**3GPP TSG-RAN WG4 Meeting #** **104-e R4-22xxxxx**

**Electronic Meeting, Aug. 15 – Aug. 26, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **DraftCR** | **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:***  | draft CR on test cases for Handover with PSCell from NE-DC to NE-DC with known target PSCell |
|  |  |
| ***Source to WG:*** | vivo |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_RRM\_enh2-Perf |  | ***Date:*** | 2022-08-26 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Introduce Test case for Handover with PSCell from FR1+LTE NE-DC to FR1+LTE NE-DC, for the intra-frequency handover case:1. intra-frequency handover;2. both target PCell and PSCell are known |
|  |  |
| ***Summary of change:*** | Introduce intra-frequency handover with PSCell from FR1+LTE NE-DC to FR1+LTE with known target PCell and known target E-UTRA PSCell |
|  |  |
| ***Consequences if not approved:*** | No test case is specified. |
|  |  |
| ***Clauses affected:*** | A.4A.1.X1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS38.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | R4-2211010, R4-2212660 |

<Start of Change #1>

### A.4A.1.X1 Intra-freuqncy handover with E-UTRAN PSCell

#### A.4A.1.X1.1 Test purpose and environment

The purpose of this test is to verify that the intra-frequency handover with PSCell addition/change delay and interruption under NE-DC are within the requirements stated in clause 6.1.5.3 for the case when the PCell and PSCell are known by the UE.

Supported test configurations are shown in A.4A.1.X1.1-1. The test parameters for the E-UTRA cell are given in Table A.3.7.2.1-1.

The test parameters for NR cells are given in Tables A.4A.1.X1.1-2 and cell-specific parameters in A.4A.1.X1.1-3 below. The test consists of four time periods with duration of T1, T2, T3 and T4 respectively. There are two carriers each with two cells. Before the test starts the UE is connected to Cell 1 (NR PCell) on radio channel 1 (PCC) and Cell 2 (E-UTRAN PSCell) on radio channel 2. During T1 only Cell 1 and Cell 2 are known to the UE.

Before the start of T2, the UE in the measurement control information that event-triggered reporting with Event A3 is configured for NR neighbour cell (Cell 3), and event-triggered reporting with Event A3 is configured for E-UTRAN neighbour cell (Cell4). The Cell3 and Cell4 become known to the UE during T2. Therefore, during T2 the UE shall report Event A3 for the PCC freqnecy layer and Event A3 for the PSCC frequency layer.

The test system shall send a RRC message to the UE implying handover with PSCell, with targe PCell as Cell 3 and target PSCell as Cell 4 at the end of T2 duration. The RRC message shall be sent after the measurement gaps are released by the test system. The point in time at which the RRC message implying handover with PSCell is received at the UE antenna connector defines the start of period T3 and T4.

Table A.4A.1.X1.1-1: Applicable E-UTRA and NR configurations for NE-DC Handover with PSCell test

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

Table A.4A.1.X1.1-2: General Test Parameters for Intra-frequency handover with PSCell

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2 | Two radio channels are used for this test. One for NR cell and second for E-UTRAN Cell |
| Initial  | Active PCell |  | Cell1 | PCell on RF channel number 1. |
| Active PSCell |  | Cell2 | PSCell cell on RF channel number 2. |
| Neighbour PCell |  | Cell3 | Neighbor PCell on RF channel number 1. |
| Neighbour PSCell |  | Cell4 | Neighbor PSCell on RF channel number 2. |
| Final  | Active PCell |  | Cell3 | PCell on RF channel number 1. |
| Condition | Active PSCell |  | Cell4 | PSCell on RF channel number 2. |
| A3 for PCC frequency layer | A3-Offset | dB | 0 |  |
| Hysteresis | dB | 0 | Hysteresis for evaluation of event A3. |
| Time To Trigger | s | 0 | Time to Trigger of event A3 |
| A3 for PSCC frequency layer | A3-Offset | dB | 0 | Hysteresis for evaluation of event A3. |
|  | Hysteresis | dB | 0 | Actual RSRP threshold for event A3.  |
|  | Time to Trigger | S | 0 | Time to Trigger of event A3 |
| DRX |  | OFF | Continuous monitoring of primary cell |
| Measurement gap pattern Id |  | 0 | Gaps are configured before T2 and released before T3. |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | Individual offset for cells on primary component carrier.  |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | Individual offset for cells on carrier frequency of cell2.  |
| T1 | s | 1 | During this time the PCell shall be known and cell2 shall be unknown. |
| T2 | s | [TBD] | During this time the UE shall identify neighbour cell (cell3 and cell 4) and report event A3 in Cell 1 and Cell 2, and RRC message implying handover with PSCell at the end of this duration |
| T3 | s | [TBD] | During this time the UE finishes PCell handover. |
| T4 | s | [TBD] | During this time the UE finishes PSCell addition/change. |

