

TECHNICAL EXHIBIT
APPLICATION FOR FM CONSTRUCTION PERMIT
STATION WUKQ-FM
FACILITY ID 54818
MAYAGUEZ, PUERTO RICO
CH 254B 19 KW (ND) 676 M

Technical Narrative

1. *Proposed Operation:* It is proposed to relocate WUKQ-FM to an existing tower (ASRN 1237284) and operate on channel 254B (98.7 MHz) at Mayaguez, Puerto Rico utilizing a Dielectric model DCRM6C, 6-bay, one-wavelength spaced nondirectional (ND) antenna incorporating 1 degree of electrical beam tilt with a maximum ERP of 19 kW (H&V) and an HAAT of 676 meters.¹

2. *Compliance with Sections 73.207 & 73.215:* Figure 1 is a separation study based on Section 73.207 for Channel 254B operation from the proposed WUKQ-FM transmitter site. As indicated, there is one short-spacing with WXHD on channel 251A (98.1 MHz) at Santa Isabel, Puerto Rico. Section 73.215 processing is requested with respect to the WXHD short-spacing. Figure 2 is a map demonstrating compliance with the contour overlap provisions of Section 73.215 with respect to WXHD. It is noted that since WXHD's licensed facilities were authorized under Section 73.215, actual facilities were utilized for WXHD's facilities for the Section 73.215 analysis. Finally, the minimum distance separation requirements of Section 73.215(e) are met with respect to the WXHD operation.

3. *Compliance with Section 73.315:* Figure 3 is a map which demonstrates that the proposed WUKQ-FM operation complies with the provisions of section 73.315 and provides the entire community of Mayaguez, Puerto Rico with a 70-dBu signal. The Mayaguez city limits shown on Figure 3 were obtained from a map contained in the 2020 U.S. Census of Population.²

4. *Notification to Arecibo Observatory and FCC Monitoring Station:* The Interference Office of the Arecibo Observatory was notified of the proposed facility pursuant to Section 73.1030 of the FCC Rules and determined that it is unlikely to cause harmful interference to the passive use of the Radio Astronomy bands at the Arecibo Observatory as indicated by the attached letter of March 16, 2023 from Angel M. Vazquez, Spectrum Manager of the Arecibo Observatory Interference Office.

¹ The proposed WUKQ-FM facilities are equivalent to maximum Class B facilities in accordance with Section 73.211(b)(2).

² Figure 3 also demonstrates that the 54 dBu for WUKQ-FM's licensed booster operation (WUKQ-FM1, BLFTB-20130325AML) will be located entirely within the proposed WUKQ-FM 54 dBu contour as required by Section 74.1235(c).

In addition, the proposed facility is located 66.1 km from the closest FCC monitoring station at Santa Isabel, PR. At this distance, stations with an ERP exceeding 25 kW are advised to notify the monitoring stations. Since the proposed facility will operate with a maximum ERP of 19 kW, there is no potential for interference. Therefore, notification to the FCC monitoring station is not necessary.

5. *Use of USGS 1-Second Terrain Data:* The USGS 1-second terrain database was used to determine the locations of the protected and interfering contours depicted on Figures 2 and 3. Terrain data was derived along 72 equally spaced radials.

6. *RFR Compliance:* The proposed WUKQ-FM facilities were evaluated in terms of potential radio frequency (RF) energy exposure at ground level to workers and the general public based on the FCC's FM Model software. As noted above, it is proposed to utilize a Dielectric model DCRM6C, 6-bay, one-wavelength spaced ND antenna (EPA Type 5) with a total ERP of 38 kW (H+V). The antenna will be mounted at the 84.4 meter level on the existing tower. Figure 4 depicts the output of the FCC's FM Model program. As indicated, a maximum power density of 24.5 uW/cm² will occur at a point located 22 meters from the tower. This is only 12.2% of the FCC's recommended limit of 200 uW/cm² for FM frequencies for an uncontrolled environment. However, as this is a multi-user site, if necessary, measurements will be made to substantiate compliance with the FCC's radio frequency radiation exposure requirements.

Access to the transmitting site will be restricted and appropriately marked with RFR warning signs. Furthermore, as this is a multi-user site, a protocol will be in effect in the event that workers or other authorized personnel 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 measures include reducing the average exposure by spreading out the work over a longer period of time, wearing accepted RFR protective clothing and/or RFR exposure.

