**3GPP TSG-RAN WG2 Meeting #131 *R2-250xxxx***

**Bengaluru, India, Aug. 25th – 29th 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.305** | **CR** | **0190** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *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 | **x** | Radio Access Network | **x** | Core Network | **x** |

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|  | | | | | | | | | | |
| ***Title:*** | 38.305 running CR for AIML Positioning | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_AIML\_air-Core | | | | |  | ***Date:*** | | | 2025-09-01 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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 can be 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of UE-based DL AI/ML positioning with UE-side model in Rel-19. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduction of UE-based DL AI/ML positioning with UE-side model in Rel-19. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | UE-based DL AI/ML positioning with UE-side model is not supported in Rel-19. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.2, 4.3.1, 4.3.X, 5.4.1, 7.13.1, 8.X | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 37.355 CR 0559 | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | RAN2#129bis: initial version in R2-2501920  RAN2#130: endorsed in R2-2503587, which is updated based on [POST129bis][014][AI PHY] 38.305 Running CR (CATT), and the main changes include:   1. Remove separate sub-clause for applicability reporting, and add the corresponding description to “Capability Transfer Procedure” 2. Remove the corresponding description for positioning integrity 3. Add the content of “Information that may be transferred from the LMF to UE” based on available RAN1 agreement   RAN2#131: updated based on [POST130][023][AI PHY] 38.305 CR (CATT), and the main changes include:   1. add the corresponding description for positioning integrity 2. update “Information that may be transferred from the LMF to UE” and “Information that may be transferred from the UE to LMF” 3. add “Assistance Data Transfer Procedure” in “Procedures between LMF and UE” 4. add “Procedures between LMF and gNB” and “Information that may be transferred from the gNB to LMF”   RAN2#131: further updated based on online agreements, and the main changes include:   1. add the description of applicability related UE behaviour | | | | | | | | |

*START OF CHANGES*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

5GC 5G Core Network

5GS 5G System

A-AoA Azimuth-Angle of Arrival

ADR Accumulated Delta Range

AI Artificial Intelligence

AL Alert Limit

AoA Angle of Arrival

AP Access Point

APC Antenna Phase Center

ARP Antenna Reference Point

BDS BeiDou Navigation Satellite System

BSSID Basic Service Set Identifier

CID Cell-ID (positioning method)

CLAS Centimetre Level Augmentation Service

DL-AoD Downlink Angle-of-Departure

DL-PRS Downlink Positioning Reference Signal

DL-RSCP Downlink Reference Signal Carrier Phase

DL-RSCPD Downlink Reference Signal Carrier Phase Difference

DL-TDOA Downlink Time Difference Of Arrival

DNU Do Not Use

DRX Discontinuous Reception

E-SMLC Enhanced Serving Mobile Location Centre

E-CID Enhanced Cell-ID (positioning method)

ECEF Earth-Centered, Earth-Fixed

ECI Earth-Centered-Inertial

eDRX Extended Discontinuous Reception

EGNOS European Geostationary Navigation Overlay Service

E-UTRAN Evolved Universal Terrestrial Radio Access Network

FDMA Frequency Division Multiple Access

FKP Flächenkorrekturparameter (Engl: Area Correction Parameters)

GAGAN GPS Aided Geo Augmented Navigation

GCS Global Coordinate System (as defined in TR 38.901 [55])

GLONASS GLObal'naya NAvigatsionnaya Sputnikovaya Sistema (Engl.: Global Navigation Satellite System)

GMLC Gateway Mobile Location Centre

GNSS Global Navigation Satellite System

GPS Global Positioning System

GRS80 Geodetic Reference System 1980

HESSID Homogeneous Extended Service Set Identifier

IOD Issue of Data

LCS LoCation Services

Local Coordinate System (as defined in TR 38.901 [55])