Table A.4A.1.X1.1-3: NR Cell Specific Parameters for Intra-frequency handover with PSCell

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 1 | Cell 3 |
|  |  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| NR RF Channel Number |  | 1,2,3,4,5,6 | 1 |
| E-UTRA RF Channel Number |  | 1,2,3,4,5,6 | 2 |
| TDD  |  | 1,4 | Not Applicable |
| configuration |  | 2,5 | TDDConf.1.1 |
|  |  | 3,6 | TDDConf.2.1 |
| BWchannel | MHz | 1,4 | 10: NRB,c = 52 |
|  |  | 2,5 | 10: NRB,c = 52 |
|  |  | 3,6 | 40: NRB,c = 106 |
| Initial BWP Configuration |  | 1,2,3 | DLBWP.0.1ULBWP.0.1 |
| Dedicated BWP Configuration |  | 1,2,3 | DLBWP.1.1ULBWP.1.1 |
| PDSCH Reference  |  | 1,4 | SR.1.1 FDD |
| measurement |  | 2,5 | SR.1.1 TDD |
| channel |  | 3,6 | SR.2.1 TDD |
| CORESET Reference  |  | 1,4 | CR.1.1 FDD |
| Channel |  | 2,5 | CR.1.1 TDD |
|  |  | 3,6 | CR.2.1 TDD |
| OCNG Patterns |  | 1,2,3,4,5,6 | OP.1 |
| SSB configuration |  | 1,2,4,5 | SSB.1 FR1 |
|  |  | 3,6 | SSB.2 FR1 |
| SMTC configuration |  | 1,2,4,5 | SMTC.1 |
|  |  | 3,6 | SMTC.1 |
| TRS Configuration |  | 1,4 | TRS.1.1 FDD |
|  |  | 2,5 | TRS.1.1 TDD |
|  |  | 3,6 | TRS.1.2 TDD |
| PRACH configuration  |  | FR1 PRACH configuration 1 |
| PDSCH/PDCCH subcarrier spacing | kHz | 1,2,4,5 | 15 kHz |
| 3,6 | 30 kHz |
| PUCCH/PUSCH subcarrier spacing | kHz | 1,2,4,5 | 15 kHz |
| 3,6 | 30 kHz |
| EPRE ratio of PSS to SSS |  |  |  |
| 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 | dB | 1,2,3,4,5,6 | 0 |
| 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/15 kHz | 1,2,3,4,5,6 | -98 |
| Note2 | dBm/SCS | 1,2,4,5 | -98 |
|  |  | 3,6 | -95 |
|  |  | 1,2,3,4,5,6 | 8 | -3.3 | -3.3 | -Infinity | 2.36 | 2.36 |
|  |  | 1,2,3,4,5,6 | 8 | 8 | 8 | -Infinity | 11 | 11 |
| SS-RSRPNote3 | dBm/SCS | 1,2,4,5 | -90 | -90 | -90 | -Infinity | -87 | -87 |
|  |  | 3,6 | -87 | -87 | -87 | -Infinity | -84 | -84 |
| IoNote3 | dBm/9.36MHz | 1,2,4,5 | -61.41 | -57.06 | -57.06 | -61.41 | -57.06 | -57.06 |
|  | dBm/38.1MHz | 3,6 | -55.31 | -50.96 | -50.96 | -55.31 | -50.96 | -50.96 |
| Propagation condition |  | 1,2,3,4,5,6 | 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: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. |

