

TEST REPORT

Report number: Z071C-11340

Issue Date: March 22, 2012

The device, as described herewith, was tested pursuant to applicable test procedure indicated below and complies with the requirements of;

FCC Part15 Subpart C / IC RSS-210

The test results are traceable to the international or national standards.

Applicant	:	Wacom Co., Ltd.
Equipment under test (EUT)	:	LCD Tablet
Model Number	:	DTH-2400
FCC ID	:	HV4DTH2400
IC Certification Number	:	6888A-DTH2400



Test procedure	:	ANSI C63.4-2003
Date of test	:	January 26, 29, February 28, 2012
Test place	:	ZACTA Technology Corporation Yonezawa Testing Center 4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Test results	:	Complied

Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

The results in this report are applicable only to the samples tested.

This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

This test report must not be used by client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Tested by:  
Taiki Watanabe Nobuaki Marukawa


Authorized by: 
Jun Shimanuki
General Manager of Technical Division



Table of contents

	Page
1. Summary of Test.....	4
1.1 Purpose of test.....	4
1.2 Standards.....	4
1.3 Summary of test results.....	4
1.4 Deviation from the standard.....	4
1.5 Modification to the EUT by laboratory.....	4
2. Equipment description.....	5
2.1 General Description of equipment.....	5
2.2 EUT information.....	5
2.3 Operating mode.....	5
2.4 Description of Test modes.....	5
3. Configuration information.....	6
3.1 EUT and Peripheral(s) used.....	6
3.2 Cable(s) information.....	7
3.3 System configuration.....	8
4. Test Type and Results.....	9
4.1 99% Occupied Bandwidth.....	9
4.1.1 Test Procedure [IC RSS-Gen 4.6.1].....	9
4.1.2 Measurement Setup.....	9
4.1.3 Limit of Bandwidth at 99% Occupied Bandwidth.....	9
4.1.4 Measurement Result.....	10
4.1.5 Trace Data.....	10
4.2 Radiated Emissions (9kHz to 30MHz).....	11
4.2.1 Test Procedure [FCC 15.209, IC RSS-210 A2.2, RSS-Gen 4.9, 4.10, 4.11].....	11
4.2.2 Measurement Setup.....	11
4.2.3 Limit of Spurious Emission Measurement.....	12
4.2.4 Calculation Method.....	12
4.2.5 Measurement Results.....	12
4.3 Radiated Emissions (30MHz to 1000MHz).....	15
4.3.1 Test Procedure [FCC 15.209, IC RSS-210 A2.2, RSS-Gen 4.9, 4.10, 4.11].....	15
4.3.2 Measurement Setup.....	15
4.3.3 Limit of Spurious Emission Measurement.....	16
4.3.4 Calculation Method.....	16
4.3.5 <i>Measurement Results</i>	16
4.4 AC power line Conducted Emissions.....	19
4.4.1 Test Procedure [FCC 15.207, IC RSS-Gen 7.2.4].....	19
4.4.2 Measurement Setup.....	19
4.4.3 Limit of AC power line Conducted Emissions Measurement.....	20

4.4.4 Calculation method.....20
4.4.5 Measurement Result.....21
5. Uncertainty of measurement..... 25
6. Laboratory description..... 26
Appendix A: Test equipment..... 27

1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to standards listed in section 1.2.

1.2 Standards

CFR47 FCC Part 15 Subpart C, RSS-210

1.3 Summary of test results

Test Items Section	Test Items	Condition	Result
RSS-Gen 4.6.1	99% Occupied Bandwidth	Radiated	Pass
15.209 RSS-210 A2.2 RSS-Gen 4.9, 4.10, 4.11	Radiated Emissions	Radiated	Pass
15.207 RSS-Gen 7.2.4	AC Power Line Conducted Emissions 150kHz – 30MHz	Conducted	Pass

1.4 Deviation from the standard

None

1.5 Modification to the EUT by laboratory

None

2. Equipment description

2.1 General Description of equipment

The EUT is LCD Tablet with stylus pen.

2.2 EUT information

Applicant	: Wacom Co., Ltd. 2-510-1, Toyonodai, Kazo-shi, Saitama 349-1148, Japan Phone: + 81-480-78-1211 Fax: + 81-480-78-1404
Equipment under test (EUT)	: LCD Tablet
Trade name	: Wacom
Model number	: DTH-2400
Serial number	: A01FANS00093
EUT condition	: Pre-production
Max. frequency	: 2700MHz
Power ratings	: INPUT:AC 100-240V 47-63Hz 1.6A OUTPUT:DC 24V 5.0A
Size	: (W) 769.3 x (H) 463.74 x (D) 64 mm
Environment	: Indoor use
Thermal limitation	: 5°C to 35°C
Operating mode	: Normal Operation
Variation of the family model(s)	: N/A
Options	: Using devices KP-501E (Grip Pen) KP-300E (Classic Pen) KP-400E (Airbrush) KP-701E (Art Pen)
[RF Specification]	
Frequency Range	: 667.0kHz
Modulation method	: OOK (On-Off-Keying)
RF emission type designator	: 107KK1D

2.3 Operating mode

【Normal Operation】

- i) "H" characters data are sent to Interactive Display from PC.
- ii) Displayed H characters data scrolls.
- iii) i) and ii) is repeated.

2.4 Description of Test modes

This EUT has total two operating modes: Display Port mode and DVI-I(Analog) mode. As for the FCC Part 15 subpartC test, the operating mode which generates the highest emission level (Display Port mode) only was reported in this test report. The field strength of spurious emission and AC Power Line Conducted was measured at each position of Horizontal and Vertical to compare the level, and the maximum noise. The worst emission was found in Vertical and the worst case recorded. However, The field strength of spurious emission (9kHz to 30MHz) was found in Horizontal and the worst case recorded.

