eCall Host Laboratory Proposal

CENTRO DE TECNOLOGÍA DE LAS COMUNICACIONES, S.A.

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draft	2008-05-23	The first draft to be discussed
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1 INTRODUCTION

3GPP (3rd Generation Partnership Project) has produced the 3GPP TR 26.967 v8.0.1 [1] concept definition in order to examine and describe the in band modem solution for eCall[1] technology.

3GPP plans to begin eCall in-band MODEM testing during the month of July 2008. For this purpose, TSG SA WG4[2] is working to define an eCall Test Plan [4] and is looking for a Host Laboratory [5] in order to set up a test environment (See Figure 1) to perform all the test cases against the eCall software candidates and produce the final test report for each candidate.

This document is AT4 wireless proposal for 3GPP TSG SA WG4.

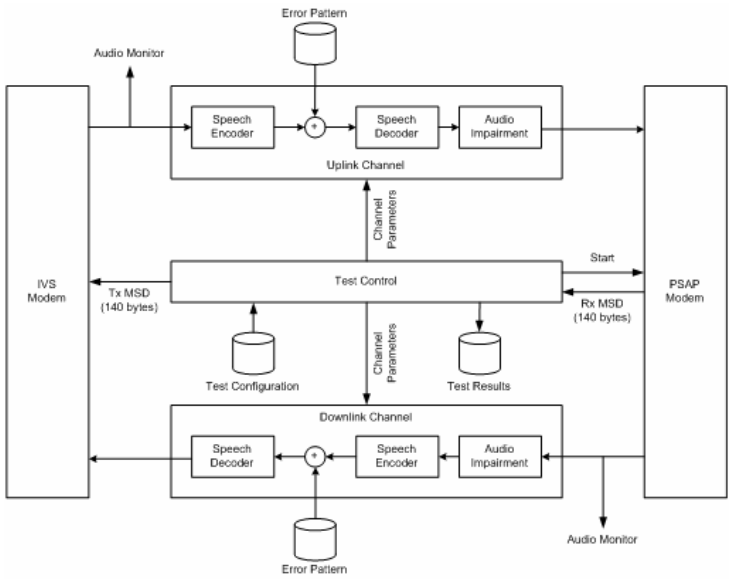

Figure 1. Logical Test Setup for eCall Candidate Selection

[1] eCall is a European-wide solution for automatically or manually initiated emergency voices calls. eCall will supplement E112 and 112 (TS112) emergency call with related data from the vehicle. The expected benefits is that emergency services will be made aware of accidents much more rapidly, will get precise information on location, vehicle type, etc, and therefore will be able to reach accident victims faster, with the potential to save many lives annually.

[2] TSG SA WG4 deals with the specifications for speech, audio, video, and multimedia codecs, in both circuit-switched and packet-switched environments. Other topics within the mandate of SA WG4 are: quality evaluation, end-to-end performance, and interoperability aspects with existing mobile and fixed networks (from codec point of view).

2 AT4 wireless

2.1 Introduction

Founded in 1991, AT4 wireless has evolved from a test laboratory into a global supplier in test systems and services. Today we see ourselves as the most complete Wireless Certification & Testing Laboratory in the world and a leading manufacturer of cutting-edge test & measurement equipment for telecommunication technologies.

AT4 wireless is committed to stay in the front line in the development of new wireless technologies. We are actively contributing in standardisation work, several years in advance before the new technologies hit the market. With this we want to ensure the quality and interoperability of the new technologies. Further we want to make sure, that we are the company having the best knowledge and testing solutions ready, when our customers start developing the first commercial products.

At AT4 wireless our key strength is our personnel. Today AT4 wireless has more than 330 employees and over 80% of them have a degree in telecommunications, electronics, computer or industrial engineering and have gained strong experience in testing and products or systems development.

Headquarters

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AT4 wireless Inc.

Herndon, VA, USA

R&D Building

Málaga, SPAIN

WiMAX Certification Laboratory

Málaga, SPAIN

Wireless Competence Center

Málaga, SPAIN

AT4 wireless has currently offices and test facilities in Spain and in US. Headquarters are located in Andalucía Technologic Park in Malaga.

2.2 PRODUCTS AND SERVICES

2.2.1 Products and services overview

MINT Tester

BITE Tester

RIDER Tester

PACT Tester

AT4 wireless offers a complete range of test systems and test services for wireless technologies. The next table shows an overview of different test services and test tools provided by AT4 wireless and also the technologies currently on our focus.

