

April 26, 2019

**Ex Parte**

Marlene Dortch, Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street SW  
Washington, DC 20554

*Re: Unlicensed Use of the 6 GHz Band, ET Docket No. 18-295; Expanding Flexible Use in Mid-Band Spectrum between 3.7 and 24 GHz, GN Docket No. 17-183*

Dear Ms. Dortch:

On April 24, Mark Neumann of Apple Inc., Chris Szymanski of Broadcom Inc. (by telephone), Mary Brown of Cisco Systems, Inc., Thomas Navin of Facebook, Inc., Megan Stull of Google LLC, Chuck Lukaszewski of Hewlett Packard Enterprise, Hassan Yaghoobi of Intel Corporation (by telephone), Yi-Ling Chao of Marvell Semiconductor, Inc. (by telephone), Paula Boyd of Microsoft Corporation, John Kuzin of Qualcomm Incorporated, Dave Wright of Ruckus Networks, a Business Segment of CommScope (by telephone), Joely Denkinger of Harris, Wiltshire & Grannis LLP, and I met with Aaron Goldberger, Legal Advisor to Chairman Pai.

In a separate meeting, Ms. Brown, Mr. Lukaszewski, Paul Caritj of Harris, Wiltshire & Grannis LLP, and I met with Bahman Badipour, Michael Ha, Ira Keltz, Nicholas Oros, Aspasia Paroutsas, Barbara Pavon, Karen Rackley, and Hugh Van Tuyl of the Office of Engineering and Technology.

In the meeting with Mr. Goldberger, we discussed the attached presentation addressing the Commission's Notice of Proposed Rulemaking in the above-referenced dockets proposing to open the 6 GHz band for unlicensed technologies. In both meetings, we expressed support for the NPRM's framework; its recognition of the need for additional unlicensed frequencies; and the importance of FCC rules implementing a framework that would support the use of standard-power using AFC in U-NII-5, U-NII-7, and the bottom 100 MHz of U-NII-8 and lower-power devices in all four sub-bands.

Pursuant to the FCC's rules, I have filed a copy of this notice electronically in the above referenced dockets. If you require any additional information, please contact the undersigned.

Sincerely,



Paul Margie  
*Counsel to Apple Inc., Broadcom Inc., Cisco Systems, Inc., Facebook, Inc., Google LLC, Hewlett Packard Enterprise, and Microsoft Corporation*

Enclosures  
cc: Meeting Participants

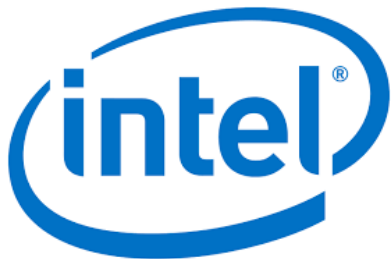
# ATTACHMENT

The FCC's 6 GHz proceeding:  
Enabling the next wave of unlicensed innovation

Briefing for Aaron Goldberger

April 24, 2019

# 6 USC Engineering Group



# Overview

- **We strongly support the FCC's 6 GHz framework.**
  - The NPRM proposes a carefully considered approach that will protect licensed incumbent services while supporting unlicensed use in 6 GHz.
  - We have identified important improvements to the NPRM's proposed technical rules and band structure related to low-power indoor, very-low-power, and portable operations.
  - This framework will meet the explosive demand for unlicensed frequencies, making room for increasing consumer demand and new innovations.
- **Clear-and-license proponents oppose the FCC's proposed framework.**
  - Some parties ask the FCC to displace commercial and public safety incumbents in the upper 6 GHz band and government users in the 7 GHz band, which would be disastrous for incumbent services.

