**Before the**

**Federal Communications Commission**

**Washington, D.C. 20554**

|  |  |  |
| --- | --- | --- |
| In the Matter of:  Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz | )  )  )  ) | GN Docket No. 17-183 |

**REPLY COMMENTS OF DECAWAVE**

Michael Mc Laughlin,

Chief Technical Officer,

Decawave.

[michael.mclaughlin@decawave.com](mailto:michael.mclaughlin@decawave.com)

November 15, 2017

In the matter of the Notice of Inquiry regarding Expanding the Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, Decawave would like to submit the following reply comments.

# Unlicensed use between 3.1 and 10.6 GHz is already allowed

In their submissions, the Wireless Broadband Alliance[[1]](#footnote-1), Hewlett Packard Enterprise[[2]](#footnote-2), Broadcom[[3]](#footnote-3) and some others request unlicensed use in the frequency bands 3.7-4.2 GHz and 5.925-7.125 GHz. Perhaps they were slightly misled by the initial FCC NOI, which omitted this fact, but as pointed out in our original submission[[4]](#footnote-4) and the submission by Zebra Technologies[[5]](#footnote-5), unlicensed use is already allowed in the entire range from 3.1 to 10.6 GHz under the UWB regulations of Subpart F and, in the case of the spectrum between 5.925-7.125 GHz, also Subpart C, Section 15.250 - Operation of wideband systems within the band 5925-7250 MHz.

# U-NII band power levels have already been shown to be unacceptable

Interference studies leading up to the UWB regulations, both within FCC and for example CEPT/ECC, have shown that the U-NII band power levels that the Wireless Broadband Alliance[[6]](#footnote-6), Hewlett Packard Enterprise[[7]](#footnote-7), Broadcom[[8]](#footnote-8) and others are asking for is incompatible with the non-protected, non-interfering requirements of Part 15.

Zebra’s submission[[9]](#footnote-9), as well as those from some satellite operators, show that the protection mechanisms that the proponents are suggesting are insufficient from a practical point of view. The submission from IEEE 802.15[[10]](#footnote-10) is opposed to opening the 6 GHz to 7 GHz band to IEEE 802.11 type modulations cited by some of the proponents because it has not been demonstrated how they will ensure coexistence with current IEEE 802.15 devices.

We support Microchip[[11]](#footnote-11) in their demand that any new unlicensed technology must be subject to the ‑41.3 dBm/MHz limit.

# UWB should receive incumbent protection

It looks as if the Wi-Fi companies would like to use their consumer brand recognition to ask for a change to the regulations to accommodate their technology instead of adapting their technology to the existing regulations. The desire to transfer existing 5 GHz U-NII band technologies to neighbouring spectrum is explicitly mentioned in the submissions from for example Hewlett Packard Enterprise[[12]](#footnote-12) and Broadcom[[13]](#footnote-13). As one of the companies that have invested in the design of devices that operate under the current regulations, we feel this is disingenuous and unfair.

While UWB operates on a non-protected, non-interfering basis, the suggested unlicensed use of the mid-band would operate under the same Part 15 conditions. Since UWB is an existing Part 15 user operating in the spectrum concerned, we expect that UWB will be protected as an incumbent spectrum user.

NXP Semiconductors[[14]](#footnote-14) highlights how UWB in Subpart F is the only spectrum regulation providing the necessary bandwidth to enable high accuracy ranging and location tracking applications. It would be a pity if this capability was lost due to higher power interfering Part 15 devices being admitted. Besides our initial submission[[15]](#footnote-15), Zebra Technologies[[16]](#footnote-16), Secure Care[[17]](#footnote-17), IndoTraq[[18]](#footnote-18), Novelda[[19]](#footnote-19), Agilion[[20]](#footnote-20), IIDRE SAS[[21]](#footnote-21), and many others[[22]](#footnote-22),[[23]](#footnote-23) have submitted reply comments pointing out the difficulties U-NII band power interference would cause to the operation of their systems.

