

ETSI TS 136 355 V15.5.0 (2019-10)



LTE;
Evolved Universal Terrestrial Radio Access (E-UTRA);
LTE Positioning Protocol (LPP)
(3GPP TS 36.355 version 15.5.0 Release 15)

*Full Standards Catalogue
https://standards.iteh.ai/catalog/standards/sist/41a7968d-8faf-4b7f-af03-a7e635c7-4d06/etsi-ts-136-355-v15-5-0-2019-10*



ReferenceRTS/TSGR-0236355vf50

KeywordsLTE

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2019.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Legal Notice

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

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

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

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	10
1 Scope	11
2 References	11
3 Definitions and Abbreviations.....	12
3.1 Definitions	12
3.2 Abbreviations	13
4 Functionality of Protocol.....	15
4.1 General	15
4.1.1 LPP Configuration	15
4.1.2 LPP Sessions and Transactions.....	15
4.1.3 LPP Position Methods	16
4.1.4 LPP Messages	16
4.2 Common LPP Session Procedure	16
4.3 LPP Transport	17
4.3.1 Transport Layer Requirements	17
4.3.2 LPP Duplicate Detection	17
4.3.3 LPP Acknowledgement	18
4.3.3.1 General	18
4.3.3.2 Procedure related to Acknowledgement.....	18
4.3.4 LPP Retransmission.....	19
4.3.4.1 General	19
4.3.4.2 Procedure related to Retransmission	19
4.3.5 LPP Message Segmentation.....	20
5 LPP Procedures	21
5.1 Procedures related to capability transfer	21
5.1.1 Capability Transfer procedure.....	21
5.1.2 Capability Indication procedure.....	21
5.1.3 Reception of LPP Request Capabilities	22
5.1.4 Transmission of LPP Provide Capabilities.....	22
5.2 Procedures related to Assistance Data Transfer.....	22
5.2.1 Assistance Data Transfer procedure.....	22
5.2.1a Periodic Assistance Data Transfer procedure.....	23
5.2.1b Periodic Assistance Data Transfer with Update procedure	25
5.2.2 Assistance Data Delivery procedure	25
5.2.2a Periodic Assistance Data Delivery procedure	26
5.2.3 Transmission of LPP Request Assistance Data	28
5.2.4 Reception of LPP Provide Assistance Data	28
5.3 Procedures related to Location Information Transfer	28
5.3.1 Location Information Transfer procedure.....	28
5.3.2 Location Information Delivery procedure	29
5.3.3 Reception of Request Location Information.....	29
5.3.4 Transmission of Provide Location Information	30
5.4 Error Handling Procedures	30
5.4.1 General.....	30
5.4.2 Procedures related to Error Indication	30
5.4.3 LPP Error Detection.....	30
5.4.4 Reception of an LPP Error Message	31
5.5 Abort Procedure	32
5.5.1 General.....	32
5.5.2 Procedures related to Abort	32

