



# SPORTON International Inc.

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## EMI TEST REPORT

Applicant's company	ICP DAS CO., LTD.
Applicant Address	No. 111, Kuangfu N. Rd., Hukou Shiang, Hsinchu, Taiwan 303, R.O.C.
Manufacturer's company	ICP DAS CO., LTD.
Manufacturer Address	No. 111, Kuangfu N. Rd., Hukou Shiang, Hsinchu, Taiwan 303, R.O.C.

Product Name	I/O Board
Brand Name	ICP DAS
Model Name	ICPDAS (Please refer to section 3.1)
Test Standard	47 CFR FCC Part 15 Subpart B
Receive Date	Dec. 31, 2005
Test Date	Jan. 02, 2006
File Type	New Applicant



### Statement

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart B**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

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## History of This Test Report

Original Issue Date: Dec. 31, 2005

Report No.: FD5D3104

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



## 1. CERTIFICATE OF COMPLIANCE

Product Name : I/O Board  
Brand Name : ICP DAS  
Model Name : ICPDAS (Please refer to section 3.1)  
Applicant : ICP DAS CO., LTD.  
Test Standard : 47 CFR FCC Part 15 Subpart B

Sporton International as requested by the applicant to evaluate the EMI performance of the product sample received on Dec. 31, 2005 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMI nature.

A handwritten signature in blue ink, appearing to read "Alex Chen", written over a dashed line.

Alex Chen / Manager

## 2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart B				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.107	AC Power Line Conducted Emissions	Complies	9.13 dB
4.2	15.109	Radiated Emissions	Complies	5.83 dB

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	$\pm 2.26\text{dB}$	Confidence levels of 95%
Radiated Emissions	$\pm 3.72\text{dB}$	Confidence levels of 95%

### 3. GENERAL INFORMATION

#### 3.1. Product Details

Items	Description
Product Type	I/O Board
Power Type	HOST (PC)
Interface Type	D-SUB

Main Control Unit	Model Number	Diversity
PCI-M512	PCI-M512	PCI bus 32-bit Memory Board
	DB-16P	16-channel OPTO-Isolated Digital Input Board
	DB-16R	16-channel Relay Output Board
PIO-D168	PIO-D168	PCI Bus 168-bit OPTO-22 DIO Board
	DB-24POR	24-channel OPTO-22 Compatible Photo-Mos Relay Output Board
	DB-24R	24-channel OPTO-22 Compatible Relay Output Board
	DB-24PR	24-channel OPTO-22 Compatible Power-relay Board
	DB-24OD	24-channel Open-drain Output Board
PISO-CAN400-T	PISO-CAN200-D	2-Port Isolated Protection CAN Communication Board with 9-Pin D-subConnector
	PISO-CAN200-T	2-Port Isolated Protection CAN Communication Board with 5-Pin Screw Terminal Connector
	PISO-CAN400-D	4-Port Isolated Protection CAN Communication Board with 9-Pin D-subConnector
	PISO-CAN400-T	4-Port Isolated Protection CAN Communication Board with 5-Pin Screw Terminal Connector
A-81111	A-8111	30KS/s 12-bit Analog and Digital I/O Board
	DB-24C	24-channel OPTO-22 Compatible Open-collector output board
	DB-24P	24-channel OPTO-22 Compatible Opto-isolated Input Board
A-821PGH	A-821PGH	45KS/s 12-bit Analog and Digital I/O Board
	DB-889D	16-channel Analog Multiplexer Board

Note:

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

### 3.2. Accessories

N/A

### 3.3. Table for Filed Antenna

N/A

### 3.4. Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Antenna
AC Power Line Conducted Emissions	Normal Use	
Radiated Emissions	Normal Use	

### 3.5. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
10CH02-HY	SAC	Hwa Ya	343133	–	–
CO04-HY	Conduction	Hwa Ya	101377	–	–

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

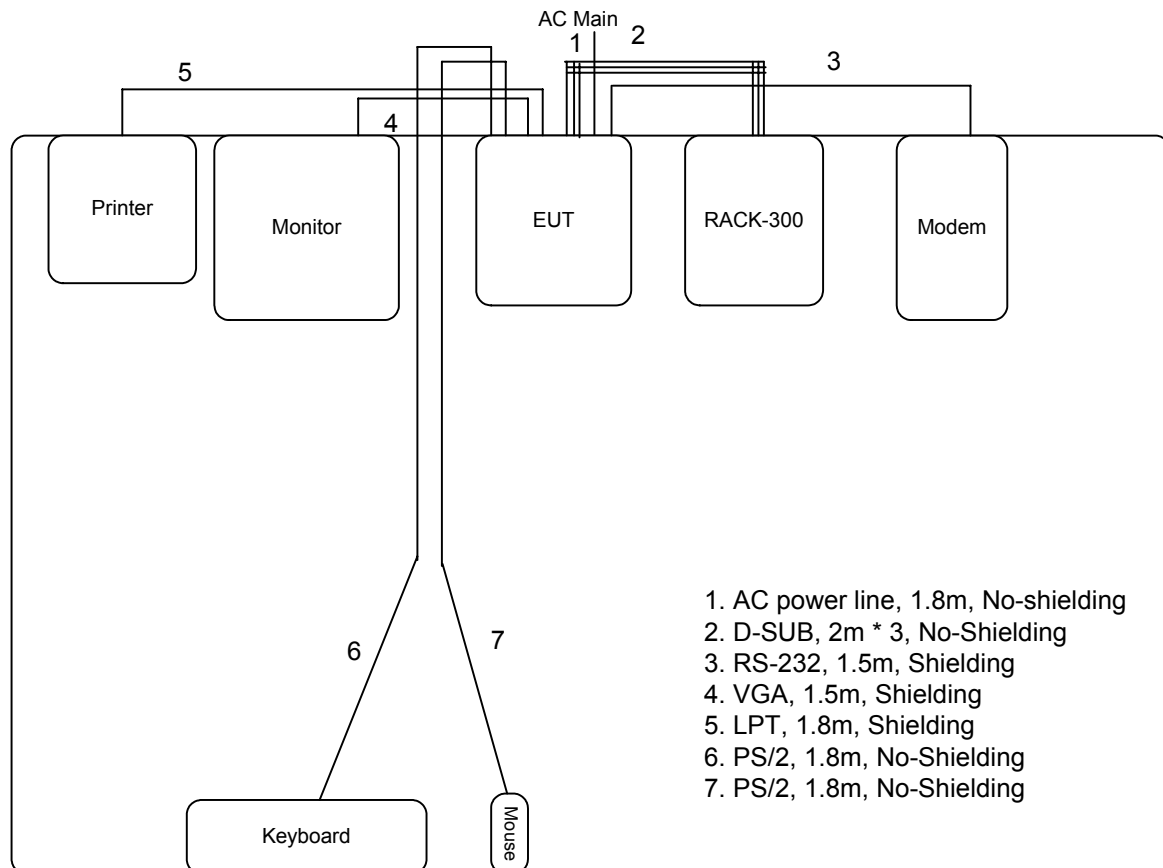
Please refer section 6 for Test Site Address.

