ETSI TS 137 571-4 V12.0.0 (2015-04)

TECHNICAL SPECIFICATION

Universal Mobile Telecommunications System (UMTS);
LTE;
Universal Terrestrial Radio Access (UTRA)
and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC);
User Equipment (UE) conformance specification for UE
positioning;
Part 4: Test suites
(3GPP TS 37.571-4 version 12.0.0 Release 12)

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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Introduction

The present document is part 4 of a multi-part conformance test specification. The specification contains a TTCN design frame work and the detailed test specifications in TTCN for the UE:

-   A-GPS at the UTRA Uu interface in TTCN-2;

-   A-GNSS at the UTRA Uu interface in TTCN-3;

-   LTE positioning at the LTE-Uu interface in TTCN-3.

The present document is part 4 of a multi-parts TS:

-   3GPP TS 37.571-1: Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 1: Terminal conformance.

-   3GPP TS 37.571-2: Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 2: Protocol conformance.

-   3GPP TS 37.571-3: Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 3: Implementation Conformance Statement (ICS).

-   **3GPP TS 37.571-4: Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 4: Test suites.**

-   3GPP TS 37.571-5: Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 5: Test scenarios and assistance data.

1   Scope

The present document specifies the protocol and signalling conformance testing in TTCN for the UE:

- A-GPS at the UTRA Uu interface;

- LTE positioning at the LTE-Uu interface;

- A-GNSS at the UTRA Uu interface.

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

- Test system architecture;

- Test models and ASP definitions;

- Test methods and usage of communication ports definitions;

- Test configurations;

- Design principles and assumptions;

- TTCN styles and conventions;

- Partial PIXIT proforma;

- Test suites in TTCN-2 and TTCN-3;

- The Test Suites designed and implemented in the present document are based on the test specifications in prose in 3GPP TS 37.571-2 [3];

- The applicability of the individual test cases is specified in the test ICS proforma specification in 3GPP TS 37.571-3 [4].

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2]   3GPP TS 37.571-1: "Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 1: Conformance test specification".

[3]   3GPP TS 37.571-2: "Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 2: Protocol conformance".

[4]   3GPP TS 37.571-3: "Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 3: Implementation Conformance Statement (ICS)".

[5] 3GPP TS 37.571-5: "Universal Terrestrial Radio Access (UTRA); Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC): User Equipment (UE) conformance specification for UE positioning; Part 5: Test scenarios and assistance data".

[6] 3GPP TS 36.523-3: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 3: Test suites".

[7] 3GPP TS 36.508: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing".

[8] 3GPP TS 34.123-3: "User Equipment (UE) conformance specification; Part 3: Abstract test suite (ATS)".

[9] 3GPP TS 34.108: "Common test environments for User Equipment (UE); Conformance testing".

[10] 3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)".

[11] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[12] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol specification".

[13] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification; Formats and coding".

[14] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[15] ITU-T Recommendation X.880: "Information technology - Remote Operations: Concepts, model and notation".

[16] ITU-T Recommendation Q.773: "Transaction capabilities formats and encoding".

[17] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

[18] 3GPP TS 34.109: "Terminal logical test interface; Special conformance testing functions".

[19] 3GPP TS 23.038: "Alphabets and language-specific information".

[20] ETSI TR 101 666 (V1.0.0): "Information technology; Open Systems Interconnection Conformance testing methodology and framework; The Tree and Tabular Combined Notation (TTCN) (Ed. 2++)".

[21] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[22] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[23] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] apply.

3.2   Symbols

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] apply.

3.3   Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply:

ASP   Abstract Service Primitive

4   A-GPS system architecture and test model

A-GPS signalling conformance tests are specified in TTCN-2. The system architecture and the test model are based on 3GPP TS 34.123-3 [8].

4.1   ATS and module structure

Refer to 3GPP TS 34.123-3 [8], clause 5.

4.2   Upper tester

Refer to 3GPP TS 34.123-3 [8], clause 7.3.5.1.

4.3   SV PCO

Refer to 3GPP TS 34.123-3 [8], clause 7.3.5.2.

4.4   A-GPS Primitives

Refer to 3GPP TS 34.123-3[8], clause 7.3.5.3.

4.5   Specific test suite operation for A-GPS testing

Refer to 3GPP TS 34.123-3 [8], clause 8.7.7.

5   A-GNSS and LTE positioning system architecture and test models

5.1   Test system architecture

5.1.1   General system architecture

Refer to 3GPP TS 36.523-3 [6], clause 4.1.1.

5.1.2   Component architecture

Each access technology (RAT) is hosted by a separate TTCN-3 parallel component (PTC):

- E-UTRA PTC;

- UTRA PTC.

The PTCs are controlled by the TTCN-3 positioning master test component (POS MTC) which:

- Is an extension of the MTC as defined in 3GPP TS 36.523-3 [6], clause 4.1.2.

- Controls the SS Positioning Simulator.

Figure 5.1.2-1 shows this component architecture for an E-UTRA and UTRA scenario.
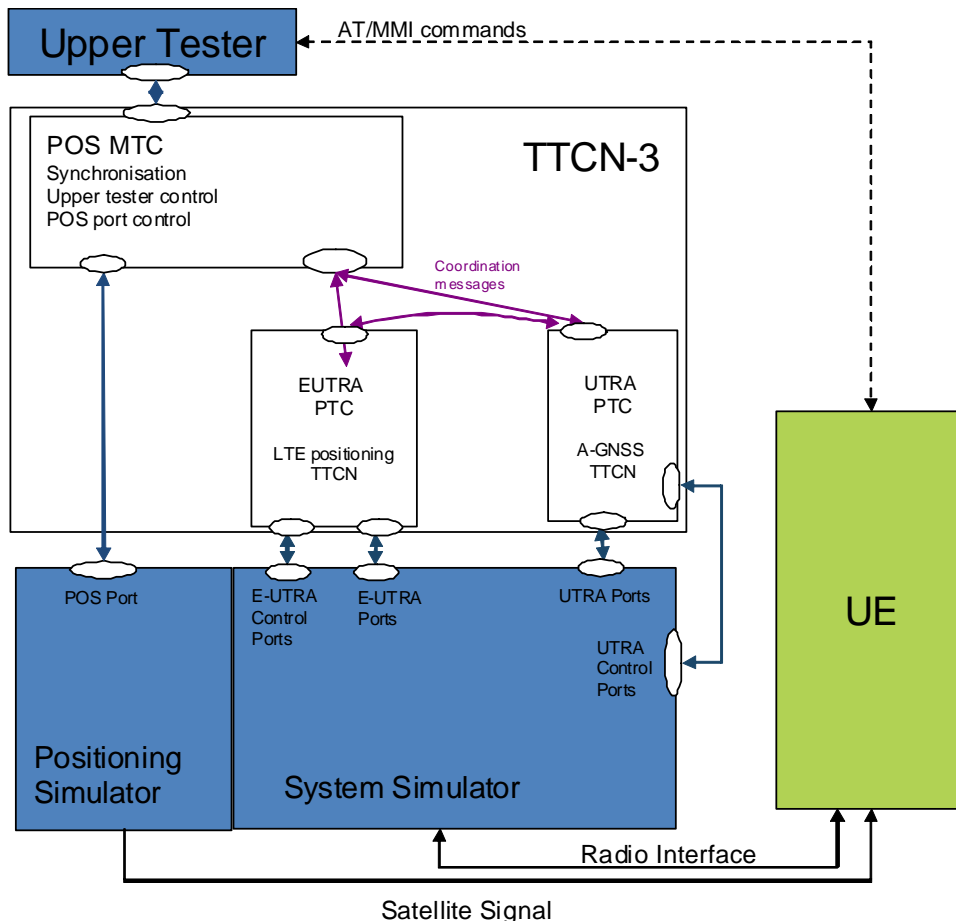
Figure 5.1.2-1: Component architecture for an E-UTRA and UTRA scenario

