**3GPP TSG RAN WG1 Meeting #109-e** **R1-22xxxxx**

**e-Meeting, May 9th – 20th, 2022**

**Agenda Item: 8.13**

**Source: Moderator (Huawei)**

**Title:** **[Draft] [109-e-R17\_DSS-02] Summary of Further Multi-RAT Dual-Connectivity enhancements**

**Document for: Discussion and Decision**

# Introduction

This summary is for the following email discussion.

[109-e-R17\_DSS-02] Email discussion for maintenance on further MR-DC/CA Enhancement, including Issue-1, Issue-2 and Issue-3 of moderator’s proposals in the FL summary R1-2205179 – Frank(Huawei)

         Discussion and decision by 5/18

# Summary of issues

According to all of contribution papers, three issues are summarized below.

* **Issue-1:** CA:Clarification for the cell of the reference slot in [TS 38.214]. [1]
* **Issue-2:** NR-DC: Power allocation between MCG and SCG when SCG is deactivated.[3] [2]
* **Issue-3:** NR-DC:UE determination of PDCCH monitoring when SCG is deactivated for NR-DC. [2]

## TP for Issue-1:

In [1], TP for clarification for the cell of the reference slot for fast SCell activation is provided.

**----------------------------------------**Text Proposal for Section 5.2.1.5.3 in TS 38.214 h10**------------------------------------**

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| ***Reason for change:*** There is ambiguous for fast SCell activation because the cell of the reference slot *n+k* is a PUCCH cell which may be different with the cell of MAC-CE received in slot *n*.***Summary of change:*** To correct the cell of the reference slot *n+k*.***Consequences if not approved:*** The timeline of the fast cell activation is impacted due to the ambiguous cell of the reference slot. |
| 5.2.1.5.3 Aperiodic CSI-RS for tracking for fast SCell activationWhen the UE receives an *Enhanced Scell Activation/Deactivation* MAC-CE that triggers one or two CSI-RS bursts for fast SCell activation for a (set of) deactivated SCell(s),- if the MAC-CE indicates that the first CSI-RS burst for SCell activation is present in an SCell, then the UE may assume that the first CSI-RS burst for SCell activation is present in that SCell. The first slot of the first CSI-RS burst starts at the *m1*th SCell slot after the last SCell slot coinciding with the reference slot *n+k*, as defined in clause 4.3 of [6, TS38.213], of the cell in which the PUCCH with HARQ-ACK information for the MAC-CE reception was transmitted.- if the MAC-CE indicates that the second CSI-RS burst for SCell activation is present in an SCell, then the UE may assume that the second CSI-RS burst for SCell activation is present in that SCell. The first slot of the second CSI-RS burst starts at the *m2*thSCell slot after the end of the first CSI-RS burst. The CSI-RS of the second burst shall have the same antenna port index, OFDM symbol allocations in a slot, same PRB allocation location as the CSI-RS of the first burst.- Where the CSI-RS burst is defined as four CSI-RS resources in two consecutive slots in clause 5.1.6.1.1.1, and *m1* and *m2* are provided by the MAC-CE and higher layer configuration. |

## TP for Issue-2:

**Observation 1**: *The NR-DC semi-static power sharing modes keep the SCG power allocation even if the SCG is deactivated.*

**Proposal 1:** *Update the TS38.213 subclause 7.6.2 to allocate all the TX power to the MCG when the SCG is deactivated*

