



SIMT

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NATIONAL CENTER OF MEASUREMENT AND TEST FOR EAST CHINA
SHANGHAI INSTITUTE OF MEASUREMENT AND TESTING TECHNOLOGY

检测报告编号: 2006J10-30-112062

Test Report series No.

TEST REPORT

华东国家计量测试中心
上海市计量测试技术研究院

检 测 报 告

委托者 Customer	上海松下微波炉有限公司 Panasonic Home Appliances Microwave Oven (Shanghai) Co., Ltd.
委托者地址 Address of customer	上海浦东新区龙东大道 898 号 No. 898 Long Dong Rd. PuDong, Shanghai
样品名称 Name of sample	微波炉 Microwave Oven
制造厂 Manufacturer	上海松下微波炉有限公司 Panasonic Home Appliances Microwave Oven (Shanghai) Co., Ltd.
型号/规格 Model/ Specification	NN-SN667
样品编号 No. of sample	PP07003 (NN-SN667)



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Tested by

检测日期 2006 年 12 月 18 日
Date for test Year Month Day

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未经本院批准, 部分采用本证书内容无效。
Partly using this certificate will not be admitted unless allowed by SIMT.

国家法定计量检定机构计量授权证书号（中心院）：（国）法计（2002）01039号/（2002）01019号
The number of the Certificate of Metrological Authorization to The Legal Metrological Verification Institution is No.（2002）01039 / No.（2002）01019

中国实验室国家认可委员会（CNAL）实验室认可证书号：No.L0134
The number of the certificate accredited by CNAL is No.L0134

本次检测所依据的技术规范（代号、名称）：
Reference documents for the test (code、name)

CISPR 11: 2004 Industrial, scientific and medical (ISM) radio-frequency equipment -
Electromagnetic disturbance characteristics - Limits and methods of
measurement

Refer to: FCC Part 18: 2004 Industrial, Scientific, and Medical Equipment

FCC/OST MP-5: 1986

本次检测所使用的主要测量仪器：
Main measuring instruments used in this test

Refer to Attachment 1

以上测量仪器的量值溯源至国家基准。

Quantity values of above measuring instruments used in this test are traced to those of the national primary standards in the P.R. China.

检测地点及环境条件：

Location and environmental condition for the test

地点： Shanghai Institute of Measurement and Testing Technology
Location

温度： 20-22 ; 湿度： 40-48 %RH ; 其它： /
Ambient temperature Relative humidity Others

检测结果的说明：

Description of results

Pass

本报告提供的结果仅对本次被检的样品有效。
The data are valid only for the sample(s).

检测数据/结果：
Data/Results of test

1. Description of EUT

Name of sample:	Microwave oven
Model No.:	NN-SN667
Sample No.:	PP07003
FCC ID No.:	ACLAP7D01
Operation frequency:	2450MHz
Output rating:	1300W
Magnetron type:	2M261-M32
Employed mode:	Turntable
Door seal type:	Choke

2. Data summary

Item		Result
Input power measurement		Measured input power: 1527.6W
RF output power measurement		Measured RF output power: 1090.35W
Frequency measurement	Frequency vs Line voltage variation test (96~150V/1500ml water load)	Maximum frequency variation
		Horizontal: 2445.99~2468.58MHz Vertical: 2437.1~2459.82MHz
	Frequency vs Load variation test (1500~300ml water load/ 120V)	Maximum frequency variation:
		Horizontal: 2439.73~2465.09MHz Vertical: 2433.9~2461.06MHz
Radiated emission test		See section 3.4
Safety check		Left side: 0.1423mW/cm ² Front side: 0.1123mW/cm ² Top side: 0.2000mW/cm ² Right side: 0.1175mW/cm ² Back side: 0.2054mW/cm ² Maximum: Back side: 0.2054mW/cm ²
Conducted emission test		See section 3.6

3. Test data and results

3.1 Input power measurement

A beaker of 1050ml water was placed in the center of the microwave oven. The microwave oven worked at maximum power.

Sample	Input voltage	Input current	Measured input power
NN-SN667	120V/60Hz	12.73A	1527.6W

Test instrumentation

Name/Model	Number
Programmable AC Power Source CIF-5000FP	979824
Voltage Meter	D26/1-V
Current Meter	T19/1-A

Test photograph



3.2 RF output power measurement

A beaker of 1500ml water was placed in the center of the oven. The oven worked at maximum output power for 120 seconds. The temperature of the water before and after this operation was measured and recorded. Redo above test three times and get the average.

