

TECHNICAL EXHIBIT  
MINOR MODIFICATION OF LICENSE  
SPANISH BROADCASTING SYSTEM HOLDING COMPANY, INC.  
FM TRANSLATOR STATION W276AI  
PONCE, PUERTO RICO  
CHANNEL 276D  
FACILITY ID 53553

JULY 26, 2017

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Technical Narrative

The technical exhibit, of which this narrative is part, has been prepared on behalf of Spanish Broadcasting System Holding Company, Inc., licensee of a FM translator W276AI, in Ponce, PR, Fac. ID 53553. W276AI is a fill-in translator of FM station WNOD, Fac. ID 53554. The licensee is requesting a minor license modification of W276AI to move to a nearby site, as explained below; no change in channel is proposed.

Licensed and Proposed Transmitter Locations

W276AI needs to relocate to a different location due to site contractual difficulties. The proposed site, an existing registered tower housing FM station WZMT, is located 1.37 kilometers SW from the licensed W276AI site. The proposed transmitting facility would operate on its existing channel 276 using a new Scala CL-FM vertical polarized antenna, side-mounted on an existing tower with ASR 1011495. The proposed site is described by the following NAD27 geographic coordinates:

17° 59' 27.1" North

66° 37' 45.4" West

The NAD 83 site coordinates are: 17-59-20.0 N / 66-37-44.0 W. It is proposed to side mount the existing antenna at a height of 51 meters (168 feet) above ground on the existing tower at a site with an elevation of 2.4 meters AMSL. Thus, the antenna will be mounted with a RC height of 53.4 m AMSL. According to the FCC HAAT web utility, this corresponds to a HAAT of -30 meters (Appendix 2). An ERP of 100 Watts is proposed for this facility.

Tower Registration

The FAA is not being notified of the proposed construction, as it is proposed to side-mount the FM antenna on an existing 53 meter registered tower, ASRN 1011530.

### Environmental Considerations

The proposal is excluded from environmental processing, as an existing supporting structure is to be employed and the proposal complies with the FCC Rules concerning human exposure to radio frequency (RF) energy. The proposal would not exceed 0.3 % of the RF exposure limit for general population/uncontrolled environments for the frequency proposed. The calculation of RF energy at 2-m above ground was made under the procedures of OET Bulletin No. 65.\* The formula employed is as follows:

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

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 the vertical radiation pattern of the proposed antenna, a relative field factor of 0.65 or less for any depression angle equal or greater than 30 degrees below horizon (see Appendix 3), a total effective radiated power of 100 watts (vertical polarization) and an antenna radiation center height above ground of 51 m, the calculated power density will not exceed  $0.6 \mu\text{W}/\text{cm}^2$ . Therefore, the calculated RF exposure at 2 m above ground will not exceed 0.3 % of the limit of  $200 \mu\text{W}/\text{cm}^2$  for the general population and uncontrolled environments.

The antenna system will be restricted from access and appropriate warning signs posted. As this is a shared site, in the event that personnel are required to climb the structure, the FM transmissions of W276AI will be reduced or terminated as necessary to prevent RF exposure above the FCC recommended limits.

### FCC Monitoring Stations

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. The closest FCC monitoring station to the proposed operation is located at Santa Isabel, PR, at a distance of 27 kilometers along an azimuth of  $86^\circ$  N. The proposed operation will produce field strengths much lower than 10 mV/m at the FCC station in Santa Isabel, PR.

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

### 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 this application. A copy of the notification letter and of the letter of consent from the Arecibo Observatory of the proposed facility are included in Appendix 1.

### AM Stations within 3.2 kilometers

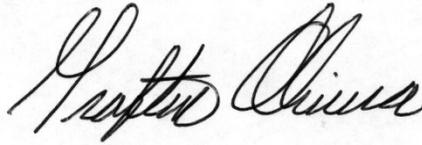
There are several non-directional AM stations within 3.2 km of the above specified coordinates. But since an existing tower, for which no significant structural changes are contemplated is proposed, no adverse effect should be caused to any AM station and the proposal is believed to be compliant with Section 47 CFR 73.1692.

### Fill-In Compliance and Allocation Considerations

Figure 1 is a Fill-In Compliance map. As shown in Figure 1, the proposed translator 54 dBu contour will be contained within the 54 dBu contour of WNOD(FM). Figures 2a, 2b, 2c, and 2d summarize the allocation study and contour overlap of the licensed and proposed facilities of W276AI with respect to FM stations WDIN(FM), WVJP-FM, and WTOK-FM. As indicated in these figures, in all three cases, the existing overlaps between W276AI and these stations will be reduced.

