**3GPP TSG-RAN WG3 Meeting #113-e R3-21xxxx**

**16-26 Aug 2021, E-meeting**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.413** | **CR** | **0615** | **rev** | **3** | **Current version:** | **16.6.0** |  |
|  |
| *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 |  | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:***  | CR to 38.413 on QoE measurement configuration |
|  |  |
| ***Source to WG:*** | Huawei, China Mobile, China Unicom |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** | NR\_QoE-Core |  | ***Date:*** | 2021-07-27 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | To introduce the support of NR QoE measurement over NG interface |
|  |  |
| ***Summary of change:*** | Add the support of NR QoE measurement configuration, including :- introduce Application layer measurement conifguration including the RAN visible QMC metrics, the radio related measurement results report and the radio related information report in trace activation IE- introduce the application layer measurement release in the deactivate trace message |
|  |  |
| ***Consequences if not approved:*** | NR QoE measurement is not supported |
|  |  |
| ***Clauses affected:*** | 8.3.1,8.4.2,8.11.1,8.11.3,9.2.10.3,9.3.1.14,9.3.1.xx1(new), 9.3.1.xx2(new), 9.3.1.xx3(new), 9.3.1.xxx4 (new) , 9.3.1.xxx5 (new) |
|  |  |
|  | **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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

8.3.1 Initial Context Setup

8.3.1.1 General

The purpose of the Initial Context Setup procedure is to establish the necessary overall initial UE context at the NG-RAN node, when required, including PDU session context, the Security Key, Mobility Restriction List, UE Radio Capability and UE Security Capabilities, etc. The AMF may initiate the Initial Context Setup procedure if a UE-associated logical NG-connection exists for the UE or if the AMF has received the *RAN UE NGAP ID* IE in an INITIAL UE MESSAGE message or if the NG-RAN node has already initiated a UE-associated logical NG-connection by sending an INITIAL UE MESSAGE message via another NG interface instance. The procedure uses UE-associated signalling.

For signalling only connections and if the *UE Context Request* IE is not received in the Initial UE Message, the AMF may be configured to trigger the procedure for all NAS procedures or on a per NAS procedure basis depending on operator’s configuration.

8.3.1.2 Successful Operation

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**Figure 8.3.1.2-1: Initial context setup: successful operation**

In case of the establishment of a PDU session the 5GC shall be prepared to receive user data before the INITIAL CONTEXT SETUP RESPONSE message has been received by the AMF. If no UE-associated logical NG-connection exists, the UE-associated logical NG-connection shall be established at reception of the INITIAL CONTEXT SETUP REQUEST message.

-----------------------------------------------skip the unchanged parts---------------------------------------------

If the *Trace Activation* IE is included in the INITIAL CONTEXT SETUP REQUEST message the NG-RAN node shall, if supported, initiate the requested trace function as described in TS 32.422 [11]. In particular, the NG-RAN node shall, if supported:

- if the *Trace Activation* IE includes the *MDT Activation* IE set to "Immediate MDT and Trace", initiate the requested trace session and MDT session as described in TS 32.422 [11];

- if the *Trace Activation* IE includes the *MDT Activation* IE set to "Immediate MDT Only", "Logged MDT only", initiate the requested MDT session as described in TS 32.422 [11] and the NG-RAN node shall ignore the *Interfaces To Trace* IE and the *Trace Depth* IE;

- if the *Trace Activation* IE includes the *MDT Location Information* IE within the *MDT Configuration* IE, store this information and take it into account in the requested MDT session;

- if the *Trace Activation* IE includes the *Signalling Based MDT PLMN List* IE within the *MDT Configuration* IE, the NG-RAN node may use it to propagate the MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *Bluetooth Measurement Configuration* IE within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *WLAN Measurement Configuration* IE within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *Sensor Measurement Configuration* IE within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *MDT Configuration* IE and if the NG-RAN node is a gNB at least the *MDT Configuration-NR* IE shall be present, while if the NG-RAN node is an ng-eNB at least the *MDT Configuration-EUTRA* IE shall be present.

- if the *Trace Activation* IE includes the *UE Application layer measurement configuration* IE, initiate the requested trace session and QoE Measurement Collection function as described in TS 38.300 [8].

If the *UE Security Capabilities* IE included in the INITIAL CONTEXT SETUP REQUEST message only contains the EIA0 or NIA0 algorithm as defined in TS 33.501 [13] and if the EIA0 or NIA0 algorithm is defined in the configured list of allowed integrity protection algorithms in the NG-RAN node (TS 33.501 [13]), the NG-RAN node shall take it into use and ignore the keys received in the *Security Key* IE.

