**3GPP TSG-RAN WG4 Meeting #116 R4-2509113**

**Bangalore, India, August 25th – August 29th, 2025**

**Source: Nokia**

**Title: pCR on TR 38.753 Conclusions Chapter**

**Agenda item: 7.12.2**

**Document for: Endorsement**

1. Introduction

During RAN#104 the study item on Spatial Channel Model was agreed, whereby the SI started during RAN4#112, within this contribution we present some views on the work plan of the Study Item as well as details of what Nokia believes should be included in TR 38.753.

Furthermore, during RAN#107 the study item was extended, such that the revised completion plenary was RAN#109, indicated in the new SID [1].

During RAN4#113 the work split for the TR was agreed, in this document, TR content for the conclusions chapter is included.

1. Text Proposal

***<Start of Change 1>***

8 Summary

8.1 General

This Technical Report has studied candidate spatial channel models for NR demodulation performance requirements in FR1, considering SU-MIMO scenarios, and evaluating CDL-based and Multi cluster TDL-based modelling approaches. The study has:

* Investigated methodology to generate repeatable spatial channel effects with manageable test complexity
* Compared performance outcomes across candidate models against agreed test cases
* Collected alignment results from multiple contributors to determine the span and average for key performance metrics.

The following subsections capture the preliminary consensus points and highlight areas requiring further discussion.

8.2 Summary of SU-MIMO Results

8.2.1 PDSCH

8.2.1.1 Rank 8

For rank-8 SU-MIMO PDSCH scenarios, for rCDL-C1 6 out of 7 sources could achieve SNR span <2.5dB for both CW1 and CW2 at both 30% and 70% normalized throughput, for [xTDL-C1] 2 out of 3 sources could achieve SNR span < 2.5dB for CW1 at both 30% and 70% normalized throughput

8.2.1.1 Rank 4

For rank-4 SU-MIMO PDSCH scenarios, for rCDL-C1 7 out of 8 sources could achieve SNR span <2.5dB for both CW1 and CW2 at both 30% and 70% normalized throughput, for [xTDL-C1] 4 out of 4 sources could achieve SNR span < 2.5dB for CW1 at both 30% and 70% normalized throughput.

8.2.2 PMI

8.2.1.1 4 layer, type-I

For PMI testing with 4 layer transmission, with rCDL-C1, In type-I codebook case, 8 out of 9 sources could achieve SNR span < 2.5dB at 70% and 90% normalized throughput, for xTDL-C1 4 out of 4 sources could achieve SNR span < 2.5dB for both 30% and 70% normalized throughput.

8.2.1.1 4 layer, eType-II

For PMI testing with 4 layer transmission, with rCDL-C1, in eType-II codebook case, three clusters of results can be observed; Cluster 1: include source #3, #7, Cluster 2: include #4, #5, #6, #9. The span of this cluster is < 2.5dB for both 70% and 90% normalized throughput percentiles, and Cluster 3 include source #1, #2, #8. The span of this cluster < 2.5dB for both 70% and 90% normalized throughput percentiles.

For PMI testing with 4 layer transmission, with [xTDL-C1], in eType-II codebook case, 2 out of 3 sources could achieve SNR span < 2.5dB at 70% normalized throughput and 3 out of 3 sources could achieve SNR span < 2.5dB at 90% normalized throughput.

8.3 Comparison of SCM Candidates

Regarding rCDL-C1 the following observations can be drawn:

* The study has worked on alignment of rCDL-C1 implementations and has verified that there is a reasonable level of alignment.
* This level of alignment is expected to allow RAN4 to work on normative requirements.
* If the group considers the application of rCDL to settings that involve time-domain prediction it is necessary to further review the deterministic behaviour of rCDL and, if found necessary, identify countermeasures.

Regarding xTDL-C1 the following observations can be drawn:

* The study has worked on alignment of xTDL-C1 implementations and has verified that there is a reasonable level of alignment, among a lower number of contributors than other SCM candidates.
* This level of alignment likely allows RAN4 to work on normative requirements.

Regarding all channel models:

* Applicability of all channel models for band agnostic requirements to be evaluated for specific use case.

***<End of Change 1>***

References

1. RP-241610, “Study on spatial channel model for demodulation performance requirements for NR”, Nokia, BT Plc, RAN#107, Incheon, Korea, March 2025.