BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	WT Docket No. 24-240
Wireless Telecommunications Bureau	)	
and Office of Engineering and	)	RM-11989
Technology Seek Comment on NextNav	)	
Petition for Rulemaking	)	

To: Chief, Wireless Telecommunications Bureau
Chief, Office of Engineering and Technology

COMMENTS IN OPPOSITION OF

OPEN TECHNOLOGY INSTITUTE AT NEW AMERICA
PUBLIC KNOWLEDGE
CONSUMER REPORTS
NEXT CENTURY CITIES
SCHOOLS HEALTH & LIBRARIES BROADBAND (SHLB) COALITION
DIGITAL PROGRESS INSTITUTE

September 5, 2024

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The Open Technology Institute at New America, Public Knowledge, Consumer Reports, Next Century Cities, Schools Health & Libraries Broadband (SHLB) Coalition and the Digital Progress Institute ("Public Interest Orgs" or "PIOs") hereby submit these Comments in response to the Public Notice issued by the Wireless Telecommunications Bureau and the Office of Engineering and Technology requesting comment on the petition for rulemaking filed by NextNav Inc. ("NextNav").[1] We strongly oppose NextNav's proposal to effectively reallocate 15 megahertz of the shared 902-928 MHz band for a single, nationwide and exclusive flexible use license that it would receive in exchange for its spectrum holdings in the band.

[1] *Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment on NextNav Petition For Rulemaking WT Docket No. 24-240 and RM-11989*, Public Notice, DA 24-776 (WTB rel Aug. 6, 2024) ("Public Notice"); NextNav Petition for Rulemaking, Enabling Next-Generation Terrestrial Positioning, Navigation, and Timing and 5G: A Plan for the Lower 900 MHz Band (902-928 MHz) (filed Apr. 16, 2024) ("Petition"); Letter from Robert Lantz, General Counsel, NextNav Inc., to Marlene H. Dortch, Secretary, FCC (filed June 7, 2024) ("Supplement").

I. INTRODUCTION AND SUMMARY

Our groups strongly oppose NextNav's proposal to effectively reallocate 15 megahertz of the shared 902-928 MHz band for a single, nationwide and exclusive flexible use license that it would receive in exchange for its spectrum holdings in the band. Today, the Lower 900 MHz band is the only low-band spectrum available for unlicensed use and home to a massive and rapidly growing ecosystem that supports home and business IoT and other device connectivity needs. Tens of millions of consumers, businesses, schools and other government services rely on the band to connect hundreds of millions of devices. NextNav's misconceived proposal would reduce the already limited spectrum available for open and cost-free device connectivity from 26 to 11 megahertz at precisely the time that low-cost IoT connectivity is exploding in scale and becoming central to home, business and smart city connectivity.

Our comments make three general points in opposition to NextNav's Petition:

First, NextNav's proposal is completely contrary to the Commission's rules, policy framework and goals for the band. Unlicensed use of the 902-928 MHz unleashed a wave of innovation and device-to-device connectivity that would have been unimaginable four decades ago. In adopting its *1995 LMS Order,* the Commission was keenly aware of the economic and social value of ensuring that any new use could coexist with the already well-established unlicensed and amateur uses of the band. Accordingly, the Commission sought to 'maximize coexistence,' to 'strike an equitable balance,' and to create 'regulatory certainty' by granting M-LMS overlay licenses subject to four different conditions that would both preserve unlicensed access to the entire band and minimize interference.

For nearly 30 years the Commission's framework has been a raging success. But now NextNav proposes to reorganize the band, reallocate 60 percent of the spectrum to an entirely different service, assign to itself the exclusive rights to 15 megahertz of full power flexible use

(mobile) spectrum, and condense all other incumbent users of the band (both licensed LMS and unlicensed devices) into the remaining 11 megahertz, which will likely cause millions of devices to malfunction or become worthless. NextNav further proposes to rewrite the Commission's rules for the band, including the elimination of the existing testing requirement and safe harbor that has applied to the unlicensed operation of Part 15 devices across the entirety of the Lower 900 MHz band. None of this is consistent with the rules, Commission policy, or with the broader public interest in widely shared use of this unique band.

Second, the band supports a plethora of important use cases in a range of industries, as well as for connected home and smart city applications that are only beginning to emerge and proliferate. The 900 MHz band powers devices that shape the medical field, industrial logistics, agriculture, utilities, security, transportation, retail operations and more. It supports a vast network of devices including audio assistance devices, drones, the U.S. government's REAL IDs, toll collection, security systems, panic buttons, baby monitors, smart electricity meters, temperature and humidity sensors, smart lighting, medical wearable devices, rural broadband and irrigation control. It is exceedingly difficult, in fact, to pinpoint some major area of consumer-facing or commercial relevance that does *not* rely in some way on the band.

Entire ecosystems of interoperable products and specifications have sprung up around 900 MHz. In many ways, the IoT is grounded in use of the band. RAIN radio frequency identification (RFID) is a technology that wirelessly connects everyday items to the internet using frequencies between 860 and 960 MHz. The technology is used to support asset tracking, mail delivery, self-checkout, the supply of medicine and medical devices, and more. Z Wave protocol enables scalability and interoperability among certified devices. Its 300 plus participating companies provide over 4,000 products offering everything from home security

(garage doors, cameras) to home management (lights, water, leakage detection) to energy management. And LoRaWAN, a Low Power, Wide Area networking protocol, boasts among its use cases waste management, irrigation control, supply chain tracking and pollution monitoring. Disrupting this rich landscape of realized use cases—especially at a time when IIoT, connected homes, and smart cities are only growing in importance—risks upending enormous parts of the consumer-facing and commercial marketplaces in pursuit of a claimed narrowband application with tenuous benefits.

