

# TEST REPORT

Report number: Z071C-09307

Issue Date: December 16, 2009

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

## FCC Part15 Subpart C

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

Applicant	:	Wacom Co., Ltd.
Equipment under test (EUT)	:	Pen Tablet
FCC ID	:	HV4CTL-660
Model Number	:	CTL-660
Serial Number	:	9KDPS00015
EUT Condition	:	Pre-production

Test procedure	:	ANSI C63.4-2003
Date of test	:	December 8, 2009
Test place	:	3m Semi-anechoic chamber
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*

Taiki Watanabe

Authorized by:

*Jun Shimanuki*

Jun Shimanuki

General Manager of Technical Division

**NVLAP**<sup>®</sup>  
NVLAP LAB CODE 200306-0

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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

### ***1.3 Summary of test results***

<b>Test Items Section</b>	<b>Test Items</b>	<b>Condition</b>	<b>Result</b>
	<b>Transmit mode [Tx]:</b>		
15.209	Radiated Emissions	Radiated	<b>Pass</b>
15.207	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***

1. The EUT is a Pen Tablet, which is transceiver.
2. The EUT is the ideal tool to enhance user's presentations and documents.  
The pen (Brand: Wacom, Model: LP-160) will be sold together with the EUT.
3. For more detailed features description, please refer to the manufacturer's specifications or User's manual.

### ***2.2 EUT information***

Applicant	: Wacom Co., Ltd. 2-510-1, Toyonodai, Otone-machi, Kitasaitama-gun, Saitama, 349-1148 Japan Phone: + 81-480-78-1211 Fax: + 81-480-78-1404
Equipment under test (EUT)	: Pen Tablet
Trade name	: Wacom
Model number	: CTL-660
Serial number	: 9KDPS00015
EUT condition	: Pre-production
Max. frequency	: 48MHz
Power ratings	: DC 5V (USB)
Size	: (W) 366.8 x (D) 223 x (H) 8.5 mm
Environment	: Indoor use
Thermal limitation	: 5°C to 40°C
Operating mode	: Normal Operation
Variation of the family model(s)	: N/A
[RF Specification]	
Frequency Range	: 667kHz
Modulation method	: OOK (On-Off-Keying)

