

**DELAWDER COMMUNICATIONS, INC.**

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**ENGINEERING REPORT**

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**ENGINEERING STATEMENT—NEW LPFM APPLICATION**

Location : Ponce, PR (Site is in the city.)

Type of Support Structure for Antenna : New

Coordinates: N 18-00-41.5; W 66-38-22.8

ASR : None (Pass Slope)

Ground Elevation (m AMSL) : 18

Antenna Centerline (m AGL) : 50 (68 m AMSL)

Antenna Centerline HAAT (m) : minus 72 Source: Globe

Maximum Allowed ERP (w) : 100 (FCC Form Calculator has maximum at 100 w ERP)

FM CHANNEL : 207

Second Adjacent-channel Waiver Needed : Y

Section 73.827 Requirement Met : Y

Third Adjacent-channel to Radio Reading Service : None

Section 73.1030 Notification : Done via email

**TV CHANNEL 6 PROTECTION WAIVER**

By separate attachment, a waiver request is made regarding Rule Section 73.825 as it relates to protecting W06DA-D, Aguada, PR, 6D.

**SECOND ADJACENT CHANNEL PROTECTION WAIVER**

The proposed FM antenna is a Nicom BKG77 One bay.

WPUC-FM, Ponce, PR (205B) and WRTU, San Juan, PR (209B) are second adjacent-channel stations to the proposed channel 207 LPFM facility with transmitter sites that are located within the short-spacing distance of Section 73.807 to the proposed LPFM transmitter site. Using the well-established *Living Way Ministries* Methodology, no

actual interference to any population is predicted to exist to WPUC-FM and WRTU.

Note that a rule waiver of Section 73.807 for this second adjacent-channel protection using the well-established *Living Way Ministries* Methodology is respectfully requested if such a rule waiver is deemed necessary for protection to any station.

For WRTU, its 60 dBu F50,50 contour extends 40 kilometers in the direction of the LPFM transmitter site (244 degrees T). Since the distance between the WRTU and LPFM transmitter sites is 65 kilometers, the WRTU protected contour falls 25 kilometers short of the LPFM transmitter site. Therefore, WRTU is adequately protected.

The F50,50 signal strength from WPUC-FM at the proposed LPFM transmitter site is at least 81.7 dBu (the "desired" signal). The second/third adjacent-channel protection is an undesired-to-desired ("U/D") dB signal strength ratio of 40:1. Therefore, predicted interference to WPUC-FM from the proposed LPFM facility is a signal of greater than or equal to 121.7 dBu.

Using the maximum allowed ERP of 100 watts for the LPFM, the 121.7 dBu signal based on a free space field determination is predicted to extend out to 58 meters from the proposed LPFM transmit antenna. A vertical plane relative field pattern for the proposed Nicom BKG77 one-bay is attached. By adjusting for the vertical plane downward relative field values of the proposed antenna, it is herein demonstrated that the 121.7 dBu interfering signal (using a free space field determination) does not exist at any point at two meters above ground level—the clearance is at least 22 meters.

Based on the above showing, WPUC-FM and WRTU are adequately protected by the proposed facility.

## **ENVIRONMENTAL STATEMENT**

This proposal does not involve a site location specified under Section 1.1307(a) through (a)(8) of the FCC Rules.

The proposed FM antenna produces an ERP that is equal to or less than 100 watts (200 watts, with circular polarization). Assuming: (a) a maximum ERP of 200 watts; (b) a relative field of less than 0.3 in the critical downward angles; and (c) a distance of at least 47 meters from the lowest antenna element to 2 meters above ground level, the maximum power density is calculated as follows:

$$S = 33.4 (F)(F)(ERP) / [(R)(R)]$$

Where, S equals power density in uW/cm<sup>2</sup>  
 F equals the relative field factor  
 ERP equals the effective radiate power in watts  
 R equals the distance in meters

$$= 33.4 (0.3)(0.3)(200) / [(47)(47)]$$

$$= 1 \text{ uW/cm}^2, \text{ or less}$$

1 uW/cm<sup>2</sup> represents less than the uncontrolled power density limit (200 uW/cm<sup>2</sup>). The electromagnetic radiation from this proposed operation will not produce a value in excess of the radiation standard. The electromagnetic radiation from the proposed operation will not combine with other facilities on or near the structure to produce a significant change in value.