3. Configuration information

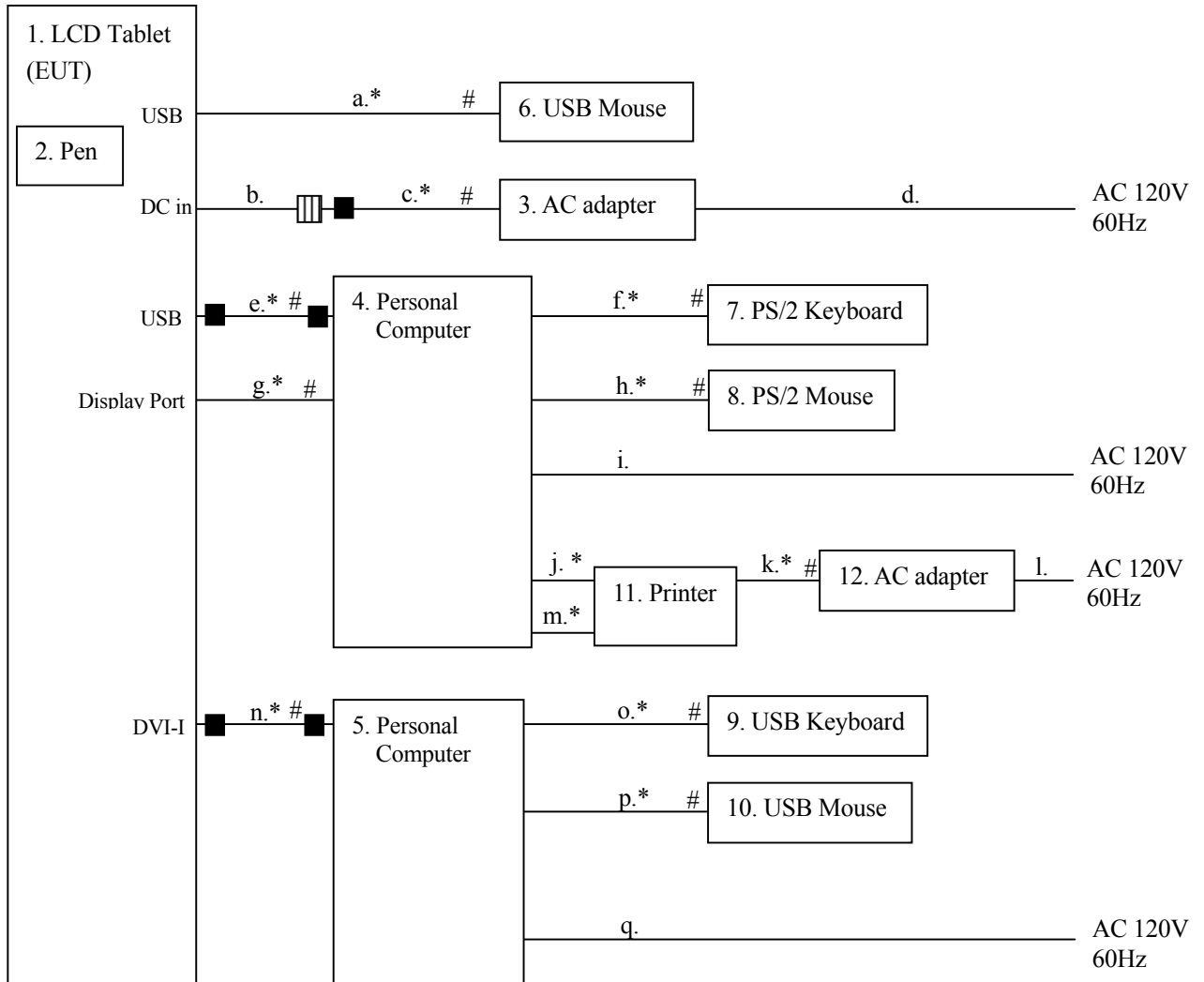
3.1 EUT and Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	LCD Tablet	Wacom	DTH-2400	A01FANS00093	FCC ID: HV4DTH2400 IC: 6888A-DTH2400	EUT
2	Pen	Wacom	KP-501E	N/A	-	Accessory
			KP-300E	N/A	-	Option
			KP-400E	N/A	-	Option
			KP-701E	N/A	-	Option
3	AC adapter for LCD Tablet	Wacom	STD-24050	TY2E410002AD BT20029	DoC	-
4	Personal Computer	HP	xw4600	JPA74707	DoC	-
5	Personal Computer	DELL	DCMF	JNVBCBX	DoC	-
6	USB Mouse	DELL	MO56UOA	F1400INU	DoC	-
7	PS/2 Keyboard	HP	KB-0316	N/A	DoC	-
8	PS/2 Mouse	HP	M-S69	N/A	DoC	-
9	USB Keyboard	HP	KB-0316	435382-291	DoC	-
10	USB Mouse	HP	M-UAE-96	N/A	DoC	-
11	Printer	SII	DPU-414	1000169C	DoC	-
12	AC Adaptor for Printer	SII	PW-4007-JU1-E	0948	N/A	-

3.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	Comment
a	Mouse cable	1.8	Yes	Metal	-
b	DC cable for LCD Tablet	0.9	No	Plastic	-
c	DC cable for LCD Tablet AC adapter	1.5	No	Plastic	-
d	AC cable for LCD Tablet AC adapter	1.8	No	Plastic	-
e	USB cable	3.0	Yes	Metal	-
f	Keyboard cable	1.8	No	Plastic	-
g	Display port cable	3.0	Yes	Metal	-
h	Mouse cable	1.8	No	Plastic	-
i	AC cable for PC	2.1	No	Plastic	-
j	Parallel cable	3.0	Yes	Metal	-
k	DC cable for Printer	1.9	No	Metal	-
l	AC Power cord for Printer AC adaptor	2.0	No	Plastic	-
m	Serial cable	1.4	Yes	Metal	-
n	DVI-Digital cable	3.0	Yes	Metal	-
o	Keyboard cable	1.8	Yes	Metal	-
p	Mouse cable	1.8	Yes	Metal	-
q	AC cable for PC	2.1	No	Plastic	-

3.3 System configuration



: Un-detachable cable
 ■ : Ferrite core
 * : Bundled excess cable
 □□□ : Broadcast connector

Note1: Numbers assigned to equipment or cables on this diagram are corresponded to the list in “3.1 EUT and Peripheral(s) used” and “3.2 Cable(s) information”.

4. Test Type and Results

4.1 99% Occupied Bandwidth

4.1.1 Test Procedure [IC RSS-Gen 4.6.1]

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99% bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

The spectrum analyzer is set to:

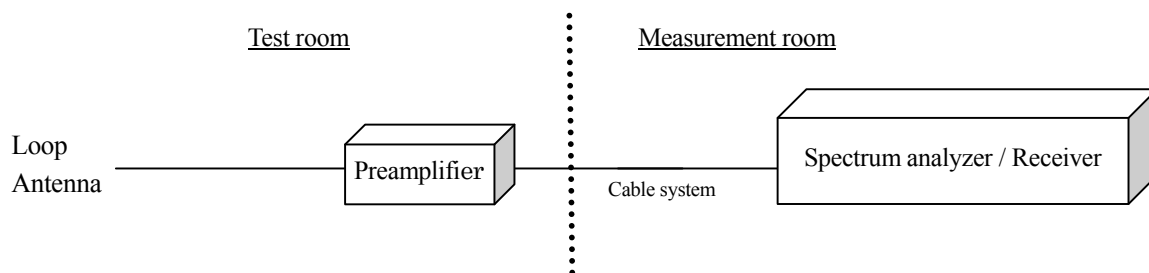
- RBW=3kHz, VBW=10kHz, Span=300kHz, Sweep=auto

The test mode of EUT is as follows.

