



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Portable Navigation Device

Model: RN5 (NS-4102), RN5 (NS-4102F), RN5 (NS-4102B)

Trade Name: RoyalTek

Issued to

**RoyalTek Company Ltd.
4F, No.188 Wen Hwa 2nd Rd., Kuei Shan,
Tao Yuan 33383, Taiwan, R.O.C.**

Issued by

**Compliance Certification Services Inc.
No. 11, Wu-Gong 6th Rd., Wugu Industrial Park,
Taipei Hsien 248, Taiwan (R.O.C.)
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TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION	3
2. EUT DESCRIPTION	4
3. TEST METHODOLOGY	5
3.1 EUT CONFIGURATION	5
3.2 EUT EXERCISE	5
3.3 GENERAL TEST PROCEDURES	5
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS	6
3.5 DESCRIPTION OF TEST MODES	7
4. INSTRUMENT CALIBRATION	8
4.1 MEASURING INSTRUMENT CALIBRATION	8
4.2 MEASUREMENT EQUIPMENT USED	8
4.3 MEASUREMENT UNCERTAINTY	9
5. FACILITIES AND ACCREDITATIONS	10
5.1 FACILITIES	10
5.2 EQUIPMENT	10
5.3 TABLE OF ACCREDITATIONS AND LISTINGS	11
6. SETUP OF EQUIPMENT UNDER TEST	12
6.1 SETUP CONFIGURATION OF EUT	12
6.2 SUPPORT EQUIPMENT	12
7. FCC PART 15.239 REQUIREMENTS	13
7.1 20 DB BANDWIDTH	13
7.2 BAND EDGES MEASUREMENT	16
7.3 RADIATED EMISSIONS	19
7.4 POWERLINE CONDUCTED EMISSIONS	25
APPENDIX I PHOTOGRAPHS OF TEST SETUP	28



1. TEST RESULT CERTIFICATION

Applicant: RoyalTek Company Ltd.
 4F, No.188 Wen Hwa 2nd Rd., Kuei Shan,
 Tao Yuan 33383, Taiwan, R.O.C.

Equipment Under Test: Portable Navigation Device

Trade Name: RoyalTek

Model: RN5 (NS-4102), RN5 (NS-4102F), RN5 (NS-4102B)

Date of Test: November 27 ~ December 16, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.4: 2003** and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and 15.239.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Reviewed by:

Rex Lai
 Section Manager
 Compliance Certification Services Inc.

Amanda Wu
 Section Manager
 Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Portable Navigation Device				
Trade Name	RoyalTek				
Model	RN5 (NS-4102), RN5 (NS-4102F), RN5 (NS-4102B)				
Model Discrepancy	All the specification and layout are identical except they come with different model numbers for marketing purposes.				
Power Supply		Trade Name	Model	I/P	O/P
	Power Adapter	PHIHONG	PSAA05A-050	100-240V, 200mA, 50-60Hz, 13-20VA	5V, 1A LPS
	Car Charge	L&K	G12PCL-549-0041	DC 10.8-30V	DC 5V, 1.0A
	Car Charge	NASA	GER-2MK-D	DC 10.8-30V	DC 5V, 1.0A
Accessory Type	Cradle x 1 USB Cable Type: Unshielded, 1.8m (Detachable) x 1 Unshielded, 1.1m (Detachable) x 1 (RTA-3000) Earphone Cable Type: Unshielded, 1.8m (Detachable) x 1 IR Cable Type: Unshielded, 1.5m (Detachable) x 1				
Operate Frequency	88.2 ~ 107.8 MHz				
Number of Channels	197 Channels				
Channel Spacing	100kHz				
Transmit Power	46.78 dBuV/m				
Modulation Technique	FM				

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. The product is a Transmitter. This submittal(s) (test report) is intended for **RCCNS-4102** filing to comply with Section 15.239 of the FCC Part 15 Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47 Part 15.239 Subpart C.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.239 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4: 2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions

The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSIC63.4: 2003.



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



3.5 DESCRIPTION OF TEST MODES

The EUT (model: RN5 (NS-4102)) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

Channel Low (88.2 MHz) · Mid (98.0 MHz) and High (107.8 MHz) was chosen for full testing.

Download the audio signal (MP3 songs) to the device, and then play MP3 songs during the 20% BW test and the volume of audio was tuned to the max during the test.

The tuning controls were manually adjusted to verify maximum tuning range.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	02/24/2009
Power Meter	Agilent	E4416A	GB41291611	04/06/2009
Power Sensor	Agilent	E9327A	US40441097	06/19/2009

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	09/10/2009
Test Receiver	Rohde&Schwarz	ESCI	100064	11/29/2009
Switch Controller	TRC	Switch Controller	SC94050010	05/03/2009
4 Port Switch	TRC	4 Port Switch	SC94050020	05/03/2009
Horn-Antenna	TRC	HA-0502	06	06/04/2009
Horn-Antenna	TRC	HA-0801	04	06/19/2009
Horn-Antenna	TRC	HA-1201A	01	08/11/2009
Horn-Antenna	TRC	HA-1301A	01	08/11/2009
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/28/2009
Loop Antenna	EMCO	6502	8905/2356	05/29/2009
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC MRA: TW1039 IC: 2324G-1 / -2	10/17/2009 11/04/2010
Test S/W	LABVIEW (V 6.1)			

