

LABORATORY MEASUREMENTS

Pursuant To
47 CFR Part 15 Subpart B (June, 2005)
And
FCC Procedure ANSI C63.4 (2003)

Applicant: ICP Das Co., Ltd.
No. 111, Kuangfu No. Rd., Hukou Shiang, Hsinchu, Taiwan

Product: ICPDAS CPU with Converter

Model No.: RU-87P SERIES

Issue Date: Nov. 26, 2008

Test Site Location: No. 11, Lane 275, Ko-Nan 1st St., Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

Note: Supersede Report No.: EME-070539 dated (Jun.11, 2007) to
test Report No.: EME-070539/01.

We attest to the accuracy of this report :

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1. General Information

1.1 General Description of EUT

Product: ICPDAS CPU with Converter
Model No.: RU-87P SERIES
Rated Power: 85-264Vac, 47-63Hz
Power Cord: 3C×18AWG×1.8meter unshielded cable
Data Cable: Fiber 10meter × 1

Sample receiving date: Jun. 04, 2007

Testing date: Jun. 05, 2007 ~ Jun. 06, 2007

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Note 2: When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The EUT is an ICPDAS CPU with Converter, and was defined as information technology equipment.

The modules are listed as below:

Module	Diversity
RU-87P2	2 slots Remote I/O Expansion Unit (For RS-485)
RU-87P4	4 slots Remote I/O Expansion Unit (For RS-485)
RU-87P8	8 slots Remote I/O Expansion Unit (For RS-485)
M-7033	3-channel RTD Input Module
M-7033D	3-channel RTD Input Module , with LED Display
M-7041	Isolated Digital Input Module
M-7041D	Isolated Digital Input Module , with LED Display
M-7050	M-7050:Digital I/O Module
M-7050D	M-7050:Digital I/O Module , with LED Display
M-7052	Isolated Digital Input Module
M-7052D	Isolated Digital Input Module , with LED Display
M-7053	Non-isolated Digital Input Module
M-7053D	Non-isolated Digital Input Module , with LED Display
M-7060	4-channel Relay Output and 4-channel isolated Digital Input Module
M-7060D	4-channel Relay Output and 4-channel isolated Digital Input Module ,with LED Display
M-7067	Relay Output Module with Modbus protocol
M-7067D	Relay Output Module with Modbus protocol , with LED Display
M-7080	Counter/Frequency Input Module
M-7080D	Counter/Frequency Input Module , with LED Display
I-87013W	4-channel RTD Input Module
I-87017W	8-channel Analog Input Module
I-87018W	8-Channel Thermocouple Input Module
I-87018Z	10-channel Thermocouple Input Module with High Over Voltage Protection
M-7018Z	10-channel Thermocouple Input Module with High Voltage Protection
I-87024W	4-channel 14-bit analog output module
I-87051W	16-channel Non-isolated Digital Input Module
I-87052W	8-channel Non-isolation Digital Input Module
I-87055W	16-channel Non-isolated Digital I/O Module
I-87057W	16-channel Isolated Open Collector Output Module
I-87058W	8-Channel Isolated Digital Input Module
I-87063W	8-Channel Power Relay Output Module
I-87064W	8-Channel Power Relay Output Module
I-87066W	8-channel SSR-DC Output Module
I-87068W	8-channel Relay Output Module
I-7018Z	10 channel Thermocouple Input Module with High Voltage Protection

For more detail features, please refer to user's Manual.

1.3 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.
RS-232 Converter	N/A	i-7502OR	N/A
RS-485 Converter	N/A	ICP CON	N/A
Notebook PC	Compaq	DP2130	3912A556



2. Test Summary

<i>Emission</i>			
Standard	Test Type	Result	Remarks
FCC Subpart B Section 15.107 Class A	Conducted Emission Test	PASS	Pass by -23.70 dB at 14.192 MHz at Neutral Phase
FCC Subpart B Section 15.109 Class A	Radiated Emission Test	PASS	Pass by -9.56 dB at 43.60 MHz With antenna polarization Horizontal

Remark:

The EUT has been tested/evaluated and pass the FCC Part 15 Subpart B without modification.

