**3GPP TSG-RAN WG2 Meeting #131bis R2-250xxxx**

**Prague, Czech Republic, Oct. 13-17, 2025**

**Agenda item: 8.11.1**

**Source: Samsung**

**Title: List of Rel-19 SBFD MAC open issues for maintenance**

**Document for: Discussion and Decision**

# Introduction

This offline discussion aims to collect and summarize Rel-19 SBFD MAC open issues/suggested resolutions for maintenance, compared to the agreed Rel-19 SBFD MAC CR [1], according to the instructions from Chairlady captured below.





As the result of this discussion, the Rapporteur will provide a summary outlining:

- the issues (if any) requiring further discussion with tdoc contributions in RAN2#131bis, and

- the non-controversial/editorial issues (if any) that will be handled by Rapporteur CR in RAN2#131bis, as well as the draft Rapporteur CR for review before submission deadline.

Kindly provide your input for this discussion, no later than **~~Sep. 19, 10:00 UTC~~** **Sep. 26 10:00 UTC**.

Please provide your contact information in the table below when responding.

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email** |
| ZTE | Yu Pan | pan.yu24@zte.com.cn |
| Ericsson | Min Wang | Min.w.wang@ericsson.com |
| Interdigital | Jongwoo Hong | Jongwoo.hong@interdigital.com |
| Qualcomm | Ruiming Zheng | rzheng@qti.qualcomm.com |
| vivo | Dongdong Wei | weidongdong@vivo.com |
| LGE | Hanseul Hong | hanseul.hong@lge.com |
| Huawei, HiSilicon | Tao Cai | tao.cai@huawei.com |
| Xiaomi | Yujian Zhang | zhangyujian@xiaomi.com |
| CATT | Jianxiang Li | Lijianxiang@catt.cn |
| Sharp | Sangkyu Baek | baeks@sharplabs.com |

# Co-existence of SBFD and intra-DU LTM

We have agreed to support the coexistence of SBFD and intra-DU LTM in the last meeting [2], as captured below.

|  |
| --- |
| Email discussion summaryR2-2505364 Summary of [Post130][216][SBFD] Running CR for 38.331 Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core* Noted

*[Proposals for easy agreement]:**[Proposal for RRC-2] Not to support that a further different SSB RSRP threshold is indicated/configured for an SSB or a group of SSBs. [13/13]**[Proposal for RRC-3] Not to pursue the further optimization of parameter signalling of SBFD RACH configuration. [11/12]**[Proposal for RRC-6] (Only) support RACH-based LTM cell change in SBFD symbols [10/11]. Add RO type indication in LTM cell switch command MAC CE.* *[Proposals for discussion]:**[Proposal for RRC-1] For the network indicating RO type, use 1 bit signalling (as in the current RRC running CR) [9/13].** Not to support that a further different SSB RSRP threshold is indicated/configured for an SSB or a group of SSBs.
* Not to pursue the further optimization of parameter signalling of SBFD RACH configuration.

DiscussionsRRC-6- Samsung object this proposal. Samsung think this should be discussed in LTM session. - InterDigital think there is majority so we can agree, think we can discuss in SBFD because it is co-existence with Rel-18 LTM. Nokia, LG E, ZTE, CATT agree. - ZTE think at least for intra-DU case we should be able to agree. QC agree with ZTE, think if we cannot conclude here it is not easy to agree in LTM session either. Ericsson, CATT agree. - Samsung also has concern because there is RAN3 impact, and it is the last meeting for the WI. ZTE think if we focus on intra-DU, then there is not additional R3 impact. - Samsung wonder if we agree which WI should handle the necessary MAC spec change. * Support co-existence of SBFD with intra-DU LTM. Whether to support the co-existence between SBFD and other LTM cases is not discussed in the Rel-19 SBFD WI.
 |

***Question: Do companies think additional MAC spec change(s) compared to the agreed MAC CR [1] is needed for supporting the co-existence of SBFD and intra-DU LTM? Please provide the suggested change(s) if any.***

