**3GPP TSG-RAN4 Meeting #98-e DRAFT R4-2103784**

**Online, , 25th Jan 2021 - 5th Feb 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.145-2** | **CR** | **0286** | **rev** | **1** | **Current version:** | **16.6.0** |  |
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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 |  | Radio Access Network | **x** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16 | | | | | | | | | |
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| ***Source to WG:*** | Huawei, China Unicom | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AASenh\_BS\_LTE\_UTRA-Perf, TEI16, MSR\_GSM\_UTRA\_LTE\_NR-Perf | | | | |  | ***Date:*** | | | 2021-01-15 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | Referring to the Rel-16 WI on MSR\_GSM\_UTRA\_LTE\_NR, the MSR BS specification was extended with additional CS configuration (e.g. UTRA+EUTRA+NR).  WID in RP-190642 captured that only MSR BS specifications are to be affected, i.e. TS 37.104, TS 37.141. Realted MSR BS CRs are listed below:   * TS 37.104: R4-1908049 Introduction of requirements for NR + UTRA/GSM combinations * TS 37.141: R4-1910476 Introduction of requirements for NR + UTRA/GSM combinations   Still, the referred WI has also impacted OBUE and blocking requirements, which also impacts the AAS BS specifications, as well as the Capability Sets and test configurations were extended.  Therefore, this CR provides modifications to the AAS BS test specification TS 37.145-2, to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 MSR BS TS 37.141. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * 4.9: introduction of RCSA3B for UTRA, EUTRA, NR multi-RAT case. * 4.11.2.8.1.2 (ATCR5): applicability table updated with new CS * 4.11.2.8.2 (ATCR5b): MSR changes reflected. Applicabiltiy table updated with new CS * 4.11.2.9, 4.11.2.10 (ATCR7, ANTCR7): MSR changes reflected. Power allocation section updated. * 4.11.2.13, 4.11.2.14 (ATCR9, ANTCR9): new section for UTRA, E-UTRA and NR multi-RAT operation * 5.2: Test configuration applicability table updated with new RCSA3B test case * 6.6.5.5.2, 6.6.5.5.3: updates to the OBUE applicability table and related OBUE tables headers corrections * 7.8.5.1.1: Tx IMD table updated | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | AAS BS specification would be misaligned with the MSR BS specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.9, 4.11.2.8, 4.11.2.8.2, 4.11.2.11, 4.11.2.13, 4.11.2.14, 5.1, 5.2, 6.7.5.5.2, 6.7.5.5.3, 7.8.5.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 37.104 CR#0222 | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 37.145-1 CR#0246 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | In order to make the implementation process transparent, the CR was implemented using separate Track Change ID for the content taken from the source CR to TS 37.104, and separate Track Change ID was used to implement AAS-specific modifications on top of it. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Content of this CR is updated based on R4-2015969. Furthermore, the list of co-sourcing companies was updated.  OBUE table headings were drafted based on related Rel-15 CR in R4-2103887, with additional modifications introduced to reflect content of the original CR in R4-2102567 (e.g. introduction of Rel-16 band n65, options 1 and 2 for OBUE limits). | | | | | | | | |

*------------------------------ Modified section ------------------------------*

## 4.9 Capability sets

A radiated capability set is defined as the AAS BS capability to support certain RAT combinations in an operating band.

The manufacturer shall declare (D9.25) the supported radiated capability set(s) according to table 4.9-1 for each supported operating band.

Table 4.9-1 Radiated capability sets

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Radiated capability Set supported by the AAS BS | RCSA1 | RCSA2 | RCSA3 | RCSA3A | RCSA3B | RCSA4 | RCSA5 |
| Supported RATs | AAS BS supports MSR operation of UTRA only in the band | AAS BS supports MSR operation of E-UTRA only in the band | AAS BS supports MSR E-UTRA and UTRA in the band | AAS BS supports MSR NR and E-UTRA in the band | AAS BS supports MSR NR, E-UTRA and UTRA in the band | AAS BS supports single-RAT UTRA in the band | AAS BS supports single-RAT E‑UTRA in the band |
| Supported configurations | SR UTRA (SC, MC) | SR  E-UTRA (SC, MC, CA) | MR UTRA + E‑UTRA  SR UTRA (SC, MC)  SR E-UTRA (SC, MC, CA) | MR E-UTRA + NR  SR NR (SC, MC, CA)  SR E-UTRA (SC, MC, CA) | SR UTRA (SC, MC)    SR E-UTRA (SC, MC, CA)    SR NR (SC, MC, CA)    MR UTRA + E-UTRA    MR UTRA + NR    MR E-UTRA + NR    MR UTRA + E-UTRA + NR | SR UTRA (SC, MC) | SR  E-UTRA (SC, MC, CA) |
| Applicable BC | BC1, BC2 or BC3 | BC1, BC2 or BC3 | BC1, BC2 or BC3 | BC1, BC2 or BC3 | BC1, BC2 | BC1, BC2 or BC3 | BC1, BC2 or BC3 |

The applicable test configurations for each RF requirement are defined in subclause 5.1, 5.2 and 5.3 for the declared radiated capability set(s). For beams with multi-band beam dependencies the applicable test configurations for each RF requirement are defined in subclause 5.4 for the declared radiated capability set(s).

NOTE: Not every supported configuration within a capability set is tested, but the tables in subclauses 5.2, 5.3 and 5.4 provide a judicious choice among the supported configurations and test configurations to ensure proper test coverage.

*------------------------------ Next modified section ------------------------------*

#### 4.11.2.8 ATCR5: MB-MSR operation

##### 4.11.2.8.1 ATCR5a: MB-MSR test configuration for full carrier allocation

###### 4.11.2.8.1.1 General

The purpose of ATCR5a is to test beams which have been generated using transceiver units supporting operation in multiple operating bands through common active electronic components(s), considering maximum supported number of carriers.

###### 4.11.2.8.1.2 ATCR5a generation

ATCR5a is based on re-using the existing test configurations applicable per band on beams generated using multi-band transceiver units and hence have declared multi-band dependencies (see table 4.10-1, D9.16). ATCR5a is constructed using the following method:

- The *Base Station RF Bandwidth* of each supported operating band shall be the declared maximum radiated *Base Station RF Bandwidth* (see table 4.10-1, D9.17).

- The number of carriers of each supported operating band shall be the declared maximum number of supported carriers by the multi-band dependencies in each band (see table 4.10-1, D9.16).Carriers shall first be placed at the outermost edges of the declared maximum radiated *Radio Bandwidth* (see table 4.10-1, D9.17). Additional carriers shall next be placed at the edges of the *Base Station RF Bandwidths,* if possible.

- The allocated *Base Station RF Bandwidth* of the outermost bands shall be located at the outermost edges of the declared maximum radiated *Radio Bandwidth* (see table 4.10-1, D9.17).

- Each concerned band shall be considered as an independent band and the corresponding test configuration shall be generated in each band. The mirror image of the single band test configuration shall be used in the highest band being tested for the beam.

- Band category and declared per band capability set (see table 4.10-1, D9.25) shall be used to generate per band RAT/carrier allocation according to table 4.11.2.8.1.2-1 for each band category and radiated capability set. If an operating band with multi-band dependencies supports three carriers only, two carriers shall be placed in one band according to the relevant test configuration while the remaining carrier shall be placed at the edge of the maximum *Radio Bandwidth* (see table 4.10-1, D9.17) in the other band.

- If the sum of the maximum *Base Station RF bandwidths* of each of the supported operating bands is greater than the declared *Total RF Bandwidth* BWtot (D9.32) of transmitter and receiver for the declared band combinations of the BS, then repeat the steps above for test configurations where the *Base Station RF Bandwidth* of one of the operating band shall be reduced so that the declared *Total RF Bandwidth* is not exceeded and vice versa.