The PTCs are allocated according to the following principles:

- For LTE positioning tests cases, the E-UTRA PTC is created.

- For LTE positioning CS fallback test cases, E-UTRA and UTRA PTCs are created.

- For UTRA A-GNSS test cases, the UTRA PTC is created.

5.1.2.1   Interfaces

A number of interfaces are taken into consideration.

POS MTC - PTC:

Common synchronisation of PTCs.

Positioning simulator command/data coordination messages.

Upper tester primitives.

POS MTC - System Interface:

Upper tester primitives.

POS MTC- Positioning Simulator:

Positioning simulator command and data primitives.

PTC - PTC:

Primitives containing information for IRAT handover.

PTC - System Interface:

Primitives containing peer-to-peer message.

Configuration primitives.

5.2   Test model

In order to perform the LTE positioning and A-GNSS tests, the Positioning Simulator shall have two basic functional unites:

- Satellite simulator generating and broadcasting satellite signals.

- Assistance data source storing the data associated with the pre-defined GPS and GNSS test scenarios (see 3GPP TS 37.571-5 [5]).

This specification supports the following GNSS: GPS, Galileo, GLONASS and BDS.

5.2.1   LTE GNSS test model
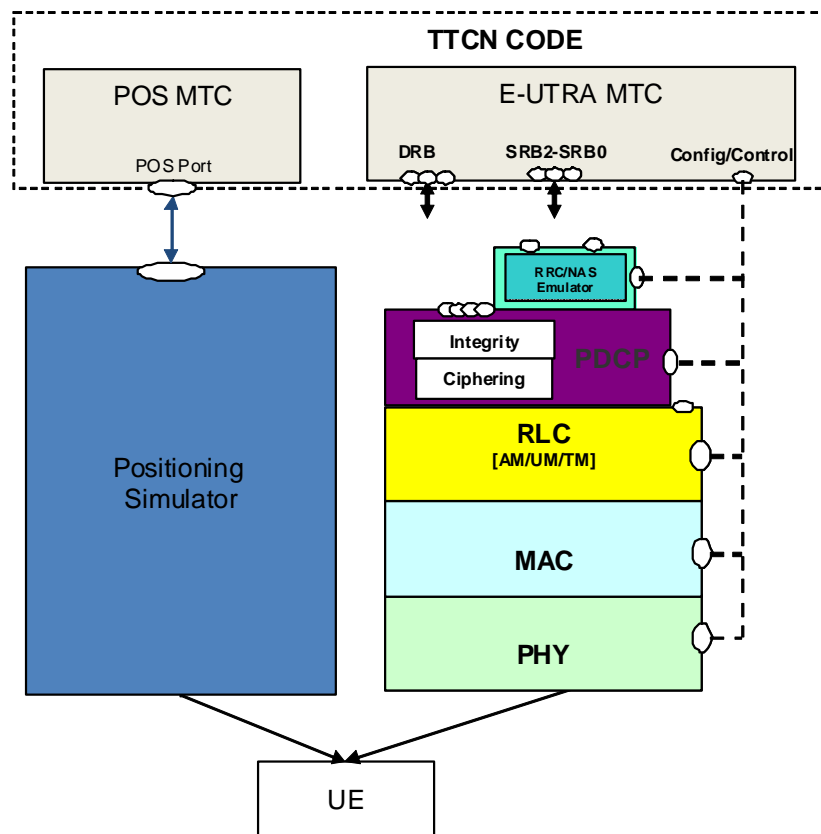
Figure 5.2.1-1: E-UTRA Test model for LTE positioning GNSS testing

The LTE positioning test model consists of an SS E-UTRAN protocol stack and a positioning simulator. The SS E-UTRA emulation part is the same as the model defined in 3GPP TS 36.523-3 [6].

The UE is configured in normal mode. On UE side Ciphering/Integrity (PDCP and NAS) is enabled. The tests are performed on C-Plane.

The ASPs at POS Port are used to:

- Load a pre-defined test scenario into the positioning simulator.

- Start or stop generating and broadcasting satellite signals from the positioning simulator.

- Retrieve the GNSS assistance data from assistance data source.

Under the ASP commands, the upper tester loads or re-loads pre-defined GNSS test scenario to the positioning simulator. The generated satellite signals shall simulate the GNSS environment as specified in 3GPP TS 37.571-2 [3], clause 5.

The SS also sends the GNSS assistance data to the UE through LPP signalling (see 3GPP TS 36.355 [10]) to facilitate the UE acquiring and tracking satellites. Such assistance data shall be consistent to within ±2 seconds with the satellite signals generated (see 3GPP TS 37.571-2 [3], clause 5.2.1).

The assistance data source shall provide the assistance data consistent to +1/-0 second with the GNSS test scenario currently running in the satellite simulator (i.e. the data shall be up to 1 second in advance of the scenario); this allows for a further 2 seconds of latency in the SS. In case multiple satellite systems are configured in a test, the assistance data are requested or retrieved in a single ASP command for all satellite systems.

