



Connecting Appalachia Position Paper

Barriers and Solutions for Wireless Coverage in the Rural Expanse

Licensed Frequencies

Licensed frequencies offer key advantages over the unlicensed frequencies often used to serve rural areas:

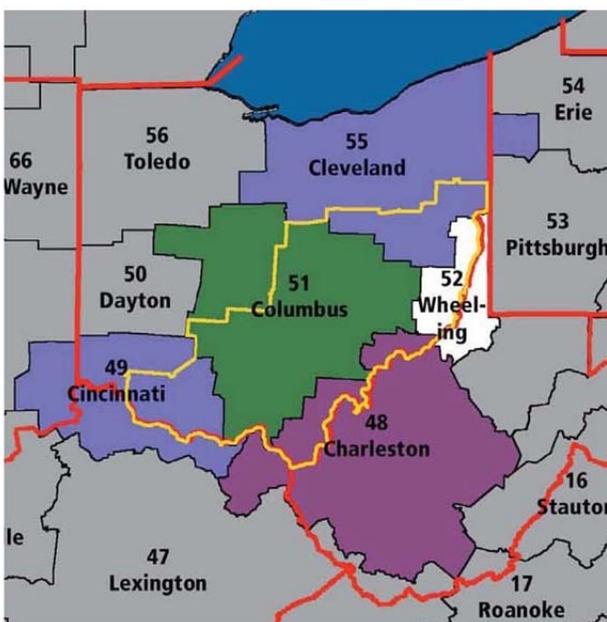
1. The authorized transmit power levels are much higher than the unlicensed options, increasing the range of each tower.
2. Providers would escape the interference issues that plague unlicensed operators.
3. Industry-standard mobile voice/data services can be supported, opening the network to a wide range of low-cost consumer devices and enabling roaming agreements with national carriers.

However, the high cost of licensed frequencies has prevented Appalachian operators from leveraging these benefits. Consider the case of the 700 MHz licensed frequencies being widely used for the next generation LTE deployments. In addition to the general benefits of licensed frequencies, this particular frequency range is also excellent at penetrating foliage.

The FCC auctions these and other valuable spectrum licenses. In unserved rural areas, these licensing costs create yet another barrier to broadband and mobile voice/data availability. Three licensing scenarios thwart rural broadband deployment, particularly in Appalachia.

A. Licenses Bundling Rural Expanse with a Metropolitan Area

In the diagram below we have super-imposed the outline of the Appalachian counties in Ohio (in yellow) on top of a map of the 700 MHz A-Block license holders. Consider, for instance, the coverage of the “51 Columbus” license. It extends well beyond the Columbus metropolitan market reaching into many of our rural counties. The price paid for 51 Columbus during the FCC Auction 73 was \$7.8 million, reflecting the valuable, high population density portions of the license area. The cost is well beyond what a provider targeting the rural areas could pay. The mechanisms for subdividing licenses are very limited and generally undesirable to license holders.



A Block			
Market	Holder	Status	A-73 Price
BEA48: Charleston	US Cellular	Unavail	\$1,993,000
BEA49: Cincinnati	Verizon	Unavail	\$23,601,000
BEA51: Columbus	Continuum 700	Avail	\$7,814,000
BEA52: Wheeling	FCC	Unavail	\$0
BEA55: Cleveland	Verizon	Unavail	\$18,654,000

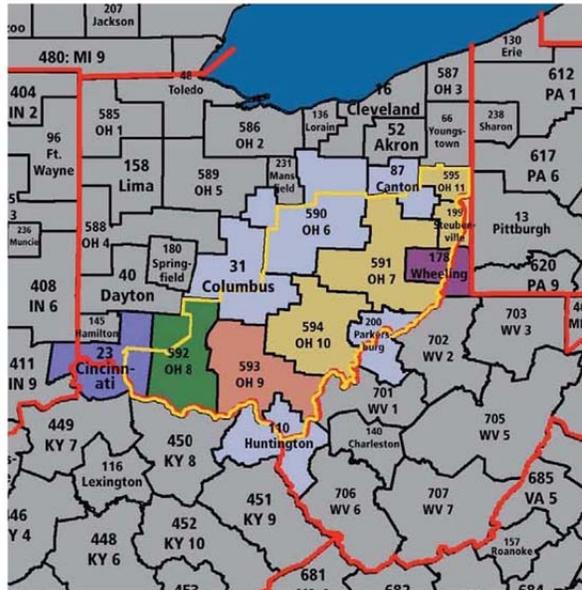


Connecting Appalachia Position Paper

Barriers and Solutions for Wireless Coverage in the Rural Expanse

B. Rural Licenses Owned by Speculators with Costs Beyond the Reach of Rural Providers

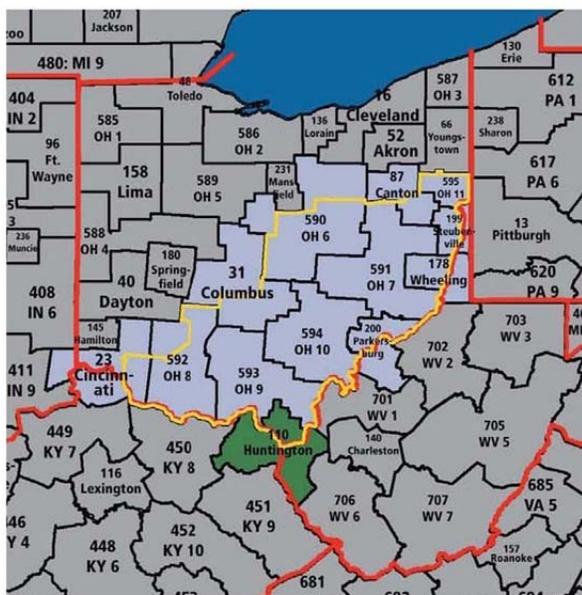
In the 700 MHz B-Block the geographic license groupings cover smaller geographies. For instance, the “591 OH 7” license covers several Appalachian counties, all of which are of low population density and suffer from significant poverty. In the FCC Auction 73, a speculator paid \$416,000 for this license, a relatively low cost per square mile. However, adding the cost of licensed frequencies simply exacerbates the negative return on investment.



