

Engineering Statement in support of  
FCC FORM 2100, SCHEDULE 349  
APPLICATION FOR AUTHORITY TO CONSTRUCT OR MAKE CHANGES IN AN FM  
TRANSLATOR OR FM BOOSTER STATION  
(To Modify a Licensed Translator)

This is a minor change to a licensed facility by Circuitwerkes, Inc. (the Applicant) for an FM translator, W280FD, serving the community of Largo, FL. The facility ID is 158581 and the call sign is W280FD. This application seeks to change the antenna type, power and height of the existing licensed facility. This is a minor modification since the licensed antenna is on the same tower as the proposed facility and no channel change is being proposed.

**Figure 1** is a showing of protected and interfering contours. The proposed W280FD will employ a directional antenna with reduced power to protect co-channel translator W280DW, FCC Fac ID#139286. The proposed location of W280FD is within the 60dB $\mu$  service contours of 2<sup>nd</sup> adjacent station WFUS, FCC Fac ID# 63984. The W280FD 113.4 dB $\mu$  interfering contour is contained within the WFUS 73.4 dB $\mu$  service contour.

A desired to undesired analysis is attached to the application as "Appendix A" and shows no predicted interference will reach the ground when a 1-bay antenna is used. Therefore, a so-called "Living Way" waiver is requested with respect to WFUS. **Figure 2** shows the 2<sup>nd</sup> adjacent channel interfering contour for WFUS. **Figure 3** shows that the 2<sup>nd</sup> adjacent channel interfering contour remains on the tower property.

**Figure 4** shows that the proposed 60dB $\mu$  contour is entirely within the WXYB's 66dB $\mu$  service contour, therefore this proposal qualifies as a fill-in translator for WXYB.

**Figure 5** shows that the licensed 60dB $\mu$  service contour overlaps the proposed service contour, making this a minor modification.

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 30-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  
April 24, 2020

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

**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' 51.8 " N**  
**82° 45' 49.8 " W**

5. Antenna Structure Registration: **1037654**

6. Antenna Location Site Elevation Above Mean Sea Level: **3 meters**

7. Overall Tower Height Above Ground Level: **195meters**

8. Height of Radiation Center Above Ground Level: **171 meters (H) AGL**  
**171 meters (V) AGL**

9. ERP:  
**0.014 kW (H)**  
**0.014 kW (V)**

10. Transmitting Antenna: **PSI FML-DA 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).

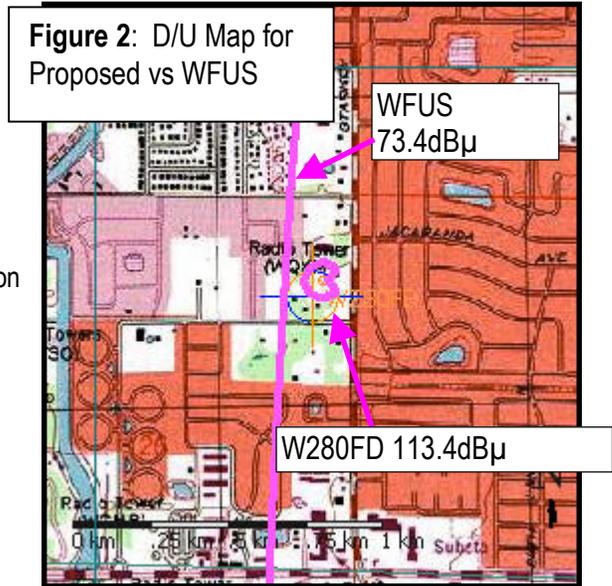


## Desired to Undesired ratio (D/U) studies of W280FD vs WFUS

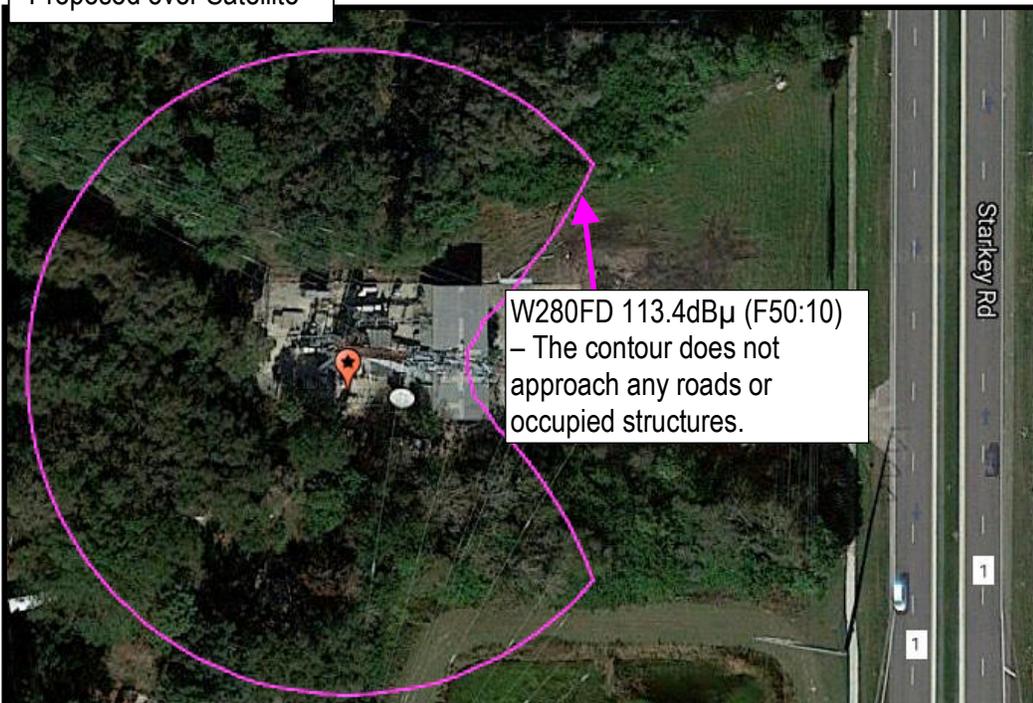
W280FD is within the service contour of WFUS. The WFUS 73.4dB $\mu$  contour encompasses the proposed W280FD location. As shown in figure 2, the W280FD 113.4dB $\mu$  contour is completely contained within the WFUS 73.4dB $\mu$  contour.

Therefore the worst case scenario for interference is:  
 $73.4\text{dB}\mu + 40\text{dB}\mu = 113.4\text{dB}\mu$ .

As shown in figure 3 below, the interfering contour remains entirely on the tower property. No occupied structures or roads are within the interfering zone. However, a D-U study was done anyway. An isotropic radiator was used to provide a worst case scenario. The D/U ratio shows that the interfering countour does not approach the ground.



**Figure 3: D/U Map for Proposed over Satellite**



## 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:

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

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.

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

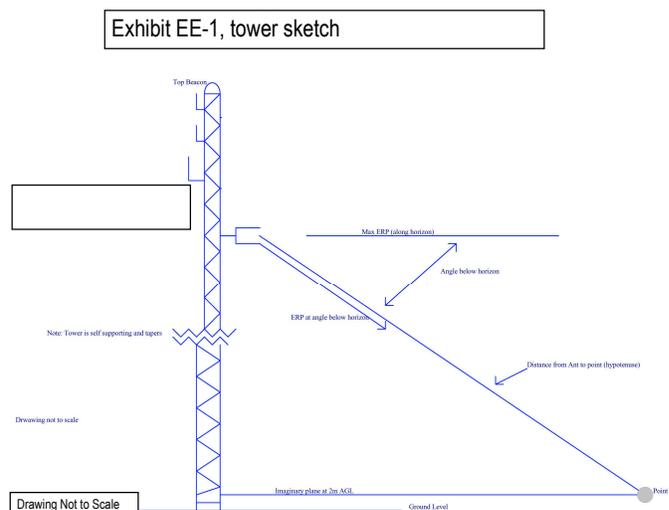
Interference Threshold = Protected station's predicted contour value at a point +40dBμ

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

OverThresh = Signal – Interference Threshold value

**A negative Over Threshold value indicates no interference.**

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 yields the desired result.