FM Study LMS

du Treil, Lundin, & Rackley, Inc., Sarasota, Florida



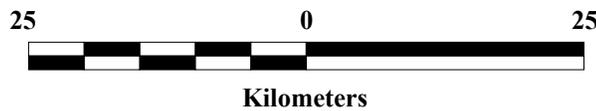
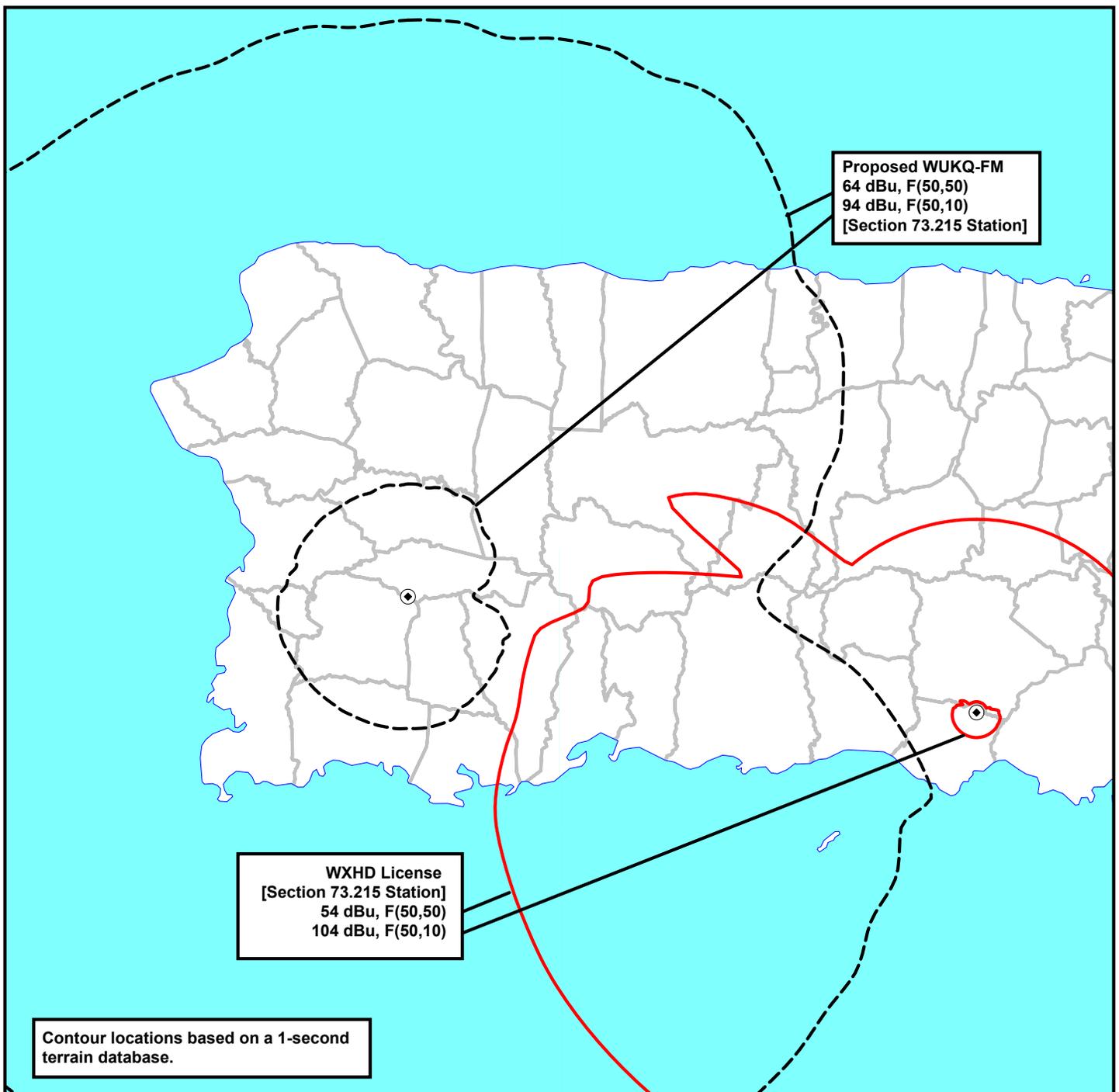
Station Channel: 254 **Station Coordinates:** 018-08-51.6 066-58-57.1 (NAD) HD
Class: B **Buffer Distance:** 20 km
Comment: Proposed WUKQ-FM

