**3GPP TSG RAN WG1 Meeting #118bis R1-24xxxxx**

**Hefei, China, October 14– 18, 2024**

**Agenda Item: 7**

**Source: Moderator (Huawei)**

**Title: Summary of Discussion on open-loop power control parameters for SCell**

**Document for: Discussion and Decision**

# Introduction

An issue of open-loop power control parameters of SCell is identified in [1] and a CR is proposed in [2].

This document is a summary of discussions for this issue.

According subclause 7.1.1 of TS 38.213, is used for open-loop power control of PUSCH in the following two cases.

Case 1: If *P0-PUSCH-AlphaSet* is not provided

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| - is a parameter composed of the sum of a component and a component where .  - If a UE established dedicated RRC connection using a Type-1 random access procedure, as described in clause 8, and is not provided *P0-PUSCH-AlphaSet* or for a PUSCH (re)transmission corresponding to a RAR UL grant as described in clause 8.3,  , , and ,  where is provided by *preambleReceivedTargetPower* [11, TS 38.321] and is provided by *msg3-DeltaPreamble* or *deltaPreamble*, or dB if *msg3-DeltaPreamble* and *deltaPreamble* are not provided, for carrier of serving cell |

Case 2: If *p0-NominalWithGrant* is not provided

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| - For , a value, applicable for all , is provided by *p0-NominalWithGrant,* or if *p0-NominalWithGrant* is not provided, for each carrier of serving cell and a set of values are provided by a set of *p0* in *P0-PUSCH-AlphaSet* indicated by a respective set of *p0-PUSCH-AlphaSetId* for active UL BWP of carrier of serving cell |

In this subclause, and is provided by *preambleReceivedTargetPower* which is configured for random access procedure.

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| - is a parameter composed of the sum of a component and a component where .  - If a UE established dedicated RRC connection using a Type-1 random access procedure, as described in clause 8, and is not provided *P0-PUSCH-AlphaSet* or for a PUSCH (re)transmission corresponding to a RAR UL grant as described in clause 8.3,  , , and ,  where is provided by *preambleReceivedTargetPower* [11, TS 38.321] and is provided by *msg3-DeltaPreamble* or *deltaPreamble*, or dB if *msg3-DeltaPreamble* and *deltaPreamble* are not provided, for carrier of serving cell |

However, *preambleReceivedTargetPower* is optional according to TS 38.331 and is not configured for SCell when random access procedure is not needed.

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| ***BWP-UplinkCommon* information element**  -- ASN1START  -- TAG-BWP-UPLINKCOMMON-START  BWP-UplinkCommon ::= SEQUENCE {  genericParameters BWP,  rach-ConfigCommon SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M  pusch-ConfigCommon SetupRelease { PUSCH-ConfigCommon } OPTIONAL, -- Need M  pucch-ConfigCommon SetupRelease { PUCCH-ConfigCommon } OPTIONAL, -- Need M  ...,  [[  <other part omitted> |

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| ***RACH-ConfigCommon* information element**  -- ASN1START  -- TAG-RACH-CONFIGCOMMON-START  RACH-ConfigCommon ::= SEQUENCE {  rach-ConfigGeneric RACH-ConfigGeneric,  totalNumberOfRA-Preambles INTEGER (1..63) OPTIONAL, -- Need S  ssb-perRACH-OccasionAndCB-PreamblesPerSSB CHOICE {  oneEighth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},  oneFourth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},  oneHalf ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},  one ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},  two ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32},  four INTEGER (1..16),  eight INTEGER (1..8),  sixteen INTEGER (1..4)  <other part omitted> |

