**3GPP TSG-RAN WG4 Meeting #116 *R4-251zzzz***

**Bengaluru, India, 25th – 29th August 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.141-1** | **CR** | **05zz** | **rev** | **-** | **Current version:** | **19.1.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | (TEI19-BDaT\_simp\_improvement) CR to 38.141-1 on framework simplification for co-location/co-existence requirements | | | | | | | | | |
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| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
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| ***Work item code:*** | TEI19 | | | | |  | ***Date:*** | | | 2025-10-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Simplification for co-location/co-existence requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Relevant Clauses are updated. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Existing requirements to be updated whenever new band is introduced. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 6.6.5.5.1.3, 6.6.5.5.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 38.104 CR 07zz | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* **< START OF CHANGE >** \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications"

[2] 3GPP TS 38.104: "NR Base Station (BS) radio transmission and reception"

[3] 3GPP TS 38.141-2: "NR, Base Station (BS) conformance testing, Part 2: Radiated conformance testing"

[4] ITU-R Recommendation M.1545, "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications-2000"

[5] ITU-R Recommendation SM.329: "Unwanted emissions in the spurious domain"

[6] IEC 60 721-3-3: "Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weather protected locations"

[7] IEC 60 721-3-4: "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Clause 4: Stationary use at non-weather protected locations"

[8] IEC 60 721: "Classification of environmental conditions"

[9] IEC 60 068-2-1 (2007): "Environmental testing - Part 2: Tests. Tests A: Cold"

[10] IEC 60 068-2-2: (2007): "Environmental testing - Part 2: Tests. Tests B: Dry heat"

[11] IEC 60 068-2-6: (2007): "Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)"

[12] ITU-R Recommendation SM.328: "Spectra and bandwidth of emissions"

[13] Federal Communications Commission: "Title 47 of the Code of Federal Regulations (CFR) "

[14] ECC/DEC/(17)06: "The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)"

[15] 3GPP TR 25.942: "RF system scenarios"

[16] 3GPP TS 38.212: "NR; Multiplexing and channel coding"

[17] 3GPP TS 38.211: "NR; Physical channels and modulation"

[18] 3GPP TS 38.214: "NR; Physical layer procedures for data"

[19] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification"

[20] 3GPP TR 38.901: "Study on channel model for frequencies from 0.5 to 100 GHz"

[21] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone"

[22] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception"

[23] ITU-T Recommendation O.150, "Equipment for the measurement of digital and analogue/digital parameters"

[24] 3GPP TS 36.141: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing"

[25] ECC Decision(20)02: “Harmonised use of the paired frequency bands 874.4-880.0 MHz and 919.4-925.0 MHz and of the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio (RMR)”

[26] 3GPP TS 37.141: "E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing".

[27] 3GPP TS 37.145-1: "Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: Conducted conformance testing".

[28] 3GPP TS 25.104: " Base Station (BS) radio transmission and Reception (FDD)".

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* **Unchanged Section Omitted** \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

###### 6.6.5.5.1.3 Additional spurious emissions requirements

These requirements may be applied for the protection of system operating in frequency ranges other than the BS downlink *operating band*. The limits may apply as an optional protection of such systems that are deployed in the same geographical area as the BS, or they may be set by local or regional regulation as a mandatory requirement for an NR *operating band*. It is in some cases not stated in the present document whether a requirement is mandatory or under what exact circumstances that a limit applies, since this is set by local or regional regulation. An overview of regional requirements in the present document is given in clause 4.4.

Some requirements may apply for the protection of specific equipment (UE, MS and/or BS) or equipment operating in specific systems (GSM, CDMA, UTRA, E-UTRA, NR, etc.) as listed below.

The power of any spurious emission shall not exceed the *basic limits* of table 6.6.5.5.1.3-1 for a BS where requirements for co-existence with the system listed in the first column apply. For a *multi-band connector*, the exclusions and conditions in the table 6.6.5.5.1.3-1 apply for each supported *operating band*.

