**3GPP TSG-RAN4 Meeting #95-e *R4-2008633***

**Online, , 25th May 2020 - 5th Jun 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.133** | **CR** | **6848** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  |
| *For* [***HELP***](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 | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Cell re-selection for EUTRAN-NR high speed in TS36.133 |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_HST-Core |  | ***Date:*** | 2020-06-03 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-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:*** | Enhanced reselection requirements need to be added for high speed reselection from LTE to NR |
|  |  |
| ***Summary of change:*** | Add an additional table with requirements when high speed reselection from LTE to NR is supported and configured |
|  |  |
| ***Consequences if not approved:*** | Insufficient minimum performance for reselections in high speed scenario. |
|  |  |
| ***Clauses affected:*** | 4.2.2.5.6 |
|  |  |
|  | **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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

##### 4.2.2.5.6 Measurements of NR cells

If Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ then the UE shall search for inter-RAT NR layers of higher priority at least every Thigher\_priority\_search where Thigher\_priority\_search is described in clause 4.2.2 except if the inter-RAT NR layer is indicated to meet high speed requirements, when a search at every Thigher\_priority\_search is not required.

If Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ then the UE shall search for and measure inter-RAT NR layers of higher, lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT NR layers shall be the same as that defined below for lower priority RATs.

The requirements in this section apply for inter-RAT NR measurements. When the measurement rules indicate that inter-RAT NR cells are to be measured, the UE shall measure SS-RSRP and SS-RSRQ of detected NR cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter NNR\_carrier is the total number of configured NR carriers in the neighbour frequency list. The UE shall filter SS-RSRP and SS-RSRQ measurements of each measured NR cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

The UE shall be able to evaluate whether a newly detectable inter-RAT NR cell meets the reselection criteria defined in TS 36.304 [1] within NNR\_carrier\_HST \* Tdetect, NR\_HST + NNR\_carrier,Non-HST \* Tdetect, NR,Non-HST

 when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ when Treselection = 0 provided that the reselection criteria is met by a margin of at least 5 dB in FR1 or [6.5] dB in FR2 for reselections based on ranking or 6 dB in FR1 or [7.5] dB in FR2 for SS-RSRP reselections based on absolute priorities or 4 dB in FR1 and [4] dB in FR2 for SS-RSRQ reselections based on absolute priorities. NNR\_carrier\_HST is the number of configured carriers for reselection indicated to meet high speed requirements and NNR\_carrier,Non-HST is the number of configured carriers for reselection indicated to meet non high speed requirements.

When higher priority cells are found by the higher priority search, they shall be measured at least every Tmeasure,NR. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

If the UE detects on an inter-RAT NR carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall not consider an inter-RAT NR cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

Cells which have been detected shall be measured at least every NNR\_carrier\_HST \* Tmeasure, NR\_HST + NNR\_carrier,NonHST \* Tmeasure, NR,NonHST when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-RAT NR cell has met reselection criterion defined in TS 36.304 [1] within NNR\_carrier\_HST \* Tevaluate, NR\_HST + NNR\_carrier,NonHST \* Tevaluate, NR,NonHST \* TevaluateNR,NonHST when Treselection = 0as specified in Table 4.2.2.5.6-1 and table 4.2.2.5.6-2 provided that the reselection criteria is met by a margin of at least 5dB in FR1 or [6.5] dB in FR2 for reselections based on ranking or 6 dB in FR1 or [7.5] dB in FR2 for SS-RSRP reselections based on absolute priorities or 4 dB in FR1 and [4] dB in FR2 for SS-RSRQ reselections based on absolute priorities.

If Treselection timer has a non zero value and the inter-RAT NR cell is satisfied with the reselection criteria which are defined in TS 36.304 [1], the UE shall evaluate this NR cell for the Treselection time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

Table 4.2.2.5.6-1: Tdetect,NR\_nonHST, TmeasureNR\_nonHST, and Tevaluate,NR\_nonHST

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DRX cycle length [s] | Scaling Factor (N1) | Tdetect,NR\_nonHST [s] (number of DRX cycles) | Tmeasure,NR\_nonHST [s] (number of DRX cycles) | Tevaluate,NR\_nonHST[s] (number of DRX cycles) |
| FR1 | FR2Note1 |
| 0.32 | 1 | 8 | 11.52 x 1.5 x N1(36 x 1.5 x N1) | 1.28 x 1.5 x N1(4 x 1.5 x N1) | 5.12 x 1.5 x N1(16 x 1.5 x N1) |
| 0.64 | 5 | 17.92 x N1(28 x N1) | 1.28 x N1(2 x N1) | 5.12 x N1(8 x N1) |
| 1.28 | 4 | 32 x N1(25 x N1) | 1.28 x N1(1 x N1) | 6.4 x N1(5 x N1) |
| 2.56 | 3 | 58.88 x N1(23 x N1) | 2.56 x N1(1 x N1) | 7.68 x N1(3 x N1) |
| NOTE 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length. |

Table 4.2.2.5.6-2: Tdetect,NR, TmeasureNR, and Tevaluate,NR when UE supports and is configured with high speed reselection from LTE to NR

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Tdetect,NR\_HST [s] (number of DRX cycles) | Tmeasure,NR\_HST [s] (number of DRX cycles) | Tevaluate,NR\_HST[s] (number of DRX cycles) |
|
| 0.32 | 4.16 x M2 (13 x M2)Note 2 | 0.64 x M3 (2 x M3)Note 2 | 0.96 x M4 (3 x M4) Note 2 |
| 0.64 | 7.68 (12)) | 1.28 (2) | 1.92 (3) |
| 1.28 | 12.8(10)  | 1.28 (1) | 3.84 (3) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |
| Note 1: FR2 high speed requirements are not specified.Note 2: M2=1.5, M3=2 and M4=2 if SMTC periodicity of measured intra-frequency cell > 40 ms; otherwise M2=1. |