**3GPP TSG-SA5 Meeting #141e *S5-221346rev1***

**17 - 26 January 2022, E-meeting**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **28.552** | **CR** | **0354** | **rev** | **1** | **Current version:** | **17.5.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Add location determination and notification related measurements for LMF |
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| ***Source to WG:*** | Intel |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | ePM\_KPI\_5G |  | ***Date:*** | 2022-01-04 |
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| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)**Rel-17 (Release 17)* |
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| ***Reason for change:*** | The UE location is required for various purposes, e.g., location-based applications, lawful interception, emergency calls, as well as the positioning services, etc.The LMF manages the overall co-ordination and scheduling of resources required for the location of a UE for 5G. It also calculates or verifies a final location and any velocity estimate and may estimate the achieved accuracy. The LMF determine the result of the positioning in geographical co-ordinates.The LMF provides location management related NF services (such as location determination, location notification, and location context transfer) in order for the consumer to get the location of the UEs. Therefore, the performance of location management related NF services need to be monitored in order to evaluate whether it can fulfil the consumer’s requirements, and to figure out the causes for the failures to derive the remedy solutions. |
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| ***Summary of change:*** | Add the measurements related to location determination and location notification for LMF. |
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| ***Consequences if not approved:*** | The performance for location determination and location notification cannot be monitored. |
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| ***Clauses affected:*** | 2, 3.3, 5.x (new), A.x (new) |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **1st modified section** |

# 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 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[3] 3GPP TS 32.404: "Performance Management (PM); Performance measurements - Definitions and template".

[4] 3GPP TS 23.501: "System Architecture for the 5G System".

[5] IETF RFC 5136: "Defining Network Capacity".

[6] 3GPP TS 38.473: "NG-RAN; F1 Application Protocol (F1AP)".

[7] 3GPP TS 23.502: "Procedures for the 5G System".

[8] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[9] 3GPP TS 32.425: "Performance Management (PM); Performance measurements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".

[10] 3GPP TS 32.451: "Key Performance Indicators (KPI) for Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Requirements".

[11] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[12] Void.

[13] 3GPP TS 38.423: "NG-RAN; Xn Application Protocol (XnAP)".[14] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[15] Void.

[16] 3GPP TS 29.244: "Technical Specification Group Core Network and Terminals; Interface between the Control Plane and the User Plane Nodes; Stage 3".

[17] ETSI GS NFV-IFA027 v2.4.1: "Network Functions Virtualisation (NFV); Management and Orchestration; Performance Measurements Specification".

[18] Void.

[19] 3GPP TS 38.214: "NR; Physical layer procedures for data".

[20] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[21] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[22] 3GPP TS 29.413: "Application of the NG Application Protocol (NGAP) to non-3GPP access".

[23] 3GPP TS 29.122: "Technical Specification Group Core Network and Terminals; T8 reference point for Northbound APIs".

[24] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[25] ETSI ES 202 336-12 V1.2.1: "Environmental Engineering (EE); Monitoring and control interface for infrastructure equipment (power, cooling and building environment systems used in telecommunication networks); Part 12: ICT equipment power, energy and environmental parameters monitoring information model".

[26] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[27] 3GPP TS 29.274: "Evolved General Packet Radio Service (GPRS); Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[28] 3GPP TS 29.510: "5G System; Network function repository services; Stage 3".

[29] 3GPP TS 38.314: "NR; layer 2 measurements".

[30] 3GPP TS 38.313: "Self-Organizing Networks (SON) for 5G networks".

[31] 3GPP TS 38.415: "NG-RAN; PDU session user plane protocol".

[32] 3GPP TS 38.321: "NR MAC protocol specification".

[33] 3GPP TS 38.214: "NR; Physical layer procedures for data".

[34] 3GPP TS 38.215: "NR; Physical layer measurements".

[35] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".

[36] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[37] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state".

[38] 3GPP TS 28.530: "Management and orchestration; Concepts, use cases and requirements".

[39] 3GPP TS 29.507: "5G System; Access and Mobility Policy Control Service; Stage 3".

[40] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[41] 3GPP TS 29.531: "5G System; Network Slice Selection Services".

[42] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)".

[43] 3GPP TS 29.540: "5G System; SMS Services; Stage 3".

[44] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[45] 3GPP TS 29.541: "5G System; Network Exposure FunctionServices for Non-IP Data Delivery (NIDD); Stage 3".

[46] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[47] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".

[48] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[49] 3GPP TS 38.300: "NR and NG-RAN Overall description; Stage-2".

[50] 3GPP TS 28.538: "Management and orchestration; Edge Computing Management".

[51] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[x] 3GPP TS 23.273: "5G System (5GS); Location Services (LCS); Stage 2".

[y] 3GPP TS 29.572: "5G System (5GS); Location Management Services; Stage 3".

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## 3.3 Measurement family

The measurement names defined in the present document are all beginning with a prefix containing the measurement family name. This family name identifies all measurements which relate to a given functionality and it may be used for measurement administration.

The list of families currently used in the present document is as follows:

- DRB (measurements related to Data Radio Bearer).

