

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)
)
Amazon.com Services, LLC)
) ET Docket No. _____
Request for Waiver of Section 15.255(c)(3))
of the Commission’s Rules for Short Range)
Interactive Motion Sensing Devices)

REQUEST FOR WAIVER

Amazon.com Services, LLC (“Amazon”) respectfully requests waiver of Section 15.255(c)(3) of the Federal Communications Commission’s (“Commission”) rules to permit the certification and marketing of non-mobile devices that operate only when connected to a power source containing field disturbance radar sensors (“Radar Sensors”) that would operate at higher power levels than currently allowed, consistent with the performance conditions requested herein.¹ The Radar Sensors would enable touchless control of device features and functions without causing harmful interference to co-frequency users, thus providing significant benefits to consumers with mobility, speech, or tactile impairments. In addition, the Radar Sensors would be used for sleep tracking and could help improve consumers’ awareness and management of sleep hygiene. Waiver is therefore appropriate pursuant to Section 1.3 of the Commission’s rules and consistent with agency precedent.²

¹ See 47 C.F.R. § 15.255(c)(3).

² See 47 C.F.R. § 1.3. See also *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 et al.*, DA 21-407 (rel. Apr. 14, 2021) (“60 GHz Waiver Order”) (waiving Section 15.255(c)(3) for devices operating in the 57-64 GHz band at a maximum +13 dBm EIRP, +10 dBm transmitter conducted output power, +13 dBm/MHz power spectral

I. AMAZON’S RADAR SENSORS WILL PROVIDE COMPELLING BENEFITS TO CONSUMERS.

Amazon would deploy the Radar Sensors in use cases that would provide significant benefits to consumers. By capturing motion in a three-dimensional space, a Radar Sensor can capture data in a manner that enables touchless device control. As a result, users can engage with a device and control its features through simple gestures and movements. Facilitating touchless device control could have a substantial societal impact by greatly enhancing the accessibility of everyday devices. As the Commission recognized in the *Google Waiver Order*, “[t]he ability to recognize users’ touchless hand gestures to control a device . . . could help people with mobility, speech, or tactile impairments, which in turn could lead to higher productivity and quality of life for many members of the American public.”³

The Radar Sensors would also be used for contactless sleep tracking that would rely on the bandwidth available under the rule and the modest increment in additional radiated power to be achieved under the waiver so as to monitor sleep with a higher degree of resolution and location precision than would otherwise be achievable. In doing so, these devices would enable users to estimate sleep quality based on movement patterns. The use of Radar Sensors in sleep tracking could improve awareness and management of sleep hygiene, which in turn could produce significant health benefits for many Americans.

density, and transmit duty cycle of 10 percent in any 33 milliseconds interval); *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*, Order, 33 FCC Rcd 12542 (2018) (“*Google Waiver Order*”) (same).

³ *Google Waiver Order* ¶ 12.

II. AMAZON’S REQUEST FOR WAIVER OF SECTION 15.255(C)(3) IS CONSISTENT WITH COMMISSION PRECEDENT.

Section 15.255 governs unlicensed operation of radio frequency devices in the 57-71 GHz band.⁴ Section 15.255(a)(2) permits the operation of field disturbance sensors in cases where the sensors are used either for fixed operation or as short-range devices for “interactive motion sensing.”⁵ The Commission’s rules define a “field disturbance sensor” as a “device that establishes a radio frequency field in its vicinity and detects changes in that field resulting from the movement of persons or objects within its range.”⁶ The rules do not define either the term “fixed operation” or “interactive motion sensing,” except that fixed operation includes “field disturbance sensors installed in fixed equipment, even if the sensor itself moves within the equipment.”⁷

The rules also establish technical parameters for unlicensed use in the 57-71 GHz band. Section 15.255(c)(3) provides that the peak transmitter conducted output power must not exceed -10 dBm and the peak EIRP level must not exceed 10 dBm.⁸ The Commission established its Part 15 rules to “achieve more effective use of the radio frequency spectrum while providing additional technical and operational flexibility in the design, manufacture and use of non-licensed devices.”⁹ In particular, the rules “are designed to ensure that unlicensed devices have a low probability of causing harmful interference to other users of the radio spectrum.”¹⁰

⁴ See 47 C.F.R. § 15.255.

⁵ 47 C.F.R. § 15.255(a)(2).

⁶ 47 C.F.R. § 15.3(l).

⁷ 47 C.F.R. § 15.255(a)(2).

⁸ 47 C.F.R. § 15.255(c)(3).

⁹ *Amendment of the Rules Regarding Operation of RF Devices Without an Individual License*, Report and Order, 4 FCC Rcd 17710, ¶ 1 (1989).

¹⁰ *Google Waiver Order*, ¶ 2.

To be utilized for gesture detection and sleep monitoring, the Radar Sensors require higher peak transmitter conducted output power and peak EIRP levels than currently permitted under Section 15.255(c)(3).¹¹ Amazon therefore respectfully requests waiver of Section 15.255(c)(3) restricting use of field disturbance sensors to allow the Radar Sensors to operate at a maximum +10 dBm transmitter conducted output power, +13 dBm peak EIRP level, and +13 dBm/MHz peak power spectral density. In addition, for purposes of the instant waiver, Amazon will operate the Radar Sensors within a maximum transmit duty cycle of 10 percent in any 33 millisecond interval, consistent with the recent request of Facebook, Intel, and Qualcomm. Further, Amazon agrees that for purposes of computing the duty cycle, radar off-time period between two successive radar pulses that is less than 2 milliseconds will be considered “on time.”¹²

These technical parameters are consistent with FCC precedent. Indeed, the Commission has previously granted waivers of Section 15.255(c)(3) to permit the type of innovative use cases contemplated here. In 2018, the Commission granted a waiver of Section 15.255(c)(3) for Google’s Project Soli devices and treated the devices’ hand gesture capabilities as “interactive motion sensing capabilities.”¹³ Earlier this year, the Commission likewise granted several requests for waiver of Section 15.255(c)(3) filed by manufacturers seeking to operate radars in

¹¹ See 47 C.F.R. § 15.255(c)(3).

