**3GPP TSG RAN WG1 #117R1-24XXXX\_c**

**Fukuoka City, Fukuoka, Japan, May 20th – 24th, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.211** | **CR** | **DRAFT** | **rev** |  | **Current version:** | **18.2.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Correction of parameter names for SRS with with tx hopping | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Moderator (Ericsson), [Huawei/HiSilicon, Ericsson] | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos\_enh2-Core | | | | |  | | ***Date:*** | | 2024-05-04 |
|  |  | | | |  | | |  | |  |
| ***Category:*** | **F** |  | | | | | | ***Release:*** | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Correction of the parameter names for SRS with Tx hopping | | | | | | | | |
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| ***Summary of change:*** | | The parameter names for *numberOfHops、overlapValue* for SRS with tx hopping where not aligned with RAN2. Placeholder parameter name for the reference points used by SRS with tx hopping for frequency allocation have also been replaced with the proper parameter names. | | | | | | | | |
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| ***Consequences if not approved:*** | | Misaligned RAN2 and RAN1 specification for SRS with tx hopping | | | | | | | | |
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| ***Clauses affected:*** | | 6.4.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | |  | | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | TS/TR ... CR ... | | | |
| ***affected:*** | |  | **x** | Test specifications | | | TS/TR ... CR ... | | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | TS/TR ... CR ... | | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |

6.4.1.4 Sounding reference signal

6.4.1.4.1 SRS resource

An SRS resource is configured by the *SRS-Resource* IE or the *SRS-PosResource* IE and consists of

- antenna ports , where the number of antenna ports is given by the higher layer parameter *nrofSRS-Ports* or *nrofSRS-Ports-n8* if configured, otherwise , and when the SRS resource is in a SRS resource set with higher-layer parameter *usage* in *SRS-ResourceSet* not set to 'nonCodebook', or determined according to [6, TS 38.214] when the SRS resource is in a SRS resource set with higher-layer parameter *usage* in *SRS-ResourceSet* set to 'nonCodebook'.

- , the number of hops for SRS Tx hopping for an SRS resource configured by *SRS-PosResource* given by the higher layer parameter *numberOfHops*if configured, otherwise .

- consecutive OFDM symbols given by the field *nrofSymbols* contained in the higher layer parameter *resourceMapping*. If ,is the number of consecutive OFDM symbol per hop.

- , the starting position in the time domain given by  where the offset counts symbols backwards from the end of the slot and is given by the field *startPosition* contained in the higher layer parameter *resourceMapping* and . If is the starting position of each hop in the time domain, determined by the field *startPosition* for each SRS transmission hop.

- , the frequency-domain starting position of the sounding reference signal.

6.4.1.4.2 Sequence generation

The sounding reference signal sequence for an SRS resource, or if *numberOfHops* for *SRS-PosResource* is provided, for a given hop within an SRS resource, shall be generated according to

<--------------------------unchanged text ommited------------------------------>

6.4.1.4.3 Mapping to physical resources

Throughout this clause, when the higher layer parameter *numberOfHops* is provided for *SRS-PosResource*, the sounding reference signal sequence definitions applies to a given hop.

When SRS is transmitted on a given SRS resource, the sequence for each OFDM symbol and for each of the antenna ports of the SRS resource shall be multiplied with the amplitude scaling factor  in order to conform to the transmit power specified in [5, 38.213] and mapped in sequence starting with  to resource elements  in a slot for each of the antenna ports  according to

The length of the sounding reference signal sequence is given by

where is given by a selected row of Table 6.4.1.4.3-1 with  where  is given by the field *b-SRS* contained in the higher-layer parameter *freqHopping* if configured, otherwise . The row of the table is selected according to the index  given by the field *c-SRS* contained in the higher-layer parameter *freqHopping*. The quantity is given by the higher-layer parameter *FreqScalingFactor* if configured, otherwise . When *FreqScalingFactor* is configured, the UE expects the length of the SRS sequence to be a multiple of 6.

The frequency-domain starting position is defined by

where

and

and

- is given by the higher-layer parameter *StartRBIndex* if configured, otherwise ;

- is given by Table 6.4.1.4.3-3 with

if the higher-layer parameter *EnableStartRBHopping* is configured, otherwise .

- is given by the higher-layer parameter *overlapValue* in *TxHoppingConfig*.

- is the hop transmission counter in the time domain, which corresponds to the order of the higher-layer parameter *SlotOffsetForRemainingHops*.

- is the initial hop index.

The quantity is given by

- if the higher-layer parameter *combOffsetHopping* is not configured:

- if the higher-layer parameter *combOffsetHopping* is configured:

where and is the th entry and the cardinality of the set

respectively, where is given by the higher-layer parameter *hoppingSubset* inthe *combOffsetHopping* IE if configured, otherwise . The higher-layer parameter *hoppingSubset* inthe *combOffsetHopping* IE includes a bitmap of bits with non-zero bits, where if the th non-zero bit is the :th bit in the bitmap, then .

The pseudo-random sequence is defined by clause 5.2.1 and shall be initialized with at the beginning of each radio frame for which , where the comb offset hopping identity  is contained in the higher-layer parameter *combOffsetHopping*.

If the higher-layer parameter *hoppingWithRepetition* is set to *Repetition*, , otherwise .

If *numberOfHops* is configured:

- The reference point for is the lowest subcarrier of the configured bandwidth for SRS with Tx hopping configured by the parameter *bwp* in *SRS-PosTx-Hopping*.

otherwise:

- If  the reference point for is subcarrier 0 in common resource block 0, otherwise the reference point is the lowest subcarrier of the BWP.

<--------------------------unchanged text ommited------------------------------>