**3GPP TSG-RAN WG4 Meeting #111 R4-240xxxx**

**Fukuoka City, JP, May 20-24, 2024**

**Source: China Telecom**

**Title: Ad-hoc minutes for NR\_cov\_enh2\_demod WI**

**Agenda Item: 7.17.3**

**Document for: Approval**

1. **Discussion**

**Issue 1-1: PRACH repetition interval and TDD pattern for Multiple PRACH transmission**

* Status in the WF R4-2406137 in RAN4#110-bis:

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| *Agreements on detailed network configurations:*   * + *Msg1-FDM =1*   + *TDD pattern: 3D1S1U for 15KHz, and 120kHz, 7D1S2U for 30kHz*   + *msgA-SSB-PerRACH-Occasion:*   *msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB-r16 CHOICE {*  ***one*** *ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},*  *On PRACH interval based on the above configurations:*   * + *Option 1: Simulation assumption based on the following PRACH repetition interval.*     - *For FDD and TDD with 7D1S2U 30kHz SCS: Consecutive slots.* * *FFS whether PRACH repetition can be within 1 slot for PRACH format A2 and C2.*   + - *For TDD with DDDSU:* * *Option 1A: Consecutive slots* * *Option 1B: DDDSUDDDSU for 15kHz and 120kHz SCS* * *Option 1C: DDDSUDDDSUDDDSUDDDSU for 120kHz SCS only*   + *Option 2: fixed PRACH interval for all the SCSs, i.e., 10ms.*   + *Companies are encouraged to bring simulation results for all options in the next meeting.*   *Companies are encouraged to bring detailed PRACH configuration for the above options in the next meeting.*   * + *Companies to check if PRACH B4 can be configured in FDD 15kHz SCS based on available PRACH Configuration Index* |

* Whether PRACH B4 can be configured in FDD 15kHz SCS:
  + Option 1: PRACH B4 can be configured in FDD 15kHz SCS (Huawei, Samsung)
    - HW, Samsung: PRACH configuration index FDD 211/210
  + Option 2: The configuration index not applicable to B4 for FDD 15kHz SCS (ZTE)
    - ZTE: the number of PRACH slots within a subframe is always set to 2
* Proposals on PRACH repetition interval:
  + Option 1: Define PRACH repetition requirements based on shortest PRACH repetition interval as min requirements (China Telecom, Nokia, Ericsson, Huawei, [ZTE])
    - For PRACH format A2 and C2 for FDD and TDD:
* For FDD with 15/30kHz SCS and TDD with 7D1S2U 30kHz SCS:
* Option 1: Consecutive slots (China Telecom, ZTE)
* Option 2: PRACH repetition within 1 slot (Huawei)
* For TDD with DDDSU:
* Option 1: PRACH repetition within 1 slot (Huawei)
* Option 2: 5 slots for 15kHz SCS and 10 slots for 120kHz SCS (ZTE)
* Samsung: Not consider the PRACH repetition within 1 slot for PRACH format A2 and C2, it is too dense considering multiple ROs transmission within 10ms
  + - For PRACH format B4:
* For FDD with 15/30kHz SCS and TDD with 7D1S2U 30kHz SCS: Consecutive slots (China Telecom, Huawei, ZTE)
* For TDD with DDDSU
* 15kHz SCS: DDDSUDDDSU, i.e., 5 slots (Nokia, [Huawei], ZTE)
* 120kHz SCS:
* Option 1: DDDSUDDDSU, i.e., 5 slots (Nokia)
* Option 2: DDDSUDDDSUDDDSUDDDSU, i.e.,10 slots (Huawei, ZTE)
  + Option 2: Longer PRACH repetition interval (Samsung)
    - Option 2A: 10ms (Samsung)
    - Option 2B: 10ms for FR1 and 5ms for FR2 (Samsung)
* Proposals on additional requirements if shortest PRACH repetition interval is used:
  + Proposal 1: Adding AWGN requirements to reduce the impact of fading channel (Ericsson)
  + Proposal 2: Do not define additional applicability for different TDD patterns (Huawei)
  + Proposal 3: Add note in the spec that the requirements are applicable for all BS that support this feature regardless of PRACH configuration index or TDD pattern (CTC)
* Proposals on additional requirements if longer PRACH repetition interval is used:
  + Proposal 1: Consider larger repetition number n4 or n8 (Ericsson)
  + Proposal 2: The following PRACH configuration index (Samsung)

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| * 15KHz SCS   + Format A2     - PRACH configuration index, 127, number of RO within 10ms =3, number of SSB within 10ms=3   + Format B4     - PRACH configuration index, 210, number of RO within 10ms =1, number of SSB within 10ms=1   + Format C2     - PRACH configuration index, 246, number of RO within 10ms =2, number of SSB within 10ms=2 * 30KHz SCS   + Format A2     - PRACH configuration index 96, number of RO within 10ms =3, number of SSB within 10ms=3   + Format B4     - PRACH configuration index, 156, number of RO within 10ms =1, number of SSB within 10ms=1   + Format C2     - PRACH configuration index, 201, number of RO within 10ms =2, number of SSB within 10ms=2 * 120KHz SCS   + Format A2     - PRACH configuration index 41, number of RO within 10ms=4, number of SSB within 10ms =4   + Format B4     - PRACH configuration index, 124, number of RO within 10ms=4, number of SSB within 10ms =4   + Format C2   + PRACH configuration index, 185, number of RO within 10ms =4, number of SSB within 10ms=4 |

* Recommended WF
  + Discussion needed.

**Issue 1-2: Manufacturer declarations for PRACH repetition test requirements**

* Proposals:
  + Option 1: Introduce additional manufacturer declarations for supported SCS(s) for PRACH repetition (China Telecom, Ericsson, Huawei, [Samsung])
  + Option 2: No need to introduce additional manufacturer declarations for supported SCS(s) for PRACH repetition (China Telecom, ZTE, Samsung)
* Recommended WF
  + Can we agree with option 1 considering it give BS more flexibility?

**Issue 1-3: SNR requirement value deriving rule for both PUSCH and PUCCH BE demod requirements**

* Proposals:
  + Proposal 1 (China Telecom)
    - Reuse the SNR requirement value deriving rule for Rel-15 BS demodulation SNR requirement derivation procedure as agreed in R4-1904713:

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| Procedure to derive the performance requirements:  – Only inputs that consist of a pair of ideal and impaired results can be taken into account.  – If the ideal span <= [2]dB:  • The AVERAGE impairment results can be used for the performance requirement with [] in the draftCRs/CRs;  – Else if the ideal span is larger than [2]dB:  • The results farthest from the AVERAGE value is taken out for the AVERAGE and SPAN re-calculation until the ideal span is <=2dB but still with at least 3 companies’ results available:  – The ultimate AVERAGE impairment results with corresponding ideal span <=2dB can be used for performance requirement with [] in the draftCRs/CRs.  • Otherwise put TBD for the related performance requirements.  – If the span of the impairment results after removal the outliers (if any) are larger than 4dB, then the procedure cannot be applied, related performance requirement remain TBD. |

* Recommended WF
  + It is recommended to use the above proposal for requirement definition in this meeting.
  + The requirement value will be in [] and companies can still update results in the next meeting as a maintenance part.