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 radials. The antenna height elevations of the facilities was used in conjunction with the propagation prediction curves of Section 73.333 to determine distances to contours.

For the reasons stated above, it is believed that the proposed facility is in compliance with FCC Rules and Regulations and will serve the public interest.

A handwritten signature in black ink, reading "Grafton Olivera". The signature is written in a cursive style with a large initial "G".

Grafton Olivera, P.E.

Consulting Engineer

5119 60<sup>th</sup> Drive E

Bradenton, Florida 34203

(941) 329-6001

July 26, 2017

Figure 1



PROPOSED FACILITY FILL-IN COMPLIANCE MAP  
FM TRANSLATOR W276AI  
PONCE, PUERTO RICO  
CH 276D (103.1 MHZ) 0.10 KW DA

## Figure 2 Allocation Study - W276AI

W276AI - LICENSED FACILITY												
REFERENCE		Spanish Broadcasting System Holding Company, Inc. - 103.1 MHz, Pwr= 0.004 kW DA, HAAT= 0.0 M, COR= 77 M Average Protected F(50-50)= 2.54 km Standard Directional								DISPLAY DATES		
18 00 00.0 N. 66 37 14.0 W.		CH#	276D									DATA 05-22-17 SEARCH 05-31-17
CH CITY	CALL	TYPE STATE	ANT	AZI <--	DIST FILE #	LAT LNG	PWR(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*	
275B Camuy	WDIN	LIC _CX PR		352.5 172.5	32.61 BLH20030728APW	18 17 27.0 66 39 39.0	50.000 321	80.4 697	67.1	-48.9*	-36.1*	
277B Caguas	WVJF-FM	LIC _CX PR		69.0 249.2	86.75 BLH20140911ABF	18 16 41.0 65 51 12.0	26.000 592	116.9 817	93.5	-31.6*	-8.3*	
273B San Juan	WTOX-FM	LIC _CN PR		66.2 246.4	77.94 BLH19900129KD	18 16 54.0 65 56 42.0	50.000 347	10.0 545	89.9	66.4	-12.0*	
276D Ponce	W276AI	LIC DNH PR		0.0 0.0	0.00 BLFT19860609TH	18 00 00.0 66 37 14.0	0.004 77	2.3 77	1.1	-3.4*	-3.4*	
275D Yauco	WDIN-FM3	LIC DC_ PR		303.5 123.5	16.16 BLFTB20150109ABF	18 04 49.0 66 44 53.0	0.100 650	15.1 650	9.8	-0.6	4.8	
279B Lajas	WOLX	LIC _CN PR		269.4 89.2	59.77 BLH19940113KE	17 59 37.0 67 11 09.0	50.000 139	4.6 171	55.1	53.5	4.6	
277D Salinas	WVJF-FM3	CP DC_ PR		75.0 255.1	42.36 BNPFTB20160114ABS	18 05 54.0 66 14 00.0	3.000 867	33.0 867	21.6	7.8	19.2	
275D Mayaguez	WDIN-FM2	LIC _C_ PR		292.1 112.0	53.99 BLFTB20161215ABV	18 10 56.0 67 05 39.0	8.000 402	25.3 402	17.1	27.1	35.3	

Terrain database is GLOBE 30 Sec , R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM  
Contour distances are on direct line to and from reference station. Reference zone= East Zone, Co to 3rd adjacent.  
All separation margins (if shown) include rounding.  
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
\*\*affixed to 'IN' or 'OUT' values = site inside restricted contour.  
Reference station has protected zone issue: Arecibo

