

# TEST REPORT

Report number: Z071C-10292

Issue Date: October 20, 2010

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              |
| FCC ID                     | : | HV4CTE660               |
| Model Number               | : | CTE-460 / CTE-660       |
| Serial Number              | : | 0IFYS00070 / 0IFYS00032 |
| EUT Condition              | : | Pre-production          |

|                |   |                                |
|----------------|---|--------------------------------|
| Test procedure | : | ANSI C63.4-2003                |
| Date of test   | : | September 21, 28, 2010         |
| Test place     | : | 3m Semi-anechoic chamber, OATS |
| 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:

  
Hiroaki Suzuki

  
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Authorized by:

  
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<br/>Section</b>                    | <b>Test Items</b>                                   | <b>Condition</b> | <b>Result</b> |
|--|---|------------------|---------------|
|  | <b>Transmit mode [Tx]:</b>                          |                  |               |
| RSS-Gen 4.6.1                                    | 99% Occupied Bandwidth                              | Radiated         | <b>Pass</b>   |
| 15.209<br>RSS-210 2.2<br>RSS-Gen 4.9, 4.10, 4.11 | Radiated Emissions                                  | Radiated         | <b>Pass</b>   |
| 15.207<br>RSS-Gen 7.2.2                          | AC Power Line Conducted<br>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 is a Pen Tablet, which is transceiver.

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

|                                  |   |
|----------------------------------|---|
| Applicant                        | : Wacom Co., Ltd.<br>2-510-1, Toyonodai, Kazo-shi, Saitama 349-1148, Japan<br>Phone: + 81-480-78-1257 Fax: + 81-480-78-1404   |
| Equipment under test (EUT)       | : Pen Tablet  |
| Trade name                       | : WACOM   |
| Model number                     | : CTE-460<br>CTE-660  |
| Serial number                    | : 0IFYS00070 (CTE-460)<br>0IFYS00032 (CTE-660)  |
| EUT condition                    | : Pre-production  |
| Max. frequency                   | : 12MHz   |
| Power ratings                    | : DC 5V (USB)   |
| Size                             | : (W) 213.30 x (D) 188.46 x (H) 10.2 mm (CTE-460)<br>(W) 285.29 x (D) 231.46 x (H) 10.2 mm (CTE-660)  |
| Environment                      | : Indoor use  |
| Thermal limitation               | : 5°C to 35°C   |
| Operating mode                   | : Normal Operation  |
| Variation of the family model(s) | : CTE-460<br>- Size: (W) 213.30 x (D) 188.46 x (H) 10.2mm<br>(Pen Active Area: (W) 147.6 x (D) 92.25 mm)<br>CTE-660<br>- Size: (W) 285.29 x (D) 231.46 x (H) 10.2mm<br>(Pen Active Area: (W) 216.48 x (D) 135.3 mm) |
| [RF Specification]               |   |
| Frequency Range                  | : 750.0kHz  |
| Modulation method                | : OOK (On-Off-Keying)   |
| RF emission type designator      | : 80K4K1D (CTE-460)<br>80K3K1D (CTE-660)  |

### ***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        | CTE-460                | 0IFYS00070                   | FCC ID: HV4CTE660 | EUT            |
|     |                      |              | CTE-660                | 0IFYS00032                   |                   |                |
| 2   | Pen                  | Wacom        | EP-150-1K              | N/A                          | -                 | Accessory*1    |
|     |                      |              | EP-150-0K              | N/A                          | -                 | Accessory*2    |
| 3   | Personal Computer    | DELL         | DCM                    | 1HZY31X                      | DoC               | -              |
| 4   | Keyboard             | DELL         | SK-8110                | CN-07N247-38<br>844-293-0337 | DoC               | -              |
| 5   | PS/2 Mouse           | DELL         | M-SAW34                | LZB23459449                  | DZL211029         | -              |
| 6   | Display              | DELL         | E771p                  | CN-0540NK-47<br>803-1BC-CRDF | A3KM076           | Below<br>30MHz |
|     |                      |              | E176FPc                | CN-0MC42-641<br>80-657-0V0K  | DoC               | Above<br>30MHz |
| 7   | Printer              | HP           | C4555A                 | SG69A1425N                   | B94C4555X         | -              |
| 8   | Modem                | US. Robotics | Sport_Ster33.6<br>Kbps | 000839032BK<br>6YV4J         | DoC               | -              |
| 9   | AC adapter for Modem | US. Robotics | N/A                    | N/A                          | -                 | -              |

\*1: Accessory for CTE-460.

