November 22, 2021

VIA ECFS

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

Re: **Comsearch Proposal to be Approved as an Automated Frequency Coordination System Operator (ET Docket No. 21-352)**

Dear Ms. Dortch,

Comsearch, a CommScope Company submits the attached proposal for consideration as an Automated Frequency Coordination system operator.

Please feel free to contact me if you should have any questions or if you require any additional information.

Respectfully Submitted,

/s/ H. Mark Gibson

H. Mark Gibson
Director, Regulatory Policy
Comsearch, a CommScope Company

November 22, 2021

To: Marlene H. Dortch
          Office of the Secretary, Federal Communications Commission

**COMSEARCH PROPOSAL
TO BE DESIGNATED AS A
6 GHZ BAND AUTOMATED FREQUENCY COORDINATION SYSTEM OPERATOR**

ET Docket No. 21-352

In response to the above-mentioned Public Notice (notice)[1] from the Wireless

Telecommunications Bureau and the Office of Engineering and Technology issued September

28, 2021, Comsearch, a CommScope company (Comsearch) hereby submits this proposal to

develop and manage an independent Automated Frequency Coordination (AFC) system. We

provide below our responses to the Federal Communication Commission's (Commission)

specific questions in the Public Notice.

Our response to the Public Notice will demonstrate that Comsearch is capable of developing

and maintaining an AFC system as outlined in the Commission's proceedings[2]. Based upon our

long-standing background in spectrum management, our history of developing and maintaining

some of the largest and most accurate commercial telecommunications databases, our strength

and corporate breadth and our approach to the database development as described in our

response below, we firmly believe we are qualified to develop and deliver AFC services.

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[1] See *FCC Requests 6 GHz Automated Frequency Coordination Proposals,* ET Docket No. 21-352 (FCC 21-100) (Public Notice).

[2] *See, "*Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz", Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 3852 (5) (2020).

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Question 1: **AFC system operator contact information, including name, phone number and email address that Commission staff may use for all AFC system related inquiries, such as information and data requests or to provide enforcement instructions.**

Comsearch Response

General Contact

H. Mark Gibson
Sr. Director, Regulatory Policy
(703) 585-6249
mark.gibson@commscope.com

Technical Contact

Jamie Miley
Director, Software Development
(703) 943-6922
jamie.miley@commscope.com

Question 2: **A technical diagram showing the architecture of the AFC system with a brief description of its operation.**

Comsearch Response

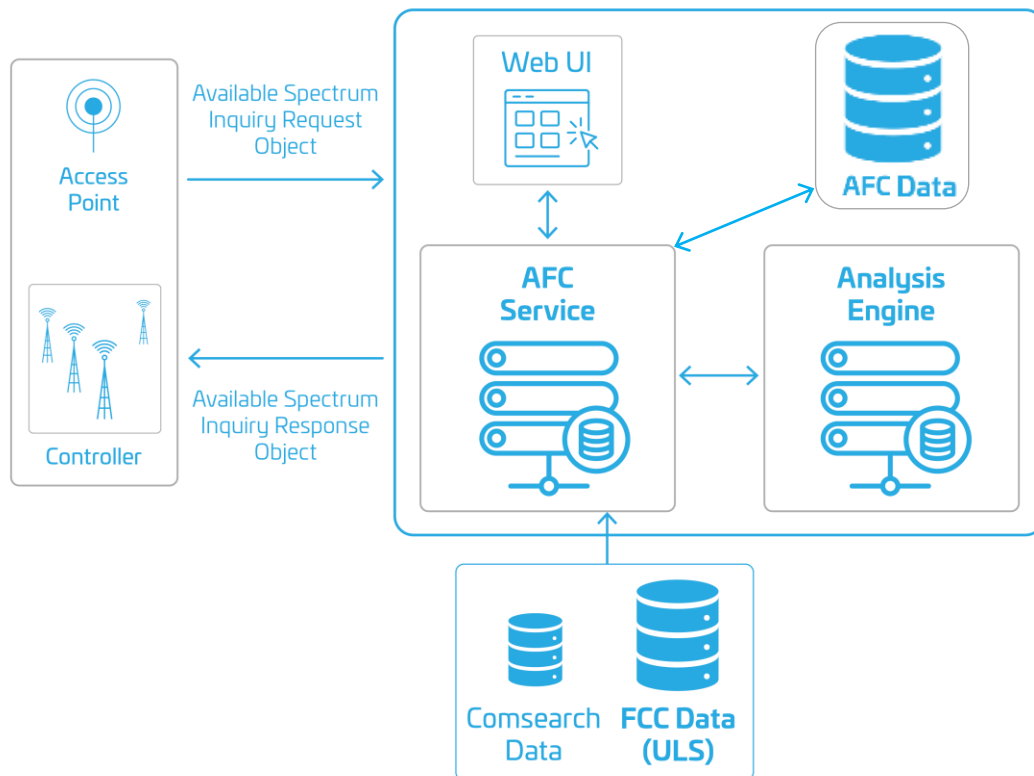The high-level architecture for the Comsearch AFC system is shown in Figure 1 below:

