August 30, 2013

Via email
Thomas Dolislager
FirstNet Network Service Platforms RFI
3130 Crow Canyon Place, Suite 210
San Ramon, CA 94583 USA

Re: Response to Request for Information
         Solicitation Number: SA1301-12-RP-0016-k

Dear Mr. Dolislager:

The Alliance for Telecommunications Industry Solutions (ATIS) is pleased to provide this response to the Request for Information (RFI) for Network Service Platforms issued by the First Responder Network Authority (FirstNet). ATIS actively supports enhancements to telecommunications networks to support public safety requirements and has worked collaboratively on this effort with the National Institute for Standards and Technology, the National Telecommunications and Information Administration, the Federal Bureau of Investigation, the Department of Homeland Security, the Federal Emergency Management Agency, and others. However, unlike many of its members, ATIS does not provide network services and is not submitting these comments in anticipation of a potential future contract with FirstNet. Instead, ATIS' comments are intended solely to provide information on industry work related to network service platforms that may be beneficial to FirstNet and to stakeholders that may support FirstNet through the provision of goods and services.

ATIS' comments are directed at the RFI sections on: IP Multimedia Subsystem (IMS); Location; Messaging; Evolved Multimedia Broadcast Multicast System (E-MBMS); Identity Management; Mission Critical Voice (MCV) Direct; Next Generation 9-1-1 (NG9-1-1); and Commercial Mobile Alerting System (CMAS). ATIS is also pleased to provide updates to the References worksheet.

Background

ATIS is a global standards development and technical planning organization that leads, develops and promotes worldwide technical and operations standards and solutions for information, entertainment, and communications technologies. ATIS' diverse membership includes key stakeholders from the Information and Communications Technology (ICT) industry – wireless and wireline service providers, equipment manufacturers, broadband providers, software developers, consumer electronics companies, public safety agencies, digital rights management companies, and internet service providers. ATIS is the North American Organizational Partner in the 3rd Generation Partnership Project (3GPP) and a significant focus of ATIS' work is directed at the development of IP Multimedia Subsystems (IMS)-based networks and Long Term Evolution (LTE) technologies.

Work within ATIS is progressed through ATIS' open industry committees and other initiatives, which include participation from nearly six hundred (600) industry subject matter experts. Among the committees that have work programs relevant to the information sought in the RFI are:

- Emergency Services Interconnection Forum (ESIF). ATIS ESIF serves as the primary forum for the telecommunications industry, public safety and other stakeholders to identify and resolve recognized technical and operational interconnection issues related to the delivery of E9-1-1 services. ESIF liaises with standards and government organizations to apprise them of its deliberations and decisions. ESIF also works closely with the National Emergency Number Association (NENA), which currently manages the technical evolution of the 9-1-1 system and emergency communications process.

- Packet Technologies and Systems Committee (PTSC). The ATIS PTSC develops and recommends standards and technical reports related to services, architectures, and signaling, including emergency services and Emergency Telecommunications Service (ETS). The PTSC also coordinates and develops standards and technical reports relevant to telecommunications networks in the U.S., reviews and prepares contributions on such matters for submission to the U.S. International Telecommunication Union Standardization (ITU-T) and the U.S. International Telecommunication Union Radiocommunication (ITU-R) Study Groups or other standards organizations, and reviews for acceptability or per contra the positions of other countries in related standards development and takes or recommends appropriate actions.
- Wireless Technologies and Systems Committee (WTSC). The ATIS WTSC is comprised of leading technologists who lead industry technical work on wireless issues, including NG9-1-1. ATIS WTSC develops standards and technical reports related to 2G, 3G, 4G, and beyond wireless services and systems for advancing NG9-1-1 communications services. The ATIS WTSC coordinates and develops standards and technical reports primarily relevant to wireless/mobile telecommunications networks in the U.S. and reviews and prepares contributions on such matters for submission to the appropriate U.S. preparatory body for consideration as ITU contributions or for submission to other domestic and regional standards organizations.

IP Multimedia Subsystem (IMS)

Among the issues on which input is sought by FirstNet in the RFI is regarding the interoperability and interworking of the IMS solution and architecture [IMS 6.01]. As explained above, ATIS is not a service or equipment provider and therefore is not proposing a specific IMS solution. However, as a leading developer of industry standards, including Voice over IP (VoIP) and IMS technical specifications, ATIS has significant work aimed at ensuring the interoperability of next generation IP networks.

This work includes standards focused on the interconnection of VoIP networks. The *IP Network-to-Network Interface (NNI) Standard for VoIP* (ATIS-1000009), for example, addresses the IP NNI for VoIP between carriers, as well as the need for a standard interface as telecommunications networks migrate the NNI from TDM circuit-switched to IP systems. It supports VoIP by defining: (1) interconnection architecture; (2) Session Initiation Protocol (SIP) call/session control signaling; (3) signaling and media transport; (4) Quality of Service (QoS); (5) association between call control and media control; and (6) mandatory SIP uniform resource identifiers (URI) to be supported.

