

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

In the Matter of )
)
GPR, Inc. Request for Waiver of the Commission's ) ET Docket No. 19-241
Part 15 Rules Applicable to Ultra-Wideband )
Devices )

ORDER

Adopted: November 2, 2023

Released: November 2, 2023

By the Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this Order, we grant a request for a limited waiver of Sections 15.509(b) and 15.525 of the Commission's rules filed by GPR, Inc. (GPR) to permit the marketing and operation of GPR's driver-assistance safety technology which uses ultra-wideband (UWB) ground penetrating radar to read subterranean information that is used to help keep vehicles in lane under different driving conditions, and thus increase vehicle safety. For the reasons discussed below, we find that there is good cause to grant GPR's request for waiver.

II. BACKGROUND

2. GPR states that its driver-assistance technology relies on UWB ground penetrating radar to enable active lanekeeping in challenging environmental conditions, such as in snow or fog.1 It describes its technology as enabling precise vehicle positioning by using a downward-facing UWB radar to measure and map a road's subsurface features, such as changes in soil type/density, roots, rocks, and cavities. When a vehicle drives over a previously mapped road, GPR's technology uses algorithms that match the current radar scan with previously captured data to determine the vehicle's position with high accuracy.

3. In its July 25, 2019 filing, GPR requested waivers of Sections 15.509(b) and 15.525 of the rules to permit the use of its UWB ground penetrating radar system operating between 103-403 MHz by the general public without the need for coordination with federal users.2 Section 15.509 permits the operation of ground penetrating radar on frequencies below 10.6 GHz, but paragraph (b) of this section limits such operation to entities involved in law enforcement, firefighting, emergency rescue, scientific research, commercial mining, or construction.3 In addition, Section 15.525 requires the operator of a UWB imaging system to coordinate with federal users through the Commission's Office of Engineering

1 GPR, Inc. Request for Waiver of the Commission's Part 15 Rules Applicable to Ultra-Wideband Devices, filed July 25, 2019 (GPR Waiver Request). The request was originally filed by WaveSense, Inc., which has undergone a corporate name change with no change of control and is now operating as GPR, Inc. Its counsel requests that the Commission substitute GPR, Inc. for WaveSense, Inc. with respect to the pending waiver petition. Letter from Michele C. Farquhar, Counsel to GPR, Inc., Hogan Lovells US LLP, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-241, at 1 (filed Sept. 23, 2021). We grant this request and use the name GPR, Inc. throughout this document.

2 GPR Waiver Request.

3 47 CFR § 15.509(a)-(b).

and Technology (OET).<sup>4</sup> As an alternative to its requested waiver of Section 15.525, GPR states that the Commission could permit it to coordinate use of its ground penetrating radar technology on a one-time basis as the operator of that technology.<sup>5</sup>

4. In response to OET's request for comment on GPR's waiver request, Aviation Spectrum Resources, Inc. (ASRI) and GPS Innovation Alliance (GPSIA) filed comments and GPR filed reply comments.<sup>6</sup> ASRI initially opposed the request, arguing that grant of the waiver would result in a proliferation of devices that could cause interference to the 117.975-137 MHz Aeronautical Mobile (Route) Service (AM(R)S) in the United States that is used by both the Federal Aviation Administration and commercial aviation service providers to transmit air traffic control and other safety and flight messages.<sup>7</sup>

5. While it "recognizes the promise that [GPR's] system may hold for advancing vehicular automation, GPSIA raised several matters that it says must be addressed before the Commission acts on the request.<sup>8</sup> Specifically, it asks for confirmation that the GPR device's modulation would comply with the definition of UWB, along with documentation of equipment measurements at GPS frequencies.<sup>9</sup> It asserts that GPR must also ask for a waiver of Section 15.503 of the rules because it does not believe that the GPR device will comply with the 20% (0.20) minimum fractional bandwidth limit in that rule.<sup>10</sup> It states that the Commission should authorize a limited number of units as evaluation kits for a period of two or three years as opposed to granting a blanket waiver.<sup>11</sup> Lastly, it claims that a waiver grant we previously issued for an agricultural purpose that GPR cites cannot be relied on as a basis for waiving Section 15.509(b) because the use cases are "fundamentally different."<sup>12</sup>

