Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Upper C-band (3.98-4.2 GHz)	)	GN Docket No. 25-59

COMMENTS OF THE DIGITAL PROGRESS INSTITUTE

The Digital Progress Institute is a non-profit research organization dedicated to bipartisan, incremental reform of technology and telecommunications policies. Core to its mission is to promote 5G and beyond for the benefit of American families and veterans. That is why the Institute supports the Commission's effort to open up more commercial spectrum in 3.98-4.2 GHz to ensure the resiliency of our networks and raise our international standing in the wireless space. This is especially necessary as our greatest foreign adversaries gain more of a foothold in international markets. As FCC Chairman Brendan Carr said: "Restoring U.S. leadership in wireless is key to the nation's economic and national security interests."[1]

We agree.

Opening more midband is key to reclaiming our leadership position. Indeed, midband spectrum, like the C-band, is the "goldilocks" of spectrum given its reach and ability to carry far more data over its frequencies than other 5G frequencies, like millimeter waves. C-band spectrum, in particular, was integral to the U.S.'s success in 5G during President Trump's first term. Not only

[1] Carr Congratulates President Trump & Congressional Republicans on Win, FCC, Press Release (Jul. 3, 2025), https://www.fcc.gov/document/carr-congratulates-president-trump-congressional-republicans-win.

did it raise $81 billion for the U.S. Treasury,[2] but it also increased carriers' download speeds by a multiple of 4.[3]

The U.S. is poised to continue those stellar gains by American companies leveraging more of this much needed midband spectrum. This and the desire to solidify the U.S.'s dominance in the global wireless market are why DPI welcomes the FCC's efforts in this proceeding.

I. The Commission Should Move Expeditiously to Repurpose Up to 180 Megahertz

With more online applications going mobile, more data will need to travel over our wireless networks. For instance, we are already seeing AI's impact on 5G networks. The ubiquity of AI applications, such as AI-powered assistants and augmented reality platforms, "will soon drive mobile data traffic beyond the capacity of current 5G networks," according to a report by Mobile Experts.[4] More empirical studies find that the current amount of spectrum is insufficient to accommodate the onslaught of data traveling over our wireless networks.[5] One report claims that "the US is expected to have a capacity deficit of over 10 exabytes/month" and "have a spectrum deficit of nearly 400 megahertz" in the near term.[6]

In other words, we need to get the spectrum pipeline started quickly—with as much spectrum as possible—to ensure American consumers and the American economy get the capacity they need.

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[2] *Auction of Flexible-Use Service Licenses in the 3.7-3.98 GHz Band Closes; Winning Bidders Announced for Auction 107*, AU Docket No. 20-25, Public Notice, 36 FCC Rcd 4318 (2021).

[3] Sydney Price, *Verizon's, AT&T's Download Speeds Jumped After C-band Deployment*, S&P Global (Apr. 1, 2022), https://www.spglobal.com/market-intelligence/en/news-insights/articles/2022/4/verizon-s-at-t-s-download-speeds-jump-after-c-band-deployment-69557617.

[4] Julia King, *AI is Already Increasing 5G Traffic. Signs Point Toward 6G as the Answer*, Fierce Network (Sep. 6, 2024), https://www.fierce-network.com/cloud/ai-reshaping-5g-traffic-are-networks-ready-surge.

[5] https://www.brattle.com/insights-events/publications/current-spectrum-allocation-is-not-sufficient-for-meeting-the-future-demand-for-wireless-broadband-in-the-us-according-to-a-new-brattle-report/.

[6] *Id.*

What is worse, when the Commission's auction authority lapsed in 2022, our enemies took full advantage of our complacency. China deployed far more mid-band spectrum, added 2.22 million 5G base stations[7] in its market, and is already working on 6G capabilities. As GSMA points out, China awarding its companies "mid-band frequencies across the 2.6 GHz and 3.5 GHz for 5G have played important roles in tackling [their] significant coverage and capacity challenges."[8]

And it has paid off for them. In late 2024, China Unicom and Huawei deployed the "world's first large-scale integrated 5G-A intelligent network" and is already incorporating AI to underpin new 5G services and devices.[9] These developments are not limited to China's domestic growth. Huawei has leveraged this domestic buildout to hone its capabilities, scale its manufacturing capabilities, and flood foreign markets will low-cost, state-subsidized hardware designed to budget-conscious markets. And China has used this domestic success to further the country's leadership position internationally and infiltrate international standards bodies for 5G and AI.[10]

Thankfully, Congress set an aggressive timeline for the FCC to repurpose and auction up to 180 megahertz of spectrum in the upper C-band by July 4, 2027. Armed with its reauthorized spectrum auction authority, this timeline is aggressive but entirely doable. Indeed, in President Trump's first term, the Commission opened up more than six gigahertz of spectrum for licensed 5G services, including more than 600 megahertz of mid-band spectrum to auction within 3 years.

