**3GPP TSG-RAN WG2 Meeting #123R2-230xxxx**

**Toulouse, France, August 21-25, 2023**

**Agenda item:** 7.2.4

**Source:** CATT

**Title:** [Post122][401][POS] SRS configuration and activation in LPHAP (CATT)

**Document for:** Discussion and Agreement

# 1 Introduction

This is to discuss the SRS configuration and activation/deactivation functionality.

* [Post122][401][POS] SRS configuration and activation in LPHAP (CATT)

 Scope: Discuss the SRS configuration and activation/deactivation functionality, including:

* determining if there are separate messages, the conditions under which they are used, and if all messages can use the same signalling method;
* evaluating the signalling options (RRC and MAC CE); and
* understanding if there is interest in pursuing the option of using a dedicated preamble.

 Intended outcome: Report to next meeting

 Deadline: Thursday 2023-08-10 1000 UTC

Rapporteur would like to have the following schedule for this email discussion.

* Phase 1: Companies are invited to provide inputs and comments to questions by 2023-08-04 18:00 UTC
* Phase 2: Rapporteur will provide draft summary with proposals, companies are invited to provide comments to the summary proposals by 2023-08-1010:00 UTC.

The purpose is to collect the views and identify the commonalties and differences in order to provide proposals for next meeting, i.e. RAN2#123.

# 2 Organization of the discussion

Firstly, the rapporteur would like to clarify there are two mechanisms on enhanced SRS configuration according to the WID and previous contributions by companies.

* Configured UE-specific SRS with validity area via RRC signalling;
* Preconfigured SRSs (with/without validity area).

In RAN2#122, the issue of “SRS configuration request” and “SRS activation request” has been discussed online. It is observed that, some companies’ views on related issues may be confused between these two enhanced mechanisms. Hence, the rapporteur would like to organize the discussion on these two enhanced mechanisms separately.

***Related agreements***

* For UE-specific SRS with validity area, the agreements on SRS configuration request were achieved.

RAN2#121 Agreements:

RAN2 assume when the UE reselects out of the positioning validity area during SRS transmission, the UE may send an RRC message to the network for SRS configuration request.

LS to RAN3 to confirm this.

RAN2#121-bis Agreement:

SRS configuration request can be indicated via Msg3/MsgA transmission. FFS if the request is in the RRC message or an accompanying MAC CE.

* For preconfigured SRSs, the agreement on activation was achieved.

RAN2#122 Agreement:

RAN2 will introduce an activation indication and/or request for preconfigured SRS using at least Msg3/MsgA; FFS if Msg1 would be supported also. FFS RRC signalling or MAC CE for the Msg3/MsgA case, as for the configuration request. This agreement does not imply that the UE will be allowed to transmit autonomously.

***Organization of this email discussion***

The remainder of this document is organized as the following. Section 3 is the questionnaire on the UE-specific SRS with validity area, containing SRS configuration request and SRS activation/deactivation. Section 4 is the questionnaire on the preconfigured SRS, contains activation indication and/or request for preconfigured SRS.

# 3 Configured UE-specific SRS with validity area

In RAN2#121-bis, it has been agreed that, RRCRelease message can be used to provide SRS configuration with validity area for UE in RRC\_INACTIVE. The SRS configuration is UE-specific within the validity area, and there will be no resource conflict problems.

## 3.1 SRS configuration request

For UE-specific SRS with validity area, it has been agreed that UE can request SRS configuration via Msg3/MsgA. Companies are invited to further discuss the detailed solution on how to request SRS configuration using Msg3/MsgA.

**Q1: For the mechanism of Configured UE-specific SRS with validity area, please provide your view on which message is used to send the SRS configuration request via Msg3/MsgA.**

* **Alt1: RRCResumeRequest**
* **Alt2: new RRC message**
* **Other**

**For the supported message, which** **following signalling method of sending the SRS configuration request do you support? Please also provide the detailed content/information of SRS configuration request in the comments column.**

* **Option A: In the RRC message, e.g. define a new resume cause in *RRCResumeRequest***
* **Option B: Accompanying MAC CE.**

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| **Company** | **Supported message (Alt1/Alt2/other)** | **Signalling method (Option A/B)** | **Comments** |
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**Summary:**

## 3.2 SRS activation/deactivation

According to the online discussion in RAN2#122, for the UE-specific SRS with validity area, there are two main issues which are ambiguous in companies’ views.

Issue 1: Within the validity area, does the UE need to get permission for SRS transmission, e.g. via activation/deactivation procedure?

Issue 2: If the UE can send SRS without network permission, how to solve the issue of NW continuous monitoring SRS?

* ***For issue 1***
* Some companies think activation procedure is needed for the UE to get permission of transmitting SRS.
* Other companies think the UE has been allowed to transmit the SRS upon receiving the configuration and the activation procedure is not needed. The activation procedure will bring power consumption.
* Some companies think this issue depends on the SRS type. If periodic SRS is supported for SRS with validity area, activation/deactivation is not needed. But if aperiodic or semi-persistent SRS is supported, activation/deactivation is needed.

In Rel-18, we haven’t discussed which SRS type is supported for SRS with validity area. The SRS type will be taken into consideration as well.

