



ETSI EN 301 489-17 V1.2.1: 2002

TEST REPORT

For

108M Wireless Router

Model: MR0-WR641G / MR0-WR642G

Trade Name: TP-LINK

Prepared for

**TP-LINK TECHNOLOGIES CO., LTD.
BUILDING 7, SECTION 2, HONGHUALING INDUSTRIAL PARK, XILI,
NANSHAN DISTRICT, SHENZHEN, P. R. C.**

Prepared by

**COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.
NO. 5, JINAO INDUSTRIAL PARK, NO. 35 JUKENG ROAD,
DASHUIKENG VILLAGE, GUANLAN TOWN, BAOAN
DISTRICT, SHENZHEN, CHINA**



LAB CODE:200577-0

TEL: 86-755-28055000

FAX: 86-755-28055221

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1. TEST RESULT CERTIFICATION

Applicant: TP-LINK TECHNOLOGIES CO., LTD.
 BUILDING 7, SECTION 2, HONGHUALING
 INDUSTRIAL PARK, XILI, NANSHAN DISTRICT,
 SHENZHEN, P. R. C.

Equipment Under Test: 108M Wireless Router

Trade Name: TP-LINK

Model: MR0-WR641G / MR0-WR642G

Date of Test: November 15-December 06, 2006

APPLICABLE STANDARDS		
STANDARD	TEST RESULT	
ETSI EN 301 489-17 v1.2.1: 2002	No non-compliance noted	
Applicable Standard	Class/Limit/Criterion	Test Result
ETSI EN 301 489-1 v1.5.1: 2004-11		
EN 55022: 1998	Class B	No non-compliance noted
EN 61000-3-2: 2000	Class D	No non-compliance noted
EN 61000-3-3: 1995 + A1: 2001	Limit	No non-compliance noted
EN 61000-4-2: 1995 + A2: 2001	Criterion B	No non-compliance noted
EN 61000-4-3: 2002 + A1: 2002	Criterion A	No non-compliance noted
EN 61000-4-4: 1995 + A2: 2001	Criterion B	No non-compliance noted
EN 61000-4-5: 1995 + A1: 2001	Criterion B	No non-compliance noted
EN 61000-4-6: 1996 + A1: 2001	Criterion A	No non-compliance noted
EN 61000-4-11: 1994 + A1: 2001	Criterion B/C/C	No non-compliance noted
Deviation from Applicable Standard		
None		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in ETSI EN 301 489-17 v1.2.1: 2002. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Tested By: Henry Ding

Clinton Kao/ Manager
 COMPLIANCE CERTIFICATION
 SERVICES (SHENZHEN) INC.

Reviewed By:

Eric Wong / Assistant manager
 COMPLIANCE CERTIFICATION
 SERVICES (SHENZHEN) INC.



2. EUT DESCRIPTION

Product	108M Wireless Router
Trade Name	TP-LINK
Model Number	MR0-WR641G / MR0-WR642G
Model Difference	MR0-WR641G are fixed antenna, MR0-WR642G are detachable antenna. Others are the same each other.
Power Supply	Powered by the adapter
Frequency Range	IEEE 802.11b: 2400 ~ 2483.5 MHz IEEE 802.11g: 2400 ~ 2483.5 MHz
Modulation Technique	IEEE 802.11b: DSSS (CCK; DQPSK; DBPSK) IEEE 802.11g: OFDM
Transmit Power	802.11b mode: 18.76dBm 802.11g mode: 19.50 dBm
Number of Channels	IEEE 802.11b: 13 CH IEEE 802.11g: 13 CH
Air Data Rate	802.11b: 11Mbps(CCK) with fall back rates of 5.5, 2, and 1Mbps 802.11g: 54Mbps with fall back rates of 54/48/36/24/18/12/9/6 Mbps (OFDM)
Antenna Specification	RF Antenna Assembly Gain: 5 dBi (Max)
Temperature Range	0 ~ +55°C

Note: for more details, please refer to the User's manual of the EUT.



3. TEST METHODOLOGY

All tests were performed in accordance with the procedure documented in ETSI EN 301 489-1 V1.5.1 (2004-11) as referenced in ETSI EN 301 489-17 V1.2.1 (2002-04).

3.1 UNIT OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the Spectrum analyzers were converted to dB (uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors and subtracting the Amplifier Gain from the measured reading. The following is a sample calculation:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB are added. The Amplifier Gain of 29 dB is subtracted, giving field strength of 32 dBuV/m. The 32-dBuV/m values was mathematically converted to its corresponding level in uV/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/m}$$

Note: Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

3.2 ANTENNA

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 10 meters from the leading edge of the turntable.

3.3 DECISION OF FINAL TEST MODE

1. The following test mode was scanned during the preliminary test:

Mode 1: TX+RX

After the preliminary scan, the following test mode was found to produce the highest emission level.

Mode 1

Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items.



4. INSTRUMENT AND CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No. 5, Jinao industrial park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200577-0 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.



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

Setup Diagram

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Equipment	Model	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	Notebook	PP05L	CN-04Y212-48643 -38L-0491	E2K24C LNS	DELL	N/A	Unshielded 1.8m
2.	AC/AC Adaptor	G090080A34	N/A	DoC	TEN PAO	N/A	Unshielded 1.8m
3.	AC/AC Adaptor	U090080A	N/A	DoC	TEN PAO	N/A	Unshielded 1.8m
4.	AC/AC Adaptor	A41090080- C5	N/A	DoC	LEADER	N/A	Unshielded 1.8m

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

6.3 TEST SETUP

The equipment under test was configured and operated in a manner to communicate with 108M Wireless Router continuously. EUT tends to maximize its emission characteristics in a typical application for conducted and radiated emission measurement. The RF module plus ancillary (stand alone unit) was evaluated as per table 2 of clause 7.1 of ETSI Final draft ETSI EN 301 489-1 v1.5.1: 2004-11. The transmitter was active during the conducted and radiated emission measurements.

Software Used During the Test	
Operating System	Windows XP
File Name	EMCTEST.exe
Program Sequence	1. Boot up Windows XP. 2. Run ping.exe and link the auxiliary AP.
RF Management Software	DOS/TEST MODE SETUP

Remark: During the test, no modification is made to the EUT to comply with Class B limit levels.



7. ETSI EN 301 489-1/-17 REQUIREMENTS

7.1 RADIATED EMISSION

LIMIT

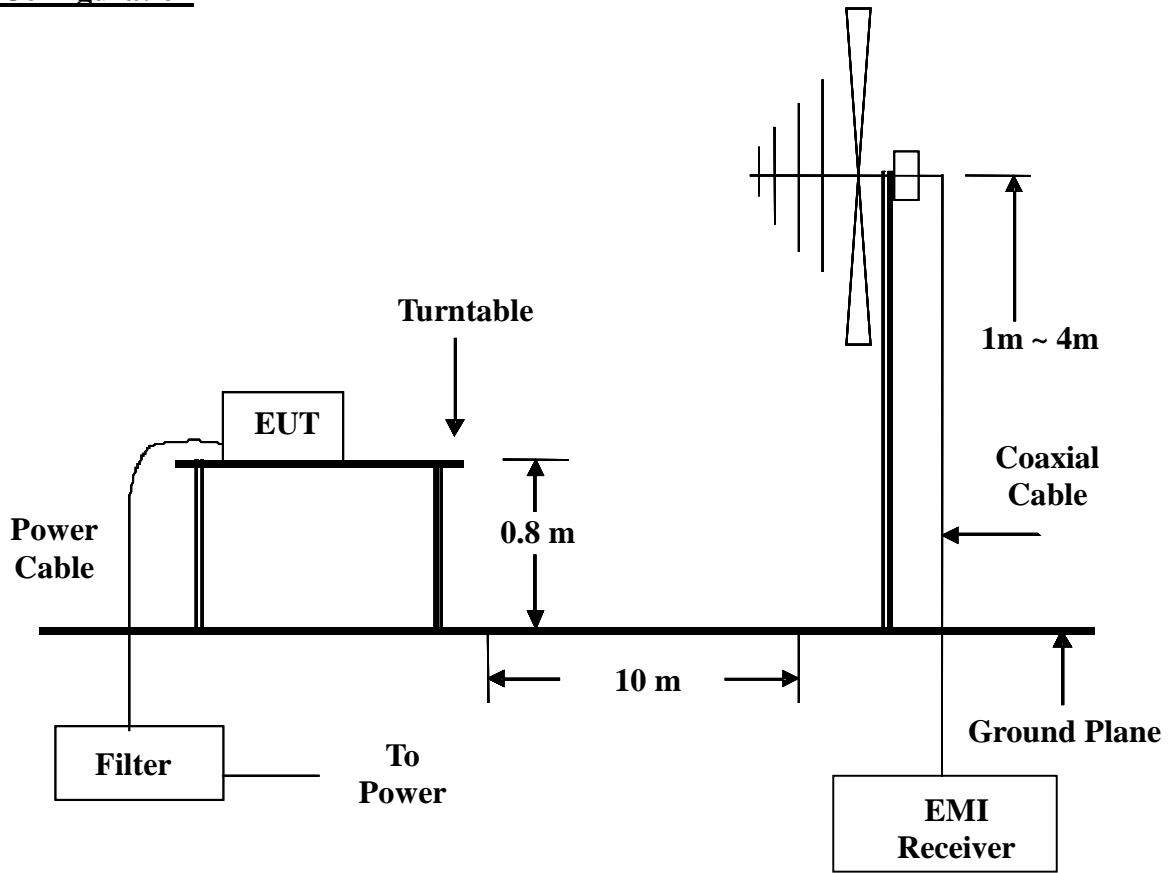
Please refer to ETSI EN 301 489-1 Clause 8.2.3, Table 4 and EN 55022:1998 Clause 6, Table 6, Class B

