

**BEFORE THE FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20054**

In the Matter of)	
)	
Wireless Telecommunications Bureau and)	
The Office of Engineering and Technology)	
Seek Comment on Unmanned Aerial)	GN Docket No. 19-356
System Operations in the 960-1164 MHz)	
and the 5030-5091 MHz Bands, Pursuant)	
to Section 374 of the FAA Reauthorization)	
Act of 2018)	

COMMENTS OF THE SMALL UAV COALITION

The Small UAV Coalition (“Coalition”)¹ hereby submits comments in response to the above-captioned proceeding.² Since its inception, the Coalition has supported and advocated for a range of law and policy changes that will not only embrace, but also encourage, the growth of the commercial unmanned aircraft systems (UAS) industry. We believe that in order to realize the vast economic potential and consumer benefits that will result from UAS integration, federal agencies must implement thoughtful regulations that reflect and anticipate the rapid growth of the industry, including promoting spectrum policies that advance the development of highly-automated unmanned traffic management (UTM) systems that will depend on interoperability of communications links. To that end, the Coalition files these comments to applaud the Commission’s efforts over the last three decades to not only make more licensed spectrum

¹ A full list of members can be found at <http://www.smalluavcoalition.org/members/>.

² Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment on Unmanned Aerial System Operations in the 960-1164 MHz and the 5030-5091 MHz Bands, Pursuant to Section 374 of the FAA Reauthorization Act of 2018; GN Docket No. 19-356; Public Notice, Federal Communications Commission, DA 19-1207 (Nov. 25, 2019) (“*UAS Spectrum PN*”).

available under its flexible use policy, which allows licensees to use spectrum for its highest use without the need for service-specific designations in licensed spectrum bands, but also for its efforts to promote the availability of spectrum for unlicensed uses. The Coalition also provides comment, consistent with its past filings, regarding the specific spectrum bands that the Commission seeks comment on in this Public Notice. Consistent with past advocacy before the Commission, we urge the Commission, the Federal Aviation Administration (FAA), and the National Telecommunications and Information Administration (NTIA) to reiterate in this report that existing spectrum policies should benefit the development of the UAS ecosystem and that the full range of licensed and unlicensed spectrum currently available, as well as spectrum that the Commission is in the process of making available, will support UAS and UTM deployment.

Sound Spectrum Policy for UAS Needs to Focus on Ensuring Automation of Functions

In the *UAS Spectrum PN*, the Commission seeks comment on actions it could take to “promote the safe and robust use of licensed, commercial spectrum for UAS operations.” The Coalition believes that studies underway by major wireless providers and commercial operators to determine the viability of the use of commercial, licensed spectrum for UTM show promise. For example, in October 2019, Skyward, a Verizon company, collaborated with Southern Company and Hitec to test drone aircraft and procedures at an active airport [Griffis] as a precursor to long-range beyond visual line of sight (BVLOS) flights.³ The results of the test, which involved use cases that are core to Southern Company’s operations, demonstrated that the aircraft was capable of a two mile round trip, with three-quarters of a mile between launch and

³ Southern Company Partners with Skyward, Verizon and HiTec for BVLOS Test Operations, available at <https://skyward.io/southern-company-partners-with-skyward-verizon-and-hitec-for-bvlos-test-operations/> (visited Dec. 17, 2019).

ground control. The aircraft performed as expected and accurate data was collected.⁴ The project also tested the aircraft's endurance; the 32-minute flight expended just over half the battery capacity and proved the aircraft was well equipped for long-range BVLOS flights.⁵ The project demonstrates that Skyward can "safely deploy and control drones beyond visual line of sight using the equipment available."⁶ It further demonstrated that the operations could be performed in a manner that "allowed for the uninterrupted flight of Griffiss's manned traffic flow, which included military (attack, lift, and rotary-wing), commercial, and civil aircraft."⁷ Additionally, Verizon has conducted testing on its commercial wireless network to better understand the capabilities, challenges, and any necessary network modifications relevant to using its commercial wireless spectrum to support a variety of drone operations. Verizon is mindful of the need to care for interference concerns, both to its own terrestrial network users, as well as to adjacent band licensees and licensees in adjacent geographies.

Ericsson has also conducted studies over the last two years to explore issues of maintenance of connection links, even in BVLOS scenarios.⁸ Its studies demonstrate that "licensed mobile spectrum serves as the foundation for mobile networks to provide wide-area, high-quality and secure connectivity that can enable cost-efficient drone operations beyond visual line-of-sight range."⁹

Intel has conducted trial designed to test safe operation of multiple UASs sharing the same airspace by recreating typical scenarios of what a UAS operator might encounter when

⁴ *Id.*

⁵ *Id.*

⁶ *Id.*

⁷ *Id.*

⁸ Drones and Networks: Ensuring Safe and Secure Operations, available at <https://www.ericsson.com/en/reports-and-papers/white-papers/drones-and-networks-ensuring-safe-and-secure-operations> (visited Dec. 17, 2019).

⁹ *Id.*

commercial drone flights beyond line of sight become commonplace.¹⁰ As Intel described, the trial evaluated technologies that allow flight path conformance monitoring, dynamic adjustments to drone operation plans and contingency management. This requires coordinated communication between the UAS and the traffic management system both for flight planning and for real-time flight monitoring. Intel's drones communicated flight plans and real-time locations were performed through its on-board LTE modem to Project Wing's traffic management platform, which instructed each drone to a safe flight path.¹¹ Intel noted that LTE communications and integrated depth sensing and vision technologies allow commercial UAS developers the ability to pursue even more sophisticated capabilities.¹²

Nokia is using private network LTE to offer drone solutions to a range of industry segments.¹³ Nokia has deployed almost two in five (37 per cent), on average, of its total private wireless networks in Europe, followed by a little over one in four (27 per cent) in North America.¹⁴ Nokia is currently using 4G LTE but is building its platforms for the introduction of 5G, and particularly of massive machine-type communications (mMTC) and ultra-reliable low-latency communication (URLLC), as specified in the 3GPP's Release 16 of the 5G standard."¹⁵

Similarly, Qualcomm has moved to product introduction, offering a range of services that support connectivity through integrated 4G/LTE and CBRS, with 5G support planned to be enabled late this year. Qualcomm also provides Wi-Fi integrated 802.11ac; tri-band Wi-Fi: on

¹⁰ Bird's-Eye View: How Traffic Management Will Lead to Safer Skies, June 15, 2017, available at <https://newsroom.intel.com/editorials/birds-eye-view-how-traffic-management-will-lead-safer-skies/#gs.oaibsr> (visited Dec. 26, 2019).

¹¹ *Id.*

¹² *Id.*

¹³ Nokia counts 120 private LTE customers, widens spectrum support, intros new devices, available at <https://enterpriseiotinsights.com/20191119/channels/news/nokia-counts-private-lte-customers-and-widens-spectrum-support> (visited Dec. 26, 2019).

¹⁴ *Id.*

¹⁵ *Id.*

the 2.4 GHz and 5 GHz with Dual Band Simultaneous (DBS); and Qualcomm TrueWireless™ Bluetooth 5.0.¹⁶

These and other tests demonstrate that commercial, licensed networks are not only capable, but particularly well-suited to promoting safe and reliable connectivity for UAS operations, even BVLOS. The Commission should ensure the continuation of a supportive regulatory environment for ongoing BVLOS and UTM testing and deployment. For example, the Commission should continue to promote flexible use spectrum rules that exemplify the regulatory environment that encourages innovation, supports the testing, etc. without imposing unnecessary restrictions.¹⁷ Under the existing licensing rules, only a few spectrum bands have explicit prohibitions on air-to-ground communications.¹⁸ The Commission's service and technical rules rely instead on power limits, out of band emission standards, and geographic licensing restrictions to control for issues relating to harmful interference. Those rules have not only allowed the commercial mobile industry to flourish, creating the United States as a world leader in that sector, but have also allowed for the aforementioned testing that is demonstrating the viability of commercial mobile spectrum for use in drone operations such as BVLOS and UTM. The Commission should continue to promote these activities through its proceedings. Licensees understand that they cannot cause harmful interference and that they have restrictions against adjacent band interference, as well as other restrictions placed on the licenses they secured at auction. Beyond compliance with the Commission's rules, licensees have an incentive to ensure that they do not cause interference or other issues for other licensees, whether that is

¹⁶ Qualcomm Launches New Platform Aimed to Transform the Robotics Industry, Feb. 2019, available at <https://www.qualcomm.com/news/releases/2019/02/25/qualcomm-launches-new-platform-aimed-transform-robotics-industry> (visited Dec. 26, 2019).

¹⁷ *UAS Spectrum PN* at 2.

¹⁸ For example, the 900 MHz band has such a restriction.

adjacent geographies in the same area, or adjacent spectrum bands licensed to other users. The licensing structure promoted by the Commission, which provides licensees the flexibility to experiment and develop new use cases, creates the environment in which licensees find they have not only a duty but an incentive to understand, investigate and mitigate interference issues without having to involve the FCC.

The Commission Should Ensure that Spectrum Specifically Designated for UAS Operations is Not Unfairly Advantaged Over Other Spectrum Alternatives.

In the *UAS Spectrum PN*, the Commission seeks comment on “whether unmanned aircraft systems operations should be permitted, but not required, to operate on spectrum that was recommended for allocation for [Aeronautical Mobile Route (R) Service] and control links for UAS by the World Radio Conferences in 2007 (L-band, 960-1164 MHz) and 2012 (C-band, 5030-5091 MHz) on an unlicensed, shared, or exclusive basis, for operations within the [UAS Traffic Management] system or outside of such a system,”¹⁹ As the Commission notes in the *UAS Spectrum PN*, the Coalition provided comments on the Aerospace Industries Association (AIA) petition for rulemaking related to the 5030-5091 MHz band.²⁰ The Coalition reiterates its position that given the pace of innovation and the range of spectrum options for innovation, the Commission should continue to provide companies with maximum flexibility to research, develop, and deploy spectrum-based solutions for UAS and UTM.²¹ The Coalition would note that the recommended allocation of these bands for UAS use occurred over seven years ago for

¹⁹ *UAS Spectrum PN* at 1-2 (citations omitted).

²⁰ *Id.* at 2. The Small UAV Coalition’s comments and supplemental filings are available at [https://www.fcc.gov/ecfs/search/filings?proceedings_name=RM-11798&q=filers.name:\(*small%20uav%20coalition*\)&sort=date_disseminated,DESC](https://www.fcc.gov/ecfs/search/filings?proceedings_name=RM-11798&q=filers.name:(*small%20uav%20coalition*)&sort=date_disseminated,DESC).

²¹ Letter from Gregory Guice, Counsel for the Small UAV Coalition, to Marlene H. Dortch, Secretary, Federal Communications Commission, RM-11798, filed Sept. 10, available at <https://ecfsapi.fcc.gov/file/109102423719011/Small%20UAV%20Coalition%20AIA%20Supplemental%20Petition%20ex%20parte.pdf>.

the 5030-5091 MHz band and over 12 years ago for the 960-1164 MHz band, which is well before much of the current testing was underway. The Coalition, therefore, agrees with the Commission's assertion in the *UAS Spectrum PN* that should it consider opening these bands for use with UAS operations, but that regardless of licensing regime, it remain clear that such use is "permitted but not required."²²

Regarding licensing regime for these bands, again the Coalition supports a mix of spectrum opportunities, be they licensed, unlicensed, or shared. Each of these varying regimes may support different concepts of operation (ConOps) and a mix of regimes may be appropriate depending on the operation. We note that a number of bodies continue to work on standards for safe operations and having a full range of opportunities available will inure to the benefit of all that seek to participate in the opportunities that UAS and UTM present. Should any forthcoming standards point to a more specific need, the Coalition looks forward to working with the Commission to address such needs. Given past efforts by the Commission to bring spectrum to market to meet the needs of other technologies, the Coalition is certain the Commission will act with resolve to quickly address any such needs for UAS. It is, however, premature to begin proceedings to direct such designations of spectrum for mission critical operations.

Conclusion

The Small UAV Coalition appreciates this opportunity to comment on the spectrum opportunities that numerous UAS market participants are undertaking. The Coalition commends the Commission for its past efforts to make a range of spectrum solutions available for such exploration. As the Coalition states in its Spectrum Policy Statement:

²² *UAS Spectrum PN* at 1.

Spectrum is a critical component to ensure safe and reliable operations of unmanned aircraft systems (UAS) in low altitude airspace. Spectrum will be essential for (1) wireless control links between unmanned aircraft and their control systems, (2) remote, electronic identification and tracking; (3) payload communications; (4) ensuring separation and de-confliction between and among aircraft; and (5) avoiding collision with persons or structures.²³

The foundational work the Commission has performed over the last three decades in establishing flexible use licensing and unlicensed use opportunities will help ensure this critical resource is available.

Respectfully submitted,

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²³ [Small UAV Coalition Spectrum Policy Statement.](#)