

TECHNICAL EXHIBIT  
APPLICATION FOR MINOR LICENSE CHANGE  
BOOSTER STATION WIOA-FM1  
CEIBA, PUERTO RICO  
FACILITY ID 171638

March 10, 2022

CH 260D 0.21 KW 315 M AMSL

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Engineering Statement

This Technical Exhibit was prepared on behalf of International Broadcasting Corporation, licensee of FM Booster station WIOA-FM1, Facility ID 171638, Ceiba, Puerto Rico, in support of an application for a modification of its existing license. The instant application proposes a change of site and transmission parameters to conform the facility to the recently constructed CP of WIOA (FM), in process of being licensed. The proposed booster facility will operate on Channel 260 (99.9 MHz) with an antenna radiation center height above mean sea level of 315 meters, using a PSI, single bay, circularly polarized antenna and an ERP of 0.21 kW. The proposed operating parameters are shown in Figure 1.

Proposed Transmitter Location

The proposed facility would operate from an existing registered tower, located 0.29 kilometers S-SW of the licensed site. The proposed site location is described by the following NAD83 geographic coordinates:

18° 16' 42.8" North  
65° 40' 11.6" West

The overall height above ground of the tower is 24.4 meters and is registered with the FCC with ASRN 1298084. No changes are proposed to the existing structure.

Notification of FCC Monitoring Station and Arecibo Observatory

FCC rules, Section 73.1030(c), requires that the proposed facility do 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, Puerto Rico, at 80.5 kilometers on a

bearing of 248° True. The proposed operation will produce field strengths much lower than 10 mV/m at the FCC Santa Isabel, PR station; notification to the FCC monitoring station is deemed necessary.

Pursuant to Section 73.1030 of the FCC Rules, the Arecibo Observatory has been notified of the proposed facility. Copy of the notification letter is included in Appendix 1.

#### Environmental Considerations Environmental Considerations\*

The proposal will comply with the FCC Rules concerning human exposure to radio frequency (RF) energy. The calculation of RF energy at 2-m above ground was made under the procedures of OET Bulletin No. 65.<sup>†</sup> 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.

The proposed antenna, a single bay PSI circularly polarized antenna, will be mounted with radiation center at a height of 24.1 meters on the tower; a total ERP of 420 Watts (Circular) is proposed. For a maximum antenna field factor of 0.87 for any angle greater than 30° below horizon, at a height of 2 mts AGL, the RF field will not exceed 21.7  $\mu\text{W}/\text{sq.cm.}$  or 10.9 % of the 200  $\mu\text{W}/\text{sq.cm.}$  allowed for a non-controlled, public environment in the FM band. Since the RF exposure will be below the FCC limits for uncontrolled environments, the proposal is believed to comply with the FCC guidelines for human exposure to RF radiation.

The applicant will verify that access to the tower site is restricted, and the site is appropriately marked with RFR warning signs. In addition, as this is a multi-user site, procedures will be in effect to coordinate in the event that workers or other authorized personnel need to enter the restricted area or climb the tower to ensure that appropriate measures will be taken to assure worker safety with respect to radio frequency radiation exposure. Such procedures include wearing RFR exposure monitors or scheduling work when the station is shut down.

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\* This statement addresses only human exposure to radiofrequency radiation and not to other non-radiofrequency radiation matters listed in the National Environmental Policy Act of 1969.

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

Allocation Study

Figure 2 shows the allocation study for the proposed facility as shown in Figure 2, there is no conflict with other authorized FM facilities.

Predicted Coverage Contour

Figure 3 shows the predicted 54 dBu coverage contours for the proposed facility and the WIOA Main CP. Contours were calculated in accordance with Section 73.313 of the FCC Rules. The average terrain elevations from 3 to 16 km from the proposed site were computed using the Globe 30-second terrain database. The antenna radiation center height above average terrain and the ERP in each radial direction at every degree of azimuth were used in conjunction with the propagation prediction curves of Section 73.333 to determine the distances to the contour. The V-Soft FMCommader@2022 software was used to perform the calculations.

