IEEE P802.11  
Wireless LANs

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| Draft TGbd Comments on FCC NPRM Docket 19-138 | | | | |
| Date: 2020-01-13 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Joseph LEVY | InterDigital, Inc. | 2 Huntington Quadrangle  4th floor, South Wing Melville, NY 11747 | +1.631.622.4139 | jslevy@ieee.org |
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Abstract

This document provides a draft of the potential 802.11 TGbd postions and opintions related to the United States (US) Federal Comunications Comission (FCC) recently released Notice of Proposed Rule Making (NPRM) on the matter of use of the 5.850-5.925 GHz Band, ET Docket No. 19-138.

r0 – The content of this revision is based on previous available content from some available references. The content has not been yet discussed by 802.11 TGbd and hence is provided only as a place to start the discussion.

**Before the Federal Communications Commission**

**Washington, D.C. 20554**

In the Matter of )

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of Use of the 5.850-5.925 GHz Band ) ET Docket No. 19-138

**Ex Parte OF IEEE 802**

Paul Nikolich

Chair, IEEE 802 LAN/MAN Standards Committee

em: IEEE802radioreg@ieee.org

January 2020

I. Introduction

IEEE 802 LAN/MAN Standards Committee (LMSC) is pleased to provide comments on the above-captioned proceeding to the NPRM on the use of the 5.850-5.925 GHz Band dated 17 December 2019.

IEEE 802 LMSC is a leading- consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). We appreciate the opportunity to provide these comments to the Commission. With the release of FCC NPRM 19-129 (Docket 19-138), the United States Federal Communications Commission has requested comments regarding assess the 5.9 GHz band rules and propose appropriate changes to ensure the spectrum supports its highest and best use. In this NPRM it is proposed to: … continue to dedicate spectrum—the upper 30 megahertz portion of the band—for transportation and vehicle safety purposes, while repurposing the remaining lower 45 megahertz part of the band for unlicensed operations to support high-throughput broadband applications.”

IEEE 802 is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 420,000 members in about 190 countries and supports the needs and interests of engineers and scientists broadly. In submitting this document, IEEE 802 acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802. Therefore, this submission should not be construed as representing the views of IEEE as a whole.1

The IEEE Std 802.11p-2010 amendment, now incorporated into IEEE Std 802.11-2016, provides core technology for Dedicated Short Range Communication (DSRC). The term "OCB" (outside the context of a BSS) was introduced in IEEE 802.11p, which specified "Wireless Access in Vehicular Environments". The OCB specifications within IEEE Std 802.11 continue to support DSRC-compatible operation.

The IEEE 802.11 Working Group (WG) is now specifying an IEEE Next Generation V2X (NGV) amendment the P802.11bd project. As described below, the IEEE NGV amendment is intended to provide a seamless evolution path from DSRC in the 5.9 GHz DSRC band. Any consideration of the rules governing use of the 5.9 GHz band must recognize the societal value of allowing DSRC and IEEE NGV to operate together throughout the band. I should be noted that one of the advanced features being considered for the P802.11bd project is 20 MHz bandwith operation.

Additional background information: the IEEE 802.11 Regulatory Standing Committee provided an open, public forum to study the issues surrounding U-NII-4 band sharing between Wireless Local Area Networks and Dedicated Short Range Communications; this DSRC Coexistence “Tiger Team” has examined some initial ideas for how band sharing could work. The complete record of the work of the Tiger Team since its inception in August 2013, identifies the issues surrounding the proposed band sharing ideas discussed in the group, assesses the level of support for these concepts among the participants in the group, and recommends next steps for validating the sharing methods. The record is contained in a subset of the documents stored at <https://mentor.ieee.org/802.11/documents?is_group=0reg>. The relevant documents are dated between 21 August 2013 and 11 March 2015; most, but not necessarily all, include the word "DSRC" and/or "Tiger" in the title.

The record will inform regulators about initial discussions regarding the feasibility and practicality of sharing the 5.9 GHz band and outlining future analysis and field/lab testing that needs to take place to assure that these techniques will protect DSRC transmissions from harmful interference when deployed in the mass market.

II. Current deployments are using the entire band

As the US Department of Transportation noted, in October 2018 there were already more than 70 active DSRC deployments, using all seven channels and with thousands of vehicles on the road2. IEEE 802 believes that allowing automakers and infrastructure owner-operators to evolve their deployments to NGV over time will protect past and future investments in DSRC, providing a critical incentive for additional deployment of these life-saving technologies. As outlined below, we are concerned that alternative deployment models, will undermine existing investments and discourage widespread deployment of V2X technology.