Model Number	Test	Temperature before test ()	Temperature after test ()	T ()
NN-SN667	1	10.9	31.7	20.8
	2	10.5	31.4	20.9
	3	10.4	31.2	20.8

Temp. Rise= (Temperature after test- Temperature before test)/3=18.23
 RF output power=[(4.187 joules/Cal) x (Volume in ml) x (Temp. Rise)] / Time in seconds
 =(4.187x1500x20.833)/120=1090.35W

The measured output was found to be above 500W. Therefore, in accordance with section 18.305 of subpart C, the measured out-of-band emissions were compared to the 25xSQRT(power/500)[µV/m] @ 300m limit.

Test instrumentation

Name/Model	Number
Programmable AC Power Source CIF-5000FP	979824
Warranty Label testo 106-T1	63236

3.3 Frequency measurement

Following the above test, a beaker of 1500ml water was placed in the center of the oven. The oven worked at maximum power.

3.3.1 Frequency vs Line voltage variation test

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.

Model Number	Maximum frequency variation (96~150V/1500ml water load)
NN-SN667	Horizontal: 2445.99~2468.58MHz
	Vertical: 2437.1~2459.82MHz

3.3.2 Frequency vs Load variation test

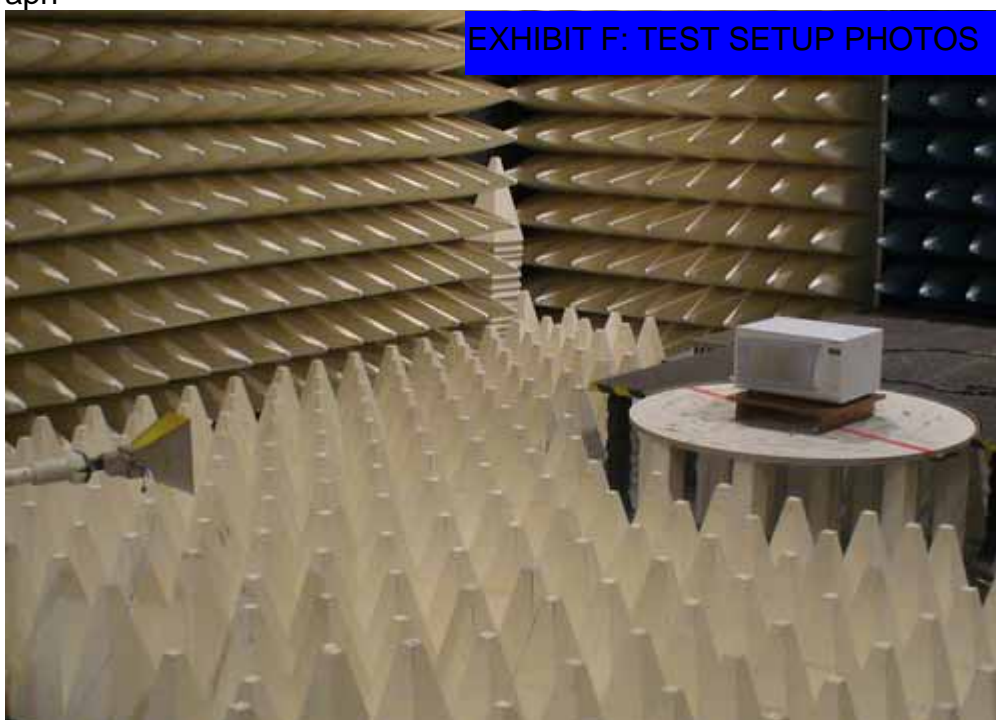
Initial load: 1500ml. Load at completion of test: 300ml.

Model Number	Maximum frequency variation (1500~300ml water load/ 120V)
NN-SN667	Horizontal: 2439.73~2465.09MHz
	Vertical: 2433.9~2461.06MHz

Test instrumentation

Name/Model	Number
Double-Ridged Waveguide Horn Antenna HF 906	容-001-04
Spectrum Analyzer R3162	容-001-33

Test photograph



3.4 Radiated Emission Test

A beaker of the water load was placed in the center of the oven and at the front right corner. The oven worked at maximum power.

Model Number: NN-SN667	
The variable test condition	Antenna polarization: vertical & horizontal
	Water load position (in the center of the oven and at the front right corner)
	Turn table azimuth (0°~360°)
	Water load quantity (450ml & 1050ml)

The test results is the maximized value as above test condition:

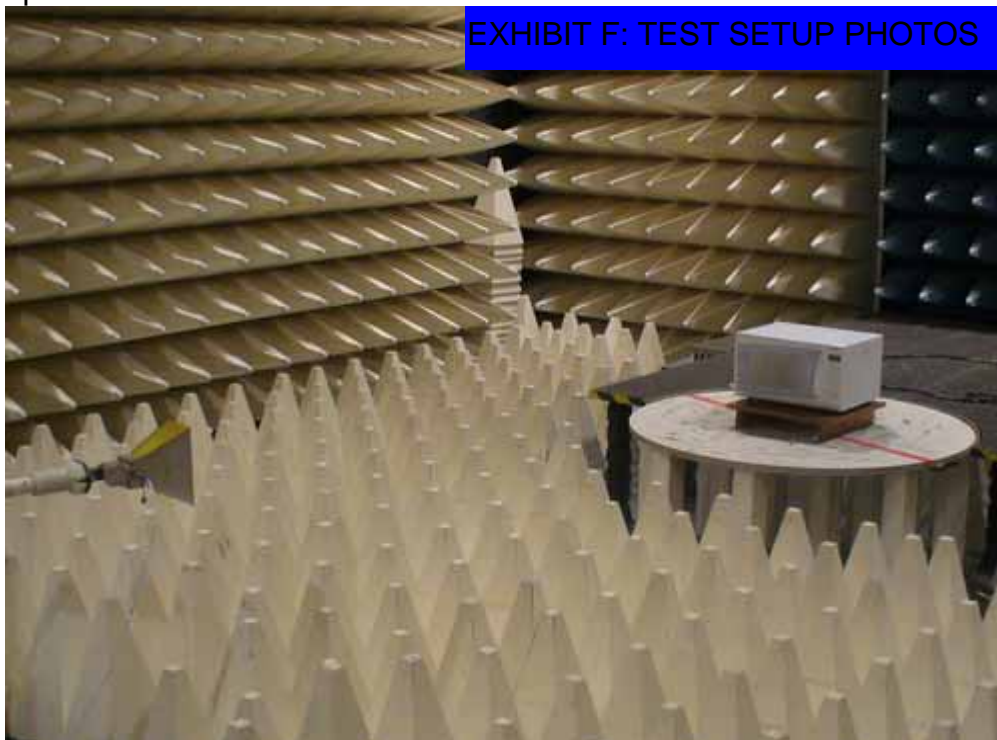
Model Number: NN-SN667						
Comment	Test Frequency (MHz)	Result (dBuV/m)	Result @ 300m (dBuV/m)	Antenna Polarization	Limit @ 300m (dBuV/m)	Margin (dB)
SIDE BAND	2196.1	67.45	13.39358394	Vertical	36.92	23.52641606
SIDE BAND	2201.1	69.21	16.44106855	Horizontal	36.92	20.47893145
SIDE BAND	2706.3	69.82	21.44513846	Vertical	36.92	15.47486154
SIDE BAND	2710.8	71.84	27.09870116	Horizontal	36.92	9.821298839
2nd.Harmonic (1050mlcentre)	4896.2	60.66	10.78946722	Vertical	36.92	26.13053278
2nd.Harmonic (1050mlcentre)	4897.8	58.77	8.679605773	Horizontal	36.92	28.24039423
2nd.Harmonic (1050mlcorner)	4899.2	59.66	9.616122784	Vertical	36.92	27.30387722
2nd.Harmonic (1050mlcorner)	4912.3	58.05	7.989139417	Horizontal	36.92	28.93086058
2nd.Harmonic (450mlcentre)	4887.4	60.03	10.03459849	Vertical	36.92	26.88540151
2nd.Harmonic (450mlcentre)	4895.2	58.93	8.840971692	Horizontal	36.92	28.07902831
2nd.Harmonic (450mlcorner)	4901.2	59.17	9.088662991	Vertical	36.92	27.83133701
2nd.Harmonic (450mlcorner)	4899.2	58.23	8.156427871	Horizontal	36.92	28.76357213
Spurious	4391.3	67.42	23.03468545	Vertical	36.92	13.88531455
Spurious	4391.3	67.84	24.17587972	Horizontal	36.92	12.74412028
Spurious	6518.1	70.63	34.00165058	Vertical	36.92	2.91834942
Spurious	6518.1	67.83	24.63201838	Horizontal	36.92	12.28798162
Spurious	7063.6	69.91	31.29680472	Vertical	36.92	5.623195284
Spurious	7098.8	60.07	10.08091609	Horizontal	36.92	26.83908391
3nd.Harmonic (1050mlcentre)	7345.6	61.43	11.78962523	Vertical	36.92	25.13037477
3nd.Harmonic (1050mlcentre)	7368.1	67.21	22.9350663	Horizontal	36.92	13.9849337

3nd.Harmonic (1050mlcorner)	7351.2	65.51	18.85818969	Vertical	36.92	18.06181031
3nd.Harmonic (1050mlcorner)	7362.9	66.64	21.47830474	Horizontal	36.92	15.44169526
3nd.Harmonic (450mlcentre)	7347.9	64.84	17.45822153	Vertical	36.92	19.46177847
3nd.Harmonic (450mlcentre)	7353.7	65.94	19.81527026	Horizontal	36.92	17.10472974
3nd.Harmonic (450mlcorner)	7360.3	64.53	16.84612427	Vertical	36.92	20.07387573
3nd.Harmonic (450mlcorner)	7354.6	63.88	15.63147643	Horizontal	36.92	21.28852357
4th.Harmonic (1050mlcentre)	9790.4	57.97	7.915894546	Vertical	36.92	29.00410545
4th.Harmonic (1050mlcentre)	9816.8	59.57	9.516998481	Horizontal	36.92	27.40300152
5th.Harmonic (1050mlcentre)	12278.8	61.92	12.47383514	Horizontal	36.92	24.44616486
5th.Harmonic (1050mlcentre)	12266.3	69.57	30.09539169	Vertical	36.92	6.824608311

Test instrumentation

Name/Model	Number
EMI Test Receiver ESI 26	容-001-01
Double-Ridged Waveguide Horn Antenna HF 906	容-001-04

Test photograph



3.5 Safety check

Model No.: NN-SN667	
At 275ml water load was placed in the center of the oven. The temperature of the water is 20 degree. The oven worked at maximum power. The radiation emission was moved at 2.5cm/s around the oven.	
Safety check	Left side: 0.1423mW/cm ² Front side: 0.1123mW/cm ² Top side: 0.2000mW/cm ² Right side: 0.1175mW/cm ² Back side: 0.2054mW/cm ² Maximum: Back side: 0.2054mW/cm ²