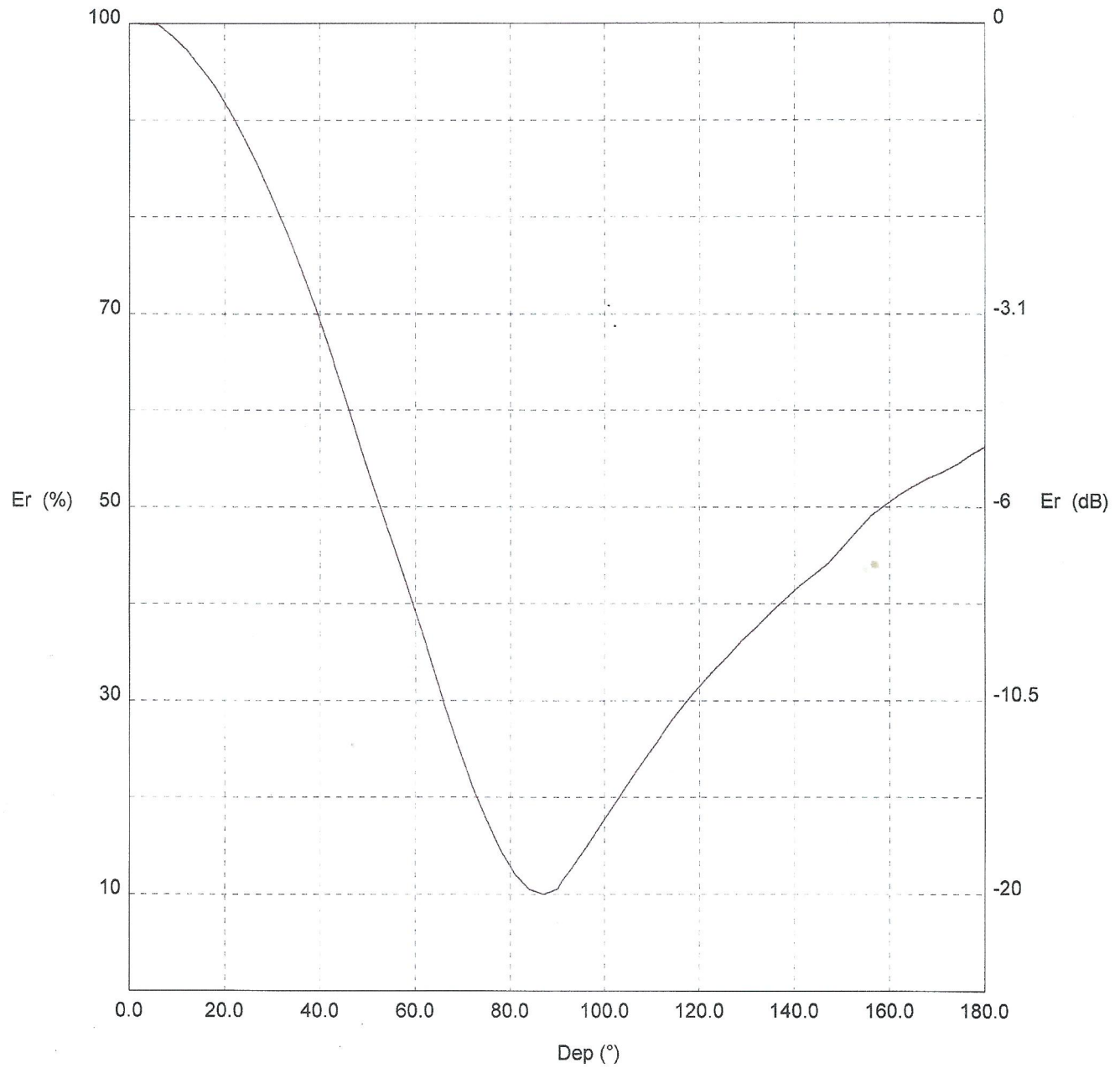
If this is a structure that may support various other operations, the applicant will cooperate with the other operators in establishing a plan for work done on the structure in close proximity to the existing antenna.

TX station:

Site name:

Frequency: 100.00 MHz

## Vertical diagram



— 0.0° Az. (Total antenna)

TX station:

Site name:

Frequency: 100.00 MHz

## Vertical diagram at an azimuth of 0° degrees

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
0.0	100.0	373.6	60.0	39.1	57.2	120.0	31.5	37.0
1.0	100.0	373.5	61.0	37.6	52.8	121.0	32.0	38.3
2.0	100.0	373.4	62.0	36.1	48.6	122.0	32.6	39.6
3.0	99.9	373.3	63.0	34.5	44.6	123.0	33.1	41.0
4.0	99.9	373.1	64.0	32.9	40.5	124.0	33.6	42.2
5.0	99.9	372.9	65.0	31.3	36.6	125.0	34.1	43.5
6.0	99.9	372.8	66.0	29.7	33.0	126.0	34.6	44.7
7.0	99.5	369.9	67.0	28.2	29.8	127.0	35.2	46.2
8.0	99.1	367.0	68.0	26.8	26.8	128.0	35.7	47.6
9.0	98.7	364.1	69.0	25.3	23.9	129.0	36.2	49.1
10.0	98.2	360.5	70.0	23.9	21.3	130.0	36.7	50.3
11.0	97.7	356.9	71.0	22.5	18.9	131.0	37.1	51.5
12.0	97.2	353.3	72.0	21.1	16.6	132.0	37.6	52.7
13.0	96.6	348.9	73.0	19.9	14.8	133.0	38.1	54.1
14.0	96.0	344.5	74.0	18.8	13.2	134.0	38.6	55.6
15.0	95.4	340.1	75.0	17.6	11.6	135.0	39.1	57.0
16.0	94.7	335.4	76.0	16.6	10.2	136.0	39.5	58.4
17.0	94.1	330.8	77.0	15.5	9.0	137.0	40.0	59.7
18.0	93.4	326.1	78.0	14.5	7.8	138.0	40.4	61.1
19.0	92.6	320.4	79.0	13.7	7.0	139.0	40.9	62.5
20.0	91.8	314.7	80.0	12.9	6.2	140.0	41.4	63.9
21.0	91.0	309.1	81.0	12.0	5.4	141.0	41.8	65.3
22.0	90.0	302.7	82.0	11.5	5.0	142.0	42.2	66.5
23.0	89.1	296.5	83.0	11.0	4.5	143.0	42.6	67.8
24.0	88.1	290.3	84.0	10.5	4.1	144.0	43.0	69.0
25.0	87.2	283.8	85.0	10.3	4.0	145.0	43.4	70.3
26.0	86.2	277.4	86.0	10.2	3.9	146.0	43.8	71.6
27.0	85.2	271.1	87.0	10.0	3.7	147.0	44.1	72.8
28.0	84.0	263.9	88.0	10.2	3.9	148.0	44.7	74.7
29.0	82.9	256.8	89.0	10.4	4.0	149.0	45.3	76.5
30.0	81.8	249.8	90.0	10.5	4.1	150.0	45.8	78.4
31.0	80.6	242.9	91.0	11.4	4.8	151.0	46.4	80.3
32.0	79.5	236.1	92.0	12.0	5.4	152.0	46.9	82.3
33.0	78.3	229.3	93.0	12.7	6.0	153.0	47.5	84.3
34.0	77.1	222.0	94.0	13.4	6.7	154.0	48.0	86.2
35.0	75.8	214.7	95.0	14.1	7.4	155.0	48.6	88.2
36.0	74.5	207.6	96.0	14.8	8.2	156.0	49.1	90.2
37.0	73.2	200.4	97.0	15.6	9.1	157.0	49.5	91.5
38.0	71.9	193.3	98.0	16.4	10.0	158.0	49.8	92.8
39.0	70.6	186.3	99.0	17.1	11.0	159.0	50.2	94.1
40.0	69.1	178.6	100.0	17.9	11.9	160.0	50.5	95.4
41.0	67.6	170.9	101.0	18.6	12.9	161.0	50.9	96.8
42.0	66.1	163.5	102.0	19.3	13.9	162.0	51.2	98.1
43.0	64.6	156.0	103.0	20.1	15.0	163.0	51.5	99.2
44.0	63.1	148.7	104.0	20.8	16.2	164.0	51.8	100.4
45.0	61.6	141.6	105.0	21.5	17.3	165.0	52.1	101.6
46.0	60.0	134.4	106.0	22.3	18.5	166.0	52.4	102.7
47.0	58.4	127.5	107.0	23.0	19.7	167.0	52.7	103.7
48.0	56.8	120.7	108.0	23.7	21.0	168.0	53.0	104.8
49.0	55.3	114.4	109.0	24.4	22.2	169.0	53.2	105.7
50.0	53.8	108.2	110.0	25.1	23.5	170.0	53.4	106.5
51.0	52.3	102.2	111.0	25.7	24.8	171.0	53.6	107.4
52.0	50.8	96.6	112.0	26.5	26.2	172.0	53.9	108.4
53.0	49.4	91.1	113.0	27.2	27.6	173.0	54.1	109.4
54.0	47.9	85.8	114.0	27.9	29.0	174.0	54.4	110.5
55.0	46.5	80.7	115.0	28.5	30.4	175.0	54.7	111.9
56.0	45.0	75.7	116.0	29.2	31.8	176.0	55.1	113.3
57.0	43.6	71.0	117.0	29.8	33.1	177.0	55.4	114.7
58.0	42.1	66.2	118.0	30.4	34.4	178.0	55.7	115.9
59.0	40.6	61.6	119.0	30.9	35.7	179.0	56.0	117.0

74.1204(d) Showing (also used for LPFM)

Ponce, PR FM channel 207  
NICOM BKG-77 1-bay

ERP (kw)

0.1  
50  
121.7

Hght of Antenna center above ground (m)  
Translator's IX Contour

<u>Depression Angle from Horizon</u>	<u>Antenna Relative Field</u>	<u>ERP (kw) from the Antenna RF</u>	<u>Dist. To IX Contour (m)</u>	<u>Height IX Contour Above Ground (m)</u>
0	1	0.1000	57.6766	50.000
5	0.999	0.0998	57.6190	44.978
10	0.982	0.0964	56.6385	40.165
15	0.954	0.0910	55.0235	35.759
20	0.918	0.0843	52.9472	31.891
25	0.872	0.0760	50.2940	28.745
30	0.818	0.0669	47.1795	26.410
35	0.758	0.0575	43.7189	24.924
40	0.691	0.0477	39.8546	24.382
45	0.618	0.0382	35.6442	24.796
50	0.538	0.0289	31.0300	26.230
55	0.465	0.0216	26.8196	28.031
60	0.391	0.0153	22.5516	30.470
65	0.313	0.0098	18.0528	33.639
70	0.239	0.0057	13.7847	37.047
75	0.178	0.0032	10.2664	40.083
80	0.129	0.0017	7.4403	42.673
85	0.103	0.0011	5.9407	44.082
90	0.105	0.0011	6.0560	43.944

Note: Input the ERP, Height of the antenna above Ground, the Calculated Translator IX contour, and the specified Antenna Relative Field Pat