



NVLAP LAB CODE 200707-0



FCC PART 18 EMI MEASUREMENT AND TEST REPORT

For

Guangdong Galanz Enterprises Co., Ltd.

25 Ronggui Nan.Rd., Shunde, Foshan, Guangdong, China.

FCC ID: UHW10028001

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Microwave Oven
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Report Number: RSZ07010651	
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Report Date: 2007-01-15	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Guangdong Galanz Enterprises Co., Ltd.'s model: WD1000ASP28RII series or the "EUT" as referred to in this report is a Microwave Oven which measures approximately 52.0cmL x 50.0cmW x 30.0cmH, rated input voltage: 120V/60Hz.

* *The test data gathered are from production sample, serial number: 0701106, provided by the manufacturer*

Objective

The following test report is prepared on behalf of *Guangdong Galanz Enterprises Co., 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

Related Submittal(s)/Grant(s)

No related submittal(s).

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 measurement was 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 Laboratory Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratory 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 and Industrial Canada registration test site No.: 5500A. 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 Laboratory 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 I/O Cable

Cable Description	Length (M)	From/Port	To
Unshielded Undetachable AC Line	1.50	EUT	AC Power

OPERATING CONDITION/TEST CONFIGURATION

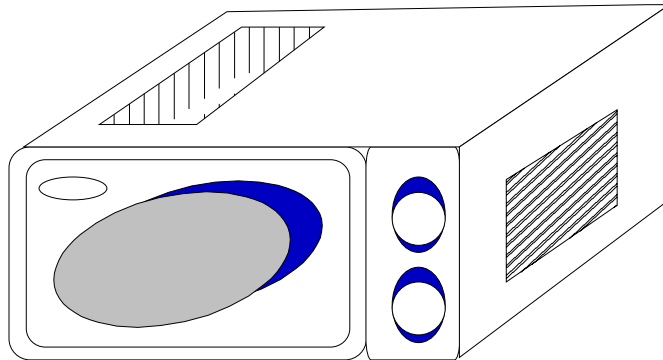
Justification

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.

