

WPBB (FM)  
Construction Permit Compliance  
Effect on WWMI, 1380kHz per FCC 47CFR 1.30002

Condition number three of the WPBB construction permit (BPH-20151201CSW) specifies verification that the replacement of the previous 103-meter tower with the new 162-meter tower will comply with FCC rule 1.30002(a) with respect to distortion of the directional antenna pattern for WWMI (AM), 1380kHz which is located 1.7km away from the subject WPBB (FM) tower.

This exhibit includes a method of moments analysis which will demonstrate that the distortion of the tower will continue to create some ripple in the pattern, however, that distortion is less than 2dB and the pattern shape as well as the WWMI nighttime null structure remains intact. The calculations were made using WWMI licensed operating parameters and analyzed using MININEC Broadcast Professional software.

In the following exhibits, the pattern plots are shown for both day, non-directional operation and nighttime directional operation. It should be noted that there are several other tower structures nearby the WWMI tower. One tower, ASR 1020779, a large self-supporting tower, is only 0.8km from the WWMI array (the WPBB tower is 1.7km away), is NOT detuned and is 205 meters high. Although we did not analyze the effect that ASR 1020779 or other towers may have on WWMI, in a relative sense, it is believed that any effect the WPBB tower may have on the WWMI pattern is minimal when considered with the other nearby

environmental effects. Further, both the previous tower and the new tower are detuned for WWMI.

- Exhibit A shows the calculated effect on the non-directional daytime operation of WWMI with the new WPBB (FM) tower.
- Exhibit B shows the calculated effect on the WWMI nighttime pattern of the licensed WGES tower which was replaced by the new tower supporting WGES and WPBB.
- Exhibit C shows the calculated effect of the new WGES/WPBB tower on the WWMI nighttime pattern.
- Exhibit D shows the MININEC modeling data for the daytime, non-directional WWMI operation without any WGES/WPBB tower.
- Exhibit E shows the MININEC modeling data for the daytime, non-directional WWMI operation with the new WGES/WPBB tower, skirted and detuned.
- Exhibit F shows the MININEC modeling data for the nighttime, directional WWMI operation without any WGES/WPBB tower.
- Exhibit G shows the MININEC modeling data for the nighttime, directional WWMI operation with the new WGES/WPBB tower, skirted and detuned.

This Method of Moments analysis was conducted by Kurt Gorman of Phasetek, Inc. The data was reviewed and compiled into this report by Bert Goldman. Both Gorman's and Goldman's qualifications are a matter of record with the Federal Communications Commission.

This exhibit was prepared on behalf of WPOW License Limited Partnership, licensee of WPBB by Bert Goldman of Goldman Engineering Management. All statements herein are true and correct to the best of his knowledge.

A handwritten signature in cursive script, appearing to read "Bertram S. Goldman".

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Exhibit A- Effect of new tower to WWMI Daytime operation

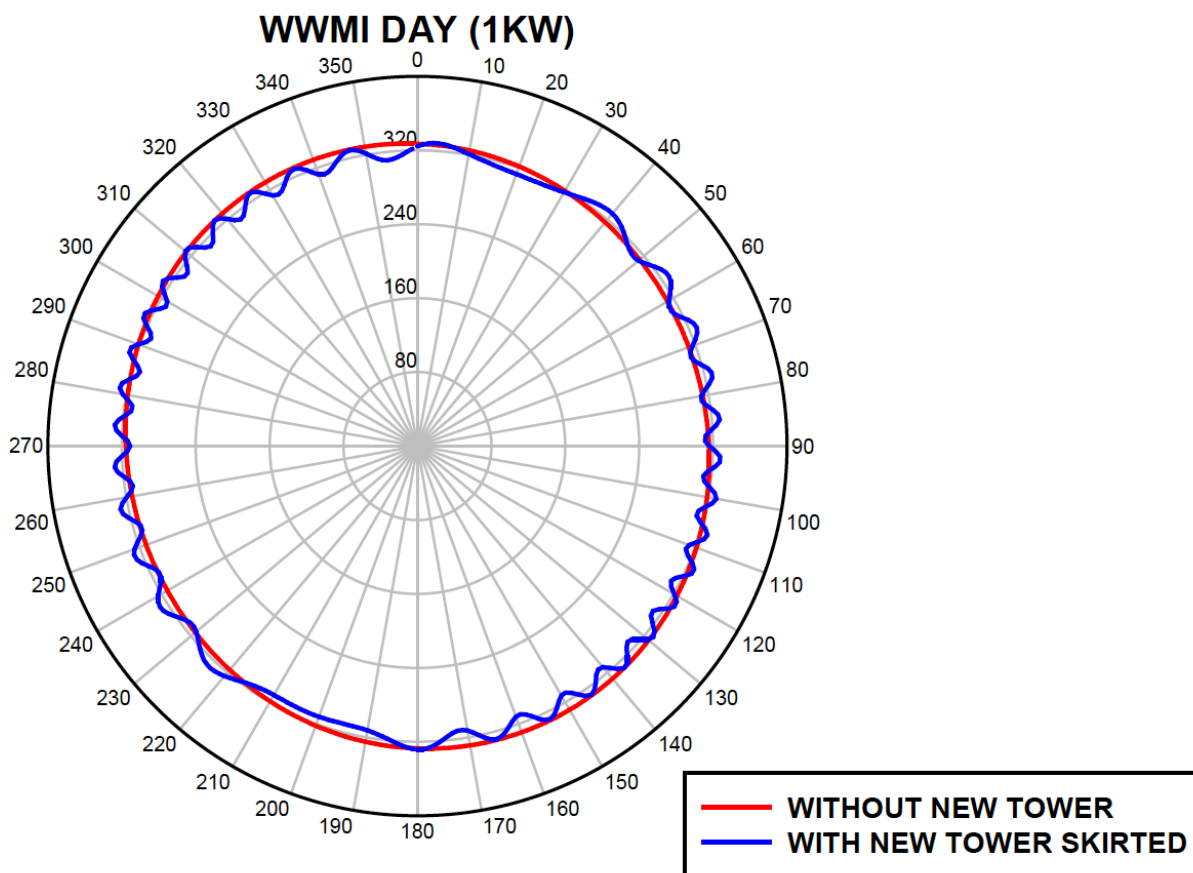


Exhibit B- Effect of previous 103-meter tower on WWMI (AM)- Night Pattern

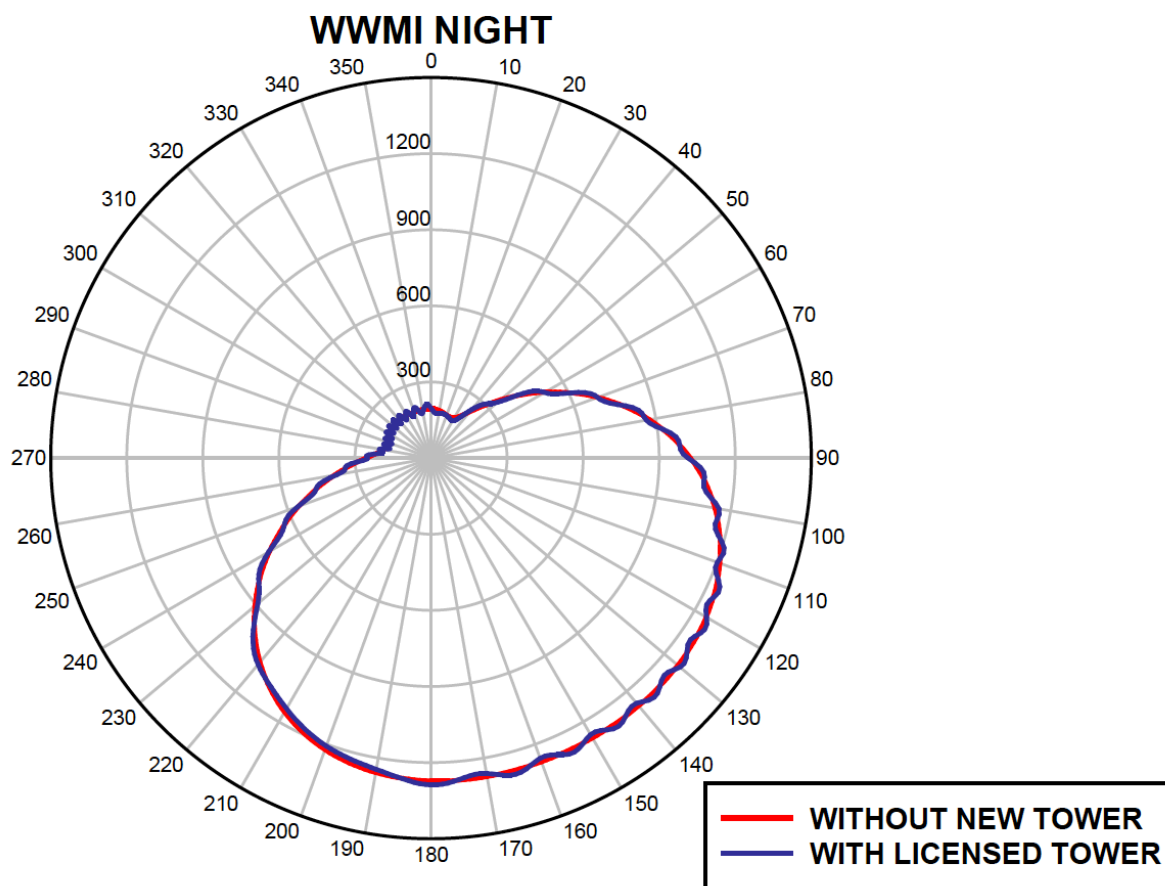
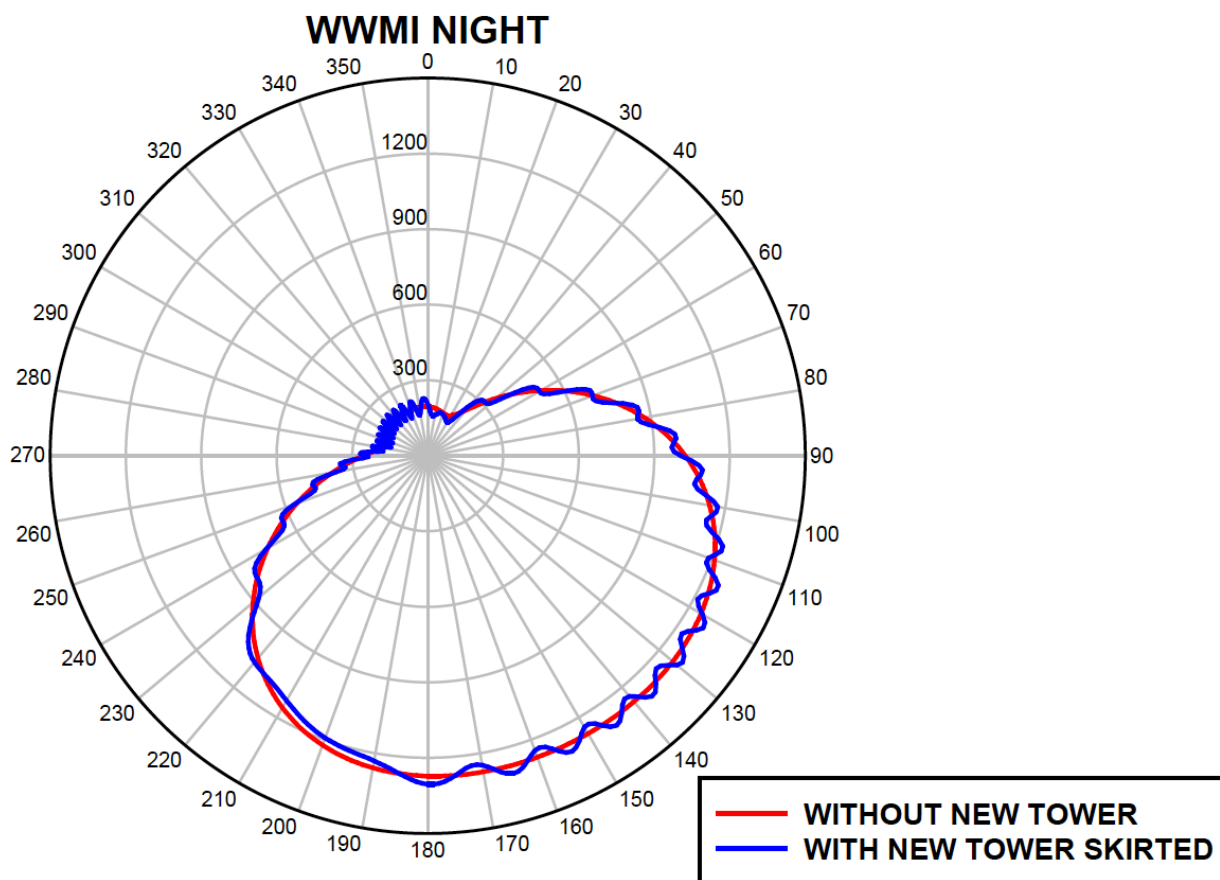


Exhibit C- Effect of New tower to WWMI (AM)- Night Pattern



# Exhibit D Method of Moments Modeling data- DAY-NON-DIRECTIONAL- NO WPBB TOWER

RADIATION PATTERN rms  
geographic coordinate system

Radial distance (meters) = 1,000.