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[7] Juan Pedro Tomás, *China Reaches 2.22 million 5G Base Stations at the End of Q3*, RCR Wireless News (Nov. 16, 2022), https://www.rcrwireless.com/20221116/5g/china-reaches-2-million-5g-base-stations-end-q3#:~:text=China%20ended%20September%20with%20a,from%20the%20end%20of%202021.

[8] GSMA, *New Spectrum for 5G: Adding Up the Mid-Band Maths*, (Jan. 24, 2023), https://www.gsma.com/connectivity-for-good/spectrum/new-spectrum-for-5g-adding-up-the-mid-band-maths/.

[9] The Mobile Economy China 2024, GSMA (2024), https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/wp-content/uploads/2024/03/Mobile-Economy-Report-China-2024_English.pdf.

[10] Shane Tews & Luke Hogg, *If the U.S. Doesn't Set Global Tech Standards, China Will*, Wall Street Journal (Aug. 12, 2025), https://www.wsj.com/opinion/if-the-u-s-doesnt-set-global-tech-standards-china-will-035cdb97?gaa_at=eafs&gaa_n=AWEtsqfSeeY4NBYOzpqYioROhk7r1PRqENfvFbUsC_DwyZfmDTorH2BmfZhfxoMacLA%3D&gaa_ts=696a80e7&gaa_sig=wY-COGbm50qYH-42cNH2yusCEMU-UYecSfJjUlF6BCMkt1d93cdRBQOPFktOf7HgCqRkRGjAmZ_hyqKLDZhS_w%3D%3D.

This is an incredible feat when one considers that more than a decade ago, China—our greatest foreign adversary—had the lead in 5G. It had allocated over 300 megahertz of mid-band spectrum for 5G and was constructing new cell sites at a rate of 460 per day.[11] In the United States, we had no mid-band spectrum for 5G, and we were averaging only three sites per day. Even worse, Chinese equipment found its ways into our own networks.

But, similar to what occurred last year, Congress and the Commission responded with fervor. Congress passed the MOBILE NOW Act in 2018, which, in part, created a spectrum pipeline for commercial 5G use. In President Trump's first term, his FCC initiated one of the most aggressive spectrum plans in the Commission's history, *i.e.*, the 5G FAST Plan, to unleash the full power of commercial 5G.[12] The plan included auctioning off up 70 MHz of licensed spectrum in the 600 MHz band via its broadcast incentive auction;[13] auctioning a total of 1,550 MHz of high-band spectrum from both 24 GHz and 28 GHz bands;[14] 3,400 MHz of upper 37 GHz, 39 GHz, and 47 GHz band in its spectrum frontiers incentive auction;[15] created a Rural Tribal Priority Window to give early access for Tribal Nations in rural areas to the 2.5 GHz band;[16] auctioned 70 megahertz

[11] *Keynote Remarks Of FCC Commissioner Brendan Carr At The American Enterprise Institute, Washington, DC, "Extending America's 5G Leadership,"* Speech, FCC (2021), https://www.fcc.gov/document/carr-aei-keynote-extending-americas-5g-leadership.

[12] The FCC's 5G FAST Plan (last visited Jan. 20, 2026), https://www.fcc.gov/5G.

[13] *Incentive Auction Closing and Channel Reassignment Public Notice*, AU Docket No. 14-252, Public Notice, 32 FCC Rcd 2786, 2793, para. 15 (2017).

[14] *Auction of 24 GHz Upper Microwave Flexible Use Service Licenses Closes*, AU Docket No. 18-85, Public Notice, 34 FCC Rcd 4294 (2019); *Auction of 28 GHz Upper Microwave Flexible Use Service Licenses for Next-Generation Wireless Services Closes*, AU Docket No. 18-85, Public Notice, 34 FCC Rcd 75 (2019).

[15] The Spectrum Frontiers proceeding made available high-band spectrum in the 24 GHz, 28 GHz, Upper 37 GHz, 39 GHz, and 47 GHz bands. *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14177, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988, 10994-11006, paras. 15-59 (2017); *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8023-62, paras. 19-124 (2016).

