

Gray Miller Persh LLP

Attorneys-at-Law
2233 Wisconsin Avenue, NW
Suite 226
Washington, DC 20007

Todd D. Gray
Partner
tgray@graymillerpersh.com
202-776-2571
www.graymillerpersh.com

May 8, 2019

Via Electronic Filing

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: *Transforming the 2.5 GHz Band* – WT Docket No. 18-120 – *NOTICE OF EX PARTE PRESENTATION*

Dear Ms. Dortch:

I am writing pursuant to Section 1.1206(b)(2) of the Commission's rules to report that on May 7, 2019, Lonna Thompson, Executive Vice President, Chief Operating Officer and General Counsel of America's Public Television Stations ("APTS"), and the undersigned counsel for APTS met with Commissioner Carr and Will Adams, the Commissioner's Legal Advisor, regarding the referenced proceeding. We were joined telephonically by Tom Axtel, General Manager of Vegas PBS.

During the meeting, we stated that public television stations are significant and innovative EBS licensees and have a strong interest in preserving EBS as an educational resource. We urged that the Commission preserve existing educational eligibility requirements for EBS and use priority filing windows to license remaining EBS "white space."

We provided the attached talking points, list of public TV stations with EBS licenses, and information describing EBS activities in Michigan.

Respectfully submitted,



Todd D. Gray

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cc Commissioner Brendan Carr, FCC
 Will Adams, Office of Commissioner Carr, FCC
 Lonna Thompson, APTS

Public Television and EBS

Public Television Stations are Leaders in the EBS Community. Public TV stations were pioneers in using EBS stations to enhance educational service. The licensees of nearly 50 PTV stations today also hold EBS licenses. These include some of the country's most significant and innovative EBS licensees.

The EBS Regulatory Model is a Success. There is no need to “transform” the 2.5 GHz band. The transformation *already* took place in 2004 when, with significant help from the EBS community working in close coordination with the wireless industry, the FCC transitioned the 2.5 GHz band to accommodate emerging technology, including wireless broadband services. Today, EBS works. The band is successfully operating where licensed. It does not need fixing, it needs finishing.

EBS Spectrum is Not Underutilized. The FCC's forward-looking rules and policies have fostered many and varied educational uses of the band, as well as a robust secondary market with commercial operators. Where EBS is licensed, which covers about 85% of the U.S. population, the spectrum is widely deployed. The record reflects many examples of educational programs that rely on EBS. Furthermore, the 2.5 GHz band is a fundamental component of Sprint's current 4G network and is critical spectrum for its planned 5G network.

Local Priority Filing Windows will Enhance Education and Commercial Deployment. The existing EBS regulatory model serves two important Commission objectives at the same time – it facilitates both wireless educational services and commercial broadband deployment to consumers. Following rationalization of existing EBS licensed GSAs (based on county boundaries), the Commission should use that model to license EBS in areas of the United States where the spectrum remains unassigned. APTS and public television stations support establishing local priority filing windows for Tribal Nations and educational entities (including public TV stations).

EBS Should Not be Commercialized. The proposal to eliminate educational eligibility requirements so that EBS licensees have the option of selling their licenses to commercial entities may *sound* like a good idea, but it is not. The notion that EBS licensees will have the *choice* to sell or not to sell is illusive. Open eligibility will create a hostile leasing environment for educators who wish to remain EBS licensees. The existing leasing model provides licensees with the opportunity to negotiate ongoing educational benefits, including devices, services and support from commercial operators. With open eligibility, that relationship will dramatically shift. Commercial entities will have the incentive and ability to offer licensees unfavorable sale terms rather than new or renewed leases, cutting off educational benefits under the leasing model.

Participants

Tom Axtell, General Manager, Vegas PBS (Las Vegas, NV); Clark County School District hold licenses for 6 EBS Stations

Lonna Thompson, Executive VP, Chief Operating Officer and General Counsel of America's Public Television Stations (APTS)

Todd Gray, Gray Miller Persh LLP, counsel for APTS

PBS Station Licensees with EBS Stations

WITF	Harrisburg, PA
WVIZ	Cleveland, OH
WEAO/WNEO	Akron/Youngstown, OH
Ohio State (WOSU)	Columbus, OH
New Jersey PBA	NJ State Network
Oregon PB	Oregon State Network
Washington State U	Pullman, WA
KCPT	Kansas City, MO
KETC	St. Louis, MO
West Central ILL	Springfield, IL
U of Arizona	Tucson, AZ
KRCB	Cotati, CA
Conn. Pub B/C	CT State Network
South Carolina ETV	SC State Network
Wisconsin ECB	WI State Network
Kentucky ETV	KY State Network
Greater Dayton PTV	Dayton and Cincinnati, OH
Clark County SD	Las Vegas, NV
KNME (U of NM)	Albuquerque, NM
Oklahoma ETV	OK State Network
KCTS	Seattle, WA
WHRO	Norfolk, VA
WBRA	Roanoke, VA
WBGU	Bowling Green, OH

