**3GPP TSG-SA5 Meeting #141e *S5-221342rev1***

**17 - 26 January 2022, E-meeting**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **28.552** | **CR** | **0352** | **rev** | **1** | **Current version:** | **17.5.0** |  |
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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 beam related measurements to support coverage problem analysis |
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| ***Source to WG:*** | Intel |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | eMDAS |  | ***Date:*** | 2022-01-06 |
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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)**Rel-17 (Release 17)* |
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| ***Reason for change:*** | As specified in draft TS 28.104, the measurements in the table below are needed to support coverage problem analysis for MDA.

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| SS-RSRP distribution per SSB (beam) of neighbor NR cell |
| RSRP distribution of neighbor E-UTRA cell for an NR cell |
| Timing Advance distribution for NR cell |
| Number of UE Context Release Request per SSB (gNB-DU initiated) |
| Number of UE Context Release Requests per SSB (gNB-CU initiated) |

This CR is to define these measurements. |
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| ***Summary of change:*** | Add the measurements related to SS-RSRP distribution per SSB (beam) of neighbor NR cell, RSRP distribution of neighbor E-UTRA cell for an NR cell, and Timing Advance distribution for NR cell.Added measured object Beam to masurements of Number of UE Context Release Request per SSB (gNB-DU initiated) and Number of UE Context Release Requests per SSB (gNB-CU initiated). |
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| ***Consequences if not approved:*** | The SS-RSRP distribution per SSB (beam) of neighbor NR cell, RSRP distribution of neighbor E-UTRA cell for an NR cell, Timing Advance distribution for NR cell, number of UE Context Release Request per SSB (gNB-DU initiated) and number of UE Context Release Requests per SSB (gNB-CU initiated) cannot be monitored. |
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| ***Clauses affected:*** | 5.1.1.22.1, 5.1.1.22.x (new), 5.1.1.22.y (new), 5.1.1.X (new), 5.1.3.5.1, 5.1.3.5.2 |
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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** |

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| **Next modified section** |

##### 5.1.1.22.1 SS-RSRP distribution per SSB

a) This measurement provides the distribution of SS-RSRP per SSB (see TS 38.215 [34]) received by gNB from UEs in the cell when SS-RSRP is used for L1-RSRP as configured by reporting configurations as defined in TS 38.214 [33], in case the L1-RSRP report function is enabled.

b) CC.

c) This measurement is obtained by incrementing the appropriate measurement bin using measured quantity value (See Table 10.1.6.1-1 in TS 38.133 [35]) when a RSRP value is reported by a UE when SS-RSRP is used for L1-RSRP as configured by reporting configurations as defined in TS 38.214 [33].

d) Each subcounter is an integer.

e) L1M.SS-RSRP.*Bin*

where *Bin* represents the range of Measured quantity SS-RSRP value (-140 to -40 dBm).

NOTE: Number of bins and the range for each bin is left to implementation.

f) Beam

g) Valid for packet switched traffic

h) 5GS

i) One usage of this performance measurements is to support MDA.

##### 5.1.1.22.x SS-RSRP distribution per SSB of neighbor NR cell

a) This measurement provides the distribution of SS-RSRP per SSB (see TS 38.215 [34]) of a neighbour NR cell received by gNB from UEs when SS-RSRP is used for L1-RSRP as configured by reporting configurations as defined in TS 38.214 [33], in case the L1-RSRP report function is enabled.

b) CC.

c) This measurement is obtained by incrementing the appropriate measurement bin using measured quantity value (See Table 10.1.6.1-1 in TS 38.133 [35]) when a RSRP value for the SSB beam of the neighbour NR cell is reported by a UE to the gNB via RRC *MeasurementReport* message (see TS 38.331 [20]).

d) Each subcounter is an integer.

e) L1M.SS-RSRPNrNbr.*SSBIndex*.*Bin*

where *SSBIndex* identifies the SSB beam of the neighbor NR cell; and
the *Bin* represents the range of Measured quantity SS-RSRP value (-140 to -40 dBm).

NOTE: Number of bins and the range for each bin is left to implementation.

f) NRCellRelation

g) Valid for packet switched traffic

h) 5GS

i) One usage of this performance measurements is to support MDA.

