

TECHNICAL EXHIBIT
CONSTRUCTION PERMIT APPLICATION
MINOR MODIFICATION OF LICENSE
INTERNATIONAL BROADCASTING CORPORATION
FM STATION WIOA
SAN JUAN, PUERTO RICO
FACILITY ID 8151

December 12, 2018

CH 260B 31 KW CPOL 289 M

TECHNICAL EXHIBIT
CONSTRUCTION PERMIT APPLICATION
MINOR MODIFICATION OF LICENSE
INTERNATIONAL BROADCASTING CORPORATION
FM STATION WIOA
SAN JUAN, PUERTO RICO
FACILITY ID 8151
CH 260B 31 KW 289 M

Table of Contents

Technical Narrative

Figure 1	Engineering Specifications
Figure 2	Transmitter Site Location
Figure 3	Proposed Antenna and Supporting Structure
Figure 4	Summary of Allocation Analysis
Figure 5	Predicted Coverage Contours
Appendix 1	Towair Study Determination
Appendix 2	HAAT Calculation (FCC Web Site Tools)
Appendix 3	Notification to Arecibo Observatory
Appendix 4	Antenna Pattern Data
Appendix 5	Tabulation of Calculations of 70 dBu Contour

TECHNICAL EXHIBIT
CONSTRUCTION PERMIT APPLICATION
MINOR MODIFICATION OF LICENSE
INTERNATIONAL BROADCASTING CORPORATION
FM STATION WIOA
SAN JUAN, PUERTO RICO
FACILITY ID 8151

CH 260B 31 KW 289 M

Technical Narrative

The technical exhibit of which this narrative is part has been prepared on behalf of International Broadcasting Corporation (IBC), licensee of FM broadcast station WIOA in San Juan, Puerto Rico. By means of this application, IBC seeks a construction permit (CP) to make minor changes in the licensed facilities of WIOA. It is proposed to change the transmitter site to a location 25 kilometers from the licensed site, closer to the COL, San Juan, and to modify the antenna HAAT. Specifications for the proposed operation are included herein as Figure 1.

It is proposed to mount the antenna on an existing 200 ft tower (of former WJSU-TV, relinquished in the TV repacking) whose structure was significantly damaged by Hurricane Maria and is currently being repaired and conditioned. The tower being reconstructed is 61 meters (200 ft.) of overall height AGL and according to the TOWAIR study, shown in Appendix 1, does not require registration. The antenna radiation center will be at a HAAT of 289 m AMSL, as per calculations performed using the FCC Web site HAAT Calculation tools, shown in Appendix 2. The applicant certifies that the proposed reconstruction will not have a significant environmental impact, as defined by 47 CFR 1.1307. There are no AM stations within 7.9 kilometers of the proposed site, thus no adverse effects to AM stations will be caused by the reconstructed tower.

It is believed that the proposal conforms to the applicable rules and regulations of the Federal Communications Commission.

Transmitter Location

The proposed transmitting facility will use a new Micronetixx circularly polarized, 12 bay, half wavelength antenna that will be shared with station WQBS-FM (Channel 299B, also of IBC), that is also requesting relocation to this site. A properly designed combiner with a minimum isolation of 35 dB will be used to feed the signals of both stations to a common wide band antenna. The new Micronetixx antenna will be side-mounted at height of 50.2 m AGL on the uniform cross-section, guyed tower. It is proposed to use an ERP of 31 kW, circular polarization.

The following NAD27 geographic coordinates describe the proposed WIOA site location:

18° 16' 30.0" North Latitude
66° 05' 35.9" West Longitude

A map showing the location of the proposed transmitter site is included herein as Figure 2. A sketch showing the proposed antenna and supporting structure is included herein as Figure 3.

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 the proposed modification. Copy of the notification letter to the Arecibo Observatory is included in Appendix 3.

Environmental Considerations

The proposed WIOA antenna will be side-mounted on the proposed tower with the antenna RC located 50.2 meters above ground level with a height above mean sea level of 500.2 meters. A maximum radiated power (ERP) of 31 kW circular polarization is proposed.

