**3GPP TSG-RAN WG4 Meeting # 102-e R4-22XXXX**

**Electronic Meeting, February 21 - March 3, 2022**

**Agenda item:** 10.10.2.3

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [102-e][216] NR\_RRM\_enh2\_3

**Document for:** Information

# Introduction

This document includes the discussions in agenda item 10.10.2.3 which contains the following topic

* Topic #1: PUCCH SCell activation/deactivation requirements

# Topic #1: PUCCH SCell activation/deactivation requirements

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2203786 | Apple | ***Proposal 1: RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups.***  ***Proposal 2: the known condition of PL-RS for known PUCCH SCell could be defined as (the different part form legacy definition is highlighted in yellow):***  ***The pathloss reference signal is known for known PUCCH SCell during activation if the following conditions are met during the period between the last transmission of the RS resource used for L3 RSRP measurement reporting and the completion of PUCCH SCell activation, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.***  ***- Pathloss reference signal activation command is received within 1280 ms upon the last transmission of the RS resource for L3 measurement***  ***- The UE has sent at least one L3 RSRP report for the target pathloss reference signal before the pathloss reference signal activation command***  ***- The target pathloss reference signal remains detectable during the PUCCH SCell activation period***  ***- SNR of the target pathloss reference signal≥-3dB***  ***- The associated SSBs with the target pathloss reference signal remain detectable during the PUCCH SCell activation period***  ***- SNR of the associated SSB ≥-3dB***  ***Otherwise, the pathloss reference signal is unknown.***  ***Proposal 3: the known condition of PL-RS for unknown PUCCH SCell could be defined as (the different part form legacy definition is highlighted in yellow):***  ***The pathloss reference signal is known for unknown PUCCH SCell during activation if the following conditions are met during the period between the last transmission of the RS resource used for L1-RSRP measurement reporting and the completion of PUCCH SCell activation, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.***  ***- Pathloss reference signal activation command is received within 1280 ms upon the last transmission of the RS resource for beam reporting or measurement***  ***- The UE has sent at least one L1-RSRP report for the target pathloss reference signal before the pathloss reference signal activation command***  ***- The target pathloss reference signal remains detectable during the PUCCH SCell activation period***  ***- SNR of the target pathloss reference signal≥-3dB***  ***- The associated SSBs with the target pathloss reference signal remain detectable during the PUCCH SCell activation period***  ***- SNR of the associated SSB ≥-3dB***  ***Proposal 4:*** ***when PL-RS of target PUCCH SCell is known, the 5 sample measurement time is always considered and no need to consider condition of ‘maintain’ or ‘not maintain’.***  ***Proposal 5: Applicability on PDCCH order receiving is:***   * ***UE is not expected to receive a PDCCH order to initiate RA procedure on the PUCCH SCell earlier than n+ THARQ + Tactivation\_time;*** * ***A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ + Tactivation\_time until reception of PDCCH order.*** * ***To capture the delay uncertainty for reception of PDCCH order in the PUCCH SCell activation delay requirements, adopt one of the following options:***   + ***count this uncertainty in T1 (the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH Scell), or***   + ***introduce a new uncertainty parameter TPDCCH as in issue 1-3-4*** |
| R4-2203852 | Qualcomm Incorporated | **Proposal 1**: In FR2, if UE is not provided *pathlossReferenceRSs* but provided *PUCCH-SpatialRelationInfo* before receiving a PUCCH SCell activation command, an associated DL-RS with *PUCCH-SpatialRelationInfo* will be served as PL-RS and the DL-RS should be within an active DL BWP of the serving cell. Here, ‘the serving cell’ is the PUCCH SCell, and DL BWP is the RRC configured first active DL BWP of the SCell.  **Proposal 2**: RAN4 does not define PUCCH SCell activation requirements that require an assumption of UE being able to maintain a measurement of PL-RS configured in a different serving cell in the same band as the PUCCH SCell.  **Proposal 3**: A CSI report across PUCCH groups specific latency relaxation margin is not introduced for unknown PUCCH SCell activation requirements.  **Proposal 4**: RAN4 does not introduce a new parameter for the delay uncertainty for PDCCH order receiving. Instead, the uncertainty is included in the definition of T1. T1 is the delay uncertainty in acquiring the first available PDCCH triggered PRACH occasion in the PUCCH SCell after Tactivation\_time. |
| R4-2203924 | CATT | **Proposal 1: RAN4 not to specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups.**  **Proposal 2: The known conditions of PL-RS are defined as following:**  **The PL-RS is known if the following conditions are met:**  **- During the period from the last transmission of the PL-RS resource used for the L1-RSRP measurement reporting for the target PUCCH SCell to the completion of PUCCH SCell activation, where the RS resourece for L1-RSRP measurement is the RS in target PUCCH SCell or QCLed to the target PUCCH SCell.**  **- PUCCH SCell activation command is received within 1280 ms upon the last transmission of the RS resource for beam reporting or measurement.**  **- The UE has sent at least 1 L1-RSRP report for the target PUCCH SCell before the PUCCH SCell activation command**  **- The PL-RS remains detectable during the PUCCH SCell activation period.**  **- The SSB associated with the PL-RS remain detectable during the PUCCH SCell activation period**  **- SNR of the PL-RS ≥ -3dB**  **Otherwise, the PL-RS is unknown.**  **Proposal 3: 5 samples time is considered when PL-RS is not maintained before SCell is activated. And no additional delay is needed when PL-RS is maintained before SCell is activated.**  **Proposal 4: No need to have following restrictions：**   * **For the activation with known condition, the SSB associated to PL-RS indication, TCI state switch and spatial relation is the same.** * **For the activation with unknown condition, the SSB or CSI-RS associated to PL-RS indication, TCI state switch and spatial relation is the same.**   **Proposal 5: No additional relaxation margin is needed for unknown cell for valid TA case.**  **Proposal 6: No additional relaxation margin is needed for unknown cell, i.e. X=0.**  **Proposal 7: RAN4 need to consider TPDCCH in the PUCCH SCell activation requirements for invalid TA case.**  **Proposal 8: Slightly prefer not to capture the agreement of issue 1-5-1 in the spec.**  **Proposal 9: Two candidate options is ok, and prefer option 1, i.e.**   * The UE shall be capable to receive a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot . * A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ + Tactivation\_time until reception of PDCCH order. * FFS whether and how to capture the delay uncertainty for reception of PDCCH order in the PUCCH SCell activation delay requirements (which can be included in issue 1-3-4)   **Proposal 10: The delay uncertainty for reception of PDCCH order (TPDCCH) will be included in the PUCCH SCell activation requirements for invalid TA case and is defined as above with no certain value need defined.**  **Proposal 11: The PUCCH Scell activation with multiple SCell means that multiple SCells are activated by one single MAC command among which one SCell is PUCCH SCell.**  **Proposal 12: The PUCCH Scell activation with multiple SCell will be two parallel procedures for SCell activation, one is PUCCH SCell activation procedure and one is other downlink SCells activation procedure.**  **Proposal 13: For the case of PUCCH SCell activation with multiple SCells, the single PUCCH SCell activation delay requirements still apply for the PUCCH Scell, and the normal SCell activation delay requirement for deactivated SCell with multiple Downlink SCells defined in clause 8.3.7 of current specification 38.133 apply for other downlink Scells.** |
| R4-2203925 | CATT | **Draft CR on PUCCH Scell activation delay requirements with multiple Scell** |
| R4-2204232 | Xiaomi | **Proposal 1: RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups.**  **Proposal 2: RAN4 to capture the delay uncertainty for reception of PDCCH order in the PUCCH SCell activation delay requirements, and the time uncertainty is form the end of n + THARQ + Tactivation\_time+ TCSI\_reporting until reception of PDCCH order.**  **Proposal 3: The timeline for PUCCH SCell activation requirement for invalid TA case is updated as slot .** |
| R4-2204264 | CMCC | ***Proposal 1: for UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting, it is proposed to specify PUCCH SCell activation requirement for the scenarios in which beam information are not necessary to be reported to network.***  ***Proposal 2: for the known condition of PL-RS, it is proposed as following:***   * ***For the case with known PUCCH SCell: L3 measurement is reported, and the TCI sate, PL-RS and spatial relation indication are assumed to be based on the L3 measurement*** * ***For the case with unknown PUCCH SCell: L1 measurement is reported, and the TCI sate, PL-RS and spatial relation indication are assumed to be based on the L1 measurement***   ***Proposal 3: when PL-RS of target PUCCH SCell is known, the related delay requirements is proposed as following:***   * ***If the target PL-RS is not maintained by the UE, 5 samples are needed*** * ***If the target PL-RS is maintained by the UE, there is no additional delay*** |
| R4-2204276 | OPPO | **Proposal 1: RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups.**  **Proposal 2: [X] is not needed for the PUCCH Scell activation delay requirements for valid TA case.**  **Proposal 3: RAN4 not to consider TPDCCH in the PUCCH SCell activation requirements for invalid TA case.**  **Proposal 4: UE is not expected to receive a PDCCH order to initiate RA procedure on the PUCCH SCell earlier than n+ THARQ + Tactivation\_time.** |
| R4-2204363 | MediaTek Inc. | **Proposal 1: The known condition of PL-RS is as following:**   * **For known PUCCH SCell,**    + **Similar as in legacy PL-RS switching requirement, but only replace the L1-RSRP measurement report of PL-RS by “L3 measurement report for the target PL-RS”** * **For unknown PUCCH SCell,**    + **PL-RS is known if L1-RSRP measurement for the target PL-RS is reported before the PL-RS activation and PL-RS is remains detectable during the PUCCH SCell activation. Otherwise PL-RS is unknown.**   **Proposal 2: The known condition of TCI state and spatial relation should be updated, e.g., for known PUCCH SCell, replace the L1-RSRP measurement report for the target TCI state/spatial relation by “L3 measurement report for the target TCI state/spatial relation”.**  **Proposal 3: The detailed delay requirement of PL-RS is as following:**   * **5 samples time is considered when PL-RS is not maintained before SCell is activated.** * **No additional delay is needed when PL-RS is maintained before SCell is activated.**   **Proposal 4: The PUCCH Scell activation requirements are defined based on the following assumption:**   * **For the activation with known condition, the SSB associated to PL-RS indication, TCI state switch and spatial relation is the same.** * **For the activation with unknown condition, the SSB or CSI-RS associated to PL-RS indication, TCI state switch and spatial relation is the same.**   **Observation 1: For the agreed definition of T1, there is no description of delay uncertainty for reception of PDCCH order.Observation 1: For the agreed definition of T1, there is no description of delay uncertainty for reception of PDCCH order.**  **Proposal 5: For the PUCCH SCell activation with invalid TA case, two options are suggested**   * **Option 1: the delay uncertainty for PDCCH order reception () is explicitly defined in activation procedure timeline.** * **Option 2: revised the definition of T1, e.g., T1 is up to the summation of a delay uncertainty for reception of PDCCH order, 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. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ+ Tactivation\_time until reception of PDCCH order.**   **Proposal 6: For the unknown PUCCH SCell activation, the relaxation margin X for cross PUCCH group report is not needed, i.e., X = 0.** |
| R4-2204364 | MediaTek Inc. | **Draft CR for PUCCH SCell deactivation delay requirements in TS 38.133** |
| R4-2204401 | Intel Corporation | **Proposal 1: RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups.**  **Proposal 2: PL-RS is assumed to be known:**   * **If PUCCH SCell is known, L3-RSRP report is sent before the activation command arrived.** * **If PUCCH SCell is unknown, L1-RSRP report is sent before the activation command arrived.**   **Proposal 3: If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, and PL-RS is maintained on the active serving cell, UE don’t need extra 5 samples to calculate pathloss.**  **Proposal 4: Applicability on PDCCH order receiving is follows:**  **If UE receives a PDCCH order to initiate RA procedure on the PUCCH SCell later than n+ THARQ + Tactivation\_time, a delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ + Tactivation\_time until reception of PDCCH order.** |
| R4-2204688 | NTT DOCOMO, INC. | **Proposal 1: RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups**  **Proposal 2:**  **The known condition of PL-RS is to be defined as:**   * **For known PUCCH SCell,**    + **Similar as in legacy PL-RS switching requirement, but only replace the L1-RSRP measurement report of PL-RS by “L3 measurement report of PL-RS”** * **For unknown PUCCH SCell,**    + **PL-RS is known if L1-RSRP measurement of PL-RS is reported before the PL-RS activation and PL-RS is remains detectable during the PUCCH SCell activation. Otherwise PL-RS is unknown.**   **Proposal 3:**  **About PL-RS switching delay,**   * + **5 samples time is considered when PL-RS is not maintained before SCell is activated.**   + **No additional delay is needed when PL-RS is maintained before SCell is activated.**   **Proposal 4:**  **Following relation between the associated RS for TCI state, PL-RS and spatial relation does not need to be specified.**   * **For the activation with known condition, the SSB associated to PL-RS indication, TCI state switch and spatial relation is the same.** * **For the activation with unknown condition, the SSB or CSI-RS associated to PL-RS indication, TCI state switch and spatial relation is the same.**   **Proposal 5: The relaxation margin X should be included within Tactivation\_time**  **Proposal 6: The uncertainty of PDCCH order reception should be part of T1** |
| R4-2204702 | Nokia, Nokia Shanghai Bell | **Proposal 1: Wait for RAN2 conclusion to determine whether to define the requirements for unknown PUCCH SCell activation for UE not supporting cross PUCCH group CSI reporting.**  **Proposal 2: The relaxation margin [X] is not needed for the case of unknown FR1 PUCCH SCell activation with a valid TA.**  **Proposal 3: TL1-RSRP, report is re-defined as “the delay of acquiring CSI reporting resources in a cell on which the L1-RSRP report is sent” to capture the relaxation margin [X].**  **Proposal 4: Do not consider the time uncertainty of MAC CE for PL-RS activation, irrespective of the UE is configured with PL-RS or not.**  **Observation 1: The UE is able to use existing L3-RSRP (if the SCell is known) or L1-RSRP measurements (if the SCell is unknown) to estimate the pathloss.**  **Observation 2: RAN4#101-e has agreed “the PL-RS is assumed to be based on L3 measurements for known PUCCH SCell and based on L1 measurement for unknown PUCCH SCell”.**  **Proposal 5: Follow the RAN4#101-e agreements on PL-RS assumption and the PL-RS measurement would not introduce extra delay to PUCCH SCell activation.**  **Proposal 6: The PUCCH SCell activation delay requirement shall apply provided the UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot , otherwise additional delay to activate the SCell is expected.** |
| R4- 2204703 | Nokia, Nokia Shanghai Bell | **draftCR on PUCCH SCell activation delay requirements** |
| R4-2204872 | Huawei, HiSilicon | **Proposal 1: Prioritize defining unknown PUCCH SCell activation requirements for UE supporting the new capability of cross PUCCH group CSI reporting, and whether to have requirements for UE not supporting the capability can be decided based on RAN2 conclusion.**  **Observation 1: The details of the cross PUCCH group CSI reporting capability will be further finalized in RAN1/2.**  **Proposal 2: For unknown case where beam indication is needed, the requirements only apply when UE supports cross PUCCH group CSI reporting capability, and UE is configured with CSI reporting via SpCell. And the TCI, UL spatial relation, PL-RS and PDCCH order (when applicable) are configured based on latest valid L1-RSRP reporting via Primary PUCCH group.**  **Proposal 3: Based on RAN4 working assumption, there is no need to consider the uncertainty in MAC CE for PL-RS activation in FR2. For FR1 case, RAN4 should wait for RAN1 LS reply.**  **Proposal 4:**  **Define the “known condition” for PL-RS in the same way in existing requirements that:**   * **For known PUCCH SCell,**    + **TCI sate, PL-RS and spatial relation indication are assumed to be based on the latest L3 measurement, and the associated RS remains detectable during activation procedure.** * **For unknown PUCCH SCell,**    + **TCI sate, PL-RS and spatial relation indication are assumed to be based on latest L1-RSRP measurement, and the associated RS remains detectable during activation procedure.**   **Proposal 5: 5 samples measurement time is considered for “known PL-RS”; otherwise, longer delay is expected.**  **Proposal 6: There is no need the have the restriction that RS associated to PL-RS indication, TCI state switch and spatial relation should be the same.**  **Proposal 7: Capturing the applicability on interruption in WF is enough.**  **Proposal 8:**   * **The UE shall be capable to receive a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot .** * **A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ + Tactivation\_time until reception of PDCCH order.**   **Proposal 9: Wait for RAN1 LS reply on whether to have interruptions when diffNumerologyAcrossPUCCH-Group is not supported.** |
| R4-2204873 | Huawei, HiSilicon | **Draft CR on interruption of PUCCH SCell activation** |
| R4-2205840 | Ericsson | **Proposal 1: RAN4 to agree that PL-RS known condition is based on legacy PL-RS known definition. Wherein, for PUCCH known cell, L3-RSRP can be used instead of L1-RSRP. For PUCCH unknown cell, L1-RSRP can used as in legacy definition.**  **Proposal 2: When PL-RS is known, RAN4 to define requirements for both PL-RS maintained and non-maintained scenarios.**  **Proposal 3: RAN4 not specify any relation or restriction between the associated RS for TCI state, PL-RS and spatial relation indication.**  **Proposal 4: RAN4 to agree that, when PUCCH SCell is known and PL-RS is non-maintained, Tactivation\_time\_PUCCH is sum of Tactivation\_time for FR2 as defined in section 8.3.2 and 5\*. Where, is the periodicity of the target pathloss reference signal.**  **Proposal 5: X value, which is the relaxation margin for unknown cell is FFS based RAN1/2 progress.**  **Proposal 6: RAN4 to agree that legacy SCell requirements can be reused for unknown PUCCH SCell activation delay.**  **Proposal 7: RAN4 to consider delay uncertainty in TPDCCH. Where, TPDCCH is the delay uncertainty in receiving PDCCH order after n+ THARQ + Tactivation\_time.**  **Proposal 8: RAN4 to agree that UE is not expected to receive a PDCCH order to initiate RA procedure on the PUCCH SCell earlier than n+ THARQ + Tactivation\_time.**  **Proposal 9: RAN4 to reuse valid TA case Tactivation\_time for invalid TA case too**  **Proposal 10: When multiple SCells are activated, and in a scenario where parallel SCell activation is not possible, PUCCH SCell activation shall be prioritised w.r.t other SCells.**  **Proposal 11: When multiple SCells are activated, and in a scenario where parallel SCell activation is possible, single PUCCH SCell activation framework can be reused while replacing Tactivation\_time with Tactivation\_time\_multiple\_scells.** |
| R4-2205841 | Ericsson | **Draft CR on Interruption requirements to LTE serving cell** |

