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EMI Test Report

On Model Name: Microwave oven
Model Numbers: P70B17X-Z
Brand Name: Galanz
FCC ID : UHW7017001

Prepared for Guangdong Galanz Enterprises Co., Ltd.

According to FCC Part 18
Industrial, Scientific and Medical Equipment
FCC/OST MP-5(1986)
FCC methods of measurements of radio noise emission from industrial,scientific and medical equipment

Test Report #:	GUA-0803-0667-FCCID
Prepared by:	Ravin Su
Reviewed by:	Ivan Wen
QC Manager:	Paul Chen

Test Report Released by: Paul J. Chen — Paul Chen

2008, Mar 12 — Date

List Attached Files

Exhibit Type	File Description	File Name
Test Report	Test Report	UHW7017001 _Test report.pdf
Operation Description	Technical Description	UHW7017001 _Operation description.pdf
External Photos	External Photos	UHW7017001 _External Photos
Internal Photos	Internal Photos	UHW7017001 _Internal Photos
Block Diagram	Block Diagram	UHW7017001 _Block Diagram.pdf
Schematics	Circuit Diagram	UHW7017001 _Schematics.pdf
ID Label/Location	Label Artwork and Location	UHW7017001 _Label & Location.pdf
User Manual	User Manual	UHW7017001 _User Manual.pdf
Test setup photos	Test setup photos	UHW7017001 _Test Setup Photos

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room.

Test Site Location: Guangdong Galanz Enterprises Co., Ltd

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

Tel: 86-757-23612785

Fax: 86-757-23612537

Registration Number: 580210

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EUT). Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample : *Microwave Oven*

Model Numbers : *P70B17X-Z*

Model Tested : *P70B17AL-D4*

Brand Name : *Galanz*

Date Tested : *2006, December 27th*

Applicant : *Guangdong Galanz Enterprises Co., Ltd.*

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

Telephone : *86-757-23612785*

Fax : *86-757-23612537*

Manufacturer : *Guangdong Galanz Enterprises Co., Ltd.*

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

EUT Description

Guangdong Galanz Enterprises Co., Ltd. model tested P70B17AL-D4 (referred to the EUT in this report) is a Microwave Oven.

Specifications:

Model Number:	*P70B17AL-D4*
Power Consumption:	*120V~60Hz, 1050W*
Output	*700W*
Operation Frequency	*2450MHz*
Magnetron Manufacturer	*Galanz*
Magnetron Number	*M24FA-410A*
Outside Dimensions (H×W×D)	*9 5/8×17 13/16×12 13/16 in.*
Outside Dimensions (H×W×D):	*8 11/16×12 3/8×11 in.*
Oven Capacity	*0.6 cu.ft.*
Cooking Uniformity	*Turntable System {Φ9 5/8"}*
Net Weight	*Approx.23.1 lbs.*

Type of Deriver

P70B17X-Z

P: Denotes the Microwave function.
70: Denotes the output power is 700W.
B: Denotes the type of the cavity
17: Denotes capacity in 17 liters;

X may be
L,P,J,SL,SP,SJ,TL,TP,TJ,AL,AP,AJ,ASL,ASP,ASJ,ATL,ATP,ATJ,EL,EP,EJ,ESL, ESP,ESJ,ETL, ETP,ETJ,ML,MP,MJ,MSL,MSP,MSJ,MTL,MTP,MTJ

"L" and "J" is pull-out type door, P is push-button type door. When there is no letter before "L" ,"P" and "J", denotes mechanical control model; When there is "A" , "E" or "M" denote the electrical control model. "S" denotes stainless steel cavity; "T" denotes the gray cavity; When there is neither "S" nor "T" before "L", "P" or "J", denotes the epoxy painted cavity.

Z may be any combination of one to five letters and/or numbers representing cosmetic differences,for example, the different color or the different door handle.

Test Summary

The Electromagnetic Compatibility requirements on model tested P70B17AL-D4 for this test is stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

Emission Tests				
Specifications	***Description***	***Test Results***	***Test Point***	***Remark***
FCC Part 18:2004 FCC/OST MP-5:1986 ANSI C63.4: 2003	*Radiation Hazard Measurement*	*Passed by 0.00384mW/cm^2*	*EUT*	*Attachment 1*
FCC Part 18:2004 FCC/OST MP-5:1986 ANSI C63.4: 2003	*Input Power Measurement*	*Refer to Attachment2*	*EUT*	*Attachment 2*
FCC Part 18:2004 FCC/OST MP-5:1986 ANSI C63.4: 2003	*RF Output power Measurement*	*Refer to Attachment3*	*EUT*	*Attachment 3*
FCC Part 18:2004 FCC/OST MP-5:1986 ANSI C63.4: 2003	*Operating Frequency Measurement*	*Passed*	*EUT*	*Attachment 4*
FCC Part 18:2004 FCC/OST MP-5:1986 ANSI C63.4: 2003	*Conducted Emission*	*Passed by 16.9dB of QP Passed by 29.8dB of AVE*	*AC Input Port*	*Attachment 5*
FCC Part 18:2004 FCC/OST MP-5:1986 ANSI C63.4: 2003	*Radiated Emission*	*Passed by 23.61dB of AVE*	*Enclosure*	*Attachment 6*

Load for Microwave Ovens

For all measurements the energy developed by the oven was absorbed by a dummy load consisting of a quantity of tag 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 1000watts 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.

--Load for all other measurements: 700 milliliters of water, with the beaker located in the center of the oven.

Equipment Modification

Any modifications installed previous to testing by Guangdong Galanz Enterprises Co., Ltd. will be incorporated in each production model sold or leased in United States.

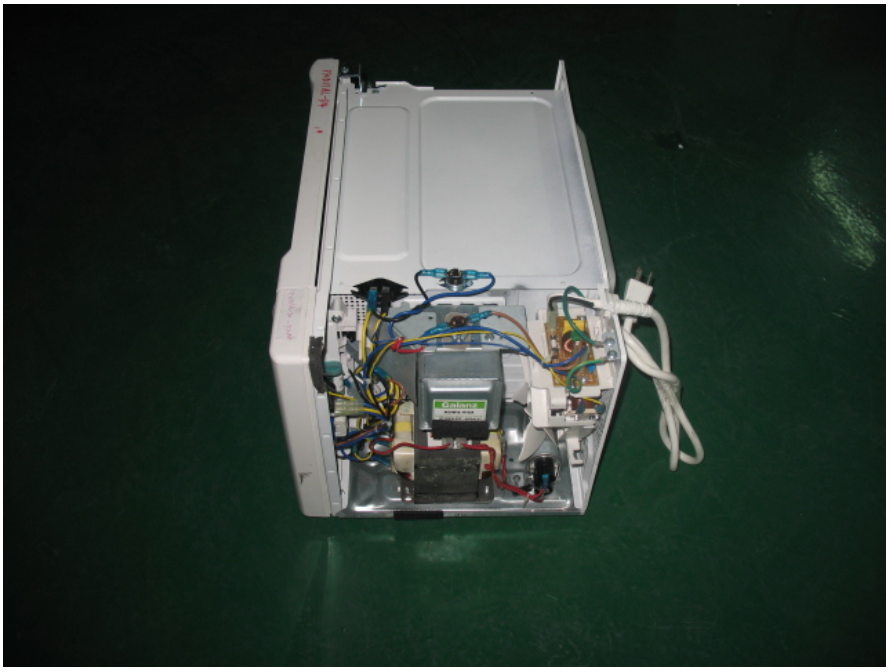
There were no modifications installed by EMC Compliance Management Group (China) test personnel.