Test instrumentation

Name/Model	Number
E-Filed Sensor FMR-300	2244/31

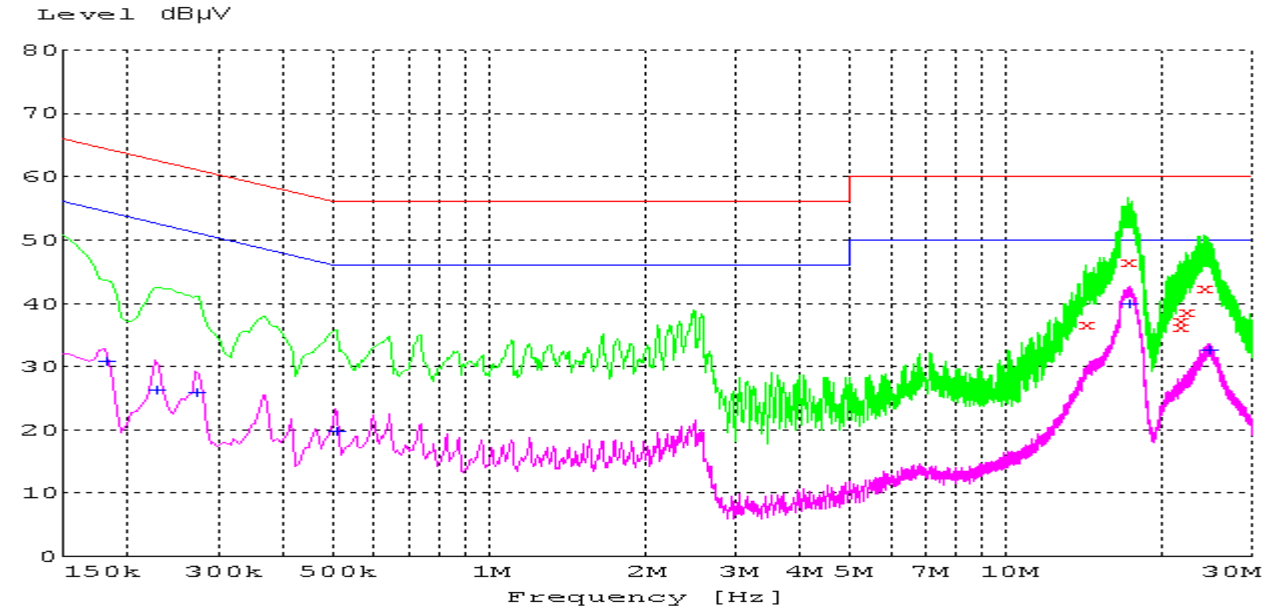
Test photograph



3.6 Conducted emission test

A beaker of 1050ml water was placed in the center of the microwave oven. The microwave oven worked at maximum power.

“L” line:

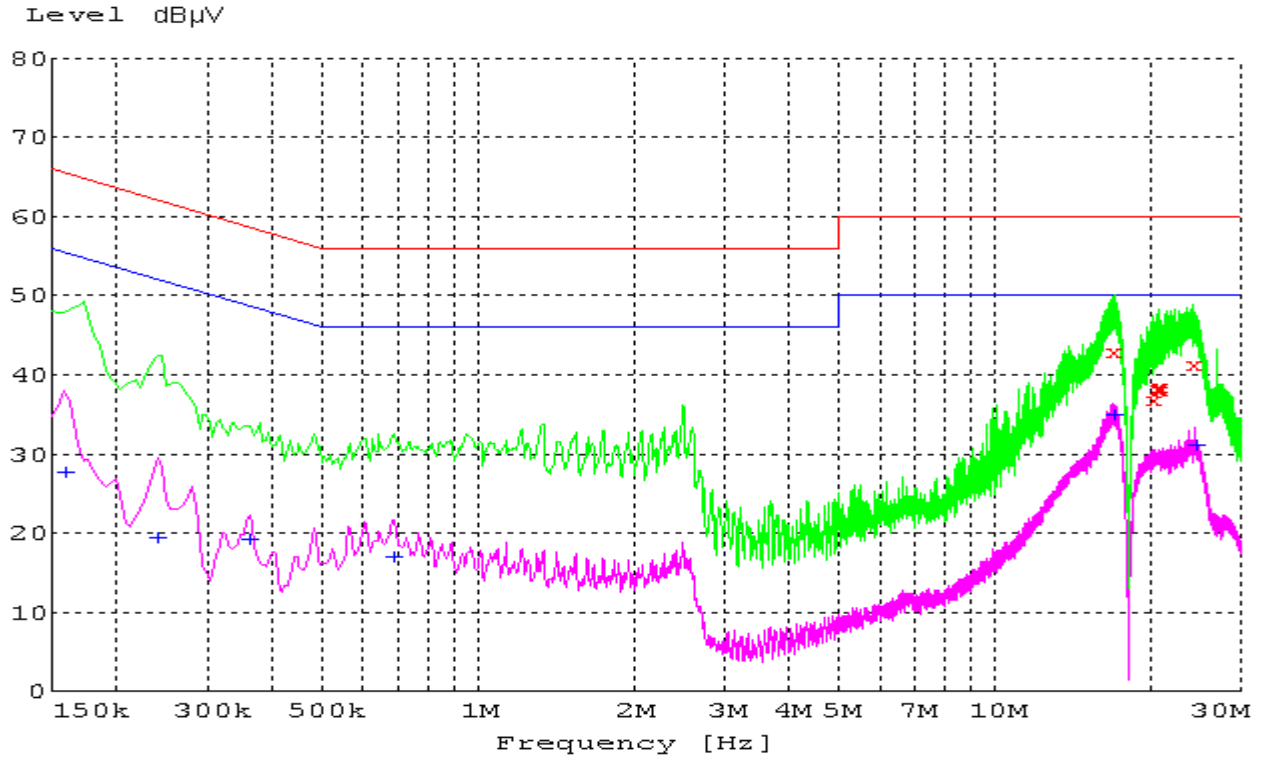


x x MES C61218PA001L_fin QP
+ + MES C61218PA001L_fin AV
— MES C61218PA001L_pre PK
— MES C61218PA001L_pre AV
— LIM FCC 18 QP 2004 Voltage QP Limit
— LIM FCC 18 AV 2004 Voltage AV Limit