3. Test Specifications

3.1 Standards

The following standards were applied for testing:

FCC standard: 47 CFR Part 15, Subpart B. Clause 15.107 and 15.109. (The radiated emission was tested at 10m OATS, the limit level of CISPR 22 was applied.)

The EUT setup configuration please refer to the photo of test configuration in item.

3.2 Definition of Device Classification

Unintentional radiator:

A device which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:

A digital device which is marketed for use in commercial or business environment.

Class B Digital Device:

A digital device which is marketed for use by the general public or in a residential environment.

Note:

A manufacturer may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, regardless of its intended use.

3.3 EUT Operation Condition

The EUT was supplied with 120Vac, 60Hz and was running in normal operating mode.

4. Conducted Emission Measurements (FCC 15.107)

4.1 Operating environment

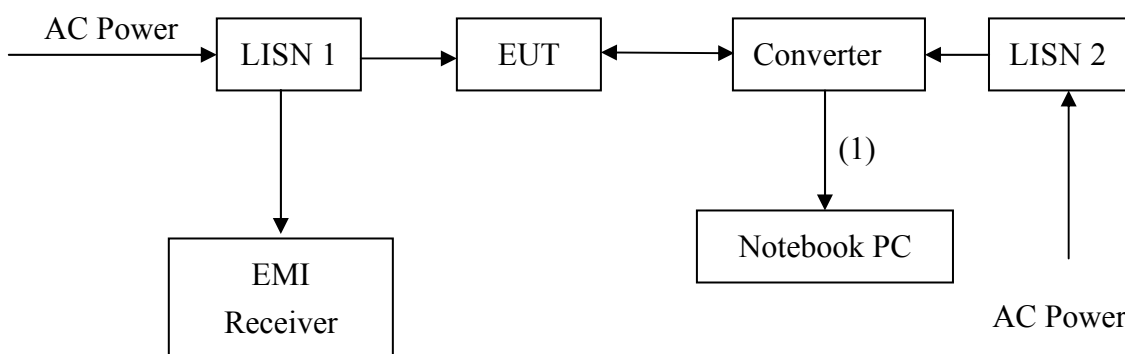
Temperature: 25 °C

Atmospheric Pressure: 1023 hPa

Relative Humidity: 55 %

Test Voltage: 120Vac, 60Hz

4.2 Test Setup and procedure



(1) Fiber 10meter × 1

The EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission

4.3 Test Equipment

Equipment	Brand	Model No.
EMI Receiver	Rohde & Schwarz	ESCS 30
LISN	Rohde & Schwarz	EHS3-Z5
LISN	Schaffner	MN2050D
Shield Room	N/A	N/A

Note: The above equipments are within the valid calibration period.

4.4 Conducted Emission Limits:

Freq. (MHz)	Maximum RF Line Voltage			
	Class A (dB μ V)		Class B (dB μ V)	
	Q.P.	Avg.	Q.P.	Avg.
0.15~0.50	79	66	66~56	56~46
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

4.5 Uncertainty of Conducted Emission

Expanded uncertainty (k=2) of conducted emission measurement is ± 2.26 dB.