With respect to the potential for human exposure to radio frequency (RF) energy, calculations prepared in accordance with FCC Bulletin OET-65.* Indicate that the proposal will not result in human exposure to RF energy at ground level in excess of FCC

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

standards. The calculation at 2-m above ground was made using the following formula from the OET-65 document:

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

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 a “worst-case” vertical relative field value of 0.211 for any depression angle greater than 10 degrees below horizon (see Appendix 4, vertical plane radiation pattern), a total ERP of 62 kW (H+V) and an antenna center of radiation height above ground level of 50.2 meters, the calculated power density at two meters above ground level at the base of the tower is 39.7 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$), or 19.8 % of the Commission’s recommended limit applicable to uncontrolled exposure areas ($200 \mu\text{W}/\text{cm}^2$ for the FM band). The other station to be collocated, WQBS-FM, has similar specifications, and based on a “worst-case” vertical relative field value of 0.213 for any depression angle greater than 10 degrees below horizon (see Appendix 4, vertical plane radiation pattern), a total ERP of 66 kW (H+V) and an antenna center of radiation height above ground level of 50.2 meters, the calculated power density at two meters above ground level at the base of the tower is 43 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$), or 21.5 % of the Commission’s recommended limit applicable to uncontrolled exposure areas ($200 \mu\text{W}/\text{cm}^2$ for the FM band). Thus the total RF exposure caused by both stations would not exceed 41.3 % of the Commission’s recommended limit for uncontrolled exposure areas. Therefore, the proposal is believed to comply with the FCC limits for human exposure to RF energy.

Access to the tower will be restricted with a locked fence, appropriately marked with potential RF radiation exposure warning signs. Since this is a multiuser site, there will be in place a coordination agreement so the proposed transmission facilities, reduce power or cease operation altogether, as necessary, to prevent RF exposure above FCC limits.

FCC Monitoring Station at Santa Isabel

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. Since the proposed site is located at a distance of 42 kilometers from the Santa Isabel FCC monitoring station, the signal of WIOA (FM) will be well below 10 mV/m at the FCC station; no interference problems to the monitoring station at Santa Isabel are expected.

Allocation Considerations

Figure 4 summarizes the allocation study for the proposed facility of WIOA. Figure 4a shows the current licensed channel allocation and Figure 4b shows the allocation situation of the proposed facility. As shown in Figure 4b, the proposed facility of WIOA will comply with all FCC protection requirements.

City Coverage and Impact on Radio Multiple Ownership

Figure 5 is a map showing the predicted coverage contours of the licensed and proposed facilities of WIOA. The proposed 70 dBu will encompass 100% of the city and of the municipality of San Juan (obtained from the 2010 Census). A study of line-of-sight conditions with the city of San Juan from the proposed site shows that line-of-sight conditions are fully adequate. A tabulation of predicted distances to the 70 dBu contour is shown in Appendix 5.

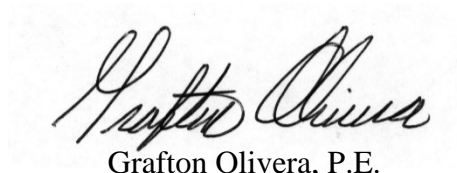
As can be appreciated in Figure 5, the coverage of WIOA of San Juan is fully adequate and not significantly changed and should have little impact in the situation of IBC as to Radio Multiple Ownership.

Coverage, Protected and Interfering Contours

The predicted coverage, protected and interfering contours were calculated in accordance with the provisions of 47 CFR 73.313. In accordance with current FCC practice, no consideration was given to terrain roughness correction factors.

The “blanketing” contour for a 31 kilowatt FM station, as defined by 47 CFR 73.318, extends approximately 2.19 kilometers from the transmitter site. There are several FM and TV stations within this distance. While no receiver-induced inter-modulation interference or blanketing interference is expected, the applicant is fully aware of its responsibility to remedy complaints of blanketing interference, as required by 47 CFR 73.318, and to protect existing facilities in accordance with all the applicable rules.

The predicted contours were calculated in accordance with Section 73.313 of the FCC Rules, using the V-Soft FMCommander@2016 software in conjunction with the 30-second Global terrain database; contour calculation were made using an evenly spaced set of 72 radials. The antenna height elevation above average terrain of the proposed RC height was used in conjunction with the propagation prediction curves of Section 73.333 to determine the distances to contours.

A handwritten signature in black ink, appearing to read 'Grafton Olivera', is centered on the page. The signature is fluid and cursive, with the first name 'Grafton' and last name 'Olivera' clearly distinguishable.