# The growing need for additional unlicensed spectrum

- **Unlicensed bands are the workhorses of the wireless economy.**
  - Unlicensed bands carry half of all internet traffic in the U.S., a figure that is growing each year.
  - LTE offload to unlicensed will increase with 5G, from 54% of traffic in 2017 to 59% by 2022.
  - Unlicensed is the on ramp for broadband for American homes, enterprise wireless, rural communities, schools, healthcare facilities, and more.
  - Unlicensed spectrum is also the backbone for new IoT networks.
  - Key economic sectors—manufacturing, logistics, and research—depend on Wi-Fi for business processes and internal connections.
- **But Quotient and Qualcomm studies have demonstrated an enormous unlicensed spectrum shortfall in the mid-band.**
- **The 6 GHz band is central to addressing this pressing need.**

# The FCC's framework

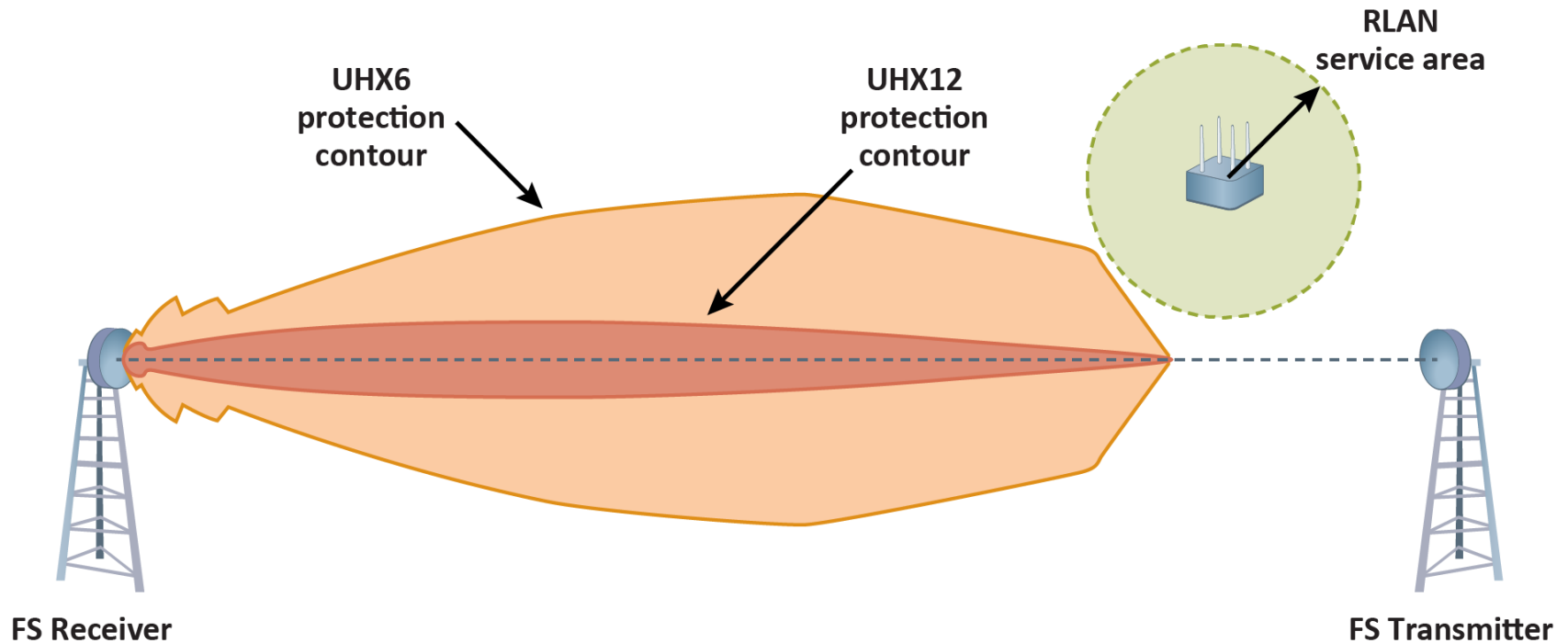
- The Commission proposes to allow unlicensed use in 6 GHz based on the successful and time-tested U-NII rules.
- The proposed rules authorize categories of unlicensed devices in four sub-bands:
  - 5.925-6.425 GHz (U-NII-5)
  - 6.425-6.525 GHz (U-NII-6)
  - 6.525-6.875 GHz (U-NII-7)
  - 6.875-7.125 GHz (U-NII-8)
- The NPRM represents the Commission's hard work and thoughtful consideration of stakeholder information and technical analyses submitted in response to the Mid-Band NOI.