LCS-UP Location Services User Plane

LCS-UPP Location Services User Plane Protocol

LMF Location Management Function

LPP LTE Positioning Protocol

MAC Master Auxiliary Concept

MBS Metropolitan Beacon System

ML Machine Learning

MO-LR Mobile Originated Location Request

MT-LR Mobile Terminated Location Request

Multi-RTT Multi-Round Trip Time

NavIC NAVigation with Indian Constellation

NG-C NG Control plane

NG-AP NG Application Protocol

NI-LR Network Induced Location Request

N-RTK Network – Real-Time Kinematic

NRPPa NR Positioning Protocol A

NTN Non-Terrestrial Network

OTDOA Observed Time Difference Of Arrival

PCO Phase Center Offset

PCV Phase Center Variation

PDU Protocol Data Unit

posSI Positioning System Information

posSIB Positioning SIB

PPP Precise Point Positioning

PPP-RTK Precise Point Positioning – Real-Time Kinematic

PRS Positioning Reference Signal (for E-UTRA)

PRU Positioning Reference Unit

QZSS Quasi-Zenith Satellite System

RP Reception Point

RRM Radio Resource Management

RSPP Ranging/SL Positioning Protocol

RSRP Reference Signal Received Power

RSRPP Reference Signal Received Path Power

RSRQ Reference Signal Received Quality

RSSI Received Signal Strength Indicator

RSTD Reference Signal Time Difference

RTD Relative Time Difference

RTK Real-Time Kinematic

SBAS Space Based Augmentation System

SDT Small Data Transmission

SET SUPL Enabled Terminal

SIB System Information Block

SL Sidelink

SL-PRS Sidelink Positioning Reference Signal

SL-PRS-RSRP Sidelink PRS Reference Signal Received Power

SL-PRS-RSRPP Sidelink PRS Reference Signal Received Path Power

SL-RSTD Sidelink Reference Signal Time Difference

SL-RTOA Sidelink Relative Time of Arrival

SLP SUPL Location Platform

SLPP Sidelink Positioning Protocol

SP Semi-Persistent

SRS Sounding Reference Signal

SSB Synchronization Signal Block

SSID Service Set Identifier

SSR State Space Representation

STEC Slant TEC

SUPL Secure User Plane Location

TADV Timing Advance

TBS Terrestrial Beacon System

TEC Total Electron Content

TEG Timing Error Group

TP Transmission Point

TRP Transmission-Reception Point

TTA Time To Alert

TxTEG Tx Timing Error Group

UE User Equipment

UL-AoA Uplink Angle of Arrival

UL-RSCP Uplink Reference Signal Carrier Phase

UL-RTOA Uplink Relative Time of Arrival

UL-SRS Uplink Sounding Reference Signal

UL-TDOA Uplink Time Difference of Arrival

UPF User Plane Function

URA User Range Accuracy

WAAS Wide Area Augmentation System

WGS-84 World Geodetic System 1984

WLAN Wireless Local Area Network

Z-AoA Zenith Angles of Arrival

*NEXT CHANGE*

## 4.3 Standard UE Positioning Methods

### 4.3.1 Introduction

The standard positioning methods supported for NG-RAN access are:

- network-assisted GNSS methods;

- observed time difference of arrival (OTDOA) positioning based on LTE signals;

- enhanced cell ID methods based on LTE signals;

- WLAN positioning;

- Bluetooth positioning;

- terrestrial beacon system (TBS) positioning;

- sensor based methods:

- barometric Pressure Sensor;

- motion sensor.

- NR enhanced cell ID methods (NR E-CID) based on NR signals;

- Multi-Round Trip Time Positioning (Multi-RTT based on NR signals);

- Downlink Angle-of-Departure (DL-AoD) based on NR signals;

- Downlink Time Difference of Arrival (DL-TDOA) based on NR signals;

- Uplink Time Difference of Arrival (UL-TDOA) based on NR signals;

- Uplink Angle-of-Arrival (UL-AoA), including A-AoA and Z-AoA based on NR signals;

- SL positioning and Ranging based on sidelink signals, incl.:

- Sidelink Round Trip Time Positioning (SL-RTT);

- Sidelink Angle-of-Arrival (SL-AoA);

- Sidelink Time Difference of Arrival (SL-TDOA);

- Sidelink Time of Arrival (SL-TOA).

- Downlink AI/ML positioning based on NR signals.

