

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

Amendment of the Commission's Rules to
Allow Next-Generation Wireless Charging
Technology for Electric Vehicles Under Part 18

RM-11815

**COMMENTS of MERCEDES BENZ RESEARCH & DEVELOPMENT
NORTH AMERICA, INC. and QUALCOMM INC.
on PETITION for RULEMAKING**

Dr. Mohamad Abdul-Hak
Senior Manager, Electrical Drive
Mercedes Benz Research & Development
North America, Inc.
A Daimler Company
12120 Telegraph Rd
Redford, MI 48239

Mr. Andrew A. Vu
Vice President & General Counsel
Mercedes Benz Research & Development
North America, Inc.
A Daimler Company
309 North Pastoria Ave
Sunnyvale, CA 94085

Mr. Karlheinz Baier
Manager, RD/EIL
Wireless Charging
Development CASE & Development e-Drive
Mercedes-Benz Cars
DAIMLER AG
71059 Sindelfingen, Germany

Mr. Dean R. Brenner
Senior Vice President, Spectrum Strategy &
Technology Policy

Mr. John W. Kuzin
Vice President & Regulatory Counsel

Qualcomm Inc.
1730 Pennsylvania Ave, NW, Suite 850
Washington, DC 20006

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Mercedes Benz Research & Development North America, Inc (“Mercedes Benz R&D”) and Qualcomm Inc. (“Qualcomm”) welcome the Petition for Rulemaking requesting the FCC to amend its Part 18 regulations to support next-generation wireless charging technologies for electric vehicles (“EVs”) that operate within the 79-90 kHz frequency range.¹ Mercedes-Benz R&D believes that one of the key next steps on the way to perfecting electric drive and plug-in hybrid vehicles is wireless charging. Qualcomm Halo is a next-generation wireless EV charging technology that uses highly efficient, high-power, resonant magnetic inductive wireless energy transfer like the technology described in the Petition.

For the reasons detailed in these comments, Mercedes Benz R&D and Qualcomm support the Commission taking favorable action on the Petition and moving forward to a Notice of

¹ See BMW of North America, LLC, Ford Motor Company, Nissan North America, Inc. Toyota Motor North America Petition for Rulemaking, Amendment of the Commission's Rules to Allow Next-Generation Wireless Charging Technology for Electric Vehicles Under Part 18, RM-11815 (filed Sept. 5, 2018) (hereinafter the “Petition”); *see also* FCC Public Notice, Report No. 3103, Consumer & Governmental Affairs Bureau Reference Information Center, Petition for Rulemakings Filed (Sept. 21, 2018).

Proposed Rulemaking so long as the FCC-proposed H-field limit is 82.8 dB μ A/m — a limit that is consistent with multiple international standardization efforts — rather than the 74.4 dB μ A/m level proposed in the Petition that is much lower than what the international standards provide. This higher limit will encourage the deployment of Wireless Power Transfer (“WPT”) technologies that provide faster, more reliable charging, which will be crucial for the proliferation of EVs that offer so many benefits for the public.

INTRODUCTION and SUMMARY

Mercedes Benz R&D and Qualcomm agree with the Petition that WPT technologies offer the real promise of increasing consumer adoption of EVs and the improved accessibility of EV technology for all Americans, including persons with disabilities, as well as support for autonomous vehicles, improved traffic management, enhanced roadway safety, and reduced vehicle emissions. We agree that establishing higher power limits in the U.S. will advance commercial development and deployment of wireless charging technology for EVs and will position the U.S. as a leader in promoting WPT technology development.² Mercedes-Benz R&D develops the latest and advanced wireless electric-vehicle charging technologies and is a contributing member to the development of global automotive standardization efforts. Qualcomm Halo wireless EV charging technology uses highly efficient, high-power, resonant magnetic inductive wireless energy transfer just like the technology discussed in the Petition for Rulemaking. WPT technologies for EVs will be essential to the future world of autonomous EVs that are not going to be able to plug themselves into an outlet after returning to the garage at the end of the day.

² See Petition at 13.

