3GPP TSG RAN WG1 #118 R1-2407191

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

**Source: Moderator (OPPO)**

**Title: Summary #3 on Rel-19 asymmetric DL sTRP/UL mTRP**

**Agenda Item: 9.2.4**

**Document for: Discussion and Decision**

# Introduction

This document summarizes remaining issues proposed in company contributions of AI 9.2.4 for the following objective in Rel-19 WI of NR MIMO Phase 5:

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| 1. Specify enhancement for asymmetric DL sTRP/UL mTRP deployment scenarios, assuming intra-band intra-DU non-co-located mTRP scenarios, without changing existing cell definition or defining a new cell (e.g. UL-only cell), assuming the Rel-17/18 unified TCI framework and fully reusing the legacy QCL/UL spatial relation rules, targeting FR1 and FR2
	1. Two closed-loop PC adjustment states for SRS, both separate from PUSCH; and pathloss offset configurations for pathloss calculation to UL TRP(s), when the pathloss RS is from DL sTRP.
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# Issue for Discussions

**Proposal 2.1**: Support DCI format 1\_1 to indicate TPC command for SRS CLPC adjustment state(s) separate from PUSCH:

* Introduce a 1-bit SRS CLPC indicator to indicate one of the separate SRS CLPC adjustment states, and a 2-bit TPC command indicator to indicate TPC command for one of the separate SRS CLPC adjustment states where:
	+ The 2-bit TPC command indicator are present for scheduled CC/BWP if UE reports supporting a UE capability, and a corresponding RRC parameter is configured.
	+ The 1-bit SRS CLPC indicator is present for the scheduled CC/BWP if the 2-bit TPC command indicator is present and two separate SRS CLPC adjustment states are configured

Table 2-2: Company input for Issues 2.x

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| --- | --- |
| **Company**  | **Comments** |
| Mod00 | Please share your views/inputs on the issues 2.x |
| ZTE | **Proposal 2.1:** Support the updated version for progress. |
| Samsung | **Proposal 2.1**: Actually our comment was that we need to introduce different condition for two new fields. * For 1-bit SRS CLPC indicator, we think that it is based on the case when RRC parameter supporting two separate SRS CLPC adjustment states is configured.
* For 2-bit SRS TPC command indicator, we think that it is based on separate parameters (e.g., UE capability and/or RRC parameter) from the parameters for 1-bit SRS CLPC indicator above.

So, 2-bit SRS TPC command indicator can be used for the case when a UE has a single SRS CLPC separate from PUSCH, especially for SRS antenna switching.Hence, we would like to suggest one more time as we mentioned in the previous round.**(Updated) Proposal 2.1**: Support DCI format 1\_1 to indicate TPC command for SRS CLPC adjustment state(s)separate from PUSCH:* Introduce a 1-bit SRS CLPC indicator to indicate one of the separate SRS CLPC adjustment states, and a 2-bit TPC command indicator to indicate TPC command for one of the separate SRS CLPC adjustment states, where
	+ 1-bit SRS CLPC indicator is present for scheduled CC/BWP where two separate SRS CLPC adjustment states are configured.
	+ 2-bit TPC command indicator is present for scheduled CC/BWP if the UE reports a separate UE capability (independent from UE capability of supporting rel-19 two separate SRS CLPC adjustment states) and the corresponding RRC parameter (which is different with an RRC parameter for two separate SRS CLPC adjustment states) is configured.
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| Spreadtrum | **Proposal 2.1**: Not support. It would change the original intention since Rel-15 where only DCI 2\_3 can indicate TPC command for SRS. We have not seen strong motivation to do the enhancement specially for asymmetric DL/UL scenario in Rel-19. We have agreed to the enhancement on DCI 2\_3 and introduce PL offset, which are enough for asymmetric DL/UL scenario. |
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| Lenovo | **Proposal 2.1**: Not support. Support only DCI 2\_3 to indicate TPC command for SRS as explained in the first-round discussion. |
| Docomo | **Proposal 2.1:** Support the updated version |
| Tejas | **Proposal 2.2:** Support. Our preference is Alt 1 that provisions the extension to be applicable to any rel-19 UE, including UL mTRP UE. |
| ETRI | **Proposal 2.1** Support.  |
|  |  |
| CATT | **Proposal 2.1:** Not support. Same comment as in round1. |
| Nokia | **Proposal 2.1** we support |
| QC | **Proposal 2.1**(Mod: I think this is a typo, QC meant to say 2.1):Not support. As we commented in round 1, we don’t see strong motivation to introduce additional solution given DCI 2\_3 is already supported. In addition, DCI 1\_1 is used for PDSCH scheduling which is used more frequent than SRS power control, introducing 3 bits could lead to high burden for DCI 1\_1 and degrade the performance of DCI 1\_1. |
| Ericsson | **Proposal 2.1**We support the proposal and the updated proposal by Samsung. DCI 1\_1 is well established and used in real networks, compared to the UE common DCI 2\_3 which is less used in real networks. As explained earlier, CLPC for separate SRS using only the dedicated DCI, e.g. DCI 1\_1, will significantly reduce the increased PDCCH blocking probability and scheduling latency due to NW needs to schedule both DCI 1\_1 and DCI 2\_3. We’ve showed in our contribution simulation result on PDCCH blocking probability impact comparing using DCI 1\_1 or DCI 2\_3 for CLPC. We also showed PDCCH performance impact with respect to DCI sizes to address concerns on increasing the size of DCI 1\_1 raise by some of the companies from last meeting. It is also a big advantage that only using DCI 1\_1 will reduce the network and UE implementation complexity, and improve the over all system performance.  |
| CMCC | **Proposal 2.1:** Support.  |
| China Telecom | **Proposal 2.1:** Support. Introduce DCI 1\_1 to indicate the TPC command for SRS CLPC can be an essential complementary for UEs who doesn’t want to support DCI 2\_3 but want to support the asymmetric DL sTRP/UL mTRP deployment, which will expand the deployment in pratical network. |
| Samsung | **Proposal 2.1:** Thanks FL for good wording suggestion. We are fine with the latest updated Proposal 2.1 in principle. Some minor wording update is additionally suggested with the following reasons.It seems that the 1st bullet “This is subject to UE capability” can be removed since it is already reflected in 1st sub-bullet in the 2nd bullet.Also, based on the updated proposal, it is possible to have two cases as follows:* 2-bit SRS TPC command field
* 2-bit SRS TPC command field + 1-bit SRS CLPC indicator

