**3GPP TSG-RAN WG4 Meeting #116-bis R4-2514034**

**Prague, CZ, 13th – 17th October 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.115-1** | **CR** | **-** | **rev** | **-** | **Current version:** | **19.2.0** |  |
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| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <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) draftCR to TS 38.115-1 spec structure simplification for co-locationco-existence requirements | | | | | | | | | |
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| ***Source to WG:*** | ZTE Corporation | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI19 | | | | |  | ***Date:*** | | | 2025-10-03 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | According to the RAN task, the spec structure simplification for transmitter spurious emission in subclause 6.5.4.5.2 and subclause 6.5.4.5.3 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The table is simplified to include the general requirement level and exceptions. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | If not approved, the specification cannot be improved as requested by RAN task. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 6.5.4.5.2 and 6.5.4.5.3 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*<Start of the 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 38.106: "NR; Repeater Radio Transmission and Reception"

[3] 3GPP TS 38.115-2: "NR; Repeater conformance testing, Part 2: Radiated conformance testing"

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

[5] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception"

[6] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception"

[7] 3GPP TS 38.141-1: "NR; Base Station (BS) conformance testing, Part 1: Conducted conformance testing"

[8] 3GPP TS 38.211: "NR; Physical channels and modulation"

[9] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone"

[10] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification"

[11] ITU-R Recommendation M.1545: “Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications – 2000”

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

[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] 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"

[17] 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"

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

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

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

[21] IEC 60 068-2-6: (2007): "Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)" [22] Void

[23] 3GPP TS 38.214: "NR; Physical layer procedures for data"

[24] 3GPP TR 38.901: "Study on channel model for frequencies from 0.5 to 100 GHz"

[25] 3GPP TS 38.521-1: "User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone"[26] 3GPP TR 38.174: "NR; Integrated Access and Backhaul (IAB) radio transmission and reception"

[26] 3GPP TS 25.104: "Base Station (BS) radio transmission and reception (FDD) "

*<Next of the change>*

##### 6.5.4.5.2 Additional spurious emissions requirements

These requirements may be applied for the protection of system operating in other frequency ranges. The limits may apply as an optional protection of such systems that are deployed in the same geographical area as the repeater-Node, 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.

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 spurious emission *minimum requirements* are provided in table 6.5.4.5.2-1 where requirements for co-existence with the system listed in the first column apply for *repeater type 1-C, NCR type 1-C and NCR type 1-H*. For a *multi-band connector*, the exclusions and conditions in of table 6.5.4.5.2-1 apply for each supported *operating band*.

Table 6.5.4.5.2-1: *Repeater type 1-C, NCR type 1-C and NCR type 1-H* spurious emissions minimum requirements 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 | 100 kHz | Note 1, Note 3 |
| 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 | 1 MHz | Note 1, Note 3 |
| 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 repeater operating in Band n28, the co-existence requirements in table 6.5.4.5.2 -1 do not apply for the ΔfOBUE frequency range immediately outside the downlink *operating band*. Emission limits for this excluded frequency range may be covered by local or regional requirements.

NOTE 2: Table 6.5.4.5.2 -1 assumes that two *operating bands*, where the frequency ranges 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: For unsynchronized operation, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 4: For NR Band n28 repeater, specific solutions may be required to fulfil the spurious emissions limits for repeater 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 repeater, specific solutions may be required to fulfil the spurious emissions limits for NR repeater 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 repeater, 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 [6], table 5.5-1.

NOTE 8: Frequency range of UTRA, E-UTRA and NR bands, as described in TS 25.104 [26] clause 5.2, TS 36.104 [6] clause 5.5 and TS 38.104 [5] 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 repeater transmitter frequency of the downlink *operating band* and ΔfOBUE above the highest repeater transmitter frequency of the downlink *operating band*. ΔfOBUE is defined in clause 6.5.1.

The spurious emission *minimum requirements* for this requirement are:

**Table 6.5.4.5.2-2: Repeater spurious emissions minimum requirements for repeater for co-existence with PHS for DL**

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | *minimum requirements* | *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 |

In certain regions, the following requirement may apply to NR repeater or NCR operating in Band n50 and n75 within the 1432 – 1452 MHz, and in Band n51 and Band n76. The *minimum requirements are* specified in Table 6.5.4.5.2-3. This requirement is also applicable at the frequency range from ΔfOBUE below the lowest frequency of the repeater downlink *operating band* up to ΔfOBUE above the highest frequency of the repeater downlink *operating band*.

