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

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| In the Matter of | ) | |
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| Promoting Efficient Use of Spectrum through Improved Receiver Interference Immunity Performance | ) | ET Docket No. 22-137 |
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## REPLY COMMENTS OF THE GPS INNOVATION ALLIANCE

The GPS Innovation Alliance ("GPSIA") hereby submits these reply comments in response to the comments filed on the Notice of Inquiry in the above-captioned proceeding, which explores the "role of receiver performance in our spectrum management responsibilities . . . to better inform the Commission as it considers how to ensure valuable and innovative services are able to thrive across the frequency range."[1]

In its initial comments, GPSIA recognized that radiofrequency spectrum is a scarce resource that must be managed in the public interest.[2] It also noted that different services, particularly safety-of-life services, have fundamentally different characteristics that require distinct approaches for specific bands, use cases, applications, and devices. Specifically, GPSIA explained that the Global Navigation Satellite System ("GNSS"), as a navigation system, operates fundamentally differently than radio communications systems that the Commission has historically regulated. GNSS requires wide receiver bandwidth and is susceptible to even minor increases in the effective noise floor. GPSIA, therefore, urged the Commission to ensure that it does not jeopardize GNSS or services like the U.S. Global Positioning System ("GPS"). GPSIA,

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[1] *Promoting Efficient Use of Spectrum through Improved Receiver Immunity Performance*, Notice of Inquiry, FCC 22-29, ¶ 1 (rel. Apr. 21, 2022) ("*NOI*").

[2] *See* Comments of the GPS Innovation Alliance, ET Docket No. 22-137 (filed June 27, 2022) ("GPSIA Comments").

along with many other commenters, oppose a "one-size-fits-all" approach,[3] and GPSIA urges the Commission to reject proposals that rely on such an approach, which may unnecessarily result in existing equipment being evaluated based on inapplicable or irrelevant criteria.

## I. COMMENTERS AGREE THAT THE COMMISSION MUST TAKE INTO CONSIDERATION THE FUNDAMENTAL DIFFERENCES IN DISTINCT SERVICES, BE MINDFUL OF ADJACENT SERVICES WHEN MAKING SPECTRUM POLICY, AND ACKNOWLEDGE THE IMPACT TO THE EMBEDDED USER BASE

Overwhelmingly, commenters agree with GPSIA that the unique nature of each radio service precludes broad receiver regulation or the application of a one-size-fits-all approach.[4] GPSIA supports those commenters and similarly urges the Commission to reject one-size-fits-all proposals, even if they are presented as mere policy statements and not binding regulation.[5] GPSIA also agrees with commenters that suggest the Commission should acknowledge that spectrum allocations with mission-critical operations, such as GPS, require the highest possible form of protection.[6] As some commenters observe, the Commission must account for the critical role – both from an economic and safety-of-life perspective – that GPS and GNSS technologies

[3] *See infra* note 4.

[4] *See, e.g.*, Comments of AT&T Services, Inc., ET Docket No. 22-137 (filed June 27, 2022); Comments of CTIA, ET Docket No. 22-137 (filed June 27, 2022); Comments of Motorola Solutions, Inc., ET Docket No. 22-137 (filed June 27, 2022); Comments of Robert Bosch LLC, ET Docket No. 22-137 (filed June 27, 2022); Comments of the Ultra Wide Band (UWB) Alliance, ET Docket No. 22-137 (filed June 27, 2022); Joint Comments of Aerospace Industries Association, Air Line Pilots Association, International, Aviation Spectrum Resources, Inc., The Boeing Company, Collins Aerospace, The General Aviation Manufacturers Association, ET Docket No. 22-137 (filed June 27, 2022); Comments of Intelsat License LLC, ET Docket No. 22-137, at 2 (filed June 27, 2022); Comments of Lockheed Martin Corporation, ET Docket No. 22-137, at 9 (filed June 27, 2022).

[5] *See, e.g.*, Comments of The Boeing Company, ET Docket No. 22-137, at 9 (filed June 27, 2022) ("Boeing Comments").

[6] *See, e.g.*, Comments of Lumen Technologies, ET Docket No. 22-137, at 5-6 (filed June 27, 2022) ("Lumen Comments"); *see also* Comments of Garmin International, Inc., ET Docket No. 22-137 (filed June 27, 2022) ("Garmin Comments"); Comments of Deere & Company, ET Docket No. 22-137 (filed June 27, 2022) ("Deere Comments"); Boeing Comments at 8-9.

have played in improving the health and safety of the traveling public, agricultural productivity, and environmental sustainability, among other important goals.[7]

The record demonstrates that application of a one-size-fits-all approach to spectrum management, on the other hand, would likely fundamentally fail to afford mission-critical services, such as GPS, appropriate protection. Similar to GPSIA, commenters note that, unlike communications systems, which operate above the noise floor, spread spectrum GNSS signals are below the thermal noise floor when they are received.[8] While a brief loss of a communications signal may be inconsequential in certain circumstances, increases in the noise floor can impede a GPS receiver's ability to correlate and track a signal, which could prove catastrophic in emergency, public safety, aviation, or other safety-of-life situations.[9] Accordingly, commenters agree that the Commission should evaluate the unique needs of each service and find that a sufficiently stable and predictable spectrum environment requires that the Commission avoid placing services with fundamentally different technical parameters immediately adjacent to each other.[10] It is particularly impractical to place highly sensitive receivers that must capture faint signals from remote transmission facilities immediately adjacent to high-power terrestrial operations.