5.5.3	Reception of an LPP Abort Message	32
6	Information Element Abstract Syntax Definition.....	32
6.1	General	32
6.2	LPP PDU Structure	33
–	<i>LPP-PDU-Definitions</i>	33
–	<i>LPP-Message</i>	33
–	<i>LPP-MessageBody</i>	34
–	<i>LPP-TransactionID</i>	34
6.3	Message Body IEs	35
–	<i>RequestCapabilities</i>	35
–	<i>ProvideCapabilities</i>	35
–	<i>RequestAssistanceData</i>	36
–	<i>ProvideAssistanceData</i>	36
–	<i>RequestLocationInformation</i>	37
–	<i>ProvideLocationInformation</i>	37
–	<i>Abort</i>	38
–	<i>Error</i>	38
6.4	Common IEs.....	38
6.4.1	Common Lower-Level IEs	39
–	<i>AccessTypes</i>	39
–	<i>ARFCN-ValueEUTRA</i>	39
–	<i>ARFCN-ValueNR</i>	39
–	<i>ARFCN-ValueUTRA</i>	39
–	<i>CarrierFreq-NB</i>	40
–	<i>CellGlobalIdEUTRA-AndUTRA</i>	40
–	<i>CellGlobalIdGERAN</i>	41
–	<i>ECGI</i>	41
–	<i>Ellipsoid-Point</i>	41
–	<i>Ellipsoid-PointWithUncertaintyCircle</i>	42
–	<i>EllipsoidPointWithUncertaintyEllipse</i>	42
–	<i>EllipsoidPointWithAltitude</i>	42
–	<i>EllipsoidPointWithAltitudeAndUncertaintyEllipsoid</i>	42
–	<i>EllipsoidArc</i>	43
–	<i>EPDU-Sequence</i>	43
–	<i>HighAccuracyEllipsoidPointWithUncertaintyEllipse</i>	44
–	<i>HighAccuracyEllipsoidPointWithAltitudeAndUncertaintyEllipsoid</i>	44
–	<i>HorizontalVelocity</i>	44
–	<i>HorizontalWithVerticalVelocity</i>	44
–	<i>HorizontalVelocityWithUncertainty</i>	45
–	<i>HorizontalWithVerticalVelocityAndUncertainty</i>	45
–	<i>LocationCoordinateTypes</i>	45
–	<i>NCGI</i>	45
–	<i>PeriodicAssistanceDataControlParameters</i>	46
–	<i>Polygon</i>	46
–	<i>PositioningModes</i>	46
–	<i>SegmentationInfo</i>	47
–	<i>VelocityTypes</i>	47
6.4.2	Common Positioning	47
–	<i>CommonIEsRequestCapabilities</i>	47
–	<i>CommonIEsProvideCapabilities</i>	48
–	<i>CommonIEsRequestAssistanceData</i>	48
–	<i>CommonIEsProvideAssistanceData</i>	49
–	<i>CommonIEsRequestLocationInformation</i>	49
–	<i>CommonIEsProvideLocationInformation</i>	53
–	<i>CommonIEsAbort</i>	55
–	<i>CommonIEsError</i>	56
6.5	Positioning Method IEs	56
6.5.1	OTDOA Positioning	56
6.5.1.1	OTDOA Assistance Data	56
–	<i>OTDOA-ProvideAssistanceData</i>	56
6.5.1.2	OTDOA Assistance Data Elements	57

