3GPP TSG RAN#91E
March 2021

RP-210646
Agenda Item 9.7.17

Discussion on DSS for LTE CRS interference handling

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Introduction

- Real network
  - Perf. degradation observed in DSS scenario: neighboring cell LTE CRS causing significant interference to NR throughput performance
- Handling LTE CRS in LTE-NR coexistence scenarios
  - Discussed in Rel-17 Demod working area (RP-202092)
  - But not included in the WID (RP-202000) @RP#89e meeting.

- This contribution discusses two solutions incl. further evaluation

- **Proposal**
  - Not to preclude any potential solution in the WID
  - To leave the discussion to RAN4

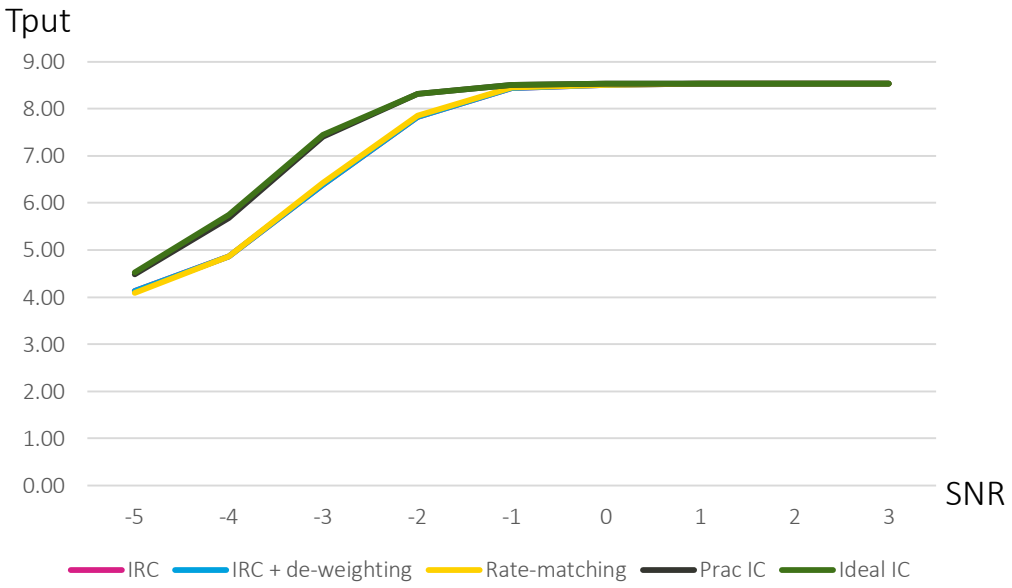
Potential Solutions

- CRS-IM (interference mitigation)
  - In LTE, Demod performance requirements were defined for CRS-IM (or IC) receivers. Performance benefit was justified.
  - Static network assistance information was introduced to increase the robustness of CRS-IM.
  - UE complexity is high with potentially extra decoding delay to NR HARQ timing. Further analysis is needed.
  - Applicable to synchronous network only

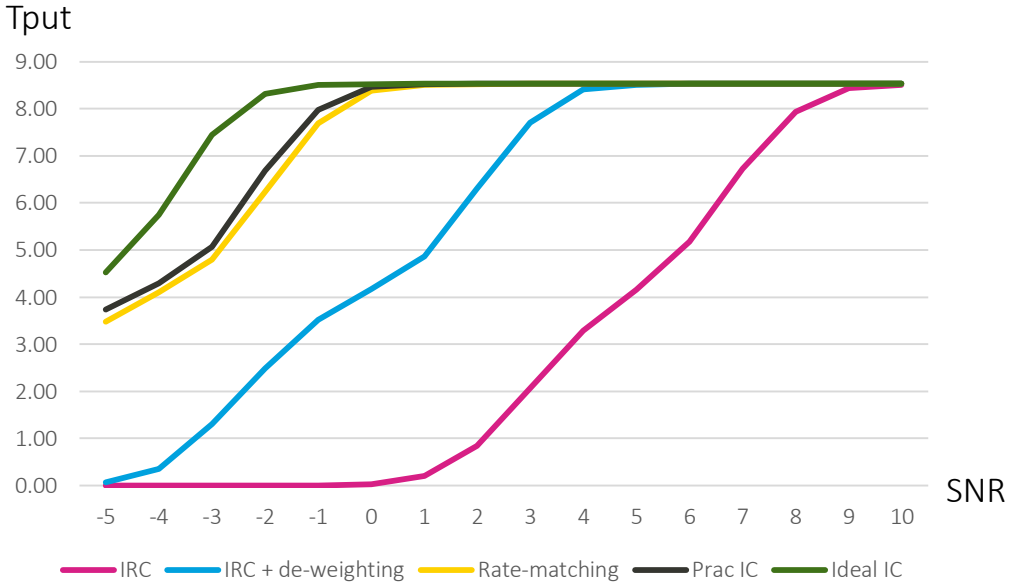
- Rate-matching
  - Agreed in Rel-15 to deal with co-site LTE CRS. In theory, same pattern can be re-used or extended for neighbor LTE cells
  - Dynamic network indication on rate-matching pattern(s) is needed with additional feedback from UE on dominant LTE cell (e.g., through LTE RSRP reporting)
  - No extra UE complexity is required.
  - Applicable to synchronous network only

