**3GPP TSG RAN WG1 #102-e R1-200xxxx**

**E-Meeting, August 17th – 28th, 2020**

**Agenda Item: 8.13.3**

**Source: Moderator (Huawei)**

**Title: Summary of discussions on** **efficient activation/de-activation mechanism for SCells in NR CA (1st round summary)**

**Document for: Discussion and Decision**

# Introduction

As per chairman’s guidance, three rounds with check points below are planned. This summary is for the first round and is expected to complete by Wednesday August 19th.

[102-e-NR-DSS-DC\_enh2-01] Email discussion/approval using the summary as a starting point, focusing on high-level aspects – Ravi (Ericsson) & Frank (Huawei)

* By 8/19 – Classification of high priority/medium priority items for this e-Meeting
* By 8/24 – high priority items
* By 8/27 - medium priority items

According to the contribution papers under agenda item 8.13.3 for efficient activation/de-activation mechanism for NR CA SCells, and in light of RAN1 task by WID RP-201040, all identified issues are summarized and listed in Section 3 to facilitate discussions. In section 2, discussion priority for those issues is addressed.

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| The objective of this work item is to specify enhancements to MR-DC related scenarios. At least the following topics should be considered in the work:   1. Support efficient activation/de-activation mechanism for one SCG and SCells  * Support for one SCG applies to (NG)EN-DC, and NR-DC [RAN2, RAN3, RAN4] * Support for SCells applies to NR CA, based on RAN1 leading mechanisms [RAN1, RAN2, RAN4] * This objective applies to FR1 and FR2 |

# Discussions

Based on the discussions till August 19th [16], we have the classification of high priority/medium priority items as below,

**Possible FL conclusion:**

*Classification of high priority/medium priority items for this RAN1#102 e-Meeting*

* *High priority:*
  + *Issue-2: The functionality of temporary RS during the SCell activation*
  + *Issue-3: Candidate RS for the temporary RS*
  + *Question G2: Whether or not can UE measure the triggered RS on the BWP indicated by “firstActiveDownlinkBWP-Id” although the BWP is inactive during Scell activation procedure?*
* *Medium priority:*
  + *Issue-4: Triggering command for temporary RS*
  + *Issue-1: Triggering command for SCell activation/de-activation*
  + *Issue-5: Tactivation reduction with BS assistance but no temporary RS nor SSB*
  + *Question G1: Whether or not should RAN1 consider at least the cases of FR1 unknown cell and FR2 unknown cell, if RAN1 decides to design temporary RS to assist fast SCell activation?*
  + *Question G3: Whether the accurate timing for SCell activation should be clarified or not [4], i.e. after which time points of time point#1, #2 and #3 in the Figure 1 of [4] is the to-be-activated SCell regarded as activated?*
  + *Issue-6: Enhancement for CSI reporting*

Companies’ views are very welcome.

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| *Company* | *View* |
| MTK | We (MTK) want to echo with QC and Futurewei in email reflector that enabling SRS transmissions on an SCell with dormant BWP can be discussed here.  I=In the RAN4 LS (R1-2005226), RAN4 commented that:   * RAN4 discussed the impact of not supporting CSI reporting and SRS transmission. Not supporting UL P-SRS transmissions risks performance losses on UL/DL performance in TDD systems, UL PC, BFR/Beam management and Timing Advance. RAN4 see some benefits and these performance losses can be prevented by maintaining some UL P-SRS with long periodicity while at the cost of power saving.   To us, this seems like an issue and this agenda is the only place fitted to tackle this issue. |
| Nokia, NSB | LS belongs to R16 dormancy WID, I thought we are in R17 and different WID. 😊  We are fine with the FL proposal, given that ISSUE-6 is deprioritize from this meeting. |
| Qualcomm | We share the view with MTK – SRS transmission on an SCell with dormant BWP should be supported, and this is the WI that can discuss it. If we literally follow what WID describes, we can even not discuss SCell activation/deactivation that is not a “re-use of efficient SCG activation/deactivation)”. |
| Huawei, Hisilicon | OK with the FL conclusion, SRS transmission on SCell with dormant BWP can be discussed in next meeting. |
| Moderator | Please see updated possible FL conclusion below |
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By 8/24, update the FL conclusion for classification according to the feedbacks in email reflector. Please note that a note is added.

**Possible FL conclusion -rev:**

*Classification of high priority/medium priority items for this RAN1#102 e-Meeting*

* *High priority:*
  + *Issue-2: The functionality of temporary RS during the SCell activation*
  + *Issue-3: Candidate RS for the temporary RS*
  + *Question G2: Whether or not can UE measure the triggered RS on the BWP indicated by “firstActiveDownlinkBWP-Id” although the BWP is inactive during Scell activation procedure?*
* *Medium priority:*
  + *Issue-4: Triggering command for temporary RS*
  + *Issue-1: Triggering command for SCell activation/de-activation*
  + *Issue-5: Tactivation reduction with BS assistance but no temporary RS nor SSB*
  + *Question G1: Whether or not should RAN1 consider at least the cases of FR1 unknown cell and FR2 unknown cell, if RAN1 decides to design temporary RS to assist fast SCell activation?*
  + *Question G3: Whether the accurate timing for SCell activation should be clarified or not [4], i.e. after which time points of time point#1, #2 and #3 in the Figure 1 of [4] is the to-be-activated SCell regarded as activated?*
* *Note: The classification does not preclude any items that are not listed above for the next RAN1 meeting.*

The proposal seems to be **stable**, and **NOT** expected to be further discussed. In case of any important feedback, they are welcome below.