The UE positioning services are encoded in a TCAP [16] ROSE component [15] of the facility information element [14] in the Supplement Service [13] conveyed in the NAS messages. The facility information element is encoded in BER in TTCN referred to 3GPP TS 24.080 [13], clause 3.6.1 and 3GPP TS 29.002 [14], clause 17.1.1.

5.2.2   UTRA A-GNSS test model
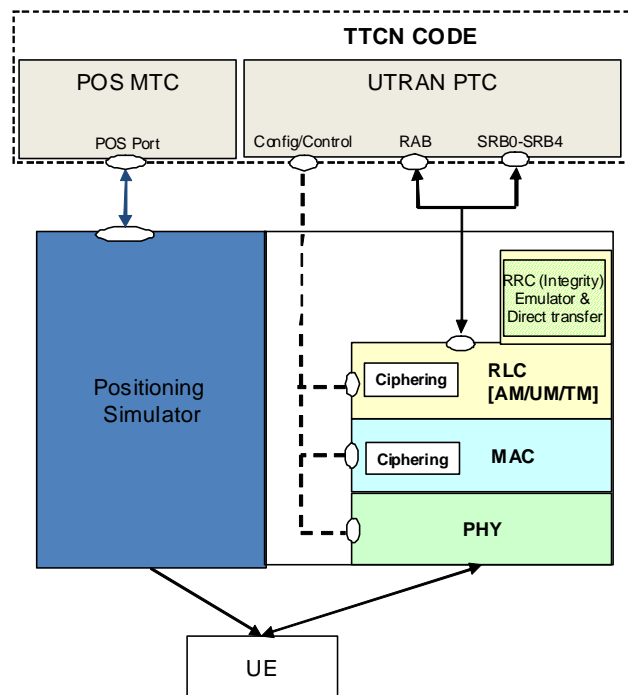
Figure 5.2.2-1: UTRA Test model for A-GNSS testing

The A-GNSS test model consists of an SS UTRAN protocol stack and a positioning simulator. The SS UTRA emulation part is the same as the model defined in 3GPP TS 36.523-3 [6], clause 4.4.1.

The UE is configured in normal mode. Ciphering and Integrity (RRC) are enabled. The tests are performed on C-Plane.

The ASPs at POS Port are used to:

-   Load a pre-defined test scenario into the positioning simulator.

-   Start or stop generating and broadcasting satellite signals from the positioning simulator.

-   Retrieve the GPS and GNSS assistance data from assistance data source.

Under the ASP commands, the upper tester loads or re-loads pre-defined GPS or GNSS test scenario to the positioning simulator. The generated satellite signals shall simulate the A-GPS and A-GNSS environment as specified in 3GPP TS 37.571-2 [3], clause 4.2.

The SS also sends the GPS or GNSS assistance data to the UE through RRC signalling to facilitate the UE acquiring and tracking satellites. Such assistance data shall be consistent to within ±2 seconds with the satellite signals generated (see 3GPP TS 37.571-2 [3], clause 4.2).

The assistance data source shall provide the assistance data consistent to +1/-0 second with the GPS or GNSS test scenario currently running in the satellite simulator (i.e. the data shall be up to 1 second in advance of the scenario); this allows for a further 2 seconds of latency in the SS. In case multiple satellite systems are configured in a test, the assistance data are requested or retrieved in a single ASP command for all satellite systems.

The UE positioning services are encoded in a TCAP [16] ROSE component [15] of the facility information element [14] in the Supplement Service [13] conveyed in the NAS messages. The facility information element is encoded in BER in TTCN referred to 3GPP TS 24.080 [13], clause 3.6.1 and 3GPP TS 29.002 [14], clause 17.1.1.

5.3   ASP specifications

The E-UTRAN and UTRAN ASP definitions are specified according to 3GPP TS 36.523-3 [6], clause 6.

The positioning simulator ASP definitions are documented in annex C.

5.4   OTDOA test model
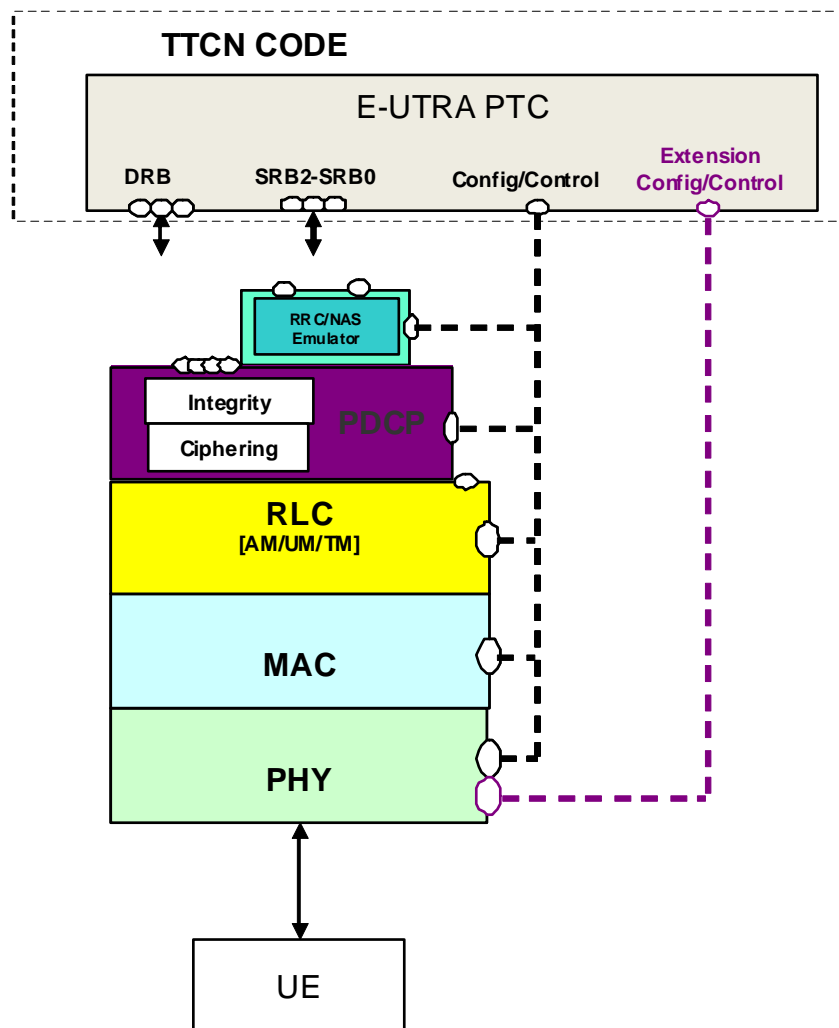
Figure 5.4-1: E-UTRA OTDOA test model

The LTE OTDOA test model consists of an SS E-UTRAN protocol stack. The SS E-UTRA emulation part is the same as the model defined in 3GPP TS 36.523-3 [6] with an additional port to configure the antenna port 6 and the Positioning Reference Signal (PRS) in the LTE cells. The extension of LTE ASPs is defined in annex C.