¹² Letter from Alan Norman, Facebook *et al.*, to Marlene Dortch, FCC, Re: Use of Spectrum Bands Above 24 GHz for Mobile Services (GN Docket No. 14-177) *et al.* (filed May 10, 2021) (“Duty Cycle Ex Parte”). Amazon’s commitment to comply with the parameters specified in the Duty Cycle Ex Parte is conditioned on the Commission’s grant of the instant waiver request. Should the Commission revisit its service rules in a future rulemaking proceeding, Amazon reserves the right to operate pursuant to any new duty cycle rules that may be adopted.

¹³ *Google Waiver Order* ¶ 1.

the 60 GHz band in passenger motor vehicles.¹⁴ Just as in those cases, Amazon seeks a waiver of Section 15.255(c)(3) to permit the certification and marketing of field disturbance sensors operating at identical power limits and that should reasonably be considered short-range devices for interactive motion sensing. Moreover, as noted above, for purposes of the waiver, Amazon would operate pursuant to a more restrictive duty cycle condition to further address any potential coexistence concerns.

III. GRANTING AMAZON’S REQUEST FOR WAIVER WOULD SERVE THE PUBLIC INTEREST.

The Commission may waive any of its rules if there is “good cause” to do so.¹⁵ Waiver is appropriate where “special circumstances warrant a deviation from the general rule” and “such deviation will serve the public interest.”¹⁶ The Commission generally grants waiver requests if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.¹⁷

Here, waiver of Section 15.255(c)(3) would serve the public interest. Allowing operation at the requested power levels would not increase the potential for harmful interference to other users in the band. The Commission has assessed and concurred with technical studies in the record demonstrating that the operations requested here (*i.e.*, those with a transmitter output power limit of +10 dBm, peak EIRP level of +13 dBm, peak power spectral density of +13 dBm/MHz, and maximum transmit duty cycle of 10 percent in any 33 milliseconds interval)

¹⁴ *60 GHz Waiver Order* ¶ 1.

¹⁵ 47 C.F.R. § 1.3.

¹⁶ *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) (*Northeast Cellular*).

¹⁷ *See WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969) (*WAIT Radio*); *Northeast Cellular*, 897 F.2d at 1166.

minimize the potential effects on authorized passive sensors in the Earth Exploration Satellite Service (“EESS”) and the Radio Astronomy Service (“RAS”) or on other unlicensed operations in the 60-64 GHz band.¹⁸ Waiver of Section 15.255(c)(3) is therefore consistent with, and would not undermine, the rules’ purpose.

More broadly, grant of the waiver would provide clear public interest benefits to a wide range of consumers. As discussed above, the Commission has already determined that facilitating device recognition of hand gestures serves the public interest, finding that it could improve the productivity and quality-of-life of individuals with mobility, speech, or tactile impairments.¹⁹ Moreover, when deployed in low-cost contactless sleep tracking devices, the Radar Sensors will allow consumers to recognize potential sleep issues. Grant of this waiver would therefore provide tangible benefits to many members of the American public.

IV. CONCLUSION.

Amazon accordingly requests waiver of Section 15.255(c)(3) of the Commission’s rules to permit the certification and marketing of devices that use Radar Sensors operating in the 60

¹⁸ See *Google Waiver Order* ¶ 11 (“We believe that any coexistence and interference concerns have been adequately addressed with the updated operational parameters and the supporting studies and provide us confidence that all users of the 57-64 GHz band will be able to operate without experiencing harmful interference.”) See generally, Google LLC’s Request for Waiver of Section 15.255(c)(3) the Commission’s Rules (filed Mar. 7, 2018) (including Attachment, *Assessing the Interference of Miniature Radar on Millimeter Wave 60 GHz Wi-Fi Simulation Study*); Letter from Megan Stull, Counsel, Google LLC to Marlene Dortch, Secretary, FCC, ET Docket No. 18-70 (filed Jun. 8, 2018) (including Attachment A, *Assessing the Interference of Miniature Radar on Millimeter Wave 60 GHz Wi-Fi — Supplemental Analysis*, Attachment B, *Measurement Study on Soli/802.11ad Coexistence*, and Attachment C, *Compatibility between Earth Exploration-Satellite Service Sensors and Airborne Use of Project Soli Devices at 57.5 to 63.5 GHz*); Letter from Megan Stull, Counsel, Google, LLC to Marlene H. Dortch, Secretary, FCC, ET Docket No. 18-70 (filed Oct. 12, 2018) (including Attachment A, *Gesture Classification Performance Estimate under Regulatory Limits*, and Attachment B, *Supplement to Measurement Study on Soli/802.11ad Coexistence*).

¹⁹ *Google Waiver Order* ¶ 12.

GHz band in a manner consistent with the performance conditions requested herein. Grant of the waiver request would serve the public interest by enabling touchless control of devices and sleep tracking with minimal risk of harmful interference to licensed or unlicensed users in the 57-71 GHz band.

Respectfully submitted,

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