**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*
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* 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
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* 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.