

3GPP TSG RAN #104

RP-241038

Shanghai, China, June 17-20, 2024

Agenda Item: 9.3.1.2

Source: vivo

Title: Discussion on CLI handling for R19 NR duplex evolution

Document for: Discussion&Decision

Background

The objectives for CLI in RP-234035:

- Specify enhancements for CLI handling [RAN1, RAN2, RAN3]:
 - Support gNB-to-gNB co-channel CLI handling scheme(s) (the detailed schemes are to be down-selected from those in TR38.858 by RAN1#117)
 - Support UE-to-UE co-channel CLI handling scheme(s) (the detailed schemes are to be down-selected from those in TR38.858 by RAN1#117)
 - Note: Without dedicated optimization for dynamic/flexible TDD.

Background

Outcome of RAN1 discussion in RAN1#117:

Agreement

For enhancements for CLI handling, the following are recommended from RAN1's perspective:

- Information exchange of semi-static cell-specific SBFD time and frequency location configuration [RAN3]
- Information exchange of measurement resource configuration, i.e., SSB and/or periodic NZP CSI-RS [RAN3]
- Information exchange of strongest DL beam information [RAN3]
 - o Information exchange of CLI-mitigation request [RAN3]
 - o Note: No normative behavior is implied for the gNB receiving the CLI-mitigation request. No need to further send a stop message for CLI mitigation. Detailed signaling can be discussed in RAN3.
- UL resource muting for PUSCH, including [RAN1, RAN2, RAN4]
 - o Indication/Determination of UL resource muting for PUSCH based on semi-static configuration, assuming comb-2 for both DFT-S-OFDM and CP-OFDM in each allocated PRB and up to 2 symbols in time domain
 - Note: No new DCI field / MAC CE is introduced
 - o PUSCH resource mapping, i.e., rate-matching around the muted REs
 - o UCI resource determination in symbols with muted REs
 - Note: No impact on data and control multiplexing as defined in section 6.2.7, TS 38.212.
 - o Note: UL resource muting does not apply for Msg A PUSCH and Msg 3 PUSCH.
 - o Note: UL resource muting applies only for UEs in RRC_CONNECTED mode.
 - o Note: UE assumes that the UL resource muting pattern does not overlap UL DMRS or PT-RS in the same symbol.
 - o Note: Power boosting is assumed for REs in the symbol with UL resource muting. PUSCH transmit power does not change across symbols.
 - o Note: No changes on TBS determination for PUSCH.
 - o Note: Check impact on transmit signal quality/MPR requirement, if any, with RAN4
 - o Note: This feature is subject to UE capability
- L1 based UE-to-UE CLI measurement and reporting based on existing CSI framework, including [RAN1, RAN2, RAN4]
 - o Measurement resources
 - Periodic, semi-persistent, or aperiodic measurement resource (set), i.e., SRS-RSRP resource or CLI-RSSI resource
 - Note: The measurement resources for SRS-RSRP are based on the existing legacy RS patterns. No specification impact for SRS configuration information exchange between gNBs.
 - Configuration/Determination of 'typeD' QCL assumptions for the CLI measurement resource
 - o Measurement reporting
 - At least aperiodic reporting
 - Note: Periodic and semi-persistent reporting can be considered
 - New report quantities: e.g. L1-SRS-RSRP, L1-CLI-RSSI and/or measurement resource indices
 - Note: At least wideband reporting is supported
 - UCI bits generation
 - Priority rules for multiple CSI reporting
 - Note: The existing CSI processing unit, CPU occupation rule and timeline for L1 beam reporting are reused for L1 UE-to-UE CLI measurement and reporting as starting point.
 - o CLI measurement accuracy requirement [RAN4]
- Note: The above information exchanges are subject to RAN3's assessment of feasibility and specification impact.

vivo' s view on CLI schemes

For following agreement:

- L1 based UE-to-UE CLI measurement and reporting based on existing CSI framework, including [RAN1, RAN2, RAN4] [...]
- o Measurement reporting
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 - New report quantities: e.g. L1-SRS-RSRP, L1-CLI-RSSI and/or measurement resource indices
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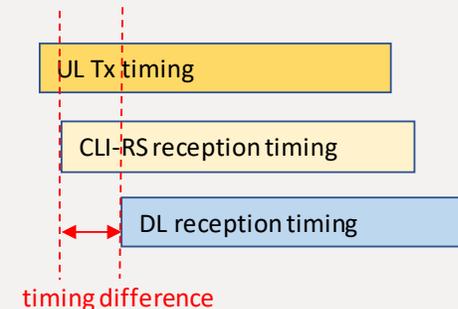


Fig.1 Example for different timing at victim UE

Reporting type: Propose that **Only** aperiodic reporting on **PUSCH** is supported

- Large resource consumption for periodic and semi-persistent measurement and reporting
 - For victim UE, CLI-RS from nearby UEs has a different reception timing than DL signals from gNB. Considering the victim UE may not be capable to receive/process signals simultaneously at different timings, CLI measurement will result in both DL and UL scheduling restrictions for the symbols configured for CLI-RS and its preceding symbols. Periodic and semi-persistent CLI measurement and reporting reduce flexibility and increase resource consumption for measurement and reporting.
- Periodic and semi-persistent reporting may have additional specification impact.
- Aperiodic reporting has the most flexibility and is sufficient.
- Aperiodic CLI reporting on PUCCH is not based on existing CSI framework, and will cause additional efforts.

vivo' s view on CLI schemes

For following agreement:

- L1 based UE-to-UE CLI measurement and reporting based on existing CSI framework, including [RAN1, RAN2, RAN4]
[...]
 - Measurement reporting
 - At least aperiodic reporting
 - Note: Periodic and semi-persistent reporting can be considered
 - New report quantities: e.g. L1-SRS-RSRP, L1-CLI-RSSI and/or measurement resource indices
 - Note: At least wideband reporting is supported

New report quantities: Propose to **Only** support wideband reporting **with following clarification** for wideband reporting

- The frequency granularity for L1 CLI measurement and reporting follows the same frequency granularity for L3 CLI measurement and reporting. i.e.,
 - For L1-SRS-RSRP, the frequency granularity is same as the bandwidth configured for the CLI-RS
 - For L1-CLI-RSSI, the frequency granularity is same as the bandwidth configured for the CLI-RSSI resource

vivo' s view on CLI schemes

Modified objectives

[...]

- Measurement reporting

- ~~At least a~~ periodic reporting on PUSCH

- ~~Note: Periodic and semi-persistent reporting can be considered~~

- New report quantities: e.g. L1-SRS-RSRP, L1-CLI-RSSI and/or measurement resource indices

- Note: ~~At least wideband reporting is supported~~ The frequency granularity for L1 CLI measurement and reporting follows the same frequency granularity for L3 CLI measurement and reporting

THANK YOU.

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