Frequency = 1.38 MHz

Input power = 9,800. watts

Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	phase (deg)	E-phi mag (mv/m)	phase
0	0	1,024.06	5.8	0	0
0	1.	1,023.41	6.4	0	0
0	2.	1,022.75	7.	0	0
0	3.	1,022.06	7.7	0	0
0	4.	1,021.35	8.3	0	0
0	5.	1,020.62	9.	0	0
0	6.	1,019.87	9.7	0	0
0	7.	1,019.1	10.4	0	0
0	8.	1,018.31	11.2	0	0
0	9.	1,017.5	11.9	0	0
0	10.	1,016.68	12.7	0	0
0	11.	1,015.84	13.5	0	0
0	12.	1,014.99	14.4	0	0
0	13.	1,014.12	15.2	0	0
0	14.	1,013.24	16.1	0	0
0	15.	1,012.35	17.	0	0
0	16.	1,011.44	17.9	0	0
0	17.	1,010.53	18.8	0	0
0	18.	1,009.6	19.8	0	0
0	19.	1,008.67	20.7	0	0
0	20.	1,007.73	21.7	0	0
0	21.	1,006.79	22.7	0	0
0	22.	1,005.84	23.8	0	0
0	23.	1,004.88	24.8	0	0
0	24.	1,003.93	25.9	0	0
0	25.	1,002.97	26.9	0	0
0	26.	1,002.02	28.	0	0
0	27.	1,001.06	29.1	0	0
0	28.	1,000.11	30.3	0	0
0	29.	999.164	31.4	0	0
0	30.	998.222	32.6	0	0
0	31.	997.287	33.8	0	0
0	32.	996.36	35.	0	0
0	33.	995.443	36.2	0	0
0	34.	994.537	37.4	0	0
0	35.	993.643	38.6	0	0
0	36.	992.762	39.9	0	0
0	37.	991.895	41.2	0	0
0	38.	991.045	42.5	0	0
0	39.	990.211	43.8	0	0
0	40.	989.398	45.1	0	0
0	41.	988.601	46.4	0	0

0	42.	987.828	47.7	0	0
0	43.	987.076	49.1	0	0
0	44.	986.346	50.5	0	0
0	45.	985.642	51.9	0	0
0	46.	984.962	53.2	0	0
0	47.	984.308	54.7	0	0
0	48.	983.682	56.1	0	0
0	49.	983.085	57.5	0	0
0	50.	982.517	58.9	0	0
0	51.	981.978	60.4	0	0
0	52.	981.47	61.9	0	0
0	53.	980.994	63.3	0	0
0	54.	980.551	64.8	0	0
0	55.	980.139	66.3	0	0
0	56.	979.762	67.8	0	0
0	57.	979.42	69.3	0	0
0	58.	979.111	70.8	0	0
0	59.	978.838	72.4	0	0
0	60.	978.6	73.9	0	0
0	61.	978.398	75.4	0	0
0	62.	978.232	77.	0	0
0	63.	978.104	78.5	0	0
0	64.	978.012	80.1	0	0
0	65.	977.957	81.6	0	0
0	66.	977.939	83.2	0	0
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0	71.	978.398	91.1	0	0
0	72.	978.6	92.7	0	0
0	73.	978.837	94.3	0	0
0	74.	979.11	95.9	0	0
0	75.	979.419	97.5	0	0
0	76.	979.762	99.1	0	0
0	77.	980.139	100.6	0	0
0	78.	980.551	102.2	0	0
0	79.	980.994	103.8	0	0
0	80.	981.469	105.4	0	0
0	81.	981.977	107.	0	0
0	82.	982.516	108.6	0	0
0	83.	983.086	110.1	0	0
0	84.	983.683	111.7	0	0
0	85.	984.309	113.3	0	0
0	86.	984.961	114.8	0	0
0	87.	985.642	116.4	0	0
0	88.	986.347	117.9	0	0
0	89.	987.075	119.4	0	0
0	90.	987.827	121.	0	0
0	91.	988.602	122.5	0	0
0	92.	989.397	124.	0	0
0	93.	990.212	125.5	0	0
0	94.	991.045	127.	0	0
0	95.	991.896	128.4	0	0
0	96.	992.762	129.9	0	0



0	97.	993.643	131.3	0	0
0	98.	994.537	132.8	0	0
0	99.	995.444	134.2	0	0
0	100.	996.361	135.6	0	0
0	101.	997.287	137.	0	0
0	102.	998.223	138.4	0	0
0	103.	999.164	139.7	0	0
0	104.	1,000.11	141.1	0	0
0	105.	1,001.06	142.4	0	0
0	106.	1,002.02	143.7	0	0
0	107.	1,002.97	145.	0	0
0	108.	1,003.93	146.3	0	0
0	109.	1,004.89	147.6	0	0
0	110.	1,005.84	148.8	0	0
0	111.	1,006.79	150.	0	0
0	112.	1,007.73	151.2	0	0
0	113.	1,008.67	152.4	0	0
0	114.	1,009.6	153.5	0	0
0	115.	1,010.53	154.7	0	0
0	116.	1,011.44	155.8	0	0
0	117.	1,012.35	156.9	0	0
0	118.	1,013.24	157.9	0	0
0	119.	1,014.12	159.	0	0
0	120.	1,014.99	160.	0	0
0	121.	1,015.84	161.	0	0
0	122.	1,016.68	162.	0	0
0	123.	1,017.5	162.9	0	0
0	124.	1,018.31	163.8	0	0
0	125.	1,019.1	164.7	0	0
0	126.	1,019.87	165.6	0	0
0	127.	1,020.62	166.4	0	0
0	128.	1,021.35	167.3	0	0
0	129.	1,022.06	168.	0	0
0	130.	1,022.75	168.8	0	0
0	131.	1,023.41	169.5	0	0
0	132.	1,024.06	170.3	0	0
0	133.	1,024.68	170.9	0	0
0	134.	1,025.28	171.6	0	0
0	135.	1,025.85	172.2	0	0
0	136.	1,026.41	172.8	0	0
0	137.	1,026.93	173.4	0	0
0	138.	1,027.43	173.9	0	0
0	139.	1,027.91	174.5	0	0
0	140.	1,028.36	174.9	0	0
0	141.	1,028.78	175.4	0	0
0	142.	1,029.18	175.8	0	0
0	143.	1,029.55	176.2	0	0
0	144.	1,029.9	176.6	0	0
0	145.	1,030.22	176.9	0	0
0	146.	1,030.51	177.3	0	0
0	147.	1,030.77	177.5	0	0
0	148.	1,031.01	177.8	0	0
0	149.	1,031.22	178.	0	0
0	150.	1,031.4	178.2	0	0
0	151.	1,031.55	178.4	0	0

0	152.	1,031.68	178.5	0	0
0	153.	1,031.78	178.6	0	0
0	154.	1,031.85	178.7	0	0
0	155.	1,031.89	178.7	0	0
0	156.	1,031.9	178.8	0	0
0	157.	1,031.89	178.7	0	0
0	158.	1,031.85	178.7	0	0
0	159.	1,031.78	178.6	0	0
0	160.	1,031.68	178.5	0	0
0	161.	1,031.55	178.4	0	0
0	162.	1,031.4	178.2	0	0
0	163.	1,031.22	178.	0	0
0	164.	1,031.01	177.8	0	0
0	165.	1,030.77	177.5	0	0
0	166.	1,030.51	177.3	0	0
0	167.	1,030.22	176.9	0	0
0	168.	1,029.9	176.6	0	0
0	169.	1,029.55	176.2	0	0
0	170.	1,029.18	175.8	0	0
0	171.	1,028.78	175.4	0	0
0	172.	1,028.36	174.9	0	0
0	173.	1,027.91	174.5	0	0
0	174.	1,027.43	173.9	0	0
0	175.	1,026.93	173.4	0	0
0	176.	1,026.41	172.8	0	0
0	177.	1,025.85	172.2	0	0
0	178.	1,025.28	171.6	0	0
0	179.	1,024.68	170.9	0	0
0	180.	1,024.06	170.3	0	0
0	181.	1,023.41	169.5	0	0
0	182.	1,022.75	168.8	0	0
0	183.	1,022.06	168.	0	0
0	184.	1,021.35	167.3	0	0
0	185.	1,020.62	166.4	0	0
0	186.	1,019.87	165.6	0	0
0	187.	1,019.1	164.7	0	0
0	188.	1,018.31	163.8	0	0
0	189.	1,017.5	162.9	0	0
0	190.	1,016.68	162.	0	0
0	191.	1,015.84	161.	0	0
0	192.	1,014.99	160.	0	0
0	193.	1,014.12	159.	0	0
0	194.	1,013.24	157.9	0	0
0	195.	1,012.35	156.9	0	0
0	196.	1,011.44	155.8	0	0
0	197.	1,010.53	154.7	0	0
0	198.	1,009.6	153.5	0	0
0	199.	1,008.67	152.4	0	0
0	200.	1,007.73	151.2	0	0
0	201.	1,006.79	150.	0	0
0	202.	1,005.84	148.8	0	0
0	203.	1,004.89	147.6	0	0
0	204.	1,003.93	146.3	0	0
0	205.	1,002.97	145.	0	0
0	206.	1,002.02	143.7	0	0

0	207.	1,001.06	142.4	0	0
0	208.	1,000.11	141.1	0	0
0	209.	999.164	139.7	0	0
0	210.	998.223	138.4	0	0
0	211.	997.287	137.	0	0
0	212.	996.361	135.6	0	0
0	213.	995.444	134.2	0	0
0	214.	994.537	132.8	0	0
0	215.	993.643	131.3	0	0
0	216.	992.762	129.9	0	0
0	217.	991.896	128.4	0	0
0	218.	991.045	127.	0	0
0	219.	990.212	125.5	0	0
0	220.	989.397	124.	0	0
0	221.	988.602	122.5	0	0
0	222.	987.827	121.	0	0
0	223.	987.075	119.4	0	0
0	224.	986.347	117.9	0	0
0	225.	985.642	116.4	0	0
0	226.	984.962	114.8	0	0
0	227.	984.309	113.3	0	0
0	228.	983.682	111.7	0	0
0	229.	983.086	110.1	0	0
0	230.	982.516	108.6	0	0
0	231.	981.977	107.	0	0
0	232.	981.469	105.4	0	0
0	233.	980.994	103.8	0	0
0	234.	980.551	102.2	0	0
0	235.	980.139	100.6	0	0
0	236.	979.762	99.1	0	0
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0	254.	979.111	70.8	0	0
0	255.	979.42	69.3	0	0
0	256.	979.762	67.8	0	0
0	257.	980.139	66.3	0	0
0	258.	980.551	64.8	0	0
0	259.	980.994	63.3	0	0
0	260.	981.47	61.9	0	0
0	261.	981.978	60.4	0	0

0	262.	982.517	58.9	0	0
0	263.	983.085	57.5	0	0
0	264.	983.682	56.1	0	0
0	265.	984.308	54.7	0	0
0	266.	984.962	53.2	0	0
0	267.	985.642	51.9	0	0
0	268.	986.347	50.5	0	0
0	269.	987.076	49.1	0	0
0	270.	987.828	47.7	0	0
0	271.	988.602	46.4	0	0
0	272.	989.398	45.1	0	0
0	273.	990.211	43.8	0	0
0	274.	991.045	42.5	0	0
0	275.	991.895	41.2	0	0
0	276.	992.762	39.9	0	0
0	277.	993.642	38.6	0	0
0	278.	994.537	37.4	0	0
0	279.	995.444	36.2	0	0
0	280.	996.36	35.	0	0
0	281.	997.287	33.8	0	0
0	282.	998.223	32.6	0	0
0	283.	999.164	31.4	0	0
0	284.	1,000.11	30.3	0	0
0	285.	1,001.06	29.1	0	0
0	286.	1,002.02	28.	0	0
0	287.	1,002.97	26.9	0	0
0	288.	1,003.93	25.9	0	0
0	289.	1,004.88	24.8	0	0
0	290.	1,005.84	23.8	0	0
0	291.	1,006.79	22.7	0	0
0	292.	1,007.73	21.7	0	0
0	293.	1,008.67	20.7	0	0
0	294.	1,009.6	19.8	0	0
0	295.	1,010.53	18.8	0	0
0	296.	1,011.44	17.9	0	0
0	297.	1,012.35	17.	0	0
0	298.	1,013.24	16.1	0	0
0	299.	1,014.12	15.2	0	0
0	300.	1,014.99	14.4	0	0
0	301.	1,015.84	13.5	0	0
0	302.	1,016.68	12.7	0	0
0	303.	1,017.5	11.9	0	0
0	304.	1,018.31	11.2	0	0
0	305.	1,019.1	10.4	0	0
0	306.	1,019.87	9.7	0	0
0	307.	1,020.62	9.	0	0
0	308.	1,021.35	8.3	0	0
0	309.	1,022.06	7.7	0	0
0	310.	1,022.75	7.	0	0
0	311.	1,023.41	6.4	0	0
0	312.	1,024.06	5.8	0	0
0	313.	1,024.68	5.3	0	0
0	314.	1,025.28	4.7	0	0
0	315.	1,025.85	4.2	0	0
0	316.	1,026.41	3.7	0	0

0	317.	1,026.93	3.2	0	0
0	318.	1,027.43	2.8	0	0
0	319.	1,027.91	2.3	0	0
0	320.	1,028.36	1.9	0	0
0	321.	1,028.78	1.5	0	0
0	322.	1,029.18	1.2	0	0
0	323.	1,029.55	.8	0	0
0	324.	1,029.9	.5	0	0
0	325.	1,030.22	.3	0	0
0	326.	1,030.51	360.	0	0
0	327.	1,030.77	359.8	0	0
0	328.	1,031.01	359.5	0	0
0	329.	1,031.22	359.4	0	0
0	330.	1,031.4	359.2	0	0
0	331.	1,031.55	359.1	0	0
0	332.	1,031.68	359.	0	0
0	333.	1,031.78	358.9	0	0
0	334.	1,031.85	358.8	0	0
0	335.	1,031.89	358.8	0	0
0	336.	1,031.9	358.8	0	0
0	337.	1,031.89	358.8	0	0
0	338.	1,031.85	358.8	0	0
0	339.	1,031.78	358.9	0	0
0	340.	1,031.68	359.	0	0
0	341.	1,031.55	359.1	0	0
0	342.	1,031.4	359.2	0	0
0	343.	1,031.22	359.4	0	0
0	344.	1,031.01	359.5	0	0
0	345.	1,030.77	359.8	0	0
0	346.	1,030.51	360.	0	0
0	347.	1,030.22	.3	0	0
0	348.	1,029.9	.5	0	0
0	349.	1,029.55	.8	0	0
0	350.	1,029.18	1.2	0	0
0	351.	1,028.78	1.5	0	0
0	352.	1,028.36	1.9	0	0
0	353.	1,027.91	2.3	0	0
0	354.	1,027.43	2.8	0	0
0	355.	1,026.93	3.2	0	0
0	356.	1,026.41	3.7	0	0
0	357.	1,025.85	4.2	0	0
0	358.	1,025.28	4.7	0	0
0	359.	1,024.68	5.3	0	0

WWMI

#### GEOMETRY

Wire coordinates in degrees; other dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.218	12
		0	0	94.7		
2	none	90.	156.	0	.218	12
		90.	156.	103.2		
3	none	180.	156.	0	.218	12
		180.	156.	94.7		

Number of wires = 3  
current nodes = 36

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	7.89167	2	8.6
radius	1	.218	1	.218

#### ELECTRICAL DESCRIPTION

Frequencies (MHz)

frequency		no. of steps	segment length (wavelengths)	
no.	lowest		minimum	maximum
1	1.38	0	.0219213	.0238889

Sources

source	node	sector	magnitude	phase	type
1	1	1	603.99	326.6	voltage
2	13	1	1,944.57	60.3	voltage
3	25	1	603.99	326.6	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	497.2	0	0	0
2	25	0	497.2	0	0	0

#### IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.38	2,869.8	-2,708.9	3,946.4	316.7	108.55	-.16005	-14.415
source = 2; node 13, sector 1							
1.38	64.787	91.708	112.28	54.8	4.4385	-3.9822	-2.2166
source = 3; node 25, sector 1							
1.38	2,869.8	-2,708.9	3,946.3	316.7	108.54	-.16005	-14.415

## CURRENT rms

Frequency = 1.38 MHz

Input power = 9,800. watts

Efficiency = 100. %

coordinates in degrees

current				mag	phase	real	imaginary
no.	X	Y	Z	(amps)	(deg)	(amps)	(amps)
GND	0	0	0	.108317	9.9	.106703	.0186311
2	0	0	7.89167	.289931	246.1	-.117553	-.265031
3	0	0	15.7833	.504788	239.8	-.254098	-.436171
4	0	0	23.675	.661124	237.7	-.353377	-.558757
5	0	0	31.5667	.766545	236.7	-.421349	-.640356
6	0	0	39.4583	.824426	236.1	-.460366	-.683916
7	0	0	47.35	.836737	235.7	-.471775	-.691055
8	0	0	55.2417	.805132	235.4	-.45672	-.663057
9	0	0	63.1333	.731276	235.3	-.41638	-.60116
10	0	0	71.025	.616775	235.2	-.351932	-.506513
11	0	0	78.9167	.462616	235.2	-.264228	-.379733
12	0	0	86.8083	.267299	235.2	-.152696	-.219391
END	0	0	94.7	0	0	0	0
GND	-82.2191	-36.6063	0	12.2567	5.5	12.2	1.17709
14	-82.2191	-36.6063	8.6	13.0934	2.7	13.0793	.606944
15	-82.2191	-36.6063	17.2	13.379	1.	13.377	.234146
16	-82.2191	-36.6063	25.8	13.3102	359.7	13.3101	-.0615528
17	-82.2191	-36.6063	34.4	12.9154	358.7	12.9121	-.293101
18	-82.2191	-36.6063	43.	12.213	357.8	12.2042	-.464279
19	-82.2191	-36.6063	51.6	11.2213	357.1	11.2065	-.57625
20	-82.2191	-36.6063	60.2	9.96059	356.4	9.94067	-.629587
21	-82.2191	-36.6063	68.8	8.45323	355.8	8.4301	-.624936
22	-82.2191	-36.6063	77.4	6.72131	355.2	6.69768	-.5631
23	-82.2191	-36.6063	86.	4.78157	354.7	4.76086	-.444531
24	-82.2191	-36.6063	94.6	2.62814	354.2	2.6145	-.267367
END	-82.2191	-36.6063	103.2	0	0	0	0
GND	-164.438	-73.2126	0	.108318	9.9	.106704	.0186307
26	-164.438	-73.2126	7.89167	.289931	246.1	-.117551	-.265031
27	-164.438	-73.2126	15.7833	.504789	239.8	-.254098	-.436172
28	-164.438	-73.2126	23.675	.661125	237.7	-.353376	-.55876
29	-164.438	-73.2126	31.5667	.766545	236.7	-.421348	-.640358
30	-164.438	-73.2126	39.4583	.824427	236.1	-.460366	-.683918
31	-164.438	-73.2126	47.35	.836738	235.7	-.471774	-.691056
32	-164.438	-73.2126	55.2417	.805133	235.4	-.456719	-.663058
33	-164.438	-73.2126	63.1333	.731276	235.3	-.416379	-.60116
34	-164.438	-73.2126	71.025	.616776	235.2	-.351932	-.506514
35	-164.438	-73.2126	78.9167	.462617	235.2	-.264228	-.379734
36	-164.438	-73.2126	86.8083	.267299	235.2	-.152696	-.219392
END	-164.438	-73.2126	94.7	0	0	0	0

# **EXHIBIT E- WWMI Daytime Non- Directional WITH NEW TOWER (skirted, detuned)**

RADIATION PATTERN rms  
geographic coordinate system

Radial distance (meters) = 1,000.

