LABORATORY MEASUREMENTS

Pursuant To
47 CFR Part 15 Subpart B (July, 2004)
And
FCC Procedure ANSI C63.4 (2003)

0597
ILAC MRA

Applicant:	ICP DAS Co., Ltd. No. 111, Kuangfu N. Rd., Hukou Shiang, Hsinchu, Taiwan
Model No.:	I-7005, I-7015, I-7019R, I-7045, I-7045D, I-7051, I-7051D, I-7055, I-7055D, I-7530, I-87017R, I-87018R, I-87040, I-87041, M-7017, M-7017-232, M-7017R, M-7018, M-7018R, M-7019R, FR-2053, FR-2057, SG-3016, I-2541
Issue Date:	Dec. 14, 2004
Test Site Location:	No. 11, Lane 275, Ko-Nan 1st St., Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan

We attest to the accuracy of this report：
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Project Engineer

Brandon Huang

Brandon Huang

Reviewed By

Rico Deng

Rico Deng

Table of Contents

1. General Information

1.1 General Description of EUT

Product:	ICPDAS CPU with Converter
Model No.:	I-7005
Applicant:	ICP DAS Co., Ltd.
Rated Power:	120Vac, 60Hz
Power Cord:	3C×18AWG ×1.5meter with 2 cores
Data Cable:	Fiber cable 10meter × 1
Sample receiving date:	Nov. 25, 2004
Testing date:	Nov. 26, 2004 ~ Dec.8, 2004

1.2 Additional information about the EUT

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

According to the hardware aspect, we verified the models listed as below are series model to I-7005 (EUT), the difference please refer to the following table:

Model Number	Firmware
I-7005	8- channel Thermistor Input and 6-channel Alarm Output Module
I-7015	6-channel RTD Input Module
I-7019R	8-channel Universal Analog Input Module
I-7045	16-channel Isolated Digital Output Module
I-7045D	I-7045 with LED Display
I-7051	16-channel Isolated Digital Input Module
I-7051D	16-channel Isolated Digital Input Module
I-7055	8-channel Isolated Digital Input and 8-channel Isolated Digital Output Module
I-7055D	8-channel Isolated Digital Input and 8-channel Isolated Digital Output Module
I-7530	Intelligent RS-232 to CAN converter
I-87017R	8-channel Analog Input Module

Model Number	Firmware
I-87018R	8-channel Thermocouple Input Module
I-87040	32-channel Isolated Digital Input Module
I-87041	32-channel Isolated Digital Output Module
M-7017	8-channel Analog Input Module
M-7017-232	8-channel Analog Input Module
M-7017R	8-channel Analog Input Module with High Over Voltage Protection
M-7018	8-channel Thermocouple Input Module
M-7018R	8-channel Thermocouple Input Module with High Over Voltage Protection
M-7019R	8-channel Universal Input Module with High Over Voltage Protection
FR-2053	16-channel Isolated Digital Input Module
FR-2057	16-channel Isolated Digital Output Module
SG-3016	Isolated Strain Gauge Input Module
I-2541	RS-232/422/485 to Fiber Optic Converter

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

1.3 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.
Notebook PC	Dell	PP01L	CN-03P83-48643-33O-3930
Fiber Optic Converter	ICP DAS	I-2541	N/A

2. Test Summary

Emission			
Standard	**Test Type**	**Result**	**Remarks**
CISPR 22: 2003 Class B	Conducted Emission Test	PASS	Pass by –18.45 dB at 0.244 MHz at Line
	Radiated Emission Test	PASS	Pass by –5.61 dB at 100.8 MHz with antenna polarization vertical

Remark:

The EUT has been tested/evaluated and pass the CISPR 22 without modification.

3. Test Specifications

3.1 Standards

According to 47 CFR Part 15.109 (g), both conducted and radiated emission tests were performed according to the procedures in CISPR 22: 2003.

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

3.2 Definition of Device Classification

Unintentional radiator:
A device that intentionally generates radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but 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; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device:
A digital device, which is, marketed for use in a residential environment, notwithstanding use in a commercial, business of industrial environment. Example of such devices is designed to market for the general public.

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.