Finally, at the heart of NextNav's proposal is an undeniable and indefensible windfall that is wholly unnecessary even in relation to the company's claimed goal of deploying a very narrowband PNT network as a GPS alternative. Under a truly equitable "swap," NextNav would relinquish 15 megahertz of comparable value. Instead, NextNav is proposing to exchange 14 megahertz of very low-power, limited-purpose, shared and heavily encumbered licenses for 15-megahertz of full power, flexible use spectrum reallocated to an entirely different (mobile 5G) service. A substantial share of its licenses (A Block) have been terminated and are not available for commercial use.

NextNav's proposed "swap" represents a wildly unnecessary windfall. NextNav admits that its promised PNT service would occupy only a tiny fraction of the capacity available on 15 megahertz of 5G spectrum and that it would lease or sell the rest to a mobile carrier partner. Even if the Commission believes there is merit in NextNav's notion of leveraging low-band spectrum to create an enhanced PNT network that is not viable as a business, alternatives include assigning different low-band spectrum or providing incentives to mobile carriers that have their own spectrum below 1 GHz. There is also the fundamental question of whether subsidizing an unprofitable terrestrial alternative to GPS is a decision for the FCC or one better left to Congress.

If there is a pressing public need for this location service, Congress could simply authorize a grant of low-band spectrum, of deployment funding, and require (or not) the FCC or NTIA to initiate an RFP to determine a suitable provider for a public-private partnership for the network. In any case, the answer is not upending this unique and widely-shared IoT device ecosystem.

II. NEXTNAV'S PROPOSAL CONTRADICTS THE COMMISSION'S RULES AND LONGSTANDING POLICY TO PROMOTE COEXISTENCE, CONSUMER WELFARE AND INNOVATION IN THE 902-928 MHZ BAND

Unlicensed use of the 902-928 MHz band began in 1985, unleashing a wave of innovation and device-to-device connectivity that would have been unimaginable four decades ago.[2] Today, the Lower 900 MHz band is the only low-band spectrum available for unlicensed use. This is very significant since today it's widely recognized that a robust, diverse and innovative wireless ecosystem—whether for licensed mobile or for unlicensed connectivity—depends on access to a sufficient amount of low-, mid- and high-band spectrum. While Wi-Fi use has exploded in mid-band spectrum, the Lower 900 MHz band is heavily utilized by a massive and rapidly growing ecosystem that supports home and business IoT and other device connectivity needs.

A decade later, at a time when millions of Part 15 devices had already populated the 902-928 MHz band, the Commission decided to add overlay licenses to enable two distinct types of Location Monitoring Services (LMS) "intended to further the efficiency of the nation's transportation infrastructure."[3] One category (LMS) continues to share two band segments for a

[2] *See Authorization of Spread Spectrum and Other Wideband Emissions Not Presently Provided for in the Commission's Rules and Regulations*, 101 FCC 2d 419 (1985); *Revision of Part 15 of the Rules Regarding Operation of Radio Frequency Devices Without an Individual License*, 4 FCC Rcd 3493 (1989).

[3] *Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, Report and Order, 10 FCC Rcd 4695, 4699-4700 (1995) (1995 LMS Order), at ¶ 6.

total of 14 megahertz. It uses narrowband and short range signals to support services—such as automated toll collection systems—that have expanded enormously to deliver even more widespread public benefits than the Commission predicted in 1995. The other category, Multilateration LMS (M-LMS) was assigned to three band segments, also spanning 14 megahertz, and uses wideband signals for the purpose of tracking vehicles and other moving objects over a wide geographic area.[4] The M-LMS licenses were assigned by competitive bidding and have not garnered much use at all over the subsequent nearly 30 years.

In its *1995 LMS Order*, the Commission was keenly aware of the economic and social value of Part 15 devices in the band, and it sought to ensure that any new use could coexist with the well-established unlicensed and amateur uses of the band.[5] The Commission acknowledged that "[i]n addition to the enormous benefits to both businesses and consumers that will result from the continued growth in the use of the Part 15 industry, our nation's economy also benefits due to the continued development of these new, advanced radio technologies by American companies."[6] In recognition of this value, the Commission stated, "we seek to maximize the ability of Part 15 and amateur operations to coexist with the operation of LMS systems."[7]

Accordingly, the *1995 LMS Order* sought to "strike an equitable balance between the needs of M-LMS service providers and those of the Part 15 users and manufacturers."[8] The rules adopted then, and relied on for over 25 years, were designed to give "Part 15 manufacturers and

[4] *Id*. at ¶ 4.

[5] "It is estimated that several million Part 15 devices have been sold and are being used every day to provide a wide variety of valuable services to the American public." *Id*. at ¶ 8.

[6] *Id*. at ¶ 8. The Order also recognized that Part devices "allow businesses to operate more effectively and efficiently, without the regulatory complexities of many licensed services." *Id*. at ¶ 34.

[7] *Id*. at ¶ 34.