- Normal Operation

4.1.2 Measurement Setup

Test configuration for 99% Occupied Bandwidth



4.1.3 Limit of Bandwidth at 99% Occupied Bandwidth

None

4.1.4 Measurement Result

Occupied Bandwidth [kHz]	Frequency [MHz]
106.6591	0.667

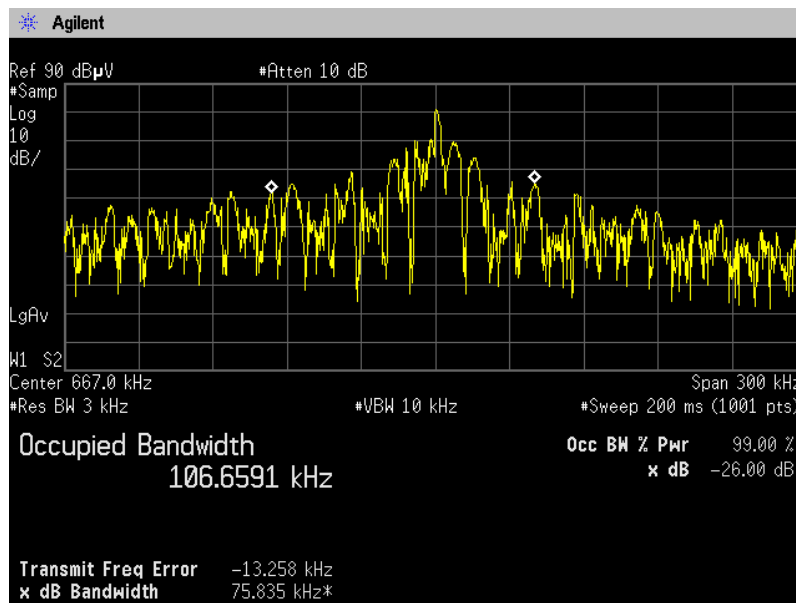
4.1.5 Trace Data

Test Personnel:

Tested by: Taiki Watanabe

Date : Feb. 28, 2012
Temperature : 20.7 [°C]
Humidity : 48.6 [%]
Test place : 3m Semi-anechoic chamber

Pen: KP-501E



4.2 Radiated Emissions (9kHz to 30MHz)

4.2.1 Test Procedure [FCC 15.209, IC RSS-210 A2.2, RSS-Gen 4.9, 4.10, 4.11]

Radiated emission measurements are performed at 3m distance with the Loop antenna.

The antenna is positioned with its plane vertical, and the center of the Loop is 1.0meter above the ground plane.

Frequency Range: 9kHz to 30MHz is scanned and investigated with the test receiver.

The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 200Hz (9kHz to 150kHz) and 9kHz (150kHz to 30MHz).

The EUT and support equipment are placed on a 1 meter x 2.0 meter surface, 0.8 meter height FRP table. The turntable and the loop antenna are rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

Interconnecting cables, which hanging closer than 40cm to the horizontal metal ground plane are bundled its excess in center. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

Frequency range:

- 9kHz to 30MHz

The Test receiver is set to:

Detector: Quasi-peak

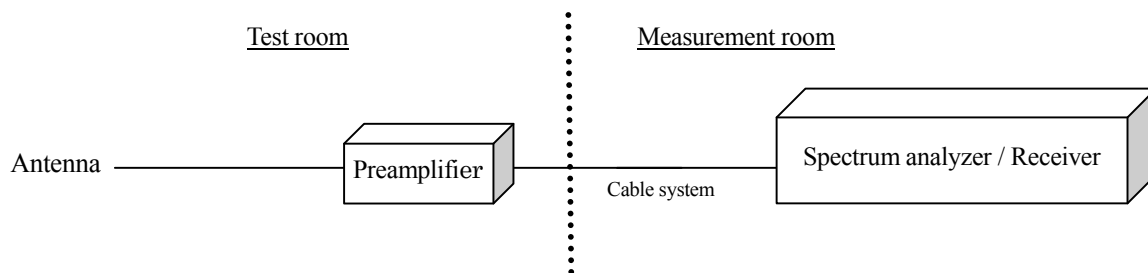
Bandwidth: 200Hz, 9kHz

The test mode of EUT is as follows.

- Normal Operation

4.2.2 Measurement Setup

Test configuration for Radiated emissions



4.2.3 Limit of Spurious Emission Measurement

Frequency [MHz]	Field Strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009 – 0.490	2400 / F [kHz]	20logE [uV/m]	300
0.490 – 1.705	24000 / F [kHz]	20logE [uV/m]	30
1.705-30	30	29.5	30
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20 log Emission [uV/m]
3. Measurements were corrected to 30m using $40\log(3/30) = -40.0\text{dB}$

4.2.4 Calculation Method

Emission level = Reading + c.f.(Ant. factor + Cable system loss – Amp. Gain)

Margin = Limit – Emission level

4.2.5 Measurement Results

Test Personnel:

Tested by: Taiki Watanabe

Date : Feb. 28, 2012
 Temperature : 20.7 [°C]
 Humidity : 48.6 [%]
 Test place : 3m Semi-anechoic chamber

Pen: KP-501E

Frequency [MHz]	Reading [dBuV] at 3m	c.f [dB(1/m)]	Result [dBuV/m] at 3m	Result [dBuV/m] at 30m	Limit [dBuV/m] at 30m	Margin [dB]	Result
0.667	79.8	-10.6	69.2	29.2	31.1	1.9	PASS
1.334	53.7	-10.4	43.3	3.3	25.1	21.8	PASS
2.001	41.0	-10.3	30.7	-9.3	29.5	38.8	PASS
2.668	35.1	-10.2	24.9	-15.1	29.5	44.6	PASS

Pen: KP-300E

Frequency [MHz]	Reading [dBuV] at 3m	c.f [dB(1/m)]	Result [dBuV/m] at 3m	Result [dBuV/m] at 30m	Limit [dBuV/m] at 30m	Margin [dB]	Result
0.667	79.8	-10.6	69.2	29.2	31.1	1.9	PASS
1.334	54.6	-10.4	44.2	4.2	25.1	20.9	PASS
2.001	45.8	-10.3	35.5	-4.5	29.5	34.0	PASS
2.668	43.1	-10.2	32.9	-7.1	29.5	36.6	PASS

Pen: KP-400E

Frequency [MHz]	Reading [dBuV] at 3m	c.f [dB(1/m)]	Result [dBuV/m] at 3m	Result [dBuV/m] at 30m	Limit [dBuV/m] at 30m	Margin [dB]	Result
0.667	79.8	-10.6	69.2	29.2	31.1	1.9	PASS
1.334	53.9	-10.4	43.5	3.5	25.1	21.6	PASS
2.001	43.0	-10.3	32.7	-7.3	29.5	36.8	PASS
2.668	37.4	-10.2	27.2	-12.8	29.5	42.3	PASS

Pen: KP-701E

Frequency [MHz]	Reading [dBuV] at 3m	c.f [dB(1/m)]	Result [dBuV/m] at 3m	Result [dBuV/m] at 30m	Limit [dBuV/m] at 30m	Margin [dB]	Result
0.667	80.0	-10.6	69.4	29.4	31.1	1.7	PASS
1.334	55.3	-10.4	44.9	4.9	25.1	20.2	PASS
2.001	47.3	-10.3	37.0	-3.0	29.5	32.5	PASS
2.668	44.1	-10.2	33.9	-6.1	29.5	35.6	PASS

4.3 Radiated Emissions (30MHz to 1000MHz)

4.3.1 Test Procedure [FCC 15.209, IC RSS-210 A2.2, RSS-Gen 4.9, 4.10, 4.11]

Radiated emission measurements are performed at 10m distance with the Biconical antenna and Log periodic antenna.

