Federal Communications Commission
Washington, D.C. 20554

July 9, 2021

DA 21-814

Ms. Laura Stefani
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
701 Pennsylvania Avenue, NW, Suite 900
Washington, DC 20004

Subject: Request by Acconeer AB for Waiver of 47 CFR § 15.255(c)(3) rules
ET Docket No. 21-48

Dear Ms. Stefani:

This is in reply to your Request for Waiver of Section 15.255 of the Commission's rules filed on behalf of your client, Acconeer AB (Acconeer).

Acconeer requests a waiver of Section 15.255 of the Commission's rules to permit a grant of equipment authorization for a radar designed to operate in the 57-64 GHz band at higher power than specified in the rules.[1] Acconeer describes its technology as a pulse-coherent radar (PCR) sensor that consumes very low power and that will be used for vehicle safety and security applications, including the detection of children left in hot passenger motor vehicles who can be subject to heat stroke and death.[2] In seeking the waiver, Acconeer states that the power levels in Section 15.255 do not allow it to achieve the signal-to-noise ratio needed for its radar technology to achieve high accurate measurements with low false positive rates.[3] Acconeer claims that its PCR radar design, when operated under its requested technical limits, will result a maximum power spectral density that is lower than the maximum amount we had previously found permissible for radars operating under a Frequency Modulated Continuous Wave design. This, it states, is because the energy generated by the Acconeer radar design is spread across a wide band in a transitory manner.[4]

In response to a Public Notice seeking comment on Acconeer's filing, Alps Alpine, the Alliance for Automotive Innovation, NEXTY Electronics, and Volvo Car Corporation submitted filings during the comment and reply comment period in support of the application.[5] Alps Alpine, for example, characterizes Acconeer's device as "the best solution" for providing vehicle safety and security applications because of its ability to provide high accuracy rates in a small form factor, and asserts that it "has the potential to save lives, reduce injuries and provide enhanced security."[6] In subsequent *ex parte* filings directed to Acconeer's request as well as those by other entities seeking waivers to operate

[1] *Acconeer AB Request for Waiver of Section 15.255 of the Commission's rules*, ET Docket No. 21-48, (filed Dec. 23, 2020) (Acconeer Request).
[2] *Id.*
[3] *Id.*at 2-3.
[4] *Id.* at 7 and Fig. 2 at 8.
[5] *OET Seeks Comment on Acconeer AB Request for Waiver of Section 15.255(c)(3) of the Commission Rules for Vehicle Radar Operation in the 57-64 GHz band*, ET Docket No. 21-48, Public Notice, DA 21-155, 36 FCC Rcd 1531 (2021); Comments of Alps Alpine and Volvo Car Corporation and reply comments of NEXTY Electronics in ET Docket No. 21-48; *See also* Letter from Hilary M. Cain, Vice President, Alliance for Automotive Innovation, to Marlene H. Dortch, Secretary, FCC, filed March 12, 2021 in ET Docket No. 21-48.
[6] Alps Alpine Comments in ET Docket No. 21-48 at 1.

unlicensed 60 GHz radars, parties representing unlicensed communications device users raised concerns that, without unlicensed radars operating under appropriate duty cycle and other technical rules, unlicensed communications devices could be prevented from using virtual reality and other applications that are under development.[7] Last month, Acconeer and representatives of unlicensed communications device interests jointly proposed technical operating conditions that they claim will allow Acconeer's radars and unlicensed communications devices to coexist. We discuss these most recent filings below.

When Acconeer submitted its request in December 2020, it referred to the waiver we granted to Google in 2018 to operate unlicensed radars at a higher power than permitted by our rules and asked to operate under the same technical characteristics as those allowed for Google.[8] In that 2018 Order, we waived Section 15.255(c)(3) for Google to deploy a mobile radar to enable touchless control of device functions or features at +10 dBm peak transmitter conducted output power, +13 dBm peak EIRP level, and +13 dBm/MHz peak power spectral density, with a 10% duty cycle in any 33 ms interval.[9] Subsequently, in April 2021, we granted waivers to six parties to permit the use of radars operating at the higher power levels associated with the Google Waiver when installed in passenger motor vehicles.[10] In granting those waivers, we waived Section 15.255(c)(3) based on our prior analysis from the Google Waiver; and also Section 15.255(a)(2), which limits radar operations to fixed operation or when used as short-range devices for interactive motion sensing, because of concern that this rule might otherwise limit use in some passenger motor vehicle use modes.