|  |  |  |
| --- | --- | --- |
| **Company** | **Any change is needed? (Yes/No)** | **Suggested change(s), if any** |
| ZTE | Yes | If SBFD RO can be used when UE performs intra-DU LTM, source cell should include the RO type indicator of LTM CFRA resource in both Rel-18 LTM Cell Switch Command MAC CE and Rel-19 Enhanced LTM Cell Switch Command MAC CE. Intra-DU LTM can use both MAC CEs, if security key needs update, source cell will send Rel-19 MAC CE; if security key does not need update, source cell will send Rel-18 MAC CE.BTW, for the above spec change, there is no additional RAN3 spec impact |
| Ericsson | Yes or No | We are fine with either way, with the changes proposed by ZTE, LTM can be better supported with SBFD, without the changes, it is also workable, i.e., UE relies on dedicated RRC signaling to derive RO type. |
| IDC | Yes | Since RAN2 agreed to support co-existence of SBFD with intra-DU LTM, this agreement should be captured/specified in MAC spec.As ZTE mentioned, RO type indication can be included in the Rel-18 and Rel-19 LTM cell switch MAC CE (e.g., intra-DU LTM case) |
| Qualcomm | Yes | RO type indication can be included in the Rel-18 and Rel-19 LTM cell switch MAC CE in Rel-19 MAC specification. |
| vivo | Yes  | Share the same view as ZTE. |
| LGE | Yes, slightly | In our understanding, if the RO type can be indicated via RRC signalling (i.e., RO type indication via RACH-ConfigDedicated IE) for LTM cell switch, it could also be indicated by the LTM cell switch MAC CE with similar reason. For RAN3 impact, aligned with ZTE, i.e., there is no additional RAN3 impact for indicating RO type in LTM Cell switch MAC CE. |
| Huawei, HiSilicon | Yes with comments | The understanding during online session was to use a separate CR (not MAC running CR) to add RO type indicator in Rel-19 LTM cell change command MAC CE and it was assumed not to change Rel-18 MAC CE (contrary to what was proposed in the pre RAN2#131 RRC open issue discussion summary). Calling it Rel-18 MAC CE in a Rel-19 CR/spec seems odd, however we are fine if majority thinks Rel-18 MAC CE is to be used when security key does not need update as in ZTE comments.  |

**Rapp summary**: The discussion on this issue has shown that companies are largely aligned that, to support coexistence of SBFD and intra-DU LTM, RO type signalling should be integrated into both Rel-18 and Rel-19 LTM cell switch command MAC CEs.

**Proposed WF**: Given the non-controversial resolution for this issue, as per the Chairlady's instruction, the Rapporteur CR will incorporate the RO type signalling/selection for the cases of Rel-18 and Rel-19 LTM cell switch command MAC CEs. A draft CR will be shared soon for companies to review before submission deadline.

# Other MAC open issues for maintenance

Please share any other identified MAC open issues for maintenance, by explaining what the issue is, and the suggested change(s), including editorial improvement. Note that, as the WI has been declared complete, the Rapporteur will not consider the issue(s) involving any further functional changes, for further discussion.

