**3GPP TSG-RAN WG4 Meeting # 99-e R4-2108398**

**Electronic Meeting, 19th – 27th May, 2021**

**Agenda item:** 9.9.2.3

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [99-e][226] NR\_RRM\_enh2\_3

**Document for:** Information

# Introduction

The documents in agenda item 9.9.2.3 focus on the following topic

* Topic #1: PUCCH SCell activation/deactivation requirements

# Topic #1: PUCCH SCell activation/deactivation requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2108970 | Qualcomm Incorporated | **Start and Ending point of PUCCH SCell activation sequence****Proposal 1: For a single PUCCH SCell activation requirement, the activation latency is defined from a slot in which UE receives the PUCCH SCell activation MAC-CE command to a slot when UE reports a valid CSI to the target PUCCH SCell irrespective of whether TA is valid or not.****PUCCH SCell Activation Sequence, Framework, and Restrictions****Observation 1: For a single known PUCCH SCell activation, the SCell activation sequence is exactly the same as non-PUCCH SCell activation except that CSI of the SCell is reported on the SCell.****Observation 2: An activation sequence of a single known PUCCH SCell without a valid TA requires CFRA procedure on the target PUCCH SCell before a valid CSI report.** **Observation 3: An activation sequence of a single unknown FR1 PUCCH SCell with a valid TA can be supported by the current specification and the activation sequence is the same as non-PUCCH SCell activation except CSI report on the target SCell including L1-RSRP report. For a single unknown FR2 PUCCH SCell with a valid TA, L1-RSRP report on the target SCell may not be supported.****Observation 4: An activation sequence of a single unknown FR1 PUCCH SCell without a valid TA cannot be supported by the current specification.****Proposal 2: If the target PUCCH SCell is unknown cell, RAN4 to discuss/decide whether to define the SCell activation requirements for the following cases separately:*** + **FR1 PUCCH SCell with a valid TA**
	+ **FR2 PUCCH SCell with a valid TA**
	+ **FR1 PUCCH SCell without a valid TA**
	+ **FR2 PUCCH SCell without a valid TA**

**Proposal 2-1: If RAN4 agrees to define requirements for unknown FR1 PUCCH SCell activation with a valid TA, the requirements are as follows:*** + **if ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted, or ‘ssb-PositionInBurst’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation,**
		- **UE does not report the beam information, i.e. L1-RSRP, if the following conditions are additionally met,**
			* **the SCell is contiguous to an active serving cell in the same band, and**
			* **A single SSB is used in the unknown SCell; or multiple SSBs are used in the SCell and TCI state indication for PDCCH is provided by the same MAC PDU used for SCell activation; and**
			* **its ssb-PositionInBurst is same as the one of contiguous FR1 active serving cell, and**
			* **its SMTC offset is same as the one of contiguous FR1 active serving cell, and**
			* **its RTD with contiguous FR1 active serving cell is smaller than or equal to 260ns with respect to the to-be-activated SCell’s SSB numerology, and its reception power difference with contiguous FR1 active serving cell is smaller than or equal to 6dB;**
		- **UE reports the beam information, i.e. L1-RSRP, to the target SCell, otherwise**
	+ **otherwise, UE reports the beam information, i.e. L1-RSRP, to the target SCell for TCI activation**

**Proposal 2-2: If RAN4 agrees to define requirements for any of the following cases, RAN4 should discuss how to exchange beam information between UE and network. If it is identified that non-PDCCH order based CBRA can be used for the beam information exchange as a part of the SCell activation sequence, RAN4 to consider sending an LS to RAN1 and RAN2 asking if the CBRA can be exceptionally allowed for the identified case(s).*** + **unknown FR1 PUCCH SCell without a valid TA**
	+ **unknown FR2 PUCCH SCell with a valid TA**
	+ **unknown FR2 PUCCH SCell without a valid TA**

**PUCCH UL spatial relation in FR2****Proposal 3: For FR2, UL spatial relation of PUCCH on target being-activated SCell should be considered for PUCCH SCell activation*** + **the time uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated SCell shall be defined assuming the spatial relation activation signal and TCI activation command are received in the same MAC CE**
	+ **FFS on FR2 unknown PUCCH SCell with an invalid TA**
 |
| R4-2109052 | CATT | **Proposal 1: If the TA is valid, the ending point of PUCCH SCell activation is UE transmit valid CSI report on cell scheduled by network. If the TA is not valid, the ending point of PUCCH SCell activation should be defined at the point UE transmit PRACH on PUCCH SCell.****Proposal 2: Adopt above agreements and proposals for beam information (SSB index) of PUCCH Scell indication.****Proposal 3: Adopt above proposals for beam information indication processing.****Proposal 4: L1-RSRP report is transmitted on the SpCell before the PUCCH Scell is activated if L1-RSRP report is needed.****Proposal 5: The UL spatial relation is needed only for FR2 PUCCH SCell activation. The time for the UL spatial relation will be out of delay requirement for PUCCH SCell activation if ending point is defined at UE transmit first valid CSI report for valid TA case and first PRACH for invalid TA case.****Proposal 6: UE UL special capability can be not considred if ending point of PUCCH Scell activation is defined at UE transmit first PRACH.****Proposal 7: Reuse the Rel-15 SCell activation delay requirement for valid TA case, i.e. (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).****Proposal 8: The PUCCH SCell activation requirements for invalid TA case is:Delay = (( THARQ + Tactivation\_time + TCell\_search + TCSI\_Reporting + TSSB index + TPDCCH + T1)/ NR slot length)TCell\_search = 0 if PUCCH SCell is known.TSSB index = 0 if PUCCH SCell is known or ‘ssb-PositionInBurst’ indicates only one SSB.****Proposal 9: Support the option that 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.****Proposal 10: T2 should not be considered in the delay requirements for PUCCH SCell activation.****Proposal 11: T3 should not be considered in the delay requirements for PUCCH SCell activation.****Proposal 12: Reuse the interruption requirement of normal Scell activation.****Proposal 13: Adopt applicability of PUCCH Scell activation requirements of option 1 in WF.** |
| R4-2109251 | Xiaomi | **Proposal 1: The ending point of PUCCH SCell activation is the time when UE transmit valid CSI report on the target PUCCH SCell for both valid TA case and invalid TA case.****Proposal 2: The following alternatives can be considered for the indication of the beam information.*** **Alternative 1: UE measures the quality of the PUCCH SCell and reports the beam information to network via sPCell.**
* **Alternative 2: the PDCCH order containing the indicated SSB/PBCH index for determining the RA occasion is configured by sPCell.**

**Proposal 3: Support to send LS to RAN1/2 for the feasibility of beam information indication for PUCCH SCell activation.****Proposal 4: L1-RSRP reporting on the sPCell is needed for PUCCH SCell activation.****Proposal 5: The UL spatial relation of PUCCH on target being-activated SCell should be considered for PUCCH SCell activation for both valid case and invalid case.****Proposal 6: If UE has the valid TA on the PUCCH SCell being activated, the basic SCell activation delay defined in section 8.3.2 in TS38.133 can be reused for PUCCH SCell activation.****Proposal 7: If UE does not have the valid TA on the PUCCH SCell being activated, an additional UL synchronization procedure to obtain the valid TA shall be considered which including the following factors:**1. **the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell;**
2. **the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs;**
3. **the delay for applying the received TA for uplink transmission**
 |
| R4-2109310 | Apple | ***Proposal 1: The ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell, for both valid TA and invalid TA cases.******Proposal 2: The beam information for network to determine the associated SSB for PDCCH triggered RACH occasion shall be considered for both FR1 and FR2 cases.******Proposal 3:******If the target PUCCH Scell is known, no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA, i.e., no additional SSB based beam measurement is needed.******If the target PUCCH Scell is unknown cell in FR2:**** ***If there is at least one active serving cell on that FR2 band (following the same conditions in TS38.133 section 8.3.2 for intra-band FR2 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.***
* ***If there is no active serving cell on that FR2 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.***

***If the target PUCCH Scell is unknown cell in FR1:**** ***If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.***
* ***If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.***

***Proposal 4: beam information of PUCCH SCell is needed to be indicated to NW for both valid and invalid TA cases.******Proposal 5: discuss if RAN4 could have conclusion on how to indicate beam information of PUCCH SCell to network during PUCCH SCell activation, following alternative solutions are considered:**** + - ***Alt 1: using L3 measurement report of PUCCH SCell via SpCell PUSCH***
		- ***Alt 2: Not define the requirement for the unknown PUCCH SCell activation***

***RAN4 sends LS to RAN1/2 for clarification on this issue only when the solutions could not be concluded in RAN4.******Proposal 6: same solution of beam reporting in issue 1-1-3b shall be applied to L1-RSRP reporting of target PUCCH SCell during unknown PUCCH SCell activation.******Proposal 7: For both valid TA and invalid TA cases in PUCCH SCell activation:*** * ***the UL spatial relation of PUCCH on target being-activated SCell should be considered for PUCCH SCell activation in FR2 only.***
	+ ***the time uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated SCell shall be defined in the baseline FR2 SCell activation delay part (Tactivate\_basic). Details are FFS.***

***Proposal 8: For UEs not supporting beamCorrespondenceWithoutUL-BeamSweeping, FR2 PUCCH SCell (de)activation requirements are not defined.******Proposal 9: Regarding PUCCH Scell activation delay requirement for valid TA case,**** ***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 MAC CE for UL spatial relation activation of PUCCH in target being-activated SCell shall be considered in the baseline Tactivation\_time.***

***Proposal 10: Regarding* the PUCCH SCell activation requirements for invalid TA case*,**** **If UE does not have the valid TA on the PUCCH SCell being activated, an additional UL synchronization procedure to obtain the valid TA shall be considered which including the following factors:**
	+ **the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (T1);**
	+ **the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (T2);**
	+ **the delay for applying the received TA for uplink transmission (T3)**

***Proposal 11: In NR PUCCH SCell activation delay requirement with invalid TA, T1 is the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell. T1 is up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].******Proposal 12: In NR PUCCH SCell activation delay requirement with invalid TA, T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated. Tactivate\_basic is the normal SCell activation delay in TS38.133 section 8.3.2. slot n is the slot when UE received PUCCH SCell activation MAC CE.******Proposal 13: In NR PUCCH SCell activation delay requirement with invalid TA, T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.******Proposal 14: regarding interruption requirements for PUCCH Scell activation in invalid TA case:**** ***The interruption requirement shall include the existing requirement for Scell activation in Rel-15.***
* ***Introduce additional interruption by PRACH transmission when target PUCCH SCell RACH has different SCS from spCell data/control channel and UE does not support diffNumerologyAcrossPUCCH-Group.***

***Proposal 15:*** ***The PUCCH SCell activation delay requirement shall apply provided that,**** + ***The UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell within Tactivate\_basic otherwise additional delay to activate the SCell is expected; and***
	+ ***No interruption occurs in same FR as the target PUCCH SCell during the SCell activation procedure if UE supports per-FR MG, otherwise the PUCCH SCell activation delay can be extended, and***
	+ ***No interruption occurs during the SCell activation procedure if UE does not support per-FR MG, otherwise the PUCCH SCell activation delay can be extended.***