- If the sum of the maximum number of supported carrier of each supported operating bands with multi-band dependencies (see table 4.10-1, D9.16) is larger than the declared t Total number of supported carriers for operating bands with multi-band dependencies (see table 4.10-1, D9.27), repeat the steps above for test configurations where in each test configuration the number of carriers of one of the operating band shall be reduced so that the total number of supported carriers is not be exceeded and vice versa.

Table 4.11.2.8.1.2-1: The applicability of test configuration in each band

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BC | RCSA1 | RCSA2 | RCSA3 | RCSA3A | RCSA3B | RCSA4 | RCSA5 |
| BC1 | ATCR1a | ATCR2a | ATCR3a | ATCR7 | ATCR9 | ATCR1a | ATCR2a |
| BC2 | ATCR1a | ATCR2a | ATCR3a | ATCR7 | ATCR9 | ATCR1a | ATCR2a |
| BC3 | ATCR1b | ATCR2a | ATCR3b | ATCR7 | N/A | ATCR1b | ATCR2a |

###### 4.11.2.8.1.3 ATCR5a power allocation

Set the number of carriers to the total number of supported carriers for the declared multi-band dependencies (see table 4.10-1, D9.27).

For EIRP accuracy requirements set each beam to maximum EIRP (see table 4.10-1, D9.10) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals to Rated transmitter TRP per RIB, Prated,t,TRP (see table 4.10-2, D11.35).

If the allocated number of carriers in an operating band exceeds the declared number of carriers at maximum TRP in an operating band (see table 4.10-1, D9.14) the carriers should if possible be allocated to a different operating band.

##### 4.11.2.8.2 ATCR5b: MB-MSR test configuration with high PSD per carrier

###### 4.11.2.8.2.1 General

The purpose of ATCR5b is to test multi-band operation aspects considering higher PSD cases with reduced number of carriers and non-contiguous operation (if supported) in multi-band mode.

Unless otherwise stated, for all test configurations in this section, the narrowest supported NR channel bandwidth and lowest SCS for that bandwidth and the narrowest supported E-UTRA channel bandwidth for each operating band shall be used in the test configuration.

###### 4.11.2.8.2.2 ATCR5b generation

ATCR5b is based on re-using the existing test configurations applicable for operating bands using multi-band transceiver units and hence have declared multi-band dependencies (see table 4.10-1, D9.16)*.* ATCR5b is constructed using the following method:

- The *Base Station RF Bandwidth* of each supported operating band shall be the declared maximum radiated *Base Station RF Bandwidth* (see table 4.10-1, D9.17).

- The allocated *Radio Bandwidth* of the outermost bands shall be located at the outermost edges of the declared maximum *Radio Bandwidth* of the operating band with multi-band dependencies (see table 4.10-1, D9.26).

- The maximum number of carriers is limited to two per band. Carriers shall be placed at the outermost edges of the declared maximum *Radio Bandwidth* of the operating band with multi-band dependencies (see table 4.10-1, D9.26).

- Each concerned band shall be considered as an independent band and the corresponding test configuration for non-contiguous operation shall be generated in each band according to table 4.11.2.8.2.2-1. The mirror image of the single band test configuration shall be used in the highest band being tested*.*

- For AAS BS supporting RCSA4 in the band and supports three carriers only, two carriers shall be placed in one band according to ATC2 while the remaining carrier shall be placed at the edge of the maximum *Base Station RF Bandwidth* in the other band.

- If the sum of the maximum *Base Station RF bandwidths* of each of the supported operating bands is greater than the declared *Total RF Bandwidth* BWtot (D9.32) of transmitter and receiver for the declared band combinations of the BS, then repeat the steps above for test configurations where the *Base Station RF Bandwidth* of one of the operating band shall be reduced so that the declared *Total RF Bandwidth* of the operating band with multi-band dependencies (see table 4.10-1, D9.26) is not exceeded and vice versa.

Table 4.11.2.8.2.2-1: The applicability of test configuration in each band

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BC | RCSA1 | RCSA2 | RCSA3 | RCSA3A | RCSA3B | RCSA4 | RCSA5 |
| BC1 | ANTCR1a | ANTCR2 | ANTCR3a | ANTCR7 | ANTCR8 | ANTCR1 | ANTCR2 |
| BC2 | ANTCR1a | ANTCR2 | ANTCR3a | ANTCR7 | ANTCR8 | ANTCR1 | ANTCR2 |
| BC3 | ATCR1b | ANTCR2 | ANTCR3a | ANTCR7 | N/A | N/A | ANTCR2 |

*------------------------------ Next modified section ------------------------------*

#### 4.11.2.10 ATCR7: E-UTRA and NR multi RAT operation

##### 4.11.2.10.1 General

The purpose of ATCR7 is to test E-UTRA and NR multi-RAT aspects.

If the maximum EIRP and total number of supported carriers at maximum EIRP are not simultaneously supported in Multi-RAT operations, two instances of ATCR7 shall be generated using the following values for rated transmitter TRP and the total number of supported carriers:

1) The maximum EIRP and the reduced number of supported carriers at the maximum EIRP in Multi-RAT operations.

2) The reduced maximum EIRP at the total number of supported carriers in Multi-RAT operations and the total number of supported carriers.

Tests that use ATCR7 shall be performed using both instances 1) and 2) of ATCR7.

Unless otherwise stated, for all test configurations in this section, the narrowest supported NR channel bandwidth and lowest SCS for that bandwidth for the operating band shall be used in the test configuration.

Unless otherwise stated, the E-UTRA bandwidth shall be 5 MHz unless the BS does not support 5 MHz E-UTRA, in which case the E-UTRA bandwidth shall be the lowest supported bandwidth for the operating band.

##### 4.11.2.10.2 ATCR7 generation

ATCR7 is only applicable for a BS that supports E-UTRA and NR. ATCR7 is constructed using the following method:

- The *Base Station RF Bandwidth* of each supported operating band shall be the declared maximum radiated *Base Station RF Bandwidth* (see table 4.10-1 D9.17).

- Select a NR carrier as specified in subclause 4.11.1A to be placed at the lower *Base Station RF Bandwidth edge*. The specified Foffset, RAT shall apply.

- Place an E-UTRA carrier at the upper *Base Station RF Bandwidth edge*. If that is not possible use the narrowest E-UTRA carrier supported by the beam. The specified Foffset, RAT shall apply.

- For transmitter tests, alternately add NR carriers as specified in subclause 4.11.1A at the low end and E-UTRA carriers at the high end adjacent to the already placed carriers until the *Base Station RF Bandwidth* is filled or the total number of supported carriers (see table 4.10-1, D9.14) is reached. The nominal carrier spacing defined in subclause 4.6 shall apply.

##### 4.11.2.10.3 ATCR7 power allocation

a) Unless otherwise stated, set each carrier to the same power so that the sum of the carrier powers equals the rated total output power as appropriate for the test configuration according to manufacturer’s declarations in subclause 4.10.

b) In case that ATCR7 is configured for testing modulation quality, the power allocated per carrier for the RAT on which modulation quality is measured shall be the highest possible for the given modulation configuration according to the manufacturer’s declarations in subclause 4.10, unless that power is higher than the level defined by case a). The power of the remaining carriers from other RAT(s) shall be set to the same level as in case a).

If in the case of b) the power of one RAT needs to be reduced in order to meet the manufacture’s declaration the power in the other RAT(s) does not need to be increased.

For EIRP accuracy requirements set each beam to maximum EIRP (see table 4.10-1, D9.10) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals to Rated transmitter TRP per RIB, Prated,t,TRP (see table 4.10-2, D11.35).

#### 4.11.2.11 ANTCR7: E-UTRA and NR multi RAT non-contiguous operation

##### 4.11.2.11.1 General

The purpose of ANTCR7 is to test E-UTRA and NR multi RAT non-contiguous aspects.

If the maximum EIRP and total number of supported carriers at maximum EIRP are not simultaneously supported in Multi-RAT operations, two instances of ANTCR7 shall be generated using the following values for rated transmitter TRP and the total number of supported carriers:

1) The maximum EIRP and the reduced number of supported carriers at the maximum EIRP in Multi-RAT operations.

