



# CE TEST REPORT

FOR

IPC

Model : ARK-4180

Trade Name: Advantech

Issued to

Advantech Co., Ltd.

No. 1, Alley 20, Lane 26, Rueiguang Road , Neihu District, Taipei 114, Taiwan,  
R.O.C.

Issue by

Global Certification Corp.

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**APPENDIX 1**

**PHOTOS OF TEST CONFIGURATION**

**APPENDIX 2**

**TEST DATA**

**PHOTOS OF EUT**



## **1. GENERAL INFORMATION**

**Applicant** : Advantech Co., Ltd.

**Address** : No. 1, Alley 20, Lane 26, Rueiguang Road , Neihu District, Taipei 114, Taiwan, R.O.C.

**Manufacturer** : Advantech Co., Ltd.

**Address** : No. 1, Alley 20, Lane 26, Rueiguang Road , Neihu District, Taipei 114, Taiwan, R.O.C.

**EUT** : IPC

**Model Name** : ARK-4180

**Model Differences** : N/A

### **Measurement procedure used:**

#### **EMI :**

EN55022 CLASS A:1998/A1:2000/A2:2003

EN55011:1998+A1:1999+A2:2000(Group1 class A)

EN 61000-6-4 (2001): CISPR 11 Class A (1990)

EN61000-3-2:2006

EN61000-3-3:1995/A1:2001/A2:2005

#### **EMS :**

EN55024:1998/A1:2001/A2:2003

EN61000-6-2:2001

IEC 61000-4-2 (2001)

IEC 61000-4-3 (2002)

IEC 61000-4-4 (2004)

IEC 61000-4-5 (2001)

IEC 61000-4-6 (2003) + A1 (2004)

IEC 61000-4-8 (2001)

IEC 61000-4-11 (2004)

## **Deviation from Applicable Standard**

According to applicants declaration this EUT is a class A product, and to be market in industrial environment only.



## 1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT

EUT Type : ☐Proto Type ☒Engineer Type ☐Mass Production  
Condition when received : ☒Good ☐Damage :  
EUT Name : IPC  
Applicant : Advantech Co., Ltd.  
Manufacturer : Advantech Co., Ltd.  
Model Number : ARK-4180  
Serial Number : N/A  
FCC ID : N/A  
Used Power : ☒AC POWER ☒DC POWER  
Power From : ☐N/A ☐Inside ☒Outside  
☒Adaptor ☐BATTERY ☐Power Supply ☒DC Power Source  
☐Support Unit PC  
Power Supply Type : ☒Switching ☐Linear  
Power Cord : AC 230 V 50 Hz 3 Pin 1.8 m Un-Shielded  
(Adaptor Input)  
Power Cord : DC 12 V 9 Pin 1.3 m Un-Shielded  
(Adaptor Output) DC 5 V 9 Pin 1.3 m Un-Shielded  
Power Cord : DC 12 V 9 Pin 1.3 m Un-Shielded  
(EUT Input) DC 5 V 9 Pin 1.3 m Un-Shielded  
The frequency of the EUT :  
CPU : Intel Celeron ® M processor 1.00GHz  
CPU Clock : 100\*10MHz  
OSC/Clock Frequencies : 25MHz, 14.31818MHz



## **1.2 I/O PORT OF THE EUT**

I/O port type	Q'ty	Tested with	Connect type	Note
1) USB Port	2	2	Metal	
2) LAN Port	1	1	Metal	
3) PRINTER Port	1	1	Metal	
4) AUDIO Port	2	2	Plastics	
5) RS232 Port	1	1	Metal	RS-232 to USB Port
6) COM Port	2	2	Metal	

## **1.3 TEST METHODOLOGY**

### **EUT SYSTEM OPERATION**

1. The EUT was configured according to EN55022 Class A, EN55011 Class A and EN61000-6-4(CISPR11 Class A)
2. All I/O ports were connected to the appropriate peripherals.
3. Photos of test configuration please refer to appendix 1 or 1.4 Setup Diagram.
4. Turn on all the power of EUT and peripheral.
5. EUT executes "emctest.exe and loop back test program of I/O control card" and perform the EMC testing procedures.
6. During the test, "H" patterns sends to the EUT through each input port individually.
7. Monitor display "H" character , printer "H" character, modem receive "H" and return to EUT, keyboard led flash.
8. EUT links the remote PC and channels packet switching.
9. Execute read-write program to exercise the EUT under windows.
10. Perform the EMI testing procedures, and measure the maximum emission noise.

All peripherals and cables are listed below (including internal device)

### **DECISION OF FINAL TEST MODE**

#### **1. The following test mode were scanned during the preliminary test:**

Mode 1: Resolution 800\*600 (Adaptor)

Mode 2: Resolution 1024\*768(Adaptor)

Mode 3: Resolution 1600\*1200(Adaptor)

Mode 4: DC12V + DC5V : Resolution 1024\*768(DC Power Source)

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

Conduction: Mode 2

Radiation: Mode 2



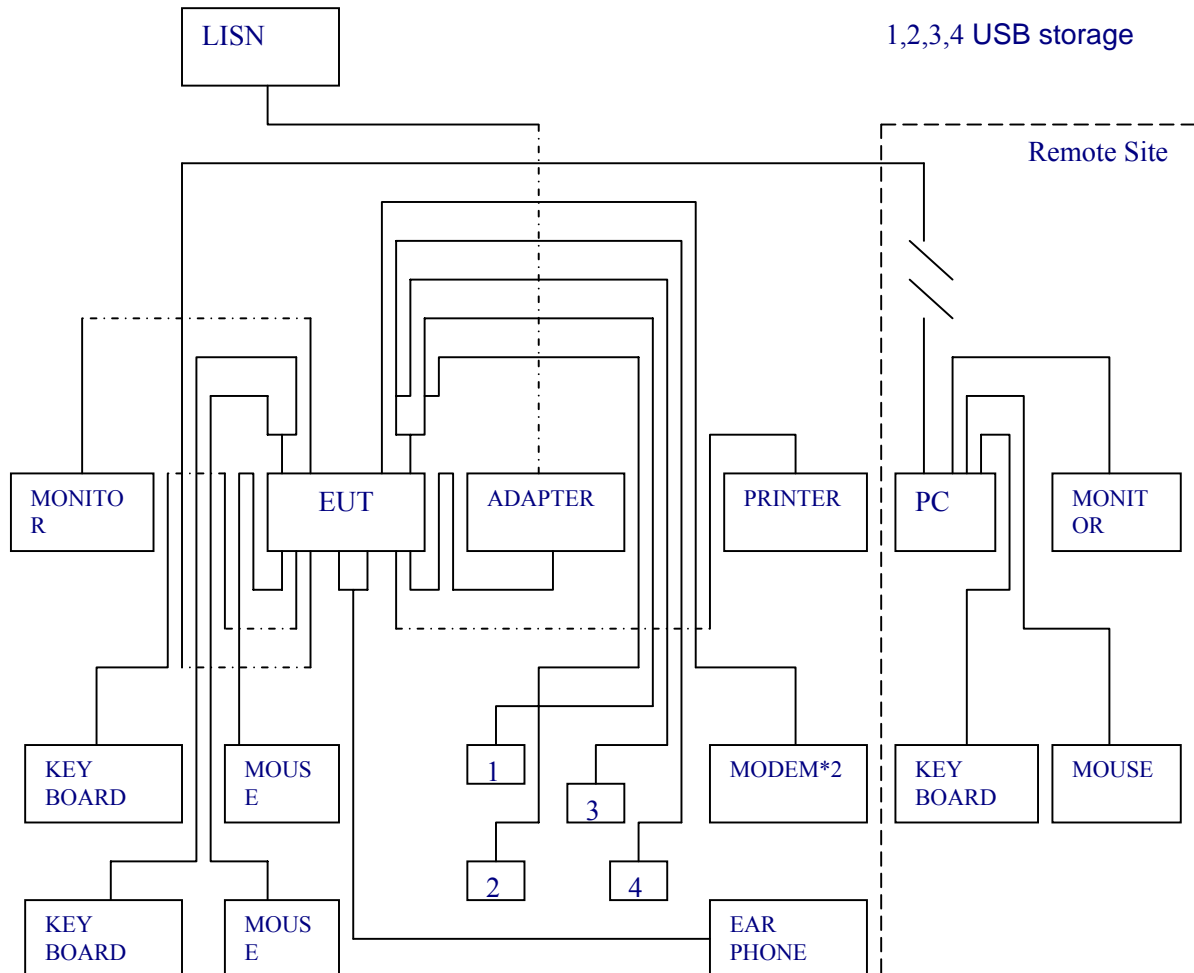
Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test item

**3. HARMONICS / FLICKER and EMS test mode is Mode 2**



## 1.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

### Setup Diagram



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

### Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1	PC	A13	L3AB112	R33B65	IBM	Unshielded 10M	Unshielded 1.8M
2	MONITOR	VCDTS2235 5-9P	25K0351006 06	3912A750	View Sonic	Shielded 1.8M	Unshielded 1.8M
3	MONITOR	200P7EB/00	BZ3A0635 323113	A3KM148/ R33048	PHILIPS	Shielded 1.8M	Unshielded 1.8M
4	PRINTER	PHOTO750	BDEK0176 29	/3872P011	EPSON	Shielded 1.8M	Unshielded 1.8M





5	MODEM	2814	N/A	IFAXDM1 414	ACEEX	Shielded RS232~1.2M	Unshielded 1.8M
6	MODEM	2814	N/A	IFAXDM1 414	ACEEX	Shielded RS232~1.2M	Unshielded 1.8M
7	MOUSE	M-S34	HCA41700 532	DEL21102 9/4862A01 1	Logitech	Shielded 1.8M~PS2	N/A
8	MOUSE	M-S34	HCA41700 531	DEL21102 9/4862A01 1	Logitech	Shielded 1.8M~PS2	N/A
9	MOUSE	E-C011-02-5 025	N/A	N/A	Microsoft	Shielded 1.8M/USB	N/A
10	KEY BOARD	KU-9978	N/A	3892B454	COMPAQ	Shielded 1.8M/USB	N/A
11	KEY BOARD	SK-8820	09149045	3912A521	IBM	Shielded 1.9M/PS2	N/A
12	KEY BOARD	RT7D00	TH-0332TR- 37171-16R- 3087	AQ6-7D00 80COB /3892C595	DELL	Shielded 1.9M/PS2	N/A
13	EAR PHONE	03-MSB301	N/A	N/A	HAWK	Unshielded 2.1M	N/A
14	DC POWER SOURCE	GPC-3030D Q	C680186	N/A	GW	DC OUT Unshielded 1M	Unshielded 1.8M
15	ADAPTER	SPU-130-20 1-1	N/A	DOC	SINPRO	N/A	Unshielded AC:1.8M DC1.3M
16	USB storage	TS2GJFV30	156511-640 0	DOC/ D33193	TRANSCEN D	Shielded 1M	N/A
17	USB storage	TS1GJFV30	153685-732 6	DOC/ D33193	TRANSCEN D	Shielded 1M	N/A
18	USB storage	TS1GJFV30	158955-157 4	DOC/ D33193	TRANSCEN D	Shielded 1M	N/A
19	USB storage	TS1GJFV30	160294-799 7	DOC/ D33193	TRANSCEN D	Shielded 1M	N/A
<b>INSIDE SUPPORT EQUIPMENT</b>							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1	Main Board-1	PCM-402	N/A	DOC	ADVANTEC H	Unshielded 1.8M	Unshielded 1.3M
2.	Main Board-2	PCM-403	N/A	DOC	Infineon	Unshielded 1.8M	N/A
3.	RAM	PC2700S-25 33	N/A	DOC	ADVANTEC H	N/A	N/A
4	Main Board-3	PCM-4180	N/A	DOC	ADVANTEC H	Unshielded 0.15M	Unshielded 0.15M