[8] *Id.* at ¶ 23.

users require[d] regulatory certainty" in further developing use of the band.[9] Most crucially, while the Part 15 rules for other unlicensed bands offer users no protection from the harmful interference that may result from licensed use (whether co-channel or adjacent-channel), here the Commission adopted a more balanced and protective approach. The *1995 LMS Order* provided that "to ensure that the coexistence of the various services in the band is as successful as possible," the Commission expressly conditioned the use of M-LMS licenses "upon the **licensee's ability to demonstrate through actual field tests that their systems do not cause unacceptable levels of interference** to 47 CFR Part 15 devices."[10]

Moreover, the Commission defined "what **is not** harmful interference from both amateur operations and unlicensed Part 15 devices to multilateration LMS systems."[11] The *1995 LMS Order* established a safe harbor for certain classes of "unlicensed users of Part 15 devices [within which they] may operate without risk of being considered sources of harmful interference to services with a higher allocation status."[12]

To further ensure the coexistence of the new LMS services with the incumbent public uses, the *Order* imposed additional technical restrictions to reduce the risk of interference to Part 15 devices, including limitations on power[13] and restrictions on the placement of links within authorized spectrum.[14] The Commission also adopted rules specifying the kinds of transmissions that could be made by M-LMS service providers to ensure that such systems are "utilized

[9] *Id.* at ¶ 16. "Our decisions herein also provide certainty for all users of the band so they can invest in the equipment and facilities necessary to bring quality, low cost services to consumers." *Id.* at ¶ 2.

[10] *Id*. at ¶82 (emphasis added); 47 C.F.R. § 90.353(d).

[11] *Id*. at ¶ 36 (emphasis in original).

[12] *Id*. at ¶ 36, embodied at 47 C.F.R. § 90.361.

[13] *Id.* at ¶ 77.

[14] *Id*. at ¶ 74.

primarily for location service and not as a general messaging or interconnected voice or data service" which would pose a much greater risk of interference to Part 15 devices.[15] The Commission reiterated the importance of these restrictions when it granted NextNav more time to build out its network in 2011.[16]

The Commission's nearly 30-year-old framework to ensure coexistence between unlicensed and LMS users in the Lower 900 MHz has been a raging success with respect to innovation, spurring a world-leading proliferation of connected devices operating on a free-to-use unlicensed basis. As described below, it is clear that continued unlicensed use of the entire 902-928 MHz band is uniquely valuable to the public interest. The Commission's carefully crafted framework, designed "to ensure that the coexistence of the various services in the band is as successful as possible," highlights what a radical change NextNav's Petition is proposing.

In contrast to the current ecosystem in which hundreds of millions of connected devices coexist—including both unlicensed and licensed LMS operations—NextNav would reorganize the band, reallocate 60 percent of the band to an entirely different service, assign to itself the exclusive rights to 15 megahertz of full power flexible use (mobile) spectrum, and condense all other incumbent users of the band (both licensed LMS and unlicensed devices) into the remaining 11 megahertz. For many, this will mean devices will malfunction and there will be lost investment. NextNav further proposes to rewrite the Commission's rules for the band, including eliminating the existing testing requirement and safe harbor that have applied for 25 years to unlicensed operation of Part 15 devices across the entirety of the Lower 900 MHz band.

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[15] *Id*. at ¶ 23.

[16] *See Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules*, Order, 26 FCC Rcd 16878, at ¶ 25 (2011) ("2011 Waiver Order") (noting that it had "adopted specific interference rules designed to maintain coexistence of many varied users in the band, including Part 15 users" and the "order does not waive any of those rules").

NextNav expects the Commission to do all this on the premise (and mere promise) that it will use a tiny fraction of that bandwidth to provide a Positioning, Navigation, and Timing (PNT) service it has failed to deliver for more than two decades. Section IV responds to the Commission's questions about the obvious windfall that NextNav is seeking to reap as a consolation for its failed effort to deliver on very similar promises over the past two decades.

Our groups urge the Commission to reject NextNav's flawed Petition out of hand. Among other defects, NextNav either ignores or engages in cavalier hand-waving with respect to the successful, 25-year-old coexistence framework described above. NextNav claims that "[c]oexistence between the NextGen system and unlicensed Part 15 operations should be achievable."[17] However, neither its Petition nor its supplemental filing present results from the required field testing or any other evidence to support that assertion. Instead, despite initially claiming in its Petition that coexistence is feasible, NextNav shows its true intentions by proposing in its supplemental filing to eliminate the safe harbor for Part 15 unlicensed devices,[18] and to remove the Commission's requirement that M-LMS licensees must "demonstrate through actual field tests that their systems do not cause unacceptable levels of interference to Part 15 devices."[19] NextNav obviously has no plan or intention to coexist with unlicensed devices in the 15 megahertz it requests for exclusive use, since it flatly asks the Commission to "[r]emove special treatment for unlicensed operations vis-à-vis licensed operations in the band."[20]

[17] Petition at 31.

[18] Letter from Robert Lantz, General Counsel, NextNav Inc., to Marlene H. Dortch, Secretary, FCC, at A-6 (June 7, 2024) ("Supplement to Petition"), at A-6.

[19] *1995 LMS Order* at ¶ 82.

[20] Supplement to Petition, *supra*, at A-1.

