



# EMC TEST REPORT

According to

EN 55022:2006/A1:2007 (Class A)  
EN 61000-3-2 : 2006  
EN 61000-3-3 : 1995/ A1:2001/ A2:2005  
AS/NZS CISPR 22:2006 (Class A)

EN 55024 : 1998/ A1:2001/ A2:2003  
IEC 61000-4-2 : 1995/ A1:1998/ A2:2000  
IEC 61000-4-3 : 2006  
IEC 61000-4-4 : 2004  
IEC 61000-4-5 : 2005  
IEC 61000-4-6 : 2006  
IEC 61000-4-8 : 2001  
IEC 61000-4-11 : 2004

Applicant : VIVOTEK INC.  
Address : 6F, No.192, Lien-Cheng Rd., Chung-Ho,  
Taipei County, Taiwan  
Equipment : Video Server  
Model No. : VS8102  
Trade Name : VIVOTEK

Laboratory accreditation



- The test result refers exclusively to the test presented test model / sample.
- Without written approval of *CerpPASS Technology Corp.* the test report shall not be reproduced except in full.
- This test report is only applicable to European Community.



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# CERTIFICATE OF COMPLIANCE

According to

EN 55022:2006/A1:2007 (Class A)  
EN 61000-3-2 : 2006  
EN 61000-3-3 : 1995/ A1:2001/ A2:2005  
AS/NZS CISPR 22:2006 (Class A)

EN 55024 : 1998/ A1:2001/ A2:2003  
IEC 61000-4-2 : 1995/ A1:1998/ A2:2000  
IEC 61000-4-3 : 2006  
IEC 61000-4-4 : 2004  
IEC 61000-4-5 : 2005  
IEC 61000-4-6 : 2006  
IEC 61000-4-8 : 2001  
IEC 61000-4-11 : 2004

Applicant : VIVOTEK INC.

Address : 6F, No.192, Lien-Cheng Rd., Chung-Ho,  
Taipei County, Taiwan

Equipment : Video Server

Model No. : VS8102

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**.

The equipment was **passed** the test performed according to **European Standard EN 55022:2006/A1:2007 (Class A), AS/NZS CISPR 22:2006 (Class A), EN 61000-3-2: 2006, EN 61000-3-3:1995/ A1:2001/ A2:2005 and EN 55024:1998/ A1:2001/ A2:2003 (IEC 61000-4-2 : 1995/ A1:1998/ A2:2000, IEC 61000-4-3 : 2006, IEC 61000-4-4 : 2004, IEC 61000-4-5 : 2005, IEC 61000-4-6 : 2006, IEC 61000-4-8 : 2001, IEC 61000-4-11 : 2004 )**.

The test was carried out on Oct. 01, 2009 at **CerpPASS Technology Corp.**

Signature

Jonson Lee  
EMC/RF B.U. Senior Manager



## 1. Declaration of Conformity and the CE Mark

There are three possible procedures pertaining to the declaration of conformity:

### 1.1. Conformity Testing and Declaration of Conformity by the Manufacturer or His Authorized Representative Established within the Community or by an Importer.

- Article 10 (1) of the EMC Directive, - § 3 (1) no. 2a of the EMC Act.

### 1.2. Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing of the Product and Issued of an EC certificate of conformity by a competent body.

- Article 10 (2) of the EMC Directive, - § 3 (1) no. 2b of the EMC Act.

### 1.3. Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing and Certification of the Product by a Notified Body.

- Article 10 (5) of the EMC Directive,  
- § 3 (1) no. 2b of the EMC Act (radio transmitting installations).

### 1.4. Specimen For The CE Marking Of Electrical / Electronical Equipment

The components of the CE marking shall have substantially the same vertical dimension, which may not be less than 5 mm.





## 2. Test Configuration of Equipment under Test

### 2.1. Feature of Equipment under Test

Please refer to user's manual

### 2.2. Test Manner

- a. During testing, the interface cables and equipment positions were varied according to Europe Standard EN55022 Class A.
- b. The complete test system included remote workstation, Earphone and EUT for EMC test. The remote workstation included Notebook, POE and CCD Camera.
- c. An executive program, "PING.EXE" under WIN XP was executed to transmit and receive data to the remote workstation through LAN.
- d. The test modes of conduction test as follow:  
 Test Mode 1: Link LAN: 100Mbps, Power from Adapter: 3A-181WP12  
 The test mode 1 was the worst case, it was reported as final data.
- e. The test modes of radiation and EMS test as follow:  
 Test Mode 1: Link LAN: 100Mbps, Power from Adapter: 3A-181WP12  
 Test Mode 2: Link LAN: 100Mbps, Power from POE  
 The test mode 2 was the worst case, it was reported as final data.
- f. The test modes of disturbances at telecommunication ports test as follow:  
 Test Mode 1. ISN LAN (100Mbps)  
 Test Mode 2. ISN LAN (10Mbps)  
 Test Mode 3: Link LAN: 100Mbps, Power from POE
- g. During the disturbances at telecommunication port test, the condition of LAN utilization in excess of 10%.

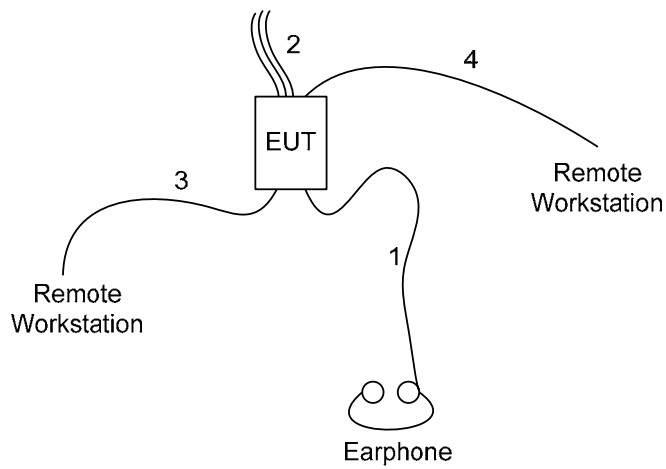
### 2.3. Description of Test System

Device	Manufacturer	Model No.	Description
Earphone	MIC	MIC-4	Data Cable, Audio Shielding 1.35m
Remote Workstation			
Notebook	DELL	PP10L	Power Cable, Unshielding 1.8m
CCD Camera	AVC	AVC 591	Power Cable, Unshielding 1.8m
POE	VIVOTEK	IP7161	Power Cable, Unshielding 1.8m

Use Cable:

Cable	Quantity	Description
RJ45	1	Unshielding, 10m
Coaxial	1	Shielding, 5m

## 2.4. Connection Diagram of Test System



1. The Audio cable is connected from EUT to the Earphone.
2. These cables (\*8) are floating.
3. The Coaxial cable is connected from EUT to the Remote workstation (CCD Camera).
4. The RJ45 cable is connected from EUT to the Remote workstation (Notebook and POE).



## 2.5. General Information of Test

Test Site :	CerpPASS Technology Corp. 2F-11, No. 3, Yuan Qu St., (Nankang Software Park), Taipei, Taiwan 115, R.O.C.
Test Site Location (OATS1-SD):	No. 7-2, Moshihkeng, Fongtian Village, Shihding Township, Taipei County, Taiwan, R.O.C.
FCC Registration Number :	TW1049, 982971, 488071
IC Registration Number :	4934C-1, 4934D-1
VCCI Registration Number:	T-543 for Telecommunication Test C-3328 for Conducted emission test R-3013 for Radiated emission test
Test Voltage:	AC 230V/ 50Hz or POE
Test in Compliance with:	EMI Test (conduction and radiation) : European Standard EN 55022:2006/A1:2007 Class A AS/NZS CISPR 22:2006 Class A Harmonics Test : European Standard EN 61000-3-2 :2006 Voltage Fluctuations Test : European Standard EN 61000-3-3 :1995/ A1:2001/ A2:2005 EMS Test : European Standard EN 55024 :1998/ A1:2001/ A2:2003 ESD : IEC 61000-4-2 :1995/ A1:1998/ A2:2000 RS : IEC 61000-4-3 :2006 EFT : IEC 61000-4-4 :2004 SURGE : IEC 61000-4-5 :2005 CS : IEC 61000-4-6 :2006 Power Frequency Magnetic Field : IEC 61000-4-8 :2001 DIPS : IEC 61000-4-11 :2004
Frequency Range Investigated :	Conducted Emission Test: from 150kHz to 30 MHz Radiated Emission Test: from 30 MHz to 6,000 MHz
Test Distance :	The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

## 2.6. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE / NEUTRAL	2.71 dB
Radiated Emission	30 MHz ~ 6GHz	Vertical	3.89 dB
		Horizontal	3.59 dB







### 3. Test of Conducted Emission

#### 3.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55022. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 4.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

**Table 1 Class A Line Conducted Emission Limits:**

Frequency range (MHz)	Limits (dB $\mu$ V)	
	Quasi Peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60

Note : The lower limits shall apply at the transition frequencies.

**Table 2 - Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class A equipment.**

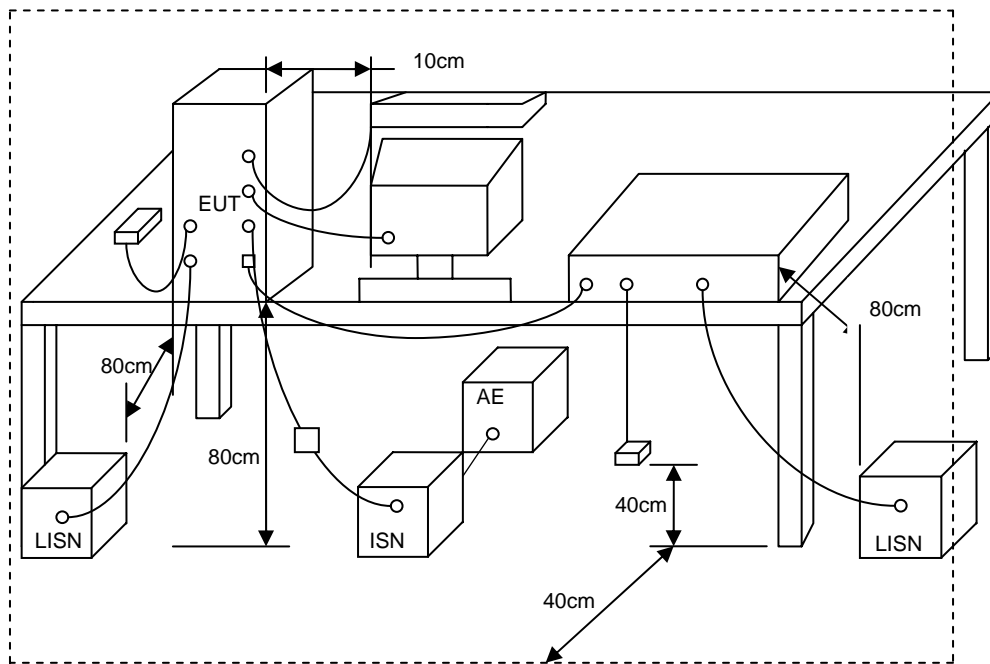
Frequency range (MHz)	Voltage limits dB( $\mu$ V)		Current limits dB( $\mu$ A)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	97 to 87	84 to 74	53 to 43	40 to 30
0.5 to 30	87	74	43	30

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 to 0.5 MHz.  
 Note 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 150  $\Omega$  to the telecommunication under test (conversion factor is  $20 \log_{10} 150/1 = 44\text{dB}$ ).