EUT Sample Photos for model P70B17AL-D4

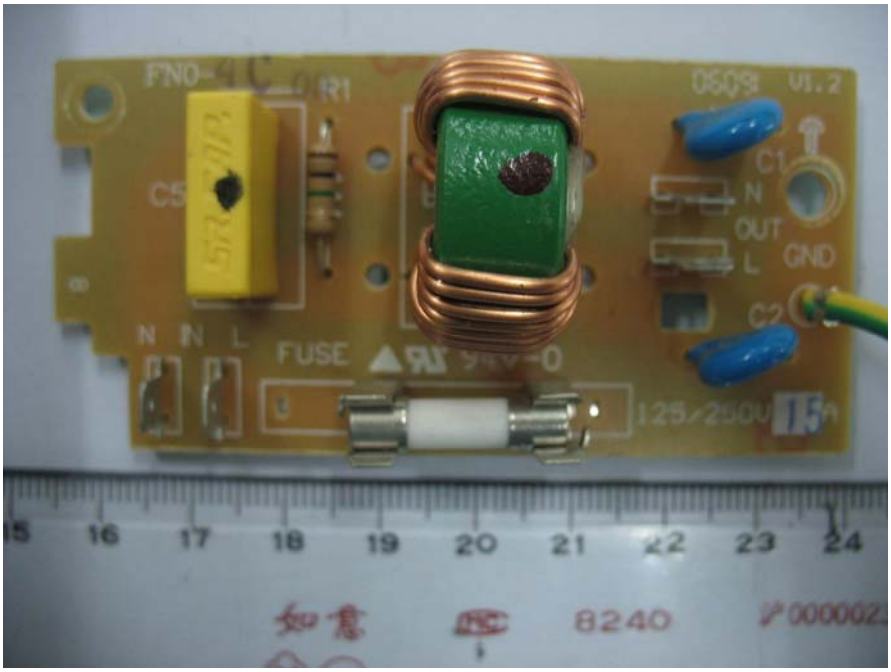
Front & Top View

Rear View

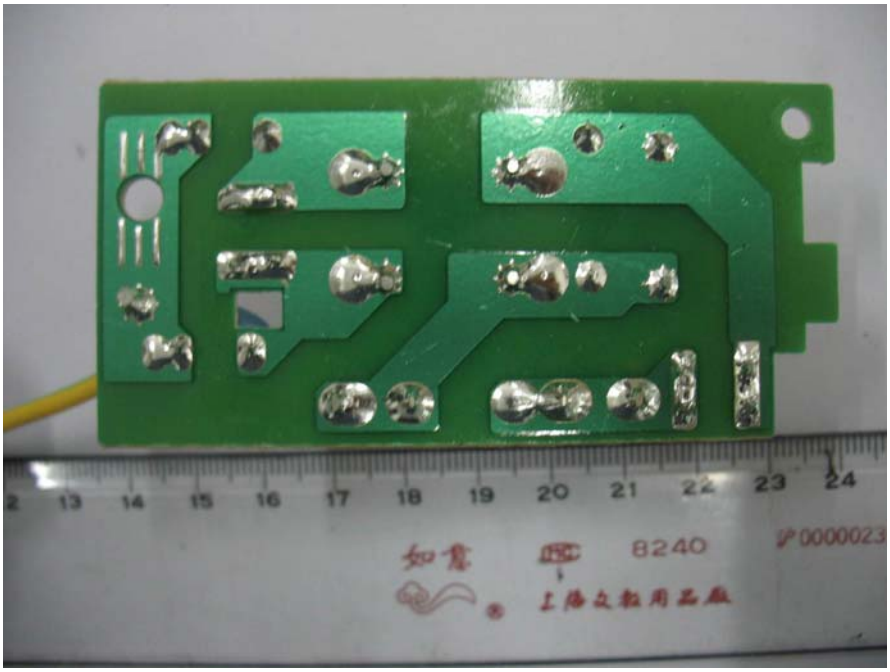
Door opened View



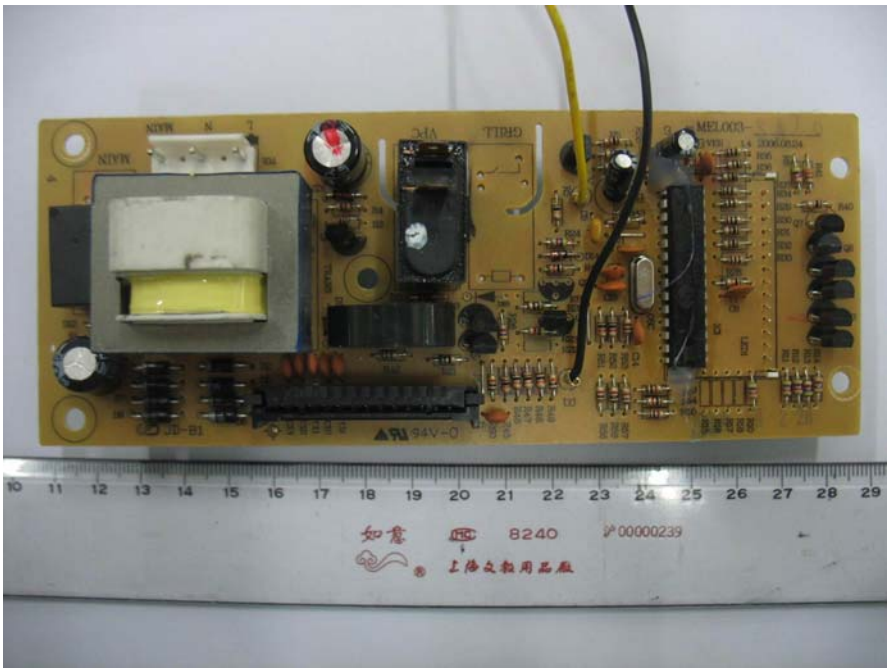
Uncovered View



Filter View



Filter Reversed View



PCB View

PCB Reversed View

Test System Details

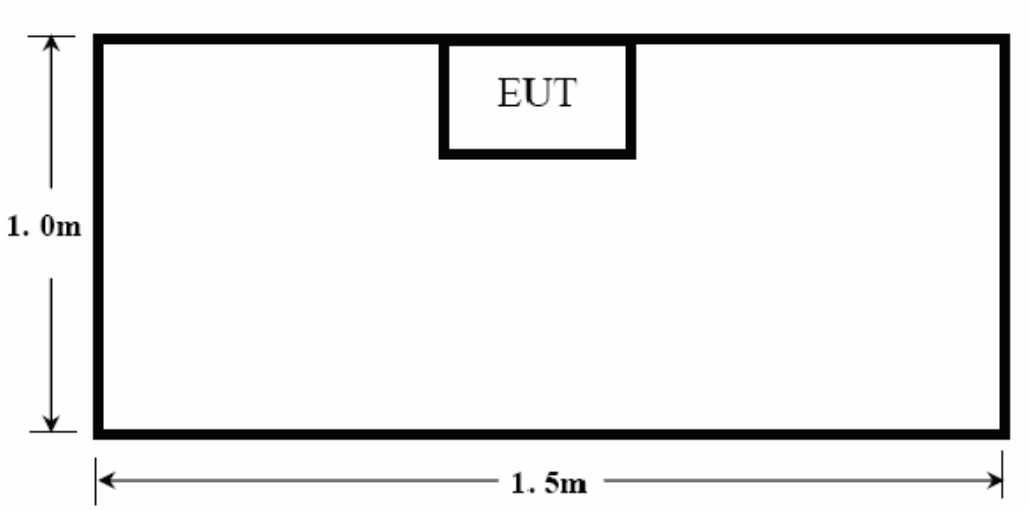
EUT	
Model Numbers:	P70B17X-Z
Model Tested:	P70B17AL-D4
Description:	Microwave Oven
Manufacturer:	Guangdong Galanz Enterprises Co., Ltd.

Support Equipment
N/A

Cable Description

Description	From	To	Length (Meters)	Shielded (Y/N)	Ferrite (Y/N)
Power Cable	EUT	Plug	1.20	N	N

Configuration of Tested System

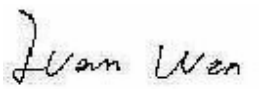


ATTACHMENT 1 – RADIATION HAZARD TEST

CLIENT:	Guangdong Galanz Enterprises Co., Ltd.	**TEST STANDERD:**	FCC Part 18
MODEL NUMBERS:	P70B17X-Z	**PRODUCT:**	Microwave Oven
MODEL TESTED:	P70B17AL-D4	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22℃	**HUMIDITY:**	56%RH
ATM PRESSURE:	101 kPa	**GROUNDING:**	Through AC Power Cord
TESTED BY:	Ivan Wen	**DATE OF TEST:**	2006, December 27th
TEST REFERENCE:	ANSI C63.4: 2003, FCC/OST MP-5:1986		
TEST PROCEDURE:	The EUT was set up according to the FCC MP-5 and FCC Part 18 for Radiation Hazard Measurement. The measurement was using a microwave leakage meter to measure the Radiation leakage in the as-received condition with the oven door closed. A 1000ml water load in a beaker was located in the center of the oven and the Microwave oven was set to maximum power. While the oven operating, the microwave meter will check the leakage and then record the maximum leakage.		
TESTED RANGE:	N/A		
TEST VOLTAGE:	120VAC / 60Hz		
RESULTS:	There was no microwave leakage exceeding a power level of 0.00384 mW/cm^2 observed at any point 5cm or more from the external surface of the oven. A maximum of 1.0mW/cm^2 is allowed in accordance with the applicable FCC standards. Hence, microwave leakage in the as-received condition with the oven door closed was below the maximum allowed. The test results relate only to the equipment under test provided by client.		
Changes or Modifications:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	0.0001 mW/cm^2		

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Field Monitor	R&S	AR FM5004	A0304252	25/05/06	24/05/07
Electric FieldProber	R&S	AR FP6001	A0304302	15/03/06	14/03/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY:  **ENGINEER**

Radiation Hazard Test Set-up

ATTACHMENT 2 – INPUT POWER MEASUREMENT

CLIENT:	Guangdong Galanz Enterprises Co., Ltd.	**TEST STANDERD:**	FCC Part 18
MODEL NUMBERS:	P70B17X-Z	**PRODUCT:**	Microwave Oven
MODEL TESTED:	P70B17AL-D4	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22℃	**HUMIDITY:**	56%RH
ATM PRESSURE:	101 kPa	**GROUNDING:**	Through AC Power Cord
TESTED BY:	Ivan Wen	**DATE OF TEST:**	2006, December 27th

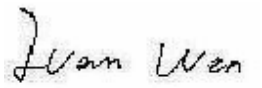
TEST REFERENCE:	ANSI C63.4: 2003, FCC/OST MP-5:1986
TEST PROCEDURE:	The EUT was set up according to the FCC MP-5 and FCC Part 18 for Input power Measurement. The input power and current was measured using a power analyzer. A 1000ml water load in a beaker was located in the center of the oven and the Microwave oven was set to maximum power. While the oven is operating, use a voltmeter and an ampmeter to test the AC input voltage and current.
TESTED RANGE:	N/A
TEST VOLTAGE:	120VAC / 60Hz
RESULTS:	Based on the measured input power, the EUT was found to be operating within the intended specifications. The test results relate only to the equipment under test provided by client.
Changes or Modifications:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	± 5W

Test Data:

Input Voltage (Vac/Hz)	Input Current (amps)	Measured Input Power (watts)	Rated Input Power (watts)
120V/60Hz	9.089	1038	1050

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Power frequency test system	Ainuo	AN8716PX	058704273	07/12/06	06/12/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY:  _____

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Input Power Test Set-Up

ATTACHMENT 3 – RF OUTPUT POWER MEASUREMENT

CLIENT:	Guangdong Galanz Enterprises Co., Ltd.	**TEST STANDERD:**	FCC Part 18
MODEL NUMBERS:	P70B17X-Z	**PRODUCT:**	Microwave Oven
MODEL TESTED:	P70B17AL-D4	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22℃	**HUMIDITY:**	56%RH
ATM PRESSURE:	101 kPa	**GROUNDING:**	Through AC Power Cord
TESTED BY:	Ivan Wen	**DATE OF TEST:**	2006, December 27th

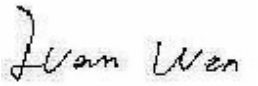
TEST REFERENCE:	ANSI C63.4: 2003, FCC/OST MP-5:1986
TEST PROCEDURE:	The EUT was set up according to the FCC MP-5 and FCC Part 18C for RF output power Measurement. The Caloric Method was used to determine maximum RF output power. The initial temperature of the water load was measured. A 1000ml water load in a beaker was located in the center of the oven. The oven was operated at maximum output power for 120 seconds, the temperature of the water was re-measured. RF Output Power = (4.2joules/calorie)(volume in milliliters)(temperature rise) / (time in seconds) RF Output Power = 4.2 joules/calorie × 1000 × (Final Temp – Initial Temp) / 120
TESTED RANGE:	N/A
TEST VOLTAGE:	120VAC / 60Hz
RESULTS:	RF Output Power = 483watts The test results relate only to the equipment under test provided by client.
Changes or Modifications:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	± 0.3℃

Test Data:

Quality of Water (ml)	Starting Temperature (℃)	Final Temperature (℃)	Elapsed Time (Seconds)	RF Output Power (watts)
120V/60Hz	19.3	36.0	120	584.5

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Data Acquisition	TES	TES-1310	020907011	12/03/06	11/03/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY:  _____

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RF Output Power Test Set-Up

ATTACHMENT 4 – OPERATING FREQUENCY MEASUREMENT

CLIENT:	Guangdong Galanz Enterprises Co., Ltd.	**TEST STANDERD:**	FCC Part 18
MODEL NUMBERS:	P70B17X-Z	**PRODUCT:**	Microwave Oven
MODEL TESTED:	P70B17AL-D4	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22℃	**HUMIDITY:**	56%RH
ATM PRESSURE:	101 kPa	**GROUNDING:**	Through AC Power Cord
TESTED BY:	Ivan Wen	**DATE OF TEST:**	2006, December 27th

TEST REFERENCE:	ANSI C63.4: 2003, FCC/OST MP-5:1986
TEST PROCEDURE:	The EUT was set up according to the FCC MP-5 and FCC Part 18 for Operating Frequency Measurement. **1) The variation of frequency with time.** The operating frequency was measured using a spectrum analyzer. Starting with the EUT at room temperature, a 1000ml water load in a beaker was located in the center of the oven. Set a spectrum analyzer with antenna at 3 meters distance form 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. **2) The variation of frequency with Line Voltage.** The operating frequency was measured using a spectrum analyzer. 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.
TESTED RANGE:	2450 ± 50MHz
TEST VOLTAGE:	120VAC / 60Hz
RESULTS:	Please refer to following pages for details of the variation in operating frequency with time & line voltage measurement. The test results relate only to the equipment under test provided by client.
Changes or Modifications:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	Freq. ±10kHz

Variation in Operating Frequency with Time:

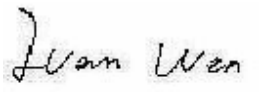
Minimum Frequency (MHz)	Maximum Frequency (MHz)
2464.8	2466.2

Variation in Operating Frequency with Line Voltage:

Minimum Frequency (MHz)	Maximum Frequency (MHz)
2461.6	2466.2
Note: Line voltage varied from 96Vac to 150Vac.	

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Vltra Broadband Antenna	ETS	3142C	00042672	04/12/06	03/12/07
Horn Antenna	ETS	3115	6587	04/07/06	03/07/07
EMI Receiver	R&S	FSP30	100755	04/12/06	03/12/07
5M Anechoic chamber	ETS	3m	N/A	19/03/05	18/03/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY:  _____

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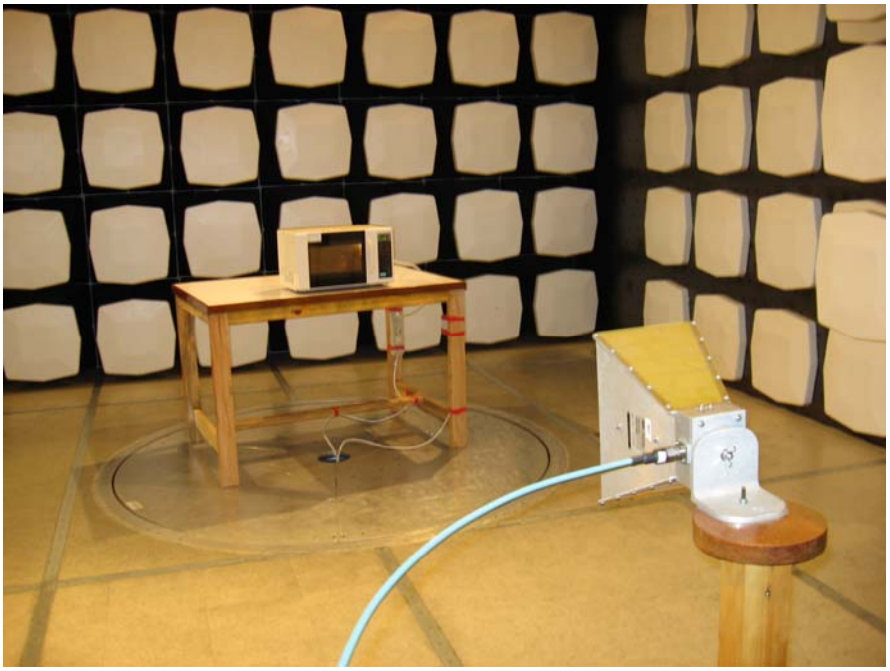
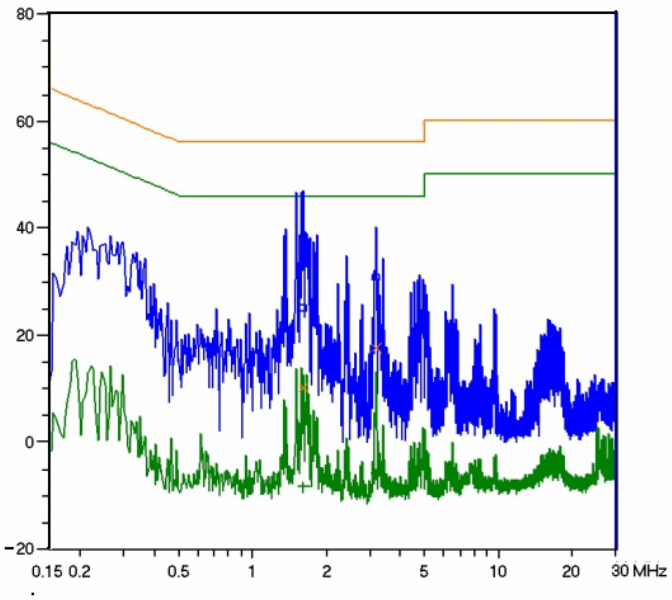


Operating Frequency Test Set-up

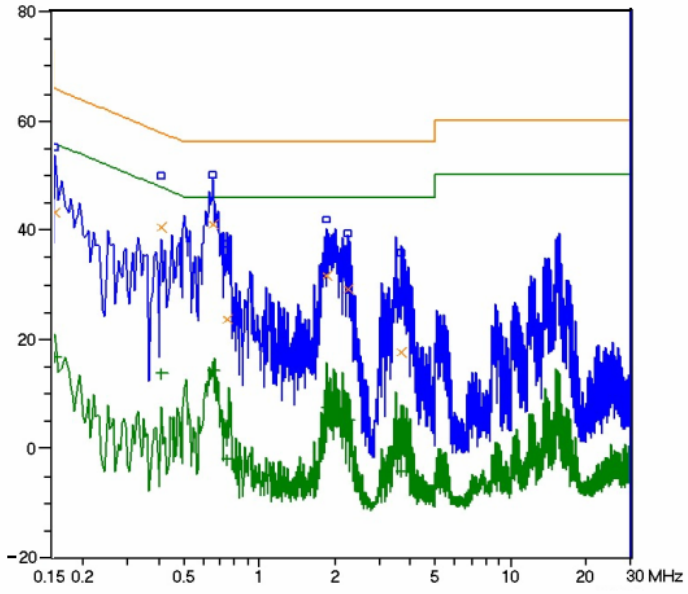
ATTACHMENT 5 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Guangdong Galanz Enterprises Co., Ltd.	**TEST STANDERD:**	FCC Part 18
MODEL NUMBERS:	P70B17X-Z	**PRODUCT:**	Microwave Oven
MODEL TESTED:	P70B17AL-D4	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22℃	**HUMIDITY:**	56%RH
ATM PRESSURE:	101 kPa	**GROUNDING:**	Through AC Power Cord
TESTED BY:	Ivan Wen	**DATE OF TEST:**	2006, December 27th

TEST REFERENCE:	ANSI C63.4: 2003, FCC/OST MP-5:1986
TEST PROCEDURE:	The EUT was set up according to the guideline of ANSI C63.4: 2003 & FCC MP-5 for conducted emissions. The measurement was using a AMN on each line and an EMI receiver peak scan was made at the frequency measurement range. The six highest significant peaks were then marked, and these signals were then quasi-peaked and averaged. The frequency range investigated was from 150kHz to 30MHz.
TESTED RANGE:	150kHz to 30MHz
TEST VOLTAGE:	120VAC / 60Hz
RESULTS:	The EUT meets the requirements of test reference for Conducted Emissions on line N by 16.9 dB of Quasi-Peak detector and by 29.8 dB of Average detector. The test results relate only to the equipment under test provided by client.
Changes or Modifications:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	±2.5 dB



Line L Conducted Emission Graph



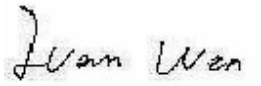
Line N Conducted Emission Graph

Test Data:

Line	Frequency [KHz]	Corrected QP Reading [dBµV]	Delta QP [dB]	Limit [dBµV/m]	Corrected AVE Reading [dBµV]	Delta AVE [dB]	Limit [dBµV/m]
L	1.4994	19.70	-36.3	56.00	7.80	-38.2	46.00
L	1.5866	16.30	-39.9	56.00	14.10	-31.9	46.00
L	3.1624	13.60	-42.4	56.00	14.50	-31.5	46.00
N	0.1538	48.90	-16.9	65.80	23.90	-31.9	55.80
N	0.4026	38.80	-19.0	57.80	7.60	-40.2	47.80
N	0.6454	34.80	21.2	56.00	16.20	-29.8	46.00
Note: All readings are using a bandwidth of 9 kHz, with a 30 ms sweep time.							

Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMI Receiver	SCHAFFNE	SMR4503	44	04/07/06	03/07/07
LISN	AGILENT	482512	1161	04/07/06	03/07/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					

SIGNED BY:  _____

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Conducted Emission Test Set-up

ATTACHMENT 6 - RADIATED EMISSION TEST RESULTS

CLIENT:	Guangdong Galanz Enterprises Co., Ltd.	**TEST STANDERD:**	FCC Part 18
MODEL NUMBERS:	P70B17X-Z	**PRODUCT:**	Microwave Oven
MODEL TESTED:	P70B17AL-D4	**EUT DESIGNATION:**	Home or Office
TEMPERATURE:	22℃	**HUMIDITY:**	56%RH
ATM PRESSURE:	101 kPa	**GROUNDING:**	Through AC Power Cord
TESTED BY:	Ivan Wen	**DATE OF TEST:**	2006, December 27th
TEST REFERENCE:	ANSI C63.4: 2003, FCC/OST MP-5:1986		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4: 2003 & FCC MP-5 for radiated emissions. Microwave oven was placed on a 1m *1.5m nonconductive table. The top of the table is 1.0 m above the ground. The table is placed on a flush mounted metal turntable. An EMI receiver peak scan was made at the frequency measurement range (pre-scan) in an Anechoic chamber. Signal discrimination was then performed and the significant peaks marked. All data was recorded in Quasi-peak detection mode from 30 MHz to 1GHz and average detector mode above 1GHz. The following data lists the significant emission frequencies, measured levels, correction factors (including cable and antenna correction factors), and the corrected readings against the limits. Explanation of the Correction Factor are given as follows: FS= RA + AF + CF - AG Where: FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Attenuation Factor AG = Amplifier Gain		
TESTED RANGE:	30MHz to 24.5GHz		
TEST VOLTAGE:	120VAC / 60Hz		

