TECHNICAL EXHIBIT
APPLICATION FOR MINOR CHANGE
IN LICENSED FACILITY
WDIN-FM2 BOOSTER STATION
MAYAGUEZ, PUERTO RICO
FACILITY ID 178107

January 16, 2015

CH 275 2.0 KW (MAX-DA) 410 M AMSL

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Engineering Statement

This Technical Exhibit was prepared on behalf of HQ-103, Inc., licensee of FM radio station WDIN, Camuy, Puerto Rico in support of an application for a minor change in the licensed facility of FM booster station WDIN-FM2 at Mayaguez, Puerto Rico. The instant application proposes an effective radiated power (ERP) of 2.0 kW using a directional antenna system. The proposed booster facility will operate on Channel 275 (102.9 MHz) with an antenna radiation center height above mean sea level of 410 m. The proposed operating parameters are shown in Figure 1.

Transmitter Location

The proposed transmitting facility will employ a Scala, CA5-FM/CP Array consisting of three Scala CA5-FM/CP/RM directional antennas horizontally spaced 60° apart, with the main radiation lobe oriented at 270° True. The antenna array will be side-mounted on a self-support tower. The following NAD27 geographic coordinates describe the proposed site location:

18° 10’ 56.4” North Latitude
67° 05’ 39.3” West Longitude

Tower Registration

It is proposed to mount the FM booster antenna on an existing tower property of PRTC, Inc. The overall height above ground of this tower is 56.5 m and has been registered under ASR 1223547. 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 78.5 kilometers on a bearing of 104.3° True. The proposed FM booster operation is predicted to be significantly less than 10 mV/m at the FCC Santa Isabel, PR station. Therefore, notification to the FCC monitoring station is not considered necessary.

Pursuant to Section 73.1030 of the FCC Rules, the Arecibo Observatory located near Arecibo, Puerto Rico has been notified of the proposal. Copies of the notification letter and of the letter of consent of the Observatory are included in Appendix 1.

Environmental Considerations

The proposed facility is 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 4.9% of the FCC uncontrolled standard.* Since the RF exposure is predicted not to exceed 5% 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 shall 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. 3-second terrain database. The distances to the predicted 54 dBu coverage contour for the proposed booster was determined using the

* This is based on the proposed FM booster antenna radiation center height above ground of 50 m, effective radiated power in each polarization plane of 2.0 kW, and a downward relative field factor of 0.41 for any antenna depression angle greater than 45 degrees. Calculations were made at 2-m AGL according procedures outlined in FCC OET Bulletin No. 65. Calculated combined RF energy will not exceed 9.7 uW/cm^2 according to these assumptions. This is 4.9% of the FCC limit of 200 uW/cm^2 for uncontrolled environments.

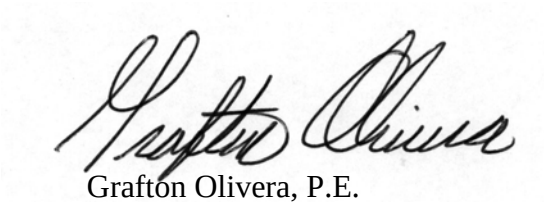
average elevations of radials spaced every 5-degree of azimuth. The antenna radiation center height above average terrain and the ERP in each radial direction were used in conjunction with the propagation prediction curves of Section 73.333 to determine the distances to the contour.

Figure 2 is a map showing the predicted 54 dBu coverage contours of the WDIN 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 predicted 54 dBu contour over land. The proposed maximum ERP for the booster is within 20% of the licensed ERP of the primary station, WDIN. As shown in Figure 2, the 1 mV/m contour of the proposal overlaps the 1 mV/m of the license facility, as required in a minor change application.

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. Therefore, the proposed facility meets the adjacent-channel protection requirements of the FCC Rules.

As the proposed station has an ERP greater than 100 Watts, minimum distance requirements to stations spaced 53 or 54 channels apart apply. Station WZET, channel 221A, to which the proposed facility should be at least 10 kilometers apart, is located 17.48 kilometers from the proposed site. Thus, it is believed that the proposed booster facility meets all allocation requirements.



