**3GPP TSG RAN WG1 #114** **R1-230xxxx**

**Toulouse, France, August 21st – 25th, 2023**

**Agenda item:** 9.17

**Source:** Samsung

**Title:** Summary of email discussions [114-R18-38.213-NR\_NTN\_enh]

**Document for:** Discussion and decision

# Introduction

The purpose of this document is to collect inputs/comments on the draft CR for TS 38.213 [draftCR\_38213 NTN](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_NTN_enh/R1-230xxxx%20draftCR_38213%20NTN.docx) on the introduction of NR NTN enhancements. If a comment on a particular aspect has been made by another company, please do not repeat it until, if needed, after a response.

The first checkpoint is on September 5, UTC 13:00.

# First Round Discussion

Please provide your comments on the draft CR for TS 38.213 [draftCR\_38213 NTN](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_NTN_enh/R1-230xxxx%20draftCR_38213%20NTN.docx).

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| Company | Comments |
| DCM | We think that according to the following agreement reached in this meeting, “a capability or a request” should be “a capability” only.

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| AgreementThe working assumption at the RAN1#112 meeting is superseded by the following agreement:For PUCCH repetition for Msg4 HARQ-ACK,* A RSRP threshold can be configured via SIB when the number of repetitions is configured by SIB.
	+ If the RSRP threshold is configured,
		- UE capable of PUCCH repetition for Msg4 HARQ-ACK reports the capability of PUCCH repetition for Msg4 HARQ-ACK only if measured RSRP is lower than the configured RSRP threshold.
	+ If the RSRP threshold is not configured,
		- UE capable of PUCCH repetition for Msg4 HARQ-ACK reports the capability of PUCCH repetition for Msg4 HARQ-ACK
	+ Alt B: New RSRP threshold is introduced.
		- Note: the same value between the new RSRP threshold and the RSRP threshold for R17 Msg3 repetition can be configured by gNB implementation.
		- The range of RSRP threshold for PUCCH repetition for Msg4 HARQ-ACK is the same as the range of the RSRP threshold for R17 Msg3 repetition.
			* FFS signaling details, e.g. whether RSRP threshold for PUCCH repetition for Msg4 HARQ-ACK is signaled as a relative or absolute value
* Note: UE incapable of PUCCH repetition for Msg4 HARQ-ACK transmits neither repetition request nor capability report
* Note 2: RAN1 considers that there is no difference between “repetition request” and “capability report” in earlier RAN1 agreements
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Thus, an update is suggested as below.

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| 9.2.6 PUCCH repetition procedureA UE that does not have dedicated PUCCH resource configuration and indicates a capability ~~or a request~~ to transmit with repetitions a PUCCH with HARQ-ACK information [11, TS 38.321], determines a number of $N\_{PUCCH}^{repeat}$ slots for repetitions of a PUCCH transmission with HARQ-ACK information based on an indication by *numberOfPUCCHforMsg4HARQACK-RepetitionsList*. If *numberOfPUCCHforMsg4HARQACK-RepetitionsList* provides more than one values, the DAI field in a DCI format 1\_0 with CRC scrambled by a TC-RNTI scheduling a PDSCH reception that includes a UE contention resolution identity indicates $N\_{PUCCH}^{repeat}$ from the more than one values. The UE transmits each repetition of the PUCCH using frequency hopping as described in Clause 9.2.1. … |

[Aris]: OK. |
| Nokia, Nokia Shanghai Bell | For the proposed text for section 9.2.6, the preamble is too inclusive, as it is referring to “A UE that does not have dedicated PUCCH resource configuration”. Current agreements are only for PUCCH repetition for Msg4 HARQ-ACK. Nothing more, nothing less. With this way of formulating the preamble, the text will also apply for subsequent PUCCH transmissions until dedicated PUCCH resources have been configured.Additionally, agreement from RAN1#114 does not make a distinction between “repetition request” or “capability indication”, since the UE will only be able to provide an indication of its capability through the Msg3. Hence we would suggest to remove the “repetition request” to better align with current agreements and to have simpler language in the specification text.Proposed formulation of the text is as follows (some removal of text and addition of text suggested):A UE that does not have dedicated PUCCH resource configuration and indicates a capability ~~or a request~~ to transmit with repetitions a PUCCH with HARQ-ACK information for a PDSCH reception that includes a UE contention resolution identity [11, TS 38.321], determines a number of $N\_{PUCCH}^{repeat}$ slots for repetitions of a PUCCH transmission with HARQ-ACK information based on an indication by *numberOfPUCCHforMsg4HARQACK-RepetitionsList*. If *numberOfPUCCHforMsg4HARQACK-RepetitionsList* provides more than one values, the DAI field in a DCI format 1\_0 with CRC scrambled by a TC-RNTI scheduling a PDSCH reception that includes a UE contention resolution identity indicates $N\_{PUCCH}^{repeat}$ from the more than one values. The UE transmits each repetition of the PUCCH using frequency hopping as described in Clause 9.2.1. In the remaining of this clause, a UE without dedicated PUCCH resource configuration determines a value of a parameter, if applicable, according to Table 9.2.1-1 or as specified above in this clause for a PUCCH transmission with repetitions from the UE.[Aris]: I don’t understand the suggestion. If repetitions are applicable only for a PDSCH with UE contention resolution, shouldn’t that be additionally conditioned on the UE correctly receiving the TB of the PDSCH? Otherwise, if the UE does not know what the PDSCH includes, the UE does not transmit the PUCCH with repetitions – i.e. based on the suggestion, repetitions apply only for ACK (and only for contention resolution) and do not apply for NACK (and the gNB does not know how the UE transmits the PUCCH). Basically, shouldn’t the suggested text also be conditioned on a correct reception of the TB that includes the contention resolution?[Nokia, Frank] Yes, it should be conditioned on the correct reception of the TB of the PDSCH containing the contention resolution (basically correct reception of Msg4). For this case the UE should of course provide repetitions (if capable, if meeting the RSRP threshold to indicate capability through Msg3 signaling, and if indicated via DCI which repetition level to use). However, the UE should **not** continue performing PUCCH repetitions of HARQ-ACK for subsequent PDSCH receptions (which would be covered by the generic term “does not have dedicated PUCCH resource configuration”). Such additional transmissions have not been agreed in RAN1. So, if you have text proposal that would capture this “correct reception of the TB that includes the contention resolution” and applies the HARQ-ACK repetitions to this only, it would be great. Thanks! |
| vivo  | For following update, RAN1 only agreed on how to determine the pathloss RS for **DG PUSCH** in RACH less handover. So “scheduling dynamic UL grant for initial transmission” should be included as following in red.

