

**Before the  
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION  
Washington, DC 20230**

In the Matter of	)	
	)	
Developing a Sustainable Spectrum	)	Docket No. 181130999-8999-01
Strategy for America’s Future	)	RIN 0660-XC044

**COMMENTS OF COMSEARCH**

Comsearch, a CommScope company, submits these comments in response to the Notice and Request for Comments issued by the National Telecommunications and Information Administration (“NTIA”) in the above-referenced proceeding.<sup>1</sup> Comsearch applauds NTIA’s commitment to make more efficient use of finite radio frequency spectrum resources and to develop a fulsome National Spectrum Strategy. Comsearch enthusiastically supports NTIA’s effort to further advance the development and deployment of wireless broadband services while also simultaneously ensuring that important federal incumbents have access to the spectrum resources necessary to support their services.

As discussed in greater detail below, Comsearch does not view the needs of non-federal and federal users as mutually exclusive. New technologies and strategies have made shared spectrum access a reality in recent years, and Comsearch anticipates that further success can be achieved using derivative technology in the near term.

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<sup>1/</sup> See *Developing a Sustainable Spectrum Strategy for America’s Future*, 83 Fed. Reg. 65,640 (Dec. 21, 2018). Due to the press of other business, these comments are being submitted shortly after the announced due date. Comsearch submits that no party is prejudiced by this delay and respectfully requests that the NTIA accept these late-filed comments.

## I. STATEMENT OF INTEREST

Comsearch is the pre-eminent global provider of wireless spectrum management and engineering products and services. Comsearch has developed industry-standard interference analysis and mitigation processes and procedures, and maintains state-of-the-art software and comprehensive databases used in the design of complex wireless systems. Our commercial and government customers rely on us for innovative yet cost-effective solutions to the challenges posed by 21st century wireless deployments.

Among other cutting edge spectrum sharing initiatives, Comsearch is a leading developer of geolocation database technology, and has been conditionally approved as a first wave Spectrum Access System (“SAS”) for the 3550-3700 MHz Citizens Broadband Radio Service (“CBRS”). Comsearch’s SAS is presently undergoing final certification testing at the NTIA Institute for Telecommunications Sciences in Boulder, Colorado, and Comsearch anticipates full commercial deployment of its first wave SAS in early 2019.

Comsearch is also a database manager for the 70-80-90 GHz Service.<sup>2</sup> Since the band is shared with federal users, coordinating in this band represents substantial collaboration with NTIA. We worked together to develop a registration protocol to ensure that non-federal government links are coordinated with federal government operations through NTIA’s planned automated coordination mechanism, and promptly notify the licensee when a link submission receives a green- or yellow-light response from NTIA<sup>3</sup>.

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<sup>2</sup> See *Allocations and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands*, WT Docket No. 02-146, 18 FCC Rcd 23318 (2003); *Wireless Telecommunications Bureau Opens Filing Window For Proposals To Develop And Manage Independent Database Of Site Registrations By Licensees In The 71-76 GHz, 81-86 GHz and 92-95 GHz Bands* (DA 04-672) (70-90 GHz Public Notice), and Comsearch Proposal To Develop And Manage A Database Of Site Registrations In The 71-76 GHz, 81-86 GHz and 92-95 GHz Bands (March 26, 2004); (see also [http://wireless.fcc.gov/services/index.htm?job=service\\_home&id=millimeter\\_wave](http://wireless.fcc.gov/services/index.htm?job=service_home&id=millimeter_wave))

<sup>3</sup> A "green light" response will indicate that the link is coordinated with the Federal Government; a "yellow light" response will indicate a potential for interference to Federal Government or certain other operations. *See generally*

## II. COMMENTS

Comsearch provides responses to NTIA's specific questions concerning radio frequency spectrum access, sharing and management below.

### 1. In what ways could the predictability of spectrum access for all users be improved?

Response: For the purpose of improving the predictability of spectrum access for all users, Comsearch urges NTIA to make more granular information on federal spectrum use available to non-federal interests. As a first step toward this goal, NTIA should grant non-federal entities access to non-classified portions of the Government Master File ("GMF") database on federal spectrum use.

At present, with respect to many bands, non-federal interests have inadequate information about federal spectrum use. Non-federal interests, through publicly accessible materials such as NTIA's *Manual of Regulations and Procedures for Federal Radio Frequency Management* (the "Redbook") or *Federal Government Spectrum Compendium Reports*, may be able to glean a general sense for the type of federal users and class of services deployed in a band, but cannot ascertain the specifics necessary to fully appreciate the intensity of federal spectrum use, or the sensitivity of the underlying federal spectrum user. Accordingly, it may be difficult or impossible to determine whether or not a band may be suitable for shared access on a secondary or tertiary service, and if the concerned band is suitable, what type of interference protection mechanisms (e.g., a geolocation database) will best ensure that federal incumbents experience no harmful

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47 C.F.R. § 2.106 (US388, US389). In the case of a "yellow light," the licensee must file an application for the requested link with the Commission, which in turn will submit the application to the IRAC for individual coordination. See *Report and Order*, 18 FCC Rcd. at 23341-43 ¶¶ 52, 54, 58.

interference from a new entrant in the band. Making the GMF database available, to the extent possible while also protecting the confidentiality of classified end users and services, will help alleviate potential interference concerns earlier in the planning process, and give both federal and non-federal spectrum users more confidence and certainty when making long-term decisions on investments in 5G and other future wireless broadband transmission standards.

2. To what extent would the introduction of automation facilitate assessments of spectrum use and expedite the coordination of shared access, especially among Federal and non-Federal spectrum stakeholders?

Response: The current method of coordination between co-channel federal and commercial spectrum users, which involves a laborious, consensus-driven, bespoke review by the Interdepartment Radio Advisory Committee (“IRAC”) of any proposed co-channel spectrum use, is obsolete with respect to most routine frequency coordination between parties that have established service rules and known radio transmitter characteristics. In such instances, Comsearch agrees that automation will dramatically expedite coordination of shared access spectrum.

Comsearch urges NTIA to explore whether an automated coordination framework similar to the current scheme in the 70/80/90 GHz “millimeter wave” bands might have utility in other bands. Specifically, a non-federal user in the 70/80/90 GHz bands is required to input microwave link parameters into an FCC-approved third-party database prior to initiating service. The third-party database then conveys the information to an NTIA database that undertakes an interference analysis and determines whether any federal user will be affected by the proposed non-federal use. The NTIA database then conveys to the third-party system either a “green light,” granting approval to transmit, or, alternatively, a “yellow light,” indicating further analysis is required before any

transmission can commence and full IRAC coordination must occur. In turn, the third-party database conveys instructions to the ultimate non-federal licensee attempting to register the link.

An automated system akin to what has been successfully implemented in the 70/80/90 GHz bands expedites coordination and provides automated (and nearly instantaneous) approval where certain baseline interference thresholds are satisfied, but involves IRAC when appropriate to resolve more complex or borderline coordination. Comsearch views such a framework as striking the right balance between a fully automated system and a laborious, bespoke coordination.

3. What is the practical extent of applying standards, incentives, and enforcement mechanisms to promote efficient and effective spectrum use?

Response: Comsearch views the application of standards, incentives and enforcement mechanisms as useful tools for promoting more efficient and effective spectrum use. With respect to the practical implementation of these tools in NTIA's spectrum policy, Comsearch endorses the 2018 recommendations and ongoing efforts of the Commerce Spectrum Management Advisory Committee ("CSMAC").<sup>4</sup>

In 2018, CSMAC provided recommendations to NTIA on interfacing with Standardization Development Organizations ("SDOs") in order to facilitate early and effective engagement on voluntary standards that may involve shared spectrum access.<sup>5</sup> Comsearch concurs with these recommendations and emphasizes that engagement with SDOs early in the development of a regulatory standard is essential if NTIA wants to shape critical parameters that may affect the viability of shared spectrum access.

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<sup>4</sup> CSMAC advises the Assistant Secretary for Communications and Information at NTIA on a broad range of spectrum policy issues. Its members are spectrum policy experts from outside the federal government appointed as "Special Government Employees."

<sup>5</sup> CSMAC SDO Engagement Recommendations available at: [https://www.ntia.doc.gov/files/ntia/publications/csmac\\_spectrum\\_efficiency\\_subcommittee\\_report.pdf](https://www.ntia.doc.gov/files/ntia/publications/csmac_spectrum_efficiency_subcommittee_report.pdf). ("SDO Recommendations").

Comsearch similarly endorses 2018 CSMAC recommendations made to NTIA concerning improvements in spectrum efficiency.<sup>6</sup> In particular, Comsearch urges NTIA to explore the recommendations for improving spectrum efficiency identified by CSMAC as “most promising,” including: the creation of predictable and flexible funding to support the development and implementation of sharing options for federal agencies; granting agencies flexible use rights that resemble “property-like” rights within spectrum assignments to motivate shared use, including options for agencies to sell or lease spectrum; the implementation of limited bi-directional spectrum exchanges or barter/swaps between federal and non-federal entities (with prior coordination and the express approval of NTIA); and appropriate steps to ensure that NTIA’s authority and resources expand to allow it to better support federal agencies that want to collaboratively share spectrum.<sup>7</sup>

Finally, Comsearch urges the NTIA to adopt enforcement recommendations made concurrently by the CSMAC.<sup>8</sup> Comsearch agrees that shared spectrum access between federal and non-federal spectrum users will necessitate access to technology and systems to facilitate interference prevention, detection and resolution (“IPDR”).<sup>9</sup> Comsearch agrees with the CSMAC’s recommendations that the deployment of a Spectrum Access System (“SAS”) and Environmental Sensing Capability (“ESC,” together “SAS/ESC”) in the 3550-3560 MHz Citizens Broadband Radio Service (“CBRS”) will help both federal and non-federal interests learn to detect and prevent interference in a shared spectrum access framework. Comsearch similarly agrees that

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<sup>6</sup> CSMAC 2018 Spectrum Efficiency Report available at: [https://www.ntia.doc.gov/files/ntia/publications/csmac\\_5g\\_subcommittee\\_recommendations\\_july\\_24th\\_2018\\_final.pdf](https://www.ntia.doc.gov/files/ntia/publications/csmac_5g_subcommittee_recommendations_july_24th_2018_final.pdf). (“2018 Spectrum Efficiency Report”).

<sup>7</sup> See *id.* at 6-7.

<sup>8</sup> CSMAC Enforcement Subcommittee Recommendations available at: [https://www.ntia.doc.gov/files/ntia/publications/csmac\\_enforcement\\_sub-committee\\_report\\_072418.pdf](https://www.ntia.doc.gov/files/ntia/publications/csmac_enforcement_sub-committee_report_072418.pdf). (“Enforcement Recommendations”).

<sup>9</sup> See *id.* at 1.

SAS capabilities may play an effective and important role in detecting and preventing interference in other bands, and that SAS (or similar dynamic spectrum management) technologies should be developed further based on findings from the nationwide deployment of CBRS in 2019.<sup>10</sup> With respect to interference resolution, Comsearch agrees that a mechanism is needed to either directly or indirectly modify the transmission or reception parameters of one or more users to mitigate interference.<sup>11</sup> In the CBRS context, the SAS administrators will be able to modify device transmission parameters (power, frequency, bandwidth, etc.) and to return a device or devices to their previous operational states as soon as practical.<sup>12</sup> A similar approach, with a mechanism to verify to NTIA that resolution has occurred may have utility in other shared spectrum access scenarios.

4. How might investment in RDT&E improve spectrum-utilization methods, and spectrum-sharing tools and techniques?

Response: Comsearch recommends that NTIA leverage and develop off of commercial successes in spectrum-utilization methods and spectrum-sharing tools. Most significantly the geolocation database technology developed to implement the SAS framework in the CBRS can serve as a valuable starting point for future federal efforts to share more spectrum. As discussed above in Comsearch's response to Question 3, interference prevention, detection and resolution are all made possible through the SAS systems being implemented commercially in 2019, and these technologies likely have applicability in other bands where shared spectrum access may be feasible. NTIA should look to partner with non-federal interests and further refine these commercially developed technologies in other bands.

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<sup>10</sup> See *id.* at 1-2.

<sup>11</sup> See *id.* at 3.

<sup>12</sup> *Id.*

Comsearch recommends against an independent RDT&E investment by federal agencies in new spectrum sharing technology. Past federal-led efforts to develop such technology (e.g., the Federal Spectrum Management System) have involved millions of dollars spent on systems that have not been effectively developed or deployed.

5. What are the risks, if any, to the global competitiveness of U.S. industries associated with spectrum management and policy actions?

Response: Falling behind in the footrace to develop and deploy 5G transmission technology represents the obvious near-term risk associated with failing to improve U.S. efficiency in making more radiofrequency spectrum available by shared spectrum access or other means. 5G transmission technology has the potential to increase downstream data transmission in a cellularized network by an order of magnitude, and to dramatically reduce network latency. Both speed and low latency are critical for next generation broadband and Internet-of-Things (“IoT”) applications, including, among other technologies, connected cars, A.I.-driven analytics, and smart city services. 5G, however, requires new pools of spectrum, and vis-à-vis other regulatory jurisdictions, the U.S. has not been as quick to repurpose or to adopt band-sharing requirements. To the extent that the U.S. falls behind in 5G, RDT&E may ultimately be redirected to other jurisdictions as well, which would ultimately hamper U.S. 5G competitiveness and the cost of service.

6. How could a spectrum management paradigm be structured such that it satisfies the needs of commercial interests while preserving the spectrum access necessary to satisfy the mission requirements and operations of Federal entities?

Response: Comsearch appreciates the delicate balancing act between satisfying the needs of commercial, non-federal interests while still preserving spectrum resources for critical federal

uses. Meeting the needs of both interests, however, is not a mutually exclusive proposition. In recent years federal and non-federal interests have been able to employ new technology and/or carefully manage the introduction of new services while ensuring the satisfaction of both parties.

The use of SAS/ESC technology in the CBRS represents one success story. While CBRS users may access the 3550-3650 MHz when not in use by federal users, the band must be relinquished promptly when needed to support coastal radar. The implementation of SAS/ESC technology allows this spectrum “hand-off” to occur in near real-time on the coasts, but also enables continuous non-federal use of the spectrum as devices move away from coastal protection zones.

The 1695-1710 MHz Advanced Wireless Service 3 (“AWS-3”) band represents another success story. In the AWS-3 band certain federal meteorological satellite incumbent systems will continue to operate indefinitely. To facilitate shared use of the band, NTIA and private industry developed a “customized web-based database storage software solution that manages the flow of information between commercial wireless operators deploying broadband wireless networks and federal agencies who have meteorological satellite Earth station operations in the identified coordination zones.”<sup>13</sup> This flexible system facilitates careful coordination around federal earth stations before an AWS-3 licensee deploys network infrastructure.

Recommendations made in the *CSMAC 2018 Spectrum Efficiency Report* (discussed above in response to Question 3) should also be considered in the context of how to satisfy non-federal interests that want to use spectrum while protecting federal incumbent services, particularly with respect to the information and resources necessary to ensure a collaborative engagement between non-federal and federal interests contemplating shared spectrum access.<sup>14</sup>

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<sup>13</sup> AWS-3 Portal at: <https://www.ntia.doc.gov/blog/2015/portal-opens-aws-3-spectrum-sharing-coordination>.

<sup>14</sup> See *2018 Spectrum Efficiency Report* at 9-11.

7. What are the likely future needs of spectrum users, both terrestrially and for space-based applications, within the next 15 years? In particular, are present allocations of spectrum sufficient to provide next generation services like Fifth Generation (5G) cellular services and emerging space-based applications?

Response: New technologies, including 5G, are hungry for spectrum. At this early juncture in the development of 5G it is premature to set expectation for long-term spectrum needs. Comsearch can definitively state, however, that current allocations are inadequate to satisfy the near-term (2-5 years) needs of cellular service providers as evidenced by the aggressive advocacy to repurpose the entirety of the 3.7-4.2 GHz fixed satellite service C-band for broadband wireless service, with certain cellular carriers asserting that the C-band proceeding presently open before the FCC will be a flop if every carrier does not obtain at least 100 megahertz of spectrum for 5G use.<sup>15</sup>

### **III. CONCLUSION**

Comsearch appreciates the efforts that NTIA has taken to develop a sustainable spectrum strategy and remains committed to further advance this effort in the future.

Respectfully submitted,

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/s/

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<sup>15</sup> See Comments of T-Mobile USA, Inc., GN Docket No. 18-122, at 12 (filed Oct. 29, 2018).