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

(941) 323-0321

December 12, 2018

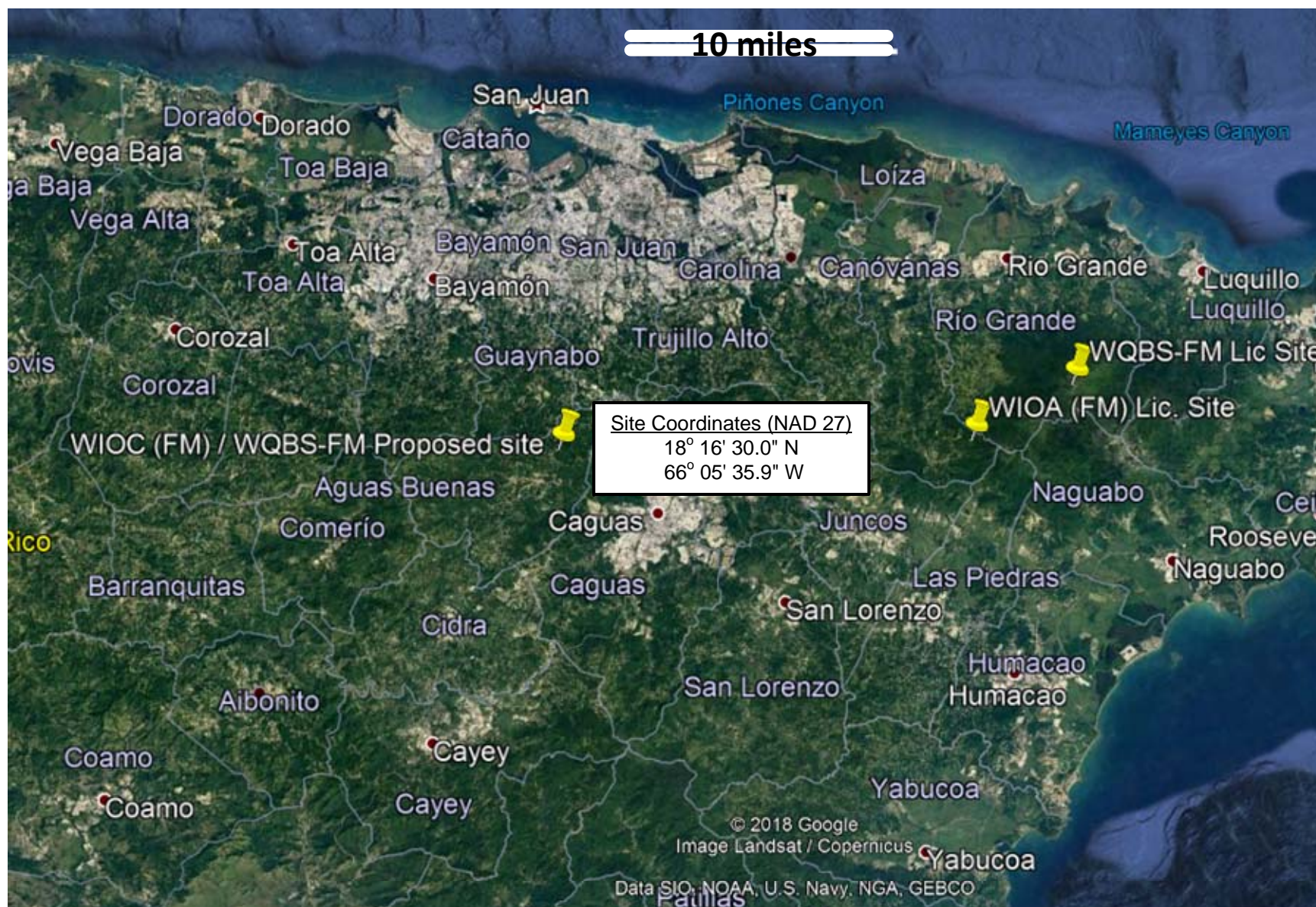
Figure 1

TECHNICAL EXHIBIT
CONSTRUCTION PERMIT APPLICATION
MINOR MODIFICATION OF LICENSE
INTERNATIONAL BROADCASTING CORPORATION
FM STATION WIOA
SAN JUAN, PUERTO RICO
FACILITY ID 8151
CH 260B 31 KW 289 M

Engineering Specifications

Channel / Frequency	260B / 99.9 MHz
Site Coordinates (NAD27)	18° 16' 30.0" North Latitude 66° 05' 35.9" West Longitude
Site elevation	450 m AMSL
Overall height of antenna structure	61 m AGL / 511 m AMSL
Height of antenna radiation center	50.2 m AGL / 500.2 m AMSL
Antenna radiation center HAAT	289 m AMSL
Transmitter	Type Approved
Transmitter power output	10 kW
Transmission line, 3" air-dielectric	Andrew, HJ8-50B
Transmission line length	83.8 m
Transmission line efficiency, including 0.2 dB combiner loss	87.3 %
Antenna	Micronetixx FMP-12, half wavelength
Polarization	Circular (50/50)
Power gain	3.52 Circular Pol
Antenna input power	8.73 kW
Effective radiated power	31 kW Circular Pol.

