**VERYU 3GPP TSG-RAN2 Meeting #110 Electronic  *Draft\_R2-*** ***2005796***

**1st June – 12th June 2020**

**Agenda item: 6.16.3**

**Source: Samsung**

**Title: Summary of proposed corrections (AI 6.16.3) (Phase 2)**

**Document for: Discussion and Decision**

# Introduction

This contribution is to further discuss the aspect highlighted in yellow

Proposal 1: For a pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell sr-ProhibitTimer shall be stopped when the MAC PDU is transmitted and this PDU includes an BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of that Scell.

* Nokia thinks this does not fully align to BSR (which was the intent), for the truncated BFR MAC CE case
* Samsung thinks the proposal is for the case the truncated BFR MAC CE includes full information
* ZTE agrees with Nokia
* Agree that some revision is needed along the lines of P1. Check the details regarding truncated BFR MAC CE case. Continue during the second round of offline [103]

Proposal 3: Design new SP/AP SRS spatial relation indication MAC CE for multiple serving cells case. Annexure 6 is the baseline.

* QC agrees with the proposal but would like to discuss the exact details (not agree immediately on Annex 6). QC wonders whether we need an A/D field.
* Agreed. Check the exact details (Annex 6 is a baseline for discussion but not endorsed yet). Continue during the second round of offline [103]

# Discussion

## SR Prohibit Timer

According to MAC spec, SR cancellation criteria for the case when MAC PDU including MAC CE for SCell BFR is transmitted is as follows: "Pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell shall be cancelled when the MAC PDU is transmitted and this PDU includes an BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of that SCell."

*Observation: SR cancellation criteria considers both BFR MAC CE and Truncated BFR MAC CE*

Based on previous discussion, *sr-ProhibitTimer* shall be stopped when the MAC PDU is transmitted and this PDU includes an BFR MAC CE for SCell BFR. One of the following texts (both have same consequence) can be added in spec to capture this:.

* TP 1: For a pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell, *sr-ProhibitTimer* corresponding to the SR configuration for SCell BFR shall be stopped when the MAC PDU is transmitted and this PDU includes an BFR MAC CE which contains beam failure recovery information of that SCell.
* TP 2: *sr-ProhibitTimer* corresponding to the SR configuration for SCell BFR shall be stopped when the MAC PDU is transmitted and this PDU includes a BFR MAC CE for SCell BFR.

The case which needs further discussion is whether to stop *sr-ProhibitTimer* when the MAC PDU is transmitted and this PDU includes Truncated BFR MAC CE which contains beam failure recovery information of SCell(s). According to observation 1 above, SR is cancelled in this case. If *sr-ProhibitTimer* is not stopped, it will delay the SRs triggered after initiation of MAC PDU assembly.

**Q 1. Do you agree to stop sr-ProhibitTimer when the MAC PDU is transmitted and this PDU includes Truncated BFR MAC CE which contains beam failure recovery information of SCell(s)?**

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| **Company** | **Preference (Y/N)** | **Detailed Comments** |
| **ZTE** | **N** | Firstly, for the current SR cancellation mechanism for BFR MAC CE, the description is shown as below:---------- From current running CR -------------Pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell shall be cancelled when the MAC PDU is transmitted and this PDU includes an BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of that SCell. Pending SR triggered for beam failure recovery of a SCell shall be cancelled upon deactivation of that SCell (as defined in clause 5.9).----------- From current running CR ----------According to above description, which means the pending SR is canceled in a granularity of SCell. For example, if the SCell #1, #2 , #3 are failed prior to the MAC PDU assembly, but only SCell#1 and SCell#2’s BFR information is included into the truncated MAC CE, in this case, the SR triggered by SCell#3 failure will not be canceled and pending still by obeying above specification. Regarding the sr-ProhibitTimer is configured per SR configuration, we are confused about why the sr-ProhibitTimer is stopped because there is remaining pending SR triggered prior to the MAC PDU assembly. In addition, each company may state that this is aligned with the R-15 behavior, we can check the following the specification in R-15 for BSR:----------From running CR for BSR ------------------all pending SR(s) for BSR triggered according to the BSR procedure (clause 5.4.5) prior to the MAC PDU assembly shall be cancelled and each respective *sr-ProhibitTimer* shall be stopped when the MAC PDU is transmitted---------- For BSR ---------------------------------------------Assuming that all LCHs are associated with only one SR configuration, It can be interpreted as that all pending SR for this specific SR configuration triggered prior to MAC PDU assembly is cancelled and then the respective sr-ProhibitTimer shall be stopped. It seems if we say yes to this question, we have a totally different behavior of sr-ProhibitTimer with R-15.Thus if we would like to follow the R15 spec, our understanding is negative to this question.  |
| **Samsung** | **Y** |  |
| **Qualcomm** | **Y** | Since the pending SR is cancelled for the Truncated BFR MAC CE transmission case. The *sr-ProhibitTimer* should be stopped. Otherwise, it will delay the SRs triggering again. |
| **Ericsson**  | **Y**  | It is very difficult to understand the corresponding paragraph in the specification. What is discussed are the cancellation criteria for three different SR types: SR for BSR, SR for BFR on SCell, and SR for consistent LBT failure. On top of this it is also described how and when to stop the sr-prohibitTimer. This part of the specification could be improved.  |