WNET	New York, NY
WLRN	Miami, FL
Detroit ETF	Detroit, MI
WMTJ/WQTO	San Juan and Ponce, PR
WHYY	Philadelphia, PA
Eastern NMU	Portales, NM
Montana State U	Bozeman, MT
WGBY	Springfield MA
Northern Mich U	Marquette, MI
Delta College	University Center, MI
Arizona State U	Phoenix, AZ
West Central MN ETV	Appleton, MN
Daytona State College	Daytona Beach, FL
Commonwealth PB	Richmond, VA
Mississippi Auth	MS State Network
Louisiana ETV	LA State Network
San Diego St U	San Diego, CA (also owns KPBS)*
U of Central Florida	Orlando, FL (also owns WUCF)*
U of Southern Florida	Tampa, FL (also owns WUSF)*
U Wisconsin	Madison, WI (also owns WHA)*
U Nebraska	Lincoln, NE (also owns KUON)*
Brigham Young U	Provo, UT (also owns KBYU)*
UNC	Research Triangle Park, NC (also owns UNC-TV)



DPTV's EBS Spectrum

Detroit Public Television's roots in educational program delivery go back to its earliest days, when the station was organized by a consortium of learning organization to provide televised educational content to the classroom. Since that beginning nearly 60 years ago, DPTV has remained deeply committed to providing free, universal access to education to our community.

In the early days, DPTV used what was then known as the ITFS spectrum to receive content from community-based education partners like the University of Detroit, and Wayne State University, using our broadcast signal during daytime hours to provide that programming to the Detroit Public Schools. By the 1980's, DPTV had added two specialty services on the educational broadcast spectrum -- *The Working Channel* and *The College Channel* – and had a daily *Homework Helper* program.

In 1987, several organizations came together to create a new non-profit, the Community Telecommunications Network, to better integrate and support education services in the community. The chartering institutions applied and received licenses from the Federal Communications Commission to operate Instructional Television Fixed Service (ITFS) broadcasting services on frequencies put aside for educational use. The Community Telecommunications Network operated the licenses on behalf of member institutions creating an 18-channel public service television and telecommunications system dedicated to education and human resource development.

Broadcast transmitters were collocated at a cooperative operations center in order to take advantage of common facilities, technical staff, faculty, and the educational expertise of the members. With limited financial resources, a broad scope of programs, educational training and informational services were designed to maximize the efficient use of ITFS spectrum and provide new extended services to the community of southeast Michigan. Original programming include a K-12 educational series originally known as M*Star, the working channel and the college cable channel.

In addition, Community Telecommunications Network became the leasing agent for the partnership allowing them to use the excess capacity of the system as a source of funding. In the mid 90's the FCC realigned the ITFS frequencies and rules were enacted allowing for expanded partnerships between private for profit and non-profit agencies. The Community Telecommunications Network explored partnerships with a variety of organizations including Eastern Cable People's Choice and eventually Sprint.

In the early 2000's the technology matured and ITFS frequencies became valuable assets to broadband wireless development throughout the country. Community Telecommunications Network members recognized this shift and a new partnership was solidified with Sprint/Clearwire to move the combined spectrum from a broadcast environment to a two-way interactive service. At the heart of the new partnership with Sprint was the original mission of the Community Telecommunications Network; to “enhance the quality of life in southeast Michigan through the creative use of telecommunications...”

Today the Community Telecommunications Network continues to serve government, education and the community as a wireless service partner. The existing partners include the Intermediate School District of Macomb County, Oakland Schools, the Wayne Regional Education Service Agency, the Detroit Public Schools Community District, Wayne State University, and Detroit Public Television. Revenue from the Sprint partnership funds a host of educational activities among all the partners, with emphasis on innovative uses of technology to serve community needs.



