

EMC TEST REPORT

For

Microwave Oven

Model Number: WP700D-N20, WP700D-S20
FCC ID: NRTSZJENSMWO20LS

Report Number : WT088002718

Test Laboratory	:	Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory Guangdong EMC Compliance Test Center
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TEST REPORT DECLARATION

Applicant : Shenzhen Jens Electric Co., Ltd.
Block 71, Changxing Industrial Zone, Gongming Town, Baoan,
Shenzhen, China.

Manufacturer : Shenzhen Jens Electric Co., Ltd.
Block 71, Changxing Industrial Zone, Gongming Town, Baoan,
Shenzhen, China.

EUT Description : Microwave oven

Model Number : WP700D-N20, WP700D-S20

FCC ID : NRTSZJENSMWO20LS

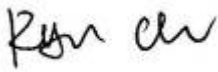
Test Standards:

FCC Part 18 18.301, 18.305, 18.307

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. 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), FCC MP-5 and the energy emitted by the sample EUT tested as described in this report is in compliance with FCC Rules Part 18.301, 18.305, 18.307.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by:



(Ryan Chen)

Date:

Feb.24.2009

Checked by:

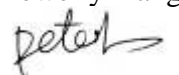


(Dewelly Yang)

Date:

Feb.24.2009

Approved by:



(Peter Lin)

Date:

Feb.24.2009

1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Conducted Disturbance	18.307	Pass
Radiated disturbance	18.305	Pass
Operating Frequency	18.301	Pass

2. GENERAL INFORMATION

2.1. Report information

- 2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.
- 2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.
- 2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Committee for Laboratories (**CNAL**) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is L0579.

The Laboratory is listed in the United States of American Federal Communications Commission (**FCC**), and the registration number are **97379**(open area test site) and **274801**(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (**VCCI**), and the registration number are **R-1974**(open area test site) , **R-1966**(semi anechoic chamber), **C-2117**(mains ports conducted interference measurement) and **T-180**(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (**IC**), and the registration number is **IC4174**.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is E2024086Z02.

2.3. Measurement Uncertainty

Available upon request.

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description : Microwave oven
Applicant : WP700D-N20, WP700D-S20
Model Number : Shenzhen Jens Electric Co., Ltd.
Input : AC120V/60Hz
Rated Microwave Power : 700W
Magnetron : JENS JM002

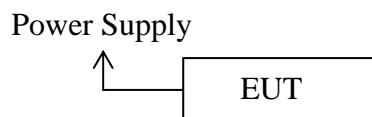
Remark: The sameness and differences between WP700D-N20 and WP700D-S20 are as follows:

- 1, Above two models belong to the same series products, most relevant parameter, such as microwave input power, output power, cavity capacity, interlock switch, and all safety component, are exactly the same.
- 2, Above two products are all digital controlled.
- 3, The difference between both models:
The model name, control board and oven door's appearance.

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: NRTSZJENSMWOC20LS filing to comply with Section 18.301, 18.305, 18.307 of the FCC Part 18, Subpart C Rules.

3.3. Block Diagram of EUT Configuration



3.4. Operating Condition of EUT

Test mode 1: P10 (Full power microwave output)

3.5. Support Equipment

N/A

3.6. Test Conditions

Temperature: 23-24°C
Relative Humidity: 33-43%

3.7. Modifications

No modification was made.

4. TEST EQUIPMENT USED

4.1. Test Equipment Used to Measure Conducted Disturbance

Table 2 Conducted Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	Jan.24, 2008	1 Year
SB4357	AMN	Rohde & Schwarz	ESH2-Z5	Jan.24, 2008	1 Year

4.2. Test Equipment Used to Measure Radiated Disturbance

Table 3 Radiated Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.24, 2008	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Jan.24, 2008	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.24, 2008	1 Year

5. CONDUCTED DISTURBANCE TEST

5.1. Test Standard and Limit

5.1.1. Test Standard

FCC Part 18

5.1.2. Test Limit

Table 4 Conducted Disturbance Test Limit (Part 18 consumer device)

Frequency	Limit (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

* Decreasing linearly with logarithm of the frequency

5.2. Test Procedure

The EUT was set up according to the guideline of ANSI C63.4: 2003 & FCC MP-5 for conducted emissions. The EUT is put on a table of non-conducting material that is 40cm high. The vertical conducting wall of shielding is located 80cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions form both sides of AC line. The bandwidth of EMI test receiver is set at 9kHz.

5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

5.4. Test Data

The emissions don't show in below are too low against the limits, the test curves are shown in the APPENDIX I

Table 5 Conducted Disturbance Test Data

Model No.: WP700D-N20									
Test Mode: 1									
Line					Neutral				
Frequency (MHz)	Quasi-Peak		Average		Frequency (MHz)	Quasi-Peak		Average	
	Reading (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Limit (dB μ V)		Reading (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Limit (dB μ V)
0.150	49.5	66	21.6	56	0.165	48.7	65.2	21.5	55.2
0.210	46.1	63.2	21.8	53.2	0.230	46.3	62.4	19.8	52.4
0.250	49.6	61.7	21.1	51.7	0.270	43.2	61.1	18.6	51.1
0.265	47.5	61.3	21.4	51.3	0.340	39.6	59.2	15.2	49.2
0.435	40.8	57.1	14.6	47.1	0.522	34.6	56	10.6	46
0.510	42.7	56	15.2	46	0.575	35.1	56	10.0	46

Table 6 Conducted Disturbance Test Data

Model No.: WP700D-S20									
Test Mode: 1									
Line					Neutral				
Frequency (MHz)	Quasi-Peak		Average		Frequency (MHz)	Quasi-Peak		Average	
	Reading (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Limit (dB μ V)		Reading (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Limit (dB μ V)
0.160	40.5	65.4	17.2	55.4	0.165	34.5	65.2	12.1	55.2
0.195	37.3	63.8	14.0	53.8	0.225	33.4	62.6	12.3	52.6
0.245	35.8	61.9	12.9	51.9	0.320	31.4	59.7	10.8	49.7
0.460	37.1	56.7	12.3	46.7	0.370	28.6	58.5	9.6	48.5
0.495	37.4	56.1	11.8	46.1	0.505	33.0	56	8.2	46
0.505	36.8	56	11.7	46	0.545	32.1	56	8.9	46

6. RF POWER OUTPUT MEASUREMENT AND RESULT

The Calorimetric Method was used to determine maximum output power. A 1000 ml water load was placed in the center of the oven. A thermometer was used to measure temperature rise.

$$Power(W) = \frac{(4.2 \text{ Joules / Cal}) * (Volume \text{ In ml}) * (Temperature \text{ Rise})}{Time \text{ in Seconds}}$$

Model No.: WP700D-N20

Magnetron type: JENS JM002

Quantity of Water(ml)	Starting Temperature(°C)	Final Temperature((°C)	Elasped Time(Second)
1000	11.6	20.8	60

$$Power(W) = \frac{(4.2) * (1000) * (9.2)}{60}$$

Power(W)=644

Model No.: WP700D-S20

Magnetron type: JENS JM002

Quantity of Water(ml)	Starting Temperature(°C)	Final Temperature((°C)	Elasped Time(Second)
1000	10.1	19.5	60

$$Power(W) = \frac{(4.2) * (1000) * (9.4)}{60}$$

Power(W)=658

7. RADIATED DISTURBANCE TEST

7.1. Test Standard and Limit

7.1.1. Test Standard

FCC Part 18

7.1.2. Test Limit

Table 7 Radiated Disturbance Test Limit

Operating Frequency	RF Power generated by equipment(watts)	Field strength limit (μV/m)	Distance (m)
Any ISM Frequency	Below 500	25	300
	500 or more	$25 \times \text{SQRT}(\text{power}/500)$	300

*For the EUT of this test report, the measured RF power is below 500W, and at test distance of 3 meters, the test limit is provided as 68.0dBμV/m according to the table above.