## Open issues summary

### Sub-topic 1-1 PUCCH SCell activation requirements for unknown cell

**Issue 1-1-1: Whether to define PUCCH SCell activation requirements for unknown cell case for UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting?**

Proposals

* Option 1: (Apple, CATT, Xiaomi, CMCC, OPPO, Intel, DOCOMO)
  + RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups
* Option 2: (Nokia, Huawei)
  + Wait RAN2 to determine whether to define requirements for unknown PUCCH SCell activation for UE not supporting cross PUCCH group CSI reporting.
* Recommended WF
  + *Agree on option 1?*

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| **Issue 1-1-1: Whether to define PUCCH SCell activation requirements for unknown cell case for UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting?** | |
| **Company** | **Comments** |
| Qualcomm | Option 1. For ‘beam information’ in Option 1, shouldn’t it be more specific, e.g. L1-RSRP? |
| Apple | Option 1. This is the last meeting for core part, and we didn’t receive reply from RAN2, so we shall go ahead to define the requirement based on the information we got so far. |
| Nokia | Option 2.  If RAN2 concludes the capability of cross PUCCH groups CSI reporting as conditional mandatory, the issue would become invalid. It seems insensible to conclude on the issue which may not exist. |
| Intel | Since this is the last meeting and we prefer option 1. |
| Huawei | For sake of progress, we can compromise to option 1. |
| vivo | We can support option 1 |
| CMCC | Support option 1. In our understanding, for the UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting, for the case that it is not necessary to report beam information to network, the requirements could still be defined. |
| Xiaomi | Option 1 |
| OPPO | Option 1 |
| MediaTek | Option 1 |
| CATT | Option 1. This is the last meeting for core part, RAN2 has no conclusion on the procedure for UE not supporting this capability. At least in R17, there is no time for the requirements for UE not supporting this capability. We can limit this agreement in R17, if RAN2 has further conclusion in the future meeting, the requirements can be considered in future release.  To QC’s question, for option 1, we think it is better to keep “beam information” since L1-RSRP can be reported for other purpose not only for beam information. If L1-RSRP is needed for other purpose and beam information is not needed, the requirements are still applied.  RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups in Rel-17. |
| Ericsson | Option 1 |
| NTT DOCOMO, INC. | We prefer option 1. |
| ZTE | We can support option 1. |