Mercedes Benz R&D and Qualcomm have been heavily involved with the Society of Automotive Engineers International (“SAE”) and other standards bodies such as CISPR, CEPT, and ETSI developing standards for WPT systems for EVs. As such, our companies welcome the Petition for Rulemaking seeking changes to the FCC’s Part 18 regulations to enable this new innovative technology. As explained herein, the Commission should commence a rulemaking proposing to adopt the measurement parameters set out in the Petition, *i.e.*, H-field measurements taken at 10 meters on a turntable with an EUT (Equipment Under Test) ring radius of 1.9 meters. The FCC also should propose adoption of the H-field limit of 82.8 dBμA/m at 10 meters consistent with international standardization efforts. The Petition inexplicably ignores the fact that international standards are incorporating the higher limit. The FCC should look to these standards. Adopting the Petition’s lower limit of 74.4 dBμA/m at 10 meters would unnecessarily constrain WPT equipment designs. It also would result in longer charging times, which would threaten to undermine consumer adoption of this important new technology, and place the U.S. at a competitive disadvantage to other countries that permit WPT EV charging systems to operate at the internationally standardized 82.8 dBμA/m limit.

DISCUSSION

I. The FCC Should Move Forward To A Notice Of Proposed Rulemaking That Proposes Adoption Of A Higher Radiated Emissions Limit, Consistent With Multiple Standards

A. SAE, CISPR, CEPT And ETSI Standards All Will Include A Radiated Emissions Limit Of At Least 82 dBμA/m

Mercedes Benz R&D and Qualcomm support the FCC commencing a rulemaking in response to the Petition so long as the agency adopts the H-field limit of 82.8 dBμA/m that is consistent with multiple international standardization efforts. Four major standards bodies are in the process of finalizing standards that adopt a higher limit to support improved charging technologies.

Radiated Emissions Section 9.1.2 in the SAE J2954 Proposed Draft Standard provides a limit of 82.8 dBμA/m for the Wireless Power Transfer Class 3 (“WPT3”) systems³ discussed in the Petition for Rulemaking.⁴ This SAE Proposed Draft Standard is scheduled to become final in late 2019. Similarly, the International Electrotechnical Commission (“IEC”) International Special Committee on Radio Interference (“CISPR”) 11 Committee Draft Standard for WPT systems, which is set to be finalized in early 2020, provides a limit of 82.8 dBμA/m for systems operating in the 79-90 kHz range that support charging at 11.1 kW levels.⁵ Also, the European Conference of Postal and Telecommunications Administrations (“CEPT”) Electronic Communications Committee (“ECC”) Draft Report 289, which is set to be finalized in early 2019, provides a maximum limit of 82 dBμA/m at 10 meters.⁶ Finally, the European ICT standards body ETSI soon will update its WPT standard EN 303 417 to match ETSI Technical Report TR 103 409, which provides an 82 dBμA/m limit as well.

The Commission should initiate a rulemaking that proposes amending FCC Rule Section 18.305 to provide a radiated emissions limit of 82.8 dBμA/m measured at 10 meters within the 79-90 kHz frequency range, consistent with international standards groups that have studied WPT technologies for many years. As noted in the Petition, “the Commission has acknowledged

³ SAE International, J2954, Surface Vehicle Information Report, Wireless Power Transfer for Light-Duty Plug-In/Electric Vehicles and Alignment Methodology, Proposed Draft (Sept. 27, 2018).

⁴ See Petition at 8-10.

⁵ IEC CISPR 11, Amendment 3 Fragment 1 to CISPR 11 Ed. 6: Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement - Requirements for air-gap wireless power transfer (WPT) Circulated Draft (Aug. 10, 2018).

⁶ CEPT Draft ECC Report 289, “Wireless Power Transmission (WPT) systems for electrical vehicles (EV) operating within 79-90 kHz band” (ECC Report 289 was published for public consultation on Sept 17, 2018, available at <https://www.cept.org/ecc/tools-and-services/ecc-consultation>).

[in the Part 18 context] that “[h]armonizing rules with international standards will allow manufacturers to produce products for distribution in several markets without any modification, thus reducing costs.”⁷ Imposing the Petition’s lower emissions limit would unnecessarily constrain the development and deployment of WPT systems in the United States.

**B. Mercedes Benz R&D and Qualcomm Support
The Other Measurement Parameters In The Petition**

Aside from the radiated emissions limit that should be raised to the 82.8 dBμA/m level in multiple international standards, Mercedes Benz R&D and Qualcomm agree with the other measurement parameters proposed in the Petition. Specifically, our companies support the Commission issuing an NPRM that proposes to adopt these three measurement parameters:

1. Measurement distance should be 10 meters (and not 300 meters in current FCC rules);
2. Measurand should be H-field (not E-field); and
3. Setup should be on a turntable, with an EUT ring radius of 1.9 meters (or 3.8 meters in diameter).