7.2. Test Procedure

The EUT was set up according to the guideline of ANSI C63.4: 2003 & FCC MP-5 for radiated emissions. The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

7.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

7.4. Test Data

Emissions don't show below are too low against the limits, the test curves are shown in the APPENDIX I

Table 8 Radiated Disturbance Test Data

Model No.: WP700D-N20						
Test Mode: 1						
Frequency MHz	Emission Level dB(μ V/m)	Cable loss	Antenna factor	Reading dB μ V	Polarization	Limits dB (μ V/m)
51.046	17.9	1.2	7.5	9.2	Vertical	69.1
490.06	36.9	3.7	17.6	15.6	Vertical	69.1
718.943	42.1	4.5	19.8	17.8	Vertical	69.1
1724.148	64.4	-32.2	28.5	36.4	Vertical	69.1
2020.801	32.7	-32.2	28.5	36.6	Vertical	69.1
2164.088	32.9	-31.0	33.3	46.7	Vertical	69.1
4875.681	49.0	-32.3	27.2	69.5	Vertical	69.1
236.494	20.3	2.7	12.0	5.7	Horizontal	69.1
306.224	16.6	2.9	13.8	-0.1	Horizontal	69.1
517.386	23.0	3.8	17.6	1.6	Horizontal	69.1
1984.208	31.5	-32.3	27.2	36.6	Horizontal	69.1
2169.959	32.2	-32.2	28.5	35.9	Horizontal	69.1
4880.511	63.9	-31.0	33.3	61.6	Horizontal	69.1
9759.388	56.2	-28.2	37.5	46.9	Horizontal	69.1

Table 9 Radiated Disturbance Test Data

Model No.: WP700D-S20						
Test Mode: 1						
Frequency MHz	Emission Level dB(μ V/m)	Cable loss	Antenna factor	Reading dB μ V	Polarization	Limits dB (μ V/m)
47.661	22.5	1.2	9.4	11.9	Vertical	69.2
181.462	17.2	2.2	9.8	5.2	Vertical	69.2
179.276	22.7	2.2	10.1	10.4	Vertical	69.2
518.637	26.4	3.8	17.6	5.0	Vertical	69.2
2023.847	26.1	-32.2	28.5	29.8	Vertical	69.2
2177.264	27.8	-32.2	28.5	31.5	Vertical	69.2
4885.070	62.3	-31.0	33.3	60.0	Vertical	69.2
7319.438	49.1	-28.3	36.4	41.0	Horizontal	69.2
178.360	19.0	2.2	10.1	6.7	Horizontal	69.2
449.950	24.3	3.4	16.9	4.0	Horizontal	69.2
779.671	28.3	4.7	20.2	3.4	Horizontal	69.2
2200.255	26.1	-32.2	28.5	29.8	Horizontal	69.2
2341.188	27.6	-32.2	28.5	31.3	Horizontal	69.2
4880.460	57.1	-31.0	33.3	54.8	Horizontal	69.2
7334.268	25.6	-28.3	36.4	17.5	Horizontal	69.2

Remark: For test above 1GHz, Average detector with 1MHz RBW is used.

8. OPERATING FREQUENCY TEST

8.1. Test Standard

8.1.1. Test Standard

FCC Part 18

8.2. Test Procedure

The EUT was set up according to the FCC MP-5 and FCC Part 18 for Operating frequency measurement.

1) 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.

2) Variation in Operating Frequency with Line Voltage

The EUT was operated/ warmed by at least 10minutes 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.

8.3. Test Data

Table 10 Variation in Operating Frequency with Time (WP700D-N20)

Minimum Frequency (MHz)	Maximum Frequency (MHz)
2406.6	2464.7

Table 11 Variation in Operating Frequency with Line Voltage (WP700D-N20)

Minimum Frequency (MHz)	Maximum Frequency (MHz)
2400.4	2465.1
Note: Line voltage varied from 96Vac to 150Vac	

Table 12 Variation in Operating Frequency with Time (WP700D-S20)

Minimum Frequency (MHz)	Maximum Frequency (MHz)
2407.3	2466.9

Table 13 Variation in Operating Frequency with Line Voltage (WP700D-S20)

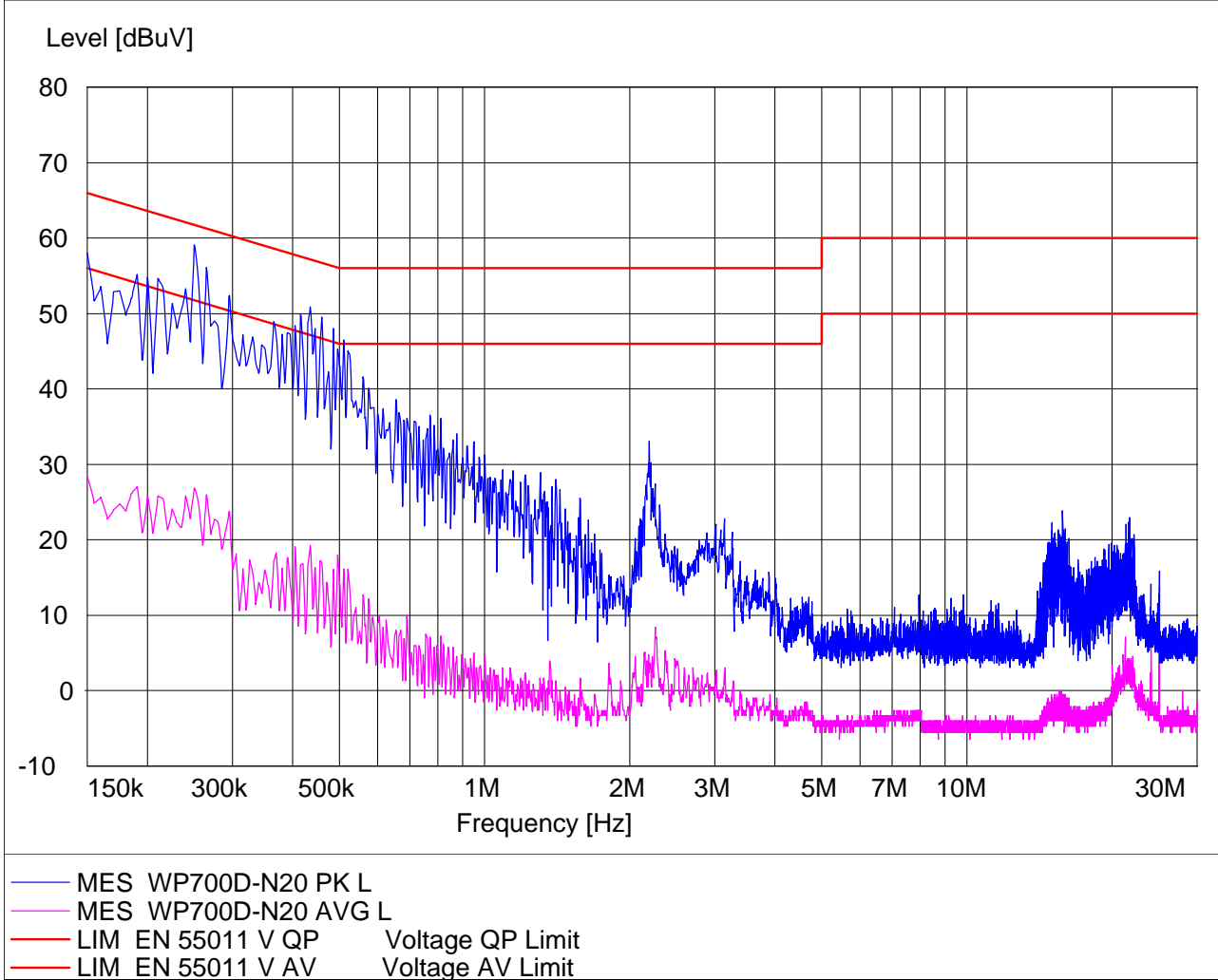
Minimum Frequency (MHz)	Maximum Frequency (MHz)
2400.6	2467.3
Note: Line voltage varied from 96Vac to 150Vac	

