

ETSI TS 123 273 V18.11.0 (2026-01)



TECHNICAL SPECIFICATION

5G;
5G System (5GS) Location Services (LCS);
Stage 2
(3GPP TS 23.273 version 18.11.0 Release 18)

[ETSI TS 123 273 V18.11.0 \(2026-01\)](https://standards.iteh.ai/catalog/standards/etsi/48ad66b4-3742-42ed-acc2-8cbacf16ccdd/etsi-ts-123-273-v18-11-0-2026-01)

<https://standards.iteh.ai/catalog/standards/etsi/48ad66b4-3742-42ed-acc2-8cbacf16ccdd/etsi-ts-123-273-v18-11-0-2026-01>



Reference

RTS/TSGS-0223273v18

Keywords

5G

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 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
[ETSI Search & Browse Standards](#) application.

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 on [ETSI deliver](#) repository.

Users should be aware that the present document may be revised or have its status changed, this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our [Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

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 2026.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are 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 IPR online database](#).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, 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.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo 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.

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. (2026-01)

The cross reference between 3GPP and ETSI identities can be found at [3GPP to ETSI numbering cross-referencing](#).

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.....	8
1 Scope	10
2 References	10
3 Definitions and Abbreviations.....	12
3.1 Definitions	12
3.2 Abbreviations	13
4 Architecture Model and Concepts.....	14
4.1 General Concepts	14
4.1a Types of Location Request.....	14
4.1a.1 Network Induced Location Request (NI-LR)	14
4.1a.2 Mobile Terminated Location Request (MT-LR).....	14
4.1a.3 Mobile Originated Location Request (MO-LR)	15
4.1a.4 Immediate Location Request	15
4.1a.5 Deferred Location Request	15
4.1a.5.1 Types of event.....	15
4.1b LCS Quality of Service	16
4.1c Scheduled Location Time.....	17
4.2 Architectural Reference Model	17
4.2.1 Non-roaming reference architecture	17
4.2.2 Roaming reference architecture	19
4.2.3 Reference architecture with sidelink positioning.....	20
4.2a Interconnection between 5GC and EPC	20
4.2a.1 General.....	20
4.2a.2 Non-roaming architecture	20
4.2a.3 Roaming architecture.....	21
4.2b Positioning methods	22
4.3 Functional description of LCS per network function	22
4.3.1 Access Network	22
4.3.2 LCS Clients, Application Functions and Network Functions	23
4.3.3 Gateway Mobile Location Centre, GMLC	23
4.3.4 Location Retrieval Function, LRF	24
4.3.5 UE.....	24
4.3.6 UDM.....	25
4.3.7 Access and Mobility Management Function, AMF.....	25
4.3.8 Location Management Function, LMF	26
4.3.9 Network Exposure Function, NEF.....	28
4.3.10 Unified Data Repository, UDR.....	29
4.3.11 Positioning Reference Unit, PRU	29
4.3.12 Network Repository Function, NRF	29
4.4 Reference Point to Support Location Services	29
4.4.1 Le Reference Point.....	29
4.4.2 NL3 Reference Point	29
4.4.3 N1 Reference Point.....	30
4.4.4 N2 Reference Point.....	30
4.4.5 Void	30
4.4.6 NL5 Reference Point	30
4.4.7 NL2 Reference Point	30
4.4.8 NL6 Reference Point	30
4.4.9 N51 Reference Point.....	30
4.4.10 NL1 Reference Point	30
4.4.11 N52 Reference Point.....	30

