**3GPP TSG-RAN WG4 Meeting # 111 R4-24XXXXX**

**Fukuoka City, Fukuoka, Japan, 20th-24th May, 2024**

**Agenda item:** 7.1.3

**Source:** Huawei, HiSilicon

**Title:** Topic summary for [111][317] RF\_FR1\_enh2\_Demod

**Document for:** Information

# Introduction

This contribution summarizes the open issues and CR revision for RF\_FR1\_enh2\_Demod including following topics:

* 8Rx UE performance requirements
* 4Tx BS performance requirements

# Topic #1: 8Rx requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2407014 | MediaTek inc. | Simulation results |
| R4-2407132 | Nokia | Simulation results |
| R4-2407133 | Nokia | Proposal 1: RAN 4 shall use the following definition for a Simplified Rx: “8Rx receivers for SU-MIMO transmissions with support of only up to 4 layers, and a single codeword, with two joint 4Rx MIMO detectors.” |
| R4-2407266 | Apple | Simulation results |
| R4-2408739 | Ericsson | Simulation results collection |
| R4-2408740 | Ericsson | Simulation results |
| R4-2409008 | Huawei | Proposal 1: A new CR for introduction of 8Rx Applicability Rule for single carrier is needed to capture all the changes above.Proposal 2: New CRs related to single carrier and CA performance requirements need to be requested to capture updated simulation results if necessary. |

## Open issues summary

### Sub-topic 1-1: Definition for simplified 8Rx receiver

**Issue 1-1-1: Whether to revise the definition for simplified 8Rx receiver**

* Proposals
	+ Option 1: RAN 4 shall use the following definition for a Simplified Rx: “8Rx receivers for SU-MIMO transmissions with support of only up to 4 layers, and a single codeword, with two joint 4Rx MIMO detectors.” (Nokia)
* Recommended WF
	+ Moderator: Only single codeword is supported for up to 4 MIMO layers as per RAN1 core specification Table 7.3.1.3-1 of TS 38.211, so it is not necessary to update the simplified 8Rx receiver definition to emphasize single codeword.

### Sub-topic 1-2: Applicability rules

**Issue 1-2-1: How to implement** **applicability rules for supporting different Rx and receiver types in spec**

* Background
	+ According to R4-2406059 (draftCR for 38.101-4 Introduction of 8Rx Applicability Rule for single carrier), the applicability rules for different number of Rx antenna ports and UE receiver types are captured in same clause (clause 5.1.1.2 Applicability of requirements for different number of Rx antenna ports). The problem is that there are two dedicated clauses defined for these two applicability rules
* Proposals
	+ Option 1: Capture applicability rules for supporting different Rx antenna ports and receiver types in different Table. (Huawei)
		- Capture applicability rules for supporting different Rx in Table 5.1.1.2-1
		- Capture applicability rules for supporting different receiver types in Table 5.1.1.3-1
* Recommended WF
	+ Option 1 is agreeable?

### Sub-topic 1-3: Release independence for 8Rx

**Issue 1-2-1: Release independence for 8Rx demodulation performance requirement**

* Background
	+ RAN4 RF agreed 8Rx to be release independent from Rel-17 during RAN4#108bis in the approved WF for 8Rx R4-2317621
* Proposals
	+ Option 1: 8Rx demodulation requirements are release independent from Rel-17
	+ Option 2: 8Rx demodulation requirements are applicable from Rel-18
* Recommended WF
	+ TBA

# Topic #2: 4Tx requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2408235 | Keysight Technologies, NEC | Proposal 1:* Add a note in an annex for the misaligned FRCs to state different FRC numbers are assigned in other specifications

Proposal 2:* Making alignment on FRC numbering between TS38.104, TS38.141-1 and TS38.141-2 document starting from A-15 with using approved method (gap filling) in WF [1]

Proposal 3:* For the case newly introduced FRCs are not required in one of specification documents, then add gap filling annex as following example (there are already some examples in TS38.141-1 documents)

A.x Fixed Reference Channels for xxxxFixed Reference Channels for xxxx are not used in this specification. |

## Open issues summary

*Before Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1 FRC number between BS specification

**Issue 2-1-1: FRC numbering alignment**

* Proposals
	+ Option 1: (Keysight):

- Add a note in an annex for the misaligned FRCs to state different FRC numbers are assigned in other specifications

- Making alignment on FRC numbering between TS38.104, TS38.141-1 and TS38.141-2 document starting from A-15 with using approved method (gap filling) in WF [1]

- For the case newly introduced FRCs are not required in one of specification documents, then add gap filling annex as following example (there are already some examples in TS38.141-1 documents)

* Recommended WF
	+ Option1 is agreeable?

