

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 is a minor change to an existing construction permit by Circuitwerkes, Inc. (the Applicant) for an FM translator serving the community of Largo, FL. The facility ID 158581 and the call sign is W238BW. W238BW is currently licensed to Lake City, Florida but has a permit to move to Largo, FL. This application seeks to change the power and height of the existing CP. Since the location is unchanged from the earlier granted CP, this is a minor modification.

Figure 1 is a showing of protected and interfering contours. The proposed W238BW will employ a directional antenna protecting co-channel translator W280DW, FCC Fac ID#139286. The proposed location of W238BW is within the 60dB μ service contours of 2nd adjacent station WFUS, FCC Fac ID# 63984 . The W238BW 112.8 dB μ interfering contour is contained within the WFUS 72.8 dB μ service contour. A desired to undesired analysis is attached to the application as "Appendix 1" and shows no predicted interference will reach the ground when a, 3-bay, 0.6 spaced, antenna is used. Therefore, a so-called "Living Way" waiver is requested with respect to WFUS.

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. The tower is located within a secured compound. The public does not have access to the tower compound. The applicant will reduce power or cease operation when workers are present near the transmitting antenna.

This application was prepared using FCC 3-arc-second terrain data.

This facility will be a fill-in translator for AM station WXYB (facility ID# 2918) and its power is limited by the interfering contours and the distance to the service contour of the primary station as shown in Exhibit 1 below.

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

Kyle Magrill, President/applicant
PG-7T-6155
March 22, 2017

CircuitWerkes, Inc.
2805 NW 6th Street
Gainesville, FL 32609
352-335-6555

Section VII Engineering Data:

Tech Box Data:

1. Channel: **280**

2. Primary Station: **FID: 2918**
WXYB (AM)
Indian Rocks Beach, FL

3. Delivery Method: **direct**

4. Antenna Location Coordinates: (NAD27):
27° 50' 39 " N
82° 46' 21 " W

5. Antenna Structure Registration: **1060090**

6. Antenna Location Site Elevation Above Mean Sea Level: **2 meters**

7. Overall Tower Height Above Ground Level: **56meters**

8. Height of Radiation Center Above Ground Level: **54 meters (H) AGL**
54 meters (V) AGL

9. ERP:
0.250 kW (H)
0.250 kW (V)

10. Transmitting Antenna: **Directional composite**

11. Fill-in Translator: **Yes**

12. Interference: **Yes**
a) Section 74.1204, **Checked.**
b) Section 74.1205, **Not Checked.**

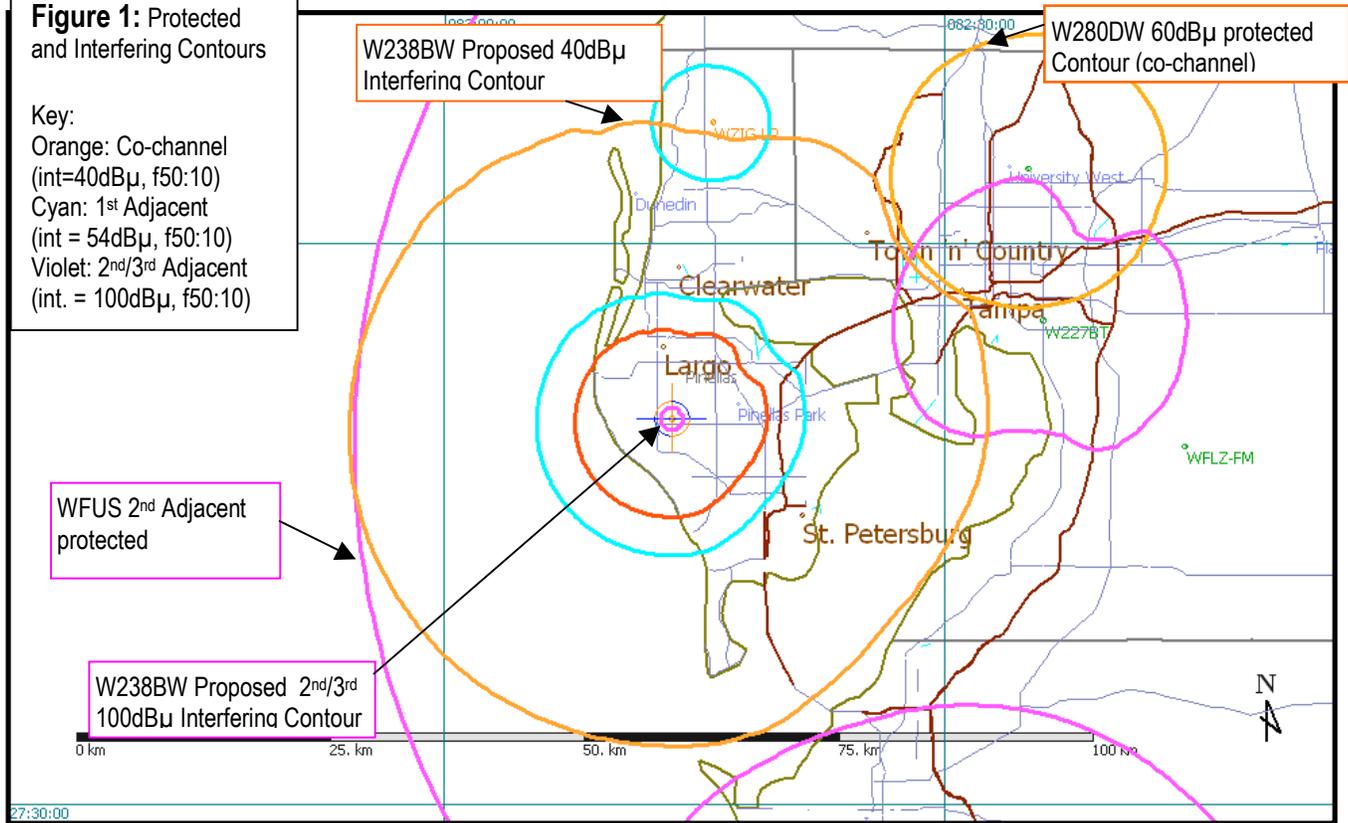
13. Unattended operation: **Yes**

14. Multiple Translators: **Yes**

15. NEPA: **Yes.** This proposal is excluded from environmental processing: The modeled rf at the base of the tower is less than 5% of the maximum public exposure level at prescribed in 1.1307(b).

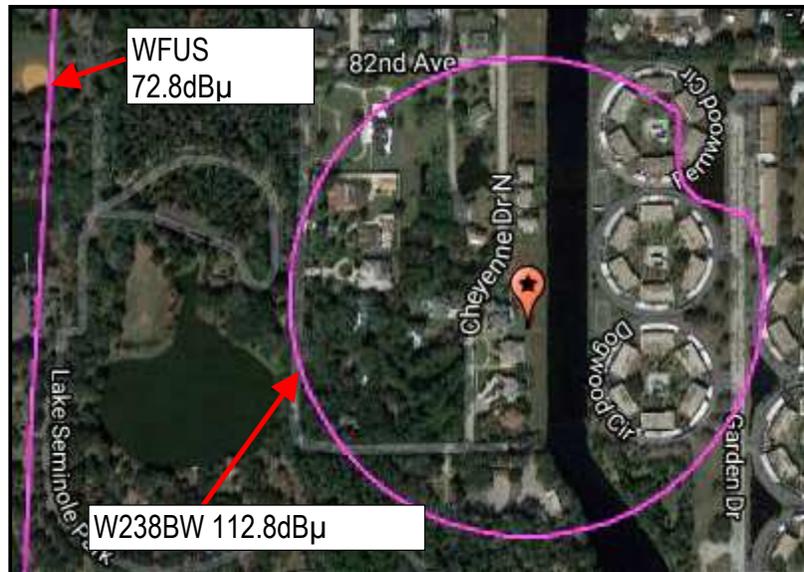
Protected and Interfering Contours

Contours are color-coded so that prohibited overlap is indicated by LIKE color contours overlapping.



Desired to Undesired ratio (D/U) studies of W238BW vs WFUS

W238BW is within the service contour of WFUS. The WFUS 72.8dB μ contour encompasses the proposed W238BW location. As shown in figure 2, the W238BW 112.8dB μ contour is completely contained within the WFUS 72.8dB μ contour. Therefore the worst case scenario for interference is $72.8\text{dB}\mu + 40\text{dB}\mu = 112.8\text{dB}\mu$.



Study 1: Desired to Undesired Ratio Exhibit

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.

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

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

$$\text{Distance From Tower} = \text{DistToPoint} * \text{Sin}(90^\circ - \text{Angle})$$

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.

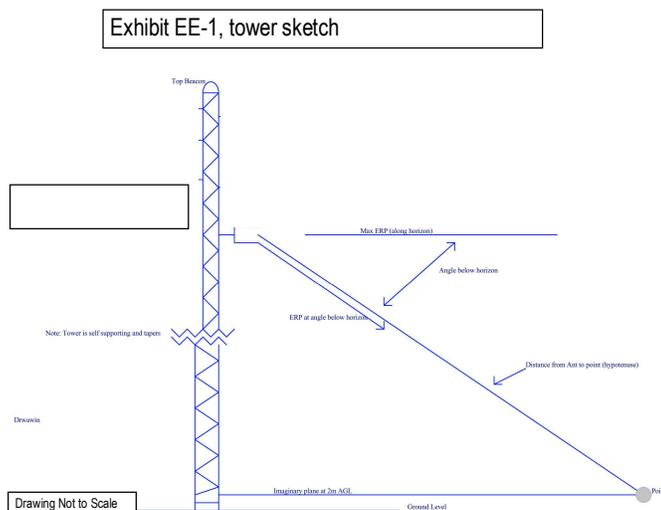
$$\text{OverThresh} = \text{Signal} - \text{Interference Threshold value}$$

A negative Over Threshold value indicates no interference.

When finding a value for a point two meters above ground, then: $\text{DistToPoint} = \text{Antenna Rad Center in meters above the plane, not ground} / (\text{Cos}(90^\circ - \text{Angle}))$. Subtracting 2 meters from the antenna RC yields the desired result.

Results:

Appendix A (attached separately) shows the angle and distance to a point 2meters AGL from the proposed antenna and shows the distance, at ground level, to the interfering contour at 250W.



The field strength is calculated at each end point and compared to the worst case protected contour of WFUS (72.8dB μ). Using a three bay radiator of the specified power for Table 1, the results show that, at 2 meters above the ground, the interference threshold of 112.8dB μ will not reach any occupied structure or roadway. The interfering contour is more than 2 meters above the ground at all points. 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 WFUS as a result of this proposal.

Fill-In Translator for WXYB (AM)

The proposed W238BW 1mV/m contour is contained within WXYB licensed 2mV/m contour.