[16] *Transforming the 2.5 GHz Band*, WT Docket No. 18-120, Report and Order, 34 FCC Rcd 5446 (2019); *Wireless Telecommunications Bureau Announces Procedures for 2.5 GHz Rural Tribal Priority Window*, WT Docket No. 18-120, DA 20-18 (WTB 2020).

of Priority Access Licenses of 3.5 GHz mid-band spectrum that the Commission authorized for commercial use;[17] and of course opened 280 MHz of lower C-band spectrum.[18]

This resulted in U.S. carriers providing actual 5G commercial offerings almost immediately and allowed us to lead the world in 5G. Domestically, these expedient, yet measured, moves, added competition that not only increased our internet speeds but also reduced the price of wireless services.[19] Our 5G Fast Plan also made U.S. technology the dominant player in international markets.[20]

If we do not reinvigorate our own 5G strategy fast, we run the risk of not only ceding the race to 5G but also 6G and even AI to China. We need to recreate this same aggressive strategy, and this proceeding can serve as the first positive first step as more consumers migrate over to fixed-mobile services.

What is more, the One Big Beautiful Bill Act requires the Commission to repurpose at least 800 megahertz of usable spectrum.[21] Thus, the Commission should strongly opt for opening the full 180 megahertz of this band given that the spectrum at issue is, candidly, low-hanging fruit as we explain below.

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[17] *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258, Report and Order, 33 FCC Rcd. 10598 (2018) (2018 3.5 GHz Band Report and Order); *Auction of Priority Access Licenses for the 3550-3650 MHz Band*, Comment Sought on Competitive Bidding Procedures for Auction 105, Bidding in Auction 105 Scheduled to Begin June 25, 2020, AU Docket No. 19-244, Public Notice, 34 FCC 9215 (Sept. 27, 2019).

[18] *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Order and Notice of Proposed Rulemaking, 33 FCC Rcd. 6915, 6923 para. 16 (2018) (C-Band Order and NPRM); *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020) ("C-Band Order").

[19] CTIA, *More for Less: The Actual Story of the Amazing Decline in U.S. Wireless Prices*, Blog (Mar. 30, 2021), https://www.ctia.org/news/blog-more-for-less-the-actual-story-of-the-amazing-decline-in-u-s-wireless-prices.

[20] Mitch Wagner, *The US is Losing the 5G Race. But Next-G is Just Getting Started*, Fierce Network (May 10, 2024), https://www.fierce-network.com/wireless/us-losing-5g-race-next-g-just-getting-started#:~:text=Industry%20analysts%20agree%20that%20non,offer%20a%20more%20agile%20solution.%E2%80%9D.

[21] OBBB Act, § 40002(b)(1); see also 47 U.S.C. § 309(j)(11).

II. The Aviation Industry Has Been on Notice of High-Power Service in the C-band since 2017

In 2022, DPI partnered with Public Knowledge to develop research on the federal interagency process to allocate more commercial spectrum.[22] As part of that study, we evaluated the rather disruptive antics by industry players occurring when the FCC attempted to open more spectrum in this precise band. DPI believes that a rehashing of our findings may prove instructive as the Commission moves through its processes by demonstrating just how extensive the Commission's knowledge is on the issue and establishing a timeline of the aviation industry's actual knowledge of the FCC's plan.

By way of background, in 2017 the FCC initiated a proceeding in which it began the consideration of the potential for sharing spectrum in the C-band. As the Commission stated in the opening of that inquiry for that initial proceeding, it was aware that there were "significant and important federal operations" in the band and that it worked closely with the NTIA to evaluate the potential operational impacts, costs, benefits, and resource considerations to ensure the continued operation of those important missions.[23]

In 2018, the Commission moved from the inquiry stage in its process to the rulemaking stage, releasing a Notice of Proposed Rulemaking seeking comment on a more specific plan for using potentially the entire band for mobile and fixed wireless service. The Commission also adopted an Order at that time that required the collection of additional information from incumbent users of the band to better understand the implications of potential mobile use of the band and the

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[22] Digital Progress Institute & Public Knowledge, *The Interagency Process and Its Importance in Securing the Future of 5G*, White Paper (Mar. 9, 2022), https://www.benton.org/headlines/interagency-process-and-its-importance-securing-future-5g.

