**3GPP TSG-RAN WG4 Meeting #99-e *R4-2108737***

**Electronic Meeting, 19 – 27 May, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **37.141** | **CR** | **0987** | **rev** | **1** | **Current version:** | **15.14.0** |  |
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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 37.141: In-band blocking for multi-band Base Stations |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_newRAT-Perf |  | ***Date:*** | 2021-05-24 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-15 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Multi-band support for MSR and LTE BS was introduced in 3GPP Rel-11 and the work is summarized in TR 37.812. Many RF requirements were impacted, including in-band blocking, where in order to minimize the impact of blocking between the bands, the in-band blocking is modified for multi-band capable BS to ensure that the blocking probability for each band is kept to a reasonably low level and does not increase proportionally with the added frequency range with multiple bands. For this reason, the allowed degradation for blocking signals in bands other than the band with the wanted signal is set at 1.4 dB instead of the usual 6 dB. This is clarified in NOTE 5 to Table 7.4.5.1-1, where the 1.4 dB desensitization is defined for blocking signals in “other” supported bands, while 6 dB applies in case of interfering signals that are “in the in-band blocking frequency range of the operating band where the wanted signal is present or in an adjacent or overlapping band”. Since the in-band blocking is defined in a frequency range that stretches also outside the operating band, it is not clear what is intended by “adjacent or overlapping band” in this context. For near-adjacent bands, the in-band frequency ranges will be a contiguous frequency range in many cases.It is therefore proposed to clarify that “adjacent and overlapping” refers to the operating bands in question. |
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| ***Summary of change:*** | The NOTE for multi-band operation is updated to clarify that “adjacent and overlapping” refers to the operating bands in question. |
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| ***Consequences if not approved:*** | It would remain unclear what the intention is with “adjacent and overlapping bands” for in-band-blocking in case of multi-band BS. |
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| ***Clauses affected:*** | 7.4.5.1 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 37.104 |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | R1: Note text and cover page updated to refer to adjacent operating bands. |

### 7.4.5 Test requirements

#### 7.4.5.1 General blocking test requirement

For the general blocking requirement, the interfering signal shall be a UTRA FDD signal as specified in Annex A.1 for a UTRA, E-UTRA, NB-IOT, GSM/EDGE or NR (≤ 20 MHz) wanted signal. The interfering signal shall be a 20 MHz E-UTRA signal for NR wanted signal channel bandwidth greater than 20MHz.

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

For BS operating in non-contiguous spectrum, the requirement applies in addition inside any sub-block gap, in case the sub-block gap size is at least 15MHz. The interfering signal offset is defined relative to the sub-block edges inside the sub-block gap.

For BS capable of multi-band operation, the requirement applies in addition inside any Inter RF Bandwidth gap, in case the gap size is at least 15MHz. The interfering signal offset is defined relative to the Base Station RF Bandwidth edges inside the Inter RF Bandwidth gap.

For the wanted and interfering signal coupled to the Base Station antenna input, using the parameters in Table 7.4.5.1-1, the following requirements shall be met:

- For any measured E-UTRA carrier, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel defined in TS 36.104 [5], clause 7.2.

- For any measured UTRA FDD carrier, the BER shall not exceed 0.001 for the reference measurement channel defined in TS 25.104 [3], clause 7.2.

- For any measured UTRA TDD carrier, the BER shall not exceed 0.001 for the reference measurement channel defined in TS 25.105 [4], clause 7.2.

- For any measured GSM/EDGE carrier, the conditions are specified in TS 45.005 [6], Annex P.2.1.

- For any measured NB-IoT carrier, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel defined in TS 36.104 [5], clause 7.2.

- For any measured NR carrier, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel defined in TS 38.104 [27], clause 7.2.

For BS capable of multi-band operation, the requirement applies according to Table 7.4.5.1‑1 for the in-band blocking frequency ranges of each supported operating band.

Table 7.4.5.1-1: General blocking requirement

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| --- | --- | --- | --- | --- |
| Base Station Type | Mean power of interfering signal [dBm] | Wanted Signal mean power [dBm](Note 1) | Centre Frequency of Interfering Signal | Interfering signal centre frequency minimum frequency offset from the Base Station RF Bandwidth edge or sub-block edge inside a gap [MHz] |
| Wide Area BS | -40+y (Note 7) | PREFSENS + x dB (Note 2, 6) |  |  |
| Medium Range BS | -35+y (Note 7) | PREFSENS + x dB (Note 3, 6) | FUL\_low - ΔfOOB to FUL\_high + ΔfOOB  | ±(7.5 + z) (Note 9) |
| Local Area BS | -30+y (Note 7) | PREFSENS + x dB (Note 4, 6) | (Note 8) |  |
| NOTE 1: PREFSENS depends on the RAT, the BS class and on the channel bandwidth, see clause 7.2 in TS 37.104.NOTE 2: For WA BS not supporting NR, “x” is equal to 6 in case of E-UTRA or UTRA or NB-IoT wanted signals and equal to 3 in case of GSM/EDGE wanted signal.NOTE 3: For MR BS not supporting NR, “x” is equal to 6 in case of UTRA wanted signals, 9 in case of E-UTRA or NB-IoT wanted signal and 3 in case of GSM/EDGE wanted signal.NOTE 4: For LA BS not supporting NR, “x” is equal to 11 in case of E-UTRA or NB-IoT wanted signal, 6 in case of UTRA wanted signal and equal to 3 in case of GSM/EDGE wanted signal.NOTE 5: For a BS capable of multi-band operation, “x” in Note 2, 3, 4, 6 applies in case of interfering signals that are in the in-band blocking frequency range of the operating band where the wanted signal is present or in the in-band blocking frequency range of an adjacent or overlapping operating band. For other in-band blocking frequency ranges of the interfering signal for the supported operating bands, “x” is equal to 1.4 dB.NOTE 6: For a BS supporting NR and not supporting UTRA nor GSM, x is equal to 6.NOTE 7: For a BS not supporting NR, “y” is equal to zero for all BS classes. For a BS supporting NR and not supporting UTRA nor GSM, “y” is equal to -3 for the WA and MR BS class and -5 for the LA BS class.NOTE 8: The downlink frequency range of an FDD operating band is excluded from the general blocking requirement.NOTE 9: For NR wanted signal channel bandwidth greater than 20 MHz, z = 22.5. For all other cases, z = 0. |

Table 7.4.5.1-2: Void

NOTE: The requirement in Table 7.4.5.1-1 assumes that two operating bands, where the downlink operating band (see Table 4.4-1 and Table 4.4-2) of one band would be within the in-band blocking region of the other band, are not deployed in the same geographical area.