Other interconnection standards developed by ATIS include:
- *Session Border Controller Functions and Requirements* (ATIS-1000026.2008(R2013)), which defines the Session Border Controller (SBC) functions and requirements that reside within a service provider's network, including operation, administration, maintenance, and provisioning (OAM&P) requirements.
- *Technical Parameters for IP Network to Network Interconnection Release 1.0* (ATIS-1000038), which specifies the "Interconnection Technical Parameters" that need to be collected and eventually exchanged between two service providers so that they can successfully interconnect IP-based facilities and VoIP services at an NNI.
- *Testing Configuration for IP Network to Network Interconnection Release 1.0* (ATIS-1000039), which specifies the service under test configurations that shall be utilized in order to verify the settings (to support ingress and egress processing) of the network border elements for interoperability of a service between providers.

- *Protocol Suite Profile for IP Network to Network Interconnection Release 1.0* (ATIS-1000040), which identifies a set of protocols and specifies their profile so that signaling, media, and network-related parameters can be uniformly and consistently (as identified by the test scenarios defined in ATIS-1000041) utilized across the interconnection interface.
- *Test Suites for IP Network to Network Interconnection Release 1.0* (ATIS-1000041), which specifies a set of call test scenarios involving SIP and other signaling messages which for various situations may be required to provide an expected reaction to an event or a sequence of events appropriate to the previously-signaled message. This "expected reaction" is based upon the protocol profile established in the messages that flow across the NNI.
- *IP Device (SIP UA) to Network Interface Standard* (ATIS-1000028.2008(R2013)), which supports SIP-based interconnection for VoIP between a carrier and the user. The SIP UNI specified in this document is applicable to individual SIP phones as well as to SIP PBXs.

Other relevant ATIS IMS-related work, including that related to ATIS' NG9-1-1 and Next Generation Network Government Emergency Telecommunications Service (NGN GETS), is summarized further below.

ATIS has also developed a standard that facilitates interconnection between IP-based networks and those based on Signaling System No. 7 (SS7) circuit-switched technology. *Signaling System 7 (SS7) and Internet Protocol (IP) Transport Networks Signaling Interworking and Compatibility* (ATIS-1000047), addresses the fact that control mechanisms and procedures of traditional Public Switched Telephone Network (PSTN) SS7 differ from the signaling/control mechanisms associated with IP technology. The standard identifies the need for lower-layer protocol transport network interworking and interoperability to support the end-to-end upper layer protocol communications and application protocol services. It provides guidelines and requirements for traditional lower-layer SS7 transport protocols and IP-based transport network interworking and interoperability, and for the interconnection nodes that will provide this interworking and interoperability, as well as guidelines and requirements for gateway support of the relevant lower-layer SS7 and IP protocols.

An aspect of IP interconnection is circuit-switched (ISDN User Part (ISUP)) to IP (SIP) interworking, which addresses interoperability between the two domains and PSTN Transition. In June 2004, ATIS published *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part* (ATIS-1000679.2004(R2010)), which is currently being updated. ATIS-1000679 defines the signaling and interworking between the ISDN User Part (ISUP) protocols and SIP in order to support services that can be commonly supported by ISUP and SIP-based network domains.

ATIS notes that the RFI also seeks information on interoperability testing [IMS 6.01]. ATIS has been involved in interoperability testing to validate the next generation NNI designed to provide a direct, IP-only connection between carriers. An NNI interoperability test event (NNI IOT) was conducted in January 2013 based in part on interface specifications and test plans developed by ATIS. The NNI IOT verified the North American ETS configurations of the NNI in the U.S. Government's Office of Emergency Communications (OEC) laboratory, operated by Applied Communication Sciences in Basking Ridge, New Jersey.

The NNI IOT tested interconnections between service providers using a number of scenarios, including scenarios in which both interconnected service providers were compliant with industry standards and other scenarios in which only one of the providers was compliant. The goal of this testing was to verify the validity and completeness of ATIS' profile and test suite in support of the NNI specifications, especially as they pertain to ETS, in support of service providers' goal to make NGN as resistant to failures, attacks, and congestion as the legacy Public Switched Telephone Network (PSTN). The event demonstrated that the ETS requirements based on ATIS specifications for providing end-to-end ETS communications services utilizing an IMS infrastructure across the NNI were mature and interoperable.

Location

Another issue on which the RFI seeks information relates to location solution architectures [Location 1.01]. An ATIS standard, *Approaches to Wireless E9-1-1 Indoor Location Performance Testing* (ATIS-0500013), presents guidelines for assessing the performance of wireless location technologies and recommends the testing of representative samples of indoor environments. It further recommends that the sampling be driven by the classes of buildings in the test area and that the sample ensures a scattering of buildings across the test area to guard against clustering and undetected biases based on ease of access, ease of ground truth generation, or difficulty of getting a location fix.

