

ENGINEERING EXHIBIT  
APPLICATION FOR LICENSE  
RADIO STATION WWRM(FM)  
TAMPA, FLORIDA

May 18, 2001

CH 235C 100 KW 470 M

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Engineering Statement

This Engineering Exhibit was prepared on behalf of radio station WWRM(FM), Tampa, Florida in support of an application for license. This exhibit provides details concerning the WWRM operation and its use of electrical beam tilt.

Figure 1 is a tabulation of the operational specifications for the WWRM facility, as built. As indicated therein, there is a total transmission loss of 1.12 dB (77.3% efficiency), which, given a maximum beam ERP of 100 kW and an antenna power gain of 3.8, results in a transmitter power output of 34.0 kW.

The facility employs a Dielectric, TDM-9 FM transmitting antenna with 0.9 degree of downward electrical beam tilt.\* The Appendix contains the antenna vertical pattern data. The horizontal plane ERP is calculated to be 97.3 kW, with a maximum beam ERP of 100 kW, based on the manufacturer-supplied data,

Louis Robert du Treil, Jr.

May 18, 2001

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\* This is the same antenna pattern specified in the application for construction permit. There is no change in the radio-frequency energy exposure calculation for the WWRM facility.

**Figure 1**

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Operational Specifications

Transmitter	Broadcast Electronics, FM35B
Transmitter power output	34.0 kW
Transmission line 1	Dielectric, EIA 3 in
Length	10 ft
Loss	0.01 dB
Transmission line 2	Dielectric, EIA 4 in
Length	41 ft
Loss	0.03 dB
Transmission line 3	Dielectric, EIA 6-1/8 in
Length	1542 ft
Loss	0.78 dB
Switch 1	
Loss	0.10 dB
Switch 2	
Loss	0.10 dB
Combiner	
Loss at 94.9 MHz	0.10 dB
Total transmission loss	1.12 dB (77.3% efficiency)
Antenna	Dielectric, TDM-9 FM
Polarization	Circular
Maximum power gain	3.8
Antenna input power	26.3 kW
Effective radiated power at main beam maximum	100 kW

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Vertical Plane Radiation Pattern for Transmitting Antenna

