NEXTNAV

July 9, 2025

VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street NE
Washington, DC 20554

Re: Promoting the Development of Positioning, Navigation, and Timing Technologies and Solutions (WT Docket No. 25-110); 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), Public Notice (WT Docket No. 24-240)

Dear Ms. Dortch,

NextNav Inc. ("NextNav") submits the attached report, *Supplement to NextNav's Engineering Study on 5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band*. In February 2025, in response to stakeholder requests for additional technical analysis of NextNav's proposal for a next-generation, terrestrial positioning, navigation, and timing ("PNT") system as a complement and backup to the Global Positioning System ("GPS"), NextNav submitted an engineering study titled *5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band* ("NextNav Technical Study").[1] The NextNav Technical Study provided a rigorous and comprehensive technical analysis based on real-world deployment scenarios, demonstrating that the proposed 5G operations in the 902 – 928 MHz ("lower 900 MHz") band will coexist with unlicensed Part 15 technologies.[2]

Rather than seriously addressing the NextNav Technical Study, commenters who oppose NextNav's proposal have advanced numerous misconceptions about NextNav's proposal.[3] Further,

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[1] John Kim et al., *5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band*, NextNav (Feb. 27, 2025), attached to Letter from Renee Gregory, NextNav Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 24-240 (Feb. 27, 2025) ("NextNav Technical Study").
[2] *Id.*
[3] *See, e.g.*, *See* Richard Rudd, *Assessment of the NextNav Inc document "5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band - A coexistence Analysis,"* Plum, at 9 (Apr. 25, 2025), attachment to Letter from Aileen Ryan et al., Counsel to RAIN Alliance et al., to Marlene H. Dortch, Secretary, FCC, WT Docket Nos. 25-110 and 24-240 (filed Apr. 28, 2025).

such commenters have failed to provide rigorous technical analysis to back up their claims that coexistence between 5G NR and unlicensed use is not feasible.

While the NextNav Technical Study continues to stand on its own, this supplemental report further validates its assumptions and conclusions. First, this report includes a detailed discussion of the misunderstandings and mischaracterizations advanced by the critics of NextNav's proposal, and where relevant, it provides additional data and analysis to support NextNav's assumptions. And second, while the original assumptions in the NextNav Technical Study remain valid, this report also includes additional simulated hypothetical scenarios. This simulation demonstrates that, even if certain assumptions are modified, it does not change the bottom line regarding NextNav's proposal—namely, that introducing 5G operations will not cause unacceptable levels of interference to unlicensed Part 15 devices in the lower 900 MHz band.

Based on the record, including the NextNav Technical Study and this supplemental report, it is clear that the technical merits of NextNav's proposal withstand scrutiny. Further, NextNav's proposal will enable a much-needed, market-based terrestrial backup and complement to GPS, addressing an urgent national security and public safety priority, at no cost to taxpayers. The time for delay and obstruction has come to an end, and the path forward is clear: the Commission should promptly issue a Notice of Proposed Rulemaking to enable 5G-based 3D PNT in the lower 900 MHz band.

Sincerely,

/s/ Renee Gregory

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NextNav Inc.

Supplement to NextNav's Engineering Study on 5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band

A Coexistence Analysis

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July 9, 2025

Executive Summary

This report supplements NextNav's February 2025 comprehensive technical study demonstrating that NextNav's proposed 5Goperations in the 902 – 928 MHz ("lower 900 MHz") band will coexist with unlicensed Part 15 technologies. In that technical study, NextNav concluded—based on detailed analysis, real-world deployment comparisons, and in-depth technical assessments—that the introduction of 5G operations with the technical parameters that NextNav has proposed will not cause unacceptable levels of interference to unlicensed Part 15 devices. This report provides additional support for the assumptions and analysis NextNav used in its technical study and further reinforces that the conclusions drawn in that study are valid.

While NextNav has already submitted a rigorous and thorough technical analysis, NextNav concluded that submitting this supplemental report was necessary because some commenters have attempted to cast doubt on NextNav's proposal by misconstruing and mischaracterizing its technical study. In this report, NextNav's corrects these inaccuracies. Specifically:

- Contrary to inaccurate assertions by some commenters, NextNav reiterates that its proposal will allow Part 15 operations to continue across the entire 902 – 928 MHz band.
- Ironically, some commenters vehemently oppose introducing 5G operations into the lower 900 MHz band, despite the conclusions in the NextNav technical study showing that such a network will be better for coexistence by introducing less emissions into the band than already-authorized M-LMS deployments.
- Along similar lines, NextNav rebuts a flimsy claim that its proposal would result in higher emissions levels than it claims, and instead explains how its San Francisco 5G vs M-LMS analysis is valid and proper by referencing 5G field data from an industry leading mobile network intelligence firm.
- NextNav demonstrates that, contrary to unsupported assertions, it uses established and data-backed 5G NR network characteristics in its technical study.
- NextNav explains how its approach of using real-world assumptions is superior to the implausible worst-case ones that some commenters advance.
- NextNav addresses misplaced concerns that 5G uplink operations pose a risk of unacceptable levels of interference to Part 15 operations, demonstrating that 5G uplink operational characteristics pose less of an interference risk than those of Part 15 operations.

Finally, while NextNav firmly stands behind the assumptions of its technical study, it concludes by providing additional simulation results, which demonstrate that—even if certain assumptions that commenters have criticized are altered—it does not change the conclusions of its study. Specifically, NextNav's analysis demonstrates that its proposal would allow Part 15 devices to continue operating across the entire band, and that 5G operations would better coexist with Part 15 operations than a comparable version of the M-LMS network that the Commission has already approved for deployment in the band.

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1. Introduction

This report supplements NextNav Inc.'s ("NextNav") engineering study titled *5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band* ("NextNav Technical Study") submitted to the Federal Communications Commission ("Commission") in February 2025.[4] The NextNav Technical Study demonstrated that the proposed 5G operations in the lower 900 MHz band can coexist with unlicensed Part 15 technologies. Detailed analysis, real-world deployment comparisons, and in-depth technical assessments supported one consistent finding: the introduction of 5G operations with the technical parameters that NextNav has proposed will not cause unacceptable levels of interference to unlicensed Part 15 devices.

Since the report was filed, some commenters have questioned various aspects of the NextNav Technical Study and its conclusions. However, these comments lack merit due to two main flaws. First, these comments appear to be based on misconceptions regarding NextNav's assumptions and findings. Second, many of the claims are presented without real data or rigorous technical analysis. Heated rhetoric about potential harms rings hollow without data to support assertions that the introduction of 5G operations in the 902 – 928 MHz band would cause unacceptable levels of interference to unlicensed Part 15 devices.

In this report, NextNav first addresses major misconceptions relating to the NextNav Technical Study by reiterating key facts that validate its assumptions and conclusions. Where appropriate, NextNav provides additional data and references to reinforce its previous findings. While strongly standing by its original assumptions, NextNav then simulates additional hypothetical scenarios to demonstrate that changing certain assumptions does not materially affect the study's conclusions. These conclusions are that:

1) Part 15 devices can continue to operate across the entire lower 900 MHz band, and
2) 5G operations offer better coexistence opportunities with Part 15 operations than currently authorized M-LMS deployment parameters.

[4] John Kim et al., *5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band*, NextNav (Feb. 27, 2025), attached to Letter from Renee Gregory, NextNav Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 24-240 (Feb. 27, 2025) ("NextNav Technical Study").

2. Part 15 Commenters' Misconceptions

Many commenters have misrepresented and/or misinterpreted the methodology, assumptions, and results of the NextNav Technical Study. In this section, NextNav addresses these comments by highlighting key facts along with additional data.