This standard, as well as the ATIS *Test Plan Input for Location Technology Test Bed* (ATIS-0500022), provided the foundation for a multi-vendor interoperability testing event [Location 5.01]. This event, performed under the auspices of the Federal Communications Commission's Communications Security, Reliability and Interoperability Council (FCC CSRIC), took place in the San Francisco Bay Area and was based upon the indoor test methodology developed by ATIS. This methodology centers on performing the indoor testing in sample buildings within the salient representative morphologies (*i.e.,* wireless use environments), which are dense urban, urban, suburban and rural.

Messaging

The RFI also seeks information on messaging [Messaging 1.01 et seq.]. ATIS has lead the joint work with the Telecommunications Industry Association (TIA) to define the requirements, architecture, protocols and procedures for text messaging to 9-1-1 emergency services using native wireless carrier SMS capabilities for the existing generation and next generation (NG9-1-1) Public Safety Answering Points (PSAPs). J-STD-110, *Joint ATIS/TIA Native SMS to 9-1-1 Requirements and Architecture Specification*, was published in March 2013. There is also a robust work program to develop a coordinated approach to assist Commercial Mobile Radio Service (CMRS) providers and Text Control Centers (TCC) with implementation of this recently developed ATIS/TIA joint standard (J-STD-110).

Finally, ATIS notes that it is also working to extend its voice-centric work to address Multimedia Emergency Services (MMES) which includes simultaneous text, messaging, video and voice capabilities. The purpose of this work effort is to identify and adapt, as necessary, 3GPP common IMS emergency procedures for applicability in North America to support emergency communications originating from a fixed or mobile IMS subscriber and terminating at an ESInet that supports MMES.

Evolved Multimedia Broadcast System (E-MBMS)

E-MBMS is another issue on which input is sought [E-MBMS 1.01 et seq.]. ATIS notes that work on E-MBMS takes place primarily within 3GPP, in which ATIS is the North American Organizational Partner. The E-MBMS baseline was defined in 3GPP Release 9. This release defines physical layer changes and upper layers specifications, which are stable enough for implementation. It also provides basic support for Adaptive HTTP Streaming (AHS) over broadcast and allows multiband/Multi-frequencies E-MBMS service discovery in idle state

3GPP Release 10 provides additional features, including the "counting" of E-MBMS interested user equipment (if the network is expected to enable/disable Multicast-Broadcast Single Frequency Network (MBSFN)), Allocation and Retention Priority (ARP) that enables priority between E-MBMS sessions, unicast

reception in MBSFN subframes, and support for Dynamic Adaptive Streaming over HTTP (DASH) over broadcast to align with Moving Picture Expert Group Dynamic Adaptive Streaming over HTTP (MPEG-DASH).

ATIS further notes that it is considering the potential role of E-MBMS in authority-to-citizen warning systems (*i.e.,* CMAS) as well as group communications.

FirstNet also inquires in the RFI regarding the spectrum allocation for public safety [E-MBMS 1.01]. ATIS notes that, based on 3GPP standards, each frequency/carrier can have up to 60% MBSFN allocation used for E-MBMS.

With respect to the RFI's inquiry regarding security [E-MBMS 2.01], it should be understood that 3GPP has specified service protection architecture and mechanisms for MBMS. As part of these mechanisms, an MBMS Service Key (MSK) will be delivered to user equipment upon successful authentication and authorization if the MSK is needed for service protection. Only the user equipment that has the MSK can obtain the MBMS Traffic Key (MTK) to decrypt the content. If needed, content protection can be applied as well.

Identity Management

ATIS also has a robust work program on identity management, another subject on which information is being sought by FirstNet in the RFI [Identity Management 1.01]. Relevant ATIS work on this issue includes published standards on:

- *ATIS NGN Identity Management Framework* (ATIS-1000035.2009), which establishes a framework for handling identities in a secured and authenticated manner in a multi-network, multiple service provider environment.
- *ATIS NGN Identity Management Use Cases* (ATIS-1000044.201), which defines use cases illustrating identity management applications in a multi-network, multiple service provider environment defined by the ATIS NGN architecture and establishes requirements for handling identities in a secured and authenticated manner in a multi-network, multiple service provider environment.
- *ATIS NGN Identity Management Mechanisms* (ATIS-1000045), which establishes a framework for handling identities in a secured and authenticated manner in a multi-network, multiple service provider environment.

Mission Critical Voice (MCV) Direct

In the RFI [MCV 1.01], FirstNet asks about the integration of key elements of Public Safety defined Mission Critical Voice (MCV) including: (1) Direct/Talk Around/ProSe, (2) Push-to-Talk (PTT), (3) Full Duplex Voice, (4) Group Call, (5) Talker Identification, (6) Emergency Alerting, and (7) Audio Quality. As noted above, ATIS is the North American Organizational Partner in 3GPP. In this role, ATIS supports the continued development of the Long Term Evolution (LTE) technology. This technology provides MCV, including:

- **Direct/Talk Around/Proximity-based Services** (**ProSe**): The feature is being developed for both public safety and commercial cellular users, with some capabilities limited to public safety users. While the network generally sets up, controls and monitors the Device-to-Device (D2D) communication, for

devices with a "public safety mode," the device may set up and control the D2D connection even if the network is down or the device is outside radio coverage range.[1]

