3GPP TSG SA WG5 Meeting 139-e TDoc S5-215345rev1

electronic meeting, online, 11 - 20 October 2021

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **28.552** | **CR** | **0327** | **rev** | **-** | **Current version:** | **16.11.0** |  |
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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 | **X** | Core Network |  |

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| ***Title:***  | Update handover measurements  |
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| ***Source to WG:*** | Ericsson, Telefonica, Nokia, CMCC, China Telecom |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | 5G\_SLICE\_ePA |  | ***Date:*** | 2021-10-01 |
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| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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)* |
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| ***Reason for change:*** | Clarify measurements to include only legacy handovers. |
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| ***Summary of change:*** | Measurements for handovers are updated to include only legacy handovers and not Conditional Handover. Editorial corrections. |
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| ***Consequences if not approved:*** | The definition of these measurments are unclear, leading to interoperability problems. |
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| ***Clauses affected:*** | 5.1.1.6.1.1, 5.1.1.6.1.2, 5.1.1.6.1.3, 5.1.1.6.1.4, 5.1.1.6.1.5, 5.1.1.6.1.6, 5.1.1.6.1.7, 5.1.1.6.1.8, 5.1.1.6.1.9, 5.1.1.6.1.10, 5.1.1.6.1.11, 5.1.1.6.2.1, 5.1.1.6.2.2 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |   |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |   |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First change** |

###### 5.1.1.6.1.1 Number of requested legacy handover preparations

a) This measurement provides the number of legacy handover preparations requested by the source gNB.

b) CC.

c) On transmission of HANDOVER REQUIRED message (see 3GPP TS 38.413 [11]) by the NR cell CU to the AMF, or transmission of HANDOVER REQUEST message (see 3GPP TS 38.423 [13]), where the message denotes a legacy handover, by the source NR cell CU to target NR cell CU, for requesting the preparation of resources at the target NR cell CU.

d) A single integer value.

e) MM.HoPrepInterReq.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurements is for performance assurance.

###### 5.1.1.6.1.2 Number of successful legacy handover preparations

a) This measurement provides the number of successful legacy handover preparations received by the source NR cell CU.

b) CC.

c) On receipt of HANDOVER COMMAND message by the NR cell CU from the AMF (see 3GPP TS 38.413 [11]), or receipt of HANDOVER REQUEST ACKNOWLEDGE message (see 3GPP TS 38.423 [13]), where the message corresponds to a previously sent legacy handover HANDOVER REQUEST message, by the source NR cell CU from the target NR cell CU, for informing that the resources for the handover have been prepared at the target NR cell CU.

d) A single integer value.

e) MM.HoPrepInterSucc.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurements is for performance assurance.

###### 5.1.1.6.1.3 Number of failed legacy handover preparations

a) This measurement provides the number of failed legacy handover preparations received by the source NR cell CU. This measurement is split into subcounters per failure cause.

b) CC

c) On receipt of HANDOVER PREPARATION FAILURE message (see 3GPP TS 38.413 [11]) by the NR cell CU from the AMF, or receipt of HANDOVER PREPARATION FAILURE message (see 3GPP TS 38.423 [13]), where the message corresponds to a previously sent legacy handover HANDOVER REQUEST message, by the source NR cell CU from the target NR cell CU, for informing that the preparation of resources at the target NR cell CU has failed. Each received HANDOVER PREPARATION FAILURE message increments the relevant subcounter per failure cause by 1.

d) Each subcounter is an integer value.

e) MM.HoPrepInterFail.*cause.*

 Where *cause* identifies the failure cause of the handover preparations.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurements is for performance assurance.

###### 5.1.1.6.1.4 Number of requested legacy handover resource allocations

a) This measurement provides the number of legacy handover resource allocation requests received by the target NR cell CU.

b) CC.

c) On receipt of HANDOVER REQUEST message (see 3GPP TS 38.413 [1]) by the NR cell CU from the AMF, or receipt of HANDOVER REQUEST message (see 3GPP TS 38.423 [13]), where the message denotes a legacy handover, by the target NR cell CU from the source NR cell CU, for requesting the preparation of resources for handover.

d) A single integer value.

e) MM.HoResAlloInterReq.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurements is for performance assurance.

###### 5.1.1.6.1.5 Number of successful legacy handover resource allocations

a) This measurement provides the number of successful legacy handover resource allocations at the target NR cell CU for the handover.

b) CC.

c) On transmission of HANDOVER REQUEST ACKNOWLEDGE message (see 3GPP TS 38.413 [11]) by the NR cell CU to the AMF, or transmission of HANDOVER REQUEST ACKNOWLEDGE message (see 3GPP TS 38.423 [13]), where the message corresponds to a previously received legacy handover HANDOVER REQUEST message, by the target NR cell CU to the source NR cell CU, for informing that the resources for the handover have been prepared.

d) A single integer value.

e) MM.HoResAlloInterSucc.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurements is for performance assurance.