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| *Company* | *View* |
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## Issues with high priority

For the identified issues with high priority for this meeting, we have the following possible agreements,

**Proposal 1**:

*Temporary RS is supported for SCell activation:*

* *The temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking.*
* *FFS potential functionalities of CSI measurement/acquisition and cell search*

Companies’ views are very welcome.

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| *Company* | *View* |
| MTK | We think the temporary RS should also provide assistance to cell search in addition to AGC settling and time/frequency tracking since cell search is a critical component for SCell activation of unknown cell. |
| Nokia | We support the FL proposal. I suppose unknown cell we can discuss later. Would be good to start with known cell.  **Proposal 1**:  *At least for known cell, Temporary RS is supported for SCell activation:*   * *The temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking.* * *FFS potential functionalities of CSI measurement/acquisition and cell search* |
| ZTE | First of all, based on the WI, this objective applies to both FR1 and FR2. It seems companies haven’t discussed whether the temporary RS based solution can be applied to both FR1 and FR2. Our understanding is that the temporary RS based solution is common solution for both FR1 and FR2. Thus, we would like to emphasize this point in the above proposal.  Secondly, we would like to make it clear that the temporary RS is to be sent during the SCell activation procedure, otherwise it is not clear what does the temporary RS mean.  Regarding the FFS point, based on understanding, UE is required to acquire cell ID and frame/subframe index during the cell search procedure. We are not sure how can the temporary RS be used for cell search. But keeping it in FFS is fine for us.  With this, we would like to propose the Proposal as below.  *Temporary RS is supported during the SCell activation procedure for efficient SCell activation for both FR1 and FR2:*   * *The temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking.* * *FFS potential functionalities of CSI measurement/acquisition and cell search* |
| Qualcomm | Agree with the proposal. |
| Spreadtrum | Agree with the proposal |
| CATT | Agree with the proposal. |
| Moderator | Please review the updated Proposal1.  @Nokia, @ZTE, comments are reflected. |
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**Proposal 1-rev**:

*At least for the case of known cell, temporary RS is supported during the SCell activation procedure for efficient SCell activation for both FR1 and FR2:*

* *The temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking.*
* *FFS potential functionalities of CSI measurement/acquisition and cell search*

Any comments are welcome below.

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| *Company* | *View* |
| Ericsson | Proposal 1-rev should be working assumption with the understanding that we will confirm it after converging on some design for ‘temporary RS’. We actually prefer to agree on a specific RS (i.e., as in proposal 2) than have generic agreement as in proposal 1-rev.  The definition of ‘temporary RS’ as part of such agreement/WA should be made more specific e.g. temporary RS = additional RS transmission to reduce SCell activation delay requirements compared to Rel16. In principle, some form of temporary RS during SCell activation is already possible with Rel15/Rel16 mechanisms. So, the new agreement/WA should identify differentiation from Rel15/Rel16. |
| ZTE | Support the above proposal. |
| vivo | Agree with the updated proposal. |
| Nokia, NSB | We support |
| Intel | Agree with the updated proposal |
| Qualcomm | The proposal looks good |
| FUTUREWEI | Support the updated proposal. |
| Moderator | Updated as below to address Ericsson’s comment. The temporary RS was defined by the subbullet. |

**Proposal 1-rev2 (as WorkingAssumption)**:

*At least for the case of known cell, new temporary RS is supported during the SCell activation procedure for efficient SCell activation for both FR1 and FR2:*

* *The new temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking to expedite the activation process.*
* *FFS potential functionalities of CSI measurement/acquisition and cell search*

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| *Company* | *View* |
| Nokia, NSB | OK |
| Qualcommn | On Proposal 1-rev2, my understanding of Ericsson’s comment was that the proposal 1 itself is a kind of our ‘work plan’, and is not a specific design proposal. Adding ‘new’ does not resolve this concern and may cause more confusion (looks like we will specify another brand new RS). So we prefer to delete “new”. |
| ZTE | we prefer to delete the term "new". |
| Samsung | we share the same view as Fred that prefer to remove “new” in order to avoid potential miss-understanding.  For P1-rev2, we also think “to expedite the activation process” is not necessary. It is enough to just capture the functionalities and we do not need to capture the something like “for what”. |
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**Proposal 1-rev3 (as WorkingAssumption)**:

*At least for the case of known cell, temporary RS is supported during the SCell activation procedure for efficient SCell activation for both FR1 and FR2:*

* *The temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking ~~to expedite the activation process~~.*
* *FFS potential functionalities of CSI measurement/acquisition and cell search*

Any comments are welcome below.

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| *Company* | *View* |
| Moderator | It is closed |
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**Proposal 2:**

*Aperiodic TRS is selected as temporary RS for Scell activation*

* *If more functionalities are confirmed to be supported by temporary RS, other RS candidates, i.e. aperiodic CSI RS and P/SP-CSI RS, are not precluded.*

Companies’ views are very welcome.