Frequency = 1.38 MHz

Input power = 9,800. watts

Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	phase (deg)	E-phi mag (mv/m)	phase
0	0	1,014.99	9.1	1.45E-09	342.5
0	1.	1,021.31	9.5	1.912E-09	58.5
0	2.	1,025.49	9.8	1.299E-09	198.2
0	3.	1,027.47	10.1	4.165E-09	184.9
0	4.	1,027.41	10.4	3.375E-09	170.9
0	5.	1,025.62	10.8	3.346E-09	49.4
0	6.	1,022.47	11.2	3.601E-09	229.3
0	7.	1,018.39	11.8	1.967E-09	144.2
0	8.	1,013.77	12.4	8.425E-10	307.9
0	9.	1,008.94	13.1	1.139E-09	133.
0	10.	1,004.18	13.9	6.195E-09	265.3
0	11.	999.699	14.8	1.136E-09	222.8
0	12.	995.634	15.7	2.497E-09	265.4
0	13.	992.064	16.7	2.483E-10	144.2
0	14.	989.018	17.7	3.373E-09	118.2
0	15.	986.491	18.8	4.628E-09	358.6
0	16.	984.451	19.9	4.681E-09	153.6
0	17.	982.86	20.9	1.224E-09	198.1
0	18.	981.662	22.	2.033E-09	276.4
0	19.	980.819	23.2	1.516E-09	45.6
0	20.	980.287	24.3	3.811E-09	295.4
0	21.	980.045	25.4	2.943E-09	285.8
0	22.	980.079	26.5	2.671E-09	186.7
0	23.	980.387	27.6	1.558E-09	8.5
0	24.	980.987	28.7	1.414E-09	48.
0	25.	981.908	29.9	2.745E-09	343.5
0	26.	983.185	31.	2.666E-09	186.7
0	27.	984.871	32.1	2.686E-09	117.6
0	28.	987.006	33.3	2.887E-09	305.4
0	29.	989.636	34.5	2.719E-09	60.4
0	30.	992.786	35.7	6.429E-09	93.9
0	31.	996.458	36.9	2.687E-09	266.7
0	32.	1,000.62	38.2	4.415E-10	260.2
0	33.	1,005.17	39.5	1.607E-09	309.1
0	34.	1,009.98	40.9	6.199E-09	161.4
0	35.	1,014.81	42.4	2.921E-09	100.1
0	36.	1,019.4	43.9	2.234E-09	323.8
0	37.	1,023.38	45.6	2.498E-09	6.
0	38.	1,026.35	47.3	1.243E-09	151.5
0	39.	1,027.92	49.	4.02E-09	162.
0	40.	1,027.69	50.8	6.577E-09	170.
0	41.	1,025.38	52.7	7.988E-10	121.3



0	42.	1,020.86	54.5	3.117E-09	104.
0	43.	1,014.25	56.2	1.52E-09	330.9
0	44.	1,005.93	57.9	3.065E-09	85.5
0	45.	996.669	59.3	3.617E-09	165.
0	46.	987.531	60.6	1.428E-09	168.1
0	47.	979.829	61.7	3.038E-09	176.4
0	48.	974.928	62.7	3.808E-09	196.2
0	49.	973.963	63.6	1.884E-09	342.4
0	50.	977.523	64.4	2.087E-09	96.7
0	51.	985.379	65.5	1.379E-09	122.1
0	52.	996.371	66.7	2.685E-09	72.6
0	53.	1,008.52	68.3	2.609E-09	221.6
0	54.	1,019.38	70.2	2.211E-09	188.4
0	55.	1,026.49	72.3	4.798E-09	17.3
0	56.	1,027.98	74.6	1.645E-09	164.1
0	57.	1,023.09	76.9	1.755E-09	251.1
0	58.	1,012.51	78.9	3.97E-09	59.2
0	59.	998.578	80.6	2.214E-09	221.6
0	60.	984.962	81.9	9.659E-10	24.5
0	61.	975.792	82.8	5.396E-09	193.5
0	62.	974.333	83.5	3.017E-09	113.2
0	63.	981.548	84.2	2.891E-10	15.4
0	64.	995.396	85.4	4.688E-09	240.4
0	65.	1,011.32	87.	3.195E-10	111.5
0	66.	1,023.79	89.2	2.025E-09	337.5
0	67.	1,028.22	91.7	2.225E-09	247.2
0	68.	1,022.62	94.1	1.056E-09	175.4
0	69.	1,008.57	96.2	7.829E-10	305.4
0	70.	991.177	97.8	5.878E-09	184.1
0	71.	977.609	98.7	1.297E-09	14.2
0	72.	974.123	99.2	4.984E-09	86.2
0	73.	982.786	99.8	1.199E-09	3.2
0	74.	999.897	101.	2.177E-09	330.5
0	75.	1,017.59	102.9	6.549E-09	10.3
0	76.	1,027.6	105.3	1.346E-09	123.2
0	77.	1,024.98	107.9	1.88E-09	112.
0	78.	1,010.54	110.2	4.523E-09	124.6
0	79.	991.002	111.7	2.876E-10	110.5
0	80.	976.436	112.5	4.432E-09	89.1
0	81.	975.122	112.8	2.592E-09	269.9
0	82.	988.195	113.5	2.407E-09	328.9
0	83.	1,008.43	114.9	5.352E-09	5.1
0	84.	1,024.5	117.1	2.48E-09	198.2
0	85.	1,027.37	119.7	2.342E-09	102.5
0	86.	1,015.15	122.1	3.694E-09	282.6
0	87.	994.39	123.8	3.452E-09	191.2
0	88.	977.331	124.5	5.884E-09	85.4
0	89.	974.88	124.8	6.313E-09	105.9
0	90.	988.933	125.2	7.986E-09	3.8
0	91.	1,010.55	126.6	1.055E-09	114.1
0	92.	1,026.04	128.9	2.849E-09	251.
0	93.	1,025.72	131.5	3.576E-09	49.5
0	94.	1,009.51	133.8	1.436E-09	225.6
0	95.	987.446	135.	3.929E-09	174.4
0	96.	974.193	135.4	1.804E-09	89.7

0	97.	979.187	135.4	4.032E-09	71.4
0	98.	999.067	136.2	5.192E-09	359.2
0	99.	1,020.05	138.	2.709E-09	351.6
0	100.	1,028.	140.5	1.881E-09	359.9
0	101.	1,017.57	142.9	3.341E-10	321.4
0	102.	995.483	144.5	2.283E-09	343.9
0	103.	976.918	145.	1.285E-09	267.7
0	104.	975.411	144.9	1.856E-09	330.2
0	105.	992.188	145.2	2.466E-09	7.7
0	106.	1,014.96	146.6	2.556E-09	146.7
0	107.	1,027.64	148.9	1.343E-09	124.2
0	108.	1,021.52	151.3	4.49E-09	6.8
0	109.	1,000.7	153.	1.698E-09	142.6
0	110.	979.697	153.6	2.641E-09	266.1
0	111.	973.949	153.4	2.674E-09	46.9
0	112.	987.813	153.4	7.116E-09	183.6
0	113.	1,010.87	154.4	3.037E-09	293.4
0	114.	1,026.52	156.5	4.708E-09	92.3
0	115.	1,024.01	158.8	3.143E-09	344.1
0	116.	1,005.06	160.5	2.703E-09	342.5
0	117.	982.823	161.2	4.288E-09	281.7
0	118.	973.353	160.9	1.359E-09	237.3
0	119.	983.649	160.7	2.106E-09	.6
0	120.	1,005.96	161.3	5.705E-09	251.
0	121.	1,024.31	163.	9.04E-10	59.9
0	122.	1,026.33	165.2	2.175E-09	262.4
0	123.	1,010.83	167.	7.473E-09	185.6
0	124.	988.2	167.8	1.045E-09	17.2
0	125.	974.049	167.6	6.273E-09	74.8
0	126.	978.342	167.1	2.489E-09	12.1
0	127.	997.802	167.2	1.955E-09	6.1
0	128.	1,018.86	168.4	1.096E-09	52.3
0	129.	1,027.8	170.2	3.004E-09	234.9
0	130.	1,019.23	172.1	1.794E-09	358.9
0	131.	998.683	173.2	2.225E-09	232.
0	132.	979.23	173.3	1.077E-09	309.2
0	133.	973.499	172.7	3.216E-09	187.8
0	134.	985.037	172.2	4.794E-09	154.6
0	135.	1,006.04	172.6	3.018E-09	118.6
0	136.	1,023.41	173.8	3.72E-09	41.5
0	137.	1,027.15	175.5	1.23E-09	297.6
0	138.	1,015.5	177.	1.246E-09	181.8
0	139.	995.207	177.7	3.407E-09	95.2
0	140.	977.915	177.5	1.228E-09	328.5
0	141.	973.553	176.7	3.82E-09	187.2
0	142.	984.341	176.1	2.084E-09	283.8
0	143.	1,003.74	176.2	1.061E-09	53.1
0	144.	1,021.08	177.1	9.585E-10	18.2
0	145.	1,027.72	178.4	4.386E-09	351.7
0	146.	1,020.82	179.7	1.231E-09	237.2
0	147.	1,004.02	180.5	3.756E-09	48.
0	148.	985.517	180.5	5.745E-09	262.
0	149.	974.228	179.8	2.98E-09	320.1
0	150.	975.357	178.9	6.842E-10	150.2
0	151.	987.914	178.3	1.55E-09	58.7

0	152.	1,005.71	178.3	5.13E-09	266.1
0	153.	1,020.94	178.9	2.512E-09	274.4
0	154.	1,027.64	179.9	3.199E-09	245.4
0	155.	1,023.66	180.9	7.237E-10	64.5
0	156.	1,010.93	181.5	2.336E-09	135.3
0	157.	994.404	181.6	5.459E-09	290.8
0	158.	980.199	181.1	3.834E-10	195.5
0	159.	973.332	180.2	1.671E-09	254.2
0	160.	975.889	179.1	9.446E-10	145.
0	161.	986.48	178.4	2.493E-09	110.5
0	162.	1,001.19	178.	1.793E-09	147.4
0	163.	1,015.29	178.1	4.017E-09	273.4
0	164.	1,024.87	178.5	4.77E-09	130.5
0	165.	1,027.7	179.	2.771E-09	19.3
0	166.	1,023.53	179.5	8.333E-10	21.3
0	167.	1,013.8	179.8	5.071E-09	178.8
0	168.	1,001.11	179.7	1.47E-09	52.9
0	169.	988.5	179.2	6.999E-09	92.1
0	170.	978.715	178.4	3.924E-09	125.6
0	171.	973.634	177.3	2.697E-09	139.3
0	172.	973.926	176.2	1.974E-09	134.8
0	173.	979.08	175.1	2.524E-09	11.8
0	174.	987.732	174.3	1.921E-09	139.7
0	175.	998.096	173.6	3.54E-09	321.2
0	176.	1,008.42	173.1	4.771E-09	273.1
0	177.	1,017.27	172.9	1.128E-09	228.7
0	178.	1,023.67	172.7	1.894E-09	291.6
0	179.	1,027.16	172.6	3.509E-09	56.2
0	180.	1,027.69	172.4	1.928E-09	318.8
0	181.	1,025.58	172.2	3.29E-09	344.2
0	182.	1,021.35	172.	4.013E-09	357.4
0	183.	1,015.62	171.5	2.538E-09	36.5
0	184.	1,009.07	171.	1.205E-09	251.2
0	185.	1,002.28	170.3	1.924E-09	248.8
0	186.	995.746	169.5	7.384E-10	262.6
0	187.	989.841	168.7	1.826E-09	40.8
0	188.	984.798	167.7	2.351E-09	92.5
0	189.	980.729	166.6	2.104E-09	257.2
0	190.	977.65	165.5	8.42E-10	320.5
0	191.	975.492	164.4	1.951E-09	81.1
0	192.	974.14	163.3	2.004E-09	144.1
0	193.	973.448	162.1	2.723E-09	102.7
0	194.	973.267	161.	1.423E-09	289.
0	195.	973.446	159.8	1.18E-09	124.6
0	196.	973.844	158.7	1.826E-09	78.
0	197.	974.349	157.5	3.3E-09	199.9
0	198.	974.863	156.4	1.659E-09	315.
0	199.	975.311	155.3	3.099E-09	51.2
0	200.	975.636	154.2	2.764E-09	354.8
0	201.	975.807	153.	4.735E-09	325.
0	202.	975.807	151.9	4.01E-09	105.1
0	203.	975.632	150.8	1.392E-09	173.7
0	204.	975.306	149.7	3.926E-09	159.3
0	205.	974.865	148.6	3.217E-09	328.4
0	206.	974.37	147.5	1.083E-09	115.2

