**3GPP TSG RAN WG1 #101 R1-200xxxx**

**e-Meeting, May 25th – June 5th, 2020**

Source: moderator (vivo)

Title: Feature lead summary on [101-e-NR-eMIMO-ULFPTx-02]

Agenda Item: 7.2.6.4

Document for: Discussion and Decision

1. Introduction

Per guidance from Mr. Chairman, this is to kick-off following email discussion, please provide your views below..

[101-e-NR-eMIMO-ULFPTx-02] TPs for correction on power scaling by 5/29 – Rakesh (vivo)

* TP 1, 2, 8 under Issues 2 of the FL summary
1. Remaining issues
	1. Issue 2 : TPs for correction on power scaling

TP#1

if *ul-FullPowerTransmission* in *PUSCH-Config* is provided and *codebookSubset* in *PUSCH-Config* is set to 'nonCoherent' or 'partialAndNonCoherent', the UE scales $\hat{P}\_{PUSCH,b,f,c}(i,j,q\_{d},l)$ by $s$ where:

- if *ul-FullPowerTransmission* in *PUSCH-Config* is set to *fullpowerMode1*, and each SRS resource in the *SRS-ResourceSet* with *usage* set to 'codebook' has more than one SRS port, $s$ is the ratio of a number of antenna ports with non-zero PUSCH transmission power over the maximum number of SRS ports supported by the UE in one SRS resource

- if *ul-FullPowerTransmission* in *PUSCH-Config* is set to *fullpowerMode2*

- $s=1$ for full power TPMIs reported by the UE [16, TS 38.306], and $s$ is the ratio of a number of antenna ports with non-zero PUSCH transmission power over a number of SRS ports for remaining TPMIs, where the number of SRS ports is associated with a SRS resource indicated by a SRI field in a DCI format scheduling the PUSCH transmission if more than one SRS resource is configured in the *SRS-ResourceSet* with *usage* set to 'codebook', or the number of SRS ports is associated with the SRS resource if only one SRS resource is configured in the *SRS-ResourceSet* with *usage* set to 'codebook',

- if *ul-FullPowerTransmission* in PUSCH-Config is set to *fullpower*, $s=1$

- if a SRS resource with a single port is indicated by a SRI field in a DCI format scheduling the PUSCH transmission when more than one SRS resource is provided in the *SRS-ResourceSet* with *usage* set to 'codebook', or if only one SRS resource with a single port is provided in the *SRS-ResourceSet* with *usage* set to 'codebook', $s=1$

TP#2

if *ul-FullPowerTransmission* in *PUSCH-Config* is set to *fullpowerMode2*

- $s=1$ for full power TPMIs reported by the UE [16, TS 38.306], and $s$ is the ratio of a number of antenna ports with non-zero PUSCH transmission power over a number of SRS ports for remaining TPMIs, where the number of SRS ports is associated with a SRS resource indicated by a SRI field in a DCI format scheduling the PUSCH transmission if more than one SRS resource is configured in the *SRS-ResourceSet* with *usage* set to 'codebook', or the number of SRS ports is associated with the SRS resource if only one SRS resource is configured in the *SRS-ResourceSet* with *usage* set to 'codebook',

- $s=1$, if a SRS resource with a single port is indicated by a SRI field in a DCI format scheduling the PUSCH transmission when more than one SRS resource is provided in the *SRS-ResourceSet* with *usage* set to 'codebook', or if only one SRS resource with a single port is provided in the *SRS-ResourceSet* with *usage* set to 'codebook', ~~and~~

- $s=1$, if the SRS resource with 2 ports is indicated by SRI when *codebookSubset* in *PUSCH-Config* is set to 'partialAndNonCoherent' and one SRS resource with 4 ports and one SRS resource with 2 ports are configured in the *SRS-ResourceSet* with *usage* set to 'codebook', and

- if *ul-FullPowerTransmission* in PUSCH-Config is set to *fullpower*, $s=1$

TP#8

if *ul-FullPowerTransmission* in *PUSCH-Config* is set to *fullpowerMode2*

- $s=1$ for full power TPMIs reported by the UE [16, TS 38.306], and $s$ is the ratio of a number of antenna ports with non-zero PUSCH transmission power over a number of SRS ports for remaining TPMIs, where the number of SRS ports is associated with a SRS resource indicated by a SRI field in a DCI format scheduling the PUSCH transmission if more than one SRS resource is configured in the *SRS-ResourceSet* with *usage* set to 'codebook', or indicated by Type 1 configured grant, or the number of SRS ports is associated with the SRS resource if only one SRS resource is configured in the *SRS-ResourceSet* with *usage* set to 'codebook',

- $s=1$, if a SRS resource with a single port is indicated by a SRI field in a DCI format scheduling the PUSCH transmission when more than one SRS resource is provided in the *SRS-ResourceSet* with *usage* set to 'codebook', or indicated by Type 1 configured grant, or if only one SRS resource with a single port is provided in the *SRS-ResourceSet* with *usage* set to 'codebook', and

- if *ul-FullPowerTransmission* in PUSCH-Config is set to *fullpower*, $s=1$

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| Company | Comment |
| Intel | TP #1The modification is not necessary. For Mode 1, there is no single port operation.TP #2The TP is not necessary. In Mode 2, for antenna virtualization to 2-port, the UE needs to report which 2-port TPMI could support full power transmission so that the gNB knows for which TPMI, power scaling factor of 1 should be applied.TP #8Fine with the proposal |
| Apple | TP #1: Not necessary. But we think this TP is also correct. Just different ways of specifying the same UE behaviour.TP #2: Not needed. Isn’t this TP in conflict with the first sub-bullet in which s = #NZP ports/#ports indicated by SRI TP #8: Fine with the proposal |
| QC | TP #1: This TP is not needed. Agree with Intel’s comment that mode 1 has no single port operation. TP #2: This TP is not needed. For 4 Tx UE, our understanding is that UE needs to report which TPMIs can support full power for 4 Tx precoders, as well as 2 Tx precoders. With that, when SRI point to SRS resource with 2 ports, current spec is clear on how to set power scaling factor for 2 Tx precoders. TP #8: OK with this TP.  |
| LG | TP #1: Not needed. Agree with Intel’s comment that mode 1 has no single port operation. TP #2: Not needed. Agree with QC that current spec is clear.TP #8: Fine with this TP.  |
| OPPO | TP#1: Not necessary, but we are fine with the TPTP2: Not support. Agree with other companies TP#8: Support |
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# References

[1] R1-2003402, “Feature lead summary on ULFPTx”, vivo, RAN1#101-e