Grafton Olivera, P.E.
Consulting Engineer

TECHNICAL EXHIBIT
MINOR MODIFICATION OF LICENSE
ARSO RADIO CORPORATION
FM TRANSLATOR STATION W285DL
SAN JUAN, PUERTO RICO
CHANNEL 232
FACILITY ID 85936

JULY 29, 2016

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Technical Narrative

The technical exhibit, of which this narrative is part, has been prepared on behalf of ARSO RADIO CORPORATION, licensee of a AM radio station WUNO, 630 KHz in San Juan, PR and FM translator station W285DL, in Hormigueros, PR, Fac. ID 85936. ARSO RADIO CORPORATION is requesting a minor license modification of W285DL to change its facilities to serve as a fill-in translator for AM radio station WUNO, in San Juan, PR.

Proposed Transmitter Location

The proposed transmitting facility would operate on channel 232 using an ERI LPX-2C, 2-bay, circularly polarized antenna, side-mounted on an existing guyed tower. The proposed site location, 78 miles from the existing licensed site (less than the 250 miles allowed by the FCC under the current window), is described by the following NAD27 geographic coordinates:

18° 23’ 00” North
66° 04’ 01” West

It is proposed to side mount the antenna at a height of 80 meters (262 feet) above ground on an existing tower at a site with an elevation of 35 meters AMSL. Thus, the antenna will be mounted at a height of 115 meters AMSL. According to the FCC HAAT web utility, this corresponds to a HAAT of 45.4 meters. The permissible ERP of 250 Watts allowed under the proposed conditions is requested. The proposed tower currently is being used by AM station WSKN, 1320 KHz, San Juan, PR. WSKN is working to move to a new site 9 kilometers apart from this site. It is proposed to mount the W285DL antenna on the proposed tower using a properly designed isolator, as to not affect the operation of WSKN. WSKN antenna impedance will me carefully measured before and after the FM translator antenna is installed, and should there be any significant impedance change, a new license application for WSKN 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 81.1 meter registered tower, ASRN 1025613.

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 6.4 % 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 uW/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 0.525 or less for any depression angle equal or greater than 30 degrees below horizon, a total effective radiated power of 500 watts (circular polarization) and an antenna radiation center height above ground of 80 m, the calculated power density will not exceed 0.8 uW/cm^2. Therefore, the calculated RF exposure at 2 m above ground will not exceed 0.4% of the limit of 200 uW/cm^2 for the general population and uncontrolled environments.

The antenna system is restricted from access and appropriate warning signs are posted. In the event that personnel are required to climb the structure, the FM transmissions of W285DL will be reduced or terminated as necessary to prevent RF exposure above the FCC recommended limits.

* Given that the proposed ERP will not exceed 100 watts, the proposal is categorically excluded from environmental processing pursuant to Section 1.1307 of the FCC Rules.

† 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 53 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 km

Except for WSKN, previously discussed, there are no non-directional AM or directional AM stations located within 6 km of the above specified coordinates. Therefore, no adverse effect is predicted to AM stations and the proposal is believed to be compliant with Section 47 CFR 73.1692.

Fill-In Compliance and Allocation Considerations

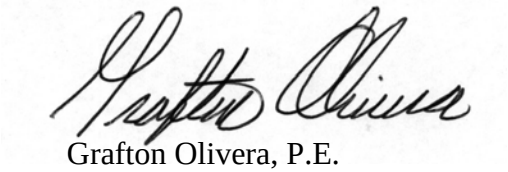
Figure 1 is a Fill-In Compliance map. As shown in Figure 1, the proposed translator 60 dBu contour will be contained within the 25 mile radius of WUNO and within the 2 mV/m contours of WUNO. Figure 2 summarizes the allocation study for the proposed facility. As indicated in Figure 2, there is no co-channel or first-adjacent full-service or translator facility to be concerned about.

The proposed FM station will operate on Channel 232, second adjacent channel to WODA (FM), Channel 234B and third adjacent channel to WZNT (FM), Channel 229B. Thus, the protection requirements of the undesired signal from the proposal is 40 dB higher that the desired signals of these stations. The proposed transmitter site is located 25.4 kilometers, at a bearing of 297 degrees true from stations WZNT and WODA which are co-located and operate with the same antenna height on ND mode. WZNT operates with an ERP of 28 kW and 31 kW; thus protection to WZNT is the determining criteria. WZNT operates

with an ERP of 28 kW and HAAT of 605.2 meters. The predicted WZNT (FM) F(50,50) field strength at the proposed site is 84.8 dBu. Using the U/D ratio of 40 dB, the proposed F(50,10) interfering signal is 124.8 dBu, thus this contour defines the maximum extent of predicted interference.

