



**ENGINEERING STATEMENT**  
**OF**  
**BENJAMIN L. PIDEK, P.E.**  
**IN SUPPORT OF**  
**APPLICATION FOR CONSTRUCTION PERMIT**  
**POST-INCENTIVE AUCTION ASSIGNMENT FACILITY**  
**WXXI-TV**  
**ROCHESTER, NY**

**Background**

WXXI Public Broadcasting Council (WXXI) is the licensee of WXXI, located at Rochester, NY, which is presently authorized to operate its digital facility on Ch. 16 with the following parameters:

**Pre-Incentive Auction Facility (Ch. 16)**

Coordinates: 43° 08' 07.0" N (NAD83)  
77° 35' 02.0" W  
ERP: 236.6 kW (DA)  
RCAMSL: 299.0m

WXXI has been assigned Ch. 22 for its post-incentive auction facility with the following parameters:

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Post-Incentive Auction Facility (Ch. 22)

Coordinates: 43° 08' 07.0" N (NAD83)  
77° 35' 02.0" W  
ERP: 223.0 kW (DA)  
RCAMSL: 299.0m

The current WXXI antenna incorporates both electrical (0.75°) and mechanical beam tilt (0.5° @ 0° azimuth relative to true north). Due specifically to the antenna the mechanical beam tilt, the horizontal plane pattern for the antenna, provided as tabulated relative field values in the construction permit application for the Ch. 16 facility<sup>1/</sup>, was not normalized (i.e., did not have a maximum relative field value of 1.0 in any azimuth). This was done intentionally after discussions with the Commission staff on how best to provide an accurate horizontal plane pattern that incorporated the effects of the mechanical tilt; however, the way the pattern was filed ultimately created an issue with the coverage translation methodology the Commission used when analyzing potential channels WXXI could be moved to as part of the overall television spectrum repack.

Typically, when a station is moved to a higher channel in the repack process, the ERP is increased due to the receive antenna dipole factor difference between the relative channels. With WXXI, the coverage translation from Ch. 16 to Ch. 22 resulted in a decrease in the ERP (from 236.6 kW to 223.0 kW) rather than the expected increase. The anomaly in the assigned WXXI Ch. 22 ERP appears to be the result of a decision by the Commission to normalize all antenna azimuth patterns for any station that did not have a maximum relative field value of 1.0 listed in the tabulation of relative field values stored in the CDBS database (and later the LMS database), which was the case for WXXI.

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<sup>1/</sup> Tabulated relative values provided in Section VII - DTV Engineering (Tech), Question 10E of the construction permit application in the CDBS.

For any station that did not have a relative field value of 1.0 in its antenna azimuth pattern data, the Commission, as part of this normalizing process, adjusted the ERP (down) to account for the difference the maximum relative field value of 1.0 and the highest relative field value listed in the tabulated azimuth pattern data for the particular station under consideration.

In the case of WXXI, the Ch. 16 ERP is 236.6 kW and the maximum relative field value in the antenna azimuth pattern data (as-filed) is 0.904 (due to the incorporation of the effects of mechanical beam tilt). The Ch. 16 ERP of 236.6 kW was first adjusted (reduced) to 193.37 kW to compensate for the 0.876 dB difference between a relative field value of 1.0 and the maximum relative field value of .904 (18.27% reduction) in the WXXI pattern. The power level was then adjusted (increased) for the 0.622 dB dipole factor difference between Ch. 16 and Ch. 22 (15.39% increase) which is how the new Ch. 22 ERP of 223 kW was derived.

The process used by the Commission to translate the WXXI coverage from Ch. 16 to Ch. 22 did not take into account that the antenna pattern incorporated mechanical tilt. In fact, at the time the conversion work was done the software used by the Commission for determining coverage replication between channels, known as TVStudy, was not capable of properly analyzing stations that employed mechanical beam tilt. Furthermore, instead of assigning WXXI the normalized antenna azimuth pattern that TVStudy calculated in the translation process, WXXI was assigned the same antenna azimuth pattern that is currently on file for the Ch. 16 facility (which is not normalized). This inadvertent mix-up has the effect of reducing the WXXI coverage twice: first through the normalization process employed by TVStudy and, second, by assigning the non-normalized (reduced) antenna azimuth pattern to WXXI on Ch. 22.

At this point in the repack process, the Commission does not have time to correct the issues with the assigned WXXI coverage that resulted from the errors in the translation process. Based



on guidance from the Commission staff, WXXI will file a construction permit application for a Ch. 22 facility that can satisfy all of the criteria listed in the "Construction Permit Certifications" section of Schedule A of Form 2100. It will then file for a maximized facility in the first maximization filing window to recover the lost coverage area where it will make the case that it lost more than 1% of its interference free service population.