–	<i>OTDOA-ReferenceCellInfo</i>	57
–	<i>PRS-Info</i>	59
–	<i>TDD-Config</i>	60
–	<i>OTDOA-NeighbourCellInfoList</i>	61
–	<i>OTDOA-ReferenceCellInfoNB</i>	64
–	<i>PRS-Info-NB</i>	66
–	<i>OTDOA-NeighbourCellInfoListNB</i>	69
6.5.1.3	OTDOA Assistance Data Request	72
–	<i>OTDOA-RequestAssistanceData</i>	72
6.5.1.4	OTDOA Location Information	72
–	<i>OTDOA-ProvideLocationInformation</i>	72
6.5.1.5	OTDOA Location Information Elements	73
–	<i>OTDOA-SignalMeasurementInformation</i>	73
–	<i>OTDOA-SignalMeasurementInformation-NB</i>	76
–	<i>OTDOA-MeasQuality</i>	78
–	<i>AdditionalPath</i>	79
6.5.1.6	OTDOA Location Information Request	79
–	<i>OTDOA-RequestLocationInformation</i>	79
6.5.1.7	OTDOA Capability Information	80
–	<i>OTDOA-ProvideCapabilities</i>	80
6.5.1.8	OTDOA Capability Information Request	82
–	<i>OTDOA-RequestCapabilities</i>	82
6.5.1.9	OTDOA Error Elements	82
–	<i>OTDOA-Error</i>	82
–	<i>OTDOA-LocationServerErrorCauses</i>	82
–	<i>OTDOA-TargetDeviceErrorCauses</i>	83
6.5.2	A-GNSS Positioning	83
6.5.2.1	GNSS Assistance Data	83
–	<i>A-GNSS-ProvideAssistanceData</i>	83
–	<i>GNSS-CommonAssistData</i>	83
–	<i>GNSS-GenericAssistData</i>	84
–	<i>GNSS-PeriodicAssistData</i>	84
6.5.2.2	GNSS Assistance Data Elements	85
–	<i>GNSS-ReferenceTime</i>	85
–	<i>GNSS-SystemTime</i>	86
–	<i>GPS-TOW-Assist</i>	87
–	<i>NetworkTime</i>	87
–	<i>GNSS-ReferenceLocation</i>	90
–	<i>GNSS-IonosphericModel</i>	90
–	<i>KlobucharModelParameter</i>	90
–	<i>NeQuickModelParameter</i>	91
–	<i>GNSS-EarthOrientationParameters</i>	91
–	<i>GNSS-RTK-ReferenceStationInfo</i>	92
–	<i>GNSS-RTK-CommonObservationInfo</i>	93
–	<i>GNSS-RTK-AuxiliaryStationData</i>	94
–	<i>GNSS-TimeModelList</i>	96
–	<i>GNSS-DifferentialCorrections</i>	98
–	<i>GNSS-NavigationModel</i>	100
–	<i>StandardClockModelList</i>	102
–	<i>NAV-ClockModel</i>	103
–	<i>CNAV-ClockModel</i>	103
–	<i>GLONASS-ClockModel</i>	104
–	<i>SBAS-ClockModel</i>	105
–	<i>BDS-ClockModel</i>	105
–	<i>NavModelKeplerianSet</i>	106
–	<i>NavModelNAV-KeplerianSet</i>	107
–	<i>NavModelCNAV-KeplerianSet</i>	108
–	<i>NavModel-GLONASS-ECEF</i>	110
–	<i>NavModel-SBAS-ECEF</i>	111
–	<i>NavModel-BDS-KeplerianSet</i>	112
–	<i>GNSS-RealTimeIntegrity</i>	113
–	<i>GNSS-DataBitAssistance</i>	114