In short, NextNav's Petition is unsupported and misconceived. It does not request changes remotely consistent with the purpose, history or current widespread use of the band by tens of millions of Americans employing hundreds of millions of devices on a regular basis. Further, NextNav provides no cost-benefit analysis, either narrative or numerical, to support its implicit claim that allowing it to lease or sell 60 percent of this widely shared band to a mobile carrier—that might or might not facilitate a nationwide PNT network as a backup to GPS—provides benefits that greatly exceed the cost of disrupting, and ultimately shrinking, the access of all U.S. households, business firms and local governments to the most prolific and productive spectrum for connecting hundreds of millions of devices at low cost. NextNav also fails to reveal what national mobile carrier has agreed to "partner" to deploy this network. The company's CEO acknowledges NextNav "is not going to build the network," but will instead rely on a mobile carrier partner to do so.[21] For all these reasons, the Commission must reject NextNav's Petition.

III. NEXTNAV'S PROPOSAL TO REALLOCATE 15 MEGAHERTZ FROM UNLICENSED TO EXCLUSIVE USE FOR FULL POWER MOBILE 5G WOULD HARM CONSUMERS AND STALL CONNECTED DEVICE INNOVATION

The lower 900 MHz band is far from underutilized; in fact, it hosts a broad and diverse range of use cases – and connects hundreds of millions of devices – that benefit the public in various ways. The band supports audio assistance devices, home security systems, audio and visual monitors, medical devices and drones. Connected devices that it supports define the medical field, logistics (e.g., SCADA), agriculture, transportation, security, utilities, retail operations, and environmental monitoring and control systems. It may be briefer, in fact, to list

[21] Mike Dano, "Nextnav's CEO Explains Her 5G Network Buildout Plan," *Light Reading* (May 3, 2024) https://www.lightreading.com/5g/nextnav-s-ceo-explains-her-5g-network-buildout-plan; and *see* Petition, Executive Summary at i.

the important functions in which the Lower 900 MHz band does *not* play a role. In short, potentially disrupting—perhaps catastrophically—the band's current use will have immense and far-ranging effects on a plethora of industries and vast numbers of consumers.

On multiple fronts, American consumers' safety is secured by devices using the Lower 900 MHz band. Their homes are increasingly protected by a home security system enabled by motion detection sensors that detect any change or movement in the vicinity of its radio frequency field.[22] These motion detectors can be connected to lights or cameras that automatically power on when a change in the field is detected. Remote keyless entry may enable easy access to their vehicles, and tire pressure monitoring systems may provide awareness before tires' air pressure drops dangerously low.[23] A baby monitor may grant peace of mind regarding the safety of a child or pet by transmitting images and/or audio over unlicensed spectrum to a receiver in another room; audio-only baby monitors, in particular, frequently use 900 Mhz.[24]

Most households also rely on a smart electricity meter to encourage economical electricity use and to report usage data regularly and efficiently to utilities—a vast industry that is predicted to grow from 145.9 million installed devices across North America in 2023 to 182.9 million in 2029.[25] Indeed, as of 2022, the Department of Energy reported that more than "100

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[22] Consumer Technology Association, "UNLICENSED SPECTRUM AND THE U.S. ECONOMY: Quantifying the Market Size and Diversity of Unlicensed Devices," at C3 and E1 (Jan. 2022), https://shop.cta.tech/products/unlicensed-spectrum-and-the-us-economy-quantifying-the-market-size-and-diversity-of-unlicensed-devices ("CTA Report").

[23] *Id.* at E3.

[24] *Id.* at C1-C2.

[25] "North America Smart Metering Industry Report 2024: Installed Base of Smart Electricity Meters Set to Grow at a Compound Annual Growth Rate of 3.8%, from 145.9 Million in 2023 to 182.9 Million in 2029 - ResearchAndMarkets.com," *Business Wire* (June 12, 2024), https://www.businesswire.com/news/home/20240612740592/en/North-America-Smart-Metering-Industry-Report-2024-Installed-Base-of-Smart-Electricity-Meters-Set-to-Grow-at-a-Compound-Annual-Growth-Rate-of-3.8-from-145.9-Million-in-2023-to-182.9-Million-in-2029---ResearchAndMarkets.com.

million advanced smart electric meters [had] been installed throughout the United States, with residential installations representing 88% of the total."[26]

Consumers may maintain a view of their porch, yard or the street by their home with a Ring doorbell that captures video images using 908 or 916 MHz.[27] Ring technologies are owned by Amazon and include a number of home security and smart home devices that use the Lower 900 MHz band. The devices can send signals around the home up to 250 feet from the base station.[28] Devices include a range of safety-oriented technologies like motion detectors, video doorbells, panic buttons and smart outdoor lighting.[29] Globally, more than 1.4 million video doorbells were sold by Ring in 2020 alone.[30] Other companies sell millions more.

Beyond the physical home, children or loved ones may attend a school that has Crisis Go's Safety OneClick enabled. Crisis Go uses the LoRaWAN specification to connect its wireless Safety OneClick Button to the internet and provides a network of communication during emergencies.[31] Safety OneClick is a panic button that transmits information to a pre-selected list of recipients that can include school faculty members, law enforcement or other first responders.

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[26] "Modern Smart Meters Offer Consumers the Power of Choice," Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy (March 7, 2022), https://www.energy.gov/energysaver/articles/modern-smart-meters-offer-consumers-power-choice.