Technology	Test Services	Test Systems	Solutions
GSM, GPRS, EDGE	✔	**MINT**	✔
WCDMA/HSPA			
Wi-Fi	✔	Under Development	✔
Bluetooth	✔	**BITE**	✔
WiMAX	✔	**MINT**	✔
NFC	Under Development	**RIDER**	✔
RFID	Under Development	**RIDER**	✔
UWB	Under Development	Under Development	Under Development
Future Internet (IPv6)	✔	Under Development	Under Development

Table 1. Test Services, Test Tools and Solutions offered by AT4 wireless

2.2.2 Laboratories

AT4 wireless Laboratories offer global services in certification, testing and calibration for the industry. Goal is to ensure that products comply with the quality and safety requirements set for the global market and end users.

Testing	Regulated: Electromagnetic Compatibility (EMC), Electrical Safety and Environmental	CE
	Telecommunications: GSM, GPRS, EDGE, UMTS, HSDPA, Wi-Fi®, WiMAX™, Mobile WiMAX™ , RFID, NFC, *Bluetooth*®, DECT, SRD	WiMAX Forum, Wi-Fi Alliance, 3GPP, NFC Forum, Bluetooth, CTIA Authorized Test Lab LAB CODE 20080208-00
	Future Internet technologies: IPv6	IPv6 Forum
	Gambling, Photovoltaic modules	
Calibration	Calibration of measurement equipment	ENAC CALIBRACIÓN Nº 51/LE 147, 51/LE 203
Consultancy	Consultancy services in testing and management of the documentation procedure to gain CE Marking	CE
	Management of the certification process for private brands (GS, UL, FCC, TUV)	FC Federal Communications Commissions
	Consultancy services in International Certification	TEAM ITA
	Technical and Legal Consultancy	
Training	Wireless Technologies Formal Testing Languages Testing Methodology EMC	TTCN-3

Table 2. AT4 wireless laboratory services

AT4 wireless has the complete range of test equipment and accreditations for the testing services provided, granted by national authorities and independent accreditations bodies.

AT4 wireless laboratories have international recognition at European level and international recognition by authorities in some countries. All testing services are performed according to the ISO 17025 Quality Standard (recognized by EA, ILAC and IAF Agreements).

AT4 wireless has an important group of consultants: the ITA team. The ITA Team is a group of professionals with wide experience in the field of telecommunication equipment Worldwide Compliance services and it helps manufacturers to get approval certificates for their products worldwide. More than 1.600 certificates have been achieved with the help of AT4 wireless providing services in more than 130 countries.

Furthermore, AT4 wireless has organized and participated in many Plugfests (also called Unplugfests, Plugtests, etc., depending on the technology), which are interoperability events organized in the early stages of a technology, in order to get important feedback for the development of the specifications. Plugfests also help developers to verify the interoperability of their products or prototypes with other implementations of products not yet in the market.

2.3 EXPERIENCE AND CAPABILITIES

2.3.1 Experience with technology organizations

AT4 wireless actively participates in the most prestigious national and international associations and technical committees. We are committed to stay in the front line in the development of new wireless technologies.

