**3GPP TSG-RAN4 Meeting #104-eR4-2212129**

**Electronic meeting, 15th-26th, Aug., 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** |  | **rev** |  | **Current version:** | **17.6.0** |  |
|  |
| *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:***  | DraftCR to TS 38.133: Handover with PSCell from NR-DC to NR-DC with parallel processing |
|  |  |
| ***Source to WG:*** | Intel |
| ***Source to TSG:*** | RAN4 |
|  |  |
| ***Work item code:*** | NR\_RRM\_enh2-Perf |  | ***Date:*** | 2022-8-20 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-17 |
|  | *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)* |
|  |  |
| ***Reason for change:*** | In Rel-17, delay requirements for handover with PSCell from NR-DC to NR-DC with parallel processing needs to be defined.  |
|  |  |
| ***Summary of change:*** | Add handover with PSCell from NR-DC to NR-DC with parallel processing test case. |
|  |  |
| ***Consequences if not approved:*** | Delay requirement for handover with PSCell from NR-DC to NR-DC with parallel processing will be missing. |
|  |  |
| ***Clauses affected:*** | A.7.3.1.x4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

==========================Start of first change =============================

#### A.7.3.1.x4 NR PSCell change delay in HO with PSCell from NR-DC to NR-DC

##### A.7.3.1.x4.1 Test Purpose and Environment

The purpose of this test is to verify the PSCell change delay requirements in HO with PSCell from NR-DC to NR-DC defined in clauses 6.1.5.4.2. The requirements are applicable to NR FR1-FR1 inter-frequency PCell handover and NR FR2-FR2 intra-frequency PSCell change.

The supported test configurations are given in Table A.7.3.1.x4.1-1. The test scenario comprises four NR cells, source PCell(Cell 1) and source PSCell(Cell 2), target PCell(Cell 3), target PSCell(Cell 4).

Cell 1 and Cell 3 are on radio channel 1 in FR1.Cell 2 and Cell 4 are on radio channel 2 in FR2. Test parameters are given in Tables A.7.3.1.x4.1-2, A.7.3.1.x4.1-3, A.7.3.1.x4.1-4 and A.7.3.1.x4.1-5 below. The test consists of two successive time periods, with time durations of T1, T2 respectively. At the start of T1, the UE shall be connected to Cell 1 on radio channel 1 and Cell 2 on radio channel 2. UE is not aware of Cell 3 and Cell 4. Starting T2, cell 3 and Cell 4 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.7.3.1.x4.1-1: Supported test configurations for HO with PSCell from NR-DC to NR-DC

|  |  |
| --- | --- |
| Config | Description |
| 1 | Source PCell: FR1 NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex modeTarget PCell: FR1 NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex modeSource PSCell: FR2 NR 120kHz SSB SCS, 100MHz bandwidth, TDD duplex modeTarget PSCell: FR2 NR 120kHz SSB SCS, 100MHz bandwidth, TDD duplex mode |
| 2 | Source PCell: FR1 NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex modeTarget PCell: FR1 NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex modeSource PSCell: FR2 NR 120kHz SSB SCS, 100MHz bandwidth, TDD duplex modeTarget PSCell: FR2 NR 120kHz SSB SCS, 100MHz bandwidth, TDD duplex mode |
| 3 | Source PCell: FR1 NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex modeTarget PCell: FR1 NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex modeSource PSCell: FR2 NR 120kHz SSB SCS, 100MHz bandwidth, TDD duplex modeTarget PSCell: FR2 NR 120kHz SSB SCS, 100MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

Table A.7.3.1.x4.1-2: General test parameters for PCell FR1-FR1 Inter frequency handover

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 3 |  |
| Final condition | Active cell |  | Cell 3 |  |
| Access Barring Information | - | Not Sent | No additional delays in random access procedure. |
| T1 | s | 5 |  |
| T2 | s | ≤5 |  |

Table A.7.3.1.x4.1-3: Cell specific test parameters for PCell FR1-FR1 Inter frequency handover

