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

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In the Matter of	)	
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Starkey Laboratories, Inc. Petition for Rulemaking and Request for Waiver of Section 15.247(a)(2) of the Commission's Rules	)))	ET Docket No. 09-38 RM-11523

MAILED
JUN 12 2012
FCC Mail Room

ORDER

Adopted: May 29, 2012 **Released: May 31, 2012**

By the Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this action, we dismiss a petition for rulemaking and deny a request for waiver filed by Starkey Laboratories, Inc. (Starkey). In its petition for rulemaking, Starkey requests that the Commission amend Section 15.247(a)(2) of its regulations for unlicensed devices using spread spectrum and other digital modulation techniques in the 902-928 MHz (915 MHz), 2400-2483.5 MHz (2.4 GHz), and 5725-5850 MHz (5.8 GHz) radio frequency (RF) bands to reduce the minimum required signal bandwidth from 500 kilohertz to 100 kilohertz.[1] In its waiver request, Starkey asks that we waive the minimum 500-kilohertz bandwidth requirement in Section 15.247(a)(2) to allow its unlicensed assistive listening devices (ALDs) and hearing aid programming devices to be approved to operate in the 915 MHz band with a minimum bandwidth of 100 kilohertz until the Commission rules on its petition for rulemaking.[2] For the reasons discussed below, we conclude that Starkey's petition for rulemaking plainly does not warrant consideration and that Starkey's proposed waiver of our Part 15 spread spectrum communications rules would undermine the underlying purpose of those rules.

II. BACKGROUND

2. Part 15 of the Commission's rules provides for the operation of low power radio frequency (RF) devices without an individual license from the Commission. Before marketing them to the public, parties responsible for all Part 15 unlicensed devices must demonstrate compliance with the

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[1] *See* Starkey Laboratories, Inc. Petition for Rulemaking of Section 15.247(a)(2) of the Commission's Rules, filed April 11, 2008 (Starkey Rulemaking Petition).

[2] *See* Starkey Laboratories, Inc., Request for Waiver of Section 15.247 (a)(2) of the Commission's Rules, filed April 11, 2008 (Starkey Request for Waiver); Starkey Laboratories, Inc. Amended Request for Waiver of Section 15.247(a)(2) of the Commission's Rules, filed November 12, 2008 (Starkey November 12, 2008 Amended Request for Waiver); Starkey Laboratories, Inc. Amended Request for Waiver of Section 15.247(a)(2) of the Commission's Rules, filed July 22, 2011 (Starkey July 22, 2011 Amended Request for Waiver). Starkey requests a waiver of Section 15.247(a)(2) for a device that is already authorized under Section 15.247 – its SurfLink Media Controls – and for three devices that are already authorized under Section 15.249 – its SURFLink Programmer, SURFLink Remote Control, and WiSeries RIC (Receiver-in-Canal) – which does not impose a minimum 6 dB bandwidth requirement. Starkey submits that it would like to increase the range and link margin of the devices authorized under Section 15.249, but cannot do so under the reduced power limit in Section 15.249. *Id.* at 3-4. *See* FCC Equipment Authorization database at https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm.

Commission's rules and obtain an FCC equipment authorization.[3] As a general condition of operation, Part 15 devices may not cause harmful interference to any authorized services and must accept any interference that may be received from them or other Part 15 devices.[4]

3. The Commission adopted its Part 15 spread spectrum rules to allow the operation of wide-bandwidth devices in the 915 MHz, 2.4 GHz, and 5.8 GHz bands.[5] Spread spectrum systems use special modulation techniques that spread their transmitted energy across a wide bandwidth, which reduces the power density of the signal in any one portion of the occupied frequency band, thereby reducing the potential to cause interference to other signals in the same frequency band. At the receiving end, the spreading technique used in the transmitter is reversed to enable detection and decoding of the signal. This reversal of the signal spreading process enables the suppression of strong undesired signals, making systems using spread spectrum modulation techniques relatively immune to interference from outside sources. Systems employing spread spectrum techniques are inherently more secure, and they have less potential to cause interference to and are less susceptible to receive interference from other devices operating in the same band than conventional communications systems. Digital modulation techniques other than spread spectrum have spectrum characteristics similar to direct sequence spread spectrum techniques and spread the transmitted energy across a wide bandwidth. Thus, these digital modulation techniques have no more potential to cause interference to other devices in the same band than direct sequence spread spectrum techniques. If designed appropriately, digital non-spread spectrum systems will also have immunity to interference so they can operate effectively for their intended purpose in the presence of other signals in the same band. Because of these similarities, the Commission has allowed low power Part 15 devices that use digital modulation techniques to operate under the same Part 15 rules it applied to devices that use spread spectrum techniques.[6] The Commission's Part 15 spread spectrum and other digital modulation rules have promoted widespread business and consumer use of unlicensed devices in the 915 MHz, 2.4 GHz, and 5.8 GHz bands that employ wide bandwidths in a very spectrally efficient manner.