**Issue 1-1-2: Requirements applicability of unknown cell case where beam indication is needed**

Proposals

* Option 1: (Huawei)
  + For unknown case where beam indication is needed, the requirements only apply when UE supports cross PUCCH group CSI reporting capability, and UE is configured with CSI reporting via SpCell. And the TCI, UL spatial relation, PL-RS and PDCCH order (when applicable) are configured based on latest valid L1-RSRP reporting via Primary PUCCH group.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-1-2: Requirements applicability of unknown cell case where beam indication is needed** | |
| **Company** | **Comments** |
| Apple | Not sure if option 1 is needed to define the requirement. The sentence “And the TCI, UL spatial relation, PL-RS and PDCCH order (when applicable) are configured based on latest valid L1-RSRP reporting via Primary PUCCH group” seems like a proposal to standardize network behavior, and we don’t have such clarification in legacy SCell activation delay requirement either. For current uncertainty definition in legacy Scell activation, we defined:  Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable) relative to   * + SCell activation command for known case;   + First valid L1-RSRP reporting for unknown case.   It’s up to network which valid L1-RSRP shall be used, but uncertainty is counted from the first valid L1-RSRP. |
| Nokia | We understood this also depends on RAN2 conclusion on the capability. In addition, how the CSI reporting is sent on SpCell is up to RAN1 discussion. The inputs from RAN1/2 are needed. |
| Huawei | Support option1. Not only UE should support the cross PUCCH group CSI reporting, but also NW should configured CSI reporting via Primary PUCCH group, and corresponding TCI, UL spatial relation should be configured based on these CSI reporting. The option serves as the condition of the requirements.  Response to Apple, it is just to follow the same principle as legacy requirements for TCI. We think it is only the applicability of the requirements.  “The requirement for unknown SCell applies provided that the activation commands for PDCCH TCI, PDSCH TCI (when applicable), semi-persistent CSI-RS for CQI reporting (when applicable), and configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) are based on the latest valid L1-RSRP reporting.  ” |
| MediaTek | Support option 1 to make the requirement clear. |
| CATT | We are fine with the first sentence i.e.   * For unknown case where beam indication is needed, the requirements only apply when UE supports cross PUCCH group CSI reporting capability, and UE is configured with CSI reporting via SpCell.   But for the second sentence, based on the definition of MAC CE uncertainty, it is not very necessary. If companies want to define it, we would like to follow the wording in legacy requirements. |
| Ericsson | Proposal looks fine with us. |

### Sub-topic 1-2 Components of Tactivation\_time

*Moderator: It has been agreed in RAN4#101e meeting that the definition of Tactivation\_time can be applied for both valid TA and invalid TA case, so this topic is listed separately irrespective of valid TA and invalid TA.*

**Issue 1-2-1: Whether to update the working assumption for PL-RS?**

*Working assumption agreed in last meeting:*

* + RAN4 to agree that PL-RS assumptions defined in TS38.213 section 7.2.1 can be applied for the PUCCH of target being-activated SCell during the activation procedure. In FR2 if UE is not provided pathlossReferenceRSs but provided PUCCH-SpatialRelationInfo before receiving the PUCCH SCell activation command, use the associated DL-RS in PUCCH-SpatialRelationInfo as PL-RS.
  + RAN4 send LS (R4-2202602) to RAN1 for clarification/confirming on the above working assumptions.

Proposals

* Option 1: (QC)
  + Update the working assumption to:
    - In FR2, if UE is not provided *pathlossReferenceRSs* but provided *PUCCH-SpatialRelationInfo* before receiving a PUCCH SCell activation command, an associated DL-RS with *PUCCH-SpatialRelationInfo* will be served as PL-RS and the DL-RS should be within an active DL BWP of the serving cell. Here, ‘the serving cell’ is the PUCCH SCell, and DL BWP is the RRC configured first active DL BWP of the SCell.
* Option 2:
  + Keep the working assumption agreed in last meeting.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-2-1: Whether to update the working assumption for PL-RS?** | |
| **Company** | **Comments** |
| Qualcomm | Option 1 is to make the current working assumption more accurately compliant with RAN1 spec. |
| Apple | Either option is fine to us, same technical meaning. |
| Nokia | Option 2.  Since LS has been sent to RAN1, we prefer not changing the working assumption and wait for the reply from RAN1. |
| Intel | Fine with both option 1 and option 2. |
| Huawei | Option 1 is fine. But it needs to be confirmed by RAN1. |
| OPPO | Option 1 is fine. |
| MediaTek | Support option 1. |
| CATT | Since this is no technical issue for the agreed assumption and the LS has been sent to RAN1, suggest not to update the working assumption and wait for RAN1 confirmation. |
| Ericsson | Both options are fine |
| NTT DOCOMO, INC. | Both options are fine, but next action if working assumption is updated should be clarified. Should we also update LS? |
| ZTE | Suggest to keep the original work assumption,which had been sent to RAN1. |

**Issue 1-2-2: Whether to consider the time uncertainty of MAC CE for PL-RS activation?**

*Moderator: Based on previous agreement in RAN4#100e meeting, the discussion for this time uncertainty is for FR2. So for the proposal 3 in Huawei’s paper R4-2204872, I didn’t capture the FR1 case, please let me know if I misunderstood anything.*

*Agreements in RAN4#100e meeting*:

* In FR1, reuse the Rel-15 Scell activation delay requirement which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).
* In FR2, use normal Scell activation delay (i.e., (THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length ) in TS38.133 section 8.3.2 as baseline, but the time uncertainty of the single MAC CE for both UL spatial relation and PL-RS activation of PUCCH in target being-activated Scell shall be considered in the baseline Tactivation\_time.
* FFS: whether additional delay will be introduced due to the time uncertainty.

Proposals:

* Option 1: (Nokia, Huawei)
  + Do not consider the time uncertainty of MAC CE for PL-RS activation based on RAN4 working assumption.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-2-2: Whether to consider the time uncertainty of MAC CE for PL-RS activation?** | |
| **Company** | **Comments** |
| Qualcomm | Option 1. |
| Apple | Fine with option 1. Based on RAN4 working assumption, if PL-RS list is not configured, PL-RS is same as RS for uplink spatial relation(USR) and USR activation is same as PL-RS activation; otherwise if PL-RS list is configured, based on RAN1/2 definition, when USR is activated, the mapped PL-RS would also be activated (no need to have additional PL-RS activation uncertainty). |
| Nokia | Option 1.  In RAN4#101-e, we agreed to capture the time uncertainty of MAC CE for PL-RS activation in Tuncertainty\_MAC, hence no need to consider additional delay due to PL-RS activation.   * *How to reflect the time uncertainty of MAC CE for UL spatial relation and PL-RS activation and TCI state indication in PUCCH Scell activation delay requirements?*   + *No additional delay time is needed if UL spatial relation and PL-RS activation command and TCI activation command are received in the same MAC PDU.*   + *For both valid TA and invalid TA cases in FR2 PUCCH SCell activation, the uncertainty for receiving UL spatial relation and PL-RS activation command and TCI activation command could be defined as below,*     - *Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation and PL-RS relative to*       * *SCell activation command for known case;*       * *First valid L1-RSRP reporting for unknown case.* |
| Intel | Fine with option 1. PL-RS may not always need to be configured. |
| Huawei | We confirm the understanding from moderator. Based on the working assumption in last meeting, in FR2, there is no need to consider uuncertainty of MAC CE for PL-RS activation. For the first bullet in the agreement above about FR1, it is based on the assumption that there is no needed to indicate the PL-RS via MAC CE based on TS 38.213 that UE can use the SSB for MIB. But based on discussion in last meeting, it is not valid anymore. So for FR1, whether to have the uncertainty need RAN1’s conclusion. |
| vivo | Ok with option 1 |
| OPPO | Fine with option 1. |
| MediaTek | Support option 1 |
| CATT | Based on previous agreement, single MAC CE for PL-RS and spatial relation is considered. And the time uncertainty for the MAC CE is updated as below. So we would like to be clarified what the proposal in option 1 indicate. Does it mean to remove the PL-RS from the following definition? At least from our side, it is not necessary.   * *Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation ~~and PL-RS~~ relative to*   + *SCell activation command for known case;*   + *First valid L1-RSRP reporting for unknown case.* |
| NTT DOCOMO, INC. | Fine with option 1. |
| ZTE | Support option 1. |

**Issue 1-2-3: The known condition of PL-RS**

Proposals:

* Option 1: (Apple, CATT, MTK, DOCOMO, Ericsson)
* the known condition of PL-RS for known PUCCH SCell could be defined as (based on the known condition in legacy PL-RS switching delay, and the different part form legacy definition is highlighted in *yellow*):
  + The pathloss reference signal is known *for known PUCCH SCell during activation* if the following conditions are met during the period between the last transmission of the RS resource used for *L3 RSRP measurement reporting* and *the completion of PUCCH SCell activation*, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.
    - *Pathloss reference signal activation command* is received within 1280 ms upon the last transmission of the RS resource for *L3 measurement*
    - The UE has sent at least one *L3 RSRP report* for the target pathloss reference signal before *the pathloss reference signal activation command*
    - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period*
      * SNR of the target pathloss reference signal≥-3dB
    - The associated SSBs with the target pathloss reference signal remain detectable during *the PUCCH SCell activation period*
      * SNR of the associated SSB ≥-3dB
    - Otherwise, the pathloss reference signal is unknown.
  + The pathloss reference signal is known for *unknown PUCCH SCell during activation* if the following conditions are met during the period between the last transmission of the RS resource used for L1-RSRP measurement reporting and *the completion of PUCCH SCell activation*, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.
    - *Pathloss reference signal activation command* is received within 1280 ms upon the last transmission of the RS resource for beam reporting or measurement
    - The UE has sent at least one L1-RSRP report for the target pathloss reference signal before *the pathloss reference signal activation command*
    - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period*
      * SNR of the target pathloss reference signal≥-3dB
    - The associated SSBs with the target pathloss reference signal remain detectable during *the PUCCH SCell activation period*
      * SNR of the associated SSB ≥-3dB
    - Otherwise, the pathloss reference signal is unknown.
* Option 2: (Huawei, CMCC, Intel)
  + Define the “known condition” for PL-RS in the same way in existing requirements that:
    - For known PUCCH SCell,
      * L3 measurement is reported before the activation command arrived, TCI sate, PL-RS and spatial relation indication are assumed to be based on the latest L3 measurement, and the associated RS remains detectable during activation procedure.
    - For unknown PUCCH SCell,
      * L1 measurement is reported before the activation command arrived, TCI sate, PL-RS and spatial relation indication are assumed to be based on latest L1-RSRP measurement, and the associated RS remains detectable during activation procedure.
* Option 3 (Nokia): Follow the RAN4#101-e agreements on PL-RS assumption (as below) and use this as known condition.