Next change

8.4.2 Handover Resource Allocation

8.4.2.1 General

The purpose of the Handover Resource Allocation procedure is to reserve resources at the target NG-RAN node for the handover of a UE. The procedure uses UE-associated signalling.

8.4.2.2 Successful Operation

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**Figure 8.4.2.2-1: Handover resource allocation: successful operation**

The AMF initiates the procedure by sending the HANDOVER REQUEST message to the target NG-RAN node.

If the *Masked IMEISV* IE is contained in the HANDOVER REQUEST message the target NG-RAN node shall, if supported, use it to determine the characteristics of the UE for subsequent handling.

-----------------------------------------------skip the unchanged parts---------------------------------------------

If the *Trace Activation* IE is included in the HANDOVER REQUEST message the target NG-RAN node shall, if supported, initiate the requested trace function as described in TS 32.422 [11]. In particular, the NG-RAN node shall, if supported:

- if the *Trace Activation* IE includes the *MDT Activation* IE set to "Immediate MDT and Trace", initiate the requested trace session and MDT session as described in TS 32.422 [11];

- if the *Trace Activation* IE includes the *MDT Activation* IE set to "Immediate MDT Only", "Logged MDT only", initiate the requested MDT session as described in TS 32.422 [11] and the target NG-RAN node shall ignore the *Interfaces To Trace* IE and the *Trace Depth* IE;

- if the *Trace Activation* IE includes the *MDT Location Information* IE within the *MDT Configuration* IE, store this information and take it into account in the requested MDT session;

- if the *Trace Activation* IE includes the *Signalling Based MDT PLMN List* IE within the *MDT Configuration* IE, the NG-RAN node may use it to propagate the MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *Bluetooth Measurement Configuration* IE within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *WLAN Measurement Configuration* IE within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *Sensor Measurement Configuration* IE within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [41].

- if the *Trace Activation* IE includes the *MDT Configuration* IE and if the NG-RAN node is a gNB at least the *MDT Configuration-NR* IE shall be present, while if the NG-RAN node is an ng-eNB at least the *MDT Configuration-EUTRA* IE shall be present.

- if the *Trace Activation* IE includes the *UE Application layer measurement configuration* IE, initiate the requested trace session and QoE Measurement Collection function as described in TS 38.300 [8].

If the *Location Reporting Request Type* IE is included in the HANDOVER REQUEST message, the target NG-RAN node should perform the requested location reporting functionality for the UE as described in subclause 8.12.

If the *Core Network Assistance Information for RRC INACTIVE* IE is included in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, store this information in the UE context and use it for the RRC\_INACTIVE state decision and RNA configuration for the UE and RAN paging if any for a UE in RRC\_INACTIVE state, as specified in TS 38.300 [8].

If the *CN Assisted RAN Parameters Tuning* IE is included in the HANDOVER REQUEST message, the NG-RAN node may use it as described in TS 23.501 [9].

If the *New Security Context Indicator* IE is included in the HANDOVER REQUEST message, the target NG-RAN node shall use the information as specified in TS 33.501 [13].

Next change

8.11.1 Trace Start

8.11.1.1 General

The purpose of the Trace Start procedure is to allow the AMF to request the NG-RAN node to initiate a trace session for a UE. The procedure uses UE-associated signalling. If no UE-associated logical NG-connection exists, the UE-associated logical NG-connection shall be established as part of the procedure.

8.11.1.2 Successful Operation

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**Figure 8.11.1.2-1: Trace start**

The AMF initiates the procedure by sending a TRACE START message. Upon reception of the TRACE START message, the NG-RAN node shall initiate the requested trace session as described in TS 32.422 [11].

If the *Trace Activation* IE is included in the TRACE START message which includes the *MDT Activation* IE set to "Immediate MDT and Trace", the NG-RAN node shall, if supported, initiate the requested trace session and MDT session as described in TS 32.422 [11].

If the *Trace Activation* IE is included in the TRACE START message which includes the *MDT Activation* IE set to "Immediate MDT Only", "Logged MDT only", the NG-RAN node shall, if supported, initiate the requested MDT session as described in TS 32.422 [11] and the NG-RAN node shall ignore the *Interfaces To Trace* IE and the *Trace Depth* IE.

If the *Trace Activation* IE includes the *MDT Location Information* IE within the *MDT Configuration* IE, the NG-RAN node shall, if supported, store this information and take it into account in the requested MDT session.

If the *Trace Activation* IE is included in the TRACE START message which includes the *MDT Activation* IE set to "Immediate MDT Only", "Logged MDT only" and if the *Signalling Based MDT PLMN List* IE is included in the *MDT Configuration* IE, the NG-RAN node may use it to propagate the MDT Configuration as described in TS 37.320 [41].