***The above interruption is caused by factor defined in TS38.133 section 8.2.1.1 for EN-DC, in TS38.133 section 8.2.2.1 for NR SA, in TS38.133 section 8.2.3.1 for NE-DC and*** ***in TS38.133 section 8.2.4.1 for NR-DC.*** |
| R4-2109518 | CMCC | The ending point of PUCCH SCell activation***Proposal 1: for invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.******Proposal 2: for valid TA case, if RAN4 have the common understanding that CSI of PUCCH SCell can’t be reported to other cells than the PUCCH SCell once the PUCCH SCell is configured by RRC, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.***PUCCH Scell activation delay requirements***Proposal 3: for the case of SCell activation for deactivated PUCCH SCell with valid TA, the SCell activation delay requirement for deactivated SCell specified in section 8.3.2 of TS 38.133 can be reused, which is* (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).*****Proposal 4: for the case of SCell activation for deactivated PUCCH SCell with invalid TA,*** * ***the SCell activation delay requirement in DL:* (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length)**
* ***the SCell activation delay requirement in UL: except THARQ + Tactivation\_time +TCSI\_Reporting, additional delay including following parts need to be considered for the SCell activation delay requirements specification:***
* ***the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell***
* ***the delay for obtaining a valid TA command for the sTAG***
* ***the delay for applying the received TA for upling transmission***
 |
| R4-2109545 | NTT DOCOMO, INC. | **Proposal 1: For both valid TA case and invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.****Proposal 2: If the target PUCCH SCell is unknown cell in FR1*** **If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network.**
* **If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network.**

**Proposal 3: RAN4 should send LS to RAN1/2 whether following behaviours can be feasible within Rel-15 scope:*** **UE uses CBRA for PUCCH SCell activation to update TA value and indicate the best beam for the PUCCH SCell to be activated.**
* **UE transmits CSI report to indicate the best beam for the PUCCH SCell to be activated on P(S)Cell.**
* **UE indicates the best beam for the PUCCH SCell to be activated other than L1-RSRP report.**

**Proposal 4: The UL spatial relation of PUCCH on target being-activated SCell should be considered for PUCCH SCell activation in FR2 only both for valid TA case and invalid TA case.****Proposal 5: Rel-17 PUCCH SCell activation should require beam correspondence related capability support.****Proposal 6: If the target PUCCH SCell is known, additional delay related to UL spatial relation switch is not needed to be considered.****Proposal 7: Reuse the Rel-15 SCell activation delay requirement which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length) for known PUCCH SCell case.****Proposal 8: If the target PUCCH SCell is known and UE does not have the valid TA on the PUCCH SCell being activated, an additional UL synchronization procedure to obtain the valid TA shall be considered which including the following factors:*** **the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (T1);**
* **the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (T2);**
* **the delay for applying the received TA for uplink transmission (T3)**

**Proposal 9: 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.****Proposal 10: T2 is the delay from slot n + (Tactivate\_basic +T1)/(NR slot length) until UE has obtained a valid TA command for the target PUCCH SCell being activated. Slot n is the slot when UE received PUCCH SCell activation MAC CE. The reasonable upperlimit for T2 should be specified.****Proposal 11: T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.** |
| R4-2109548 | Nokia, Nokia Shanghai Bell | **Observation #1: The target PUCCH SCell is considered as a known cell if there is at least one active serving cell on the FR2 band of the target PUCCH SCell.** **Proposal 1: If the target PUCCH SCell is unknown cell in FR2, the UE needs to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.****Proposal 2: If the target PUCCH SCell is unknown in FR1, the UE does not need to indicate the beam information to the network and can follow LTE PUCCH SCell activation procedure.****Proposal 3: For the cases where beam information needs to be indicated to the network, RAN4 send LS to RAN1/2 asking for the feasibility and potential solutions for transmitting the beam information of PUCCH SCell on the PCell/PSCell.** **Observation #2: In LTE PUCCH SCell activation, the UE is required to be able to transmit valid CSI report on the PUCCH SCell within the activation delay requirement, which indicates the end of the PUCCH SCell activation.****Proposal 4: If the UE has a valid TA for transmitting on the PUCCH SCell in NR, the activation delay requirement is the same as the activation delay for activating a non-PUCCH SCell i.e. Tactivation\_time as defined in TS 38.133 section 8.3.2.** **Proposal 5: If the UE does not have a valid TA for transmitting on the PUCCH SCell in NR, the activation delay shall be discussed for downlink and uplink actions separately.** **Proposal 6: If the UE does not have a valid TA for transmitting on an SCell, the UE shall be capable to perform downlink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot** $n+\frac{T\_{HARQ}+T\_{activation\\_time}}{NR slot length}$**.****Proposal 7: The activation delay requirement for PUCCH SCell shall be defined assuming no dedicated time period for CSI measurements and reporting.****Proposal 8: If the UE does not have a valid TA for transmitting on an SCell, the UE shall be capable to perform uplink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot** $n+\frac{T\_{HARQ}+T\_{activation\\_time}+T\_{RACH}}{NR slot length}$**, where TRACH is the delay to perform RACH procedure and apply the TA.****Proposal 9: In case beam information needs to be transmitted, the CSI report may be sent together with the beam information hence RACH completion can be considered as the ending point of PUCCH SCell activation.** |
| R4-2109617 | vivo | **Observation 1: beam information is always required for an eNB to configure PDCCH order and does not depend on known or unknown case.** **Proposal 1: for either valid TA or invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell, i.e., use both option 1 for valid and invalid TA case.** **Proposal 2: To confirm that if the target PUCCH Scell is unknown cell in FR1 and if there is no contiguous active serving cell on that FR1 band, the beam information is needed by the network for determining the associated SSB in PDCCH order for RA.****Proposal 3: For the invalid TA and unknown SCell scenario, assuming the UE can measure the quality of the PUCCH SCell and report the beam information to network via SpCell.****Proposal 4: PUCCH Scell activation delay requirement for valid TA case, slight prefer option 2.****Proposal 5: For the PUCCH Scell activation delay requirement under invalid TA scenairo, suggest to reuse the corresponding structure of legacy requirements for the extra delay, i.e., option 1.** |
| R4-2109631 | MediaTek Inc. | **Observation 1: The uplink control information cannot be transmitted cross PUCCH group, i.e., UE cannot transmit the L1-RSRP and CSI report on SpCell for PUCCH SCell.****Proposal 1: The ending point for valid and invalid TA case should be the CSI report transmission on target PUCCH SCell.****Proposal 2: For the PUCCH SCell activation, RAN4 should only define requirement for the known cell case (include FR1 and FR2).****Proposal 3: For the PUCCH SCell activation, the spatial relation should only be considered for the valid TA case, not for the invalid TA case.****Proposal 4: For the known PUCCH SCell with valid TA case, the activation requirement should be*** **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)) specified in TS38.133 section 8.3.2 as the baseline. The timing uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated SCell shall be considered in the baseline Tactivation\_time.**

**Proposal 5: For the known PUCCH SCell without valid TA case (include FR1 & FR2), the activation delay requirement shall be THARQ + Tactivate\_basic + T1 + T2 + T3 + TCSI\_Reporting, where*** **Tactivate\_basic: the SCell activation delay specified in TS38.133 section 8.3.2.**
* **T1:** **the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell. T1 is up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].**
* **T2:** **the delay from slot n + (Tactivate\_basic +T1)/(NR slot length) until UE has obtained a valid TA command for the target PUCCH SCell being activated. Slot n is the slot when UE received PUCCH SCell activation MAC CE.**
* **T3: the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.**

**Proposal 6: For the case PUCCH SCell activation with invalid TA, the interruption requirement of PUCCH SCell activation can reuse the existing requirement for SCell in Rel-15.** |
| R4-2109892 | NEC | **Proposal 1: For valid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.****Proposal 2: For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.****Proposal 3: RAN4 to agree that CSI reporting can be transmitted on SCell for PUCCH SCell activation and TA acquisition should be performed before CSI reporting.** **Proposal 4: For known/unknown FR1/2 SCell activation where CSI reporting is transmitted on SCell, RAN4 to agree that SCell activation procedure includes UL spatial relation info for PUCCH.** **Proposal 5: RAN4 to send LS to RAN2 to get clarification regarding the PUCCH SCell configuration or reconfiguration and also to get clarification on possibility of existence of unknown PUCCH SCell activation procedure in reality.** **Proposal 6: PUCCH SCell activation delay (TDelay\_PUCCH\_SCell) is defined as: TDelay\_PUCCH\_SCell=TBasic\_SCell\_activation\_delay + TL1-RSRP + TTA\_delay + TUL\_spatial\_relationInfo; where:*** **TBasic\_SCell\_activation\_delay is SCell activation delay as described in clause 8.3.2 of TS 38.133;**
* **TL1-RSRP: L1-RSRP measuring and reporting delay. This is zero for FR1/2 known SCells and FR2 unknown SCells;**
* **TTA\_delay: Delay required for TA command acquisition and application. Exact delay is FFS; and**
* **TUL\_spatial\_relationInfo: Delay uncertainty for receiving UL spatial relation info MAC CE and UL spatial relation info application delay. Exact delay is FFS. This is applicable only when CSI report of to be activated SCell is transmitted on SCell.**

**Proposal 7: RAN4 to agree that timing command acquisition and application delay (TTA\_delay) when the TA is invalid is defined as: TTA\_delay = T1 + T2 + T3; where,** * **T1: delay uncertainty in acquiring next available PRACH occasion in the PUCCH SCell;**
* **T2: delay for obtaining a valid TA command for the TAG to which the SCell configured with PUCCH belongs;**
* **T3: delay for applying the received TA for uplink transmission.**
 |
| R4-2110063 | OPPO | ***Proposal 1：For both valid TA and invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.******Proposal 2: If the target PUCCH SCell is unknown cell in FR1,**** ***if it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.***
* ***if there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.***

***Proposal 3: Send LS to RAN1/RAN2 asking for the feasible solutions for transmitting beam information during activating a PUCCH SCell.******Observation 1: L1-RSRP report is transmitted on the SpCell if L1-RSRP report is needed******Proposal 4: The PUCCH SCell activation delay with valid TA should be THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length.*** ***Proposal 5: The UL spatial relation should be considered for PUCCH SCell activation in FR2 only, if it was agreed that the UL spatial relation is needed.******Proposal 6: The additional delay for NR PUCCH SCell activation with invalid TA should be defined, considering at least the following 3 components:**** ***the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell***
* ***the delay for obtaining a valid TA command for the sTAG***
* ***the delay for applying the received TA for uplink transmission***
 |
| R4-2110345 | Huawei, HiSilicon | **Observation 1: Same ending point of PUCCH SCell activation for both valid TA and invalid TA****Proposal 1: The ending point of PUCCH SCell activation for both valid TA and invalid TA is the point when UE transmit valid CSI report on target PUCCH SCell.****Observation 2: Beam information is needed for both FR1 and FR2 no matter whether TA is valid or not.****Proposal 2: Define requirements for both known and unknown cases.****Observation 3: Even if UE is allowed to transmit CSI (L1-RSRP) on PUCCH of PCell, the activation procedure will become over complicated:*** **Add/ release the CSI report on PCell via RRC each time before/after PUCCH SCell activation.**
* **Implementation will be very complicated for both UE and gNB to determine each point involving cross PUCCH group operation.**
* **The delay for PUCCH SCell activation wil be extremely long.**

**Observation 4: Changes or clarifications from RAN1 and RAN2 are needed to enable the PUCCH SCell activation for unknown cases.****Proposal 3: Send LS to RAN1 and RAN2 to ask whether UE is allowed to report CSI of PUCCH SCell on PCell and whether it is feasible to allow CBRA or similar approach on PUCCH SCell considering the benefits in PUCCH SCell activation procedure with invalid TA.****Proposal 4：For unknown case with valid TA, FFS temporary beam indication approach.** **Proposal 5: The UL spatial relation is needed for PUCCH SCell activation for both valid and invalid TA.** |
| R4-2110972 | Ericsson | **Proposal 1:** The following ending point is used in requirements for PUCCH SCell activation:* For valid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.
* For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.