Figure 2



INTERNATIONAL BROADCASTING CORPORATION

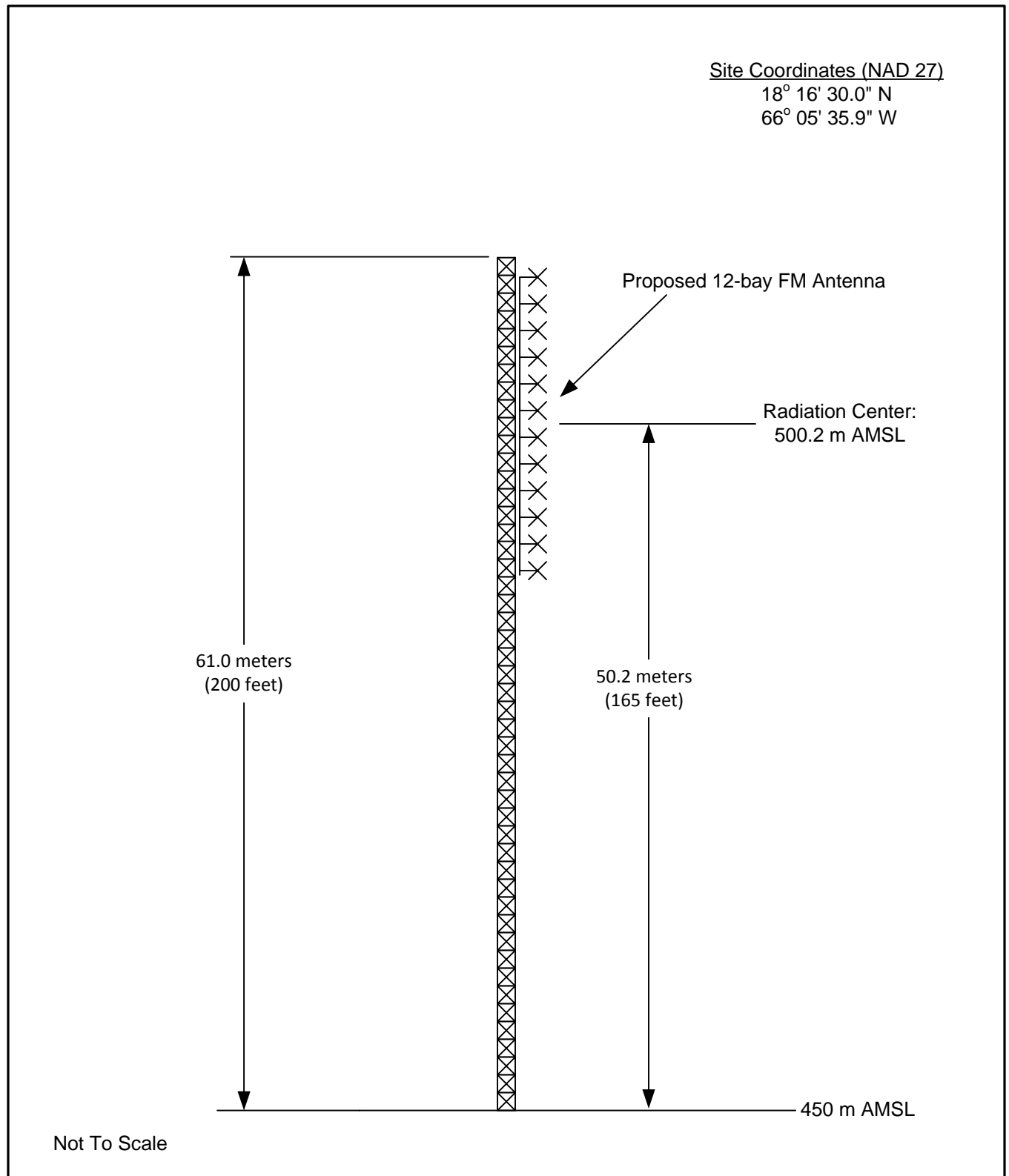
FM STATION WIOA

SAN JUAN, PUERTO RICO

CH 260B 31KW CPOL 289 M HAAT

Grafton Olivera, P.E. – Consulting Engineer

Figure 3



PROPOSED ANTENNA AND SUPPORTING STRUCTURE

INTERNATIONAL BROADCASTING CORPORATION

FM STATION WIOA

SAN JUAN, PUERTO RICO

CH 260B 31 KW CPOL 289 M HAAT

Grafton Olivera, P.E. – Consulting Engineer

Figure 4a

ALLOCATION STUDY – LICENSED FACILITY WIOA

WIOA LICENSED ALLOCATION SUMMARY

N. Lat. 18 16 44.0	787 m COR	PR_VI Tables	San Juan PR	M	WIOA FM Licensed
W. Lng. 65 51 12.0	31.0 kW	CH 260. 99.9 B	560.0 m HAAT		WIOA 12-12-18