Since an ERP of 250 watts is proposed, the 137.8 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 124.8 dBu contour would reach is 166 feet at a horizontal distance of 55 feet from the transmitting antenna. This is graphically depicted in Figure 3B. Therefore, no harmful interference is predicted to WZNT or to WODA as a result of the proposed LPFM facility. Figure 3A is a table and Figure 3B a graphic representation showing the computed distances to the predicted 124.8 dBu contour under these assumptions.

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



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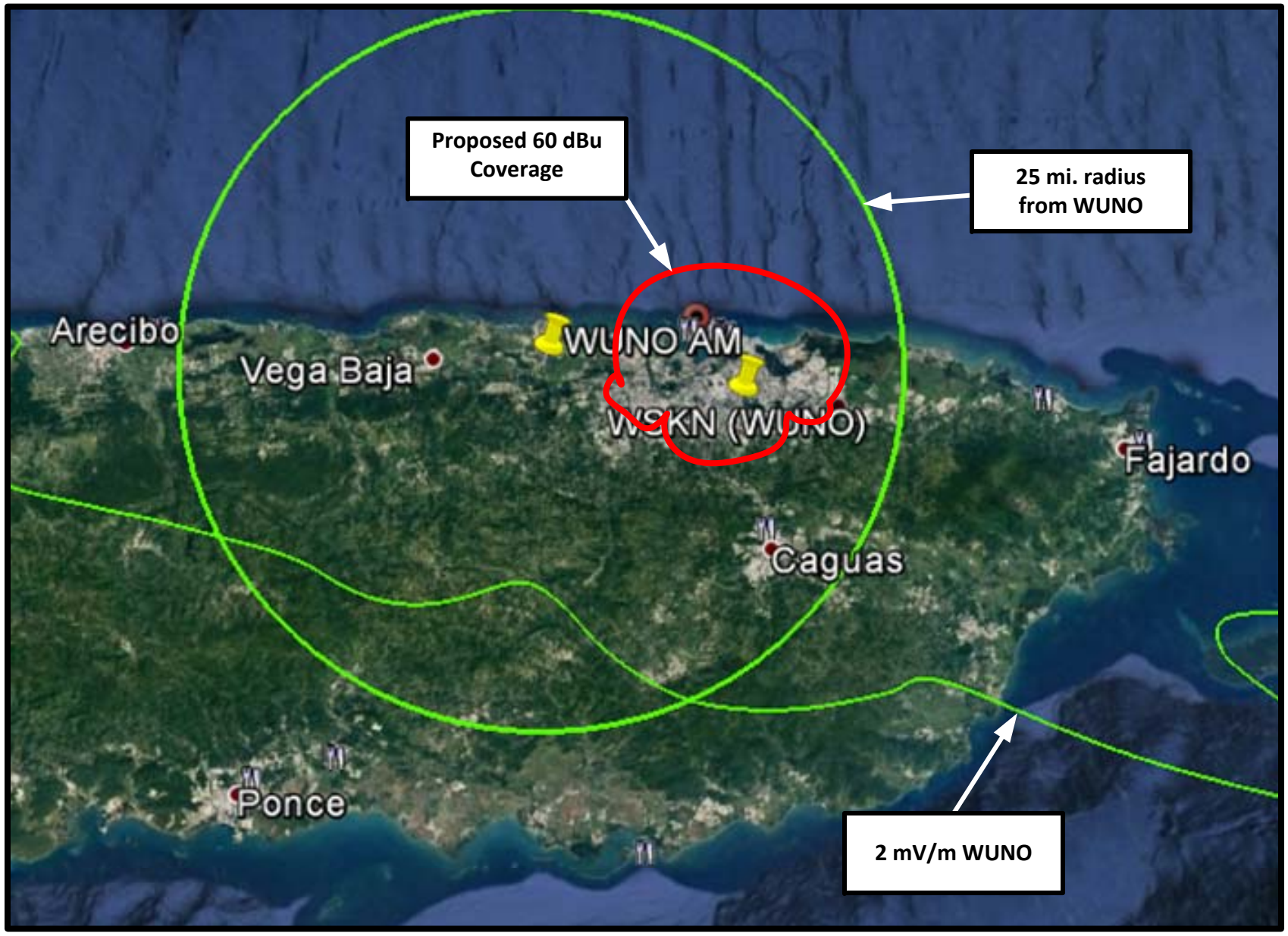
July 29, 2016