MEASUREMENT EQUIPMENT USED

966 RF CHAMBER 2				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2007
EMI Test Receiver	R&S	ESCI	1166.5950 03	01/13/2007
Pre-Amplifier	MITEQ	N/A	AFS42-00102650-42-10P-42	02/14/2007
Bilog Antenna	SCHWAZBECK	CBL6143	5082	06/09/2007
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/09/2007
Horn Antenna	TRC	N/A	N/A	03/04/2007

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



**TEST PROCEDURE**

Please refer to ETSI EN 301 489-1 Clause 8.2.3 and EN 55022:1998 Clause 6 for the measurement methods.

TEST RESULTS

No non-compliance noted

Test Data

Location: RF Chamber 2	Tested by: Henry
Test Mode: TX+RX	Test Distance: 10m
Detector Function: Quasi-peak/Peak	Test Results: Passed
Adaptor Model Number: G090080A34	

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
75.00	V	50.82	-28.50	22.32	30.00	-7.68	Peak
92.10	V	51.49	-23.58	27.91	30.00	-2.09	Peak
124.95	V	48.59	-28.06	20.53	30.00	-9.47	Peak
276.15	V	53.80	-24.52	29.28	37.00	-7.72	Peak
367.66	V	42.18	-25.91	16.27	37.00	-20.73	Peak
549.66	V	36.61	-19.03	17.58	37.00	-19.42	Peak
106.95	H	56.41	-31.46	24.95	30.00	-5.05	Peak
250.05	H	62.86	-29.27	33.59	37.00	-3.41	Peak
276.15	H	58.80	-29.01	29.79	37.00	-7.21	Peak
323.33	H	54.85	-24.33	30.52	37.00	-6.48	Peak
374.66	H	45.82	-21.42	24.40	37.00	-12.60	Peak
499.50	H	41.33	-16.20	25.13	37.00	-11.87	Peak

Remark:

- 1. Measuring frequencies from 30 MHz to the 1GHz.*
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
- 3. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.*
- 4. Measurements above show only up to 6 maximum emissions noted.*
- 5. The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.*

7.2 AC MAINS LINE CONDUCTED EMISSION

LIMIT

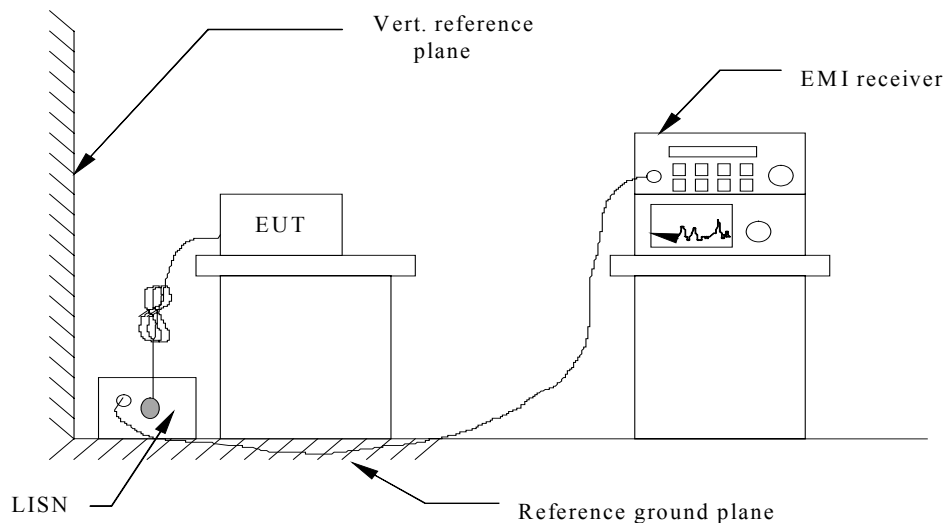
Please refer to ETSI EN 301 489-1 Clause 8.4.3, Table 8 and EN 55022:1998 Clause 5, Table 2, Class B

MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site G				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESCI EMI TEST RECEIV.ESCI	ROHDE&SCHWARZ	1166.5950 03	100088	02/08/2007
LISN	EMCO	3825/2	1371	02/08/2007
LISN	EMCO	3825/2	8901-1459	02/08/2007

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.3 and EN 55022:1998 Clause 5 for the measurement methods.

TEST RESULTS

No non-compliance noted

**Test Data****Test Mode:** TX+RX**Adaptor Model Number:** G090080A34

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.183	29.29	---	---	65.05	55.05	---	-25.76	L1
0.231	23.44	---	---	63.67	53.67	---	-30.23	L1
0.283	26.14	---	---	62.19	52.19	---	-26.05	L1
5.879	19.26	---	---	60.00	50.00	---	-30.74	L1
14.833	42.37	---	---	60.00	50.00	---	-7.63	L1
17.366	29.75	---	---	60.00	50.00	---	-20.25	L1
0.187	31.90	---	---	64.94	54.94	---	-23.04	L2
0.231	27.15	---	---	63.67	53.67	---	-26.52	L2
0.302	26.51	---	---	61.66	51.66	---	-25.15	L2
5.791	23.61	---	---	60.00	50.00	---	-26.39	L2
15.507	31.36	---	---	60.00	50.00	---	-18.64	L2
17.879	32.39	---	---	60.00	50.00	---	-17.61	L2

Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. “---” denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.
4. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9KHz.
5. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

**Adaptor Model Number: U090080A**

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.802	21.33	---	---	56.00	46.00	---	-24.67	L1
9.414	39.58	---	---	60.00	50.00	---	-10.42	L1
11.835	34.75	---	---	60.00	50.00	---	-15.25	L1
13.759	35.85	---	---	60.00	50.00	---	-14.15	L1
17.543	39.51	---	---	60.00	50.00	---	-10.49	L1
23.122	35.59	---	---	60.00	50.00	---	-14.41	L1
0.183	24.93	---	---	65.05	55.05	---	-30.12	L2
0.357	22.23	---	---	60.07	50.07	---	-27.84	L2
0.795	21.96	---	---	56.00	46.00	---	-24.04	L2
9.751	32.90	---	---	60.00	50.00	---	-17.10	L2
11.627	37.12	---	---	60.00	50.00	---	-12.88	L2
17.543	38.71	---	---	60.00	50.00	---	-11.29	L2

Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. “---” denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.
4. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9KHz.
5. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

7.3 AC MAINS HARMONIC CURRENT EMISSION

LIMIT

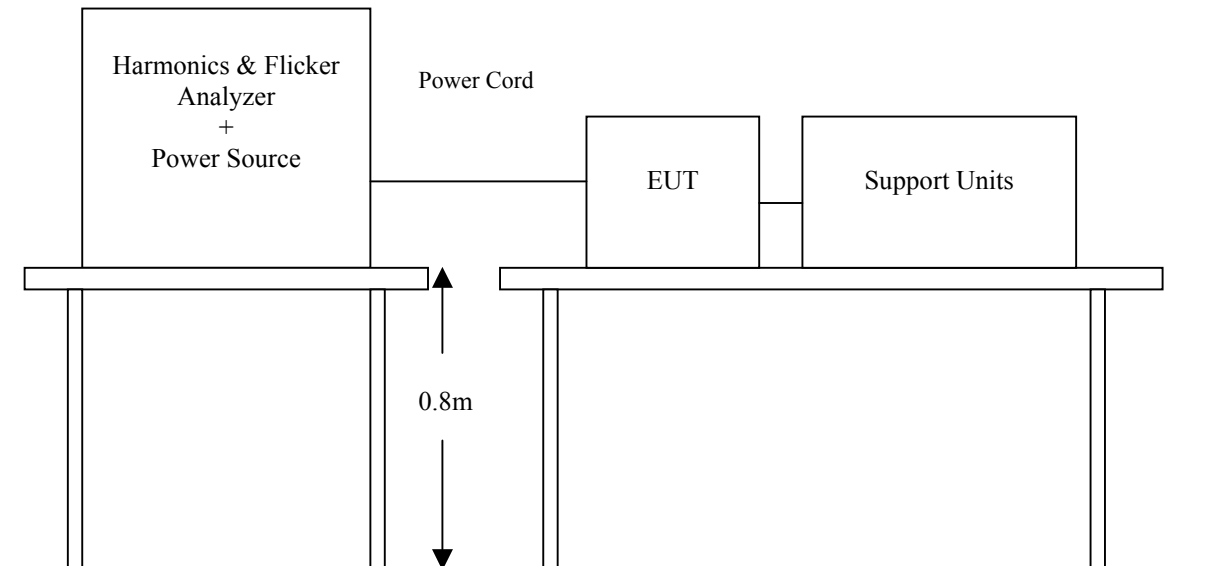
Please refer to EN 61000-3-2

MEASUREMENT EQUIPMENT USED

AC MAINS HARMONIC CURRENT EMISSIONS (EN 61000-3-2)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonic & Flicker Tester	SCHAFFNER	CCN1000	720465	02/08/2007
Power Source	SCHAFFNER	NSG1007	54789	02/08/2007

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Ambient Condition of the Test Site			
Temperature	24°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	48%RH	EUT DC Voltage Rating	N/A
Tested by	Henry		

TEST PROCEDURE

Please refer to EN 61000-3-2: 2000 for the measurement methods.



TEST RESULTS

No non-compliance noted.

Test Mode: TX+RX

Note: According to clause 7 of EN 61000-3-2, equipment with a rated power of 75W or less, no limits apply. The test result is only for reference.



Harmonics – Class-A

EUT: 108M Wireless Router

Tested by: Henry

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2006-11-16

Start time: 11:59:15

End time: 12:01:56

Test duration (min): 2.5

Data file name: H-000091.cts_data

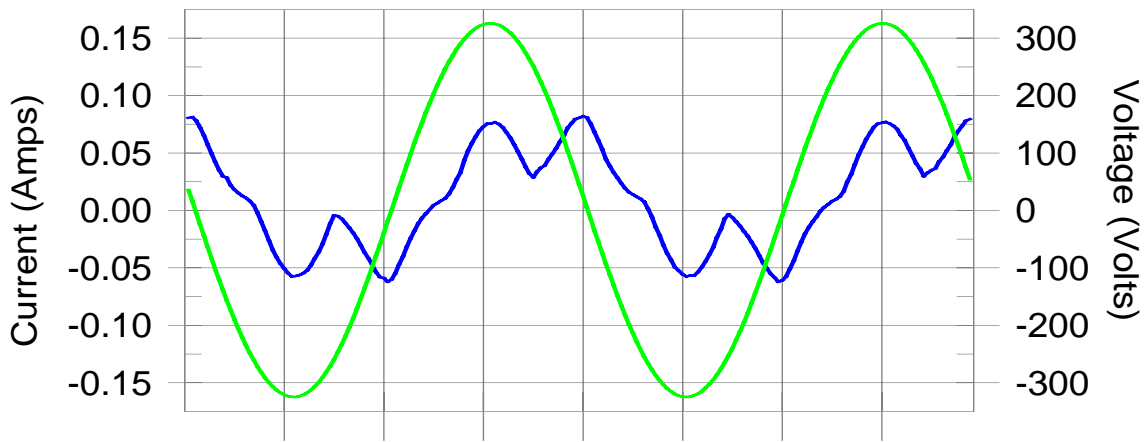
Comment: MR0-WR641G

Customer: TP-LINK TECHNOLOGIES CO., LTD.

Test Result: Pass

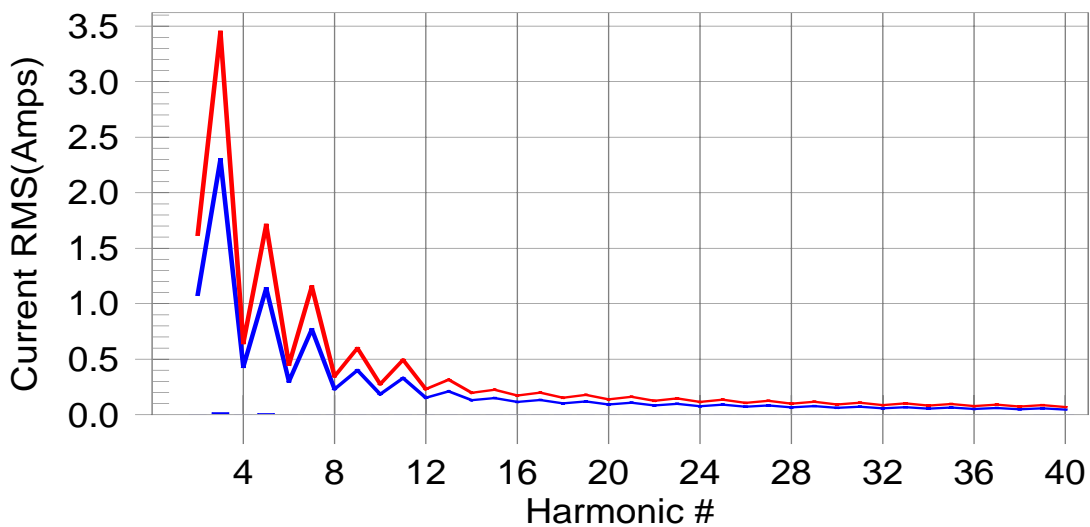
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonic was #5 with 0.63% of the limit.



Current Test Result Summary

EUT: 108M Wireless Router

Tested by: Henry

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2006-11-16

Start time: 11:59:15

End time: 12:01:56

Test duration (min): 2.5

Data file name: H-000091.cts_data

Comment: MR0-WR641G

Customer: TP-LINK TECHNOLOGIES CO., LTD.

Test Result: Pass

Source qualification: Normal

THC(A): 0.02

I-THD(%): 50.06

POHC(A): 0.000

POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.18

Frequency(Hz): 50.00

I_Peak (Amps): 0.090

I_RMS (Amps): 0.048

I_Fund (Amps): 0.042

Crest Factor: 1.944

Power (Watts): 6.9

Power Factor: 0.637

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	0.1	0.001	1.620	0.06	Pass
3	0.018	2.300	0.8	0.019	3.450	0.54	Pass
4	0.001	0.430	0.2	0.001	0.645	0.11	Pass
5	0.010	1.140	0.9	0.011	1.710	0.63	Pass
6	0.000	0.300	0.1	0.000	0.450	0.07	Pass
7	0.001	0.770	0.2	0.001	1.155	0.12	Pass
8	0.000	0.230	0.0	0.000	0.345	0.03	Pass
9	0.001	0.400	0.3	0.001	0.600	0.21	Pass
10	0.000	0.184	0.1	0.000	0.276	0.07	Pass
11	0.001	0.330	0.3	0.001	0.495	0.21	Pass
12	0.000	0.153	0.1	0.000	0.230	0.06	Pass
13	0.000	0.210	0.2	0.000	0.315	0.14	Pass
14	0.000	0.131	0.1	0.000	0.197	0.06	Pass
15	0.000	0.150	0.3	0.000	0.225	0.22	Pass
16	0.000	0.115	0.0	0.000	0.173	0.04	Pass
17	0.000	0.132	0.1	0.000	0.199	0.12	Pass
18	0.000	0.102	0.1	0.000	0.153	0.07	Pass
19	0.000	0.118	0.2	0.000	0.178	0.16	Pass
20	0.000	0.092	0.0	0.000	0.138	0.03	Pass
21	0.000	0.107	0.1	0.000	0.161	0.09	Pass
22	0.000	0.084	0.0	0.000	0.125	0.03	Pass
23	0.000	0.098	0.1	0.000	0.147	0.12	Pass
24	0.000	0.077	0.0	0.000	0.115	0.04	Pass
25	0.000	0.090	0.1	0.000	0.135	0.10	Pass
26	0.000	0.071	0.0	0.000	0.106	0.05	Pass
27	0.000	0.083	0.1	0.000	0.125	0.09	Pass
28	0.000	0.066	0.0	0.000	0.099	0.04	Pass
29	0.000	0.078	0.1	0.000	0.116	0.12	Pass
30	0.000	0.061	0.0	0.000	0.092	0.03	Pass
31	0.000	0.073	0.1	0.000	0.109	0.07	Pass
32	0.000	0.058	0.0	0.000	0.086	0.05	Pass
33	0.000	0.068	0.1	0.000	0.102	0.12	Pass
34	0.000	0.054	0.1	0.000	0.081	0.06	Pass
35	0.000	0.064	0.1	0.000	0.096	0.06	Pass
36	0.000	0.051	0.1	0.000	0.077	0.05	Pass
37	0.000	0.061	0.1	0.000	0.091	0.07	Pass
38	0.000	0.048	0.1	0.000	0.073	0.07	Pass
39	0.000	0.058	0.1	0.000	0.087	0.08	Pass
40	0.000	0.046	0.1	0.000	0.069	0.05	Pass



Voltage Source Verification Data

EUT: 108M Wireless Router Tested by: Henry
 Test category: Class-A (European limits) Test Margin: 100
 Test date: 2006-11-16 Start time: 11:59:15 End time: 12:01:56
 Test duration (min): 2.5 Data file name: H-000091.cts_data
 Comment: MR0-WR641G
 Customer: TP-LINK TECHNOLOGIES CO., LTD.

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.18	Frequency(Hz):	50.00
I_Peak (Amps):	0.090	I_RMS (Amps):	0.048
I_Fund (Amps):	0.042	Crest Factor:	1.944
Power (Watts):	6.9	Power Factor:	0.637

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.232	0.460	50.48	OK
3	0.523	2.071	25.26	OK
4	0.108	0.460	23.52	OK
5	0.066	0.921	7.21	OK
6	0.085	0.460	18.40	OK
7	0.048	0.690	7.02	OK
8	0.049	0.460	10.65	OK
9	0.037	0.460	8.10	OK
10	0.024	0.460	5.16	OK
11	0.029	0.230	12.63	OK
12	0.025	0.230	10.66	OK
13	0.019	0.230	8.38	OK
14	0.019	0.230	8.18	OK
15	0.017	0.230	7.38	OK
16	0.015	0.230	6.62	OK
17	0.022	0.230	9.55	OK
18	0.020	0.230	8.69	OK
19	0.019	0.230	8.34	OK
20	0.017	0.230	7.53	OK
21	0.015	0.230	6.46	OK
22	0.013	0.230	5.59	OK
23	0.015	0.230	6.61	OK
24	0.009	0.230	4.01	OK
25	0.018	0.230	7.87	OK
26	0.014	0.230	6.08	OK
27	0.015	0.230	6.37	OK
28	0.014	0.230	5.93	OK
29	0.013	0.230	5.53	OK
30	0.011	0.230	4.90	OK
31	0.010	0.230	4.18	OK
32	0.010	0.230	4.44	OK
33	0.011	0.230	4.84	OK
34	0.008	0.230	3.35	OK
35	0.009	0.230	3.82	OK
36	0.008	0.230	3.51	OK
37	0.008	0.230	3.40	OK
38	0.006	0.230	2.81	OK
39	0.008	0.230	3.29	OK
40	0.007	0.230	3.24	OK



7.4 AC MAINS VOLTAGE FLUCTUATION AND FLICKER

LIMIT

Please refer to EN 61000-3- 3

MEASUREMENT EQUIPMENT USED

AC MAINS HARMONIC CURRENT EMISSIONS (EN 61000-3-3)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonic & Flicker Tester	SCHAFFNER	CCN1000	720465	02/08/2007
Power Source	SCHAFFNER	NSG1007	54789	02/08/2007

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration

(Same as the configuration of the AC MAINS HARMONIC CURRENT EMISSIONS TEST)

Ambient Condition of the Test Site			
Temperature	24°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	48%RH	EUT DC Voltage Rating	N/A
Tested by	Henry		

TEST PROCEDURE

Please refer to EN 61000-3- 3 for the measurement methods.

TEST RESULTS

No non-compliance noted.

Test Mode : TX+RX



Flicker Test Summary

EUT: 108M Wireless Router

Test category: All parameters (European limits)

Test date: 2006-11-16

Start time: 12:05:50

Test duration (min): 10

Data file name: F-000092.cts_data

Comment: MR0-WR641G

Customer: TP-LINK TECHNOLOGIES CO., LTD.

Tested by: Henry

Test Margin: 100

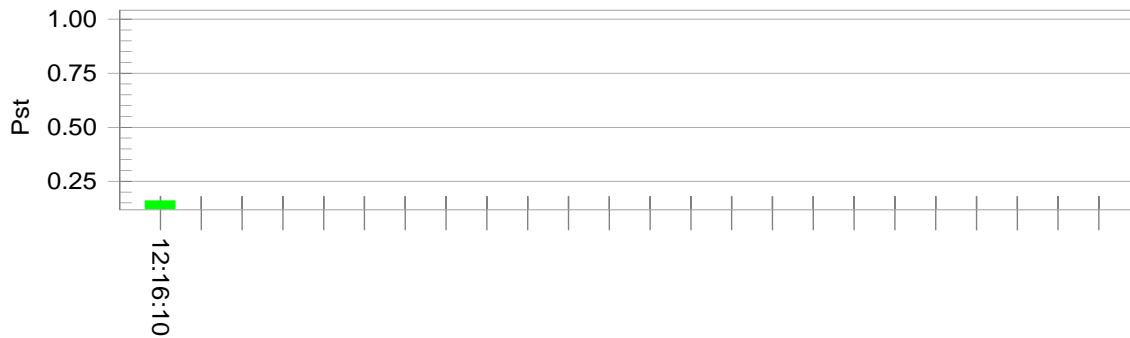
End time: 12:16:10

Test Result: Pass

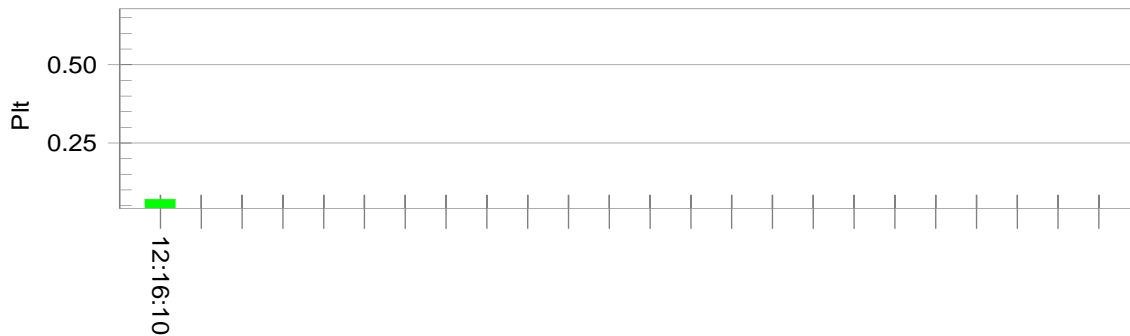
Status: Test Completed

Pst, and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.02			
Highest dt (%):	-0.13	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	-0.09	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.160	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.070	Test limit:	0.650	Pass