Table A.4A.1.X1.1-4: E-UTRAN cell specific test parameters for Intra-frequency handover with PSCell

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | Cell 4 |
| T1 | T2 | T4 | T1 | T2 | T4 |
| Duplex mode |  | FDD or TDD |
| TDD special subframe configurationNote1 |  | 6 |
| TDD uplink-downlink configurationNote1 |  | 1 |
| BWchannel |  | 5 MHz: NRB,c = 2510 MHz: NRB,c = 5020 MHz: NRB,c = 100 |
| PDSCH parameters:DL Reference Measurement ChannelNote2 |  | 5 MHz: R.7 FDD10 MHz: R.3 FDD20 MHz: R.6 FDD5 MHz: R.4 TDD10 MHz: R.0 TDD20 MHz: R.3 TDD |
| PCFICH/PDCCH/PHICH parameters:DL Reference Measurement ChannelNote2 |  | 5 MHz: R.11 FDD10 MHz: R.6 FDD20 MHz: R.10 FDD5 MHz: R.11 TDD10 MHz: R.6 TDD20 MHz: R.10 TDD |
| OCNG PatternsNote2 |  | 5 MHz: OP.20 FDD10 MHz: OP.10 FDD20 MHz: OP.17 FDD5 MHz: OP.9 TDD10 MHz: OP.1 TDD20 MHz: OP.7 TDD |
| PBCH\_RA | dB |  |
| PBCH\_RB | dB |  |
| PSS\_RA | dB |  |
| SSS\_RA | dB |  |
| PCFICH\_RB | dB |  |
| PHICH\_RA | dB |  |
| PHICH\_RB | dB | 0 |
| PDCCH\_RA | dB |  |
| PDCCH\_RB | dB |  |
| PDSCH\_RA | dB |  |
| PDSCH\_RB | dB |  |
| OCNG\_RANote3 | dB |  |
| OCNG\_RBNote3  | dB |  |
| NocNote4 | dBm/15 kHz | -104 |
| Ês/Noc | dB | 14 | 14 | 14 | -Infinity | 17 | 17 |
| Ês/Iot | dB | 14 | 14 | 14 | -Infinity | 17 | 17 |
| RSRP Note5 | dBm/15 kHz | -90 | -90 | -90 | -Infinity | -87 | -87 |
| SCH\_RP Note5 | dBm/15 kHz | -90 | -90 | -90 | -Infinity | -87 | -87 |
| Io Note5 | dBm/Ch BW | -56.13+10log(NRB,c /50) | -56.13+10log(NRB,c /50) | -56.13+10log(NRB,c /50) | N/A | -59.13+10log(NRB,c /50) | -59.13+10log(NRB,c /50) |
| Propagation Condition |  | AWGN |
| Antenna Configuration |  | 1x2 |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211.Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 respectively.Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.Note 4: 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 Noc to be fulfilled.Note 5: Es/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. |

#### A.4A.1.X1.2 Test Requirements

The UE shall transmit the PRACH to PCell at latest DHOwithPSCell\_PCellinto T3.

The UE shall transmit the PRACH to PSCell at latest DHOwithPSCell\_PSCell into T4.

The PCell handover delay, DHOwithPSCell\_PCell, is equals the applicable RRC procedure delay defined in clause 12 in TS 38.331 [2] plus the PCell interruption time (Tinterrupt) define in clause 6.1.5.3.2.

PSCell addition/change delay, DHOwithPSCell\_PSCell is defined in clause 6.1.5.3.3.

All the above test requirements shall be fulfilled in order for the observed handover with PSCell delay to be counted as correct. The rate of correct observed handover with PSCell delay during repeated tests shall be at least 90%.

<End of Change #1>