**3GPP TSG- Meeting #**

**, Netherlands, - , Aug, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **0639** | **rev** | **1** | **Current version:** |  |  |
|  |
| *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:***  |  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***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 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | Rel-18 FR2 HST demodulation requirements was completed in RAN4#111 meeting. The related CR has been implemented into the latest specfication of 38.101-4. Due to the conflict of Multi-Rx WI with multi-DCI transmission scheme CR R4-2407244 and FR2 HST mutli-Rx reception of CR R4-2409840, the current section 7.2.2.2.6 is implemented for FR2 HST after RAN#104 meeting based on CR R4-2409840, which should be implemented for Multi-Rx WI with multi-DCI transmission scheme based on version CR R4-2407244, after RAN#103 meeting |
|  |  |
| ***Summary of change:*** | * Correction the Table 7.1.1.3-1 for FR2 HST
* Add the new section of 7.2.2.2.8 for Minimum requirements for multi-Rx simultaneous reception in FR2 HST-DPS to capture the change from R4-2409840
* Correction the Table 7.2A.2.2-5 for FR2 HST PDSCH CA
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|  |  |
| ***Consequences if not approved:*** | The FR2 HST demodualtion requirement can not be verified well |
|  |  |
| ***Clauses affected:*** | 7.1.1.3, 7.2.2.2.8, 7.2A.2.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-4 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Revision of CR R4-2413445 |

<Start of Change 1>

#### 7.1.1.3 Applicability of requirements for optional UE features

The performance requirements in Table 7.1.1.3-1 shall apply for UEs which support optional UE features only.

Table 7.1.1.3-1: Requirements applicability for optional UE features

|  |  |  |  |
| --- | --- | --- | --- |
| UE feature/capability [14] | Test type | Test list | Applicability notes |
| SU-MIMO Interference Mitigation advanced receiver | FR2-1 TDD | PDSCH | Clause 7.2.2.2.1 (Test 3-1) |  |
| Basic DL NR-NR CA operation (*supportedBandCombinationList*) | NR CA | SDR | Clause 7.5A.1 | 1) Up to 16 DL carriers2) Same numerology across carrier for data/control channel at a given time |
| PDSCH repetitions over multiple slots *(pdsch-RepetitionMultiSlots)* | FR2-1 TDD | PDSCH | Clause 7.2.2.2.2 |  |
| Alternative 64QAM MCS table for PDSCHNew 64QAM MCS table for PDSCH (*dl-64QAM-MCS-TableAlt*) | FR2 TDD | PDSCH | Clause 7.2.2.2.2 |  |
| DRX Adaptation (*drx-Adaptation-r16*) | FR2-1 TDD | PDCCH | Clause 7.3.2.2.3 | If the Test 3-1 in Clause 7.3.2.2.3 is passed, the test coverage can be considered fulfilled without executing Test 1-2 in clause 7.3.2.2.1. |
| 256QAM for PDSCH(*pdsch-256QAM-FR2*) | FR2-1 TDD | PDSCH | Clause 7.2.2.2.1 (Test 1-4) |  |
| 256QAM for PDSCH (*pdsch-256QAM-FR2*) | FR2-1 TDD | SDR | Clause 7.5A.1 | For UE capable of *pdsch-256QAM-FR2* for certain band(s), *mcs-Table* is configured to ‘64QAM’ for SDR test. |
| Support of FR2 HST operation [(FR2 UE power class PC6 signalling is used to indicate support of feature group)] | FR2-1 TDD | PDSCH | [Clause 7.2.2.2.4] |  |
| Support of Single Carrier operations with 120kHz SCS for FR2-2(*initialAccessSSB-120kHz-r17)* | FR2-2 TDD | PDSCH | Clause 7.2.2.2.1(Table 7.2.2.2.1-6: Test 4-1, 4-2, 4-3, 4-4) |  |
|  |  | PDCCH | Clause 7.3.2.2(Table 7.3.2.2.1-2: Test 1a-1, 1a-2, 1a-3) (Table 7.3.2.2.2-2, Test 3-1, 3-2) |  |
|  |  | PBCH | Clause 7.4.2.2(Table 7.4.2.2-2: Test 3) |  |
| Support of 480kHz SCS for FR2-2(*ul-FR2-2-SCS-480kHz-r17* and *initialAccessSSB-480kHz-r17)* | FR2-2 TDD | PDSCH | Clause 7.2.2.2.1(Table 7.2.2.2.1-6: Test 4-5, 4-6) |  |
|  |  | PDCCH | Clause 7.3.2.2(Table 7.3.2.2.1-2: Test 1a-4)(Table 7.3.2.2.2-2, Test 3-3) |  |
|  |  | PBCH | Clause 7.4.2.2(Table 7.4.2.2-2: Test 4) |  |
| Support simultaneous reception with different QCL Type-D RSs (simultaneousReceptionDiffTypeD-r16) | FR2TDD | PDSCH | Clause 7.2.2.2.5Clause 7.2.2.2.6Clause 7.2.2.2.7 |  |
| Single DCI based SDM transmission for simultaneous reception support (singleDCI-SDM-scheme-r16) | FR2TDD | PDSCH | Clause 7.2.2.2.7 |  |
| Multi DCI based simultaneous reception non-overlapping support (multiDCI-MultiTRP-r16) | FR2TDD | PDSCH | Clause 7.2.2.2.5 |  |
| Multi DCI based simultaneous reception fully-overlapping support (overlapPDSCHsFullyFreqTime-r16) | FR2TDD | PDSCH | Clause 7.2.2.2.6 |  |
| Support of 2-port DL PTRS (supportTwoPortDL-PTRS-r16) | FR2TDD | PDSCH | Clause 7.2.2.2.7 Test 1-2 |  |
|  |  |  |  |  |
| Support of FR2 HST operation (FR2 UE power class PC6 signalling is used to indicate support of feature group) with simultaneous multiRX reception | FR2-1 TDD | PDSCH | Clause 7.2.2.2.8 | FR2 HST UE should support the following optional capabilities* *[simultaneousReceptionFR2HST-r18];*
* *multiDCI-MultiTRP-r16;*
* *overlapPDSCHsFullyFreqTime-r16;*