After filing its initial petition for waiver, Acconeer amended its request in part to account for discussions it has had with unlicensed communications devices stakeholders. Acconeer, Facebook, Intel, and Qualcomm jointly submitted a letter on June 22 2021, which Acconeer further clarified in a June 28, 2021 letter.[11] These submissions document the parties' agreement as to the technical operating conditions under which Acconeer would be able to operate under a waiver.[12] Specifically, Acconeer asks the Commission to waive the +10 dBm peak EIRP and -10 dBm peak conducted output power in section 15.255(c)(3) of the rules to allow its radar to operate at +3 dBm average EIRP without a limit on either peak EIRP or conducted output power; this 3 dBm average EIRP would be evaluated in 0.125 μs time average window and also requires 5% duty cycle in 0.125 μs time-averaged windows, with a pulse duration not to exceed 6 ns.[13] Acconeer asserts that its radar operating under the amended requested technical parameters will not create a more interfering operating environment for licensed and authorized

---

[7] *See, e.g.,* Letter from Alan Norman, Facebook, Inc.; Carlos Cordeiro, Intel Corporation; and John Kuzin, Qualcomm Inc., to Marlene Dortch, FCC, ET Docket No. 21-48 (filed May 10, 2021).

[8] Acconeer Request at 3, citing *Google LLC Request for Waiver of Section 15.255(c)(3) of the Commission's Rules Applicable to Radars used for Short-Range Interactive Motion Sensing in the 57-64 GHz Frequency Band*, ET Docket No. 18-70, Order, 33 FCC Rcd 12542 (OET 2018) (Google Waiver).

[9] *Id.*, 33 FCC Rcd at 12548-49, para. 14. Google developed the Soli sensor to capture motion in a three-dimensional space using a radar beam, which enables persons to use gestures and motions to control a smartphone's functions or features. *See* www.google.com/soli. Google also received a waiver of 15.255(b)(2), which restricts airborne operation, and that is not relevant to Acconeer's automotive-related use model. *Google Waiver*, 33 FCC Rcd at 12542, para. 1.

[10] Waiver of Section 15.255 of the Commission's rules, ET Docket Nos. 20-15, 20-121, 20-263, 20-264, 20-434, 20-435, DA 21-407, Order (2021) (2021 Waiver Order).

[11] Letter from Laura A. Stefani, counsel to Acconeer AB, Alan Norman, Public Policy Director, Facebook, Carlos Cordeiro, CTO Wireless, Intel, and John Kuzin, Vice President and Regulatory Counsel, Qualcomm to Marlene H. Dortch, Secretary, FCC in ET Docket No. 21-48 (filed June 22, 2021) (June 22 *ex parte* letter); Letter from Laura A. Stefani, counsel to Acconeer AB to Marlene H. Dortch, Secretary, FCC in ET Docket No. 21-48 (filed June 28, 2021) (June 28 *ex parte* letter).

[12] Acconeer represents the conditions as a method to allow for equipment authorization under a waiver "while new, permanent rules are being considered." June 22 *ex parte* letter.

[13] June 22 *ex parte* letter and Jun 28 *ex parte* letter.

users in the band, in large part because the radar's transmissions will be significantly lower than other devices operating in the band, and would be largely confined to within or immediately near vehicles.[14] Acconeer's amended request does not change the requested use cases as outlined in its original request, which continue to be vehicle-bound applications (i.e., passenger presence detection to include children inadvertently left in vehicles in hot weather; seat belt reminder/airbag suppression; intruder alarm; and automotive access gesture control to detect foot movement to close a sliding door).[15]

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.[16] Good cause, in turn, may be found and a waiver granted "where particular facts would make strict compliance inconsistent with the public interest."[17] 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.[18] As noted in our prior waiver orders, both Sections 15.255(c)(3) and 15.255(a)(2) are designed to prevent unlicensed devices from causing harmful interference to other authorized users in the band.[19]

