**3GPP TSG- Meeting #**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *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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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
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| ***Category:*** |  |  | | | | | ***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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of text clause with RRM performance requirements of contention-based 2-step RACH in FR2 in standalone | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | New clause wifh 2-step CBRA in FR2 NR SA | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Test case will not be specified for 2-step RACH. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.7.3.2.2.3 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Draft CR submitted to AI 7.18.2.2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision from R4-2014936 | | | | | | | | |

### <Start of Change 1>

##### A.7.3.2.2.3 2-step RA type contention based random access test in FR2 for NR Standalone

A.7.3.2.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the 2-step RA type random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2.3 and Clause 7.1.2 in an AWGN model.

For this test one cell is used, with the configuration of Cell 1 configured as PCell or SCell in FR2. Supported test parameters are shown in Table A.7.3.2.2.3.1-1. UE capable of SA with PCell or SCell in FR2 needs to be tested by using the parameters in Table A.7.3.2.2.3.1-2 and Table A.7.3.2.2.3.1-3.

Table A.7.3.2.2.3.1-1: Supported test configurations for 2-step RA type contention based random access test in FR2 for NR Standalone

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR PSCell/SCell 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

Table A.7.3.2.2.3.1-2: General test parameters for 2-step RA type contention based random access test in FR2 for NR Standalone

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Test-1 | Comments |
| SSB Configuration | Config 1 |  | SSB.1 FR2 | As defined in A.3.10 |
| Duplex Mode for Cell 1 | Config 1 |  | TDD |  |
| TDD Configuration | Config 1 |  | TDDConf.3.1 | As defined in A.3.1.4 |
| BWchannel | Config 1 | MHz | 100: NRB,c = 24 |  |
| OCNG Pattern Note 1 | |  | OCNG pattern 1 | As defined in A.3.2.1. |
| PDSCH Reference Channel Note 2 | Config 1 |  | SR.3.1 TDD | As defined in A.3.1.1. |
| RMSI CORESET Reference Channel | Config 1 |  | CR.3.1 TDD | As defined in A.3.1.2 |
| NR RF Channel Number | |  | 1 |  |
| EPRE ratio of PSS to SSS | | dB | 0 |  |
| EPRE ratio of PBCH\_DMRS to SSS | | dB |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | dB |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | dB |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | dB |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | dB |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | dB |  |
| ss-PBCH-BlockPower | | dBm/ SCS | +20 +ΔUL | As defined in TS 38.331 [2].  ΔUL is derived from the uplink calibration process Note 3 |
| Configured UE transmitted power () | | dBm | maximum value configurable for certain power class | As defined in clause 6.2.4 in TS 38.101-2 [19] |
| MsgA Configuration | |  | FR2 MsgA configuration 1 | As defined in A.3.x.3, with exceptions as defined below |
| *msgA-RSRP-ThresholdSSB* | | dBm | RSRP\_69 +ΔDL | RSRP\_69 corresponds to -88dBm. ΔDL is derived from the downlink calibration process Note 4 |
| preambleReceivedTargetPower | | dBm | -100 | As defined in TS 38.331 [2] |
| Note 1: OCNG shall be used such that a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 3: The ΔUL value is calculated as -ROUND(PPRACH0 -1), where PPRACH0 is the measured first PRACH power with -80.6dBm/SCS applied, *msgA-PreambleReceivedTargetPower* = -100dBm and *ss-PBCH-BlockPower* = 20dBm. These values are used during the uplink calibration process carried out before the test case is run, with the UE configured to send PRACH.  Note 4: The ΔDL value is calculated as (RSRP\_REP – RSRP\_76), where RSRP\_REP is the SS-RSRP Reported value in Table 10.1.6.1-1 with -80.6dBm/SCS applied. These values are used during the downlink calibration process carried out before the test case is run, with the UE configured to report SS-RSRP. For a Reported value RSRP\_x, x is treated as a positive integer value. | | | | |

