

TECHNICAL EXHIBIT  
AMENDMENT OF APPLICATION  
FOR CONSTRUCTION PERMIT  
WDIN FM BOOSTER STATION  
MAYAGUEZ, PUERTO RICO

June 30, 2008

CH 275 0.099 KW(MAX-DA) 380 M AMSL

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Engineering Statement

This Technical Exhibit was prepared on behalf of HQ-103, Inc. licensee of FM station WDIN, Camuy, Puerto Rico in support of an application for construction permit for an FM booster station at Mayaguez, Puerto Rico. The instant application proposes an effective radiated power (ERP) of 0.099 kW (99 Watts) using a directional antenna. The proposed booster facility will operate on Channel 275 (102.9 MHz) with an antenna radiation center height above mean sea level of 380 m. The proposed facility will employ a composite Scala, CA5-FMCP directional transmitting antenna array, with antenna elements oriented at 10° and 170° True. Proposed operating parameters are shown in Figure 1.

Tower Registration

It is proposed to mount the FM booster antenna in the existing tower of TV station WQHA. The overall height above ground of the existing tower is 61 m and according to the FCC Tower program, the structure does not require registration. There will be no change in the overall height of 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 a distance of 91.9 kilometers on a bearing of 112° True. The proposed operation will produce field strengths much lower than 10 mV/m at the FCC Santa Isabel, PR station. Therefore, notification to the FCC monitoring station is not considered necessary.

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The Arecibo Observatory located near Arecibo, Puerto Rico was notified on April 29, 2008 of a significantly higher power FM booster facility for WDIN, pursuant to Section 73.1030 of the FCC Rules. Since the instant amended application is for a much lower power facility (all other parameters unchanged), no further notification is deemed necessary.

### Environmental Considerations

The proposed facility is categorically excluded from environmental processing pursuant to Section 1.1306 of the FCC Rules. With respect to the potential for human exposure to radio frequency (RF) radiation, a conservative calculation of the FM energy in the downward direction indicates an RF level for the FM Booster of no greater than 4.2% of the FCC uncontrolled standard.\* Therefore, since the RF exposure is predicted not to exceed 5.0% of the FCC limit for uncontrolled environments, the proposal complies with the FCC limits for human exposure to RF radiation and it is categorically excluded from environmental processing. The applicant will reduce power or cease operation as necessary to protect persons having access to fenced area around the tower from RF energy in excess of the FCC guidelines.

### Predicted Coverage Contour

The predicted 54 dBu coverage 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 U.S.G.S. 30-second terrain database. The distances to the predicted 54 dBu coverage contour for the proposed booster was determined using the average elevations of radials spaced every 5-degree of azimuth. The antenna radiation center height above average terrain and the ERP in each radial direction were used in conjunction with the propagation prediction curves of Section 73.333 to determine the distances to the contour. Figure 2 is a map showing the predicted 54 dBu coverage contours of the WDIN(FM) main facility and the proposed booster. As indicated in Figure 2, the proposed predicted 54 dBu contour of the booster will be contained within the WDIN main facility

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\* This is based on the proposed FM booster antenna radiation center height above ground of 30 m, effective radiated power in each polarization plane of 0.099 kW, and a worst-case relative field factor of 1.0. Calculations were made at 2-m AGL according to procedures outlined in FCC OET Bulletin No. 65. Calculated combined RF energy will not exceed 8.43 uW/cm<sup>2</sup> according to these assumptions. This is 4.2% of the FCC limit of 200 uW/cm<sup>2</sup> for uncontrolled environments.

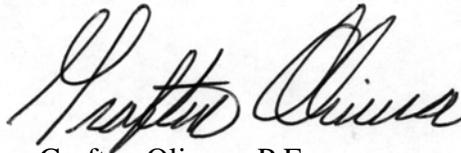
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predicted 54 dBu contour over land. The proposed maximum ERP for the booster is well within 20% of the licensed ERP of the primary station, WDIN(FM).

Allocation Considerations

The closest adjacent-channel FM facility in proximity to the proposed booster is W276AI, an FM translator on Channel 276 in Ponce, Puerto Rico. As shown in Figure 2, the 6-dB contour protection requirement is met with respect to W276AI with ample clearance. Since the proposed facility has an ERP of less than 100 Watts, IF spacing requirements do not apply. Therefore, the proposed facility meets the adjacent-channel protection and all other allocation requirements outlined in the FCC Rules.