The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission. Frequency Range: 30MHz to 1000MHz is scanned and investigated with the test receiver. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 120kHz.

The EUT and support equipment are placed on a 1 meter x 2.0 meter surface, 0.8 meter height FRP table. The turntable and the loop antenna are rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

Interconnecting cables, which hanging closer than 40cm to the horizontal metal ground plane are bundled its excess in center. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

Frequency range:
- 30MHz to 1000MHz

The Test receiver is set to:

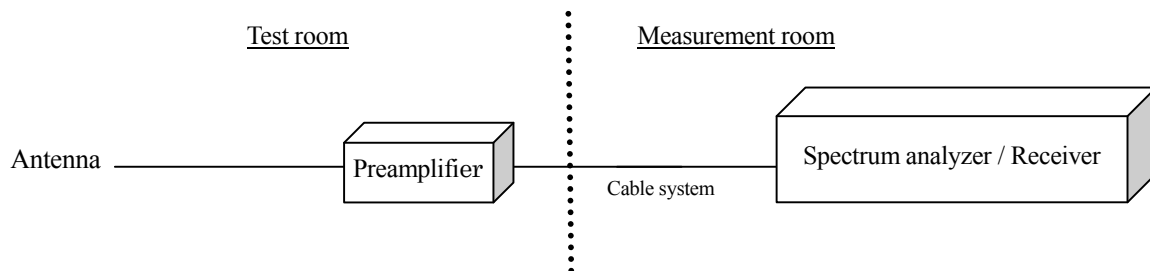
Detector: Quasi-peak
Bandwidth: 120kHz

The test mode of EUT is as follows.

- Normal Operation

4.3.2 Measurement Setup

Test configuration for Radiated emissions



4.3.3 Limit of Spurious Emission Measurement

Limits of FCC Part15 and IC RSS-210

Frequency [MHz]	Field Strength		Distance [m]
	[uV/m]	[dBuV/m]	
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

Limits of CISPR 22

Frequency [MHz]	Limit [dBuV/m]	Distance [m]
30 – 300	30	10
300 – 1000	37	10

NOTE:

1. CISPR 22 limit was applied to Radiated emission measurements as prescribed in FCC part 15 section 15.109(g).
2. Emission level [dBuV/m] = 20 log Emission [uV/m]

4.3.4 Calculation Method

Emission level = Reading + c.f.(Ant. factor + Cable system loss – Amp. Gain)

Margin = Limit – Emission level

4.3.5 Measurement Results

Test Personnel:

Tested by: Nobuaki Marukawa

Date : Jan. 26, 2012
 Temperature : 23.9 [°C]
 Humidity : 23.9 [%]
 Test place : 10m Semi-anechoic chamber

Pen: KP-501E

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	38.902	V	30.1	-7.9	22.2	30.0	7.8	100.0	107.0
2	48.000	V	33.9	-10.9	23.0	30.0	7.0	100.0	262.0
3	86.900	V	36.0	-14.7	21.3	30.0	8.7	100.0	317.0
4	96.000	V	37.3	-13.1	24.2	30.0	5.8	200.0	357.0
5	113.446	V	34.2	-9.9	24.3	30.0	5.7	200.0	40.0
6	151.297	V	28.4	-6.8	21.6	30.0	8.4	100.0	357.0
7	180.000	H	29.5	-5.5	24.0	30.0	6.0	350.0	28.0
8	192.000	V	28.0	-5.2	22.8	30.0	7.2	149.0	0.0
9	209.532	H	27.5	-4.9	22.6	30.0	7.4	349.0	0.0
10	769.971	H	33.0	-1.3	31.7	37.0	5.3	300.0	230.0
11	769.971	V	32.8	-1.3	31.5	37.0	5.5	198.0	279.0

Pen: KP-300E

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	38.902	V	29.6	-7.9	21.7	30.0	8.3	299.0	53.0
2	48.000	V	34.9	-10.9	24.0	30.0	6.0	100.0	282.0
3	86.900	V	36.8	-14.7	22.1	30.0	7.9	149.0	146.0
4	96.000	V	37.2	-13.1	24.1	30.0	5.9	100.0	311.0
5	105.444	V	35.5	-11.2	24.3	30.0	5.7	149.0	5.0
6	113.446	V	34.3	-9.9	24.4	30.0	5.6	100.0	0.0
7	156.520	V	27.7	-6.6	21.1	30.0	8.9	100.0	0.0
8	180.000	H	29.5	-5.5	24.0	30.0	6.0	400.0	23.0
9	192.000	V	28.8	-5.2	23.6	30.0	6.4	149.0	337.0
10	209.532	H	27.8	-4.9	22.9	30.0	7.1	400.0	336.0
11	480.010	H	33.4	-6.3	27.1	37.0	9.9	193.0	333.0
12	700.600	V	27.3	-3.6	23.7	37.0	13.3	199.0	141.0
13	749.055	V	35.0	-4.0	31.0	37.0	6.0	198.0	182.0
14	769.975	V	30.5	-1.3	29.2	37.0	7.8	300.0	33.0
15	769.975	H	31.8	-1.3	30.5	37.0	6.5	100.0	137.0

Pen: KP-400E

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	38.902	V	29.6	-7.9	21.7	30.0	8.3	100.0	152.0
2	48.000	V	33.0	-10.9	22.1	30.0	7.9	100.0	250.0
3	86.900	V	36.0	-14.7	21.3	30.0	8.7	150.0	354.0
4	96.000	V	37.5	-13.1	24.4	30.0	5.6	100.0	347.0
5	108.000	V	34.9	-10.8	24.1	30.0	5.9	150.0	0.0
6	113.446	V	34.4	-9.9	24.5	30.0	5.5	150.0	0.0
7	156.520	V	26.8	-6.6	20.2	30.0	9.8	100.0	35.0
8	180.000	H	29.0	-5.5	23.5	30.0	6.5	350.0	16.0
9	192.000	V	28.0	-5.2	22.8	30.0	7.2	100.0	290.0
10	209.532	H	27.0	-4.9	22.1	30.0	7.9	300.0	0.0
11	480.014	H	33.6	-6.3	27.3	37.0	9.7	200.0	58.0
12	749.055	V	34.0	-4.0	30.0	37.0	7.0	199.0	169.0
13	768.000	V	28.8	-1.5	27.3	37.0	9.7	148.0	306.0
14	769.975	H	32.7	-1.3	31.4	37.0	5.6	100.0	230.0
15	769.975	V	29.6	-1.3	28.3	37.0	8.7	300.0	42.0