### 3.6. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Modem	ACEEX	DM-1414	FCC ID IFAXDM1414
Printer	EPSON	LQ-300	DOC
Monitor	SUN	DP17M0	DOC
Keyboard	HP	KB-0133	DOC
Mouse	Microsoft	1004	DOC

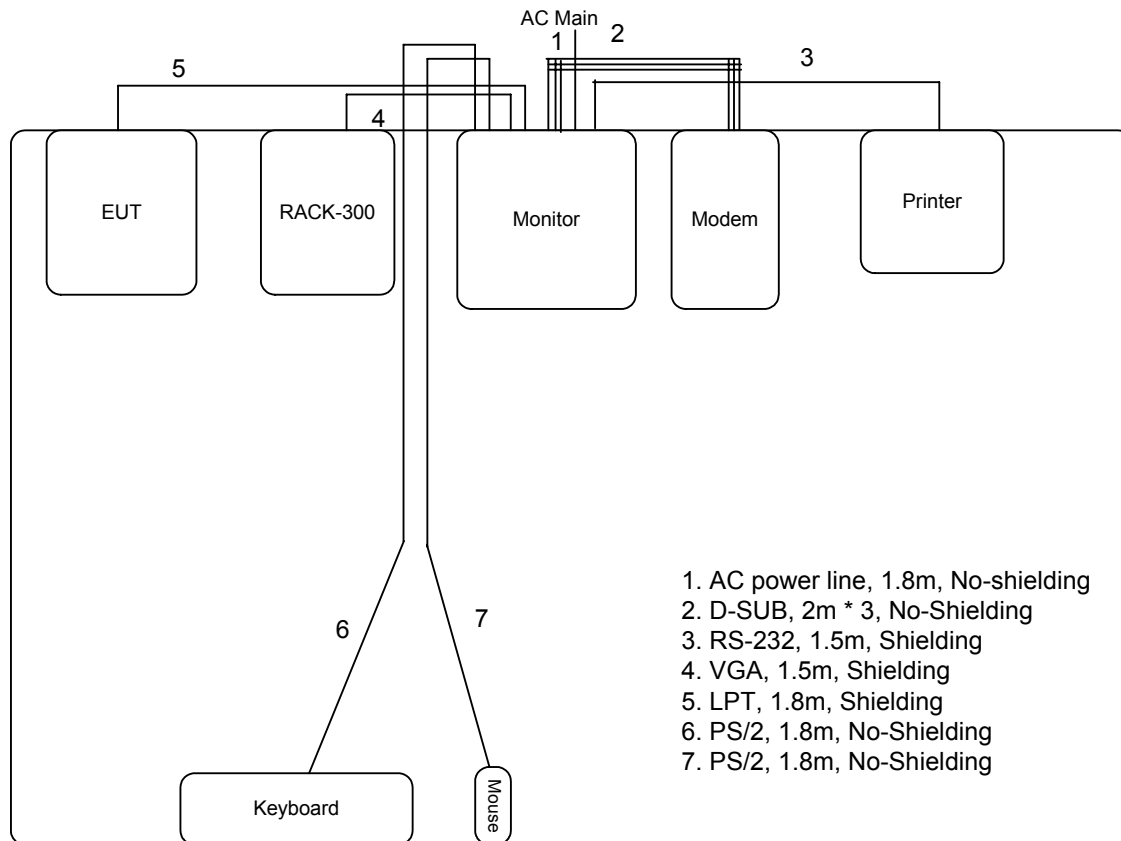
### 3.7. Test Configurations

#### 3.7.1. Radiation Emissions Test Configuration





### 3.7.2. AC Power Line Conduction Emissions Test Configuration



## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

For a Low-power Radio-frequency Device which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

