**3GPP TSG RAN WG1 #114** **R1-230xxxx**

**Toulouse, France, August 21st – 25th, 2023**

**Agenda item:** 9.17

**Source:** Samsung

**Title:** Summary of email discussions [114-R18-38.213-NR\_pos\_enh2]

**Document for:** Discussion and decision

# Introduction

The purpose of this document is to collect inputs/comments on the draft CR for TS 38.213 [draftCR\_38213 Positioning](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_pos_enh2/R1-230xxxx%20draftCR_38213%20Positioning.docx) on the introduction of expanded and improved NR positioning. If a comment on a particular aspect has been made by another company, please do not repeat it until, if needed, after a response.

The first checkpoint is on September 5, UTC 13:00.

# First Round Discussion

Please provide your comments on the draft CR for TS 38.213 [draftCR\_38213 Positioning](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_pos_enh2/R1-230xxxx%20draftCR_38213%20Positioning.docx).

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| Company | Comments |
| OPPO | 1. Following changes are proposed according to the agreement.* if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS; else, if the resource pool is dedicated for SL PRS transmissions, the priority level is the priority level for SL PRS.

 AgreementFor a slot, a single priority value is provided by higher layers to the physical layer and is used at least to determine the PSSCH and/or SL-PRS transmission power via the value of $P\_{MAX,CBR}$.* For dedicated resource pool, this corresponds to the priority level of SL PRS.
* Send an LS to RAN2 requesting them to take the above into consideration when defining priority levels for SL PRS and PSSCH that are multiplexed in the same slot of a shared resource pool.
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| Huawei, HiSilicon | **Comment 1:**On the following change in 16.2.3A* if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS and is the priority level for SL PRS

we prefer to remove “and it the priority level for SL PRS”. It should be a common one provided by higher layers, which is applicable for both PSCCH and SL-PRS power control when determining the CBR.In addition, we prefer to add another bullet for dedicated resource pool.So it could read as* if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS
* if the resource pool is dedicated for SL PRS transmission, the priority level is for SL PRS.

**Comment 2:**On the changes in 16.2.2, we prefer to change the description similar to the procedure of PSCCH as communication so that they appear as two branches for determining the PSCCH transmission power for communication/shared RP and dedicated RP, respectively.For example:A UE determines a power $P\_{PSCCH}(i)$ for a PSCCH transmission on a resource pool dedicated for SL PRS transmissions, the same as a power of SL PRS transmission by the UE in the slot. The UE determines the power as described in Clause 16.2.3A. **Comment 3:**We prefer to capture the following agreement with regards to PSCCH transmission in dedicated resource pool in e.g. a new clause of 16.4A.AgreementFor dedicated resource pool, with regards to the SL-PRS configuration and/or SL-PRS time assignment information, support Alt. 3.1, i.e.* support a one-to-one mapping relationship between a PSCCH resource and an associated SL-PRS resource in the same slot.
	+ Note: In this case, there is no need of an explicit signaling of which SL PRS resource for the same slot
	+ Note: Same number of PSCCH resource(s) and SL-PRS resource(s)