###### 5.1.1.6.1.6 Number of failed legacy handover resource allocations

a) This measurement provides the number of failed legacy handover resource allocations at the target NR cell CU for the handover. This measurement is split into subcounters per failure cause.

b) CC

c) On transmission of HANDOVER FAILURE message (see 3GPP TS 38.413 [11]) by the NR cell CU to the AMF, or transmission of HANDOVER PREPARATION FAILURE message (see 3GPP TS 38.423 [13]), where the message corresponds to a previously sent legacy handover HANDOVER REQUEST message, by the target NR cell CU to the source NR cell CU, for informing that the preparation of resources has failed. Each transmitted HANDOVER FAILURE message or HANDOVER PREPARATION FAILURE message increments the relevant subcounter per failure cause by 1.

d) Each subcounter is an integer value.

e) MM.HoResAlloInterFail.*cause*

 Where *cause* identifies the failure cause of the legacy handover resource allocations.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurements is for performance assurance.

###### 5.1.1.6.1.7 Number of requested legacy handover executions

a) This inter gNB handover measurement provides the number of outgoing legacy handover executions requested by the source gNB.

b) CC.

c) On transmission of *RRC Reconfiguration* message, where the message denotes a legacy handover, to the UE triggering the inter gNB legacy handover from the source NRCellCU to the target NRCellCU, indicating the attempt of an outgoing inter gNB legacy handover (see TS 38.331 [20]), the counter is stepped by 1.

d) A single integer value.

e) MM.HoExeInterReq.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurement is for performance assurance.

###### 5.1.1.6.1.8 Number of successful legacy handover executions

a) This inter gNB handover measurement provides the number of successful legacy handover executions received by the source gNB.

b) CC.

c) On receipt at the source gNB of UE CONTEXT RELEASE [13] over Xn from the target gNB following a successful handover, where the message denotes a legacy handover, or, if handover is performed via NG, on receipt of UE CONTEXT RELEASE COMMAND [11] from AMF following a successful inter gNB handover, where the message denotes a legacy handover, the counter is stepped by 1.

d) A single integer value.

e) MM.HoExeInterSucc.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurement is for performance assurance.

###### 5.1.1.6.1.9 Number of failed legacy handover executions

a) This inter gNB handover measurement provides the number of failed legacy handover executions received by the source gNB. This measurement is split into subcounters per failure cause.

b) CC.

c) On receipt at the source gNB of UE CONTEXT RELEASE [13] over Xn from the target gNB indicating an unsuccessful inter gNB handover, or, if handover is performed via NG, on receipt of UE CONTEXT RELEASE COMMAND [11] from AMF indicating an unsuccessful inter gNB handover.

The failure causes are listed for the UE CONTEXT RELEASE in [13] and for UE CONTEXT RELEASE COMMAND in [11]. Each received message increments the relevant subcounter per failure cause by 1.

d) Each subcounter is an integer value.

e) MM.HoExeInterFail.*cause.*

Where *cause* identifies the failure cause of the UE CONTEXT RELEASE or UE CONTEXT RELEASE COMMAND message.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurement is for performance assurance.

###### 5.1.1.6.1.10 Mean Time of requested legacy handover executions

a) This measurement provides the mean time of inter gNB legacy handover executions during each granularity period. The measurement is split into subcounters per S-NSSAI.

b) DER(n=1).

c) This measurement is obtained by accumulating the time interval for every successful inter gNB handover executions procedure per S-NSSAI between the receipt by the source NG-RAN from the target NG-RAN of a "Release Resource" and the sending of a "N2 Path Switch Request" message from source NG-RAN to the target NG-RAN over a granularity period using DER, for legacy handovers. The end value of this time will then be divided by the number of inter gNB legacy handovers observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value, in milliseconds.

e) MM.HoExeInterReq.TimeMean.*SNSSAI.*

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is for monitoring the mean time of inter gNB handovers during the granularity period.

5.1.1.6.1.11 Max Time of requested legacy handover executions

a) This measurement provides the max time of inter gNB legacy handover executions during each granularity period. The measurement is split into subcounters per S-NSSAI.

b) DER(n=1).

c) This measurement is obtained by measuring the time interval for every successful inter gNB handover executions procedure per S-NSSAI between the receipt by the source NG-RAN from the target NG-RAN of a “Release Resource" and the sending of a "N2 Path Switch Request" message from source NG-RAN to the target NG-RAN over a granularity period using DER, for legacy handovers. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value, in milliseconds.

e) MM.HoExeInterReq.TimeMax.*SNSSAI.*

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is for monitoring the mean time of inter gNB handovers during the granularity period.

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| **Next change** |

###### 5.1.1.6.2.1 Number of requested legacy handover executions

a) This measurement provides the number of outgoing intra gNB legacy handover executions requested by the source NRCellCU.

b) CC.

c) On transmission of *RRC Reconfiguration* message to the UE triggering the legacy handover from the source NRCellCU to the target NRCellCU, indicating the attempt of an outgoing intra gNB legacy handover (see 3GPP TS 38.331 [20]), the counter is stepped by 1.

d) A single integer value.

e) MM.HoExeIntraReq.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurement is for performance assurance.

###### 5.1.1.6.2.2 Number of successful legacy handover executions

a) This measurement provides the number of successful intra gNB legacy handover executions received by the source NRCellCU.

b) CC.

c) On reception of *RRC ReconfigurationComplete* message from the UE to the target NRCellCU indicating a successful intra gNB legacy handover (see 3GPP TS 38.331 [20]), the counter is stepped by 1.

d) A single integer value.

e) MM.HoExeIntraSucc.

f) NRCellCU;
NRCellRelation.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this performance measurement is for performance assurance.

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| **End of changes** |