#### 4.1.2. Measuring Instruments and Setting

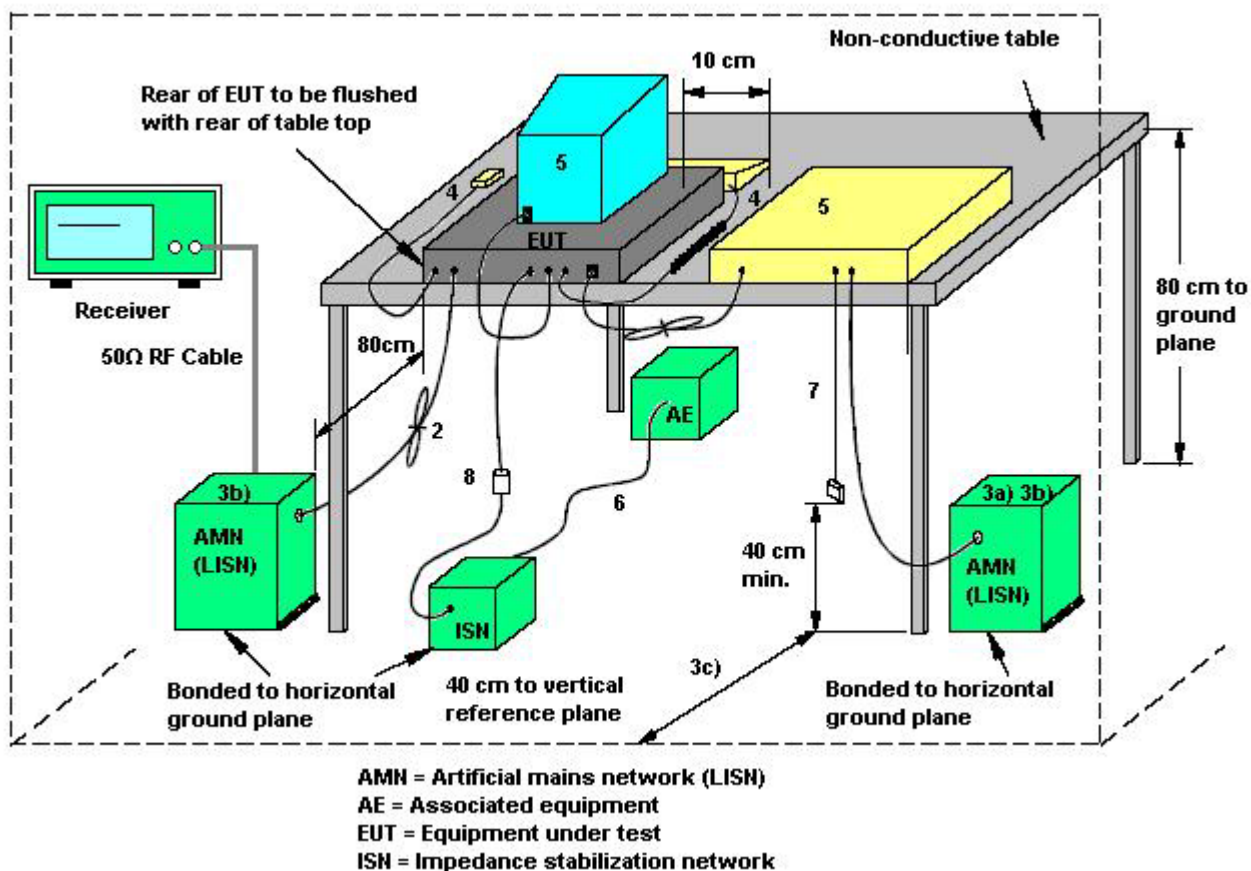
Please refer to section 6 in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

#### 4.1.3. Test Procedures

1. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

#### 4.1.4. Test Setup Layout



1. If cables, which hang closer than 40 cm to the horizontal metal groundplane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
2. Excess mains cord shall be bundled in the centre or shortened to appropriate length.
3. EUT is connected to one artificial mains network (AMN). All AMNs and ISNs may alternatively be connected to a vertical reference plane or metal wall.
4. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
5. AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.
6. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
7. Cables of hand operated devices, such as keyboards, mouses, etc. shall be placed as for normal usage.
8. Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
9. I/O signal cable intended for external connection.
10. The end of the I/O signal cables which are not connected to an AE may be terminated, if required, using correct terminating impedance.
11. If used, the current probe shall be placed at 0.1 m from the ISN.

#### 4.1.5. Test Deviation

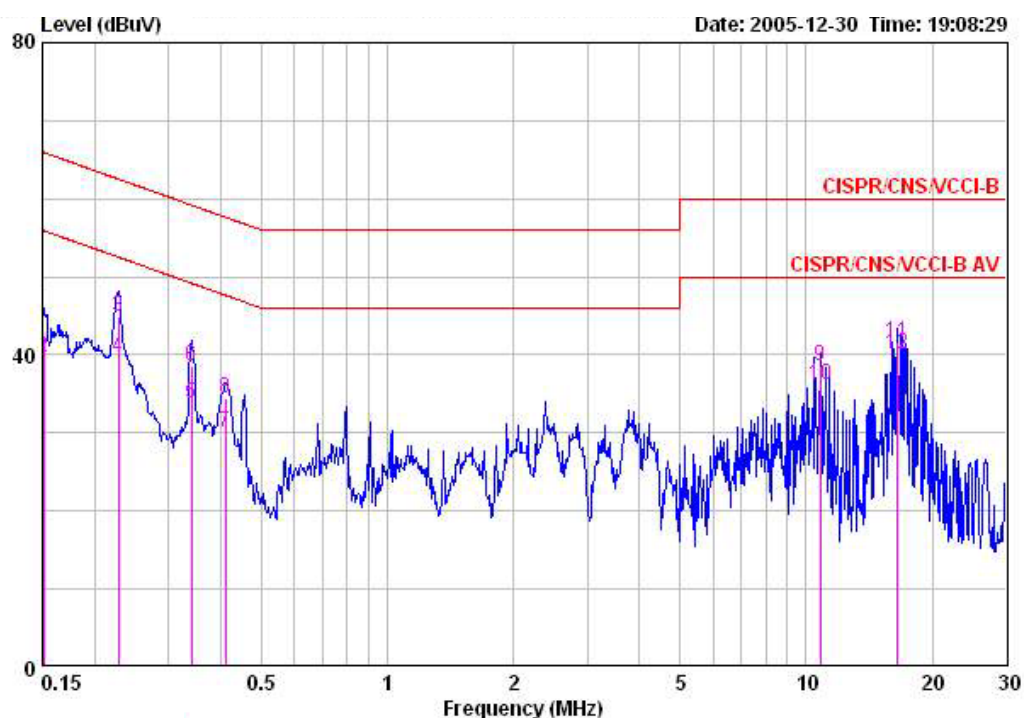
There are no deviations with the original standard.

#### 4.1.6. EUT Operation during Test

The EUT was placed on the test table with essential peripherals connected. The EUT was placed on the test table and programmed in normal function mode.

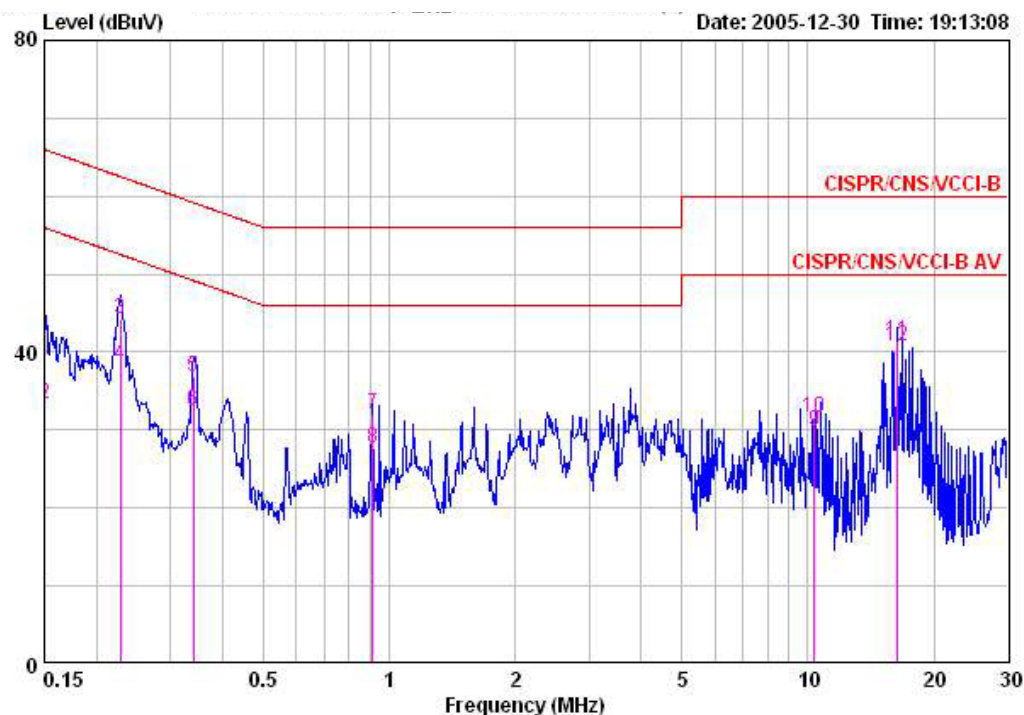
#### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	20°C	Humidity	70%
Test Engineer	Ken Tu	Phase	Line
Configuration	Normal Use		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15080	42.34	-23.62	65.96	40.13	2.01	0.20	QP
2	0.15080	39.60	-16.36	55.96	37.39	2.01	0.20	AVERAGE
3	0.22797	44.85	-17.67	62.52	43.63	1.02	0.20	QP
4	0.22797	39.66	-12.86	52.52	38.44	1.02	0.20	AVERAGE
5	0.34100	33.73	-15.45	49.18	32.83	0.70	0.20	AVERAGE
6	0.34100	38.69	-20.49	59.18	37.79	0.70	0.20	QP
7	0.41048	30.04	-17.60	47.64	29.34	0.50	0.20	AVERAGE
8	0.41048	34.36	-23.28	57.64	33.66	0.50	0.20	QP
9	10.804	38.49	-21.51	60.00	37.73	0.36	0.40	QP
10	10.804	36.20	-13.80	50.00	35.44	0.36	0.40	AVERAGE
11	16.493	41.61	-18.39	60.00	40.91	0.30	0.40	QP
12	16.493	40.16	-9.84	50.00	39.46	0.30	0.40	AVERAGE

Temperature	20°C	Humidity	70%
Test Engineer	Ken Tu	Phase	Neutral
Configuration	Normal Use		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15000	38.15	-27.85	66.00	36.05	1.90	0.20	QP
2	0.15000	33.43	-22.57	56.00	31.33	1.90	0.20	AVERAGE
3	0.22797	44.14	-18.38	62.52	43.02	0.92	0.20	QP
4	0.22797	38.36	-14.16	52.52	37.24	0.92	0.20	AVERAGE
5	0.34100	36.80	-22.38	59.18	36.00	0.60	0.20	QP
6	0.34100	32.49	-16.69	49.18	31.69	0.60	0.20	AVERAGE
7	0.91357	32.13	-23.87	56.00	31.63	0.30	0.20	QP
8	0.91357	27.72	-18.28	46.00	27.22	0.30	0.20	AVERAGE
9	10.366	29.78	-20.22	50.00	29.11	0.30	0.37	AVERAGE
10	10.366	31.56	-28.44	60.00	30.89	0.30	0.37	QP
11	16.404	41.43	-18.57	60.00	40.73	0.30	0.40	QP
12	16.404	40.87	-9.13	50.00	40.17	0.30	0.40	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

## 4.2. Radiated Emissions Measurement

### 4.2.1. Limit

Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 5th harmonic of highest frequency. The quasi-peak measuring receiver shall be in accordance with clause 2 of CISPR 16-1. Receivers with peak detectors shall be in accordance with clause 3 of CISPR 16-1, and shall have a 6 dB bandwidth in accordance with clause 2 of CISPR 16-1.

Frequency of Emission (MHz)	Field Strength QP Limit (dBuV/m) at 3/10m
30~230	30 at 10m
230~1000	37 at 10m
Above 1GHz	54 at 3m

### 4.2.2. Measuring Instruments and Setting

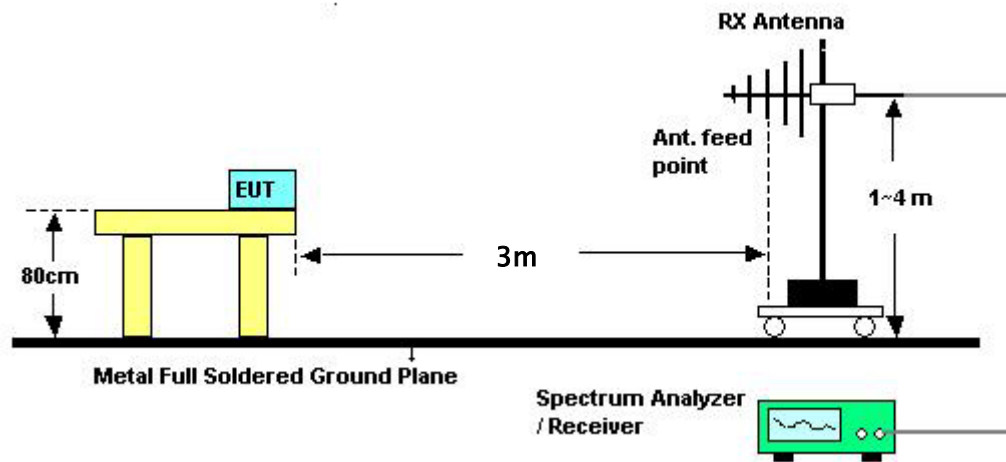
Please refer to section 6 in this report. The following table is the setting of spectrum analyzer and receiver.