2.1 Fact: Under NextNav's proposal, Part 15 operations will continue across the entire 902 – 928 MHz band

Some Part 15 commenters have suggested that NextNav's proposal to enable 5G operations in the lower 900 MHz band would prevent them from operating in the 902 – 907 and 918 – 928 MHz portions of the band and force them to relocate or cease operations.[5] Some even state that NextNav's proposal would limit Part 15 access to the band by 60%.[6] While they suggest that NextNav's optimized band plan would cause major disruptions, they do not explain why these major disruptions would occur with 5G operations, but not with authorized M-LMS operations. These comments lack merit because the proposed band plan retains the current configuration governing the band regarding Part 15 operations. Figure 1 shows a comparison between the current lower 900 MHz band plan and NextNav's proposed band plan. It is clear from the figure that NextNav's proposal does not materially change the amount of spectrum for 5G as compared to that of the current licensed M-LMS designation.

In fact, NextNav has proposed key rule changes that will make the band more conducive to coexistence with Part 15 operations than the current Part 90 M-LMS rules, such as lowering the power limit in the uplink portion of the band and introducing a power-spectral-density-based power limit to cap the maximum emissions allowed in the downlink.[7] In addition, the NextNav Technical Study has shown that there would be no need for Part 15 operations to vacate the 5G portion of the band; rather, they would be able to continue to operate across the entire 902–928 MHz band under NextNav's proposal. The commenters' claim that they

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[5] *See* Comments of the LoRa Alliance at 11, WT Docket No. 24-240 (Sept. 5, 2024) ("LoRa Alliance Comments"); Comments of The Ad Hoc RAIN RFID Coalition at 12-13, WT Docket No. 24-240, RM-11989 (Sept. 5, 2024) ("Ad Hoc RAIN RFID Coalition Comments"); Comments of Security Industry Association at 2, WT Docket No. 24-240 (Sept. 4, 2024); Comments of Wi-SUN Alliance at 2, WT Docket No. 24-240, RM-11989 (Sept. 4, 2024) ("Wi-SUN Alliance Comments").

[6] *See, e.g.*, Response of Wi-SUN Alliance to NextNav Coexistence Study at 3, WT Docket No. 24-240 (Apr. 27, 2025) ("Wi-SUN Alliance Response to NextNav Coexistence Study"); Comments of Wi-Fi Alliance at 6, WT Docket Nos. 25-110 and 24-240, RM-11989 (Apr. 28, 2025) ("Wi-Fi Alliance Comments").

[7] Petition for Rulemaking of NextNav Inc., WT Docket No. 24-240 (Apr. 16, 2024) (advocating for amendments to Part 90 rules).

would need to discontinue Part 15 operations in the proposed 5G segments of the band in anticipation of unacceptable levels of interference does not constitute either network operation best practices or efficient use of spectrum, especially considering that Part 15 operations must already tolerate interference-intensive environments and are designed to do so. Rather than focusing on the merits and specifics of NextNav's proposal, these commenters seem interested in preventing both existing licensed M-LMS and future 5G allocations in the band from being utilized.

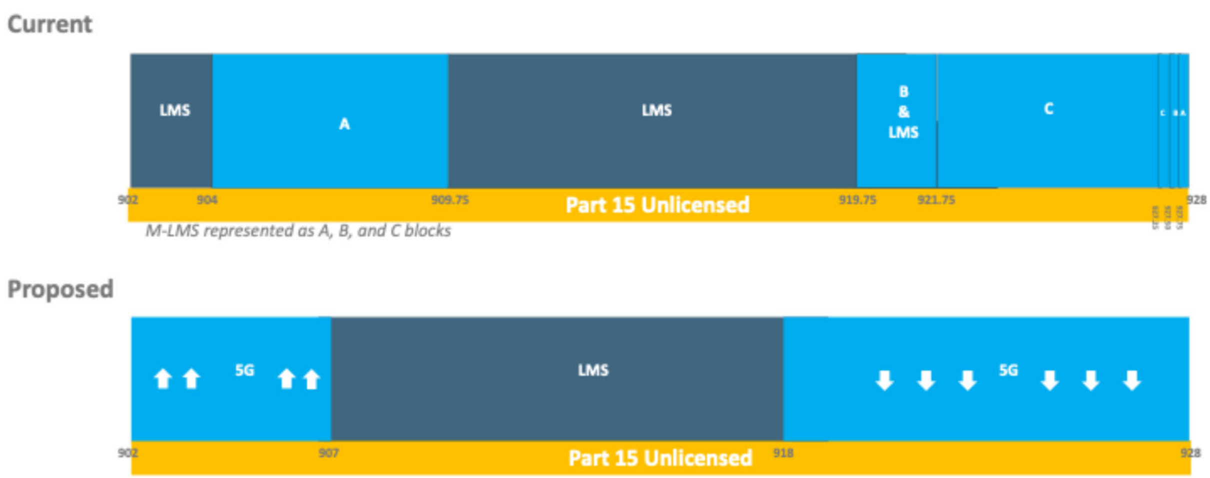

Figure 1. Current lower 900 MHz band configuration vs. optimized configuration

2.2 Fact: Currently authorized M-LMS deployments would introduce more emissions into the band than a comparable 5G deployment

NextNav's analysis has consistently shown that currently authorized M-LMS deployments using the current Part 90 rules will result in higher on-the-ground signal (i.e. emissions) levels than typical 5G deployments with the same coverage.[8] Yet, there are commenters who advocate for an M-LMS based positioning, navigation, and timing ("PNT") solution over the proposed 5G PNT solution.[9] Interestingly, the same commenters also seem concerned about the potential impact on their operations from NextNav's proposed 5G deployment. If these parties are truly concerned about coexistence and the potential for unacceptable levels of interference with their operations, their preference for an M-LMS based PNT

[8] *See* NextNav Technical Study at 12-22.
[9] Ad Hoc RAIN RFID Coalition Comments; Comments of Neology, Inc., WT Docket No. 25-110 (Apr. 28, 2025).

solution under the current rules—which will cause more emissions than a 5G deployment—is perplexing.

For example, NextNav compared an actual M-LMS deployment in San Francisco, California to a 5G design providing coverage in the same area. Utilizing propagation software broadly accepted and used in the wireless industry, NextNav showed that the M-LMS deployment resulted for many years in higher emissions in the lower 900 MHz band than 5G operations would. The NextNav Technical Study also demonstrated that a 5G-based PNT network would generate significantly lower emissions than a comparable version of the M-LMS network that the Commission has already licensed and authorized for deployment. These results are unsurprising because higher power 5G deployments would require many fewer sites than the lower power M-LMS counterparts to provide similar levels of coverage and PNT performance.[10] NextNav's analysis has shown that the deployment of longer inter-site distances and sectorized antennas in the 5G network compensates for the higher transmit EIRP of 5G compared to M-LMS and leads to less impact on Part 15 operations. More densely packed lower power transmission sites, such as an M-LMS deployment, emit more aggregate emissions than high powered counterparts[11] despite the lower activity factor assumed (10%) for M-LMS. Because a 5G deployment would require many fewer sites to provide similar coverage, it would ultimately lead to lower emissions than an M-LMS deployment.

