**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\_cov\_enh2]

**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 Coverage](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_cov_enh2/R1-230xxxx%20draftCR_38213%20Coverage.docx) on the introduction of further NR coverage 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 Coverage](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_cov_enh2/R1-230xxxx%20draftCR_38213%20Coverage.docx).

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| Company | Comments |
| DOCOMO | **Issue 1: Determination for first RO of all RO groups**In RAN1#114, we have following agreements to determine the first RO for all RO groups in time period X.AgreementFor a given number of *N* multiple PRACH transmissions, to determine the starting RO of all the RO groups within a time period X:* + If a time offset is configured, then
		- the starting RO of the first RO group for each is determined from the first valid RO within the time period X, first in increasing order of frequency resource index for frequency multiplexed PRACH occasions; second in increasing order of time resource index.

* + - the starting RO of the *n*-th RO group for each is determined as the RO at the time offset equal to a number of valid ROs from the starting RO of the (*n-1*)-th RO group for the same .

* + If time offset is not configured, then
		- the starting RO of the first RO group is the first valid RO within the time period X.
		- the starting RO of other RO groups are determined as the first valid RO after the previous RO group in the following order within the time period X: first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes.

**Comment 1**: According to the agreement, the configured time offset is from the starting RO of the *(n-1)th* RO group to the starting RO of the *nth* RO group for the same frequency location. In the below CR, the time offset seems to be the offset between the last RO of the *(n-1)th* RO group and the first RO of *nth* RO group.Suggested change: Modify the “last” (in positions as highlighted below) into “first”.

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| For a PRACH transmission with preamble repetitions within a time period, a first valid PRACH occasion is determined according to the ordering of PRACH occasions and is after consecutive valid PRACH occasions in time from a last valid PRACH occasion corresponding to previous preamble repetitions, if any, where is the value of *TimeOffsetBetweenStartingRO*, if provided; otherwise, . |

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| For a PRACH transmission with preamble repetitions within a time period, the first valid PRACH occasion of the first preamble repetitions associated with an SS/PBCH block is the first valid PRACH occasion associated with the SS/PBCH block in the association period for preamble repetitions. The first valid PRACH occasion of subsequent preamble repetitions associated with the SS/PBCH block in the time period, if any, is determined according to an ordering of PRACH occasions- First, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions- Second, in increasing order of time resource indexes for time multiplexed PRACH occasions after consecutive valid PRACH occasions in time from a last valid PRACH occasion corresponding to previous preamble repetitions with same frequency location, if any, for the SS/PBCH block |

**Comment 2**: The above two paragraphs are both about determination for first RO of RO groups. We feel the first paragraph seems redundant, since it can be captured by the second paragraph.Suggested change: Remove the first paragraph as above. **Issue 2: RO groups for same repetition number****Comment 3**: In RAN1#114, it was agreed that no overlapping between RO groups for the same repetition number (as highlighted part below). The CR seems not capture this limitation/rule.AgreementFor a given number of *N* multiple PRACH transmissions, all the RO groups within a time period X are determined as follows:* Firstly, the starting RO of the first RO group is determined, then its remaining ROs are determined. Next, the starting RO of other RO groups and its remaining ROs are determined sequentially.
* the starting RO is determined as follows (down select only one of the Alt.):

**Alt.1 (w/o density control)*** + the starting RO of the first RO group is the first valid RO within the time period X.
	+ the starting RO of other RO groups are determined as the first valid RO after the previous RO group in the following order within the time period X: first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes.

**Alt.2 (w/ density control)*** + If a time offset is configured, then
		- the starting RO of the first RO group for each is determined from the first valid RO within the time period X, first in increasing order of frequency resource index for frequency multiplexed PRACH occasions; second in increasing order of time resource index.

* + - the starting RO of the *n*-th RO group for each is determined as the RO at the time offset equal to a number of valid ROs from the starting RO of the (*n-1*)-th RO group for the same .

* + If time offset is not configured, then Alt.1 Applies.
* It is not expected to have overlapping RO between any two RO groups for the given number of *N* multiple PRACH transmissions.
* the remaining *N-1* ROs are the next *N-1* ROs after the starting RO with increasing order of time resource indexes and associated with the same SSB(s) as the starting RO, and (down select only one of the Alt.)
	+ - Alt. 1 (the starting RB of ROs within a RO group is the same) the *N-1* ROs are with the same starting RB as the starting RO.
		- Alt. 2 (the starting RB of ROs within a RO group can be different) the *N*-1 ROs are with the lowest frequency resource index in corresponding time instance.
		- Alt. 3 (the starting RB of within a RO group can be different and a frequency offset is configured) the *N-1* ROs are determined based on a configured frequency offset.
		- Alt. 4 (the starting RB of ROs within a RO group can be different), the *N*-1 ROs are with the same relative frequency resource index among the multiple frequency multiplexing ROs associated with the same SSB in corresponding time instances.

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| For a PRACH transmission with preamble repetitions within a time period, a first valid PRACH occasion is determined according to the ordering of PRACH occasions and is after consecutive valid PRACH occasions in time from a last valid PRACH occasion corresponding to previous preamble repetitions, if any, where is the value of *TimeOffsetBetweenStartingRO*, if provided; otherwise, .For a PRACH transmission with preamble repetitions within a time period, the first valid PRACH occasion of the first preamble repetitions associated with an SS/PBCH block is the first valid PRACH occasion associated with the SS/PBCH block in the association period for preamble repetitions. The first valid PRACH occasion of subsequent preamble repetitions associated with the SS/PBCH block in the time period, if any, is determined according to an ordering of PRACH occasions- First, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions- Second, in increasing order of time resource indexes for time multiplexed PRACH occasions after consecutive valid PRACH occasions in time from a last valid PRACH occasion corresponding to previous preamble repetitions with same frequency location, if any, for the SS/PBCH blockFor a PRACH transmission with preamble repetitions, all respective valid PRACH occasions are consecutive in time and use same frequency resources and are associated with a same SS/PBCH block index. |

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