

EMC TEST REPORT

for

WACOM Co., Ltd.

2-510-1 Toyonodai, Otone-machi, Kitasaitama-gun, Saitama 349-1148, Japan

Equipment Under Test: Digitizer
Model Name : PTZ-430
PTZ-630
PTZ-930

Category: FCC Part 15 Sub.part B Class B Digital Device
FCC Part 15 Sub.part C

FCC ID: HV4PTZ

Tokin Report No.: T6E0461113

Date of Issue: July 20, 2004

Approved by


Mickey Fukuda
Manager, Tsukuba Testing Lab.
Tokin EMC Engineering Co., Ltd.

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Contents

	<i>Page</i>
1 DESCRIPTION OF DEVICE	3 ~ 4
2 TEST FACILITY	4
3 SUMMARY OF RESULTS	
3.1 Electromagnetic Emission	5
3.2 Modification to The EUT.....	5
4 TESTED SYSTEM DETAILS	
4.1 Peripherals and Others	6
4.2 Type of Used Cables	6
Figure 4-1 System Configuration Diagram	7
5 TECHNICAL COUNTERMEASURE	7
6 TEST RESULTS	
6.1 RFI Voltage Measurement	
6.1.1 Measurement Instrumentation Used	8
6.1.2 Measurement Procedure.....	8
6.1.3 Deviation from the specification	8
6.1.4 Measurement Uncertainty	8
6.1.5 Test Data.....	9 ~ 20
6.2 RFI Field Strength Measurement	
6.2.1 Measurement Instrumentation Used	21
6.2.2 Measurement Procedure.....	22
6.2.3 Deviation from the specification	22
6.2.4 Measurement Uncertainty	22
6.2.5 Test Data.....	23 ~ 38
6.3 Minimum Margin.....	39
6.4 Sample Calculation	39
7 MEASUREMENT PHOTOS	
Photo 7.1 Setup with the Maximized RFI Voltage Emission Level.....	40 ~ 43
Photo 7.2 Setup with the Maximized RFI Field Strength Emission Level	44 ~ 47

1 DESCRIPTION OF DEVICE

- A) Kind of Equipment : Digitizer
- B) FCC ID : HV4PTZ
- C) Model Name : PTZ-430
PTZ-630
PTZ-930

The differences among these 3 models are as follows.

Model Name	PTZ-430	PTZ-630	PTZ-930
Size (mm)	238.5*217*13	345*261.5*13	439.5*340*14
Active area (mm)	127.0*101.6	203.2*152.4	304.8*228.6
Weight (g)	600	1000	1800
Number of Touch Pad	1	2	2

The Touch Pads of these 3 models are using the same parts completely and the number to be using by the model is different.

- D) Serial No. : None
- E) Type of Sample Tested : Pre-production
- F) High Frequency Used : 667kHz (Communication between a device and a tablet)
12MHz (CPU clock)
16MHz (Gatearray clock)
8MHz (Touch Pad)
- G) Rating Power Supply : DC5V, 300mA
- H) Tested Power Supply : DC5V (EUT)
1phase AC120V, 60Hz (PC)
- I) Date of Manufacture : June 2004
- J) Manufacturer : WACOM Co., Ltd.
2-510-1 Toyonodai, Otone-machi, Kitasaitama-gun,
Saitama 349-1148, Japan

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K) Options :

Using Devices: ZP-130-00 (Ink Pen)
ZP-400E-00 (Airbrush)
ZP-501E-00 (Grip Pen)
ZC-100-00 (2D Mouse)

- As a kind of digitizer, there are three sorts, PTZ-430, PTZ-630, and PTZ-930, according to size.
- As a device which can be used on each digitizer, there are a grip-pen, an ink pen, an airbrush, and a 2D mouse.
- The device of these cannot be simultaneously used on two or more and the same digitizer.
- Each digitizer has an USB I/F cable and is connected by PC and USB.

L) Description of Operating :

Device detection state

M) Date of Sample Received :

June 2, 2004

N) Tested Engineer :

Kazunori Maeshima

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2 TEST FACILITY

The open field test site and conducted measurement facility are used for these testing, where are located following address. This site was fully described in a report dated Mar 20,2001, that was submitted to the FCC. And we had accepted in a letter dated Mar.26,2001 (31040/SIT). This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200221-0.

Tokin EMC Engineering Co., Ltd.
Tsukuba Testing Laboratory, Open Field Test Site No.6 and Shielded Room No.2

Address ; 28-1, Kitahara-aza, Hanashimashinden-ohaza, Tsukuba-city, Ibaragi 305-0875, Japan

3 SUMMARY OF RESULTS

3.1 Electromagnetic Emission

RFI Voltage Measurement**PASS**

RFI Field Strength Measurement**PASS**

Although the measured emissions indicate that the EUT complies with the required limits, some measurements are close to these limits. When the uncertainty of measurement is considered, there is some possibility that the EUT may not be compliant.

Test results are traceable to JQA and NML/CSIRO.

3.2 Modifications to The EUT

Model PTZ-430 was taken countermeasures.

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4 TESTED SYSTEM DETAILS

4.1 Peripherals and Others :

Description	Model Name	Serial No.	Manufacturer	FCC ID
PC	DHM	FKBY21X	DELL	DoC
Monitor	570STFT	CN15LSSN/XSJ	Samsung	DoC
AC Adapter for Monitor	PSCV360104A	C010801969	Samsung	None
Modem	1414	9068680	ACEEX	IFAXDM1414
AC Adapter for Modem	AA121	None	OEM	None
Printer	K10206	FATH01746	Canon	DoC
Keyboard	SK-8100	---	DELL	3892D553
Mouse	IntelliMouse 1.3A	---	Microsoft	3892A378

4.2 Type of Used Cables :

Description	Length	Type of shield	Model name	Manufacturer
PC AC Cable	1.8m	Non-shielded	None	---
Monitor AC Cable	1.5m	Non-shielded	None	---
Printer AC Cable	1.5m	Non-shielded	None	---
Modem DC Cable	2.0m	Non-shielded	None	---
Monitor I/F Cable (PC ~ Monitor)	1.8m	Shielded	None	---
Modem I/F Cable (PC ~ Modem)	1.5m	Shielded	None	---
Printer I/F Cable (PC ~ Printer)	1.5m	Shielded	None	---
Keyboard Cable (PC ~ Keyboard)	1.8m	Non-shielded	None	---
Mouse Cable (PC ~ Mouse)	1.8m	Non-shielded	None	---
USB Cable (EUT ~ PC)	2.5m	Shielded	None	TOP CHARGER ENTERPRISE CO., LTD.

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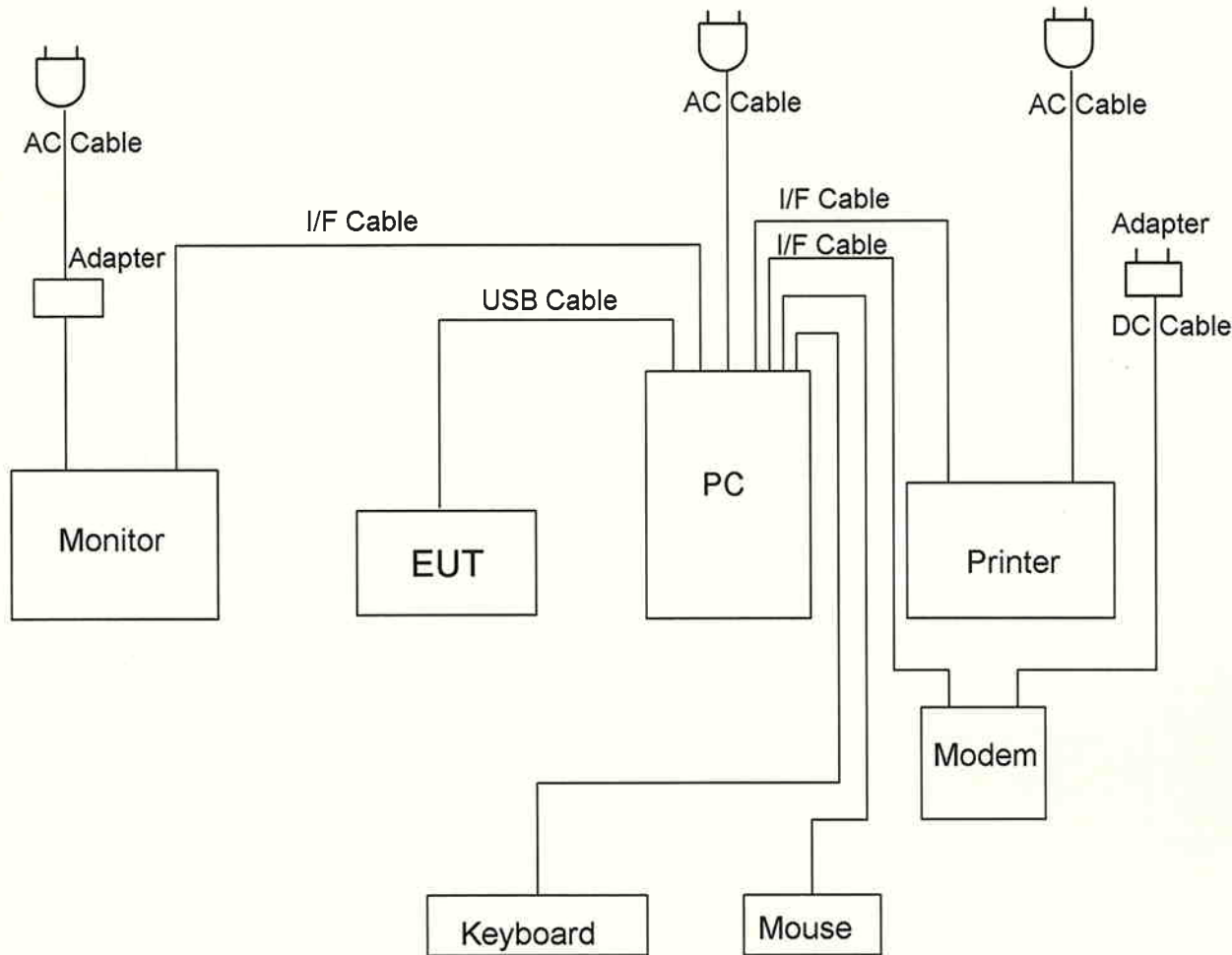


Figure 4-1 System Configuration Diagram

5 TECHNICAL COUNTERMEASURE

<PTZ-430>

5-1 Common mode chock coil (DLP31SN121S / Murata Manufacturing Co., Ltd.) is inserted in the signal line of USB.

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6 TEST RESULTS**6.1 RFI Voltage Measurement****6.1.1 Measurement Instrumentation Used***(model/serial no./manufacturer/Tokin control no./last calibration/next calibration)*

Field strength meter (FCKL1528/134/Schwarzbeck/RE041/26 May'04/Aug.'04)

L.I.S.N. (KNW-407/8-578-14/Kyoritsu/LI012/20 Nov.'03/Nov.'04)

2nd L.I.S.N. (PN-T22/9403/Tokin/LI065/30 Oct.'03/Oct.'04)

Spectrum analyzer (E4401B/MY41440237/Agilent/SP051/15 Jan.'04/Jan.'05)

Coaxial cable (RG-55U/---/---/DK194/05 Oct.'04/Oct.'05)

Software..... (Software Data Calculation Software TEPTO 1.06/---/AES/---/---/---)

Shielded Room (Tsukuba No.2-S/---/Tokin/SA017/---/---)

The measurement instrumentation used, are calibrated according to Quality Manual.

