**3GPP TSG-RAN WG4 Meeting # 98-e R4-2103713**

**Electronic Meeting, 25 Jan. – 5 Feb., 2021**

**Agenda item:** 11.4.2.3

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [98e][232] NR\_RRM\_enh2\_2

**Document for:** Information

# Introduction

The documents in agenda item 11.4.2.3 focus on the following topic

* Topic #1: PUCCH SCell activation/deactivation

# Topic #1: PUCCH SCell activation/deactivation

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2100194 | Apple | ***Proposal 1: in R17, RAN4 defines PUCCH SCell activation/deactivation requirements based on the “legacy R15 SCell activation mechanism” rather than “R16 direct SCell activation from DC/CA enhancement WI”.***  ***Observation: both valid and invalid TA cases shall be specified for PUCCH SCell activation requirement.***  ***Proposal 2: A TA is considered to be valid provided that the TimeAlignmentTimer associated with the TAG containing the PUCCH SCell is running.***  ***Proposal 3: When the TA associated with target PUCCH SCell is valid, this PUCCH SCell activation delay is as same as the normal SCell activation delay in TS38.133 section 8.3.2.***  ***Proposal 4: The three additional delay parts (T1/T2/T3) in LTE PUCCH SCell activation with invalid TA could be reused for NR PUCCH SCell activation with invalid TA. However, the values for T1/T2/T3 might be revisited for NR PUCCH SCell activation.***  ***Proposal 5: In NR PUCCH SCell activation delay requirement with invalid TA, T1 is the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell. T1 is up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].***  ***Proposal 6: In NR PUCCH SCell activation delay requirement with invalid TA, T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated. Tactivate\_basic is the normal SCell activation delay in TS38.133 section 8.3.2. slot n is the slot when UE received PUCCH SCell activation MAC CE.***  ***Proposal 7: In NR PUCCH SCell activation delay requirement with invalid TA, T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.***  ***Proposal 8:*** ***The PUCCH SCell activation delay requirement shall apply provided that,***   * + ***The UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell within Tactivate\_basic otherwise additional delay to activate the SCell is expected; and***   + ***No interruption occurs in same FR as the target PUCCH SCell during the SCell activation procedure if UE supports per-FR MG, otherwise the PUCCH SCell activation delay can be extended, and***   + ***No interruption occurs during the SCell activation procedure if UE does not support per-FR MG, otherwise the PUCCH SCell activation delay can be extended.***   ***The above interruption is caused by factor defined in TS38.133 section 8.2.1.1 for EN-DC, in TS38.133 section 8.2.2.1 for NR SA, in TS38.133 section 8.2.3.1 for NE-DC and*** ***in TS38.133 section 8.2.4.1 for NR-DC.***  ***Proposal 9: only MAC CE based SCell deactivation requirement is specified for PUCCH activated SCell, i.e., no timer based PUCCH SCell deactivation is assumed.***  ***Proposal 10: reuse MAC CE based normal SCell deactivation requirement to PUCCH SCell deactivation requirement.***  ***Proposal 11: reuse the interruption requirement of normal SCell activation/deactivation to the interruption requirement of PUCCH SCell activation/deactivation.*** |
| R4-2100402 | CATT | **Observation 1: It may be needed to add clarification in current specification TS38.133 that the SCell deactivated by expiry of the *sCellDeactivationTimer* is not PUCCH SCell.**  **Observation 2: The SCell Activation/ Deactivation delay requirement in current specification TS38.133 can be reused for PUCCH SCell Activation/ Deactivation.**  **Observation 3: Action time of getting TA for UE to transmit PUCCH on activated SCell should not be included in the PUCCH SCell Activation/ Deactivation delay requirement.** |
| R4-2100711 | Xiaomi | **Proposal 1: If UE has the valid TA on the PUCCH SCell being activated, the basic SCell activation delay defined in section 8.3.2 in TS38.133 can be reused for PUCCH SCell activation.**  **Proposal 2: If UE does not have the valid TA on the PUCCH SCell being activated, an additional UL synchronization procedure to obtain the valid TA shall be considered which including the following factors:**   1. **the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell;** 2. **the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs;** 3. **the delay for applying the received TA for uplink transmission** |
| R4-2100872 | CMCC | SCell Activation Delay Requirement for Deactivated PUCCH SCell  ***Proposal 1: a TA is considered to be valid provided that the TimeAlignmentTimer associated with the TAG containing the PUCCH SCell is running.***  ***Proposal 2: for the case of SCell activation for deactivated PUCCH SCell with valid TA, the SCell activation delay requirement for deactivated SCell specified in section 8.3.2 of TS 38.133 can be reused, which is* (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).**  ***Proposal 3: for the case of SCell activation for deactivated PUCCH SCell with invalid TA, except THARQ + Tactivation\_time +TCSI\_Reporting，additional delay including following parts need to be considered for the SCell activation delay requirements specification:***   * ***the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell*** * ***the delay for obtaining a valid TA command for the sTAG*** * ***the delay for applying the received TA for upling transmission***   SCell Activation Delay Requirement for Deactivated PUCCH SCell with Multiple SCells  ***Proposal 4: for the case of SCell activation for deactivated PUCCH SCell with multiple SCells with valid TA, the SCell activation delay requirement for deactivated SCell with multiple downlink SCells specified in section 8.3.7 of TS 38.133 can be reused, which is (( THARQ + Tactivation\_time\_multiple\_scells +TCSI\_Reporting)/ NR slot length) .***  ***Proposal 5: for the case of SCell activation for deactivated PUCCH SCell with multiple SCells with invalid TA, except THARQ + Tactivation\_time\_multiple\_scells +TCSI\_Reporting，additional delay including following parts need to be considered for the SCell activation delay requirements specification:***   * ***the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell*** * ***the delay for obtaining a valid TA command for the sTAG*** * ***the delay for applying the received TA for upling transmission***   SCell Deactivation Delay Requirement for Activated PUCCH Scell  ***Proposal 6: for the case of SCell deactivation for activated PUCCH SCell, the SCell deactivation delay requirement for activated SCell specified in section 8.3.3 of TS 38.133 can be reused, which is (( THARQ + 3ms)/ NR slot length).***  SCell Deactivation Delay Requirement for Activated PUCCH SCell with Multiple Scells  ***Proposal 7: for the case of SCell deactivation for activated PUCCH SCell with multiple SCells, the SCell deactivation delay requirement for activated SCell with multiple downlink SCells specified in section 8.3.8 of TS 38.133 can be reused, which is (( THARQ + 3ms)/ NR slot length).*** |
| R4-2101046 | NTT DOCOMO, INC. | **Proposal 1: For NR, the same manner as LTE SCell activation delay requirement for deactivated PUCCH SCell should be applied and relaxation factor should be reconsidered.**  **Proposal 2: SCell activation delay requirement for deactivated PUCCH SCell with valid TA should be same as that of SCell activation delay requirement for deactivated SCell.**  **Proposal 3: SCell deactivation delay requirement for activated PUCCH SCell should be same as that of for the normal SCell if there are no special reasons.** |
| R4-2101080 | NEC | **Proposal 1: PUCCH SCell activation delay (TDelay\_PUCCH\_SCell) is defined as: TDelay\_PUCCH\_SCell = TBasic\_SCell\_activation\_delay + TTA\_delay; where, TBasic\_SCell\_activation\_delay is SCell activation delay as described in clause 8.3.2 of TS 38.133; and TTA\_delay is delay required for TA command acquisition and application.**  **Proposal 2: If *TimeAlignmentTimer* is running for the TAG containing the PUCCH SCell, TA is considered valid. If *TimeAlignmentTimer* is not running for the TAG containing the PUCCH SCell, TA is considered invalid.**  **Proposal 3: PUCCH SCell activation delay (TDelay\_PUCCH\_SCell) when the TA is valid is defined as: TDelay\_PUCCH\_SCell = TBasic\_SCell\_activation\_delay; where, TBasic\_SCell\_activation\_delay is SCell activation delay as described in clause 8.3.2 of TS 38.133.**  **Proposal 4: PUCCH SCell activation delay (TDelay\_PUCCH\_SCell) when the TA is valid is defined as: TDelay\_PUCCH\_SCell = TBasic\_SCell\_activation\_delay + T1 + T2 + T3; where,**   * **TBasic\_SCell\_activation\_delay is SCell activation delay as described in clause 8.3.2 of TS 38.133;** * **T1: delay uncertainty in acquiring next available PRACH occasion in the PUCCH SCell;** * **T2: delay for obtaining a valid TA command for the TAG to which the SCell configured with PUCCH belongs;** * **T3: delay for applying the received TA for uplink transmission.**   **Proposal 5: RAN4 to define requirements for PUCCH SCell activation with multiple SCell after requirements for PUCCH SCell activation with single SCell are completed.**    **Proposal 6: RAN 4 to reuse the SCell deactivation requirement of clause 8.3.3 for SCell Deactivation requirements of Activated PUCCH SCell.**  **Proposal 7: RAN 4 to reuse the SCell deactivation requirement of clause 8.3.8 for SCell Deactivation requirements of Activated PUCCH SCell with multiple SCells.** |
| R4-2101380 | vivo | **Proposal 1: For PUCCH SCell with UL synchronization, the activation/deactivated delay requirements for deactivated/activated SCell of different scenarios can be reused for PUCCH SCell activation/deactivation.**  **Proposal 2: Current requirements for SCell activation/deactivation with multiple downlink SCells can be reused for activation/deactivation requirement for PUCCH SCell with multiple downlink SCells of different scenarios if each SCell has UL synchronization.**  **Proposal 3: Based on UL synchronization status, for direct SCell Activation of Multiple Downlink SCells at SCell addition, corresponding requirements can be reused for PUCCH SCell case if the related SCell has UL synchronization.**  **Proposal 4: for all scenarios where Scells being activated/deactivated have not UL synchronization, relaxation on delay requirements should be considered for TA alignment time.** |
| R4-2101391 | Nokia, Nokia Shanghai Bell | **Proposal1: If the UE has a valid TA for transmitting on the PUCCH SCell in NR, the activation delay requirement is the same as the activation delay for activating a non-PUCCH SCell i.e. Tactivation\_time as defined in TS 38.133 section 8.3.2.**  **Proposal2: If the UE does not have a valid TA for transmitting on the PUCCH SCell in NR, the activation delay shall be defined for downlink and uplink actions separately.**  **Proposal3: If the UE does not have a valid TA for transmitting on an SCell, the UE shall be capable to perform downlink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot .**  **Proposal4: If the UE does not have a valid TA for transmitting on an SCell, the UE shall be capable to perform uplink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot , where TRACH is the delay to perform RACH procedure and apply the TA.**  **Proposal5: The SCell deactivation delay for activated PUCCH SCell is the same as the SCell deactivation delay defined in 3GPP TS 38.133 section 8.3.3.** |
| R4-2101536 | OPPO | **Proposal 1: For valid TA case, NR SCell activation delay requirement for deactivated PUCCH SCell should be the same as that for deactivated normal SCell.**  **Proposal 2: For invalid TA case, NR SCell activation delay requirement for deactivated PUCCH SCell should be relaxed, and relaxation factor should be reconsidered.**  **Proposal 3: Activation delay for deactivated PUCCH SCell with direct SCell activation should be separately specified.**  **Proposal 4: For direct SCell activation for PUCCH SCell at handover, only valid TA case should be considered.** |
| R4-2101658 | Huawei, HiSilicon | **Observation 1: It is beneficial to take PUCCH SCell activation and deactivation requirements for E-UTRA as the baseline.**  **Proposal 1: The way to indicate the beam information of the PUCCH SCell being activated to NW needs further discussion.**  **Observation 2: Only RA procedure triggered by a PDCCH order is considered for SCell and the SSB index should be explicitly indicated.**  **Proposal 3: Beam information is needed for NW to initiate the RA for TA updating by a PDCCH order.**  **Proposal 4: The UL spatial relation shall be considered as the UE shall be capable for UL transmission of valid CQI after the PUCCH SCell is activated.** |
| R4-2102365 | Ericsson | **Proposal 1:** Valid TA is defined in similar ways in NR as in EUTRA, i.e., TAT for TAG to which the PUCCH belongs is running. Valid TA implication is same as in EUTRA, i.e., when TA is valid, UE can skip RA at PUCCH SCell activation.  **Proposal 2:** For activation of single PUCCH SCell with valid TA, existing RRM requirements for activation of single downlink NR SCell to be used as baseline.  **Proposal 3:** For activation of single PUCCH SCell with invalid TA, existing RRM requirements for activation of single downlink NR SCell to be used as baseline for completion of downlink actions. Completion of uplink actions are to be further studied.  **Proposal 4:** For activation of multiple PUCCH SCells with valid TA, existing RRM requirements for activation of multiple downlink NR SCells to be used as baseline.  **Proposal 5:** For activation of multiple PUCCH SCells with invalid TA, existing RRM requirements for activation of multiple downlink NR SCells to be used as baseline for completion of downlink actions. Completion of uplink actions are to be further studied.  **Proposal 6:** For deactivation of activated PUCCH SCell(s), existing RRM requirements for deactivation of NR SCell(s) to be used as baseline. |
| R4-2102892 | Qualcomm Incorporated | **Proposal 1: PUCCH SCell activation delay is composed of ‘SCell activation delay’ and ‘TA acquisition/application delay in case of non-valid TA for the cell’**  **Proposal 2: RAN4 to define requirements based on absolute time, i.e. numerology agnostic manner**   * + **Whether and how to quantize the final requirement can be separately discussed in the later stage**   **Proposal 3: RAN4 to prioritize PUCCH SCell in FR1 when there is an available SCell in FR1 with UL if there is a need for frequency range differentiation in specifying requirements** |

