CE EMC
TEST REPORT

For

IP Cam

Model : F511W

Data Applies To : F510W

Trade Name : ZAVIO

Issued for

ZAVIO Inc.

B3,1F,NO. 1,Lising 1st Rd.,
Science-Based Industrial Park,Hsinchu,Taiwan

Issued by

Compliance Certification Services Inc.
Hsinchu Lab.
NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C
TEL: +886-3-5921698
FAX: +886-3-5921108

http://www.ccsrf.com
E-Mail : service@ccsrf.com

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	04/30/2010	Initial Issue	All Page 57	Kate Shi

TABLE OF CONTENTS

TITLE PAGE NO.

1. TEST REPORT CERTIFICATION 4
2. EUT DESCRIPTION 5
2.1 DESCRIPTION OF EUT & POWE 5
3. DESCRIPTION OF TEST MODES 5
4. TEST METHODOLOGY 5
5. FACILITIES AND ACCREDITATION 6
5.1 FACILITIES 6
5.2 TABLE OF ACCREDITATIONS AND LISTINGS 6
5.3 MEASUREMENT UNCERTAINTY 7
6. SETUP OF EQUIPMENT UNDER TEST 8
7. EMISSION TEST 9
7.1 RADIATED EMISSION 9-14
7.2 CONDUCTED EMISSION 15-22
7.3 HARMONIC CURRENT EMISSION 23-27
7.4 VOLTAGE FLUCTUATION AND FLICKER 28-29
8. IMMUNITY TEST 30
8.1 ELECTROSTATIC DISCHARGE (ESD) 31-33
8.2 RF ELECTROMAGNETIC FIELD (RS) 34-35
8.3 FAST TRANSIENTS COMMON MODE (EFT) 36-38
8.4 SURGE 39-40
8.5 CONDUCTED RADIO FREQUENCY DISTURBANCES (CS) 41-42
8.6 POWER FREQUENCY MAGNETIC FIELDS (PFMF) 43-44
8.7 VOLTAGE DIPS & VOLTAGE INTERRUPTIONS (DIP) 45-46
APPENDIX SETUP PHOTOS 47-57

1. TEST REPORT CERTIFICATION

Applicant ： ZAVIO Inc.
Address ： B3, 1F, NO. 1, Lising 1st Rd.,
Science-Based Industrial Park,Hsinchu, Taiwan
Equipment Under Test ： IP Cam
Model ： F511W
Data Applies To ： F510W
Trade Name ： ZAVIO
Tested Date ： April 22 ~ May 04, 2010

APPLICABLE STANDARD		
Emission Standard	**Item**	**Test Result**
EN 55022:2006 + A1:2007, CLASS B	Radiated Emission	PASS
	Conducted Emission	PASS
EN 61000-3-2:2006	Harmonic Current Emissions	PASS
EN 61000-3-3:1995 + A1:2001 + A2:2005	Voltage Fluctuation & Flicker	PASS
Immunity Standard EN 55024:1998 + A1:2001 + A2:2003	**Item**	**Test Result**
IEC 61000-4-2:1995 + A1:1998 + A2:2000	Electrostatic Discharge	PASS
IEC 61000-4-3:2006	RF Electromagnetic Field	PASS
IEC 61000-4-4:2004	Fast Transients Common Mode	PASS
IEC 61000-4-5:2005	Surge	PASS
IEC 61000-4-6:2003 + A1:2004 + A2:2006	Conducted Radio Frequency Disturbances	PASS
IEC 61000-4-8:1993 + A1:2000	Power Frequency Magnetic Fields	PASS
IEC 61000-4-11:2004	Voltage Dips & Voltage Interruptions	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. 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:

Alan Fan
Section Manager

Reviewed by:

Gundam Lin
Team Leader

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWE

Product Name	IP Cam
Model Number	F511W
Data Applies To	F510W
Received Date	April 23, 2010
Power Source	12VDC, 1.25A (From Power Adapter)
I/O Port	RJ-45 port × 1, Audio In port × 1, Audio Out port × 1, Power port × 1, DI+DI-Com No port × 1

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	FAIRWAY	WRG15F-120B	100-240VAC, 1.0A max, 50/60Hz	12V, 1.25A

The difference of the series model :

Model Number	Difference
F511W	The CMOS camera has a LED light around
F510W	The CMOS camera has no LED light around

Remark : *For more details, please refer to the User's manual of the EUT.*

3. DESCRIPTION OF TEST MODES

The EUT(F511W) has been tested under normal operating condition.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following standards : EN 55022:2006 + A1:2007, EN 61000-3-2:2006, EN 61000-3-3:1995 + A1:2001 + A2:2005, EN 55024:1998 + A1:2001 + A2:2003.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

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

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4 :2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Germany	TÜV NORD
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Open Area Test Site (OATS No.3) / Radiated Emission, 30 to 200 MHz	+/- 3.9267
Open Area Test Site (OATS No.3) / Radiated Emission, 200 to 1000 MHz	+/- 3.6899
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 30 to 200 MHz	+/- 3.6878
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 200 to 1000 MHz	+/- 3.0885
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 1 to 26.5GHz	+/- 3.2000
Conducted Emission, 9kHz to 30MHz	+/- 1.7468

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than UCISPR which is 3.6dB and 5.2dB respectively. CCS values (called ULab in CISPR 16-4-2) is less than UCISPR as shown in the table above. Therefore, MU need not be considered for compliance.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	DELL	Latitude D610	CN-0C4708-48643-625 -5565	E2K24BNHM
2	Notebook PC	HP	nx6130	CNU543274R	CNTWM3B2200BGA
3	Headset/Microphone	ERGOTECH	ET-E203	4719405008042	-----
4	Wireless Gigabit Router	D-Link	DI-724GU	-----	-----

No.	Signal Cable Description
1	Unshielded RJ-45 cable, 12m ×1

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

1. Setup whole system for test as shown on diagram
2. Wireless Router to provide IP to the EUT.
3. Notebook PC (1) ping 192.168.1.90 to EUT.
4. Notebook PC (2) ping 192.168.0.151 to EUT.
5. Audio In/Out link Headset/Microphone.
6. All of the function are under run.
7. Start test.

7. EMISSION TEST

7.1 RADIATED EMISSION

LIMITS

(1) Frequency Range below 1GHz

Frequency range (MHz)	Field Strength Quasi-peak limits (dBμV/m)		Distance (meters)
	Class A	Class B	
30 - 230	40	30	10
230 - 1000	47	37	10

Remark: *(1) The lower limit shall apply at the transition frequency.*
(2) Additional provisions may be required for cases where interference occurs.

(2) Frequency Range above 1GHz

Frequency range (GHz)	Field Strength Limit (dBμV/m)				Distance (meters)
	Class A		Class B		
	Peak	Average	Peak	Average	
1 - 3	76	56	70	50	3
3 - 6	80	60	74	54	3

Remark: *The lower limit shall apply at the transition frequency.*

According to EN55022: 2006 + A1: 2007 clause 6.2, the measurement frequency range shown in the following table:

Highest frequency generated or used within the EUT or on which the EUT operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Less than 108	1000
108-500	2000
500-1000	5000
Above 1000	5 times of the highest frequency or 6GHz, whichever is less

TEST EQUIPMENT

Radiated Emission below 1GHz / OATS3

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Bi-log Antenna	SCHAFFER	CBL6112B	2696	12/10/2010
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/27/2010
N Type Coaxial Cable	MIYAZAKIN	8D-FB	03	07/26/2010
Pre-Amplifier	Agilent	8447D	2944A10052	07/26/2010

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

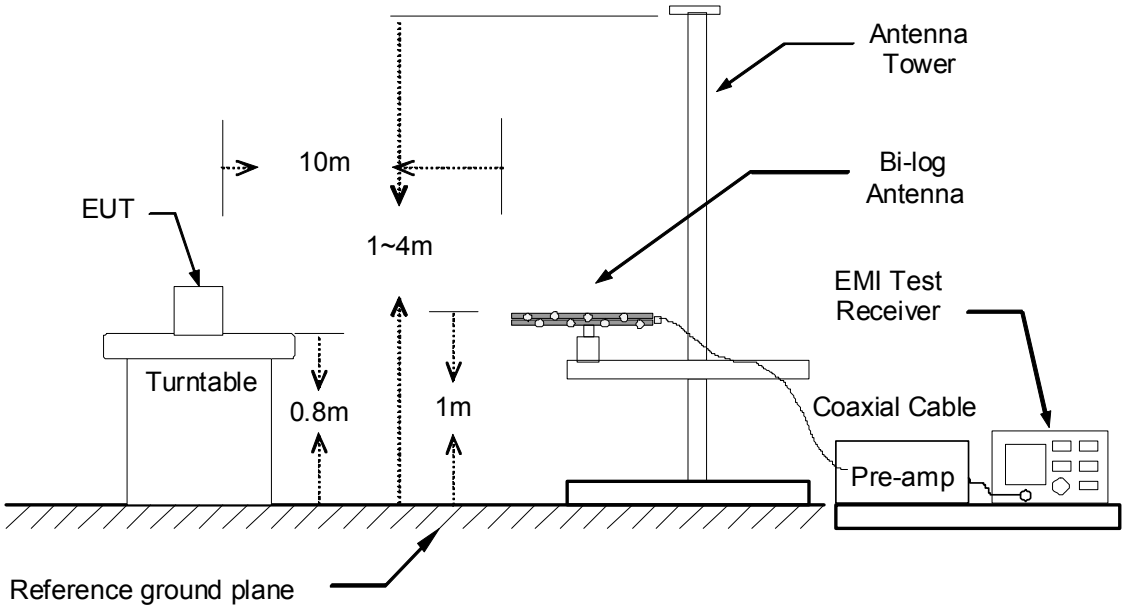
Radiated Emission above 1GHz / 966Chamber_A

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/09/2010
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100221	05/17/2010
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-249	11/12/2010
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078732	06/30/2010
Pre-Amplifier	Agilent	8449B	3008A01471	08/02/2010
Pre-Amplifier	HP	8447F	2944A03748	09/24/2010
RF Coaxial Cable	HUBER-SUHNER	SF104PEA	31347	07/21/2010
RF Coaxial Cable	HUBER-SUHNER	SF104PEA	31350	07/21/2010
RF Coaxial Cable	HUBER-SUHNER	SF104PEA	31355	07/21/2010
Band Reject Notch Filter	Micro-Tronics	BRM05702-01	009	N.C.R

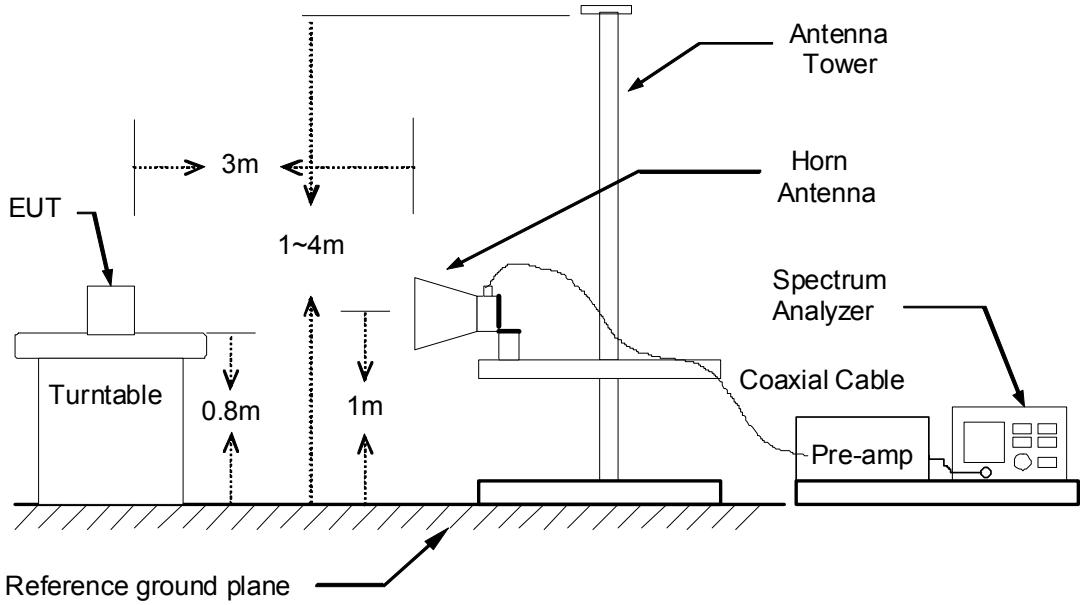
Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

The basic test procedure was in accordance with EN 55022.

The EUT were placed on a turn table top 0.8 meter above ground. The table was rotated 360 degrees to determine the position of the maximum emission level. EUT is set 3 or 10 meters from the interference receiving antenna which is mounted on the top of a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum emission level, both horizontal and vertical polarization of the antenna is set on the measurement.

Radiated emissions were invested over the frequency range from 30 MHz to 1000 MHz using a receiver bandwidth of 120 kHz.

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.

The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

TEST RESULTS

Below 1 GHz

Product Name	IP Cam	Test By	Rick Lin
Model	F511W	Test Date	2010/04/26
Test Mode	Normal operating	Temp. & Humidity	23°C, 85%

OATS3 at 10Meter / Horizontal

Frequency (MHz)	Antenna Factor (dB/m)	Pre Amp. Gain (dB)	Cable Loss (dB)	Meter Reading (dBμV)	Limits (dBμV/m)	Emission Level (dBμV/m)	Margin Limit (dB)	Remark
225.01	10.80	28.62	2.35	37.40	30.00	21.92	-8.08	QP
368.80	15.02	28.89	3.28	39.20	37.00	28.61	-8.39	QP
398.14	15.75	29.10	3.44	43.10	37.00	33.20	-3.80	QP
527.99	17.76	29.57	4.13	34.90	37.00	27.22	-9.78	QP
551.99	18.08	29.61	4.23	36.90	37.00	29.60	-7.40	QP
575.99	18.39	29.64	4.33	34.80	37.00	27.87	-9.13	QP

OATS3 at 10Meter / Vertical

Frequency (MHz)	Antenna Factor (dB/m)	Pre Amp. Gain (dB)	Cable Loss (dB)	Meter Reading (dBμV)	Limits (dBμV/m)	Emission Level (dBμV/m)	Margin Limit (dB)	Remark
156.00	10.36	29.06	1.91	46.70	30.00	29.91	-0.09	QP
168.00	9.74	29.03	1.99	45.60	30.00	28.30	-1.70	QP
191.99	9.20	28.82	2.14	42.50	30.00	25.02	-4.98	QP
225.01	10.80	28.62	2.35	42.80	30.00	27.32	-2.68	QP
390.79	15.57	29.04	3.40	37.70	37.00	27.62	-9.38	QP
527.99	17.76	29.57	4.13	36.60	37.00	28.92	-8.08	QP
597.21	18.66	29.68	4.42	39.70	37.00	33.11	-3.89	QP
750.00	19.45	29.59	5.15	34.90	37.00	29.91	-7.10	QP

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Emission Level = Antenna Factor (dB/m) + Cable Loss (dB) + Meter Reading (dBμV) – PreAmp.Gain (dB)*
4. *Margin (dB) = Emission Level (dBuV/m) - Quasi-peak limit (dBuV/m)*

Above 1 GHz

Product Name	IP Cam	Test By	Rick Lin
Model	F511W	Test Date	2010/04/26
Test Mode	Normal operating	Temp. & Humidity	25.6°C, 61%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1145.00	53.53	---	-4.28	49.25	---	70.00	50.00	-0.75	Peak
1655.00	49.16	---	-1.59	47.56	---	70.00	50.00	-2.44	Peak
2175.00	44.06	---	1.96	46.02	---	70.00	50.00	-3.98	Peak
2595.00	44.68	---	2.61	47.29	---	70.00	50.00	-2.71	Peak
3250.00	44.20	---	3.82	48.02	---	74.00	54.00	-5.98	Peak
4585.00	42.09	---	6.96	49.05	---	74.00	54.00	-4.95	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1035.00	48.74	---	-4.65	44.09	---	70.00	50.00	-5.91	Peak
1295.00	50.39	---	-3.77	46.62	---	70.00	50.00	-3.38	Peak
1630.00	48.08	---	-1.83	46.24	---	70.00	50.00	-3.76	Peak
2620.00	45.05	---	2.66	47.71	---	70.00	50.00	-2.29	Peak
3250.00	50.39	48.48	3.82	54.21	52.30	74.00	54.00	-1.70	AVG
4875.00	51.77	37.50	7.11	58.88	44.61	74.00	54.00	-9.39	AVG

Remark:

1. *Average test would be performed if the peak result were greater than the average limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

7.2 CONDUCTED EMISSION

LIMITS

(1) Mains Ports

Frequency Range (MHz)	Voltage Limits (dBμV)			
	Class A		Class B	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.50	79	66	66 - 56	56 - 46
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

Remark: *(1) The limit decreases linearly with logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.*
(2) The lower limit shall apply at the transition frequency.

(2) Telecommunication Ports

Frequency Range (MHz)	Voltage Limits (dBμV)				Current Limits (dBμA)			
	Class A		Class B		Class A		Class B	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.50	97 - 87	84 - 74	84 - 74	74 - 64	53 - 43	40 - 30	40 - 30	30 - 20
0.50 - 30.0	87	74	74	64	43	30	30	20

Remark: *(1) The limit decreases linearly with logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.*
(2) The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20 $\log_{10}$ 150 / I = 44 dB).

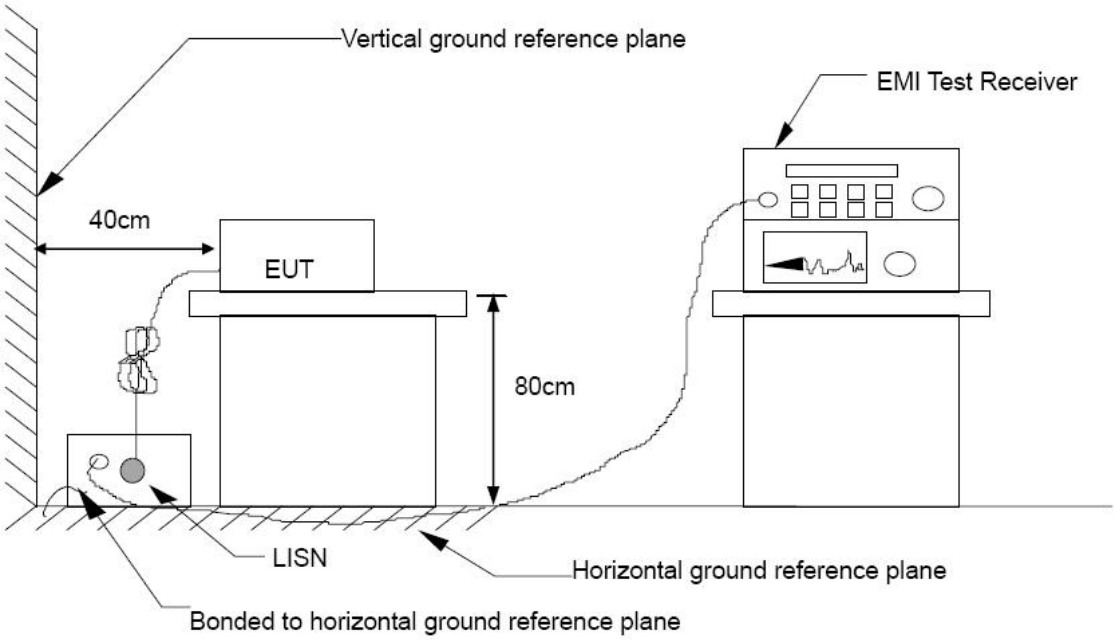
TEST EQUIPMENT

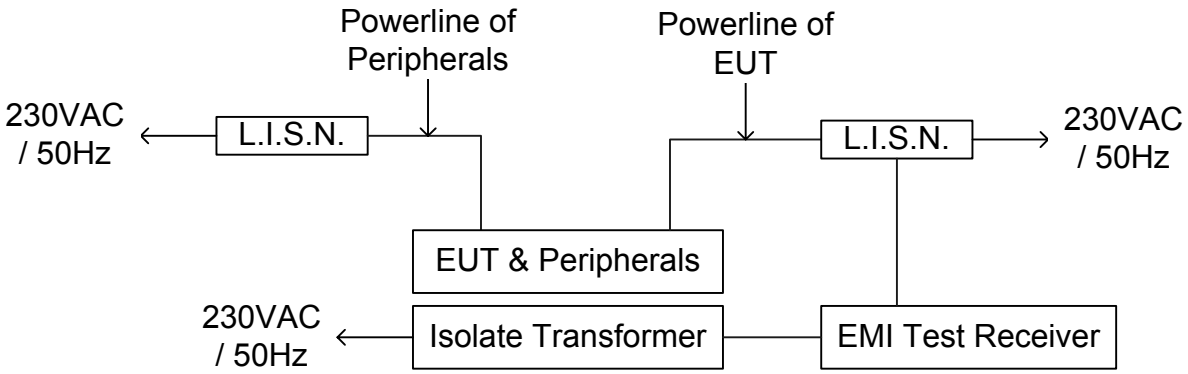
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/13/2010
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/22/2011
EMI Test Receiver	ROHDE & SCHWARZ	ESHS 30	838550/003	01/28/2011
Pulse Limit	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2010
N Type Coaxial Cable	BELDEN	8268 M17/164	003	07/09/2010
I.S.N.	SCHAFFNER	T800	24313	05/25/2010
Ferrite Clamp	SCHAFFNER	KEMA801	15937	05/25/2010
Current Probe	SCHAFFNER	SMZ11	14802	N.C.R.

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

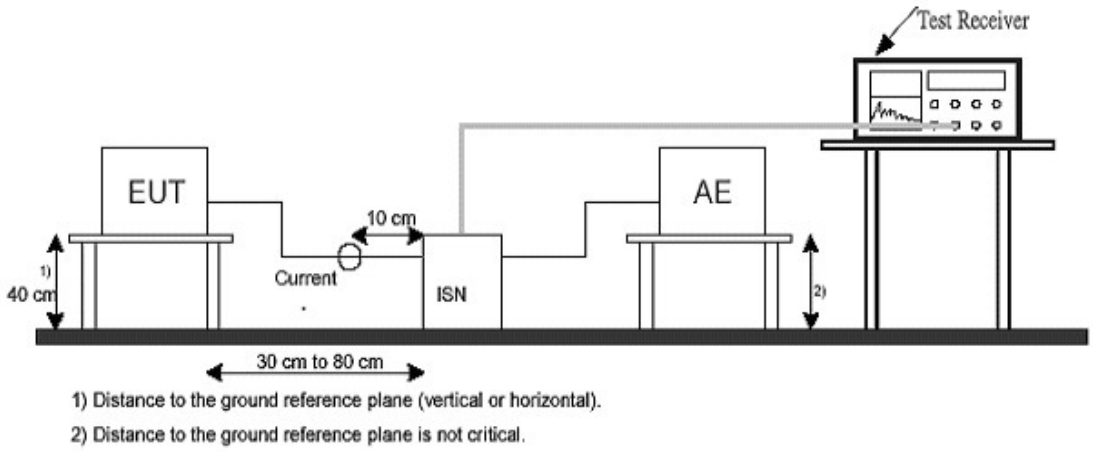
TEST SETUP

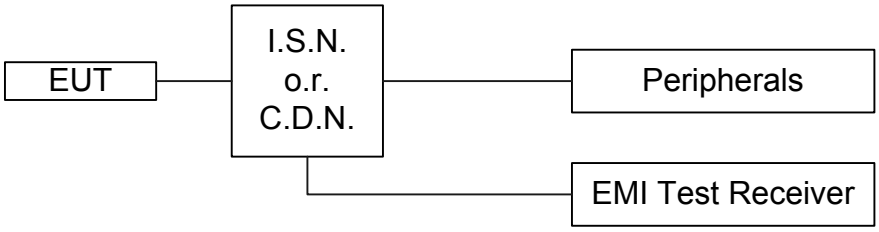
(1) Mains Ports

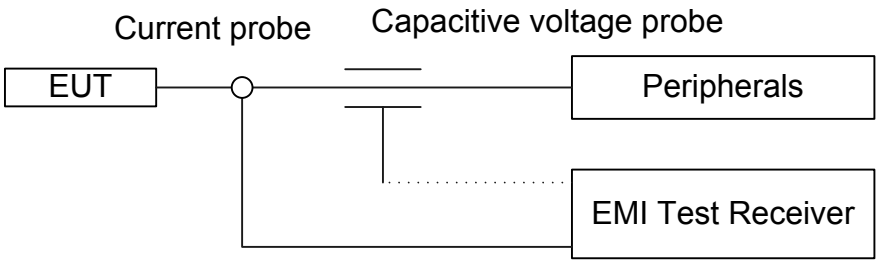




(2) Telecommunication Ports







TEST PROCEDURE

The basic test procedure was in accordance with EN 55022

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

Mains ports:

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

Telecommunication ports:

The telecommunication port of the EUT was connected to the test receiver through the ISN/Current Probe and communication in normal condition. ISN shall be nominally 0.8 m from the EUT and bounded to a ground reference plane.

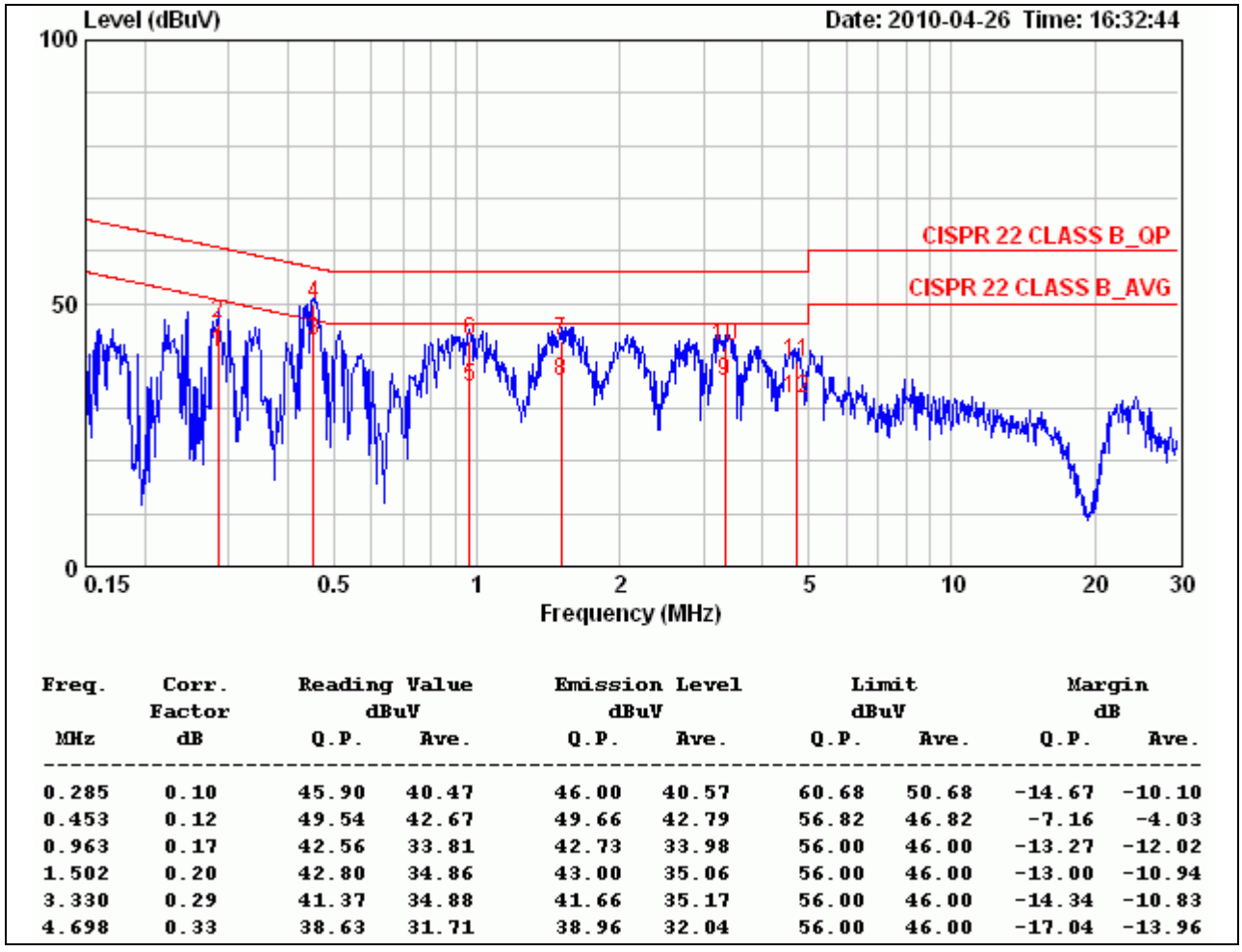
Conducted emission were investigated over the frequency range from 0.15 MHz to 30 MHz using a receiver, where the resolution bandwidth of the receiver is set as 9 kHz at frequency range from 0.15 MHz to 30 MHz.

TEST RESULTS

Mains Ports

Product Name	IP Cam	Test By	Joe Peng
Model	F511W	Test Date	2010/04/26
Test Mode	Normal operating	Temp. & Humidity	22.4°C, 47%

LINE



Freq.	Corr. Factor	Reading Value dBuV		Emission Level dBuV		Limit dBuV		Margin dB	
MHz	dB	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.285	0.10	45.90	40.47	46.00	40.57	60.68	50.68	-14.67	-10.10
0.453	0.12	49.54	42.67	49.66	42.79	56.82	46.82	-7.16	-4.03
0.963	0.17	42.56	33.81	42.73	33.98	56.00	46.00	-13.27	-12.02
1.502	0.20	42.80	34.86	43.00	35.06	56.00	46.00	-13.00	-10.94
3.330	0.29	41.37	34.88	41.66	35.17	56.00	46.00	-14.34	-10.83
4.698	0.33	38.63	31.71	38.96	32.04	56.00	46.00	-17.04	-13.96

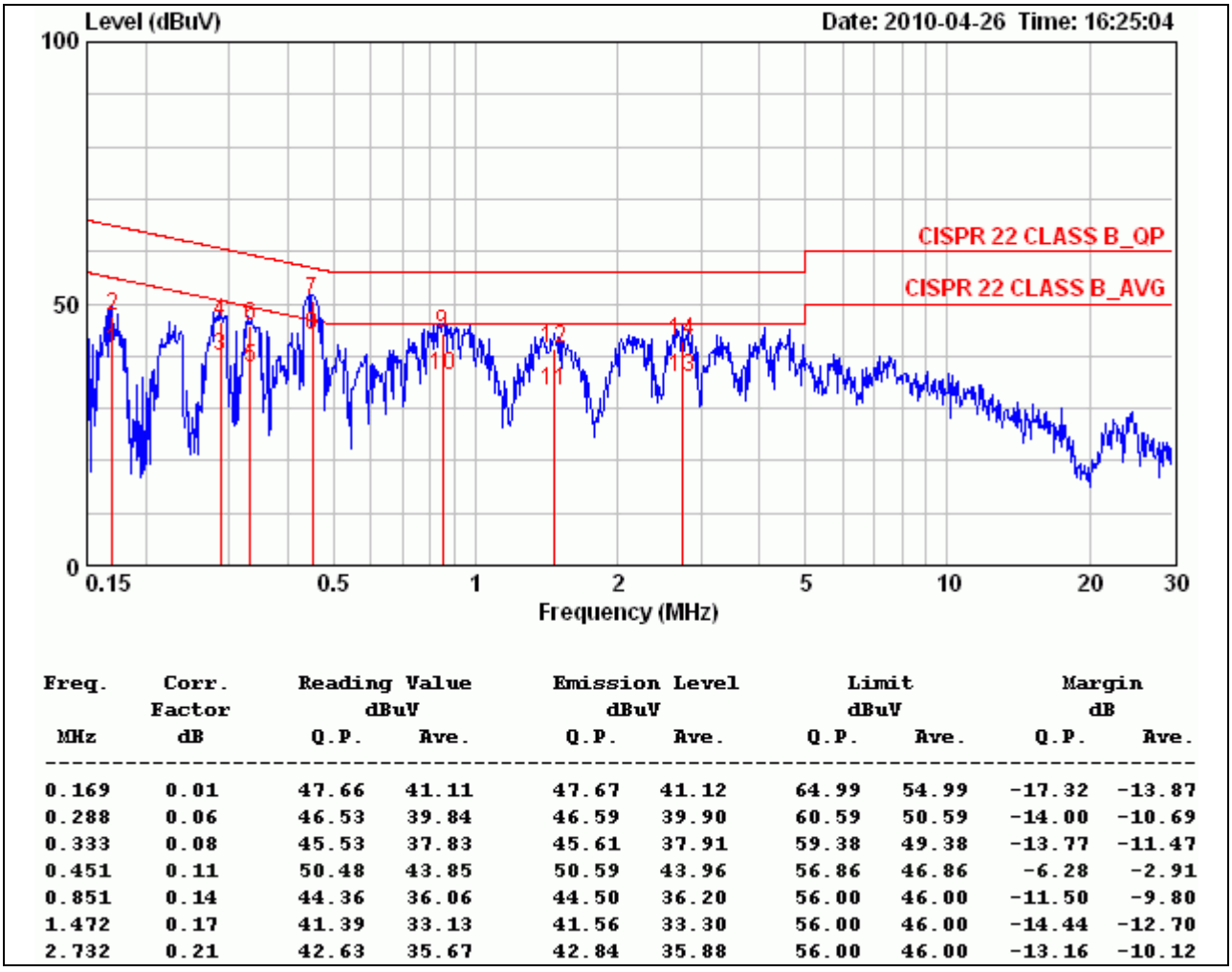
Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Product Name	IP Cam	Test By	Joe Peng
Model	F511W	Test Date	2010/04/26
Test Mode	Normal operating	Temp. & Humidity	22.4°C, 47%

NEUTRAL



Freq.	Corr. Factor	Reading Value dBuV		Emission Level dBuV		Limit dBuV		Margin dB	
MHz	dB	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.169	0.01	47.66	41.11	47.67	41.12	64.99	54.99	-17.32	-13.87
0.288	0.06	46.53	39.84	46.59	39.90	60.59	50.59	-14.00	-10.69
0.333	0.08	45.53	37.83	45.61	37.91	59.38	49.38	-13.77	-11.47
0.451	0.11	50.48	43.85	50.59	43.96	56.86	46.86	-6.28	-2.91
0.851	0.14	44.36	36.06	44.50	36.20	56.00	46.00	-11.50	-9.80
1.472	0.17	41.39	33.13	41.56	33.30	56.00	46.00	-14.44	-12.70
2.732	0.21	42.63	35.67	42.84	35.88	56.00	46.00	-13.16	-10.12

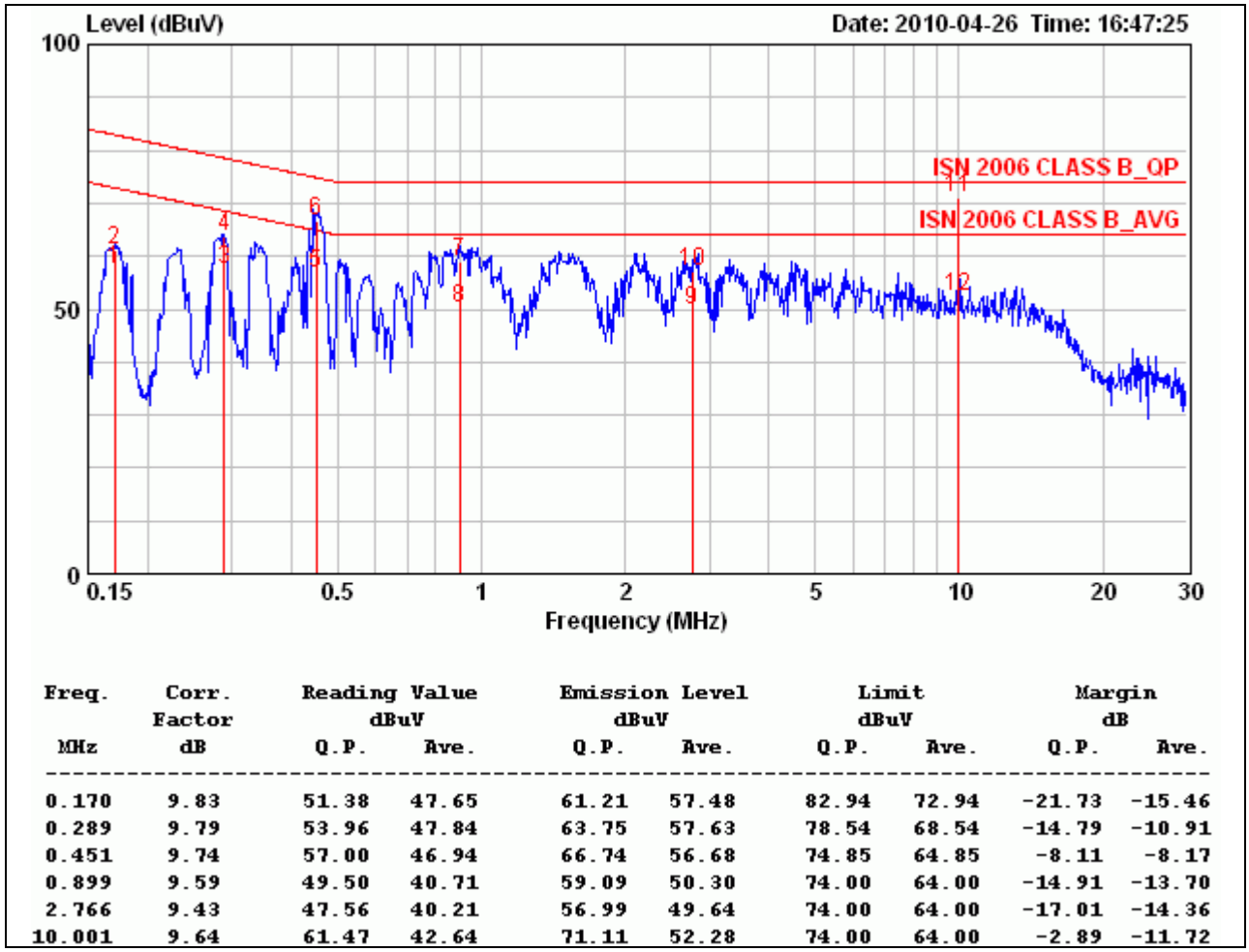
Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Telecommunication Ports

Product Name	IP Cam	Test By	Joe Peng
Model	F511W	Test Date	2010/04/26
Test Mode	LAN - 10Mbps	Temp. & Humidity	22.4°C, 47%



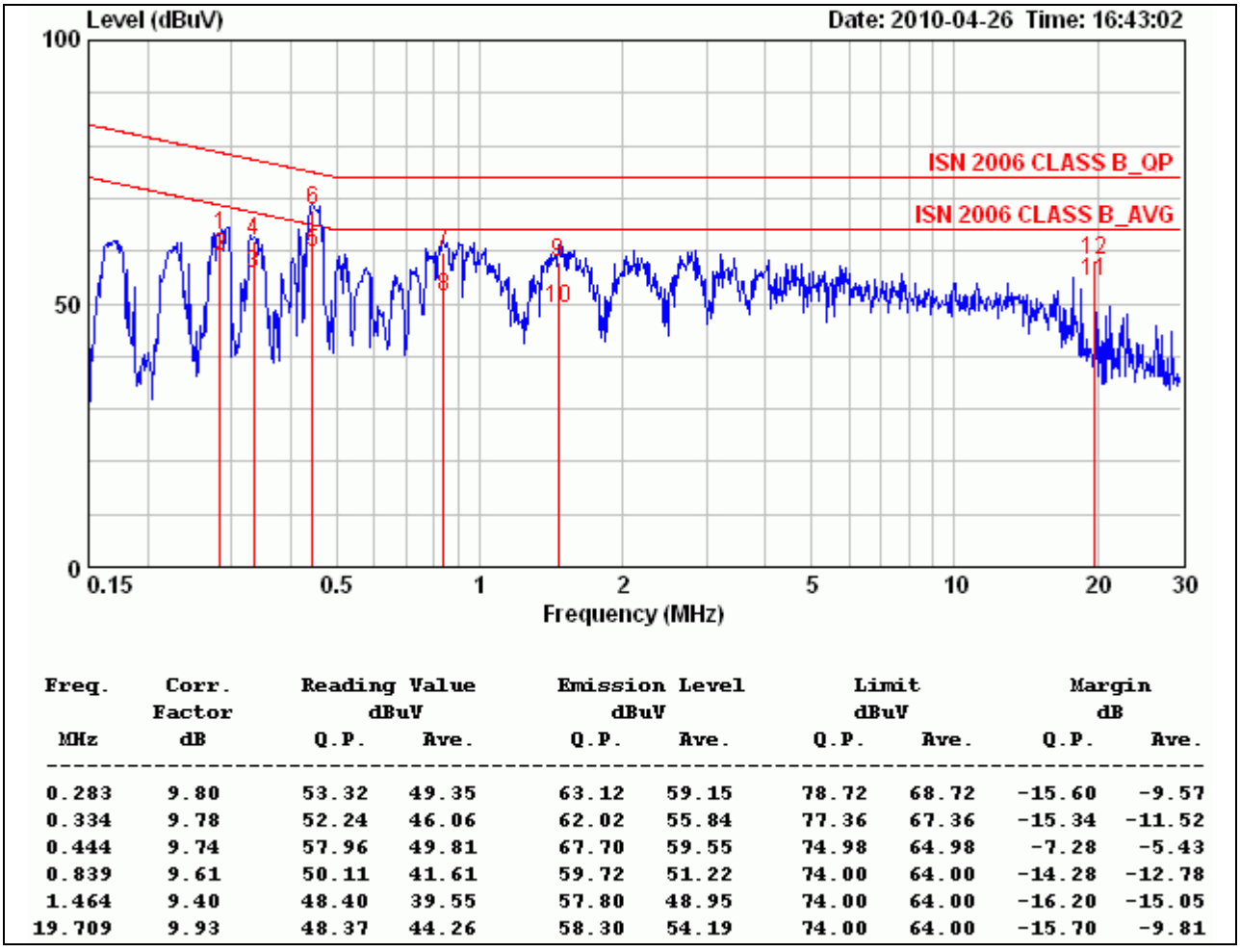
Freq.	Corr. Factor	Reading Value dBuV		Emission Level dBuV		Limit dBuV		Margin dB	
MHz	dB	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.170	9.83	51.38	47.65	61.21	57.48	82.94	72.94	-21.73	-15.46
0.289	9.79	53.96	47.84	63.75	57.63	78.54	68.54	-14.79	-10.91
0.451	9.74	57.00	46.94	66.74	56.68	74.85	64.85	-8.11	-8.17
0.899	9.59	49.50	40.71	59.09	50.30	74.00	64.00	-14.91	-13.70
2.766	9.43	47.56	40.21	56.99	49.64	74.00	64.00	-17.01	-14.36
10.001	9.64	61.47	42.64	71.11	52.28	74.00	64.00	-2.89	-11.72

Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Product Name	IP Cam	Test By	Joe Peng
Model	F511W	Test Date	2010/04/26
Test Mode	LAN - 100Mbps	Temp. & Humidity	22.4°C, 47%



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.283	9.80	53.32	49.35	63.12	59.15	78.72	68.72	-15.60	-9.57
0.334	9.78	52.24	46.06	62.02	55.84	77.36	67.36	-15.34	-11.52
0.444	9.74	57.96	49.81	67.70	59.55	74.98	64.98	-7.28	-5.43
0.839	9.61	50.11	41.61	59.72	51.22	74.00	64.00	-14.28	-12.78
1.464	9.40	48.40	39.55	57.80	48.95	74.00	64.00	-16.20	-15.05
19.709	9.93	48.37	44.26	58.30	54.19	74.00	64.00	-15.70	-9.81

Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

7.3 HARMONIC CURRENT EMISSION

LIMITS

(1) Limits For Class A Equipment Disturbance Voltage Limits At Mains Terminals

Harmonic Order (n)	Maximum Permissible Harmonic Current (A)
Odd Harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15 ≦ N ≦ 39	0.15*15/N
Even Harmonics	
2	1.08
4	0.43
6	0.30
8 ≦ n ≦ 40	0.23*8/n

(2) Limits for Class B equipment

For Class B equipment, the harmonic of the input current shall not exceed the maximum permissible values given in table that is the limit of Class A multiplied by a factor of 1.5.

(3) Limits For Class C Equipment

Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at fundamental frequency (%)
Odd Harmonics	
2	2
3	30*λ*
5	10
7	7
9	5
11 ≦ n ≦ 39	3
(odd harmonics only)	

Remark: **λ is the circuit power factor*

(4) Limits For Class D Equipment

Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible Harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13 ≦ n ≦ 39	3.85/n	See Table 1
(odd harmonics only)		

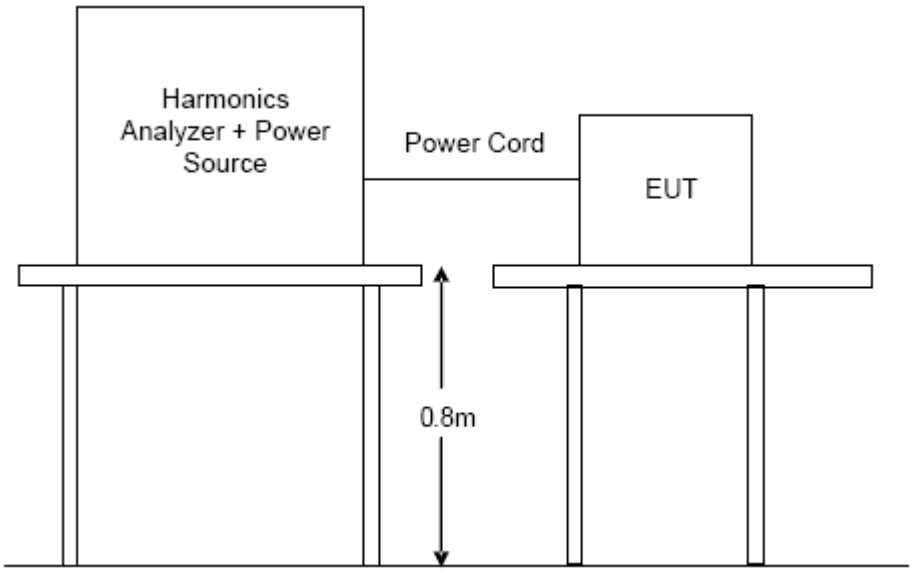
Remark: **λ is the circuit power factor*

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonics & Flicker Test System	EMC PARTNER	HARMONIC-1000	071	01/17/2011

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

TEST SETUP



TEST SETUP

The basic test procedure was in accordance with EN 61000-3-2.

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The classification of EUT is according to section 5 of EN 61000-3-2.

The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

TEST RESULTS

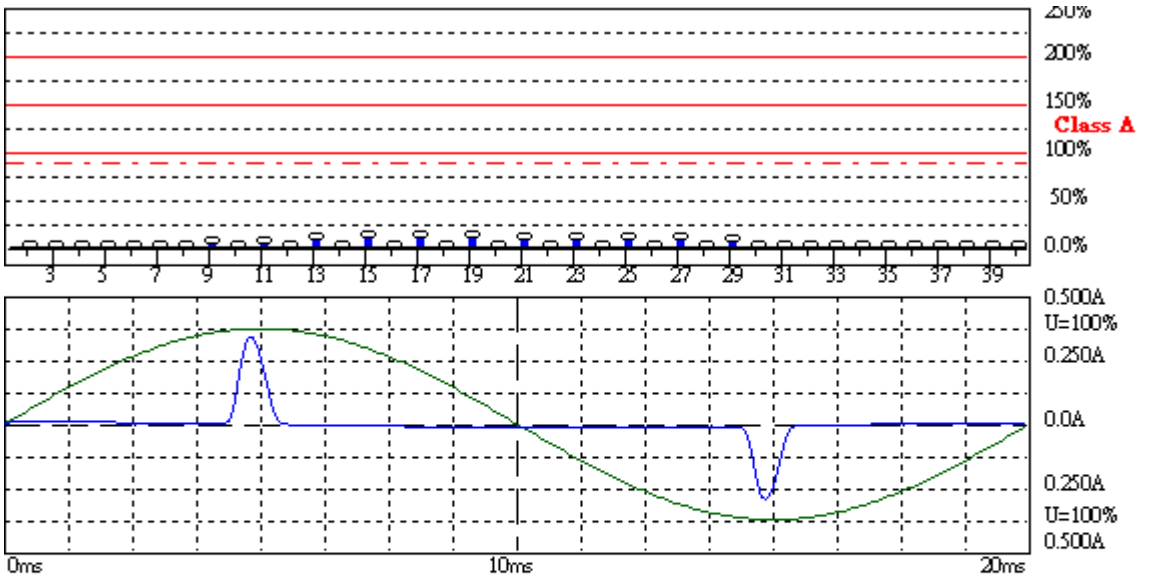
Ambient Temperature	26 ˚C	Test By	Vic Lin
Relative Humidity	52 %	Test Date	2010/04/27
Atmospheric Pressure	1005.6 mbar		

Urms = 230.3V Freq = 49.987 Range: 0.5 A
Irms = 0.064A Ipk = 0.355A cf = 5.567
P = 5.853W S = 14.68VA pf = 0.399
THDi = 91.6 % THDu = 0.10 % Class A

Test - Time : 5min (100 %)

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	50	0.0261		0.0271			
2	100	0.0000	0.0000	0.0024	0.2204	1.0800	
3	150	0.0226	0.9844	0.0231	1.0031	2.3000	
4	200	0.0000	0.0000	0.0023	0.5465	0.4300	
5	250	0.0222	1.9468	0.0226	1.9836	1.1400	
6	300	0.0000	0.0000	0.0023	0.7731	0.3000	
7	350	0.0215	2.7872	0.0219	2.8377	0.7700	
8	400	0.0000	0.0000	0.0023	0.9819	0.2300	
9	450	0.0205	5.1231	0.0208	5.2109	0.4000	
10	500	0.0000	0.0000	0.0022	1.1776	0.1840	
11	550	0.0193	5.8459	0.0196	5.9463	0.3300	
12	600	0.0000	0.0000	0.0020	1.3335	0.1533	
13	650	0.0179	8.5404	0.0182	8.6757	0.2100	
14	700	0.0000	0.0000	0.0020	1.4861	0.1314	
15	750	0.0164	10.940	0.0167	11.108	0.1500	
16	800	0.0000	0.0000	0.0018	1.5922	0.1150	
17	850	0.0148	11.175	0.0150	11.321	0.1324	
18	900	0.0000	0.0000	0.0017	1.6718	0.1022	
19	950	0.0131	11.087	0.0133	11.210	0.1184	
20	1000	0.0000	0.0000	0.0016	1.7249	0.0920	
21	1050	0.0114	10.660	0.0115	10.767	0.1071	
22	1100	0.0000	0.0000	0.0015	1.7879	0.0836	
23	1150	0.0098	9.9682	0.0098	10.045	0.0978	
24	1200	0.0000	0.0000	0.0014	1.7912	0.0767	
25	1250	0.0081	9.0262	0.0082	9.0875	0.0900	
26	1300	0.0000	0.0000	0.0013	1.8112	0.0708	
27	1350	0.0066	7.9261	0.0067	7.9834	0.0833	
28	1400	0.0000	0.0000	0.0012	1.7647	0.0657	
29	1450	0.0052	6.6810	0.0053	6.8441	0.0776	
30	1500	0.0000	0.0000	0.0011	1.7912	0.0613	
31	1550	0.0000	0.0000	0.0042	5.7183	0.0726	
32	1600	0.0000	0.0000	0.0010	1.7514	0.0575	
33	1650	0.0000	0.0000	0.0031	4.6102	0.0682	
34	1700	0.0000	0.0000	0.0009	1.7481	0.0541	
35	1750	0.0000	0.0000	0.0023	3.5129	0.0643	
36	1800	0.0000	0.0000	0.0009	1.7315	0.0511	
37	1850	0.0000	0.0000	0.0016	2.5594	0.0608	
38	1900	0.0000	0.0000	0.0008	1.7017	0.0484	
39	1950	0.0000	0.0000	0.0013	2.2746	0.0577	
40	2000	0.0000	0.0000	0.0008	1.6586	0.0460	



Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2) 2010/4/27 14:19:41

Urms =	230.3	V	P =	5.853	W	THC =	0.061	A	Range:	0.5 A
Irms =	0.064	A	pf =	0.399					V-nom:	230 V
									TestTime:	5 min (100%)

Test completed, Result: PASSED

BAR-1000 EMC-Partner

7.4 VOLTAGE FLUCTUATION AND FLICKER

LIMITS

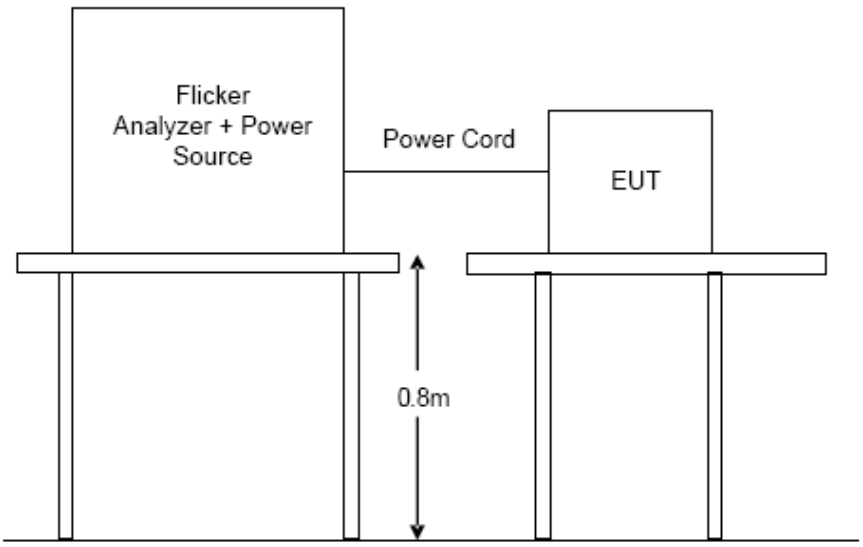
Test item	Limit	Remark
Pst	1.0	Pst means short-term flicker indicator.
Plt	0.65	Plt means long-term flicker indicator.
Tdt (ms)	500	Tdt means maximum time that dt exceeds 3.3 %.
dmax (%)	4%	dmax means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonics & Flicker Test System	EMC PARTNER	HARMONIC-1000	071	01/17/2011

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

TEST SETUP



TEST SETUP

The basic test procedure was in accordance with EN 61000-3-3.

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

TEST RESULTS

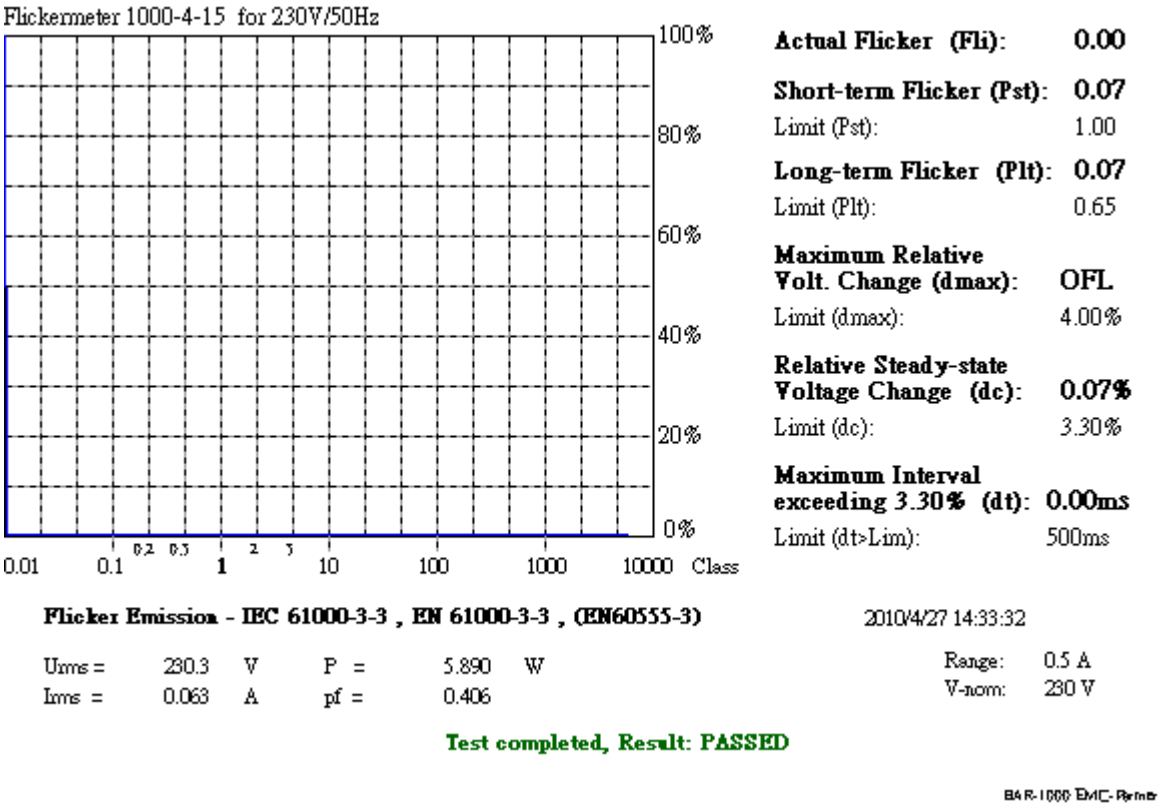
Ambient Temperature	26 ˚C	Test By	Vic Lin
Relative Humidity	52 %	Test Date	2010/04/27
Atmospheric Pressure	1005.6 mbar		

Urms = 230.3V Freq = 50.000 Range: 0.5 A
Irms = 0.063A Ipk = 0.339A cf = 5.384
P = 5.890W S = 14.51VA pf = 0.406

Test - Time : 1 x 10min = 10min (100 %)

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED



8. IMMUNITY TEST

PERFORMANCE CRITERIA DESCRIPTION

Criterion A	The apparatus shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After test, the apparatus shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. However, no change of operating state if stored data is allowed to persist after the test. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion C	Temporary loss of function is allowed, provided the functions is self-recoverable or can be restored by the operation of controls by the user in accordance with the manufacturer instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

8.1 ELECTROSTATIC DISCHARGE (ESD)

TEST SPECIFICATION

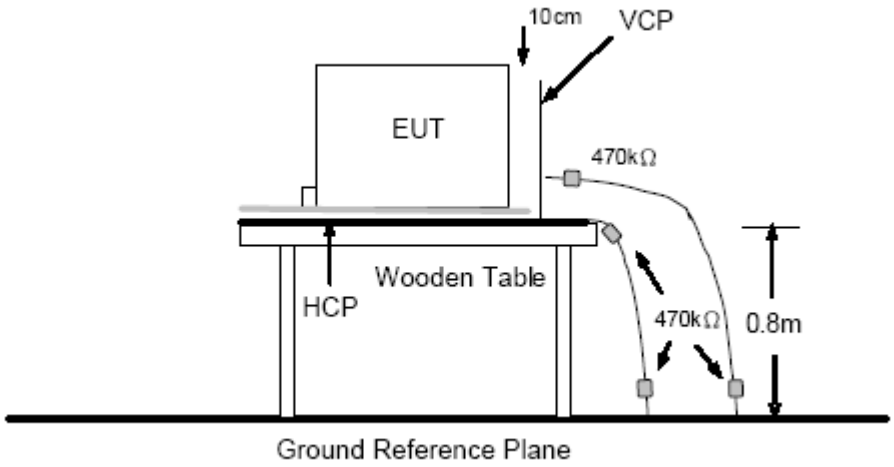
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-2:1995 + A1:1998 + A2:2000
Discharge Impedance	330 ohm / 150 pF
Discharge Voltage	Air Discharge: 2, 4, 8 kV (Direct) Contact Discharge: 2, 4 kV (Direct/Indirect)
Polarity	Positive & Negative
Number of Discharge	Air Discharge: min. 10 times at single test point for each negative and positive polarity Contact Discharge: min. 200 times in total
Discharge Mode	Single Discharge 1 second minimum

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Electrostatic Discharge Simulator	NoiseKen	ESS-2000	0189C01569	09/17/2010

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

TEST SETUP



TEST SETUP

The basic test procedure was in accordance with IEC 61000-4-2.
The EUT was located 0.1 m minimum from all side of the HCP (dimensions 1.6m x 0.8m).
The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
The time interval between two successive single discharges was at least 1 second.
Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.
At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane (VCP) in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

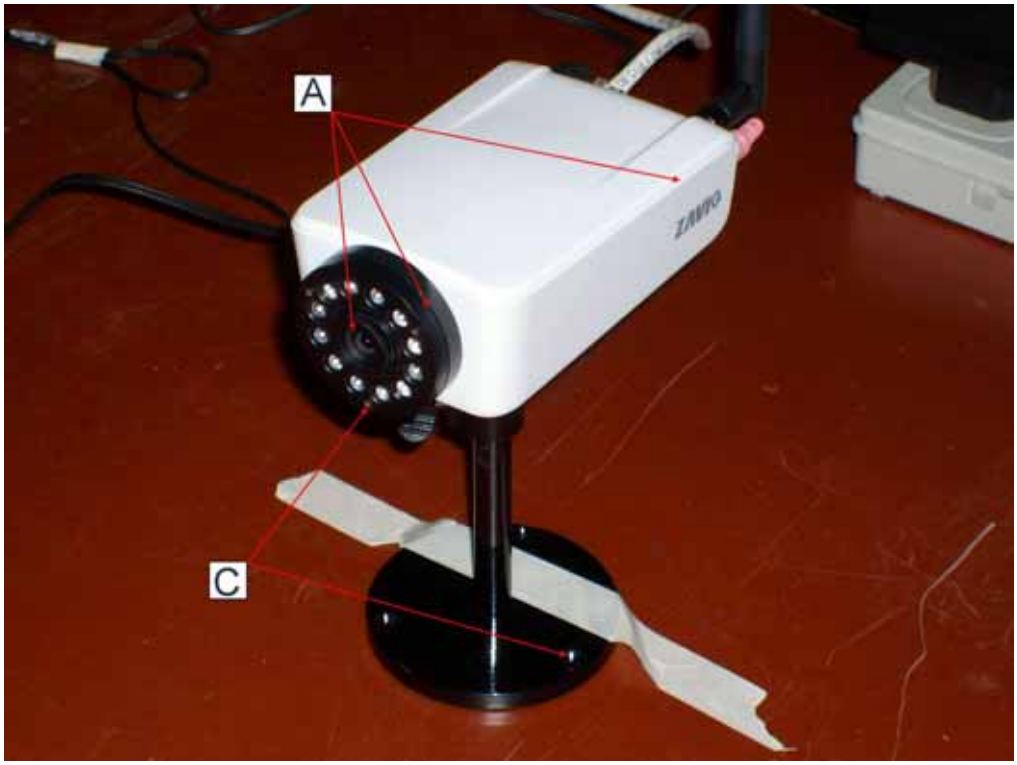
TEST RESULTS

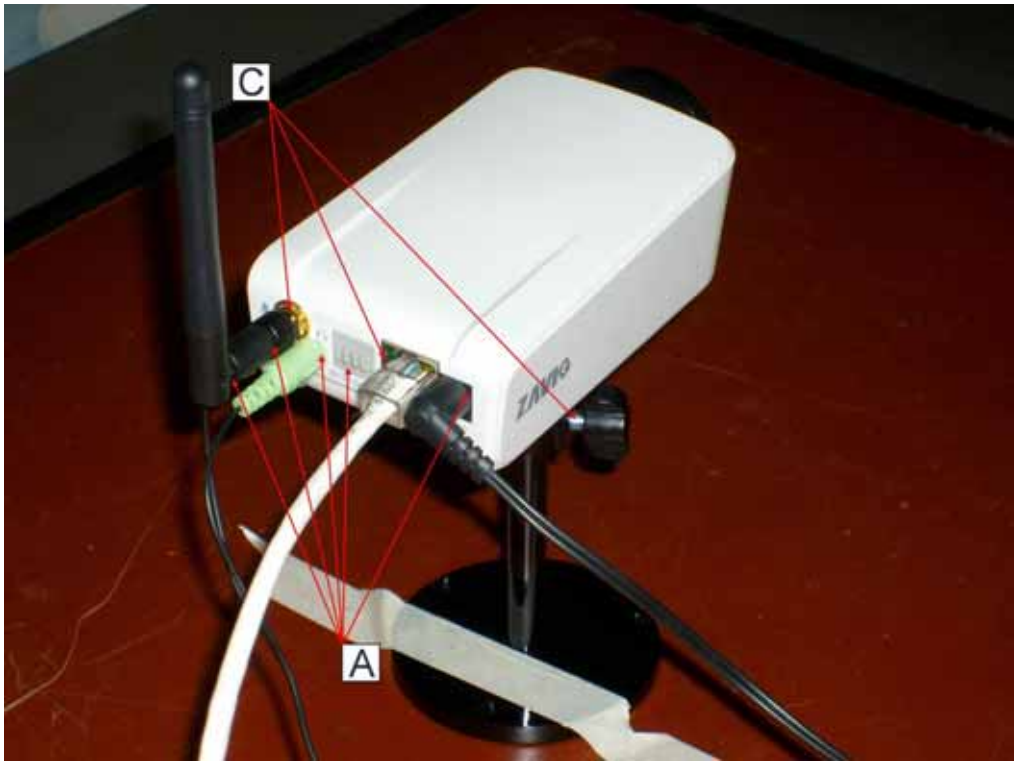
Ambient Temperature	26 ˚C	**Test By**	Eason Chou
Relative Humidity	52 %	**Test Date**	2010/04/28
Atmospheric Pressure	1005.6 mbar		

Test Level	Polarity	Required Criterion				Performance Criterion				Result
		Air discharge	Contact discharge	HCP discharge	VCP discharge	Air discharge	Contact discharge	HCP discharge	VCP discharge	
2 kV	+	B	B	B	B	B	B	A	A	PASS
	−	B	B	B	B	B	B	A	A	PASS
4 kV	+	B	B	B	B	B	B	A	A	PASS
	−	B	B	B	B	B	B	A	A	PASS
8 kV	+	B	NR	NR	NR	B	NR	NR	NR	PASS
	−	B	NR	NR	NR	B	NR	NR	NR	PASS

Remark: *NR means there is no requirement.*

THE TESTED POINTS OF EUT





※ A：Air Discharge, C：Contact Discharge

8.2 RF ELECTROMAGNETIC FIELD (RS)

TEST SPECIFICATION

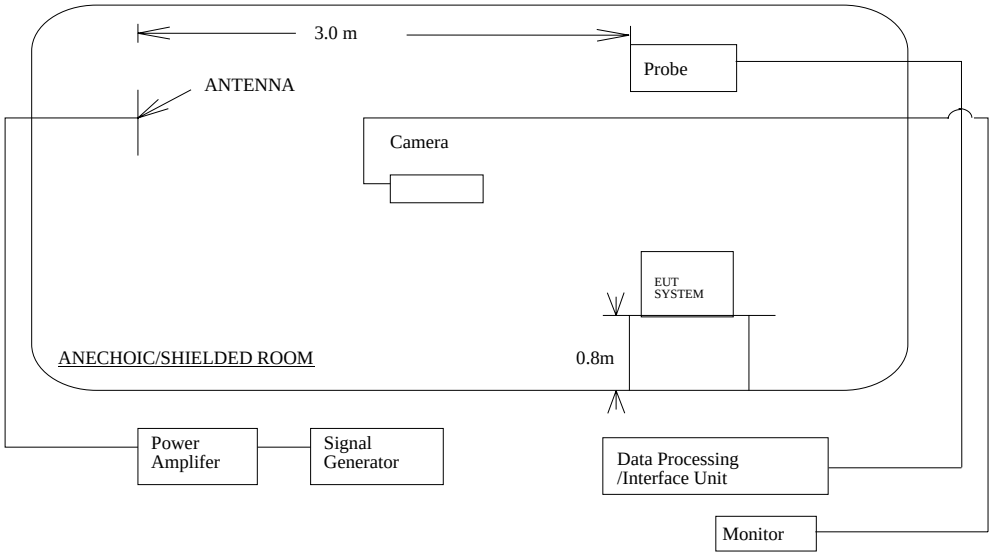
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-3:2006
Frequency Range	80 MHz ~1000 MHz
Field Strength	3 V/m
Modulation	1kHz Sine Wave, 80%, AM Modulation
Frequency Step	1 % of preceding frequency value
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.5m

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G.	Agilent	8648C	4108A05772	11/05/2010
Power Meter	R&S	NRVD	837794/029	08/11/2010
Power Sensor	R&S	URV5-Z2	835640/015	08/11/2010
Power Sensor	R&S	URV5-Z2	835640/016	08/11/2010
Power Amplifier	ar	150W1000	300300	N.C.R
Power Amplifier	ar	60S1G3M3	0328274	N.C.R
Bilog Antenna	SCHAFFNER	CBL 6140A	1221	N.C.R
Horn Antenna	EMCO	3115	00022257	12/20/2010
EM PROBE	ar	FL7006	0330722	02/17/2010

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

TEST SETUP



TEST SETUP

The test procedure was in accordance with IEC 61000-4-3.

The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed 1.5 x 10 -3 decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.

The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

TEST RESULTS

Ambient Temperature	28 ˚C	Test By	Louis Shen
Relative Humidity	46 %	Test Date	2010/05/04
Atmospheric Pressure	998 mbar		

Frequency (MHz)	Polarity	Azimuth (°)	Field Strength (V/m)	Required Criterion	Performance Criterion	Result
80 ~ 1000	V&H	0	3	A	A	PASS
80 ~ 1000	V&H	90	3	A	A	PASS
80 ~ 1000	V&H	180	3	A	A	PASS
80 ~ 1000	V&H	270	3	A	A	PASS

Remark : *This test item is test by CCS- Linkuo.*

8.3 FAST TRANSIENTS COMMON MODE (EFT)

TEST SPECIFICATION

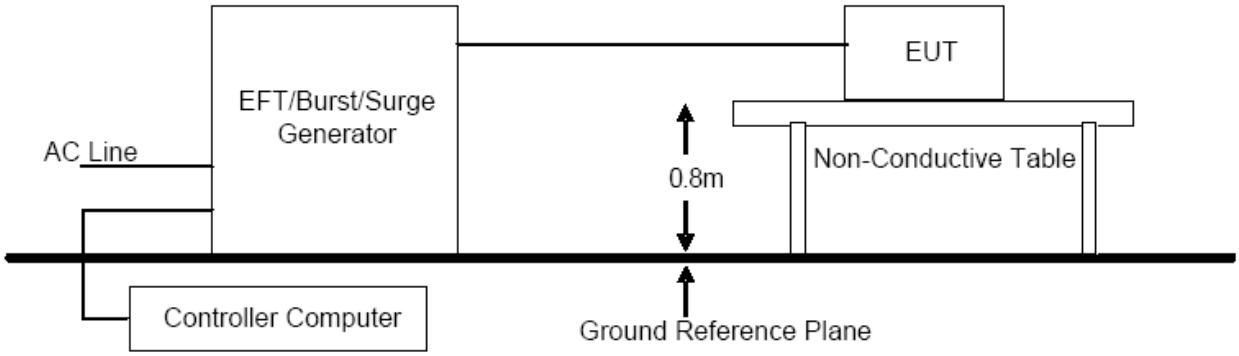
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-4:2004
Test Voltage	AC Power Port: 1kV DC Power Port: 0.5kV Signal Ports and Telecommunication Ports: 0.5kV
Polarity	Positive & Negative
Impulse Frequency	5 kHz
Impulse Wave-shape	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	Not less than 1 min.

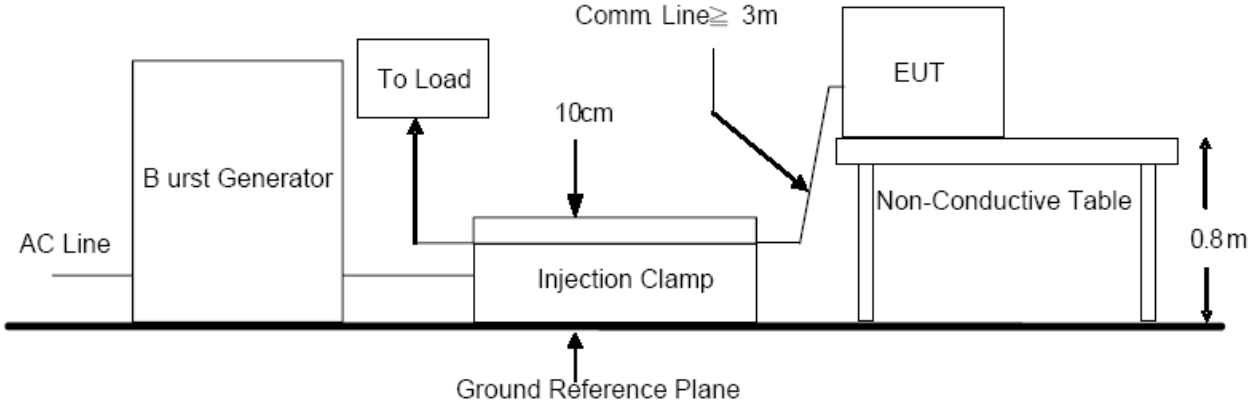
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
True-EFT Simulator Module	KeyTek	E421	9306421	06/28/2010
Control Center	KeyTek	E-CLASS Series-100	--------	N.C.R
Combined EFT/Surge Coupler/Decoupler	KeyTek	E4552	--------	N.C.R
Capacitive Coupling Clamp	KeyTek	CCL-4/S	9306414	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2.N.C.R = No Calibration Request.

TEST SETUP





TEST SETUP

The test procedure was in accordance with IEC 61000-4-4.

The EUT is placed on a table that is 0.8 meter height. A ground reference plane is placed on the table, and uses a 0.1 m insulation between the EUT and ground reference plane. The minimum area of the ground reference plane is 1 m *1 m, and 0.65 mm thick min, and projected beyond the EUT by at least 0.1 m on all sides.

Test on I/O and communication ports: The EFT/B interference signal is through coupling clamp device couples to the signal and control lines of the EUT with burst noise.

Test on power supply ports: The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. The length of the signal and power lines between the coupling device and the EUT is 0.5 m.

Fast transient are carried out during 1 min with a positive polarity and during 1 min with negative polarity.

TEST RESULTS

Ambient Temperature	24.9 °C	Test By	Vic Lin
Relative Humidity	50 %	Test Date	2010/04/27
Atmospheric Pressure	1006 mbar		

Test Point	Polarity	Test Level (kV)	Required Criterion	Performance Criterion	Result
☒ L	+/-	1	B	A	PASS
☒ N	+/-	1	B	A	PASS
☐ PE	+/-	1	B	NR	NR
☒ L+N	+/-	1	B	A	PASS
☐ L+PE	+/-	1	B	NR	NR
☐ N+PE	+/-	1	B	NR	NR
☐ L+N+PE	+/-	1	B	NR	NR

Test Point	Polarity	Test Level (kV)	Required Criterion	Performance Criterion	Result
☒ I/O and communication ports	+/-	0.5	B	A	PASS

Remark: *NR means there is no requirement.*

8.4 SURGE

TEST SPECIFICATION

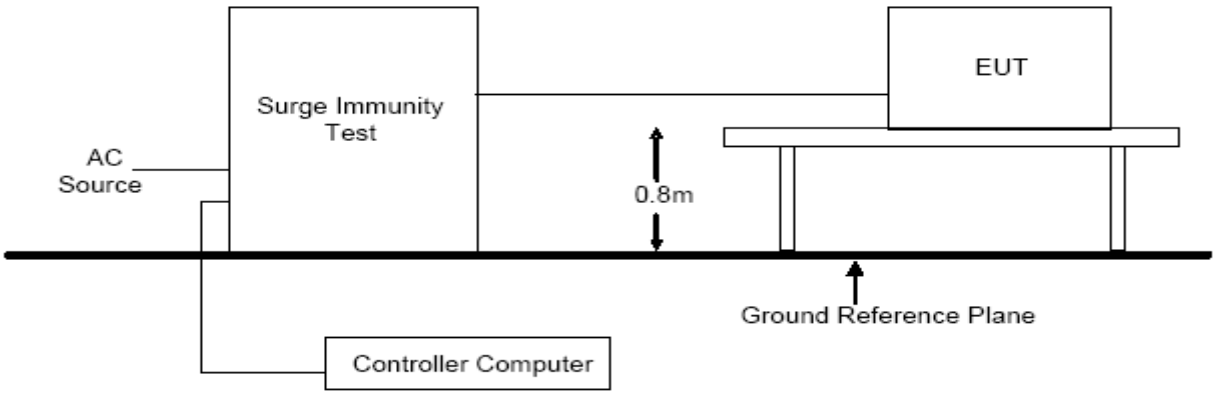
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-5:2005
Wave-Shape	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Test Voltage	AC Power Port ~ line to line: 1kV, line to ground: 2kV DC Power Port ~ line to ground: 0.5kV Signal Ports and Telecommunication Ports ~ line to ground: 1kV
Surge Input/Output:	AC Power Port: L-N / L-PE / N-PE DC Power Port: L1-PE Telecommunication Ports: Tip + Ring to ground
Generator Source Impedance	AC Power Port: 2 ohm between networks 12 ohm between network and ground Telecommunication Ports: 42 ohm between network and ground
Polarity	Positive/Negative
Phase Angle	0 / 90 / 180 / 270
Pulse Repetition Rate	1 time / min. (maximum)
Number of Tests	5 positive and 5 negative at selected points

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Surge Simulator Module	KeyTek	E510A	0206173	09/17/2010
Control Center	KeyTek	E-CLASS Series-100	--------	N.C.R
Combined EFT/Surge Coupler/Decoupler	KeyTek	E4552	--------	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2.N.C.R = No Calibration Request.

TEST SETUP



TEST SETUP

The test procedure was in accordance with IEC 61000-4-5.

The EUT and its load are placed on a table that is 0.8 meter above a ground reference plane. The minimum area of the ground reference plane is 1 m *1 m, and 0.65 mm thick min, and projected beyond the EUT by at least 0.1 m on all sides. The length of power cord/interconnection line between the coupling device and the EUT shall be 2 m or less.

Test on Input AC Power ports:

The EUT is connected to the power mains through a coupling device that directly couples the Surge interference signal.

The surge noise shall be applied synchronized to voltage phase at 0°, 90°, 180°, 270° and the peak value of the a.c. voltage wave.

TEST RESULTS

Ambient Temperature	24.9 °C	Test By	Vic Lin
Relative Humidity	50 %	Test Date	2010/04/27
Atmospheric Pressure	1006 mbar		

Test Point	Polarity	Test Level (kV)	Required Criterion	Performance Criterion	Result
☒ L-N	+/-	1	B	A	PASS
☐ L-PE	+/-	2	B	NR	NR
☐ N-PE	+/-	2	B	NR	NR

Test Point	Polarity	Test Level (kV)	Required Criterion	Performance Criterion	Result
☐ Telecom Ports	+/-	1	B	NR	NR

Remark: *NR means there is no requirement.*

8.5 CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

TEST SPECIFICATION

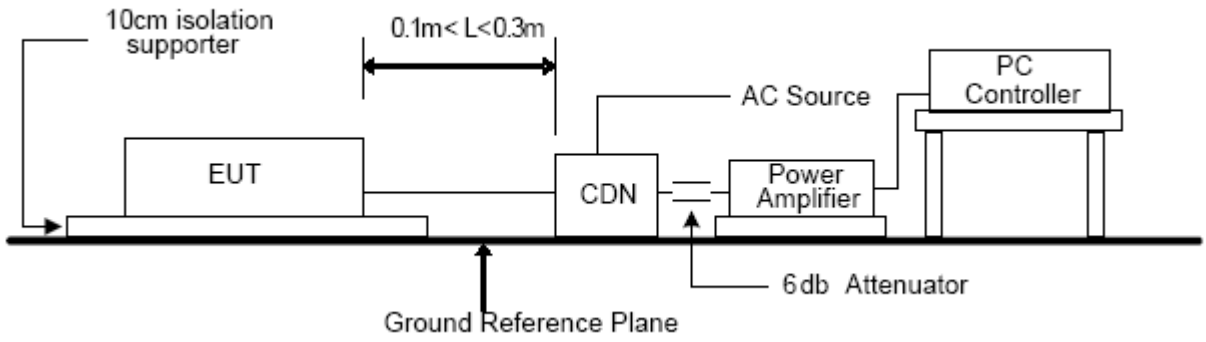
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-6:2003 + A1:2004 + A2:2006
Frequency Range	0.15 MHz ~ 80 MHz
Voltage Level	3 Vrms
Modulation	1kHz Sine Wave, 80%, AM Modulation
Frequency Step	1 % of preceding frequency value
Dwell Time	3 seconds
Coupled cable	Power Mains, Unshielded
Coupling device	CDN-M2 (2 wires) / CDN-M3 (3 wires) CDN-T2/CDN-T4/EM Clamp (signal and control lines)

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Emv-Mess-System	FRANKONIA	CIT-10/75	102D3226	10/12/2010
Coupling and Decoupling Network	SCHAFFNER	M225	16500	01/03/2011
Coupling and Decoupling Network	SCHAFFNER	M325	17457	01/03/2011
EM Clamp	SCHAFFNER	KEMZ 801	19239	05/13/2010

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2.N.C.R = No Calibration Request.

TEST SETUP



TEST SETUP

The test procedure was in accordance with IEC 61000-4-6.

The EUT is placed on an insulating support of 0.1 m height above a ground reference plane. All cables exiting the EUT shall be supported at a height at least 30 mm above the ground reference plane.

Test on signal ports and telecommunication ports:

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp device couples to the signal and telecommunication lines of the EUT.

Test on DC and AC ports: The EUT is connected to the power mains through a coupling and decoupling networks for power supply lines. And directly couples the disturbances signal into EUT.

TEST RESULTS

Ambient Temperature	24.9 °C	**Test By**	Vic Lin
Relative Humidity	50 %	**Test Date**	2010/04/27
Atmospheric Pressure	1006 mbar		

Frequency (MHz)	Voltage Level (V)	Injection Method	Test port	Required Criterion	Performance Criterion	Result
0.15 ~ 80	3	☒ CDN-M2	☒ AC Input	A	A	PASS
		☐ CDN-M3	☐ DC Input			
0.15 ~ 80	3	EM Clamp	☒ Signal lines	A	A	PASS
			☐ Control lines			

8.6 POWER FREQUENCY MAGNETIC FIELDS (PFMF)

TEST SPECIFICATION

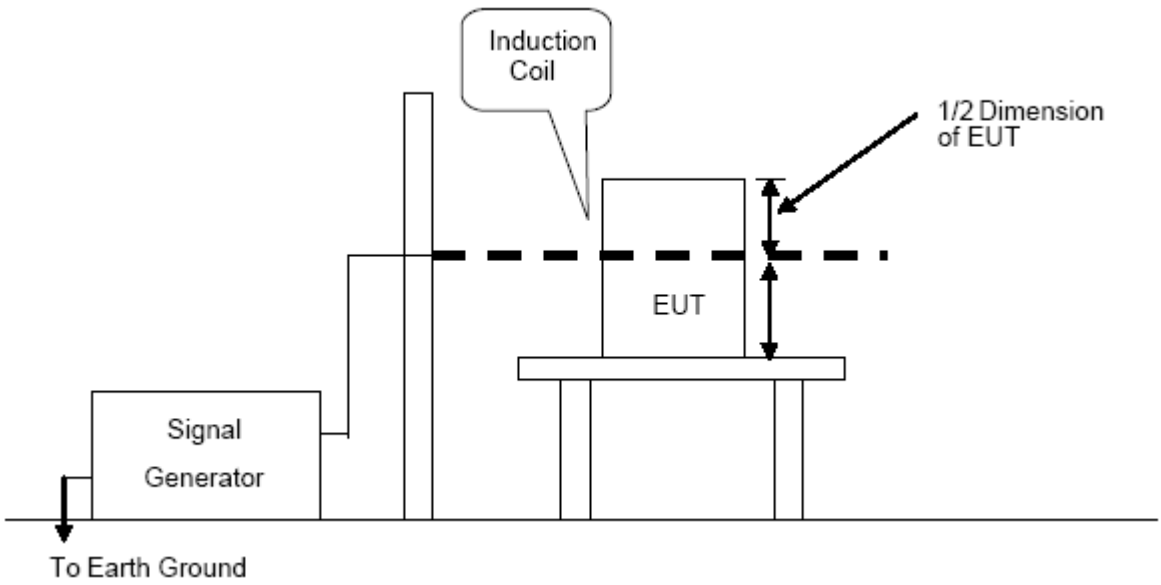
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-8:1993 + A1:2000
Frequency Range	50/60Hz
Field Strength	1 A/m
Observation Time	1 minute
Inductance Coil	Rectangular type, 1mx1m

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Frequency Magnetic Field	DANA TORINO-ITALY	DAS-G60 DAS 1 S 1000	96DA6-101	11/04/2010

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

TEST SETUP



TEST SETUP

The test procedure was in accordance with IEC 61000-4-8.

