**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** |
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**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** |
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### 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** |
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**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** |
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**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** |
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**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** |
| XXX |  |
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**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** |
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**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** |
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### 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** |
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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.**

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** |
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**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** |
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### 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** |
| XXX |  |
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**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** |
| XXX |  |
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### 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** |
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## 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2203925 (CATT)  (draft CR for PUCCH Scell activation delay with multiple cell) | Company A |
| Company B |
|  |
| R4-2204364 (MTK)  (draft CR for PUCCH Scell deactivation delay) | Company A |
| Company B |
|  |
| R4- 2204703 (Nokia)  (draft CR for PUCCH Scell activation delay) |  |
|  |
|  |
| R4-2204873 (Huawei)  (Draft CR on interruption of PUCCH SCell activation in 38.133) |  |
|  |
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| R4-2205841 (Ericsson)  (Draft CR on Interruption requirements to LTE serving cell in 36.133) |  |
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## Summary for 1st round

### Open issues

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| --- | --- |
|  | **Status summary** |
| **Sub-topic 1-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-3** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-4** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-5** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

## Discussion on 2nd round (if applicable)

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**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 |  |  |
| R4-2204364 | Draft CR for PUCCH SCell deactivation delay requirements in TS 38.133 | MTK |  |  |
| R4- 2204703 | 38.133 draft CR on PUCCH SCell activation delay requirements | Nokia |  |  |
| R4-2204873 | Draft CR on requirements for interruption requirements to NR serving Cell for PUCCH SCell activation | Huawei |  |  |
| R4-2205841 | Draft CR on Interruption requirements to LTE serving cell | Ericsson |  |  |
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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 |  |
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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

Contact information

|  |  |  |
| --- | --- | --- |
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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)