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

#### **【Normal Operation】**

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

### 3. Configuration information

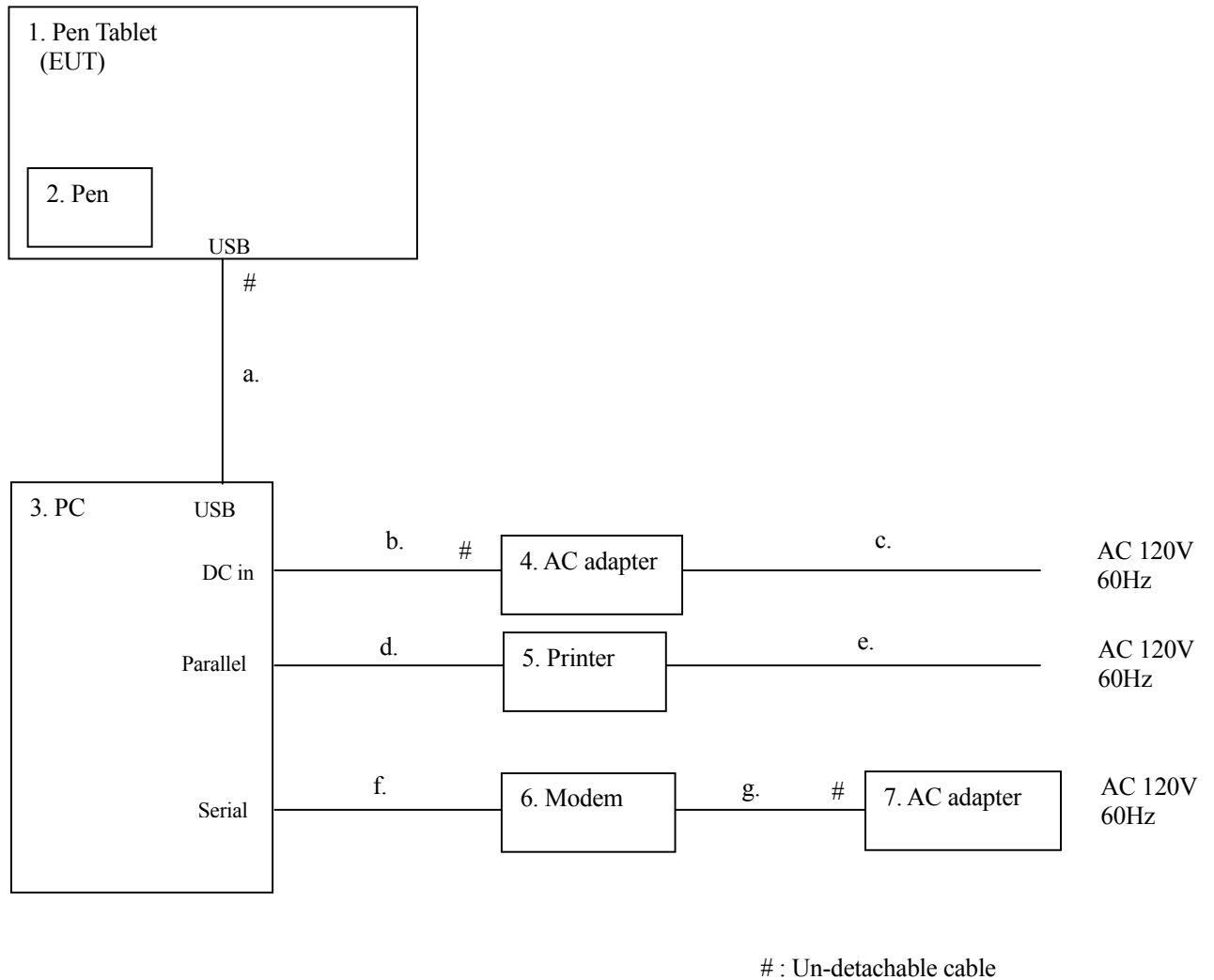
#### 3.1 EUT and Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Pen Tablet	Wacom	CTL-660	9KDPS00015	FCC ID: HV4CTL-660 IC: 6888A-CTL-660	EUT
2	Pen	Wacom	LP-160	N/A	-	Option
3	PC	HP	Compaq nx6320	CNU7071H4D	DoC	-
4	AC adapter for PC	HP	PA-1650-02HC	7108054501	-	-
5	Printer	Canon	BJF200	ETN02300	DoC	-
6	Modem	US. Robotics	Sport_Ster33.6 Kbps	000839032BK 6YV4J	DoC	-
7	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	1.5	Yes	Metal	-
b	DC cable for PC AC adapter	1.8	No	Plastic	-
c	AC cable for PC AC adapter	1.7	No	Plastic	-
d	Parallel cable	2.1	Yes	Metal	-
e	AC cable	2.0	No	Plastic	-
f	Serial cable	2.0	Yes	Metal	-
g	DC cable	1.7	No	Plastic	-

### 3.3 System configuration



Note: 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 Radiated Emissions (9kHz – 1000MHz)**

#### **4.1.1 Test Procedure [ FCC 15.209 ]**

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.

