3GPP TSG-RAN WG2 #113-e R2-210xxxx

eMeeting, 12th – 20th April, 2021

Agenda Item: 6.5.2

Source: MediaTek Inc.

**Title: Report of [Post113-e][224][DCCA] TCI state indication at direct SCell activation (MediaTek)**

Document for: Discussion and decision

# 1 Introduction

This is report for the following AT113-e mail discussion.

* [Post113-e][224][DCCA] TCI state indication at direct SCell activation (MediaTek)

 Scope: Discuss what is needed in RAN2 for TCI state indication at direct SCell activation based on latest RAN1 LS (should consider also earlier RAN2 meeting discussion).

 Intended outcome: Discussion report and agreeable CR (if needed)

 Deadline: Long

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

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| Company | Name | Email Address |
| MediaTek (Rapporteur) | Felix Tsai | Chun-Fan.tsai@mediatek.com |
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# 3 Discussion on TCI State for Direct SCell activation

## 3.1 Background

The TCI state issue for direction SCell activation is triggered by RAN4 LS R2-2100058 [1]. According to RAN4, the TCI state information is required for NR FR1 or FR2 SCell activation.

RAN4 would like to inform RAN1/RAN2 that TCI state activation is required as part of the SCell activation procedure in NR. Current RRC command for direct SCell activation does not include TCI state activation information to UE. In current framework, network needs to send separate MAC CE to complete direct SCell activation procedure. Due to this both gNB and UE may not realise the full benefit of direction SCell activation feature using existing framework. The above mentioned issue applies to both FR1 and FR2.

Then RAN1 also discussed this issue and send a reply LS in R2-2102199 [2]. According to RAN1, TCI state is required for some case if more than one TCI state is configured. But they have no intention to define RAN1 based solution for this.

RAN1 thanks RAN4 for the LS regarding TCI state indication at Direct SCell activation. RAN1 understands that in current framework, a TCI state activation is required in some cases (e.g. inter-band CA) in addition to the RRC activation command to complete the direct SCell activation procedure if more than one TCI states are configured. It is mentioned by RAN4 that the solution to the issue is RAN1/RAN2 aspect. However, from RAN1 perspective, no further RAN1-based enhancement for this issue is intended in Rel-16.

In the last RAN2 meeting, the issue is postponed to wait RAN1 LS. Since now RAN1 LS is arrived, RAN2 could discuss the action on this issue.

## 3.2 Discussion

According to RAN4/RAN1 LS, the TCI state information is needed for direct SCell activation at least for some cases. Since RAN1 solution is not adopted, RAN2 should discuss whether we need RAN2 based solution. In our understanding, the RAN2 based solution would be simply add the TCI state information via RRC for direct SCell activation.

**Question 1: Do companies intend to have RAN2-based solution for TCI state issue (i.e. Add TCI state in RRC for direct SCell activation)?**

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| **Company** | **Yes or No** | **Comments** |
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There are some offline comment that there should be capability bit for this new change. The rapporteur understand that if we agree to have this new RRC parameter, it is also reasonable to have corresponding capability so that the CR would be backward compatible. It is assumed that a simple optional capability bit is enough.

**Question 2: If agree to have RRC configuration of TCI state for direct SCell activation, do companies agree to introduce a new capability for this? (Assuming to be per-UE and optional)**

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| **Company** | **Agree or not** | **Comments** |
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During the RAN2 discussion, there is question about whether the TCI state is only about PDCCH or both PDCCH and PDSCH. The proposed CR [R2-2101853](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101853.zip) includes both PDCCH and PDSCH. The rapporteur also noticed that TCI state could be provided for SP-CSI and that seems to be used also during SCell activation. Therefore, it would be good to discuss what kind of TCI state information should be provided in RRC.

Note that 38.321 specific the following MAC CE to provide TCI state.

* (PDCCH) 6.1.3.15 TCI State Indication for UE-specific PDCCH MAC CE
* (PDSCH) 6.1.3.14 TCI States Activation/Deactivation for UE-specific PDSCH MAC CE
* (SP CSI-RS) 6.1.3.12 SP CSI-RS/CSI-IM Resource Set Activation/Deactivation MAC CE

**Question 3: If agree to have RRC configuration of TCI state for direct SCell activation, which kind(s) of TCI state information should be included ?**

* **(a) TCI state for PDCCH as defined in 38.321 6.1.3.15**
* **(b) TCI state for PDSCH as defined in 38.321 6.1.3.14**
* **(c) TCI state for SP CSI-RS as defined in 38.321 6.1.3.12**

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| **Company** | **Comments** |
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If companies agree to progress on RAN2 based solution, the rapporteurs suggest that we could start from the CR [R2-2101853](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101853.zip) [3] proposed in last meeting. Besides for the issues discussed in Q3/Q4 above, companies are invited to provide further comment (if any).

**Question 4: If agree to have RRC configuration of TCI state for direct SCell activation, except for the issues discussed above, do companies have further comment on the CR** [R2-2101853](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101853.zip)**?**

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Finally, companies could raise other comment/suggestion/question if not covered by previous discussion.

**Question 5: Companies are invited to provide other comment (if any) on TCI state for direction SCell activation issue.**

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| **Company** | **Comments** |
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# 4 Conclusions

Base on the discussion in section 3, we propose the following:

**Proposal 1:**

# 5 References

[1] R2-2100058 / R4-2017329, “LS on TCI state indication at Direct SCell activation”, RAN4

[2] R2-2102199 / R1-2102015, “Reply LS on TCI state indication at Direct SCell activation”, RAN1

[3] R2-2101853, “TCI state for direct SCell activation”, MediaTek Inc.