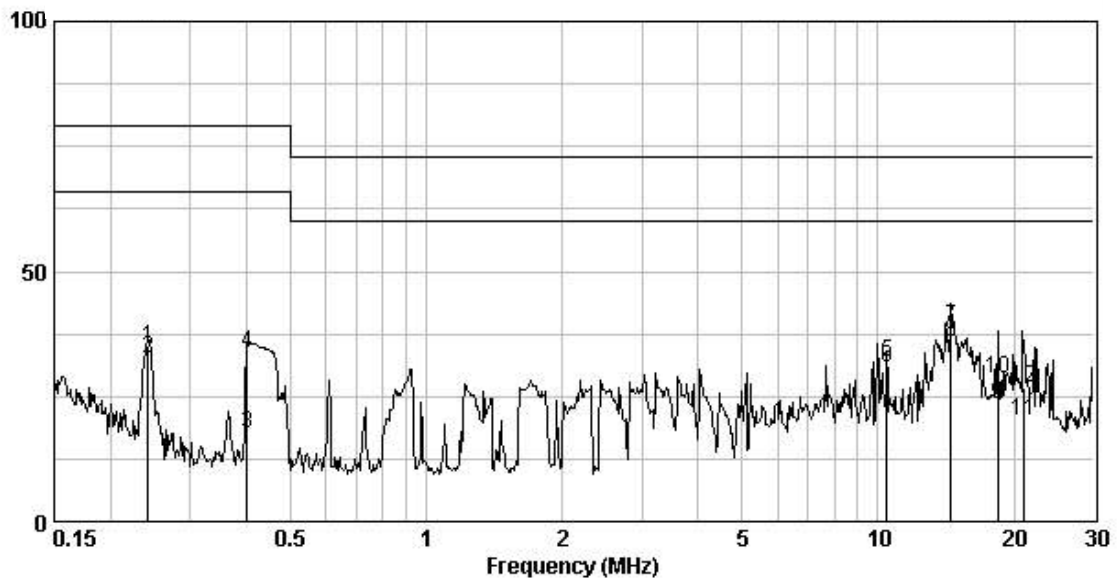
4.6 Conducted Emission Data

Phase: Line
 Model No.: RU-87P SERIES
 Test Condition: Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.242	0.10	34.65	79.00	32.67	66.00	-44.35	-33.33
0.402	0.10	33.81	79.00	17.63	66.00	-45.19	-48.37
10.476	0.43	31.74	73.00	30.63	60.00	-41.26	-29.37
14.517	0.67	38.73	73.00	36.03	60.00	-34.27	-23.97
18.451	0.77	28.53	73.00	23.50	60.00	-44.47	-36.50
20.971	0.84	26.83	73.00	20.32	60.00	-46.17	-39.68

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

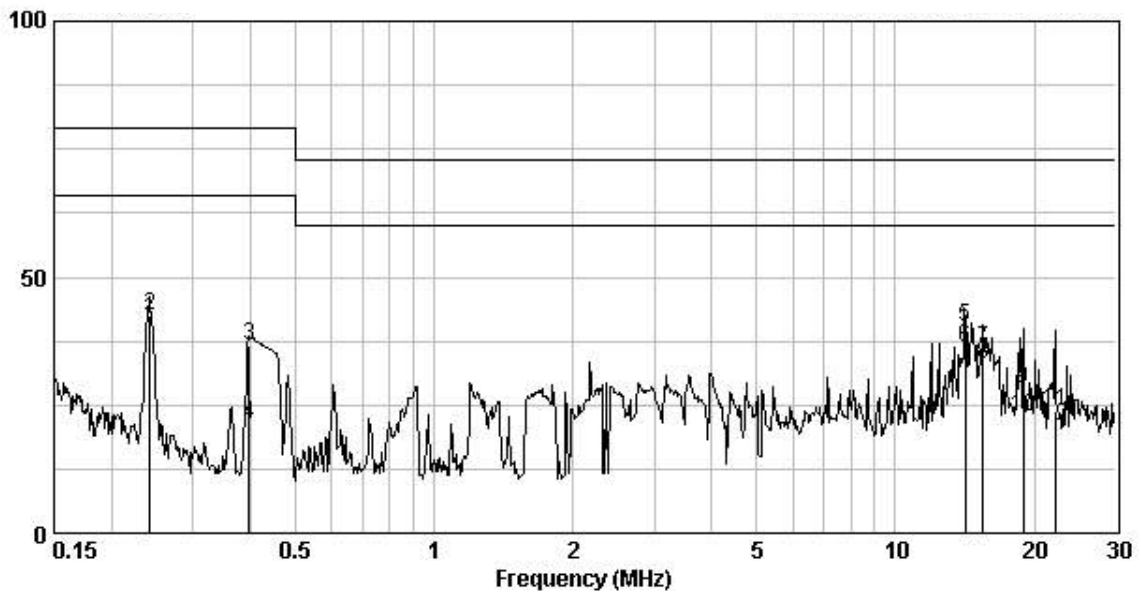


Phase: Neutral
 Model No.: RU-87P SERIES
 Test Condition: Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.242	0.10	42.31	79.00	41.66	66.00	-36.69	-24.34
0.397	0.10	36.48	79.00	21.29	66.00	-42.52	-44.71
14.192	0.37	40.38	73.00	36.30	60.00	-32.62	-23.70
15.482	0.42	35.82	73.00	33.06	60.00	-37.18	-26.94
18.911	0.56	28.05	73.00	22.71	60.00	-44.95	-37.29
22.178	0.64	23.70	73.00	20.92	60.00	-49.30	-39.08

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



5. Radiated Emission Measurements (FCC 15.109)

5.1 Operating Environment

Temperature: 25 °C

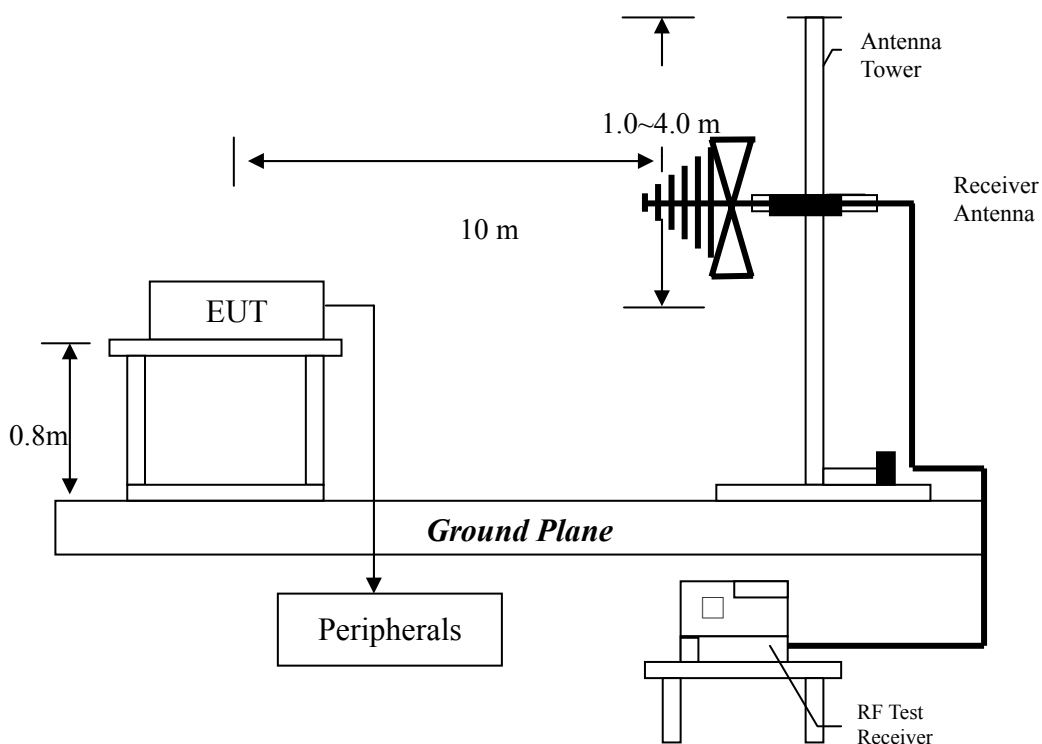
Atmospheric Pressure: 1023 hPa

Relative Humidity: 55 %

Test Voltage: 120Vac, 60Hz

5.2 Test Setup and Procedure

The figure below shows the test setup, which is utilized to make these measurements.



The equipment under test was placed on the top of rotation table 0.8 meter above ground plane.

The table was 360 degrees to determine the position of the highest radiation.

EUT is set 10 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna are set to make the measurement. The bandwidth was setting on the EMI meter 120 kHz.

The levels are quasi peak value readings.

5.3 Test Equipment

Equipment	Brand	Model No.
EMI Receiver	Rohde & Schwarz	ESCS 30
Bilog Antenna	Schaffner	CBL6112B

Note: The above equipments are within the valid calibration period.

5.4 Radiated Emission Limits:

According to FCC 15.109(g), to perform digital device radiated emission using CISPR 22 limits and method, the field strength of radiated emission from unintentional radiators at a distance of 10 meters shall not exceed the following values:

Frequency (MHz)	Distance (m)	Class A	Class B
30~230	10	40	30
230~1000	10	47	37

Note:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument Antenna and the closet point of EUT.

5.5 Uncertainty of Radiated Emission

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.68 dB.