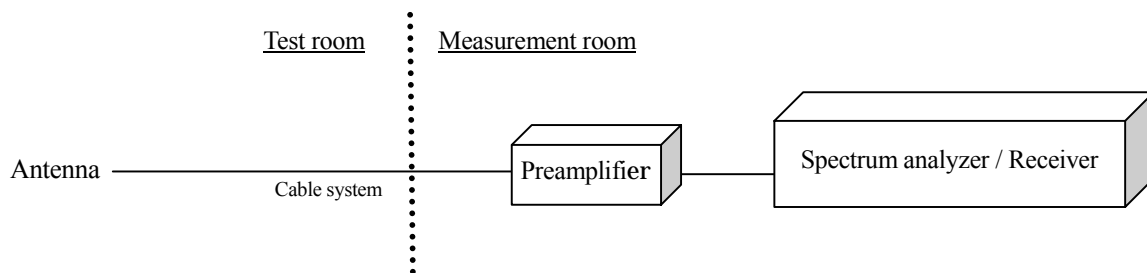
Frequency range:  
- 0.009MHz to 1000MHz

The Test receiver is set to:  
Detector: Quasi-peak  
Bandwidth: 200Hz, 9kHz, 120kHz

The test mode of EUT is as follows.  
- Normal Operation

#### **4.1.2 Measurement Setup**

##### **Test configuration for Radiated emissions**



### 4.1.3 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  $40\log(3/30) = -40.0\text{dB}$

### 4.1.4 Calculation Method

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

Margin = Limit – Emission level

### 4.1.5 Measurement Results

**Test Personnel:**

Tested by: Taiki Watanabe

Date : Dec. 8, 2009  
 Temperature : 22.3 [°C]  
 Humidity : 30.8 [%]  
 Test place : 3m Semi-anechoic chamber



**[0.009MHz to 30MHz]**

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	47.2	-10.7	36.5	-3.5	31.1	34.6	PASS
1.334	35.5	-10.7	24.8	-15.2	25.1	40.3	PASS
2.000	36.0	-10.6	25.4	-14.6	29.5	44.1	PASS

**[30MHz to 1000MHz]**

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	96.091	H	40.5	-13.9	26.6	43.5	16.9	329.0	170.0
2	108.054	H	46.6	-11.5	35.1	43.5	8.4	292.0	208.0
3	108.088	V	39.6	-11.5	28.1	43.5	15.4	100.0	81.0
4	168.016	H	44.4	-8.6	35.8	43.5	7.7	183.0	191.0
5	168.104	V	38.3	-8.6	29.7	43.5	13.8	100.0	100.0
6	180.164	H	40.0	-9.7	30.3	43.5	13.2	234.0	207.0
7	192.279	H	45.1	-10.9	34.2	43.5	9.3	201.0	196.0
8	216.009	H	42.7	-10.8	31.9	46.0	14.1	158.0	186.0
9	432.006	H	38.0	-4.6	33.4	46.0	12.6	100.0	158.0

## 4.2 AC power line Conducted Emissions

### 4.2.1 Test Procedure [ FCC 15.207 ]

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 wooden 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

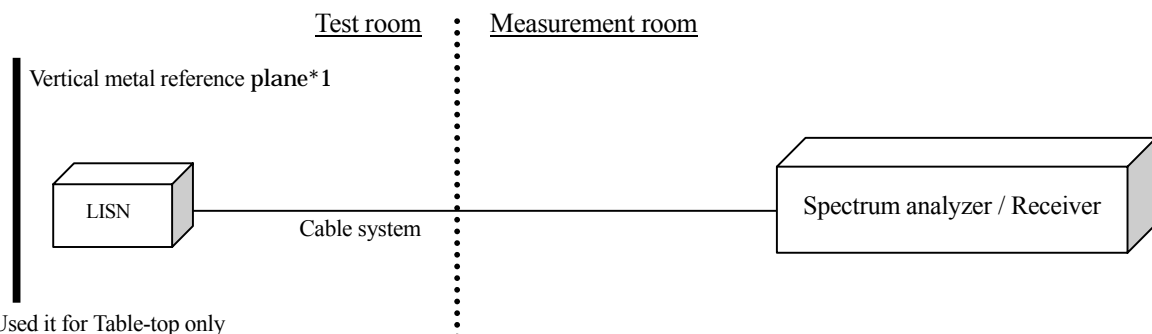
Bandwidth: 9kHz

The test mode of EUT is as follows.

