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

In the Matter of Schlage Lock Company LLC's Request for Waiver of Section 15.519(a) and 15.519(a)(2) of the Commission's Rules	)))))	ET Docket No. 22-248

ORDER

Adopted: May 24, 2023 **Released: May 24, 2023**

By the Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this order, we grant a request by Schlage Lock Company LLC (Schlage) to waive Sections 15.519(a) and 15.519(a)(2) of our rules governing ultrawideband (UWB) devices.[1] These rules require UWB devices to be handheld while operating and prohibit use of antennas mounted on outdoor infrastructure, respectively.[2] For the reasons discussed below, we find there is good cause to grant Schlage's request.

II. BACKGROUND

2. The Schlage locking system is designed to provide more secure entry to locked spaces by utilizing ultra-wide band technology (UWB) in conjunction with traditional Bluetooth technology.[3] In its waiver request, Schlage describes how its locks, which it intends to market for use in residential environments, would utilize the UWB functionality to acquire ranging information which determines user's location in proximity to the lock.[4] Based on this ranging information, the access control determines a secure "Proof of Presence" by establishing the distance of the user using a secure time-of-flight measurement.[5] Schlage explains that this measurement prevents the possibility of relay attacks and prevents tricking a lock into opening via boosting of a signal when using a wireless, keyless entry system, which makes the incorporation of UWB functionality preferable to using a Bluetooth-only lock design.[6] Schlage's waiver request pertains only to the UWB aspect of its locking system.

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[1] *Schlage Lock Company Request for Waiver of Section 15.519(a), and 15.519(a)(2)) of the Commission's Rules* (filed April 7, 2022) (Schlage Waiver Request). *See also* 47 CFR §§ 15.519(a) and 15.519(a)(2).

[2] *See* 47 CFR §§ 15.519(a) and 15.519(a)(2).

[3] Schlage Waiver Request at 2-3. Bluetooth is a short-range wireless technology standard that is designed to operate on an unlicensed basis in the 2.4 GHz frequency band.

[4] Schlage Waiver Request at 3-4.

[5] *Id.* at 3.

[6] *Id*. at 2-3.

3. To allow for the certification and marketing of its lock system, Schlage requests to waive Sections 15.519(a) and 15.519(a)(2) of the Commission's rules.[7] Section 15.519(a) requires UWB devices to be hand-held and not employ a fixed infrastructure.[8] Section 15.519(a)(2) prohibits the use of antennas mounted on outdoor infrastructure like the outside of a building, telephone pole, or any fixed infrastructure.[9] The underlying purpose of the rule is to avoid development of large-scale communications systems that could adversely impact the authorized services, and to ensure that the UWB devices would only transmit when it is sending information to an associated receiver.[10] According to Schlage, its system will employ directional planar antennas designed for frequencies ranging from 6 GHz to 10 GHz.[11] Because Schlage's UWB locks and readers ("access control devices," "locks," or "devices") will be installed on residential entranceways and doors, Schlage seeks a waiver of these rules.[12]

4. Schlage's lock system will operate under the Commission's Part 15 rules governing the operation of UWB devices.[13] Part 15 permits low-power radio frequency devices to operate without an individual license from the Commission.[14] Unlicensed transmitters using UWB technology, which are governed by Subpart F of Part 15, employ very narrow or short-duration pulses that result in very large transmission bandwidths.[15] UWB devices share frequency bands with authorized radio services and, like all unlicensed devices, may not cause harmful interference to authorized radio services and must accept interference that may be caused by the operation of other stations and devices.[16]

5. The Office of Engineering and Technology (OET) issued a Public Notice on July 5, 2022, seeking comment on Schlage's waiver request.[17] In response, the Commission received four comments all of which support granting the waiver request.

III. DISCUSSION

6. 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.[18] Good cause, in turn, may be found and a waiver

[7] Schlage Waiver Request at 4.

[8] 47 CFR § 15.519(a).

[9] 47 CFR § 15.519(a)(2).

[10] *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission* Systems, First Report and Order, ET Docket 98-153, 17 FCC Rcd 7435, 7503, para 199 (2002) (*UWB First R&O*).

[11] Schlage Waiver Request at 4. A directional antenna is an antenna that radiates or receives radio wave power in specific directions. A planar antenna is one in which all the elements are in one plane, which makes the antenna two dimensional (e.g., a microstrip or printed circuit board antenna). Thus, a directional planar antenna is a two dimensional antenna used to radiate or receive radio waves in a specific direction.

[12] *Id.* at 3.

[13] *Id*.

[14] 47 CFR §§ 15.1 *et seq.*

[15] 47 CFR §§ 15.501-15.525. Several of these rules address specific UWB applications, such as ground penetrating radar, medical imaging, and surveillance systems, that are not directly applicable here. Schlage proposes to operate its devices under those parts of Subpart F that govern the authorization and use of handheld UWB systems. Schlage Waiver Request at 1, 5-10.