If above is agreed, one of the following texts (both have same consequence) can be added in spec to capture this:.

* TP 3: For a pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell, *sr-ProhibitTimer* corresponding to the SR configuration for SCell BFR shall be stopped when the MAC PDU is transmitted and this PDU includes an BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of that SCell. (See annexure 1)
* TP 4: *sr-ProhibitTimer* corresponding to the SR configuration for SCell BFR shall be stopped when the MAC PDU is transmitted and this PDU includes a BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of SCell(s). (See annexure 2)

**Q2 If answer to Q1 is yes, indicate your preference for text proposal (annexure 1, annexure 2)**

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| **Company** | **Preference (Y/N)** | **Detailed Comments** |
| **ZTE** | **N** | We would like to keep the current cancellation of sr-ProhibitTimer for BFR as it is. |
| **Samsung** | **Y** |  |
| **Qualcomm** | **Annex 1** | The change in Annex 1 is simpler. |
| **Ericsson**  | **Annex 1**  | In the choice between annex 1 and 2 our preference is for annex 1, but if we are not limited to annex 1 or 2 our preference would be to restructure this part of the specification.  |

## SP/AP SRS spatial relation indication MAC CE for Multiple Serving Cells

RAN1 replied to RAN2 questions in R1-2002798/ R2-2004251 on SRS activation/deactivation MAC CE for the list of serving cells:

**Question 4.** RAN2 would like to ask RAN1 whether the intention is to activate per SRS resource set or per SRS resource. Further, if per SRS resource, whether RAN1 sees any issues in indicating spatial relation, potentially different, for more than one resource in one MAC CE in order to save overhead.

**Answer 4.**

RAN1 understands that the intention of the agreement is to support activating the independent spatial relations for SRS resource(s) in an SRS resource set.  Furthermore, RAN1 see no issue in using one MAC CE (to save overhead) to activate/deactivate spatial relations for >1 SRS resources from an SRS resource set.

According to the above response from RAN1, it can be observed that the requirement from RAN1 is to support activating the spatial relation information for the indicated SRS resource. One remark is that it has been agreed to consider supporting update spatial relation for both the AP and SP SRS source inside one MAC CE as well as extending the spatial relation resource ID field for larger ID space of NZP CSI-RS resource in the RAN2 #109bis-e meeting i.e. Enhanced SP/AP SRS spatial relation indication MAC CE.

During the RAN2#110-e online session, it was agreed that the new SP/AP SRS spatial relation indication MAC CE for multiple serving cells case will be introduced and the detail design of the MAC CE is further discussed in Phase II discussion. In addition, Annexure 3 will be the baseline of the discussion as agreed on the online session.

Agreements via email (from [103][EMIMO]):

1. Clarify that a MAC PDU shall contain at most one BFR MAC CE.
2. Design new SP/AP SRS spatial relation indication MAC CE for multiple serving cells case. Annexure 6 is the baseline for discussion but not endorsed yet.
3. Clarify that the pathloss reference RS is updated by this MAC CE in the SRI-PUSCH-powercontrol mappings provided in the same MAC CE.
4. RAN2 confirm that the multiple PUCCH resources can be indicated in an Enhanced PUCCH spatial relation Activation/Deactivation MAC CE.

For the new design of this MAC CE, one company proposed to introduce A/D field (i.e. replace SUL field to A/D field) because this MAC CE support activation/deactivation, but another opinion is that this MAC CE includes multiple serving cells so replacing SUL field to A/D field cannot fully solve the intended operation.

