IEEE P802.11 Wireless LANs

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| Proposed text for 32.3.3.4.5 CCA requirements |
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Abstract

This document is to propose the changes needed for the LC in the CCA mechanism. The base documents are IEEE P802.11bbD4.0.

***Discussion: Highlighted text preceded by “Discussion” are not to be copied into the TGbb Draft. Such text provides rationale for the proposed changes.***

History

R0: proposal of sentences to explain the difference of the CCA in LC

R1: update text by adding new subclause and moving repetition CCA to the subclauses for CCA requirements

### 32.3.3.4.5 CCA requirements

***Discussion: this document is to add a paragraph to explain the differences in the CCA in LC and radio communication systems for LC CM PHY.***

The 17.3.10.6 (CCA requirements) which provides the criteria to detect a channel busy condition works for LC. For the CCA to function, light signals are converted to electrical signals.

The nature of LC is that the transmissions are directional, hence non-AP LC STAs may not be able to receive signals from peer non-AP LC STAs. The repetition CCA mechanism could allow the existing CCA mechanism to be used within non-AP LC STAs with the assistance of the LC AP. In general, the LC AP could detect any transmission from any non-AP LC STA as described in 32.3.2.3.5.2 CCA requirements. Then, the LC AP may disseminate the channel occupation information among the non-AP LC STAs within its coverage.

A simple mechanism to achieve this could be a simple amplify and forward retransmission mechanism. When the LC AP detects a transmission from a non-AP LC STA or transmissions from multiple non-AP LC STAs, it may repeat any signal it receives on the uplink channel, even if it may not be decodable by the non-AP LC STAs. The repetition could be done at the analogue level, i.e., the detected transmission could be forwarded to both the receiver physical layer of the LC AP and analogue amplifying element. The repetition would be a broadcast to all the non-AP LC STAs within its range, so that the non-AP LC STAs may be able to obtain the occupation status of the uplink channel from the retransmitted signal of the LC AP if that signal is decodable. Non-AP LC STAs that successfully detect the retransmitted signal by the LC AP would mark the medium ‘busy’ as currently done in the CCA mechanism.

When the LC AP has a packet to transmit, it could start the transmission of the new packet immediately after the retransmission of the transmission from a non-AP LC STA is completed.

Figure 1 illustrates an example of channel access with the repetition CCA mechanism. The LC AP may retransmit the signals received from non-AP LC STA 1 on the downlink channel. The non-AP LC STA 2 then detects a channel busy condition based on the repeated signal. The LC AP could switch from the repetition of received signals to its own queue at the end of the repetition, as shown in the example of Packet 3 and 4’s switch.

**LC AP**

**non-AP LC STA1**

**non-AP LC STA2**

Packet 1

Repeated

Signal

Backoff

Repetition CCA Busy

Packet 2

Repeated

Signal

Repetition CCA Busy

Delay (ns)

Delay (ns)

Delay (ns)

Packet 3

Backoff

Backoff

Backoff

Backoff

Packet 4

Figure 1 An example of channel access with repetition CCA mechanism

### 32.3.5.4 CCA requirements

***Discussion: add a new subclause in the LC HE PHY.***

The CCA requirements for HE PHY in 27.2.6 (Support for non-HT, HT and VHT formats) and 27.3.20 (Receiver specification) to detect a channel busy condition work for LC. For the CCA to function, light signals are converted to electrical signals.

The repetition CCA mechanism demonstrated in 32.3.3.4.5 also applies to LC HE PHY.