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

In the Matter of	)	
	)	
Lumi United Technology	)	ET Docket No. 25-102
	)	
Request for Waiver of Section 15.519(a) and 15.519(a)(2) of the Commission's Rules	)	

ORDER

Adopted: September 9, 2025 **Released: September 9, 2025**

By the Acting Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this order, we grant a request by Lumi United Technology (Lumi) to waive Sections 15.519(a) and 15.519(a)(2) of our rules governing ultrawideband (UWB) devices for its smart door lock for residential use.[1] For the reasons discussed below, we find there is good cause to grant Lumi's request.

II. BACKGROUND

2. Lumi seeks authorization to manufacture and market its smart door locks for residential use, called the Aqara Smart Lock U400, that operates in the 6-10 GHz range.[2] In its waiver request, Lumi claims that its lock is safer compared to locks that use authentication alone, via Bluetooth Low Energy (BLE) to unlock doors, as those systems are susceptible to man-in-the-middle and relay types of attacks.[3] In contrast, Lumi's system employs additional UWB functionality to acquire ranging information, which determines the user's location in proximity to the lock before the device grants access.[4] This enables the credentials to be authenticated via the BLE, and verify the user's proximity via UWB, ensuring that the lock can only be opened by an authorized user.[5] Lumi's waiver request pertains only to the UWB aspect of its locking system.

3. Lumi's lock system will operate under the Commission's Part 15 rules governing the UWB device operation. Part 15 permits low-power radio frequency devices to operate without an

[1] *Lumi United Technology Co, Ltd. Request for Waiver of Section 15.519(a), and 15.519(a)(2)) of the Commission's Rules* (filed Dec 16, 2024) (Lumi Waiver Request). *See also* 47 CFR §§ 15.519(a) and 15.519(a)(2) (requiring UWB devices to be handheld while operating and prohibiting the use of antennas mounted on outdoor infrastructure, respectively).

[2] Lumi Waiver Request at 2. The initial product will be the Aqara Smart Lock U400, but Lumi anticipates that it would market similar products with the same operational characteristics under the requested waiver.

[3] *Id.* at 2-3. These attacks enable an attacker to intercept and relay authentication signals from a user's smartphone through another device, tricking the lock into thinking the user is nearby and unlocking the door.

[4] *Id.* at 3.

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

individual license from the Commission.[6] 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.[7] 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.[8]

4. To allow its lock system to be certified and marketed, Lumi asks us to waive Sections 15.519(a) and 15.519(a)(2) of the Commission's rules.[9] Section 15.519(a) requires UWB devices to be hand-held and not employ a fixed infrastructure.[10] Section 15.519(a)(2) prohibits the use of antennas mounted on outdoor infrastructure, such as the outside of a building or a telephone pole.[11] Lumi claims that although these locks will be installed on the outside of structures, they are inherently part of the structure, operate sporadically, have limited range, are unlikely to cause interference, and are similar to previous waivers the Commission has granted.[12]

5. The Office of Engineering and Technology (OET) issued a Public Notice on February 25, 2025, seeking comment on Lumi's waiver request.[13] In response, the Commission received three 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.[14] Good cause, in turn, may be found and a waiver granted "where particular facts would make strict compliance inconsistent with the public interest."[15] 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.[16]

[6] 47 CFR §§ 15.1 *et seq.*

[7] 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. Lumi proposes to operate its devices under those parts of Subpart F that govern the authorization and use of handheld UWB systems.

[8] 47 CFR § 15.5(b).

[9] Lumi Waiver Request at 1.

[10] 47 CFR § 15.519(a).

[11] 47 CFR § 15.519(a)(2).

[12] Lumi Waiver Request at 2.

[13] *Office of Engineering and Technology Seeks Comment on Lumi's Request for Waiver of Section 15.519(a) and 15.519(a)(2) of the Commission's Rule for a UWB Lock System*, Public Notice, ET Docket 25-102. (Public Notice).

[14] 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).

[15] *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.

[16] *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).

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.[17] As discussed below, we find nothing in the record to indicate that Lumi'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 note that just like all UWB devices, Lumi's lock system will emit signals at very low power, consistent with the UWB handheld rules.[18] The current rules allow power levels up to -41.3 dBm in the 6 to 10 GHz range in which this device is designed to operate, and Lumi is not seeking a waiver of these requirements.[19]

8. When adopting the UWB rules and designating devices to be handheld, and antennas not to be mounted on outdoor infrastructure, the Commission was concerned about the development of a large communications system and its adverse impact on authorized services.[20] Essentially, the underlying purpose of the rule is to avoid the development of large-scale communication systems that could adversely impact authorized services and to ensure that UWB devices only transmit when they are sending information to an associated receiver. In response to those concerns, Lumi states that its UWB door locks are consistent with the underlying purpose of the rules, as its device operates individually, not as part of a broader network, and is limited to residential locations.[21] Lumi also notes that although its device will be installed on the outside of the structures, they are inherently part of the structure, will operate only sporadically, have minimal range, and are unlikely to cause interference due to their low-power, short-interval UWB signals.[22]

9. In its request, Lumi explains that the system operates in such a way that the UWB session does not initiate until credential authentication has first taken place.[23] A typical UWB operation begins with a BLE interaction between the device and the door lock, ensuring that the access credential is within range for two-way UWB communication.[24] The door lock then sends a UWB signal to the device, initiating a UWB session. This two-way communication will last no longer than 1 millisecond. If a connection cannot be established or is lost, the system will retry, but will not transmit more than 1 millisecond every 100 milliseconds.[25] If UWB communication remains unsuccessful, the system will fall back to a non-UWB method of access verification.[26] Additionally, Lumi's UWB locks do not communicate with each other over UWB, regardless of their location.[27] In essence, Lumi's UWB lock only interacts with access credentials, and not with other UWB locks.[28] Based on the device's operational

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

[18] Lumi Waiver Request at 9.

