**3GPP TSG-SA5 Meeting #133e *S5-205147***

**e-meeting 12th - 21st October 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | 28.552 | **CR** | 0271 | **rev** | - | **Current version:** | 17.0.0 |  |
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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:***  | Add Intra/Inter-frequency Handover related measurements |
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| ***Source to WG:*** |  ZTE |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | ePM\_KPI\_5G |  | ***Date:*** | 2020/10/01 |
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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)* |
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| ***Reason for change:*** | The continuity of network coverage affects user experience, and the handover success rate is a key monitoring indicator. In addition to monitoring the overall handover success rate, it is essential in network operations to follow the success rate of various handover. Low handover success rate will impact user experience, therefore it is important to define measurements to follow handover success rate. It is expected that the HO success rate may vary depending on the respective scenarios: intra-RAT, inter-RAT, inter System, intra frequency, inter frequency |
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| ***Summary of change:*** | Add Intra/Inter-frequency Handover related measurements |
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| ***Consequences if not approved:*** | The measurement of handover-related indicators is incomplete. |
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| ***Clauses affected:*** | 5.1.1.6.X(new), 5.1.1.6.X.1(new), 5.1.1.6.X.2(new), 5.1.1.6.X.3(new), 5.1.1.6.X.4(new), A.17 |
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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** |

#### 5.1.1.6.X Intra/Inter-frequency Handover related measurements

###### 5.1.1.6.X.1  Number of requested intra-frequency handover executions

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

b) CC.

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

d) A single integer value.

e) MM.HoExeIntraFreqReq.

f) NRCellCU

g) Valid for packet switched traffic.

h) 5GS.

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

###### 5.1.1.6.X.2 Number of successful intra-frequency handover executions

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

b) CC.

c) On reception of *RRC ConnectionReconfigurationComplete* message from the UE to the target NRCellCU indicating a successful intra-frequency intra gGNB handover (see 3GPP TS 38.331 [20]), or, on reception of UE CONTEXT RELEASE [13] over Xn from the target gNB following a successful handover, or, if handover is performed via NG, on reception of UE CONTEXT RELEASE COMMAND [11] from AMF following a successful inter gNB handover, the counter is stepped by 1.

d) A single integer value.

e) MM.HoExeIntraFreqSucc.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

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

###### 5.1.1.6.X.3 Number of requested inter-frequency handover executions

a) This measurement provides the number of outgoing inter-frequency handover executions requested by the source NRCellCU.

b) CC.

c) On transmission of *RRC ConnectionReconfiguration* message to the UE triggering the handover from the source NRCellCU to the target NRCellCU, indicating the attempt of an outgoing inter-frequency handover (see 3GPP TS 38.331 [20]), the counter is steped by 1.

d) A single integer value.

e) MM.HoExeInterFreqReq.

f) NRCellCU

g) Valid for packet switched traffic.

h) 5GS.

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

###### 5.1.1.6.X.4 Number of successful inter-frequency handover executions

a) This measurement provides the number of successful inter-frequency handover executions received by the source NRCellCU.

b) CC.

c) On reception of *RRC ConnectionReconfigurationComplete* message from the UE to the target NRCellCU indicating a successful inter-frequency intra gGNB handover (see 3GPP TS 38.331 [20]), or, on reception of UE CONTEXT RELEASE [13] over Xn from the target gNB following a successful handover, or, if handover is performed via NG, on reception of UE CONTEXT RELEASE COMMAND [11] from AMF following a successful inter gNB handover, the counter is stepped by 1.

d) A single integer value.

e) MM.HoExeInterFreqSucc.

f) NRCellCU.

g) Valid for packet switched traffic.

h) 5GS.

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

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| **Next modified section** |

# A.17 Monitoring of handovers

Mobility is one of the most significant feature of the mobile networks, and handover is one typical action of the mobility. The handover failure would cause service discontinuation, thus the performance of the handover has direct impact to the user experience.The handover procedure includes handover preparation, handover resource allocation and handover execution, and the performance related to handover needs to be monitored for each phase. The resources (e.g., PDU Session Resource) need to be prepared and allocated for a handover according to the QoS requirements for each S-NSSAI.

The handover could occur intra-gNB and inter-gNB for 5G networks, and for inter-gNB case the handover could happen via NG or Xn interface. The handover could occur Intra-frequency and Inter-frequency for 5G networks. The handover could also occur between 5GS and EPS.

For the handover failures, the measurements with specific causes are required for trouble shooting.

The handover parameters setting could be specific for each NCR, and the handover performance could vary significantly for different NCRs, therefore the performance needs to be measured per NCR to support handover parameters optimization when necessary.

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| **End of modifications** |