

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 Minor Modification to an Existing Construction Permit)

This engineering exhibit supports a minor change application for a FM translator W241CZ (Facility ID 202630), Deland, FL. File number BNPFT-20180418ABY. This FM translator will be used as a fill-in facility for Class D AM station, WYND (Fac. ID # 7741). This application changes the tower location, antenna height and coverage pattern of W241CZ.

The proposed facility's 103.25dB $\mu$  contour is within the protected contour of 2<sup>nd</sup> adjacent stations, WHOG, Ormond-by-the-Sea, FL (Facility ID 24365) and WDBO-FM, Orlando, FL (Facility ID 23443). Of the two, WHOG is the weaker signal, so demonstrating no interference to WHOG also demonstrates no interference to WDBO-FM. WHOG's 63.25dB $\mu$  contour completely encompasses the new facility's proposed 103.25dB $\mu$  interfering contour. A three bay antenna with a custom inter-bay spacing of 72" will be used to prevent the interfering contour from reaching the ground. 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 LPFM stations WWID-LP (FID# 194169) and FM Translator W241CR (FID# 200215). A directional antenna is used to protect each of these facilities. Appendix B is the proposed directional antenna pattern.

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 WYND, an AM radio station licensed to Deland, FL. The maximum ERP is limited by the class limit of 250W (0.250kW).

Attached as Figure 1 is a color coded map showing the protected contours of all relevant FM facilities and the associated interfering contours from the proposed facility.

Figure 2 shows the proposed 1mV service contour of this application compared with the 2mV service contour for WYND. Also shown in Figure 2 is overlap between the current CP and this proposal. The proposed 1mV contour entirely encompasses the service contour from the original CP.

Figure 3, Study 1 and Appendix A demonstrate that no harmful interference will occur to adjacent channel stations WHOG and WDBO-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

/S/

Kyle Magrill, Consultant  
25 February, 2019

2805 NW 6<sup>th</sup> Street  
Gainesville, FL 32609  
352-335-6555

## Analysis:

The proposed facility is inside the Daytona Beach, FL radio market. This application changes antenna type, height and pattern.

**Figure 1:** Contour analysis of Ch241, Deland, FL.  
Colors are referenced to proposed 'W241CZ'.  
Other facilities' colors should not overlap the same colors from NEW. Overlapping colors from one affected station to another is okay.

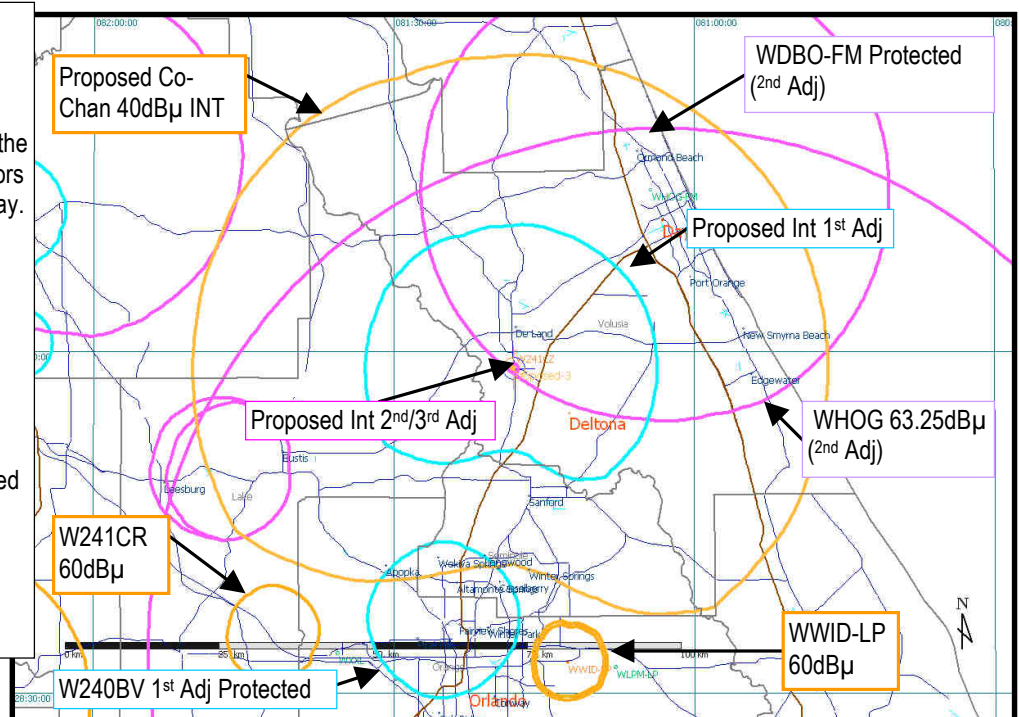
### Key:

Amber = Interfering 40dBμ vs Protected (Co-chan)

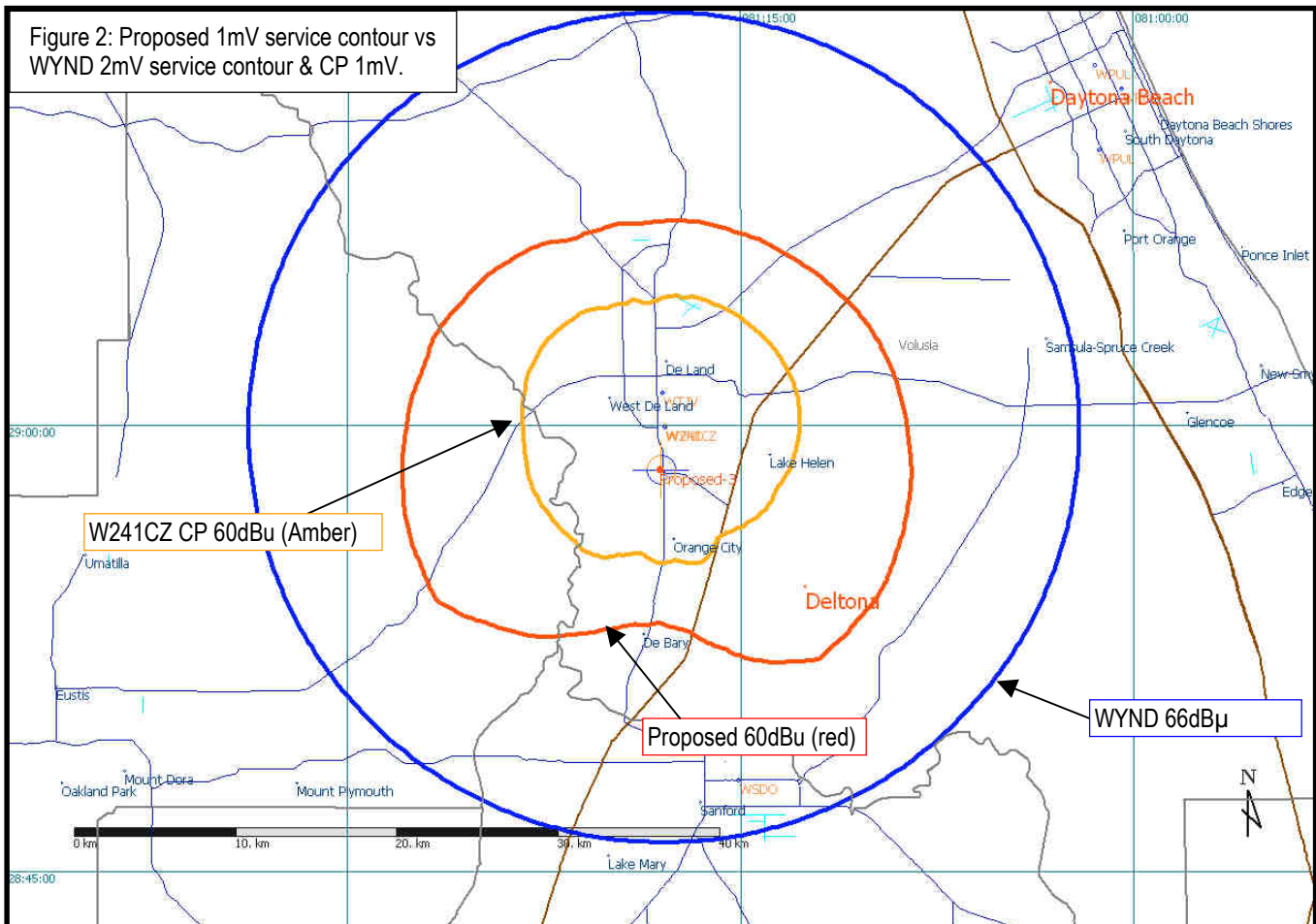
Blue or cyan = Interfering 54dBμ vs Protected (1<sup>st</sup> Adj)

Violet = Interfering 103.25dBμ vs Protected (2<sup>nd</sup>/3<sup>rd</sup> adj)

Proposed power = 0.250kW (250 Watts).  
Proposed antenna type: SHI 6812, directional.