B Block			
Market	Holder	Status	A-73 Price
CMA023: Cincinnati	Verizon	Unavail	\$35,120,000
CMA031: Columbus	AT&T	Unavail	\$23,487,000
CMA087: Canton	AT&T	Unavail	\$5,711,000
CMA110: Huntington	AT&T	Unavail	\$3,475,000
CMA178: Wheeling	GreenFly	Avail	\$159,000
CMA199: Steubenville	Triad 700	Avail	\$58,000
CMA200: Parkersburg	AT&T	Unavail	\$365,000
CMA590: Ohio 6	AT&T	Unavail	\$3,782,000
CMA591: Ohio 7	Triad 700	Avail	\$416,000
CMA592: Ohio 8	Cincinnati Bell	Avail	\$201,000
CMA593: Ohio 9	Chillicothe	Avail	\$1,038,000
CMA594: Ohio 10	Triad 700	Avail	\$432,000
CMA595: Ohio 11	Triad 700	Avail	\$46,000

C. Rural Licenses Owned by a Major Carrier but Deployed Only Along Highway Corridors

In this map, you can see that AT&T owns nearly all of the 700 MHz C-Block licenses across the Connecting Appalachia service area. In our 34-county service area, AT&T’s coverage focuses on the highway corridors, leaving much of the rural expanse lacking in both broadband and mobile voice/data coverage.



C Block			
Market	Holder	Status	A-73 Price
CMA023: Cincinnati	AT&T	Unavail	\$35,120,000
CMA031: Columbus	AT&T	Unavail	\$23,487,000
CMA087: Canton	AT&T	Unavail	\$5,711,000
CMA110: Huntington	EKN	Unavail	\$3,475,000
CMA178: Wheeling	AT&T	Unavail	\$159,000
CMA199: Steubenville	AT&T	Unavail	\$58,000
CMA200: Parkersburg	AT&T	Unavail	\$365,000
CMA590: Ohio 6	AT&T	Unavail	\$3,782,000
CMA591: Ohio 7	AT&T	Unavail	\$416,000
CMA592: Ohio 8	AT&T	Unavail	\$201,000
CMA593: Ohio 9	AT&T	Unavail	\$1,038,000
CMA594: Ohio 10	AT&T	Unavail	\$432,000
CMA595: Ohio 11	AT&T	Unavail	\$46,000



Connecting Appalachia Position Paper Barriers and Solutions for Wireless Coverage in the Rural Expanse

Policy Options – Licensed Frequencies

To a large extent, the recommendations below could be coupled with provisions in the Connect America Fund (currently the subject of an FCC Notice of Proposed Rule Making) to create a sustainable and comprehensive solution to broadband coverage in the Appalachian rural expanse.

- a. Create mechanisms to encourage license holders to allow rural operators to utilize the licensed frequencies to serve low population density areas.

For instance, an operator could establish a single LTE coverage area that is open to roaming by multiple mobile voice/data providers. This approach would extend these crucial services to the rural expanse in a way that retains competitiveness for the consumers and makes it affordable for carriers.

Such an approach would also cost-effectively serve critical needs for first responders and the Department of Homeland Security.

- b. Require license holders to deploy across their entire licensed coverage area within a set time limit or return the frequencies in the unserved areas to the FCC (preferably in combination with recommendation “a.” to provide a viable solution for existing license holders).
- c. Encourage the FCC to avoid bundling low population areas with metropolitan areas in a license boundaries.
- d. Rather than auctioning licensed frequencies in rural areas, create a reverse auction offering these frequencies at no cost to providers willing to serve the rural expanse.

“White Space” Unlicensed Frequencies

The FCC has opened unused television “white space” frequencies for unlicensed use in rural areas. This promising development has thus far been constrained by limitations on power levels imposed due to concern about interfering with television channels. While interference is a legitimate concern in rural areas adjacent to metropolitan areas, in the remote rural expanse there are usually only one or two broadcast television channels that can be received. Thus huge tracts of “white space” frequencies are unused across the rural expanse offering an excellent set of options for wireless broadband providers.

Policy Options – “White Space” Frequencies

The FCC has already required that all “white space” transmitters include sophisticated anti-interference capabilities that include GPS based signal referencing and active interference sensing. Thus the suggested policy changes would require only minor software modifications by the equipment manufacturers.

- a. Allow rural providers to utilize progressively higher transmit power levels based on the distance of their towers from television transmitters operating in nearby frequencies.
- b. Increase the frequency block sizes to allow for higher bandwidth transmission.

Contact

Tom Reid
President
Reid Consulting Group LLC

Tom@ReidConsultingGroup.com
740-590-0076
www.ReidConsultingGroup.com

www.ConnectingAppalachia.org