



Engineering Solutions & Electromagnetic Compatibility Services

FCC 15.231 Radiated Test Data

for

Models: Pencil, Panic, Repeater

for

Resolution Engineering

RTL Project Number 2009209

Test Engineer: Daniel Baltzell

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These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1445.

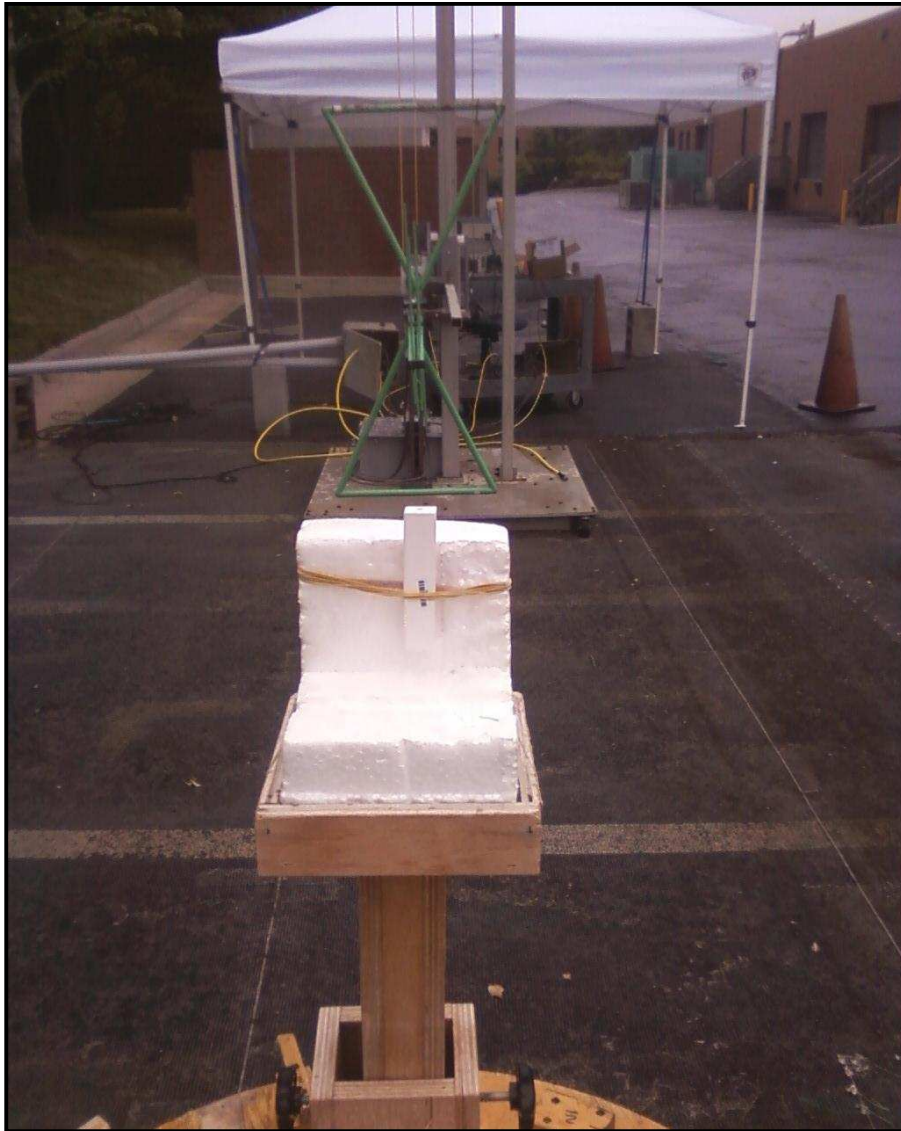
Radiated Emissions Test Data – FCC Limits / 3m Distance

Pencil 345 MHz – Horizontal Peak

Frequency (MHz)	Horizontal Peak (dBuV)	Site Correction Factor (dB/m)	Corrected Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)
345.0	102.8	-14.6	88.2	97.3	-9.1
690.0	69.5	-7.2	62.3	77.3	-15.0
1035.0	60.2	-2.5	57.7	74.0	-16.3
1380.0	51.2	2.1	53.3	74.0	-20.7
1725.0	39.7	5.4	45.1	77.3	-32.2
2070.0	36.6	-1.1	35.5	77.3	-41.8
2415.0	44.9	-0.4	44.5	77.3	-32.8
2760.0	47.6	-0.5	47.1	74.0	-26.9
3105.0	45.1	-3.2	41.9	77.3	-35.4
3450.0	57.5	-2.9	54.6	77.3	-22.7

Pencil 345 MHz – Vertical Peak

Frequency (MHz)	Vertical Peak (dBuV)	Site Correction Factor (dB/m)	Corrected Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)
345.0	104.5	-14.6	89.9	97.3	-7.4
690.0	59.8	-7.2	52.6	77.3	-24.7
1035.0	52.9	-2.5	50.4	74.0	-23.6
1380.0	49.6	2.1	51.7	74.0	-22.3
1725.0	35.6	5.4	41.0	77.3	-36.3
2070.0	33.3	-1.1	32.2	77.3	-45.1
2415.0	41.2	-0.4	40.8	77.3	-36.5
2760.0	47.4	-0.5	46.9	74.0	-27.1
3105.0	43.8	-3.2	40.6	77.3	-36.7
3450.0	56.0	-2.9	53.1	77.3	-24.2



Pencil 345 MHz Front View



Pencil 345 MHz Back View

Test Procedure

Radiated emissions of the harmonics were tested at three meters. The EUT was tested in the three orthogonal planes with the receive antenna in both polarities. The emissions were maximized per ANSI C63.4:2003 8.3.1.2; that is, the measurement antenna height was varied between 1 and 4 m, and the EUT was rotated through 360° on a rotating turntable until the maximum emissions were found. Both horizontal and vertical measurement antenna polarizations were used. A resolution bandwidth of 100 kHz was used for frequencies less than 1000 MHz, and a resolution bandwidth of 1 MHz was used for frequencies greater than or equal to 1000 MHz. The video bandwidth was set to a value at least three times greater than the resolution bandwidth.

EUT Disposition

The EUT was adapted to continuously transmit for testing purposes.

Test Equipment List

Barcode	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901516	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	10/17/09
901517	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	NA	10/17/09
901365	MITEQ	JS4-00102600-41-5P	Amplifier, 0.1-26 GHz, 30dB gain	N/A	3/4/10
900791	Chase	CBL6111B	Bilog antenna (30 MHz – 2000 MHz)	N/A	12/12/10
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9kHz-12.8GHz)	3826A00144	10/23/09
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	6/14/10
900905	Rhein Tech Labs	PR-1040	OATS 1 Preamp (30 MHz – 2 GHz)	1006	4/10/10
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 KHz – 6.5 GHz)	3325A00159	6/8/10

Note: Limit/Distance: FCC 15.231(b)/3m

Test Personnel:

Daniel W. Baltzell
 Test Engineer



Signature

June 29, 30, 2009
 Dates Of Tests