The simulated OTDOA environment is specified in 3GPP TS 37.571-2 [3], clause 5.2.2), cells are synchronous and configured with the timing offset set to 0. The PRS is transmitted according to 3GPP TS 36.211 [23], clause 6.10.4.

The UE is configured in normal mode. On UE side Ciphering/Integrity (PDCP and NAS) is enabled. The tests are performed on C-Plane.

The PRS signals are transmitted by the SS E-UTRAN, the assistance data are written in TTCN.

5.5   ECID test model

The test model is referred to the LTE positioning test model defined in clause 5.2.1; except that no satellite signals are required.

6 Reserved for LTE-A positioning

7 Upper Tester Interface

7.1 MMI for A-GPS

Refer to 3GPP TS 34.123-3 [8], clause B.1.12.

7.2 MMI for A-GNSS and LTE positioning

Refer to 3GPP TS 36.523-3 [6], clause 5.

The following MMI commands are defined for A-GNSS and LTE positioning.

Table 7.2-1: MMI commands

Command	Parameters	
	Name	**Value**
"CHECK_LCS_CLIENT"	none	
'LOCATION_INFO'	none	

Table 7.2-2: MMI commands imported from 3GPP TS 36.523-3 [6], clause 5

Command
"SWITCH_ON"
"SWITCH_OFF"
"POWER_ON"
"POWER_OFF"
"CHECK_DTCH_THROUGHCONNECTED"
"CLEAR_STORED_ASSISTANCE_DATA"

The following AT commands are applied in TTCN.

Table 7.2-3: AT Commands

Command	Reference
AT+CMOLR	TS 27.007 [32]
AT+CMTLR	TS 27.007 [32]
AT+CMTLRA	TS 27.007 [32]

8 IXIT Proforma

8.1 A-GPS test suite parameters declarations

Refer to 3GPP TS 34.123-3 [8], clause B.1.13.

8.2 A-GNSS and LTE positioning test suite parameters declarations

Same PIXIT parameters are referred to clause 8.1.

Annex A (normative):
Test Suites

This annex contains the approved TTCN Test Suites.

A.1   A-GPS test suite

This annex includes the reference to those approved A-GPS ATS which are contained in 3GPP TS 34.123-3 [8], clause A.11.

The ATSs have been produced using the Tree and Tabular Combined Notation (TTCN2) according to TR 101 666 [20].

A.1.1   Version of specifications

Table A.1.1-1 shows the version of the test specifications which the delivered ATSs are referred to.

Table A.1.1-1: Versions of the test and Core specifications

Core specifications	3GPP TS 25.331 [12]
Test specifications	3GPP TS 37.571-2 [3]
	3GPP TS 37.571-3 [4]
	3GPP TS 37.571-5 [6]
	3GPP TS 34.123-3 [8]
	3GPP TS 34.108 [9]
	3GPP TS 34.109 [18]

A.1.2   AGPS ATS

The approved AGPS test cases are listed. An "X" in columns FDD or LCR TDD indicates the test case approved for the relevant ATS.

Table A.1.2-1: AGPS TTCN test cases

Test case reference		Description	FDD	TDD
TS 37.571-2 [3]	TS 34.123-3 [8]			
6.1.1.1	17.2.2.1	LCS Network Induced location request/UE-Based GPS/Emergency Call/with USIM	X	
6.1.1.2	17.2.2.2	LCS Network Induced location request/UE-Based GPS/Emergency Call/without USIM	X	
6.1.1.3	17.2.2.3	LCS Network induced location request/UE-Assisted GPS/Emergency call/With USIM	X	
6.1.1.4	17.2.2.4	LCS Network induced location request/UE-Assisted GPS/Emergency call/Without USIM	X	
6.1.2.1	17.2.3.2	LCS Mobile originated location request/UE-Based GPS/Position estimate request/Success	X	
6.1.2.7	17.2.3.9	LCS Mobile originated location request/UE-Assisted GPS/Position Estimate/Success	X	
6.1.3.1	17.2.4.1	LCS Mobile terminated location request/UE-Based GPS	X	
6.1.3.2	17.2.4.2	LCS Mobile-terminated location request/UE-Based GPS/Request for additional assistance data/Success	X	
6.1.3.3	17.2.4.3	LCS Mobile-terminated location request/UE-Based GPS/Failure - Not Enough Satellites	X	
6.1.3.4	17.2.4.4	LCS Mobile terminated location request/UE-Assisted GPS/Success	X	
6.1.3.5	17.2.4.5	LCS Mobile terminated location request/UE-Assisted GPS/Request for additional assistance data/Success	X	
6.1.3.7	17.2.4.7	LCS Mobile terminated location request/UE-Based GPS/Privacy Verification/Location Not Allowed if No Response	X	

A.1.3 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to the corresponding FDD ATS is referred to 3GPP TS 34.123-3 [8], clause A.11.

A.2 A-GNSS and LTE positioning test suite

The test suites have been produced using the Testing and Test Control Notation version 3 (TTCN3) according to ES 201 873-1 [17].

A.2.1 Baseline of specifications

Table A.2.1-1 shows the baseline of the relevant cores specifications and the test specifications which the delivered TTCN test suites are referred to.

Table A.2.1-1: References of the test and Core specifications

Core specifications baseline	3GPP TS 36.355 [10]
	3GPP TS 24.301 [11]
	3GPP TS 25.331 [12]
Test specifications	3GPP TS 37.571-2 [3]
	3GPP TS 37.571-3 [4]
	3GPP TS 37.571-5 [5]
	3GPP TS 36.508 [7]

The Test Suite in TTCN3 is contained in multiple ASCII files which accompany the present document.

A.2.2 E-UTRA LTE positioning Test Cases

Table A.2.2-1 lists all approved test cases. An "X" in columns FDD or TDD indicates the test case approved for the respective variant.

