**3GPP TSG-RAN WG2 Meeting #128 R2-24XXXXX**

**Orlando, USA, Nov 18th – 22th, 2024**

**Source: ZTE Corporation**

**Title: [AT128][402][POS] Spatial relation info source for positioning in RRC\_INACTIVE (ZTE)**

**Agenda item: 6.3.1**

**Document for: Discussion and Decision**

# Introduction

This document is to trigger the following email discussion:

* [AT128][402][POS] Spatial relation info source for positioning in RRC\_INACTIVE (ZTE)

Scope: Polish the RRC and MAC CRs in R2-2409565 and R2-2409607 and their shadows, and discuss to converge on what level of changes to the MAC spec are acceptable.

Intended outcome: Agreeable CRs (with CB) in R2-2410985 / R2-2410986 / R2-2410987 / R2-2410988

Deadline: Wednesday 2024-11-20 1600 EST

The related CR is referenced as below:

[R2-2409565](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202411%20-%20RAN2_128,%20Orlando\Extracts\R2-2409565%20Correction%20on%20spatial%20relation%20info%20in%20SP%20SRS%20activation%20deactivation%20MAC%20CE%20(R17).docx) Correction on spatial relation info in SP SRS activation deactivation MAC CE (R17) ZTE Corporation, Ericsson CR Rel-17 38.321 17.10.0 1977 - F NR\_pos\_enh-Core

[R2-2409566](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202411%20-%20RAN2_128,%20Orlando\Extracts\R2-2409566%20Correction%20on%20spatial%20relation%20info%20in%20SP%20SRS%20activation%20deactivation%20MAC%20CE%20(R18).docx) Correction on spatial relation info in SP SRS activation deactivation MAC CE (R18) ZTE Corporation, Ericsson CR Rel-18 38.321 18.3.0 1978 - A NR\_pos\_enh-Core

[R2-2409607](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202411%20-%20RAN2_128,%20Orlando\Extracts\R2-2409607%20Correction%20on%20spatial%20relation%20info%20in%20SRS%20configuration%20(R17).docx) Correction on spatial relation info in SRS configuration (R17) ZTE Corporation, Ericsson CR Rel-17 38.331 17.10.0 5101 - F NR\_pos\_enh-Core

[R2-2409608](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202411%20-%20RAN2_128,%20Orlando\Extracts\R2-2409608%20Correction%20on%20spatial%20relation%20info%20in%20SRS%20configuration%20(R18).docx) Correction on spatial relation info in SRS configuration (R18) ZTE Corporation, Ericsson CR Rel-18 38.331 18.3.0 5102 - A NR\_pos\_enh-Core

# Discussion

## Background

RAN1 has replied with the LS R2-2409508 indicating that CSI-RS and SRS configured in RRC\_CONNECTED should not be used as spatial relation RS for SRS transmission in RRC\_INACTIVE:

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| RAN1 thanks RAN2 for the LS on CSI-RS/SRS for spatial relation in RRC\_INACTIVE, with regard to RAN2’s following questions, RAN1 provides the corresponding answers.  **Q1: When activating semi-persistent SRS for positioning in RRC\_INACTIVE, whether NZP-CSI-RS and SRS can be used as source for spatial relation indication in the MAC CE?**  [RAN1 reply] SRS configured by the *SRS-PosResource* for RRC\_INACTIVE can be used as source, but NZP CSI-RS and SRS configured by the *SRS-Resource* cannot be used as source for spatial relation indication in MAC CE for activating semi-persistent SRS for positioning in RRC\_INACTIVE state.  **Q2: When activating semi-persistent SRS for positioning in RRC\_INACTIVE, whether** **NZP-CSI-RS and SRS which are configured in RRC\_CONNECTED can be used as source for spatial relation indication in the MAC CE?**  [RAN1 reply] NZP-CSI-RS and SRS configured by the *SRS-PosResource* or *SRS-Resource* in RRC\_CONNECTED cannot be used as source for spatial relation indication in the MAC CE for activating semi-persistent SRS for positioning in RRC\_INACTIVE.  **Q3: Whether the above answers are applicable for SP-SRS without validity area activation in RRC\_INACTIVE, SP-SRS with validity area activation in RRC\_INACTIVE and aggregated SP-SRS activation in RRC\_INACTIVE?**  [RAN1 reply] The above answers can be applicable for SP-SRS without validity area activation in RRC\_INACTIVE, SP-SRS with validity area activation in RRC\_INACTIVE and aggregated SP-SRS activation in RRC\_INACTIVE. |

The RRC CR and MAC CR are provided to address this constriction.