## Open issues summary

### Sub-topic 1-1 General

**Issue 1-1-1: The working scope of R17 PUCCH SCell activation/deactivation requirements?**

* Proposals
  + Option 1: (Apple)
    - RAN4 defines PUCCH SCell activation/deactivation requirements based on the “legacy R15 SCell activation mechanism” rather than “R16 direct SCell activation from DC/CA enhancement WI”.
  + Option 2: (OPPO)
    - The PUCCH SCell activation/deactivation based on the ‘direct SCell activation’ should also be considered.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-1-1: The working scope of R17 PUCCH SCell activation/deactivation requirements?** | |
| **Company** | **Comments** |
| Apple | Support option 1, since we did not include R16 direct SCell activation feature in the scope of this WI in RANP discussion. |
| Ericsson | We think Option 1is too limiting in its current form as it is only referring to Rel-15 (single SCell). We would like it to apply also to activation of multiple SCells. |
| Huawei | We slightly prefer option 2. |
| Qualcomm | Support Option 1. Regarding applicability to “multiple SCells”, in our understanding, it has been supported since Rel-15 by the spec even though the corresponding requirements were introduced in Rel-16. In order words, if we agree that the “mechanism” in Option 1 is about signaling not requirement, we believe “multiple SCells” is in the scope of Rel-17PUCCH SCell activation/deactivation. |
| Xiaomi | Support option 1. And we support QC’s explanation on “multiple SCells”. |
| OPPO | Prefer option 2. Our intention is to consider direct Scell activation with PUCCH Scell.  If it was the case mentioned by Apple for this objective, we can also accept option 1. |
| vivo | We are ok to use option 1 as the starting point |
| CATT | Define PUCCH SCell activation/deactivation requirements based on the “legacy R15 SCell activation mechanism” in the current stage. Whether the direct SCell activation is included can be further studied. |
| NEC | We are OK with option 2 |
| NTT DOCOMO, INC. | Option 1 is preferable as the starting point. |
| MTK | Support Option 1. |
| Nokia | We support Option 1.  In last meeting, we agreed the PUCCH SCell activation with direct SCell activation is out of scope of the WI. The existing SCell and multiple SCell activation should be the starting point. Probably some update on Option 1 is needed to also capture multiple SCell activation in Rel16.   * Recommended WF   tentative agreement: Subject to the TU plan, view 1/2/5 are relevant to requirement design and shall be discussed from RAN4 #98e meeting. View 3/4 is out of scope of this WI, since PUCCH SCell activation/deactivation in the WI is based on the “legacy R15 SCell activation” rather than “direct SCell activation from DC/CA enhancement WI”. |

**Issue 1-1-2: If option 2 in issue 1-1-1 is accepted, whether the direct SCell activation delay for deactivated PUCCH SCell should be separately specified?**

* Proposals
  + Option 1: (OPPO(proposal 3))
    - Yes
  + Option 2:
    - No
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-1-2: If option 2 in issue 1-1-1 is accepted, whether the direct SCell activation delay for deactivated PUCCH SCell should be separately specified?** | |
| **Company** | **Comments** |
| Apple | Wait conclusion from issue 1-1-1 |
| Ericsson | It seems something is unclear here. Direct SCell activation is a feature that allows SCell to be configured and immediately activated without first being in deactivated state. Hence there should be no such thing as direct SCell activation of deactivated SCell. Can the proponent please clarify the proposal/OPPO Proposal 3? |
| Qualcomm | On top of our comment in Issue-1-1-1, we share the same view as Ericsson. |
| Xiaomi | Pending on the conclusion on issue 1-1-1. |
| OPPO | As clarified in issue 1-1-1, we considered activation delay for PUCCH SCell by direct SCell activation. We agree with Ericsson there is no direct SCell activation from deactivated status. Sorry for the misleading wording. |
| vivo | Wait conclusion from issue 1-1-1 |
| CATT | Depending on the conclusion of issue 1-1-1. |
| NTT DOCOMO, INC. | Wait conclusion from issue 1-1-1 |
| MTK | Suggest to wait for the conclusion in Issue 1-1-1 |
| Nokia | We should prioritize the discussion on PUCCH SCell activation independently from the direct SCell activation, as agreed in last meeting. After the basic PUCCH SCell activation is concluded, we may further discuss if the scenario with direct SCell activation needs to be considered. |

**Issue 1-1-3: If option 2 in issue 1-1-1 is accepted, which cases would be defined for the direct SCell activation delay for deactivated PUCCH SCell at handover?**

* Proposals
  + Option 1: (OPPO(proposal 4))
    - Only valid TA case is considered.
  + Option 2:
    - Both valid and invalid TA cases are considered.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-1-3: If option 2 in issue 1-1-1 is accepted, which cases would be defined for the direct SCell activation delay for deactivated PUCCH SCell at handover?** | |
| **Company** | **Comments** |
| Apple | Wait conclusion from issue 1-1-1 |
| Ericsson | Please see our comment for Issue 1-1-2 regarding “direct activation of deactivated scell” which is contradictory. Assuming only valid TA here would require that the PUCCH SCell is in pTAG – which would be unnecessarily limiting. Hence we do not agree with Option 1/OPPO Proposal 4. |
| Qualcomm | The same comments as those in the above issues. |
| Xiaomi | Pending on the conclusion on issue 1-1-1. |
| OPPO | The same comments as those in the above issues. Whether to consider direct Scell activation delay for PUCCH Scell depends on issue 1-1-1. |
| CATT | Depending on the conclusion of issue 1-1-1. |
| NEC | Option 2 pending on conclusion of issue 1-1-1 |
| NTT DOCOMO, INC. | Wait conclusion from issue 1-1-1 |
| MTK | Suggest to wait for the conclusion in Issue 1-1-1 |
| Nokia | We should prioritize the discussion on PUCCH SCell activation independently from the direct SCell activation, as agreed in last meeting. After the basic PUCCH SCell activation is concluded, we may further discuss if the scenario with direct SCell activation needs to be considered. |