**Proposal 2:** If the target PUCCH Scell is unknown cell in FR1:* + - * If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
			* If there is a contiguous known SCell being activated with the same MAC CE command, no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
			* If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.

**Proposal 3:** RAN4 to ask RAN1 to confirm that L1-RSRP reporting for PUCCH SCell to-be-activated can be configured from and reported in spCell.**Proposal 4:** RAN4 to account for L1-RSRP reporting for any case where network does not know which beam is suitable for the UE. * In case of valid TA, this information is used for TCI state configuration and potentially spatial relation information configuration.
* In case of invalid TA, this information is used for TCI state configuration, potentially for spatial relation information configuration, and for indicating SSB index in PDCCH order for RA.

**Proposal 5:** Regardless of TA status:* + - The UL spatial relation of PUCCH on target being-activated SCell should be considered for PUCCH SCell activation in FR2 only.
		- the time uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated SCell shall be defined in the baseline FR2 SCell activation delay part (Tactivate\_basic). Details are FFS

**Proposal 6:** Current set of requirements is developed for UEs supporting either of following capabilites:* + - beamCorrespondenceWithoutUL-BeamSweeping
		- beamCorrespondenceSSB-based-r16.

**Proposal 7:** For known TA: Reuse the Rel-15 SCell activation delay requirement which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).**Proposal 8:** For unknown TA: Reuse the Rel-15 SCell activation delay requirement which is (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length) and add the following to the timeline: time for receiving PDCCH order, time for transmitting RA preamble, and time for receiving RAR with TA.* + - If UE does not have the valid TA on the PUCCH SCell being activated, an additional UL synchronization procedure to obtain the valid TA shall be considered which including the following factors:
			* the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (T1);
			* the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (T2);
			* the delay for applying the received TA for uplink transmission (T3)

**Proposal 9:** 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. **Proposal 10:** T2 is the delay from slot n + (Tactivate\_basic +T1)/(NR slot length) until UE has obtained a valid TA command for the target PUCCH SCell being activated. Slot n is the slot when UE received PUCCH SCell activation MAC CE.**Proposal 11:** T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.**Proposal 12:** Reuse the interruption requirement of normal SCell activation also for PUCCH Scell activation with invalid TA. **Proposal 13:** For the applicability of PUCCH SCell activation requirements* + - Delay requirements for PUCCH SCell activation shall account for additional time when PDCCH order is received outside Tactivate\_basic. The additional time shall be accounted for by an expression and/or a delay component, e.g. max(Tactivate\_basic, TPDCCH\_order).
		- In activation of multiple SCells with one PUCCH SCell, activation delay requirement shall apply at least for the PUCCH SCell in the event that one or more SCells have configurations that render parallel activation impossible for the UE. FFS on whether activation delay requirement also is to apply for SCells that are compatible with parallel activation with PUCCH SCell.
 |

## Open issues summary

### Sub-topic 1-1 Ending point of PUCCH SCell activation

**Issue 1-1-1: The ending point of PUCCH SCell activation procedure for valid TA case?**

Proposals

* Option 1: (Qualcomm, Xiaomi, Apple, NTT DOCOMO, vivo, MTK, NEC, OPPO, Huawei, Ericsson)
	+ For valid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell
* Option 2: (CATT)
	+ For valid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on the cell scheduled by network
* Option 3: (CMCC)
	+ If RAN4 have the common understanding that CSI of PUCCH SCell can’t be reported to other cells than the PUCCH SCell once the PUCCH SCell is configured by RRC, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell.
* Recommended WF
	+ *Need more discussion*

**Issue 1-1-2: The ending point of PUCCH SCell activation procedure for invalid TA case?**

Proposals

* Option 1: (Qualcomm, Xiaomi, Apple, CMCC, NTT DOCOMO, vivo, MTK, NEC, OPPO, Huawei, Ericsson)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on the target PUCCH SCell
* Option 2: (CATT)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit PRACH on PUCCH Scell
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Sub-topic 1-1 Ending point of PUCCH SCell activation** |
| **Company** | **Comments** |
| vivo | **Issue 1-1-1:** Option 1 we think the benefit of option 1 is that it can ensure that PUCCH SCell’s uplink is ready after using option 1, which justify the reasons where different requirements are defined for PUCCH SCell activation.**Issue 1-1-2:** Option 1 |
| MediaTek | **Issue 1-1-1:** Support option 1. In our understanding, CSI report cannot be transmitted across PUCCH group.**Issue 1-1-2:** Support option 1. The reason is same as Issue 1-1-1. |
| CATT | **Issue 1-1-1:** We can support option 1. **Issue 1-1-2:** Support option 2. The HO delay and PSCell delay requirements in NR are both defined based on the ending point at first PRACH transmission. And in our understanding, when UE can transmit PRACH, the SCell can be regarded as activated and can already have interaction with gNB. The following procedure such as uplink synchronization can be performed by SCell individually after it is activated..  |
| Apple | **Issue 1-1-1:** Option 1. Cross PUCCH group CSI reporting is not supported so far, and we think we can just reuse the same methodology we used in LTE PUCCH SCell activation.**Issue 1-1-2:**Option 1. Based on RAN2 MAC definition as below, when PUCCH SCell is activated, the PUCCH shall be ready to use. But if we use RACH as ending point, that’s conflicting with RAN2 definition. **Text, letter  Description automatically generated** |
| Xiaomi | **Issue 1-1-1:** Option 1According to existing specification defined in TS36.133, the ending point of PUCCH SCell activation is the time when UE transmit valid CSI report on the target PUCCH SCell for both valid TA case and invalid TA case. The similar way can be followed for the PUCCH SCell activation in NR.**Issue 1-1-2:** Option 1 |
| Qualcomm | **Issue 1-1-1:** Option 1.**Issue 1-1-2:**Option 1. |
| Ericsson | **Issue 1-1-1:** Option 1**Issue 1-1-2:** Option 1 |
| OPPO | **Issue 1-1-1:** Option 1. CSI report cannot be transmitted across PUCCH group.**Issue 1-1-2:**Option 1. |
| CMCC | **Issue 1-1-1:**We are fine with option 1.**Issue 1-1-2:**Option 1. |
| Huawei | Issue 1-1-1:Support option 1. We fail to see why the ending point need to be distinguished for valid TA and invalid TA.Issue 1-1-2:Support option 1. |
| NEC | Issue 1-1-1: Support option 1Issue 1-1-2: Support option 1 |
| Nokia | Issue 1-1-1: Option 1. Issue 1-1-2: For invalid TA case, we may define the ending point at some time before CSI reporting. As the UE need perform RACH on PUCCH SCell, we prefer taking the completion of RACH as the ending point as below. In Option 2, it refers to the timing “when UE transmit RACH”, it may not be sufficient if the RACH failed. * For invalid TA case, the ending point of PUCCH SCell activation should be the point when RACH is completed on PUCCH Scell.
 |
| NTT DOCOMO, INC. | **Issue 1-1-1:** Option 1.**Issue 1-1-2:** Option 1 |

### Sub-topic 1-2 Beam information for PUCCH SCell activation

**Issue 1-2-1: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR2?**

**Agreements in RAN4#98bis-e meeting:**

* If the target PUCCH Scell is known, no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA, i.e., no additional SSB based beam measurement is needed.
* If the target PUCCH Scell is unknown cell in FR2:
	+ If there is at least one active serving cell on that FR2 band (following the same conditions in TS38.133 section 8.3.2 for intra-band FR2 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
	+ If there is no active serving cell on that FR2 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.

Proposals

* Option 1: (Nokia)
	+ The target PUCCH SCell is considered as a known cell if there is at least one active serving cell on the FR2 band of the target PUCCH SCell.
	+ If the target PUCCH SCell is unknown cell in FR2, the UE needs to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 2:
	+ Keep the agreements in last meeting.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Issue 1-2-1: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR2?** |
| **Company** | **Comments** |
| vivo | Option 2 we think the original agreements are clearer. |
| MediaTek | Support option 2. In our understanding, to make requirement simple, the known/ unknown condition should be aligned with SCell activation and deactivation. |
| CATT | Support option 2.  |
| Apple | Option 2. |
| Xiaomi | Option 2, prefer to keep previous agreements. |
| Qualcomm | Option 2. |
| Ericsson | Our preferrence is to stick to the agreement from RAN4#98-bis-e (Option 2). But seems Option 1 is equivalent. Can proponent clarify? |
| OPPO | Option 2. |
| Huawei | Option 2. Prefer not to change the definition of a known Cell. |
| Nokia | Our intention is exactly to align the definition of unknown FR2 cell with current spec. According to the agreements above, the FR2 unknown SCells are classified into two types:* If there is at least one active serving cell on that FR2 band
* If there is no active serving cell on that FR2 band

However, based on 38.133 (cited below), the FR2 SCell is unknown only if it is the first SCell to be activated on the band i.e. there is no at least one active serving cell on the FR2 band. Hence the first bullet would never happen when FR2 unknown SCell is to be activated. So the agreements in last meeting should be reformulated as proposed in Option 2. *For the first SCell activation in FR2 bands, the SCell is known if it has been meeting the following conditions:**….**- Otherwise, the first SCell in FR2 band is unknown.* |
| NTT DOCOMO, INC. | Option 2 |

**Issue 1-2-2: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR1?**

Proposals

* Option 1: (Apple, Huawei)
	+ The beam information for network to determine the associated SSB for PDCCH triggered RACH occasion shall be considered for both FR1 and FR2 cases
	+ Beam information of PUCCH SCell is needed to be indicated to NW for both valid and invalid TA cases
* Option 1a: (CATT, Apple, NTT DOCOMO, vivo, OPPO, Qualcomm)
	+ If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
	+ If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 1b: (Ericsson)
	+ If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
	+ If there is a contiguous known SCell being activated with the same MAC CE command, no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
	+ If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 2: (Nokia)
	+ If the target PUCCH SCell is unknown in FR1, the UE does not need to indicate the beam information to the network and can follow LTE PUCCH SCell activation procedure.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Issue 1-2-2: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR1?** |
| **Company** | **Comments** |
| vivo | Support option 1a |
| MediaTek | Support option 1, 1a One question about second bullet in option 1b, what is the meaning of the same MAC CE command? |
| CATT | Support option 1 and 1a. For option 2, we think the beam information is the DL beam direction from gNB, even if UE is omnidirectional receiving, the beam information is still needed.  |
| Apple | Option 1 and 1a. |
| Xiaomi | Option 1a is fine |
| Qualcomm | Option 1a. |
| Ericsson | We support Option 1a/1b. The difference is whether one can utilize beam information for known contiguous to-be-activated SCell, but we can further discuss that later when looking into activation of multiple SCells out of which one is PUCCH SCell. |
| OPPO | Option 1a. |
| Huawei | Support option 1. The conditions for intra-band contiguous FR1 Scell activation means UE could utilize the timing information from UE’s perspective, for option 1a/1b, it implies that the Tx beams of gNB are also same. From our understanding, they are not completely equivalent.  |
| NEC | Yes, beam information is needed to be indicated for unknown PUCCH SCell. We can agree on option 1 and 1a as baseline and further discuss second bullet of option 1b. |
| Nokia | Support Option 2.We had the understanding that the UE is receiving in omini-directional manner and hence is able to receive the PDCCH order no matter in which beam it is sent. We would like to hear more views here. In addition, in current spec, it says below where TCI indication is assumed to be provided together with activation command. With this applicability condition, the UE is assumed to obtain the beam information via TCI, therefore no need to transmit beam information? *The requirements for FR1 unknown SCell activation specified in this clause apply when one of the following conditions is met**- ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted, or**- ‘ssb-PositionInBurst’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation.* |
| NTT DOCOMO, INC. | Support option 1a.We understood the intention of option 1b but firstly we should focus on simple case that only one PUCCH SCell is activated. |