Link-level simulation results
MCS#0

- 1 interference cell
- INR 0dB



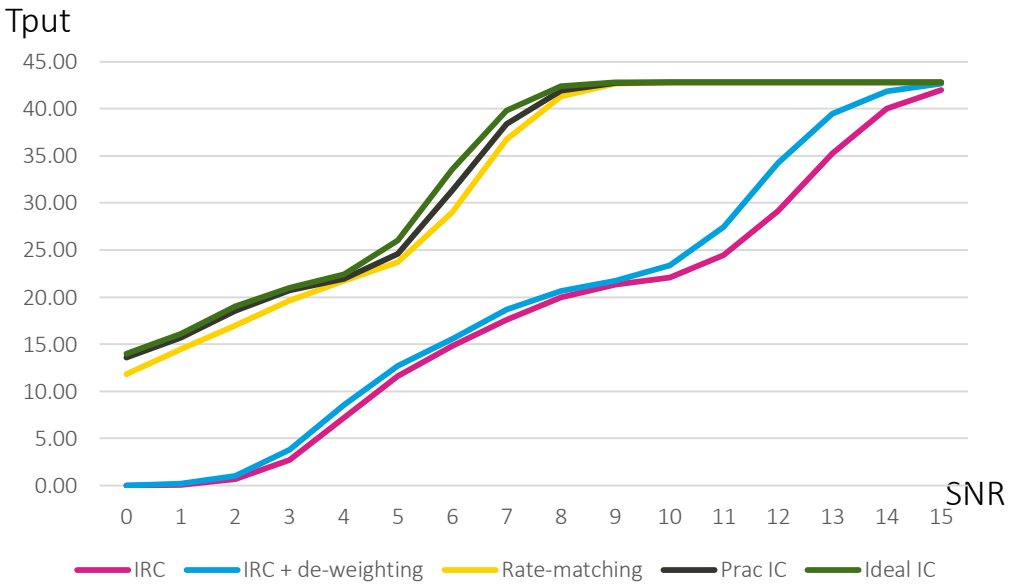
- 2 interference cells
- INR 0dB



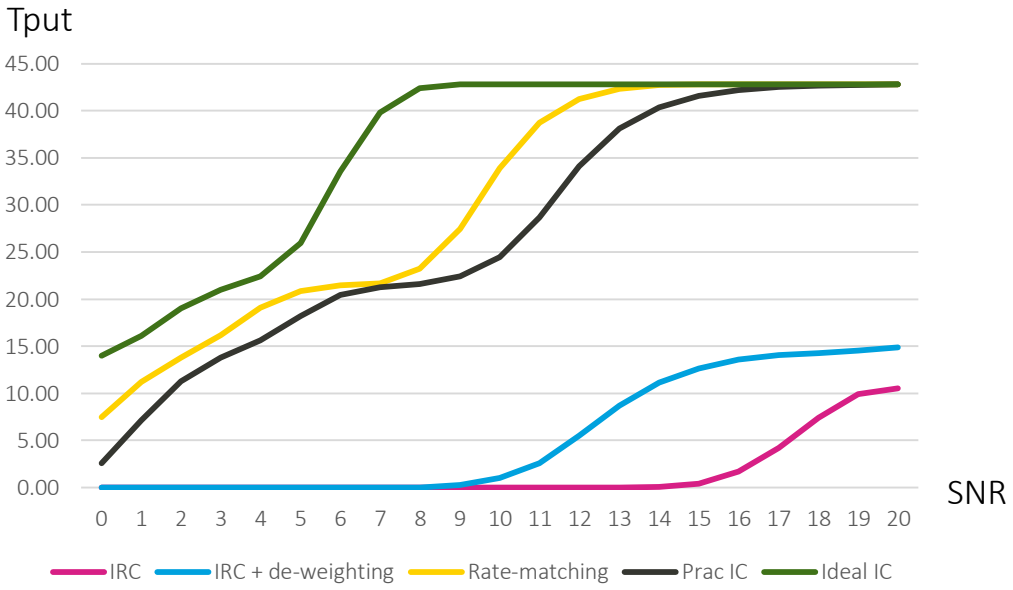
IRC: no special handling on LTE CRS
IRC + de-weighting: LLR de-weighting on CRS corrupted REs