**Note:** All the above equipment/cable were placed in worse case position to maximize emission signals during emission test

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

### **1.5 FEATURES OF EUT : PLEASE REFER TO USER MANUAL OR PRODUCT SPECIFICATION.**



## **2. INSTRUMENT AND CALIBRATION**

### **2.1 MEASURING INSTRUMENT CALIBRATION**

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### **2.2 TEST AND MEASUREMENT EQUIPMENT**

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

**TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT**

Conducted Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
Test Receiver	AFJ	ER55C	55090502270	Apr.23.2008	
LISN	SCHAFFNER	NNB41	03/10015	Jun.10.2008	For EUT
LISN	EMCO	3825/2	9001-1589	Apr.09.2008	For Support Unit
RF CABLE	MIYAZAKI	5D-F8	002	May.24.2008	
50ohm Terminal	N/A	N/A	TM003	Apr,18,2008	
Impedance Stabilization	Teseq GmbH	ISN T8	23334	DEC.18.2007	
Radiated Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
Test Receiver	AFJ	ER55R	55300508277	May.20.2008	
Bilog Antenna	SUNOL	JB1	A052104	SEP.30.2008	
Turn table	EMCO	2080	9508-1805	N/A	
Controller	EMCO	2090	9804-1328	N/A	



Amplifier	G.W	GAP-801	EF150001	Jul.18.2008	
EMC Analyzer	AGILENT	E7401A	MY42000145	May.23.2008	
RF Cable	BELDEN	RG-8/U	E037	Jun.07.2008	
Thermo-Hygro meter	WISEWIND	4-IN-1	0412	Apr.10.2008	
<b>Power Harmonic Measurement and Voltage Fluctuations</b>					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
5KV AC POWER SOURCE	SCHAFFNER	NSG1007	55869	JAN,04/2008	
SIGNAL CONDITIONING	SCHAFFNER	CCN1000-1	72281	JAN,04/2008	
<b>EMS</b>					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
<b>IEC61000-4-2</b>					
Thermo-Hygro meter	WISEWIND	N/A	N/A	APR.10.2008	
ESD SIMULATOR	NOISEKEN	ESS-100L	6366876	OCT.04.2008	
<b>IEC61000-4-3</b>					
POWER METER	BOONTON	4231A	110602	SEP.09.2008	
Signal Generator	IFR	2023A	202305/561	SEP.06.2008	
Electric Field probe	ETS-LINDGREN	00029837	305650	MAY/29/2008	2 years
Power Amplifier	SCHAFFNER	CBA9413B	4039	N/A	
<b>IEC61000-4-4/ IEC61000-4-5/ IEC61000-4-8/ IEC61000-4-11</b>					
EMC Immunity Test System	EMC PARTNER AG	TRA2000IN6	739	OCT.10.2008	
EFT CLAMP	EMC PARTNER AG	CN-EFT1000	451	N/A	
TTIAXIAL ELF	SYPRIS	4090	4090070316	Apr.13.2008	



MAGNETIC FIELD METER					
ANTENNA	EMC PARTNER AG	MF-1000-1	117	OCT.11.2008	
IEC61000-4-6					
Decoupling network	Frankonia	M2+M3	A3011055	JUL.29.2008	
Decoupling network	Frankonia	RJ45	A3023009	N/A	
EM Injection Clamp	FCC	F-203I-23MM	471	AUG.08.2008	
CONDUCTED IMMUNITY TEST SYSTEM	Frankonia	CIT-10	10203233	SEP.11.2008	

✂ Calibration interval of instruments listed above is one year

## 2.3 TEST PERFORMED

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver which resolution bandwidth is set at 9KHz.

Radiated emissions were investigated over the frequency range from 30MHz to 1000MHz using a receiver which resolution bandwidth is set at 120KHz. Radiated measurement was performed at distance that from an antenna to EUT is 10 meters.

## 2.4 APPENDIX

### **Appendix A: Measurement Procedure for Main Power Port Conducted Emissions**

The measurements are performed in a Global lab's room, The EUT was placed on non-conductive 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type



specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

## **Appendix B: Test Procedure for Radiated Emissions**

### **Preliminary Measurements in the Anechoic Chamber**

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°. The antenna height is 1m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.

### **Measurements on the Open Site or Chamber**

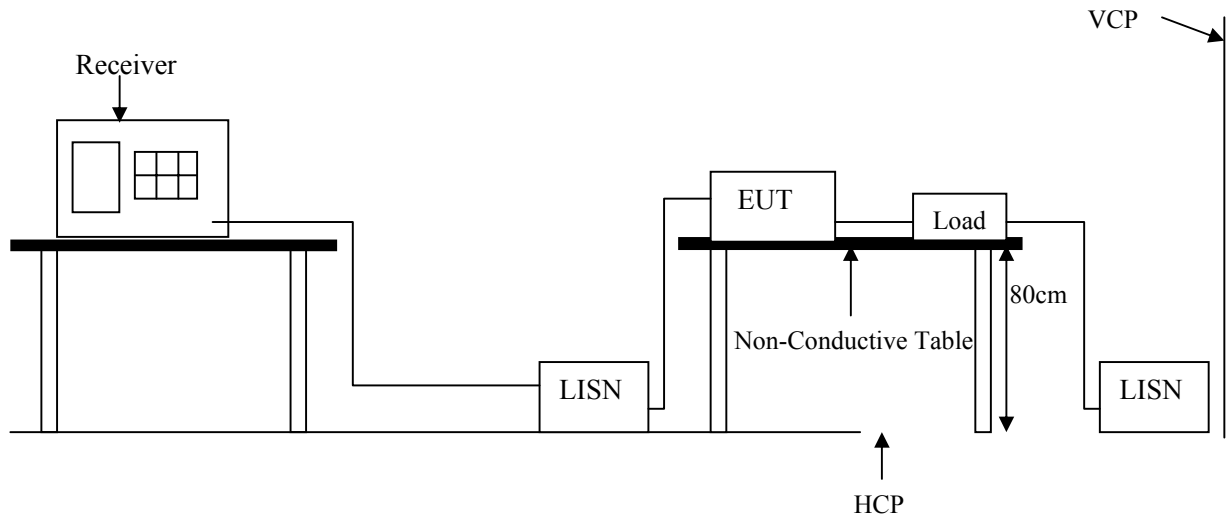
The radiated emissions test will then be repeated on the open site or chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipments are set up on the turntable. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. Both reading are recorded with the quasi-peak detector with 120KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

### 3. CONDUCTED EMISSION MEASUREMENT

#### 3.1 TEST SET-UP



#### 3.2 LIMIT

Frequency range (MHz)	CLASS A		CLASS B	
	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)
0.15-0.5	79 dBuV	66 dBuV	66 - 56 dBuV	56 - 46 dBuV
0.5-5.0	73 dBuV	60 dBuV	56 dBuV	46 dBuV
5.0-30.0	73 dBuV	60 dBuV	60 dBuV	50 dBuV

Remark: In the above table, the tighter limit applies at the band edges.

#### 3.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50  $\mu$ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50  $\mu$ H coupling impedance with 50 ohm termination. (Please refer to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55022/1998 regulation: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9KHz



### **3.4 TEST SPECIFICATION**

According to EN 55022/1998+A1:2000+A2:2003

According to EN 55011:1998+A1:1999+A2:2002(Group1 class A)

According to EN 61000-6-4 (2001): CISPR 11 Class A (1990)

### **3.5 RESULT : PASSED**

EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

### **3.6 TEST DATA:**

**Please refer to appendix 2**



### 3.7 LIMIT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS:

Frequency Range	Quasi Peak (dBuV)	Average
0.15 ~ 0.5 MHz	97 - 87	84 – 74
0.5 ~ 30 MHz	87	74

The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz for Class A.

### 3.8 RESULT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS

Frequency (MHz)		Emission Level (dBuV/m)		Limit (dBuV)		Margin (dBuV)	
QP	Average	QP	Average	QP	Average	QP	Average
0.250	0.250	58.56 *	58.56 *	92.76	79.76	-34.20	-21.20
0.310	0.310	57.44 *	57.44 *	90.97	77.97	-33.53	-20.53
0.980	0.980	56.93 *	56.93 *	87.00	74.00	-30.07	-17.07
1.650	1.650	52.43 *	52.43 *	87.00	74.00	-34.57	-21.57
15.620	15.620	46.01 *	46.01 *	87.00	74.00	-40.99	-27.99
19.710	19.710	59.12 *	59.12 *	87.00	74.00	-27.88	-14.88