2) The reduced maximum EIRP at the total number of supported carriers in Multi-RAT operations and the total number of supported carriers.

If the reduced number of supported carriers is 4 or more, only instance 1) of ANTCR7 shall be used in the tests, otherwise both instances 1) and 2) of ANTCR7 shall be used in the tests.

Unless otherwise stated, for all test configurations in this section, the narrowest supported NR channel bandwidth and lowest SCS for that bandwidth shall be used in the test configuration.

Unless otherwise stated, the E-UTRA bandwidth shall be 5 MHz unless the BS does not support 5 MHz E-UTRA, in which case the E-UTRA bandwidth shall be the lowest supported bandwidth.

##### 4.11.2.11.2 ANTCR7 generation

ANTCR7 is only applicable for a BS that supports E-UTRA and NR. ANTCR7 is constructed using the following method:

- The *Base Station RF Bandwidth* of each supported operating band shall be the declared maximum radiated *Base Station RF Bandwidth* for non-contiguous operation (see table 4.10-1, D6.21). The *Base Station RF Bandwidth* consists of one sub-block gap and two sub-blocks located at the edges of the declared maximum *Base Station RF Bandwidth* for non-contiguous operation.

- For transmitter tests, place an NR carrier as specified in subclause 4.11.1A at the lower *Base Station RF Bandwidth edge* and an E-UTRA carrier at the upper *Base Station RF Bandwidth edge*. The specified Foffset, RAT shall apply.

- For receiver tests, place a NR carrier as specified in subclause 4.11.1A at the lower *Base Station RF Bandwidth edge* and an E-UTRA carrier at the upper *Base Station RF Bandwidth edge*. The specified Foffset, RAT shall apply.

- The sub-block edges adjacent to the sub-block gap shall be determined using the specified Foffset, RAT for the carrier adjacent to the sub-block gap.

##### 4.11.2.11.3 ANTCR7 power allocation

a) Unless otherwise stated, set each carrier to the same power so that the sum of the carrier powers equals the rated total output power appropriate for the test configuration according to manufacturer’s declarations in subclause 4.10.

b) In case that ANTCR7 is configured for testing modulation quality, the power allocated per carrier for the RAT on which modulation quality is measured shall be the highest possible for the given modulation configuration according to the manufacturer’s declarations in subclause 4.10, unless that power is higher than the level defined by case a). The power of the remaining carriers from other RAT(s) shall be set to the same level as in case a).

If in the case of b) the power of one RAT needs to be reduced in order to meet the manufacture’s declaration the power in the other RAT(s) does not need to be increased.

For EIRP accuracy requirements set each beam to maximum EIRP (see table 4.10-1, D9.10) for the tested *beam direction pair*.

For all other requirements set the power of each carrier to the same level so that the sum of the carrier powers equals to Rated transmitter TRP per RIB, Prated,t,TRP (see table 4.10-2, D11.35).

*------------------------------ Next modified section ------------------------------*

#### 4.11.2.13 ATCR9: UTRA, E-UTRA and NR multi-RAT operation

##### 4.11.2.13.1 General

The purpose of ATCR9 is to test UTRA, E-UTRA and NR multi-RAT aspects.

Unless otherwise stated, for all test configurations in this section, the narrowest supported NR channel bandwidth and lowest SCS for that bandwidth for the operating band shall be used in the test configuration.

Unless otherwise stated, the E-UTRA bandwidth shall be 5 MHz unless the BS does not support 5 MHz E-UTRA, in which case the E-UTRA bandwidth shall be the lowest supported bandwidth for the operating band.

##### 4.11.2.13.2 ATCR9 generation

ATCR9 is only applicable for a BS that supports UTRA, E-UTRA and NR. ATCR9is constructed using the following method:

For transmitter tests, if the rated total output power and total number of supported carriers are not simultaneously supported in Multi-RAT operations, two instances of ATCR9shall be generated using the following values for rated total output power and the total number of supported carriers:

1) The rated total output power and the reduced number of supported carriers at the rated total output power in multi-RAT operations

2) The reduced rated total output power at the total number of supported carriers in multi-RAT operations and the total number of supported carriers.

If the rated total output power and total number of supported carriers are not simultaneously supported in multi-RAT operations, tests that use ATCR9shall be performed using both instances 1) and 2) of ATCR9.

- The Base Station RF Bandwidth shall be the declared maximum Base Station RF Bandwidth.

- Adjacent to the lower Base Station RF Bandwidth edge:

* Place an NR carrier. The specified FOffset-RAT shall apply.

- Adjacent to the upper Base Station RF Bandwidth edge: Place a E-UTRA carrier. The specified FOffset-RAT shall apply.

- Place UTRA carrier adjacent to the already placed E-UTRA carrier.

- The UTRA FDD may be shifted maximum 100 kHz towards lower frequencies to align with the channel raster.

- For transmitter tests, alternately add NR carriers at the low end and E-UTRA carriers at the high end adjacent to the already placed carriers until the Base Station RF Bandwidth is filled or the total number of supported carriers is reached. The nominal carrier spacing defined in subclause 4.6 shall apply.

##### 4.11.2.13.3 ATCR9 power allocation

a) Unless otherwise stated, set each carrier to the same power so that the sum of the carrier powers equals the rated total output power as appropriate for the test configuration according to manufacturer’s declarations in subclause 4.10.

b) In case that ATCR9 is configured for testing modulation quality, the power allocated per carrier for the RAT on which modulation quality is measured shall be the highest possible for the given modulation configuration according to the manufacturer’s declarations in subclause 4.10, unless that power is higher than the level defined by case a). The power of the remaining carriers from other RAT(s) shall be set to the same level as in case a).

If in the case of b) the power of one RAT needs to be reduced in order to meet the manufacture’s declaration the power in the other RAT(s) does not need to be increased.

*------------------------------ Next modified section ------------------------------*

#### 4.11.2.14 ANTCR9: UTRA, E-UTRA and NR multi-RAT non-contiguous operation

The purpose of ANTCR9 is to test UTRA, E-UTRA and NR multi RAT non-contiguous aspects.

Unless otherwise stated, for all test configurations in this section, the narrowest supported NR channel bandwidth and lowest SCS for that bandwidth shall be used in the test configuration.

Unless otherwise stated, the E-UTRA bandwidth shall be 5 MHz unless the BS does not support 5 MHz E-UTRA, in which case the E-UTRA bandwidth shall be the lowest supported bandwidth.

##### 4.11.2.14.1 ANTCR9generation

ANTCR9 is only applicable for a BS that supports UTRA, E-UTRA and NR. ANTCR9 is constructed using the following method:

If the rated total output power and total number of supported carriers are not simultaneously supported in multi-RAT operations, two instances of ANTCR9shall be generated using the following values for rated total output power and the total number of supported carriers:

1) The rated total output power and the reduced number of supported carriers at the rated total output power in multi-RAT operations

2) The reduced rated total output power at the total number of supported carriers in multi-RAT operations and the total number of supported carriers.

If the rated total output power and total number of supported carriers are not simultaneously supported in multi-RAT operations, tests that use ANTCR9 shall be performed using both instances 1) and 2) of ANTCR9 except if the reduced number of supported carriers is 4 or more, only instance 1) of ANTCR9 shall be used.

- The Base Station RF Bandwidth shall be the declared maximum Base Station RF Bandwidth for non-contiguous operation. The Base Station RF Bandwidth consists of one sub-block gap and two sub-blocks located at the edges of the declared maximum Base Station RF Bandwidth.

- Adjacent to the lower Base Station RF Bandwidth edge:

- Place an NR carrier. The specified FOffset-RAT shall apply.

- Adjacent to the upper Base Station RF Bandwidth edge:

- Place an E-UTRA carrier. The specified FOffset-RAT shall apply.

- Place a UTRA carrier adjacent to the lower sub-block edge of the upper sub-block.

- For transmitter tests, place one UTRA adjacent to the upper sub-block edge of the lower sub-block. The nominal carrier spacing defined in subclause 4.6 shall apply.