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| *Company* | *View* |
| MTK | For the sub-bullet, we want to add “RS based on SSS/PSS are not precluded“ due to the FFS of cell search in Proposal 1. |
| Nokia | We support the FL proposal. |
| ZTE | We are supportive of selecting TRS as temporary RS for efficient Scell activation. However, for now, we are not sure whether we need to restrict the temporary RS to only aperiodic TRS for now. As also commented by many other companies, periodic or semi-persistent temporary RS can also be considered (although it seems we don’t have semi-persistent TRS). With this, we would like to update the proposal as below.  *TRS is selected as temporary RS for Scell activation*   * *If more functionalities are confirmed to be supported by temporary RS, other RS candidates, i.e. aperiodic CSI RS and P/SP-CSI RS, are not precluded.* |
| Qualcomm | Agree with the proposal. |
| Spreadtrum | We support the comments from ZTE. P-TRS can be under the study. |
| CATT | Agree with the proposal. |
| Moderator | Please review the updated Proposal2.  @MTK, FFS is added  @ZTE, based on the first round of feedback, it seems majority view for A-TRS which means a triggering is preferred. But considering the triggering command to be discussed in issue#4 this week, a revision is provided. |
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**Proposal 2 -rev:**

*~~Aperiodic~~ TRS is selected as temporary RS for Scell activation*

* *If more functionalities are confirmed to be supported by temporary RS, other RS candidates, i.e. aperiodic CSI-RS, P/SP-CSI RS, and RS based on SSS/PSS, are not precluded.*
* *The TRS is triggered by DCI or MAC-CE. FFS which exact triggering command.*

Any comments are welcome below.

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| *Company* | *View* |
| Ericsson | We prefer using “aperiodic TRS” as in original Proposal 2. “TRS is selected…” also includes periodic case? Then it is unclear if the proposal is to trigger periodic TRS with listed mechanisms. Overall, since the intention is to identify “*Candidate RS for the temporary RS*”, it is better to have the triggering discussion later after identifying the candidate(s).  Some additional comments below  For the 2nd bullet, does “by DCI” refer to Rel15/16 mechanism?  The definition of ‘temporary RS’ should be made more specific as indicated for Proposal1-rev.  Prefer to use e.g. instead of i.e. for the listing of other RS candidates, |
| ZTE | Support the above proposal. |
| Vivo | In our view, a “period” RS, by definition seems to be contradict the “temporary” principle. So we prefer to use the “aperiodic TRS” as in original Proposal, as currently no clear motivation identified for periodic TRS. Anyway the 1st sub-bullet open the door for other RS if periodic TRS deemed necessary. |
| Nokia, NSB | If something is triggered “*The TRS is triggered by DCI or MAC-CE*” it is by definition aperiodic? So we prefer keeping “Aperiodic” in the proposal.  Otherwise, we support the update! |
| Intel | We share the view periodic TRS is not proper candidate for temporary RS. However, SP-TRS, assuming it can be supported may be considered. In general, once triggered, the TRS for temporary RS can be transmitted for several cycles until the SCell is activated.  On the other hand, If CSI measurement based on temporary RS is supported, it is effectively a kind of CSI-RS. |
| Qualcomm | Maybe repeating the comments from other companies – “TRS is triggered by DCI or MAC-CE” looks implying the TRS is aperiodic.  Is the intention of deleting “aperiodic” to cover the possibility that the TRS is transmitted periodically while the UE measure it aperiodically based on the DCI or MAC-CE indication? If so, the proposal should be written in such the way. |
| FUTUREWEI | Both A-TRS and SP-TRS can be considered further so support without “aperiodic” at this stage and suggest change “triggered” to “triggered/activated” to include both cases. Furthermore, if other functionality is included, we’d like to add SRS as an option for further consideration. |
| Moderator | @all, Aperiodic TRS is associated only with DCI triggering in Rel-16. The main reason to remove “aperiodic” was to address ZTE’s comments in the previous round where the trigger command by MAC-CE should be still on table for the coming discussion (issue#4). Now majority views seem to be OK to further discuss MAC-CE as an option while still prefer to add back “aperiodic”, but some companies prefer not to call it aperiodic TRS. Please note that the 2nd subbullet has precluded periodic TRS in my understanding. If helpful, “should be” is to emphasize the triggering. It seems the best way forward. Hope it is also OK for ZTE.  @Ericsson, “i.e.” => “e.g” as you suggested. “the new” is added, and referred to proposal 1-rev2. |

**Proposal 2 –rev2:**

*~~Aperiodic~~ TRS is selected as the new temporary RS for Scell activation*

* *If more functionalities are confirmed to be supported by temporary RS, other RS candidates, ~~i.e.~~ e.g. aperiodic CSI-RS, P/SP-CSI RS, RS based on SSS/PSS and SRS, are not precluded.*
* *The TRS should be ~~is~~ triggered by DCI or MAC-CE. FFS which exact triggering command.*

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| *Company* | *View* |
| Nokia, NSB | OK |
| ZTE | For proposal1 and proposal2, we prefer to delete the term "new". |
| Qualcomm | On Proposal 2-rev2, same as above, “new” does not help the clarification. Regarding “should be” for the 2nd sub-bullet, not sure the intention of this “should be”. Prefer to keep “is”.  Adding “and SRS” is OK (though it should be added before “RS based on SSS/PSS”). |
| Samsung | For P2-rev2, could you please clarify it include all types of time behavior (e.g., P/SP/AP) for the TRS? |
| Moderator | @Samsung, according to companies’ feedbacks, the TRS has to be triggered, but its triggering command is FFS. It does not matter whether SP or AP it is called at the phase. As replied in previous round, please note that the 2nd subbullet has precluded periodic TRS in my understanding.  @Qualcomm, “should be” is just an emphasis to address companies’ concerns last round. Compared to “is”, it seems still a good way forward. Hope it is OK for you.  Please find a revision below |

**Proposal 2 –rev3:**

*~~Aperiodic~~ TRS is selected as temporary RS for Scell activation*

* *If more functionalities are confirmed to be supported by temporary RS, other RS candidates, ~~i.e.~~ e.g. aperiodic CSI-RS, P/SP-CSI RS, SRS and RS based on SSS/PSS, are not precluded.*
* *The TRS should be ~~is~~ triggered by DCI or MAC-CE. FFS which exact triggering command.*

Any comments are welcome below.