If the *Trace Activation* IE includes the *Bluetooth Measurement Configuration* IE within the *MDT Configuration* IE, the NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [41].

If the *Trace Activation* IE includes the *WLAN Measurement Configuration* IE within the *MDT Configuration* IE, the NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [41].

If the *Trace Activation* IE includes the *Sensor Measurement Configuration* IE within the *MDT Configuration* IE, the NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [41].

If the *Trace Activation* IE includes the *MDT Configuration* IE and if the NG-RAN node is a gNB at least the *MDT Configuration-NR* IE shall be present, while if the NG-RAN node is an ng-eNB at least the *MDT Configuration-EUTRA* IE shall be present.

If the *Trace Activation* IE includes the *UE Application layer measurement configuration* IE, the NG-RAN node shall, if supported, initiate the requested trace session and QoE Measurement Collection function as described in TS 38.300 [8] .

**Interactions with other procedures:**

If the NG-RAN node is not able to initiate the trace session due to ongoing handover of the UE to another NG-RAN node, the NG-RAN node shall initiate a Trace Failure Indication procedure with the appropriate cause value.

Next change

8.11.3 Deactivate Trace

8.11.3.1 General

The purpose of the Deactivate Trace procedure is to allow the AMF to request the NG-RAN node to stop the trace session for the indicated trace reference. The procedure uses UE-associated signalling.

8.11.3.2 Successful Operation

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**Figure 8.11.3.2-1: Deactivate trace**

The AMF initiates the procedure by sending a DEACTIVATE TRACE message to the NG-RAN node as described in TS 32.422 [11]. Upon reception of the DEACTIVATE TRACE message, the NG-RAN node shall stop the trace session for the indicated trace reference in the *NG-RAN Trace ID* IE.

If the *QMC Deactivate* IE is included in the DEACTIVATE TRACE message, the NG-RAN node shall stop the QMC of the indicated service type in the *QMC Deactivate* IE.

**Interactions with other procedures:**

If the NG-RAN node is not able to stop the trace session due to ongoing handover of the UE to another NG-RAN node, the NG-RAN node shall initiate a Trace Failure Indication procedure with the appropriate cause value.

Next change

9.3.1 Radio Network Layer Related IEs

-----------skip the unchanged parts--------------

9.2.10.3 DEACTIVATE TRACE

This message is sent by the AMF to deactivate a trace session.

Direction: AMF → NG-RAN node

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| AMF UE NGAP ID | M |  | 9.3.3.1 |  | YES | reject |
| RAN UE NGAP ID | M |  | 9.3.3.2 |  | YES | reject |
| NG-RAN Trace ID | M |  | OCTET STRING (SIZE(8)) | As per NG-RAN Trace ID in *Trace Activation* IE | YES | ignore |
| QMC Deactivate | O |  | 9.3.1.xx1 |  | YES | ignore |

*Editior’s Note: FFS on Whether to use Deactivate Trace procedure or other procedure for the deactivation of QoE measurement.*

Next change

9.3.1.14 Trace Activation

This IE defines parameters related to a trace session activation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| NG-RAN Trace ID | M |  | OCTET STRING (SIZE(8)) | This IE is composed of the following: Trace Reference defined in TS 32.422 [11] (leftmost 6 octets, with PLMN information encoded as in 9.3.3.1), andTrace Recording Session Reference defined in TS 32.422 [11] (last 2 octets). | - |  |
| Interfaces to Trace | M |  | BIT STRING (SIZE(8)) | Each position in the bitmap represents an NG-RAN node interface:first bit = NG-C, second bit = Xn-C, third bit = Uu, fourth bit = F1-C, fifth bit = E1:other bits reserved for future use. Value '1' indicates 'should be traced'. Value '0' indicates 'should not be traced'. | - |  |
| Trace Depth | M |  | ENUMERATED (minimum, medium, maximum, minimumWithoutVendorSpecificExtension,mediumWithoutVendorSpecificExtension,maximumWithoutVendorSpecificExtension, …) | Defined in TS 32.422 [11]. | - |  |
| Trace Collection Entity IP Address | M |  | Transport Layer Address9.3.2.4 | For File based Reporting. Defined in TS 32.422 [11].This IE is ignored if the *Trace Collection Entity URI* IE is present. | - |  |
| MDT Configuration | O |  | 9.3.1.167 |  | YES | ignore |
| Trace Collection Entity URI | O |  | URI9.3.2.14 | For Streaming based Reporting.Defined in TS 32.422 [11]. | YES | ignore |
| UE Application layer measurement configuration | O |  | 9.3.1.xx2 |  | YES | ignore |

