

TECHNICAL EXHIBIT
ARSO RADIO CORPORATION
APPLICATION FOR MINOR LICENSE MODIFICATION
FM TRANSLATOR STATION W260DR
FACILITY ID 203174
CHANNEL 260D 250 WATTS ND

FEBRUARY 23, 2023

TECHNICAL EXHIBIT
ARSO RADIO CORPORATION
APPLICATION FOR MINOR LICENSE MODIFICATION
FM TRANSLATOR STATION W260DR
FACILITY ID 203174
CHANNEL 260D 250 WATTS ND

Table of Contents

Technical Statement

Figure 1	Fill-In Compliance Determination
Figure 2	Allocation Study W260DR (FX)
Figure 3	Calculations of Interfering Contour to WIDI (FM)
Figure 4	Graph of Interfering Contour to WIDI (FM)
Appendix 1	Notification to Arecibo Astronomical Observatory

TECHNICAL EXHIBIT
ARSO RADIO CORPORATION
APPLICATION FOR MINOR LICENSE MODIFICATION
FM TRANSLATOR STATION W260DR
FACILITY ID 203174
CHANNEL 260D 250 WATTS ND

Technical Narrative

The technical exhibit, of which this narrative is part, has been prepared on behalf of Arso Radio Corporation, licensee of AM radio station WORA, 760 KHz in Mayaguez, PR, Facility ID 54480, for a minor license modification of WORA's FM Translator W260DR, Facility ID 203174. It is proposed to relocate W260DR, to side-mount its antenna on a tower of WORA(AM) and increase its power to the maximum permissible level.

Proposed Transmitter Location

The proposed transmitting facility would continue to operate on channel 260D using a Micronetixx FMP-1, a single bay, circularly polarized antenna, side-mounted on an existing tower. The proposed site location at a WORA(AM) tower is described by the following NAD83 geographic coordinates:

18° 11' 22.0" North
67° 09' 25.0" West

It is proposed to side mount the antenna radiation center (RC) at a height of 82 meters (269 feet) above ground on an existing tower at a site with an elevation of 2 meters AMSL. Thus, the antenna RC will be mounted at a height of 84 meters AMSL, which corresponds to a HAAT of 22.7 meters. The permissible ERP of 250 Watts allowed under the proposed conditions is requested. The proposed tower currently is being used by AM station WORA, 760 KHz, Mayaguez, PR. It is proposed to mount the FM translator antenna on this tower using a properly designed isolator, as to not affect the operation of WORA or the FM translator. The WORA antenna impedance will be measured before and after the FM translator antenna is installed, and should there be a significant impedance change, a new license applications for WORA (AM) will be filed.

Tower Registration

The FAA is not being notified of the proposed construction, as it is proposed to side-mount the FM antenna on an existing 84 meter registered tower, ASRN 1011316.

Environmental Considerations

The proposal is excluded from environmental processing, as an existing supporting structure is to be employed and the proposal complies with the FCC Rules concerning human exposure to radio frequency (RF) energy. The proposal would not exceed 1.9 % of the RF exposure limit for general population/uncontrolled environments for the frequency proposed. The calculation of RF energy at 2-m above ground was made under the procedures of OET Bulletin No. 65.* The formula employed is as follows:

$$S = \frac{(33.4)F^2P}{R^2}$$

where, S = power density in $\mu\text{W}/\text{cm}^2$, F = relative field factor at the angle to the calculation point, P = the total effective radiated power relative to a dipole in watts, and R = distance from the antenna radiation center to the calculation point in meters.

Based on the vertical radiation pattern of the proposed antenna, a relative field factor of 0.866 or less for any depression angle equal or greater than 30 degrees below horizon (see Figure 3), a total effective radiated power of 500 watts (circular polarization) and an antenna radiation center height above ground of 82 m, the calculated power density will not exceed $2.0 \mu\text{W}/\text{cm}^2$. Therefore, the calculated RF exposure at 2 m above ground will not exceed 1.0 % of the limit of $200 \mu\text{W}/\text{cm}^2$ for the general population and uncontrolled environments.