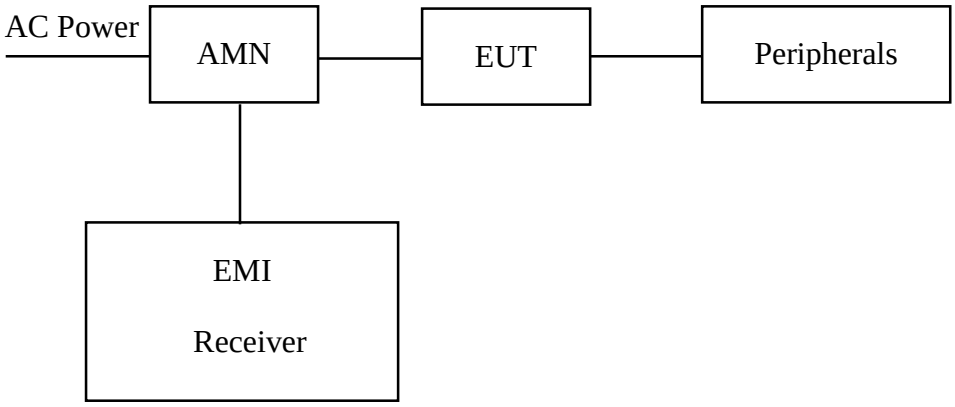
4. Conducted Emission Measurements (FCC 15.107)

4.1 Operating environment

Temperature: 23 ℃ (10-40℃) Atmospheric Pressure: 1023 hPa (860-1060hPa)

Relative Humidity: 55 % (10-90%) Test Voltage: 120Vac, 60Hz

4.2 Test Setup and procedure



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 ,0.4 meter 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.	Intertek ID No.	Next Cal. Date
EMI Receiver	Rohde & Schwarz	ESCS 30	EC318	06/18/2005
LISN	Rohde & Schwarz	EHS3-Z5	EC320	01/08/2005
LISN	Rohde & Schwarz	ESH3-Z5	EC344	01/14/2005
Shield Room	N/A	N/A	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

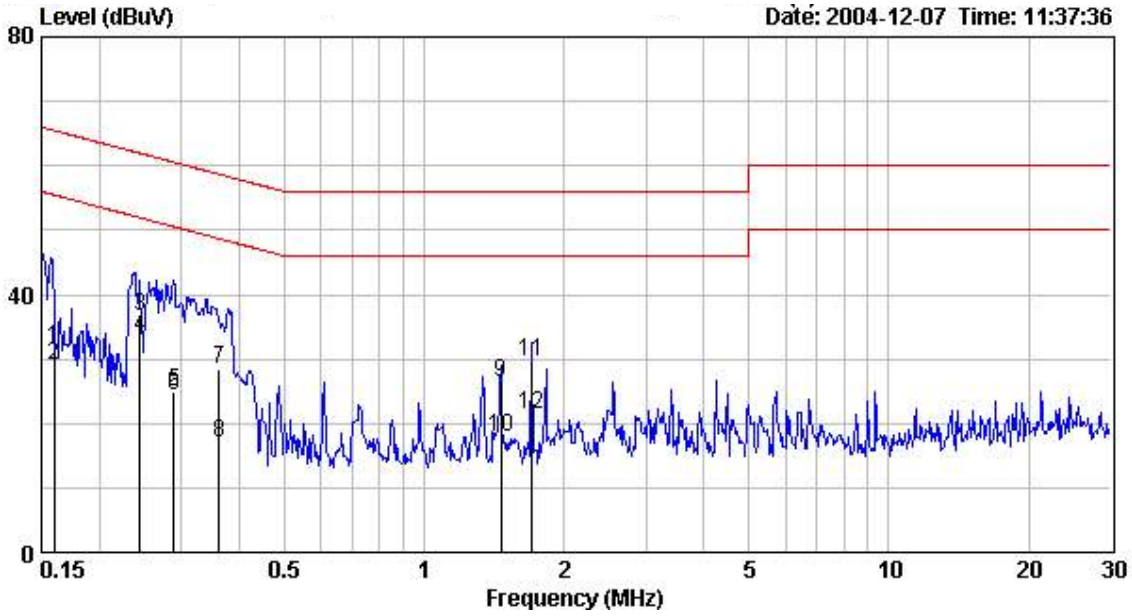
Expanded uncertainty (k=2) of conducted emission measurement is ±2.6 dB.

