**3GPP TSG RAN WG1 #112bis-e R1-23xxxxx**

**e-Meeting, April 17th – April 26th, 2023**

**Agenda item:** 7.2

**Source:** Moderator (ZTE)

**Title:** Moderator Summary#1 of Maintenance on Rel-17 SRS

**Document for:** Discussion and Decision

## Introduction

The moderator summary#1 on Rel-17 SRS maintenance is given below, which is based on the submitted contributions (three in total) in Reference and also the last round of discussion. Please provide your comments in this round of discussion, if any, **by April 20th (Thursday) @23:59 UTC+0**.

## Maintenance Issues

### **Issue#1:** **TS 38.214, Correction on the UE capability name of triggering AP SRS in DCI 0\_1/0\_2 without data and without CSI (R1-2302425, R1-2303004)**

In TS 38.214, the UE capability parameter for aperiodic SRS without data and without CSI is described using the temporary name by “*[Triggering SRS* only in DCI 0\_1/0\_2*]*”. These temporary names should be replaced with the corresponding UE capability parameters as defined in TS 38.306, i.e., “***srs-TriggeringDCI-r17***”.

#### Round 0

According to the above, two following draft CRs are provided in **R1-2302425** and **R1-2303004**, respectively.

**In R1-2302425:**

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<unchanged part is omitted>

**6.2.1 UE sounding procedure**

- When UE reporting *srs-TriggeringOffset-r17,* the UE can be indicated with DCI 0\_1 and 0\_2 to trigger aperiodic SRS without data and without CSI as described in clause 7.3.1.1 of TS38.212. Otherwise, except for DCI format 0\_1/0\_2 with CRC scrambled by SP-CSI-RNTI, a UE is not expected to receive a DCI format 0\_1/0\_2 with UL-SCH indicator of "0" and CSI request of all zero(s) as described in clause 7.3.1.1 of [5, TS 38.212].

<unchanged part is omitted>

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**In R1-2303004:**

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**6.2.1 UE sounding procedure**

<omitted text>

For a UE configured with one or more SRS resource configuration(s), and when the higher layer parameter *resourceType* in *SRS-Resource* or *SRS-PosResource* is set to 'aperiodic':

- the UE receives a configuration of SRS resource sets,

- the UE receives a downlink DCI, a group common DCI, or an uplink DCI based command where a codepoint of the DCI may trigger one or more SRS resource set(s). For SRS in a resource set with usage set to 'codebook' or 'antennaSwitching', the minimal time interval between the last symbol of the PDCCH triggering the aperiodic SRS transmission and the first symbol of SRS resource is *N2*  symbols and an additional time duration *Tswitch*. Otherwise, the minimal time interval between the last symbol of the PDCCH triggering the aperiodic SRS transmission and the first symbol of SRS resource is *N2* +14 symbols and an additional time duration *Tswitch*. The minimal time interval unit of OFDM symbol is counted based on the minimum subcarrier spacing given by min(*µPDCCH, µUL*) where *µUL* is given by min(*µUL,carrier1, µUL,carrier2, µSRS*) when the UE is configured with the higher layer parameter *uplinkTxSwitchingOption* set to 'dualUL' for uplink carrier aggregation, and by *µSRS*otherwise. *µSRS* and *µPDCCH*are the subcarrier spacing configurations for triggered SRS and PDCCH carrying the triggering command respectively.

- *Tswitch*, *µUL,carrier1* and *µUL,carrier2* are defined in clause 6.4.

- A UE reporting its UE capability ‘srs-TriggeringDCI’ can be indicated with DCI 0\_1 and 0\_2 to trigger aperiodic SRS without data and without CSI as described in clause 7.3.1.1 of [5, TS 38.212]. Otherwise, except for DCI format 0\_1/0\_2 with CRC scrambled by SP-CSI-RNTI, a UE is not expected to receive a DCI format 0\_1/0\_2 with UL-SCH indicator of "0" and CSI request of all zero(s) as described in clause 7.3.1.1 of [5, TS 38.212].

- If the UE receives the DCI triggering aperiodic SRS in slot *n* and at least one resource set is configured with parameter *availableSlotOffset* across all configured BWPs in a component carrier except when SRS is configured with the higher layer parameter *SRS-PosResource*,

- If ca-*SlotOffset* is configured, the UE transmits aperiodic SRS in each of the triggered SRS resource set(s) in the (*t* + 1)-th available slot counting from slot ,

- otherwise the UE transmits aperiodic SRS in each of the triggered SRS resource set(s) in the (t + 1)-th available slot counting from slot , where

<omitted text>

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| **Company** | **Comments (if any)** |
| Mod | **FL note 1:**   * This issue is editorial correction. Generally, either of the above two CRs can be used to address this issue, but it is proper to completely and accurately capture the UE capability name as defined in TS 38.306, i.e. ***srs-TriggeringDCI-r17***.   **TS 38.306, Section 4.2 UE capability Parameters**   |  | | --- | | ***srs-TriggeringDCI-r17***  Indicates whether the UE supports triggering SRS in DCI 0\_1/0\_2 without data and without CSI. |  * Notably, this issue have NOT been discussed before.   **FL note 2:** FL’s assessment of this issue is “E”.  Whether this issue should be “E”? If yes, please further provide your views of these two CRs. |
| Nokia | The issue is editorial and we think the alternative provided in **R1-2302425** is not correct, in fact there seems to be a mistake in the CR cover page as the document is discussing about the correct parameter but then proposing something else. Anyway, the solution we have in **R1-2303004** should be OK! |
| Samsung | We are fine as Editorial change. |
| Apple | We are fine with editorial change, and Nokia one can be used. |
| QC | We are fine with editorial change. |
| vivo | We are fine with the editorial change, one minor comment is to remove prefix “-r17” from RRC parameter name. |
| Intel | Fine with editorial change. |
| LGE | Fine with editorial change. |
| NTT DOCOMO | Fine with editorial change. |
| Ericsson | We are fine with the editorial change and agree with vivo that prefix should be removed. |

#### Round 1

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| **Company** | **Comments (if any)** |
| Mod | All companies agreed that it is an editorial change. Given that draft CR provided in R1-2303004 is majority preference, FL’s suggestion is to take this as alignment CR.  Please provide your views of the following Proposal 1.  **Proposal 1**  **For TS 38.214 editor:**  The following TP is provided for improving specification clarity (alignment CR)  R1-2303004 Correction of aperiodic SRS triggering without data and CSI Nokia, Nokia Shanghai Bell |
| Apple | In general, we are fine. However, whether to use “-r17”, “-r16” in RAN1 TS, e.g., TS38.214 is not consistent based on our observation. But we can leave it to the editor.  [Mod]: FYI, neither prefix “-r17” nor “-r16” is used in the draft CR provided in R1-2303004. |
| Samsung | We are fine the intention of this CR and can live with it. |
| LGE | OK. |
| Mod | Thank you all for the great inputs so far.  Given that almost all companies can be fine with this proposal, let’s switch to email thread for endorsement. |

### **Issue#2:** **TS 38.214, Correction on the antenna switching capability indication for more than 4 Rx antenna (R1-2302531)**

In TS 38.306 and TS 38.331, the RRC parameters *supportedSRS-TxPortSwitch* and *supportedSRS-TxPortSwitchBeyond4Rx* are used to report the supported antenna switching. Moreover, the antenna switching corresponding to more than 4 Rx antennas can only be reported via *supportedSRS-TxPortSwitchBeyond4Rx*. However, the current TS 38.214 only says “the indicated UE capability *supportedSRS-TxPortSwitch*” that can only indicates antenna switching with up to 4 Rx antennas.

#### Round 0

According to the above, the following draft CR is provided in **R1-2302531**.

**6.2.1.2 UE sounding procedure for DL CSI acquisition**

When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* or *supportedSRS-TxPortSwitchBeyond4Rx* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R, ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R):

- For 1T2R, if the UE is indicating *srs-AntennaSwitching2SP-1Periodic* and/or *srs-ExtensionAperiodicSRS*:

< omitted text>

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| **Company** | **Comments (if any)** |
| Mod | FL note 1: This issue is essential correction, which shall be discussed in RAN1#112 meeting. Notably, this issue have NOT been discussed before.  FL note 2: FL’s assessment of this issue is “H”.  Whether this issue should be “H”? If yes, please further provide your views of this CR. |
| Samsung | Support the intention of the proposal. We would like to suggest the following to separate the possible signaling between *supportedSRS-TxPortSwitch* (until Rel-16) and *supportedSRS-TxPortSwitchBeyond4Rx* (from Rel-17).  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or *supportedSRS-TxPortSwitchBeyond4Rx* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R, ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R): |
| Apple | We are fine with change. Either OPPO CR or Samsung’s TP above can be considered. |
| QC | Support the CR.  supportedSRS-TxPortSwitchBeyond4Rx is an 11-bit bitmap field (where each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8}. The listed combination by Samsung suggest text is not the comprehensive set of all combinations that UE can support. So, we prefer the original CR by OPPO. |
| Samsung | Thank QC for pointing out. As mentioned by QC, since the signaling principle of *supportedSRS-TxPortSwitchBeyond4Rx* is different with *supportedSRS-TxPortSwitch*, OPPO’s TP is also needed to be revised. Having said that, we suggest the following TP. Based on companies’ input, the exact wording could be further revised.  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or *supportedSRS-TxPortSwitchBeyond4Rx* indicating a combination of supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R. |
| vivo | Looks like original CR from OPPO is sufficient |
| Intel | The update version from Samsung looks better.  Just some wording comment on the update version from Samsung. The text “a combination of” could be removed. It could be covered by the following text “supported configuration(s)”. |
| LGE | OK to discuss, and slightly prefer OPPO’s version which is simple solution. |
| NTT DOCOMO | Support the intention. Either OPPO’s CR or Samsung’s suggestion is fine. |
| Ericsson | OK to discuss and prefer Samsung’s version with Intel’s suggested change. Our understanding is that the original CR are missing some configurations which could be supported by the bitmap (e.g., t1r8-t2r8-t4r8). |

