

STANDARD HORIZONTAL PLANE PATTERN
FOR THE PROPOSED 21 kW NIGHTTIME OPERATION OF
WPEN, PHILADELPHIA, PENNSYLVANIA
950 kHz – 21 kW N/50 kW D – DA-2

*Exhibit 19 - Form 301, Section III-A AM Engineering
Technical Specifications*

Engineering Exhibit of WPEN, Philadelphia, Pennsylvania

TABULATION OF
STANDARD HORIZONTAL PLANE PATTERN
FOR THE PROPOSED 21 kW NIGHTTIME OPERATION OF
WPEN, PHILADELPHIA, PENNSYLVANIA
September 2004
 (Page 1 of 4)

Call: WPEN Proposed Nighttime Frequency: 950.0 kHz

Power: 21.000 kW

ERSS: 3212.19 mV/m at 1 km

Multiplying Constant (K factor): 831.79 mV/m at 1 km

Q Factor (elevation angle = 0 degrees): 80.30

Theoretical Pattern RMS: 1587.35 mV/m at 1 km

Standard Pattern RMS: 1668.85 mV/m at 1 km

ANTENNA TOWER PARAMETERS:

##	Field Ratio	Phase (degs.)	Spac. (degs.)	Bear. (degs.)	TL SW	HT (degs.)	TLA (degs.)	TLB (degs.)	TLC (degs.)	TLD (degs.)
1	1.000	.0	.0	.0	1	.0	90.4	13.9	.0	.0
2	2.546	137.1	77.3	300.0	1	.0	90.4	13.9	.0	.0
3	2.530	279.2	154.6	300.0	1	.0	90.4	13.9	.0	.0
4	1.015	59.2	231.9	300.0	1	.0	90.4	13.9	.0	.0

CALCULATED STANDARD PATTERN DATA:

Azimuth (degs.)	Elevation Angle (degrees):								
	.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00
.0	136.32	136.33	136.36	136.31	136.04	135.31	133.81	131.13	126.86
5.0	171.48	171.14	170.09	168.23	165.44	161.51	156.23	149.38	140.80
10.0	203.23	202.41	199.96	195.84	190.03	182.49	173.23	162.27	149.68
15.0	222.46	221.22	217.51	211.42	203.06	192.58	180.21	166.20	150.83
20.0	220.66	219.20	214.87	207.82	198.27	186.52	172.95	157.94	141.91
25.0	191.45	190.11	186.16	179.76	171.14	160.64	148.62	135.48	121.61
30.0	136.37	135.54	133.07	129.06	123.65	117.02	109.37	100.93	91.91
35.0	106.11	105.34	103.08	99.47	94.72	89.09	82.85	76.27	69.55
40.0	211.22	208.73	201.42	189.78	174.60	156.82	137.52	117.79	98.65
45.0	400.00	395.07	380.60	357.55	327.40	292.01	253.43	213.75	174.89
50.0	635.92	628.03	604.87	567.97	519.69	463.01	401.19	337.54	275.11
55.0	906.58	895.30	862.23	809.53	740.58	659.60	571.26	480.29	391.04
60.0	1201.82	1186.89	1143.08	1073.27	981.88	874.51	757.33	636.59	518.11
65.0	1511.29	1492.58	1437.68	1350.13	1235.46	1100.62	953.34	801.45	652.27
70.0	1824.62	1802.16	1736.22	1631.02	1493.11	1330.75	1153.19	969.85	789.55
75.0	2131.91	2105.86	2029.37	1907.22	1746.92	1557.95	1350.97	1136.90	926.04
80.0	2424.33	2394.96	2308.70	2170.83	1989.68	1775.81	1541.15	1297.98	1058.02
85.0	2694.41	2662.09	2567.08	2415.10	2215.16	1978.71	1718.81	1448.94	1182.08
90.0	2936.28	2901.39	2798.81	2634.58	2418.23	2161.98	1879.78	1586.16	1295.21

Engineering Exhibit of WPEN, Philadelphia, Pennsylvania

TABULATION OF
STANDARD HORIZONTAL PLANE PATTERN
FOR THE PROPOSED 21 KW NIGHTTIME OPERATION OF
WPEN, PHILADELPHIA, PENNSYLVANIA
September 2004
 (Page 2 of 4)

CALCULATED STANDARD PATTERN DATA:

Azimuth (degs.)	Elevation Angle (degrees) :								
	.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00
95.0	3145.56	3108.54	2999.63	2825.12	2594.94	2321.91	2020.68	1706.67	1394.89
100.0	3319.28	3280.54	3166.55	2983.76	2742.41	2455.71	2138.91	1808.09	1479.02
105.0	3455.56	3415.52	3297.67	3108.56	2858.63	2561.42	2232.55	1888.63	1546.01
110.0	3553.36	3512.42	3391.86	3198.32	2942.36	2637.70	2300.26	1946.99	1594.66
115.0	3612.18	3570.70	3448.54	3252.38	2992.84	2683.76	2341.20	1982.33	1624.16
120.0	3631.80	3590.14	3467.46	3270.43	3009.71	2699.16	2354.90	1994.16	1634.04
125.0	3612.18	3570.70	3448.54	3252.38	2992.84	2683.76	2341.20	1982.33	1624.16
130.0	3553.36	3512.42	3391.86	3198.32	2942.36	2637.70	2300.26	1946.99	1594.66
135.0	3455.56	3415.52	3297.67	3108.56	2858.63	2561.42	2232.55	1888.63	1546.01
140.0	3319.28	3280.54	3166.55	2983.76	2742.41	2455.71	2138.91	1808.09	1479.02
145.0	3145.56	3108.54	2999.63	2825.12	2594.94	2321.91	2020.68	1706.67	1394.89
150.0	2936.28	2901.39	2798.81	2634.58	2418.23	2161.98	1879.78	1586.16	1295.21
155.0	2694.41	2662.09	2567.08	2415.10	2215.15	1978.71	1718.81	1448.94	1182.08
160.0	2424.33	2394.96	2308.70	2170.83	1989.68	1775.81	1541.15	1297.98	1058.02
165.0	2131.91	2105.86	2029.37	1907.22	1746.92	1557.95	1350.97	1136.90	926.04
170.0	1824.62	1802.16	1736.22	1631.02	1493.11	1330.75	1153.19	969.85	789.55
175.0	1511.29	1492.58	1437.68	1350.13	1235.46	1100.62	953.34	801.45	652.27
180.0	1201.82	1186.89	1143.08	1073.27	981.88	874.51	757.33	636.59	518.11
185.0	906.58	895.30	862.23	809.53	740.58	659.60	571.26	480.29	391.04
190.0	635.92	628.03	604.87	567.97	519.69	463.01	401.19	337.54	275.11
195.0	400.00	395.07	380.60	357.55	327.40	292.01	253.43	213.75	174.89
200.0	211.22	208.73	201.42	189.78	174.60	156.82	137.52	117.79	98.65
205.0	106.11	105.34	103.08	99.47	94.72	89.09	82.85	76.27	69.55
210.0	136.37	135.54	133.07	129.06	123.65	117.02	109.37	100.93	91.91
215.0	191.45	190.11	186.16	179.76	171.14	160.64	148.62	135.48	121.61
220.0	220.66	219.20	214.87	207.82	198.27	186.52	172.95	157.94	141.91
225.0	222.46	221.22	217.51	211.42	203.06	192.58	180.21	166.20	150.83
230.0	203.23	202.41	199.96	195.84	190.03	182.49	173.23	162.27	149.68
235.0	171.48	171.14	170.09	168.24	165.44	161.51	156.23	149.38	140.80
240.0	136.32	136.33	136.36	136.31	136.04	135.31	133.81	131.13	126.86
245.0	106.68	106.77	107.06	107.61	108.45	109.49	110.50	111.04	110.52
250.0	89.45	89.28	88.87	88.46	88.40	89.01	90.39	92.33	94.18
255.0	84.88	84.38	82.97	80.91	78.71	77.01	76.51	77.57	79.88
260.0	86.27	85.64	83.78	80.81	77.02	73.00	69.69	68.17	69.02
265.0	87.51	86.95	85.27	82.40	78.34	73.33	68.07	63.83	62.08
270.0	86.77	86.35	85.05	82.76	79.31	74.56	68.74	62.82	58.57
275.0	85.30	84.88	83.70	81.80	79.05	75.09	69.68	63.25	57.34
280.0	85.20	84.57	82.91	80.69	78.11	74.81	70.15	63.95	57.25
285.0	87.52	86.48	83.79	80.47	77.30	74.17	70.13	64.44	57.55
290.0	91.40	89.90	86.02	81.26	77.04	73.60	69.90	64.67	57.87
295.0	94.87	93.04	88.26	82.35	77.15	73.28	69.68	64.75	58.08
300.0	96.24	94.29	89.19	82.83	77.25	73.19	69.59	64.76	58.15
305.0	94.87	93.04	88.26	82.35	77.15	73.28	69.68	64.75	58.08

