**3GPP TSG-RAN WG4 Meeting #109 R4-2318120
Chicago, US, November 13 – 17, 2023**

**Agenda item:** 8.5.3

**Source:** Moderator (OPPO)

**Title:** Topic summary for [109][114] NR\_3Tx-4Rx\_WI

**Document for:** Information

# Introduction

This summary cover Tdoc submitted in this meeting under agenda 7.28 (4Rx basket WI), 7.29 (3Tx basket WI) and 8.5 (low band 4Rx and inter-band 3Tx general requirements). The discussions below will be split into three sections with each topic.

Topic #1: 4Rx\_NR\_bands\_R18-Core

Topic #2: 3Tx basket WI

Topic #3: 3T4R WI

# Topic #1: 4Rx\_NR\_bands\_R18-Core

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2320112 | ZTE | Revised WID: 4Rx support for NR FR1 bands (<2.6GHz) in Rel-18*Moderator note: tdoc is reserved.* |
| R4-2320113 | ZTE | CR to reflect the completed 4Rx support for NR FR1 bands (<2.6GHz) into TS 38.101-1*Moderator note: tdoc is reserved.* |

# Topic #2: 3Tx basket WI

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2319899 | OPPO | TR 38.880 for 3Tx band combinations*Moderator note: tdoc is reserved.* |
| R4-2320017 | OPPO | TR 38.880 skeleton for 3Tx band combinations |
| R4-2318719 | Huawei | TP for TR 38.880 DC\_7A\_n78A with 3Tx |
| R4-2318720 | Huawei | TP for TR 38.880 DC\_8A\_n78A |
| R4-2318721 | Huawei | TP for TR 38.880 DC\_20A\_n78A |
| R4-2318722 | Huawei | TP for TR 38.880 DC\_28A\_n78A |
| R4-2318724 | Huawei | TP for TR 38.880 DC\_41A\_n78A |
| R4-2318804 | Verizon, Samsung, Nokia | TP for TR 38.880: 3Tx inter-band CA\_n2-n77 |
| R4-2320445 | T-Mobile USA | TP for TR 38.880: Input for CA\_n25A-n41A |
| R4-2320872 | T-Mobile USA | TP for TR 38.880: Input for CA\_n41A-n66A |

## Open issues summary

### Sub-topic 2-1

**Issue 2-1-1: TR skeleton**

* Proposal: To approve TR skeleton in R4-2320017
	+ No
	+ Yes

## TPs

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Recommendation** |
| R4-2318719 | Huawei | TP for TR 38.880 DC\_7A\_n78A with 3Tx*Moderator note: this BC seems no MSD is needed* |  |
| R4-2318720 | Huawei | TP for TR 38.880 DC\_8A\_n78A*Moderator note: 4th harmonic mixing missing in the TP* |  |
| R4-2318721 | Huawei | TP for TR 38.880 DC\_20A\_n78A*Moderator note: It would be useful if could give some key parameters as reference or calculations in the TP when MSD is newly specified.* |  |
| R4-2318722 | Huawei | TP for TR 38.880 DC\_28A\_n78A*Moderator note: harmonic mixing for 2T PC2 is also in 38.101-3 which may need to be listed in the TP.* |  |
| R4-2318724 | Huawei | TP for TR 38.880 DC\_41A\_n78A |  |
| R4-2318804 | Verizon, Samsung, Nokia | TP for TR 38.880: 3Tx inter-band CA\_n2-n77*Moderator note: some updates may be needed like MSD scenarios, and PC2 MSD table for IMD5.* |  |
| R4-2320445 | T-Mobile USA | TP for TR 38.880: Input for CA\_n25A-n41A |  |
| R4-2320872 | T-Mobile USA | TP for TR 38.880: Input for CA\_n41A-n66A |  |