## RRC CR

According to online comments and offline discussion with some companies, the RRC CR is updated as below:

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| ***spatialRelationInfoPos***  Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS/DL-PRS (see TS 38.214 [19], clause 6.2.1).  If the IE *srs-ResourceId-Ext* is present, the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 63. Otherwise the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 31. If the SRS is transmitted in RRC\_INACTIVE, *srs-ResourceId,* *csi-RS-IndexServing* or *srs-PosResourceId* that configured in RRC\_CONNECTED are not contained in this field. |

**Question 1: Do companies agree with the above polishing of the RRC CR? (If you have better wording, please provide it in Comments)**

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| --- | --- | --- |
| Companies | Agree/disagree | Comments |
| Huawei, HiSilicon |  | Without change, it is already not supported to indicate SRS ID, CSI\_RS ID or posSRS ID configured in RRC\_CONNECED in RRC\_INACTIVE. I would consider it as redundant to add it to the field description. If companies insist, it is fine with us to have the change. |
| CATT | Agree in principle but | The gNB provides SRS-Config for RRC\_CONNECTED, and SRS-Config for RRC\_INACTIVE separately. However it seems it’s gNB’s behavior that gNB should not provide the *srs-ResourceId,* *csi-RS-IndexServing* or *srs-PosResourceId* that configured in RRC\_CONNECTED in SRS-Config for RRC\_INACTIVE according to RAN1’s LS. So a Note would be better to clarify the limitation spotted by RAN1.  Otherwise the limitation cannot be specified in spec. |
| Samsung | Agree with some wording suggestion. | Agree to capture the restriction in RRC according to the LS from RAN1.  We would like to suggest better wording as below. If this field is configured for the SRS transmitted in RRC\_INACTIVE, srs-ResourceId, csi-RS-IndexServing or srs-PosResourceId that configured in RRC\_CONNECTED are not contained in this field. |
| Qualcomm | Yes, with comments | The new sentence looks a bit "anti causal"; i.e., the UE transmits what is configured. I think it should be something like this:  "If the SRS for positioning is configured for RRC\_INACTIVE state, the *srs-ResourceId* and *csi-RS-IndexServing* are not included in this field." |
| Xiaomi | Yes, with comments | Prefer the wording provided by the Qualcomm. |
| Ericsson | Yes, with comments | RAN1 replied below:  **Q1: When activating semi-persistent SRS for positioning in RRC\_INACTIVE, whether NZP-CSI-RS and SRS can be used as source for spatial relation indication in the MAC CE?**  *[RAN1 reply] SRS configured by the SRS-PosResource for RRC\_INACTIVE can be used as source, but NZP CSI-RS and SRS configured by the SRS-Resource cannot be used as source for spatial relation indication in MAC CE for activating semi-persistent SRS for positioning in RRC\_INACTIVE state.*  **Q2: When activating semi-persistent SRS for positioning in RRC\_INACTIVE, whether NZP-CSI-RS and SRS which are configured in RRC\_CONNECTED can be used as source for spatial relation indication in the MAC CE?**  *[RAN1 reply] NZP-CSI-RS and SRS configured by the SRS-PosResource or SRS-Resource in RRC\_CONNECTED cannot be used as source for spatial relation indication in the MAC CE for activating semi-persistent SRS for positioning in RRC\_INACTIVE.*  We think Q2 scenario does not exist; i.e there is no SRS continuity from RRC Connected to RRC Inactive mode.  Thus, we need to capture only answer 1 in our spec as below for ***spatialRelationInfoPos***. Capturing, answer 2 is not that relevant; it is more UE implementation.  ***spatialRelationInfoPos***  Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS/DL-PRS (see TS 38.214 [19], clause 6.2.1).  If the IE *srs-ResourceId-Ext* is present, the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 63. Otherwise the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 31. Reference signals CSI-RS and SRS with *srs-ResourceId* are not applicable in RRC\_INACTIVE state. |
| Nokia | Agree | Prefer the text proposed by Qualcomm. |

**Report**

Rapp: Based on companies view, all companies support the RRC CR, and Qualcomm’s suggestion gets companies preference. So Rapp updated the CR to add co-signed companies, and the wording is polished as Qualcomm suggests.