As shown in Figure 3, the proposed WIOA-FM1 facility 54 dBu F50,50 contour will be within the 54 dBu contour of the WIOA(FM) CP. Appendix 2 shows the distance to 54 dBu contour table, calculated every 5 degrees of azimuth for the proposed WIOA-FM1 facility.



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Engineering Specifications

Channel / Frequency	260 / 99.9 MHz
Site Coordinates	18° 16' 42.8" North Latitude 65° 40' 11.9" West Longitude
Site elevation	290.8 m AMSL
Overall height of existing structure	24.4 m AGL / 315.2 m AMSL
Height of antenna radiation center	24.1m AGL / 315 m AMSL
Transmitter	RVR Tech 500 LCD
Transmitter power output	0.500 kW
Transmission line	Andrew, LDF4-50A
Transmission line length	35 m
Transmission line efficiency	90.84 %
Antenna	PSIFML-1B-BKD
Polarization	Circular
Power gain	0.46 X
Antenna input power	0.454 kW
Effective radiated power (H & V)	0.21 kW

Figure 2

Allocation Study – Proposed WIOA-FM1 Minor Change in License

IX Issue! Arcibo

FCC NGDC 30 Sec

DATA: 03-08-22 - Zone 1A

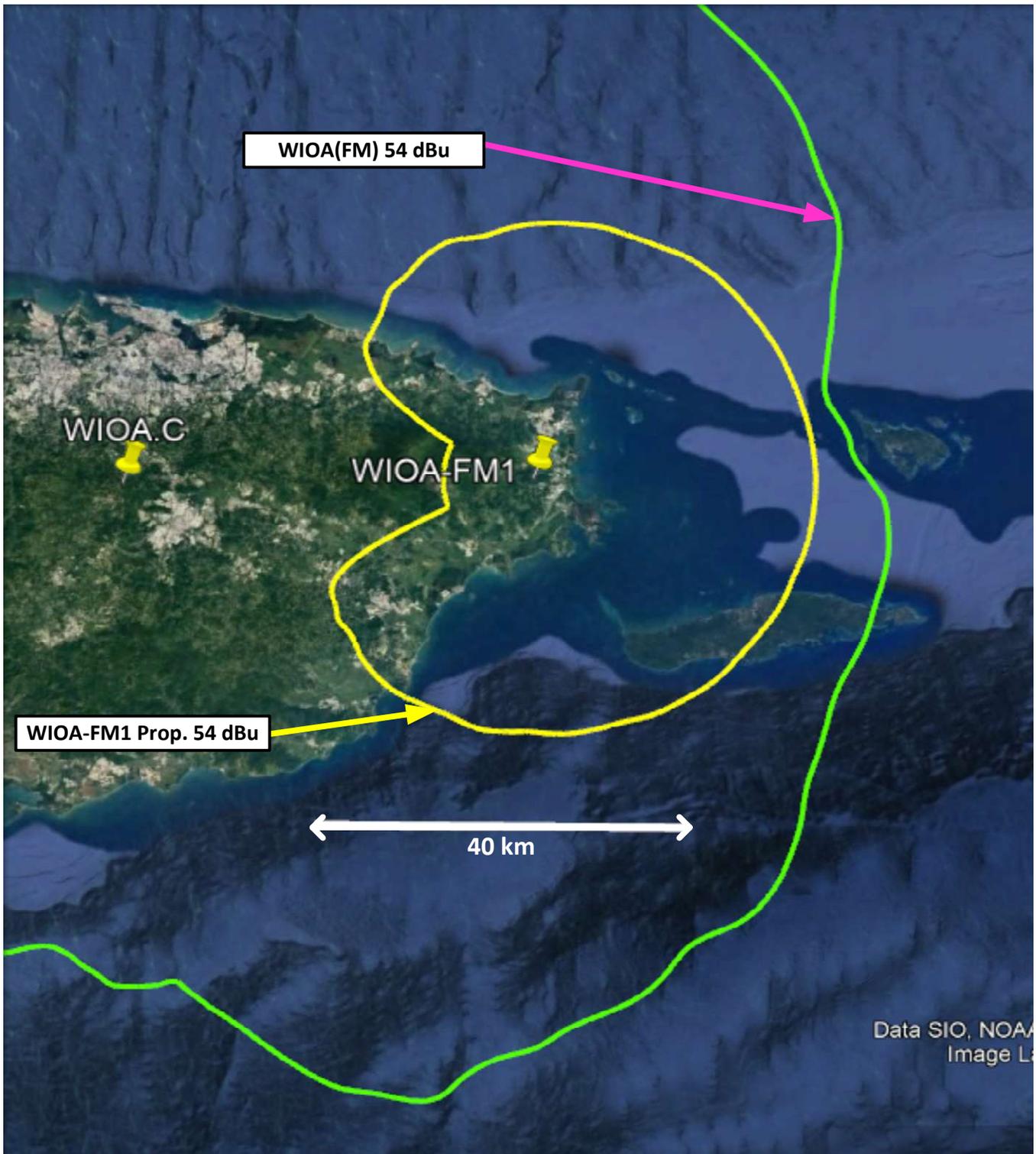
N. Lat. 18 16 42.80 314.9 m COR Contours are detailed Ceiba PR B WIOA-FM1 Los  
W. Lng. 65 40 11.60 0.21 kW CH 260. 99.9 D 217.4 m HAAT WIOA-FM1 03-09-22

