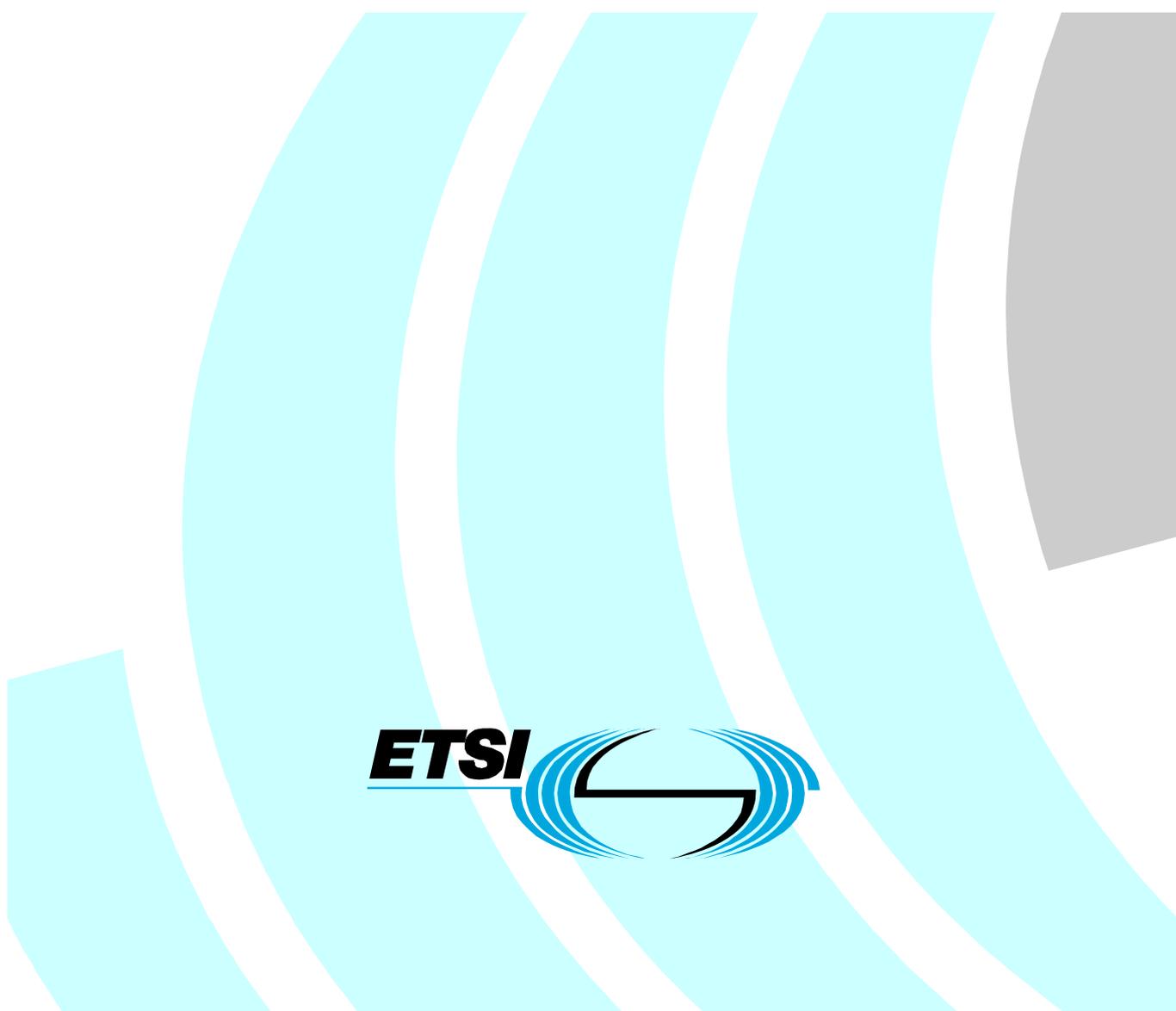


eCall Network Access Device (NAD) conformance specification; Part 2: Test Suites



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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

The present document is part 2 of a multi-part deliverable covering eCall Network Access Device (NAD) conformance specification as identified below:

Part 1: "Protocol test specification";

Part 2: "Test suites".