- **Full Duplex Voice**: This is fully supported by Voice over LTE (VoLTE).
- **Group Call:** Group Call will be part of the 3GPP Group Communication System Enablers for LTE (GCSE_LTE) feature, which is being developed for both public safety and commercial cellular users. The feature provides one-to-many communications (for example push-to-talk) for LTE and supports voice, video and data. For public safety users, Group Call can be extended to user equipment that may be out of LTE radio coverage by using a ProSe user equipment-to-network relay.
  The work is divided into Radio Access Network (RAN), Core Network and Application layer functionality for group communication. The RAN layer will transmit media to devices in a most resource efficient way, either point-to-point or point-to-multipoint. The Application layer functionality sets up and controls group membership and floor control/arbitration.[2]
- **Talker Identification**: This is supported as part of VoLTE (Full Duplex Voice) and is also a requirement for GCSE_LTE.[3]
- **Audio Quality**: Audio quality will depend on the audio codec used and quality of service (QoS). VoLTE based on GSMA IR.92, *IMS Profile for Voice and SMS*, allows for either the Adaptive Multi-Rate (AMR) codec or the optional Wideband AMR codec. The AMR codec has 8 modes of operation; to comply with the standard, user equipment must support all 8 modes. The Wideband AMR codec has 9 modes of operation and, if wideband speech communication is offered, the user equipment must support all 9 modes. The different modes use different data rates that relate to the audio quality.

ATIS has on-going work efforts related to MCV. One of these efforts is aimed at ensuring that public safety requirements are satisfied by the LTE network capabilities, as mobile communications networks evolve to LTE. As part of this work, the requirements from the National Public Safety Telecommunications Council (NPSTC) will be reviewed to identify the ones that are not fully supported in 3GPP Specifications. Another on-going project is a joint project between ATIS and the Telecommunications Industry Association (TIA) that is developing use cases, requirements, architecture, call/message flows, and implementation guidelines for a standards-based solution that will provide a Public Safety Mission Critical push-to-talk (PTT) voice service between subscriber units operating on both Project 25-compliant[4] land mobile radio systems and conventional FM systems[5], in addition to subscriber units operating on Public Safety LTE network systems.

In the RFI [MCV 1.05], FirstNet asks how much functionality should be "baked in" to the LTE infrastructure and how much should be delivered by non-standardized application servers. ATIS recommends that the interfaces and messaging between equipment be standardized. This would allow FirstNet the flexibility to procure equipment from multiple vendors. Algorithms and details within equipment, on the other hand, should be left to the manufacturer for implementation. ATIS also notes, however, that there is an exception to this general recommendation related to device applications, which transmit IP packets between the device and an application server. The detailed contents within these IP packets are typically not standardized to allow networks to support a vast array of different applications.

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[1] More information can be found in 3GPP TS 22.278 and TS 22.115 (Stage 1 Service Aspects). This feature is part of 3GPP Release 12, with applicable standards planned for completion in June 2014.

[2] More information can be found in TS 22.468 (Requirements Specification) and TR 23.768 (Architecture Study). The work item is targeted for completion by June 2014 as part of 3GPP Release 12. The standards and details surrounding the Application layer are subject to further discussion within 3GPP.

[3] More information can be found in 3GPP TS 22.468, para. 5.3.5.

[4] *Project 25 Inter-RF Subsystem Interface (ISSI) - Messages and Procedures for Supplementary Data* (TIA-102.BACD).

[5] *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards* (TIA-603).

Next Generation 9-1-1 (NG9-1-1)

In the RFI [NG911 1.01], FirstNet asks about the features and function that the application provides for an NG9-1-1 solution. ATIS notes that there is a great deal of industry work related to NG9-1-1 Emergency Services Network Architectures. For example, ATIS has developed, and is in the process of developing, a number of NG9-1-1 standards, including key work on transitional architectures involving the interconnection of legacy and next generation components.

Applying Common IMS to NG9-1-1 Networks (ATIS-0500023), for example, addresses the assumptions, requirements, and use cases associated with applying IMS architecture concepts to a next generation emergency services network. The next phase of this work is currently underway. This work will address the architecture, protocol, and procedures to support the interconnection of IMS-based next generation emergency services networks with legacy and IP-based originating networks, and legacy and NG PSAPs.

ATIS has developed a standard to identify and adapt as necessary 3GPP common IMS emergency procedures for applicability in North America to support emergency communications that originate from an IMS subscriber and are delivered to an Emergency Services IP Network (ESInet) or to a legacy Selective Router. This effort supports Voice over LTE (VoLTE) emergency calls controlled by an operator's IMS-based network via the procedures specified in 3GPP for IMS emergency calls. The output of this effort is documented in ATIS-0700015, *ATIS Standard for Implementation of 3GPP Common IMS Emergency Procedures for IMS Origination and ESInet/Legacy Selective Router Termination*. There is related work that compares the SIP profiles associated with the interface between an IP- originating network and an IP-based Emergency Services Network as defined in the standards developed by ATIS, 3GPP (IMS Release 10), and the NENA i3 specification. This work is contained in ATIS-0500024, *Comparison of SIP Profiles*.