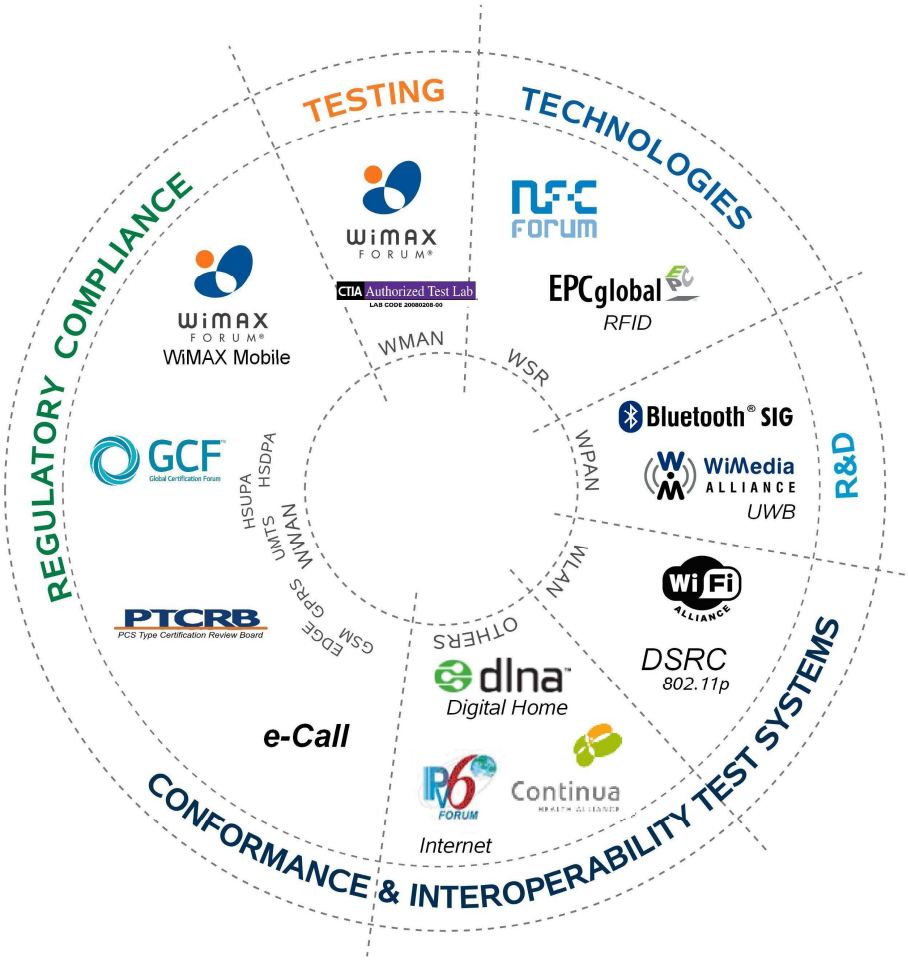

Figure 2. Current experience with technologies

2.3.2 Experience with projects relating to eCall technologies

Traffic safety is among the most important topics addressed in the new technology schemes today. AT4 wireless has carried research and development activities to develop testing methodologies for these new technologies. The main goals have been to assure interoperability among collaborative systems and to create test facilities covering related wireless technologies and services. Some examples of these technologies are Emergency Call (112), IEEE 802.11p, DSRC and WiMAX.

Currently the main research topics for AT4 wireless in this field are:

- Vehicle to Vehicle communication (V2V): Vehicles interworking with each other are subject to potential flaws of interoperability. AT4 wireless is developing test facilities to ensure interoperability among vehicles at service level (Road Hazard warning, Virtual Cones etc.) and at technology level (IEEE 802.11a/b/g and DSRC IEEE 802.11p).
- Vehicle to Infrastructure communication (V2I): Extending features beyond the driver line-sight can be achieved by deploying a roadside infrastructure with telematic capabilities. AT4 wireless is developing test facilities to ensure interoperability between vehicle and infrastructure at service level (Enhanced floating car data) and at technology level (IEEE 802.11a/b/g and DSRC IEEE 802.11p).
- Emergency Call is a service with a goal to minimize emergency service response time. A vehicle having an accident transmits relevant information to a health-care operator. With the information received an ambulance can then take the fastest route towards the accident location. AT4 wireless is developing test facilities to ensure interoperability between vehicle and PSAP operators at service level (eCall application) and at technology level (GSM/UMTS).

Focused on eCall testing, AT4 wireless worked in GST-CERTECS[3] project in developing a conformance test system for eCall based on USSD (Unstructured Supplementary Service Data) technology. All test cases for eCall were developed and specified in TTCN-3 language and the final test system mock-up was built. The eCall test system includes a signalling units developed by AT4 wireless (See Figure 4) to support the GSM communication channels using USSD technology.

[3] Specification, deployment of a prototype and validation of a certification process for telematic components, systems and services, targeted at the automobile industry.

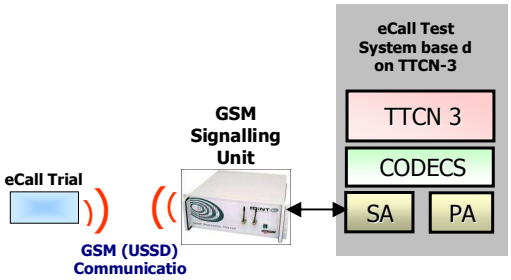

Figure 3. eCall conformance test system developed by AT4 wireless

GSM lower layer (from RF to network layer) was implemented on the AT4 wireless's GSM Signalling Unit. This signalling unit is composed of a stand-alone hardware connected to a host computer via ethernet. It also provides an API (Application Program Interface) to manage it. This API is used in the test system core with goal to provide a GSM transport connection with the GSM modem integrated into the eCall application under test.