- The sub-block edges adjacent to the sub-block gap shall be determined using the specified FOffset-RAT for the carrier adjacent to the sub-block gap. The carrier(s) may be shifted maximum 100 kHz towards higher frequencies to align with the channel raster.

##### 4.11.2.14.2 ANTCR9 power allocation

a) Unless otherwise stated, set each carrier to the same power so that the sum of the carrier powers equals the rated total output power appropriate for the test configuration according to manufacturer’s declarations in subclause 4.10.

b) In case that ANTCR9 is configured for testing modulation quality, the power allocated per carrier for the RAT on which modulation quality is measured shall be the highest possible for the given modulation configuration according to the manufacturer’s declarations in subclause 4.10, unless that power is higher than the level defined by case a). The power of the remaining carriers from other RAT(s) shall be set to the same level as in case a).

If in the case of b) the power of one RAT needs to be reduced in order to meet the manufacture’s declaration the power in the other RAT(s) does not need to be increased.

*------------------------------ Next modified section ------------------------------*

# 5 Applicability of Requirements

## 5.1 General

The present clause defines for each radiated test requirement the set of mandatory test configurations which shall be used for demonstrating conformance for radiated requirement.

Test configurations for beams supporting multiple RAT in the tested operating band are specified in subclause 5.1.

Test configurations for radiated requirements where the operating band has been declared to support single RAT requirements (see table 4.10-1, D9.5) by either MSR requirements for UTRA only or E-UTRA only or with a single-RAT UTRA requirements or single RAT E-UTRA requirements are specified in subclause 5.2.

Test configurations for an AAS BS with operating bands which have multi-band dependencies are specified in subclause 5.3.

Requirements apply to AAS BS according to the declared RAT radiated Capability Set (see table 4.10-1, D9.25) within each supported operating band the Band Category of the declared operating band (see table 4.10-1, D9.4), as listed in the heading of each table. Some RF requirements listed in the tables may not be mandatory or they may apply only regionally. This is further specified for each requirement in clauses 6 and 7, and in table 4.4-1.

For a declared RAT radiated Capability Set (see table 4.10-1, D9.25) in tables 5.2-1, 5.3.2-1, 5.3.3-1, 5.3.4-1, 5.4.1-1 or 5.4.2-1 only the requirements listed in the column for that radiated Capability Set apply. Requirements listed under RCSA other than the declared RCSA(s) need not be tested. In case the BS is declared to support more than one CS, the tests that are common between different supported CSs are not repeated.

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## 5.2 Test configurations for AAS BS for operating bands where MSR with more than 1 RAT is supported

Table 5.2-1: Test configuration applicability to requirements  
and capability sets for AAS BS supporting MSR operation

