**3GPP TSG-RAN2 Meeting #125  *draft-*R2*-*2401597**

**Athens, Greece, 26th Feb 2024 –1st March 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **36.304** | **CR** | **0871** | **rev** | **1** | **Current version:** | **18.0.0** |  |
|  |
| *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:***  | Introduction of IoT-NTN Enhancements |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | RAN2 |
|  |  |
| ***Work item code:*** | IoT\_NTN\_enh-Core |  | ***Date:*** | 2024-04-03 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | Miscellanious corrections to IoT-NTN |
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| ***Summary of change:*** | The distance based intra frequency measurement triggering related description is included for Srxlev/Squal check criteria.UE capability for location-based measurement for different types of cells is considered in the evaluation steps |
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| ***Consequences if not approved:*** | Location based measurement triggering is not triggered for some conditions of serving cell  |
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| ***Clauses affected:*** | 5.2.4.2,5.2.4.2a |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS36.331  |
| ***affected:*** |  |  |  Test specifications | TS36.300  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS36.306 |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR’s revision history:*** |  |

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 *referenceLocation* are broadcast in *SystemInformationBlockType31*, and if the UE has obtained its location information:

- If *referenceLocation* is set to *fixedCell* and if the UE supports location-based measurement initiation for fixed cell if the distrance between the UE and *referenceLocation* is shorter than *distanceThresh*, the UE may choose not to perform intra-frequency measurements. Else, the UE shall perform intra-frequency measurements.

- If *referenceLocation* is set to *movingCell* and if the UE supports location-based measurement initiation for moving cell, the UE derives the serving cell reference location based on ephemeris, epohcTime and *referenceLocation.* If the distance between the 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.

- 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 broadcast in *SystemInformationBlockType31*, and if the UE has obtained its location information:

- If *referenceLocation* is set to *fixedCell* and if the UE supports location-based measurement initiation for fixed cell if the distrance between the UE and *referenceLocation* is shorter than *distanceThresh*, the UE may choose not to perform intra-frequency measurements. Else, the UE shall perform intra-frequency measurements.

- If *referenceLocation* is set to *movingCell* and if the UE supports location-based measurement initiation for moving cell, the UE derives the serving cell reference location based on ephemeris, epohcTime and *referenceLocation.* If the distance between the 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.

- 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 broadcast in *SystemInformationBlockType31*, and if the UE has obtained its location:

- If *referenceLocation* is set to *fixedCell* and if supports location-based measurement initiation for fixed cell, the *referenceLocation* is used as serving cell reference location. If the distance between the 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].

- If *referenceLocation* is set to *movingCell* and UE supports location-based measurement initiation for moving cell, the UE derives the serving cell reference location based on ephemeris, epochTime and *referenceLocation*. If the distance between the 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, 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 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 broadcast in *SystemInformationBlockType31*, and if the UE supports location-based measurement initiation and has obtained its location:

- If *referenceLocation* is set to *fixedCell* and UE supports location-based measurement initiation for fixed cell, the *referenceLocation* is used as serving cell reference location. If the distance between the 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].

- If *referenceLocation* is set to *movingCell* and UE supports location-based measurement initiation for moving cell, the UE derives the serving cell reference location based on ephemeris, epochTime and *referenceLocation*. If the distance between the 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, 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 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 and *t-ServiceStartNeigh* if present in *SystemInformationBlockType33* may be used to decide on when to start measurements. UE shall perform measurements of higher priority inter-frequencies or inter-RAT frequencies regardless of the remaining service time of the serving cell.

#### 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 broadcast in *SystemInformationBlock31-NB*, and if the UE has obtained its location:

* If *referenceLocation* is set to *fixedCell*, the *referenceLocation* is used as serving cell reference 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.
* If *referenceLocation* is set to *movingCell* the UE derives the serving cell reference location based on ephemeris, epochTime and *referenceLocation*. 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, 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 broadcast in *SystemInformationBlock31-NB*, and if the UE supports location-based measurement initiation and has obtained its location:

- If *referenceLocation* is set to *fixedCell*, *referenceLocation* is used as serving cell reference location. If *referenceLocation* is set to *movingCell*, the UE derives the serving cell reference location based on ephemeris, epochTime, referenceLocation and the UE location.

- If the distance between the UE and serving cell reference location is shorter than *distanceThresh*, the UE may choose not to perform inter-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 and *t-ServiceStartNeigh* if present in *SystemInformationBlockType33-NB* may be used to decide on when to start measurements.

End Of Changes