Powerline Conducted Emission Room #3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	845552/030	04/08/2009
LISN	R&S	ENV216	100074	12/03/2009
LISN	FCC	FCC-LISN-50/ 250-16-2-07	06013	10/12/2009
Test S/W	LabVIEW 6.1 (CCS Conduction Test SW Version_01)			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission # 3	+/- 1.7806
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	+/-3.7046
3M Semi Anechoic Chamber / Above 1GHz	+/-3.0958

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

Remark: The conducted emissions test items was tested at Compliance Certification Services Inc. (Linkou Lab.) The test equipments were listed in page 8 and the test data, please refer page 26-27.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT




Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

For Wugu Lab

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC	DELL	PP05L	7T390 A03	E2K5HCKT	RS232 Cable: Unshielded, 1.0m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	Test Kit	N/A	N/A	N/A	N/A	N/A	N/A

For Luchu Lab

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	PC	HP	DX-6120	SGH53102TR	FCC DoC	N/A	Unshielded, 1.8m
2.	LCD Monitor	DELL	2408WFB	CN-0NN792-74261-849 -15ES	FCC DoC	Shielded, 1.8m with two cores	Unshielded, 1.8m
3.	Modem	ACEEX	DM-1414	304012265	IFAXDM1414	Unshielded, 1.8m	Unshielded, 1.8m
4.	Printer	EPSON	STYLUS C60	DR3K043129	FCC DoC	Unshielded, 1.8m	Unshielded, 1.8m
5.	PS/2 Keyboard	Logitech	Y-SJ17	SYU13518342	FCC DoC	Unshielded, 1.8m	N/A
6.	PS/2 Mouse	Logitech	M-SBF69	HCA51603814	FCC DoC	Unshielded, 1.8m	N/A

Remark:

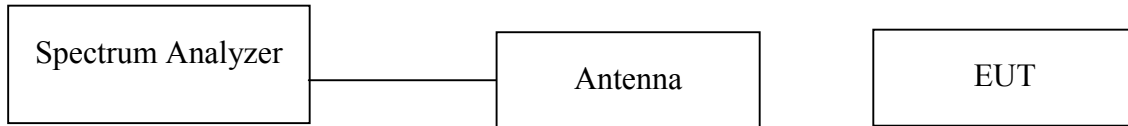
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



7. FCC PART 15.239 REQUIREMENTS

7.1 20 dB BANDWIDTH

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10kHz, VBW = RBW, Span = 200kHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

Test Data

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low	88.20	173.1
Mid	98.00	172.1
High	107.80	174.1



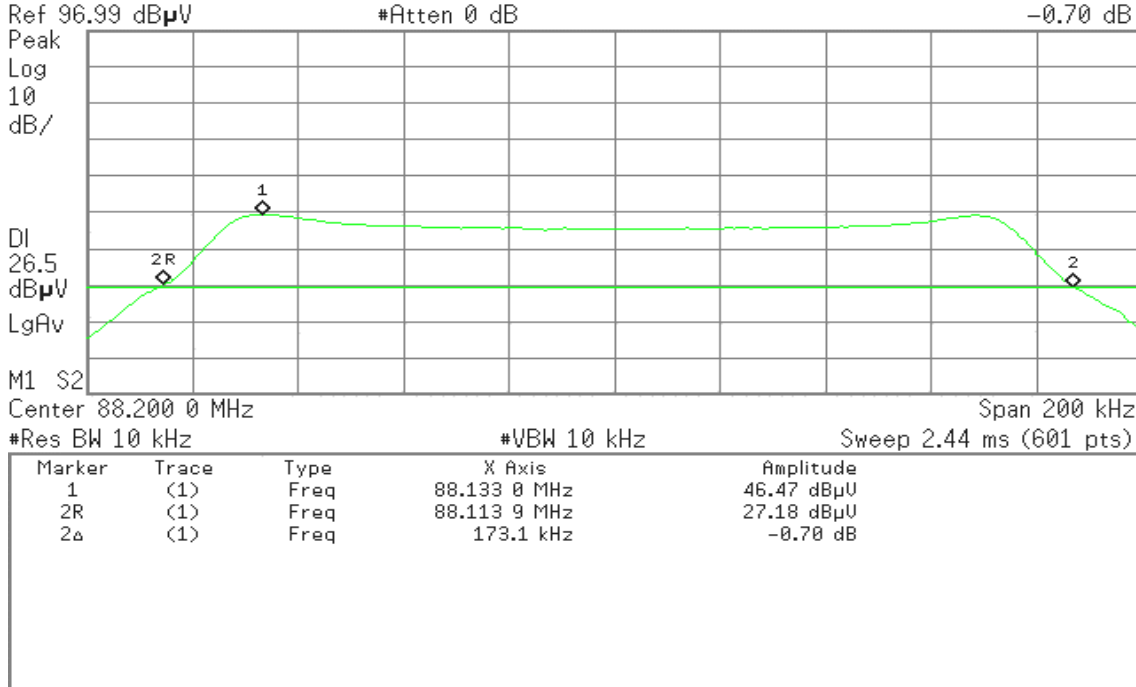
Test Plot

CH Low

Agilent 13:45:47 Dec 16, 2008

T

Mkr2 173.1 kHz -0.70 dB

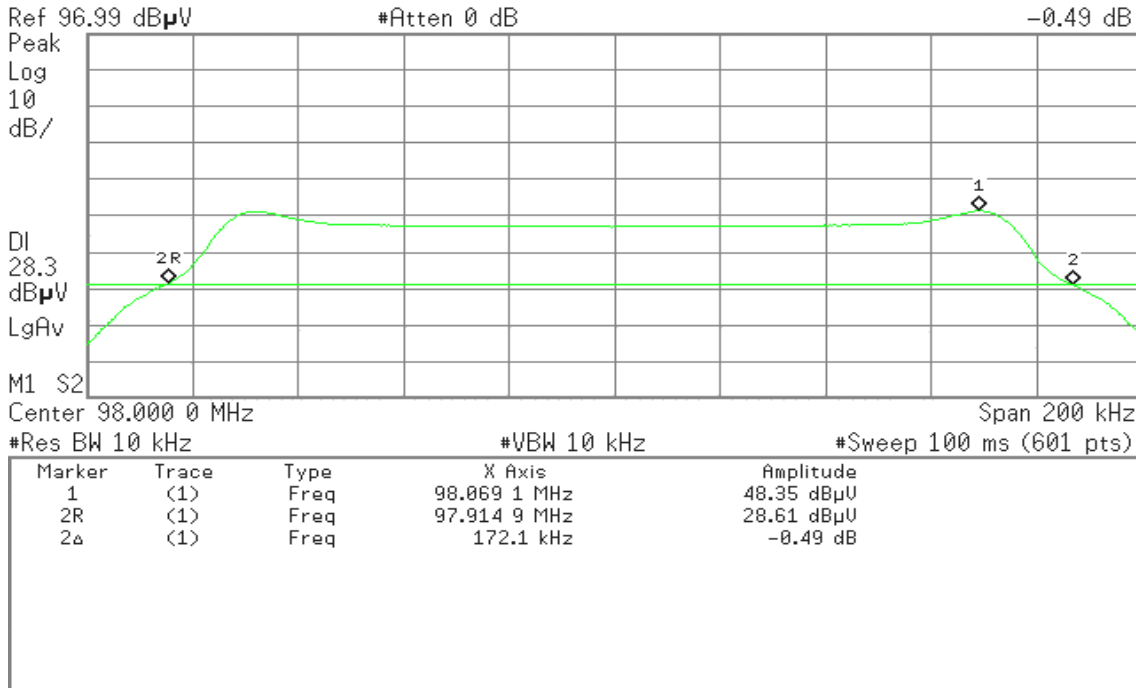


CH Mid

Agilent 13:53:03 Dec 16, 2008

T

Mkr2 172.1 kHz -0.49 dB





CH High

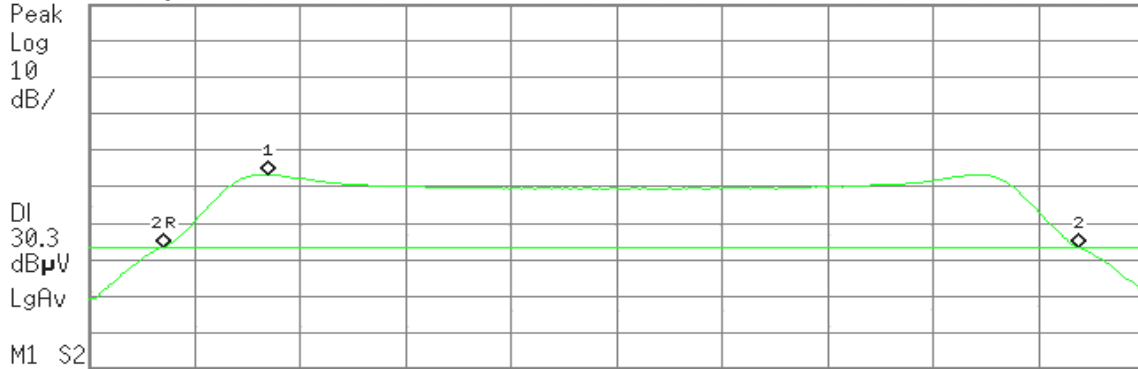
Agilent 13:39:38 Dec 16, 2008

T

Mkr2 174.1 kHz
0.24 dB

Ref 96.99 dB μ V

#Atten 0 dB



Center 107.800 0 MHz

Span 200 kHz

#Res BW 10 kHz

#VBW 10 kHz

Sweep 2.44 ms (601 pts)

