



Federal Communications Commission
Washington, D.C. 20554

February 4, 2015

Dr. Jeff Shuren, MD, JD
Director
Center for Devices and Radiological Health
U.S. Food and Drug Administration
White Oak Building 66
10903 New Hampshire Ave
Silver Spring, MD 20993

Dear Dr. Shuren:

The FCC has recently received numerous requests to authorize devices and equipment implementing new applications of wireless power transfer (WPT). WPT has been in existence for many years, transferring power primarily by means of magnetic induction in devices such as electric toothbrush chargers, transformers, induction cooktops, and electronic article surveillance.¹ With advances in semiconductor technology and circuit-design simulation capabilities, the technology has been refined to provide wire-free battery charging and power to a variety of consumer products ranging from cellular phones, to television and entertainment products, to medium-size appliances, and most recently to electric vehicles.

The FCC Laboratory has already approved numerous low-power wireless charging pads (typically operating at frequencies less than a megahertz and with output power up to five watts) used to recharge cellphones and other consumer devices such as laptops and tablets.² The consumer device receives power delivered through magnetic induction when placed on top of a charging pad, with a small separation from the magnetic charging coil. Wireless power transfer to vehicles is similar in concept (and frequency) to wireless device charging where a vehicle receives power when driven atop a pad installed in a garage, a parking space, or potentially at a bus stop. However, vehicular wireless charging requires significantly more power to work effectively (thousands of watts), especially for commercial applications,³ and entails a greater separation distance between the charging coil and receiving coil under the vehicle. In contrast, another recent innovation – wireless power transfer at a distance (tens of feet) – relies on antenna beam steering to deliver power across rooms to receiving devices, which may be mobile while

¹ Electric toothbrush chargers and transformers both typically transfer electric power across a small gap between two magnetic coils. The coils of an electric toothbrush are smaller and separable to meet form factor and portability requirements, whereas transformer coils are larger and stationary. While induction cooktops and electronic article surveillance systems do not transfer electric power, they do generate fields at frequencies similar to those used by lower frequency WPT systems.

² See FCC Laboratory KDB Publication 680106, available at:
<https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?id=41701&switch=P>.

³ See Federal Transit Administration, U.S. Department of Transportation, *Review and Evaluation of Wireless Power Transfer (WPT) for Electric Transit Applications*, FTA Report No. 0060, August 2014, available at: http://www.fta.dot.gov/documents/FTA_Report_No._0060.pdf.

being charged, such as a cellphone in a pocket. Power delivery at these distance ranges typically requires a high operating frequency (gigahertz).

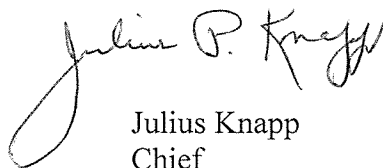
Presently, our specific absorption rate (SAR) exposure limits for human tissue are defined as low as 100 kilohertz in frequency, and our maximum permissible exposure (MPE) limits for field strength are defined as low as 300 kilohertz in frequency. At the time our limits were established, there was negligible activity by FCC-regulated devices that could affect humans on frequencies outside of this range. Below these frequencies, limits are not specified in our rules, although energy-emitting sources regulated by the Commission are subject to sections 1.1307(c) and (d) of our rules. It is our understanding that human exposure in this frequency domain may require different exposure guidelines than those at higher frequencies.

Please note that the Commission opened a *Notice of Inquiry (Inquiry)* into whether recent research, standards setting activities and usage patterns of RF emitters of all types warrant a reexamination of the FCC's exposure limits and policies for all regulated sources of RF emissions.⁴ In our *Inquiry*, we specifically solicit input from federal health and safety agencies and institutes, including the FDA, on the propriety of our present exposure limits.

Notwithstanding this *Inquiry*, my purpose in writing this letter is to seek guidance on the RF exposure principles or guidelines under which we should consider authorizing the newer WPT devices that operate in frequencies for which exposure limits have not yet been specified in our rules, at least during the pendency of the rulemaking. In addition, we seek your collaboration in our due diligence to identify and ameliorate any risks of interference to medical devices due to the use of WPT equipment.

We greatly appreciate the support FDA has given the FCC on RF exposure and our ongoing coordination on matters involving the intersection of wireless and health care technologies. If you need any additional information, please contact Bruce Romano, Associate Chief of our Office of Engineering and Technology, at Bruce.Romano@fcc.gov or by telephone at (202) 418-2470.

Sincerely,



Julius Knapp
Chief
Office of Engineering and Technology

⁴ See *Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies*, Notice of Inquiry, ET Docket No. 13-84, FCC 13-39, March 29, 2013, available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-13-39A1.docx.