

FCC PART 18
EMI MEASUREMENT AND TEST REPORT

For

Whirlpool Microwave Products Development Ltd

16/F, Paliburg Plaza, 68 Ye Wo Street, Causeway Bay, Hong Kong

FCC ID: PR4MH1170X

July 29, 2006

This Report Concerns: ☒ Class II permissive change	Equipment Type: Microwave Oven
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Report Number: RSZ06061552	
Test Date: July 10-20, 2006	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Whirlpool Microwave Products Development Ltd*'s model: MH1170 series or the "EUT" as referred to in this report is a Microwave Oven which measures approximately 76.0cmL x 40.0cmW x 44.0cmH, rated input voltage: AC 120 V/60 Hz.

* The test data gathered are from production sample, serial number: 0606104, provided by the manufacturer, we receive the EUT on 2006-6-15.

Objective

The following test report is prepared on behalf of *Whirlpool Microwave Products Development Ltd* in accordance with Part 2, Subpart J, and Part 18, Subparts A, B and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 18 limits.

This is the C2PC application of the device. The difference between the original device and the current one is as follows:

	Alternative HV transformer	Original HV transformer
Model	EDX-JK1013A	EDX-JX1012A

For the changes made to the device, conducted emission testing and Radiated emission testing were performed.

Related Submittal(s)/Grant(s)

This is a C2PC application. The original application was granted on 2005-12-2.

Test Methodology

All measurements contained in this report were conducted with MP-5, FCC Methods of Measurements of Radio Noise Emissions from ISM Equipment, February 1986. All measurements were performed at Bay Area Compliance Laboratory Corporation. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

External Cable List and Details

Cable Description	Length (M)	From/Port	To
Unshielded Undetachable AC Power Cable	1.0	EUT	AC Power

OPERATING CONDITION/TEST CONFIGURATION

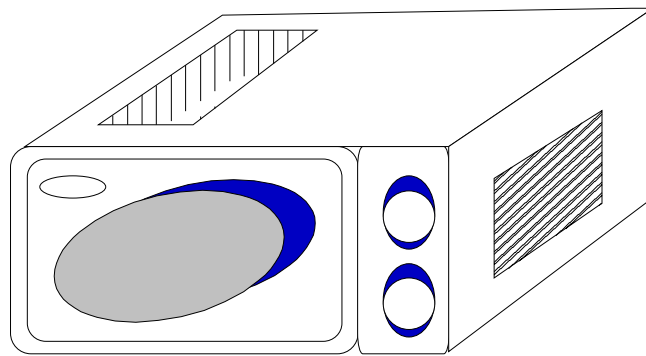
Justification

The EUT was provided for tests as a stand-alone device. It was prepared for testing in accordance with the manufacturer's instructions. The EUT was operated at maximum (continuous) RF output power. The loads consisted of water in a glass beaker in the amounts specified in the test procedure.

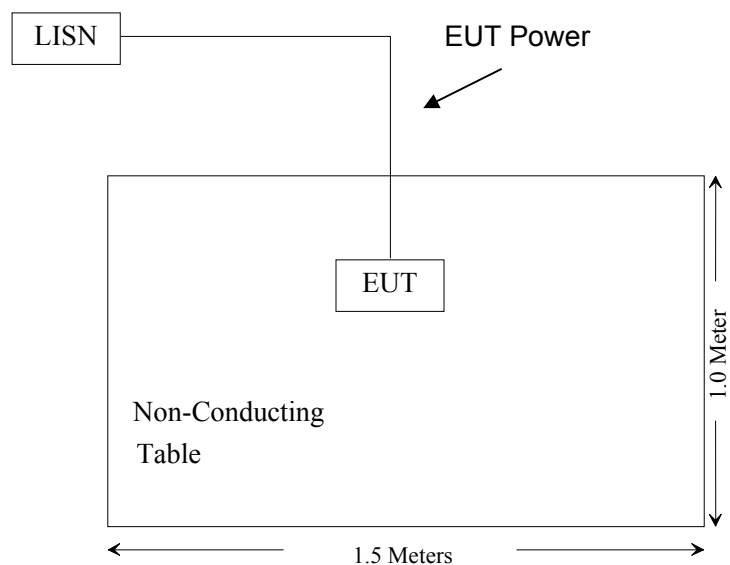
Equipment Modifications

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



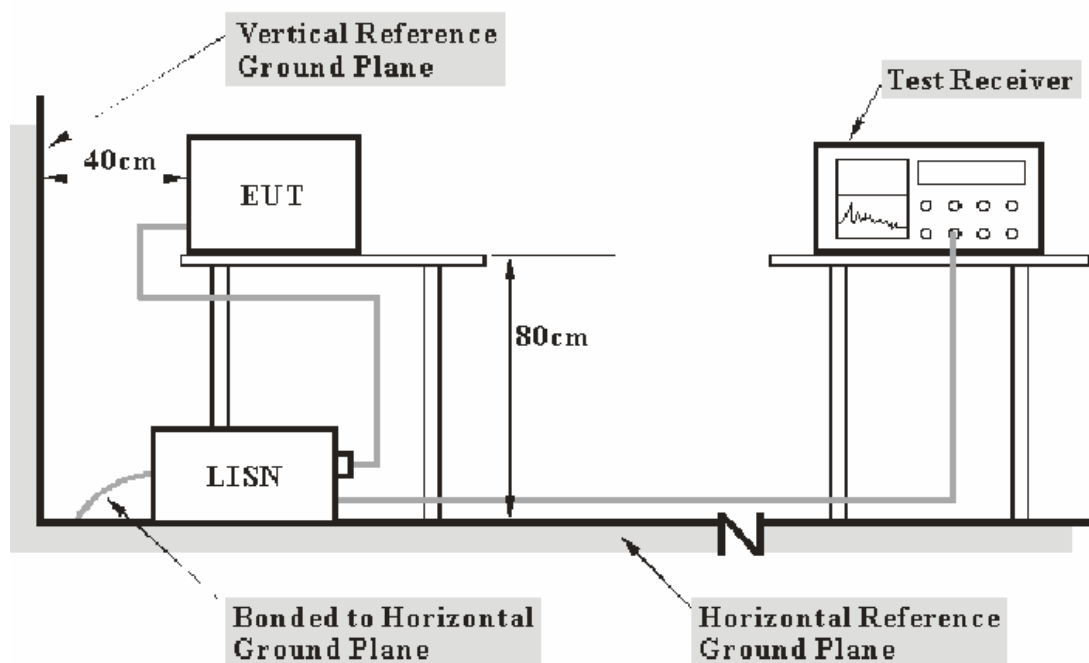
CONDUCTED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 2.4 dB.

EUT Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per MP-5: 1986 measurement procedure. Specification used was with the FCC Part 18.

The EUT was connected to a 120 VAC/ 60Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<i><u>Frequency Range</u></i>	<i><u>IF B/W</u></i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12008	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330 or 830245/006	2006-1-26	2007-1-26
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-3-1	2007-3-1

* Com-Power's LISN were used as the supporting equipment.

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the EUT power cord was connected to the outlet of the LISN.

Maximizing procedure were performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC PART 18, with the worst margin reading of:

-2.90 dB at 0.850 MHz in the Neutral conductor mode.

