

# TEST REPORT

Report number: Z071C-11200

Issue Date: November 9, 2011

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)	:	Pen Tablet, Pen & Touch Tablet
Model Number	:	PTK-650 PTH-650
FCC ID	:	HV4PTH650
IC Certification Number	:	6888A-PTH650

Test procedure	:	ANSI C63.4-2003
Date of test	:	October 24-26, 2011
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: Chiaki Kanno  
Chiaki Kanno

Authorized by: Jun Shimanuki  
Jun Shimanuki  
General Manager of Technical Division



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## ***1. Summary of Test***

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### ***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***

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

### ***1.4 Deviation from the standard***

None

### ***1.5 Modification to the EUT by laboratory***

None

## ***2. Equipment description***

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### ***2.1 General Description of equipment***

The EUT are Pen Tablet and Pen & Touch Tablet, which are transceiver.

### ***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)	: Pen Tablet, Pen & Touch Tablet
Trade name	: Wacom
Model number	: PTK-650, PTH-650
Serial number	: 1HDHS00108, 1HDHS00256
EUT condition	: Pre-production
Max. frequency	: 48MHz
Power ratings	: DC 5V (USB)
Size	: (W) 379.9 x (D) 251.4 x (H) 11.5 mm (PTK-650) (W) 379.9 x (D) 251.4 x (H) 11.5 mm (PTH-650)
Environment	: Indoor use
Thermal limitation	: 5°C to 40°C
Operating mode	: Normal Operation
Variation of the family model(s)	: Pen Tablet (PTK-650) Pen & Touch Tablet (PTH-650)
Options	: Using devices KP-501E (Grip Pen) KP-300E (Classic Pen) KP-400E (Airbrush) KP-701E (Art Pen) KP-130 (Inking Pen) KC-100 (Mouse) KC-210 (Lens Cursor)
[RF Specification]	
Frequency Range	: 666.0kHz
Modulation method	: OOK (On-Off-Keying)
RF emission type designator	: 113KK1D (PTK-650), 113KK1D (PTH-650)

### ***2.3 Operating mode***

#### **【Normal Operation】**

- i) Tablet test set up
- ii) Select a Packet measurement
- iii) Start test mode

### 3. Configuration information

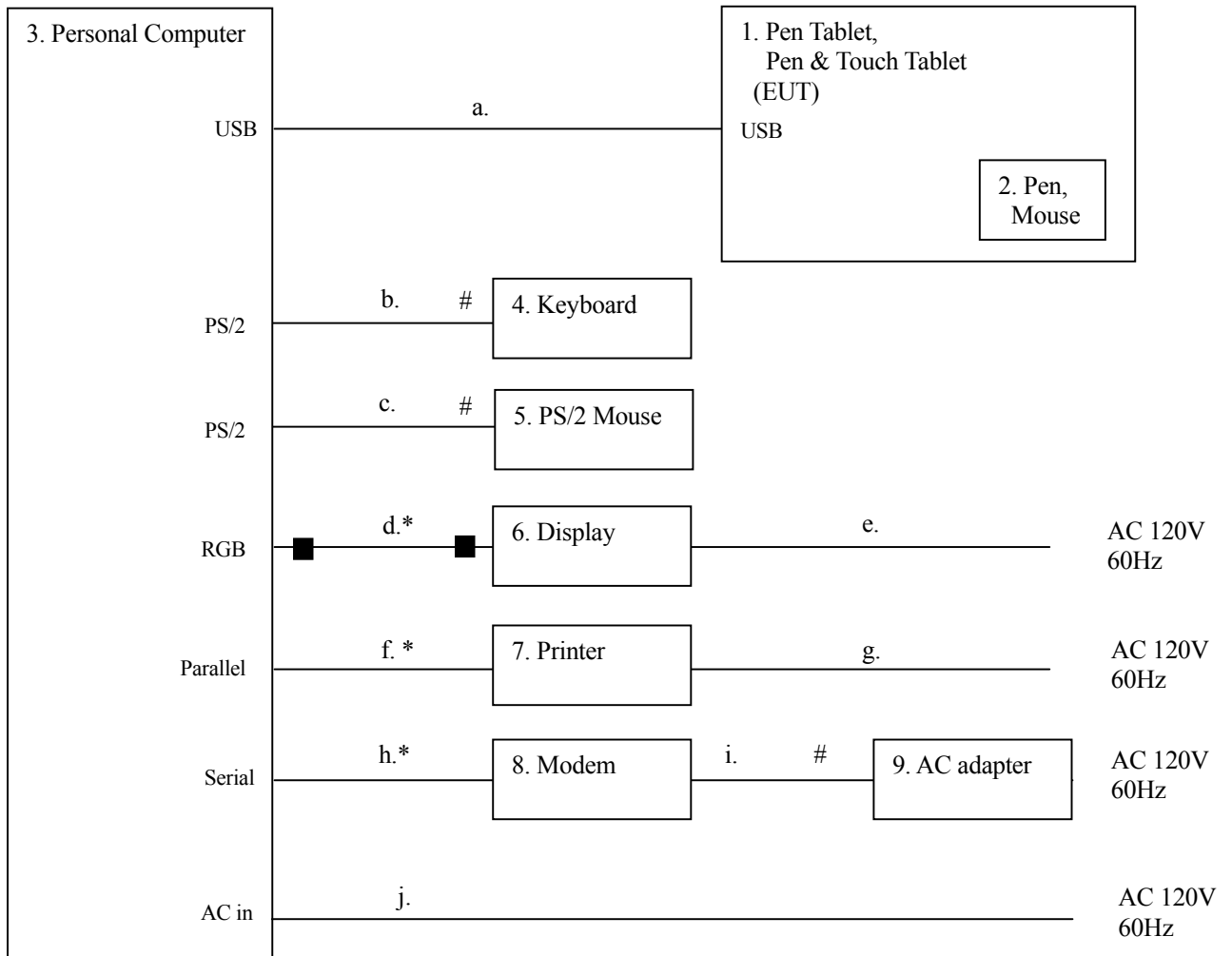
#### 3.1 EUT and Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Pen Tablet, Pen & Touch Tablet	Wacom	PTK-650	1HDHS00108	FCC ID: HV4PTH650 IC:6888A-PTH650	EUT
			PTH-650	1HDHS00256		
2	Pen	Wacom	KP-501E	N/A	-	Accessory
			KP-300E	N/A	-	Option
			KP-400E	N/A	-	Option
			KP-701E	N/A	-	Option
			KP-130	N/A	-	Option
	Mouse	Wacom	KC-100	8JP000206	-	Option
			KC-210	N/A	-	Option
3	Personal Computer	DELL	MTC2	BBDTJ1X	DoC	-
4	Keyboard	DELL	054EXM	TH-054EXE-37 171-19A-1537	AQ6-7D0080COB	-
5	PS/2 Mouse	DELL	M-SAW34	LNA20517343	DoC	-
6	Display	DELL	E176FPc	CN-0MC042-64 180-657-0V0K	DoC	-
7	Printer	Canon	BJF200	ETN02300	DoC	-
8	Modem	US. Robotics	Sport_Ster 33.6kbps	000839032BK6 YV4J	DoC	-
9	AC adapter for Modem	US. Robotics	N/A	N/A	-	-

#### 3.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	Comment
a	USB cable	2.0	Yes	Metal	Accessory
b	Keyboard cable	1.8	No	Metal	-
c	Mouse cable	1.9	No	Metal	-
d	RGB cable	1.5	Yes	Metal	-
e	AC power cord for Display	1.8	No	Plastic	-
f	Parallel cable	2.1	Yes	Metal	-
g	AC power cord for Printer	2.0	No	Plastic	-
h	Serial cable	2.0	Yes	Metal	-
i	DC cable for Modem AC adapter	1.9	No	Plastic	-
j	AC power cord for PC	1.8	No	Plastic	-

### 3.3 System configuration



# : Un-detachable cable  
■ : Ferrite core  
\* : Bundled excess cable

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”.

