### 1.2.1 Titles and synopses of the global core specification and the transposed standards

#### 1.2.1.1 Introduction

The standards documents referenced below, as transposed from the relevant 3GPP specifications, are provided by the identified ***Transposing Organizations*** as the transposed sets of standards for the terrestrial radio interface of IMT-Advanced identified as *LTE-Advanced* and includes not only the key characteristics of IMT-Advanced but also the additional capabilities of *LTE-Advanced* both of which are continuing to be enhanced.

#### 1.2.1.2 Radio Layer 1

##### 1.2.1.2.1 TS 36.201

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE physical layer; General description

This document provides a general description of the physical layer of the E-UTRA radio interface. This document also describes the document structure of the 3GPP E-UTRA physical layer specifications, i.e. TS 36.200 series. The TS 36.200 series specifies the Uu point for the LTE mobile system, and defines the minimum level of specifications required for basic connections in terms of mutual connectivity and compatibility.

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##### 1.2.1.2.2 TS 36.211

Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation

This document describes the physical channels and modulation for E-UTRA.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.2.3 TS 36.212

Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding

This document specifies the coding, multiplexing and mapping to physical channels for E-UTRA.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.2.4 TS 36.213

Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures

This document specifies and establishes the characteristics of the physical layer procedures for E-UTRA.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.2.5 TS 36.214

Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements

This document contains the description and definition of the measurements done at the UE and network in order to support operation in idle mode and connected mode in E-UTRA.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.2.6 TS 36.216

Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer for relaying operation

This document describes the characteristics of eNodeB – relay node transmissions.

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#### 1.2.1.3 Radio Layers 2 & 3

##### 1.2.1.3.1 TS 36.300

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2

This document provides an overview and overall description of the E-UTRAN radio interface protocol architecture. Details of the radio interface protocols are specified in companion specifications of the 36 series.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.2 TS 36.302

Evolved Universal Terrestrial Radio Access (E-UTRA); Services provided by the physical layer

This document is a technical specification of the services provided by the physical layer of E-UTRA to upper layers.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.3 TS 36.304

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode

This document specifies the Access Stratum (AS) part of the Idle Mode procedures applicable to a UE. This document specifies the model for the functional division between the NAS and AS in a UE. This document applies to all UEs that support at least E-UTRA, including multi-RAT UEs as described in 3GPP specifications, in the following cases: (i) When the UE is camped on an E-UTRA cell; (ii) When the UE is searching for a cell to camp on.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 12**

**Release 13**

##### 1.2.1.3.4 TS 36.305

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Stage 2 functional specification of User Equipment (UE) positioning in E-UTRAN

This document specifies the stage 2 of the UE positioning function of E-UTRAN, which provides the mechanisms to support or assist the calculation of the geographical position of a UE. The purpose of this stage 2 specification is to define the E-UTRAN UE Positioning architecture, functional entities and operations to support positioning methods. This description is confined to the E-UTRAN Access Stratum. This stage 2 specification covers the E-UTRAN positioning methods, state descriptions, and message flows to support UE positioning.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.5 TS 36.306

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities

This document defines the E-UTRA UE Radio Access Capability Parameters.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.6 TS 36.314

Evolved Universal Terrestrial Radio Access (E-UTRA); Layer 2 – Measurements

This document contains the description and definition of the measurements performed by E‑UTRAN that are transferred over the standardized interfaces in order to support E-UTRA radio link operations, radio resource management (RRM), network operations and maintenance (OAM), and self-organizing networks (SON).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.7 TS 36.321

Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification

This document specifies the E-UTRA Medium Access Control(MAC) protocol.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.8 TS 36.322

Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Link Control (RLC) protocol specification

This document specifies the E-UTRA Radio Link Control (RLC) protocol.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.9 TS 36.323

Evolved Universal Terrestrial Radio Access (E-UTRA); Packet Data Convergence Protocol (PDCP) specification

This document specifies the E-UTRAPacket Data Convergence Protocol (PDCP).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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##### 1.2.1.3.10 TS 36.331

Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification

This document specifies the Radio Resource Control protocol for the radio interface between UE and E-UTRAN as well as for the radio interface between RN and E-UTRAN. The scope of this document also includes: (i) the radio related information transported in a transparent container between source eNodeB and target eNodeB upon inter eNodeB handover; (ii) the radio related information transported in a transparent container between a source or target eNodeB and another system upon inter RAT handover.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.11 TS 36.355

