

## **Merrill Weiss Group** LLC

227 Central Avenue  
Metuchen, NJ 08840-1242  
(732) 494-6400 Phone  
(732) 494-6401 Fax

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*Consultants in Electronic Media Technology/Management*

### **Technical Statement for Digital Television Construction Permit Application Amendment:**

**EBC St. Louis, Inc.  
WPXS-DT  
Channel 21  
Mt Vernon, IL  
File Number BPCDT-19990701KI**

#### ***Introduction***

This Technical Statement provides the supplemental technical data and information required for the FCC Form 301 “Application for Construction Permit for Commercial Broadcast Station” of EBC St. Louis, Inc. (“EBC”), for amendment of its construction permit application for Digital Television (DTV) facilities on Channel 21 in Mt Vernon, IL in File Number BPCDT-19990701KI. In particular, it addresses the additional information required by Section III-D of Form 301 – DTV Engineering Data – applicable to facilities proposed for EBC’s station WPXS-DT. The current application amendment is being filed to tie together the existing construction permit application with an FAA Determination of No Hazard and the corresponding FCC Antenna Structure Registration. As a result of meeting FAA requirements, the proposed tower has been reduced in height and slightly relocated (approximately 0.4 mile) from the parameters given in the earlier application, and the antenna consequently has been changed in type and orientation to maximize performance given the new tower characteristics.

The instant application proposes to locate WPXS-DT at a site approximately 4.4 km east of Germantown, IL. The proposed tower has received an FAA Determination of No

Hazard to Air Navigation in FAA Aeronautical Study Number 1999-AGL-3026-OE. This amendment proposes to conform the tower parameters to those in the FAA study and therefore to locate the DTV Station's center of radiation at an elevation of 224.9 meters above ground level, 375.8 meters above mean sea level, and 242 meters above average terrain, respectively. The proposed tower has been registered with the Commission under Antenna Structure Registration Number 1245875.

### ***Facilities***

The facilities requested in this amendment include operation at 1000 kW ERP (average) using a broad cardioid pattern directional antenna at a height above average terrain of 242 meters. Elevation power gain of the antenna is 13.69 (11.37 dBd) at the vertical beam maximum (1.2 degrees below horizontal) and 12.30 (10.90 dBd) at 0.431 degree below horizontal, the average depression angle to the radio horizon (computed at 45-degree azimuth intervals). The azimuth power gain is 1.7 (2.3 dB), yielding a total power gain in the main beam of 23.28 (13.67 dB). Full specifications for the proposed facility are included in Figure 1. The site location detail is shown in Figure 2.

The new tower structure itself is planned to be 229.9 meters tall. The antenna will be mounted on the side of the tower with its radiation center at a height above ground of 224.9 meters. The ground elevation at the site is 150.9 meters above mean sea level. The overall tower height above mean sea level will be 380.8 meters. The tower layout is shown in Figure 3.

A plot of the horizontal radiation pattern in relative field values is included as Figure 4; the horizontal power pattern expressed in decibels relative to 1 kW (dBk) is plotted in Figure 5. The tabulated horizontal field and power values are given in Figure 6. The vertical plane radiation pattern in relative field values is included as Figure 7; the vertical plane power pattern expressed in decibels relative to 1 kW (dBk) is plotted in Figure 8. The tabulated vertical plane field and power values are given in Figure 9. Figure 10 gives the tabulated values of average elevations and contour distances for the nine required radial directions, calculated as prescribed in §73.625(b)(2), (3), (4), and (5), and

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Figure 11 shows the 41 and 48 dBu contours on a map of the coverage area as prescribed by §73.625(b)(3).

The transmitter to be used by WPXS-DT will have been granted authorization through the Notification procedures as required by Section 73.1660 of the Commission's Rules and described in Part 2 Subpart J thereof. The precise transmitter power will be set to yield the authorized effective radiated power. Transmission line and filter losses will determine the specific power required. The antenna will be side-mounted on the new WPXS-DT tower, as shown in the drawing of Figure 2.

### ***Principal Community Coverage***

As required by Section 73.625(a)(1), the DTV transmitter location must be chosen so as to put a minimum F(50,90) field strength of 48 dBu<sup>1</sup> over the entire principal community to be served. Section 73.625(a)(2) further requires that "the location of the antenna must be so chosen that there is not a major obstruction in the path over the principal community to be served." As demonstrated in Figure 11, the facilities proposed in the instant amendment meet these requirements.

### ***Interference to U.S. Stations***

Because the instant application involves changes in location and antenna pattern from the reference facilities provided by the FCC in its DTV Plan and includes a power level that exceeds the reference effective radiated power, studies according to OET Bulletin No. 69 are required. A version of the Commission's TV\_Process program was used to perform those studies. Table 1 is a summary of the studies. The channel, call sign, city of license, and application record number of each station studied are given in the left four columns of the table. The DTV baseline or Grade B contour population for each station follows in the fifth column; the total population predicted to receive interference with WPXS-DT assumed to be located at the Commission's original DTV Plan reference site (near Cartter, IL) is included in the sixth column; and the number of scenarios studied for each

station appears in the seventh column. In the two columns on the right, the total population predicted to receive interference when the planned facilities are included in the analysis is shown alongside the percent change from the DTV Plan values in total population predicted to receive interference. The dashes shown on some rows indicate instances in which the TV\_Process program reported that the “proposal causes no interference,” meaning that there were no cells in its initial culling study that indicated interference. The plus signs on other rows indicate instances in which the TV\_Process program reported that the “proposed station is beyond the site to nearest cell evaluation distance.” Thus, in these cases, no further examination was required, and the number of scenarios studied was zero. When multiple scenarios existed and TV\_Process studied them, the worst-case population increase was selected for presentation in the table.