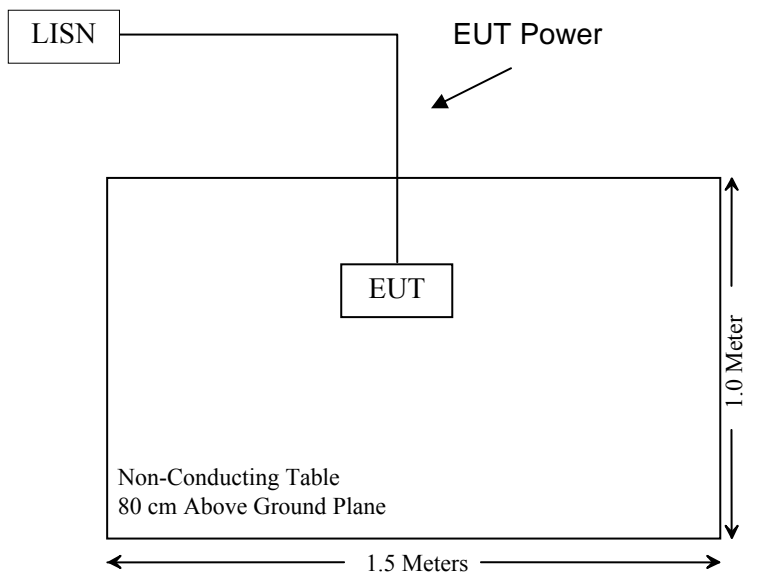
Equipment Modifications

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



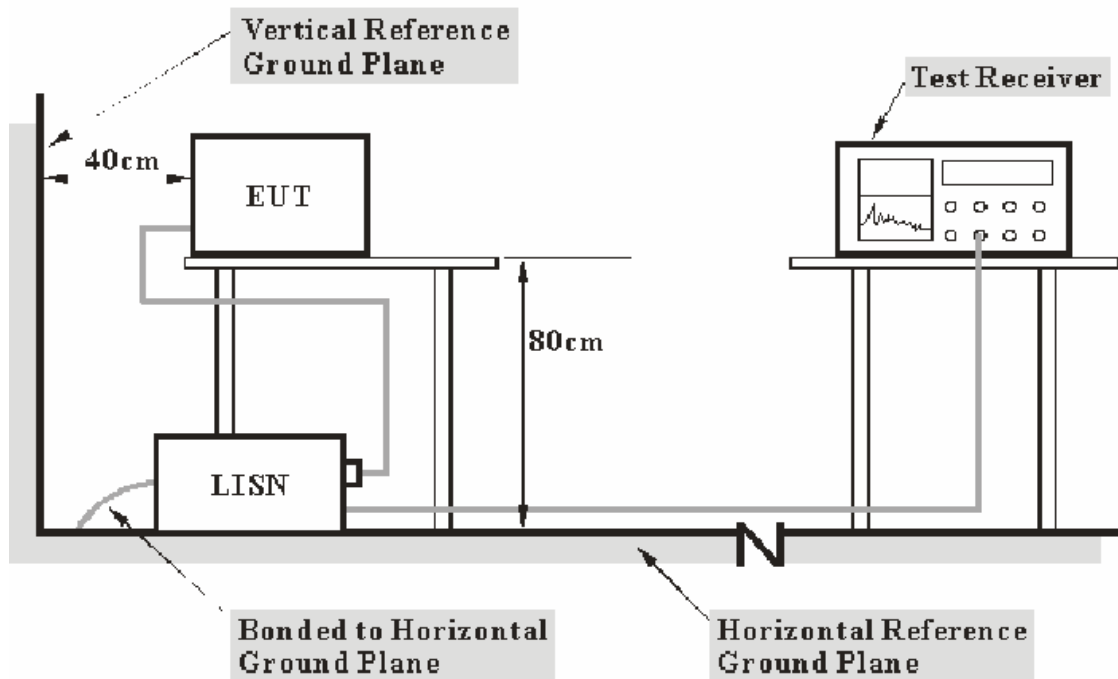
CONDUCTED EMISSION

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 Laboratory 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.

Test Receiver Setup

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

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

<i>Frequency Range</i>	<i>IFBW</i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330 or 830245/006	2006-03-20	2007-03-19
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-03-01	2007-03-01

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to 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:

3.30 dB at 0.575 MHz in the **Live** conductor mode.

Test Data**Environmental Conditions**

Temperature:	25°C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by William Chan on 2007-01-11.

Test Mode: Max Power

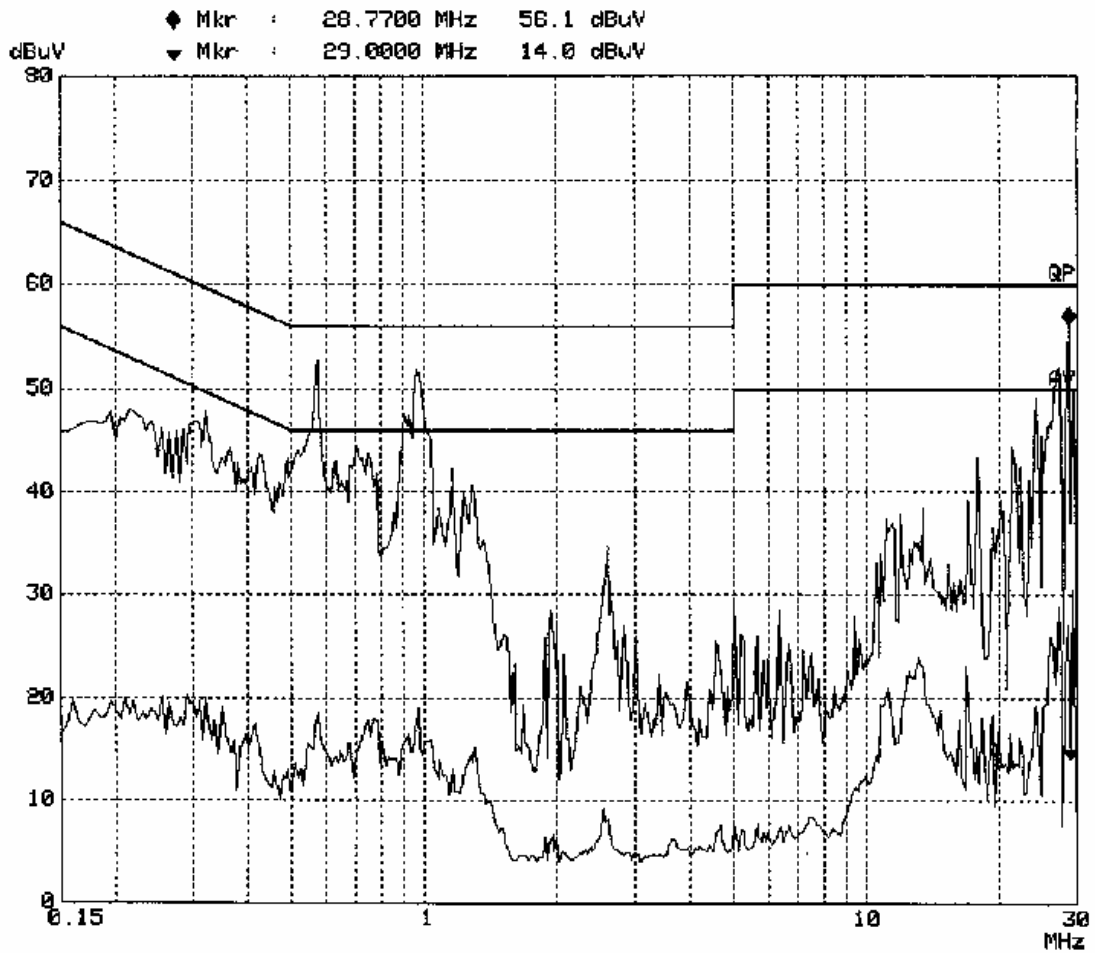
LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Phase (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.575	52.70	QP	Live	56.00	3.30
28.770	56.10	QP	Live	60.00	3.90
0.965	51.80	QP	Live	56.00	4.20
0.565	48.70	QP	Neutral	56.00	7.30
26.895	52.20	QP	Neutral	60.00	7.80
27.340	52.00	QP	Live	60.00	8.00
0.940	47.40	QP	Neutral	56.00	8.60
28.910	50.30	QP	Neutral	60.00	9.70
0.370	45.20	QP	Neutral	58.50	13.30
0.215	48.00	QP	Live	63.01	15.01
21.390	43.20	QP	Neutral	60.00	16.80
28.770	30.20	AV	Live	50.00	19.80
28.910	28.80	AV	Neutral	50.00	21.20
27.340	28.80	AV	Live	50.00	21.20
26.890	28.50	AV	Neutral	50.00	21.50
13.370	38.40	QP	Live	60.00	21.60
21.390	25.50	AV	Neutral	50.00	24.50
0.965	19.10	AV	Live	46.00	26.90
0.565	18.80	AV	Neutral	46.00	27.20
13.370	22.80	AV	Live	50.00	27.20
0.575	18.70	AV	Live	46.00	27.30
0.940	17.30	AV	Neutral	46.00	28.70
0.370	18.40	AV	Neutral	48.50	30.10
0.215	19.60	AV	Live	53.01	33.41

