3GPP TSG-RAN WG4 Meeting # 97-e R4-2016934

Electronic Meeting, 2 – 13 November 2020

**Agenda Item:** **15.1.2**

**Source: Nokia, Nokia Shanghai Bell**

**Title:** **TP to TR 37.880: Coexistence Simulation Results and Observations for High-power UE operation Vs NB-IoT standalone operation**

**Document for:** **Approval**

**1. Introduction**

The study item on High-power UE operation for fixed-wireless/vehicle-mounted use cases in Band 12, Band 5, and Band n71 was approved at TSG RAN#88-e [1]. The purpose of this study item is to study RF requirements that are applicable for high power UE operation in LTE band 12 and band 5, and in NR band n71 for fixed wireless and vehicle-mounted use cases, in ITU Region 2.

One of the objectives of this study item is to carry out coexistence study to evaluate the throughput OOBE impact on a victim band from a high-power aggressor in Band 12, Band 5, and Band n71. The simulation assumptions for the coexistence study was agreed in RAN4#96-e [2], where the UL HPUE Vs NB-IoT standalone operation scenario was classified as high priority. The coexistence simulation results for this scenario according to the agreed assumptions are provided in RAN4#97-e [3].

This contribution provides a text proposal for approval to record the simulation results and observations in [3] into TR 37.880 [4].

**2. Text proposal**

**<Start of text proposal>**

5.2 Simulation results

The simulation results of the victim NB-IoT UE (with 2km cell radius) and interfering UE transmit power with 23dBm LTE UE (with 2km cell radius) and 31dBm HPUE (with 4km cell radius) are provided in Figures 5.2-1 and 5.2-2 below. Here the uplink ACIR is obtained using 30dB LTE UE and 37dB HPUE ACLR and 45dB BS ACS. It can be seen from the figures that around 8% and 5% of the UE are transmitting at maximum power, respectively, with 23dBm LTE UE and 31dBm HPUE.



Figure 5.2-1: NB-IoT and 23dBm LTE UE transmit power



Figure 5.2-2: NB-IoT and 31dBm HPUE transmit power

The simulation results of the victim NB-IoT UE UL SINR with 23dBm interfering LTE UE (with 2km cell radius) and 31dBm interfering HPUE (with 4km cell radius) are provided in Figures 5.2-3 and 5.2-4 below. Here again the uplink ACIR is obtained using 30dB LTE UE and 37dB HPUE ACLR and 45dB BS ACS. It can be seen from the figures that the victim NB-IoT UE UL SINR degradation caused by the 23dBm interfering LTE UE and 31dBm interfering HPUE are similar (within 0.5dB difference). It can also be seen from the figures that the victim NB-IoT UE UL SINR degradation caused by the 31dBm interfering HPUE is less than 1dB at 5%, 50%, 95% and 99% CDF points.



Figure 5.2-3: NB-IoT UE UL SINR with 23dBm interfering LTE UE



Figure 5.2-4: NB-IoT UE UL SINR with 31dBm interfering HPUE

The simulation results of the victim NB-IoT BS received blocking signal power at the antenna connector with 23dBm interfering LTE UE (with 2km cell radius) and 31dBm interfering HPUE (with 4km cell radius) are provided in Figures 5.2-5 and 5.2-6 below. The 99.99%-tile received blocking signal power levels are around -56dBm and -48dBm, respectively, with 23dBm interfering LTE UE and 31dBm interfering HPUE. Therefore, the currently specified -43dBm BS receiver blocking requirement can provide enough protection for the NB-IoT BS receiver against the HPUE transmission.



Figure 5: NB-IoT BS received blocking signal power with 23dBm interfering LTE UE



Figure 6: NB-IoT BS received blocking signal power with 31dBm interfering HPUE

To summarize, the simulation results have shown that:

1) The victim NB-IoT UE UL SINR degradation caused by the 23dBm interfering LTE UE and 31dBm interfering HPUE are similar (within 0.5dB difference).

2) The victim NB-IoT UE UL SINR degradation caused by the 31dBm interfering HPUE is less than 1dB at 5%, 50%, 95% and 99% CDF points.

3) The currently specified -43dBm BS receiver blocking requirement can provide enough protection for the NB-IoT BS receiver against the HPUE transmission.

**<End of text proposal>**

**References**

[1] RP-201261, “New SID on high-power UE operation for fixed-wireless/vehicle-mounted use cases in Band 12, Band 5, and Band n71”, U.S. Cellular.

[2] R4-2011833, “TP to TR 37.xxx: Simulation assumptions for coexistence study on High-power UE operation for fixed-wireless/vehicle-mounted use cases in Band 12, Band 5, and Band n71”, Nokia, Nokia Shanghai Bell.

[3] R4-2014480, “Coexistence Simulation Results for High-power UE operation for fixed-wireless/vehicle-mounted use cases in Band 12, Band 5, and Band n71”, Nokia, Nokia Shanghai Bell.

[4] R4-2014479, “TR 37.880 V0.1.0: High-power UE operation for fixed-wireless/vehicle-mounted use cases in Band 12, Band 5, and Band n71”, Nokia, Nokia Shanghai Bell.