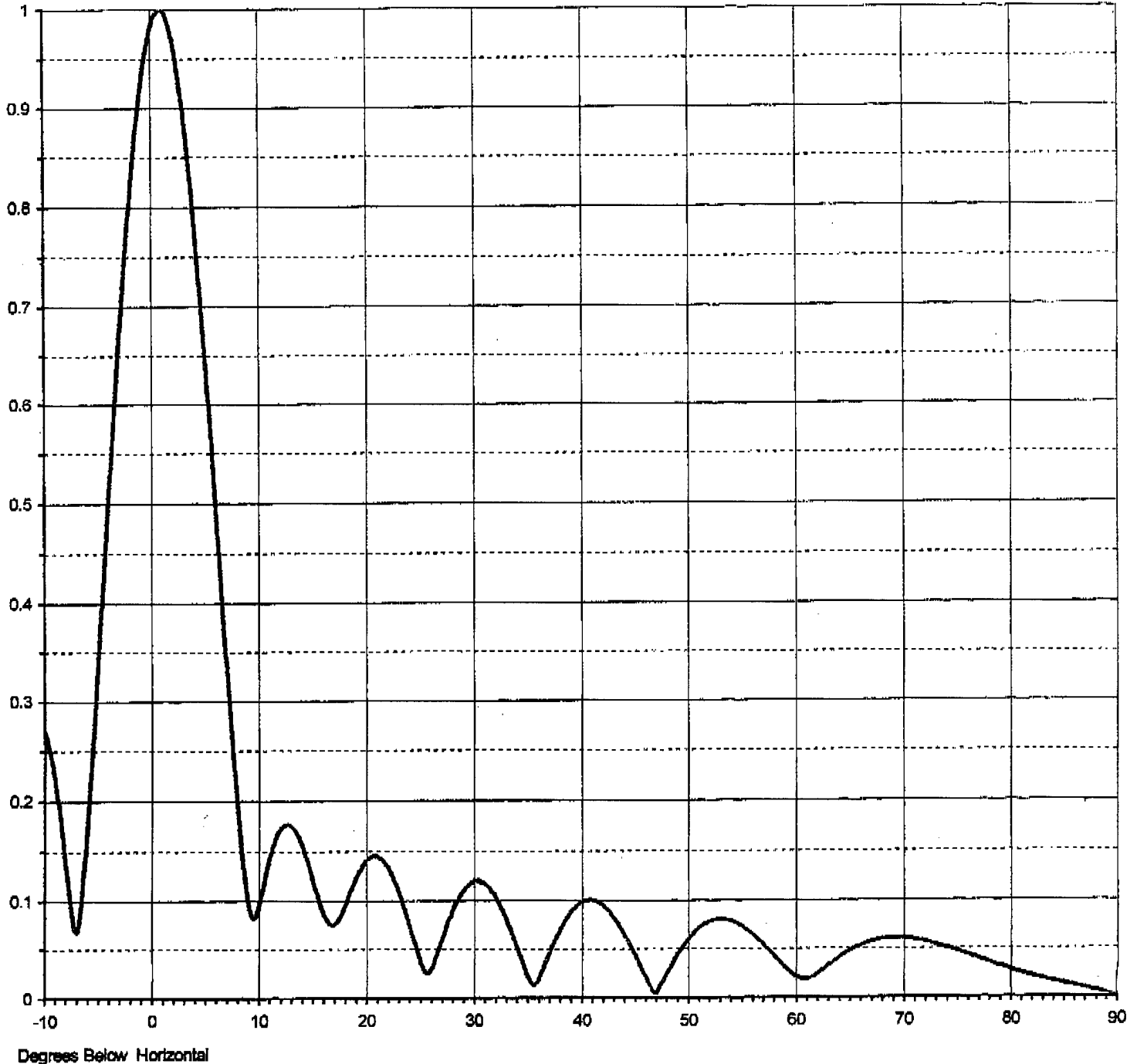
*(two sheets follow)*



Proposal Number	DCA-8875	
Date	28-Jul-00	
Call Letters	WWRM-FM	Channel 235
Location	Tampa, FL	
Customer	ATS	
Antenna Type	TDM-9 FM	

### ELEVATION PATTERN

RMS Gain at Main Lobe	3.80	( 5.80 dB )	Beam Tilt	0.90 deg
RMS Gain at Horizontal	3.70	( 5.68 dB )	Frequency	94.90 MHz
Calculated / Measured	Calculated		Drawing #	9D038090-90





