3GPP RAN WG2 Meeting #122 R2-230xxxx

Incheon KR, May 22nd – 26th, 2023

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.304** | **CR** | **draft** | **rev** | **-** | **Current version:** | **17.4.0** |  |
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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 | **X** | Radio Access Network | **x** | Core Network |  |

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| ***Title:***  | Running CR for TS 36.304 for Rel-18 IoT-NTN |
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| ***Source to WG:*** | Nokia |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | IoT\_NTN\_enh |  | ***Date:*** | 2023-06-13 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *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:*** | Introduction of Release-18 enhancement for IoT-NTN |
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| ***Summary of change:*** | This running CR captures the following RAN2 agreements related to the idle mode procedure for IoT-NTN until RAN2-122.**RAN2-122**1. Extend the neighbor cell information in existing SIBs (not SIB31) to include satellite ID2. The system Information modification procedure is not triggered for an update of new SIB on neighbor-cell assistance information.3. For NB-IoT, SIBxx is not an essential SIB. UE does not need to consider the cell barred if it is unable to acquire the SIB when scheduled. FFS for eMTC4. In RRC IDLE, how to (re-)acquire neighbor cell assistance information is up to UE’s implementation.5. The satellite ID in the new SIB is an integer of X bits wherein X depends on the maximum number of satellites to be considered for mobility.6. The satellite ID is defined as a Radio resource control information element to be used in other configurations.7. If a parameter in the common TA parameters is absent, then the value of the parameter is assumed zero.8. If Kmac is absent, then the value of Kmac for the neighbor satellite in the list is assumed zero. FFS on further optimization on signaling, e.g., signalling explicit value 0 of Kmac.9 R18 location and time-based trigger for measurements (for connected mode and for idle) apply to both NB-IoT and eMTC.10. Reference location and distanceThresh in SIB31. A change of reference location does not trigger SI modification. A UE does not need to get a new reference location as long as ephemeris and Epoch time are valid (in Connected mode the UE relies on T317)**RAN2-121-bis**1. For eMTC NTN, for fixed cell, location-based measurement initiation can also be used in RRC\_IDLE for cell re-selection purposes (like in NR-NTN)2. For eMTC NTN, for moving cell, location-based measurement initiation can also be used in RRC\_IDLE for cell re-selection purposes (like in NR-NTN). FFS whether to consider a solution that does not require UE to update the GNSS for this same as in connected mode |
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| ***Consequences if not approved:*** | No support for Release-18 enhancements for NTN in IoT |
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| ***Clauses affected:*** | 5.2.4.2,5.2.4.2a |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | 1st version |

Start of changes

#### 5.2.4.2 Measurement rules for cell re-selection

For NB-IoT measurement rules for cell re-selection is defined in clause 5.2.4.2.a.

When evaluating Srxlev and Squal of non-serving cells for reselection purposes, the UE shall use parameters provided by the serving cell.

Following rules are used by the UE to limit needed measurements:

- If the measurements are performed using RSS as specified in [10] and the serving cell fulfils Srxlev> SIntraSearchP:

- If [distanceThresh] and [reference location] are broadcasted in SIB31, and if UE supports location-based measurement initiation and has obtained its location:

- If the distance between UE and serving cell reference location is shorter than [distanceThresh] the UE may choose not to perform intra-frequency measurements.- Else,the UE shall perform intra-frequency measurements.

- Else, the UE may choose not to perform intra-frequency measurements.

- Else if the serving cell fulfils Srxlev> SIntraSearchP and Squal > SIntraSearchQ:

- If *[distanceThresh]* and [*referenceLocation*] are broadcasted in SIB31, and if UE supports location-based measurement initiation and has obtained its location:

- If the distance between UE and the serving cell reference location is shorter than *[distanceThresh]* the UE may choose not to perform intra-frequency measurements.

- Else,the UE shall perform intra-frequency measurements.

- Else, the UE may choose not to perform intra-frequency measurements.- Otherwise, the UE shall perform intra-frequency measurements.

- The UE shall apply the following rules for E-UTRAN inter-frequencies and inter-RAT frequencies which are indicated in system information and for which the UE has priority provided as defined in 5.2.4.1:

- For an E-UTRAN inter-frequency or inter-RAT frequency with a reselection priority higher than the reselection priority of the current E-UTRA frequency the UE shall perform measurements of higher priority E-UTRAN inter-frequency or inter-RAT frequencies according to TS 36.133 [10].

