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Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Radio Access Network;

Evolved Universal Terrestrial Radio Access (E-UTRA);

LTE Positioning Protocol (LPP)

(Release 15)

 

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# Foreword

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

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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.

# 1 Scope

See TS 37.355 [38].

# 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]-[37] Void

# [38] 3GPP TS 37.355: "LTE Positioning Protocol (LPP)".3 to 7 Void











































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































# 8 LPP Procedures, IE Abstract Syntax Definition etc.

See TS 37.355 [38].

Annex A (informative):  
Change History

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2009-10 | RAN2 #67bis | R2-096252 |  |  |  | RAN2 agreed TS 36.355 v0.1.0 | 0.1.0 |
| 2009-11 | RAN2 #68 | R2-097492 |  |  |  | RAN2 agreed TS 36.355 v2.0.0 | 2.0.0 |
| 2009-12 | RP-46 | RP-091208 |  |  |  | RAN #46 approval of TS 36.355 | 9.0.0 |
| 2010-03 | RP-47 | RP-100304 | 0001 | - |  | Clarification on Position location | 9.1.0 |
|  | RP-47 | RP-100304 | 0002 | - |  | Clarification on UE Rx-Tx time difference supporting capability | 9.1.0 |
|  | RP-47 | RP-100304 | 0003 | 2 |  | Completion of LPP common material | 9.1.0 |
|  | RP-47 | RP-100304 | 0004 | 5 |  | Completion of OTDOA in LPP | 9.1.0 |
|  | RP-47 | RP-100304 | 0006 | - |  | Provision of Frame Drift Information in Network Time | 9.1.0 |
|  | RP-47 | RP-100304 | 0007 | - |  | Clarification of measurement reference point | 9.1.0 |
|  | RP-47 | RP-100304 | 0010 | - |  | GNSS-DifferentialCorrectionsSupport | 9.1.0 |
|  | RP-47 | RP-100304 | 0011 | - |  | BSAlign Indication in GNSS Reference Time | 9.1.0 |
|  | RP-47 | RP-100304 | 0012 | 1 |  | Changes to reflect LPP ASN.1 review | 9.1.0 |
|  | RP-47 | RP-100304 | 0013 | 1 |  | Introduction of LPP reliability sublayer | 9.1.0 |
|  | RP-47 | RP-100304 | 0015 | - |  | LPP error procedures and conditions | 9.1.0 |
|  | RP-47 | RP-100304 | 0016 | - |  | Triggered Location Information Transfer due to Cell Change | 9.1.0 |
| 2010-06 | RP-48 | RP-100558 | 0018 | 2 |  | Addition of need codes to optional LPP information elements | 9.2.0 |
|  | RP-48 | RP-100558 | 0019 | 1 |  | Miscellaneous corrections to LPP stage 3 | 9.2.0 |
|  | RP-48 | RP-100558 | 0020 | 1 |  | Small corrections to LPP specification | 9.2.0 |
|  | RP-48 | RP-100558 | 0021 | - |  | Clarifications of OTDOA parameters | 9.2.0 |
|  | RP-48 | RP-100558 | 0022 | 1 |  | Signalling support for PRS muting in OTDOA | 9.2.0 |
|  | - | - | - | - |  | Two times capital R replaced by lower case r in "MeasuredResultsElement" (undoing not intended change) | 9.2.1 |
| 2010-09 | RP-49 | RP-100852 | 0024 | - |  | Addition of an EPDU to an LPP Error and LPP Abort | 9.3.0 |