### 3.2. Test Procedures

- a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The CISPR states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### 3.3. Typical Test Setup



### 3.4. Measurement Equipment

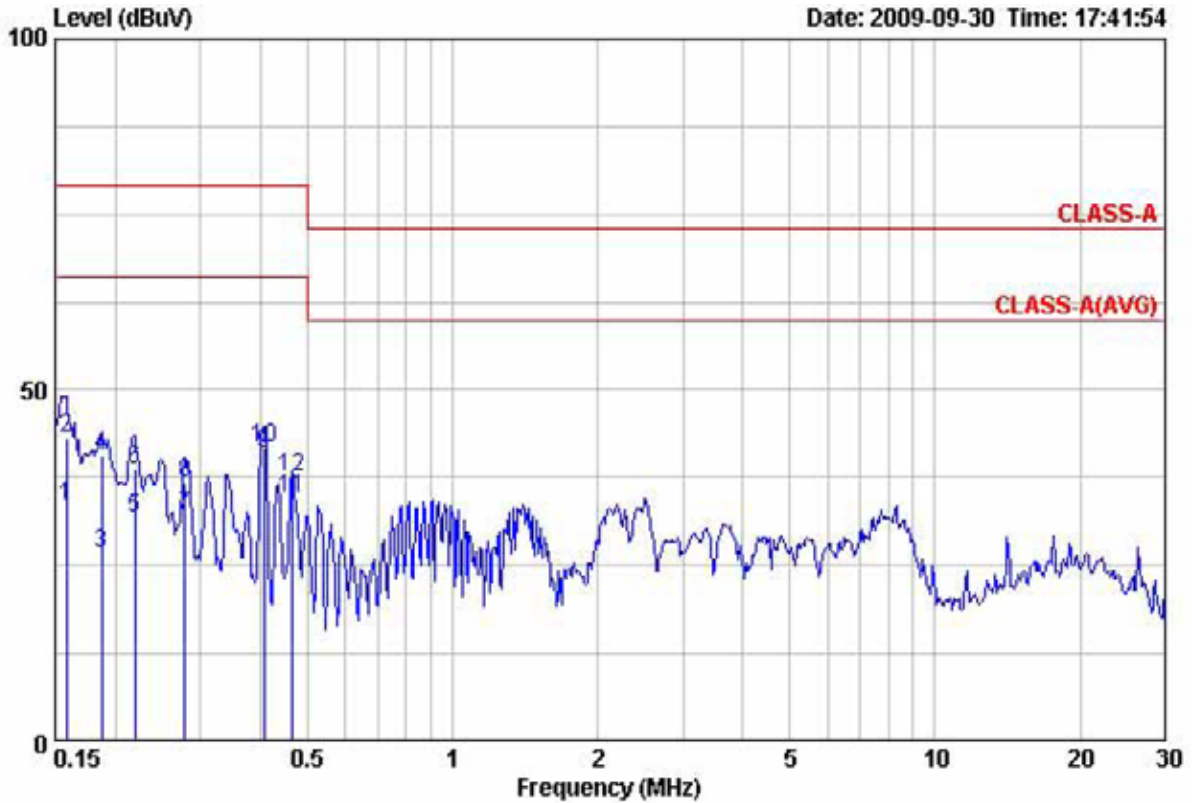
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100443	2008/09/27	2009/09/26
LISN	NSLK 8127	Schwarzbeck	8127-516	2009/05/15	2010/05/14
LISN	ROLF HEINE	NNB-2/16Z	03/10058	2009/04/18	2010/04/17
ISN	TESEQ GMBH	ISN T4	20158	2009/04/24	2010/04/23



### 3.5. Test Result and Data

#### 3.5.1 Conducted Emission for Adapter

Power	: AC 230V	Pol/Phase	: LINE
Test Mode 1	: Link LAN: 100Mbps	Temperature	: 25 °C
Memo	: Power from Adapter: 3A-181WP12	Humidity	: 66 %

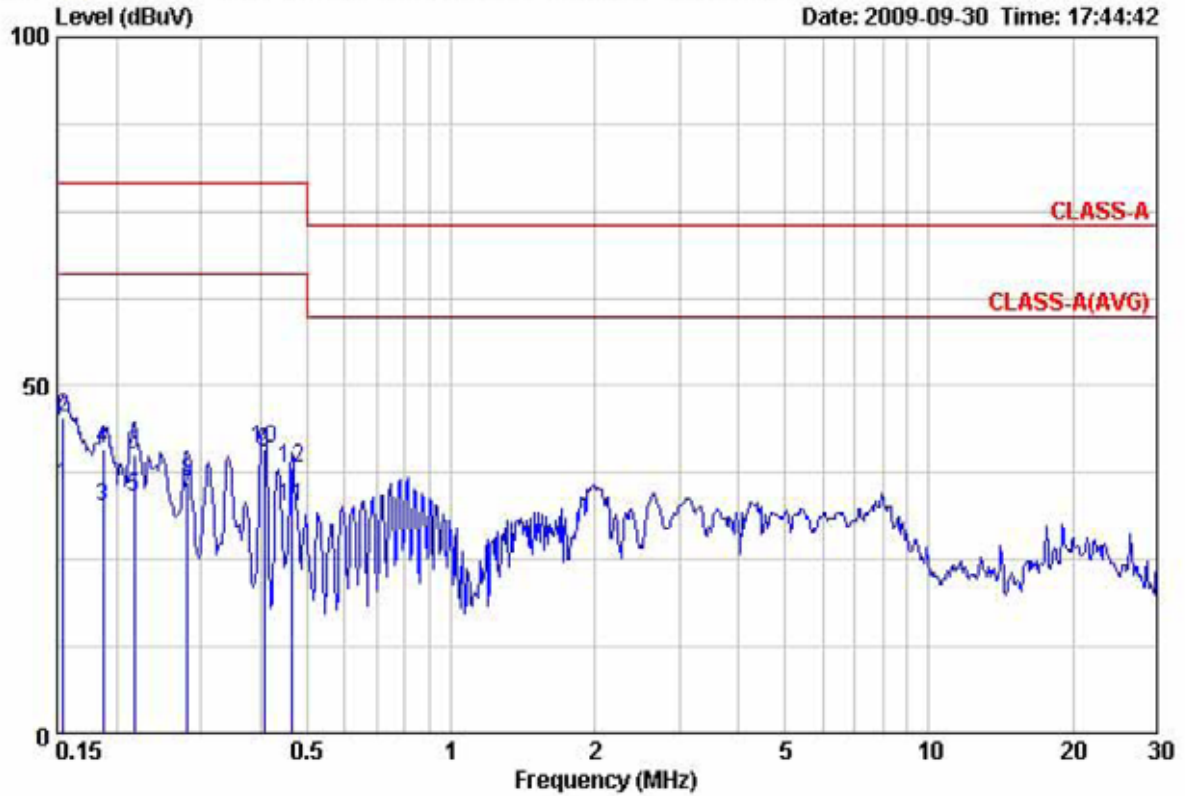


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.158	33.457	0.062	33.519	66.000	-32.481	Average
2	0.158	43.072	0.062	43.134	79.000	-35.866	QP
3	0.187	26.729	0.068	26.797	66.000	-39.203	Average
4	0.187	40.610	0.068	40.678	79.000	-38.322	QP
5	0.220	31.821	0.071	31.892	66.000	-34.108	Average
6	0.220	38.603	0.071	38.674	79.000	-40.326	QP
7	0.279	31.924	0.075	31.999	66.000	-34.001	Average
8	0.279	36.802	0.075	36.877	79.000	-42.123	QP
9	0.406	40.918	0.080	40.998	66.000	-25.002	Average
10	0.406	41.618	0.080	41.698	79.000	-37.302	QP
11	0.466	34.363	0.085	34.448	66.000	-31.552	Average
12	0.466	37.417	0.085	37.502	79.000	-41.498	QP

Remarks: 1. Result = Read Value + Factor  
 2. Factor = LISN(ISN) Factor + Cable Loss



Power	: AC 230V	Pol/Phase	: NUTRAL
Test Mode 1	: Link LAN: 100Mbps	Temperature	: 25 °C
Memo	: Power from Adapter: 3A-181WP12	Humidity	: 66 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.155	35.585	0.061	35.646	66.000	-30.354	Average
2	0.155	45.459	0.061	45.520	79.000	-33.480	QP
3	0.187	32.535	0.068	32.603	66.000	-33.397	Average
4	0.187	40.975	0.068	41.043	79.000	-37.957	QP
5	0.217	33.977	0.071	34.048	66.000	-31.952	Average
6	0.217	40.046	0.071	40.117	79.000	-38.883	QP
7	0.282	34.441	0.075	34.516	66.000	-31.484	Average
8	0.282	36.273	0.075	36.348	79.000	-42.652	QP
9	0.406	40.347	0.080	40.427	66.000	-25.573	Average
10	0.406	40.927	0.080	41.007	79.000	-37.993	QP
11	0.466	32.521	0.085	32.606	66.000	-33.394	Average
12	0.466	38.098	0.085	38.183	79.000	-40.817	QP

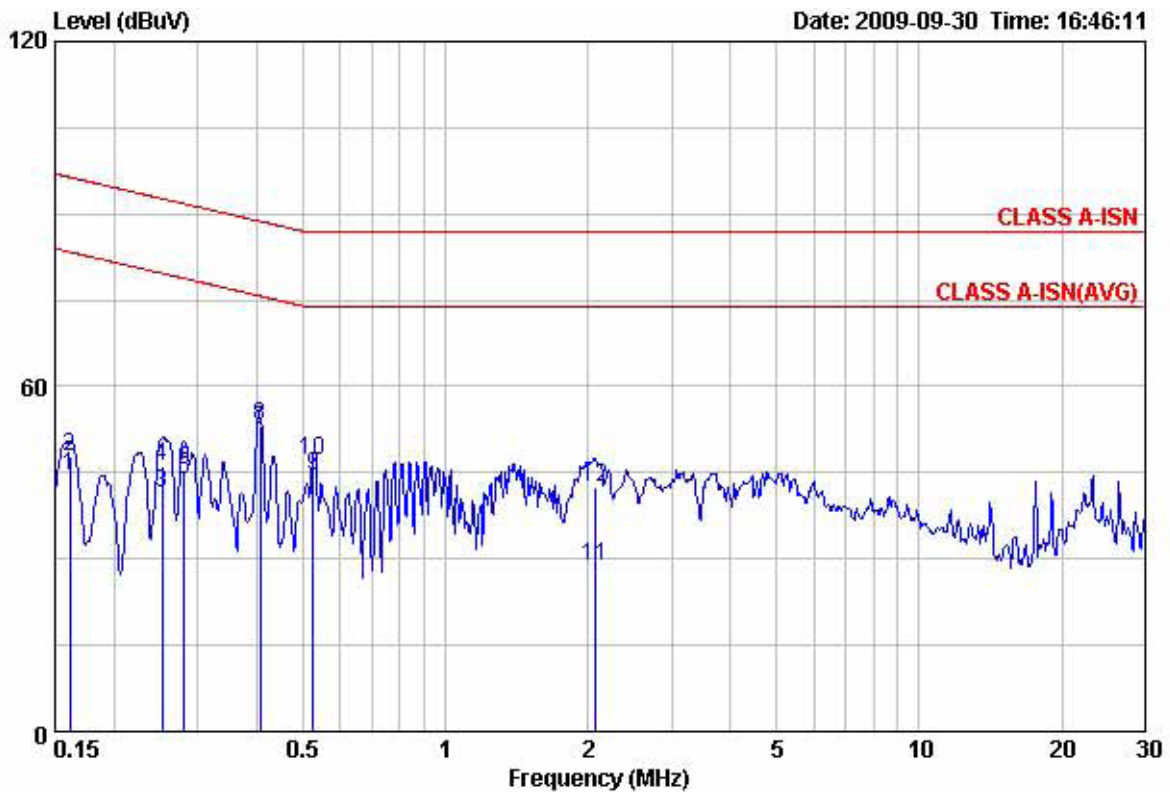
Remarks: 1. Result = Read Value + Factor  
 2. Factor = LISN(ISN) Factor + Cable Loss

Test engineer: Dean



3.5.2 Conducted Emission for Telecommunication Port Test Data

Power	: AC 230V	Temperature	: 25°C
Test Mode 1	: ISN LAN (100Mbps)	Humidity	: 66 %

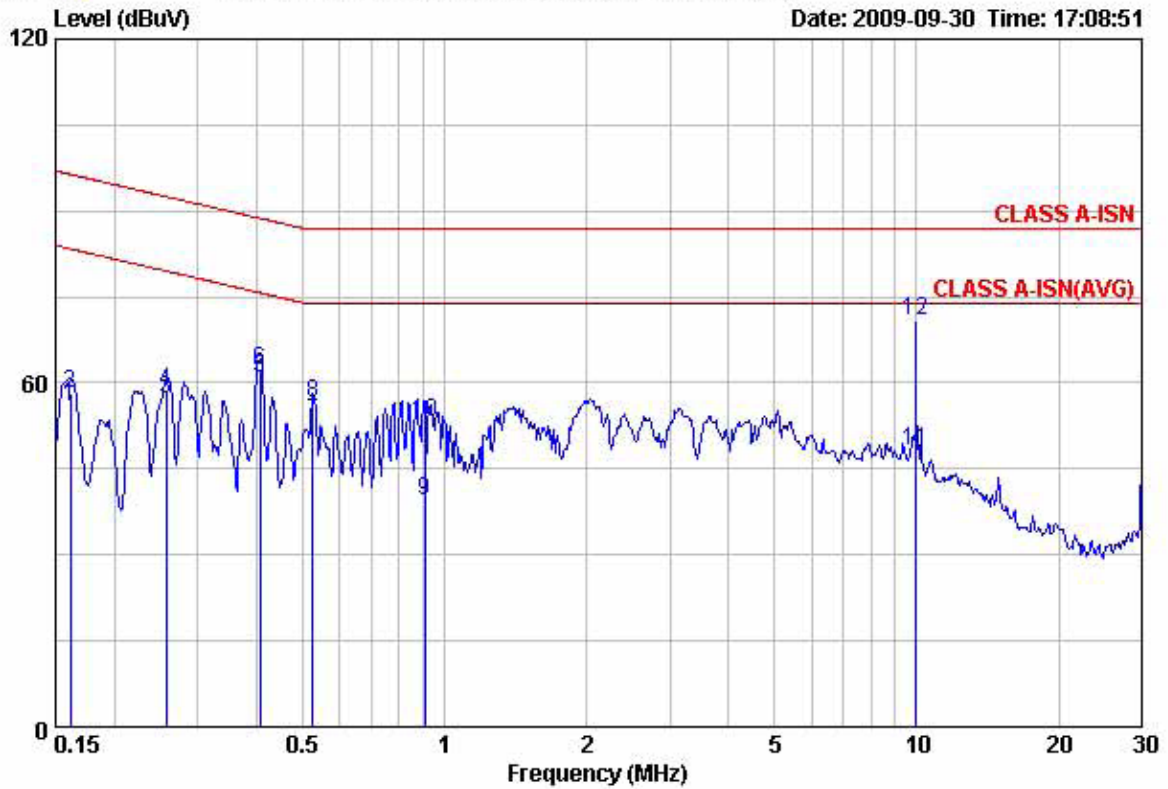


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV	dB	dBuV	dBuV	dBuV	
1	0.162	34.233	10.118	44.351	83.384	-39.033	Average
2	0.162	37.668	10.118	47.786	96.384	-48.598	QP
3	0.252	31.424	9.973	41.397	79.687	-38.290	Average
4	0.252	36.194	9.973	46.167	92.687	-46.520	QP
5	0.282	33.792	9.952	43.744	78.763	-35.019	Average
6	0.282	35.453	9.952	45.405	91.763	-46.358	QP
7	0.406	42.588	9.862	52.450	75.727	-23.277	Average
8	0.406	43.165	9.862	53.027	88.727	-35.700	QP
9	0.527	34.597	9.795	44.392	74.000	-29.608	Average
10	0.527	37.358	9.795	47.153	87.000	-39.847	QP
11	2.066	19.077	9.701	28.778	74.000	-45.222	Average
12	2.066	32.789	9.701	42.490	87.000	-44.510	QP

Remarks: 1. Result = Read Value + Factor  
2. Factor = LISN(ISN) Factor + Cable Loss



Power	: AC 230V	Temperature	: 25°C
Test Mode 2	: ISN LAN (10Mbps)	Humidity	: 66 %

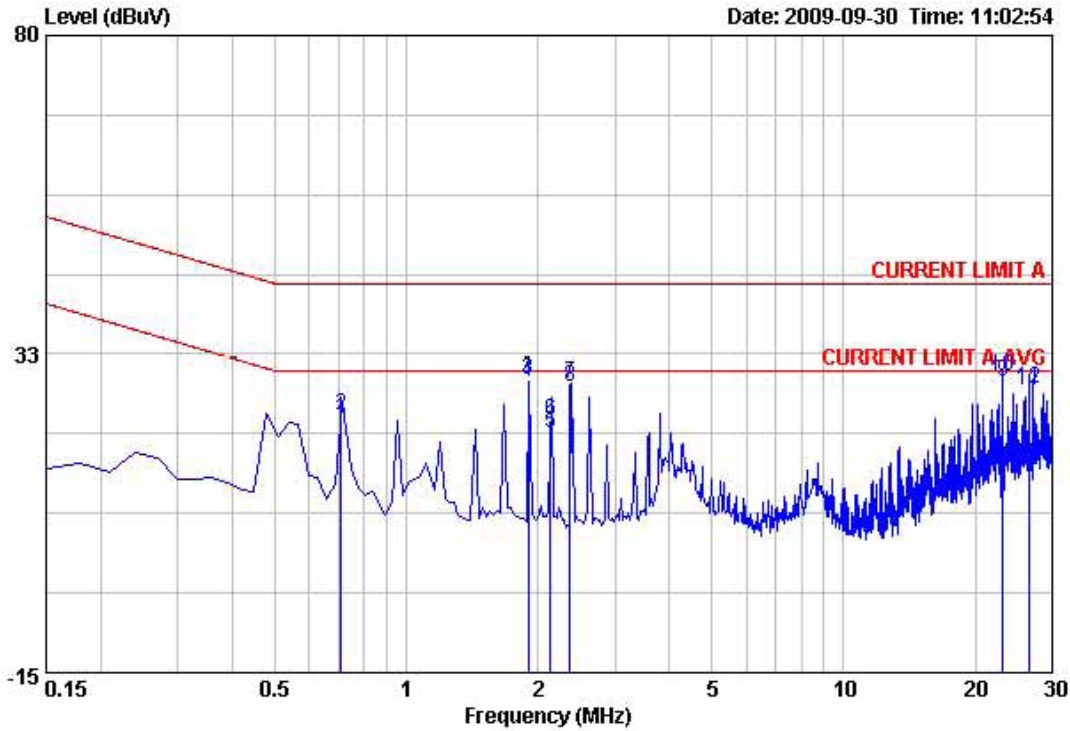


Item	Freq MHz	Read Value dBuV	Factor dB	Result dBuV	Limit dBuV	Margin dBuV	Remark
1	0.162	45.670	10.118	55.788	83.384	-27.596	Average
2	0.162	48.004	10.118	58.122	96.384	-38.262	QP
3	0.258	47.148	9.970	57.118	79.511	-22.393	Average
4	0.258	48.383	9.970	58.353	92.511	-34.158	QP
5	0.406	50.845	9.862	60.707	75.727	-15.020	Average
6	0.406	52.195	9.862	62.057	88.727	-26.670	QP
7	0.527	43.418	9.795	53.213	74.000	-20.787	Average
8	0.527	46.600	9.795	56.395	87.000	-30.605	QP
9	0.909	29.838	9.752	39.590	74.000	-34.410	Average
10	0.909	43.285	9.752	53.037	87.000	-33.963	QP
11	10.000	38.540	9.720	48.260	74.000	-25.740	Average
12	10.000	61.007	9.720	70.727	87.000	-16.273	QP

Remarks: 1. Result = Read Value + Factor  
2. Factor = LISN(ISN) Factor + Cable Loss



Power	: POE	Temperature	: 25 °C
Test Mode 3	: Link LAN: 100Mbps	Humidity	: 66 %
Memo	: Power from POE		



Item	Freq MHz	Read Value dBuA	Factor dB	Result dBuA	Limit dBuA	Margin dBuA	Remark
1	0.711	22.405	0.329	22.734	30.000	-7.266	Average
2	0.711	23.124	0.329	23.453	43.000	-19.547	QP
3	1.897	28.439	0.320	28.759	30.000	-1.241	Average
4	1.897	28.105	0.320	28.425	43.000	-14.575	QP
5	2.135	20.387	0.322	20.709	30.000	-9.291	Average
6	2.135	22.131	0.322	22.453	43.000	-20.547	QP
7	2.371	27.784	0.324	28.108	30.000	-1.892	Average
8	2.371	27.395	0.324	27.719	43.000	-15.281	QP
9	23.130	29.320	-0.922	28.398	30.000	-1.602	Average
10	23.130	30.131	-0.922	29.209	43.000	-13.791	QP
11	26.490	28.795	-1.631	27.164	30.000	-2.836	Average
12	26.490	29.002	-1.631	27.371	43.000	-15.629	QP

Remarks: 1. Result = Read Value + Factor  
 2. Factor = Antenna factor + Cable loss - Amplifier factor

Test engineer: Dean





### 3.6. Test Photographs of Power Port

Front View



Rear View





### 3.7. Test Photographs of Telecommunication Port

Rear View





## 4. Test of Radiated Emission

### 4.1. Test Limit

The EUT shall meet the limits of below Table when measured at the measuring distance R in accordance with the methods described in European Standard EN 55022 Clause 10. If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

Table – Limits for radiated disturbance of class A ITE at a measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB( $\mu$ V/m)
30 to 230	40
230 to 1000	47

NOTE 1 The lower limit shall apply at the transition frequency.  
NOTE 2 Additional provisions may be required for cases where interference occurs.

The EUT shall meet the limits of below Table when measured in accordance with the method described in European Standard EN 55022 Clause 10 and the conditional testing procedure described below.

Table – Limits for radiated disturbance of class A ITE at a measuring distance of 3 m

Frequency range GHz	Average limit dB( $\mu$ V/m)	Peak limits dB( $\mu$ V/m)
1 to 3	56	76
3 to 6	60	80

NOTE The lower limit applies at the transition frequency.

#### • Conditional testing procedure:

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.

If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.

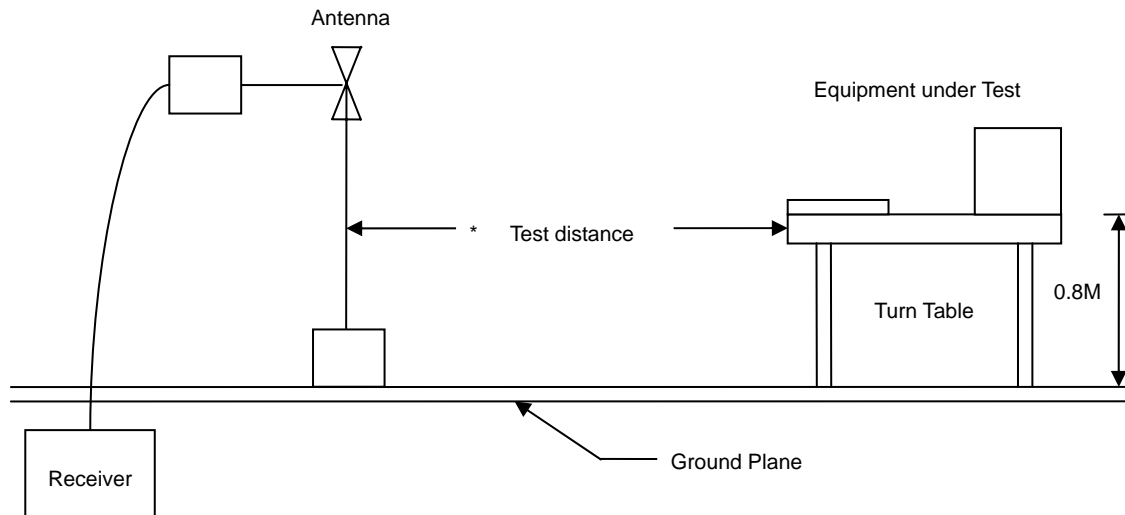
If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.



## 4.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

### 4.3. Typical Test Setup



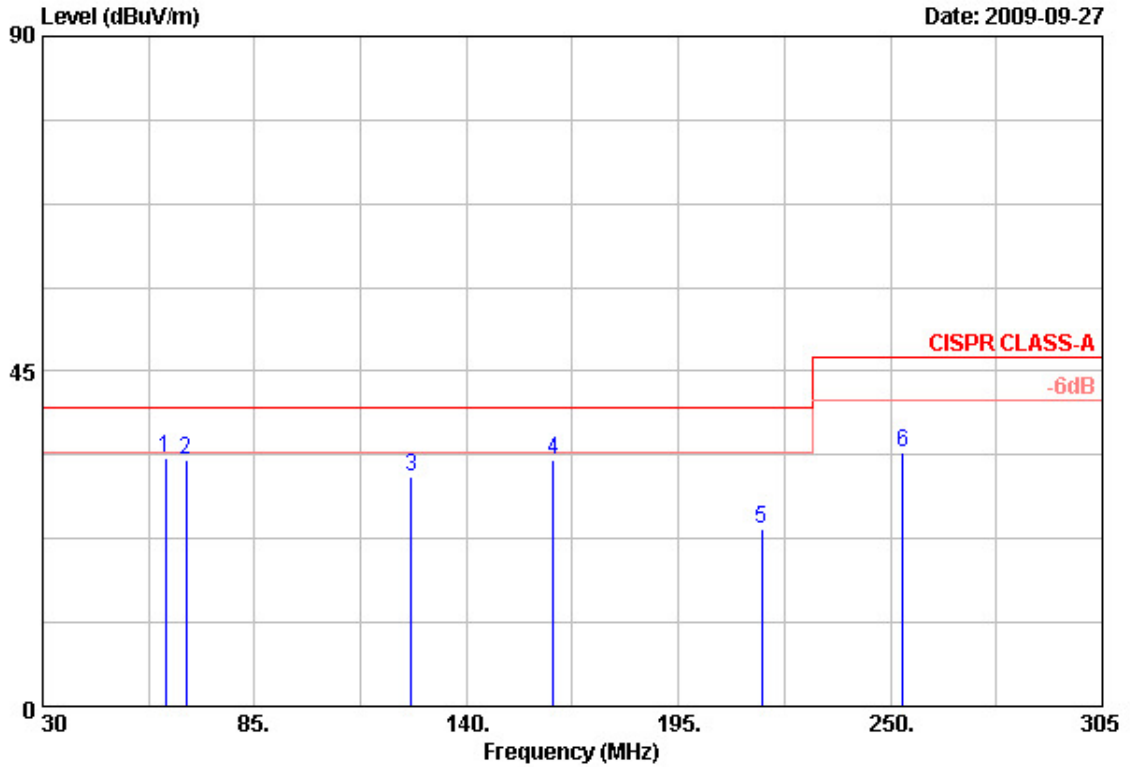
### 4.4. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Bilog Antenna	Schaffner	CBL6112B	2840	2009/05/14	2010/05/13
EMI Receiver	R&S	ESCI	100443	2008/12/19	2009/12/18
Signal Generator	HP	8648B	3629U00612	2008/10/08	2009/10/07
Amplifier	Agilent	8447D	2944A10593	2009/05/21	2010/05/20
AC Power Converter	APC	AFC-11005	F103120008	N/A	N/A



### 4.5. Test Result and Data

Power	: POE	Pol/Phase	: VERTICAL
Test Mode 2	: Link LAN: 100Mbps	Temperature	: 28 °C
Memo	: Power from POE	Humidity	: 67 %

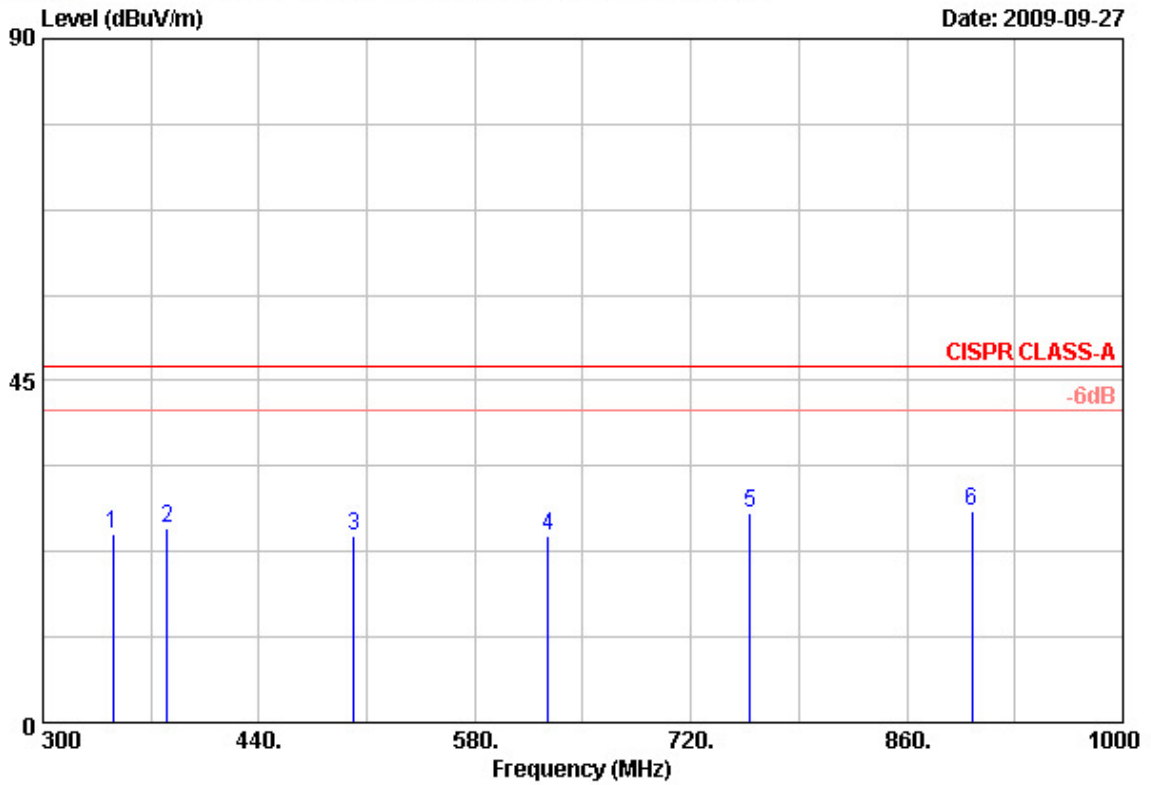


Item	Freq MHz	Read Value dBUV	Factor dB/m	Result dBUV/m	Limit dBUV/m	Margin dB	Remark	Ant Pos cm	Tab Pos Deg
1	61.900	52.204	-18.880	33.324	40.000	-6.676	Peak	400	0
2	67.125	53.111	-20.083	33.028	40.000	-6.972	Peak	400	0
3	125.700	44.119	-13.375	30.744	40.000	-9.256	Peak	400	0
4	162.550	47.840	-14.715	33.125	40.000	-6.875	Peak	400	0
5	216.725	40.650	-16.858	23.792	40.000	-16.208	Peak	400	0
6	253.300	46.741	-12.718	34.023	47.000	-12.977	Peak	400	0

Remarks: 1. Result = Read Value + Factor  
 2. Factor = Antenna factor + Cable loss - Amplifier factor



Power	: POE	Pol/Phase	: VERTICAL
Test Mode 2	: Link LAN: 100Mbps	Temperature	: 28 °C
Memo	: Power from POE	Humidity	: 67 %

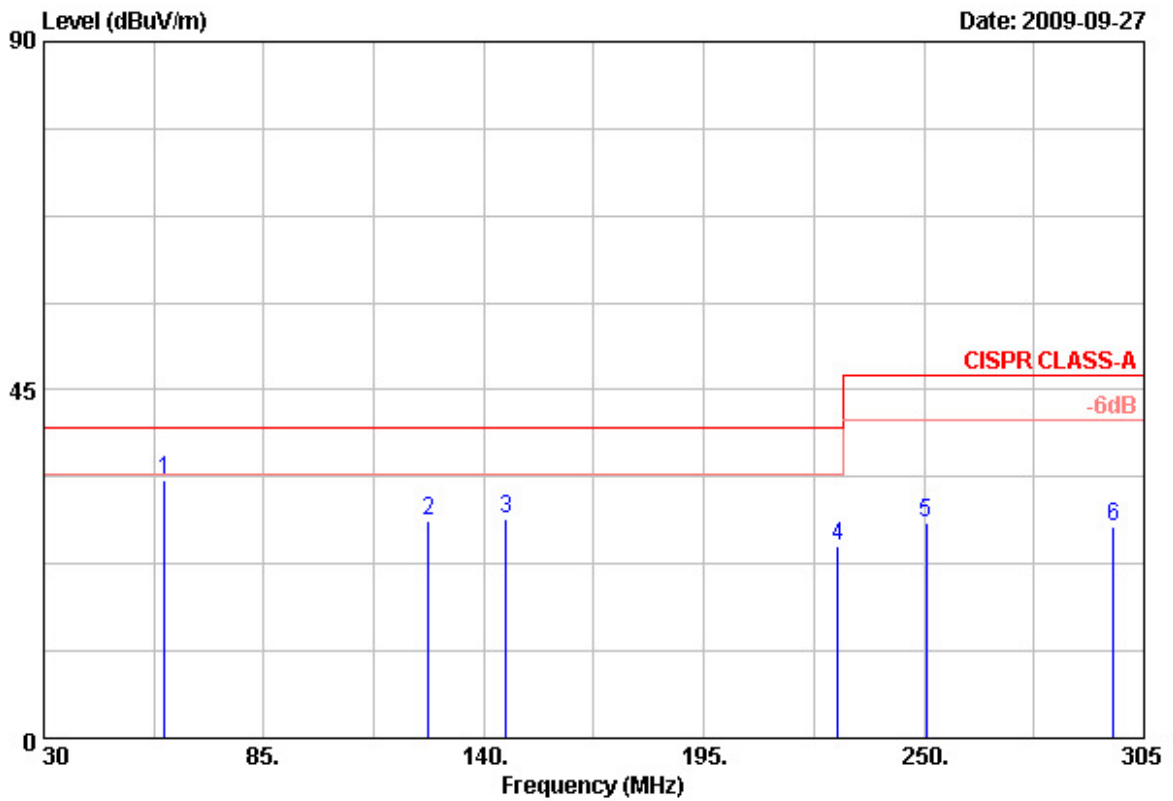


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	345.500	34.381	-9.548	24.833	47.000	-22.167	Peak	100	0
2	380.500	34.069	-8.389	25.680	47.000	-21.320	Peak	100	0
3	501.600	31.750	-7.172	24.578	47.000	-22.422	Peak	100	0
4	627.600	30.801	-6.354	24.447	47.000	-22.553	Peak	100	0
5	758.500	32.420	-4.826	27.594	47.000	-19.406	Peak	100	0
6	902.000	28.811	-0.981	27.830	47.000	-19.170	Peak	100	0

Remarks: 1. Result = Read Value + Factor  
 2. Factor = Antenna factor + Cable loss - Amplifier factor



Power	: POE	Pol/Phase	: HORIZONTAL
Test Mode 2	: Link LAN: 100Mbps	Temperature	: 28 °C
Memo	: Power from POE	Humidity	: 67 %