0	207.	973.894	146.4	2.929E-09	122.3
0	208.	973.544	145.3	3.901E-09	217.4
0	209.	973.435	144.2	3.905E-09	91.6
0	210.	973.708	143.2	1.43E-09	81.4
0	211.	974.513	142.1	8.989E-10	131.7
0	212.	976.003	141.	1.72E-09	94.9
0	213.	978.32	140.	1.018E-09	40.9
0	214.	981.572	138.9	1.29E-09	4.1
0	215.	985.817	137.7	3.619E-09	70.
0	216.	991.026	136.5	1.352E-10	91.8
0	217.	997.066	135.2	5.715E-09	10.7
0	218.	1,003.69	133.9	1.234E-09	219.6
0	219.	1,010.5	132.4	3.027E-09	198.4
0	220.	1,016.98	130.8	1.038E-09	220.2
0	221.	1,022.53	129.	3.239E-09	53.9
0	222.	1,026.49	127.2	5.588E-09	72.5
0	223.	1,028.23	125.3	1.991E-09	299.4
0	224.	1,027.26	123.3	1.258E-09	109.8
0	225.	1,023.32	121.4	1.405E-09	225.1
0	226.	1,016.51	119.5	2.549E-09	253.
0	227.	1,007.36	117.8	1.102E-09	314.8
0	228.	996.941	116.3	3.57E-09	3.6
0	229.	986.734	115.	6.572E-09	193.2
0	230.	978.535	113.9	1.844E-09	165.6
0	231.	974.08	113.1	3.003E-09	278.6
0	232.	974.64	112.2	1.527E-09	290.9
0	233.	980.544	111.3	6.294E-09	51.9
0	234.	990.934	110.2	3.479E-10	145.6
0	235.	1,003.77	108.8	1.478E-09	347.5
0	236.	1,016.2	107.	2.827E-09	53.3
0	237.	1,025.21	104.8	3.499E-09	87.2
0	238.	1,028.34	102.5	4.681E-09	78.9
0	239.	1,024.39	100.2	1.904E-09	233.
0	240.	1,013.91	98.1	1.277E-09	186.7
0	241.	999.422	96.3	9.693E-10	170.6
0	242.	985.054	95.	1.782E-09	104.8
0	243.	975.514	94.2	2.833E-09	251.6
0	244.	974.432	93.5	2.002E-09	301.1
0	245.	982.682	92.8	6.577E-10	327.9
0	246.	997.638	91.6	1.921E-09	229.3
0	247.	1,013.97	89.8	5.511E-09	74.6
0	248.	1,025.6	87.6	3.721E-09	280.3
0	249.	1,027.92	85.1	2.535E-09	154.7
0	250.	1,019.63	82.6	1.194E-09	39.1
0	251.	1,003.52	80.6	4.406E-09	201.5
0	252.	986.016	79.3	3.465E-09	93.5
0	253.	974.941	78.6	6.152E-10	174.4
0	254.	975.856	78.1	1.044E-09	19.8
0	255.	988.76	77.4	2.431E-09	156.3
0	256.	1,007.61	75.9	3.689E-09	249.4
0	257.	1,023.32	73.8	2.638E-09	111.5
0	258.	1,028.17	71.2	1.475E-09	216.5
0	259.	1,019.47	68.7	7.238E-10	287.6
0	260.	1,001.11	66.7	4.94E-09	259.5
0	261.	982.376	65.6	2.238E-09	277.8

0	262.	973.719	65.2	4.335E-09	137.5
0	263.	980.49	64.8	4.375E-09	172.9
0	264.	999.031	63.8	4.939E-09	91.1
0	265.	1,018.66	61.9	1.002E-09	53.
0	266.	1,028.14	59.4	5.165E-09	178.4
0	267.	1,021.88	56.8	1.359E-09	32.7
0	268.	1,003.1	54.8	2.228E-09	82.6
0	269.	982.727	53.7	6.097E-10	237.2
0	270.	973.628	53.4	1.652E-09	230.9
0	271.	982.043	53.1	2.717E-09	192.6
0	272.	1,002.62	52.1	2.525E-09	124.1
0	273.	1,022.01	50.2	1.142E-09	158.3
0	274.	1,027.9	47.6	4.919E-10	192.9
0	275.	1,016.4	45.1	4.492E-09	126.5
0	276.	994.541	43.5	4.811E-09	263.2
0	277.	976.708	43.	4.428E-09	163.8
0	278.	975.45	42.9	9.608E-11	162.4
0	279.	991.854	42.5	1.349E-09	357.2
0	280.	1,014.36	41.1	3.381E-09	277.8
0	281.	1,027.52	38.7	7.062E-10	333.4
0	282.	1,022.49	36.2	3.749E-09	218.3
0	283.	1,002.45	34.3	3.624E-09	257.6
0	284.	981.025	33.6	2.227E-09	115.
0	285.	973.671	33.6	6.81E-10	315.
0	286.	985.96	33.5	1.441E-09	267.
0	287.	1,008.79	32.5	8.439E-09	98.7
0	288.	1,025.77	30.4	3.236E-09	149.5
0	289.	1,025.16	28.	3.579E-09	230.4
0	290.	1,007.34	26.	1.022E-09	129.4
0	291.	984.61	25.1	2.462E-09	183.4
0	292.	973.454	25.2	3.432E-09	191.3
0	293.	982.275	25.4	3.55E-09	14.
0	294.	1,004.38	24.7	1.845E-09	63.6
0	295.	1,023.64	23.	1.326E-09	124.9
0	296.	1,026.69	20.7	3.107E-09	186.5
0	297.	1,011.53	18.7	4.397E-09	93.7
0	298.	988.562	17.7	1.636E-09	186.4
0	299.	974.104	17.8	2.408E-09	200.
0	300.	978.765	18.2	2.802E-09	310.7
0	301.	998.955	17.9	4.076E-09	106.9
0	302.	1,020.06	16.5	3.549E-09	195.3
0	303.	1,027.72	14.5	5.941E-09	163.9
0	304.	1,017.03	12.5	1.421E-09	43.3
0	305.	995.135	11.4	1.727E-09	281.9
0	306.	976.839	11.3	2.351E-09	305.7
0	307.	974.848	11.9	1.899E-09	249.4
0	308.	990.365	12.	2.472E-09	287.7
0	309.	1,012.45	11.3	1.234E-09	125.2
0	310.	1,026.56	9.6	2.594E-10	287.3
0	311.	1,024.08	7.7	8.889E-10	289.
0	312.	1,006.76	6.3	1.217E-09	68.9
0	313.	985.43	5.9	5.152E-09	173.5
0	314.	973.616	6.4	9.829E-10	71.2
0	315.	978.789	7.	2.761E-09	80.8
0	316.	997.281	7.	2.026E-09	55.5

0	317.	1,017.41	6.2	3.448E-09	96.5
0	318.	1,027.46	4.7	1.823E-09	171.8
0	319.	1,022.14	3.1	2.973E-09	247.5
0	320.	1,004.67	2.	3.695E-09	101.2
0	321.	984.825	1.8	3.348E-09	258.
0	322.	973.724	2.4	1.951E-09	188.9
0	323.	977.433	3.2	2.046E-09	227.8
0	324.	993.448	3.5	7.534E-10	317.2
0	325.	1,012.81	3.1	3.328E-09	50.8
0	326.	1,025.67	2.	1.282E-09	26.1
0	327.	1,026.18	.7	1.298E-09	218.
0	328.	1,014.5	359.6	3.584E-09	282.
0	329.	996.292	359.2	3.302E-09	248.
0	330.	980.059	359.5	2.205E-09	350.3
0	331.	973.216	.3	3.933E-09	213.1
0	332.	978.576	1.2	2.234E-09	243.5
0	333.	993.231	1.7	1.536E-09	278.7
0	334.	1,010.54	1.6	3.044E-09	104.6
0	335.	1,023.51	.9	2.314E-09	181.3
0	336.	1,027.53	360.	3.167E-09	155.2
0	337.	1,021.61	359.1	3.394E-09	277.7
0	338.	1,008.24	358.6	8.049E-10	43.3
0	339.	992.282	358.7	3.092E-09	198.6
0	340.	979.233	359.3	1.578E-09	13.8
0	341.	973.339	.3	9.867E-10	106.9
0	342.	976.164	1.3	4.151E-09	155.8
0	343.	986.302	2.1	8.333E-10	285.7
0	344.	1,000.25	2.5	1.35E-09	9.4
0	345.	1,013.87	2.5	1.867E-09	66.6
0	346.	1,023.67	2.2	7.09E-10	256.4
0	347.	1,027.57	1.8	4.327E-09	17.2
0	348.	1,025.1	1.4	2.781E-09	280.9
0	349.	1,017.26	1.2	4.33E-09	70.3
0	350.	1,006.04	1.2	4.98E-09	275.3
0	351.	993.928	1.6	2.853E-09	317.3
0	352.	983.331	2.3	2.036E-09	17.3
0	353.	976.116	3.3	5.956E-09	187.4
0	354.	973.293	4.4	2.504E-09	147.2
0	355.	974.953	5.5	2.294E-09	183.4
0	356.	980.4	6.6	1.337E-09	97.7
0	357.	988.433	7.4	2.552E-09	288.6
0	358.	997.694	8.2	5.227E-09	87.
0	359.	1,006.89	8.7	4.463E-09	69.7

WWMI

#### GEOMETRY

Wire coordinates in degrees; other dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.218	12
		0	0	94.7		
2	none	90.	156.	0	.218	12
		90.	156.	103.2		
3	none	180.	156.	0	.218	12
		180.	156.	94.7		
4	none	2,936.11	200.17	0	.509	15
		2,936.11	200.17	127.5		
5	none	2,936.11	200.17	127.5	.509	15
		2,936.11	200.17	263.2		
6	none	2,936.11	200.17	127.5	.01	1
		2,934.11	200.24	127.5		
7	none	2,936.11	200.17	127.5	.01	1
		2,934.11	200.1	127.5		
8	none	2,936.11	200.17	127.5	.01	1
		2,940.11	200.17	127.5		
9	none	2,934.11	200.24	0	.01	15
		2,934.11	200.24	127.5		
10	none	2,934.11	200.1	0	.01	15
		2,934.11	200.1	127.5		
11	none	2,940.11	200.17	0	.01	15
		2,940.11	200.17	127.5		

Number of wires = 11  
current nodes = 117

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	8	3.99994	5	9.04667
radius	6	.01	4	.509

#### ELECTRICAL DESCRIPTION

Frequencies (MHz)

frequency			no. of steps	segment length (wavelengths)	
no.	lowest	step		minimum	maximum
1	1.38	0	1	.011111	.0251296

Sources

source	node	sector	magnitude	phase	type
1	13	1	1,944.57	60.3	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	70	0	1,000.	0	0	0
2	86	0	1,000.	0	0	0
3	102	0	1,000.	0	0	0

4	1	0	497.16	0	0	0
5	25	0	497.16	0	0	0

# IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 13, sector 1							
1.38	69.783	92.557	115.92	53.	4.3368	-4.079	-2.1533

# CURRENT rms

Frequency = 1.38 MHz

Input power = 9,800. watts

Efficiency = 100. %

coordinates in degrees

current				mag	phase	real	imaginary
no.	X	Y	Z	(amps)	(deg)	(amps)	(amps)
GND	0	0	0	.859017	56.6	.473306	.716863
2	0	0	7.89167	.521409	56.5	.287427	.435032
3	0	0	15.7833	.302073	56.4	.166989	.25172
4	0	0	23.675	.12666	55.9	.0710081	.104883
5	0	0	31.5667	.0134571	247.5	-5.15E-03	-.0124306
6	0	0	39.4583	.120403	238.4	-.0631183	-.102533
7	0	0	47.35	.195947	238.1	-.103619	-.166308
8	0	0	55.2417	.240591	238.1	-.127188	-.204224
9	0	0	63.1333	.254944	238.2	-.134369	-.21666
10	0	0	71.025	.239614	238.3	-.125745	-.203968
11	0	0	78.9167	.194965	238.5	-.101801	-.166276
12	0	0	86.8083	.120185	238.7	-.0624158	-.102707
END	0	0	94.7	0	0	0	0
GND	-82.2191	-36.6063	0	11.8505	7.3	11.7541	1.50877
14	-82.2191	-36.6063	8.6	12.6703	4.2	12.6356	.937488
15	-82.2191	-36.6063	17.2	12.9555	2.5	12.9434	.557686
16	-82.2191	-36.6063	25.8	12.8968	1.1	12.8944	.249561
17	-82.2191	-36.6063	34.4	12.5212	0.0	12.5212	3.97E-04
18	-82.2191	-36.6063	43.	11.8463	359.1	11.8448	-.193303
19	-82.2191	-36.6063	51.6	10.8896	358.3	10.8846	-.332364
20	-82.2191	-36.6063	60.2	9.67054	357.5	9.66154	-.416971
21	-82.2191	-36.6063	68.8	8.21049	356.9	8.19829	-.447352
22	-82.2191	-36.6063	77.4	6.53096	356.3	6.51719	-.423902
23	-82.2191	-36.6063	86.	4.64795	355.7	4.635	-.346784
24	-82.2191	-36.6063	94.6	2.55566	355.2	2.54666	-.214292
END	-82.2191	-36.6063	103.2	0	0	0	0
GND	-164.438	-73.2126	0	.859847	56.7	.472121	.718636
26	-164.438	-73.2126	7.89167	.52191	56.7	.286709	.436105
27	-164.438	-73.2126	15.7833	.302358	56.6	.166578	.252333
28	-164.438	-73.2126	23.675	.126767	56.	.070845	.105123
29	-164.438	-73.2126	31.5667	.0135001	247.7	-5.12E-03	-.012493
30	-164.438	-73.2126	39.4583	.120556	238.5	-.062923	-.102832
31	-164.438	-73.2126	47.35	.196184	238.2	-.103311	-.166779
32	-164.438	-73.2126	55.2417	.240882	238.2	-.126811	-.2048
33	-164.438	-73.2126	63.1333	.255255	238.3	-.133967	-.217273