Pen: KP-701E

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	38.902	V	29.6	-7.9	21.7	30.0	8.3	100.0	152.0
2	48.000	V	33.0	-10.9	22.1	30.0	7.9	100.0	236.0
3	86.900	V	35.9	-14.7	21.2	30.0	8.8	150.0	325.0
4	96.000	V	37.4	-13.1	24.3	30.0	5.7	100.0	347.0
5	108.000	V	35.3	-10.8	24.5	30.0	5.5	150.0	0.0
6	113.446	V	34.4	-9.9	24.5	30.0	5.5	100.0	0.0
7	156.520	V	27.7	-6.6	21.1	30.0	8.9	100.0	352.0
8	180.000	H	29.9	-5.5	24.4	30.0	5.6	350.0	16.0
9	209.532	H	27.2	-4.9	22.3	30.0	7.7	400.0	11.0
10	480.014	H	32.7	-6.3	26.4	37.0	10.6	193.0	333.0
11	749.055	V	34.7	-4.0	30.7	37.0	6.3	177.0	160.0
12	768.000	V	29.0	-1.5	27.5	37.0	9.5	148.0	306.0
13	769.975	V	30.6	-1.3	29.3	37.0	7.7	148.0	241.0
14	769.975	H	31.4	-1.3	30.1	37.0	6.9	100.0	225.0

Minimum Margin

Pen: KP-501E ----- 769.971MHz 5.3dB

Frequency [MHz]	Reading [dBuV] at 10m	c.f [dB(1/m)]	Result [dBuV/m] at 10m	Result [dBuV/m] at 3m	Limit of FCC/IC [dBuV/m] at 3m	Margin [dB]	Result
769.971	33.0	-1.3	31.7	42.2	46.0	3.8	PASS

*: Measurements were corrected to 3m using $20\log(10/3) = 10.5\text{dB}$

4.4 AC power line Conducted Emissions

4.4.1 Test Procedure [FCC 15.207, IC RSS-Gen 7.2.4]

Conducted emission at AC mains port measurements are performed at open area test site according to ANSI C63.4 section 7.

EUT and support equipment are placed on FRP table of 2.0m(W) × 1.0m(D) × 0.8m(H) in size. EUT is connected to 50Ω/50μH Line impedance stabilization network (LISN) which is placed on reference ground plane, and was placed 80cm away from EUT. Excess of AC power cable is bundled in center. Vertical Metal Reference Plane 2.0m (W) × 2.0m (H) in size is placed 0.4m away from EUT. LISN for peripheral is terminated in 50Ω.

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, support equipment, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, support equipment and test equipment are provided in order for them to warm up to their normal operating condition.

Frequency range:

- 0.15MHz to 30MHz

The Test receiver is set to:

Detector: Quasi-peak, Average

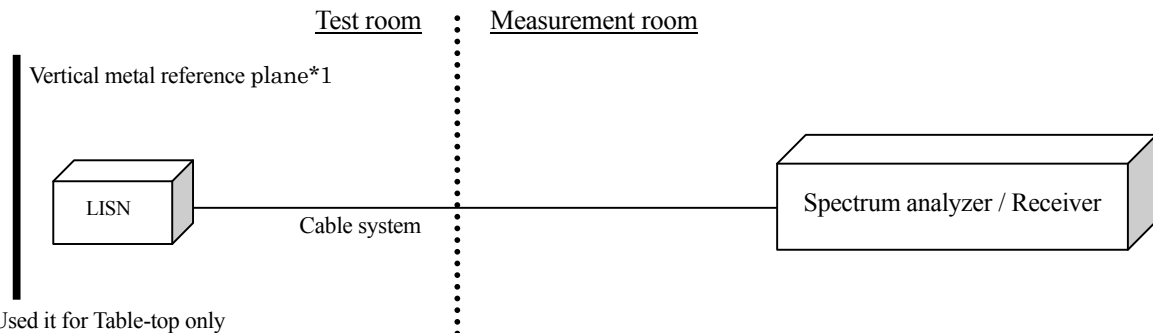
Bandwidth: 9kHz

The test mode of EUT is as follows.

- Normal Operation

4.4.2 Measurement Setup

Test configuration for AC power line Conducted Emissions



*1: Used it for Table-top only

4.4.3 Limit of AC power line Conducted Emissions Measurement

Frequency	Limit	
	QP(dBµV)	AV(dBµV)
0.15MHz to 0.5MHz	66 to 56*	56 to 46*
0.5MHz to 5MHz	56	46
5MHz to 30MHz	60	50

*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

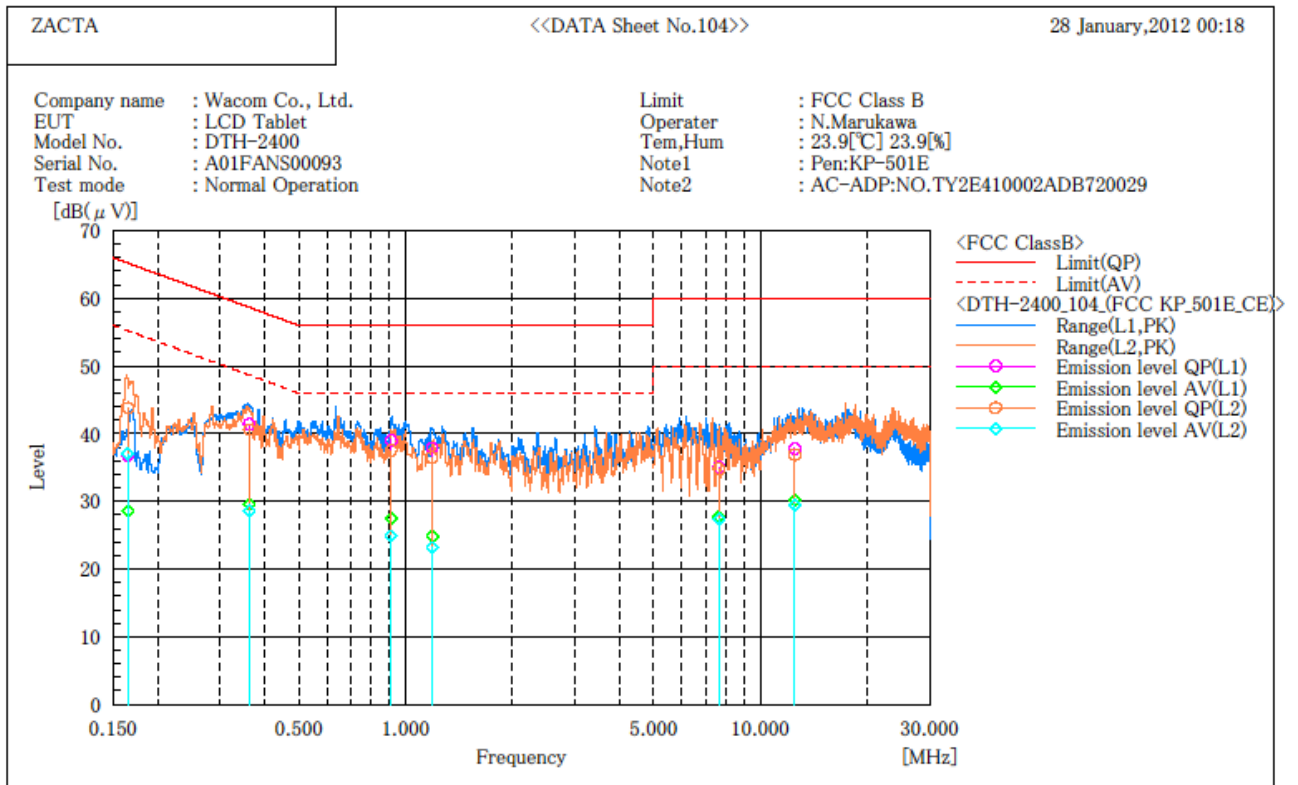
4.4.4 Calculation method

Emission level = Reading + (LISN. factor + Cable system loss)