Additionally, the UE should report *maxNumberActiveTCI-PerBWP* > 1 |

<End of Change 1>

<Start of Change 2>

##### 7.2.2.2.8 Minimum requirements for multi-Rx simultaneous reception in FR2 HST-DPS

The performance requirements are specified in Table 7.2.2.2.8-3, with the addition of test parameters in Table 7.2.2.2.8-2 and the downlink physical channel setup according to Annex C.5.1.

The test purposes are specified in Table 7.2.2.2.8-1.

**Table 7.2.2.2.8-1: Test purposes**

|  |  |
| --- | --- |
| **Purpose** | **Test index** |
| Verify UE performance for multi-Rx simultaneous reception in FR2 HST-DPS scenario defined in B.3.4.3 when UE is configured two different values of CORESETPoolIndex in ControlResourceSet and the UE receives multiple PDCCHs scheduling with fully-overlapping PDSCHs | 1-1 |

**Table 7.2.2.2.8-2: Test parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Value** |
| Duplex mode |  | TDD |
| Active DL BWP index |  | 1 |
| PDCCH configuration | TCI state |  | Note 1 |
| PDSCH configuration | Mapping type |  | Type A |
| k0 |  | 0 |
| Starting symbol (S) |  | 1 |
| Length (L) |  | Specific to each Reference channel |
| PDSCH aggregation factor |  | 1 |
| PRB bundling type |  | Static |
| PRB bundling size |  | 2 |
| Resource allocation type |  | Type 0 |
| RBG size |  | Config2 |
| VRB-to-PRB mapping type |  | Non-interleaved |
| VRB-to-PRB mapping interleaver bundle size |  | N/A |
| TCI state |  | Note 1 |
| PDSCH DMRS configuration | DMRS Type |  | Type 1 |
| Number of additional DMRS |  | 2 |
| Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 |
| CSI-RS for tracking | Resource set #1 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 0 for CSI-RS resource 1,2,3,4 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 5 for CSI-RS resource 1 and 3 |
| l0 = 9 for CSI-RS resource 2 and 4 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 1,2,3,4 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 1 and 2 |
| 6 for CSI-RS resource 3 and 4 |
| QCL info |  | TCI state #4 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #2 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 0 for CSI-RS resource 5,6,7,8 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 4 for CSI-RS resource 5 and 7 |
| l0 = 8 for CSI-RS resource 6 and 8 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 5,6,7,8 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 5 and 6 |
| 6 for CSI-RS resource 7 and 8 |
| QCL info |  | TCI state #5 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #3 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 1 for CSI-RS resource 9,10,11,12 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 5 for CSI-RS resource 9 and 11 |
| l0 = 9 for CSI-RS resource 10 and 12 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 9,10,11,12 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 9 and 10 |
| 6 for CSI-RS resource 11 and 12 |
| QCL info |  | TCI state #6 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #4 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 1 for CSI-RS resource 13,14,15,16 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 4 for CSI-RS resource 13 and 15 |
| l0 = 8 for CSI-RS resource 14 and 16 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 13,14,15,16 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 13 and 14 |
| 6 for CSI-RS resource 15 and 16 |
| QCL info |  | TCI state #7 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #13 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 2 for CSI-RS resource 17,18,19,20 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 5 for CSI-RS resource 17 and 19 |
| l0 = 9 for CSI-RS resource 18 and 20 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 17,18,19,20 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 17 and 18 |
| 6 for CSI-RS resource 19 and 20 |
| QCL info |  | TCI state #12 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #14 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 2 for CSI-RS resource 21,22,23,24 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 4 for CSI-RS resource 21 and 23 |
| l0 = 8 for CSI-RS resource 22 and 24 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 21,22,23,24 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 21 and 22 |
| 6 for CSI-RS resource 23 and 24 |
| QCL info |  | TCI state #13 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #15 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 3 for CSI-RS resource 25,26,27,28 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 5 for CSI-RS resource 25 and 27 |
| l0 = 9 for CSI-RS resource 26 and 28 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 25,26,27,28 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 25 and 26 |
| 6 for CSI-RS resource 27 and 28 |
| QCL info |  | TCI state #14 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| Resource set #16 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 3 for CSI-RS resource 29,30,31,32 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 4 for CSI-RS resource 29 and 31 |
| l0 = 8 for CSI-RS resource 30 and 32 |
| CSI-RS periodicity | Slots | 80 for CSI-RS resource 29,30,31,32 |
| CSI-RS offset | Slots | 5 for CSI-RS resource 29 and 30 |
| 6 for CSI-RS resource 31 and 32 |
| QCL info |  | TCI state #15 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB =ceil(BWP size/4)\*4 |
| NZP CSI-RS for CSI acquisition | Resource set #5 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 0 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #0 |
| Resource set #6 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 2 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #1 |
| Resource set #7 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 4 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #2 |
| Resource set #8 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 6 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #3 |
| Resource set #17 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 0 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #8 |
| Resource set #18 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 2 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #9 |
| Resource set #19 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 4 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #10 |
| Resource set #20 | First subcarrier index in the PRB used for CSI-RS (*k0*) |  | 6 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #11 |
| CSI-RS for beam refinement | Resource set #9 | First subcarrier index in the PRB used for CSI-RS  |  | k0=0 for CSI-RS resource 1,2 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 8 for CSI-RS resource 1l0 = 9 for CSI-RS resource 2 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #0 |
