**3GPP TSG- Meeting # *r1***

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **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:*** | (NR\_HST-Perf) FR1 HST-DPS on TCI state switching scheduling | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Corporation | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST-Perf | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | From Note 1 in test parameters, only MCS is defined for TCI-state MAC-CE. Since MAC-CE transmission slot will also be SSB slot, it is better to define RB allocation to avoid conflict with SSB. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added Layer, Start RB, Num of RB in Note 1 of Table 5.2.2.1.10-2, Table 5.2.2.2.10-2, Table 5.2.3.1.10-2, Table 5.2.3.2.10-2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Improper values might be used. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.1.10, 5.2.2.2.10, 5.2.3.1.10, 5.2.3.2.10  **Isolated impact analysis:**  No change to UE requirements, changes test parameters only. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | R1: Revised from R4-2407179.  Wording improvement was made on the original corrected part. | | | | | | | | |

<<Unchanged sections skipped>>

<<Start of change>>

##### 5.2.2.1.10 Minimum requirements for HST-DPS

The performance requirements are specified in Table 5.2.2.1.10-3, with the addition of test parameters in Table 5.2.2.1.10-2 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.2.1.10-1.

Table 5.2.2.1.10-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify UE performance in the HST-DPS scenario defined in B.3.3 | 1-1, 1-2 |

Table 5.2.2.1.10-2: Test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
| Duplex mode | | |  | FDD |
| Active DL BWP index | | |  | 1 |
| PDCCH configuration | TCI state | |  | Note 1 |
| PDSCH configuration | Mapping type | |  | Type A |
|  | k0 | |  | 0 |
|  | Starting symbol (S) | |  | 2 |
|  | Length (L) | |  | 12 |
|  | 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 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 | 10 for CSI-RS resource 1,2,3,4. |
|  |  | CSI-RS offset | Slots | 1 for CSI-RS resource 1 and 2 2 for CSI-RS resource 3 and 4 |
|  |  | QCL info |  | TCI state #2 |
|  | Resource set #2 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 6 for CSI-RS resource 5 and 7  l0 = 10 for CSI-RS resource 6 and 8 |
|  |  | CSI-RS periodicity | Slots | 10 for CSI-RS resource 5,6,7,8. |
|  |  | CSI-RS offset | Slots | 1 for CSI-RS resource 5 and 6 2 for CSI-RS resource 7 and 8 |
|  |  | QCL info |  | TCI state #3 |
| NZP CSI-RS for CSI acquisition | Resource set #3 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
|  |  | CSI-RS periodicity | Slots | 20 |
|  |  | CSI-RS offset | Slots | 0 |
|  |  | QCL info |  | TCI state #0 |
|  | Resource set #4 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
|  |  | CSI-RS periodicity | Slots | 20 |
|  |  | CSI-RS offset | Slots | 0 |
|  |  | QCL info |  | TCI state #1 |
| 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 |  | N/A |
|  |  | QCL Type |  | N/A |
| 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 |  | N/A |
|  |  | QCL Type |  | N/A |
| TCI state #2 | Type 1 QCL information | SSB index |  | SSB #0 |
|  |  | QCL Type |  | Type C |
|  | Type 2 QCL information | SSB index |  | N/A |
|  |  | QCL Type |  | N/A |
| TCI state #3 | Type 1 QCL information | SSB index |  | SSB #1 |
|  |  | QCL Type |  | Type C |
|  | Type 2 QCL information | SSB index |  | N/A |
|  |  | QCL Type |  | N/A |
| Number of HARQ Processes | | |  | 4 |
| The number of slots between PDSCH and corresponding HARQ-ACK information | | |  | 2 |
| Note 1: SSB # (k mod 2) , CSI-RS (for tracking) resource set # ((k mod 2) + 1) and CSI-RS (for CSI acquisition) resource set # ((k mod 2) + 3) are transmitted by kth RRH.  For Test 1-1, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 24, NumOfRB 28 is transmitted in slot #i that satisfy.  PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from slot#      to  slot# ,  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  For Test 1-2, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 24, NumOfRB 28 is transmitted in slot #i that satisfy.  PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:  slot#  to:  slot#  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  Where k=0, 1, 2… is the RRH number, n = 2520 is half of the number of slots between two RRH, = 2 is the number of slots between PDSCH and corresponding HARQ-ACK information, = 3 is the number of slots for MAC CE processing, = 6 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, = 2 is the number of slots for TRS processing. | | | | |
|  | | | | |

Table 5.2.2.1.10-3: Minimum performance for HST-DPS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | Propagation condition | Number of active PDSCH TCI states | Correlation matrix and antenna configuration | Reference value | |
| Fraction of maximum throughput (%) | SNR (dB) |
| 1-1 | R.PDSCH.1-8.4 FDD | 10 / 15 | 64QAM, 0.43 | HST-DPS | 1 | 2x2 | 70 | 13.4 |
| 1-2 | R.PDSCH.1-8.4 FDD | 10 / 15 | 64QAM, 0.43 | HST-DPS | 2 | 2x2 | 70 | 13.4 |

<<Unchanged sections skipped>>

##### 5.2.2.2.10 Minimum requirements for HST-DPS

The performance requirements are specified in Table 5.2.2.2.10-3, with the addition of test parameters in Table 5.2.2.2.10-2 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.2.2.10-1.