| **Test case** | | **UTRA + E-UTRA (RCSA 3)** | | | **E-UTRA + NR (RCSA 3A)** | | | UTRA + E-UTRA + NR (RCSA 3B) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BC1** | **BC2** | **BC3** | **BC1** | **BC2** | **BC3** | BC1, BC2 |
| 6.2 | Radiated transmit power | C: ATCR3a  CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a  CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3b | C: ATCR7  CNC: ATCR7  C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
| 6.3 | OTA Base Station output power | - | - | - | - | - | - | - |
| 6.3.2 | OTA Maximum output power | C: ATCR3a CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
| 6.3.3 | OTA E-UTRA DL RS power | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 |
| 6.4 | OTA Output power dynamics | - | - | - | - | - | - | - |
|  | E-UTRA | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 |
|  | UTRA FDD | Subclause 5.3.3 | Subclause 5.3.3 | N/A | N/A | N/A | N/A | Subclause 5.3.3 |
|  | NR – RE power control dynamic range | N/A | N/A | N/A | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude | Tested with Error Vector Magnitude |
|  | NR – total power dynamic range | N/A | N/A | N/A | SC | SC | SC | SC |
| 6.5 | OTA Transmit ON/OFF power | - | - | - | - | - | - | - |
| 6.5.1 | OTA Transmitter OFF power | N/A | N/A | N/A | N/A | N/A | C: ATCR7  CNC: ATCR7 C/NC: ATCR7, ANTCR7 | N/A |
| 6.5.2 | OTA Transmitter transient period | N/A | N/A | N/A | N/A | N/A | C: ATCR7 CNC: ATCR7 C/NC: ATCR7, ANTCR7 | N/A |
| 6.6 | Transmitted signal quality | - | - | - | - | - | - | - |
| 6.6.2 | OTA Frequency error | - | - | - | - | - | - | - |
|  | E-UTRA | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 |
|  | UTRA FDD | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6 6.4 | N/A | N/A | N/A | N/A | Same TC as used in subclause 6.6.4 |
|  | NR | N/A | N/A |  | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 | Same TC as used in subclause 6.6.4 |
| 6.6.3 | OTA Time alignment error | - | - | - | - | - | - | - |
|  | E-UTRA | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 |
|  | UTRA FDD | Subclause 5.3.3 | Subclause 5.3.3 | N/A | N/A | N/A | N/A | Subclause 5.3.3 |
|  | NR | N/A | N/A | N/A | C: ATCR8  CNC: ATCR8  C/NC: ATCR8, ANTCR8 | C: ATCR8  CNC: ATCR8  C/NC: ATCR8, ANTCR8 | C: ATCR8  CNC: ATCR8  C/NC: ATCR8, ANTCR8 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
| 6.6.4 | OTA Modulation quality - EVM | - | - | - | - | - | - | - |
|  | E-UTRA | C: ATCR3a CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
|  | UTRA FDD | C: ATCR3a CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ATCR3a C/NC: ATCR3a, ANTCR3a | N/A | N/A | N/A | N/A | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
|  | NR | N/A | N/A | N/A | N/A | C: ATCR7 CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ATCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
| 6.7 | OTA Unwanted Emissions | - | - | - | - | - | - | - |
| 6.7.2 | OTA Occupied bandwidth | - | - | - | - | - | - | - |
|  | Minimum requirement | Subclause 5.3.3 Subclause 5.3.4 | Subclause 5.3.3 Subclause 5.3.4 | Subclause 5.3.3 Subclause 5.3.4 | Subclause 5.3.4  SC, ATCR8b (Note) | Subclause 5.3.4  SC, ATCR8b (Note) | Subclause 5.3.4  SC, ATCR8b (Note) | Subclause 5.3.3  Subclause 5.3.4  SC |
| 6.7.3 | OTA Adjacent Channel Leakage power Ratio | - | - | - | - | - | - | - |
|  | E-UTRA | C: ATCR2a CNC: ANTCR2 C/NC:ATCR2a, ANTCR2 | C: ATCR2a CNC: ANTCR2 C/NC:ATCR2a, ANTCR2 | C: ATCR2a CNC: ANTCR2 C/NC:ATCR2a, ANTCR2 | C: ATCR2a CNC: ANTCR2 C/NC:ATCR2a, ANTCR2 | C: ATCR2a CNC: ANTCR2 C/NC:ATCR2a, ANTCR2 | C: ATCR2a CNC: ANTCR2 C/NC:ATCR2a, ANTCR2 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
|  | UTRA FDD | Subclause 5.3.3 | Subclause 5.3.3 | N/A | N/A | N/A | N/A | Subclause 5.3.3 |
|  | NR | N/A | N/A | N/A | C: ATCR8a  CNC: ANTCR8  C/NC: ATCR8a, ANTCR8 | C: ATCR8a  CNC: ANTCR8  C/NC: ATCR8a, ANTCR8 | C: ATCR8a  CNC: ANTCR8  C/NC: ATCR8a, ANTCR8 | C: ATCR9  CNC: ATCR9  C/NC: ATCR9, ANTCR9 |
|  | Cumulative ACLR | CNC: ANTCR3a C/NC:ANTCR3a | CNC: ANTCR3a C/NC:ANTCR3a |  | CNC: ANTCR7 C/NC:ANTCR7 | CNC: ANTCR7 C/NC:ANTCR7 | CNC: ANTCR7 C/NC:ANTCR7 | CNC: ANTCR9  C/NC: ANTCR9 |
| 6.6.5 | OTA Operating band unwanted emission | - | - | - | - | - | - | - |
|  | General requirement for Band Categories 1 and 3 | Subclause 5.3.3 Subclause 5.3.4 C: ATCR3a CNC: ATCR3a, ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | Subclause 5.3.3 Subclause 5.3.4 | Subclause 5.3.4  C: ATCR7 CNC: ATCR7, ANTCR7  C/NC: ATCR7, ANTCR7 | N/A | Subclause 5.3.4  C: ATCR7  CNC: ATCR7, ANTCR7  C/NC: ATCR7, ANTCR7 | Subclause 5.3.3 Subclause 5.3.4 |
|  | General requirement for Band Category 2 | N/A | Subclause 5.3.3 Subclause 5.3.4  C: ATCR3a CNC: ATCR3a, ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | N/A | Subclause 5.3.4  C: ATCR7 CNC: ATCR7, ANTCR7  C/NC: ATCR7, ANTCR7 | N/A | BC1: N/A  BC2:  Subclause 5.3.3  Subclause 5.3.4  C: ATCR9  CNC: ATCR9, ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | Additional requirements | (note 1) | (note 1) | (note 1) | (note 1) | (note 1) | (note 1) | (note 1) |
| 6.7.6 | OTA Spurious emission | - | - | - | - | - | - | - |
|  | (Category A) | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | (Category B) | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | Protection of the BS receiver of own or different BS | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | Additional spurious emissions requirements | C: ATCR3a, CNC: ANTCR3a, C/NC: ATCR3a, ATCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7, CNC: ANTCR7, C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | Co-location with other Base Stations | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
| 6.8 | OTA Transmitter intermodulation | - | - | - | - | - | - | - |
|  | General requirement | Same TC as used in subclause 6.7 | Same TC as used in subclause 6.7 | Same TC as used in subclause 6.7 | Same TC as used in subclause 6.7 | Same TC as used in subclause 6.7 | Same TC as used in subclause 6.7 | Same TC as used in subclause 6.7 |
|  | Additional requirement (BC1 and BC2) | CNC: ANTCR3a C/NC:ANTCR3a | Same TC as used in subclause 6.7 | N/A | CNC: ANTCR7 C/NC:ANTCR7a | Same TC as used in subclause 6.7 | N/A | BC1:  CNC: ANTCR9 C/NC:ANTCR9  BC2:  Same TC as used in subclause 6.7 |
|  | Additional requirement (BC3) | N/A | N/A | Same TC as used in subclause 6.7 | N/A | N/A | N/A | N/A |
| 7.2 | OTA sensitivity | - | - | - | - | - | - | - |
|  | E-UTRA requirement | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 |
|  | UTRA FDD requirement | subclause 5.3.3 | subclause 5.3.3 | N/A | N/A | N/A | N/A | subclause 5.3.3 |
|  | UTRA TDD requirement | N/A | N/A | subclause 5.3.3 | N/A | N/A | N/A | N/A |
|  | NR requirement | N/A | N/A | N/A | ATCR4d | ATRC4d | ATCR4d | ATCR4d |
| 7.3 | OTA reference sensitivity level | - | - | - | - | - | - | - |
|  | E-UTRA requirement | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 | subclause 5.3.4 |
|  | UTRA FDD requirement | subclause 5.3.3 | subclause 5.3.3 | N/A | N/A | N/A | N/A | subclause 5.3.3 |
|  | NR requirement | N/A | N/A | N/A | ATRC4d | ATCR4d | ATCR4d | ATCR4d |
| 7.4 | OTA Dynamic range | - | - | - | - | - | - | - |
|  | E-UTRA | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 |
|  | UTRA FDD | Subclause 5.3.3 | Subclause 5.3.3 | N/A | N/A | N/A | N/A | Subclause 5.3.3 |
|  | NR | N/A | N/A | N/A | ATCR4d | ATCR4d | ATCR4d | ATCR4d |
| 7.5 | OTA Adjacent channel selectivity and narrowband blocking | - | - | - | - | - | - | - |
|  | General blocking requirement | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | General narrowband blocking requirement | C: ATCR3a, ATCR4b CNC:ANTCR3a, ATCR4b C/NC: ATCR3a, ANTCR3a,ATCR4b | C: ATCR3a, ATCR4b CNC:ANTCR3a, ATCR4b C/NC: ATCR3a, ANTCR3a,ATCR4b | C: ATCR4b | C: ATCR7, ATCR4b, ATCR4d CNC:ANTCR7, ATCR4b, ATCR4d  C/NC: ATCR7, ANTCR7,ATCR4b, ATCR4d | C: ATCR7, ATCR4b, ATCR4d CNC:ANTCR7, ATCR4b, ATCR4d  C/NC: ATCR7, ANTCR7,ATCR4b, ATCR4d | C: ATCR7, ATCR4b, ATCR4d  CNC: ANTCR7, ATCR4b, ATCR4d C/NC: ATCR7, ANTCR7, ATCR4b, ATCR4d | C:  ATCR9, ATCR4a, ATCR4b, ATCR4d  CNC:  ANTCR9, ATCR4a, ATCR4b, ATCR4d  C/NC:  ATCR9,  ANTCR9, ATCR4a, ATCR4b, ATCR4d |
|  | Additional BC3 blocking minimum requirement | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 7.6 | OTA Blocking | - | - | - | - | - | - | - |
|  | General requirement | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | Co-location requirement | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
| 7.7 | OTA Receiver spurious emissions | - | - | - | - | - | - | - |
|  | General requirement | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | Additional requirement for BC2 (Category B) | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 7.8 | OTA Receiver intermodulation | - | - | - | - | - | - | - |
|  | General intermodulation requirement | C: ATCR3a CNC: ANTCR3a C/NC: ATCR3a, ANTCR3a | C: ATCR3a CNC ANTCR3a C/NC: ATCR3a, ANTCR3a | N/A | C: ATCR7 CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR7  CNC: ANTCR7 C/NC: ATCR7, ANTCR7 | C: ATCR9  CNC: ANTCR9  C/NC: ATCR9, ANTCR9 |
|  | General narrowband intermodulation requirement | C: ATCR3a, ATCR4b CNC:ANTCR3a, ATCR4b C/NC: ATCR3a, ANTCR3a, ATCR4b | C: ATCR3a ATCR4b CNC:ANTCR3a,ATCR4b C/NC: ATCR3a, ANTCR3a; ATCR4b | C: ATCR4b | C: ATCR7, ATCR4b, ATCR4d CNC:ANTCR7, ATCR4b, ATCR4d  C/NC: ATCR7, ANTCR7, ATCR4b, ATCR4d | C: ATCR7 ATCR4b, ATCR4d CNC:ANTCR7,ATCR4b, ATCR4d  C/NC: ATCR7, ANTCR7; ATCR4b, ATCR4d | C: ATCR7, ATCR4b, ATCR4d CNC: ANTCR7, ATCR4b, ATCR4d C/NC: ATCR7, ANTCR7, ATCR4b, ATCR4d | C:  ATCR9, ATCR4a, ATCR4b, ATCR4d  CNC:  ANTCR9, ATCR4a, ATCR4b, ATCR4d  C/NC:  ATCR9,  ANTCR9, ATCR4a, ATCR4b, ATCR4d |
| 7.9 | OTA In-channel selectivity | - | - | - | - | - | - | - |
|  | E-UTRA requirement | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 | Subclause 5.3.4 |
|  | NR requirement | N/A | N/A | N/A | ATCR4d | ATCR4d | ATCR4d | ATCR4d |
| NOTE 1: ATCR8b is only applicable when contiguous CA is supported.  NOTE 2: For Operating band unwanted emissions, NR shall also be tested with SC with widest supported channel bandwidth and highest supported sub-carrier spacing. | | | | | | | | |

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##### 6.7.5.5.2 MSR Band categories 1 and 3

For an AAS BS of Wide Area BS class operating in Band Category 1 or Band Category 3, the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a Wide Area BS operating in non-contiguous spectrum, it applies inside any sub-block gap. In addition, for an AAS BS of Wide Area BS class operating in multiple bands, it applies inside any *Inter RF Bandwidth gap*.