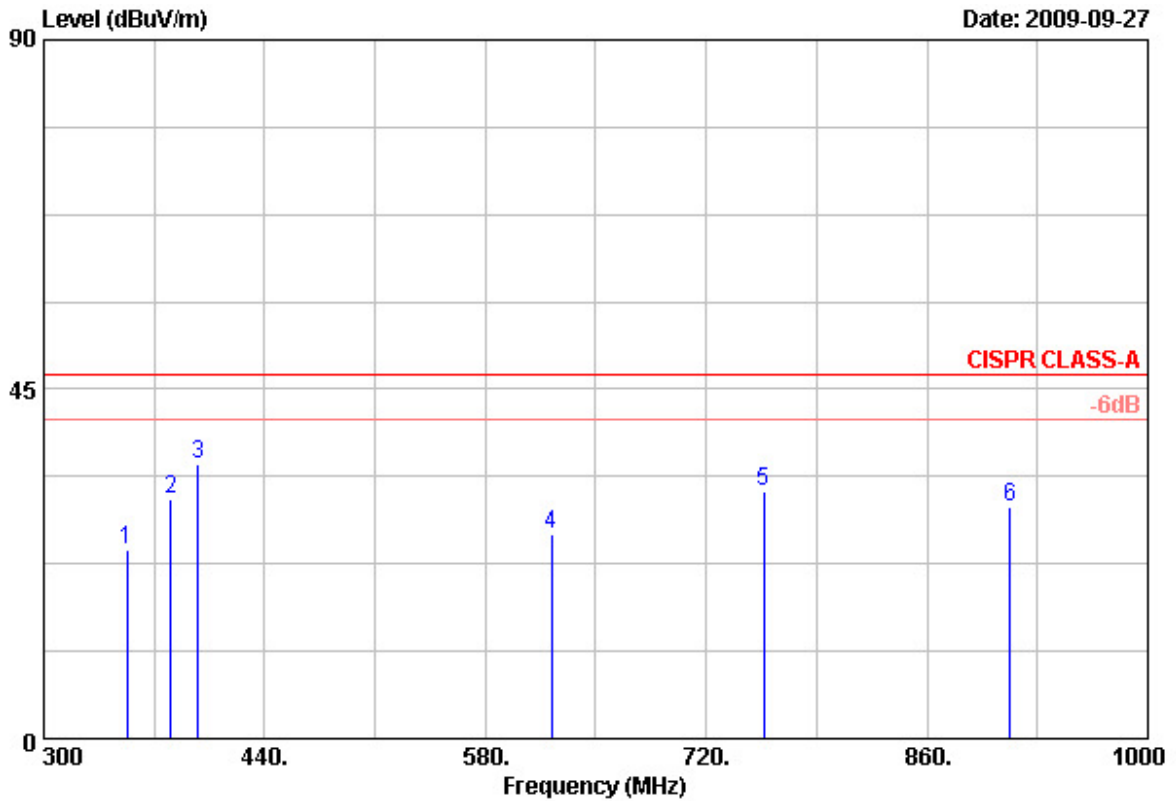
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	60.250	51.858	-18.498	33.360	40.000	-6.640	Peak	400	0
2	126.250	41.439	-13.452	27.987	40.000	-12.013	Peak	400	0
3	145.500	44.280	-15.958	28.322	40.000	-11.678	Peak	400	0
4	228.550	40.660	-15.910	24.750	40.000	-15.250	Peak	400	0
5	250.550	40.898	-13.147	27.751	47.000	-19.249	Peak	400	0
6	297.300	38.790	-11.363	27.427	47.000	-19.573	Peak	400	0

Remarks: 1. Result = Read Value + Factor  
2. Factor = Antenna factor + Cable loss - Amplifier factor





Power	: POE	Pol/Phase	: HORIZONTAL
Test Mode 2	: Link LAN: 100Mbps	Temperature	: 28 °C
Memo	: Power from POE	Humidity	: 67 %

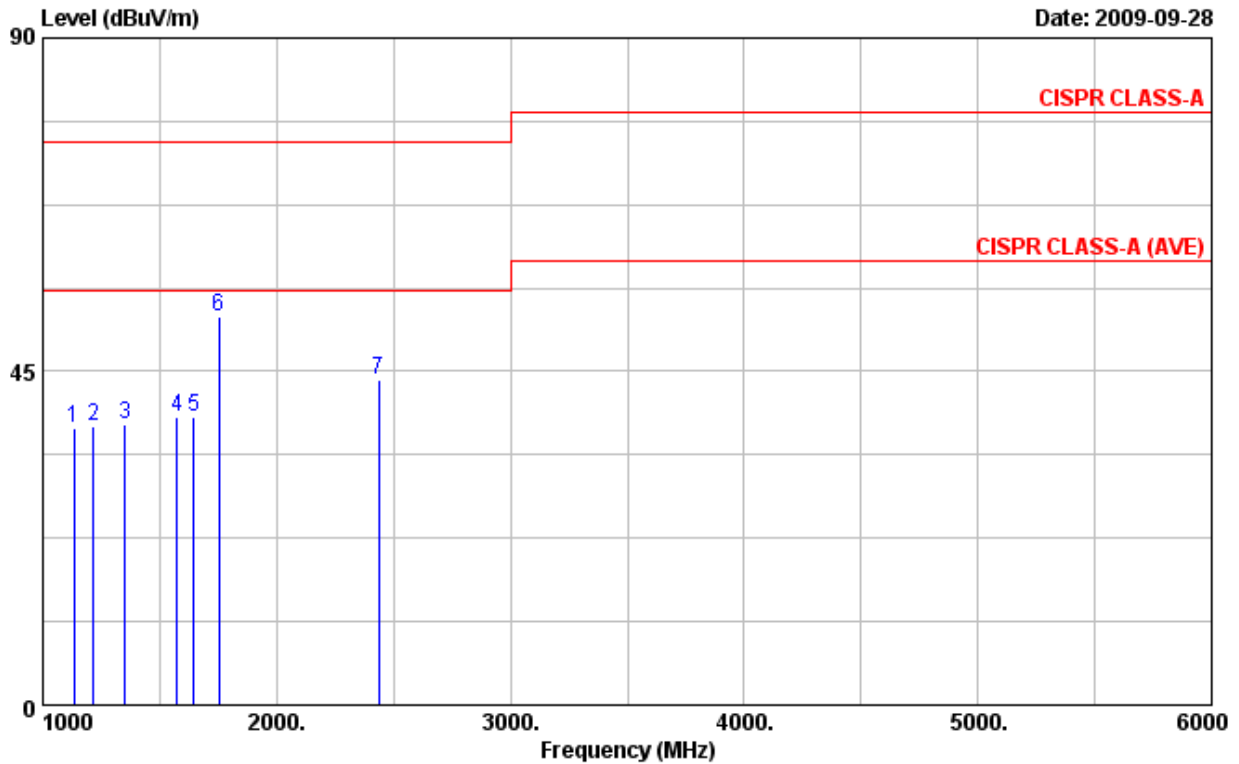


Item	Freq MHz	Read Value dBUV	Factor dB/m	Result dBUV/m	Limit dBUV/m	Margin dB	Remark	Ant Pos cm	Tab Pos Deg
1	352.500	33.621	-9.295	24.326	47.000	-22.674	Peak	100	0
2	380.500	39.259	-8.389	30.870	47.000	-16.130	Peak	100	0
3	398.000	43.230	-7.825	35.405	47.000	-11.595	Peak	100	0
4	622.000	32.630	-6.379	26.251	47.000	-20.749	Peak	100	0
5	756.400	36.720	-4.865	31.855	47.000	-15.145	Peak	100	0
6	912.500	30.829	-0.877	29.952	47.000	-17.048	Peak	100	0

Remarks: 1. Result = Read Value + Factor  
2. Factor = Antenna factor + Cable loss - Amplifier factor



Power	: POE	Pol/Phase	: VERTICAL
Test Mode 2	: Link LAN: 100Mbps	Temperature	: 26 °C
Memo	: Power from POE	Humidity	: 60 %

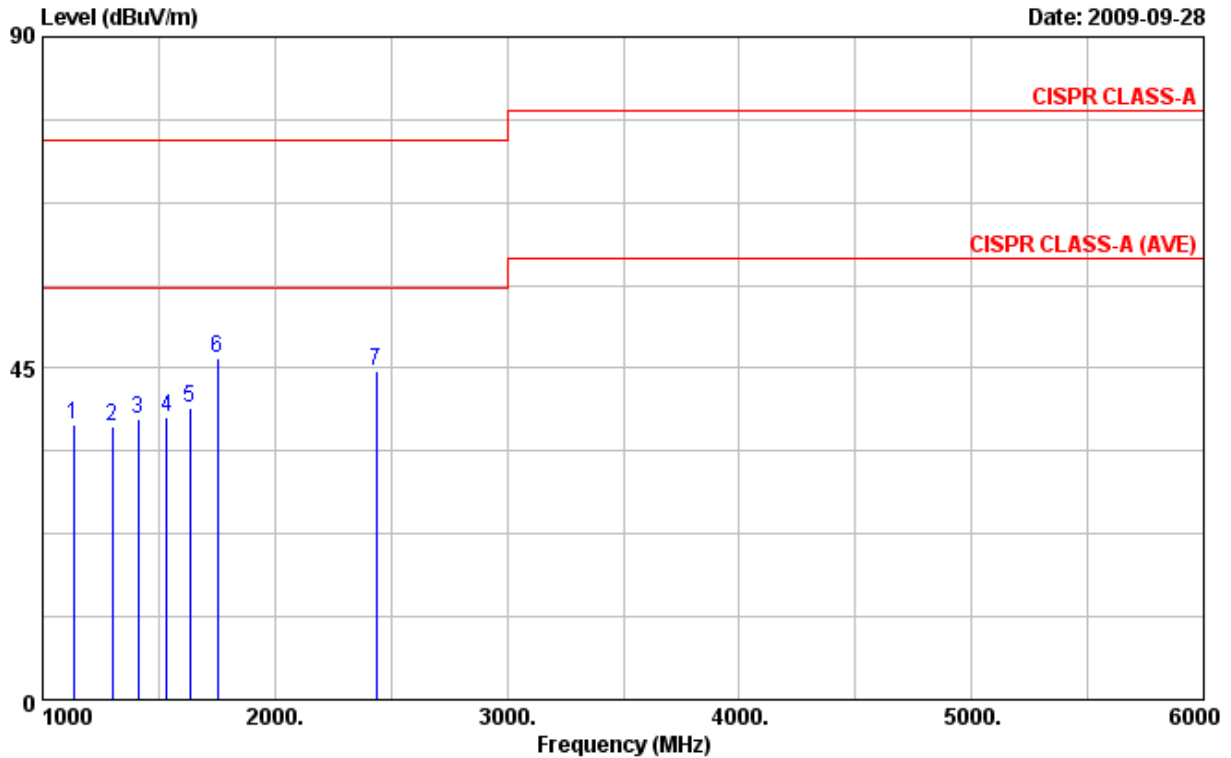


Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	1135.000	46.248	-8.790	37.458	76.000	-38.542	Peak	100	0
2	1215.000	45.841	-8.310	37.531	76.000	-38.469	Peak	100	0
3	1350.000	45.355	-7.500	37.855	76.000	-38.145	Peak	100	0
4	1575.000	45.062	-6.180	38.882	76.000	-37.118	Peak	100	0
5	1645.000	44.763	-5.788	38.975	76.000	-37.025	Peak	100	0
6	1755.000	57.682	-5.172	52.510	76.000	-23.490	Peak	100	0
7	2435.000	45.887	-2.060	43.827	76.000	-32.173	Peak	100	0

Remarks: 1. Result = Read Value + Factor  
 2. Factor = Antenna factor + Cable loss - Amplifier factor



Power	: POE	Pol/Phase	: HORIZONTAL
Test Mode 2	: Link LAN: 100Mbps	Temperature	: 26 °C
Memo	: Power from POE	Humidity	: 60 %



Item	Freq MHz	Read Value dBuV	Factor dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Remark	Ant Pos cm	Tab Pos Deg
1	1135.000	46.079	-8.790	37.289	76.000	-38.711	Peak	100	360
2	1300.000	44.906	-7.800	37.106	76.000	-38.894	Peak	100	360
3	1410.000	45.333	-7.140	38.193	76.000	-37.807	Peak	100	360
4	1535.000	44.801	-6.404	38.397	76.000	-37.603	Peak	100	360
5	1635.000	45.396	-5.844	39.552	76.000	-36.448	Peak	100	360
6	1755.000	51.660	-5.172	46.488	76.000	-29.512	Peak	100	360
7	2435.000	46.628	-2.060	44.568	76.000	-31.432	Peak	100	360

Remarks: 1. Result = Read Value + Factor  
 2. Factor = Antenna factor + Cable loss - Amplifier factor

Test engineer: Ray



#### 4.6. Test Photographs

Front View



Rear View





## 5. Harmonics Test

### 5.1. Limits of Harmonics Current Measurement

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. Permissible harmonics current A	Harmonics Order n	Max. Permissible harmonics current per watt mA/W	Max. Permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15 x 15/n	15<=n<=39	3.85/n	0.15 x 15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23 x 8/n			

**NOTE:**

1. Class A and Class D are classified according to item section 5 of EN 61000-3-2: 2006.
2. According go section 7 of EN 61000-3-2: 2006, the above limits for all equipment except for lighting equipment are for all applications having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

### 5.2. Test Result and Data

As specified on clause 7 and figure Z1 of EN 61000-3-2:2006, the limits are not specified for equipment with a rated power of 75W or less.

