

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

In the Matter of)	
)	
IDS GEORADAR)	WT Docket No. 17-358
)	
Request for Waiver to Allow Licensing and Use)	
of Its 76-77 GHz Band Radar in Mines and)	
Tunnels)	

ORDER

Adopted: August 9, 2018

Released: August 10, 2018

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

1. *Introduction.* We have before us a request filed by IDS GeoRadar for waiver of section 90.103(b) of the Commission's rules¹ to allow certification and use of its 76-77 GHz band Hyper Definition Radar (HYDRA) system to detect potential collapses, landslides, and rockfalls in mines and tunnels.² For the reasons discussed herein, we grant the request.

2. *Background.* HYDRA is a remote sensing mechanism that uses radiolocation and other techniques to monitor rock and soil surface deformations.³ The lower power version (28 dBm effective isotropic radiated power (EIRP)) is used for monitoring at close ranges (up to 200 meters) in underground mines and tunnels; while the higher power version (45 dBm EIRP) is used for monitoring open pit mines, with a range of up to 800 meters.⁴ IDS GeoRadar states that the HYDRA achieves higher accuracy and spatial resolution than current technologies,⁵ and that the use of the 76-77 GHz band instead of lower frequencies results in a smaller antenna that can be moved more easily to where it is needed as mining or tunneling progresses.⁶ It asserts that these features allow earlier detection of potential collapses, landslides, and rockfalls, which will reduce injuries and deaths related to mining and tunneling operations.⁷

¹ 47 CFR § 90.103(b).

² See Request by IDS GeoRadar for Waiver of Section 90.103(b) of the Commission's Rules (filed Nov. 15, 2017) (Waiver Request). The Wireless Telecommunications Bureau sought comment on the request. See *Wireless Telecommunications Bureau Seeks Comment on IDS GeoRadar Request for Waiver to Allow Licensing and Use of Its 76-77 GHz Band Radar in Mines and Tunnels*, Public Notice, 32 FCC Rcd 10346 (WTB MD 2017). No party other than IDS GeoRadar submitted comments.

³ Waiver Request at 1.

⁴ *Id.* at 2.

⁵ Specifically, IDS states that the HYDRA produces an accuracy better than 0.1 mm (compared to 1 mm) and a spatial resolution of 15 cm (compared to 75 cm). See *id.* at 3.

⁶ See *id.* at 3-4.

⁷ See *id.* at 7-8.

3. The 76-77 GHz band is allocated for radiolocation use, but is not available to the part 90 Radiolocation Service.⁸ Instead, it is part of the 76-81 GHz band designated for licensed-by-rule operation under part 95 for vehicular radar, and fixed and mobile radar at airports.⁹ IDS GeoRadar therefore requests a waiver of the Radiolocation Service frequency table in section 90.103(b) to permit equipment authorization and site-based licensing of the HYDRA system for use in mines and tunnels.

4. *Discussion.* To obtain a waiver of the Commission's Rules, a petitioner must demonstrate either that the underlying purpose of the rule(s) would not be served or would be frustrated by application to the present case and that grant of the waiver would be in the public interest; or that, in view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative.¹⁰

5. When the Commission designated the 76-81 GHz band for vehicular radar and radar in airport air operations areas, it declined to permit additional types of fixed radar in the band so as to “mitigate[e] any risk that fixed radar operations could cause harmful interference to and impair the reliability of vehicular radar operations in the band.”¹¹ It noted that there is adequate geographic separation between public roads and airport air operations areas to avoid harmful interference to vehicular radars.¹² The Commission also stated,

We acknowledge that, under careful coordination, it might nevertheless be possible for fixed radars to operate in the band at carefully selected locations without causing harmful interference to vehicular radars. Presently, there is insufficient information in the record to develop the specific criteria for a successful coordination process. Interested parties may provide future filings that might provide such detail. We are open to the possibility that specific, limited fixed uses of 76-81 GHz radars outside of airport locations may be possible, provided we can be convinced that such use would not cause harmful interference to vehicular radar operations in the band.¹³

6. IDS GeoRadar asserts that mines and tunnels constitute a “specific, limited fixed use[]” that should be permitted. It asserts that approval of the HYDRA system is consistent with the intent of the rule because operation in mines and tunnels, like operation at airports, poses no interference threat to vehicular radar or other co-channel operations, due to geographic separation, physical shielding, and the propagation characteristics of the 76-77 GHz band.¹⁴ It also argues that grant of the waiver would be in

⁸ See 47 CFR §§ 2.106, 90.103(b).

