**3GPP TSG-RAN WG4 Meeting # 107 R4-23XXXXX**

**Incheon, KR, May 22nd – May 26th , 2023**

**Agenda item: 8.29.6**

**Source:** Moderator (ZTE Corporation)

**Title:** Topic summary for [107][328] NCR-MT Demodulation performance

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

# Topic #1: NCR\_MT demodulation requirements

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2308190 | CMCC | Proposal 1: it’s suggested to consider additional CBW 5MHz/15kHz considering 5MHz is minimum CBW for certain NCR operation bands.Proposal 2: requirements for signaling of access link beam change indication should be applicable for both FR1 and FR2.Observation 1: it’s much important to make sure MT would accurately demod access indication information to avoid connection interruption or severe interference to other UE due to wrong beam direction. Proposal 3: one suggestion is to use 1% BLER as test metric for MAC-CE access link beam indication transmitted over PDSCH.Observation 2: RAN1 use DCI format 2\_8 rather than 5\_0 to indicate non-periodic beam indication. The main difference from 1\_0/1\_1 is the payload side difference.Proposal 4: it’s suggested to define PMI reporting requirements for NCR-MT. |
| R4-2308409 | ZTE Corporation | Proposal 1. No need to consider additional CHBW 5MHz/15kHzProposal 2. No need to consider new requirements for signaling of Access link beam indication.Proposal 3. No need to consider new test metric for PDSCH.Proposal 4. To consider MCS 4 for QPSK and MCS 13 for 16QAM.Proposal 5. To consider define new requirements for DCI 2\_8.Proposal 6. To consider CORESET duration 2 for 1TX.Proposal 7. No need to define PMI requirements. |
| R4-2308525 | Ericsson | Observation 1 Decisions on whether QPSK is sufficient, whether to support 5MHz and the PDSCH operation point of 1% will have a significant impact on the number of needed simulations.Observation 2 1% BLER is a correct point for control operation, but there may be a risk of lack of convergence between different companies.Observation 3 Adding requirements for 5MHz and/or lower than 1% BLER target would add 12-24 simulations.Observation 4 No new simulations needed for CQI.Observation 5 In theory, for PMI, if 5MHz is adopted then the requirement should be checked. In practice, for the low delay spread channel it is unlikely the requirement will differ.Proposal 1 RAN4 decide whether QPSK is sufficient for the 70% throughput requirementsProposal 2 Use TDLA30-75 as the channel model for FR2.Proposal 3 Adopt the following for FR1 PDCCH:1TX: coreset duration 22TX: coreset duration 1 |
| R4-2308893 | Huawei, HiSilicon | Proposal 1:Only consider 10MHz for 15kHz SCS and 40MHz for 30kHz SCS for NCR-MT demodulation requirements.Proposal 2:Define new requirements for 15kHz and 30kHz, same requirements are applicable to FDD and TDD with different UL-DL patterns.Proposal 3:Do not define new requirements on PDCCH/PDSCH for signaling of Access link beam change indication.Proposal 4:Do not consider test metric higher than 70%.Proposal 5:Select coreset duration 2 for 1Tx and coreset duration 1 for 2Tx for NCR-MT PDCCH requirements with 15kHz.Proposal 6:Define PMI reporting cases for the NCR-MT with the test parameters reused from IAB.Proposal 7:Define applicability rule that “Testing of performance requirements for PMI reporting is optional”. |
| R4-2309329 | Nokia, Nokia Shanghai Bell | Observation 1: C-link NCR-MT will have low TPUT and, hence, smallest CBW can be allocated for such a link.Observation 2: NCR will operate in different CBW sizes. Requirements for minimum CBW could be extended/reused to any supported CBW.Observation 3: The operation of NCR in FR2 will depend on the Access link beam used by the NCR-Fwd. It is unlikely that a FR2 Fwd link NCR will implement FR1 for the backhaul link only, as such we need requirements to cover the FR2 only case.Observation 4: C-link of NCR-MT must be decoded correctly with as few HARQ retransmission as possible to ensure the best Access link beam is set properly for the NCR-Fwd within the appropriate time (i.e., not outdated and not introducing further latency).Observation 5: With the low data rate transmission on the C-link NCR-MT and with the requirements of having high reliability in decoding the Access link beam indication MAC CEs, Block Error Rate (BLER) can be considered as a metric for C-link NCR-MT.Observation 6: For NCR-MT, scheduling grant (i.e., DCI format 1\_0/1\_1) is not typical, whereas DCI type 5\_0/2\_8 can be used for access link beam change indication. The DCI size can have the maximum value of 128.Observation 7: In 38.101-4, for FDD, the majority test cases have Coreset duration of 2 for 1TX.Observation 8: NCRs are part of the network and can profit from network planning. Good channel conditions and known spatial transmission/receptions environments can be assumed. Overall low data rates are expected for NCR control information, hence fixed PMI or even no-PMI will be feasible in deployment. Link adaptation is covered in CQI requirements.Proposal 1: RAN4 shall define new FR1 requirements for 5 MHz/15 KHz.Proposal 2: New FR2 requirements shall be defined on PDCCH/PDSCH for signaling of the indication of changing the Access link beam.Proposal 3: RAN4 shall consider no less than 70% throughput in the requirements.Proposal 4: Additionally, RAN4 shall specify requirements having BLER <1% for the PDSCH C-link NCR-MT without HARQ retransmission.Proposal 5: RAN4 shall adapt test parameters for NCR PDCCH requirements following DCI format 5\_0/2\_8, e.g., FRC, DCI format, payload size, probability of misdetection.Proposal 6: RAN4 to down select the test cases in 38.101-4 for NCR-MT by considering Coreset duration 2 for 1TX and Coreset duration 1 for 2TX.Proposal 7: RAN4 shall not consider defining requirements for PMI reporting. |