## MAC CR

During online discussion, one company do not agree with the current MAC CR. Therefore, Rapporteur provides the following options:

Option 1: Take the original CR with the following word polishing (i.e., in a formative way):

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| - SRS resource ID: When F1 is set to 0, the field indicates an index for SRS resource *SRS-ResourceId* as defined in TS 38.331 [5]; When F1 is set to 1, the field indicates an index for Positioning SRS resource *SRS-PosResourceId* as defined in TS 38.331 [5]. When the MAC CE is used for SP SRS activation in RRC\_INACTIVE, this field can only indicate an index for Positioning SRS resource *SRS-PosResourceId* configured in RRC\_INACTIVE. The length of the field is 5 bits representing the index from 0 to 31; |

Option 2: Add a note under the MAC CE to address the restriction (i.e., in an informative way):

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| Note: When the MAC CE is used for activation of SP-SRS in RRC\_INACTIVE, the SRS configured in RRC\_CONNECTED and the CSI-RS cannot be configured as spatial relation source RS by this MAC CE. |

**Question 2: If companies agree to have MAC CR, which option of the MAC CR do companies agree to?**

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| --- | --- | --- |
| Companies | Option1/Option2/Both are ok | Comments |
| Huawei, HiSilicon |  | The spatialRelationInfoPOS is configured as follows:    Within the IE, CSI-RS as the source is configured by NZP-CSI-RS-ResourceId, but within suspendConfig with RRCRelease message, there is no CSI-RS configuration and there is no *NZP-CSi-RS-ResourceId*. Hence, it is already impossible to configure CSI-RS for semi-persistent SRS in RRC\_INACTIVE.  Then, coming to the MAC spec, since, it is not possible to configure CSI-RS, it is not possible to indicate CS-RS as the source for spatial relation. The change is redundant as well. |
| CATT | Option2 | The behaviors of gNB can be clarified by a Note. |
| Samsung | Option 2 | As a compromise, we support to have the note to capture the restriction in MAC spec. |
| Qualcomm | Option 1 | If Option 2 is preferred, the NOTE should have the same text as in Option 1. I.e., MAC-CE is not really "configuring" something? |
| Xiaomi | Prefer Option 1 | Share the same view that Option 2 should have the same text as in option 1. |
| Ericsson | Prefer Option 1 for across spec consistency | We agree with Huawei though for across spec consistency; we do not see as such problem to capture in MAC spec. Since the question was asked for semi-persistent and MAC layer provides SP Config to UE. Hence, capturing it in MAC spec is more for consistency and completeness.  - NZP CSI-RS Resource ID: This field contains an index of *NZP-CSI-RS-ResourceID*, as specified in TS 38.331 [5], indicating the NZP CSI-RS resource, which is used to derive the spatial relation for the positioning SRS. This field is not applicable in RRC\_INACTIVE. The length of the field is 8 bits;  - SRS resource ID: When F1 is set to 0, the field indicates an index for SRS resource *SRS-ResourceId* as defined in TS 38.331 [5]; When F1 is set to 1, the field indicates an index for Positioning SRS resource *SRS-PosResourceId* as defined in TS 38.331 [5]. The F1 set to 0 is not applicable in RRC\_INACTIVE. The length of the field is 5 bits representing the index from 0 to 31; |
| Nokia | Option 1 | An explicit clarification in MAC specification is good in our view. |

**Report**

Rapp: based on companies views, most companies (6/7) support the MAC CR, in which 4 companies support to go with option 1, i.e., formative text. So Rapp updated the MAC CR to add co-signed companies and keep option 1 as it is.

# Conclusion

TBD