7.5 ELECTROSTATIC DISCHARGE

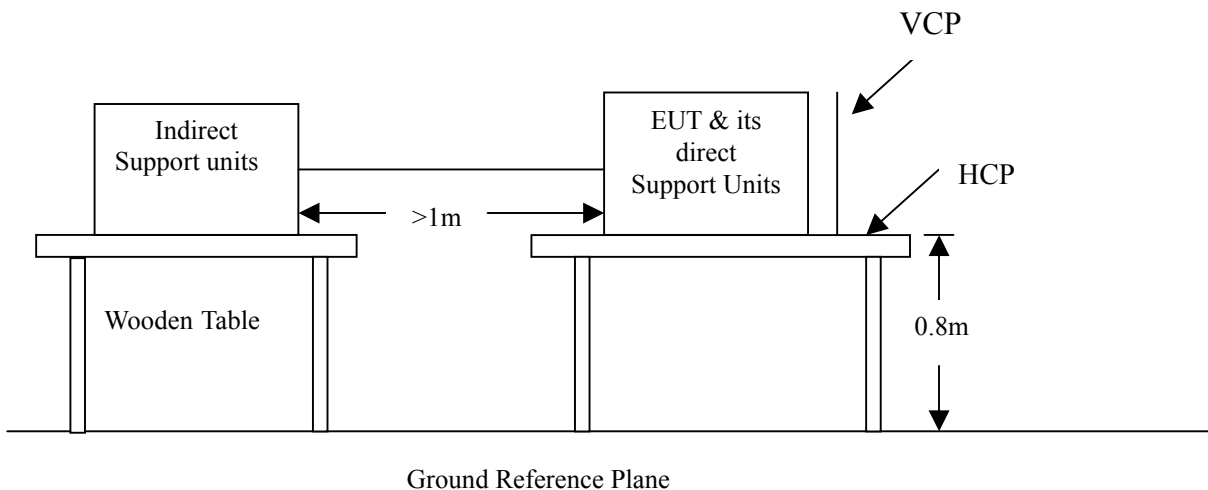
LIMIT

Please refer to EN 61000-4-2

MEASUREMENT EQUIPMENT USED

ELECTROSTATIC DISCHARGE (EN 61000-4-2)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESD 30 System	EM Test	ESD 30C	1202-17	10/17/2007

Test Configuration



Ambient Condition of the Test Site			
Temperature	23°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	45%RH	EUT DC Voltage Rating	N/A
Pressure	1022mbar	Ground Bond Resistance	0.2 Ω
Tested by	Henry		



Test Procedure:

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test.)

Test Mode: TX+RX

Description of the Electrostatic Discharges (ESD)

TX+RX Mode

Amount of discharge	Voltage	Coupling	Result (Pass/Fail)
Mini 20 /Point	±2;4; 8 kV	Air Discharge	No discharge Point
Mini 20 /Point	±2; 4 kV	Contact Discharge	Pass
Mini 20 /Point	± 2;4 kV	Indirect Discharge HCP	Pass
Mini 20 /Point	±2; 4 kV	Indirect Discharge VCP	Pass

Note: For tested points to EUT, refer to the attached pages. Be aware that the Blue mark is for contact discharge, and the red mark is for air discharge.

PERFORMANCE CRITERIA	
Criteria requested	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

The Tested Points of EUT



7.6 RF ELECTROMAGNETIC FIELD

LIMIT

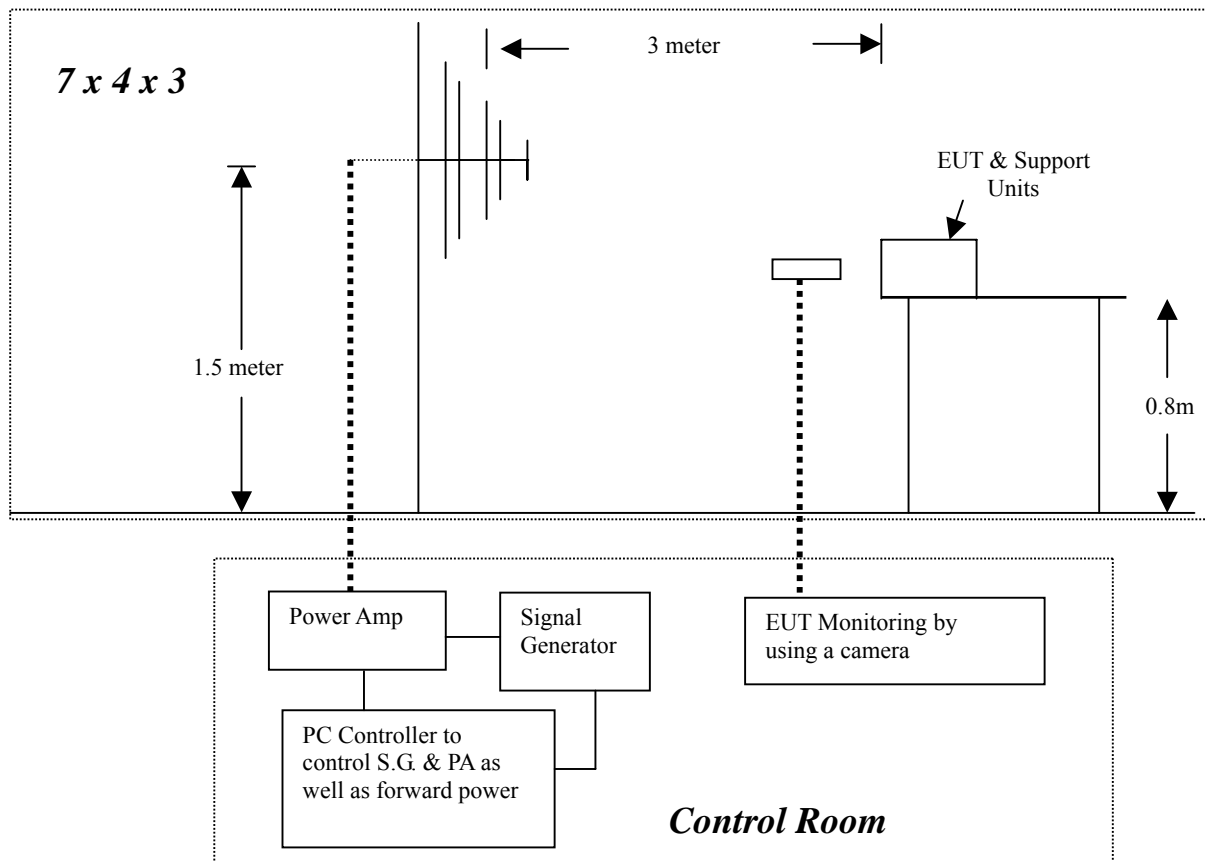
Please refer to EN61000-4-3

MEASUREMENT EQUIPMENT USED

RF ELECTROMAGNETIC FIELD (EN 61000-4-3)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Generator	Maconi	2022D	119246/003	06/09/2007
Power Amplifier	M2S	A00181-1000	9801-112	06/09/2007
Power Amplifier	M2S	AC8113/ 800-250A	9801-179	06/09/2007
Power Antenna	SCHAFFNER	CBL6140A	1204	06/09/2007

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration





Ambient Condition of the Test Site			
Temperature	23°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	45%RH	EUT DC Voltage Rating	N/A
Pressure	1022mbar	Tested by	Henry

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2, ETSI EN 301 489-3 Clause 7.2.2 and EN 61000-4-3 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX+RX

Test conditions:

Test level : 3V/m

Steps : 1 % of fundamental

Dwell Time : 3 sec

Description of Test (TX+RX Mode)

	Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Selection for the final test
1	80-1000	3V/m	Yes	H / V	Front	<input checked="" type="checkbox"/>
	1400-2000	3V/m	Yes	H / V	Front	<input checked="" type="checkbox"/>
2	80-1000	3V/m	Yes	H / V	Right	<input checked="" type="checkbox"/>
	1400-2000	3V/m	Yes	H / V	Right	<input checked="" type="checkbox"/>
3	80-1000	3V/m	Yes	H / V	Back	<input checked="" type="checkbox"/>
	1400-2000	3V/m	Yes	H / V	Back	<input checked="" type="checkbox"/>
4	80-1000	3V/m	Yes	H / V	Left	<input checked="" type="checkbox"/>
	1400-2000	3V/m	Yes	H / V	Left	<input checked="" type="checkbox"/>