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 4.2.3. Test Procedures

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

#### 4.2.4. Test Setup Layout



#### 4.2.5. Test Deviation

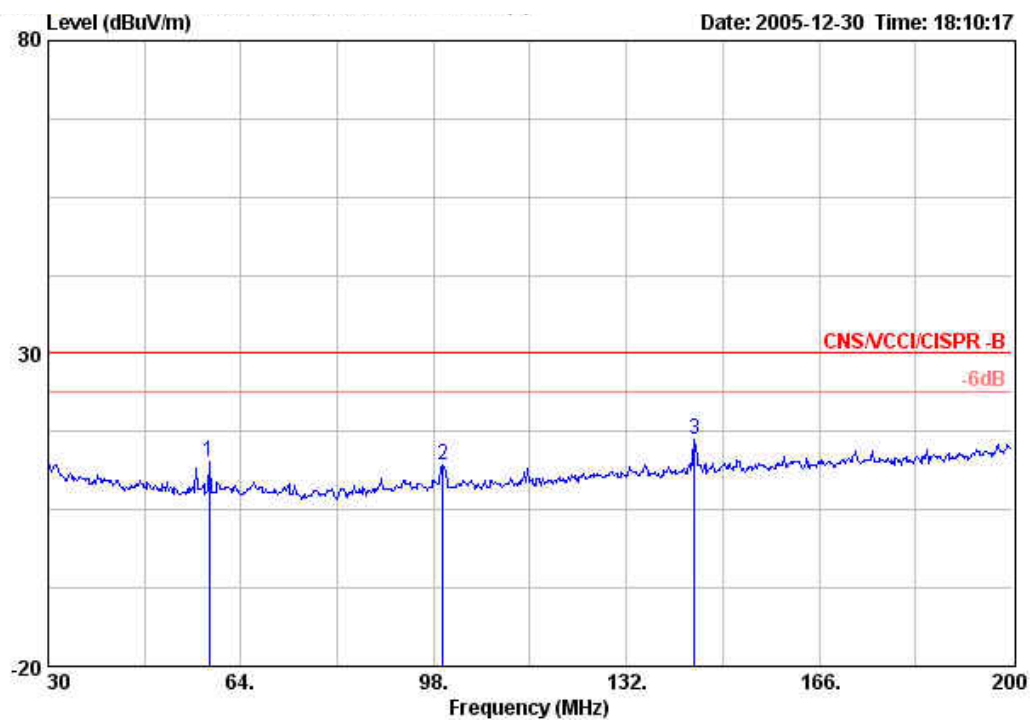
There are no deviations with the original standard.

#### 4.2.6. EUT Operation during Test

During radiated emissions (30MHz~1GHz), the EUT was placed on the test table with essential peripherals connected. The EUT was placed on the test table and programmed in normal function mode.

#### 4.2.7. Results of Radiated Emissions (30MHz~1GHz)

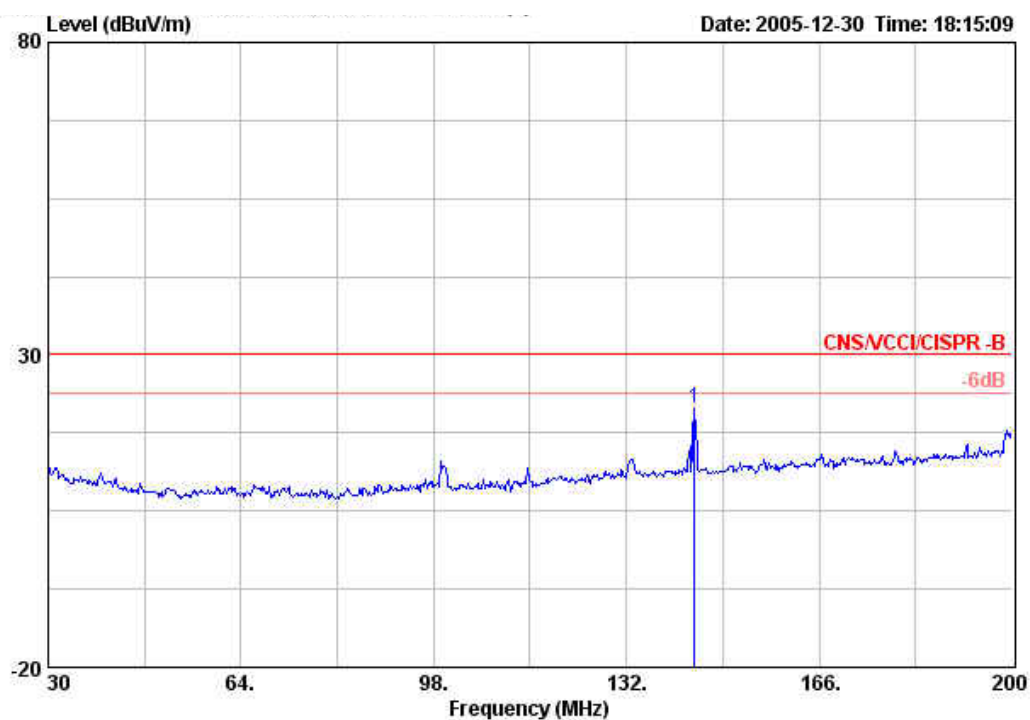
Temperature	24℃	Humidity	60%
Test Engineer	Beck Wu	Configurations	Normal Use (Vertical)



	Freq	Level	Over	Limit	Read	Preamp	Cable	Antenna		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1	58.390	12.67	-17.33	30.00	28.27	27.62	1.53	10.49	Peak	---	---
2	99.700	12.17	-17.83	30.00	29.76	27.63	1.89	8.15	Peak	---	---
3	144.070	16.36	-13.64	30.00	30.01	27.64	2.19	11.79	Peak	---	---

