EMC TEST REPORT

for

WACOM Co., Ltd.

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

Equipment Under Test:	PEN TABLET Model Name : PTU-600U
FCC ID :	HV4PTU600
Category:	FCC Part 15 Sub.part B Class B Digital Device FCC Part 15 Sub.part C
Tokin Report No.:	T6J034111
Date of Issue:	April 28, 2003

Approved by

Mickey Fukuda May/7/2003
Manager, Tsukuba Testing Lab.
Tokin EMC Engineering Co., Ltd.

-- ATTENTION --

The test results in this report relate only to the following EUTs, and this report shall not be reproduced except in full, without the written approval of the laboratory.
This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

NVLAP Lab. Code: 200221-0

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7 MEASUREMENT PHOTOS

1 DESCRIPTION OF DEVICE

A) Kind of Equipment :	PEN TABLET
B) FCC ID :	HV4PTU600
C) Model Name :	PTU-600U
D) Serial No. :	3CJS00028
E) Type of Sample Tested :	Pre-production
F) High Frequency Used :	6MHz (USB Clock) 8MHz (CPU Clock) The frequency that is using intentionally Power Output: <1pW 531.25/562.50/593.75kHz (PEN TABLET operating signal frequency)
G) Rating Power Supply :	DC5.0V, 0.1A
H) Tested Power Supply :	1phase AC120V, 60Hz
I) Date of Manufacture :	March 2003
J) Manufacturer :	WACOM Co., Ltd. 2-510-1 Toyonodai, Otone-machi, Kitasaitama-gun, Saitama 349-1148, Japan
K) Description of Operating :	X and Y Coordinates Data Sending Mode
L) Date of Sample Received :	April 7, 2003
M) Tested Engineer :	Toshihiro Nomura

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Hiroko Nakamura
28/Apr./2003

Tested by

Toshihiro Nomura, Engineer

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/CISRO.

3.2 Modifications to The EUT : None

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4 TESTED SYSTEM DETAILS

4.1 Peripherals and Others :

Description	Model Name	Serial No.	Manufacturer	FCC ID
Personal Computer	GP7JP3YR/FDKER	01480592	Gateway	DoC
Monitor	EV500A	15017F019434	Gateway	BEJCB575B
Keyboard	JAPAN 235212-119	B2080G39F40A13	Compaq	AQ6-MTN4C15
Mouse	M-S34	B04AB0H5BFG1 PTE	Compaq	DZL211029
Printer	XR-1000	430091101326	STAR MICRONICS AMERICA, INC.	B6D8MFJ250

4.2 Type of Used Cables :

Description	Length	Type of shield	Model name	Manufacturer
AC Cable (PC)	1.8m	Non-shielded	None	---
VGA cable (PC ~ Monitor)	1.8m	Shielded	None	Gateway
AC cable (Monitor)	2.2m	Non-shielded	None	---
Centro cable (PC ~ Printer)	2.0m	Shielded	None	STAR MICRONICS AMERICA, INC.
AC cable (Printer)	1.8m	Non-shielded	None	---

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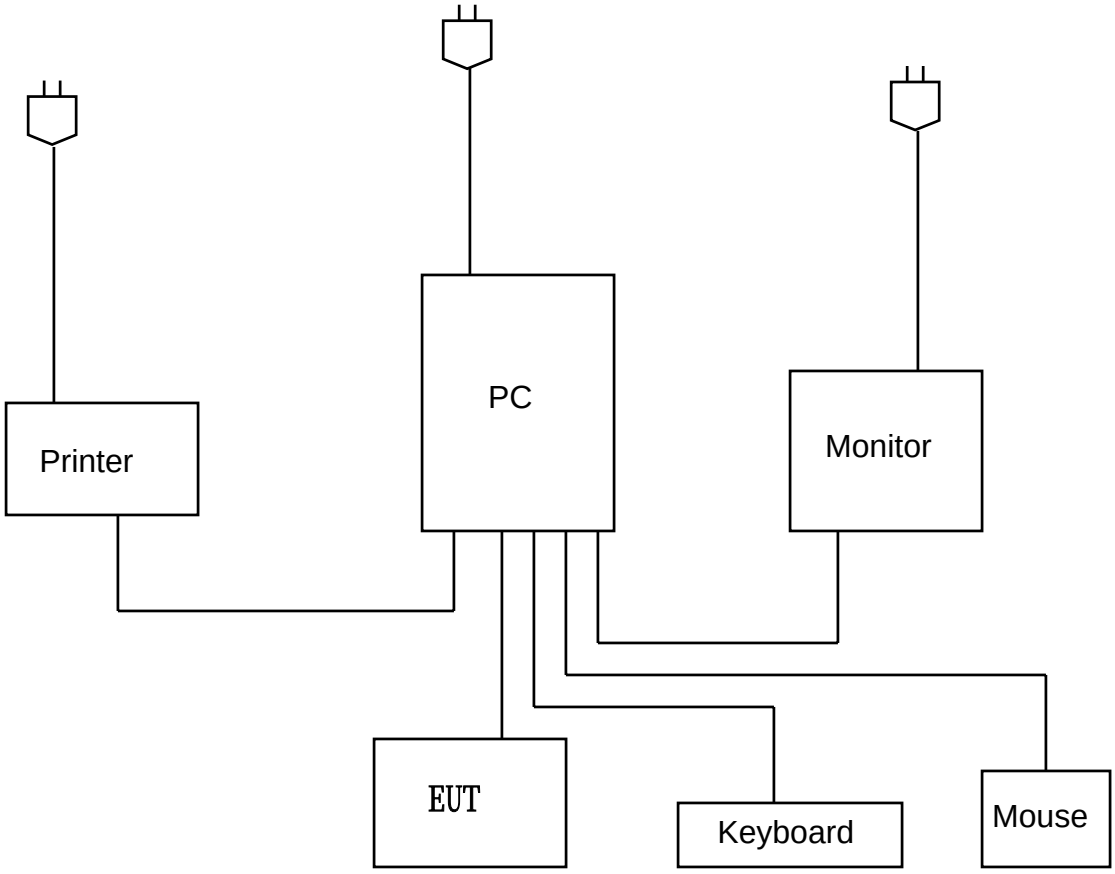

Figure 4-1 System Configuration Diagram

5 TECHINICAL COUNTERMEASURE: None

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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 ..... (FCKL1528/1528124/Schwarzbeck/RE039/12 Sep.'02/Sep.'03)
L.I.S.N. ..... (KNW-407/8-578-14/Kyoritsu/LI012/22 Oct.'02/Oct.'03)
2nd L.I.S.N..... (PN-T22/9406/Tokin/LI046/24 Oct.'02/Oct.'03)
Spectrum analyzer ..... (E4401B/MY41440236/Agilent/SP050/15 Jan.'03/Jan.'04)
Coaxial cable..... (RG-55U/---/---/DK193/13 Jun.'02/Jun.'03)
Data entry system..... (EMC Data Order Program Ver 1.06/---/---/---/---/---)
Software ..... (EP5/CE Ver. 1.30/---/TOYO/---/---/---)
Shielded Room..... (Tsukuba No.2-S/---/Tokin/SA017/---/---)

These measurement instrumentation are calibrated according to Quality Manual.

6.1.2 Measurement Procedure

The power line conducted interference measurements were performed according to ANSI C63.4-1992 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 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.
Result (dBμV) = Level (dBμV) + 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

Measurement uncertainty of RFI Voltage Measurement test was estimated at ±1.54dB(k=2).

