

## JHU/APL Testing of the Echodyne EchoGuard Solid State Radar

JHU/APL is requesting an STA from the FCC for characterization testing of the Echodyne EchoGuard Solid State Radar at the JHU/APL campus near Laurel Maryland over the first half of 2020. The radar operates over the 24.45-24.65 GHz band.

APL would like to leverage the FCCs grant to Echodyne of a waiver request to permit ground-based radiolocation use of its EchoGuard security and surveillance radar. This order was released June 12, 2019 with reference number DA 19-556.

A copy of the order is attached.

Frank Marcotte, Engineer  
JHU/APL  
240-228-7248

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

|   |   |                      |
|---|---|----------------------|
| In the Matter of  | ) |                      |
|   | ) |                      |
| ECHODYNE CORPORATION  | ) | WT Docket No. 17-352 |
|   | ) |                      |
| Request for Waiver of Part 2 and Part 87 of the<br>Commission's Rules | ) |                      |

**ORDER**

**Adopted: June 12, 2019**

**Released: June 12, 2019**

By the Deputy Chief, Mobility Division, Wireless Telecommunications Bureau:

1. *Introduction.* This *Order* addresses a request filed by Echodyne Corporation (Echodyne) for a limited waiver of the Commission's rules to permit ground-based radiolocation use of its EchoGuard (formerly MESA-SSR) security and surveillance radar.<sup>1</sup> For the reasons set forth below, we grant the waiver request, subject to the specific conditions set forth below as well as the outcome of Echodyne's pending rulemaking petition that proposes to establish permanent rules for secondary use of the 24.45-24.65 GHz band for radiolocation operations.<sup>2</sup>

2. *Background.* Radiodetermination—the determination of the position, velocity, and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves—consists of radionavigation, which is radiodetermination for the purposes of navigation (including obstruction warning), and radiolocation, which is radiodetermination for purposes other than radionavigation.<sup>3</sup> The 24.45-24.65 GHz band is allocated to the Radionavigation Service on a primary basis for Federal and non-Federal use,<sup>4</sup> and the Commission's part 87 rules authorize airborne and ground-based use of the band for aeronautical radionavigation.<sup>5</sup> Radiolocation currently is not authorized in the band.

3. In its petition for rulemaking, Echodyne notes that it markets the EchoFlight (formerly MESA-DAA) radar that operates in the 24.45-24.65 GHz band for airborne radionavigation use in unmanned aircraft systems (UAS) to detect and avoid obstacles.<sup>6</sup> Echodyne states that others expressed interest in using the device for ground-based security and surveillance radiolocation, so the company

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<sup>1</sup> See Request by Echodyne Corp. for Limited Waiver (filed Oct. 27, 2017) (Request), available at <https://ecfsapi.fcc.gov/file/12142648129656/17-352.pdf>. MESA stands for Metamaterial Electronically Scanning Array.

<sup>2</sup> Petition of Echodyne Corp. for Rulemaking (filed Oct. 24, 2018) (Petition), available at [https://ecfsapi.fcc.gov/file/102459526386/Echodyne%20Petition%20for%20Rulemaking\\_October%202018.pdf](https://ecfsapi.fcc.gov/file/102459526386/Echodyne%20Petition%20for%20Rulemaking_October%202018.pdf).

<sup>3</sup> See 47 CFR §§ 2.1, 87.5.

<sup>4</sup> See 47 CFR § 2.106. The band also is allocated to the Inter-Satellite Service, *id.*, and there is also one inter-satellite service licensee, *see Audacy Corporation*, Order and Authorization, 33 FCC Rcd 5554 (2018). In addition, unlicensed use of the band is permitted for vehicular radar (until 2022) and level probing radar. See 47 CFR §§ 15.37(m)-(n), 15.252, 15.256.

<sup>5</sup> See 47 CFR §§ 87.5, 87.173(b), 87.187(x), 87.475(b)(14).

<sup>6</sup> See Petition at 2.

developed the EchoGuard, a low-power, low-cost, small radar that is optimized for ground-based use but uses the same frequency band and core technologies as the EchoFlight.<sup>7</sup> Potential uses of the EchoGuard include UAS detection at sensitive sites, such as prisons and stadiums, or ground perimeter surveillance at borders and other locations.<sup>8</sup> Echodyne argues that amending the rules to permit radiolocation operations in the 24.45-24.65 GHz band would address a public safety need and promote the efficient use of spectrum without causing any interference issues (given that the EchoFlight and EchoGuard perform the same radiodetermination function from an RF perspective).<sup>9</sup> Echodyne requests that the Commission add a radiolocation allocation to the 24.45-24.65 GHz band and authorize use of the band under the part 90 Radiolocation Service on a secondary basis.<sup>10</sup> No comments were filed regarding the rulemaking petition,<sup>11</sup> which remains pending.