Grafton Olivera, P.E.
Consulting Engineer

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

January 16, 2015

Figure 1

TECHNICAL EXHIBIT
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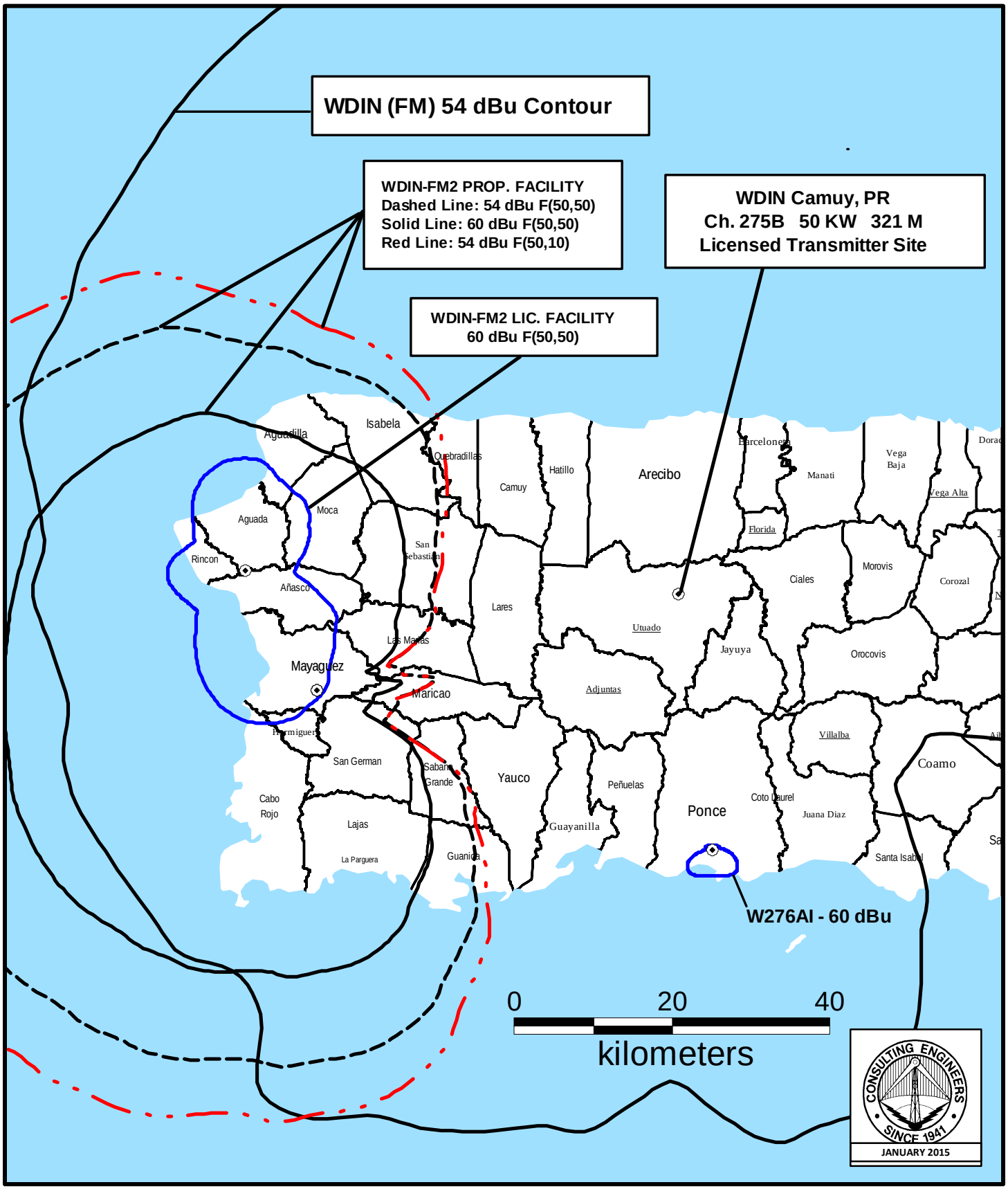
CH 275 2.0 KW (MAX-DA) 410 M AMSL

Engineering Specifications

Channel / Frequency	275 / 102.9 MHz
Site Coordinates (NAD27)	18° 10' 56" North Latitude 67° 05' 39" West Longitude
Site elevation	359.9 m AMSL
Overall height of existing structure	56.5 m AGL / 416.4 m AMSL
Height of antenna radiation center	50 m AGL / 410 m AMSL
Transmitter	Bext, XT20/FS1000
Transmitter power output	0.757 kW
Transmission line	Andrew, LDF5-50A
Transmission line length	60 m
Transmission line efficiency	94.4%
Antenna	Scala, CA5-FM/CP/RM Array
Polarization	Circular
Power gain	2.8
Antenna input power	0.714 kW
Effective radiated power (H & V)	2.0 kW



