IEEE P802.11
Wireless LANs

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| Draft Reply LS from 802.11 to WFA |
| Date: 2018-12-11 |
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Abstract

This document contains draft text for a liaison statement (LS) from IEEE 802.11 Wi-Fi Alliance (WFA) in response to their LS and the information they have provided in 11-18/1843r0.

r1: Edits as discussed on the 802.11 TGbd teleconference 11 December 2018 10:00am EST.

status

To: The Wi-Fi Alliance
Edgar Figueroa, CEO, Wi-Fi Alliance efigueroa@wi-fi.org

CC: IEEE 802 EC; Konstantinos Karachalios Secretary IEEE-SA Standards Board Secretary, IEEE-SA Board of Governors sasecretary@ieee.org,Paul Nikolich Chair, IEEE 802 LMSC p.nikolich@ieee.org

Subject: IEEE 802.11 Working Group Reply Liaison Statement to the Wi-Fi Alliance (WFA) Liaison Statement on: Liaison Statement reply to “IEEE 802.11 WLAN Working Group Liaison Communication related to Next Generation V2X (NGV) Use Cases and Requirements.

Date: 2018-11-16

**Discussion:**

The IEEE 802.11 Working Group (WG) thanks the Wi-Fi Alliance for sharing the views and comments provided by their members on prioritization and additional information.

The 802.11 WG is pleased to inform the Wi-Fi Alliance that the “Enhancements for Next Generation Vehicle-to-Everything (V2X)” (NGV) amendment Project Authorization Request (PAR) has been approved and that the amendment will be developed by 802.11 TGbd, a newly formed task group of 802.11.

IEEE 802.11 WG will consider the information provided by the Wi-Fi Alliance as it continues to develop the features and capabilities of the NGV amendment. Some of the comments you provided address specific use cases and included statements and questions. 802.11 TGbd is currently discussing and working towards consensus for many of these statements and questions, but consensus has not yet been reached, below we have provided our initial feedback (italicized in line below):

**Comments on specific use cases**

Use Case 1 Basic Safety Messages (BSM)

* BSM is very important…it’s the primary use case
	+ Should clarify whether the intent is to send BSM only with NGV or whether legacy 802.11p will be used for BSM. If only legacy 802.11p will be used for BSM, then do you also intend to send a redundant BSM using NGV?

*802.11 TGbd has not reached a conclusion if redundant BSMs will be sent using NGV modulations. 802.11 TGbd recognizes the importance of avoiding excess channel load and minimizing redundant messages.*

* SPaT and MAP messages can also be sent in Channel 172
* In the EU, safety messages are CAM and DENM, not BSM
* Antenna diversity (both TX and RX) is not required today; they are optional features that are vendor specific and not described in standards, either IEEE 802.11p or SAE J2945/1. NGV may choose to standardize these features.

*802.11 TGbd is considering antenna diversity standardization.*

Use Case 2 Sensor Sharing

* Sensor sharing messages could be either raw sensor data or metadata. The size of the messages could vary significantly between the two. In either case, these messages would be larger than BSM.
* This use case could require a significant amount of bandwidth. Is NGV considering spectrum outside of 5.9GHz for this use case?

*802.11 TGbd may enable the use spectrum outside of the 5.9 GHz band for sensor sharing. This would be in addition to any industry standardized sensor sharing in the 5.9 GHz band using legacy 11p or new NGV capabilities.*

Use Case 3 Multi-Channel Operation

* Not clear how this reflects multichannel operation as described in IEEE 1609.4

*802.11 TGbd may provide new capability to decrease mutual interference between channels. How IEEE 1609.4 manages or uses this capability is beyond the scope of the NGV amendment.*

* Not clear which is the “non-safety” channel. Under the FCC bandplan, all channels are considered safety channels; there are no “non-safety” channels. Two channels (172 and 184) are safety only; the rest can be a mixture of safety and non-safety.
* IEEE 1609.4 defines a control channel (178) for multi-channel service channel operations. The assumption in the industry is that one radio is dedicated to channel 172 and another radio is dedicated to monitoring the control channel and moving to a service channel for exchanging data on the channels advertised in the control channel. Not clear how many radios this feature entails: 2 (safety + control), 3 (safety + control + service channel), or more (safety + control + multiple service channels). How many radios does NGV propose to use?

*NGV does not propose to specify the number of radios used for multi-channel operation this is viewed as an implementation issue or for other standards bodies to determine and will not be specified by IEEE 802.11.*

Use Case 4 Infrastructure Applications

* One additional usage: Drive assist; e.g., high definition maps download
* Certificate distribution is another significant type of data that could be transmitted to vehicles from infrastructure
* Should consider possible future SW upgrades to allow existing 11p in roadside units or onboard units to support new or modified applications.
* “Higher layer (e.g. IEEE1609) protocol should be defined for version negotiation (out of NGV scope)” – this statement needs clarification…it’s not clear what it means.
* The requirement for high throughput implies use of multiple data rates; if multiple data rates are going to be used, selection criteria need to be defined. Perhaps there needs to be an advertisement of the supported rates by an OCB device.

Use Case 5 Vehicular Positioning & Location

* Is this is intended to send sensor information derived from GNSS or other external systems from vehicle to vehicle or infrastructure, or is the plan to use the NGV waveform itself for fine positioning, as in 802.11az?

*NGV has not determined what positioning technologies will be specified.*

* If the plan is to use 802.11az, how is the baseline established?

*As above NGV has not determined what positioning technologies will be specified, nor how they will be specified.*

* If not using 802.11az, suggest review of 802.11v, which has an optional frame for carrying GPS location and timing.

Use Case 6 Automated Driving Assistance

* What is the anticipated throughput?

*The requirement of throughput for automated driving has not yet been determined, if WFA has inputs as to what these requirements should be, share them with us.*

* Are there requirements for latency and range?

*The requirements for latency and range are critical for automated driving assistance, but they have not yet been agreed, if you have inputs as to what the requirements should be, please share them with us.*

* There are many other use cases in automated driving in addition to cooperative maneuvers.
* Infrastructure (I2V) would also be useful for these use cases.

**Overall comments**

* IEEE 1609 or SAE DSRC TC (J2735 & J2945) are the standards bodies that would define new message types, revised BSM content, and performance requirements.
* SAE J2945/1 defines a congestion control algorithm today which is cross layer in its operation. Is NGV proposing a congestion control algorithm that would be contained in layers 1 and 2 (PHY and lower MAC) only?

*The 802.11 specification and all its amendments only specify Layers 1 and 2 features. However, the specification may provide Layer 1 and 2 features that can be used by higher layers provide enhanced capabilities to the system. These features may be useful in cross layer operations, but congestion control implementations will most likely be regulatory domain dependent.*

IEEE 802.11 WG thanks the Wi-Fi Alliance for their support in providing these inputs that will help define the PHY and MAC features in the a NFV amendment. IEEE 802.11 WG is also interested in continuing this discussion, and looks forward to any additional information or comments WFA is willing provide.

**Date of Next IEEE 802.11 WG Meetings:**

802 Interim: 13-18 January 2019, Hilton St Louis at the Ballpark, St. Louis, Illinois, USA

802 Plenary: 10-15 March 2019, Hyatt Regency Vancouver & Fairmont Hotel Vancouver, Vancouver, CA

Sincerely,

Dorothy Stanley

IEEE 802.11 Working Group Chair

References: