3GPP TSG-RAN WG3 Meeting #110-e R3-206988

E-meeting, 2 – 12 November, 2020

**Agenda item: 9.3.7.1**

**Source: Ericsson (moderator)**

**Title: CB: # 98\_MeasGapConfig - Summary of email discussion**

**Document for: Approval**

# 1 Introduction

This paper provides summary of discussions at RAN#110-e on:

**CB: # 98\_MeasGapConfig**

**- need to clarify behavior on reception of MeasGapConfig IE? Same mechanism as Cell Group Config?**

**- maintain backwards compatibility!**

**- merge disc from 6773**

**- any delta w.r.t. previous discussions?**

(E/// - moderator)

# 2 For the Chairman’s Notes

[To be completed]

# 3 Discussion

## 3.1 Analysis of transparent Delivery of MeasGapConfig

In R3-206809 it is proposed to add the following sentence to the F1: UE Context Setup, UE Context Modification (gNB-CU initiated) and UE Context Modification (gNB-DU initiated):

If the *MeasGapConfig* IE is included in the *DU to CU RRC Information* IE contained in the UE CONTEXT MODIFICATION RESPONSE message, the gNB-CU shall perform RRC Reconfiguration as described in TS 38.331 [8]. The *MeasGapConfig* IE shall transparently be signaled to the UE as specified in TS 38.331 [8].

To understand the rationale behind this sentence let’s analyse what TS38.471 describes with regards to the use of the *MeasGapConfig* IE.

In TS38.473, section “8.3.1 UE Context Setup” it is mentioned that

If the gNB-CU includes the SMTC information of the measured frequency(ies) in the *MeasurementTimingConfiguration* IE of the *CU to DU RRC Information* IE that is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall generate the measurement gaps based on the received SMTC information. Then the gNB-DU shall send the measurement gaps information to the gNB-CU in the *MeasGapConfig* IE of the *DU to CU RRC Information* IE that is included in the UE CONTEXT SETUP RESPONSE message.

If the *MeasConfig* IE is included in the *CU to DU RRC Information* IE in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall deduce that changes to the measurements configuration need to be applied. If the *measObjectToAddModList* IE is included in the *MeasConfig* IE, then the frequencies added in such IE are to be activated. Then the gNB-DU shall decide if measurement gaps are needed or not and, if needed, the gNB-DU shall send the measurement gaps information to the gNB-CU in the *MeasGapConfig* IE of the *DU to CU RRC Information* IE that is included in the UE CONTEXT SETUP RESPONSE message. If the *measObjectToRemoveList* IE is included in the *MeasConfig* IE, the gNB-DU shall ignore it.

In TS38.473, section “8.3.4 UE Context Modification (gNB-CU initiated)” it is mentioned that

If the gNB-CU includes the SMTC information of the measured frequency(ies) in the *MeasurementTimingConfiguration* IE of the *CU to DU RRC Information* IE that is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall generate the measurement gaps based on the received SMTC information. Then the gNB-DU shall send the measurement gaps information to the gNB-CU in the *MeasGapConfig* IE of the *DU to CU RRC Information* IE that is included in the UE CONTEXT MODIFICATION RESPONSE message.

If the *MeasConfig* IE is included in the *CU to DU RRC Information* IE in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall deduce that changes to the measurements’ configuration need to be applied. The gNB-DU shall take the received info, e.g. the *measObjectToAddModList* IE, and/or the *measObjectToRemoveList* IE into account, when generating measurement gap and when deciding if a measurement gap is needed or not.

From the text mentioned above, it can be deduced the following:

* The gNB-DU is responsible to generate measurement gaps. Namely, the measurement gap configuration is decided by the gNB-DU and shall not be changed by the gNB-CU. This is confirmed by the text above stating that
Then the gNB-DU shall send the measurement gaps information to the gNB-CU in the *MeasGapConfig* IE of the *DU to CU RRC Information* IE that is included in the UE CONTEXT MODIFICATION RESPONSE message.
And
The gNB-DU shall take the received info, e.g. the *measObjectToAddModList* IE, and/or the *measObjectToRemoveList* IE into account, when generating measurement gap and when deciding if a measurement gap is needed or not.
* The gNB-DU is the node deciding whether measurement gaps are needed or not. Namely, when a gNB-DU receives from the gNB-CU a *MeasConfig* IE indicating the need for measurement gaps on certain frequency bands, the gNB-DU decides if such measurement gaps are needed or not and the gNB-DU produces a *MeasGapConfig* IE as a consequence of such decision.
	+ If a gNB-DU decides that no measurement gaps are needed, gNB-DU does not generate a *MeasGapConfig* IE
	+ If a gNB-DU decides, at any point in time, that measurement gaps are needed it generates a *MeasGapConfig* IE

The understanding above is also confirmed by the fact that the gNB-CU signals to the gNB-DU a *MeasConfig* IE which does not include the details about the Measurement Gap configuration. Namely, the MeasConfig IE signalled from gNB-CU to gNB-DU does not contain the MEasGapConfig IE, which is under the gNB-DU responsibility. This is confirmed by the following semantics in 38.473:

#### 9.3.1.25 CU to DU RRC Information

This IE contains the RRC Information that are sent from gNB-CU to gNB-DU.