<u>Call</u>	<u>Type</u>	<u>Ch</u>	<u>Location</u>		<u>Azi</u>	<u>Dist</u>	<u>FCC</u>	<u>Margin</u>
WIOA	LIC	260B	San Juan	PR	0.0	0.00	240.5	-240.5
WIOA-FM1	LIC	260D	Ceiba	PR	89.2	19.47	177.5	-158.0
W258DT	CP-D	258D	San Juan	PR	286.1	28.56	53.5	-24.9

End of Screen List, Cardinal Radials = 72

WIOA LICENSED ALLOCATION REPORT

International Broadcasting Corporation

REFERENCE		CLASS = B	DISPLAY DATES
18 16 44.0 N.			DATA 12-11-18
65 51 12.0 W.	PR & VI Spacings to 3rd Adj.		SEARCH 12-12-18
----- Channel 260 - 99.9 MHz -----			

Call	Channel	Location		Azi	Dist	FCC	Margin
WIOA	LIC 260B	San Juan	PR	0.0	0.00	240.5	-240.5
WIOA-FM1	LIC 260D	Ceiba	PR	89.2	19.47	177.5	-158.0
W258DT	CP -D 258D	San Juan	PR	286.1	28.56	53.5	-24.9

Reference station has protected zone issue: Arecibo
All separation margins include rounding

ALLOCATION STUDY – PROPOSED FACILITY WIOA

WIOA PROPOSED ALLOCATION SUMMARY

N. Lat. 18 16 30.0	500.2 m COR	PR_VI Tables	San Juan PR	M	WIOA FM Prop
W. Lng. 66 05 35.9	31.0 kW	CH 260. 99.9 B	289.0 m HAAT		WIOA 12-12-18

<u>Call</u>	<u>Type</u>	<u>Ch</u>	<u>Location</u>		<u>Azi</u>	<u>Dist</u>	<u>FCC</u>	<u>Margin</u>
WIOA	LIC	260B	San Juan	PR	89.0	25.37	240.5	-215.1
WIOA-FM1	LIC	260D	Ceiba	PR	89.1	44.85	177.5	-132.7
W258DT	CP-D	258D	San Juan	PR	346.0	8.55	53.5	-45.0
W260DR	CP	260D	Mayaguez	PR	265.4	112.91	111.5	1.4