The EUT meets the above condition, so it conforms to EN 61000-3-2



## 6. Voltage Fluctuations Test

### 6.1. Test Procedure

The equipment shall be tested under the conditions of **Clause 5**.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of  $\pm 8\%$  is achieved during the whole assessment procedure.

### 6.2. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Power & Harmonics Analyzer	TTI	HA1600	198226	2008/10/01	2009/09/30





Supply Voltage: 230.6 to 230.6 Vrms      327.1 Vpk      Frequency: 50.00 Hz  
    THD: 0.6%      Crest Factor: 1.419      peak at: 92.6 deg

Load Power:                    0.003 kW                                    0.012 kVA      Power Factor: 0.318

Load Current:                0.04 to 0.05 Arms                    0.26 Apk      Crest Factor: 5.630

Voltage Variations

Highest Half-cycle level: +0.37%  
 Lowest Half-cycle level: +0.19%  
    d(max): 0.18%                                    Pass

Number of Change Intervals:            1  
 Highest d(t) for 500 ms: 0.00%                                    Pass  
 Longest d(t) over 3.30%: 0.00 seconds

'Steady State' definition: >1000 ms below 0.32%  
 Highest Steady State level: 0.25%  
 Lowest Steady State level: 0.25%  
 max d(c) between adjacent: 0.00%                                    Pass  
 max d(c) between any: 0.00%

Flicker

Long-term Flicker indicator Plt :      0.00  
 Short-term Flicker indicator Pst :

Plt Interval	Pst
1:	0.06
2:	0.06
3:	0.06
4:	0.06
5:	0.06
6:	0.06
7:	0.06
8:	0.06
9:	0.06
10:	0.06
11:	0.07
12:	0.06

Pst classifier:	Duration	Flicker
	0.1%	0.01
	0.7%	0.01
	1.0%	0.01
	1.5%	0.01
	2.2%	0.01
	3%	0.01
	4%	0.01
	6%	0.01
	8%	0.01
	10%	0.01
	13%	0.01
	17%	0.01
	30%	0.01
	50%	0.01

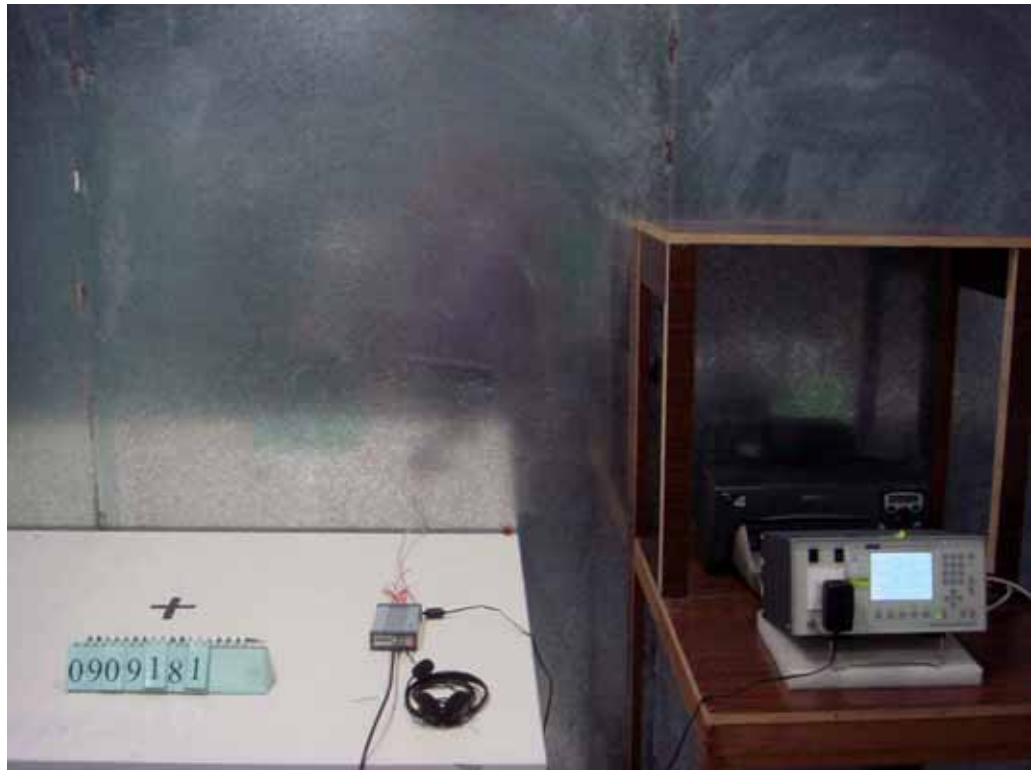
Test engineer: Melky





### 6.4. Test Photographs

Front View



Rear View



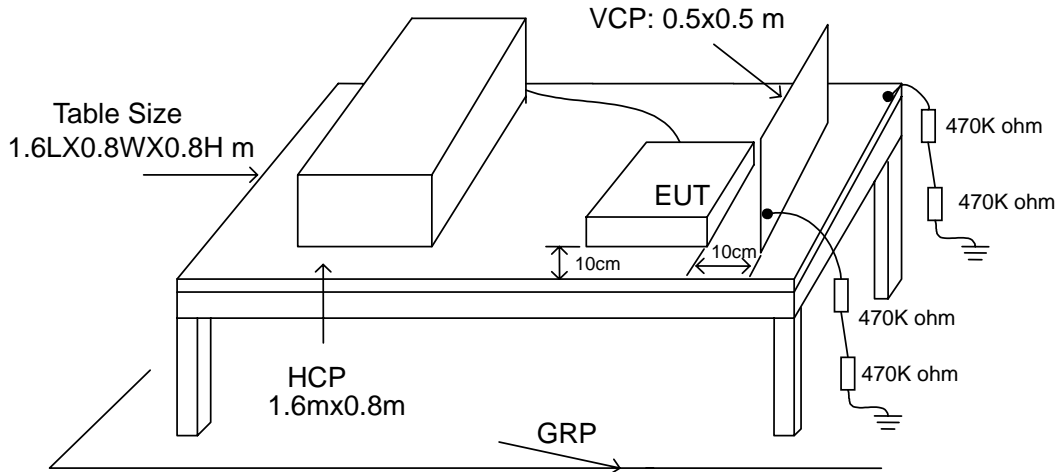


## 7. Electrostatic Discharge Immunity Test

### 7.1. Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
  - ambient temperature: 15 to 35 ;
  - relative humidity : 30% to 60%;
  - atmospheric pressure : 86 KPa (860 mbar) to 106 KPa (1060 mbar).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On reselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On reselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
  - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
  - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
  - The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

## 7.2. Test Setup for Tests Performed in Laboratory



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the following manner :

- a. Contact Discharge to the conductive surfaces and to coupling plane;
- b. Air Discharge at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the CerpPASS Technology Corp., we provided 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 2.5 m x 2.5 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.



### 7.3. Test Severity Levels

Contact Discharge		Air Discharge	
Level	Test Voltage (KV) of Contact discharge	Level	Test Voltage (KV) of Air Discharge
1	±2	1	±2
2	±4	2	±4
3	±6	3	±8
4	±8	4	±15
X	Specified	X	Specified

Remark: "X" is an open level.

### 7.4. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
ESD SIMULATOR	Schaffner	NSG438	878	2009/06/23	2010/06/22



7.5. Test Result and Data

Final Test Result : **PASS**  
 Pass performance criteria : A  
 Required performance criteria : B  
 Basic Standard : IEC 61000-4-2  
 Product Standard : EN 55024  
 Test Voltage : ±2 / ±4 / ±8 KV for air discharge,  
 ±2 / ±4 KV for contact discharge  
 Temperature : 25°C  
 Relative Humidity : 54 %  
 Atmospheric Pressure : 1011 hPa  
 Test Date : Oct. 01, 2009

Test Mode: The test result of all test modes are the same

	Contact Discharge				Air Discharge					
	25 times / each				10 times / each					
Voltage	2 KV		4 KV		2 KV		4 KV		8 KV	
Point\Polarity	+	-	+	-	+	-	+	-	+	-
HCP	A	A	A	A	---	---	---	---	---	---
VCP	A	A	A	A	---	---	---	---	---	---
Case	A	A	A	A	---	---	---	---	---	---
Screw	A	A	A	A	---	---	---	---	---	---
DC Jack (test mode 1only)	---	---	---	---	A	A	A	A	A	A
RJ45 Port	A	A	A	A	---	---	---	---	---	---
Audio Port	---	---	---	---	A	A	A	A	A	A
BNC Port	A	A	A	A	---	---	---	---	---	---

Note:" A" means the EUT function is normal working during the test.

Test engineer: Tom



### 7.6. Test Photographs

Front View



Rear View





## 8. Radio Frequency electromagnetic field immunity test

### 8.1. Test Procedure

- The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- The antenna which is enabling the complete frequency range of 80-1000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- The test is normally performed with the antenna facing the most sensitive side of the EUT. The polarization of the field generated by the bucolical antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. The circular polarization of the field from the log-spiral antenna makes a change of position of the antenna unnecessary.
- At each of the above conditions, the frequency range is swept 80-1000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of  $1.5 \times 10^{-3}$  decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

### 8.2. Test Severity Levels

Frequency Band : 80-1000 MHz	
Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified
Remark: "X" is an open class.	

### 8.3. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Amplifiers 80-1000MHz/100W	SCHAFFNER	CBA9413B	43510	N/A	N/A
Antenna	SCHAFFNER	CBL6141A	4257	N/A	N/A
Power Meter	Boonton	4231A-01	115902	2009/09/29	2010/09/28
Field Probe	HOLADAY	HI-6005	00035824	2009/01/04	2010/01/03
Signal Generator	HP	8648B	3629U00612	2008/10/08	2009/10/07
Power Sensor	Boonton	51011-EMC	33312	2009/09/29	2010/09/28



8.4. Test Result and Data

Final Test Result : **PASS**  
 Pass performance criteria : A  
 Required performance criteria : A  
 Basic Standard : IEC 61000-4-3  
 Product Standard : EN 55024  
 Frequency Range : 80~1000 MHz  
 Temperature : 25°C  
 Relative Humidity : 58 %  
 Atmospheric Pressure : 1011 hPa  
 Test Date : Oct. 01, 2009

Test Mode: The test result of all test modes are the same

Modulation : AM 80% , 1KHz sine wave, Dwell time: 2.9 S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~1000	Vertical	Front	3 V/m	A
80~1000	Vertical	Rear	3 V/m	A
80~1000	Vertical	Left	3 V/m	A
80~1000	Vertical	Right	3 V/m	A
80~1000	Horizontal	Front	3 V/m	A
80~1000	Horizontal	Rear	3 V/m	A
80~1000	Horizontal	Left	3 V/m	A
80~1000	Horizontal	Right	3 V/m	A

Note: "A" means the EUT function is normal working during the test.

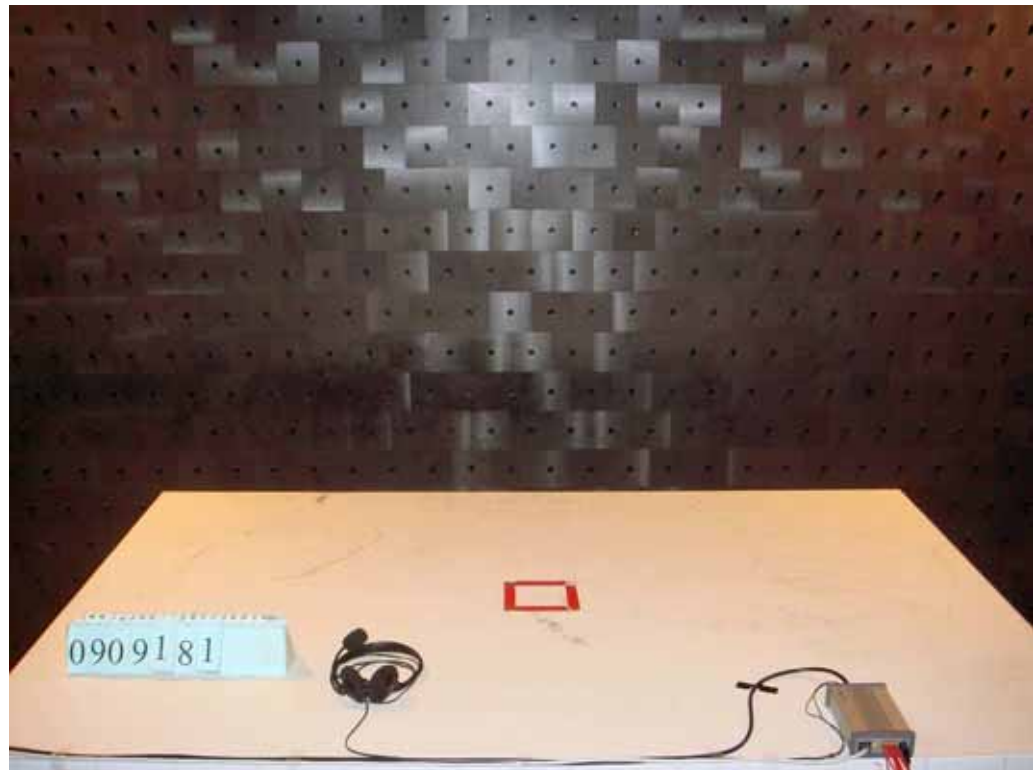
Test engineer: Melky



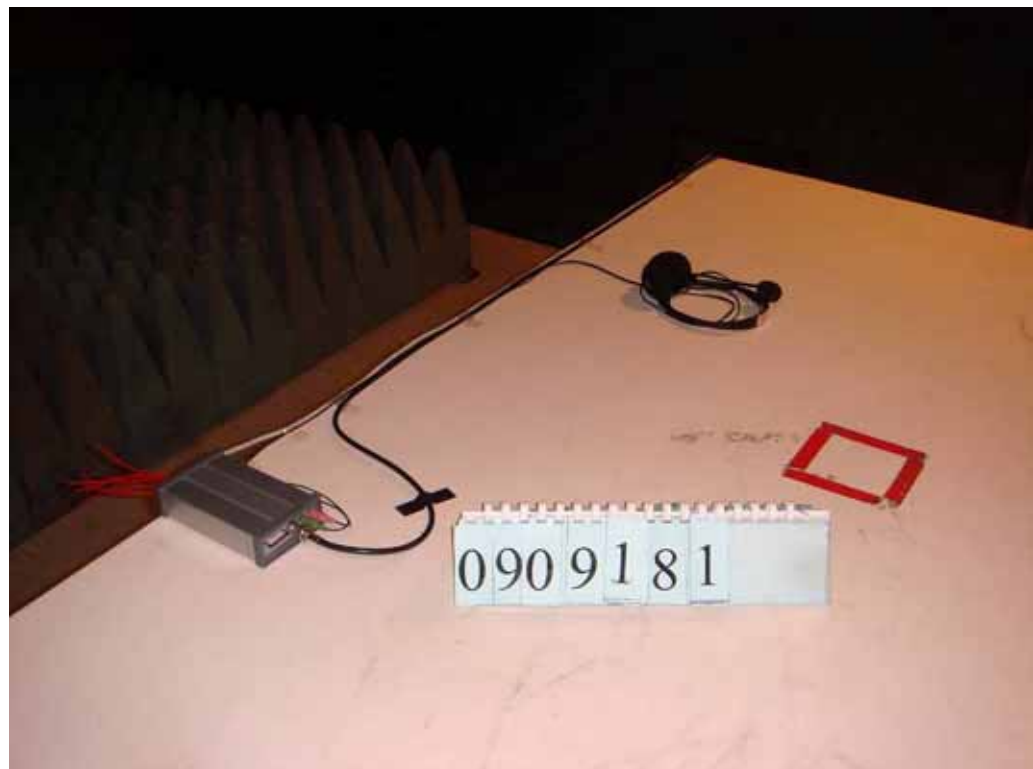


### 8.5. Test Photographs

Front View



Rear View





## 9. Electrical Fast Transient/ Burst Immunity Test

### 9.1. Test Procedure

- a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
  - ambient temperature: 15 to 35 ;
  - relative humidity : 45% to 75%;
  - Atmospheric pressure: 86 Kpa (860 mbar) to 106 Kpa (1060 mbar).
- b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
- c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
- d. Test on Power Line:
  - The EFT/B-generator was located on the GRP.. The length from the EFT/B-generator to the EUT is not exceeding 1 m.
  - The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.
- e. Test on Communication Lines
  - The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP.
  - The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.
- f. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
  - Normal performance within the specification limits.
  - Temporary degradation or loss of function or performance which is self-recoverable.
  - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
  - Degradation or loss of function which is not recoverable due to damage of equipment (components).

### 9.2. Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test :

Open circuit output test voltage $\pm$ 10%		
Level	On Power Supply	On I/O signal, data and control line
1	0.5 KV	0.25 KV
2	1.0 KV	0.50 KV
3	2.0 KV	1.00 KV
4	4.0 KV	2.00 KV
X	Specified	Specified

Remark : “ X ” is an open level. The level is subject to negotiation between the user and manufacturer or is specified by the manufacturer.



**9.3. Measurement Equipment**

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMC Pro	KeyTek	EMC Pro	0309207	2008/11/14	2009/11/13

**9.4. Test Result and Data**

Final Test Result : **PASS**

Pass performance criteria : B

Required performance criteria : B

Basic Standard : IEC 61000-4-4

Product Standard : EN 55024

Test Voltage : On Power Supply --  $\pm 0.5$  KV,  $\pm 1.0$  KV  
On Signal Port - -  $\pm 0.5$  KV

Temperature : 25°C

Relative Humidity : 58 %

Atmospheric Pressure : 1011 hPa

Test Date : Oct. 01, 2009

Test Mode 1

Pulse : 5/50 ns		Repetition Rate: <u>2.5 kHz</u> above 2.0 kV			
Burst : 15m/300ms		<u>5 kHz</u> below and equal 2.0Kv			
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>0.5 kV</u>		<u>1.0 kV</u>	
		+	-	+	-
Power Line	L	A	A	A	A
	N	A	A	A	A
	L-N	A	A	A	A
Signal Line	RJ45 LAN (10M / 100M)	A	A	---	---
	BNC Cable	B	B	---	---



Test Mode 2

Pulse : 5/50 ns		Repetition Rate: <u>2.5 kHz</u> above 2.0 kV			
Burst : 15m/300ms		<u>5 kHz</u> below and equal 2.0Kv			
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>0.5 kV</u>		<u>1.0 kV</u>	
		+	-	+	-
Signal Line	RJ45 LAN (10M / 100M)	A	A	---	---
	BNC Cable	B	B	---	---

Remark: During the test at  $\pm 0.5kV$  on the BNC Cable, there was no image shown on the screen.  
 After the test, the equipment continued to operate as intended without operator intervention.

Note: "A" Means the EUT function is normal working during the test.

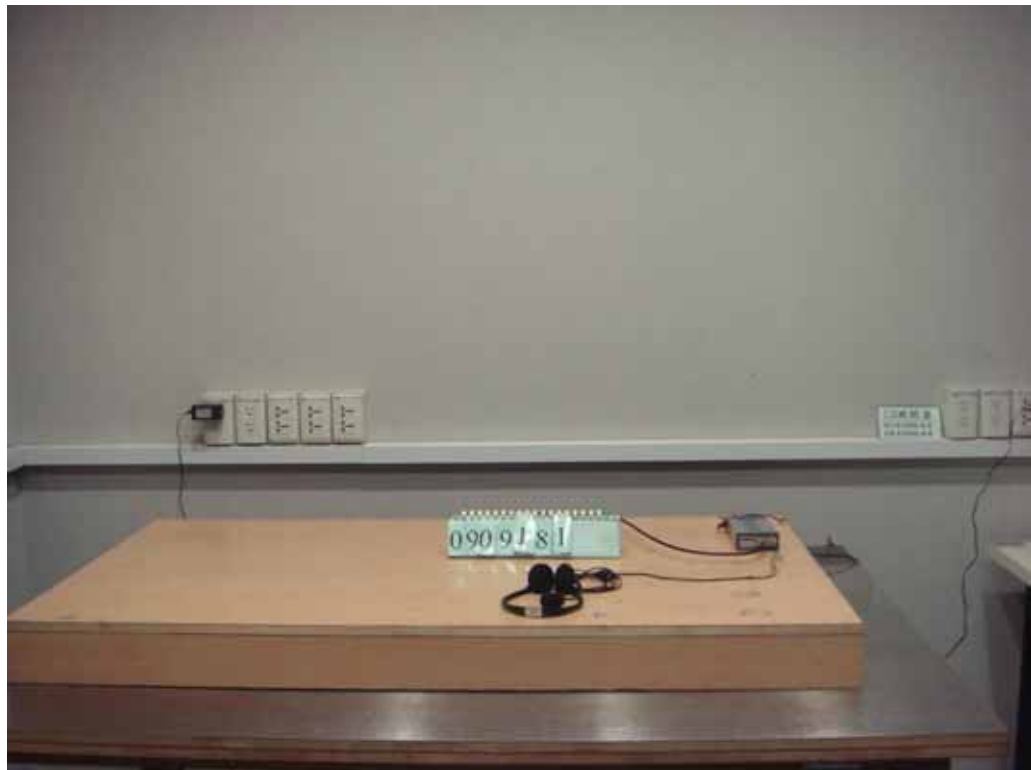
"B" Means the EUT function is affected during the test, but it can be recovered automatically after a while.

Test engineer: Melky



### 9.5. Test Photographs

Front View



Rear View





Clamp





## 10. Surge Immunity Test

### 10.1. Test Procedure

- a. Climatic conditions  
The climatic conditions shall comply with the following requirements :
  - ambient temperature : 15 to 35
  - relative humidity : 10 % to 75 %
  - atmospheric pressure : 86 kPa to 106 kPa ( 860 mbar to 1060 mbar )
- b. Electromagnetic conditions  
the electromagnetic environment of the laboratory shall not influence the test results.
- c. The test shall be performed according the test plan that shall specify the test set-up with
  - generator and other equipment utilized;
  - test level ( voltage/current );
  - generator source impedance;
  - internal or external generator trigger;
  - number of tests : at least five positive and five negative at the selected points;
  - repetition rate : maximum 1/min.
  - inputs and outputs to be tested;
  - representative operating conditions of the EUT;
  - sequence of application of the surge to the circuit;
  - phase angle in the case of AC. power supply;
  - actual installation conditions, for example :
    - AC : neutral earthed,
    - DC : ( + ) or ( - ) earthed to simulated the actual earthing conditions.
- d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the AC. voltage wave ( positive and negative ).
- e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
- f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.
- g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level ( let-through level ) of the primary protection.
- h. If the actual operating signal sources are not available, that may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according to a test plan.
- i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test previously unstressed equipment shall be used to the protection devices shall be replaced.

### 10.2. Test Severity Level

Level	Open-circuit test voltage, ± 10%, KV
1	0.5
2	1.0
3	2.0
4	4.0
X	Specified

NOTE: "X" is an open class. This level can be specified in the product specification.



10.3. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMC Pro	KeyTek	EMC Pro	0309207	2008/11/14	2009/11/13

10.4. Test Result and Data

Final Test Result : **PASS**  
 Pass performance criteria : A  
 Required performance criteria : B  
 Basic Standard : IEC 61000-4-5  
 Product Standard : EN 55024  
 Test Voltage : AC Power Port --  $\pm 0.5$  kV,  $\pm 1.0$  kV,  $\pm 2.0$  kV  
 RJ45 Port --  $\pm 1.0$  kV  
 Temperature : 25°C  
 Relative Humidity : 58 %  
 Atmospheric Pressure : 1011 hPa  
 Test Date : Oct. 01, 2009

Test Mode 1

Power Port

Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)			Repetition rate : 60 sec		Time : 5 time/each condition	
Phase Voltage / Mode / Polarity / Result			0°	90°	180°	270°
0.5 kV, 1.0kV	L-N	+	A	A	A	A
		-	A	A	A	A
2.0 kV	L-PE, N-PE	+	A	A	A	A
		-	A	A	A	A

RJ45 Port

Waveform : 1.2/50 $\mu$ s(8/20 $\mu$ s)			Repetition rate : 60 sec		Time : 5 time/each condition	
Mode / Polarity			Result			
1.0kV	RJ45	+	A			
		-	A			

Test Mode 2: The power of EUT is from POE, so this item doesn't require testing.