6.1.2 Measurement Procedure

The power line conducted interference measurements were performed according to ANSI C63.4-2001 in a shielded enclosure No.2 with peripherals placed on a table, 0.8m high over a metal floor. It was located distance 0.4m away from the shielded enclosure wall. There are no deviations from the standard. The standard limit was adopted CISPR Pub.22:1997 Class B.

The EUT was plugged into the LISN and the frequency range of interest scanned.

Reported are maximized emission levels.

These tests were performed at 9kHz of 6dB bandwidth.

Test results had obtained from following equation.

$$\text{Result (dB}\mu\text{V)} = \text{Level (dB}\mu\text{V)} + \text{Total Factor (dB)}$$

<Decision to Pass or Fail>

To judge pass or fail of the test result, it was added "uncertainty" to the obtained data and then subtracted it from the limit value. If all the values are +(plus), it will be passed, and if there is -(minus), it will be failed.

6.1.3 Deviation from the specification: None

6.1.4 Measurement Uncertainty

The data was tested are including uncertainty.

Measurement uncertainty is $\pm 1.94\text{dB}(k=2)$ and it had estimated for decision to PASS or FAIL.

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6.1.5 Test Data

Table 6.1-1a RFI Voltage Measurement Results (Q-Peak Measurement)

EUT: PTZ-430 + Grip Pen
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.173	43.0	0.0	43.0	64.8	21.8
	0.347	30.0	0.0	30.0	59.0	29.0
	1.040	33.5	0.0	33.5	56.0	22.5
	2.080	35.0	0.1	35.1	56.0	20.9
	4.677	28.0	0.4	28.4	56.0	27.6
	17.418	28.0	0.8	28.8	60.0	31.2
	22.003	31.0	0.9	31.9	60.0	28.1
L1-E	0.173	39.0	0.0	39.0	64.8	25.8
	0.347	30.0	0.0	30.0	59.0	29.0
	1.040	34.0	0.0	34.0	56.0	22.0
	2.080	35.0	0.0	35.0	56.0	21.0
	4.677	32.0	0.4	32.4	56.0	23.6
	17.418	31.0	0.7	31.7	60.0	28.3
	22.003	32.0	0.8	32.8	60.0	27.2

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Table 6.1-1b RFI Voltage Measurement Results (Average Measurement)

EUT: PTZ-430 + Grip Pen
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.173	42.5	0.0	42.5	54.8	12.3
	0.347	30.0	0.0	30.0	49.0	19.0
	1.040	31.5	0.0	31.5	46.0	14.5
	2.080	30.5	0.1	30.6	46.0	15.4
	4.677	27.0	0.4	27.4	46.0	18.6
	17.418	21.0	0.8	21.8	50.0	28.2
	22.003	25.0	0.9	25.9	50.0	24.1
L1-E	0.173	38.5	0.0	38.5	54.8	16.3
	0.347	30.0	0.0	30.0	49.0	19.0
	1.040	32.0	0.0	32.0	46.0	14.0
	2.080	30.0	0.0	30.0	46.0	16.0
	4.677	30.0	0.4	30.4	46.0	15.6
	17.418	21.0	0.7	21.7	50.0	28.3
	22.003	26.5	0.8	27.3	50.0	22.7

