**3GPP TSG-RAN WG2 Meeting #121bis-eR2-2304268**

**April 17-26, 2023**

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| *CR-Form-v11.4* |
| **CHANGE REQUEST** |
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|  | **38.300** | **CR** | **0647** | **rev** | **2** | **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:***  | NTN stage-2 correction |
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| ***Source to WG:*** | OPPO, Ericsson, Thales, Samsung |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_NTN\_solutions-Core |  | ***Date:*** | 2023-04-24 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***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)* |
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| ***Reason for change:*** | 1. RP is used for the Common TA before it has been introduced.
2. Common TA defines where the RP is, it is equal to the RTT between RP and NTN payload, “corresponds” gives the wrong impression.
3. Explanation of kmac is disconnected to where it is introduced.
4. kmac does not have to be larger or equal to the RTT between RP and gNB – also lower or higher values will work but best is if it is close to the RTT between RP and gNB.
5. The reference to the figure is not precise as the figure does not include Koffset nor kmac.
6. Figure 16.14.2.1-1 is not editable and Kmac should be added in the figure.
7. RP’s reference to RAN1 spec is wrong.
8. Kmac is missing in the assistance information for neighbor cell measurements.
9. Both SIB3 and SIB4 can include neighbouring cell related information, however SIB3 is missing in the corresponding text.
10. The statement of “it is up to NW to configure the same HARQ modes for CG and SPS” is missing.
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| ***Summary of change:*** | 1. Sequence of paragraphs is adjusted.
2. Descriptions on common TA and Kmac are corrected.
3. Kmac is added in the assistance information for neighbor cell measurements.
4. SIB3 is added to include neighbor cell related information.
5. Add Kmac in the figure.
6. Some editial changes.
7. Add the NOTE that it is up to NW to configure the same HARQ modes for CG and SPS.
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| ***Consequences if not approved:*** | Stage-2 specification is not correct for some descriptions. |
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| ***Clauses affected:*** | 16.14.2.1, 16.14.3.3 |
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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:*** |  |

1st Change

#### 16.14.2.1 Scheduling and Timing

DL and UL are frame aligned at the uplink time synchronization reference point (RP) with an offset given by NTA,offset (see clause 4.2 of TS 38.213 [38]).

To accommodate the propagation delay in NTNs, several timing relationships are enhanced by a Common Timing Advance (Common TA) and two scheduling offsets $K\_{offset}$and $k\_{mac}$:

- $Common TA$ is a configured timing offset that is equal to the RTT between the RP and the NTN payload.

- $\_{}\_{}$ is a configured scheduling offset that needs to be larger or equal to the sum of the service link RTT and the Common TA.

- $k\_{mac} $is a configured scheduling offset that approximately equals to the RTT between the RP and the gNB.

The offset $k\_{mac}$ is used to delay the application of a downlink configuration indicated by a MAC CE command on PDSCH, see TS 38.213 [38], and in estimation of UE-gNB RTT, see TS 38.321 [6]. It may be provided by the network when downlink and uplink frame timing are not aligned at gNB. The $k\_{mac}$ is also used in the random access procedure, to determine the start time of RAR window/MsgB window after a Msg1/MsgA transmission (see TS 38.213 [38]).

The Service link RTT, Feeder link RTT, RP, common TA, $k\_{mac}$ and TTA (see clause 16.14.2.2) are illustrated in Figure 16.14.2.1-1.



 (assuming gNB and NTN Gateway are collocated)

NOTE: It is up to network implementation to ensure proper configuration of HARQ feedback (i.e. either enabled or disabled) for HARQ processes used by an SPS configuration and of HARQ mode (i.e. either HARQ modeA or HARQ modeB) for HARQ processes used by a CG configuration.

2nd Change

#### 16.14.3.3 Measurements

The same principle as described in 9.2.4 applies to measurements in NTN unless hereunder specified.

The network can configure:

- multiple SMTCs in parallel per carrier and for a given set of cells depending on UE capabilities;

- measurement gaps based on multiple SMTCs;

- assistance information (e.g., ephemeris, Common TA parameters, $k\_{mac}$, etc.) provided in SIB19 for UE to perform measurement on neighbour cells in RRC\_IDLE/RRC\_INACTIVE/RRC\_CONNECTED.

NW-controlled adjustment of SMTCs can be based on UE assistance information reported in RRC\_CONNECTED. A UE in RRC\_IDLE/RRC\_INACTIVE can adjust SMTCs based on its location and assistance information in SIB19.

UE assistance information consists of the service link propagation delay difference(s) between serving the cell and neighbour cell(s).

For a UE in Idle/Inactive mode it's up to UE implementation whether to perform NTN neighbour cell measurements on a cell indicated in SIB3/SIB4 but not included in SIB19.

For a UE in Connected mode, it's up to UE implementation whether to perform NTN neighbour cell measurements on a cell included in the measurement configuration but not included in SIB19.

In the quasi-earth fixed cell scenario, UE can perform time-based and location-based measurements on neighbour cells in RRC\_IDLE/RRC\_INACTIVE:

- The timing and location information associated to the serving cell is provided in SIB19;

- Timing information refers to the UTC time when the serving cell stops serving the current geographical area;

- Location information refers to the reference location of the serving cell and a distance threshold to the reference location.

Measurement rules for cell re-selection based on timing information and location information are specified in clause 5.2.4.2 in TS 38.304 [10].