The antenna system will be restricted from access and appropriate RF warning signs are already posted on the AM tower. In the event that personnel are required to climb the structure, the transmissions of the proposed FM translator will be reduced or terminated as necessary to prevent RF exposure above the FCC recommended limits.

* Federal Communications Commission OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01, August 1997).

FCC Monitoring Stations

FCC rules pertaining to FCC monitoring stations, Section 73.1030(c), requires that the proposed facility does not produce a field strength greater than 10 mV/m at the FCC stations. The closest FCC monitoring station to the proposed operation is located at Santa Isabel, PR, at a distance of 85.2 kilometers. The proposed operation will produce field strengths much lower than 10 mV/m at the FCC station in Santa Isabel, PR.

Quiet Zone Notification

As required by FCC rules pertaining to radio Quiet Zones, Section 73.1030(a), the National Astronomy and Ionosphere Center (NAIC) in Arecibo, Puerto Rico is being notified of this application. A copy of the notification letter to the Arecibo Observatory of the proposed facility is included herein as Appendix 1.

AM Stations within 3.2 kilometers

There are several AM stations located within 3.2 km of the above specified coordinates. Since an existing tower used by AM station WORA for which no structural changes are contemplated is proposed and the FM translator antenna will use a properly designed isolator, no adverse effect should be caused to any of these AM stations, thus the proposal is believed to be compliant with Section 47 CFR 73.1692.

Fill-In Compliance and Allocation Considerations

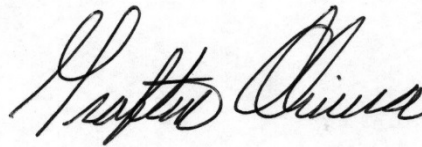
Figure 1 is a Fill-In Compliance map. As shown in Figure 1, the proposed translator 60 dBu contour will be contained within a 25 mile radius of WORA. Figure 2 summarizes the allocation study for the proposed facility. As indicated in Figure 2a, there is no co-channel or first-adjacent full-service station, translator, or LPFM facility to be concerned, as far as causing interference to by the proposed facility. Figure 2b shows the predicted contour overlap with FM station WIOA; while no interference to WIOA is predicted, some interference to the proposed translator is predicted. However, as shown at the bottom of Figure 2b, the intervening path between WIOA and the proposed facility is significantly obstructed by extensive mountainous terrain, so no significant interference to the proposed facility from WIOA is expected.

The proposed FM station will operate on Channel 260, second adjacent channel to WIDI (FM), Channel 258B and second adjacent channel to WIVA-FM, Channel 262B. The, the protection requirements of the undesired signal from the proposal is 40 dB higher than the desired signals of these stations. WIDI is predicted to put a signal of 90.1 dBu at the proposed FX site and WIVA-FM is predicted to put a signal of 90.3 dBu at the proposed site. WIDI being the weaker of the two signals determines the protection requirements. The proposed transmitter site is located 18.9 kilometers from station WIDI, which operates with an ERP of 22.4 kW and HAAT of 640 meters. The predicted WIDI F(50,50) field strength at the proposed site is 90.1 dBu. Using the U/D ratio of 40 dB, the proposed F(50,10) interfering signal is 130.1 dBu, thus this contour defines the maximum extent of predicted interference.

Since an ERP of 250 watts is proposed, the 130.1 dBu signal contour is calculated by means of a free-space calculation. Based on free-space calculations, the minimum height above ground level that the 130.1 dBu contour would reach is 210 feet at a horizontal distance of 59 feet from the transmitting antenna. This is graphically depicted in Figure 4. Therefore, no harmful interference is predicted to WIDI (or WIVA-FM) as a result of the proposed facility. Figure 3 is a tabulation and Figure 4 a graphic representation of the computed distances and heights of the predicted 130.1 dBu contour under these assumptions.