Plot(s) of Test Data

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

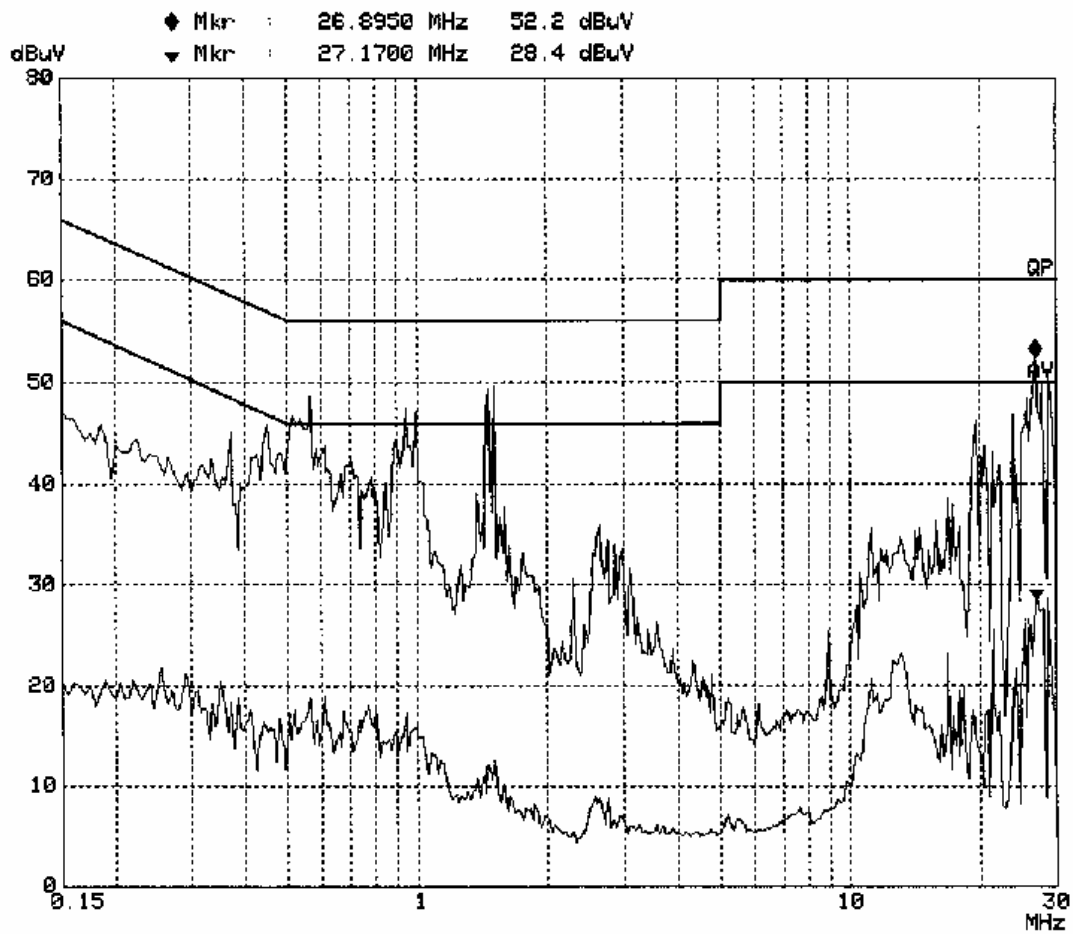
conducted emission test FCC Part 18

EUT: Microwave oven M/N:WD1000ASP28R11 Series
Manuf: Galanz
Op Cond: Max Power
Operator: William.chen
Test Spec: AC 120V/60Hz L
Comment: Temp:25'C Humi:56%
Date: 11. Jan 07 23:32



conducted emission test FCC Part 18

EUT: Microwave oven M/N:WD1000ASP2BR11 Series
Manuf: Galanz
Op Cond: Max Power
Operator: William.chen
Test Spec: AC 120V/60Hz N
Comment: Temp:25°C Humi:56%
Date: 11. Jan 07 23:37



RADIATION HAZARD MEASUREMENT

Environmental Conditions

Temperature:	25°C
Relative Humidity:	50%
ATM Pressure:	1008mbar

The testing was performed by William Chan on 2007-01-11.

Test Mode: Max Power

Radiation Hazard Measurement

Radiation leakage was measured in the as-received condition with the oven door closed using a microwave leakage meter.

A 275ml water load was placed in the center of the oven and the oven was operated at maximum output power.

There was no microwave leakage exceeding a power level of $0.65\text{mW}/\text{cm}^2$ observed at any point 5cm or more from the external surface of the oven.

A maximum of $1.0\text{mW}/\text{cm}^2$ is allowed in accordance with the applicable Federal Standards. Hence, microwave leakage in the as-received condition with the oven door closed was below the maximum allowed.

Input Power

Input power and current was measured using a power analyzer. A 1000ml water load was placed in the center of the oven and the oven was operated at maximum output power. A 1000ml water load was chosen for its compatibility with the procedure commonly used by manufacturers to determine their input ratings.

Input Voltage (Vac/Hz)	Input Current (amps)	Measured Input Power (watts)	Rated Input Power (watts)
120/60	11.93	1432	1450

Based on the measured input power, the EUT was found to be operating within the specifications.

Load for Microwave Ovens

For all measurements, the energy developed by the oven was absorbed by a dummy load consisting of a quantity of tap water in a beaker. If the oven was provided with a shelf or other utensil support, this support was in its initial normal position. For ovens rated at 1000 watts or less power output, the beaker contained quantities of water as listed in the following subparagraphs. For ovens rated at more than 1000watts output, each quantity was increased by 50% for each 500watts or fraction thereof in excess of 1000watts. Additional beakers were used if necessary.

- Load for power output measurement: 1000 milliliters of water in the beaker located in the center of the oven.
- Load for frequency measurement: 1000 milliliters of water in the beaker located in the center of the oven.
- Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and the other of 300 milliliters, of water are used. Each load is tested both with the beaker located in the center of the oven and with it in the right front corner.

The RF output power is rated at 1000 W

Load used for power output measurement = 1000 milliliters of water
 Load used for frequency measurement = 1000 milliliters of water
 Load used for harmonic measurement = 700 & 300 milliliters of water
 Load used for other measurement = 700 milliliters of water

RF Output Power Measurement

The Caloric Method was used to determine maximum RF output power. The initial temperature of the water load was measured. The water load was placed in the center of the oven. The oven was operated at maximum output power for 63 seconds, the temperature of the water was re-measured.

Quality of Water (ml)	Starting Temperature (°C)	Final Temperature (°C)	Elapsed Time (Seconds)
1000	20	65.6	200

$$\text{Power} = (4.2 \text{ joules/calorie})(\text{volume in milliliters})(\text{temperature rise})/(\text{time in seconds})$$

$$\text{Power} = 4.2 \text{ joules/calorie} \times 1000 \times (65.6-20) / 200$$

$$\text{Power} = 957.6 \text{ watts}$$

The measurement output power was found to be less than 500watts. Therefore, in accordance with Section 18.305 of Subpart-C, the measured out-of-band emissions were compared to the limit of 25µV/meter at a 300-meter measurement distance.

- ☒ The measured output power was found to exceed 500watts. Therefore, in accordance with Section 18.305 of Subpart-C, the measured out-of-band emissions were compared with the limit calculated as following:

$$\text{LFS} = 25 * \text{SQRT} (\text{Power Output}/500)$$

$$\text{LFS} = 25 * \text{SQRT} (957.6/500)$$

$$\text{LFS} \approx 34.59$$

Where: LFS is the maximum allowable field strength for out-of-band emissions in $\mu\text{V}/\text{meter}$ at a 300-meter measurement distance. Power Output is the measured output power in watts.

Manufacturer	Model Number	LFS	dB($\mu\text{V}/\text{M}$)	dB($\mu\text{V}/\text{M}$)@3m
Guangdong Galanz Enterprises Co., Ltd.	WD1000ASP28RII Series	34.59	30.78	70.78