Another ongoing work project within ATIS addresses the interconnection of IMS-based Next Generation Emergency Services Networks with legacy Emergency Services Networks and other Next Generation Emergency Services Networks.

ATIS is also working to support Over-the-Top (OTT) service providers by identifying technical methods by which an operator of a user access network can acquire and convey location for a non-operator-managed OTT VoIP emergency call. Future phases of the standards work are expected to handle location acquisition and conveyance for OTT messaging applications.

Commercial Mobile Alerting Service (CMAS)

Another issue on which input is sought is CMAS [CMAS 1.02]. ATIS spearheaded the development of industry standards to define how CMAS functions, including the U.S. Federal Alert and Commercial Mobile Service Provider (CMSP) gateways. For example, ATIS has worked to define the interface and message transfer protocol between a Cell Broadcast Entity (CBE) and a Cell Broadcast Center (CBC) to support text-based Cell Broadcast Services, such as CMAS. This work is described in the ATIS standard, *Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification* (ATIS-0700008).

Included in this work are two standards that were jointly developed by ATIS and TIA. The *Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Specification* (J-STD-101) defines the interface between the Federal Alert Gateway and the CMSP gateways for CMAS alerts. The *Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Test Specification* (J-STD-102) defines the operational testing procedures for communications between

the Federal Alert Gateway and the CMSP Gateway over the Reference Point "C" Interface, which is the secure interface between the gateways, including any processing functionality that directly impact communications over the Reference Point "C" Interface.

ATIS has also described the Evolved Packet System (EPS) Public Warning System (PWS) for the broadcast of CMAS messages and mapped CMAS application level messages to the Cell Broadcast Center (CBC) message structure as used within the EPS. This work can be found in the ATIS *CMAS via EPS Public Warning System Specification* (ATIS-070010).

With regard to the client that is required on the device to receive the alerts [CMAS 1.04], ATIS would like to point out that the implementation of CMAS on mobile devices varies according to manufacturer. Individual manufacturers may specify required clients or applications. ATIS/TIA joint standard J-STD-100, *Joint ATIS/TIA CMAS Mobile Device Behavior Specification*, and its Supplement A define the mobile device behavior when English CMAS messages are received. ATIS standard ATIS-0700013, *Implementation Guidelines for Mobile Device Support of Multi-Language CMAS,* defines the mobile device behavior for multi-language CMAS messages.

With regard to the inquiry regarding industry testing done to date [CMAS 3.01], ATIS/TIA joint standard J-STD-102, *Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Test Specification*, and its Supplement A define the operational testing procedures, including test environments and test cases, for communications between the Federal Alert Gateway and the CMSP Gateway.

Finally, on the issue of product deployment [CMAS 3.02], it should be noted that CMAS/Wireless Emergency Alerts (WEA) is currently deployed in the U.S. by wireless operators, including AT&T, Sprint, T-Mobile USA, and Verizon.

IMS/Messaging and MCV – Quality of Service (QoS)/Priority

ATIS' work in support of NGN Government Emergency Telecommunications Service (GETS) in defining capabilities for Priority and QoS spans multiple areas of the FirstNet RFI, including: IMS, Messaging, and MCV. This work includes:
- *Emergency Telecommunications Service (ETS) Profile and Tests for IP Network-to-Network Interconnection* (ATIS-1000053), which provides a profile and tests to verify the support of Emergency Telecommunications Service (ETS) on the Internet Protocol (IP) Network-to-Network Interconnection (NNI). Phase II of this work is currently underway.
- *ETS Packet Priority for IP NNI Interfaces - Use of Existing DiffServ Per Hop Behaviors* (ATIS-1000011), which provides guidelines for the application of existing Differentiated Services (DiffServ) Per Hop Behaviors (PHB) and their associated DiffServ Code Points (DSCP) when ETS VoIP packets are transported in the media stream at NNI.
- *ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism* (ATIS-1000020), which provides the requirements for a separate expedited forwarding mechanism that can recognize a class of traffic for preferential treatment via a unique DiffServ Code Point (DSCP). This class of traffic included ETS VoIP calls/sessions with the requirement of a pre-determined quantity of reserved bandwidth for ETS service.
- *ETS Network Element Requirements for an NGN IMS Based Deployment* (ATIS-1000023.2008), which defines network element requirements to ensure that ETS is implementable and interoperable in a multi-vendor environment for an NGN IMS-based network deployment.

- *End-to-End NGN GETS Call Flows* (ATIS-1000049), which describes end-to-end call/session flows for various wireline and wireless access technologies, in addition to the IMS Core Network call/session flows in support of NGN GETS. These call/session flows illustrate how an NGN GETS call/session can be processed, and address call/session set-up, termination, and on-going activities of the call/session for the various NGN GETS service types and access technologies.