**Proposal 2:** *Select one of the two possible TP alternatives below*

**Alternative 1**

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| 7.6.2 NR-DCIf a UE is configured with an MCG using NR radio access in FR1 or in FR2 and with a SCG using NR radio access in FR2 or in FR1, respectively, the UE performs transmission power control independently per cell group as described in clauses 7.1 through 7.5.If a UE is configured with an MCG and a SCG using NR radio access in FR1 and/or in FR2, the UE is configured a maximum power $P\_{MCG}$ for transmissions on the MCG by *p-NR-FR1* and/or by *p-NR-FR2* and a maximum power $P\_{SCG}$ for transmissions on the SCG by *p-NR-FR1* and/or by *p-NR-FR2* and with an inter-CG power sharing mode by *nrdc-PCmode-FR1* for FR1 and/or by *nrdc-PCmode-FR2* for FR2. The UE determines a transmission power on the MCG and a transmission power on the SCG per frequency range.If a UE is provided *semi-static-mode1* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*,or *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*, the UE does not expect $P\_{MCG}$ and $P\_{SCG}$ to be configured such that $\hat{P}\_{MCG}+\hat{P}\_{SCG}>\hat{P}\_{Total}^{NR-DC}$, where $\hat{P}\_{MCG}$ is the linear value of $P\_{MCG}$, $\hat{P}\_{SCG}$ is the linear value of $P\_{SCG}$, and $\hat{P}\_{Total}^{NR-DC}$ is the linear value of a configured maximum transmission power for NR-DC operation in FR1 or FR2 as defined in [8-3, TS 38.101-3].If a UE is provided *semi-static-mode1* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*, - if the SCG is activated, the UE determines a transmission power for the MCG or for the SCG as described in clauses 7.1 through 7.5 using $P\_{MCG}$ or $P\_{SCG}$ as the maximum transmission power, respectively.- if the SCG is deactivated, the UE determines the MCG tranmission power as if the UE was not configured with SCG.If a UE is provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2* and the SCG is activated,- if the UE is not provided *tdd-UL-DL-ConfigurationCommon* for the MCG or SCG, the UE determines a transmission power for the MCG or for the SCG as described in clauses 7.1 through 7.5 using $P\_{MCG}$ or $P\_{SCG}$ as the maximum transmission power, respectively - if at least one symbol of slot $i\_{1}$ of the MCG or of the SCG that is indicated as uplink or flexible to a UE by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated*, if provided, overlaps with a symbol for any ongoing transmission overlapping with slot $i\_{2}$ of the SCG or of the MCG, respectively, the UE determines a power for the transmission on the SCG or the MCG overlapping with slot $i\_{2}$ as described in clauses 7.1 through 7.5 using $P\_{SCG}$ or $P\_{MCG}$, respectively, as the maximum transmission power- otherwise, the UE determines a power for the transmission on SCG or the MCG overlapping with slot $i\_{2}$, as described in [8-3, TS 38.101-3] and in clauses 7.1 through 7.5 without considering $P\_{SCG}$ or $P\_{MCG}$ respectivelyIf a UE is provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2* and the SCG is deactivated, the UE determines the MCG tranmission power as if the UE was not configured with SCG.The UE expects to be provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2* only for synchronous NR-DC operation [10, TS 38.133].[\*\*\*\*\*\*\*\*\*\* unchanged part of the subcluse not shown \*\*\*\*\*\*\*\*\*\*\*\*\*\* ]  |

**Alternative 2**

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| 7.6.2 NR-DCIf a UE is configured with an MCG using NR radio access in FR1 or in FR2 and with a SCG using NR radio access in FR2 or in FR1, respectively, the UE performs transmission power control independently per cell group as described in clauses 7.1 through 7.5.If a UE is configured with an MCG and a SCG using NR radio access in FR1 and/or in FR2 and at least one cell in the SCG is activated, the UE is configured a maximum power $P\_{MCG}$ for transmissions on the MCG by *p-NR-FR1* and/or by *p-NR-FR2* and a maximum power $P\_{SCG}$ for transmissions on the SCG by *p-NR-FR1* and/or by *p-NR-FR2* and with an inter-CG power sharing mode by *nrdc-PCmode-FR1* for FR1 and/or by *nrdc-PCmode-FR2* for FR2. The UE determines a transmission power on the MCG and a transmission power on the SCG per frequency range.If the SCG is deactivated, the UE determines the MCG tranmission power as if the UE was not configured with SCG.If a UE is provided *semi-static-mode1* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*,or *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*, the UE does not expect $P\_{MCG}$ and $P\_{SCG}$ to be configured such that $\hat{P}\_{MCG}+\hat{P}\_{SCG}>\hat{P}\_{Total}^{NR-DC}$, where $\hat{P}\_{MCG}$ is the linear value of $P\_{MCG}$, $\hat{P}\_{SCG}$ is the linear value of $P\_{SCG}$, and $\hat{P}\_{Total}^{NR-DC}$ is the linear value of a configured maximum transmission power for NR-DC operation in FR1 or FR2 as defined in [8-3, TS 38.101-3].If a UE is provided *semi-static-mode1* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*, the UE determines a transmission power for the MCG or for the SCG as described in clauses 7.1 through 7.5 using $P\_{MCG}$ or $P\_{SCG}$ as the maximum transmission power, respectively.If a UE is provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*- if the UE is not provided *tdd-UL-DL-ConfigurationCommon* for the MCG or SCG, the UE determines a transmission power for the MCG or for the SCG as described in clauses 7.1 through 7.5 using $P\_{MCG}$ or $P\_{SCG}$ as the maximum transmission power, respectively - if at least one symbol of slot $i\_{1}$ of the MCG or of the SCG that is indicated as uplink or flexible to a UE by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated*, if provided, overlaps with a symbol for any ongoing transmission overlapping with slot $i\_{2}$ of the SCG or of the MCG, respectively, the UE determines a power for the transmission on the SCG or the MCG overlapping with slot $i\_{2}$ as described in clauses 7.1 through 7.5 using $P\_{SCG}$ or $P\_{MCG}$, respectively, as the maximum transmission power- otherwise, the UE determines a power for the transmission on SCG or the MCG overlapping with slot $i\_{2}$, as described in [8-3, TS 38.101-3] and in clauses 7.1 through 7.5 without considering $P\_{SCG}$ or $P\_{MCG}$ respectivelyThe UE expects to be provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2* only for synchronous NR-DC operation [10, TS 38.133].[\*\*\*\*\*\*\*\*\*\* unchanged part of the subcluse not shown \*\*\*\*\*\*\*\*\*\*\*\*\*\* ] |

