**3GPP TSG RAN WG1 #118bisR1-2409290**

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

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.214** | **CR** | **DRAFT** | **rev** |  | **Current version:** | **18.4.0** |  |
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| *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:***  | Corrections to TS 38.214 on SRS for positioning with frequency hopping |
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| ***Source to WG:*** | Moderator (Ericsson), [Intel, ZTE, Huawei/HiSilicon, Ericsson] |
| ***Source to TSG:*** | R1 |
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| ***Work item code:*** | NR\_pos\_enh2-Core |  | ***Date:*** | 2024-10-17 |
|  |  |  |  |  |
| ***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 canbe 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)* |
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| ***Reason for change:*** | At the RAN1#116b meeting, the following TP was agreed regarding collision handling for positioning SRS with frequency hopping.

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| **Agreement**The TP 2.5-1d in section 2.5.3 of R1- 2403520 is endorsed for inclusion in 38.214. |

In particular, it was agreed that “***when the reduced capability UE is configured by the higher layer parameter SRS-PosTx-Hopping, including a switching time to and from the active bandwidth part, the UE shall use the same priority rules as defined in Clause 6.2.1***”. The above-quoted text from current version of TS38.214 is incomplete (it does not clarify the context in which priority rules as defined in Clause 6.2.1 should apply for positioning SRS with frequency hopping) and could be misleading in that the “*switching time to and from the active bandwidth part*” is configured to the UE via higher layer parameter *SRS-PosTx-Hopping*.Further, certain collision handling rules when positioning SRS overlaps with other physical channels and signals are missing in the current version of the specifications. The following clauses in TS 38.213 specify the collision handling between SRS and downlink physical channels/signals on semi-statically configured Flexible symbols. * In Clause 11.1, collision handling of SRS with downlink signals/channels on semi-statically configured Flexible symbols.
* In Clause 17.2, collision handling of SRS with DL channels/signals on semi-statically configured Flexible symbols for half-duplex RedCap UEs.

Remove the description “If the SRS symbol(s), including the switching time to and from the active bandwidth part, of the transmit frequency hopping collides with PUSCH or PUCCH, and if the UE determines the SRS to be dropped, the colliding SRS symbol(s) are dropped” and include all the relevant cases of collision handling involving SRS for positioning with frequency hopping in a single sentence.  |
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| ***Summary of change:*** | * Add the context that is currently missing: collision of SRS symbol(s) (including any switching time) with downlink channels/signals semi-statically configured Flexible symbols.
* For Clause 6.2.1.4.1, add reference to missing clauses, including Clause 6.2.1 in TS 38.214 and Clauses 11.1, and 17.2 in TS 38.213 for collision handling when SRS for positioning with frequency hopping overlaps with other physical channels/signals or DL/Flexible symbols configured semi-statically.
* Move the description for collision handling between SRS and PUSCH/PUCCH to the same paragraph
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| ***Consequences if not approved:*** | Collision handling for positioning SRS with frequency hopping with other physical channels/signals is incomplete. |
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| ***Clauses affected:*** | 6.2.1.4.1 |
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|  | **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 ...  |
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| ***Other comments:*** |  |

6.2.1.4.1 SRS frequency hopping for positioning

**<Unchanged parts omitted>**

The reduced capability UE may be configured, via *srs-PosUplinkTransmissionWindowConfig*, subject to UE capability, with an UL time window where the UE is not expected to transmit other signals/channels and is only expected to transmit the SRS for positioning using frequency hopping. The UE is not expected to be configured with a SRS resource for positioning with transmit frequency hopping for which the transmission, which includes all the hops once and the switching time from/to active BWP required ahead of the first hop and after the last hop, is partially overlapped with an UL time window.

For aperiodic positioning SRS with Tx frequency hopping, 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 corresponding to the switching time from the active uplink BWP.

The reduced capability UE is expected to switch back to the active BWP if the time between two consecutive hops exceeds twice the switching time from/to the active BWP.

In RRC\_CONNECTED mode, for a transmission of a hop for an SRS resource for positioning with frequency hopping starting in symbol $N\_{c\_{1}}$ and a colliding PUSCH or PUCCH transmission$ $starting in symbol $N\_{S} $, the UE shall apply the dropping rules taking into account:

- DCI(s) for which the time interval between the last symbol of PDCCH and the SRS symbol $N\_{c\_{1}}$is at least $N\_{2}$ symbols and additional time duration $T\_{SRS\_{h}}$, where $T\_{SRS\_{h}}$ is the switching time to/from the active BWP.

- DCI(s) for which the time interval between the last symbol of PDCCH and the colliding PUSCH/PUCCH symbol $N\_{S} $is at least $N\_{2}$ symbols, where calculation of $N\_{2}$ is based on the smallest SCS between the SCS configured for positioning SRS with the frequency hopping, the SCS of the PUSCH/PUCCH, and the SCS of the PDCCH.

- semi-persistent CSI reports or SRS considered active at least $N\_{2}$ symbols and an additional time duration $T\_{SRS\_{h}}$ before $N\_{c\_{1}}$, and considered active at least $N\_{2}$ symbols before $N\_{S}$.

~~When the reduced capability UE is configured by the higher layer parameter~~ *~~SRS-PosTx-Hopping~~*~~, including a switching time to and from the active bandwidth part, the UE shall use the same priority rules as defined in Clause 6.2.1.~~

When the reduced capability UE is configured by the higher layer parameter *SRS-PosTx-Hopping*, if the SRS symbol(s), including a switching time to and from the active bandwidth part, of the transmit frequency hopping collides with downlink physical channels/signals on flexible symbols configured by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated*,, or with PUSCH or PUCCH,the UE shall use the same priority rules as defined in Clause 6.2.1 in this specification and Clauses 11.1, and 17.2 in [6, TS38.213].

For operation in the same carrier, the reduced capability UE is not expected to be configured on overlapping symbols with an SRS resource of the transmit frequency hopping configured by the higher layer parameter *SRS-PosTx-Hopping* including the switching time to or from the active bandwidth part and an SRS resource with *resourceType* of both SRS resources as 'periodic'.

For operation in the same carrier, the reduced capability UE is not expected to be activated or triggered to transmit SRS on overlapping symbols with a SRS resource of the transmit frequency hopping configured by the higher layer parameter *SRS-PosTx-Hopping* including the switching time to or from the active bandwidth part and a SRS resource with *resourceType* of both SRS resources as 'semi-persistent' or 'aperiodic'.

**<Unchanged parts omitted>**