**3GPP TSG- Meeting # *rev1***

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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 | **x** | Core Network |  |

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| ***Title:***  |  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *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)* |
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| ***Reason for change:*** | For DRB flows measurements, there has now been an agreement that a DRB flow is defined to be of type continuous flow if the mapped 5QI is any of {1, 2, 65, 66}. It is proposed to align the definition of continuous flow between QoS flows and DRB flows. |
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| ***Summary of change:*** | The measurement has been updated, so that a QoS flow now is defined to be of type continuous flow if the 5QI is any of {1, 2, 65, 66}. Further corrected that QCI is not possible in NR option 3. |
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| ***Consequences if not approved:*** | The definition of continuous flow will be different between QoS flows and DRB flows. |
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| ***Clauses affected:*** | 5.1.1.13.1.1, 5.1.1.13.2.1, 5.1.1.13.2.2, A.28 |
|  |  |
|  | **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 change*** |

#### 5.1.1.13 QoS flow related measurements

##### 5.1.1.13.1 QoS flow release

5.1.1.13.1.1 Number of released active QoS flows

a) This measurement provides the number of released QoS flows that were active at the time of release. QoS flows with bursty flow are seen as being active when there is user data in the queue in any of the directions. QoS flows with continuous flow are always seen as active QoS flows in the context of this measurement.
The measurement is split into subcounters per QoS level.

b) CC.

c) On transmission by the NG-RAN of a PDU SESSION RESOURCE RELEASE RESPONSE message for the PDU release initiated by the AMF with the exception of corresponding PDU SESSION RESOURCE RELEASE COMMAND message with "Cause" equal to "Normal Release" or "User inactivity", "Load balancing TAU required", "Release due to CN-detected mobility", "O&M intervention", or on transmission by the PDU SESSION RESOURCE MODIFY RESPONSE message for the PDU modification initiated by the AMF with the exception of corresponding PDU SESSION RESOURCE MODIFY REQUEST message with the "Cause" equal to "Normal Release", or on transmission by the NG-RAN of UE CONTEXT RELEASE COMPLETE for the UE context release initiated by the NG-RAN with the exception of the corresponding UE CONTEXT RELEASE REQUEST message with the cause equal to "Normal Release" or "User inactivity", "Partial handover", "Successful handover", or on transmission by the NG-RAN of UE CONTEXT RELEASE COMPLETE message for the UE context release initiated by the AMF with the exception of the corresponding UE CONTEXT RELEASE COMMAND message with "Cause" equal to "Normal Release", "Handover Cancelled" or a successful mobility activity (e.g., cause "Successful Handover", or "NG Intra system Handover triggered"), or on receipt by the NG-RAN of a PATH SWITCH REQUEST ACKNOWLEDGE or PATH SWITCH REQUEST FAILED message by which some or all QoS flows in the corresponding PATH SWITCH REQUEST need to be released , or on transmission of a NG RESET ACKNOWLEDGE message to AMF; or on receipt of a NG RESET ACKNOWLEDGE message from AMF, if any of the UL or DL are considered active in 3GPP TS 38.413 [11].

QoS flows with bursty flow are considered active when there is still data transmission in the DL or UL. QoS flows with continuous flow are always seen as active QoS flows in the context of this measurement. Each corresponding QoS flows to release is added to the relevant measurement per QoS level (5QI), the possible 5QIs are described in TS 23.501 [4]. The sum of all supported per QoS flow measurements shall equal the total number of QoS flows attempted to release when the QoS flows is active according to the definition of bursty flow/continuous flow. In case only a subset of per QoS flows measurements is supported, a sum subcounter will be provided first.

A particular QoS flow is defined to be of type continuous flow if the 5QI is any of {1, 2, 65, 66}.

d) Each measurement is an integer value. The number of measurements is equal to the number of QoS flows plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form QF.RelActNbr.*QoS.*

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) This measurement is to support the Retainability KPI "QoS flow Retainability" defined in TS 28.554 [8].

Note: This measurement is applicable for all gNB deployment scenarios.