End of Screen List, Cardinal Radials = 72

WIOA PROPOSED ALLOCATION REPORT

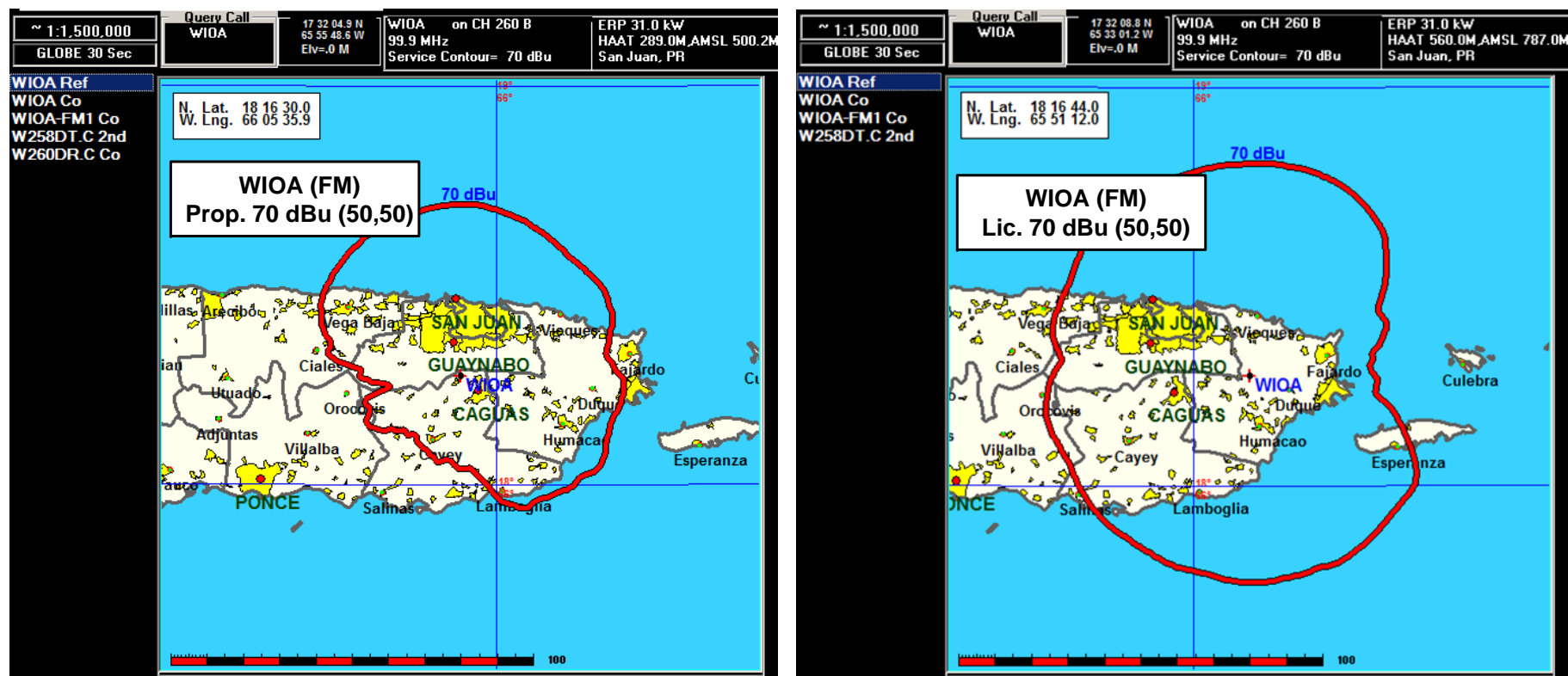
International Broadcasting Corporation

REFERENCE		CLASS = B	DISPLAY DATES
18 16 30.0 N.			DATA 12-11-18
66 05 35.9 W.	PR & VI Spacings to 3rd Adj.		SEARCH 12-12-18
----- Channel 260 - 99.9 MHz -----			

Call	Channel	Location		Azi	Dist	FCC	Margin
WIOA	LIC 260B	San Juan	PR	89.0	25.37	240.5	-215.1
WIOA-FM1	LIC 260D	Ceiba	PR	89.1	44.85	177.5	-132.7
W258DT	CP -D 258D	San Juan	PR	346.0	8.55	53.5	-45.0
W260DR	CP 260D	Mayaguez	PR	265.4	112.91	111.5	1.4

Reference station has protected zone issue: Arecibo
All separation margins include rounding

Figure 5



PREDICTED COVERAGE CONTOUR – LICENSED & PROPOSED

FM STATION WIOA
 SAN JUAN, PUERTO RICO
 CH 260B 31 KW CPOL 289 M HAAT
 Grafton Olivera, P.E. – Consulting Engineer

TOWAIR Determination Results

*** NOTICE ***

TOWAIR's findings are not definitive or binding, and we cannot guarantee that the data in TOWAIR are fully current and accurate. In some instances, TOWAIR may yield results that differ from application of the criteria set out in 47 C.F.R. Section 17.7 and 14 C.F.R. Section 77.13. A positive finding by TOWAIR recommending notification should be given considerable weight. On the other hand, a finding by TOWAIR recommending either for or against notification is not conclusive. It is the responsibility of each ASR participant to exercise due diligence to determine if it must coordinate its structure with the FAA. TOWAIR is only one tool designed to assist ASR participants in exercising this due diligence, and further investigation may be necessary to determine if FAA coordination is appropriate.

DETERMINATION Results

Structure does not require registration. There are no airports within 8 kilometers (5 miles) of the coordinates you provided.

Your Specifications

NAD83 Coordinates

Latitude	18-16-22.8 north
Longitude	066-05-34.5 west

Measurements (Meters)

Overall Structure Height (AGL)	61
Support Structure Height (AGL)	5
Site Elevation (AMSL)	450

Structure Type

GTOWER - Guyed Structure Used for Communication Purposes

[Tower Construction Notifications](#)

Notify Tribes and Historic Preservation Officers of your plans to build a tower.

CLOSE WINDOW

Appendix 2

Antenna Height Above Average Terrain Calculations -- Results

Input Data

Latitude **18° 16' 22.8"** North

Longitude **66° 5' 34.5"** West (NAD 83)

Height of antenna radiation center above mean sea level: **500.2** meters AMSL

Number of Evenly Spaced Radials = **8** 0° is referenced to True North

Results

Calculated HAAT = **289 meters**

Antenna Height Above Average Terrain calculated
using 1 km [GLOBE terrain data](#)

Individual "Radial HAAT" Values, in meters

0°	441.3 m
45°	387.6 m
90°	373.0 m
135°	369.5 m
180°	121.5 m
225°	83.3 m
270°	135.3 m
315°	401.9 m

Print Results?