4.4.12	NL7 Reference Point	31
4.4.13	NL8 Reference Point	31
4.4.14	NL9 Reference Point	31
4.4.15	NL10 Reference Point	31
4.4.16	NL11 Reference Point	31
4.5	Service Based Interfaces to Support Location Services	31
5	High Level Features	31
5.1	LMF Discovery and Selection	31
5.1a	GMLC Discovery and Selection	33
5.2	3GPP access specific aspects	33
5.3	Non-3GPP Access Specific Aspects	33
5.3.1	Location Information for Non-3GPP Access	33
5.3.2	Access Type Selection for LCS Service	34
5.4	UE LCS privacy	35
5.4.1	General	35
5.4.2	Content of UE LCS Privacy Profile	35
5.4.2.1	General	35
5.4.2.2	Privacy Classes	36
5.4.2.2.1	Universal Class	36
5.4.2.2.2	Call/Session related Class	36
5.4.2.2.3	Call/Session unrelated Class	36
5.4.2.2.4	PLMN Operator Class	36
5.4.2.3	Location Privacy Indication (LPI)	37
5.4.3	Provision of UE LCS privacy profile	37
5.4.4	Privacy Override Indicator (POI)	37
5.4.5	LCS service authorization for an Immediate UE Location	37
5.4.6	LCS service authorization for a Deferred UE Location	38
5.5	Location service exposure	39
5.6	LCS Charging	41
5.7	Support of Concurrent Location Requests	41
5.7.1	General	41
5.7.2	Combining location requests by an H-GMLC or NEF	42
5.7.3	Combining location requests by a V-GMLC	42
5.7.4	Combining location requests by an AMF	42
5.7.5	Combining location requests by an LMF	42
5.7.6	Combining location requests by a UE	42
5.8	Interworking with the IMS	43
5.9	Location Service involving Mobile Base Station Relay	43
5.9.1	General	43
5.9.2	Obtaining location information for the MBSR	43
5.9.3	Privacy check for MBSR	43
5.10	Support of Positioning over user plane connection between UE and LMF for non-regulatory service	44
5.11	Collection of GNSS assistance data	44
5.12	UE Unaware Positioning	44
5.13	Support of location service in PNI-NPN with signalling optimisation	45
5.14	Event Report Allowed Area	46
5.15	Support of Low Power and High Accuracy Positioning	46
5.16	Location services assisted by NWDAF	46
5.16A	Network data analytics assisted by LCS	46
5.16B	LCS Continuity During UE Mobility	47
5.16B.1	Mobility Between 5GS and EPS	47
5.17	Support of Ranging and Sidelink Positioning	47
6	Location Service Procedures	47
6.1	5GC-MT-LR Procedure	47
6.1.1	5GC-MT-LR procedure for the regulatory location service	47
6.1.2	5GC-MT-LR Procedure for the commercial location service	49
6.1.3	5GC-MT-LR multiple location procedure for the regulatory location service	54
6.1.4	5GC-MT-LR procedure involving Mobile Base Station Relay	56
6.2	5GC-MO-LR Procedure	58
6.3	Deferred 5GC-MT-LR Procedure for Periodic, Triggered and UE Available Location Events	61

6.3.1	Initiation and Reporting of Location Events.....	61
6.3.2	Cancellation of Reporting of Location Events by a UE.....	68
6.3.3	Cancellation of Reporting of Location Events by an AF, an NF or External LCS Client or GMLC.....	69
6.4	LMF Change Procedure	70
6.5	Unified Location Service Exposure Procedure.....	72
6.5.1	Unified Location Service Exposure Procedure without routing by a UDM	72
6.5.2	Unified Location Service Exposure Procedure with routing via a UDM.....	75
6.6	NG-RAN Location Service Exposure Procedure	76
6.7	Low Power Periodic and Triggered 5GC-MT-LR Procedures	76
6.7.1	Event Reporting with no change of LMF	77
6.7.2	Event Reporting with change of LMF	79
6.7.3	Event Reporting in RRC INACTIVE state for DL Positioning, RAT Independent Positioning or No Positioning	79
6.7.4	Event Reporting in RRC INACTIVE state for UL Positioning	81
6.7.5	Event Reporting in RRC INACTIVE state for UL+DL Positioning	84
6.8	Bulk Operation of LCS Service Request Targeting to Multiple UEs.....	87
6.9	Procedures to Support Non-3GPP Access.....	89
6.9.1	Common Positioning Procedures when a UE is served by only one PLMN	89
6.9.2	MT-LR Procedures when a UE is served by Different PLMNs for 3GPP Access and Non-3GPP Access.....	91
6.9.3	MO-LR Procedures when UE is served by the Different PLMNs via 3GPP Access and Non-3GPP Access.....	94
6.9.4	NI-LR Procedures when a UE is served by Different PLMNs for 3GPP access and non-3GPP access.....	94
6.10	Procedures dedicated to Support Regulatory services.....	94
6.10.1	5GC-NI-LR Procedure.....	94
6.10.2	5GC-MT-LR Procedure without UDM Query.....	96
6.10.3	Location continuity for Handover of an Emergency session from NG-RAN	97
6.10.4	5GC-MT-LR multiple location procedure without UDM Query.....	99
6.11	Common Sub-Procedures.....	100
6.11.0	General.....	100
6.11.1	UE Assisted and UE Based Positioning Procedure.....	100
6.11.2	Network Assisted Positioning Procedure.....	101
6.11.3	Obtaining Non-UE Associated Network Assistance Data	102
6.11.4	Positioning Procedure over User Plane.....	103
6.12	UE Location Privacy Setting Procedure	104
6.12.1	UE Location Privacy Setting Procedure Initiated by UE.....	104
6.12.2	UE Location Privacy Setting Procedure Initiated by AF.....	104
6.13	Procedures with interaction between 5GC and EPC	105
6.13.1	MT-LR Procedure.....	105
6.13.2	MO-LR Transfer to a Third Party Procedure.....	106
6.14	Procedures for Broadcast of Assistance Data.....	107
6.14.1	Broadcast of Assistance Data by an LMF.....	107
6.14.2	Delivery of Ciphering Keys to UEs for Broadcast Assistance Data	108
6.15	Procedures for GNSS assistance data Collection	110
6.15.1	GNSS assistance data collection from untrusted AF via NEF	110
6.15.2	GNSS assistance data collection from trusted AF	111
6.16	Periodic and Triggered 5GC-MT-LR Procedure with User Plane.....	112
6.16.1	Reporting of Location Events to an LCS Client or AF via user plane	112
6.16.2	Cancellation of Reporting of Location Events with a User Plane Connection	114
6.17	Procedures applicable to a PRU	114
6.17.1	PRU Association Procedure.....	114
6.17.2	LMF Initiated PRU Disassociation Procedure.....	116
6.17.3	PRU Initiated PRU Disassociation Procedure	118
6.17.4	Positioning of a target UE.....	119
6.18	Procedures of User Plane Connection between UE and LMF	121
6.18.0	General.....	121
6.18.1	LMF initiated User Plane Connection	121
6.18.2	UE initiated User Plane Connection	123
6.18.3	Modification of User Plane Connection between UE and LMF	125
6.19	Location Service Continuity between EPS and 5GS	126
6.19.0	General.....	126
6.19.1	Location Service Continuity for Immediate Location Request.....	127