#### Round 1

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| **Company** | **Comments (if any)** |
| Mod | The number of proponents supporting OPPO’s CR or Samsung’s suggestion are quite the same. FL’s assessment is aligned with Ericsson that “Samsung’s version with Intel’s suggested change” is more accurate.  Please provide your views of the following Proposal 2.  **Proposal 2**  The TP provided as follows for TS38.214 on antenna switching capability indication for more than 4 Rx antenna is agreed. Final CR in R1-230xxxx.  <omitted text>  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R, ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or *supportedSRS-TxPortSwitchBeyond4Rx* indicating supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R:  - For 1T2R, if the UE is indicating *srs-AntennaSwitching2SP-1Periodic* and/or *srs-ExtensionAperiodicSRS*:  <omitted text> |
| Samsung | Thank FL for capturing the updated proposal with Intel’s suggested change. We support the updated proposed 2. |
| Apple | With this proposed TP, it is wrong since supportedSRS-TxPortSwitch does not contain anything related to 6R, 8R. The TP can be changed to  <omitted text>  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ~~‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R,~~ ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or *supportedSRS-TxPortSwitchBeyond4Rx* indicating supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R  <omitted text> |
| OPPO | We prefer some concise version as it is usually taking a long time for Microsoft word to open the lengthy spec. Moreover, the meaning/mechanism for *supportedSRS-TxPortSwitchBeyond4Rx* has been clearly specified in TS 38.306 and we don’t duplicate the information in TS 38.214  In order to address the concern that the original CR misses some combinations, the following modification “or more” is added  <omitted text>  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one or more of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* or *supportedSRS-TxPortSwitchBeyond4Rx* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R, ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R):  - For 1T2R, if the UE is indicating *srs-AntennaSwitching2SP-1Periodic* and/or *srs-ExtensionAperiodicSRS*:  <omitted text>  Even the group finally select Samsung’s version, some further modifications are still needed on top of Apple’s suggestion as the current version is conflicting with itself. For the grammatical perspective, the red part is equivalent to the following:  or the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitchBeyond4Rx* indicating supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R  The first highlight part indicates “only one configuration”, but the second highlight part indicates one or more configurations.  Thus, some modification is needed to avoid the above confliction. Moreover, two aspects need to be considered:   * the duplicated information from 38.306 doesn’t need and should be removed. * The style should keep the same for supportedSRS-TxPortSwitch and supportedSRS-TxPortSwitchBeyond4Rx   Based on the above-mentioned three points, the following modifications are suggested as below:  <omitted text>  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ~~‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R,~~ ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or the UE may be configured with one or more of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitchBeyond4Rx* ~~indicating supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where~~ (‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R)  <omitted text> |
| Samsung | Thank Apple for catching. We only focused on the red text and missed the black text.  Regarding OPPO’s comment on “only one”, our understanding is that the wording “only one” is for configuration, not for UE capability reporting. Based on current specification, a UE is configured with “only one” SRS antenna switching configuration, although the UE can report “more than one” possible antenna switching configurations. Hence, adding “or more” is not needed.  Regarding removed part “indicating ~ where” from OPPO’s suggestion, we prefer to keep our original proposed wording, but let’s see companies’ opinions. |
| OPPO2 | Samsung’s comment for “only one” is right. Thus, the modification based on Apple’s version is updated. Accordingly, the same change of “or more” is not needed in our original CR.  @Samsung: Would you like to elaborate a bit more what’s the issue of the original CR? What information is missed?  @Ericsson: It is clearly specified in TS 38.306 that the configurations (e.g., t1r8-t2r8-t4r8) can be reported. Thus, no need to repeat the same information in TS 38.214. Otherwise, the only output is more complicated description and a lengthy paragraph, but without any additional information/benefit.  <omitted text>  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ~~‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R,~~ ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitchBeyond4Rx* ~~indicating supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where~~ (‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R)  <omitted text> |