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| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| CG-ConfigInfo | O |  | OCTET STRING | CG-ConfigInfo, as defined in TS 38.331 [8]. | - |  |
| UE-CapabilityRAT-ContainerList | O |  | OCTET STRING | This IE is used in the NG-RAN and it consists of the UE-CapabilityRAT-ContainerList, as defined in TS 38.331 [8]. | - |  |
| MeasConfig  | O |  | OCTET STRING | MeasConfig, as defined in TS 38.331 [8] (without MeasGapConfig). For EN-DC/NGEN-DC operation, includes the list of FR2 frequencies for which the gNB-CU requests the gNB-DU to generate gaps.For NG-RAN,NE-DC and MN for NR-NR DC, includes the list of FR1 and/or FR2 frequencies for which the gNB-CU requests the gNB-DU to generate gaps and the gap type (per-UE or per-FR). | - |  |

From the above, it is clear that, once the gNB-DU generates the *MeasGapConfig* IE, containing the measurement gap configuration, the gNB-CU shall signal it to the UE so to configure the measurement gaps. Failure to do so would generate an out of synch situation between measurement gaps configured at gNB-DU and those configured at the UE.

From the above it can also be understood that the content of the *MeasGapConfig* IE should be transferred transparently by the gNB-CU to the UE. Failure to do so would again create an out of synch situation between measurement gaps configured at gNB-.DU and those configured at the UE.

**In light of the analysis above, companies are invited to provide their comments on whether R3-206809 can be agreed**

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| --- | --- |
| Company | Comment |
| Ericsson | Yes, R3-206809 can be agreed as it clarifies some principles that are implicitly supported in the specifications. |
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**If companies believe that R3-206809 cannot be agreed, please explain**

* **Why a new MeasGapConfig IE signalled from a gNB-DU to a gNB-CU should not trigger a UE RRC reconfiguration aimed at configuring the measurement gaps**
* **Why a new MeasGapConfig IE signalled from a gNB-DU to a gNB-CU should not be signalled to the UE transparently**

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| --- | --- |
| Company | Comment |
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## 3.2 Analysis of *MeasGapConfig* IE and the *Configuration Query* IE

In R3-206774 the following change is proposed for section “8.3.4 UE Context Modification (gNB-CU initiated)” of TS38.473:

If the GNB-*DU Configuration Query* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, gNB-DU shall include the *CellGroupConfig* IE and the *MeasGapConfig* IE in the *DU To CU RRC Information* IE in the UE CONTEXT MODIFICATION RESPONSE message.

To understand the rationale behind this change one needs to understand the purpose of the *GNB-DU Configuration Query* IE. This IE is described as follows in TS38.473:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| GNB-DU Configuration Query | O |  | ENUMERATED (true, ...) | Used to request the gNB-DU to provide its configuration. | YES | reject |

Therefore, the GNB-*DU Configuration Query* IE is a tool for the gNB-CU to check on the gNB-DU configuration and eventually identify that there is no out of synch between the gNB-DU configuration known at the gNB-CU and that in place at the gNB-DU.

As per current specifications, the GNB-*DU Configuration Query* IE is used only to request that the gNB-DU reports the *CellGroupConfig* IE. However, as seen in the analysis from section 3.1, the gNB-DU is also responsible for generation of the *MeasGapConfig* IE. Hence it is plausible that the gNB-CU can query the gNB-DU configuration in terms of *MeasGapConfig* IE.

**Conclusion 1: The the GNB-*DU Configuration Query* IE is a tool for the gNB-CU to request the latest gNB-DU configuration information. As gNB-DU is responsible for MeasGapConfig, it is plausible that the the *GNB*-*DU Configuration Query* IE triggers reporting of the *MeasGapConfig* IE too**

Of course, it is obvious that if the gNB-CU requests from the gNB-DU reporting of the CellGroupConfig and MeasGapConfig, via the *GNB-DU Configuration Query* IE, the gNB-CU shall not signal these parameters towards the UE (by means of RRC reconfiguration) unless these parameters are different from those currently configured at the UE.

**Conclusion 2: IF the gNB-CU receives CellGroupConfig and MeasGapConfig as a response to signalling of the the *GNB-DU Configuration Query* IE, the gNB-CU shall not signal these parameters to the UE via RRC reconfiguration unless they are different from those last configured at the UE**

**In light of the analysis above, companies are invited to provide their comments on whether R3-206774 can be agreed**

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| --- | --- |
| Company | Comment |
| Ericsson | Yes, R3-206774 can be agreed as it enalbes the gNB-DU to report its configuration information when the GNB-*DU Configuration Query* IE is received |
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**If companies believe that R3-206774 cannot be agreed, please explain**

* **How can a gNB-CU check the latest gNB-DU MeasGapConfig configuration and how to correct eventual out of synch MeasGapConfig configurations between gNB-DU and UE**

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| Company | Comment |
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# 4 Conclusion, Recommendations [if needed]

If needed

# 5 References

[1] R3-206032, Discussion on the MDT for inactive UE (Samsung)

[2] R3-206701, Management based MDT should not overwrite signaling based MDT (ZTE)

[3] R3-206094, Further discussion on MDT configuration overriding issue (Huawei)

[4] R3-206549, Discussion on Signalling and Management based Logged MDT (Ericsson)