⁹ See 47 CFR § 95.3331. In addition to vehicular radar and radar at airports, the 76-77 GHz band is allocated to the Federal and non-Federal Radio Astronomy service on a primary basis, and to the Amateur service and the Federal and non-Federal Space Research (space-to-earth) services on a secondary basis. See 47 CFR § 2.106.

¹⁰ See 47 CFR § 1.925(b)(3).

¹¹ See *Amendment of Parts 1, 2, 15, 90 and 95 of the Commission's Rules to Permit Radar Services in the 76-81 GHz Band*, Report and Order, 32 FCC Rcd 8822, 8845, para. 40 (2017) (*76-81 GHz Report and Order*).

¹² See *id.* at 8845, para. 42. The air operations area is that part of an airport where aircraft operate, including runways, taxiways, and apron areas (areas where aircraft park and are serviced) within the airport's perimeter fence. 47 CFR § 87.5.

¹³ *76-81 GHz Report and Order*, 32 FCC Rcd at 8845, para. 40 (footnote omitted).

¹⁴ See Waiver Request at 5-6. Free space attenuation in the 76-77 GHz band is significant. Free Space Path Loss = $32.5 + 20 \log(f_{\text{MHz}}) + 20 \log(d_{\text{km}})$; at a distance of 1 km and the center frequency of the band at 76500 MHz, the

the public interest because the device will be used to reduce injuries and deaths related to mining and tunnel activities.¹⁵

7. We agree that a waiver of section 90.103(b) to permit certification and use of the 76-77 GHz band HYDRA system to detect potential collapses, landslides, and rockfalls in mines and tunnels is warranted. This is a specific, limited fixed use outside of airport locations that will not cause harmful interference to vehicular radar operations in the band.¹⁶ Moreover, grant of a waiver is in the public interest because it will increase safety in mines and tunnels.

8. We therefore grant the requested waiver of section 90.103(b) to permit licensing and operation of the HYDRA system, subject to the following conditions:

- Use is limited to underground mines, open pit mines, and tunnels. Authorized EIRP may not exceed 48 dBm.

- HYDRA devices may not cause interference to and must tolerate interference from Government Radiolocation, 76-81 GHz Band Radar, Radio Astronomy, Amateur, and Space Research operations.

9. IDS GeoRadar must obtain equipment authorization for the HYDRA system. A copy of this *Order* shall be submitted with the equipment authorization application.

10. Operation of HYDRA devices will require a separate Commission authorization from the Wireless Telecommunications Bureau, using radio service code RS (radiolocation service). The application must contain an exhibit referencing this *Order* by the DA number above, and demonstrating that the device(s) will be used only in a mine or tunnel, and will not illuminate any public roadways. While part 90 frequency coordination is not required,¹⁷ we will coordinate the applications with the National Telecommunications and Information Administration.¹⁸ No operation is authorized prior to license grant, and no applications will be granted until IDS GeoRadar obtains equipment authorization.

11. *Conclusion and Ordering Clauses.* Based on the circumstances presented in the record, we grant IDS GeoRadar's request for waiver of section 90.103(b) of the Commission's rules to allow certification, licensing, and use its HYDRA ground-based radar system in underground mines, open pit mines, and tunnels.

12. Accordingly, pursuant to section 4(i) of the Communications Act of 1934, as amended, 47 U.S.C. § 154(i), and section 1.925 of the Commission's rules, 47 CFR § 1.925, the waiver request filed by IDS GeoRadar on November 15, 2017, IS GRANTED SUBJECT TO THE CONDITIONS set forth in paragraphs 8-10.

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free-space path loss is approximately 130 dB. This means that at a distance of 1 kilometer from the transmitter, the power of the signal has decreased by a factor of approximately 10 trillion.

¹⁵ See Waiver Request at 1, 4.

¹⁶ In addition to the factors identified by IDS GeoRadar, we note that the HYDRA system operates with no more power than part 95 76-81 GHz Band Radar devices. See 47 CFR § 95.3367.

¹⁷ See 47 CFR § 90.175(j)(6).

¹⁸ License applications in particular areas may be denied in order to protect Federal Government radiolocation facilities.

13. This action is taken under delegated authority pursuant to sections 0.131 and 0.331 of the Commission's rules, 47 CFR §§ 0.131, 0.331.

FEDERAL COMMUNICATIONS COMMISSION

Scot Stone
Deputy Chief, Mobility Division
Wireless Telecommunications Bureau