IEEE P802.11
Wireless LANs

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| Additions to Draft Reply LS from 802.11 to WFA |
| Date: 2018-11-21 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Onn Haran | Autotalks | Grand Netter Bldg., Kfar Netter, Israel | +972.9.886.5300 | onn.haran@auto-talks.com |
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Abstract

This document contains suggested additions and edits to 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.

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.

IEEE 802.11 WG will consider this information as it continues to develop the scope and capabilities of the NGV amendment. Some of the additional comments provided were questions, many of these questions have not yet been resolved, though we have provided our feedback to them (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?

*NGV SG has two operating modes. Legacy and NGV. It is up to the upper layer to determine which mode to use. NGV SG recognizes the importance of minimizing channel load, thus not sending 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.

Antenna diversity standardization is considered.

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?

*The industry is planning to introduce sensor sharing in the 5.9GHz using legacy 11p.*

*NGV is developing new NGV modulation for more efficient transmission of long sensor sharing messages.*

*Having said that, NGV SG might be considering using spectrum outside of the 5.9 GHz band for raw sensor data sharing.*

Use Case 3 Multi-Channel Operation

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

NGV is not addressing topics in IEEE 1609 domain. IEEE 1609.4 operation ignores the PHY limitations, which may cause mutual interferences between channels. NGV may decrease those limitations.

* 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 and will not be specified.*

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.

The last two points refer to the capability of the infrastructure to determine the data rate. It may be done by upper layer (IEEE 1609) or by MAC layer advertisements.

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?

*Sensor information may be shared today between devices already using legacy 11p. NGV is studying adaptation of 802.11az.*

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

*NGV has not determined how it 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.*

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: