**3GPP TSG-SA5 Meeting #145-e *S5-225326rev1***

e-meeting, 15 – 24 August 2022

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.552** | **CR** | **0378** | **rev** | **1** | **Current version:** | **17.7.1** |  |
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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 | **X** |

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| ***Title:***  | Rel-17 CR 28.552 Clarification of inter-system too early and too late handover failures and unnecessary handovers for inter-system mobility  |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell  |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | ePM\_KPI\_5G |  | ***Date:*** | 2022-08-05 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***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)* |
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| ***Reason for change:*** | Some details of description of inter-sytem mobility counters related to MRO are missing. |
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| ***Summary of change:*** | * Clarification of inter-system too early handover failures, too late handover failures and unnecessary handovers
* Editorial corrections
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| ***Consequences if not approved:*** | Description of inter-sytem mobility counters related to MRO is lacking of some details. |
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| ***Clauses affected:*** | 5.1.1.25.1, 5.1.1.25.2, 5.1.1.25.3, 5.1.1.25.4 |
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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:*** | The mirrored Rel-16 CR is S5-225325 (CR 0377). |
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| ***This CR's revision history:*** |  |

***First changes***

#### 5.1.1.25 Measurements related to MRO

##### 5.1.1.25.1 Handover failures related to MRO for intra-system mobility

a) This measurement provides the number of handover failure events related to MRO detected during the intra-system mobility within 5GS, see TS 38.300 [49] clause 15.5.2. The measurement includes separate counters for various handover failure types, classified as "Intra-system too early handover", "Intra-system too late handover" and "Intra-system handover to wrong cell".

b) CC.

c) The measurements of too early handovers, too late handovers and handover to wrong cell events are obtained respectively by accumulating the number of failure events detected by gNB during the intra-system mobility within 5GS.

d) Each measurement is an integer value.

e) HO.IntraSys.TooEarly
 HO.IntraSys.TooLate

HO.IntraSys.ToWrongCell

f) NRCellCU
 NRCellRelation

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is to support MRO (see TS 28.313 [30]).

##### 5.1.1.25.2 Handover failures related to MRO for inter-system mobility

a) This measurement provides the number of handover failure events related to MRO detected during the inter-system mobility between NG-RAN and E-UTRAN, as defined in TS 38.300 [49] clause 15.5.2.2.3 The measurement includes separate counters for various handover failure types, classified as "Inter-system too early handover" (inter-system mobility from E-UTRAN to NG-RAN) and "Inter-system too late handover" (inter-system mobility from NG-RAN to E-UTRAN).

b) CC.

c) The measurements of too early inter-system handover events are obtained by accumulating the number of failure events detected during the inter-system mobility from E-UTRAN to NG-RAN. The measurements of too late inter-system handover events are obtained by accumulating the number of failure events detected during the inter-system mobility from NG-RAN to E-UTRAN.

d) Each measurement is an integer value.

e) HO.InterSys.TooEarly

HO.InterSys.TooLate

f) NRCellCU
EutranRelation

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is to support MRO (see TS 28.313 [30]).

##### 5.1.1.25.3 Unnecessary handovers for inter-system mobility

a) This measurement provides the number of unnecessary handover events detected during the inter-system mobility from NG-RAN to E-UTRAN, see TS 38.300 [49] clause 15.5.2.3. An example of unnecessary handover occurred when a UE handed over from NG-RAN to other system (e.g. UTRAN) even though quality of the NG-RAN coverage was sufficient.

b) CC.

c) The measurement of unnecessary inter-system handovers is obtained by accumulating the number of inter-system unnecessary handover events detected during the inter-system mobility from NG-RAN to E-UTRAN.

d) Each measurement is an integer value.

e) HO.InterSys.Unnecessary

f) NRCellCU

EutranRelation

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is to support MRO (see TS 28.313 [30]).

##### 5.1.1.25.4 Handover ping-pong for inter-system mobility

a) This measurement provides the number of handover ping-pong events detected during the inter-system mobility between NG-RAN to E-UTRAN, see TS 38.300 [49] clause 15.5.2.4. An example of handover ping-pong occurred when a UE is handed over from a cell in a source system (e.g. NG-RAN) to a cell in a target system different from the source system (e.g. E-UTRAN), then within a predefined limited time the UE is handed over back to a cell in the source system, while the coverage of the source system was sufficient for the service used by the UE.

b) CC.

c) The measurement of handover ping-pong events is obtained by accumulating the number of failure events detected during the inter-system mobility between NG-RAN and E-UTRAN.

d) Each measurement is an integer value.

e) HO.InterSys.PingPong

f) NRCellCU

EutranRelation

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is to support MRO (see TS 28.313 [30]).

##### 5.1.1.25.5 Handover failures per beam-cell pair related to MRO for intra-system mobility

a) This measurement provides the number of handover failure events per beam-cell pair (source beam, i.e., the last beam before failure, and target cell) related to MRO detected during the intra-system mobility within 5GS. The measurement includes separate counters for various handover failure types, classified as "Intra-system too early handover per beam”, "Intra-system too late handover per beam " and "Intra-system handover to wrong cell per beam ". The handovers considered are inter-cell handovers.

b) CC.

c) The measurements of too early handovers for the beam per adjacent cell, too late handovers for the beam per adjacent cell and handover to wrong cell for the beam per adjacent cell events are obtained respectively by accumulating the number of failure events detected by gNB during the intra-system mobility within 5GS, where adjacent cells are identified by their NR Cell Identity (NCI).

d) Each measurement is an integer value.

e) HO.IntraSys.bTooEarly.NCI
HO.IntraSys.bTooLate.NCI
HO.IntraSys.bToWrongCell.NCI

f) Beam

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is to support MRO (see TS 28.313 [30]).

***End of changes***