**Issue 1-1-4: Whether the beam information is needed for NW to initiate the RA for TA updating by a PDCCH order?**

* Proposals
  + Option 1: (Huawei(proposal 3))
    - Yes
  + Option 2:
    - No
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-1-4: Whether the beam information is needed for NW to initiate the RA for TA updating by a PDCCH order?** | |
| **Company** | **Comments** |
| Apple | Agree with option 1 especially when the target SCell is unknown and no any L3 measurement has been reported before activation. |
| Ericsson | It depends on what activation sequence we are assuming. Network gets beam information from CSI reporting for SCell in PCell. After CSI report has been recived, PDCCH order can be sent to UE in SCell (or on cross carrier scheduling cell scheduling the SCell). |
| Huawei | Option 1. Actually it is not an issue to be discussed. Per RAN1and RAN2 spec. RACH on SCell could only be triggered by PDCCH order, where the SSB index shall be explicitly indicated.  To Ericsson’s comments: Whether CSI reporting of the PUCCH SCell could still be performed in the PUCCH in the PCell needs more discussion as it is already configured with PUCCH is activated.  Further comments:  To Qualcomm’s question in issue 1-1-4 amd 1-1-5.  Our initial thinking is that for normal SCell activation, UE could report the L1-RSRP to indicate the beam information to NW on thte PUCCH in the PCell. But for the PUCCH SCell, in our understanding, UE shall be capable of PUCCH transmission after the activation.  If we assume that the L1-RSRP or CQI are also reported in the PUCCH of the PCell as the normal SCell, lots of issues could be avoided, such as no UL spatial relation is needed. But we think the PUCCH SCell activation process could not be considered as completed, and it may not be the typical cases.  We believe it is a general issue as further clarified in Apple’s response in issue 1-1-6. |
| Qualcomm | Option 1. And agree to HW’s comment that “not an issue to be discussed”.  And based on the way how PUCCH SCell activation delay requirements for the case of invalid TA condition are structured by most companies, we do not see a case where NW cannot provide SSB index associated with the PDCCH order based random access transmission because the legacy SCell activation procedure is followed by PDCCH order based PRACH.  However, there can be an issue especially in FR1 because RAN4 hasn’t include TCI activation procedure in the requirement, e.g. L1-RSRP report. We prefer to add the procedure in Rel-16 in accordance with the legacy RAN1/2 spec and leverage it for the procedure of the beam information indicator for PRACH transmission as a part of PUCCH SCell activation.  Besides, there can potentially another issue in FR2 for non-BC capable UE and/or Rel-16 CSI-RS only based enhanced BC capable UE.  Just to better understand the context of “as it is already configured with PUCCH is activated” in HW’s comment, can HW elaborate on it? |
| OPPO | Prefer option 1. The comments from Huawei and QC make sense to us. |
| CATT | Need clarification that this is for invalid case. And agree that whether the CSI reporting of the PUCCH SCell could be performed in the PCell needs to be discussed. |
| NEC | Before agreeing on the beam information is needed or not, in our view RAN4 should agree on whether CSI report of PUCCH SCell is transmitted on PCell or PUCCH of PUCCH SCell to be activated. |
| NTT DOCOMO, INC. | We support option 1 in principle. As stated by each company, we need more discussion that how and when NW should know beam information to be used for the SCell to be activated. |
| MTK | Support option1 |
| Nokia | Fine with Option 1 but we do not see any issue here.  We understood the network is able to know the beam information by receiving CSI reporting from the UE. For PUCCH SCell activation, the UE may send the invalid CSI reporting via PCell which can then trigger the PDCCH order. After the UE acquires the TA via RACH, the UE need send valid CSI reporting via PUCCH SCell. |

**Issue 1-1-5: Whether the beam information of the PUCCH SCell being activated is needed to be indicated to NW?**

* Proposals
  + Option 1: (Huawei(proposal 1))
    - Yes
  + Option 2:
    - No
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-1-5: Whether the beam information of the PUCCH SCell being activated is needed to be indicated to NW?** | |
| **Company** | **Comments** |
| Apple | Needs more discussion, and we may need to differentiate unknown and known cases, e.g., if target SCell is known, then the previous L3 measurement report may help network to know which SSB beam is the best for RACH. |
| Ericsson | See our comment on 1-1-4. It depends on which activation sequence is assumed. |
| Huawei | We support option 1. According to the requirements for PUCCH SCell for E-UTRA, UE shall be capable to transmit CQI on the PUCCH SCell. For NR, if the being–activated SCell is unknown , then UE how to report the beam information for TCI configuration, etc. shall be discussed. For original SCell, UE could report the L1-RSRP on the PUCCH of PCell/PSCell. But for PUCCH SCell, when the UE is ready to UL transmission or whether the UE shall report the L1-RSRP on the PUCCH of PCell and PSCell shall be discussed. |
| Qualcomm | The same comment as Issue 1-1-4. We agree that this needs further discussion about, e.g. known vs. unknow cell, activation sequences for different SCell/serving cell conditions, etc.  Can HW provide some more detailed background of the idea “for PUCCH SCell, when the UE is ready to UL transmission or whether the UE shall report the L1-RSRP on the PUCCH of PCell and PSCell shall be discussed.”? Were there any relevant discussions? I believe I can understand what this implies but it sounds kind of an up-scoping. |
| CATT | Need more discussion. Same as issue 1-1-4, the uplink action for PUCCH SCell activation such as what information needs to be reported and which cell the report is transmitted needs to be discussed. |
| NEC | Agree that known and unknown cases should be differentiated. On top of that should also agree whether L1-RSRP is transmitted on spCell or SCell. |
| NTT DOCOMO, INC. | Same view as issue 1-1-4. |
| MTK | Support option 1 |
| Nokia | Same comments as to Issue 1-1-4. |

**Issue 1-1-6: Whether the UL spatial relation should be considered for PUCCH SCell activation?**

* Proposals
  + Option 1: (Huawei)
    - Yes
  + Option 2:
    - No
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-1-6: Whether the UL spatial relation should be considered for PUCCH SCell activation?** | |
| **Company** | **Comments** |
| Apple | Revised a typo in our comment:  May need more discussion because it depends on whether UE report CQI from PCell PUCCH or ~~P~~SCell PUCCH. |
| Ericsson | UL spatial relation needs to be considered. |
| Huawei | We support option 1. Based on the requirements for E-UTRA, then ending point is when the UE is ready for CQI on the PUCCH SCell. For NR, the UL spatial relation shall be considered for PUCCH SCell activation for UL transmission. |
| Qualcomm | Option 1. Can Apple elaborate on how it differs by which SpCell UE reports CQI to?  Apple response: that was a typo in our comment, we tended to comment that “it depends on whether UE reports CQI from PCell PUCCH or SCell PUCCH”. If CQI is reported via PCell PUCCH, we assume the uplink spatial relation is known for PCell PUCCH; otherwise if it’s via being-activated SCell PUCCH, then we may need to consider the status of UL spatial relation for being-activated SCell PUCCH. |
| NEC | Assuming PUCCH SCell activation end point is CSI reporting, we agree with option 1. Our understanding is CSI reporting is transmitted on PUCCH SCell. If it is not the case, RACH may not be required for PUCCH SCell activation completion (just like normal SCell activation). |
| NTT DOCOMO, INC. | Similar view as issue 1-1-4 but we support option 1 in principle. We need more discussion about physical layer procedure of PUCCH SCell activation. |
| MTK | Support option 1 |
| Nokia | Option2.  We understood the UE can use any Tx beam during the random access procedure. After the PUCCH SCell activation is completed i.e. the valid CSI reporting is sent, the UL spatial relation may be considered via Tx beam selection. But this would not impact the SCell activation procedure. Is it a must for the UE to get UL spatial relation during or even before RACH? |

### Sub-topic 1-2 PUCCH SCell activation requirements

**Issue 1-2-1: The condition that TA of target PUCCH SCell is valid?**

* Proposals
  + Option 1: (Apple, CMCC, NEC, Ericsson)
    - A TA is considered to be valid provided that the *TimeAlignmentTimer* associated with the TAG containing the PUCCH SCell is running.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-1: The condition that TA of target PUCCH SCell is valid?** | |
| **Company** | **Comments** |
| Apple | Option 1. |
| Ericsson | Option 1. This is the definition of valid time alignment for a TAG. |
| Huawei | We support option 1. |
| Qualcomm | Option 1. |
| Xiaomi | OK with option1 |
| OPPO | Option 1 |
| CATT | Support option 1. |
| NEC | Option 1 |
| CMCC | Option 1. |
| NTT DOCOMO, INC | Support option 1. |
| MTK | Support option 1. Follow the similar logic as LTE |
| Nokia | Support Option 1. |

**Issue 1-2-2: The PUCCH SCell activation delay when TA of target PUCCH SCell is valid?**

* Proposals
  + Option 1: (Apple, CATT, Xiaomi, CMCC, NTT DOCOMO, NEC, vivo, Nokia, OPPO)
    - Same as the normal SCell activation delay in TS38.133 section 8.3.2 which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).
  + Option 2: (Ericsson)
    - Existing RRM requirements for activation of single downlink NR SCell to be used as baseline.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-2: The PUCCH SCell activation delay when TA of target PUCCH SCell is valid?** | |
| **Company** | **Comments** |
| Apple | Option 1. |
| Ericsson | Same options. Support Option 1. |
| Qualcomm | Option 1. |
| Xiaomi | Support option1 |
| OPPO | Option 1 |
| vivo | Option 1 |
| CATT | Support option 1. |
| NEC | Option 1 |
| CMCC | Option 1. |
| NTT DOCOMO, INC | Support option 1. |
| MTK | Support option 1 |
| Nokia | Support Option1. |