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 Date **28-Jul-00**  
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 Customer **ATS**  
 Antenna Type **TDM-9 FM**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **9D038090-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.271	2.4	0.946	10.6	0.119	30.5	0.120	51.0	0.071	71.5	0.058
-9.5	0.250	2.6	0.931	10.8	0.129	31.0	0.118	51.5	0.075	72.0	0.057
-9.0	0.221	2.8	0.915	11.0	0.138	31.5	0.113	52.0	0.078	72.5	0.056
-8.5	0.183	3.0	0.897	11.5	0.157	32.0	0.105	52.5	0.080	73.0	0.054
-8.0	0.138	3.2	0.877	12.0	0.170	32.5	0.095	53.0	0.081	73.5	0.052
-7.5	0.092	3.4	0.856	12.5	0.176	33.0	0.083	53.5	0.081	74.0	0.051
-7.0	0.068	3.6	0.834	13.0	0.176	33.5	0.070	54.0	0.079	74.5	0.049
-6.5	0.103	3.8	0.810	13.5	0.170	34.0	0.055	54.5	0.077	75.0	0.047
-6.0	0.170	4.0	0.785	14.0	0.158	34.5	0.040	55.0	0.074	75.5	0.045
-5.5	0.248	4.2	0.759	14.5	0.143	35.0	0.025	55.5	0.070	76.0	0.043
-5.0	0.332	4.4	0.732	15.0	0.125	35.5	0.014	56.0	0.066	76.5	0.041
-4.5	0.417	4.6	0.705	15.5	0.106	36.0	0.017	56.5	0.061	77.0	0.039
-4.0	0.502	4.8	0.676	16.0	0.090	36.5	0.030	57.0	0.056	77.5	0.037
-3.5	0.586	5.0	0.647	16.5	0.078	37.0	0.043	57.5	0.050	78.0	0.035
-3.0	0.665	5.2	0.617	17.0	0.075	37.5	0.056	58.0	0.044	78.5	0.033
-2.8	0.696	5.4	0.586	17.5	0.081	38.0	0.068	58.5	0.038	79.0	0.032
-2.6	0.725	5.6	0.556	18.0	0.093	38.5	0.078	59.0	0.032	79.5	0.030
-2.4	0.753	5.8	0.525	18.5	0.107	39.0	0.087	59.5	0.027	80.0	0.028
-2.2	0.781	6.0	0.493	19.0	0.120	39.5	0.093	60.0	0.022	80.5	0.026
-2.0	0.807	6.2	0.462	19.5	0.131	40.0	0.098	60.5	0.020	81.0	0.025
-1.8	0.831	6.4	0.431	20.0	0.140	40.5	0.100	61.0	0.019	81.5	0.023
-1.6	0.854	6.6	0.400	20.5	0.144	41.0	0.101	61.5	0.021	82.0	0.022
-1.4	0.876	6.8	0.369	21.0	0.145	41.5	0.099	62.0	0.024	82.5	0.020
-1.2	0.896	7.0	0.339	21.5	0.142	42.0	0.096	62.5	0.028	83.0	0.019
-1.0	0.915	7.2	0.309	22.0	0.135	42.5	0.091	63.0	0.032	83.5	0.018
-0.8	0.932	7.4	0.280	22.5	0.124	43.0	0.084	63.5	0.036	84.0	0.016
-0.6	0.947	7.6	0.252	23.0	0.111	43.5	0.076	64.0	0.040	84.5	0.015
-0.4	0.960	7.8	0.225	23.5	0.095	44.0	0.067	64.5	0.044	85.0	0.014
-0.2	0.971	8.0	0.198	24.0	0.077	44.5	0.057	65.0	0.048	85.5	0.013
0.0	0.981	8.2	0.174	24.5	0.059	45.0	0.046	65.5	0.051	86.0	0.011
0.2	0.988	8.4	0.151	25.0	0.041	45.5	0.035	66.0	0.053	86.5	0.010
0.4	0.994	8.6	0.130	25.5	0.027	46.0	0.023	66.5	0.056	87.0	0.009
0.6	0.998	8.8	0.112	26.0	0.028	46.5	0.012	67.0	0.057	87.5	0.008
0.8	1.000	9.0	0.098	26.5	0.041	47.0	0.005	67.5	0.059	88.0	0.006
1.0	1.000	9.2	0.088	27.0	0.057	47.5	0.013	68.0	0.060	88.5	0.005
1.2	0.998	9.4	0.083	27.5	0.073	48.0	0.023	68.5	0.061	89.0	0.004
1.4	0.994	9.6	0.083	28.0	0.087	48.5	0.033	69.0	0.061	89.5	0.002
1.6	0.988	9.8	0.085	28.5	0.099	49.0	0.043	69.5	0.061	90.0	0.000
1.8	0.980	10.0	0.091	29.0	0.109	49.5	0.051	70.0	0.061		
2.0	0.971	10.2	0.100	29.5	0.116	50.0	0.059	70.5	0.060		
2.2	0.959	10.4	0.109	30.0	0.119	50.5	0.065	71.0	0.059		