

# CE EMC TEST REPORT

**REPORT NO. :** CE940127L06B

**MODEL NO. :** FCS-1040

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0536  
ILAC MRA



Lab Code: 200376-0



No. 2177-01

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**CERTIFICATION - Continued**

The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

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Responsible for EMS ( Ivan Peng )

**APPROVED BY** : Eric Lin , **DATE:** May 23, 2005  
( Eric Lin, Manager )

Note \*: The power consumption of EUT is 9.719W, which is less than 75W and no limits apply.  
Therefore it is deemed to comply with EN 61000-3-2: 2000 without any testing.

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN55022:1994 +A1:1995+A2:1997, Class B	Conducted Test	<b>PASS</b>	Meets Class B Limit Minimum passing margin is -16.46 dB at 0.861 MHz
	Radiated Test	<b>PASS</b>	Meets Class B Limit Minimum passing margin is -0.5 dB at 999.98 MHz
EN61000-3-2:2000, Class A	Harmonic current emissions	<b>PASS</b>	The power consumption of EUT is less than 75W and no limits apply
EN61000-3-3:1995 + A1:2001	Voltage fluctuations & flicker	<b>PASS</b>	Meets the requirements.

IMMUNITY (EN 55024:1998+A1:2001+A2:2003)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2: 2001	Electrostatic discharge immunity test	<b>PASS</b>	Meets the requirements of Performance Criterion B
IEC 61000-4-3: 2002 +A1:2002	Radiated, radio- frequency, electromagnetic field immunity test	<b>PASS</b>	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 1995 + A1:2000+A2:2001	Electrical fast transient / burst immunity test.	<b>PASS</b>	Meets the requirements of Performance Criterion A
IEC 61000-4-5: 2001	Surge immunity test	<b>PASS</b>	Meets the requirements of Performance Criterion A
IEC 61000-4-6: 2003 +A1:2004	Immunity to conducted disturbances, induced by radio-frequency fields	<b>PASS</b>	Meets the requirements of Performance Criterion A
IEC 61000-4-8: 2001	Power frequency magnetic field immunity test.	<b>PASS</b>	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests	<b>PASS</b>	Meets the requirements of Voltage Dips: 1. >95% reduction - Performance Criterion A 2. 30% reduction - Performance Criterion A Voltage Interruptions: 1. >95% reduction - Performance Criterion B

## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

Measurement	Value
Conducted emissions	2.53 dB
Radiated emissions (30MHz-1GHz)	3.46 dB



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	LevelOne FCS-1040 P/T/Z IP Camera
<b>MODEL NO.</b>	FCS-1040
<b>POWER SUPPLY</b>	Power Adapter, Class I
<b>POWER CORD</b>	DC output cable (Unshielded, 1.8m, with one core)
<b>DATA CABLE SUPPLIED</b>	NA
<b>I/O PORT</b>	Video Port Audio Port RJ45 Port

**NOTE:**

1. The EUT must be supplied with a power adapter as below :

<b>Adapter 1:</b>	
Brand:	DVE
Model No.:	DSA-0151F-12 U
Input power :	AC100-240V ~50/60Hz 0.4A
Output power :	DC +12V/1.5A (unshielded 1.8m; with core)
<b>Adapter 2: (the adapter is as same as DSA-0151F-12 U, except for plug shape of UK)</b>	
Brand:	DVE
Model No.:	DSA-0151F-12 K
Input power :	AC100-240V ~50/60Hz 0.4A
Output power :	DC +12V/1.25A (unshielded 1.8m; with core)

2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

#### 3.2 DESCRIPTION OF TEST MODES

The EUT was tested under following test modes:

Mode 1 : With LAN Ping Mode

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of IT equipment and, according to the specifications of the manufacturers, must comply with the requirements of the following standards:

EN 55022:1994+A1:1995 +A2:1997, Class B	EN 55024:1998+A1:2001 +A2:2003
EN 61000-3-2: 2000, Class A	IEC 61000-4-2:2001
EN 61000-3-3: 1995+A1: 2001	IEC 61000-4-3:2002+A1:2002
	IEC 61000-4-4:1995+A1:2000 +A2:2001
	IEC 61000-4-5:2001
	IEC 61000-4-6:2003+A1:2004
	IEC 61000-4-8:2001
	IEC 61000-4-11:2004

All tests have been performed and recorded as per the above standards.

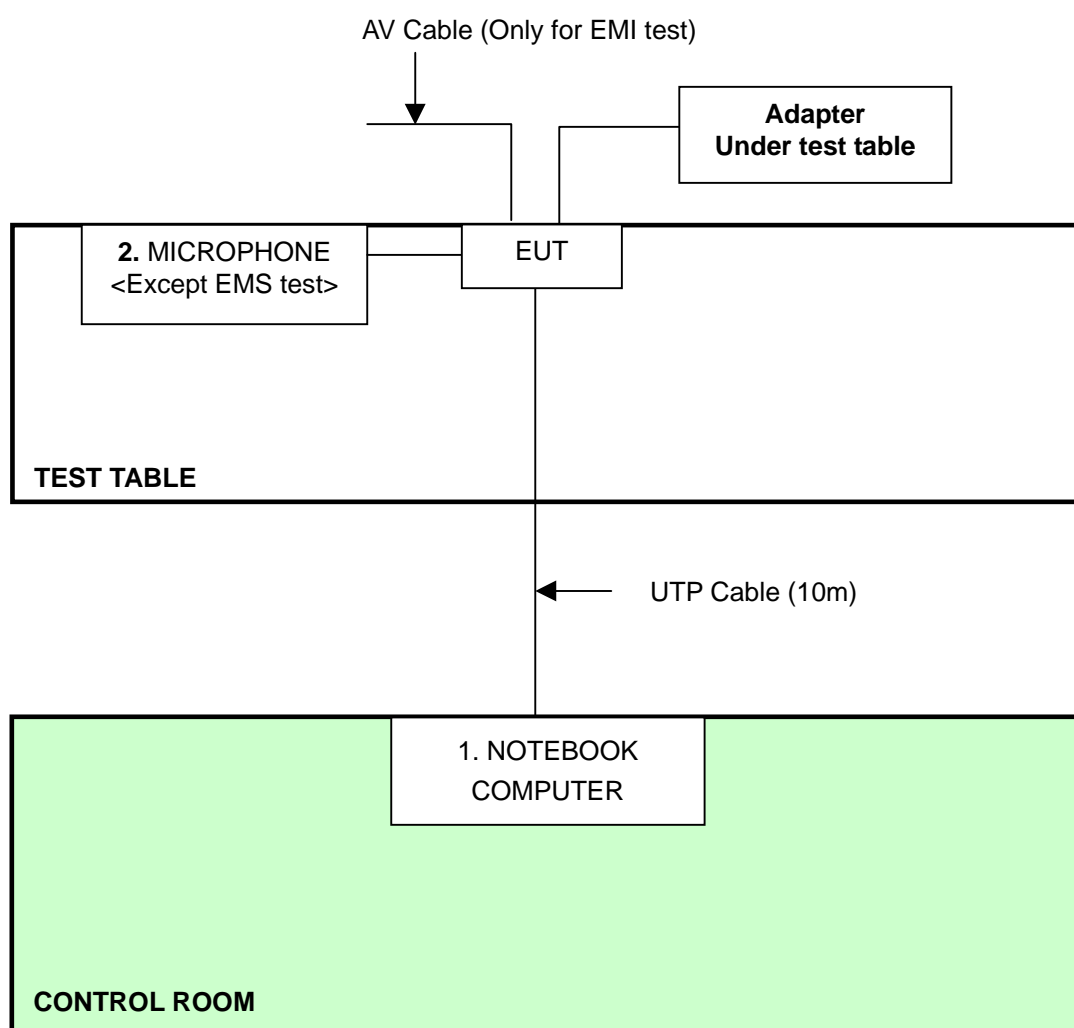
### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook Computer	ASUS	A2400H	49NG038481	NA
2	MICROPHONE	KOKA	DM-510	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

**NOTE:** All power cords of the above support units are non-shielded (1.8m).



**NOTE:** 1. Support unit 1 was kept in the control room during the test.  
2. Please refer to the photos of test configuration in Item 5 also.