2.3 Fact: NextNav's San Francisco 5G analysis accurately compares expected 5G emissions levels to those of an actual M-LMS deployment

In the NextNav Technical Study, NextNav performed an analysis of an actual M-LMS deployment in San Francisco, California that for many years has produced higher emissions in the lower 900 MHz band than 5G would, without a single confirmed complaint of unacceptable levels of interference to Part 15 devices. In contrast, the submission by

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[10] Simulated 5G and M-LMS transmit power difference of 21 dB (66 dBm – 45 dBm) would require approximately 18 times more M-LMS sites to match the coverage of 5G assuming 3.5 path loss exponent

[11] Reply Comments of Verizon at 7-8, GN Docket No. 17-258, at 7-8 (Dec. 5, 2024) ("[T]he notion that there is somehow more net total interference because of higher power is wrong. A larger number of Category B cells can create more coverage gaps and more net interference over a larger area than a fewer number of Category C cells. It only depends upon the total area chosen to be covered . . . higher-powered CBSD will have a larger cell size, thereby increasing the likely separation distance between base stations from nearby networks. Indeed, the purpose of using higher power base stations would be to increase coverage area by using larger cell sizes. The weaker signal levels in large areas far from the larger sized cells will more than offset the increase in power level, and thus mutual interference will actually decrease with higher power levels.")

Plum Consulting ("Plum") purported to compare one carrier's estimated Band 12 (700 MHz) site locations in downtown San Francisco to NextNav's 5G design and stated that the carrier's Band 12 deployment has a "10x" higher site count than NextNav's 5G design.[12] Plum further asserted that if NextNav's 5G design had achieved the density of this "real-world" network, the field strength would increase significantly.[13] This comparison is faulty, and its conclusion is incorrect.

The "10x" site count Plum claimed was based on the website, CellMapper.net. However, the sites shown in the screenshot Plum provided are not all "verified" per the website's own designations. And, even among the "verified" Band 12 sites, a quick validation using Google Earth indicates some do not appear to be suitable cellular site locations.[14] In addition, the disclaimer from the website states that the data is for personal use only, and "strictly prohibited" for commercial use.[15] Hence, the accuracy of the claimed site count in the Plum report is highly questionable and unreliable.

Instead, NextNav has validated its San Franscisco 5G result by sourcing comparable field data from an industry leading mobile network intelligence firm, According to Ookla's data collected in the same San Francisco downtown area,[16] actual field collected low band (n5 and n71) 5G outdoor Synchronization Signal Reference Signal Received Power ("SS-RSRP")[17] values are much lower than the simulated outdoor SS-RSRP values in the NextNav Technical Study. Figure 2 compares the SS-RSRP distributions of Ookla's field collected and NextNav's simulated 5G SS-RSRPs. The median SS-RSRPs observed from the Ookla data were -101.5 dBm and -96.0 dBm for n71 (600 MHz band) and n5 (Cellular band), while NextNav's simulation derived -82.9 dBm. Given that the total emissions level is proportional to the RSRP,[18] it is clear that NextNav's 5G design did not result in a lower overall emissions level than the real-world 5G deployments, which is what the Plum report

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[12] *See* Richard Rudd, *Assessment of the NextNav Inc document "5G NR and Unlicensed Part 15 Technologies in the Lower 900 MHz Band - A coexistence Analysis,"* Plum, at 9 (Apr. 25, 2025) ("Plum Report"), attachment to Letter from Aileen Ryan et al., Counsel to RAIN Alliance et al., to Marlene H. Dortch, Secretary, FCC, WT Docket Nos. 25-110 and 24-240 (filed Apr. 28, 2025).

[13] Plum Report at 9.

[14] Band 12 site locations identified from Cellmapper.net were compared with Google Earth Satellite and Street Map views to visually inspect for cellular antenna infrastructure nearby.

[15] https://cellmapper.freshdesk.com/support/solutions/articles/28000008220-is-cellmapper-free-

[16] Based on NextNav's analysis of Ookla® data in San Francisco from November 2024 through March 2025. Ookla trademarks used under license and reprinted with permission.

[17] ETSI, ETSI TS 138 215 V16.2.0 (2020-07), *5G; NR; Physical Layer Measurements (3GPP TS 38.215 version 16.2.0 Release 16)* (2020),, available at https://www.etsi.org/deliver/etsi_ts/138200_138299/138215/16.02.00_60/ts_138215v160200p.pdf.

[18] When the primary serving sector offers the dominant signal strength, the 5G RSSI is directly proportional to the primary server's RSRP in main coverage areas. 4G 5G World, *5GNR Reference Signals Measurement*, (Jan. 22, 2019), http://4g5gworld.com/blog/5gnr-reference-signals-measurement.

contends. Instead, this confirms that NextNav's San Francisco design in fact conservatively estimated the on-ground power,[19] and the conclusions drawn from the analysis remain valid—namely, that the San Francisco M-LMS deployment produced higher emissions than a comparable 5G deployment would.

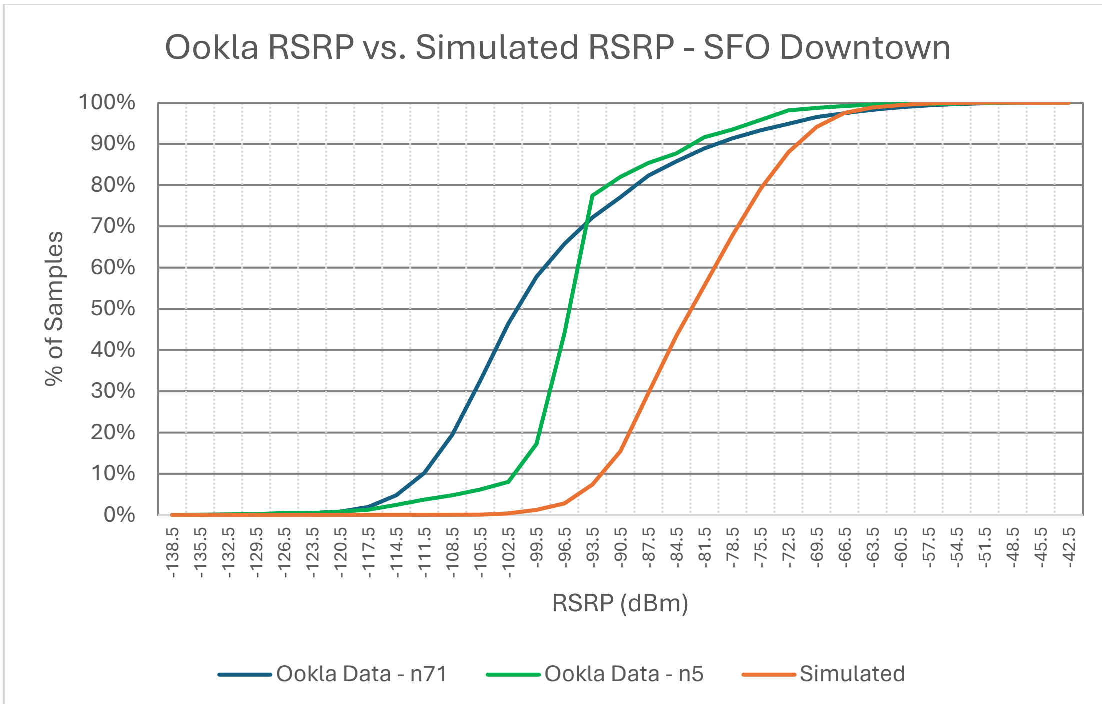

Figure 2. NextNav 5G RSRP vs. Actual 5G RSRP (n71 & n5) in SF Downtown Outdoor

2.4 Fact: NextNav uses established and data-backed 5G NR network characteristics in its study

Some commenters have criticized NextNav's use of a 20% base station loading factor in its interference analyses.[20] However, multiple sources support the assumption that 5G NR base stations will on average have network loading (activity factors) of 20%.

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[19] The observed signal power overestimation can be attributed to a number of real-world deployment considerations such as actual site properties and configurations. For example, while NextNav's SF 5G design assumed full base station transmit power, 5G deployments are optimized to minimize inter-site interference in urban environments, thus could transmit less than full power.

[20] *See, e.g.*, Plum Report at 7.

NextNav has previously explained that this assumption is based on ITU documents, and more importantly, that it is a number that NTIA has said should be used for evaluating interference to critical DoD systems.[21] This second point is worth emphasizing: the DoD systems in question are highly sensitive radar systems that are critical to national defense and the nation's security. NTIA and DoD have taken great care to assure that these systems are adequately protected. And as part of that careful evaluation, these federal agencies have determined that a 20% base station activity factor is the correct assumption.

A statement from Qualcomm lends further support to the use of a 20% loading factor for 5G NR base stations. Qualcomm has said on the record at the Commission that "50% macro-cell load . . . is unrealistically high for macro-cell operations. Typical deployments involve average loadings of 20-30% for both macro and small cells."[22] Here, one of the major companies in the telecom industry, which supplies chips for the vast majority of 3GPP radios, reaches the same conclusion as federal agencies tasked with protecting the nation—that actual 5G NR base station utilization is around 20%.

In addition, 20% is consistent with public information on the amount of data carried by networks in the U.S. and the amount of spectrum they have. Specifically, Ericsson—the largest provider of Radio Access Network equipment in North America—says that the average data per subscriber in North America in 2025 is 25.8 GB per month.[23] Applying the same parameters as in the NextNav Technical Study—30 active days a month, 8 active hours a day, a 92%-8% downlink-uplink split, and 333 subscribers per sector—this means an average sector moves 263 gigabytes in the busy hour,[24] or 73 Mbps. According to the Commission's reported spectrum holdings of the large Mobile Network Operators ("MNOs"), the top three average 203.8 MHz of downlink spectrum.[25] Assuming conservatively that their networks can achieve 2.0 bps/Hz averaged across the 5G NR and

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[21] NextNav Technical Study at 8.
[22] Reply Comments of Qualcomm Inc. at 7-8 n.24, GN Docket No, 17-258 (Dec. 5, 2024).
[23] Ericsson, *Mobile Data Traffic Outlook*, https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/mobile-traffic-forecast (last visited July 2, 2025) (green line in Figure 6).
[24] 25.8 GB/month ÷ 30 days ÷ 8 hours × 8 bits/byte × 92% downlink × 333 subscribers = 263 gigabits.
[25] *See Communications Marketplace Report*, 2024 FCC Marketplace Report, 39 FCC Rcd 14116, 14176 (2024), https://docs.fcc.gov/public/attachments/FCC-24-136A1_Rcd.pdf ("2024 FCC Marketplace Report").

legacy networks,[26] the typical sector can handle a total of 407.6 Mbps.[27] This means the average 73 Mbps load represents 18% network loading.[28]

To summarize, decisions by the ITU and the NTIA on loading values for interference studies for critical systems (20%), statements by Qualcomm (20-30%), and comparison of public reports of network data consumption versus network spectrum holdings (18%) all show that 20% base station loading is realistic and appropriate for interference analysis.

Plum also contends that 902-928 MHz, as a sub-1 GHz-band, will have higher utilization than higher bands due to its excellent propagation and large coverage area compared to mid-band spectrum,[29] and therefore NextNav's assumption that 5.57% of total uplink traffic will be in 902-928 MHz is incorrect. However, Plum's assertion is inconsistent with real-world network capacity planning and operation. In areas where there is mid-band coverage, operators will preferentially place traffic on the mid-band spectrum, reserving low-band capacity for areas where there is only low-band coverage and/or where its excellent propagation is essential, such as in providing indoor and widescale coverage. This balances usage between mid and low bands, maximizing the value of each part of operators' spectrum portfolios and resulting in usage that is proportional to the amount of spectrum. This practice is confirmed by data that Ookla has provided. Ookla recorded device connections on mid and low (sub 1 GHz) 5G NR bands, and reported the percentage of devices using the low band, for major carriers in the San Francisco downtown area of interest. This data was compared to the holdings shown for each operator in the Commission's Communications Marketplace Report, from which the percentage of low band spectrum was calculated.[30] This table summarizes our findings:

[26] *See, e.g.,* Joint Application of T-Mobile US Inc. and Sprint Corp. for Consent to Transfer Control of International And Domestic Authority Pursuant to Section 214 of the Communications Act of 1934, as Amended at 35-36, WT Docket No. 18-197 (June 18, 2018), (stating 2.1 bps/Hz for LTE and 2.5 bps/Hz for low band 5G).
[27] 203.8 Mbps × 2.0 bps/Hz = 407.6 Mbps.
[28] 73 Mbps ÷ 407.6 Mbps = 18%.
[29] Plum Report at 6.
[30] 2024 FCC Marketplace Report, 39 FCC Rcd 14176.

Table 1: *Field-collected 5G low band connection percentages vs. carriers' low band spectrum holding percentage*

Network	Connection bands[31]	Connection low mix[32]	Spectrum band holdings[33]	Spectrum low mix
Carrier 1	n5, n77	17.15%	Cellular (n5): 23.5 MHz 3.45-3.55 GHz (n77): 39.3 MHz C-Band (n77): 79.6 MHz	16.4%
Carrier 2	n71, n2, n41	7.26%	600 (n71): 30.4 MHz PCS (n2): 66.3 MHz BRS/EBS (n41): 175 MHz	11.2%
Carrier 3	n71, n5, n77	4.56%	Cellular (n5): 25.3 MHz C-Band (n77): 160.1 MHz	13.6%

In all cases, the fraction of connections on low band(s) is similar to—or significantly less than—the percentage of spectrum held in the low band(s). Commenters who suggest there would be proportionally more traffic on low bands compared to the mid-band spectrum are simply incorrect.

2.5 Fact: NextNav's analysis uses real-world assumptions, not implausible worst-case ones

Some commenters have accused NextNav of using assumptions in its analyses that are overly simplistic and/or not representative of real-world conditions, but this is not the case. NextNav used assumptions that represent reasonable median values. NextNav did not use—as some of these commenters did—a series of worst-case assumptions in which the likelihood of each assumption is very low, and for which the likelihood of multiple worst-case assumptions occurring simultaneously is accordingly orders of magnitude lower. As the Commission correctly observed when it rejected such arguments in the 6 GHz Order, "the probability that every parameter (e.g., building entry loss, clutter loss, same channel operation, being located in the same area, etc.) is worst case at the same place and time is extremely low."[34]

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[31] Based on NextNav's analysis of Ookla® data in San Francisco from November 2024 through March 2025. Ookla trademarks used under license and reprinted with permission

[32] *Id.*

[33] 2024 FCC Marketplace Report, 39 FCC Rcd at 14176.

[34] *In re Unlicensed Use of the 6 GHz Band*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 3852, 3897 ¶ 122 n.317 (2020), https://docs.fcc.gov/public/attachments/FCC-20-51A1_Rcd.pdf ("6 GHz Report and Order"), *review granted in part, cause remanded*, *AT&T Servs., Inc. v. FCC*, 21 F.4th 841 (D.C. Cir. 2021).

For example, several commenters, including Plum and the Wi-Fi Alliance, assumed worst-case boresight-to-boresight antenna alignment and free space path loss over a line-of-sight path between the two antennas in their counter-analyses—among other worst-case assumptions. While these configurations are possible, the likelihood of each is very low. Further, the likelihood of both occurring simultaneously is equal to the product of the probability of each, which would result in an even lower overall probability. And these two examples, when used in an analysis in conjunction with other worst-case and low-probability assumptions—such as maximum user equipment ("UE") radiated power, 50% to 100% base station loading, or out-of-band emissions at the regulatory limit—lead to extremely low probability, worst-of-worst-case results that are extraordinarily unlikely to occur in the real world. As the Commission has recognized in recent proceedings, such low probability results should not be the basis for decisions about spectrum policy.[35]

As another example, Plum argues that NextNav has ignored the "extensive work within ITU-R Study Group 3" ("ITU-R Study Group") that led to Recommendation P.2109, titled, "Prediction of building entry loss" ("BEL").[36] Plum claims that this work demonstrates that "building loss is less than assumed in the simple 3GPP model, implying a greater risk of interference from the 5G transmissions."[37] In doing so, however, Plum fails to accurately capture the work of the ITU-R Study Group, which provided BEL predictions for two classes of building construction: modern, thermally efficient buildings and traditional buildings. The ITU-R Study Group provided BEL predictions for both classes of building construction, with building entry loss being significantly higher for thermally efficient buildings.