# A robust and flexible AFC

- **Incumbent protection**: The AFC will ensure that emissions from an unlicensed device will not cause harmful interference to FS incumbents using the FCC's database.
- **Targeted rules**: The FCC should establish robust rules, but should not overregulate. AFC rules should be limited to those necessary to protect incumbents and should not include unnecessary rules that suppress investment and broadband deployment.
- **Flexibility to innovate**: The FCC should allow a range of implementations. The FCC should not prescribe technologies or standards.



# Flexible geolocation and incumbent protection



Source: Dynamic Spectrum Alliance, Automated Frequency Coordination: An Established Tool for Spectrum Management (March 2019), [http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA\\_DB-Report\\_Final\\_03122019.pdf](http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf).

# Recommended rules by sub-band

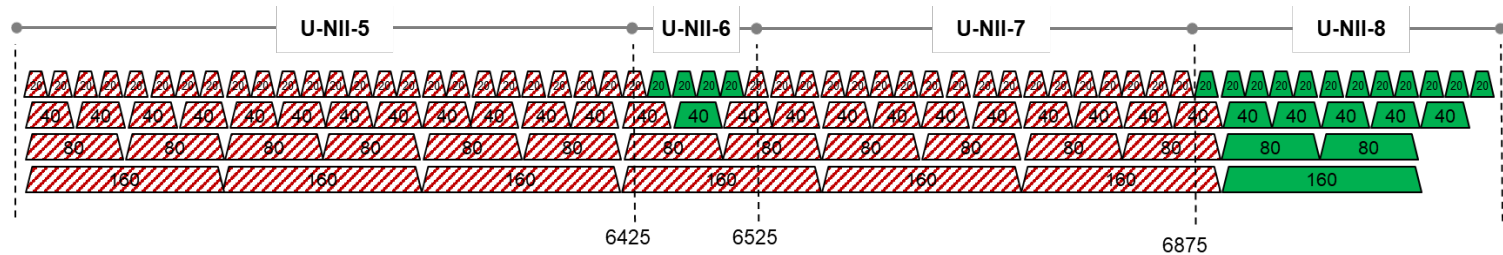
Device Class	Bands	Location Restrictions	AFC Control	Power Limits	PSD Limits
Standard-Power AP	U-NII-5 U-NII-7 Bottom 100 MHz of U NII-8	Indoor/ Outdoor	Yes	30 dBm (1 Watt) conducted; 36 dBm (4 Watts) radiated	27 dBm/MHz
Low-Power Indoor AP	U-NII-5 U-NII-6 U-NII-7 U-NII-8	Indoor	No	24 dBm (250 milliwatts) conducted; 30 dBm (1 Watt) radiated	21 dBm/MHz
Very-Low-Power AP	U-NII-5 U-NII-7 Bottom 100 MHz of U-NII-8	Indoor/ Outdoor	No	14 dBm (24 milliwatts) radiated	1 dBm/MHz
Client Devices	Same as associated AP	Same as associated AP	N/A	Same as associated AP	Same as associated AP

# Meeting consumer needs

- **Low-Power Indoor (LPI) operation is critical to the success of the band.**
  - Restricting LPI to only two small parts of the band would leave manufacturers with too few channels.
  - The record shows that low power levels combined with building attenuation will prevent harmful interference to incumbent licensees.
- **Very-Low-Power (VLP) operations will enable short-range connectivity without increasing the risk of harmful interference.**
- **Portable APs are central to expected consumer uses and will avoid harmful interference using AFC control or very-low-power levels.**

# LPI and Wi-Fi channels

- **Blocking LPI from the two largest sub-bands would leave only a single 160 MHz-wide Wi-Fi 6 channel.**



Low-power indoor use in U-NII-6 and -8 under the IEEE's current 6 GHz band plan

# The NPRM protects incumbents while enabling sharing

- **The Commission should reject proposals to forcibly relocate incumbents out of the 6 GHz band.**
  - This plan would displace 6 GHz licensees *and* federal users in the 7 GHz band.
  - These suggestions offer no concrete detail or technical support.
  - A clear-the-incumbents approach would add years of delay.
- **The FCC should adopt its proposal to protect incumbents while allowing shared unlicensed use.**
  - This will allow existing services to continue without interruption.
  - And it will allow unlicensed operations to make more intensive use of the band in areas where incumbents will not experience harmful interference.