**3GPP TSG-RAN WG4 Meeting # 101-e *R4-2120756***

**Electronic meeting, 1 – 12 November 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.141-1** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **16.9.0** |  |
|  | | | | | | | | |
| *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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Draft CR to TS 38.141-1 with NRTC6 test configuration updates | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Perf | | | | |  | ***Date:*** | | | 2021-10-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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:*** | | During RAN4#100-e meeting draft CR R4-2115812 with NRTC6 introduction was endorsed. NRTC6 introduces specific test configuration for non-contiguous tranmission testing for unlicensed bands n46 and n96. However NRTC6 details require clarifications. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Clause 4.7.8: Addition of clarification with 20 MHz channel bandiwdth  Clause 4.7.8.1: Method splited for 60 MHz and 80 MHz channel bandwidth with clear definition of pattern  Clause 4.8.3: editorial updates  Clause 4.8.4: editorial updates | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Existing NRTC6 detilas will not be specified correctly and may be ambigous. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.7.8, 4.7.8.1, 4.8.3, 4.8.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | This is revision of draft CR R4-2119439 | | | | | | | | |

<Start of changes>

### 4.7.8 NRTC6: Non-contiguous spectrum operation in band n46 and n96

The purpose of test configuration NRTC6 is to test operating band unwanted emission (OBUE) for one or two non-transmitted 20 MHz channels for band n46 and n96 operation with 60 MHz and or 80 MHz channel bandwidth.

#### 4.7.8.1 NRTC6 generation

NRTC6 shall be constructed on a per band basis using the following method:

- Declared maximum Base Station RF Bandwidth supported for contiguous spectrum operation (D.11) shall be used.

- For60 MHz channel bandwidth, place 60 MHz carrierwith ON-OFF-ON pattern for non-contiguous transmission at the upper edge of the BS channel bandwidth for the carrier adjacent to the upper Base Station RF Bandwidth edge and 60 MHz carrier with ON-OFF-ON pattern for non-contiguous transmission at the lower edge of the BS channel bandwidth for the carrier adjacent to the lower Base Station RF Bandwidth edge.

- For 80MHz channel bandwidth, place 80 MHz carrier ~~carriers (according to 4.7.2)~~ with ON-OFF~~ON~~-OFF-ON pattern for non-contiguous transmission at the upper edge of the BS channel bandwidth for the carrier adjacent to the upper Base Station RF Bandwidth edge and 80 MHz carrier ~~three carriers~~ with ON-OFF-~~ON~~OFF-ON pattern for non-contiguous transmission at the lower edge of the BS channel bandwidth for the carrier adjacent to the lower Base Station RF Bandwidth edge.

- For transmitter tests, select as many 60 MHz channel bandwidth (with ON-OFF-ON pattern for non-contiguous transmission) or 80 MHz channel bandwidth (with ON-ON-OFF-ON pattern for non-contiguous transmission) that the BS supports within an *operating band* and fit in the rest of the declared maximum Base Station RF Bandwidth (D.11). Place the 60 MHz channel bandwidth (with ON-OFF-ON pattern for non-contiguous transmission) or 80 MHz channel bandwidth (with ON-~~ON~~OFF-OFF-ON pattern for non-contiguous transmission) adjacent to each other starting from the upper Base Station RF Bandwidth edge. The nominal channel spacing defined in TS 38.104 [2], clause 5.4.1 shall apply.

The test configuration should be constructed sequentially on a per band basis for all component carriers of the inter-band CA bands declared to be supported by the BS and are transmitted using the same *antenna connector*. All configured component carriers are transmitted simultaneously in the tests where the transmitter should be ON.

#### 4.7.8.2 NRTC6 power allocation

Set the power spectral density of each carrier to the same level so that the sum of the carrier powers equals the rated total output power (Prated,t,AC, or Prated,t,TABC, D.22) according to the manufacturer's declaration in clause 4.6.

<Next changes>

### 4.8.3 Applicability of test configurations for single-bandoperation

The applicable test configurations are specified in the tables below for each the supported RF configuration, which shall be declared according to clause 4.6. The generation and power allocation for each test configuration is defined in clause 4.7. This clause contains the test configurations for a BS capable of single carrier, multi-carrier and/or CA operation in both contiguous and non-contiguous spectrum in single band.