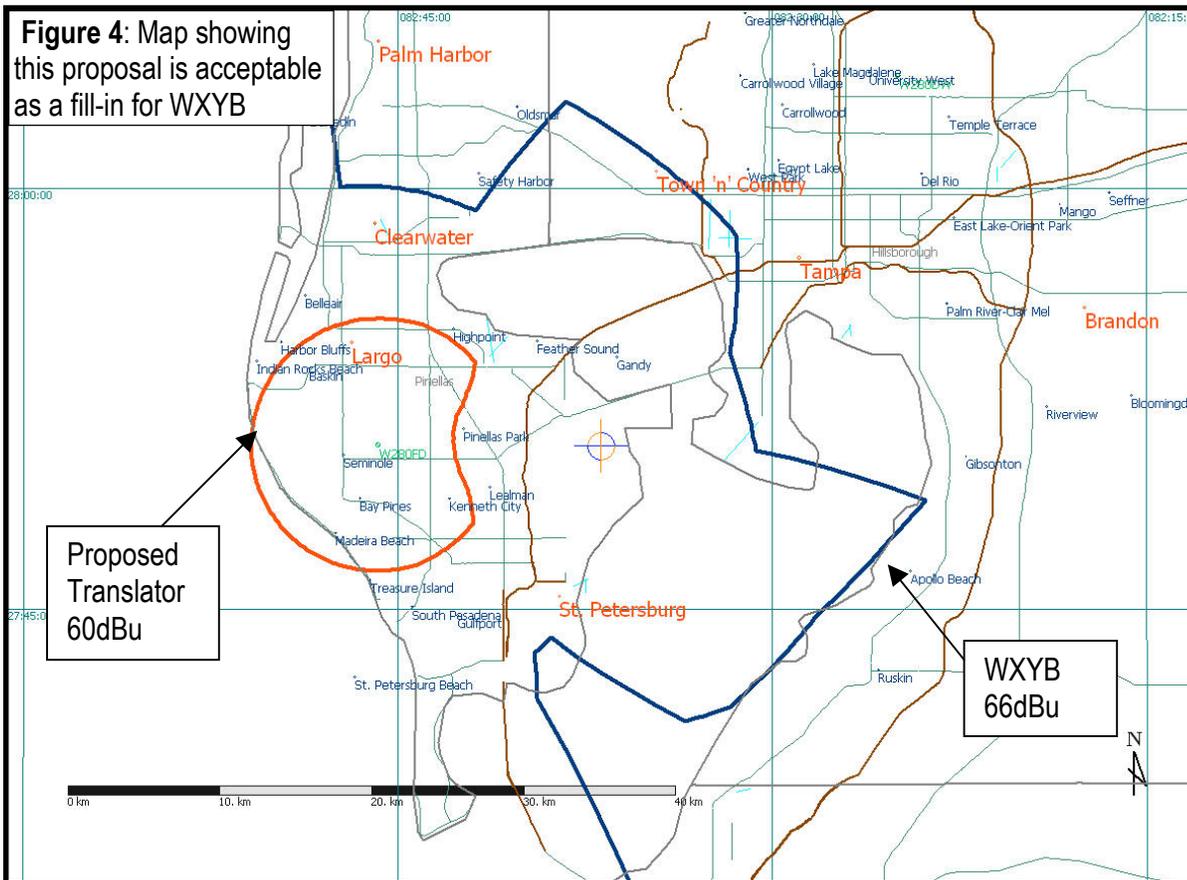
**Results:**

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 14W (.014kW).

The field strength is calculated at each end point and compared to the worst case protected contour of WFUS (73.4dBμ). Using a one bay (isotropic) radiator of the specified power for Table 1, the results show that, at 2 meters above the ground, the interference threshold of 113.4dBμ will not reach any occupied structure or roadway. The interfering contour is more than 2 meters above the ground at all points and remains entirely on the tower property. 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 W280FD 1mV/m contour is contained within WXYB licensed 2mV/m contour.



**Figure 5:** Shows that the proposed 60dB $\mu$  service contour overlaps the licensed 60dB $\mu$  service contour