PREDICTED COVERAGE CONTOURS

FM BOOSTER STATION WDIN-FM2

MAYAGUEZ, PUERTO RICO

CH 275 2.0 KW (MAX-DA) 410 M AMSL

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

Appendix 1

TECHNICAL EXHIBIT
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Notification & Letter of Consent
National Astronomy and Ionosphere Center

{three sheets follow}

du Treil, Lundin & Rackley, Inc.
Consulting Engineers

201 Fletcher Ave.
Sarasota, FL 34237-6019
941-329-6000
941-329-6031 FAX

Grafton Olivera
Direct Dial 941-329-6001
e-mail: grafton@dlr.com

January 12, 2015

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, HQ-103, Inc., licensee of FM station WDIN of Camuy, PR and applicant of a minor license modification of FM booster station WDIN-FM2, in Mayaguez, Puerto Rico, in accordance with Section 73.1030 of the FCC Rules, we are hereby notifying of the proposed changes to the facility of WDIN-FM2. The particulars of the proposal are as follows:

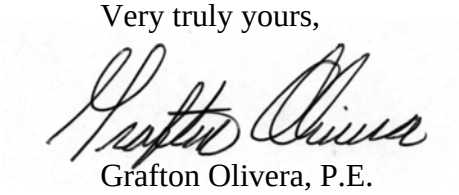
Proposed Facilities

Geographical coordinates of antenna location (NAD83): 18-10-49.2 / 67-05-37.9
Antenna radiation center height: 50 m AGL; 410 m AMSL
Antenna directivity: see attached antenna pattern
Operating channel: 275 (102.9 MHz)
Type of emission: F3E
Effective isotropic radiated power: 3.248 kW (Circular Polarization)

Please review this proposal and if you find any cause of concern, let us know immediately, so appropriate action can be taken.

Please feel free to communicate via email (mailto:Grafton@dlr.com), telefax (941-329-6030) or regular mail.