Plum, however, appears to focus only on buildings that are of "traditional" construction and ignores the "thermally efficient" buildings.[38] While it's true that there are more buildings in the U.S. that are of traditional construction than are thermally efficient, the percentage of thermally efficient buildings is substantial, and a median building penetration loss to be used in a simulation must account for both types of buildings. This is what the ITU-R Study Group intended when they developed this recommendation and is the reason they provided predictions for both building types.

[35] *In re Unlicensed Use of the 6 GHz Band*, Second Report and Order, Second Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order on Remand, 38 FCC Rcd 10523, 10534 ¶ 23 (2023), https://docs.fcc.gov/public/attachments/FCC-23-86A1_Rcd.pdf ("[The Commission] recognize[s] the highly variable nature of the electromagnetic environment and rel[ies] on analyses that use a probabilistic approach to evaluating interference risk rather than basing our decision on worst-case examples.").
[36] The recommendation that Plum references is Report ITU-R P.2346.
[37] Plum Report at 14.
[38] *Id*.

It is easy to correct Plum's flawed approach to building penetration loss. The 923 MHz curves Plum provides from P.2109 show that the median building entry loss at the center of NextNav's proposed downlink frequency (i.e., 50% probability) is about 14 dB for traditional buildings and about 32 dB for thermally efficient buildings.[39] If the percentage of each building type is known, one can easily calculate a weighted average of the two medians to be used in a coexistence analysis. For example, if two thirds of buildings are traditional construction and one third are thermally efficient, the weighted average would be 66.67% * 14 + 33.33% * 32 = 20 dB. This was precisely the assumption that NextNav used in its analysis.

Despite Plum's assertion that traditional construction buildings are "generally representative" and therefore by far dominant in the U.S., in 2020, the Commission stated, "We believe that a mix of 70% traditional and 30% thermally efficient building types is appropriate to use when determining a statistical probability of building entry loss."[40] In the intervening five years, the percentage of thermally efficient buildings has only increased, perhaps reaching the two thirds to one third ratio used above. But even if the percentage has not changed at all since 2020, the weighted average would be 70% * 14 + 30% * 32 = 19.4 dB, just 0.6 dB lower than NextNav's assumption. Substituting 19.4 dB for the 20 dB NextNav used in its analyses does not materially change the results or the conclusions.

In addition, as the Wi-Fi Alliance pointed out in a 2023 *ex parte*, "It should be further noted that the described BEL apply for horizontal transmission, whereas in reality many mobile cells are located either higher than the surrounding buildings (or in the case of high-rise buildings, lower) leading to even higher losses."[41] Although the BEL model in P.2109 allows for other incidence angles, the 923 MHz curves that Plum provided represent horizontal incidence. Therefore, given that it's very unlikely for Part 15 devices to be indoors at the exact same height as the 5G base station transmitting antennas, it's more likely that NextNav *underestimated* the median BEL.

In yet another unfounded criticism of NextNav's assumptions, the LoRa Alliance says that NextNav should have used the regulatory maximum base station radio power levels rather than typical power levels in its analyses. As NextNav has previously explained, the vast majority of base stations will use power amplifiers ("PAs") with output power that is consistent with existing sub-1 GHz bands. This means that the base station transmit power

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[39] *Id.*, Figure 2.5.
[40] 6 GHz Report and Order, 35 FCC Rcd at 3894, ¶ 117 n.297.
[41] Ing Peter Kroon et al., *Sustainability Benefits of 6 GHz Spectrum Policy*, WIK Consult, at 16 (July 31, 2023), attached to Letter from Alex Roytblat, Vice President of Worldwide Regulatory Affairs, Wi-Fi Alliance, to Jessica Rosenworcel et al., Commissioners, FCC, ET Docket No. 18-295 (Aug. 15, 2023).

is limited by practical constraints to 40 watts per PA (i.e., 46 dBm). Per NextNav's base station configuration assumption of four transmitters per sector, the total maximum transmit power will be 6 dB greater, or 52 dBm. A typical antenna at 900 MHz has a gain of 15.4 dBi and NextNav anticipates about 1.4 dB of losses, resulting in a net antenna gain of 14 dBi. Thus, the maximum radiated power will be 66 dBm EIRP,[42] which is the value NextNav used in its analyses.

To assume that all 5G base stations would operate at the regulatory maximum radiated power is unrealistic for several reasons:

1) Given practical limitations on sub-1 GHz antennas, equipment vendors do not manufacture sub-1 GHz power amplifiers with enough power to reach the regulatory limit. Thus, reaching the regulatory limit for radiated power would require non-standard, more expensive PAs.
2) A 5G network operating at 902–928 MHz will likely be deployed by one or more MNO partners, which would already hold sub-1 GHz spectrum. It would not make sense either financially or technically for an MNO partner to deploy the 900 MHz band using PAs that are non-standard and significantly higher power than the PAs used in the other bands the MNO has deployed.
3) Wireless communications are two-way, and typically the limiting link is the uplink. This is because the output power of handheld devices is limited by several factors, including the handset's form factor (which limits the size of PAs and antennas), consumers' desire for long battery life, and exposure concerns. Because base stations are not constrained by these factors, wireless devices are much more limited in how far they can be from a base station than vice versa. Further, these uplink constraints affect wireless deployments because MNOs have no reason to transmit downlink signals at maximum power from a base station to reach very distant devices if the return signals from those devices cannot reach the base station.
4) Both 4G and 5G networks are designed for universal frequency reuse, which means the same frequencies are transmitted from all sectors of all base stations. This results in potential self-interference that operators must control. Therefore, wireless network operators attempt to design their networks such that base stations radiate as little power as possible to provide service to the area they were designed to cover. Any more power than the minimum required will cause

[42] Verizon Wireless's 5G (7 Mbps downlink, Dec. 2024) BDC link budget EIRP is 65.8 dBm for the 850 MHz band. *See* FCC, *National Broadband Map: Data Download, https://broadbandmap.fcc.gov/data-download/data-by-provider?version=dec2024* (last updated June 19, 2025).

additional self-interference that reduces the performance and efficiency of the network.

5) Operators are also concerned about power consumption and lowering operational expenses, providing another compelling reason to minimize the base station transmit power. Similarly, in an emergency that causes a power outage, base stations operate on backup batteries—which will power the base station longer at lower transmit power than at higher power levels.

In sum, there is no merit to the LoRa Alliances argument that "the real-world impact [of 5G operations in 902-928 MHz] could be over 10 dB higher than the study's estimates."

Similarly, for adjacent channel analyses, both Plum and the Wi-Fi Alliance assume that out-of-band emissions ("OOBE") will be at the maximum regulatory limit, and due to misinterpreting the Commission's rules, in some cases the Wi-Fi Alliance assumed that OOBE will *exceed* currently allowed limits.[43] These assumptions are equally unrealistic because (a) OOBE generally drops off as the frequency distance from the fundamental channel increases, and (b) manufacturers must design in tolerances that account for production variations to ensure that all products coming off the assembly line meet the Commission's limits. In practice, these tolerances ensure that the vast majority of transmitters meet the Commission's OOBE limits by a wide margin near the band edge, and the natural roll-off of OOBE as the frequency separation increases ensures that the margin expands.