Grafton Olivera, P.E.  
Consulting Engineer

du Treil, Lundin & Rackley, Inc.  
201 Fletcher Ave.  
Sarasota, FL 34237-6019

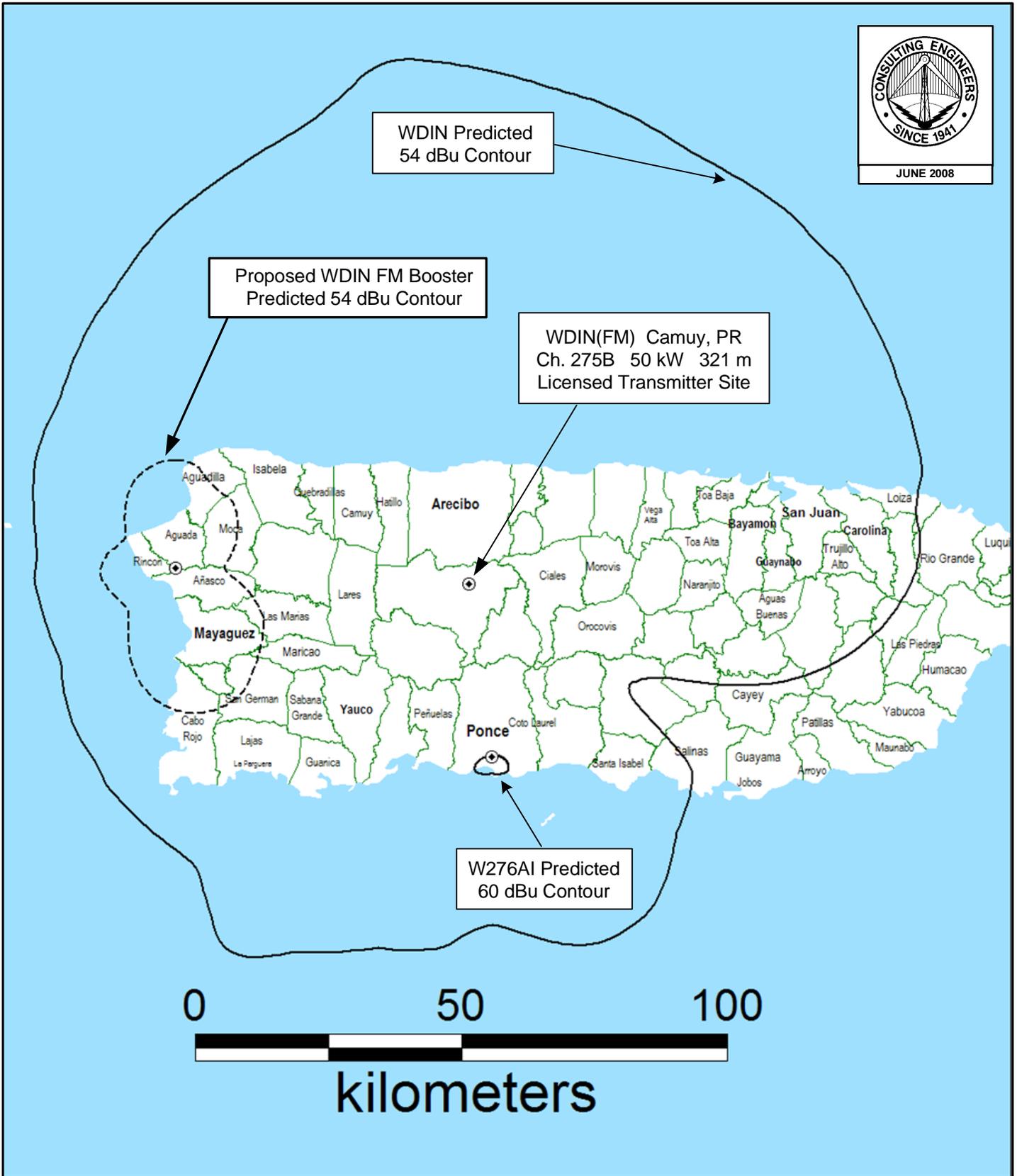
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Engineering Specifications