# Topic #3: CRs

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2407134 | Nokia | [NR\_ENDC\_RF\_FR1\_enh2-Perf] Introduction of 8Rx CA Performance Requirements |
| R4-2407212 | Nokia | [NR\_ENDC\_RF\_FR1\_enh2-Perf] draftCR for 38.101 - inclusion of 8Rx Applicability Rule and definition of simplified and baseline Rx |
| R4-2408191 | NEC | CR to 38.104: FRC number alignments among specifications  |
| R4-2408192 | NEC | CR to 38.141-1: FRC number alignments among specifications |
| R4-2408193 | NEC | CR to 38.141-2: FRC number alignments among specifications |
| R4-2408738 | Ericsson | draft CR to 38.101-4: Correction on the reference measurement channel for 8Rx requirements |
| R4-2409009 | Huawei, HiSilicon | Draft BigCR on 38.101-4 for introduction of 8Rx performance requirements |
| R4-2409010 | Huawei, HiSilicon | Draft BigCR on 38.141-1 \_RF\_FR1\_enh2\_Demod\_4Tx |
| R4-2409028 | Huawei, HiSilicon | [NR\_ENDC\_RF\_FR1\_enh2-Perf] CR for 38.104 Corrections on typos and remove the brackets for 4Tx requirements |
| R4-2409570 | Apple | draftCR on FRC for 8Rx UEs TDD 2 layers in CBW 5MHz to 30MHz |
| R4-2409571 | Apple | draftCR on FRC for 8Rx UEs TDD 2 layers in CBW 50MHz to 100MHz |

# Recommendation for Tdocs

|  |  |  |
| --- | --- | --- |
| **t-doc number** | **suggested status** | **comments** |
| R4-2407014 | Noted |  |
| R4-2407132 | Noted |  |
| R4-2407133 | Noted |  |
| R4-2407266 | Noted |  |
| R4-2408739 | Noted |  |
| R4-2408740 | Noted |  |
| R4-2409008 | Noted |  |
| R4-2408235 | Noted |  |
| R4-2407134 | Revised  | Comments：1. Update the performance number based on the new submitted results
2. FRC in performance table can be removed.
 |
| R4-2407212 | Revised | Comments:1. Definition of simplified receiver depends on the conclusion of issue 1-1-1
2. Refer to Option 1 in Issue 1-2-1.
	* Split the applicability rules for single CC as follows:
		+ Capture applicability rules for supporting different Rx in Table 5.1.1.2-1
		+ Capture applicability rules for supporting different receiver types in Table 5.1.1.3-1
		+ Moderator’s suggestions are in R4-2409008
 |
| R4-2408191 | Agreeable |  |
| R4-2408192 | Agreeable |  |
| R4-2408193 | Agreeable |  |
| R4-2408738 | Revised  | Comments: The order of FRC tables in the CR are reversed |
| R4-2409009 | Revised | Comments: 1. Coversheet issues.
2. Need to capture new draft CRs
 |
| R4-2409010 | Revised | Comments: 1. Coversheet issues.
2. Need to update merge the CR of R4-2408192
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| R4-2409028 | Agreeable |  |
| R4-2409570 | Revised | Comments: 1) Table title: Table A.3.2.2.2-XX should be Table A.3.2.2.2-362)\_FRC number R.PDSCH 2-35-X TDD should be R.PDSCH 2-36-X TDD |
| R4-2409571 | Revised  | Comments: 1) Table title: Table A.3.2.2.2-XX should be Table A.3.2.2.2-372) FRC number R.PDSCH 2-36-X TDD should be R.PDSCH 2-37-X TDD |