4.6 Conducted Emission Data

Phase: Line
Model No.: I-7005
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
0.160	0.10	31.59	65.46	29.10	55.46	-33.87	-26.36
0.244	0.10	36.70	61.94	33.49	51.94	-25.24	-18.45
0.290	0.10	24.83	60.53	24.26	50.53	-35.70	-26.27
0.362	0.10	28.35	58.69	16.95	48.69	-30.34	-31.74
1.461	0.11	26.38	56.00	17.95	46.00	-29.62	-28.05
1.704	0.11	29.68	56.00	21.38	46.00	-26.32	-24.62

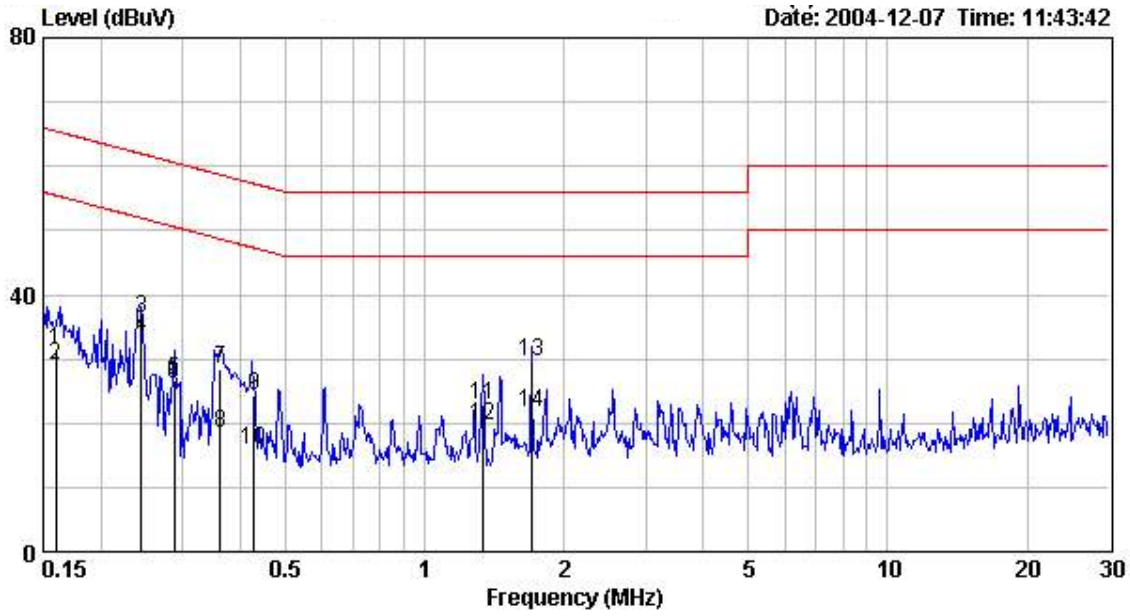
Remark:
1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase: Neutral
Model No.: I-7005
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	Margin (dB) Av
0.160	0.10	31.33	65.46	29.02	55.46	-34.13	-26.44
0.244	0.10	36.35	61.94	33.41	51.94	-25.59	-18.53
0.288	0.10	26.56	60.57	25.94	50.57	-34.01	-24.63
0.362	0.10	28.31	58.69	18.39	48.69	-30.38	-30.30
0.429	0.10	24.39	57.28	15.69	47.28	-32.89	-31.59
1.338	0.10	22.71	56.00	19.56	46.00	-33.29	-26.44
1.703	0.11	29.71	56.00	21.76	46.00	-26.29	-24.24