There is also work underway within ATIS to develop an ETS Roadmap and requirements for ETS wireline access, ETS service, ETS EPC network elements and ETS EPC call flows.

References

Attached to this response as Attachment A is an updated References chart including additional references. These new references are noted in red.

ATIS is pleased to have the opportunity to provide its input in response to the FirstNet RFI for Network Service Platforms. The information in this filing will also be incorporated into the RFI spreadsheets.

If there are any questions, please do not hesitate to contact the undersigned.

Sincerely,

[Original signed by Thomas Goode]

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Attachment A References

Reference Number	Reference Title	Specification #	Location (URL)
1	**Basic References**		
1.01	NPSTC Statement of Requirements, dated 12/7/2012	-	http://www.npstc.org/statementOfRequirements.jsp
1.02	FCC Recommended Minimum Technical Requirements to Ensure Nationwide Interoperability for the Nationwide Public Safety Broadband Network, dated May 22, 2012	-	http://apps.fcc.gov/ecfs/document/view?id=7021919873
1.03	NPSTC on QOS	-	http://www.npstc.org/download.jsp?tableId=37&column=217&id=2304&file=PriorityAndQoSDefinition_v1_0_clean.pdf
1.04	NPSTC on MMES		http://www.npstc.org/download.jsp?tableId=37&column=217&id=2597&file=Use_Cases_Rqmts_PS_MMES_Report_revC_121106.pdf
1.05	NPSTC on Local Control	-	http://www.npstc.org/download.jsp?tableId=37&column=217&id=2254&file=LC21%20Local%20Control%20Definition%20Rev%20F.pdf
1.06	NPSTC on MCV	-	http://www.npstc.org/download.jsp?tableId=37&column=217&id=2024&file=Functional%20Description%20MCV%20083011%20FINAL.pdf
	General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access	3GPP TS 23.401	http://www.3gpp.org/ftp/specs/html-info/23401.htm
2	**Location**		
2.01	LTE Positioning Protocol (LPP)	3GPP TS 36.355	http://www.etsi.org/deliver/etsi_ts/136300_136399/136355/10.06.00_60/ts_136355v100600p.pdf
2.02	LTE Positioning Protocol (LPP)	3GPP TS 36.355	http://www.3gpp.org/ftp/Specs/html-info/36355.htm

2.03	OMA Secure User Plane Location Requirements	Secure User Plane Location Requirements, Approved Version 2.0 – 17 Apr 2012	http://technical.openmobilealliance.org/technical/release_program/docs/SUPL/V2_0_1-20121205-A/OMA-RD-SUPL-V2_0-20120417-A.pdf
2.04	OMA Mobile Location Service Requirements	OMA-RD-MLS-V1_3-20120529-C	http://technical.openmobilealliance.org/Technical/release_program/mls_v1_3.aspx
2.05	User Plane Location Protocol	OMA TS ULPv2.0.1	http://technical.openmobilealliance.org/technical/release_program/supl_v2_0.aspx
2.06	Secure User Plane Location Protocol (SUPL)	OMA RD SUPLv2.0	http://technical.openmobilealliance.org/technical/release_program/supl_v2_0.aspx
2.07	Feasibility study on Location Services (LCS) for Wireless Local Area Network (WLAN) interworking	3GPP TR 22.935	http://www.3gpp.org/ftp/Specs/html-info/22935.htm
2.08	Location Services (LCS); Evolved Packet Core (EPC) LCS Protocol (ELP) between the Gateway Mobile Location Centre (GMLC) and the Mobile Management Entity (MME); SLg interface	3GPP TS 29.172	http://www.3gpp.org/ftp/specs/html-info/29172.htm
	Functional stage 2 description of Location Services (LCS)	3GPP TS 23.271	http://www.3gpp.org/ftp/specs/html-info/23271.htm
3	**Presence**		
3.01	Presence service; Architecture and functional description; Stage 2	3GPP TS 23.141	http://www.etsi.org/deliver/etsi_ts/123100_123199/123141/09.00.00_60/
3.02	Presence service; Architecture and functional description; Stage 2	3GPP TS 23.141	http://www.3gpp.org/ftp/Specs/html-info/23141.htm
3.03	Presence service; stage 1	3GPP TS 22.141	http://www.3gpp.org/ftp/Specs/html-info/22141.htm
3.04	A Model for Presence and Instant Messaging	RFC2778	