Note2: RGB cable(No.d) with two ferrite cores is accessory for Display(No.6).

## **4. Test Type and Results**

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### ***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:

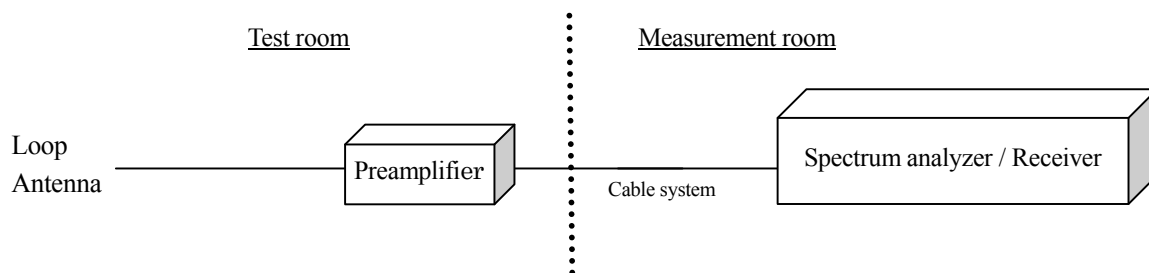
- RBW=3kHz, VBW=10kHz, Span=300kHz, Sweep=auto

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**

**[PTK-650]**

Frequency [MHz]	Occupied Bandwidth [kHz]
0.666	113.2352

**[PTH-650]**

Frequency [MHz]	Occupied Bandwidth [kHz]
0.666	113.3225



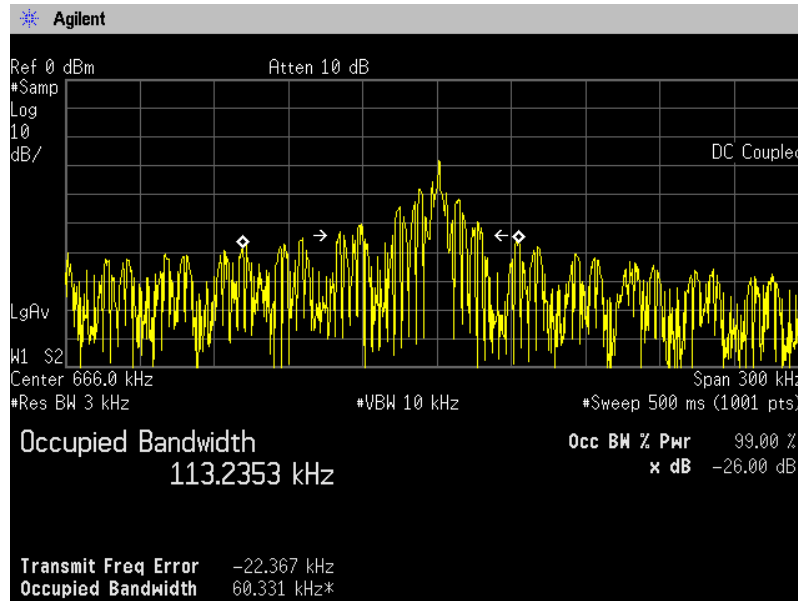
### 4.1.5 Trace Data

**Test Personnel:**

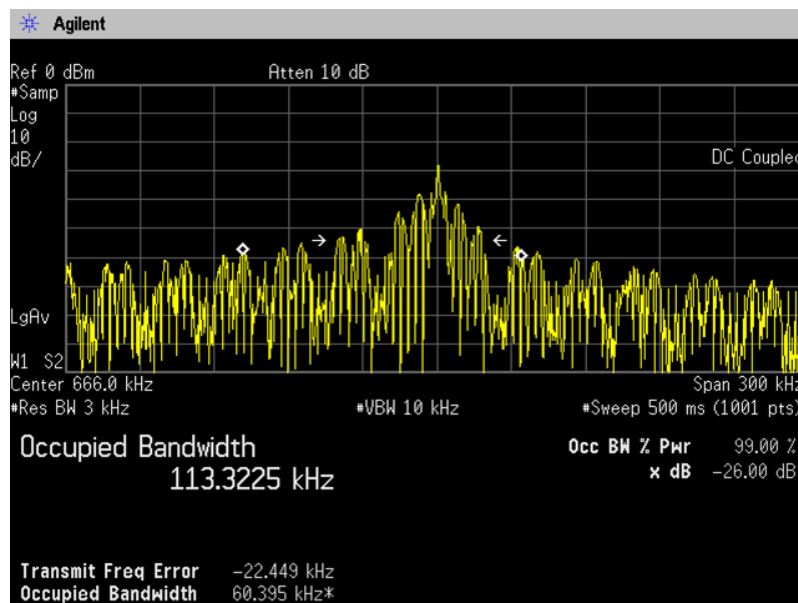
Tested by: Chiaki Kanno

Date : Oct. 25, 2011  
Temperature : 22.7 [°C]  
Humidity : 52.6 [%]  
Test place : 3m Semi-anechoic chamber

**[PTK-650]**



**[PTH-650]**



## 4.2 Radiated Emissions (9kHz to 1000MHz)

### 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 broadband antenna (Loop antenna, TRILOG 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. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop is 1.0meter above the ground plane. Frequency Range: 9kHz –1GHz is scanned and investigated with the test receiver, and above 1GHz, with the spectrum analyzer. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 200Hz (9kHz to 150kHz), 9kHz (150kHz to 30MHz) and 120kHz (above 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 1000MHz

The Test receiver is set to:

Detector: Quasi-peak

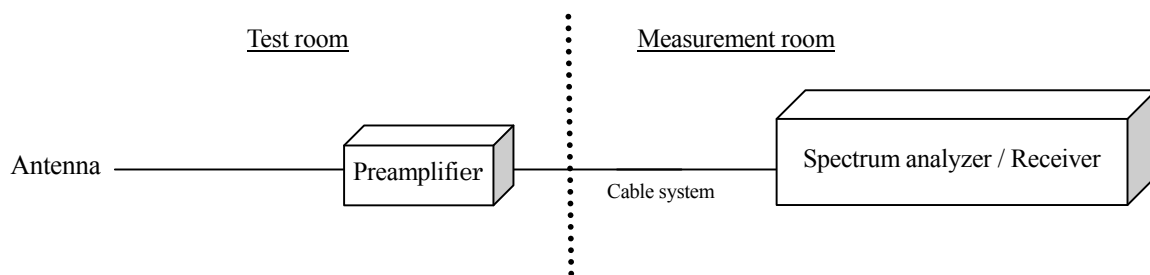
Bandwidth: 200Hz, 9kHz, 120kHz

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: Chiaki Kanno

Date : Oct. 24, 2011  
 Temperature : 23.4 [°C]  
 Humidity : 43.7 [%]  
 Test place : 3m Semi-anechoic chamber

**Test Personnel:**

Tested by: Chiaki Kanno

Date : Oct. 25, 2011  
 Temperature : 22.7 [°C]  
 Humidity : 52.6 [%]  
 Test place : 3m Semi-anechoic chamber

**[PTH-650] 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
0.666	54.9	-10.6	44.3	4.3	31.1	26.8	PASS
1.332	35.3	-10.4	24.9	-15.1	25.1	40.2	PASS
1.998	36.6	-10.3	26.3	-13.7	29.5	43.2	PASS
2.664	34.7	-10.1	24.6	-15.4	29.5	44.9	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.345	V	44.8	-9.7	35.1	40.0	4.9	100.0	2.0
2	69.520	H	45.7	-11.6	34.1	40.0	5.9	400.0	286.0
3	112.000	H	47.6	-11.2	36.4	43.5	7.1	268.0	349.0
4	128.010	H	45.9	-9.9	36.0	43.5	7.5	255.0	22.0
5	272.030	H	41.9	-8.5	33.4	46.0	12.6	100.0	26.0
6	828.840	H	21.6	2.8	24.4	46.0	21.6	299.0	56.0
7	985.506	V	24.1	6.1	30.2	54.0	23.8	100.0	283.0