9. TABLE LIST

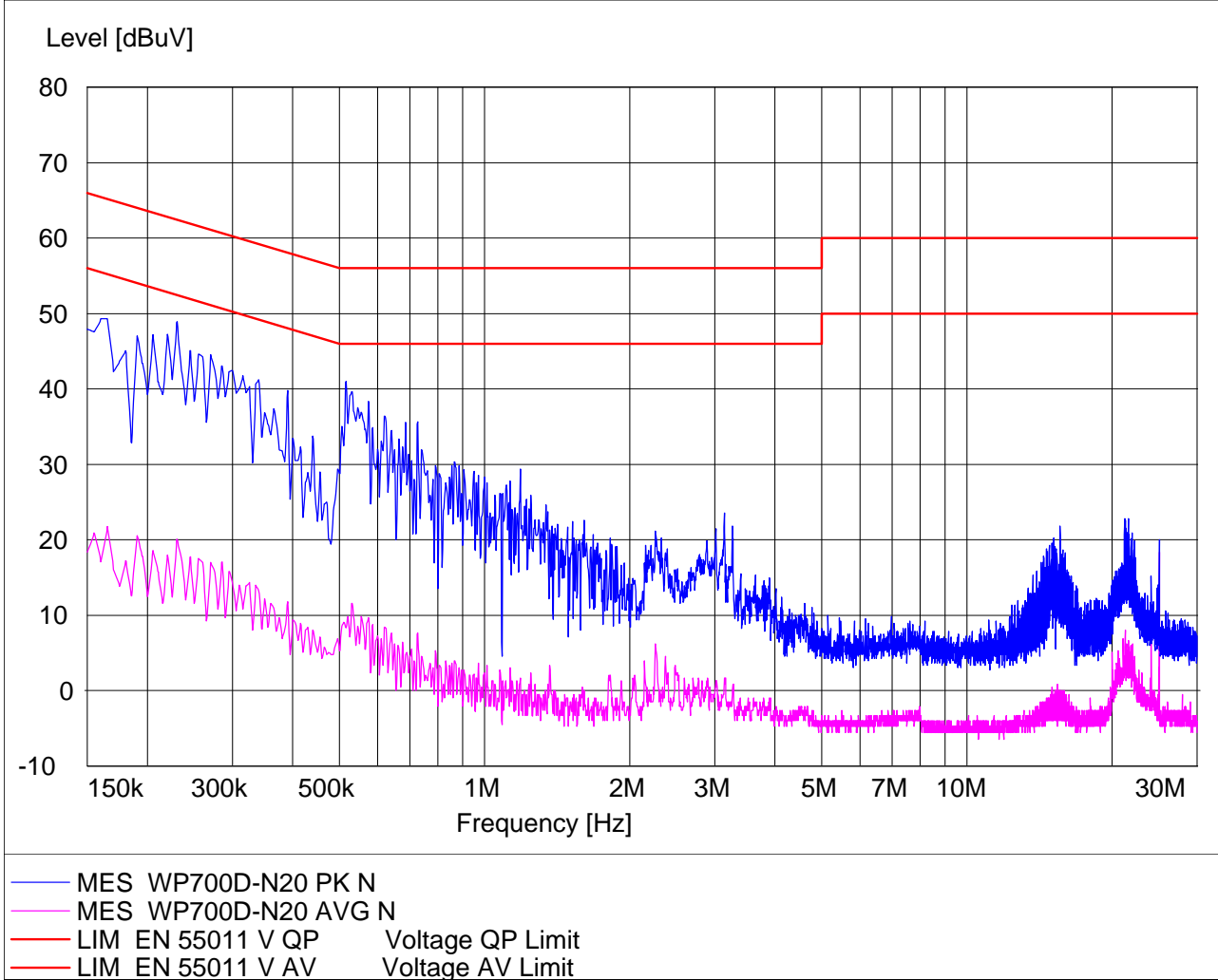
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APPENDIX I TEST CURVES

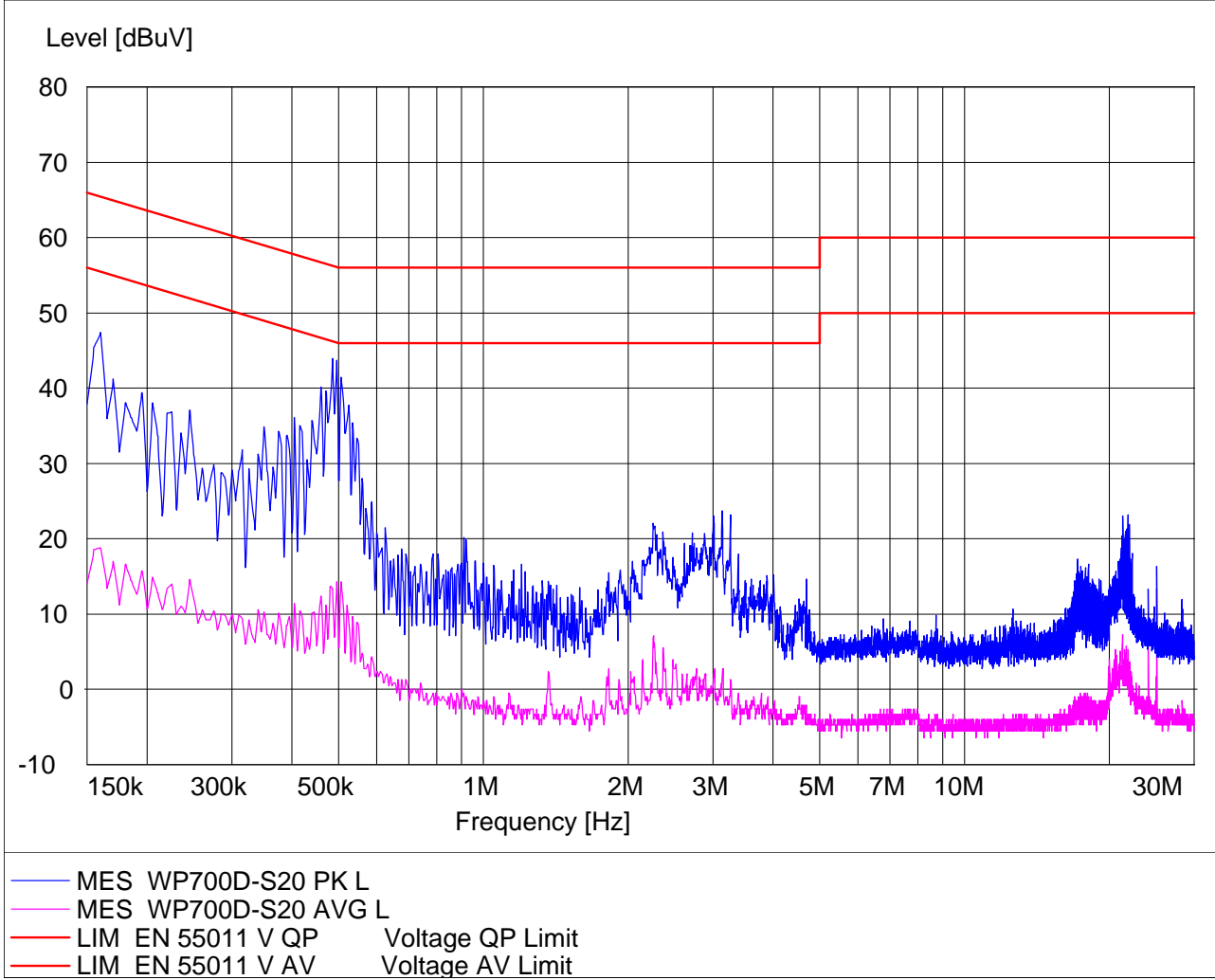
EUT: WP700D-N20
Manufacturer:
Operating Condition: P10 (Full power microwave output)
Test Site: SMQ EMC Lab.
Operator:
Test Specification: L
Comment: AC 120V/60Hz



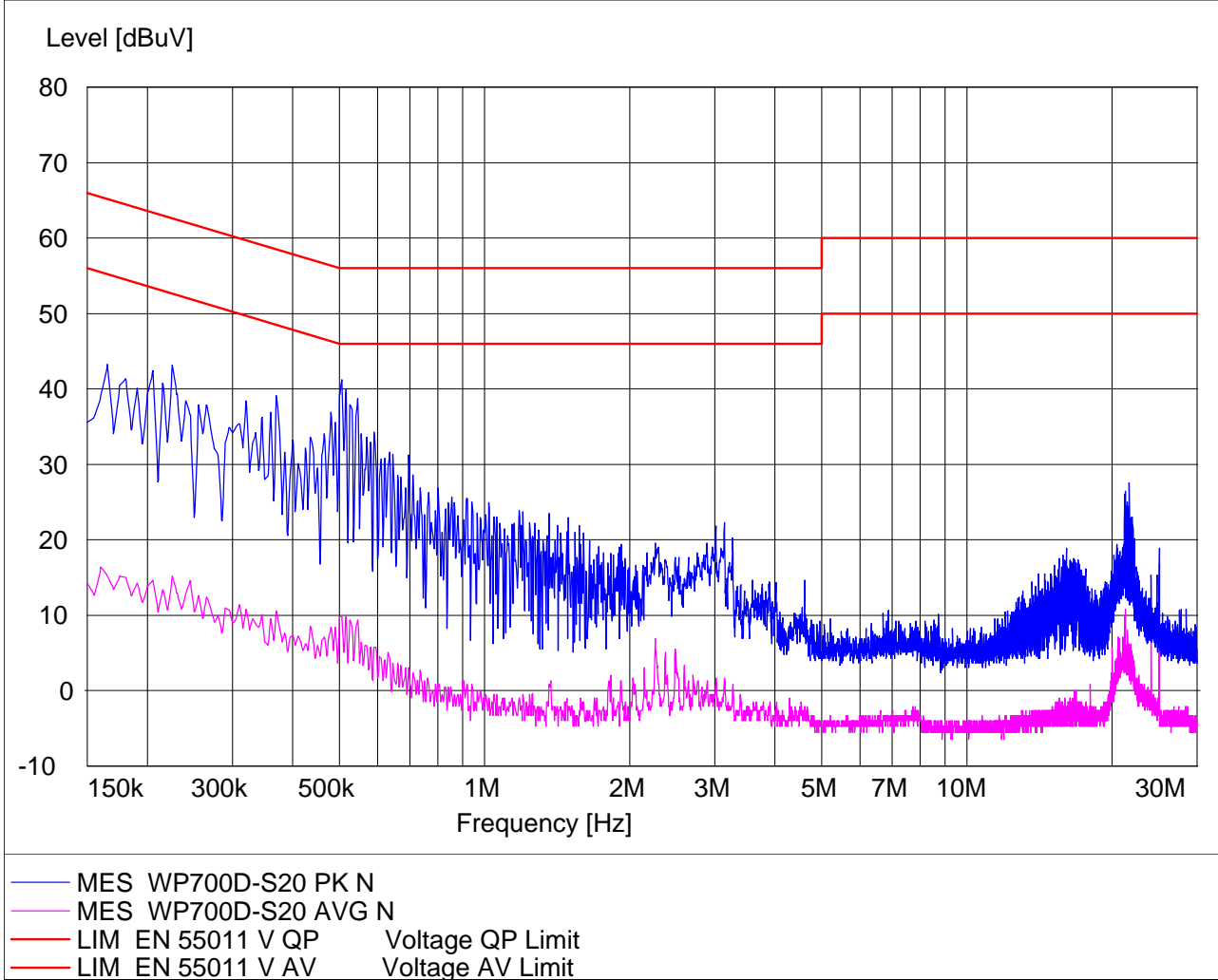
EUT: WP700D-N20
Manufacturer:
Operating Condition: P10 (Full power microwave output)
Test Site: SMQ EMC Lab.
Operator:
Test Specification: N
Comment: AC 120V/60Hz



EUT: WP700D-S20
Manufacturer:
Operating Condition: P10 (Full power microwave output)
Test Site: SMQ EMC Lab.
Operator:
Test Specification: L
Comment: AC 120V/60Hz



EUT: WP700D-S20
Manufacturer:
Operating Condition: P10 (Full power microwave output)
Test Site: SMQ EMC Lab.
Operator:
Test Specification: N
Comment: AC 120V/60Hz

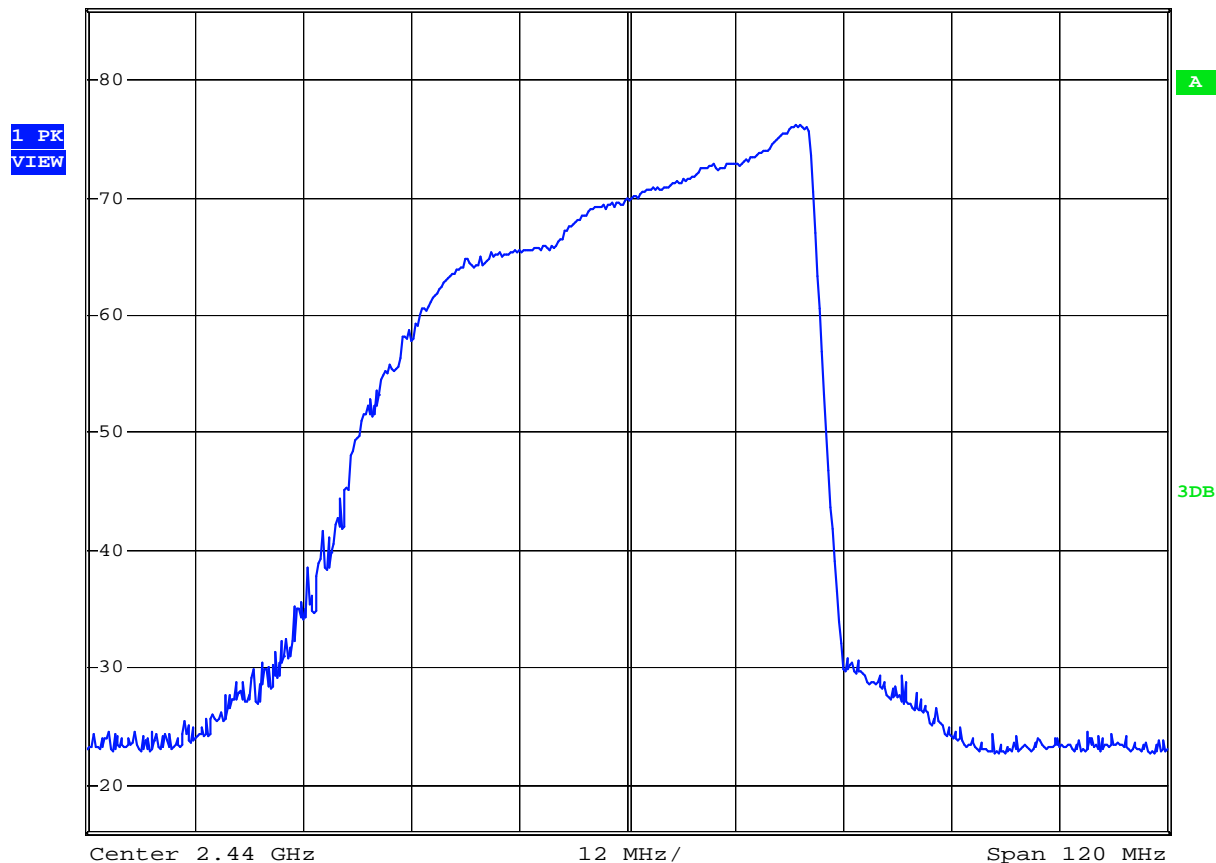


Operating Frequency

WP700D-N20



Ref 86 dBμV *Att 0 dB *RBW 1 MHz
*VBW 3 MHz SWT 5 ms



Date: 16.DEC.2008 09:03:35

WP700D-S20



*RBW 1 MHz

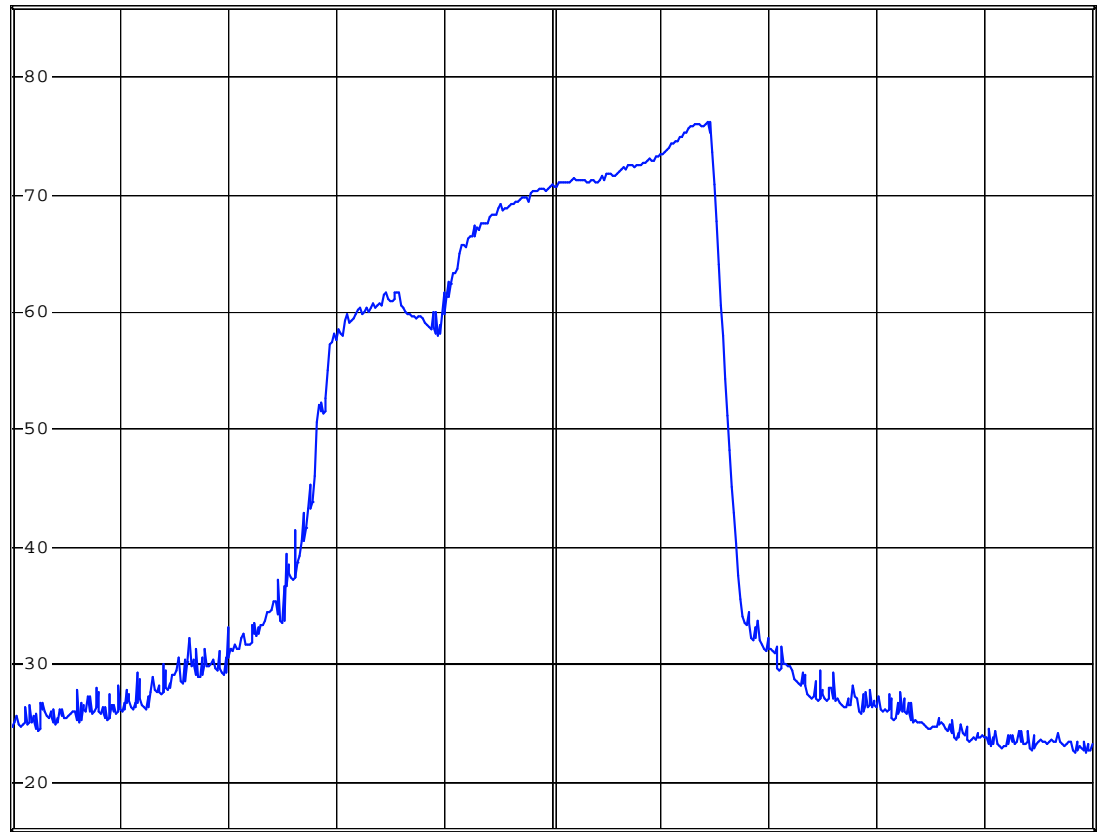
*VBW 3 MHz

Ref 86 dBμV

*Att 0 dB

SWT 5 ms

1 PK
VIEW



Center 2.44 GHz

12 MHz/

Span 120 MHz

Date: 16.DEC.2008 08:47:10

APPENDIX II TEST PICTURE

Photo 1 Conducted Disturbance Test (WP700D-N20)



Photo 2 Conducted Disturbance Test (WP700D-N20)



Photo 3 Conducted Disturbance Test (WP700D-S20)



Photo 4 Conducted Disturbance Test (WP700D-S20)



Photo 2 Radiated disturbances (below 1GHz) (WP700D-N20)

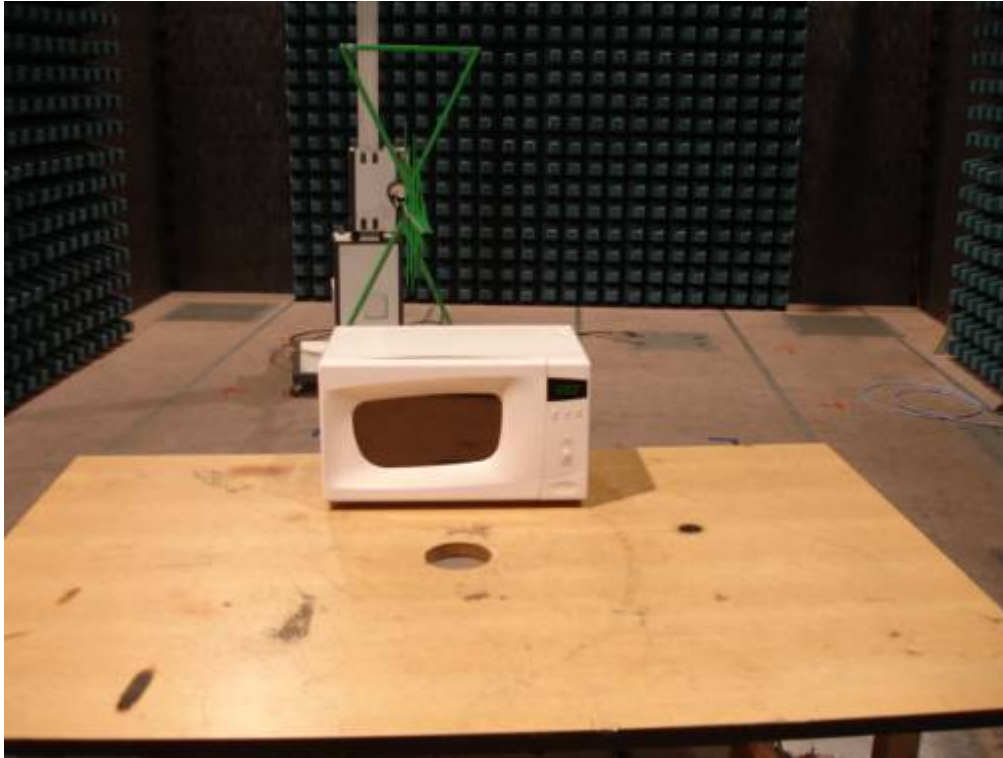


Photo 3 Radiated disturbances (Above 1GHz) (WP700D-N20)

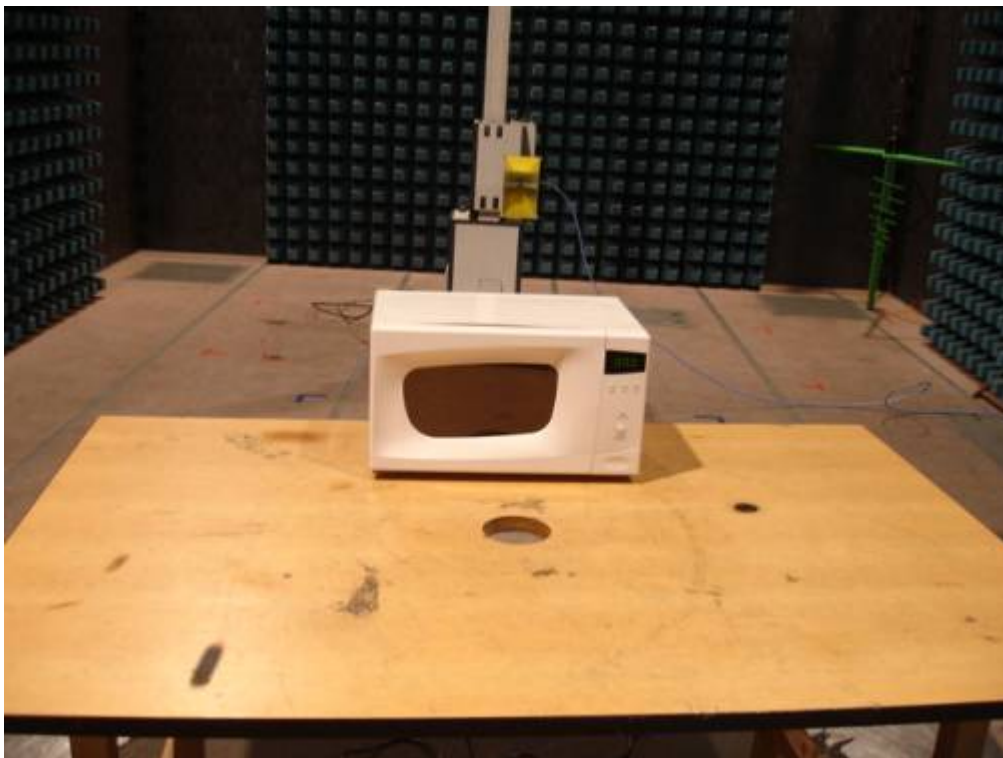


Photo 2 Radiated disturbances (below 1GHz) (WP700D-S20)