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| *Company* | *View* |
| Moderator | It is closed |
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**Proposal 3**:

*UEs measure the triggered temporary RS on an inactive BWP during Scell activation procedure:*

* *The inactive BWP can be indicated by “firstActiveDownlinkBWP-Id”.*
* *FFS whether the inactive BWP can be other BWP than the one above.*

Companies’ views are very welcome.

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| *Company* | *View* |
| MTK | We agree on the FL proposal 3. |
| Nokia, NSB | We would like to clarify the time point where UE expects CSI-RS to be triggered on inactive Scell. We understand that BWP should not be active yet, because otherwise UE would be required to receive PDSCH.  **Proposal 3**:  *UEs measure the triggered temporary RS on an inactive BWP during Scell activation procedure after point #1 in Figure 1 in [4]:*   * *The inactive BWP can be indicated by “firstActiveDownlinkBWP-Id”.*   *FFS whether the inactive BWP can be other BWP than the one above.* |
| ZTE | There are two issues to be discussed here.  First, whether triggering temporary RS on an inactive BWP is allowed or not, this has been covered by the main bullet. Second, if triggering temporary RS on inactive BWP is allowed, which BWP shall be selected? This has been covered by the first sub-bullet and second-bullet.  For now, as we are trying to finalize some high-level considerations for this topic. We didn’t see the need to discuss whether *“firstActiveDownlinkBWP-Id”* should be selected or not as this is highly depending on the companies’ detailed design. For example, if companies prefer DCI based solution, then BWP indicator is already there in the DCI and thus some more flexibility can be expected.  Thus, we would like to propose the following update.  *UEs measure the triggered temporary RS on an inactive BWP during Scell activation procedure:* |
| Qualcomm | We are not sure what exactly “inactive BWP” means. What we want is to let the UE to receive temporary RS after the time point #1 but before the time point #2, where the reception should be able to be as earlier as possible. The reception might be on an “inactive BWP”, but we do not need to explicitly say whether it is inactive BWP or not.  Combining with Nokia/ZTE’s updates, following would be a reasonable proposal for now.  **Proposal 3**:  *UEs measure the triggered temporary RS ~~on an inactive BWP~~ during Scell activation procedure after point #1 in Figure 1 in [4]:*   * *~~The inactive BWP can be indicated by “firstActiveDownlinkBWP-Id”.~~*   *~~FFS whether the inactive BWP can be other BWP than the one above.~~* |
| Spreadtrum | We support this temporary RS should be associated with a BWP of the Scell and agree *firstActiveDownlinkBWP-Id* can the first choice. Before the point #1 in [4] of the Scell activation procedure, all the BWPs are inactive. So we prefer only delete the word of “inactive”. |
| CATT | We support the revised proposal from Nokia. It’s important to make it clear when the temporary RS is expected. Regarding the sub-bullets, it doesn’t preclude anything as a BWP ID other than firstActiveDownlinkBWP-Id can be indicated via DCI if necessary. We prefer to keep the sub-bullet as it is. |
| Moderator | Please review the updated Proposal3.  @Spreadtrum, @CATT, @Qualcomm, in TS 38.331, the *NZP-CSI-RS-ResourceSet* configuration for TRS is under a cell rather than a BWP. Therefore, it would be better to discuss its associated BWP, if any, during the discussion how to trigger the temporary RS. A subbullet is added to clarify the independence of the activation state of an associated BWP. |
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**Proposal 3-rev**:

*UEs measure the triggered temporary RS ~~on an inactive BWP~~ during Scell activation procedure no earlier than a slot m:*

* *If a SCell is activated by MAC-CE, then the slot m is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation. If a SCell is activated by a DCI, if supported, then the slot m is FFS.*
* *If the triggered temporary RS is associated with a BWP, then the measurement above is independent of the activation state of the BWP.*
* *~~The inactive BWP can be indicated by “firstActiveDownlinkBWP-Id”.~~*
* *~~FFS whether the inactive BWP can be other BWP than the one above.~~*

Any comments are welcome below.