**Issue 1-2-3: How to indicate the beam information for PUCCH SCell activation (The procedure for beam indication for PUCCH SCell activation)?**

Proposals

* Option 1: (Qualcomm)
	+ If the target PUCCH SCell is unknown cell, RAN4 to discuss/decide whether to define the SCell activation requirements for the following cases separately:
		- FR1 PUCCH SCell with a valid TA
		- FR2 PUCCH SCell with a valid TA
		- FR1 PUCCH SCell without a valid TA
		- FR2 PUCCH SCell without a valid TA
	+ If RAN4 agrees to define requirements for any of the following cases, RAN4 should discuss how to exchange beam information between UE and network. If it is identified that non-PDCCH order based CBRA can be used for the beam information exchange as a part of the SCell activation sequence, RAN4 to consider sending an LS to RAN1 and RAN2 asking if the CBRA can be exceptionally allowed for the identified case(s).
		- unknown FR1 PUCCH SCell without a valid TA
		- unknown FR2 PUCCH SCell with a valid TA
		- unknown FR2 PUCCH SCell without a valid TA
* Option 2: (CATT)
	+ The valid case:
		- UE may measure the quality of the PUCCH SCell and report the beam information to network via SpCell.
		- Network transmits the downlink signals via the beam reported by UE and UE can transmit the uplink signals with valid TA.
	+ The invalid case:
		- UE may measure the quality of the PUCCH SCell and report the beam information to network via SpCell.
		- Network will indicate the PDCCH order to UE and then UE will trigger the random access procedure for obtaining the TA command.
		- After UE obtain the valid TA, UE may transmit the CSI-reporting on its own PUCCH resource.
* Option 3: (Xiaomi)
	+ The following alternatives can be considered for the indication of the beam information.
		- Alternative 1: UE measures the quality of the PUCCH SCell and reports the beam information to network via sPCell.
		- Alternative 2: the PDCCH order containing the indicated SSB/PBCH index for determining the RA occasion is configured by sPCell.
* Option 4: (Xiaomi, Nokia, OPPO, NTT DOCOMO, NEC, Huawei)
	+ Send LS to RAN1/2 for PUCCH SCell configuration or reconfiguration and the feasibility of beam information indication for PUCCH SCell activation, e.g.
		- UE uses CBRA for PUCCH SCell activation to update TA value and indicate the best beam for the PUCCH SCell to be activated.
		- UE transmits CSI report to indicate the best beam for the PUCCH SCell to be activated on P(S)Cell.
		- UE indicates the best beam for the PUCCH SCell to be activated other than L1-RSRP report.
		- The possibility of unknown PUCCH SCell activation procedure
* Option 5: (Apple)
	+ Discuss if RAN4 could have conclusion on how to indicate beam information of PUCCH SCell to network during PUCCH SCell activation, following alternative solutions are considered:
		- Alt 1: using L3 measurement report of PUCCH SCell via SpCell PUSCH
		- Alt 2: Not define the requirement for the unknown PUCCH SCell activation
	+ RAN4 sends LS to RAN1/2 for clarification on this issue only when the solutions could not be concluded in RAN4.
* Option 6: (vivo)
	+ For the invalid TA and unknown SCell scenario, assuming the UE can measure the quality of the PUCCH SCell and report the beam information to network via SpCell
* Option 7: (MTK)
	+ For the PUCCH SCell activation, RAN4 should only define requirement for the known cell case (include FR1 and FR2).
* Option 8: (Huawei)
	+ Define requirements for both known and unknown cases
	+ Changes or clarifications from RAN1 and RAN2 are needed to enable the PUCCH SCell activation for unknown cases.
	+ For unknown case with valid TA, FFS temporary beam indication approach
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Issue 1-2-3: How to indicate the beam information for PUCCH SCell activation (The procedure for beam indication for PUCCH SCell activation)?** |
| **Company** | **Comments** |
| vivo | Suggests to discuss whether to define requirements for cases like unknown FR1/FR2 cell with invalid TA, i.e., the first part of option 1. |
| MediaTek | Support option 7. As we known, typically, PUCCH SCell is activated with known condition. Because this is R15 feature, RAN1/2 should not be changed because of this issue. Otherwise, it will lead to a NBC issue.We are fine to send the LS to RAN1/2 to clarify this issue in R17. |
| CATT | Agree to first discuss whether to define requirement for unknown cell. We think the alternative in option 5 can be a baseline. And in our understanding, the PUCCH SCell to be activated is generally known cell, because it should be already measured by UE when in deactivated state. The case in which PUCCH SCell is configured and activated directly is corner case. So we prefer alt2 in option 5 which is also same as option 7.  |
| Apple | Prefer to discuss the two alternatives in option 5 first, which we think is the minimum impact to current RAN1/2 spec. No matter whether TA is valid or invalid, the issue about cross PUCCH group CSI reporting always exists for unknown PUCCH SCell activation case. |
| Xiaomi | Option 3 and option 4 are fine, UE can measure the quality of the PUCCH SCell and reports the beam information to network via SpCell before the configuration of PDCCH order for both valid and invalid TA cases. |
| Qualcomm | Option 1 and 5 in principle.In our understanding, if RAN4 decides to support unknown PUCCH SCell activation, the only backward compatible option is Alt 1 of Option 5 which is L3 based beam information indication. All other options are non-backward compatible, i.e. Rel-15 and -16 UEs can’t support unknown PUCCH SCell activation even if RAN1/2 make changes to their spec to support it. In that sense, high-level questions the group need to answer before getting into detailed options should be:1. whether to support/define unknown PUCCH SCell activation requirement for Rel-15 and -16 UEs which the WI originally aims to do

whether to enhance unknown PUCCH SCell activation efficiency in terms of latency and/or reliability for Rel-17 UEs |
| Ericsson | According to our understanding, it is possible to configure L1-RSRP measurements on PUCCH SCell for reporting in spCell. This seems supported by the signaling below. We suggest that RAN4 sends an LS to RAN1 to have RAN1 confirming that this approach would be feasible.– *CSI-ReportConfig*The IE *CSI-ReportConfig* is used to configure a periodic or semi-persistent report sent on PUCCH on the cell in which the *CSI-ReportConfig* is included, or to configure a semi-persistent or aperiodic report sent on PUSCH triggered by DCI received on the cell in which the *CSI-ReportConfig* is included (in this case, the cell on which the report is sent is determined by the received DCI). See TS 38.214 [19], clause 5.2.1.***CSI-ReportConfig* information element**-- ASN1START-- TAG-CSI-REPORTCONFIG-STARTCSI-ReportConfig ::= SEQUENCE { reportConfigId CSI-ReportConfigId, carrier ServCellIndex OPTIONAL, -- Need S resourcesForChannelMeasurement CSI-ResourceConfigId, csi-IM-ResourcesForInterference CSI-ResourceConfigId OPTIONAL, -- Need R nzp-CSI-RS-ResourcesForInterference CSI-ResourceConfigId OPTIONAL, -- Need R reportConfigType CHOICE { periodic SEQUENCE { reportSlotConfig CSI-ReportPeriodicityAndOffset, pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource }, semiPersistentOnPUCCH SEQUENCE { reportSlotConfig CSI-ReportPeriodicityAndOffset, pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource }, semiPersistentOnPUSCH SEQUENCE { reportSlotConfig ENUMERATED {sl5, sl10, sl20, sl40, sl80, sl160, sl320}, reportSlotOffsetList SEQUENCE (SIZE (1.. maxNrofUL-Allocations)) OF INTEGER(0..32), p0alpha P0-PUSCH-AlphaSetId }, aperiodic SEQUENCE { reportSlotOffsetList SEQUENCE (SIZE (1..maxNrofUL-Allocations)) OF INTEGER(0..32) } }, reportQuantity CHOICE { none NULL, cri-RI-PMI-CQI NULL, cri-RI-i1 NULL, cri-RI-i1-CQI SEQUENCE { pdsch-BundleSizeForCSI ENUMERATED {n2, n4} OPTIONAL -- Need S }, cri-RI-CQI NULL, cri-RSRP NULL, ssb-Index-RSRP NULL, cri-RI-LI-PMI-CQI NULL },[...] |
| OPPO | Start with Option 1 and 5 as baseline. We are fine to not define requirements for unknown PUCCH Scell. And RAN4 sends LS to RAN1/2 for confirm the feasibility of beam information indication for PUCCH SCell activation. |
| Huawei | For option 1 and option 7. We support to define requirements for both known and unknown cases for both FR1 and FR2. If we only define requirements for known cases and leave the beam indication information unsolved, it means NW either always keep the cell active or always configured the periodic report, which are not adorable for both NW and UE. For option 5 the first bullet. We think it is actually the same that NW may always configured the L3 measurement before the activation. For option 2/3/6, after checking the RAN1 and RAN2 spec, we didn’t find specific rules about whether CSI report could be transmitted via SpCell in NR. Then we think it should be confirmed by RAN1.Then we believe the LS is needed. For option 4, we think the following question should be mentioned1. Whether UE can report CSI of PUCCH SCell via SpCell2. Whether CBRA can be supported on PUCCH SCell for the advantages of facilitating the unknown PUCCH SCell activation with invalid TA.For the last two bullets, we don’t really understanding the meaning, maybe some clarifications are needed.For option 8, for unknown case with valid TA, we are fine to further discuss it as RACH is not always needed hereFor QC’s question, we are a little bit confused. From our understanding, the functionality is supported since Rel-15, but the requirements is defined for Rel-17 UE.  |
| NEC | Our preference is send LS to RAN1 and RAN2 to confirm the feasibility of sending CSI report on spCell. If it is feasible when the CSI report can be configured to be sent on PUCCH of PUCCH SCell.If it is not feasible to send CSI report on spCell, we would like to check with RAN1/2 about possibility of unknown PUCCH SCell scenario.  |
| Nokia | We support Option 4. But probably no need to list the candidate solutions. Instead, we may refer to RAN4 conclusion that UE needs to transmit beam information of PUCCH SCell, and ask for the feasibility and potential solutions from RAN2.  |
| NTT DOCOMO, INC. | Basically we support option 4, but we agree with Ericsson’s analysis. CSI-ReportConfig on PUCCH SCell seems to be configurable on SpCell. Therefore we just send LS to RAN1/2 whether L1-RSRP report on PUCCH SCell belonging to secondary PUCCH group can be transmitted on the cell belonging to primary PUCCH group or not. In addition, the feasibility of CBRA on PUCCH SCell also should be included to cover invalid TA case. |