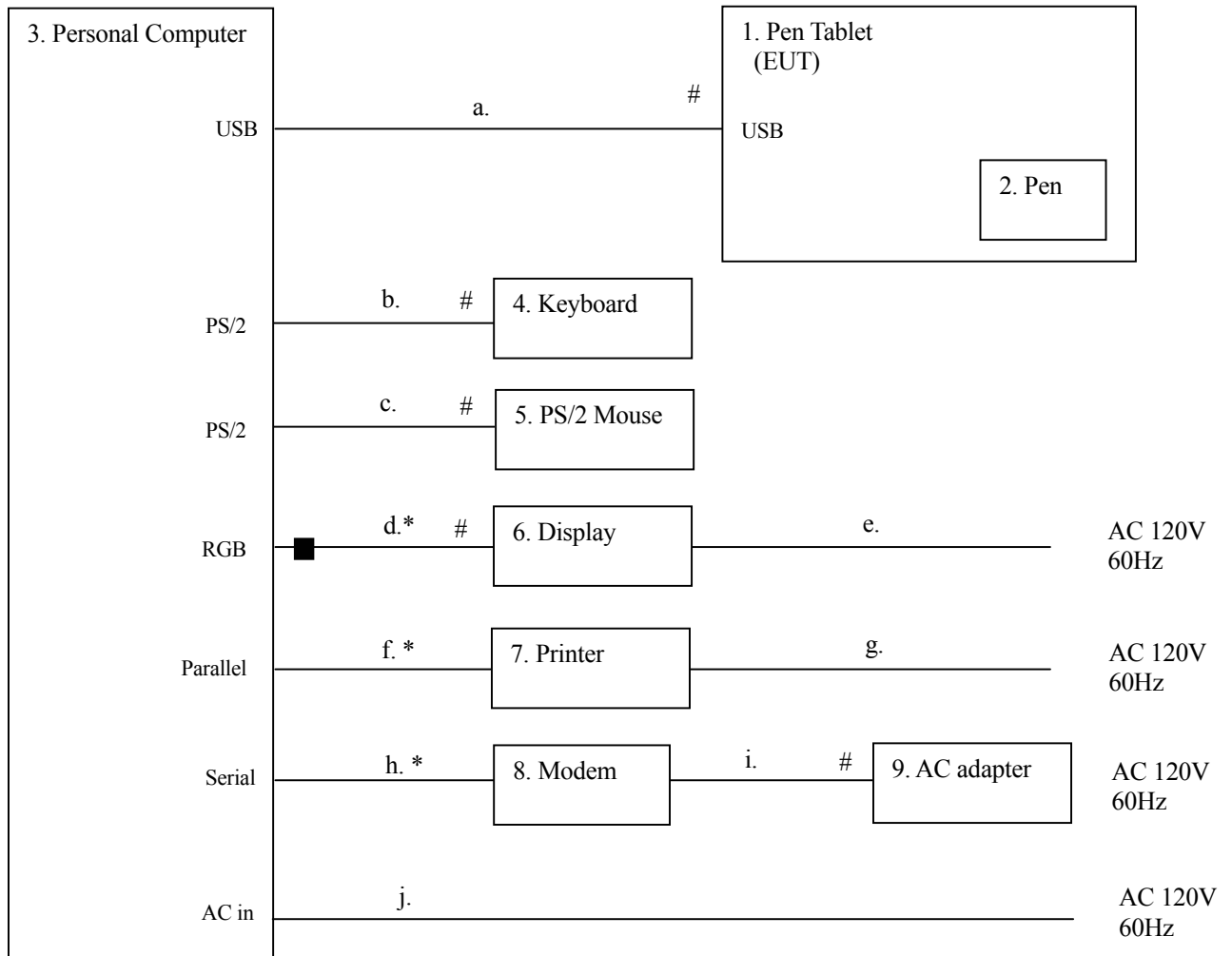
\*2: Accessory for CTE-660.

