3GPP TSG-RAN WG3 Meeting #124 R3-243868

**Fukuoka, Japan, 20th – 24th May, 2024**

**Agenda Item: 17.3**

**Source: Ericsson (Moderator)**

**Title: Summary of offline discussions: Support on-demand SIB1 for UEs**

**Document for: Discussion and approval**

# Introduction

**CB: # R19ES**

* **Focus on RAN3 impact on case2**

(moderator - E///)

Summary of offline disc [R3-243868](file:///C%3A/3GPP/RAN3/2024/RAN3%23124/Work%20On%20Site/Inbox/R3-243868.zip)

# For the Chairman’s Notes

**It is proposed to capture the following in the chairman’s notes:**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* The Start \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

The below issues are proposed by the companies to be further discussed at the next meeting:

**Related to WUS provision:**

**Issue 1:** The WUS configuration signalling to support NES Cell to request WUS configuration provision in Cell A and to support NES cell to receive WUS configuration provision status feedback from Cell A?

**Issue 2**: The WUS configuration signalling between NES gNB-DU and NES gNB-CU?

**Issue 3**: Which network node entity decides the content of the WUS configuration?

**Issue 4:** The UL WUS configuration signalling provision and update from NES cell to Cell A?

**Issue 5:** The SIB1 broadcast status indication or On-demand SIB1 operation activation/deactivation indication?

**Issue 6:** There might be multiple NES cells under a single Cell A?

**Issue 7**: There might be multiple Cell A for a single NES cell?

**Related to NES Cell** **on demand SIB activation/deactivation:**

**Issue 8**: Which network node entity decides operating a cell in periodic or on-demand SIB1 transmission mode?

**Issue 9:** Signal the SIB1 broadcast status indication or On-demand SIB1 operation activation/deactivation indication from the NES cell to the Cell A over Xn?

**Issue 10:** On-demand transmission activation/deactivation, include the split architecture?

**Issue 11:** Cell A needs to be aware of the SIB transmission mode (current ES state) of all the NES cells under its coverage. Accordingly, it can decide which WUS configurations are to be broadcast?

**Example of questions: (OD SIB1 == On Demand SIB1)**

* Is it NES gNB-CU who decides to activate OD SIB1 mode for NES gNB-DU?
* **or** it is NES gNB-CU who indicates which NES gNB-DU can go to OD SIB1 mode, and NES gNB-DU determines when it should enter OD SIB1 mode, and when to go out of that mode?
* Is it NES gNB-DU who determines the content of WUS configuration(s) and sends it to NES gNB-CU over F1AP?
* *NES gNB-CU sends WUS configuration to Cell A gNB-CU over XnAP before entering on-demand SIB1 mode in the NES Cell or when the UL WUS configuration is changed.*

*(Note: this is the agreement from RAN3#123bis.)*

* Cell A gNB-CU may accept or reject the WUS configuration broadcast?
* If Cell A gNB-CU accepts this task, it sends ACK to NES gNB-CU, and NES gNB-CU activates OD-SIB1 mode? NES gNB-CU informs NES-gNB-DU of this decision, and NES-gNB-DU stops transmission of periodic SIB1?
* **or** if Cell A gNB-CU accepts this task, it sends ACK to NES gNB-CU who passes the ACK to NES gNB-DU. It is the NES gNB-DU determines when to enter OD-SIB1 mode from the periodic SIB1 transmission mode?
* Does NES-gNB-CU need to inform Cell A gNB-CU of its SIB1-transmission-mode? Or any change of the SIB1-transmission-mode?

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* **The End!** \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

# 3 Discussion

This offline is meant to capture the issues that we would like to discuss/focus at the next meeting.

As discussed at the online session, here we only take Case 2 into account.

Companies are welcome to provide input on the issues to be discussed and your view, comment.

We will not produce any agreement/working assumption, only to clarify so that we could better understand each other.

## 3.1 Related to WUS Configuration

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| **Company** | **Comment** |
| Ericsson | We think the following issues should be discussed:**Issue 1**: The WUS configuration signalling to support NES cell’s requesting starting (or stopping) WUS configuration provision in certain Cell As and receiving WUS configuration provision status updates.**View 1**: WUD configuration is sent from the NES cell to Cell A via XnAP. We prefer to introduce a new procedure:, e.g.* NES cell requests Cell A to broadcast the WUS configuration;
* Cell A may accept or reject the above task
* NES cell can request Cell A to stop the above task, when NES cell for a long time will stay in legacy SIB mode.
* Cell A can inform NES cell that it does not want to perform the WUS broadcast task any more

**Issue 2**: The WUS configuration signalling between NES gNB-DU to NES gNB-CU**View 2:** Over F1AP, we think the existing procedure Configuration Update procedure can be used so that:* The gNB-CU can indicate to gNB-DU that cells are allowed to use on-demand SIB operation.
* We think the gNB-DU serving the NES cell should decide its WUS configuration;
* The gNB-DU to send the WUS configuration to its gNB-CU, when gNB-DU decides to operate the cell in on-demand SIB1 transmission mode
* The gNB-DU can indicate to its gNB-CU that it has stopped operating a certain cell in on-demand SIB1 transmission mode.
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| Nokia | Issue 4: Which network node entity decides the content of the WUS configuration?View: The NES gNB-DU decides the content of the WUS configuration. |
| Huawei | Basically, we think we should split the discussion as follows. * **The UL WUS configuration signalling provision**.
	+ We have made agreements for Xn at the previous meeting. Then we can agree F1 agreements at this meeting if possible (don’t understand why these sentences are not green)
* **The SIB1 broadcast status indication or On-demand SIB1 operation activation/deactivation indication**.
	+ The naming can be FFS. This can be used each time the NES cell decides to stop SIB1 broadcast, or begin SIB1 broadcast (e.g., upon UE UL WUS request), the NES cell can indicate to the Cell A to begin or stop the WUS configuration broadcast/dedicated RRC signalling to its UEs.

For issue 1 above from Ericsson, this is related to the “starting” or “stopping” of the WUS configuration broadcast from the Cell A, this is more like the discussion about the **SIB1 broadcast status indication or On-demand SIB1 operation activation/deactivation indication,** in our understanding. For issue 2, we agree Ericsson procedures. Here also mentions that the DU should notify the CU about the stop the on-demand SIB1 transmission, this is also more like the discussion of the SIB1 broadcast status indication.  |
| NEC | We prefer to reword Issue 1 as below:**Issue 1**: UL WUS configuration provision and update from NES cell to Cell A**View 1**: From the NES cell to Cell A via XnAP. We prefer to reuse NG-RAN node Configuration Update procedure. |
| Rakuten | **Issue 5:** There might be multiple NES cells under a single Cell A, **View 5a**: All the NES-gNB-CUs to transmit WUS configuration to CellA-gNB-CU over XnAP.All the NES-gNB-CU to transmit SIB1-transmission mode to CellA-gNB-CU over XnAP on activation/deactivation of OD-SIB1 transmisison.**View 5b**: CellA-gNB-CU has to transmit WUS configuration with the Cell IDs corresponding to the different NES cells to CellA-gNB-DU over F1AP.This contains only the NES cells which are in OD-SIB1 transmission mode.**Issue 6**: There might be multiple CellA for a single NES cell.**View 6**: NES-gNB-CU to transmit WUS configuration to all the CellA-gNB-CUs over XnAP on activation of OD-SIB1 activation.NES-gNB-CU to transmit SIB1-transmission mode to all the CellA-gNB-CUs over XnAP on activation/deactivation of OD-SIB1 transmisison. |

Moderator summary:

Moderator collect the issues provided by the companies.

## 3.2 Related to on-demand SIB1 activation/deactivation

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| **Company** | **Comment** |
| Ericsson | **Issue 3**: Which network node entity decides operating a cell in periodic or on-demand SIB1 transmission mode, activate/deactivation?**View 3**: NES gNB-DU determines. Before operating a cell (NES Cell) into on-demand SIB1 transmission mode, it must be ensured the WUS configuration of the cell (NES Cell) can be acquired by UEs in the coverage area of the cell (e.g., via another cell (Cell A)). |
| Nokia | We propose to capture issue 3 as follows: Which network node entity decides operating a cell in periodic or on-demand SIB1 transmission mode?View: NES gNB-CU takes this decision. |
| Huawei | We propose first discuss Xn, i.e., * Signal the SIB1 broadcast status indication or On-demand SIB1 operation activation/deactivation indication from the NES cell to the Cell A over Xn.

