**3GPP TSG RAN WG1 #110bis-e R1- 220xxxx**

**e-Meeting, October 10th – 19th, 2022**

**Agenda item:** 8.17

**Source:** Moderator (ZTE)

**Title:** Summary of discussion on NR ra-SearchSpace issues

**Document for:** Discussion and Decision

# 1 Introduction

Per chair’s guidance, the following email thread is triggered.

[110bis-e-R17-Others-03] Email discussion on NR ra-SearchSpace issues by October 14 – Youjun (ZTE)

* Check on October 12 whether there is consensus for specification change

[R1-2209192](file:///C:\Users\10234951\AppData\Local\Temp\Temp1_Chair's%2520notes%2520RAN1%2523110bis-e%2520v03.zip\../../Docs/R1-2209192.zip) Discussion on NR ra-SearchSpace issues ZTE, Sanechips

[R1-2209193](file:///C:\Users\10234951\AppData\Local\Temp\Temp1_Chair's%2520notes%2520RAN1%2523110bis-e%2520v03.zip\../../Docs/R1-2209193.zip) Correction on ra-SearchSpace for DCI format 0\_0 ZTE, Sanechips

This document summarizes the discussion on the NR ra-SearchSpace issues proposed by [1][2]. Please provide your first round comments in by **11th Oct 23:59 UTC**.

# 2 Discussion

According to the discussion in [1], some observations are made as follows:

**Observation 1: In legacy Rel-15 and Rel-16 spec, TC-RNTI scrambled DCI including DCI format 1\_0 and 0\_0 can be monitored in *ra-SearchSpace.***

**Observation 2: In Rel-17 spec, it is specified that only DCI format 1\_0 can be monitored in *ra-SearchSpace* while the description for DCI format 0\_0 is missing.**

The corresponding spec is copied as follows:

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| 10.1 UE procedure for determining physical downlink control channel assignment  A set of PDCCH candidates for a UE to monitor is defined in terms of PDCCH search space sets. A search space set can be a CSS set or a USS set. A UE monitors PDCCH candidates in one or more of the following search spaces sets  - a Type0-PDCCH CSS set on the primary cell of the MCG configured by  - *pdcch-ConfigSIB1* in MIB or by *searchSpaceSIB1* in *PDCCH-ConfigCommon* or by *searchSpaceZero* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI, or  - *searchSpaceZero* in *PDCCH-ConfigCommon* when *searchSpaceMCCH* and *searchSpaceMTCH* are not provided, for a DCI format 4\_0 with CRC scrambled by a MCCH-RNTI or a G-RNTI  - a Type0A-PDCCH CSS set configured by *searchSpaceOtherSystemInformation* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI on the primary cell of the MCG  - a Type0B-PDCCH CSS set configured by *searchSpaceMCCH* and *searchSpaceMTCH* for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI for MTCH, on the primary cell of the MCG  - a Type1-PDCCH CSS set configured by *ra-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a RA-RNTI, a MsgB-RNTI, or a TC-RNTI on the primary cell |

The mentioned issue can be summarized as: the DCI format 0\_0 scrambled by TC-RNTI also can be monitored in ra-SearchSpace, however, in Rel-17 spec, only DCI format 1\_0 can be monitored in ra-SearchSpace and the description for DCI format 0\_0 is missing.

To solve this issue, two solutions are discussed in [1] as follows

Option 1: delete DCI format 1\_0. An exemplary text proposal is as follows:

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| - a Type1-PDCCH CSS set configured by *ra-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format ~~1\_0~~ with CRC scrambled by a RA-RNTI, a MsgB-RNTI, or a TC-RNTI on the primary cell |

Option 2: add DCI format 0\_0. An exemplary text proposal is as follows:

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| - a Type1-PDCCH CSS set configured by *ra-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a RA-RNTI, a MsgB-RNTI, or a TC-RNTI, or a DCI format 0\_0 with CRC scrambled by a TC-RNTI on the primary cell |

And some proposals are made in [1].

**Proposal 1: In Rel-17, consider the corrections to TS38.213 clause 10.1 where the DCI format 0\_0 is missing.**

**Proposal 2: Discuss and decide to select option 1 or option 2.**

Based on option2, a candidate CR is proposed in [2]

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| **<Unchanged parts are omitted>** 10.1 UE procedure for determining physical downlink control channel assignment A set of PDCCH candidates for a UE to monitor is defined in terms of PDCCH search space sets. A search space set can be a CSS set or a USS set. A UE monitors PDCCH candidates in one or more of the following search spaces sets  - a Type0-PDCCH CSS set on the primary cell of the MCG configured by  - *pdcch-ConfigSIB1* in MIB or by *searchSpaceSIB1* in *PDCCH-ConfigCommon* or by *searchSpaceZero* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI, or  - *searchSpaceZero* in *PDCCH-ConfigCommon* when *searchSpaceMCCH* and *searchSpaceMTCH* are not provided, for a DCI format 4\_0 with CRC scrambled by a MCCH-RNTI or a G-RNTI  - a Type0A-PDCCH CSS set configured by *searchSpaceOtherSystemInformation* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI on the primary cell of the MCG  - a Type0B-PDCCH CSS set configured by *searchSpaceMCCH* and *searchSpaceMTCH* for a DCI format with CRC scrambled by a MCCH-RNTI or a G-RNTI for MTCH, on the primary cell of the MCG  - a Type1-PDCCH CSS set configured by *ra-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a RA-RNTI, a MsgB-RNTI, or a TC-RNTI, or a DCI format 0\_0 with CRC scrambled by a TC-RNTI on the primary cell  - a Type1A-PDCCH CSS set configured by *sdt-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a C-RNTI or a CS-RNTI on the primary cell as described in clause 19.1  - a Type2-PDCCH CSS set configured by *pagingSearchSpace* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a P-RNTI on the primary cell of the MCG  **<Unchanged parts are omitted>** |

**Q1**: Companies are invited to share the views on whether this issue should be addressed and which solution, e.g., option1 and option 2, can be the starting point. If the answer is NO, please clarify the reason.

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| **Company name** | **Comments** |
| vivo | This is clearly a bug introduced when capturing Rel-17 power saving feature in email thread [Post-107-e-NR-NR\_UE\_pow\_sav\_enh-Core-38.213], where DCI 0\_0 was not considered.  Therefore, we propose to revert the changes made in that email thread and delete “1\_0” in section 10.1 when Type 1 CSS set is described, i.e. adopt Option 1. |
| Samsung | Same view as vivo. Go back to previous version is just fine. |
| Ericsson | We share the same view as vivo and Samsung and support Option 1. |
| Huawei, HiSilicon | Support Option 1 |

# 3 Summary

TBD

# 4 References

1. R1-2209192 Discussion on NR ra-SearchSpace issues ZTE, Sanechips
2. R1-2209193 Correction on ra-SearchSpace for DCI format 0\_0 ZTE, Sanechips