|  | RP-49 | RP-100852 | 0026 | - |  | Division of LPP into Separate ASN.1 Modules with a Global Identifier | 9.3.0 |
|  | RP-49 | RP-100852 | 0028 | - |  | Proposed Corrections to LPP Reliable Transport | 9.3.0 |
|  | RP-49 | RP-100852 | 0029 | - |  | Proposed Corrections to the PeriodicalReportingCriteria in LPP | 9.3.0 |
|  | RP-49 | RP-100852 | 0030 | 1 |  | Various corrections and clarifications to LPP | 9.3.0 |
|  | RP-49 | RP-100852 | 0031 | - |  | Support of functional components for LPP reliable transport | 9.3.0 |
|  | RP-49 | RP-100852 | 0032 | 1 |  | Introduction of EPDU ID requested by OMA LOC | 9.3.0 |
|  | RP-49 | RP-100852 | 0035 | 1 |  | Several corrections in LPP | 9.3.0 |
|  | RP-49 | RP-100852 | 0036 | - |  | Clarification to Assistance Data Transfer Procedure | 9.3.0 |
| 2010-12 | RP-50 | RP-101207 | 0037 | - |  | Correction of reliable transport terminology in description of LPP-Message | 9.4.0 |
|  | RP-50 | RP-101207 | 0038 | - |  | One cell with known SFN in OTDOA assistance data | 9.4.0 |
|  | RP-50 | RP-101207 | 0039 | 1 |  | UE frequency capability for LPP | 9.4.0 |
|  | RP-50 | RP-101207 | 0041 | - |  | Correction to LPP reliable transport | 9.4.0 |
|  | RP-50 | RP-101207 | 0042 | - |  | Correction to LPP Error procedure | 9.4.0 |
|  | RP-50 | RP-101207 | 0043 | - |  | Addition of missing reference to LPPe | 9.4.0 |
|  | RP-50 | RP-101207 | 0044 | 2 |  | Correction to the ODTOA assistance data | 9.4.0 |
|  | RP-50 | RP-101226 | 0040 | - |  | Update of 'serving cell' terminology in 36.355 | 10.0.0 |
| 2011-03 | RP-51 | RP-110269 | 0046 | - |  | Editorial corrections to 36.355 | 10.1.0 |
|  | RP-51 | RP-110269 | 0048 | - |  | Removal of FFS for retransmission timer in LPP | 10.1.0 |
|  | RP-51 | RP-110269 | 0050 | - |  | Correction to code phase encoding in GNSS acquisition assistance | 10.1.0 |
|  | RP-51 | RP-110269 | 0052 | 1 |  | Clarification on SFN provided with OTDOA measurement | 10.1.0 |
|  | RP-51 | RP-110269 | 0053 | 1 |  | Introduction of OTDOA inter-freq RSTD measurement indication procedure | 10.1.0 |
|  | RP-51 | RP-110269 | 0057 | - |  | Small corrections in 36.355 | 10.1.0 |
|  | RP-51 | RP-110269 | 0058 | 3 |  | Further corrections to the OTDOA assistance data | 10.1.0 |
| 2011-06 | RP-52 | RP-110830 | 0060 | - |  | Clarifications to description of OTDOA positioning fields | 10.2.0 |
| 2011-09 | RP-53 | RP-111279 | 0062 | 1 |  | Various corrections to LPP | 10.3.0 |
|  | RP-53 | RP-111279 | 0064 | - |  | Mandatory support of PRS for OTDOA measurements | 10.3.0 |
| 2011-12 | RP-54 | RP-111709 | 0066 | - |  | Clarification of packed encoding rules of LPP | 10.4.0 |
|  | RP-54 | RP-111709 | 0068 | - |  | Clarification of first bit in BIT STRING definitions | 10.4.0 |
| 2012-06 | RP-56 | RP-120808 | 0071 | - |  | Usage of additionalInformation IE | 10.5.0 |
| 2012-09 | RP-57 | RP-121424 | 0074 | 2 |  | Corrections to GNSS Acquisition Assistance Data | 10.6.0 |
|  | RP-57 | - | - | - |  | Upgrade to the Release 11 - no technical change | 11.0.0 |