6. In reply comments, GPR refutes the arguments raised by ASRI and GPSIA. Specifically, it asserts that a waiver limited to 2-3 years for a restricted number of units would undermine the commercial viability of the GPR ground penetrating radar and that the requested waiver is consistent with the Commission's waiver standard and would not undermine the purpose of those rules, which it argues is to protect authorized users from harmful interference, not to limit proliferation.<sup>13</sup> It also argues that the waiver request's technical information is sufficient for the Commission to grant the request and that GPR's ground penetrating radar does not require a waiver of Section 15.503.<sup>14</sup> GPR provided measurement results for equipment at frequencies which include the GPS bands.<sup>15</sup> In a filing submitted after the comment deadline, Cisco and Hewlett Packard Enterprise object to the Commission handling

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<sup>4</sup> 47 CFR § 15.525.

<sup>5</sup> GPR Waiver Request at 7 (stating that GPR believes that it is best positioned to serve as the "operator" if the Commission determines that federal coordination under this rule is required).

<sup>6</sup> *Office of Engineering and Technology Seeks Comment on WaveSense, Inc. Request for Waiver of Sections 15.509(b) and 15.525 of the Rules for Use of Ground-Penetrating Radar in Driver-Assistance Safety Technology*, ET Docket No. 19-241, Public Notice, 34 FCC Rcd 7759 (OET 2019).

<sup>7</sup> ASRI Comments at 2-3.

<sup>8</sup> GPSIA Comments at 2.

<sup>9</sup> GPSIA Comments at 2-3.

<sup>10</sup> GPSIA Comments at 3-4.

<sup>11</sup> GPSIA Comments at 4-5.

<sup>12</sup> GPSIA Comments at 4 (citing Headsight, Inc. Request for Waiver of Part 15 of the Commission's Rules Applicable to Ultra-Wide Band Devices, Order, 32 FCC Rcd 1511 (OET 2017) (*Headsight Waiver*)).

<sup>13</sup> GPR Reply at 2-10.

<sup>14</sup> GPR Reply at 10-12.

<sup>15</sup> GPR Reply at Appendix 3.

this and other waiver requests involving UWB applications on an ad-hoc basis, noting the objections raised by ARSI and GPSIA and arguing that the waiver request raises issues of general applicability that are better resolved through a more comprehensive proceeding.<sup>16</sup>

7. GPR subsequently amended its waiver request to limit its UWB ground penetrating radar to two frequency bands: 137-328.6 MHz and 335.4-400 MHz, which would eliminate operation in the AM(R)S band for which ASRI expressed concern.<sup>17</sup> It states that the GPR ground penetrating radar will avoid intentional emissions at frequencies below 137 MHz, in the band 328.6-335.4 MHz, and above 400 MHz, and specified the emission mask that the equipment will meet in the 328.6-335.4 MHz band.<sup>18</sup> ASRI withdrew its opposition to the GPR waiver request, provided any waiver grant limits GPR's ground penetrating radar technology to operate and emit in frequencies above 137 MHz, specifically 137.0-328.6 MHz and 335.4-400.0 MHz as set forth in GPR's amendment.<sup>19</sup> GPR further amended its waiver request after consultation with the National Telecommunications and Information Administration (NTIA) and requested that the lower frequency band of operation be slightly reduced to 137-322 MHz and that emissions within the band 322-335.4 MHz be limited to 10 dB below the Section 15.209 limit.<sup>20</sup> GPR stated that it would limit sales to 31,000 units per year and that it would report any incidents of interference to the Commission and NTIA and provide the Commission and NTIA with a report containing details of its U.S. deployments within 60 days of December 31, 2024.<sup>21</sup>