##### 5.1.1.22.y RSRP distribution per neighbor E-UTRAN cell

a) This measurement provides the distribution of RSRP per neighbour E-UTRA cell received by gNB from UEs (see 38.331 [20])

b) CC.

c) This measurement is obtained by incrementing the appropriate measurement bin using measured quantity value (See Table 10.1.6.1-1 in TS 38.133 [35]) when a RSRP value for the neighbour E-UTRA cell is reported by a UE to the gNB via RRC *MeasurementReport* message (see TS 38.331 [20]).

d) Each subcounter is an integer.

e) L1M.RSRPEutraNbr.*Bin*

where the *Bin* represents the range of Measured quantity RSRP value (-140 to -40 dBm).

NOTE: Number of bins and the range for each bin is left to implementation.

f) EUtranCellRelation

g) Valid for packet switched traffic

h) 5GS

i) One usage of this performance measurements is to support MDA.

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| **Next modified section** |

#### 5.1.1.X Timing Advance

##### 5.1.1.X.1 Timing Advance distribution for NR Cell

a) This measurement provides the distribution of the Absolute Timing Advance (*TA*) values transmitted by the gNB to UEs in the cell..

b) SI

c) This measurement is obtained by incrementing the appropriate measurement bin when an Absolute Timing Advance Command is sent to a UE in the NR cell, see TS 38.321 [32].

d) Each subcounter is an integer.

e) L1M. ATADist.*Bin*
where *Bin* represents the range of absolute *TA* value (0 to 4095).

NOTE: Number of bins and the range for each bin is left to implementation.

f) NRCellDU

g) Valid for packet switched traffic

h) 5GS

i) One usage of this performance measurements is to support MDA.

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| **Next modified section** |

#### 5.1.3.5 UE Context Release

##### 5.1.3.5.1 UE Context Release Request (gNB-DU initiated)

a) This measurement provides the number of UE CONTEXT Release initiated by gNB-DU for each release cause.

b) SI

c) Transmission of an UE CONTEXT RELEASE REQUEST message initiated by gNB-DU. Each release request is to be added to the relevant cause measurement. This measurement is also counted to the SSB beam which the UE connects to when the UE CONTEXT RELEASE REQUEST message is transmitted. The possible causes are defined in 38.473 [6]. The sum of all supported per causes measurements shall equal the total number of UE CONTEXT Release initiated by gNB-DU. 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 UECNTX.RelReq.*Cause*
 where *Cause* identifies the release cause.

f) NRCellDU
Beam

g) Valid for packet switched traffic

h) 5GS

i) One usage of this performance measurements is to support MDA.

##### 5.1.3.5.2 Number of UE Context Release Requests (gNB-CU initiated)

a) This measurement provides the number of UE CONTEXT RELEASE initiated by gNB-CU for each release cause.

b) SI

c) Transmission of an UE CONTEXT RELEASE COMMAND message initiated by gNB-CU. Each release request is to be added to the relevant cause measurement. This measurement is also counted to the SSB beam which the UE connected to when the UE CONTEXT RELEASE REQUEST COMMAND message is transmitted. The possible causes are defined in 38.473 [6]. The sum of all supported per causes measurements shall equal the total number of UE CONTEXT Release initiated by gNB-CU. 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 UECNTX.RelCmd.Cause where Cause identifies the release cause.

f) NRCellCU
Beam

g) Valid for packet switched traffic

h) 5GS

i) One usage of this performance measurements is to support MDA.

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| **Next modified section** |

# A.64 Monitoring of RF performance

Monitoring of the quality of RF signal in the cell is useful for the purpose of network planning and network optimization.

In case the L1-RSRP report function is enabled, measurements of RSRP per beam reported by UEs is a useful metric reflecting RF signal strength. In 5G NR, gNB cells transmit many narrow beams targeting UEs in the cell that result in better link budget and lower interference. However, some areas between beams of neighbouring NR cells, or between the NR cell and the neighbor E-UTRA cell may experience poor coverage or coverage holes. Therefore, it is necessary to optimize the beam coverage by coordinating the beam management function across multiple neighboring NR cells.

The Absolute Timing Advance reflects the distance of the UE from the cell antenna. The distribution of Absolute Timing Advance reflects UE distribution in the NR cell, thus it is helpful for analyzing the coverage and the capacity.

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| **End of modified sections** |