**Q3 Do you agree that this MAC CE needs the A/D field(s)?**

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| **Company** | **Preference (Y/N)** | **Detailed Comments** |
| **ZTE** | **Y** | According to rely from RAN1, the A/D field seems needed for this MAC CE. |
| **Samsung** | **Y** |  |
| **Qualcomm** | **N** | We don’t see A/D field is needed in this MAC CE. The intention to design serving cell based SRS MAC CE is to update the spatial relation information of each SRS resource cross the multiple cells, but not to activate or deactivate the SRS resources cross the multiple cells. It has the different use case from the single cell SRS MAC CE (i.e. Enhanced SP/AP SRS spatial relation Indication MAC CE). The A/D filed in single cell SRS MAC CE is to activate or deactivate one SP SRS resource set. If network does want to activate or deactivate the SRS resource within the SRS resource set. The single cell SRS MAC CE can be used. There is no requirement to activate or deactivate the SRS source cross the multiple cells.We should not ‘replace’ SUL field to A/D filed. Because SUL filed is still useful for this MAC CE. |
| **Ericsson** | **Y** | RAN1 response: RAN1 understands that the intention of the agreement is to support ***activating*** the independent spatial relations for SRS resource(s) in an SRS resource set. Furthermore, RAN1 see no issue in using one MAC CE (to save overhead) to ***activate/deactivate*** spatial relations for >1 SRS resources from an SRS resource set.Do we need another round of LS? |

**Q4 Please provide the detail suggestion for the new MAC CE compared to the Annexure 3.**

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| **Company** | **Detailed Comments** |
| **ZTE** | **-** |
| **Samsung** | Change SUL field to A/D field. |
| **Qualcomm** | 1. If A/D filed is agreed in this MAC CE, the SRS resource indicted in this MAC CE should belongs to the same resource type. Since the *resourceType* is defined in the *SRS-ResourceSet*. The spec should clarify that the indicated SRS resource in this MAC CE should belongs to the same SP *SRS-ResourceSet*. For SRS resource configured in AP *SRS-ResourceSet*, A/D filed should be ignored with same reason in Enhanced SP/AP SRS spatial relation Indication MAC CE.2. If A/D filed is agreed in this MAC CE, the MAC CE format can refer to the Enhanced SP/AP SRS spatial relation Indication MAC CE so that A/D, C, and SUL field can be placed at the first two octets. Suggest format below. |
| **Ericsson**  | Change SUL field to A/D field and clarify it applies only when the SRS resource set the resources belong to is SP SRS resource set  |

## Enhanced TCI state MAC CE for URLLC

According to RAN1 LS [1], RAN1 provides the answers for the several collected questions which RAN2 requested in the RAN2#109bis meeting [2]. Among the questions in this LS, it seems issues #5 would have impact on the MAC specification in terms of MAC CE restrictions in case DCI format 1\_2 is simultaneously configured with the conventional DCI formats.

Below is the related questions and answers in the LS from RAN1 [1]. According to the answer for the Q5-3, RAN1 replied that the Enhanced TCI state MAC CE can be also applied to DCI1\_2 (i.e. URLLC).

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| **5)** **DCI format 1\_2 applicability to features introduced in NR\_eMIMO WI** The IE ControlResourceSet includes both tci-PresentInDCI and tci-PresentInDCI-ForDCI-Format1-2. Currently both parameters can be configured in all or some CORESETs of the UE and these CORESETs may be configured with CORESETPoolIndex (mPDCCH mTRP). Further, eMIMO WI introduced a new TCI state mapping MAC CE in TS 38.321 6.1.3.24 where two TCI states can be mapped to one DCI codepoint. Currently, there is no limitation which DCI format this new MAC CE in TS 38.321 6.1.3.24 applies to.**Q5-1)** Can the UE be configured with both DCI format 1\_1 and DCI format 1\_2 with TCI field, either in the same or different CORESETs? And can the value of tci-PresentInDCI-ForDCI-Format1-2 be different in different CORESETs?**[Answer]: Yes to both questions.****Q5-2)** Can the UE be configured with mPDCCH mTRP (have at least on CORESET with CORESETPoolIndex=1) and the parameter tci-PresentInDCI-ForDCI-Format1-2?**[Answer]: Yes.****Q5-3)** Does the Enhanced TCI state MAC CE in TS 38.321 6.1.3.24 apply to DCI1\_2?**[Answer]: Yes.** |

In the current MAC specification, there are no statement that the MAC CEs so far dealing with old DCI would apply to DCI1\_2. In addition, the DCI1\_2 can be configured less bits compared to the conventional DCI field, to reduce the overhead of DCI in case of URLLC. Therefore, it should be stated how UE interprets the MAC CEs which are done for the full DCI field length.