Test Data**Environmental Conditions**

Temperature:	25°C
Relative Humidity:	53%
ATM Pressure:	1002mbar

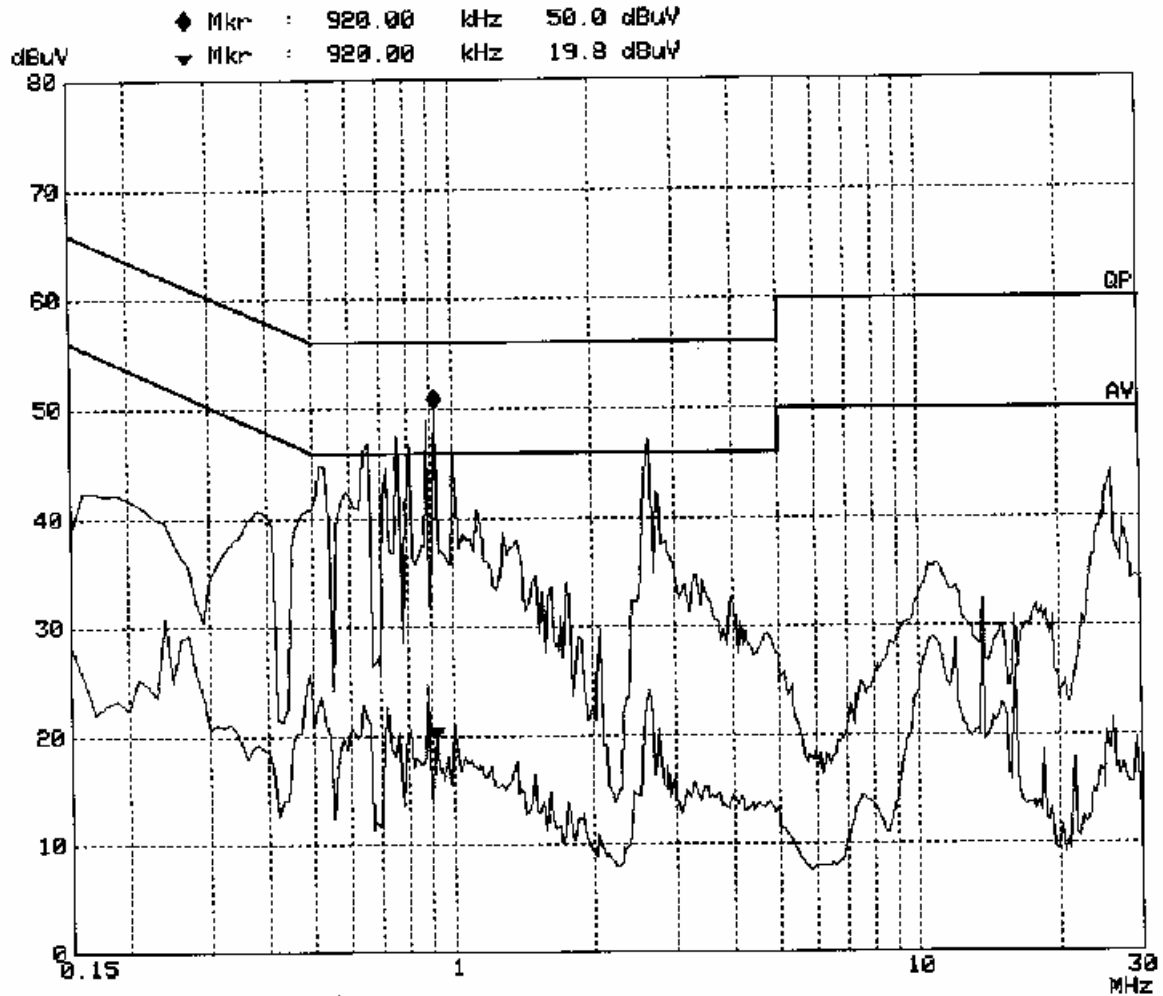
The testing was performed by Louise Lu on 2006-7-24.

Test Mode: Max Power

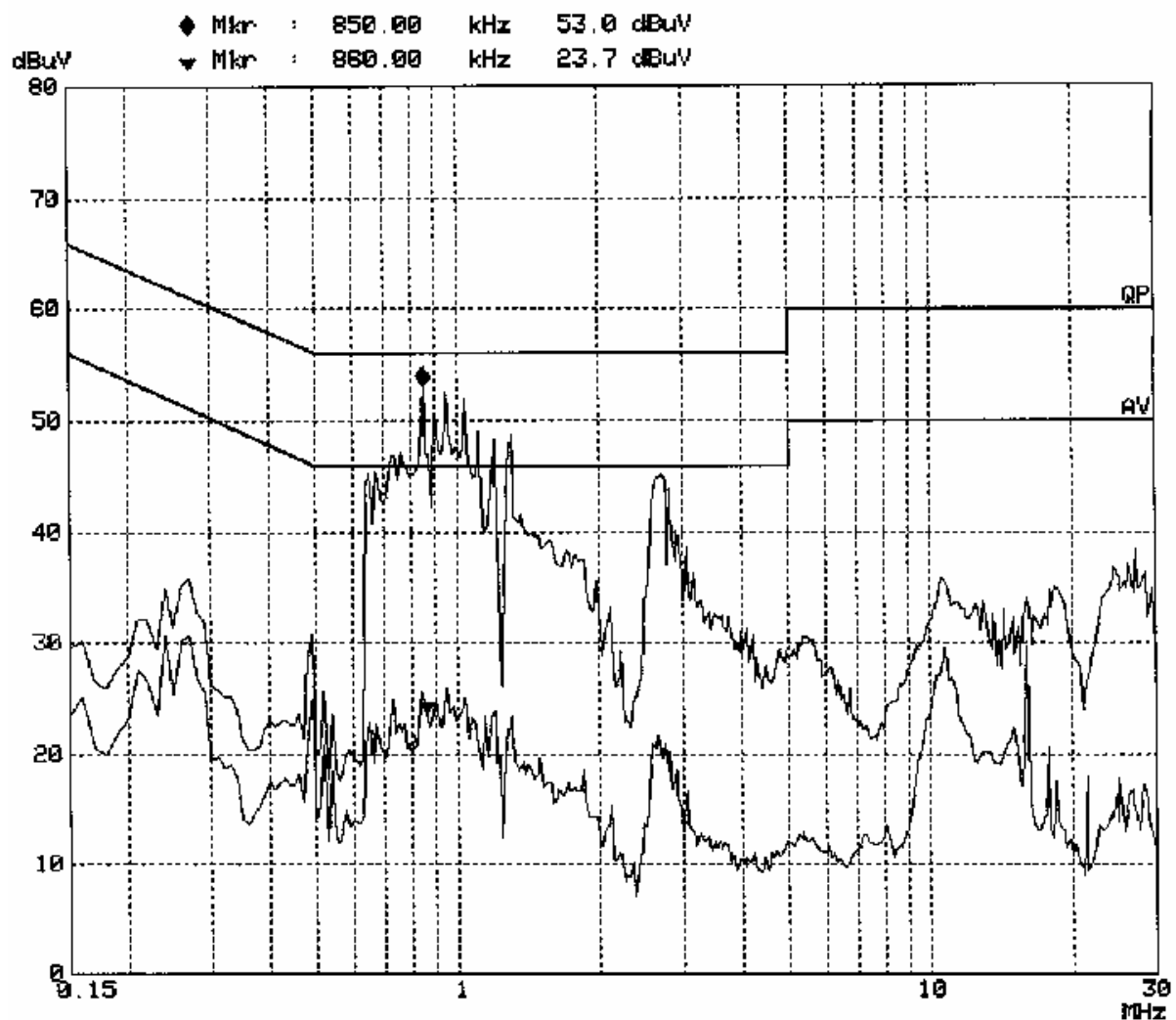
LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dBμV	QP/AV	Live/Neutral	dBμV	dB
0.850	53.10	QP	Neutral	56.00	-2.90
0.950	52.50	QP	Neutral	56.00	-3.50
0.920	50.00	QP	Live	56.00	-6.00
1.310	48.70	QP	Neutral	56.00	-7.30
0.760	47.40	QP	Live	56.00	-8.60
2.650	47.10	QP	Live	56.00	-8.90
2.700	45.20	QP	Neutral	56.00	-10.80
0.520	44.90	QP	Live	56.00	-11.10
26.220	44.20	QP	Live	60.00	-15.80
0.950	26.00	AV	Neutral	46.00	-20.00
0.270	30.70	AV	Neutral	51.12	-20.42
10.590	28.50	AV	Neutral	50.00	-21.50
2.650	24.20	AV	Live	46.00	-21.80
0.850	23.70	AV	Neutral	46.00	-22.30
0.520	23.70	AV	Live	46.00	-22.30
0.170	42.40	QP	Live	64.96	-22.56
10.590	35.90	QP	Neutral	60.00	-24.10
0.270	36.00	QP	Neutral	61.12	-25.12
0.760	20.50	AV	Live	46.00	-25.50
0.920	19.90	AV	Live	46.00	-26.10
2.700	19.70	AV	Neutral	46.00	-26.30
1.310	19.50	AV	Neutral	46.00	-26.50
26.220	21.40	AV	Live	50.00	-28.60
0.170	22.10	AV	Live	54.96	-32.86

Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.



EUT: Microwave Oven M/N:MH1170 series
Manuf: Whirlpool
Op Cond: MAX POWER
Operator: Louise
Test Spec: AC 120V/60Hz L
Comment: Temp.:24 Humi.:53%
Date: 24. Jul 06 08:22



EUT: Microwave Oven M/N:MH1170 series
Manuf: Whirlpool
Op Cond: MAX POWER
Operator: Louise
Test Spec: AC 120V/60Hz N
Comment: Temp.:24 Humi.:53%
Date: 24. Jul 06 09:02

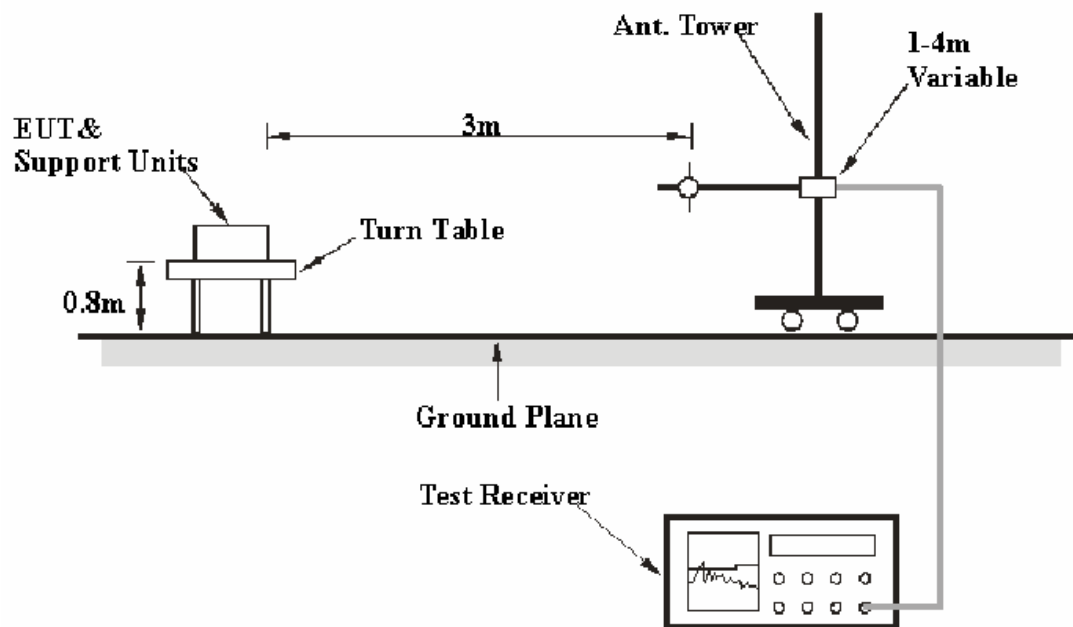
RADIATED EMISSION DATA

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the FCC MP - 5. The specification used was the FCC part 18 limits.

