2nd NG112 Emergency Services Plugtest; Sophia Antipolis, FR; 6 - 10 March 2017

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1 Executive Summary

ETSI, in partnership with EENA (the European Emergency Number Association), has organized the second NG (Next Generation) Emergency Services Plugtests™ event. This event was hosted by ETSI, from 6 to 10 March 2017 in Sophia Antipolis, France.

The aim of the event was to trial independently and jointly all components of the 112 communication chain based on Next Generation networks. Different topics were addressed, including Location Based Emergency Call Routing, Policy Based Emergency Call Routing, and Next Generation Media Types.

15 organizations from around the world, including Asia, Europe, and North America, had the opportunity to connect their equipment to the test infrastructure and validate the interoperability and conformity of their market solutions using different scenarios and test cases on-site from the ETSI headquarters in Sophia-Antipolis, France, as well as from their own labs. In fact, for the first time, specific remote-only testing sessions involving a US-based organization were carried out.

While the 2016 event edition focused on voice and geo-localization solutions, the 2017 scope was extended to content-rich emergency calling, such as video calling and TOTAL conversation. Participants put their products to the test, gaining valuable insights from experiencing a variety of scenarios. Tested technologies included Advanced Mobile Location as well as PEMEA (the Pan-European Mobile Emergency Application).

2 References

The following base specifications were validated in the Plugtest.

[i.1] EENA. Next Generation 112 Long Term Definition, Version 1.1, March 2013. http://www.eena.org/uploads/gallery/files/pdf/2013-03-15-eena_ng_longtermdefinitionupdated.pdf

[i.2] EMTEL. Emergency Communications (EMTEL); Total Conversation Access to Emergency Services, ETSI TS 101 470, June 2012. http://www.etsi.org/deliver/etsi_ts/101400_101499/101470/01.01.01_60/ts_101470v010101p.pdf

[i.3] EMTEL. Emergency Communications (EMTEL); Total Conversation for Emergency Communications, Implementation Guidelines, ETSI TR 103 201, March 2016. http://www.etsi.org/deliver/etsi_tr/103200_103299/103201/01.01.01_60/tr_103201v010101p.pdf

[i.4] 3GPP. TS 22.173: IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and Supplementary Services; Stage 1, Version 9.4.0, December 2009.

[i.5] 3GPP. TS 23.167: IP Multimedia Subsystem (IMS) Emergency Sessions, Version 9.3.0, December 2009.

[i.6] 3GPP. TS 24.229: IP Multimedia Call Control Protocol Based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), Stage 3, Release 11, Version 11.4.0, June 2012

[i.7] ETSI NG112 Test Specification. https://portal.etsi.org/Portals/0/TBpages/CTI/Docs/ETSI%20NG112%20Plugtest%20Test%20Specification%20v1.0.pdf

3 Abbreviations

EUT	Equipment Under Test
NO	Test is recorded as NOT successfully passed
NA	Test is not applicable
OK	Test is recorded as successfully passed
OT	Test is recorded as not being executed due to lack of time
Test Session	A paring of vendors that test together during a given time slot
TSR	Test Session Report. Report created during a test session

4 Participants

The teams which executed tests during the Plugtest are listed in the table below.

Table 1: List of teams

#	Team
1	**ACULAB**
2	**AVAYA/Engelbart Software**
3	**BETA80**
4	**COM4INNOV**
5	**DEVERYWARE**
6	**FRAUNHOFER FOKUS**
7	**UPV/EHU**
8	**FREQUENTIS**
9	**GRIDGEARS**
10	**Hellenic Open University**
11	**MCS DATALABS**
12	**ORACLE**
13	**RAPIDSOS**
14	**Technological Educational Institute of Crete**
15	**VOLTDELTA**

The EU projects who attended the Plugtests event are listed in the table below.

Table 2:List of EU projects

#	EU project
1	http://www.emynos.eu/
2	http://nexes.eu/

The EU projects who attended the Plugtests event are listed in the table below.