Call sign	Status	Channel	Service	Freq.	City	State	Co.	Rec Type	Latitude	Dist. (km)	Sep. (km)	Spacing (km)	
Facility ID	ARN		Class	DA	Ant ID	ERP (kW)	HAAT (m)	73.215	Longitude	Bear. (deg)	73.215 (km)	Comment	
WXHD	L2C	251	FM	98.1	SANTA ISABEL		PR	US	C	018-01-36	67.43	69	-1.57
77881	0000191115		A	NDIR	100959 4	6	153		Y	066-21-29.7	101.43	63	SHORT /1
WUKQ-FM	L2C	254	FM	98.7	MAYAGUEZ		PR	US	C	018-08-57.8	0.63	241	-240.37
54818	BLH-20130104ABI		B	NDIR		25	601		N	066-59-17.6	287.66	211	SHORT /2
WNVE	AMD	254	FM	98.7	CULEBRA		PR	US	C	018-19-19	179.02	178	1.02
183333	BLH-20130523AAT		A	DRL	111692	6	173		N	065-17-59	83.51	143	CLOSE

/1 It is proposed to utilize Section 73.215 with respect to this short-spacing. See Technical Narrative and Figure 2.

/2 Licensed WUKQ-FM site.

Figure 2

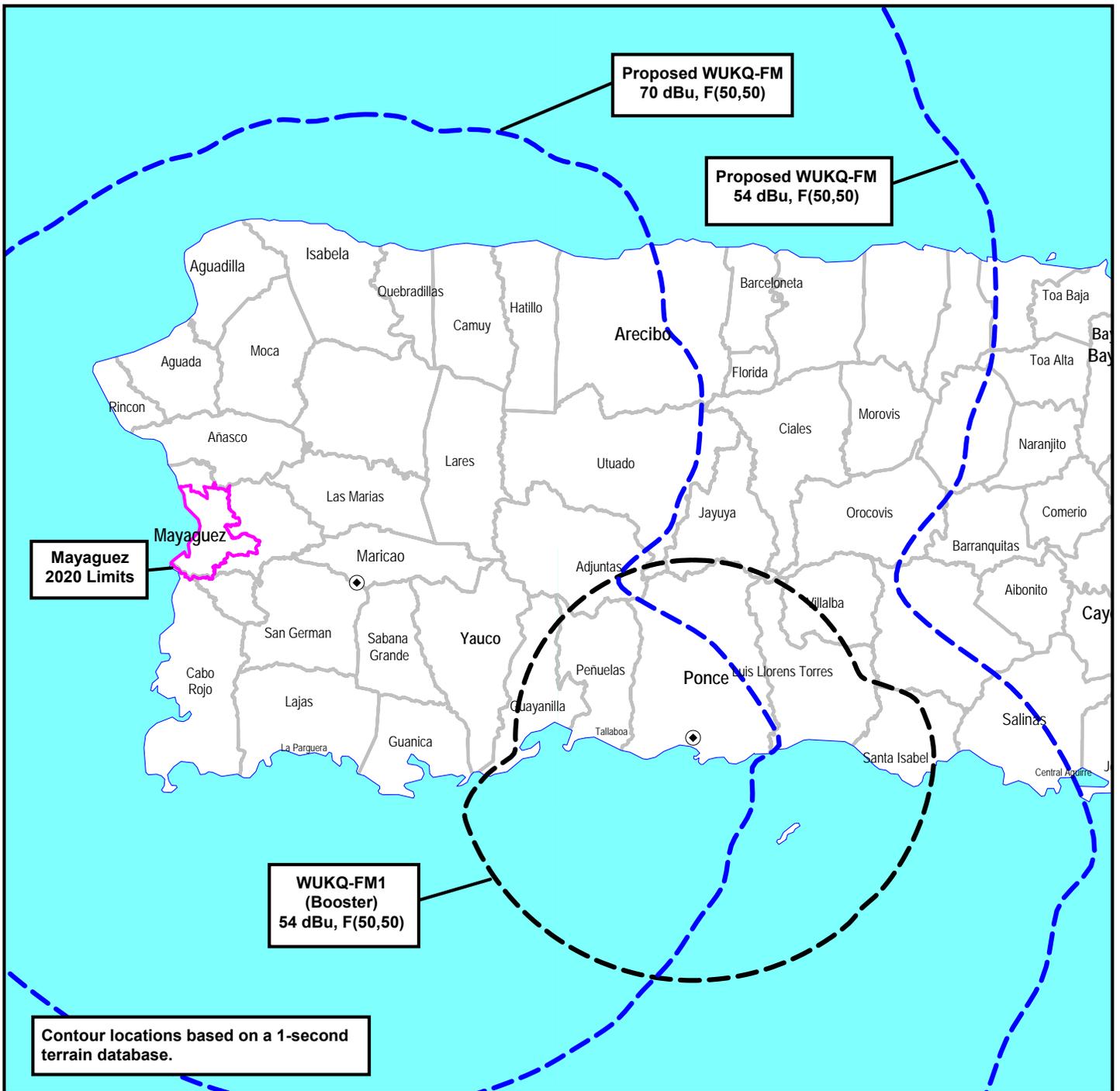


SECTION 73.215 COMPLIANCE

FM STATION WUKQ-FM
MAYAGUEZ, PUERTO RICO
CH 254B 19 KW (ND) 676 M

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

Figure 3



25 0 25



Kilometers

SECTION 73.315 COMPLIANCE

FM STATION WUKQ-FM
MAYAGUEZ, PUERTO RICO
CH 254B 19 KW (ND) 676 M

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

ARECIBO OBSERVATORY

The William E. Gordon Telescope
Angel Ramos Foundation Science and Visitor Center