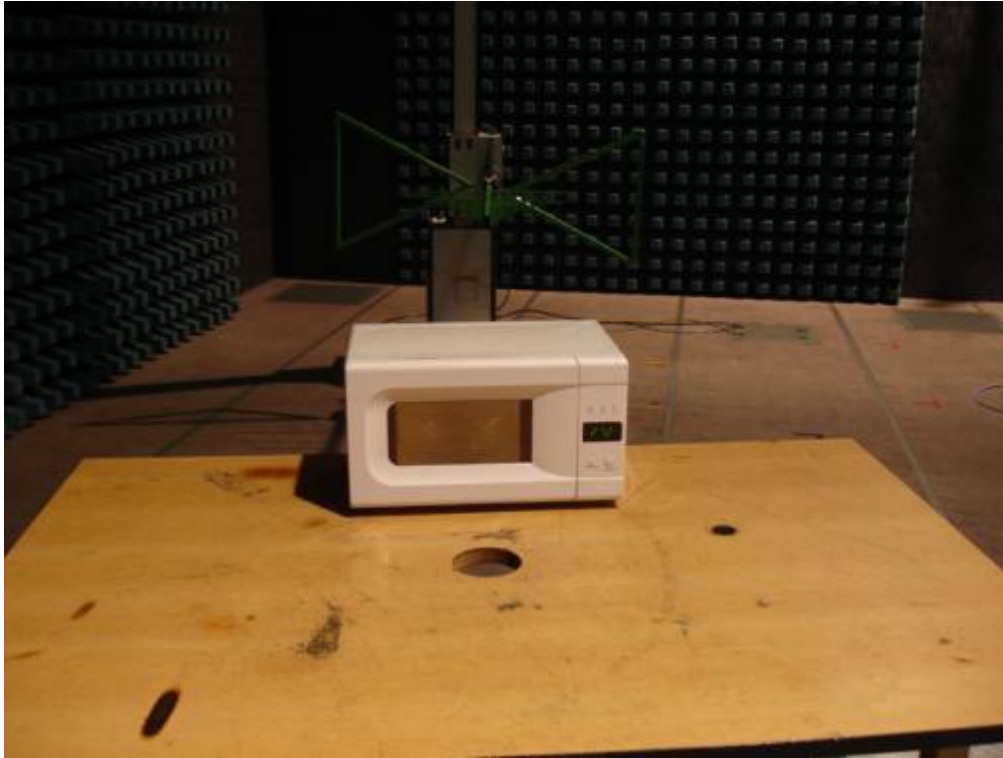


Photo 3 Radiated disturbances (Above 1GHz) (WP700D-S20)

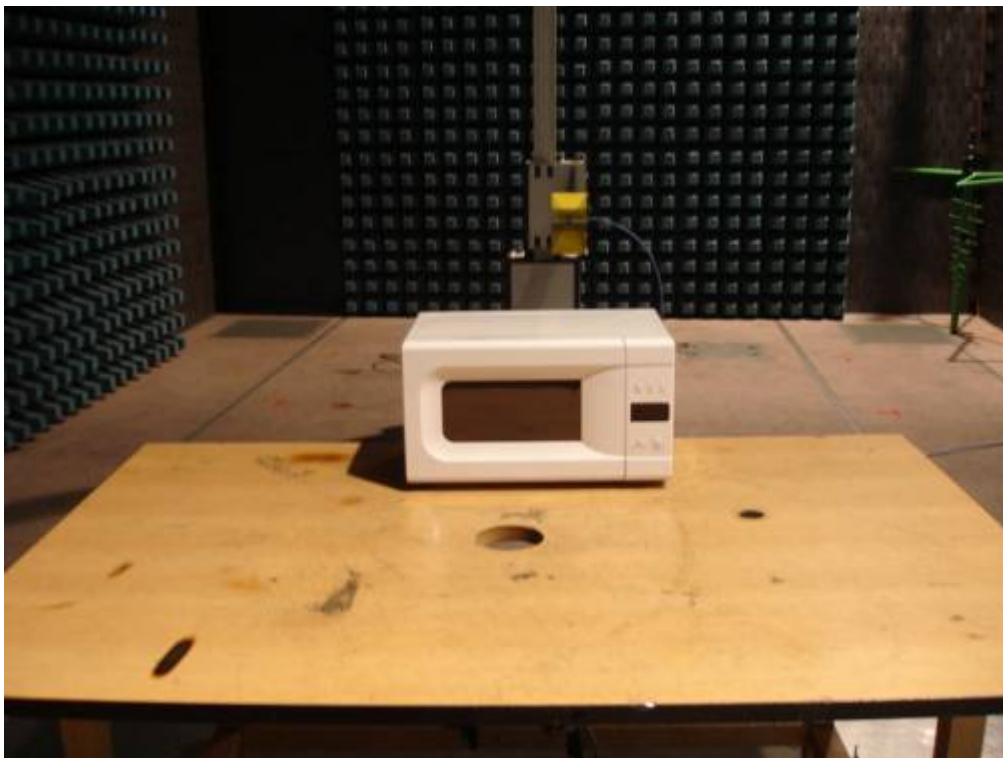


Photo 4 Appearance of EUT (WP700D-N20)



Photo 5 Appearance of EUT (WP700D-N20)



Photo 6 Inside of EUT (WP700D-N20)



Photo 7 Inside of EUT (WP700D-N20)



Photo 8 Inside of EUT (WP700D-N20)



Photo 9 Inside of EUT (WP700D-N20)



Photo 10 Inside of EUT (WP700D-N20)

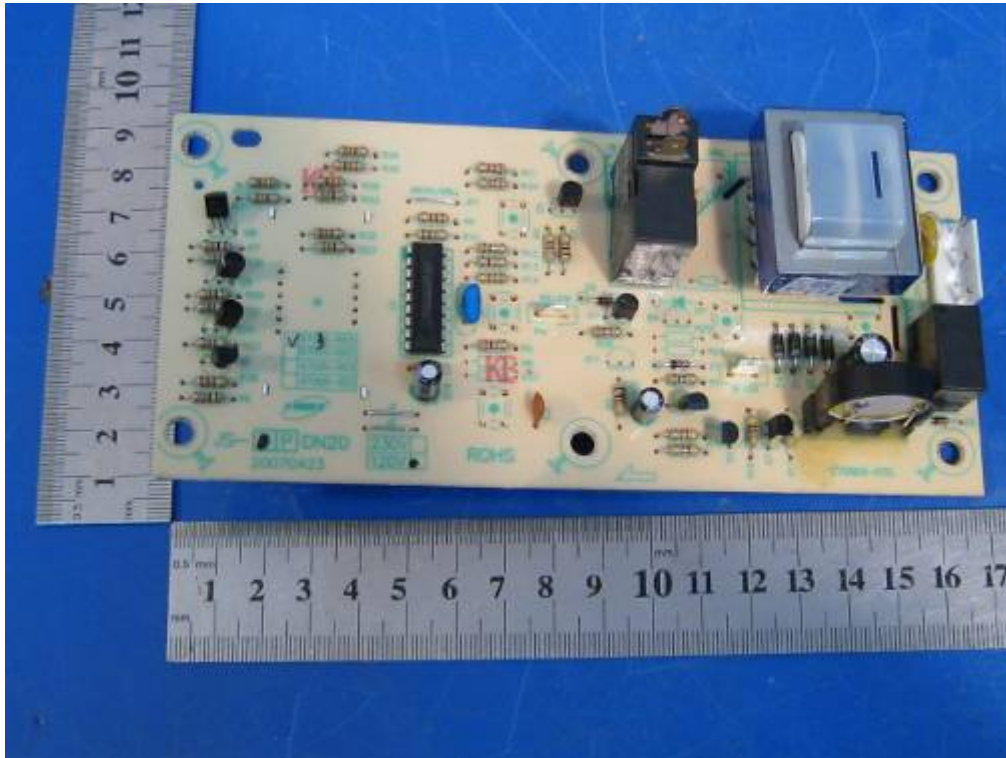


Photo 11 Inside of EUT (WP700D-N20)