# Topic #3: 3T4R WI

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc** | **Company** | **Proposals / Observations** |
| R4-2319910 | OPPO | R18 38101-1 CR for low band 4Rx |
| R4-2319908 | OPPO, Samsung, Apple, Huawei, LGE, ZTE, Xiaomi, vivo | R18 38101-1 CR for 3Tx inter-band CA |
| R4-2319909 | OPPO, Samsung, Apple, Huawei, LGE, ZTE, Xiaomi, vivo | R18 38101-3 CR for 3Tx inter-band ENDC |
| R4-2318951 | vivo | Views on draft CR for new TxD capability adaptation**Observation:** TxD capabilities related revision can be treated in FR1 enh WI with 4Tx TxD capability to avoid duplicate analysis and possible overlapping.**Proposal:** Not to consider TxD capabilities related revision in the CR of this WI. |
| R4-2320092 | ZTE | Release independent for 3Tx band combination |
| R4-2318725 | Huawei | MSD due to IMD5 in CA\_n25-n77 and CA\_n5-n77**Proposal 1: add MSDs due to IMD5 to the MSD tables as shown below.**

|  |  |
| --- | --- |
| : | Source of IMD |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL CLRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n25-n77 | n25 | 1855 | 5 | 25 | 1935 | 29.9 | FDD | IMD5 |
| n77 | 3790 | 10 | 50 | 3790 | N/A | TDD | N/A |
| CA\_n5-n7713 | n5 | 844 | 5 | 25 | 889 | 23.1 | FDD | IMD5 |
| n77 | 3421 | 10 | 50 | 3421 | N/A | TDD | N/A |
| NOTE 13: For a UE which supports this band combination only when the Band n77 frequency range restriction defined in NOTE 12 of TS 38.101-1 Table 5.2-1 applies, the MSD test point(s) cannot be verified for the band combination and the test point(s) can be skipped. |

**Proposal 2. Make a mean out of the MSD proposals and remove the brackets for IMD5 of Table 7.3A.5-1b in TS38.101-1.** |
| R4-2319907 | OPPO | R18 3T4R MSD analysis**Proposal:** Agree the endorsed PC1.5 IMD5 MSD values for CA\_n5A -n77A (25.3dB) and CA\_n25-n77 (29.6dB) with 3Tx. |

## Open issues summary

### Sub-topic 3-1

**Issue 3-1-1: IMD5 of CA\_n25-n77**

* Option 1: 29.9dB (Huawei)
* Option 2: 29.6dB (OPPO, Apple from last meeting)
* **Recommendation**: Take linear averaged value, i.e. 29.8dB

Agreement: Take linear averaged value, i.e. 29.8dB

**Issue 3-1-2: IMD5 of CA\_n5-n77**

* Option 1: 23.1dB (Huawei)
* Option 2: 25.3dB (OPPO, Apple from last meeting)
* **Recommendation**: Take linear averaged value, i.e. 24.3dB

Agreement: Take linear averaged value, i.e. 24.3dB

**Issue 3-1-3: TxD capability**

* Proposal: Not to consider TxD capabilities related revision in the CR of this WI. (vivo)
	+ TxD capabilities related revision can be treated in FR1 enh WI with 4Tx TxD capability to avoid duplicate analysis and possible overlapping.
* **Recommendation**: Agree with the proposal.

Huawei: we do not need discussion here.

OPPO: the propose is to move the discussion to 4Tx.

Apple: in last meeting, we had LS to RAN2. Should we discuss it further?

Agreement:

* Not to consider TxD capabilities related revision in the CR of this WI.
	+ TxD capabilities related revision can be treated in FR1 enh WI with 4Tx TxD capability to avoid duplicate analysis and possible overlapping.

## CRs

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc** | **Company** | **Title** | **Recommendation** |
| R4-2319910 | OPPO | R18 38101-1 CR for low band 4Rx |  |
| R4-2319908 | OPPO, Samsung, Apple, Huawei, LGE, ZTE, Xiaomi, vivo | R18 38101-1 CR for 3Tx inter-band CA*Moderator note: the MSD value of CA\_n25-n77 IMD5, and CA\_n5-n77 IMD4 need to be updated.* |  |
| R4-2319909 | OPPO, Samsung, Apple, Huawei, LGE, ZTE, Xiaomi, vivo | R18 38101-3 CR for 3Tx inter-band ENDC |  |
| R4-2320092 | ZTE | Release independent for 3Tx band combination*Moderator note: the EN-DC with TxD clauses need to be added.* |  |