Request for LPTV Experimental STA

Chesapeake Television Licensee, LLC ("Applicant") respectfully requests Experimental Special Temporary Authority ("STA") to operate a multi-channel experimental low-power television facility (the "Station") to evaluate performance of the ATSC 3.0 broadcast transmission standard in multiple-frequency scenarios. As detailed in the accompanying Technical Exhibit, the proposed facility will be located on the rooftop of Applicant's headquarters building in Hunt Valley, Maryland and will run simultaneously on channel 25 (pursuant to an agreement with WNUV(TV), the channel 25 full-power ATSC 3.0 station in the Baltimore, DMA) and on vacant channels 24, 28 and 30. Applicant certifies that it will operate the Station in accordance with the technical parameters set forth in the accompanying Technical Exhibit.

Applicant is a qualified broadcast licensee and respectfully requests STA to commence experimental operations on January 10, 2022. Applicant proposes to operate the Station using the ATSC 3.0 broadcast transmission standard to run a variety of tests in connection with a multi-phased test project targeted towards the future deployment of Single Frequency Networks ("SFNs"). Applicant's primary goal is to test SFN technologies and scenarios in the context of the ATSC 3.0 use cases and, if it is determined to be useful, to provide guidance to broadcasters and equipment manufacturers for SFN deployments, including in connection with equipment, transmitter placement, power, and connectivity options. SFNs are an essential extension to a robust deployment of NextGen Broadcast features. Aside from equalizing power levels and filling in compromised coverage areas within a station's service contour, SFNs enable hyper-localized emergency alerting and informing services and tailored distance/e-learning experiences for those in rural and underserved areas. Testing SFNs is necessary to optimize these benefits. As detailed more below, the requested STA will permit analysis of signal strength and reception in a real-world environment to analyze the impact of: (1) adjacent channel interference, (2) channel bonding, (3) inter-tower communications (4) power differentials, and (5) new antenna designs, in addition to enabling Applicant to conduct testing related to the monitoring and control of individual SFN nodes and the SFN network as a whole. Applicant expects such testing to take approximately one year following installation of the antennas.

1) Adjacent Channel Interference: In prior testing conducted pursuant to Applicant's previously granted channel 24 experimental LPTV STA ("Phase 1"), Applicant observed that adjacent channel energy was quite high in many locations, and power leakage from higher power adjacent channels on both sides of the target channel caused disruptions to the power measurement of the target channel, impacting Applicant's ability to correlate the predicted data with the measured data. Applicant seeks authority to operate the proposed multi-channel facility to evaluate further the impact of adjacent channels on SFN operations and to identify any observed coverage, service, or margin problems in the shadowed SFN service area. This, in turn, will enable Applicant to evaluate the causes of any reduced reception performance and potential solutions including, for example, modeling monitoring scenarios such as placement of SFN monitoring at the very low power transmitters or in the center of an SFN cluster.

2) Channel Bonding: The proposed operations will enable Applicant to test the capabilities and benefits of channel bonding (i.e., using two or more broadcast channels together) on broadcasters' ability to increase downlink capacity. Applicant anticipates that

such tests will demonstrate that broadcast facilities can serve as a compliment to broadband in delivering robust amounts of content to viewers.

3) Inter-tower Communications: The ATSC 3.0 broadcast transmission standard when deployed using Digital Transmission Systems (DTS) to create SFNs requires precisely timed interconnected inter-tower communications. SFN nodes will be deployed on different towers, rooftops, and off the sides of buildings, not all of which can be connected with terrestrial installed fiber. Because SFNs are not expected or intended to be revenue producing facilities, especially at the beginning of SFN deployment, it would not be economically viable to run fiber to every SFN node. Grant of this STA will enable Applicant to test and assess methods other than fiber or studio transmitter links for inter-tower communications, which will help broadcasters to optimize communications between towers and to perfect network timing which, in turn, will benefit broadcasters by not necessarily being dependent on carrier fiber which may "harden" facilities in the event of power loss.