–	<i>GNSS-AcquisitionAssistance</i>	115
–	<i>GNSS-Almanac</i>	118
–	<i>AlmanacKeplerianSet</i>	119
–	<i>AlmanacNAV-KeplerianSet</i>	120
–	<i>AlmanacReducedKeplerianSet</i>	121
–	<i>AlmanacMidiAlmanacSet</i>	122
–	<i>AlmanacGLONASS-AlmanacSet</i>	123
–	<i>AlmanacECEF-SBAS-AlmanacSet</i>	124
–	<i>AlmanacBDS-AlmanacSet</i>	125
–	<i>GNSS-UTC-Model</i>	126
–	<i>UTC-ModelSet1</i>	126
–	<i>UTC-ModelSet2</i>	127
–	<i>UTC-ModelSet3</i>	128
–	<i>UTC-ModelSet4</i>	128
–	<i>UTC-ModelSet5</i>	129
–	<i>GNSS-AuxiliaryInformation</i>	130
–	<i>BDS-DifferentialCorrections</i>	131
–	<i>BDS-GridModelParameter</i>	132
–	<i>GNSS-RTK-Observations</i>	132
–	<i>GLO-RTK-BiasInformation</i>	134
–	<i>GNSS-RTK-MAC-CorrectionDifferences</i>	135
–	<i>GNSS-RTK-Residuals</i>	137
–	<i>GNSS-RTK-FKP-Gradients</i>	138
–	<i>GNSS-SSR-OrbitCorrections</i>	140
–	<i>GNSS-SSR-ClockCorrections</i>	142
–	<i>GNSS-SSR-CodeBias</i>	143
6.5.2.3	<i>GNSS Assistance Data Request</i>	144
–	<i>A-GNSS-RequestAssistanceData</i>	144
–	<i>GNSS-CommonAssistDataReq</i>	144
–	<i>GNSS-GenericAssistDataReq</i>	145
–	<i>GNSS-PeriodicAssistDataReq</i>	146
6.5.2.4	<i>GNSS Assistance Data Request Elements</i>	147
–	<i>GNSS-ReferenceTimeReq</i>	147
–	<i>GNSS-ReferenceLocationReq</i>	148
–	<i>GNSS-IonosphericModelReq</i>	148
–	<i>GNSS-EarthOrientationParametersReq</i>	148
–	<i>GNSS-RTK-ReferenceStationInfoReq</i>	149
–	<i>GNSS-RTK-AuxiliaryStationDataReq</i>	149
–	<i>GNSS-TimeModelListReq</i>	149
–	<i>GNSS-DifferentialCorrectionsReq</i>	150
–	<i>GNSS-NavigationModelReq</i>	150
–	<i>GNSS-RealTimeIntegrityReq</i>	152
–	<i>GNSS-DataBitAssistanceReq</i>	152
–	<i>GNSS-AcquisitionAssistanceReq</i>	153
–	<i>GNSS-AlmanacReq</i>	153
–	<i>GNSS-UTC-ModelReq</i>	154
–	<i>GNSS-AuxiliaryInformationReq</i>	154
–	<i>BDS-DifferentialCorrectionsReq</i>	154
–	<i>BDS-GridModelReq</i>	155
–	<i>GNSS-RTK-ObservationsReq</i>	155
–	<i>GLO-RTK-BiasInformationReq</i>	155
–	<i>GNSS-RTK-MAC-CorrectionDifferencesReq</i>	156
–	<i>GNSS-RTK-ResidualsReq</i>	156
–	<i>GNSS-RTK-FKP-GradientsReq</i>	156
–	<i>GNSS-SSR-OrbitCorrectionsReq</i>	157
–	<i>GNSS-SSR-ClockCorrectionsReq</i>	157
–	<i>GNSS-SSR-CodeBiasReq</i>	157
6.5.2.5	<i>GNSS Location Information</i>	158
–	<i>A-GNSS-ProvideLocationInformation</i>	158
6.5.2.6	<i>GNSS Location Information Elements</i>	158
–	<i>GNSS-SignalMeasurementInformation</i>	158
–	<i>MeasurementReferenceTime</i>	159