**Table 6.5.4.5.2-3: Additional operating band unwanted emission minimum requirement for NR repeater operating in Band n50 and n75 within 1432 – 1452 MHz, and in Band n51 and n76**

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | *Minimum requirements* | *Measurement Bandwidth* |
| Ffilter = 1413.5 MHz | -42 dBm | 27 MHz |

In certain regions, the following requirement may apply to repeater operating in NR Band n50 and n75 within 1492-1517 MHz and in Band n74 within 1492-1518 MHz. The maximum level of emissions, measured on centre frequencies Ffilter with filter bandwidth according to Table 6.5.4.5.2-4, shall be defined according to the *minimum requirements* PEM,n50/n75,a nor PEM,n50/n75,b declared by the manufacturer.

**Table 6.5.4.5.2-4: *Operating band* n50, n74 and n75 declared emission above 1518 MHz**

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Declared *minimum requirements* (dBm) | *Measurement bandwidth* |
| 1518.5 MHz ≤ Ffilter ≤ 1519.5 MHz | PEM, n50/n75,a | 1 MHz |
| 1520.5 MHz ≤ Ffilter ≤ 1558.5 MHz | PEM,n50/n75,b | 1 MHz |

In certain regions, the following requirement shall be applied to repeater 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 repeater downlink operating band up to 10 MHz above the highest frequency of the repeater downlink operating band.

The power of any spurious emission shall not exceed:

**Table 6.5.4.5.2-5: Repeater 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 |

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

The power of any spurious emission shall not exceed:

**Table 6.5.4.5.2-6: Additional NR repeater spurious emissions minimum requirements for Band n30**

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | *Minimum requirements* | *Measurement Bandwidth* | Note |
| 2200 – 2345 MHz | -45 dBm | 1 MHz |  |
| 2362.5 – 2365 MHz | -25 dBm | 1 MHz |  |
| 2365 – 2367.5 MHz | -40 dBm | 1 MHz |  |
| 2367.5 – 2370 MHz | -42 dBm | 1 MHz |  |
| 2370 – 2395 MHz | -45 dBm | 1 MHz |  |

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

**Table 6.5.4.5.2-7: Additional repeater spurious emissions limits for Band n48**

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

NOTE: The regional requirement, included in [14], is defined in terms of EIRP, which is dependent on both the repeater 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 Annex F.

The following requirement shall be applied to repeater 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 repeater downlink operating band up to 10 MHz above the highest frequency of the repeater downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.5.4.5.2-8: Repeater spurious emissions limits for protection of 800 MHz public safety operations

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

The following requirement may apply to Repeater 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 Repeater downlink operating band up to ΔfOBUE above the highest frequency of the Repeater downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.5.4.5.2-9: Additional repeater spurious emissions minimum requirements for Band n41 and n90

|  |  |  |
| --- | --- | --- |
| Frequency range | *Minimum requirement* | *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 repeater operating in 3.45-3.55 GHz in Band n77 in certain regions. Emissions shall not exceed the maximum levels specified in table 6.5.4.2.3-11.

Table 6.5.4.5.2-10: Additional repeater 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 may also apply to repeater operating in Band n54 in certain regions. The level of emissions in the 1541 – 1650 MHz band, measured in measurement bandwidth according to Table 6.5.4.5.2-11 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 6.5.4.5.2-11: 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 specified in attachment to the FCC reference document, 0007135419 are defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the repeater 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 repeater unwanted emission level at the antenna connector, Gant equals the repeater antenna gain minus feeder loss. The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement.

*<Next of the change>*

##### 6.5.4.5.3 Co-location with base stations and *repeater*

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

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

The *minimum requirements* are in table 6.5.4.5.3-1 for a *repeater*. Requirements for co-location with a system listed in the second column apply, depending on the declared *repeater* class. For a *multi-band connector*, the exclusions and conditions in the table 6.5.4.5.3-1 shall apply for each supported *operating band*.

Table 6.5.4.5.3-1: *Repeater type 1-C* spurious emissions minimum requirements for co-location with BS, IAB-Node or repeater-Node

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| Frequency range of uplink operating band of the | System type to co-locate with  (Note 3) | *Basic limits* (dBm/100kHz)  (Note 1) | | |
| co-located BS (MHz)  (Note 4) | 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 6.5.4.5.3-1 do not apply for the frequency range extending ΔfOBUE immediately outside the transmit frequency range of a *repeater type 1-C*. 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 antenna to antenna 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 6.5.4.5.3-1 assumes that two *operating bands*, where the corresponding transmit and receive frequency ranges 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: Does not apply for co-location with V2X operation defined in TS 36.104 [6], table 5.5-1.

NOTE 4: Frequency range of UTRA, E-UTRA and NR bands, as described in TS 25.104 [26] clause 5.2, TS 36.104 [6] clause 5.5 and TS 38.104 [5] clause 5.2, respectively.

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*<End of the change>*