 Booster

<u>Call</u>	<u>Type</u>	<u>Ch</u>	<u>Location</u>		<u>Azi</u>	<u>Dist</u>	<u>In</u>	<u>Out</u>
WIOA	LIC	260B	San Juan	PR	269.5	19.32	---	
WIOA	APP	260B	San Juan	PR	269.3	44.63	---	
WIOA	CP	260B	San Juan	PR	269.3	44.63	---	
WIOA-FM1	LIC	260D	Ceiba	PR	15.0	0.29	---	
WSTX-FM	LIC	262B	Christiansted	VI	122.2	109.08	78.0	23.3
WJVP«	LIC	207B	Culebra	PR	82.0	38.86	14.5R	24.4M
W258DT	LIC-D	258D	San Juan	PR	279.7	47.44	33.1	39.5
WVIQ	LIC	258B	Christiansted	VI	119.9	121.04	92.5	49.5
WIDI	LIC	258B	Quebradillas	PR	264.3	139.44	117.4	64.0
WIVA-FM	LIC	262B	Aguadilla	PR	264.4	140.04	118.0	65.3

End of Screen List, Cardinal Radials = 72

Figure 3



PREDICTED COVERAGE CONTOURS  
PROP. WIOA-FM1, MAIN WIOA CP  
CEIBA, PUERTO RICO  
CH 260 0.21 KW 315 M AMSL  
Grafton Olivera, P.E. Consulting Engineer

Distance to 54 dBu Contour Table

N. Lat. = 181642.8    W. Lng. = 654011.6  
 HAAT and Distance to Contour,  
 FCC, FM 2-10 Mi, 51 pts Method - GLOBE 30 SEC