Table 3: List of observers

#	Observer
1	Communications of CARL AB
2	Smart 112 mobile

5 Technical and Project Management

5.1 Interoperability Tests

A document defining Test Descriptions [i.7] was developed by one NG112 expert. It contained Test Configurations, Interoperable Function Statements and the test scenarios to be executed by vendors.

The document was distributed to participants some weeks before the event, proposing them to comment on the tests or to add more tests.

5.2 Test Scheduling

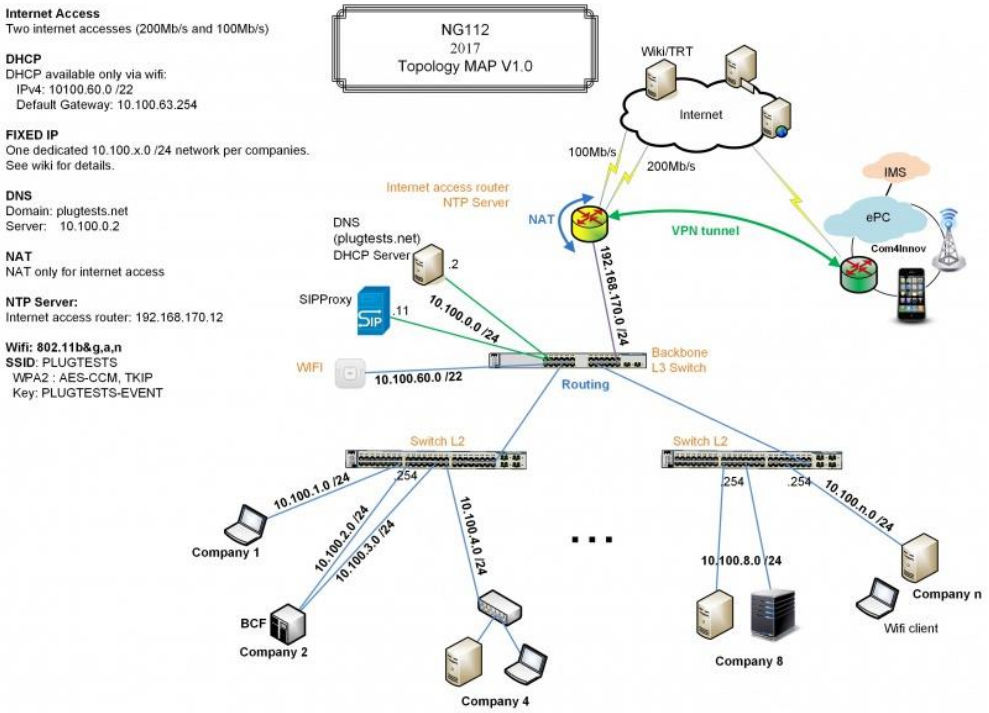
The preliminary test schedule was developed before the Plugtest and was circulated to all the participants in advance for comments. The initial test schedule allowed for each company to test against a fair number of other companies. A day was organized in a morning test session from 9.00 to 13.00 and in an afternoon test session from 14.00 to 18.00. Within the test sessions, test slots of variable length were allocated according to the relevant test configurations.

During the test event the test schedule was constantly updated according to the progress of the test sessions. This was done during the daily wrap-up meetings at the end of each day and during face-to-face meetings with the participants.

5.3 Test Network Infrastructure

The Test Network Infrastructure is shown in the picture below. It allowed to connect remote sites to the local network. The VPN access router and the local network were setup at the ETSI HQ.

Table 4: Test Network Infrastructure



5.4 VoLTE IMS

Com4Innov http://www.com4innov.com/ , who deployed a 4G/IMS network at Sophia Antipolis, provided access to their network in order to enable emergency calls from VoLTE mobile phones.