**Issue 1-2-4: Which cell is the L1-RSRP reporting transmitted for PUCCH SCell activation?**

Proposals

* Option 1: (CATT, Xiaomi, OPPO)
	+ L1-RSRP report is transmitted on the SpCell before the PUCCH Scell is activated if L1-RSRP report is needed.
* Option 2: (Apple)
	+ Same solution of beam reporting in issue 1-2-3 shall be applied to L1-RSRP reporting of target PUCCH Scell during unknown PUCCH Scell activation.
* Option 3: (Ericsson)
	+ RAN4 to ask RAN1 to confirm that L1-RSRP reporting for PUCCH Scell to-be-activated can be configured from and reported in spCell.
	+ RAN4 to account for L1-RSRP reporting for any case where network does not know which beam is suitable for the UE.
		- In case of valid TA, this information is used for TCI state configuration and potentially spatial relation information configuration.
		- In case of invalid TA, this information is used for TCI state configuration, potentially for spatial relation information configuration, and for indicating SSB index in PDCCH order for RA.
* Option 4: (Qualcomm)
	+ CSI cannot be reported across PUCCH group, i.e. should be transmitted to the target PUCCH Scell if TA is valid
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Issue 1-2-4: Which cell is the L1-RSRP reporting transmitted for PUCCH Scell activation?** |
| **Company** | **Comments** |
| vivo | We have similar views as option 1. Ok with option 3 if further confirmation from RAN1 is needed |
| MediaTek | Support option 4 but we are fine to send LS to RAN1 for clarification. |
| CATT | We think the L1-RSRP in this issue is for beam information indication before NW send PDCCH order. The SCell is not activated at this time, so the L1-RSRP can only be reported in SpCell. But it depends on the discussion on issue 1-2-3, if we do not define requirements for unknown cell or use L3 report to indicate beam information, this issue is not needed.  |
| Apple | Option 2. L1-RSRP is one kind of CSI, and therefore the solution in issue 1-2-3 shall also applied to L1-RSRP reporting of target PUCCH Scell during unknown PUCCH Scell activation. |
| Xiaomi | Option 1 is our understanding. But we are fine to ask RAN1 to confirm that L1-RSRP reporting for PUCCH Scell to-be-activated can be configured from and reported in SpCell. |
| Qualcomm | Option 2. If RAN4 agrees to support L3 based beam information indication or to not support unknown PUCCH SCell activation, no need to discuss it further.And there is a missing word in Option 4. \*should => shouldn’t |
| Ericsson | We support Option 3. From signaling point of view it seems report can be requested in cell where the report configuration is configured. But we better check with RAN1.  |
| OPPO  | Option 1. Also OK to send LS for confirmation. |
| Huawei | Support option 2. For option 4, we think we cannot make such conclusion in RAN4. For HARQ feedback, we think it may be valid according to RAN2’s spec. But for CSI reporting, we fail to find clear descriptions on this. So it is better to be confirmed by RAN 1. In addition, even if it is confirmed by RAN1 that CSI reporting on SpCell is allowed, we don’t think it is a typical use case and it will bring complicated cross group interaction during the PUCCH SCell activation procedures.  |
| NEC | We prefer confirming with RAN1/2. |
| Nokia | Option 2 could be the general principle assuming L1-RSRP is to be transmitted before RACH is performed on PUCCH SCell. As for where to transmit L1-RSRP, we are fine with Option 3 to ask RAN1 about the feasibility.  |
| NTT DOCOMO, INC. | Support option 2. |

**Issue 1-2-5: Whether the UL spatial relation is needed for PUCCH Scell activation?**

Proposals

* Option 1: (Qualcomm)
	+ For FR2, UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation
		- the time uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated Scell shall be defined assuming the spatial relation activation signal and TCI activation command are received in the same MAC CE
		- FFS on FR2 unknown PUCCH Scell with an invalid TA
* Option 2: (CATT)
	+ The UL spatial relation is needed only for FR2 PUCCH Scell activation. The time for the UL spatial relation will be out of delay requirement for PUCCH Scell activation if ending point is defined at UE transmit first valid CSI report for valid TA case and first PRACH for invalid TA case.
* Option 3: (Xiaomi, Apple, NTT DOCOMO, Huawei)
	+ The UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation for both valid case and invalid case.
* Option 3a: (Apple, OPPO, Ericsson)
	+ For both valid TA and invalid TA cases in PUCCH Scell activation:
		- the UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation in FR2 only.
			* the time uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated Scell shall be defined in the baseline FR2 Scell activation delay part (Tactivate\_basic). Details are FFS.
* Option 4: (NTT DOCOMO)
	+ If the target PUCCH Scell is known, additional delay related to UL spatial relation switch is not needed to be considered.
* Option 5: (MTK)
	+ For the PUCCH Scell activation, the spatial relation should only be considered for the valid TA case, not for the invalid TA case.
* Option 6: (NEC)
	+ RAN4 to agree that CSI reporting can be transmitted on Scell for PUCCH Scell activation and TA acquisition should be performed before CSI reporting.
	+ For known/unknown FR1/2 Scell activation where CSI reporting is transmitted on Scell, RAN4 to agree that Scell activation procedure includes UL spatial relation info for PUCCH.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Issue 1-2-5: Whether the UL spatial relation is needed for PUCCH Scell activation?** |
| **Company** | **Comments** |
| vivo | We think the UL spatial relation is needed only for FR2 PUCCH Scell activation. OK with option 3. |
| MediaTek | Support option 5. As we know, for invalid TA case, UE may know how to transmit the UL signals after the PRACH preamble is transmitted by UE. Thus, we do not see the needs of spatial relation for invalid TA case. |
| CATT | We think the UL spatial information is needed for valid TA case, how to account for the delay for UL spatial relation can be FFS. But for invalid TA case, if the ending point is defined as first PRACH transmission, the time for UL spatial relation will be out of scope.  |
| Apple | Option 3a. UL spatial relation is not only determined by UE side. Even though UE can know which Tx beam shall be used for CFRA based on PDCCH order, but the uplink spatial relation for PUCCH may not be same as RACH Tx beam (at least UE cannot assume it by default). Both network and UE needs to have same understanding on which UL spatial relation is used for PUCCH, and therefore that UL spatial relation for PUCCH is configured/activated by network. |
| Xiaomi | Option 3 |
| Qualcomm | Option 3a.We share the same understanding as Apple. |
| Ericsson | We support Option 3a. |
| OPPO | Option 3a. To be highlighted, it is considered for PUCCH Scell activation in FR2 only. |
| Huawei | Support option 3/3a. For option 5, from our understanding, for invalid TA case, as UE will indicate the beam information via certain approach, most likely that NW may use the reported beam information to configure the UL spatial relation. But we think it is also up to NW implementation and configuration. Otherwise, some default principles are needs to be defined. |
| NEC | We are OK with option 3a. |
| Nokia | We at least agree with Option 3. For unknown case, we understood the UE is able to determine the UL beams for PRACH transmission based on the SSB index in PDCCH order. Why do we need additional UL spatial relation?  |
| NTT DOCOMO, INC. | Support option 3a and 4. The option 4 we proposed is related to the detailed discussion in option 3a. |

### Sub-topic 1-3 UE capability for PUCCH SCell activation requirements

Proposals

* Option 1: (CATT)
	+ UE UL special capability can be not considred if ending point of PUCCH Scell activation is defined at UE transmit first PRACH
* Option 2: (Apple)
	+ For UEs not supporting *beamCorrespondenceWithoutUL-BeamSweeping*, FR2 PUCCH Scell (de)activation requirements are not defined.
* Option 3: (NTT DOCOMO)
	+ Rel-17 PUCCH SCell activation should require beam correspondence related capability support
* Option 4: (Ericsson)
	+ Current set of requirements is developed for Ues supporting either of following apabilities:
		- beamCorrespondenceWithoutUL-BeamSweeping
		- beamCorrespondenceSSB-based-r16.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Sub-topic 1-3 UE capability for PUCCH Scell activation requirements** |
| **Company** | **Comments** |
| MediaTek | Whether UE support *beamCorrespondenceWithoutUL-BeamSweeping* or not, UE anyway need to support the beam correspondence. The only difference is how accurate UE can form the uplink beam.We are not 100% clear why the requirement should be coupled with this IE. |
| CATT | We think this issue is about the time for UL spatial relation. If UE support *beamCorrespondenceWithoutUL-BeamSweeping*, the delay for UL beam acquisition can be not included.  |
| Apple | Option 2. The *beamCorrespondenceWithoutUL-BeamSweeping* is a R15 UE capability for beam correspondence, and it’s also used as the side condition of applicability for uplink spatial relation switching requirement. So if UE cannot support *beamCorrespondenceWithoutUL-BeamSweeping*, UE cannot activate the uplink spatial relation for the target PUCCH of SCell, and therefore the activation requirement of PUCCH SCell shall not apply. |
| Qualcomm | Option 4.If UE doesn’t support either of capabilities, the UE needs either CSI-RS resources with repetition or SRS resources for beam sweeping which haven’t considered in legacy SCell activation requirements. |
| Ericsson | We support Option 3 and Option 4.  |
| Huawei | This capability works as the condition for UL spatial relation, but the relation to PUCCH SCell activation shall be further justified. |
| Nokia | With existing capability on beamcorrespondence as listed in Option 4, it seems we don’t need additional capability dedicatedly for PUCCH SCell activation.  |
| NTT DOCOMO, INC. | Support option 3 and 4. |

### Sub-topic 1-4 PUCCH Scell activation delay requirement for valid TA case

Proposals

* Option 1: (Qualcomm)
	+ If RAN4 agrees to define requirements for unknown FR1 PUCCH SCell activation with a valid TA, the requirements are as follows:
		- if ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted, or ‘ssb-PositionInBurst’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation,
			* UE does not report the beam information, i.e. L1-RSRP, if the following conditions are additionally met,
				+ the SCell is contiguous to an active serving cell in the same band, and
				+ A single SSB is used in the unknown SCell; or multiple SSBs are used in the SCell and TCI state indication for PDCCH is provided by the same MAC PDU used for SCell activation; and
				+ its ssb-PositionInBurst is same as the one of contiguous FR1 active serving cell, and
				+ its SMTC offset is same as the one of contiguous FR1 active serving cell, and
				+ its RTD with contiguous FR1 active serving cell is smaller than or equal to 260ns with respect to the to-be-activated SCell’s SSB numerology, and its reception power difference with contiguous FR1 active serving cell is smaller than or equal to 6dB;
			* UE reports the beam information, i.e. L1-RSRP, to the target SCell, otherwise
		- otherwise, UE reports the beam information, i.e. L1-RSRP, to the target SCell for TCI activation
* Option 2: (CATT, Xiaomi, CMCC, NTT DOCOMO, Nokia, OPPO, Ericsson)
	+ Reuse the Rel-15 SCell activation delay requirement for valid TA case, i.e. (( THARQ + Tactivation\_time +TCSI\_Reporting)/ NR slot length).
* Option 3: (Apple, vivo, MTK)
	+ 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 MAC CE for UL spatial relation activation of PUCCH in target being-activated SCell shall be considered in the baseline Tactivation\_time.
* Option 4: (NEC)
	+ PUCCH SCell activation delay (TDelay\_PUCCH\_SCell) is defined as: TDelay\_PUCCH\_SCell=TBasic\_SCell\_activation\_delay + TL1-RSRP + TTA\_delay + TUL\_spatial\_relationInfo; where:
		- TBasic\_SCell\_activation\_delay is SCell activation delay as described in clause 8.3.2 of TS 38.133;
		- TL1-RSRP: L1-RSRP measuring and reporting delay. This is zero for FR1/2 known SCells and FR2 unknown SCells;
		- TTA\_delay: Delay required for TA command acquisition and application. Exact delay is FFS; and
		- TUL\_spatial\_relationInfo: Delay uncertainty for receiving UL spatial relation info MAC CE and UL spatial relation info application delay. Exact delay is FFS. This is applicable only when CSI report of to be activated SCell is transmitted on SCell.
		- TTA\_delay is considered to be zero.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Sub-topic 1-4 PUCCH Scell activation delay requirement for valid TA case** |
| **Company** | **Comments** |
| vivo | Support option 1 |
| MediaTek | Support option 3. In our understanding, the uncertainty of the MAC CE for UL spatial relation should be considered. |
| CATT | Support option 2. We think the requirements for unknown cell should not be considered. And in our understanding, if UE support *beamCorrespondenceWithoutUL-BeamSweeping*, the delay for UL beam acquisition can be not included. If UE does not support *beamCorrespondenceWithoutUL-BeamSweeping*, the delay for UL beam acquisition is the delay for UL beam sweeping which is UE implementation, so the requirement should not be defined. |
| Apple | Option 3. The uplink spatial relation for target PUCCH on SCell is activated by network MAC CE, and that uncertainty of MAC CE command shall be considered anyway. |
| Xiaomi | Option 2 |
| Qualcomm | Option 3. |
| Ericsson | We support Option 2.For Option 3 in FR2, we would assume that MAC CE for UL spatial relation can be transmitted in same MAC PDU as the MAC CE for TCI state activation, hence we do not see that additional time would be needed in the timeline for this purpose. For Option 4, same comment as above regarding MAC CE, but the additional time for application might make sense considering the previous discussions on PL RSs. |
| OPPO | For FR1, option 2 is ok.For FR2, it depends on issue 1-2-5. Option 3 seems not contradictory with option 2. If agreed, it is also reasonable to consider time uncertainty of the MAC CE for UL spatial relation activation of PUCCH. |
| CMCC | For option 3 in FR2, one question for clarification, if UE supports *beamCorrespondenceWithoutUL-BeamSweeping*, do we still need the time uncertainty of the MAC CE for UL spatial relation activation? |
| Huawei | The detailed requirements depend on the conclusions of related issues. For option 1, the “L1-RSRP” related to issue 1-2-2.For option 2 and 3, the unknown case is not considered.For option 4.It depends on the conclusions of related issues. |
| NEC | May be a clarification question.For valid TA case only known cell is considered and not unknown SCell. We considered both known and unknown cases.If it is only known SCell considered, then option 4 is equal to option 2 |
| Nokia | We support Option 2.  |
| NTT DOCOMO, INC. | Support option 2. |