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| ***RACH-ConfigGeneric* information element**  -- ASN1START  -- TAG-RACH-CONFIGGENERIC-START  RACH-ConfigGeneric ::= SEQUENCE {  prach-ConfigurationIndex INTEGER (0..255),  msg1-FDM ENUMERATED {one, two, four, eight},  msg1-FrequencyStart INTEGER (0..maxNrofPhysicalResourceBlocks-1),  zeroCorrelationZoneConfig INTEGER(0..15),  preambleReceivedTargetPower INTEGER (-202..-60),  preambleTransMax ENUMERATED {n3, n4, n5, n6, n7, n8, n10, n20, n50, n100, n200},  powerRampingStep ENUMERATED {dB0, dB2, dB4, dB6},  ra-ResponseWindow ENUMERATED {sl1, sl2, sl4, sl8, sl10, sl20, sl40, sl80},  ...,  [[  prach-ConfigurationPeriodScaling-IAB-r16 ENUMERATED {scf1,scf2,scf4,scf8,scf16,scf32,scf64} OPTIONAL, -- Need R  prach-ConfigurationFrameOffset-IAB-r16 INTEGER (0..63) OPTIONAL, -- Need R  prach-ConfigurationSOffset-IAB-r16 INTEGER (0..39) OPTIONAL, -- Need R  ra-ResponseWindow-v1610 ENUMERATED { sl60, sl160} OPTIONAL, -- Need R  prach-ConfigurationIndex-v1610 INTEGER (256..262) OPTIONAL -- Need R  ]],  [[  ra-ResponseWindow-v1700 ENUMERATED {sl240, sl320, sl640, sl960, sl1280, sl1920, sl2560} OPTIONAL -- Need R  ]]  }  -- TAG-RACH-CONFIGGENERIC-STOP  -- ASN1STOP |

Therefore, an observation is the following,

***Observation*:** *If either P0-PUSCH-AlphaSet or p0-NominalWithGrant is not configured, is applied for open-loop power control of PUSCH, which is determined with RRC parameter preambleReceivedTargetPower. In case of SCell, the parameter preambleReceivedTargetPower may not be configured. Therefore, the current determination of for open-loop power control of PUSCH in an SCell is infeasible for a UE if preambleReceivedTargetPower is not configured and either P0-PUSCH-AlphaSet or p0-NominalWithGrant is not configured.*

To address this issue, a proposal is,

***Proposal: For SCell, if preambleReceivedTargetPower is not configured, then both p0‑NominalWithGrant and P0-PUSCH-AlphaSet are expected to be configured.***

# Discussions

**Question 0: Please consider entering contact info below for the convenience of email contact and F2F discussions.**

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| **Company** | **Point(s) of contact** | **Email address(es)** |
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### Question 1-1: Does the issue in the observation in section 1 exists? If not, please elaborate a bit your views.

Companies’ views are welcome.

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| *Company* | *View* |
| Huawei, HiSilicon | As discussed before, *preambleReceivedTargetPower* is optional RRC parameter and it is confirmed in previous RAN1 CR discussion that a gNB may not configure it to a UE for SCell because it is a parameter for PRACH and may not be needed by SCell.  However, the RRC parameter is used for open-loop power control of SCell in some cases. Therefore, if either *P0-PUSCH-AlphaSet* or *p0-NominalWithGrant* is not configured, the RRC parameter *preambleReceivedTargetPower* shall be configured. |
| MTK | Yes.  Our view: Agree to Huawei’s proposal:   * “*For SCell, if* ***preambleReceivedTargetPower*** *is not configured, then both* ***p0‑NominalWithGrant and P0-PUSCH-AlphaSet*** *are expected to be configured.*”   To us, there exists two cases which may cause problem:   * + Case 1. SCell tries to access ***preambleReceivedTargetPower*** when ***p0‑NominalWithGrant*** is **not** configured. UE may fail for this case.   + Case 2. SCell tries to access ***preambleReceivedTargetPower*** when ***P0-PUSCH-AlphaSet*** is **not** configured. UE may fail for this case. |
| Samsung | Yes, the issue can be happened, and the issue already has been discussed in RAN1 CR (R1-2401683) for PHR. |
| Nokia | The issue exists, however the fallback has already been agreed in [R1-2401838](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_116/Docs/R1-2401838.zip): when *preambleReceivedTargetPower* is not configured for the cell, then the parameter *preambleReceivedTargetPower* configured for the primary cell is applied. We prefer to generalize this approach instead of the current proposal as we have the following concerns:   1. It is unclear how mandating *PUSCH-AlphaSet* configuration would help to avoid using *preambleReceivedTargetPower* for . So far, the specification defines derivation only the case when *PUSCH-AlphaSet* is not provided(case 1 in the discussion Tdoc). 2. Configuration of *p0-NominalWithGrant* will help to avoid fallback to that depends on *preambleReceivedTargetPower.* If it is clarified how we can avoid relying on *preambleReceivedTargetPower* for using *PUSCH-AlphaSet*, then mandatory provision of *p0-NominalWithGrant* is not needed. |
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### Question 1-2: If yes for Q1-1, do you agree the proposal in section 1? If not, please elaborate a bit your concerns or alternative proposal.