| Resource set #10 | First subcarrier index in the PRB used for CSI-RS  |  | k0=1 for CSI-RS resource 3,4 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 8 for CSI-RS resource 3l0 = 9 for CSI-RS resource 4 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #1 |
| Resource set #11 | First subcarrier index in the PRB used for CSI-RS  |  | k0=2 for CSI-RS resource 5,6 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 8 for CSI-RS resource 5l0 = 9 for CSI-RS resource 6 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #2 |
| Resource set #12 | First subcarrier index in the PRB used for CSI-RS  |  | k0=3 for CSI-RS resource 7,8 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 8 for CSI-RS resource 7l0 = 9 for CSI-RS resource 8 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #3 |
| Resource set #21 | First subcarrier index in the PRB used for CSI-RS  |  | k0=0 for CSI-RS resource 9,10 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 10 for CSI-RS resource 9l0 = 11 for CSI-RS resource 10 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #8 |
| Resource set #22 | First subcarrier index in the PRB used for CSI-RS  |  | k0=1 for CSI-RS resource 11,12 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 10 for CSI-RS resource 11l0 = 11 for CSI-RS resource 12 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #9 |
| Resource set #23 | First subcarrier index in the PRB used for CSI-RS  |  | k0=2 for CSI-RS resource 13,14 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 10 for CSI-RS resource 13l0 = 11 for CSI-RS resource 14 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #10 |
| Resource set #24 | First subcarrier index in the PRB used for CSI-RS  |  | k0=3 for CSI-RS resource 15,16 |
| First OFDM symbol in the PRB used for CSI-RS |  | l0 = 10 for CSI-RS resource 15l0 = 11 for CSI-RS resource 16 |
| CSI-RS periodicity | Slots | 160 |
| CSI-RS offset | Slots | 1 |
| QCL info |  | TCI state #11 |
| TCI state #0 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 1 from 'CSI-RS for tracking Resource set #1' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 1 from 'CSI-RS for tracking Resource set #1' configuration |
| QCL Type |  | Type D |
| TCI state #1 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 5 from 'CSI-RS for tracking Resource set #2' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 5 from 'CSI-RS for tracking Resource set #2' configuration |
| QCL Type |  | Type D |
| TCI state #2 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 9 from 'CSI-RS for tracking Resource set #3' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 9 from 'CSI-RS for tracking Resource set #3' configuration |
| QCL Type |  | Type D |
| TCI state #3 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 13 from 'CSI-RS for tracking Resource set #4' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 13 from 'CSI-RS for tracking Resource set #4' configuration |
| QCL Type |  | Type D |
| TCI state #8 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 17 from 'CSI-RS for tracking Resource set #13' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 17 from 'CSI-RS for tracking Resource set #13' configuration |
| QCL Type |  | Type D |
| TCI state #9 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 21 from 'CSI-RS for tracking Resource set #14' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 21 from 'CSI-RS for tracking Resource set #14' configuration |
| QCL Type |  | Type D |
| TCI state #10 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 25 from 'CSI-RS for tracking Resource set #15' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 25 from 'CSI-RS for tracking Resource set #15' configuration |
| QCL Type |  | Type D |
| TCI state #11 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 29 from 'CSI-RS for tracking Resource set #16' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 29 from 'CSI-RS for tracking Resource set #16' configuration |
| QCL Type |  | Type D |
| TCI state #4 | Type 1 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type D |
| TCI state #5 | Type 1 QCL information | SSB index |  | SSB #1 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #1 |
| QCL Type |  | Type D |
| TCI state #6 | Type 1 QCL information | SSB index |  | SSB #2 |
|  | QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #2 |
|  | QCL Type |  | Type D |
| TCI state #7 | Type 1 QCL information | SSB index |  | SSB #3 |
|  | QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #3 |
|  | QCL Type |  | Type D |
| TCI state #12 | Type 1 QCL information | SSB index |  | SSB #4 |
|  | QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #4 |
|  | QCL Type |  | Type D |
| TCI state #13 | Type 1 QCL information | SSB index |  | SSB #5 |
|  | QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #5 |
|  | QCL Type |  | Type D |
| TCI state #14 | Type 1 QCL information | SSB index |  | SSB #6 |
|  | QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #6 |
|  | QCL Type |  | Type D |
| TCI state #15 | Type 1 QCL information | SSB index |  | SSB #7 |
|  | QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #7 |
|  | QCL Type |  | Type D |
| Number of HARQ Processes |  | 8 |
| The number of slots between PDSCH and corresponding HARQ-ACK information |  | Specific to each TDD UL-DL pattern and as defined in Annex A.1.3 |
| Note 1: For Test 1-1, SSB # (2k mod 8) , CSI-RS (for tracking) resource set # ((k mod 4)+1), CSI-RS (for CSI acquisition) resource set # ((k mod 4) + 5) and CSI-RS (for beam refinement) resource set # ((k mod 4) + 9) are transmitted by kth RRH; SSB # ((2k mod 8)+1) , CSI-RS (for tracking) resource set # ((k mod 4) + 13), CSI-RS (for CSI acquisition) resource set # ((k mod 4) + 17) and CSI-RS (for beam refinement) resource set # ((k mod 4) + 21) are transmitted by kth RRH. TCI state switching command scheduled by MAC CE with MCS 4 is transmitted in slot #i that satisfy (i≠0) and . PDCCH and PDSCH associated with TCI # (k mod 4) is transmitted by kth RRH from slot#to slot#,PDCCH and PDSCH associated with TCI # ((k mod 4)+8) is transmitted by kth RRH from slot#to slot#,where k is the RRH number, n = 57600 is the number of slots between two RRHs, = 4 is the number of slots between PDSCH and corresponding HARQ-ACK information, = 24 is the number of slots for MAC CE processing, = 132 and = 155 is the number of slots to first SSB transmission occasion after MAC CE command is decoded by the UE, = 16 is the number of slots for SSB processing, = 69 is the number of slots to first TRS transmission occasion after first SSB is processed by the UE, = 16 is the number of slots for TRS processing. PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered. |