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Identified issues** | **Suggested change(s)** | **Rapp comment** |
| Ericsson | *sbfd-RO-Type is not included in the parameter list in clause 5.1.1* | Include *sbfd-RO-Type in the parameter list* | Agree and thanks for thorough review. Will be incorporated in Rapp CR. |
| Ericsson | 1> if the *RO\_TYPE* is set to *2nd-RO*:2> set the *RA\_TYPE* to *4-stepRA*.The above condition highlighted in yellow is not needed/wrong.The logic is that: it can be up to gNB configuration to ensure that 2-step RA and SBFD will not be present in the same cell/BWP. | There may be several options to address the scenario, where the SBFD aware UE is configured with both 2-step RA and SBFDOption 1 – up to gNB configuration to ensure that 2-step RA and SBFD will not be present in the same cell/BWP.RAN2 can further check if some restriction text is needed in RRC.Option 2 – UE has 2-step RA and SBFD RO selected, UE falls back to 4-step RA (as captured in the rapporteur CR)Option 3 – UE has 2-step RA and SBFD RO selected, UE falls back to legacy RO. | An offline discussion (3.1) is triggered below for this issue. Note that Option 3 is precluded for further discussion, given that it is a new UE behavior that is out of the maintenance scope.Ericsson-> we don’t agree with that option 3 is a new UE behavior.The issue itself is not discussed in RAN2 yet, the implemented Option 2 is just an artificial implementation by RAPP, there is no RAN2 agreement.If you want companies to discuss the issue, it is more correct to list all options.**[Rapp reply]** I understand your concern is lack of formal agreement on the prioritization between RA type selection and RO type selection. But, you know, we have already concluded RO type selection is performed in the very beginning prior to other steps, based on which, the CR and the past several open issue discussions have been conducted.For your reference, I added my explanation why I deemed option 3 as new UE behavior below. If you think I mis-understood your intention, please provide the proposed TP in the suggested changes, for (at least) me and other companies to fully understand it. Otherwise, I can't let companies make decision without a clear understanding on its impact on UE behavior and the specification.**[Rapp explanation]** Considering the three steps that UE has to perform sequentially, with inter-dependencies between consecutive steps, i.e., [step 1] RO type selection => [step 2] RACH resource set selection (based on the selected RO type) => [step 3] RA type selection (based on the selected RACH resource set), my understanding of your option 3 is to allow UE that has selected SBFD RO (in [step 1]) and 2-step RA (in [step 3]), to fallback to legacy RO. But please note that the consequence would be, UE needs to re-select RACH resource set for legacy RO (note that in RACH config option 2, RACH resource set of SBFD RO and legacy RO are provided separately), and then, [step 3] should be performed again, based on the re-selected RACH resource set (note that 2-step RA can be selected only when the 2-step resource is provided by the selected RACH resource set). Also, we can't even guarantee that 2-step RA will be selected again when re-doing the [step 3] with the re-selected RACH resource set, since there could be no 2-step RA resource provided by the re-selected RACH resource set for legacy RO, such that we may end up with legacy RO with 4-step RA (even though SBFD RO is selected in the very beginning). From my perspective, such operation is a new type of RO type fallback that is deemed as new UE behavior. |
| LGE | As we commented during the CR review, it may be needed to be clarified that the highlighted preambleReceivedTargetPower should not be the value included in the *sbfd-RACH-DualConfig,* which is not used for initialization when the UE selects the 2nd-RO. 5> else (i.e., the received UL grant indicates that the corresponding PUSCH transmission is in non-SBFD symbols as specified in clause 11.1 of TS 38.213 [6]):6> indicate the preambleReceivedTargetPower and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (PREAMBLE\_POWER\_RAMPING\_COUNTER – 1) × PREAMBLE\_POWER\_RAMPING\_STEP + POWER\_OFFSET\_2STEP\_RA + POWER\_OFFSET\_RO\_TYPE); | If the 1st RO is selected for preamble transmission but the Msg3 PUSCH is transmitted in SBFD symbol, the *preambleReceivedTargetPower* in *sbfd-RACH-DualConfig* should be used even though it is not used for initialization. It is already captured as follows:

|  |
| --- |
| 6> else if sbfd-RACH-DualConfig (see TS 38.331 [5]) is configured for the Random Access procedure:7> indicate the preambleReceivedTargetPower included in the sbfd-RACH-DualConfig, and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (PREAMBLE\_POWER\_RAMPING\_COUNTER – 1) × PREAMBLE\_POWER\_RAMPING\_STEP + POWER\_OFFSET\_2STEP\_RA + POWER\_OFFSET\_RO\_TYPE). |

Therefore, for the mentioned case, similar text may be used, e.g.,

|  |
| --- |
| 5> else (i.e., the received UL grant indicates that the corresponding PUSCH transmission is in non-SBFD symbols as specified in clause 11.1 of TS 38.213 [6]):6> indicate the preambleReceivedTargetPower (not included in sbfd-RACH-DualConfig) and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (PREAMBLE\_POWER\_RAMPING\_COUNTER – 1) × PREAMBLE\_POWER\_RAMPING\_STEP + POWER\_OFFSET\_2STEP\_RA + POWER\_OFFSET\_RO\_TYPE); |

 | An offline discussion (3.2) is triggered for this issue below. |

**Rapp summary**: From the Rapporteur's perspective, two additional issues worth further offline discussions, have been identified based on the inputs from companies. Consequently, the discussions seeking companies' views are triggered below, respectively, to determine whether tdoc contributions are required for these issues for the upcoming meeting.

## MAC-1: RO Type and RA Type Selections

**Issue description (Ericsson)**:

|  |  |
| --- | --- |
| Given the consensus that SBFD RO is not supported for 2-step RA, and the RO type selection is performed before RA type selection, there are largely two options in implementing the expected UE behaviour, i.e., UE selecting SBFD RO performs 4-step RA. **Option 1) (as specified in SBFD MAC CR [1])**- Explicitly capturing UE behaviour for the case when RO type is set to SBFD RO, 4-step RA is selected, i.e., maintaining the RO type condition in RA selection (in yellow) captured in SBFD MAC CR [1].

|  |
| --- |
| *CR#R2-2506606*5.1.1 Random Access procedure initialization…1> if the *RO\_TYPE* is set to *2nd-RO*:2> set the *RA\_TYPE* to *4-stepRA*.… |

**Option 2) (proposed by Ericsson)**- Relying on a proper network configuration (which ensures expected UE behaviour) without explicitly capturing the relevant UE behavior in MAC spec, i.e., removing the RO type condition in RA selection captured in SBFD MAC CR [1]. |