### III. DISCUSSION

8. We are authorized to grant a waiver under Section 1.3 of the Commission's rules if the petitioner demonstrates good cause for such action.<sup>22</sup> Good cause, in turn, may be found and a waiver granted "where particular facts would make strict compliance inconsistent with the public interest."<sup>23</sup> To make this public interest determination, the waiver cannot undermine the purposes of the rule, and there must be a stronger public interest benefit in granting the waiver than in applying the rule.<sup>24</sup>

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<sup>16</sup> Letter from Mary Brown, Cisco Systems and Chuck Lukaszewski, Hewlett Packard Enterprise Company to Marlene Dortch, Secretary, FCC, ET Docket Nos. 19-241, 19-242, 19-246, 19-155, 19-217, 19-89, 18-284, 18-295, and GN Docket No. 17-183, (filed Nov. 13, 2019) (Cisco/HPE UWB Letter).

<sup>17</sup> Letter from Michele C. Farquhar, Counsel to GPR, Inc., Hogan Lovells US LLP, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-241, at 1 (filed Dec. 4, 2020) (GPR Dec. 4, 2020 *Ex Parte*).

<sup>18</sup> *Id.*

<sup>19</sup> Letter from Edward A. Yorkgitis, Jr., Counsel for Aviation Spectrum Resources, Inc., Kelley Drye & Warren LLP, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-241, at 2 (filed Jan. 13, 2021) (ASRI Jan 13, 2021 *Ex Parte*).

<sup>20</sup> Letter from Michele C. Farquhar, Counsel to GPR, Inc., Hogan Lovells US LLP, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-24, at 1 (filed Jul. 28, 2023) (GPR Jul. 28, 2023 *Ex Parte*). GPR requests that in the 1.4-megahertz segments outside each edge of this band (i.e., in the 320.6-322.0 MHz and 335.4-336.8 MHz bands), the GPR device's emissions limits be linearly interpolated between the Section 15.209(a) limit and a level 10 dB below this limit.

<sup>21</sup> GPR Jul. 28, 2023 *Ex Parte* at 1-2.

<sup>22</sup> 47 CFR § 1.3. *See also* *ICO Global Communications (Holdings) Limited v. FCC*, 428 F.3d 264 (D.C. Cir. 2005); *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

<sup>23</sup> *Northeast Cellular*, 897 F.2d at 1166; *see also* *ICO Global Communications*, 428 F.3d at 269 (quoting *Northeast Cellular*); *WAIT Radio*, 418 F.2d at 1157-59.

<sup>24</sup> *See, e.g.,* *WAIT Radio*, 418 F.2d at 1157 (stating that even though the overall objectives of a general rule have been adjudged to be in the public interest, it is possible that application of the rule to a specific case may not serve the public interest if an applicant's proposal does not undermine the public interest policy served by the rule);

(continued...)

9. We conclude that, with appropriate operational and technical restrictions to prevent harmful interference to authorized services, granting GPR's request for waiver of the eligibility and frequency coordination requirements for operating a UWB ground penetrating radar does not undermine the purpose of the rules. The UWB technical and operational standards in Part 15 were adopted to ensure that UWB devices, including ground penetrating radars, do not cause harmful interference to authorized radio services, including Federal services.<sup>25</sup> In particular, the rules reflected a "a cautious approach to the standards for UWB devices," and Section 15.509(b) was written to include specific eligibility and use restrictions because doing so was "[o]ne method of reducing interference potential."<sup>26</sup>

10. GPR's technology is designed to comply with the existing power levels for UWB ground penetrating radars. Moreover, we agree that the automobiles in which its technology will be deployed will provide additional shielding from its downward-facing lower power radar transmissions. In the technical appendix associated with its waiver request, GPR analyzes the potential for its technology to cause harmful interference, addressing aggregate interference, distinct use situations, and interference considerations for both GPS and aviation interests. With regard to aggregate interference, GPR calculates that the probability that emissions from multiple devices located in close proximity (e.g., five meters) would simultaneously fall within an assumed receiver bandwidth of 120 kHz is a very small fraction of a percent.<sup>27</sup>