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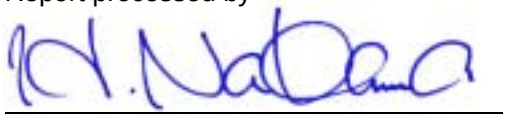

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6.1.5 Test Data

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

Operating mode: X and Y Coordinates Data Sending Mode
Test procedure: ANSI C63.4-1992 Date of measurement: April 7, 2003
Temperature: 15 degree C
Humidity: 42 %

	Frequency (MHz)	Level (dBμV)	Total Factor(dB)	Result (dBμV)	Result (μV)	Limit (μV)	Margin (dB)
L1-E	0.502	29.0	0.0	29.0	28.18	250	19.0
	3.655	21.0	0.2	21.2	11.48	250	26.8
	8.315	28.0	0.2	28.2	25.70	250	19.8
	10.440	32.0	0.3	32.3	41.21	250	15.7
	28.140	27.0	0.9	27.9	24.83	250	20.1
N-E	0.504	29.0	0.0	29.0	28.18	250	19.0
	2.935	28.0	0.1	28.1	25.41	250	19.9
	5.033	30.0	0.2	30.2	32.36	250	17.8
	10.430	31.0	0.3	31.3	36.73	250	16.7
	28.756	24.0	0.9	24.9	17.58	250	23.1

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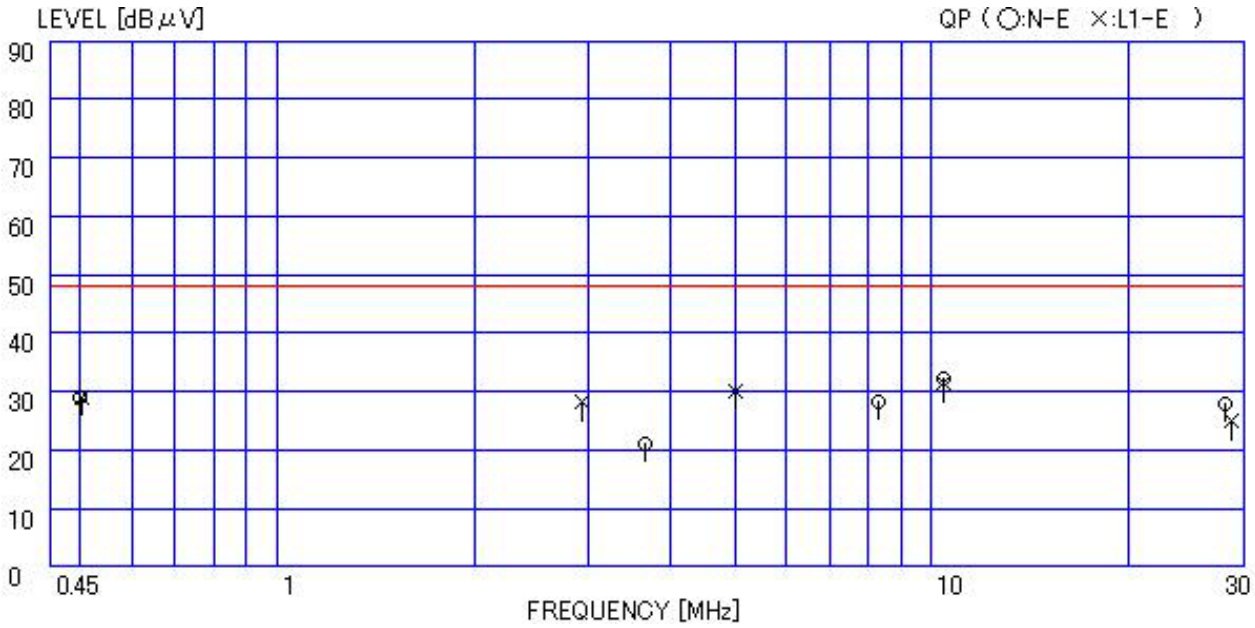

Figure 6.1-1 RFI Voltage Measurement Results

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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/AN005/09 Aug.'02/Aug.'03)
Field strength meter .....(FCKL1528/1528124/Schwarzbeck/RE039/12 Sep.'02/Sep.'03)
Spectrum analyzer .....(E4401B/MY41440236/Agilent/SP050/15 Jan.'03/Jan.'04)
Coaxial cable .....(RG-55U/---/---/DK193/13 Jun.'02/Jun.'03)
Data entry system .....(EMC Data Order Program Ver 1.06/---/---/---/---/---)
Shielded Room.....(Tsukuba No.1-S/---/Tokin/SA016/---/---)