*RAN4#101-e Agreements:*

* + For Tactivation\_time,
    - For known PUCCH SCell,
      * TCI sate, PL-RS and spatial relation indication are assumed to be based on the L3 measurement.
    - For unknown PUCCH SCell,
      * TCI sate, PL-RS and spatial relation indication are assumed to be based on L1-RSRP measurement.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-2-3: The known condition of PL-RS** | |
| **Company** | **Comments** |
| Qualcomm | To us, options do not look mutually exclusive. Option 1 seems to implement the details implied by Option 2 and 3 which we believe a common understanding in the group. |
| Apple | Option 1; it’s not conflicted with option 2, but it’s like a detailed description of option 2. |
| Nokia | Option 3.  We believe the PL-RS assumption in RAN4#101-e agreements in Option 3 are sufficient to reflect the PL-RS status. In any case, the UE is able to use existing L3-RSRP (if the SCell is known) or L1-RSRP measurements (if the SCell is unknown) to estimate the pathloss. As long as the assumption is fulfilled, the PL-RS can be assumed as “known”. Not sure if we must define a “known” condition for PL-RS.  We are also fine with Option 2 as it is aligned with the PL-RS assumptions in Option 3. The condition “the associated RS remains detectable is already captured in known/unknown condition of a SCell. Probably no need to duplicate it in the known condition of PL-RS? |
| Intel | Option 1 is a description in more detail. While option 2 and 3 are more general description. We are fine with all of them. |
| Huawei | We think option 1 and option 2 are not mutually excluded. Option 2 is to state that the configured PL-RS should be based on latest L3/L1 RSRP reporting, which is already defined for legacy requirements. Option 1 is more specific about the time limit that the results can remain valid and the conditions of SNR.  So we are fine with option 1 adding another bullet that:  For known PUCCH SCell activaiton  …   * The configuration of PL-RS is based on latest L3-RSRP report   For known PUCCH SCell activaiton  …   * The configuration of PL-RS is based on latest L1-RSRP report   And we suggest to also add a note that the agreement can be revisited based on conclusion from RAN1. As now it assumes that pathloss reference signal activation command is always neede. |
| CMCC | We also think all these three options are not mutually excluded, and can be considered together. |
| MediaTek | We are fine with all options |
| CATT | Option 1. We suggest to have a detailed description. And in our understanding, option 3 may not enough for defining the known condition since that the indication is assumed to be based on L3/L1 measurement does not mean the measurement has been already performed. |
| Ericsson | All options look similar. Principle can be agreed here, and wording can be discussed in CR. |
| NTT DOCOMO, INC. | Option 1 is fine. All options seeme to be same direction and option 1 is detailed description. |

**Issue 1-2-4: Whether the PL-RS will introduce extra delay time when the known condition is met?**

Proposals

* Option 1: (QC)
  + RAN4 does not define PUCCH SCell activation requirements that require an assumption of UE being able to maintain a measurement of PL-RS configured in a different serving cell in the same band as the PUCCH Scell.
* Option 2: (Apple, Huawei)
  + when PL-RS of target PUCCH Scell is known, the 5 sample measurement time is always considered and no need to consider condition of ‘maintain’ or ‘not maintain’.
* Option 3: (CATT, CMCC, MTK, Intel, DOCOMO, Ericsson)
  + 5 samples time is considered when PL-RS is not maintained before Scell is activated. And no additional delay is needed when PL-RS is maintained before Scell is activated.
* Option 3a: (Intel)
  + If the Scell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, and PL-RS is maintained on the active serving cell, UE don’t need extra 5 samples to calculate pathloss.
* Option 4: (Nokia)
  + No additional delay will be introduced due to PL-RS measurement.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-2-4: Whether the PL-RS will introduce extra delay time when the known condition is met?** | |
| **Company** | **Comments** |
| Qualcomm | Support Option 2. The intent of our proposal (Option 1) is not different from Option 2.  It should be a common understanding that the idea of PL-RS sharing can’t be extended to inter-band CA scenario, i.e. cells in different bands are not expected to share the same PL-RS. As dual PUCCH is not intended for intra-band CA which is in line with what we have observed in commercialized deployments, we do not support any requirements that require an assumption of UE being able to maintain a measurement of PL-RS configured in a different serving cell in the same band as the PUCCH Scell. |
| Apple | Option 2 because we think PL-RS cannot be really maintained/tracked on a being activated Scell, but we can compromise to option 3 if companies think this PL-RS could be maintained on another active serving CC. |
| Nokia | Option 4.  If PL-RS is not maintained before Scell is activated, the Scell shall be considered as unknown under the assumption that PL-RS is based on L1/L3 measurements. Then the UE needs perform L1-RSRP during activation procedure and use the L1-RSRP measurements for PL estimation. So the time for PL-RS measurements is either captured by L3-RSRP measurements before receiving Scell activation command (for known Scell), or by L1-RSRP measurements (for unknown Scell). There is no extra delay due to PL-RS measurements no matter it is maintained or not during Scell activation. |
| Intel | If dual PUCCH is not intended for intra-band CA, we can compromise to option 2. |
| Huawei | We support option 1 and 2. Even for the case that PL-RS is associated with RS in other activated serving cell, it only means UE has measured the PL-RS for other purpose, and it does not mean UE will maintenance the PL-RS for the deactivated SCell. From our understanding, it is unreasonable to assume that UE will maintain (e.g. filtering the L1 results) the PL-RS of a deactivated SCell, as UE has no idea when it will be activated. |
| vivo | Support option 2 |
| CMCC | Option 3. We take existing PL-RS delay requirements as baseline. According to existing requirements, if the target PL-RS is not maintained by the UE, 5 samples are needed to perform the PL-RS measurement. If the target PL-RS is maintained by the UE, there is no additional delay. Same approach can be used for the definition of PUCCH SCell activation delay requirements. |
| MediaTek | After checking with other companies’ view. We can compromise to option 2 |
| CATT | Fine with option 2 and option 3 since the existing PL-RS switching delay is for activated cell. For Nokia’s comments we think that PL-RS is not maintained is not equal to that the Scell is unknown. They are based on the different condition. |
| Ericsson | Option 3.  To QC: We agree with QC that cells in different bands are not expected to share same PL-RS. However, in our understanding, even for inter-band CA, there can be other SCell which may already be activated in the band before PUCCH SCell activation. In this case, we think if PL-RS can be maintained for known PUCCH SCell. |
| NTT DOCOMO, INC. | According to Qualcomm and Huawei’s comment, we can compromise option 1 and 2. |

**Issue 1-2-5: The known condition of TCI state and spatial relation**

Proposals

* Option 1: (MTK)
  + The known condition of TCI state and spatial relation should be updated, e.g., for known PUCCH SCell, replace the L1-RSRP measurement report for the target TCI state/spatial relation by “L3 measurement report for the target TCI state/spatial relation”.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-2-5: The known condition of TCI state and spatial relation** | |
| **Company** | **Comments** |
| Qualcomm | In principle, okay with Option 1. |
| Apple | Fine with Option 1, but it may be not necessary to explicitly reflect in the spec. Like legacy SCell activation, if SCell is known TCI determination could be based on L3 measurement before SCell activation command and no L1 RSRP is needed in the activation procedure without saying that “L3 measurement report for the target TCI state/spatial relation”. |
| Nokia | We don’t think the update is needed.  In existing spec, the known condition of TCI state is defined for TCI switching delay. For SCell activation, we have defined the MAC uncertainty time to capture the time to send the TCI state MAC CE. The known/unknown condition of TCI state and spatial relation does not apply to SCell activation procedure. |
| Intel | Fine with option 1. |
| Huawei | Not clear, are well also going to define known conditions of TCI state indication to the existing requirement for known and unknown SCell? |
| vivo | Technically proposal is fine however update may not necessary |
| MediaTek | Support option 1.  Response to HW: to our understanding the known conditions of TCI state indication could be also applied for known and unknown SCell.  To us, the discussion in Issue 1-2-3 should be also applied for TCI state and spatial relation. Because, for the known and unknown cell, the indications for spatial relation, TCI state and PL-RS should be based on L3 and L1 report, respectively. From the indication perspective, we do not see the difference between PL-RS, spatial relation and TCI state. |
| CATT | We don’t think it is necessary. In the existing Scell activation requirements, there is no such condition defined. |
| Ericsson | We do not think update is necessary as it is similar to legacy SCell known condition. |
| NTT DOCOMO, INC. | Fine with option 1. |

**Issue 1-2-6: Relation between the associated RS for TCI state, PL-RS and spatial relation indication?**

* Option 1: (MTK)
  + The PUCCH Scell activation requirements are defined based on the following assumption:
    - For the activation with known condition, the SSB associated to PL-RS indication, TCI state switch and spatial relation is the same.
    - For the activation with unknown condition, the SSB or CSI-RS associated to PL-RS indication, TCI state switch and spatial relation is the same.
* Option 2: (CATT, DOCOMO, Huawei, Ericsson)
  + No need to have the restrictions in option 1.
* Recommended WF
  + *Agree on option 2?*

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| **Issue 1-2-6: Relation between the associated RS for TCI state, PL-RS and spatial relation indication?** | |
| **Company** | **Comments** |
| Qualcomm | In practice, we believe Option 1 should be a common use case. But if NW vendors see concerns about the explicit restriction, we are still open. |
| Apple | Agree with recommended WF. |
| Nokia | Option 2.  We believe the PL-RS assumption in RAN4#101-e agreement is sufficient. How to configure the reference signals shall be left for network implementation. |
| Intel | Support option 2. PL-RS may be activated independently and may not be activated in the same MAC CE with spatial relation info, we don’t need to assume the same RS for them. If they are active in the same MAC CE, we prefer that they are the same. |
| Huawei | Support option 2. As explained before, in legacy requirements, we also don’t have such restriction that the TCI for PDC and CSI-RS should be same. We can have this typical configuration when defining the test case. |
| MediaTek | Support option 1. To our understanding, even though the indications are provided in different MAC CE, network should update spatial relation, PL-RS and TCI state at the same time based on latest report to reflect the channel status. |
| CATT | Option 2. No need to have such restriction. |
| Ericsson | Option 2 |
| NTT DOCOMO, INC. | Support option 2. Option 1 is typical case, but not general. |