**Issue 1-2-3: Compared to valid case, whether the NR PUCCH SCell activation delay requirements should be relaxed for invalid TA case?**

* Proposals
  + Option 1: (Apple, Xiaomi, CMCC, NTT DOCOMO, NEC, Qualcomm, OPPO, vivo, Nokia)
    - Yes.
  + Option 2:
    - No.
* Recommended WF
  + *Option 1 is recommended as majority view.*

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| **Issue 1-2-3: Compared to valid case, whether the NR PUCCH SCell activation delay requirements should be relaxed for invalid TA case?** | |
| **Company** | **Comments** |
| Apple | Agree with recommended WF. |
| Ericsson | It is incorrect to be talking about “relaxation”. There are additional procedural steps to take when TA is invalid, and those steps are well-defined so rather it is a matter of executing some procedural steps when TA is valid and some additional steps when TA is invalid. The additional steps mean additional delay, obviously. |
| Huawei | Similar views as Ericsson. Extra procedures are needed to obtain the TA. Relaxation is strong. |
| Qualcomm | Option 1. And we agree to Ericsson’s comment that the wording ‘relaxation’ can be misleading. |
| Xiaomi | Option 1, and agree with Ericssion’s comment on “relaxation”. Additional delay due to extra procedure for UL synchronization need to be considered. |
| OPPO | Option 1. Agree with Ericsson, additional delay is expected for invalid TA case. |
| vivo | Option 1 and same view on wordings. |
| CATT | Support option 1. And fine with Ericsson’s comment on the wording. Maybe it can be refined as:  **‘Compared to valid TA case, additional delay is needed for the NR PUCCH SCell activation delay requirements with invalid TA’** |
| NEC | Agree with Ericsson comments. Option 1 |
| NTT DOCOMO, INC | Support option 1 and agree with Ericsson’s comment. |
| MTK | Support option 1. For invalid case, the PUCCH SCell needs additional time to obtain the time alignment information. |
| Nokia | Support Option1. |

**Issue 1-2-4: The additional delay parts for NR PUCCH SCell activation with invalid TA?**

* Proposals
  + Option 1: (Apple, Xiaomi, CMCC, NTT DOCOMO, NEC, Qualcomm)
    - The following three additional delay parts (T1/T2/T3) in LTE PUCCH SCell activation with invalid TA could be reused for NR PUCCH SCell activation with invalid TA.
      * the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell
      * the delay for obtaining a valid TA command for the sTAG
      * the delay for applying the received TA for upling transmission
  + Option 1a: (Apple, NTT DOCOMO)
    - The values for T1/T2/T3 might be revisited for NR PUCCH SCell activation.
  + Option 2: (Nokia)
    - The UE shall be capable to perform downlink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot .
    - The UE shall be capable to perform uplink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot , where TRACH is the delay to perform RACH procedure and apply the TA.
  + Option 3: (CATT)
    - Action time of getting TA for UE to transmit PUCCH on activated SCell should not be included in the PUCCH SCell Activation/ Deactivation delay requirement.
  + Option 4: (Ericsson)
    - Existing RRM requirements for activation of single downlink NR SCell to be used as baseline for completion of downlink actions. Completion of uplink actions are to be further studied.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-4: The additional delay parts for NR PUCCH SCell activation with invalid TA?** | |
| **Company** | **Comments** |
| Apple | Support option 1/1a, we could use LTE PUCCH SCell activation procedure as baseline to define the NR PUCCH SCell activation requirement. The PUCCH SCell activation requirement is to make sure the DL and UL(PUCCH) is ready to use by UE and network after activation, and therefore the TA acquisition time for target PUCCH shall also be included in the PUCCH SCell activation time with invalid TA. |
| Ericsson | For Option 1, I would expect that also some uncertainty in receiving PDCCH order. Additionally, for UE that is not fulfilling beam correspondance there could be different delays from those outline. Hence propose to look further into the specifics for NR rather than defining the steps solely based on LTE legacy.  For Option 2, it is a bit unclear why CSI reporting is not considered part of the downlink actions. CSI can be reported in PCell for SCell.  For Option 3, our view is that TA acquisition shall be included in the PUCCH SCell activation time, if needed i.e. when TA for sTAG is invalid. For deactivation time it has no meaning. |
| Huawei | We generally agree with option 4. Completion of uplink actions need further discussion based on the issues above. |
| Qualcomm | In principle, we agree to Option 1 and 1a. For further detailed discussion, we would like to propose to consider the issues brought up in Issue 1-1-4 (including QC’s 2 suggestions) |
| Xiaomi | Support option 1/1a in general. And we can further discuss the delay for valid TA acquisition. |
| OPPO | Support option 1/1a as baseline. How to handle the procedure of beam information indicator for PRACH transmission can be further discussed. |
| vivo | Prefer to use option 1/1a as the baseline |
| CATT | Further discussion is needed for the completion of downlink and uplink actions as discussed in issue 1-1-4 and 1-1-5.  During the discussion on HO with PSCell, it is known that the ending point of PSCell addition is defined as the point that UE is capable to transmit PRACH preamble, then whether the ending point of PUCCH SCell activation can also be defined as the point that UE is capable to transmit PRACH preamble towards the target PUCCH SCell similarly? |
| NEC | We can consider option 1/1a as baseline |
| CMCC | Option 1/1a. Our consideration is to use the requirements for LTE PUCCH SCell activation with invalid TA as baseline to specify the related requirements for NR cases. As for the exact value of T1/T2/T3, we can have further discussion. And in our understanding, at least T1/T2/T3 is needed for the invalid case. Except T1/T2/T3, whether other additional delay is needed for NR case, we are open to have further discussion. |
| NTT DOCOMO, INC. | We support option 1/1a as a starting point. |
| MTK | Support option 1 and 1a. The similar logic as LTE can be reused in NR. |
| Nokia | Support Option 2.  We understood the principle for PUCCH SCell activation delay in LTE could be adopted as the baseline. All the listed options are actually following the principle. The difference is if we exactly follow T1,T2,T3 in NR. In our view, we can further clarify the UE behavior and identify the difference from LTE, which explains why we put TRACH in Option 2 to generalize the time period.  To E///’s question: For DL activation delay, the TCSI-reporting is put as a separate parameter from Tactivation (while in LTE, the CSI reporting time is counted in Tactivation\_basic). But the DL action can be performed already before CSI reporting; that’s why we remove TCSI-reporting from the DL SCell activation delay. We think this gives more correct timing for DL operation. |

**Issue 1-2-5: The delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (i.e. T1)?**

* Proposals
  + Option 1: (Apple)
    - T1 is up to the summation of SSB to PRACH occasion association period and 10 ms.
    - SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-5: The delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (i.e. T1)?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | First need to agree on 1-2-4 |
| Huawei | It depends on the issue that whether the beam information is needed for triggering RACH and whether extra delay will be introduced. |
| Qualcomm | For the details about T1, other aspects may also have to be accounted for in, e.g. non-BC capable UE if considered. |
| Xiaomi | Wait for the conclusion on issue 1-2-4. |
| OPPO | Pending issue 1-2-4. |
| NEC | Agree with comments from Huawei. Uncertainty of PDCCH order to trigger PRACH may needs to be considered |
| NTT DOCOMO, INC. | We need the conclusion of issue 1-2-4 first. |
| MTK | Wait for the conclusion on issue 1-2-4. |
| Nokia | We can come back to the detailed values after concluding on additional procedures to activate the PUCCH SCell in Issue 1-2-4. |

**Issue 1-2-6: The delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)?**

* Proposals
  + Option 1: (Apple)
    - T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated.
    - Tactivate\_basic is the normal SCell activation delay in TS38.133 section 8.3.2.
    - Slot n is the slot when UE received PUCCH SCell activation MAC CE.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-6: The delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | First need to agree on 1-2-4 |
| Qualcomm | Support Option 1 in principle. |
| Xiaomi | Wait for the conclusion on issue 1-2-4. |
| OPPO | Support Option 1 in principle |
| NTT DOCOMO, INC. | We need the conclusion of issue 1-2-4 first. |
| MTK | Wait for the conclusion on issue 1-2-4. |
| Nokia | We can come back to the detailed values after concluding on additional procedures to activate the PUCCH SCell in Issue 1-2-4. |

**Issue 1-2-7: The delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)?**

* Proposals
  + Option 1: (Apple)
    - T3 is greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-7: The delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | First need to agree on 1-2-4 |
| Qualcomm | Support Option 1 in principle. |
| Xiaomi | Wait for the conclusion on issue 1-2-4. |
| OPPO | Support Option 1 in principle |
| NTT DOCOMO, INC. | We need the conclusion of issue 1-2-4 first. |
| MTK | Wait for the conclusion on issue 1-2-4. |
| Nokia | We can come back to the detailed values after concluding on additional procedures to activate the PUCCH SCell in Issue 1-2-4. |

**Issue 1-2-8: Applicability of PUCCH SCell activation requirements?**

* Proposals
  + Option 1: (Apple)
    - The PUCCH SCell activation delay requirement shall apply provided that,
      * The UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell within Tactivate\_basic otherwise additional delay to activate the SCell is expected; and
      * No interruption occurs in same FR as the target PUCCH SCell during the SCell activation procedure if UE supports per-FR MG, otherwise the PUCCH SCell activation delay can be extended, and
      * No interruption occurs during the SCell activation procedure if UE does not support per-FR MG, otherwise the PUCCH SCell activation delay can be extended.
      * The above interruption is caused by factor defined in TS38.133 section 8.2.1.1 for EN-DC, in TS38.133 section 8.2.2.1 for NR SA, in TS38.133 section 8.2.3.1 for NE-DC and in TS38.133 section 8.2.4.1 for NR-DC.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-2-8: Applicability of PUCCH SCell activation requirements?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | First need to settle the basics on which steps are taken and in which order during the activation. |
| Qualcomm | Support Option 1 in principle. And agree to Ericsson’s comment. |
| vivo | Ok with option 1 |
| CATT | Generally support option 1. |
| NEC | Similar view as Ericsson |
| NTT DOCOMO, INC. | Agree with Ericsson’s comment but we can agree with option 1 as a baseline. |
| MTK | Support option 1 |
| Nokia | We can come back to this after concluding on additional procedures to activate the PUCCH SCell in Issue 1-2-4. |