Here, we find that Acconeer's vehicular use cases are closely related to the waivers confined to the narrow deployment scenario in the automotive environment that we previously considered, and granted, in the 2021 Waiver Order.[20] In the 2021 Waiver Order, we determined that radar operation in the 57-64 GHz band in passenger motor vehicles will be conducted at comparatively much lower power levels than the levels already permitted to communication devices (which operate both indoors and outdoors) in the same band.[21] We also determined that, with the radar installed inside a vehicle, the vehicle's metallic chassis and the glass windows will block or attenuate the radar signals;[22] and when combined with the extensive radio frequency propagation loss in the 57-64 GHz band, the radar signals will be further attenuated outside the vehicle.[23]

Acconeer's amended requested technical parameters are more restrictive than those specified in the Google Waiver and the 2021 Waiver Order. Specifically, the average EIRP limit is lower and the duty cycle is shorter, and the pulse-coherent radar technology employed by the Acconeer radar has lower peak power spectral density than the FMCW technology considered in the 2021 Waiver Order.[24] Thus, our prior determination that the conditions in both the Google Waiver and the 2021 Waiver Order are

---

[14] June 28 *ex parte* letter.

[15] Acconeer Request at 3.

[16] 47 C.F.R. § 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).

[17] *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.

[18] *See, e.g.*, *WAIT Radio*, 418 F.2d at 1157 and *Northeast Cellular*, 897 F.2d at 1166.

[19] 2001 Waiver Order at para. 40.

[20] *Vayyar Imaging Ltd. Request for Waiver of Section 15.255(c)(3) of the Commission's Rules for Radars used for Interactive Motion Sensing in the frequency band 57-64 GHz*, Order, DA 21-407 (OET 2021) at para. 40 (2021 Waiver Order).

[21] 2021 Waiver Order at para. 40.

[22] Some researchers indicate that at 60 GHz, regular glass provides 11 dB/centimeter attenuation and mesh glass, 32 dB/centimeter. *See* e.g., C. Anderson and T. Rappaport, *In-building Wideband Partition Loss Measurements at 2.5 and 60 GHz*, IEEE Trans. Wireless Communications, vol. 3, no. 3, pp. 922–928 (2004.)

[23] Free space path loss (FSPL) for a 60 GHz signal is 77.56 dB at 3 meters from the transmitter (*i.e.*, FSPL (in dB)= 20 log F + 20 log d – 147.55, where F is the signal frequency in Hertz and d is the distance from the transmitter in meters).

[24] Acconeer Request at 7-9.

sufficient to prevent harmful interference to licensed users in the band gives us confidence that the technical parameters under which Acconeer will operate its vehicle-specific radars are more than sufficient to prevent harmful interference to licensed users in the band. We further find that it serves the public interest to adopt technical standards here that differ from those that we previously adopted for Google and other automotive-related radar applications. As Acconeer and representatives of unlicensed communications device manufacturers state, Acconeer's PCR technology differs from the frequency modulated continuous wave radars that we had previously addressed, even while serving similar vehicular-safety purposes.[25] For this reason, we agree with these parties that we should adopt technical parameters that are designed to be compatible with Acconeer's technology. Doing so will promote greater coexistence between Acconeer's unlicensed PCR radars and communication device operations while not increasing the likelihood of interference to licensed and authorized users.

We also find that the second element of the waiver standard has been met. As in the vehicular use cases in the 2021 Waiver Order, granting Acconeer's waiver will provide substantial public benefit in improving passenger safety—most notably the prevention of vehicular pediatric heatstroke deaths—while at the same time enhancing opportunities for additional vehicular automation and theft prevention applications.[26] The same special circumstances that supported our decision in the 2021 Waiver Order apply here. There, we recognized that the automotive industry, consumer interest groups, and an expert Federal government agency had all identified the prevention of pediatric hot car deaths as a significant priority. Waiving our rules was necessary for 60 GHz radars to be used to meet this objective; specifically, the waiver permitted the radars to be operated in mobile vehicles and at a power level that gives sufficient resolution to detect an infant's respiration. Furthermore, granting a waiver to Acconeer can promote additional competition in the vehicular radar space and spread the benefits of preventing hot car child deaths to even more Americans. This further supports our finding that there is a stronger public interest in granting the waiver than in applying the rule. The conditions under which Acconeer must operate have been designed to facilitate coexistence between it and other unlicensed device users in the short term, while not precluding a more thorough consideration of this matter in the context of a rulemaking proceeding or other appropriate process.