**Q2: For UE-specific SRS with validity area, which SRS type do you support? For each supported SRS type, please provide your view on whether activation/deactivation is required when the SRS configuration is valid.**

* **Alt1: periodic SRS**
* **Alt2: semi-persistent SRS**
* **Alt3: aperiodic SRS**

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| **Company** | **Supported type for SRS with validity area (Alt1/Alt2/Alt3)** | **For each type of SRS, whether the** **activation/deactivation is required** |
| **Periodic (Yes/No)** | **semi-persistent (Yes/No)** | **Aperiodic (Yes/No)** |
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**Summary:**

If the activation/deactivation is required when the SRS configurations are valid mentioned in Q2, the activation procedure may include the activation indication from UE to gNB, as well as the activation command from gNB to UE which depend on the detailed solutions on different SRS types. The activation indication from UE to gNB will be discussed here according to email discussion scope. We will further discuss if and how gNB activate the SRS later.

**Q2-1: For each supported SRS type, if you think activation/deactivation is required, please provide your view on which message is used to send the SRS activation request via Msg3/MsgA.**

* **Alt1: RRCResumeRequest**
* **Alt2: new RRC message**
* **Alt3: Other**
* **Alt4: No need**

**Which following signalling method of sending the SRS activation request do you support? Please also provide the detailed content/information of SRS activation request in the comments column.**

* **Option A: In the RRC message, e.g. define a new resume cause in *RRCResumeRequest***
* **Option B: Accompanying MAC CE.**

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| **Company** | **For each type of SRS, the detailed solution on how to send the SRS activation request with validity area** | **Comments** |
| **periodic** | **semi-persistent** | **aperiodic** |
| **Supported message (Alt1/2/3/4)** | **Signalling method (Option A/B)** | **Supported message (Alt1/2/3/4)** | **Signalling method (Option A/B)** | **Supported message (Alt1/2/3/4)** | **Signalling method (Option A/B)** |
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**Summary:**

**Q2-2: For each supported SRS type, if you think activation/deactivation is required, please provide detailed solution on how to deactivate the SRS resource with validity area.**

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| **Company** | **For each type of SRS, the detailed solution on how to deactivate the SRS with validity area** |
| **periodic** | **semi-persistent** | **aperiodic** |
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**Summary:**

* ***For issue 2***
* After the network configures the SRS via RRCRelease message, if the activation/deactivation in Q2 is not needed, the network may has no idea of which cell the UE in RRC\_INACTIVE is camping on and when it will perform SRS transmission for positioning. Some companies raised the concern on continuous monitoring by the network. To avoid this issue, they think the UE need to indicate the NW that it is going to transmit SRS, e.g. via dedicate preamble.

**Q3: If the activation/deactivation in Q2 is not needed, do you agree the issue of continuous monitoring by the network needs to be solved? If yes, please provide the detailed solution in the comments column.**

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| **Company** | **Yes/No** | **Comments** |
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**Summary:**

# 4 Preconfigured SRSs (with/without validity area)

From the rapporteur’s perspective, the “preconfigured SRS” concept used in the previous discussions refer to the preconfigured common SRSs. For example, the network broadcast a list of positioning SRSs, all the UEs which camp on the cell can receive these SRSs. When the positioning event is detected, the UE will coordinate with the network to choose a SRS within the broadcast SRSs for this positioning.

## 4.1 Activation indication and/or request for preconfigured SRS

With the mechanism of network preconfigured common SRSs to UE, e.g. via posSIB, all the UEs camp on the cell can receive these SRS configurations. To avoid the conflict caused by two or more UEs which choose the same SRS at the same time, coordination between UE and RAN is needed. In RAN2#122, the following agreement was achieved.

Agreement:

RAN2 will introduce an activation indication and/or request for preconfigured SRS using at least Msg3/MsgA; FFS if Msg1 would be supported also. FFS RRC signalling or MAC CE for the Msg3/MsgA case, as for the configuration request. This agreement does not imply that the UE will be allowed to transmit autonomously.

Companies are invited to further discuss the detailed solution on how to send the activation indication and/or request for preconfigured common SRSs using Msg3/MsgA.

**Q4: For the mechanism of preconfigured SRSs, do you agree the preconfigured SRSs mean the preconfigured common SRSs?**

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| **Company** | **Yes/No** | **Comments** |
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**Q5: For the mechanism of preconfigured SRSs, please provide your view on which message is used for UE to send the activation indication and/or request for preconfigured SRS using Msg3/MsgA.**

* **Alt1: RRCResumeRequest**
* **Alt2: new RRC message**
* **Other**

**Which following signalling method of sending the activation indication and/or request for preconfigured SRSs do you support?** **Please also provide the detailed content/information of activation indication and/or request for preconfigured SRS in the comments column.**

* **Option A: In the RRC message, e.g. define a new resume cause in *RRCResumeRequest***
* **Option B: Accompanying MAC CE.**

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| **Company** | **Supported message****(Alt1/Alt2/other)** | **Signalling method****(Option A/B)** | **Comments** |
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**Summary:**

Companies are invited to further discuss whether Msg1 would be supported to send the activation indication and/or request for preconfigured common SRSs.

**Q6: For the mechanism of preconfigured SRSs, do you support UE sending the activation indication and/or requesting for preconfigured SRS using Msg1? If yes, please also provide the detailed solution.**

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| **Company** | **Yes/No** | **Comments** |
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**Summary:**

# 5 Conclusion

Based on company feedback, the following is observed and proposed:

TBD

# 6 References

1. 3GPP TS 38.331 Radio Resource Control (RRC) protocol specification (Release 17).
2. 3GPP TS 38.305 Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN
3. RAN2#121-bis Chair note.
4. RAN2#122 Chair note.

# 7 Participants

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| **Company Name** | **Participant name/contact** |
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