Link-level simulation results
MCS#4

- 1 interference cell
- INR 10dB



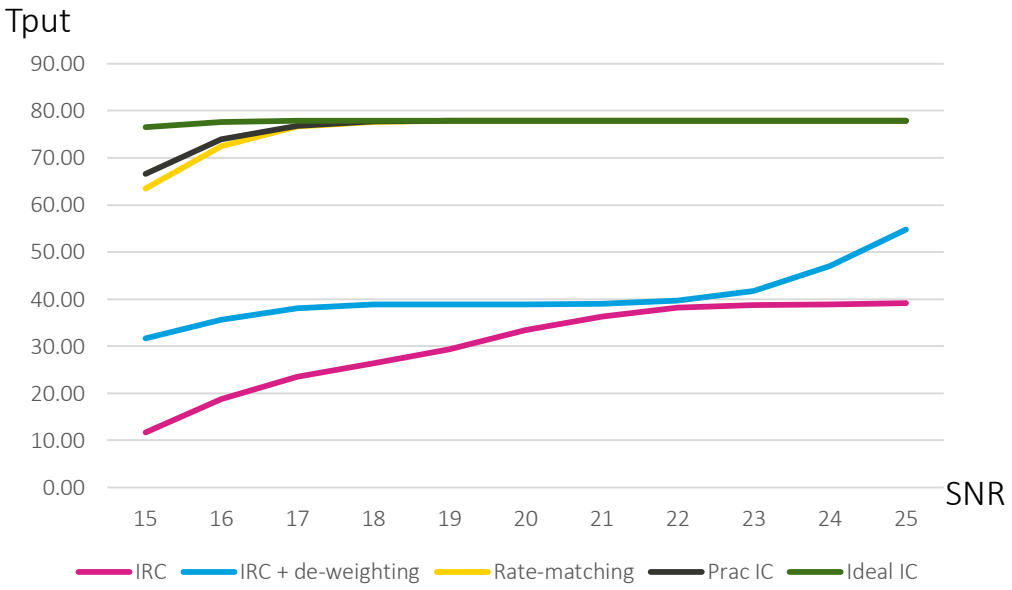
- 2 interference cells
- INR 10dB



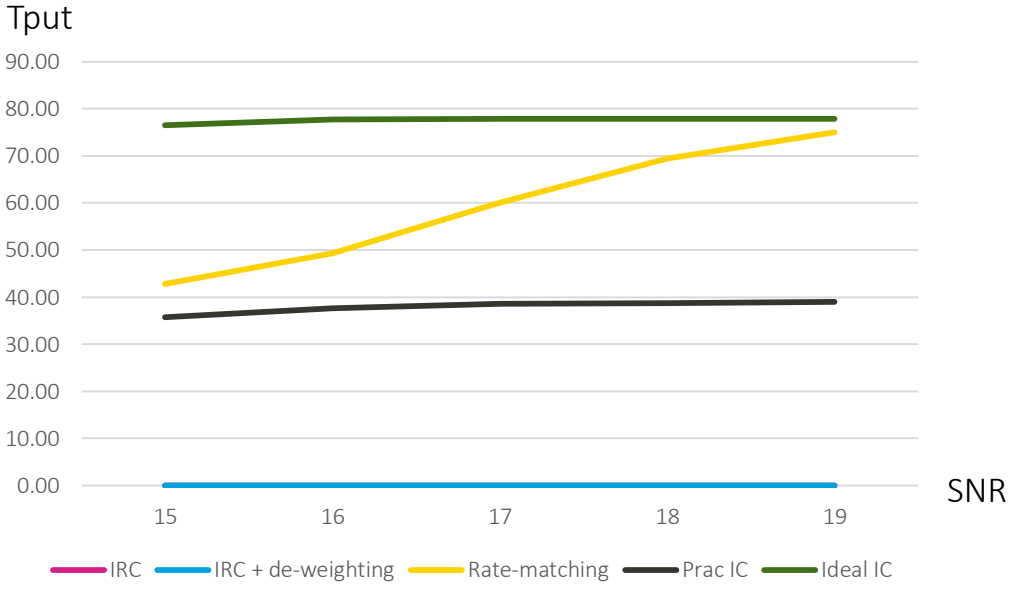
IRC: no special handling on LTE CRS
IRC + de-weighting: LLR de-weighting on CRS corrupted REs

Link-level simulation results
MCS#8 – specific to intra-site scenario

- 1 interference cell
- INR 20dB



- 2 interference cells
- INR 20dB



IRC: no special handling on LTE CRS
IRC + de-weighting: LLR de-weighting on CRS corrupted REs

Summary

- **Observation 1:** Depending on the scenarios (intra-site or inter-site), rate-matching solutions can provide comparable or better performance, comparing to practical CRS-IC.
- **Proposal 1**: Consider only synchronous network in the new objective for handling neighboring cell LTE CRS interference in DSS scenario.
- **Proposal 2:** Do not preclude network assistance information (including static RRC configuration and dynamic rate-matching pattern indication) in the candidate solutions in the new objective for handling neighboring cell LTE CRS interference in DSS scenario.

Appendix
Common simulation assumptions

- MIMO : 4x4, low correlation
- Propagation channel model: TDL-A_30_5Hz
- BW: 20MHz
- Timing and frequency offset between cells: Zero
- Practical sync, channel/interference estimation