**3GPP TSG- Meeting #**

**Fukuoka City, Fukuoka, , -**

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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 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:*** | 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 3l0 = 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 22 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 7l0 = 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 62 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$ mod\left(i,2n\right)=n$.PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}+T\_{firstTRS}+T\_{TRS proc}, 0]$ to slot# $\left(2k+1\right)n+T\_{HARQ}+T\_{MAC proc}$,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$ mod\left(i,2n\right)=n$.PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:slot#$ max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}, 0]$to:slot#$ \left(2k+1\right)n$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, $T\_{HARQ}$ = 2 is the number of slots between PDSCH and corresponding HARQ-ACK information, $T\_{MAC proc}$ = 3 is the number of slots for MAC CE processing, $T\_{firstTRS}$ = 6 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, $T\_{TRS proc}$ = 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$ mod\left(i,2n\right)=n$. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}+T\_{firstTRS}+T\_{TRS proc}, 0]$to:slot# $\left(2k+1\right)n$,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$ mod\left(i,2n\right)=n$. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}, 0]$to:slot# $\left(2k+1\right)n$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, $T\_{HARQ}$ = 8 is the number of slots between PDSCH and corresponding HARQ-ACK information, $T\_{MAC proc}$ = 6 is the number of slots for MAC CE processing, $T\_{firstTRS}$ = 7 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, $T\_{TRS proc}$ = 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 3l0 = 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 22 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 7l0 = 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 62 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$ mod\left(i,2n\right)=n$. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}+T\_{firstTRS}+T\_{TRS proc}, 0]$to:slot# $\left(2k+1\right)n$,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$ mod\left(i,2n\right)=n$. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from:slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}, 0]$to:slot# $\left(2k+1\right)n$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, $T\_{HARQ}$ = 2 is the number of slots between PDSCH and corresponding HARQ-ACK information, $T\_{MAC proc}$ = 3 is the number of slots for MAC CE processing, $T\_{firstTRS}$ = 6 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, $T\_{TRS proc}$ = 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$ mod\left(i,2n\right)=n$. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}+T\_{firstTRS}+T\_{TRS proc}, 0]$ to slot# $\left(2k+1\right)n+T\_{HARQ}+T\_{MAC proc}$, 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$ mod\left(i,2n\right)=n$. PDCCH and PDSCH associated with TCI # (k mod 2) is transmitted by kth RRH from slot# $max⁡[\left(2k-1\right)n+1+T\_{HARQ}+T\_{MAC proc}, 0]$ to slot# $\left(2k+1\right)n+T\_{HARQ}+T\_{MAC proc}$Where k=0, 1, 2… is the RRH number, n = 5040 is half of the number of slots between two RRH, $T\_{HARQ}$ = 8 is the number of slots between PDSCH and corresponding HARQ-ACK information, $T\_{MAC proc}$ = 6 is the number of slots for MAC CE processing, $T\_{firstTRS}$ = 7 is the number of slots to first TRS transmission occasion after MAC CE command is decoded by the UE, $T\_{TRS proc}$ = 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 >>