### Sub-topic 1-5 PUCCH Scell activation delay requirement for invalid TA case

**Issue 1-5-1: The PUCCH SCell activation requirements for invalid TA case**

Proposals

* Option 1: (CATT)
	+ The PUCCH SCell activation requirements for invalid TA case is:
	Delay = (( THARQ + Tactivation\_time + TCell\_search + TCSI\_Reporting + TSSB index + TPDCCH + T1)/ NR slot length)
	TCell\_search = 0 if PUCCH SCell is known.
	TSSB index = 0 if PUCCH SCell is known or ‘ssb-PositionInBurst’ indicates only one SSB.
* Option 2: (Xiaomi, Apple, CMCC, NTT DOCOMO, vivo, MTK, OPPO, Ericsson)
	+ If UE does not have the valid TA on the PUCCH SCell being activated, an additional UL synchronization procedure to obtain the valid TA shall be considered which including the following factors:
		- the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH Scell(T1);
		- the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs(T2);
		- the delay for applying the received TA for uplink transmission(T3)
* Option 3: (Nokia)
	+ The activation delay shall be discussed for downlink and uplink actions separately.
	+ The UE shall be capable to perform downlink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot $n+\frac{T\_{HARQ}+T\_{activation\\_time}}{NR slot length}$.
	+ The activation delay requirement for PUCCH SCell shall be defined assuming no dedicated time period for CSI measurements and reporting.
	+ The UE shall be capable to perform uplink actions related to the SCell activation command for the SCell being activated on the PUCCH SCell no later than in slot $n+\frac{T\_{HARQ}+T\_{activation\\_time}+T\_{RACH}}{NR slot length}$, where TRACH is the delay to perform RACH procedure and apply the TA.
	+ In case beam information needs to be transmitted, the CSI report may be sent together with the beam information hence RACH completion can be considered as the ending point of PUCCH SCell activation.
* Option 4: (NEC)
	+ PUCCH SCell activation delay (TDelay\_PUCCH\_SCell) is defined as: TDelay\_PUCCH\_SCell=TBasic\_SCell\_activation\_delay + TL1-RSRP + TTA\_delay + TUL\_spatial\_relationInfo; where:
		- TBasic\_SCell\_activation\_delay is SCell activation delay as described in clause 8.3.2 of TS 38.133;
		- TL1-RSRP: L1-RSRP measuring and reporting delay. This is zero for FR1/2 known SCells and FR2 unknown SCells;
		- TTA\_delay: Delay required for TA command acquisition and application. Exact delay is FFS; and
		- TUL\_spatial\_relationInfo: Delay uncertainty for receiving UL spatial relation info MAC CE and UL spatial relation info application delay. Exact delay is FFS. This is applicable only when CSI report of to be activated SCell is transmitted on SCell.
		- TTA\_delay is T1+T2+T3
* Recommended WF
	+ *Need more discussion*

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

Proposals

* Option 1: (CATT, Apple, NTT DOCOMO, MTK, Ericsson)
	+ 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
* Recommended WF
	+ *Need more discussion*

**Issue 1-5-3: the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)**

Proposals

* Option 1: (CATT)
	+ T2 should not be considered in the delay requirements for PUCCH SCell activation
* Option 2: (Apple, MTK, Ericsson)
	+ T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated. Tactivate\_basic is the normal SCell activation delay in TS38.133 section 8.3.2. slot n is the slot when UE received PUCCH SCell activation MAC CE
* Option 2a: (NTT DOCOMO)
	+ The reasonable upper limit for T2 should be specified
* Recommended WF
	+ *Need more discussion*

**Issue 1-5-4: the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)**

Proposals

* Option 1: (CATT)
	+ T3 should not be considered in the delay requirements for PUCCH SCell activation
* Option 2: (Apple, NTT DOCOMO, MTK, Ericsson)
	+ T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Sub-topic 1-5 PUCCH Scell activation delay requirement for invalid TA case** |
| **Company** | **Comments** |
|  vivo | Issue 1-5-1: Support option 2Issue 1-5-2: Issue 1-5-3: Option 2Issue 1-5-4: Option 2 |
| MediaTek | Issue 1-5-1: option 2Issue 1-5-2: option 1Issue 1-5-3: option 2Issue 1-5-4: option 2 |
| CATT | Issue 1-5-1: Support option 1, depends on the ending point definition and the requirement scope (whether define requirements for unknown cell). Issue 1-5-2: Support option 1. Issue 1-5-3: Support option 1 and depends on the ending point definition. Issue 1-5-4: Support option 1 and depends on the ending point definition.  |
| Apple | Issue 1-5-1: Option 2Issue 1-5-2: Option 1Issue 1-5-3: Option 2Issue 1-5-4Option 2 |
| Qualcomm | Issue 1-5-1: Option 2 as a baseline for now. But there can be more factors that need to be accounted for in the latency requirement depending on pending issues. And whether invalid TA case can be supported based on the current NR spec is also a bit unclear as of now. Issue 1-5-2: Option 1 in principle, but FFS until Issue 1-5-1 and other pending issues are resolved.Issue 1-5-3: Option 2 in principle, but FFS until Issue 1-5-1 and other pending issues are resolved.Issue 1-5-4Option 2 in principle, but FFS until Issue 1-5-1 and other pending issues are resolved. |
| Ericsson | Issue 1-5-1: We support Option 2. But we agree with Nokia that requirements shall be separated for downlink actions and uplink actions. This is in any case needed since at least currently PDCCH order for CFRA in PUCCH SCell can only be transmitted in the PUCCH SCell and not in e.g. spCell. Hence there should be some requirment specifying when one can anticipate the UE to be ready to receive on PUCCH SCell downlink.Regarding Option 4, it might make sense to add additional time for UL spatial relation information application delay, if we need to consider the PL-RS issue.Issue 1-5-2: We support Option 1. In our view this follows the same as TIU in HO delay requirements.Issue 1-5-3: We support Option 2. Since we also propose that ending point shall be when CQI for PUCCH SCell is transmitted in PUCCH SCell, T2 needs to be included in the timeline.Issue 1-5-4: We support Option 2. Since we also propose that ending point shall be when CQI for PUCCH SCell is transmitted in PUCCH SCell, T3 needs to be included in the timeline. |
| OPPO | Issue 1-5-1: Option 2Issue 1-5-2: Option 1Issue 1-5-3: Option 2Issue 1-5-4Option 2 |
| CMCC | Issue 1-5-1:Option 2. And in our view, T1, T2, T3 are only needed for UL. For the delay requirements for DL procedure, T1, T2 and T3 are not needed.Issue 1-5-2:Option 1 |
| Huawei | Issue 1-5-1: Generally fine with the framework of option 2, but details may be FFS.Issue 1-5-2: Fine with option 1.Issue 1-5-3: Fine with option 2 but the Tactivate\_basic ­may need updated.Issue 1-5-4: Fine with option 2. |
| NEC | Issue 1-5-1: Option 4, considering both known and unknown SCell. Similar clarification question as previous issue regarding considering known and unknown SCells.Issue 1-5-2: Option 1Issue 1-5-3: Option 2Issue 1-5-4: Option 2 |
| Nokia | Issue 1-5-1: Option 3. We are also fine with the general principle in Option 2 as the formulation seems aligned except different parameters. But would be good to clarify the proposal in Option 2 refers to the UL activation delay. Issue 1-5-2: Option 1. Issue 1-5-3: We prefer a general definition of T2 similar as in LTE PUCCH SCell activation. In Option 2, the Tactivation\_basic includes Tcsi-reporting which is not possible before UL is activated. The value of the starting point of T2 needs further discussion.  |
| NTT DOCOMO, INC. | Issue 1-5-1:Support option 2Issue 1-5-2:Support option 1Issue 1-5-3:Support option 2/2a. the current description of option 2 just sais “until UE has obtained a valid TA command for the target PUCCH SCell being activated”. It seems to be unclear.Issue 1-5-4:Support option 2 |

### Sub-topic 1-6 Interruption requirements for PUCCH SCell activation in invalide TA case

Proposals

* Option 1: (CATT, MTK, Ericsson)
	+ Reuse the interruption requirement of normal Scell activation
* Option 2: (Apple)
	+ The interruption requirement shall include the existing requirement for Scell activation in Rel-15.
	+ Introduce additional interruption by PRACH transmission when target PUCCH SCell RACH has different SCS from spCell data/control channel and UE does not support diffNumerologyAcrossPUCCH-Group.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Sub-topic 1-6 Interruption requirements for PUCCH SCell activation in invalide TA case** |
| **Company** | **Comments** |
| MediaTek | Support option 2. |
| CATT | Support option 1. The PRACH procedure does not cause interruption.  |
| Apple | Option 2. The capability diffNumerologyAcrossPUCCH-Group was clearly defined for mixed numerology case between PUCCH groups, and if UE cannot support such capability, what UE behavior shall RAN4 assume (e.g. priority between SCell RACH and other spCell data/control channels)? We are open to further discuss. |
| Qualcomm | Option 2. But whether invalid TA case can be supported based on the current NR spec is also a bit unclear as of now. |
| Ericsson | We support Option 1.For Option 2, would this really be unique to the activation procedure? Would this not just follow a common principle for how UL transmissions in secondary PUCCH group are handled when UE is incapable of supporting diffNumerologyAcrossPUCCH-Group? |
| OPPO | Ok with Option 2 in generally. The details can be further discussed. |
| Huawei | For the second bullet in option 2. Is it more like a wrong configuration from NW? Not sure whether it is needed to have interruptions for such case |
| NEC | We support option 1 |
| Nokia | We support Option 1. |