Operating Frequency Measurement

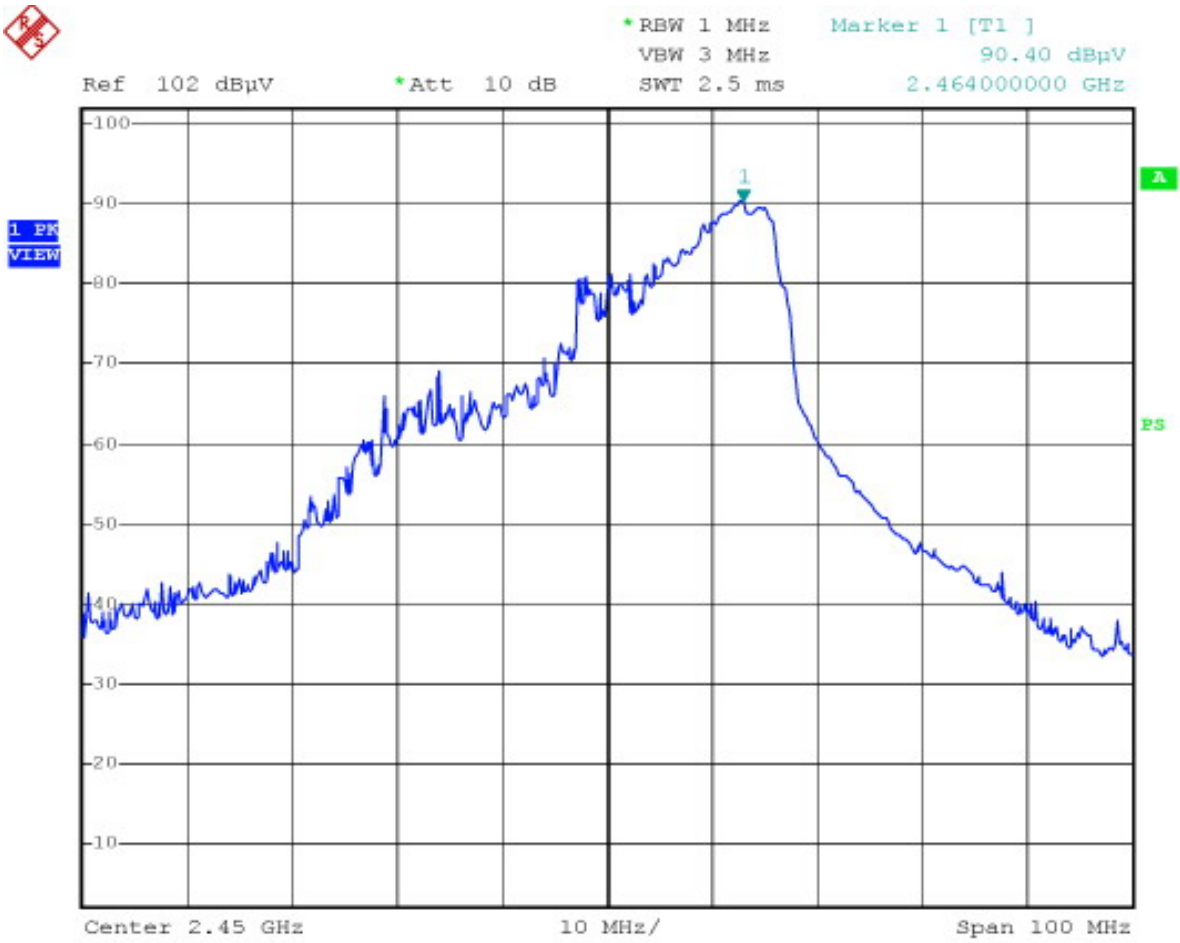
Variation in Operating Frequency with Time

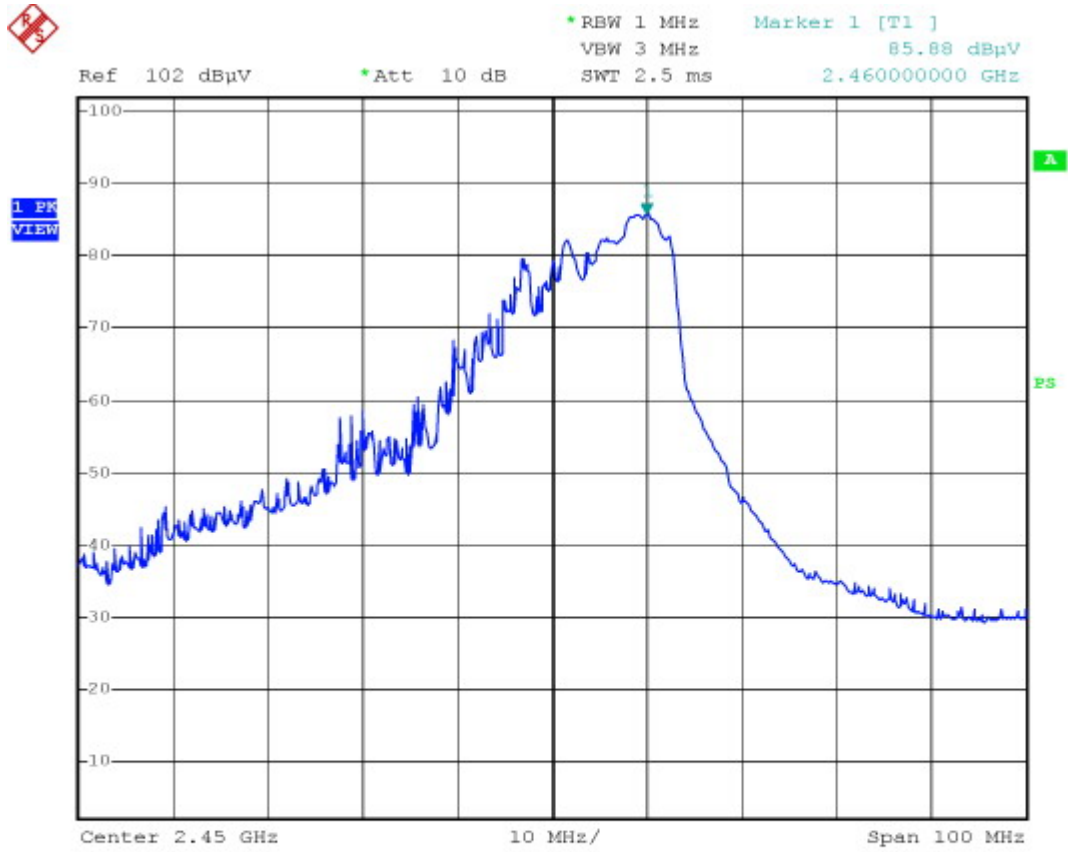
The operating frequency was measured using a spectrum analyzer. Starting with the EUT at room temperature, a 1000ml water load was placed in the center of the oven and the oven was operated at maximum output power. The fundamental operating frequency was monitored until the water load was reduced to 20 percent of the original load.

