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WPXI Antenna Elevation versus Noise-Limited Service Contour Expansion

In the Construction Permit Certifications section of the construction permit application to which this document is attached, it has been indicated that the proposed DTV facility does not comply with the condition that it will “not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice.” This document explains the cause for that outcome and also demonstrates that the application does comply with the condition that it does not expand the noise-limited service contour by more than one percent in any direction, as permitted by FCC rules §73.3700(b)(1)(ii)(B).

To enable its change from Channel 48 to Channel 23, WPXI intends to leave its existing Channel 48 antenna in place and to replace an old, analog Channel 11 antenna on top of its tower (and above the Channel 48 antenna) with one for Channel 23. Doing so will enable the station to remain on Channel 48 with minimal disruption until the Phase 4 Transition Date and then to switch to the new channel and antenna at the appropriate time. To make its plan work, WPXI must move the height of the center of radiation of its post-repack antenna upward by approximately 17 meters. Doing so has two effects: It requires a reduction in effective radiated power (ERP) to compensate for the effective gain of the height increase, and it changes the shape of the noise-limited service contour (NLSC) by a small amount, preventing the contour from exactly matching the contour that would have resulted from the parameters specified by the FCC.

As a consequence of these factors, an effort has been made to obtain a “best fit” result from the NLSC that results when the antenna height is increased, as compared to the NLSC that would result from use of the FCC-specified parameters. The results of the best-fit effort are provided in an Excel spreadsheet workbook file that accompanies this document. The remaining discussion herein refers to the spreadsheet workbook.

In the spreadsheet workbook, the first tab contains a chart that compares the outlines of the contours of three configurations of potential WPXI facilities. One in blue represents the current WPXI facility, operating on Channel 48 with 1 MW ERP and its antenna at an elevation of 233 meters above ground level (AGL). The second contour is shown in brown

and represents the FCC-specified WPXI facility, operating on Channel 23 with 606 kW ERP and its antenna at the same elevation of 233 meters (AGL). The blue contour is almost not visible because the brown contour aligns nearly perfectly with it and is on top, thus mostly obscuring the blue contour. The third contour is shown in olive and represents a configuration on Channel 23 with 500 kW ERP and the antenna at an elevation of approximately 249 meters AGL. The olive contour is balanced with the brown contour – sometimes inside and sometimes outside of it.

The next tab provides comparisons of the contour distances from the transmitter. On the sheet, there are five sets of data, each grouped into four columns of data. Each column has 360 rows, representing compass bearings every one degree in azimuth. The first group of columns shows the results from the Channel 48 operation described above for the blue contour. The second group of columns provides the results that define the brown contour and Channel 23 operation using the FCC parameters. The third group of columns includes a comparison of the first two groups and effectively of the blue and brown contours. As can be seen, the brown contour is slightly smaller than the blue contour at all azimuths, with the maximum value for all azimuths shown at the top of the comparison columns being slightly greater than – 0.1 percent.

The fourth group of columns provides the results that define the olive contour and Channel 23 operation with the antenna at the top of the tower and ERP reduced to 500 kW. The fifth and final group of columns provides comparisons of the distances to the olive contour with the distances to the blue contour at the same azimuthal bearings. The value above the right-hand end of the group is the maximum value in percent at any bearing in the comparison. As can be seen, its value is less than one percent at every bearing, meaning that the requirement of the rule limiting contour extensions to one percent in all directions is met by the set of parameters chosen.

Given the results just described, it has been shown that the adjusted set of parameters used to compensate for the elevation increase of the antenna and the ensuing shape change of the contour meet the requirements of the relevant rules and should be approved.

(Please note that, for reference, the raw data used in preparation of the chart and the comparisons on the first two tabs are provided on the remaining tabs of the workbook. All data was obtained using EDX SignalPro software to generate the contour distances based on the charts in §73.699 and the Commission's TVFMFS routine.)