TABULATION OF
STANDARD HORIZONTAL PLANE PATTERN
FOR THE PROPOSED 21 KW NIGHTTIME OPERATION OF
WPEN, PHILADELPHIA, PENNSYLVANIA
September 2004
 (Page 3 of 4)

CALCULATED STANDARD PATTERN DATA:

Azimuth (degs.)	Elevation Angle (degrees):								
	.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00
310.0	91.40	89.90	86.02	81.26	77.04	73.60	69.90	64.67	57.87
315.0	87.52	86.48	83.79	80.47	77.30	74.17	70.13	64.44	57.55
320.0	85.20	84.57	82.91	80.69	78.11	74.81	70.15	63.95	57.25
325.0	85.30	84.88	83.70	81.80	79.05	75.09	69.68	63.25	57.34
330.0	86.77	86.35	85.05	82.76	79.31	74.56	68.74	62.82	58.57
335.0	87.51	86.95	85.27	82.40	78.34	73.33	68.07	63.83	62.08
340.0	86.27	85.64	83.78	80.81	77.02	73.00	69.69	68.17	69.02
345.0	84.88	84.38	82.97	80.91	78.71	77.01	76.51	77.57	79.88
350.0	89.45	89.28	88.87	88.46	88.40	89.01	90.39	92.33	94.18
355.0	106.68	106.77	107.06	107.61	108.45	109.49	110.50	111.04	110.52

CALCULATED STANDARD PATTERN DATA:

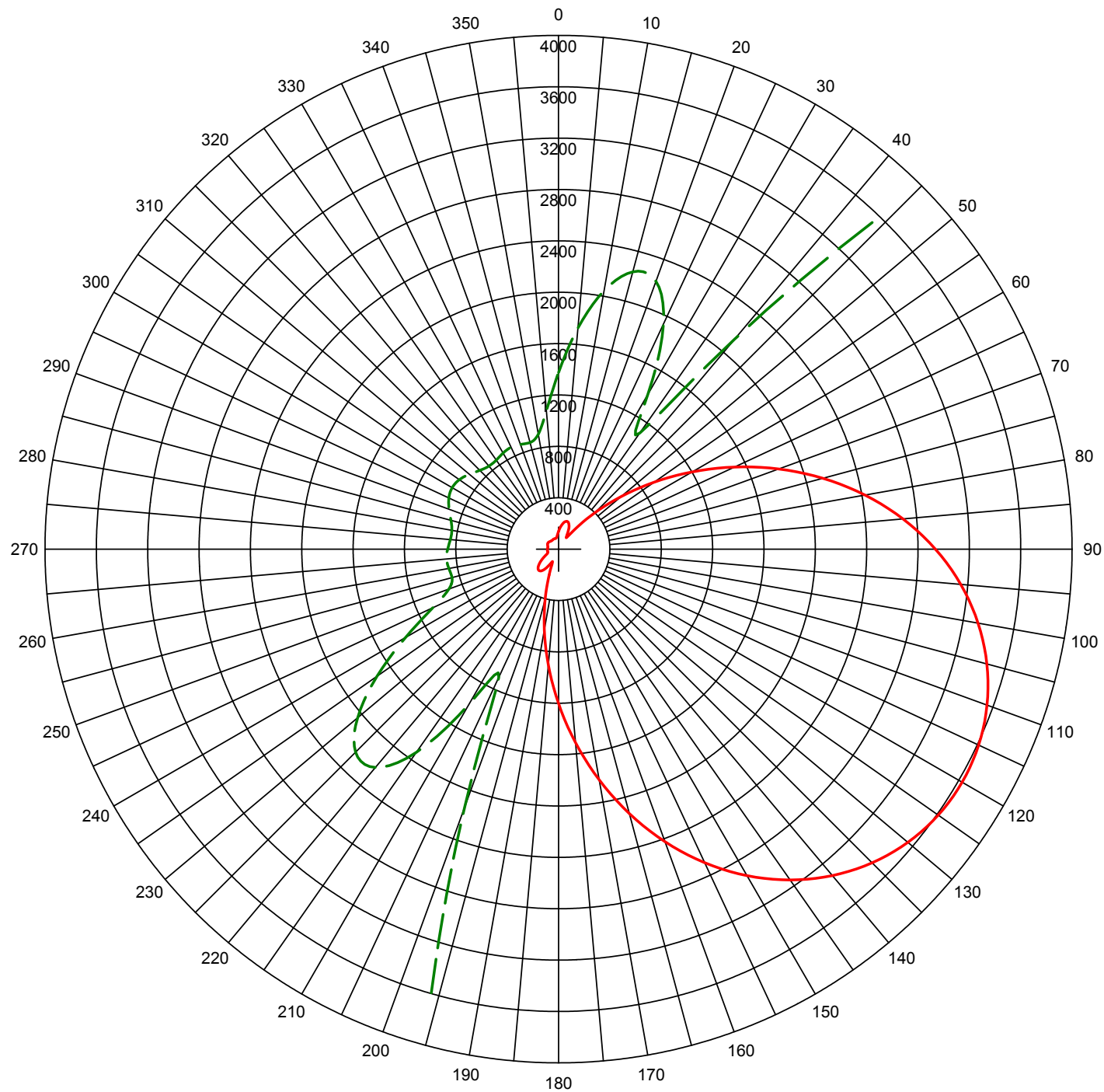
Azimuth (degs.)	Elevation Angle (degrees):			
	45.00	50.00	55.00	60.00
.0	120.62	112.14	101.28	88.17
5.0	130.37	118.08	104.08	88.63
10.0	135.59	120.24	103.89	86.91
15.0	134.43	117.35	99.96	82.63
20.0	125.28	108.43	91.73	75.50
25.0	107.38	93.13	79.13	65.61
30.0	82.53	72.97	63.36	53.83
35.0	62.85	56.24	49.74	43.29
40.0	80.95	65.38	52.32	41.84
45.0	138.53	106.00	78.28	55.93
50.0	216.53	163.86	118.55	81.47
55.0	307.26	231.86	166.85	113.39
60.0	406.84	306.68	220.28	149.12
65.0	512.09	385.83	276.89	187.13
70.0	619.94	467.04	335.04	226.23
75.0	727.38	548.07	393.12	265.33
80.0	831.53	626.79	449.63	303.41
85.0	929.71	701.17	503.13	339.50
90.0	1019.52	769.38	552.30	372.73
95.0	1098.87	829.81	595.95	402.27
100.0	1166.04	881.10	633.07	427.42
105.0	1219.66	922.12	662.82	447.61
110.0	1258.67	952.02	684.53	462.37
115.0	1282.36	970.20	697.75	471.35
120.0	1290.30	976.30	702.19	474.37
125.0	1282.36	970.20	697.75	471.35
130.0	1258.67	952.02	684.53	462.37
135.0	1219.66	922.12	662.82	447.61

