IEEE P802.18
Radio Regulatory Technical Advisory Group (RR-TAG)

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| Draft response to NextNav’s petition for rulemaking |
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This document drafts a proposed response to the NextNav petition for rulemaking (WT Docket No. 24-240)

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Electronic filing September 5, 2024

Re: WT Docket No. 24-240.

Dear Secretary,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks the Wireless Telecommunications Bureau and the Office of Engineering and Technology of the Federal Communications Commission for issuing a public notice on the NextNav petition for rulemaking and for the opportunity to provide feedback on this important topic.

IEEE 802 LAN/MAN Standards Committee (IEEE 802 LMSC) is a leading consensus-based open standards development committee for networking standards that are used by industry globally. It produces standards for networking devices, including wired and wireless local area networks (“LANs” and “WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). Technologies produced by implementers of our standards are a critical element for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and of Technical Activities, two of the Major Organizational Units of the IEEE. IEEE has about 400,000 members in over 160 countries and its core purpose is to foster technological innovation and excellence for the benefit of humanity. IEEE is also a major accredited standards development organization whose standards are recognized worldwide. In submitting this document, IEEE 802 LMSC acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC. Therefore, this submission should not be construed as representing the views of IEEE as a whole[[1]](#footnote-1).

Please find below the IEEE 802 LMSC’s comments on this petition for rulemaking.

**Discussion: The 902-928 MHz band is extensively used by unlicensed Part 15 operations including Wi-SUN Field Area Networks (FAN) and supports new technologies such as Wi-Fi CERTIFIED HaLow to enable a thriving IoT ecosystem.**

Permitting NextNav operations at significantly higher power levels, higher Out of Band Emission (OOBE) levels, removing existing restrictions on Multilateration Location and Monitoring Service (M-LMS) operations, and expanding operation to generate both fixed and mobile interference will potentially disrupt the operation of 100s of millions of currently deployed IoT devices using IEEE 802 standards-based technology. Deployed devices include smart meters, streetlights, smart-parking devices, smart signs, environmental sensors, door entry systems, fire and security alarms and structural integrity sensors. NextNav completely fails to demonstrate how coexistence with millions of Part 15 devices can be achieved, which will risk seriously impacting day-to-day operations of a wide range of applications, as well as impeding ongoing technological development and investments.

**Discussion: Other spectrum bands lack sub-1GHz propagation characteristics.**

Sub-1 GHz frequency has better penetration capabilities due to longer range and cleaner propagation spectrum, which allows IoT sensors and low power devices to operate more efficiently. This band is necessary for proper coverage since there is no alternative spectrum available for the Part 15 devices currently occupying this band.

**Discussion: NextNav wrongly asserts that “Part 15 devices do not have any allocation status in the Commission’s rules” (Petition at FN 65).**

Part 15 devices are allocated see § 2.106, pg 31.

**Discussion: NextNav fails to recognize that the Commission’s rules clearly define “harmful interference” from Part 15 devices to M-LMS.**

By proposing to suppress §90.361, NextNav seeks to eliminate a carefully balanced coexistence arrangement.

**Discussion: The NextNav proposal to eliminate the testing requirements of current rule section 90.353(d) is without merit and contrary to public interest.**

NextNav contradicts itself by arguing that “Coexistence between the NextGen system and unlicensed Part 15 operations should be achievable” while seeking to eliminate the requirement for “field tests” to demonstrate such coexistence.

**Discussion: NextNav wrongly asserts that “The Lower 900 MHz Band Is Underutilized Due to Outdated Service and Technical Rules”.**

The 900 MHz band is widely used by systems such as Wi-SUN FAN and supports growing deployment of Wi-Fi HaLow (IEEE 802.11 based) devices, all operating under Part 15 rules. Both of these systems use IEEE 802 standards for their underlying technology. IEEE standards-based devices have been operating in this band for more than a decade, with estimated deployment exceeding 120 million smart electric meters[[2]](#footnote-2) across North America.

In addition to these IEEE 802 standards-based technologies, Low Power Wide Area Network (LPWAN) technologies such as SigFox and LoRa use the 900 MHz band and there are millions of proprietary 900MHz systems deployed in large scale outdoor applications such as Utility SCADA systems, wastewater monitoring and processing stations, potable water towers, streetlights, electric, gas and water meters (AMR), oil and gas processing and distribution monitoring, agriculture, and many more. Approval of the changes petitioned by NextNav would require cities and towns to spend millions of dollars to migrate their existing systems to different technologies. This is a heavy and seemingly unnecessary burden to urban and rural communities both financially and organizationally in replacing existing systems which are currently meeting application needs. For some of these applications, there may not even be a viable alternative available.