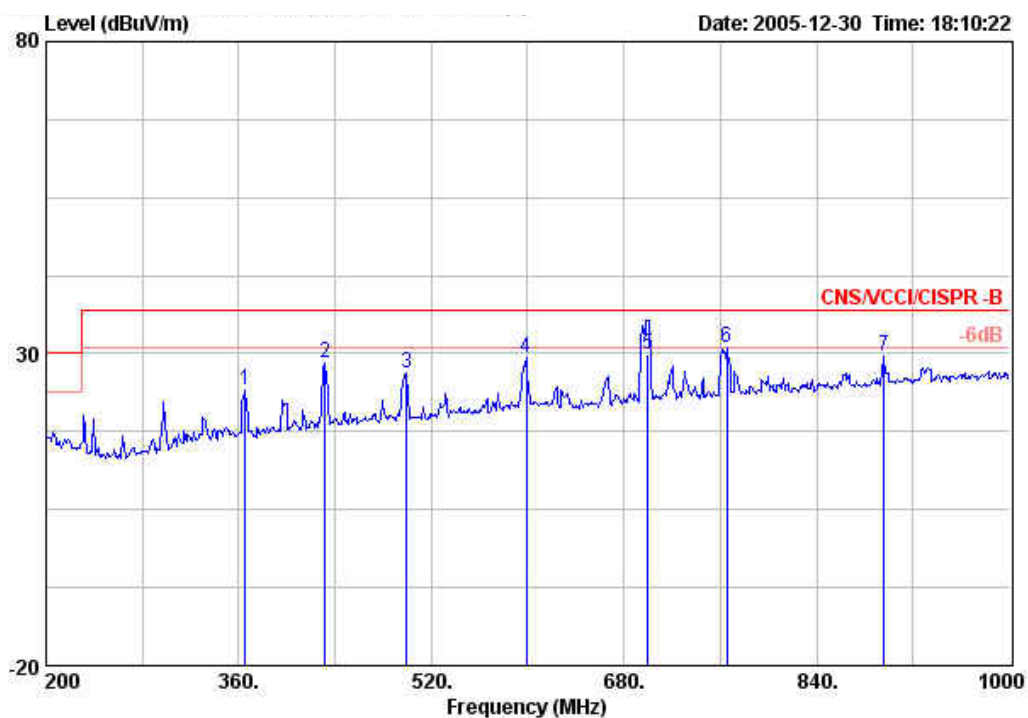


Temperature	24°C	Humidity	60%
Test Engineer	Beck Wu	Configurations	Normal Use (Horizontal)



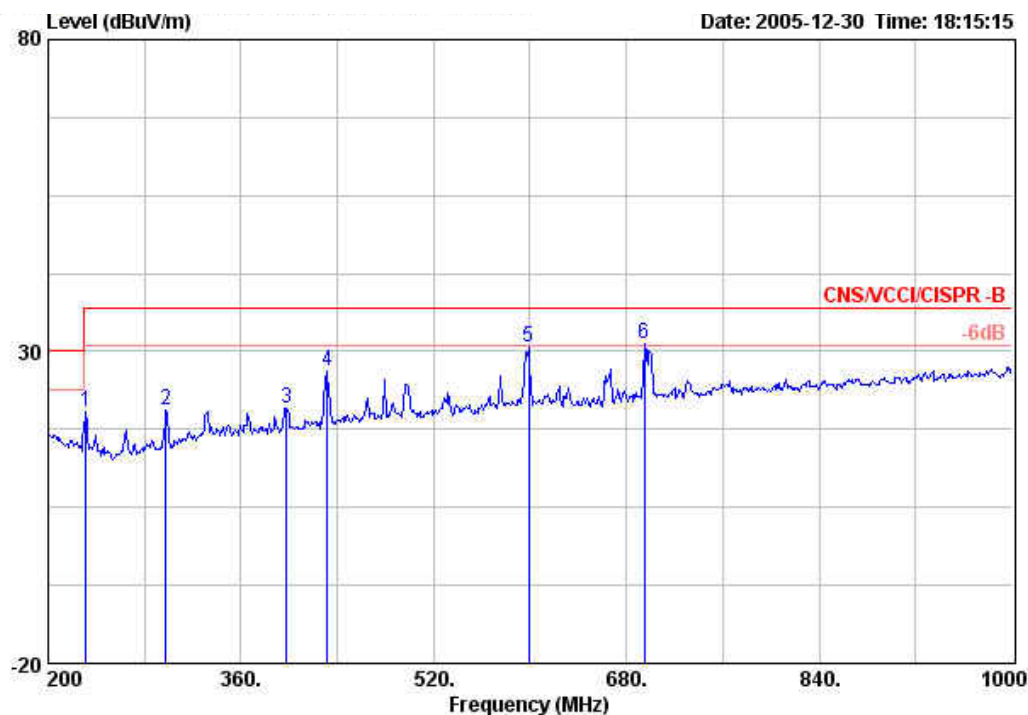
	Freq	Level	Over Limit	Limit Line	Read Level	Preamplifier Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1	144.070	21.34	-8.66	30.00	35.00	27.64	2.19	11.79	Peak	---	---

Temperature	24°C	Humidity	60%
Test Engineer	Beck Wu	Configurations	Normal Use (Vertical)



	Freq	Level	Over Limit	Limit Line	Read Level	Preamplifier Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1	365.600	24.27	-12.73	37.00	35.64	29.70	2.98	15.35	Peak	---	---
2	432.000	28.61	-8.39	37.00	38.76	29.70	3.15	16.39	Peak	---	---
3	499.200	26.81	-10.19	37.00	36.85	29.50	3.35	16.10	Peak	---	---
4	599.200	29.31	-7.69	37.00	34.73	29.40	3.59	20.40	Peak	---	---
5	700.000	29.84	-7.16	37.00	34.56	29.40	3.82	20.86	QP	100	0
6	765.600	31.08	-5.92	37.00	36.74	29.60	4.04	19.90	Peak	---	---
7	896.000	29.61	-7.39	37.00	34.14	29.42	4.30	20.58	Peak	---	---

Temperature	24°C	Humidity	60%
Test Engineer	Beck Wu	Configurations	Normal Use (Horizontal)



	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1	231.200	20.41	-16.59	37.00	34.26	29.68	2.42	13.42	Peak	---	---
2	297.600	20.52	-16.48	37.00	34.36	29.61	2.74	13.04	Peak	---	---
3	397.600	20.99	-16.01	37.00	31.15	29.70	3.09	16.45	Peak	---	---
4	432.000	26.88	-10.12	37.00	37.04	29.70	3.15	16.39	Peak	---	---
5	599.200	30.79	-6.21	37.00	36.20	29.40	3.59	20.40	Peak	---	---
6	695.200	31.17	-5.83	37.00	35.92	29.41	3.81	20.84	Peak	---	---

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Corrected Reading: Antenna Factor + Cable Loss + Read Level – Preamp Factor = Level.