Figure 1: Comsearch AFC System Architecture

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General AFC System operation is as follows:

- The Comsearch AFC system accesses the FCC Universal Licensing System (ULS) at least daily to receive updates of the data on licensed microwave systems. This data are stored on our internal data management systems. Comsearch will augment the FCC ULS data with additional data from our proprietary microwave databases.
- Data related to standard power device (SPD) registrations, spectrum availability queries, responses, etc. are stored in the AFC database.
- Information on protected Radio Astronomy services is contained within the AFC system.[3]
- The AFC receives and responds to registration requests and spectrum inquiries from SPDs. The AFC performs frequency availability calculations consistent with 47 C.F.R Part 15.407(k), (l) (m) and (n). The AFC performs numerous additional functions as described below.
    - SPDs send registration/spectrum availability requests to the AFC either directly or using a proxy.
    - The AFC Service validates the request and verifies the SPD FCC ID. Invalid requests will receive a "no spectrum available" response.
    - Valid spectrum availability requests are processed in the AFC Analysis Engine using FCC ULS and Comsearch data to calculate spectrum availability as mentioned above.
    - The AFC Service returns available spectrum results to the SPD or proxy.

Question 3:   A description of whether the AFC system software is based on a propriety implementation or open source.

Comsearch Response

The Comsearch AFC system will be based on proprietary implementation. We also expect to implement specifications that are currently under development by both the Wireless Innovation Forum[4] and the Wi-Fi Alliance[5].

Question 4:   A demonstration that the prospective AFC system operator possesses sufficient technical expertise to operate an AFC system.

Comsearch Response

Comsearch has long standing expertise in spectrum management, interference analysis and mitigation, and decades of experience in providing mission critical network infrastructure services. Comsearch maintains state-of-the-art software and comprehensive spectrum databases

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[3] See 47 C.F.R. Part 15.407(m)
[4] See Forum Work Products: https://6ghz.wirelessinnovation.org/work-group-products
[5] See, "Wi-Fi Alliance® accelerates Wi-Fi 6E development with Automated Frequency Coordination", https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-accelerates-wi-fi-6e-development-with-automated-frequency

utilized in the design of complex wireless systems. We offer an extensive array of data and engineering solutions and consulting. We have been gathering data for over 40 years on microwave, broadcast, satellite, PCS, AWS and cellular networks from an abundance of sources. We verify, update and manage our extensive databases daily, and have amassed one of the largest and most accurate private collections of engineering data in the telecommunications industry. Our engineers rely upon these databases to perform thousands of interference analyses and frequency assignments per month.

Comsearch has specific experience with the Commission's database-enabled centralized spectrum management systems considering the following examples:

- FCC-certified Spectrum Access System (SAS) and Environmental Sensing Capability (ESC) provider for the Citizens Broadband Radio Service (CBRS)[6]

- FCC-certified TV White Space database administrator. [7]

- FCC-certified database administrator in the 70/80-90 GHz service[8]

- Support the American Hospital Association for management of the Wireless Medical Telemetry Service (WMTS) registration database

CommScope interacts regularly with the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA), and actively participates in various industry groups such as the Wireless Innovation Forum (WInnForum), the CBRS Alliance, the National Spectrum Management Association (NSMA), the Telecommunications Industry Association (TIA), and the Institute of Electrical and Electronics Engineers (IEEE) to develop rules, industry recommendations, and standards that promote the efficient use of the radio spectrum

Comsearch is a business unit within the Integrated Solutions/Mobility Solutions division of CommScope (NASDAQ: COMM). We are a global provider of infrastructure solutions for communication and entertainment networks. Our solutions for wired and wireless networks enable service providers including cable, telephone and digital broadcast satellite operators and media programmers to deliver media, voice, IP data services and Wi-Fi to their subscribers and allow enterprises to experience constant wireless and wired connectivity across complex and varied networking environments. Our solutions are supported by our broad array of services including technical support, systems design and integration.