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Introduction

Following a decision of the European Parliament, and a request by the European Commission to ETSI, ETSI TC MSG was tasked with managing the technical specification and creation of open standards for the Pan-European eCall emergency service.

An eCall is an emergency voice call, initiated manually or automatically from a vehicle to a Public Safety Answering Point (PSAP), supplemented by up to 140 bytes of incident related data. The Minimum Set of Data (MSD) has been defined by CEN Technical Committee 278 and includes the GNSS derived location and direction of travel of the vehicle, the Vehicle Identification Number (VIN) and other information to enable the emergency response teams to quickly location and provide medical and other life saving assistance to the accident victims.

eCall has been designed to operate over any PLMN that supports emergency voice calls, specifically TeleService 12. Should the MSD not be transmitted or received for any reason, or if the PSAP is not equipped with the necessary eCall equipment (eCall modem / server), the accident victims and PSAP operator may still converse using the In-Vehicle System (IVS) audio equipment.

The 3rd Generation Partnership Project (3GPP) has specified the eCall service requirements, data transmission protocols and network signaling aspects for Release 8.

NOTE: Early implementation of eCall in Release-7 is certifiable.

The in-band modem used to transfer the MSD from the vehicle to the PSAP, following the establishment of a 112 or other emergency voice call, has been specified by 3GPP TSG SA4.

Once an eCall is invoked - initiated manually by the vehicle occupants or automatically as the result of an accident, the eCall call set-up and clear-down procedures (RR, CC, and MM) are automatically controlled by the eCall in-vehicle system (IVS) and network access device (NAD). Once initiated the system requires no MMI intervention and does not permit the user to intervene at any stage during call management. It is important, therefore, that the eCall system works autonomously and reliable when faced with a wide range of probable network access events.

An eCall NAD may be used to access other non-emergency subscription services or for the purpose of making emergency calls only. In the latter case the eCall NAD is referred to an 'eCall only' device and there are specific network access restrictions placed on these devices in order to avoid the generation of large volumes of unnecessary MM signaling, when not engaged in an eCall, test or reconfiguration call TS 122 101 [1]. The eCall NAD is permitted to make calls to a non-emergency number for the purpose of testing, or requesting the reconfiguration of the NAD to lift the network access restriction so as to allow the NAD to register on power-up and to access subscribed to commercial services.

The eCall in-band modem conformance test protocols are as specified in TS 126 269 [2].

A vademecum on the applicability of ETSI GSM and UMTS mobile station harmonised standards EN 301 908 parts 1 [7] and 2 [8] and EN 301 511 [9] to the ETSI specified eCall NAD, for the purpose of demonstrating compliance with R&TTE Directive 1999/5/EC [i.1], article 3.2, can be found in TR 102 937 [i.4].

1 Scope

The present document specifies the protocol conformance testing in TTCN to ensure eCall NAD conformance when accessing a Universal Telecommunication System (UMTS) mobile network.

The following TTCN test specification and design considerations can be found in the present document:

- the testing architecture;
- the test methods and PCO definitions;
- the test configurations;
- the design principles, assumptions, and used interfaces to the TTCN tester (System Simulator);
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the TTCN.MP form for the mentioned protocols tests.

The Abstract Test Suites designed in the present document are based on the test cases specified in prose (TS 102 936-1 [10]).

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

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2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 122 101: "Universal Mobile Telecommunications System (UMTS); LTE; Service aspects; Service principles (3GPP TS 22.101)".
- [2] ETSI TS 126 269: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); eCall data transfer; In-band modem solution; Conformance testing (3GPP TS 26.269)".
- [3] ETSI TS 134 109: "Universal Mobile Telecommunications System (UMTS); LTE; Terminal logical test interface; Special conformance testing functions (3GPP TS 34.109)".
- [4] ETSI TS 134 123-1: "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification (3GPP TS 34.123-1)".
- [5] ETSI TS 134 123-3: "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) conformance specification; Part 3: Abstract Test Suites (ATSS) (3GPP TS 34.123-3)".
- [6] ETSI TS 134 108: "Universal Mobile Telecommunications System (UMTS); LTE; Common test environments for User Equipment (UE); Conformance testing (3GPP TS 34.108)".
- [7] ETSI EN 301 908-1: "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 1: Introduction and common requirements".