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)

This document contains the definition of the LTE Positioning Protocol (LPP).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.3.12 TS 36.360

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE-WLAN Aggregation Adaptation Protocol (LWAAP) specification

This document specifies the E-UTRA LTE-WLAN Aggregation Adaptation Protocol (LWAAP).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 13**

##### 1.2.1.3.13 TS 36.361

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE/WLAN Radio Level Integration Using IPsec Tunnel (LWIP) encapsulation; Protocol specification

This document specifies the LWIP Encapsulation Protocol.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 13**

#### 1.2.1.4 Architecture

##### 1.2.1.4.1 TS 36.401

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture description

This document describes the overall architecture of the E-UTRAN, including internal interfaces and assumptions on the radio, S1 and X2 interfaces.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.2 TS 36.410

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 layer 1 general aspects and principles

This document is an introduction to the 3GPP TS 36.41x series of technical specifications that define the S1 interface for the interconnection of the eNodeB component of the Evolved Universal Terrestrial Radio Access Network (E UTRAN) to the Core Network of the EPS system.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.3 TS 36.411

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 layer 1

This document specifies the standards allowed to implement layer 1 on the S1 interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document. In the following, “layer 1” and “physical layer” are assumed to be synonymous.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 12**

**Release 13**

##### 1.2.1.4.4 TS 36.412

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 signalling transport

This document specifies the standards for signalling transport to be used across S1 interface. S1 interface is a logical interface between the eNodeB and the E-UTRAN core network. This document describes how the S1-AP signalling messages are transported over S1.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.5 TS 36.413

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)

This document specifies the E-UTRAN radio network layer signalling protocol for the S1 interface. The S1 Application Protocol (S1AP) supports the functions of S1 interface by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 13**

##### 1.2.1.4.6 TS 36.414

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the S1 interface.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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**Release 13**

##### 1.2.1.4.7 TS 36.420

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 general aspects and principles

This document is an introduction to the TSG RAN TS 36.42x series of UMTS technical specifications that define the X2 interface. It is an interface for the interconnection of two E-UTRAN NodeB (eNodeB) components within the Evolved Universal Terrestrial Radio Access Network (E‑UTRAN) architecture.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.8 TS 36.421

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 layer 1

This document specifies the standards allowed to implement Layer 1 on the X2 interface. The specification of transmission delay requirements and O & M requirements are not in the scope of this document. In the following “Layer 1” and “Physical Layer” are assumed to be synonymous.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.9 TS 36.422

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 signalling transport

This document specifies the standards for Signalling Transport to be used across X2 interface. X2 interface is a logical interface between eNodeBs. This document describes how the X2-AP signalling messages are transported over X2.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.10 TS 36.423

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)

This document specifies the radio network layer signalling procedures of the control plane between eNodeBs in E-UTRAN. X2AP supports the functions of X2 interface by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.11 TS 36.424

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 data transport

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the X2 interface.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.12 TS 36.425

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 interface user plane protocol

This document specifies the X2 user plane protocol being used over the X2 interface.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.13 TS 36.440

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); General aspects and principles for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN

This document describes the overall architecture of the interface for the provision of MBMS in the E-UTRAN. This includes also a description of the general aspects, assumptions and principles guiding the architecture and interface. The MBMS functions to be provided within that architecture are summarized. It provides an introduction to the TSG RAN TS 36.44x series of UMTS technical specifications that define the different interfaces introduced for MBMS provision in E-UTRAN.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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**Release 13**

##### 1.2.1.4.14 TS 36.441

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Layer 1 for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN

This document specifies the standards allowed to implement layer 1 on the interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN. In the following, “layer 1” and “physical layer” are assumed to be synonymous.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.15 TS 36.442

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Signalling Transport for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN

This document specifies the standards for signalling transport to be used across M2 and M3 interfaces. M2 interface is a logical interface between the eNodeB and the MCE. M3 interface is a logical interface between the MCE and the MME. This document describes how the M2-AP signalling messages are transported over M2, and how the M3-AP signalling messages are transported over M3.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.16 TS 36.443

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M2 Application Protocol (M2AP)