###### 5.1.1.13.1.2 Number of QoS flows attempted to release

a) This measurement provides the number of QoS flows attempted to release. The measurement is split into subcounters per QoS level and per S-NSSAI.

b) CC.

c) On receipt by the gNB of an PDU SESSION RESOURCE RELEASE COMMAND or PDU SESSION RESOURCE MODIFY REQUEST message, or on gNB send the message of UE CONTEXT RELEASE REQUEST or PDU SESSION RESOURCE NOTIFY to AMF, each requested QoS Flow release Item in the message is release to the relevant measurement per QoS level, the possible QoS levels are included in TS 38.413. The sum of all supported per QoS level measurements shall equal the total number of Qos FlowS attempted to setup plus the number of S-NSSAI. In case only a subset of per QoS level measurements is supported, a sum subcounter will be provided first. Measurements are subcounters per 5QI and subcounters per S-NSSAI.

d) A single integer value.

e) The measurement name has the form:

QF.ReleaseAttNbr.*5QI* where *5QI* identifies the 5QI and

QF.ReleaseAttNbr.*SNSSAI* identifies the S-NSSAI

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

Note: This measurement is applicable for all gNB deployment scenarios.

##### 5.1.1.13.2 QoS flow activity

5.1.1.13.2.1 In-session activity time for QoS flow

a) This measurement provides the aggregated active session time for QoS flow in a cell. The measurement is split into subcounters per QoS level.

b) CC.

c) Number of "in session" seconds aggregated for QoS flows with a certain QoS level. , where "in session" has the following definitions:
- QoS flows with bursty flow is said to be "in session" for a UE if any QoS flow data (UL or DL) has been transferred during the last 100 ms for that 5QI
- QoS flows with continuous flow are always seen as being "in session" in the context of this measurement, and the session time is increased from the first data transmission on the QoS flow until 100 ms after the last data transmission on the QoS flow.

The sum of all supported per QoS flow measurements shall equal the total session seconds. In case only a subset of per QoS flow measurements is supported, a sum subcounter will be provided first.

A particular QoS flow is defined to be of type continuous flow if the 5QI is any of {1, 2, 65, 66}.

d) Each measurement is an integer value. The number of measurements is equal to the number of QoS levels plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form QF.SessionTimeQoS.*QoS.*

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) This measurement is to support the Retainability KPI "QoS flow Retainability" defined in TS 28.554 [8].

Note: This measurement is applicable for all gNB deployment scenarios

5.1.1.13.2.2 In-session activity time for UE

a) This measurement provides the aggregated active session time for UEs in a cell.

b) CC.

c) Number of session seconds aggregated for UEs in a cell.
For QoS flows with bursty flow, a UE is said to be "in session" if any QoS flow data on a Data Radio Bearer (UL or DL) has been transferred during the last 100 ms.
For QoS flows with continuous flow, the QoS flows (and the UE) is always seen as being "in session" in the context of this measurement, and the session time is increased from the first data transmission on the QoS flow until 100 ms after the last data transmission on the QoS flow.

 A particular QoS flow is defined to be of type continuous flow if the 5QI is any of {1, 2, 65, 66}.

d) Each measurement is an integer value.

e) The measurement name has the form QF.SessionTimeUE

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) This measurement is to support the Retainability KPI "QoS flow Retainability" defined in TS 28.554 [8].

Note: This measurement is applicable for all gNB deployment scenarios

##### 5.1.1.13.3 QoS flow setup

###### 5.1.1.13.3.1 Number of QoS flow attempted to setup

a) This measurement provides the number of QoS flows attempted to setup. The measurement is split into subcounters per QoS level (5QI).

b) CC.

c) On receipt by the NG-RAN of a PDU SESSION RESOURCE SETUP REQUEST message, or receipt by the NG-RAN of a INITIAL CONTEXT SETUP REQUEST message, or receipt by the NG-RAN of a PDU SESSION RESOURCE MODIFY REQUEST message, each requested QoS flow in the message is added to the relevant measurement per QoS level (5QI) and per S-NSSAI, the possible 5QIs are included in TS 23.501 [4]. The sum of all supported per QoS level measurements shall equal the total number of QoS flows attempted to setup. In case only a subset of per QoS level measurements is supported, a sum subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of QoS levels plus the number of S-NSSAIs, plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form.