34	-164.438	-73.2126	71.025	.239911	238.5	-.125365	-.20455
35	-164.438	-73.2126	78.9167	.195211	238.7	-.101488	-.166756
36	-164.438	-73.2126	86.8083	.120341	238.9	-.0622206	-.103007
END	-164.438	-73.2126	94.7	0	0	0	0
GND	-2,756.05	1,012.39	0	.125619	164.8	-.121247	.0328502
38	-2,756.05	1,012.39	8.5	.11578	165.2	-.111952	.0295282
39	-2,756.05	1,012.39	17.	.100205	166.2	-.0973254	.0238505
40	-2,756.05	1,012.39	25.5	.0824122	168.2	-.0806612	.0168979
41	-2,756.05	1,012.39	34.	.063253	171.9	-.0626209	8.92E-03
42	-2,756.05	1,012.39	42.5	.0437454	179.8	-.0437452	1.4E-04
43	-2,756.05	1,012.39	51.	.0261975	200.6	-.0245208	-9.22E-03
44	-2,756.05	1,012.39	59.5	.0197008	254.1	-5.41E-03	-.0189428
45	-2,756.05	1,012.39	68.	.0316499	294.5	.0131339	-.0287962
46	-2,756.05	1,012.39	76.5	.0492808	308.5	.0306933	-.0385555
47	-2,756.05	1,012.39	85.	.0670862	314.3	.046869	-.0479985
48	-2,756.05	1,012.39	93.5	.0836452	317.1	.0612986	-.0569122
49	-2,756.05	1,012.39	102.	.0983051	318.5	.0736614	-.0650991
50	-2,756.05	1,012.39	110.5	.110646	319.1	.0836825	-.0723856
51	-2,756.05	1,012.39	119.	.120389	319.2	.0911464	-.0786493
J4	-2,756.05	1,012.39	127.5	.127303	318.8	.0958483	-.0837804
2J1	-2,756.05	1,012.39	127.5	.148163	219.7	-.113945	-.0947039
53	-2,756.05	1,012.39	136.547	.148636	222.8	-.109079	-.100968
54	-2,756.05	1,012.39	145.593	.147945	226.1	-.102628	-.106562
55	-2,756.05	1,012.39	154.64	.145757	229.3	-.0950514	-.110501
56	-2,756.05	1,012.39	163.687	.142003	232.4	-.0865781	-.112557
57	-2,756.05	1,012.39	172.733	.136646	235.5	-.0774322	-.112589
58	-2,756.05	1,012.39	181.78	.129678	238.5	-.0678439	-.110515
59	-2,756.05	1,012.39	190.827	.121125	241.4	-.0580509	-.106307
60	-2,756.05	1,012.39	199.873	.111036	244.2	-.048294	-.0999829
61	-2,756.05	1,012.39	208.92	.0994873	247.	-.0388142	-.0916035
62	-2,756.05	1,012.39	217.967	.0865745	249.8	-.0298476	-.0812666
63	-2,756.05	1,012.39	227.013	.0723967	252.6	-.0216219	-.0690926
64	-2,756.05	1,012.39	236.06	.0570386	255.4	-.0143517	-.0552035
65	-2,756.05	1,012.39	245.107	.0405114	258.3	-8.24E-03	-.0396655
66	-2,756.05	1,012.39	254.153	.02264	261.2	-3.45E-03	-.0223753
END	-2,756.05	1,012.39	263.2	0	0	0	0
2J1	-2,756.05	1,012.39	127.5	.0703583	8.5	.0695794	.0104399
J6	-2,752.93	1,015.07	127.5	.0705242	8.1	.0698236	9.92E-03
2J1	-2,756.05	1,012.39	127.5	.0704009	9.	.0695377	.0109906
J7	-2,755.41	1,008.34	127.5	.0705195	8.5	.0697395	.0104599
2J1	-2,756.05	1,012.39	127.5	.0714529	351.5	.0706761	-.010507
J8	-2,759.8	1,013.77	127.5	.0714876	351.2	.0706436	-.0109526
GND	-2,752.93	1,015.07	0	.0188465	345.1	.0182114	-4.85E-03
71	-2,752.93	1,015.07	8.5	9.53E-03	343.7	9.15E-03	-2.67E-03
72	-2,752.93	1,015.07	17.	1.42E-03	308.3	8.81E-04	-1.12E-03
73	-2,752.93	1,015.07	25.5	7.43E-03	179.5	-7.43E-03	6.97E-05
74	-2,752.93	1,015.07	34.	.0157847	176.7	-.0157583	9.11E-04
75	-2,752.93	1,015.07	42.5	.0240229	176.6	-.0239814	1.41E-03
76	-2,752.93	1,015.07	51.	.0319926	177.2	-.0319541	1.57E-03
77	-2,752.93	1,015.07	59.5	.0395464	178.	-.0395219	1.39E-03
78	-2,752.93	1,015.07	68.	.0465403	178.9	-.0465318	8.89E-04
79	-2,752.93	1,015.07	76.5	.0528391	179.9	-.052839	7.56E-05
80	-2,752.93	1,015.07	85.	.0583203	181.	-.0583113	-1.03E-03
81	-2,752.93	1,015.07	93.5	.0628782	182.2	-.0628327	-2.39E-03
82	-2,752.93	1,015.07	102.	.0664266	183.4	-.0663069	-3.99E-03

83	-2,752.93	1,015.07	110.5	.0689022	184.8	-.0686594	-5.78E-03
84	-2,752.93	1,015.07	119.	.0702672	186.3	-.0698389	-7.75E-03
2J2	-2,752.93	1,015.07	127.5	.0705242	188.1	-.0698236	-9.92E-03
GND	-2,755.41	1,008.34	0	.0188097	345.3	.0181958	-4.77E-03
87	-2,755.41	1,008.34	8.5	9.51E-03	343.9	9.14E-03	-2.63E-03
88	-2,755.41	1,008.34	17.	1.43E-03	308.1	8.82E-04	-1.13E-03
89	-2,755.41	1,008.34	25.5	7.42E-03	179.9	-7.42E-03	8.32E-06
90	-2,755.41	1,008.34	34.	.0157597	177.1	-.0157396	7.96E-04
91	-2,755.41	1,008.34	42.5	.0239858	177.	-.0239537	1.24E-03
92	-2,755.41	1,008.34	51.	.0319458	177.6	-.0319175	1.34E-03
93	-2,755.41	1,008.34	59.5	.0394924	178.4	-.0394767	1.11E-03
94	-2,755.41	1,008.34	68.	.0464819	179.3	-.0464785	5.58E-04
95	-2,755.41	1,008.34	76.5	.0527792	180.3	-.0527784	-3.03E-04
96	-2,755.41	1,008.34	85.	.0582621	181.4	-.0582441	-1.45E-03
97	-2,755.41	1,008.34	93.5	.0628249	182.6	-.0627601	-2.85E-03
98	-2,755.41	1,008.34	102.	.0663812	183.9	-.06623	-4.48E-03
99	-2,755.41	1,008.34	110.5	.0688679	185.2	-.0685795	-6.3E-03
100	-2,755.41	1,008.34	119.	.0702471	186.8	-.0697573	-8.28E-03
2J2	-2,755.41	1,008.34	127.5	.0705195	188.5	-.0697395	-.0104599
GND	-2,759.8	1,013.77	0	.0199836	336.5	.0183266	-7.97E-03
103	-2,759.8	1,013.77	8.5	.0100484	336.2	9.19E-03	-4.06E-03
104	-2,759.8	1,013.77	17.	1.09E-03	319.8	8.34E-04	-7.04E-04
105	-2,759.8	1,013.77	25.5	7.95E-03	162.3	-7.58E-03	2.42E-03
106	-2,759.8	1,013.77	34.	.016855	161.7	-.0160037	5.29E-03
107	-2,759.8	1,013.77	42.5	.02557	162.1	-.0243284	7.87E-03
108	-2,759.8	1,013.77	51.	.0339441	162.7	-.0324005	.0101195
109	-2,759.8	1,013.77	59.5	.0418194	163.3	-.0400626	.0119937
110	-2,759.8	1,013.77	68.	.049042	164.1	-.0471592	.0134586
111	-2,759.8	1,013.77	76.5	.0554681	164.9	-.0535428	.014487
112	-2,759.8	1,013.77	85.	.0609684	165.7	-.059079	.0150604
113	-2,759.8	1,013.77	93.5	.0654323	166.6	-.0636497	.0151691
114	-2,759.8	1,013.77	102.	.0687708	167.6	-.0671568	.0148117
115	-2,759.8	1,013.77	110.5	.0709185	168.6	-.0695242	.0139935
116	-2,759.8	1,013.77	119.	.0718337	169.8	-.0706987	.0127189
2J2	-2,759.8	1,013.77	127.5	.0714876	171.2	-.0706436	.0109526

## EXHIBIT F- WWMI Nighttime Directional With No tower effect

RADIATION PATTERN rms  
geographic coordinate system

Radial distance (meters) = 1,000.

Frequency = 1.38 MHz

Input power = 6,500. watts

Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	phase (deg)	E-phi mag (mv/m)	phase
0	0	195.281	145.7	0	0
0	1.	195.077	145.6	0	0
0	2.	194.814	145.6	0	0
0	3.	194.488	145.5	0	0
0	4.	194.095	145.4	0	0
0	5.	193.635	145.3	0	0
0	6.	193.104	145.1	0	0
0	7.	192.503	144.9	0	0
0	8.	191.832	144.7	0	0
0	9.	191.091	144.4	0	0
0	10.	190.284	144.1	0	0
0	11.	189.415	143.8	0	0
0	12.	188.49	143.3	0	0
0	13.	187.515	142.9	0	0
0	14.	186.502	142.3	0	0
0	15.	185.461	141.7	0	0
0	16.	184.409	141.	0	0
0	17.	183.361	140.2	0	0
0	18.	182.338	139.4	0	0
0	19.	181.364	138.4	0	0
0	20.	180.466	137.4	0	0
0	21.	179.675	136.3	0	0
0	22.	179.023	135.	0	0
0	23.	178.549	133.7	0	0
0	24.	178.294	132.2	0	0
0	25.	178.3	130.7	0	0
0	26.	178.614	129.	0	0
0	27.	179.283	127.3	0	0
0	28.	180.355	125.5	0	0
0	29.	181.878	123.6	0	0
0	30.	183.898	121.7	0	0
0	31.	186.459	119.7	0	0
0	32.	189.601	117.8	0	0
0	33.	193.357	115.8	0	0
0	34.	197.758	113.9	0	0
0	35.	202.825	112.	0	0
0	36.	208.574	110.2	0	0
0	37.	215.014	108.5	0	0
0	38.	222.149	106.9	0	0
0	39.	229.976	105.4	0	0
0	40.	238.487	104.	0	0
0	41.	247.668	102.8	0	0
0	42.	257.506	101.7	0	0
0	43.	267.98	100.7	0	0

0	44.	279.069	99.8	0	0
0	45.	290.751	99.1	0	0
0	46.	303.	98.5	0	0
0	47.	315.792	98.	0	0
0	48.	329.101	97.6	0	0
0	49.	342.901	97.3	0	0
0	50.	357.165	97.2	0	0
0	51.	371.867	97.1	0	0
0	52.	386.98	97.1	0	0
0	53.	402.477	97.2	0	0
0	54.	418.334	97.4	0	0
0	55.	434.523	97.7	0	0
0	56.	451.018	98.1	0	0
0	57.	467.793	98.5	0	0
0	58.	484.823	98.9	0	0
0	59.	502.081	99.5	0	0
0	60.	519.543	100.1	0	0
0	61.	537.183	100.7	0	0
0	62.	554.975	101.4	0	0
0	63.	572.896	102.1	0	0
0	64.	590.919	102.9	0	0
0	65.	609.022	103.7	0	0
0	66.	627.178	104.5	0	0
0	67.	645.365	105.4	0	0
0	68.	663.559	106.3	0	0
0	69.	681.735	107.2	0	0
0	70.	699.873	108.2	0	0
0	71.	717.949	109.1	0	0
0	72.	735.941	110.1	0	0
0	73.	753.828	111.1	0	0
0	74.	771.589	112.2	0	0
0	75.	789.202	113.2	0	0
0	76.	806.65	114.3	0	0
0	77.	823.911	115.4	0	0
0	78.	840.968	116.5	0	0
0	79.	857.804	117.6	0	0
0	80.	874.402	118.7	0	0
0	81.	890.744	119.8	0	0
0	82.	906.815	120.9	0	0
0	83.	922.601	122.	0	0
0	84.	938.089	123.2	0	0
0	85.	953.265	124.3	0	0
0	86.	968.118	125.4	0	0
0	87.	982.636	126.6	0	0
0	88.	996.808	127.7	0	0
0	89.	1,010.63	128.8	0	0
0	90.	1,024.08	130.	0	0
0	91.	1,037.17	131.1	0	0
0	92.	1,049.88	132.2	0	0
0	93.	1,062.21	133.4	0	0
0	94.	1,074.15	134.5	0	0
0	95.	1,085.7	135.6	0	0
0	96.	1,096.86	136.7	0	0
0	97.	1,107.62	137.8	0	0
0	98.	1,117.99	138.9	0	0

0	99.	1,127.96	140.	0	0
0	100.	1,137.54	141.1	0	0
0	101.	1,146.72	142.2	0	0
0	102.	1,155.51	143.2	0	0
0	103.	1,163.92	144.3	0	0
0	104.	1,171.94	145.3	0	0
0	105.	1,179.58	146.3	0	0
0	106.	1,186.84	147.4	0	0
0	107.	1,193.74	148.4	0	0
0	108.	1,200.27	149.4	0	0
0	109.	1,206.44	150.3	0	0
0	110.	1,212.27	151.3	0	0
0	111.	1,217.76	152.3	0	0
0	112.	1,222.92	153.2	0	0
0	113.	1,227.75	154.1	0	0
0	114.	1,232.27	155.	0	0
0	115.	1,236.49	155.9	0	0
0	116.	1,240.41	156.8	0	0
0	117.	1,244.05	157.6	0	0
0	118.	1,247.42	158.5	0	0
0	119.	1,250.53	159.3	0	0
0	120.	1,253.38	160.1	0	0
0	121.	1,255.99	160.9	0	0
0	122.	1,258.37	161.7	0	0
0	123.	1,260.53	162.4	0	0
0	124.	1,262.49	163.1	0	0
0	125.	1,264.25	163.8	0	0
0	126.	1,265.82	164.5	0	0
0	127.	1,267.22	165.2	0	0
0	128.	1,268.46	165.8	0	0
0	129.	1,269.54	166.5	0	0
0	130.	1,270.48	167.1	0	0
0	131.	1,271.29	167.7	0	0
0	132.	1,271.98	168.2	0	0
0	133.	1,272.56	168.8	0	0
0	134.	1,273.03	169.3	0	0
0	135.	1,273.42	169.8	0	0
0	136.	1,273.72	170.3	0	0
0	137.	1,273.94	170.7	0	0
0	138.	1,274.11	171.2	0	0
0	139.	1,274.21	171.6	0	0
0	140.	1,274.26	172.	0	0
0	141.	1,274.27	172.3	0	0
0	142.	1,274.25	172.7	0	0
0	143.	1,274.2	173.	0	0
0	144.	1,274.13	173.3	0	0
0	145.	1,274.04	173.6	0	0
0	146.	1,273.94	173.8	0	0
0	147.	1,273.84	174.	0	0
0	148.	1,273.73	174.2	0	0
0	149.	1,273.63	174.4	0	0
0	150.	1,273.53	174.6	0	0
0	151.	1,273.44	174.7	0	0
0	152.	1,273.37	174.8	0	0
0	153.	1,273.31	174.9	0	0

0	154.	1,273.26	175.	0	0
0	155.	1,273.23	175.	0	0
0	156.	1,273.22	175.	0	0
0	157.	1,273.23	175.	0	0
0	158.	1,273.26	175.	0	0
0	159.	1,273.31	174.9	0	0
0	160.	1,273.37	174.8	0	0
0	161.	1,273.44	174.7	0	0
0	162.	1,273.53	174.6	0	0
0	163.	1,273.63	174.4	0	0
0	164.	1,273.73	174.2	0	0
0	165.	1,273.84	174.	0	0
0	166.	1,273.94	173.8	0	0
0	167.	1,274.04	173.6	0	0
0	168.	1,274.13	173.3	0	0
0	169.	1,274.2	173.	0	0
0	170.	1,274.25	172.7	0	0
0	171.	1,274.27	172.3	0	0
0	172.	1,274.26	172.	0	0
0	173.	1,274.21	171.6	0	0
0	174.	1,274.11	171.2	0	0
0	175.	1,273.94	170.7	0	0
0	176.	1,273.72	170.3	0	0
0	177.	1,273.42	169.8	0	0
0	178.	1,273.03	169.3	0	0
0	179.	1,272.56	168.8	0	0
0	180.	1,271.98	168.2	0	0
0	181.	1,271.29	167.7	0	0
0	182.	1,270.48	167.1	0	0
0	183.	1,269.54	166.5	0	0
0	184.	1,268.46	165.8	0	0
0	185.	1,267.22	165.2	0	0
0	186.	1,265.82	164.5	0	0
0	187.	1,264.25	163.8	0	0
0	188.	1,262.49	163.1	0	0
0	189.	1,260.53	162.4	0	0
0	190.	1,258.37	161.7	0	0
0	191.	1,255.99	160.9	0	0
0	192.	1,253.38	160.1	0	0
0	193.	1,250.53	159.3	0	0
0	194.	1,247.42	158.5	0	0
0	195.	1,244.05	157.6	0	0
0	196.	1,240.41	156.8	0	0
0	197.	1,236.49	155.9	0	0
0	198.	1,232.27	155.	0	0
0	199.	1,227.75	154.1	0	0
0	200.	1,222.92	153.2	0	0
0	201.	1,217.76	152.3	0	0
0	202.	1,212.27	151.3	0	0
0	203.	1,206.44	150.3	0	0
0	204.	1,200.27	149.4	0	0
0	205.	1,193.74	148.4	0	0
0	206.	1,186.84	147.4	0	0
0	207.	1,179.58	146.3	0	0
0	208.	1,171.94	145.3	0	0