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| *Company* | *View* |
| Ericsson | Prefer to remove “*. If a SCell is activated by a DCI, if supported, then the slot m is FFS*”. It seems to not add additional information to the Proposal.  Prefer to coordinate with RAN4 before agreeing to “*If the triggered temporary RS is associated with a BWP, then the measurement above is independent of the activation state of the BWP*” as the related spec text (i.e., consideration of available RSs when activating SCell) is mainly in RAN4 spec. |
| ZTE | We are fine with the above proposal except for the “slot m” thing.  Our understanding is that, here we only discussion some high-level designs. “slot m” is actually trying to discuss some timeline related issues, which is better to be addressed in later discussion considering that different solutions may have different timelines, e.g., the timeline of DCI-based solution and timeline of MAC-CE based solution are different.  Considering this, we would like to propose the following to make it more general.  **Proposal 3-rev**:  *UEs measure the triggered temporary RS during Scell activation procedure ~~no earlier than a slot m~~:*   * *~~If a SCell is activated by MAC-CE, then the slot m is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation. If a SCell is activated by a DCI, if supported, then the slot m is FFS.~~* * *If the triggered temporary RS is associated with a BWP, then the measurement above is independent of the activation state of the BWP.* * *FFS timeline of the triggered temporary RS* |
| vivo | The part of “*no earlier than a slot m*” seems to address some companies’ concerns on the expected time point this RS is used, which seems reasonable to us. If ZTE’s concern is on the exact timeline, maybe we can put the exact value in bracket (or FFS). |
| Nokia, NSB | UE can measure CSI-RS on an inactive BWP in case of RRM measurements. So temporary RS could be treated in specification as CSI-RS for mobility. But perhaps no need to agree in the first meeting on this. Therefore, we could start with the below baby step at this point.  *UEs measure the triggered temporary RS during Scell activation procedure*   * *FFS timeline of the Scell activation procedure and triggered temporary RS* |
| Intel | We are supportive to ZTE’s updated proposal. Exact timeline can be addressed later. |
| Qualcomm | The 2nd bullet “*If the triggered temporary RS is associated with a BWP, then the measurement above is independent of the activation state of the BWP*” is quite unclear. This seems assuming that the temporary RS is defined per BWP, but we have not discussed and not agreed such aspect on the temporary RS. In other words, this would not be the thing that we should agree on at the beginning.  For the 1st bullet, the important timeline is “no later than a certain timing”, which requires further discussion (and maybe coordination with RAN4). “no earlier than a certain timing” can be lower priority and determined later once the design is clearer. |
| FUTUREWEI | ZTE’s revision is fine to us |
| Moderator | @all, The proposal is addressing the *Question G2* which is about the impact of inactive BWP (of inactive SCell) on the TRS measurement. But now companies seem not happy about any wording related to BWP. :) Regarding the 2nd subbullet, it is just to clarify the consensus on the Question G2. It does not assume any BWP association with the temporary RS because it said “if”. Speaking of coordination with RAN4, would what really matter be the value of slot m rather than the 2nd subbullet since it said “independent”? To reflect the scope of question G2, suggest to keep slot m1 and m2 in the main bullet, but their values are FFS.  @Qualcomm, According to your previous comment “after time point#1”, I thought you were suggesting “no earlier than a certain time”. Additionally, if helpful, , “is” is replaced with “can” in the 2nd subbullet.  @Nokia, 1st subbullet as FFS seems to more reflect the time point#1 you suggested before than the latest FFS you suggested. Your latest proposal seems very small baby step which may have been covered by proposal 1 and proposal 2. |
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**Proposal 3-rev2**:

*UEs measure the triggered temporary RS during Scell activation procedure no earlier than a slot m1 and no later than a slot m2:*

* *FFS timeline values m2 and m1 which may depend on and may need coordination with RAN4. ~~If a SCell is activated by MAC-CE, then the slot m1 is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation.~~*
* *If the triggered temporary RS can ~~is~~ associated with a BWP, then the measurement above is independent of the activation state of the BWP.*

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| *Company* | *View* |
| Nokia, NSB | **Proposal 3-rev2**:  *UEs measure the triggered temporary RS during Scell activation procedure no earlier than a slot m1 and no later than a slot m2:*   * *FFS timeline values m2 and m1 which may depend on and may need coordination with RAN4. ~~If a SCell is activated by MAC-CE, then the slot m1 is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation.~~* * *If the triggered temporary RS can ~~is~~ be associated with a BWP, then the measurement above is independent of the activation state of the BWP.*   Small typo (in blue) and I am not sure we need to mandate m2 at this point. I understand that we are trying to shorten activation time, but not sure  we need to force  gNB to TRS be certain slot m2. Or do others  think m2 is needed and should be defined? |
| Moderator | Slot m2 is based one Fred comment, he may explain it. In my understanding, “*no earlier than a slot m1 and no later than a slot m2*” is   * About a UE capability in term of timing range to response a triggering * If the triggering is a DCI, slot m1 has to be defined which is similar to the needs of N1/N2, but slot m2 is simply equal to m1. If the triggering is a MAC-CE, slot m1 is needed but slot m2 may not be equal to m1 because of high layer processing involvement. |
| Qualcomm | On Proposal 3-rev2, still we suggest to delete the 2nd bullet for now. For the m1 and m2 timepoints, I misinterpreted the proposal. Please revert the change related to m1 and m2. But then, ZTE’s wording “FFS timeline for the triggered temporary RS” looks better for now. If companies prefer to keep “*If a SCell is activated by MAC-CE, then the slot m is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation*”, it would be better to keep it under the FFS bullet as one possible option for the case of MAC-CE command. |
| ZTE | For proposal3, from our perspective, it seems the "m1" and "m2" don't offer any additional information as anyway the temporary RS should be within a particular period. How about the following proposal |
| Samsung | For P3-rev2, we prefer to take FFS for whole sentence related to DCI-based SCell activation. Following modification is suggested.  **Proposal 3-rev**:  *UEs measure the triggered temporary RS ~~on an inactive BWP~~ during Scell activation procedure no earlier than a slot m:*   * *If a SCell is activated by MAC-CE, then the slot m is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation. ~~If a SCell is activated by a DCI, if supported, then the slot m is FFS.~~*   + *FFS: DCI-based SCell activation* * *If the triggered temporary RS is associated with a BWP, then the measurement above is independent of the activation state of the BWP.* * *~~The inactive BWP can be indicated by “firstActiveDownlinkBWP-Id”.~~* * *~~FFS whether the inactive BWP can be other BWP than the one above.~~* |
| Nokia, NSB | I do understand that  “*SCell is activated by MAC-CE, then the slot m is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation*”  is current Scell activation command. However, as pointed out by Aris before, some MAC-CE commands in R15 are faster than that. And since task for next meeting is to compare MAC-CE and DCI timelines, we suggest not to restrict MAC-CE only to current Scell activation MAC-CE  behavior.  Of course, current behavior based on current MAC-CE would minimize spec change, and this should be one criteria on selecting DCI or MAC-CE. Therefore, we suggest the following revision  **Proposal 3-rev**:  *UEs measure the triggered temporary RS ~~on an inactive BWP~~ during Scell activation procedure no earlier than a slot m:*   * *~~If a SCell is activated by MAC-CE, then the slot m is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation. If a SCell is activated by a DCI, if supported, then the slot m is FFS.~~*   + *~~FFS: DCI-based SCell activation~~* * *FFS m for  DCI-based trigger and m for MAC-CE-based trigger* * *If the triggered temporary RS is associated with a BWP, then the measurement above is independent of the activation state of the BWP.* * *~~The inactive BWP can be indicated by “firstActiveDownlinkBWP-Id”.~~* * *~~FFS whether the inactive BWP can be other BWP than the one above.~~* |
| Moderator | @Qualcomm, please find revision according to your comments. For the 2nd subbullet, some companies want it, and you are the only one having concern for it. Hope FFS is fine for you. Just FFS.  @Samsung, Your comments seems to be referring to the previous version rev1 instead of rev2. Please find the latest one below.  @all, with all subbullets as FFS and proposal 1&2, the only value of proposal 3 is “no earlier than a slot m”, hope companies could be fine with it. |