**Table 7.2.2.2.8-3: Minimum performance for multi-Rx simultaneous reception in FR2 HST-DPS**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test num** | **RRH num** | **Reference channel** | **Bandwidth (MHz) / Subcarrier spacing (kHz)** | **Modulation format and code rate** | **TDD UL-DL pattern** | **Propagation condition** | **Number of active PDSCH TCI states (Note 3)** | **Correlation matrix and antenna configuration** | **Reference value** |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 1-1 | RRH#i | R.PDSCH.5-18.1 TDD | 200 / 120 | 64QAM, 0.50 | FR2.120-1 | HST-DPS-FR2-BI-B1-MR | 2 | 2x2 | 70 | 15.0 |
| RRH#j | R.PDSCH.5-18.2 TDD | 200 / 120 | 16QAM, 0.37 | FR2.120-1 | HST-DPS-FR2-BI-B1-MR | 2 | 2x2 | 70 | 8.2 |
| Note 1 : The RRH#i (i =-1,0,1,2…) and RRH#j (j=1,2,3,…) indicate the RRHs simultaneously transmitting PDSCH to the UE.Note 2: Receive timing difference (RTD) of PDSCH data transmitted from RRH#i (i =-1,0,1,2…) and RRH#j (j=1,2,3,…) at the UE between two Rx chains is 0.88 us (1.5\*CP).Note 3: Only 1 available active TCI state per RRH. |