- Normal Operation

### 4.2.2 Measurement Setup

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



\*1: Used it for Table-top only

#### ***4.2.3 Limit of AC power line Conducted Emissions Measurement***

Frequency	Limit	
	QP(dB $\mu$ V)	AV(dB $\mu$ V)
0.15MHz to 0.5MHz	66 to 56*	56 to 46*
0.5MHz to 5MHz	56	46
5MHz to 30MHz	60	50

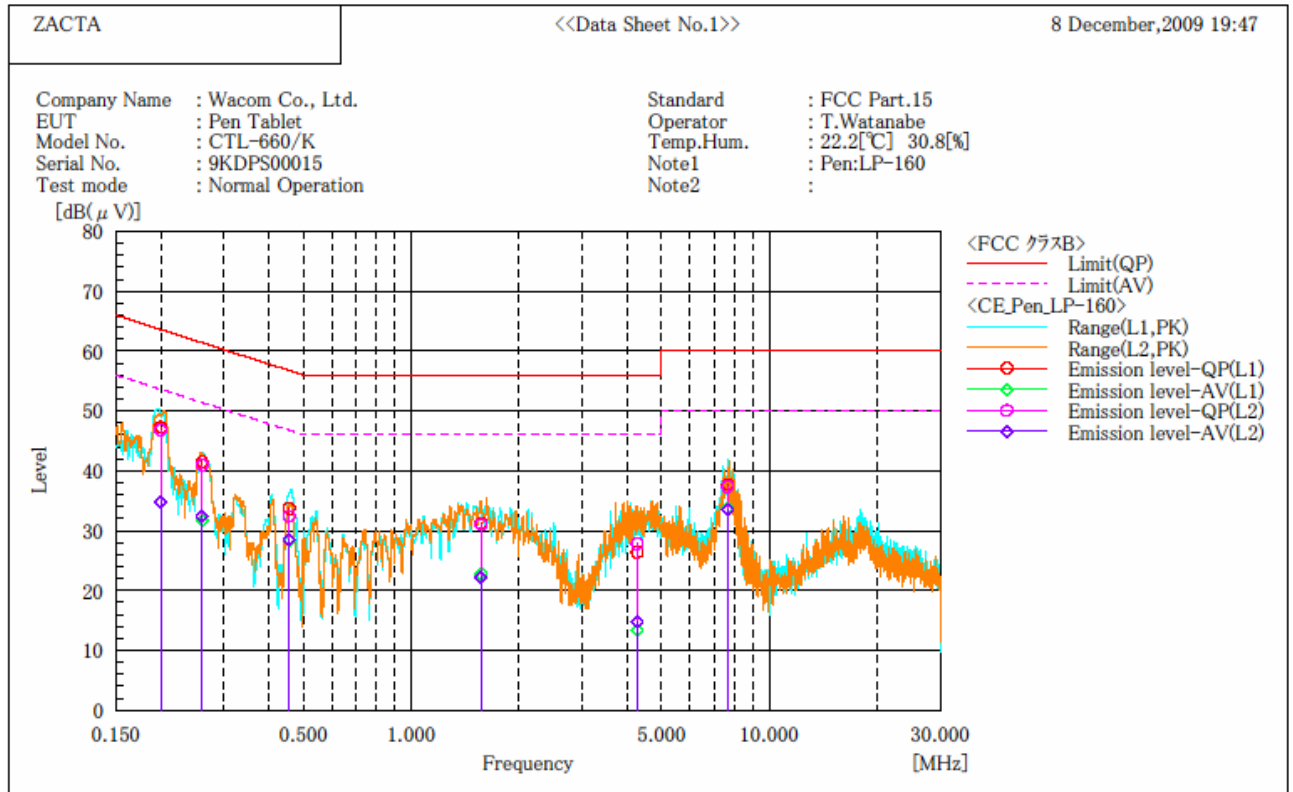
\*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