**[PTH-650] 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
0.666	53.8	-10.6	43.2	3.2	31.1	27.9	PASS
1.332	35.3	-10.4	24.9	-15.1	25.1	40.2	PASS
1.998	35.9	-10.3	25.6	-14.4	29.5	43.9	PASS
2.664	34.7	-10.1	24.6	-15.4	29.5	44.9	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.350	V	44.8	-9.7	35.1	40.0	4.9	100.0	3.0
2	69.520	H	44.1	-11.6	32.5	40.0	7.5	400.0	293.0
3	112.011	H	46.2	-11.1	35.1	43.5	8.4	264.0	353.0
4	128.000	H	43.6	-9.9	33.7	43.5	9.8	252.0	28.0
5	272.020	H	41.7	-8.5	33.2	46.0	12.8	100.0	21.0
6	339.230	H	36.4	-6.7	29.7	46.0	16.3	100.0	277.0

**[PTH-650] 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
0.666	57.1	-10.6	46.5	6.5	31.1	24.6	PASS
1.332	35.3	-10.4	24.9	-15.1	25.1	40.2	PASS
1.998	36.3	-10.3	26.0	-14.0	29.5	43.5	PASS
2.664	34.6	-10.1	24.5	-15.5	29.5	45.0	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.340	V	44.3	-9.7	34.6	40.0	5.4	100.0	0.0
2	69.500	H	44.9	-11.6	33.3	40.0	6.7	400.0	305.0
3	112.010	H	46.1	-11.1	35.0	43.5	8.5	278.0	356.0
4	128.012	H	44.0	-9.9	34.1	43.5	9.4	245.0	21.0
5	272.030	H	41.5	-8.5	33.0	46.0	13.0	100.0	21.0
6	339.227	H	35.6	-6.7	28.9	46.0	17.1	100.0	288.0

**[PTH-650] 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
0.666	57.9	-10.6	47.3	7.3	31.1	23.8	PASS
1.332	35.3	-10.4	24.9	-15.1	25.1	40.2	PASS
1.998	36.7	-10.3	26.4	-13.6	29.5	43.1	PASS
2.664	34.6	-10.1	24.5	-15.5	29.5	45.0	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.334	V	45.1	-9.7	35.4	40.0	4.6	100.0	3.0
2	69.510	H	44.9	-11.6	33.3	40.0	6.7	400.0	282.0
3	112.011	H	47.7	-11.1	36.6	43.5	6.9	279.0	359.0
4	128.020	H	46.1	-9.9	36.2	43.5	7.3	261.0	33.0
5	272.018	H	41.8	-8.5	33.3	46.0	12.7	126.0	26.0
6	339.226	H	36.0	-6.7	29.3	46.0	16.7	100.0	288.0

[PTH-650] Pen: KP-130

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
0.666	56.3	-10.6	45.7	5.7	31.1	25.4	PASS
1.332	35.2	-10.4	24.8	-15.2	25.1	40.3	PASS
1.998	36.4	-10.3	26.1	-13.9	29.5	43.4	PASS
2.664	34.7	-10.1	24.6	-15.4	29.5	44.9	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.339	V	45.2	-9.7	35.5	40.0	4.5	102.0	13.0
2	69.501	H	44.7	-11.6	33.1	40.0	6.9	400.0	294.0
3	112.007	H	45.9	-11.1	34.8	43.5	8.7	257.0	357.0
4	128.012	H	44.1	-9.9	34.2	43.5	9.3	254.0	27.0
5	272.025	H	41.7	-8.5	33.2	46.0	12.8	103.0	26.0
6	339.232	H	37.9	-6.7	31.2	46.0	14.8	100.0	288.0

[PTH-650] Mouse: KC-100

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
0.666	57.7	-10.6	47.1	7.1	31.1	24.0	PASS
1.332	35.3	-10.4	24.9	-15.1	25.1	40.2	PASS
1.998	36.1	-10.3	25.8	-14.2	29.5	43.7	PASS
2.664	34.6	-10.1	24.5	-15.5	29.5	45.0	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.320	V	44.6	-9.7	34.9	40.0	5.1	100.0	11.0
2	69.500	H	45.3	-11.6	33.7	40.0	6.3	400.0	279.0
3	112.013	H	46.1	-11.1	35.0	43.5	8.5	277.0	354.0
4	128.008	H	44.1	-9.9	34.2	43.5	9.3	253.0	22.0
5	272.026	H	41.7	-8.5	33.2	46.0	12.8	103.0	27.0
6	339.242	H	37.7	-6.7	31.0	46.0	15.0	100.0	284.0

**[PTH-650] Mouse: KC-210**

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
0.666	53.4	-10.6	42.8	2.8	31.1	28.3	PASS
1.332	35.2	-10.4	24.8	-15.2	25.1	40.3	PASS
1.998	36.4	-10.3	26.1	-13.9	29.5	43.4	PASS
2.664	34.6	-10.1	24.5	-15.5	29.5	45.0	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.333	V	45.2	-9.7	35.5	40.0	4.5	100.0	18.0
2	69.506	H	45.0	-11.6	33.4	40.0	6.6	400.0	289.0
3	112.012	H	45.8	-11.1	34.7	43.5	8.8	286.0	346.0
4	128.007	H	44.0	-9.9	34.1	43.5	9.4	253.0	31.0
5	272.026	H	41.7	-8.5	33.2	46.0	12.8	100.0	28.0
6	339.232	H	37.5	-6.7	30.8	46.0	15.2	100.0	284.0

**[PTK-650] 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
0.666	57.6	-10.6	47.0	7.0	31.1	24.1	PASS
1.332	35.3	-10.4	24.9	-15.1	25.1	40.2	PASS
1.998	36.6	-10.3	26.3	-13.7	29.5	43.2	PASS
2.664	34.4	-10.1	24.4	-15.6	29.5	45.1	PASS

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.332	V	45.0	-9.7	35.3	40.0	4.7	100.0	28.0
2	69.305	H	45.8	-11.6	34.2	40.0	5.8	400.0	278.0
3	128.009	H	50.2	-9.9	40.3	43.5	3.2	265.0	29.0
4	272.018	H	40.6	-8.5	32.1	46.0	13.9	133.0	34.0
5	480.033	H	34.9	-3.4	31.5	46.0	14.5	100.0	279.0

Note: PTK-650 was tested by the worst case of PTH-650.

### 4.3 AC power line Conducted Emissions

#### 4.3.1 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

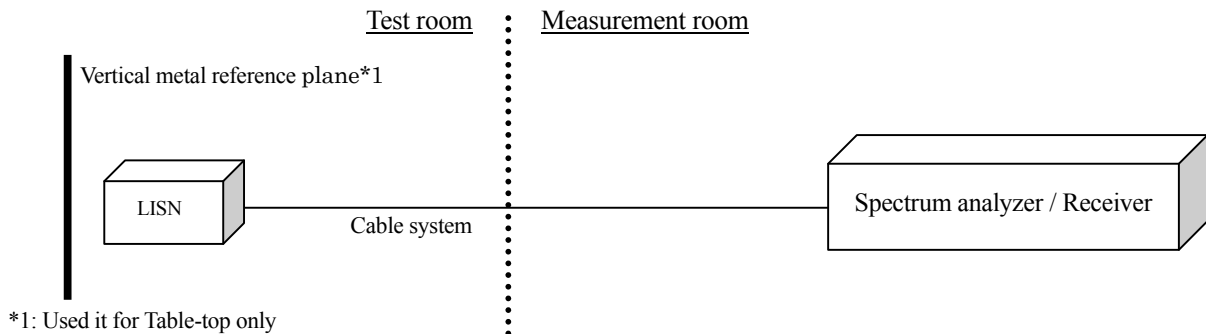
Bandwidth: 9kHz

The test mode of EUT is as follows.