11. GPR subsequently provided additional information to show that interference to GPS is unlikely and amended its waiver request to further reduce the likelihood of harmful interference to aeronautical services.<sup>28</sup> In a subsequent *ex parte* filing, GPR submitted the results of measurements performed in an anechoic chamber showing that all emissions from the device that fall in the GPS bands are significantly below the Part 15 limits.<sup>29</sup> GPSIA did not dispute GPR's results. Based on those results and the fact that the GPR operating frequency range is well below the GPS bands, we conclude that the likelihood of the GPR device causing harmful interference specifically to GPS is low. Furthermore, ASRI withdrew its objection to the GPR waiver request after GPR amended the request to modify the device's frequency range and eliminate operation below 137 MHz, in the band 328.6-335.4 MHz, and above 400 MHz.<sup>30</sup> We agree that this change will help protect aeronautical services, and the technical parameters described in GPR's July 28, 2023 filing will provide at least the same level of protection to aeronautical services as those in its December 4, 2020 filing that ASRI cited in withdrawing its objection to grant of the waiver.<sup>31</sup> As suggested by GPR and ASRI, we are conditioning grant of this waiver on the GPR UWB device not operating in these frequency bands. For these reasons, we find that the technical information GPR supplied initially in its waiver request, and subsequently in its reply comments and *ex*

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*Northeast Cellular*, 897 F.2d at 1166 (stating that in granting a waiver, an agency must explain why deviation from the general rule better serves the public interest than would strict adherence to the rule).

<sup>25</sup> *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, First Report and Order, ET Docket No. 98-153, 17 FCC Rcd 7435 (2002) (*UWB First R&O*).

<sup>26</sup> *UWB First R&O*, 17 FCC Rcd 7435, 7499 para. 185 (2002). In the *Headsight Waiver*, for example, the applicant asserted that Section 15.509(b) did not expressly authorize ground imaging devices for agricultural use only because agricultural use was never raised or discussed during the rulemaking. *Headsight Waiver*, 32 FCC Rcd at 1514.

<sup>27</sup> GPR Waiver Request Technical Appendix at 1.

<sup>28</sup> GPR Reply at Appendix 3; GPR December 4, 2020 *Ex Parte* at 1.

<sup>29</sup> GPR Reply at Appendix 3.

<sup>30</sup> ASRI Jan 13, 2021 *Ex Parte* at 2.

<sup>31</sup> GPR December 4, 2020 *Ex Parte* at 1; ASRI Jan 13, 2021 *Ex Parte* at 2; GPR Jul. 28, 2023 *Ex Parte* at 1. In both its December 4, 2020 and July 28, 2023 filings, GPR indicates that its device will not produce intentional emissions below 137 MHz, which avoids operation of the GPR device in the 117.975-137 MHz band for which ASRI expressed concern. ASRI Comments at 2-3.

*parte* filings, demonstrates that harmful interference to existing services is unlikely. It is on this basis that we conclude that a grant of a waiver to GPR will not undermine the purpose of the rule.<sup>32</sup>

12. We find that GPR promises to deliver a significant new public interest benefit in the developing field of subterranean driver-assistance technologies. Because the system relies on locating underground features that are not obscured by weather conditions and that do not change significantly with time, it can increase the reliability and safety of driver-assistance technologies and autonomous vehicle navigation. GPR's request is narrowly tailored, can be granted without raising the potential for causing harmful interference to authorized services, and can help realize important benefits to the public at large. Because subterranean road mapping to augment vehicular driving uniquely relies on ground penetrating radar technology, we do not see any ready alternatives by which GPR can provide its services.

