**3GPP TSG-RAN WG4 Meeting # 108 R4-** **2314237**

**Toulouse, France, 21 – 25 August, 2023**

**Agenda item:** 5.4

**Source:** Moderator (Ericsson)

**Title:** Summary for [108][301] BSRF\_Maintenance

**Document for:** Information

# Introduction

The scope of this topic summary is BS RF maintenance agenda items. Topics are divided according to the agenda:

**Up to Rel-16 maintenance:**

1. BS RF requirements and BS conformance testing (4.2)

**Rel-17 maintenance:**

1. BS RF requirements (5.2.1)

**Rel-18 maintenance:**

1. Rel-18 maintenance for LTE and NR (6)

# Topic #1: BS RF requirements and BS conformance testing (up to Rel-16) (4.2)

## Companies’ contributions summary

**Discussion paper**

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| **T-doc number** | **Company** | **Title/Proposals** |
| [R4-2313735](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313735.zip) | Ericsson | Proposal for clean-up and improvements on BS specifications  **Proposal:** Initiate a task force in RAN4 to improve the BS specification involving clarifications as described above, removal of controversial and confusing statements and editorial changed to align with 3GPP drafting rules. |

**Submitted CRs (Cat A CRs not listed)**

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| **T-doc number** | **Company** | **Title / Summary of change** |
| [R4-2311538](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311538.zip) | Nokia, Nokia Shanghai Bell | [MSR\_NC-Perf] CR to TS 37.141 NR with Multipath fading of GSM for MSR BS  Summary of change: Multipath fading test (the reference to Section 7.4 of Specification TS 51.021, Base Station System (BSS) equipment specification - Radio aspects) would be removed. The number of reference channels would be reduced. |
| [R4-2311541](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311541.zip) | Nokia, Nokia Shanghai Bell | [MSR\_NC-Perf] CR to TS 37.141 with correction to interference signal bandwidth for MSR BS  Summary of change: Changes to Table 7.7.5.2-2. |
| [R4-2311542](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311542.zip) | Nokia, Nokia Shanghai Bell | [MSR\_NC-Perf] CR to TS 37.141 with correction to interference signal bandwidth for MSR BS |
| [R4-2311545](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311545.zip) | Nokia, Nokia Shanghai Bell | [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with corrections to TCs for AAS BS conformance testing  Summary of change: Change requirement references to table 5.2-1 and 5.3.2-1. |
| [R4-2311548](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311548.zip) | Nokia, Nokia Shanghai Bell | [MSR\_NC-Perf] CR to TS 37.141 with the rated output power definition of the test signal for MSR BS  Summary of change: It is proposed to add definitions relating to cases where the rated output power is not reached. |
| [R4-2311551](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311551.zip) | Nokia, Nokia Shanghai Bell | [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with test signal configuration changes for AAS BS  Summary of change: It is proposed to add definitions relating to cases where the rated output power is not reached. |
| [R4-2311582](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311582.zip) | CATT | CR for TS 38.141-2, Correction on reference of EISminSENS, EISREFSENS and EISREFSENS\_50M (Rel-15)  Summary of change:  1) For BS type 1-O: For reference of EISminSENS, change “TS 38.104 [2], clause 10.2.1” to “clause 7.2.5.2”. For reference of EISREFSENS, change “TS 38.104 [2], clause 10.3.2” to “clause 7.3.5.2”.For reference of EISREFSENS and EISminSENS, change “TS 38.104 [2], clause 10.3.2 and 10.2.1” to “clause 7.3.5.2 and 7.2.5.2”.  2) For BS type 2-O: For reference of EISREFSENS, change “TS 38.104 [2], clause 10.3.3” to “clause 7.3.5.3”. For reference of EISREFSENS and EISREFSENS\_50MHz, change “TS 38.104 [2], clause 10.3.3” to “clause 7.3.5.3”. |