TABULATION OF
STANDARD HORIZONTAL PLANE PATTERN
FOR THE PROPOSED 21 KW NIGHTTIME OPERATION OF
WPEN, PHILADELPHIA, PENNSYLVANIA
September 2004
 (Page 4 of 4)

CALCULATED STANDARD PATTERN DATA:

Azimuth	Elevation Angle (degrees):			
(deg.)	45.00	50.00	55.00	60.00
-----	-----	-----	-----	-----
140.0	1166.04	881.10	633.07	427.42
145.0	1098.87	829.81	595.95	402.27
150.0	1019.52	769.38	552.30	372.73
155.0	929.71	701.17	503.13	339.50
160.0	831.53	626.79	449.63	303.41
165.0	727.38	548.07	393.12	265.33
170.0	619.94	467.04	335.04	226.23
175.0	512.09	385.83	276.89	187.13
180.0	406.84	306.68	220.28	149.12
185.0	307.26	231.86	166.85	113.39
190.0	216.53	163.86	118.55	81.47
195.0	138.53	106.00	78.28	55.93
200.0	80.96	65.38	52.32	41.84
205.0	62.85	56.24	49.74	43.29
210.0	82.53	72.97	63.36	53.83
215.0	107.38	93.13	79.13	65.61
220.0	125.28	108.43	91.73	75.50
225.0	134.43	117.35	99.96	82.63
230.0	135.59	120.24	103.89	86.91
235.0	130.37	118.08	104.08	88.62
240.0	120.62	112.14	101.28	88.17
245.0	108.27	103.69	96.34	86.04
250.0	95.06	93.97	90.04	82.72
255.0	82.50	84.04	83.12	78.67
260.0	71.73	74.77	76.18	74.29
265.0	63.43	66.75	69.71	69.93
270.0	57.74	60.31	64.02	65.85
275.0	54.32	55.50	59.29	62.24
280.0	52.53	52.17	55.57	59.22
285.0	51.74	50.01	52.83	56.85
290.0	51.46	48.73	50.98	55.15
295.0	51.38	48.07	49.91	54.14
300.0	51.37	47.86	49.57	53.81
305.0	51.38	48.07	49.91	54.14
310.0	51.46	48.73	50.98	55.15
315.0	51.74	50.01	52.83	56.85
320.0	52.53	52.17	55.57	59.22
325.0	54.32	55.50	59.29	62.24
330.0	57.74	60.31	64.02	65.85
335.0	63.43	66.75	69.71	69.93
340.0	71.73	74.77	76.18	74.29
345.0	82.50	84.04	83.12	78.67
350.0	95.06	93.97	90.04	82.72
355.0	108.27	103.69	96.34	86.04

AM Directional Pattern



Theo RMS: 1586.967 mV/m@1km
Std RMS: 1668.438 mV/m@1km
Q: 80.12 mV/m@1km

Horizontal Plane Standard Pattern

— Pattern (mV/m @ 1km)
- - - Pattern X10

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Switch	TL Switch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	0.0	0	1	90.3	13.8	0.0	0.0
2	2.551	137.1	77.4	300.0	0.0	0	1	90.3	13.8	0.0	0.0
3	2.526	279.2	77.4	300.0	0.0	1	1	90.3	13.8	0.0	0.0
4	1.015	59.2	77.4	300.0	0.0	1	1	90.3	13.8	0.0	0.0

Call: WPEN Proposed Night
Freq: 950 kHz
PHILADELPHIA, PA, US
Lat: 40-09-15 N
Lng: 075-22-10 W
Power: 21.0 kW
Theo RMS: 1586.97 mV/m @ 1km