Figure 1



AM FILL-IN COMPLIANCE MAP
FM TRANSLATOR W285DL
SAN JUAN, PUERTO RICO
CH 232 (94.3 MHZ) 0.250 KW ND

FIGURE 2

285DL ALLOCATION STUDY / WUNO-AM TRANSLATOR STUDY

V-SOFT FM COMMANDER@2016

WUNO STUDIOS TWR, RC 262 ft (80 M) AGL, HAAT 45.4 M, CH. 232, 250 WATTS ERP

Call	Type	Ch	Location		Azi	Dist	In	Out
WODA	LIC	234B	Bayamon	PR	117.2	25.35	5.9	-70.4*
WZNT	LIC-N	229B	San Juan	PR	117.2	25.35	6.3	-69.4*
WNOD	LIC	231B	Mayaguez	PR	255.3	100.69	0.4	0.4
NEW		232C	British Virgin	BV	88.4	149.52	6.2	78.0
WZNT-FM1	LIC	229D	Ceiba	PR	105.1	43.49	30.7	22.4
WODA-FM1	LIC	234D	Ceiba	PR	105.1	43.49	30.7	22.4

End of Screen List, Cardinal Radials = 12

Figure 3A

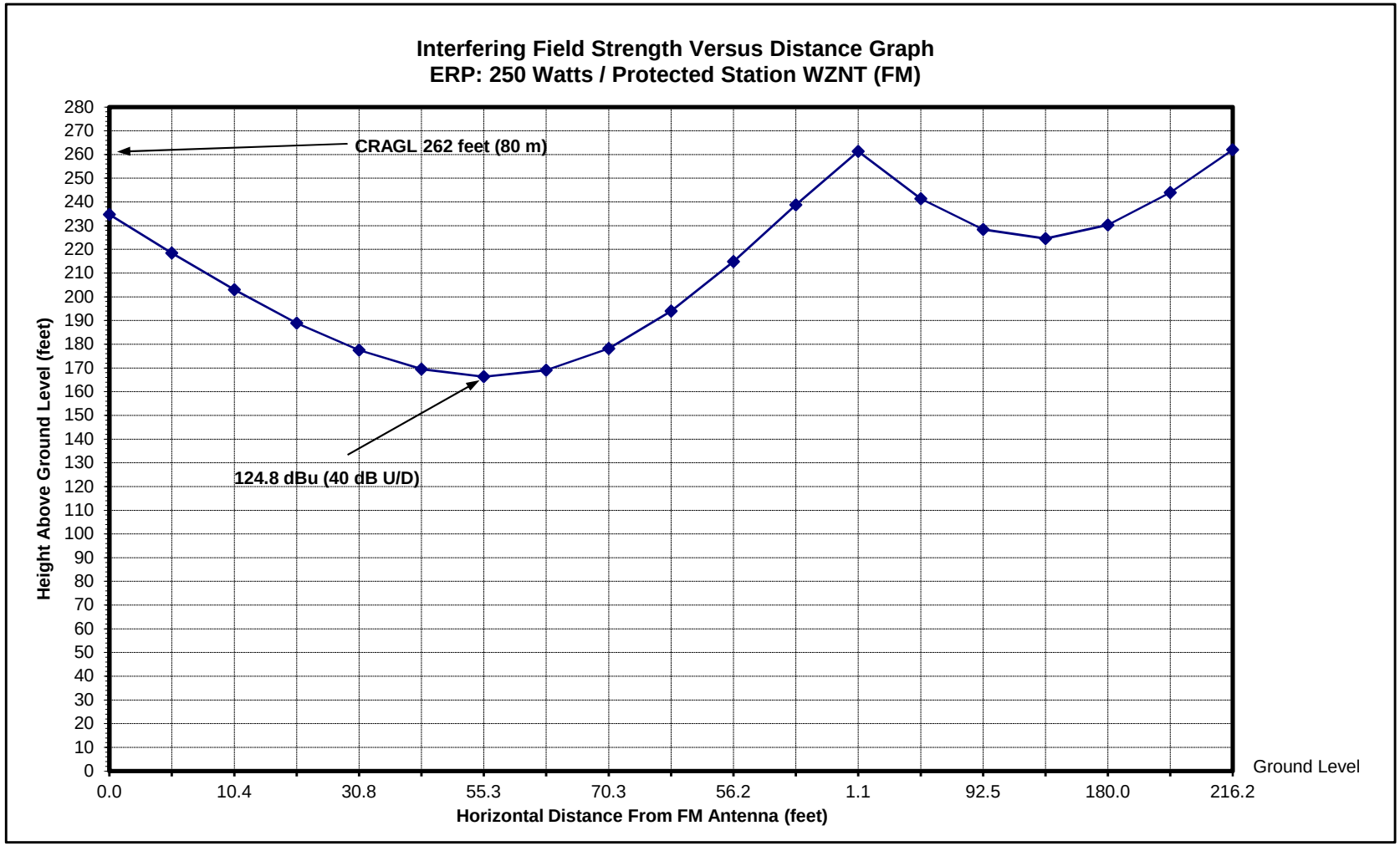
Interfering Field Strength Vs. Distance Graph