[27] "Technical Specifications for Ring Alarm Devices," Ring Help page (accessed Sept. 3, 2024), https://ring.com/support/articles/x9gba/Technical-Specifications-for-Ring-Alarm-Devices?srsltid=AfmBOooIHjBd9t_itglrzhf4TIGiPPHsTVyt5Gzv_zF3HCjukNfn9VOJ.

[28] *Id.*

[29] Ring Products page (accessed Sept. 3, 2024), https://ring.com/collections/all-products.

[30] "Strategy Analytics: Amazon's Ring Remained atop the Video Doorbell Market in 2020," *Business Wire* (May 12, 2021), https://www.businesswire.com/news/home/20210512005336/en/Strategy-Analytics-Amazons-Ring-Remained-atop-the-Video-Doorbell-Market-in-2020.

[31] "Enhance school safety with Safety OneClick – CrisisGo Case Study: AWS IoT Core for LoRaWAN," CrisisGo, at 2 (Aug. 2021), https://d1.awsstatic.com/partner-network/partner_marketing_web_team/Case%20Study_CrisisGo_Aug%202021.pdf.

The system can be set to alerts to evacuate, lockdown, hold, lockout or shelter in place.[32] It provides a line of communication that can be used in cases of day-to-day incidents like bullying, emergency events, inclement weather, and even system testing notifications like fire alarms or power outages.[33]

Many consumers' medical needs are met by devices relying on the 900 MHz band. They may receive medication from a pharmacy with humidity and temperature monitoring systems in place in its storage facilities to ensure environmentally sensitive medication remains viable.[34] Consumers may rely on auditory assistance devices, some of which use the 900 MHz band, that provide enhanced audio at loud events for those who are hard of hearing.[35] Anchor Audio, for example, provides an assistive listening system that operates on the Lower 900 MHz band.[36] And they may rely on a wearable medical device to provide important, real-time input on their health—such as a glucose monitoring system whose transmitter uses the 916.5 MHz/ 868.35 MHz frequency band.[37]

Many of these technologies and similar ones are used commercially as well. For example, the same field disturbance sensors that are used in many home security systems are also used commercially. Large stores selling clothing, drugstore items, or liquor may use them as part of

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[32] *Id.* at 3.

[33] *Id.* at 2.

[34] *See, e.g.*, 900 MHz Temperature / Humidity Transmitter 10071 product page, "Features," Copeland (accessed Sept. 4, 2024), https://www.copeland.com/en-us/shop/1/cooper-atkins-10071.

[35] CTA Report at B3; *see also* Jennifer Groth, MA, director of audiology communication at GN ReSound, "Five Myths About Digital Wireless Hearing Aid Technology," *The Hearing Review* (Dec. 2, 2010), https://hearingreview.com/hearing-products/hearing-aids/ite/five-myths-about-digital-wireless-hearing-aid-technology.

[36] CTA Report at B3; "Assistive Listening: ONE-WAY COMMUNICATION," Anchor Audio (accessed Sept. 4, 2024), https://www.anchoraudio.com/assistive-listening-system.

[37] "Equipment Interference," Medtronic customer support page (accessed Sept. 4, 2024), https://www.medtronicdiabetes.com/customer-support/equipment-interference.

surveillance systems to detect unpaid goods that are brought outside the store's perimeters.[38] "Security fences" can be established through stationary perimeter fields in which an unexpected movement can trigger an alarm.[39] These can be used by law enforcement, fire and rescue, public utilities and industry.[40] Unlicensed wireless headsets can be used as a communication system in retail, particularly in locations such as fast food, supermarkets and drive-thrus.[41]

Even more broadly, radio frequency identification (RFID) technology that uses tags to wirelessly connect devices to the internet is integral to a diverse range of industries. RAIN RFID, which operates between 860 and 960 MHz,[42] helps airlines track their passengers' luggage, allows retailers to track inventory and self-checkout, facilitates mail delivery, and supports the government's REAL ID initiative.[43] The RAIN industry has shipped over 200 billion tag chips and predicts annual shipments of 115 billion units by 2028.[44]

In general, the rapidly expanding market for connected homes and smart devices is fundamentally reliant on 900 MHz. For example, Z Wave is a major network protocol—operating on 908.4 MHz and 916 MHz—that ensures scalability and interoperability among certified smart devices.[45] The Z Wave Alliance's 300 plus member companies offer over 4,000

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[38] CTA Report at C3.

[39] *Id*. at C5.

[40] *Id.* at E3.

[41] *Id.* at C3.

[42] Jill West, "UHF RFID and RAIN RFID: What's the Difference?" Impinj Insights (May 2, 2024), https://www.impinj.com/library/blog/uhf-rfid-vs-rain-rfid-the-differences-and-similarities.

[43] Chris Diorio,"Impinj CEO: RAIN RFID Industry Must Oppose Proposed Changes to 900 MHz Frequency Band," *RFID Journal* (Aug. 22, 2024), https://www.rfidjournal.com/editors-views/impinj-ceo-rain-rfid-industry-must-oppose-proposed-changes-to-900-mhz-frequency-band/221538/.

[44] *Id*.

