**3GPP TSG-RAN WG1 Meeting #118**

Maastricht, NL, August 19th – 23rd, 2024

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **3** | **CR** |  | **rev** |  | **Current version:** | **18.3.0** |  |
|  |
| *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 on Multi-Resource SRS Port Power Scaling |
|  |  |
| ***Source to WG:*** | Moderator(Ericsson), Nokia, Google, Samsung |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2024-08-23 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | Whether the UE applies power control on a per-SRS resource basis vs. over the total power of simultaneously transmitted SRS resources is unclear in the specifications when multiple SRS resources are configured for non-codebook based operation. Specifically, it is unclear if “the configured antenna ports for SRS” in 38.213 subclause 7.3 refers to 1) the SRS ports in one SRS resource in an SRS resource set or 2) the SRS ports across multiple SRS resources in an SRS resource set, or 3) the total number of SRS ports in all resources in an OFDM symbol. This leads to uncertainty for the SRS power headroom in the UE and for how to set PUSCH power given measurements of SRS for these non-codebook based PUSCH configurations. |
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| ***Summary of change:*** | Clarify that the UE applies power control on a per-SRS resource basis. |
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| ***Consequences if not approved:*** | Depending on which understanding of SRS power control is used, for non-codebook based operation with simultaneously transmitted SRS resources:* The gNB understanding of SRS power headroom can vary by 6 dB or more (e.g. when there are 4 resources or more in a set), making it difficult for the gNB to know how to configure multiple SRS resources and their power control settings, as well as if the SRS is power limited at a given point in time.
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| ***Clauses affected:*** | 7.3, 7.3.1 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **N** |  Other core specifications  |  |
| ***affected:*** |  | **N** |  Test specifications |  |
| ***(show related CRs)*** |  | **N** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

## 7.3 Sounding reference signals

For SRS,

- if a UE is provided *nrofSRS-Ports-n8* = 'ports8tdm'for an SRS resource with 8 ports in an SRS resource set with usage 'codebook' or 'antennaSwitching', the UE splits a linear value $\hat{P}\_{SRS,b,f,c}(i,q\_{s},l)$ of the transmit power $P\_{SRS,b,f,c}(i,q\_{s},l)$ on active UL BWP $b$ of carrier $f$ of serving cell $c$ equally across the SRS ports of an SRS resource of an SRS resource set on each symbol for SRS transmission.

- else, a UE splits a linear value $\hat{P}\_{SRS,b,f,c}(i,q\_{s},l)$ of the transmit power $P\_{SRS,b,f,c}(i,q\_{s},l)$ on active UL BWP $b$ of carrier $f$ of serving cell $c$ equally across the SRS ports of each SRS resource of an SRS resource set in a symbol for SRS transmission.

### 7.3.1 UE behaviour

If a UE transmits SRS based on a configuration by *SRS-ResourceSet* on active UL BWP $b$ of carrier $f$ of serving cell $c$ using SRS power control adjustment state with index $l$, the UE determines the SRS transmission power $P\_{SRS,b,f,c}(i,q\_{s},l)$ of each SRS resource in SRS transmission occasion $i$ as

 [dBm]

where,

- $P\_{CMAX,f,c}(i)$ is the UE configured maximum output power defined in [8, TS 38.101-1], [8-2, TS 38.101-2], [TS 38.101-3] and [8-5, TS 38.101-5] for carrier $f$ of serving cell $c$ in SRS transmission occasion $i$