0	209.	1,163.92	144.3	0	0
0	210.	1,155.51	143.2	0	0
0	211.	1,146.72	142.2	0	0
0	212.	1,137.54	141.1	0	0
0	213.	1,127.96	140.	0	0
0	214.	1,117.99	138.9	0	0
0	215.	1,107.62	137.8	0	0
0	216.	1,096.86	136.7	0	0
0	217.	1,085.7	135.6	0	0
0	218.	1,074.15	134.5	0	0
0	219.	1,062.21	133.4	0	0
0	220.	1,049.88	132.2	0	0
0	221.	1,037.17	131.1	0	0
0	222.	1,024.08	130.	0	0
0	223.	1,010.63	128.8	0	0
0	224.	996.808	127.7	0	0
0	225.	982.636	126.6	0	0
0	226.	968.118	125.4	0	0
0	227.	953.265	124.3	0	0
0	228.	938.089	123.2	0	0
0	229.	922.601	122.	0	0
0	230.	906.815	120.9	0	0
0	231.	890.744	119.8	0	0
0	232.	874.402	118.7	0	0
0	233.	857.804	117.6	0	0
0	234.	840.968	116.5	0	0
0	235.	823.911	115.4	0	0
0	236.	806.65	114.3	0	0
0	237.	789.202	113.2	0	0
0	238.	771.588	112.2	0	0
0	239.	753.828	111.1	0	0
0	240.	735.941	110.1	0	0
0	241.	717.949	109.1	0	0
0	242.	699.873	108.2	0	0
0	243.	681.735	107.2	0	0
0	244.	663.559	106.3	0	0
0	245.	645.364	105.4	0	0
0	246.	627.178	104.5	0	0
0	247.	609.022	103.7	0	0
0	248.	590.919	102.9	0	0
0	249.	572.896	102.1	0	0
0	250.	554.975	101.4	0	0
0	251.	537.182	100.7	0	0
0	252.	519.543	100.1	0	0
0	253.	502.081	99.5	0	0
0	254.	484.823	98.9	0	0
0	255.	467.793	98.5	0	0
0	256.	451.018	98.1	0	0
0	257.	434.523	97.7	0	0
0	258.	418.334	97.4	0	0
0	259.	402.477	97.2	0	0
0	260.	386.98	97.1	0	0
0	261.	371.867	97.1	0	0
0	262.	357.165	97.2	0	0
0	263.	342.901	97.3	0	0

0	264.	329.101	97.6	0	0
0	265.	315.792	98.	0	0
0	266.	303.	98.5	0	0
0	267.	290.751	99.1	0	0
0	268.	279.069	99.8	0	0
0	269.	267.98	100.7	0	0
0	270.	257.506	101.7	0	0
0	271.	247.668	102.8	0	0
0	272.	238.487	104.	0	0
0	273.	229.976	105.4	0	0
0	274.	222.149	106.9	0	0
0	275.	215.014	108.5	0	0
0	276.	208.574	110.2	0	0
0	277.	202.825	112.	0	0
0	278.	197.758	113.9	0	0
0	279.	193.357	115.8	0	0
0	280.	189.601	117.8	0	0
0	281.	186.459	119.7	0	0
0	282.	183.898	121.7	0	0
0	283.	181.878	123.6	0	0
0	284.	180.355	125.5	0	0
0	285.	179.283	127.3	0	0
0	286.	178.614	129.	0	0
0	287.	178.3	130.7	0	0
0	288.	178.294	132.2	0	0
0	289.	178.549	133.7	0	0
0	290.	179.023	135.	0	0
0	291.	179.674	136.3	0	0
0	292.	180.466	137.4	0	0
0	293.	181.364	138.4	0	0
0	294.	182.338	139.4	0	0
0	295.	183.361	140.2	0	0
0	296.	184.409	141.	0	0
0	297.	185.461	141.7	0	0
0	298.	186.502	142.3	0	0
0	299.	187.515	142.9	0	0
0	300.	188.49	143.3	0	0
0	301.	189.415	143.8	0	0
0	302.	190.284	144.1	0	0
0	303.	191.091	144.4	0	0
0	304.	191.832	144.7	0	0
0	305.	192.503	144.9	0	0
0	306.	193.104	145.1	0	0
0	307.	193.635	145.3	0	0
0	308.	194.095	145.4	0	0
0	309.	194.488	145.5	0	0
0	310.	194.814	145.6	0	0
0	311.	195.077	145.6	0	0
0	312.	195.281	145.7	0	0
0	313.	195.429	145.7	0	0
0	314.	195.525	145.7	0	0
0	315.	195.573	145.7	0	0
0	316.	195.579	145.7	0	0
0	317.	195.547	145.7	0	0
0	318.	195.482	145.6	0	0



0	319.	195.388	145.6	0	0
0	320.	195.27	145.6	0	0
0	321.	195.133	145.5	0	0
0	322.	194.982	145.5	0	0
0	323.	194.82	145.4	0	0
0	324.	194.652	145.4	0	0
0	325.	194.482	145.3	0	0
0	326.	194.313	145.3	0	0
0	327.	194.15	145.3	0	0
0	328.	193.995	145.2	0	0
0	329.	193.851	145.2	0	0
0	330.	193.721	145.2	0	0
0	331.	193.607	145.1	0	0
0	332.	193.511	145.1	0	0
0	333.	193.434	145.1	0	0
0	334.	193.379	145.1	0	0
0	335.	193.345	145.1	0	0
0	336.	193.334	145.1	0	0
0	337.	193.345	145.1	0	0
0	338.	193.379	145.1	0	0
0	339.	193.434	145.1	0	0
0	340.	193.511	145.1	0	0
0	341.	193.607	145.1	0	0
0	342.	193.721	145.2	0	0
0	343.	193.851	145.2	0	0
0	344.	193.995	145.2	0	0
0	345.	194.15	145.3	0	0
0	346.	194.313	145.3	0	0
0	347.	194.482	145.3	0	0
0	348.	194.652	145.4	0	0
0	349.	194.82	145.4	0	0
0	350.	194.982	145.5	0	0
0	351.	195.133	145.5	0	0
0	352.	195.27	145.6	0	0
0	353.	195.388	145.6	0	0
0	354.	195.482	145.6	0	0
0	355.	195.547	145.7	0	0
0	356.	195.579	145.7	0	0
0	357.	195.573	145.7	0	0
0	358.	195.525	145.7	0	0
0	359.	195.429	145.7	0	0

WWMI

#### GEOMETRY

Wire coordinates in degrees; other dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.218	12
		0	0	94.7		
2	none	90.	156.	0	.218	12
		90.	156.	103.2		
3	none	180.	156.	0	.218	12
		180.	156.	94.7		

Number of wires = 3  
current nodes = 36

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	7.89167	2	8.6
radius	1	.218	1	.218

#### ELECTRICAL DESCRIPTION

Frequencies (MHz)

frequency		no. of steps	segment length (wavelengths)	
no.	lowest step		minimum	maximum
1	1.38 0	1	.0219213	.0238889

Sources

source	node	sector	magnitude	phase	type
1	1	1	387.915	116.5	voltage
2	13	1	1,178.54	58.3	voltage
3	25	1	880.549	320.1	voltage

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#### IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.38	35.106	22.94	41.937	33.2	1.8998	-10.164	-.43969
source = 2; node 13, sector 1							
1.38	82.916	98.1	128.45	49.8	4.3529	-4.0634	-2.1634
source = 3; node 25, sector 1							
1.38	133.16	128.47	185.03	44.	5.3298	-3.2984	-2.7401

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CURRENT rms

Frequency = 1.38 MHz

Input power = 6,500. watts

Efficiency = 100. %

coordinates in degrees

current				mag	phase	real	imaginary
no.	X	Y	Z	(amps)	(deg)	(amps)	(amps)
GND	0	0	0	6.54077	83.4	.754476	6.49711
2	0	0	7.89167	6.60716	81.8	.93896	6.5401
3	0	0	15.7833	6.52504	80.9	1.03658	6.44218
4	0	0	23.675	6.32191	80.1	1.0904	6.22716
5	0	0	31.5667	6.00418	79.4	1.1058	5.90147
6	0	0	39.4583	5.57798	78.8	1.08512	5.47141
7	0	0	47.35	5.05016	78.2	1.02992	4.94402
8	0	0	55.2417	4.42841	77.7	.941577	4.32716
9	0	0	63.1333	3.72087	77.2	.821432	3.62906
10	0	0	71.025	2.93512	76.8	.670686	2.85747
11	0	0	78.9167	2.07579	76.4	.489801	2.01717
12	0	0	86.8083	1.13735	75.9	.276704	1.10317
END	0	0	94.7	0	0	0	0
GND	-82.2191	-36.6063	0	6.48791	8.5	6.41702	.95649
14	-82.2191	-36.6063	8.6	6.97032	4.8	6.9454	.588928
15	-82.2191	-36.6063	17.2	7.15076	2.8	7.14242	.34523
16	-82.2191	-36.6063	25.8	7.13795	1.2	7.13641	.148198
17	-82.2191	-36.6063	34.4	6.94666	359.9	6.94666	-.0104479
18	-82.2191	-36.6063	43.	6.58617	358.8	6.58483	-.133085
19	-82.2191	-36.6063	51.6	6.06579	357.9	6.06178	-.220399
20	-82.2191	-36.6063	60.2	5.39605	357.1	5.38915	-.272682
21	-82.2191	-36.6063	68.8	4.58869	356.4	4.5795	-.290263
22	-82.2191	-36.6063	77.4	3.65547	355.7	3.64522	-.273579
23	-82.2191	-36.6063	86.	2.60517	355.1	2.59562	-.222904
24	-82.2191	-36.6063	94.6	1.43437	354.5	1.42778	-.137291
END	-82.2191	-36.6063	103.2	0	0	0	0
GND	-164.438	-73.2126	0	3.36507	276.1	.358211	-3.34595
26	-164.438	-73.2126	7.89167	3.6894	270.7	.0456416	-3.68912
27	-164.438	-73.2126	15.7833	3.83481	267.8	-.14974	-3.83188
28	-164.438	-73.2126	23.675	3.87042	265.6	-.297573	-3.85897
29	-164.438	-73.2126	31.5667	3.80398	263.9	-.405798	-3.78227
30	-164.438	-73.2126	39.4583	3.63984	262.5	-.477234	-3.60842
31	-164.438	-73.2126	47.35	3.38207	261.3	-.513187	-3.34291
32	-164.438	-73.2126	55.2417	3.03525	260.2	-.514569	-2.99132
33	-164.438	-73.2126	63.1333	2.6044	259.3	-.482257	-2.55936
34	-164.438	-73.2126	71.025	2.09434	258.5	-.417083	-2.05239
35	-164.438	-73.2126	78.9167	1.50787	257.8	-.319447	-1.47365
36	-164.438	-73.2126	86.8083	.840306	257.1	-.187963	-.819014
END	-164.438	-73.2126	94.7	0	0	0	0

# **EXHIBIT G- WWMI Nighttime Directional WITH NEW TOWER (skirted, detuned)**

RADIATION PATTERN rms  
geographic coordinate system

Radial distance (meters) = 1,000.

Frequency = 1.38 MHz

Input power = 6,500. watts

Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	phase (deg)	E-phi mag (mv/m)	phase
0	0	203.846	136.1	3.319E-09	65.2
0	1.	193.968	135.6	1.552E-09	140.8
0	2.	184.45	135.9	4.609E-09	356.1
0	3.	176.037	136.9	2.757E-09	218.7
0	4.	169.279	138.6	6.669E-09	6.7
0	5.	164.484	140.7	7.544E-09	228.7
0	6.	161.695	143.	6.548E-10	.9
0	7.	160.725	145.2	1.649E-09	335.4
0	8.	161.231	147.2	3.866E-10	33.6
0	9.	162.792	148.9	3.495E-09	96.7
0	10.	164.997	150.1	3.634E-09	93.8
0	11.	167.485	150.9	5.574E-10	172.4
0	12.	169.968	151.4	7.314E-10	350.2
0	13.	172.233	151.6	3.036E-09	8.4
0	14.	174.138	151.5	2.729E-09	268.2
0	15.	175.591	151.2	5.519E-09	50.3
0	16.	176.544	150.7	3.141E-09	244.
0	17.	176.975	150.1	5.163E-09	214.9
0	18.	176.883	149.4	5.954E-09	171.9
0	19.	176.28	148.5	4.175E-09	252.3
0	20.	175.188	147.5	2.158E-09	188.7
0	21.	173.636	146.4	2.599E-09	112.3
0	22.	171.661	145.1	2.509E-09	342.9
0	23.	169.314	143.7	2.631E-09	262.2
0	24.	166.667	142.	2.783E-09	24.
0	25.	163.821	140.1	5.396E-09	48.2
0	26.	160.921	137.9	5.828E-10	5.6
0	27.	158.171	135.2	6.543E-09	113.1
0	28.	155.847	132.2	1.316E-09	114.8
0	29.	154.306	128.7	4.016E-09	281.2
0	30.	153.98	124.8	3.764E-09	285.8
0	31.	155.344	120.5	1.774E-09	312.3
0	32.	158.856	116.1	8.274E-09	260.
0	33.	164.873	111.7	2.09E-09	60.6
0	34.	173.571	107.8	2.853E-09	222.2
0	35.	184.89	104.4	3.202E-09	163.4
0	36.	198.526	101.8	2.675E-09	283.8
0	37.	213.961	100.	2.184E-09	5.6
0	38.	230.513	99.	3.955E-09	172.3
0	39.	247.386	98.8	2.083E-10	134.8
0	40.	263.718	99.1	1.804E-09	324.1
0	41.	278.646	100.	7.882E-10	24.1

0	42.	291.366	101.1	1.222E-09	122.
0	43.	301.224	102.4	3.439E-09	269.9
0	44.	307.839	103.5	5.E-09	275.
0	45.	311.234	104.4	2.731E-09	122.6
0	46.	312.014	104.6	2.18E-09	272.4
0	47.	311.501	104.1	8.642E-10	118.2
0	48.	311.78	102.7	5.54E-09	26.8
0	49.	315.472	100.5	6.524E-10	127.6
0	50.	325.11	97.8	9.869E-10	185.2
0	51.	342.22	95.3	3.436E-09	275.5
0	52.	366.592	93.5	1.266E-09	168.2
0	53.	396.207	92.8	2.548E-09	135.3
0	54.	427.822	93.3	9.189E-10	183.8
0	55.	457.787	94.8	2.456E-09	1.1
0	56.	482.784	97.	3.697E-09	318.6
0	57.	500.474	99.4	1.02E-10	143.
0	58.	510.064	101.6	8.786E-09	79.2
0	59.	512.789	103.2	3.067E-09	199.7
0	60.	512.153	103.8	6.27E-09	358.9
0	61.	513.542	103.3	2.456E-09	225.7
0	62.	522.738	102.1	7.094E-09	265.5
0	63.	543.394	100.8	9.442E-10	78.
0	64.	574.92	100.2	5.834E-10	66.3
0	65.	612.439	100.7	4.617E-09	14.5
0	66.	648.842	102.4	3.577E-09	156.2
0	67.	677.428	104.8	8.848E-09	119.4
0	68.	694.085	107.4	4.03E-09	281.8
0	69.	698.756	109.6	5.538E-09	201.9
0	70.	696.057	110.9	2.422E-09	174.2
0	71.	694.446	111.1	1.881E-09	158.2
0	72.	703.121	110.4	2.415E-09	85.6
0	73.	727.111	109.7	2.769E-09	323.1
0	74.	763.772	109.9	4.079E-09	208.6
0	75.	803.982	111.2	1.697E-09	169.4
0	76.	836.937	113.5	1.56E-09	247.5
0	77.	855.127	116.1	3.693E-09	82.9
0	78.	857.589	118.4	5.598E-09	18.2
0	79.	850.917	119.8	7.046E-10	131.3
0	80.	847.212	120.	1.158E-09	52.2
0	81.	858.147	119.5	2.127E-09	89.4
0	82.	887.345	119.2	7.152E-09	198.5
0	83.	927.305	120.	9.466E-10	174.8
0	84.	964.144	122.	3.059E-09	98.
0	85.	985.798	124.6	8.986E-10	108.4
0	86.	988.317	127.	1.905E-09	329.1
0	87.	978.217	128.5	3.454E-09	2.9
0	88.	970.012	128.9	1.269E-09	33.5
0	89.	978.156	128.5	3.742E-09	69.2
0	90.	1,006.77	128.4	3.386E-09	25.1
0	91.	1,045.99	129.4	1.47E-09	331.1
0	92.	1,079.01	131.4	9.048E-10	59.4
0	93.	1,093.05	134.	3.542E-09	254.3
0	94.	1,086.74	136.1	2.157E-09	177.5
0	95.	1,071.37	137.2	2.684E-09	19.5
0	96.	1,064.95	137.2	5.885E-09	273.5