| [R4-2311584](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311584.zip) | CATT | CR for TS 38.141-2, Correction on reference of EISminSENS, EISREFSENS and EISREFSENS\_50M (Rel-17) |
| [R4-2311586](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311586.zip) | CATT | CR for TS 38.141-1, Correction on reference of PREFSENS (Rel-15)  Summary of change:  Change "TS 38.104 [2], table 7.2.2-1, 7.2.2-2 and 7.2.2-3" to "tables 7.2.5-1, 7.2.5-2 and 7.2.5-3" in Tables 7.4.1.5-1, 7.4.2.5-1, 7.4.2.5-2, 7.5.5.1-1, 7.5.5.2-1, 7.7.5-1 and 7.7.5-3. |
| [R4-2311588](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311588.zip) | CATT | CR for TS 38.141-1, Correction on reference of PREFSENS (Rel-17)  Summary of change:  1) Change "TS 38.104 [2], table 7.2.2-1, 7.2.2-2 and 7.2.2-3" to "tables 7.2.5-1, 7.2.5-2 and 7.2.5-3" in Tables 7.4.1.5-1, 7.4.2.5-1, 7.4.2.5-2, 7.5.5.1-1, 7.5.5.2-1, 7.7.5-1 and 7.7.5-3.  2) Change “TS 38.104 [2], table 7.2.2-1a, 7.2.2-2c and 7.2.2-3c” to “tables 7.2.5-1a, 7.2.5-2c and 7.2.5-3c” in Table 7.5.5.1-1. |
| [R4-2311590](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311590.zip) | CATT | CR for TS 38.174, Correction on scaling factor for IAB-MT type 1-O  Summary of change:  1) Add” Prated,x = Prated,c,TRP – 9 dB” for IAB-DU type 1-O in section 6.6.4.2.3.  2) Add that manufacturer shall declare Ncells, TAB connector TX min cell groups for IAB-MT type 1-O in section 9.1.  3) Add that manufacturer shall declare TAB connector RX min cell groups for IAB-MT type 1-O in section 10.7.1. |
| [R4-2311593](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311593.zip) | CATT | CR for TS 38.176-2, Correction on scaling factor for IAB-MT type 1-O  Summary of change:  1) Add” Prated,x = Prated,c,TRP – 9 dB” for IAB-DU type 1-O in section 6.7.4.6.1.  2) Change Ncells Declaration identifier (D.49) to be applicable for IAB type 1-O.  3) Add TAB connector RX min cell group Declaration identifier (D.64) for IAB-MT type 1-O.  4) Add TAB connector TX min cell group Declaration identifier (D.65) for IAB-MT type 1-O.  5) Add modified factor “Y = 0 dB for IAB-DU and Y = - 9 + 10log10(NTXU,countedpercell) dB for IAB-MT.” for ACLR (CACLR) absolute limit.  6) Add modified factor “Y = 0 dB for IAB-DU and Y = - 9 + 10log10(NTXU,countedpercell) dB for IAB-MT.” for OBUE requirement in section6.7.4.  7) Add scaling factor “X = 9 dB for IAB-DU and X = 10log10(NTXU,countedpercell) dB for IAB-MT” for General OTA transmitter spurious emissions requirements in section 6.7.5.2.  8) Add modified factor “Y = 0 dB for IAB-DU and Y = - 9 + 10log10(NTXU,countedpercell) dB for IAB-MT.” for Additional spurious emissions requirements in section6.7.5.4 and Co-location requirements in section 6.7.5.5.  9) Add scaling factor “X = 9 dB for IAB-DU and X = 10log10(NRXU,countedpercell) dB for IAB-MT” for OTA receiver spurious emissions in section 7.7.5.1.  10) Add that manufacturer needs to declare TAB connector TX min cell groups for IAB-MT type 1-O in section 6.7.1.  11) Add that manufacturer needs to declare TAB connector RX min cell groups for IAB-MT type 1-O in section 7.7.1. |
| [R4-2311659](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311659.zip) | Nokia, Nokia Shanghai Bell | [NR\_newRAT-Core] CR to TR 38.817-02: Clarification on calculation of CW frequency offset for conducted narrowband receiver intermodulation requirement in FR1 |
| [R4-2311723](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311723.zip) | Nokia, Nokia Shanghai Bell | [AASenh\_BS\_LTE\_UTRA-Perf] CR to TR 37.145-2: Corrections on table references for E-UTRA in-channel selectivity test requirement |