Table 1 summarizes 29 cases implicated in the move of WTVE-DT from near Cartter, IL to Germantown, IL using the proposed new facilities that require analysis. (Two are low power or Class A and are shown at the bottom of Table 1 and considered here as well as in the section below on Interference to Class A Stations.) Eighteen of these cases show that analysis beyond the initial culling study was unnecessary. Of the remaining eleven cases, one shows no predicted change in interference, and five show a very slight decrease. Two cases show very slight increases of 0.01 percent or less, and the other three cases show small increases in the population numbers predicted to receive new interference because of the proposal, when compared to the FCC’s DTV Plan. None of these three increases exceeds 1 percent (after rounding); in fact, two of the three increase by less than half a percent.

In summary, there is no increase in interference predicted by the Longley-Rice analysis method of OET Bulletin No. 69 to any other full service broadcast station exceeding the *de minimis* limits of 2 percent additional interference from a single station and 10 percent from all interfering stations taken together. Thus, no new interference is predicted to any full service broadcast station that would preclude the current proposal.

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<sup>1</sup> While §73.625(a)(1) permits coverage of the principal community with a field strength of 41 dBu until December 31, 2004, it is anticipated that construction of the proposed facilities will not be completed until after that date. Consequently, all planning is for the 48 dBu requirement.

**Table 1 – WPXS-DT Interference Studies to Neighboring Stations Using FCC TV\_Process Program**

Chnl	Station	City	ARN	DTV Baseline / Grade B	Cartter Interference Population	Scen- arios	Germantwn Interference Population	% Change
14	WSEC	Jacksonville, IL	BLET-20030731AFQ	58,479	+	+	+	+
18	951211KI	Edwardsville, IL	BPET-19951211KI	2,652,662	11,180	4	11,414	0.0088
20	WICS	Springfield, IL	BLCT-2187	679,672	—	—	—	—
20	WAZE-TV	Madisonville, KY	BMPCDT-20040329AKL	552,761	—	—	—	—
20	WLCN-DT	Madisonville, KY	DTVPLN-DTVP0397	552,761	+	+	+	+
20	WAZE-TV	Madisonville, KY	BPCDT-19991101AHC	552,761	—	—	—	—
20	KNLJ	Jefferson City, MO	BPCDT-19991028AFN	328,291	+	+	+	+
20	KNLJ-DT	Jefferson City, MO	DTVPLN-DTVP0404	328,291	+	+	+	+
21	WYCC	Chicago, IL	BLEDT-20030501ABC	8,060,943	—	—	—	—
21	WYCC-DT	Chicago, IL	DTVPLN-DTVP0435	8,060,943	—	—	—	—
21	WMEC	Macomb, IL	BLEDT-20031031ADO	56,530	270	3	539	0.4759
21	WMEC-DT	Macomb, IL	DTVPLN-DTVP0436	56,530	—	—	—	—
21	WFYI	Indianapolis, IN	BLEDT-20030310BAD	1,647,903	3,607	3	2,139	-0.0891
21	WFYI-DT	Indianapolis, IN	DTVPLN-DTVP0438	1,647,903	—	—	—	—
21	WBNA	Louisville, KY	BLCT-19890201KS	1,147,670	61,855	72	61,771	-0.0073
21	WKMU	Murray, KY	BLET-19830812KO	287,753	10,869	6	11,318	-0.1560
21	KOZK	Springfield, MO	BLET-20030911AAT	514,587	12,542	36	14,299	0.3414
21	WUXP-TV	Nashville, TN	BMPCDT-20010525AAJ	1,371,193	19,618	6	19,578	-0.0029
21	WUXP-DT	Nashville, TN	DTVPLN-DTVP0457	1,371,193	7,411	2	7,337	-0.0054
22	WFHL-DT	Decatur, IL	DTVPLN-DTVP0481	649,976	—	—	—	—

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<b>Chnl</b>	<b>Station</b>	<b>City</b>	<b>ARN</b>	<b>DTV Baseline / Grade B</b>	<b>Cartter Interference Population</b>	<b>Scen- arios</b>	<b>Germantwn Interference Population</b>	<b>% Change</b>
22	WBUI	Decatur, IL	BLCDT-20040521ADS	649,976	—	—	—	—
22	WVUT	Vincennes, IN	BLET-344	249,829	+	+	+	+
22	KBSI-DT	Cape Girardeau, MO	DTVPLN-DTVP0489	523,735	532	1	580	0.0092
22	KBSI	Cape Girardeau, MO	BMPCDT-20040622AAU	523,735	2,473	1	7,717	1.0004
23	KBSI	Cape Girardeau, MO	BLCT-19951120KT	523,735	+	+	+	+
23	KBSI	Cape Girardeau, MO	BPCT-20040622AAT	523,735	+	+	+	+
24	KNLC	St. Louis, MO	BLCT-19860123KG	2,537,308	13,085	2	13,085	0.0000
28	K28IK	St. Louis, MO	BPTTL-19980601YF	+	+	+	+	+
29	W29CI	Salem, IL	BLTTA-20011130AAJ	—	—	—	—	—

### ***Interference to Class A Stations***

The Commission's TV\_Process program also was used to locate and evaluate predicted interference to Class A stations. The TV\_Process program indicated "no spacing violations or contour overlap to Class A stations" and therefore no need to study any such stations in detail. Notwithstanding this determination, TV\_Process studied one Class A station using the Longley-Rice methodology of OET Bulletin No. 69 (the last entry in Table 1) and reported that the "proposal causes no interference." This means that there were no cells in its initial culling study that indicated interference, and, thus, there was no need to evaluate the situation further.

### ***Canadian and Mexican Coordination***

In accordance with the Letter of Understanding ("LOU") regarding DTV coordination between the United States and Canada,<sup>2</sup> stations within 400 km of the Canadian border require coordination between the U.S. and Canadian governments as part of the authorization process. At 658 km (409 miles) from the nearest point on the Canadian border, the Germantown site falls outside the coordination distance; therefore coordination with Canada will not be required in the case of this WPXS-DT application.

In accordance with the Memorandum of Understanding ("MOU") regarding DTV coordination between the United States and Mexico,<sup>3</sup> stations within 275 km of the Mexican border require coordination between the U.S. and Mexican governments as part of the authorization process. At 1,467 km (912 miles) from the nearest point on the Mexican border, the Germantown site falls outside the coordination distance, therefore coordination with Mexico will not be required in the case of this WPXS-DT application.

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<sup>2</sup> "Letter of Understanding Between the Federal Communications Commission of the United States of America and Industry Canada Related to the Use of the 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-806 MHz Bands for the Digital Television Broadcasting Service Along the Common Border."

<sup>3</sup> Memorandum of Understanding Between the Federal Communications Commission of the United States of America and the Secretaria de Comunicaciones y Transportes of the United Mexican States Related to the Use of the 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-806 MHz Bands for the Digital Television Broadcast Service Along the Common Border (July 22, 1998).

***Environmental Impact / Radio Frequency Radiation***

None of the conditions specified in Section 1.1307 that would require the preparation of an Environmental Assessment pertain with respect to the proposed facility at Germantown. In particular, because it will be located in an area of oil and farm fields, the new operation does not implicate many of the causes for further investigation and preparation of further reports.

With respect to Radio Frequency Radiation exposure, OET Bulletin No. 65 provides methods for evaluating the level of exposure for both employees (occupational/controlled situations) and non-employees (general population/uncontrolled situations). The antenna radiation pattern, as provided in the manufacturer's technical specifications, combined with the antenna height above ground level and the operating power level predict that the potential exposure will be less than 5 percent of the Maximum Permissible Exposure (MPE) limit for general population / uncontrolled situations. (5 percent of the MPE at Channel 21 is  $17.1 \mu\text{W}/\text{cm}^2$ ). Specifically, application of the formulas provided in OET-65 yields a value of less than one percent (actually,  $3.1 \mu\text{W}/\text{cm}^2$ , or 0.9 percent) of the MPE. Thus, the proposed operation is categorically excluded from having to submit a detailed RF exposure analysis of the site.

Notwithstanding the foregoing, EBC recognizes its responsibility for the safety and health of employees and contractors when exposed to RF radiation conditions. It will take the steps necessary to assure that personnel working in its facilities and on the tower and antenna are protected from exposure to RF radiation levels exceeding those specified in the Commission's rules. The steps to be taken may include measurements and monitoring as well as power reductions or turning off the transmitter if necessary to ensure a safe working environment. Moreover, despite the prediction of RF energy levels well below the MPE for general population/uncontrolled situations, EBC will restrict public access to the facility and the areas surrounding the tower and guy anchors through installation of fencing.

***Notifications***

The proposed site near Germantown is not in proximity to any of the government radio astronomy installations named in Section 73.1030, nor is it proximate to any of the named radio receiving locations. Furthermore, the nearest FCC monitoring station, in Allegan, Michigan, is over 540 km distant. Thus, none of the notifications mandated or recommended by Section 73.1030 is required in this instance.

**Figure 1 — Technical Specifications — Proposed WPXS-DT Facility  
Channel 21 — Mount Vernon, IL**

**Frequency**

Channel	21
Frequency Band	512 - 518 MHz
Center Frequency	515 MHz

**Location**

Site	4.4 km (2¾ miles) East of Germantown, IL
Geographic Coordinates (NAD27)	38° 32' 53.9" N 89° 29' 17.2" W
Tower Registration (FCC ASR Number)	1245875

**Elevation**

Elevation of site above mean sea level	150.9 m
Overall height of tower above site elevation	229.9 m
Overall height of tower above mean sea level	380.8 m
Height of antenna radiation center above site elevation	224.9 m
Elevation of average terrain (45-degree spaced radials, 3.2-16.1 km)	133.8 m
Height of antenna radiation center above mean sea level	375.8 m
Height of antenna radiation center above average terrain (HAAT)	242.0 m

**Antenna**

Manufacturer	Radio Frequency Systems
Model	RD12A-1424H6S7S
Description	Side-Mounted UHF Cavity-Slot
Orientation (rotation around vertical axis)	205.0 degrees true
Electrical beamtilt	1.2°
Mechanical beamtilt	None
Polarization	Horizontal
Gain (in horizontal plane – 0° depression)	18.03 (12.56 dB)
Gain (peak of beam – 1.2° depression)	23.28 (13.67 dB)