Antenna: ERI 2-bay, 1.0 WL		
RCAGL	*262*	feet
Interfering Contour	*124.8*	dBu
Signal from Station	*84.8*	dBu

ERP	*0.25*	kW
	-6.0205999	dBk

Depression Angle	VRF	ERP (dBk)	Distance to Contour (m)**	Distance to Contour (feet)**	Horiz. Dist. (feet)	Height AGL (feet)
90	0.126	-24.0	8.3	27	0	235
85	0.202	-19.9	13.3	44	4	218
80	0.277	-17.2	18.3	60	10	203
75	0.350	-15.1	23.1	76	20	189
70	0.416	-13.6	27.4	90	31	177
65	0.472	-12.5	31.1	102	43	169
60	0.511	-11.9	33.7	111	55	166
55	0.525	-11.6	34.6	114	65	169
50	0.506	-11.9	33.4	109	70	178
45	0.445	-13.1	29.3	96	68	194
40	0.339	-15.4	22.3	73	56	215
35	0.187	-20.6	12.3	40	33	239
30	0.006	-50.5	0.4	1	1	261
25	0.226	-18.9	14.9	49	44	241
20	0.455	-12.9	30.0	98	92	228
15	0.669	-9.5	44.1	145	140	225
10	0.845	-7.5	55.7	183	180	230
5	0.960	-6.4	63.3	208	207	244
0	1.000	-6.0	65.9	216	216	262

Figure 3B


Interfering Field Strength Versus Distance Graph
ERP: 250 Watts / Protected Station WZNT (FM)
CRAGL 262 feet (80 m)
124.8 dBu (40 dB U/D)
Height Above Ground Level (feet)
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0.0
10.4
30.8
55.3
70.3
56.2
1.1
92.5
180.0
216.2
Ground Level
Horizontal Distance From FM Antenna (feet)

Appendix 1

Grafton Olivera, P.E.
Consulting Engineer

July 29, 2016

Via email (prcz@naic.edu)

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

Gentlemen:

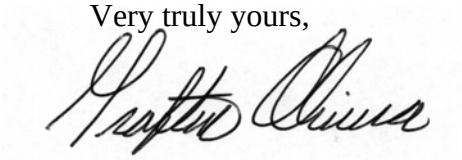
On behalf of my client, ARSO RADIO CORP. licensee of AM station WUNO, in San Juan, PR, in accordance with Section 73.1030 of FCC Rules, I hereby notify proposed changes to FM Translator Station W285DL. The particulars of the proposal are as follows:

Proposed Facility:

Geographical coordinates of antenna location (NAD27): 18-23-00 / 66-04-01
Antenna height: 80 m AGL; 115 m AMSL
Antenna Gain: 1.0 X (0 dBd)
Antenna Orientation: ND
Operating channel: 232 (94.3 MHz)
Type of emission: F3E
Effective isotropic radiated power: 0.41 kW – Circular Polarization

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

Very truly yours,



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