This document specifies the E-UTRAN radio network layer signalling protocol for the M2 interface. The M2 Application Protocol (M2AP) supports the functions of M2 interface by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.17 TS 36.444

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M3 Application Protocol (M3AP)

This document specifies the E-UTRAN radio network layer signalling protocol for the M3 interface. The M3 Application Protocol (M3AP) supports the functions of M3 interface by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

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**Release 13**

##### 1.2.1.4.18 TS 36.445

Evolved Universal Terrestrial Radio Access Network (E-UTRAN); M1 data transport

This document specifies the standards for user data transport protocols over the E-UTRAN M1 interface.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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**Release 13**

##### 1.2.1.4.19 TS 36.455

Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa)

This document specifies the control plane radio network layer signalling procedures between eNodeB and E-SMLC. LPPa supports the concerned functions by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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##### 1.2.1.4.20 TS 36.456

SLm interface general aspects and principles

This document is an introduction to the 3GPP TS 36.45x series of technical specifications that define the SLm interface for the interconnection of the Evolved Serving Mobile Location Centre (E-SMLC) to the Location Measurement Unit (LMU) components of the Evolved Universal Terrestrial Radio Access Network (E-UTRAN).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 11**

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##### 1.2.1.4.21 TS 36.457

**SLm interface layer 1**

This document specifies the standards allowed to implement layer 1 on the SLm interface.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 11**

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##### 1.2.1.4.22 TS 36.458

**SLm interface signalling transport**

This document specifies the standards for signalling transport to be used across the SLm interface. The SLm interface is a logical interface between the LMU and the E-SMLC in the E-UTRAN core network. This document describes how the SLmAP signalling messages are transported over SLm.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.23 TS 36.459

**SLm interface Application Protocol (SLmAP)**

This document specifies the E-UTRAN radio network layer signalling protocol for the SLm interface. The SLm Application Protocol (SLmAP) supports the functions of the SLm interface by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.4.24 TS 36.461

**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw layer 1**

This document specifies the standards allowed to implement Layer 1 on the Xw interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 13**

##### 1.2.1.4.25 TS 36.462

**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw signalling transport**

This document specifies the standards for Signalling Transport to be used across the Xw interface. The Xw interface is a logical interface between the eNB and the WT. This document describes how the Xw-AP signalling messages are transported over Xw.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 12 (not applicable – this specification added beginning with Release 13)**

**Release 13**

##### 1.2.1.4.26 TS 36.463

**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw application protocol (XwAP)**

This document specifies the signalling procedures of the control plane between an eNB and WLAN Termination (WT). The Xw Application Protocol (XwAP) supports the functions of Xw interface by signalling procedures defined in this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 12 (not applicable – this specification added beginning with Release 13)**

**Release 13**

##### 1.2.1.4.27 TS 36.464

**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw data transport**

This document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the Xw interface for LTE/WLAN Aggregation (LWA).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 12 (not applicable – this specification added beginning with Release 13)**

**Release 13**

##### 1.2.1.4.28 TS 36.465

**Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw interface user plane protocol**

This document specifies the Xw user plane protocol being used over the Xw interface for LTE/WLAN Aggregation (LWA).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 13**

##### 1.2.1.4.29 TS 25.460

UTRAN Iuant interface: General aspects and principles

This document is an introduction to the 3GPP TS 25.46x series of technical specifications that define the Iuant Interface for UMTS and E-UTRAN. The logical Iuant interface is a NodeB/eNodeB internal interface between the implementation specific O&M function and the RET antennas and TMAs control unit function of the NodeB/eNodeB.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.4.30 TS 25.461

UTRAN Iuant interface: Layer 1

This document specifies the standards allowed to implement layer 1 on the Iuant interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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##### 1.2.1.4.31 TS 25.462

UTRAN Iuant interface: Signalling transport

This document specifies the signalling transport related to RETAP and TMAAP signalling to be used across the Iuant interface. The logical Iuant interface is a NodeB/eNodeB internal interface between the implementation specific O&M function and the RET antennas and TMAs control unit function of the NodeB/eNodeB.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