### Sub-topic 1-3 PUCCH Scell activation delay requirement for invalid TA case

**Issue 1-3-1: Applicability of PDCCH order receiving.**

Proposals

* Option 1: (CATT, Huawei)
  + The UE shall be capable to receive a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot .
* Option 2: (Apple, OPPO, Intel, Ericsson)
  + UE is not expected to receive a PDCCH order to initiate RA procedure on the PUCCH SCell earlier than ;
* Option 3: (Nokia)
  + The PUCCH SCell activation delay requirement shall apply provided the UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot , otherwise additional delay to activate the SCell is expected.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-3-1: Applicability of PDCCH order receiving.** | |
| **Company** | **Comments** |
| Qualcomm | Support Option 1. To us, the wording in Option 2 implies UE should discard PDCCH triggering CFRA if it is received before the end of T\_activation even when UE processed everything earlier than requirement spec and is ready to start TA acquisition procedure via PDCCH order based RA. |
| Apple | Option 2 is more preferable from our perspective since minimum requirement for DL synchronization is . We understand the technical reason of option 1 and option 3, and we could compromise to following option to avoid the ambiguity of UE missing the PDCCH:  Compromise Option (clarify the actual PDCCH transmission in test):   * The UE shall be capable to receive a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot , otherwise additional delay to activate the SCell is expected. In test, the PDCCH order to initiate RA procedure would be sent to UE no earlier than slot . |
| Nokia | Option 3.  In our views, when the PDCCH order is received is up to network scheduling. The DL activation delay i.e. gives the maximum time by which the DL action can be performed, but the UE may be ready for DL earlier than this time. In this case, the PDCCH order may be received before and this would not introduce additional delay. We may include this as one of the applicability conditions, and additional delay may be expected otherwise. |
| Intel | We support option 2. We also understand the concern from some companies that there may be some restriction about PDCCH order if UE finish the task more quickly. We suggest not to limit the time when the PDCCH order is received and just mention that additional delay will be needed if PDCCH order is received after activation time. Therefore, we suggest to modify the wording as:   * If UE receives a PDCCH order to initiate RA procedure on the PUCCH SCell later than n+ THARQ + Tactivation\_time, a delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ + Tactivation\_time until reception of PDCCH order. |
| Huawei | We support option 1. We have agreed that for DL/UL ready point, UE shall be capable of XXX. Not clear why change the wording here. It strange to say UE is not expected be ready for DL/UL action earlier than xxx. We are defining minimum requirements, and it is not preferred to forbidden UE/NW to receive/trigger that PDCCH order earlier if UE can be ready before the minimum requirements. |
| vivo | We are ok with the new wording proposed by Apple/Intel |
| Xiaomi | Option 2, UE should be able to perform DL related operations when the DL synchronization is ready, so, UE is not expected to receive a PDCCH order earlier than , if UE receives a PDCCH order between and , no need to consider the delay uncertainty for PDCCH order reception, otherwise, the delay uncertainty for PDCCH order reception should be considered and it starts from the end of to the reception of PDCCH order. |
| OPPO | Fine with the updated proposal by Apple. No need to limit the time when the PDCCH order is received, but UE behaviour in the case of missing the PDCCH would be clearly defined. |
| MediaTek | No strong view |
| CATT | Based on the discussion, we think the common understanding is that UE shall be able to perform the downlink actions (in our understanding, PDCCH order is included) no later than slot n+ THARQ + Tactivation\_time, and if UE receives the PDCCH order after Tactivation\_time, additional uncertainty is needed. So we think option 1 has been included in agreed requirements and for option 3, we think it is not needed since issue 1-3-2 will introduce the time uncertainty for PDCCH order, so the requirements should be applied no matter when the PDCCH order is received. Option 2 is also not needed since some UE may receive the PDCCH order before activation. In summary, when the uncertainty of PDCCH order is introduced in issue 1-3-2, this issue is not needed. |
| Ericsson | In practice though UE is ready before activation time NW may not know when the UE is ready. To transmit PDCCH anyway NW will wait till  We prefer option 2 but can compromise to Option 1 too. |
| NTT DOCOMO, INC. | We are fine with Intel’s modified proposal. |

**Issue 1-3-2: How to capture the delay uncertainty of PDCCH order receiving in PUCCH Scell activation delay requirements for invalid TA case.**

Agreement in RAN4#99e meeting:

* 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

Proposals

* Option 1: (Apple, CATT, Xiaomi, MTK, Ericsson)
  + Introduce a new uncertainty parameter TPDCCH in PUCCH Scell activation delay requirements with no certain value defined.
* Option 2a: (Apple, QC, OPPO, DOCOMO)
  + The uncertainty for PDCCH order receiving is included in the definition of T1. T1 is the delay uncertainty in acquiring the first available PDCCH triggered PRACH occasion in the PUCCH SCell after Tactivation\_time.
* Option 2b: (MTK)
  + revised the definition of T1, e.g., T1 is up to the summation of a delay uncertainty for reception of PDCCH order, 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. The delay uncertainty for reception of PDCCH order starts from end of n + THARQ+ Tactivation\_time until reception of PDCCH order.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-3-2: How to capture the delay uncertainty of PDCCH order receiving in PUCCH Scell activation delay requirements for invalid TA case.** | |
| **Company** | **Comments** |
| Qualcomm | Option 2a. During PUCCH SCell activation for the case where UE doesn’t have a valid TA for the to-be-activated PUCCH SCell, PRACH can be triggered only by PDCCH order. Therefore, an explicit parameter for PDCCH reception doesn’t have to be additionally defined. And for Option 2b, it is obvious that the PRACH can be earlier than the PDCCH order, hence, we do not want to make parameter definition unnecessarily complicated. |
| Apple | Either option 1 or 2a is fine to us since they are technically same. |
| Nokia | Option 2a.  For invalid TA case, we agree the time uncertainty of PDCCH order reception can be captured in T1 if it is initiated after hence there is no additional delay due to PDCCH order reception. |
| Intel | Prefer option 2a. |
| vivo | Prefer option 2a |
| Xiaomi | Option 1, we are fine to introduce a new parameter for delay uncertainty of PDCCH order reception, and delay uncertainty starts from the end of to the reception of PDCCH order.  We are also fine option 2b, revise the definition of T1 by considering the delay uncertainty of PDCCH order reception. But the delay uncertainty should start rom the end of to the reception of PDCCH order. |
| OPPO | Prefer option 2a |
| MediaTek | Prefer option 1 or 2b.  Unclear option 2a, we wondering that whether the margin 10 ms is removed or not. |
| CATT | Option 1. Firstly we think the uncertainty of PDCCH order is because that UE is not aware of when NW will send the order. Secondly no matter introducing a new parameter or including it into the definition of T1, the results are the same that the uncertainty of PDCCH order receiving will be included. But option 1 is more straightforward and simple while option 2a and 2b changed the definition of T1 we have agreed. And since the T1 is reused from other requirements(RA requirements), changing the definition only for PUCCH Scell activation will cause the misalignment of the specification. Also for option 2a, the wording “PDCCH triggered PRACH occasion” is not very accurate since the PRACH occasion is always existing and not triggered by PDCCH. |
| Ericsson | Option 1. Technically option 1 and 2a are same. However, we prefer not to change the T1 definition and prefer to keep as legacy one. |
| NTT DOCOMO, INC. | Prefer option 2a. |
| ZTE | Support option 2a. |

**Issue 1-3-3: Whether to include [X] in the PUCCH Scell activation delay requirements for invalid TA case?**

*Moderator: The conclusion can also be applied for the delay requirements for valid TA case.*

*Background for option 2: For in current specification, the definition of TL1-RSRP, report: TL1-RSRP, report is the delay of acquiring CSI reporting resources.*

* Option 1: (QC, CATT, Xiaomi, OPPO, MTK, DOCOMO)
  + No
* Option 2: (Nokia)
  + The relaxation margin [X] is not needed for the case of unknown FR1 PUCCH SCell activation with a valid TA.
  + TL1-RSRP, report is re-defined as “the delay of acquiring CSI reporting resources in a cell on which the L1-RSRP report is sent” to capture the relaxation margin [X] in FR2.
* Option 3: (Ericsson)
  + Based on RAN1/2 progress.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-3-3: Whether to include [X] in the PUCCH Scell activation delay requirements for invalid TA case?** | |
| **Company** | **Comments** |
| Qualcomm | If any change is made to CSI measurement and/or report timeline, it shall be discussed and determined by RAN1 whether the change is only for CSI report across PUCCH group and whether it is only during PUCCH Scell activation, which we don’t think is what is planned because UE CSI performance in terms of latency has nothing to do with which serving cell the CSI is reported to. Thus, no additional time is necessary compared to a normal unknown Scell activation. |
| Apple | Option 1. |
| Nokia | It seems these options are not exclusive.  We are fine not to introduce relaxation margin [X] to activation delay, but the definition of TL1-RSRP, report may need to be extended or clarified to allow the cross-PUCCH group CSI reporting. We can also wait for RAN1/2 progress on the timeline relaxation. |
| Intel | Fine with option 1. |
| Huawei | From our understanding, [X] is not the relaxation from RAN4’s perspective, but the relaxation about cross PUCCH group reporting according to the RAN1 LS reply. So it can be simply referred to RAN1/RAN2 spec if any. |
| Xiaomi | Option 1 |
| OPPO | Option 1 |
| MediaTek | Support option 1 |
| CATT | Option 1. From RAN4 perspective, no relaxation is needed. If the proposal is intended to include the possible procedure extension from RAN1 perspective, we think it is also not needed since there is not any such procedure in RAN1/2. And as I know, RAN1/2 are not discussing such procedure and the only issue RAN1/2 are discussing is UE capability. |
| Ericsson | Our understanding is there is no further progress in RAN1 regarding this issue. We suggest waiting for RAN1 progress. |
| NTT DOCOMO, INC. | Support option 1. |

### Sub-topic 1-4 PUCCH SCell activation delay requirements with multiple DL Scells

*Moderator: Since the single PUCCH Scell activation delay requirements is quite stable and this is the last meeting for core requirements, companies are encouraged to share views on the PUCCH Scell activation delay requirements with multiple DL Scells.*

**Issue 1-4-1: The scenarios of PUCCH Scell activation with multiple DL Scells?**

Proposals

* Option 1: (CATT)
  + The PUCCH Scell activation with multiple Scell means that multiple Scells are activated by one single MAC command among which one Scell is PUCCH Scell..
* Recommended WF
  + *Need more discussion*

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| **Issue 1-4-1: The scenarios of PUCCH Scell activation with multiple DL Scells?** | |
| **Company** | **Comments** |
| Qualcomm | Agree with Option 1. More specifically, we can reuse the same applicability condition as legacy multiple Scell activation. The below is a summary of the legacy applicability condition. If anything is incorrect, please let us know.  For FR1:   * UE only receives **one single MAC** command for multiple Scell activation within the activation period defined in this clause (8.3.7) * in each single CG, there are **no other Scell activation, deactivation, addition or release before activation is completed** for all the Scells activated by the single MAC CE in this clause, and * in EN-DC and NE-DC, there are **no E-UTRAN Scell activation, deactivation, addition or release before multiple Scell activation is completed** in this clause, and * any to-be-activated unknown Scell has active serving cell(s) or known to-be-activated Scell(s) **on the same band**   For FR2:   * UE receives **one MAC command per CG** for multiple Scell activation within the activation period defined in this clause (8.3.7), and * UE supports **per-FR measurement gap capability**, and * any to-be-activated unknown Scell has active serving cell(s) or known to-be-activated Scell(s) **on the same band** |
| Apple | We support option 1. |
| Nokia | Fine with Option 1. |
| Intel | We are fine with option 1. |
| Huawei | Fine with option 1. |
| Vivo | OK with option 1 |
| Xiaomi | Fine with option 1. |
| OPPO | Fine with option 1. |
| MediaTek | More discussion is needed.  At this stage, we prefer to define the requirement only for single PUCCH SCell in R17. For the activation with multiple SCell can be postpone to future release.  Maybe RAN4 can discuss whether to introduce the activation with multiple SCell first. |
| CATT | Support option 1. For the detail condition mentioned by QC, we can discuss in the CR drafting, if the legacy requirements are reused. We don’t need to duplicate the same wording in the new clause.  To MTK, this requirement is included in the WID scope and has been agreed to be defined after the single Scell case is stable. So the discussion on whether to introduce is not needed. We would like to suggest to focus on the issue. |
| Ericsson | Fine with option 1 |
| NTT DOCOMO, INC. | Fine with option 1. |
| ZTE | Fine with option 1. |