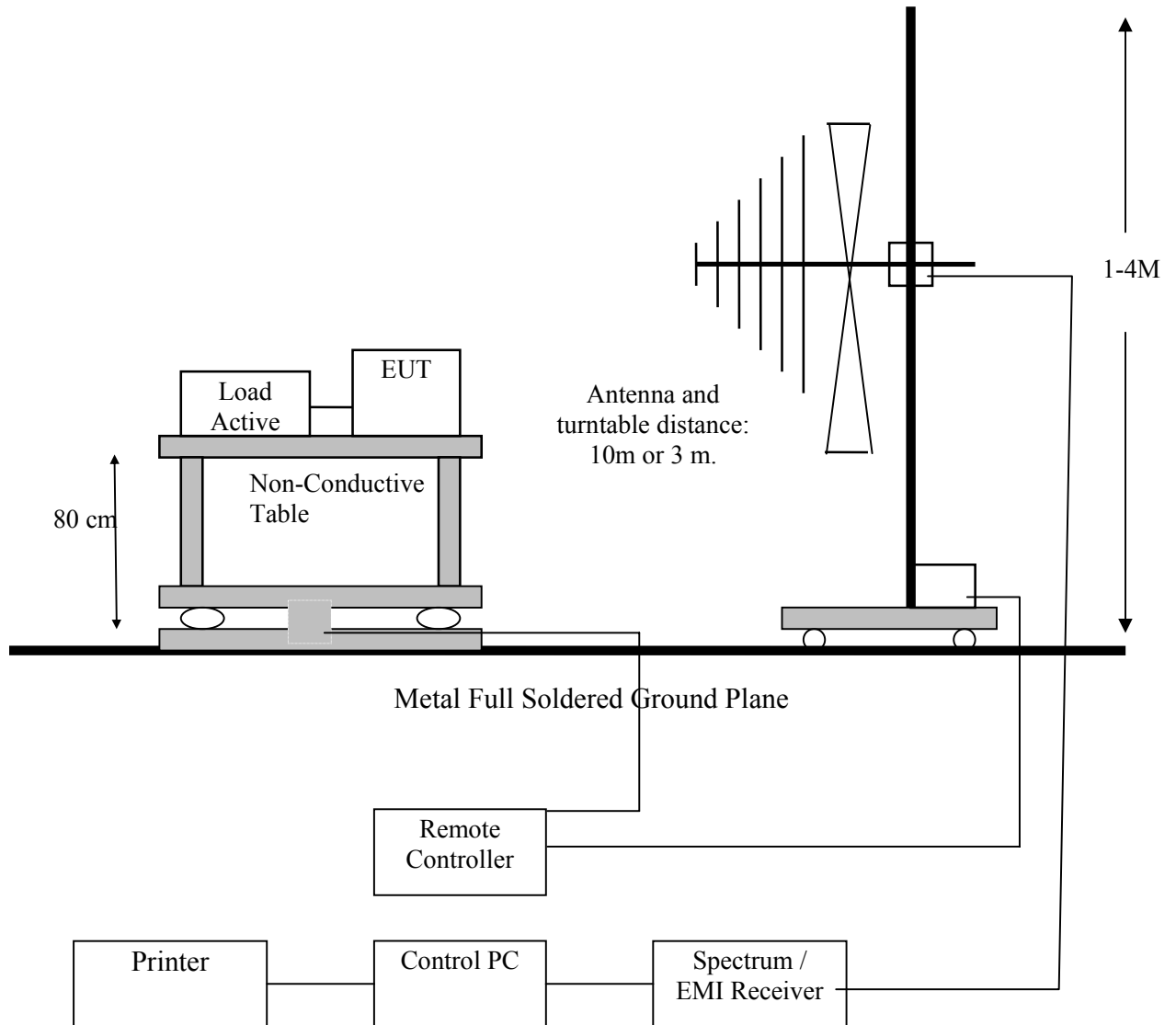
#### REMARK :

1. Model : ARK-4180
2. Measuring mode : 1.100M, 2.10M
3. The Worst Mode : 100M
4. Deviations from the test standards and rules : None.
5. “\*”, means this data is peak measuring as peak value is under Q.P. Limit or Average Limit 3dB margin.
6. Result : **PASSED**



## 4. RADIATED EMISSION MEASUREMENT

### 4.1 TEST SETUP





#### **4.2 LIMIT**

Frequency	Class A		Class B	
MHz	Distance (Meter)	Limit dB $\mu$ V/m	Distance (Meter)	Limit dB $\mu$ V/m
30 ~ 230	10	40	10	30
230 ~ 1000	10	47	10	37

Remark: In the above table, the tighter limit applies at the band edges

#### **4.3 TEST PROCEDURE**

The EUT and its simulators are placed on turn table, non-conductive and wooden table, which is 0.8 meter above ground. The turn table rotates 360 degree to determine the position of the maximum emission level. The EUT was positioned such that distance from antenna to the EUT is 10 meters.

The antenna is moved up and down between 1 meter to 4 meter to receive the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interference cables must be manipulated according to EN 55022/1998 regulation: the test procedure of the radiated emission measurement.

The bandwidth set on the field strength is 120KHz when the frequency range is below 1GHz

#### **4.4 TEST SPECIFICATION**

According to EN 55022/1998+A1:2000+A2:2003

According to EN 55011:1998+A1:1999+A2:2002(Group1 class A)

According to EN 61000-6-4 (2001): CISPR 11 Class A (1990)

#### **4.5 RESULT: PASSED**

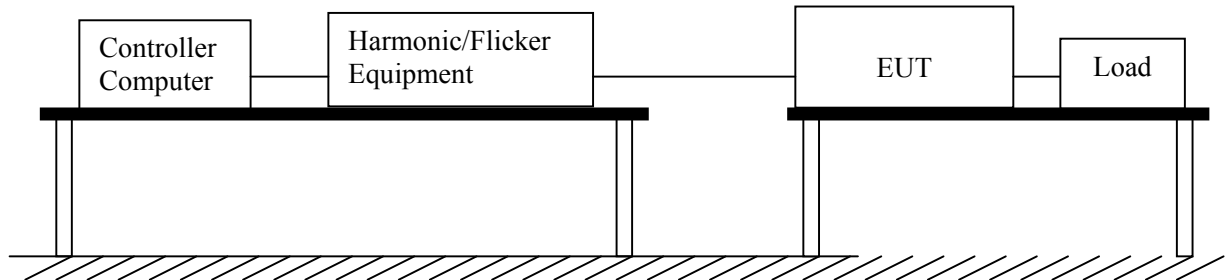
#### **4.6 TEST DATA:**

**Please refer to appendix 2**



## **5. POWER HARMONIC MEASUREMENT**

### **5.1 TEST SETUP**



### **5.2 LIMIT OF HARMONIC CURRENT**

Limit of Harmonic Currents

Harmonic Order	Maximum Permissible Harmonic Current (Ampere)	Harmonic Order	Maximum Permissible Harmonic Current (Ampere)
Odd Harmonic		Even Harmonic	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	$8 \leq n \leq 40$	$0.23 \times 8/n$
11	0.33		
13	0.21		
$15 \leq n \leq 39$	$0.15 \times 15/n$		

### **5.3 TEST PROCEDURE**

The EUT is supplied in series with power analyzer from a power source has the same normal voltage and frequency as the rated supply voltage and the equipment under test. The rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

### **5.4 TEST SPECIFICATION**

According to EN 61000-3-2/2006 Class D

### **5.5 RESULT : PASSED**

### **5.6 TEST DATA:**



## Harmonics – Class-D per A-14(Run time)

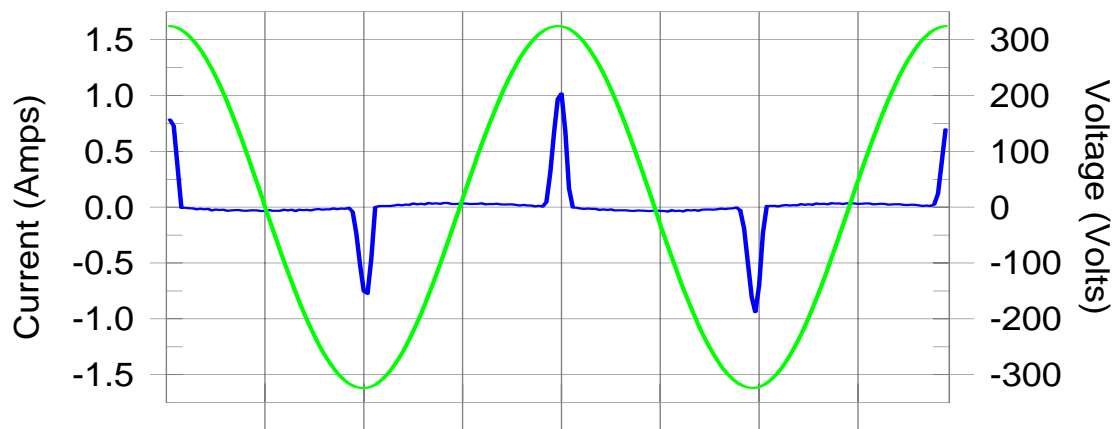
EUT: Please refer to Page 1 of Report  
Test category: Class-D per A-14 (European limits)  
Test date: 2007/9/3  
Comment: ARK-4180  
Customer: ADVANTECH

Tested by: Daniel  
Test Margin: 100

Test Result: Pass

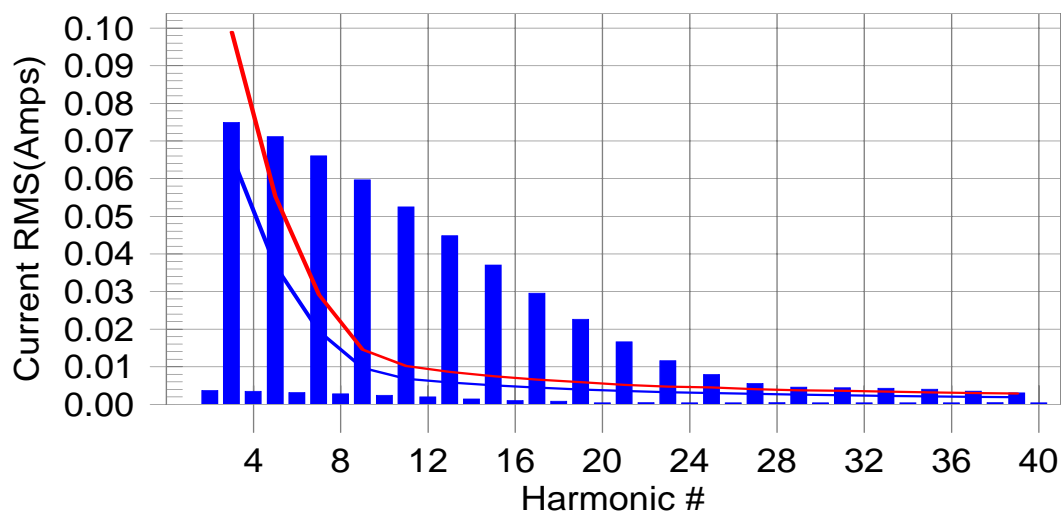
Source qualification: Normal

### Current & voltage waveforms



### Harmonics and Class D limit line

### European Limits



Test result: Pass Worst harmonic was #0 with 0.00% of the limit.



## Current Test Result Summary (Run time)

EUT: Please refer to Page 1 of Report

Test category: Class-D per A-14 (European limits)

Test date: 2007/9/3

Test duration (min): 15

Comment: ARK-4180

Customer: ADVANTECH

Tested by: Daniel

Test Margin: 100

Start time: PM 01:58:35

End time: PM 02:13:48

Data file name: H-000356.cts\_data

Test Result: Pass

Source qualification: Normal

THC(A): 0.00 I-THD(pk%): 0.00

POHC(A): 0.000

POHC Limit(A): 0.000

Highest parameter values during test:

V\_RMS (Volts): 229.43

Frequency(Hz): 50.00

I\_Peak (Amps): 1.039

I\_RMS (Amps): 0.197

I\_Fund (Amps): 0.086

Crest Factor: 6.118

Power (Watts): 19

Power Factor: 0.430

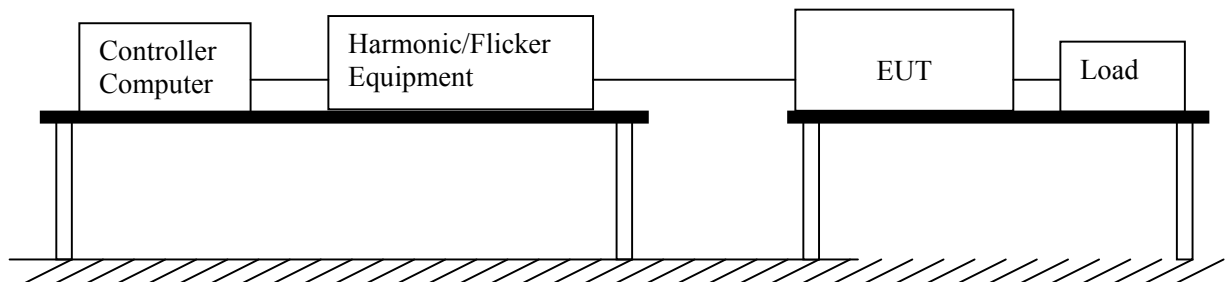
Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.004						
3	0.070	0.066	0.0	0.075	0.099	0.00	Pass
4	0.003						
5	0.067	0.037	0.0	0.071	0.055	0.00	Pass
6	0.003						
7	0.062	0.019	0.0	0.066	0.029	0.00	Pass
8	0.003						
9	0.056	0.010	0.0	0.060	0.015	0.00	Pass
10	0.002						
11	0.050	0.007	0.0	0.052	0.010	0.00	Pass
12	0.002						
13	0.043	0.006	0.0	0.045	0.009	0.00	Pass
14	0.001						
15	0.035	0.005	0.0	0.037	0.007	0.00	Pass
16	0.001						
17	0.028	0.004	0.0	0.030	0.007	0.00	Pass
18	0.001						
19	0.022	0.004	0.0	0.023	0.006	0.00	Pass
20	0.000						
21	0.016	0.004	0.0	0.017	0.005	0.00	Pass
22	0.000						
23	0.011	0.003	0.0	0.012	0.005	0.00	Pass
24	0.000						
25	0.008	0.003	0.0	0.008	0.004	0.00	Pass
26	0.000						
27	0.006	0.003	0.0	0.006	0.004	0.00	Pass
28	0.000						
29	0.004	0.003	0.0	0.005	0.004	0.00	Pass
30	0.000						
31	0.004	0.002	0.0	0.004	0.004	0.00	Pass
32	0.000						
33	0.004	0.002	0.0	0.004	0.003	0.00	Pass
34	0.000						
35	0.004	0.002	0.0	0.004	0.003	0.00	Pass
36	0.000						
37	0.004	0.002	0.0	0.004	0.003	0.00	Pass
38	0.000						
39	0.003	0.002	0.0	0.003	0.003	0.00	Pass
40	0.000						

Note: The EUT power level is below 75.0 Watts and therefore has no defined limits



## **6. VOLTAGE FLUCTUATIONS**

### **6.1 TEST SETUP**



### **6.2 VOLTAGE FLUCTUATIONS TEST**

Port:	AC mains
Basic Standard:	EN61000-3-3/AS/ AS/NZS 61000.3.3 (Details referred to Sec 2.2)
Test Procedure	Refer to GCC
Observation period:	For Pst 10min
	For Plt 2 hours

### **6.3 TEST PROCEDURE**

The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

### **6.4 TEST SPECIFICATION**

EN 61000-3-3/1995+A1:2001+A2:2005

### **6.5 RESULT : PASSED**

### **6.6 TEST DATA**



## Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Please refer to Page 1 of Report  
Test category: All parameters (European limits)  
Test date: 2007/9/3  
Comment: ARK-4180  
Customer: ADVANTECH

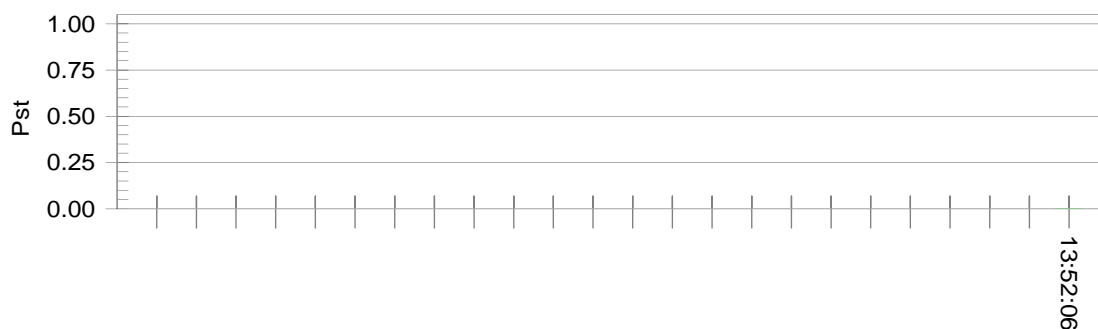
Tested by: Daniel  
Test Margin: 100

Test Result: Pass

Status: Test Completed

Pst<sub>i</sub> and limit line

European Limits



Time is too short for Plt plot

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.33		
Highest dt (%):	0.00	Test limit (%):	3.30 Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.001	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.001	Test limit:	0.650 Pass

## 7. ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

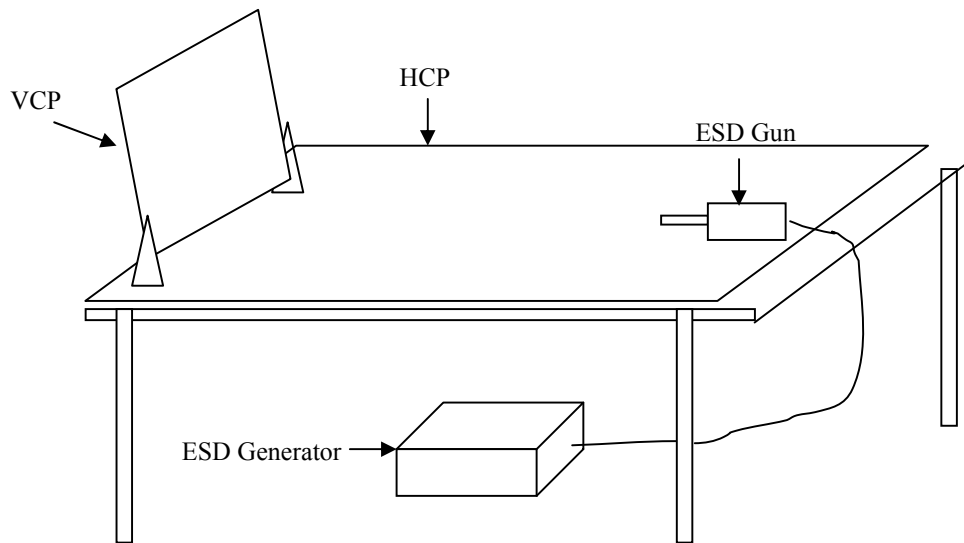
### 7.1 TEST PROCEDURE

According To IEC 61000-4-2 (2001)

According To EN 55024 (1998) + A1 (2001) + A2 (2003)

According To EN61000-6-2:2001

### 7.2 TEST SETUP



### 7.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Enclosure Room	±2, 4, 8 (Air Discharge)	KV (Charge Voltage)	B
Electrostatic Discharge	±2,4 (Contact Discharge)		
Time between test	<u>1</u>	sec	

Number of test : 10 Discharges / Test point / Polarity / Level

Particular requirements : at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points.

When the measurement was taken, The ESD discharger was performed in single discharge. For the single discharge time between successive single discharges will keep on one second. It was at least ten single discharges with positive and negative at the same selected pointed. The selected pointed, which was performed with electrostatic discharge, was marked on the red label on the EUT

Indirect applicant of discharge to the EUT

Vertical Coupling Plane (VCP)





The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to , and positioned at a distance 0.1m from, the EUT, with the discharge electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten singles discharges with positive and negative at the same selected point.

**Horizontal Coupling Plane (HCP)**

The coupling plane is placed under the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the discharge electrode touching the coupling.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten single discharges with positive and negative at the same selected pointed.

**7.4 TEST RESULT.**

Model : ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature : 24°C , Humidity : 58 % RH

Test Point	Air Discharge	Contact Discharge	Performance Criteria	Result
HCP	----	±2, 4KV	A	<b>PASSED</b>
VCP	----	±2, 4KV	A	<b>PASSED</b>
CASE	±2, 4, 8KV	±2, 4KV	A	<b>PASSED</b>
I/O PORTS	±2, 4, 8KV	±2, 4KV	A	<b>PASSED</b>
LED	±2, 4, 8KV	±2, 4KV	A	<b>PASSED</b>
SCREWS	±2, 4, 8KV	±2, 4KV	A	<b>PASSED</b>
Power Switch	±2, 4, 8KV	±2, 4KV	A	<b>PASSED</b>
DC SOCKET	±2, 4, 8KV	±2, 4KV	A	<b>PASSED</b>

Final Result : **PASSED**

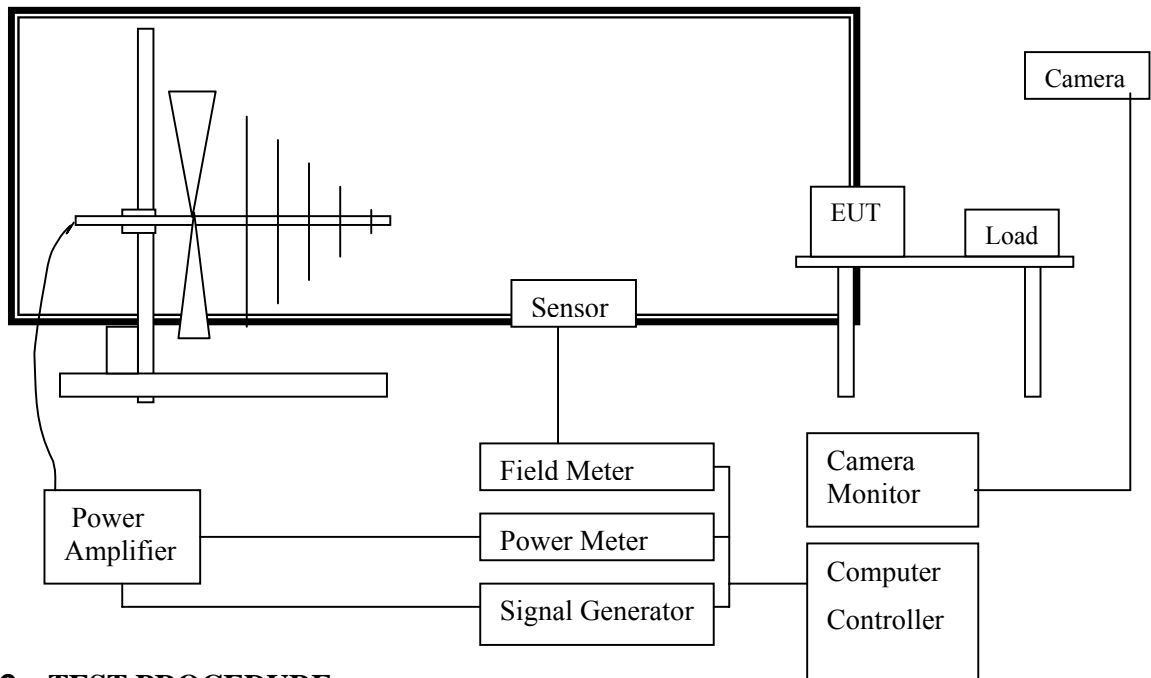
Remark :

**Photos of test configuration please refer to appendix 1.**



## **8. RADIATED EMISSION MEASUREMENT (RS)**

### **8.1 TEST SETUP**



### **8.2 TEST PROCEDURE**

According To IEC 61000-4-3 (2002)

According To EN 55024 (1998) + A1 (2001) + A2 (2003)

According To EN61000-6-2:2001

### **8.3 TEST LEVEL**

Item	Test Specification	Unit	Performance Criteria
Radio –Frequency	80~1000	MHz	A
Electromagnetic Field	<b>3</b>	V/m (unmodulated, rms)	
Amplitude Modulated	80	%AM (1KHz)	

Item	Test Specification	Unit	Performance Criteria
Radio –Frequency	80~1000	MHz	A
Electromagnetic Field	<b>10</b>	V/m (unmodulated, rms)	
Amplitude Modulated	80	%AM (1KHz)	



#### 8.4 TEST PROCEDURE

The EUT and load, which are placed on a wooden table that the height is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT is 3 meters.

Both horizontal and vertical polarization of the antenna position and four sides of the EUT are set on measurement. In order to judge the EUT performance, a CCD camera is used to monitor the situation of EUT.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 and 10 V/M; Level 2 and 3
2. Radiated Signal	AM 80% modulated with 1KHz
3. Scanning Frequencies	80MHz ~ 1000MHz
4. Dwell Time	3 seconds
5. Frequency step size	1%
6. The rate of swept of frequency	$1.5 \times 10^{-3}$ decades/s
7. Antenna Polarity	HORIZONTAL & VERTICAL
8. The four sides of EUT are tested	FRONT, REAR, RIGHT, LEFT

#### 8.5 TEST RESULT

Model : ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature : 30°C , Humidity : 68 % RH

ANT SIDE	3V and 10V HORIZONTAL	3V and 10V VERTICAL	RESULT
FRONT	A	A	<b>PASSED</b>
REAR	A	A	<b>PASSED</b>
RIGHT	A	A	<b>PASSED</b>
LEFT	A	A	<b>PASSED</b>

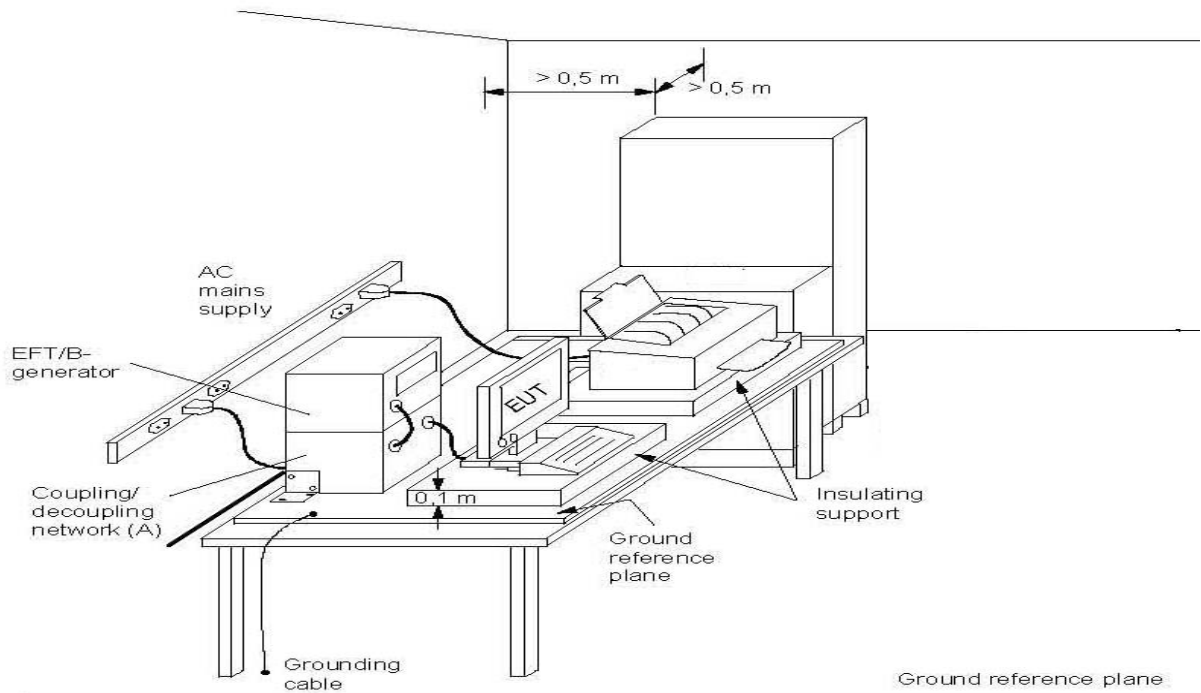
Final Result : **PASSED**

Remark :

**Photos of test configuration please refer to appendix 1.**

## **9. ELECTRICAL FAST TRANSIENT/BURST (EFT)**

### **9.1 TEST SETUP**



### **9.2 TEST PROCEDURE**

According To IEC 61000-4-4 (2004)

According To EN 55024 (1998) + A1 (2001) + A2 (2003)

According To EN61000-6-2:2001

### **9.3 TEST PROCEDURE**

The EUT and load are placed on a wooden table that is 0.8meter height above a metal ground plane dimension is 1m x 1m and thickness is at least 0.2mm. It also projected beyond the EUT by at lease 0.1meter on all sides.

For Input and Output AC power or DC Input and DC Output Power Ports:

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

Each of the line and nature conductors is impressed with burst noise for 1 minute.

For Functional Earth Port:

The EUT is connected to the power mains through a coupling device that directly couples the EFT interference signal. The protective earth line (PE) is impressed with burst noise for 1 minute.

The length of power cord between the coupling device and the EUT shall be 1 meter.

For signal Lines and Control Lines Test:

The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 1 minute.



#### 9.4 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Test Voltage	$\pm 0.5, \pm 1, \pm 2$	KV (Peak)	B
Pulse Rise time & Duration	5/50	Tr/Ts (ns)	
Pulse Repetition	5	Rep. Frequency (KHz)	
Coupling of power line	L, N, PE, L+N, L+PE, N+PE, L+N+PE		

#### 9.5 TEST RESULT

Model : ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature : 28°C , Humidity : 64 % RH

AC Input and AC Output Power Line							
TEST VOLTAGE	L	N	PE	L+N	L+PE	N+PE	L+N+PE
$\pm 0.5KV$	B	B	B	B	B	B	B
$\pm 1KV$	B	B	B	B	B	B	B
$\pm 2KV$	B	B	B	B	B	B	B

DC Input and DC Output Power Line			
TEST VOLTAGE	L	N	L+N
$\pm 0.5KV$	B	B	B
$\pm 1KV$	B	B	B
$\pm 2KV$	B	B	B

Signal Control Line	
TEST VOLTAGE	Performance Criteria
$\pm 0.25KV$	A
$\pm 0.5KV$	A
$\pm 1KV$	A

Final Result : **PASSED**

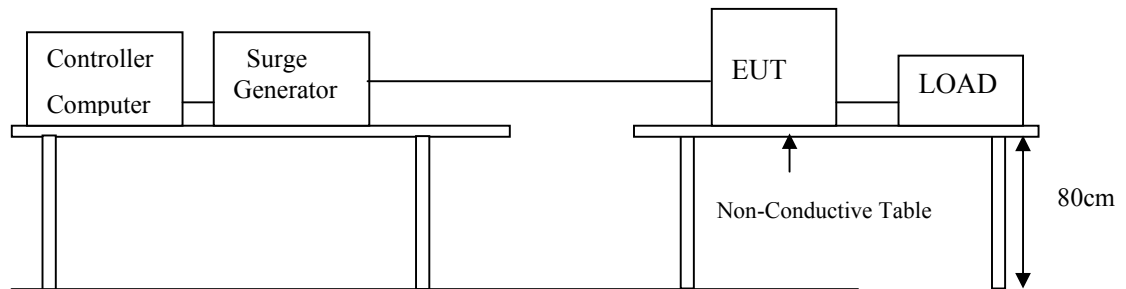
Remark : During the test, key board and mouse stops operating. But key board and mouse auto revives the operation after remove the interference noise.

**Photos of test configuration please refer to appendix 1.**



## 10. SURGE

### 10.1 TEST SETUP



### 10.2 TEST PROCEDURE

According To IEC 61000-4-5 (2001)  
According To EN 55024 (1998) + A1 (2001) + A2 (2003)  
According To EN61000-6-2:2001

### 10.3 TEST LEVEL

Item		Test Specification	Unit	Performance Criteria
DC Input and DC Output Power Ports				
	Surge	1.2/50(8/20)	Tr/Ts ((s)	B
	Line to Ground	$\pm 0.5$	KV	
	Line to Line	$\pm 0.5$	KV	
AC Input and AC Output Power Ports				
	Surge	1.2/50(8/20)	Tr/Ts ((s)	B
	Line to Ground	$\pm 2$	KV	
	Line to Line	$\pm 1$	KV	
Polarity		POSITIVE / NEGATIVE		
Phase shifting in a range between 0°to 360°				

### 10.4 TEST PROCEDURE

The EUT and its load are placed on a table which is 0.8 meter height above a metal ground plane dimension is 1 meter x 1 meter and the thickness is 0.5 mm. It's also projected beyond the EUT at least 0.1 meter on all sides. The length of power cord between the coupling device and the EUT shall be 2meter or less.

For Input and Output AC Power or DC Input and DC Output Power Ports:



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

The Surge noise shall be applied synchronized to the voltage phase at 0°, 90°, 180°, 270° and the peak value of the AC voltage wave. (Positive and Negative)

Each of line-earth and line-line is impressed with a sequence of five surge voltages with interval of 1 minute.

## **10.5 TEST RESULT**

Model : ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature : 25°C , Humidity : 62 % RH

### AC Input and AC Output Power Ports

Environmental Phenomena	Test Specification	Units	Performance Criteria
Line to Line	±1	KV (Charge Voltage)	A
Line to Earth	±2	KV (Charge Voltage)	A

### DC Input and DC Output Power Ports

Environmental Phenomena	Test Specification	Units	Performance Criteria
Line to Line	±0.5	KV (Charge Voltage)	A
Line to Earth	±0.5	KV (Charge Voltage)	A

Final Result : **PASSED**

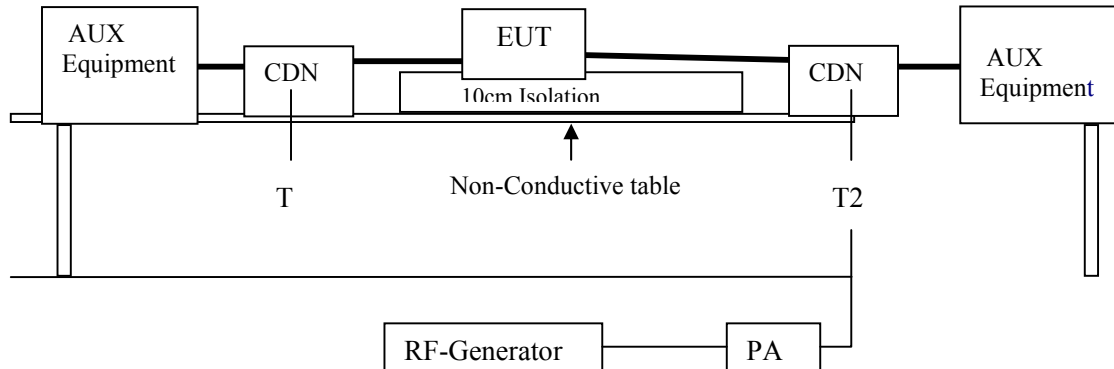
Remark :

**Photos of test configuration please refer to appendix 1.**



## **11. IMMUNITY TEST TO CS CONDUCTED DISTURBANCE (CS)**

### **11.1 TEST SETUP**



### **11.2 TEST PROCEDURE**

According To IEC 61000-4-6 (2003) + A1 (2004)

According To EN 55024 (1998) + A1 (2001) + A2 (2003)

According To EN61000-6-2:2001

### **11.3 TEST LEVEL**

Item	Test Specification	Unit	Performance Criteria
Ports for Signal Lines and Data Buses, not involved in process control, etc.			
Radio-Frequency	0.15 ~ 80	MHz	A
Common Mode	3 / 10	V (rms, Unmodulated)	
Amplitude Modulated	80	%AM (1KHz)	
	150	Source Impedance	
Ac Input and AC Output and DC Input and DC output Ports and Functional Earth Ports			
Radio-Frequency	0.15 ~ 80	MHz	
Common Mode	3 / 10	V (rms, Unmodulated)	A
Amplitude Modulated	80	%AM (1KHz)	
	150	Source Impedance	

### **11.4 TEST PROCEDURE**

The EUT are placed on a table which is 0.8meter height and a ground reference plane on the table, the EUT are placed upon table and use a 10cm insulation between the EUT and ground reference plane.

For AC Input and AC Output Power or DC Input and DC Output Power Ports

The EUT is connected to the power mains through a coupling and decoupling networks for power supply lines. It also directly couples the disturbance signal into EUT.

Use CDN-M2 for two wires or CDN-3 for three wires.

For Signal Lines and Control Lines Test:

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp





device couples to the signal and control lines of the EUT.  
All scanning frequencies conditions are as following:

Condition of Test	Remarks
EN 61000-4-6/2003+A1:2004	
1. Field Strength	3 and 10 V/M; Level 2 and 3
2. Radiated Signal	AM 80% modulated with 1KHz
3. Scanning Frequencies	0.15MHz ~ 80MHz
4. Dwell Time	3 seconds
5. Frequency step size $\Delta f$	1%
6. The rate of swept of frequency	$1.5 \times 10^{-3}$ decades/s

### 11.5 TEST RESULT

Model: ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature: 27 °C , Humidity : 69 % RH

TEST Specification	Unit	Performance Criteria
0.15 - 80	MHz	A
3	V	
80	% AM (1KHz)	

TEST Specification	Unit	Performance Criteria
0.15 - 80	MHz	A
10	V	
80	% AM (1KHz)	

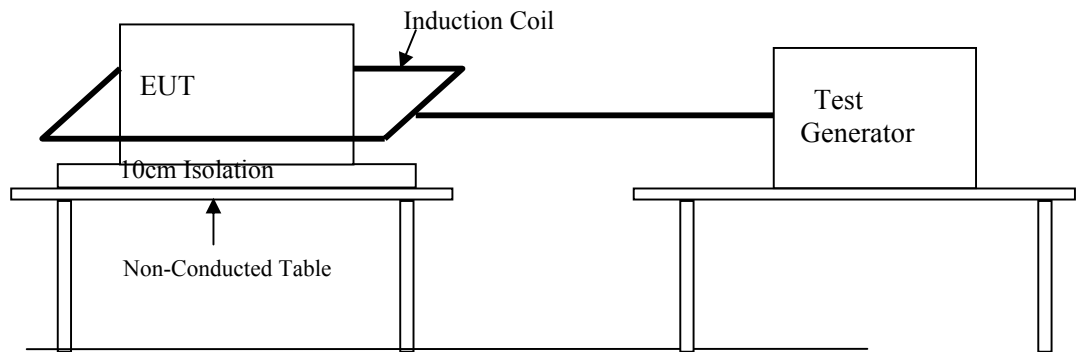
Final Result: **PASSED**

Remark: The LAN cable is shielding

**Photos of test configuration please refer to appendix 1.**

## 12. POWER FREQUENCY MAGNETIC FIELD (MAGNETIC)

### 12.1 TEST SETUP



### 12.2 TEST STANDARD

According To IEC 61000-4-8 (2001)  
According To EN 55024 (1998) + A1 (2001) + A2 (2003)  
According To EN61000-6-2:2001

### 12.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Power-Frequency	50	Hz	A
Magnetic Field	1	A/M	

Item	Test Specification	Unit	Performance Criteria
Power-Frequency	50	Hz	A
Magnetic Field	30	A/M	

### 12.4 TEST PROCEDURE

The EUT and its load are placed on a table that is 0.8 meter above the metal ground plane dimension is at least 1 meter x 1 meter. The test magnetic field shall be placed at least than 3 meter distance from the induction coil.

The test magnetic field shall be applied by the immersion method to the EUT. The induction coil shall be rotated by 90° in order to expose the EUT to the test field with different orientation (X, Y, Z orientation).



## 12.5 TEST RESULT

Model: ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature: 28 °C , Humidity: 64 % RH

Environmental Phenomena	Test Specification	Units	Performance Criteria
Magnetic Field	1	A/m	A

Environmental Phenomena	Test Specification	Units	Performance Criteria
Magnetic Field	30	A/m	A

Final Result: **PASSED**

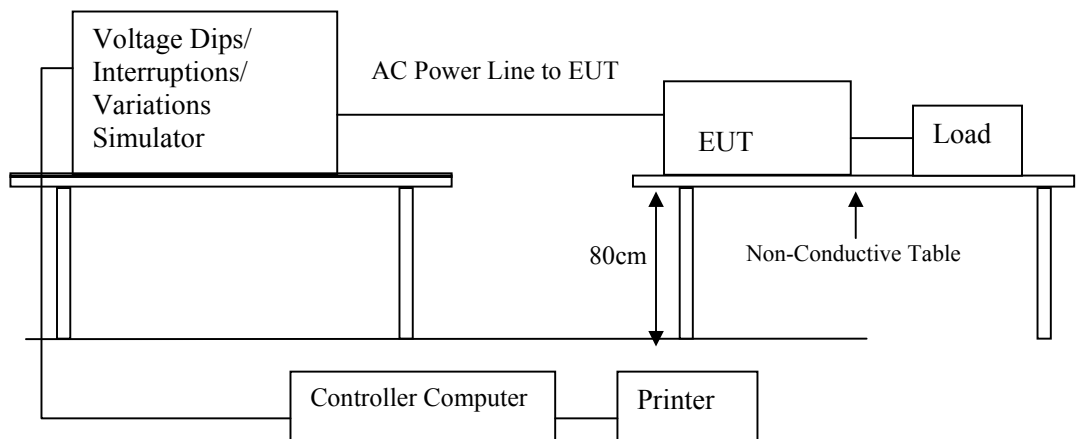
Remark:

**Photos of test configuration please refer to appendix 1.**



## **13. VOLTAGE DIPS AND INTERRUPTION MEASUREMENT**

### **13.1 TEST SETUP**



### **13.2 TEST PROCEDURE**

According To IEC 61000-4-11 (2004)  
According To EN 55024 (1998) + A1 (2001) + A2 (2003)  
According To EN61000-6-2:2001



### 13.3 TEST LEVEL

Class <sup>a</sup>	Test level and durations for voltage dips				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during 1/2 cycle	0 % during 1 cycle	70 % during 25/30 <sup>c</sup> cycles		
Class 3	0 % during 1/2 cycle	0 % during 1 cycle	40 % during 10/12 <sup>c</sup> cycles	70 % during 25/30 <sup>c</sup> cycles	80 % during 250/300 <sup>c</sup> cycles
Class X <sup>b</sup>	X	X	X	X	X
a: Classes as per IEC 61000-2-4.					
b: To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.					
c: "25/30 cycles" means "25 cycles for 50 Hz test" and "30 cycles for 60 Hz test".					