<30MHz to 1000MHz>

Field strength meter .....(FCVU1534/131/Schwarzbeck/RE046/04 Dec.'02/Dec.'03)
Biconical antenna .....(BBA9106/2099/Schawarzbeck/TB024/01 Mar.'03/Feb.'04)
Logperiodic antenna .....(UHALP9108-A/0115/Schwarzbeck/TL021/06 Jul.'02/Jul.'03)
Pre-amplifier .....(8447D/2727A05431/Hewlett Packard/AM006/09 May.'02/May.'03)
Spectrum analyzer .....(R3261A/81720103/Advantest/SP006/05 Dec.'02/Dec.'03)
Attenuator .....(8495B/3308A21823/Hewlett Packard/ME273/15 Apr.'02/Apr.'03)
Coaxial switch unit .....(MP59B/6100226498/Anritsu/ME267/23 Apr.'02/Apr.'03)
Site establishment cable.....(---/---/---/DKT07/28 Sep.'02/Sep.'03)
Data entry system .....(EMC Data Order Program Ver 1.06/---/---/---/---/---)
Open field test site .....(Tsukuba No.6/---/Tokin/SA006/28 Jan.'03/Jan.'04)

These measurement instrumentation are calibrated according to Quality Manual.

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Tested by

Toshihiro Nomura, Engineer

6.2.2 Measurement Procedure

Final test was performed according to ANSI C63.4-1992 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. In the range of 0.009MHz to 30MHz was tested at 3m distance, 30MHz to 1000MHz was tested at 10m distance, but the level of 30MHz to 1000MHz was calculated for 3meters value. 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.

Result (dBμV/m) = Level (dBμV) + Ant. Factor (dB/m) + Cable Loss (dB) – 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

Measurement uncertainty of RFI Field Strength Measurement test was estimated at ±3.70dB(k=2).

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6.2.5 Test Data

Table 6.2-1 RFI Field Strength Measurement Results (Q-Peak Measurement)
<0.009MHz to 30MHz>

Operating mode: X and Y Coordinates Data Sending Mode
Test procedure: ANSI C63.4-1992 Date of measurement: April 7, 2003
Test distance: 3 meters* Temperature: 16 degree C
Humidity: 46 %

Frequency	Level		Cable	Amp.	Ant.	Result		Result		30 Meter	Margin	
	Ver.	Hor.	Loss	Gain	Factor	Ver.	Hor.	Ver.	Hor.	Limit	Ver.	Hor.
(MHz)	(dBμV)		(dB)	(dB)	(dB/m)	(dBμV/m)		(μV/m)		(μV/m)	(dB)	
0.56	1.0	-	0.1	0.0	18.7	19.9	-	9.89	-	42.8	12.8	-
2.24	2.0	-	0.2	0.0	18.7	20.9	-	11.09	-	30.0	8.6	-
14.00	1.0	-	0.7	0.0	19.8	21.5	-	11.89	-	30.0	8.0	-

Limit

Frequency (MHz)	dBμV/m	μV/m	Distance(m)
0.009 ~ 0.490	48.5 ~ 13.8	2400/F(kHz)	300
0.490 ~ 1.705	33.8 ~ 23.0	24000/F(kHz)	30
1.705 ~ 30	29.5	30	30

* The test result obtained at 3meters from the EUT is complied with the limit of 300meters and 30meters from FCC requirement.
Therefore, the EUT had complied with FCC Part 15 Sub.part C requirement.