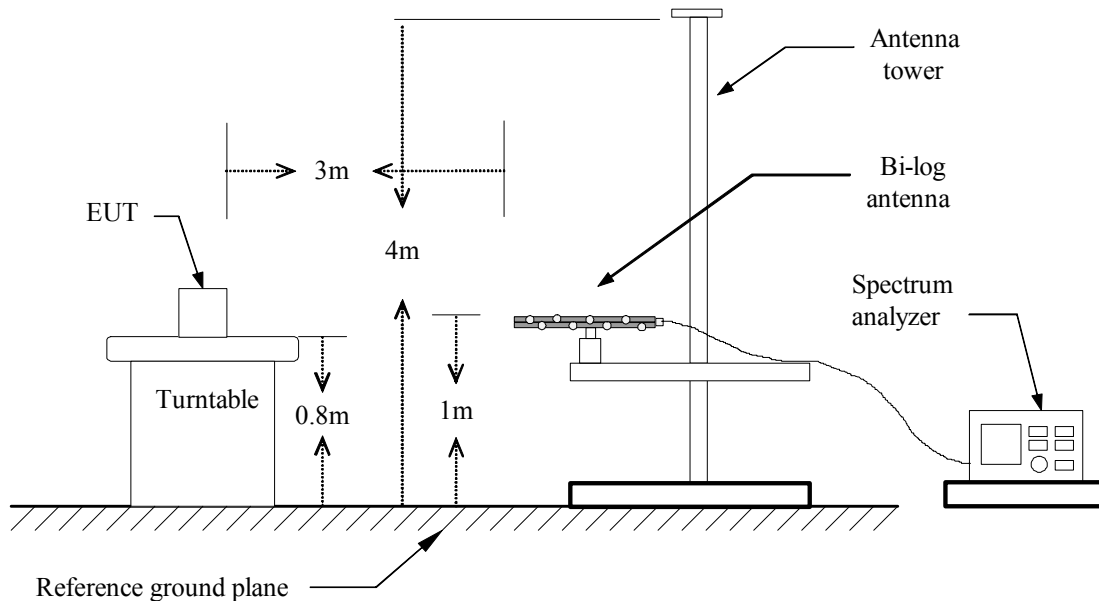
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	107.733 7 MHz	50.33 dB μ V
2R	(1)	Freq	107.713 6 MHz	30.18 dB μ V
2 Δ	(1)	Freq	174.1 kHz	0.24 dB

7.2 BAND EDGES MEASUREMENT

LIMIT

According to §15.239(a), emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.

Test Configuration



TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal form an external generator.
2. Position the EUT as shown in figure 1 and measurement the turn on the EUT. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 10kHz and 100kHz respectively with a convenient frequency span including 200kHz bandwidth of the emission.
4. Mark the bandwidth of 200kHz points and plot the graph on spectrum analyzer.
5. Repeat the procedures until all measured frequencies were complete.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

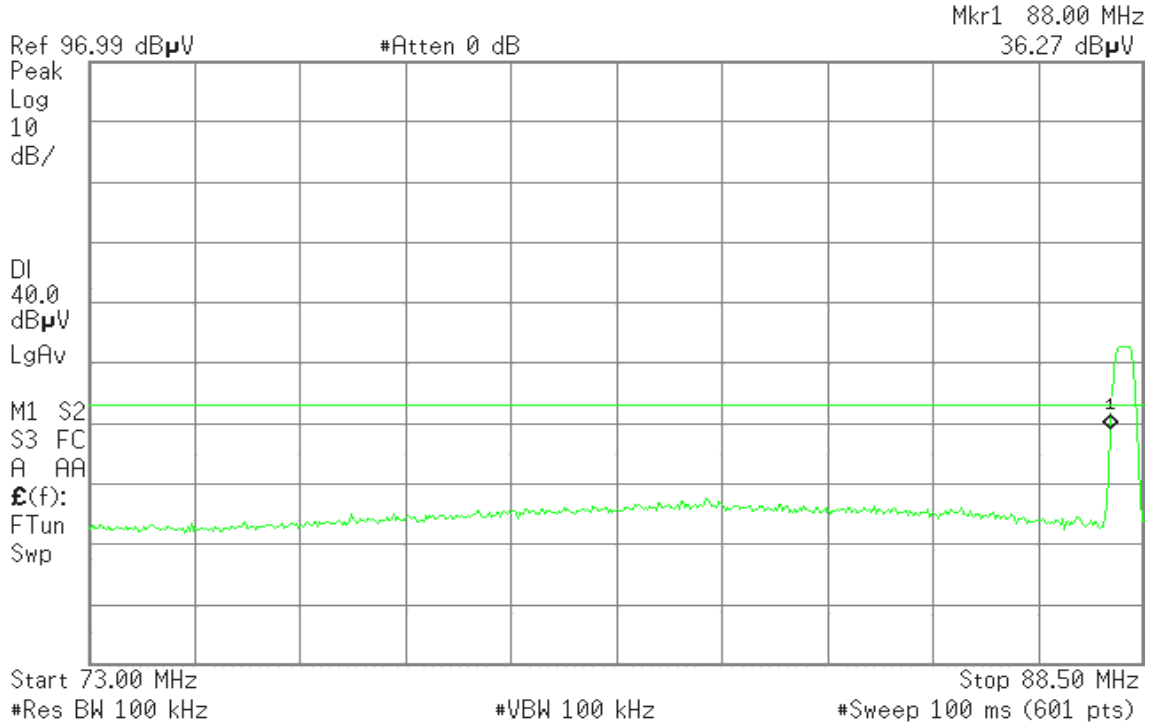


Band Edges (CH Low)

Polarity: Vertical

Agilent 11:48:08 Dec 16, 2008

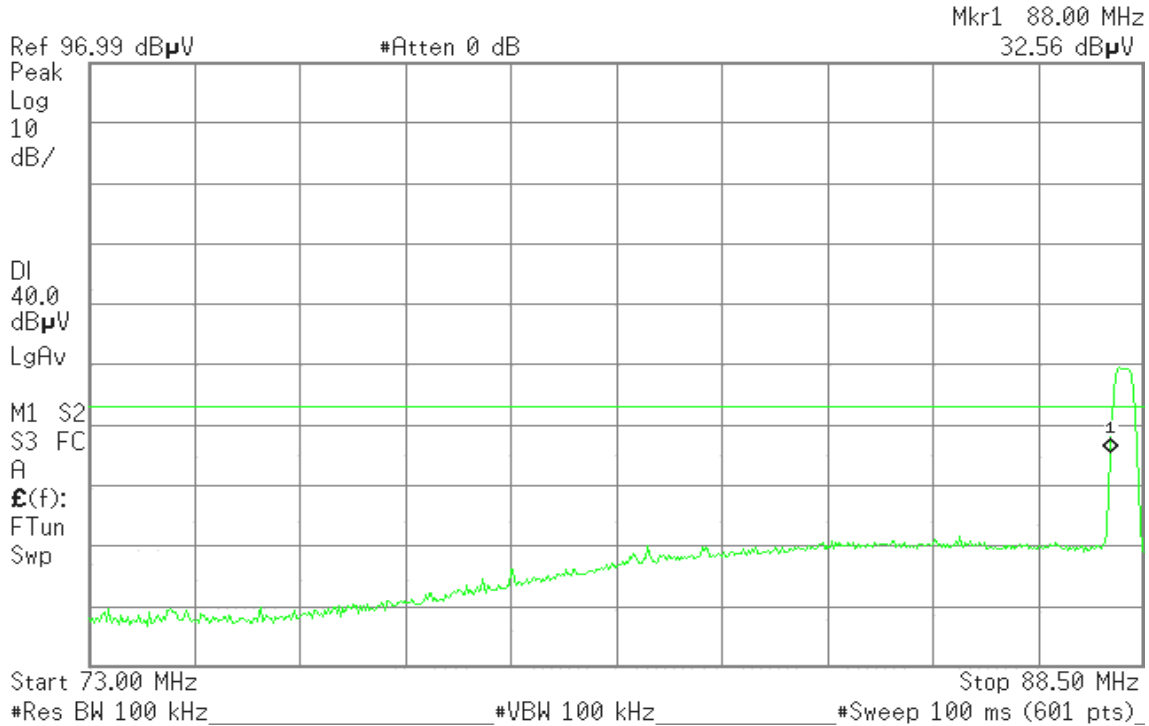
T



Polarity: Horizontal

Agilent 13:47:30 Dec 16, 2008

T



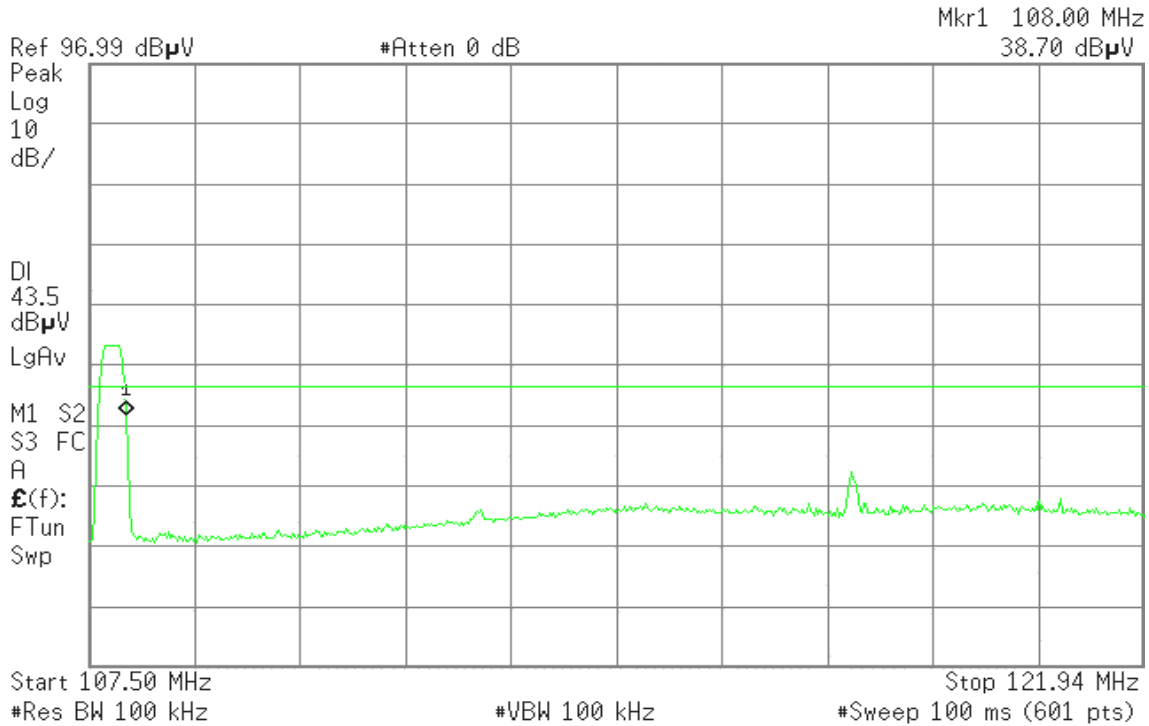


Band Edges (CH High)

Polarity: Vertical

Agilent 13:35:34 Dec 16, 2008

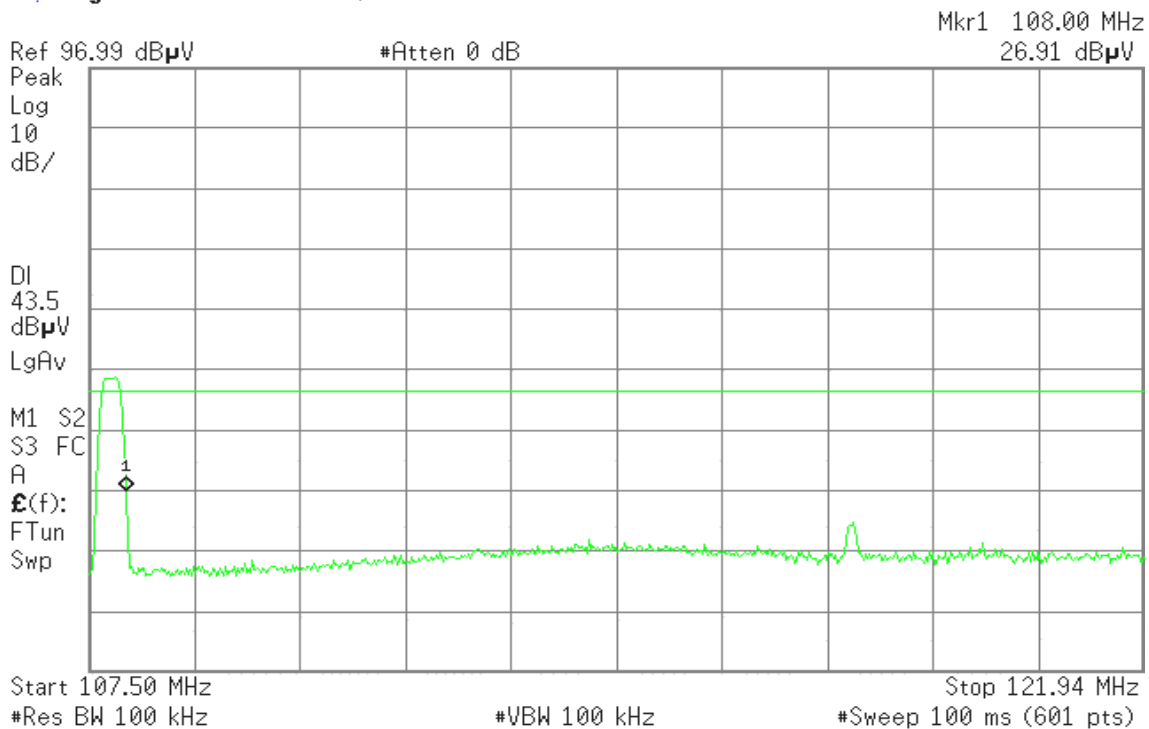
T



Polarity: Horizontal

Agilent 13:37:27 Dec 16, 2008

T





7.3 RADIATED EMISSIONS

LIMIT

1. The field strength of any emission within this band (section 15.239 frequency between 88 MHz –108 MHz) shall not exceed 250 microvolts /meter at 3 meters. (48dB μ V/m at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit), as below.

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
1.705-30	30	30
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

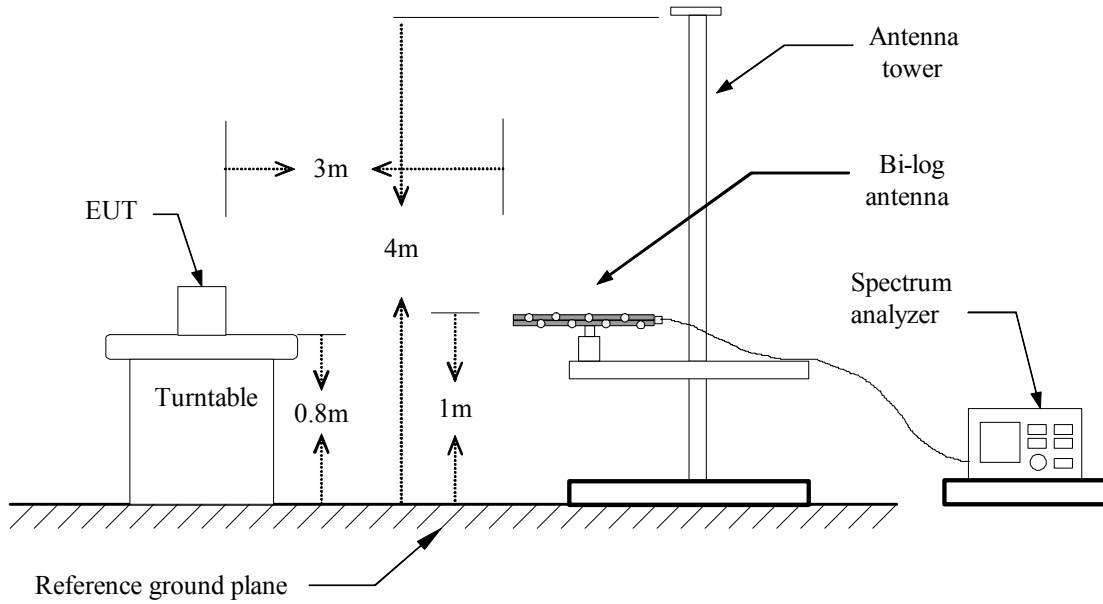
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the above emission table, the tighter limit applies at the band edges.