| [R4-2311903](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311903.zip) | ROHDE & SCHWARZ | Update to table format for enabling automated data scraping  Summary of change: Moving up the SCS outside the ream of BS channel bandwith is the only change needed |
| [R4-2312098](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312098.zip) | Ericsson | CR to 38.104: Correction to ACLR and CACLR requirement  Summary of change: The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum for NR-U is changed to “BS channel bandwidth of carrier transmitted adjacent to sub-block gap or inter RF Bandwidth gap”. |
| [R4-2312101](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312101.zip) | Ericsson | CR to 38.141-1: Correction to ACLR and CACLR requirement |
| [R4-2312104](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312104.zip) | Ericsson | CR to 37.104: Correction to ACLR and CACLR requirement |
| [R4-2312108](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312108.zip) | Ericsson | CR to 37.141: Correction to ACLR and CACLR requirement |
| [R4-2312112](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312112.zip) | Ericsson | CR to 37.145-1: Correction to ACLR and CACLR requirement |
| [R4-2312116](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312116.zip) | Ericsson | CR to 37.145-2: Correction to ACLR and CACLR requirement |
| [R4-2312375](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312375.zip) | Ericsson | CR to TR 37.941: Improvement of RC description in subclause 7.8, 8.8, 11.2.5, 11.3.5 and 11.4.5  Summary of change:  1. Explaining the use of bracket notation in 7.8.1. 2. Correction of equation in subclause 7.8.1. 3. Moved description of radiation efficiency and mismatch efficiency to where it is first used in subclause 8.8. Addition of references for the radiation efficiency and mismatch efficiency. 4. Added a missing radiation efficiency step in the calibration procedure of subclause 8.8. 5. Simplification of calcualtion of dynamic range in subclause 11.2.5. 6. Corrected textual description (in reference) on how number of independent number of samples are calculated. |
| [R4-2313477](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313477.zip) | Ericsson | CR to correct FR2 range in IAB specifiaiton  Summary of change: Align the FR2 range definition with 38.104 |
| [R4-2313600](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313600.zip) | Huawei, HiSilicon | [RInImp9-Rfmulti, TEI12] CR to TS 37.104: FFS removal, Rel-12  Summary of change: - FFS removal |
| [R4-2313603](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313603.zip) | Huawei, HiSilicon | [RInImp9-Rfmulti, TEI15] CR to TS 37.104: FFS removal, Rel-15 |
| [~~R4-2313606~~](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313606.zip) | ~~Huawei, HiSilicon~~ | ~~[RInImp9-Rfmulti, TEI15] CR to TS 37.104: FFS removal, Rel-18~~  (withdrawn) |
| [R4-2313809](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313809.zip) | Huawei, HiSilicon | [RInImp9-Rfmulti, TEI18] CR to TS 37.104: FFS removal, Rel-18 |
| [R4-2313736](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313736.zip) | Ericsson | TS 37.145-2: Corrections  Summary of change:  1. Correction on the way the reverberation chamber is suggested as an alternative method 2. Correction of the beams to be tested for radiated transmit power 3. Correction on setting the beam patterns to facilitate TRP measurements 4. Introduced a measurement procedure for EIRP for unwanted emissions |
| [R4-2313740](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2313740.zip) | Ericsson | TS 38.141-2: Corrections  Summary of change:  1. Correction on the way the reverberation chamber is suggested as an alternative method 2. Correction of the beams to be tested for radiated transmit power 3. Correction on setting the beam patterns to facilitate TRP measurements 4. Introduced a measurement procedure for EIRP for unwanted emissions |