Table A.7.3.2.2.3.1-3: OTA-related test parameters for 2-step RA type contention based random access test in FR2 for NR Standalone

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test-1 | Comments |
| AoA setup | | |  | Setup 2b | As defined in A.3.15.1 |
| Assumption for UE beamsNote 2 | | |  | Rough |  |
| SSB with index 0 | Es Note1 | | dBm/SCS | -80.6 | Power of SSB with index 0 is set to be above configured *msgA-RSRP-ThresholdSSB* |
| SSB\_RP | | dBm/SCS | -80.6 |
| Es/IotBB | | dB | 21.09 |  |
| Io | | dBm/95.04 MHz | -56.01 | Io in symbols containing SSB index 0 |
| SSB with index 1 | | Es Note1 | dBm/SCS | -95.0 | Power of SSB with index 1 is set to be below configured *msgA-RSRP-ThresholdSSB* |
| SSB\_RP | dBm/SCS | -95.0 |
| Es/IotBB | dB | 6.69 |  |
| Io | dBm/95.04 MHz | -70.41 | Io in symbols containing SSB index 1 |
| Propagation Condition | | | - | AWGN |  |
| Note 1: No articial noise is applied in this test.  Note 2: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | |

A.7.3.2.2.3.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.7.3.2.2.3.2.1 MsgA Transmission

To test the UE behavior specified in Clause 6.2.2.3.1.1 the System Simulator shall receive the MsgA with a preamble which belongs to one of the Random Access Preambles associated with the SSB with index 0, which has SS-RSRP above the configured *msgA-RSRP-ThresholdSSB*.

In addition, the power applied to all MsgA transmissions shall be in accordance with what is specified in Clause 6.2.2.3. The power of the first MsgA preamble shall be 0.6 dBm to be received at TE with an accuracy specified in clause 6.3.4.2 of TS 38.101-2 [19]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-2 [19], where indicates the MsgA PUSCH numerology, e.g. =2 for SCS=60 kHz and =3 for SCS=120 kHz. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-2 [19].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

A.7.3.2.2.3.2.2 MsgB Reception

To test the UE behavior specified in Clause 6.2.2.3.1.2 the System Simulator shall transmit a MsgB containing a fallbackRAR message and a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 3 preambles have been received by the System Simulator. In response to the first 2 preambles, the System Simulator shall transmit a MsgB *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for MsgB(s) and shall transmit the msg3 if the MsgB with a fallbackRAR contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS 38.321 [7], and transmit MsgA with the calculated MsgA PRACH and MsgA PUSCH transmission power when the backoff time expires if all received MsgB’s contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all MsgA transmissions shall be in accordance with what is specified in Clause 6.2.2.3. The power of the first MsgA PRACH shall be 0.6 dBm to be received at TE with an accuracy specified in clause 6.3.4.2 of TS 38.101-2 [19]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-2 [19], where indicates the MsgA PUSCH numerology, e.g. =2 for SCS=60 kHz and =3 for SCS=120 kHz. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-2 [19].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

A.7.3.2.2.3.2.3 No MsgB Reception

To test the UE behavior specified in clause 6.2.2.3.1.3 the System Simulator shall transmit a MsgB containing a fallbackRAR message and Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 3 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 2 preambles.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS 38.321 [7], and transmit with the calculated MsgA PRACH and MsgA PUSCH transmission power when the backoff time expires if no MsgB is received within the MsgB Response window.

In addition, the power applied to all MsgA transmissions shall be in accordance with what is specified in Clause 6.2.2.3. The power of the first MsgA PRACH shall be 0.6 dBm to be received at TE with an accuracy specified in clause 6.3.4.2 of TS 38.101-2 [19]. The power of the first MsgA PUSCH transmission shall be  dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-2 [19], where indicates the MsgA PUSCH numerology, e.g. =2 for SCS=60 kHz and =3 for SCS=120 kHz. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-2 [19].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

<End of Change 1>