Commenters also agree with GPSIA that the Commission must consider the number of incumbent users, legacy receivers, and criticality of current uses in contemplating any new

[7] *See, e.g.*, Garmin Comments at 7-8; Deere Comments at 2.

[8] *See, e.g.*, Garmin Comments at 12.

[9] *See* GPSIA Comments at 4.

[10] *See, e.g.*, Boeing Comments at 22; Garmin Comments at 10.

guidance.[11] As the Commission recognized,[12] government directives have the potential to render existing equipment and services prematurely obsolete, despite the fact that they may not have reached the end of their useful life.[13] This is particularly true for the typically very long useful life of GPS receivers and GPS-enabled equipment, which is often highly integrated with GPS devices as a single component.[14] GPSIA agrees with commenters that federal government initiatives to regulate receiver performance may risk stranding the many billions of dollars invested by the industry segments that depend on the reliable reception of GPS and the industry that supplies GPS-based technologies.[15] That is because regulation may force manufacturers to abandon existing receivers in the market that cannot be redesigned to accommodate new spectrum policies. It will also disrupt manufacturers' ability to freely innovate, respond to both market forces and consumer demand, and develop new technologies.

In any case, the Commission should not assume that even receivers that may be redesigned to comply with Commission mandates could, in fact, tolerate stronger signals in adjacent bands without any loss of performance or functionality.[16] To the contrary, a redesign of devices may result in a fundamental change to those devices and a degradation in performance. The Commission must therefore, as commenters suggest, be cautious and avoid any changes in its regulatory landscape that will result in decreased functionality of upgraded legacy devices, impose increased costs for manufacturers and consumers, strand significant equipment

[11] *See, e.g.*, Lumen Comments at 2.

[12] *See NOI* ¶¶ 156-61.

[13] *See* Garmin Comments at 5.

[14] *See* GPSIA Comments at 5.

[15] *See, e.g.*, Garmin Comments at 5-6.

[16] *See* GPSIA Comments at 6.

investments across broad swaths of industry, and potentially disadvantage U.S. companies vis-à-vis their worldwide competitors.[17]

## II. A RECEIVER PERFORMANCE DATABASE IS INAPPROPRIATE AND ADMINISTRATIVELY INFEASIBLE FOR DECOUPLED RECEIVERS

GPSIA agrees with many commenters that the Commission should not establish a receiver database because such a database would be burdensome on licensees and present particularly difficult, if not insurmountable, challenges for decoupled receivers.[18] Although GPS satellites are subject to extensive federal regulation, GPS receivers are decoupled from Commission licensing requirements and any centralized data collection process or mechanism.[19] As such, there is no obvious way for the Commission to be able to collect GPS receiver information that could populate a comprehensive database. Moreover, worldwide, GNSS manufacturers have produced over 6,000,000,000 GPS/GNSS receivers, and there are currently well over 1,000,000,000 receivers currently in use in the U.S. alone.[20] It would therefore likely be administratively infeasible to create a central source or mechanism to capture relevant data on the billions of devices that are in the hands of businesses and consumers across the U.S. today. Like other commenters, GPSIA agrees that the Commission should not pursue a receiver performance database or include decoupled receivers if it chooses to create such a database.

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[17] *See, e.g.*, Garmin Comments at 6; Deere Comments at 8.

[18] *See, e.g.*, Comments of McKay Brothers, LLC, ET Docket No. 22-137, at 7-8 (filed June 27, 2022).

[19] *See* Garmin Comments at 14.

[20] *See* European Union Agency for the Space Programme, *EUSPA, EO and GNSS Market Report*, at 20 (2022) ("EU Market Report"), https://www.euspa.europa.eu/sites/default/files/uploads/euspa_market_report_2022.pdf. A few years ago, the EU Market Report estimated that more than six billion GPS/GNSS receivers were in use worldwide. *See* J. David Grossman, *Freedom to Innovate Promotes GPS Resiliency*, GPS World (Aug. 1, 2019), https://www.gpsworld.com/freedom-to-innovate-promotes-gps-resiliency/. At that time, there were approximately one billion GPS devices in use in the U.S., most of them in the private sector. *See* National Space-Based Positioning, Navigation, and Timing Advisory Board, Twenty-Fourth Meeting, at 14 (Nov. 2019), https://www.gps.gov/governance/advisory/meetings/2019-11/minutes.pdf.

## III. CONCLUSION

GPSIA encourages the Commission to acknowledge the strong and broad consensus in the record that a one-size-fits-all approach to receiver performance should be rejected and that mission-critical services, such as those enabled by GPS, require the highest possible form of protection. Although GPS receiver manufacturers follow responsible design practices, it is well established that policies that may suit communications systems could have deleterious effects on navigation systems. GPSIA therefore urges the Commission to continue to respect the fundamental differences in spectrum-based services and avoid prematurely rendering existing equipment obsolete.

Respectfully submitted,

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