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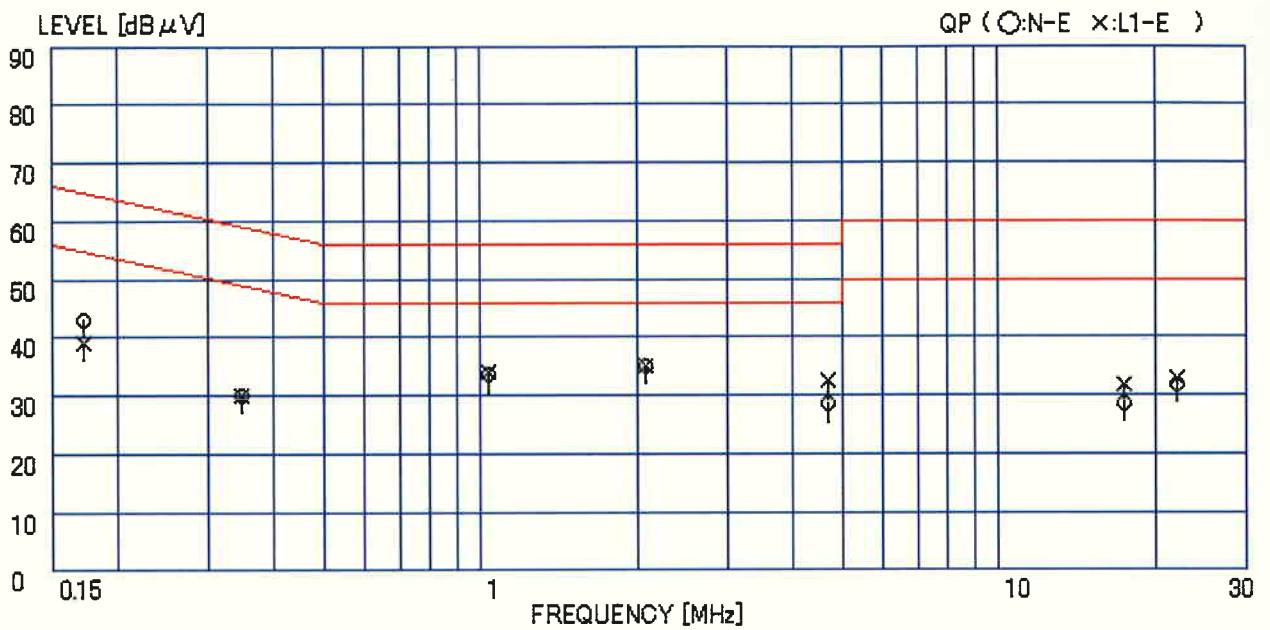
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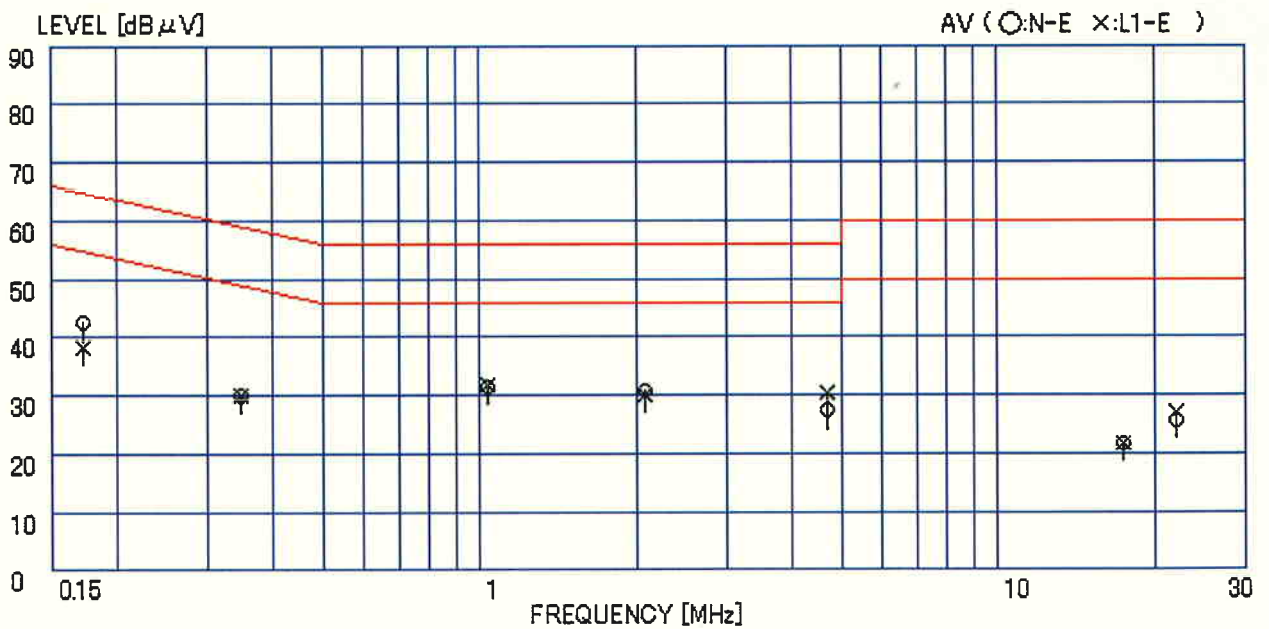


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CISPR Pub.22: 1997 Class B Limit



<Q-Peak Measurement>



<Average Measurement>

Figure 6.1-1 RFI Voltage Measurement Results

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Table 6.1-2a RFI Voltage Measurement Results (Q-Peak Measurement)

EUT: PTZ-630 + Ink Pen
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.174	43.5	0.0	43.5	64.8	21.3
	0.523	33.5	0.0	33.5	56.0	22.5
	1.045	34.0	0.0	34.0	56.0	22.0
	2.089	36.0	0.1	36.1	56.0	19.9
	4.697	29.0	0.4	29.4	56.0	26.6
	20.670	47.5	0.9	48.4	60.0	11.6

L1-E	0.174	40.0	0.0	40.0	64.8	24.8
	0.523	31.5	0.0	31.5	56.0	24.5
	1.045	32.0	0.0	32.0	56.0	24.0
	2.089	35.0	0.0	35.0	56.0	21.0
	4.697	31.0	0.4	31.4	56.0	24.6
	20.670	46.5	0.8	47.3	60.0	12.7

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Table 6.1-2b RFI Voltage Measurement Results (Average Measurement)

EUT: PTZ-630 + Ink Pen
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.174	43.0	0.0	43.0	54.8	11.8
	0.523	30.0	0.0	30.0	46.0	16.0
	1.045	32.0	0.0	32.0	46.0	14.0
	2.089	31.0	0.1	31.1	46.0	14.9
	4.697	26.0	0.4	26.4	46.0	19.6
	20.670	42.0	0.9	42.9	50.0	7.1

L1-E	0.174	39.5	0.0	39.5	54.8	15.3
	0.523	29.5	0.0	29.5	46.0	16.5
	1.045	30.0	0.0	30.0	46.0	16.0
	2.089	30.0	0.0	30.0	46.0	16.0
	4.697	30.0	0.4	30.4	46.0	15.6
	20.670	42.0	0.8	42.8	50.0	7.2

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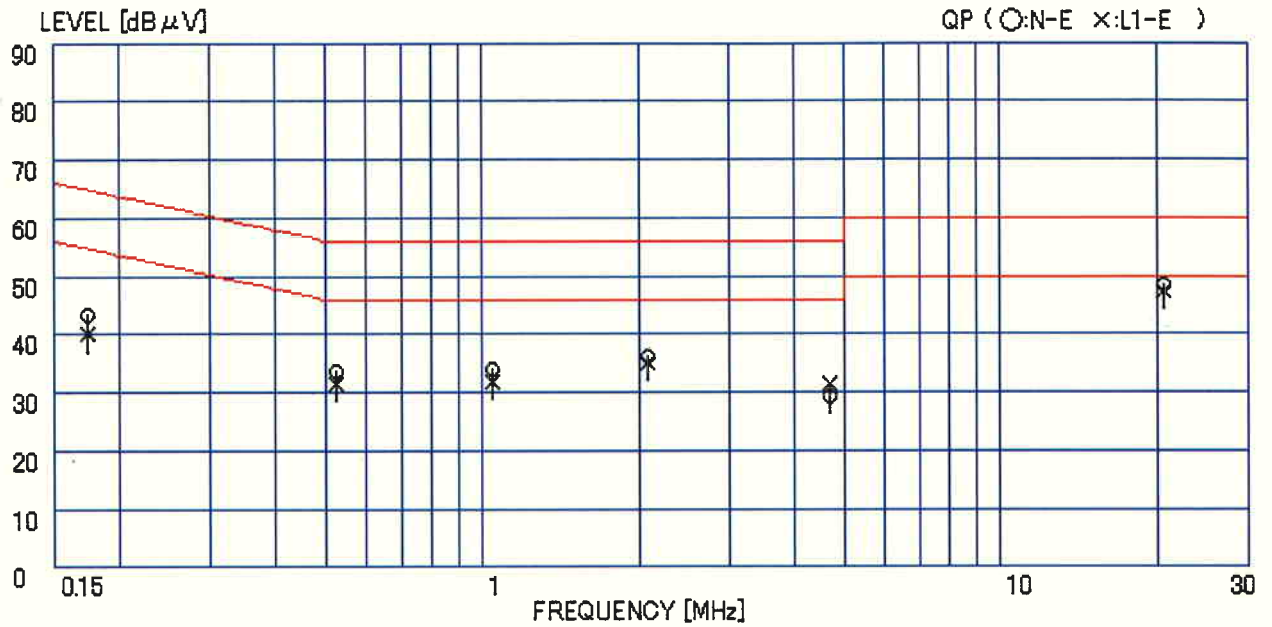
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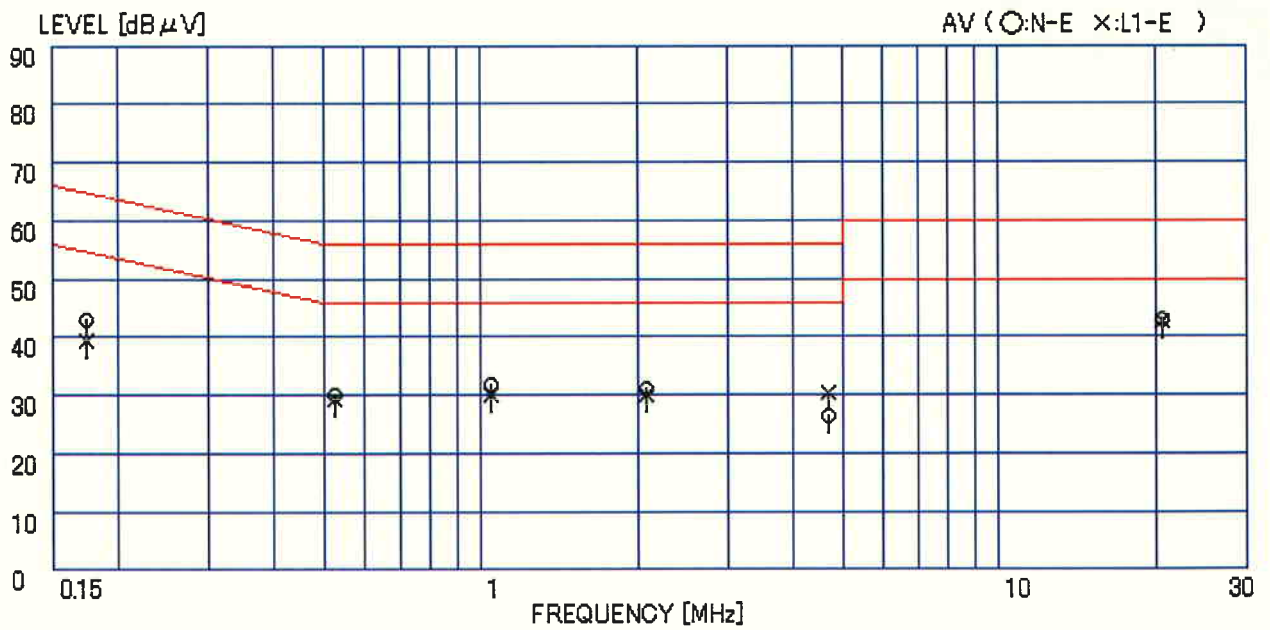


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<Q-Peak Measurement>



<Average Measurement>

Figure 6.1-2 RFI Voltage Measurement Results

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Table 6.1-3a RFI Voltage Measurement Results (Q-Peak Measurement)

EUT: PTZ-930 + Airbrush
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.174	43.5	0.0	43.5	64.8	21.3
	0.523	33.5	0.0	33.5	56.0	22.5
	1.045	34.0	0.0	34.0	56.0	22.0
	2.088	35.0	0.1	35.1	56.0	20.9
	4.594	33.0	0.4	33.4	56.0	22.6
	11.334	38.0	0.6	38.6	60.0	21.4
	15.336	40.0	0.6	40.6	60.0	19.4
L1-E	0.174	40.0	0.0	40.0	64.8	24.8
	0.523	31.5	0.0	31.5	56.0	24.5
	1.045	32.0	0.0	32.0	56.0	24.0
	2.088	34.0	0.0	34.0	56.0	22.0
	4.594	28.0	0.4	28.4	56.0	27.6
	11.334	38.0	0.5	38.5	60.0	21.5
	15.336	40.0	0.6	40.6	60.0	19.4

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Table 6.1-3b RFI Voltage Measurement Results (Average Measurement)

EUT: PTZ-930 + Airbrush
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.174	43.0	0.0	43.0	54.8	11.8
	0.523	30.0	0.0	30.0	46.0	16.0
	1.045	32.0	0.0	32.0	46.0	14.0
	2.088	30.5	0.1	30.6	46.0	15.4
	4.594	31.0	0.4	31.4	46.0	14.6
	11.334	32.0	0.6	32.6	50.0	17.4
	15.336	35.0	0.6	35.6	50.0	14.4
L1-E	0.174	39.5	0.0	39.5	54.8	15.3
	0.523	29.5	0.0	29.5	46.0	16.5
	1.045	30.0	0.0	30.0	46.0	16.0
	2.088	30.5	0.0	30.5	46.0	15.5
	4.594	26.0	0.4	26.4	46.0	19.6
	11.334	33.0	0.5	33.5	50.0	16.5
	15.336	35.0	0.6	35.6	50.0	14.4

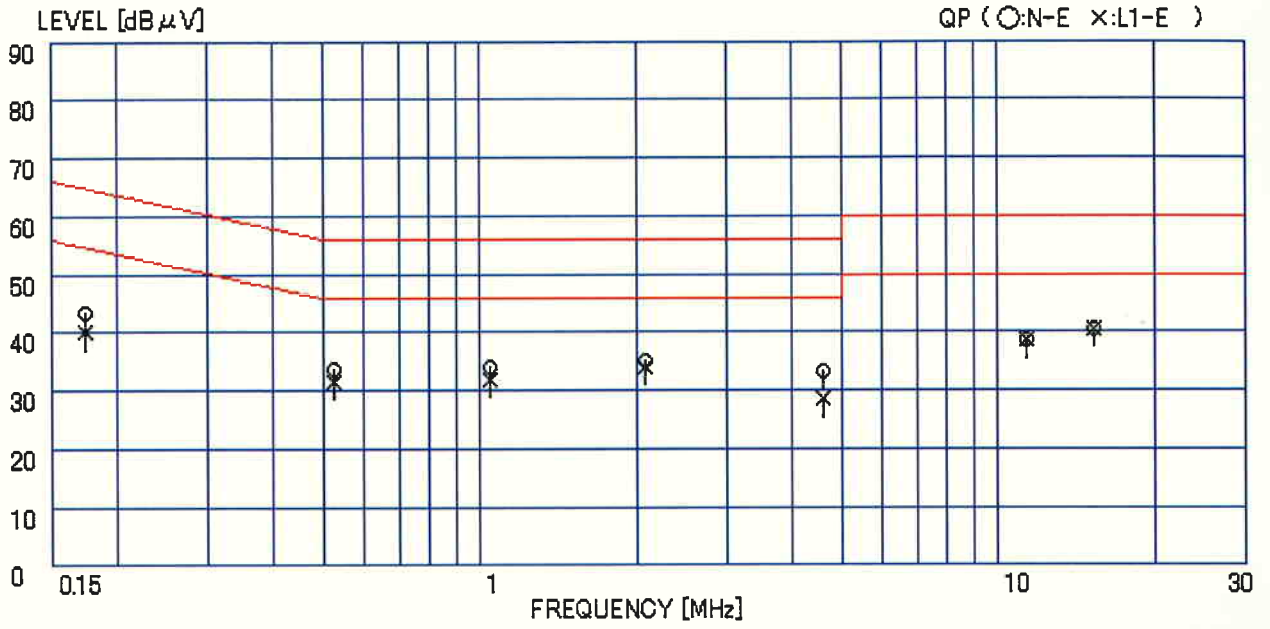
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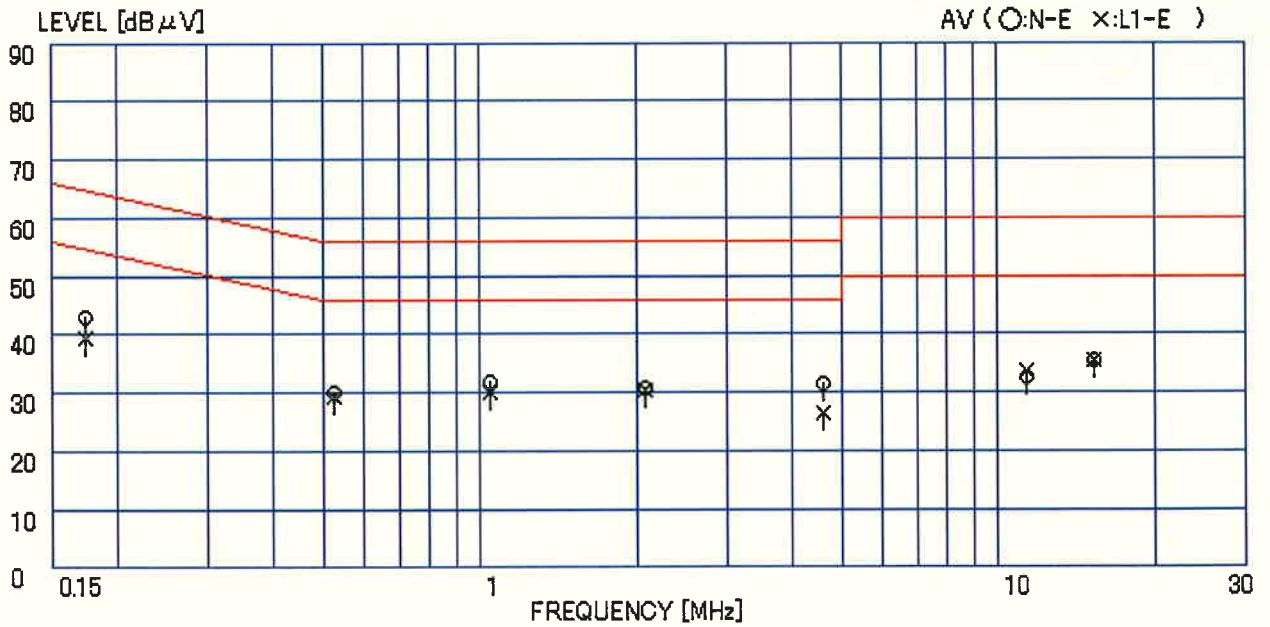
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<Q-Peak Measurement>



<Average Measurement>

Figure 6.1-3 RFI Voltage Measurement Results

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Table 6.1-4a RFI Voltage Measurement Results (Q-Peak Measurement)