The results of this test are as follows:

Manufacturer	Model Number	Minimum Frequency (MHz)	Maximum Frequency (MHz)
Guangdong Galanz Enterprises Co., Ltd.	WD1000ASP28RII series	2460.0	2464.0

Refer to data pages for details of the variation in operating frequency with time measurement.





Variation in Operating Frequency with Line Voltage

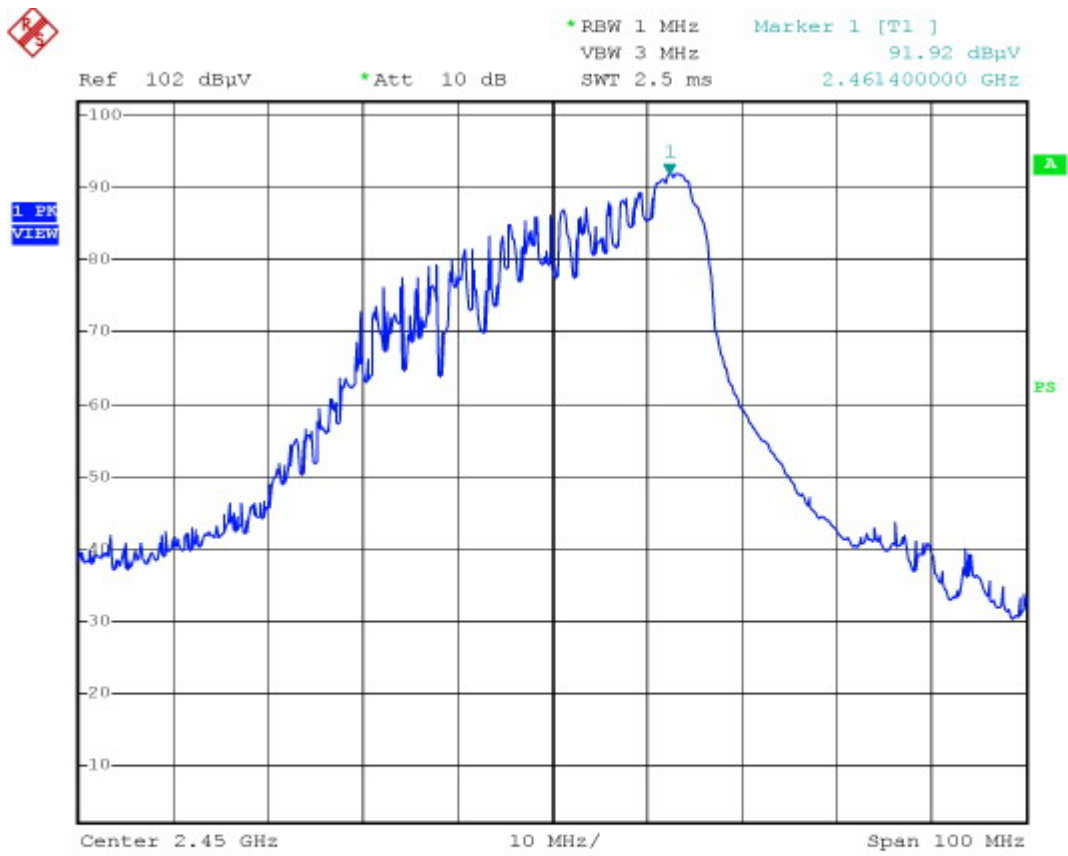
The EUT was operated / warmed by at least 10 minutes of use with a 1000ml water load at room temperature at the beginning of the test. Then the operating frequency was monitored as the input voltage was varied between 80 and 125 percent of the nominal rating.

