

## Experiment Description

Microsoft in partnership with Allband Communications, a cooperative Internet service provider serving rural northeast Michigan, seek to evaluate new ways of using TVWS technology to expanding access to high-speed Internet access for America's students, especially in rural and underserved areas.<sup>1</sup> Today, an estimated 70% of teachers assign homework that requires access to broadband,<sup>2</sup> even as 5 million American students go home at the end of each school day to a household that lacks a high-speed Internet connection.<sup>3</sup> The proposed deployment would help to address this unmet need in rural Hillman, MI by providing high-speed wireless Internet access on school buses as they complete their morning and afternoon routes. This will allow students without broadband connection at home to complete assignments that require broadband Internet access while they are on their way to and from school.

Each school bus would be equipped with a TVWS radio, which would communicate with fixed TVWS base stations for both Internet backhaul, and acquisition of channel availability information as provided under 47 U.S.C. 15.713(e)(5). Each bus-resident device would obtain geolocation data automatically and continuously from an external GPS device mounted on each school bus, and use this geolocation information to obtain updated channel availability information once every five seconds.

Because of the significant coverage needs of this experimental deployment, however, it is necessary for Microsoft and Allband to use a modified fixed white-space device<sup>4</sup> at a power level slightly higher than permitted for personal/portable devices under the Commission's rules. Microsoft and Allband will, however, prevent any harmful interference by 1) adhering to the separation distances that ordinarily apply to fixed devices of the same transmit power, 2) obtaining updated channel availability

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<sup>1</sup> Allband Communications files this application jointly with Microsoft Corporation's application for an experimental license, with file number 0662-EX-CN-2017.

<sup>2</sup> <http://www.freep.com/story/opinion/contributors/2015/03/16/internet-broadband-access/24849353/>

<sup>3</sup> <http://www.pewresearch.org/fact-tank/2017/03/22/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/>

<sup>4</sup> FCC ID 2AASTGWS-4012-23

information once every five seconds, and 3) ensuring that bus-resident devices will not operate unless they are able to connect to one of a pre-programmed list of fixed base-station devices to be deployed in Hillman, MI and receive updated channel availability information. The device will cease operating if it has not been able to obtain updated channel availability information within the last five seconds. This ensures that the bus-resident white-space devices are geofenced, and will not operate if a bus is driven outside of the intended area of operation or if there is any other loss of connectivity. A map depicting the bus route as well as location and coverage area of each fixed base station, outside of which the bus-resident devices will be unable to operate, is attached.

As they complete their routes the school buses will periodically transition from the coverage areas of one white-space base station to another. This experimental deployment will therefore also facilitate technical research regarding hand-off of a moving white-space device from one white-space network to another.