The signalling unit is a very important component in the test system mock-up, since it checks the emergency call and USSD communication with the eCall application. The signalling unit used in this CERTECS test system mock-up, called E1121 (see Figure 4), is used also for official 3GPP certification and it allows simulation of two GSM carriers (BCCH + TCH) with two different radio frequencies.

Figure 4. GSM Signalling Unit E1121

This signalling unit provides two GSM/GPRS physical channels: one of them carrying the Broadcast (BCCH) logical channel in timeslot 0 (the other timeslots are not initially used) and the other one carrying the traffic channel (a TCH logical channel in the configured timeslot if GSM mode is used, or a PDCH in every configured timeslot if GPRS mode is used). The DLL (dynamic link library used by system adaptor into test system) functions initialize, configure and send data through those channels in order to perform the desired functionality. The SADCH and the FACH are also supported by the signalling unit.

As conclusion, eCall test system was able to test the eCall application based on USSD installed in cars. Furthermore this test system architecture developed is able to efficiently cope with the evolution of the technology; in particular the move from a GSM cellular based system to an UMTS based system.

3 PROJECT PLAN - Phase 2, Comparison of In-Band Modem solution

The high level project plan defined here to execute the eCall in-band MODEM tests is based on the eCall PD5 Definition of Host Lab Tasks for eCall Selection Test [5]. If AT4 wireless will be identified as a Host Laboratory, AT4 wireless will describe each phase in sufficient detail, also to agree with all the Candidates and 3GPP SA4.

The project plan illustrated in Figure 5 below is divided into 5 tasks.