–	<i>GNSS-MeasurementList</i>	161
–	<i>GNSS-LocationInformation</i>	164
6.5.2.7	GNSS Location Information Request	165
–	<i>A-GNSS-RequestLocationInformation</i>	165
6.5.2.8	GNSS Location Information Request Elements	165
–	<i>GNSS-PositioningInstructions</i>	165
6.5.2.9	GNSS Capability Information	166
–	<i>A-GNSS-ProvideCapabilities</i>	166
6.5.2.10	GNSS Capability Information Elements	168
–	<i>GNSS-CommonAssistanceDataSupport</i>	168
–	<i>GNSS-ReferenceTimeSupport</i>	169
–	<i>GNSS-ReferenceLocationSupport</i>	169
–	<i>GNSS-IonosphericModelSupport</i>	169
–	<i>GNSS-EarthOrientationParametersSupport</i>	170
–	<i>GNSS-RTK-ReferenceStationInfoSupport</i>	170
–	<i>GNSS-RTK-AuxiliaryStationDataSupport</i>	170
–	<i>GNSS-GenericAssistanceDataSupport</i>	170
–	<i>GNSS-TimeModelListSupport</i>	172
–	<i>GNSS-DifferentialCorrectionSupport</i>	172
–	<i>GNSS-NavigationModelSupport</i>	172
–	<i>GNSS-RealTimeIntegritySupport</i>	173
–	<i>GNSS-DataBitAssistanceSupport</i>	173
–	<i>GNSS-AcquisitionAssistanceSupport</i>	173
–	<i>GNSS-AlmanacSupport</i>	174
–	<i>GNSS-UTC-ModelSupport</i>	174
–	<i>GNSS-AuxiliaryInformationSupport</i>	174
–	<i>BDS-DifferentialCorrectionsSupport</i>	175
–	<i>BDS-GridModelSupport</i>	175
–	<i>GNSS-RTK-ObservationsSupport</i>	175
–	<i>GLO-RTK-BiasInformationSupport</i>	175
–	<i>GNSS-RTK-MAC-CorrectionDifferencesSupport</i>	175
–	<i>GNSS-RTK-ResidualsSupport</i>	176
–	<i>GNSS-RTK-FKP-GradientsSupport</i>	176
–	<i>GNSS-SSR-OrbitCorrectionsSupport</i>	176
–	<i>GNSS-SSR-ClockCorrectionsSupport</i>	176
6.5.2.11	GNSS Capability Information Request	177
–	<i>A-GNSS-RequestCapabilities</i>	177
6.5.2.12	GNSS Error Elements	177
–	<i>A-GNSS-Error</i>	177
–	<i>GNSS-LocationServerErrorCauses</i>	178
–	<i>GNSS-TargetDeviceErrorCauses</i>	178
6.5.2.13	Common GNSS Information Elements	179
–	<i>GNSS-FrequencyID</i>	179
–	<i>GNSS-ID</i>	179
–	<i>GNSS-ID-Bitmap</i>	180
–	<i>GNSS-Link-CombinationsList</i>	180
–	<i>GNSS-NavListInfo</i>	180
–	<i>GNSS-NetworkID</i>	180
–	<i>GNSS-PeriodicControlParam</i>	181
–	<i>GNSS-ReferenceStationID</i>	181
–	<i>GNSS-SignalID</i>	181
–	<i>GNSS-SignalIDs</i>	185
–	<i>GNSS-SubNetworkID</i>	186
–	<i>SBAS-ID</i>	186
–	<i>SBAS-IDs</i>	186
–	<i>SV-ID</i>	187
6.5.3	Enhanced Cell ID Positioning	187
6.5.3.1	E-CID Location Information	187
–	<i>ECID-ProvideLocationInformation</i>	187
6.5.3.2	E-CID Location Information Elements	188
–	<i>ECID-SignalMeasurementInformation</i>	188
6.5.3.3	E-CID Location Information Request	189