### Sub-topic 1-3 SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells

**Issue 1-3-1: SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells with valid TA?**

* Proposals
  + Option 1: (CMCC, vivo)
    - Reuse the SCell activation delay requirement for deactivated SCell with multiple downlink SCells specified in section 8.3.7 of TS 38.133, which is (( THARQ + Tactivation\_time\_multiple\_scells +TCSI\_Reporting)/ NR slot length).
  + Option 2: (Ericsson)
    - Existing RRM requirements for activation of multiple downlink NR SCells to be used as baseline.
  + Option 3: (NEC)
    - RAN4 to define requirements for PUCCH SCell activation with multiple SCell after requirements for PUCCH SCell activation with single SCell are completed.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-3-1: SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells with valid TA?** | |
| **Company** | **Comments** |
| Apple | Based on the work plan, option 3 is fine. |
| Ericsson | Options 1 and 2 are the same. |
| Huawei | According to the work plan, it is suggested to focus on single CC activation. |
| Qualcomm | Do not see an issue with Option 1 for now, but prefer to discuss it when activation requirements get matured, i.e. Option 3. |
| Xiaomi | We prefer to focus on single CC activation/deactivation first. |
| OPPO | Prefer to focus on single Scell activation in this meeting, |
| vivo | Ok with option 1 and 2. Ok to focus on single CC performance firstly. |
| CATT | Fine with Option 3. |
| NEC | Similar comments as Qualcomm, prefer option 3 at this stage |
| CMCC | We are also fine to follow the WP to focus on single CC scenario for this meeting. |
| NTT DOCOMO, INC. | We support option 3 according to work plan. |
| MTK | Support option 1 |
| Nokia | Support Option 3. We need prioritize the PUCCH SCell activation. |

**Issue 1-3-2: Additional delay parts for SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells with invalid TA?**

* Proposals
  + Option 1: (CMCC)
    - For the case of SCell activation for deactivated PUCCH SCell with multiple SCells with invalid TA, except ***THARQ +*** Tactivation\_time\_multiple\_scells +TCSI\_Reporting, additional delay including the following parts need to be considered:
      * the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell
      * the delay for obtaining a valid TA command for the sTAG
      * the delay for applying the received TA for upling transmission.
  + Option 2: (vivo)
    - Relaxation on delay requirements should be considered for TA alignment time.
  + Option 3: (Ericsson)
    - Existing RRM requirements for activation of multiple downlink NR SCells to be used as baseline for completion of downlink actions. Completion of uplink actions are to be further studied.
  + Option 4: (NEC)
    - RAN4 to define requirements for PUCCH SCell activation with multiple SCell after requirements for PUCCH SCell activation with single SCell are completed.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-3-2: Additional delay parts for SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells with invalid TA?** | |
| **Company** | **Comments** |
| Apple | Based on the work plan, option 4 is fine. |
| Huawei | According to the work plan, it is suggested to focus on single CC activation. |
| Qualcomm | From a high-level perspective, we prefer not to differentiate requirements for single-cell and multi-cell other in terms of UL TA acquisition requirement. We can further check if there can be any foreseeable detailed issues/aspects that need to be taken into account. Our underlying principle is to avoid defining separate requirements for unnecessarily complicated scenarios/optimizations just because there are possible/not-prevented cases. |
| Xiaomi | We prefer to focus on single CC activation/deactivation first. |
| vivo | Ok with option 4. |
| CATT | Fine with option 4. |
| NEC | Prefer option 4 at this stage |
| CMCC | We are also fine to follow the WP to focus on single CC scenario for this meeting. |
| NTT DOCOMO, INC. | We support option 4 according to work plan. |
| MTK | Support option 4. |
| Nokia | Support Option 4. We need prioritize the PUCCH SCell activation. |

### Sub-topic 1-4 PUCCH SCell deactivation requirements

**Issue 1-4-1: The type of PUCCH SCell deactivation requirements?**

* Proposals
  + Option 1: (Apple)
    - Only MAC CE based SCell deactivation requirement is specified for PUCCH activated SCell, i.e., no timer based PUCCH SCell deactivation is assumed.
  + Option 2: (CATT)
    - Add clarification in current specification TS38.133 that the SCell deactivated by expiry of the *sCellDeactivationTimer* is not PUCCH SCell.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-4-1: The type of PUCCH SCell deactivation requirements?** | |
| **Company** | **Comments** |
| Apple | Option1 and option 2 is similar. Both of them mean there is no timer based PUCCH SCell deactivation. |
| Ericsson | Agree with Option 1.  We do not support Option 2. The UE cannot end up in timer-based deactivation of PUCCH SCell, as functionality defined by RAN1 and RAN2 prevents it. There is no additional UE-behaviour to describe by RAN4. Hence there is no meaning adding such clarification. It would only clutter the 38.133 specification. |
| Huawei | We are fine with either option 1 or option 2. |
| Qualcomm | Option 1. Do not see a reason to discuss/add any information to RAN4 spec. |
| OPPO | Option 1 is fine. |
| vivo | Option 1 is fine |
| CATT | Option 1 and option 2 are the same. The intention of option 2 is also to clarify there is no timer based PUCCH SCell deactivation which imply that the SCell deactivated by timer expiry cannot be PUCCH Scell. |
| NEC | Ok with option 1 |
| NTT DOCOMO, INC. | Option 1 is fine. |
| MTK | Support Option 1 and option 2. These two options do not conflict with each other. |
| Nokia | Option1. We share E///’s view above. |

**Issue 1-4-2: The PUCCH SCell deactivation requirements?**

* Proposals
  + Option 1: (Apple, CATT, CMCC, NTT DOCOMO, NEC, vivo, Nokia)
    - Reuse MAC CE based normal SCell deactivation requirement specified in section 8.3.3 of TS 38.133, which is ((THARQ + 3ms)/ NR slot length).
  + Option 2: (Ericsson)
    - Existing RRM requirements for deactivation of NR SCell(s) to be used as baseline.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-4-2: The PUCCH SCell deactivation requirements?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | Options 1 and 2 are the same. |
| Qualcomm | Option 1. |
| Xiaomi | Fine with option 1. |
| OPPO | Option 1. |
| vivo | Option 1 |
| CATT | Option 1. |
| NEC | Option 1 |
| CMCC | Option 1. |
| NTT DOCOMO, INC. | Option 1 |
| MTK | Support option 1 |
| Nokia | Option 1. |

### Sub-topic 1-5 SCell deactivation delay requirement for activated PUCCH SCell with multiple SCells

**Issue 1-5-1: SCell deactivation delay requirement for activated PUCCH SCell with multiple SCells?**

* Proposals
  + Option 1: (CMCC, NEC, vivo)
    - Reuse the SCell deactivation delay requirement for activated SCell with multiple downlink SCells specified in section 8.3.8 of TS 38.133, which is (( THARQ + 3ms)/ NR slot length).
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-5-1: SCell deactivation delay requirement for activated PUCCH SCell with multiple SCells?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | Fine with Option 1. |
| Huawei | According to the work plan, it is suggested to focus on single CC deactivation. |
| Qualcomm | Option 1. |
| Xiaomi | Fine with option 1 |
| vivo | Option 1 |
| CATT | Fine with option 1. |
| NEC | Option 1 |
| CMCC | In our view, there is no issue for option 1. But we are OK to follow the WP to focus on single CC scenario for this meeting. |
| NTT DOCOMO, INC. | Support option 1. Basically the case of multiple SCells should be discussed after single SCell case discussion. But there seems to be no discussion point about deactivation delay. |
| MTK | Support option 1 |
| Nokia | We can prioritize the PUCCH SCell activation according to the work plan. |

### Sub-topic 1-6 Interruption caused by PUCCH SCell activation/deactivation

**Issue 1-6-1: Interruption requirements for PUCCH SCell activation/deactivation?**

* Proposals
  + Option 1: (Apple)
    - Reuse the interruption requirement of normal SCell activation/deactivation.
* Recommended WF
  + *Need more discussion.*

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| **Issue 1-6-1: Interruption requirements for PUCCH SCell activation/deactivation?** | |
| **Company** | **Comments** |
| Apple | Option 1 |
| Ericsson | Needs to be further discussed after settling the activation sequence. For deactivation it is fine, though. |
| Huawei | The procedures of activation process need to be concluded first. |
| Qualcomm | Option 1 as a baseline for a valid-TA scenario. For the other case, we want a further investigation. |
| Xiaomi | For invalid TA case, the interruption need further discussion. |
| OPPO | Option 1 is fine. At least we can agree on valid TA case. |
| vivo | Too early to have any conclusion. |
| CATT | Need further discussion considering the PUCCH SCell activation procedure. |
| NEC | Similar views as other companies. Activation sequence/procedure should be agreed first. |
| NTT DOCOMO, INC. | We have also similar view as other companies. Activation procedure should be discussed first. |
| MTK | Support option 1 |
| Nokia | At least Option 1 could be the starting point. If we identify additional interruption due to PUCCH SCell activation, we may come back to this and update. |