Table 6.6.5.5.1.3-1: BS spurious emissions limits for BS for co-existence with systems operating in other frequency bands

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| System type to co-exist with (NOTE 7) | Frequency range for co-existence requirement (MHz) (NOTE 8) | *Basic limits* (dBm) | Measurement bandwidth | Notes |
| --- | --- | --- | --- | --- |
| GSM850 or CDMA850 | 869 – 894 | -57 | 100kHz | NOTE 1 |
| 824 – 849 | -61 |
| GSM900 | 921 – 960 | -57 |
| 876 – 915 | -61 |
| DCS1800 | 1805 – 1880 | -47 |
| 1710 – 1785 | -61 |
| PCS1900 | 1930 – 1990 | -47 |
| 1850 – 1910 | -61 |
| UTRA, E-UTRA or NR | Frequency range of downlink *operating band* of the BS to co-exist with | -52 | 1MHz | NOTE 1 |
| Frequency range of uplink *operating band* of the BS to co-exist with | -49 | NOTE 1, NOTE 4, NOTE 5, NOTE 6 |

NOTE 1: As defined in the scope for spurious emissions in this clause, except for the cases where the noted requirements apply to a BS operating in Band n28, the co-existence requirements in table 6.6.5.5.1.3-1do not apply for the ΔfOBUE frequency range immediately outside the downlink *operating band* (see TS 38.104 [2], table 5.2-1). Emission limits for this excluded frequency range may be covered by local or regional requirements.

NOTE 2: Table 6.6.5.5.1.3-1 assumes that two *operating bands*, where the frequency ranges in TS 38.104 [2], table 5.2-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 3: TDD base stations deployed in the same geographical area, that are synchronized and use the same or adjacent *operating bands* can transmit without additional co-existence requirements. For unsynchronized base stations, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 4: For NR Band n28 BS, specific solutions may be required to fulfil the spurious emissions limits for BS for co-existence with E-UTRA Band 27 UL *operating band*, where requirement applies 4 MHz above the Band n28 downlink operating band.

NOTE 5: For NR Band n29 BS, specific solutions may be required to fulfil the spurious emissions limits for NR BS for co-existence with UTRA Band XII, E-UTRA Band 12 or NR Band n12 UL operating band, E-UTRA Band 17 UL operating band or E-UTRA Band 85 UL or NR Band n85 UL operating band, where requirement applies 1 MHz below the Band n29 downlink operating band.

NOTE 6: For NR Band n67 BS, specific solutions may be required to fulfil the spurious emissions limits for NR BS co-existence with E-UTRA Band 28 or NR Band n28 UL operating band or NR Band n83 UL operating band, where requirement applies for 703 MHz to 736 MHz.

NOTE 7: Does not apply for co-existence with standalone downlink bands (SDO) defined in TS 36.104 [22], table 5.5-1.

NOTE 8: Frequency range of UTRA, E-UTRA and NR bands, as described in TS 25.104 [28] clause 5.2, TS 36.104 [22] clause 5.5 and TS 38.104 [2] clause 5.2, respectively.

The following requirement may be applied for the protection of PHS. This requirement is also applicable at specified frequencies falling between ΔfOBUE below the lowest BS transmitter frequency of the downlink *operating band* and ΔfOBUE above the highest BS transmitter frequency of the downlink *operating band*. ΔfOBUE is defined in clause 6.6.1.

The *basic limits* for this requirement is:

Table 6.6.5.5.1.3-2: BS spurious emissions *basic limits* for BS for co-existence with PHS

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Basic limit | Measurement bandwidth | Note |
| 1884.5 – 1915.7 MHz | -41 dBm | 300 kHz | Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz |

Table 6.6.5.5.1.3-3: Void

In certain regions, the following requirement may apply to BS operating in Band n50 and n75 within 1432-1452 MHz, and in Band n51 and Band n76. The *basic limits* are specified in table 6.6.5.5.1.3-4. This requirement is also applicable at the frequency range from ΔfOBUE below the lowest frequency of the BS downlink *operating band* up to ΔfOBUE above the highest frequency of the BS downlink *operating band*.

Table 6.6.5.5.1.3-4: Additional operating band unwanted emission *basic limits* for BS operating in Band n50 and n75 within 1432-1452 MHz, and in Band 51 and 76

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, filter | Basic limit | Measurement bandwidth |
| Ffilter = 1413.5 MHz | -42 dBm | 27 MHz |

In certain regions, the following requirement may apply to BS operating in NR Band n50 within 1492-1517 MHz. The maximum level of emissions, measured on centre frequencies Ffilter with filter bandwidth according to table 6.6.5.5.1.3-5, shall be defined according to the *basic limits* PEM,n50,a and PEM,B50,b declared by the manufacturer.

Table 6.6.5.5.1.3-5: Operating band n50, n74 and n75 declared emission above 1518 MHz

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Declared emission *basic limit* (dBm) | Measurement bandwidth |
| 1518.5 MHz ≤ Ffilter ≤ 1519.5 MHz | PEM, n50,a | 1 MHz |
| 1520.5 MHz ≤ Ffilter ≤ 1558.5 MHz | PEM,n50,b | 1 MHz |

NOTE: The regional requirement, included in ECC/DEC/(17)06 [14], is defined in terms of EIRP, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement. The assessment of the EIRP level is described in TS 38.104 [2] annex E.