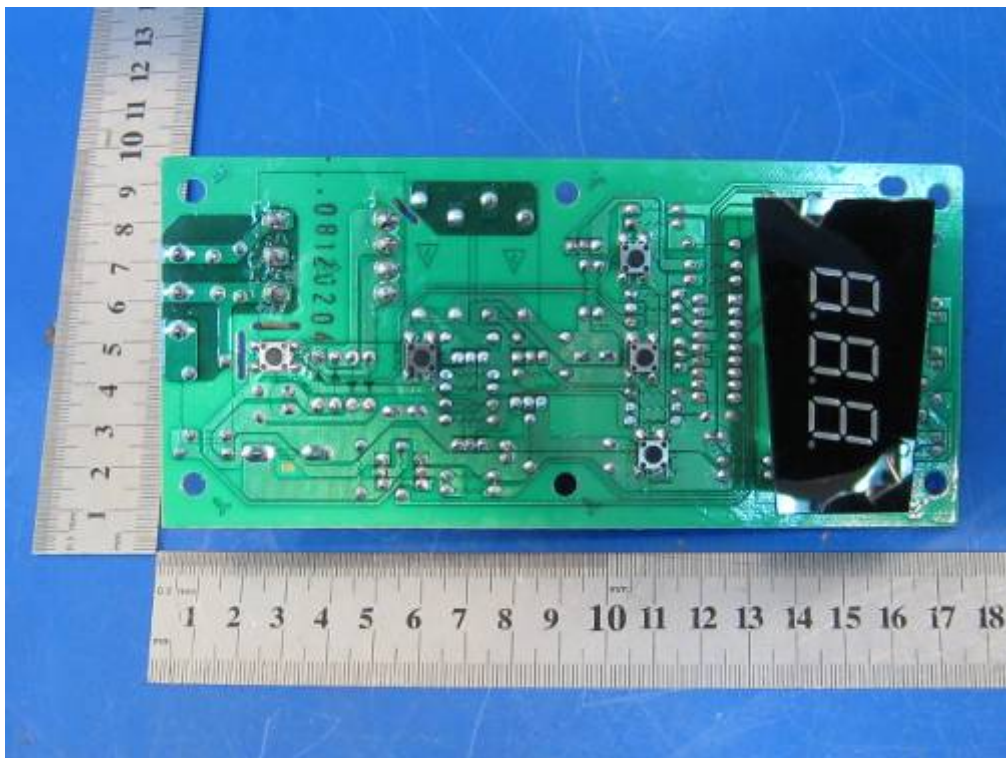


Photo 12 Inside of EUT (WP700D-N20)

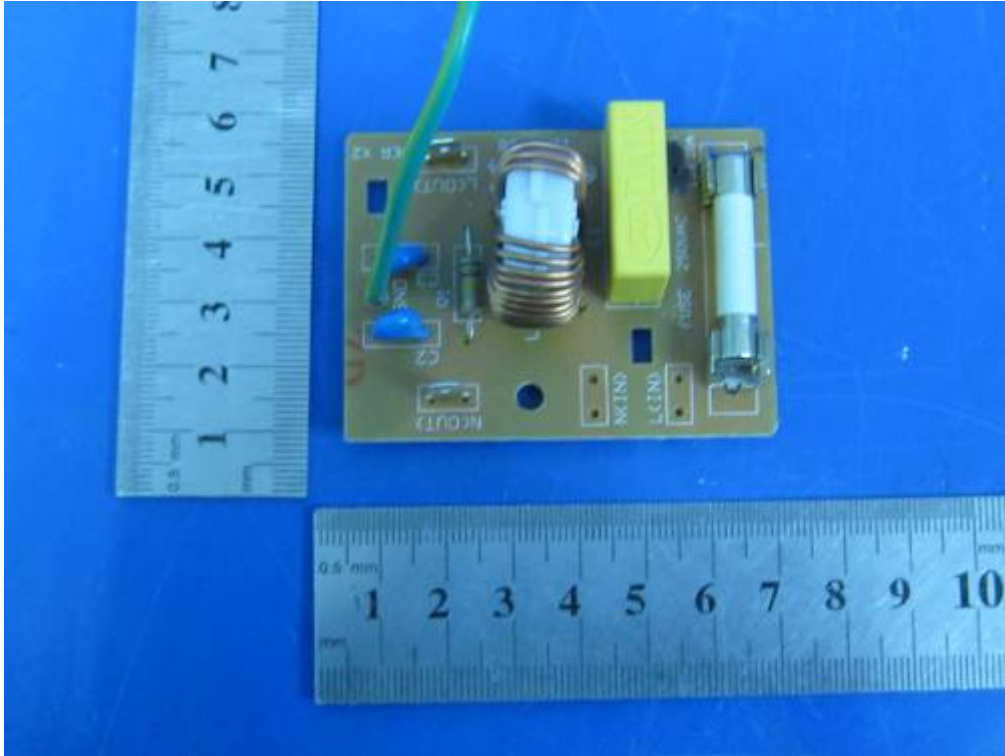


Photo 12 Inside of EUT (WP700D-N20)



Photo 4 Appearance of EUT (WP700D-S20)



Photo 5 Appearance of EUT (WP700D-S20)



Photo 6 Inside of EUT (WP700D-S20)

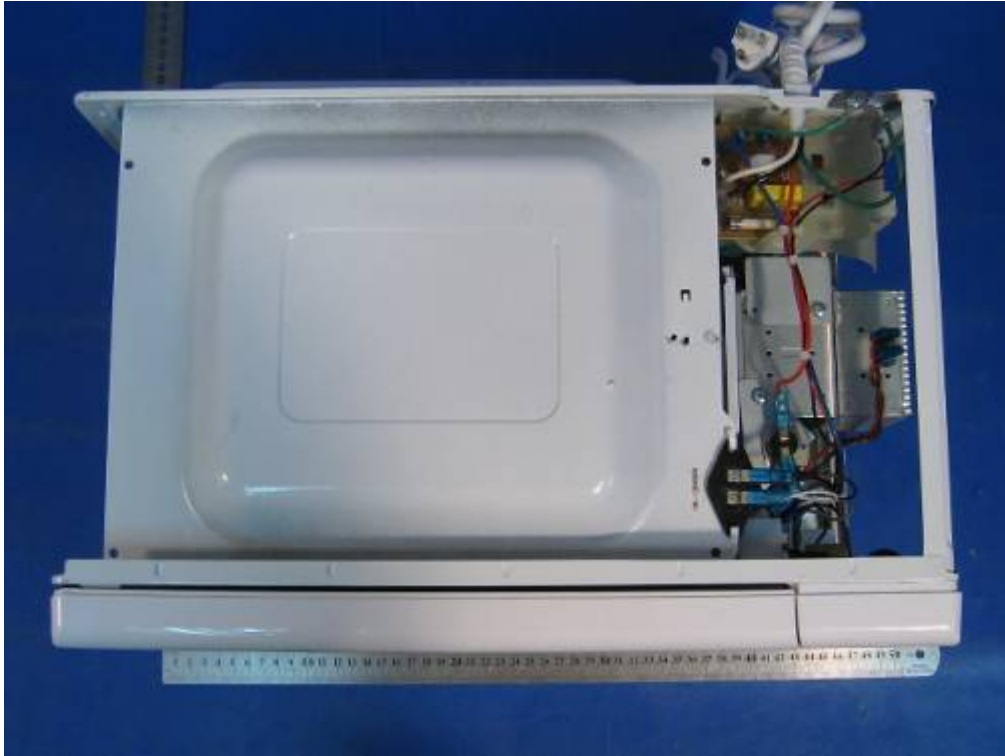


Photo 7 Inside of EUT (WP700D-S20)



