**3GPP TSG-WG2 Meeting #131R2-25XXXX**

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

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.300** | **CR** | **1021** | **rev** | **2** | **Current version:** | **18.6.0** |  |
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| *For* [***HELP***](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:*** | Introduction of Rel-19 MIMO Phase 5 | | | | | | | | | |
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| ***Source to WG:*** | CMCC | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MIMO\_Ph5-Core | | | | |  | ***Date:*** | | | 2025-09-02 |
|  |  | | | |  | |  | | |  |
| ***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 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)* | |
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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. In clause 6.12.1, introduced the Asymmetric Downlink Single-TRP and Uplink Multi-TRP of Rel-19 MIMO. 2. Refine and add functions according to agreements in RAN2#130. 3. Merging the TP that has been endorsed by RAN1. | | | | | | | | |
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| ***Consequences if not approved:*** | | Rel-19 MIMO features cannot be supported. | | | | | | | | |
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| ***Clauses affected:*** | | 6.12, 6.12.1(new), 9.2.3.1 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR 38.331 CR 5441  TS/TR 38.321 CR 2100 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***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, PUCCH, SRS, and PDCCH order triggered PRACH.

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.

There are two different operation modes for multi-TRP PDCCH: PDCCH repetition as in Clause 5.2.3 and Single Frequency Network (SFN) based PDCCH transmission. In both modes, the UE can receive two PDCCH transmissions, one from each TRP, carrying the same DCI. In PDCCH repetition mode, the UE can receive the two PDCCH transmissions carrying the same DCI from two linked search spaces each associated with a different CORESET. In SFN based PDCCH transmission mode, the UE can receive the two PDCCH transmissions carrying the same DCI from a single search space/CORESET using different TCI states.

For multi-TRP PUSCH repetition, according to indications in a single DCI or in a semi-static configured grant provided over RRC, the UE performs PUSCH transmission of the same contents toward two TRPs with corresponding beam directions associated with different spatial relations. For multi-TRP PUCCH repetition, the UE performs PUCCH transmission of the same contents toward two TRPs with corresponding beam directions associated with different spatial relations.

For inter-cell multi-TRP operation, for multi-DCI PDSCH transmission, one or more TCI states can be associated with SSB with a PCI different from the serving cell PCI. The activated TCI states can be associated with at most one PCI different from the serving cell PCI at a time.

For inter-cell and intra-cell multi-DCI multi-TRP operation, up to two TAGs with associated TAG IDs can be configured per serving cell. Each UL/Joint TCI state is associated with a TAG ID and the UE applies the timing advance of the TAG ID associated with the UL/joint TCI state utilized for UL transmission. For inter-cell and intra-cell single-DCI multi-TRP operation, up to two TAGs can be configured in the serving cell, and a TCI state for PUSCH, PUCCH, and SRS transmission can be associated with any one of two TAGs.

For single-DCI multi-TRP Simultaneous Transmission with Multi-Panel (STxMP) Spatial Domain Multiplexing (SDM) PUSCH transmission, different layers of one PUSCH are separately transmitted towards two TRPs. For single-DCI multi-TRP STxMP SFN PUSCH transmission, same layers of one PUSCH are transmitted towards two TRPs. For multi-DCI based multi-TRP STxMP PUSCH+PUSCH transmission, two PUSCHs are transmitted towards two TRPs. For single-DCI multi-TRP STxMP SFN PUCCH transmission, one PUCCH is transmitted towards two TRPs.

### 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.6.12.1 Asymmetric DL single-TRP and UL multi-TRP

For asymmetric DL single-TRP and UL multi-TRP operation, UL TRP may reduce or even turn off DL transmission. Pathloss offsets between two TRPs 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 toward UL TRP, and can be indicated by a PDCCH order for the PDCCH order triggered PRACH toward UL TRP facilitating pathloss calculation In addition, up to two closed loop power control adjustment states can be supported for SRS separate with 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>

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| *End of changes* |