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| 2012-12 | RP-58 | RP-121931 | 0077 | - |  | Correcting the referencing of QoS parameters | 11.1.0 |
|  | RP-58 | RP-121931 | 0080 | - |  | Correction to missing field description in GNSS-AcquisitionAssistance IE | 11.1.0 |
| 2013-03 | RP-59 | RP-130237 | 0083 | 1 |  | Extending E-UTRA Frequency Band and EARFCN value range | 11.2.0 |
|  | RP-59 | RP-130230 | 0086 | - |  | Correction to PRS Muting Configuration | 11.2.0 |
| 2013-06 | RP-60 | RP-130803 | 0088 | - |  | Correction for ASN.1 errors from CR0083r1 | 11.3.0 |
|  | RP-60 | RP-130803 | 0091 | - |  | Correction to integer code phase field description in GNSS Acquisition Assistance | 11.3.0 |
|  | RP-60 | RP-130803 | 0093 | - |  | Correction to serving cell terminology | 11.3.0 |
|  | RP-60 | RP-130803 | 0094 | - |  | Encoding of LPP IEs | 11.3.0 |
| 2013-09 | RP-61 | RP-131314 | 0098 | - |  | Correction on svReqList | 11.4.0 |
| 2013-12 | RP-62 | RP-131984 | 0103 | - |  | Correction to missing capability indication for inter-frequency RSTD measurements | 11.5.0 |
|  | RP-62 | RP-131984 | 0107 | 1 |  | Correction to Galileo assistance data elements | 11.5.0 |
|  | RP-62 | RP-132000 | 0104 | 1 |  | Stage 3 CR of TS 36.355 for introducing BDS in LTE | 12.0.0 |
|  | RP-62 | RP-131984 | 0108 | - |  | Correction to Galileo assistance data elements | 12.0.0 |
| 2014-03 | RP-63 | RP-140342 | 0112 | 1 |  | Clarification to gnss-DayNumber | 12.1.0 |
| 2014-06 | RP-64 | RP-140871 | 0119 | - |  | Signaling of OTDOA Neighbour Cell Information and Measurements | 12.2.0 |
| 2014-12 | RP-66 | RP-142114 | 0122 | - |  | Correction to Galileo Assistance Data | 12.3.0 |
|  | RP-66 | RP-142114 | 0123 | - |  | Addition of an Early Position Fix to LPP | 12.3.0 |
|  | RP-66 | RP-142120 | 0124 | - |  | BDS update to version 2.0 | 12.3.0 |
| 2015-03 | RP-67 | RP-150369 | 0126 | 2 |  | Correction of GLONASS system time | 12.4.0 |
|  | RP-67 | RP-150376 | 0125 | 1 |  | LPP clean-up | 12.4.0 |
| 2015-12 | RP-70 | RP-152055 | 0134 | 1 |  | Correction to the definition of Need codes | 12.5.0 |
| 2015-12 | RP-70 | RP-152068 | 0137 | 3 |  | RAT-Independent positioning enhancements | 13.0.0 |
| 2016-03 | RP-71 | RP-160463 | 0138 | 1 |  | Correction to GLONASS IOD value range | 13.1.0 |
|  | RP-71 | RP-160470 | 0140 | 1 |  | r13 Information Element correction | 13.1.0 |
|  | RP-71 | RP-160470 | 0141 | - |  | WLAN AP Identifier correction | 13.1.0 |
|  | RP-71 | RP-160470 | 0142 | 1 |  | LPP clean-up | 13.1.0 |
| 2016-09 | RP-73 | RP-161750 | 0143 | 4 |  | Correction of ECID positioning for TDD | 13.2.0 |
| 2016-12 | RP-74 | RP-162317 | 0160 | 1 |  | Clarification of WLAN RSSI value range | 13.3.0 |
| 2016-12 | RP-74 | RP-162326 | 0155 | 1 |  | CR for 36.355 Further Indoor positioning enhancements | 14.0.0 |
|  | RP-74 | RP-162327 | 0157 | - |  | Barometric Pressure Uncertainty IEs | 14.0.0 |
|  | RP-74 | RP-162326 | 0161 | 1 |  | Introduction of Further Indoor Positioning Enhancements | 14.0.0 |
| 2017-03 | RP-75 | RP-170636 | 0162 | 3 | B | Introduction of positioning for further enhanced MTC | 14.1.0 |
|  | RP-75 | RP-170642 | 0163 | - | C | Addition of periodical and triggered reporting capabilitiy signalling | 14.1.0 |
|  | RP-75 | RP-170642 | 0165 | 2 | F | Further Indoor positioning enhancements corrections | 14.1.0 |
|  | RP-75 | RP-170637 | 0166 | - | B | Introduction of positioning support for NB-IoT | 14.1.0 |
| 2017-06 | RP-76 | RP-171224 | 0169 | 3 | F | Compact Signal Measurement Information for OTDOA | 14.2.0 |