0	97.	1,080.11	136.9	3.528E-09	144.7
0	98.	1,113.91	137.2	3.861E-09	189.7
0	99.	1,149.88	138.8	2.724E-09	46.
0	100.	1,170.35	141.1	4.433E-09	290.8
0	101.	1,167.99	143.4	3.215E-09	328.9
0	102.	1,150.27	144.8	3.168E-09	36.3
0	103.	1,135.52	145.1	4.284E-10	331.7
0	104.	1,140.75	144.8	5.653E-09	166.5
0	105.	1,168.2	144.8	5.307E-09	358.6
0	106.	1,203.22	146.	2.86E-09	7.1
0	107.	1,226.06	148.1	1.297E-09	309.5
0	108.	1,225.73	150.3	5.394E-09	15.
0	109.	1,206.86	151.9	7.373E-09	357.1
0	110.	1,187.05	152.3	7.642E-10	14.8
0	111.	1,185.26	152.	3.738E-09	253.8
0	112.	1,207.08	151.8	7.262E-09	3.8
0	113.	1,239.91	152.7	8.385E-10	55.1
0	114.	1,263.5	154.5	8.977E-09	93.3
0	115.	1,264.68	156.7	4.732E-09	344.9
0	116.	1,245.58	158.3	1.815E-09	203.
0	117.	1,222.3	158.8	3.056E-09	256.7
0	118.	1,214.41	158.4	7.884E-09	284.1
0	119.	1,230.27	158.1	2.241E-09	168.5
0	120.	1,260.27	158.6	2.525E-09	83.2
0	121.	1,284.93	160.2	6.372E-09	97.4
0	122.	1,289.33	162.1	4.727E-09	315.8
0	123.	1,272.32	163.8	2.255E-09	288.1
0	124.	1,246.88	164.4	2.138E-09	149.3
0	125.	1,232.02	164.1	4.533E-09	284.7
0	126.	1,239.49	163.6	4.426E-09	20.9
0	127.	1,264.84	163.7	3.847E-09	112.9
0	128.	1,291.37	164.8	1.091E-09	75.9
0	129.	1,302.58	166.5	3.29E-09	344.1
0	130.	1,292.38	168.2	4.194E-09	10.7
0	131.	1,267.99	169.1	4.078E-09	322.4
0	132.	1,245.57	169.1	5.159E-09	88.
0	133.	1,240.18	168.5	5.289E-09	166.7
0	134.	1,255.48	168.	1.479E-09	323.
0	135.	1,281.5	168.3	7.315E-09	229.1
0	136.	1,302.26	169.5	4.312E-09	288.6
0	137.	1,306.	171.1	5.14E-09	136.5
0	138.	1,291.16	172.4	5.081E-09	245.7
0	139.	1,266.48	173.	1.942E-10	274.4
0	140.	1,246.25	172.7	4.036E-09	126.6
0	141.	1,242.15	172.	3.224E-09	47.8
0	142.	1,256.17	171.4	2.696E-09	230.9
0	143.	1,279.87	171.5	2.977E-09	259.6
0	144.	1,300.25	172.4	3.564E-09	107.6
0	145.	1,307.13	173.6	1.636E-09	182.7
0	146.	1,297.59	174.8	3.595E-09	173.1
0	147.	1,276.6	175.5	4.263E-09	152.2
0	148.	1,254.39	175.4	1.303E-09	41.
0	149.	1,241.61	174.7	6.474E-09	26.4
0	150.	1,244.08	173.9	3.136E-09	185.3
0	151.	1,260.01	173.3	2.851E-09	109.2

0	152.	1,281.6	173.4	9.183E-09	279.5
0	153.	1,299.38	174.	3.843E-09	64.7
0	154.	1,306.42	174.9	1.173E-09	54.3
0	155.	1,300.53	175.8	5.164E-09	175.
0	156.	1,284.42	176.4	5.125E-09	289.2
0	157.	1,264.35	176.4	5.105E-09	103.9
0	158.	1,247.76	175.9	2.945E-09	294.4
0	159.	1,240.48	175.	4.533E-09	226.4
0	160.	1,244.65	174.1	3.501E-09	7.5
0	161.	1,258.23	173.4	4.815E-09	350.7
0	162.	1,276.3	173.1	4.109E-10	264.1
0	163.	1,293.15	173.2	9.411E-09	82.8
0	164.	1,304.15	173.6	3.875E-09	238.
0	165.	1,306.83	174.2	3.405E-09	183.3
0	166.	1,301.09	174.6	5.178E-09	187.2
0	167.	1,288.87	174.9	3.154E-09	330.7
0	168.	1,273.42	174.8	9.435E-09	307.8
0	169.	1,258.42	174.3	2.211E-09	104.2
0	170.	1,247.13	173.5	4.075E-09	81.3
0	171.	1,241.67	172.5	1.922E-09	151.8
0	172.	1,242.68	171.5	9.514E-09	162.
0	173.	1,249.4	170.6	1.334E-09	314.2
0	174.	1,260.08	169.8	5.449E-09	358.1
0	175.	1,272.55	169.2	1.686E-09	210.
0	176.	1,284.7	168.9	4.958E-09	85.4
0	177.	1,294.82	168.6	2.065E-09	82.9
0	178.	1,301.81	168.5	3.737E-09	210.7
0	179.	1,305.14	168.5	2.182E-09	134.8
0	180.	1,304.81	168.4	5.538E-09	126.9
0	181.	1,301.22	168.3	3.938E-09	359.8
0	182.	1,295.02	168.1	4.946E-09	186.2
0	183.	1,286.98	167.7	2.65E-09	286.5
0	184.	1,277.88	167.3	3.449E-09	90.
0	185.	1,268.42	166.7	2.04E-09	328.7
0	186.	1,259.18	166.	6.601E-09	246.
0	187.	1,250.56	165.2	5.598E-09	91.6
0	188.	1,242.82	164.3	5.823E-09	91.2
0	189.	1,236.07	163.4	1.824E-09	285.6
0	190.	1,230.3	162.4	8.22E-09	84.1
0	191.	1,225.41	161.5	9.895E-09	97.
0	192.	1,221.24	160.5	6.43E-09	84.4
0	193.	1,217.6	159.4	2.244E-09	356.7
0	194.	1,214.3	158.4	5.805E-09	51.5
0	195.	1,211.15	157.4	1.259E-09	107.4
0	196.	1,207.98	156.4	4.16E-09	239.6
0	197.	1,204.63	155.5	5.871E-09	214.8
0	198.	1,200.99	154.5	3.429E-09	306.7
0	199.	1,196.96	153.5	3.255E-09	31.5
0	200.	1,192.45	152.6	4.674E-09	49.6
0	201.	1,187.44	151.6	4.096E-09	77.2
0	202.	1,181.89	150.7	7.945E-09	221.
0	203.	1,175.8	149.7	4.744E-09	172.6
0	204.	1,169.19	148.8	5.706E-09	53.9
0	205.	1,162.1	147.9	4.408E-09	276.
0	206.	1,154.6	147.	2.429E-09	53.7

0	207.	1,146.79	146.1	4.299E-09	261.8
0	208.	1,138.79	145.2	2.421E-09	24.8
0	209.	1,130.75	144.4	5.581E-09	109.2
0	210.	1,122.83	143.5	2.164E-09	88.
0	211.	1,115.21	142.7	1.851E-09	275.5
0	212.	1,108.09	141.9	1.99E-09	91.8
0	213.	1,101.62	141.1	2.251E-09	347.7
0	214.	1,095.91	140.2	1.861E-09	62.1
0	215.	1,091.02	139.3	1.97E-09	231.2
0	216.	1,086.87	138.4	3.67E-09	302.
0	217.	1,083.27	137.4	3.793E-09	348.
0	218.	1,079.84	136.2	3.797E-10	38.5
0	219.	1,076.09	135.	1.3E-09	136.2
0	220.	1,071.35	133.6	9.344E-09	348.4
0	221.	1,064.85	132.1	5.849E-09	349.6
0	222.	1,055.81	130.5	1.786E-09	126.
0	223.	1,043.51	128.8	7.373E-10	74.5
0	224.	1,027.43	127.	2.731E-09	259.3
0	225.	1,007.37	125.3	1.403E-09	237.8
0	226.	983.625	123.7	4.763E-09	33.5
0	227.	957.027	122.4	4.289E-09	196.5
0	228.	929.041	121.2	8.359E-10	139.
0	229.	901.658	120.5	5.095E-09	157.
0	230.	877.142	120.	4.247E-09	217.3
0	231.	857.559	119.8	6.862E-09	270.
0	232.	844.193	119.6	2.786E-09	313.7
0	233.	836.983	119.4	5.221E-09	10.3
0	234.	834.288	118.7	5.561E-09	181.5
0	235.	833.121	117.6	3.609E-09	272.5
0	236.	829.8	116.	1.077E-09	292.3
0	237.	820.833	114.	1.06E-09	100.5
0	238.	803.781	111.7	2.427E-09	49.5
0	239.	777.973	109.5	5.228E-09	334.9
0	240.	744.989	107.8	2.833E-09	345.1
0	241.	708.713	106.7	1.024E-09	78.7
0	242.	674.765	106.5	5.392E-09	110.1
0	243.	648.917	107.	4.689E-09	270.4
0	244.	634.676	107.8	2.157E-09	45.6
0	245.	631.179	108.2	7.692E-09	1.
0	246.	633.113	107.6	1.397E-09	201.7
0	247.	632.924	105.9	1.585E-09	169.6
0	248.	623.818	103.4	1.781E-09	241.
0	249.	602.136	100.7	2.933E-09	199.5
0	250.	568.705	98.4	4.481E-09	356.3
0	251.	529.175	97.4	3.287E-09	69.1
0	252.	492.932	98.	2.663E-09	26.7
0	253.	469.534	100.	1.894E-09	112.1
0	254.	462.908	102.1	2.022E-09	70.8
0	255.	467.81	102.7	6.754E-09	168.5
0	256.	472.974	101.3	1.504E-09	145.5
0	257.	467.704	98.5	1.104E-09	338.4
0	258.	446.575	95.2	6.358E-09	34.1
0	259.	411.399	92.9	3.056E-09	37.4
0	260.	371.367	93.	3.588E-09	7.2
0	261.	340.575	96.	2.508E-09	79.2



0	262.	330.072	100.3	1.002E-09	300.3
0	263.	337.623	103.	3.387E-09	345.9
0	264.	348.925	102.4	3.428E-09	37.2
0	265.	349.203	99.2	1.968E-09	263.2
0	266.	331.128	95.3	2.377E-09	322.7
0	267.	297.084	93.	1.335E-09	316.8
0	268.	259.243	94.6	7.22E-10	221.8
0	269.	236.108	101.	1.83E-09	88.2
0	270.	238.536	107.9	1.133E-09	214.6
0	271.	256.046	110.4	4.843E-09	137.8
0	272.	268.529	108.	1.966E-09	101.2
0	273.	262.839	103.3	4.858E-09	316.3
0	274.	237.27	99.7	5.029E-09	181.1
0	275.	201.904	100.6	3.317E-09	118.
0	276.	177.538	108.9	3.6E-09	271.3
0	277.	181.707	119.3	4.875E-09	345.4
0	278.	204.865	123.3	4.765E-09	9.6
0	279.	223.409	120.6	1.352E-09	358.9
0	280.	222.694	115.1	2.349E-09	297.1
0	281.	200.964	110.8	6.747E-09	191.6
0	282.	169.224	112.4	2.437E-09	92.8
0	283.	150.649	122.9	4.74E-09	268.8
0	284.	162.678	134.3	4.653E-09	191.7
0	285.	190.839	136.9	2.469E-09	201.3
0	286.	210.703	132.7	2.535E-09	302.7
0	287.	209.657	126.3	6.307E-09	68.3
0	288.	188.092	122.1	3.047E-09	196.7
0	289.	159.328	124.8	3.232E-09	342.4
0	290.	147.835	136.1	3.593E-09	288.7
0	291.	166.321	145.8	2.863E-09	112.1
0	292.	196.094	146.2	1.534E-09	204.1
0	293.	214.581	140.8	5.089E-09	81.2
0	294.	211.61	134.	1.622E-09	230.7
0	295.	189.365	130.	4.612E-09	174.7
0	296.	162.426	133.	1.87E-10	32.1
0	297.	154.469	143.6	5.61E-09	248.4
0	298.	174.649	151.6	3.184E-09	330.1
0	299.	203.936	151.1	4.155E-09	357.7
0	300.	221.581	145.4	2.82E-09	114.3
0	301.	218.432	138.5	1.852E-09	237.2
0	302.	196.764	134.2	3.327E-09	37.9
0	303.	170.091	136.3	2.184E-09	304.2
0	304.	160.167	145.6	8.939E-10	194.5
0	305.	177.169	153.4	4.021E-09	63.1
0	306.	205.378	153.7	8.456E-10	176.8
0	307.	224.868	148.5	3.242E-09	262.4
0	308.	225.576	141.7	1.552E-09	314.4
0	309.	207.666	136.4	2.962E-09	158.7
0	310.	180.956	136.2	4.636E-09	172.7
0	311.	163.72	143.1	3.061E-09	116.9
0	312.	170.93	151.9	5.594E-09	297.6
0	313.	195.748	155.	3.493E-09	115.
0	314.	219.491	151.8	2.277E-09	5.4
0	315.	229.278	145.6	1.288E-09	180.4
0	316.	221.101	139.3	1.255E-08	260.3

