**3GPP TSG-RAN WG4 Meeting #111  *R4-2409925***

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

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.761** | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *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 | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | CR to 38.761 on FR2 lab alignment campaign | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CAICT, SAICT | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MIMO\_OTA\_enh | | | | |  | ***Date:*** | | | 05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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:*** | | RAN4 has successfully concluded the Rel-18 FR2 MIMO OTA lab alignment activity. The outcome should be captured in the TR. | | | | | | | | |
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| ***Summary of change:*** | | Add Rel-18 FR2 MIMO OTA lab alignment activity measurement results and outcome. | | | | | | | | |
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| ***Consequences if not approved:*** | | The TR would be incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | This is a revision of R4-2407659. | | | | | | | | |

< start of change 1 >

8.1 Framework

This clause defines the working procedure on how to proceed the FR2 MIMO OTA lab alignment campaign. The purpose of lab alignment activity is to ensure there is no unexpected lab deviation and establish full trust and confidence on the measurement data pool for specifying FR2 MIMO OTA performance requirements.

1. Test labs are invited to participate in the lab alignment activity, the following conditions should be fulfilled:

- At least 3 participating labs are required.

- Participating labs shall complete channel model validation.

- Participating labs should have sufficient test resource to provide on-time measurement results without delay.

- Each lab should finalize PAD measurement within 10 workdays, and deliver to the next lab in the same country ASAP with PAD In/Out information shared via email-reflector; otherwise, labs in the same country should equally share the period for testing the PADs.

2. Test methodology:

- Test plan: 3GPP TS 38.151

3. Test cases for Lab Alignment Activity:

- Test band: n261 (for PADs that support n261), n257 (for the PAD that does not support n261)

- Number of test cases: 2~4 PADs per-band

- Operation mode: NR Non-Standalone (NSA) is preferred and SA is not precluded, and should be mapped with the measurement results submission.

- Power class: PC3

4. Test results submission:

- Use the same worksheet template in R4-2308740 to submit the measurement results

- The measurement results should be submitted to RAN4 by anonymous approach (the UE model shall not be disclosed publicly)

- Results shall not be shared between labs before submitting to RAN4 meetings or sharing in the RAN4 reflector. Comparison and lab alignment analysis should only be done in RAN4 meetings/discussions

5. Lab alignment criteria:

- The pass/fail criteria are defined as the maximum deviation between the MASC measurement result and the reference value

- The reference value is derived based on the per-band linear averaging approach (in dB) of lab alignment data pool from ≥ 3 labs, apparent outliers (if identified) should not be considered in the average process for deriving reference values. The PAD measurement result deviates over [1.5]\*preliminary MU (i.e., 7.575 dB for band n261/n257) from all the other labs’ results should be identified as apparent outlier.

- Pass/fail limit for lab alignment is defined as ±0.75\*preliminary MU, i.e., ±3.79 dB for band n261/n257.

8.2 Measurement results

RAN4 carried out the FR2 MIMO OTA lab alignment activity during Rel-18. RAN4 decided to select four smartphones (named as PADs, Performance Alignment Devices) as reference DUTs, and select band n261/n257, to perform FR2 MIMO OTA lab alignment activity.

There were 5 test labs participated in the lab alignment campaign, and 4 labs submitted PAD measurement results in Rel-18. The reference value of each PAD at each band is derived based on linear average (in dB) of PAD measurement results submitted by all labs. Channel model validation results performed by the 5 labs are presented in Clauses 6.3.2. The summary of the lab alignment results is shown in Table 8.2-1 and Figure 8.2-1. The deviation between each MASC measurement result and reference value is shown in Table 8.2-2 and Figure 8.2-2.

Table 8.2-1: Summary of Rel-18 FR2 MIMO OTA lab alignment results

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Device** | **Band** | **MASC70 measurement result [dBm/120kHz]** | | | | | **Average approach** | **Average value** | **Max-Min deviation** |
| **Lab A 1** | **Lab B** | **Lab C** | **Lab D** | **Lab E** |
| PAD 1 | n261 | -101.97 | -101.79 | -100.64 | Results not available in Rel-18 | NA | Linear average (in dB) | -101.47 | 1.33 |
| PAD 2 | n261 | -105.56 | -104.92 | -103.87 | -105.41 | -104.94 | 1.69 |
| PAD 3 | n261 | -102.40 | -101.92 | -101.22 | -103.31 | -102.21 | 2.09 |
| PAD 4 | n257 | -105.76 | -105.80 | -104.59 | -106.01 | -105.54 | 1.41 |
| Note 1: Lab A’s data were corrected by 3-dB offset from the original measurement data. | | | | | | | | | |

Table 8.2-2: FR2 MIMO OTA lab alignment outcome - MASC offset

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Device** | **Band** | **MASC offset [dBm/120kHz]** | | | | | **Pass/fail limit** | |
| **Lab A** | **Lab B** | **Lab C** | **Lab D** | **Lab E** |
| PAD 1 | n261 | -0.51 | -0.32 | 0.83 | NA | NA | ± 0.75\*preliminary MU, i.e., ± 3.79 dB | |
| PAD 2 | n261 | -0.62 | 0.02 | 1.07 | NA | -0.47 |
| PAD 3 | n261 | -0.19 | 0.29 | 0.99 | NA | -1.10 |
| PAD 4 | n257 | -0.22 | -0.26 | 0.95 | NA | -0.47 |
| **Lab alignment conclusion** | | **Pass** | **Pass** | **Pass** | **NA** | **Pass** |  |

Figure 8.2-1: Measurement results of Rel-18 FR2 MIMO OTA lab alignment

Figure 8.2-2: Deviation between each measurement result and reference value of Rel-18 FR2 MIMO OTA lab alignment

The maximum deviation between measurement results and reference values is -1.10 dB.

8.3 Pass/fail limits

Based on the preliminary MU assessment of FR2 3D-MPAC system in Annex B.2.5 of TS 38.151 V18.0.0, and lab alignment measurement results in Clause 8.2, RAN4 decided the final pass/fail limits for FR2 MIMO OTA lab alignment activity as 0.75\*preliminary MU, i.e., +/-3.79 dB for band n261/n257.

8.4 Conclusion

RAN4 concluded the successful FR2 MIMO OTA lab alignment activity for band n261/n257, with 4 test labs aligned. Rel-18 FR2 MIMO OTA performance requirements are specified based on the measurement results submitted by the above aligned test labs.

< end of change 1 >