The current Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE can include at most 8 couples of TCI states mapping, but it seems that both DCI format 1\_1 and DCI format 1\_2 can be configured in the same CORESETs. In that case, UE should know which groups of TCI states can be applied to the mapping information of the codepoints which DCI format 1\_2 indicated if the configured length of bits of DCI format 1\_2 is smaller than the conventional one.

One possible solution for clarification is that RAN2 will add the restriction such as “UE maps the first Xth codepoints of TCI states to DCI1\_2 TCI field and UE ignores the rest.”



Figure 6.1.3.24-1: Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE

**Q4 Do you agree that adding UE restriction on the Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE how UE interprets the MAC CEs which are done for the full DCI field length when both DCI format 1\_1 and DCI format 1\_2 are configured in the same CORESET.**

* **Option 1: UE maps the first Xth codepoints of TCI states to DCI1\_2 TCI field and UE ignores the rest, where X can be determined by the configured length of bits for DCI format 1\_2.**
* **Option 2: No need the clarifications**
* **Option 3: Other restrictions (if you have any, please describe the suggested restriction)**

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| --- | --- | --- |
| **Company** | **Preference (Y/N)** | **Detailed Comments** |
| **Samsung** | **Option 1** |  |
| **Qualcomm** | **Option 2** | In field description of this MAC CE, it is already specified “*The TCI codepoint to which the TCI States are mapped is determined by its ordinal position among all the TCI codepoints with sets of TCI state IDi,j fields, i.e. the first TCI codepoint with TCI state ID0,1 and TCI state ID0,2 shall be mapped to the codepoint value 0, the second TCI codepoint with TCI state ID1,1 and TCI state ID1,2 shall be mapped to the codepoint value 1 and so on.*”We think it is clear enough. |
| **Ericsson** | **Option 1** | TCI state IDi,j: This field indicates the TCI state identified by TCI-StateId as specified in TS 38.331 [5], where i is the index of the codepoint of the DCI Transmission configuration indication field as specified in TS 38.212 [9] and TCI state IDi,j denotes the jth TCI state indicated for the ith codepoint in the DCI Transmission Configuration Indication field. The TCI codepoint to which the TCI States are mapped is determined by its ordinal position among all the TCI codepoints with sets of TCI state IDi,j fields, i.e. the first TCI codepoint with TCI state ID0,1 and TCI state ID0,2 shall be mapped to the codepoint value 0, the second TCI codepoint with TCI state ID1,1 and TCI state ID1,2 shall be mapped to the codepoint value 1 and so on. The TCI state IDi,2 is optional based on the indication of the Ci field.  When the number of codepoints S in the TCI field of DCI format 1\_2 is less than the maximum number of codepoints in the TCI field of DCI format 1\_1, the activated TCI states mapped to the first S TCI field codepoints in DCI format 1\_1 are mapped to the TCI field codepoints in DCI format 1\_2.  The maximum number of activated TCI codepoint is 8 and the maximum number of TCI states mapped to a TCI codepoint is 2.  |

We assume that this DCI format 1\_2 can also be used to indicate the TCI state indication which is mapped by the TCI States Activation/Deactivation for UE-specific PDSCH MAC CE, i.e. not for the Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE.

If we consider the situation that both DCI format 1\_1 and DCI format 1\_2 are configured in the same CORESET, the TCI States Activation/Deactivation for UE-specific PDSCH MAC CE should be applied for both DCI formats. It means the mapping information activated by this MAC CE can be differently applied for the cases DCI 1\_2 is received in case that DCI format 1\_2 has configured smaller length of bits compared to DCI format 1\_1.

For example, the length of bits for DCI format 1\_2 is configured as 1, then only two mappings can be feasible when UE receives DCI format 1\_2. However, it is possible that at most 8 TCI states can be indicated by this MAC CE for DCI format 1\_1, and the format of this MAC CE is bitmap of TCI states.

Each TCI states have own configured index by RRC configuration, but it seems the first Xth index will be indicated if DCI format 1\_2 with small length of bits are used. It may require the NW restriction to configure the TCI states configuration in terms of the configuring the order of TCI state (i.e. NW may configure lower index of TCI states which can be highly activated by URLLC.)

