**3GPP TSG-RAN4 Meeting #111 *R4-2409950***

**Fukuaka, Japan, 20th May 2024 – 24th May 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **1** | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  |  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | 7 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | In co-location Tx intermodulation requirements for FR1, interfering type and interfering signal positions are defined with the minimum BWChannel (with 15 kHz SCS of the band defined in TS38.104 clause 5.3.5.). In rel-17, 10MHz BW was added in n79. On the other hand, in japanese regulation, the interfering signal of Tx intermodulation is specified with specific BW 40MHz. This requirements are not match japanese regulation. |
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| ***Summary of change:*** | Added requirements 6.7.5.1.2, 6.7.5.2.3 for BS type 1-C/1-H Co-location Tx intermodulation regional requirements for Band n79. |
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| ***Consequences if not approved:*** | BS Co-location Tx intermodulation requirements are not match japanese regulation. |
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| ***Clauses affected:*** | 4.4, 6.7.5.1.2, 6.7.5.2.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS38.104 |
| ***affected:*** | **X** |  |  Test specifications | TS38.141-2 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This’CR's revision history:*** | This is the revision of R4-2409949 |

**--------------Start of text proposal-------------**

## 4.4 Regional requirements

Some requirements in the present document may only apply in certain regions either as optional requirements, or as mandatory requirements set by local and regional regulation. It is normally not stated in the 3GPP specifications under what exact circumstances the regional requirements apply, since this is defined by local or regional regulation.

Table 4.4-1 lists all requirements in the present specification that may be applied differently in different regions.

Table 4.4-1: List of regional requirements

| Clause number | Requirement | Comments |
| --- | --- | --- |
| 5 | Operating bands | Some NR operating bands may be applied regionally. |
| 6.2.1 | Base station output power | Additional output power limits may be applied regionally. |
| 6.6.2 | Occupied bandwidth | The requirement may be applied regionally. There may also be regional requirements to declare the occupied bandwidth according to the definition in present specification. |
| 6.6.3.5.3 | Adjacent Channel Leakage Power Ratio | For Band n41 and n90 operation in Japan, absolute ACLR limits shall be applied to the sum of the absolute ACLR power over all *antenna connectors* for *BS type 1-C*. |
| 6.6.4.5 | Operating band unwanted emission | Category A or Category B operating band unwanted emission limits may be applied regionally.For operation with shared spectrum channel access, the BS may have to comply with the applicable BS power limits established regionally, when deployed in regions where those limits apply and under the conditions declared by the manufacturer. |
| 6.6.4.5.6.1 | Operating band unwanted emissions:Limits in FCC Title 47 | The BS may have to comply with the additional requirements, when deployed in regions where those limits are applied, and under the conditions declared by the manufacturer. |
| 6.6.4.5.6.2 | Operating band unwanted emissionProtection of DTT | The BS operating in Band n20 may have to comply with the additional requirements for protection of DTT, when deployed in certain regions. |
| 6.6.4.5.6.5 | Operating band unwanted emissionsAdditional requirements for n24 | The BS operating in Band n24 may have to comply with the additional requirements when deployed in regions where FCC regulation applies. |
| 6.6.4.5.7 | Operating band unwanted emission, | For Band n41 and n90 operation in Japan, the operating band unwanted emissions limits shall be applied to the sum of the emission power over all *antenna connectors* for *BS type 1-C*. |
| 6.6.5.5.1.1 | Transmitter spurious emissions | Category A or Category B spurious emission limits, as defined in ITU-R Recommendation SM.329 [5], may apply regionally.The emission limits for BS type 1-H specified as the *basic limit* + X (dB) are applicable, unless stated differently in regional regulation.In addition, for operation with shared spectrum channel access, the BS may have to comply with the applicable spurious emission limits established regionally, when deployed in regions where those limits apply and under the conditions declared by the manufacturer. |
| 6.6.5.5.1.3 | Transmitter spurious emissions: additional requirements | These requirements may be applied for the protection of system operating in frequency ranges other than the BS operating band. |
| 6.6.5.5.3 | Transmitter spurious emissions | For Band n41 and n90 operation in Japan, the sum of the spurious emissions over all *antenna connectors* for *BS type 1-C* shall not exceed the *basic limits*. |
| 6.7.5.1.1,6.7.5.2.1 | Transmitter intermodulation | Interfering signal positions that are partially or completely outside of any downlink *operating band* of the base station are not excluded from the requirement in Japan in Band n77, n78, n79. |
| 6.7.5.1.2,6.7.5.2.3 | Transmitter intermodulation | The BS may have to comply with the additional requirements, when deployed in certain regions. |
| 6.7.5.1.2,6.7.5.2.3 | Transmitter intermodulation | For Band n79 operation in Japan, the BS shall comply with the additional requirements. |
| 7.6.5.2,7.6.5.3 | Receiver spurious emissions | The emission limits for BS type 1-H specified as the *basic limit* + X (dB) are applicable, unless stated differently in regional regulation. For Band n41 and n90 operation in Japan, the sum of RX spurious emissions over all *antenna connectors* for *BS type 1-C* shall not exceed *basic limits* |