Comsearch possesses sufficient technical expertise to operate an AFC system.

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[6] See, "*WTB And OET Approve Four Spectrum Access System Administrators For Full Scale Commercial Deployment In The 3.5 GHz Band And Emphasize Licensee Compliance Obligations In The 3650-3700 MHz Band Under Part 96*", (Public Notice), 35 FCC Rcd 117 (1) (2020)

[7] See, "*Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*", (Report and Order) 26 FCC Rcd 554 (1) (2011)

[8] See, "Allocations And Service Rules For The 71-76 GHz, 81-86 GHz And 92-95 GHz Bands", (Report and Order). 19 FCC Rcd 20524 (25) (2004)

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Question 5: **A description of the prospective AFC system operator's recordkeeping policies, including registration record retention as well as retention of historical frequency availability data.**

<u>Comsearch Response</u>

The Comsearch AFC system adheres to the retention specifications outlined in 15.407(k)(5) and 15.407(k)(15)(i). We have implemented the Wi-Fi Alliance AFC System to AFC Device Interference Specification, which details data elements involved in the AFC-SPD protocol exchanges.[9] As defined in the specification, spectrum query requests will include FCC ID, Serial Number, date/time, frequency range, and location information. A response will follow with spectrum availability. All the information related to SPD registrations, spectrum availability queries, responses, etc. are stored in the AFC database as identified in Figure 1.

Question 6: **A description of how the prospective AFC system operator will handle unanticipated situations that may disrupt performance of the system's required functions—ranging from exceptional cases that affect the system's ability to perform its required functions in isolated instances to cases involving the type of widespread disruption that an event like a system failure might cause.**

<u>Comsearch Response</u>

Comsearch will build our AFC system on a framework consistent with our SAS and our other cloud-native applications. Given the critical functions served by the AFC system, we will build it for similar high system availability. This is achieved by employing various techniques and technologies, both on the hardware level as well as the application layer.

The Comsearch AFC system will leverage the flexibility and reliability of secure cloud services platform. The AFC system will be deployed as geographically redundant to eliminate system outages due to wide-area power failures, network failures or natural disasters. The AFC system will be installed in multiple physically separated Availability Zones (AZs) within an (AWS) region.

The design of the Comsearch AFC system will use a micro-service software architecture to provide high-availability, scalability, and maintainability. A micro-service-based architecture is ideal for building large scale systems because it is composed of small services that encapsulate the functionality corresponding to a single feature. The individual services are smaller, and more easily maintained. Individual services can be readily scaled or upgraded with low to no impact on other services.

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[9] Wi-Fi Alliance, "*AFC System to AFC Device Interface Specification, Version 1.0*", announced Oct. 19, 2021. https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-accelerates-wi-fi-6e-development-with-automated-frequency

In the case of a system failure Comsearch has a tiered product support system in place that will include a 24/7 call center and Tier 2 and 3 advanced engineering and development support.

Question 7: **A description of the methods (e.g., interfaces, protocols) that will be used for secure communication between the AFC system and its associated standard-power devices and to ensure that unauthorized parties cannot access or alter the database or the list of available frequencies and power levels sent to the standard-power devices.**

