3GPP TSG-RAN3 Meeting #109-E R3-205569

E-meeting, 17 – 28 August 2020

Agenda Item: 9.3.4

Source: Ericsson

Title: SoD for MeasGapActF1AP

Document for: Discussion, Decision

# Introduction

This is a summary of offline discussions for the topic of Measurement Gap Activation in F1AP.

**CB: # 66\_MeasGapActF1AP**

**- Anything broken/in need of clarification in Rel-15 specs?**

**- Avoid IOT issues**

**- Compromise: Rel-16? Rel-17?**

(E/// - moderator)

Summary of offline disc [R3-205566](file:///C:\\Users\\aarjona\\Documents\\002%20-%20RAN3%20meetings%20docs\\00%20-%202020%2008%20RAN3%20109-e\\Inbox\\Drafts\\CB%20%23%2066_MeasGapActF1AP\\Inbox\\R3-205566.zip)

# For the Chairman’s Notes

Following agreements were proposed on the first round of offline discussion:

**Proposal: with respect to the solution below**

**Solution 2) Always use the *MeasObjectToAddModList* IE plus the *measObjectToRemoveList* IE when adding/modifying/removing measurement objects.**

**In this option the *measObjectToRemoveList* IE is used to remove all measurements previously configured. All measurements that want to be added or modified are present in the *MeasObjectToAddModList* IE as measurements to be added.**

It is acknowledged that Solution 2 is a possible implementation of the current standard.

CRs with some clarification text are proposed to be agreed in R3-205767 and R3-205768

# Second Round of Discussion

The problem statement described in this SoD and agreed by the majority of companies is the following:

**Problem Statement: Reuse at the gNB-DU of RRC IEs such as the *measObjectToRemoveList* IE, used for UE configuration results in complex gNB-DU implementations because it forces the gNB-DU to store Measurement Configuration information not needed at the gNB-DU**

Two solutions have been formulated to address this problem:

1. Always use the *MeasObjectToAddModList* IE for adding, modifying of removing measurement configurations.

Every time a *MeasObjectToAddModList* IE is received at the gNB-DU, the Measurements to add/modify in the list are configured, while any other measurement not present in the Measurement to add/modify list is removed

1. Always use the *MeasObjectToAddModList* IE plus the *measObjectToRemoveList* IE when adding/modifying/removing measurement objects.

In this option the *measObjectToRemoveList* IE is used to remove all measurements previously configured. All measurements that want to be added or modified are present in the *MeasObjectToAddModList* IE as measurements to be added.

It is acknowledged that Solution 2 is a possible implementation of the current standard.

CRs with some clarification text are proposed to be agreed in R3-205767 and R3-205768

# First Round of Discussion

## Problem description

The problem in R3-204779 and R3-204892 concerns the handling of measurement gaps configurations between gNB-CU and gNB-DU.

As explained in these contributions the gNB-CU uses the *MeasConfig* IE to configure and de-configure measurement gaps at the gNB-DU. This IE consists of two types of information, the *MeasObjectToAddModList* IE, which specifies the list of frequencies for which the gNB-CU requests the gNB-DU to generate gaps, and *measObjectToRemoveList* IE, which specifies a list of Measurement Object IDs for which measurement gaps shall be deactivated.

The problem highlighted in R3-204779 and R3-204892 is that if the gNB-CU signals to th gNB-DU the *measObjectToRemoveList* IE for the purpose of removing certain measurement gaps, the gNB-DU needs to maintain a status for each MEasObjectID in order to interpret correctly the *measObjectToRemoveList* IE. This is due to the fact that the *measObjectToRemoveList* IE is nothing else but a list of indexes (MeasObjectID) pointing at the a measurement configuration. The gNB-DU needs therefore to maintain a mapping table of the like of the one below. Namely the gNB-DU needs to maintain the configuration information associated to a Measurement Object (see e.g. MeasObjectNR in TS38.331), which is an extensive set of information:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MeasObjectID | SSB Frequency | Measurement Duration | SSB Sub Carrier Spacing | SSB ID | *…* |
| 1 | Frequency 1 | *X symbols* | *X* | *X* | *…* |
| 2 | Frequency 2 | *Y symbols* | *Y* | *Y* | *…* |
| *…* | *…* | *…* | *…* | *…* | *…* |
| N | Frequency *n* | *N symbols* | *N* | *N* | *…* |

It needs to be considered that the mapping table above only contains a fraction of the information associated to a measurement object, i.e. the table would be much larger in reality. It also needs to be noted that the mapping table above needs to be maintained per UE, and it will need to be dynamically updated, making the mechanism both processing and computationally intensive.

Furthermore, according to the current specifications, the gNB-DU is not required to maintain the vast majority of the information above.