#### 3.2 Cable(s) information

| No. | Cable          | Length [m] | Shield | Connector | Comment     |
|-----|----------------|------------|--------|-----------|-------------|
| a   | USB cable      | 1.5        | Yes    | Metal     | Accessory   |
| b   | Keyboard cable | 2.1        | No     | Metal     | -           |
| c   | Mouse cable    | 1.8        | No     | Metal     | -           |
| d   | RGB cable      | 1.8        | Yes    | Metal     | Below 30MHz |
|     |                | 1.5        | Yes    | Metal     | Above 30MHz |
| e   | AC cable       | 1.9        | No     | Plastic   | Below 30MHz |
|     |                | 1.8        | No     | Plastic   | Above 30MHz |
| f   | Parallel cable | 2.1        | Yes    | Metal     | -           |
| g   | AC cable       | 2.6        | No     | Plastic   | -           |
| h   | Serial cable   | 3.0        | Yes    | Metal     | -           |
| i   | DC cable       | 1.8        | No     | Plastic   | -           |
| j   | AC cable       | 1.6        | No     | Plastic   | -           |

### 3.3 System configuration

#### Below 30MHz

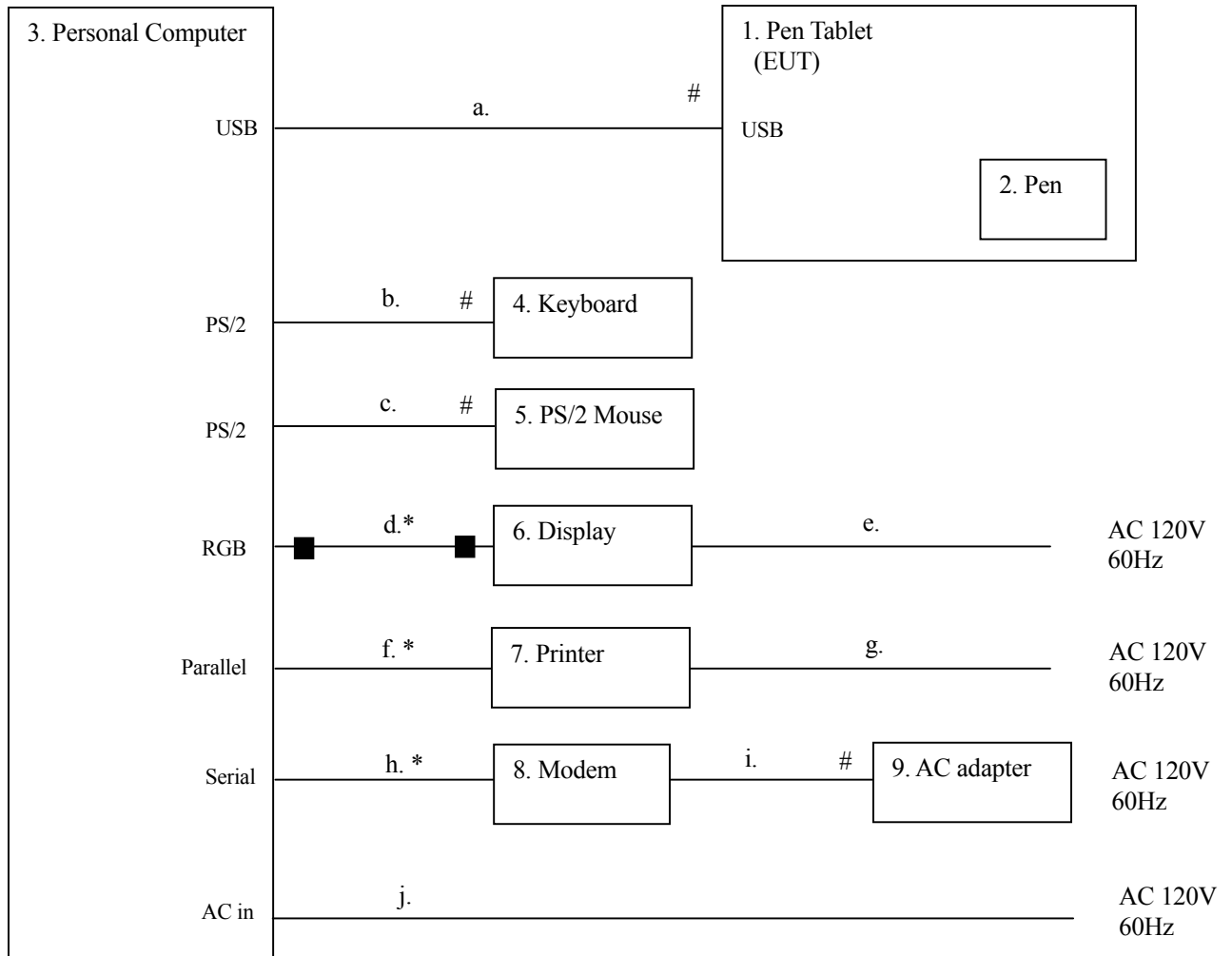


# : Un-detachable cable  
■ : Ferrite core  
\* : Bundled excess cable

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 one ferrite core is accessory for Display(No.6).

Above 30MHz



# : 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**

---

### **4.1 99% Occupied Bandwidth**

#### **4.1.1 Test Procedure [ IC RSS-210 A8.1(a) ]**

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:

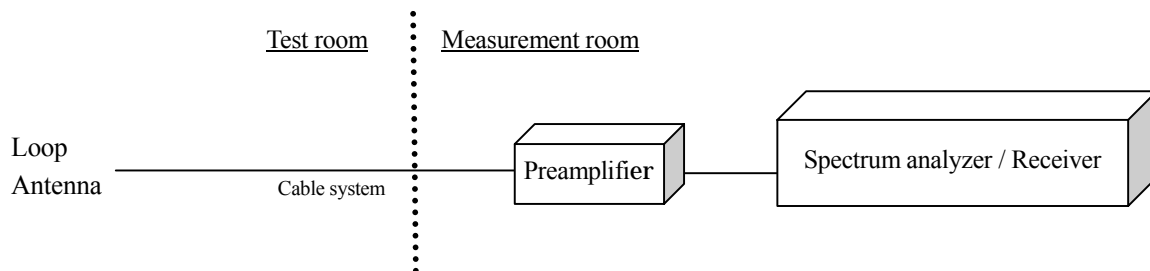
- RBW=3kHz, VBW=10kHz, Span=300kHz, Sweep=auto

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**

**[CTE-460]**

| Frequency<br>[MHz] | Occupied Bandwidth<br>[kHz] |
|--------------------|-----------------------------|
| 0.750              | 80.4096                     |

**[CTE-660]**

| Frequency<br>[MHz] | Occupied Bandwidth<br>[kHz] |
|--------------------|-----------------------------|
| 0.750              | 80.2760                     |

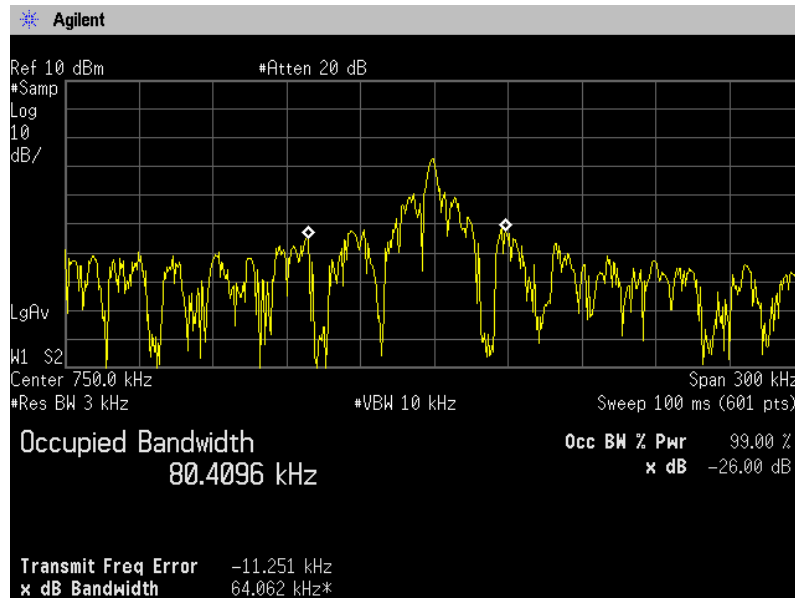
### 4.1.5 Trace Data

**Test Personnel:**

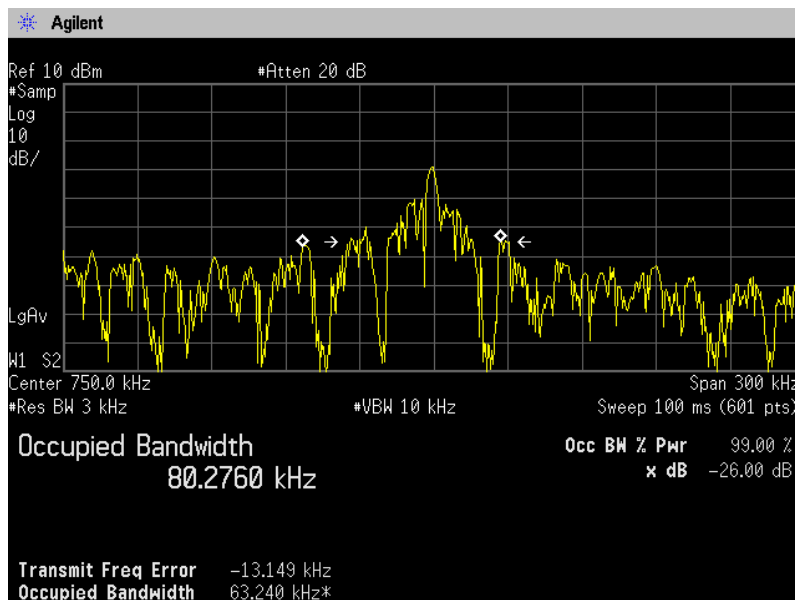
Tested by: Hiroaki Suzuki

Date : Sep. 28, 2010  
Temperature : 24.1 [°C]  
Humidity : 56.3 [%]  
Test place : 3m Semi-anechoic chamber

**[CTE-460]**



**[CTE-660]**



## 4.2 Radiated Emissions (9kHz to 30MHz)

### 4.2.1 Test Procedure [ FCC 15.209, IC RSS-210 2.2, 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

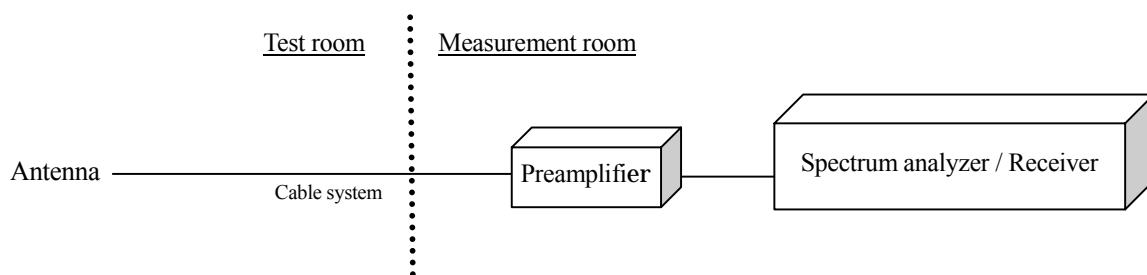
Bandwidth: 200Hz, 9kHz

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: Hiroaki Suzuki

Date : Sep. 28, 2010  
 Temperature : 24.1 [°C]  
 Humidity : 56.3 [%]  
 Test place : 3m Semi-anechoic chamber

**[CTE-460]**

| 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 |
|-----------------|----------------------|---------------|-----------------------|------------------------|-----------------------|-------------|--------|
| 0.750           | 54.3                 | -10.3         | 44.0                  | 4.0                    | 30.1                  | 26.1        | PASS   |
| 1.502           | 33.6                 | -10.2         | 23.4                  | -16.6                  | 24.1                  | 40.7        | PASS   |
| 2.251           | 42.4                 | -10.1         | 32.3                  | -7.7                   | 29.5                  | 37.2        | PASS   |
| 3.004           | 33.4                 | -10.0         | 23.4                  | -16.6                  | 29.5                  | 46.1        | PASS   |

**[CTE-660]**

| <b>Frequency<br/>[MHz]</b> | <b>Reading<br/>[dBuV]<br/>at 3m</b> | <b>c.f<br/>[dB(1/m)]</b> | <b>Result<br/>[dBuV/m]<br/>at 3m</b> | <b>Result<br/>[dBuV/m]<br/>at 30m</b> | <b>Limit<br/>[dBuV/m]<br/>at 30m</b> | <b>Margin<br/>[dB]</b> | <b>Result</b> |
|----------------------------|-------------------------------------|--------------------------|--------------------------------------|---------------------------------------|--------------------------------------|------------------------|---------------|
| 0.750                      | 50.0                                | -10.3                    | 39.7                                 | -0.3                                  | 30.1                                 | 30.4                   | PASS          |
| 1.502                      | 33.7                                | -10.2                    | 23.5                                 | -16.5                                 | 24.1                                 | 40.6                   | PASS          |
| 2.253                      | 36.6                                | -10.1                    | 26.5                                 | -13.5                                 | 29.5                                 | 43.0                   | PASS          |
| 3.004                      | 33.4                                | -10.0                    | 23.4                                 | -16.6                                 | 29.5                                 | 46.1                   | PASS          |

### 4.3 Radiated Emissions (30MHz to 1000MHz)

#### 4.3.1 Test Procedure [ FCC 15.209, IC RSS-210 2.2, 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 wooden 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

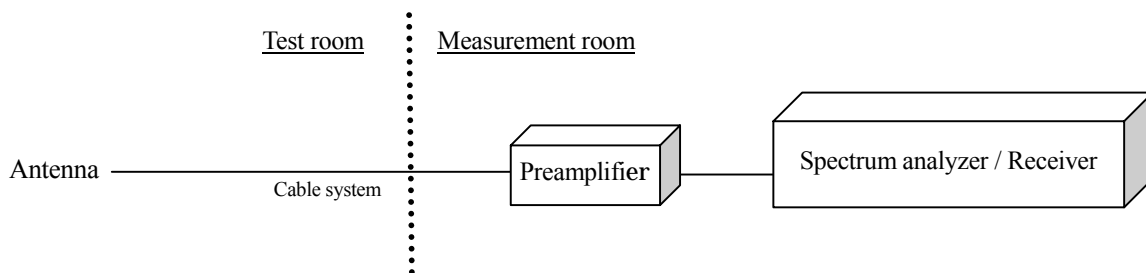
Bandwidth: 120kHz

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**

| <b>Frequency<br/>[MHz]</b> | <b>Limit<br/>[dBuV/m]</b> | <b>Distance<br/>[m]</b> |
|----------------------------|---------------------------|-------------------------|
| 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



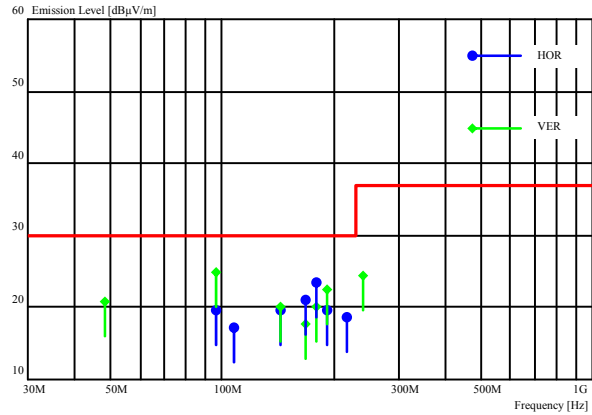
**4.3.5 Measurement Results**

[CTE-460]