In [2], in case of SCG deactivation, a TP is proposed for UL power control.

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| TP #2 for [TS 38.213]7.6 Dual connectivityThe UE procedures described in clauses 7.6.1 through 7.6.2 are not applicable if the UE is provided *scg-State* [12, TS 38.331].…… |

## TP for Issue-3:

In [2], in case of SCG deactivation, a TP for UE determination on PDCCH blind detection is proposed for NR-DC.

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| TP #2 for [TS 38.213]……10 UE procedure for receiving control information…When a UE is configured for NR-DC operation and is not provided *scg-State* [12, TS 38.331], the UE determines a capability to monitor a maximum number of PDCCH candidates and a maximum number of non-overlapped CCEs per slot that corresponds to $N\_{cells}^{cap}=N\_{cells}^{MCG}$ downlink cells for the MCG where $N\_{cells}^{MCG}$ is provided by *pdcch-BlindDetection* for the MCG and determines a capability to monitor a maximum number of PDCCH candidates and a maximum number of non-overlapped CCEs per slot that corresponds to $N\_{cells}^{cap}=N\_{cells}^{SCG}$ downlink cells for the SCG where $N\_{cells}^{SCG}$ is provided by *pdcch-BlindDetection* for the SCG. When the UE is configured for carrier aggregation operation over more than 4 cells, or for a cell group when the UE is configured for NR-DC operation and is not provided *scg-State*, the UE does not expect to monitor per slot a number of PDCCH candidates or a number of non-overlapped CCEs that is larger than the maximum number as derived from the corresponding value of $N\_{cells}^{cap}$. …When a UE is configured for NR-DC operation, and is provided *monitoringCapabilityConfig* = *r16monitoringcapability* for all downlink cells where the UE monitors PDCCH, and is not provided *scg-State*, the UE determines a capability to monitor a maximum number of PDCCH candidates and a maximum number of non-overlapped CCEs per span that corresponds to- $N\_{cells}^{cap-r16}= N\_{cells, r16}^{MCG}$ downlink cells for the MCG where $N\_{cells, r16}^{MCG}$ is provided by *pdcch-BlindDetection2* for the MCG, and - $N\_{cells}^{cap-r16}= N\_{cells, r16}^{SCG}$ downlink cells for the SCG where $N\_{cells, r16}^{SCG}$ is provided by *pdcch-BlindDetection2* for the SCG…When a UE is configured for NR-DC operation, is not provided *scg-State*, and is provided *monitoringCapabilityConfig* = *r15monitoringcapability* for at least one downlink cell and *monitoringCapabilityConfig* = *r16monitoringcapability* for at least one downlink cell where the UE monitors PDCCH, the UE determines a capability to monitor a maximum number of PDCCH candidates and a maximum number of non-overlapped CCEs that corresponds to- $N\_{cells,r15}^{cap-r16}= N\_{cells, r15}^{MCG}$ downlink cells for the MCG where $N\_{cells, r15}^{MCG}$ is provided by *pdcch-BlindDetection3* for the MCG,- $N\_{cells,r15}^{cap-r16}= N\_{cells, r15}^{SCG}$ downlink cells for the SCG where $N\_{cells, r15}^{SCG}$ is provided by *pdcch-BlindDetection3* for the SCG, and- $N\_{cells,r16}^{cap-r16}= N\_{cells, r16}^{MCG}$ downlink cells for the MCG where $N\_{cells, r16}^{MCG}$ is provided by *pdcch-BlindDetection2* for the MCG,- $N\_{cells,r16}^{cap-r16}= N\_{cells, r16}^{SCG}$ downlink cells for the SCG where $N\_{cells, r16}^{SCG}$ is provided by *pdcch-BlindDetection2* for the SCG … |