Here is a brief overview of the IMS emergency call steps from the UE perspective :

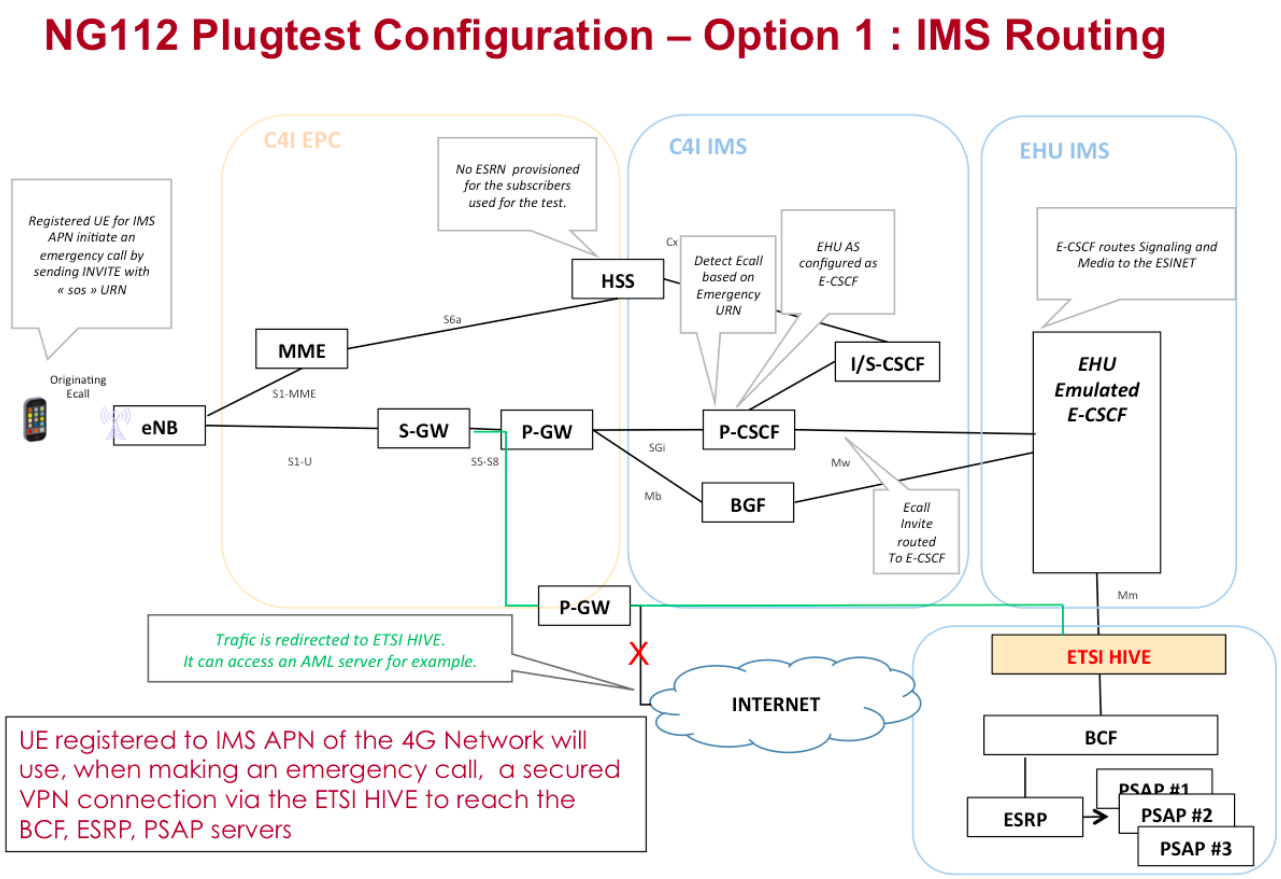
- UE Detectable Emergency Call (The UE can detect when a specific call is an emergency call or not)
- UE initiates an emergency PDN connectivity request.
- Due to the new APN for emergency , the UE need to perform an IMS registration for emergency
- The emergency SIP REGISTER message has the “sos” parameter present in the Contact URI field.
- The request URI of the SIP INVITE for the emergency call is in the form “urn:service:sos”

Prioritty management for IMS Emergency Call :

The eNodeB is mainly responsible to secure the QoS of the call, and to ensure that the ARP used for emergency is enforced in case of congestion. The eNodeB uses the ARP (Allocation and Retention Priority) to allow mobility to restricted areas. In 2017 a specific configuration to enable IP connectivity towards HIVE to access AML servers was also carried out.