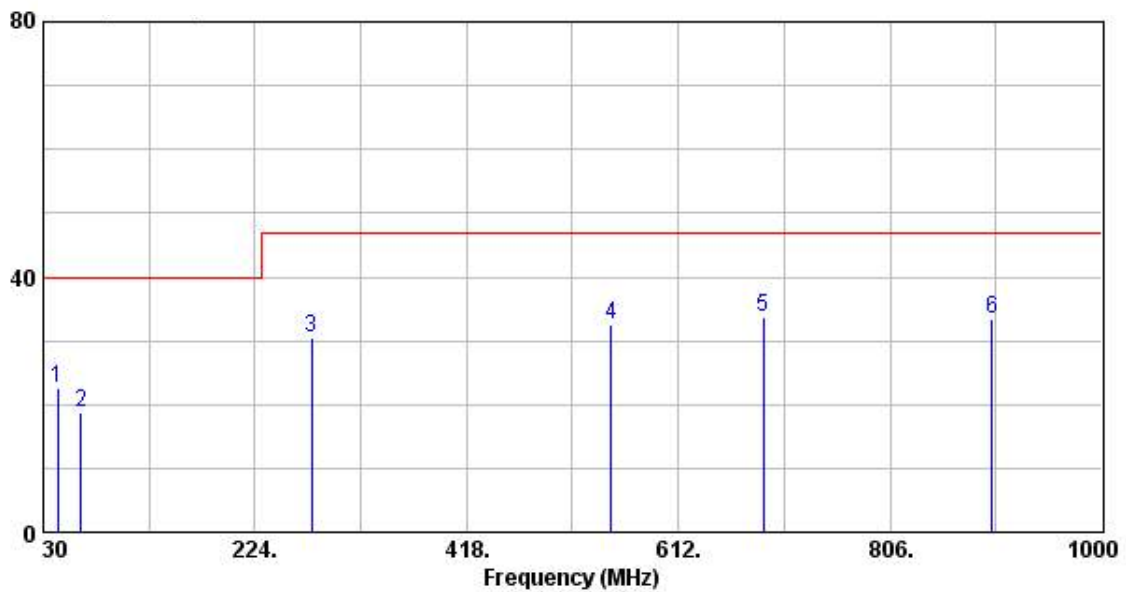
5.6 Radiated Emission Test Data

Polarity: Vertical
 Model No.: RU-87P SERIES
 Test Condition: Normal operating mode

Freq	Pol/Phase	Factor	Read		Limit Line	Over Limit	Remark
			Level	Level			
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
43.60	VERTICAL	12.24	10.30	22.54	40.00	-17.46	QP
64.90	VERTICAL	7.46	11.30	18.76	40.00	-21.24	QP
275.77	VERTICAL	15.13	15.30	30.43	47.00	-16.57	QP
550.29	VERTICAL	22.24	10.20	32.44	47.00	-14.56	QP
690.10	VERTICAL	22.64	11.10	33.74	47.00	-13.26	QP
899.10	VERTICAL	24.87	8.60	33.47	47.00	-13.53	QP

Remark:

1. Level (dB μ V/m) = Factor (dB/m) + Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line (dB μ V/m)

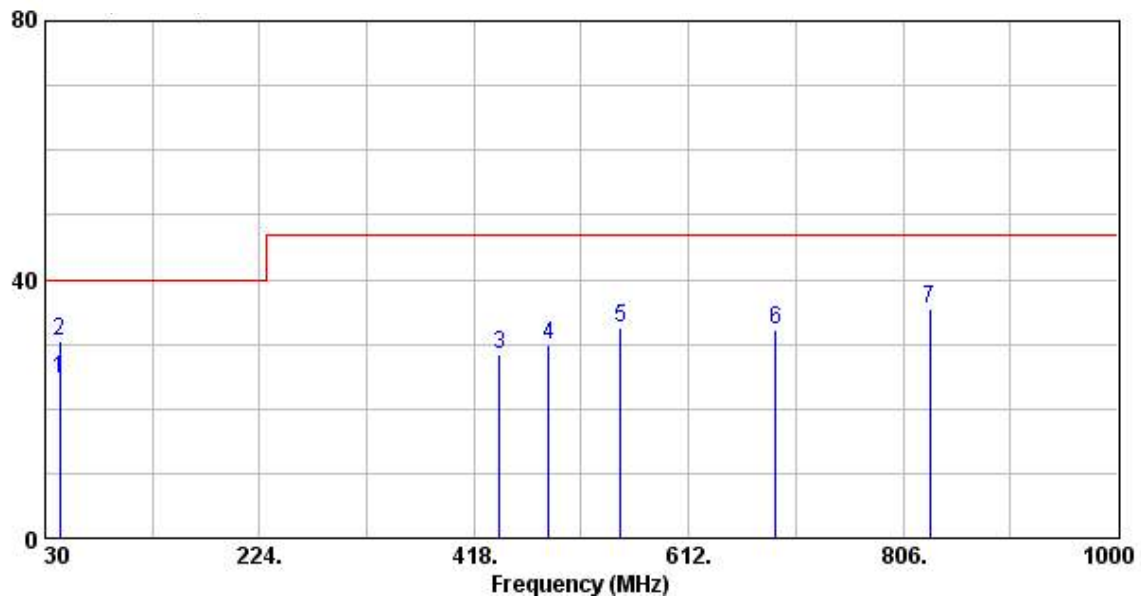


Polarity: Horizontal
 Model No.: RU-87P SERIES
 Test Condition: Normal operating mode

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
43.60	HORIZONTAL	12.24	12.30	24.54	40.00	-15.46	QP
43.60	HORIZONTAL	12.24	18.20	30.44	40.00	-9.56	QP
441.30	HORIZONTAL	19.58	8.90	28.48	47.00	-18.52	QP
485.90	HORIZONTAL	20.34	9.50	29.84	47.00	-17.16	QP
550.60	HORIZONTAL	22.24	10.20	32.44	47.00	-14.56	QP
690.50	HORIZONTAL	22.64	9.50	32.14	47.00	-14.86	QP
830.20	HORIZONTAL	24.29	11.20	35.49	47.00	-11.51	QP

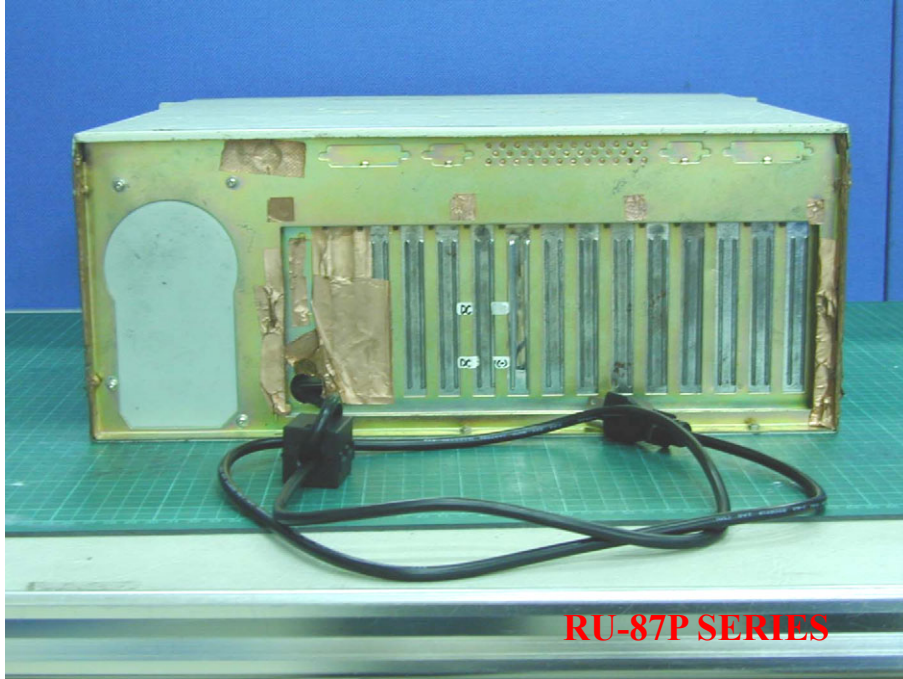
Remark:

1. Level (dB μ V/m) = Factor (dB/m) + Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line (dB μ V/m)

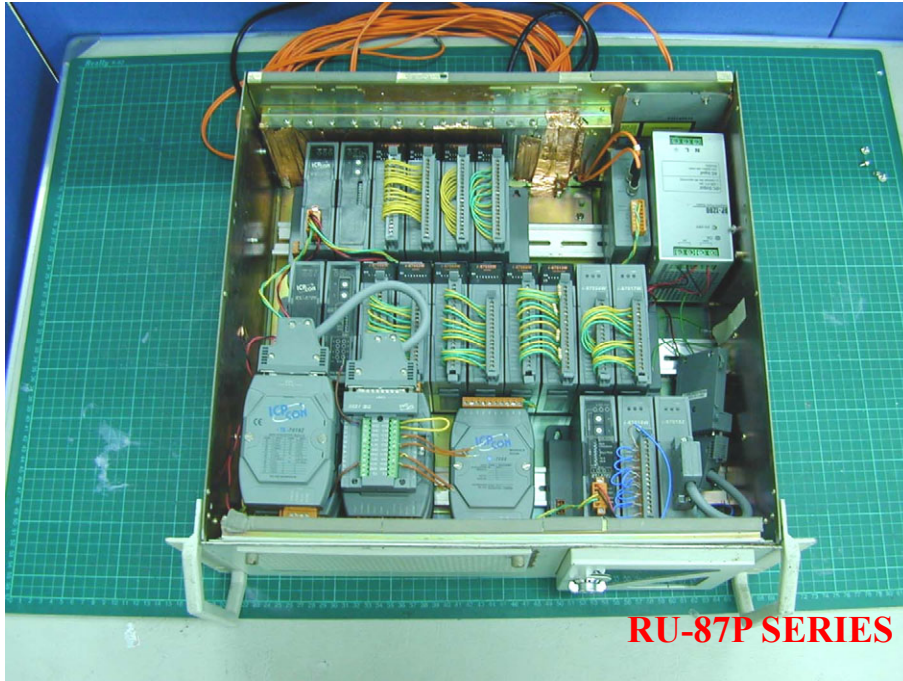


Appendix A1: External photo of EUT

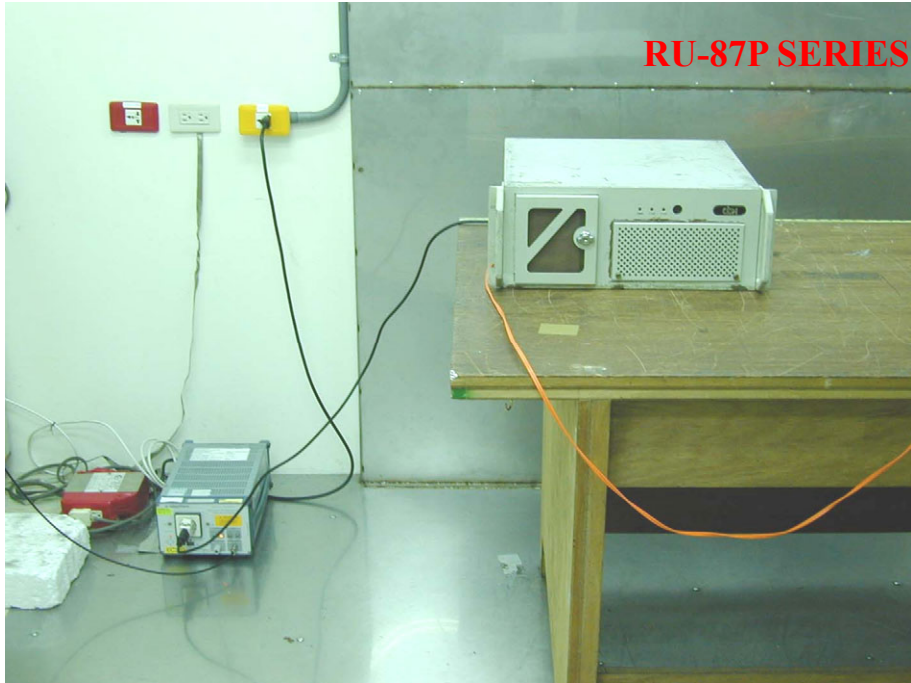




Appendix A2: Internal photo of EUT



Appendix B1: Conducted Emission Test Set-up



Appendix B2: Radiated Emission Test Set-up