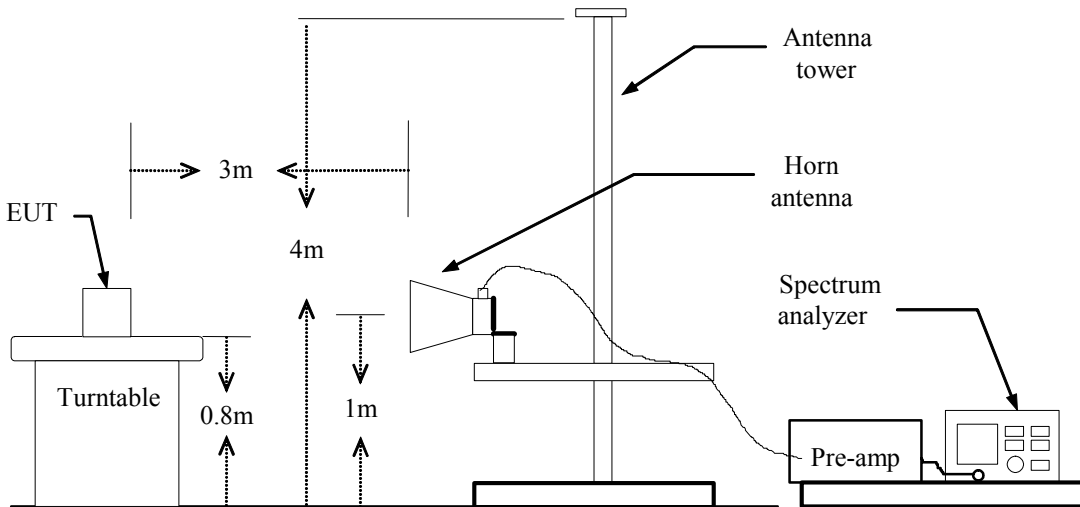
Frequency (MHz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
1.705-30	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**Test Data**

Operation Mode: CH Low **Test Date:** December 16, 2008
Temperature: 23°C **Tested by:** Mimic Yang
Humidity: 53 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol (H/V)	Reading (Peak / AV) (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (Peak / AV) (dBuV/m)	Margin (dB)	Remark
88.20	V	61.09	-15.52	45.57	48.00	-2.43	AVG
52.63	V	50.19	-13.80	36.39	40.00	-3.61	Peak
55.87	V	49.73	-14.23	35.50	40.00	-4.50	Peak
144.78	V	36.17	-9.19	26.97	43.50	-16.53	Peak
296.75	V	38.63	-8.65	29.98	46.00	-16.02	Peak
666.97	V	38.59	-2.19	36.40	46.00	-9.60	Peak
757.50	V	34.69	0.01	34.70	46.00	-11.30	Peak
88.20	H	57.04	-15.52	41.52	48.00	-6.48	AVG
49.40	H	42.89	-13.17	29.72	40.00	-10.28	Peak
296.75	H	40.07	-8.65	31.42	46.00	-14.58	Peak
335.55	H	39.64	-8.04	31.60	46.00	-14.40	Peak
666.97	H	33.34	-2.19	31.15	46.00	-14.85	Peak
762.35	H	30.74	0.05	30.79	46.00	-15.21	Peak
948.27	H	32.58	1.83	34.41	46.00	-11.59	Peak

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. The IF bandwidth of SPA from 30MHz to 1GHz was 100 kHz.



Operation Mode: CH Mid **Test Date:** December 16, 2008
Temperature: 23°C **Tested by:** Mimic Yang
Humidity: 53 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol (H/V)	Reading (Peak / AV) (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (Peak / AV) (dBuV/m)	Margin (dB)	Remark
98.00	V	60.47	-13.69	46.78	48.00	-1.22	AVG
34.85	V	37.32	-5.61	31.71	40.00	-8.29	Peak
49.40	V	48.23	-13.17	35.06	40.00	-4.94	Peak
55.87	V	48.31	-14.23	34.09	40.00	-5.91	Peak
209.45	V	40.83	-9.03	31.80	43.50	-11.70	Peak
296.75	V	37.47	-8.65	28.82	46.00	-17.18	Peak
666.97	V	39.97	-2.19	37.78	46.00	-8.22	Peak
98.00	H	56.06	-13.68	42.38	48.00	-5.62	AVG
49.40	H	43.08	-13.17	29.92	40.00	-10.08	Peak
199.75	H	42.97	-8.13	34.84	43.50	-8.66	Peak
209.45	H	44.01	-9.03	34.98	43.50	-8.52	Peak
277.35	H	41.04	-8.88	32.16	46.00	-13.84	Peak
663.73	H	34.20	-2.21	31.99	46.00	-14.01	Peak
757.50	H	31.67	0.01	31.68	46.00	-14.32	Peak

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. The IF bandwidth of SPA from 30MHz to 1GHz was 100 kHz.