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | Cell 3 |
|  |  | T1 | T2 | T1 | T2 |
| NR RF Channel Number |  | 1 | 2 |
| Duplex mode | Config 1 |  | FDD |
|  | Config 2,3 |  | TDD |
| TDD configuration | Config 1 |  | Not Applicable |
|  | Config 2 |  | TDDConf.1.1 |
|  | Config 3 |  | TDDConf.2.1 |
| BWchannel | Config 1 | MHz | 10: NRB,c = 52 |
|  | Config 2 |  | 10: NRB,c = 52 |
|  | Config 3 |  | 40: NRB,c = 106 |
| BWP BW | Config 1 | MHz | 10: NRB,c = 52 |
|  | Config 2 |  | 10: NRB,c = 52 |
|  | Config 3 |  | 40: NRB,c = 106 |
| TRS configuration | Config 1 |  | TRS.1.1 FDD |
|  | Config 2 |  | TRS.1.1 TDD |
|  | Config 3 |  | TRS.1.2 TDD |
| DRx Cycle | ms | Not Applicable |
| PDSCH Reference measurement channel  | Config 1 |  | SR.1.1 FDD |
|  | Config 2 |  | SR.1.1 TDD |
|  | Config 3 |  | SR2.1 TDD |
| CORESET Reference Channel | Config 1 |  | CR.1.1 FDD |
|  | Config 2 |  | CR.1.1 TDD |
|  | Config 3 |  | CR2.1 TDD |
| OCNG Patterns |  | OP.1 |
| SMTC Configuration |  | SMTC.1 |
| SSB Configuration | Config 1,2 |  | SSB.1 FR1 |
|  | Config 3 |  | SSB.2 FR1 |
| PDSCH/PDCCH subcarrier spacing | Config 1,2 | kHz | 15 kHz |
|  | Config 3 |  | 30 kHz |
| PUCCH/PUSCH subcarrier spacing | Config 1,2 | kHz | 15 kHz |
|  | Config 3 |  | 30 kHz |
| PRACH configuration  |  | FR1 PRACH configuration 1 |
| BWP | Initial DL BWP |  | DLBWP.0.1 |
|  | Dedicated DL BWP |  | DLBWP.1.1 |
|  | Initial UL BWP |  | ULBWP.0.1 |
|  | Dedicated UL BWP |  | ULBWP.1.1 |
| EPRE ratio of PSS to SSS | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |
| EPRE ratio of PDSCH DMRS to SSS  |  |  |
| EPRE ratio of PDSCH to PDSCH  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |
| Note2 | dBm/15kHz | -98 | -98 |
| Note2 | Config 1,2 | dBm/SCS | -98 | -98 |
|  | Config 3 |  | -95 | -95 |
|  | dB | 4 | 4 | -Infinity | 5 |
|  | dB | 4 | 4 | -Infinity | 5 |
| SSB\_RP | Config 1,2 | dBm/SCS | -94 | -94 | -Infinity | -93 |
|  | Config 3 | dBm/SCS | -91 | -91 | -Infinity | -90 |
| IoNote3 | Config 1,2 | dBm/9.36MHz | -64.59 | -64.59 | -70.05 | -63.85 |
|  | Config 3 | dBm/38.16MHz | -58.49 | -58.49 | -63.94 | -57.75 |
| Propagation condition | - | AWGN | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. |

Table A.7.3.1.x4.1-4: General test parameters Intra-frequency FR2-FR2 PSCell change

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 2 |  |
|  | Neighbouring cell |  | Cell 4 |  |
| Final condition | Active cell |  | Cell 4 |  |
| A4-Offset | dBm | -120 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Access Barring Information | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells |  | 3 μs | Synchronous cells |
| T1 | s | 5 |  |
| T2 | s | ≤10 |  |

Table A.7.3.1.x4.1-5: Cell specific test parameters for Intra-frequency FR2-FR2 PSCell change

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | Cell 4 |
|  |  | T1 | T2 | T1 | T2 |
| Assumption for UE beamsNote 6 |  | Rough | Rough |
| AoA setup |  | Setup 1 as defined in A.3.15 |
| NR RF Channel Number |  | **1** | **1** |
| Duplex mode |  | TDD |
| TDD configuration |  | TDDConf.3.1 |
| BWchannel | MHz | 100: NRB,c = 66 |
| BWP BW | MHz | 100: NRB,c = 66 |
| Data RBs allocated |  | 66 |
| DRx Cycle | ms | Not Applicable |
| PDSCH Reference measurement channel |  | SR3.1 TDD |
| RMSI CORESET Reference Channel |  | CR3.1 TDD |
| Control Channel RMC |  | CCR.3.1 TDD |
| OCNG Patterns |  | O P. 1 |
| SMTC Configuration |  | SMTC pattern 1 |
| SSB Configuration |  | SSB. 3 FR2 |
| PDSCH/PDCCH subcarrier spacing | kHz | 120 kHz |
| PUCCH/PUSCH subcarrier spacing | kHz | 120 kHz |
| PRACH configuration |  | FR2 PRACH configuration 1 |
| TRS configuration |  | TRS.2.1 TDD |
| PDSCH/PDCCH TCI state |  | TCI.State.2 |
| BWP configuraiton | Initial DL BWP |  | DLBWP.0.1 |
|  | Dedicated DL BWP |  | DLBWP.1.1 |
|  | Initial UL BWP |  | ULBWP.0.1 |
|  | Dedicated UL BWP |  | ULBWP.1.1 |
| EPRE ratio of PSS to SSS | dB | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  |
| Note2 | dBm/15kHz | -104.7 |
| Note2 |  | dBm/SCS | -95.7 |
|  | dB | 6 | -1.8 | -Infinity | 0 |
|  | dB | 6 | 6 | -Infinity | 7 |
| IoNote3 |  | dBm/BW | -59.7 | -56.7 | -59.7 | -56.7 |
| Propagation condition | - | AWGN | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zoneNote 5: As observed with 0 dBi gain antenna at the centre of the quiet zone Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation |

##### A.7.3.1.x4.2 Test Requirements

The UE shall start to transmit the PRACH to target PSCell (Cell 4) less than 83 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

==========================End of first change =============================