Note: "A" Means the EUT function is normal working during the test.

Test engineer: Melky





### 10.5. Test Photographs

Front View



Rear View





## 11. Conduction Disturbances induced by Radio-Frequency Fields

### 11.1. Test Procedure

- a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- d. The frequency range is swept from 150 KHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1KHz sign wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- f. An alternative test procedure may be adopted, wherein the frequency range is swept incrementally, with a step size not exceeding 4% of the start ad thereafter 4% of the preceding frequency value. The test level should be at least twice the value of the specified test level.
- g. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- h. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- i. The use of special exercising programs is recommended.
- j. Testing shall be performed according to a Test Plan, which shall be included in the test report.
- k. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

### 11.2. Test Severity Levels

Level	Voltage Level ( EMF ),
1	1 V
2	3 V
3	10 V
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	



**11.3. Measurement Equipment**

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
CS GENERATOR	Schaffner	NSG 2070	1059	2008/10/26	2009/10/25
CDN (M2+M3)	Schaffner	M016	20056	2008/10/26	2009/10/25
CDN	Schaffner	T400	19818	2008/10/26	2009/10/25
EM-CLAMP	Schaffner	KEMZ8010	19793	2008/10/26	2009/10/25

**11.4. Test Result and Data**

Final Test Result : **PASS**  
 Pass performance criteria : A  
 Required performance criteria : A  
 Basic Standard : IEC 61000-4-6  
 Product Standard : EN 55024  
 Coupling mode : CDN-(M2) for AC power ports  
                               : CDN-T400 for Signal Ports  
 Temperature : 25°C  
 Relative Humidity : 58 %  
 Atmospheric Pressure : 1011 hPa  
 Test Date : Oct. 01, 2009

Test Mode 1

Frequency : 0.15~80MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 2.9s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test Mode	Voltage(V)	Result
0.15 ~ 80MHz	Power(M2)	3	A
0.15 ~ 80MHz	RJ45 LAN (10M / 100M)	3	A
0.15 ~ 80MHz	Clamp (BNC)	3	A

Test Mode 2

Frequency : 0.15~80MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 2.9s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test Mode	Voltage(V)	Result
0.15 ~ 80MHz	RJ45 LAN (10M / 100M)	3	A
0.15 ~ 80MHz	Clamp (BNC)	3	A

Note: "A" Means the EUT function is normal working during the test.

Test engineer:           Melky



### 11.5. Test Photographs

Front View

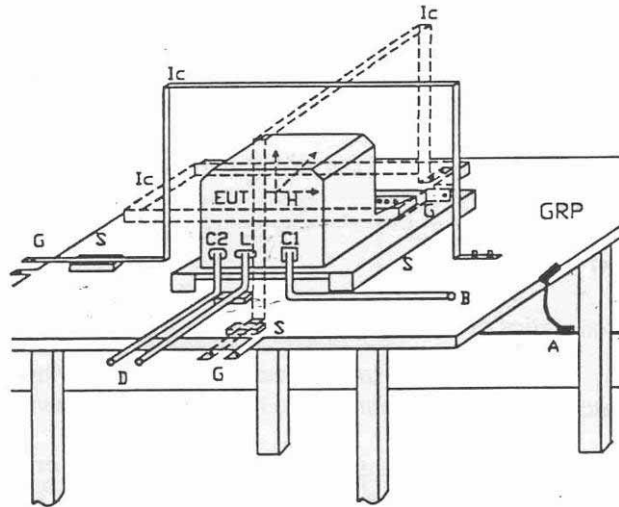


Rear View



## 12. Power Frequency Magnetic Field Immunity Test

### 12.1. Test Setup



- |     |                        |    |                               |
|-----|------------------------|----|-------------------------------|
| GPR | : Ground plane         | C1 | : Power supply circuit        |
| A   | : Safety earth         | C2 | : Signal circuit              |
| S   | : Insulating support   | L  | : Communication line          |
| EUT | : Equipment under test | B  | : To power supply source      |
| Lc  | : Induction coil       | D  | : To signal source, simulator |
| E   | : Earth terminal       | G  | : To the test generator       |

### 12.2. Test Severity Levels

Level	Magnetic field strength (A/m)
1	1
2	3
3	10
4	30
5	100
X <sup>1)</sup>	special

NOTE 1 "X" is an open level. This level can be given in the product specification.

### 12.3. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
MAGNETIC FIELD GENERATOR	KeyTek	F-1000-4-8-G-125A	N/A	2008/09/26	2009/09/25



### 12.4. Test Result and Data

Final Test Result : **PASS**  
Pass performance criteria : A  
Required performance criteria : A  
Basic Standard : IEC 61000-4-8  
Product Standard : EN 55024  
Temperature : 25°C  
Relative Humidity : 58 %  
Atmospheric Pressure : 1011 hPa  
Test Date : Oct. 01, 2009

Test Mode: The test result of all test modes are the same

Power Frequency Magnetic Field : <u>50</u> Hz, <u>1</u> A/m		
Coil Orientation	Testing duration	Results
X-axis	1.0 Min	A
Y-axis	1.0 Min	A
Z-axis	1.0 Min	A

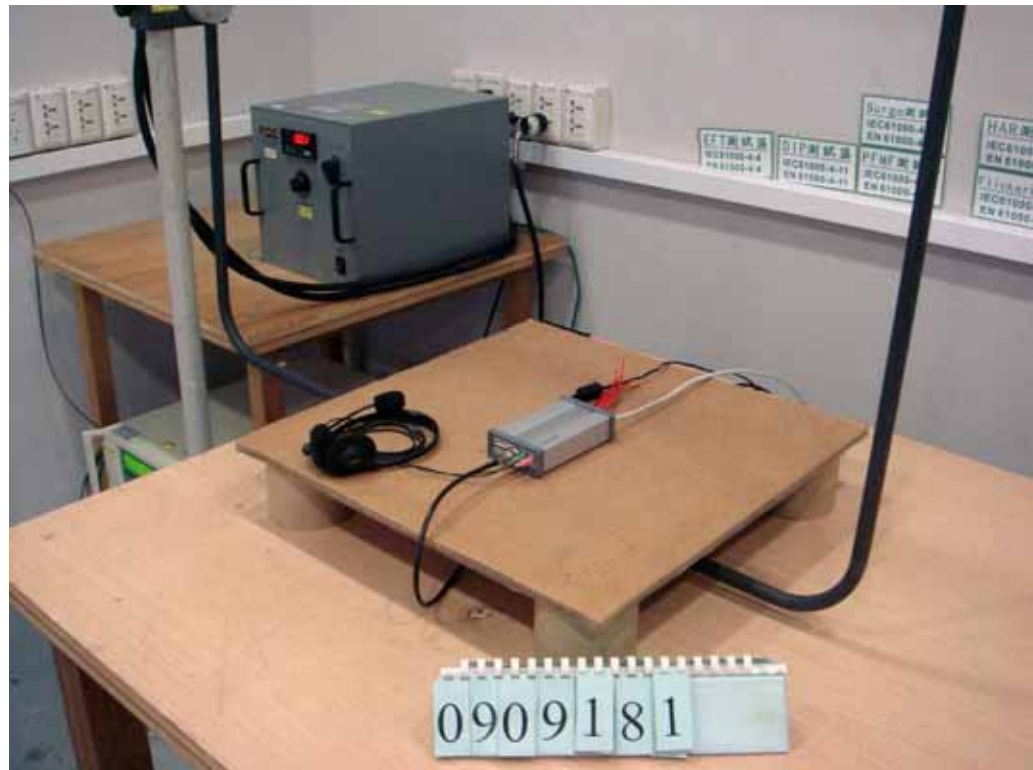
Note: "A" Mean the EUT function is normal working during the test.

Test engineer: Melky

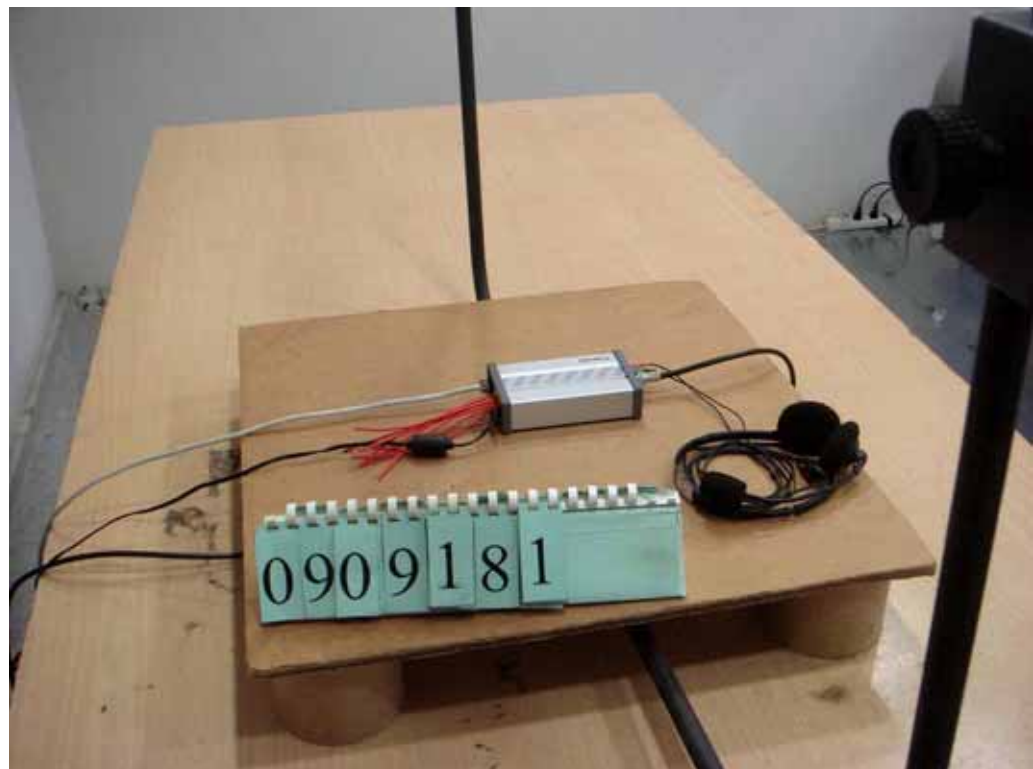


### 12.5. Test Photographs

Front View



Rear View





## 13. Voltage Dips and Voltage Interruptions Immunity Test Setup

### 13.1. Test Conditions

1. Source voltage and frequency : 230V / 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequence of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5  $\mu$ s.
5. Test severity :

Voltage dips and Interrupt reduction (%)	Test Duration (period)
>95%	250
30%	25
>95%	0.5

### 13.2. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMC Pro	KeyTek	EMC Pro	0309207	2008/11/14	2009/11/13





### 13.3. Test Result and Data

Final Test Result : **PASS**  
 Pass performance Criteria : B for voltage interruption, A for voltage dips  
 Required performance Criteria : C for voltage interruption, B/C for voltage dips  
 Basic Standard : IEC 61000-4-11  
 Product Standard : EN 55024  
 Temperature : 25°C  
 Relative Humidity : 58 %  
 Atmospheric Pressure : 1011 hPa  
 Test Date : Oct. 01, 2009

#### Test Mode 1

Voltage(UT): AC <u>230</u> V <u>50</u> Hz Interval(s) : <u>10s</u> Times : <u>3</u>				
Test mode	Test level UT %	Durations (period)	Phase / Result	
			0°	180°
Voltage interruptions	>95%	250	B	B
Voltage dips	30%	25	A	A
	>95%	0.5	A	A

Test Mode 2: The power of EUT is from POE, so this item doesn't require testing.

Note: "A" Means the EUT function is normal working during the test.

"B" Means the EUT function is affected during the test, but it can be recovered automatically after a while.

Test engineer: Melky



### 13.4. Test Photographs

Front View



Rear View





Appendix A. Photographs of EUT