13. We also find good cause to grant the GPR waiver request without first resolving the issues Cisco and Hewlett Packard have raised in their letter.<sup>33</sup> The GPR technology will be used for a specific purpose and, while it potentially will be widely available to consumers through the purchase of automobiles, it will have little or no utility except when used for its intended purpose on designated roads and in conjunction with GPR's mapping software. Accordingly, this is the type of narrow request that is well suited for consideration under the waiver process and does not represent an expansion of our ground penetrating radar rules to promote open-ended use by the general public. Accordingly, the general questions of Commission practice and policy that Cisco and Hewlett Packard raise will remain available for our consideration later and in an appropriate context.

14. Because we find there is a low likelihood of interference, we see no value in limiting sales of the devices to a limited number of evaluation kits (e.g., 2,000 units) for 2-3 years as suggested by GPSIA.<sup>34</sup> We agree with GPR that such a restriction could create regulatory uncertainty about the device and limit its commercial viability, which we believe would undermine the public interest benefits of the waiver.<sup>35</sup> We therefore decline to limit marketing of the GPR device in the manner suggested by GPSIA. We note, however, that GPR, after consultation with NTIA has requested a limit of up to 31,000 units of the device with the potential to increase this number in the future.<sup>36</sup> As discussed below we will condition grant of this waiver on the marketing limits requested by GPR.

15. Finally, we are confident that GPR's technology will both meet the definition of UWB and comply with the Section 15.503 minimum fractional bandwidth limit requirement. As noted above, GPSIA expresses concerns about these issues and requests that GPR supply information on whether the Linear Frequency Modulated (LFM) waveforms its device uses would meet the definition of UWB, and states the device does not appear to meet the minimum fractional bandwidth required by Section 15.503(d), so a waiver of that section should be required.<sup>37</sup> With respect to the type of modulation used,

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<sup>32</sup> The *Headsight Waiver* discussed by GPR and GPSIA involved an agricultural application that could satisfy the waiver standard because it was sufficiently analogous to the other types of uses and users already authorized by the rule. Here, we look at whether grant of a waiver would undermine the core purpose of the rule – i.e. to mitigate the risk of ground penetrating radar devices from causing harmful interference.

<sup>33</sup> Cisco/HPE UWB Letter at 5-7.

<sup>34</sup> GPSIA Comments at 4-5.

<sup>35</sup> GPR Reply at 3.

<sup>36</sup> GPR July 28, 2023 *Ex Parte* at 1. GPR requests that we permit up to 30,000 vehicles to be equipped with the GPR device, with up to 1,000 of these vehicles equipped with two units, for a total of 31,000 units.

<sup>37</sup> GPSIA Comments at 3-4; 47 CFR § 15.503(d). Section 15.503(d) states that a UWB transmitter must have either a bandwidth of greater than 500 MHz, or a fractional bandwidth of 0.20 or greater. The fractional bandwidth is defined as  $2(f_H - f_L) / (f_H + f_L)$ , where  $f_H$  and  $f_L$  are the highest and lowest frequencies respectively. Since the GPR device has a bandwidth of less than 500 MHz, it has to comply with the fractional bandwidth limit in order to meet the definition of a UWB transmitter.

GPS supplied a copy of correspondence from OET which states that because the rules do not require any particular type of modulation for UWB devices, a device which uses LFM can be considered a UWB device if it meets all of the technical requirements in the rules.<sup>38</sup> We support our previous interpretation of this rule.

16. With respect to the fractional bandwidth limit, GPR amended its waiver request to revise the frequency range of operation to 137-400 MHz.<sup>39</sup> Using the formula for calculating fractional bandwidth,  $2(f_H - f_L) / (f_H + f_L)$ , where  $f_H$  and  $f_L$  are the highest and lowest frequencies respectively, we calculate that the device has a fractional bandwidth of 0.98, which significantly exceeds the minimum requirement of 0.20. We note that the GPR device incorporates a notch filter to block the 322-335.4 MHz portion of the 137-400 MHz band to reduce the likelihood of harmful interference to aeronautical and radio astronomy services, which effectively splits the transmission in the 137-400 MHz band into two segments, the upper of which would not comply with the fractional bandwidth limit if we calculate the fractional bandwidth independently over each segment.<sup>40</sup> However, the GPR device actually transmits a single signal that complies with the fractional bandwidth limit, with only a small portion blocked for the purpose of reducing the likelihood of harmful interference to authorized services. We therefore find that, as operated, it effectively complies with the fractional bandwidth limit based upon the total operating range of 137-400 MHz. Thus, we will not require a waiver of the Section 15.503(d) fractional bandwidth limit for this particular use case.