Very truly yours,

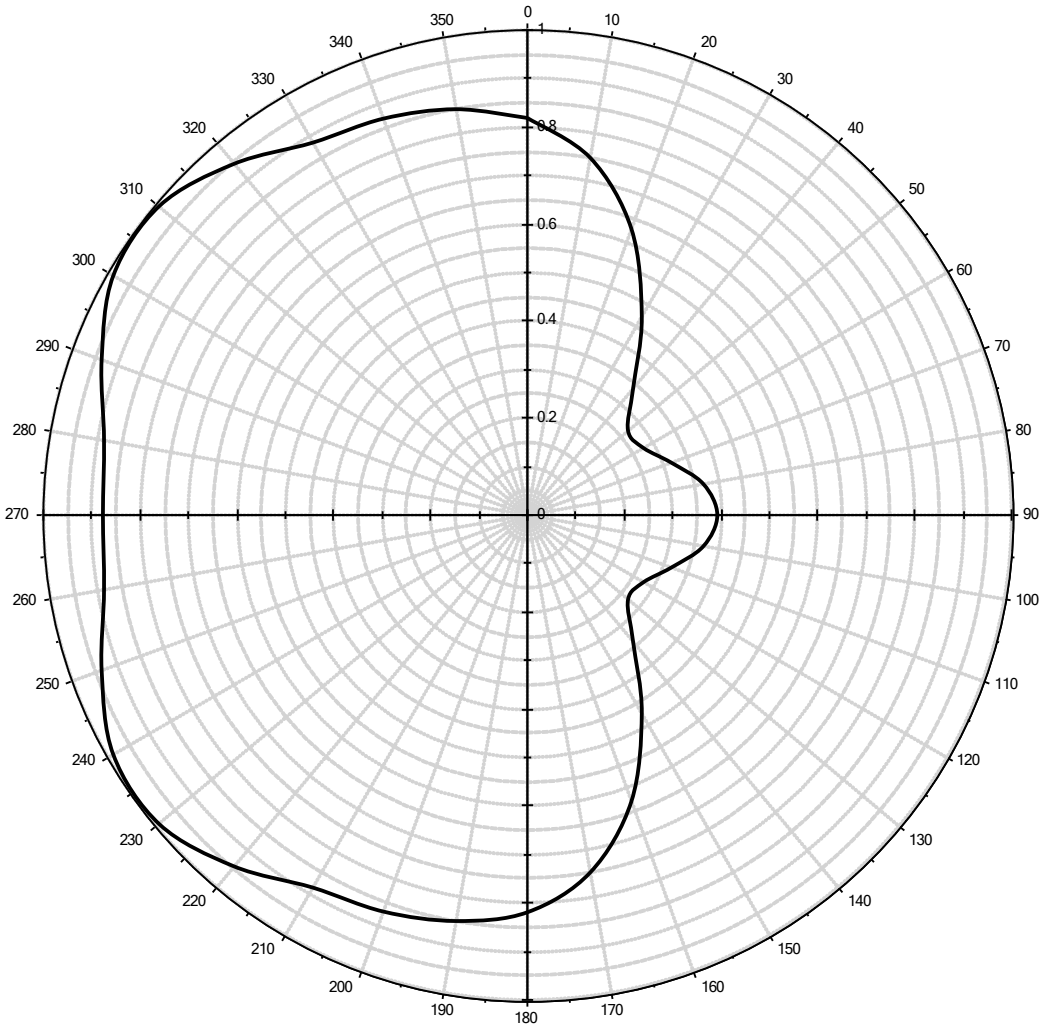


Grafton Olivera, P.E.

DA Inquiry

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

Antenna ID: 800434



Note: display reflects rotation of 0.00°

0°	0.81	***60°***	0.27	***120°***	0.27	***180°***	0.81	***240°***	0.98	***300°***	0.98
10°	0.74	***70°***	0.31	***130°***	0.27	***190°***	0.85	***250°***	0.93	***310°***	0.99
20°	0.62	***80°***	0.36	***140°***	0.33	***200°***	0.87	***260°***	0.88	***320°***	0.94
30°	0.47	***90°***	0.39	***150°***	0.47	***210°***	0.88	***270°***	0.87	***330°***	0.88
40°	0.33	***100°***	0.36	***160°***	0.62	***220°***	0.94	***280°***	0.88	***340°***	0.87
50°	0.27	***110°***	0.31	***170°***	0.74	***230°***	0.99	***290°***	0.93	***350°***	0.85

Antenna Make: SCA

Antenna Model: CA5-FM/CP/RM ARRAY

Standard Pattern:

Last Change Date:

ARECIBO OBSERVATORY

The William E. Gordon Telescope

January 16, 2015

Mr. Grafton Olivera, P.E.
du Treil, Lundin & Rackley, Inc.
201 Fletcher Ave.
Sarasota, FL 34237-6019

Re: Call Sign WDIN-FM2
HQ-103

Dear Grafton Olivera:

Thank you very much for the copy of your FCC application sent to us in accordance with the Puerto Rico Coordination zone agreements. We have considered the technical aspects of your application and find that your installation/path originating in Mayaguez is unlikely to cause harmful interference to the passive use of the Radio Astronomy bands at the Observatory. We therefore have no objection to your proposed installation.

Sincerely yours,

Angel M. Vázquez
Spectrum Manager

AV:ws

Cc: PRCZ files [File #0015001008]