Table A.2.2-1: E-UTRA LTE positioning TTCN test cases

Test case	Description	FDD	TDD
7.1.1	UE Network Capability	X	
7.2.1.1	Location Notification	X	
7.2.1.2	Privacy Verification – Location Allowed if no Response	X	
7.2.1.3	Privacy Verification – Location not Allowed if No Response	X	
7.3.1.1	Position Capability Transfer	X	
7.3.2.1	LPP Duplicated Message	X	
7.3.2.2	LPP Acknowledgment	X	
7.3.2.3	LPP Retransmission	X	
7.3.4.1.1s	E-SMLC Initiated Assistance Data Delivery followed by Location Information Transfer: UE-Based sub-test 1	X	
7.3.4.1.4s	E-SMLC Initiated Assistance Data Delivery followed by Location Information Transfer: UE-Based sub-test 4	X	
7.3.4.2.1s	E-SMLC Initiated Assistance Data Delivery followed by Location Information Transfer: UE-Assisted sub-test 1	X	
7.3.4.2.4s	E-SMLC Initiated Assistance Data Delivery followed by Location Information Transfer: UE-Assisted sub-test 4	X	
7.3.4.2.5s	E-SMLC Initiated Assistance Data Delivery followed by Location Information Transfer: UE-Assisted sub-test 5	X	
7.3.4.2.6s	E-SMLC Initiated Assistance Data Delivery followed by Location Information Transfer: UE-Assisted sub-test 6	X	
7.3.4.3.1s	E-SMLC Initiated Position Measurement without assistance data: UE-Based sub-test 1	X	
7.3.4.3.4s	E-SMLC Initiated Position Measurement without assistance data: UE-Based sub-test 4	X	
7.3.4.4.1s	E-SMLC Initiated Position Measurement without assistance data: UE-Assisted sub-test 1	X	
7.3.4.4.4s	E-SMLC Initiated Position Measurement without assistance data: UE-Assisted sub-test 4	X	
7.3.4.4.5s	E-SMLC Initiated Position Measurement without assistance data: UE-Assisted sub-test 5	X	
7.3.5.1.1s	E-SMLC initiated Abort sub-test 1	X	
7.3.5.1.2s	E-SMLC initiated Abort sub-test 2	X	
7.3.5.1.4s	E-SMLC initiated Abort sub-test 4	X	
7.3.5.1.5s	E-SMLC initiated Abort sub-test 5	X	
7.3.5.1.6s	E-SMLC initiated Abort sub-test 6	X	

A.2.3   UTRA A-GNSS Test Cases

Table A.2.3-1 lists all approved test cases. An "X" in columns FDD or LCR TDD indicates the test case approved for the respective variant.

Table A.2.3-1: UTRA A-GNSS TTCN test cases

Test case	Description	FDD	TDD
6.2.3.3	Location Notification	X	
6.2.3.4	Privacy Verification - Location Allowed if No Response	X	
6.2.3.5	Privacy Verification - Location Not Allowed if No Response	X	

Annex B (informative): ASN.1 modules

B.1 A-GPS ASN.1 module

Refer to 3GPP TS 34.123-3 [8], annex H.1.

B.2 A-GNSS ASN.1 modules

Refer to 3GPP TS 34.123-3 [8], annex H.2.

B.3 LPP ASN.1

The LPP asn.1 modules is extracted from 3GPP TS 36.355 [10] without any change.

Annex C (informative):
E-UTRA System Simulator Extension ASP Definitions in TTCN-3

C.1   EUTRA_POS_ASP_TypeDefs

Type definitions for configuration of Positioning Reference Signal in the system simulator; Common design principles: refer to 3GPP TS 36.523-3 [6], annex D.

C.1.1   System_Configuration_PosExt

Formal ASP Definitions for EUTRA PRS system configuration.

SystemRequest_PosExt_Type

TTCN-3 Union Type		
Name	**SystemRequest_PosExt_Type**	
Comment	NOTE: Same structure as SystemRequest_Type in 3GPP TS 36.523-3 [6], annex D.	
Cell	CellConfigRequest_PosExt_Type	configure PRS in an LTE cell; the cell shall be configured as usual beforehand and SS shall raise an error when the cell does not exist yet; there is no explicit release of the PRS but the whole cell needs to be released

SystemConfirm_PosExt_Type

TTCN-3 Union Type		
Name	**SystemConfirm_PosExt_Type**	
Comment	confirmations for system configuration; in general to be sent after the configuration has been done	
Cell	Null_Type	(no further parameters from SS)

C.1.2   Cell_Configuration_PosExt

Specific Info for PRS Cell Configuration Primitive.

C.1.2.1   Cell_Configuration_Common_PosExt

CellConfigRequest_PosExt_Type

TTCN-3 Union Type		
Name	**CellConfigRequest_PosExt_Type**	
Comment	NOTE: Same structure as SystemRequest_Type in 3GPP TS 36.523-3 [6], annex D.	
AddOrReconfigure	CellConfigInfo_PosExt_Type	for PRS configuration of given cell: CellId : identifier of the cell to be configured RoutingInfo : None TimingInfo : Now (for initial configuration and for reconfiguration in general) ControlInfo : CnfFlag:=true; FollowOnFlag:=false (in general)

CellConfigInfo_PosExt_Type

TTCN-3 Record Type			
Name	CellConfigInfo_PosExt_Type		
Comment	NOTE: Same structure as SystemRequest_Type in 3GPP TS 36.523-3 [6], annex D; common information for initial cell configuration or reconfiguration; in case of reconfiguration OMIT means 'keep configuration as it is'.		
Basic	BasicCellConfig_PosExt_Type	opt	Extended PRS information for a cell

BasicCellConfig_PosExt_Type

TTCN-3 Record Type			
Name	BasicCellConfig_PosExt_Type		
Comment	NOTE: Same structure as SystemRequest_Type in 3GPP TS 36.523-3 [6], annex D. Physical layer:		
PhysicalLayerConfigDL	PhysicalLayerConfigDL_PosExt_Type	opt	Default settings regarding physical control PRS signal

C.1.2.2   Downlink_Physical_Layer_Configuration_PosExt

Downlink physical layer configuration:

- DL antenna configuration for port 6.

- PRS configuration.