## 4 EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- NOTE:**
- (1) The lower limit shall apply at the transition frequencies.
  - (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  - (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	847124/029	Dec. 07, 2005
ROHDE & SCHWARZ LISN (for EUT)	ESHS-Z5	848773/004	Nov. 08, 2005
KYORITSU LISN (for peripheral)	KNW-407	8/1395/12	Jul. 23, 2005
RF Cable (JETBAO)	RG233/U	Cable_CA_01	Jul. 02, 2005
Terminator(for KYORITSU)	50	3	May 10, 2005
Software	Cond-V2e	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in ADT Shielded Room No. A.
  3. The VCCI Con A Registration No. is C-817.

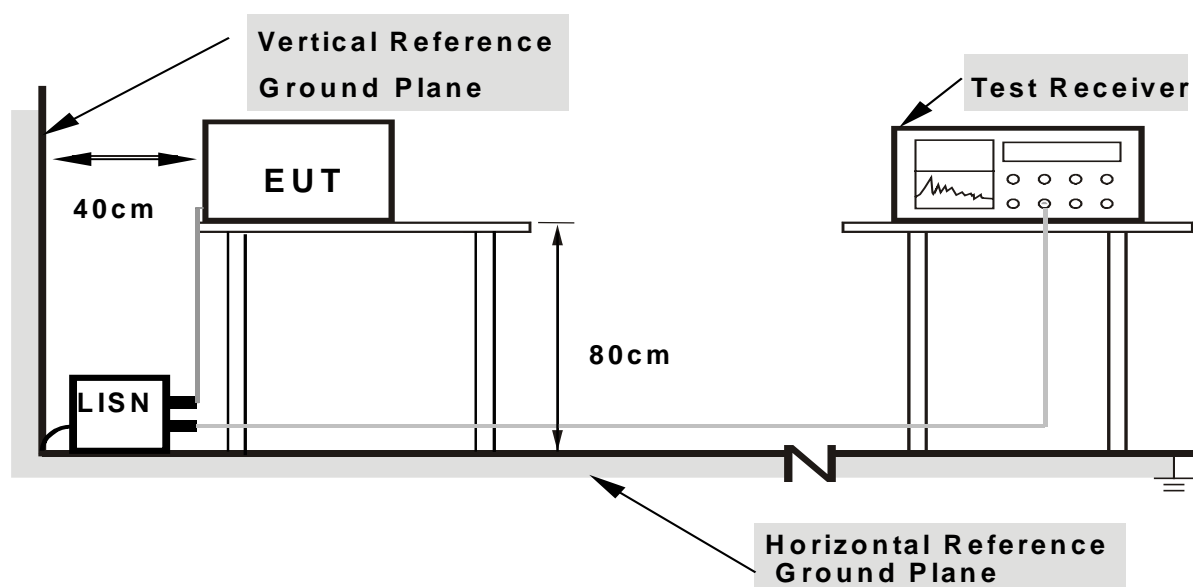
### 4.1.3 TEST PROCEDURE

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported.

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.1.5 TEST SETUP



- Note:**
- Support units were connected to second LISN.
  - Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### **4.1.6 EUT OPERATING CONDITIONS**

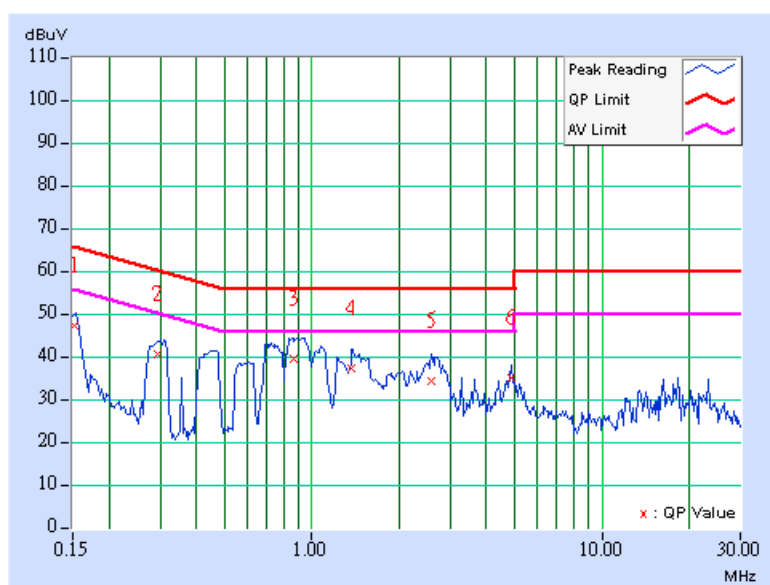
- a. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run “Ping.exe” test program to enable EUT under transmission/receiving condition continuously via UTP cable.

## 4.1.7 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	230Vac, 50 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 85 % RH, 976 hPa	<b>TESTED BY</b>	Wen Yu

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.153	9.47	37.83	-	47.30	-	65.85	55.85	-18.55	-
2	0.295	9.20	31.45	-	40.65	-	60.40	50.40	-19.74	-
<b>3</b>	<b>0.861</b>	<b>9.22</b>	<b>30.32</b>	-	<b>39.54</b>	-	<b>56.00</b>	<b>46.00</b>	<b>-16.46</b>	-
4	1.377	9.24	28.11	-	37.35	-	56.00	46.00	-18.65	-
5	2.595	9.27	25.07	-	34.34	-	56.00	46.00	-21.66	-
6	4.859	9.41	25.66	-	35.07	-	56.00	46.00	-20.93	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

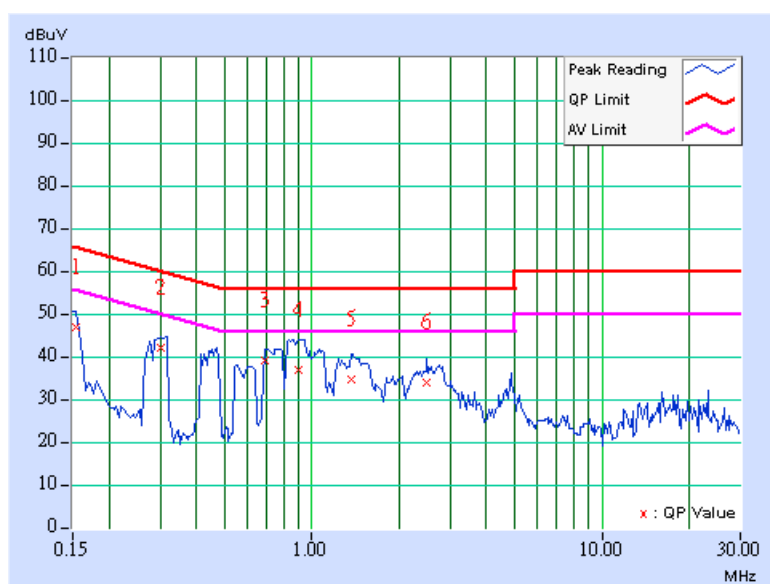




<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	230Vac, 50 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 85 % RH, 976 hPa	<b>TESTED BY</b>	Wen Yu

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	9.19	37.79	-	46.98	-	65.77	55.77	-18.78	-
2	0.302	9.21	32.90	-	42.11	-	60.18	50.18	-18.07	-
3	0.689	9.20	30.03	-	39.23	-	56.00	46.00	-16.77	-
4	0.896	9.20	27.82	-	37.02	-	56.00	46.00	-18.98	-
5	1.365	9.24	25.44	-	34.68	-	56.00	46.00	-21.32	-
6	2.502	9.34	24.57	-	33.91	-	56.00	46.00	-22.09	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

- NOTE:**
- (1) The lower limit shall apply at the transition frequencies.
  - (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
  - (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8590L	3647U00646	May 04, 2005
*ADVANTEST Spectrum Analyzer	R3271A	85060311	Jun. 29, 2005
CHASE RF Pre_Amplifier	CPA9232	1056	Jun 03, 2005
*HP Pre_Amplifier	8449B	3008A01922	Oct. 13, 2005
*ROHDE & SCHWARZ Test Receiver	ESVS 30	841977/002	Oct. 12, 2005
*CHASE Broadband Antenna	CBL6111C	2730	Jun. 03, 2005
*Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Sep. 23, 2005
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 31, 2006
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 26, 2006
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 26, 2006
*RF Switches	MP59B	6100175593	Jul. 16, 2005
*RF Cable(CHASE)	9913-30M N-N Cable	STBCAB-30M- 1GHz-021	Jul. 16, 2005
*Software	ADT_Radiated_V 5.14	NA	NA
*CHANCE MOST Antenna Tower	AT-100	CM-A007	NA
*CHANCE MOST Turn Table	TC-008	CM-T007	NA
*CORCOM AC Filter	MRI2030	024/019	NA

Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Periodic Antenna) and the calibrations are traceable to NML/ROC and NIST/USA.

2. \* = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. B.
5. The VCCI Site Registration No. is R-847.
6. The FCC Site Registration No. is 92753.
7. The CANADA Site Registration No. is IC 4824-2.

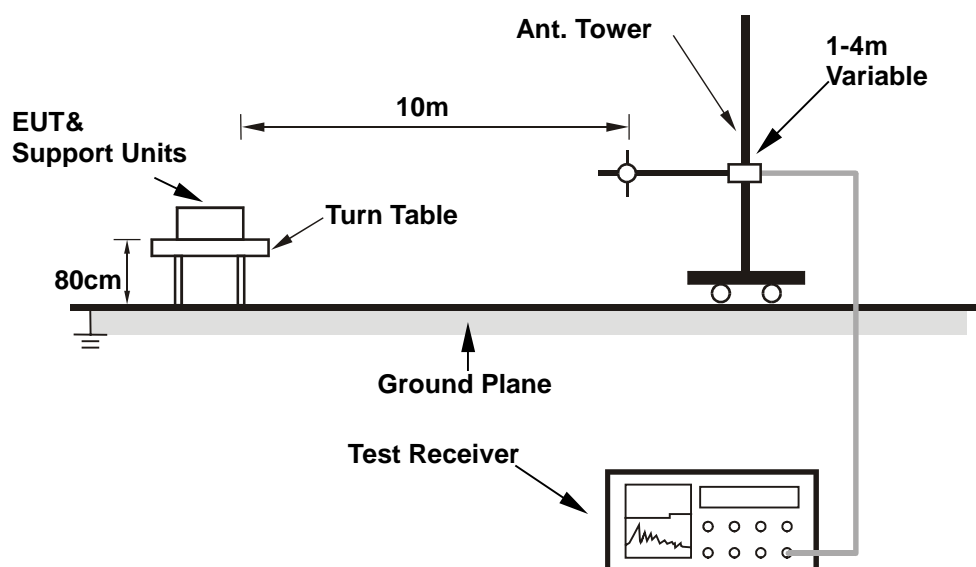
### 4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10-meter open field site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi- peak method or average method as specified and then reported In Data sheet peak mode and QP mode.

### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

## 4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

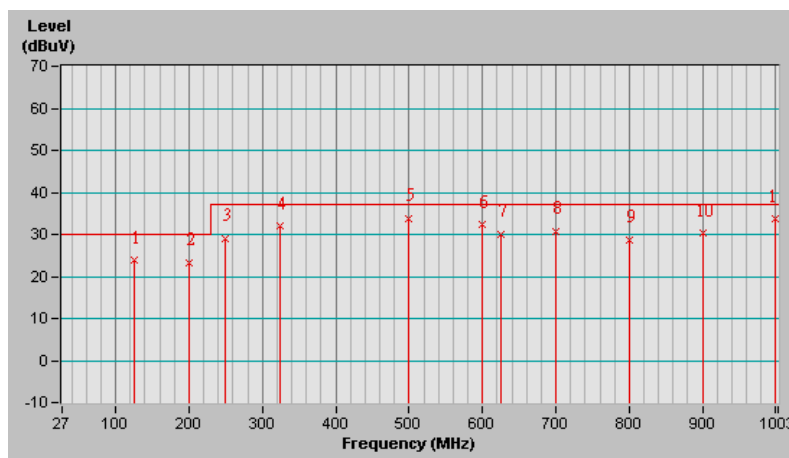
## 4.2.7 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	230Vac, 50 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 89% RH, 976 hPa	<b>TESTED BY</b>	Phoenix Huang

### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	125.05	23.80 QP	30.00	-6.20	4.00 H	118	11.80	11.90
2	200.00	23.40 QP	30.00	-6.60	4.00 H	216	13.20	10.20
3	250.13	29.00 QP	37.00	-8.00	4.00 H	97	15.40	13.60
4	324.30	31.90 QP	37.00	-5.10	2.50 H	144	15.70	16.20
5	499.99	33.70 QP	37.00	-3.30	2.36 H	52	12.60	21.10
6	600.00	32.20 QP	37.00	-4.80	1.63 H	321	9.10	23.10
7	625.00	30.10 QP	37.00	-6.90	1.42 H	245	6.70	23.40
8	700.00	30.60 QP	37.00	-6.40	1.31 H	191	6.50	24.10
9	800.00	28.80 QP	37.00	-8.20	1.00 H	152	3.20	25.60
10	900.00	30.20 QP	37.00	-6.80	1.00 H	123	3.30	26.90
11	1000.00	33.60 QP	37.00	-3.40	1.00 H	329	5.00	28.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.

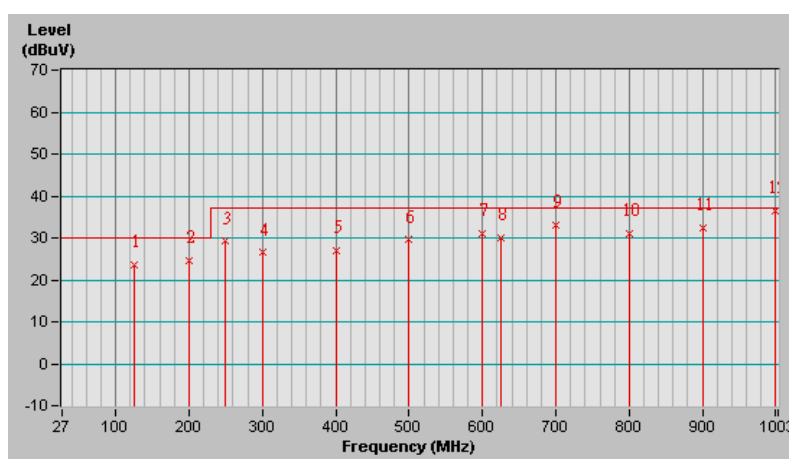


<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	230Vac, 50 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 89% RH, 976 hPa	<b>TESTED BY</b>	Phoenix Huang

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	125.10	23.50 QP	30.00	-6.50	1.00 V	261	11.60	11.90
2	200.00	24.60 QP	30.00	-5.40	1.00 V	208	14.40	10.20
3	250.13	29.20 QP	37.00	-7.80	1.00 V	265	15.60	13.60
4	300.00	26.50 QP	37.00	-10.50	1.00 V	33	10.70	15.80
5	400.00	26.90 QP	37.00	-10.10	1.00 V	212	8.20	18.70
6	499.99	29.60 QP	37.00	-7.40	1.59 V	260	8.50	21.10
7	600.00	31.10 QP	37.00	-5.90	2.92 V	268	8.00	23.10
8	624.99	30.00 QP	37.00	-7.00	2.50 V	77	6.60	23.40
9	700.00	33.00 QP	37.00	-4.00	2.62 V	250	8.90	24.10
10	800.00	31.10 QP	37.00	-5.90	2.29 V	177	5.50	25.60
11	900.10	32.40 QP	37.00	-4.60	2.24 V	213	5.40	26.90
12	999.98	36.50 QP	37.00	-0.50	1.85 V	313	7.90	28.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.



## 4.3 HARMONICS CURRENT MEASUREMENT

### 4.3.1 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	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

**NOTE:** 1. The classifications of equipment are defined in Section 5 of EN 61000-3-2:2000.

2. The above limits for all equipment except for lighting equipment are for all applications having an active input power > 75 W. No limits apply for equipment with an active input power up to and including 75 W.

### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
EMC PARTNER EMC Emission Tester	HAR1000	086	Jan. 12, 2006

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS room.

### 4.3.3 TEST PROCEDURE

- a. 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.
- b. The classification of EUT is according to section 5 of EN 61000-3-2: 2000.

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.

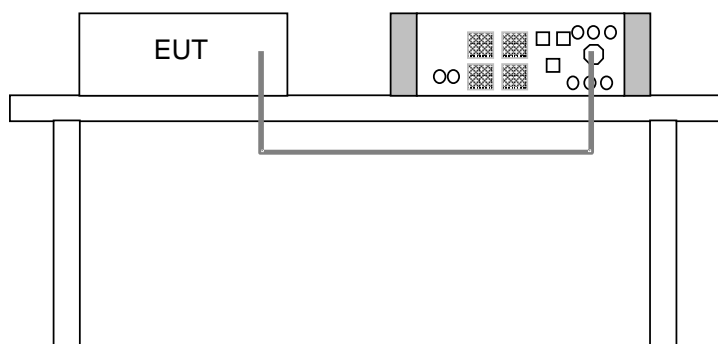
Class B: Portable tools.; Arc welding equipment which is not professional equipment

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.

- c. 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.

### 4.3.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 4.3.5 EUT OPERATING CONDITIONS

Same as 4.1.6



### 4.3.6 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>POWER FREQUENCY</b>	49.818 Hz
<b>FUNDAMENTAL VOLTAGE/AMPERE</b>	229.7 Vrms / 0.104 Arms	<b>POWER FACTOR</b>	0.405
<b>POWER CONSUMPTION</b>	9.719 W	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 44 % RH, 976 hPa
<b>TESTED BY</b>	Kevin Huang		

1. Limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment).
2. According to EN 61000-3-2: 2000 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits.

The specified power shall be within +/-10% of the measured power.

## 4.4 VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

### 4.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

TEST ITEM	LIMIT	NOTE
$P_{st}$	0.471	$P_{st}$ means short-term flicker indicator.
$P_{lt}$	0.471	$P_{lt}$ means long-term flicker indicator.
$T_{dt}$ (ms)	500	$T_{dt}$ means maximum time that dt exceeds 3.3 %.
$d_{max}$ (%)	4%	$d_{max}$ means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

### 4.4.2 TEST INSTRUMENTS

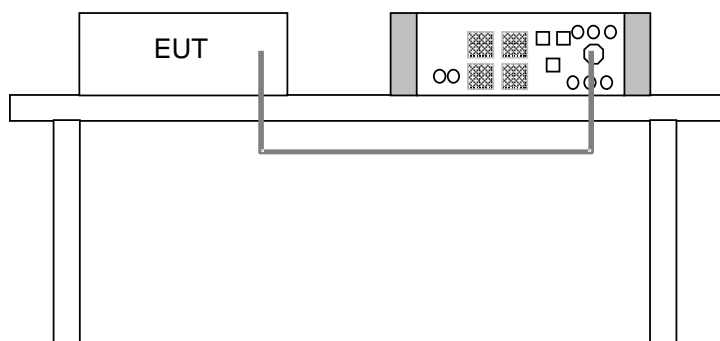
Description & Manufacturer	Model No.	Serial No.	Calibrated Until
EMC PARTNER EMC Emission Tester	HAR1000	086	Jan. 12, 2006

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS room.

### 4.4.3 TEST PROCEDURE

- 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.

#### 4.4.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.4.5 EUT OPERATING CONDITIONS

Same as 4.1.6

#### 4.4.6 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>POWER FREQUENCY</b>	49.831 Hz
<b>FUNDAMENTAL VOLTAGE/AMPERE</b>	229.7 Vrms / 0.103 Arms	<b>POWER FACTOR</b>	0.412
<b>OBSERVATION PERIOD (TP)</b>	10 min.	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 44 % RH, 976 hPa
<b>TESTED BY</b>	Kevin Huang		

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
$P_{st}$	0.209	1.00	Pass
$P_{lt}$	0.209	0.65	Pass
$T_{dt}$ (ms)	0.00	500	Pass
$d_{max}$ (%)	0.00	4%	Pass
dc (%)	0.00	3.3%	Pass

**NOTE:** (1)  $P_{st}$  means short-term flicker indicator.  
 (2)  $P_{lt}$  means long-term flicker indicator.  
 (3)  $T_{dt}$  means maximum time that dt exceeds 3.3 %.  
 (4)  $d_{max}$  means maximum relative voltage change.  
 (5) dc means relative steady-state voltage change.

## 5 IMMUNITY TEST

### 5.1 GENERAL DESCRIPTION

<b>Product Standard:</b>	<b>EN 55024:1998+A1:2001+A2:2003</b>	
<b>Basic Standard, Specification, and Performance Criteria:</b>	IEC 61000-4-2	Electrostatic Discharge - ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test - RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 1kV, Signal line: 0.5kV, Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power Line - 1 kV, line to earth - 2kV, Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test - CS: 0.15-80 MHz, 3V, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion B
	IEC 61000-4-11	Voltage Dips: i) >95% reduction -0.5 period, Performance Criteria B ii) 30% reduction - 25 period, Performance Criterion C Voltage Interruptions: i) >95% reduction - 250 period, Performance Criterion C

## 5.2 GENERAL PERFORMANCE CRITERIA DESCRIPTION

According to Clause 7.1 of EN 55024 standard, the following describes the general performance criteria.

<b>CRITERION A</b>	The equipment shall continue 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 equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, 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.
<b>CRITERION B</b>	After the test, the equipment shall continue 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 equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state if stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, 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.
<b>CRITERION C</b>	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

## 5.3 EUT OPERATING CONDITION

Same as 4.1.6

## 5.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

### 5.4.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-2
<b>Discharge Impedance:</b>	330 ohm / 150 pF
<b>Discharge Voltage:</b>	Air Discharge – 2, 4 kV (Direct) Contact Discharge – 2, 4, 8 kV (Direct/Indirect)
<b>Polarity:</b>	Positive / Negative
<b>Number of Discharge:</b>	Air Discharge: min. 20 times at each test point Contact Discharge: min. 50 times at each test point
<b>Discharge Mode:</b>	Single Discharge
<b>Discharge Period:</b>	1-second minimum

### 5.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
NoiseKen, ESD Simulator	ESS-100L(A)	0189C01491	Jun. 30, 2005

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in ESD room.

### 5.4.3 TEST PROCEDURE

The discharges shall be applied in two ways:

- a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

- b. Air discharges at slots and apertures and insulating surfaces:

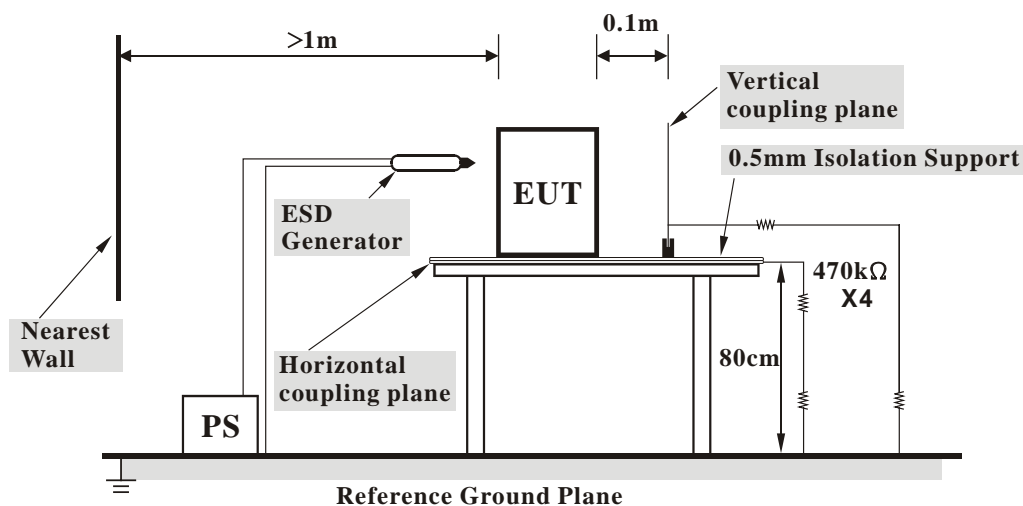
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. 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.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** 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.



## 5.4.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### NOTE:

#### TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

#### FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

## 5.4.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50 % RH, 976 hPa	<b>TESTED BY</b>	Rock Su

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4	+/-	1	Note (2)	NA	B
2, 4, 8	+/-	2 ~ 3	NA	Note (1)	A
2, 4, 8	+/-	4 ~ 6	NA	Note (2)	B

### Description of test point (Please refer to ESD test photo):

- |                    |                     |
|--------------------|---------------------|
| 1. RJ-45 connector | 2. Junction of case |
| 3. Opening         | 4. Power connector  |
| 5. MIC connector   | 6. AV out connector |

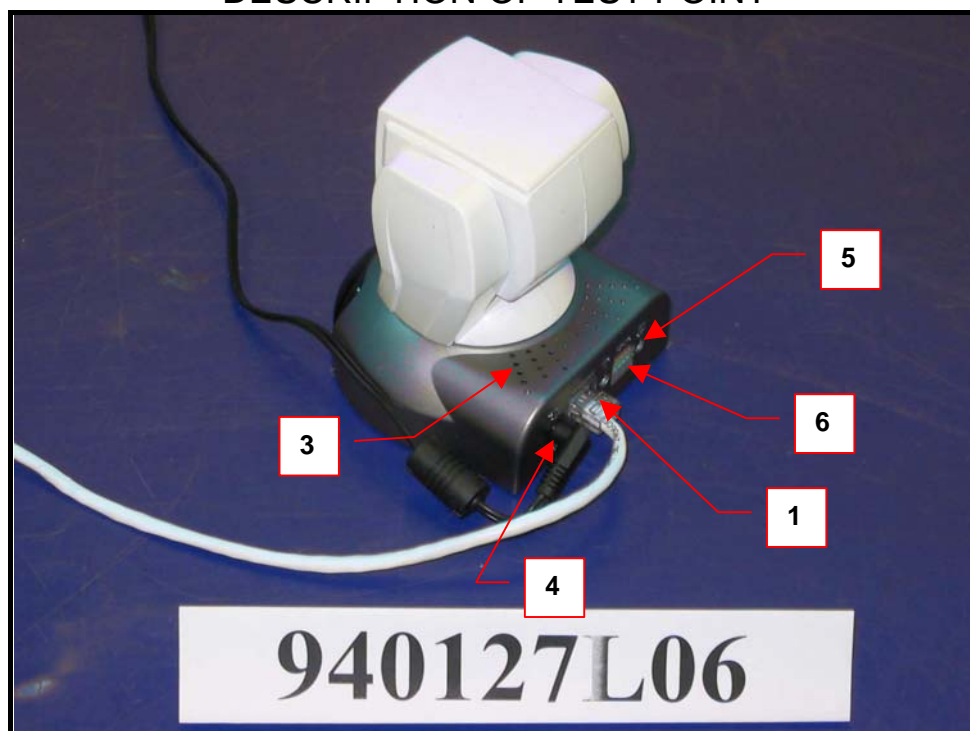
TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	1 ~ 4	Note (1)	Note (1)	A

### Description of test point:

- |               |               |              |              |
|---------------|---------------|--------------|--------------|
| 1. Front side | 2. Right side | 3. Left side | 4. Rear side |
|---------------|---------------|--------------|--------------|

**NOTES:** (1) There was no change compared with initial operation during the test.  
 (2) The network communication of EUT stopped suddenly and it could be recoverable in 3 mins.

## DESCRIPTION OF TEST POINT



## 5.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

### 5.5.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-3
<b>Frequency Range:</b>	80 MHz - 1000 MHz
<b>Field Strength:</b>	3 V/m
<b>Modulation:</b>	1kHz Sine Wave, 80% AM Modulation
<b>Frequency Step:</b>	1 % of fundamental
<b>Polarity of Antenna:</b>	Horizontal and Vertical
<b>Test Distance:</b>	3 m
<b>Antenna Height:</b>	1.5m
<b>Dwell Time:</b>	3 seconds

### 5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
KALMUS Power Amplifier	757LC	7889-1	NA
AR Power Amplifier	60S1G3M1	304334	NA
EMCO Bi_Log Antenna	3141	1050	NA
Schwarzbeck Antenna (Horn)	BBHA9120-D1	D123	Sep. 25, 2005
BOONTON RF Voltage Meter	4232A-01	93801	Jan. 30, 2006
R&S Signal Generator	SML03	101159	Feb. 01, 2006
Electric Field Probe	FP6001	30817	Aug. 19, 2005

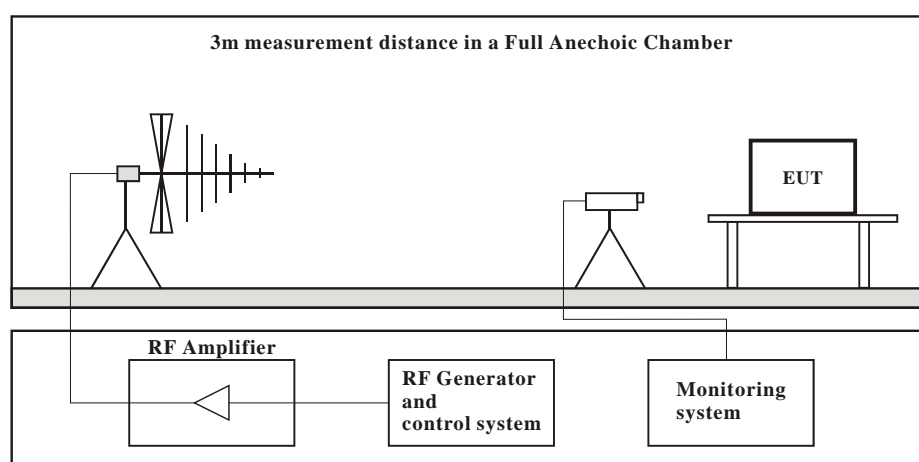
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in Chamber Room No. B.