[19] *See* 47 CFR § 15.519.

[20] *UWB First R&O*, 17 FCC Red at 7503, para. 199 (2002) (observing that without protections the creation of such networks, such as wide area networks of UWB devices, might negatively impact existing authorized services, including cellular, PCS, and GPS systems employed in E-911 applications).

[21] Lumi Waiver Request at 7.

[22] *Id.* at 2 and 6.

[23] *Id.* at 8.

[24] *Id.* at 3-4 and 8.

[25] *Id.*

[26] *Id.* at 3-4.

[27] *Id.* at 4.

[28] *Id.* at 6.

characteristics and its intended use, it appears highly unlikely that the device is capable of creating a large-scale communication network or causing harmful interference to licensed services.

10. Other factors give us added confidence that Lumi's system will not increase the risk of harmful interference. Lumi claims that it expects its door locks to be used an average of only about 8 times per day, resulting in a daily UWB signal emission duration of "well under" a second.[29] Because the door lock system will emit signals at power levels consistent with our rules, these signals will be unable to reach authorized services outside the premises of the door lock locations. These characteristics (using a low power level, emitting UWB signals for a very short duration, and being used sparingly) serve to minimize the risk of harmful interference.

11. When adopting the UWB rules initially, the Commission was particularly concerned about the risk of harmful interference to authorized airborne or satellite services. We find that Lumi's system is well designed to minimize this risk due to its antenna orientation, beamwidth, and how it will be marketed. Lumi's system uses a directional antenna with a beam pattern primarily in the azimuthal plane.[30] This ensures that emissions are directed closer to the ground, reducing the potential for interference to satellite receivers. Lumi's system will also be marketed exclusively for residential use,[31] and we are incorporating additional provisions to set a limit on sales volume and require Lumi to halt its sales if harmful interference is reported.[32] Taking all of these elements together, we do not believe that Lumi's system will increase the risk of harmful interference to authorized services.[33]

12. We also find support in the record for granting the waiver.[34] Parties generally favored granting the waiver on the grounds that similar UWB door locks are already operating pursuant to previous waivers without any reports of harmful interference.[35] They claim that Lumi's devices are practically similar to handheld devices. Similar technologies, such as digital vehicular keys, are already widely used today, and extending the entry mechanism to building entry applications will extend the same benefits of safety, security, and convenience to consumers.[36]

13. Finally, considering the importance of security and the low risk of harmful interference, we find a stronger public interest benefit in granting the waiver than in applying the rule. Lumi's UWB Door Locks will enhance safety for users and others by facilitating secure access to homes and apartments, and, because they will incorporate UWB-based proximity detection features, they will

[29] *Id.* at 8. (spelling out a scenario that describes how a typical door lock sequence will take place: Lume states that typically a door lock will connect via BLE to the user's device when the user is about 24 feet of the lock's proximity and has access credentials. The UWB module turns on when the user is typically 12 feet from the door, and will be turned off by the time the user reaches the door. Lumi states that in this scenario, the UWB "on time" would be about 3 seconds, but the transmission time would be 30 milliseconds or less. As a result, the Lumi door lock will emit a UWB signal for well under a second a day).

[30] Lumi Waiver Request at 4, 5, and 9.

[31] *Id.* at 9. Lumi will include instructions that limit installation to the ground floor of structures and a height of no more than 48 inches.

[32] *See infra* para. 14.

[33] The Commission also has experience with similar door locks operating under similar waiver provisions and has not been made aware of any instances of harmful interference caused by those devices.

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

[35] *Id.*

[36] UWB Alliance Comments at 2.

provide better security than devices that rely solely on Bluetooth technology that can be exploited by security attacks.[37]

14. For all of these reasons, we conclude that a grant of the waiver would not undermine the purpose of the rule and there is good cause to waive Sections 15.519(a) and 15.519(a)(2) of the Commission's rules to permit the certification, marketing, and operation of Lumi's UWB lock devices. Grant of this waiver is conditioned on the following:

1) Lumi'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) Lumi 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) Lumi shall sell no more than 100,000 units per year;
11) Lumi shall be prepared to halt the sale and marketing of devices subject to this waiver if OET so directs.

15. 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 Lumi IS GRANTED consistent with the terms of this Order. This action is effective upon release of this Order**.**

16. IT IS FURTHER ORDERED that if no petitions for reconsideration or applications for review are timely filed, this preceding SHALL BE TERMINATED, and ET Docket No. 25-102 IS CLOSED.

FEDERAL COMMUNICATIONS COMMISSION

Andrew Hendrickson
Acting Chief, Office of Engineering and Technology

[37] Lumi Waiver Request at 10. Lumi documents other benefits of its system, including, for example, the ability to remotely disable its devices unlike in a traditional keyed-lock scenario. *Id.*