**3GPP TSG-WG1 Meeting #106bR1-21xxxxx**

**e-Meeting, October 11th – 19th, 2021**

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| *CR-Form-v12.1* |
| **DRAFT CHANGE REQUEST** |
|  |
|  | **38.215** | **CR** | **-** | **rev** |  **-** | **Current version:** | **16.4.0** |  |
|  |
| *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:***  | TEI17: Introduction of Timing advance (TA) PRACH based solution for NR UL E-CID |
|  |  |
| ***Source to WG:*** | Intel Corporation |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | TEI17 |  | ***Date:*** | 2021-10-29 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Enable timing advance (TA) PRACH based solution for NR UL E-CID |
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| ***Summary of change:*** | New definition of TA measurement |
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| ***Consequences if not approved:*** | If timing advance is not defined or reported to LMF, this could lead to delay in providing NR solution for localization failure during emergency calls. |
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| ***Clauses affected:*** |  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  |  |
| ***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:*** |  |

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## 5.2 NG-RAN measurement abilities

The structure of the table defining a NG-RAN measurement quantity is shown below.

|  |  |
| --- | --- |
| **Column field** | Comment |
| **Definition** | Contains the definition of the measurement. |

### 5.2.1 SSS transmit power

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| --- | --- |
| **Definition** | SSS transmit power is determined as the linear average over the power contributions (in [W]) of the resource elements that carry secondary synchronization signals within the secondary synchronization signal (SSS) bandwidth.For downlink reference signal transmit power determination the secondary synchronization signal according TS 38.211 [4] can be used.For frequency range 1, the reference point for the downlink reference signal power measurement shall be the transmit antenna connector. |

### 5.2.2 UL Relative Time of Arrival (TUL-RTOA)

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| **Definition** | The UL Relative Time of Arrival (TUL-RTOA) is the beginning of subframe *i* containing SRS received in Reception Point (RP) [18] *j*, relative to the RTOA Reference Time [16]. The UL RTOA reference time is defined as $T\_{0}+t\_{SRS}$, where- $T\_{0}$ is the nominal beginning time of SFN 0 provided by SFN Initialization Time [15, TS 38.455]- $t\_{SRS}=\left(10n\_{f}+n\_{sf}\right)×10^{-3}$, where $n\_{f}$ and $n\_{sf}$ are the system frame number and the subframe number of the SRS, respectively.Multiple SRS resources can be used to determine the beginning of one subframe containing SRS received at a RP.The reference point for TUL-RTOA shall be:- for type 1-C base station TS 38.104 [9]: the Rx antenna connector,- for type 1-O or 2-O base station TS 38.104 [9]: the Rx antenna (i.e. the centre location of the radiating region of the Rx antenna),- for type 1-H base station TS 38.104 [9]: the Rx Transceiver Array Boundary connector. |

### 5.2.3 gNB Rx – Tx time difference

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| **Definition** | The gNB Rx – Tx time difference is defined as TgNB-RX –TgNB-TXWhere:TgNB-RX is the Transmission and Reception Point (TRP) [18] received timing of uplink subframe #*i* containing SRS associated with UE, defined by the first detected path in time.TgNB-TX is the TRP transmit timing of downlink subframe #*j* that is closest in time to the subframe #*i* received from the UE.Multiple SRS resources for positioning can be used to determine the start of one subframe containing SRS.The reference point for TgNB-RX shall be:- for type 1-C base station TS 38.104 [9]: the Rx antenna connector,- for type 1-O or 2-O base station TS 38.104 [9]: the Rx antenna (i.e. the centre location of the radiating region of the Rx antenna),- for type 1-H base station TS 38.104 [9]: the Rx Transceiver Array Boundary connector.The reference point for TgNB-TX shall be:- for type 1-C base station TS 38.104 [9]: the Tx antenna connector,- for type 1-O or 2-O base station TS 38.104 [9]: the Tx antenna (i.e. the centre location of the radiating region of the Tx antenna),- for type 1-H base station TS 38.104 [9]: the Tx Transceiver Array Boundary connector. |

### 5.2.4 UL Angle of Arrival (UL AoA)

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| **Definition** | UL Angle of Arrival (UL AoA) is defined as the estimated azimuth angle and vertical angle of a UE with respect to a reference direction, wherein the reference direction is defined:- In the global coordinate system (GCS), wherein estimated azimuth angle is measured relative to geographical North and is positive in a counter-clockwise direction and estimated vertical angle is measured relative to zenith and positive to horizontal direction- In the local coordinate system (LCS), wherein estimated azimuth angle is measured relative to x-axis of LCS and positive in a counter-clockwise direction and estimated vertical angle is measured relatize to z-axis of LCS and positive to x-y plane direction. The bearing, downtilt and slant angles of LCS are defined according to TS 38.901 [15].The UL AoA is determined at the gNB antenna for an UL channel corresponding to this UE. |

### 5.2.5 UL SRS reference signal received power (UL SRS-RSRP)

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| **Definition** | UL SRS reference signal received power (UL SRS-RSRP) is defined as linear average of the power contributions (in [W]) of the resource elements carrying sounding reference signals (SRS). UL SRS‑RSRP shall be measured over the configured resource elements within the considered measurement frequency bandwidth in the configured measurement time occasions.For frequency range 1, the reference point for the UL SRS-RSRP shall be the antenna connector of the gNB. For frequency range 2, UL SRS-RSRP shall be measured based on the combined signal from antenna elements corresponding to a given receiver branch. For frequency range 1 and 2, if receiver diversity is in use by the gNB, the reported UL SRS-RSRP value shall not be lower than the corresponding UL SRS-RSRP of any of the individual receiver branches. |

### 5.2.x Timing advance (TADV)

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| **Definition** | Timing advance (TADV) is defined as the time difference TADV = (TgNB-RX –TgNB-TX),Where:TgNB-RX is the Transmission and Reception Point (TRP) [18] received timing of uplink subframe #*i* containing PRACH transmitted from UE, defined by the first detected path in time. TgNB-TX is the TRP transmit timing of downlink subframe #*j* that is closest in time to the subframe #*i* received from the UE.The detected PRACH is used to determine the start of one subframe containing that PRACH.The reference point for TgNB-RX shall be:- for type 1-C base station TS 38.104 [9]: the Rx antenna connector,- for type 1-O or 2-O base station TS 38.104 [9]: the Rx antenna (i.e. the centre location of the radiating region of the Rx antenna),- for type 1-H base station TS 38.104 [9]: the Rx Transceiver Array Boundary connector.The reference point for TgNB-TX shall be:- for type 1-C base station TS 38.104 [9]: the Tx antenna connector,- for type 1-O or 2-O base station TS 38.104 [9]: the Tx antenna (i.e. the centre location of the radiating region of the Tx antenna),- for type 1-H base station TS 38.104 [9]: the Tx Transceiver Array Boundary connector. |