### 5.5.3 TEST PROCEDURE

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  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The field strength level was 3V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

### 5.5.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### NOTE:

##### TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

##### FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

## 5.5.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 53 % RH, 976 hPa	<b>TESTED BY</b>	Duke Tseng

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

**NOTE:** There was no change compared with the initial operation during the test.

## 5.6 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

### 5.6.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-4
<b>Test Voltage:</b>	Power Line - 1 kV Signal/Control Line - 0.5kV
<b>Polarity:</b>	Positive/Negative
<b>Impulse Frequency:</b>	5 kHz
<b>Impulse Wave shape :</b>	5/50 ns
<b>Burst Duration:</b>	15 ms
<b>Burst Period:</b>	300 ms
<b>Test Duration:</b>	Not less than 1 min.

### 5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC PARTNER, TRANSIENT	TRA1Z332N	683	Oct. 14, 2005
EMS Simulator	MX-15/EC	9906323	Feb. 28, 2006
EMC PARTNER, CDN-UTP8	CDN-UTP8	012	Oct. 26, 2005

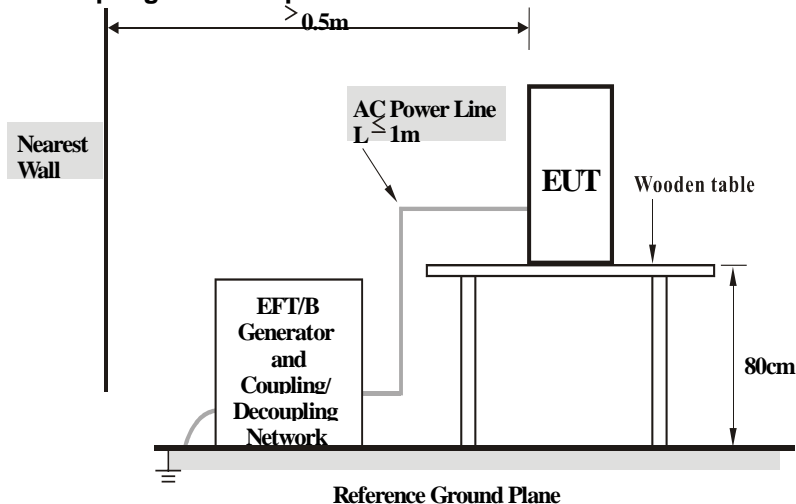
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS room B.

### 5.6.3 TEST PROCEDURE

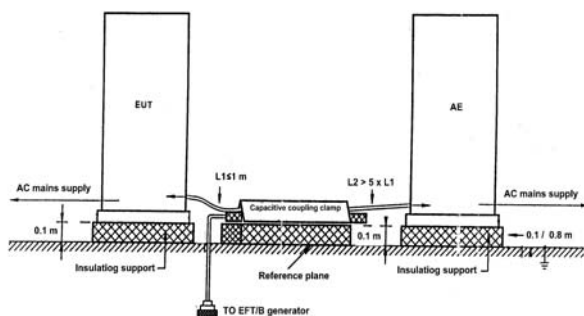
- The EUT was tested with 1000 volt discharges to the AC power input leads and 500 volt discharges to the interconnect cables.
- Both positive and negative polarity discharges were applied.
- The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

## 5.6.4 TEST SETUP

### a. Direct Coupling Test Setup



### b. Capacitive Clamp Test Setup (if any)



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### NOTE:

##### TABLETOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

##### FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.



## 5.6.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50 % RH, 976 hPa	<b>TESTED BY</b>	Rock Su

### I. POWER PORT

<b>VOLTAGE (kV)</b>	<b>TEST POINT</b>	<b>POLARITY (+/-)</b>	<b>OBSERVATION</b>	<b>PERFORMANCE CRITERION</b>
1	L1	+/-	Note (1)	A
1	L2	+/-	Note (1)	A
1	L1-L2	+/-	Note (1)	A

**NOTES:**(1) There was no change compared with the initial operation during the test.

## 5.7 SURGE IMMUNITY TEST

### 5.7.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-5
<b>Wave-Shape:</b>	Combination Wave
	1.2/50 us Open Circuit Voltage
	8 /20 us Short Circuit Current
<b>Test Voltage:</b>	Power Line - 1 kV
<b>Surge Input/Output:</b>	L1-L2
<b>Generator Source</b>	2 ohm between networks
<b>Impedance:</b>	
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle (degree):</b>	0 / 90 / 180 / 270
<b>Pulse Repetition Rate:</b>	1 time / min. (maximum)
<b>Number of Tests:</b>	5 positive and 5 negative at selected points

### 5.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC PARTNER, TRANSIENT	TRA1Z332N	683	Oct. 14, 2005
EMS Simulator	MX-15/EC	9906323	Feb. 28, 2006
EMC PARTNER, CDN-UTP8	CDN-UTP8	012	Oct. 26, 2005
Surge Adapter (EMCPartner)	NA	SU1ADA-002	NA
Surge Cable (EMCPartner)	NA	SU1Cab-001	NA
Surge Cable (EMCPartner)	NA	SU1Cab-002	NA

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS room B.

### 5.7.3 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

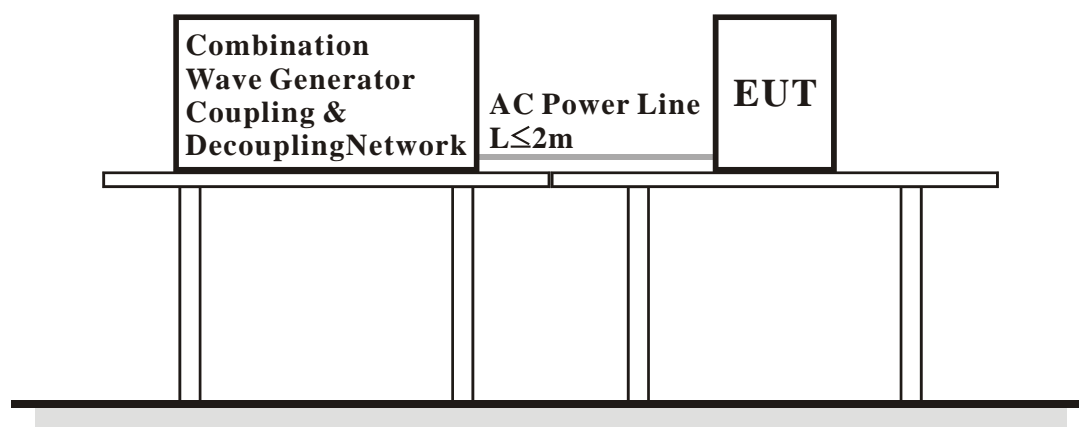
b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

### 5.7.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 5.7.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 56 % RH, 976 hPa	<b>TESTED BY</b>	Kevin Huang

### POWER PORT

<b>VOLTAGE (kV)</b>	<b>TEST POINT</b>	<b>POLARITY (+/-)</b>	<b>OBSERVATION</b>	<b>PERFORMANCE CRITERION</b>
1	L1-L2	+/-	NOTE (1)	A

**NOTE:** (1) There was no change compared with the initial operation during the test.

## 5.8 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)

### 5.8.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-6
<b>Frequency Range:</b>	0.15 MHz - 80 MHz
<b>Voltage Level:</b>	3 Vr.m.s
<b>Modulation:</b>	1kHz Sine Wave, 80% AM Modulation
<b>Frequency Step:</b>	1 % of fundamental
<b>Coupled Cable:</b>	Power Mains, Unshielded Signal / Control Line
<b>Coupling Device:</b>	CDN-M2 (2 wires), CDN-T4
<b>Dwell Time</b>	3 seconds