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##### 1.2.1.4.32 TS 25.466

UTRAN Iuant interface: Application part

This document specifies the Remote Electrical Tilting Application Part (RETAP) between the implementation specific O&M transport function and the RET Antenna Control unit function of the NodeB/eNodeB. The document also specifies the Tower Mounted Amplifier Application Part (TMAAP) between the implementation specific O&M transport function and the TMA control function of the NodeB/eNodeB. It defines the Iuant interface and its associated signalling procedures.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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#### 1.2.1.5 Radio-frequency aspects

##### 1.2.1.5.1 TS 36.101

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception

This document establishes the minimum RF characteristics and minimum performance requirements for E-UTRA User Equipment (UE).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 13**

##### 1.2.1.5.2 TS 36.104

Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception

This document establishes the minimum RF characteristics and minimum performance requirements of E-UTRA Base Station (BS).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.5.3 TS 36.106

Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater radio transmission and reception

This document establishes the minimum RF characteristics of E-UTRA FDD Repeater.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

**Release 10**

**Release 11**

**Release 12**

**Release 13**

##### 1.2.1.5.4 TS 36.111

Location Measurement Unit (LMU) performance specification; Network based positioning systems in Evolved Universal Terrestrial Radio Access Network (E-UTRAN)

This document establishes the Location Measurement Unit (LMU) minimum UTDOA positioning requirement for the FDD and TDD mode of E-UTRAN.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.5.5 TS 36.112

Location Measurement Unit (LMU) conformance specification; Network based positioning systems in Evolved Universal Terrestrial Radio Access Network (E-UTRAN)

This document establishes the conformance requirements for E-UTRAN Location Measurement Units (LMU) operating in the FDD or TDD mode.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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**Release 12**

**Release 13**

##### 1.2.1.5.6 TS 36.113

Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) and repeater ElectroMagnetic Compatibility (EMC)

This document covers the assessment of E-UTRA base stations, repeaters and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC). This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA base stations, repeaters and associated ancillary equipment in one of the following categories: (i) base stations of E-UTRA meeting the requirements of TS 36.104, with conformance demonstrated by compliance to TS 36.141; (ii) repeaters of FDD E-UTRA meeting the requirements of TS 36.106, with conformance demonstrated by compliance to TS 36.143. The environment classification used in this document refers to the environment classification used in IEC 61000-6-1 and IEC 61000-6-3. The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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##### 1.2.1.5.7 TS 36.116

**Evolved Universal Terrestrial Radio Access (E-UTRA); Relay radio transmission and reception**

This document establishes the minimum RF characteristics and minimum performance requirements of E-UTRA Relay.

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##### 1.2.1.5.8 TS 36.117

Evolved Universal Terrestrial Radio Access (E-UTRA); Relay conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA Relay. These have been derived from, and are consistent with the E-UTRA Relay specifications defined in TS 36.116.

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##### 1.2.1.5.9 TS 36.124

Evolved Universal Terrestrial Radio Access (E-UTRA); Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment

This document establishes the essential EMC requirements for “3rd generation” digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP E-UTRA user equipment (UE). This document specifies the applicable EMC tests, the methods of measurement, the frequency range, the limits and the minimum performance criteria for all types of E-UTRA UEs and their accessories. Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries have been included. The immunity requirements have been selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels however, do not cover extreme cases, which may occur in any location but with low probability of occurrence. Compliance of radio equipment to the requirements of this document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements). Compliance to the requirements of this document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

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##### 1.2.1.5.10 TS 36.133

Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management

This document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of E-UTRA. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

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##### 1.2.1.5.11 TS 36.141

Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA Base Stations (BS) operating either in the FDD mode (used in paired bands) or the TDD mode (used in unpaired bands). These have been derived from, and are consistent with the E-UTRA Base Station (BS) specifications defined in TS 36 104.

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##### 1.2.1.5.12 TS 36.143

Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA FDD Repeater. These have been derived from, and are consistent with the E-UTRA FDD repeater specifications defined in TS 36.106.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.5.13 TS 36.171

Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for Support of Assisted Global Navigation Satellite System (A‑GNSS)

This document establishes the minimum performance requirements for A-GNSS (including A-GPS) for FDD or TDD mode of E-UTRA for the User Equipment (UE).

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##### 1.2.1.5.14 TS 36.307

Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements on User Equipments (UEs) supporting a release-independent frequency band

This document specifies requirements on UEs supporting a frequency band that is independent of release. TSG-RAN has agreed that the standardization of new frequency bands may be independent of a release. However, in order to implement a UE that conforms to a particular release but supports a band of operation that is specified in a later release, it is necessary to specify some extra requirements. All frequency bands are fully specified in this release of the specifications. This document does not contain any requirements for UEs supporting frequency bands independent of release.