As mentioned above, the Wi-Fi Alliance even makes assumptions about OOBE that would exceed current Commission limits for sub-1 GHz spectrum bands. Specifically, it claims that 5G base stations transmit "with permitted conducted out-of-channel emissions reaching up to -13 dBm/30 kHz when measured at the adjacent channel. This corresponds to radiated out-of-channel emissions of 26 dBm over an 8 MHz bandwidth."[44] The Wi-Fi Alliance cites to 47 C.F.R. 27.53, but it omits the important detail that for sub-1 GHz spectrum bands, -13 dBm per 30 kHz is *only allowed in the first 100 kHz*. Assuming the correct limits—the rule allows -13 dBm per 30 kHz in the first 100 kHz and -13 dBm per 100 kHz thereafter—results in an average radiated OOBE limit of 20 dBm over an 8 MHz bandwidth.[45] However, irrespective of the Wi-Fi Alliance's error, real-world OOBE levels from both base stations and devices will meet Commission limits by a wide margin for the

[43] Plum Report at 16-17; Wi-Fi Alliance, *Impact of 5G Network Transmissions on Wi-Fi HaLow Performance in the 902-928 MHz Band*, at PDF p. 21 (Apr. 28, 2025), attached to Wi-Fi Alliance Comments ("Wi-Fi Alliance Comments Attachment").
[44] Wi-Fi Alliance Comments Attachment at PDF p. 21.
[45] Assuming net antenna gain of 14 dBi, as used in NextNav's study and as appears to have been used by the Wi-Fi Alliance. Wi-Fi Alliance Comments Attachment at PDF p. 38.

reasons described above. A very small percentage of outlier devices that come closer to the Commission limits due to production variations are not significant and should not be considered in spectrum policy decisions.

In summary, using worst-case assumptions that have a low probability of occurring leads to unrealistic results that do not reflect the actual probability of unacceptable levels of interference. The assumptions that NextNav used are realistic values that together represent an environment that will exist the vast majority of the time. Corner cases are possible but, as the Commission has correctly stated in past proceedings, they should not be the basis for spectrum policy determinations.

2.6 Fact: 5G uplink operations pose no coexistence concerns

Despite NextNav's repeated explanations regarding how the proposed 5G uplink would operate and why it poses no risk of unacceptable levels of interference to Part 15 operations, some commenters continue to raise this unfounded concern.[46] NextNav proposes a radiated power limit in the 5 MHz uplink segment that would emit significantly less power than is currently allowed (30W Peak ERP), even if the current M-LMS licensee deploys only a single transmitter. In reality, 900 MHz handheld mobile 5G devices (typically 20 dBm EIRP or less) would even transmit at significantly less power than the Commission's flexible use rules permit (3 W ERP). 5G devices also use power-control algorithms that adjust the handset's transmit power dynamically to maintain the minimum power needed for reliable communication. Examination of publicly available data shows that the average UE activity factor on a 5G system in the 902-928 MHz band will be approximately 0.045%.[47] NextNav's proposed 5G mobile uplink operation is consistent with the current Part 90 rules in allowing vehicular/mobile operations and does not introduce any additional coexistence burdens. In fact, the Plum report even declares that "*[e]missions in the uplink band will be limited, as NextNav states, to the relatively low power defined in the 3GPP specifications, which will make their impact comparable to that of Part 15 devices in the band*."[48] Again, these commenters fail to articulate why and how the proposed 5G uplink rules and operations would negatively affect their operations compared to the currently allowed M-LMS operations.

[46] *See generally* Letter from Aileen Ryan et al., Counsel to RAIN Alliance et al., to Marlene H. Dortch, Secretary, FCC, WT Docket Nos. 25-110 and 24-240 (filed Apr. 28, 2025); Plum Report.
[47] NextNav Technical Study at 5.
[48] Plum Report at 8 (emphasis added).

Regarding the impact of the uplink control overhead to the calculated average UE activity factor of 0.045% stated above,[49] expected uplink control overhead for two representative scenarios included in 3GPP[50] are evaluated in detail below. In both scenarios, the overhead is calculated for each of the considered three uplink channels—the Physical Uplink Control Channel ("PUCCH"), the Demodulation Reference Signal ("DMRS"), and the Sounding Reference Signal ("SRS")—used to carry control overhead in terms of resource elements ("RE") per uplink slot; these values are then summed to calculate the total control overhead. An RE corresponds to one subcarrier in one OFDM symbol of an uplink slot, while the uplink slot duration is 1 millisecond for the assumed subcarrier spacing of 15 kHz.

In the first scenario, NextNav makes the following assumptions:

- For PUCCH: Short PUCCH format with 1 Physical Resource Block ("PRB") and 1 OFDM symbol in every uplink slot, which leads to 12 REs per slot.
- For DMRS: Type I format allocated across one complete symbol, which leads to 300 REs per slot (12 REs per PRB times 25 PRBs for the assumed 5 MHz uplink channel).
- For SRS: 1 symbol with periodicity of 10 milliseconds for Frequency Division Duplexing, which leads to 30 REs per slot (12 REs per PRB times 25 PRBs divided by 10 as there are 10 slots in 10 millisecond time duration).
- Total REs per slot for control overhead: 12+300+30 = 342.
- Total REs per slot used for data and control transmission: 4,200 (12 REs per PRB times 25 PRB times 14 symbols in one slot).
- Uplink control overhead: 342 / 4,200 = 8.1%.

In the second scenario, NextNav makes the following assumptions:

- For PUCCH: Short PUCCH format with 8 PRBs and 2 OFDM symbols in every uplink slot, which leads to 192 (8 * 12 * 2) REs per slot.
- For DMRS: Type 2 FL (front loading) DMRS across one symbol in each slot with RS on 2 combs, which leads to 200 REs per slot (8 REs per PRB times 25 PRBs).
- For SRS: 12 REs per PRB every 5 slots, which leads to 60 REs per slot (12 REs per PRB times 25 PRBs divided by 5).
- Total REs per slot for control overhead: 192+200+60 = 452.

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[49] *Id.* at 6.

[50] ETSI, ETSI TR 137 910 V16.1.0 (2020-11), *5G; Study on Self Evaluation Towards IMT-2020 Submission (3GPP TR 37.910 version 16.1.0 Release 16)*, at Table B.3.1.2-2 (2020), https://www.etsi.org/deliver/etsi_tr/137900_137999/137910/16.01.00_60/tr_137910v160100p.pdf.

- Total REs per slot used for data and control transmission: 4,200 (the same as in first scenario).
- Uplink control overhead: 452 / 4,200 = 10.8%.

Based on the uplink control overhead calculations above, the average UE activity factor would be approximately equal to 0.05% in the worst-case scenario of 10.8% uplink overhead (0.045 * 1.108 ~= 0.05%). The uplink control overhead does not materially alter the original UE activity factor value, and NextNav's conclusions remain valid.

3 Additional Simulation Results

The NextNav Technical Study is based on well-accepted international industry standards wherever possible, including 3GPP specifications and ITU recommendations, as well as information provided by Part 15 commenters.

As described in Section 2.4, the 20% 5G network loading assumption used in the NextNav Technical Study is consistent with other expert reports and is commonly used for coexistence analyses. Despite this, NextNav supplements the record by presenting, in Figure 3, a hypothetical scenario regarding how varying 5G network loading assumptions would affect the aggregate emissions Cumulative Distribution Function ("CDF") on Part 15 operations. Table 2 summarizes the median (50th percentile) of the aggregate emissions CDFs for the simulation scenarios in Figure 3. As shown in Figure 3 and Table 2, increasing 5G loading factors leads to increasing median values of the 5G aggregate emissions. Nevertheless, 5G remains more favorable than M-LMS with 10% loading in coexisting with Part 15 operations even in the hypothetical scenario where the 5G loading factor would be 50%, noting the 5G median aggregate emissions value with 50% loading factor is 7.3 dB lower than the M-LMS median value.