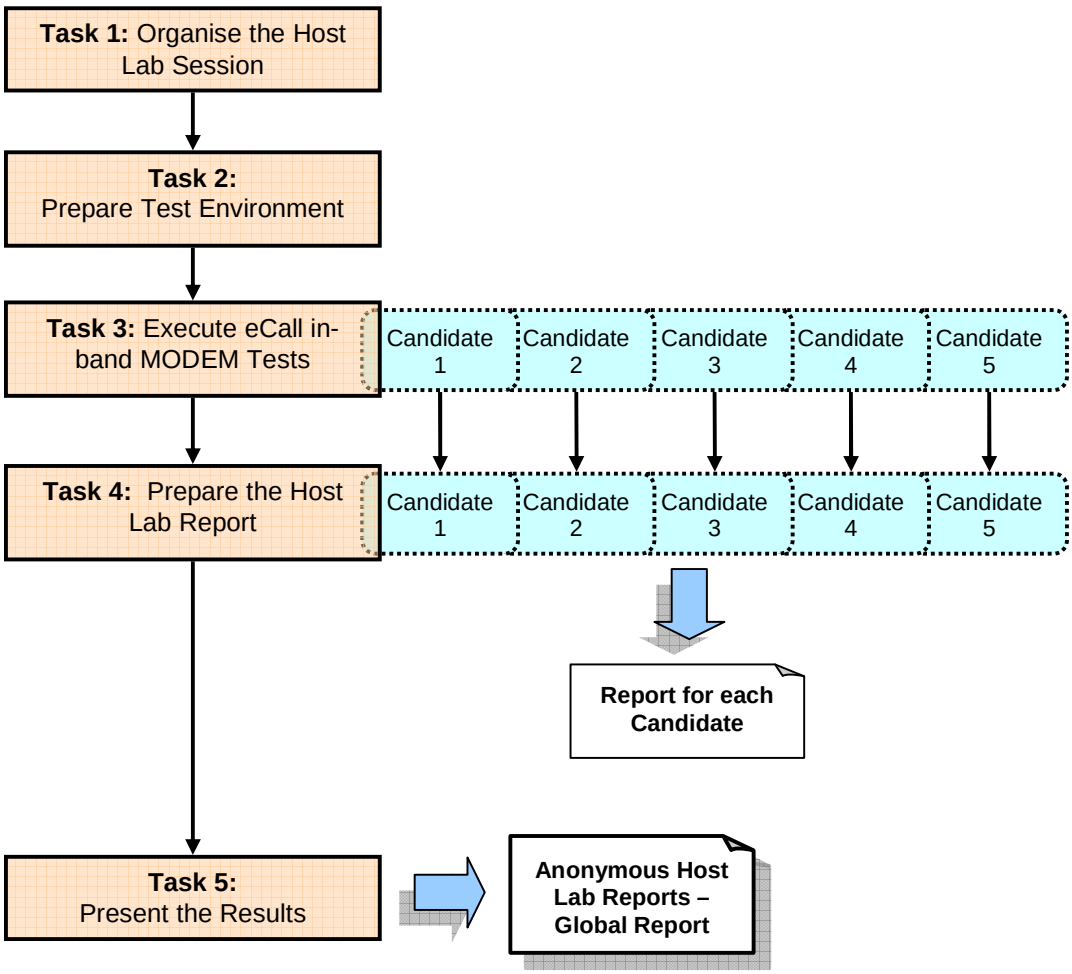

Figure 5. Project tasks and deliverables

Task 1 Organise the Host Lab Session

In this task the main activities are:

- Get standard PCs with sufficient processing power, with Ethernet I/O and a "reasonable good" Sound I/O for monitoring (not affecting the test results).
- Set up a testing framework provided by the System-Simulator-Implementer (Test Control SW, the channel simulators) and verify the correct working through dummies IVS and PSAP software.
- Manage all unpredictable failures noticed in the test, like outage of power supply, SW-crash, SW-implementation errors (as far as detectable), etc.
- Define time schedules for Candidates

Task 2 Prepare Test Environment

In this task the main activities are:

- Prepare the Test Control File (plain ASCII file) as defined in PD3 [4]. It is important to highlight that the Test Control file will not be made available to Candidate organisations.
- Prepare the Test Result Evaluation and Presentation. This is done in advance and tested with an artificially created Output table (plain ASCII file) to verify correct and fast handling after the real tests have been done. It may be wise to agree with SA4 which details and which presentation is expected. This task will be highly automated and verified.

Task 3 Execute eCall in-band MODEM Tests

In this task the main activities are:

- Perform eCall in-band MODEM test for each candidate according to the time schedule previously defined in task 1 and following selection rules in document PD4 [6].
- Reporting about testing progress to the candidates

Task 4 Prepare the Host Lab Report

In this task the main activities are:

- Perform the Test Result Evaluation and Presentation.
- Generate the anonymous test reports informing about the activities, results and experiences during the test preparation and test executions. These reports will include the averages for each test condition as well as the standard statistics for

each test condition. Finally, the candidates will be ranked by their Figures of Merit.

Task 5 Presentation of Results

In this task the main activities are:

- Transfer the Host Lab Reports to SA4 meeting #50 by 12th August 2008, 24:00h. The results shall be made anonymous.
- Present results at SA4 meeting #50 in Sophia Antipolis, France. AT4 wireless will send a representative to present the report and the test evaluation.

Alter this **Phase 2 "Comparison of alternative in-band modem solution and standardization of one in-band modem solution"**, it could be planned a further phase for **"e-Call Module Characterization"**, where AT4 wireless would like to present also a proposal.

4 PROJECT SCHEDULE

Schedule for this work is presented in the figure below. The total project schedule will be 5 weeks (week 1 starts on Friday 4th of July 2008).

