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LTE Positioning Protocol (LPP)
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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>EllipsoidPointWithUncertainty-Ellipse</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	<i>OTDOA Assistance Data Request</i>	72
—	<i>OTDOA-RequestAssistanceData</i>	72
6.5.1.4	<i>OTDOA Location Information</i>	72
—	<i>OTDOA-ProvideLocationInformation</i>	72
6.5.1.5	<i>OTDOA Location Information Elements</i>	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	<i>OTDOA Location Information Request</i>	79
—	<i>OTDOA-RequestLocationInformation</i>	79
6.5.1.7	<i>OTDOA Capability Information</i>	80
—	<i>OTDOA-ProvideCapabilities</i>	80
6.5.1.8	<i>OTDOA Capability Information Request</i>	82
—	<i>OTDOA-RequestCapabilities</i>	82
6.5.1.9	<i>OTDOA Error Elements</i>	82
—	<i>OTDOA-Error</i>	82
—	<i>OTDOA-LocationServerErrorCauses</i>	82
—	<i>OTDOA-TargetDeviceErrorCauses</i>	83
6.5.2	<i>A-GNSS Positioning</i>	83
6.5.2.1	<i>GNSS Assistance Data</i>	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	<i>GNSS Assistance Data Elements</i>	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	<i>GNSS Location Information Request</i>	165
-	<i>A-GNSS-RequestLocationInformation</i>	165
6.5.2.8	<i>GNSS Location Information Request Elements</i>	165
-	<i>GNSS-PositioningInstructions</i>	165
6.5.2.9	<i>GNSS Capability Information</i>	166
-	<i>A-GNSS-ProvideCapabilities</i>	166
6.5.2.10	<i>GNSS Capability Information Elements</i>	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	<i>GNSS Capability Information Request</i>	177
-	<i>A-GNSS-RequestCapabilities</i>	177
6.5.2.12	<i>GNSS Error Elements</i>	177
-	<i>A-GNSS-Error</i>	177
-	<i>GNSS-LocationServerErrorCauses</i>	178
-	<i>GNSS-TargetDeviceErrorCauses</i>	178
6.5.2.13	<i>Common GNSS Information Elements</i>	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	<i>Enhanced Cell ID Positioning</i>	187
6.5.3.1	<i>E-CID Location Information</i>	187
-	<i>ECID-ProvideLocationInformation</i>	187
6.5.3.2	<i>E-CID Location Information Elements</i>	188
-	<i>ECID-SignalMeasurementInformation</i>	188
6.5.3.3	<i>E-CID Location Information Request</i>	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	

https://standards.etsi.org/42ceca80-9eae3920/etsi-ts-136-355-v15.4.0-2019-07
Full standard/standard/catalog/standard/sist487c4038-838b

Foreword

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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 Exchange 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