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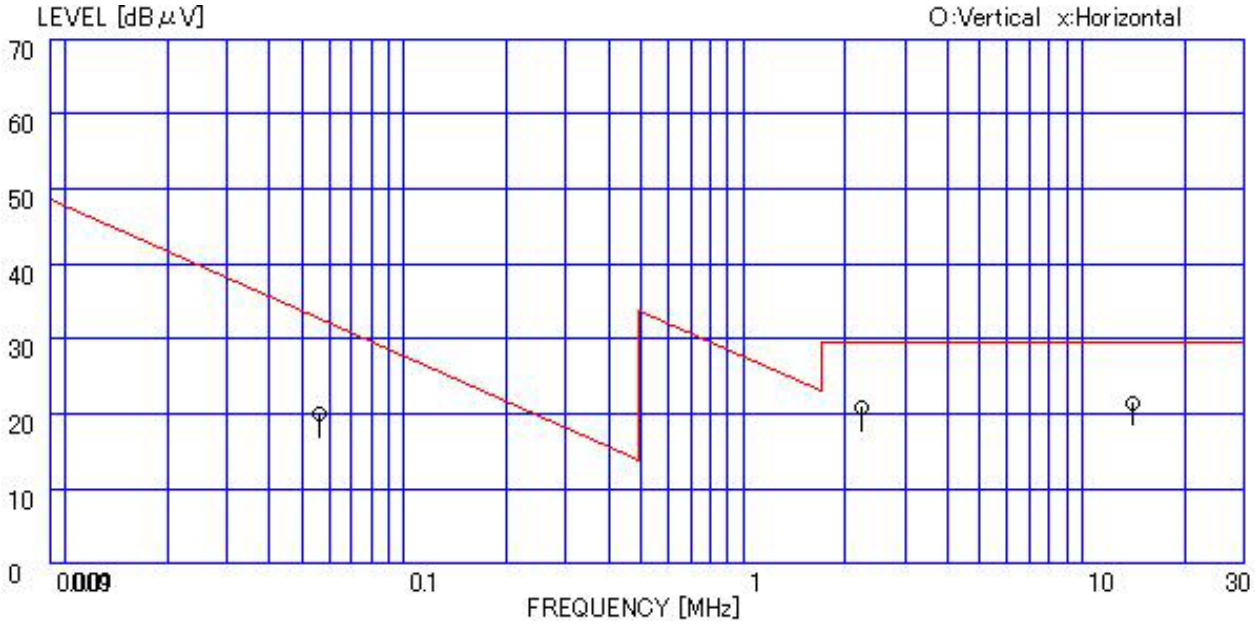

Figure 6.2-1 RFI Field Strength Measurement Results

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Table 6.2-2 RFI Field Strength Measurement Results (Q-Peak Measurement)
<30MHz to 1000MHz>

Operating mode: X and Y Coordinates Data Sending Mode
Test procedure: ANSI C63.4-1992 Date of measurement: April 7, 2003
Temperature: 16 degree C
Humidity: 46 %

Frequency	Level *		Cable	Amp.	Ant.	Result		Result		3 Meter	Margin	
	Ver.	Hor.	Loss	Gain	Factor	Ver.	Hor.	Ver.	Hor.	Limit	Ver.	Hor.
(MHz)	(dBμV)		(dB)	(dB)	(dB/m)	(dBμV/m)		(μV/m)		(μV/m)	(dB)	
65.70	50.5	36.5	1.7	-27.4	6.8	31.6	17.6	38.02	7.59	100	8.4	22.4
98.28	41.5	35.5	2.2	-27.3	10.6	27.0	21.0	22.39	11.22	150	16.5	22.5
199.52	35.5	33.5	3.4	-27.0	16.9	28.8	26.8	27.54	21.88	150	14.7	16.7
232.40	34.5	31.5	3.7	-26.9	17.3	28.7	25.7	27.23	19.28	200	17.3	20.3
320.00	34.5	33.5	4.5	-26.6	13.7	26.1	25.1	20.18	17.99	200	19.9	20.9
598.30	32.5	31.5	6.7	-28.3	19.3	30.2	29.2	31.99	28.84	200	15.8	16.8
950.00	28.5	27.5	8.7	-27.5	22.9	32.6	31.6	42.66	38.02	200	13.4	14.4

Class B limit

Radiated Emission – 3 meter distance

Frequency (MHz)	dBμV/m	μV/m
30 - 88	40.0	100
88 - 216	43.5	150
216 - 960	46.0	200
> 960	54.0	500

* Test has carried out at the distance of 10m. Level is calculated for 3m values, and level is included of transvalue of 10.5dB.