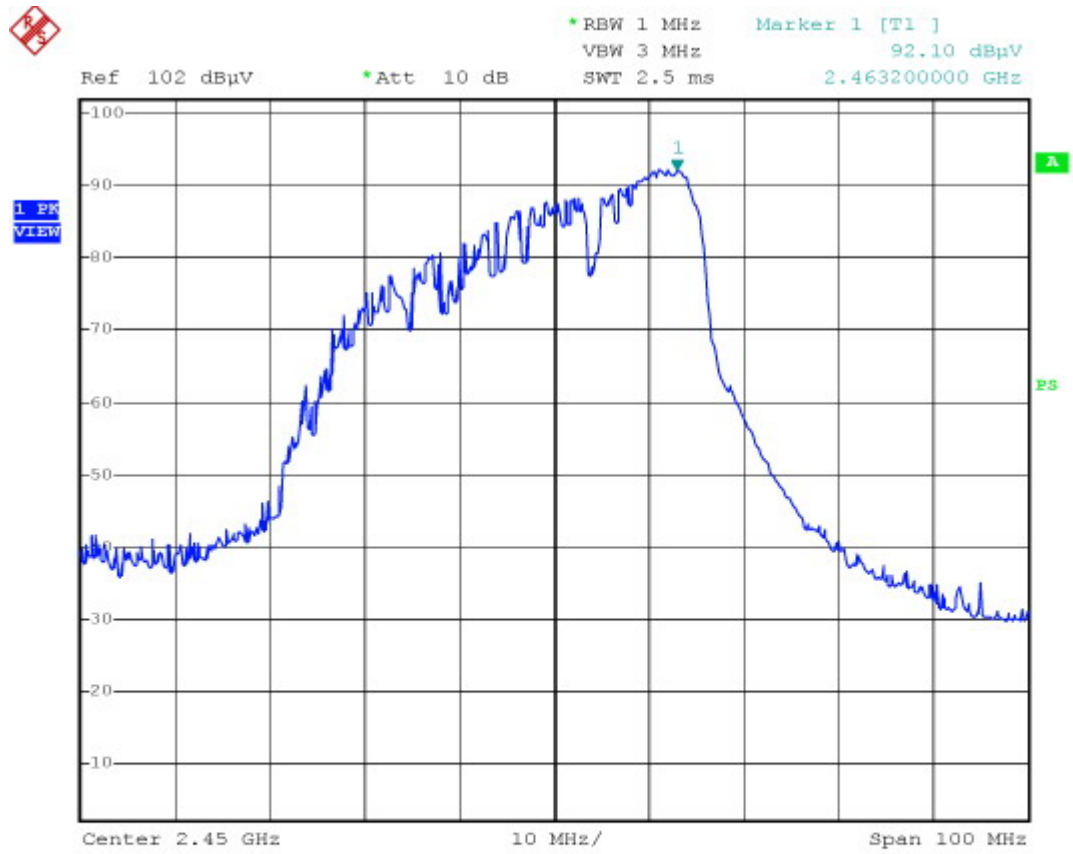
The results of this test are as follows:

Line voltage varied from 96Vac to 150Vac.

Manufacturer	Model Number	Minimum Frequency (MHz)	Maximum Frequency (MHz)
Guangdong Galanz Enterprises Co., Ltd.	WD1000ASP28RII series	2461.4	2463.2

Please refer to following pages for details of the variation in operating frequency with line voltage measurement.





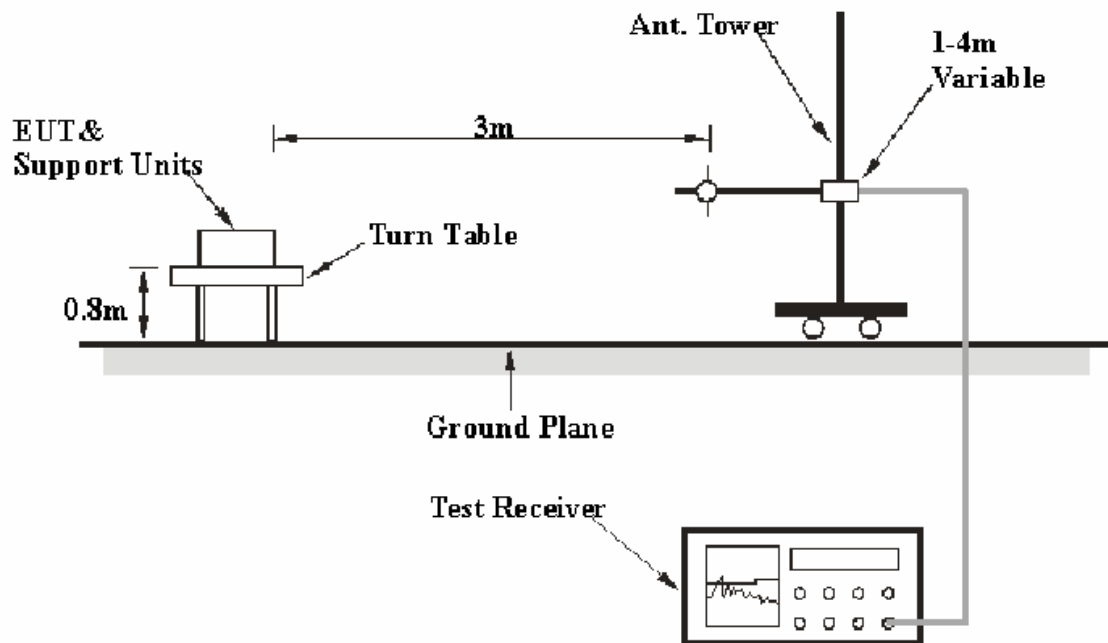
RADIATED EMISSION DATA

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 Laboratory Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



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

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

Test Receiver and Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
30 – 1000 MHz	100 kHz	300 kHz
Above 1000 MHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-08-14	2007-08-14
Sunol Sciences	System Controller	SC99V	041304-1	N/A	N/A
A.H.System	Horn Antenna	SAS-200/571	135	2006-5-17	2007-5-17
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to 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.