**--------------Next change-------------**

#### 6.7.5.1 BS type 1-C

##### 6.7.5.1.1 Co-location minimum requirements

For *BS type 1-C*, the wanted signal and interfering signal centre frequency is specified in table 6.7.5.1.1-1, where interfering signal level is *rated total output power* (Prated,t,AC) at *antenna connector* in the *operating band* – 30 dB.

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 a BS operating in non-contiguous spectrum, the requirement is also applicable inside a sub-block gap for interfering signal offsets where the interfering signal falls completely within the sub-block gap. The interfering signal offset is defined relative to the sub-block edges.

For a *multi-band connector*, the requirement shall apply relative to the Base Station RF Bandwidth edges of each supported operating band. In case the Inter RF Bandwidth gap is less than 3\*BWChannel MHz (where BWChannel is the minimal *BS channel bandwidth* of the band), the requirement in the gap shall apply only for interfering signal offsets where the interfering signal falls completely within the Inter RF Bandwidth gap.

The transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal according to table 6.7.5.1.1-1.

Table 6.7.5.1.1-1: Interfering and wanted signals for the co-location transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | NR single carrier, or multi-carrier, or multiple intra-band contiguously or non-contiguously aggregated carriers, with NB-IoT operation in NR in-band if supported. |
| Interfering signal type | NR signal, the minimum *BS channel bandwidth* (BWChannel) with 15 kHz SCS of the band defined in clause 5.3.5 of TS 38.104 [2]. |
| Interfering signal level | Rated total output power (Prated,t,AC) in the *operating band* – 30 dB |
| Interfering signal centre frequency offset from the lower/upper edge of the wanted signal or edge of sub-block inside a sub-block gap | , for n=1, 2 and 3  |
| NOTE 1: Interfering signal positions that are partially or completely outside of any downlink *operating band* of the BS are excluded from the requirement, unless the interfering signal positions fall within the frequency range of adjacent downlink *operating bands* in the same geographical area.NOTE 2: In Japan, NOTE 1 is not applied in Band n77, n78, n79. |

##### 6.7.5.1.2 Additional requirements

For Band n41 and n90 operation in Japan, the sum of transmitter intermodulation level over all *antenna connectors* shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal according to table 6.7.5.1.2-1.

Table 6.7.5.1.2-1 Interfering and wanted signals for the additional transmitter intermodulation requirement for Band n41 and n90

|  |  |
| --- | --- |
| Parameter | Value |
| Wanted signal | NR single carrier (NOTE) |
| Interfering signal type | NR signal of 10 MHz *channel bandwidth* |
| Interfering signal level | Rated total output power in the operating band – 30 dB |
| Interfering signal centre frequency offset from the lower/upper carrier centre frequency of the wanted signal  | ± 5 MHz± 15 MHz± 25 MHz |
| NOTE: This requirement applies for NR carriers allocated within 2545-2645 MHz. |

Table 6.7.5.1.2-2 Void

For Band n79 operation in Japan, the transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal according to table 6.7.5.1.2-3.

Table 6.7.5.1.2-3 Interfering and wanted signals for the additional transmitter intermodulation requirement for Band n79

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Wanted signal | NR single carrier |
| Interfering signal type | NR signal of 40 MHz *channel bandwidth* |
| Interfering signal level | Rated total output power in the operating band – 30 dB |
| Interfering signal centre frequency offset from the lower/upper edge of the wanted signal  | ± 20 MHz± 60 MHz± 100 MHz |

**--------------Next change-------------**

#### 6.7.5.2 *BS type 1-H*

##### 6.7.5.2.1 Co-location minimum requirements

The transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal according to table 6.7.5.2.1-1.