# Discussions

## Issue#1: CA: Clarification for the cell of the reference slot in [TS 38.214]

The TP for discussion can be found in S2.1.

Companies’ views are welcome.

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| *Company* | *View* |
| vivo | Some discussions/clarifications would be necessary.- if the MAC-CE indicates that the first CSI-RS burst for SCell activation is present in an SCell, then the UE may assume that the first CSI-RS burst for SCell activation is present in that SCell. The first slot of the first CSI-RS burst starts at the *m1*th SCell slot after the last SCell slot coinciding with the reference slot *n+k*, as defined in clause 4.3 of [6, TS38.213], of the cell in which the MAC-CE was received.The problem is whether the highlighted clause is to describe the “reference slot n+k”, or the “last SCell slot”. The proposed TP seems to assume the former one, however, the “reference slot n+k” is defined in clause 4.3 of 38.213, which already very clear defines that the reference slot is in the cell for PUCCH transmission. Moreover, in this case the “last SCell slot” is not very clear on which cell this slot associated to.Nevertheless, in this sense the highlighted clause may be incorrect, as the TRS burst may be transmitted in a SCell other than a cell receiving MAC CE. Thus, there might be several potential options, e.g.:Opt-0: The proposed TP.Opt-1: Remove the highlighted clause.Opt-2: Modify and move the clause after the “last SCell slot”… at the *m1*th SCell slot after the last SCell slot of the cell indicated by the MAC-CE coinciding with the reference slot *n+k*, as defined in clause 4.3 of [6, TS38.213].Opt-1 seems simplest, though not crystal clear. We would like to hear companies’ views. |
| OPPO | Support the proposed TP in [1]. |
| Qualcomm | We are supportive with the TP in [1]. However, we agree with vivo that Opt-1 is cleaner way. |
| Samsung | Agree with Vivo. Prefer Opt-1, OK with Opt-2. |
| ZTE | We are ok with Opt-0 or Opt-1. |
| Apple  | Support the proposed TP in [1].  |
| Ericsson1 | Support vivo Opt-1. It is unclear how proposed TP in [1] addresses case where HARQ-ACK transmission is on PUSCH.  |
| Intel | We share same view as Ericsson and prefer Opt-1 |
| Moderator | Opt-1 from vivo seems better and acceptable by all companies.***FL proposal 1:*** *adopt to the following TP for TS 38.214*

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| 5.2.1.5.3 Aperiodic CSI-RS for tracking for fast SCell activationWhen the UE receives an *Enhanced Scell Activation/Deactivation* MAC-CE that triggers one or two CSI-RS bursts for fast SCell activation for a (set of) deactivated SCell(s),- if the MAC-CE indicates that the first CSI-RS burst for SCell activation is present in an SCell, then the UE may assume that the first CSI-RS burst for SCell activation is present in that SCell. The first slot of the first CSI-RS burst starts at the *m1*th SCell slot after the last SCell slot coinciding with the reference slot *n+k*, as defined in clause 4.3 of [6, TS38.213]. |

Any comments are welcome. |

## Issue#2: NR-DC: Power allocation between MCG and SCG when SCG is deactivated

Because the feature of SCG deactivation does not apply to NE-DC and the LTE power control in EN-DC is independent of NR SCG, the TP in [2] seems to have unnecessary impact on EN-DC and NE-DC. Here, the TP in [3] (refers to S2.2), which has changes only in S7.6.2 of TS 38.213, is suggested to be a starting point.

Firstly, companies are encouraged to check whether the following statement in the TP is correct or not.

**Q1: At least for semi-static power sharing, whether the following statement for NR-DC is correct or not**

“If the SCG is deactivated, the UE determines the MCG tranmission power as if the UE was not configured with SCG.”

Then, regarding how to reflect the outcome for Q1, companies are also encouraged to feedback which alternative in [3] is better and any appropriate changes.