[16] 47 CFR § 15.5(b).

[17] *Office of Engineering and Technology Seeks Comment on Schlage's Request for Waiver of Section 15.519(a) and 15.519(a)(2) of the Commission's Rule for Handheld UWB Systems*, Public Notice, ET Docket 21-248, (Public Notice).

[18] 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).

granted "where particular facts would make strict compliance inconsistent with the public interest."[19] To make this public interest determination, the waiver cannot undermine the purpose of the rule and there must be a stronger public interest benefit in granting the waiver than in applying the rule.[20]

7. The technical and operational standards in Part 15 were adopted to ensure that UWB devices do not cause harmful interference to authorized radio services.[21] As discussed below, we find nothing in the record to indicate that Schlage's devices would differ from other UWB devices such that they would pose an increased risk of causing harmful interference to authorized radio services. As an initial matter, we also note that just like all UWB devices, Schlage plans to design its readers to emit a significantly low power signal.[22] The current rules allow power levels of -41.3 dBm in the 6 to 10 GHz range in which this device is requesting to operate, and Schlage is not seeking a waiver of these requirements.[23]

8. With respect to the rules for which it seeks a waiver, Schlage states that its system does not share the characteristics of a wide-area communications system – instead, it is designed to produce singular communications sessions between a user and the associated lock.[24] Moreover, the nature of the Schlage devices involve communications that are short range, for a short interval of time, limited in communication, and primarily operates close to the ground.[25]

9. The UWB feature of these devices would only operate when in close proximity (i.e., within approximately 15 feet) of a valid access credential.[26] The credentialing mechanism occurs prior to any emission of UWB signal and utilizes the Bluetooth Low Energy (BLE) protocol.[27] The device does not emit a UWB signal unless a valid credential is first exchanged over BLE.[28] The emitted UWB signal is of extremely brief moments, not more than one millisecond in duration.[29] Even in cases when a UWB connection cannot be established or is lost, the system only attempts to make another connection by transmitting no more than 1 millisecond every 100 milliseconds.[30] After that, the system employs an alternative mechanism of access control that does not rely on UWB.[31] In addition to the device not emitting a UWB signal unless a valid access credential is nearby, it also does not emit UWB signals as

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[19] *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.

[20] *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); *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).

[21] *See UWB First R&O*, 17 FCC Rcd 7435 *passim* (2002); *see also* 47 CFR. §§ 15.501-15.525.

[22] Schlage Waiver Request at 8.

[23] *See* 47 CFR § 15.519.

[24] *See* Schlage Waiver Request, Exhibit 1.

[25] Schlage Waiver Request at 4, 7.

[26] *Id*.

[27] *Id*. *See also* Exhibit 1 (where prior to any UWB ranging session, BLE is used for Advertising, Establishing Connection, Establishing Secure Channel, Transmitting Access Credential, Transmitting Results, Exchanging UWB Parameters, Transmitting UWB Session Key, and Closing BLE Session).

[28] Schlage Waiver Request at 4, 7.

[29] *Id.* at 8 (these devices would likely emit UWB signal for less than one second per device per day).

[30] *Id.*

[31] *Id.* at 4-7.

part of its duty cycles.[32] If a credential is not valid for that particular device, then there would be no communication over UWB.

10. Schlage's access control devices would be limited to deployment in residential units.[33] These devices only communicate with the user's access credential and would not be communicating with other UWB devices off of the property. Even if multiple adjacent residences use the same Schlage products, the devices will not communicate over UWB with each other.[34] Similarly, in cases when there are multiple proper access credentials near the same device, it will communicate with each of them as they are time-multiplexed on the same 500 MHz bandwidth channel. However, the communications would not happen at the exact same time.[35] Based on these reasons, we agree that this implementation will not create a large-area communication system and thus will not raise the potential for causing harmful interference to authorized users of the band that had prompted the Commission to adopt the rules we are now being asked to waive.

11. We also recognize that Schlage has taken further steps that provide us with added confidence that its system will not cause harmful interference in actual use. The reader uses directional type antennas with beam patterns primarily in the azimuthal plane, directed horizontally towards the ground, therefore reducing any potential interference to satellite receivers operating within the UWB frequency range under evaluation here.[36] Schlage claims that because of the type of antenna being used and its positioning, there would be no "bleed over" effects to signals outside of the area between the access credential and the device.[37] Moreover, Schlage has stated that it has designed and will market its system for installation on the ground floor of residential properties, which will further accentuate the benefits of the horizontal planar system design.[38] Finally, Schlage will limit sales to no more than 100,000 units per year.[39]

12. We also find support in the record developed as a result of the Public Notice, in which all interested parties supported the waiver request.[40] For example, NXP Semiconductors states that the volume of potential applications as a result of this waiver is significantly smaller than that of handheld devices, which are already permitted in the potential deployment locations without the need of a waiver.[41] It further notes that UWB transmissions will be activated only when the key and lock are within short range of each other and a transmission setup has been arranged via Bluetooth.[42]

13. We also note that grant of this waiver does not relieve Schlage of its obligation to ensure that its devices operate consistent with the rules applicable to all UWB devices that operate on an unlicensed basis, including the requirement that they do not cause harmful interference to other

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[32] *Id.*

[33] *Id.*

[34] *Id.*

[35] *Id.* at 4.