[45] "Technology Overview," Z-Wave Alliance (accessed Sept. 1, 2024), https://z-wavealliance.org/technology-overview/; "Z-Wave Global Regions," Silicon Labs (accessed Sept. 3, 2024), https://www.silabs.com/wireless/z-wave/global-regions.

certified products and collectively have over 100 million devices in the market.[46] Use cases include, but are not limited to:

- Smart security devices that include garage doors, locks and cameras.[47]
- Home management that includes lights, water and leakage detection.[48]
- Short-term property management facilitated by remote guest check-ins, monitoring and access control.[49]
- Assisted living through remote nurse-check ins and AI insights on patient behavior monitoring and alert devices that can enable aging populations to live alone safely.[50]
- Energy management systems that collect data and predict future usage, and that power smart lighting, thermostat and window controls that reduce energy consumption.[51]

These devices generate impact at enormous scale: indeed, of the roughly 40 million U.S. households protected by home security systems,[52] the vast majority rely on Z Wave in their security panel.

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[46] Devanjan Sikdar, "Matter vs Z-Wave: What You Need to Know" Silicon Labs (July 11, 2024), https://www.silabs.com/blog/matter-vs-z-wave-what-you-need-to-know; "Markets & Use Cases" Z-Wave Alliance (accessed Sept. 3, 2024), https://z-wavealliance.org/z-wave-markets-and-cases/.

[47] "Smart Security," Z-Wave Alliance, Market and Use Cases (accessed Sept. 3, 2024), https://z-wavealliance.org/market_use_case/smart-security/.

[48] "Home Management," Z-Wave Alliance, Market and Use Cases (accessed Sept. 3, 2024), https://z-wavealliance.org/market_use_case/home-management/.

[49] "Vacation + short term property management," Z-Wave Alliance, Market and Use Cases (accessed Sept. 3, 2024), https://z-wavealliance.org/market_use_case/vacation-short-term-property-management/.

[50] "Assisted living + home services," Z-Wave Alliance, Market and Use Cases (accessed Sept. 3, 2024), https://z-wavealliance.org/market_use_case/assisted-living-home-services/

[51] "Energy Management," Z-Wave Alliance, Market and Use Cases (accessed Sept. 3, 2024), https://z-wavealliance.org/market_use_case/z-wave-powers-energy-management-solutions/.

[52] Rob Gabriele, "2023 Home Security Market Report," SafeHome.org (Aug. 7, 2024), https://www.safehome.org/resources/home-security-industry-annual/.

The LoRa alliance similarly presents an enormous and diverse list of verticals enabled by LoRaWAN, which is a Low Power, Wide Area networking protocol that can operate at 915 MHz.[53] Use cases fall under a few major categories, including:

- **Smart cities** that rely on environmental monitoring, in which sensors monitor and inform populations of air, water and noise pollution in the area; remote parking management can help optimize space and ensure no-parking zones are left empty for first responders; waste management can be optimized with detailed, real-time data collection on trash receptacle use.[54]
- **Smart agriculture** that includes livestock monitoring (both for health concerns and against theft) and irrigation control (including monitoring weather conditions, setting flood risk alarms, and monitoring other potential reasons for changes in water use).[55] For example, Water2Milk is a water management system that remotely monitors water systems on dairy farms using a series of sensors.[56]
- **Smart logistics** that entail remote location tracking of goods and fleet vehicles and monitoring of conditions from beginning to end of the supply chain; sensors can also help

[53] "What is LoRaWAN®?" LoRa Alliance (accessed Sept. 3, 2024), https://lora-alliance.org/about-lorawan/; George Hardesty, "LoRa: Long Range Wireless for Internet of Things (IOT): Frequency Bands, Antennas," Data Alliance (Oct. 21, 2023), https://www.data-alliance.net/blog/lora-long-range-wireless-for-internet-of-things-iot-frequency-bands/#:~:text=It%20is%20also%20known%20as,902%20MHz%20to%20928%20MHz.

[54] "LoRaWAN® for Smart Cities," LoRa Alliance (accessed Sept. 3, 2024), https://lora-alliance.org/cities-vertical-market/.

[55] "LoRaWAN® for Smart Agriculture," LoRa Alliance (accessed Sept. 3, 2024), https://lora-alliance.org/agriculture-vertical-market/.

[56] "IoT Ventures Water2Milk," LoRa Alliance (accessed Sept. 3, 2024), https://resources.lora-alliance.org/smart-agriculture/iot-ventures-water2milk.

track goods at warehouses and similar locations and enable automatic reordering of inventory when necessary.[57]

There are a number of other discrete use cases reliant on shared use of the band:

- A recent CTA study estimates the value of wholesale sales of unlicensed drones and "radio-controlled hobby craft" as $2.7 billion in 2020.[58] Drones and other remotely-controlled devices including miniature cars and planes can operate on unlicensed spectrum at 900 MHz.[59]
- Automatic Vehicle Identification Systems (AVIS), operating on the lower 900 MHz band, can identify and track vehicles through tags. They can be used to restrict entry to a gated community or parking lot, to track fleet vehicles, or in electronic toll collection.[60] The CTA study estimates the value of those unlicensed technologies at $40 million in 2020.[61]
- CenTrak offers asset tags, patient wearables and staff badges that can operate on the 900 MHz band. They can be used to keep track of and locate resources, contain wandering patients and help support staff efficiency.[62]
- A large share of WISPs also continue to rely on the band to provide broadband service to customers in rural, remote and topographically difficult locations.[63]

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[57] "LoRaWAN® for Smart Logistics," LoRa Alliance (accessed Sept. 3, 2024), https://lora-alliance.org/logistics-vertical-market/.