**Power**

Effective radiated power (ERP) (main beam – 1.2° depression)	1000 kW
Effective radiated power (ERP) (toward avg. radio horizon – 0.431° dn.)	898.0 kW
Effective radiated power (ERP) (horizontal plane)	774.5 kW

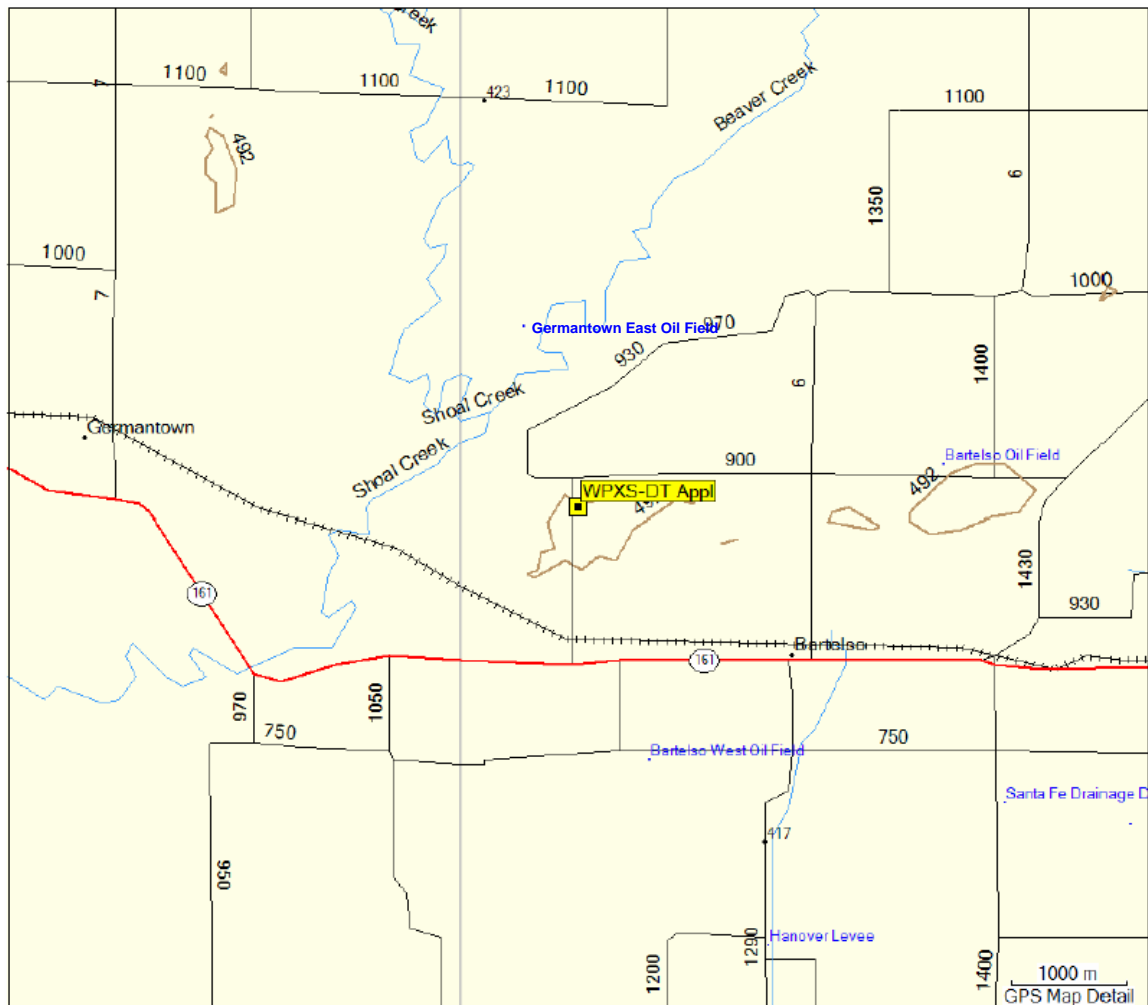
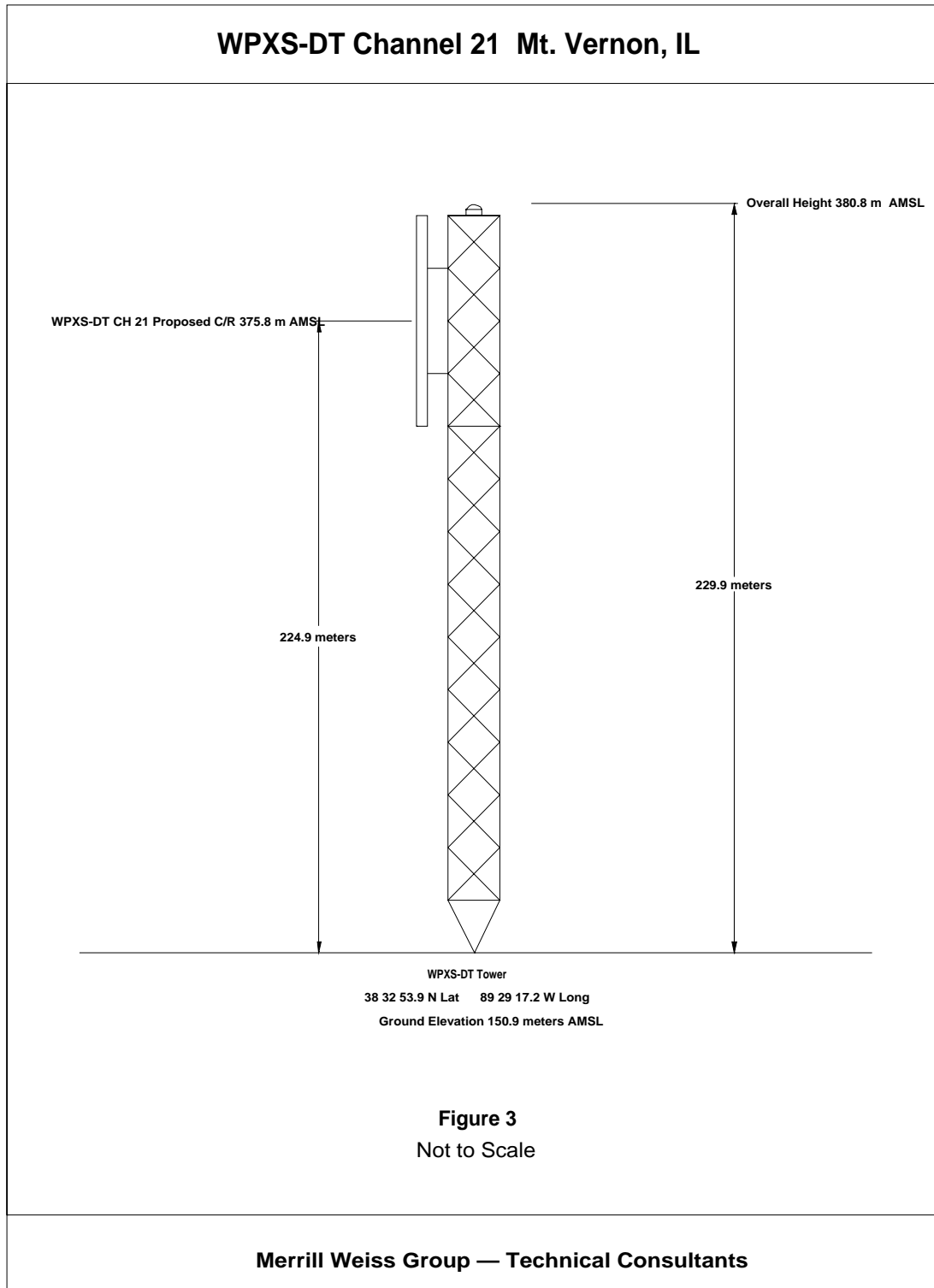
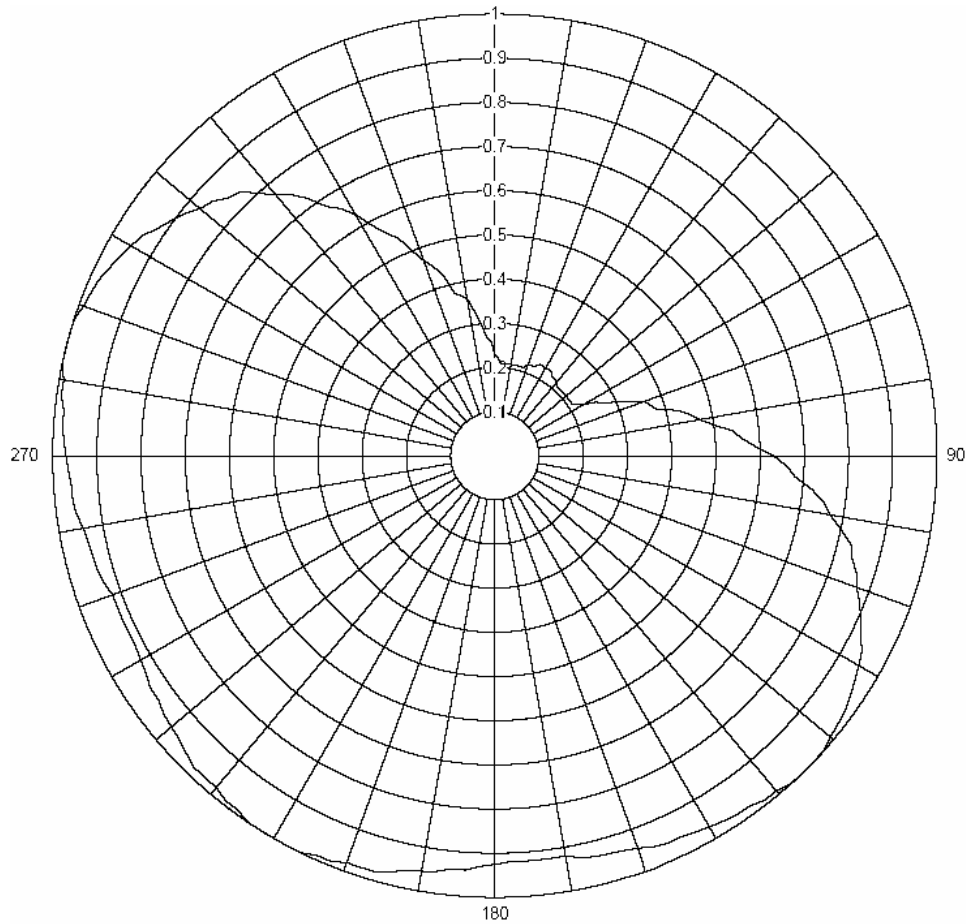


Figure 2 — WPXS-DT Site Location



**WPXS-DT Channel 21 Mount Vernon, IL**

**1000 KW ERP 242 m HAAT**



**Horizontal Plane Relative Field Pattern**

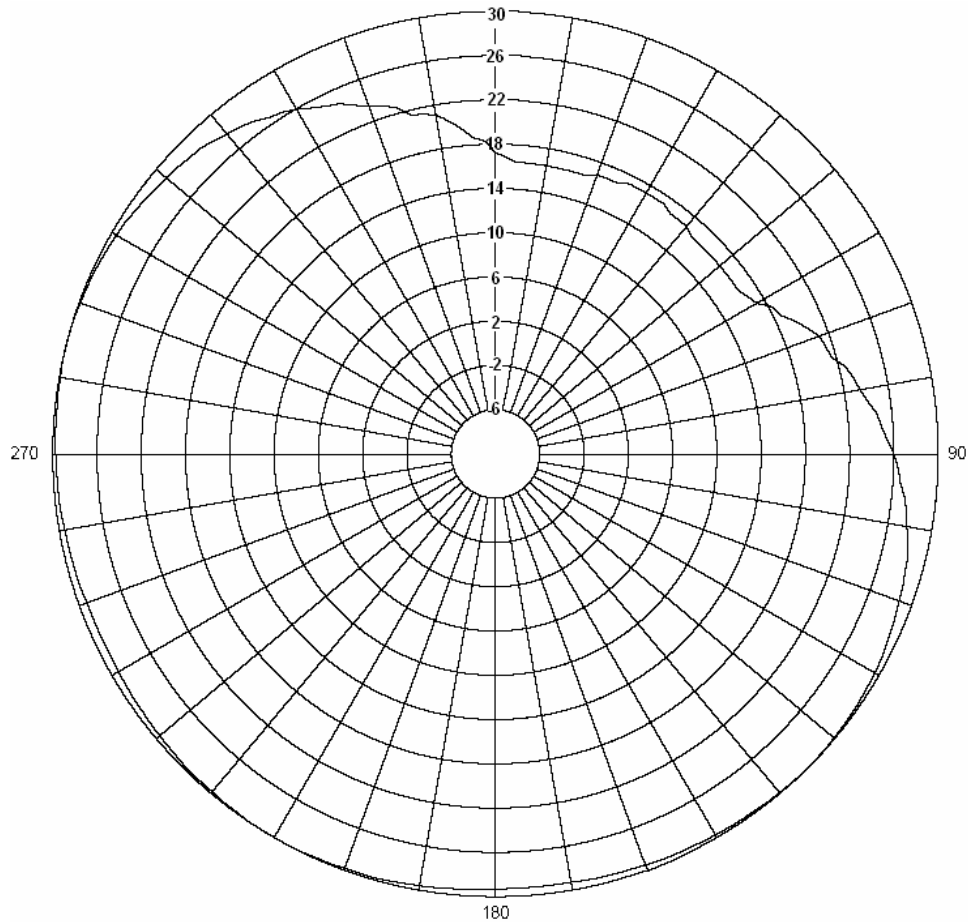
**Based on data supplied by manufacturer**

