EMC TEST REPORT

According to FCC CFR47 Part 18 Subpart C

JOB Number : LBE042278

1. *This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.*
2. *This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 18 CFR47 Subpart C Intentional Radiators.*
   All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

This laboratory is registered by the NIST/NVLAP, U.S.A.
The test reported herein have been performed in accordance with its terms of registration.

NVLAP LAB CODE 200623-0

1. Applicant Name : SAMSUNG ELECTRONICS CO., LTD.
416 Maetan-3 Dong, Yeongtong-Gu, Suwon-Si,
Gyeonggi-Do, Korea, 443-742

2. Identification of tested device

2.1 FCC ID : A3L5TH1030N
2.2 Device Name : MICROWAVE OVEN
2.3 Trade Name : Maytag
2.4 Model Number : AMC5101AAW
Variant Model :
2.5 RF Output Power : **1000** W (by IEC 705 method)

3. Test Procedure and Items

3.1 FCC/OST MP-5 : 1986

4. Issued Date : Dec 29, 2004

Tested by:

Jay Yong, PARK / Test Engineer

Reviewed by:

No Cheon, PARK / Manager of EMC Lab.

Authorised by:

Kyu Baek, CHUNG / Chief of EMC Lab.

TABLE OF CONTENTS

1. Product Description

2. Test Facility

3. Accreditation and Listing

4. Radio Noise Emission Measurement Procedures/Results

- 4.1 Radiation Hazard Measurement
- 4.2 Input Power Measurement
- 4.3 RF Output Power Measurement
- 4.4 Operation Frequency Measurement
  - 4.4.1 Frequency Measurement
- 4.5 Conducted Emission Measurement
  - 4.5.1 Conducted Emission Measurement Procedure
  - 4.5.2 Conducted Emission Measurement Configuration
  - 4.5.3 Conducted Emission Measurement Data(0.15~30MHz)
- 4.6 Radiated Emission Measurement
  - 4.6.1 Radiated Emission Measurement Procedure
  - 4.6.2 Radiated Emission Measurement Configuration
  - 4.6.3 Radiated Emission Measurement Data(30 - 1000MHz)
  - 4.6.4 Radiated Emission Measurement Data(1 - 25GHz)

5. Measurement Equipment List

1. Product Description

The equipment under test is a microwave oven sold for consumer use.
Model : AMC5101AAW is a 1000 W microwave oven with digital controls.
Installation Type: Over-the-range
Clock Frequency : 8.0MHz

< Magnetron >
Model : OM-75P manufactured by Samsung Electronic Co., Ltd.

2. Test Facility

The Semi-anechoic chamber and Conducted measurement facilities used to collect the radiated data are located at 416 Maetan 3 Dong, Yeongtong-Gu, Suwon-Si, Kyungki-Do, Korea.
The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22.

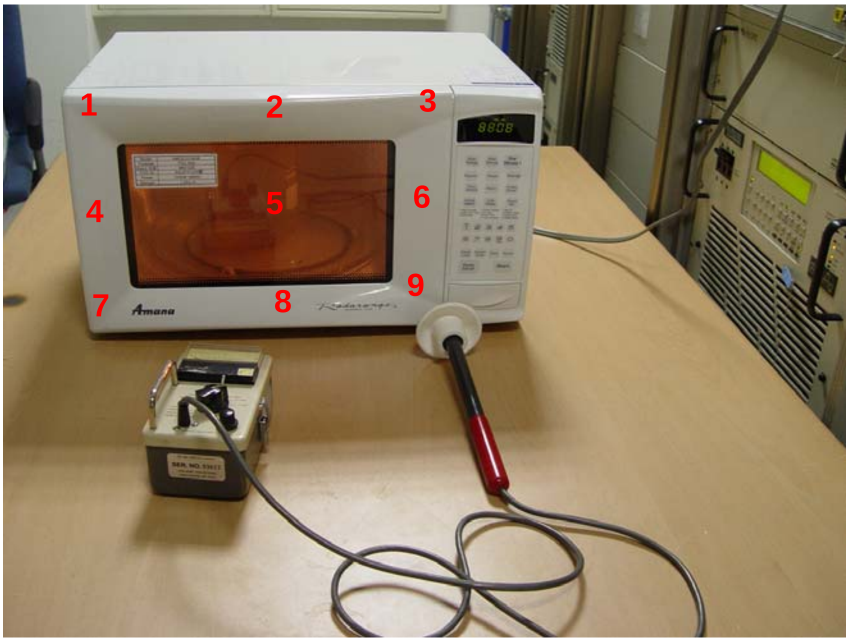
3. Accreditation and Listing

The test facilities used to perform radiated and conducted emissions tests are accrediated by National Voluntary Laboratory Accreditation Program for the specific of accreditation under Lab Code: 200623-0 to perform Electromagnetic Interference tests according to FCC PART 15 and CISPR 22 requirements.
No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

4. Radio Noise Emission Measurement Procedures/Results

4.1 Radiation Hazard Measurement

A 700-ml water load was placed in the center of the oven.
The power setting was set to maximum power.
While the oven was operating, the Microwave Survey Meter probe was moved slowly around the door seams to check for leakage.



The results of this test are as follows.

Probe Location	Maximum Leakage [mW/Cm2]	Limit [mW/Cm2]
1	0.05	1.0
5	0.05	1.0
6	0.05	1.0
All others	0.05	1.0

4.2 Input Power Measurement

Input power and current were measured using a Power Analyzer.
A 700ml water load was placed in the center of the oven and the oven set to maximum power. A 700 ml water load was chosen for its compatibility. Manufacturers to determine their input ratings commonly use this procedure.

Fig. 2 Test Setup for Input power

The results of this test are as follows.

Input Voltage [Vac]	Input Current [amps]	Measured Input power [watts]	EUT Spec. Input power [watts]
120	**12.9**	**1489**	**1500**

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

4.3 RF Output Power Measurement

The Caloric Method was used to determine maximum output power.
The initial temperature of a 1000-ml water load was measured. The water load was placed in the center of the oven. The oven was operated at maximum output power for 120 seconds. Then the temperature of the water re-measured.

Fig.3 Test Setup for RF output power

Quantity of water [ml]	Starting Temperature [centigrade]	Final Temperature [centigrade]	Elapsed Time [seconds]	RF Power [watts]
1000	10	**33.7**	120	826.9
1000	10	**32.3**	120	778.1
1000	10	**33.1**	120	806.0
Average RF Power of 3 Trials				803.7

Power = *(4.187 Joules/Cal) x (Volume in ml) x (Temp. Rise)* / *Time in seconds*

The measured output was found to be **ABOVE 500Watts**. Therefore, in accordance with section 18.305 of Subpart C, the measured out-of-band emissions were compared to the 25xSQRT(power/500)[uV/m] @ 300M limit.

4.4 Operation Frequency Measurement

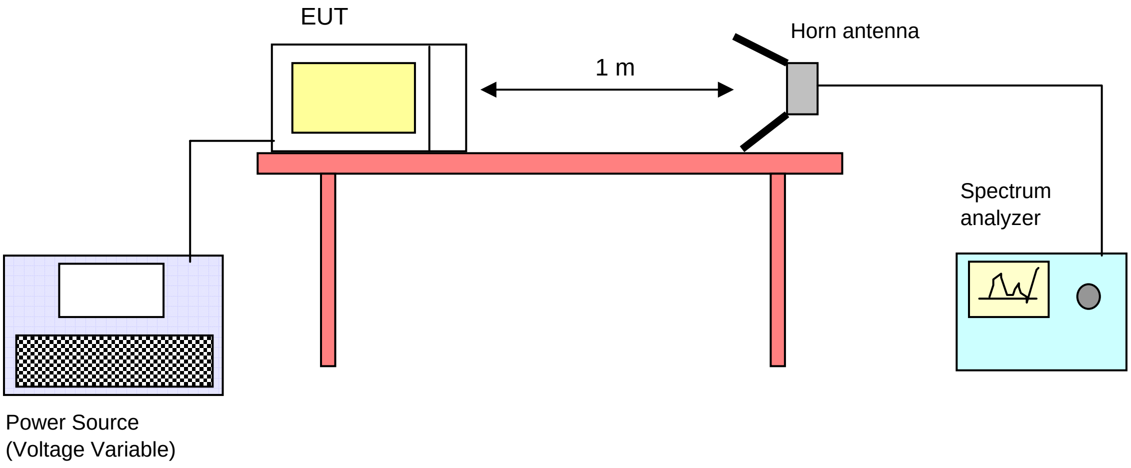
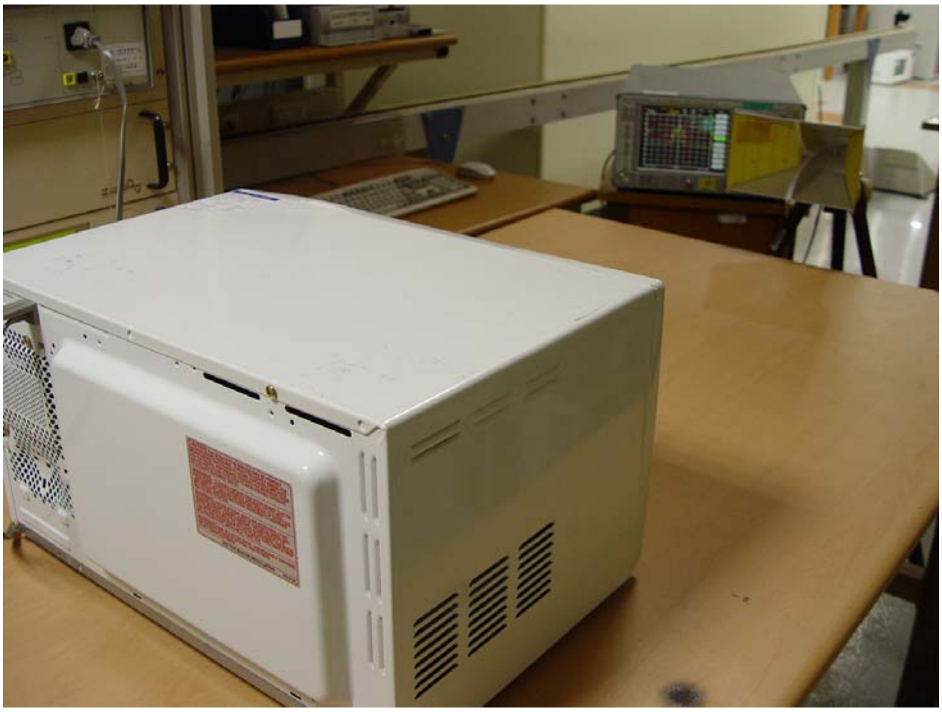


Fig. 4 Operating Frequency Measurements Configuration



4.4.1 Frequency Measurement

Following the above test, after operating the oven long enough to assure that stable operating temperature were obtained, the operating frequency was monitored as the input voltage was varied between 80 to 125 percent of the nominal rating.

The results of this test are as follows.
Line voltage varied from 96Vac to 150Vac.

Initial load : 1000 ml water in the glass beaker

(1) Frequence vs Line Voltage Variation Test

[Room Temperature : 23.0 ℃]

Line Voltage Variation (V)	Frequency (MHz)	Allowed Tolerance for the ISM Band (2450MHz)
150 (125%)	Lower : 2413	Lower: 2400 MHz Upper : 2500 MHz
	upper : 2487	
132(110%)	Lower : 2405	
	upper : 2488	
120 (Nominal)	Lower : 2409	
	upper : 2488	
108 (90%)	Lower : 2409	
	upper : 2481	
96 (80%)	Lower : 2412	
	upper : 2464	

Result : PASSED

(2) Frequence vs Load Variation Test

Initial load : 1000 ml water in the glass beaker

[Room Temperature : 23 ℃]

Volume of Water (cc)	Frequency (MHz)		Allowed Tolerance for the ISM Band (2450MHz)
1000	Lower :	2409	Lower: 2400 MHz Upper : 2500 MHz
	upper :	2488	
800	Lower :	2410	
	upper :	2494	
600	Lower :	2402	
	upper :	2477	
400	Lower :	2421	
	upper :	2457	
200	Lower :	2421	
	upper :	2471	

Note : Frequency was measured by using nominal voltage (AC120V)

Result : PASSED

4.5 Conducted Emission Measurement

4.5.1 Conducted Emission Measurement Procedure

Configurate the EUT System in accordance with ANSI C63.4-2003.
Connect the EUT's AC line cord to the EUT port of LISN.
All input terminals are terminated in the proper impedance.
The output ports are connected to the cable provided with the device and the ending port are terminated in the proper impedance.

Using a calibrated coaxial cable, the TEST RECEIVER is connected to the measuring port of the LISN for EUT.
To find out the maximum emission, change the position of the cable, and the EUT operation mode under normal usage of the EUT.
Then, the emission are scanned from 0.15MHz to 30MHz relative to the limit are recorded.

4.5.2 Radiated Emission Measurement Configuration

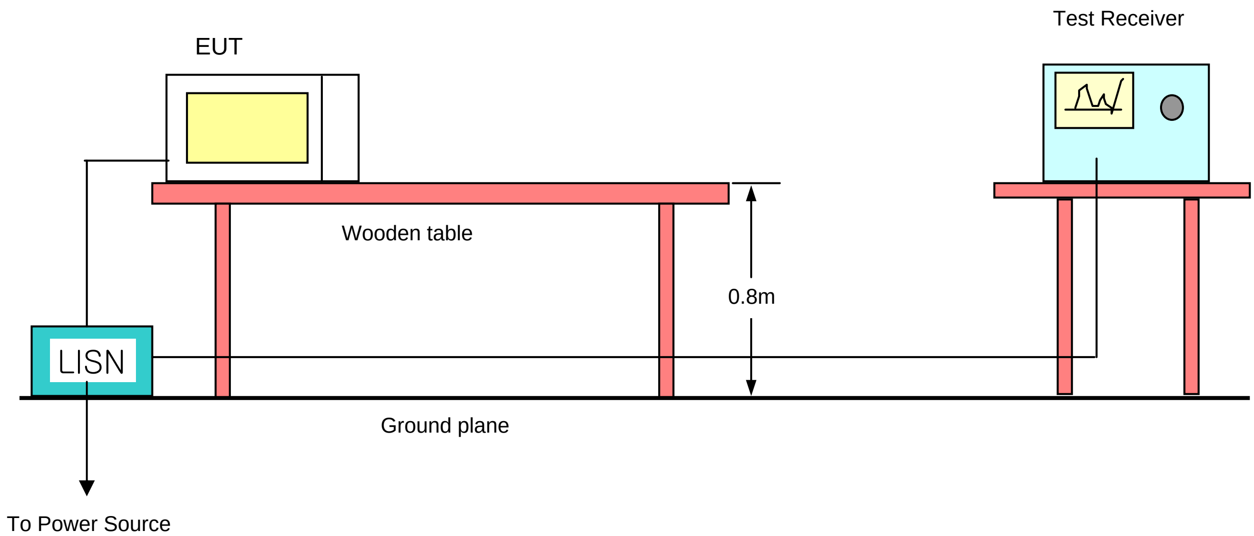


Fig. 5 Conducted Emission Configuration(0.15 - 30MHz)

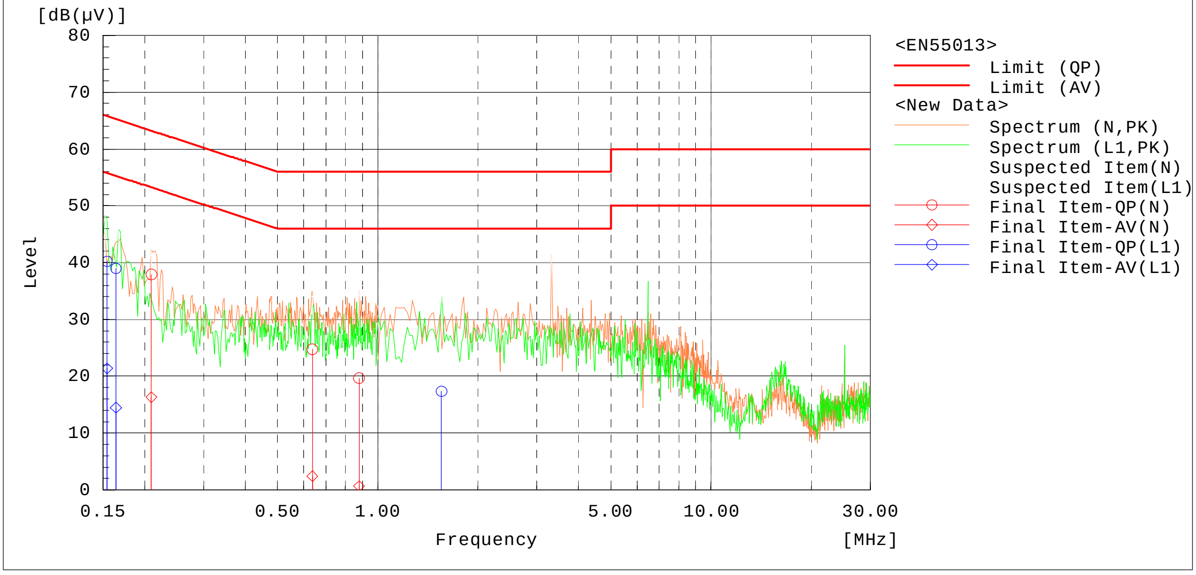
4.5.3 Conducted Emission Measurement Data(0.15 - 30MHz)

Samsung
- EMC Site -

<<Conducted Emission>>

21 December,2004 13:37

Model	: AMC5101AAW	Standard	: EN55013
Project Num	:	Remark1	:
Operator	: J Y.PARK	Remark2	:
OP Mode	:	Remark3	:
Temp,Humidity:		Remark4	:



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.2095	37.8	16.2	0.1	37.9	16.3	63.2	53.2	25.3	36.9
2	0.63656	24.6	2.3	0.1	24.7	2.4	56.0	46.0	31.3	43.6
3	0.87943	19.5	0.5	0.2	19.7	0.7	56.0	46.0	36.3	45.3
4	3.3202	-4.8	-11.2	0.1	-4.7	-11.1	56.0	46.0	60.7	57.1

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.15434	40.1	21.3	0.1	40.2	21.4	65.8	55.8	25.6	34.4
2	0.1639	38.9	14.3	0.1	39.0	14.4	65.3	55.3	26.3	40.9
3	1.5542	17.1	-2.0	0.2	17.3	-1.8	56.0	46.0	38.7	47.8

4.6 Radiated Emission Measurement

4.6.1 Radiated Emission Measurement Procedure

Radiated emission were measured over an inclusive frequency range to 30MHz through the tenth harmonic of the operating frequency. For this test, a 0.8-meter high wooden table in a semi-anechoic chamber supported the device under test. The table was placed on a turntable.

The measurement antenna was placed 3 meters for measurement from 30 to 1,000MHz and 1 meter for measurement from 1 - 25GHz, respectively, for the device under test. The indicated frequency range was swept as device under test was rotated along its vertical axis in 90 degree increments.

During the preliminary tests, the load consisted of 700-ml tap water placed in the center of the oven. The emissions were observed while the device under test was operated at maximum output power.

The level of the emissions near the edge of the designated ISM frequency band was measured. For this test, the load consisted of 700-ml water load located in the center of the oven.

The level of the second and third harmonic were measured inclusively with a 300-ml and 700-ml water load alternately placed in the center and side(or right front corner) of the oven.
The data obtained during these tests is contained on this report.

All other out-of-band emissions were measured while a 700-ml load was placed in the center of the oven. Maximum readings were recorded after variations in antenna polarizations, height, device orientation, load position, and size.
For frequencies above 1GHz, the test receiver detecting mode was set to average detection mode(Model no.:ESI , Rohde & Schwarz).

For all emissions the equivalent 300 meters intensity was calculated assuming linear decrease in the described, there were no over-limit emissions discorvered.

4.6.2 Radiated Emission Measurement Configuration

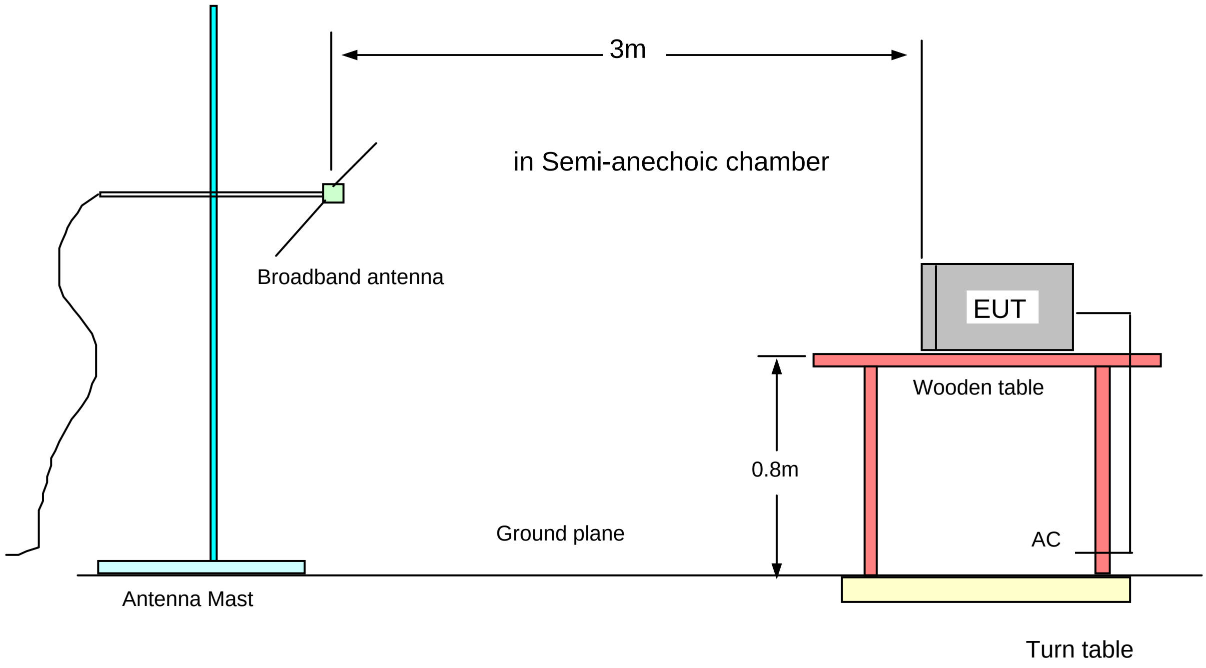


Fig. 6 Radiated Emission Configuration(30 - 1000MHz)

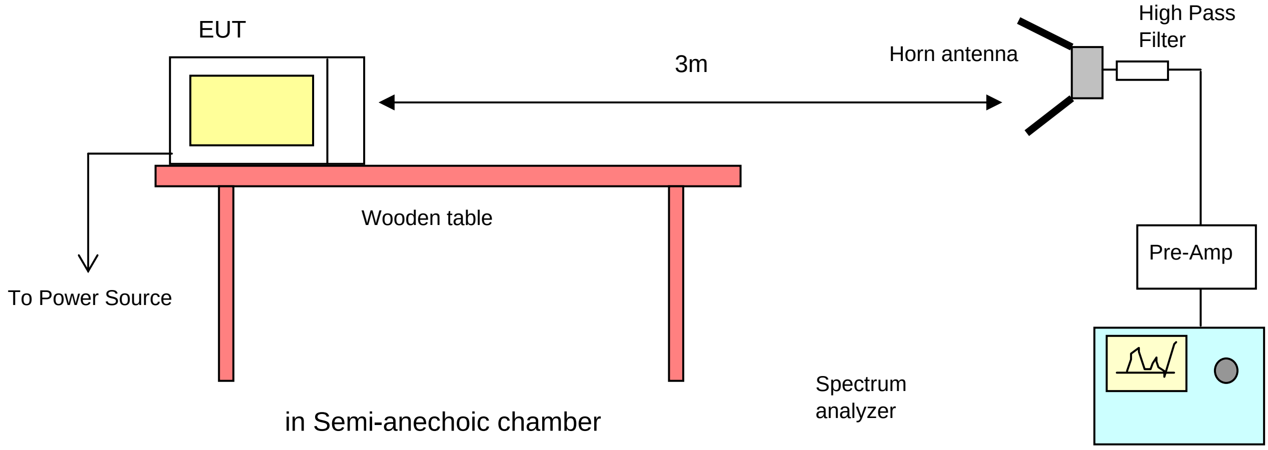


Fig. 7 Radiated Emission Configuration(1 - 25GHz)

4.6.3 Radiated Emission Measurement Data(30 - 1000MHz)

Test distance : 3m

Tested Frequency [MHz]	Meter Reading [A] [dBuV]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Limits at 3m [dBuV/m]	ANT Pol.	Margin (Limit-Result) [dB]	Antenna Height [Cm]	Turn table Degree [Deg]
	Pk		**Pk**			**Pk**		
31.4	53.5	-8.8	44.7	70.02	V	25.32	100	0
57.3	58.4	-19.7	38.7	70.02	V	31.32	100	0
64.1	57.4	-20.5	36.9	70.02	V	33.12	100	0
353.0	45.5	-7.0	38.5	70.02	H	31.52	350	30
901.0	38.5	3.0	41.5	70.02	V	28.52	100	0
939.8	44.1	3.6	47.7	70.02	H	22.32	350	30

[NOTE]

** fo = 2450MHz*
** Test distance : 3m*
** Results = Meter Reading + Total Loss(Antenna factor + Cable loss)*
** Distance Correction factor : 20 x log(d1/d2)[dBuV/m]*

20 x log(300/3) = + 40dBuV/m

** The limit at 300 meters is* 30.02 *dBuV/m.*
Add 40dB 30.02 *dBuV/m gives a* 70.02 *dBuV/m @ 3 meters.*
** Spectrum analyzer setting*
Peak(Pk) : Resolution Bandwidth(1MHz), Video Bandwidth(1MHz)

4.6.4 Radiated Emission Measurement Data(1 - 25GHz)

Test distance : 3m

Tested Frequency [MHz]	Meter Reading [dBuV]	Total Loss [dB]	AMP [dB]	HPF [dB]	k Factor	Results [A+B] [dBuV/m]	Limits at 3m [dBuV/m]	ANT Pol.	Margin [dB]
1225	55.8	26.1	38.7	0	0.0022	0.32	30.02	V	29.70
2345	54.1	26.3	40.4	0	0.0061	0.60	30.02	V	29.42
2387	50.3	26.3	40.4	0	0.0062	0.40	30.02	V	29.62
2398	48.2	26.3	40.4	0	0.0062	0.31	30.02	V	29.71
2527	62.4	33.5	31.3	0	0.0065	10.98	30.02	V	19.04
2709	52.8	33.5	31.3	0	0.0088	4.94	30.02	V	25.08
3691	42.4	34.8	41.7	1	0.01	0.67	30.02	V	29.35
4922	49.5	37.1	42.0	1	0.01	1.91	30.02	V	28.11
7407	67.9	40.0	41.5	1	0.01	23.36	30.02	V	6.66
9856	37.6	38.3	41.4	1	0.01	0.59	30.02	V	29.43
12345	41.4	41.2	40.1	1	0.01	1.50	30.02	V	28.52
12852	47.3	41.6	41.9	1	0.01	2.49	30.02	V	27.53
14790	46.6	41.3	42.5	1	0.01	2.10	30.02	V	27.92
17148	42.9	43.0	41.2	1	0.01	1.93	30.02	V	28.09

** **f** o = 2450MHz*
** **Total Loss** : Antenna Factor+ Cable Loss,   **HPF** : High Pass Filter(4.5GHz)*
** **AMP** : Pre-amplifier*
** The limit at 300 meters is 20 * LOG (25 * RF Power/500)*
** Results : Field Strength abobe 1000MHz (at 300m)(uV/m) = K*10 $^{[\text{Field strengh at 3m(dBuV/m)/20}]}$*
** Margin = Result-Limit*

[NOTE]

1. Load for measurement of radiation on second and third harmonic : Two loads, one of 1000ml and the other of 450ml, of water were used. Each load was tested both with the beaker located in the center of the oven and with it in the corner.

** k : Conversion Factor*

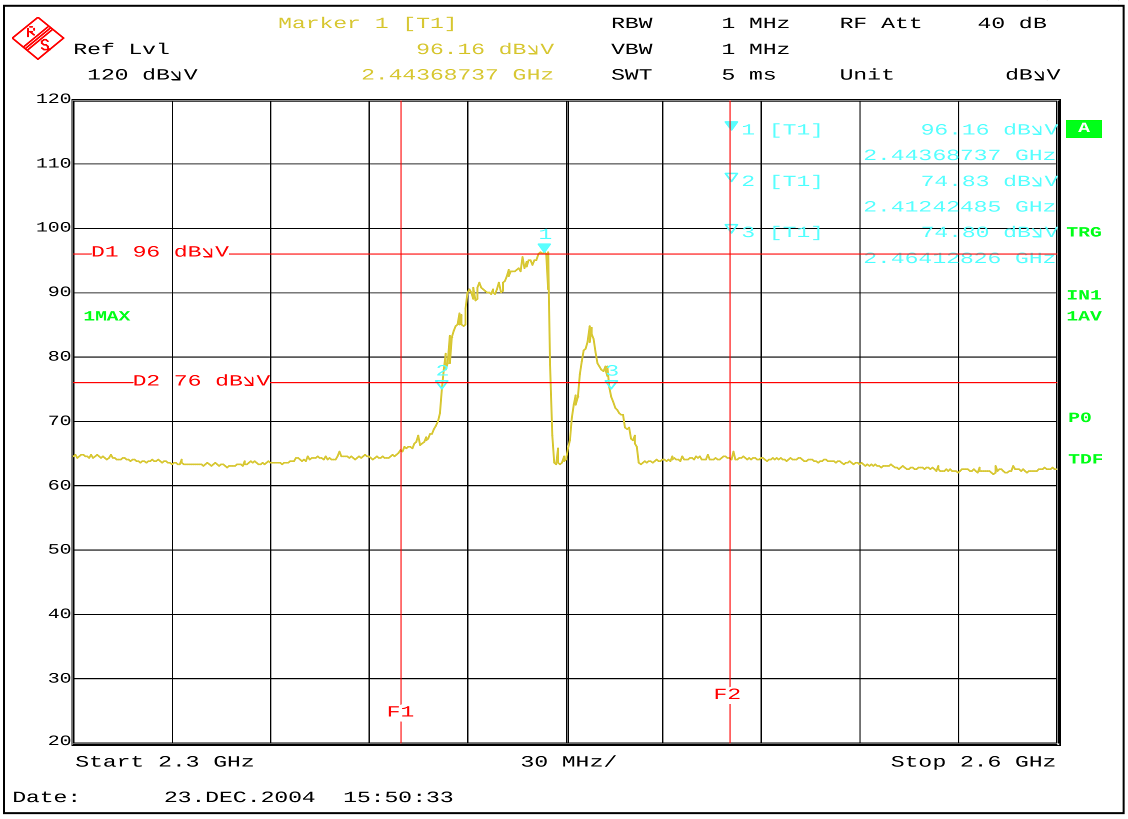
*K = 0.0137 * logF - 0.0401 (if F $<$ 4575 MHz)*
K = 0.01 (if F $\geq$ 4575 MHz)
F = Meter Reading Frequency