III. Definitions:

To facilitate this discussion, we offer specific definitions of key terms. These definitions describe various relationships between IEEE 802.11p devices and IEEE P802.11bd devices (also known as DSRC and IEEE NGV devices, respectively). While these definitions are for devices implementing the DSRC and NGV technologies, they may also be applied more generally to analyze the relationship between other V2X technologies. These definitions are agreed3 within IEEE 802.11 TGbd (the task group developing the IEEE P802.11bd NGV amendment):

• **Interoperability –** IEEE 802.11p devices to be able to decode at least one mode of transmission of IEEE 802.11bd devices, and IEEE 802.11bd devices to be able to decode IEEE 802.11p transmissions

• **Co-existence** – IEEE 802.11p devices to be able to detect IEEE 802.11bd transmissions (and hence defer from transmissions during IEEE 802.11bd transmissions causing collisions) and vice versa

• **Backward compatibility** – Ability of IEEE 802.11bd devices to operate in a mode in which they can interoperate with IEEE 802.11p devices

• **Fairness** – Ability of IEEE 802.11p devices to have the same opportunities as IEEE 802.11bd devices to access the channel

IV. IEEE 802 vision of V2X technology evolution:

The IEEE 802 vision for V2X technology evolution is documented in the approved Project Authorization Request for the IEEE NGV amendment4, which requires that:

“This amendment shall provide interoperability, coexistence, backward compatibility, and fairness with deployed OCB (Outside the Context of a BSS) devices.”5

In other words, IEEE next generation V2X technology (NGV) will have fair same-channel coexistence with DSRC and will be interoperable and backward compatible with DSRC.

Furthermore, this vision is extensible to further generations. A future extension of IEEE 802.11p and IEEE P802.11bd will also be able to achieve fair, same-channel co-existence, interoperability, and backward compatibility with previous generations. Backward compatibility across generations of IEEE 802.11 technology is fundamentally based on use of a common packet preamble and channel access mechanism.

The IEEE 802 vision of V2X technology evolution ensures that investments in DSRC are protected over the long lifetimes of automotive on-board units (OBUs) and roadside units (RSUs). This protection is critical for encouraging DSRC deployments today and in the near future. By contrast, any proposals that threaten to impair these investments will discourage deployment and delay the realization of societal benefits from this spectrum.

VI. 3GPP vision of V2X technology evolution:

By contrast, the 3GPP vision for technology evolution appears to be that none of these attributes will apply between two V2X technologies or two generations of the same technology. LTE V2X PC5 has been specified in a way that it does not achieve fair same-channel coexistence with incumbent DSRC technology, nor does it interoperate with DSRC, nor is it backward compatible with DSRC.

3GPP is now specifying a new generation of cellular V2X (i.e. New Radio, NR). The study item phase of NR V2X PC5 is complete and the terms for the specification phase have been agreed. It is now clear that NR V2X PC5 will fail to achieve any of these key evolution characteristics not only with DSRC but also with the previous generation cellular V2X (LTE V2X PC5). To be clear, NR V2X PC5 will not be able to coexist in the same channel, interoperate, or be backward compatible with LTE V2X PC5.

VII. Implications of different evolution models:

The 3GPP V2X technology evolution model implies a high societal cost, a cost that is completely avoided in the IEEE 802 V2X evolution model. The 3GPP model implies that V2X spectrum must be fragmented into sub-bands associated with every different V2X technology.

Band fragmentation carries significant costs. First, it disrupts the Commission’s vision of uniformly interoperable communication among all V2X devices based on a single technology family. With multiple non-interoperable technologies operating in different sub-bands, some devices will not be able to communicate with others. For example, if two automakers choose different technologies and different sub-bands for sending Basic Safety Messages (BSMs), vehicle collisions that could have been prevented if those BSMs were successfully exchanged will not be prevented, leading to unnecessary loss of life and property. Many vehicles are already equipped to send BSMs with DSRC. Allowing some automakers to send BSMs using only DSRC, LTE V2X PC5 or NR V2X PC5 will cause a loss of interoperability and attendant increase in road fatalities is a direct result of the fragmentation evolution model. This also extends to all other use cases supported by DSRC and by non-interoperable cellular V2X technologies. V2X evolution under the IEEE 802 model does not suffer this cost. Every vehicle will be interoperable with every other vehicle, whether the vehicles are DSRC-capable or NGV-capable.

Thank you for consideration of this information. If there are any questions, please contact me.

Regards,

By: /ss/ .

Paul Nikolich

IEEE 802 LAN/MAN Standards Committee Chairman

em: p.nikolich@ieee.org

**References:**