THE STANDARDS INSTITUTION OF ISRAEL

Electronics & Telematics Laboratory

Test Report No. 8712344284

For PetNovation Ltd.

Equipment Under Test:

Self-Washing cat box

Model: ***CatGenie***

FCC ID: ***VXHCATGENIE***

From The Standards Institution
Of Israel
Industry Division
Electronics & Telematics Laboratory
EMC Section

ACCREDITED

Certificate No. 1487-01

Test Report No.: 8712374736 **Page 1 of 22 pages**

Title: Test on Self-Washing cat box; FCC ID: VXHCATGENIE; Model: CatGenie

Order placed by:	PetNovation.
Address:	11 Haalita st, POB 275, Bazra, Israel
Sample for test selected by:	PetNovation.
The date of test:	January 2008

Description of Equipment Under Test (EUT):	Self-Flushing, Self-Washing Cat Box
Model:	CatGenie
Serial Number	6674288
Manufactured by:	Pet Novation.

Reference Documents:

- CFR 47 FCC: Rules and Regulations; Part 15. "Radio frequency devices";
  Subpart B: "Unintentional radiators" (2007)
  Subpart C: "Intentional radiators" (2007),
  Section 15.209. "Radiated emission limits, general requirements".
  "Radiated Emission Limits, Additional Provisions";
  Section 15.225. "Operation within the band 13.110 – 14.010 MHz".

Test Results: The EUT meets the following requirements of:

CFR 47 FCC Part 15:

Subpart B Section 15.107 (a)
Subpart B Section 15.109 (a)
Subpart C Section 15.225,
Section 15.209,
Section 15.205.

This Test Report contains 22 pages and may be used only in full.	This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.

1. Test summary

Parameter	FCC Part 15 Reference paragraph	Comply/not comply with the requirements
Radiated emission test.	Subpart B Section 15.109 Subpart C Section 15.209	Comply
Conducted emissions test	Subpart C Section 15.207	Comply
Test of field strength emission from intentional radiators	"Radiated Emission Limits, Additional Provisions"; Section 15.225.	Comply
Radiated emission from intentional radiators in restricted bands	Subpart C Section 15.205	Comply
Frequency stability test	Subpart C Section 15.225	Comply

Telematics Laboratory

January 2008

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch

Name: Michael Feldman
Position: Test Technician

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2. EUT Description and operation

2.1. General description:

* Note: the customer supplied all information in clause below.

The EUT is a self washing cat litter box. It automatically flushes solid and liquid cat waist out of consumer home. The unit also employs a cleaning solution.
During the operation of the unit the Processing Unit communicates via the RFID reader with the Detergent cartridge, it obligates the cartridge (RFID Tag) according to the dosage usage. Tag reader base on CRX14/CR14, ST Microelectronics Radio-frequency identification reader. The unit consists of a controller located within the Processing Unit. The controller consists of a programmable micro-controller that automatically turns the unit on/off a maximum four times a day. The cleaning cycle is approximately 18 minutes long and drying cycle is approximately 15 minutes long.

Type of modulation:	ASK
Antenna type:	Integrated on PCB
Data rate:	106 Kbit/s

The EUT's block diagram is shown in Figures 1
The EUT external and internal views are presented in Photos #1 and #2.

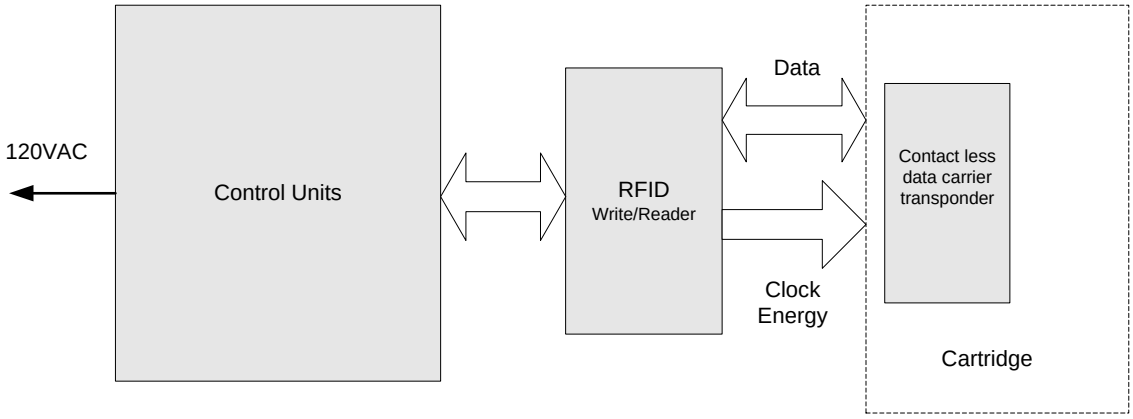


Figure 1. Transmitter block diagram.

Photo 1. EUT's external and internal view

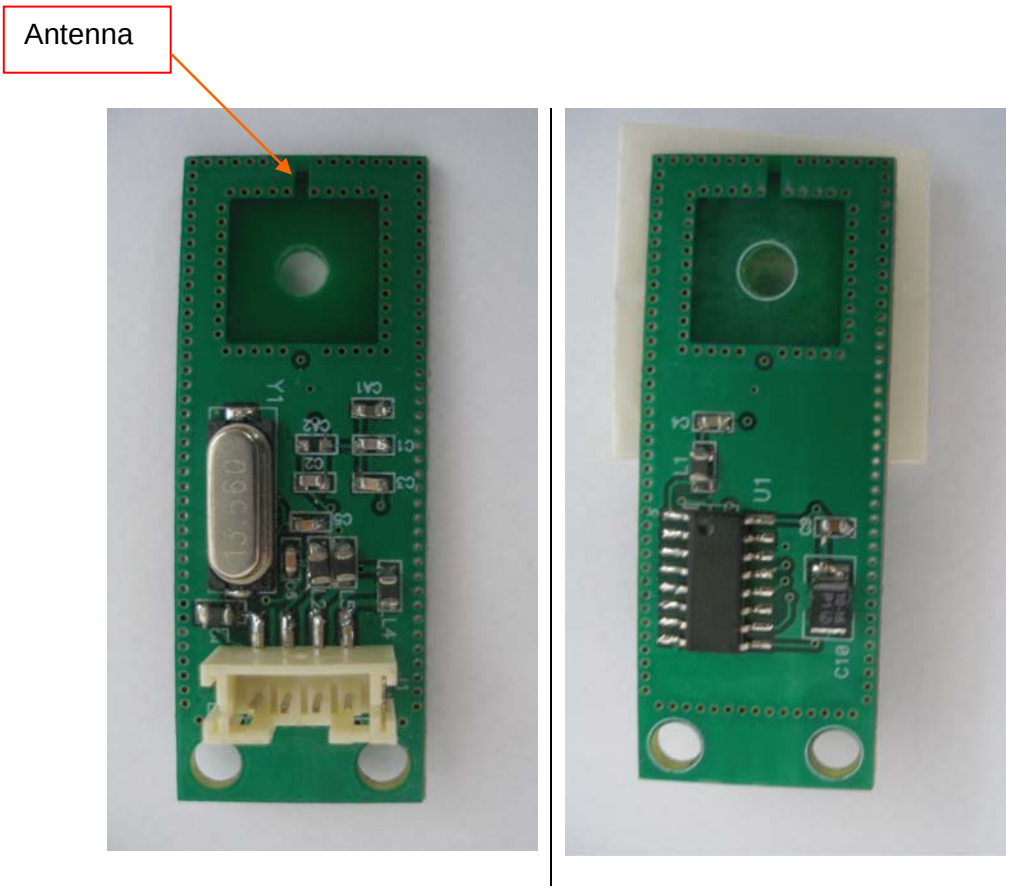


Photo # 2. Write/Reader PCB view.

Photo 3. Emissions test setup on OATS.

Photo 4. Emissions test setup on OATS.

2.2. Potential emission sources:

The potential emission sources are detailed in Table 1.

Table 1. Potential emission sources

Frequency	Location
13.56 MHz crystal	PCB
4.0 MHz crystal	Internal controller clock
13.56 MHz RF signal	Base unit

2.3. EUT setup and operation:

Measurements of transmitter were performed in continue transmition mode.

3. Measurements, examinations and derived results

3.1. Location of the Test Site:

Preliminary radiated test was conducted at the EMC laboratory of the Standards Institution of Israel in Tel-Aviv.

All other tests were conducted in an Open Area Test Site located at Kibbutz Native Halamed Hai in Emek HaEla, Israel.

3.2. Test condition:

Temperature: 20°C. Humidity: 59 %. Atmospheric pressure: 1012 mbar.

3.3. Initial visual check and functional test:

Initial visual check and brief built- in- test of the EUT was performed before testing.