Table 5.2.2.2.10-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify UE performance in the HST-DPS scenario defined in B.3.3 | 1-1, 1-2 |

Table 5.2.2.2.10-2: 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) | |  | 2 |
| 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 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 | 20 for CSI-RS resource 1,2,3,4 |
| CSI-RS offset | Slots | 1 for CSI-RS resource 1 and 2 |
| 2 for CSI-RS resource 3 and 4 |
| QCL info |  | TCI state #2 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB = 52 |
| Resource set #2 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 6 for CSI-RS resource 5 and 7 |
| l0 = 10 for CSI-RS resource 6 and 8 |
| CSI-RS periodicity | Slots | 20 for CSI-RS resource 5,6,7,8. |
| CSI-RS offset | Slots | 1 for CSI-RS resource 5 and 6 |
| 2 for CSI-RS resource 7 and 8 |
| QCL info |  | TCI state #3 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB = 52 |
| NZP CSI-RS for CSI acquisition | Resource set #3 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 40 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #0 |
| Resource set #4 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 40 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #1 |
| 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 |  | N/A |
| QCL Type |  | N/A |
| 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 |  | N/A |
| QCL Type |  | N/A |
| TCI state #2 | Type 1 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | N/A |
| QCL Type |  | N/A |
| TCI state #3 | Type 1 QCL information | SSB index |  | SSB #1 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | N/A |
| QCL Type |  | N/A |
| 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.1.2 |
| Note 1: SSB # (k mod 2), CSI-RS (for tracking) resource set # ((k mod 2) + 1) and CSI-RS (for CSI acquisition) resource set # ((k mod 2) + 3) are transmitted by kth RRH.  For Test 1-1, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 32, NumOfRB 74 is transmitted in slot #i that satisfy.  PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:  slot#  to:  slot# ,  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  For Test 1-2, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 32, NumOfRB 74 is transmitted in slot #i that satisfy.  PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:  slot#  to:  slot#  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  Where k=0, 1, 2… is the RRH number, n = 5040 is half of the number of slots between two RRH, = 8 is the number of slots between PDSCH and corresponding HARQ-ACK information, = 6 is the number of slots for MAC CE processing, = 7 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, = 4 is the number of slots for TRS processing. | | | | |

**Table 5.2.2.2.10-3: Minimum performance for HST-DPS**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test 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 | Correlation matrix and antenna configuration | Reference value | |
| Fraction of maximum throughput (%) | SNR (dB) |
| 1-1 | R.PDSCH.2-10.5 TDD | 40 / 30 | 64QAM, 0.43 | FR1.30-1 | HST-DPS | 1 | 2x2 | 70 | 13.0 |

<<Unchanged sections skipped>>

##### 5.2.3.1.10 Minimum requirements for HST-DPS

The performance requirements are specified in Table 5.2.3.1.10-3, with the addition of test parameters in Table 5.2.3.1.10-2 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.3.1.10-1.

Table 5.2.3.1.10-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify UE performance in the HST-DPS scenario defined in B.3.3 | 1-1, 1-2 |

Table 5.2.3.1.10-2: Test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
| Duplex mode | | |  | FDD |
| Active DL BWP index | | |  | 1 |
| PDCCH configuration | TCI state | |  | Note 1 |
| PDSCH configuration | Mapping type | |  | Type A |
| k0 | |  | 0 |
| Starting symbol (S) | |  | 2 |
| Length (L) | |  | 12 |
| 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 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 | 10 for CSI-RS resource 1,2,3,4. |
| CSI-RS offset | Slots | 1 for CSI-RS resource 1 and 2 2 for CSI-RS resource 3 and 4 |
| QCL info |  | TCI state #2 |
| Resource set #2 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 6 for CSI-RS resource 5 and 7  l0 = 10 for CSI-RS resource 6 and 8 |
| CSI-RS periodicity | Slots | 10 for CSI-RS resource 5,6,7,8. |
| CSI-RS offset | Slots | 1 for CSI-RS resource 5 and 6 2 for CSI-RS resource 7 and 8 |
| QCL info |  | TCI state #3 |
| NZP CSI-RS for CSI acquisition | Resource set #3 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 20 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #0 |
| Resource set #4 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 20 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #1 |
| 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 |  | N/A |
| QCL Type |  | N/A |
| 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 |  | N/A |
| QCL Type |  | N/A |
| TCI state #2 | Type 1 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | N/A |
| QCL Type |  | N/A |
| TCI state #3 | Type 1 QCL information | SSB index |  | SSB #1 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | N/A |
| QCL Type |  | N/A |
| Number of HARQ Processes | | |  | 4 |
| The number of slots between PDSCH and corresponding HARQ-ACK information | | |  | 2 |
| Note 1: SSB # (k mod 2), CSI-RS (for tracking) resource set # ((k mod 2) + 1) and CSI-RS (for CSI acquisition) resource set # ((k mod 2) + 3) are transmitted by kth RRH.  For Test 1-1, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 24, NumOfRB 28 is transmitted in slot #i that satisfy.  PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:  slot#  to:  slot# ,  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  For Test 1-2, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 24, NumOfRB 28 is transmitted in slot #i that satisfy.  PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:  slot#  to:  slot#  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  Where k=0, 1, 2… is the RRH number, n = 2520 is half of the number of slots between two RRH, = 2 is the number of slots between PDSCH and corresponding HARQ-ACK information, = 3 is the number of slots for MAC CE processing, = 6 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, = 2 is the number of slots for TRS processing. | | | | |