The picture below describes the setup.

Table 4: VoLTE IMS



The test setup did not include the E-CSCF. This component was replaced by an Application developed by EHU. The IMS infrastructure was used in order to provide IP connectivity for mobile app testing (Mobile apps were installed on mobile phones and tested). Furthermore VoLTE IMS emergency calls were tested with native VoLTE applications.

6 Achieved Interoperability Results

- All PSAPs can handle Location by Reference , rather than only by value.
- BCF perfomed successful interoperability with all originating and terminating networks, including audio calls recording relying on SIPREC interface
- PIF gateways were confirmed to provide the required interworking capability between the legacy SS7 network and the NG112 SIP interconnects thus enabling a clear strategic migration path during a phased project rollout to an eventual SIP only environment
- First intercontinental test sessions successfully conducted between a UC system located in the US and various NG112 PSAPs located at the ETSI HQ test lab.
- Emergency calls over an IMS 4G/IMS network, VoLTE emergency-call-ready Sony Z5 prototypes installed with the Thunderbird Advance Mobile Localization (AML) Google App. With this combination, Plugtest participants could test localization enriched emergency calls over IMS from the UE (User Equipment) via the LIS to the PSAP (public-safety answering point).
- All location boundaries were respected by the ECRFs and routed correctly by the ESRPs to the appropriate PSAPs.
- Location provided by the LIS or by the end devices via AML was used successfully.
- Location-data was successfully transferred from the PEMEA network via the LIS to the NG112 PSAP.

- Emergency calls and Video calls with WebRTC callers and WebRTC call takers have been accomplished.
- Sensor enabled UEs (see http://ieeexplore.ieee.org/document/7823352/) were tested and and PCAP traces were gathered from various PSAPs.

7 Lessons Learned

1. lat/long mismatch:
   GeoJson defines a point as coordinates in x, y order (easting, northing for projected coordinates, longitude, latitude for geographic coordinates) and PIDF-LO/GML defines point coordinates as (latitude, longitude); some implementations used internally GeoJson which caused wrong configurations.

2. wifi location jumping:
   This was observed when using the AML Thunderbird App and is perhaps caused by the utilization of the App during testing (no continuous reporting but frequent re-initiation of the app) as it seems that the immediate location source is WiFi and a GPS lock takes some time.

3. subscriber number missing:
   AML HTTP push uses the MSISDN from the smartphone – in some cases the MSISDN is not stored in the SIM card and therefore cannot be used in order to identify the calling party and create a mapping to the AML location report. This is no issue with AML SMS as the calling party number is part of the SMS. Depends on the provider policy.

4. Non-supported media should not result in dropping the entire call (in the case that there is at least one media type which is supported at both ends)

5. WebRTC signalling: a SIP proxy is required which translates from web sockets to the appropriate transport sockets for backward compatibility reasons

6. WebRTC Testing requires to increase the PSAP buffer to be able to handle SDP (4K buffer not sufficient)

7. Consider testing teletypewriter Telephone (TTY) originating from the legacy network to be received as Real Time Text (RTT) at the PSAP

8. Consider to test with multiple NIFs in order to validate fail over scenarios

9. Location shall be contained in a Tuple stanza (device and person shall not be used)

8 Conclusions

Next Generation technology is ready for use. More importantly, it is future-proof as it can continuously integrate new features, as it was demonstrated with the AML, PEMEA and WebRTC integrations.

The provision of SS7 to NG112 SIP gateways allows for a clear strategic migration path from legacy networks to an SIP only environment.

The sensor enabled NG112 scenarios were tested and are a good starting point for future standardization activities.

The results of the interop event show that a large number of vendors provide the various elements of the NG112 equiment chain and that those elements interoperate with each other. Thus providing a large choice of innovative products to build next generation emergency communication solutions.

History

Document history		
V0.0.1	19.04.2017	First draft