**3GPP TSG RAN WG1 Meeting #104-e R1-21xxxxx**

**E-meeting, January 25th – February 5th, 2021**

**Agenda Item: 7.1**

**Source: Moderator (Huawei)**

**Title: Summary of [104-e-NR-7.1CRs-04] Correction on the search space configuration of PUCCH-Scell**

**Document for: Discussion and Decision**

# Introduction

This document is created to collect company views on the proposed changes in [1].

# Discussion

The CR in [1] relates to two issues as discussed separately in section 2.1 and 2.2.

## Issue 1#: Search space configuration for PUCCH-SCell

The search space configuration for PUCCH-SCell are described in section 12 of TS 38.213

**TS 38.213 V15.12.0**

For each DL BWP in a set of DL BWPs of the PCell, or of the PUCCH-SCell, a UE can be configured CORESETs for every type of CSS sets and for USS as described in Clause 10.1. The UE does not expect to be configured without a CSS set on the PCell, or on the PUCCH-SCell, of the MCG in the active DL BWP.

The above descriptions are not in line with the search space configuration for SCell as described in section 10 where a UE can only be configured with Type-3 PDCCH CSS set in PUCCH-SCell since the PUCCH-SCell is essentially a SCell. In addition, a UE can be configured without a CSS set in PUCCH-SCell.

The above descriptions related to search space configuration for PUCCH-SCell are introduced in TS 38.213 V15.3.0 and V15.4.0 respectively. However, they are actually not aligned with the RAN plenary approved CRs in R1-1810020 and R1-1814394 as highlighted in yellow and blue blow.

Table 1 Summary of RAN approved CRs (R1-1810020, R1-1814394) and TS 38.213 (V15.3.0, V15.4.0)

|  |  |
| --- | --- |
| **RAN#81, R1-1810020**  For each DL BWP in a set of DL BWPs on the primary cell, a UE can be configured control resource sets for every type of common search space and for UE-specific search space as described in Subclause 10.1. The UE does not expect to be configured without a common search space on the PCell, or on the PSCell, of the MCG in the active DL BWP. | **TS 38.213 V15.3.0**  For each DL BWP in a set of DL BWPs of the PCell or of the PUCCH-SCell on the primary cell, a UE can be configured control resource sets for every type of common search space and for UE-specific search space as described in Subclause 10.1. The UE does not expect to be configured without a common search space on the PCell, or on the PSCell, of the MCG in the active DL BWP. |
| **RAN#82, R1-1814394**  For each DL BWP in a set of DL BWPs on the primary cell, a UE can be configured CORESETs for every type of CSS sets and for USS as described in Subclause 10.1. The UE does not expect to be configured without a CSS set on the PCell, or on the PSCell, of the MCG in the active DL BWP. | **TS 38.213 V15.4.0**  For each DL BWP in a set of DL BWPs of the PCell, or of the PUCCH-SCell, a UE can be configured CORESETs for every type of CSS sets and for USS as described in Subclause 10.1. The UE does not expect to be configured without a CSS set on the PCell, or on the PUCCH-SCell, of the MCG in the active DL BWP. |

Therefore, the unexpected changes leads to some ambiguity of CSS configurations in PUCCH-SCell. It was proposed to remove the PUCCH-SCell in this section.

## Issue 2#: Common search space configuration for PSCell

According to current specification, a UE cannot be configured without a CSS set on the PCell of the MCG in the active DL BWP and it was unclear whether a UE can be configured without a CSS set on the PSCell. However, according to a working assumption made in RAN1#91, a UE cannot be configured without a CSS set on the PCell or on the PSCell in the active DL BWP.

Agreements:

* C-SS in each DL BWP of the PCell/PScell
  + On C-SS, Yp ,kp= 0.
  + In Rel.15,
    - For scheduling RMSI, OSI, Paging, UE monitors common search space in the PCell only
    - In addition, for random access and fall back, UE monitors common search space in the PCell and PSCell only
    - Working assumption: The UE is not expected to be configured without C-SS on the PCell (PSCell) in the active DL BWP
      * NOTE: RAN1 does not expect additional impact on the UE behavior due to not having PRACH resource in the BWP
  + Working assumption: In Rel.15,
    - A UE is expected to monitor C-SS (if configured) in the activated BWP
    - Full functionalities of C-SS (scheduling RMSI, OSI, Paging, random access, etc) are supported by the C-SS configured by UE-specific RRC signaling.
    - All RRC parameters defined for UE-SS are also defined for C-SS that is configured by UE-specific RRC signaling.

The above working assumption was captured in TS 38.213 V15.2.0

**TS 38.213 V15.2.0**

For each DL BWP in a set of DL BWPs on the primary cell, a UE can be configured control resource sets for every type of common search space and for UE-specific search space as described in Subclause 10.1. The UE does not expect to be configured without a common search space on the PCell, or on the PSCell, in the active DL BWP.

As shown in Table 1, the restriction “of the MCG” was added the in R1-1810020, even though the PSCell was still there. “PSCell” was also in R1-1814394 and TS 38.213 V15.3.0. However, in TS 38.213 V15.4.0, it was replaced with “PUCCH-SCell”.

Therefore, it was proposed to clarify that a UE cannot be configured without a CSS set on the PSCell by replacing “PUCCH-SCell” with “PSCell” and remove “of the MCG” to align with the working assumption.

# Company views

**Q1: Do you agree with changes proposed for issue 1? If not, why?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree or not** | **Comment** |
| CATT | Agree |  |
| vivo | Agree |  |
| ZTE | Agree |  |
| Spreadtrum | Agree |  |
| Intel | Agree |  |
| Qualcomm | Agree |  |
| Samsung | Agree |  |

**Q2: Do you agree with changes proposed for issue 2? If not, why?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree or not** | **Comment** |
| CATT | Agree |  |
| vivo | Agree |  |
| ZTE | Agree | We prefer the following changes, which seems simpler.  For each DL BWP in a set of DL BWPs of the PCell, ~~or of the PUCCH-SCell,~~ a UE can be configured CORESETs for every type of CSS sets and for USS as described in Clause 10.1. The UE does not expect to be configured without a CSS set on the primary cell ~~PCell, or on the PUCCH-SCell, of the MCG~~ in the active DL BWP. |
| Spreadtrum | Agree | Either TP from Huawei or ZTE is fine to us. |
| Intel | Agree |  |
| Qualcomm | Agree |  |
| Samsung | Agree |  |

# Conclusions

To be updated based on the discussion

# References

1. R1-2101275, Correction on the search space configuration of PUCCH-SCell, Huawei, HiSilicon
2. R1-1810020, CR to 38.213 capturing the RAN1#94 meeting agreements, Samsung
3. R1-1814394, CR to 38.213 capturing the RAN1#94bis and RAN1#95 meeting agreements, Samsung

# Appendix: Proposed CR in R1-2101275

For each DL BWP in a set of DL BWPs of the PCell, a UE can be configured CORESETs for every type of CSS sets and for USS as described in Clause 10.1. The UE does not expect to be configured without a CSS set on the PCell, or on the PSCell, in the active DL BWP.