AntennaPort6_Config_Type

TTCN-3 Record Type			
Name	AntennaPort6_Config_Type		
Comment	to configure antenna port 6 for positioning; all fields are declared as optional to allow single reconfigurations; in this case omit means "keep as it is"		
Port	AntennaPort_Type	opt	
PRS	PRS_Info	opt	

PhysicalLayerConfigDL_PosExt_Type

TTCN-3 Record Type			
Name	PhysicalLayerConfigDL_PosExt_Type		
Comment	all fields are declared as optional to allow single reconfigurations; in this case omit means "keep as it is"		
AntennaPort6	AntennaPort6_Config_Type	opt	

C.1.3   System_Interface_PosExt

SYSTEM_CTRL_POSEXT_REQ

TTCN-3 Record Type		
Name	SYSTEM_CTRL_POSEXT_REQ	
Comment		
Common	ReqAspCommonPart_Type	For configuration of antenna port 6 TimingInfo is now
Request	SystemRequest_PosExt_Type	configure a PRS in a cell

SYSTEM_CTRL_POSEXT_CNF

TTCN-3 Record Type			
Name	**SYSTEM_CTRL_POSEXT_CNF**		
Comment			
Common	CnfAspCommonPart_Type		TimingInfo is ignored by TTCN => SS may set TimingInfo to "None"
Confirm	SystemConfirm_PosExt_Type		

EUTRA_SYSTEM_POSEXT_PORT

TTCN-3 Port Type		
Name	**EUTRA_SYSTEM_POSEXT_PORT**	
Comment	EUTRA PTC: Ext Port for system configuration of antenna port 6	
out	SYSTEM_CTRL_POSEXT_REQ	
in	SYSTEM_CTRL_POSEXT_CNF	

C.2 References to TTCN-3

References to TTCN-3		
EUTRA_POS_ASP_TypeDefs	Positioning/EUTRA_POS_ASP_TypeDefs.ttcn	Rev 6449

Annex D (informative): Positioning System Simulator ASP Definitions in TTCN-3

D.1 PosSystem_ASP_TypeDefs

D.1.1 PosSystem_Load_Scenario

Load scenarios follow 3GPP TS 37.571-5 [5].

PosSystem_Load_Scenario: Basic Type Definitions

TTCN-3 Basic Types		
ScenarioNumber_Type	integer	

PositioningScenario_Type

TTCN-3 Union Type		
Name	**PositioningScenario_Type**	
Comment		
LTE_Positioning	ScenarioNumber_Type	Reference to 3GPP TS 37.571-5 [5]
AGNSS	ScenarioNumber_Type	Reference to 3GPP TS 37.571-5 [5]

D.1.2 PosSystem_Retrieve_Data

D.1.2.1 SatSystem_Retrieve_UTRAN_Data

UTRAN_GPS_AssistanceDataRequest_Type

TTCN-3 Record Type		
Name	**UTRAN_GPS_AssistanceDataRequest_Type**	
Comment		
AssistanceData ReqGPS	bitstring	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GPS-AdditionalAssistanceDataRequest

UTRAN_GANSS_AssistanceDataRequest_Type

TTCN-3 Record Type			
Name	**UTRAN_GANSS_AssistanceDataRequest_Type**		
Comment			
AssistanceData ReqGANSS	bitstring	opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GANSS-AdditionalAssistanceDataRequest
AssistanceData ReqGANSSv86 0ext	bitstring	opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GANSS-AdditionalAssistanceDataRequest-v860ext
AssistanceData ReqGANSSvcx yext	bitstring	opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GANSS-AdditionalAssistanceDataRequest-vcxyext

UTRAN_AssistanceDataRequest_Type

TTCN-3 Union Type	
Name	**UTRAN_AssistanceDataRequest_Type**
Comment	
GPS	UTRAN_GPS_AssistanceDataRequest_Type
GANSS	UTRAN_GANSS_AssistanceDataRequest_Type

UTRAN_AssistanceDataRequestList_Type

TTCN-3 Record of Type	
Name	**UTRAN_AssistanceDataRequestList_Type**
Comment	
record length(1..tsc_MaxPosSystems) of UTRAN_AssistanceDataRequest_Type	

UTRAN_GPS_AssistanceData_Type

TTCN-3 Record Type				
Name	**UTRAN_GPS_AssistanceData_Type**			
Comment	The returned Almanac information is split into two fields: Almanac for satellites 1 to 16 in AssistanceDataGPSr7 together with other information; Almanac for satellites 17 to 31: in 'almanacSat17To31'			
AssistanceData GPSr7	bitstring		opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GPS-AssistanceData-r7
AssistanceData GPSr12	bitstring		opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GPS-AssistanceData-r12
AlmanacSatInfo List17To31	bitstring		opt	bitstring containing 3GPP TS 25.331 [12] type AlmanacSatInfoList

UTRAN_GANSS_AssistanceData_Type

TTCN-3 Record Type			
Name	**UTRAN_GANSS_AssistanceData_Type**		
Comment			
AssistanceData GANSS_r8	bitstring	opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GANSS-AssistanceData-r8
AssistanceData GANSS_r12	bitstring	opt	bitstring containing 3GPP TS 25.331 [12] type UE-Positioning-GANSS-AssistanceData-r12

UTRAN_AssistanceData_Type

TTCN-3 Union Type	
Name	**UTRAN_AssistanceData_Type**
Comment	
GPS	UTRAN_GPS_AssistanceData_Type
GANSS	UTRAN_GANSS_AssistanceData_Type

UTRAN_AssistanceDataList_Type

TTCN-3 Record of Type	
Name	**UTRAN_AssistanceDataList_Type**
Comment	
record length(1..tsc_MaxPosSystems) of UTRAN_AssistanceData_Type	

D.1.2.2   PosSystem_Retrieve_EUTRA_Data

For EUTRA, when data is to be requested for more than one positioning system, they will be included into one single template. This template will include a list with one element for each positioning system.
See template "cs_RequestAssistData_UEB_GpsAndGlonass" as an example.

EUTRA_AssistanceDataRequest_Type

TTCN-3 Union Type		
Name	**EUTRA_AssistanceDataRequest_Type**	
Comment		
LPP_Assistance Data	bitstring	bitstring containing 3GPP TS 36.355 [10] type RequestAssistanceData-r9-IEs

EUTRA_AssistanceDataProvide_Type

TTCN-3 Union Type		
Name	**EUTRA_AssistanceDataProvide_Type**	
Comment		
LPP_Assistance Data	bitstring	bitstring containing 3GPP TS 36.355 [10] type ProvideAssistanceData-r9-IEs

EUTRA_AssistanceDataRequestList_Type

TTCN-3 Record of Type	
Name	**EUTRA_AssistanceDataRequestList_Type**
Comment	
record length(1..tsc_MaxPosSystems) of EUTRA_AssistanceDataRequest_Type	

EUTRA_AssistanceDataList_Type

TTCN-3 Record of Type	
Name	**EUTRA_AssistanceDataList_Type**
Comment	
record length(1..tsc_MaxPosSystems) of EUTRA_AssistanceDataProvide_Type	

D.1.2.3   PosSystem_Retrieve_Data_Common

AssistanceDataRetrieveRequest_Type

TTCN-3 Union Type		
Name	**AssistanceDataRetrieveRequest_Type**	
Comment		
LPP	EUTRA_AssistanceDataRequestList_Type	LTE positioning
UTRA_GNSS	UTRAN_AssistanceDataRequestList_Type	Retrieve A-GNSS data list in the order of positioning system provided in PositioningSystemList

AssistanceDataRetrieveResponse_Type

TTCN-3 Union Type		
Name	**AssistanceDataRetrieveResponse_Type**	
Comment		
LPP	EUTRA_AssistanceDataList_Type	LTE positioning
UTRA_AGNSS	UTRAN_AssistanceDataList_Type	Retrieve A-GNSS data list in the order of positioning system provided in PositioningSystemList

D.1.3 System_Interface

Common ASP definitions.