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| - if the UE is provided *ntn-RACH-LessHO* in *ReconfigurationWithSync*, using a RS resource from an SS/PBCH block with same SS/PBCH block index as the one with same quasi co-location properties as for PDCCH receptions scheduling dynamic UL grant for initial transmission, as described in Clause 10.1, in *controlResourceSetZero* provided in *ServingCellConfigCommon* of *ReconfigurationWithSync*  |

For CG PUSCH, RAN2 already agrees SSB to PUSCH mapping is supported and RSRP threshold is configured for SSB determination, according to following agreements. Therefore, such PUSCH transmission should be captured in 38.213, and the pathloss should be the SSB associated to the PUSCH similar to SDT description in section 19.1 of 38.213.

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| Agreements:1. Single beam can be indicated in HO command to monitor target cell PDCCH for dynamic grant for initial UL transmission
2. The pre-allocated grant is provided with association to SSBs
3. The mapping between type-1 CG and SSBs in CG-SDT can be the baseline of how to configure pre-allocated grant mapped to SSBs (can rediscuss in case of different input from RAN1)
4. UE selects an SSB associated to the pre-allocated grant with RSRP above a configured threshold, use the selected SSB and the corresponding UL grant occasions for the initial UL transmission
5. If no SSB mapping to pre-allocated grant has RSRP above the threshold, fallback to RACH HO (with new SSB selection), while T304 is running
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For following updates, the scope of the PUCCH repetition is up to RAN#101 to determine, therefore we propose to have “with HARQ-ACK information [11, TS 38.321]” and other similar text in bracket. Agree that “or a request” should be deleted based on agreement we’ve made.The “or” in the last sentence should be replace by “and/or” since both above text and following text need to be considered for the case when common PUCCH repetition is enabled.So we propose to have following updates in red.

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| A UE that does not have dedicated PUCCH resource configuration and indicates a capability ~~or a request~~ to transmit with repetitions a PUCCH [with HARQ-ACK information [11, TS 38.321]], determines a number of $N\_{PUCCH}^{repeat}$ slots for repetitions of a PUCCH transmission [with HARQ-ACK information] based on an indication by *numberOfPUCCHforMsg4HARQACK-RepetitionsList*. If *numberOfPUCCHforMsg4HARQACK-RepetitionsList* provides more than one values, the DAI field in a DCI format 1\_0 with CRC scrambled by a TC-RNTI scheduling a PDSCH reception that includes a UE contention resolution identity indicates $N\_{PUCCH}^{repeat}$ from the more than one values. The UE transmits each repetition of the PUCCH using frequency hopping as described in Clause 9.2.1. In the remaining of this clause, a UE without dedicated PUCCH resource configuration determines a value of a parameter, if applicable, according to Table 9.2.1-1 and/or as specified above in this clause for a PUCCH transmission with repetitions from the UE. |

Another comment is that the PUCCH repetition request procedure seems missing. Is the intention to capture it in RAN2 spec.? e.g., how the RSRP is checked against the RSRP threshold so that a request is indicated in Msg3.[Aris]: I don’t understand how the cited RAN2 agreements relate to PUCCH repetitions and for UCI other than HARQ-ACK, and for PUCCH without dedicated resources (specifications support PUCCH transmission in such case only for HARQ-ACK). If any relevance/applicability, RAN1 can provide an associated agreement.The ‘or’ is not an “either … or …” and already allows the “and” – but will modify to “and/or” as that expression already found its way into the general specifications. |
| Sharp | Whether Msg4 HARQ-ACK repetition is extended to the common PUCCH will be discussed in RAN#101 meeting, and the plenary’s decision would affect the first sentence in 6.1.7. Therefore, the first sentence should be in square brackets.

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| [A UE that does not have dedicated PUCCH resource configuration and indicates a capability ~~or a request~~ to transmit with repetitions a PUCCH with HARQ-ACK information [11, TS 38.321], determines a number of $N\_{PUCCH}^{repeat}$ slots for repetitions of a PUCCH transmission with HARQ-ACK information based on an indication by *numberOfPUCCHforMsg4HARQACK-RepetitionsList*.] If *numberOfPUCCHforMsg4HARQACK-RepetitionsList* provides more than one values, the DAI field in a DCI format 1\_0 with CRC scrambled by a TC-RNTI scheduling a PDSCH reception that includes a UE contention resolution identity indicates $N\_{PUCCH}^{repeat}$ from the more than one values. The UE transmits each repetition of the PUCCH using frequency hopping as described in Clause 9.2.1. In the remaining of this clause, a UE without dedicated PUCCH resource configuration determines a value of a parameter, if applicable, according to Table 9.2.1-1 or as specified above in this clause for a PUCCH transmission with repetitions from the UE. |

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