All data was recorded in the Quasi-peak detection mode. from 30 MHz to 1000 MHz, and average detection mode above 1 GHz.

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

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, 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 maximum limit. The equation for margin calculation is as follows:

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

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:

9.54 dB at 49.00 MHz in the **Vertical** polarization, above 1 GHz
11.88dB at 285.350725MHz in the **Horizontal** polarization, 30MHz-1000MHz

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	50%
ATM Pressure:	940mbar

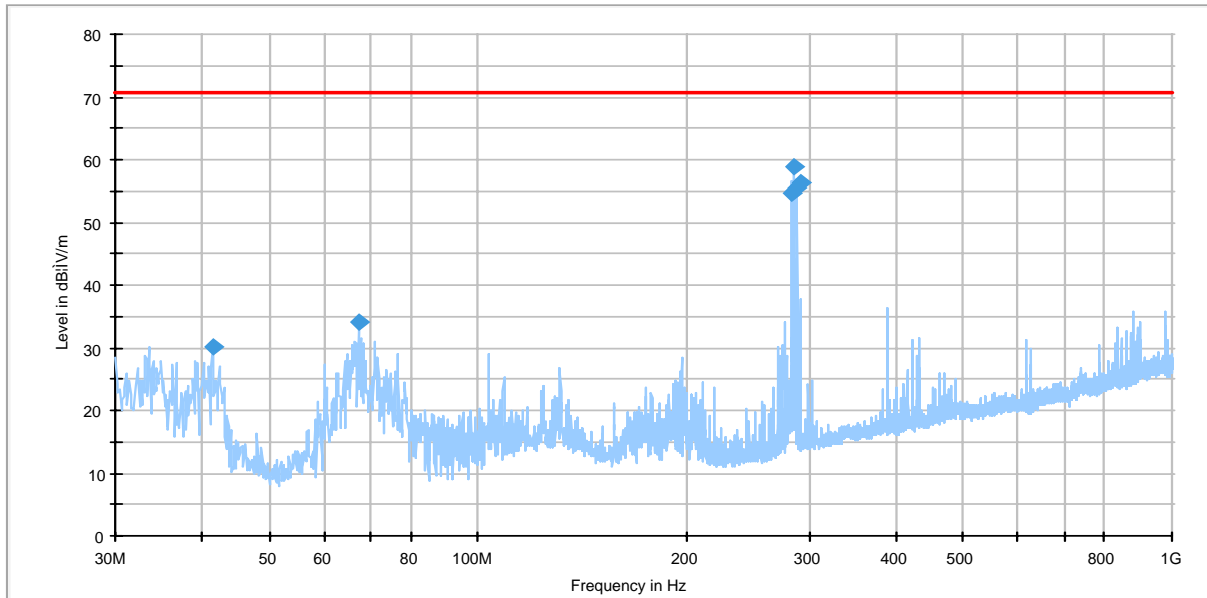
The testing was performed by William Chan on 2007-01-11.

Test Mode: Max Power

Above 1GHz

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 18	
Frequency (MHz)	Meter Reading (dBμV/m)	Angle Degree	Height (m)	Polar H/ V	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)	Corr. Ampl. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4900	57.64	180	1.2	V	32.0	4.6	33.00	61.24	70.78	9.54
4900	61.12	180	1.2	H	32.0	4.6	33.00	64.72	70.78	6.06
7350	51.64	60	1.0	V	35.3	4.7	33.40	58.24	70.78	12.54
7350	53.42	60	1.0	H	35.3	4.7	33.40	60.02	70.78	10.76
9800	47.56	180	1.2	V	38.2	5.8	34.10	57.46	70.78	13.32
9800	52.69	180	1.2	H	38.2	5.8	34.10	62.59	70.78	8.19
14700	42.92	45	1.2	V	38.8	6.7	33.17	55.25	70.78	15.53
14700	44.18	45	1.2	H	38.8	6.7	33.17	56.51	70.78	14.27
12250	40.68	180	1.0	V	37.2	6.1	34.64	49.34	70.78	21.44
12250	42.85	180	1.0	H	37.2	6.1	34.64	51.51	70.78	19.27

30MHz-1000MHz:



Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
285.350725	58.9	169.0	H	333.0	-11.4	70.78	11.88
291.881900	56.2	234.0	V	358.0	-11.3	70.78	14.58
288.358625	55.6	142.0	H	318.0	-11.4	70.78	15.18
282.894325	54.6	147.0	H	95.0	-11.5	70.78	16.18
67.125425	34.2	368.0	H	306.0	-18.2	70.78	36.58
41.480725	30.1	378.0	H	138.0	-13.8	70.78	40.68