**3GPP TSG-RAN WG4 Meeting #95-e** ***R4-2008818***

**Electronic Meeting, 25 May – 5 June 2020**

**Source:** Ericsson

**Title:** TP to TR 38.883: Section 7 Demod test challenges

**Agenda item:** 6.12.4

**Document for:** Approval

# 1. Introduction

The feasibility of testing demodulation has been discussed as part of the feasibility study for 256 QAM in FR2. Further to that in RAN4#93 given by chairman’s guidance to have the group focus on core requirements this contribution was noted [2].

After the outcome of RAN4#94-e meeting we have agreed on BS and UE RF core requirements and discussions on BS conformance requirements. To have full consideration of 256 QAM requirement UE demodulation aspects should also be captured. In this contribution, background on UE demodulation aspects are introduced into the TR.

# 2. References

1. R4-1909403, “256 QAM and Feasibility of UE Demodulation Testing”, Ericsson
2. R4-1914569, “TP to TR 38.883: Section 7 Demod testing challenges”, Ericsson
3. R4-2003656, “Draft TR for 256 QAM”, China Telecom

[Start of Text Proposal]

# 7 Demod test challenge for DL 256QAM

Editor’s note: This clause will capture the study for highlighting demod test challenge which will have no impact to define the core requirement or start the normative work.

The SNR levels expected at the UE reference point needed for radiated demodulation and CSI requirements, can be expressed using the following equation:

The numerator represents samples of the wanted signal and the denominator AWGN generated in the test gear. The SNR is determined and fixed at the test gear and transmitter. The signal experienced at each receiver is as follows:

Where PL is the pathloss and NF represents the power of the internal noise in the receiver. The pathloss is a property of the OTA chamber, and the maximum possible transmit power for the wanted signal and AWGN are determined by the test gear. NF depends on the receiver sensitivity. Since the factors in the equation are limited by chamber and equipment performance, there is a limit to the SNR that can be tested at the receiver without experiencing substantial degradation at the receiver. At higher modulations, such as 256 QAM, the importance of SNR needed becomes significant. This needs to be taken into account in test point selection.

Table 7-1: Predicted SNR upper bound values for Direct far field (DFF)

|  |  |  |
| --- | --- | --- |
|  | Channel Bandwidth | Maximum SNR |
| Single band UE | 100 MHz | [19.4 dB] |
| 200 MHz | [16.4 dB] |
| Multi-band UE (Note) | 100 MHz | [17.4 dB] |
| 200 MHz | [14.3 dB] |
| Note: For ∑MBp from TS 38.101-2 [16] Table 6.2.1.3-4 allow up to 2 dB |

Table 7-2: Predicted SNR upper bound values for Indirect far field (IFF)

|  |  |  |
| --- | --- | --- |
|  | Channel Bandwidth | Maximum SNR |
| Single band UE | 100 MHz | [19.7 dB] |
| 200 MHz | [16.7 dB] |
| Multi-band UE (Note) | 100 MHz | [17.7 dB] |
| 200 MHz | [14.6 dB] |
| Note: For ∑MBp from TS 38.101-2 [16] Table 6.2.1.3-4 allow up to 2 dB |

Table 7-1, and 7-2 capture DFF, and IFF predicted SNR upper bound for FR2. Further information on test methods can be found in TR38.810.

7.1 Conclusion

Considerations on IFF, and DFF upper limits has been taken accounted when creating performance requirements by means of carefully selecting bandwidths and MCS such that requirements are testable with Rel-15 test methods.

 [End of Text Proposal]