

Views on RAN4 Rel-18: NR and MR-DC Measurement Gap Enhancements

Agenda Item: 9.1.4.3

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Introduction

Extensive discussion on Further enhancements on NR and MR-DC measurement gaps and measurement requirements without gaps objectives took place as a part of email thread [RAN95e-RAN4-R18Prep-03] during February email discussions, with the following Final proposals [RP-220021]

- Working Area #3 (MG enhancements)
 - Prioritized objectives for further discussion
 - 3.5 Joint requirements for pre-configured MG, concurrent MG and NCSG
 - 3.1 NeedForGap requirements
 - 3.3 Inter-RAT NR and [LTE] measurement without gaps
 - Note: further prioritization of objectives can be required in RAN #95e
- MUSIM gaps
 - Further discuss inclusion of objectives on RRM requirements for Rel-17 MUSIM features in the scope of Rel-18 MUSIM WI in RAN #95e

The objectives from Working Area #3 are further categorized into 2 parts

- Enhancements of pre-configured MGs, multiple concurrent MGs and NCSG
- RRM requirements for measurement without gaps for different cases

In this contribution we provide motivations and justifications to each of the prioritized objectives in the scope of Even Further RRM enhancement for NR and MR-DC Measurement Gaps and measurements requirements without gaps work item in Rel-18

Views on Prioritization

Based on email discussion outcome further discussion on scope refinement/prioritization of selected work items is required in RAN #95e to meet practical RAN4 TU constraints

Intel's view: Objectives related to measurements without gaps have relatively limited scope and recommend to consider all identified objectives during pre-RAN #95e discussion for further adoption

- (1) Enhancements of pre-configured MGs, multiple concurrent MGs and NCSG
 - (1-1) Pre-configured MGs and multiple concurrent MGs (i.e., concurrent MGs where at least one of the gaps is a pre-configured gap)
 - (1-2) NCSG and multiple concurrent MGs (i.e., concurrent MGs where at least one of the gaps is NCSG)

- (2) Define RRM requirements for measurement without gaps for different cases
 - (2-1) NR SSB-based inter-frequency and intra-frequency measurements without gaps for UEs reporting NeedForGapsInfoNR IE
 - (2-2) Inter-RAT measurements without gaps

Objective #1: Enhancements of pre-configured MGs, multiple concurrent MGs and NCSG

Intel's views

- Enhancements of pre-configured MGs, multiple concurrent MGs and NCSG are leftovers from Rel-17. RAN4 consensus is to have this objective and discuss the detailed contents within.
- Our preference is to prioritize Pre-configured MGs and multiple concurrent MGs (i.e., concurrent MGs where at least one of the gaps is a pre-configured gap) and NCSG and multiple concurrent MGs (i.e., concurrent MGs where at least one of the gaps is NCSG) over other cases. We propose to work on additional cases after Case 1/2 discussion is complete.

Motivation/Justification

- The baseline functionality of pre-configured MG, concurrent MG and NCSG was introduced in Rel-17 NR and MR-DC Measurement gap enhancements WI. Meanwhile, the work on requirements for the joint configuration of pre-configured MG, concurrent MG and NCSG was deprioritized. Support of respective joint requirements will improve network configuration flexibility and allow addressing additional use cases via a combination of pre-configured MG, concurrent MG and NCSG mechanisms.

Objective #1: Enhancements of pre-configured MGs, multiple concurrent MGs and NCSG

- *Define RRM requirements for UEs configured with a combination of pre-configured MGs, and/or multiple concurrent MGs and/or NCSG [RAN4]*
 - *Prioritize at least joint requirements for UE configured with*
 - *Case 1: Pre-configured MGs and multiple concurrent MGs (i.e., concurrent MGs where at least one of the gaps is a pre-configured gap)*
 - *Case 2: NCSG and multiple concurrent MGs (i.e., concurrent MGs where at least one of the gaps is NCSG)*
 - *Note: Work on additional cases can start after baseline requirements for Case 1 and Case 2 are identified.*

Note: updated objectives are highlighted in red

Objective #2: Define RRM requirements for measurement without gaps for different cases(1)

Intel's views

- The idea of NeedForGaps enhancements is to allow interruptions for UE when performing RF retuning to the target frequency to measure.
- Regarding inter-RAT measurements without gaps, we need to clarify on the scenario: it is for the cases where the UE active BWP contains target LTE CRS and the UE is able to measure on the target LTE CRS without gap. We don't see the need to consider other cases. Our preference is to consider only the inter-RAT E-UTRAN measurements without gaps.

Motivation/Justification

- The NeedForGaps feature can bring gains for system throughput and/or mobility performance under certain conditions, where gap-less measurements can be applied. The existing RRM requirements for UEs supporting NeedForGaps feature are specified for intra-frequency SSB based measurements without gaps, while requirements for inter-frequency measurements without gaps are missing. Also, RRM requirements for intra-frequency SSB based measurements without gaps do not assume interruptions, which may be required.
- Inter-frequency measurements without gaps are already supported in Rel-17. Support of gap-less inter-RAT LTE measurements can bring gains for system throughput and/or mobility performance under certain conditions, where gap-less measurements can be applied.

Objective #2: Define RRM requirements for measurement without gaps for different cases(2)

Objective #2-1: NR SSB-based inter-frequency and intra-frequency measurements without gaps for UEs reporting NeedForGapsInfoNR IE

- NR SSB-based inter-frequency and intra-frequency measurements without gaps for UEs reporting NeedForGapsInfoNR IE [RAN4]
 - Study whether the additional interruption is allowed when UE reporting 'NeedForGapsInfoNR'. Further define the interruption length, occasion and ratio, if the interruption is allowed
 - Define related requirements, such as CSSF, measurement period, scheduling restriction etc.

Objective #2-2: Inter-RAT measurements without gaps

- Inter-RAT ~~E-UTRA~~ measurements without gaps [RAN4]
 - ~~Inter-RAT NR measurements~~
 - ~~Inter-RAT LTE measurements~~ Specify inter-RAT E-UTRA measurement requirements without gaps when the target CRS is contained in the UE active BWP in CONNECTED mode

Note: updated objectives are highlighted in red

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