In certain regions, the following requirement shall be applied to BS operating in Band n13 and n14 to ensure that appropriate interference protection is provided to 700 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-6: BS Spurious emissions limits for protection of 700 MHz public safety operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operating Band | Frequency range | Maximum Level | Measurement Bandwidth |
| n13 | 763 - 775 MHz | -46 dBm | 6.25 kHz |
| n13 | 793 - 805 MHz | -46 dBm | 6.25 kHz |
| n14 | 769 – 775 MHz | -46 dBm | 6.25 kHz |
| n14 | 799 – 805 MHz | -46 dBm | 6.25 kHz |

The following requirement may apply to NR BS operating in Band n30 in certain regions. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-7: Additional NR BS Spurious emissions limits for Band n30

|  |  |  |
| --- | --- | --- |
| Frequency range | Basic limit | Measurement bandwidth |
| 2200 – 2345 MHz | -45 dBm |  |
| 2362.5 – 2365 MHz | -25 dBm |  |
| 2365 – 2367.5 MHz | -40 dBm | 1 MHz |
| 2367.5 – 2370 MHz | -42 dBm |  |
| 2370 – 2395 MHz | -45 dBm |  |

The following requirement may apply to BS operating in Band n48 in certain regions. The power of any spurious emission shall not exceed:

Table 6.6.5.2.3-8: Additional BS Spurious emissions limits for Band n48

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Maximum Level | Measurement Bandwidth (NOTE) | Note |
| 3530MHz – 3720MHz | -25dBm | 1 MHz | Applicable 10MHz from the assigned channel edge |
| 3100MHz – 3530MHz  3720MHz – 4200MHz | -40dBm | 1 MHz |  |

NOTE: 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.

The following requirement shall be applied to BS operating in Band n26 to ensure that appropriate interference protection is provided to 800 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.2.3-9: BS Spurious emissions limits for protection of 800 MHz public safety operations

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| Operating Band | Frequency range | Maximum Level | Measurement Bandwidth | Note |
| n26 | 851 - 859 MHz | -13 dBm | 100 kHz | Applicable for offsets > 37.5kHz from the channel edge |

The following requirement may apply to BS for Band n41 and n90 operation in Japan. This requirement is also applicable at the frequency range from ΔfOBUE below the lowest frequency of the BS downlink operating band up to ΔfOBUE above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-10: Additional BS Spurious emissions limits for Band n41 and n90

|  |  |  |
| --- | --- | --- |
| Frequency range | *Basic limit* | *Measurement Bandwidth* |
| 2505 MHz – 2535 MHz | -42 dBm | 1 MHz |
| NOTE: This requirement applies for carriers allocated within 2545-2645 MHz. | | |

The following requirement may apply to BS operating in 3.45-3.55 GHz in Band n77 in certain regions. Emissions shall not exceed the maximum levels specified in table 6.6.5.5.1.3-11.

Table 6.6.5.5.1.3-11: Additional BS spurious emissions limits for Band n77

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth [MHz] | Frequency range [MHz] | Filter centre frequency, Ffilter [MHz] | Minimum requirement [dBm] | *Measurement bandwidth* [MHz] |
| All | 3430 – 3440  3560 – 3570 | 3430.5 ≤ Ffilter < 3439.5  3560.5 ≤ Ffilter < 3569.5 | -25 | 1 |
| All | ≤ 3430  > 3570 | Ffilter < 3429.5  3570.5 ≤ Ffilter | -40 | 1 |

NOTE: 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.

The following requirement shall apply to BS operating in Band n101 in CEPT countries. The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-12: Additional BS Spurious emissions limits for Band n101

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Maximum Level | *Measurement Bandwidth* | Note |
| 1920 MHz – 1980 MHz | -57 dBm | 5 MHz | This limit is derived from ECC Decision (20)02 [25] assuming a 18 dBi maximum antenna gain and 4dB losses, and assuming one antenna connector. |

The following requirement shall apply to BS operating in Band n100 in CEPT countries. The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-13: Additional BS Spurious emissions limits for Band n100

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Maximum Level | *Measurement Bandwidth* | Note |
| 880 MHz – 915 MHz | -62 dBm | 5 MHz | This limit is derived from ECC Decision (20)02 [25] assuming a 17 dBi maximum antenna gain and 4dB losses, and assuming one antenna connector. |

The following requirement may also apply to BS operating in Band n54 in certain regions. The level of emissions in the 1541 – 1650 MHz band, measured in measurement bandwidth according to Table 6.6.5.5.1.3-14 shall not exceed the maximum emission levels PEM,n54,a, PEM,n54,b, PEM,n54,c, PEM,n54,d, PEM,n54,e and PEM,n54,f declared by the manufacturer.