17. *Coordination requirement.* Section 15.525 requires each UWB operator to coordinate use of a UWB imaging system through OET, which in turn, coordinates with the Federal Government through the NTIA.<sup>41</sup> We agree with GPR that individual operators of driver-assisted and autonomous vehicles that utilize its technology cannot reasonably be expected to coordinate their devices, and that application of Section 15.525 to individual vehicle operators would represent an extreme administrative burden for both the operators and the Commission.<sup>42</sup> Further, because of the low interference potential of the GPR device, we do not believe that an individual operator coordination requirement is necessary in this case. Accordingly, we waive the requirements of Section 15.525. This does not mean, of course, that the Federal Government has not thoroughly considered GPR's proposed operations. GPR has engaged in ongoing discussions with NTIA over the course of this proceeding, and we in turn have coordinated our decision with NTIA through the well-established inter-agency coordination process.

18. *Waiver conditions.* We are placing conditions on the grant of waiver to help limit the potential for harmful interference from the GPR system while still allowing for its deployment in vehicular applications. Specifically, we will limit the device's operating frequency range and emissions in bands adjacent to its operating frequencies as described in GPR's *ex parte* filings.<sup>43</sup> We establish operational conditions that permit the device to operate only when pointed at the ground and not when a vehicle is stopped or the ignition is turned off and require that when more than one device is installed on a vehicle, the devices must operate independently, e.g., non-synchronously. To help ensure compliance with these operational conditions, we will require GPR to include them in its sales contracts with vehicle manufacturers or research organizations that use the equipment. As suggested by GPR, we will limit

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<sup>38</sup> GPR Reply at 12, Appendix 2.

<sup>39</sup> GPR Dec. 4, 2020 *Ex Parte* at 1; GPR Jul. 28, 2023 *Ex Parte* at 1. In its July 28, 2023 filing, GPR specified a slightly wider band where emissions will be attenuated to at least 10 dB below the limit, but indicated again that its device will operate in the 137-400 MHz band.

<sup>40</sup> The fractional bandwidth of the 137-322 MHz band is 0.806, and the fractional bandwidth of the 335.4-400 MHz band is 0.176.

<sup>41</sup> 47 CFR § 15.525(a)-(b).

<sup>42</sup> GPR Waiver Request at 7.

<sup>43</sup> GPR Dec. 4, 2020 *Ex Parte* at 1; GPR Jan. 5, 2021 *Ex Parte* at 1-2; GPR Jul. 28, 2023 *Ex Parte* at 1.

sales to 30,000 vehicles, of which 1,000 will be permitted to incorporate two units, for a total of 31,000 units, and will consider increasing this limit after 2024 with the concurrence of NTIA.<sup>44</sup> We will also require GPR to promptly report any incidents of interference attributable to the GPR system to the Commission and NTIA and to provide a report containing details of U.S. deployments of its system to the Commission and NTIA within 60 days after December 31, 2024.<sup>45</sup> Additionally, we will require that GPR obtain certification of the equipment from a designated Telecommunication Certification Body (TCB) prior to marketing and operation.