[23] In a footnote to the Notice of Inquiry, the Commission acknowledged the coordination work it was generally undertaking with NTIA and the resources such coordination demand of the agencies. Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, GN Docket No. 17-183, Notice of Inquiry, 32 FCC Rcd. 6373, n.2 (2017).

appropriate transition methodology. Why? Well, the Commission noted, "it is important that we obtain a clear understanding of the operations of current users in the band."[24] The Commission further explained that such information was critical to its "consideration of how much spectrum could be made available, how incumbent operators could be protected, accommodated, or relocated, and the overall structure of the band going forward."[25] Additionally, the Commission rightly sought comment on adjacent band operations that were raised in the Notice of Inquiry concerning the aeronautical navigation operating in 4.2-4.4 GHz portion of the band related to aircraft radio altimeters and wireless avionics intra-communications (WAIC) systems.[26] The Commission noted that these systems increase aircraft safety by providing important redundancies in communications links between aircraft systems.[27] It specifically asked stakeholders that used such systems to comment on what were the needed out-of-band emission limits necessary to "protect the aeronautical radionavigation service in the 4.2-4.4 GHz band."[28]

In response, Boeing, Aviation Spectrum Resources (ASR), Aeronautics Industry Association, and other aviation interests filed comments urging the Commission to protect their operations in the adjacent band. As Boeing explained, "radio altimeters are already 'properly engineered' to resist spurious emissions from external sources. The band pass filters that are incorporated into radio altimeters, however, have limited ability to reject transmissions close to the edges of the 4.2-4.4 GHz band. As a result, relatively powerful mobile communications in the adjacent band could

[24] See Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122, Order and Notice of Proposed Rulemaking, 33 FCC Rcd. 6915, 6923 para. 16 (2018) (C-Band Order and NPRM).

[25] *Id.*

[26] *Id.* at 6957, para. 125.

[27] *Id.*

[28] *Id.*

overload the radio altimeter receivers on aircrafts, inhibiting their accurate operation."[29] ASR supported the assessment from Boeing, providing information on preliminary test data that was being conducted by the Aerospace Vehicle System Institute that indicated that "interim results have indicated that the adjacent 100 MHz (4.1-4.2 and 4.4-4.5 GHz) is of most concern to the demonstrated radio altimeter receivers."[30] The final test results were filed with the Commission in 2019.[31]

In 2020, the Commission adopted its Order putting in place new rules for use of the C-Band for mobile services.[32] To address the concerns raised by the aviation industry, the Commission adopted a guard band of 220 MHz, double the amount suggested by Boeing and ASR in their comments. In its review of competing studies that were placed in the record, the Commission concluded that the 220 MHz guard band in combination with the power and emission limits provided all due protection to the altimeters and WAIC systems operating in the 4.2-4.4 GHz band.[33] In recognition of a request by the AVSI for additional study and analysis, the Commission encouraged the parties to engage in a multi-stakeholder group to further analyze "why there may even be a potential for some interference given that well-designed equipment should not ordinarily receive any significant interference (let alone harmful interference)" with such a large guard band.[34]

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[29] Boeing Reply Comments, GN Docket 18-122 at 6 (filed Dec. 11, 2018); see also Aviation Spectrum Resource, Inc. Comments, GN Docket No. 18-122 at 5-6 (filed Oct. 30, 2018).

[30] Aviation Spectrum Resource, Inc. Comments at 6. That testing data was anticipated to be completed by the end of 2018 and Aviation Spectrum Resource committed to updating the record with the testing data once it was complete. Aviation Spectrum Resource, Inc. Reply Comments at 5.

[31] "Behavior of Radio Altimeters Subject to Out-Of-Band Interference," attachment to Letter of Dr. David Redman, Aerospace Vehicle Systems Institute, to Marlene H. Dortch, Secretary, Federal Communications Commission, Docket No. 18-122 (filed Oct. 22, 2019).

[32] C-Band Order.

[33] C-Band Order at 2485, para. 395.