0	317.	198.9	135.7	8.445E-10	273.2
0	318.	174.154	137.7	5.694E-09	178.
0	319.	163.177	145.4	3.833E-09	275.9
0	320.	174.45	152.9	1.813E-09	132.2
0	321.	198.354	154.7	2.763E-09	169.7
0	322.	219.564	151.3	3.132E-09	173.
0	323.	228.353	145.5	1.868E-09	118.3
0	324.	221.734	139.6	2.148E-09	215.2
0	325.	202.537	135.7	1.231E-09	234.9
0	326.	178.937	136.1	1.753E-09	194.4
0	327.	163.258	141.8	3.785E-09	263.2
0	328.	165.465	149.7	9.804E-09	270.1
0	329.	183.284	154.2	8.639E-10	30.4
0	330.	205.383	153.7	2.901E-09	15.7
0	331.	221.722	149.7	2.728E-09	155.3
0	332.	226.981	144.3	2.695E-09	117.3
0	333.	220.088	139.1	4.902E-09	78.9
0	334.	203.5	135.6	4.296E-09	143.9
0	335.	182.807	135.2	1.024E-09	136.6
0	336.	166.095	139.1	2.725E-09	240.4
0	337.	161.228	145.9	3.436E-09	231.1
0	338.	170.31	151.9	1.953E-09	31.9
0	339.	187.994	154.4	4.782E-09	98.3
0	340.	206.669	153.4	6.227E-09	0.0
0	341.	220.668	150.2	4.773E-09	172.
0	342.	226.996	145.8	3.929E-09	241.
0	343.	224.874	141.4	1.367E-09	331.3
0	344.	215.255	137.7	2.64E-09	143.1
0	345.	200.494	135.5	3.179E-09	29.1
0	346.	184.088	135.5	2.183E-09	352.5
0	347.	170.265	138.2	8.743E-10	133.
0	348.	163.001	143.	7.781E-09	83.2
0	349.	164.307	148.4	2.841E-09	113.7
0	350.	173.141	152.6	4.746E-09	82.8
0	351.	186.347	154.6	2.285E-09	40.7
0	352.	200.524	154.6	4.466E-09	44.3
0	353.	213.084	153.1	3.546E-09	359.4
0	354.	222.441	150.7	3.395E-09	16.9
0	355.	227.847	147.8	4.126E-09	2.4
0	356.	229.171	144.8	3.877E-09	226.4
0	357.	226.73	141.9	2.244E-09	94.
0	358.	221.141	139.4	1.061E-08	273.4
0	359.	213.211	137.4	2.427E-09	85.3

WWMI

#### GEOMETRY

Wire coordinates in degrees; other dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.218	12
		0	0	94.7		
2	none	90.	156.	0	.218	12
		90.	156.	103.2		
3	none	180.	156.	0	.218	12
		180.	156.	94.7		
4	none	2,936.11	200.17	0	.509	15
		2,936.11	200.17	127.5		
5	none	2,936.11	200.17	127.5	.509	15
		2,936.11	200.17	263.2		
6	none	2,936.11	200.17	127.5	.01	1
		2,934.11	200.24	127.5		
7	none	2,936.11	200.17	127.5	.01	1
		2,934.11	200.1	127.5		
8	none	2,936.11	200.17	127.5	.01	1
		2,940.11	200.17	127.5		
9	none	2,934.11	200.24	0	.01	15
		2,934.11	200.24	127.5		
10	none	2,934.11	200.1	0	.01	15
		2,934.11	200.1	127.5		
11	none	2,940.11	200.17	0	.01	15
		2,940.11	200.17	127.5		

Number of wires = 11  
current nodes = 117

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	8	3.99994	5	9.04667
radius	6	.01	4	.509

#### ELECTRICAL DESCRIPTION

Frequencies (MHz)

frequency			no. of steps	segment length (wavelengths)	
no.	lowest	step		minimum	maximum
1	1.38	0	1	.011111	.0251296

Sources

source	node	sector	magnitude	phase	type
1	1	1	387.915	116.5	voltage
2	13	1	1,178.54	58.3	voltage
3	25	1	880.549	320.1	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	70	0	1,000.	0	0	0

2	86	0	1,000.	0	0	0
3	102	0	1,000.	0	0	0

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#### IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.38	35.071	22.949	41.912	33.2	1.9016	-10.153	-.44093

source = 2; node 13, sector 1							
1.38	82.992	98.019	128.43	49.7	4.3477	-4.0685	-2.1601

source = 3; node 25, sector 1							
1.38	133.19	129.23	185.58	44.1	5.3604	-3.2791	-2.7571

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#### CURRENT rms

Frequency = 1.38 MHz

Input power = 6,500. watts

Efficiency = 100. %

coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	6.54686	83.3	.759364	6.50267
2	0	0	7.89167	6.61335	81.8	.943877	6.54565
3	0	0	15.7833	6.53118	80.8	1.04141	6.44762
4	0	0	23.675	6.32787	80.	1.09507	6.2324
5	0	0	31.5667	6.00987	79.4	1.1102	5.90643
6	0	0	39.4583	5.58326	78.8	1.0892	5.47599
7	0	0	47.35	5.05496	78.2	1.03359	4.94816
8	0	0	55.2417	4.43263	77.7	.944776	4.33077
9	0	0	63.1333	3.72442	77.2	.824108	3.6321
10	0	0	71.025	2.93793	76.8	.672782	2.85986
11	0	0	78.9167	2.07777	76.3	.491271	2.01886
12	0	0	86.8083	1.13844	75.9	.277503	1.1041
END	0	0	94.7	0	0	0	0
GND	-82.2191	-36.6063	0	6.49079	8.5	6.41904	.962403
14	-82.2191	-36.6063	8.6	6.97302	4.9	6.94761	.594667
15	-82.2191	-36.6063	17.2	7.15329	2.8	7.14469	.350745
16	-82.2191	-36.6063	25.8	7.14032	1.2	7.13868	.153416
17	-82.2191	-36.6063	34.4	6.94887	360.	6.94886	-5.6E-03
18	-82.2191	-36.6063	43.	6.58817	358.9	6.58691	-.128674
19	-82.2191	-36.6063	51.6	6.06755	358.	6.06369	-.216485
20	-82.2191	-36.6063	60.2	5.39756	357.1	5.39083	-.269319
21	-82.2191	-36.6063	68.8	4.58993	356.4	4.58092	-.287495
22	-82.2191	-36.6063	77.4	3.65642	355.7	3.64633	-.271442
23	-82.2191	-36.6063	86.	2.60583	355.1	2.5964	-.221426
24	-82.2191	-36.6063	94.6	1.43472	354.5	1.42821	-.136501
END	-82.2191	-36.6063	103.2	0	0	0	0
GND	-164.438	-73.2126	0	3.35632	275.9	.347663	-3.33827

26	-164.438	-73.2126	7.89167	3.6818	270.5	.0350703	-3.68163
27	-164.438	-73.2126	15.7833	3.82801	267.6	-.160124	-3.82466
28	-164.438	-73.2126	23.675	3.86437	265.4	-.307586	-3.85211
29	-164.438	-73.2126	31.5667	3.79864	263.7	-.415268	-3.77587
30	-164.438	-73.2126	39.4583	3.6352	262.3	-.485999	-3.60257
31	-164.438	-73.2126	47.35	3.37813	261.1	-.521093	-3.33769
32	-164.438	-73.2126	55.2417	3.03199	260.1	-.521478	-2.98681
33	-164.438	-73.2126	63.1333	2.60181	259.2	-.488044	-2.55563
34	-164.438	-73.2126	71.025	2.09241	258.4	-.421633	-2.04948
35	-164.438	-73.2126	78.9167	1.50658	257.6	-.322655	-1.47163
36	-164.438	-73.2126	86.8083	.839633	256.9	-.189715	-.817919
END	-164.438	-73.2126	94.7	0	0	0	0
GND	-2,756.05	1,012.39	0	.151989	162.9	-.145254	.0447433
38	-2,756.05	1,012.39	8.5	.140092	163.3	-.134158	.0403426
39	-2,756.05	1,012.39	17.	.121259	164.3	-.116718	.0328739
40	-2,756.05	1,012.39	25.5	.0997425	166.2	-.0968663	.0237798
41	-2,756.05	1,012.39	34.	.0765743	169.9	-.0753946	.0133893
42	-2,756.05	1,012.39	42.5	.0529833	177.8	-.0529457	2.E-03
43	-2,756.05	1,012.39	51.	.0317533	198.6	-.0300987	-.0101162
44	-2,756.05	1,012.39	59.5	.0238366	251.9	-7.41E-03	-.0226569
45	-2,756.05	1,012.39	68.	.0382326	292.5	.014602	-.0353343
46	-2,756.05	1,012.39	76.5	.0595401	306.5	.035422	-.0478572
47	-2,756.05	1,012.39	85.	.081069	312.3	.0545834	-.0599402
48	-2,756.05	1,012.39	93.5	.101094	315.1	.071657	-.0713111
49	-2,756.05	1,012.39	102.	.118823	316.5	.0862624	-.0817176
50	-2,756.05	1,012.39	110.5	.13375	317.2	.0980766	-.0909394
51	-2,756.05	1,012.39	119.	.145534	317.2	.106841	-.0988179
J4	-2,756.05	1,012.39	127.5	.153896	316.9	.112312	-.105213
2J1	-2,756.05	1,012.39	127.5	.179241	217.7	-.141771	-.109673
53	-2,756.05	1,012.39	136.547	.179805	220.8	-.13615	-.117443
54	-2,756.05	1,012.39	145.593	.17896	224.1	-.128583	-.124471
55	-2,756.05	1,012.39	154.64	.176303	227.3	-.119587	-.129545
56	-2,756.05	1,012.39	163.687	.171754	230.4	-.109428	-.132382
57	-2,756.05	1,012.39	172.733	.165266	233.5	-.0983694	-.132801
58	-2,756.05	1,012.39	181.78	.156832	236.4	-.0866882	-.130695
59	-2,756.05	1,012.39	190.827	.14648	239.4	-.0746703	-.126018
60	-2,756.05	1,012.39	199.873	.134273	242.2	-.0626064	-.118784
61	-2,756.05	1,012.39	208.92	.120302	245.	-.0507913	-.109054
62	-2,756.05	1,012.39	217.967	.104683	247.8	-.0395144	-.0969385
63	-2,756.05	1,012.39	227.013	.0875358	250.6	-.0290559	-.0825728
64	-2,756.05	1,012.39	236.06	.068963	253.4	-.0196804	-.0660953
65	-2,756.05	1,012.39	245.107	.0489785	256.3	-.0116301	-.0475777
66	-2,756.05	1,012.39	254.153	.0273707	259.2	-5.12E-03	-.026888
END	-2,756.05	1,012.39	263.2	0	0	0	0
2J1	-2,756.05	1,012.39	127.5	.0850356	6.6	.0844742	9.76E-03
J6	-2,752.93	1,015.07	127.5	.0852357	6.1	.0847472	9.11E-03
2J1	-2,756.05	1,012.39	127.5	.0852443	7.	.0846135	.010351
J7	-2,755.41	1,008.34	127.5	.0853886	6.5	.0848357	9.7E-03
2J1	-2,756.05	1,012.39	127.5	.0864237	349.6	.0849955	-.0156466
J8	-2,759.8	1,013.77	127.5	.0864656	349.2	.0849375	-.0161837
GND	-2,752.93	1,015.07	0	.0227748	343.1	.0217933	-6.61E-03
71	-2,752.93	1,015.07	8.5	.0115195	341.8	.0109413	-3.6E-03
72	-2,752.93	1,015.07	17.	1.72E-03	306.3	1.02E-03	-1.39E-03
73	-2,752.93	1,015.07	25.5	8.98E-03	177.5	-8.97E-03	3.89E-04
74	-2,752.93	1,015.07	34.	.019073	174.7	-.0189926	1.75E-03

75	-2,752.93	1,015.07	42.5	.0290282	174.7	-.0289031	2.69E-03
76	-2,752.93	1,015.07	51.	.0386593	175.2	-.0385257	3.21E-03
77	-2,752.93	1,015.07	59.5	.0477881	176.	-.0476734	3.31E-03
78	-2,752.93	1,015.07	68.	.0562407	177.	-.0561612	2.99E-03
79	-2,752.93	1,015.07	76.5	.0638535	178.	-.0638133	2.27E-03
80	-2,752.93	1,015.07	85.	.0704788	179.1	-.0704693	1.16E-03
81	-2,752.93	1,015.07	93.5	.0759887	180.2	-.0759881	-3.05E-04
82	-2,752.93	1,015.07	102.	.0802785	181.5	-.0802513	-2.09E-03
83	-2,752.93	1,015.07	110.5	.0832731	182.9	-.0831691	-4.16E-03
84	-2,752.93	1,015.07	119.	.0849255	184.4	-.0846772	-6.49E-03
2J2	-2,752.93	1,015.07	127.5	.0852357	186.1	-.0847472	-9.11E-03
GND	-2,755.41	1,008.34	0	.0227586	343.3	.0218043	-6.52E-03
87	-2,755.41	1,008.34	8.5	.0115108	342.	.0109459	-3.56E-03
88	-2,755.41	1,008.34	17.	1.73E-03	306.	1.02E-03	-1.4E-03
89	-2,755.41	1,008.34	25.5	8.99E-03	177.9	-8.98E-03	3.23E-04
90	-2,755.41	1,008.34	34.	.0190796	175.1	-.0190104	1.62E-03
91	-2,755.41	1,008.34	42.5	.0290377	175.	-.0289293	2.51E-03
92	-2,755.41	1,008.34	51.	.0386744	175.6	-.0385604	2.97E-03
93	-2,755.41	1,008.34	59.5	.0478112	176.4	-.0477166	3.01E-03
94	-2,755.41	1,008.34	68.	.0562741	177.3	-.0562126	2.63E-03
95	-2,755.41	1,008.34	76.5	.0638996	178.3	-.0638727	1.85E-03
96	-2,755.41	1,008.34	85.	.0705395	179.4	-.070536	6.99E-04
97	-2,755.41	1,008.34	93.5	.0760659	180.6	-.0760616	-8.05E-04
98	-2,755.41	1,008.34	102.	.0803734	181.9	-.0803305	-2.62E-03
99	-2,755.41	1,008.34	110.5	.0833871	183.2	-.0832533	-4.72E-03
100	-2,755.41	1,008.34	119.	.0850592	184.8	-.0847649	-7.07E-03
2J2	-2,755.41	1,008.34	127.5	.0853886	186.5	-.0848357	-9.7E-03
GND	-2,759.8	1,013.77	0	.024161	334.5	.0218132	-.0103892
103	-2,759.8	1,013.77	8.5	.0121488	334.2	.0109371	-5.29E-03
104	-2,759.8	1,013.77	17.	1.32E-03	317.8	9.77E-04	-8.85E-04
105	-2,759.8	1,013.77	25.5	9.62E-03	160.3	-9.06E-03	3.24E-03
106	-2,759.8	1,013.77	34.	.0203821	159.7	-.0191212	7.06E-03
107	-2,759.8	1,013.77	42.5	.0309208	160.1	-.0290747	.0105243
108	-2,759.8	1,013.77	51.	.0410478	160.7	-.0387372	.0135777
109	-2,759.8	1,013.77	59.5	.0505723	161.4	-.0479203	.0161619
110	-2,759.8	1,013.77	68.	.0593078	162.1	-.0564372	.0182281
111	-2,759.8	1,013.77	76.5	.0670805	162.9	-.0641111	.0197373
112	-2,759.8	1,013.77	85.	.0737339	163.7	-.0707799	.0206616
113	-2,759.8	1,013.77	93.5	.0791343	164.6	-.0763014	.020984
114	-2,759.8	1,013.77	102.	.0831744	165.6	-.0805576	.0206992
115	-2,759.8	1,013.77	110.5	.0857746	166.6	-.0834556	.0198102
116	-2,759.8	1,013.77	119.	.0868845	167.8	-.0849311	.0183199
2J2	-2,759.8	1,013.77	127.5	.0864656	169.2	-.0849375	.0161837