New Calculation?

Appendix 3

Grafton Olivera, P.E.

Consulting Engineer

December 12, 2018

Via email (prcz@naic.edu)

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

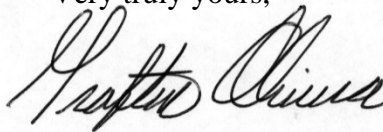
Gentlemen:

On behalf of our client, International Broadcasting Corporation, licensee of FM station WIOA in San Juan, Puerto Rico, in accordance with Section 73.1030 of FCC Rules, we hereby notify of a proposed Construction Permit (CP) for WIOA. The particulars of the proposal are as follows:

Geographical coordinates of antenna location (NAD27): 18-16-30.0 / 66-05-35.9
Antenna height: 50.2 m AGL; 500.2 m AMSL
Antenna Gain (horizontal plane): 0 dBd (non-directional)
Operating channel: 260B, 99.9 MHz
Type of emission: F3E
Effective isotropic radiated power: 50.8 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.

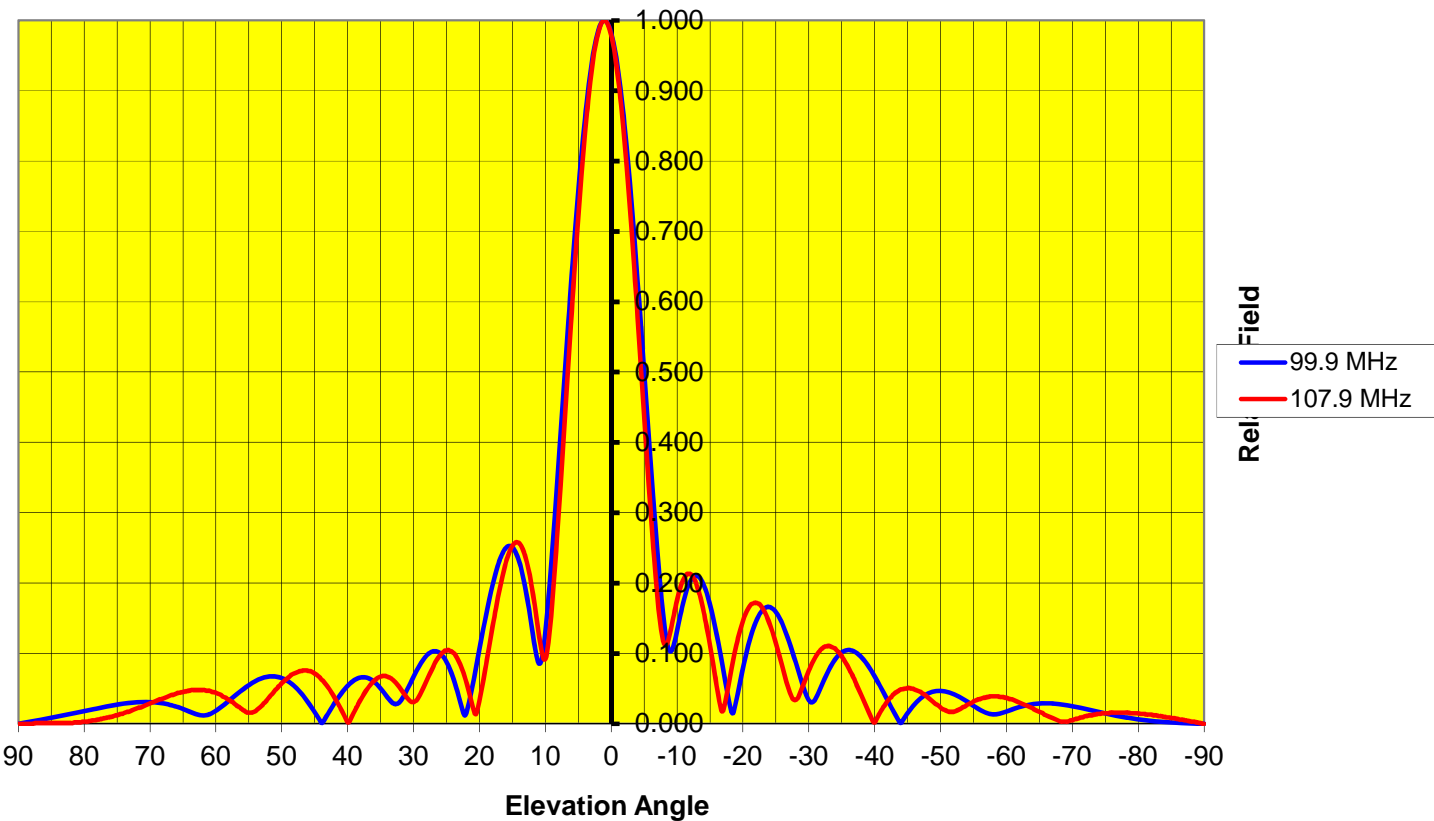
Very truly yours,



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

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

Appendix 4



99.9 MHz

Gain over Dipole	Gain over Isotropic Radiator	Electrical Number	Amplitude Position	Phase
7.04	11.55	12.0	1903.0	1.0
3.52 G (CP)		11.0	1730.0	1.0
		10.0	1557.0	1.0
		9.0	1384.0	1.0
		8.0	1211.0	1.0
		7.0	1038.0	1.0
		6.0	865.0	1.0
		5.0	692.0	1.0
		4.0	519.0	1.0
		3.0	346.0	1.0
		2.0	173.0	1.0
		1.0	0.0	1.0

107.9 MHz

Gain over Dipole	Gain over Isotropic Radiator	Electrical Number	Amplitude Position	Phase
7.55	12.38	12.0	2057.0	1.0
3.77 G (CP)		11.0	1870.0	1.0
		10.0	1683.0	1.0
		9.0	1496.0	1.0
		8.0	1309.0	1.0
		7.0	1122.0	1.0
		6.0	935.0	1.0
		5.0	748.0	1.0
		4.0	561.0	1.0
		3.0	374.0	1.0
		2.0	187.0	1.0