- [8] ETSI EN 301 908-2: "Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive".
- [9] ETSI EN 301 511: "Global System for Mobile communications (GSM); Harmonized EN for mobile stations in the GSM 900 and GSM 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (1999/5/EC)".
- [10] ETSI TS 102 936-1: "eCall Network Access Device (NAD) conformance specification; Part 1: Protocol test specification".
- [11] ETSI TS 124 008: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008)".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [i.2] ETSI TR 121 905: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905)".
- [i.3] ETSI TR 101 666: "Information technology Open Systems Interconnection Conformance testing methodology and framework; The Tree and Tabular Combined Notation (TTCN) (Ed. 2++)".
- [i.4] ETSI TR 102 937: "Mobile systems; Guidelines on applicability of GSM and UMTS mobile station harmonized standards to eCall Network Access Device (NAD)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 121 905 [i.2] and the following apply:

eCall: manually or automatically initiated emergency call, (TS12) from a vehicle, supplemented with a minimum set of emergency related data (MSD), as defined under the EU Commission's eSafety initiative

Minimum Set of Data (MSD): data component of an eCall sent from a vehicle to a Public Safety Answering Point or other designated emergency call centre

NOTE: The MSD has a maximum size of 140 bytes and includes, for example, vehicle identity, location information and time-stamp.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 121 905 [i.2] and the following apply:

ATS	Abstract Test Suite
IVS	In Vehicle System (eCall terminal and associated sub-systems in vehicle)
NAD	Network Access Device

4 Requirements on the TTCN development

A number of requirements are identified for the development and production of TTCN specification for 3GPP UE at Uu interface.

1. Top-down design, following TS 134 123-1 [4], TS 134 108 [6] and TS 134 109 [3].
2. A unique testing architecture and test method for testing all protocol layers of UE.
3. Uniform TTCN style and naming conventions.
4. Improve TTCN readability.
5. Using TTCN-2++ (TR 101 666 [i.3]) avoid the use of the TTCN 2 features TTCN 3 does not support.
6. TTCN specification feasible, implementable and compilable.
7. Test cases shall be designed in a way for easily adaptable, upwards compatible with the evolution of the 3GPP core specifications and the future Releases.
8. The test declarations, data structures and data values shall be largely reusable.
9. Modularity and modular working method.
10. NAS ATS should be designed being independent from the radio access technologies.
11. Minimizing the requirements of intelligence on the emulators of the lower testers. Especially the functionality of the RRC emulator in the TTCN tester should be reduced and simplified, the behaviours should be standardized as the TTCN RRC test steps in the TTCN modular library.
12. Giving enough design freedom to the test equipment manufacturers.
13. Maximizing reuse of ASN.1 definitions from the relevant core specifications.

In order to fulfil these requirements and to ensure the investment of the test equipment manufacturers having a stable testing architecture for a relatively long period, a unique testing architecture and test method are applied to the 3GPP UE protocol tests.

5 ATS structure - Modularity

The eCall ATS is developed making use of the modular TTCN approach used for the development of the 3GPP ATS specifications. The following modules are used: BasicM, RRC_M, L3M, NAS_M, HSR5_R6_M, R7_M and R8_M.

The module structure is shown in figure 1.

