**3GPP TSG-RAN WG4 Meeting # 106-bis-e R4-23XXXXX**

**Electronic Meeting, 17 April –26 April, 2023**

**Agenda item:** 5.19.3

**Source:** Intel Corporation

**Title:** WF on absolute physical layer throughput requirement

**Document for:** Approval

# <Test paramters and simulation assumptions >

**Issue 1-1: Maximum number of HARQ transmission**

* Agreement: Define ATP requirements with HARQ ReTx enabled
  + Further effort on the alignment of simulation results can be performed.

**Issue 1-2: Precoding for HARQ retransmission**

* Agreement: Tentative offline agreements confirmed as below

|  |
| --- |
| o For retransmission number 4 including initial transmission, RV {0,2,3,1} with same MCS and rank as initial transmission; follow the latest UE reported PMI whose rank is same as the initial transmission |

**Issue 1-3: Understanding of TX EVM for ATP simulation**

* Agreement: RAN4 clarify the Tx. EVM as below
  + If BS support Tx with 256QAM, Tx EVM should be 3.5% or less, according to BS RF requirements (TS 38.104 Table 6.5.2.2-1).

|  |
| --- |
| For ATP requirements, RAN4 assume the following Tx EVM. Note this is for simulation purpose.   * FR1   + TX EVM = 6% for QPSK/16QAM/64QAM, when 64QAM CQI Table is configured   + TX EVM = 3% for QPSK/16QAM/64QAM/256QAM, when 256QAM CQI Table is configured * FR2   + TX EVM = 6% for QPSK/16QAM/64QAM, when 64QAM CQI Table is configured**.** |

Note) RAN4 don’t need to rerun the simulation with this statement.

* Interested company may update the simulation results in the next meeting

# <Phy Layer TP requirement specication >

**Issue 2-1 Phy Layer TP test metric**

* Average SNR of impairments results to achieve T% of maximum throughput + X dB margin
  + Use Gspan = [2.5] dB to check if the results are aligned
  + The maximum throughput is defined as with TBS corresponding to CQI index 15 with rank Y for 2Rx/4Rx UE, e.g., Y=2 for both 2Rx/4Rx UEs.

**Issue 2-1-1: Test point T (%) selection**

* Candidate test pool based on alignment simulation results in R4-2304257

|  |  |  |
| --- | --- | --- |
| Test Case | Candidate test point 1:  T % (SNR, Gspan) | Candidate test point 2:  T % (SNR, Gspan) |
| FR1 FDD 2x2 | 10% (3.1 dB, 1.6 dB)  15% (6.5 dB, 2.1 dB) | 40% (18.4 dB, 2.4 dB) |
| FR1 TDD 2x2 | 10% (3.6 dB, 1.9 dB)  15% (7.1 dB, 1.8 dB) | 35% (17.4 dB, 2.4 dB) |
| FR1 FDD 2x4 | 15% (3.2 dB, 1.9 dB) | 50% (15.1 dB, 2.5 dB) |
| FR1 TDD 2x4 | 15% (3.5 dB, 2.2 dB) | 50% (15.3 dB, 2.8 dB)  35% (10.7 dB, 2.3 dB) |
| FR2-1 (TDD 2x2) | 15% (4.2 dB, 2.1 dB) | 40% (15.0 dB, 1.8 dB) |

* Issue A. # of test point(s)
  + Option 1. Two test points for 2Rx and 4 Rx.
  + Option 2. Two test points for 2Rx and 1 test point for 4 Rx.
  + Option 3. Single test point for 2Rx and 4 Rx
* Issue B. T(%) and outlier removal for Gspan <= 2.5 dB

**Issue 2-1-2: X dB margin**

* + Option 1: Apply X dB margin per modulation order

X = [0.5] dB for QPSK, X = [0.5] dB for 16QAM

X = [0.8] dB for 64QAM, X = [0.8] dB for 256QAM

Note that the modulation order would be based on median value over companies’ own median statistics on CQI.

* + Option 2: Apply single X dB margin to impairment results (e.g. X=0.5 dB or else)

**WF for Issue 2-1-1 and 2-1-2**

* Discuss in the next meeting with the following aspect based on the updated results if any.
* SNR options considering uniqueness of test SNR coverage
* T (%) based on impairment results considering Gspan and X dB margin
* It does not preclude the possibility of T(%) adjustment with [+- 5% steps] or removal of outlier results from Gspan perspective.

# <Applicability and release depandancy >

**Issue 2-2: Applicability and release independent**

* Option 1: The requirement with link adaptation should be applicable for all NR UEs without any new applicability rules, and the requirement should be release independent from Rel-15
* Option 1.a: Proposal considering MMSE-IRC declaration

|  |
| --- |
| * *Optional for Rel-15 and Rel-16 UEs based on declaration on MMSE-IRC test.* * *Mandatory for all Rel-17 and forward UEs.* |

* Option 2: The requirement with link adaptation should be applicable from Rel-18 and not release independent from Rel-15 considering that companies are providing the latest results.

# <Work plan and CR work split >

**Issue 2-3: Work plan and CR work split**

* Consider Split 2 and prepare CR text in the next meeting
* Moderator will communicate for CR TP alignment before the next meeting

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Section | | | Split 1 | Split 2 |
| FR1  (5.X) | 1 Rx | Void | NA | NA |
| 2 Rx | FDD | Company A | Company A  **[Intel]** |
| TDD | Company D  **[Samsung]** |
| 4 Rx | FDD | Company B | Company E  **[CMCC]** |
| TDD | Company B  **[CTC]** |
| FR2  (7.X) | 1 Rx | Void | NA | NA |
| 2 Rx | TDD | Company C | Company C  **[Nokia]** |