**3GPP TSG-WG2 Meeting #131R2-250xxxx**

**Bangalore, India, 25th – 30th August, 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.300** | **CR** | **draft** | **rev** | **-** | **Current version:** | **18.6.0** |  |
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| *For* ***[HELP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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:***  | Running CR for Rel-19 MIMO Phase 5  |
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| ***Source to WG:*** | CMCC |
| ***Source to TSG:*** | R2 |
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| ***Work item code:*** | NR\_MIMO\_Ph5-Core |  | ***Date:*** | 2025-06-30 |
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| ***Category:*** | B |  | ***Release:*** | Rel-19 |
|  | *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:*** | Introduce the Rel-19 MIMO features based on the agreements in Annex.  |
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| ***Summary of change:*** | 1. Introducing the clause 6.X of Rel-19 MIMO.
2. Refine and add functions according to agreements in RAN2#130.
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| ***Consequences if not approved:*** | Rel-19 MIMO features cannot be supported. |
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| ***Clauses affected:*** | 6.X(new) |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.331 CR XXTS 38.321 CR XX |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** |  |

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| *Start of changes* |

## 6.12 Multiple Transmit/Receive Point Operation

In Multiple Transmit/Receive Point (multi-TRP) operation, a serving cell can schedule the UE from two TRPs, providing better coverage, reliability and/or data rates for PDSCH, PDCCH, PUSCH, and PUCCH.

There are two different operation modes to schedule multi-TRP PDSCH transmissions: single-DCI and multi-DCI. For both modes, control of uplink and downlink operation can be done by physical layer and MAC layer, within the configuration provided by the RRC layer. In single-DCI mode, the UE is scheduled by the same DCI for both TRPs and in multi-DCI mode, the UE is scheduled by independent DCIs from each TRP.

<unchanged parts are omitted>

For inter-TRP delay, frequency, and phase calibration for coherent joint transmission (CJT), CSI-RS per TRP is transmitted and the UE measures the CSI-RS(s) and estimates the reporting quantity including inter-TRP delay offset(s), frequency offset(s), and phase offset(s). A CSI report associated with the reporting quantity is carried on a PUSCH.

9.2.3 Mobility in RRC\_CONNECTED

9.2.3.1 Overview

<unchanged parts are omitted>

**Beam Level Mobility** does not require explicit RRC signalling to be triggered. Beam level mobility can be within a cell, or between cells, the latter is referred to as inter-cell beam management (ICBM). For ICBM, a UE can receive or transmit UE dedicated channels/signals via a TRP associated with a PCI different from the PCI of a serving cell, while non-UE-dedicated channels/signals can only be received via a TRP associated with a PCI of the serving cell. The gNB provides via RRC signalling the UE with measurement configuration containing configurations of SSB/CSI resources and resource sets, reports and trigger states for triggering channel and interference measurements and reports. In case of ICBM, a measurement configuration includes SSB resources associated with PCIs different from the PCI of a serving cell. Beam Level Mobility is then dealt with at lower layers by means of physical layer and MAC layer control signalling, and RRC is not required to know which beam is being used at a given point in time.

SSB-based Beam Level Mobility is based on the CD-SSB associated to the initial DL BWP and can be configured for the initial DL BWPs, for DL BWPs containing the CD-SSB associated to the initial DL BWP, and if supported, for DL BWPs not containing the CD-SSB associated to the initial DL BWP. SSB-based Beam Level Mobility can be also performed based on an NCD-SSB, if configured for the active DL BWP. Beam Level Mobility can be also performed based on CSI-RS, if configured for the active DL BWP.

For UE-initiated beam reporting, Mode A and Mode B are supported, where upon detection of an event, UE transmits a UE Initiated Report Indicator (UEIRI) indication in a PUCCH resource to indicate transmission of a beam report. Corresponding to the UEIRI indication, in Mode A, the UE transmits the beam report on a PUSCH indicated by a DCI, while in Mode B, the UE transmits the beam report on a type1 CG PUSCH associated to the PUCCH resource.

<unchanged parts are omitted>

## 6.X Asymmetric Downlink Single-TRP and Uplink Multi-TRP

For asymmetric DL single-TRP and UL multi-TRP scenario where UL TRP may reduce or even turn off DL transmission, pathloss offset can be configured by RRC and each of pathloss offset is explicitly indicated by each UL/Joint TCI state for PUSCH, PUCCH, and SRS transmission, and can be indicated by a PDCCH order for the PDCCH order triggered PRACH toward UL TRP facilitating pathloss calculation The pathloss offset values associated with UL/Joint TCI states are updated by the latest pathloss offset value received in RRC or Pathloss Offset Update MAC CE, which defined in 3GPP TS 38.321[6]. The pathloss offset values stored in the RRC of the UE and the source/anchor gNB is updated based on RRC and not updated based on the Pathloss Offset Update MAC CE.

In addition, up to two closed loop power control adjustment states can be supported for SRS separate with PUSCH. Also, up to two TAGs can be configured in the serving cell without *coresetPoolIndex* configured, and a TCI state for PUSCH, PUCCH, and SRS transmission can be associated with any one of two TAGs.

