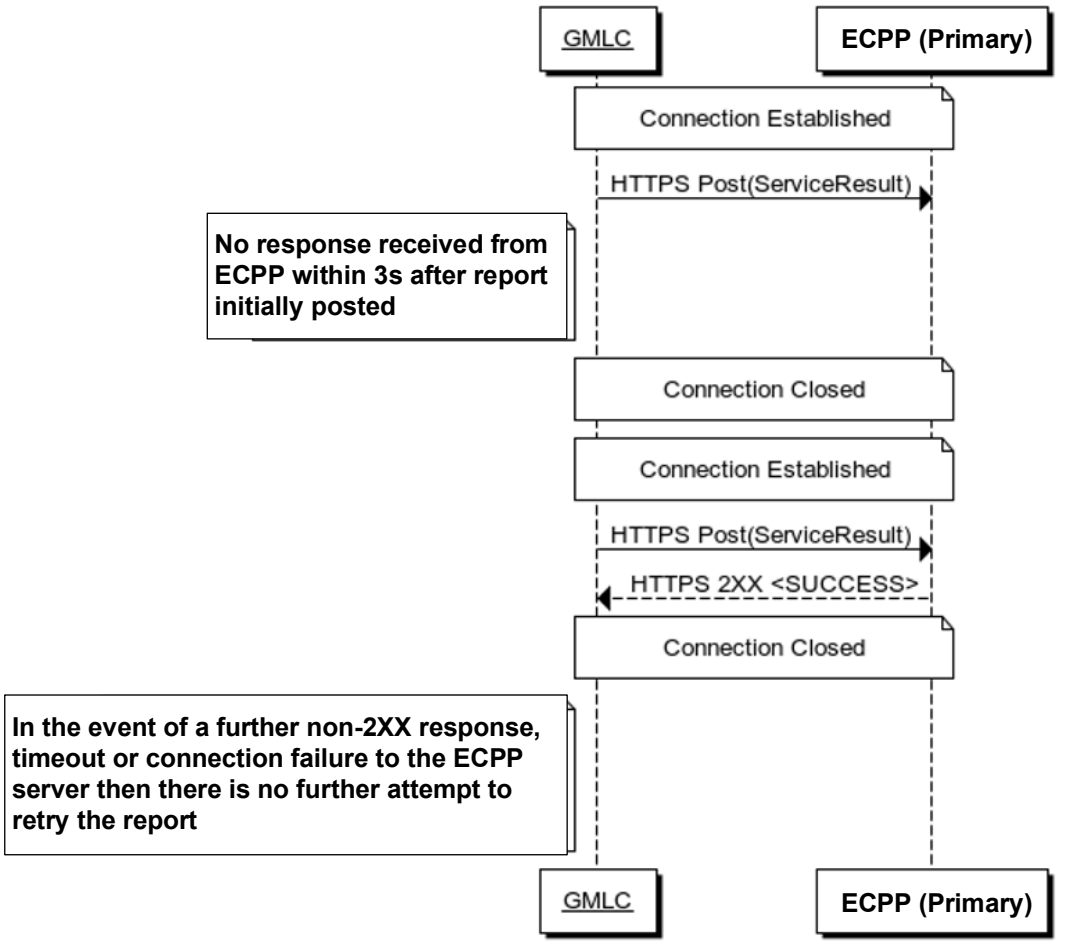

FIGURE 15

Timeout from Primary ECPP Server – Alternate Failover

PARTICIPANTS

The Working Committee responsible for the revisions made to this Specification consisted of the following organisations and their representatives:

Organisation	Membership	Representative
Optus	Voting	James Dam
Optus	Non-voting	Sam Mangar
Telstra	Voting	Jane Elkington
Telstra	Non-voting	Kandiah Arulventhan
Telstra	Non-voting	Michael Ryan
TPGT	Voting	Alexander R. Osborne
TPGT	Non-voting	Angus Clearie
TPGT	Non-voting	Michael Ziegelmann

This Working Committee was chaired by Michael Ryan. James Duck of Communications Alliance 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.

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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