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##### 1.2.1.5.15 TS 37.104

E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception

This document establishes the minimum RF characteristics of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS). Requirements for multi-RAT and single-RAT operation of MSR BS are covered in this document. The requirements in this document for E-UTRA and UTRA single-RAT operation of MSR BS are also applicable to E-UTRA and UTRA multi-carrier capable single-RAT BS. Requirements for GSM BS that are only single-RAT capable are not covered.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.5.16 TS 37.105

Active Antenna System (AAS) Base Station (BS) transmission and reception

This document establishes the RF characteristics, the RF minimum requirements and minimum performance requirements for E-UTRA AAS Base Station (BS), the FDD mode of UTRA AAS Base Station (BS), the 1,28 Mcps TDD mode of UTRA AAS Base Station (BS) in single RAT and any MSR AAS Base Station (BS) implementation of these RATs.

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##### 1.2.1.5.17 TS 37.113

E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)

This document covers the assessment of E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Stations and associated ancillary equipment in respect of Electromagnetic Compatibility (EMC). This document specifies the applicable test conditions, performance assessment and performance criteria for E-UTRA, UTRA and GSM/EDGE Base Stations and associated ancillary equipment in one of the following categories: (i) Multi-Standard Radio (MSR) Base Stations for E-UTRA, UTRA and GSM/EDGE meeting the requirements of TS 37.104, with conformance demonstrated by compliance to TS 37.141; (ii) Base Stations for E-UTRA meeting the requirements of TS 36.104, with conformance demonstrated by compliance to TS 36.141; (iii) Base Stations for UTRA FDD meeting the requirements of TS 25.104, with conformance demonstrated by compliance to TS 25.141; (iv) Base Stations for UTRA TDD meeting the requirements of TS 25.105, with conformance demonstrated by compliance to TS 25.142; (v) Base Stations for GSM/EDGE meeting the requirements of TS 45.005, with conformance demonstrated by compliance to TS 51.021. The environment classification used in this document refers to the environment classification used in IEC 61000-6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.5.18 TS 37.114

Active Antenna System (AAS) Base Station (BS) Electromagnetic Compatibility (EMC)

This document covers the assessment of E-UTRA, UTRA and Multi-Standard Radio (MSR) Active Antenna Systems Base Stations in respect of Electromagnetic Compatibility (EMC).

This document specifies the applicable test conditions, performance assessment and performance criteria for E‑UTRA and UTRA Base Stations and associated ancillary equipment in one of the following categories:

- Active Antenna System Base Station for E-UTRA, UTRA and MSR meeting the requirements of 3GPP TS 37.105, with conformance demonstrated by compliance to 3GPP TS 37.145.

The scope of this document is AAS BS with TAB connectors for every transceiver unit at the Transceiver Array Boundary. Requirement, procedures and values of an AAS Base Station without TAB connectors are not included in this document and are FFS.

The environment classification used in this document refers to the residential, commercial and light industrial environment classification used in IEC 61000‑6-1 and IEC 61000-6-3.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial and light industrial environments. The levels, however, do not cover extreme cases which may occur in any location but with low probability of occurrence.

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**Release 13**

##### 1.2.1.5.19 TS 37.141

E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA, UTRA and GSM/EDGE Multi‑Standard Radio (MSR) Base Station (BS).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.5.20 TS 37.144

User Equipment (UE) and Mobile Station (MS) GSM, UTRA and E-UTRA over the air performance requirements

This document establishes over the air antenna minimum requirements for user equipment (UE) and mobile station (MS).

Handheld UE requirements are defined for roaming bands for the speech position (beside the head and beside the head and hand) and hand phantom browsing mode position. Laptop mounted equipment requirements are defined for roaming bands for the data transfer position (laptop ground plane phantom). Laptop embedded equipment requirements are defined for roaming bands for the data transfer position (free space).

All bands are potential roaming bands, and the requirements for roaming bands shall therefore be fulfilled for all bands supported by a UE/MS.

