**3GPP TSG-RAN WG2 Meeting #130 R2-250xxxx**

Malta, 19th – 23rd May 2025

**Agenda item: 8.4.2**

**Source: Huawei/HiSilicon**

**Title: Summary of [AT130][204][LPWUS] Proposals on whether/how to enable/disable LP-WUS, e.g. by RRC/NAS (Huawei)**

**WID: NR\_LPWUS-Core**

**Document for: Discussion and Decision**

# Introduction

This document aims to collect views from companies for the following offline discussion:

* [AT130][204][LPWUS] Proposals on whether/how to enable/disable LP-WUS, e.g. by RRC/NAS (Huawei)

 Intended outcome: Summary with proposals in R2-2504738.

 Deadline: before Thursday CB

Please provide your input before 10am on Thursday.

# Discussion

RAN2 had an initial discussion on enabling/disabling of LP-WUS based on the proposals from contribution R2-2503809 and R2-2503900. Below is the related excerpt from the chairman notes:

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| *[RRC-12, whether/how to enable/disable LP-WUS, e.g. by RRC/NAS]*R2-2503809 Remaining issues of LP-WUS in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core*Proposal 2: For UE in RRC\_IDLE state to enable/disable the LP-WUS feature, there is no need to introduce additional UE dedicated signaling for control, i.e. UE level control can be performed by means of the LP-WUS group ID allocated by CN.**Proposal 3: For UE in RRC\_INACTIVE state to enable/disable the LP-WUS feature, network can enable/disable the LP-WUS feature within RNA through RRCRelease message.*R2-2503900 Further discussion on the LP-WUS in RRC\_IDLE/INACTIVE mode Huawei, HiSilicon discussion Rel-19*Proposal 2: (RRC-12) The CN indicates whether LP-WUS capable UE(s) is/are allowed to use the LP-WUS functionality by NAS signaling: the absence of indication means UE is allowed to use LP-WUS functionality, and presence of indication to disable means UE is not allowed to use LP-WUS functionality.* *Proposal 2a: If above proposal is agreed, send LS to SA2/CT1/RAN3 to inform the agreement and to update the signalling between CN and RAN.*Discussion- CATT think there is other way, e.g., UE can decide whether LPWUS is enabled or disabled based on latency.- ZTE think for CN based way it is not up to R2. - Ericsson think it can base on CN assigned subgrouping. Ericsson think if we introduce disable/enable signalling in RRCRelease it introduce impact to other WGs.- Docomo think it is based on gNB implementation, and support RRC based indication. - Sony wonders what is the requirement to UE.  |

CATT commented during online that there is another way, i.e., UE can decide whether LPWUS is enabled or disabled based on latency. Their proposals are given below:

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| **Proposal 1: (RRC-12) Enabling/disabling LP-WUS monitoring in IDLE/INACTIVE per UE is supported.****Proposal 2: (RRC-12) RAN2 consider UE to determine whether to enable/disable LP-WUS monitoring in IDLE/INACTIVE based on latency requirement (i.e., i-DRX cycle of the UE).** |

We can first discuss whether to support enabling/disabling LP-WUS per UE, and then discuss how to support.

## Whether to support enabling/disabling LP-WUS in IDLE/INACTIVE per UE?

From CATT’s proposal: “**(RRC-12) Enabling/disabling LP-WUS monitoring in IDLE/INACTIVE per UE is supported.**”