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary** |
| **Sub-topic 1-1** | **Issue 1-1-1: The working scope of R17 PUCCH SCell activation/deactivation requirements?**  *Tentative agreements:*  RAN4 defines PUCCH SCell activation/deactivation requirements based on the “legacy R15 SCell activation mechanism” rather than “R16 direct SCell activation from DC/CA enhancement WI”.  *Candidate options:*  *None.*  *Recommendations for 2nd round:*  *No more discussion.*  **Issue 1-1-4: Whether** **the beam information is needed for NW to initiate the RA for TA updating by a PDCCH order?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Huawei, Apple, Qualcomm, OPPO, NTT DOCOMO, MTK, Nokia)   + The beam information is needed for NW to initiate the RA for TA updating by a PDCCH order * Option 2: (Ericsson)   + Depends on what activation sequence we are assuming. * Option 2a: (NEC, CATT)   + Agree on whether CSI report of PUCCH SCell is transmitted on PCell or PUCCH of PUCCH SCell to be activated first.   *Recommendations for 2nd round:*  *Need more discussion.*  **Issue 1-1-5: Whether the beam information of the PUCCH SCell being activated is needed to be indicated to NW?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Huawei, MTK, Nokia)   + The beam information of the PUCCH SCell being activated is needed to be indicated to NW * Option 2: (Ericsson, Qualcomm)   + Depends on what activation sequence we are assuming. * Option 3: (Apple, Qualcomm, NEC)   + Need to differentiate unknown and known cases. * Option 4: (NEC)   + Agree on whether L1-RSRP is transmitted on spCell or SCell first.   *Recommendations for 2nd round:*  *Need more discussion.*  **Issue 1-1-6: Whether the UL spatial relation should be considered for PUCCH SCell activation?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Huawei, Ericsson, Qualcomm, NTT DOCOMO, MTK)   + Yes * Option 2: (Nokia)   + No * Option 3: (Apple)   + Depends on whether UE report CQI from PCell PUCCH or SCell PUCCH   *Recommendations for 2nd round:*  *Need more discussion.* |
| **Sub-topic 1-2** | **Issue 1-2-1: The condition that TA of target PUCCH SCell is valid?**  *Tentative agreements:*  A TA is considered to be valid provided that the *TimeAlignmentTimer* associated with the TAG containing the PUCCH SCell is running.  *Candidate options:*  *None.*  *Recommendations for 2nd round:*  *No more discussion.*  **Issue 1-2-2: The PUCCH SCell activation delay when TA of target PUCCH SCell is valid?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple, CATT, Xiaomi, CMCC, NTT DOCOMO, NEC, vivo, Nokia, OPPO, Qualcomm, Ericsson, MTK)   + Same as the normal SCell activation delay in TS38.133 section 8.3.2 which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).   *Recommendations for 2nd round:*  *Depends on the conclusion of issue 1-1-5 and 1-1-6. Need more discussion.*  **Issue 1-2-3: Compared to valid case, whether the NR PUCCH SCell activation delay requirements should be relaxed for invalid TA case?**  *Tentative agreements:*  Compared to valid TA case, additional delay is needed for the NR PUCCH SCell activation delay requirements with invalid TA.  *Candidate options:*  *None.*  *Recommendations for 2nd round:*  *No more discussion.*  **Issue 1-2-4: The additional delay parts for NR PUCCH SCell activation with invalid TA?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple, Xiaomi, CMCC, NTT DOCOMO, NEC, Qualcomm, vivo, OPPO, MTK)   + The following three additional delay parts (T1/T2/T3) in LTE PUCCH SCell activation with invalid TA could be reused for NR PUCCH SCell activation with invalid TA.     - the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell     - the delay for obtaining a valid TA command for the sTAG     - the delay for applying the received TA for upling transmission   + The values for T1/T2/T3 might be revisited for NR PUCCH SCell activation. * Option 2: (Nokia)   + The UE shall be capable to perform downlink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot .   + The UE shall be capable to perform uplink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot , where TRACH is the delay to perform RACH procedure and apply the TA. * Option 3: (CATT)   + Further discussion is needed for the completion of downlink and uplink actions. * Option 4: (Ericsson, Huawei)   + Existing RRM requirements for activation of single downlink NR SCell to be used as baseline for completion of downlink actions. Completion of uplink actions are to be further studied.   *Recommendations for 2nd round:*  *Further discussion is needed.*  **Issue 1-2-5: The delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (i.e. T1)?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple)   + T1 is up to the summation of SSB to PRACH occasion association period and 10 ms.   + SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].   *Recommendations for 2nd round:*  *Wait for the conclusion on issue 1-2-4 and issue 1-1-4.*  **Issue 1-2-6: The delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple, Qualcomm, OPPO)   + T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated.   + Tactivate\_basic is the normal SCell activation delay in TS38.133 section 8.3.2.   + Slot n is the slot when UE received PUCCH SCell activation MAC CE.   *Recommendations for 2nd round:*  *Wait for the conclusion on issue 1-2-4.*  **Issue 1-2-7: The delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple, Qualcomm, OPPO)   + T3 is greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.   *Recommendations for 2nd round:*  *Wait for the conclusion on issue 1-2-4.*  **Issue 1-2-8: Applicability of PUCCH SCell activation requirements?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple, Qualcomm, vivo, CATT, NTT DOCOMO, MTK)   + The PUCCH SCell activation delay requirement shall apply provided that,     - The UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell within Tactivate\_basic otherwise additional delay to activate the SCell is expected; and     - No interruption occurs in same FR as the target PUCCH SCell during the SCell activation procedure if UE supports per-FR MG, otherwise the PUCCH SCell activation delay can be extended, and     - No interruption occurs during the SCell activation procedure if UE does not support per-FR MG, otherwise the PUCCH SCell activation delay can be extended.     - The above interruption is caused by factor defined in TS38.133 section 8.2.1.1 for EN-DC, in TS38.133 section 8.2.2.1 for NR SA, in TS38.133 section 8.2.3.1 for NE-DC and in TS38.133 section 8.2.4.1 for NR-DC. * Option 2: (Ericsson, Qualcomm, NEC, NTT DOCOMO)   + - Need to settle the basics on which steps are taken and in which order during the activation first.   *Recommendations for 2nd round:*  *Wait for the conclusion on other issues. Focus on PUCCH SCell activation/deactivation procedure first.* |
| **Sub-topic 1-3** | **Issue 1-3-1: SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells with valid TA?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (CMCC, vivo)   + Reuse the SCell activation delay requirement for deactivated SCell with multiple downlink SCells specified in section 8.3.7 of TS 38.133, which is (( THARQ + Tactivation\_time\_multiple\_scells +TCSI\_Reporting)/ NR slot length).   *Recommendations for 2nd round:*  *No more discussion in 2nd round. Focus on the single PUCCH SCell activation requirements first.*  **Issue 1-3-2: Additional delay parts for SCell activation delay requirement for deactivated PUCCH SCell with multiple SCells with invalid TA?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (CMCC)   + For the case of SCell activation for deactivated PUCCH SCell with multiple SCells with invalid TA, except ***THARQ +*** Tactivation\_time\_multiple\_scells +TCSI\_Reporting, additional delay including the following parts need to be considered:     - the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell     - the delay for obtaining a valid TA command for the sTAG     - the delay for applying the received TA for upling transmission. * Option 2: (Qualcomm)   + Not to differentiate requirements for single-cell and multi-cell other in terms of UL TA acquisition requirement.   *Recommendations for 2nd round:*  *No more discussion in 2nd round. Focus on the single PUCCH SCell activation requirements first.* |
| **Sub-topic 1-4** | **Issue 1-4-1: The type of PUCCH SCell deactivation requirements?**  *Tentative agreements:*  Only MAC CE based SCell deactivation requirement is specified for PUCCH activated SCell, i.e., no timer based PUCCH SCell deactivation is assumed.  *Candidate options:*  *None.*  *Recommendations for 2nd round:*  *No more discussion.*  **Issue 1-4-2: The PUCCH SCell deactivation requirements?**  *Tentative agreements:*  Reuse MAC CE based normal SCell deactivation requirement specified in section 8.3.3 of TS 38.133, which is ((THARQ + 3ms)/ NR slot length).  *Candidate options:*  *None.*  *Recommendations for 2nd round:*  *No more discussion.* |
| **Sub-topic 1-5** | **Issue 1-5-1: SCell deactivation delay requirement for activated PUCCH SCell with multiple SCells?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (CMCC, NEC, vivo, Apple, Ericsson, Qualcomm, Xiaomi, CATT, NTT DOCOMO, MTK)   + Reuse the SCell deactivation delay requirement for activated SCell with multiple downlink SCells specified in section 8.3.8 of TS 38.133, which is (( THARQ + 3ms)/ NR slot length).   *Recommendations for 2nd round:*  *No more discussion in 2nd round. Focus on the single PUCCH SCell deactivation requirements first.* |
| **Sub-topic 1-6** | **Issue 1-6-1: Interruption requirements for PUCCH SCell activation/deactivation?**  *Tentative agreements:*  *None.*  *Candidate options:*   * Option 1: (Apple, OPPO, MTK, Nokia)   + Reuse the interruption requirement of normal SCell activation/deactivation. * Option 2: (Ericsson)   + Interruption requirements for PUCCH SCell deactivation reuse the interruption requirement of normal SCell deactivation.   + Interruption requirements for PUCCH SCell activation are FFS. * Option 3: (Qualcomm)   + Reuse the interruption requirement of normal SCell activation/deactivation for valid TA case. FFS for invalid TA case.   *Recommendations for 2nd round:*  *No more discussion in 2nd round. Focus on PUCCH SCell activation/deactivation procedure first.* |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on PUCCH SCell activation/deactivation requirements | CATT |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

Moderator:

For issue 1-1-4, 1-1-5 and 1-1-6, from the 1st round discussion, there is a common issue that where the CSI report is performed. So I add a new issue 1-1-0 to collect companies’ views based on which companies can provide your further views on issue 1-1-4, 1-1-5 and 1-1-6.