Hybrid positioning using multiple methods from the list of positioning methods above is also supported.

Standalone mode (e.g. autonomous, without network assistance) using one or more methods from the list of positioning methods above is also supported.

These positioning methods (except SL positioning and ranging methods) may be supported in UE-based, UE-assisted/LMF-based, and NG-RAN node assisted versions. Table 4.3.1-1 indicates which of these versions are supported in this version of the specification for the standardised positioning methods.

Table 4.3.1-1: Supported versions of UE positioning methods

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Method | UE-based | UE-assisted, LMF-based | NG-RAN node assisted | SUPL Note 8 |
| A-GNSS | Yes | Yes | No | Yes |
| OTDOA Note1, Note 2 | No | Yes | No | Yes |
| E-CID Note 4, Note 7 | No | Yes | Yes | Yes for E-UTRA |
| Sensor | Yes | Yes | No | No |
| WLAN | Yes | Yes | No | Yes |
| BluetoothNote 9 | Yes | Yes | No | No |
| TBS Note 5 | Yes | Yes | No | Yes (MBS) |
| DL-TDOA | Yes | Yes | No | Yes |
| DL-AoD | Yes | Yes | No | Yes |
| Multi-RTT | No | Yes | Yes | Yes |
| NR E-CID | No | Yes | Yes | Yes (DL NR E-CID) |
| UL-TDOA | No | No | Yes | Yes |
| UL-AoA | No | No | Yes | Yes |
| DL AI/ML | Yes | No | No | N/A |
| NOTE 1: This includes TBS positioning based on PRS signals.  NOTE 2: In this version of the specification only OTDOA based on LTE signals is supported.  NOTE 3: Void  NOTE 4: This includes Cell-ID for NR method when UE is served by gNB.  NOTE 5: In this version of the specification only for TBS positioning based on MBS signals.  NOTE 6: Void  NOTE 7: Enhanced Cell ID based on LTE signals.  NOTE 8: This shows whether the positioning method is supported by SUPL ULP [16].  NOTE 9: UE-based positioning mode is supported only for Bluetooth AoD positioning method. | | | | |

Sensor, WLAN, Bluetooth, and TBS positioning methods based on MBS signals are also supported in standalone mode, as described in the corresponding clauses.

The SL positioning and ranging methods may be supported in SL-Target UE-based or SL-Target UE-assisted/server-based mode, where "server" may be a SL Server UE or LMF. Table 4.3.1-2 indicates which of these versions are supported in this version of the specification for the SL positioning and ranging methods.

Table 4.3.1-2: Supported versions of SL positioning and ranging methods.

|  |  |  |
| --- | --- | --- |
| Method | SL-Target UE-based | SL-Target UE-assisted, server-based |
| SL-RTTNOTE 1 | Yes | Yes |
| SL-AoANOTE 2 | Yes | Yes |
| SL-TDOA | Yes | Yes |
| SL-TOA | Yes | Yes |
| NOTE 1: The SL-RTT method may also be used for ranging between UEs.  NOTE 2: The SL-AoA method may also be used to obtain direction between UEs. | | |

*NEXT CHANGE*

### 4.3.X DL AI/ML positioning

The DL AI/ML positioning method makes use of the downlink signals received from multiple TPs to determine AI/ML model input at the UE. The UE performs inference using AI/ML model with assistance data received from the positioning server and other configuration information to locate the UE.

The operation of the UE-based DL AI/ML positioning method is described in clause 8.X.

*NEXT CHANGE*

### 5.4.1 User Equipment (UE)

The UE may make measurements of downlink signals from NG-RAN, sidelink signals from other UEs, and other sources such as E-UTRAN, different GNSS and TBS systems, WLAN access points, Bluetooth beacons, UE barometric pressure and motion sensors. The measurements to be made will be determined by the chosen positioning method.

The UE may also contain LCS applications, or access an LCS application either through communication with a network accessed by the UE or through another application residing in the UE. This LCS application may include the needed measurement and calculation functions to determine the UE's position with or without network assistance. This is outside of the scope of this specification.