For an AAS BS of Medium Range BS class operating in Band Category 1 the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a Medium Range BS operating in non-contiguous spectrum, it applies inside any sub-block gap. In addition, for an AAS BS of Medium Range BS class operating in multiple bands, it applies inside any *Inter RF Bandwidth gap*.

For an AAS BS of Local Area BS class operating in Band Category 1 the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a Local Area BS operating in non-contiguous spectrum, it applies inside any sub-block gap. In addition, for an AAS BS of Local Area BS class operating in multiple bands, it applies inside any *Inter RF Bandwidth gap*.

Outside the *Base Station RF Bandwidth edges*, emissions shall not exceed the maximum levels specified in Tables 6.7.5.5.2-1 to 6.7.5.5.2-8 below, where:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is the offset to the frequency ΔfOBUE MHz outside the downlink operating band.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band RIB*, inside any *Inter RF Bandwidth gap*s with Wgap < 2×ΔfOBUE MHz, emissions shall not exceed the cumulative sum of the test requirements specified at the *Base Station RF Bandwidth edges* on each side of the *Inter RF Bandwidth gap*. The minimum requirement for *Base Station RF Bandwidth edge* is specified in Tables 6.7.5.5.2-1 to 6.7.5.5.2-8, where in this case:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the *Inter RF Bandwidth gap* divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band RIB*, the operating band unwanted emission limits apply also in a supported operating band without any carriers transmitted, in the case where there are carriers transmitted in another operating band. In this case where there is no carrier transmitted in an operating band, no cumulative limits are applied in the *inter-band gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted and

- In case the *Inter RF Bandwidth gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted is less than 2×ΔfOBUE MHz, f\_offsetmax shall be the offset to the frequency ΔfOBUE MHz outside the outermost edges of the two supported downlink operating bands and the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause, shall apply across both supported downlink bands.

- In other cases, the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause for the largest frequency offset (Δfmax), shall apply from ΔfOBUE MHz below the lowest frequency, up to ΔfOBUE MHz above the highest frequency of the supported downlink operating band without any carrier transmitted.

Inside any sub-block gap for a *RIB* operating in non-contiguous spectrum, emissions shall not exceed the cumulative sum of the test requirements specified for the adjacent sub blocks on each side of the sub block gap. The minimum requirement for each sub block is specified in Tables 6.7.5.5.2-1 to 6.7.5.5.2-8, where in this case:

- Δf is the separation between the sub block edge frequency and the nominal -3 dB point of the measuring filter closest to the sub block edge frequency.

- f\_offset is the separation between the sub block edge frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the sub block gap bandwidth divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

Applicability of Wide Area operating band unwanted emission requirements in tables 6.7.5.5.2-1/2, 6.7.5.5.2-2a and 6.7.5.5.2-2b is specified in table 6.7.5.5.2-0.

Note: Option 1 and Option 2 correspond to the Category B option 1/2 operating band unwanted emissions defined in the E-UTRA and NR specifications TS 36.104 [4] and TS 38.104 [36]. Option 2 also corresponds to the UTRA spectrum emission mask as defined in TS 25.104 [2].

Table 6.7.5.5.2-0: Applicability of operating band unwanted emission requirements for BC1 and BC3 Wide Area BS

|  |  |  |
| --- | --- | --- |
| NR band operation | UTRA supported | Applicable requirement table |
| None | Y/N | 6.7.5.5.2-1/2 (option 2) |
| In certain regions (NOTE 2), band 1, 65 | N | 6.7.5.5.2-1/2 (option 2) |
| Any below 1 GHz | N | 6.7.5.5.2-2a (option 1) |
| Any above 1 GHz except for certain regions (NOTE 2), band 1, 65 | N | 6.7.5.5.2-2b (option 1) |
| NOTE 1: Void  NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [16] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [4] and TS 38.104 [33] are applied. | | |

Table 6.7.5.5.2-1: WA BS OBUE in BC1 and BC3 bands ≤ 3 GHz applicable for: BS not supporting NR; or BS supporting NR in Band n1 or n65 - option 2

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz | -3.2 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz | -3.2-15(f\_offset/MHz-0.215)dBm (Note 6) | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -15.2 dBm (Note 6) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -2.2 dBm (Note 6) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (NOTE 5, 6) | 1 MHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be -6 dBm/MHz (for MSR *multi-band TAB connector* supporting multi-band operation, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz).  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the test requirementwithin the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz.  NOTE 6: For MSR *multi-band TAB connector* supporting multi-band operation, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz. | | | |

Table 6.7.5.5.2-2: WA BS OBUE in BC1 and BC3 bands > 3 GHz applicable for: BS not supporting NR; or BS supporting NR in Band n1 or n65 - option 2

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz | -3 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz | -3-15(f\_offset/MHz-0.215)dBm | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -15 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -2 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (NOTE 5) | 1 MHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -6 dBm/MHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-2a: WA BS OBUE in BC1 and BC3 bands ≤ 1 GHz applicable for: BS supporting NR and not supporting UTRA - option 1

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 3.8 dBm – 7/5(f\_offset/MHz-0.05)dB | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -3.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -7 dBm (Note 5) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -7dBm/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. | | | |

Table 6.7.5.5.2-2b: WA BS OBUE in BC1 and BC3 bands > 1GHz and ≤ 3 GHz applicable for: BS supporting NR, not operating NR in band n1 or n65, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -4 dBm – 7/5(f\_offset/MHz-0.05)dB | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -3 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (Note 5) | 1 MHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -6dBm/1 MHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. | | | |

Table 6.7.5.5.2-3: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm and not supporting NR; or BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm supporting NR and UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz | Prated,c,TRP - 56.2 dB - (5/3)\*(f\_offset - 0,015) dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz | Prated,c,TRP - 51.2 dB-15\*(f\_offset - 0,015) dB | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | Prated,c,TRP – 63.2 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.6 MHz | 1.5 MHz ≤ f\_offset < 3.1 MHz | Prated,c,TRP – 50.2 dB | 1 MHz |
| 2.6 MHz ≤ Δf ≤ 5 MHz | 3.1 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c,TRP – 50.2 dB, -4.2dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min (f\_offsetmax, 10.5 MHz) | Prated,c,TRP –54.2 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c,TRP-56 dB | 1 MHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be (Prated,c,TRP - 56 dB)/MHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-3a: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm BS, supporting NR and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | Prated,c,TRP-51.2dB-(7/5)\*(f\_offset-0,05)dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,c,TRP-58.2dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,c,TRP-60dB, -16dBm) (Note 5) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Min(Prated,c,TRP -60dB, -16dBm)/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. | | | |

Table 6.7.5.5.2-4: Medium Range BS operating band unwanted emission mask (UEM)  
in BC1 bands > 3 GHz applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm and not supporting NR; or BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm supporting NR and UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz | Prated,c,TRP – 56 dB - (5/3)\*(f\_offset - 0,015) dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz | Prated,c,TRP - 51dB -15\*(f\_offset-0,015) dB | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | Prated,c,TRP – 63 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.6 MHz | 1.5 MHz ≤ f\_offset < 3.1 MHz | Prated,c,TRP –50 dB | 1 MHz |
| 2.6 MHz ≤ Δf ≤ 5 MHz | 3.1 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c,TRP – 50 dB, -4 dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax ,10.5 MHz) | Prated,c,TRP –54 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c,TRP-56 dB | 1 MHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be (Prated,c,TRP - 56 dB)/MHz.  NOTE 2: For MSR multi-band *RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-4a: MR BS OBUE in BC1 bands > 3 GHz applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm BS, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | Prated,c,TRP – 51dB - 7/5(f\_offset/MHz-0.05) dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,c,TRP -58 dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,c,TRP -60dB, -16dBm) (Note 5) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Min(Prated,c,TRP -60dB, -16dBm)/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. | | | |