The predicted contours were calculated in accordance with Section 73.313 of the FCC Rules, using the V-Soft FMCommander@2022 software in conjunction with the 30 second Global terrain database; contour calculation were made using an evenly spaced set of 360 radials. The antenna height elevations of the facilities was used in conjunction with the propagation prediction curves of Section 73.333 to determine distances to contours.

For the reasons stated above, it is believed that the proposed W260DR facility is in compliance with FCC Rules and Regulations and the significant coverage increase will serve well the public interest.

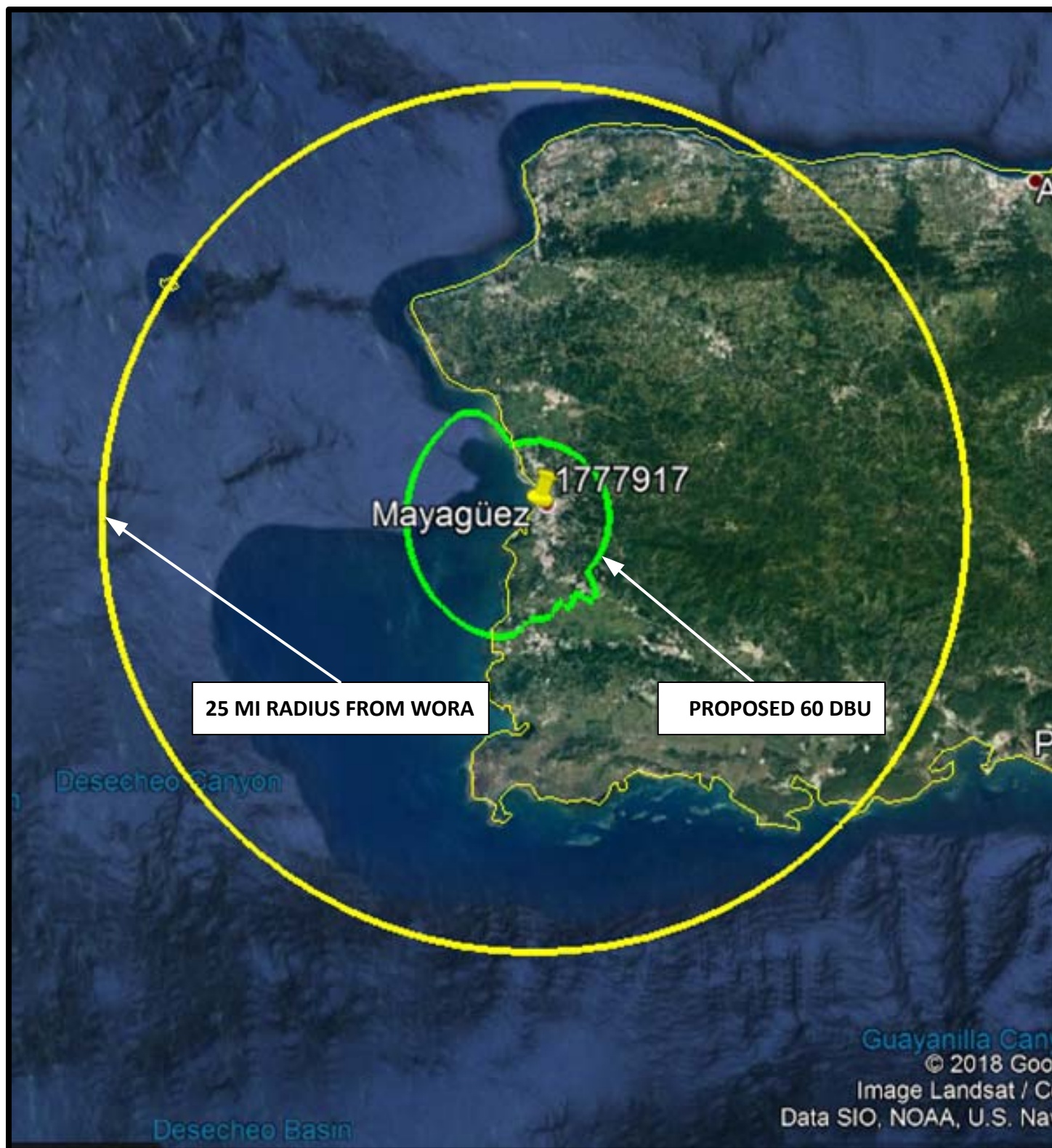


Grafton Olivera, P.E.
Consulting Engineer
5119 60th Drive E
Bradenton, Florida 34203

(941) 329-6001

February 23, 2023

FIGURE 1



AM FILL-IN COMPLIANCE MAP – LIC. MOD. APP W260DR (FX)
CH 260D (99.9 MHZ) - 0.250 KW - MAYAGUEZ, PUERTO RICO

Figure 2a

Allocation Study Prop. Minor Lic. Mod. W260DA FX Facility

FCC NGDC 30 Sec								
N. Lat. 18 11 22.00 84 m COR Contours are detailed Mayaguez PR X W260DR FX WORA								
W. Long. 67 09 25.00 0.25 kW CH 260. 99.9 D 22.7 m HAAT W260DR 02-22-23								
Translator								
Call	Type	Ch	Location		Azi	Dist	In	Out
WIVA-FM	LIC	262B	Aguadilla	PR	103.6	18.23	2.5	-78.4*
WIDI	LIC	258B	Quebradillas	PR	103.4	18.85	3.3	-77.4*
W260DR	LIC	260D	Mayaguez	PR	356.2	6.68	---	---
WIOA	LIC	260B	San Juan	PR	85.1	112.77	-20.0*	10.6
W258DT	LIC-D	258D	San Juan	PR	80.6	111.64	104.4	107.4
WIOA-FM1	LIC	260D	Ceiba	PR	86.1	157.43	114.7	111.5
WIOA-FM1	CP	260D	Ceiba	PR	86.2	157.34	127.5	117.6
WJVP«	STA	207B	Culebra	PR	86.1	157.56	14.5R	143.1M
WJVP«	STA	207B	Culebra	PR	86.1	157.56	14.5R	143.1M
WSTX-FM	LIC	262B	Christiansted	VI	100.6	254.11	238.4	170.3
WJVP«	LIC	207B	Culebra	PR	85.2	196.34	14.5R	181.8M
WVIQ	LIC	258B	Christiansted	VI	100.6	266.92	254.7	200.3