<End of Change 2>

<Start of Change 3>

**Table 7.2A.2.2-4: Single carrier performance for HST-FR2-DPS CA Configurations with 2 Active TCI States**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference channel** | **Bandwidth (MHz) / Subcarrier spacing (kHz)** | **Modulation format and code rate** | **TDD UL-DL pattern** | **Propagation condition** | **Number of active PDSCH TCI states** | **Correlation matrix and antenna configuration** | **Reference value** |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| R.PDSCH.5-17.1 TDD | 50 / 120 | 64QAM, 0.43 | FR2.120-1 | HST-DPS-FR2-UNI-A | 2 | 2x2, ULA Low | 70 | 13.7  |
| R.PDSCH.5-17.2 TDD | 100 / 120 | 64QAM, 0.43 | FR2.120-1 | HST-DPS-FR2-UNI-A | 2 | 2x2, ULA Low | 70 | 13.9  |
| R.PDSCH.5-12.1 TDD | 200 / 120 | 64QAM, 0.43 | FR2.120-1 | HST-DPS-FR2-UNI-A | 2 | 2x2, ULA Low | 70 | 14.0  |
| R.PDSCH.5-17.3 TDD | 400 / 120 | 64QAM, 0.43 | FR2.120-1 | HST-DPS-FR2-UNI-A | 2 | 2x2, ULA Low | 70 | 13.8  |

**Table 7.2A.2.2-5: Minimum performance for HST-FR2-DPS multiple CA configurations**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |
| **Test number** | **CA duplex mode** | **Minimum performance requirements** |
| 1 | TDD 120 kHz + TDD 120 kHz | As defined in Table 7.2A.2.2-3 |
| 2 | TDD 120 kHz + TDD 120 kHz | As defined in Table 7.2A.2.2-4 |
| Note 1: The applicability of requirements for different CA duplex modes, SCSs, CA configurations and bandwidth combination sets is defined in 7.1.1.5. |

<End of Change 3>