**Issue 1-1-0: Whether CSI report of PUCCH SCell is transmitted on PCell or PUCCH SCell to be activated?**

Proposals:

* Option 1:
  + PUCCH of PCell.
* Option 2:
  + PUCCH of PUCCH SCell to be activated.

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| **Issue 1-1-0: Whether CSI report of PUCCH SCell is transmitted on PCell or PUCCH SCell to be activated?** | |
| **Company** | **Comments** |
| Qualcomm | The question needs to be more precisely shaped, e.g. from when to when CSI is reported to PCell. And if the rationale behind the question is whether/how NW can get UE spatial information for PDCCH order based PRACH, we do not understand why it should be based on the reported CQI not L1-RSRP. |
| Huawei | Support option 2.  To Qualcomm’s comment. We believe it is related to how to define the ending point of the PUCCH SCell activation. If the ending point is the valid CQI on the PUCCH of PCell, then the activation procedure is almost the same as normal Scell, and even obtaining the TA is not needed. If the ending point is the valid CQI on the PUCCH of the PUCCH SCell, then further discussion is needed on what are the necessary procedure before the UE is capable for UL transmission on the being-activated SCell. |
| Xiaomi | Support option 2, the feature of “two PUCCH groups” is to configure two PUCCH groups to avoid a single uplink carrier from carrying a large number of acknowledgments in case of a large number of DL CA. the feedback relating the first group is transmitted on the PCell the feedback relating the second group is transmitted on the PSCell. Here, we are discussing the SCell activation for the second group, which the feedback should be transmitted on the PSCell. |
| OPPO | Ok with option 1 and option 2. FFS whether RAN4 defines requirements for the two cases. |
| Apple | Where to report the target SCell CQI is configured by network, so we think both option 1 and option 2 are possible. The principle to determine if activation is completed/successful is whether or not DL and UL of PUCCH SCell is ready to use. When CQI is on PUCCH of PCell, we need to consider to modify UE behavior, e.g., sending valid CQI when the DL/UL is ready on target SCell. When CQI is on PUCCH of target SCell, we still can use the ending point as when UE report the valid CQI on SCell. We understand the concerns from other companies on the ending point, and as concluded in GTW we are fine to further discuss. |
| NEC | Support option 2. Also we discussed in our discussion paper, since the PUCCH SCell is activated to reduce load on PUCCH of primary PUCCH group, we do not see reason to transmit CSI report on spCell. However as discussed in GTW we are fine to further discuss. |
| Ericsson | Can consider reporting in PCell for initial reporting (e.g. L1-RSRP or up to first valid CQI) and then switch to SCell. End-point can be valid CQI for SCell in SCell. This would allow the NW to send PDCCH order (when TA invalid) when UE is ready to receive on SCell downlink, and would also allow NW to know which beam to use for UE in the PDCCH order. According to our understanding, unless cross carrier scheduling is configured, PDCCH order has to be sent in SCell. So potentially some issues can be avoided if having initial reporting in PCell. Configuration-wise it should be possible to indicate where the UE is to report based on which active BWP is used in SCell. But we can discuss further. |
| CATT | Both option 1 and option 2 can be possible. Then we need to consider what content need to be reported and when to perform the report. If the report occurs after the PUCCH SCell is ready, then I think there is no need to report in PCell. So we should have a common definition on the activation procedure and ending point of the procedure first. |
| NTT DOCOMO, INC. | We need more discussion about ending point of PUCCH SCell activation. In normal SCell activation, the requirement only states “the UE shall be **capable** to transmit valid CSI” and TCSI\_Reporting included in the activation delay does not consider spatial relation info condition. This means the SCell activation delay itself does not require actual CSI report transmission. If this understanding is correct and also applicable to PUCCH SCell activation, this issue is irrelevant. We can include spatial relation info related delay into additional delay term. |
| Nokia | We understood Option 1 and Option 2 are both possible dependent on the network configuration. But the ending point of the PUCCH SCell activation procedure should be the first valid CSI reporting via PUCCH SCell, as this is to verify the UL action can be performed on the PUCCH SCell. We can have more detailed analysis on each option and continue the discussion in next meeting. |
| vivo | Both options are possible in practice however priority should be placed on option 2 since to our understanding, this is a key point to differentiate what we try to do for this WI and legacy cases. |
| MediaTek | Need more discussion in next meeting. |

**Issue 1-1-4: Whether the beam information is needed for NW to initiate the RA for TA updating by a PDCCH order?**

Proposals:

* Option 1: (Huawei, Apple, Qualcomm, OPPO, NTT DOCOMO, MTK, Nokia)
  + The beam information is needed for NW to initiate the RA for TA updating by a PDCCH order
* Option 2: (Ericsson)
  + Depends on what activation sequence we are assuming.
* Option 2a: (NEC, CATT)
  + Agree on whether CSI report of PUCCH SCell is transmitted on Pcell or PUCCH of PUCCH Scell to be activated first.

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| **Issue 1-1-4: Whether the beam information is needed for NW to initiate the RA for TA updating by a PDCCH order?** | |
| **Company** | **Comments** |
| Qualcomm | In principle, we agree to Option 1. But as Ericsson pointed out, it really depends on activation sequence, more specifically, e.g. whether more than one SSBs are configured, whether UE support IBC, whether the to-be-activated PUCCH SCell(s) is contiguous to one of active serving cells, etc. |
| Huawei | We support option 1 but we also agree with the observation that it may depend on the activation sequence. |
| Xiaomi | Fine with option 1, need more analysis on the beam information |
| OPPO | OK with option 1. |
| Apple | Option 1, and beside the CSI reporting mentioned by companies, we were also considering if L3 SSB based RSRP has been reported before activation, network can also know which SSB beam is best for triggering RACH. |
| NEC | As Ericsson pointed out it depends on activation sequence. At present we feel option 1, 2 and 2a are fine in principle |
| Ericsson | We agree with Option 1, i.e. beam information is needed for the PDCCH order. How to acquire such information may differ depending on what activation sequence we are assuming. Hence Option 2a is valid too. |
| CATT | Follow the conclusion in GTW. |
| NTT DOCOMO, INC. | Option 1 with some clarification and editorial change is already agreed during GTW as follows:   * Agreements   The beam information (SSB index) is needed for NW to initiate the PDCCH order to trigger RA |
| Nokia | The agreements in GTW could be the starting point. We may further analysis what beam information and how it is communicated between UE and network. |
| MediaTek | Option 1 |

**Issue 1-1-5: Whether the beam information of the PUCCH SCell being activated is needed to be indicated to NW?**

Proposals:

* Option 1: (Huawei, MTK, Nokia)
  + The beam information of the PUCCH Scell being activated is needed to be indicated to NW
* Option 2: (Ericsson, Qualcomm)
  + Depends on what activation sequence we are assuming.
* Option 3: (Apple, Qualcomm, NEC)
  + Need to differentiate unknown and known cases.
* Option 4: (NEC)
  + Agree on whether L1-RSRP is transmitted on spCell or Scell first.

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| **Issue 1-1-5: Whether the beam information of the PUCCH Scell being activated is needed to be indicated to NW?** | |
| **Company** | **Comments** |
| Qualcomm | Option 2. A similar comment as Issue 1-1-4. |
| Huawei | We support option 1. Actually for unknown Cell, the beam information is anyway needed (e.g. L1-RSRP as defined for normal Scell). Out concern is that Whether UE could use the PUCCH of Pcell to indicate the beam information or UE shall use the PUCCH of the to-be-activated Scell. Similar issue in 1-1-0. |
| Xiaomi | Fine with option 1, need more analysis on the beam information |
| OPPO | Option 1 is fine. FFS the details. |
| Apple | Option 3 and option 2. We need to discuss case by case, differentiate known and unknown. |
| NEC | Needs more discussion. In principle all options looks fine. |
| Ericsson | We agree that beam information is needed by the NW for the PDCCH order, but how to acquire and convey such information may differ depending on assumed activation sequence. So from that point of view we think at least options 1 – 3 are relevant. For Option 4 we might need some clarification as we currently do not see how transmission of L1-RSRP in Scell for purpose of indicating suitable beam would be possible. If it is possible to transmit the L1-RSRP report in Scell (solved somehow), then maybe it is unnecessary to transmit L1-RSRP and UE can directly start using the uplink. |
| CATT | Support option 2 and can be FFS. |
| NTT DOCOMO, INC. | Support option 2. |
| Nokia | This may also depend on Issue 1-1-0. Some detailed analysis is needed. |
| vivo | Related to Issue 1-1-0, need more discussion |
| MediaTek | Option 1 |

**Issue 1-1-6: Whether the UL spatial relation should be considered for PUCCH SCell activation?**

Proposals:

* Option 1: (Huawei, Ericsson, Qualcomm, NTT DOCOMO, MTK)
  + Yes
* Option 2: (Nokia)
  + No
* Option 3: (Apple)
  + Depends on whether UE report CQI from Pcell PUCCH or Scell PUCCH

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| **Issue 1-1-6: Whether the UL spatial relation should be considered for PUCCH Scell activation?** | |
| **Company** | **Comments** |
| Qualcomm | In principle, agree to Option 1. However it is a bit unclear what UL spatial relation it means. Is this about the case where a spatial relation of PUCCH on the PUCCH Scell is different from that of PDCCH order based PRACH used as a part of PUCCH Scell activation? |
| Huawei | Option 1. We think it is under the assumption that UE shall report the CQI using the PUCCH of the to-be-activated PUCCH Scell, and the UL spatial info is for PUCCH of the to-be-activated PUCCH Scell. Otherwise, there is no difference if UE always use the PUCCH of Pcell. |
| Xiaomi | Fine with option 1 |
| OPPO | Support Option 1 for the case UE report CQI from PUCCH Scell. |
| Apple | We would like to change our view after the discussion, we can agree on option 1 since anyway the PUCCH of target Scell shall be ready to use after activation regardless of whether CQI is sent on Pcell or Scell. |
| NEC | Fine with option 1 |
| Ericsson | Option 1, we think it is needed. |
| CATT | Need further check. |
| NTT DOCOMO, INC. | Support option 1. How to consider, i.e. it is included in the CSI reporting procedure, additional delay term, etc., related to issue 1-1-0 should be FFS. |
| Nokia | We support option 2 for now as the UL spatial relation seems not a must for random access procedure. And it may also depend on FR1 or FR2. Further analysis is needed. |
| vivo | OK with option 1 |
| MediaTek | option 1 |

**Issue 1-2-2: The PUCCH SCell activation delay when TA of target PUCCH Scell is valid?**

Moderator: For issue 1-2-2, it is kept open considering the dependency with issue 1-1-5 and 1-1-6. Companies please further check your view based on issue 1-1-5 and 1-1-6 and enumerate the possible difference between PUCCH Scell activation and normal Scell activation if any.