|  | RP-76 | RP-171223 | 0171 | 1 | F | Correction to PRS Subframe Offset | 14.2.0 |
|  | RP-76 | RP-171223 | 0173 | 1 | F | Correction to SFN time stamp in OTDOA Signal Measurement Information | 14.2.0 |
|  | RP-76 | RP-171223 | 0174 | 1 | F | Correction to OTDOA capabilities | 14.2.0 |
|  | RP-76 | RP-171224 | 0175 | 1 | F | Correction to NPRS | 14.2.0 |
|  | RP-76 | RP-171225 | 0176 | 2 | F | LPP clean-up | 14.2.0 |
|  | RP-76 | RP-171224 | 0177 | - | F | Corrections to number of NPRS carriers and ECID measurements for NB-IoT | 14.2.0 |
|  | RP-76 | RP-171224 | 0178 | 1 | F | Removal of FFS for retransmission timer in LPP | 14.2.0 |
|  | RP-76 | RP-171224 | 0181 | 1 | F | Signalling optimisation for NB-IoT Enhancements | 14.2.0 |
| 2017-09 | RP-77 | RP-171913 | 0182 | 2 | F | Clarification on definition of PRS Occasion Group | 14.3.0 |
|  | RP-77 | RP-171914 | 0183 | 1 | F | Additional OTDOA Capabilities | 14.3.0 |
|  | RP-77 | RP-171911 | 0184 | - | F | Clarification to *GNSS-TimeModelList* | 14.3.0 |
|  | RP-77 | RP-171913 | 0185 | 1 | F | Minor corrections on TS 36.355 for Rel-14 MTC | 14.3.0 |
| 2017-12 | RP-78 | RP-172616 | 0187 | 2 | F | Correction on PRS hopping configuration | 14.4.0 |
| 2018-03 | RP-79 | RP-180446 | 0189 | 1 | F | Segmentation of LPP Messages | 14.5.0 |
| 2018-04 | RP-79 |  |  |  |  | New version to fix ASN.1 formatting | 14.5.1 |
| 2018-06 | RP-80 | RP-181235 | 0202 | 2 | F | Clarification for NRSRQ reporting with E-CID | 14.6.0 |
| 2018-06 | RP-80 | RP-181219 | 0204 | 2 | B | Introduction of IMU support for OTDOA | 15.0.0 |
|  | RP-80 | RP-181219 | 0205 | 1 | B | Addition of RTK and PPP support | 15.0.0 |
|  | RP-80 | RP-181219 | 0207 | 1 | B | Addition of broadcast of positioning assistance data | 15.0.0 |
|  | RP-80 | RP-181215 | 0209 | 1 | B | Addition of NR Support | 15.0.0 |
|  | RP-80 | RP-181252 | 0210 | 1 | B | Addition of NB-IoT TDD support | 15.0.0 |
| 2018-09 | RP-81 | RP-181963 | 0215 | 1 | A | Support for NPRS enhancements | 15.1.0 |
|  | RP-81 | RP-181945 | 0218 | 1 | F | Corrections to TDD in 36.355 | 15.1.0 |
|  | RP-81 | RP-181961 | 0221 | 3 | A | Correction to RSRQ range in 36.355 | 15.1.0 |
|  | RP-81 | RP-181942 | 0222 | 1 | F | OTDOA Assistance Data Request for NR | 15.1.0 |
|  | RP-81 | RP-181960 | 0223 | - | F | LPP clean-up | 15.1.0 |
|  | RP-81 | RP-181952 | 0224 | 1 | F | GAD shapes for high accuracy positioning | 15.1.0 |
|  | RP-81 | RP-181952 | 0226 | 1 | B | Positioning SIB value tag and expiration time | 15.1.0 |
| 2018-12 | RP-82 | RP-182672 | 0213 | 3 | F | Addition of TDD UL/DL configuration to OTDOA assistance data | 15.2.0 |
|  | RP-82 | RP-182681 | 0228 | 2 | F | Introduction of TDD UL/DL configuration for NB-IoT in 36.355 | 15.2.0 |
|  | RP-82 | RP-182659 | 0229 | 3 | F | SFN offset for OTDOA | 15.2.0 |
|  | RP-82 | RP-182674 | 0230 | 1 | F | Alignment of IE/field names between LPP and RRC specifications | 15.2.0 |
|  | RP-82 | RP-182672 | 0232 | 1 | F | Sensor Assistance Data Elements Correction | 15.2.0 |
| 2019-03 | RP-83 | RP-190550 | 0234 | 3 | F | Stage 2 and stage 3 sensor methods description alignment | 15.3.0 |
| 2019-06 | RP-84 | RP-191376 | 0239 | 1 | F | Minor corrections on NR Support | 15.4.0 |
|  | RP-84 | RP-191384 | 0240 | 4 | F | Periodic assistance data transfer with cell ID change procedure | 15.4.0 |
| 2019-09 | RP-85 | RP-192196 | 0243 | 1 | F | Distinguishing Location Source when sensor method is used | 15.5.0 |
| 2019-12 | RP-86 | RP-192449 | 0249 | - | F | Turning TS 36.355 into a pointer to TS 37.355 (for LTE & NR) | 15.6.0 |