### Sub-topic 1-7 Applicability of PUCCH SCell activation requirements

Proposals

* Option 1: (CATT, Apple)
	+ The PUCCH Scell activation delay requirement shall apply provided that,
		- The UE has received a PDCCH order to initiate RA procedure on the PUCCH Scell within Tactivate\_basic otherwise additional delay to activate the Scell is expected; and
		- No interruption occurs in same FR as the target PUCCH Scell during the Scell activation procedure if UE supports per-FR MG, otherwise the PUCCH Scell activation delay can be extended, and
		- No interruption occurs during the Scell activation procedure if UE does not support per-FR MG, otherwise the PUCCH Scell activation delay can be extended.
		- The above interruption is caused by factor defined in TS38.133 section 8.2.1.1 for EN-DC, in TS38.133 section 8.2.2.1 for NR SA, in TS38.133 section 8.2.3.1 for NE-DC and in TS38.133 section 8.2.4.1 for NR-DC.
* Option 2: (Ericsson)
	+ For the applicability of PUCCH SCell activation requirements
		- Delay requirements for PUCCH SCell activation shall account for additional time when PDCCH order is received outside Tactivate\_basic. The additional time shall be accounted for by an expression and/or a delay component, e.g. max(Tactivate\_basic, TPDCCH\_order).
		- In activation of multiple SCells with one PUCCH SCell, activation delay requirement shall apply at least for the PUCCH SCell in the event that one or more SCells have configurations that render parallel activation impossible for the UE. FFS on whether activation delay requirement also is to apply for SCells that are compatible with parallel activation with PUCCH SCell.
* Recommended WF
	+ *Need more discussion*

|  |
| --- |
| **Sub-topic 1-7 Applicability of PUCCH SCell activation requirements** |
| **Company** | **Comments** |
| CATT | Support option 1. The first bullet in option 2 is aligned with option 1, but we think the extend delay when PDCCH order is received outside Tactivate\_basic should not be defined.  |
| Apple  | Option 1 |
| Qualcomm | Revisit the issue later when other pending issues are resolved. We should also discuss the following aspect together:1. Dual PUCCH vs. Multi-TAG
2. Intra- vs. Inter-band between PUCCH cells
 |
| Ericsson | We support Option 2, i.e., that requirements shall still apply even if PDCCH order would be received outside Tactivate\_basic, but then UE shall be given more time to compensate for the late received PDCCH order. One justification is that network node may not known exactly when UE is ready to receive on downlink.Second aspect of Option 2 concerns multiple SCell activation and can be further discussed later. |
| Huawei | For the first bullet in option 1 and option 2, we think if the PDCCH order is received outside Tactivate\_basic, allowing additional delay or no requirements are same in some degree. We are option to further discuss whether it is possible and necessary to explicitly define the additional delay. For the other bullet in option 1, we think there is no needs to mention the per-FR gap as there are some interruptions apply to both FR even UE is capable of per-FR gap.For the second bullet in option2, we suggest to focus on the single PUCCH SCell activation first. |
| Nokia | We prefer Option 1.  |

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

## Summary for 1st round

### Open issues

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic 1-1** | **Issue 1-1-1: The ending point of PUCCH SCell activation procedure for valid TA case?***Tentative agreements:*For valid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on target PUCCH SCell*Candidate options:* None*Recommendations for 2nd round:* No more discussion. **Issue 1-1-2: The ending point of PUCCH SCell activation procedure for invalid TA case?***Tentative agreements:* None*Candidate options:** Option 1: (Qualcomm, Xiaomi, Apple, CMCC, NTT DOCOMO, vivo, MTK, NEC, OPPO, Huawei, Ericsson)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on the target PUCCH SCell
* Option 2: (CATT)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit PRACH on PUCCH Scell
* Option 3: (Nokia)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when RACH is completed on PUCCH Scell.

*Recommendations for 2nd round:* Continue discussion in 2nd round.  |
| **Sub-topic 1-2** | **Issue 1-2-1: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR2?***Tentative agreements:* None*Candidate options:** Option 1: (Nokia)
	+ The target PUCCH SCell is considered as a known cell if there is at least one active serving cell on the FR2 band of the target PUCCH SCell.
	+ If the target PUCCH SCell is unknown cell in FR2, the UE needs to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 2: kiadssion(vivo, MTK, CATT, Apple, Xiaomi, Qualcomm, Ericsson, OPPO, Huawei, NTT DOCOMO)
	+ Keep the agreements in last meeting.

*Recommendations for 2nd round:* Continue discussion in 2nd round.**Issue 1-2-2: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR1?***Tentative agreements:*Beam information of PUCCH SCell is needed to be indicated to NW for both valid and invalid TA cases*Candidate options:** Option 1a: (vivo, MTK, CATT, Apple, Xiaomi, Qualcomm, Ericsson, OPPO, NEC, NTT DOCOMO)
	+ If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
	+ If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 2: (Nokia)
	+ If the target PUCCH SCell is unknown in FR1, the UE does not need to indicate the beam information to the network and can follow LTE PUCCH SCell activation procedure.

*Recommendations for 2nd round:* Continue discussion in 2nd round.**Issue 1-2-3: How to indicate the beam information for PUCCH SCell activation (The procedure for beam indication for PUCCH SCell activation)?***Tentative agreements:* None*Candidate options:** Option 1:
	+ RAN4 to discuss/decide whether to define the SCell activation requirements for unknown cell (including valid TA case and invalid TA case)
* Option 1a:
	+ RAN4 only define requirements for the known cell (include FR1 and FR2)
* Option 1b:
	+ RAN4 define requirements for both known and unknown cell (include FR1 and FR2)
* Option 2:
	+ Using L3 measurement report of PUCCH SCell via SpCell PUSCH
* Option 3:
	+ UE measures the quality of the PUCCH SCell and reports the beam information to network via SpCell.
* Option 4:
	+ Send an LS to RAN1 to confirm the feasibility of beam information indication approach
		- Whether UE can report CSI of PUCCH SCell via SpCell
		- Whether CBRA can be supported on PUCCH SCell for the advantages of facilitating the unknown PUCCH SCell activation with invalid TA.
		- The possibility of unknown PUCCH SCell activation procedure

*Recommendations for 2nd round:* Continue discussion in 2nd round.**Issue 1-2-4: Which cell is the L1-RSRP reporting transmitted for PUCCH SCell activation?***Tentative agreements:*L1-RSRP report is one kind of CSI report, and the same solution of CSI report in issue 1-2-3 can be applied. *Candidate options:* None*Recommendations for 2nd round:* No more discussion as it can be covered by issue 1-2-3. **Issue 1-2-5: Whether the UL spatial relation is needed for PUCCH Scell activation?** *Tentative agreements:*The UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation for valid case. * The UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation in FR2 only.
	+ the time uncertainty of the MAC CE for UL spatial relation activation of PUCCH in target being-activated Scell shall be defined in the baseline FR2 Scell activation delay part (Tactivate\_basic). Details are FFS.

FFS: whether the UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation for invalid case. *Candidate options:***Issue 1-2-5a: Whether the UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation for invalid case.*** Option 1:
	+ Yes
* Option 2:
	+ No

*Recommendations for 2nd round:* Continue discussion on issue 1-2-5a in 2nd round |
| **Sub-topic 1-3** | *Tentative agreements:* None*Candidate options:** Option 1: (Apple)
	+ For UEs not supporting *beamCorrespondenceWithoutUL-BeamSweeping*, FR2 PUCCH Scell (de)activation requirements are not defined.
* Option 2: (Ericsson, NTT DOCOMO)
	+ Rel-17 PUCCH SCell activation should require beam correspondence related capability support
* Option 3: (Qualcomm, Ericsson, NTT DOCOMO, Nokia)
	+ Current set of requirements is developed for Ues supporting either of following capabilities:
		- beamCorrespondenceWithoutUL-BeamSweeping
		- beamCorrespondenceSSB-based-r16.
* Option 4: (MTK, CATT, Huawei)
	+ FFS

*Recommendations for 2nd round:* Continue discussion in 2nd round |
| **Sub-topic 1-4** | *Tentative agreements:* None*Candidate options:** Options in 1st round.

*Recommendations for 2nd round:* No more discussion in 2nd round. Waiting for the conclusions of other issues.  |
| **Sub-topic 1-5** | **Issue 1-5-1: The PUCCH SCell activation requirements for invalid TA case***Tentative agreements:* None*Candidate options:***Issue 1-5-1: The PUCCH SCell activation requirements for invalid TA case*** Options in 1st round.

**Issue 1-5-1a: Whether to define separated requirements for downlink actions and uplink actions?** * Option 1:
	+ Yes
* Option 2:
	+ No

*Recommendations for 2nd round:* Continue discussion on issue 1-5-1a in 2nd round**Issue 1-5-2: the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell (i.e. T1)** *Tentative agreements:*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 *Candidate options:* None*Recommendations for 2nd round:* No more discussion.**Issue 1-5-3: the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs (i.e. T2)** *Tentative agreements:* None*Candidate options:** Option 1: (CATT)
	+ T2 should not be considered in the delay requirements for PUCCH SCell activation
* Option 2: (vivo, MTK, Apple, Qualcomm, Ericsson, OPPO, Huawei, NEC, NTT DOCOMO)
	+ T2 is the delay from slot n + (Tactivate\_basic +T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated. Tactivate\_basic is the normal SCell activation delay in TS38.133 section 8.3.2. slot n is the slot when UE received PUCCH SCell activation MAC CE
* Option 3: (Nokia)
	+ FFS

*Recommendations for 2nd round:* No more discussion in 2nd round.**Issue 1-5-4: the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated (i.e. T3)** *Tentative agreements:* None*Candidate options:** Option 1: (CATT)
	+ T3 should not be considered in the delay requirements for PUCCH SCell activation
* Option 2: (vivo, MTK, Apple, Qualcomm, Ericsson, OPPO, Huawei, NEC, NTT DOCOMO)
	+ T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213.

*Recommendations for 2nd round:* No more discussion in 2nd round. |
| **Sub-topic 1-6** | *Tentative agreements:* None*Candidate options:** Option 1: (CATT, Ericsson, NEC, Nokia)
	+ Reuse the interruption requirement of normal Scell activation
* Option 2: (MTK, Apple, Qualcomm, OPPO)
	+ The interruption requirement shall include the existing requirement for Scell activation in Rel-15.
	+ Introduce additional interruption by PRACH transmission when target PUCCH SCell RACH has different SCS from spCell data/control channel and UE does not support diffNumerologyAcrossPUCCH-Group.

*Recommendations for 2nd round:* No more discussion in 2nd round. |
| **Sub-topic 1-7** | *Tentative agreements:* None*Candidate options:** Options in 1st round.