Appendix 2

TECHNICAL EXHIBIT
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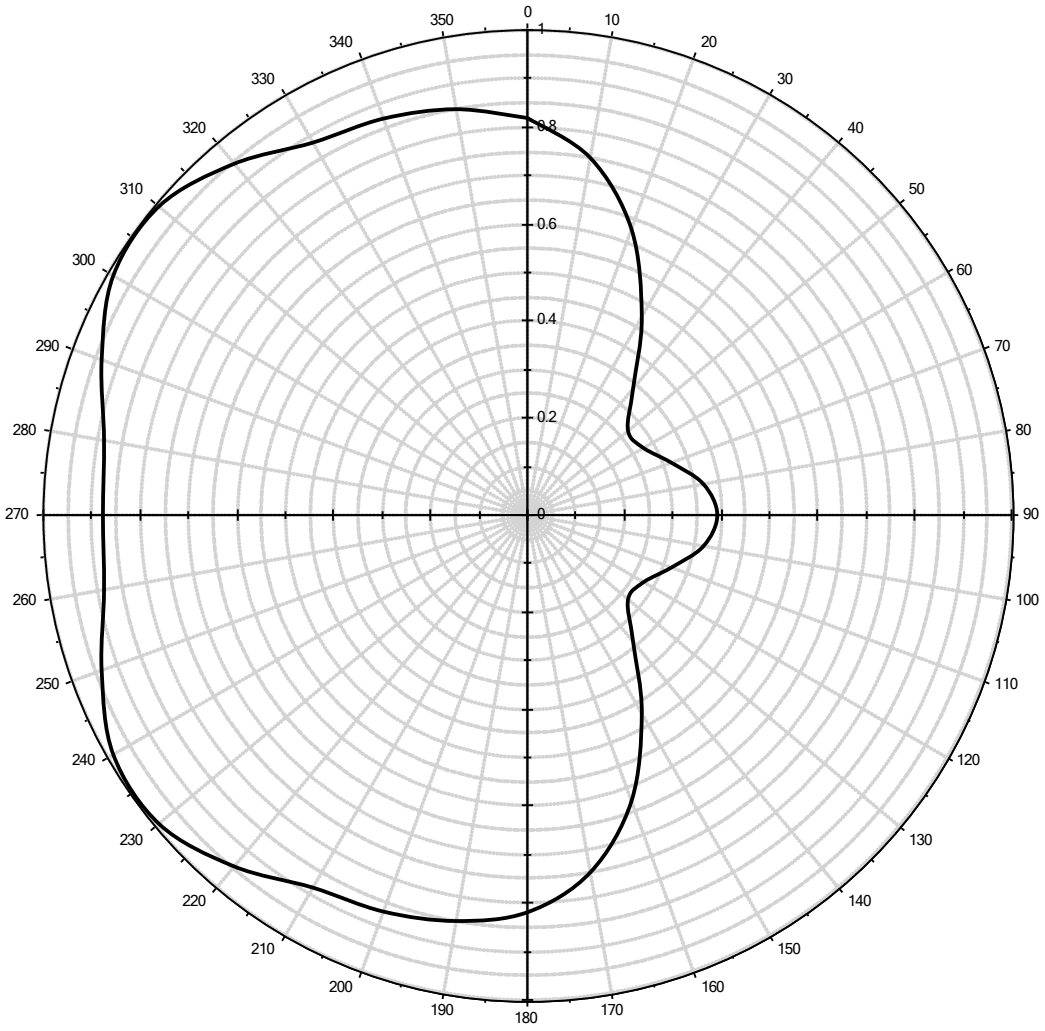
Antenna Manufacturer's Pattern Data

{two sheets follow}

DA Inquiry

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

Antenna ID: 800434



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Antenna Make: SCA

Antenna Model: CA5-FM/CP/RM ARRAY

Standard Pattern:

Last Change Date:

KATHREIN
SCALA DIVISION

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.

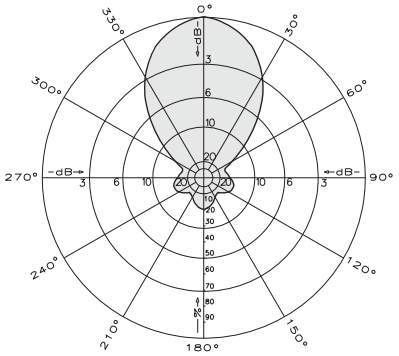
Specifications:

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^2 (0.264 m^2) 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.

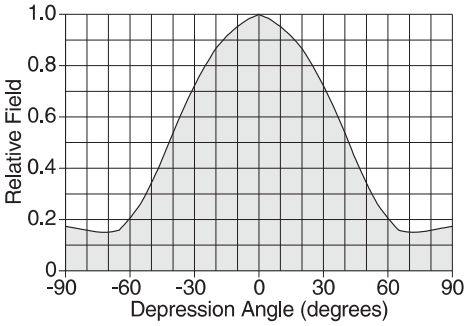
* Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

Order Information:

Contact Scala Customer Service for detailed order information.



Azimuth pattern (E-plane)



Elevation pattern (H-plane)

TÜV MANAGEMENT SERVICE ISO 9001

10748-B

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Email: broadcast@kathrein.com Internet: www.kathrein-scala.com