[58] CTA Report at 13.

[59] *Id*. at B8.

[60] *Id*. at B4.

[61] *Id*. at 14.

[62] "IoT Devices," CenTrak (accessed Sept. 4, 2024), https://centrak.com/our-process/iot-devices.

[63] Linda Hardesty, "Is FWA from big carriers different than FWA from WISPS?" *Fierce Network* (May 11, 2021), https://www.fierce-network.com/tech/fwa-from-big-carriers-different-than-fwa-from-wisps.

Even licensed LMS users of the band are rightly trepidatious of the disruption that would be wrought by the proposed rebanding. The Los Angeles County Metropolitan Transportation Authority ("Metro") recently alerted the FCC to its concern that the change would interfere with the transponders it uses for its toll lanes, which process 110 million transactions per year.[64] The two high-occupancy toll lanes (Express Lanes) in the county span 72 miles, include 75 transponder antennas, and over 850,000 active transponders in distribution.[65] Metro contends that if the available spectrum were reduced as suggested and "all existing licensed and unlicensed users of the lower 900 MHz frequencies [were] compressed… [it would] face potential significant difficulties identifying frequencies that can be used for its transponder communications without being subject to interference moving forward."[66] In addition, the lack of guard bands in the proposal would require Metro to create buffer zones within its own available spectrum, further reducing the bandwidth available for the actual application.[67]

These arguments can be applied more broadly to many of the use cases listed above, both unlicensed and licensed. Even in cases where the user may still be able to access the same or similar spectrum, significantly increased congestion in a smaller band will render everyone's operations less productive and more fraught. There would also be a tremendous opportunity loss with respect to future innovation and connected devices that would be crowded out of a now shrunken shared band.

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[64] Jake Neenan, "L.A. Transit Agency Fears Revenue Hit if FCC Approves Spectrum Plan," *Broadband Breakfast* (Sept. 3, 2024), https://broadbandbreakfast.com/l-a-transit-agency-fears-revenue-hit-if-fcc-approves-spectrum-plan/.

[65] Memorandum from Mark Linsenmayer, Executive Officer, ExpressLanes, LA County Metropolitan Transportation Authority, to Federal Communications Commission, WT Docket No. 24-240, at 1 (Aug. 30, 2024).

[66] *Id.*

[67] *Id.* at 1-2.

IV. NEXTNAV IS SEEKING AN UNJUSTIFIED WINDFALL THAT ONLY CONGRESS HAS AUTHORITY TO GRANT

As part of its petition, NextNav proposes to swap its current M-LMS holdings for "a single, nationwide 15-megahertz flexible use license" that aligns with its proposed reorganization of the band.[68] However, to the extent that the word "swap" implies a "like for like" trade, this description is a deep mischaracterization. Under a truly equitable trade, NextNav would relinquish 15 megahertz of spectrum rights of comparable value, which at a minimum would be two-way, full power, exclusive use and mostly contiguous bands. Instead, NextNav is proposing to exchange 14 megahertz of very low-power, limited-purpose, shared, impaired, and heavily encumbered licenses for 15-megahertz of full power, flexible use spectrum reallocated to an entirely different (mobile 5G) service.[69]

Further, in addition to the fact that NextNav shares the 14 megahertz it proposes to "swap" with a multitude of authorized users, it appears that even its own limited licensing rights are impaired. As the *Public Notice* observes, "Progeny's A Block licenses were terminated and, unlike its B and C Block licenses, were not authorized by the Commission for commercial operations."[70] In 2017, "WTB denied the waiver/extension requests for Progeny's two A Block licenses, which were not authorized to provide commercial operations, and therefore terminated as of July 2012."[71] This suggests that 41% of NextNav's holdings in the band, which were never

[68] Petition at iv; Public Notice at 1.

[69] *Id.*

[70] Public Notice at 5.

[71] *Id.*, noting that Progeny filed a petition for reconsideration and a petition for modification of its terminated A Block licenses, both of which remain pending since the 2017 Order. *See Request of Progeny LMS, LLC for Waiver and Limited Extension of Time,* Order, WT Docket No. 12-202, 32 FCC Rcd 122 (WTB MD 2017) (Progeny 2017 Order*);* Progeny LMS, LLC's Petition for Reconsideration, WT Docket No. 12-202 (filed Feb. 16, 2017); *Progeny LMS, LLC's Petition for Modification of A Block M-LMS Licenses*, WT Docket No. 12-202 (filed Apr. 4, 2018).

built out, are not eligible for commercial operations—and have been terminated, albeit subject to Progeny's pending appeal. In addition, as the *Public Notice* also states, NextNav has not met the buildout requirements for much of its B and C Block spectrum and has petitions for waivers and extensions of time pending (yet again).[72]

Even if the Commission believes there is merit in NextNav's notion of leveraging low-band spectrum to create an enhanced PNT network, these drawbacks should compel the Commission to consider alternatives, including other low-band spectrum, incentives to mobile carriers, or simply recommending this idea to Congress for funding. Certainly, NextNav's proposed "swap" would represent a wildly unnecessary windfall. NextNav admits that its promised PNT service would occupy only "a small amount of capacity,"[73] "roughly 2% to 5% of the network's total capacity,"[74] and that it would lease or sell the rest to a mobile carrier partner.

