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Report of Test FM-3V-DA
For
Larlen Communications, WDPW 91.9 MHz Greenville, MI

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a FM-3V-DA to meet the needs of WDPW and to comply with the requirements of the FCC construction permit, file number BMPED-20080725ADN.

RESULTS:

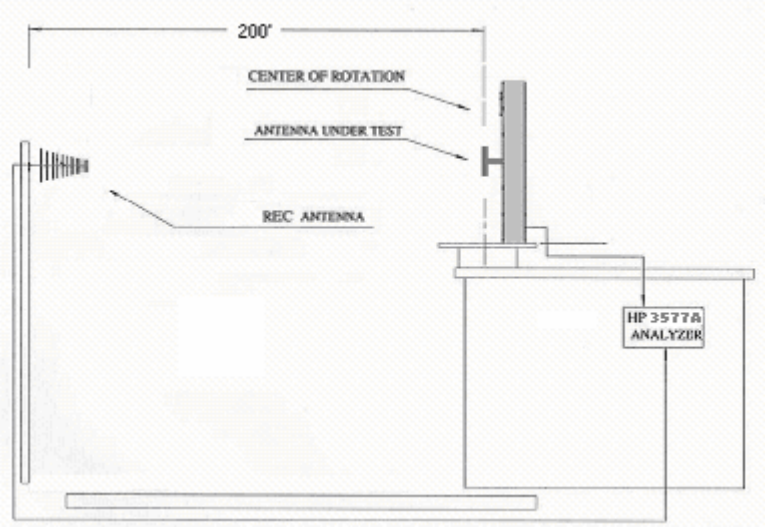
The measured azimuth pattern for the FM-3V-DA is shown in Figure 2. Figure 1 shows the Tabulation of the Vertical Polarization. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BMPED-20080725ADN indicates that the Vertical radiation component shall not exceed 4 kW at any azimuth.

From Figure 1, the maximum radiation of the Vertical component occurs at 290 Degrees T. At the restricted azimuth of 110-180 Degrees T the Vertical component is at least 13 dB down from the maximum of 4 kW, or 0.23 kW.

The R.M.S. of the Vertical component is 0.727694056. The total Vertical power gain is 5.037. See Figure 4 for calculations. The R.M.S. of the FCC pattern in construction permit BMPED-20080725ADN is 0.796614259. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:
One bay of the FM-3V-DA dipole-type antenna was mounted on a tower of exact scale to the Stainless G-25 series tower present at site. The spacing and mounting angle of the antenna in relation to the tower was varied to achieve the azimuth pattern shown in Figure 2. See Figure 5 for mechanical details.

METHOD OF MEASUREMENT:
As allowed by the construction permit, file number BMPED-20080725ADN, a single level of the FM-3V-DA was set up on a rural "quiet zone" 80-acre antenna pattern measuring range, a scale of 1:1 was used.



EQUIPMENT:
The full-scale model pattern range consists of a rotating device equipped with an electronic position indicator. The full-scale tower section is placed on the top of rotating device and is used in the transmission mode at approximately 20 feet above ground level. A small diameter wooden support structure holds a broadband FM receiving yagi antenna that is spaced 200 feet away from the rotating device at the same level above ground as the transmitting antenna. The transmitting and receiving signals are carried to a control area by means of RG-8 type and RG-6 type double-shielded coax cables, respectively. The control area is equipped with: Hewlett Packard Model 3577A Network Analyzer. The test equipment is calibrated to ANSI/NCSL Z540-1-1994.

TEST PROCEDURES:
The network analyzer was set to the frequency of 91.9 MHz. Calibrated physical markers are used to check the linearity of the measuring system. From the recorded patterns, the R.M.S. values are calculated and recorded as shown in Figure 4.