- No external damages were found.
- The test on the EUT passed successfully.

3.4. Radiated emission test.

3.4.1. General:

Per FCC Part 15 subpart B Section 15.109 and subpart C Section 15.225, 15.205, 15.209

- Initial scans were made using a peak detector but still using the appropriate ANSI IF bandwidth.
- A tolerance limit was set 10 dB below the specification limit. Levels above the tolerance limit were retested using the Peak and Q. Peak detector.

3.4.2. Preliminary radiated emission tests:

Preliminary investigation measurements were performed up to tenth harmonic of fundamental in a semi-anechoic chamber at distance 3 meter. The EUT was setup in its typical configuration and operated in its various modes. For each mode of operation the frequency spectrum was monitored. EUT configuration, cable configuration and mode of operation, which produced the maximum level of emission, were documented. A list of frequencies to be tested was prepared.

3.4.3. Final measurements procedure:

The final radiated emission measurements were performed at the Open Area Test Site at the same (3 m) test distance. The EUT was operated as described above. The EUT was installed on a turn - table. Measurements were performed with active loop antenna at frequencies below 30 MHz and with Biconilog 30 MHz-2 GHz antenna above 30 MHz up to 10^{th} harmonic of fundamental. The measurements were performed at each frequency that founded previously at which the signal level was 10 dB below the limit or less. The levels were maximized by rotating turntable through 360° and changing antenna-to-EUT polarization from vertical to horizontal. The worse case result was noted in tables.

3.4.4. Radiated emission test results:

All received emissions from the EUT were found below FCC Part 15 Subpart B Section 15.109 and Subpart C sections 15.209 and 15.225.
Final result measurements in transmit mode are presented in tables #2, #3 in section 3.5.5.

3.5. Test of field strength emission from intentional radiator.

3.5.1. General:

Per FCC Part 15 Subpart C section 15.225.

3.5.2. Requirements:

The EUT's operation frequency is 13.56 MHz.
The field strength emissions from intentional radiators operated on this frequency shall comply with the limit of section 15.225 (a).

Emission frequency MHz	Specified Field Strength limit of Fundamental (μV/m)@30m	Calculated Field Strength limit dB (μV/m)@3m
13.553 – 13.567	15,848	124.0

Note: Field strength limit was calculated with 40 dB/decade linear distance extrapolation factor.

The field strength of any emissions outside of the 13.110 – 14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

3.5.3. Test procedure:

The test was conducted according to clause 15.225.

3.5.4. Test summery:

The tested unit meets the standard requirement.

3.5.5. Test results:

Table # 2. Fundamental frequency test result

Carrier frequency MHz	Peak Amplitude dB (μV/m)	Limit@ 3m dB (μV/m)
13.564	43.9	124.0

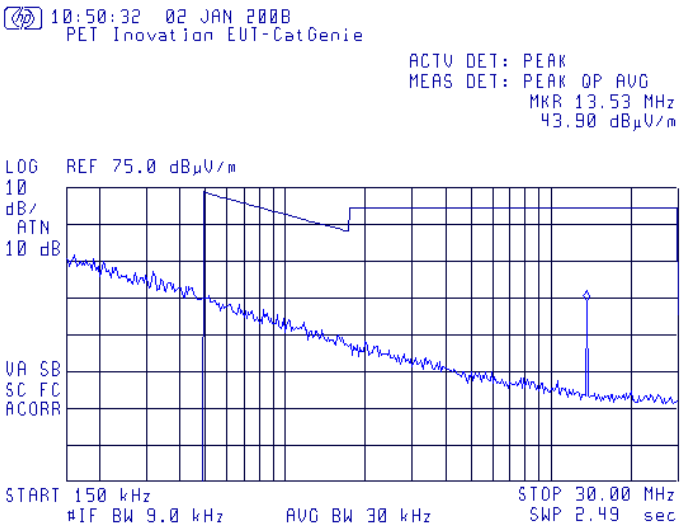
For recorded Fundamental frequencies result see plots #1.
All received radiated emissions results were found below the § 15.209 specified limit. Founded spurious emissions results presented in table below.

Spurious emissions test result.

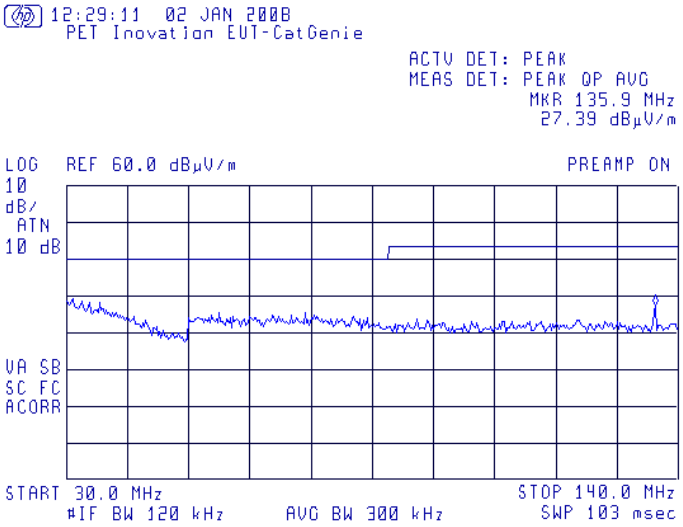
Table # 3. Spurious emissions test result

Freq. MHz	Peak Ampl dB (μV/m)	Peak limit dB (μV/m)	Margin dB	QP-Ampl dB (μV/m)	Specified @3m limit, dB (μV/m)	Margin dB
135.63	30.0	63.5	33.5	26.5	43.5	17.0

Preliminary scan of spurious emissions present in plot #1 and 2



Plot # 1. Field strength of fundamental frequency 13.56 MHz.



Plot # 2. Preliminary scan 30 – 140 MHz. Test distance =3m.

3.6. AC main conducted emissions test

Per FCC Part 15 subpart B Section 15.207

Test configuration:

The EUT was placed on a non-metallic table in a shielded chamber at a height of 80 cm from the floor and 40 cm from the vertical ground plane (wall) of the t chamber.

3.6.1. Test procedure:

The EUT was operated to transmitting through the customer software.
First, initial scans were performed. Final measurements were performed at the frequencies where emission exceeded the tolerance limit.

Test equipment (EMI receiver) setup was as follow:

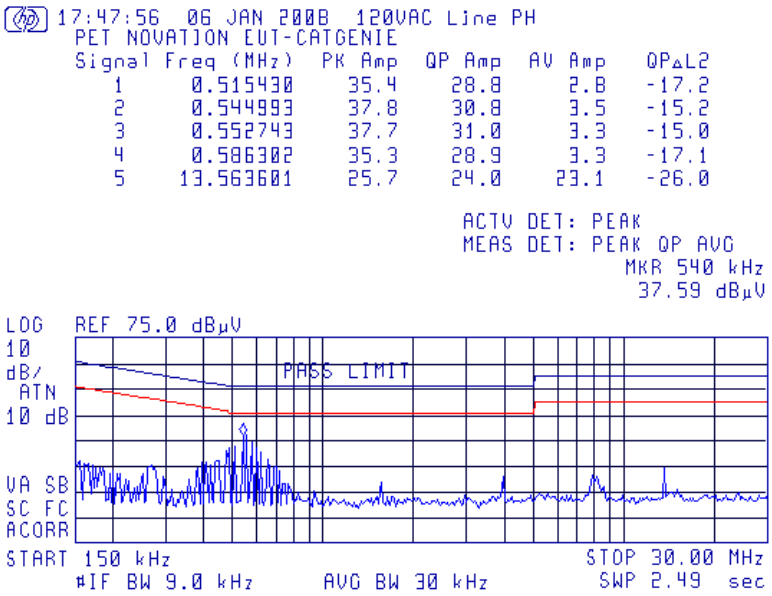
Initial scan:	
Detector type	Peak
Mode	Max hold
Bandwidth	9 kHz
Step size	Continuous sweep
Sweep time	>100 msec

Measurements:	
Detector type	Quasi-peak (CISPR)
Bandwidth	9 kHz
Observation	>15 seconds

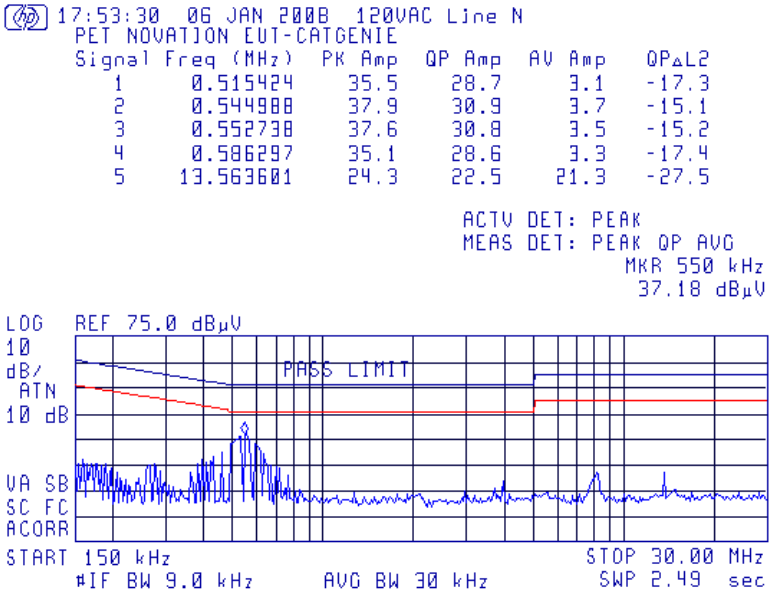
3.6.2. Test results:

All received emissions from EUT were found below FCC Part 15.207 limits (see Plots #3-#4 below).

The worst result measured on Phase line at 0.552 MHz with Quasi peak detector was found 15 dB below the AVG limit.



Plot # 3. Tested line Phase



Plot # 4. Tested line Neutral

3.7. Test of radiated emissions from unintentional radiator

Per FCC Part 15 subpart B Section 15.109

3.7.1. Test procedure:

The EUT was operated to transmitting through the customer software. First, initial scans were performed. Final measurements were performed according to clause 3.4.3.

Initial scan:	
Detector type	Peak
Mode	Max hold
Bandwidth	120 kHz
Step size	Continuous sweep
Sweep time	>1 seconds/MHz

Measurements:	
Detector type	Quasi-peak (CISPR)
Bandwidth	120 kHz
Measurement time	20 seconds/MHz
Observation	>15 seconds

3.7.2. Radiated emission test results:

All received emissions from EUT were found below FCC Part 15 class B limits and presented in table # 4 below.

Table 4. Radiated emission test results
Subpart B class B 3m distance.

Frequency (MHz)	Antenna Polariz. V/H	Antenna Height (m)	Turn-table Angle (°)	Emission Level Note 1 (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Results
149.2	V	1.0	90	27.9	43.5	15.6	Complies
162.8	V	1.0	76	29.1	43.5	14.4	Complies
176.3	V	1.0	82	28.8	43.5	14.7	Complies
203.5	V	1.0	251	33.1	43.5	10.4	Complies
217.0	V	1.0	222	35.6	46.0	10.4	Complies
230.6	V	1.0	237	31.7	46.0	14.3	Complies

Note 1: Emission level = E Reading (dBμV) + Cable loss (dB) + Antenna Factor (dB/m)
For Cable Loss and Antenna Factor refer to Appendix 2

3.8. Frequency stability test according to 15.225

Table 5. Frequency stability test result

TEST CONDITIONS		Carrier frequency, MHz	Frequency deviation Hz
Test temperature	Test voltage(AC)		
+20°C	Vmin (102)	13.564063	-2
	Vmax (138)	13.564061	-4
0°C	Vnom (120)	13.564087	+22
+10°C	Vnom (120)	13.564072	+7
+20°C	Vnom (120)	13.564065	0
+30°C	Vnom (120)	13.564043	-22
+40°C	Vnom (120)	13.564028	-37
+50°C	Vnom (120)	13.564021	-44
Maximum measured deviation		-44.0 Hz	

3.8.1. Test procedure

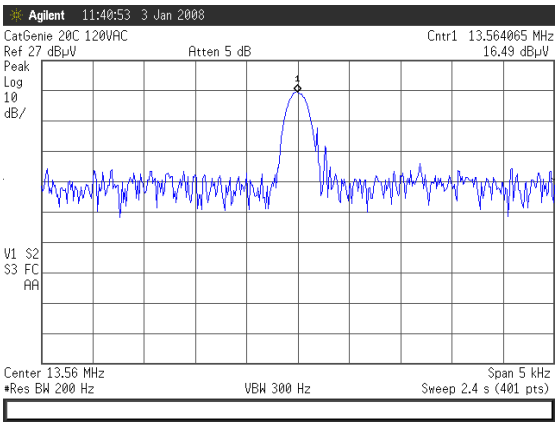
The EUT was placed in a climatic chamber and allowed to stabilize at 20ºC temperature and nominal voltage for at list 15 min. The reference carrier frequency was taken. The input voltage was changed from 85% of nominal to 115%. Frequency changes were noted. The temperature in climatic chamber was varied from 0ºC to +50ºC. Measured changes of frequencies were noted in table #5 above and present in plots #10 - #17.