[34] *Id.*

Several months after the Commission released its Order, the aviation industry did form a multi-stakeholder working group to further study the issue and on October 8, 2020—eight months after the proceeding concluded—filed a report outlining its findings. That report worried that the 220 MHz guard band was insufficient to prevent interference to altimeters. It also claimed that the power levels in use in operations in the 3.7-3.98 GHz band would also cause interference even to "properly engineered" altimeters.[35]

By October 2021, it became clear that an impasse had been reached and the aviation industry employed an unfortunately all-too-familiar campaign intended to stoke public fear so as to reverse the Commission's decision. It started with a well-timed article in the Wall Street Journal and the vague warning from the FAA that planes may need to be grounded.[36] On November 2, the FAA issued a Special Airworthiness Information Bulletin, in which it warned of "potential adverse effects on radio altimeters" and provided information to manufacturers and airlines on what they should do to prepare for the 5G launch that was then scheduled for December 2, 2021.[37] Interestingly, the bulletin revealed an important point for this debate, particularly given the RCTA study. The FAA stated in the bulletin

> [t]here have not yet been proven reports of harmful interference due to wireless broadband operations internationally, although this issue is continuing to be studied. In the United States, there has been wireless broadband deployment in the 3.65-3.7 GHz band since 2007. The FCC started a proceeding to authorize mobile broadband service in the 3.55-3.7 GHz band in December 2012 and adopted final rules in April 2015 and October 2018. Commercial deployment started in September 2019, with no known issues for altimeters to date."[38]

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[35] Letter from Terry McVenes and David Redman, RTCA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 18-122, Nov. 19, 2020.

[36] FAA Plans Warning to Pilots, Airlines over 5G Rollout, Andrew Tangle and Ryan Tracey, Wall Street Journal (Oct. 29, 2021).

[37] Risk of Potential Adverse Effects on Radio Altimeters, Special Airworthiness Information Bulletin, AIR-21-18 (Nov. 2, 2021), https://aea.net/pdf/FAA_SAIB_on_Risk_of_Potential_Adverse_Effects_on_Radio_Altimeters.pdf.

[38] *Id.*

On November 4, the licensees of the spectrum, the aviation industry, the FAA, and the FCC hashed out an agreement that would alleviate some of the aviation industry and FAA's concerns by either not turning on the new 5G systems that were close to 50 airports and reducing power levels at other locations.[39] Additional concessions from the wireless licensees followed[40] and as those concessions were being given, the FAA guidance to airlines modified as approvals for altimeters expanded.[41] All told, the cost to the airline industry of retrofitting the subset of altimeters that did not properly shield themselves from adjacent-channel (or more accurately more-than-200-megahertz-spectrally-distant-channel) interference was a mere $26 million.[42]

All this to say that the FCC's process was undermined by industry players that did not get the result they wanted by leveraging an over-used playbook to achieve a different result than what the record developed by the FCC demanded. But in truth, the issue was not with the spectrum rules, but the aviation industry's own negligence to develop "properly engineered radio altimeters."

Thankfully, they cannot rely on the same "unfair surprise" argument this time around. The aviation industry has been on notice that the entire C-band has been in play since 2017. The current FCC provided the public (including the aviation industry) with ample notice of its intention to review new uses in the upper C-band (up to the 4.2 GHz border) early last year.[43] Congress hid no

[39] AT&T, Verizon to Delay Rollout Over FAA's Airplane Safety Concerns, Andrew Tangel and Drew Fitzgerald, Wall Street Journal (Nov. 4, 2021).

[40] The FAA Announces Progress in Expanding 5G Service at Airports, Niraj Chokshi, New York Times (Jan. 28, 2022).

[41] FAA Statements on 5G, https://www.faa.gov/newsroom/faa-statements-5g.

[42] FAA, Notice of Proposed Rulemaking, Docket No. FAA-2022-1647, RIN 2120-AA64 (2022), https://public-inspection.federalregister.gov/2023-00420.pdf.

[43] *Upper C-band (3.98 to 4.2 GHz)*, GN Docket No. 25-59, Notice of Inquiry, 40 FCC Rcd 1807, 1808–09, para. 5 (2025) (Upper C-band NOI).

elephants in mouseholes when enacting the OBB. The FAA too has initiated proceedings to ensure that the FCC can meet its statutory deadline, which DPI finds encouraging.[44]

Thus, any of those in this particular industry that cry foul once these comment periods end should ring hollow because the FCC has the relevant expertise, notice, and diligence to repurpose the whole 180 megahertz without further holdup.

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DPI appreciates the Commission's consideration of these comments and looks forward to continued engagement with the Commission and its excellent staff as this proceeding unfolds.

Respectfully submitted,

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[44] FAA, *Requirements for Interference-Tolerant Radio Altimeter Systems*, Docket No.: FAA-2025-5666; Notice No. 26-02, NPRM (Jan. 7, 2026), https://www.govinfo.gov/content/pkg/FR-2026-01-07/html/2026-00051.htm?utm_source=chatgpt.com.