## Open issues summary

N/A

# Topic #2: 5.2.1 BS RF requirements (Rel-17) (5.2.1)

## Companies’ contributions summary

**Submitted CRs (Cat A CRs not listed)**

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| **T-doc number** | **Company** | **Title / Summary of change** |
| [R4-2311566](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311566.zip) | Nokia, Nokia Shanghai Bell | [NR\_IAB\_enh-Core] CR to TS 38.174: Addition of missing bands for IAB co-existence and co-location requirements  Summary of change:  - Addition of band n67 and band n100 for IAB co-existence reuqirements with other systems  - Removal of band n101 for repeater co-location requirement as per agreement captured in TR 38.852/-53. |
| [R4-2311568](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311568.zip) | Nokia, Nokia Shanghai Bell | [NR\_6GHz-Core] CR to TS 38.104 on receiver requirements for 100MHz channel bandwidth  Summary of change: - Addition of receiver sensitivity level requirement for 100 MHz CBW for unlicesed bands. - Addition of Fixed reference channels for 100 MHz CBW. |
| [R4-2311700](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311700.zip) | NEC | CR to 38.181: Out-of-band emissions requirements  Summary of change:  Introduce out-of-band emissions and remove OBUE. Introduce BWSAN and remove ΔfOBUE. |
| [R4-2311701](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311701.zip) | NEC | CR to 38.108: Application of unwanted emissions requirements  Summary of change: Add “unless otherwise stated” in general section. |
| [R4-2311702](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311702.zip) | NEC | CR to 38.181: Applicaiton of unwanted emissions requirements  Summary of change: Add following sentence in unwanted emissions general section. “For SAN type 1-H the unwanted emission requirements are applied to sum of power over all TAB connectors for all the configurations supported by the SAN unless otherwise stated.” |
| [R4-2311703](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311703.zip) | NEC | CR to 38.181: Characteristic of interfering signal  Summary of change: Clarify PDSCH is adopted as the interfering signal for adjacent channel selectivity/OTA adjacent channel selectivity requirements. |
| [R4-2311711](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311711.zip) | NEC | CR to 38.106: Editorial correction in transmitter transient period for NR repeaters  Summary of change: Add a line break before 6.10.2.2. Use the correct style for heading. |
| [R4-2312329](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312329.zip) | Huawei, HiSilicon | [NR\_repeaters] CR to 38.106: Input intermodulation  Summary of change: Clarify the requirement shall apply during the transmitter ON period. |
| [R4-2312331](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312331.zip) | Huawei, HiSilicon | [NR\_repeaters] CR to 38.115-1: Input intermodulation |
| [R4-2312333](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312333.zip) | Huawei, HiSilicon | [NR\_repeaters] CR to 38.115-2: Input intermodulation |
| [R4-2312447](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2312447.zip) | Keysight Technologies UK Ltd | [NR\_FR1\_35MHz\_45MHz\_BW-Core] CR to 38.141-2: Correction on EVM window length table R17  Summary of change:  In Clause 6.6.3.5.1  • Table 6.6.3.5.1-2 ~ 4 has missing entry for 35 MHz and 45 MHz CBW, which should be 50% • (For TS38.141-1, both 35 MHz and 45 MHz CBW EVM length specified.) |
| [R4-2311596](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311596.zip) | CATT | CR for TS 38.108, Correction on antenna connector  Summary of change:  1) Remove symbol Pmax,c,AC. 2) Remove antenna connector. |
| [R4-2311597](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311597.zip) | CATT | CR for TS 38.181, Correction on antenna connector  Summary of change: 1) Remove symbol Pmax,c,AC. 2) Change reference of TS 38.108 from [3] to [2]. 3) Change “antenna connectors” to “TAB connectors” in some sub-clauses. |
| [R4-2311598](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311598.zip) | CATT, THALES | CR for TS 38.108, Correction on out-of-band emissions  Summary of change:   1. Add an explanation for necessary bandwidth in sub-clause 6.6.4.1. 2. Change PSDchannel to PSDSAN 3. Correct PSD equation Table 6.6.4.2-1 with Prated,SAN,sys, where Prated,SAN,sys is sum of Prated,c,sys for all carriers operating in BWSAN. |
| [R4-2311599](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311599.zip) | CATT | CR for TS 38.181, Correction on out-of-band emissions  Summary of change:   1. Update the corresponding conformance test spec contents according the agreed CR R4-2302864(RAN4#106) for TS 38.108. 2. More changes are also included according to the our CR R4-2311598 for TS 38.108. 3. Add an explanation for necessary bandwidth in sub-clause 6.6.4. 4. Change PSDchannel to PSDSAN 5. Correct PSD equation Table 6.6.4.5-1 with Prated,SAN,sys, where Prated,SAN,sys is sum of Prated,c,sys for all carriers operating in BWSAN. |

## Open issues summary

N/A

# Rel-18 maintenance for LTE and NR (6)

## Companies’ contributions summary

**Submitted CRs (Cat A CRs not listed)**

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| **T-doc number** | **Company** | **Title / Summary of change** |
| [R4-2311663](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_108/Docs//R4-2311663.zip) | Nokia, Nokia Shanghai Bell | [FS\_NR\_BS\_RF\_evo] CR to TR 38.877 on correction and additional clarification on phase shifters for MB BS  Summary of change: Add discussion for true-time-delay and frequency-flat phase shifter, and add text to clarify the simulation results are based on frequeny-flat phase shifter. |

## Open issues summary

N/A