Table 5.2.3.1.10-3: Minimum performance for HST-DPS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | Propagation condition | Number of active PDSCH TCI states | Correlation matrix and antenna configuration | Reference value | |
| Fraction of maximum throughput (%) | SNR (dB) |
| 1-1 | R.PDSCH.1-8.4 FDD | 10 / 15 | 64QAM, 0.43 | HST-DPS | 1 | 2x4 | 70 | 10.6 |
| 1-2 | R.PDSCH.1-8.4 FDD | 10 / 15 | 64QAM, 0.43 | HST-DPS | 2 | 2x4 | 70 | 10.6 |

<<Unchanged sections skipped>>

##### 5.2.3.2.10 Minimum requirements for HST-DPS

The performance requirements are specified in Table 5.2.3.2.10-3, with the addition of test parameters in Table 5.2.3.2.10-2 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.3.2.10-1.

Table 5.2.3.2.10-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify UE performance in the HST-DPS scenario defined in B.3.3 | 1-1, 1-2 |

Table 5.2.3.2.10-2: 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) | |  | 2 |
| 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 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 | 20 for CSI-RS resource 1,2,3,4 |
| CSI-RS offset | Slots | 1 for CSI-RS resource 1 and 2 |
| 2 for CSI-RS resource 3 and 4 |
| QCL info |  | TCI state #2 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB = 52 |
| Resource set #2 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 6 for CSI-RS resource 5 and 7 |
| l0 = 10 for CSI-RS resource 6 and 8 |
| CSI-RS periodicity | Slots | 20 for CSI-RS resource 5,6,7,8. |
| CSI-RS offset | Slots | 1 for CSI-RS resource 5 and 6 |
| 2 for CSI-RS resource 7 and 8 |
| QCL info |  | TCI state #3 |
| Frequency Occupation |  | Start PRB 0 |
| Number of PRB = 52 |
| NZP CSI-RS for CSI acquisition | Resource set #3 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 12 |
| CSI-RS periodicity | Slots | 40 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #0 |
| Resource set #4 | First OFDM symbol in the PRB used for CSI-RS |  | l0 = 13 |
| CSI-RS periodicity | Slots | 40 |
| CSI-RS offset | Slots | 0 |
| QCL info |  | TCI state #1 |
| 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 |  | N/A |
| QCL Type |  | N/A |
| 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 |  | N/A |
| QCL Type |  | N/A |
| TCI state #2 | Type 1 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | N/A |
| QCL Type |  | N/A |
| TCI state #3 | Type 1 QCL information | SSB index |  | SSB #1 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | N/A |
| QCL Type |  | N/A |
| 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.1.2 |
| Note 1: SSB # (k mod 2) , CSI-RS (for tracking) resource set # ((k mod 2) + 1) and CSI-RS (for CSI acquisition) resource set # ((k mod 2) + 3) are transmitted by kth RRH.  For Test 1-1, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 32, NumOfRB 74 is transmitted in slot #i that satisfy. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from slot#    to slot#  ,  PDCCH and PDSCH are DTXed in other slots in which throughput statistics are not considered.  For Test 1-2, TCI state switching command scheduled by MAC CE with PDSCH configuration - MCS 4, Layer 1, StartRB 32, NumOfRB 74 is transmitted in slot #i that satisfy. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from slot#    to slot#    Where k=0, 1, 2… is the RRH number, n = 5040 is half of the number of slots between two RRH, = 8 is the number of slots between PDSCH and corresponding HARQ-ACK information, = 6 is the number of slots for MAC CE processing, = 7 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, = 4 is the number of slots for TRS processing. | | | | |

**Table 5.2.3.2.10-3: Minimum performance for HST-DPS**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test 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 | Correlation matrix and antenna configuration | Reference value | |
| Fraction of maximum throughput (%) | SNR (dB) |
| 1-1 | R.PDSCH.2-10.5 TDD | 40 / 30 | 64QAM, 0.43 | FR1.30-1 | HST-DPS | 1 | 2x4 | 70 | 10.2 |
| 1-2 | R.PDSCH.2-10.5 TDD | 40 / 30 | 64QAM, 0.43 | FR1.30-1 | HST-DPS | 2 | 2x4 | 70 | 10.2 |

<<End of change >>