### 5.8.2 TEST INSTRUMENTS

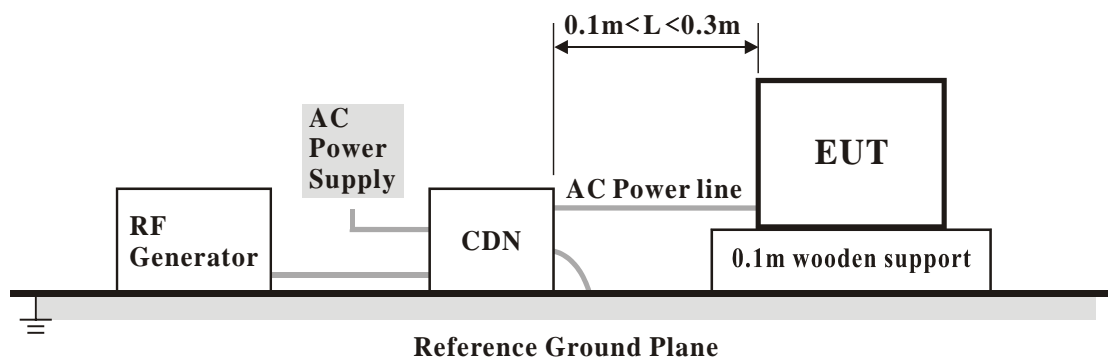
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
R&S Signal Generator	SML 01	102731	Feb. 01, 2006
AR Amplifier	75A250AM1	307297	NA
BOONTON RF Voltage Meter	4230	13302	Nov. 13, 2005
LUTHIE EM Injection Clamp	EM-101	35453	NA
FCC CDN M2	FCC-801-M2-16A	03048	Dec. 11, 2005
FCC CDN M3	FCC-801-M3-16A	03055	Dec. 11, 2005
Fischer Custom Communications Inc Coupling Decoupling Network	FCC-801-T2	02025	Oct. 07, 2005
Fischer Custom Communications Inc Coupling Decoupling Network	FCC-801-T4	02030	Oct. 07, 2005
Fischer Custom Communications Inc Coupling Decoupling Network	FCC-801-T8	02036	Oct. 07, 2005

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in Chamber Room No. B.

### 5.8.3 TEST PROCEDURE

- The EUT shall be tested within its intended operating and climatic conditions.
- 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.
- The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed  $1.5 \times 10^{-3}$  decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of the preceding frequency value where the frequency is swept incrementally.
- 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 such as clock frequency(ies) and harmonics or frequencies of dominant interest, shall be analyzed separately.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

### 5.8.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### NOTE:

#### FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

## 5.8.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 53 % RH, 976 hPa	<b>TESTED BY</b>	Duke Tseng

### FOR MAINS POWER:

Frequency (MHz)	Voltage Level (Vr.m.s.)	Cable	Injection Method	Observation	Performance Criterion
0.15 –80	3	AC power line	CDN-M2	Note (1)	A

### FOR SIGNAL / CONTROL LINE:

Frequency (MHz)	Voltage Level (Vr.m.s.)	Cable	Injection Method	Observation	Performance Criterion
0.15 –80	3	RJ-45	CDN-T4	Note (1)	A

**NOTE:** (1) There is no change compared with the initial operation during the test.

## 5.9 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

### 5.9.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-8
<b>Frequency Range:</b>	50Hz
<b>Field Strength:</b>	1 A/m
<b>Observation Time:</b>	1 minute
<b>Inductance Coil:</b>	Helmholtz coil, diameter 1.5m

### 5.9.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
BELL, Triaxial Elf Magnetic Field Meter	4090	NA	Dec. 10, 2005
MONTENA, Helmholtz Coil	HC150-360	NA	NA

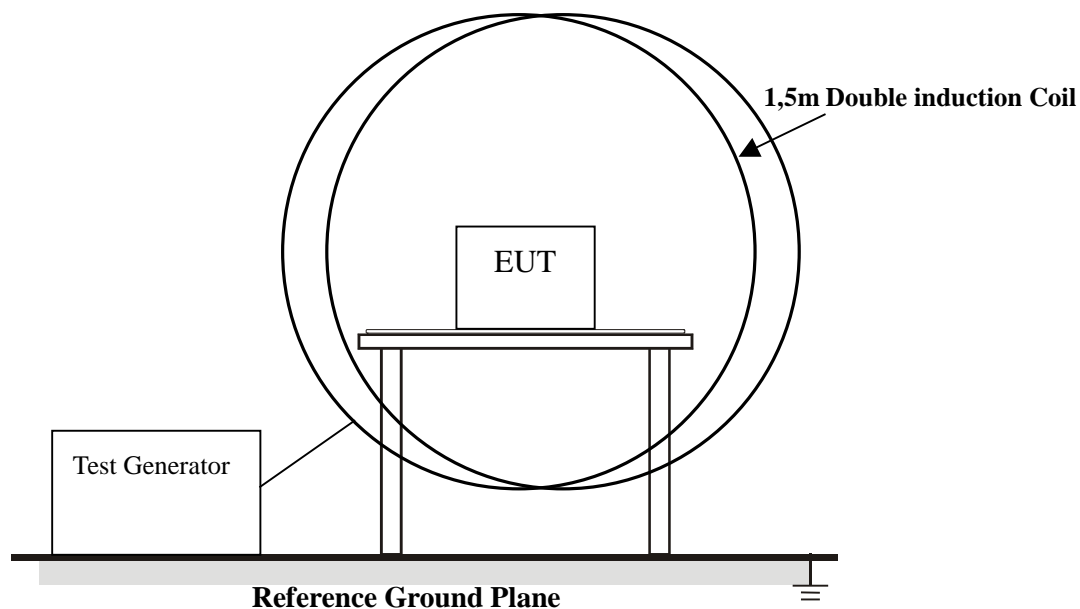
**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS room.

### 5.9.3 TEST PROCEDURE

- d. The equipment is 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.
- e. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- f. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- g. 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.



## 5.9.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### NOTE:

#### TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (diameter 1.5m). The EUT placement shall then be rotated by 90 degrees in order to expose to the test field with different orientations.

## 5.9.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 56 % RH, 976 hPa	<b>TESTED BY</b>	Kevin Huang

<b>DIRECTION</b>	<b>RESULTS</b>	<b>OBSERVATION</b>	<b>PERFORMANCE CRITERION</b>
X	PASS	Note	A
Y	PASS	Note	A
Z	PASS	Note	A

**NOTE:** There was no change compared with the initial operation during the test.

## 5.10 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST

### 5.10.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-11
<b>Test Duration Time:</b>	Minimum three test events in sequence
<b>Interval between Event:</b>	Minimum ten seconds
<b>Phase Angle (degree):</b>	0 / 45 / 90 / 135 / 180 / 225 / 270 / 315
<b>Test Cycle:</b>	3 times

### 5.10.2 TEST INSTRUMENTS

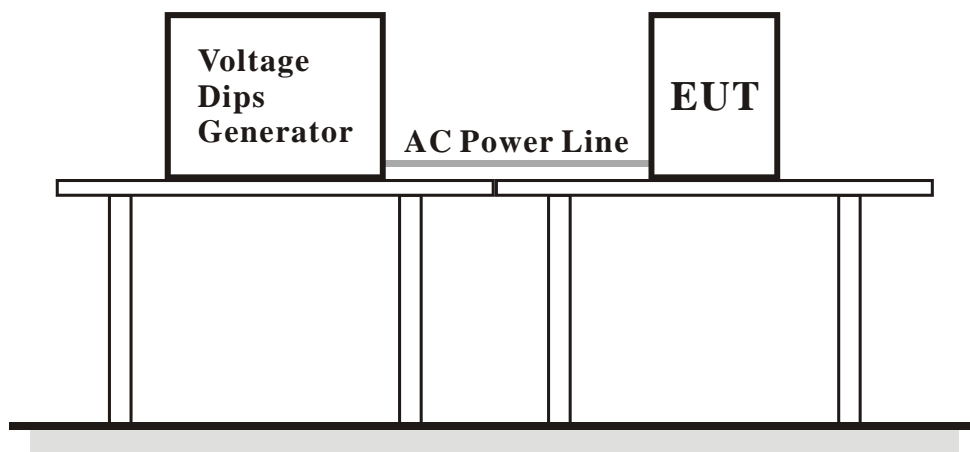
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC PARTNER, TRANSIENT	TRA1Z332N	683	Oct. 14, 2005
EMS Simulator	MX-15/EC	9906323	Feb. 28, 2006
EMC PARTNER, CDN-UTP8	CDN-UTP8	012	Oct. 26, 2005
Surge Adapter (EMCPartner)	NA	SU1ADA-002	NA
Surge Cable (EMCPartner)	NA	SU1Cab-001	NA
Surge Cable (EMCPartner)	NA	SU1Cab-002	NA

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS room B.