**Discussion:**

***Question: From MAC spec point of view, for preventing UE that has selected SBFD RO, from performing 2-Step RA, which option do companies prefer?***

***- Option 1) Maintaining the RO type condition in RA selection (as specified in SBFD MAC CR [1]),***

***- Option 2) Removing the RO type condition in RA selection,***

***- Option 3) Need further discussion via tdoc contribution in RAN2#131bis.***

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1 or 2 or 3** | **Comments if any** |
| Ericsson | We are fine with either option 2 or option 3.  | **Option 1 is an artificial implementation by the RAPP, there is no corresponding RAN2 agreement****[Rapp]** Companies may have different preference on how to model the expected UE behavior, but can't agree it is "artificially" implemented by Rapporteur, given that the change is triggered by companies' comment during CR review, and no concerns that had been shared afterwards. FYI, bubbles below are the discussion on how this change is introduced. It may be helpful also for other companies in their decision-making.Ericsson-> I can see only few companies have commented in the bubble. Again, inclusion “correction text” in the MAC spec to perform correction for a misconfiguration gave by the NW, this is a bad exercise. Do we also need to introduce similar texts in all places to do such correction for other misconfigured features?In stage 2, there is already text says that “*Only the 4-step RA type using SBFD RACH resources can be supported*”. The network will ensure the correct configurations. We don’t think this correction text is needed.

|  |
| --- |
| **[Post130][217][SBFD] Running CR for 38.321 (Samsung)**[Draft\_R2-25xxxx MAC Running CR for SBFD\_v07\_Rapp (reply)](https://www.3gpp.org/ftp/Email_Discussions/RAN2/%5BRAN2%23130%5D/%5BPost130%5D%5B217%5D%5BSBFD%5D%20Running%20CR%20for%2038.321%20%28Samsung%29/Draft_R2-25xxxx%20MAC%20Running%20CR%20for%20SBFD_v07_Rapp%20%28reply%29.docx)1> if the contention-free Random Access Resources have been explicitly provided in the LTM Cell Switch Command MAC CE:2> set the *RA\_TYPE* to *4-stepRA*.1> else if the *RO\_TYPE* is set to *non-SBFD-RO*, and the BWP selected for Random Access procedure is configured with both 2-step and 4-step RA type Random Access Resources within the selected set of Random Access resources (as specified in clause 5.1.1b) and the RSRP of the downlink pathloss reference is above *msgA-RSRP-Threshold*; or1> if the BWP selected for Random Access procedure is only configured with 2-step RA type Random Access resources within the selected set of Random Access resources according to clause 5.1.1b; or1> if the Random Access procedure was initiated for reconfiguration with sync not initiated for recovery using an LTM candidate configuration as specified in TS 38.331 [5] clause 5.3.7.3 and if the contention-free Random Access Resources for 2-step RA type have been explicitly provided in *rach-ConfigDedicated* for the BWP selected for Random Access procedure:2> set the *RA\_TYPE* to *2-stepRA*. |

 |
| Nokia | Option 1 | We think the current MAC CR is in good shape and helps to avoid any wrong network configuration of 2-step RACH for SBFD RO.  |
| Huawei, HiSilicon | Option 1 acceptable | From MAC running CR review, Option 1 is the common understanding.  |
| Xiaomi | No strong view | Option 1 is acceptable. |
| ZTE | Option 1 | From NW config perspective:* NW can provide 4-step legacy RO+2-step legacy RO+SBFD RO in the same BWP via RRC signaling;
* NW can provide 4-step legacy RO+SBFD RO in the same BWP via RRC signaling;
* NW should NOT provide ONLY 2-step legacy RO+SBFD RO in the same BWP via RRC signaling.

From UE MAC behavior perspective:UE has 4-step SBFD RO, 4-step legacy RO, 2-step legacy RO on the table. Then, UE’s MAC should firstly determine RO type, then determine RA type. Note that in current MAC CR, if UE selects SBFD RO, UE will select 4-step, UE will not further check whether 2-step is valid or not.From current MAC CR writing, it implies that if UE is provided with SBFD RO and UE chooses SBFD RO, the SBFD RO should belong to 4-step, and once UE selects 4-step, UE will not further check whether 2-step is valid or not. So there is no need to restrict (or it does not matter) whether the BWP can provide SBFD RO and 2-step resource simultaneously. So no need to add any restriction in anywhere. |
| CATT | Option 1 | For Option 2, it restricts the NW implementation. If it is adopted, a note should be added in spec. Compared with Option 2, Option 1 is slightly preferred. But we can follow the majority. |
| Sharp | Option 1 | Option 2 would work, but we slightly prefer to have a clear UE behavior to avoid any error case. |
| Qualcomm | Option 1 |  |
| LGE | Option 1, but Option 2 is okay as well. | In our understanding, Option 1 and Option 2 does not have big difference on UE behaviour. In other words, result of RA type selection will be same in Option 1 and Option 2.Based on the current MAC procedure, the UE performs RA resource selection as follows:* …
* RO type selection between 1st-RO and 2nd-RO
* Set of RA resources selection (within the selected RO type)
* RA type selection (within the selected RO type and selected set of RA resources)
* …