W276AI - PROPOSED FACILITY												
REFERENCE		Spanish Broadcasting System Holding Company, Inc. - 103.1 MHz, Pwr= 0.1 kW DA, HAAT= -30.0 M, COR= 53.4 M Average Protected F(50-50)= 5.64 km Standard Directional								DISPLAY DATES		
17 59 27.1 N. 66 37 45.4 W.		CH#	276D									DATA 07-14-17 SEARCH 07-18-17
CH CITY	CALL	TYPE STATE	ANT	AZI <--	DIST FILE #	LAT LNG	PWR(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*	
275B Camuy	WDIN	LIC _CX PR		354.3 174.3	33.51 BLH20030728APW	18 17 27.0 66 39 39.0	50.000 321	78.7 697	65.6	-46.8*	-34.1*	
277B Caguas	WVJF-FM	LIC _CX PR		68.6 248.8	87.98 BLH20140911ABF	18 16 41.0 65 51 12.0	26.000 592	116.8 817	93.4	-30.5*	-7.4*	
276D Ponce	W276AI	LIC DNH PR		42.3 222.3	1.37 BLFT19860609TH	18 00 00.0 66 37 14.0	0.004 77	12.5 77	3.9	-12.7*	-5.6*	
273B San Juan	WTOX-FM	LIC _CN PR		65.8 246.0	79.19 BLH19900129KD	18 16 54.0 65 56 42.0	50.000 347	10.0 545	89.9	67.6	-10.8*	
275D Yauco	WDIN-FM3	LIC DC_ PR		308.4 128.4	16.01 BLFTB20150109ABF	18 04 49.0 66 44 53.0	0.100 650	14.1 650	9.2	0.3	5.2	
279B Lajas	WOLX	LIC _CN PR		270.4 90.2	58.85 BLH19940113KE	17 59 37.0 67 11 09.0	50.000 139	4.6 171	54.7	52.7	4.1	
277D Salinas	WVJF-FM3	CP DC_ PR		74.0 254.1	43.52 BNPFTB20160114ABS	18 05 54.0 66 14 00.0	3.000 867	34.2 867	22.3	7.7	19.6	
275D Mayaguez	WDIN-FM2	LIC _C_ PR		293.5 113.3	53.54 BLFTB20161215ABV	18 10 56.0 67 05 39.0	8.000 402	25.3 402	17.1	26.6	34.9	
223B Corozal	WORO	LIC _CN PR		47.1 227.2	42.69 BLH19900530KC	18 15 09.0 66 19 58.0	50.000 365	0.0 816	0.0	14.5R	28.2M	

Terrain database is GLOBE 30 Sec , R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM  
Contour distances are on direct line to and from reference station. Reference zone= East Zone, Co to 3rd adjacent.  
All separation margins (if shown) include rounding.  
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
\*\*affixed to 'IN' or 'OUT' values = site inside restricted contour.  
Reference station has protected zone issue: Arecibo AM tower

Figure 2a

Allocation Study - W276AI

Licensed:

IX Issue! GLOBE 30 Sec Arecibo DATA: 05-22-17 East Zone

N. Lat. 18 00 00.0	77 m COR	Contours are detailed	Ponce PR	X	W276AI - Lic Fac.vsf
W. Lng. 66 37 14.0	0.004 kW DA	CH 276. 103.1 D	0.0 m HAAT	*	W276AI 05-31-17

Call	Type	Ch	Location		Azi	Dist	In	Out
WDIN	LIC	275B	Camuy	PR	352.5	32.61	-53.0*	-36.1*
WVJP-FM	LIC	277B	Caguas	PR	69.0	86.75	-32.3*	-8.3*
WTOK-FM	LIC	273B	San Juan	PR	66.2	77.94	65.8	-12.0*
W276AI	LIC-D	276D	Ponce	PR	0.0	0.00	-3.4	-3.4
WDIN-FM3	LIC-D	275D	Yauco	PR	303.5	16.16	-0.7	3.3
WVJP-FM3	CP-D	277D	Salinas	PR	75.0	42.36	1.0	10.6
WXLX	LIC	279B	Lajas	PR	269.4	59.77	52.2	3.7
WDIN-FM2	LIC	275D	Mayaguez	PR	292.1	53.99	24.5	14.3

End of Screen List, Cardinal Radials = 12

Proposed:

N. Lat. 17 59 27.1	53.4 m COR	Contours are detailed	Ponce PR	X	W276AI - Prop CL-FM
W. Lng. 66 37 45.4	0.1 kW DA	CH 276. 103.1 D	-30.0 m HAAT	*	W276AI 07-18-17

Call	Type	Ch	Location		Azi	Dist	In	Out
WDIN	LIC	275B	Camuy	PR	354.3	33.51	-49.3*	-34.1*
WVJP-FM	LIC	277B	Caguas	PR	68.6	87.98	-31.2*	-7.4*
W276AI	LIC-D	276D	Ponce	PR	42.3	1.37	-12.7	-5.6
WTOK-FM	LIC	273B	San Juan	PR	65.8	79.19	66.8	-10.8*
WVJP-FM3	CP-D	277D	Salinas	PR	74.0	43.52	-3.0*	10.5
WDIN-FM3	LIC-D	275D	Yauco	PR	308.4	16.01	-1.5*	3.9
WDIN-FM2	LIC	275D	Mayaguez	PR	293.5	53.54	2.1	12.5
WXLX	LIC	279B	Lajas	PR	270.4	58.85	50.2	3.8
WORO«	LIC	223B	Corozal	PR	47.1	42.69	14.5R	28.2M

