

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

In the Matter of:)	
)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services)	GN Docket No. 14-177
)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands)	IB Docket No. 15-256
)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band)	RM-11664
)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services)	WT Docket No. 10-112
)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations)	IB Docket No. 97-95
)	

COMMENTS OF ECHODYNE CORP.

Echodyne Corp. (Echodyne) hereby responds to the above-captioned Notice of Proposed Rulemaking that proposes to make certain spectrum bands above 24 GHz available for mobile

and other terrestrial-based services.¹ In considering the proposals contained in the NPRM, Echodyne respectfully asks that the Commission avoid actions that could hinder the ongoing development of innovative radar technology. In particular, the Commission should be cautious about considering reallocation or allowing the introduction of new terrestrial “5G” services in frequency bands currently allocated to radionavigation services.

I. BACKGROUND

Echodyne is a technology startup based in the Seattle, Washington area developing and bringing to market innovative metamaterial-based radar technology. Echodyne’s patented Metamaterial Electronically Scanning Array (MESA) represents a major breakthrough in radar technology – thinner, lighter, and lower cost than any other electronically scanning radar technology. Echodyne’s MESA makes high performance radar far easier to deploy by lowering both the cost and weight by up to 10 or more times while decreasing the size of the antenna by up to 5 or more times over traditional electronically scanned arrays. The first product from Echodyne, a metamaterials electronically scanning array for X-band (MESA-X-EVU) was made available in December of 2015, for partners and integrators interested in evaluating MESA for radar systems in a variety of commercial markets including maritime, aviation, and surveillance/security among others.²

Echodyne’s technology offers disruptive capabilities for existing radar applications, and enables new categories of radars never before thought possible such as small, lightweight radars for unmanned aerial systems (UAS), robots, autonomous vehicles, and security that work well

¹ See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, GN Docket No. 14-177, *Notice of Proposed Rulemaking*, 30 FCC Rcd 11878 (2015) (“NPRM”).

² Press Release, Echodyne, Inc., Echodyne Brings First Metamaterials Based Radar Antenna To Market, <http://echodyne.com/echodyne-brings-first-metamaterials-based-radar-antenna-to-market/> (Dec. 4, 2015).

even when environmental conditions are less than ideal. MESA-X-EVU is just the first radar product Echodyne has made available to third parties, and various others are in the works. Echodyne's next product release will be a complete MESA-based radar operating at K-band which will measure a mere 22.9 x 8.7 x 3.2 cm (9 x 3.4 x 1.25 in) and weigh under 900 g (2 lb) including packaging.³ Echodyne actively is exploring new technologies, services, and applications that would leverage various radionavigation and radiolocation allocations, including radionavigation allocations in the 24 GHz and 32 GHz bands.

II. COMMENTS ON THE NPRM

As a technology and radiofrequency innovator, Echodyne understands the importance of opening frequency bands for development and use by new services. Echodyne appreciates the long view the Commission is taking in this proceeding, the open participative process it has adopted in examining various frequency bands for potential future mobile use, and its willingness to consider the impacts of these contemplated new uses on adjacent services. As it continues in this proceeding, the Commission should ensure that its activities do not hinder the development of innovative technologies for the radionavigation bands. Near-term advances in radar technology soon will help fuel revolutionary changes in many sectors. For example, accurate, lightweight, and low-power radar-based detect and avoid systems will be essential to widespread commercial deployment of UAS and autonomous vehicles, which will change the face of transportation, shipping, security, and numerous other industries. These technological advancements require suitable spectrum allocations to achieve their potential and the Commission should be careful not to prematurely take options off the table through its actions in this proceeding.

³ *Products*, ECHODYNE, <http://echodyne.com/products/> (last visited Jan. 13, 2016).

Echodyne's designs rely on frequency bands allocated to the radionavigation and radiolocation services for the development of its radar systems. As stated above, the 24 GHz and 32 GHz radionavigation allocations are among those that Echodyne currently is considering for use in future products, more specifically, the 24.45-24.65 GHz and the 32.3-33.4 GHz bands. Predictability and uniformity in the interference environment is particularly important in radionavigation bands, which need to have relatively consistent operating conditions across a geographic region to be effective for radionavigation operations. Intermittent disruptions or areas of heightened interference within an operating area can severely compromise the functionality of a radionavigation system, potentially creating a highly dangerous situation, particularly if detect-and-avoid systems for UAS or autonomous vehicles are those that are compromised.

The NPRM does not specifically propose any new mobile operations in the bands currently used or being explored by Echodyne for radar operations. The Commission does, however, seek comment on circumstances under which spectrum directly adjacent on each end of the 24 GHz radionavigation band—specifically, 24.25-24.45 GHz and 25.05-25.25 GHz—might be used for future mobile operations.⁴ Similarly, while noting the challenges for mobile use in the 32 GHz band, the Commission does not propose new mobile operations in this spectrum, but asks for comments that would support further consideration of the 31.8-33 GHz band, which includes spectrum actively being investigated by Echodyne.⁵

Without detailed proposals on how the 24 GHz and 32 GHz bands could be made available for mobile use, Echodyne's comments here are limited to informing the Commission that the radionavigation allocations in and near these bands are under active development and

⁴ NPRM, 30 FCC Rcd at 11908 ¶ 66.

⁵ *Id.*, 30 FCC Rcd 11910 ¶¶ 73-74.

will likely support innovative radar technologies for autonomous vehicle and other navigation applications in the near future. While Echodyne shares the Commission's skepticism on the availability of these bands for mobile services, it will in good faith provide more detailed analysis and participate in any future compatibility studies should any comments be filed suggesting that these bands should be made part of the future 5G spectrum pipeline. Pending that, Echodyne reiterates its recommendation that the Commission act cautiously in considering any actions that could hinder development in the radionavigation frequency bands.

III. CONCLUSION

Echodyne appreciates this opportunity to respond to the NPRM. Identifying new frequency bands for future innovation and service deployment is an important goal, and one that Echodyne shares with the Commission. As the Commission proceeds on this path, it should ensure that its actions continue to protect radionavigation services, which will be essential to important technological developments in the near-term.

Respectfully submitted,

/s/ Andrea Radosevich

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