For example16.4A UE procedure for transmitting PSCCH in dedicated resource poolFor SL PRS transmission in the dedicated resource pool, a UE can be provided a number of symbols in a resource pool, by *sl-TimeResourcePSCCH*, starting from a second symbol that is available for SL transmissions in a slot, a number of PRBs in the resource pool, by *sl-FreqResourcePSCCH*, for a PSCCH transmission with a SCI format 1-B.A UE that transmits a PSCCH with SCI format 1-B using SL PRS resource allocation scheme 2 [6, TS 38.214] sets - "Resource reservation period" as an index in *sl-ResourceReservePeriodList* corresponding to a reservation period provided by higher layers [11, TS 38.321], if the UE is provided *sl-MultiReserveResource*- the values of the time resource assignment field and SL PRS resource indication field as described in [6, TS 38.214] to indicate $N$ resources from a set $\left\{R\_{y}\right\}$ of resources selected by higher layers as described in [11, TS 38.321] with $N$ smallest slot indices $y\_{i}$ for $0\leq i\leq N-1$ such that $y\_{0}<y\_{1}<…<y\_{N-1}\leq y\_{0}+31$, where:- $N=min\left(N\_{selected}, N\_{max\\_reserve}\right)$, where $N\_{selected}$ is a number of resources in the set $\left\{R\_{y}\right\}$ with slot indices $y\_{j}$, $0\leq j\leq N\_{selected}-1$, such that $y\_{0}<y\_{1}<…<y\_{N\_{selected}-1}\leq y\_{0}+31$, and $N\_{max\\_reserve}$ is provided by *sl-MaxNumPerReserve*- each resource, from the set of $\left\{R\_{y}\right\}$ resources, corresponds to a SL PRS resource and a slot in a set of slots $\{t'\_{y}^{SL}\}$- $\left(t'\_{0}^{SL},t'\_{1}^{SL},t'\_{2}^{SL},...\right)$ is a set of slots in a sidelink resource pool [6, TS 38.214]- $y\_{0}$ is an index of a slot where the PSCCH with SCI format 1-B is transmitted.A UE that transmits a PSCCH with SCI format 1-B using SL PRS resource allocation scheme 1 [6, TS 38.214] sets- the values of the SL PRS resource indication field and the time resource assignment field for the SCI format 1-B transmitted in the $m$-th resource for SL PRS transmission provided by a dynamic grant or by a SL configured grant, where $m= \left\{1,…,M\right\}$ and M is the total number of resources for SL PRS transmission provided by a dynamic grant or the number of resources for SL PRS transmission in a period provided by a SL configured grant type 1 or SL configured grant type 2, as follows:- the SL PRS resource indication field and time resource assignment field indicate the $m$-th to $M$-th resources as described in [6, TS 38.214].For decoding of a SCI format 1-B, a UE may assume that a number of bits provided by *sl*-*NumReservedBits* can have any value as described in [4, TS 38.212].  |
| Intel | * **Comment #1**: for the following text, we suggest to update this to follow the RAN1 agreement quoted below. Further, since PSSCH Tx power should follow priority of PSSCH based on legacy design, this means that the same priority level for PSSCH and SL PRS should be the one for PSSCH.

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| AgreementFor a slot, a single priority value is provided by higher layers to the physical layer and is used at least to determine the PSSCH and/or SL-PRS transmission power via the value of $P\_{MAX,CBR}$.* For dedicated resource pool, this corresponds to the priority level of SL PRS.
* Send an LS to RAN2 requesting them to take the above into consideration when defining priority levels for SL PRS and PSSCH that are multiplexed in the same slot of a shared resource pool.
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Suggesting changing from the following:

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| * if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS and is the priority level for SL PRS
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to:

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| * if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS and is the priority level for PSSCH;
* else, if the resource pool is dedicated for SL PRS transmissions, the priority level is for SL PRS
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* **Comment #2**: for the following text, we suggest to update this as “$α\_{D}$ is provided by *dl-Alpha-SLPRS* and, if provided and $α\_{D}=1$ if *dl-Alpha-SLPRS* is not provided”.

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| * if the resource pool is common for PSSCH and SL PRS transmissions, $α\_{D}$ is a value of *dl-Alpha-PSSCH-PSCCH*, if provided and $α\_{D}=1$ if *dl-Alpha-PSSCH-PSCCH* is not provided; else, if the resource pool is dedicated for SL PRS transmissions, $α\_{D}$ is provided by *dl-Alpha-SLPRS*
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* **Comment #3**: at least for dedicated resource pool, UE procedure for transmitting PSCCH should be captured in 213, e.g., in Clause 16.4. For example, at least capturing the following:

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| AgreementFor PSCCH configuration in a dedicated resource pool,* (pre-)configure the number of PRBs of a PSCCH in the resource pool:
	+ Alt. 1: One parameter for all PSCCHs
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However, our understanding is that the association between PSCCH and SL PRS in the dedicated resource pool should be captured in 214 instead of 213.  |
| ZTE | * if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS and is the priority level for SL PRS

Comment 1: For the above sentence, it is unreadable. Here is our suggestion:* if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS; else, if the resource pool is dedicated for SL PRS transmissions, the priority level is only for SL PRS