End of Screen List, Cardinal Radials = 12

Figure 2b

Contour Overlaps with WDIN(FM)

Licensed:



Proposed:

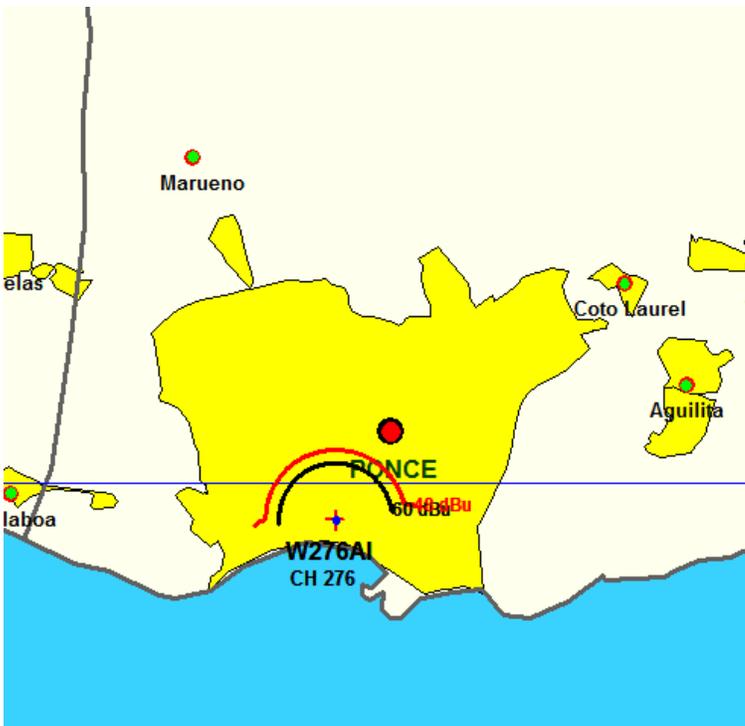


Figure 2c

Contour Overlaps with WVJP-FM

Licensed:



Proposed:



Figure 2d

Contour Overlaps with WTOK-FM

Licensed:



Proposed:



## Appendix 1

**Grafton Olivera, P.E.**

Consulting Engineer

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July 18, 2017

Via email (prcz@naic.edu)

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

Gentlemen:

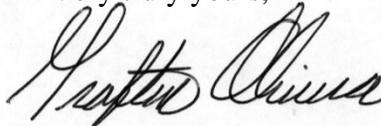
On behalf of our client, Spanish Broadcasting System Holding Company, Inc., licensee of a FM translator W276AI, in Ponce, PR, Fac. ID 53553, in accordance with Section 73.1030 of FCC Rules, we hereby notify of a proposed minor modification of license for W276AI. The particulars of the proposal are as follows:

Proposed Facility:

Geographical coordinates of antenna location (NAD27): 17-59-27.1 / 66-37-45.4  
Antenna height: 51 m AGL; 53.4 m AMSL  
Maximum Antenna Gain (horizontal plane): 7.0 dBd  
Operating channel: 276 (103.1 MHz)  
Type of emission: F3E  
Effective isotropic radiated power: 0.164 kW – Vertical 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](mailto:Grafton.Olivera@me.com)

# ARECIBO OBSERVATORY

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



July 26, 2017

Mr. Grafton Olivera, P.E.  
Consulting Engineer  
5119 60<sup>th</sup> Drive E  
Bradenton, FL 34203

Re: Spanish Broadcasting System Holding Company, Inc.  
Call Sign W276AI - Fac. ID 53553

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 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 #00170070016]

## APPENDIX 2

### Antenna Height Above Average Terrain Calculations -- Results

#### Input Data

Latitude 17° 59' 20" North  
Longitude 66° 37' 44" West (NAD 83)