**Q2: For uplink power control of NR-DC, which alternative in [3] is better or any appropriate changes?**

Companies’ views are welcome.

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| *Company* | *View* |
| vivo | We agree that SCG deactivation is only applicable to NR-DC. On the other hand, the TP in [2] seems to simpler and future-proof. Maybe a modified version would be acceptable:The UE procedures described in clause~~s 7.6.1 and through~~ 7.6.2 is ~~are~~ not applicable if the UE is provided *scg-State* [12, TS 38.331]. |
| OPPO | We also prefer the direction in [2]. The suggestion from vivo is one simple way to go in order to address FL’s concern. For the alt-1 and alt-2 in [3], it is not quite clear to us whether “SCG is deactivated” means both of following, given Alt-2 talks about “at least one cell in the SCG is activated”: * All the cells in SCG are deactivated, but one-by-one, i.e., not by scg-State.
* The SCG is deactivated in whole with scg-State.
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| Qualcomm | We prefer Alternative 1 of [2] as the baseline. “if the SCG is deactivated” and “at least one cell in the SCG is activated” can simply be replaced by “if the UE is provided *scg-State* [12, TS 38.331]” as proposed in [3].A UE may be configured with *p-NR-FR1* for MCG and *p-NR-FR1* for SCG while also be configured with *scg-State*. RAN4 may specify max configured power for MCG and SCG using the parameter *p-NR-FR1* for MCG and *p-NR-FR1* SCG, respectively (same as for EN-DC). The intention here is to clarify that the UE does not use *p-NR-FR1* for MCG when it is configured with *scg-State* even if *p-NR-FR1* for MCG is provided. This is well captured in alternative 1 of [2]. |
| Samsung | As previously mentioned, Alt.1 [3] is unnecessarily long, would require text refinements, and at least a mapping/reference to 38.331 for what “SCG is deactivated” means (of course, that is not currently defined in 38.213). Continue to prefer the text from [2] with the update above from Vivo.  |
| ZTE | Ok with the updated text from vivo. |
| Apple  | Support Alt.1 in [2] with modification from Vivo. With SCG deactivation, essentially NR-DC fallbacks to NR-CA on MCG. In this case, the power control in other clauses of TS 38.213 remain applicable, except clause 7.6.2.  |
| Ericsson1 | As SCG activation/deactivation (via scg-State) is configured by RRC, it seems the power setting for MCG and SCG could also be changed by RRC without need for any additional spec change.  |
| Intel | We support Alt.1 in [2] with update by vivo |
| Moderator | Majority companies prefer the version from vivo.***FL proposal 2:*** *adopt to the following TP for TS 38.213*

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| 7.6 Dual connectivityThe UE procedures described in clause 7.6.2 is not applicable if the UE is provided *scg-State* [12, TS 38.331]. |

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## Issue#3: NR-DC: UE determination of PDCCH monitoring when SCG is deactivated for NR-DC

In [4], it has been specified for deactivated SCG that PDCCH monitoring on SCG is not required and uplink transmissions on SCG is not allowed. Whether the TP in S2.3 for issue#3 is necessary or not and any appropriate change are discussed.

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| 7.x        Activation and Deactivation of SCGTo enable reasonable UE battery consumption while having fast usage of SCG when MR-DC is configured, an activation/deactivation mechanism of SCG is supported. While the SCG is deactivated, there is no transmission via SCG RLC bearers. Only the NR SCG can be deactivated, and all SCG SCell(s) are in deactivated state while the SCG is deactivated.Note:         Upon SCG (de)activation, it is up to the network to ensure there is no pending SDUs or PDUs in SCG RLC entity (e.g. instructs the UE to perform PDCP data recovery and RLC re-establishment/release, if needed).While the SCG is deactivated, the UE will not transmit PUSCH, SRS and CSI report on SCG, and the UE is not required to monitor PDCCH on SCG. If configured by the network, the UE performs radio link monitoring on the SCG and beam failure detection on the SCG while SCG is deactivated. In case of SCG activation without performing random access, the network can indicate TCI states to UE for PDCCH/PDSCH reception on PSCell, if not provided, the UE uses the previously activated TCI states.  |

Companies’ views are welcome.