The only task the gNB-DU needs to carry out once it receives from the gNB-CU a request to setup a measurement gap, is to create a time gap in the scheduling for the UE of the requested time length, periodicity and starting at the requested time.

**Observation: the gNB-DU does not need to store Measurement Object information per measurement gap configuration. Instead, the gNB-DU needs to be able to maintain time gaps in the UE scheduling that fulfil the measurement configuration request. Hence, many information like Measurement Frequency, Sub carrier Spacing, SSB ID…do not need to be stored by the gNB-DU**

The problem therefore highlighted in R3-204779 and R3-204892 is that if we try to reuse for the gNB-DU the same IEs used over RRC for measurement gap configuration at the UE, the gNB-DU implementation results very complex without any added gain.

**Problem Statement: Reuse at the gNB-DU of RRC IEs such as the *measObjectToRemoveList* IE, used for UE configuration results in complex gNB-DU implementations because it forces the gNB-DU to store Measurement Configuration information not needed at the gNB-DU**

Companies are invited to provide their comments to the problem statement below.

|  |  |  |
| --- | --- | --- |
| Company | Agree/Don’t Agree | Comments |
| ZTE | Agree | Although both options (the *MeasObjectToAddModList* IE, the  *measObjectToRemoveList* IE) can deactivate the measurement gap, the  *measObjectToRemoveList* IE option requires the gNB-DU to store the information  of all existing gaps, such as the MeasObjectID and the associated frequency, to identify the  measurement gap when the target measurement gap is to be deactivated. |
| Nokia | Agree | Storing of all measurement object IDs serve no actual purpose at DU. Avoiding this burden at DU will be beneficial. |
| Ericsson | Agree |  |
| Huawei | Disagree | *measObjectToRemoveList* and *MeasObjectToAddModList were* defined by RAN2 which have specific meaning, and the argumentation of storing measurements doesn’t stand, since this should be part of contexts at DU side |

Summary of the Problem Description discussion:

The Majority of companies believe that there is no need for the gNB-DU to store most of the information associated to a Measurement Object (as per TS38.331). For this reason, most companies believe that the use of *measObjectToRemoveList* IE is sub-optimal and that Addition and Removal of measurements can be performed by means of the *MeasObjectToAddModList* IE

## Possible Solutions

In order to solve the problem described above, at least two solutions have been presented:

1. Always use the *MeasObjectToAddModList* IE for adding, modifying of removing measurement configurations.

Every time a *MeasObjectToAddModList* IE is received at the gNB-DU, the Measurements to add/modify in the list are configured, while any other measurement not present in the Measurement to add/modify list is removed

1. Always use the *MeasObjectToAddModList* IE plus the *measObjectToRemoveList* IE when adding/modifying/removing measurement objects.

In this option the *measObjectToRemoveList* IE is used to remove all measurements previously configured. All measurements that want to be added or modified are present in the *MeasObjectToAddModList* IE as measurements to be added.

It is worth noticing that the above solutions avoid that the gNB-DU stores extensive measurement configuration contexts.

Companies are invited to provide their comments to the solutions above correctness and feasibility.

|  |  |  |
| --- | --- | --- |
| Company | Solution | Comments on solution |
| ZTE | 1)Preferred, while 2) is acceptable | Option1) is simpler than Option2). If Option2) used, how to avoid IOT issue, e.g.,  the case that only the measObjectToAddModList IE exists needs to be addressed  and solved. |
| Nokia | Either Solution 1 (preferred) or Solution 2 are agreeable. |  |
| Ericsson | Solution 1 or Solution 2 would solve the issue |  |
| Huawei | solution 2 | And, for solution 2, this *measObjectToRemoveList* should be able to remove some of configured measurement object, but this could be left to implementation. |

An agreement towards solution 2 below can be reached:

Solution 2) Always use the *MeasObjectToAddModList* IE plus the *measObjectToRemoveList* IE when adding/modifying/removing measurement objects.

In this option the *measObjectToRemoveList* IE is used to remove all measurements previously configured. All measurements that want to be added or modified are present in the *MeasObjectToAddModList* IE as measurements to be added.

One company expressed the view that the *measObjectToRemoveList* IE could be also used to remove measurement objects, but that this aspect could be left to implementation.

It is proposed to take the following agreement:

**Proposal: To agree to the following solution**

**Solution 2) Always use the *MeasObjectToAddModList* IE plus the *measObjectToRemoveList* IE when adding/modifying/removing measurement objects.**

**In this option the *measObjectToRemoveList* IE is used to remove all measurements previously configured. All measurements that want to be added or modified are present in the *MeasObjectToAddModList* IE as measurements to be added.**

CRs reflecting this solution are in R3-20xxxx, R3-20xxxx

# Conclusion, Recommendations [if needed]

If needed