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

For *TAB connectors* supporting operation in *non-contiguous spectrum*, the requirement is also applicable inside a *sub-block gap* for interfering signal offsets where the interfering signal falls completely within the *sub-block gap*. The interfering signal offset is defined relative to the *sub-block* edges.

For *multi-band connector*, the requirement shall apply relative to the *Base Station RF Bandwidth* *edges* of each operating band. In case the inter *RF Bandwidth* gap is less than 3\*BWChannel MHz (where BWChannel is the minimal *BS channel bandwidth* of the band), the requirement in the gap shall apply only for interfering signal offsets where the interfering signal falls completely within the inter *RF Bandwidth* gap.

Table 6.7.5.2.1-1: Interfering and wanted signals for the co-location transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | NR single carrier, or multi-carrier, or multiple intra-band contiguously or non-contiguously aggregated carriers |
| Interfering signal type | NR signal, the minimum *BS channel bandwidth* (BWChannel) with 15 kHz SCS of the band defined in clause 5.3.5 of TS 38.104 [2]. |
| Interfering signal level | Rated total output power per *TAB connector* (Prated,t,TABC) in the *operating band* – 30 dB |
| Interfering signal centre frequency offset from the lower/upper edge of the wanted signal or edge of *sub-block* inside a gap | , for n=1, 2 and 3 |
| NOTE 1: Interfering signal positions that are partially or completely outside of any downlink *operating band* of the TAB connector are excluded from the requirement, unless the interfering signal positions fall within the frequency range of adjacent downlink *operating bands* in the same geographical area. NOTE 2: In Japan, NOTE 1 is not applied in Band n77, n78, n79. |

##### 6.7.5.2.2 Intra-system minimum requirements

The transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3 and 6.6.4 in the presence of an NR interfering signal according to table 6.7.5.2.2-1.

Table 6.7.5.2.2-1: Interfering and wanted signals for intra-system transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | NR signal |
| Interfering signal type | NR signal of the same *BS channel bandwidth* and SCS as the wanted signal (Note 1). |
| Interfering signal level | Power level declared by the BS manufacturer in D.29 (Note 2). |
| Frequency offset between interfering signal and wanted signal | 0 MHz |
| NOTE 1: The interfering signal shall be incoherent with the wanted signal.NOTE 2: The declared interfering signal power level at each *TAB connector* is the sum of the co-channel leakage power coupled via the combined RDN and Antenna Array from all the other *TAB connectors*, but does not comprise power radiated from the Antenna Array and reflected back from the environment. The power at each of the interfering *TAB connectors* is Prated,c,TABC. |

##### 6.7.5.2.3 Additional requirements

For Band n41 operation in Japan, the transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal according to table 6.7.5.2.3-1.

Table 6.7.5.2.3-1 Interfering and wanted signals for the additional transmitter intermodulation requirement for Band n41 and n90

|  |  |
| --- | --- |
| Parameter | Value |
| Wanted signal | NR single carrier (NOTE) |
| Interfering signal type | NR signal of 10 MHz *channel bandwidth* |
| Interfering signal level | Rated total output power in the operating band – 30 dB |
| Interfering signal centre frequency offset from the lower/upper carrier centre frequency of the wanted signal  | ± 5 MHz± 15 MHz± 25 MHz |
| NOTE: This requirement applies for NR carriers allocated within 2545-2645 MHz. |

Table 6.7.5.2.3-2 Void

For Band n79 operation in Japan, the transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal according to table 6.7.5.2.3-3.

Table 6.7.5.2.3-3 Interfering and wanted signals for the additional transmitter intermodulation requirement for Band n79

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Wanted signal | NR single carrier |
| Interfering signal type | NR signal of 40 MHz *channel bandwidth* |
| Interfering signal level | *Rated total output power* per *TAB connector* (Prated,t,TABC) in the *operating band* – 30 dB |
| Interfering signal centre frequency offset from the lower/upper edge of the wanted signal or | ± 20 MHz± 60 MHz± 100 MHz |

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