- Normal Operation

#### 4.3.2 Measurement Setup

##### Test configuration for AC power line Conducted Emissions





### 4.3.3 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.

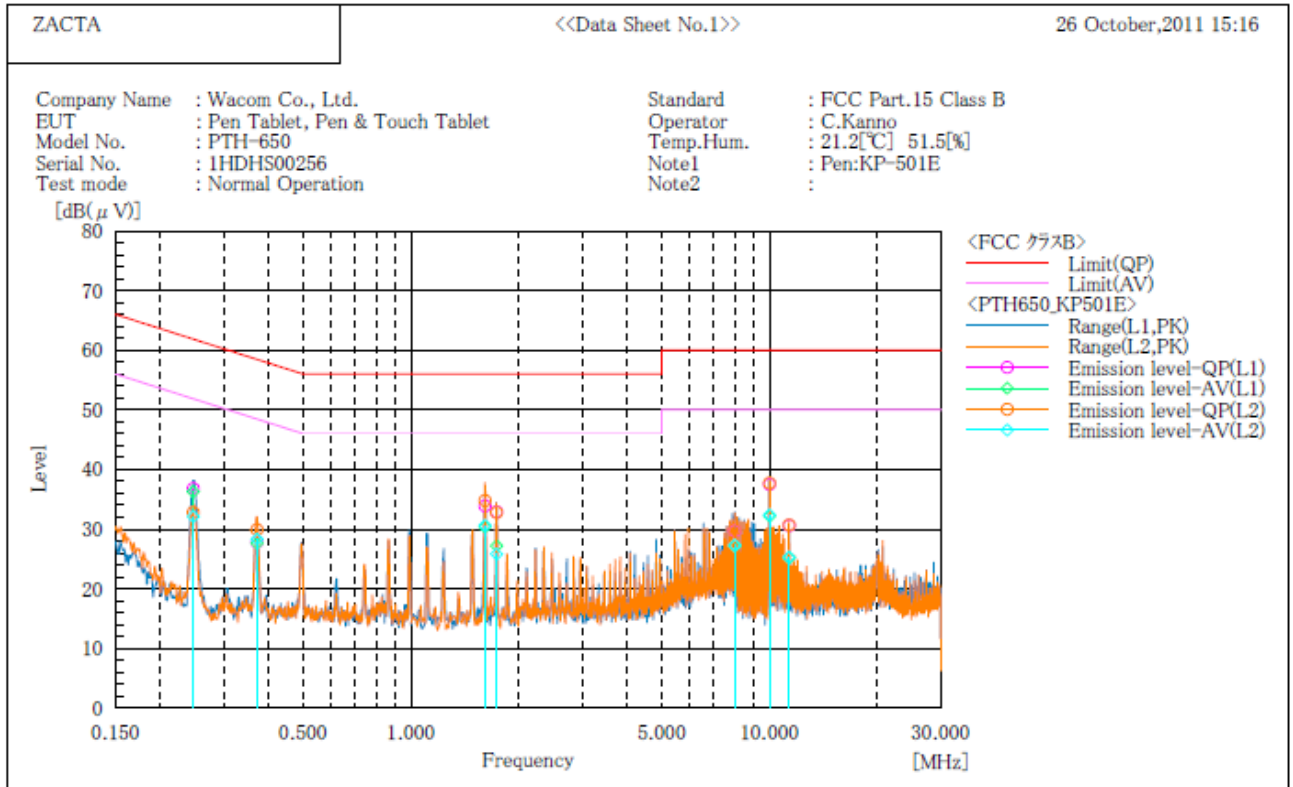
### 4.3.4 Calculation method

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

Margin = Limit – Emission level

**4.3.5 Measurement Result**  
**[PTH-650]**

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



**Final Result**

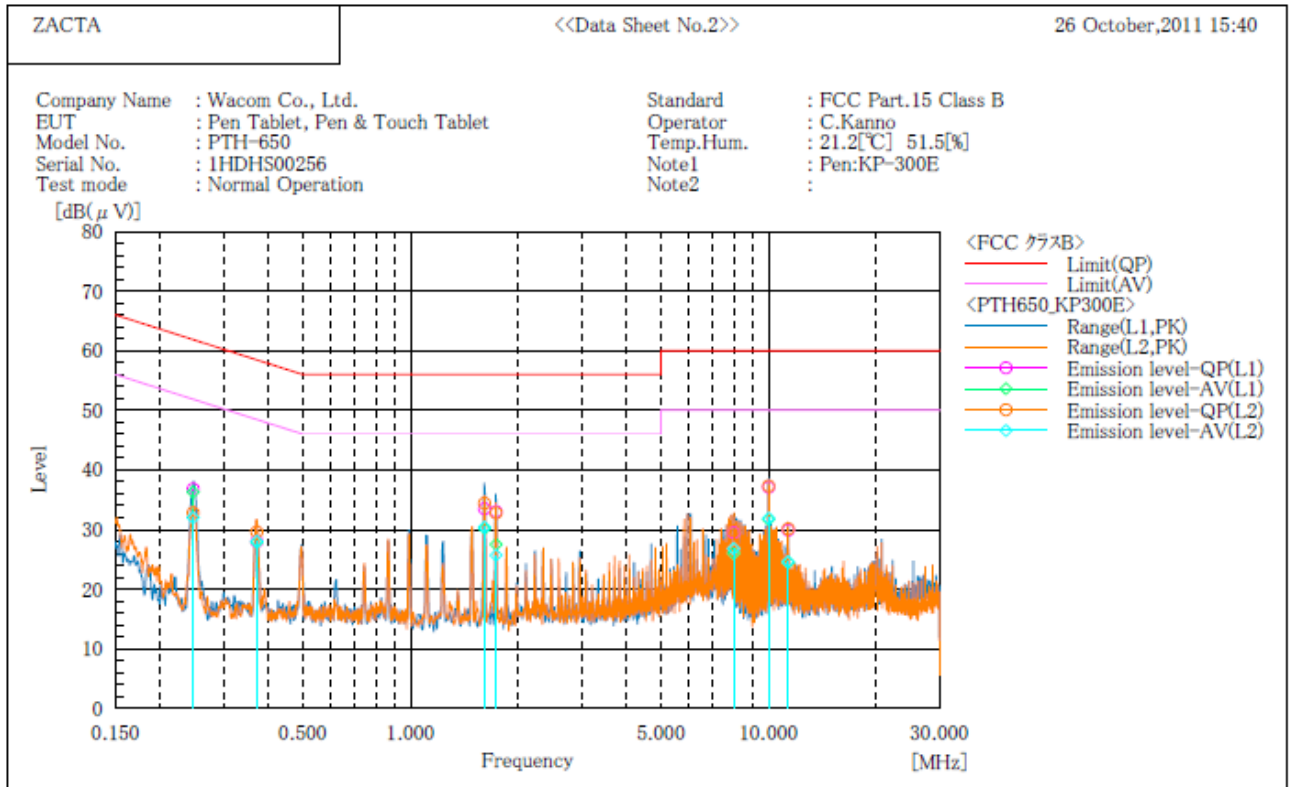
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.8	26.3	10.0	36.8	36.3	61.9	51.9	25.1	15.6
2	0.372	17.8	17.6	10.0	27.8	27.6	58.5	48.5	30.7	20.9
3	1.608	23.9	20.4	10.0	33.9	30.4	56.0	46.0	22.1	15.6
4	1.732	22.8	17.1	10.1	32.9	27.2	56.0	46.0	23.1	18.8
5	7.992	19.5	16.9	10.3	29.8	27.2	60.0	50.0	30.2	22.8
6	10.000	27.1	21.8	10.4	37.5	32.2	60.0	50.0	22.5	17.8
7	11.334	20.2	14.8	10.4	30.6	25.2	60.0	50.0	29.4	24.8

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.7	22.0	10.1	32.8	32.1	61.9	51.9	29.1	19.8
2	0.372	19.9	18.3	10.0	29.9	28.3	58.5	48.5	28.6	20.2
3	1.608	24.7	20.5	10.1	34.8	30.6	56.0	46.0	21.2	15.4
4	1.732	22.7	15.7	10.1	32.8	25.8	56.0	46.0	23.2	20.2
5	7.992	19.6	17.0	10.3	29.9	27.3	60.0	50.0	30.1	22.7
6	10.000	27.3	22.0	10.4	37.7	32.4	60.0	50.0	22.3	17.6
7	11.334	20.3	14.9	10.4	30.7	25.3	60.0	50.0	29.3	24.7

