IEEE P802.11
Wireless LANs

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| Allowing Radar within Wireless LAN |
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Abstract

This document proposes changes to the TGay draft to insert an Annex in which describes how DMG/EDMG PPDUs can be in packet transmission

**Discussion**

Radars are devices which estimate the range and direction of objects by measuring the time and direction in which transmissions to these objects are reflected. Radars can be used in many applications using the frequency bands in 802.11 WLAN operates. In particular in the 60GHz band, the same system that is used to transmit communication signals can be used to transmit radars signal and a similar system may be used to receive them. The same waveforms (PPDUs) that are used in 60GHz WLAN may be used as radars pulses, with high efficiency. This is due to the high bandwidth of the signals and fact that some of the fields of the PPDU enable accurate channel estimation with high time resolution. The advantage of using these waveforms for radar signal is that they are compatible with 802.11 signals at the same band. A device that receives these PPDUs will respect them as it estimates CCA and will know exactly when to expect the end of the waveform. A radar based on 802.11 devices operating in this band shall also respect the medium access rules of 802.11 devices and respect their transmission. Therefore, we can achieve better coexistence between radars and WLAN devices.

Radars based on 802.11 PPDU waveform don’t require a change in the standard. However, we propose to describe the possibility of using such waveforms while observing 802.11 medium access rules as annex to the standard.

***TGay Editor: Add the following at the end of the draft:***

***Editor: Add the following as a new Annex:***

**Annex AAA**

(Informative)

**Radar implementation using the DMG PHY and EDMG PHY**

A radar is used to estimate the relative position and velocity of a target object with respect to the radar by transmitting a signal from a transmitting antenna and measuring the time and direction in which one or more reflections of the signal arrive at a receiving antenna. Given their directional propagation characteristics, the DMG PHY and EDMG PHY can be used to implement radar functionality.

To implement radar functionality, a STA (DMG STA or EDMG STA) can transmit a PPDU and measure the time it takes and direction from which reflections arrive at the STA. Any type of PPDU can be used by the STA as long as:

1. The PPDU is a valid EDMG or DMG PPDU constructed according to the EDMG (see 29) or DMG PHY (see 20) specification, respectively; and
2. The STA follows all corresponding medium access rules to transmit the PPDU and
3. The TA field and RA field of the frame in the PPDU are set to the MAC address of the transmitting STA.

Examples of frames that can be used to implement radar functionality include:

1. A STA may transmit an SSW frame with both the RA field and the TA field set to the MAC address of the STA may to implement radar functionality. In this case, the TXVECTOR parameter TRN\_LEN, if the frame is transmitted with the DMG PHY, or the EDMG\_TRN\_LEN, if the frame is transmitted with the EDMG PHY, may be set to a nonzero value.
2. A non-PCP and non-AP EDMG STA may transmit a Short SSW packet with both the TXVECTOR parameter SSW\_SOURCE\_AID and SSW\_DESTINATION\_AID set to the AID of the STA to implement radar functionality.
3. An EDMG PCP STA or an EDMG AP STA may transmit a Short SSW packet with both the TXVECTOR parameter SSW\_SOURCE\_AID and SSW\_DESTINATION\_AID set to BSS AID of the STA to implement radar functionality.

***TGay Editor: Add the following text at the end of 10.43.1:***

A Sector Sweep frame in which both the RA field and the TA field are set to the MAC address of the transmitter STA, may have the TRN\_LEN, in case of a DMG PPDU or the EDMG\_TRN\_LEN, in case of an EDGM PPDU set to a non-zero value.

**References:**