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| *Company* | *View* |
| vivo | Given the above text in [4], the PDCCH monitoring behavior is clear, thus the TP in S2.3 seems to be unnecessary. Further, it seems the intention of the TP is to reallocate the PDCCH blind decoding capabilities to MCG when SCG is deactivated, however, unlike the SCell deactivation done by MAC CE, the SCG deactivation is done by RRC. If the network would like to reallocate the PDCCH BD capabilities when deactivating the SCG (by configuring the RRC parameter *scg-State*), it may simply reconfigure the *pdcch-BlindDetection* together.  |
| OPPO | First, the current 38.213 still works in presence of above new RAN2 feature. So the TP in [2] is not quite necessary. Secondly, the TP in [2] may end up with a question whether/how one RRC parameter of scg-State would change the intention of another RRC parameter (e.g., pdcch-BlindDetectionX). This should be a RAN2 decision. Before RAN2 has an explicit request for RAN1, it is better to keep RAN1 spec as is.  |
| Qualcomm | There are a number of per-BD and per-FS UE capabilities related to PDCCH blind decodes (e.g., FG11-2, 11-2a, 11-2b, 11-2c, 11-2d, 11-2e, 11-2f, 11-2g). When a UE is configured with NR-DC for a band combination with SCG being deactivated via scg-State, it is not clear which UE capability(ies) (for which band combination, and/or for which CCs of a band combination) takes effect. If RAN1 has a consensus to work on this area, before making a progress in RAN1, this has to be discussed in RAN2.  |
| Samsung | It would be a rather poor outcome if RAN1 forces a UE operating with CA (SCG is deactivated) to monitor PDCCH on the MCG according to the DC capability/partitioning (and, at the same time, have R17/R18 WIs aiming to improve PDCCH monitoring). Without a statement in 38.213 that the DC allocation for PDCCH capability does not apply when the SCG is deactivated, that allocation remains applicable and the text in [4] that the UE is not required to monitor PDCCH on the SCG does not change that. Regarding the RRC time uncertainty, the issue is same as with every reconfiguration (e.g. for search space sets, …) and can be addressed by the gNB as usual. Reconfiguring *pdcch-BlindDetectionXCG* does not solve the issue as there is no 0 value. Although we do not identify any issue, fine to ask RAN2 if they identify any if the UE monitors PDCCH as for CA when the SCG is deactivated – any RAN1 action can then depend on the feedback from RAN2.  |
| ZTE | We are not sure why this “if the UE monitors PDCCH as for CA when the SCG is deactivated” should be discussed in RAN2. This seems to be a RAN1 issue.It seems that companies have different understandings on whether any spec impacts are needed. From our perspective, we can first have a conclusion/agreement first on this issue to align companies’ understandings here and FFS any spec impact is needed. |
| Apple  | It seems beneficial to collect RAN2 input on the applicable UE capability in case of SCG deactivation, e.g., CA capability or DC capability of PDCCH BDs when SCG is deactivated.  |
| Ericsson1 | We have similar view as vivo. |
| Intel | We believe the behavior from RAN2 CR is already clear. The UE is still under NR-DC mode. Especially, PDCCH monitoring is also dimensioned assuming NR-DC operation, however, PDCCH monitoring on SCG is simply dropped.  |
| Moderator | More discussions seem needed.@Samsung, In order to address ZTE’s question, could you provide a detailed question for the LS to RAN2? Additionally, *pdcch-BlindDetectionXCG* cannot be found in TS 38.331. The other IEs with *pdcch-BlindDetectionSCG* are not RRC configurations for UEs. Maybe you could elaborate your previous reply a bit “Reconfiguring *pdcch-BlindDetectionXCG* does not solve the issue as there is no 0 value.”  |
| Samsung2 | @Moderator/etc.Sorry for any confusion on the ‘XCG’ – the ‘X’ was meant for ‘M’ or ‘S’. To restate the previous comment (hopefully clearly this time), “Reconfiguring *pdcch-BlindDetectionSCG-UE* does not solve the issue as there is no 0 value”.The question/request to RAN2 is simple – the essence can be as below (i.e. whether what RAN1 agreed for power control can also be done for PDCCH monitoring) and can include the text for the agreement on power control (not included here).RAN1 discussed SCG de/activation for NR-DC for power control and for PDCCH monitoring and made the following agreement for power control to depend on the SCG de/activation status. RAN1 would like to ask RAN2 whether RAN2 identifies any problem if the same approach is also used for PDCCH monitoring. That is, whether a UE can monitor PDCCH as for operation without NR-DC when the SCG is deactivated and as for operation with NR-DC when the SCG is activated.  |