4. In its waiver request, Echodyne seeks a waiver of the section 2.106 Table of Allocations and of sections 87.471 and 87.475 to permit ground-based use of the EchoGuard on a secondary basis to other authorized operations, and it proposes to limit the number of units that can be authorized during the first five years of the waiver period to 15,000.<sup>12</sup> Echodyne argues that interference is unlikely because the EchoGuard operates with low power, a narrow beam, and a minimal transmission footprint compared to traditional radars.<sup>13</sup> While not objecting to the waiver request, AT&T requests that potential interference to current or future in-band and adjacent band users be minimized by requiring the device to comply with the Commission's part 87 regulatory framework and by authorizing only fixed deployments at specific locations.<sup>14</sup> Echodyne agrees to the conditions proposed by AT&T.<sup>15</sup>

5. Echodyne asserts that the EchoGuard is easier to deploy than other electronically scanning radar devices because it is thinner, lighter, and less expensive.<sup>16</sup> It further claims that the EchoGuard performs better than other available radar and non-radar technologies.<sup>17</sup> Echodyne also argues that deploying the EchoGuard in the 24.05-24.25 GHz band, which already is allocated for radiolocation, is not feasible because of the technical restrictions on that band and the potential impact on

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<sup>7</sup> *See id.*

<sup>8</sup> *Id.* at 3-4. Another use of the EchoGuard is ground-based UAS air traffic control, but this constitutes radionavigation and thus requires no rule change or waiver. *Id.* at 2-3.

<sup>9</sup> *See id.* at 3.

<sup>10</sup> *See id.* at 3, 6-9.

<sup>11</sup> *See Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemakings Filed*, Public Notice, Report No. 3107 (Oct. 30, 2018), available at <https://ecfsapi.fcc.gov/file/103021732456/DOC-354845A1.pdf>.

<sup>12</sup> Echodyne initially proposed a limit of 20,000 units. *See* Request at 6. After consultation with the Federal Aviation Administration, Echodyne reduced the proposal to 15,000. *See* Letter from Michael A. Lewis, Senior Engineering Advisor, DLA Piper, LLP, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 17-352, at 2 (May 29, 2019).

<sup>13</sup> *See* Request at 10, App. B.

<sup>14</sup> *See* AT&T Reply Comments at 2-3.

<sup>15</sup> *See* Echodyne Further Reply Comments at 2.

<sup>16</sup> *See* Request at 2; Letter from Michael A. Lewis, Senior Engineering Advisor, DLA Piper, LLP, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 17-352, at 1 (filed Feb. 16, 2018).

<sup>17</sup> *See* Letter from Grace Koh, Partner, DLA Piper, LLP, Andrea Radosevich, General Counsel, Echodyne Corp., and Michael A. Lewis, Senior Engineering Advisor, DLA Piper, LLP, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 17-352, at 3-4 (filed Oct. 10, 2018).

other users.<sup>18</sup> The U.S. Border Patrol and In-Q-Tel support Echodyne's request, on the grounds that grant of a waiver would enhance security as unmanned aircraft proliferate in U.S. airspace.<sup>19</sup>

6. *Discussion.* Section 1.925 of the Commission's rules provides that we may grant a waiver if it is shown that (a) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and grant of the requested waiver would be in the public interest; or (b) in light of unique or unusual circumstances, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative.<sup>20</sup>

7. We agree with Echodyne that grant of the requested waiver would serve the underlying purpose of the rules and thus conclude that the waiver request meets the first prong of the waiver test.<sup>21</sup> As noted earlier, our rules already permit use of the 24.45-24.65 GHz band for UAS detection as part of a ground-based air traffic control system, so allowing use of the band for other UAS detection does not undermine or conflict with that purpose. In fact, the waiver would further the purpose of the rule.<sup>22</sup> We agree that UAS detection is an important public safety function, and that facilitating the deployment of new, more effective technology to protect critical infrastructure and other sensitive areas furthers the public interest.<sup>23</sup> Moreover, based on the record before us, it appears that no available equipment can serve this purpose as effectively, based on performance characteristics and cost. It also is noteworthy that no party has filed any objection to the waiver request or rulemaking petition,<sup>24</sup> and that the Federal Aviation Administration (FAA) and Echodyne have worked together to develop the conditions set forth below. **Therefore, subject to the conditions specified below, we grant a waiver to permit the marketing, licensing, and use of the EchoGuard pending the resolution of Echodyne's rulemaking petition.**