However, since it is obvious that each step is performed within the selected RA resources in the previous step, it is not needed to specify whether the next step is performed within the selected RA resources in all the previous steps.Therefore, given that SBFD RO(2nd-RO) is not supported for 2-step RA (as in Stage-2 text), if the 2nd-RO is selected in the RO type selection, none of the yellow colored level-1 bullet will be met, and the UE will select the 4-step RA anyway.

|  |
| --- |
| 1> else if the BWP selected for Random Access procedure is configured with both 2-step and 4-step RA type Random Access Resources within the selected set of Random Access resources (as specified in clause 5.1.1b) and the RSRP of the downlink pathloss reference is above *msgA-RSRP-Threshold*; or1> if the BWP selected for Random Access procedure is only configured with 2-step RA type Random Access resources within the selected set of Random Access resources according to clause 5.1.1b; or1> if the Random Access procedure was initiated for reconfiguration with sync not initiated for recovery using an LTM candidate configuration as specified in TS 38.331 [5] clause 5.3.7.3 and if the contention-free Random Access Resources for 2-step RA type have been explicitly provided in *rach-ConfigDedicated* for the BWP selected for Random Access procedure:2> set the *RA\_TYPE* to *2-stepRA*.1> else:2> set the *RA\_TYPE* to *4-stepRA*. |

As in the Rapporteur’s comment, the condition to select RA type based on whether 2nd-RO is selected is added just to select the RA type without checking whether the 2-step RA resource is configured for selected RO type and the selected set of RA resources which will not be configured for 2nd-RO. Given that the current text is already implemented and there is no big harm to keep this condition, we slightly prefer Option 1 (i.e., keep the current text). However, if there is strong concern on this, Option 2 is ok. |

**Rapp summary for MAC-1:**

Majority consider Option 1 (i.e., maintaining the RO type condition in RA selection) preferable/acceptable, mainly for

 1) more efficient UE behavior, in that the redundancy in checking whether 2-step RA resource is provided together with SBFD RO, can be avoided, and

 2) undesirable UE behavior, caused by wrong network configuration, can be avoided.

One company shared a strong concern on Option 1, considering the intention is already captured in stage-2 CR, which can ensure correct network configuration.

**Proposed WF for MAC-1:**

Following the majority view, no correction will be considered for MAC-1 in Rapp CR. Companies that deem further discussion necessary, can submit tdoc contribution for MAC-1.

## MAC-2: *preambleReceivedTargetPower* for Msg3 Tx Power

**Issue description (LGE)**:

|  |  |  |  |
| --- | --- | --- | --- |
| According to RAN1#120bis agreement captured below,

|  |
| --- |
| RAN1#120bisFor determination of the Msg3 PUSCH transmission power for RACH configuration Option 2:- preambleReceivedTargetPower configured for legacy-RO is used if Msg3 PUSCH is transmitted in non-SBFD symbols;- preambleReceivedTargetPower configured for additional-RO is used if Msg3 PUSCH is transmitted in SBFD symbols; |

the Rapporteur captured the corresponding UE behavior in SBFD MAC CR [1] by:

|  |
| --- |
| *CR#R2-2506606*5.1.4 Random Access Response reception…5> if the received UL grant indicates that the corresponding PUSCH transmission is in SBFD symbols as specified in clause 11.1 of TS 38.213 [6]:6> if *sbfd-RACH-SingleConfig* (see TS 38.331 [5]) is configured for the Random Access procedure:7> indicate the *sbfd-RACH-SingleConfig-preambleReceivedTargetPower* if configured, or the *preambleReceivedTargetPower* otherwise, and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × *PREAMBLE\_POWER\_RAMPING\_STEP +* *POWER\_OFFSET\_2STEP\_RA* + *POWER\_OFFSET\_RO\_TYPE*).6> else if *sbfd-RACH-DualConfig* (see TS 38.331 [5]) is configured for the Random Access procedure:7> indicate the *preambleReceivedTargetPower* included **in the *sbfd-RACH-DualConfig***, and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × *PREAMBLE\_POWER\_RAMPING\_STEP +* *POWER\_OFFSET\_2STEP\_RA* + *POWER\_OFFSET\_RO\_TYPE*).6> else:7> indicate the *preambleReceivedTargetPower* and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × *PREAMBLE\_POWER\_RAMPING\_STEP +* *POWER\_OFFSET\_2STEP\_RA* + *POWER\_OFFSET\_RO\_TYPE*).5> else (i.e., the received UL grant indicates that the corresponding PUSCH transmission is in non-SBFD symbols as specified in clause 11.1 of TS 38.213 [6]):6> indicate the *preambleReceivedTargetPower* and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × *PREAMBLE\_POWER\_RAMPING\_STEP +* *POWER\_OFFSET\_2STEP\_RA* + *POWER\_OFFSET\_RO\_TYPE*).… |

Note that, based on the RAN1 agreement, the *preambleReceivedTargetPower* indicated to lower layer for Msg3 tx power calculation solely depends on the type of symbols (SBFD or non-SBFD) the corresponding Msg3 is transmitted in, irrespective of the RO type used in preamble transmission, and hence, is not necessarily the same parameter (re)initialized for the preamble transmission(s).One company (LGE) shared a concern that "the *preambleReceivedTargetPower*" (without further condition) can be mis-interpreted as the one used/initialized for preamble transmission, and proposed to clarify explicitly with the condition below for avoiding such mis-interpretation, i.e., **[TP of LGE]**

|  |
| --- |
| …5> else (i.e., the received UL grant indicates that the corresponding PUSCH transmission is in non-SBFD symbols as specified in clause 11.1 of TS 38.213 [6]):6> indicate the *preambleReceivedTargetPower* (not included in *sbfd*-*RACH*-*DualConfig*) and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × *PREAMBLE\_POWER\_RAMPING\_STEP +* *POWER\_OFFSET\_2STEP\_RA* + *POWER\_OFFSET\_RO\_TYPE*). |

The Rapporteur had also shared the similar concern when drafting the running CR that, for the same purpose, captured the parameters with distinctive texts, i.e., with and without "**in the *sbfd-RACH-DualConfig***", to differentiate the parameters configured for SBFD RO and legacy RO, respectively, for SBFD RACH config option 2. |

**Discussion:**

***Question 1: For the case that Msg3 is transmitted in non-SBFD symbols and SBFD RACH config option 2 is configured, do companies think further spec change(s) is needed, compared to the SBFD MAC CR [1], to clarify the preambleReceivedTargetPower used in Msg3 transmission power calculation is that configured for legacy RO?***

***Question 2: If so, please indicate whether to support TP of LGE or not (meaning further discussion via tdoc contribution is needed in RAN2#131bis).***

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Need further change (Y/N)** | **Support TP of LGE (Y/N)** | **Comments if any** |
| Ericsson | Slight prefer LGE solution | Y | With LG’s suggested changes, it can help to avoid any mis-interpretation. We are fine with LG’s TP.Ericsson-> we agree with HW suggested wording. |
| Nokia | Y | Y | We are ok with LG’s TP |
| Huawei, HiSilicon | Y | comments | Prefer to use " preambleReceivedTargetPower in xxx" in stead of using " preambleReceivedTargetPower not in yyy" if xxx can be implemented w/o too much trouble. This should be easier for UE implementation as: UE needs to find two preambleReceivedTargetPower, one in xxx and one in yyy. Instead of excluding preambleReceivedTargetPower in yyy, UE can directly select preambleReceivedTargetPower in xxx.  |
| Xiaomi | Y | Comments | Agree with Huawei’s suggestion to indicate the used configuration directly. |
| ZTE | Y | Y | Agree with LG wording, since preambleReceivedTargetPower is inside RACH-ConfigGeneric -- RACH-ConfigCommon -- BWP-UplinkCommon/ AdditionalRACH-Config-r17/ sbfd-RACH-DualConfig-r19, where BWP-UplinkCommon and AdditionalRACH-Config-r17 are both parent IE of sbfd-RACH-DualConfig-r19. So it is easier and simple to say the ‘preambleReceivedTargetPower not in yyy’ than ‘preambleReceivedTargetPower in xxx’ to reduce redundant text in MAC spec |
| CATT | Slight prefer LGE solution | Y | If it is modified, it can avoid misunderstanding. But we can follow the majority. |
| Sharp | Y | Comment | We prefer Huawei’s suggestion. |
| Qualcomm | Y | Y | Wondering how to describe and capture ‘in xxx’. It seems saying ‘not in yyy’ is simpler. |
| LGE | Y | Y | Understand the Huawei’s comment to simplify the UE implementation, but we would like to note that it is not easy to specify in the format of ‘~ in xxx,’ since the exact IE (xxx) is different based on which feature combination is used for this Random Access procedure. Specifically:* if the UE selects the set of Random Access resources which is not associated with any feature, the UE should use *preambleReceivedTargetPower* in *rach-ConfigCommon* (without suffix) which is directly included in *BWP-UplinkCommon* IE.
* If the UE selects the set of Random Access resources associated with feature(s), the UE may need to use *preambleReceivedTargetPower* in *rach-ConfigCommon-17* for the selected feature combination, which is included in a*dditionalRACH-Config-r17* IE.