1st case above is corresponding to a single SRS CLPC separate from PUSCH and 2nd case is corresponding to two SRS CLPC separate from PUSCH. To include 1st case, we would like to put bracket as follows:**Proposal 2.1**: Support DCI format 1\_1 to indicate TPC command for SRS CLPC adjustment state(s) separate from PUSCH:* ~~This is subject to UE capability~~
* Introduce a 1-bit SRS CLPC indicator to indicate one of the separate SRS CLPC adjustment states, and a 2-bit TPC command indicator to indicate TPC command for one of the separate SRS CLPC adjustment states where:
	+ The 2-bit TPC command indicator are present for scheduled CC/BWP if UE reports supporting a UE capability, and a corresponding RRC parameter is configured.
	+ The 1-bit SRS CLPC indicator is present for the scheduled CC/BWP if the 2-bit TPC command indicator is present and two separate SRS CLPC adjustment states are configured
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| Mod | For proposal 2.1: from the round-2 discussion, Spreadtrum/Lenovo/CATT/QC have concern on it and their argument is: there is no motivation to support that in addition to DCI format 2\_3 for asymmetric DL sTRP/UL mTRP scenarios , and extra bits in DCI 1\_1 might degrade the performance of DCI 1\_1. |

# Proposal for Online Discussion

# Contributions in RAN1#118

1. R1-2405873 Enhancements for asymmetric DL sTRP/UL mTRP scenarios Huawei, HiSilicon
2. R1-2405878 On Rel-19 Asymmetric mTRP Operation InterDigital, Inc.
3. R1-2405890 Enhancement for asymmetric DL sTRP/UL mTRP scenarios MediaTek Inc.
4. R1-2405906 Enhancements for asymmetric DL sTRP/UL mTRP scenarios Spreadtrum Communications
5. R1-2405937 Enhancement for asymmetric DL sTRP/UL mTRP scenarios Tejas Networks Limited
6. R1-2405983 Discussion on enhancement for asymmetric DL sTRP/UL mTRP scenarios CMCC
7. R1-2406026 Enhancements for asymmetric DL/UL scenarios Intel Corporation
8. R1-2406031 Discussion on enhancements for asymmetric DL sTRP/UL mTRP scenarios ZTE Corporation, Sanechips, China Telecom
9. R1-2406086 Discussion on enhancements for asymmetric DL sTRP/UL mTRP scenarios China Telecom, ZTE
10. R1-2406180 Discussion on asymmetric DL sTRP/UL mTRP scenarios vivo
11. R1-2406263 Enhancements on asymmetric DL sTRP/UL mTRP scenarios OPPO
12. R1-2406265 Discussion on asymmetric DL sTRP/UL mTRP scenarios TCL
13. R1-2406282 Discussion on enhancement for asymmetric DL sTRP/UL mTRP scenarios Xiaomi
14. R1-2406313 Discussion on UL-only mTRP operation Fujitsu
15. R1-2406366 On asymmetric DL sTRP/UL mTRP scenarios CATT
16. R1-2406455 "Enhancement for Asymmetric DL sTRP/UL mTRP Scenarios " Panasonic
17. R1-2406469 Enhancement for asymmetric DL sTRP/UL mTRP scenarios Sony
18. R1-2406524 Enhancement for asymmetric DL sTRP/UL mTRP scenarios Lenovo
19. R1-2406544 Discussion on enhancements for asymmetric DL sTRP and UL mTRP scenarios NEC
20. R1-2406647 Views on Rel-19 asymmetric DL sTRP/UL mTRP scenarios Samsung
21. R1-2406701 Discussion on enhancements for asymmetric DL sTRP/UL mTRP scenarios Transsion Holdings
22. R1-2406724 Discussion on UL enhancement through asymmetric DL and UL ETRI
23. R1-2406748 Enhancement for asymmetric DL sTRP/UL mTRP scenarios Nokia
24. R1-2406803 Enhancement for asymmetric DL sTRP UL mTRP scenarios Ericsson
25. R1-2406834 Enhancements for asymmetric DL sTRP/UL mTRP Apple
26. R1-2406928 Discussion on enhancement for asymmetric DL sTRP/UL mTRP scenarios NTT DOCOMO, INC.
27. R1-2407005 Enhancement for asymmetric DL sTRP/UL mTRP scenarios Sharp
28. R1-2407027 Enhancement for asymmetric DL sTRP and UL mTRP deployment scenarios Qualcomm Incorporated
29. R1-2407112 Discussion on enhancement for asymmetric DL sTRP and UL mTRP scenarios Google
30. R1-2407123 Discussion on asymmetric DL sTRP and UL mTRP ASUSTeK