**Issue 1-4-2: The delay requirements for PUCCH SCell activation with multiple DL Scells?**

Proposals

* Option 1: (CATT)
  + The PUCCH Scell activation with multiple SCell will be two parallel procedures for SCell activation, one is PUCCH SCell activation procedure and one is other downlink SCells activation procedure.
  + For the case of PUCCH SCell activation with multiple SCells, the single PUCCH SCell activation delay requirements still apply for the PUCCH Scell, and the normal SCell activation delay requirement for deactivated SCell with multiple Downlink SCells defined in clause 8.3.7 of current specification 38.133 apply for other downlink Scells.
* Option 2: (Ericsson)
  + When multiple SCells are activated, and in a scenario where parallel SCell activation is not possible, PUCCH SCell activation shall be prioritised w.r.t other SCells.
  + When multiple SCells are activated, and in a scenario where parallel SCell activation is possible, single PUCCH SCell activation framework can be reused while replacing Tactivation\_time with Tactivation\_time\_multiple\_scells.
* Recommended WF
  + *Need more discussion*

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| **Issue 1-4-2: The delay requirements for PUCCH SCell activation with multiple DL Scells?** | |
| **Company** | **Comments** |
| Qualcomm | We are not quite sure what are the exact definition of ‘parallel’ SCell activation. Please clarify it.  In the meantime, for the scenarios where parallel activation is not applicable (although we want the definition to be further clarified), we think NW should send MAC CE sequentially instead of asking UE to figure out and prioritize SCell activation sequence. Adding additional prioritization rule at UE should be avoided. |
| Apple | Support option 1. To Option 2, could we assume that: when parallel SCell activation is not possible then no requirement would be applied? |
| Nokia | This needs further discussion.  If multiple SCells are associated with PUCCH SCell, they cannot be activated before PUCCH SCell. Even parallel procedures are assumed in the DL sync phase of activation, the UL actions in other SCells cannot be activated until after PUCCH SCell is activated. In this sense, this is not “parallel” procedure.  The first bullet in Option 2 sounds reasonable. But what does it mean with “where parallel SCell activation is possible”? Are we going to define the conditions for it? |
| Huawei | Actually both option 1 and option 2 needs more clarification in details. For option 1, it is not clear how it can be considered as two parallel procedures. If it is about searcher limitation, it seems not aligned with the assumption in R16. For option 2, it is not clear what is the exact condition when Parallel activation is possible /not possible. |
| MediaTek | More discussion is needed.  At this stage, we prefer to define the requirement only for single PUCCH SCell in R17. For the activation with multiple SCell can be postponed to future release.  For option 1, does that mean three searcher are needed for activation with multiple SCells, i.e. one for PCell, one for PUCCH SCell and other one is for remaining SCells.? |
| CATT | Support option 1.  Firstly, “parallel” means the activation procedure of different Scell can be done in parallel. In the case that PUCCH Scell and multiple Scells are activated, since the PUCCH Scell activation is different with other normal scell, we would like to suggest the PUCCH scell activation is performed in parallel with other Scells. Then both legacy requirements for PUCCH Cell and normal Scell can be reused. If the parallel procedure is not applicable, we are fine to say the requirements will not apply.  To Nokia’s comment, as we discussed in issue 1-4-1, the scenario is that the multiple scell are activated by one single MAC CE, but there is no association between Scells. So the procedure of other Scells should not be delayed by PUCCH Scell.  To Huawei’s comment, we think the parallel procedure is not for the searcher limitation but for the different RF chains. |
| Ericsson | We agree with other companies that more discussion is needed. Maybe we could first agree in this meeting about RAN4 will work on this issue in maintenance phase (than in future release) as we agree to work on it after finalizing single SCell activation requirements. We think PUCCH SCell activation along with other SCells may be a common scenario and should be specified in this release.  To MTK: We do not intend to introduce additional searcher for PUCCH SCell.  Maybe we could start with all SCells to be activated (including PUCCH SCell) being considered as multiple SCells discussed in Rel-16 and we could further discuss whether is there any scenario where PUCCH SCell activation prioritization is required. We think all SCells considered as multiple SCells is straight forward scenario, and we think it can be delay requirements can be derived by replacing respective activation time (Tactivation\_time\_multiple\_scells). |

### Sub-topic 1-5 Applicability of PUCCH SCell activation requirements

Agreements in RAN4#101bis-e meeting:

* PUCCH SCell activation requirements are applied when 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
* PUCCH SCell activation requirements are applied when 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.

**Issue 1-5-1: whether to capture the agreements above in the spec:**

Proposals

* Option 1: (CATT, Huawei)
  + No
* Recommended WF
  + *Agree on option 1?*

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| **Issue 1-5-1: whether to capture the agreements above in the spec:** | |
| **Company** | **Comments** |
| Apple | Since this is the last meeting for core, we have no strong view to keep it in WF agreement if majority companies don’t want to have it in spec. |
| Nokia | Fine with the recommended WF. |
| Xiaomi | Option 1 is fine for us. |
| OPPO | Fine with the recommended WF. |
| MediaTek | Ok with the recommended WF |
| CATT | Fine with option 1. |
| Ericsson | OK with option 1 |
| ZTE | Fine with the recommended WF. |

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| R4-2203925 (CATT)  (draft CR for PUCCH Scell activation delay with multiple cell) | Nokia: This depends on the conclusion of sub-topic 1-4. |
| Company B |
| CATT: agree that it depends on the conclusion of sub-topic 1-4, but we would like to try whether some basic requirements and structures can be agreed based on the discussion. |
| R4-2204364 (MTK)  (draft CR for PUCCH Scell deactivation delay) | Company A |
| Company B |
|  |
| R4- 2204703 (Nokia)  (draft CR for PUCCH Scell activation delay) | Huawei : Some parts are related to the discussion above. |
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| R4-2204873 (Huawei)  (Draft CR on interruption of PUCCH SCell activation in 38.133) | Nokia: “consequence if not approved” seems incorrect. As PUCCH SCell is also SCell, is it really necessary to have separate sub-section. Would it be sufficient to add PUCCH SCell in existing sections of “interruptions at SCell activation/deactivation”? |
| Huawei: Thanks Nokia for spotting the typo, which can be fixed in revised version. We have no strong views on separate section. One considerations is that there is pending issue about whether there will be additional interruptions caused by PRACH transmission. So we think separate section may be clearer. |
|  |
| R4-2205841 (Ericsson)  (Draft CR on Interruption requirements to LTE serving cell in 36.133) | Nokia: As PUCCH SCell is also SCell, is it really necessary to have separate sub-section? Would it be sufficient to add PUCCH SCell in existing sections of “interruptions at SCell activation/deactivation”? |
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## Summary for 1st round

### Open issues

Sub-topic 1-1 PUCCH SCell activation requirements for unknown cell

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|  | **Status summary** |
| **Issue 1-1-1** | **Issue 1-1-1: Whether to define PUCCH SCell activation requirements for unknown cell case for UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting?**  *Tentative agreements:*   * RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups in R17.   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |
| **Issue 1-1-2** | **Issue 1-1-2: Requirements applicability of unknown cell case where beam indication is needed**  *Tentative agreements:*   * For unknown case where beam indication is needed, the requirements only apply when UE supports cross PUCCH group CSI reporting capability, and UE is configured with CSI reporting via SpCell. And the TCI, UL spatial relation, PL-RS and PDCCH order (when applicable) are configured based on latest valid L1-RSRP reporting via Primary PUCCH group.   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |

Sub-topic 1-2 Components of Tactivation\_time

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|  | **Status summary** |
| **Issue 1-2-1** | **Issue 1-2-1: Whether to update the working assumption for PL-RS?**  *Moderator: Although most companies are fine with option 1 as there is no technical difference between option 1 and agreed working assumption. Since the working assumption has been sent to RAN1, moderator would suggest to wait for the reply.*  *Tentative agreements:*   * Keep the working assumption agreed in last meeting.   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |
| **Issue 1-2-2** | **Issue 1-2-2: Whether to consider the time uncertainty of MAC CE for PL-RS activation?**  *Tentative agreements:*   * Do not consider the time uncertainty of MAC CE for PL-RS activation based on RAN4 working assumption.   *Candidate options: None.*  *Recommendations for 2nd round: No more discussion on the proposal but some clarifications on the spec impact are needed which can be discussed based on CR revision.* |
| **Issue 1-2-3** | **Issue 1-2-3: The known condition of PL-RS**  *Moderator: Almost all the companies think the three options are similar but option 1 implemented the details. Huawei’s comment can be addressed in issue 1-1-2, there is no need to repeat the same sentence in each part in moderator’s understanding.*  *Please Nokia check if option 1 can be acceptable.*  *Tentative agreements:*   * the known condition of PL-RS for known PUCCH SCell could be defined as (based on the known condition in legacy PL-RS switching delay, and the different part form legacy definition is highlighted in *yellow*):   + The pathloss reference signal is known *for known PUCCH SCell during activation* if the following conditions are met during the period between the last transmission of the RS resource used for *L3 RSRP measurement reporting* and *the completion of PUCCH SCell activation*, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.     - *Pathloss reference signal activation command* is received within 1280 ms upon the last transmission of the RS resource for *L3 measurement*     - The UE has sent at least one *L3 RSRP report* for the target pathloss reference signal before *the pathloss reference signal activation command*     - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period*       * SNR of the target pathloss reference signal≥-3dB     - The associated SSBs with the target pathloss reference signal remain detectable during *the PUCCH SCell activation period*       * SNR of the associated SSB ≥-3dB     - Otherwise, the pathloss reference signal is unknown.   + The pathloss reference signal is known for *unknown PUCCH SCell during activation* if the following conditions are met during the period between the last transmission of the RS resource used for L1-RSRP measurement reporting and *the completion of PUCCH SCell activation*, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.     - *Pathloss reference signal activation command* is received within 1280 ms upon the last transmission of the RS resource for beam reporting or measurement     - The UE has sent at least one L1-RSRP report for the target pathloss reference signal before *the pathloss reference signal activation command*     - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period*       * SNR of the target pathloss reference signal≥-3dB     - The associated SSBs with the target pathloss reference signal remain detectable during *the PUCCH SCell activation period*       * SNR of the associated SSB ≥-3dB     - Otherwise, the pathloss reference signal is unknown.   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |
| **Issue 1-2-4** | **Issue 1-2-4: Whether the PL-RS will introduce extra delay time when the known condition is met?**  *Tentative agreements:*   * When PL-RS of target PUCCH Scell is known   + When PL-RS is not maintained before Scell is activated, 5 samples delay is introduced   + When PL-RS is maintained before Scell is activated     - Option 2: 5 samples delay is introduced     - Option 3: No additional delay is introduced   *Candidate options: None.*  *Recommendations for 2nd round: Further discuss option 2 and option 3.* |
| **Issue 1-2-5** | **Issue 1-2-5: The known condition of TCI state and spatial relation**  *Tentative agreements:*   * No need to update the known condition of TCI state and spatial relation in the PUCCH Scell activation delay requirements.   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |
| **Issue 1-2-6** | **Issue 1-2-6: Relation between the associated RS for TCI state, PL-RS and spatial relation indication?**  *Tentative agreements:*   * No need to have restrictions on the relation between the associated RS for TCI state, PL-RS and spatial relation indication.   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |

Sub-topic 1-3 PUCCH Scell activation delay requirement for invalid TA case

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|  | **Status summary** |
| **Issue 1-3-1** | **Issue 1-3-1: Applicability of PDCCH order receiving.**  *Tentative agreements:*   * The UE shall be capable to receive a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot .   *Candidate options:*  FFS If UE receives a PDCCH order to initiate RA procedure on the PUCCH SCell later than slot   * Option 1:   + Additional delay to activate the SCell is expected. In test, the PDCCH order to initiate RA procedure would be sent to UE no earlier than slot . * Option 2:   + A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of slot until reception of PDCCH order.   *Recommendations for 2nd round: Check the tentative agreement and further discuss candidate options.* |
| **Issue 1-3-2** | **Issue 1-3-2: How to capture the delay uncertainty of PDCCH order receiving in PUCCH Scell activation delay requirements for invalid TA case.**  *Tentative agreements:*   * The uncertainty for PDCCH order receiving is included in the definition of T1. T1 is the delay uncertainty in acquiring the first available PDCCH triggered PRACH occasion in the PUCCH SCell after Tactivation\_time.   + T1 is up to the summation of a delay uncertainty for reception of PDCCH order, 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   *Candidate options: None.*  *Recommendations for 2nd round: Check the tentative agreement.* |
| **Issue 1-3-3** | **Issue 1-3-3: Whether to include [X] in the PUCCH Scell activation delay requirements for invalid TA case?**  *Tentative agreements:*   * GTW Agreements   + Do not include [X] in the PUCCH Scell activation delay requirements for invalid TA case     - Note: the decision can be revisited in case any issues are identified based on further RAN1/2 decisions   *Candidate options: None.*  *Recommendations for 2nd round: No more discussion.* |

Sub-topic 1-4 PUCCH SCell activation delay requirements with multiple DL Scells

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|  | **Status summary** |
| **Issue 1-4-1** | **Issue 1-4-1: The scenarios of PUCCH Scell activation with multiple DL Scells?**  *Tentative agreements:*   * The PUCCH Scell activation with multiple Scell means that multiple Scells are activated by one single MAC command among which one Scell is PUCCH Scell..   *Candidate options: None.*  *Recommendations for 2nd round: No more discussion.* |
| **Issue 1-4-2** | **Issue 1-4-2: The delay requirements for PUCCH SCell activation with multiple DL Scells?**  *Tentative agreements: None.*  *Candidate options:*  *Moderator: Firstly consider the principle/framework on defining the requirements.*   * Option 1: Define the requirements based on the following scenarios (different processing assumption for PUCCH Scell and other DL Scells)   + **Scenario 1: The procedure of PUCCH Scell activation and other DL Scells activation can be performed in parallel.**      - FFS on the requirements:       * the single PUCCH SCell activation delay requirements still apply for the PUCCH Scell, and       * the normal SCell activation delay requirement for deactivated SCell with multiple Downlink SCells defined in clause 8.3.7 of current specification 38.133 apply for other downlink Scells.   + **Scenario 2: The procedure of PUCCH Scell activation and other Scells activation cannot be performed in parallel.**      - FFS on the requirements:       * PUCCH SCell activation shall be prioritised w.r.t other SCells.       * the single PUCCH SCell activation delay requirements still apply for the PUCCH Scell. * Option 2: Define the requirements taking normal Scell activation with multiple DL Scell as baseline (i.e. take PUCCH Scell as one of normal Scell in R16 requirement)   + FFS on the requirements:     - the normal SCell activation delay requirement for deactivated SCell with multiple Downlink SCells defined in clause 8.3.7 of current specification 38.133 apply for other downlink Scells.     - PUCCH Scell activation delay requirements can be derived from single PUCCH SCell activation delay by replacing with   *Recommendations for 2nd round: Further discuss.* |

Sub-topic 1-5 Applicability of PUCCH SCell activation requirements

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|  | **Status summary** |
| **Issue 1-5-1** | **Issue 1-5-1: whether to capture the agreements above in the spec:**  *Tentative agreements:*   * Do not capture the following agreement in the specification.   + PUCCH SCell activation requirements are applied when 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   + PUCCH SCell activation requirements are applied when 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.   *Candidate options: None.*  *Recommendations for 2nd round: No more discussion.* |

### CRs/TPs

## Discussion on 2nd round (if applicable)

### Sub-topic 1-1 PUCCH SCell activation requirements for unknown cell

**Issue 1-1-1: Whether to define PUCCH SCell activation requirements for unknown cell case for UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting?**

*Moderator: please Nokia check if the tentative agreement is acceptable.*

*Tentative agreements:*

* RAN4 to not specify PUCCH SCell activation requirement for the scenarios in which beam information needs to be reported to network but UE cannot support CSI reporting cross PUCCH groups in R17.

*Recommendations for 2nd round: Check the tentative agreement.*

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| **Issue 1-1-1: Whether to define PUCCH SCell activation requirements for unknown cell case for UE not supporting the Rel-17 capability of cross PUCCH group CSI reporting?** | |
| **Company** | **Comments** |
| Apple | Support the tentative agreement. |
| Nokia | Fine with the tentative agreement by adding “if the capability is concluded as optional by RAN2”, or “this issue becomes invalid if RAN2 conclude the capability as conditional mandatory”.  As commented, this issue is NOT valid if RAN2 concludes the capability is conditional mandatory. |
| Qualcomm | Agree with Nokia’s comment for further clarification on the tentative agreement. |
| Huawei | Fine with tentative agreement |
| Intel | OK with the tentative agreement. |
| Xiaomi | Fine with tentative agreement |

**Issue 1-1-2: Requirements applicability of unknown cell case where beam indication is needed**

*Tentative agreements:*

* For unknown case where beam indication is needed, the requirements only apply when UE supports cross PUCCH group CSI reporting capability, and UE is configured with CSI reporting via SpCell. And the TCI, UL spatial relation, PL-RS and PDCCH order (when applicable) are configured based on latest valid L1-RSRP reporting via Primary PUCCH group.

*Recommendations for 2nd round: Check the tentative agreement.*

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| **Issue 1-1-2: Requirements applicability of unknown cell case where beam indication is needed** | |
| **Company** | **Comments** |
| Apple | Support the tentative agreement. |
| Nokia | We can understand the intention of the proposal, but the wording needs to be refined.  Referring to below in existing spec, “configured” refers to RRC configuration. By using “configured” in the proposal, it implies the CSI reporting resources on PCell is periodic which is not concluded by RAN1 yet. Similarly, PDCCH order should be “scheduled” instead of “configured” by network. The wording as it is now is not correct.   * *. The requirement for unknown SCell applies provided that the activation commands for PDCCH TCI, PDSCH TCI (when applicable), semi-persistent CSI-RS for CQI reporting (when applicable), and configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) are based on the latest valid L1-RSRP reporting.* |
| Qualcomm | Okay with Nokia’s wording. |
| Huawei | Fine with tentative agreement. Regarding Nokia’s comments, we do not fully understand the meaning “configured” implies “periodic”. Any kind of CSI report is “configured” by NW, the only difference is the way of triggering. Even for AP CSI, the resource is configured by NW via CSI-ResourceConfig and CSI-ReportConfig by RRC. The proposal doesn't imply any particular type of CSI. The suggested wording is almost same as normal Scell activation, but for PUCCH SCell the following two points needs to be clearly stated:   * + 1. CSI reporting should be configured on other cell (CSI-ReportConfig in this configuration),otherwise UE still cannot report beam information.     2. Not only TCI, but also UL spatial and PL-RS |

### Sub-topic 1-2 Components of Tactivation\_time

**Issue 1-2-1: Whether to update the working assumption for PL-RS?**

*Moderator: Although most companies are fine with option 1 as there is no technical difference between option 1 and agreed working assumption. Since the working assumption has been sent to RAN1, moderator would suggest to wait for the reply.*

*Tentative agreements:*

* Keep the working assumption agreed in last meeting.

*Candidate options: None.*

*Recommendations for 2nd round: Check the tentative agreement.*

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| **Issue 1-2-1: Whether to update the working assumption for PL-RS?** | |
| **Company** | **Comments** |
| Apple | Support tentative agreement. |
| Nokia | Support tentative agreement. |
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**Issue 1-2-3: The known condition of PL-RS**

*Moderator: Almost all the companies think the three options are similar but option 1 implemented the details. Huawei’s comment can be addressed in issue 1-1-2, there is no need to repeat the same sentence in each part in moderator’s understanding.*

*Please Nokia check if option 1 can be acceptable.*

*Tentative agreements:*

* the known condition of PL-RS for known PUCCH SCell could be defined as (based on the known condition in legacy PL-RS switching delay, and the different part form legacy definition is highlighted in *yellow*):
  + The pathloss reference signal is known *for known PUCCH SCell during activation* if the following conditions are met during the period between the last transmission of the RS resource used for *L3 RSRP measurement reporting* and *the completion of PUCCH SCell activation*, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.
    - *Pathloss reference signal activation command* is received within 1280 ms upon the last transmission of the RS resource for *L3 measurement*
    - The UE has sent at least one *L3 RSRP report* for the target pathloss reference signal before *the pathloss reference signal activation command*
    - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period*
      * SNR of the target pathloss reference signal≥-3dB
    - The associated SSBs with the target pathloss reference signal remain detectable during *the PUCCH SCell activation period*
      * SNR of the associated SSB ≥-3dB
    - Otherwise, the pathloss reference signal is unknown.
  + The pathloss reference signal is known for *unknown PUCCH SCell during activation* if the following conditions are met during the period between the last transmission of the RS resource used for L1-RSRP measurement reporting and *the completion of PUCCH SCell activation*, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.
    - *Pathloss reference signal activation command* is received within 1280 ms upon the last transmission of the RS resource for beam reporting or measurement
    - The UE has sent at least one L1-RSRP report for the target pathloss reference signal before *the pathloss reference signal activation command*
    - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period*
      * SNR of the target pathloss reference signal≥-3dB
    - The associated SSBs with the target pathloss reference signal remain detectable during *the PUCCH SCell activation period*
      * SNR of the associated SSB ≥-3dB
    - Otherwise, the pathloss reference signal is unknown.