The UE may also, for example, contain an independent positioning function (e.g., GPS) and thus be able to report its position, independent of the NG-RAN transmissions. The UE with an independent positioning function may also make use of assistance information obtained from the network.

The UE may use AI/ML models to infer the UE location using measurements of downlink signals from NG-RAN.

*NEXT CHANGE*

## 7.13 Positioning Integrity

### 7.13.1 General

Positioning Integrity is supported for the following positioning methods:

- GNSS positioning methods as specified in clause 8.1;

- Multi-RTT positioning as specified in clause 8.10;

- DL-AoD positioning as specified in clause 8.11;

- DL-TDOA positioning as specified in clause 8.12;

- UL-TDOA positioning as specified in clause 8.13;

- UL-AoA positioning as specified in clause 8.14;

- DL AI/ML positioning as specified in clause 8.X.

NOTE: The local errors/threats associated with the UE and TRP measurements are implementation dependent. For UE-based mode, local UE errors/threats may be addressed by the UE when determining protection levels.   
For UE-assisted mode and network-based positioning, an LMF may address the UE and TRP local errors from UE and/or TRP measurement results. A specific method for determining local UE and TRP errors/threats is not specified as this is implementation defined.

*NEXT CHANGE*

# 8 Positioning methods and Supporting Procedures

## 8.X UE-based DL AI/ML positioning

### 8.X.1 General

In the DL AI/ML positioning method, the UE position is inferred as an output of the AI/ML model.

The inference technique using AI/ML model for UE positioning is up to implementation and beyond the scope of this specification.

### 8.X.2 Information to be transferred between NG-RAN/5GC Elements

#### 8.X.2.0 General

This clause defines the information that may be transferred between LMF and UE/gNB.

#### 8.X.2.1 Information that may be transferred from the LMF to UE

##### 8.X.2.1.0 General

The information that may be transferred from the LMF to the UE are listed in table 8.X.2.1.0-1.

Table 8.X.2.1.0-1: Assistance data that may be transferred from LMF to the UE

|  |
| --- |
| Information |
| Physical cell IDs (PCIs), global cell IDs (GCIs), ARFCN, and PRS IDs of candidate NR TRPs for measurement |
| Timing relative to the serving (reference) TRP of candidate NR TRPs |
| DL-PRS configuration of candidate NR TRPs |
| Indication of which DL-PRS Resource Sets across DL-PRS positioning frequency layers are linked for DL-PRS bandwidth aggregation |
| SSB information of the TRPs (the time/frequency occupancy of SSBs) |
| Spatial direction information (e.g. azimuth, elevation etc.) of the DL-PRS Resources of the TRPs served by the gNB |
| Geographical coordinates of the TRPs served by the gNB (include a transmission reference location for each DL-PRS Resource ID, reference location for the transmitting antenna of the reference TRP, relative locations for transmitting antennas of other TRPs) |
| Associated ID for the TRPs |
| Fine Timing relative to the serving (reference) TRP of candidate NR TRPs |
| PRS-only TP indication |
| The association information of DL-PRS resources with TRP Tx TEG ID |
| LOS/NLOS indicators |
| On-Demand DL-PRS-Configurations, possibly together with information on which configurations are available for DL-PRS bandwidth aggregation |
| Validity Area of the Assistance Data |
| PRU measurements together with the location information of the PRU |
| Data facilitating the integrity results determination of the calculated location |

##### 8.X.2.1.1 Mapping of integrity parameters

Table 8.X.2.1.1-1 shows the mapping between the integrity fields and the assistance data according to the Integrity Principle of Operation (Clause 7.13.2). The corresponding field descriptions for each of the field names listed in Table 8.X.2.1.1-1 are specified in TS 37.355 [42].