EUT: PTZ-930 + 2D Mouse
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.174	43.5	0.0	43.5	64.8	21.3
	0.523	33.5	0.0	33.5	56.0	22.5
	1.045	34.0	0.0	34.0	56.0	22.0
	2.088	35.0	0.1	35.1	56.0	20.9
	4.594	32.0	0.4	32.4	56.0	23.6
	11.334	37.5	0.6	38.1	60.0	21.9
	15.336	40.5	0.6	41.1	60.0	18.9
L1-E	0.174	40.0	0.0	40.0	64.8	24.8
	0.523	31.5	0.0	31.5	56.0	24.5
	1.045	32.0	0.0	32.0	56.0	24.0
	2.088	35.0	0.0	35.0	56.0	21.0
	4.594	28.0	0.4	28.4	56.0	27.6
	11.334	37.0	0.5	37.5	60.0	22.5
	15.336	40.0	0.6	40.6	60.0	19.4

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Table 6.1-4b RFI Voltage Measurement Results (Average Measurement)


EUT: PTZ-930 + 2D Mouse
 Operating mode: Device detection state
 Test procedure: ANSI C63.4-2001

Date of measurement: June 7, 2004
 Temperature: 21 degree C
 Humidity: 68 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)
N-E	0.174	43.0	0.0	43.0	54.8	11.8
	0.523	30.0	0.0	30.0	46.0	16.0
	1.045	32.0	0.0	32.0	46.0	14.0
	2.088	30.0	0.1	30.1	46.0	15.9
	4.594	30.0	0.4	30.4	46.0	15.6
	11.334	31.0	0.6	31.6	50.0	18.4
	15.336	34.0	0.6	34.6	50.0	15.4

L1-E	0.174	39.5	0.0	39.5	54.8	15.3
	0.523	29.5	0.0	29.5	46.0	16.5
	1.045	30.0	0.0	30.0	46.0	16.0
	2.088	30.0	0.0	30.0	46.0	16.0
	4.594	26.0	0.4	26.4	46.0	19.6
	11.334	31.0	0.5	31.5	50.0	18.5
	15.336	34.0	0.6	34.6	50.0	15.4

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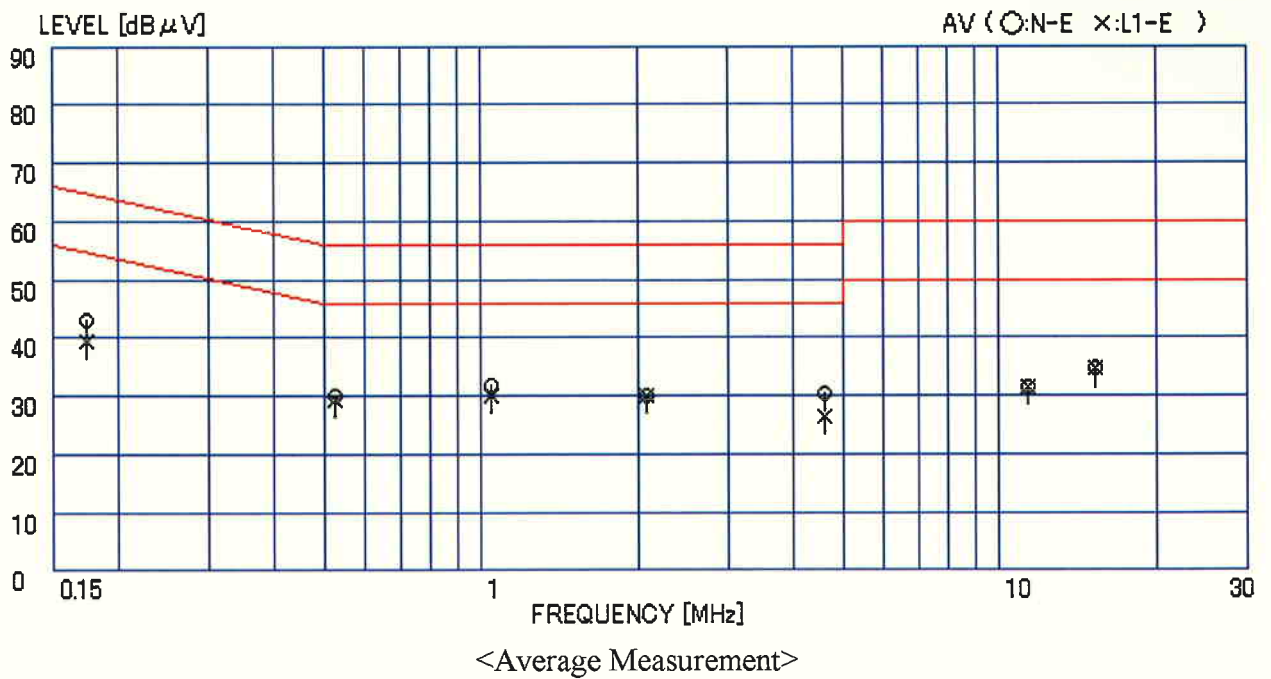
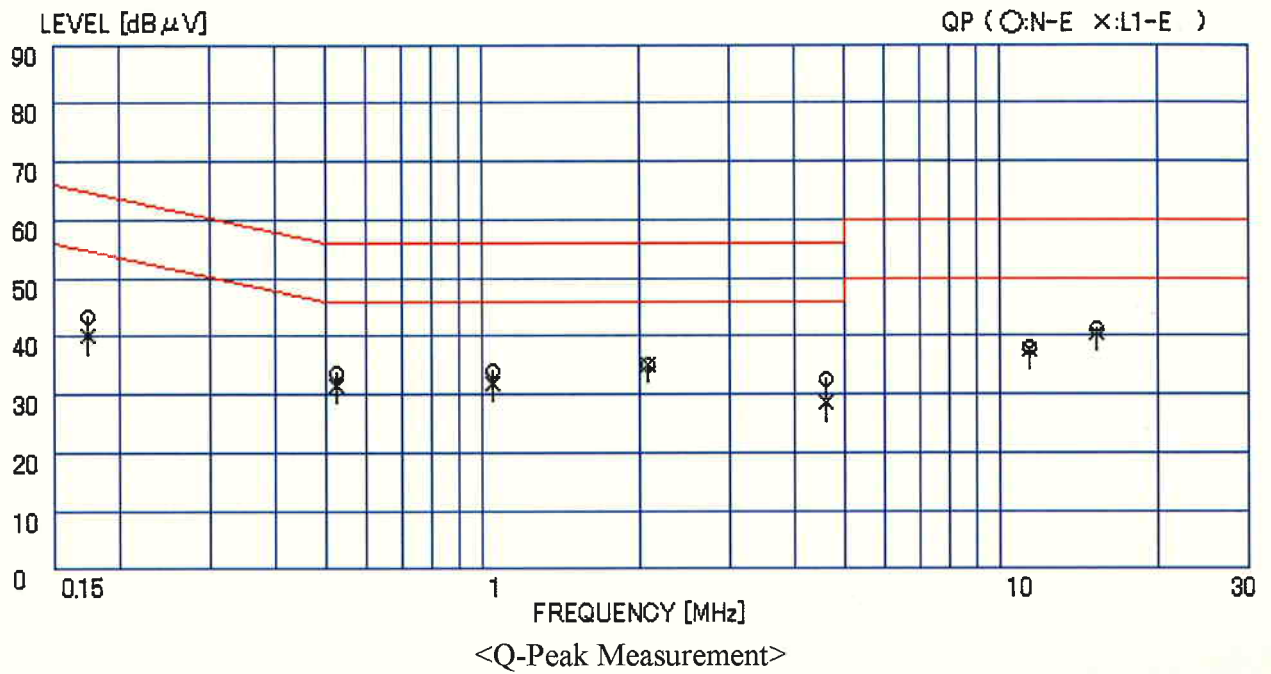