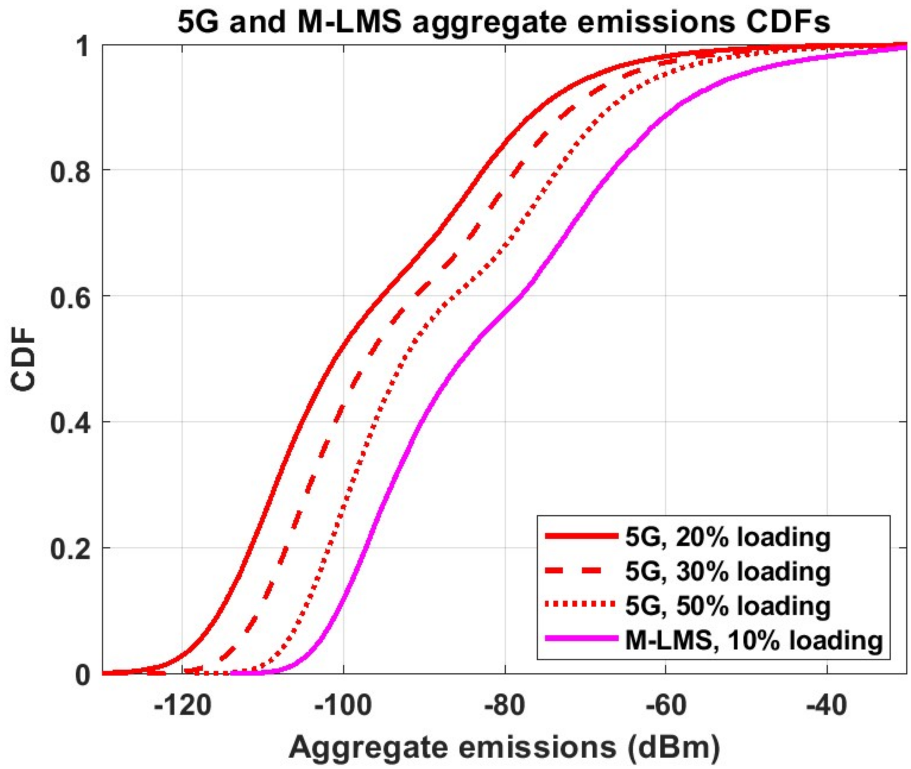

Figure 3. 5G and M-LMS aggregate emissions generated on Part 15 operations.

Table 2: *Median aggregate emissions (in dBm) for the simulation scenarios in Figure 3*

Scenario	**Median aggregate emissions (dBm)**
5G, 20% loading	**-101.1**
5G, 30% loading	**-97.0**
5G, 50% loading	**-92.5**
M-LMS, 10% loading	**-85.2**

Some commenters disagree with some of the Part 15 assumptions in the NextNav Technical Study, such as Part 15 power level, Part 15 coverage radius, and lack of Listen-Before-Talk (LBT or carrier-sensing) modeling, arguing that the assumptions NextNav used in the simulation do not reflect their own operations. However, these parties fail to understand that the assumptions NextNav used are generalized to best represent a diverse group of Part 15 technologies operating in the band in a fair manner. For example, NextNav conservatively assumed 1% duty cycle[51] for all Part 15 devices, although it was fully aware

[51] Low traffic Part 15 IoT use cases in the lower 900 MHz band are claimed to have ~1% duty cycle. Wi-SUN Alliance Comments; Comments of The Z-Wave Alliance, WT Docket No. 24-240, RM-11989 (Sept. 5, 2024).

that some Part 15 use cases such as RFID, security cameras, and p2p/p2mp data connections exhibit higher duty cycles. Similarly, NextNav assumed a uniform Part 15 device "radiated" power level of 30 dBm EIRP, which is 6 dB lower than what Part 15 rules allow, with an understanding that some Part 15 operations can transmit at lower levels and some at higher.[52]

Regarding LBT, it is not a feature which is universally implemented in Part 15 devices operating in the band. Even among Part 15 technologies that support LBT, there are various implementations and operational practices[53] which necessitate the needed generalization. Additionally, even for Part 15 devices enabled with LBT, only a small subset of the devices will meet the thresholds necessary to defer transmissions, thereby limiting its impact on overall results. The key point is that results stemming from these generalized assumptions, rather than ones based on extreme, corner cases, provide sound insights into how complex and diverse systems would behave overall.

Rather than focusing on the merit of NextNav's generalized, optimized assumptions to best represent diverse Part 15 technologies and use cases, and then using those assumptions to understand the overall effect of non-Part 15 emissions, these commenters are cherry-picking aspects benefiting their arguments. Making matters even worse, the same parties who advocate using specific Part 15 operations assumptions (rather than generalized assumptions that capture a diverse ecosystem) insist on using unrealistic assumptions for 5G such as 100% loading and full regulatory power.[54]

While NextNav continues to stand behind the validity of its assumptions in the NextNav Technical Study, solely for purposes of illustration, NextNav conducted a second simulation study of a hypothetical mix of Part 15 EIRP, coverage radius, and LBT-enabled devices. NextNav assumed four different types of Part 15 EIRP levels, namely 0 dBm, 10 dBm, 30 dBm, and 36 dBm,[55] with equal probability of occurrence. NextNav further

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[52] *Impinj Speedway RAIN RFID Readers for Flexible Solution Development*, Impinj, https://www.impinj.com/products/readers/impinj-speedway (last visited July 1, 2025). Radiated power levels can be higher than specified output (conducted) power levels.

[53] For example, LoRa Alliance claims LoRaWAN's CSMA implementation is designed to selectively avoid other LoRa transmissions only. Wi-SUN Alliance says "CSMA/CA is typically only used for network discovery traffic, not for network control and data plane messaging." Wi-SUN Alliance Response to NextNav Coexistence Study at 3. Wi-Fi Alliance states that "Wi-Fi HaLow devices must implement the LBT detection threshold at a minimum of -75 dBm/1 MHz." Wi-Fi Alliance Comments at 10. However, this threshold is specific to Wi-Fi HaLow.

[54] Wi-Fi Alliance Comments at PDF pp. 20, 34, 37; Response of Wi-SUN Alliance to NextNav Coexistence Study at 4.

[55] Skyworks Inc., *Enhancing Wi-SUN Alliance Product Range with Skyworks RF Front End Modules*, https://www.skyworksinc.com/-/media/SkyWorks/SL/documents/public/white-papers/Skyworks_Wi-SUN_Whitepaper.pdf; Newracom, *Power-Up Wi-Fi HaLow with the 1 Watt TD-HALOM Module by Teledatics*

assumed that the maximum radius of a Part 15 transmitter with 0 dBm or 10 dBm EIRP is 50 meters, the maximum radius of a Part 15 transmitter with 30 dBm is 100 meters, and the maximum radius of a Part 15 transmitter with 36 dBm EIRP is 1 kilometer. To address comments related to the height of high-power Part 15 transmitters placed outdoors,[56] NextNav assumed that the antennas of all outdoor Part 15 transmitters with 30 dBm or 36 dBm EIRP are placed at a height of 20 meters, while all other Part 15 transmitter antennas are placed at a height of 1.5 meters. Finally, NextNav assumed that 50% of the Part 15 transmitters are enabled with LBT functionality.[57] In the following, we refer to this hypothetical mix as the "hypothetical scenario," while we refer to the scenario in the NextNav Technical Study as the "original scenario." For convenience, Table 3 summarizes the different parameters of the original and hypothetical simulation scenarios.

