**IEEE P802.19**

**Wireless Coexistence**

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| Liaison statement to 3GPP TSG-RAN |
| Date: 2015-01-15 |
| Author(s): |
| Name | Company | Address | Phone | Email |
| Alireza Babei | CableLabs | 858 Coal Creek CirLouisville, CO 80027USA | +1-303-661-3405 | a.babaei@cablelabs.com |
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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 802.19 WIRELESS COEXISTENCE WORKING GROUP (WG)

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)

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 .

**Recommendation 1: Incorporate truncated exponential back-off in LBT requirements and simulate its effect**

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 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. The main reason for this performance degradation can be attributed 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, consider 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 301 389 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 a 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: Consider 256 QAM, LDPC and RTS/CTS as mandatory for 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.