

Exhibit EE-1: Engineering Statement in support of
FCC FORM 349
APPLICATION FOR AUTHORITY TO CONSTRUCT OR MAKE CHANGES IN AN FM TRANSLATOR OR FM BOOSTER STATION
(For a New FM Translator)

This engineering exhibit supports an application for a new FM translator associated with class D AM station WHOL (FID # 36987).

The proposed 109.8dB μ contour is within the 69.8 dB μ contour of 3rd adjacent station, WBYN-FM Boyertown, PA (FID # 71310) A D/U analysis shows that no interference reaches or approaches the ground nor any occupied structure or elevated roadway. Therefore this proposal should be acceptable under 74.1204(d) and a "Living Way" waiver is hereby requested.

The proposed facility protects co-channel class B station WKVP (FID # 20842) by employing a directional antenna.

The proposed facility is in compliance with 47 C.F.R. Section 1.1306 with regards to radio-frequency electromagnetic exposure in that the contribution to the rf environment is less than 5% of the maximum public exposure.

This application was prepared using FCC 30-arc-second terrain data.

This translator will operate as a fill-in facility for WHOL, an AM radio station licensed to Allentown, PA. The maximum ERP is limited by interference and protection to I.F. station WCTO.

Attached as Figures 1 and 2 are a color coded maps showing the protected contours and interfering contours of all relevant FM facilities.

Figure 3 shows the proposed 1mV service contour of this application compared with the 40km ring for WHOL.

Appendix A (attached separately) demonstrates that no harmful interference will occur to adjacent station WBYN-FM.

The proposal is sufficiently distant from all facilities mentioned in 73.1030(a), (b) & (c) so that notification under 73.1030 is not required.

Respectfully submitted

Kyle Magrill, Consultant
31 July, 2017

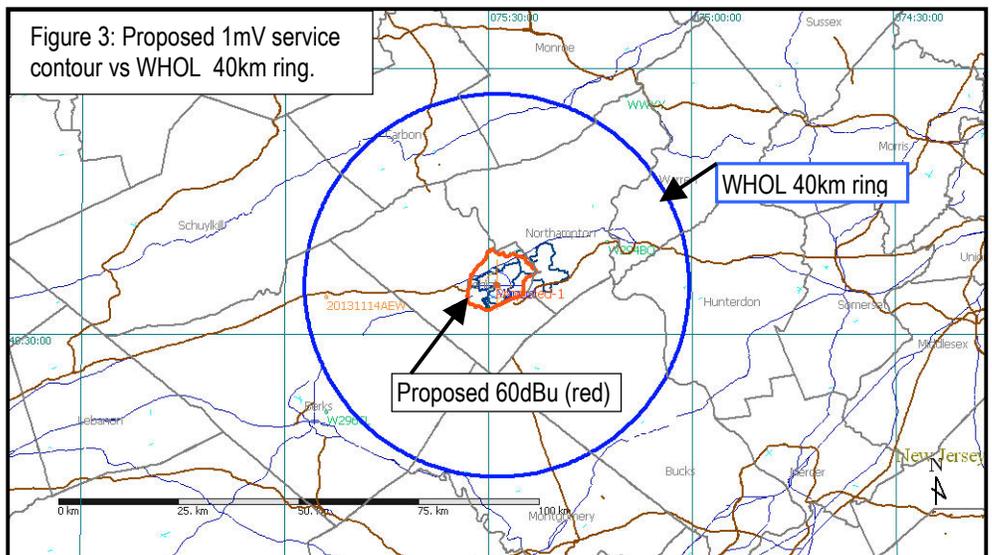
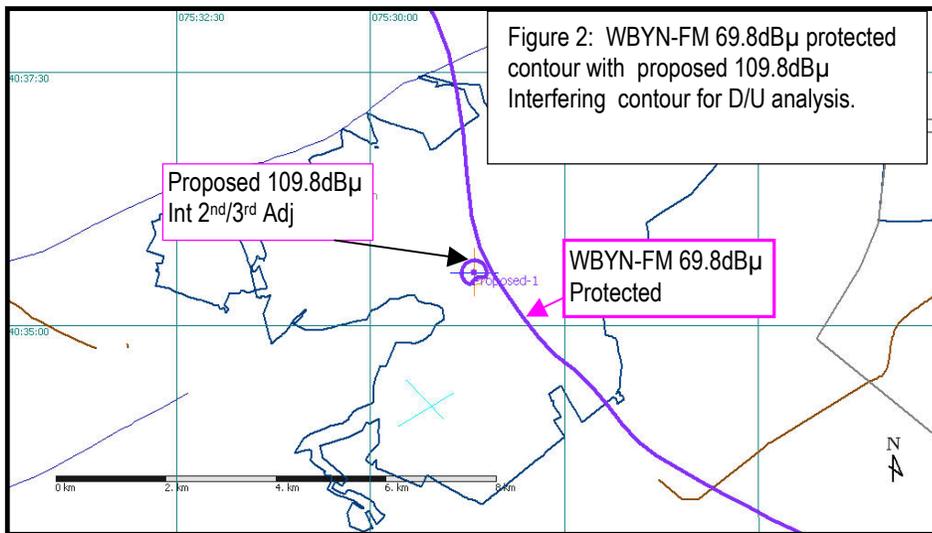
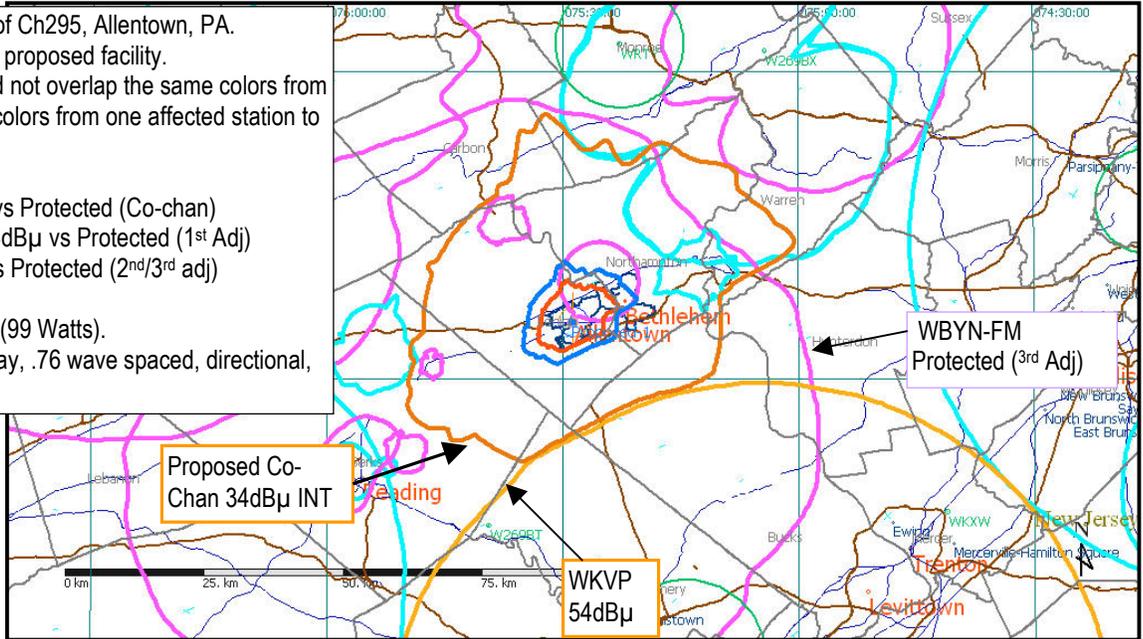
2805 NW 6th Street
Gainesville, PA 32609
352-335-6555

Figures:

Figure 1: Contour analysis of Ch295, Allentown, PA. Colors are referenced to the proposed facility. Other facilities' colors should not overlap the same colors from this proposal. Overlapping colors from one affected station to another is okay.

Key:
 Amber = Interfering 34dBμ vs Protected (Co-chan)
 Blue or cyan = Interfering 54dBμ vs Protected (1st Adj)
 Violet = Interfering 94dBμ vs Protected (2nd/3rd adj)

proposed power = 0.099kW (99 Watts).
 Proposed antenna type: 2-bay, .76 wave spaced, directional, composite.



Desired to Undesired ratio (D/U) studies of the proposed facility vs WBYN-FM Methodology:

The WBYN-FM 69.8dB μ contour encompasses the proposed the proposed facility's 109.8dB μ contour. The WHOL tower is located in a residential area with single family homes and roads located nearby. Therefore, it is important that the interfering contour of the proposed facility not reach the ground.

A two-bay, circularly polarized, directional antenna with a spacing of 84 inches will be used to prevent the interfering contour from reaching any point 2 meters above the ground.

Spreadsheets were used to calculate the distance to the interfering contours and show the margins of clearance (in dB) at a point two meters AGL. Where the interfering contour reaches near the ground, the table indicates how far from the tower the interference will reach. In the case of the proposed facility, a two-bay, approx 0.76 wave spaced antenna will be employed. The result is that the interfering contour does not reach any occupied structure or roadway. The spreadsheet outputs are attached as Appendix A.

Interference Study:

Terms and Methodology

Max ERP: The power specified in the application, expressed in kW.

Angle below the Horizon: The radiation angle below the antenna's horizontal plane.

Field at Angle: The field supplied by the antenna manufacturer for each Angle below the Horizon.

ERP at Angle: The ERP for an Angle given Max ERP & Field:

$$\text{ERP@Angle} = \text{Max ERP} * \text{Field}^2$$

Signal at Point: The predicted signal level assuming Free Space attenuation at a point:

$$\text{Signal} = 106.92 - (20 * \text{Log}(\text{Dist}(\text{km}))) + (10 * \text{Log}(\text{ERP@Angle}(\text{kW})))$$

Distance to Point: The radiation path distance from the antenna to a point.

$$\text{DistToPoint} = \text{Antenna Rad Center in meters AGL} / (\text{Cos}(90^\circ - \text{Angle}^\circ))$$

Distance From Tower: The distance from the tower base to a point.

$$\text{DistToPoint} * \text{Sin}(90^\circ - \text{Angle}^\circ)$$

Interference Threshold = Protected station's predicted contour value at a point +40dB μ

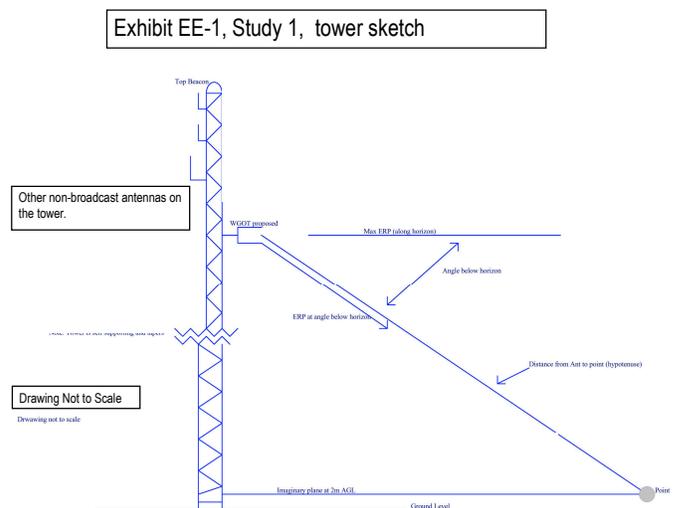
Over Threshold: The amount that the Proposal's signal exceeds the interference threshold.

$$\text{OverThresh} = \text{Signal} - \text{Interference Threshold value}$$

A negative Over Threshold value indicates no interference.

Notes:

When finding a value for a point two meters above ground, then: DistToPoint = Antenna Rad Center in meters above the plane, not ground/(Cos(90° - Angle°)). Subtracting 2 meters from the antenna RC produces the desired result.



Results:

Appendix A (separately attached to this application) shows the angle and distance to a point 2meters AGL from the proposed antenna. The table portion of Appendix A also shows the distance to the interfering contour at 99W (.099kW).

The field strength is calculated at each end point and compared to the worst case protected contour of WBYN-FM (69.8dB μ). Using the manufacturer's specified field elevation data, Appendix A shows that, at 2 meters above the ground, the interference threshold of 109.8dB μ will not reach any occupied structure or roadway. No elevated public roads nor occupied multi-story buildings extend into the zone of interference on any radial. It can be concluded that no interference is predicted to occur to WBYN-FM as a result of this proposal.

Section VII Engineering Data:

Tech Box Data:

1. Channel: **295**

Primary Station: **FID: 36987**

WHOL

Allentown, PA

1600 kHz

Delivery Method: **Other**

Antenna Location Coordinates: (NAD27):

40° 35' 32.65" N

75° 28' 42.34" W

Antenna Structure Registration: **1016360**

Antenna Location Site Elevation Above Mean Sea Level: **106 meters**

Overall Tower Height Above Ground Level: **62.5 meters**

Height of Radiation Center Above Ground Level: **60 meters**

ERP:

0.099 kW (H)

0.099 kW (V)

Transmitting Antenna: **Shi 6812B or equiv.: 2-bay, 0.76 wave spaced, Composite Directional.**

Fill-in Translator: **Yes** (see EE-1, Figure 2)

Interference: **Yes**

Section 74.1204, **Checked**. See EE-1, Figure 1

Section 74.1205, **Not Checked**.

Unattended operation: **Yes**

Multiple Translators: **Yes**

NEPA: **Yes**. This proposal is excluded from environmental processing: The rf exposure was modeled using "FM Model" on the FCC website using a 2-element antenna at a height of 58m. The modeled maximum rf near the base of the tower is far below 1% of the uncontrolled public exposure limit, so no further processing is required. No changes to structure, lighting, land or water are proposed. Applicant will cease radiating if workers are near the antenna.

Kyle Magrill

Technical consultant

(352) 335-6555

kyle@circuitwerkes.com