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



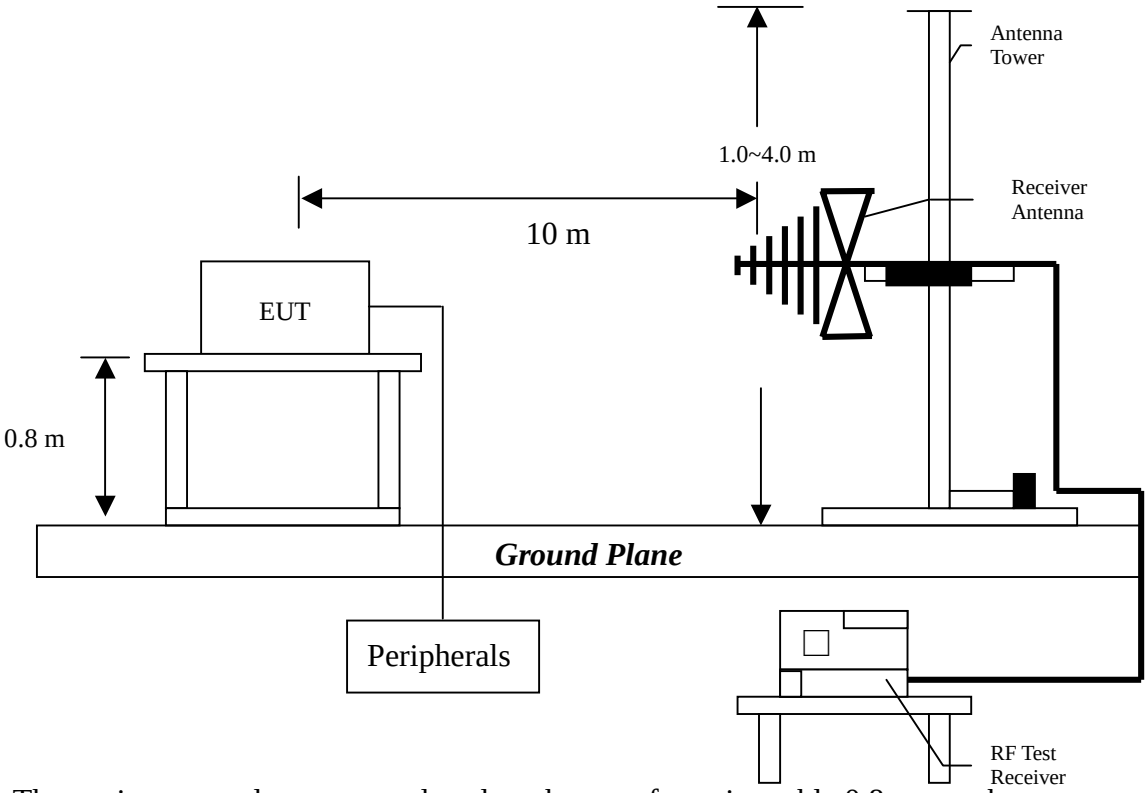
5. Radiated Emission Measurements (FCC 15.109)

5.1 Operating environment

Temperature: 28 ℃ (10-40℃) Atmospheric Pressure: 1023 hPa (860-1060hPa)
Relative Humidity: 40 % (10-90%) Test Voltage: 120Vac, 60Hz

5.2 Test Setup and procedure

The Diagram 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. The frequency spectrum from 30MHz to 1000MHz was investigated.

5.3 Test Equipment

Equipment	Brand	Model No.	Intertek ID No.	Next Cat. Date
EMI Receiver	Rohde & Schwarz	ESCS 30	EC318	6/18/2005
EMI Spectrum	Rohde & Schwarz	ESMI	EC317	7/14/2005
Turn Table	Electro-Metrics	EM4710	EP306	N/A
Bilog Antenna	Schaffner	CBL611213	EC366	02/06/2005
Antenna Tower	Electro-Metrics	EM-4720	EP307	N/A

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

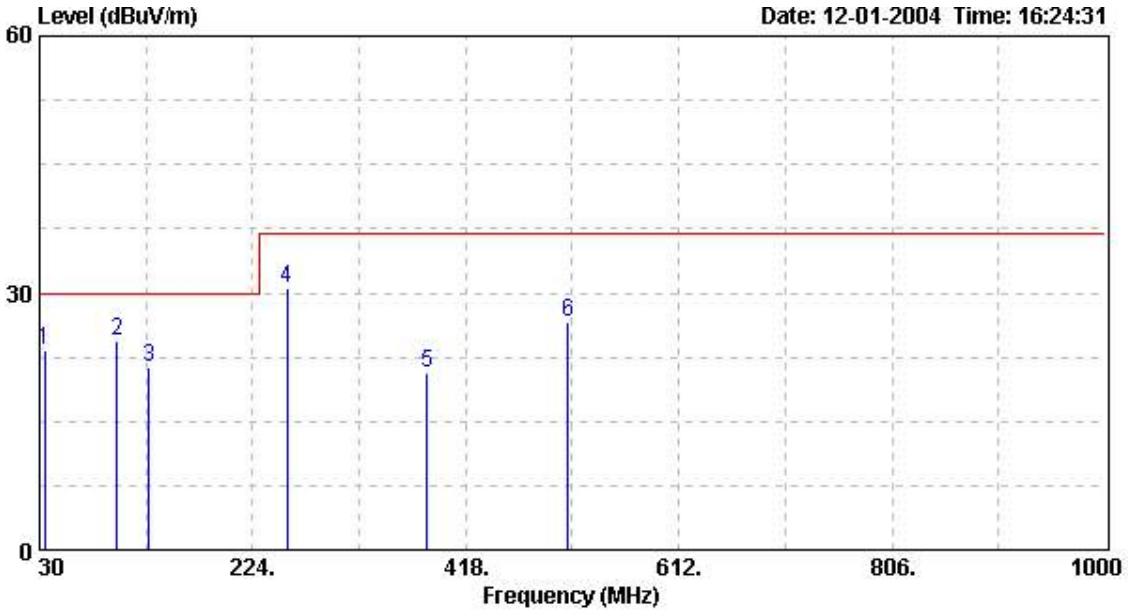
Expanded uncertainty (k=2) of radiated emission measurement is ±3.58 dB.

5.6 Radiated Emission Test Data

Polarity: Vertical
Model No.: I-7005
Test Condition: Normal operating mode

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Ant Pos	Table Pos	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	cm	deg	
34.9	VERTICAL	16.85	6.42	23.27	30.00	-6.73	100	286	QP
100.8	VERTICAL	13.18	11.21	24.39	30.00	-5.61	100	186	QP
129.9	VERTICAL	14.42	6.96	21.38	30.00	-8.62	100	273	QP
255.0	VERTICAL	15.98	14.47	30.45	37.00	-6.55	100	62	QP
383.1	VERTICAL	19.47	1.17	20.64	37.00	-16.36	100	92	QP
511.1	VERTICAL	22.04	4.54	26.58	37.00	-10.42	100	219	QP

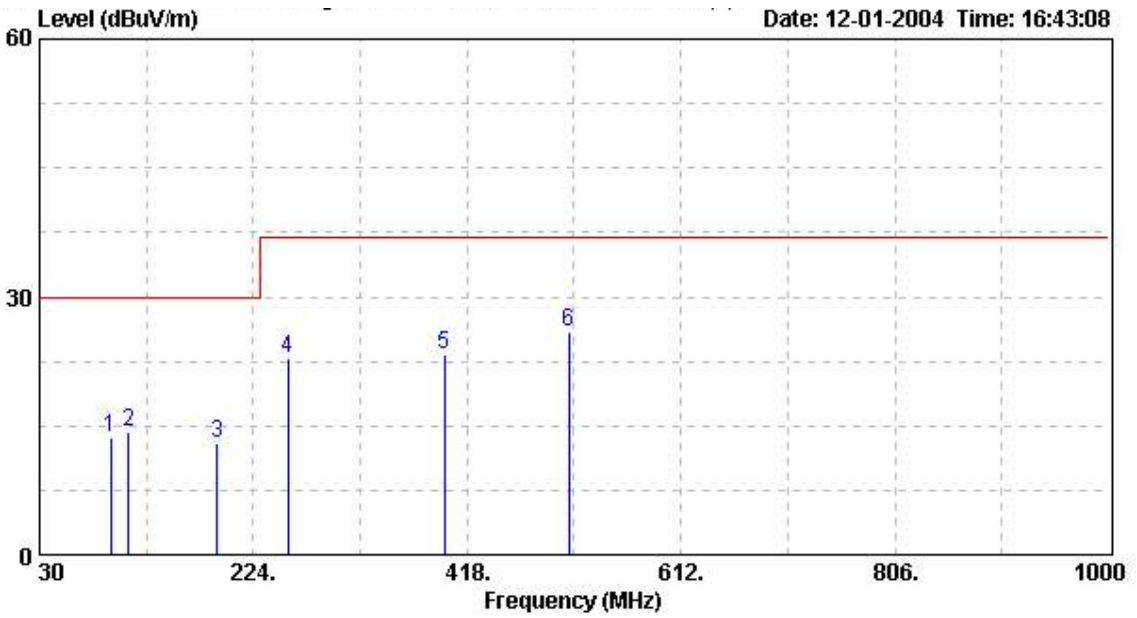
Remark:
1. Level (dB μ V/m)= Factor (dB/m)+ Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line(dB μ V/m)



Polarity: Horizontal
Model No.: I-7005
Test Condition: Normal operating mode

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Ant Pos	Table Pos	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	cm	deg	
95.0	HORIZONTAL	12.18	1.36	13.54	30.00	-16.47	385	127	QP
110.5	HORIZONTAL	14.08	0.23	14.31	30.00	-15.69	359	284	QP
191.0	HORIZONTAL	11.67	1.28	12.95	30.00	-17.05	342	182	QP
255.0	HORIZONTAL	15.98	6.82	22.80	37.00	-14.20	324	294	QP
397.6	HORIZONTAL	20.22	3.05	23.27	37.00	-13.73	338	328	QP
510.2	HORIZONTAL	22.02	3.91	25.93	37.00	-11.07	308	41	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 B1: Conducted Emission Test Set-up

Appendix B2: Radiated Emission Test Set-up