For a BS declared to be capable of single carrier operation only (D.16), a single carrier (SC) shall be used for testing.

For a BSdeclared to support multi-carrier and/or CA operation in contiguous spectrum within a single band (D.15-D.16), the test configurations in the second column of table 4.8.3-1 shall be used for testing.

For a BSdeclared to support multi-carrier and/or CA operation in contiguous and non-contiguous spectrum within a single band (D.15-D.16) and where the parameters in the manufacture's declaration according to clause 4.6 are identical for contiguous (C) and non-contiguous (NC) spectrum operation (D.9), the test configurations in the third column of table 4.8.3-1 shall be used for testing.

For a BSdeclared to support multi-carrier and/or CA in operation contiguous and non-contiguous spectrum within a single band (D.15-D.16) and where the parameters in the manufacture's declaration according to clause 4.6 are not identical for contiguous (C) and non-contiguous (NC) spectrum operation (D.9), the test configurations in the fourth column of table 4.8.3-1 shall be used for testing.

For a BS declared to support band n46 and/or band n96 operation with 60 MHz and or 80 MHz channel bandwidth with non-contiguous transmission, the test configuration NRTC6 shall be used for operation band unwanted emission,.

Unless otherwise stated, single carrier configuration (SC) tests shall be performed using signal with narrowest supported channel bandwidth and the smallest supported sub-carrier spacing.

Table 4.8.3-1: Test configurations for a BS capable of multi-carrier and/or CA in a single band

|  |  |  |  |
| --- | --- | --- | --- |
| BS test case | Contiguous spectrum capable BS | C and NC capable BS with identical parameters | C and NC capable BS with different parameters |
| Base station output power | NRTC1 | NRTC1 | NRTC1, NRTC3 |
| RE Power control dynamic range | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| Total power dynamic range (Note 3) | SC | SC | SC |
| Transmit ON/OFF power (only applied for NR TDD BS) | NRTC1 | NRTC1 | NRTC1, NRTC3 |
| Frequency error | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| Error Vector Magnitude (Note 3) | NRTC1 | NRTC1 | NRTC1, NRTC3 |
| Time alignment error (Note 3) | NRTC1 | NRTC1 | NRTC1, NRTC3 |
| Occupied bandwidth | SC, NRTC2 (Note 1) | SC, NRTC2 (Note 1) | SC, NRTC2 (Note 1) |
| Adjacent Channel Leakage power Ratio (ACLR) | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| Cumulative ACLR requirement in non-contiguous spectrum | - | NRTC3 | NRTC3 |
| Operating band unwanted emissions | NRTC1, SC (Note 2) NRTC6 (Note 4) | NRTC1, NRTC3, SC (Note 2)  NRTC6 (Note 4) | NRTC1, NRTC3, SC (Note 2)  NRTC6 (Note 4) |
| Transmitter spurious emissions | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| Transmitter intermodulation | NRTC1 | NRTC1, NRTC3 | NRTC1, NRTC3 |
| Reference sensitivity level | SC | SC | SC |
| Dynamic range | SC | SC | SC |
| Adjacent Channel Selectivity (ACS) | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| In-band blocking | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| Out-of-band blocking | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| Receiver spurious emissions | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| Receiver intermodulation | NRTC1 | NRTC3 | NRTC1, NRTC3 |
| In-channel selectivity | SC | SC | SC |
| Note 1: NRTC2 is only applicable when contiguous CA is supported.  Note 2: OBUE SC shall be tested using the widest supported channel bandwidth and the highest supported sub-carrier spacing.  Note 3: There is no specific test for NB-IoT operation in NR in-band for these requirements, tests could be performed using NR signal only, without NB-IoT.  Note 4: NRTC6 is only applicable for band n46 and n96 when 60 MHz or 80 MHz channel bandwidth with non-contiguous transmission is supported. | | | |

4.8.4 Applicability of test configurations for multi-bandoperation

For a BS declared to be capable of multi-band operation, the test configuration in table 4.8.4-1 and/or table 4.8.3-1 shall be used for testing. In the case where multiple bands are mapped on common *multi-band connector*, the test configuration in the second column of table 4.8.4-1 shall be used. In the case where multiple bands are mapped on common *single-band connector*, the test configuration in table 4.8.3-1 shall be used. In the case where multiple bands are mapped on separate *single-band connector* or *multi-band connector*, the test configuration in the third column of table 4.8.4-1 shall be used.