Editor’s Note: FFS on whether a new subclause is needed for the description of deployment and the application of pathloss offset or merged to the subclause 6.12 where mainly focous on the PDCCH/PDSCH/PUSCH sheduling and transmission via single-DCI and multi-DCI.

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| *End of changes* |

Annex: RAN2 agreements

RAN2#128 agreements:

**Agreements on asymmetric DL sTRP and UL mTRP**

* New MAC CE is introduced for PL offset update for asymmetric DL sTRP/UL mTRP. This new MAC CE is identified by new eLCID.
* Absolute value of PL offset is indicated in the new MAC CE. For the offset value, the value range is [-12, 60] dB and the step size is 4dB.
* In the MAC CE, PL offset value can be updated for any configured TCI states with RRC configured PL offset, i.e., not limited to the activated TCI states.

RAN2#129 agreements:

**Agreements on Asymmetric DL sTRP/UL mTRP**

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| * One PL offset value is indicated for each TCI state included in the new MAC CE.
* The new MAC CE contains one serving cell ID and one BWP ID
* TCI state ID is used to indicate a TCI state in the new MAC CE (i.e., no bitmap for TCI states is needed)
* The new MAC CE can include flexible number of PL offset values.

Working assumption: * UE applies the latest PL offset value received in RRC or MAC CE. Can revisit if new issue is found.

Agreement* RAN2 understands that if a joint/UL TCI state is configured with a PL offset, PHR trigger is based on the PL change of the PL-RS associated to the joint/UL TCI, where the PL change takes into account the PL offset. FFS whether/how to capture this.
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RAN2#129bis agreements:

**Agreements on Asymmetric DL sTRP/UL mTRP**

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| * No need to add a maximum number restriction of the TCI states indicated by the PL offset MAC CE.
* RAN2 understand the PL offset update MAC CE is at least applicable to PUCCH, PUSCH, SRS, and PDCCH-order CFRA.
* We will capture in a note to reflect the previous understanding ‘RAN2 understands that if a joint/UL TCI state is configured with a PL offset, PHR trigger is based on the PL change of the PL-RS associated to the joint/UL TCI, where the PL change takes into account the PL offset.’. FFS on exact wording.
* From RAN2 point of view, UE applies the latest PL offset value received in RRC or MAC CE.
* For 2TA in asymmetric DL sTRP/UL mTRP scenario with pathloss offset configured Rel-18 2TA operation is applied with the following RRC changes:
	+ - remove the restriction that RRC field tag2 is configured only if coresetPoolIndex is configured with more than one value;
		- a single n-TimingAdvanceoffset is configured, i.e., n-TimingAdvanceOffset2 is not configured for 2TA in asymmetric DL sTRP/UL mTRP scenario.
* For PRACH transmission, PL offset is applicable only to PDCCH-order CFRA.
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RAN2#130 agreements:

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| **Agreements on Asymmetric DL sTRP/UL mTRP*** Introduce a new RRC parameter per BWP that explicitly enables the Rel-19 sDCI-mTRP 2TA, and clarify in FD of tag2 to include all cases where tag2 is configured that “it is optionally configured in a serving cell for mDCI mTRP 2TA if coresetPoolIndex for a BWP is configured with more than one value, and for sDCI mTRP 2TA if [the new parameter] is configured.”;
* 2TA operation is supported for Rel-19 single-DCI mTRP without the restriction that coresetPoolIndex needs to be configured with more than one value, and single-DCI mTRP 2TA is applied to both the scenarios that PL offset is configured and PL offset is not configured.
* Regarding Rel-19 sDCI mTRP 2TA operation for the scenario PL offset is not configured (UE is configured with SSB-MTC-additionalPCI), RAN2 assumes both n-TimingAdvanceoffset and n-TimingAdvanceOffset2 are configured unless RAN1 has different agreement.
* Rel-17/18 Unified TCI States A/D MAC CE is reused for asymmetric DL sTRP/UL mTRP deployment.
* No MAC spec impact is expect, can confirm in the post meeting email discussion
* RAN2 understands UE maintains the internal configuration for this element (including Need R) in case the parent element (element in elementsToAddList) is absent as legacy.
* RAN2 to confirm that the PL offset value stored in the UE, i.e. in the internal UE configuration is not updated based on the MAC CE for PL update.
* RAN2 to confirm that the PL offset value stored in the source gNB/anchor gNB, i.e. in the UE RRC AS configuration, is not updated based on the MAC CE for PL update.
* It is up to network implementation whether to 1) apply the stored RRC configured PL offset value to the UE in case the associated tci-State (i.e. the parent parameter in tci-StatesToAddList) is absent, or 2) release the stored RRC configured PL offset value in case PL update is absent and the associated tci-State (i.e. the parent parameter in tci-StatesToAddList) is present, or 3) configure a new RRC value to the UE for the associated tci-State during the RRC resume procedure. No specification change is needed.
* Need R is applied for PL offset.
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