**3GPP TSG-RAN WG4 Meeting # 104-e *R4-2212953***

**Electronic Meeting, August 15 – August 26, 2022**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **Draft 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:*** | CR on TC for HO with PSCell from NR SA to EN-DC | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RRM\_enh2-Perf | | | | |  | ***Date:*** | | | 2022-04-01 |
|  |  | | | |  | |  | | |  |
| ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Changes are based on endorsed draft CR R4-2211009   * The Noc, Es/Iot, Es/Noc configurations for NR PSCell (Cell 3) shall be aligned with PSCell addition test cases (A.4.5.7). * There is typos need to be corrected. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Corret the configurations of Noc, Es/Iot, Es/Noc configurations for NR PSCell (Cell 3) to align with PSCell addition test cases (A.4.5.7). * Correct typos. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The correponding test case is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.6.3.1.x1 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

### <Start of Change 1>

A.6.3.1.x1 SA NR - E-UTRAN with NR PSCell addition in FR1

A.6.3.1.x1.1 Test Purpose and Environment

The purpose of this set of tests is to verify that the UE can make correct inter-RAT E-UTRAN handover with PSCell addition when operating in standalone (SA) operation with PCell in FR1 where target PCell and target PSCell are unknown. This test shall verify the Handover with PSCell from NR SA to EN-DC requirements as specified in clause 6.1.5.1.

The test comprises of two NR carrier and one E-UTRA carrier. There are three cells and one cell on each carrier. Cell 1 is the NR PCell, Cell 2 is an inter-RAT E-UTRAN neighbour cell and Cell 3 is an NR neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2 and Cell 3. Starting T2, Cell 2 and Cell 3 becomes detectable

A RRC message implying handover with PSCell shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover with PSCell is sent to the UE.Before T2, the UE does not have any information of Cell 3. The handover with PSCell message shall contain Cell 2 and Cell 3 as the target cells and the SMTC for Cell 3 is configured in *RRCConnectionReconfiguration.*

Supported test configurations are shown in table A.6.3.1.x1-1. General test parameters are provided in Table A.6.3.1.x1-2. Cell specific test parameters for Cell 1, Cell 2 and Cell 3 are provided in Tables A.6.3.1.x1-3, A.6.3.1.x1-4 and A.6.3.1.x1-5 respectively.

**Table A.6.3.1.x1-1: Supported test configurations for SA inter-RAT E-UTRAN handover tests**

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

**Table A.6.3.1.x1-2: General test parameters for Handover with PSCell from NR SA to EN-DC**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| NR RF Channel Number | |  | 1, 2 | 2 NR carrier frequency is used in the test |
| LTE RF Channel Number | |  | 3 | 1 E-UTRAN carrier frequency is used in the test |
| Initial conditions | Active cell |  | Cell 1 | NR cell |
|  | Neighbouring cell |  | Cell 2, Cell3 | E-UTRAN cell and NR Cell |
| Final condition | Active cell |  | Cell 2 and Cell 3 |  |
| DRX | |  | OFF | Non-DRX test |
| Access Barring Information | | - | Not sent | No additional delays in random access procedure |
| Time offset between Cell 1 and Cell 2 | |  | 3 ms | Asynchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |

**Table A.6.3.1.x1-3: Cell specific test parameters for Handover with PSCell from NR SA to EN-DC (Cell1)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Configuration** | **Cell 1** | |
|  | |  |  | **T1** | **T2** |
| RF channel number | |  | 1, 2, 3, 4, 5, 6 | 1 | |
| Duplex mode | |  | 1, 4 | FDD | |
|  | |  | 2, 3, 5, 6 | TDD | |
| TDD Configuration | |  | 2, 5 | TDDConf.1.1 | |
|  | |  | 3, 6 | TDDConf.2.1 | |
| BWchannel | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | |
|  | |  | 2, 5 | 10: NRB,c = 52 (TDD) | |
|  | |  | 3, 6 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | |  | 1, 4 | SR.1.1 FDD | |
|  | |  | 2, 5 | SR.1.1 TDD | |
|  | |  | 3, 6 | SR.2.1 TDD | |
| CORSET reference channel | |  | 1, 4 | CR.1.1 FDD | |
|  | |  | 2, 5 | CR.1.1 TDD | |
|  | |  | 3, 6 | CR.2.1 TDD | |
| TRS configuration | |  | 1, 4 | TRS.1.1 FDD | |
|  | |  | 2, 5 | TRS.1.1 TDD | |
|  | |  | 3, 6 | TRS.1.2 TDD | |
| OCNG patternNote1 | |  | 1, 2, 3, 4, 5, 6 | OP.1 | |
| BWP | Initial DL BWP |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | |
| SMTC configuration | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | |
| SSB configuration | |  | 1, 2, 4, 5 | SSB.1 FR1 | |
|  | |  | 3, 6 | SSB.2 FR1 | |
| EPRE ratio of PSS to SSS | | dB | 1, 2, 3, 4, 5, 6 | 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\_DMRS | |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS | |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS | |  |  |  | |
| *Noc*Note2 | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -100 | -100 |
| *Noc*Note2 | | dBm/SCS | 1, 2, 4, 5 | -100 | -100 |
|  | |  | 3, 6 | -97 | -97 |
| Ês/Noc | | dB | 1, 2, 3, 4, 5, 6 | 12 | -4 |
| Ês/IotNote3 | | dB | 1, 2, 3, 4, 5, 6 | 12 | -4 |
| SS-RSRPNote3 | | dBm/SCS | 1, 2, 4, 5 | -88 | -104 |
|  | |  | 3, 6 | -85 | -101 |
| IoNote3 | | dBm/9.36 MHz | 1, 2, 4, 5 | -59.78 | -70.59 |
|  | | dBm/38.16 MHz | 3, 6 | -53.68 | -64.49 |
| Propagation condition | |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix | |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| 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 *Noc* to be fulfilled.  Note 3: Ês/Iot, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | |

**Table A.6.3.1.x1-4: Cell specific test parameters for Handover with PSCell from NR SA to EN-DC (Cell 2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Configuration** | **Cell 2** | |
|  |  |  | **T1** | **T2** |
| RF channel number |  | 1, 2, 3, 4, 5, 6 | 3 | |
| Duplex mode |  | 1, 2, 3 | FDD | |
| 4, 5, 6 | TDD | |
| TDD special subframe configurationNote1 |  | 4, 5, 6 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 4, 5, 6 | 1 | |
| BWchannel | MHz | 1, 2, 3, 4, 5, 6 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PRACH ConfigurationNote2 |  | 1, 2, 3 | 4 | |
|  |  | 4, 5, 6 | 53 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote3 |  | 1, 2, 3 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 4, 5, 6 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote3 |  | 1, 2, 3 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote3 |  | 1, 2, 3 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 4, 5, 6 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| PBCH\_RA | dB | 1, 2, 3, 4, 5, 6 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote4 |  |  |  | |
| OCNG\_RBNote4 |  |  |  | |
| NocNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -98 | |
| Ês/Noc | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 78 |
| Ês/IotNote6 | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 78 |
| RSRPNote6 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -90 |
| SCH\_RPNote6 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -90 |
| IoNote6 | dBm/9MHz | 1, 2, 3, 4, 5, 6 | -67.21  +10log(NRB,c/100) | -58.57  +10log(NRB,c/100) |
| Propagation Condition |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix Note7 |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211 [23].  Note 3: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 4: 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 5: 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 6: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 7: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

**Table A.6.3.1.x1-5: Cell specific test parameters for Handover with PSCell from NR SA to EN-DC (Cell 3)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Configuration** | **Cell 3** | |
|  | |  |  | **T1** | **T2** |
| RF channel number | |  | 1, 2, 3, 4, 5, 6 | 2 | |
| Duplex mode | |  | 1, 4 | FDD | |
|  | |  | 2, 3, 5, 6 | TDD | |
| TDD Configuration | |  | 2, 5 | TDDConf.1.1 | |
|  | |  | 3, 6 | TDDConf.2.1 | |
| BWchannel | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | |
|  | |  | 2, 5 | 10: NRB,c = 52 (TDD) | |
|  | |  | 3, 6 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | |  | 1, 4 | SR.1.1 FDD | |
|  | |  | 2, 5 | SR.1.1 TDD | |
|  | |  | 3, 6 | SR.2.1 TDD | |
| CORSET reference channel | |  | 1, 4 | CR.1.1 FDD | |
|  | |  | 2, 5 | CR.1.1 TDD | |
|  | |  | 3, 6 | CR.2.1 TDD | |
| TRS configuration | |  | 1, 4 | TRS.1.1 FDD | |
|  | |  | 2, 5 | TRS.1.1 TDD | |
|  | |  | 3, 6 | TRS.1.2 TDD | |
| PRACH configuration | |  | 1, 2, 3, 4, 5, 6 | FR1 PRACH configuration 1 | |
| OCNG patternNote1 | |  | 1, 2, 3, 4, 5, 6 | OP.1 | |
| BWP | Initial DL BWP |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | |
| SMTC configuration | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | |
| SSB configuration | |  | 1, 2, 4, 5 | SSB.1 FR1 | |
|  | |  | 3, 6 | SSB.2 FR1 | |
| EPRE ratio of PSS to SSS | | dB | 1, 2, 3, 4, 5, 6 | 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\_DMRS | |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS | |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS | |  |  |  | |
| *Noc*Note2 | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -100 | -85 |
| *Noc*Note2 | | dBm/SCS | 1, 2, 4, 5 | -100 | -85 |
|  | |  | 3, 6 | -100 | -82 |
| Ês/Noc | | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 0 |
| Ês/IotNote3 | | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 0 |
| SS-RSRPNote3 | | dBm/SCS | 1, 2, 4, 5 | -Infinity | -85 |
|  | 3, 6 | -Infinity | -82 |
| IoNote3 | | dBm/9.36 MHz | 1, 2, 4, 5 | -72.05 | -57 |
|  | | dBm/38.16 MHz | 3, 6 | -68.96 | -51 |
| Propagation condition | |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix | |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| 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 *Noc* to be fulfilled.  Note 3: Ês/Iot, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | |

A.6.3.1.x1.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 175 ms from the beginning of time period T2.

The UE shall start to transmit the PRACH to Cell 3 less than 270 ms from the beginning of time period T2.

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 50 ms and is specified in clause 6.1.5.1.

Tinterrupt = 125 ms in the test; Tinterrupt is defined in clause 6.1.5.1.

The PSCell addition time can be expressed as: TRRC\_delay + Tprocessing + Tsearch\_HO + Tsearch\_PSCell + T∆ + TPSCell\_ DU + 2 ms which is defined in clause 6.1.5.1

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

### <End of Change 1>