**Figure 2:** Proposed 1mV service contour vs WYND 2mV service contour & CP 1mV.

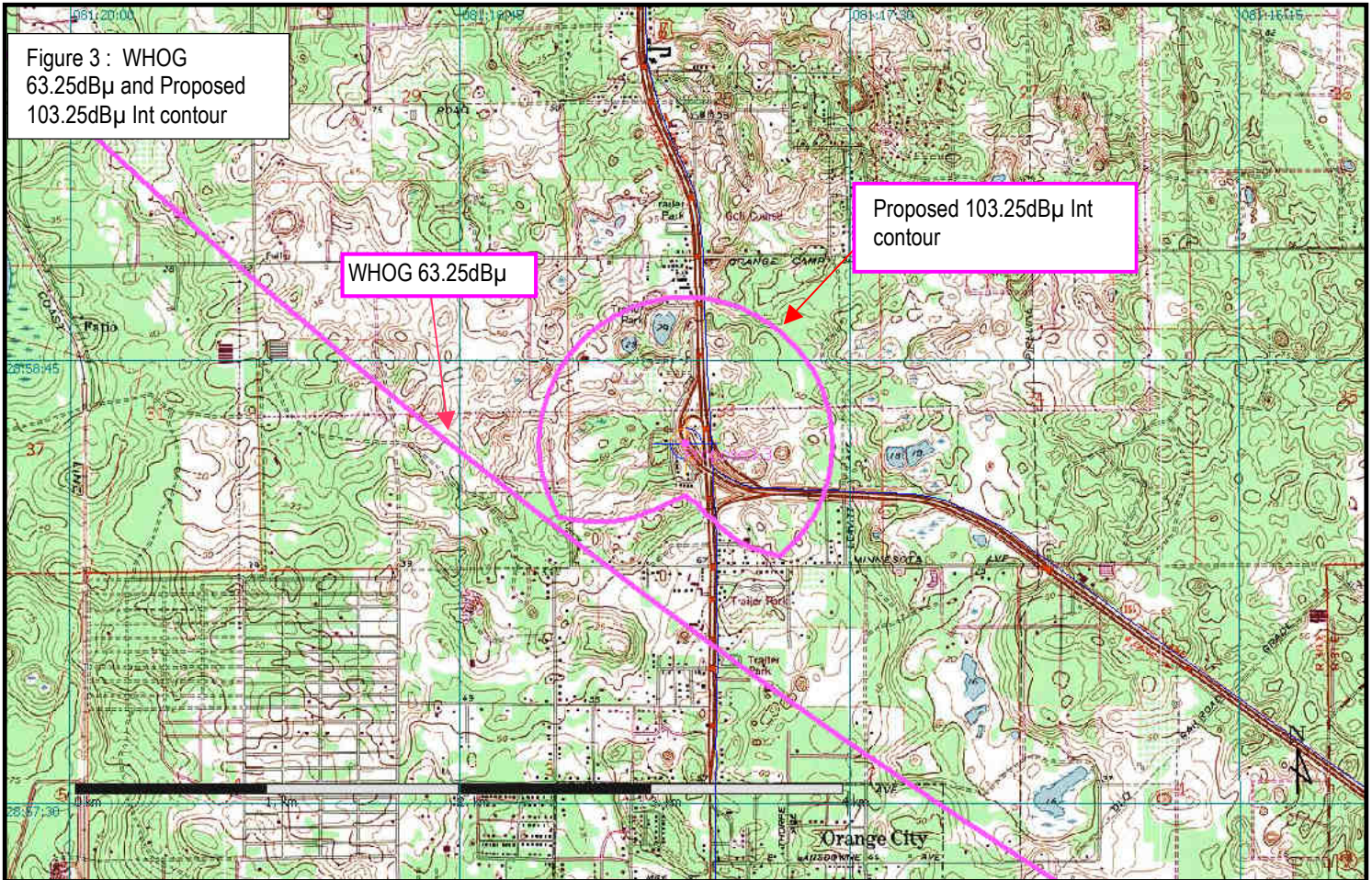




### Desired to Undesired ratio (D/U) studies of facility vs WHOG & WDBO-FM Methodology:

The WHOG 63.25dBμ contour encompasses the proposed facility's 103.25dBμ contour. The WDBO-FM 68.7dBμ contour also encompasses the proposed facility location. Since WHOG has the weaker signal at the facility location, demonstrating no interference to WHOG also demonstrates no interference to WDBO-FM. Therefore 63.25dBμ was used for the study.

The proposed facility is located adjacent to several highways and structures. Therefore it is necessary to prevent the interfering contour from reaching the ground.



All of the affected areas are completely contained within the WHOG 63.25dBμ contour. Therefore the worst case scenario for interference is  $63.25\text{dB}\mu + 40\text{dB}\mu = 103.25\text{dB}\mu$ .

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 facility, a three-bay directional antenna with inter-bay spacing of 72" shall be employed. The result is that the interfering contour does not reach any occupied structure or roadway. The spreadsheet output is attached as Appendix A.

# Interference Study 1:

## 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.

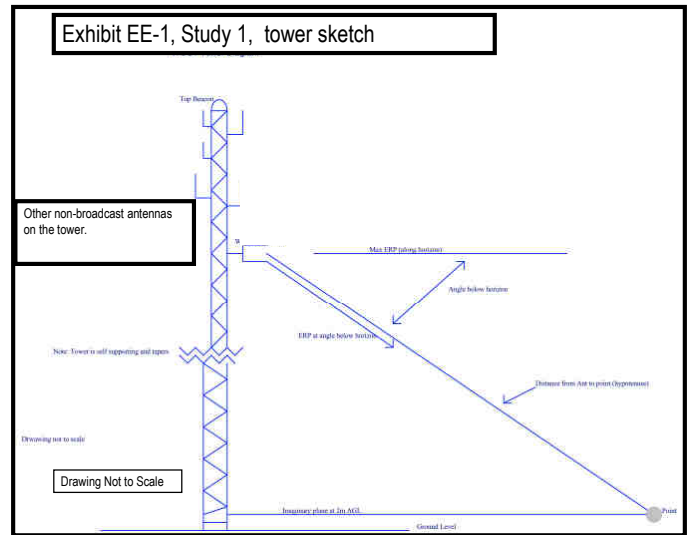
ERP at Angle: The ERP for an Angle given Max ERP & Field:

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

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.



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

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

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

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