*Candidate options: None.*

*Recommendations for 2nd round: Check the tentative agreement.*

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| **Issue 1-2-3: The known condition of PL-RS** | |
| **Company** | **Comments** |
| Apple | Support tentative agreement. |
| Nokia | We don’t agree with the tentative agreement, and would like to clarify the following issues.   * According to PL-RS assumption agreed in last meeting, PL-RS may or may not be configured by the network. If it is not configured, there is no need to activate the PL-RS, then “*Pathloss reference signal activation command* is received within 1280 ms…” becomes a valid condition. Is current proposal assuming PL-RS activation command is always needed? * In the known condition, one condition is “he target pathloss reference signal remains detectable during the PUCCH SCell activation period”. Then under known condition, it was proposed to discuss “maintained” and “not maintained”. What is the difference between “PL-RS remains detectable” and “PL-RS is maintained”? * The known condition for unknown SCell seems not correct. As PL-RS is activated after L1-RSRP, which is reported after SCell activation command, it seems unlikely to fulfill the following sub-condition.   + - The target pathloss reference signal remains detectable during *the PUCCH SCell activation period* |
| Huawei | Fine with tentative agreement |
| Intel | OK with the tentative agreement |

**Issue 1-2-4: Whether the PL-RS will introduce extra delay time when the known condition is met?**

*Tentative agreements:*

* When PL-RS of target PUCCH Scell is known
  + When PL-RS is not maintained before Scell is activated, 5 samples delay is introduced
  + When PL-RS is maintained before Scell is activated
    - Option 2: 5 samples delay is introduced
    - Option 3: No additional delay is introduced

*Candidate options: None.*

*Recommendations for 2nd round: Further discuss option 2 and option 3.*

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| **Issue 1-2-4: Whether the PL-RS will introduce extra delay time when the known condition is met?** | |
| **Company** | **Comments** |
| Apple | We are fine with either option, according to the reason commented in the 1st round. |
| Nokia | We need agree on the known condition before we could determine if additional delay is needed. And as commented in Issue 1-2-3, there are many issues to be clarified. The tentative agreement is not agreeable to us. |
| Qualcomm | Although we are in favor or Option 2 in terms of number of samples required for PL-RS measurement, we do not agree with the way tentative proposal is put. We propose the following wording:   * RAN4 to define requirement only for the case where PL-RS is not maintained during SSell is deactivated, and the number of PL-RL samples for UE to measure up on SCell activation is 5. |
| Huawei | Similar view as QC. But more accurately, no need to considered “maintained” case as commented by companies. We didn’t get clear explanation of “maintained before SCell is activated”. According to RAN1 definition, 5 samples is needed for filtering purpose. Does option 3 means UE should always filtering the results when it is deactivated as UE have no idea when it will be activated. OR does it mean UE can only use one samples without filtering to decide PL-RS? |
| Intel | Here, the question is whether PL-RS of another activated SCell can assumed to be maintained. As commented by some companies, the scenario is not typical in intra-frequency case. For inter-frequency case, the PL-RS from another SCell can’t be used. We are fine that there is no maintained case. |

**Issue 1-2-5: The known condition of TCI state and spatial relation**

*Tentative agreements:*

* No need to update the known condition of TCI state and spatial relation in the PUCCH Scell activation delay requirements.

*Candidate options: None.*

*Recommendations for 2nd round: Check the tentative agreement.*

|  |  |
| --- | --- |
| **Issue 1-2-5: The known condition of TCI state and spatial relation** | |
| **Company** | **Comments** |
| Apple | Support tentative agreement. |
| Nokia | Support tentative agreement. |
| Qualcomm | Based on companies’ comments in the first round, e.g. Nokia, tentative agreement is okay with us. |
| Huawei | Fine with tentative agreements |
| Intel | Fine with the tentative agreements |

**Issue 1-2-6: Relation between the associated RS for TCI state, PL-RS and spatial relation indication?**

*Tentative agreements:*

* No need to have restrictions on the relation between the associated RS for TCI state, PL-RS and spatial relation indication.

*Candidate options: None.*

*Recommendations for 2nd round: Check the tentative agreement.*

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| --- | --- |
| **Issue 1-2-6: Relation between the associated RS for TCI state, PL-RS and spatial relation indication?** | |
| **Company** | **Comments** |
| Apple | Support tentative agreement. |
| Nokia | Support tentative agreement. |
| Qualcomm | Tentative agreement is okay. |
| Huawei | Fine with tentative agreements |
| Intel | OK with the tentative agreement. |

### Sub-topic 1-3 PUCCH Scell activation delay requirement for invalid TA case

**Issue 1-3-1: Applicability of PDCCH order receiving.**

*Tentative agreements:*

* The UE shall be capable to receive a PDCCH order to initiate RA procedure on the PUCCH SCell no later than in slot .

*Candidate options:*

FFS If UE receives a PDCCH order to initiate RA procedure on the PUCCH SCell later than slot

* Option 1:
  + Additional delay to activate the SCell is expected. In test, the PDCCH order to initiate RA procedure would be sent to UE no earlier than slot .
* Option 2:
  + A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of slot until reception of PDCCH order.

*Recommendations for 2nd round: Check the tentative agreement and further discuss candidate options.*

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| --- | --- |
| **Issue 1-3-1: Applicability of PDCCH order receiving.** | |
| **Company** | **Comments** |
| Apple | The first sentence between option 1 and 2 are same: A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. We agree with option 2, and perhaps we could merge option 1 and 2:   * A delay uncertainty for reception of PDCCH order shall be accounted for in the activation timeline. The delay uncertainty for reception of PDCCH order starts from end of slot until reception of PDCCH order. In test, the PDCCH order to initiate RA procedure would be sent to UE no earlier than slot .   The reason to add clarification of test is to avoid the case: when PDCCH is transmitted earlier than , UE may be not able to receive it and fail the test. |
| Nokia | Agree with the tentative agreement. But “shall” seems excluding FFS case. Is it the intention?  For FFS case, we understood the delay uncertainty can be captured in T1 as discussed in Issue 1-3-2. What is the intention to discuss FFS here? |
| Qualcomm | To address companies’ concern observed in the first round, the current tentative agreement can be modified as below:   * The UE shall be ~~capable~~ ready to receive a PDCCH order to initiate RA procedure on the PUCCH SCell by no later than ~~in~~ slot .   With the modification above, it does not necessarily mean UE shall be able to receive PDCCH before slot n + . |
| Huawei | Fine with tentative agreement, and support option 2 which is aligned with the tentative agreements in issue 1-3-2. But we think option 1 is also valid as option 1 and option 2 are not mutually precluded. |
| Xiaomi | Support the modification for the tentative agreement.  For the delay uncertainty, we are fine with Apple’s suggestion. |

**Issue 1-3-2: How to capture the delay uncertainty of PDCCH order receiving in PUCCH Scell activation delay requirements for invalid TA case.**

*Tentative agreements:*

* The uncertainty for PDCCH order receiving is included in the definition of T1. T1 is the delay uncertainty in acquiring the first available PDCCH triggered PRACH occasion in the PUCCH SCell after Tactivation\_time.
  + T1 is up to the summation of a delay uncertainty for reception of PDCCH order, 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

*Candidate options: None.*

*Recommendations for 2nd round: Check the tentative agreement.*

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| --- | --- |
| **Issue 1-3-2: How to capture the delay uncertainty of PDCCH order receiving in PUCCH Scell activation delay requirements for invalid TA case.** | |
| **Company** | **Comments** |
| Apple | Support tentative agreement. |
| Nokia | Support tentative agreement. |
| Qualcomm | Okay with the main bullet of tentative agreement. For the second bullet, we still fail to understand why it is needed and whether any unnecessary information is added or not.  It would be appreciated if proponent of the second bullet further elaborates on the significance of it. If ‘the first available PDCCH triggered PRACH occasion’ is unclear, we can replace the wording with ‘the PRACH resource triggered by the PDCCH.’ |
| Intel | Fine with tentative agreement. |
| Xiaomi | Support the tentative agreement. |

### Sub-topic 1-4 PUCCH SCell activation delay requirements with multiple DL Scells

**Issue 1-4-2: The delay requirements for PUCCH SCell activation with multiple DL Scells?**

*Candidate options:*

*Moderator: Firstly consider the principle/framework on defining the requirements.*

* Option 1: Define the requirements based on the following scenarios (different processing assumption for PUCCH Scell and other DL Scells)
  + **Scenario 1: The procedure of PUCCH Scell activation and other DL Scells activation can be performed in parallel.** 
    - FFS on the requirements:
      * the single PUCCH SCell activation delay requirements still apply for the PUCCH Scell, and
      * the normal SCell activation delay requirement for deactivated SCell with multiple Downlink SCells defined in clause 8.3.7 of current specification 38.133 apply for other downlink Scells.
  + **Scenario 2: The procedure of PUCCH Scell activation and other Scells activation cannot be performed in parallel.** 
    - FFS on the requirements:
      * PUCCH SCell activation shall be prioritised w.r.t other SCells.
      * the single PUCCH SCell activation delay requirements still apply for the PUCCH Scell.
* Option 2: Define the requirements taking normal Scell activation with multiple DL Scell as baseline (i.e. take PUCCH Scell as one of normal Scell in R16 requirement)
  + FFS on the requirements:
    - the normal SCell activation delay requirement for deactivated SCell with multiple Downlink SCells defined in clause 8.3.7 of current specification 38.133 apply for other downlink Scells.
    - PUCCH Scell activation delay requirements can be derived from single PUCCH SCell activation delay by replacing with

*Recommendations for 2nd round: Further discuss.*

|  |  |
| --- | --- |
| **Issue 1-4-2: The delay requirements for PUCCH SCell activation with multiple DL Scells?** | |
| **Company** | **Comments** |
| Apple | Option 2. The multiple SCell activation case could be an optimization of normal single PUCCH SCell activation, so if we cannot complete it in this meeting, the discussion could be continued in maintenance stage. |
| Nokia | What does “processing in parallel” mean exactly? Does it refer to RF retuning, AGC setting or also other procedures? We understood the PUCCH SCell has to be prioritized over the SCells associated to the PUCCH SCell. Both of the proposals seem not very much complete. We can discuss this in next meeting. |
| Qualcomm | We’d like to discuss this in the next meeting (maintenance stage).  In the meantime, if companies can further elaborate on each proposal with clear definition of terminologies, e.g. parallel processing, it would be appreciated.  Is this PUCCH SCell activation with multiple SCells about the case where all SCells are in the same PUCCH group? Then our first impression at the moment is other SCells than PUCCH SCell can’t or don’t have to be activated earlier than the PUCCH SCell. Is this correct and common understanding in the group? If yes, ‘parallel processing’ means part of processing for multiple SCells including PUCCH SCell can be in parallel, i.e. the entire activation processing for other SCells than PUCCH SCell does not have to be held off until the PUCCH SCell activation is complete? |
| Huawei | Suggest to take normal Scell activation with multiple DL Scell as baseline. As commented in 1st round, it is not very clear about the meaning parallel/sequential. In legacy requirements, due to searcher limitaiton, some componnets of the delay is in sequential and some are in paralell. And also what has been mentioned in QC’s comment is valid. |
| Xiaomi | Option 2 |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
| WF on further RRM enhancement for NR and MR-DC – PUCCH SCell activation/deactivation requirements | CATT | *WF to capture all the agreements and open issues.* |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2203925 | PUCCH Scell activation delay requirements with multiple Scell | CATT | Revised |  |
| R4-2204364 | Draft CR for PUCCH SCell deactivation delay requirements in TS 38.133 | MTK | Noted | *No updates on the endorsed CR in last meeting* |
| R4- 2204703 | 38.133 draft CR on PUCCH SCell activation delay requirements | Nokia | Revised |  |
| R4-2204873 | Draft CR on requirements for interruption requirements to NR serving Cell for PUCCH SCell activation | Huawei | Revised |  |
| R4-2205841 | Draft CR on Interruption requirements to LTE serving cell | Ericsson | Revised |  |
|  |  |  |  |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

# Annex

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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)