Photo 8 Inside of EUT (WP700D-S20)



Photo 9 Inside of EUT (WP700D-S20)



Photo 10 Inside of EUT (WP700D-S20)

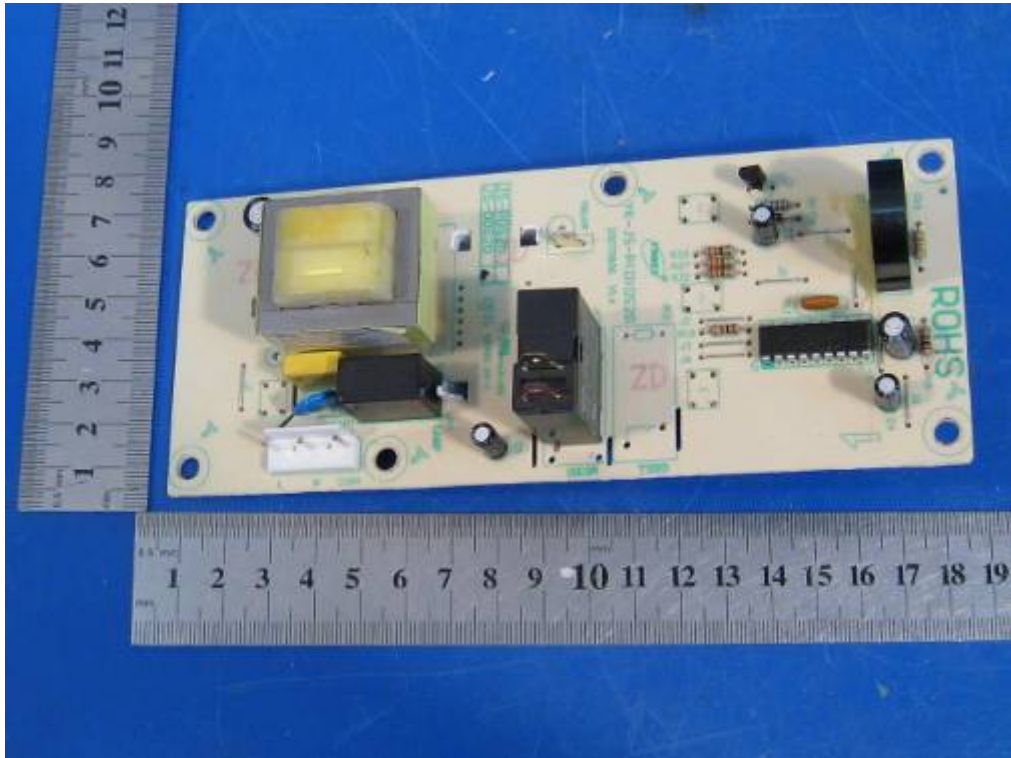


Photo 11 Inside of EUT (WP700D-S20)

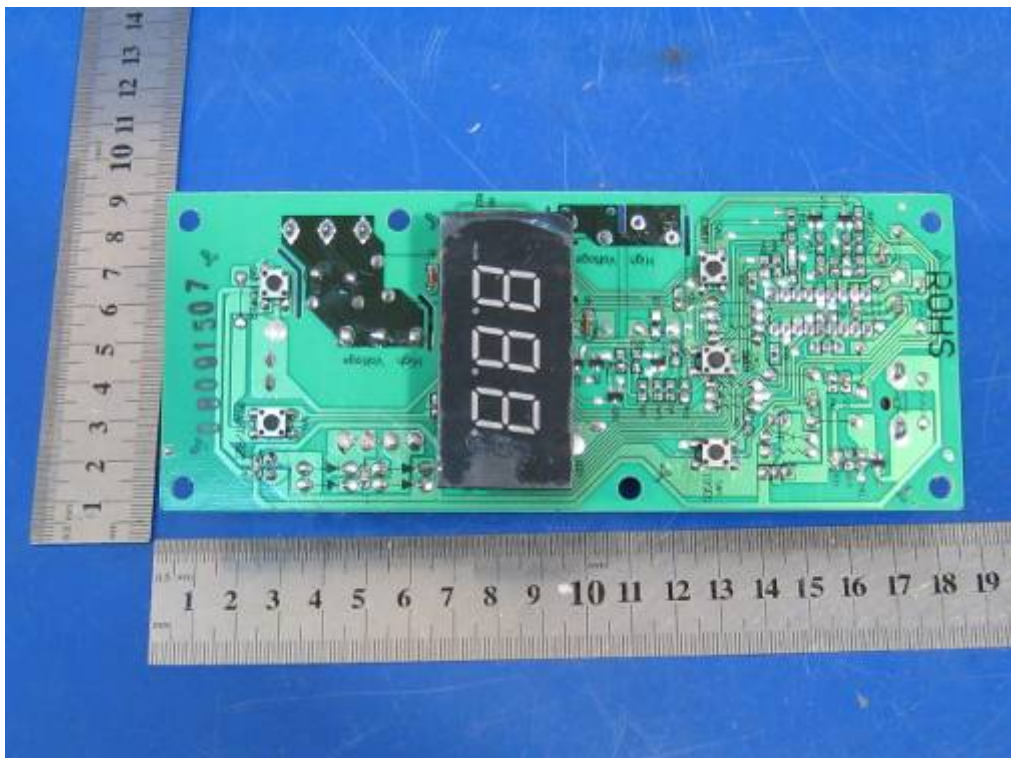


Photo 12 Inside of EUT (WP700D-S20)

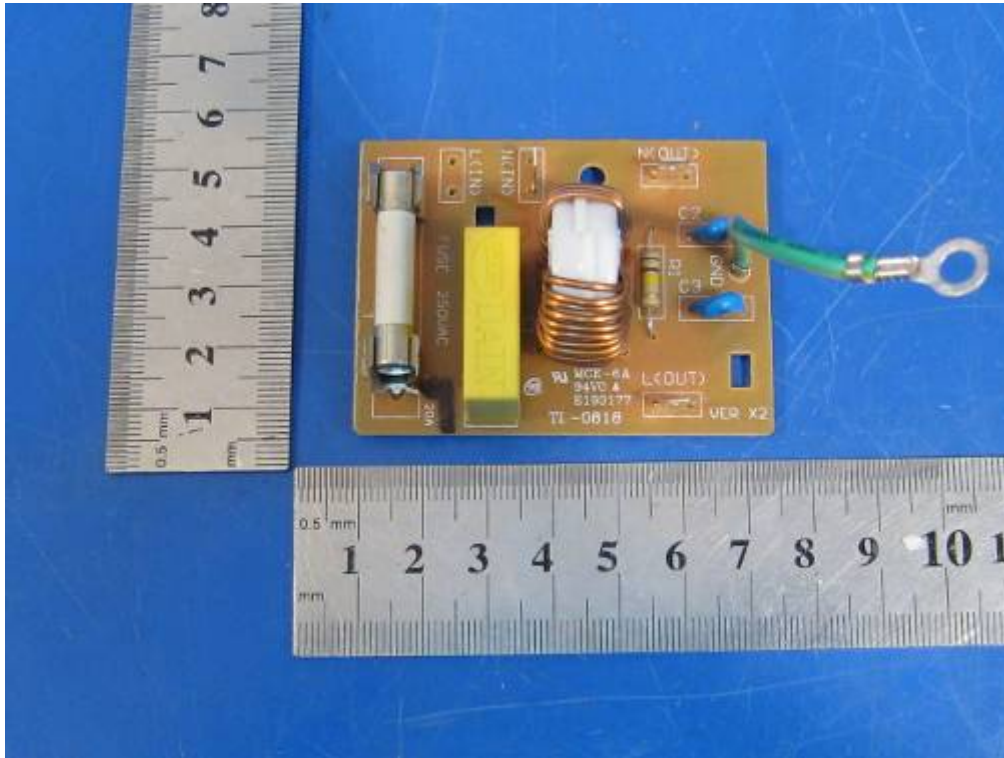


Photo 12 Inside of EUT (WP700D-S20)