–	<i>ECID-RequestLocationInformation</i>	189
6.5.3.4	E-CID Capability Information	189
–	<i>ECID-ProvideCapabilities</i>	189
6.5.3.5	E-CID Capability Information Request.....	190
–	<i>ECID-RequestCapabilities</i>	190
6.5.3.6	E-CID Error Elements.....	190
–	<i>ECID-Error</i>	190
–	<i>ECID-LocationServerErrorCauses</i>	191
–	<i>ECID-TargetDeviceErrorCauses</i>	191
6.5.4	Terrestrial Beacon System Positioning	192
6.5.4.1	TBS Location Information	192
–	<i>TBS-ProvideLocationInformation</i>	192
6.5.4.2	TBS Location Information Elements	192
–	<i>TBS-MeasurementInformation</i>	192
–	<i>MBS-BeaconMeasList</i>	192
6.5.4.3	TBS Location Information Request	193
–	<i>TBS-RequestLocationInformation</i>	193
6.5.4.4	TBS Capability Information.....	194
–	<i>TBS-ProvideCapabilities</i>	194
–	<i>MBS-AssistanceDataSupportList</i>	194
6.5.4.5	TBS Capability Information Request	195
–	<i>TBS-RequestCapabilities</i>	195
6.5.4.6	TBS Error Elements	195
–	<i>TBS-Error</i>	195
–	<i>TBS-LocationServerErrorCauses</i>	195
–	<i>TBS-TargetDeviceErrorCauses</i>	195
6.5.4.7	TBS Assistance Data	196
–	<i>TBS-ProvideAssistanceData</i>	196
6.5.4.8	TBS Assistance Data Elements	196
–	<i>TBS-AssistanceDataList</i>	196
–	<i>MBS-AlmanacAssistance</i>	196
–	<i>MBS-AcquisitionAssistance</i>	197
6.5.4.9	TBS Assistance Data Request	197
–	<i>TBS-RequestAssistanceData</i>	197
6.5.5	Sensor based Positioning	198
6.5.5.0	Introduction	198
6.5.5.1	Sensor Location Information.....	198
–	<i>Sensor-ProvideLocationInformation</i>	198
6.5.5.2	Sensor Location Information Elements.....	198
–	<i>Sensor-MeasurementInformation</i>	198
–	<i>Sensor-MotionInformation</i>	199
6.5.5.3	Sensor Location Information Request.....	200
–	<i>Sensor-RequestLocationInformation</i>	200
6.5.5.4	Sensor Capability Information	201
–	<i>Sensor-ProvideCapabilities</i>	201
6.5.5.5	Sensor Capability Information Request	202
–	<i>Sensor-RequestCapabilities</i>	202
6.5.5.6	Sensor Error Elements.....	202
–	<i>Sensor-Error</i>	202
–	<i>Sensor-LocationServerErrorCauses</i>	202
–	<i>Sensor-TargetDeviceErrorCauses</i>	202
6.5.5.7	Sensor Assistance Data	203
–	<i>Sensor-ProvideAssistanceData</i>	203
6.5.5.8	Sensor Assistance Data Elements	203
–	<i>Sensor-AssistanceDataList</i>	203
6.5.5.9	Sensor Assistance Data Request	204
–	<i>Sensor-RequestAssistanceData</i>	204
6.5.6	WLAN-based Positioning	204
6.5.6.1	WLAN Location Information.....	205
–	<i>WLAN-ProvideLocationInformation</i>	205
6.5.6.2	WLAN Location Information Elements.....	205
–	<i>WLAN-MeasurementInformation</i>	205

6.5.6.3	WLAN Location Information Request.....	206
–	<i>WLAN-RequestLocationInformation</i>	206
6.5.6.4	WLAN Capability Information.....	207
–	<i>WLAN-ProvideCapabilities</i>	207
6.5.6.5	WLAN Capability Information Request.....	207
–	<i>WLAN-RequestCapabilities</i>	207
6.5.6.6	WLAN Error Elements.....	208
–	<i>WLAN-Error</i>	208
–	<i>WLAN-LocationServerErrorCauses</i>	208
–	<i>WLAN-TargetDeviceErrorCauses</i>	208
6.5.7	Bluetooth-based Positioning.....	212
6.5.7.1	Bluetooth Location Information.....	212
–	<i>BT-ProvideLocationInformation</i>	212
6.5.7.2	Bluetooth Location Information Elements.....	212
–	<i>BT-MeasurementInformation</i>	212
6.5.7.3	Bluetooth Location Information Request.....	213
–	<i>BT-RequestLocationInformation</i>	213
6.5.7.4	Bluetooth Capability Information.....	213
–	<i>BT-ProvideCapabilities</i>	213
6.5.7.5	Bluetooth Capability Information Request.....	214
–	<i>BT-RequestCapabilities</i>	214
6.5.7.6	BT Error Elements.....	214
–	<i>BT-Error</i>	214
–	<i>BT-LocationServerErrorCauses</i>	214
–	<i>BT-TargetDeviceErrorCauses</i>	215
–	<i>End of LPP-PDU-Definitions</i>	215
7	Broadcast of assistance data.....	215
7.1	General.....	215
7.2	Mapping of <i>posSibType</i> to assistance data element.....	215
7.3	Procedures related to broadcast information elements.....	216
7.4	Broadcast information elements.....	218
7.4.1	Basic production.....	218
7.4.2	Element definitions.....	218
–	<i>AssistanceDataSIBelement</i>	218
–	<i>OTDOA-UE-Assisted</i>	219
7.5	Broadcast ciphering (informative).....	219
Annex A (informative):	Change History.....	222
History.....		225

Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/41a7968d-8fa1-4b7f-af03-a7e635c7add06/etsi-ts-136-355-v15.5.0-2019-10>

1 Scope

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

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 36.305: "Stage 2 functional specification of User Equipment (UE) positioning in E-UTRAN".
- [3] 3GPP TS 23.271: "Functional stage 2 description of Location Services (LCS)".
- [4] IS-GPS-200, Revision D, Navstar GPS Space Segment/Navigation User Interfaces, March 7th, 2006.
- [5] IS-GPS-705, Navstar GPS Space Segment/User Segment L5 Interfaces, September 22, 2005.
- [6] IS-GPS-800, Navstar GPS Space Segment/User Segment L1C Interfaces, September 4, 2008.
- [7] IS-QZSS, Quasi Zenith Satellite System Navigation Service Interface Specifications for QZSS, Ver.1.1, July 31, 2009.
- [8] Galileo OS Signal in Space ICD (OS SIS ICD), Issue 1.2, February 2014, European Union.
- [9] Global Navigation Satellite System GLONASS Interface Control Document, Version 5.1, 2008.
- [10] Specification for the Wide Area Augmentation System (WAAS), US Department of Transportation, Federal Aviation Administration, DTFA01-96-C-00025, 2001.
- [11] RTCM-SC104, RTCM Recommended Standards for Differential GNSS Service (v.2.3), August 20, 2001.
- [12] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Radio Resource Control (RRC); Protocol specification".
- [13] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification".
- [14] 3GPP TS 44.031: "Location Services (LCS); Mobile Station (MS) - Serving Mobile Location Centre (SMLC) Radio Resource LCS Protocol (RRLP)".
- [15] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".
- [16] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".
- [17] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer – Measurements".
- [18] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".

- [19] 3GPP TS 23.003: "Numbering, addressing and identification".
- [20] OMA-TS-LPPE-V1_0, LPP Extensions Specification, Open Mobile Alliance.
- [21] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception".
- [22] ITU-T Recommendation X.691 (07/2002) "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)" (Same as the ISO/IEC International Standard 8825-2).
- [23] BDS-SIS-ICD-2.0: "BeiDou Navigation Satellite System Signal In Space Interface Control Document Open Service Signal (Version 2.0)", December 2013.
- [24] ATIS-0500027: "Recommendations for Establishing Wide Scale Indoor Location Performance", May 2015.
- [25] Bluetooth Special Interest Group: "Bluetooth Core Specification v4.2", December 2014.
- [26] IEEE 802.11, Part 11: "Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".
- [27] IETF RFC 6225, "Dynamic Host Configuration Protocol Options for Coordinate-Based Location Configuration Information", July 2011.
- [28] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures".
- [29] "Earth Gravitational Model 96 (EGM96)", National Geospatial-Intelligence Agency, NASA.
- [30] RTCM Standard 10403.3: "Differential GNSS (Global Navigation Satellite Systems) Services" – Version 3, October 7, 2016.
- [31] IGS ANTEX: "The Antenna Exchanged Format" – version 1.4, September 15, 2010.
- [32] Federal Information Processing Standards Publication 197, "Specification for the ADVANCED ENCRYPTION STANDARD (AES)", November 26, 2001.
- [33] NIST Special Publication 800-38A, "Recommendation for Block Cipher Modes of Operation Methods and Techniques", 2001.
- [34] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".
- [35] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
- [36] 3GPP TS 38.215: "NR; Physical layer measurements".
- [37] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

3 Definitions and Abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1], TS 36.305 [2] and TS 23.271 [3] apply. Other definitions are provided below.

Anchor carrier: In NB-IoT, a carrier where the UE assumes that NPSS/NSSS/NPBCH/SIB-NB for FDD or NPSS/NSSS/NPBCH for TDD are transmitted.

Location Server: a physical or logical entity (e.g., E-SMLC or SUPL SLP) that manages positioning for a target device by obtaining measurements and other location information from one or more positioning units and providing assistance