PERFORMANCE CRITERIA

Criteria requested	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

7.7 AC MAINS FAST TRANSIENTS – COMMON MODE

LIMIT

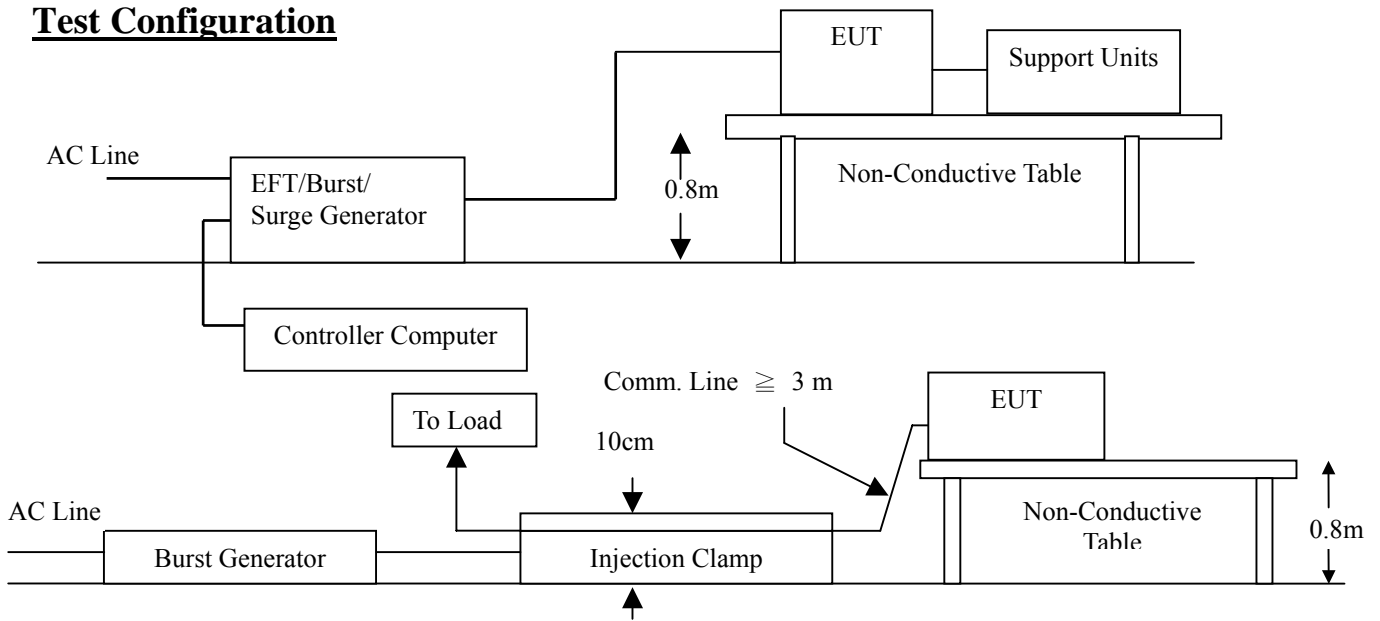
Please refer to EN 61000-4-4

MEASUREMENT EQUIPMENT USED

AC MAINS FAST TRANSIENTS - COMMON MODE (EN 61000-4-4)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Fast Transients/Burst Generator	SCHAFFNER	BEST EMC V2.7	200126-012SC	02/08/2007
CLAMP	HAEFELY TRENCH	093 506.1	080 421.13	N.C.R.

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Ambient Condition of the Test Site			
Temperature	23°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	45%RH	EUT DC Voltage Rating	N/A
Pressure	1022mbar	Ground Bond Resistance	0.2 Ω
Tested by	Henry		



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX+RX

TEST CONDITIONS

Results of Final Tests (TX+RX Mode)

Impulse Frequency: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 3Hz

Injection Line	Voltage (kV)	Injected Method	Result (Pass / Fail)
<input checked="" type="checkbox"/> Line	±1	Direct	Pass
<input checked="" type="checkbox"/> Neutral	±1	Direct	Pass
<input type="checkbox"/> PE	± 1	Direct	Pass
<input checked="" type="checkbox"/> Line + Neutral	±1	Direct	Pass
<input type="checkbox"/> L + PE	± 1	Direct	Pass
<input type="checkbox"/> N + PE	± 1	Direct	Pass
<input type="checkbox"/> L + N + PE	± 1	Direct	Pass
<input type="checkbox"/> RJ45 port (LAN cable)	±0.5	Clamp	Pass
<input type="checkbox"/> RJ11 port (Line cable)	±0.5	Clamp	Pass

PERFORMANCE CRITERIA	
Criteria requested	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

7.8 AC MAINS SURGE LIMIT

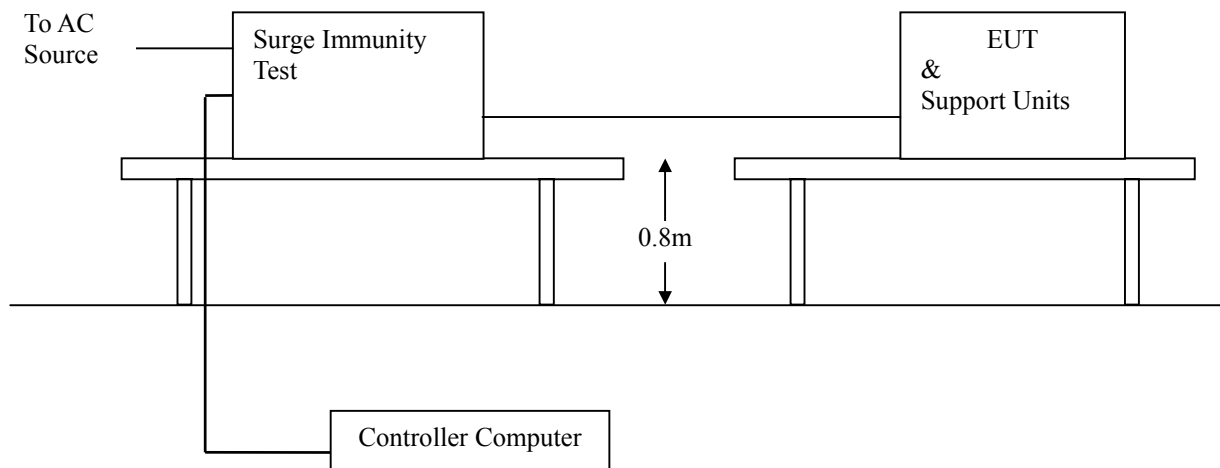
Please refer to EN 61000-4-5

MEASUREMENT EQUIPMENT USED

AC MAINS SURGES (EN 61000-4-5)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Fast Transients/Burst Generator	SCHAFFNER	BEST EMC V2.7	200126-012SC	02/08/2007
CDN	HAEFELY TRENCH	IP6.2	148342	N.C.R.
CDN	HAEFELY TRENCH	DEC1A	148050	N.C.R.

Remark: 1. Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Ambient Condition of the Test Site			
Temperature	22°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	45%RH	EUT DC Voltage Rating	N/A
Pressure	1022 mbar	Ground Bond Resistance	0.2 Ω
Tested by	Henry		

Test Procedure:

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.



TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX+RX

TEST CONDITIONS

Results of Final Tests (TX+RX Mode)

Voltage Waveform: 1.2/50 us

Current Waveform: 8/20 us

Polarity: Positive/Negative

Phase angle: 0°, 90°, 180°, 270°

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Result (Pass/Fail)
<input checked="" type="checkbox"/> Line + Neutral	1	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> L + PE	2	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> N + PE	2	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> T, R-Ground	0.5	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> L1, 2, 3, 4-G (LAN)	0.5	Pos./ Neg.	Capacitive	Pass

PERFORMANCE CRITERIA	
Criteria requested	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

7.9 AC MAINS RF – COMMON MODE LIMIT

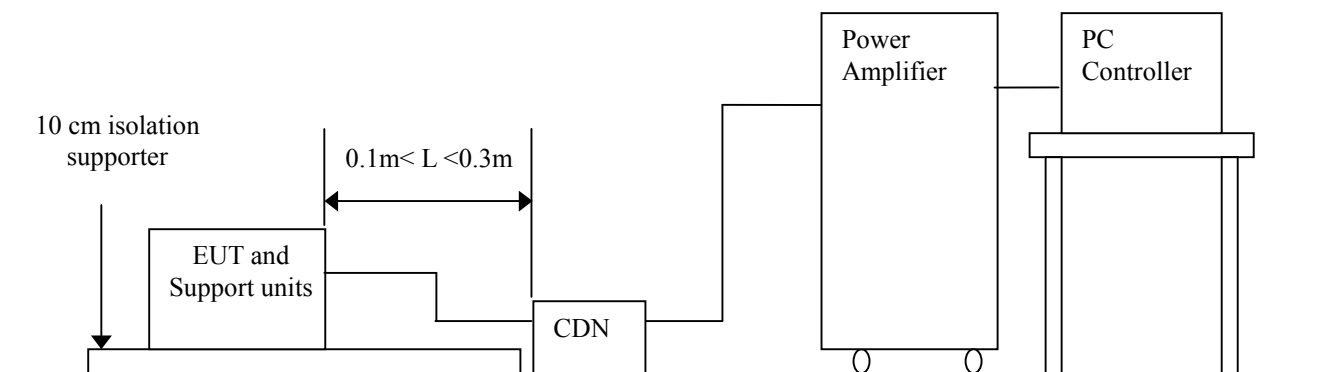
Please refer to EN 61000-4-6

MEASUREMENT EQUIPMENT USED

AC MAINS RF COMMON MODE (EN 61000-4-6)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Generator	Maconi	2022D	119246/003	06/09/2007
Power Amplifier	M2S	A00181-1000	9801-112	06/09/2007
CDN	MEB	M3-8016	003683	06/09/2007

Remark: 1. Each piece of equipment is scheduled for calibration once a year

Test Configuration



Ambient Condition of the Test Site			
Temperature	22°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	45%RH	EUT DC Voltage Rating	N/A
Pressure	1022 mbar	Ground Bond Resistance	0.2 Ω
Tested by	Henry		

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2, ETSI EN 301 489-17 Clause 7.2.2 and EN 61000-4-6 for the measurement methods.



TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX+RX

TEST CONDITIONS

Results of Final Tests (TX+RX Mode)

Frequency Range: 0.15MHz~80MHz

Frequency Step: 1% of fundamental

Dwell time: 3 Sec.

80% A.M., 1 kHz Sine wave (Field Strength: 3 V/m)

Coupling type: **CDN** / **RF Current Probe**

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V/m	Yes	Pass

PERFORMANCE CRITERIA	
Criteria requested	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

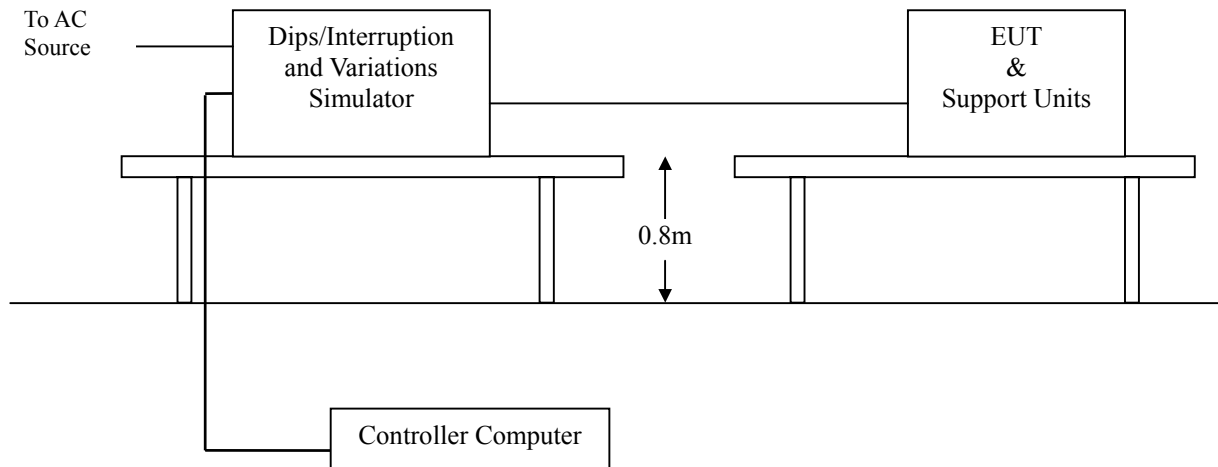
7.10 VOLTAGE DIPS AND INTERRUPTION LIMIT

Please refer to EN61000-4-11

MEASUREMENT EQUIPMENT USED

Voltage Dips/Short Interruption and Voltage Variation Immunity Test Site (IEC/EN 61000-4-11)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Fast Transients/Burst Generator	SCHAFFNER	BEST EMC V2.7	200126-012SC	02/08/2007

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	EUT AC Voltage Rating	Powered by the adaptor
Humidity	55%RH	EUT DC Voltage Rating	N/A
Pressure	1022 mbar	Ground Bond Resistance	0.2 Ω
Tested by	Henry		

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods.



TEST RESULTS

PASS (for criteria A: EUT continued to operate normally during test)
(for criteria B: EUT shut down but can be auto recovered as the events disappear.)

Test Mode: TX+RX

TEST CONDITIONS

Interruption at phase angles of 0, 45, 90, 135, 180, 225, 270 and 315 degree in a 10 sec-interval.

	Test Level (% U _T)	Reduction (%)	Duration (ms)	Criterion
Voltage Dips	70	30%	10	B
	40	60%	100	C
Voltage Interruption	<5	>95%	5000	C

Note: The duration with a sequence of three dips/interruptions with a minimum interval of 10 s between each test event.

Results of Final Tests (TX+RX Mode)

Voltage Dips

Test Level (% U _T)	Reduction (%)	Duration (ms)	Observation	Criterion
70	30	10	Normal	A
40	60	100	Normal	C

Voltage Interruption

Test Level (% U _T)	Reduction (%)	Duration (ms)	Observation	Criterion
<5	95	5000	Normal	C