Companies’ views are welcome.

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| *Company* | *View* |
| MTK | Yes. |
| Samsung | As mentioned above, the issue raised in this CR has been discussed, and the issue has been addressed as below using the parameter *preambleReceivedTargetPower* configured for the primary cell.  From our perspective, same as previous RAN1 discussion, for SCell, if *preambleReceivedTargetPower* is not configured, then the parameter *preambleReceivedTargetPower* configured for the primary cell can be applied. Therefore, we suggest updated proposal as below:  ***Updated Proposal: If the activated serving cell is an SCell and parameter preambleReceivedTargetPower is not configured, the parameter preambleReceivedTargetPower configured for the primary cell can be applied.***  [TS 38.213]  7.7.1 Type 1 PH report  < omitted part >  If the activated serving cell is an SCell and parameter *preambleReceivedTargetPower* is not configured for the cell, then the parameter *preambleReceivedTargetPower* configured for the primary cell is applied, where the parameter refers to the one configured for the non-supplementary uplink carrier if the primary cell is configured with two uplink carriers.  <omitted part> |
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### Question 1-3: If yes for Q1-1, is the CR in [2], as copied in Appendix, agreeable?

Companies’ views are welcome.

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| *Company* | *View* |
| Huawei, HiSilicon | It is necessary to capture clearly what configuration a UE is incapable of, which is essential for UE implementation. |
| MTK | Yes |
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#### [2nd round: ]

# Conclusions

# References

1. R1-2408178, “Corrections on open-loop power control parameters for SCell”, Huawei, HiSilicon, October 14 – 18, 2024.
2. R1-2408179, “Discusson on open-loop power control parameters for SCell”, Huawei, HiSilicon, October 14 – 18, 2024.

# Appendix

The CR in [2]

< Unchanged parts are omitted >

7.1.1 UE behaviour

If a UE transmits a PUSCH on active UL BWP of carrier of serving cell using parameter set configuration with index and PUSCH power control adjustment state with index , the UE determines the PUSCH transmission power in PUSCH transmission occasion as

 [dBm]

where,

- is the UE configured maximum output power defined in [8-1, TS 38.101-1], [8-2, TS 38.101-2], [8-3, TS 38.101-3] and [8-5, TS 38.101-5] for carrier of serving cell in PUSCH transmission occasion .

- is a parameter composed of the sum of a component and a component where .

- If the serving cell is an SCell and *preambleReceivedTargetPower* is not configured, then both *P0-PUSCH-AlphaSet* and *p0-NominalWithGrant* are expected to be configured.

- If a UE established dedicated RRC connection using a Type-1 random access procedure, as described in clause 8, and is not provided *P0-PUSCH-AlphaSet* or for a PUSCH (re)transmission corresponding to a RAR UL grant as described in clause 8.3,

, , and ,

where is provided by *preambleReceivedTargetPower* [11, TS 38.321] and is provided by *msg3-DeltaPreamble* or *deltaPreamble*, or dB if *msg3-DeltaPreamble* and *deltaPreamble* are not provided, for carrier of serving cell

< Unchanged parts are omitted >