**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.

Testability studies have indicated that the receiver maximum input level needed is considered to be of challenge where an estimated SNR >26dB is needed at the receiver in order to have a passing requirement or deemed not testable. Considerations of the conclusion based upon that the SNR operating point to see benefit of 256 QAM is [22] dB SNR at the BS with added pathloss conditions (depending on DNF or IFF test method), which creates an uncertainty whether UE demodulation requirements are fully testable.

Further information on test methods can be found in TR38.810.

For high SINR it is necessary to ensure low noise performance at the receiver, which can only be achieved if high SINR is achievable. Additionally, a robust UE baseband performance that does not create any SINR floor inside the baseband is ensured with appropriate UE demodulation testing.

7.1 Conclusion

The testability upper limit needs to be considered when developing performance requirements. Currently the upper limit on testability is [22.4]dB with existing Rel-15 test methods for smallest supported FR2 channel bandwidth.

[End of Text Proposal]