Margin = Limit – Emission level

4.4.5 Measurement Result

Pen: KP-501E



Final Result

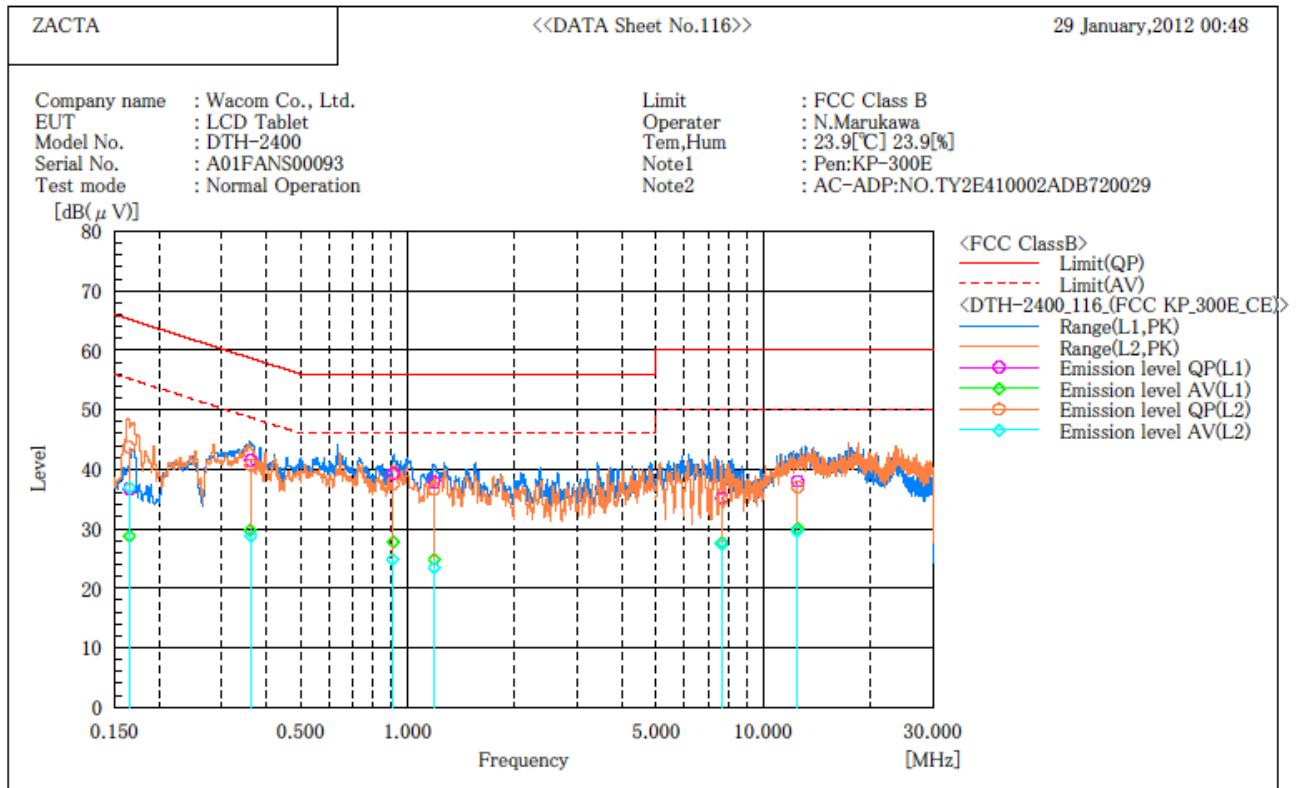
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	26.7	18.5	10.1	36.8	28.6	65.2	55.2	28.4	26.6
2	0.363	31.4	19.6	10.0	41.4	29.6	58.7	48.7	17.3	19.1
3	0.911	28.9	17.4	10.1	39.0	27.5	56.0	46.0	17.0	18.5
4	1.189	27.8	14.7	10.1	37.9	24.8	56.0	46.0	18.1	21.2
5	7.650	24.5	17.2	10.5	35.0	27.7	60.0	50.0	25.0	22.3
6	12.500	27.0	19.3	10.8	37.8	30.1	60.0	50.0	22.2	19.9

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	33.7	26.9	10.1	43.8	37.0	65.2	55.2	21.4	18.2
2	0.363	30.6	18.6	10.0	40.6	28.6	58.7	48.7	18.1	20.1
3	0.911	27.4	14.8	10.1	37.5	24.9	56.0	46.0	18.5	21.1
4	1.189	26.4	13.0	10.1	36.5	23.1	56.0	46.0	19.5	22.9
5	7.650	24.3	16.9	10.5	34.8	27.4	60.0	50.0	25.2	22.6
6	12.500	26.1	18.7	10.8	36.9	29.5	60.0	50.0	23.1	20.5

Pen: KP-300E



Final Result

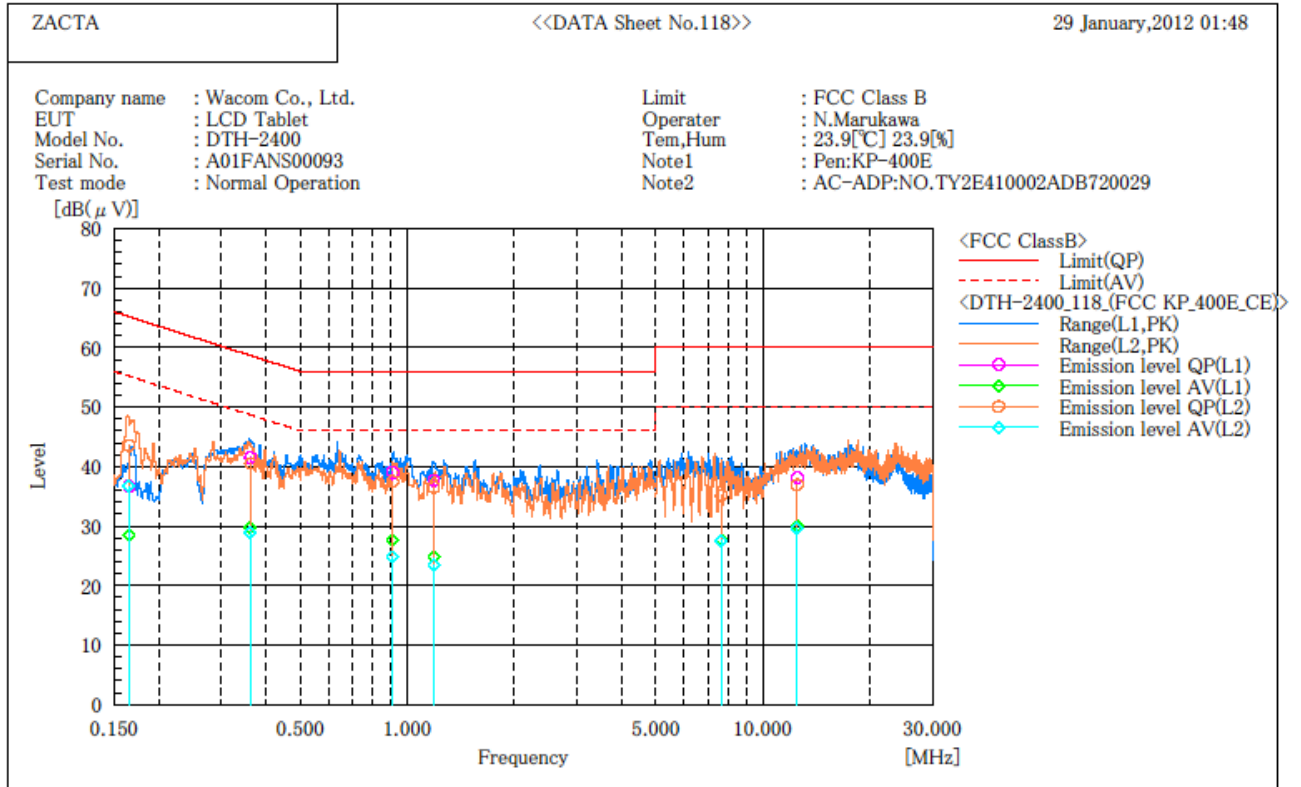
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	26.6	18.6	10.1	36.7	28.7	65.2	55.2	28.5	26.5
2	0.363	31.5	19.7	10.0	41.5	29.7	58.7	48.7	17.2	19.0
3	0.911	29.1	17.6	10.1	39.2	27.7	56.0	46.0	16.8	18.3
4	1.189	27.7	14.8	10.1	37.8	24.9	56.0	46.0	18.2	21.1
5	7.650	24.6	17.1	10.5	35.1	27.6	60.0	50.0	24.9	22.4
6	12.500	27.2	19.1	10.8	38.0	29.9	60.0	50.0	22.0	20.1

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	33.6	26.8	10.1	43.7	36.9	65.2	55.2	21.5	18.3
2	0.363	30.7	18.7	10.0	40.7	28.7	58.7	48.7	18.0	20.0
3	0.911	27.5	14.7	10.1	37.6	24.8	56.0	46.0	18.4	21.2
4	1.189	26.5	13.4	10.1	36.6	23.5	56.0	46.0	19.4	22.5
5	7.650	24.4	16.8	10.5	34.9	27.3	60.0	50.0	25.1	22.7
6	12.500	26.2	18.8	10.8	37.0	29.6	60.0	50.0	23.0	20.4

Pen: KP-400E



Final Result

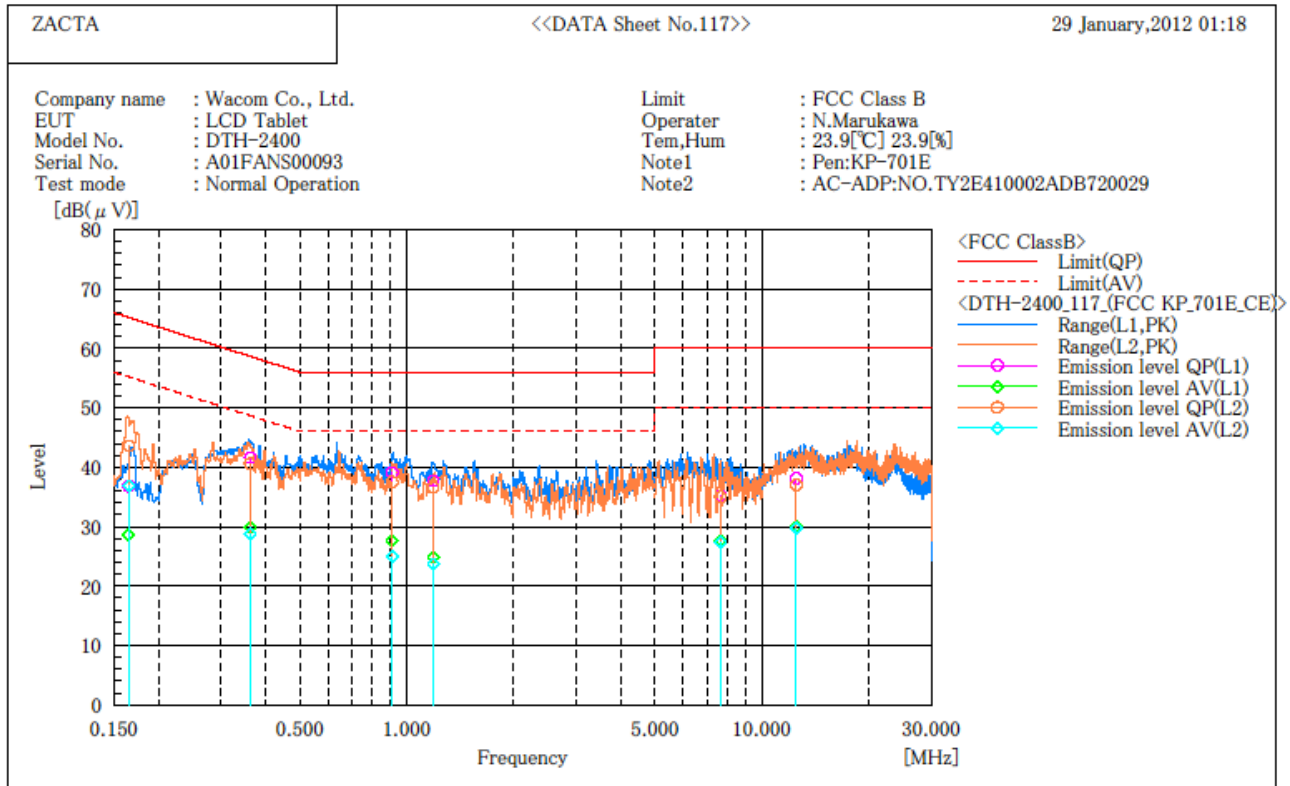
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	26.6	18.4	10.1	36.7	28.5	65.2	55.2	28.5	26.7
2	0.363	31.5	19.7	10.0	41.5	29.7	58.7	48.7	17.2	19.0
3	0.911	28.9	17.5	10.1	39.0	27.6	56.0	46.0	17.0	18.4
4	1.189	27.5	14.6	10.1	37.6	24.7	56.0	46.0	18.4	21.3
5	7.650	24.6	17.1	10.5	35.1	27.6	60.0	50.0	24.9	22.4
6	12.500	27.3	19.3	10.8	38.1	30.1	60.0	50.0	21.9	19.9