Unless otherwise stated, single carrier configuration (SC) tests shall be performed using signal with narrowest supported channel bandwidth and the smallest supported sub-carrier spacing.

**Table 4.8.4-1: Test configuration for a BS capable of multi-band operation**

|  |  |  |
| --- | --- | --- |
| **BS test case** | **Test configuration** | |
|  | **Common connector** | **Separate connectors** |
| Base station output power | NRTC1/3 (Note 1), NRTC4 | NRTC1/3 (Note 1), NRTC4 |
| RE Power control dynamic range | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| Total power dynamic range (Note 8) | SC | SC |
| Transmit ON/OFF power (only applied for NR TDD BS) | NRTC4 | NRTC4 |
| Frequency error | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
| Error Vector Magnitude (Note 8) | NRTC1/3 (Note 1), NRTC4 | NRTC1/3 (Note 1), NRTC4 |
| Time alignment error (Note 8) | NRTC1/3 (Note 1), NRTC5 (Note 2) | NRTC1/3 (Note 1), NRTC5 (Note 2) |
| Occupied bandwidth | SC, NRTC2 (Note 3) | SC, NRTC2 (Note 3) |
| Adjacent Channel Leakage power Ratio (ACLR) | NRTC1/3 (Note 1), NRTC5 (Note 4) | NRTC1/3 (Note 1, 5), NRTC5 (Note 4, 5) |
| Cumulative ACLR requirement in non-contiguous spectrum | NRTC3 (Note 1), NRTC5 (Note 4) | NRTC3 (Note 1, 5) |
| Operating band unwanted emissions | NRTC1/3 (Note 1), NRTC5, SC (Note 7)  NRTC6 (Note 9) | NRTC1/3 (Note 1, 5), NRTC5 (Note 5),  SC(Note 7)  NRTC6 (Note 9) |
| Transmitter spurious emissions | NRTC1/3 (Note 1), NRTC5 | NRTC1/3 (Note 1, 5), NRTC5 (Note 5) |
| Transmitter intermodulation | NRTC1/3 (Note 1) | NRTC1/3 (Note 1, 5) |
| Reference sensitivity level | SC | SC |
| Dynamic range | SC | SC |
| Adjacent Channel Selectivity(ACS) | NRTC5 | NRTC1/3 (Note 1), NRTC5 (Note 6) |
| In-band blocking | NRTC5 | NRTC1/3 (Note 1), NRTC5 (Note 6) |
| Out-of-band blocking | NRTC5 | NRTC1/3 (Note 1), NRTC5 (Note 6) |
| Receiver spurious emissions | NRTC1/3 (Note 1), NRTC5 | NRTC1/3 (Note 1, 5), NRTC5 (Note 5) |
| Receiver intermodulation | NRTC5 | NRTC1/3 (Note 1), NRTC5 (Note 6) |
| In-channel selectivity | SC | SC |
| Note 1: NRTC1 and/or NRTC3 shall be applied in each supported operating band.  Note 2: NRTC5 is only applicable when inter-band CA is supported.  Note 3: NRTC2 is only applicable when contiguous CA is supported.  Note 4: NRTC5 may be applied for Inter RF Bandwidth gap only.  Note 5: For single-band operation test, other antenna connector(s) is (are) terminated.  Note 6: NRTC5 is only applicable for multi-band receiver.  Note 7: OBUE SC shall be tested using the widest supported channel bandwidth and the highest supported sub-carrier spacing.  Note 8: There is no specific test for NB-IoT operation in NR in-band for these requirements, tests could be performed using NR signal only, without NB-IoT.  Note 9: NRTC6 is only applicable for band n46 and n96 when 60 MHz or 80 MHz channel bandwidth with non-contiguous transmission is supported. | | |

<End of changes>