3GPP TSG RAN #94e
Electronic Meeting, December 6 - 17, 2021
Agenda: 8A.4

RP-213093

On neighboring cell LTE CRS-IC in Rel-18

China Telecom, ZTE

Background

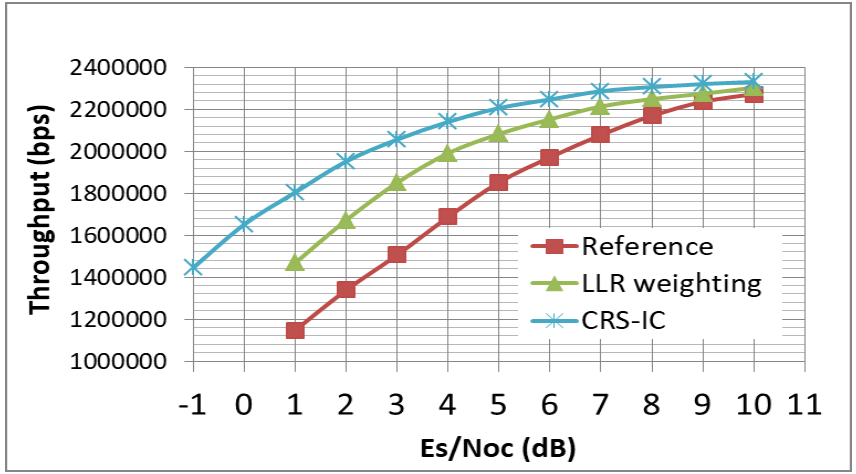
- To deal with neighboring LTE CRS interference, two candidate receivers for CRS-IM (interference mitigation) were evaluated in Rel-17 NR demodulation performance WI [1].
  - » LLR (Log-likelihood ratio) weighting: estimate the power of neighboring LTE CRS interference and apply the weight to the estimated LLRs for REs which occupy with LTE CRS.
  - » CRS-IC (interference cancellation): reconstruct neighboring LTE CRS interference based on detected neighboring LTE cell(s)' channel estimation and cancel the interference.
- LLR weighting was agreed as the baseline reference receiver in Rel-17 normative work [2], considering the trade-off among the performance gain, UE complexity and the required network parameters.

Performance simulation for CRS-IC

- Based on our link-level simulation results in slide #4 and #5, 1.4 dB ~ 2.3 dB performance gain can achieved by CRS-IC compared to LLR weighting in DSS scenario, using the parameters agreed in Rel-17.
- 4 cases are simulated:
  - » 4Tx 2Rx, MCS4 for target PDSCH
  - » 4Tx 2Rx, MCS13 for target PDSCH
  - » 4Tx 4Rx, MCS4 for target PDSCH
  - » 4Tx 4Rx, MCS13 for target PDSCH