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

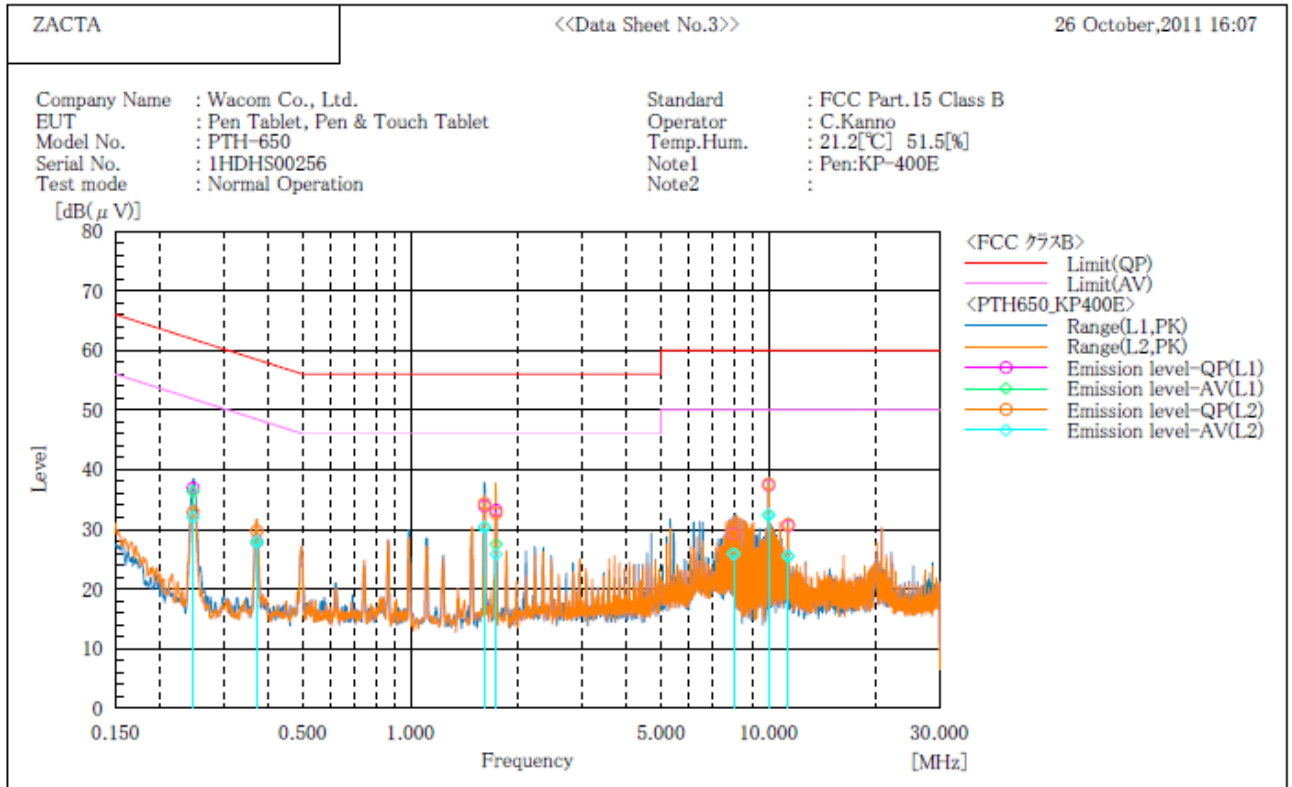
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.8	26.3	10.0	36.8	36.3	61.9	51.9	25.1	15.6
2	0.372	18.0	17.9	10.0	28.0	27.9	58.5	48.5	30.5	20.6
3	1.608	23.5	20.2	10.0	33.5	30.2	56.0	46.0	22.5	15.8
4	1.732	22.9	17.4	10.1	33.0	27.5	56.0	46.0	23.0	18.5
5	7.992	19.3	15.7	10.3	29.6	26.0	60.0	50.0	30.4	24.0
6	10.000	26.7	21.3	10.4	37.1	31.7	60.0	50.0	22.9	18.3
7	11.334	19.5	14.1	10.4	29.9	24.5	60.0	50.0	30.1	25.5

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.7	21.9	10.1	32.8	32.0	61.9	51.9	29.1	19.9
2	0.372	19.6	18.0	10.0	29.6	28.0	58.5	48.5	28.9	20.5
3	1.608	24.3	20.3	10.1	34.4	30.4	56.0	46.0	21.6	15.6
4	1.732	22.7	15.6	10.1	32.8	25.7	56.0	46.0	23.2	20.3
5	7.992	19.5	16.5	10.3	29.8	26.8	60.0	50.0	30.2	23.2
6	10.000	26.9	21.5	10.4	37.3	31.9	60.0	50.0	22.7	18.1
7	11.334	19.7	14.2	10.4	30.1	24.6	60.0	50.0	29.9	25.4

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

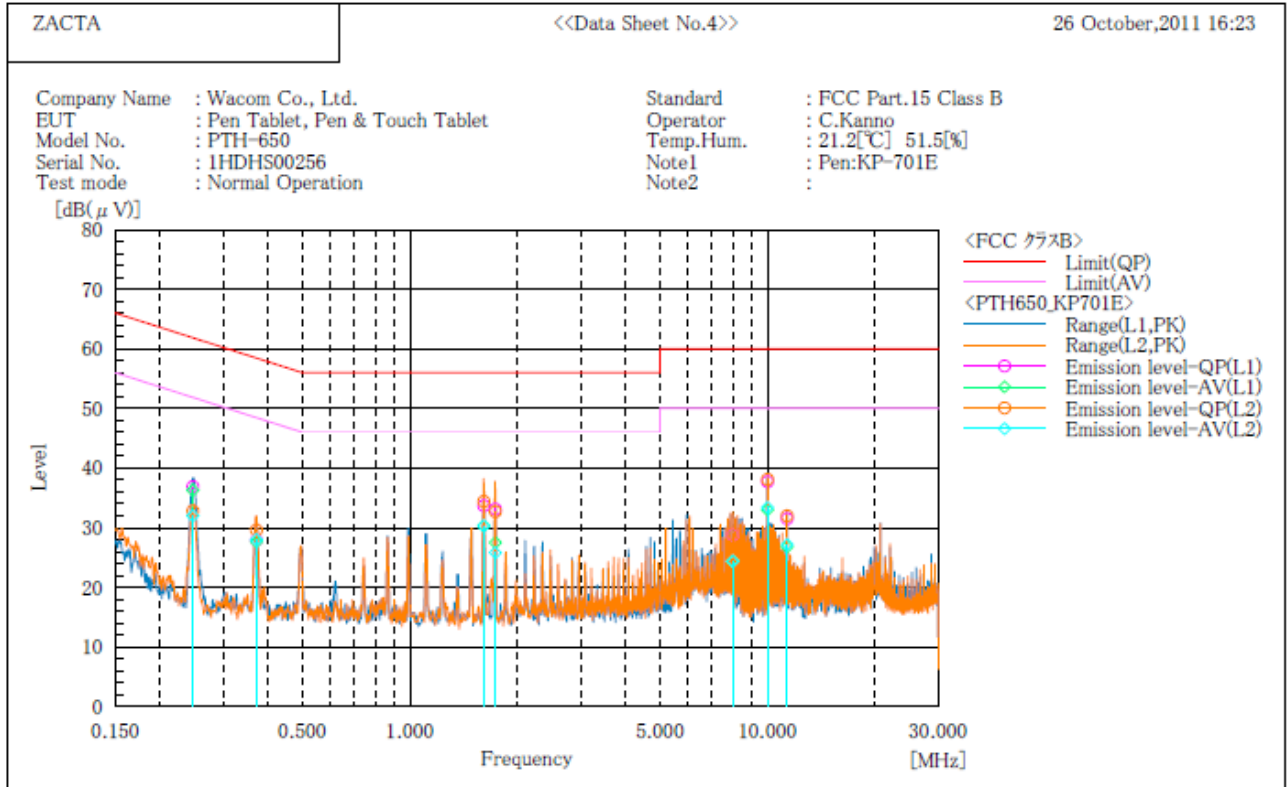
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.9	26.3	10.0	36.9	36.3	61.9	51.9	25.0	15.6
2	0.372	17.9	17.7	10.0	27.9	27.7	58.5	48.5	30.6	20.8
3	1.608	23.9	20.4	10.0	33.9	30.4	56.0	46.0	22.1	15.6
4	1.732	23.1	17.4	10.1	33.2	27.5	56.0	46.0	22.8	18.5
5	7.992	19.1	15.7	10.3	29.4	26.0	60.0	50.0	30.6	24.0
6	10.001	27.0	21.9	10.4	37.4	32.3	60.0	50.0	22.6	17.7
7	11.334	20.2	15.0	10.4	30.6	25.4	60.0	50.0	29.4	24.6