Requirements for operating bands are dependent on how the network has been built and are thus operator specific and cannot be specified here. Recommended performance values for operating bands (Annex B) are however included in this specification for information. It should be recognised that the ability to meet the recommended performance values depends on the number of frequency bands supported by the UE/MS.

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**Release 13**

##### 1.2.1.5.21 TS 37.145-1

Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: conducted conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for Single RAT E-UTRA, UTRA and Multi-Standard Radio (MSR) UTRA and EUTRA Active Antenna System (AAS) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA AAS BS specification. The technical specification is in 2 parts, part 1 covers conducted requirements and part 2 covers radiated requirements.

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##### 1.2.1.5.22 TS 37.145-2

Active Antenna System (AAS) Base Station (BS) conformance testing; Part 2: radiated conformance testing

This document specifies the Radio Frequency (RF) test methods and conformance requirements for Single RAT E-UTRA, UTRA and Multi-Standard Radio (MSR) UTRA and EUTRA Active Antenna System (AAS) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA AAS BS specification defined in 3GPP TS 25.104. The technical specification is in 2 parts, part 1 covers conducted requirements and part 2 (this document) covers radiated requirements.

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**Release 13**

##### 1.2.1.5.23 TS 37.171

Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA); User Equipment (UE) performance requirements for RAT-Independent Positioning Enhancements

This document establishes the minimum performance requirements for RAT-Independent Positioning Enhancements (e.g. MBS positioning technology) for FDD or TDD mode of UTRA and E-UTRA for the User Equipment (UE).

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**Release 13**

##### 1.2.1.5.24 TS 37.320

Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2

This document provides an overview and overall description of the minimization of drive tests functionality. The document describes functions and procedures to support collection of UE-specific measurements for MDT using Control Plane architecture, for both UTRAN and E‑UTRAN. Details of the signalling procedures for single-RAT operation are specified in the appropriate radio interface protocol specification. Network operation and overall control of MDT is described in OAM specifications.

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#### 1.2.1.6 User Equipment (UE) conformance testing

##### 1.2.1.6.1 TS 36.508

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing

This document contains definitions of reference conditions and test signals, default parameters, reference radio bearer configurations used in radio bearer interoperability testing, common radio bearer configurations for other test purposes, common requirements for test equipment and generic set-up procedures for use in conformance tests for the 3rd Generation E-UTRAN User Equipment (UE).

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.6.2 TS 36.509

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Special conformance testing functions for User Equipment (UE)

This document defines for User Equipment (UE) in E-UTRA FDD or TDD mode those special functions and their activation/deactivation methods that are required in UE for conformance testing purposes.

This document also describes the operation of these special functions for UEs supporting E-UTRA FDD or TDD mode, when operating in UTRA FDD and TDD mode, in GSM/GPRS mode, and in CDMA2000 mode.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.6.3 TS 36.521-1

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain transmitting characteristics, receiving characteristics and performance requirements as part of the 3G Long Term Evolution (3G LTE). Conformance test for the support of RRM (Radio Resource Management) are specified in TS 36.521-3.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “definition and applicability” part of the test.

For example only Release 8 and later UE declared to support LTE shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

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##### 1.2.1.6.4 TS 36.521-2

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Implementation Conformance Statement (ICS)

This document provides the ICS proforma for 3G Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE), in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document specifies the recommended applicability statement for the test cases included in 3GPP TS 36.521-1 and 3GPP TS 36.521-3. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 36.509 and the common test environments are included in 3GPP TS 36.508.

This document is valid for UE implemented according to 3GPP releases starting from Release 8 up to the Release indicated on the cover page of this document.

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##### 1.2.1.6.5 TS 36.521-3

Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing

This document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 3G Long Term Evolution (3G LTE).

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “test applicability” part of the test.

For example only Release 8 and later UE declared to support LTE shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

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##### 1.2.1.6.6 TS 36.523-1

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification

This document specifies the protocol conformance testing for the 3rd Generation E-UTRAN User Equipment (UE).

This is the first part of a multi-part test specification. The following information can be found in this part:

– the overall test structure;

– the test configurations;

– the conformance requirement and reference to the core specifications;

– the test purposes; and

– a brief description of the test procedure, the specific test requirements and short message exchange table.

The following information relevant to testing could be found in accompanying specifications:

– the default setting of the test parameters (TS 36.508);

– the applicability of each test case (TS 36.523-2).