3.05	IETF SIMPLE Specifications Support Presence-Based IM, Video, and Voice	draft-ietf-simple-presence-10	https://datatracker.ietf.org/doc/draft-ietf-simple-presence-rules/
	Presence service using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3	3GPP TS 24.141	http://www.3gpp.org/ftp/Specs/html-info/24141.htm
4	**IMS Core/EPC**		
4.01	IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction	3GPP TS 26.114	http://www.3gpp.org/ftp/Specs/html-info/26114.htm
	Architecture enhancements for non-3GPP accesses	3GPP TS 23.402	http://www.3gpp.org/ftp/specs/html-info/23402
4.02	Signaling plane interface between MME and HSS.	3GPP TS 29.272	http://www.3gpp.org/ftp/Specs/html-info/29272.htm
4.03	Signaling plane interface between PCRF in home network and PCRF in visited network.	3GPP TS 29.215	http://www.3gpp.org/ftp/Specs/html-info/29215.htm
4.04	Signaling plane interface between PCRF and external Application Functions.	3GPP TS 29.214	http://www.3gpp.org/ftp/Specs/html-info/29214.htm
4.05	Signaling plane interface between MMEs.	3GPP TS 29.274	http://www.3gpp.org/ftp/Specs/html-info/29274.htm
4.06	Signaling plane interface between MME and S-GW.	3GPP TS 29.274	http://www.3gpp.org/ftp/Specs/html-info/29274.htm
4.07	Signaling plane interface between PCRF and P-GW.	3GPP TS 29.212, 29.213	http://www.3gpp.org/ftp/Specs/html-info/29212.htm, http://www.3gpp.org/ftp/Specs/html-info/29213.htm
4.08	User plane interface between P-GW and external IP networks	3GPP TS 29.061	http://www.3gpp.org/ftp/Specs/html-info/29061.htm
4.09	GSMA PRD IP.92, "IMS Profile for Voice and SMS".	GSMA PRD IR.92	http://www.gsma.com/newsroom/wp-content/uploads/2012/06/IR9230.pdf

4.10	COMET (Converged Messaging Technology) consortium, COMESI (COnverged MultimEdia communication Suite over IMS) Interoperability Requirements		IR.65 IMS Roaming and Interworking Guidelines IR.88 LTE Roaming Guidelines IR.92 IMS Profile for Voice and SMS–QCI=1 marking IR.67 DNS/ENUM Guidelines for Service Providers and GRX/IPX IR.94 IMS Profile for Conversational Video Service–QCI=1 & 2 marking
4.11	IP Multimedia Subsystem (IMS) emergency sessions	3GPP TS 23.167	http://www.3gpp.org/ftp/Specs/html-info/23167.htm
4.12	IP Multimedia (IM) session handling; IM call model; Stage 2	3GPP 23.218	http://www.3gpp.org/ftp/Specs/html-info/23218.htm
	IP Multimedia Subsystem (IMS); Stage 2	3GPP TS 23.228	http://www.3gpp.org/ftp/Specs/html-info/23228.htm
	IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3	3GPP TS 24.229	http://www.3gpp.org/ftp/Specs/html-info/24229.htm
	Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3	3GPP TS 24.301	http://www.3gpp.org/ftp/Specs/html-info/24301.htm
4.13	Session Initiation Protocol	RFC3261	http://www.ietf.org/rfc/rfc3261.txt
4.14	SIP Event Notification	RFC3265	http://www.ietf.org/rfc/rfc3265.txt
5	**PTT**		
5.01	Push-to-talk over Cellular (PoC) services; Stage 2	3GPP TR 23.979	http://www.3gpp.org/ftp/Specs/html-info/23979.htm
6	**RCS**		
6.01	GSMA Rich Communications Suite (RCS)	Rich Communication Suite 5.1 Advanced Communications	http://www.gsma.com/rcs/specifications/
6.02	Compliance with OASIS, Common Alerting Protocol Version 1.2, March 2010	Version 1.2	http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.doc

6.03	IETF Emergency Context Resolution with Internet Technologies Working Group	RFC 6442	https://tools.ietf.org/html/rfc6442
6.04	IETF Framework for Emergency Calling Using Internet Multimedia	RFC 6443	https://tools.ietf.org/html/rfc6443
6.05	Roaming inter-operator handbook and compliance test plans	GSMA PRD IR.61, GSMA PRD IR.62	http://www.eduroam.hr/doc/ir61.pdf
6.06	PCC rules	3GPP TS 23.203	http://www.3gpp.org/ftp/Specs/html-info/23203.htm
6.07	PCC rules	3GPP TS 23.203	http://www.etsi.org/deliver/etsi_ts/123200_123299/123203/09.12.00_60/ts_123203v091200p.pdf
6.08	User plane interface between S-GW and P-GW.	3GPP TS 29.274, 29.281	http://www.3gpp.org/ftp/Specs/html-info/29274.htm, http://www.3gpp.org/ftp/Specs/html-info/29281.htm
7	**Emergency Services**		
7.01	Common Alerting Protocol (CAP)	ITU X.1303	http://www.itu.int/rec/T-REC-X.1303/en
7.02	IETF Emergency Context Resolution with Internet Technologies Working Group	RFC 6442	https://tools.ietf.org/html/rfc6442
7.03	IETF Framework for Emergency Calling Using Internet Multimedia	RFC 6443	https://tools.ietf.org/html/rfc6443
7.04	JOINT ATIS/TIA CMAS MOBILE DEVICE BEHAVIOR SPECIFICATION	TIA J-STD-100, Revision/Edition: 09, Date: 12/00/12	http://webstore.ansi.org/sitelicense.aspx?source=product_description#.URkhu6Xok_Z
7.05	Public Warning System (PWS) requirements	3GPP TS 22.268	http://www.3gpp.org/ftp/Specs/html-info/22268.htm
7.06	FCC CSRIC III	FCC Report – Leveraging LBS and Emerging Location Technologies for Indoor Wireless E9-1-1	http://transition.fcc.gov/bureaus/pshs/advisory/csric3/CSRIC_III_WG3_Report_March_%202013_LeveragingLBS.pdf
7.07	Functional & Interface Standards for NG9-1-1 (i3)	Various specifications	http://www.nena.org/?page=Standards
8	**Security, Identity Management**		