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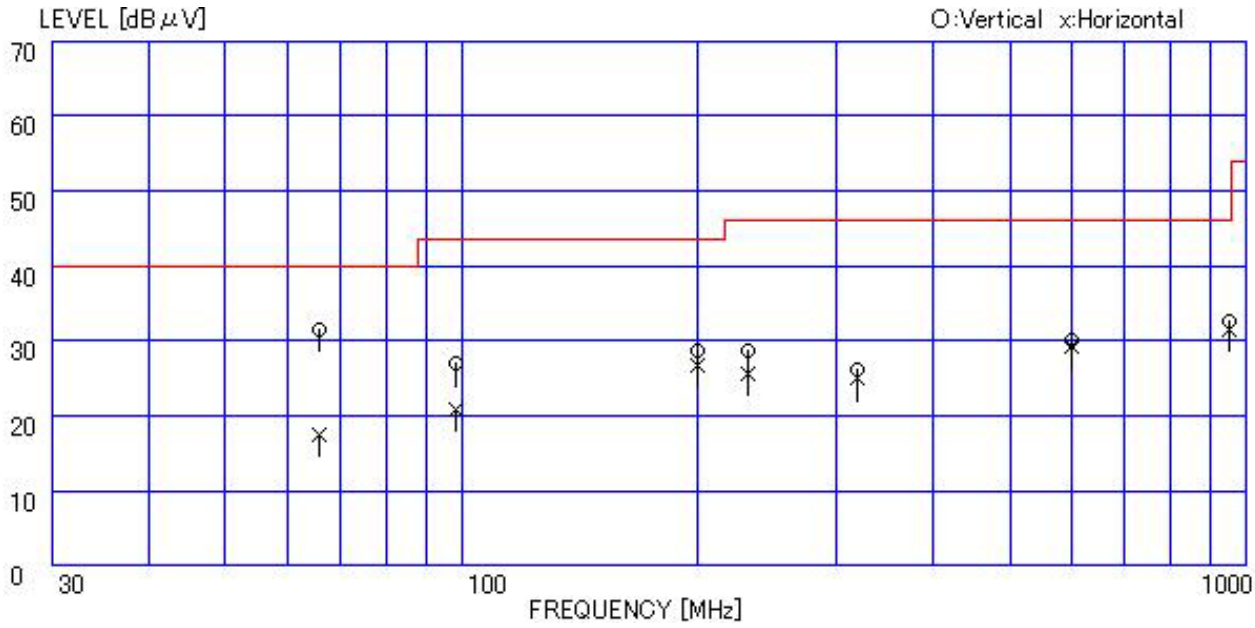

Figure 6.2-2 RFI Field Strength Measurement Results

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6.3 Minimum Margin

Table 6.3-1 Minimum Margin

Conducted emission			
X and Y Coordinates Data Sending operation mode	10.440 MHz,	15.7 dB	
Radiated emission			
X and Y Coordinates Data Sending operation mode	14.00 MHz,	8.0 dB	

6.4 Sample Calculation

Table 6.4-1 Sample Calculation

The maximum radiating emission can be obtained at the frequency of 14.00 MHz,
Vertical polarization on X and Y Coordinates Data Sending operation mode.

Each value at frequency is as follows;

R :	Field strength meter reading	=	1.0	(dBμV)
A :	Antenna factor	=	19.8	(dB/m)
C :	Cable loss	=	0.7	(dB)
G :	Amplifier gain	=	0.0	(dB)

Then radiated emission E(dBμV/m) is ;

$$E = R + A + C - G$$

Therefore, the maximum radiated emission is ;

21.5 (dBμV/m)

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7 MEASUREMENT PHOTOS

Photo 7.1 Setup with the Maximized RFI Voltage Emission Level

Photo 7.2 Setup with the Maximized RFI Field Strength Emission Level