- For an E-UTRAN inter-frequency with an equal or lower reselection priority than the reselection priority of the current E-UTRA frequency and for inter-RAT frequency with lower reselection priority than the reselection priority of the current E-UTRAN frequency:

- If the measurements are performed using RSS as specified in [10] and the serving cell fulfils Srxlev > SnonIntraSearchP:

- If *[distanceThresh]* and *[referenceLocation]* are broadcasted in SIB31, and if UE supports location-based measurement initiation and has obtained its location:

- If the distance between UE and serving cell reference location is shorter than *[distanceThresh]* ]the UE may choose not to perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority unless the UE is triggered to measure an E-UTRAN inter-frequency which is configured with *redistributionInterFreqInfo*.

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- Else, the UE shall perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority according to TS 36.133 [10].

- Else, UE may choose not to perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority unless the UE is triggered to measure an E-UTRAN inter-frequency which is configured with *redistributionInterFreqInfo*.

- Else if the serving cell fulfils Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ:

- If *[distanceThresh]* and *[referenceLocation]* are broadcasted in SIB31, and if UE supports location-based measurement initiation and has obtained its location:

 - If the distance between UE and serving cell reference location is shorter than *[distanceThresh]* ]the UE may choose not to perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority unless the UE is triggered to measure an E-UTRAN inter-frequency which is configured with *redistributionInterFreqInfo*.

 - Else, the UE shall perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority according to TS 36.133 [10].

- Else, UE may choose not to perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority unless the UE is triggered to measure an E-UTRAN inter-frequency which is configured with *redistributionInterFreqInfo*.

- Otherwise,the UE shall perform measurements of E-UTRAN inter-frequencies or inter-RAT frequency cells of equal or lower priority according to TS 36.133 [10].

- If the UE supports relaxed monitoring and *s-SearchDeltaP* is present in *SystemInformationBlockType3*, the UE may further limit the needed measurements, as specified in clause 5.2.4.12.

If *t-Service* is present in *SystemInformationBlockType3* of the serving cell, UE shall perform intra-frequency, inter-frequency or inter-RAT measurements, before the time *t-Service* regardless whether the serving cell fulfils Srxlev> SIntraSearchP and Squal > SIntraSearchQ, or Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ. The exact time to start measurements before *t-Service* is up to UE implementation. UE shall perform measurements of higher priority inter-frequencies or inter-RAT frequencies regardless of the remaining service time of the serving cell.

#### Editor Note: When evaluating the distance-based condition, the current serving cell reference location is derived based on the ephemeris and *[referenceLocationInfo ]* by UE implementation.5.2.4.2a Measurement rules for cell re-selection for NB-IoT

When evaluating Srxlev and Squal of non-serving cells for reselection purposes, the UE shall use parameters provided by the serving cell.

Following rules are used by the UE to limit needed measurements:

- If the serving cell fulfils Srxlev> SIntraSearchP,

- If *[distanceThresh]* and *[referenceLocation] are* broadcasted in *SystemInformationBlock31-NB*, and if UE supports location-based measurement initiation and has obtained its location:

- If the distance between UE and serving cell reference location is shorter than *[distanceThresh]* the UE may choose not to perform intra-frequency measurements.

- Else,the UE shall perform intra-frequency measurements.

 - Else, the UE may choose not to perform intra-frequency measurements.

- Otherwise, the UE shall perform intra-frequency measurements.

- The UE shall apply the following rules for NB-IoT inter-frequencies which are indicated in system information:

- If the serving cell fulfils Srxlev > SnonIntraSearchP:

- If *[distanceThresh]* and *[referenceLocation] are* broadcasted in *SystemInformationBlock31-NB*, and if UE supports location-based measurement initiation and has obtained its location:

- If the distance between UE and serving cell reference location is shorter than *[distanceThresh]* the UE may choose not to perform intra-frequency measurements.

- Else,the UE shall perform inter-frequency measurements.

- Else, the UE may choose not to perform inter-frequency measurements.

- Otherwise,the UE shall perform inter-frequency measurements.

- If the UE supports relaxed monitoring and *s-SearchDeltaP* is present in *SystemInformationBlockType3-NB*, the UE may further limit the needed measurements, as specified in clause 5.2.4.12.

If *t-Service* is present in *SystemInformationBlockType3-NB* of the serving cell, UE shall perform intra-frequency or inter-frequency measurements before the time *t-Service* regardless whether the serving cell fulfils Srxlev> SIntraSearchP or Srxlev > SnonIntraSearchP. The exact time to start measurements before *t-Service* is up to UE implementation.

Editor Note: When evaluating the distance-based condition, the current serving cell reference location is derived based on the ephemeris and *[referenceLocationInfo ]* by UE implementation.

End of changes