Channel / Frequency	275 / 102.9 MHz
Site Coordinates	18°19'06" North Latitude 67°10'49" West Longitude
Site elevation	350 m AMSL
Overall height of existing structure	61 m AGL / 411 m AMSL
Height of antenna radiation center	30 m AGL / 380 m AMSL
Transmitter	Bext, XT20
Transmitter power output	0.020 kW
Transmission line	Andrew, LDF5-50A
Transmission line length	38.1 m
Transmission line efficiency	89.8%
Antenna	Scala, CA5-FMCP Composite Array
Polarization	Circular
Power gain	5.5
Antenna input power	0.018 kW
Effective radiated power (H & V)	0.099 kW

Figure 2



**PREDICTED COVERAGE CONTOURS**  
FM BOOSTER STATION FOR WDIN(FM)  
MAYAGUEZ, PUERTO RICO  
CH 275 0.099 KW(MAX-DA) 380 M AMSL  
du Treil, Lundin & Rackley, Inc. Sarasota, Florida

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Antenna Manufacturer's Pattern Data

*{2 sheets follow}*

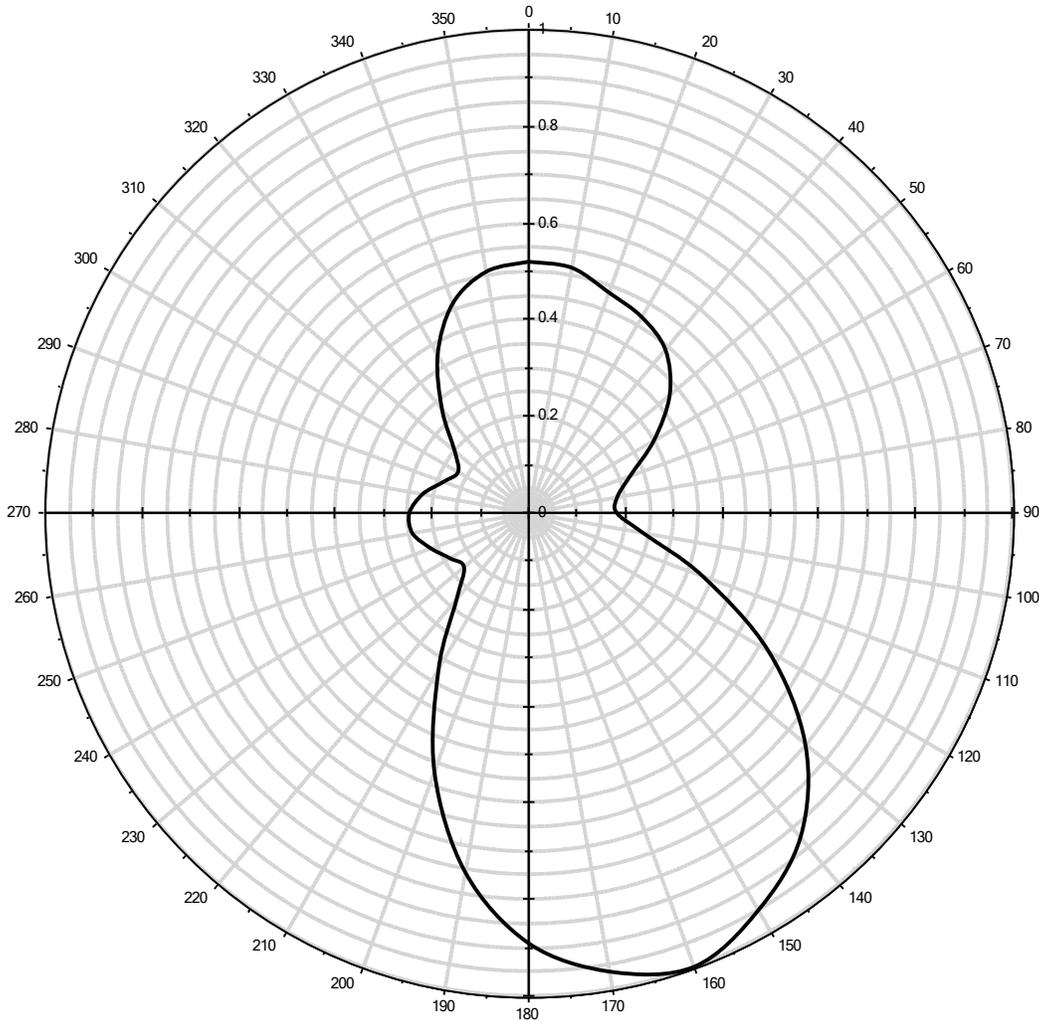
# DA Inquiry

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



**Antenna Pattern:** Antenna ID: 800124

**FM BOOSTER FOR  
WDIN, CAMUY, PR**  
(1) CA5-FMCP (25% Pwr) at 10°  
(2) CA5-FMCP (75% Pwr) at 160°



Antenna DLR ID #: 800124, Rotation: 0.00°

**Antenna Details:**

0°	0.520	60°	0.299	120°	0.573	180°	0.891	240°	0.188	300°	0.169
10°	0.515	70°	0.223	130°	0.747	190°	0.756	250°	0.215	310°	0.201
20°	0.485	80°	0.186	140°	0.875	200°	0.571	260°	0.244	320°	0.279
30°	0.468	90°	0.182	150°	0.950	210°	0.374	270°	0.247	330°	0.377
40°	0.440	100°	0.241	160°	1.000	220°	0.232	280°	0.223	340°	0.461
50°	0.381	110°	0.382	170°	0.964	230°	0.175	290°	0.188	350°	0.507