Frequency (MHz)	QP-Level (dBµV)	Limit (dBµV)	Margin (dB)
14.307000	36.70	60.00	23.30
17.268000	46.70	60.00	13.30
21.691500	37.30	60.00	22.70
21.781500	36.30	60.00	23.70
22.344000	38.60	60.00	21.40
24.261000	42.50	60.00	17.50

Frequency (MHz)	AV-Level (dBµV)	Limit (dBµV)	Margin (dB)
0.181500	30.70	54.40	23.70
0.226500	26.20	52.60	26.40
0.271500	25.80	51.10	25.30
0.505500	19.80	46.00	26.20
17.340000	40.00	50.00	10.00
24.544500	32.50	50.00	17.50

“N” line:



- x x MES C61218PA001N_fin QP
- + + MES C61218PA001N_fin AV
- MES C61218PA001N_pre PK
- MES C61218PA001N_pre AV
- LIM FCC 18 QP 2004 Voltage QP Limit
- LIM FCC 18 AV 2004 Voltage AV Limit

Frequency (MHz)	QP-Level (dBµV)	Limit (dBµV)	Margin (dB)
17.047500	43.00	60.00	17.00
20.229000	37.00	60.00	23.00
20.620500	38.30	60.00	21.70
20.706000	38.50	60.00	21.50
20.787000	38.10	60.00	21.90
24.148500	41.30	60.00	18.70

Frequency (MHz)	AV-Level (dBµV)	Limit (dBµV)	Margin (dB)
0.159000	27.70	55.50	27.80
0.240000	19.30	52.10	32.80
0.361500	19.20	48.70	29.50
0.685500	17.00	46.00	29.00
16.908000	35.00	50.00	15.00
24.409500	31.10	50.00	18.90

Test instrumentation

Name/Model	Number
EMI TEST RECEIVER ESCS 30	容-003-01
ARTIFICIAL MAINS NETWORK ESH2-Z5	容-003-05

Test photograph



Remark: /

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Attachment 1

本次检测所使用的主要测量仪器：
Main measuring instruments used in this test

名称/型号 Name/Model	编号 Number	证书编号/有效期限 Certificate No./Due date	测量范围/准确度 Measuring range/accuracy
Programmable AC Power Source CIF-5000FP	979824	/	/
Warranty Label testo 106-T1	63236	/	/
Double-Ridged Waveguide Horn Antenna HF 906	容-001-04	XDdj2006-4022 2007.07.28	1 TO 18 GHz , NOMINAL IMPEDANCE :50 Ohm, VSWR < 1.5,GAIN :7 TO 14 dB(typ.),RF CONNECTOR:N FEMALE , LINEAR POLARISED BROADBAND REANSMIT/REC.ANT. / Gain: 7-14dB typ.
Spectrum Analyzer R3162	容-001-33	2007.11.09	9kHz - 8 GHz,Sweep time:20ms,MAX.input level:+30dBm,Frequency counter function with a resolution:1Hz / ± 1%
EMI Test Receiver ESI 26	容-001-01	200605-1-020033 2007.01.03	20 Hz TO 26.5 GHz ; -150... +30dBm 20Hz-1GHz: ± 1.5dB, 1GHz-4.5GHz : ± 2dB , 4.5GHz-26.5GHz : ± 3dB
E-Filed Sensor FMR-300	2244/31	/	/
EMI TEST RECEIVER ESCS 30	容-003-01	200605-1-020640 2007.05.18	9 kHz—2750 MHz ,- 38—+ 137 dBμV / S/N > 16 dB, 9kHz-1000MHz < 1dB,1000-2750MHz < 1.5dB
ARTIFICIAL MAINS NETWORK ESH2-Z5	容-003-05	2006F00-10-311019 2007.08.30	9 kHz TO 30 MHz , Impedance accuracy: ± 20% , Continuous current:4*25A,Max.short-time current:4*50A(2 min),Max.AC supply voltage:250 V rms
Voltage Meter D26-V	容-019-28	200605-1-010039 2007.06.26	125-250-500V,50Hz consume (VA) :5/10/20; graduation: 125
Current Meter T19-A	容-019-30	200605-1-010036 2007.06.20	0 - 100A; graduation: 100

以上测量仪器的量值溯源至国家基准。

Quantity values of above measuring instruments used in this test are traced to those of the national primary standards in the P.R. China.