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	33.4	26.6	10.1	43.5	36.7	65.2	55.2	21.7	18.5
2	0.363	30.5	18.9	10.0	40.5	28.9	58.7	48.7	18.2	19.8
3	0.911	27.4	14.7	10.1	37.5	24.8	56.0	46.0	18.5	21.2
4	1.189	26.4	13.4	10.1	36.5	23.5	56.0	46.0	19.5	22.5
5	7.650	24.6	17.0	10.5	35.1	27.5	60.0	50.0	24.9	22.5
6	12.500	26.1	18.8	10.8	36.9	29.6	60.0	50.0	23.1	20.4

Pen: KP-701E



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	26.7	18.5	10.1	36.8	28.6	65.2	55.2	28.4	26.6
2	0.363	31.6	19.8	10.0	41.6	29.8	58.7	48.7	17.1	18.9
3	0.911	29.0	17.5	10.1	39.1	27.6	56.0	46.0	16.9	18.4
4	1.189	27.6	14.7	10.1	37.7	24.8	56.0	46.0	18.3	21.2
5	7.650	24.7	17.2	10.5	35.2	27.7	60.0	50.0	24.8	22.3
6	12.500	27.3	19.2	10.8	38.1	30.0	60.0	50.0	21.9	20.0

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.165	33.5	26.7	10.1	43.6	36.8	65.2	55.2	21.6	18.4
2	0.363	30.6	18.8	10.0	40.6	28.8	58.7	48.7	18.1	19.9
3	0.911	27.4	14.8	10.1	37.5	24.9	56.0	46.0	18.5	21.1
4	1.189	26.5	13.5	10.1	36.6	23.6	56.0	46.0	19.4	22.4
5	7.650	24.5	16.9	10.5	35.0	27.4	60.0	50.0	25.0	22.6
6	12.500	26.2	18.9	10.8	37.0	29.7	60.0	50.0	23.0	20.3

5. Uncertainty of measurement

Expanded uncertainties stated were calculated with a coverage Factor $k=2$.
Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port (150kHz - 30MHz)	$\pm 3.0\text{dB}$
Radiated emission (9kHz - 30MHz)	$\pm 4.4\text{dB}$
Radiated emission (30MHz – 1000MHz)	$\pm 4.5\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.9\text{dB}$

6. Laboratory description

1. Location: ZACTA Technology Corporation Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

2. Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) FCC filing:

Site name	Registration Number	Expiry Date
Site 2, Site3	91065	October 31, 2014
3m Semi-anechoic chamber 10m Semi-anechoic chamber	540072	February 16, 2013

3) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 2	4224A-2	January 23, 2015
Site 3	4224A-3	
3m Semi-anechoic chamber	4224A-4	
10m Semi-anechoic chamber	4224A-5	

4) VCCI site filing:

Site name	Radiated emission	Conducted Emission for mains port	Expiry Date	Conducted emission for telecom port	Expiry Date
Site 2	R-137	C-133	Nov. 16, 2014	T-1221	Nov. 28, 2014
Site 3	R-138	C-134		T-1222	
10m Semi-anechoic chamber	R-2480	C-2722	Jul. 3, 2013	T-1474	Jul. 3, 2013
	G-81	-		-	-
3m Semi-anechoic chamber	R-2481	C-2723		T-1475	Jul. 3, 2013
	G-82	-		-	-
Shielded room No.1	-	C-2724		T-1476	Jul. 3, 2013

5) Intertek authorization:

Authorized as an EMC test laboratory.

6) TUV Rheinland authorization:

Authorized as an EMC test laboratory.

7) BUREAU VERITAS certification:

Certified as an EMC test laboratory.

Appendix A: Test equipment

Radiated Emission (9kHz to 30MHz)

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum Analyzer	Agilent Technologies	E4440A	US40420937	Oct. 2012	Oct. 21, 2011
Preamplifier	ANRITSU	MH648A	M96057	Jun. 2012	Jun. 12, 2011
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Jun. 2012	Jun. 16, 2011
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	891847/17	Feb.2013	Feb. 21, 2012
Microwave cable	SUHNER	SUCOFLEX104/9m	322083/4	Oct. 2012	Oct. 6, 2011
		SUCOFLEX104/1m	322084/4	Oct. 2012	Oct. 6, 2011
		SUCOFLEX104/1.5m	317226/4	Oct. 2012	Oct. 6, 2011
		SUCOFLEX106/7m	41625/6	Oct. 2012	Oct. 6, 2011
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-NSA)	May 2012	May. 18, 2011

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

Radiated Emission (30MHz to 1000MHz)

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Preamplifier	ANRITSU	MH648A	M08067	Jun. 2012	Jun. 12, 2011
EMI Receiver	ROHDE&SCHWARZ	ESCI	100451	Jun. 2012	Jun. 3, 2011
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	1627	Jun. 2012	Jun. 12, 2011
Log periodic antenna	Schwarzbeck	UHALP9108A	0589	Jun. 2012	Jun. 12, 2011
Attenuator	TME	CFA-01NPJ-6	N/A (S273)	Jun. 2012	Jun. 12, 2011
Attenuator	TME	CFA-01NPJ-3	N/A (S270)	Jun. 2012	Jun. 12, 2011
Microwave cable	SUHNER	SUCOFLEX104/9m	322082/4	Sep. 2012	Sep. 14, 2011
		SUCOFLEX104/1m	322085/4	Sep. 2012	Sep. 14, 2011
		SUCOFLEX104/1.5m	317222/4	Sep. 2012	Sep. 14, 2011
		SUCOFLEX106/12m	41624/6	Sep. 2012	Sep. 14, 2011
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A
10m Semi-anechoic chamber	TOKIN	N/A	N/A (9001-NSA10m)	May 2012	May 21, 2011

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

Conducted Emission

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100451	Jun. 2012	Jun. 3, 2011
Coaxial cable	FUJIKURA	5D-2W/4m	N/A (S189)	Feb. 2012	Feb. 4, 2011
Microwave cable	SUHNER	SUCOFLEX104/1.5m	317222/4	Sep. 2012	Sep. 14, 2011
Coaxial cable	SUHNER	RG214/U/25m	N/A (S191)	Feb. 2012	Feb. 4, 2011
Line impedance Stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407F	8-2003-1	Mar. 2012	Mar. 10, 2011
Line impedance Stabilization network for peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242F	8-1973-1	Jun. 2012	Jun. 9, 2011
Attenuator	TYC	BA-PJ-10	N/A (S348)	Apr. 2012	Apr. 26, 2011
50Ω terminator	HRS	UG-88/U	N/A (S068)	Mar. 2012	Mar. 3, 2011
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/CE-AJ	0611193/V3.3	N/A	N/A

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.