4. Under Section 15.247(a)(2), digitally modulated systems operating in the 915 MHz, 2.4 GHz, and 5.8 GHz bands must employ a minimum 6 dB (*i.e.*, "spreading") bandwidth of 500 kilohertz.[7] The Commission specifically chose the minimum 500-kilohertz 6 dB bandwidth to ensure that wideband digital devices (direct sequence spread spectrum and other digital modulation techniques) operating with higher power than normally allowed under the Part 15 general emission limits would operate compatibly with other authorized radio systems in the 915 MHz, 2.4 GHz, and 5.8 GHz bands.[8] Such systems also must not exceed a peak conducted output power of 1 Watt and a peak conducted power spectral density (PSD) of 8 dBm per 3 kilohertz (8 dBm/3 kHz).[9] Although devices that operate under

[3] *See* 47 C.F.R. §§ 15.1(c), 15.201(b).

[4] 47 C.F.R. § 15.5.

[5] *See* Authorization of spread spectrum and other wideband emissions not presently provided for in the FCC Rules and Regulations, Gen Docket No. 81-413, *First Report and Order*, 101 FCC 2d 419 (1985) (*Spread Spectrum R&O*).

[6] *See* Amendment of Part 15 of the Commission's Rules Regarding Spread Spectrum Devices, ET Docket No. 99-231, *Second Report and Order*, 17 FCC Rcd 10755, 10760 para. 11 (2002) (*Spread Spectrum 2nd R&O*).

[7] 47 C.F.R. § 15.247(a)(2). At the 6-dB bandwidth, the signal power is 6 dB below (*i.e.*, one-quarter of) the maximum signal power.

[8] *See Spread Spectrum R&O*, 101 FCC 2d at 427 para. 26; *Spread Spectrum 2nd R&O*, 17 FCC Rcd at 10760-61 paras. 11-13.

[9] 47 C.F.R. §§ 15.247(b)(3); 15.247(e). Conducted output power and PSD is the amount of power delivered to the base of a device's transmitting antenna. The 8 dBm/3 kHz conducted PSD limit approximately equates to uniformly (continued....)

Section 15.247 may use a maximum conducted output power of 1 Watt, many devices authorized under the Section 15.247 rules use less than 1 Watt conducted output power for various design reasons, such as conserving battery life. There is no maximum bandwidth limit in Section 15.247 other than the requirement to stay within the designated bands of operation. At the same output power, a signal with a wider bandwidth would have a lower PSD than with a narrower bandwidth – as the energy would be more widely dispersed over the available spectrum – which would further reduce the signal's potential to cause interference. Signals using a wider 6 dB bandwidth than required could also provide a higher data rate (*i.e.*, information transfer rate) than narrower bandwidth signals.

5. Starkey states that a reduction of the required minimum 6 dB bandwidth from 500 to 100 kilohertz is needed so its ALDs and hearing aid programming devices can operate with less power and bandwidth to communicate with hearing aids, which typically have modest RF signal processing capability due to their physical size and limited power radio subsystem.[10] Starkey argues that by using only 100-kilohertz wide signals and maintaining the 8 dBm/3 kHz conducted PSD limit, its devices' overall RF power and interference potential would be lower than those of devices using 500-kilohertz wide signals and a conducted PSD of 8 dBm/3 kHz.[11] Starkey further states that a reduction of the minimum bandwidth is needed so its Section 15.247 compliant devices may transmit a single RF carrier that is narrower than 500 kilohertz and would be time multiplexed in the right and left channels, instead of each device using two transmitters to transmit two overlapping frequency shift keying (FSK)[12] modulated RF carriers to comply with the 500-kilohertz bandwidth requirement – which increase the devices' cost, complexity, and power consumption.[13]

6. The Commission issued Public Notices soliciting comments on Starkey's petition for rulemaking and request for waiver on March 26, 2009.[14] Itron, Inc., Medical Device Manufacturers