[36] *Id.* at 9.

[37] *Id. See also* NXP Semiconductors Comments at 3-4 (claiming that the Schlage lock system has minimal risk of interference because of the proposed antenna design which radiates primarily in the azimuthal plane, thus avoiding radiating harmful interference to higher elevation angles).

[38] The installation guidance would limit the mounting height of the device to 48 inches above the ground. Schlage Waiver Request at 8.

[39] Schlage Waiver Request at 3-4.

[40] *See* generally NXP Semiconductors Comments, HID Global Comments, and FiRa Consortium Comments.

[41] NXP Semiconductors Comments at 3.

[42] *Id*.

authorized users.[43] In furtherance of this interest, and in addition to the technical and operational restrictions imposed as a condition of the waiver, we also impose certain reporting requirements on Schlage.[44] Schlage shall submit, annually for the first three years after the date of grant of this waiver, a report that identifies any known interference complaints and their resolution. During that time, Schlage shall be prepared to halt the sale and marketing of devices subject to this waiver if OET so directs.

14. For these reasons, we conclude that Schlage has adequately demonstrated that its product will not undermine the purpose of the rule as it will not create the type of wide-area communications system that the Commission was concerned could cause harmful interference to authorized users of the band when it adopted the rules. Accordingly, even though the portion of the system associated with the physical lock would not be hand held, and the system would include devices installed on fixed outdoor infrastructure (i.e., residential entry doors), a limited waiver of Sections 15.519(a) and 15.519(a)(2) of our rules is warranted. We observe that this product is designed to comply with all other technical limits in our rules for UWB systems, except for those we are waiving. We also note that based on the description of Schlage in its waiver request, certain aspects of this waiver request are consistent with the previous waiver requests granted by OET.[45]

15. Considering the importance of security, and low risk of harmful interference, we find a stronger public interest benefit in granting the waiver than in applying the rule. Schlage's device will not only be able to provide access security, reduce risk of an unauthorized person entering the locked areas and track entrants in case of emergency, but will also support the availability of additional types of secure locks in the marketplace.[46]

16. For these reasons, we conclude that there is good cause to waive Sections 15.519(a) and 15.519(a)(2) of Commission's rules to permit the certification, marketing and operation of Schlage's UWB lock devices. This waiver is conditioned on the following conditions:

1) Schlage's device shall be certified by the Commission via an accredited Telecommunication Certification Body, and the certification application shall include a copy of this waiver order;
2) UWB sessions shall only be initiated following the discovery process and successful realization of qualifying credentials via 2.4 GHz Bluetooth operation;
3) UWB sessions shall only proceed until either the system identifies the user's intent to open the door or the user leaves the area by exiting the perimeter;
4) The UWB session shall not activate until a Bluetooth Low Energy connection has been made and the user's access credential has been identified;
5) The UWB session shall be terminated upon successful door opening sequence;
6) The ranging cycle occurs no more frequently than once every 100 milliseconds;
7) The UWB system shall only transmit when sending information to an associated receiver;
8) UWB operations shall be confined to the 6-10 GHz frequency range with an antenna that has its main beam in the azimuthal plane;
9) Schlage shall submit, annually for the first three years after the date of grant of this waiver, a report that identifies any known interference complaints and their resolution;
10) Schlage shall sell no more than 100,000 units per year;

[43] *See, e.g.*, 47 CFR § 15.5(b).

[44] *See infra* para. 16.

[45] *See* 35 FCC Rcd 12912; 35 FCC Rcd 11347; and 30 FCC Rcd 8377. *See also, In the Matter of Assa Abloy Group For Waiver of 15.519(a), and 15.519(a)(2) of the Commission's Rules Applicable to Ultra-Wideband Devices,* Waiver Order, ET Docket 21-267, (OET 2022) (Assa Abloy Waiver Order).

[46] Schlage Waiver Request at 11.

11) Schlage shall be prepared to halt the sale and marketing of devices subject to this waiver if OET so directs.[47]

17. Accordingly, pursuant to authority in Sections 0.31, 0.241, and 1.3 of the Commission's rules, 47 C.F.R. §§ 0.21, 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 Schlage IS GRANTED consistent with the terms of this Order. This action is effective upon release of this Order**.**

18. IT IS FURTHER ORDERED that if no petitions for reconsiderations or applications for review are timely filed, this preceding SHALL BE TERMINATED, and ET Docket No. 22-248 IS CLOSED.

FEDERAL COMMUNICATIONS COMMISSION

Ronald T. Repasi
Chief, Office of Engineering and Technology

[47] *See supra* para. 13.