### 5.10.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of tree dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

#### 5.10.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 5.10.5 TEST RESULTS

<b>EUT</b>	LevelOne FCS-1040 P/T/Z IP Camera	<b>MODEL</b>	FCS-1040
<b>TEST MODE</b>	Mode 1	<b>INPUT POWER</b>	230Vac/100Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 56 % RH, 976 hPa	<b>TESTED BY</b>	Kevin Huang

Input Power for testing: 230Vac, 50 Hz (Normal Voltage)				
VOLTAGE % REDUCTION	PERIODS	RESULTS	OBSERVATION	PERFORMANCE CRITERION
>95	0.5	PASS	Note (1)	A
30	25	PASS	Note (1)	A
>95	250	PASS	Note (2)	B

Input Power for testing: 100Vac, 50 Hz (Minimum Voltage)				
VOLTAGE % REDUCTION	PERIODS	RESULTS	OBSERVATION	PERFORMANCE CRITERION
>95	0.5	PASS	Note (1)	A
30	25	PASS	Note (1)	A
>95	250	PASS	Note (2)	B

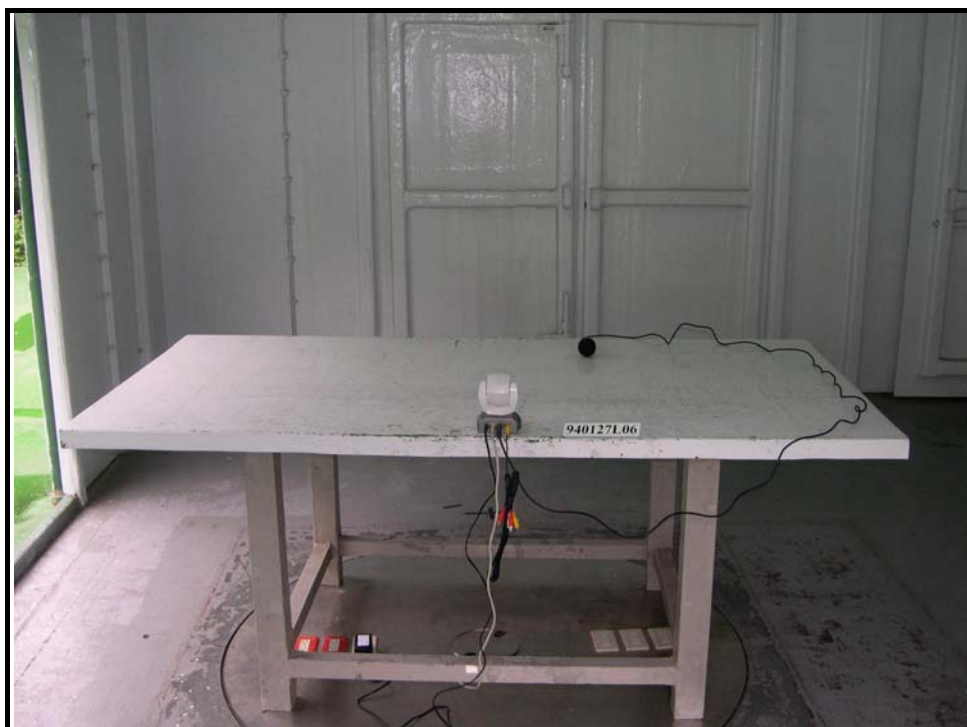
**NOTES:**(1) There was no change compared with initial operation during the test.  
(2) The EUT shut down during the test, but could be recovered to normal operation by reset.

## 6 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST



## HARMONICS EMISSION TEST & VOLTAGE FLUCTUATIONS AND FLICKER TEST



## ESD TEST





## RS TEST



## EFT TEST



## EFT TEST(RJ-45)



## SURGE & VOLTAGE DIPS AND INTERRUPTIONS TEST



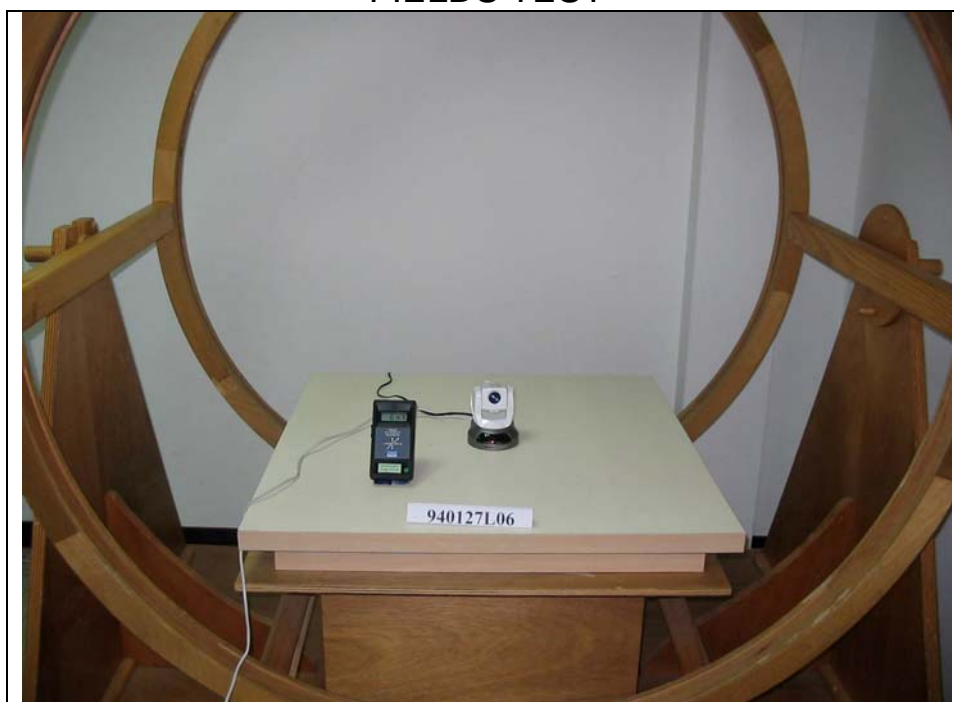
## CONDUCTED SUSCEPTIBILITY TEST



## CONDUCTED SUSCEPTIBILITY TEST(RJ-45)



## POWER-FREQUENCY MAGNETIC FIELDS TEST



## 7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

<b>USA</b>	FCC, NVLAP, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA, CSA
<b>R.O.C.</b>	CNLA, BSMI, DGT
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB, GOST-ASIA (MOU)
<b>Russia</b>	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml).  
If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab:**

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**Email:** [service@adt.com.tw](mailto:service@adt.com.tw)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.