Table 6.6.5.5.1.3-14: Declared Band n54 emissions levels for protection of the 1541-1650 MHz band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Band | Frequency range | Declared emission level (dBW)  (Measurement bandwidth = 1 MHz) | Declared emission level (dBW) of discrete emissions of less than 700 Hz bandwidth  (Measurement bandwidth = 1 kHz) | Declared emission level (dBW) of discrete emissions of less than 2 kHz bandwidth  (Measurement bandwidth = 1 kHz) |
| n54 | 1541 - 1559 MHz | PEM,n54,a |  | PEM,n54,f |
|  | 1559 - 1610 MHz | PEM,n54,b | PEM,n54,d |  |
|  | 1610 - 1650 MHz | PEM,n54,c | PEM,n54,e |  |

Note: The regional requirements is defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The EIRP level is calculated using: PEIRP = PE + Gant where PE denotes the BS unwanted emission level at the antenna connector, Gant equals the BS antenna gain minus feeder loss. The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement specified in attachment to the FCC reference document, 0007135419.

###### 6.6.5.5.1.4 Co-location with other base stations

These requirements may be applied for the protection of other BS receivers when GSM900, DCS1800, PCS1900, GSM850, CDMA850, UTRA FDD, UTRA TDD, E-UTRA and/or NR BS are co-located with a BS.

The requirements assume a 30 dB coupling loss between transmitter and receiver and are based on co-location with base stations of the same class.

The *basic limits* are in table 6.6.5.5.1.4-1 for a BS where requirements for co-location with a BS type listed in the second column apply, depending on the declared BS class (D.2). For a *multi-band connector*, the exclusions and conditions in the table 6.6.5.5.1.4-1 shall apply for each supported *operating band*.

Table 6.6.5.5.1.4-1: BS spurious emissions *basic limits* for BS co-located with another BS

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| Frequency range of uplink operating band of the | System type to co-locate with  (NOTE 4) | *Basic limits* (dBm/100kHz) (NOTE 1) | | |
| co-located BS (MHz) (NOTE 5) | WA BS | MR BS | LA BS |
| 824 – 849 | GSM850 or CDMA850 | -98 | -91 | -70 |
| 876 – 915 | GSM900 | -98 | -91 | -70 |
| 1710 – 1785 | DCS1800 | -98 | -91 | -80 |
| 1850 – 1910 | PCS1900 | -98 | -91 | -80 |
| 49, 51/n51, n91, n93 | E-UTRA or NR | N/A | N/A | -88 |
| 46/n46, 53/n53 | E-UTRA or NR | N/A | -91 | -88 |
| n100, n101 | NR | -96 | N/A | N/A |
| n96, n102 | NR | N/A | -90 | -87 |
| n104 | NR | -95 | -90 | -87 |
| Other *operating band* | UTRA, E-UTRA or NR | -96 | -91 | -88 |

NOTE 1: As defined in the scope for spurious emissions in this clause, the co-location requirements in table 6.6.5.5.1.4-1 do not apply for the frequency range extending ΔfOBUE immediately outside the BS transmit frequency range of a downlink *operating band* (see TS 38.104 [2] table 5.2-1). The current state-of-the-art technology does not allow a single generic solution for co-location with other system on adjacent frequencies for 30dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used. These techniques are addressed in TR 25.942 [15].

NOTE 2: Table 6.6.5.5.1.4-1 assumes that two *operating bands*, where the corresponding BS transmit and receive frequency ranges in TS 38.104 [2] table 5.2-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-location requirements may apply that are not covered by the 3GPP specifications.

NOTE 3: Co-located TDD base stations that are synchronized and using the same or adjacent *operating band* can transmit without special co-locations requirements. For unsynchronized base stations, special co-location requirements may apply that are not covered by the 3GPP specifications.

NOTE 4: Does not apply for co-location with V2X operation defined in TS 36.104 [22], table 5.5-1.

NOTE 5: Frequency range of UTRA, E-UTRA and NR bands, as described in TS 25.104 [28] clause 5.2, TS 36.104 [22] clause 5.5 and TS 38.104 [2] clause 5.2, respectively.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* **< END OF CHANGE >** \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*