**3GPP TSG-RAN WG4 Meeting # 104-e *R4-2214601***

**Electronic Meeting, 15 - 26 August 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **2485** | **rev** | **1** | **Current version:** | **17.6.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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| ***Title:*** | CR to TS 38.133: Adding requirements for timing advance for satellite access | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_NTN\_solutions-Core | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | |  |
|  | *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 can be 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introducing requirements for UE specific updates in timing advance. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introducing requirements for a valid transmit timing as per previous agreements.  Introducing UE correction timing for the duration of the NTN validity timer.  This is a revision of R4-2214601. | | | | | | | | |
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| ***Consequences if not approved:*** | | UE may initiate transmission with outdated ephemeris parameters, leading to outdated precompensation and poor network performance. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.3C.2.X and 7.3C.2.Y | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change 1>

## 7.3C Timing advance for satellite access

*Editor’s note: Applicability of frequency range, CA, DA, duplex mode, inter-RAT measurement, etc is subject to updates/changes based on the scope of the corresponding WID.*

*Editor’s note: Terminology will be further clarified and selected between, e.g. NTN and satellite access, based on further agreements.*

### 7.3C.1 Introduction

The timing advance is initiated from SAN to UE configured with only PCell served by SAN, with MAC message that implies the adjustment of the timing advance, as defined in clause 5.2 of TS 38.321 [7].

### 7.3C.2 Requirements

#### 7.3C.2.1 Timing Advance adjustment delay

UE shall adjust the timing of its uplink transmission timing at time slot *n*+ *k+1* for a timing advance command received in time slot *n*, and the value of *k* is defined in clause 4.2 in TS 38.213 [3]. The same requirement applies also when the UE is not able to transmit a configured uplink transmission due to the channel assessment procedure.

#### 7.3C.2.2 Timing Advance adjustment accuracy

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to the UE Timing Advance adjustment accuracy requirement in Table 7.3C.2.2-1, to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command step is defined in TS 38.213 [3].

Table 7.3C.2.2-1: UE Timing Advance adjustment accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| UL Sub Carrier Spacing(kHz) | 15 | 30 | 60 |
| UE Timing Advance adjustment accuracy | ±256 Tc | ±256 Tc | ±128 Tc |

*Editor’s Note: it would be further clairified with the additional conditions for TA adjustment accuracy requirement for satellite access*

#### 7.3C.2.X Adjustment of UE specific Component of Timing Advance

If the UE is provided with higher-layer parameters for the ephemeris fo the satellite associated with the serving cell and the UE has a running validity timer for this parameter [x, TS 38.331] the UE shall adjust the common delay component, , of its transmit timing according to the specified in clause 7.1C at [the beginning of every frame].

The value of after the adjustment is given by , where D is the distance between the UE and the satellite at the adjustment time measured in meters, is the speed of light, [299 792 458 m/s], and is the basic timing defined in TS 38.211[x].

The satellite position shall be updated according to TS 38.213 [x] for the duration of the validity timer. If the UE does not have a running validity timer or if the timer has expired, the UE shall not perform uplink transmissions.

#### 7.3C.2.Y Adjustment of Common Delay Component of Timing Advance

If one or more of the higher-layer parameters ta-Common, ta-CommonDrift, and ta-CommonDriftVariant [x, TS 38.331] for the satellite associated to the serving cell is provided, the UE shall adjust the common delay component, , of its transmit timing according to the specified in clause 7.1C at [the beginning of every frame].

The value of after the adjustment is given by , where Tc is the basic timing defined in TS 38.211[x] and is the NTN common delay, as defined in [Section 4.2 of TS 38.213 [x]].

The common delay component adjustment shall be updated for the duration of the validity timer of the higher layer common delay parameters. If the UE does not have a running validity timer or if the timer has expired, the UE shall not perform uplink transmissions.

<End of Change 1>