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spreading the maximum 1 Watt conducted output power over the minimum 500-kilohertz 6 dB bandwidth. In 1990, the Commission added the 8 dBm/3 kHz conducted PSD limit to the Part 15 spread spectrum rules to ensure that the transmitted energy is uniformly spread over the minimum signal bandwidth of 500 kilohertz to limit the potential for interference to authorized services in the same frequency band. *See* Amendment of Parts 2 and 15 of the Rules with regard to the operation of spread spectrum systems, GEN. Docket No. 89-354, *Report and Order*, 5 FCC Rcd 4123, 4124 para. 12 (1990). In 1997, the Commission corrected the reference in the Part 15 spread spectrum rules to the maximum PSD limit from an average limit to a peak limit. *See* Amendment of Parts 2 and 15 of the Commission's Rules Regarding Spread Spectrum Transmitters, ET Docket No. 96-8, RM-8435, RM-8608, RM-8609, *Report and Order*, 12 FCC Rcd 7488, 7506 para. 34 (1997).

[10] *See* Starkey Amended Request for Waiver at 3-6. Starkey claims that frequency hopping spread spectrum (FHSS) and direct sequence spectrum (DSSS) are not viable options for communicating with hearing aids due to their increased signal processing and power requirements. *See* Starkey Labs, Inc. *Ex Parte* filing, dated October 8, 2008, at 3.

[11] *See* Starkey Amended Request for Waiver at 8. To avoid interfering with other devices, Starkey submits that its devices would employ a "Listen Before Talk" mechanism along with an adaptive frequency selection algorithm. *See* Starkey Laboratories, Inc. Amended Request for Waiver, ET Docket No. 09-38, filed July 22, 2011, at 3, 5.

[12] FSK is a frequency modulation technique in which digital information is transmitted through discrete frequency changes of an RF carrier wave.

[13] *See* Starkey Laboratories, Inc. *Ex Parte*, filing, dated August 26, 2011, at 2.

[14] *See* Public Notice, DA 09-674, Office of Engineering and Technology Seeks Comment on Petition for Rulemaking by Starkey Laboratories, Inc. To Amend the Minimum Bandwidth Requirement In Section 15.247(a)(2) for the 902-928 MHz Band, RM-11523, 24 FCC Rcd 3635 (rel. March 26, 2009); Public Notice, DA 09-676, Office of Engineering and Technology Declares the Starkey Laboratories, Inc. Request for a Waiver of Part 15 for the 902-928 MHz Band To Be a "Permit-But-Disclose" Proceeding for *Ex Parte* Purposes and Requests Comments, ET Docket No. 09-38, 24 FCC Rcd 3641 (rel. March 26, 2009).

Association, Telesaurus Holdings GB LLC and Skybridge Spectrum Foundation, and USA Mobility, Inc. filed comments opposing Starkey's Request for Waiver and/or Petition for Rulemaking. Hearing Industries Association and the European Hearing Industries Manufacturers Association, Hearing Loss Association of America, Institute of Electrical and Electronics Engineers 802.18 Radio Regulatory Technical Advisory Group, ON Semiconductor, Progeny LMS, LLC, Pulse Nederland B.V., Williams Sound Corporation, and Zarlink Semiconductor filed comments supporting Starkey's Request for Waiver and/or Petition for Rulemaking.

III. DISCUSSION

7. We find that Starkey's requested modification of our Part 15 spread spectrum communications rules plainly does not warrant consideration.[15] First, Starkey has not provided any analysis to demonstrate that its proposal will not increase the potential for interference to licensed users who share the 915 MHz, 2.4 GHz, and 5.8 GHz bands. Second, the current Section 15.247 rules have permitted a wide array of unlicensed spread spectrum and digital devices to proliferate, including WiFi devices, meter readers used in Smart Grid systems, and many other unlicensed devices used ubiquitously in homes and businesses across the country that co-exist with licensed operations. Starkey has not demonstrated in its proposal that this current ecosystem could be maintained if we reduced the minimum 500-kilohertz bandwidth requirement in Section 15.247(a)(2). As noted above, the 500-kilohertz bandwidth requirement is a minimum limit and many of these unlicensed devices use an even wider bandwidth to increase their data transfer rates and therefore have conducted power spectral density levels of less than 8 dBm/3 kHz. Also, although digitally modulated devices that operate under Section 15.247 may use a maximum conducted output power of 1 Watt, because of battery life concerns and RF emissions exposure limits, many devices authorized under Section 15.247 use less than the 1 Watt maximum allowed conducted output power, which also results in a power spectral density of less than the maximum allowed 8 dBm/3 kHz.[16] The operation in the same frequency band of a relatively great number of narrowband 100-kilohertz wide signals at the maximum allowed conducted power spectral density of 8 dBm/3 kHz together could make the band unusable for devices currently operating under Section 15.247.