Simulation results for CRS-IC

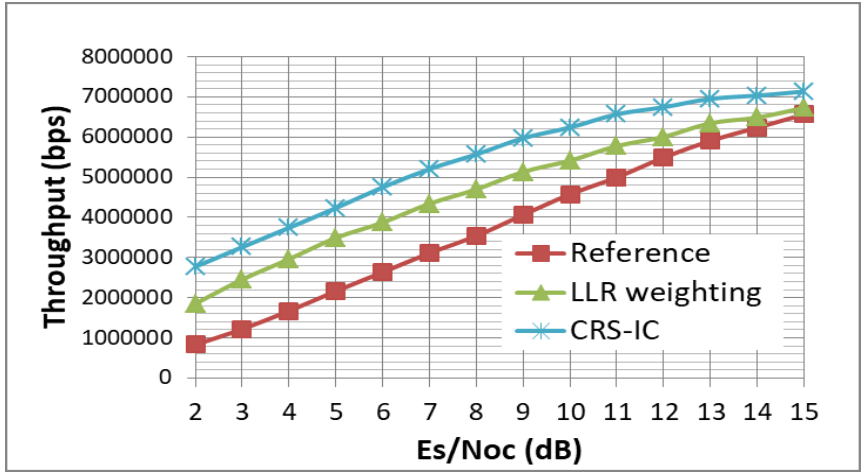
- 4Tx 2Rx, MCS4 for target PDSCH



» Required SNR (dB) at 70% max TP

Reference (No CRS-IM)	LLR weighting	CRS-IC
3.8	1.9	0.0

- 4Tx 2Rx, MCS13 for target PDSCH

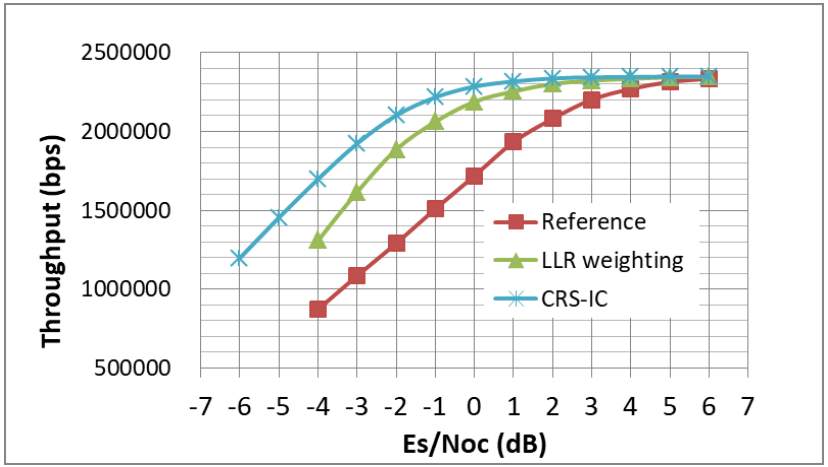


» Required SNR (dB) at 70% max TP

Reference (No CRS-IM)	LLR weighting	CRS-IC
11.2	9.0	6.8

Simulation results for CRS-IC

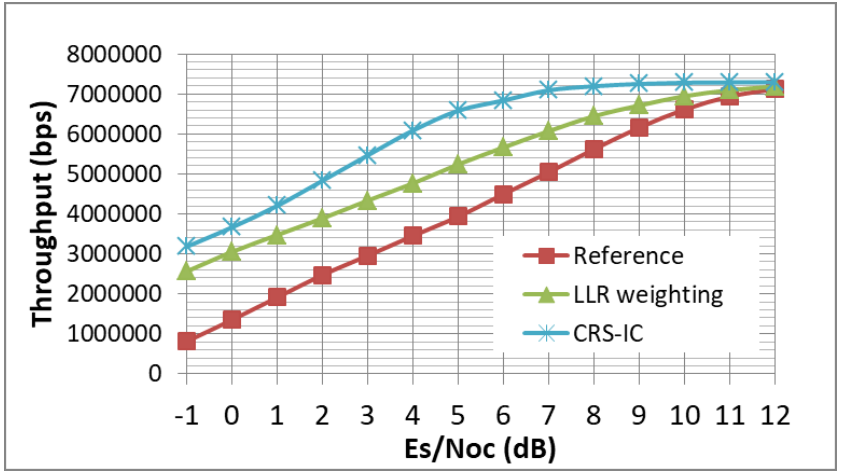
- 4Tx 4Rx, MCS4 for target PDSCH



» Required SNR (dB) at 70% max TP

Reference (No CRS-IM)	LLR weighting	CRS-IC
-0.3	-2.8	-4.2

- 4Tx 4Rx, MCS13 for target PDSCH



» Required SNR (dB) at 70% max TP

Reference (No CRS-IM)	LLR weighting	CRS-IC
7.1	4.7	2.4

Proposal

- Introduce neighboring cell CRS-IC for NR PDSCH in scenarios with overlapping spectrum for LTE and NR in Rel-18 (if not specified in Rel-17).
  - » Cover the two scenarios as in Rel-17:
    - Scenario 1: Serving and interference cells are both operating in DSS (NR+LTE) mode
    - Scenario 2: Serving cell is operating in NR mode and interference cell is operating in LTE mode
  - » Focus on synchronous network scenario.
  - » Discuss the necessity of network assistance signaling.
  - » Introduce UE capability signaling.

References

[1] R4-2117189, Draft TR 38.833 v0.2.0: Further enhancement on NR demodulation performance, RAN4 #101e, Nov 2021.

[2] RP-212636, Revised WID on Further enhancement on NR demodulation performance, China Telecom, RAN #93e, Sep 2021.

Annex: Main simulation assumptions from TR 38.833

	Serving cell PDSCH	Interference Cell #1	Interference Cell #2
MCS	4, 13		
Antenna configuration	4x2, 4x4		
Interference power level		INR1 = 10.45dB	INR2 = 4.6dB
CRS v-shift	0	1	2
LTE carrier center subcarrier location	Same as NR serving carrier center subcarrier location		
LTE carrier BW	Same as NR carrier, 10MHz		
Interference cell PDSCH loading level		20% probability of occurrence of LTE data transmission in time domain, and full bandwidth allocation in frequency domain.	
Propagation condition	TDLA30-10		

Thanks!