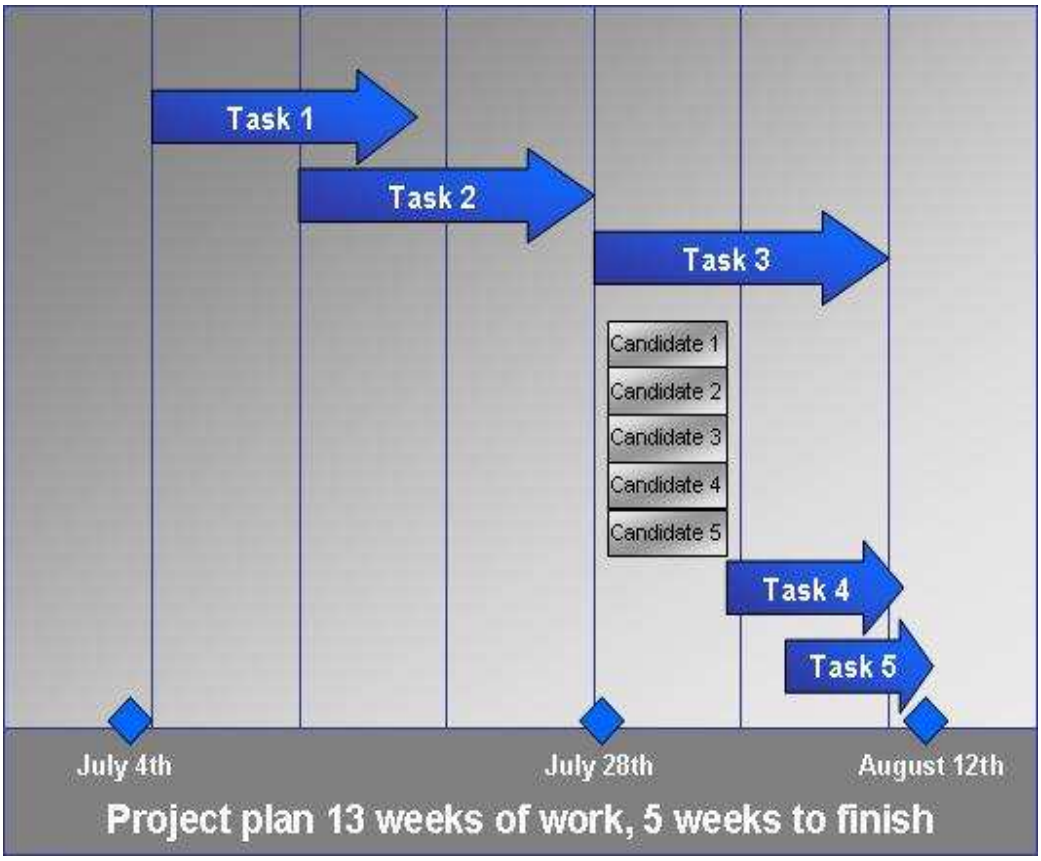

Figure 6. Project schedule

High level tasks and milestones in the project:

- Week 1: SA4#49 meeting in Philadelphia, USA – (June 30th – July 3rd)
- Week 2 and 3: Tasks 1 and 2 (including signing NDA with all candidates, prepare Host lab Testing, Schedule, etc.)
- Week 4: Task 3 - Testing all Candidates (Officially starts July 28th)
- Week 4 and 5: Prepare Test Reports.
- Week 6: SA4#50 meeting in Sophia Antipolis, France (August 18th).

More detailed scheduled and listed tasks will be provided after Host Lab has been appointed at SA4#49 meeting.

5 CONFIDENTIALITY

AT4 wireless has strict internal confidentiality and security processes. Here are some examples of the measures that are related also to customer projects:

Laboratory Access Control

- AT4 wireless buildings are locked at all times. Visitors will only enter through the front door. Centralized intruder alarm system is also operational.
- All staff areas are locked and only accessible to AT4 wireless staff. All customer rooms are locked and can be locked.
- Storage areas are located in separate rooms, which are locked and can only be accessed with a key.
- Each project is assigned with a code, which is used throughout the project to identify samples, results, logs, test reports, equipment storage containers, documentation binders etc.
- Testing information and data is kept in separate directories on file servers that are only accessible to involved staff.
- Customers may access Internet in their assigned offices and in a laboratory only after approval from IT department.

Confidentiality Measures

- AT4 wireless follows management principles and recommendations and according to its commitment with quality standard ISO 17025, takes measures to safeguard confidentiality of the information obtained in the course of its testing and/or certification activities at all levels of its organization, including committees and external bodies or individuals acting on its behalf.
- All employees sign a confidentiality clause.
- AT4 wireless has procedures established to control all documents, internally generated and from external sources as part of the tracking system to safeguard the confidentiality of information.

REFERENCES

[1] 3GPP TR 26.967 v8.0.1 (2007-12) “eCall Data Transfer; In-Band modem solution (Release 8)”.

[2] Tdoc S4-080283 - PD1 eCall Phase 2 TimePlan, Version 0.9.

[3] Tdoc S4-080226 - PD2 R-O-C reference, Version 1.1.

[4] Tdoc S4-080289 - PD3 eCall Selection Test Plan, Version 0.8,

[5] Tdoc S4-080261 - Definition of Host Lab Tasks for eCall Selection Test, Version 0.2.

[6] Tdoc S4-080260 – PD4 eCall Phase 2 selection rules (v0.1).