*Recommendations for 2nd round:* No more discussion in 2nd round. |

### CRs/TPs

## Discussion on 2nd round (if applicable)

### Sub-topic 1-1 Ending point of PUCCH SCell activation

**Issue 1-1-2: The ending point of PUCCH SCell activation procedure for invalid TA case?**

* Option 1: (Qualcomm, Xiaomi, Apple, CMCC, NTT DOCOMO, vivo, MTK, NEC, OPPO, Huawei, Ericsson)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit valid CSI report on the target PUCCH SCell
* Option 2: (CATT)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when UE transmit PRACH on PUCCH Scell
* Option 3: (Nokia)
	+ For invalid TA case, the ending point of PUCCH SCell activation should be the point when RACH is completed on PUCCH Scell.

|  |
| --- |
| **Issue 1-1-2: The ending point of PUCCH SCell activation procedure for invalid TA case?** |
| **Company** | **Comments** |
| Xiaomi | Support option 1 |
| MediaTek | Support option 1. CSI report is used to confirm whether the UE uplink transmission is ready or not. Thus, as we know, it should be included in activation procedure. |
| Apple | Option 1 |
| Nokia | We wonder if the UE still need send CSI report on PUCCH SCell if beam information has been sent before RACH e.g. in unknown FR2 case? In other scenarios where beam information in not needed, we are fine with Option 1.  |
| vivo | Support option 1 |

### Sub-topic 1-2 Beam information for PUCCH SCell activation

**Issue 1-2-1: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR2?**

* Option 1: (Nokia)
	+ The target PUCCH SCell is considered as a known cell if there is at least one active serving cell on the FR2 band of the target PUCCH SCell.
	+ If the target PUCCH SCell is unknown cell in FR2, the UE needs to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 2: kiadssion(vivo, MTK, CATT, Apple, Xiaomi, Qualcomm, Ericsson, OPPO, Huawei, NTT DOCOMO)
	+ Keep the agreements in last meeting.

|  |
| --- |
| **Issue 1-2-1: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR2?** |
| **Company** | **Comments** |
| Xiaomi | Option 2 |
| MediaTek | Support option 2. |
| Apple | Option 2 |
| Nokia | The listed options are a bit misleading. We also support agreements from last meeting. The proposal is just to raise the mis-alignment between the agreements and exist spec on “unknown FR2”. Could companies check if this is sensible or our misunderstanding? According to the agreements above, the FR2 unknown SCells are classified into two types:* If there is at least one active serving cell on that FR2 band
* If there is no active serving cell on that FR2 band

However, based on 38.133 (cited below), the FR2 SCell is unknown only if it is the first SCell to be activated on the band i.e. there is no at least one active serving cell on the FR2 band. Hence the first bullet would never happen when FR2 unknown SCell is to be activated. So the agreements in last meeting should be reformulated as proposed in Option 2. *For the first SCell activation in FR2 bands, the SCell is known if it has been meeting the following conditions:**….**- Otherwise, the first SCell in FR2 band is unknown.* |
| vivo | Support option 2 |

**Issue 1-2-2: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR1?**

* Option 1a: (vivo, MTK, CATT, Apple, Xiaomi, Qualcomm, Ericsson, OPPO, NEC, NTT DOCOMO)
	+ If it is contiguous to an active serving cell in the same band (following the same conditions in TS38.133 section 8.3.2 for intra-band contiguous FR1 Scell activation), no need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
	+ If there is no contiguous active serving cell on that FR1 band, need to indicate the beam information to network for determining the associated SSB in PDCCH order for RA.
* Option 2: (Nokia)
	+ If the target PUCCH SCell is unknown in FR1, the UE does not need to indicate the beam information to the network and can follow LTE PUCCH SCell activation procedure.

|  |
| --- |
| **Issue 1-2-2: Whether the beam information (SSB index) of PUCCH SCell is needed to be indicated to NW for unknown cell in FR1?** |
| **Company** | **Comments** |
| Xiaomi | Option 1a |
| MediaTek | Support option1a. For option 2, as we know, the beam information is still needed for FR1 because UE should let network know which BS Tx beam is good enough to UE.  |
| Apple | Option 1a. Beam information is needed in FR1 as well, since network needs to know the beam for receive the RACH preamble from this UE in CFRA and network needs to know the Tx beam for PDCCH/PDSCH to this UE as well. |
| Nokia | We can compromise to Option 1a.  |
| vivo | Support option 1a |

**Issue 1-2-3: How to indicate the beam information for PUCCH SCell activation (The procedure for beam indication for PUCCH SCell activation)?**

* Option 1:
	+ RAN4 to discuss/decide whether to define the SCell activation requirements for unknown cell (including valid TA case and invalid TA case)
* Option 1a:
	+ RAN4 only define requirements for the known cell (include FR1 and FR2)
* Option 1b:
	+ RAN4 define requirements for both known and unknown cell (include FR1 and FR2)
* Option 2:
	+ Using L3 measurement report of PUCCH SCell via SpCell PUSCH
* Option 3:
	+ UE measures the quality of the PUCCH SCell and reports the beam information to network via SpCell.
* Option 4:
	+ Send an LS to RAN1 to confirm the feasibility of beam information indication approach
		- Whether UE can report CSI of PUCCH SCell via SpCell
		- Whether CBRA can be supported on PUCCH SCell for the advantages of facilitating the unknown PUCCH SCell activation with invalid TA.
		- The possibility of unknown PUCCH SCell activation procedure

|  |
| --- |
| **Issue 1-2-3: How to indicate the beam information for PUCCH SCell activation (The procedure for beam indication for PUCCH SCell activation)?** |
| **Company** | **Comments** |
| Xiaomi | Option 3 and we are fine to send LS to RAN1. |
| MediaTek | Support option 1a and 4.To simplify specification, we prefer not to define the requirement for unknown case. But We are fine to send the LS to RAN1/2 to clarify this issue in R17. |
| Apple | Support option 1a and option 2. Even with option 4, we think we do not need to mention any solutions, but just ask questions. |
| Nokia | Option 4. In addition, we can ask RAN1/2 to provide potential solutions if the listed ones are not feasible. |
| vivo | We suggest to discuss/confirm option 1. If requirements will be defined for unknown case then either option 3 or 4 is ok. |

**Issue 1-2-5a: Whether the UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation for invalid case.**

* Option 1:
	+ Yes
* Option 2:
	+ No

|  |
| --- |
| **Issue 1-2-5a: Whether the UL spatial relation of PUCCH on target being-activated Scell should be considered for PUCCH Scell activation for invalid case.** |
| **Company** | **Comments** |
| Xioami | Option 1 |
| MediaTek | Support option2. As we know, UE can follow the Tx beam used for CFRA based on PDCCH order to transmit CSI report. Thus, additional period for spatial relation indication is not needed. Besides, we have one question in the first discussion.To Apple:“Even though UE can know which Tx beam shall be used for CFRA based on PDCCH order, but the uplink spatial relation for PUCCH may not be same as RACH Tx beam (at least UE cannot assume it by default)”Could you explain why UE cannot assume RACH Tx beam for the CSI report? |
| Apple | Option 1.To MTK, Thanks for the question. Our understanding is:Because network also needs to know the beam of PUCCH/PUSCH at network reception side, and uplink spatial relation activation is used for such purpose; i.e., network indicates UE to use certain uplink spatial relation for PUCCH transmission and network uses the corresponding beam to receive the PUCCH from UE. The RACH beam and PUCCH beam are controlled by different mechanisms:For CFRA, network indicate associated SSB for UE to derive the Tx beam to send RACH preamble, and network would also use corresponding beam to receive this preamable.But for PUCCH, it was defined in TS38.213 that: A spatial setting for a PUCCH transmission is provided by *PUCCH-SpatialRelationInfo* if the UE is configured with a single value for *pucch-SpatialRelationInfoId*; otherwise, if the UE is provided multiple values for *PUCCH- SpatialRelationInfo*, the UE determines a spatial setting for the PUCCH transmission as described in [11, TS 38.321]. Like TCI of PDCCH in the DL SCell activation, we think it’s a common case to let network provide such information to UE before or during the SCell activation.That is to say, both CFRA Tx beam and PUCCH beam are directly or indirectly controlled by network, and UE cannot automatically determine the Tx beam by itself (at least UE shall have a DL RS or uplink RS to determine the uplink spatial info for its PUCCH transmission). |
| Nokia | Option 2. We share the same understanding with MTK. |
| vivo | Option 1 |

### Sub-topic 1-3 UE capability for PUCCH SCell activation requirements

* Option 1: (Apple)
	+ For UEs not supporting *beamCorrespondenceWithoutUL-BeamSweeping*, FR2 PUCCH Scell (de)activation requirements are not defined.
* Option 2: (Ericsson, NTT DOCOMO)
	+ Rel-17 PUCCH SCell activation should require beam correspondence related capability support
* Option 3: (Qualcomm, Ericsson, NTT DOCOMO, Nokia)
	+ Current set of requirements is developed for Ues supporting either of following capabilities:
		- beamCorrespondenceWithoutUL-BeamSweeping
		- beamCorrespondenceSSB-based-r16.
* Option 4: (MTK, CATT, Huawei)
	+ FFS

|  |
| --- |
| Sub-topic 1-3 UE capability for PUCCH SCell activation requirements |
| **Company** | **Comments** |
| MediaTek | More discussion is needed. We have one question in first round discussion.To Apple:Could you explain why UE cannot activate the uplink spatial relation for the target PUCCH of SCell if UE does not support *beamCorrespondenceWithoutUL-BeamSweeping*?In our understanding, such UE still can determine the UL spatial relation without beam sweeping even though EIRP is slightly worse. |
| Apple | Option 1. But we can compromise to option 3.To MTK, thanks for the question. There are two rationales behind our proposal:1. In TS38.306 and TS38.101-2, it specified that “the UE that fulfils the beam correspondence requirement with the uplink beam sweeping (as specified in TS 38.101-2 [3], clause 6.6) shall not report this field.” So if UE does not support *beamCorrespondenceWithoutUL-BeamSweeping*, UE can only meet the minimum peak EIRP requirement according to Table 6.2.1.3-1 and spherical coverage requirement according to Table 6.2.1.3-3 with uplink beam sweeping. But the beam sweeping is not considered so far in this PUCCH SCell activation, and therefore the activation requirement cannot apply when UE does not support *beamCorrespondenceWithoutUL-BeamSweeping*.
2. In TS38.133, section 8.12, the spatial relation switching delay requirement is only defined when *beamCorrespondenceWithoutUL-BeamSweeping* is set to 1, and no requirement is specified when UE does not support *beamCorrespondenceWithoutUL-BeamSweeping.* In our understanding, UE’s behavior of uplink spatial relation activation/change cannot be guaranteed without such capability.

Long in short, we were not saying UE cannot do uplink spatial relation activation in this case, we proposed to not define requirement for such case since the delay of this uplink spatial relation activation is not guaranteed based on such UE capability (as described in the above rationales). |
| Nokia | Option 3. |
| vivo | We are ok with either option 2 or 3 |

### Sub-topic 1-5 PUCCH Scell activation delay requirement for invalid TA case

**Issue 1-5-1a: Whether to define separated requirements for downlink actions and uplink actions?**

* Option 1:
	+ Yes
* Option 2:
	+ No

|  |
| --- |
| **Issue 1-5-1a: Whether to define separated requirements for downlink actions and uplink actions?**  |
| **Company** | **Comments** |
| Xiaomi | Option 2, the activation delay should include the delay for both downlink actions and uplink actions. |
| MediaTek | More discussion is needed. We do not fully understand what is the intention of separation for UL and DL? |
| Apple | Option 2. What’s the ending point of the DL action delay requirement? |
| Nokia | Option 1. But the issue is more “whether to define the separate activation delay for the UE to perform DL and UL actions”? We are not sure if this is “separated requirements”. Anyway, the proposal is to define how long it is required to activate the DL and UL action, something as below in LTE PUCCH SCell. Probably this should not be called “separated requirements”*If the UE does not have a valid TA for transmitting on an SCell then the UE shall be capable to perform downlink actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe n+Tactivate\_basic and shall be capable to perform uplink actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe n+Tdelay\_PUCCH SCell and shall transmit valid CSI report for the SCell being activated on the PUCCH SCell no later than in subframe n+Tdelay\_PUCCH SCell, where:* |
| vivo | Option 2 |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on further RRM enhancement for NR and MR-DC - PUCCH SCell activation/deactivation requirements | CATT |  |
|  |  |  |
|  |  |  |

**Existing tdocs**

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

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