**RFS RD12A**

**Figure 4**

**WPXS-DT Channel 21 Mount Vernon, IL**

**30 dBk at 135, 210, & 285 Degrees**



**Horizontal Plane Effective Radiated Power (dBk)**

**Based on data supplied by manufacturer**

**RFS RD12A**

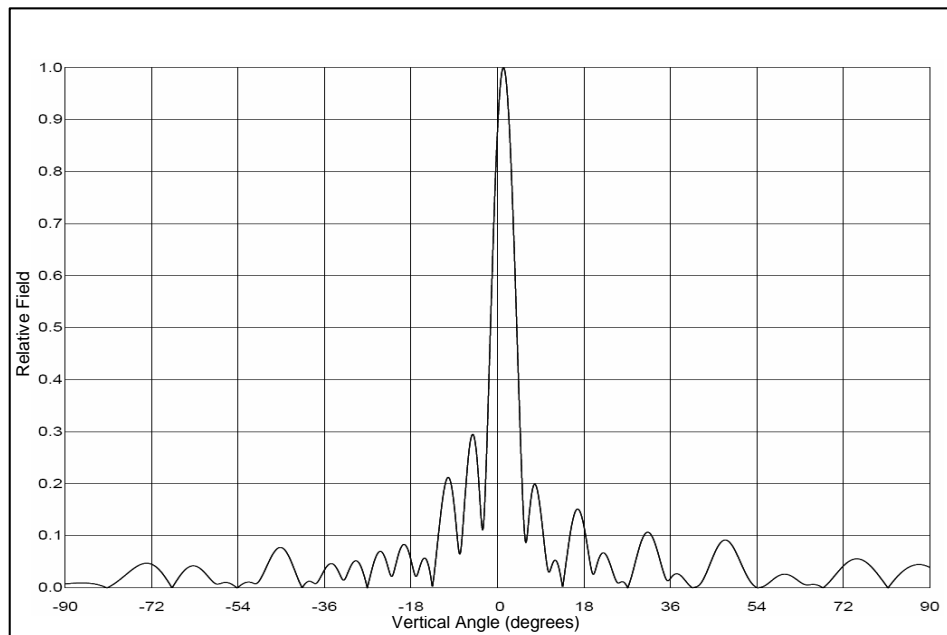
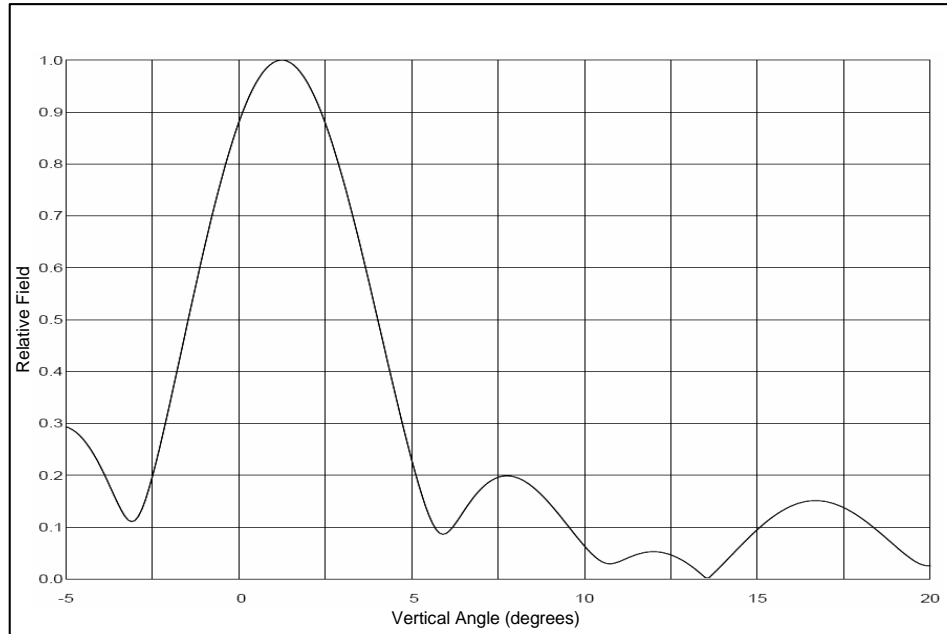
**Figure 5**

**Figure 6 — Tabulation of Horizontal Plane Radiation Pattern  
RFS Model RD12A-1424H6S Antenna — Channel 21  
Including Rotation to 210 Degrees True**

Azimuth	Relative Field	Effective Radiated Power (dBk)	Azimuth	Relative Field	Effective Radiated Power (dBk)
0	0.230	17.23	190	0.955	29.60
10	0.210	16.44	200	0.980	29.82
20	0.220	16.85	210	1.000	30.00
30	0.230	17.23	220	0.980	29.82
40	0.220	16.85	230	0.955	29.60
50	0.210	16.44	240	0.925	29.32
60	0.230	17.23	250	0.920	29.28
70	0.360	21.13	260	0.945	29.51
80	0.470	23.44	270	0.970	29.47
90	0.630	25.99	280	0.990	29.91
100	0.770	27.73	285	1.000	30.00
110	0.870	28.79	290	0.990	29.91
120	0.950	29.55	300	0.950	29.55
130	0.990	29.91	310	0.870	28.79
135	1.000	30.00	320	0.770	27.73
140	0.990	29.91	330	0.630	25.99
150	0.970	29.74	340	0.470	23.44
160	0.945	29.51	350	0.360	21.13
170	0.920	29.28			
180	0.925	29.32			

Derived from data supplied by manufacturer

**WPXS-DT CH 21**  
**Relative Field Elevation Pattern**  
**Based on data supplied by manufacturer**  
**RFS RD12A**



**Figure 7**

## WPXS-DT CH 21

Radiated Power vs Elevation Angle  
Based on data supplied by manufacturer  
RFS RD12A