Some notable projects of the Community Telecommunications Network have included:

- A project to close the digital divide for many Detroit Public School students, providing them with broadband hot spots and tablets to take home to support school-related work;
- A program to encourage K-12 students to engage in out-of-school learning at Detroit-area cultural institutions, supplemented by online “connected learning” activities, documented with digital badging;
- Development of Project ALIC (Advance Learning Innovative Collaborative) in the Oakland Schools, bringing educators, parents, and students together to design the school of the future, including learning spaces, pedagogy for instruction, and operational design;
- Supporting a partnership between the Henry Ford Museum and Wayne County educators around STEM, STEAM, and Makerspace Learning, in order to encourage more teachers to adopt project-based learning and connect more effectively with kids in order to build the tech-based workforce of tomorrow;
- Funding a pilot project for parent education through the Merrill Palmer Skillman Institute at Wayne State University, encouraging daily habits by parents to improve kindergarten readiness for Detroit children from high-need neighborhoods;
- Funding experimentation by educators in Oakland County exploring adaptive uses of Virtual Reality, Augmented Reality, and 3-D technologies in support of education for elementary and middle school students;
- Creating opportunities for K-12 teachers to explore and adopt innovative technologies for learners at all grade levels in a variety of topic areas;
- Creating virtual field trips for middle and high school students to experience local learning opportunities, coupled with classroom activities and lesson plans for teachers. In one project produced by Detroit Public Television, students learned about the need for science at the Detroit Institute of the Arts, with a virtual visit to the conservation lab – a

place that is typically off-limits to visitors. More than 8,000 students experienced the event in just one day;

- Providing broadband hot spots in underserved communities to allow children and families in high-poverty neighborhoods in Detroit undertake their first projects in coding.

In most cases, the seed money granted by the board of the Community Telecommunications Network has been leveraged by grantees to secure additional funding from community sources to greatly expand the impact and reach of their work.

Meanwhile, technology continues to move forward.

The ATSC 3.0 services of broadcast television creates the opportunity for targeted and addressable services in the next few years. PBS stations across Michigan are actively exploring this technology, with WKAR in Lansing conducting active testing since mid-2018. To be most effective as an educational tool – not just a commercial medium -- ATSC 3.0 needs to be coupled with the inexpensive, widespread broadband services that the EBS spectrum can provide. WNMU in Marquette has already demonstrated the viability of such a system to serve lightly populated geographies in the Upper Peninsula of Michigan.

Because the FCC has not opened applications for EBS licensing in more than 20 years, significant rural areas within Michigan do not currently have licensees, even though spectrum has been set aside for this purpose (see attached map). These are areas that also suffer from inadequate data wireless coverage. Residents in these areas find wireless broadband to be expensive, slow, spotty in coverage, and frequently non-existent. There are organizations in all these counties who would like to use this spectrum for educational outreach, working collaboratively with the PBS network of stations in Michigan.

Michigan is facing a shortage of talent to fill jobs. On any given day, between 30,000 and 50,000 jobs are going unfilled. The needs are urgent, but most residents do not have the skills in technology, coding, and STEM fields to meet even basic requirements of those positions. Even traditional “blue-collar” jobs in the skilled trades require a level of technology proficiency never seen before. Adults need retraining. Kids need to see themselves in different roles than their parents filled. Both need true broadband (25 mbs+) that is available, affordable, and has not data caps.

While the combination of ATSC 3.0 and EBS is not the complete answer to this problem, future-focused educators and business people certainly see EBS as an important asset. The spectrum can provide universal access to link students and teachers in order to teach the skills needed for continued economic growth and statewide prosperity. Educators in local districts, working collaboratively with PBS stations, will lead the way in developing these platforms. Unlike commercial carriers, educators are focused on educational outcomes rather than financial ROI. They have different objectives and need the EBS system to fulfill them. Maintaining a separate educational broadcast spectrum – licensed to educational organizations – has the potential to transform education for students in lightly-populated rural areas and in high poverty urban neighborhoods.

EBS Licenses Available in Michigan

Legend
Total Licenses by County

Color	Total Licenses
White	0
Light Purple	1
Light Brown	2
Light Yellow	3
Yellow	4
Teal	5

Cartography by: Katelyn Burkart
Center for Urban Studies
Wayne State University
May 2, 2016

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Providing Broadband to Rural America: How Educators with EBS Can Make the Difference

No longer considered a luxury, broadband permeates nearly every aspect of life, especially education. From research to online learning to completing homework assignments, affordable internet access is an essential tool for today's learners. Unfortunately, many rural communities lack adequate internet access, which is a problem that impedes success for students of all ages.

According to the Federal Communications Commission, 31 percent of rural Americans lack broadband access. In addition, even when broadband is available, it is not always affordable where low-population densities in rural regions often translate into unacceptable return-on-investments. It is one reason why the overall adoption rate for fixed broadband service is just 66.2 percent in the U.S. With an increasing number of teachers assigning online homework, affordable broadband access is a necessity for today's students.