Similar with the above Q4, UE restriction how TCI states can be applied to the mapping information of the codepoints which DCI format 1\_2 indicated if the configured length of bits of DCI format 1\_2 is smaller than the conventional one.

One possible solution for clarification is that RAN2 will add the restriction such as “UE maps the first Xth index of the activated TCI states in this MAC CE to DCI1\_2 TCI field and UE ignores the rest.”



Figure 6.1.3.14-1: TCI States Activation/Deactivation for UE-specific PDSCH MAC CE

**Q5 Do you agree that adding UE restriction on TCI States Activation/Deactivation for UE-specific PDSCH MAC CE how UE interprets the MAC CEs which are done for the full DCI field length when both DCI format 1\_1 and DCI format 1\_2 are configured in the same CORESET.**

* **Option 1: UE maps the first Xth index of the activated TCI states in this MAC CE to DCI1\_2 TCI field and UE ignores the rest, where X can be determined by the configured length of bits for DCI format 1\_2.**
* **Option 2: No need the clarifications**
* **Option 3: Other restrictions (if you have any, please describe the suggested restriction)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preference (Y/N)** | **Detailed Comments** |
| **Samsung** | **Option 1** |  |
| **Qualcomm** | **Option 2** | In field description of this MAC CE, it is already specified “*The codepoint to which the TCI State is mapped is determined by its ordinal position among all the TCI States with Ti field set to 1, i.e. the first TCI State with Ti field set to 1 shall be mapped to the codepoint value 0, second TCI State with Ti field set to 1 shall be mapped to the codepoint value 1 and so on.*” We think it is clear enough. |
| **Ericsson** | **Option 1** | See Q4  |

# Summary

# References

1. R2-2006057 Reply LS on Conflicting configurations LS in Rel-16 RAN1.
2. R2-2004271 LS on conflicting configurations LS out Rel-16 Huawei.

# Annexure 1

### 5.4.4 Scheduling Request

:

Except for SCell beam failure recovery, all pending SR(s) for BSR triggered according to the BSR procedure (clause 5.4.5) prior to the MAC PDU assembly shall be cancelled and each respective *sr-ProhibitTimer* shall be stopped when the MAC PDU is transmitted, regardless of LBT failure indication from lower layers, and this PDU includes a Long or Short BSR MAC CE which contains buffer status up to (and including) the last event that triggered a BSR (see clause 5.4.5) prior to the MAC PDU assembly. Except for SCell beam failure recovery, all pending SR(s) for BSR triggered according to the BSR procedure (clause 5.4.5) shall be cancelled and each respective *sr-ProhibitTimer* shall be stopped when the UL grant(s) can accommodate all pending data available for transmission. Pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell shall be cancelled and respective *sr-ProhibitTimer* shall be stopped when the MAC PDU is transmitted and this PDU includes an BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of that SCell. Pending SR triggered for beam failure recovery of a SCell shall be cancelled upon deactivation of that SCell (as defined in clause 5.9).

The MAC entity shall for each pending SR triggered by consistent LBT failure:

1> if a MAC PDU is transmitted, regardless of LBT failure indication from lower layers, and the MAC PDU includes an LBT failure MAC CE that indicates consistent LBT failure for the Serving Cell that triggered this SR; or

1> if the corresponding consistent LBT failure is cancelled (see clause 5.21):

2>cancel the pending SR and stop the corresponding *sr-ProhibitTimer*.

# Annexure 2

### 5.4.4 Scheduling Request

:

Except for SCell beam failure recovery, all pending SR(s) for BSR triggered according to the BSR procedure (clause 5.4.5) prior to the MAC PDU assembly shall be cancelled and each respective *sr-ProhibitTimer* shall be stopped when the MAC PDU is transmitted, regardless of LBT failure indication from lower layers, and this PDU includes a Long or Short BSR MAC CE which contains buffer status up to (and including) the last event that triggered a BSR (see clause 5.4.5) prior to the MAC PDU assembly. Except for SCell beam failure recovery, all pending SR(s) for BSR triggered according to the BSR procedure (clause 5.4.5) shall be cancelled and each respective *sr-ProhibitTimer* shall be stopped when the UL grant(s) can accommodate all pending data available for transmission. Pending SR triggered prior to the MAC PDU assembly for beam failure recovery of an SCell shall be cancelled when the MAC PDU is transmitted and this PDU includes an BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of that SCell. Pending SR triggered for beam failure recovery of a SCell shall be cancelled upon deactivation of that SCell (as defined in clause 5.9). *sr-ProhibitTimer* corresponding to the SR configuration for SCell BFR shall be stopped when the MAC PDU is transmitted and this PDU includes a BFR MAC CE or Truncated BFR MAC CE which contains beam failure recovery information of SCell(s).