19. Accordingly, pursuant to the delegated authority in Sections 0.31 and 0.241 of the Commission's rules, we waive the operational limitations and frequency coordination requirements of Sections 15.509(b) and 15.525 of our rules to permit the certification, marketing and operation of the GPR ultra-wideband ground penetrating radar device. This waiver is subject to the following conditions:

- 1) The GPR system shall be certified by a designated Telecommunication Certification Body and must comply with the technical specifications applicable to operation under Part 15 of 47 CFR, except as permitted below:
  - a) The operational limitations in 47 CFR § 15.509(b) are waived to permit the operation of the GPR system by the general public.
  - b) The requirement in 47 CFR § 15.525 requiring coordination of devices with the federal government through the Office of Engineering and Technology prior to operation is waived.
- 2) The GPR device shall operate only in the bands 137-322 MHz and 335.4-400 MHz. It shall not produce intentional emissions below 137 MHz, above 400 MHz or in the 322-335.4 MHz band. Emissions below 137 MHz and above 400 MHz must comply with the applicable limits, e.g., those in Section 15.209 at frequencies at or below 960 MHz and those in Section 15.509 at frequencies above 960 MHz.
- 3) Emissions from the GPR device in the following bands shall not exceed the following limits, measured using a CISPR quasi-peak detector as specified in Section 15.209(d):
  - a) 320.6-322 MHz: linearly interpolated between the Section 15.209(a) limit at the lower end of the band and 10 dB below the Section 15.209(a) limit at the upper end of the band.
  - b) 322-335.4 MHz: 10 dB below the Section 15.209(a) limit.
  - c) 335.4-336.8 MHz: linearly interpolated between 10 dB below the Section 15.209(a) limit at the lower end of the band and the Section 15.209(a) limit at the upper end of the band.
- 4) The GPR device shall comply with all other technical and operational requirements applicable to UWB ground penetrating radar devices under Part 15, Subpart F of the Commission's rules.
- 5) The GPR device may operate only when mounted under a vehicle and pointed at the ground.
- 6) The GPR device must cease operation when the vehicle comes to a stop.
- 7) The GPR device may not operate when the vehicle ignition is turned off.
- 8) If more than one GPR device is installed on a vehicle, the devices must transmit independently (e.g., non-synchronously).
- 9) GPR shall include conditions 5-8 above in its sale contracts with its customers.

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<sup>44</sup> GPR Jul. 28, 2023 *Ex Parte* at 1.

<sup>45</sup> GPR Jul. 28, 2023 *Ex Parte* at 1-2.

- 10) Sales of the GPR device authorized under this waiver grant shall be limited to 30,000 vehicles, of which up to 1,000 vehicles shall be permitted to incorporate two GPR units, for a total of up to 31,000 GPR units. Deployments of the GPR device after 2024 may be increased subject to agreement with the Commission and the concurrence of NTIA.
- 11) GPR shall promptly report any incidents of interference attributable to the GPR device to the Commission and shall provide a copy of such report to NTIA.
- 12) Within 60 days after December 31, 2024, GPR shall file with the Commission a report containing the details of its U.S. deployments of the GPR device. A copy of such report shall be provided to NTIA. The report may include information about deployments of the GPR device outside the United States.
- 13) The waiver conditions granted herein are not transferable to any third party via §2.933 or any other means of technology transfer.
- 14) This waiver and its conditions shall apply only to the UWB devices described herein and are not to be considered to apply generally to any other UWB operations where further analysis would be necessary to assess the potential for impact to other authorized users.
- 15) A copy of this Order shall be provided with the application for certification of the device.

#### **IV. ORDERING CLAUSES**

20. Accordingly, pursuant to authority delegated in Sections 0.31 and 0.241 of the Commission's rules, 47 CFR §§ 0.31, 0.241, and Section 1.3 of the Commission's rules, 47 CFR § 1.3, IT IS ORDERED that the Request for Waiver filed by GPR, Inc. on July 25, 2019 as amended on December 4, 2020, January 5, 2021 and July 28, 2023 IS GRANTED consistent with the terms of this Order. This action is taken pursuant to Sections 4(i), 302, 303(e), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 302, 303(e), and 303(r). This action is effective upon release of this Order.

21. IT IS FURTHER ORDERED that, if no applications for review are timely filed, this proceeding SHALL BE TERMINATED, and the docket CLOSED.

FEDERAL COMMUNICATIONS COMMISSION

Ronald T. Repasi  
Chief  
Office of Engineering and Technology