Pol. : V is Vertical Polarization ; H is Horizontal Polarization.

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz - 2.75GHz	Feb. 16, 2005	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz - 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9kHz - 30MHz	May. 05, 2005	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz - 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
10m Semi Anechoic Chamber	TDK	SAC-10M	10CH02-HY	30MHz~1GHz 10m,3m	Mar. 12, 2005	Radiation (10CH02-HY)
Spectrum Analyzer	R&S	FSP7	100645	9KHz - 7GHz	Jun 10, 2005	Radiation (10CH02-HY)
Receiver	R&S	ESI	838496/008	20Hz - 7GHz	Mar. 04, 2005	Radiation (10CH02-HY)
Amplifier	Agilent	8447D	2944A10827	100KHz - 1.3GHz	Jun. 07, 2005	Radiation (10CH02-HY)
Amplifier	Agilent	8447D	2944A10828	100KHz - 1.3GHz	Jun. 07, 2005	Radiation (10CH02-HY)
Biconical Antenna	Schwarzbeck	VHBB 9124	287	30MHz - 200MHz	Jan. 03, 2005	Radiation (10CH02-HY)
Log Antenna	Schwarzbeck	VUSLP 9111	207	200MHz - 1GHz	Jan. 03, 2005	Radiation (10CH02-HY)
Turn Table	HD	DS 430	430/360	0 ~ 360 degree	N/A	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/664	1 m - 4 m	N/A	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/667	1 m - 4 m	N/A	Radiation (10CH02-HY)
RF Cable-R10m	Jye Bao	RG142	CB027-INSIDE	30MHz~1GHz	Jan. 02, 2005	Radiation (10CH02-HY)
RF Cable-R10m	Suhner Switzerland + BELDEN	RG223/U + RG8/U	CB026-DOOR	30MHz~1GHz	Jan. 02, 2005	Radiation (10CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

## 6. SPORTON COMPANY PROFILE

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test facility apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

### 6.1. Test Location

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 02-2696-2468 FAX : 02-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 03-327-3456 FAX : 03-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 02-2601-1640 FAX : 02-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 02-2631-4739 FAX : 02-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 02-8227-2020 FAX : 02-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 <sup>nd</sup> Rd., Taipei 114, Taiwan, R.O.C. TEL : 02-2794-8886 FAX : 02-2794-9777
JHUBEI	ADD : No.8, Lane 728, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C. TEL : 03-656-9065 FAX : 03-656-9085

## 7. CNLA CERTIFICATE OF ACCREDITATION

United States Department of Commerce National Institute of Standards and Technology	
	
ISO/IEC 17025:1999 ISO 9002:1994	
Certificate of Accreditation	
SPORTON INTERNATIONAL, INC. TAIPEI HSIEN 221 TAIWAN	
<i>is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:</i>	
<b>ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS</b>	
December 31, 2005 <i>Effective through</i>	 For the National Institute of Standards and Technology NVLAP Lab Code: 200079-0

NVLAP-01C (06-01)

**EQUIPMENT :** I/O Board

**MODEL NO. :** ICPDAS

**APPLICANT :** ICP DAS CO., LTD.

No. 111, Kuangfu N. Rd., Hukou Shiang, Hsinchu, Taiwan 303, R.O.C.

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4-2003 and all test are performed according to 47 CFR FCC Part 15 Subpart B. Testing was carried out on Jan. 02, 2006 at SPORTON International Inc. LAB.