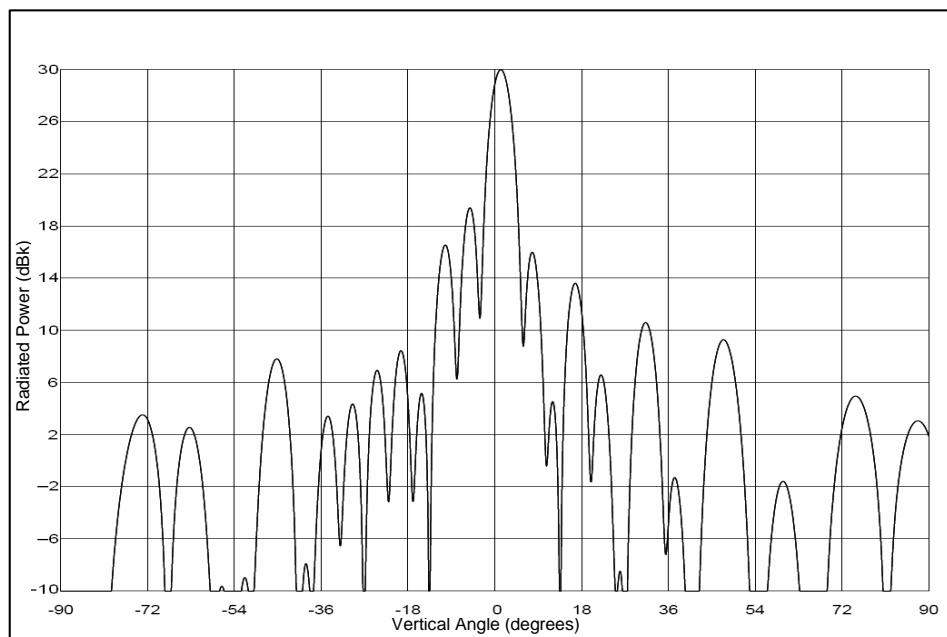
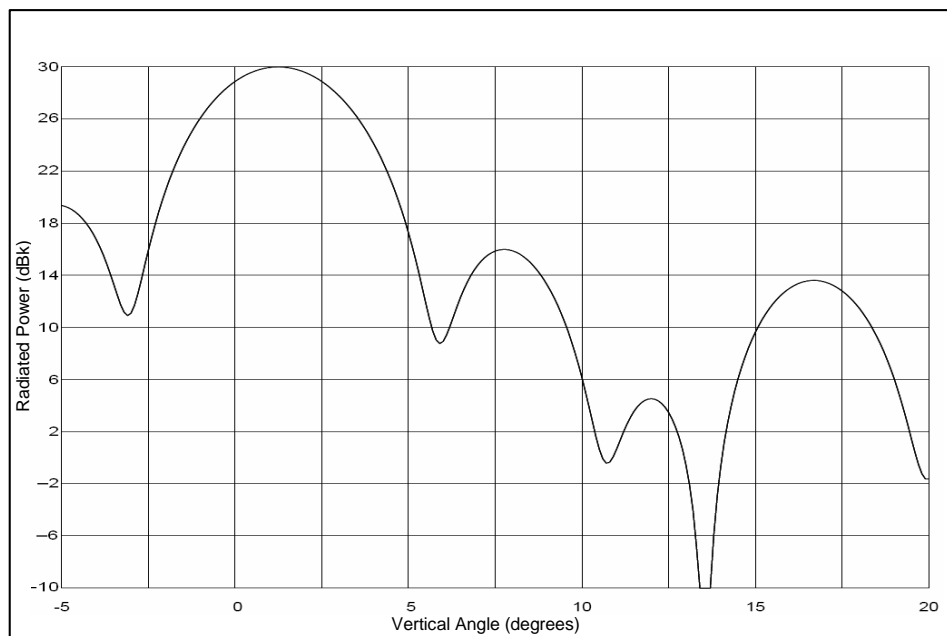


Figure 8

**Figure 9 — Tabulation of Vertical Plane Radiation Data  
RFS Model RD12A-1424H6S Antenna — Channel 21**

Elevation Angle	Relative Field	Effective Radiated Power (dBk)	Elevation Angle	Relative Field	Effective Radiated Power (dBk)
-5	0.2940	19.37	6.5	0.2522	18.03
-4.5	0.2699	18.62	7	0.2265	17.10
-4	0.2173	16.74	7.5	0.1816	15.18
-3.5	0.1467	13.33	8	0.1304	12.31
-3	0.1135	11.10	8.5	0.0949	9.55
-2.5	0.1978	15.92	9	0.0972	9.75
-2	0.3366	20.54	9.5	0.1205	11.62
-1.5	0.4885	23.78	10	0.1385	12.83
-1	0.6372	26.09	10.5	0.1418	13.03
-0.5	0.7708	27.74	11	0.1308	12.33
0	0.8797	28.89	11.5	0.1113	10.93
0.5	0.9303	29.37	12	0.0938	9.44
1	0.9915	29.93	12.5	0.0884	8.93
1.2	1.0000	30.00	13	0.0950	9.55
1.5	0.9938	29.95	13.5	0.1028	10.24
2	0.9390	29.45	14	0.1029	10.25
2.5	0.8352	28.44	14.5	0.0892	9.01
3	0.6963	26.86	15	0.0683	6.69
3.5	0.5408	24.66	15.5	0.0519	4.30
4	0.3918	21.86	16	0.0386	1.73
4.5	0.2782	18.89	16.5	0.0382	1.64
5	0.2290	17.20	17	0.0649	6.24
5.5	0.2360	17.45	17.5	0.0839	8.48
6	0.2533	18.07			

Derived from data supplied by manufacturer

**Figure 10 — Tabulation of 41 & 48 dBu Contour Derivation  
WPXS-DT Channel 21 at 1000 kW from Germantown, IL  
with RFS RD12A-1424H6S Antenna at 210 degrees**

<b>Azimuth</b>	<b>Average Terrain Elevation (meters)</b>	<b>Antenna Height Above Average Terrain (meters)</b>	<b>Effective Radiated Power (kW)</b>	<b>Distance to 48 dBu Contour F(50,90) (km)</b>	<b>Distance to 41 dBu Contour F(50,90) (km)</b>
0°	139	237	44.1	61.1	68.7
45°	138	238	44.1	61.2	68.8
90°	135	241	490.0	72.8	82.5
* 117°	131	245	921.6	76.5	88.5
135°	130	246	980.1	76.9	89.3
180°	133	243	883.6	76.1	87.8
225°	128	248	912.0	76.6	88.7
270°	133	243	960.4	76.6	88.7
315°	139	237	592.9	73.5	83.5

\* Heading to Principal Community — Mount Vernon, IL

Figure 11 — WPXS-DT Contour Map with 41 dBu & 48 dBu Contours