**Proposal 3-rev3**:

*UEs measure the triggered temporary RS during Scell activation procedure no earlier than a slot m:*

* *FFS timeline values m which may need coordination with RAN4. ~~If a SCell is activated by MAC-CE, then the slot m1 is the slot 3ms after the slot carrying HARQ-ACK information for the PDSCH reception of the MAC CE of SCell activation.~~*
* *FFS If the triggered temporary RS can be ~~is~~ associated with a BWP, then the measurement above is independent of the activation state of the BWP.*

Any comments are welcome below.

|  |  |
| --- | --- |
| *Company* | *View* |
| Moderator | It is closed with outcome of A-3. |
|  |  |
|  |  |
|  |  |

## Issues with medium priority

### Issue-1: Triggering command for SCell activation/de-activation

### Issue-4: Triggering command for temporary RS

According to companies’ views, two subtopics may be able to be combined as one proposal,

***Proposal 4***:

*DCI-based triggering for SCell activation/de-activation is supported:*

* *The DCI is also used to trigger the temporary RS.*
* *FFS DCI format/fields*

Any comments are welcome,

|  |  |
| --- | --- |
| *Company* | *View* |
| Futurewei | Support with some edits  One or more temporary RS (e.g., TRS and CSI-RS for CSI report, TRS and SRS, etc.) may be considered.  For SCell de-activation, the temporary RS may not be needed.  So we suggest the following update:  *DCI-based triggering for SCell activation/de-activation is supported:*   * *The DCI is also used to trigger one or more temporary RS during SCell activation.* * *FFS DCI format/fields* |
| Ericsson | From our perspective, this is not high priority. Our preference is to focus and complete temporary RS design. |
| CATT | We are fine with Futurewei’s second modification. I don’t think we need to spell out one or more temporary RS, the motivation is quite vague to me. Why does a UE need to trigger more than one temporary RS? Does it mean a single temporary RS is insufficient? If so, it will boil down to detail RS design. |
| Samsung | Support the proposal. We do not think Futurewei’s modification is not necessary since such details can be discussed with “FFS DCI format/fields”. |
|  |  |

### Issue-5: Tactivation reduction with BS assistance but no temporary RS nor SSB

According to companies’ views, a potential way forward is

***Proposal 5***:

*Study potential BS assistance information and its corresponding mechanism to further expedite SCell activation, e.g.*

* *BS side information to assist UE synchronization during SCell activation*

Any comments are welcome,

|  |  |
| --- | --- |
| *Company* | *View* |
| Futurewei | Support with further clarifications  We suggest to add some examples of BS side information, e.g., signaling of cross-carrier QCL assumption |
| Ericsson | From our perspective, this is not high priority. Our preference is to focus and complete temporary RS design. |
| CATT | Share the same views with Futurewei. It would be better to provide more specific examples. |
| Samsung | We think this should be deprioritized. |
|  |  |

### Question G1: Whether or not should RAN1 consider at least the cases of FR1 unknown cell and FR2 unknown cell, if RAN1 decides to design temporary RS to assist fast SCell activation?

According to companies’ views, the worst case is identified,

***Proposal 6***:

*RAN1 strives for further reduction of SCell activation time for the case of unknown cell which is the worst case that requires the longest SCell activation time.*

### Question G3: Whether the accurate timing for SCell activation should be clarified or not [4], i.e. after which time points of time point#1, #2 and #3 in the Figure 1 of [4] is the to-be-activated SCell regarded as activated?

According to companies’ views and the agreed proposal 3-rev3,

***Proposal 7***:

*It is confirmed that if a SCel activation process is triggered for a SCell, the SCell is regarded as activated after the first valid CSI reporting.*

# Conclusions

[TBU]

# References

1. [R1-2005411](C:\\Users\\wanshic\\OneDrive - Qualcomm\\Documents\\Standards\\3GPP Standards\\Meeting Documents\\TSGR1_102\\Docs\\R1-2005411.zip) Discussion on efficient activation/de-activation mechanism for Scells vivo
2. [R1-2005442](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2005442.zip) Discussion on Support Efficient Activation De-activation Mechanism for SCells in NR CA ZTE
3. [R1-2005629](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2005629.zip) On supporting efficient activation mechanism for SCells in NR CA MediaTek Inc.
4. [R1-2005698](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2005698.zip) Disucssion on efficient activation/de-activation mechanism for Scell in NR CA CATT
5. [R1-2005908](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2005908.zip) On low latency Scell activation Nokia, Nokia Shanghai Bell
6. [R1-2006065](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006065.zip) Efficient activation/de-activation for Scell OPPO
7. [R1-2006178](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006178.zip) On efficient activation/de-activation mechanism for Scells Samsung
8. [R1-2006283](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006283.zip) Discussion on efficient activation/de-activation mechanism for SCells in NR CA Spreadtrum Communications
9. [R1-2006511](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006511.zip) Views on Rel-17 DSS SCells efficient activation/de-activation Apple
10. [R1-2006673](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006673.zip) Reduced Latency SCell Activation Ericsson
11. [R1-2006751](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006751.zip) Discussion on efficient activation/deactivation mechanism for SCells NTT DOCOMO, INC.
12. [R1-2006754](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006754.zip) Efficient activation/deactivation of SCell ASUSTEK COMPUTER (SHANGHAI)
13. [R1-2006835](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006835.zip) Views on efficient activation/de-activation mechanism for SCells in NR CA Qualcomm Incorporated
14. [R1-2006927](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_102\Docs\R1-2006927.zip) Discussion on efficient activation/de-activation mechanism for SCells Huawei, HiSilicon
15. [R1-1912730](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_99/Docs/R1-1912730.zip) On efficient and low latency low power serving cell operations Futurewei
16. Summary of discussions on Rel-17 MR-DC, <https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_102-e/Inbox/drafts/8.13.3/R1-20xxxxx%20Summary%20of%20discussions%20on%20Rel-17%20MR-DC%20V011_Moderator.docx>

# Appendix

# Summary of issues and priorities for 1st round

According to all of companies’ contribution documents, all the issues includes six specific issues and nine general issues are summarized below, with more details in Section 3. As per chairman’s guidance, the priority of issues will be discussed first, and then focus on the high priority/medium priority items for this e-Meeting. Please companies provide your views at least for this section by 18:00 PST Tuesday, August 18 (UTC 01:00, August 19).

For the specific issues to activation/deactivation process:

* **Issue-1:** Triggering command for SCell activation/de-activation
* **Issue-2:** The functionality of temporary RS during the SCell activation
* **Issue-3:** Candidate RS for the temporary RS
* **Issue-4:** Triggering command for temporary RS
* **Issue-5:** Tactivation reduction with BS assistance but no temporary RS nor SSB
* **Issue-6**: Enhancement for CSI reporting

Please feedback either “No need”, “Low”, “Medium” or “High” as priority for the following issues. Your simple justification for it is welcome with details left to Section 3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Company* | *Issue-1* | *Issue-2* | *Issue-3* | *Issue-4* | *Issue-5* | *Issue-6* |
| Futurewei | Medium | High | Medium | High | High | Medium |
| MTK | Medium | High | High | High | Medium | Medium |
| ZTE | Medium | High | High | Medium | Low | Low |
| Nokia | High | High | High | Medium (triggering design is a detail to be discussed later) | Low | Low |
| Qualcomm | High | High | High | High | Medium | Medium |
| DOCOMO | High | High | High | High | Medium | Medium |
| Ericsson | Medium | High | High | Low (can be discussed after determining functionality etc. i.e., Issue 2, Issue 3) | Medium (should also check with RAN4) | Low |
| Samsung | High | High | High | High | Medium | Medium |
| CATT | High | High | Medium | Medium | Medium | Low |
| vivo | Low | High | High | Medium | Low | Low |
| Huawei, HiSilicon | High | High | High | Medium | High | Medium |
| <In Total> | 6H4M1L | 11H | 9H2M | 5H5M1L | 2H6M3L | 6M5L |

For general issues, they are translated as ‘Yes/NO’ questions for your convenience, which each is basically extracted from a proposal of one company:

* **Question G1:** Whether or not should RAN1 consider at least the cases of FR1 unknown cell and FR2 unknown cell, if RAN1 decides to design temporary RS to assist fast SCell activation? [3]
* **Question G2:** Whether or not can UE measure the triggered RS on the BWP indicated by “firstActiveDownlinkBWP-Id” although the BWP is inactive during Scell activation procedure? [1]
* **Question G3:** Whether the accurate timing for SCell activation should be clarified or not [4], i.e. after which time points of time point#1, #2 and #3 in the Figure 1 of [4] is the to-be-activated SCell regarded as activated?
* **Question G4:** Whether or not RAN1 starts the corresponding work only after RAN4 firstly estimate to what extent the delay for activation/deactivation could be reduced and potential improvement, e.g. extra information/assumption, required to reduce the delay?[12]
* **Question G5:** Whether or not in this WI RAN1 to identify and resolve any issue related to simultaneous operation of SCell dormancy and secondary DRX group? [9]
* **Question G6:** Whether or not in this WI RAN1 to consider extending the SCell dormancy mechanism to more efficiently support the SCG dormancy?[9]
* **Question G7:** Whether RAN1 should not work on an enhancement for SCell activation/de-activation for NR-CA with putting aside SCell dormancy? [13]
* **Question G8:** For SCell dormancy, whether is it unnecessary or not to re-open the discussions for the features that were not supported in Rel.16, unless other factors (e.g., SCG suspension) are to be taken into account? [13]
* **Question G9:** Whether or not RAN1 need to further study scenarios, if any, in which gNB knowledge of TCI-state or SSB index for a Scell activation may not be clear enough, such as inter-band CA? [5]