3.8.2. Requirements:

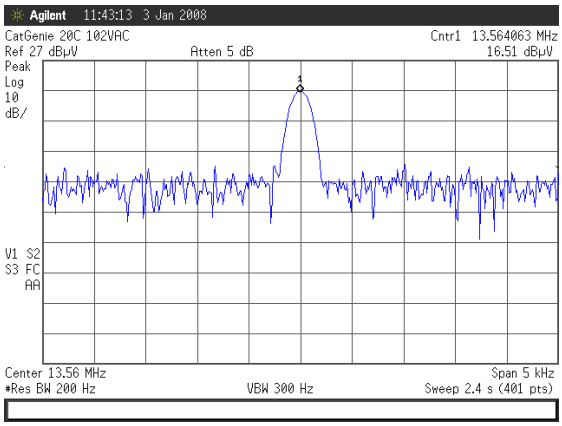
The EUT intended for operation in normal indoor condition
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency (1.356 kHz) over a temperature variation of 0 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage.

3.8.3. Test result:

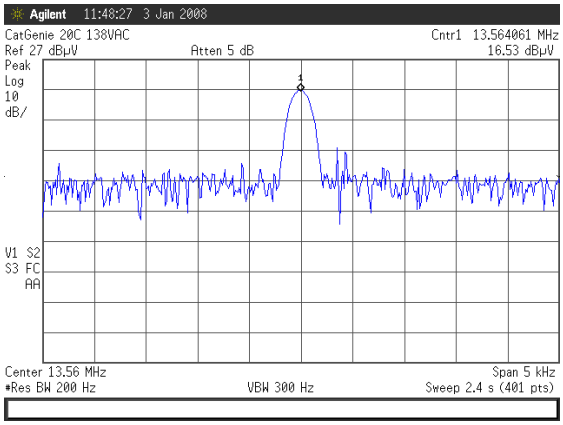
The tested unit meets the standards requirements.



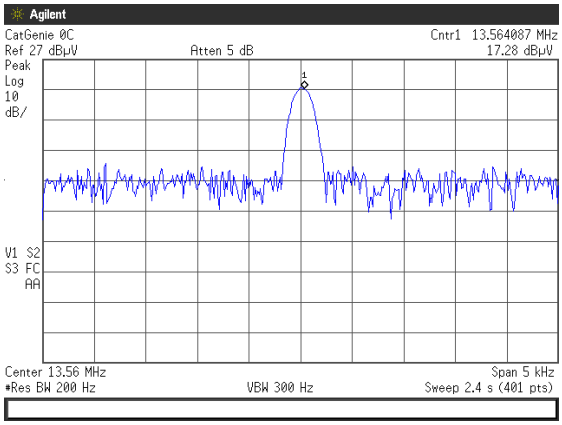
Plot # 5.



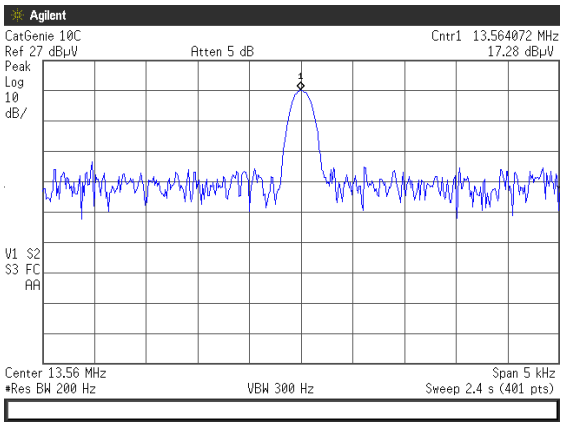
Plot # 6.



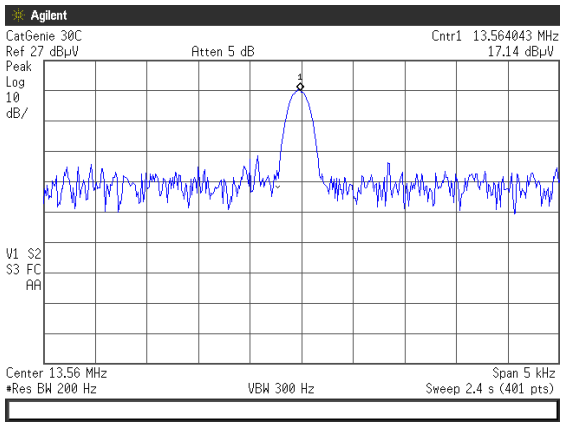
Plot # 7.



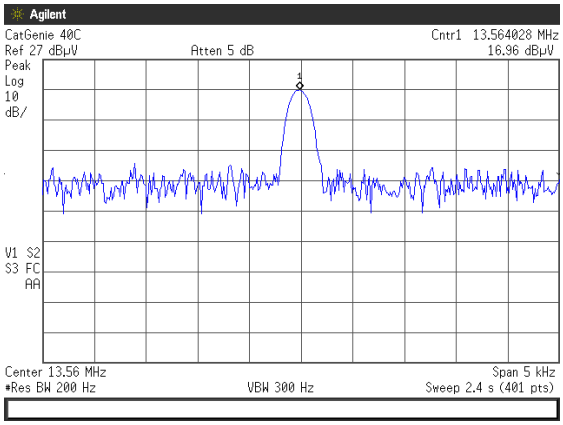
Plot # 8.



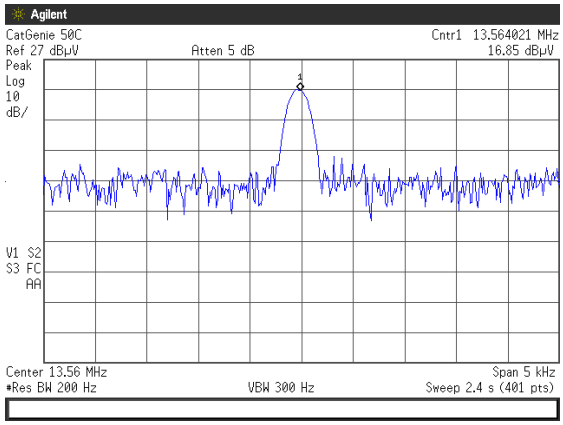
Plot # 9.



Plot # 10.



Plot # 11.



Plot # 12.

4. Appendix 1. Test equipment used

All measurements equipment is on SII calibration schedule with a recalibration interval not exceeding one year.

Instrument	MFR	Model	Serial No.	Due calibration date
EMI Receiver 9 kHz – 6.5 GHz	HP	8546A+85460 A	SII 4068	March 2008
Active Loop Antenna 10 kHz – 30 MHz	EMCO	6502	3283	March 2008
Antenna Biconilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 23181	May 2008
EMI Analyser 9 kHz - 26.5 GHz	HP	E7405A	SII 4944	Oct.2008
LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	March 2008
Transient limiter 0.009-200 MHz	HP	11947A	3107105	March 2008
Oscilloscope	HP	54610B	US37340682	May 2008
RF cable, 3m	Sucoflex	104PE	21328/4PE	Oct 2008
Antenna Mast	R&S	HCM	100002	N/A
Metallic turntable	R&S	HCT12	100001	N/A
Positioning controller	R&S	HCC	100002	N/A

5. Appendix 2: Antenna Factor and Cable Loss

Table 6. Cables #8 and #10 loss (10m cable + Mast).

Point	Frequency (MHz)	Cable Loss (dB)	Point	Frequency (MHz)	Cable Loss (dB)
1	30	0.53	21	1000	3.68
2	50	0.75	22	1100	3.82
3	100	1.08	23	1200	4.07
4	150	1.39	24	1300	4.24
5	200	1.61	25	1400	4.43
6	250	1.752	26	1500	4.6
7	300	2.00	27	1600	4.7
8	350	2.15	28	1700	4.85
9	400	2.26	29	1800	4.98
10	450	2.383	30	1900	5.19
11	500	2.52	31	2000	5.34
12	550	2.606	32	2100	5.51
13	600	2.75	33	2200	5.69
14	650	2.856	34	2300	5.89
15	700	3.06	35	2400	6.07
16	750	3.20	36	2500	6.22
17	800	3.27	37	2600	6.28
18	850	3.38	38	2700	6.41
19	900	3.46	39	2800	6.53
20	950	3.55	40	2900	6.84