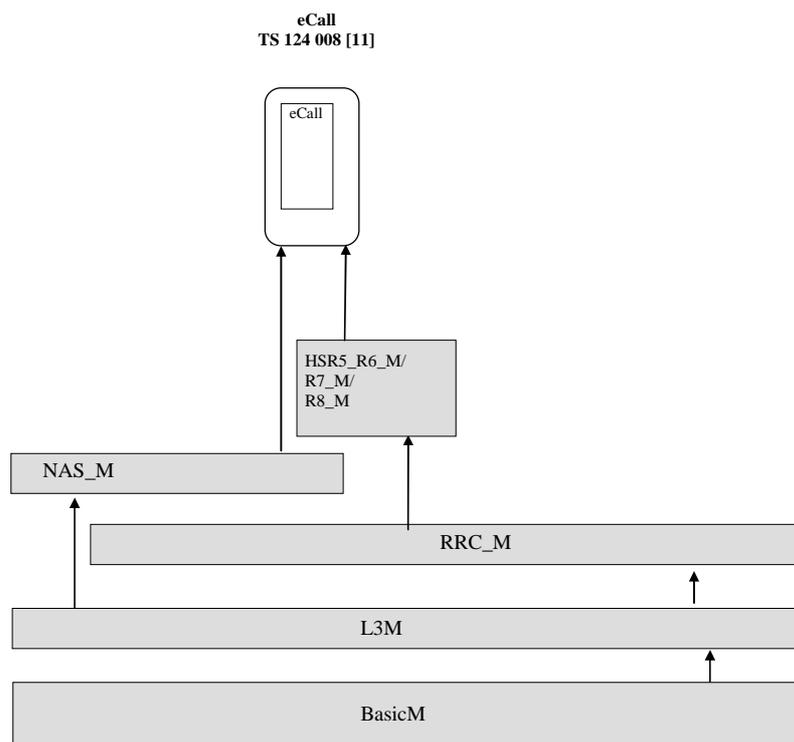


Figure 1: Module structure

The content of the modules is detailed in TS 134 123-3 [5], clause 5.1.2.

6 Test method and testing architecture

The test method and testing architecture is described in TS 134 123-3 [5], clauses 6.1 and 6.2. For the eCall ATS, the NAS test method and architecture is used as described in TS 134 123-3 [5], clause 6.3.

7 PCO and ASP definitions

The test PCO and ASP definitions are described in TS 134 123-3 [5], clause 7.

8 Design Considerations

The eCall test cases for UTRAN have been designed following the same principles used for other 3GPP UTRAN test cases. These can be found in TS 134 123-3 [5], clause 8.

Annex A (normative): Abstract Test Suite (ATS)

The ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to TR 101 666 [i.3].

The ATS was developed on a separate TTCN software tool and, therefore, the TTCN tables are not completely referenced in the table of contents. The ATS itself contains a test suite overview part which provides additional information and references.

A.1 Version of specifications

The version of the test specifications which the delivered ATSs are referred to are included in TS 134 123-3 [5], annex A, table A.1.

A.2 eCall ATS

The approved eCall test cases are listed.

Table A.1: eCall TTCN test cases

Test case	Description	FDD	LCR TDD
	eCall		
13.3.1.2	Test Call using eCall capable UE	X	
13.3.1.3	eCall using eCall capable UE with 'eCall only' subscription on USIM	X	
13.3.1.4	Reconfiguration Call using eCall capable UE	X	
13.3.1.5	eCall using eCall capable UE with eCall and non eCall subscription on USIM	X	
13.3.1.6	eCall Inactivity State after T3242 expires	X	
13.3.1.7	eCall Automatic Activation	X	

A.2.1 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to the ATS is contained in an ASCII file (eCall.MP) which accompanies the present document (ts_10293602v010101p0.zip).

Annex B (normative): Partial IXIT proforma

B.1 eCall test suite parameters declarations

The eCall test suite parameter declarations are listed in TS 134 123-3 [5], clause B.1.18, table B.20.

Annex C (informative): Additional information to IXIT

The additional information to IXIT is included in TS 134 123-3 [5], annex C.

Annex D (informative): PCTR Proforma

The PCTR Proforma is included in TS 134 123-3 [5], annex D.

Annex E (informative): Bibliography

ETSI TS 134 123-2: "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) conformance specification; Part 2: Implementation conformance statement (ICS) proforma specification (3GPP TS 34.123-2)".

ETSI TS 125 331: "Universal Mobile Telecommunications System (UMTS); Radio Resource Control (RRC); Protocol specification (3GPP TS 25.331)".

History

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