Then focus on the F1: * The NES-DU decides the SIB1 broadcast status, and signal to the NES-CU. Those NES cells which enables on-demand SIB1 should be decided by the NES CU.
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| NEC | **Issue 3:** On-demand transmission activation/deactivation in split architecture**View 3:** gNB-CU decides and informs gNB-DU. |
| Rakuten | **Issue 3**: On-demand transmission activation/deactivation**View 3**: gNB-CU of NES cell decides and informs the gNB-DU of NES cell.When WUS configuration is sent from NES-gNB-CU to CellA-gNB-CU over Xn, it requires an ACK before going into OD-SIB1 mode (ES mode). * NES-gNB-CU decides to activate OD-SIB1 mode for NES-gNB-DU.
* NES-gNB-CU informs NES-gNB-DU over F1AP.
* NES-gNB-DU sends WUS configuration(s) to NES-gNB-CU over F1AP.
* NES-gNB-CU sends WUS configuration(s) to CellA-gNB-CU.
* CellA-gNB-CU may accept or reject the WUS configuration broadcast.
* If Cell A-gNB-CU accepts this task, it sends ACK to NES-gNB-CU, and NES gNB-CU activates OD-SIB1 mode.
* NES-gNB-CU informs NES-gNB-DU of this decision, and NES-gNB-DU stops transmission of periodic SIB1.
* NES-gNB-CU then informs CellA-gNB-CU of its SIB1-transmission-mode.
* Similarly, when NES-gNB-CU decides to deactivate OD-SIB1, it informs the NES-gNB-DU to stop OD-SIB1 and resume periodic SIB1 transmission.
* NES-gNB-CU also informs CellA-gNB-CU of the change in SIB1-transmission-mode
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Moderator summary:

Moderator collect the issues provided by the companies.

## 3.3 Others

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| **Company** | **Comment** |
| Rakuten | **Issue 1:** Cell A needs to be aware of the SIB transmission mode (current ES state) of all the NES cells under its coverage. Accordingly, it can decide which WUS configurations are to be broadcast.**View 1**: Regarding transmission of SIB1, a cell may have two modes: *periodic SIB1* transmission or *SIB1-less* operation. There is no current support for a third mode: *OD-SIB1*. This is required in CellA-gNB-CU to determine whether NES cell WUS configuration needs to be broadcast in Cell A.Our recommendation is to follow the progress in RAN1 to decide what information needs to be sent from NES-gNB-CU to CellA-gNB-CU over Xn to communicate the SIB1-transmission-mode from NES cell to Cell A. |
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Moderator summary:

Moderator collect the issues provided by the companies.

# 4 References

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| [R3-243204](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243204.zip) | Aspects of on-demand SIB1 for NES enhancements (Qualcomm Inc.) | discussion |
| [R3-243126](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243126.zip) | Discussion on RAN3 impacts for On-Demand SIB1 Support (Nokia) | discussion |
| [R3-243178](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243178.zip) | (TP for TS 38.473) Discussion on on-demand SIB1 for UEs (Huawei) | other |
| [R3-243250](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243250.zip) | On-demand SIB1 transmission of a NES cell (NEC) | discussion |
| [R3-243251](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243251.zip) | [draft] LS on one case of on-demand SIB1 transmission (NEC) | LS out To: RAN1, RAN2 CC:  |
| [R3-243275](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243275.zip) | Discussion on on-demand SIB1 (Samsung) | discussion |
| [R3-243405](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243405.zip) | Discussion on On-demand SIB1 for Idle/Inactive UE (Lenovo) | discussion |
| [R3-243537](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243537.zip) | On-demand SIB1 transmission (Ericsson) | discussion |
| [R3-243575](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243575.zip) | Discussion on on-demand SIB1 for idle/inactive mode UEs (ZTE) | discussion |
| [R3-243726](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243726.zip) | (TP for TS 38.473) Support On-Demand SIB1 for UEs (CMCC) | other |
| [R3-243333](file:///D%3A/%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98/TSGR3_124/Docs/R3-243333.zip) | Discussion on on-demand SIB1 for idle UE (CATT) | Discussion |