Height of antenna radiation center above mean sea level: **53.4 meters AMSL**

Number of Evenly Spaced Radials = **12** 0° is referenced to True North

#### Results

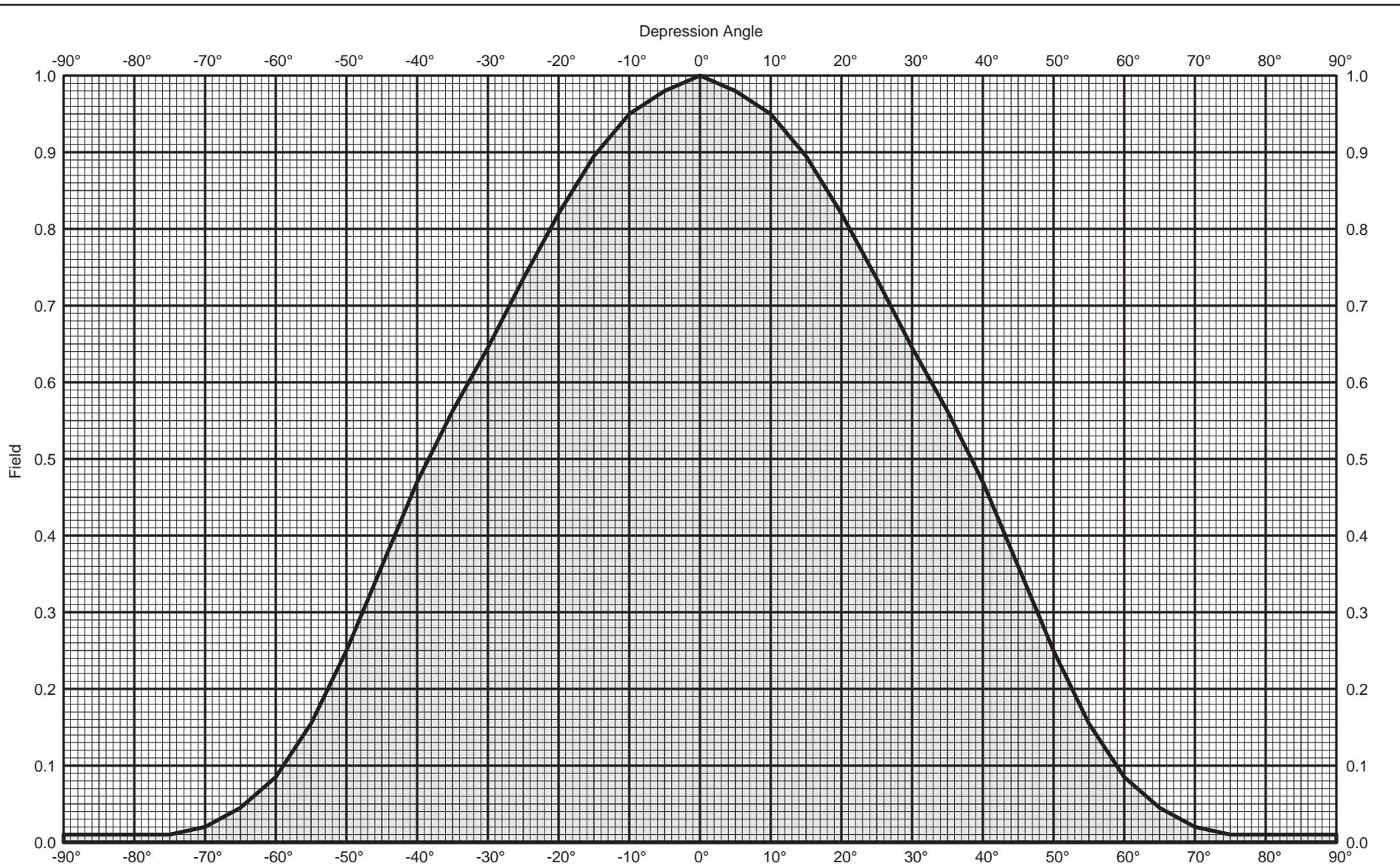
Calculated HAAT = **-30 meters**

Antenna Height Above Average Terrain calculated  
using 1 km GLOBE terrain data

#### Individual "Radial HAAT" Values, in meters

0°	-270.5 m
30°	-124.8 m
60°	-1.4 m
90°	48.6 m
120°	52.9 m
150°	53.4 m
180°	53.4 m
210°	53.4 m
240°	52.4 m
270°	8.9 m
300°	-96.1 m
330°	-191.3 m

# APPENDIX 3



CL-FM

Vertical plane pattern

FM

Maximum gain: 7.0 dBd

Vertical polarization

**KATHREIN**  
USA