The equipment was configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.

The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

TEST RESULTS

Ambient Temperature	24.9 °C	Test By	Vic Lin
Relative Humidity	50 %	Test Date	2010/04/27
Atmospheric Pressure	1006 mbar		

Direction	Field Strength (A/m)	Required Criterion	Performance Criterion	Results
X	1	A	A	Pass
Y	1	A	A	Pass
Z	1	A	A	Pass

8.7 VOLTAGE DIPS & VOLTAGE INTERRUPTIONS (DIP)

TEST SPECIFICATION

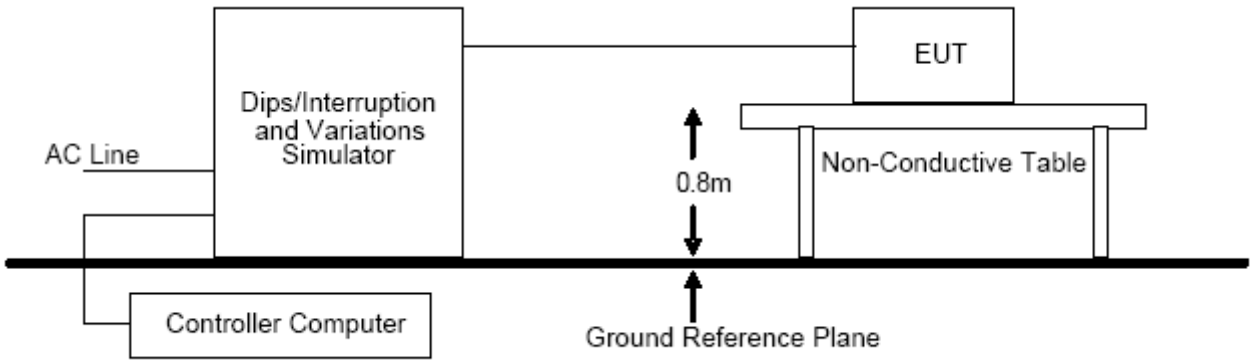
Product Standard	EN 55024:1998 + A1:2001 + A2:2003
Basic Standard	IEC 61000-4-11:2004
Test duration time	Minimum three test events in sequence
Interval between event	Minimum 10 seconds
Angle	0~360 degree
Step	45 degree

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Swell/Dip/Interrupt Simulator	KeyTek	EP62	9308252	08/04/2010
Control Center	KeyTek	E-CLASS Series-100	--------	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2.N.C.R = No Calibration Request.

TEST SETUP



TEST SETUP

The test procedure was in accordance with IEC 61000-4-11.

The EUT and its load are placed on a table that is 0.8 meter above a ground reference plane. The minimum area of the ground reference plane is 1 m *1 m, and 0.65 mm thick min, and projected beyond the EUT by at least 0.1 m on all sides. The cables supplied or recommended by the equipment manufacturer shall be used.

The EUT shall be tested for 30% voltage dip of supplied voltage and duration 10 periods, for 100% voltage reduction of supplied voltage and duration 0.5 periods with a sequence of three voltage reduction with intervals of 10 seconds.

Voltage phase shifting are shall occur at 0, 45, 90, 135, 180, 225, 270, 315 degrees.

TEST RESULTS

Ambient Temperature	24.9 °C	Test By	Vic Lin
Relative Humidity	50 %	Test Date	2010/04/27
Atmospheric Pressure	1006 mbar		

Voltage Reduction (%)	Test Duration (Periods)	Required Criterion	Performance Criterion	Results
>95	0.5	B	A	PASS
30	25	C	A	PASS
>95	250	C	C	PASS

APPENDIX SETUP PHOTOS

RADIATED EMISSION SETUP

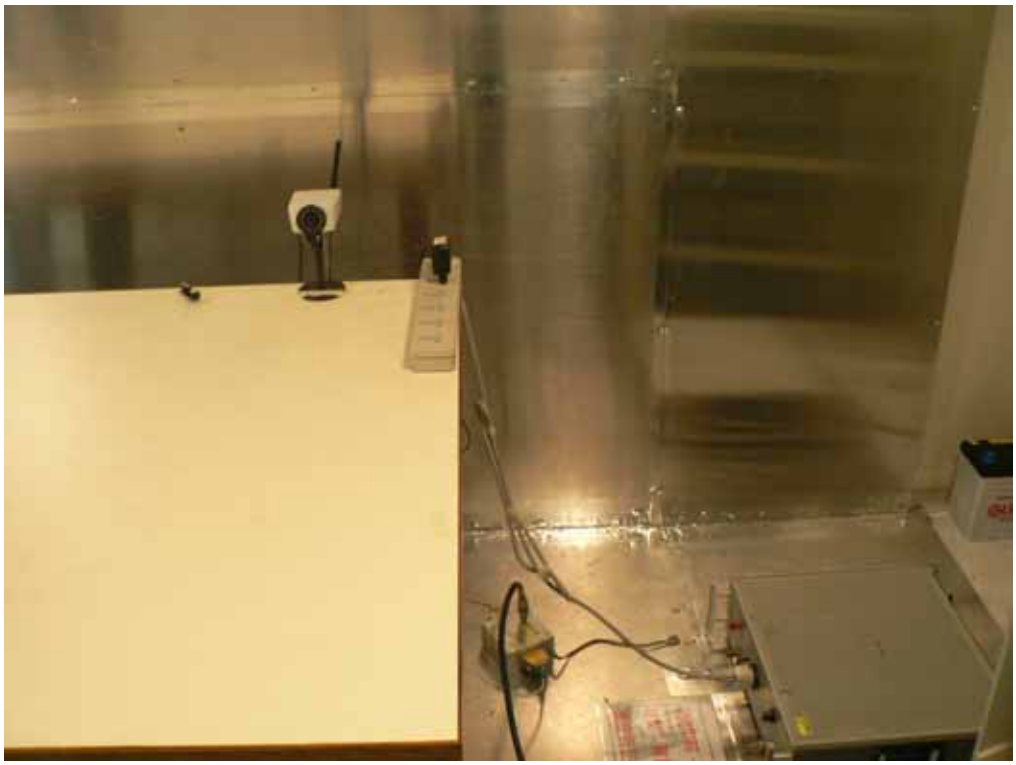
Below 1 GHz

Above 1 GHz

CONDUCTED EMISSION SETUP

Mains Ports

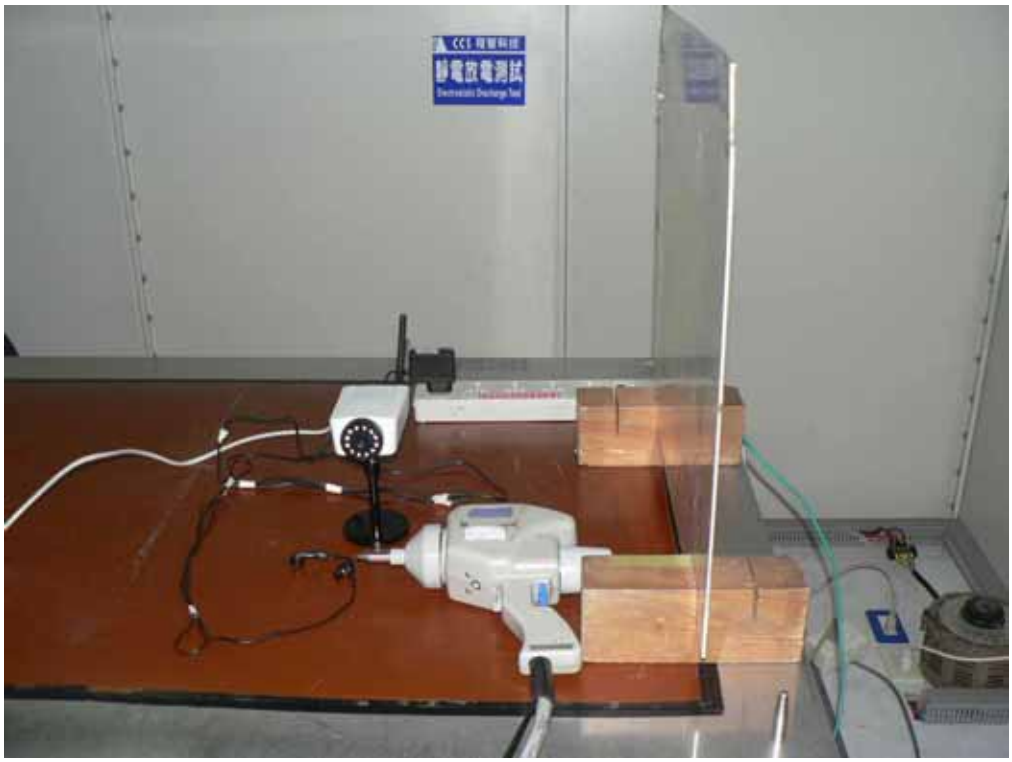
Telecommunication Ports



HARMONIC CURRENT EMISSIONS SETUP

VOLTAGE FLUCTUATION AND FLICKER SETUP

ELECTROSTATIC DISCHARGE SETUP

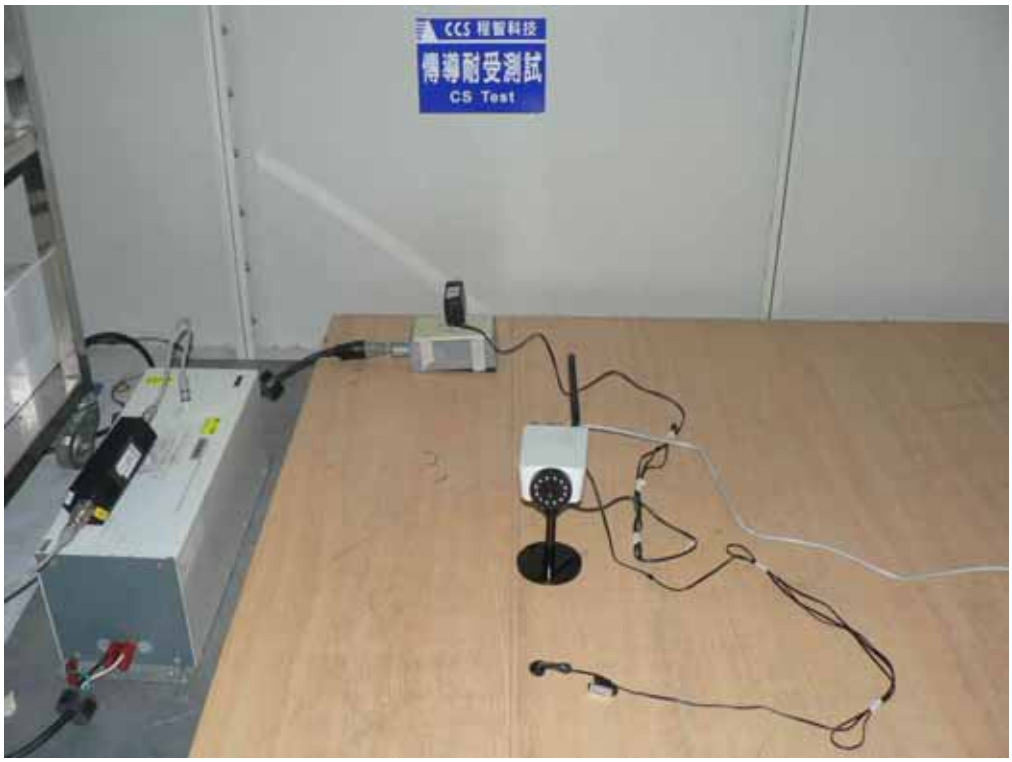


RF ELECTROMAGNETIC FIELD SETUP

FAST TRANSIENTS COMMON MODE SETUP

SURGE SETUP

CONDUCTED RADIO FREQUENCY DISTURBANCES SETUP



POWER FREQUENCY MAGNETIC FIELDS SETUP

VOLTAGE DIPS & VOLTAGE INTERRUPTIONS SETUP