*Editior’s Note: FFS on whether a new message is needed for activation of this UE Application layer measurement configuration.*

Next change

9.3.1.xx1 QMC Deactivate

The IE defines the QMC to be deactivated.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Service Type List |  | *1 ..* < *maxnoofUEApplicationLayerMeas* > |  |  | - | - |
|  > Service Type | M |  | 9.3.1.xx4 |  | - | - |
|  > QoE Reference | M | OCTET STRING (SIZE(8)) |  |  |  |  |

*Editior’s Note: FFS whether QoE Reference is needed or not.*

9.3.1.xx2 UE Application layer measurement configuration

The IE defines configuration information for the QoE Measurement Collection (QMC) function.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| **UE Application layer measurement configuration List** |  | *0..1* |  |  | YES | ignore |
| > **UE Application layer measurement configuration Item** |  | *1..<maxnoofUEApplicationLayerMeas>* |  |  |  |  |
| >> UE Application layer measurement configuration for each service type | M |  | 9.3.1.xx3 |  | - |  |
| Measurement Collection Entity IP Address | M |  | Transport Layer Address9.3.2.4 |  |  |  |

*Editior’s Note: FFS whether the Measurement Collection Entity IP Address should be per-service type.*

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofUEApplicationLayerMeas | Maximum no. of UE application layer measurement. Value is FFS. |

9.3.1.xx3 UE Application layer measurement configuration for each service type

The IE defines configuration information for the QoE Measurement Collection (QMC) function for each service type.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Container for application layer measurement configuration | M |  | Octet string (1..1000) | Indicates application layer measurement configuration, see Annex L in [xx]. | - | - |
| CHOICE *Area Scope of QMC* | M |  |  |  | - | - |
| >*Cell based* |  |  |  |  |  | - |
| >>**Cell ID List for QMC** |  | *1 .. <maxnoofCellIDforQMC>* |  |  |  | - |
| >>>NG-RAN CGI | M |  | 9.3.1.73 |  | - | - |
| >*TA based* |  |  |  |  |  | - |
| >>**TA List for QMC** |  | *1 .. <maxnoofTAforQMC>* |  |  |  | - |
| >>>TAC | M |  | 9.3.3.10 | The TAI is derived using the current serving PLMN. | - | - |
| >*TAI based* |  |  |  |  | - | - |
| >>**TAI List for QMC** |  | *1 .. <maxnoofTAforQMC>* |  |  | - | - |
| >>>TAI | M |  | 9.3.3.11 |  | - | - |
| >*PLMN area based* |  |  |  |  |  | - |
| >>**PLMN List for QMC** |  | *1 .. <maxnoofPLMNforQMC>* |  |  |  | - |
| >>>PLMN Identity | M |  | 9.3.3.5 |  | - | - |
| Service Type | M |  | 9.3.1.xx4 | This IE indicates the service type of UE application layer measurements. | - | - |
| QoE Reference  | M |  | OCTET STRING (SIZE(8)) |  |  |  |
| **S-NSSAI List**  | O | *0 .. 1* |  |  |  |  |
| >S-NSSAI Item |  | *1 .. <maxnoofS-NSSAIforQMC>* |  |  |  |  |
| >>S-NSSAI | M |  | 9.3.1.24 |  |  |  |
| Radio Related Measurements and Information Required (FFS) | O |  | 9.3.1.xx5 |  |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofCellIDforQMC | Maximum no. of Cell ID subject for QMC scope. Value is 32. |
| maxnoofTAforQMC | Maximum no. of TA subject for QMC scope. Value is 8. |
| maxnoofPLMNforQMC | Maximum no. of PLMNs in the PLMN list for QMC scope. Value is 16. |
| maxnoofS-NSSAIforQMC | Maximum no. of S-NSSAIs in the S-NSSAI list for QMC scope. Value is 16. |

9.3.1.xx4 Service Type

The IE defines service type for the QoE Measurement Collection (QMC) function.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Service Type | M |  | ENUMERATED(streaming service, mTSI service, vR, mBMS...) | This IE indicates the service type of UE application layer measurements. | - | - |

*Editior’s Note: FFS whether MBMS should be supported or not.*

9.3.1.xx5 Radio Related Measurements and Information Required (FFS)

The IE defines whether the NG-RAN needs to report the radio-related measurement results and the radio-related information for the QMC function.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Radio-related Measurement Required | O |  | ENUMERATED(true, ...) | The IE indicates whether the NG-RAN needs to report radio-related measurement results for the QMC function | - | - |
| Radio-related Information Required | O |  | ENUMERATED(true, ...) | The IE indicates whether the NG-RAN needs to report radio-related information for the QMC function |  |  |

End change