		1.0	0.0	1.0

Appendix 5

TABULATION OF CALCULATION OF 70 DBU CONTOUR - WIOA PROPOSED

N. Lat. = 181630.0 W. Lng. = 660535.9

HAAT and Distance to Contour,

FCC, FM 2-10 Mi, 51 pts Method - GLOBE 30 SEC

AZIM.	AV. ELEV.	ERP kW	70 dBu F5050
0	57.3	31	47.54
5	55.4	31	47.64
10	60.5	31	47.37
15	68.0	31	46.97
20	73.0	31	46.72
25	84.8	31	46.10
30	92.5	31	45.71
35	100.9	31	45.29
40	111.9	31	44.75
45	111.7	31	44.76
50	102.3	31	45.22
55	89.9	31	45.84
60	87.3	31	45.97
65	101.3	31	45.27
70	113.9	31	44.65
75	154.9	31	42.55
80	185.4	31	40.85
85	169.0	31	41.77
90	126.4	31	44.05
95	103.5	31	45.16
100	113.5	31	44.67
105	130.5	31	43.84
110	132.3	31	43.75
115	121.6	31	44.28
120	94.8	31	45.60
125	90.2	31	45.83
130	133.2	31	43.70
135	131.2	31	43.81
140	156.0	31	42.49
145	168.9	31	41.78
150	188.9	31	40.66
155	179.5	31	41.19
160	230.0	31	38.30
165	297.2	31	33.73
170	355.8	31	28.60
175	384.5	31	26.07

AZIM.	AV. ELEV.	ERP kW	70 dBu F5050
180	382.4	31	26.27
185	397.3	31	24.74
190	403.1	31	24.06
195	394.6	31	25.03
200	404.7	31	23.88
205	412.5	31	22.91
210	415.8	31	22.48
215	427.7	31	20.88
220	421.5	31	21.73
225	420.5	31	21.86
230	406.1	31	23.70
235	375.8	31	26.85
240	355.0	31	28.67
245	354.8	31	28.69
250	378.4	31	26.63
255	374.3	31	26.98
260	433.1	31	20.14
265	408.8	31	23.36
270	366.2	31	27.68
275	329.3	31	30.97
280	249.1	31	37.14
285	245.6	31	37.36
290	191.1	31	40.53
295	159.2	31	42.32
300	128.9	31	43.92
305	115.7	31	44.56
310	102.2	31	45.23
315	95.8	31	45.55
320	85.6	31	46.07
325	77.1	31	46.50
330	72.6	31	46.74
335	70.5	31	46.84
340	70.2	31	46.86
345	66.2	31	47.07
350	60.5	31	47.37
355	57.3	31	47.54

Ave EI= 203.72 M HAAT= 289.0 M AMSL= 500.2 M