PosSystemCrtlRequest_Type

TTCN-3 Union Type		
Name	**PosSystemCrtlRequest_Type**	
Comment		
Start	Null_Type	
Stop	Null_Type	
LoadScenario	PositioningScenario_Type	
RetrieveData	AssistanceDataRetrieveRequest_Type	

PosSystemCrtlConfirm_Type

TTCN-3 Union Type		
Name	**PosSystemCrtlConfirm_Type**	
Comment		
Start	Null_Type	
Stop	Null_Type	
LoadScenario	Null_Type	
RetrieveData	AssistanceDataRetrieveResponse_Type	

POS_SYSTEM_CTRL_REQ

TTCN-3 Record Type		
Name	**POS_SYSTEM_CTRL_REQ**	
Comment		
PositioningSystemList	PositioningSystemList_Type	The list of positioning systems to be configured; there is only one system of one type in the list e.g. gps, galileo etc.
CnfFlag	boolean	true => SS shall send CNF
Request	PosSystemCrtlRequest_Type	

POS_SYSTEM_CTRL_CNF

TTCN-3 Record Type		
Name	**POS_SYSTEM_CTRL_CNF**	
Comment		
PositioningSystemList	PositioningSystemList_Type	
Confirm	PosSystemCrtlConfirm_Type	

POS_MTC_SYSTEM_PORT

TTCN-3 Port Type		
Name	**POS_MTC_SYSTEM_PORT**	
Comment	Positioning: port at the MTC to be mapped to the system	
out	POS_SYSTEM_CTRL_REQ	
in	POS_SYSTEM_CTRL_CNF	

POS_MTC_PTC_PORT

TTCN-3 Port Type		
Name	**POS_MTC_PTC_PORT**	
Comment	Positioning: port at the MTC to hand over information from the positioning system to the PTC(s)	
out	POS_SYSTEM_CTRL_CNF	
in	POS_SYSTEM_CTRL_REQ	

POS_PTC_MTC_PORT

TTCN-3 Port Type		
Name	**POS_PTC_MTC_PORT**	
Comment	Positioning: port at the PTC(s) to send commands to the positioning system via the MTC	
out	POS_SYSTEM_CTRL_REQ	
in	POS_SYSTEM_CTRL_CNF	

PosSystem_ASP_TypeDefs: Constant Definitions

TTCN-3 Basic Types			
tsc_MaxPosSystems	integer	8	

PositioningSystemType

TTCN-3 Enumerated Type	
Name	**PositioningSystemType**
Comment	
gps	
modernizedGPS	
glonass	
galileo	
qzss	
otdoa	
ecid	
bds	

PositioningSystemList_Type

TTCN-3 Record of Type	
Name	**PositioningSystemList_Type**
Comment	
record length (1..tsc_MaxPosSystems) of PositioningSystemType	

D.2 CommonDefs

CommonDefs: Basic Type Definitions

TTCN-3 Basic Types		
Null_Type	boolean (true)	dummy type for 'typeless' fields in unions

D.3   References to TTCN-3

References to TTCN-3		
PosSystem_ASP_TypeDefs	CommonPosSystem/PosSystem_ASP_TypeDefs.ttcn	Rev 12875
CommonDefs	Common/CommonDefs.ttcn	Rev 12841