Therefore, it is suggested to use the format of ‘not in yyy’ in order to simply clarify the intended operation of RAN1 agreement.However, as long as additional description is needed to avoid mis-interpretation, if the majority really want to try the format of ‘~ in xxx,’ we can start with following wording and check whether it is clear enough to clarify the intended behavior.

|  |
| --- |
| 6> indicate the *preambleReceivedTargetPower* included in *rach-ConfigCommon* and the amount of power ramping applied to the latest Random Access Preamble transmission to lower layers (i.e. (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × *PREAMBLE\_POWER\_RAMPING\_STEP +* *POWER\_OFFSET\_2STEP\_RA* + *POWER\_OFFSET\_RO\_TYPE*). |

 |

**Rapp summary for MAC-2:**

All the companies consider further changes necessary, where:

- five companies prefer negative statement ("not in xx"), considering the tricky point in explicitly indicating a commonly applicable parent IE for different contexts inclusively, and

- four companies prefer positive statement ("in yy"), for clearer and simpler UE implementation.

**Proposed WF for MAC-2:**

To secure more time for careful review of the relevant IE structure, no correction will be considered for MAC-2 in Rapp CR. Companies are invited to submit tdoc contributions with the preferred TP for MAC-2.

## MAC-3: UE transmit power continuity during RO type switching

**Issue description (Nokia)**

|  |  |  |
| --- | --- | --- |
| During RAN2#131, companies agreed to compensate for the UE transmit power difference between legacy RO and SBFD RO by introducing a power offset:

|  |
| --- |
| Proposal: For the RO type fallback between legacy RO and additional RO for RACH configuration option 2, a power offset given by the difference between the two quantities of preamble power ramping steps is added. |

One of the arguments for supporting this power offset compensation is that the UE should not change its transmit power by a value higher than 6 dB between mgs1 transmissions, as described in TS 38.331:

|  |
| --- |
| TS 38.331:powerRampingStep ENUMERATED {dB0, dB2, dB4, dB6}, |

By using this approach, the UE power continuity is ensured given that the preamble received target power is the same.However, in Nokia's view, the current proposal is not completely solving the UE transmit power continuity issue when switching between SBFD RO to legacy RO or vice versa. The reason is that current proposal only compensates for the potential differences in the power ramping step but doesn’t take into account the potential differences in the preamble received power. In Configuration 2, the UE will receive 2 independent RACH-ConfigCommon configurations, which among others, contain different preambleTargetReceivedPower and/or different powerRampingStep (among others). Therefore, the UE transmit power continuity is not ensured. This can lead to a larger power ramp-down or power ramp-up of 6 dB, which is not acceptable from UE vendors point of view as per last meeting’s discussion. Therefore, it is required to find a new way of compensating for both the differences in power ramping offsets and preamble received target powers. |

**TP from Nokia for MAC-3**

|  |  |
| --- | --- |
| The power offset adjustment for UE transmit power continuity between SBFD RO to legacy RO (or vice versa) can be determined as follows:

|  |
| --- |
| Section 5.1.42> if the Random Access procedure is not completed:3> if *preambleTransMaxRO-Type* is applied, and neither contention-free Random Access Resources nor Random Access resources for SI request have been provided for this Random Access procedure, and *PREAMBLE\_TRANSMISSION\_COUNTER* = *preambleTransMaxRO-Type* + 1:4> if the *RO\_TYPE* is set to *2nd-RO*, and set of Random Access resources associated with the same feature or feature combination, and with the same or higher Msg1 repetition number (if the Random Access Preamble is transmitted with repetitions), than the current set of Random Access resources, is available for the first PRACH occasions as defined in TS 38.213 [6]:5> set the *RO\_TYPE* to *1st-RO*;5> select the set of Random Access resources associated with the same feature or feature combination, and with the same Msg1 repetition number if available, or with the next higher Msg1 repetition number otherwise (if the Random Access Preamble is transmitted with repetitions), for this Random Access procedure;5> if *sbfd-RACH-DualConfig* is configured for the Random Access procedure (see TS 38.331 [5]):6> set *PREVIOUS\_RO\_TYPE\_PREAMBLE\_POWER\_RAMPING\_STEP* to *PREAMBLE\_POWER\_RAMPING\_STEP*;6> (re-)initialize the parameters specified in clause 5.1.1 for the Random Access procedure according to the values configured by RRC for the selected set of Random Access resources;6> re-initialize *PREAMBLE\_POWER\_RAMPING\_STEP* and *SCALING\_FACTOR\_BI* as specified in clause 5.1.1a;6> set *POWER\_OFFSET\_RO\_TYPE* to *preambleReceivedTargetPower* (not included in *sbfd*-*RACH*-*DualConfig*) - *preambleReceivedTargetPower* (included in *sbfd*-*RACH*-*DualConfig*) + (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × (*PREVIOUS\_RO\_TYPE\_PREAMBLE\_POWER\_RAMPING\_STEP* – *PREAMBLE\_POWER\_RAMPING\_STEP*).4> else if the *RO\_TYPE* is set to *1st-RO*, and set of Random Access resources associated with the same feature or feature combination, and with the same or higher Msg1 repetition number (if the Random Access Preamble is transmitted with repetitions), than the current set of Random Access resources, is available for the second PRACH occasions as defined in TS 38.213 [6]:5> set the *RO\_TYPE* to *2nd-RO*;5> select the set of Random Access resources associated with the same feature or feature combination, and with the same Msg1 repetition number if available, or with the next higher Msg1 repetition number otherwise (if the Random Access Preamble is transmitted with repetitions), for this Random Access procedure;5> if *sbfd-RACH-DualConfig* is configured for the Random Access procedure (see TS 38.331 [5]):6> set *PREVIOUS\_RO\_TYPE\_PREAMBLE\_POWER\_RAMPING\_STEP* to *PREAMBLE\_POWER\_RAMPING\_STEP*;6> (re-)initialize the parameters specified in clause 5.1.1 for the Random Access procedure according to the values configured by RRC for the selected set of Random Access resources;6> re-initialize *PREAMBLE\_POWER\_RAMPING\_STEP* and *SCALING\_FACTOR\_BI* as specified in clause 5.1.1a;6> set *POWER\_OFFSET\_RO\_TYPE* to *preambleReceivedTargetPower* (included in *sbfd*-*RACH*-*DualConfig*) - *preambleReceivedTargetPower* (not included in *sbfd*-*RACH*-*DualConfig*) + (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × (*PREVIOUS\_RO\_TYPE\_PREAMBLE\_POWER\_RAMPING\_STEP* – *PREAMBLE\_POWER\_RAMPING\_STEP*). |

**Note: Similar changes in 5.1.5 as well.** |

**Proposed WF for MAC-3 (by Rapp):**

Given that MAC-3 was identified too late for sufficient offline discussion, companies are invited to submit tdoc contributions on:

- whether, and (if support) how, to support the compensation for the difference in preamble received target powerbetween SBFD RO and legacy RO (in addition to the compensation for the power ramping difference that is already supported), for ensuring preamble transmit power continuity, during RO type switching,

taking into account the issue description and the TP, made by Nokia.

# Conclusions

The following issues have been identified based on the discussion.

**Issues for further discussion with tdoc contributions in RAN2#131bis:**

- MAC-2:How to clarify "the *preambleReceivedTargetPower* used in Msg3 transmission power derivation is that configured for legacy RO, in the case that Msg3 is transmitted in non-SBFD symbols and SBFD RACH config option 2 is configured."

- MAC-3:Whether, and (if support) how, to support the compensation for the difference in preamble received target power between SBFD RO and legacy RO (in addition to the compensation for the power ramping difference that is already supported), for ensuring preamble transmit power continuity, during RO type switching.

**Issues that will be handled by Rapporteur CR in RAN2#131bis:**

- RO type signaling/selection for R18 and R19 LTM cell switch command MAC CEs

- (editorial) supplement the missing parameters in parameter list in clause 5.1.1.

# References

1. R2-2506606 Introduction of Rel-19 Evolution of NR duplex operation (SBFD) for MAC spec, CR#2106, Samsung
2. R2-2506202 Report from session on Rel-18 MIMO, Rel-19 MIMO, LPWUS, SBFD, NR Others RAN2 Vice Chairman (CATT)