End of Screen List, Cardinal Radials = 12

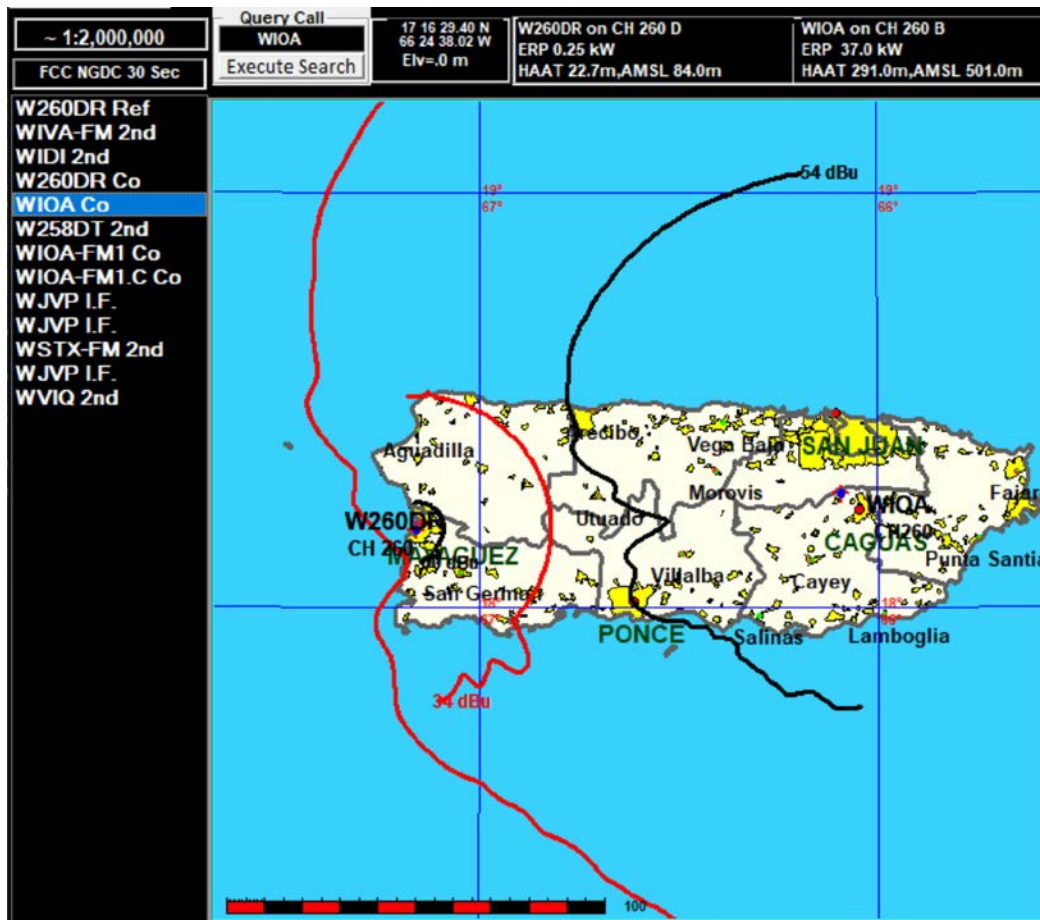
Detailed Allocation Study

Allocation Study Prop. W260DR											
Arso Radio Corporation											
REFERENCE CH# 260D - 99.9 MHz, Pwr= 0.25 kw, HAAT= 22.7 M, COR= 84 M											
Average Protected F(50-50)= 7.09 km											
Omni-directional											
DISPLAY DATES											
DATA 02-22-23											
SEARCH 02-22-23											
CH	CALL	TYPE	ANT	AZI	DIST	LAT	PWR(kw)	INT(km)	PRO(km)	*IN*	*OUT*
CITY		STATE		<--	FILE #	LNG	HAAT(M)	COR(M)	LICENSEE	(Overlap	in km)
262B	WIVA-FM	LIC	_CN	103.6	18.23	18 09 03.00	23.000	8.6	95.0	2.5	-78.4*
Aguadilla		PR		283.6	BLH20190122AAL	66 59 21.00	633	927	Arso Radio Corporation		
258B	WIDI	LIC	_CN	103.4	18.85	18 09 00.00	22.400	8.5	94.7	3.3	-77.4*
Quebradillas		PR		283.5	BLH20090610AAN	66 59 00.00	640	946	Aa Broadcast, LLC		
260D	W260DR	LIC	_CN	356.2	6.68	18 14 57.90	0.010		---	Reference---	
Mayaguez		PR		176.2	0000165354	67 09 40.20		11	Arso Radio Corporation		
260B	WIOA	LIC	_CN	85.1	112.77	18 16 23.80	37.000	127.6	54.1	-20.0*	10.6
San Juan		PR		265.4	0000185366	66 05 33.40	291	501	International Broadcasting		
258D	W258DT	LIC	DCN	80.6	111.64	18 21 00.00	0.250	0.1	2.6	104.4	107.4
San Juan		PR		261.0	0000171595	66 06 47.00		79	Calvary Evangelistic Missi		
260D	WIOA-FM1	LIC	_VN	86.1	157.43	18 16 52.00	1.000	35.6	10.2	114.7	111.5
Ceiba		PR		266.5	BLFTB20080417ABK	65 40 09.00		304	International Broadcasting		
260D	WIOA-FM1	CP	_CN	86.2	157.34	18 16 42.80	0.210	22.7	6.8	127.5	117.6
Ceiba		PR		266.6	0000186538	65 40 11.60		315	International Broadcasting		
207B	WJVP	STA	_CN	86.1	157.56	18 16 50.00	0.099	0.0	0.0	14.5R	143.1M
Culebra		PR		266.5	0000208982	65 40 13.00	214	308	Tabernaculo De Santidad In		
207B	WJVP	STA	_CN	86.1	157.56	18 16 50.00	0.099	0.0	0.0	14.5R	143.1M
Culebra		PR		266.5	0000194763	65 40 13.00	214	308	Tabernaculo De Santidad In		
262B	WSTX-FM	LIC	_CN	100.6	254.11	17 45 12.90	50.000	8.6	80.7	238.4	170.3
Christiansted		VI		281.4	BLH19880317KA	64 47 53.50	314	363	Caledonia Communication Co		
207B	WJVP	LIC	_VN	85.2	196.34	18 19 37.00	50.000	0.0	0.0	14.5R	181.8M
Culebra		PR		265.8	BLEDD20090305AAC	65 18 21.00	174	175	Tabernaculo De Santidad In		
258B	WVIQ	LIC	_CN	100.6	266.92	17 43 59.90	32.000	5.2	59.6	254.7	200.3
Christiansted		VI		281.3	BLH19940601KC	64 40 44.50	225	245	Jkc Communications Of The		

Terrain database is FCC NGDC 30 Sec , R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM
 In & Out distances between contours are shown at closest points. Reference zone= East Zone, Co to 3rd adjacent.
 All separation margins (if shown) include rounding.
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
 "«"affixed to 'IN' or 'OUT' values = site inside restricted contour.
 « = Station meets FCC minimum distance spacing for its class.
 Reference station has protected zone issue: Arecibo AM tower

Figure 2b

Contour Overlaps with WIOA and Line-of Sight Projection



Profile Graph

Print Earth Curvature

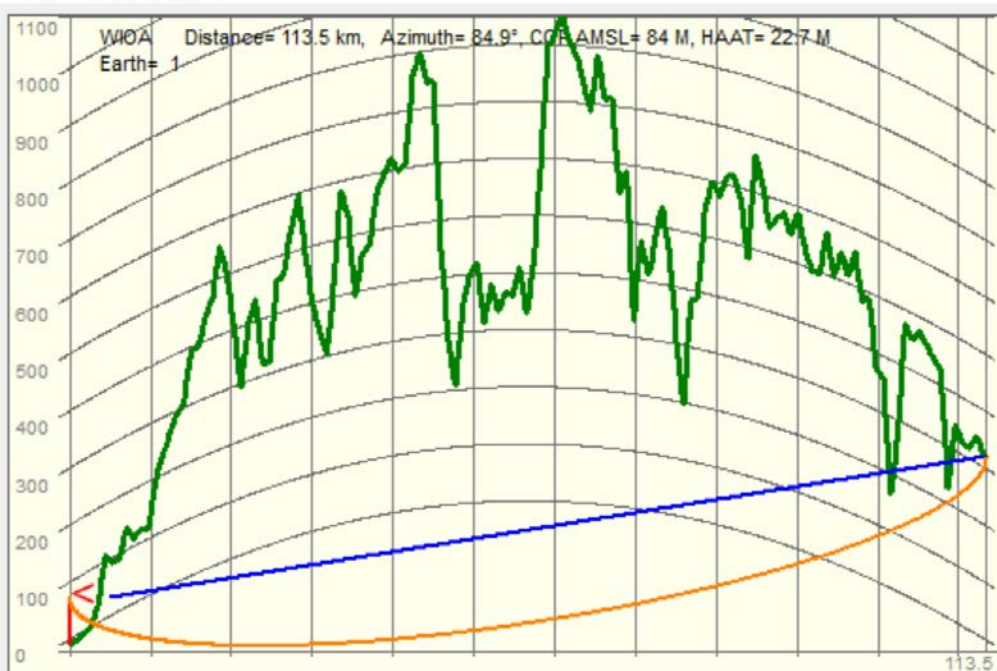
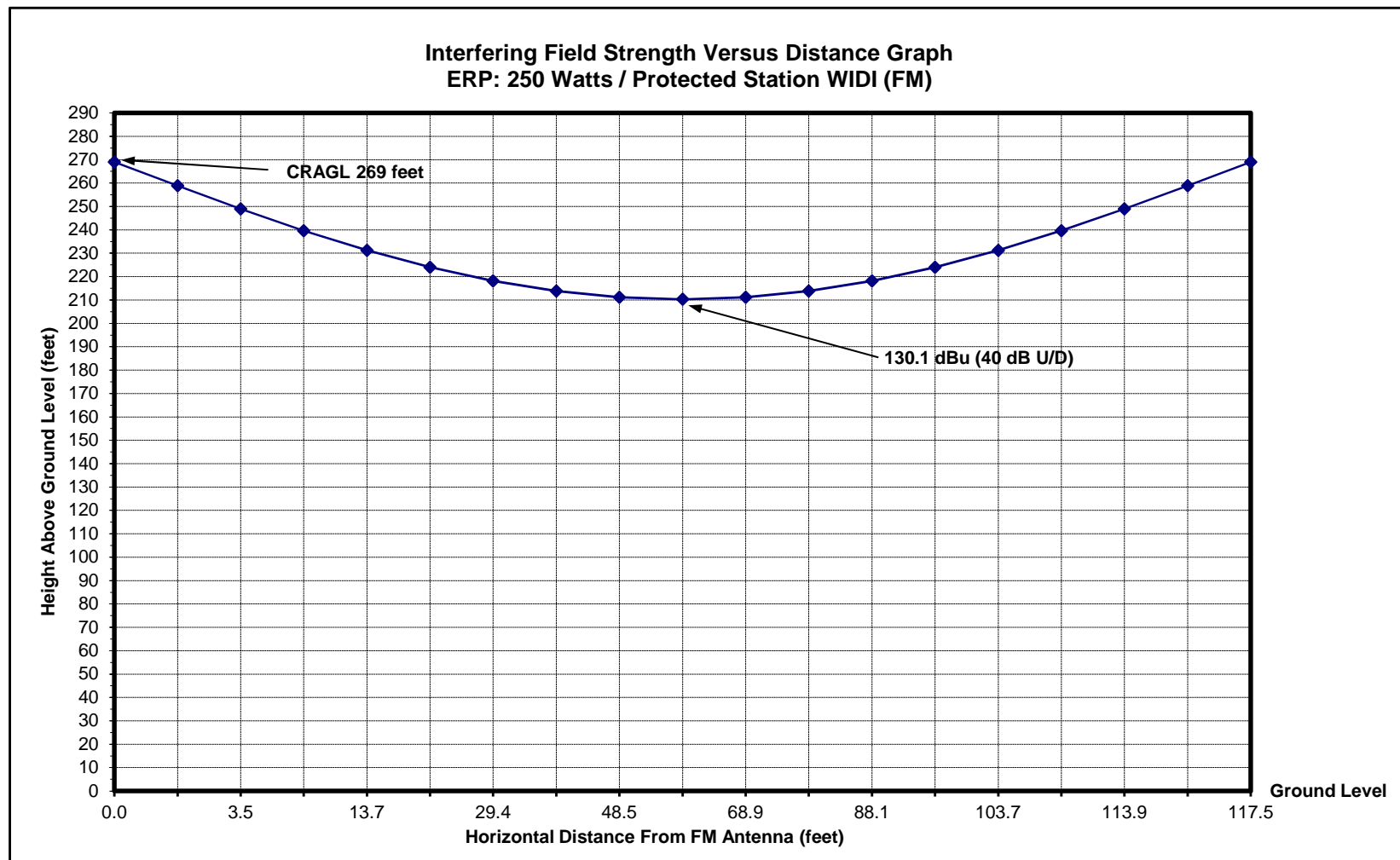