8.01	Security and Privacy Controls for Federal Information Systems and Organizations	NIST sp800-53-rev4-ipd	http://csrc.nist.gov/publications/drafts/800-53-rev4/sp800-53-rev4-ipd.pdf
8.02	Global Federated Identity and Privilege Management (GFIPM) framework	Multiple guidelines and specification documents	http://it.ojp.gov/gfipm
8.03	Guidelines for Federal agencies implementing electronic authentication. Technical specifications for levels of assurance	NIST Special Publication 800-63-1	csrc.nist.gov/publications/nistpubs/800-63-1/SP-800-63-1.pdf
8.04	A common framework for Identity Credentialing and Access Management within the Federal Government	Various FICAM specifications and guidelines	http://www.idmanagement.gov/identity-credential-access-management
9	**Future Public Safety Features**		
9.01	Future public safety 3GPP features		http://www.3gpp.org/Public-Safety 3GPP Rel 11 – Public Safety Broadband High Power User Equipment for BC14 3GPP Rel 12 – Proximity-based Services Specification (ProSe) 3GPP Rel 12 – Group Communication System Enablers for LTE (GCSE_LTE)

	MCV, Direct		
	Service requirements for the Evolved Packet System (EPS)	3GPP TS 22.278	http://www.3gpp.org/ftp/specs/html-info/22278.htm
	Service aspects; Charging and billing	3GPP TS 22.115	http://www.3gpp.org/ftp/specs/html-info/22115.htm
	Group Communication System Enablers for LTE	3GPP TS 22.468	http://www.3gpp.org/ftp/specs/html-info/22468.htm

E-MBMS		

	Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description	3GPP TS 23.246	http://www.3gpp.org/ftp/specs/html-info/23246.htm
	Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs	3GPP TS 26.346	http://www.3gpp.org/ftp/specs/html-info/26346.htm

CMAS			
	Technical realization of Cell Broadcast Service (CBS)	3GPP TS 23.041	http://www.3gpp.org/ftp/specs/html-info/23041.htm
	Joint ATIS/TIA CMAS Mobile Device Behavior Specification	J-STD-100	https://www.atis.org/docstore/search.aspx
	Supplement A to J-STD-100, Joint ATIS/TIA CMAS Mobile Device Behavior Specification	J-STD-100a	https://www.atis.org/docstore/search.aspx
	Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Specification	J-STD-101	https://www.atis.org/docstore/search.aspx
	Supplement A to J-STD-101, Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Specification	J-STD-101a	https://www.atis.org/docstore/search.aspx
	Supplement B to J-STD-101, Joint ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Specification	J-STD-101b	https://www.atis.org/docstore/search.aspx
	JOINT ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Test Specification	J-STD-102	https://www.atis.org/docstore/search.aspx
	Supplement A to J-STD-102, JOINT ATIS/TIA CMAS Federal Alert Gateway to CMSP Gateway Interface Test Specification	J-STD-102a	https://www.atis.org/docstore/search.aspx

	CMAS via GSM/UMTS Cell broadcast Service Specification	ATIS-0700006	https://www.atis.org/docstore/search.aspx
	Supplement A to ATIS-070006, CMAS via GSM/UMTS Cell broadcast Service Specification	ATIS-0700006a	https://www.atis.org/docstore/search.aspx
	Implementation Guidelines and Best Practices GSM/UMTS Cell Broadcast Service	ATIS-0700007	https://www.atis.org/docstore/search.aspx
	Cell Broadcast Entity (CBE) to Cell Broadcast Center (CBC) Interface Specification	ATIS-0700008	https://www.atis.org/docstore/search.aspx
	CMAS via EPS Public Warning System Specification	ATIS-0700010	https://www.atis.org/docstore/search.aspx
	Supplement A to ATIS-070010, CMAS via EPS Public Warning System Specification	ATIS-0700010a	https://www.atis.org/docstore/search.aspx
	Implementation Guidelines for CMAS Supplemental Information Retrieval	ATIS-0700012	https://www.atis.org/docstore/search.aspx
	Implementation Guideline for Mobile Device Support of Multi-Language CMAS	ATIS-0700013	https://www.atis.org/docstore/search.aspx
	Implementation Guideline for CMSP Handling of CMAS Supplemental Information Broadcast	ATIS-0700014	https://www.atis.org/docstore/search.aspx