We note that a draft Notice of Proposed Rulemaking that considers unlicensed radar use under Section 15.255 has been circulated for the Commissioners' consideration and potential adoption at the FCC's July 2021 Open Meeting.[27] As with the prior waiver grants, we recognize that there are strong benefits in acting on the waiver request at this time regardless of any potential rulemaking activity. Here, the narrow relief we are providing will permit the deployment of innovative radar applications to provide potentially life-saving applications — in this case, radars deployed in passenger motor vehicles to detect children left unattended in hot cars — without posing interference threats to authorized users in the band. We condition the grant of this waiver on the outcome of any changes to our rules that may be adopted in a future rulemaking proceeding. We intend to revisit this waiver, as well as other 60 GHz band waivers that have been granted to date, if and when the Commission might revise its rules. We further emphasize that grant of this waiver and the conditions we associate with it are not intended to predetermine the outcome of this or any potential future rulemaking.

Operation pursuant to this waiver is expressly conditioned on compliance with the Commission's rules except as waived, and where rules are modified as a result of any future Commission rulemaking

---

[25] June 28 *ex parte* letter.

[26] 2021 Waiver Order at para. 50.

[27] *FCC Announces Tentative Agenda for July Open Meeting*, News Release, rel. June 22, 2021. Further information about the draft document, https://www.fcc.gov/document/enabling-state-art-radar-sensing-technologies-60-ghz-band, was posted on the Commission's July Open Meeting webpage. OET opened a new docket, 21-264 to collect comments associated with this item.

Acconeer will be subject to those modified rules. To ensure that harmful interference to authorized operations and other spectrum users will not occur, we impose explicit conditions on the installation, operation, and certification of Acconeer's radars under this waiver, as follows:

- The Acconeer pulse-coherent radar shall be certified for compliance with all the technical specifications applicable to operation under 47 CFR Part 15, with the exception of the following provisions in 47 CFR §§ 15.255(a)(2) and (c)(3), which are waived to allow the device to operate as a radar on new passenger motor vehicles in the 57-64 GHz band at 5% duty cycle, evaluated in 0.125 μs time-averaged windows, at a 3 dBm average EIRP evaluated in 0.125 μs time-averaged windows, and a pulse duration not to exceed 6 ns.[28]
- The radar shall be restricted to factory installation in the interior of new passenger motor vehicles for the primary purpose of in-cabin monitoring functions and shall not be marketed in after-market add-on products. The grantee shall include clear and complete installation instructions that explain this restriction and a copy of these instructions shall be submitted along with the application for equipment authorization. If the radar is installed such that it is not visible (e.g., behind the headliner), then the required equipment labeling in accordance with the provisions of 47 CFR §§ 2.925 and 15.19 shall be provided in the vehicle's Owner's Manual. The certification grant shall specify these restrictions.
- Operations under this waiver may not be used to transmit data.
- Users of Acconeer radars must be made aware through a disclosure in the vehicle Owner's Manual or an equivalent means that that operation is subject to the conditions that no harmful interference is caused and that any interference must be accepted.
- This waiver and its conditions shall apply only to Acconeer radars intended for installation in passenger motor vehicles as described herein and are not to be considered to apply generally to any other radars or field disturbance sensors that will operate in different environments where further analysis would be necessary to assess the potential for impact to other authorized users.
- The waiver conditions granted herein are not transferable to any third party via §2.933 or any other means of technology transfer.
- The waiver is explicitly conditioned on any changes to our rules that may be adopted in a future rulemaking proceeding in accordance with the terms of this order.

Accordingly, pursuant to authority delegated in Sections 0.31 and 0.241 AND 1.3 of the Commission's rules, 47 C.F.R §§ 0.31, 0.241, and 1.3, and Sections 4(i), 302, 303(e), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C §§ 154(i), 302, 303(e), and 303(r), IT IS ORDERED that the Request for Waiver filed by Acconeer AB IS GRANTED, consistent with the terms of this Order, effective upon release of this Order**.** IT IS FURTHER ORDERED that, if no petitions for

[28] A copy of this Order shall be provided with the application for certification of the device.

reconsideration or applications for review are timely filed in ET Docket No 21-48, the docket SHALL BE TERMINATED and CLOSED.

FEDERAL COMMUNICATIONS COMMISSION

Ronald T. Repasi
Acting Chief,
Office of Engineering and Technology