IEEE P802.11
Wireless LANs

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| Liaison response to 3GPP R4-156886 |
| Date: 2015-11-15 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
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Abstract

This document is a reply to the liaison from 3GPP RAN R4-156886.

R1: WG Chair: Editorial updates.

R2: WG Chair: Provided URL to REVmc D4.0 and removed note about availability.

The 3rd Generation Partnership Project (3GPP) had submitted a letter to the IEEE 802.11 Working Group (WG). The letter is documented in IEEE 802.11-15/1263r0.

# Summary of the letter from 3GPP

**1. Overall Description:**

3GPP have been using “Beacon RSSI” WLAN measurements for Release-12 LTE/WLAN interworking, based on the liaison “Follow up liaison response to 3GPP R2-141855”/” Liaison on WLAN signal measurements for WLAN/3GPP Radio interworking” [1] received from IEEE in August 2014. The liaison [1] clarified that “RSSI should be measured from Beacon frames for WLAN-3GPP interworking purposes”.

3GPP would like to inform IEEE and Wi-Fi Alliance that in the context of Release-13 work on LTE/WLAN Aggregation (LWA) 3GPP considers using WLAN measurements for network-controlled LWA activation and mobility between WLAN mobility sets. According to the current agreements RSSI is used for measurement report triggering and the measurement report contains the following additional metrics: Beacon RSSI, channel utilization, station count, admission capacity, backhaul rate. These measurements will also be used for RAN-controlled interworking enhancements.

3GPP kindly requests IEEE802.11 WG and Wi-Fi Alliance to provide feedback whether it would be feasible to measure RSSI on other frames, e.g. Probe Response, in order to minimize LWA activation and mobility delay.

**2. Actions:**

**To IEEE 802.11 and Wi-Fi Alliance:**

**ACTION:** 3GPP kindly requests IEEE802.11 WG and Wi-Fi Alliance to provide feedback whether it would be feasible to measure RSSI on other frames, e.g. Probe Response, in order to minimize LWA activation and mobility delay.

**3. References:**

[1] R2-143002, “Follow up liaison response to 3GPP R2-141855”, IEEE P802.11

# Summary of this reply letter

IEEE 802.11 Working Group developed this reply letter for approval by the IEEE 802.11 Working Group.

To: 3GPP TSG-RAN WG4 c/o yang.tang@intel.com

CC: WiFi Alliance, RAN2

Subject: Response to LS on WLAN RSSI Measurement

Date: 2015-11-14

Dear Yang,

We would like to thank 3GPP TSG-RAN Working Group (WG) 4 for its letter requesting the following from the IEEE 802.11 WG:

*“3GPP kindly requests IEEE802.11 WG and Wi-Fi Alliance to provide feedback whether it would be feasible to measure RSSI on other frames, e.g. Probe Response, in order to minimize LWA activation and mobility delay.”*

A STA can make RSSI measurements in passive scanning mode on received beacon frames (which can be Beacon or DMG Beacon frames depending on the frequency band of operation) that are usually transmitted every 100ms. In the near future, a STA will also be able to use FILS discovery frames (IEEE 802.11ai) that should be queued for transmission approximately every 20ms. STA will also be able to perform RSSI measurements based on the reception of broadcast probe responses.

To minimize the delays associated with periodic passive scanning, Wi-Fi devices often use active scanning when and where permitted by regulation. In active scan mode, a STA sends a probe request and APs reply with probe responses on which RSSI measurements can be made.

We can distinguish two cases for RSSI measurements performed by a STA:

1. When a STA performs RSSI measurements of the serving AP it is associated with.
	* Beacons are mostly used in such conditions. Proprietary averaging based on multiple beacon reception can be used.
2. When a STA performs RSSI measurements of an AP it is not associated with.
	* STAs don’t distinguish RSSI measurements of beacons from those measured on probe responses or discovery frames. The RSSI measurements based on probe response are considered as being sufficiently accurate.

NOTE: IEEE would like to take the opportunity to inform 3GPP that Minimum Achievable Throughput over WLAN metrics, which were recommended in the LS response to 3GPP in document [Ref 1], are now completely defined by IEEE to estimate the link quality. Procedure to determine such metrics by a STA are defined in document [Ref2].

Sincerely,

Adrian Stephens
IEEE 802.11 Working Group Chair

**References:**

1. 11-14-0936-03-000m-liaison-response-followup-to-3gpp-tsg-ran-wg2.doc
2. IEEE P802.11REVmc Draft 4.0. <http://www.techstreet.com/ieee/products/1867583>