### **Antenna System and Tower**

The existing top-mounted directional WXXI Ch. 16 antenna (ERI ATW25H3-ETC170-16H) is a slotted coaxial array antenna that is channel specific and not usable on Ch. 22. WXXI intends to replace the existing top-mounted antenna with a new directional slotted coaxial array antenna for Ch. 22 (ERI ATW25H3-ETC170-22H). The azimuth and elevation patterns and dBk table for the proposed antenna have been attached to the application.

The replacement of the top-mounted antenna will result in a change in the a 1.4m decrease in the overall height of the structure. WXXI will notify the FAA of the change and update the ASR (#1003958) accordingly after construction of the Ch. 22 facility is complete.

As mentioned above, the current WXXI Ch. 16 antenna incorporates both electrical (0.75°) and mechanical beam tilt (0.5° @ 0° azimuth relative to true north). The new Ch. 22 will incorporate the exact same electrical and mechanical beam tilt.

The current Ch. 16 antenna is elliptically polarized and the new Ch. 22 antenna will also be elliptically polarized. The vertically polarized radiation will not exceed the horizontally polarized component in any azimuth.

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The new Ch. 22 antenna will have a center of radiation of 298.4m AMSL (with a calculated HAAT of 152m) which is 0.6m lower than the radiation center height of the assigned repack facility. Since TVStudy, in the latest version (2.2.2), is capable of analyzing a station with mechanical beam tilt, the new antenna azimuth pattern will be filed without incorporating the effects of mechanical beam tilt. The elevation pattern provided by the manufacturer has been uploaded to LMS. Based on the lower radiation center AMSL and the new coverage calculation methodology, WXXI proposes to operate the new Ch. 22 with an ERP of 125 kW.

The proposed parameters of the WXXI Ch. 22 facility are predicted to result in an increase in the noise-limited contour compared to the noise-limited contour generated by the assigned post-repack facility; however, that increase will be less than 1% in any azimuth and it is necessary to mitigate the predicted loss in interference free service population due to the erroneous translation of the WXXI coverage from Ch. 16 to Ch. 22.

### **Coverage**

The entire principal community of Rochester, NY is well within the predicted F(50,90) 48 dBu contour based on the proposed directional 125 kW ERP.

### **Interference**

An interference check study was run using the Commission TVStudy software (Version 2.2.2) for the proposed WXXI post-repack facility parameters. The results of the study show that the proposed facility is not predicted to cause more than 0.5% new interference to any other surrounding co-channel or adjacent channel post-repack facilities.

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## **Environmental/RFR**

This report addresses only the conditions specified in 47CFR1.1307 that deal with Radio Frequency Radiation. Any other non-RFR conditions that might require the preparation of an Environment Assessment are beyond the scope of this report; since the structure is existing and registered, such conditions should not be an issue requiring further consideration.

The location of the proposed facility is a multi-user site known locally as Pinnacle Hill. The site is the transmitting location of numerous other television and FM transmitters. Access to the area immediately surrounding the tower (that the proposed WXXI facility will be located on) and the WXXI transmitter building is restricted by a locked security fence. Although the area inside the fence is considered “controlled”, there may be locations in this area where RFR levels exceed the limit for occupational exposure such as the roof of the transmitter building; therefore, workers will be trained on RFR issues and encouraged to wear personal RFR monitors when work is required in these areas. WXXI will ensure that necessary power adjustments are made to ensure a compliant environment for worker access.

There are also areas of the Pinnacle Hill site outside of the WXXI tower and transmitter building location that are accessible to the public. Considering this, RFR calculations were made at various points to the West of the transmitter location (where the terrain rises above the level of the transmitter site). These points include the base of the WUHF-TV tower ( $0.004222 \text{ mW/cm}^2$ ), the base of the W42CO-LD tower ( $0.009734 \text{ mW/cm}^2$ ) and the approximate summit of Pinnacle Hill ( $0.003064 \text{ mW/cm}^2$ ). The RFR contributed by the proposed WXXI facility at each of these locations is calculated to be less than 5% of the MPE limit in public area ( $0.32 \text{ mW/cm}^2$ ) for Ch. 22 (518-524 MHz). Additional calculations show that the RFR contributed by the proposed facility at other public locations on the Pinnacle Hill site will be less than 5% of the MPE for public exposure and, therefore, the proposed facility will not have a significant impact on the site.

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WXXI agrees to comply with the Commission's requirements regarding power adjustments or cessation of operation as may be necessary to ensure a compliant environment for worker access including on towers adjacent to this tower.

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### **Certification**

I hereby certify that the foregoing report or statement was prepared by me but may include work performed by others under my supervision or direction. The statements of fact contained therein are believed to be true and correct based on personal knowledge, information and belief unless otherwise stated; with respect to facts not known of my own personal knowledge, I believe them to be true and correct based on their origin from sources known to me to be generally reliable and accurate. I have prepared this document with due care and in accordance with applicable standards of professional practice.

A handwritten signature in black ink, appearing to read "B. Pidek", written over a horizontal line.

Benjamin L. Pidek, P.E.  
July 11, 2017

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