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.[17] Good cause, in turn, may be found and a waiver granted "where particular facts would make strict compliance inconsistent with the public interest."[18] 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.[19] Starkey's

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[15] The Office of Engineering and Technology may dismiss or deny a petition for rulemaking that it finds is repetitious, moot, or plainly does not warrant consideration by the Commission. *See* 47 C.F.R. § 0.241(e).

[16] For example, a search of the Commission's equipment authorization database reveals that many devices operate at power levels in the range of 70-500 milliwatts (mW), depending on the intended use. Power spectral density levels are typically in the range of -10 dBm/3 kHz to 5 dBm/3 kHz.

[17] *See* 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); and *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

[18] *See Northeast Cellular*, 897 F.2d at 1166; *see also ICO Global Communications*, 428 F.3d at 269 (quoting *Northeast Cellular*); and *WAIT Radio*, 418 F.2d at 1157-59.

[19] *See, e.g., WAIT Radio*, 418 F.2d at 1157 (stating that even thought 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 even serve the public interest if an applicant's proposal does not undermine the public interest policy served by the rule); (continued....)

waiver request does not meet the above criteria in that it would undermine the fundamental purpose of Section 15.247(a)(2). As noted above, the Commission specifically chose the 500-kilohertz minimum 6 dB bandwidth in Section 15.247(a)(2) to exclude narrowband systems from using the higher power limits of Section 15.247.[20] We find that Starkey's request to use a reduced bandwidth would undermine the underlying purpose of Section 15.247(a)(2) to allow only wideband digital devices to operate with higher power than is normally allowed under Part 15 general emission limits. We note that several commenters supported Starkey's waiver request, arguing that the public interest would be served by helping people with hearing loss have better access to communications equipment and function in more settings, and we do not disagree with that objective. However, we must balance the public interest benefit in granting the waiver, including the need to waive the rule to achieve this objective, against the public interest benefit in applying the rule to avoid negative effects on other users of the spectrum, as discussed above. Starkey has not provided persuasive evidence on either point, and we note that it already is marketing equipment that complies with the rules it has asked us to waive.[21] We thus conclude that the potential public interest benefit in this case is not stronger than applying the rules.

9. For the reasons noted above, we conclude that modifying Section 15.247(a)(2) to reduce the minimum required 6 dB bandwidth of 500 kilohertz for unlicensed devices that operate in the 915 MHz, 2.4 GHz, and 5.8 GHz RF bands plainly does not warrant consideration by the Commission. We also conclude that Starkey's request for waiver of the minimum 500-kilohertz bandwidth requirement would undermine the underlying purpose of Section 15.247(a)(2) and would not be in the public interest. Thus, we dismiss Starkey's petition for rulemaking to modify Section 15.247(a)(2) and deny Starkey's request for waiver of Section 15.247(a)(2).

IV. ORDERING CLAUSES

10. Accordingly, IT IS ORDERED that, pursuant to the authority granted in Sections 4(i), 302, and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 4(i), 302(a), 303(r), and Sections 0.31 and 0.241 of the Commission's rules, 47 C.F.R. §§ 0.31, 0.241, the Petition for Rulemaking of Starkey Labs, Inc. IS DISMISSED and the Request for Waiver of Starkey Labs, Inc. IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION

for Julius P. Knapp
Chief, Office of Engineering and Technology

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and *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).

[20] *See* para. 4, *supra*.

[21] An examination of our equipment authorization database and Starkey's Internet site reveals that Starkey is currently marketing a device authorized under Section 15.247 – known as the SURFLink Media Device – that interconnects with and transmits digitally modulated audio signals to hearing aids from several media sources, including televisions, radios, and MP3 players. Starkey is also marketing three devices that are authorized under Section 15.249 – known as the WiSeries RIC (Receiver-in-Canal), for wireless communications between hearing aids, the SurfLink Programmer, for wireless hearing aid programming, and the SurfLink Remote Control, for wireless control of hearing aid settings (*i.e.*, on/off; volume). *See* Starkey July 22, 2022 Amended Request for Waiver at 7; Starkey Laboratories, Inc. *Ex Parte* filing, submitted August 26, 2011, at 2.