#### ***4.2.4 Calculation method***

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

Margin = Limit – Emission level

### 4.2.5 Measurement Result



#### 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	0.200	36.6	24.1	10.7	47.3	34.8	63.6	53.6	16.3	18.8
2	0.261	31.1	21.3	10.4	41.5	31.7	61.4	51.4	19.9	19.7
3	0.457	24.0	18.7	9.7	33.7	28.4	56.7	46.7	23.0	18.3
4	1.568	21.5	13.1	9.7	31.2	22.8	56.0	46.0	24.8	23.2
5	4.278	16.6	3.5	9.8	26.4	13.3	56.0	46.0	29.6	32.7
6	7.646	27.7	23.7	10.0	37.7	33.7	60.0	50.0	22.3	16.3

##### --- 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	0.200	36.1	24.1	10.7	46.8	34.8	63.6	53.6	16.8	18.8
2	0.261	30.5	22.0	10.4	40.9	32.4	61.4	51.4	20.5	19.0
3	0.457	22.7	18.8	9.7	32.4	28.5	56.7	46.7	24.3	18.2
4	1.568	21.3	12.5	9.7	31.0	22.2	56.0	46.0	25.0	23.8
5	4.278	18.0	5.0	9.8	27.8	14.8	56.0	46.0	28.2	31.2
6	7.646	27.3	23.5	10.0	37.3	33.5	60.0	50.0	22.7	16.5

## ***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)	$\pm 5.2\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.6\text{dB}$

## 6. Laboratory description

**6.1 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

### 6.2 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 16, 2011
3m Semi-anechoic chamber 10m Semi-anechoic chamber	540072	March 12, 2010

3) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 2	4224A-2	January 24, 2010
Site 3	4224A-3	January 24, 2010
3m Semi-anechoic chamber	4224A-4	January 24, 2010
10m Semi-anechoic chamber	4224A-5	January 24, 2010

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	T-1477	Oct. 8, 2011
Site 3	R-138	C-134	Nov. 16, 2011	T-1478	Oct. 8, 2011
10m Semi-anechoic chamber	R-2480	C-2722	Dec. 19, 2009	T-1474	Oct. 8, 2011
3m Semi-anechoic chamber	R-2481	C-2723	Dec. 19, 2009	T-1475	Oct. 8, 2011
Shielded room No.1	R-137	C-2724	Dec. 19, 2009	T-1476	Oct. 8, 2011

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***

### **List of Measuring Instruments**

<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	May. 2010	May. 27, 2009
Spectrum Analyzer (3Hz – 42.98GHz)	Agilent Technologies	E4447A	MY46180188	Feb. 2010	Feb. 27, 2009
Preamplifier (100kHz-1.2GHz)	ANRITSU	MH648A	M96057	Jun. 2010	Jun. 13, 2009
Highpass filter	R&S	EZ-25	100013	Jan. 2010	Jan. 7, 2009
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407F	8-2003-1	May. 2010	May. 29, 2009
Line impedance stabilization network for peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242F	8-1973-1	May. 2010	May. 8, 2009
50Ω terminator	HRS	UG-88/U	N/A	Mar. 2010	Mar. 4, 2009
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	891847/17	Feb.2010	Feb. 12, 2009
Coaxial cable	N/A	RG213	N/A	Feb. 2010	Feb. 12, 2009
TRILOG Antenna	Schwarzbeck	VULB9160	9160-3221	Apr. 2010	Apr. 13, 2009
Attenuator (6dB)	TDC	TAT-43B-06	N/A	Jun. 2010	Jun. 13, 2009
Coaxial cable	Fujikura	5D-2W/1.5m	#AEC3R-003	Feb. 2010	Feb. 5, 2009
		5D-2W/1m	#AEC3R-004	Feb. 2010	Feb. 5, 2009
		5D-2W/4m	#AEC3C-001	Feb. 2010	Feb. 5, 2009
	SUHNER	RG214/U/10m	#AEC3C-002	Feb. 2010	Feb. 5, 2009
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A
Site attenuation	ZACTA Technology	3m Semi-anechoic chamber	5192Z	May. 2010	May. 18, 2009

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