Respectfully submitted by:
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Figure 1
TABULATION OF VERTICAL POLARIZATION
WDPW GREEENVILLE, MI
MODEL FM-3V-DA

Degrees	Vertical Field	FCC Field
0	0.935	1.000
10	0.929	1.000
20	0.919	1.000
30	0.899	1.000
40	0.867	1.000
50	0.817	1.000
60	0.746	0.944
70	0.656	0.750
80	0.551	0.596
90	0.439	0.473
100	0.331	0.376
110	0.240	0.299
120	0.176	0.299
130	0.150	0.299
140	0.145	0.299
150	0.146	0.299
160	0.150	0.299
170	0.170	0.299
180	0.224	0.299
190	0.305	0.376
200	0.411	0.473
210	0.524	0.596
220	0.637	0.750
230	0.740	0.944
240	0.829	1.000
250	0.901	1.000
260	0.952	1.000
270	0.983	1.000
280	0.998	1.000
290	1.000	1.000
300	0.991	1.000
310	0.978	1.000
320	0.964	1.000
330	0.953	1.000
340	0.944	0.944
350	0.939	0.944

Figure 2
POLAR PLOT OF VERTICAL POLARIZATION
WDPW GREEENVILLE, MI
MODEL FM-3V-DA

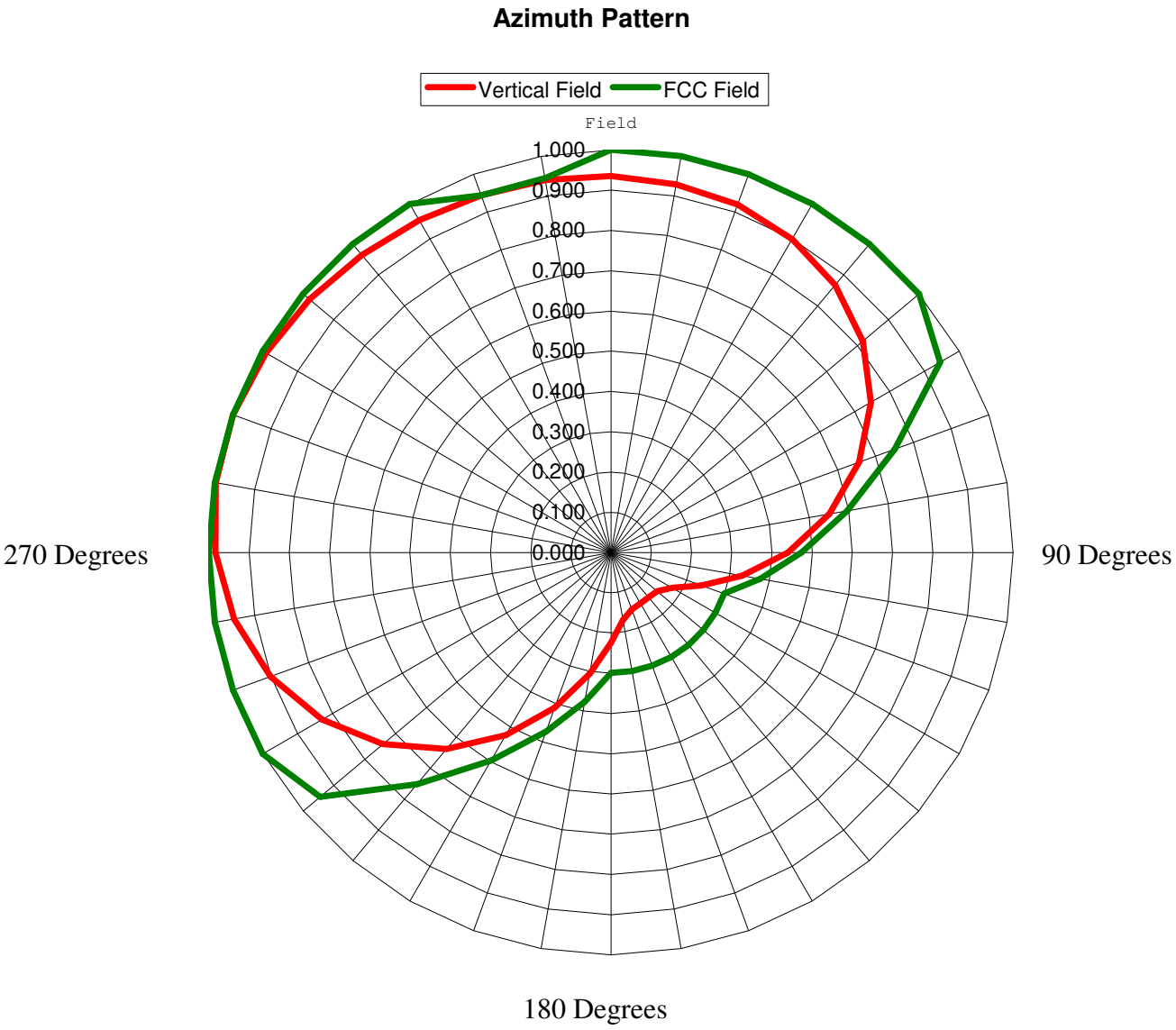

FIGURE 3
Vertical Pattern
WDPW GREEENVILLE, MI
MODEL FM-3V-DA

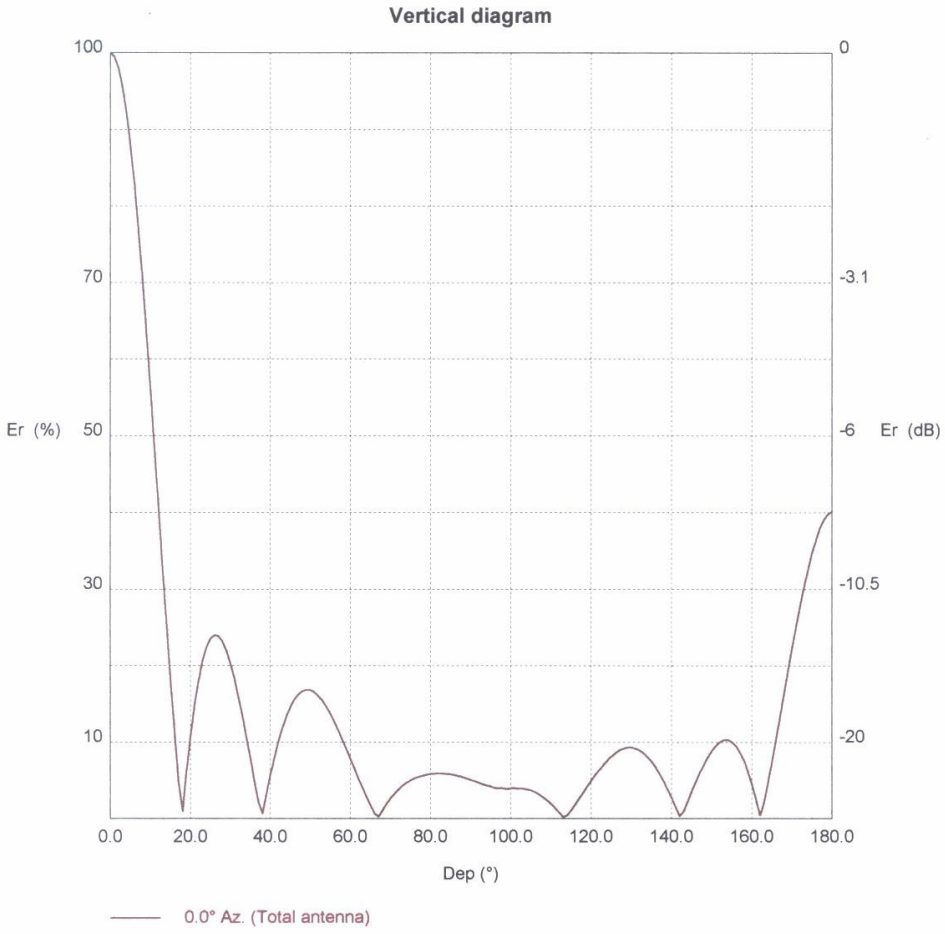

FIGURE 4
VALIDATION OF GAIN CALCULATION
WDPW GREEENVILLE, MI
MODEL FM-3V-DA

Elevation Gain of FM-3V-DA equals
Vertical 2.81

Elevation Gain of Vertical Component equals 2.81

Vertical Azimuth Gain equals $1/(RMS)^2$
$1/(0.727694056)^2 = 1.888$

* Total Vertical Gain is Elevation Gain times Azimuth Gain
$2.81 \times 1.888 = 5.307$

ERP divided by Vertical Gain equals Antenna Input Power
$4 \text{ kW} \div 5.307 = 0.754 \text{ kW}$

FIGURE 5
Antenna Mounting and Orientation
WDPW GREEENVILLE, MI
MODEL FM-3V-DA