Table 6.7.5.5.2-5: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power Prated,c,TRP ≤ 40 dBm and not supporting NR; or BS with maximum output power Prated,c,TRP ≤ 40 dBm supporting NR and UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz | -16.2 -5/3(f\_offset/MHz - 0.015) dBm | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz | -11.2 -15(f\_offset/MHz - 0.015) dBm | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -23.2 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -10.2 dBm | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax,10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz) | -14.2 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -16dBm (Note 5) | 1 MHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -16 dBm/MHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-5a: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power Prated,c,TRP ≤ 40 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -11.2 dBm – 7/5(f\_offset/MHz-0.05)dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -18.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -20 dBm (Note 8) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -20dBm/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. | | | |

Table 6.7.5.5.2-6: MR BS OBUE in BC1 bands > 3 GHz applicable for: BS with maximum output power Prated,c,TRP ≤ 40 dBm and not supporting NR; or BS with maximum output power Prated,c,TRP ≤ 40 dBm supporting NR and UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz | -16 -5/3(f\_offset/MHz - 0.015) dBm | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz | -11 -15(f\_offset/MHz - 0.015) dBm | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -23 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -10 dBm | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax,10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz) | -14 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -16dBm (Note 5) | 1 MHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -16 dBm/MHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-6a: MR BS OBUE in BC1 bands > 3 GHz applicable for: BS with maximum output power Prated,c,TRP ≤ 40 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -11 dBm – 7/5(f\_offset/MHz-0.05)dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -18 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -20 dBm (Note 5) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -20dBm/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. | | | |

Table 6.7.5.5.2-7: LA BS OBUE in BC1 bands ≤ 3 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -19.2 dBm -7/5(f\_offset/MHz – 0.05) dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -26.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -28 dBm (Note 5) | 100 kHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -28 dBm/100 kHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: Void.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-8: LA BS OBUE in BC1 bands > 3 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -19 dBm-7/5(f\_offset/MHz – 0.05) dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -26 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -28 dBm (Note 5) | 100 kHz |
| NOTE 1: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -28 dBm/100 kHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: Void.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

##### 6.7.5.5.3 MSR Band Category 2

For a *RIB* operating in Band Category 2 the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a *RIB* operating in non-contiguous spectrum, it applies inside any sub-block gap.

Outside the *Base Station RF Bandwidth edges*, emissions shall not exceed the maximum levels specified in Tables 6.7.5.5.3-1 to 6.7.5.5.3-8, where:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is the offset to the frequency ΔfOBUE MHz outside the downlink operating band.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band RIB*, inside any *Inter RF Bandwidth gap*s with Wgap < 2×ΔfOBUE MHz, emissions shall not exceed the cumulative sum of the test requirements specified at the *Base Station RF Bandwidth edges* on each side of the *Inter RF Bandwidth gap*. The *minimum requirement* for *Base Station RF Bandwidth edge* is specified in Tables 6.7.5.5.3-1 to 6.7.5.5.3-8, where in this case:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the *Inter RF Bandwidth gap* divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band RIB* and where there is no carrier transmitted in an operating band, no cumulative limits are applied in the *inter-band gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted and

- In case the *inter-band gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted less than is 2×ΔfOBUE MHz, f\_offsetmax shall be the offset to the frequency ΔfOBUE MHz outside the outermost edges of the two supported downlink operating bands and the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause, shall apply across both supported downlink bands.

- In other cases, the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause for the largest frequency offset (Δfmax), shall apply from ΔfOBUE MHz below the lowest frequency, up to ΔfOBUE MHz above the highest frequency of the supported downlink operating band without any carrier transmitted.

Inside any sub-block gap for a *RIB* operating in non-contiguous spectrum, emissions shall not exceed the cumulative sum of the test requirement specified for the adjacent sub blocks on each side of the sub block gap. The *minimum requirement* for each sub block is specified in Tables 6.7.5.5.3-1 to 6.7.5.5.3-8, where in this case:

- Δf is the separation between the sub block edge frequency and the nominal -3 dB point of the measuring filter closest to the sub block edge.

- f\_offset is the separation between the sub block edge frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the sub block gap bandwidth divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

Applicability of Wide Area operating band unwanted emission requirements in tables 6.7.5.5.3-1, 6.7.5.5.3-2a and 6.7.5.5.3-2b is specified in table 6.7.5.5.3-0.

Note: Option 1 and Option 2 correspond to the Category B option 1/2 operating band unwanted emissions defined in the E-UTRA and NR specifications TS 36.104 [4] and TS 38.104 [36]. Option 2 also corresponds to the UTRA spectrum emission mask as defined in TS 25.104 [2].

Table 6.7.5.5.3-0: Applicability of operating band unwanted emission requirements for BC2 Wide Area BS

|  |  |  |
| --- | --- | --- |
| NR band operation | UTRA supported | Applicable requirement table |
| None | Y/N | 6.7.5.5.3-1 (option 2) |
| In certain regions (NOTE 2), band 3, 8 | N | 6.7.5.5.3-1 (option 2) |
| Any below 1 GHz except for, in certain regions (NOTE 2), band 8 | N | 6.7.5.5.3-2a (option 1) |
| Any above 1 GHz except for certain regions (NOTE 2), band 3 | N | 6.7.5.5.3-2b (option 1) |
| NOTE 1: Void  NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [16] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [4] and TS 38.104 [33] are applied. | | |

Table 6.7.5.5.3-1: WA BS OBUE in BC2 bands applicable for: BS not supporting NR; or BS supporting NR in Band n3 or n8 - option 2

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2 and 3) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.2 MHz  (Note 1) | 0.015 MHz ≤ f\_offset < 0.215 MHz | -3.2 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz | -3.2-15(f\_offset/MHz-0.215) dBm (Note 11) | 30 kHz |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -15.2 dBm (Note 11) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -2.2 dBm (Note 11) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (Note 10, 11) | 1 MHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.7.5.5.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *minimum requirement* within sub-block gaps shall be -6 dBm/MHz (for MSR *multi-band TAB connector*, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands <1GHz).  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz operation the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz.  NOTE 11: For MSR *multi-band TAB connector*, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz. | | | |

Table 6.7.5.5.3-2: WA BS OBUE in BC2 bands applicable for: BS operating with E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 2, 3 and 4) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz | Max(15.8dBm-60(f\_offset/MHz-0.015), -3.2 dBm) | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz | Max(12.8dBm-160(f\_offset/MHz-0.065), -3.2 dBm) | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 4: Void.  NOTE 8: Void.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

Table 6.7.5.5.3-2a: WA BS OBUE in BC2 bands ≤ 1 GHz applicable for: BS supporting NR, not operating NR in band n8, and not supporting UTRA – option 1

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 3.8 dBm – 7/5(f\_offset/MHz – 0.05)dB | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -3.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -7 dBm (Note 10) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -7dBm/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth.  NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.7.5.5.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 4: Void.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.3-2b: WA BS OBUE in BC2 bands > 1 GHz applicable for: BS supporting NR, not operating NR in band n3, and not supporting UTRA – option 1

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 3.8 dBm – 7/5(f\_offset/MHz – 0.05)dB | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -3.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -7 dBm (Note 5) | 1 MHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -6dBm/1 MHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth.  NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.7.5.5.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 4: Void.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.3-3: MR BS OBUE in BC2 bands applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm and not supporting NR; or BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm supporting NR with UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2 and 3) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.6 MHz  (Note 1) | 0.015 MHz ≤ f\_offset < 0.615 MHz | Prated,c,TRP-56.2dB-(5/3)\*(f\_offset-0,015)dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz | Prated,c,TRP-51.2dB-15\*(f\_offset-0,215)dB | 30 kHz |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz | Prated,c,TRP - 63.2 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.8 MHz | 1.5 MHz ≤ f\_offset < 3.3 MHz | Prated,c,TRP - 50.2 dB | 1 MHz |
| 2.8 MHz ≤ Δf ≤ 5 MHz | 3.3 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c,TRP - 50.2 dB, -4.2dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz) | Prated,c,TRP - 54.2 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c,TRP -56 dB (Note 10) | 1 MHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in Table 6.7.5.5.3-5 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be (Prated,c,TRP - 56 dB)/MHz.  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