- RRC (measurements related to Radio Resource Control).

- UECNTX (measurements related to UE Context).

- RRU (measurements related to Radio Resource Utilization).

- RM (measurements related to Registration Management).

- SM (measurements related to Session Management).

- GTP (measurements related to GTP Management).

- IP (measurements related to IP Management).

- PA (measurements related to Policy Association).

- MM (measurements related to Mobility Management).

- VR (measurements related to Virtualized Resource).

- CARR (measurements related to Carrier).

- QF (measurements related to QoS Flow).

- AT (measurements related to Application Triggering).

- SMS (measurements related to Short Message Service).

- PEE (measurements related to Power, Energy and Environment).

- NFS (measurements related to NF service).

- PFD (measurements related to Packet Flow Description).

- RACH (measurements related to Random Access Channel).

- MR (measurements related to Measurement Report).

- L1M (measurements related to Layer 1 Measurement).

- NSS (measurements related to Network Slice Selection).

- PAG (measurements related to Paging).

- NIDD (measurements related to Non-IP Data Delivery).

- EPP (measurements related to external parameter provisioning).

- TI (measurements related to traffic influence).

- CE (measurements related to Connection Establishment).

- SPP (measurements related to Service Parameter Provisioning).

- BDTP (measurements related to Background Data Transfer Policy).

- DM (measurements related to Data Management).

- BDTP (measurements related to Background Data Transfer Policy).

- AFQ (measurements related to AF session with QoS).

- UCM (measurements related to UE radio Capability Management).

- PAU (measurements related to Policy Authorization).

- EEX (measurements related to Event Exposure).

- SDM (measurements related to subscriber data management).

- PPV (measurements related to parameter provisioning).

- Location Management (measurements related to Location Management).

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## 5.X Performance measurements for LMF

### 5.X.1 Location determination related measurements

#### 5.X.1.1 Number of location determination requests

a) This measurement provides the number of location determination requests received by the LMF.

b) CC

c) Receipt of an Nlmf\_Location\_DetermineLocation request by the LMF from an NF service consumer (see TS 23.273 [x]).

d) An integer value

e) LM.LocationDeterReq

f) LMFFunction

g) Valid for packet switched traffic

h) 5GS

#### 5.X.1.2 Number of successful location determinations

a) This measurement provides the number of successful location determinations provided by the LMF.

b) CC

c) Transmission of an Nlmf\_Location\_DetermineLocation response by the LMF to an NF service consumer indicating a successful location determination (see 3GPP TS 29.572 [y]).

d) An integer value

e) LM.LocationDeterSucc

f) LMFFunction

g) Valid for packet switched traffic

h) 5GS

#### 5.X.1.3 Number of failed location determinations

a) This measurement provides the number of failed location determinations provided by the LMF.

b) CC

c) Transmission of an Nlmf\_Location\_DetermineLocation response by the LMF to an NF service consumer indicating a failed location determination, each message increments the relevant subcounter per failure case by 1 (see 3GPP TS 29.572 [y]).

d) An integer value

e) LM.LocationDeterFail.*Cause,*Where *Cause* indicates the failure cause of the location determination.

f) LMFFunction

g) Valid for packet switched traffic

h) 5GS

### 5.X.2 Location notification related measurements

#### 5.X.2.1 Number of location notifications for successful activation

a) This measurement provides the number of location notifications for successful activation provided by the LMF.

b) CC

c) Transmission of an Nlmf\_Location\_EventNotify message by the LMF from an NF service consumer indicating the (periodic or triggered) location was successfully activated in the target UE (see 3GPP TS 29.572 [y]).

d) An integer value

e) LM.LocationNotifSucc

f) LMFFunction

g) Valid for packet switched traffic

h) 5GS

#### 5.X.2.2 Number of location notifications for failed activation

a) This measurement provides the number of location notifications for failed activation provided by the LMF.

b) CC

c) Transmission of an Nlmf\_Location\_EventNotify message by the LMF from an NF service consumer indicating the (periodic or triggered) location was failed to be activated in the target UE (see 3GPP TS 29.572 [y]).

d) An integer value

e) LM.LocationNotifFail.*Cause,*Where *Cause* indicates the failure cause of failed location activation in the target UE.

f) LMFFunction

g) Valid for packet switched traffic

h) 5GS

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# A.x Monitoring of location management

The UE location is required for various purposes, e.g., location-based applications, lawful interception, emergency calls, as well as the positioning services, etc.

The LMF manages the overall co-ordination and scheduling of resources required for the location of a UE for 5G. It also calculates or verifies a final location and any velocity estimate and may estimate the achieved accuracy. The LMF determine the result of the positioning in geographical co-ordinates.

The LMF provides location management related NF services (such as location determination, location notification, and location context transfer) in order for the consumer to get the location of the UEs. Therefore, the performance of location management related NF services need to be monitored in order to evaluate whether it can fulfil the consumer’s requirements, and to figure out the causes for the failures to derive the remedy solutions.

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| **End of modified sections** |