Antenna Make: Scala

Standard Pattern:

Antenna Model: CA5-FMCP Array

Last Change Date:

**CA5-FM/CP/RM**  
**FM YAGI ANTENNA**  
6 dBd gain  
88 to 108 MHz  
Circularly polarized

The Scala CA5-FM/CP/RM is a ruggedly built yagi antenna, designed for professional FM transmit and receive applications. Like all Scala antennas, the CA5-FM/CP/RM is made of the finest materials resulting in superior performance and long service life.

The CA5-FM/CP/RM may be used stand-alone or in stacked arrays for higher gain, increased side-lobe suppression, or custom azimuth patterns.



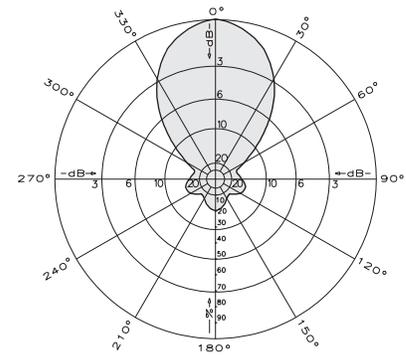
**Specifications:**

Frequency range	Any specified FM channel 88 to 108 MHz
Gain	6 dBd
Impedance	50 ohms
VSWR	< 1.5:1
Polarization	Circular
Front-to-back ratio	>14 dB
Maximum input power	250 watts
Azimuth pattern	61 degrees (half-power)
Elevation pattern	61 degrees (half-power)
Connector	N female
Weight	35 lb (15.9 kg)
Dimensions	79 x 56 x 50.8 inches maximum (2007 x 1422 x 1290 mm)
Equivalent flat plate area	2.84 ft <sup>2</sup> (0.264 m <sup>2</sup> ) maximum
Wind survival rating*	120 mph (194 kph)
Shipping dimensions	84 x 13 x 8 inches maximum (2134 x 330 x 203 mm)
Shipping weight	38 lb (8.2 kg) maximum
Mounting	For masts of 2.375 inches (60 mm) OD.

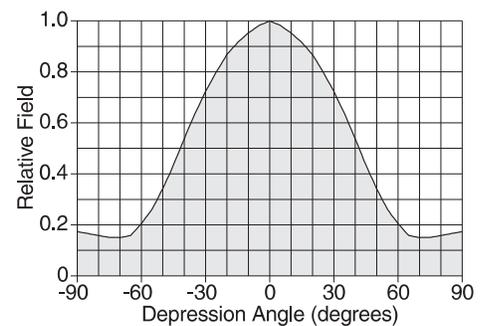
\* Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

**Order Information:**

Contact Scala Customer Service for detailed order information.



**Azimuth pattern (E-plane)**



**Elevation pattern (H-plane)**



10748-B