In the original IEEE 802 submission[[24]](#footnote-24), the proponents admitted that it is unclear how their current system could provide protection to UWB radios operating in the 5.925-7.125 GHz range. In the more recent 802.15 reply comment[[25]](#footnote-25) it is clear that they are opposed to moving forward to any notice of rulemaking in advance of demonstrable proof of UWB coexistence, a virtual impossibility given that the UWB power levels are 60 dB (1 million times) lower than the proposed 802.11 transmit levels.

# Conclusion

Unlicensed use is already available under the UWB rules. These are being used to provide highly accurate ranging and real-time location tracking systems, a functionality that is not supported by any other spectrum regulation. We urge the FCC to ensure that this functionality is not lost and we expect that UWB will be protected as an incumbent spectrum user in both 3.7-4.2 GHz and 5.925-7.125 GHz for this NOI.

Previous interference studies regarding UWB devices have shown the -41.3 dBm/MHz limit is close to the maximum that most existing primary users are willing to deal with. We are sceptical that a repeat of these studies would lead to a different result, let alone the 60 dB extra that U-NII band powers imply, and recommend that any further actions be limited to the spectrum above 10.6 GHz.

1. The Wireless Broadband Alliance submission to GN 17-183, Oct 11 2017 [↑](#footnote-ref-1)
2. Hewlett Packard Enterprise Company submission to GN 17-183, Oct. 3 2017 [↑](#footnote-ref-2)
3. Broadcom Ltd submission to GN 17-183, Oct. 3 2017 [↑](#footnote-ref-3)
4. Michael McLaughlin, Decawave submission to GN 17-183, Oct. 2 2017 [↑](#footnote-ref-4)
5. Zebra Technologies submission to GN 17-183, Nov. 3 2017 [↑](#footnote-ref-5)
6. The Wireless Broadband Alliance submission to GN 17-183, Oct. 11 2017 [↑](#footnote-ref-6)
7. Hewlett Packard Enterprise Company submission to GN 17-183, Oct. 3 2017 [↑](#footnote-ref-7)
8. Broadcom Ltd submission to GN 17-183, Oct. 3 2017 [↑](#footnote-ref-8)
9. Zebra Technologies submission to GN 17-183, Nov. 3 2017 [↑](#footnote-ref-9)
10. IEEE 802.15 Working Group submission to GN 17-183, Nov. 13 2017 [↑](#footnote-ref-10)
11. Microchip Technology submission to GN 17-183, Nov. 13 2017 [↑](#footnote-ref-11)
12. Hewlett Packard Enterprise Company submission to GN 17-183, Oct. 3 2017 [↑](#footnote-ref-12)
13. Broadcom Ltd submission to GN 17-183, Oct. 3 2017 [↑](#footnote-ref-13)
14. NXP Semiconductors submission to GN 17-183, Nov. 1 2017 [↑](#footnote-ref-14)
15. Michael McLaughlin, Decawave submission to GN 17-183, Oct. 2 2017 [↑](#footnote-ref-15)
16. Zebra Technologies submission to GN 17-183, Nov. 3 2017 [↑](#footnote-ref-16)
17. Secure Care Products LLC ('michael mclaughlin') submission to GN 17-183, Oct. 19 2017 [↑](#footnote-ref-17)
18. Michael Hamilton submission to GN 17-183, Oct. 19 2017 [↑](#footnote-ref-18)
19. Novelda US Inc submission to GN 17-183, Oct. 30 2017 [↑](#footnote-ref-19)
20. Agilion GmbH submission to GN 17-183, Nov. 2 2017 [↑](#footnote-ref-20)
21. IIDRE SAS ('FCC 17-104') submission to GN 17-183, Oct. 16 2017 [↑](#footnote-ref-21)
22. 3db Access submission to GN 17-183, Nov. 13 2017 [↑](#footnote-ref-22)
23. Microchip Technology submission to GN 17-183, Nov. 13 2017 [↑](#footnote-ref-23)
24. IEEE 802 submission to GN 17-183, Oct. 2 2017 [↑](#footnote-ref-24)
25. IEEE 802.15 Working Group submission to GN 17-183, Nov. 13 2017 [↑](#footnote-ref-25)