Figure 3

NEW FX WORA			CHANNEL:		260		RCAGL-FT				RCAGL-M		
							269				82.0		
							RCAGL-M				RCAGL-FT		
							82				269		
Interfering Field Strength Vs. Distance Graph													
Antenna: Micronetixx 1 Bay Antenna													
RCAGL		269		feet		IX TO:		ERP:		0.25		kW	
Interfering Contour		130.1		dBu		WIDI				-6.020599913		dBk	
Signal from Station		90.1		dBu									
Depression Angle		VRF		ERP (dBk)		Distance to Contour (m)**		Distance to Contour (feet)**		Horiz. Dist. (feet)		Height AGL (feet)	
90		0.000		-330.3		0.0		0		0		269	
85		0.087		-27.2		3.1		10		1		259	
80		0.174		-21.2		6.2		20		4		249	
75		0.259		-17.8		9.3		30		8		240	
70		0.342		-15.3		12.2		40		14		231	
65		0.423		-13.5		15.1		50		21		224	
60		0.500		-12.0		17.9		59		29		218	
55		0.574		-10.8		20.5		67		39		214	
50		0.643		-9.9		23.0		76		49		211	
45		0.707		-9.0		25.3		83		59		210	
40		0.766		-8.3		27.4		90		69		211	
35		0.819		-7.8		29.3		96		79		214	
30		0.866		-7.3		31.0		102		88		218	
25		0.906		-6.9		32.5		106		96		224	
20		0.940		-6.6		33.6		110		104		231	
15		0.966		-6.3		34.6		113		110		240	
10		0.985		-6.2		35.3		116		114		249	
5		0.996		-6.1		35.7		117		117		259	
0		1.000		-6.0		35.8		117		117		269	

RCAGL-FT	RCAGL-M
269	82.0
RCAGL-M	RCAGL-FT
82	269

Figure 4



Appendix 1

Grafton Olivera, P.E.

Consulting Engineer

February 22 2023

Via email (prcz@naic.edu)

Angel M. Vázquez, Spectrum Manager
National Astronomy and Ionosphere Center
Arecibo Observatory
HC3 Box 53995
Arecibo, PR 00612

Gentlemen:

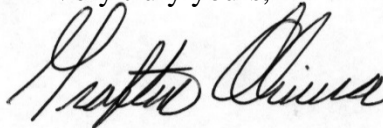
On behalf of our client, Arso Radio Corporation, licensee of AM radio station WORA, 760 KHz in Mayaguez, PR, Facility ID 54480, licensee of FM translator W260DR, in accordance with Section 73.1030 of FCC Rules, we hereby notify of a proposed Minor License Modification for W260DR (FX). The particulars of the proposal are as follows:

Proposed Facility:

Geographical coordinates of antenna location (NAD83): 18-11-22.0 / 67-09-25.0
Antenna RC height: 82 m AGL; 84 m AMSL
Maximum Antenna Gain (horizontal plane): 0 dBd (ND antenna)
Operating channel: 260 (99.9 MHz)
Type of emission: F3E
Effective isotropic radiated power: 0.41 kW – Circular Polarization

Please review this proposal and let me know your findings; feel free to communicate via email (<mailto:Grafton.Olivera@me.com>), telephone (941-323-0381) or regular mail.

Very truly yours,



Grafton Olivera, P.E.
5119 60th Drive E
Bradenton, FL 34203

Tel. 941-323-0381
Email: Grafton.Olivera@me.com