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Alex Chen  
Manager

## APPENDIX A. Photographs of EUT

















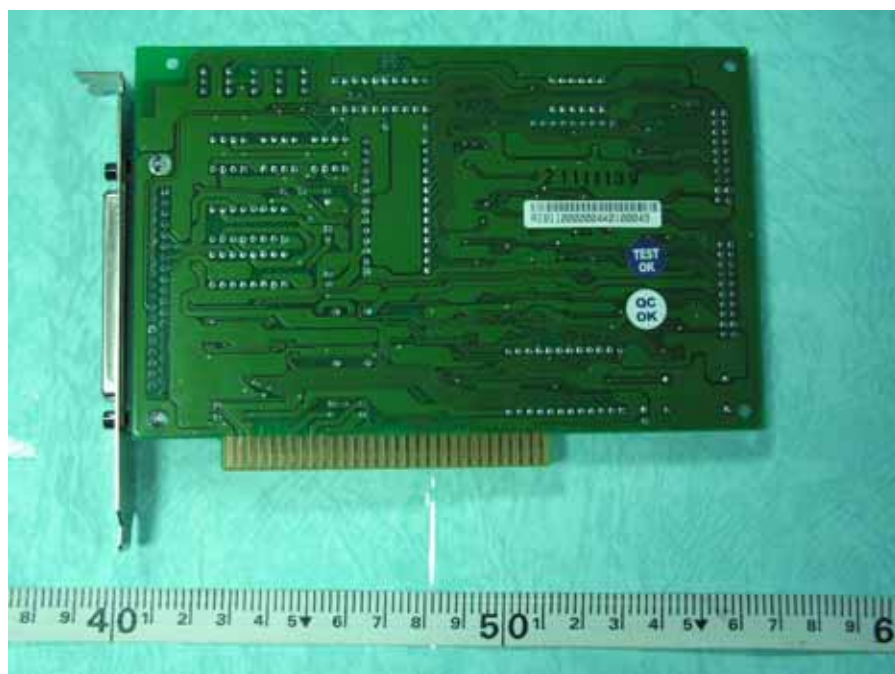




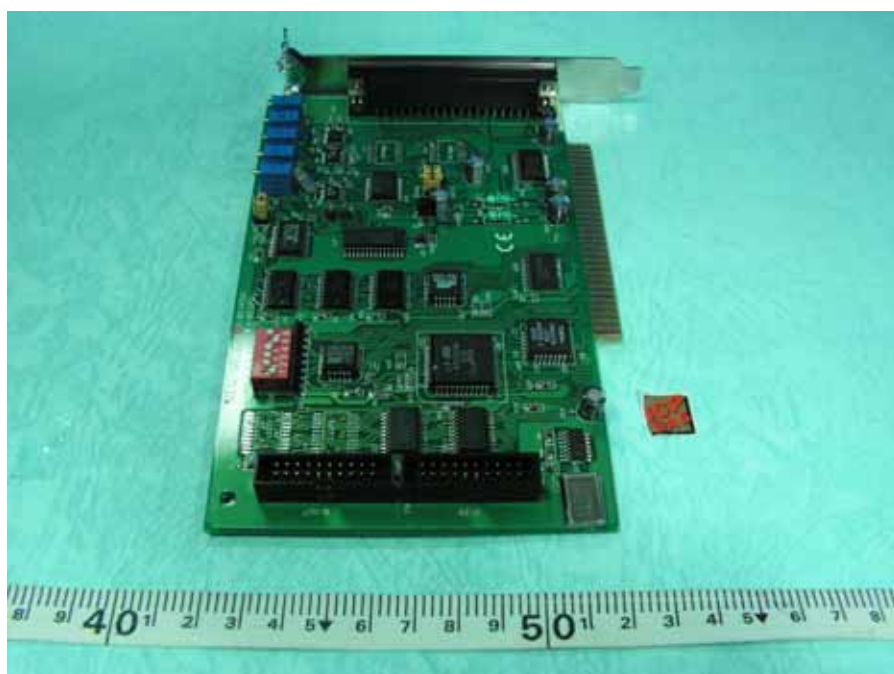








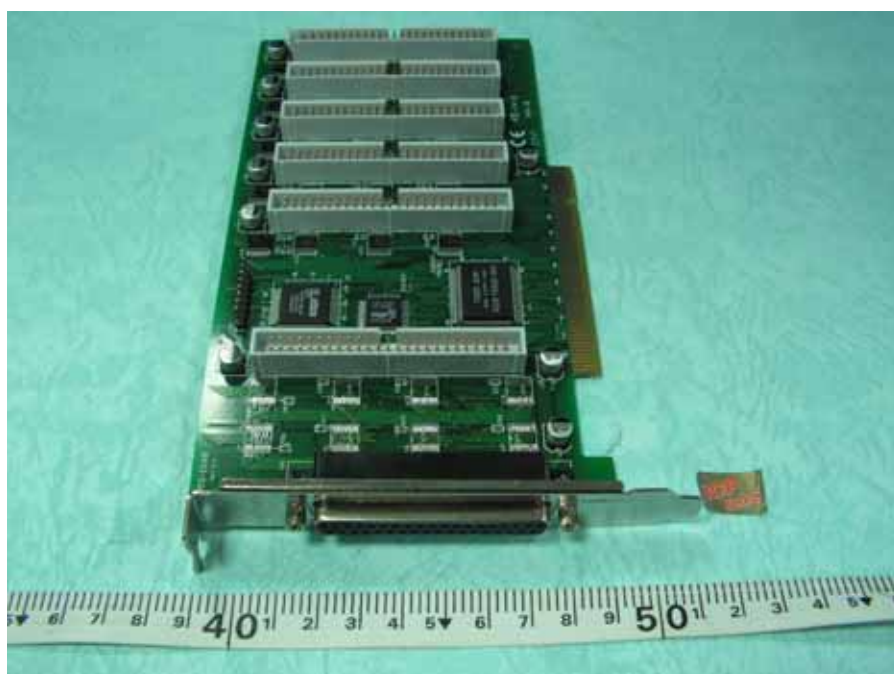


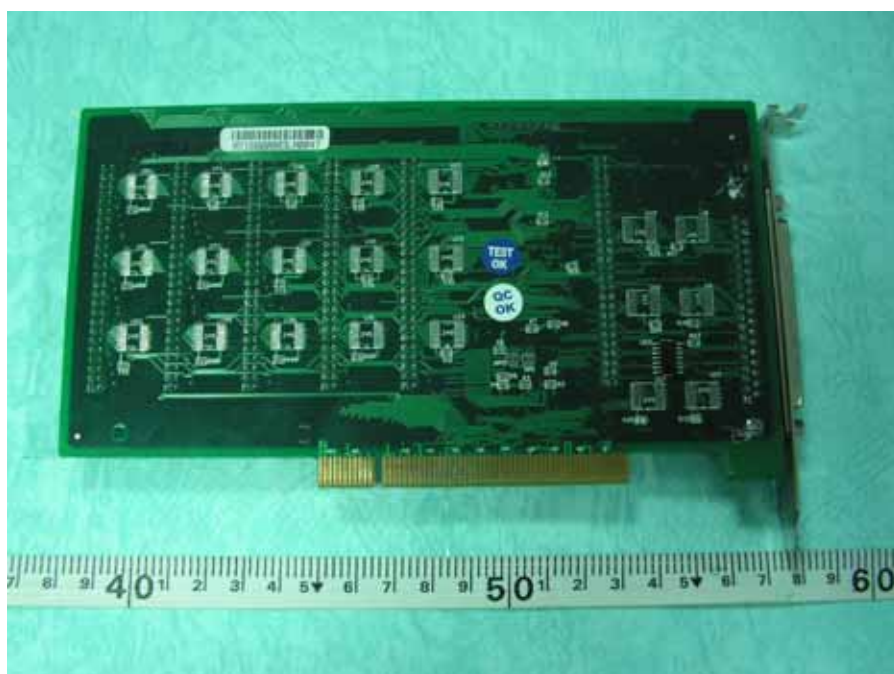












## Appendix B. Test Photos



## 1. Photographs of Conducted Emissions Test Configuration

FRONT VIEW



REAR VIEW



## 2. Photographs of Radiated Emissions Test Configuration

FRONT VIEW



REAR VIEW