Table 8.X.2.1.1-1: Mapping of Integrity Parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Error | NR Assistance Data | Integrity Fields | | | | |
| Integrity Alerts | Integrity Bounds (Mean) | Integrity Bounds (StdDev) | Residual Risks | Integrity Correlation Times |
| TRP location | *NR-TRP-LocationInfo* | TRP DNU | Mean TRP/ARP location error | Standard deviation TRP/ARP location error | Probability of Onset of TRP fault  Mean TRP fault duration | TRP/ARP location error correlation time |
| Inter-TRP synchronization | *NR-RTD-Info* | RTD DNU | Mean RTD error | Standard deviation RTD error | RTD error correlation time |

Note: Integrity Operation is applicable only when NW is providing TRP location explicitly in Assistance Data. However, if TRP location is provided implicitly then Integrity Operation is inapplicable.

#### 8.X.2.2 Information that may be transferred from the UE to LMF

##### 8.X.2.2.0 General

The information that may be signalled from UE to the LMF is listed in Table 8.X.2.2.0-1.

Table 8.X.2.2.0-1: Measurement results that may be transferred from UE to the LMF

|  |
| --- |
| Information |
| Latitude/Longitude/Altitude, together with uncertainty shape |
| Time stamp of location estimate |
| Protection Level, optionally together with achievable Target Integrity Risk |

#### 8.X.2.3 Information that may be transferred from the gNB to LMF

##### 8.X.2.3.0 General

The assistance data that may be transferred from gNB to the LMF is listed in Table 8.X.2.3.0-1.

Table 8.X.2.3.0-1: Assistance data that may be transferred from gNB to the LMF

|  |
| --- |
| Information |
| PCI, GCI, ARFCN, and TRP IDs of the TRPs served by the gNB |
| Timing information of TRPs served by the gNB |
| DL-PRS configuration of the TRPs served by the gNB |
| Indication of which DL-PRS Resource Sets across DL-PRS positioning frequency layers are linked for DL-PRS bandwidth aggregation |
| SSB information of the TRPs (the time/frequency occupancy of SSBs) |
| Spatial direction information of the DL-PRS Resources of the TRPs served by the gNB |
| Geographical coordinates information of the DL-PRS Resources of the TRPs served by the gNB |
| TRP type |
| On-demand DL-PRS information, possibly together with information on which configurations are available for DL-PRS bandwidth aggregation |
| TRP Tx TEG association information |
| Mobile TRP Location Information |
| Mobile IAB-MT UE ID NOTE 1 |
| NOTE 1: If TRP Type is Mobile TRP. |

### 8.X.3 DL AI/ML Positioning Procedures

#### 8.X.3.0 General

The procedures described in this clause support UE-based DL AI/ML positioning.

#### 8.X.3.1 Procedures between LMF and UE

##### 8.X.3.1.1 Capability Transfer Procedure

The Capability Transfer procedure for DL AI/ML positioning is described in clause 7.1.2.1.

For the DL AI/ML positioning, the LPP Capability Indication procedure, i.e., the unsolicited capability transfer, enables the UE to indicate to the LMF whether the DL AI/ML positioning method is applicable, as determined by the UE based on NW-side additional conditions (if provided) as defined in Table 8.X.2.1.0-1, UE-side additional conditions (internally known by UE) and model availability in the UE. When the applicability of the DL AI/ML positioning method changes, the UE reports updated information of applicability.

##### 8.X.3.1.2 Assistance Data Transfer Procedure

###### 8.X.3.1.2.0 General

The purpose of this procedure is to enable the LMF to provide assistance data to the UE (e.g., as part of a positioning procedure) and the UE to request assistance data from the LMF (e.g., as part of a positioning procedure). The LMF may provide the pre-configured DL-PRS assistance data (with associated validity criteria) to the UE (before or during an ongoing LPP positioning session), to be utilized for potential positioning measurements at a future time. Pre-configured DL-PRS assistance data may consist of multiple instances, where each instance is applicable to a different area within the network. One or more assistance data instances may be provided. Each instance is provided in one LPP Assistance Data message.

If a UE receives assistance data for a TRP for which it has already stored assistance data, it overwrites the stored assistance data, whereas if a UE receives assistance data for a TRP for which it has not stored assistance data, it stores the assistance data for the TRP and maintains the already stored assistance data for other TRPs. The TRPs are uniquely identified using a combination of PRS-ID and Cell-ID. The number TRPs for which the UE can store Assistance Data is a UE capability and is indicated by the number of areas a UE can support.