APPENDIX 1 PHOTOGRPHS OF TEST SETUP

RADIATED EMISSION TEST



LINE CONDUCTED EMISSION TEST

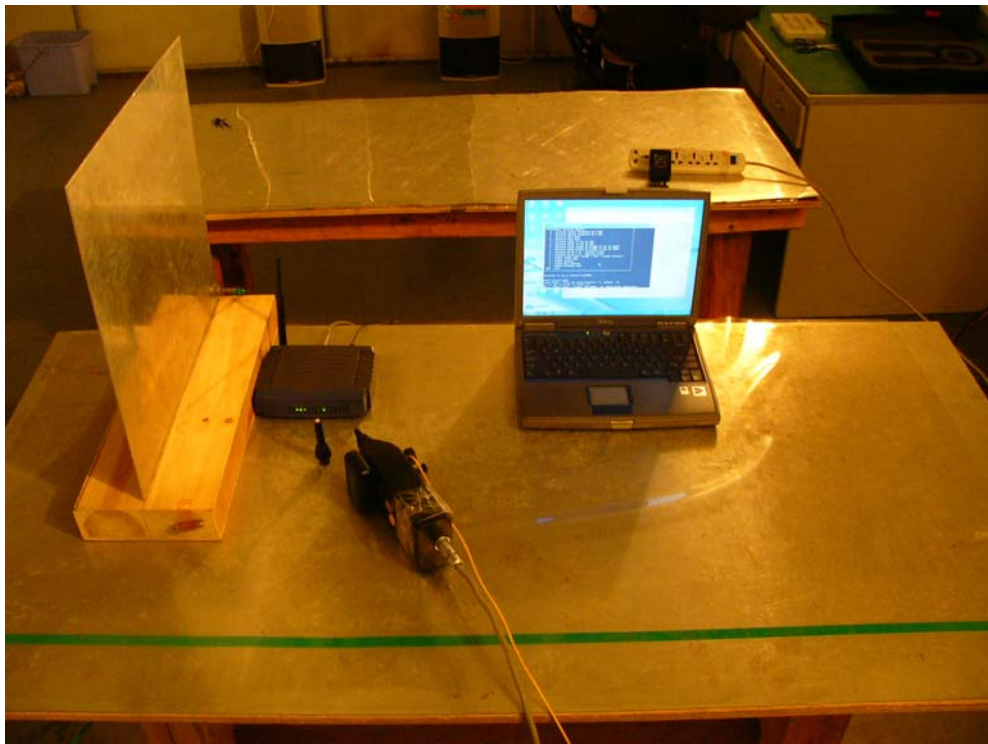
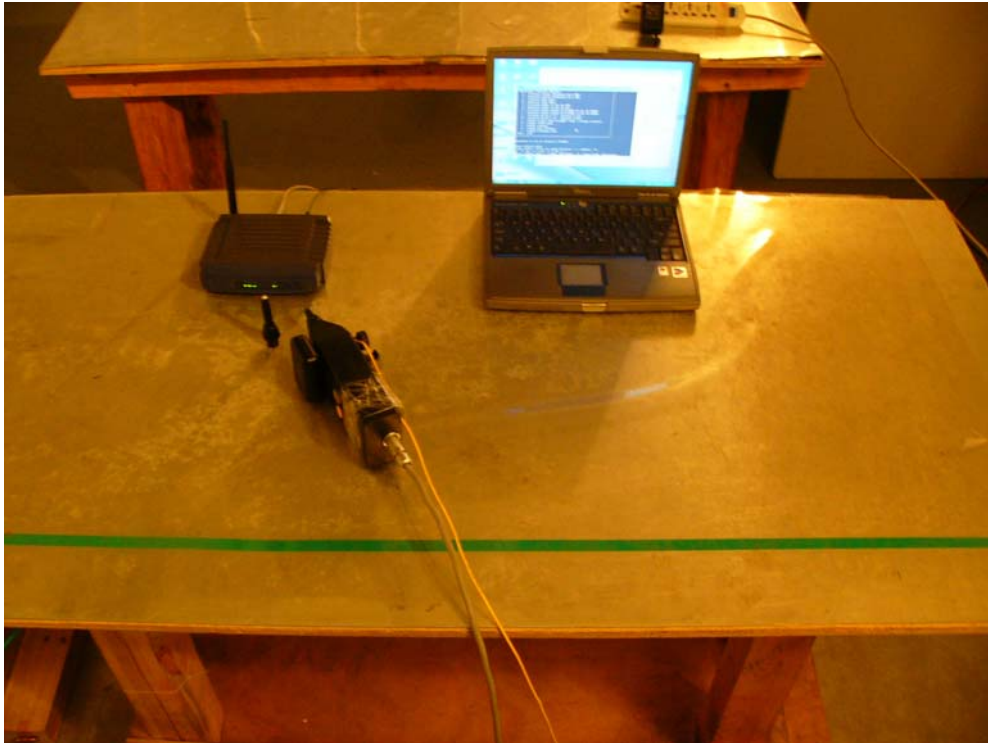




**POWER HARMONIC & VOLTAGE FLUCTUATION /
FLICKER TEST**



ELECTROSTATIC DISCHARGE TEST

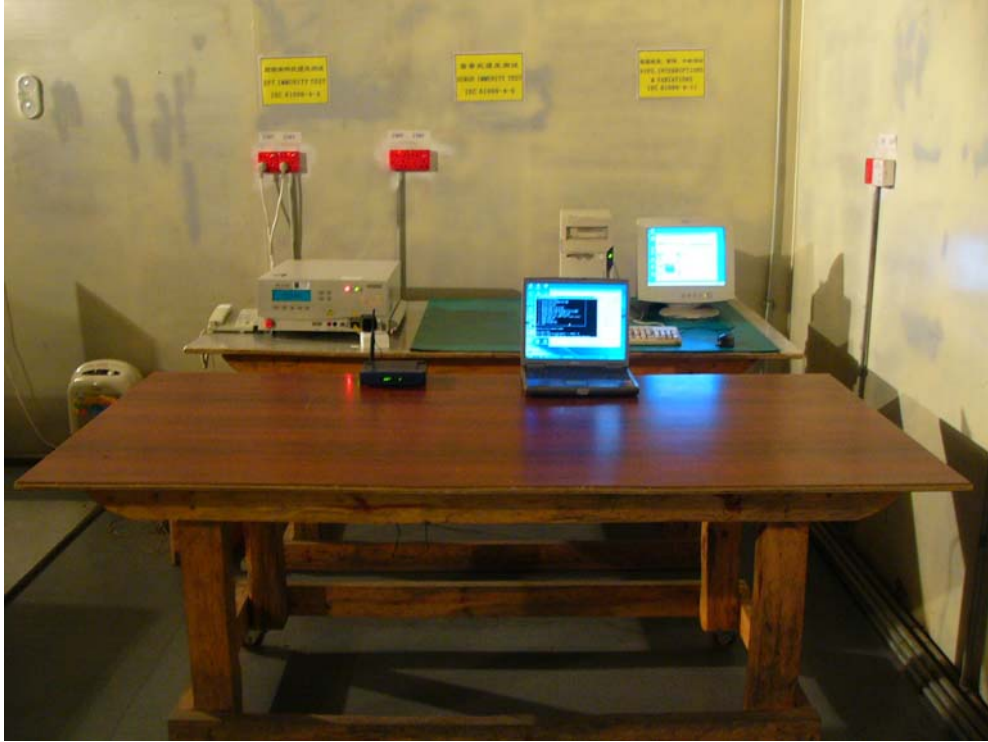


RADIATED ELECTROMAGNETIC FIELD TEST



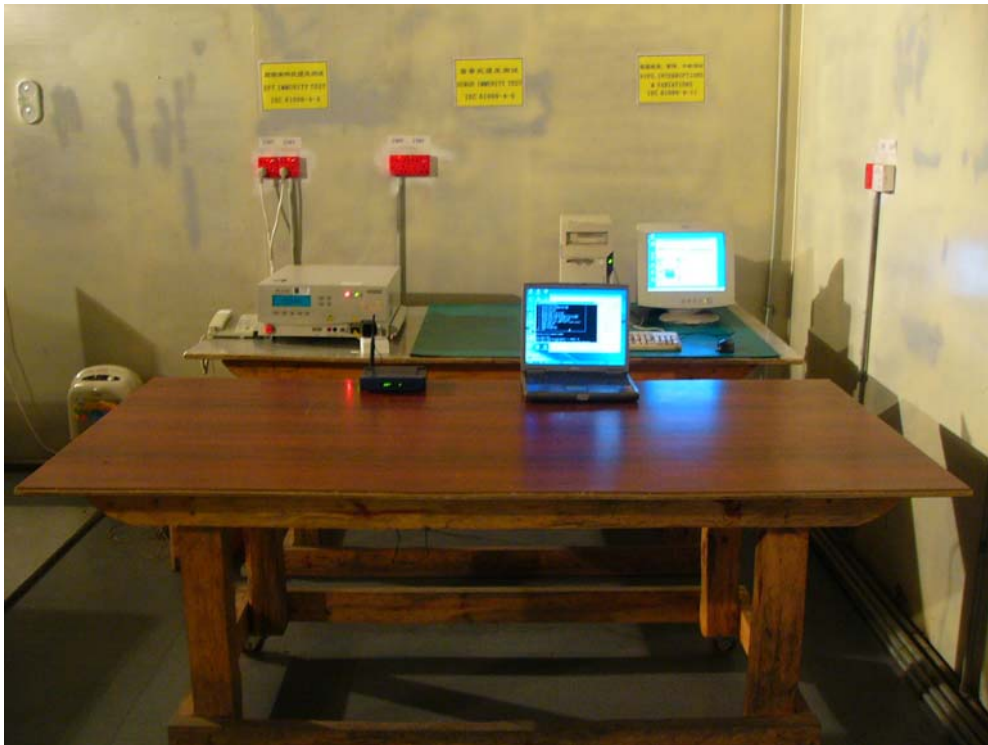


FAST TRANSIENTS/BURST TEST





SURGE IMMUNITY TEST





**CONDUCTED DISTURBANCE, INDUCED BY
RADIO-FREQUENCY FIELDS TEST**





VOLTAGE DIPS / INTERRUPTION TEST