Comment 2: As Huawei and Intel commented, UE procedure for transmitting PSCCH for dedicated resource pool, i.e. SCI format 1B should be specified in 38.213. On top of Huawei’s version, here is our suggestion:16.4A UE procedure for transmitting PSCCH in dedicated resource poolFor SL PRS transmission in the dedicated resource pool, a UE can be provided a number of symbols in a resource pool, by *sl-TimeResourcePSCCH*, starting from a second symbol that is available for SL transmissions in a slot, a number of PRBs in the resource pool, by *sl-FreqResourcePSCCH*, for a PSCCH transmission with a SCI format 1-B.A UE that transmits a PSCCH with SCI format 1-B using SL PRS resource allocation scheme 2 [6, TS 38.214] sets - "Resource reservation period" as an index in *sl-ResourceReservePeriodList* corresponding to a reservation period provided by higher layers [11, TS 38.321], if the UE is provided *sl-MultiReserveResource*- the values of the time resource assignment field and SL PRS resource indication field as described in [6, TS 38.214] to indicate $N$ resources from a set $\left\{R\_{y}\right\}$ of resources selected by higher layers as described in [11, TS 38.321] with $N$ smallest slot indices $y\_{i}$ for $0\leq i\leq N-1$ such that $y\_{0}<y\_{1}<…<y\_{N-1}\leq y\_{0}+31$, where:- $N=min\left(N\_{selected}, N\_{max\\_reserve}\right)$, where $N\_{selected}$ is a number of resources in the set $\left\{R\_{y}\right\}$ with slot indices $y\_{j}$, $0\leq j\leq N\_{selected}-1$, such that $y\_{0}<y\_{1}<…<y\_{N\_{selected}-1}\leq y\_{0}+31$, and $N\_{max\\_reserve}$ is provided by *sl-MaxNumPerReserve*- each resource, from the set of $\left\{R\_{y}\right\}$ resources, corresponds to a SL PRS resource and the and the corresponding PSCCH,and a slot in a set of slots $\{t'\_{y}^{SL}\}$- $\left(t'\_{0}^{SL},t'\_{1}^{SL},t'\_{2}^{SL},...\right)$ is a set of slots in a sidelink resource pool [6, TS 38.214]- $y\_{0}$ is an index of a slot where the PSCCH with SCI format 1-B is transmitted.A UE that transmits a PSCCH with SCI format 1-B using SL PRS resource allocation scheme 1 [6, TS 38.214] sets- the values of the SL PRS resource indication field and the time resource assignment field for the SCI format 1-B transmitted in the $m$-th resource for SL PRS and the corresponding PSCCH transmission provided by a dynamic grant or by a SL configured grant, where $m= \left\{1,…,M\right\}$ and M is the total number of resources for SL PRS and the corresponding PSCCH transmission provided by a dynamic grant or the number of resources for SL PRS transmission in a period provided by a SL configured grant type 1 or SL configured grant type 2, as follows:- the SL PRS resource indication field and time resource assignment field indicate the $m$-th to $M$-th resources as described in [6, TS 38.214].For decoding of a SCI format 1-B, a UE may assume that a number of bits provided by *sl*-*NumReservedBits* can have any value as described in [4, TS 38.212].  |
| vivo | These two yellow parts are contradictory. The two different behaviors are RRC inactive UE behaviors, the first one is for Rel-17 RRC inactive UE behavior, the second one is for Rel-18 RRC inactive UE behavior when SRS-PosRRC-InactiveConfig-ValidityArea is configured. So, we prefer to add “and not configured in *SRS-PosRRC-InactiveConfig-ValidityArea*” after “If the UE is in the RRC\_INACTIVE state” as following

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|  If the UE is in the RRC\_CONNECTED state and determines that the UE is not able to accurately measure $PL\_{b,f,c}\left(q\_{d}\right)$, or the UE is not provided with *pathlossReferenceRS-Pos*, the UE calculates $PL\_{b,f,c}\left(q\_{d}\right)$ using a RS resource obtained from the SS/PBCH block of the serving cell that the UE uses to obtain *MIB*. If the UE is in the RRC\_INACTIVE state, and not configured in *SRS-PosRRC-InactiveConfig-ValidityArea* and determines that the UE is not able to accurately measure $PL\_{b,f,c}\left(q\_{d}\right)$, the UE does not transmit SRS for the SRS resource set. The UE may indicate a capability for a number of pathloss estimates that the UE can simultaneously maintain for all SRS resource sets provided by *SRS-PosResourceSet* in addition to the up to four pathloss estimates that the UE maintains per serving cell for PUSCH/PUCCH transmissions and for SRS transmissions configured by *SRS-Resource*.\*\* Unchanged parts are omitted \*\*\*If a UE transmits SRS based on a configuration by *SRS-PosResourceSet* in *SRS-PosRRC-InactiveConfig-ValidityArea* in RRC\_INACTIVE state [12, TS 38.331], the active UL BWP *b* refers to the BWP provided by *bwp* in *SRS-PosRRC-InactiveConfig-ValidityArea*. If the UE is not provided *pathlossReferenceRS-Pos* in *SRS-PosResourceSet*, or if the UE is provided *pathlossReferenceRS-Pos* in *SRS-PosResourceSet* and the UE cannot accurately measure a pathloss, the UE calculates $PL\_{b,f,c}(q\_{d})$ using an RS resource from an SS/PBCH block with same index as the one the UE used to obtain *MIB*; otherwise, the UE uses the RS indicated by *pathlossReferenceRS-Pos* to calculate $PL\_{b,f,c}(q\_{d})$.\*\*\* Unchanged parts are omitted \*\*\* |