The MAC entity shall for each pending SR triggered by consistent LBT failure:

1> if a MAC PDU is transmitted, regardless of LBT failure indication from lower layers, and the MAC PDU includes an LBT failure MAC CE that indicates consistent LBT failure for the Serving Cell that triggered this SR; or

1> if the corresponding consistent LBT failure is cancelled (see clause 5.21):

2> cancel the pending SR and stop the corresponding *sr-ProhibitTimer*.

# Annexure 3

#### 6.1.3.29 Serving Cell set based SRS Activation/Deactivation MAC CE

The Serving Cell set based SRS Activation/Deactivation MAC CE is identified by a MAC subheader with eLCID as specified in Table 6.2.1-1b. It has a variable size and consists of the following fields:

- SUL: This field indicates whether the MAC CE applies to the NUL carrier or SUL carrier configuration. This field is set to 1 to indicate that it applies to the SUL carrier configuration, and it is set to 0 to indicate that it applies to the NUL carrier configuration;

- SRS Resource’s Cell ID: This field indicates the identity of the Serving Cell, which contains the indicated SP/AP SRS Resource Set. If the C field is set to 0, this field also indicates the identity of the Serving Cell which contains all resources indicated by the Resource IDi fields. The length of the field is 5 bits. If the indicated Serving Cell is configured as part of a *simultaneousSpatial-UpdatedList1-r16* or *simultaneousSpatial-UpdatedList2-r16* as specified in TS 38.331 [5], this MAC CE applies to all the Serving Cells configured in the set *simultaneousSpatial-UpdatedList1-r16* or *simultaneousSpatial-UpdatedList2-r16, respectively;*

 - SRS Resource's BWP ID: This field indicates a UL BWP as the codepoint of the DCI *bandwidth part indicator* field as specified in TS 38.212 [9], which contains the indicated AP/SP SRS Resource. If the C field is set to 0, this field also indicates the identity of the BWP which contains all resources indicated by the Resource IDi fields. The length of the field is 2 bits;

- C: This field indicates whether the octets containing Resource Serving Cell ID field(s) and Resource BWP ID field(s) are present. If this field is set to 1, the octets containing Resource Serving Cell ID field(s) and Resource BWP ID field(s) are present, otherwise they are not present;

- SP/AP SRS Resource IDi: This field indicates the SP/AP SRS Resource ID identified by *SRS-ResourceId* as specified in TS 38.331 [5]. The length of the field is 6 bits;

- Fi: This field indicates the type of a resource used as a spatial relationship for SRS resource within SP/AP SRS Resource Set indicated with SP/AP SRS Resource IDi field. F0 refers to the first SRS resource which is indicated SP/AP SRS Resource ID1, F1 to the second one and so on. The field is set to 1 to indicate NZP CSI-RS resource index is used, and it is set to 0 to indicate either SSB index or SRS resource index is used. The length of the field is 1 bit;

- Resource IDi: This field contains an identifier of the resource used for spatial relationship derivation for SRS resource i. Resource ID0 refers to the first SRS resource which is indicated SP/AP SRS Resource ID1, Resource ID1 to the second one and so on. If Fi is set to 0, the first bit of this field is always set to 0. If Fi is set to 0, and the second bit of this field is set to 1, the remainder of this field contains *SSB-Index* as specified in TS 38.331 [5]. If Fi is set to 0, and the second bit of this field is set to 0, the remainder of this field contains *SRS-ResourceId* as specified in TS 38.331 [5]. The length of the field is 8 bits.

- Resource Serving Cell IDi: This field indicates the identity of the Serving Cell on which the resource used for spatial relationship derivation for SP/AP SRS Resource IDi is located. The length of the field is 5 bits;

- Resource BWP IDi: This field indicates a UL BWP as the codepoint of the DCI *bandwidth part indicator* field as specified in TS 38.212 [9], on which the resource used for spatial relationship derivation for SP/AP SRS Resource IDi is located. The length of the field is 2 bits;

- R: Reserved bit, set to 0.



**Figure 6.1.3.29-1: Serving Cell set based SRS Activation/Deactivation MAC CE**