**IEEE P802.19**

**Wireless Coexistence**

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| Liaison statement to 3GPP TSG-RAN |
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Abstract

This document provides a liaison statement to 3GPP TSG-RAN and provides recommendations regarding the 3GPP draft study item document on Licensed-Assisted Access to Unlicensed Spectrum: 3GPP TR 36.889 v0.1.0 (2014-11).

IEEE 802 LMSC

LIAISON STATEMENT TO 3GPP TSG-RAN

To: 3GPP TSG RAN, Chairman Dino Flore (OFlore@qti.qualcomm.com)

Cc: 3GPP TSG WG RAN1, Chairman Satoshi Nagata (nagatas@nttdocomo.com)

It is IEEE 802’s goal to establish commonly understood levels of acceptable interference and performance degradation for LAA and 802.11 operating in the same unlicensed channel.

3GPP TSG-RAN is studying fairness between Wi-Fi and LAA networks using simulations. The simulation studies are based on 3GPP TR 36.889 v0.1.0.

This liaison statement from IEEE 802 provides a number of recommendations regarding assumptions used in the 3GPP simulations. A more detailed PPT document that includes discussion of these recommendations is available at <https://mentor.ieee.org/802.19/dcn/15/19-15-0007-02-0000-comments-on-laa-evm.ppt>.

**Recommendation 1: Evaluate an alternative to the fixed back-off mechanism in LBT simulations**

3GPP contributions indicate that the majority opinion is tending towards the use of load-based equipment (LBE) listen before talk (LBT) defined in ETSI EN 301 893 v1.7.1. Multiple simulation results (based on each individual 802.11 and LAA node being a contender) presented to ETSI BRAN indicate that v1.7.1 rules are insufficient for fairness between LTE and Wi-Fi and lead to significant performance degradation for Wi-Fi users. These presentations attributed this performance degradation to the fixed linear back-off window for the extended CCA procedure in v1.7.1.

**Recommendation 2: For a complete understanding of LAA impact on Wi-Fi, include a range of load densities in coexistence simulations**

Section A.1.1 of TR 36.889 lists the parameters for indoor LAA coexistence evaluation. Only 10 LAA UEs or Wi-Fi clients are assumed per unlicensed band carrier. Simulation results indicate that the impact of LAA (using ETSI 301 893 v1.7.1) on Wi-Fi clients is more evident at high system load, particularly when the number of nodes is large.

**Recommendation 3: Include VoIP and other traffic types as mandatory traffic models and evaluate corresponding performance metrics**

Wi-Fi and LAA have to operate in unlicensed spectrum carrying a variety of traffic types including voice, video, FTP, etc. However, the simulations evaluating the fairness of LAA with Wi-Fi (using the user perceived throughput and latency metrics) are currently limited to FTP.

**Recommendation 4: Include 256 QAM, LDPC and RTS/CTS as mandatory in simulation**

256 QAM, LDPC and RTS/CTS are considered optional for simulations. The use of lower order modulation (when SINR is sufficient for 256 QAM) means unnecessarily long frame durations. Longer frame duration increases the back-off period (and hence delay) and decreases the channel utilization for other Wi-Fi clients. Also, the hidden node behavior of two wireless systems is key to coexistence. RTS/CTS is optional but commonly used in congested environments.

The next meeting of IEEE 802 will take place on March 9th - 13th, 2015 in Berlin, Germany.