Operation Mode: CH High **Test Date:** December 16, 2008
Temperature: 23°C **Tested by:** Mimic Yang
Humidity: 53 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol (H/V)	Reading (Peak / AV) (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (Peak / AV) (dBuV/m)	Margin (dB)	Remark
107.80	V	57.99	-11.49	46.50	48.00	-1.50	AVG
49.40	V	47.98	-13.17	34.82	40.00	-5.18	Peak
209.45	V	41.57	-9.03	32.54	43.50	-10.96	Peak
296.75	V	38.31	-8.65	29.66	46.00	-16.34	Peak
666.97	V	38.67	-2.19	36.48	46.00	-9.52	Peak
712.23	V	36.71	-1.57	35.14	46.00	-10.86	Peak
781.75	V	30.61	0.24	30.85	46.00	-15.15	Peak
107.80	H	52.93	-11.48	41.45	48.00	-6.55	AVG
49.40	H	43.61	-13.17	30.44	40.00	-9.56	Peak
199.75	H	41.15	-8.13	33.03	43.50	-10.47	Peak
211.07	H	45.54	-9.19	36.35	43.50	-7.15	Peak
277.35	H	40.48	-8.88	31.60	46.00	-14.40	Peak
296.75	H	39.99	-8.65	31.34	46.00	-14.66	Peak
666.97	H	37.29	-2.19	35.10	46.00	-10.90	Peak

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. The IF bandwidth of SPA from 30MHz to 1GHz was 100 kHz.



7.4 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.



TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode: Normal Link **Test Date:** November 27, 2008
Temperature: 20°C **Tested by:** Tony Tsai
Humidity: 57% RH

Frequency (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.3258	27.89	20.69	9.71	37.60	30.40	59.56	49.56	-21.96	-19.16	L1
0.3688	33.69	26.49	9.71	43.40	36.20	58.53	48.53	-15.13	-12.33	L1
0.4078	37.40	29.70	9.70	47.10	39.40	57.69	47.69	-10.59	-8.29	L1
0.8688	26.49	18.39	9.61	36.10	28.00	56.00	46.00	-19.90	-18.00	L1
2.1344	27.98	20.08	9.72	37.70	29.80	56.00	46.00	-18.30	-16.20	L1
2.8844	23.97	15.57	9.73	33.70	25.30	56.00	46.00	-22.30	-20.70	L1
0.3727	31.89	22.59	9.61	41.50	32.20	58.44	48.44	-16.94	-16.24	L2
0.4039	35.41	25.31	9.69	45.10	35.00	57.77	47.77	-12.67	-12.77	L2
1.6852	24.32	14.22	9.68	34.00	23.90	56.00	46.00	-22.00	-22.10	L2
1.8727	24.70	15.20	9.70	34.40	24.90	56.00	46.00	-21.60	-21.10	L2
2.0914	23.69	15.69	9.71	33.40	25.40	56.00	46.00	-22.60	-20.60	L2
4.5758	22.70	14.00	9.80	32.50	23.80	56.00	46.00	-23.50	-22.20	L2

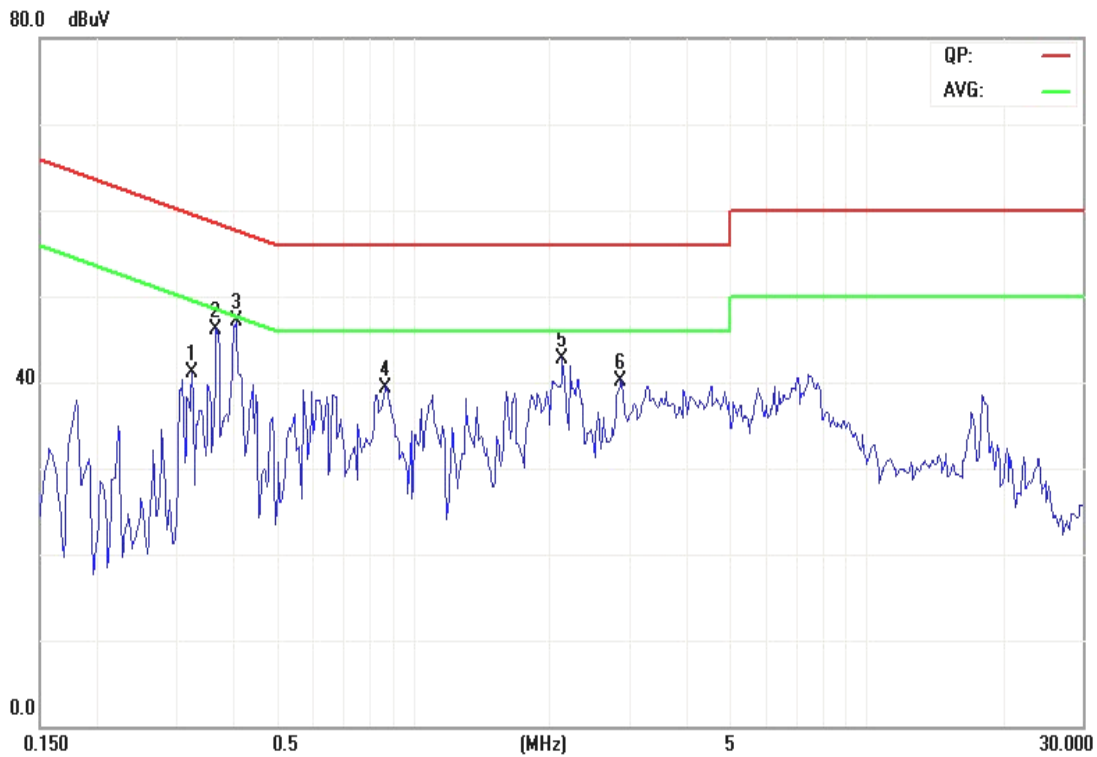
Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz.
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)
5. "-" means Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