Mercedes Benz R&D and Qualcomm believe these parameters make good technical sense as they include a magnetic field strength that is consistent with the field strength for WPT systems and the units in which the field is actually measured.⁸ These parameters also are supported by the international standards described in Section I.A above. These measurement parameters should be included in a new subsection to Rule Section 18.305, as proposed in the Petition,⁹ that also provides for an 82.8 dBμA/m radiated emissions limit as described above.

⁷ Petition at 15 (quoting *1998 Biennial Regulatory Review—Conducted Emissions Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission’s Rules*, Report and Order, 17 FCC Rcd 10806 ¶ 9 (2002)).

⁸ See Petition at 16. Mercedes Benz R&D and Qualcomm also agree with the proposed measurement methodology, which is consistent with ANSI C63.30 guidelines and other international standards. *Id.* at 16-17.

⁹ See Petition at 13-14.

Now is the time for the FCC to propose amendments to its Part 18 rules as international standards covering WPT systems for EVs are being finalized. These standards will enable interoperability among different manufacturers, which is important to the long-term success of wireless EV charging systems. It will allow one manufacturer's base charging units to interoperate with another manufacturer's vehicle charging unit.

C. Part 18 Compliance Is Separate And Distinct From Medical Device Electromagnetic Compatibility And From RF Exposure Compliance

As the FCC knows well, compliance with Part 18 of the Commission's rules is separate and distinct from compliance with the electromagnetic compatibility standards for active implantable medical devices, which is covered by ANSI/AAMI/ISO 14117.¹⁰ Part 18 compliance also is separate and distinct from compliance with the RF exposure regulations in Part 2 of the Commission's rules. Because the FCC's RF exposure rules do not currently cover the 79-90 kHz frequency range, the FCC should propose to adopt rules consistent with the ICNIRP guidelines.¹¹

The Petition's suggestion that the SAE recommendations provide acceptable limits for RF exposure to humans or for electromagnetic compatibility with medical devices is not accurate. Compliance with the H-field limit set out in SAE J2954, which is 82.8 dBμA/m, is not dependent on nor controlling in regard to human RF exposure compliance or on EMC compliance with medical devices. Regulatory compliance testing of WPT systems necessarily includes separate and independent assessments of: (1) compliance with the radiated emissions

¹⁰ See ANSI/AAMI/ISO 14117 (2012), Active implantable medical devices – Electromagnetic compatibility – EMC test protocols for implantable cardiac pacemakers, implantable cardioverter defibrillators, and cardiac resynchronization devices, Appendix M.

¹¹ See Petition at 19 (*citing* International Commission on Non-Ionizing Radiation Protection, Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100 kHz) (2010)).

limit; (2) compliance with human RF exposure requirements, and (3) compliance with implantable medical device EMC standards.¹²

II. Mercedes Benz R&D and Qualcomm Agree With Petitioners That Supporting Wireless EV Charging Technologies By Permitting Higher Power Is In The Public Interest

A. Wireless EV Charging Technologies Provide Important Public Benefits

Wireless EV charging eliminates the need to physically connect an EV to a local ac power outlet. The technology allows an EV equipped with a charging unit to begin charging once it is parked above a charging pad that can be embedded into the roadway infrastructure, at stop lights for example, or embedded below or placed on the ground in the middle of a parking space. Thus, vehicle owners need not remember to plug in their vehicles or to take any action at all after parking. Automating this process offers simplicity and convenience for drivers and owners.

Mercedes Benz R&D and Qualcomm agree with the Petition that supporting the deployment of EVs improves public health by reducing vehicle emissions that contribute to air pollution and climate change.¹³ Enabling WPT technologies for EVs also supports the development and deployment of self-driving vehicles that cannot plug themselves into a local ac power source.

B. Using Higher Power Decreases The Time To Fully Charge EVs, Which Is Very Important To Spurring Increased Adoption Of EVs And Autonomous Vehicles

Mercedes Benz R&D and Qualcomm agree with the Petition that battery charging time also is a key barrier to EV adoption and is the primary concern of many potential EV owners.¹⁴ Indeed, “compared with a five-minute pit stop at your local gas station, charging an electric

¹² *But see* Petition at 20 (suggesting that the lower radiated emissions limit of 74.4 dB μ A/m proposed in the Petition is necessary for compliance with ICNIRP 2010 and ANSI/AAMI/ISO 1417).