#### Q1. Do companies agree to support enabling/disabling LP-WUS monitoring in IDLE/INACTIVE per UE?

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| --- | --- | --- |
| Company | Answer (Yes or No) | Comments |
| LGE | Yes | LP-WUS monitoring is not suitable for UEs with high paging probability or UEs with emergency PDU session. |
| Ericsson | yes | The paging performance is an important KPI in the network, and when the paging performance for a specific UE is significantly impaired the NW should be able to disable LP-WUS for that UE. This enabling/disabling is semi-static, i.e. it can change again after registration, but it might also be kept unchanged until the UE registers with another NW. We think that this use case is best supported at the NAS level, i.e. centrally controlled from the CN where paging KPI info may be available. We also think that the use case that CATT has brought up makes sense, i.e. when the gNB releases the UE to RRC\_INACTIVE with a short DRX cycle (e.g. 320 ms) or when the gNB releases the UE to RRC\_IDLE and the UE has a UE specific DRX cycle configured shorter than the *defaultPaging* cycle in SIB1 then it might make sense to have the possibility to disable LP-WUS in that UE, i.e. LP-WUS introduces further latency. But the gNB is not aware of the UE specific DRX cycle of the UE in RRC\_CONNECTED, i.e. this is not part of the UE capabilities, and this DRX cycle is only conveyed in the PAGING message from CN to RAN for CM-IDLE paging. |
| NTT docomo | Yes | From the operator’s perspective the paging performance should not be degraded especially in case of emergency call back. |
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**Summary:**.

**Rapporteur’s input:**

**Proposal 1:**

## Whether to have a unified solution for IDLE and INACTIVE?

Based on Apple’s proposals, rapporteur understands that enabling/disabling of LP-WUS feature is done different for IDLE and INACTIVE. Hence, would like to get companies input on whether a unified solution for both states is preferred or not.

#### Q2. Do companies prefer a unified solution to enable/disable LP-WUS per UE for IDLE and INACTIVE?

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| Company | Answer (Yes or No) | Comments |
| LGE | Yes |  |
| Ericsson | Yes | We do not see the need to have a different way to enable/disable LP-WUS in RRC\_INACTIVE and RRC\_IDLE.We also think that the NAS method and *RRCRelease* method can co-exist, i.e. each method addresses a different use case, i.e. paging performance and latency. And the enable/disable status is retained when the UE goes into and out of connected mode for the NAS method, but it is reset for the *RRCRelease* method. |
| NTT docomo | Yes |  |
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**Summary:**.

**Rapporteur’s input:**

**Proposal 2:**

## How to support enabling/disabling LP-WUS in IDLE/INACTIVE per UE?

Following are the different options.

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| Option 1 | *NW can enable/disable LP-WUS monitoring per UE via dedicated RRC message, e.g. RRCRelease message* |
| Option 2 | *The CN indicates whether LP-WUS capable UE(s) is/are allowed to use the LP-WUS functionality by NAS signaling: the absence of indication means UE is allowed to use LP-WUS functionality, and presence of indication to disable means UE is not allowed to use LP-WUS functionality.* |
| Option 3 | *RAN2 consider UE to determine whether to enable/disable LP-WUS monitoring in IDLE/INACTIVE based on latency requirement (i.e., i-DRX cycle of the UE).* |

#### Q3. Which option from the above do you support to enable/disable LP-WUS in IDLE/INACTIVE per UE?

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| --- | --- | --- |
| Company | Answer | Comments |
| LGE | Option 2 | CN has more information than RAN on UE characteristics, such as paging probability, and traffic. |
| Ericsson | Option 2, see also comment | But we are also open to support **in addition** enabling/disabling in RRC\_INACTIVE and RRC\_IDLE via *RRCRelease.* We need more time to check what information in RRC\_CONNECTED mode can be used to disable LP-WUS in RRC\_IDLE. We want to prevent complex/long discussions about power saving vs latency, and whether there is UE preference, etc, etc. We should keep this method simple.  |
| NTT docomo | Option1 (and Option2) | RRC\_IDLE and INACTIVE handling is based on the gNB implementation. For the case of Emergency call back gNB may be implemented to keep RRC CONNECTED. CN does not understand the gNB implementation. So Option1 is suitable for the gNB implementation. But we are fine with Option2 for the specific CN implementation **in addition** Option1. |
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**Summary:**.

**Rapporteur’s input:**

**Proposal 3:**

# Conclusions

Based on the inputs from companies, the following proposals are made:

# References

1. R2-2503809 Remaining issues of LP-WUS in RRC\_IDLE/INACTIVE, Apple
2. R2-2503900 Further discussion on the LP-WUS in RRC\_IDLE/INACTIVE mode, Huawei/HiSilicon
3. R2-2503659 Remaining issues on LP-WUS in IDLE and INACTIVE, CATT.