In 2008, Northern Michigan University (NMU), located in Michigan's rural Upper Peninsula (U.P.), elected to tackle the lack of adequate broadband access in its community head-on. With over 8,000 notebook computers assigned to its students, NMU launched an aggressive plan to construct the nation's first educational WiMAX network. To make it work, NMU turned to the Broadband Division of the FCC's Wireless Telecommunications Bureau for assistance securing an Educational Broadband Service (EBS) spectrum license needed for WiMAX operation. For the next eight years, NMU provided robust, fixed-wireless, off-campus broadband access for our students, faculty, and staff engaged in educational pursuits. Our success captured the attention of other educators, especially those with one-to-one computing programs in the region who faced similar challenges with home broadband access. Repeatedly, NMU encountered the same question: "We're without broadband and need something like this in our area – can you help?"

The short answer was "Yes." But the caveat was "Only with access to EBS spectrum in the requested service areas." Once again, NMU turned to the FCC, applying for and receiving additional EBS licenses. With authorizations in hand and its 2016 migration from WiMAX to LTE service, NMU began working with local municipalities and schools. We traded the use of our wireless network for space on their existing public infrastructure (think water tanks or tall buildings) to mount our antennas. To date, NMU operates 49 LTE sites, each covering a nine-mile radius. This carrier-grade network provides high-speed, uncapped, affordable broadband internet access service to homes, schools, and community centers for education, personal and professional development throughout the region. There's a Child Internet Protection Act (CIPA) option and each enrollee receives access to complementary "nano" learning sessions and self-directed courses that offer educational content on a variety of topics. With 15 additional

communities currently under construction and a recent, state-of-the-art LTE core upgrade to 5G, the network is well on its way to long-term sustainability.

Ultimately, the NMU network will cover 21,548 miles of rugged, rural terrain, connecting previously unserved and underserved communities throughout the U.P. Simply put, without EBS, NMU's network could not have been built and subscribers throughout northern Michigan would likely have remained on the wrong side of the digital divide. Realizing this, state leaders awarded NMU a \$6.5 million loan from Michigan's Strategic Investment Fund to assist us with our ambitious construction schedule.

NMU has learned some important lessons that are worth considering when it comes to building wireless broadband in unserved and underserved rural communities:

- **Educators typically have the technical skills needed to construct advanced wireless broadband systems.** Educators are already accustomed to building complex, on-campus data networks. By leveraging these systems and coupling them with LTE technologies, it's possible for these institutions to successfully construct and operate mobile and fixed-wireless data networks that are cost-effective and affordable to end users.
- **Partnerships between educators and municipalities can dramatically lower costs, leading to more affordable and sustainable broadband deployments.** Many rural communities already have the essential infrastructure needed to construct LTE networks, making the need for expensive, vertical real estate overbuilds unnecessary. In communities where commercial broadband is unable to provide an acceptable return on investment, educational broadband offers a viable alternative.
- **Educators tend to share common goals that lead to creative and innovative use of wireless broadband services.** Ubiquitous community broadband, designed to meet specific student and family needs, improves student success and creates new learning opportunities for everything from early childhood education to workforce development. In the process, rural broadband deployments are accelerated, serving the public interest.

None of this, of course, is possible without spectrum, the foundational building block of all wireless systems. Reserved for educational purposes for over 50 years, using EBS spectrum allows educators to tap into state-of-the-art, carrier-grade, LTE equipment that is not only affordable and readily available but, most importantly, compatible with existing consumer devices.

The FCC is currently considering what happens next with EBS spectrum which it has not licensed in over 20 years.

NMU's educational broadband network proves what's possible. Our experience validates that EBS is an effective mechanism – *perhaps the most effective mechanism* – to bring the promise of wireless

broadband service to rural areas. This potential will be squandered unless the FCC preserves the essential educational nature of the EBS and provides priority opportunities for educators to obtain EBS licenses before holding commercial auctions that would prevent schools and universities from replicating NMU's success.

Educators nationwide, if given a green-light, can realize the chance they've been waiting for to construct new EBS-based wireless networks to serve learners of all ages in their communities. EBS is a resource with tremendous potential. If they are just given the chance, educators stand ready to use EBS to make a difference for their students and their communities.



Fritz J. Erickson is President of Northern Michigan University. Prior to his tenure at NMU, Dr. Erickson served as provost and vice president for academic affairs at Ferris State University in Big Rapids. He also held administrative positions at the University of Wisconsin-Green Bay, Eastern Washington University and Michigan Technological University. Before entering higher education administration, Erickson was a professor at Millersville University of Pennsylvania.