Class <sup>a</sup>	Test level and durations for short interruptions (t <sub>s</sub> ) (50Hz / 60Hz)
Class 1	Case-by-case according to the equipment requirements
Class 2	0 % during 250/300 <sup>c</sup> cycles
Class 3	0 % during 250/300 <sup>c</sup> cycles
Class X <sup>b</sup>	X
a: Classes as per IEC 61000-2-4.	
b: To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.	
c: "250/300 cycles" means "250 cycles for 50 Hz test" and "300 cycles for 60 Hz test".	

### 13.4 TEST PROCEDURE

The EUT and its load are placed on a wooden table which is 0.8 meter above a metal ground plane which dimension is 1 meter x 1 meter, the thickness is 0.65mm. It projected beyond the EUT by at least 0.1 meter on all sides. The power cord shall be used the shortest power cord as specified by the manufacturer.

For Voltage Dips / Interruption Test:

The EUT is connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

The EUT shall be tested for 30% voltage dips of supplied voltage and duration time is 10ms, for 60% voltage dips of supplied voltage and duration time is 100ms with a sequence of three voltage dips with intervals of 10 seconds, and for 95% voltage interruption of supplied voltage and the duration time is 5000ms with a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage phase shifting are shall occur at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° of the voltage.



### 13.5 TEST RESULT

Model: ARK-4180

Mode : Resolution 1024\*768(Adaptor)

Temperature: 28°C , Humidity: 64 % RH

Environmental Phenomena	Test Specification	Units	Performance Criteria
Voltage Dips	30 1/2	% during Periods	A
	60 5	% during Periods	C
	60 50	% during Periods	C
Voltage Short Interruptions	> 95 250	% during Periods	C

Environmental Phenomena	Test Specification	Units	Performance Criteria
Voltage Dips	0 1/2	% during Cycle	A
	0 1	% during Cycle	C
	70 25	% during Cycles	C
Voltage Short Interruptions	0 250	% during Cycles	C

Final Result: **PASSED**

Remark :

**Photos of test configuration please refer to appendix 1.**



## **14. PERFORMANCE CRITERIA**

- A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



## 15. MODIFICATION LIST FOR EMC COMPLYING TEST

The modification is solely made by the applicant.

Appendix

Appendix A: Summary of Test Result

\*\*\*\* EMC Test Result: The EUT has been pass the all measurements. \*\*\*\*

The uncertainty is calculated in accordance with CISPR16-4-2, the total uncertainty for this test is as follows:

### Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Receiver reading	Normal (k=2)	$\pm 0.2$
Cable loss	Normal (k=2)	$\pm 0.2$
AMN insertion loss	Rectangular	$\pm 0.2$
RCV/SPA specification	Rectangular	$\pm 0.9$
combined standard uncertainty $U_e(y)$	normal	$\pm 1.0$
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	$\pm 2.0$

### Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	30MHz~1GHz
Receiver reading	Normal (k=2)	$\pm 0.5$
Cable loss calibration	Normal (k=2)	$\pm 0.3$
Antenna factor calibration	Rectangular	$\pm 1.5$
Pre Amplifier Gain calibration	Rectangular	$\pm 0.5$
RCV/SPA specification	Rectangular	$\pm 0.9$
combined standard uncertainty $U_e(y)$	normal	$\pm 1.1$
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	$\pm 2.2$





## **Appendix 1**

### **PHOTOS OF TEST CONFIGURATION**



**CONDUCTED POWER LINE TEST**



Front View



Rear View



**RADIATED EMISSION TEST**



Front View



Rear View



**HARMONICS & VOLTAGE FLUCTUATIONS TEST  
SURGE IMMUNITY TEST  
VOLTAGE DIPS, SHORT INTERRUPTIONS IMMUNITY TEST**



**ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST**







**ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)**



**POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST**





**RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY  
TEST (RS)**



**CS CONDUCTED DISTURBANCE IMMUNITY TEST**



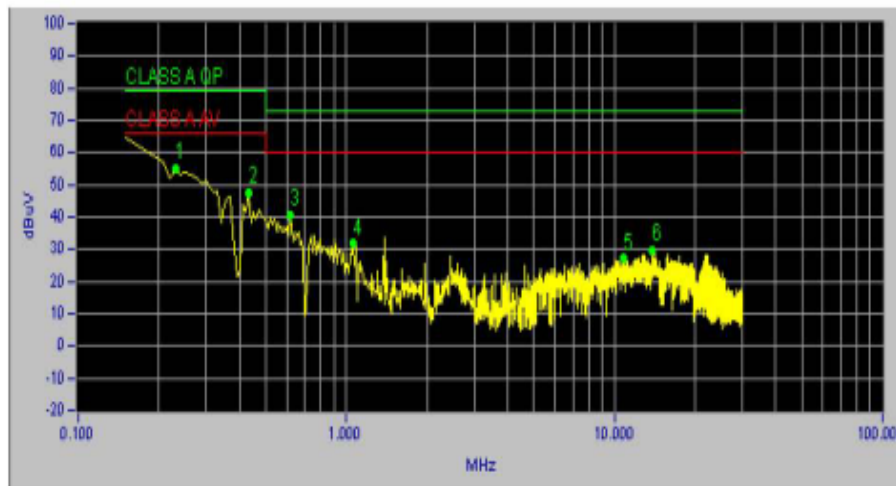


## **Appendix 2 TEST DATA**



**Test Data Of Conducted Emission Measurement (LINE)**

**Power Line Conducted Emissions (LINE)**



Report No.:782901

Print Report of 09-03-2007 - 11:29:50

CORR.: PROBE NONE EXTATT bat20m

DETECT : PEAK 100ms

LIM1: EN55022-QP-Class A

LIM2 : EN55022-AV-Class A

MODE : SWEEP CAL

SWEEP : 0.150-30.000MHz

STEP : 1.0/ 10KHz IFBW : 9KHz

LISN : L1

Threshold Level (dBuV): -20.0

Peak Escursion (dBuV): 6.0

Total Peak Found : 6

Peak Displayed : 6

Company : ADVANTECH

EUT :ARK-4180

Freq	Level	Over Lim	Limit 1	Limit 2	Read lev	LISN Loss	Cable Loss
MHz	dBuV	dBuV	dBuV	dBuV	dBuV	dBuV	dBuV
1) 0.230	55.24	-23.76	79.00	66.00	45.13	10.10	0.01
2) 0.430	47.40	-31.60	79.00	66.00	37.28	10.10	0.02
3) 0.620	40.66	-32.34	73.00	60.00	30.54	10.10	0.02
4) 1.060	31.73	-41.27	73.00	60.00	21.61	10.10	0.02
5) 10.870	27.08	-45.92	73.00	60.00	16.81	10.20	0.06
6) 13.810	29.53	-43.47	73.00	60.00	19.26	10.20	0.07

\*Note: Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

A margin of -8dB means that the emission is 8dB below the limit

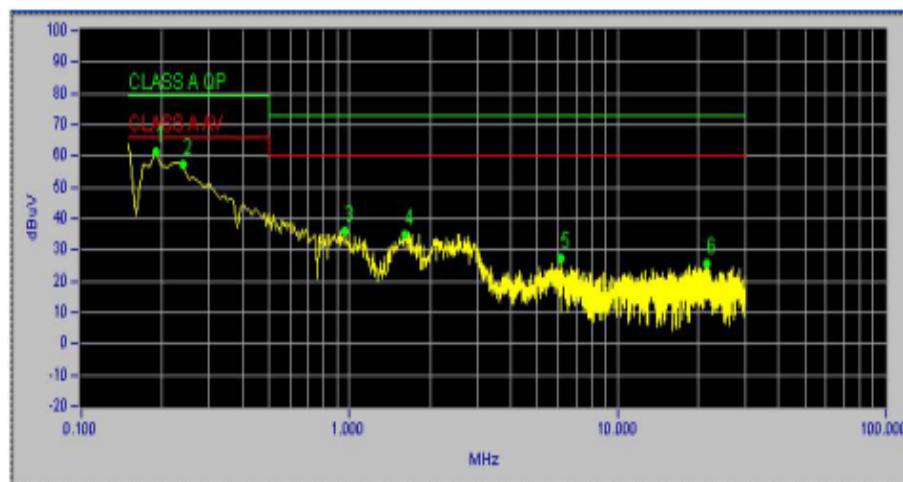
Note: Peak measuring receiver was used and the result complied with both QP and AVE Limits.





**Test Data Of Conducted Emission Measurement (NATURAL)**

**Power Line Conducted Emissions (Neutral)**



Report No.:782901

Print Report of 09-03-2007 - 10:16:16

CORR.: PROBE NONE EXTATT bat20m

DETECT : PEAK 100ms

LIM1: EN55022-QP-Class A

LIM2 : EN55022-AV-Class A

MODE : SWEEP CAL

SWEEP : 0.150-30.000MHz

STEP : 1.0/ 10KHz IFBW :9KHz

LISN : N1

Threshold Level (dBuV): -20.0

Peak Escursion (dBuV): 6.0

Total Peak Found : 6

Peak Displayed : 6

Company : ADVANTECH

EUT :ARK-4180

Freq	Level	Over Lim	Limit 1	Limit 2	Read lev	LISN Loss	Cable Loss
MHz	dBuV	dBuV	dBuV	dBuV	dBuV	dBuV	dBuV
1) 0.190	61.63	-17.37	79.00	66.00	51.52	10.10	0.01
2) 0.240	57.18	-21.82	79.00	66.00	47.07	10.10	0.01
3) 0.960	36.18	-36.82	73.00	60.00	26.06	10.10	0.02
4) 1.610	35.03	-37.97	73.00	60.00	24.90	10.10	0.03
5) 6.170	27.22	-45.78	73.00	60.00	17.07	10.10	0.05
6) 21.550	25.55	-47.45	73.00	60.00	15.17	10.30	0.08

\*Note: Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

A margin of -8dB means that the emission is 8dB below the limit

Note: Peak measuring receiver was used and the result complied with both QP and AVE Limits.



## Test Data Of Radiated Emission Measurement (Horizontal)



環球認證有限公司  
Global Certification Corp.