Table 3: *Summary of different parameters for original and hypothetical simulation scenarios*

	Original scenario	**Hypothetical scenario**			
EIRP	30 dBm	0 dBm	10 dBm	30 dBm	36 dBm
Percentage	100%	25%	25%	25%	25%
Radius	100 m	50 m	50 m	100 m	1 km
Antenna height	1.5 m	1.5 m	1.5 m	20 m for outdoor transmitters	20 m for outdoor transmitters
LBT-enabled	No	Yes (50% of Part 15 transmitters)			

with Newracom, (June 20, 2024), https://newracom.com/blog/power-up-wi-fi-halow-with-the-1-watt-td-halom-module-by-teledatics-with-newracom, https://lora-alliance.org/wp-content/uploads/2020/11/lorawan_regional_parameters_v1.0.3reva_0.pdf, https://z-wavealliance.org/what-is-z-wave-long-range-how-does-it-differ-from-z-wave/; Ted Yaku, *Setting Receive Sensitivity and Transmit Power on Impinj Readers using LLRP*, Impinj (Jan. 3, 2022), https://support.impinj.com/hc/en-us/articles/360019213380-Setting-Receive-Sensitivity-and-Transmit-Power-on-Impinj-Readers-using-LLRP#:~:text=Table_title:%20Setting%20Transmit%20Power%20Table_content:%20header:%20%7C,%7C%20JP2:%20AC:%2030.0%20PoE:%2030.0%20%7C.

[56] LoRa Alliance, LoRa Alliance Comments on NextNav Technical Report, WT Docket No. 24-240 (Mar. 26, 2025).

[57] The LBT threshold is assumed to be -85 dBm/1 MHz, which is more aggressive than values on record (the lower the CCA threshold the more LBT-enabled devices are allowed to transmit and, thus, the SINR CDF shifts to lower values). For example, Wi-Fi Alliance claimed that Wi-Fi HaLow's LBT threshold is -75 dBm/1 MHz bandwidth. Wi-Fi Alliance Comments at 10.

Figure 4 presents the signal-to-interference-plus-noise ratio (“SINR”) CDFs for the original and hypothetical scenarios for the following three cases: only Part 15 device coexistence, Part 15 + 5G coexistence, and Part 15 + M-LMS coexistence. Table 4 summarizes the median and edge SINR values for the coexistence scenarios in Figure 4.

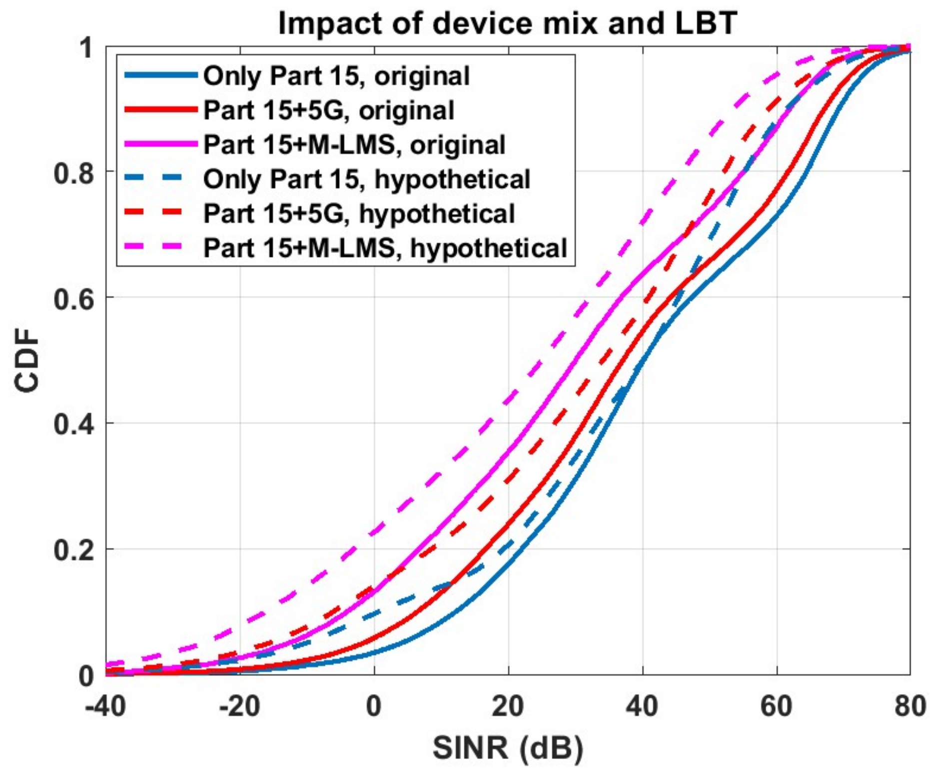

Figure 4. Part 15 impact based on hypothetical Part 15 device mix

Table 4: *Median and edge SINR values (in dB) for the coexistence scenarios in Figure 4*[58]

Scenario	Median SINR	Edge SINR
Part 15 only, original	**40.2**	**4.2**
Part 15+5G, original	**37.1**	**-1.5**
Part 15+M-LMS, original	**30.1**	**-12.6**
Part 15 only, hypothetical	**40.1**	**-10.1**
Part 15+5G, hypothetical	**34.1**	**-15.5**
Part 15+M-LMS, hypothetical	**25.1**	**-25.5**

[58] Compared to Table 3, Scenarios B-D, in NextNav’s Part 15 coexistence report from February 2025, the median/edge SINR values in the first three rows of this table are improved due to a correction we had to make in our simulation code to fully comply with the indoor-to-indoor pathloss and shadow fading standard deviation modeling, see the last column in Section A.2.1.2 of 3GPP Technical Report 36.843. Certainly, the relative SINR differences and overall conclusions remain in favor of 5G being a more favorable coexisting technology to Part 15 operations compared to M-LMS.

Based on results in Figure 4 and Table 4, we make the following observations:

- Due to the existence of a significant percentage of Part 15 devices with lower EIRP or longer radius in the hypothetical scenario, there is a shift of the SINR CDFs to the left (to lower SINR values) for both Part 15-only and Part 15+5G cases compared to the original scenario.
- The median SINR difference between the Part 15-only and the Part 15+5G cases in the hypothetical scenario is 6.0 dB compared to the corresponding difference of 3.1 dB in the original scenario. Given that the corresponding difference in the edge SINRs remains almost the same in the hypothetical scenario as in the original scenario (5.4 dB vs. 5.7 dB), we can conclude that the impact of 5G emissions on the performance of the Part 15 unlicensed network remains modest.
- As in the original scenario, 5G is continuously shown to be more favorable than M-LMS as a coexisting technology with Part 15 operations, noting that the median SINR difference between Part 15-only and Part 15+M-LMS increases to 15 dB compared to the 6 dB difference between Part 15-only and Part 15+5G.

The above results clearly reinforce that, even with the introduction of different Part 15 power classes, coverage radii, and device capability, the ultimate conclusions of the NextNav Technical Study remain valid: 5G emissions contributes, at most, an incremental Part 15 SINR loss, and a 5G-based PNT network would generate significantly less emissions to Part 15 operations than a comparable version of the M-LMS network that the Commission has already licensed and authorized for deployment.

4 Conclusions

This supplementary report to the NextNav Technical Study reaffirms that the assumptions and analytical methodologies NextNav used are sound and backed by data, and the conclusions drawn are valid despite efforts from others to discredit them. In this report, NextNav also provides additional simulation results, independent third-party data, analysis, and industry references that further strengthen its conclusion that introducing 5G operations will not cause unacceptable levels of interference to unlicensed Part 15 devices in the lower 900 MHz band.