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:  $\text{DistToPoint} = \text{Antenna Rad Center in meters above the plane, not ground} / (\cos(90^\circ - \text{Angle}^\circ))$ . 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 Appendix A table also shows the distance to the interfering contour at 250W (.250kW).

The field strength is calculated at each end point and compared to the worst case protected contour of WHOG (63.25dBμ). Using the manufacturer's specified field elevation data, Appendix A shows that, at 2 meters above the ground, the interference threshold of 103.25dBμ does reach the ground, but is over the threshold by less than 0.5dB, therefore rounds to zero. It does 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 WHOG or WDBO-FM as a result of this proposal.

## Section VII Engineering Data:

Tech Box Data:

1. Channel: **241**

Primary Station: **FID: 7741**

**WYND**

**Deland, FL**

**1310 kHz**

Delivery Method: **Other**

Antenna Location Coordinates: (NAD27):

**28° 58' 31" N**

**81° 18' 01.5" W**

Antenna Structure Registration: **1030354**

Antenna Location Site Elevation Above Mean Sea Level: **15.8 meters**

Overall Tower Height Above Ground Level: **159 meters**

Height of Radiation Center Above Ground Level: **142 meters**

ERP:

**0.25 kW (H)**

**0.25 kW (V)**

Transmitting Antenna: **SHI 6812, Directionalized.**

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" for windows (from the FCC website) using a 1-element antenna at a height of 139m. The modeled maximum rf near the base of the tower is far below 1% of the uncontrolled public exposure limit (approx 0.1μW/cm<sup>2</sup>), 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.

/S/

Kyle Magrill

Technical consultant

(352) 335-6555

[kyle@circuitwerkes.com](mailto:kyle@circuitwerkes.com)