QF. EstabAttNbr.*5QI* where *5QI* identifies the 5QI and

QF. EstabAttNbr.*SNSSAI* identifies the S-NSSAI.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

Note: This measurement is applicable for all gNB deployment scenarios.

###### 5.1.1.13.3.2 Number of QoS flow successfully established

a) This measurement provides the number of QoS flows successfully established. The measurement is split into subcounters per QoS level and per S-NSSAI.

b) CC.

c) On transmission by the NG-RAN of a PDU SESSION RESOURCE SETUP RESPONSE message, or transmission by the NG-RAN of a INITIAL CONTEXT SETUP RESPONSE message, or transmission by the NG-RAN of a PDU SESSION RESOURCE MODIFY RESPONSE message, each QoS flow successfully established is added to the relevant measurement per QoS level (5QI) and per S-NSSAI, the possible 5QIs are included in TS 23.501 [4]. The sum of all supported per QoS level measurements shall equal the total number of QoS flows successfully setup. In case only a subset of per QoS level measurements is supported, a sum subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of QoS levels plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form:

 QF.EstabSuccNbr.*5QI* where *5QI* identifies the 5QI and

QF. EstabSuccNbr.*SNSSAI* identifies the S-NSSAI.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

Note: This measurement is applicable for all gNB deployment scenarios

###### 5.1.1.13.3.3 Number of QoS flow failed to setup

a) This measurement provides the number of QoS flows failed to setup. The measurement is split into subcounters per failure cause.

b) CC.

c) On transmission by the NG-RAN of a PDU SESSION RESOURCE SETUP RESPONSE message, or transmission by the NG-RAN of a INITIAL CONTEXT SETUP RESPONSE message, or transmission by the NG-RAN of a PDU SESSION RESOURCE MODIFY RESPONSE message, each QoS flow failed to establish is added to the relevant measurement per cause, the possible causes are included in TS 38.413 [18]. The sum of all supported per cause measurements shall equal the total number of additional QoS flows failed to setup. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form QF. EstabFailNbr.*Cause*
where *Cause* identifies the cause resulting in the QoS flow setup failure.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS

Note: This measurement is applicable for all gNB deployment scenarios.

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| ***Next change*** |

# A.28 Monitor of QoS flow release

QoS flow is the key and limited resource for NG-RAN to deliver services. The release of the QoS flow needs to be monitored as:

- an abnormal release of the QoS flow will cause the call(/session) drop, which directly impacts the QoS delivered by the networks, and the satisfaction degree of the end user;

- a successfully released QoS flow can be used to setup other requested calls(/sessions). The QoS flow failed to be released will still occupy the limited resource and hence it can not be used to admit other requested calls(/sessions).

From a retainability measurement aspect, QoS flows do not need to be released because they are inactive, they can be kept to give fast access when new data arrives.

To define (from a QoS flow release measurement point of view) if a QoS flow is considered active or not, the QoS flow can be divided into two groups:

For QoS flows with bursty flow, a UE is said to be "in session" if any QoS flow data on a Data Radio Bearer (UL or DL) has been transferred during the last 100 ms.
For QoS flows with continuous flow, the QoS flow (and the UE) is always seen as being "in session" in the context of this measurement, and the session time is increased from the first data transmission on the QoS flow until 100 ms after the last data transmission on the QoS flow.

A particular QoS flow is defined to be of type continuous flow if the 5QI is any of {1, 2, 65, 66}.

The specific reason causing the abnormal and failed release of the QoS flow is required in order to find out the problem and ascertain the solutions. And due to different priority and tolerance for different service type with different QoS level in the networks, the monitor needs to be opened on each service type with QoS level.

The QoS flow can be released by PDU Session Resource Release procedure, UE Context Release procedure, Reset procedure either initiated by NG-RAN or AMF and NG Path Switch procedure (see 3GPP TS 38.413 [11]).

So performance measurements related to QoS flow Release (see 3GPP TS 38.413 [11]) and UE Context Release (see 3GPP TS 38.413 [11]) procedure for each service type with QoS level are necessary to support the monitor of QoS flow release.

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| ***End of changes*** |