Azi.	AV EL	HAAT	ERP kW	dBk	54-F5
000	26.0	288.9	0.2100	-6.78	29.38
005	21.8	293.1	0.2100	-6.78	29.59
010	18.8	296.1	0.2100	-6.78	29.74
015	15.3	299.6	0.2100	-6.78	29.91
020	16.6	298.3	0.2100	-6.78	29.85
025	14.8	300.1	0.2100	-6.78	29.93
030	8.9	306.0	0.2100	-6.78	30.23
035	3.7	311.2	0.2100	-6.78	30.48
040	2.9	312.0	0.2100	-6.78	30.52
045	4.1	310.8	0.2100	-6.78	30.46
050	5.5	309.4	0.2100	-6.78	30.39
055	5.9	309.0	0.2100	-6.78	30.37
060	5.8	309.1	0.2100	-6.78	30.38
065	7.0	307.9	0.2100	-6.78	30.32
070	7.4	307.5	0.2100	-6.78	30.30
075	6.5	308.4	0.2100	-6.78	30.34
080	4.2	310.7	0.2100	-6.78	30.45
085	2.5	312.4	0.2100	-6.78	30.54
090	1.3	313.6	0.2100	-6.78	30.60
095	1.6	313.3	0.2100	-6.78	30.59
100	2.0	312.9	0.2100	-6.78	30.57
105	3.2	311.7	0.2100	-6.78	30.51
110	7.1	307.8	0.2100	-6.78	30.32
115	5.9	309.0	0.2100	-6.78	30.37
120	5.5	309.4	0.2100	-6.78	30.39
125	9.0	305.9	0.2100	-6.78	30.22
130	11.1	303.8	0.2100	-6.78	30.12
135	9.3	305.6	0.2100	-6.78	30.21
140	7.8	307.1	0.2100	-6.78	30.28
145	11.0	303.9	0.2100	-6.78	30.12
150	13.9	301.0	0.2100	-6.78	29.98
155	16.8	298.1	0.2100	-6.78	29.84
160	25.4	289.5	0.2100	-6.78	29.41
165	26.8	288.1	0.2100	-6.78	29.34
170	27.0	287.9	0.2100	-6.78	29.33
175	29.5	285.4	0.2100	-6.78	29.21
180	36.7	278.2	0.2100	-6.78	28.85
185	34.6	280.3	0.2100	-6.78	28.95
190	30.7	284.2	0.2100	-6.78	29.15

## Appendix 2

195	36.3	278.6	0.2100	-6.78	28.87
200	43.1	271.8	0.2100	-6.78	28.53
205	44.2	270.7	0.2100	-6.78	28.47
210	41.8	273.1	0.2100	-6.78	28.59
215	44.8	270.1	0.2100	-6.78	28.44
220	54.2	260.7	0.2100	-6.78	27.97
225	71.0	243.9	0.2100	-6.78	27.12
230	82.3	232.6	0.2100	-6.78	26.52
235	90.8	224.1	0.2100	-6.78	26.04
240	105.1	209.8	0.2100	-6.78	25.23
245	171.8	143.1	0.2100	-6.78	21.20
250	278.8	36.1	0.2100	-6.78	10.57
255	391.1	-76.2	0.2100	-6.78	9.72
260	504.8	-189.9	0.2100	-6.78	9.72
265	557.4	-242.5	0.2100	-6.78	9.72
270	579.2	-264.3	0.2100	-6.78	9.72
275	557.2	-242.3	0.2100	-6.78	9.72
280	544.7	-229.8	0.2100	-6.78	9.72
285	524.1	-209.2	0.2100	-6.78	9.72
290	421.8	-106.9	0.2100	-6.78	9.72
295	294.9	20.0	0.2100	-6.78	9.72
300	231.8	83.1	0.2100	-6.78	15.91
305	171.4	143.5	0.2100	-6.78	21.23
310	128.3	186.6	0.2100	-6.78	23.92
315	115.6	199.3	0.2100	-6.78	24.63
320	98.9	216.0	0.2100	-6.78	25.58
325	75.1	239.8	0.2100	-6.78	26.91
330	67.1	247.8	0.2100	-6.78	27.32
335	48.6	266.3	0.2100	-6.78	28.25
340	37.3	277.6	0.2100	-6.78	28.82
345	40.2	274.7	0.2100	-6.78	28.67
350	42.6	272.3	0.2100	-6.78	28.55
355	33.0	281.9	0.2100	-6.78	29.04

Ave El= 97.54 M HAAT= 217.36 M AMSL= 314.9