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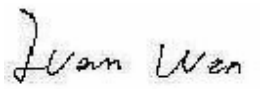
RESULTS:	The EUT meets the requirements of test reference for Radiated Emissions on Vertical polarization by 23.61 dB of Average detector at 7.3964 GHz. The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	± 3.2 dB

30MHz – 1GHz				
Frequency [MHz]	**Antenna Polarization [V/H]**	**Corrected Reading [dBµV/m]**	**Delta, QP [dB]**	**3 Meters Limits [dBµV/m]**
77.200	H	11.80	-56.84	68.64
139.468	H	15.70	-52.94	68.64
590.866	H	13.70	-54.94	68.64
348.400	V	8.40	-60.24	68.64
475.600	V	16.40	-52.24	68.64
722.200	V	16.80	-51.84	68.64
Note: All readings are quasi-peak unless stated otherwise, using a bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.				
1GHz – 24.5GHz				
Frequency [GHz]	**Antenna Polarization [V/H]**	**Corrected Reading [dBµV/m]**	**Delta, AVE [dB]**	**3 Meters Limits [dBµV/m]**
4.9260	H	43.76	-24.88	68.64
7.3940	H	41.52	-27.12	68.64
9.8410	H	44.63	-24.01	68.64
4.9285	V	44.14	-24.50	68.64
7.3964	V	45.03	-23.61	68.64
9.8514	V	43.40	-25.24	68.64
Comments: None				
Note: All readings are average unless stated otherwise, using a bandwidth of 1MHz, with a 30 ms sweep time. A video filter was not used.				

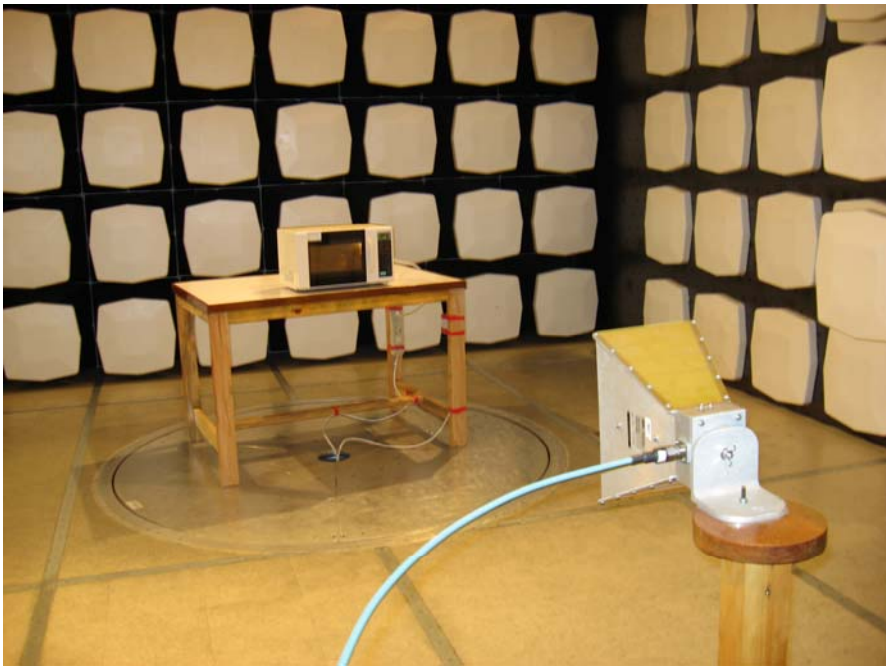
Test Equipment List:

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
Vltra Broadband Antenna	ETS	3142C	00042672	20/07/06	19/07/07
Horn Antenna	ETS	3115	6587	04/07/06	03/07/07
Band-pass Filter	Micro-Tronics	BRM50702	SIN-030	04/07/06	03/07/07
EMI Receiver 1	SCHAFFNE	SMR4503	44	04/07/06	03/07/07
Semi-anechoic chamber	ETS	3m	N/A	19/03/05	18/03/07
EMI Receiver 2	R&S	FSP30	100755	04/12/06	03/12/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated and traceable to the National Institute of Standards and Technology (NIST).					



SIGNED BY: _____

ENGINEER



Radiated Emission Test Set-up (1~18GHz)

Radiated Emission Test Set-up (30~1000MHz)