Figure 6.1-4 RFI Voltage Measurement Results

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6.2 RFI Field Strength Measurement

6.2.1 Measurement Instrumentation Used

(*model/serial no./manufacturer/Tokin control no./last calibration/next calibration*)

< 0.009MHz to 30MHz >

Loop antenna (HFH2-Z2/FNR879650-22/Rohde&Schwarz/AN005/25 Aug.'03/Aug.'04)
 Field strength meter (FCKL1528/134/Schwarzbeck/RE041/26 May'04/Aug.'04)
 L.I.S.N. (KNW-407/8-578-14/Kyoritsu/LI012/20 Nov.'03/Nov.'04)
 Spectrum analyzer (E4401B/MY41440237/Agilent/SP051/15 Jan.'04/Jan.'05)
 Coaxial cable (RG-55U/---/---/DK194/05 Oct.'04/Oct.'05)
 Software (Software Data Calculation Software TEPTO 1.06/---/AES/---/---/---)
 Open field test site (Tsukuba No.6/---/Tokin/SA006/28 Jan.'04/Jan.'05)

<30MHz to 1000MHz>

Field strength meter (FCVU1534/131/Schwarzbeck/RE046/28 May'04/Aug.'04)
 Biconical antenna (BBA9106/2099/Schwarzbeck/TB024/28 Jun.'03/Jun.'04)
 Logperiodic antenna (UHALP9108-A/0115/Schwarzbeck/TL021/28 Jun.'03/Jun.'04)
 Pre-amplifier (8447D/2727A05431/Hewlett Packard/AM006/28 Jan.'04/Jan.'05)
 Spectrum analyzer (R3261A/81720103/Advantest/SP006/07 Jun.'04/Sep.'04)
 Attenuator (8495B/3308A21823/Hewlett Packard/ME273/13 May'03/Aug.'04)
 Coaxial switch unit..... (MP59B/6100226498/Anritsu/ME267/28 Jan.'04/Jan.'05)
 Site establishment cable..... (---/---/---/DKT07/26 Jan.'04/Jan.'05)
 Software (Software Data Calculation Software TEPTO 1.06/---/AES/---/---/---)
 Open field test site (Tsukuba No.6/---/Tokin/SA006/28 Jan.'04/Jan.'05)

The measurement instrumentation used, are calibrated according to Quality Manual.

Report processed by



Hiroko Nakamura
20/Jul./2004

Tested by



Kazunori Maeshima, Engineer

6.2.2 Measurement Procedure

Final test was performed according to ANSI C63.4-2001 at the open field test site No.6. There are no deviations from the standard.

The EUT was placed in a 0.8m high table along with the peripherals. The turn table was separated from the antenna distance 3meters. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for maximum.

The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Reported are maximized emission levels.

These tests were performed at 120kHz of 6dB bandwidth.

Test results had obtained from following equation.

$$\text{Result (dB}\mu\text{V/m)} = \text{Level (dB}\mu\text{V)} + \text{Ant. Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amp. Gain (dB)}$$

<Decision to Pass or Fail>

To judge pass or fail of the test result, it was added "Uncertainty" to the obtained data and then subtracted it from the limit value. If all the values are +(plus), it will be passed and if there is -(minus), it will be failed.

6.2.3 Deviation from the specification: None

6.2.4 Measurement Uncertainty .

The data was tested are including uncertainty.

Measurement uncertainty of 0.009MHz to 30MHz is $\pm 1.94\text{dB}(k=2)$, 30MHz to 300MHz is $\pm 3.58\text{dB}(k=2)$, 300MHz to 1000MHz is $\pm 3.56\text{dB}(k=2)$ and it had estimated for decision to PASS or FAIL.

Report processed by



Hiroko Nakamura
20/Jul./2004

Tested by



Kazunori Maeshima, Engineer