Table 6.7.5.5.3-3a: MR BS OBUE in BC2 bands applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | Prated,c,TRP – 51.2dB - 7/5(f\_offset/MHz-0.05)dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,c,TRP -58.2dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,c,TRP -60dB, -16dBm) (Note 5) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Min(Prated,c,TRP -60dB, -16dBm)/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block.  NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.7.5.5.3-5 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 4: Void.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.3-4: Medium Range BS operating band unwanted emission mask (UEM)  
in BC2 bands applicable for: BS with maximum output power Prated,c,TRP ≤ 40 dBm and not supporting NR; or BS with maximum output power Prated,c,TRP ≤ 40 dBm supporting NR with UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2 and 3) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.6 MHz  (Note 1) | 0.015 MHz ≤ f\_offset < 0.615 MHz | -16.2dBm-5/3(f\_offset/MHz-0.015)dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz | -11.2dBm-15(f\_offset/MHz-0.215)dB | 30 kHz |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -23.2 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -10.2 dBm | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax,10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz) | -14.2 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -16 dBm (Note 10) | 1 MHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.7.5.5.3-6 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -16 dBm/MHz.  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

Table 6.7.5.5.3-4a: MR BS OBUE in BC2 bands applicable for: BS maximum output power Prated,c,TRP ≤ 40 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -11.2 dBm – 7/5(f\_offset/MHz-0.05) dB | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -18.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -20 dBm (Note 5) | 100 kHz |
| NOTE 1: For AAS BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -20dBm/100 kHz.  NOTE 2: For AAS BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block.  NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.7.5.5.3-6 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 4: Void.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.3-5: MR BS OBUE in BC2 bands applicable for: BS with maximum output power 40 < Prated,c,TRP ≤ 47 dBm and operating with E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2 and 3) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz | Prated,c,TRP-36.2-60(f\_offset-0.015 | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz | Prated,c,TRP-39.2-160(f\_offset-0.065) | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 8: Void.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

Table 6.7.5.5.3-6: MR BS OBUE in BC2 bands applicable for: BS with maximum output power Prated,c,TRP ≤ 40 dBm and operating E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2, 3 and 4) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 | Max(3.8-60(f\_offset/MHz-0.015), -16.2) dBm | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz | Max(0.8-160(f\_offset/MHz-0.065), -16.2) dBm | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.  NOTE 3: For *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 4: Void.  NOTE 8: Void.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

Table 6.7.5.5.3-7: LA BS OBUE in BC2 bands

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2 and 3) | Measurement bandwidth |
| 0 MHz ≤ Δf < 5 MHz  (Note 1) | 0.05 MHz ≤ f\_offset < 5.05 MHz | -19.2-7/5(f\_offset/MHz-0.05) dBm | 100 kHz |
| 5 MHz ≤ Δf < min (10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -26.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -28 dBm (Note 10) | 100 kHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-8 apply for 0 MHz ≤ Δf < 0.16 MHz.  NOTE 2: For MSR RIB supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -28 dBm/100 kHz.  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 8: Void.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

Table 6.7.5.5.3-8: LA BS OBUE for operation in BC2 bands applicable for: BS operating with E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 2, 3 and 4) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz | Max(-3.2dBm-60(f\_offset/MHz-0.015)dB, -24.2dBm) | 30 kHz |
| 0.05 MHz ≤ Δf < 0.16 MHz | 0.065 MHz ≤ f\_offset < 0.175 MHz | max(-6.2dBm-160(f\_offset/MHz-0.065)dB, -24.2 dBm) | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.  NOTE 2: For MSR *RIB* supporting non-contiguous spectrum operation within any operating band the *test requirement* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.  NOTE 3: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 4: Void.  NOTE 8: Void.  NOTE 10: The requirement is not applicable when Δfmax < 10 MHz | | | |

NOTE 9: As a general rule for the requirements in the present clause, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

*------------------------------ Next modified section ------------------------------*

##### 7.8.5.1.1 General intermodulation test requirement

Interfering signals shall be a CW signal and an E-UTRA, NR or UTRA signal as specified in 3GPP TS 37.104 [5], annex A.

The requirement is applicable outside the *Base Station RF Bandwidth* or *Radio Bandwidth*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth* *edges* or *Radio Bandwidth* edges.

For *multi-band RIBs*, the requirement applies in addition inside any *Inter RF Bandwidth gap* at those connectors, in case the gap size is at least twice as wide as the UTRA/E-UTRA interfering signal centre frequency offset from the *Base Station RF Bandwidth* *edge*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth* *edges* inside the *Inter RF Bandwidth gap*.

For the wanted signal at the assigned channel frequency and two interfering signals at the RIB, using the parameters in tables 7.8.5.1.1-1 and 7.8.5.1.1-2, the following requirements shall be met:

- For any E-UTRA carrier, the throughput shall be ≥ 95 % of the *maximum throughput* of the reference measurement channel defined in TS 36.104 [4], clause 7.2.1.

- For any UTRA FDD carrier, the BER shall not exceed 0,001 for the reference measurement channel defined in TS 25.104 [2], clause 7.2.1.

- For any NR carrier, the throughput shall be ≥ 95 % of the *maximum throughput* of the reference measurement channel defined in TS 38.104 [33], clause 7.2.2.

The OTA levels are applied referenced to 2 antenna gain offsets ΔOTAREFSENS and ΔminSENS.

Table 7.8.5.1.1-1: General intermodulation requirement

|  |  |  |  |
| --- | --- | --- | --- |
| Base Station Type | Mean power of interfering signals [dBm] | Wanted Signal mean power [dBm]  (NOTE 1) | Type of interfering signal |
| Wide Area BS | -48 + y - ΔOTAREFSENS (NOTE 6) | EISREFSENS +x dB (NOTE 2, 5) | See table 7.8.5.1.1-2 |
|  | -48 + y – ΔminSENS (NOTE 6) | EISminSENS + x dB (NOTE 2, 5) |  |
| Medium Range BS | -44 + y - ΔOTAREFSENS (NOTE 6) | EISREFSENS + x dB (NOTE 3, 5) |  |
|  | -44 + y – ΔminSENS (NOTE 6) | EISminSENS + x dB (NOTE 3, 5) |  |
| Local Area BS | -38 + y - ΔOTAREFSENS (NOTE 6) | EISREFSENS +x dB (NOTE 4, 5) |  |
|  | -38 + y – ΔminSENS (NOTE 6) | EISminSENS + x dB (NOTE 4, 5) |  |
| NOTE 1: EISREFSENS and EISminSENS depend on the RAT, the BS class and on the *channel bandwidth*, see clauses 7.3 and 7.2.  NOTE 2: For WA BS, "x" is equal to 6.  NOTE 3: For MR BS supporting UTRA, "x" is equal to 6 in case of UTRA wanted signals, 9 in case of E-UTRA .  NOTE 4: For LA BS supporting UTRA, "x" is equal to 12 in case of NR or E-UTRA wanted signals, 6 in case of UTRA wanted signal.  NOTE 5: For a BS not supporting UTRA, x is equal to 6 for all BS classes if NR is supported, or x is equal to 9 for MR and 12 for LA BS if NR is not supported.  NOTE 6: For a BS that supports NR but not UTRA; "y" is equal to -4 for the WA BS class, -3 for the MR BS class and -6 for the LA BS class. For all other cases, “y” is equal to zero for all BS classes. | | | |

*------------------------------ End of modified section ------------------------------*