



March 5, 2018

**Ex Parte filed via ECFS**

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

*Re:* ET Docket No. 16-56, ET Docket No. 14-165, MB Docket No. 15-146, MB Docket No. 16-306, RM-11745, GN Docket No. 12-268

Dear Ms. Dortch:

On Wednesday, February 28, 2018, Paula Boyd and Paul Garnett of Microsoft Corporation spoke by telephone with Louis Peraertz, Senior Legal Advisor, Wireless, International, and Public Safety to Commissioner Clyburn. During the meeting, Microsoft discussed the deployment of broadband networks using TV white spaces (TVWS) and provided an update on the development of hardware used in these networks.

More specifically, Microsoft made the points noted below and in the attached report that highlights the state of deployment of broadband networks using TV white spaces technologies and describes the benefits of using such networks to serve rural areas.

- Today, FCC certified TVWS radios can bond two contiguous channels resulting in delivered speeds up to 23 Mbps.
- Radios in the TV white spaces will increase throughput by using capabilities commonly used by Wi-Fi, LTE, and other technologies, such as:
  - antenna technologies (e.g., MIMO that can double and quadruple throughput),
  - more efficient higher modulation schemes (e.g., 256 QAM which can increase throughput by 20-30 percent by sending more bits than usual during the normal transmission cycle), and
  - the ability to bond and/or aggregate pieces of spectrum together (which can increase throughput by 2x or more).
- Radios utilizing TV white space spectrum will add these capabilities over time. For example, TVWS radios that can bond up to 4 contiguous channels are being trialed under FCC experimental licenses. These radios are delivering throughput of up to 50 Mbps.
- Microsoft is working with Adaptrum, a US-based TV white space radio technology company, and another major US technology company on a baseband chip which leverages the published IEEE 802.11af standard. This chip will



incorporate all the features discussed above and could be used in a full range of wireless devices from IoT sensors to consumer devices to access points and base stations. This baseband chip will be capable of delivering throughputs exceeding 200 Mbps.

Pursuant to Section 1.1204 of the FCC's rules, I am filing a copy of this notice electronically in the above-referenced dockets. If you require any additional information, please contact the undersigned.

Sincerely,

/s/ Paula Boyd  
Paula Boyd  
Senior Director, Government and  
Regulatory Affairs  
**Microsoft Corporation**

Enclosure

cc: Louis Peraertz