6.19.1.1	Location Service Continuity from 5GS to EPS with N26 Interface for Immediate Location Request.....	127
6.19.1.2	Location Service Continuity from EPS to 5GS with N26 Interface for Immediate Location Request.....	128
6.19.1.3	Location Service Continuity from 5GS to EPS without N26 Interface for Immediate Location Request.....	129
6.19.1.4	Location Service Continuity from EPS to 5GS without N26 Interface for Immediate Location Request.....	130
6.19.2	Location Service Continuity between EPS and 5GS (bi-direction) for deferred MT-LR.....	130
6.19.2.1	Location Service Continuity from 5GS to EPS.....	131
6.19.2.2	Location Service Continuity from EPS to 5GS.....	132
6.20	Ranging/Sidelink Positioning procedures.....	133
6.20.1	Procedures of SL-MO-LR involving LMF.....	133
6.20.2	5GC-MO-LR Procedure using Ranging/SL positioning.....	137
6.20.3	Procedures of SL-MT-LR involving LMF.....	138
6.20.4	Procedures of SL-MT-LR for periodic, triggered Location Events.....	141
6.20.5	5GC-MT-LR Procedure using Ranging/SL positioning.....	144
6.21	Procedure for NWDAF assistance to location services.....	145
6.21.1	General.....	145
6.21.1	Location Accuracy Analytics Retrieval by LMF.....	146
6.21.2	UE Mobility Analytics Retrieval by AMF.....	146
7	Information storage.....	146
7.1	UDM.....	146
7.2	GMLC.....	149
7.2.1	Information for an LCS Client.....	149
8	Network Function Services.....	151
8.1	AMF Services.....	151
8.2	UDM Services.....	151
8.3	LMF Services.....	151
8.3.1	General.....	151
8.3.2	Nlmf_Location service.....	151
8.3.2.1	General.....	151
8.3.2.2	Nlmf_Location_DetermineLocation service operation.....	152
8.3.2.3	Nlmf_Location_EventNotify service operation.....	152
8.3.2.4	Nlmf_Location_CancelLocation service operation.....	153
8.3.2.5	Nlmf_Location_LocationContextTransfer service operation.....	153
8.3.2.6	Nlmf_Location_MeasurementData service operation.....	153
8.3.2.7	Nlmf_Location_UPConfig service operation.....	154
8.3.2.8	Nlmf_Location_UPSubscribe service operation.....	154
8.3.2.9	Nlmf_Location_UPNotify service operation.....	154
8.3.2.10	Nlmf_Location_UPUnSubscribe service operation.....	154
8.3.3	Nlmf_Broadcast service.....	155
8.3.3.1	General.....	155
8.3.3.2	Nlmf_Broadcast_CipheringKeyData service operation.....	155
8.4	GMLC Services.....	155
8.4.1	General.....	155
8.4.2	Ngmlc_Location service.....	156
8.4.2.1	General.....	156
8.4.2.2	Ngmlc_Location_ProvideLocation service operation.....	156
8.4.2.3	Ngmlc_Location_LocationUpdate service operation.....	157
8.4.2.4	Ngmlc_Location_EventNotify service operation.....	157
8.4.2.5	Ngmlc_Location_CancelLocation service operation.....	157
8.4.2.6	Ngmlc_Location_LocationUpdateNotify service operation.....	158
8.4.2.7	Ngmlc_Location_PrivacyCheck_IDMapping service operation.....	158
8.4.2.8	Void.....	158
8.5	NEF Services.....	158
8.6	UDR Services.....	158
Annex A (informative): Differences with TS 23.271 [4].....	159	
A.0	General.....	159