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.7	21.9	10.1	32.8	32.0	61.9	51.9	29.1	19.9
2	0.372	19.7	18.0	10.0	29.7	28.0	58.5	48.5	28.8	20.5
3	1.608	24.2	20.2	10.1	34.3	30.3	56.0	46.0	21.7	15.7
4	1.732	22.6	15.7	10.1	32.7	25.8	56.0	46.0	23.3	20.2
5	7.992	19.2	15.5	10.3	29.5	25.8	60.0	50.0	30.5	24.2
6	10.001	27.2	22.1	10.4	37.6	32.5	60.0	50.0	22.4	17.5
7	11.334	20.4	15.2	10.4	30.8	25.6	60.0	50.0	29.2	24.4

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

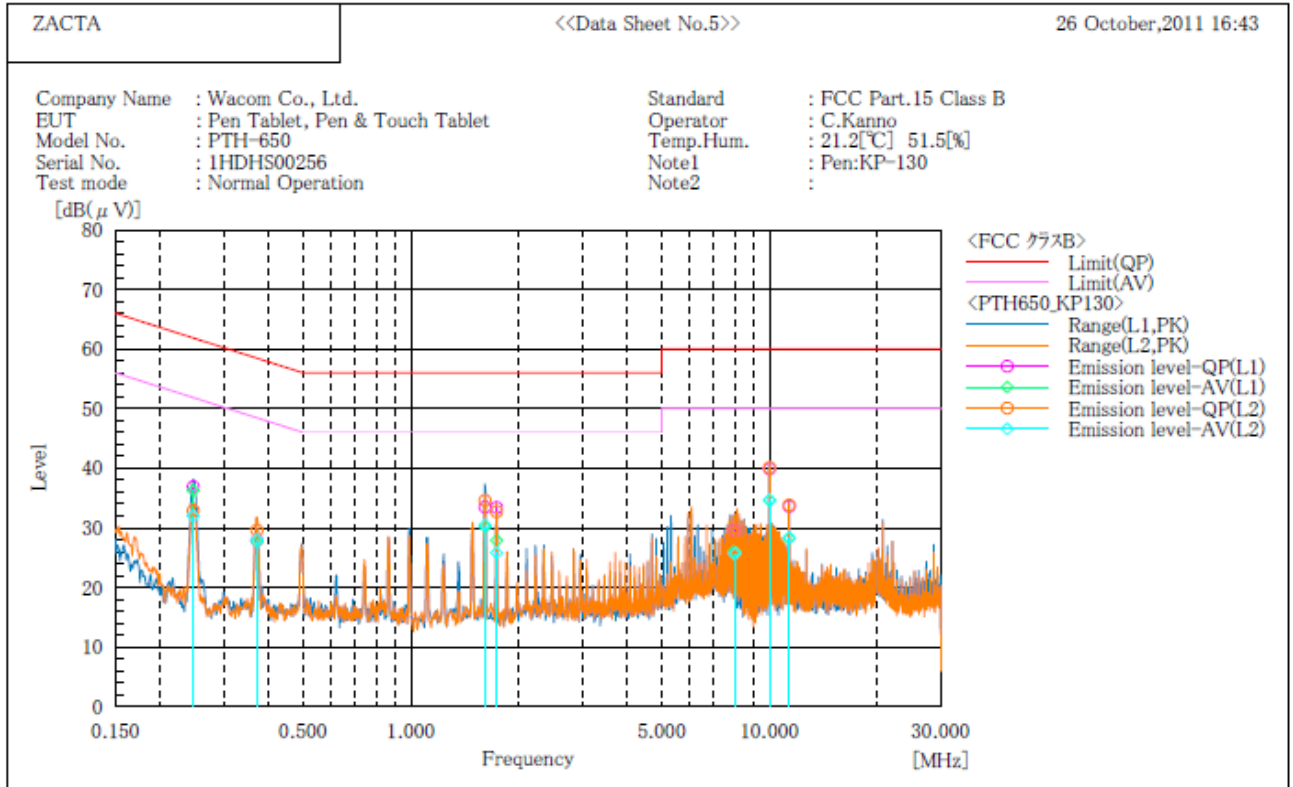
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.9	26.3	10.0	36.9	36.3	61.9	51.9	25.0	15.6
2	0.372	17.9	17.6	10.0	27.9	27.6	58.5	48.5	30.6	20.9
3	1.608	23.7	20.3	10.0	33.7	30.3	56.0	46.0	22.3	15.7
4	1.732	23.0	17.4	10.1	33.1	27.5	56.0	46.0	22.9	18.5
5	7.992	18.6	14.1	10.3	28.9	24.4	60.0	50.0	31.1	25.6
6	10.001	27.3	22.6	10.4	37.7	33.0	60.0	50.0	22.3	17.0
7	11.334	21.1	16.4	10.4	31.5	26.8	60.0	50.0	28.5	23.2

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.7	21.9	10.1	32.8	32.0	61.9	51.9	29.1	19.9
2	0.372	19.6	18.0	10.0	29.6	28.0	58.5	48.5	28.9	20.5
3	1.608	24.3	20.2	10.1	34.4	30.3	56.0	46.0	21.6	15.7
4	1.732	22.6	15.7	10.1	32.7	25.8	56.0	46.0	23.3	20.2
5	7.992	18.7	14.1	10.3	29.0	24.4	60.0	50.0	31.0	25.6
6	10.001	27.7	23.0	10.4	38.1	33.4	60.0	50.0	21.9	16.6
7	11.334	21.6	16.8	10.4	32.0	27.2	60.0	50.0	28.0	22.8

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

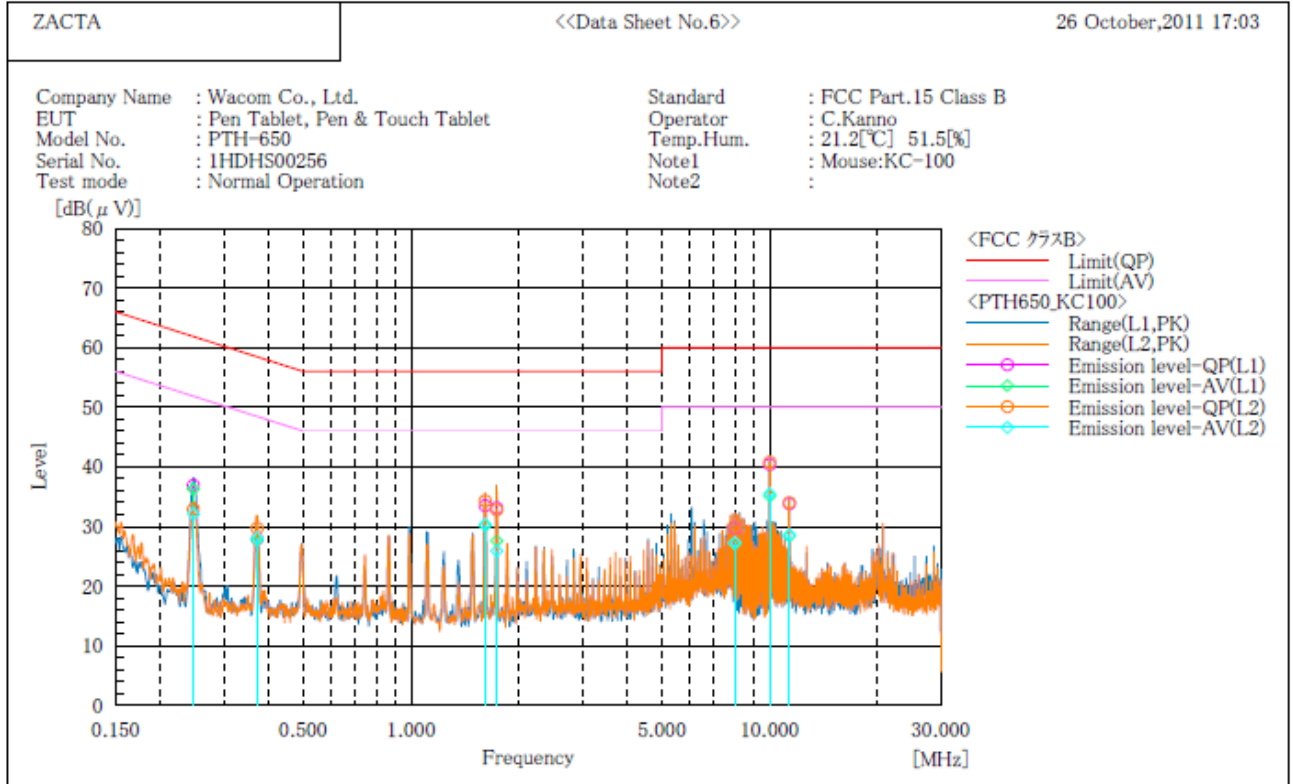
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.9	26.3	10.0	36.9	36.3	61.9	51.9	25.0	15.6
2	0.372	17.9	17.7	10.0	27.9	27.7	58.5	48.5	30.6	20.8
3	1.608	23.5	20.2	10.0	33.5	30.2	56.0	46.0	22.5	15.8
4	1.732	23.3	17.8	10.1	33.4	27.9	56.0	46.0	22.6	18.1
5	7.993	19.2	15.7	10.3	29.5	26.0	60.0	50.0	30.5	24.0
6	10.001	29.5	24.2	10.4	39.9	34.6	60.0	50.0	20.1	15.4
7	11.334	23.2	17.8	10.4	33.6	28.2	60.0	50.0	26.4	21.8

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.8	21.9	10.1	32.9	32.0	61.9	51.9	29.0	19.9
2	0.372	19.6	18.0	10.0	29.6	28.0	58.5	48.5	28.9	20.5
3	1.608	24.5	20.4	10.1	34.6	30.5	56.0	46.0	21.4	15.5
4	1.732	22.6	15.7	10.1	32.7	25.8	56.0	46.0	23.3	20.2
5	7.993	19.1	15.4	10.3	29.4	25.7	60.0	50.0	30.6	24.3
6	10.001	29.7	24.3	10.4	40.1	34.7	60.0	50.0	19.9	15.3
7	11.334	23.4	18.0	10.4	33.8	28.4	60.0	50.0	26.2	21.6

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

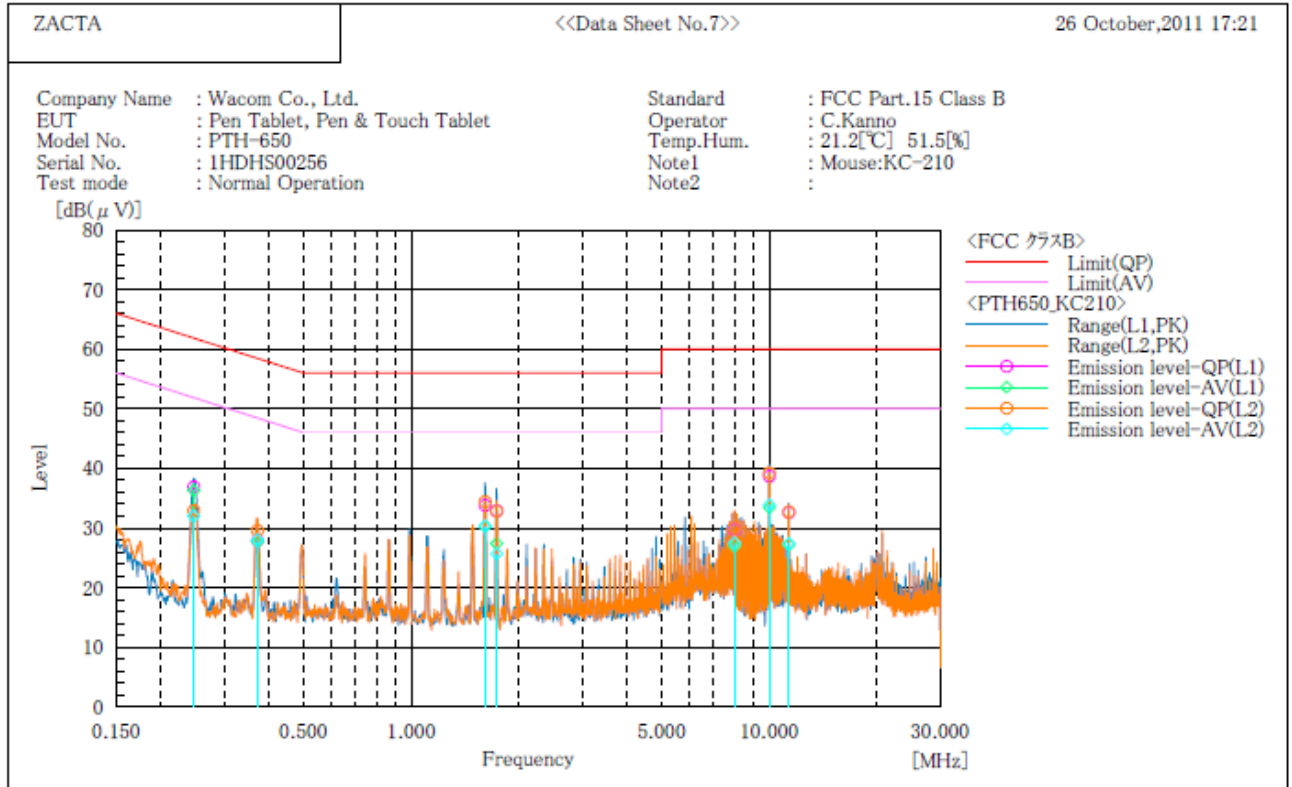
--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.9	26.3	10.0	36.9	36.3	61.9	51.9	25.0	15.6
2	0.372	17.9	17.7	10.0	27.9	27.7	58.5	48.5	30.6	20.8
3	1.608	23.5	20.2	10.0	33.5	30.2	56.0	46.0	22.5	15.8
4	1.732	23.0	17.5	10.1	33.1	27.6	56.0	46.0	22.9	18.4
5	7.995	19.5	16.8	10.3	29.8	27.1	60.0	50.0	30.2	22.9
6	10.001	30.0	24.7	10.4	40.4	35.1	60.0	50.0	19.6	14.9
7	11.334	23.4	18.0	10.4	33.8	28.4	60.0	50.0	26.2	21.6

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.8	22.0	10.1	32.9	32.1	61.9	51.9	29.0	19.8
2	0.372	19.7	18.1	10.0	29.7	28.1	58.5	48.5	28.8	20.4
3	1.608	24.2	20.2	10.1	34.3	30.3	56.0	46.0	21.7	15.7
4	1.732	22.7	15.8	10.1	32.8	25.9	56.0	46.0	23.2	20.1
5	7.995	19.7	17.0	10.3	30.0	27.3	60.0	50.0	30.0	22.7
6	10.002	30.4	25.1	10.4	40.8	35.5	60.0	50.0	19.2	14.5
7	11.334	23.6	18.2	10.4	34.0	28.6	60.0	50.0	26.0	21.4