8. Accordingly, we waive the section 2.106 Table of Allocations and sections 87.471 and 87.475 to permit operation of the EchoGuard for radiolocation use subject to the resolution of Echodyne's rulemaking petition<sup>25</sup> and to the following conditions:

- (1) This waiver is granted for a term of five years. If the rulemaking proceeding is not resolved before then, Echodyne may request that the waiver term be extended, based on a showing that the waiver should remain in effect for a longer period. Any extension request would be evaluated in conjunction with the FAA and the National Telecommunications and

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<sup>18</sup> See *id.* at 2.

<sup>19</sup> See U.S. Border Patrol Comments at 1; In-Q-Tel Comments at 1; Echodyne Reply Comments at 2-3; see also *Wireless Telecommunications Bureau Seeks Comment on Echodyne Corporation Request for Waiver to Permit Licensing and Use of Ground-Based 24.45-24.65 GHz Radar*, Public Notice, 32 FCC Rcd 10278 (WTB MD 2017).

<sup>20</sup> 47 CFR § 1.925(b)(3); see also *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

<sup>21</sup> See Request at 7.

<sup>22</sup> The EchoGuard is nearly identical to the EchoFlight, operating with a slightly higher RF output (26 dBW as opposed to 24 dBW EIRP) so the interference effects to authorized stations should be minimal. *Id.* at 2. Echodyne states that the EchoGuard meets the same part 87 technical requirements as the EchoFlight, see *id.* at 7, 11, which already has received equipment authorization, see FCC ID 2ANLB-MESADAA00051.

<sup>23</sup> See Request at 8.

<sup>24</sup> See e.g., *American Radio Relay League, Inc.*, Order, 28 FCC Rcd 3228, 3229, para. 3 (WTB MD 2013) (granting a request for waiver pending the outcome of a petition for rulemaking in part because commenters supported the requested rule change); cf. e.g., *Expert Linears America, LLC*, Order, 31 FCC Rcd 13475, 13476-77, para. 8 (WTB MD 2016) (denying a request for waiver pending the outcome of a petition for rulemaking in part because commenters differed regarding the desirability of the requested rule change); *Anchorage Volunteer Examiner Coordinator*, Order, 27 FCC Rcd 404, 405, para. 3 (WTB MD 2012) (same).

<sup>25</sup> That is, licensees ultimately will be subject to the rules adopted in the rulemaking proceeding but will be permitted to operate pursuant to this waiver until a final decision in the rulemaking proceeding takes effect.

Information Administration.

- (2) The EchoGuard units will operate using the characteristics provided in the waiver request and supporting documentation.
- (3) Echodyne must obtain equipment authorization for the EchoGuard.<sup>26</sup> A copy of this *Order* shall be submitted with the equipment authorization application.
- (4) EchoGuard units will be licensed only on a site-specific basis, as Aviation Radionavigation Land stations (service code AR, station class code RNV). Applicants must reference this *Order* (by the DA number set forth above). Applications will be coordinated with the FAA in accordance with 47 CFR § 87.475(a). Licenses will be granted for an initial term of five years.
- (5) Licensees must comply with all applicable part 87 technical and service rules other than the rules limiting operations to radionavigation.
- (6) Operation will be on a secondary basis to other authorized operations.
- (7) In the five-year period following the release date of this *Order*, sale of the EchoGuard in the United States to non-Federal users is limited to 15,000 units. Upon request, Echodyne will inform Commission staff how many units have been sold.

9. *Conclusion.* We conclude that Echodyne has shown good cause for waiver of sections 2.106, 87.173(b), 87.471, and 87.475 of the Commission's rules to permit licensing and use of its EchoGuard radar, pending the resolution of the associated rulemaking petition.

10. Accordingly, IT IS ORDERED, pursuant to sections 4(i) and 303(i) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(i), and section 1.925 of the Commission's rules, 47 CFR § 1.925, that the Request for Limited Waiver filed by Echodyne Corporation on October 27, 2017, IS GRANTED ON THE CONDITIONS SET FORTH ABOVE.

11. This action is taken under delegated authority pursuant to sections 0.131 and 0.331 of the Commission's rules, 47 C.F.R. §§ 0.131, 0.331.

FEDERAL COMMUNICATIONS COMMISSION

Scot Stone  
Deputy Chief, Mobility Division  
Wireless Telecommunications Bureau

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<sup>26</sup> See 47 CFR § 87.147.