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| Samsung | On the following change in 16.2.3A* if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is same for PSSCH and SL PRS and is the priority level for SL PRS

Comment: There are many comments on this part. We share the view to have the separate bullets for shared and dedicated resource pools. Also, we need to make clear this is provided by higher layers (based on RAN1#114 agreement below, cyan marked). Otherwise, it is not clear how to decide the priority values when the priority of PSSCH and SL PRS is different (Check RAN2#123 agreement below). RAN2 will further decide how to defining the priority values for this case. Therefore, our suggested wording is* if the resource pool is common for PSSCH and SL PRS transmissions, the priority level is provided by higher layers which is the same for PSSCH and SL PRS; else if the resource pool is dedicated for SL PRS transmission, ~~and is~~ the priority level is provided by higher layers for SL PRS

Agreement (RAN1#114)For a slot, a single priority value is provided by higher layers to the physical layer and is used at least to determine the PSSCH and/or SL-PRS transmission power via the value of $P\_{MAX,CBR}$.* For dedicated resource pool, this corresponds to the priority level of SL PRS.
* Send an LS to RAN2 requesting them to take the above into consideration when defining priority levels for SL PRS and PSSCH that are multiplexed in the same slot of a shared resource pool.

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| Agreements (RAN2#123):Define 8 priority levels for SL-PRS priority, same as the number of priority levels for SL-SCH. Send a LS to RAN1 and SA2 on RAN2 agreement with the understanding that the SL-PRS priority levels are mapped from sidelink positioning/ranging QoS. (14/14)The SL-PRS priority can be provided by the UE’s own high layer when it triggers the SL-PRS transmission. (14/14) The following issues are open and can be raised in the LS for RAN1 input: Whether the UE’s higher layer can provide SL-PRS priority for the SL-PRS triggered by peer UE Whether the peer UE triggers the SL-PRS transmission can provide the SL-PRS priority |

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| xiaomi | **Comment 1**Agree with other companies’ proposal that the spec only needs to capture that the priority value of PSSCH and SL PRS are configured by higher layer to be same in a shared resource pool; and there should be a separate description for dedicated resource pool.**Comment 2**In section 16.2.2, the we propose to do the following modification to make the description clearer.

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| In a resource pool dedicated for SL PRS transmissions, a power of PSCCH transmission by the UE in a slot is same as a power of the associated SL PRS transmission by the same UE in the same slot. The UE determines the power as described in Clause 16.2.3A.  |

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| LGE | **Comment 1:**We’re fine with new section 16.4A suggest by Huawei. But we suggest to clearly capture the following agreements in addition to Huawei’s suggestion.AgreementFor dedicated resource pool, with regards to the SL-PRS configuration and/or SL-PRS time assignment information, support Alt. 3.1, i.e.* support a one-to-one mapping relationship between a PSCCH resource and an associated SL-PRS resource in the same slot.
	+ Note: In this case, there is no need of an explicit signaling of which SL PRS resource for the same slot
	+ Note: Same number of PSCCH resource(s) and SL-PRS resource(s)

AgreementFor the PSCCH configuration in a dedicated resource pool,* A PSCCH is mapped in a single subchannel similar to shared resource pool and:
	+ the resource pool is (pre-)configured with the size of a subchannel in PRBs and the number of subchannels, and follow the legacy PSCCH mapping to resources of NR SL.
		- FFS: whether to add additional values for the subchannel (pre-)configuration
	+ the PSCCH in the ith subchannel is associated with the ith SL-PRS resource ID
	+ Note: if the number of subchannels is larger than the (pre-)configured number of SL PRS resources, then subchannels with index larger than or equal to the (pre-)configured number of SL PRS resources are not mapped to any resource

16.4A UE procedure for transmitting PSCCH in dedicated resource poolFor SL PRS transmission in the dedicated resource pool, a UE can be provided a number of symbols in a resource pool, by *sl-TimeResourcePSCCH*, starting from a second symbol that is available for SL transmissions in a slot, a number of PRBs in the resource pool, by *sl-FreqResourcePSCCH*, for a PSCCH transmission with a SCI format 1-B. PSCCH resource associated with SL PRS transmission is one-to-one mapped to the corresponding SL PRS resource. PSCCH in the ith subchannel is associated with the ith SL-PRS resource ID. |