4) Power Differentials: Grant of the STA will enable applicant to test power differentials and to analyze signal stability and penetration, i.e., how different facilities of varying powers behave when collocated on the same tower or located in close proximity to each other. This will enhance broadcasters' understanding of whether low power SFN facilities can function properly in an elevated RF environment to contribute to the SFN network and the limits of such operations.

5) New Antenna Designs: Grant of the requested STA will also enable Applicant to test a newly designed TUX Antenna that is anticipated to be used in future SFN deployments. The proposed testing will include (a) installation of the TUX Antenna on the rooftop of Applicant's headquarters building, whereby certain portions Phase 1 testing will be repeated; (b) comparison of the TUX Antenna performance against the Phase 1 antenna performance and against expected performance; and (c) comparison against other transmit antennas. The new antenna design is intended to maximize clear reception to fixed and mobile devices and is expected to facilitate a simpler and more efficient deployment of SFNs, because this antenna can be side mounted, and side-mounted with up to three of the same antennas to provide nearly circular coverage.

The proposed low-power testing cannot be conducted in the same manner from Applicant's full-power television station (WBFF(TV), Baltimore, MD) or the ATSC 3.0 host station in the market (WNUV(TV), Baltimore, MD) using the existing ATSC 3.0 procedures. The instant experimental STA is necessary to enable Applicant to conduct the proposed testing from an extremely low power transmitter on multiple channels and independent from a full-power ATSC 3.0 station. Because it would be difficult, if not impossible, to characterize the proposed low power signal individually without turning off the high-power signal(s) (which itself would likely require an engineering STA), the requested experimental STA is necessary to enable such testing to be conducted while avoiding disruption to viewers. The location of the low power transmitter is also important to continued mobile connectivity testing, as the transmitter will be located on the rooftop of the Hunt Valley, MD building where the ATSC 3.0 reception-capable mobile devices are being developed and tested in Applicant's lab facilities rather than on a tower in Baltimore, MD where Applicant's full-power facility is located.

Additionally, the proposed low power testing with UHF channel 25 will assist broadcasters in determining how very low power transmitters can co-exist with high-power neighbor transmitters and serve as a guide for how to mitigate potential power issues or other unwanted products. The purpose of an SFN is to enhance the already existing signal to improve reception; however, there has been limited real-world testing of ATSC 3.0 in an SFN configuration. Applicant's full-power station WBFF(TV) is currently simulcasting its primary stream in ATSC 3.0 format using WNUV(TV)'s channel 25 facilities, pursuant to a written hosting agreement. *See* LMS File No. 0000136477. The proposed low power Station will repeat WBFF(TV)'s ATSC 3.0 signal in order to test the existing ATSC 3.0 signal in a SFN configuration.[1] Such testing will ensure that the existing ATSC 3.0 signal is enhanced as expected around the small transmitter site in Hunt Valley and does not cause any unexpected interference. We note that, because the power of the proposed Station will be very low, the effect of any such unexpected interference would be confined to a very small area. The proposed testing will allow Applicant to vary parameters in the low power transmitter to optimize the performance of a full-power station's signal in an ATSC 3.0 environment.

As demonstrated in the accompanying engineering exhibits, operation of the Station is not expected to result in any harm to existing stations or viewers, and Applicant commits to cease operation of the Station if it is shown to cause harmful interference to existing facilities. Testing of the Station's transmit capabilities will further broadcasters' understanding of the role of LPTV transmit facilities in the schema of Distributed Transmission System and SFN deployments, the development and use of which is expected to result in qualitatively better levels of broadcast service reception.

For all of the foregoing reasons, Applicant submits that the public interest would be served by grant of this request for authority to conduct experimental operations for a relatively short duration, as such tests are expected to speed and improve deployment of enhanced ATSC 3.0 services, including hyper-localized emergency alerting and informing services and tailored distance/e-learning experiences for those in rural and underserved areas, and are not expected to result in any countervailing harm.

[1] The design of the ATSC 3.0 signal (i.e., orthogonal frequency-division multiplexing, or OFDM), allows a single frequency network (e.g., multiple copies of the same signal transmitted in the same reception area) to produce an enhanced signal at the receiver. This is what will be tested with this experiment.