| Samsung | Regarding OPPO’s question, we would like to share our view on the original CR.   * Based on the original CR, there could be some misunderstandings due to the difference of signaling principle of two UE capabilities. * For example, by *supportedSRS-TxPortSwitchBeyond4Rx*, there is no exact candidate of ‘t1r1-t1r2-t2r2-t1r4-t2r4’. * Even though if we interpret ‘t1r1-t1r2-t2r2-t1r4-t2r4’ as a combination of supported configuration(s), then based on the current specification, the full set of possible combinations of supported configuration(s) shall be captured which is aligned with the case of *supportedSRS-TxPortSwitch*, otherwise, it seems only some part of combinations could be reported by UE capability despite of bitmap structure. |
| Intel | Thanks for the discussion.  We are fine with the version from OPPO2. The update version from Apple is also fine. |
| LGE | It seems Apple’s comment is valid.  We are also fine with either of the version from Apple or the version from OPPO2 |
| OPPO | @Samsung Please see the reply below   * For example, by *supportedSRS-TxPortSwitchBeyond4Rx*, there is no exact candidate of ‘t1r1-t1r2-t2r2-t1r4-t2r4’.   OPPO: It is clear there is no such candidate based on TS 38.306. Where does this potential misunderstanding come from?  Even though if we interpret ‘t1r1-t1r2-t2r2-t1r4-t2r4’ as a combination of supported configuration(s), then based on the current specification, the full set of possible combinations of supported configuration(s) shall be captured which is aligned with the case of *supportedSRS-TxPortSwitch*, otherwise, it seems only some part of combinations could be reported by UE capability despite of bitmap structure.  OPPO: The possible combinations have been captured in TR 38.306. What’s the additional value/benefit to repeat the same information here? |
| Samsung | @OPPO: please see the reply below. BTW, actually we are fine with updated version from OPPO2 or updated version from Apple as Intel and LGE.  OPPO: It is clear there is no such candidate based on TS 38.306. Where does this potential misunderstanding come from?  [Samsung] If it is clear there is no such candidate, then it is also clear that your original CR may have potential misunderstanding.  OPPO: The possible combinations have been captured in TR 38.306. What’s the additional value/benefit to repeat the same information here?  [Samsung] There are some repeated statements in RAN1/RAN2 spec. We believe that we cannot make the spec without any overlap and repeat. Even for *supportedSRS-TxPortSwitch*, exact candidates are already captured in TS38.306, but they are also repeated in TS38.214. Our intention is that since all candidates from *supportedSRS-TxPortSwitch* is captured in the spec, for the consistency, we shall capture all candidates from *supportedSRS-TxPortSwitchBeyond4Rx* as well. |
| Mod | Thank you all for the great inputs so far.  Given that almost all companies can be fine with either the version from Apple or the version form OPPO2, let’s switch to email thread and take OPPO2’s version (which is on top of Apple’s version) as way forward.  <omitted text>  **6.2.1.2 UE sounding procedure for DL CSI acquisition**  When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set as ‘antennaSwitching’, the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitch* (‘t1r2’ for 1T2R, ‘t1r1-t1r2’ for 1T=1R/1T2R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ~~‘t1r6’ for 1T6R, ‘t1r8’ for 1T8R, ‘t2r6’ for 2T6R, ‘t2r8’ for 2T8R, ‘t4r8’ for 4T8R,~~ ‘t1r1-t1r2-t1r4’ for 1T=1R/1T2R/1T4R, ‘t1r4-t2r4’ for 1T4R/2T4R, ‘t1r1-t1r2-t2r2-t2r4’ for 1T=1R/1T2R/2T=2R/2T4R, ‘t1r1-t1r2-t2r2-t1r4-t2r4’ for 1T=1R/1T2R/2T=2R/1T4R/2T4R, ‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r1-t2r2’ for 1T=1R/2T=2R, ‘t4r4’ for 4T=4R, or ‘t1r1-t2r2-t4r4’ for 1T=1R/2T=2R/4T=4R) or the UE may be configured with only one of the following configurations depending on the indicated UE capability *supportedSRS-TxPortSwitchBeyond4Rx* ~~indicating supported configuration(s) by 11-bit bitmap and each bit corresponds to {t1r1, t2r2, t1r2, t4r4, t2r4, t1r4, t2r6, t1r6, t4r8, t2r8, t1r8} where~~ (‘t1r1’ for 1T=1R, ‘t2r2’ for 2T=2R, ‘t1r2’ for 1T2R, ‘t4r4’ for 4T=4R, ‘t2r4’ for 2T4R, ‘t1r4’ for 1T4R, ‘t2r6’ for 2T6R, ‘t1r6’ for 1T6R, ‘t4r8’ for 4T8R, ‘t2r8’ for 2T8R, ‘t1r8’ for 1T8R)  <omitted text> |

## Conclusion

TBD

# References

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | R1-2302425 | Draft CR on UE capability name alignment of AP SRS without data and without CSI in TS 38.214 | ZTE |
| 2 | R1-2302531 | Correction on the antenna switching capability indication for more than 4 Rx | OPPO |
| 3 | R1-2303004 | Correction of aperiodic SRS triggering without data and CSI | Nokia, Nokia Shanghai Bell |