The EUT was connected to 120 VAC/60 Hz power source.

EMI Test Receiver Setup and Spectrum Analyzer Setup

The system was investigated from 30 MHz to 1 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>R B/W</i>	<i>Video B/W</i>	<i>IF B/W</i>
30 – 1000 MHz	100 kHz	300 kHz	120 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28
Sunol Sciences	System Controller	SC99V	041304-1	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the EUT power cord was connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure that the EUT complied with all installation combinations.

The EUT was in the normal (naïve) operating mode during the final qualification test to represent the worst results.

All data was recorded in the Quasi-peak detection mode from 30 MHz to 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit; the equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit.} - \text{Corr. Ampl}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 18, with the worst margin reading of:

13.4 dB at 791.953625 MHz in the Vertical polarization.

Test Data and Plots

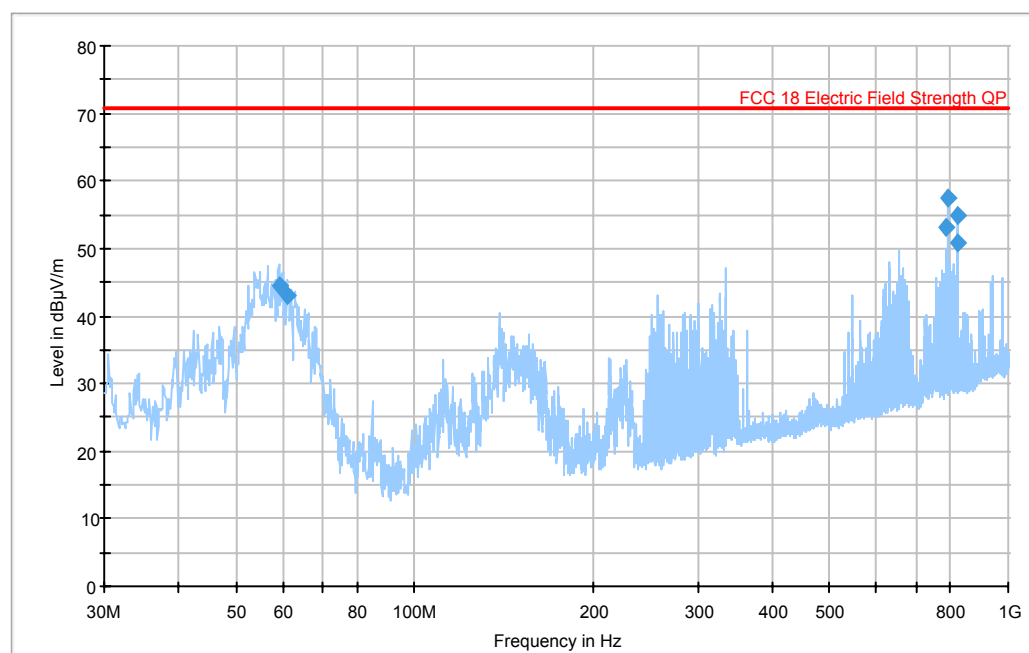
Environmental Conditions

Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1009 mbar

Testing was performed by Henry Yang on 2006-7-10.

Test mode: MAX Power

Auto Test (FCC18)



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity
59.337188	44.5	3000.000	120.000	100.0	V
60.970188	42.9	3000.000	120.000	172.0	V
787.650438	53.2	3000.000	120.000	243.0	H
791.953625	57.4	3000.000	120.000	245.0	V
819.705812	50.8	3000.000	120.000	211.0	H
820.749312	54.9	3000.000	120.000	260.0	H

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
59.337188	140.0	-18.8	26.3	70.8	
60.970188	333.0	-18.7	27.9	70.8	
787.650438	3.0	-2.3	17.6	70.8	
791.953625	133.0	-1.8	13.4	70.8	
819.705812	41.0	-1.5	20.0	70.8	
820.749312	251.0	-1.5	15.9	70.8	