Despite the huge benefits it claims its PNT network would generate, NextNav essentially admits the marketplace is not interested. NextNav states "it is not economically feasible to deploy a wide scale, standalone terrestrial PNT network."[75] If neither the private nor public sector is interested enough in paying for this functionality to motivate even one of the three nationwide mobile carriers to add this onto their existing network infrastructure—and use their own substantial holdings of spectrum below 1 GHz—the real value proposition of NextNav's offering must be thin indeed. In effect, NextNav is using the potential benefits of a hypothetical

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[72] Public Notice at 5. *See* Progeny LMS, LLC, Request for Waiver and Extension of Time, WT Docket No. 12-202 (filed Mar. 31, 2023) ("72 Progeny licenses remain the subject of a pending request for an extension of time to April 2025, which coincides with a z-axis location accuracy deadline for nationwide providers").

[73] Petition, Executive Summary at iii.

[74] Elisabeth Jeffs, "NextNav Lays Out New Vision for Complement and Backup to GPS with Additional Spectrum for Broadband Services," NextNav, News and Resources (Apr. 16, 2024), https://nextnav.com/lays-out-new-vision/.

[75] Petition at iv.

'next generation' PNT network to petition the FCC for windfall profits to support a dubious investment that could be readily deployed in partnership with one or more mobile carriers today if the market perceived substantial value and demand.

When these paltry offerings are considered alongside NextNav's poor track record of deployment and efforts to eschew any buildout obligations, they prompt significant questions about the needs this transfer would address—in particular, whether those needs are the public's or NextNav's.[76] To its credit, NextNav's petition straightforwardly lays out the commercial motivations for their efforts: "Reconfiguring the band plan and adopting rules that enable flexible use will also provide 15 megahertz of low-band spectrum for use by mobile wireless networks, a significant addition to the low-band spectrum pipeline."[77] If NextNav's FCC petition is granted and they are able to fully utilize and sell or license about 95% of the spectrum, and if the spectrum is repurposed and valued at $1 per MHz-Pop, analysts estimate that NextNav's shares could be worth over $30, or more than 4x their current share price—with past transactions suggesting even greater potential upside.[78]

However appetizing this investment opportunity may appear to NextNav's shareholders, or to a mobile carrier receiving a discount on use of low-band spectrum that could have been auctioned, this does not constitute a rationale for reallocation to NextNav. Rather, it should prompt the Commission to consider whether NextNav would be the most efficacious steward of these bands, relative to their prospective mobile partners or the band's current occupants. As outlined above, Part 15 operations in the band are meeting public needs in diverse, innovative

[76] *Id.*

[77] Petition, Executive Summary at i.

[78] Rowan Street Capital, "NextNav: Being Patient Here Will Be Worth It," Seeking Alpha (Jul. 30, 2024) www.seekingalpha.com/article/4707907-nextnav-stock-being-patient-here-will-be-worth-it.

and exponentially increasing ways. The NextNav proposal stands poised to disrupt this progress by waiving requirements that are critical for mixed band use such as rigorous field testing, which would jeopardize billions of dollars worth of investments and innovations in this band.

Given the immense innovation that diverse unlicensed operations have unlocked, these requirements have proved prescient—and the Commission should strongly weigh the questionable *prospective* benefits of this proposal against the *known* benefits of the myriad unlicensed and licensed LMS systems and devices that currently coexist across the band's 26 megahertz. Since Part 15 devices must accept interference from NextNav's systems once they are approved, it is all the more important that rigorous pre-deployment testing is performed that ensures that NextNav's systems are compatible with ongoing Part 15 operations.

Moreover, there is the fundamental question of whether subsidizing an unprofitable terrestrial alternative to GPS is a decision for the FCC or one better left to Congress. If there is a pressing public need for this location service, Congress could simply authorize a grant of low-band spectrum, of deployment funding, and require (or not) the FCC or NTIA to initiate an RFP to determine a suitable provider for a public-private partnership for the network. Alternatively, if the Commission is convinced by NextNav's arguments that the 900-928 MHz band is woefully underutilized and should be reallocated for exclusive flexible use, the Commission can wield the incentive auction authority that Congress granted it in 2012. This would not only engage the stakeholders most capable of effectuating a buildout (mobile carriers), but prompt wireless carriers to consider if they could address these PNT needs through a standards-based solution using their *existing* networks in commercial bands.

If the Commission accepts NextNav's premise that PNT-only networks are essential, but not commercially viable without substantial federal subsidies, it is all the more critical that the

agency assess the most cost-effective strategies for establishing these networks. The aforementioned Public Interest Orgs argue that it is unlikely that windfall payments to intermediaries who merely resell twenty times as much low-band spectrum as they need to achieve the proposed public interest purpose is truly the most efficient and direct approach.

CONCLUSION

NextNav's proposal to effectively reallocate 15 megahertz of the shared 902-928 MHz band would reduce the already limited spectrum available for open and cost-free device connectivity from 26 to 11 megahertz at precisely the time that low-cost IoT connectivity is exploding in scale and becoming central to home, business and smart city connectivity. The band is the only low-band spectrum available for unlicensed use and home to a massive and rapidly growing ecosystem that supports home and business IoT and other device connectivity needs. Tens of millions of consumers, businesses, schools and other government services rely on the band to connect hundreds of millions of devices.

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