March 16, 2023

W. Jeffrey Reynolds
du Treil, Lundin & Rackley, Inc.
Consulting Engineers
5212 Station Way
Sarasota, FL 34233

Re: Proposed WUKQ-FM Operation
(ASRN 1237284)
Proposed channel: 254 (98.7 MHz center)

Dear du Treil, Lundin & Rackley, Inc.

Thank you very much for your PRCZ approval request sent to us in accordance with the Puerto Rico Coordination zone agreements. We have considered the technical aspects of your application and find that the following path is unlikely to cause harmful interference to the passive use of the Radio Astronomy bands at the Arecibo Observatory:.

Path	Band
(NAD83): 18-08-51.6 N / 66-58-57.1 W	FM Channel 254B (98.7 MHz)

Sincerely yours,

Angel M. Vázquez
Spectrum Manager

AMV/ic

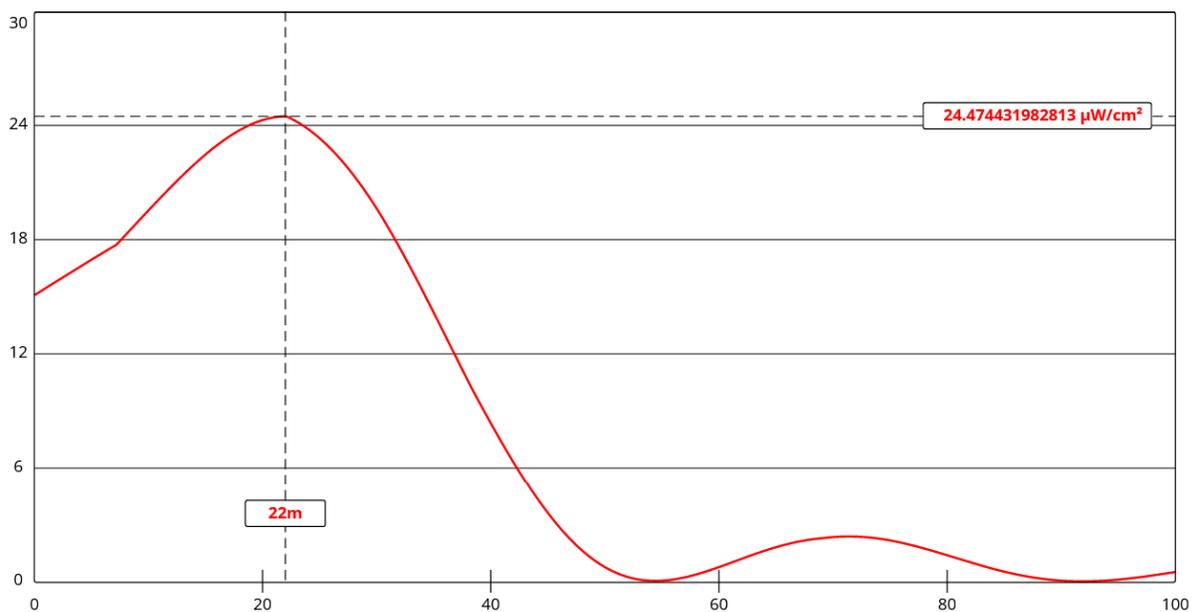
Cc: PRCZ files [File #16.Mar.23_01]

HC-3 Box 53995 Arecibo, PR 00612 | Tel: (787) 878-2612 | Fax: (787) 878-1861 | www.naic.edu

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Figure 4

Output of FCC's FM Model Program:



[View Tabular Results +](#)

Channel Selection	Channel 254 (98.7 MHz) ▾		
Antenna Type +	EPA Type 5: Three-Piece or Four-Piece Spiral ▾		
Height (m)	<input type="text" value="84.4"/>	Distance (m)	<input type="text" value="100"/>
ERP-H (W)	<input type="text" value="19000"/>	ERP-V (W)	<input type="text" value="19000"/>
Num of Elements	<input type="text" value="6"/>	λ	<input type="text" value="1"/>
Num of Points	<input type="text" value="500"/>	<input type="button" value="Apply"/>	