Address: No.112-3, Shiang Chang Rd., Sec.2,  
Hsi Chin, Taipei Hsien 221, Taiwan, R.O.C.  
Tel: 02-26426992 Fax: 02-26487450

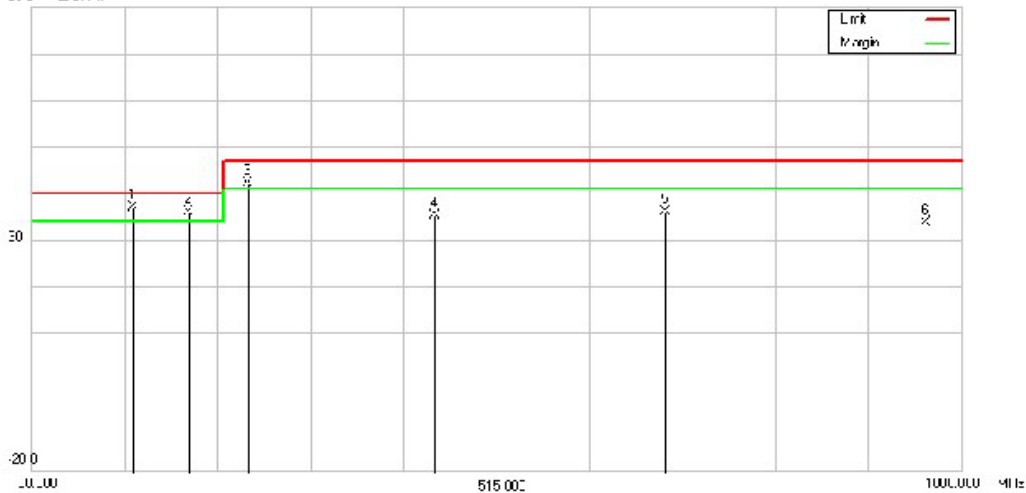
### Radiated Emission Measurement

File : 782901  
EUT : dBuV/m

Data : #2

Date: 2007/09/03

Time: 下午 01:37:31



Site: Open site #1

Limit: EN55022, CISPR22, CNS13438 Class A

Company: ADVANTECH

EUT: Please refer to page1 of report

Model: ARK-4180

Note:

Polarization: **Horizontal**

Temperature: 29 °C

Power: AC230V/50Hz

Humidity: 67 %

Distance: 10m RBW: 120 KHz

Sweep Time: 100 ms

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	*	134.3200	30.19	6.57	36.76	40.00	-3.24	QP	0	
2	!	192.9000	30.81	5.17	35.98	40.00	-4.02	QP	0	
3	!	253.4800	36.68	5.54	42.22	47.00	-4.78	peak	0	
4		449.5700	23.81	11.29	35.10	47.00	-11.90	peak	0	
5		689.6800	20.49	15.51	36.00	47.00	-11.00	peak	0	
6		961.4000	14.36	19.23	33.59	47.00	-13.41	peak	0	

\*: Maximum data x: Over limit !: over margin

●: Reference Only

Receiver:

Spectrum Analyzer: E7401A

Antenna: A0520104-060919

Engineer Signature: Daniel

Amplifier: AMP-EF150001 070719

File : 782901\Data : #2

Page: 1



## Test Data Of Radiated Emission Measurement (Horizontal)



環球認證有限公司  
Global Certification Corp.

Address: No.112-3, Shiang Chang Rd., Sec.2,  
Hsi Chin, Taipei Hsien 221, Taiwan, R.O.C.  
Tel: 02-26426992 Fax: 02-26487450

### Radiated Emission Measurement

File : 782901  
EO : dBuV/m

Data : #6

Date: 2007/09/03

Time: 下午 03:02:40



Site: Open site #1

Limit: EN55022, CISPR22, CNS13438 Class A

Company: ADVANTECH

EUT: Please refer to page1 of report

Model: ARK-4180

Note:

Polarization: **Horizontal**

Power: DC12V, DC5V

Distance: 10m RBW: 120 KHz

Temperature: 29 °C

Humidity: 67 %

Sweep Time: 100 ms

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	!	133.2900	28.21	6.57	34.78	40.00	-5.22	QP	0	
2		192.7800	28.85	5.14	33.99	40.00	-6.01	QP	0	
3	*	251.6200	36.82	5.30	42.12	47.00	-4.88	peak	0	
4		450.8100	24.81	11.32	36.13	47.00	-10.87	peak	0	
5		675.6000	21.69	15.26	36.95	47.00	-10.05	peak	0	
6		961.4500	15.71	19.23	34.94	47.00	-12.06	peak	0	

\*: Maximum data x: Over limit !: over margin

●: Reference Only

Receiver:

Spectrum Analyzer: E7401A

Antenna: A0520104-060919

Engineer Signature: Daniel

Amplifier: AMP-EF150001 070719

File : 782901\Data : #6

Page: 1



## Test Data Of Radiated Emission Measurement (Vertical)



環球認證有限公司  
Global Certification Corp.

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Tel: 02-26426992 Fax: 02-26487450

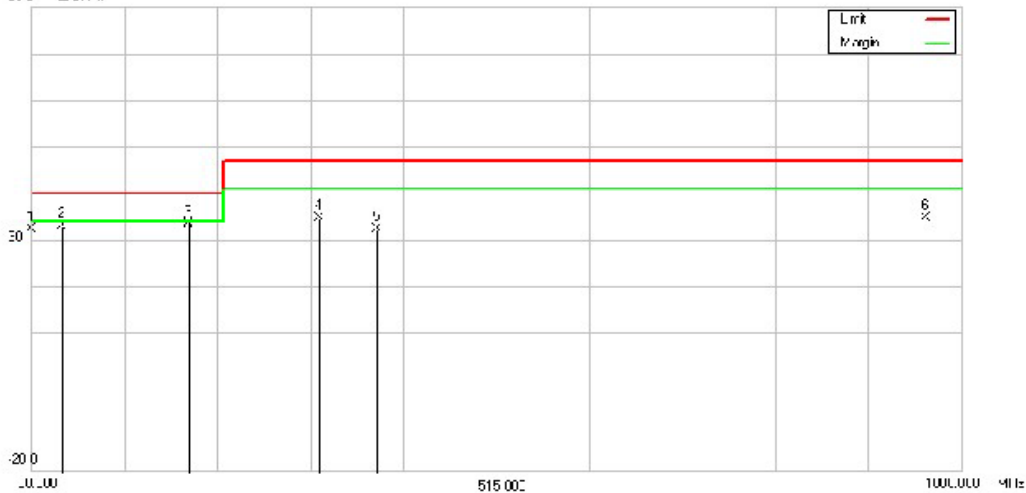
### Radiated Emission Measurement

File : 782901  
EUT : dBuV/m

Data : #1

Date: 2007/09/03

Time: 下午 01:19:19



Site: Open site #1

Limit: EN55022, CISPR22, CNS13438 Class A

Company: ADVANTECH

EUT: Please refer to page1 of report

Model: ARK-4180

Note:

Polarization: **Vertical**

Power: AC230V/50Hz

Distance: 10m RBW: 120 KHz

Temperature: 29 °C

Humidity: 67 %

Sweep Time: 100 ms

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		30.5200	20.38	11.66	32.04	40.00	-7.96	peak	0	
2		61.4500	32.49	0.30	32.79	40.00	-7.21	peak	0	
3	*	194.3800	27.94	5.44	33.38	40.00	-6.62	peak	0	
4		330.2200	26.68	7.83	34.51	47.00	-12.49	peak	0	
5		390.4500	22.77	9.35	32.12	47.00	-14.88	peak	0	
6		961.4800	15.37	19.23	34.60	47.00	-12.40	peak	0	

\*: Maximum data x: Over limit l: over margin

●: Reference Only

Receiver:

Spectrum Analyzer: E7401A

Antenna: A0520104-060919

Engineer Signature: Daniel

Amplifier: AMP-EF150001 070719

File : 782901\Data : #1

Page: 1



## Test Data Of Radiated Emission Measurement (Vertical)



環球認證有限公司  
Global Certification Corp.

Address: No.112-3, Shiang Chang Rd., Sec.2,  
Hsi Chin, Taipei Hsien 221, Taiwan, R.O.C.  
Tel: 02-26426992 Fax: 02-26487450

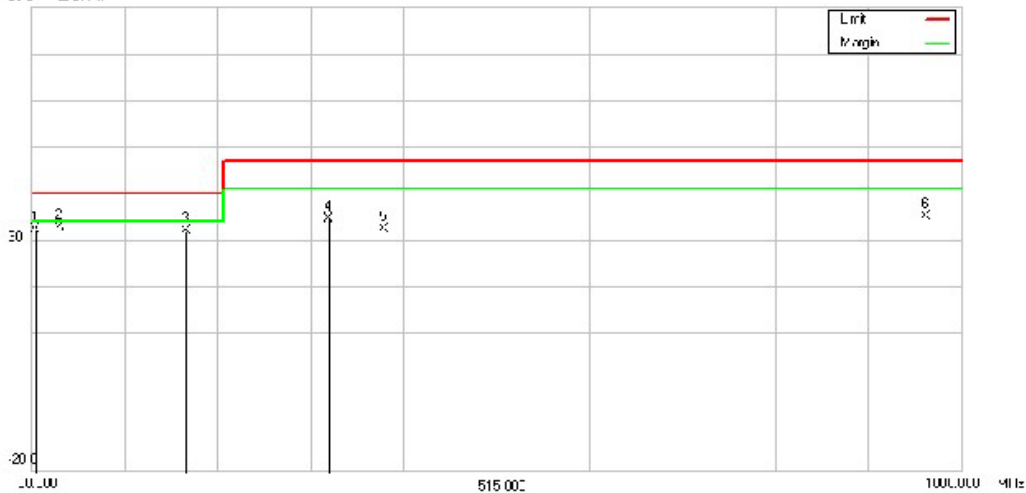
### Radiated Emission Measurement

File : 782901  
Unit : dBuV/m

Data : #5

Date: 2007/09/03

Time: 下午 02:44:25



Site: Open site #1

Limit: EN55022, CISPR22, CNS13438 Class A

Company: ADVANTECH

EUT: Please refer to page1 of report

Model: ARK-4180

Note:

Polarization: **Vertical**

Power: DC12V, DC5V

Distance: 10m RBW: 120 KHz

Temperature: 29 °C

Humidity: 67 %

Sweep Time: 100 ms

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		32.8700	21.91	10.11	32.02	40.00	-7.98	peak	0	
2	*	58.4400	32.30	0.32	32.62	40.00	-7.38	peak	0	
3		190.3800	27.26	4.69	31.95	40.00	-8.05	peak	0	
4		339.4600	26.22	8.05	34.27	47.00	-12.73	peak	0	
5		398.4600	22.57	9.56	32.13	47.00	-14.87	peak	0	
6		961.4700	15.73	19.23	34.96	47.00	-12.04	peak	0	

\*: Maximum data x: Over limit l: over margin

• Reference Only

Receiver:

Spectrum Analyzer: E7401A

Antenna: A0520104-060919

Engineer Signature: Daniel

Amplifier: AMP-EF150001 070719

File : 782901\Data : #5

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