## 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 General

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 1-1-1: FR1 requirements**

* Agreement in last meeting
* Define new requirements for FDD/15 KHz and TDD/30 KHz for 1 layer only by reusing/adapting requirements for IAB-MT.
	+ - 10M/15kHz; 40M/30kHz
		- FFS whether need to consider additional CHBW 5MHz/15kHz
* Proposals
	+ Option 1: Define new FR1 requirements for 5 MHz/15 KHz.(CMCC, Nokia)
	+ Option 2: Only consider 10MHz for 15kHz SCS and 40MHz for 30kHz SCS for NCR-MT demodulation requirements.(ZTE, HW)
		- * Option 2A: Define new requirements for 15kHz and 30kHz, same requirements are applicable to FDD and TDD with different UL-DL patterns.(HW)
* Recommended WF
	+ To be discussed

**Issue 1-1-2: FR2 requirements**

* Agreement in last meeting
	+ Reuse IAB-MT requirements for NCR-MT demodulation and only consider Rank 1 with 100MHz/120kHz
	+ FFS new requirements on PDCCH/PDSCH for signaling of Access link beam change indication
* Proposals
	+ Option 1: New FR2 requirements shall be defined on PDCCH/PDSCH for signaling of the indication of changing the Access link beam. (Nokia,CMCC)
	+ Option 2: Do not define new requirements on PDCCH/PDSCH for signaling of Access link beam change indication.(ZTE, HW)
* Recommended WF
	+ To be discussed

**Issue 1-1-3: Access link beam change indication**

* Proposals
	+ Option 1: requirements for signaling of access link beam change indication should be applicable for both FR1 and FR2.(CMCC)
* Recommended WF
	+ To be discussed

### Sub-topic PDSCH requirements

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 1-2-1: Test metric for FR1 and FR2**

* Agreement in last meeting
	+ Both 70% and 30% throughput cases agreed as baseline assumption for the test cases reused from IAB-MT requirements
		- Other values higher than 70% not precluded
	+ FFS for the test metric of new test case for specifically for MAC-CE Access link beam indication transmitted over PDSCH if introduced
* Proposals
	+ Option 1: <=1% BLER(CMCC, Nokia)
	+ Option 2: Do not consider test metric higher than 70%(HW, ZTE)
	+ Option 3: Consider no less than 70% throughput in the requirements.(Nokia)
	+ Option 4: RAN4 decide whether QPSK is sufficient for the 70% throughput requirements.(Ericsson)
* Recommended WF
	+ To be discussed

**Issue 1-2-2: MCS**

* Proposals
	+ Option 1: MCS 4 for QPSK and MCS 13 for 16QAM.(ZTE)
* Recommended WF
	+ To be discussed

**Issue 1-2-3: Channel model for FR2**

* Proposals
	+ Option 1: TDLA30-75 (Ericsson)
* Recommended WF
	+ Option 1 can be agreed

### Sub-topic PDCCH requirements

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 1-3-1: PDCCH requirements**

* Agreement in last meeting
	+ Reuse UE requirements for FDD and TDD
	+ FFS for adapt PDCCH requirement for testing of DCI type 5\_0 used for access link beam change indication.
* Proposals
	+ Option 1: RAN4 shall adapt test parameters for NCR PDCCH requirements following DCI format 5\_0/2\_8, e.g., FRC, DCI format, payload size, probability of misdetection.(Nokia, ZTE)
* Recommended WF
	+ To be discussed

**Issue 1-3-2: CORESET for FDD**

* Proposals
	+ Option 1: (Ericsson, ZTE, HW, Nokia)
		- * 1TX: coreset duration 2
			* 2TX: coreset duration 1
* Recommended WF
	+ Option 1 can be agreed.

### Sub-topic CSI requirements

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 1-4-1: PMI requirements**

* Agreement in last meeting
	+ FFS whether need to define PMI reporting requirements
* Proposals
	+ Option 1: Define PMI reporting requirements (CMCC, HW)
	+ Option 2: No (Nokia, ZTE)
* Recommended WF
	+ To be discussed

**Issue 1-4-2: Applicability rule for PMI reporting**

* Proposals
	+ Option 1: Testing of performance requirements for PMI reporting is optional. (HW)
* Recommended WF
	+ To be discussed