Proposals:

* Option 1: (Apple, CATT, Xiaomi, CMCC, NTT DOCOMO, NEC, vivo, Nokia, OPPO, Qualcomm, Ericsson, MTK)
  + Same as the normal Scell activation delay in TS38.133 section 8.3.2 which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).

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| **Issue 1-2-2: The PUCCH Scell activation delay when TA of target PUCCH Scell is valid?** | |
| **Company** | **Comments** |
| Qualcomm | Option 1 |
| Huawei | We believe it is related to the above issue. For example, if the UL spatial info is needed, then the corresponding timing uncertainty shall be included even TA is valid. |
| Xiaomi | Option 1 |
| OPPO | Support option 1 in principle. |
| Apple | Option 1, and we can FFS on whether UL spatial relation for target Scell is needed even though TA is valid. |
| NEC | Agree with comments from Huawei |
| Ericsson | We support Option 1 but agree with Huawei’s observation that UL spatial relation is something additional to the downlink Scell case. Let us look further into which cases it would be visible in the time line. |
| CATT | Fine to further study considering the activation procedure. |
| NTT DOCOMO, INC. | Basically support option 1. However, if we need CSI reporting procedure for PUCCH SCell activation as stated in issue 1-1-0, the additional delay should be included. In order to conclude, we need to fix the timeline of PUCCH SCell activation delay first. |
| Nokia | Support Option 1. |
| vivo | Ok with option 1. Agree for further discussion if any issue is identified |
| MediaTek | Support option 1 |

**Issue 1-2-4: The additional delay parts for NR PUCCH SCell activation with invalid TA?**

Moderator: For issue 1-2-4, it is also related to issue 1-1-5 and 1-1-6. Companies please further check your view and give your opinions on the PUCCH Scell activation procedure with invalid TA.

Proposals:

* Option 1: (Apple, Xiaomi, CMCC, NTT DOCOMO, NEC, Qualcomm, vivo, OPPO, MTK)
  + The following three additional delay parts (T1/T2/T3) in LTE PUCCH Scell activation with invalid TA could be reused for NR PUCCH Scell activation with invalid TA.
    - the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH Scell
    - the delay for obtaining a valid TA command for the sTAG
    - the delay for applying the received TA for upling transmission
  + The values for T1/T2/T3 might be revisited for NR PUCCH Scell activation.
* Option 2: (Nokia)
  + The UE shall be capable to perform downlink actions related to the Scell activation command for the Scell being activated on the PUCCH Scell no later than in slot .
  + The UE shall be capable to perform uplink actions related to the Scell activation command for the Scell being activated on the PUCCH Scell no later than in slot , where TRACH is the delay to perform RACH procedure and apply the TA.
* Option 3: (CATT)
  + Further discussion is needed for the completion of downlink and uplink actions.
* Option 4: (Ericsson, Huawei)
  + Existing RRM requirements for activation of single downlink NR Scell to be used as baseline for completion of downlink actions. Completion of uplink actions are to be further studied.

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| **Issue 1-2-4: The additional delay parts for NR PUCCH Scell activation with invalid TA?** | |
| **Company** | **Comments** |
| Qualcomm | Close to Option 1, but need a further investigation as suggested by Option 3 and Option 4, e.g. whether/how to define DL and UL activation timeline separately. |
| Huawei | We support option 4 for the reason in the option. We shall first have concrete conclusion on the framework of the procedure before discussing the detailed requirements. |
| Xiaomi | Support option 1 |
| OPPO | Option 1 as starting point. |
| Apple | Option 1 as baseline and discuss the other additional parts, e.g., uplink spatial relation acquisition time in addition if needed. |
| NEC | We can discuss once the basic issues are concluded |
| Ericsson | We support Option 4 for the same reason as commented by Huawei. |
| CATT | Support option 3 to further check the activation procedure. |
| NTT DOCOMO, INC. | Support option 1 as starting point. We need further discussion about other delay factors as well as T1/T2/T3 revision. |
| Nokia | We understood Option 1 and Option 2 are not conflicting with each other. It is a matter how to formulate the time period used for random access and acquiring the TA in NR. As in LTE, we need investigate the activation delay for DL and UL actions respectively, but the difference on DL SCell activation delay formation needs to be counted. |
| vivo | Option 1 as the starting point. |
| MediaTek | Support option 1 |

Moderator: For issue 1-2-5, 1-2-6, 1-2-7, they are related to issue 1-2-4. Companies can provide your further opinions **if any** based on the further discussions of issue 1-2-4.

**Issue 1-2-5: The delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (i.e. T1)?**

Proposal:

* Option 1: (Apple)
  + T1 is up to the summation of SSB to PRACH occasion association period and 10 ms.
  + SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

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| **Issue 1-2-5: The delay uncertainty in acquiring the first available PRACH occasion in the PUCCH Scell (i.e. T1)?** | |
| **Company** | **Comments** |
| Qualcomm | Too early to make a solid conclusion. |
| Huawei | Similar views as Qualcomm |
| Xiaomi | Too early to make a solid conclusion. |
| OPPO | FFS |
| Apple | Fine to FFS |
| NEC | Can discuss after conclusion of basic issues |
| Ericsson | Same as other companies we think it is too early to nail down numbers already. |
| NTT DOCOMO, INC. | FFS |
| Nokia | FFS |
| vivo | FFS |
| MediaTek | More discussion is needed |

**Issue 1-2-6: The delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)?**

Proposals:

* Option 1: (Apple, Qualcomm, OPPO)
  + T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH Scell being activated.
  + Tactivate\_basic is the normal Scell activation delay in TS38.133 section 8.3.2.
  + Slot n is the slot when UE received PUCCH Scell activation MAC CE.

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| --- | --- |
| **Issue 1-2-6: The delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)?** | |
| **Company** | **Comments** |
| Qualcomm | Too early to make a solid conclusion. |
| Huawei | Similar views as Qualcomm |
| Xiaomi | Too early to make a solid conclusion. |
| OPPO | Come back in next meeting. |
| Apple | Fine to FFS |
| NEC | Can discuss after conclusion of basic issues |
| Ericsson | We can discuss the detailed timeline when we have better view of all the steps. |
| NTT DOCOMO, INC. | FFS |
| Nokia | FFS |
| vivo | FFS |
| MediaTek | More discussion is needed |

**Issue 1-2-7: The delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)?**

Proposals:

* Option 1: (Apple, Qualcomm, OPPO)
  + T3 is greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.

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| **Issue 1-2-7: The delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)?** | |
| **Company** | **Comments** |
| Qualcomm | Do not see an issue with Option 1, but want to have another look after other open issues are further discussed/concluded. |
| Xiaomi | Need more discussion |
| OPPO | Come back in next meeting. |
| Apple | Fine to FFS |
| NEC | Can come back after basic issues are concluded |
| Ericsson | We can look further into this when we have agreed on the sequence. |
| NTT DOCOMO, INC. | FFS |
| Nokia | FFS |
| MediaTek | More discussion is needed |

**Issue 1-5-1: SCell deactivation delay requirement for activated PUCCH SCell with multiple SCells?**

Moderator: For issue 1-5-1, it was marked as ‘no more discussion’ to focus on the single SCell case. But as the single SCell case in sub-topic 1-4 has concluded in the first round, companies can provide your further views below if any.

Proposals:

* Option 1: (CMCC, NEC, vivo, Apple, Ericsson, Qualcomm, Xiaomi, CATT, NTT DOCOMO, MTK)
  + Reuse the SCell deactivation delay requirement for activated SCell with multiple downlink SCells specified in section 8.3.8 of TS 38.133, which is (( THARQ + 3ms)/ NR slot length).

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| --- | --- |
| **Issue 1-5-1: SCell deactivation delay requirement for activated PUCCH SCell with multiple SCells?** | |
| **Company** | **Comments** |
| Qualcomm | Option 1. |
| Huawei | Technically fine with option 1. But we still prefer to only focus on single CC and allow companies to have an overall consideration for multi-CC cases. |
| Xiaomi | Option 1, but we are fine with Huawei comment that focus on single CC at current stage. |
| OPPO | FFS. Come back in 2nd stage according to the approved WP. |
| Apple | Option 1. |
| NEC | Option 1 |
| Ericsson | Option 1. We can handle this after single SCell case. |
| NTT DOCOMO, INC. | Option 1. |
| Nokia | Option 1. We can handle this after single SCell activation/deactivation according to the work plan. |
| vivo | Ok with option 1 |
| MediaTek | Option 1 |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| **R4-2103675** | **Agreed** |