Annex E (informative):
Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2011-06	RAN5#51	R5-112203	-	-	Initial proposal for A-GNSS		0.0.1
2011-09	RAN5#52	R5-113037	-	-	Introduced positioning test model	0.0.1	0.1.0
2011-11	RAN5#53	R5-115106	-	-	Imported A-GPS test model from 3GPP TS 34.123-3	0.1.0	1.0.0
2011-12	RAN#54	RP-111627	-	-	Presentation of V1.0.0	0.1.0	1.0.0
2012-05	RAN5#55	R5-121083	-	-	Presentation of V1.1.0	1.0.0	1.1.0
2012-06	RAN#56	RP-120614	-	-	Presentation of V2.0.0	1.0.0	2.0.0
2012-06	RAN#56	-	-	-	Editorial corrections and formattings.	2.0.0	9.0.0
2012-06	RAN#56	-	-	-	Raised to v10.0.0 with no change.	9.0.0	10.0.0
2012-09	RAN#57	R5-123690	0001	-	37571-4: Routine maintenance and updates	10.0.0	10.1.0
2013-06	RAN#60	R5-131136	0003	-	37571-4: Routine maintenance and updates	10.1.0	10.2.0
2013-06	RAN#60	R5s130125	0004	-	Addition of EUTRA UE Positioning test case 7.1.1	10.1.0	10.2.0
2013-06	RAN#60	R5s130145	0005	-	Addition of EUTRA UE Positioning test case 7.3.1.1	10.1.0	10.2.0
2013-06	RAN#60	R5s130147	0006	-	Addition of EUTRA UE Positioning test case 7.3.2.1	10.1.0	10.2.0
2013-06	RAN#60	R5s130149	0007	-	Addition of EUTRA UE Positioning test case 7.3.2.2	10.1.0	10.2.0
2013-06	RAN#60	R5s130151	0008	-	Addition of EUTRA UE Positioning test case 7.3.2.3	10.1.0	10.2.0
2013-06	RAN#60	R5s130153	0009	-	Addition of EUTRA UE Positioning test case 7.3.5.1_6s	10.1.0	10.2.0
2013-06	RAN#60	R5s130155	0010	-	Addition of EUTRA UE Positioning test case 7.3.5.1_5s	10.1.0	10.2.0
2013-06	RAN#60	R5s130157	0011	-	Addition of EUTRA UE Positioning test case 7.3.4.2_5s	10.1.0	10.2.0
2013-06	RAN#60	R5s130159	0012	-	Addition of EUTRA UE Positioning test case 7.3.4.2_6s	10.1.0	10.2.0
2013-06	RAN#60	R5s130288	0013	-	Addition of EUTRA UE Positioning test case 7.3.4.4_5s	10.1.0	10.2.0
2013-06	RAN#60	R5s130290	0014	-	Addition of EUTRA UE Positioning test case 7.3.5.1_1s	10.1.0	10.2.0
2013-06	RAN#60	RP-130616	0015	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test cases in the TC lists in 37.571-4 (prose), Annex A	10.1.0	10.2.0
2013-09	RAN#61	R5s130421	0016	-	Correction to EUTRA UE Positioning test cases 7.3.4.2.5s and 7.3.4.4.5s	10.2.0	10.3.0
2013-09	RAN#61	R5s130457	0017	-	Correction to EUTRA UE Positioning test case 7.3.5.1.1s	10.2.0	10.3.0
2013-09	RAN#61	R5s130468	0018	-	Correction to EUTRA UE Positioning test cases 7.3.1.1	10.2.0	10.3.0
2013-09	RAN#61	RP-131167	0019	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test cases in the TC lists in 37.571-4 (prose), Annex A	10.2.0	10.3.0
2013-12	RAN#62	R5s130618	0020	-	Addition of EUTRA UE Positioning test case 7.3.4.1_1s	10.3.0	10.4.0
2013-12	RAN#62	R5s130627	0021	-	Addition of EUTRA UE Positioning test case 7.3.4.3_1s	10.3.0	10.4.0
2013-12	RAN#62	RP-131871	0022	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test cases in the TC lists in 37.571-4 (prose), Annex A	10.3.0	10.4.0
2014-03	RAN#63	R5-140326	0023	-	A-GNSS ASN.1 reference	10.4.0	10.5.0
2014-03	RAN#63	R5s130913	0024	-	Correction to function fl_TC_7_3_5_1_GNSS_TestBody	10.4.0	10.5.0
2014-03	RAN#63	R5s130914	0025	-	Correction to svID values in AcquisitionAssist and AuxiliaryInformation	10.4.0	10.5.0
2014-03	RAN#63	R5s131009	0026	-	Addition of EUTRA UE Positioning test case 7.3.5.1_2s	10.4.0	10.5.0
2014-03	RAN#63	R5s131011	0027	-	Addition of EUTRA UE Positioning test case 7.3.5.1_4s	10.4.0	10.5.0
2014-03	RAN#63	RP-140316	0028	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test	10.4.0	10.5.0

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
					cases in the TC lists in 37.571-4 (prose), Annex A		
2014-06	RAN#64	R5s140086	0029	-	Addition of EUTRA UE Positioning test case 7.2.1.1	10.5.0	10.6.0
2014-06	RAN#64	R5s140088	0030	-	Addition of EUTRA UE Positioning test case 7.2.1.2	10.5.0	10.6.0
2014-06	RAN#64	R5s140090	0031	-	Addition of EUTRA UE Positioning test case 7.2.1.3	10.5.0	10.6.0
2014-06	RAN#64	R5s140242	0032	-	Correction to LTE UE Positioning test case 7.3.5.1	10.5.0	10.6.0
2014-06	RAN#64	R5s140253	0033	-	Addition of EUTRA UE Positioning test case 7.3.4.4.1s	10.5.0	10.6.0
2014-06	RAN#64	R5s140255	0034	-	Addition of EUTRA UE Positioning test case 7.3.4.2.1s	10.5.0	10.6.0
2014-06	RAN#64	R5s140257	0035	-	Correction to LTE UE Positioning test case 7.3.4.3.1s	10.5.0	10.6.0
2014-06	RAN#64	R5s140316	0036	-	Addition of UTRAN UE Positioning test case 6.2.3.3	10.5.0	10.6.0
2014-06	RAN#64	R5s140318	0037	-	Addition of UTRAN UE Positioning test case 6.2.3.4	10.5.0	10.6.0
2014-06	RAN#64	R5s140320	0038	-	Addition of UTRAN UE Positioning test case 6.2.3.5	10.5.0	10.6.0
2014-06	RAN#64	R5s140433	0039	-	Addition of GCF WI-166 EUTRA UE Positioning test case 7.3.4.3.4s	10.5.0	10.6.0
2014-06	RAN#64	R5s140435	0040	-	Addition of GCF WI-166 EUTRA UE Positioning test case 7.3.4.4.4s	10.5.0	10.6.0
2014-06	RAN#64	RP-140825	0041	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test cases in the TC lists in 37.571-4 (prose), Annex A	10.5.0	10.6.0
2014-06	RAN#64	R5s140086	0029	-	Addition of EUTRA UE Positioning test case 7.2.1.1	10.5.0	10.6.0
2014-06	RAN#64	R5s140088	0030	-	Addition of EUTRA UE Positioning test case 7.2.1.2	10.5.0	10.6.0
2014-06	RAN#64	R5s140090	0031	-	Addition of EUTRA UE Positioning test case 7.2.1.3	10.5.0	10.6.0
2014-09	RAN#65	R5-144256	0042	-	Routine maintenance and updates	10.6.0	10.7.0
2014-12	RAN#66	R5s140739	0043	-	Addition of GCF WI-166 EUTRA UE Positioning test case 7.3.4.2.4s	10.7.0	10.8.0
2014-12	RAN#66	R5s140777	0044	-	Usage of <MULTIPLE_CNF> in UpperTesterFunctions	10.7.0	10.8.0
2014-12	RAN#66	RP-142067	0045	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test cases in the TC lists in 37.571-4 (prose), Annex A	10.7.0	10.8.0
2015-03	RAN#67	R5s141359	0047	-	Correction of errors in implementation of positioning CRs	10.8.0	10.9.0
2015-03	RAN#67	R5s150027	0048	-	Addition of GCF WI-166 EUTRA UE Positioning test case 7.3.4.1.4s	10.8.0	10.9.0
2015-03	RAN#67	RP-150336	0049	-	CR to 37.571-4: Add new verified and e-mail agreed TTCN test cases in the TC lists in 37.571-4 (prose), Annex A	10.8.0	10.9.0
2015-03	RAN#67	-	-	-	upgraded to Rel-11 with no change	10.9.0	11.0.0
2015-03	RAN#67	R5-150735	0046	-	Addition of BeiDou Test Model	11.0.0	12.0.0

History

Document history		
V12.0.0	April 2015	Publication