###### 8.X.3.1.2.1 LMF initiated Assistance Data Delivery

Figure 8.X.3.1.2.1-1 shows the Assistance Data Delivery operations for the DL AI/ML positioning method when the procedure is initiated by the LMF.



Figure 8.X.3.1.2.1-1: LMF-initiated Assistance Data Delivery Procedure

(1) The LMF determines that assistance data needs to be provided to the UE (e.g., as part of a positioning procedure) and sends an LPP Provide Assistance Data message to the UE. This message may include any of the DL AI/ML positioning assistance data defined in Table 8.X.2.1.0-1.

###### 8.X.3.1.2.2 UE initiated Assistance Data Transfer

Figure 8.X.3.1.2.2-1 shows the Assistance Data Transfer operations for the DL AI/ML positioning method when the procedure is initiated by the UE.



Figure 8.X.3.1.2.2-1: UE-initiated Assistance Data Transfer Procedure

(1) The UE determines that certain DL AI/ML positioning assistance data are desired (e.g., as part of a positioning procedure when the LMF provided assistance data are not sufficient for the UE to fulfil the request) and sends an LPP Request Assistance Data message to the LMF. This request includes an indication of which specific AI/ML assistance data are requested. Additional information concerning the UE's approximate location and serving and neighbour cells may also be provided in the Request Assistance Data message and/or in an accompanying Provide Location Information message to help the LMF provide appropriate assistance data. This additional data may include the UE's last known location if available, the cell IDs of the UE serving NG-RAN node and possibly neighbour NG-RAN nodes, as well as NR E-CID measurements.

(2) The LMF provides the requested assistance in an LPP Provide Assistance Data message, if available at the LMF. If any of the UE requested assistance data in step (1) are not provided in step 2, the UE shall assume that the requested assistance data are not supported, or currently not available at the LMF. If none of the UE requested assistance data in step (1) can be provided by the LMF, return any information that can be provided in an LPP message of type Provide Assistance Data which includes a cause indication for the not provided assistance data.

##### 8.X.3.1.3 Location Information Transfer Procedure

###### 8.X.3.1.3.0 General

The purpose of this procedure is to enable the LMF to request the UE location inferred by the UE.

###### 8.X.3.1.3.1 LMF-initiated Location Information Transfer Procedure

Figure 8.X.3.1.3.1-1 shows the Location Information Transfer operations for the DL AI/ML positioning method when the procedure is initiated by the LMF.



Figure 8.X.3.1.3.1-1: LMF-initiated Location Information Transfer Procedure

(1) The LMF sends an LPP Request Location Information message to the UE. This request includes an indication of AI/ML inference for location coordinates.

(2) The UE then sends an LPP Provide Location Information message to the LMF, and includes the inferred location coordinates. If the UE is unable to perform the DL AI/ML positioning, the UE returns LPP Provide Location Information message with error cause.

#### 8.X.3.2 Procedures between LMF and gNB

##### 8.X.3.2.1 Assistance Data Delivery procedure

###### 8.X.3.2.1.0 General

The purpose of this procedure is to enable the gNB to provide assistance data to the LMF, for subsequent delivery to the UE using the procedures of clause 8.X.3.1.2.

###### 8.X.3.2.1.1 LMF-initiated assistance data delivery to the LMF

Figure 8.X.3.2.1.1-1 shows the TRP Information Exchange operation from the gNB to the LMF for the DL AI/ML positioning method.



Figure 8.X.3.2.1.1-1: LMF-initiated TRP Information Exchange Procedure

(1) The LMF determines that certain TRP configuration information is desired (e.g., as triggered by OAM) and sends an NRPPa TRP INFORMATION REQUEST message to the gNB. This request includes an indication of which specific TRP configuration information is requested.

(2) The gNB provides the requested TRP information in an NRPPa TRP INFORMATION RESPONSE message, if available at the gNB. If the gNB is not able to provide any information, it returns an TRP INFORMATION FAILURE message indicating the cause of the failure.

*END OF CHANGE*