Table 7. Antenna Factor

For Biconilog Antenna, Model Number: CBL 6112D, S/N: 23181

No.	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m
1	30	17.90	170	9.40	530	17.70	1040	22.20
2	32	16.70	175	9.00	540	18.25	1060	22.50
3	34	15.55	180	8.50	550	18.60	1080	22.50
4	36	14.35	185	8.45	560	14.45	1100	22.40
5	38	13.30	190	8.60	570	18.40	1120	22.60
6	40	12.20	195	8.85	580	18.50	1140	22.45
7	42	11.05	200	8.95	590	18.60	1160	22.50
8	44	9.95	205	8.80	600	18.60	1180	22.40
9	46	8.90	210	8.50	610	18.80	1200	22.80
10	48	8.05	215	8.20	620	18.99	1220	22.95
11	50	7.30	220	8.50	630	19.05	1240	23.10
12	52	6.80	225	9.00	640	19.23	1260	23.40
13	54	6.45	230	9.65	650	19.10	1280	23.35
14	56	6.00	235	10.30	660	19.13	1300	23.62
15	58	5.70	240	11.00	670	19.04	1320	23.64
16	60	5.45	245	11.60	680	19.00	1340	23.86
17	62	5.30	250	12.00	690	19.17	1360	23.95
18	64	5.20	255	12.45	700	19.28	1380	23.90
19	66	5.30	260	12.85	710	19.25	1400	24.45
20	68	5.30	265	12.50	720	19.45	1420	24.74
21	70	5.35	270	12.45	730	19.75	1440	24.93
22	72	5.50	275	12.40	740	19.95	1460	25.03
23	74	5.80	280	12.55	750	20.07	1480	25.45
24	76	6.00	285	12.65	760	19.85	1500	25.30
25	78	6.60	290	12.75	770	19.80	1520	25.25
26	80	6.70	295	12.95	780	19.85	1540	25.36
27	82	7.15	300	13.00	790	19.95	1560	25.58
28	84	7.60	310	13.35	800	20.05	1580	25.50
29	86	8.10	320	13.75	810	20.10	1600	25.65
30	88	8.50	330	13.85	820	20.35	1620	25.60
31	90	8.90	340	14.10	830	20.40	1640	25.70
32	92	9.20	350	14.50	840	20.35	1660	25.83
33	94	9.75	360	14.70	850	20.46	1680	25.97
34	96	9.95	370	14.90	860	20.39	1700	26.10
35	98	10.20	380	15.10	870	20.29	1720	26.25
36	100	10.50	390	15.45	880	20.24	1740	26.04
37	105	11.25	400	16.00	890	20.35	1760	26.14
38	110	11.70	410	16.40	900	20.55	1780	26.20
39	115	11.70	420	16.70	910	20.45	1800	26.40
40	120	11.80	430	16.35	920	20.60	1820	26.64
41	125	11.80	440	16.30	930	20.60	1840	26.86
42	130	11.70	450	16.30	940	20.66	1860	27.12
43	135	11.35	460	16.70	950	20.88	1880	27.00
44	140	10.95	470	17.05	960	21.11	1900	27.25
45	145	10.35	480	17.20	970	20.93	1920	27.36
46	150	10.05	490	17.30	980	21.03	1940	27.68
47	155	9.70	500	17.40	990	21.05	1960	27.10
48	160	9.70	510	17.50	1000	21.10	1980	27.06
49	165	9.45	520	17.60	1020	21.40	2000	27.25

Antenna Factor
Double Ridged Guide Antenna mfr EMCO model 3115 1m calibration

Point	Frequency (MHz)	Antenna Factor (dB/m)
1	1000	23.9
2	2000	28.3
3	3000	31.0
4	4000	33.1
5	4500	32.5
6	5000	32.4
7	6000	53.7
8	6500	35.6
9	7000	36.4
10	7500	36.9
11	8000	37.0
12	8500	38.0
13	9000	38.6
14	9500	38.4
15	10000	38.4
16	10500	38.4
17	11000	38.9
18	11500	39.6
19	12000	39.4
20	12500	39.2
21	13000	40.3
22	13500	41.0
23	14000	41.2
24	14500	41.3
25	15000	40.0
26	15500	38.0
27	16000	38.1
28	16500	40.3
29	17000	42.2
30	17500	44.6
31	18000	46.2

Cable Loss
Type: Sucoflex 104PE; Ser.No.21328/4PE; 3 m length

Point	Frequency (GHz)	Cable Loss (dB)
0	0.0-1.8	1.67
1	1.8 – 3.6	2.39
2	3.6 – 5.4	3.04
3	5.4-7.2	3.58
4	7.2-9.0	4.06
5	9.0-10.8	4.49
6	10.8-12.6	4.91
7	12.6-14.4	5.31
8	14.4-16.2	5.66
9	16.2-18.00	6.01