Please feedback either “No need”, “Low”, “Medium” or “High” as priority for the following questions. Your simple justification for it is welcome with details left to Section 3.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Company* | *Question G1* | *Question G2* | *Question G3* | *Question G4* | *Question G5* | *Question G6* | *Question G7* | *Question G8* | *Question G9* |
| Futurewei | No need | Yes | High | No need | No need | No need | High | No need | Medium |
| MTK | High | High | Medium | Low | Low | Low | Medium | Low | Low |
| ZTE | Medium | High | Low | No need | No need | No need | No need | No need | Medium |
| Nokia | Medium | High | High | Medium | Low | Very low | FL question unclear | FL question unclear | Medium |
| Qualcomm | FFS | Yes | Clear | Clear | FFS | Yes | High | Yes | FFS |
| DOCOMO | High | High | Medium | Low | Low | Low | Medium | Low | Medium |
| Ericsson | Medium | Medium | Medium | Medium | Medium | Low (RAN2 discussion) | FL question unclear | Low | Medium |
| Samsung | Medium | Medium | Medium | No need | No need | No need | Medium | No need | No need |
| CATT | Not sure the intention. The temporary RS is applicable to all the cases or design different RS for unknown/known cell case? | High | High | No need | No need | No need | Low | Low | Low |
| vivo | Medium | High | Low | No need | No need | No need | No need | No need | No need |
| Huawei, HiSilicon | Medium | High | Medium | No need | No need | No need | No need | No need | No need |
| <In Total> | 2H6M1N | 7H2M | 3H5M2L | 2M2L6N | 1M3L6N | 4L6N | 2H3M1L3N | 4L5N | 5M2L3N |

In summary, classification of high priority/medium priority items for this e-Meeting

* High priority:
  + Issue-2: The functionality of temporary RS during the SCell activation
  + Issue-3: Candidate RS for the temporary RS
  + Question G2: Whether or not can UE measure the triggered RS on the BWP indicated by “firstActiveDownlinkBWP-Id” although the BWP is inactive during Scell activation procedure?
* Medium priority:
  + Issue-4: Triggering command for temporary RS
  + Issue-1: Triggering command for SCell activation/de-activation
  + Issue-5: Tactivation reduction with BS assistance but no temporary RS nor SSB
  + Question G1: Whether or not should RAN1 consider at least the cases of FR1 unknown cell and FR2 unknown cell, if RAN1 decides to design temporary RS to assist fast SCell activation?
  + Question G3: Whether the accurate timing for SCell activation should be clarified or not [4], i.e. after which time points of time point#1, #2 and #3 in the Figure 1 of [4] is the to-be-activated SCell regarded as activated?
  + Issue-6: Enhancement for CSI reporting
* Low priority:
  + Question G4: Whether or not RAN1 starts the corresponding work only after RAN4 firstly estimate to what extent the delay for activation/deactivation could be reduced and potential improvement, e.g. extra information/assumption, required to reduce the delay?
  + Question G5: Whether or not in this WI RAN1 to identify and resolve any issue related to simultaneous operation of SCell dormancy and secondary DRX group?
  + Question G6: Whether or not in this WI RAN1 to consider extending the SCell dormancy mechanism to more efficiently support the SCG dormancy?
  + Question G7: Whether RAN1 should not work on an enhancement for SCell activation/de-activation for NR-CA with putting aside SCell dormancy?
  + Question G8: For SCell dormancy, whether is it unnecessary or not to re-open the discussions for the features that were not supported in Rel.16, unless other factors (e.g., SCG suspension) are to be taken into account?

Question G9: Whether or not RAN1 need to further study scenarios, if any, in which gNB knowledge of TCI-state or SSB index for a Scell activation may not be clear enough, such as inter-band CA?

# WID

RP-201040:

…

4.1 Objective of SI or Core part WI or Testing part WI

The objective of this work item is to specify enhancements to MR-DC related scenarios. At least the following topics should be considered in the work:

1. Support efficient activation/de-activation mechanism for one SCG and SCells

* Support for one SCG applies to (NG)EN-DC, and NR-DC [RAN2, RAN3, RAN4]
* Support for SCells applies to NR CA, based on RAN1 leading mechanisms [RAN1, RAN2, RAN4]
* This objective applies to FR1 and FR2

1. Support of conditional PSCell change/addition [RAN2,RAN3, RAN4]

* support scenarios which are not addressed in Rel-16 NR mobility WI

…

# Agreements

**FL Proposal 1-rev4 (as Working Assumption)**:

*At least for the case of known cell, temporary RS is supported to expedite the activation process during the SCell activation procedure for efficient SCell activation for both FR1 and FR2:*

         *The temporary RS should provide at least the functionalities of AGC settling and time/frequency tracking during SCell activation procedure.*

         *FFS potential functionalities of CSI measurement/acquisition and cell search*

**FL Proposal 2 –rev3:**

*TRS is selected as temporary RS for Scell activation*

         *If more functionalities are confirmed to be supported by temporary RS, other RS candidates, e.g. aperiodic CSI-RS, P/SP-CSI RS, SRS and RS based on SSS/PSS, are not precluded.*

         *The TRS should be triggered by DCI or MAC-CE. FFS which exact triggering command.*

**FL Proposal 3-rev3**:

*UEs measure the triggered temporary RS during Scell activation procedure no earlier than a slot m:*

         *FFS timeline values m which may need coordination with RAN4.*

         *FFS If the triggered temporary RS can be associated with a BWP, then the measurement above is independent of the activation state of the BWP.*