| ZTE | Actually, we think that UE can monitor PDCCH as for operation without NR-DC when the SCG is deactivated. We can be ok to send LS to RAN2 if it helps. |
| vivo2 | We are not sure if it is beneficial to ask RAN2 this question, who may not be able to comment on the feasibility of this change due to BD/CCE limitation, etc., which is defined in RAN1.Moreover, it seems the intention of the proposal is to reallocate the PDCCH blind decoding capabilities to MCG when SCG is deactivated, which seems to be an optimization. As commented before, this can be largely achieved by reconfiguring *pdcch-BlindDetection*. It is right that no value of “0” of it, but the smallest number supported is 1 – that should be enough for most cases. Then if we really want to consult with RAN2, the question should be, e.g., whether there are any critical issues using the existing mechanism when deactivating the SCG, such as reconfiguring the *pdcch-BlindDetection* for MCG and/or SCG. |
| Samsung | @Vivo: The value range for *pdcch-BlindDetectionMCG-UE* or *pdcch-BlindDetectionSCG-UE* can be [1, 2, 3]. Keeping a value of 1 for the SCG can mean that a large % increase for PDCCH monitoring capability on the MCG is not utilized for no reason (it is doubtful whether WIs aiming to improve PDCCH monitoring can offer similar % gain in capability). Note that what you suggest (reconfiguration) could be done for power control (reconfigure the max power for the SCG to the lowest value) and it wouldn’t have any impact in that case. Of course RAN2 will say there are no critical issues for RAN2 if the UE keeps monitoring PDCCH as if there is activated CG – PDCCH monitoring capability is not a RAN2 issue. The question is rather simple. Does RAN1 see a benefit from reallocation the PDCCH monitoring capability from the SCG to the MCG when there is practically no SCG? If no, we stop here. If yes, the question is whether there is any problem to do that. We don’t think there is any but OK to ask RAN2 or leave it for next time if anyone is not comfortable. |
| vivo | @Samsung: You are right that reconfiguration can also be done for power control, so the change to the power control case can also be seen as optimization. The difference between them to us is that, the PC may affect the UL coverage if SCG is deactivated, which means a reconfiguration would be inevitable. But for the PDCCH monitoring, the UE is still schedulable in MCG as the*pdcch-BlindDetection* just affects the CA limited of BD/CCE – the PDCCH configuration on MCG is still workable, as it does work before the SCG is deactivated. Reconfiguration may still be performed to increase the scheduling flexibility, but to us this seems to be less critical than the impact to UL coverage. |
| Samsung2 | @VivoThe MCG is also schedulable without doing anything on power control – there will be no effect on UL coverage as the UE is already operating with DC prior to deactivation. But for PDCCH monitoring, there will be less blocking/dropping.Again, the issue is simple and directly analogous and the specification text can be essentially a copy-paste for power control and PDCCH. The benefit is understood. What is the cost for Vivo to be hesitant about it?  |
| vivo | @SamsungOur point is to avoid adding new UE behavior/enhancement in maintenance stage, especially when this is not in the RAN1 work scope, and especially when the gain/benefit is marginal and no critical issue is identified. As commented before, the MCG is schedulable before the SCG deactivation, thus should also be schedulable after that. It can be beneficial to reallocate the PDCCH processing capabilities in this case, but is not favorable to be introduced after the release is frozen. Anyway, the PDCCH blocking can be resolved from system perspective – i.e., prioritizing the DCI for this UE in the candidate CCE that overlapped with other UEs. While for the UL coverage case, it seems not possible to borrow the power from another UE. But maybe we don’t have to discuss the PC aspect anymore …  |

# Conclusions

TBD

# References

1. [R1-2203196](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_109-e/Docs/R1-2203196.zip) Maintenance of DSS and MR-DC ZTE

1. [R1-2203876](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_109-e/Docs/R1-2203876.zip) Remaining details of NR dynamic spectrum sharing Samsung

1. [R1-2204822](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_109-e/Docs/R1-2204822.zip) NR-DC uplink power sharing when SCG cells are deactivated Nokia, Nokia Shanghai Bell
2. R2-2203690 37340CR0309 (Rel-17, B) Introduction of further multi-RAT dual-connectivity enhancements, ZTE, CATT

# Appendix: Agreements

All RAN1 agreements and received LS’s can be found in [R1-2202934](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202934.zip).