¹³ *See* Petition at 4.

¹⁴ *See* Petition at 6.

vehicle is a glacially slow experience. ... [E]ven at a commercial fast charging station, a fill up can take an hour or more.”¹⁵ As noted in the Petition, higher power wireless charging reduces the time necessary to charge a vehicle, which is critically important to the successful adoption of EVs.¹⁶ FCC action is needed to support higher-power charging, particularly at the higher level that is consistent with international standards detailed above.

Enabling higher powered WPT technologies for EVs will promote increased adoption and deployment of EVs and the advancement of many societal benefits, such as improved roadway safety, traffic management, and air quality. The proposal in the Petition, as modified herein to promote quicker wireless EV charging, can facilitate the automation of battery charging and broader consumer acceptance of this important technology.


CONCLUSION

Mercedes Benz R&D and Qualcomm encourage the FCC to issue an NPRM proposing to amend the Part 18 rules consistent with the parameters outlined in these Comments to support higher-power wireless EV charging technology. It has long been the Commission’s policy to foster innovation by enabling new technologies that benefit the public interest. WPT systems provide many important public benefits, including automation of battery charging, improved roadway safety, lower vehicle emissions, support for autonomous vehicles, improved traffic flow, and, thus, increased consumer acceptance of EVs. The Commission should propose to adopt a new subsection to Rule Section 18.305, as proposed in the Petition, that provides for an 82.8 dBμA/m radiated emissions limit. This level will enable technologies that support quicker charging than what is possible with the level proposed in the Petition.

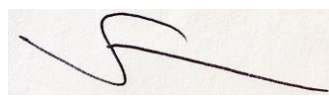
¹⁵ Petition at 7 (*quoting* Eric A. Taub, “For Electric Car Owners, ‘Range Anxiety’ Gives Way to ‘Charging Time Trauma’” NEW YORK TIMES (Oct. 5, 2017)).

¹⁶ See Petition at 12.

Respectfully submitted,

By: 

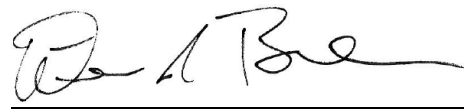
Dr. Mohamad Abdul-Hak
Senior Manager, Electrical Drive
Mercedes Benz Research & Development
North America, Inc
A Daimler Company
12120 Telegraph Rd
Redford, MI 48239

By: 

Andrew A. Vu
Vice President & General Counsel
Mercedes Benz Research & Development
North America, Inc.
A Daimler Company
309 North Pastoria Ave
Sunnyvale, CA 94085

By: 

Karlheinz Baier
Manager, RD/EIL
Wireless Charging
Development CASE & Development e-Drive
Mercedes-Benz Cars
DAIMLER AG
71059 Sindelfingen, Germany

By: 

Dean R. Brenner
Senior Vice President, Spectrum Strategy &
Technology Policy

John W. Kuzin
Vice President & Regulatory Counsel

Qualcomm Incorporated
1730 Pennsylvania Ave, NW
Suite 850
Washington, DC 20006

Dated: October 22, 2018

Certificate of Service

I certify that on October 22, 2018, one copy of the foregoing Comments of Mercedes Benz Research & Development North America, Inc. and Qualcomm Inc. was sent via First Class mail to the following individuals:

James H. Barker
Latham & Watkins LLP
555 Eleventh St, NW, Suite 100
Washington, DC 20004
Counsel for Petitioners BMW of North America, LLC, Ford Motor Company, Nissan North America, Inc.. and Toyota Motor North America, Inc.

Roberto Rossetti
Vice President Engineering
BMW of North America, LLC
200 Chestnut Ridge Rd, Building 150
Woodcliff Lake, NJ 07677

Bob Holycross
Global Director, Sustainability and
Vehicle Environmental Matters
Ford Motor Company
World Headquarters, 218-A6
One American Rd
Dearborn, MI 48126

Christopher Reed
Vice President – Platform & Technology
Engineering
Nissan North America, Inc.
39001 Sunrise Dr
Farmington Hills, MI 48331

Kevin Webber
Director – Product Regulatory Affairs
Toyota Motor North America, Inc.
1555 Woodridge Ave
Ann Arbor, MI 48105

By: /s/ Karen Elliott

Karen Elliott