5. Measurement Equipment List

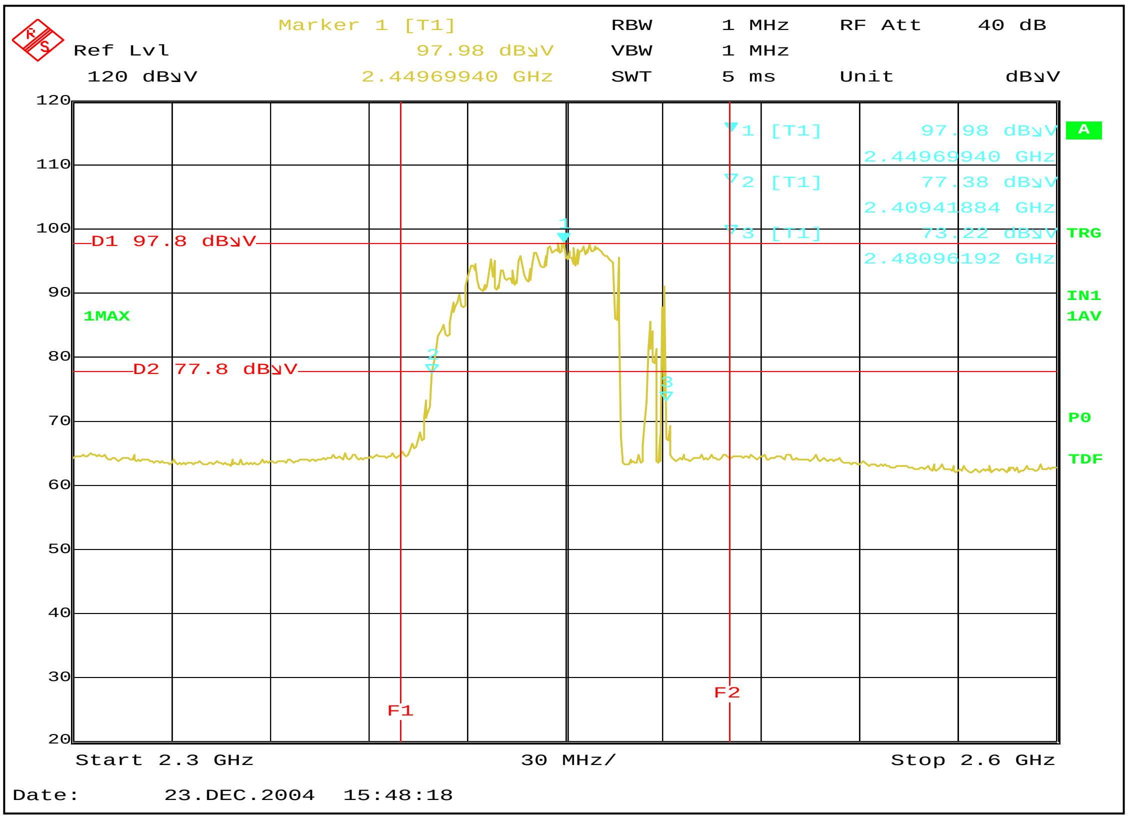
Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Field strength meter	ESCS30	839809/002	R & S	04/04/28, 12Months
	ESI26	832692/002	R & S	04/05/24, 12Months
Measurement Software	EP5RE	-	TOYO	N/A
Pre-Amplifier	8449B	3008A00705	H.P	04/07/20, 12Months
Double Ridged Guide Antenna	3115	9505-4441	EMCO	04/05/23, 24Months
Microwave Survey Meter	HI-1501	93661	H.I	04/10/02, 12Months
High Pass Filter	3H10-4500	2	K & L	04/11/11, 12Months
Amplifier	DWT-18213	004-9942	DSB Microwave	04/11/10, 12Months
Biconilog Antenna	CBL6112B	2767	SCHAFFNER	04/05/22, 12Months
Spectrum Analyzer	E7405A	MY42000052	Agilent	04/08/04, 12Months
Field strength meter	ESS	844661/005	R&S	04/01/05, 12Months
L.I.S.N	ESH3-Z5	100262	R&S	04/02/11, 12Months
Measurement Software	EP5CE	-	TOYO	N/A

Frequence vs Line Voltage Variation Test

96V(80%)

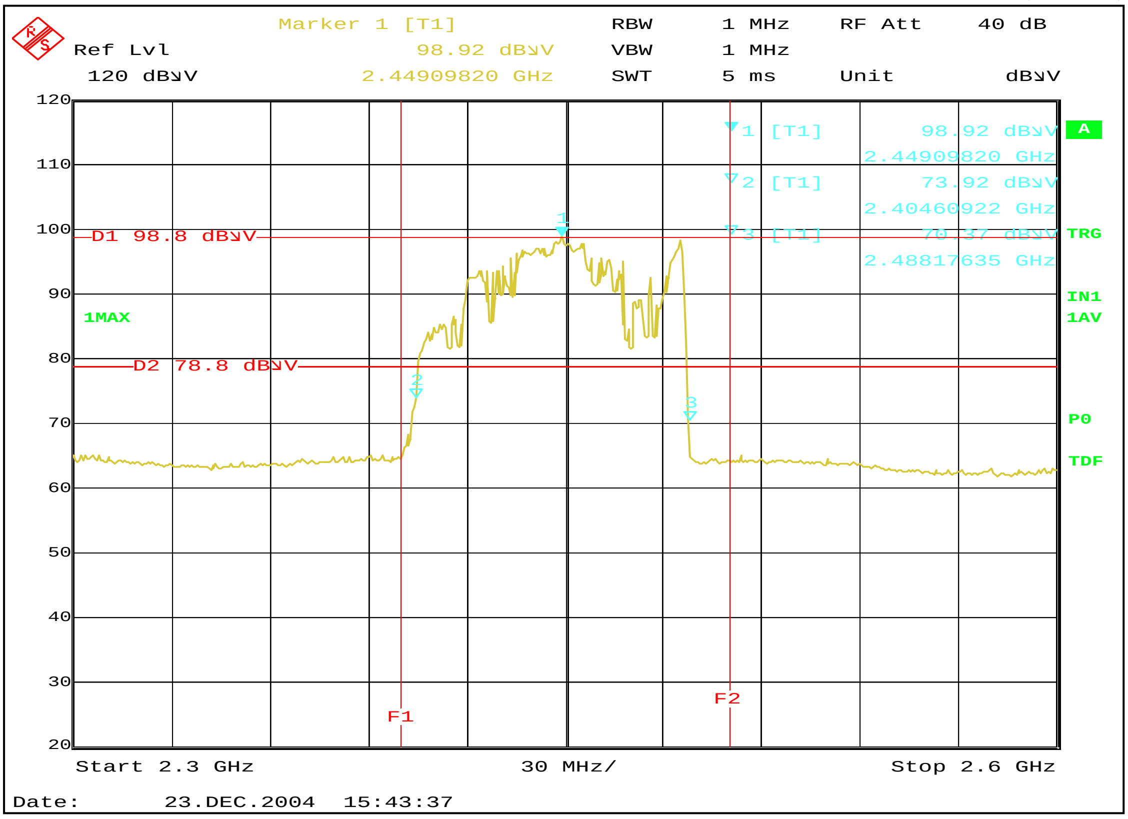


108V(90%)