Comsearch Response

The AFC system infrastructure will be located in the Amazon Cloud in its own Virtual Private Cloud (VPC) with individual security groups each with unique governing rulesets. Figure 2 below illustrates the separate security groups used in the AFC.
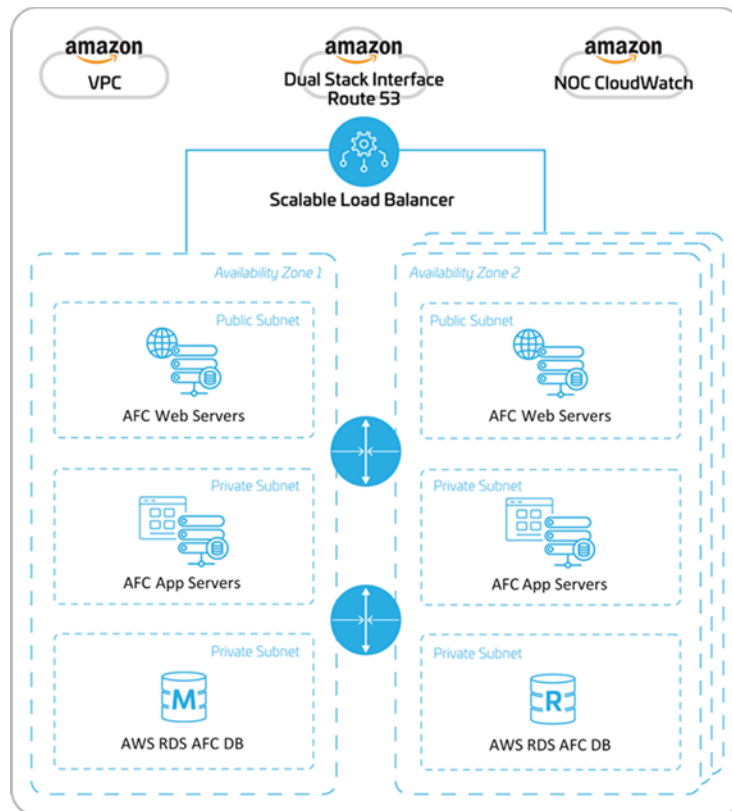

Figure 2: AFC Security Groups

The infrastructure will also have its own network access control list which will manage traffic in and out of the network. Each element of the application will be placed in a private subnet and will not be directly exposed to the public network.

For application management and monitoring, Comsearch will have a secure virtual private network (VPN) tunnel from its network to the cloud. This will allow for controlled and monitored access to the application and its network.

Comsearch will also implement a user authentication service that will manage access to the application's web interface. Only authorized users will be granted access.

Database security is also included as part of the AFC system. The database will sit in the cloud and all data will be encrypted. The data, as defined in Wi-Fi Alliance AFC System to AFC Device Interface Specification, will be transported from the Wi-Fi device to the AFC via an Application Programming Interface (API) and encrypted using transport-layer security (TLS).

Question 8: If the prospective AFC system operator will not be performing all AFC functions, information on (1) the entities that will be responsible for operating other functions of the AFC system; and (2) how the Commission can ensure that all of the requirements for AFC systems in the rules are satisfied when AFC functions are divided among multiple entities.

Comsearch Response

Comsearch intends to perform all the AFC functions outlined in FCC Part 15.407(k), (l), (m), (n) and in the Public Notice.

Question 9:   A description of how the prospective AFC system operator will provide access to their AFC system for a public trial period which will include thorough testing.

Comsearch Response

Comsearch has experience with a similar public trial for our TV White Space application.[10] We expect implementation and access for the Comsearch AFC system will be similar.

The Comsearch AFC system will be made available via API access. The AFC will also provide a traditional web interface allowing the data defined by the Interface Specification to be entered manually. Both will be available for the duration of the trial period. The AFC application will be resident in Amazon Cloud making it available via a standard HTTPs connection. Similar to our TVWS application, we will capture and report any public feedback as well as any necessary modifications or remediations. We will also include our response to all feedback. This information will be provided to the Commission in our Public Trial Final Report.

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[10] See, "*Office of Engineering and Technology Announces the Opening of Public Testing for Comsearch's TV Band Database System*", Public Notice, 29 FCC Rcd 1742 (3), 2014. See also, "TV White Space Database Trial Final Report", Comsearch ex parte, June 11, 2014, https://ecfsapi.fcc.gov/file/7521300925.pdf

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Question 10: **An affirmation that the prospective AFC system operator, and any entities responsible for operating other functions of the AFC system under the control of the AFC system operator, will comply with all of the applicable rules as well as applicable enforcement mechanisms and procedures.**

<u>Comsearch Response</u>

Comsearch hereby affirms that we will comply with all of the applicable Commission rules and applicable enforcement mechanisms and procedures.

Respectfully Submitted,

/s/ H. Mark Gibson

H. Mark Gibson
Sr. Director, Regulatory Policy
Comsearch, a CommScope Company
19700 Janelia Farm Boulevard
Ashburn, Virginia 20147

Date: November 22, 2021