**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **<Draft submission relating to the FCC mid-band spectrum NOI>** |
| Date Submitted | [14 Sept 2017] |
| Source | [Billy Verso][Decawave Ltd][Dublin, IRELAND] | Voice: [+353.1.697.5036]Fax: []E-mail: [billy.verso@decawave.com] |
| Re: | [FCC mid-band spectrum NOI response] |
| Abstract | [Draft submission for discussion] |
| Purpose | [To present to the 802.15 WG this **draft** submission representing the view of the author, and solicit WG support for the position it presents, to be then taken as representing the view of the WG.] |
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**BACKGROUND**

The FCC has an open public notice of inquiry, NOI, GN Docket No. 17-183, titled “Expanding Flexible Use in Mid-Band Spectrum between 3.7 and 24 GHz.” (FC 17-104, Released: August 3, 2017). This NOI is largely in response to lobbying by two separate coalitions of Wi-Fi manufactures who are seeking more bandwidth for their services.

Part of this “expansion of use” includes opening bands in the 6 GHz to 7 GHz range which is of concern to current 802.15.4 users of these bands under FCC PART 15 Subpart C Section 15.250, and/or under Subpart F.

Earlier in the week I brought these concerns to 802.18 with the submission [18-17-0115-01-0000](https://mentor.ieee.org/802.18/dcn/17/18-17-0115-01-0000-uwb-in-ieee-802-and-fcc-mid-band-spectrum-noi.pptx), titled *UWB in IEEE 802 and FCC Mid-band Spectrum NOI* since the draft response being prepared by 802.18 was at that time not mentioning these 802.15 users of this band. The aim of the submission was to highlight that opening the 6 GHz to 7 GHz band would have a negative impact on those wideband and UWB users already operating in those bands, and so not a good thing from the point of view of those 802.15 users.

The 802.18 chair offered to allow me some input to the response, which I duly provided, and the resultant document has included a statement saying that it may adversely affect the performance of existing UWB devices based on IEEE 802.15.4a (2007), IEEE 802.15.6 (2012) and IEEE 802.15.4f (2012) standards.

--- This is probably as much as I could have hoped for.

The view expressed by 802.18, is that this matter can be left to be resolved by 802 coexistence mechanisms, but that will really be unworkable: The new radios are unlikely to be able to detect the WB/UWB devices traffic even if they wanted to avoid them; and, the deployed devices are typically operating in a single channel band with no opportunity to move elsewhere in the case of interference.

The text below is largely similar to my input to 802.18 FCC NOI response drafting committee.

I wish to solicit 802.15 working group support of the viewpoint that it represents.

While the ship may have sailed as far as the 802.18 response to the FCC NOI is concerned, there are other steps in the process, so it would still be good to have 802.15 WG support for this viewpoint.

**The draft text of submission** **relating to the FCC mid-band spectrum NOI**

**Ultra-wideband and wideband applications in the 6 GHz TO 7 GHz band**

The FCC NOI and the 802.18 response are in general representing the view of 802.11 Wi-Fi equipment manufacturers who are seeking more spectrum to offer additional service to their users and additional business opportunities. There are however manufacturers of 802.15 equipment already operating, unlicensed, in the band between 6 GHz and 7 GHz under FCC PART 15 Subpart C Section 15.250, and/or under Subpart F depending on their characteristics. [These are the FCC regulations for wideband (WB) and ultra-wideband (UWB)]. Opening these bands to 802.11 or similar higher power Wi-Fi radio uses would represent substantial new in-band interferers which would typically be impossible for the existing deployed WB/UWB implementations to cope with. One of the main application areas of the current UWB deployments is real-time location systems, which include safety and security applications whose impairment could have serious consequences.

Hundreds of companies have invested massively in R&D over the past few years developing products using 802.15 IR-UWB modulations with various use-cases, including:

* Security of infants and geriatrics in a hospital/home setting
* Safety of personnel operating in proximity to machinery
* Guidance/safety of first responders, e.g. firefighters entering smoke filled buildings
* Automotive passive entry systems based on secure proximity detection
* Position based secure access to buildings, and, position based payment systems.
* Security of inmates/staff in a prison setting
* General indoor navigation, autonomous robot guidance, factory automation, smart home.

Even if they wanted to, typical Wi-Fi (or similar) 802.11 radios would be unable to detect-and-avoid the deployed wideband and UWB devices whose maximum transmit level of -41.3 dBm/MHz will be generally undetectable to these radios unless they include specific demodulators for the deployed modulations, which is likely to be prohibitively expensive. Manufacturers of 802.15 equipment are [I would like to instead be able to say “the **802.15** working group is”] thus opposed to opening up the 6 GHz to 7 GHz bands to Wi‑Fi modulations which will interfere with their deployed equipment operating in this band, e.g. following the applicable parts of IEEE 802.15.4a (2007), IEEE 802.15.6 (2012), IEEE 802.15.4f (2012), and the draft IEEE 802.15.8 currently in its final stages of development.