**3GPP TSG RAN WG1 Meeting # 110bis-eR1-221XXXX**

**e-Meeting, October 10th – 19th, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **36.213** | **CR** | **XXXX** | **rev** | **0** | **Current version:** | **17.3.0** |  |
|  |
| *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:***  | CR on UE pre-compensation in segment |
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| ***Source to WG:*** | Moderator (MediaTek) |
| ***Source to TSG:*** | R1 |
|  |  |
| ***Work item code:*** | LTE\_NBIOT\_eMTC\_NTN-Core |  | ***Date:*** | 2022-10-19 |
|  |  |  |  |  |
| ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | In RAN1 meeting #107e, the following agreement on UE pre-compensation in segment was made and was not reflected in the specification.AgreementSupport network re-configuration of UL transmission segment by dedicated RRC Signalling. |
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| ***Summary of change:*** | Reflect the missing agreement on UE pre-compensation in segment. |
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| ***Consequences if not approved:*** | Incomplete specification. |
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| ***Clauses affected:*** | 4.2.3, 16.1.2 |
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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:*** |  |

4.2.3 Transmission timing adjustments

<Unchanged parts are omitted>

For a BL/CE UE in a NTN serving cell, using serving satellite higher-layer ephemeris parameters, if configured, the BL/CE UE determines $N\_{TA,adj}^{UE}$ (defined in [3]) using the serving satellite position and its own position to pre-compensate the two-way transmission delay on the service link. To pre-compensate the two-way transmission delay between the uplink time synchronization reference point and the serving satellite, the BL/CE UE determines $N\_{TA,adj}^{common} $(defined in [3]) based on one-way propagation delay $Delay\_{common}\left(t\right)$ which can be obtained as:

$$Delay\_{common}\left(t\right)=\frac{1}{2}\left[N\_{TA}^{common}+N\_{TA}^{commonDrift}×\left(t-t\_{epoch}\right)+N\_{TA}^{commonDriftVariation}×\left(t-t\_{epoch}\right)^{2} \right]$$

where $N\_{TA}^{common}$, $N\_{TA}^{commonDrift}$, and $N\_{TA}^{commonDriftVariation}$ are given by the higher layer parameters *nta-Common*, *nta-CommonDrift*, and *nta-CommonDriftVariation* respectively, and $t\_{epoch}$ is the epoch time given by the higher layer parameter *epochTime*. $Delay\_{common}(t)$ provides a distance at time $t$ between the serving satellite and the uplink time synchronization reference point divided by the speed of light. The uplink time synchronization reference point is the point where DL and UL are frame aligned with an offset given by $N\_{TA,offset}$.

For a BL/CE UE communicating over NTN, time and frequency pre-compensation is adjusted per uplink segment with a transmission duration of time units, where the quantity is provided by higher layers, as specified in [11].

<Unchanged parts are omitted>

16.1.2 Timing synchronization

<Unchanged parts are omitted>

For a UE in a NTN serving cell, using serving satellite higher-layer ephemeris parameters, if configured, the UE determines $N\_{TA,adj}^{UE}$ (defined in [3]) using the serving satellite position and its own position to pre-compensate the two-way transmission delay on the service link. To pre-compensate the two-way transmission delay between the uplink time synchronization reference point and the serving satellite, the UE determines $N\_{TA,adj}^{common} $(defined in [3]) based on one-way propagation delay $Delay\_{common}\left(t\right)$ which can be obtained as:

$$Delay\_{common}\left(t\right)=\frac{1}{2}\left[N\_{TA}^{common}+N\_{TA}^{commonDrift}×\left(t-t\_{epoch}\right)+N\_{TA}^{commonDriftVariation}×\left(t-t\_{epoch}\right)^{2} \right]$$

where $N\_{TA}^{common}$, $N\_{TA}^{commonDrift}$, and $N\_{TA}^{commonDriftVariation}$ are given by the higher layer parameters *nta-Common*, *nta-CommonDrift*, and *nta-CommonDriftVariation* respectively, and $t\_{epoch}$ is the epoch time given by the higher layer parameter *epochTime*. $Delay\_{common}(t)$ provides a distance at time $t$ between the serving satellite and the uplink time synchronization reference point divided by the speed of light. The uplink time synchronization reference is the point where DL and UL are frame aligned with an offset given by $N\_{TA,offset}$.

For a NB-IoT UE communicating over NTN, time and frequency pre-compensation is adjusted per uplink segment with a transmission duration of time units, where the quantity is provided by higher layers, as specified in [11].

<Unchanged parts are omitted>