A detailed description of the expected sequence of messages could be found in the 3rd part of this test specification.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 2nd part of this document.

This document is valid for UE implemented according to 3GPP releases starting from Release 8 up to the Release indicated on the cover page of this document.

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**Release 13**

##### 1.2.1.6.7 TS 36.523-2

Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification

This document provides the ICS proforma for 3rd Generation User Equipment (UE), in compliance with the relevant EPS (E-UTRA/EPC) requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document also specifies a recommended applicability statement for the test cases included in TS 36.523-1. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in TS 36.509 and the common test environments are included in 3GPP TS 36.508.

This document is valid for UE complying with EPS (E-UTRA/EPC) and implemented according to 3GPP releases starting from Release 8 up to the Release indicated on the cover page of this document.

**SDO (2)** **Document No.** **Version** **Issued date** **Location (1)**

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##### 1.2.1.6.8 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

This document specifies the protocol and signalling conformance testing in TTCN-3 for the 3GPP UE at the UE‑E-UTRAN radio interface.

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

– the test system architecture;

– the overall test suite structure;

– the test models and ASP definitions;

– the test methods and usage of communication ports definitions;

– the test configurations;

– the design principles and assumptions;

– TTCN styles and conventions;

– the partial PIXIT proforma;

– the test suites.

The Abstract Test Suites designed in the document are based on the test cases specified in prose (3GPP TS 36.523‑1). The applicability of the individual test cases is specified in the test ICS proforma specification (3GPP TS 36.523‑2).

This document is valid for UE implemented according to 3GPP Rel-9 upwards.

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##### 1.2.1.6.9 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

This document specifies the procedures for the conformance test of the measurement requirements for FDD mode of UTRA and FDD or TDD mode of E-UTRA for the User Equipment (UE) that supports one or more of the defined positioning methods. These positioning methods are for UTRA: Assisted Global Positioning System (A-GPS), Assisted Global Navigation Satellite Systems (A-GNSS) and for E-UTRA: Assisted Global Navigation Satellite System (A-GNSS), Observed Time Difference of Arrival (OTDOA), Enhanced Cell ID (ECID).

Tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the “Test applicability” part of the test.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 3rd part of this document.

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##### 1.2.1.6.10 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

This document specifies the protocol conformance testing for the 3rd Generation UTRAN and E-UTRAN User Equipment (UE) supporting UE positioning.

This is the second part of a multi-part test specification. The following information can be found in this part:

– the overall protocol conformance test structure;

– the protocol conformance test configurations;

– the conformance requirement and reference to the core specifications;

– the test purposes; and

– a brief description of the test procedure, the specific test requirements and short message exchange table.

The Implementation Conformance Statement (ICS) pro-forma could be found in the 3rd part of this document.

This document is valid for UE supporting UE positioning implemented according to 3GPP releases starting from Release 99 up to the Release indicated on the cover page of this document.

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##### 1.2.1.6.11 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)

This document provides the ICS proforma for 3rd Generation UTRAN and E-UTRAN User Equipment (UE) supporting UE positioning, in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-1 and ISO/IEC 9646-7.

This document also specifies a recommended applicability statement for the test cases included in 3GPP TS 37.571-1 and 3GPP TS 37.571-2. These applicability statements are based on the features implemented in the UE.

Special conformance testing functions can be found in 3GPP TS 34.109 for UTRA and 3GPP TS 36.509 for E-UTRA. The common test environments are included in 3GPP TS 34.108 for UTRA and in 3GPP TS 36.508 for E-UTRA.

This document is valid for UE supporting UE positioning implemented according to 3GPP releases starting from Release 99 up to the Release indicated on the cover page of this document.

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##### 1.2.1.6.12 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

This 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 this 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 this document are based on the test specifications in prose in 3GPP TS 37.571-2;

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

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##### 1.2.1.6.13 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

This document specifies the test scenarios and assistance data required for the conformance test for FDD or TDD mode of UTRA and E-UTRA for the User Equipment (UE) that supports one or more of the defined positioning methods. For UTRA these are Assisted Global Positioning System (A-GPS) and Assisted Global Navigation Satellite System (A-GNSS). For E-UTRA these are A-GNSS, Observed Time Difference of Arrival (OTDOA) and Enhanced Cell ID (ECID).

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