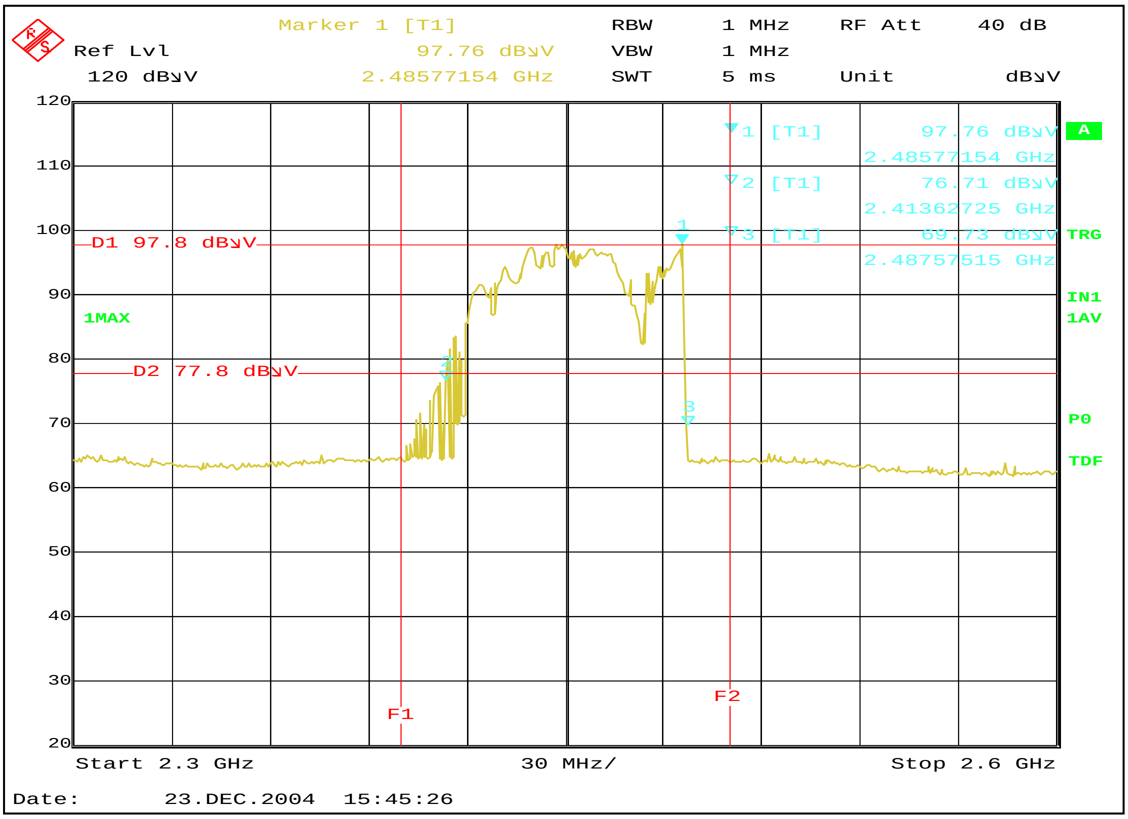


Frequence vs Line Voltage Variation Test

132V(110%)

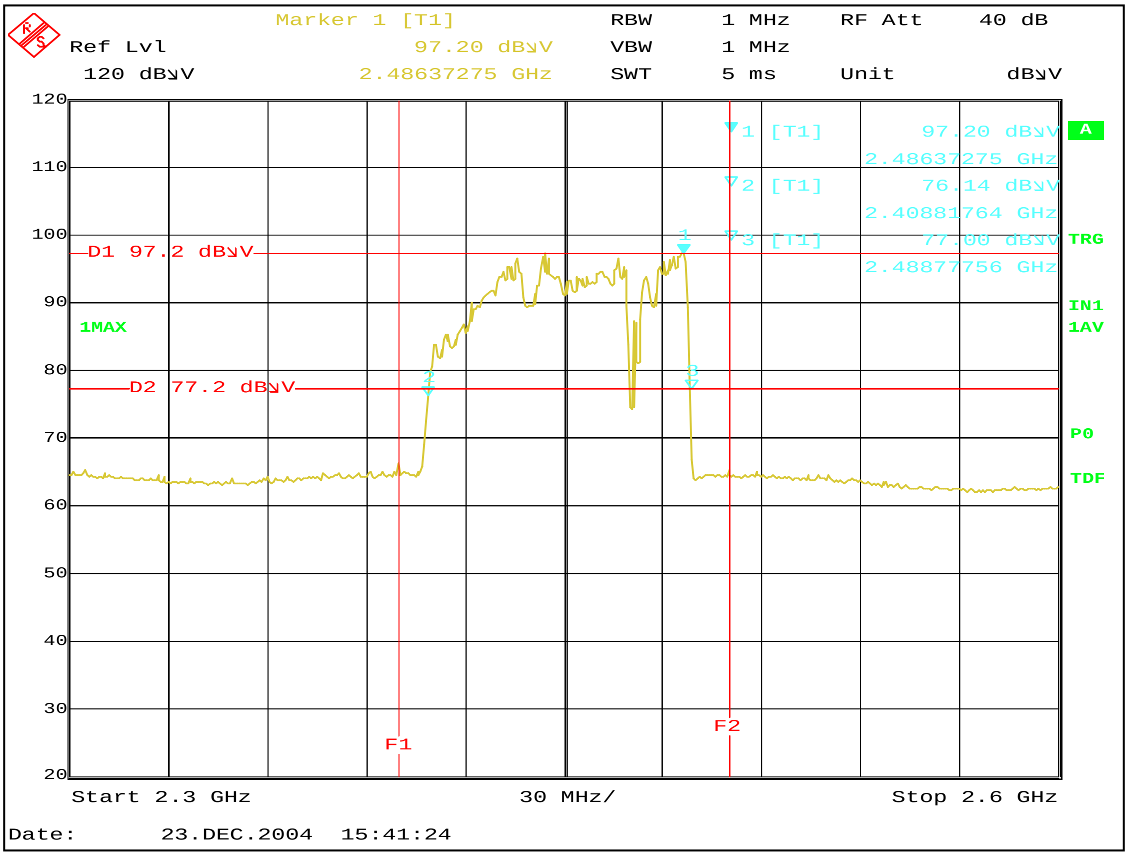


150V(125%)

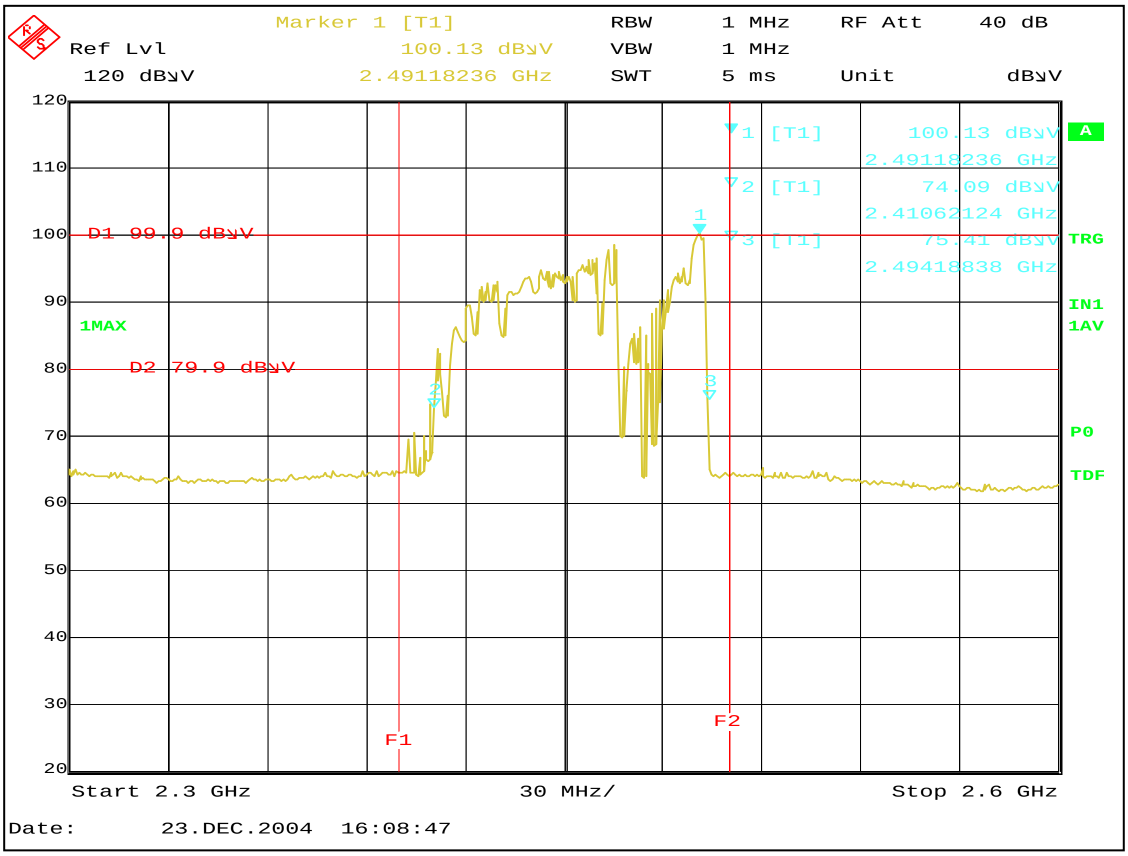


Frequence vs Load Variation Test

120V(1000ml)

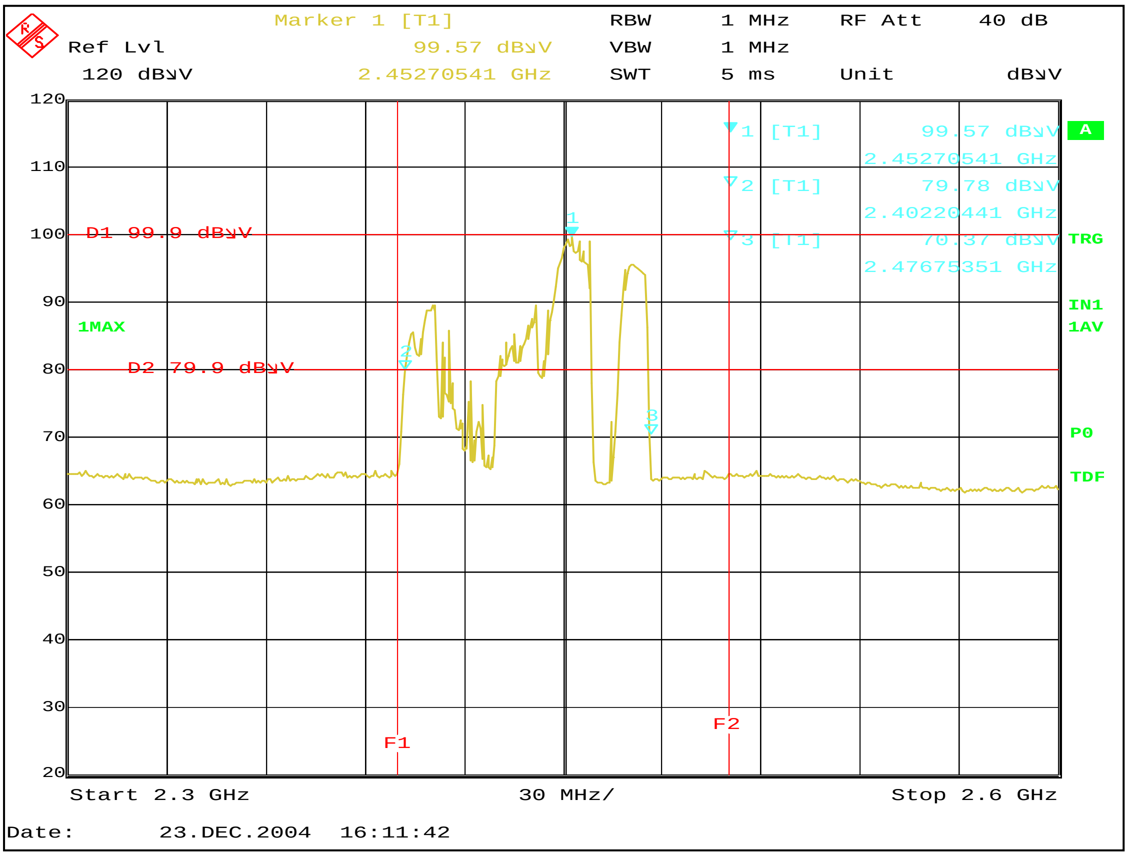


120V(800ml)

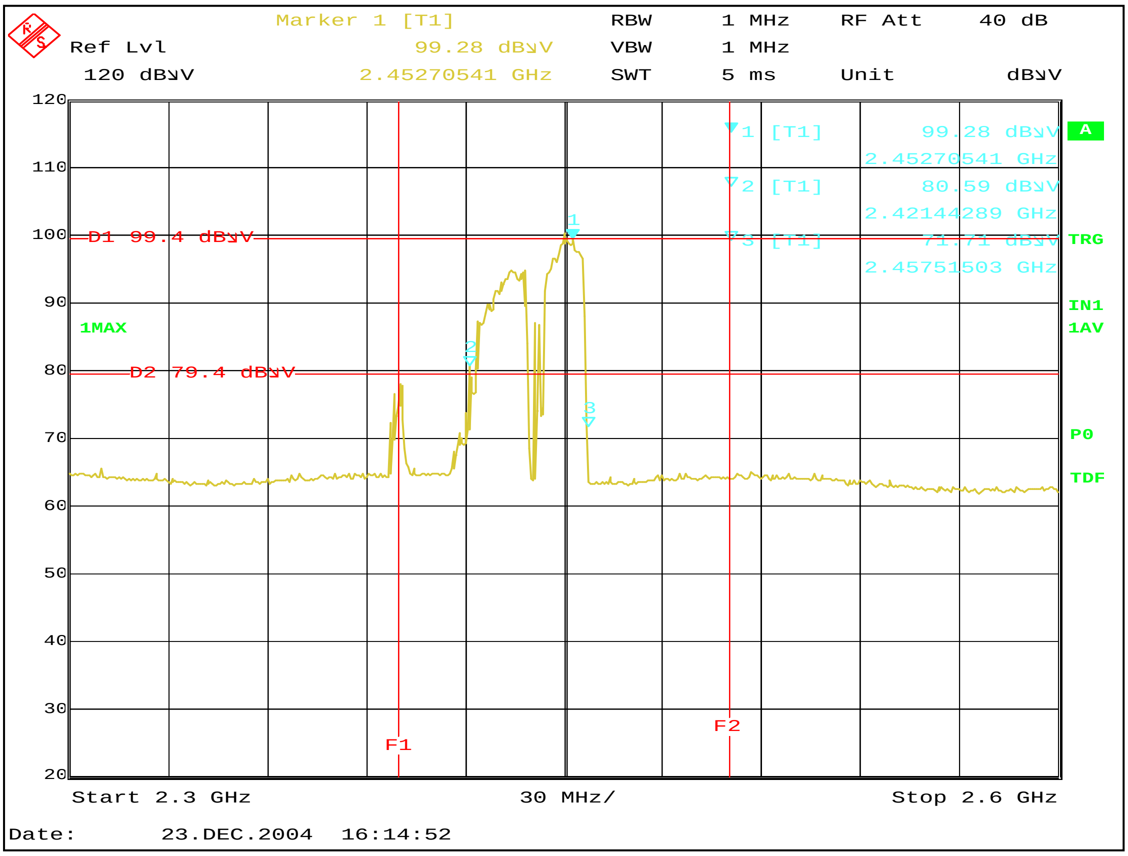


Frequence vs Load Variation Test

120V(600ml)

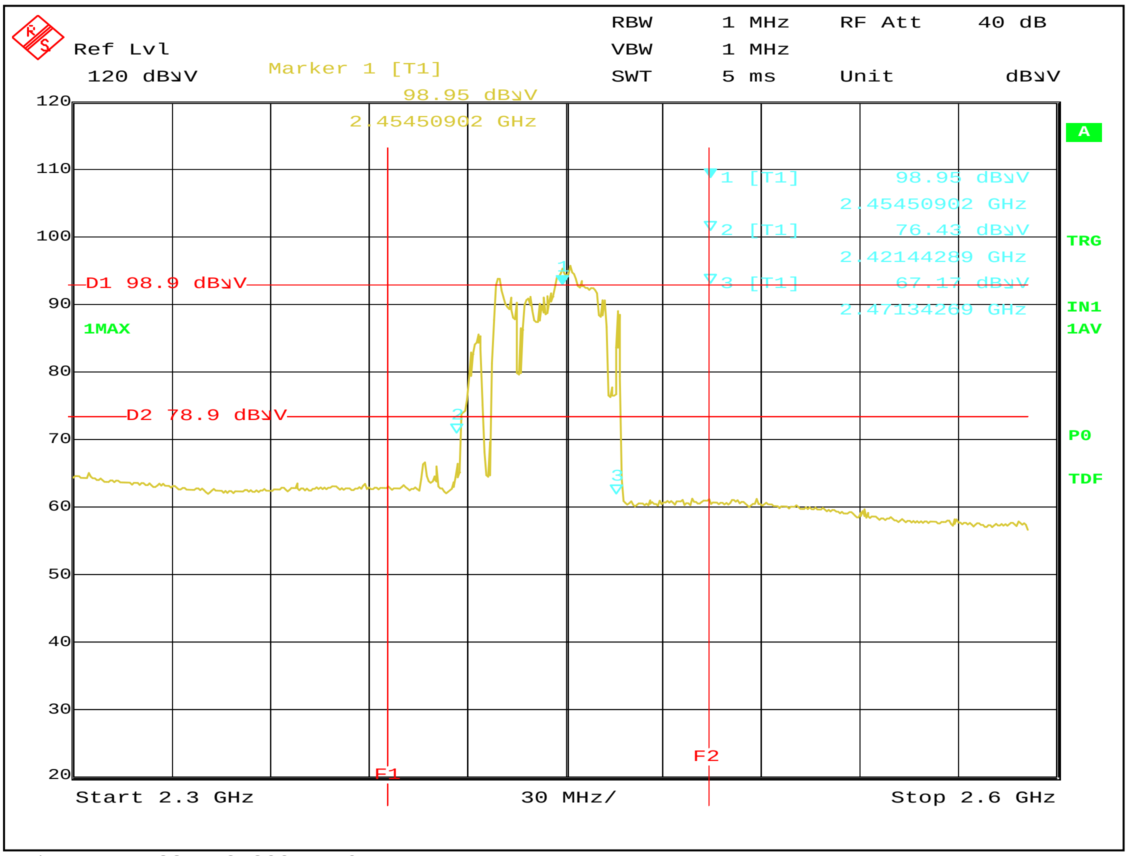


120V(400ml)



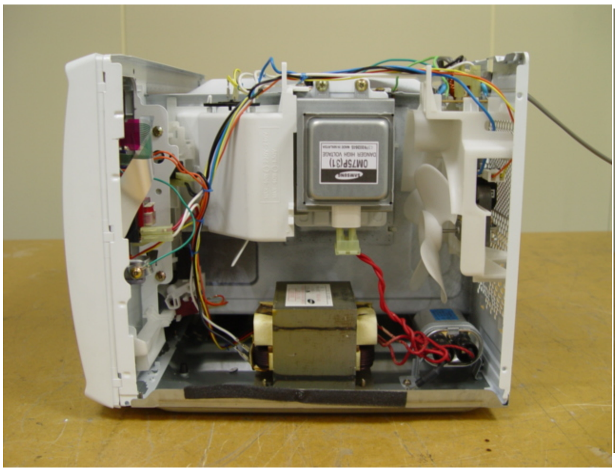
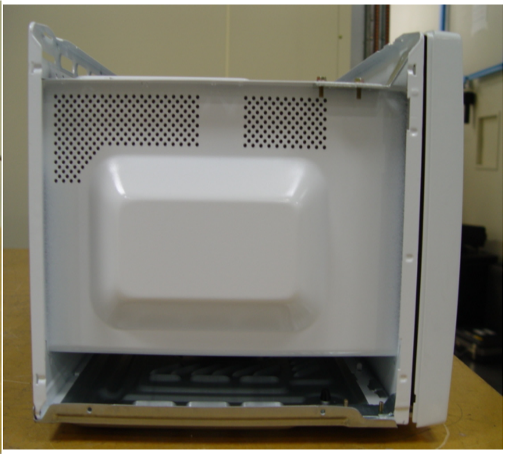
Frequence vs Load Variation Test

120V(200ml)



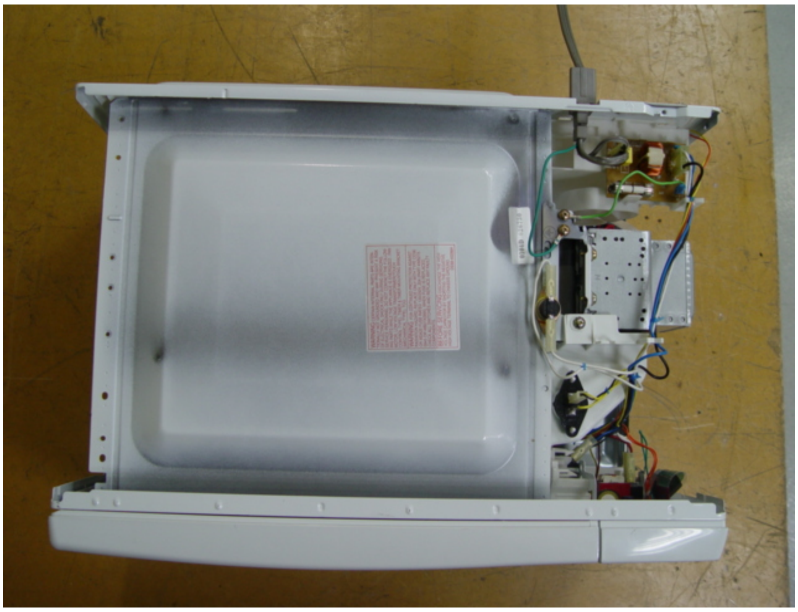
Date: 23.DEC.2004 16:17:44

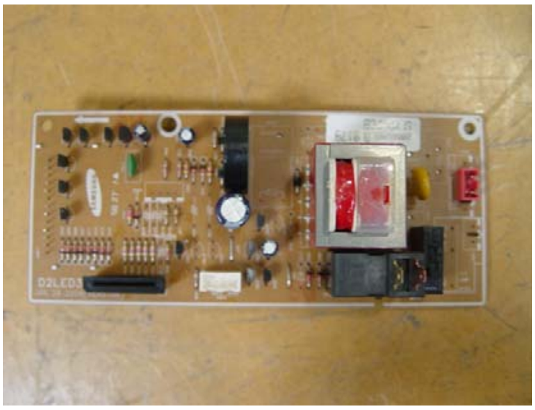

Amana

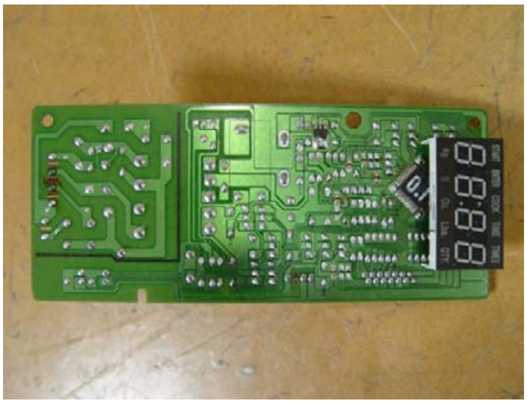



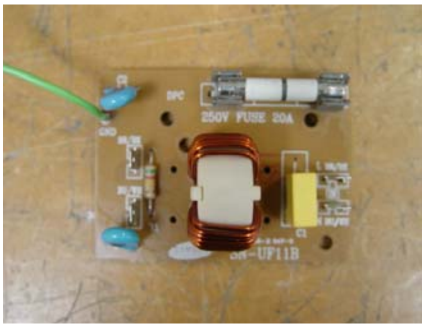
DANGER
HIGH VOLTAGE
SAMSUNG
SHV-UT10KA
120V 60Hz
AC EDX
ELEDEX CO.,LTD.
10KA
N12Y3ZPY A

SAMSUNG
OM75P(31)
DANGER HIGH VOLTAGE
MADE IN MALAYSIA








250V FUSE 20A