In addition to these outdoor networks, a myriad of wireless consumer products such as cordless phones, intercoms, sensors, toys, garage door openers etc, operate in the 902-928MHz band using FCC Part 15 rules.  These products may not be able to coexist with the proposed NextNav deployments.

(*~References pending*)

**Discussion: NextNav wrongly asserts that IEEE 802 based Location and ranging capabilities do not provide required levels of location/ranging accuracy.**

The NextNav filing references an outdated article[[3]](#footnote-3) discussing indoor ranging using other technologies. However, this information has been superseded by more recent developments by IEEE 802. Robust, precise location and ranging capabilities are available in both 802.11 and 802.15.4 standards.

IEEE 802.11 location and ranging technologies are deployed extensively today to provide location-based services and applications, supporting accurate location information for use cases that are applicable in environments served by the range of often extensive WLAN networks or personal area networks. The recently completed IEEE 802.11az-2022 standard defines precision timing capabilities to enable sub-1 meter accuracy, with P802.11bk defining operation in 320 MHz channels. Both of these standards support location information exchange between infrastructure WLAN and wireless client devices. Additional applications include, for example, Access Point to Access Point ranging to support the Access Point self-location detection capabilities that are required for deployment of 6GHz standard power systems, where, when available, GPS/GNNS data is also used in a complementary fashion. [[4]](#footnote-4),[[5]](#footnote-5),[[6]](#footnote-6)

IEEE 802.11 based location services can operate indoors and outdoors, with precision comparable to or better than the NextNav solution.

IEEE 802.15.4 supports location-based services through UWB that provides very precise ranging, with accuracy to within 3 cm[[7]](#footnote-7). The accuracy and resolution available using 802.15.4 UWB exceeds that physically possible with the NextNav solution, by several orders of magnitude. Further data on performance for indoor applications such as use by emergency services is available [[8]](#footnote-8) There is also an ongoing project IEEE P802.15.4ab[[9]](#footnote-9) which will further improve ranging precision and accuracy. The extremely low transmission power of UWB assures a near zero interference footprint. Multiple UWB systems are presently available that provide both indoor and outdoor location services.

The applications that NextNav asserts as need for rule change are readily addressed with other technologies that are currently available, operating under existing rules. Both 802.11 and 802.15.4 standards support location capabilities using unlicensed spectrum. These technologies are available today and operate without disrupting other services. The benefits that NextNav claims are readily achieved with existing technologies that operate without disrupting the many very important uses of the 902 MHz band. The NextNav solution is not an efficient use of the very limited sub-1GHz spectrum.

**[Insert SUMMARY]**

Respectfully submitted

By: /ss/.

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1. This document solely represents the views of IEEE 802 LMSC and does not necessarily represent a position of either the IEEE or the IEEE Standards Association or the IEEE Technical Activities. [↑](#footnote-ref-1)
2. Information derived from Guidehouse Global AMI Tracker 4Q23 research data. [↑](#footnote-ref-2)
3. Tim Meng, Wi-Fi, UWB and Bluetooth, which indoor positioning accuracy is strong?, LinkedIn (Apr. 20, 2020), https://www.linkedin.com/pulse/wi-fi-uwb-bluetooth-which-indoor-positioning-accuracy-tim-meng/ [↑](#footnote-ref-3)
4. <https://standards.ieee.org/beyond-standards/newly-released-ieee-802-11az-standard-improving-wi-fi-location-accuracy-is-set-to-unleash-a-new-wave-of-innovation/> [↑](#footnote-ref-4)
5. <https://www.wi-fi.org/discover-wi-fi/wi-fi-location> [↑](#footnote-ref-5)
6. [https://www.wi-fi.org/beacon/rolf-de-vegt/wi-fi-location-performance-drivers-for-wi-fi-ranging-technologies-and-its](https://www.wi-fi.org/beacon/rolf-de-vegt/wi-fi-location-performance-drivers-for-wi-fi-ranging-technologies-and-its%20)  [↑](#footnote-ref-6)
7. https://uk.mathworks.com/help/comm/ug/uwb-ranging-using-ieee-802.15.4z.html [↑](#footnote-ref-7)
8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8877371/ [↑](#footnote-ref-8)
9. https://standards.ieee.org/ieee/802.15.4ab/10694/ [↑](#footnote-ref-9)