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.9	26.3	10.0	36.9	36.3	61.9	51.9	25.0	15.6
2	0.372	17.9	17.7	10.0	27.9	27.7	58.5	48.5	30.6	20.8
3	1.608	23.8	20.3	10.0	33.8	30.3	56.0	46.0	22.2	15.7
4	1.732	22.8	17.3	10.1	32.9	27.4	56.0	46.0	23.1	18.6
5	7.995	19.5	16.7	10.3	29.8	27.0	60.0	50.0	30.2	23.0
6	10.001	28.3	23.0	10.4	38.7	33.4	60.0	50.0	21.3	16.6
7	11.334	22.2	16.8	10.4	32.6	27.2	60.0	50.0	27.4	22.8

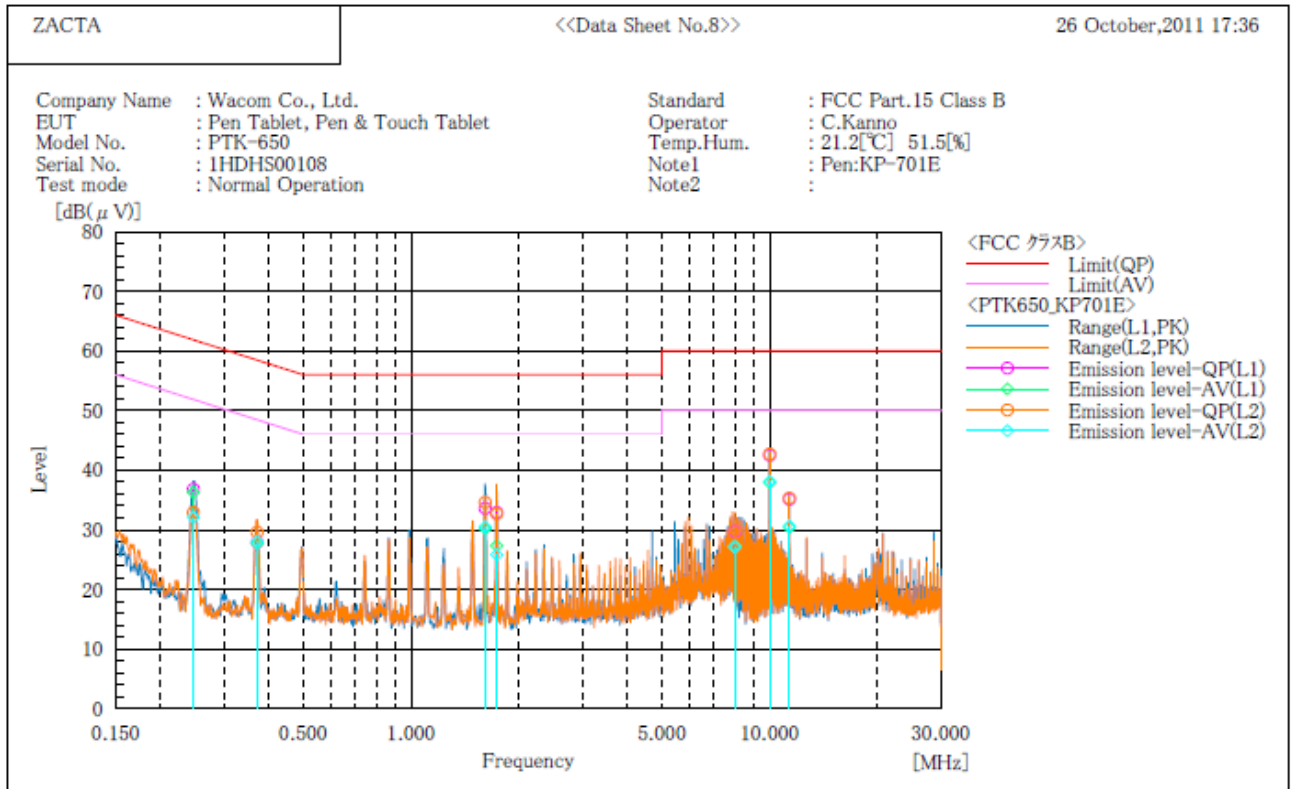
--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.8	21.9	10.1	32.9	32.0	61.9	51.9	29.0	19.9
2	0.372	19.6	18.0	10.0	29.6	28.0	58.5	48.5	28.9	20.5
3	1.608	24.3	20.2	10.1	34.4	30.3	56.0	46.0	21.6	15.7
4	1.732	22.7	15.6	10.1	32.8	25.7	56.0	46.0	23.2	20.3
5	7.995	19.7	17.2	10.3	30.0	27.5	60.0	50.0	30.0	22.5
6	10.001	28.8	23.5	10.4	39.2	33.9	60.0	50.0	20.8	16.1
7	11.334	22.3	17.0	10.4	32.7	27.4	60.0	50.0	27.3	22.6



[PTK-650]

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< 3m Semi-anechoic chamber >



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	26.8	26.3	10.0	36.8	36.3	61.9	51.9	25.1	15.6
2	0.372	17.9	17.7	10.0	27.9	27.7	58.5	48.5	30.6	20.8
3	1.608	23.6	20.2	10.0	33.6	30.2	56.0	46.0	22.4	15.8
4	1.732	22.8	17.2	10.1	32.9	27.3	56.0	46.0	23.1	18.7
5	7.995	19.5	16.9	10.3	29.8	27.2	60.0	50.0	30.2	22.8
6	10.001	32.1	27.5	10.4	42.5	37.9	60.0	50.0	17.5	12.1
7	11.334	24.7	20.0	10.4	35.1	30.4	60.0	50.0	24.9	19.6

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.247	22.8	22.0	10.1	32.9	32.1	61.9	51.9	29.0	19.8
2	0.372	19.6	18.0	10.0	29.6	28.0	58.5	48.5	28.9	20.5
3	1.608	24.5	20.4	10.1	34.6	30.5	56.0	46.0	21.4	15.5
4	1.732	22.6	15.7	10.1	32.7	25.8	56.0	46.0	23.3	20.2
5	7.995	19.7	16.8	10.3	30.0	27.1	60.0	50.0	30.0	22.9
6	10.001	32.3	27.7	10.4	42.7	38.1	60.0	50.0	17.3	11.9
7	11.334	24.9	20.2	10.4	35.3	30.6	60.0	50.0	24.7	19.4

Note: PTK-650 was tested by the worst case of PTH-650.

## ***5. Uncertainty of measurement***

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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.

<b>Test item</b>	<b>Measurement uncertainty</b>
Conducted emission at mains port (150kHz - 30MHz)	$\pm 2.9\text{dB}$
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	November 19, 2011
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	February 16, 2012
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, 2011	-	-
Site 3	R-138	C-134		-	-
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) ETL SEMKO 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**

<b>Equipment</b>	<b>Company</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. due</b>	<b>Cal. date</b>
Spectrum Analyzer	Agilent Technologies	E4447A	MY46180188	Feb. 2012	Feb. 23, 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.2012	Feb. 21, 2011
TRILOG Antenna	Schwarzbeck	VULB9160	9160-3220	Apr. 2012	Apr. 5, 2011
Attenuator	TME	CFA-01NPJ-6	N/A (S274)	Jun. 2012	Jun. 12, 2011
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.

### **Conducted Emission**

<b>Equipment</b>	<b>Company</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. due</b>	<b>Cal. date</b>
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Jun. 2012	Jun. 16, 2011
Coaxial cable	FUJIKURA	5D-2W/4m	N/A (S192)	Feb. 2012	Feb. 4, 2011
Coaxial cable	FUJIKURA	5D-2W/1m	N/A (S193)	Feb. 2012	Feb. 4, 2011
Coaxial cable	SUHNER	RG214/U/10m	N/A (S194)	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	75465BX	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.