\*\*\*\*\* **RADIATED EMISSION** \*\*\*\*\*

Sheet number : 1

Standard : FCC Part 15 Subpart B (CISPR 22)  
 Class : B  
 Distance [m] : 10  
 Date of test : 2010/9/21  
 Test site : 3  
 Temperature [ ] : 28.2  
 Humidity [%] : 48.4  
 Operator : M.Takeda  
 Company name : Wacom Co., Ltd.  
 EUT : Pen Tablet  
 Model number : CTE-460  
 Serial number : 0IFYS00070  
 Test mode : Normal Operation  
 Comment :



| Antenna Pol. | Antenna Height [m] | Table Radian [Deg.] | Reading Frequency [MHz] | Reading Level [dBμV] | Factor [dB/m] | Emission Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Comment |
|--------------|--------------------|---------------------|-------------------------|----------------------|---------------|-------------------------|----------------|-------------|---------|
| HOR/VER      | 1.0                | 275                 | 48.03                   | 35.5                 | -14.7         | 20.8                    | 30.0           | 9.2         |         |
| HOR          | 4.0                | 335                 | 96.01                   | 36.0                 | -16.4         | 19.6                    | 30.0           | 10.4        |         |
| VER          | 1.0                | 205                 | 96.04                   | 41.2                 | -16.4         | 24.8                    | 30.0           | 5.2         | *       |
| HOR          | 4.0                | 130                 | 108.03                  | 31.5                 | -14.2         | 17.3                    | 30.0           | 12.7        |         |
| HOR          | 4.0                | 350                 | 144.01                  | 30.3                 | -10.6         | 19.7                    | 30.0           | 10.3        |         |
| VER          | 1.0                | 210                 | 144.01                  | 30.7                 | -10.6         | 20.1                    | 30.0           | 9.9         |         |
| VER          | 1.0                | 145                 | 168.12                  | 27.1                 | -9.4          | 17.7                    | 30.0           | 12.3        |         |
| HOR          | 4.0                | 25                  | 168.15                  | 30.5                 | -9.4          | 21.1                    | 30.0           | 8.9         |         |
| VER          | 1.0                | 50                  | 180.21                  | 29.0                 | -8.9          | 20.1                    | 30.0           | 9.9         |         |
| HOR          | 4.0                | 10                  | 180.23                  | 32.3                 | -8.9          | 23.4                    | 30.0           | 6.6         |         |
| HOR          | 4.0                | 310                 | 192.01                  | 27.9                 | -8.4          | 19.5                    | 30.0           | 10.5        |         |
| VER          | 1.0                | 60                  | 192.04                  | 30.8                 | -8.4          | 22.4                    | 30.0           | 7.6         |         |
| HOR          | 4.0                | 320                 | 216.31                  | 26.7                 | -8.0          | 18.7                    | 30.0           | 11.3        |         |
| VER          | 1.0                | 20                  | 240.05                  | 32.1                 | -7.7          | 24.4                    | 37.0           | 12.6        |         |

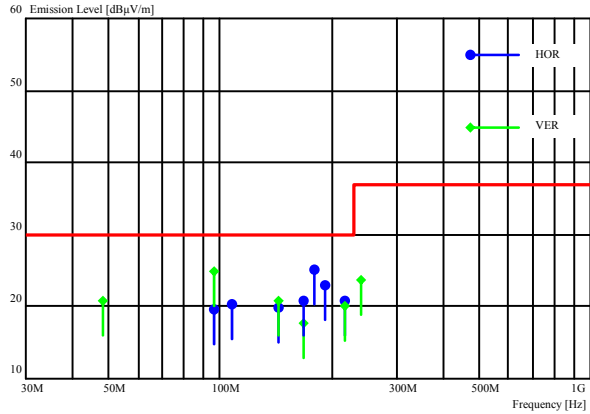
\* : The worst emission. Factor : Antenna Factor + Attenuator + Cable Loss - Amp Gain Ver.2.81 F3#043

[CTE-660]

\*\*\*\*\* RADIATED EMISSION \*\*\*\*\*

Sheet number : 2

Standard : FCC Part 15 Subpart B (CISPR 22)  
 Class : B  
 Distance [m] : 10  
 Date of test : 2010/9/21  
 Test site : 3  
 Temperature [ ] : 28.2  
 Humidity [%] : 48.4  
 Operator : M.Takeda  
 Company name : Wacom Co., Ltd.  
 EUT : Pen Tablet  
 Model number : CTE-660  
 Serial number : 0IFYS00032  
 Test mode : Normal Operation  
 Comment :



| Antenna |        | Table  | Reading   |        | Factor | Emission | Limit    | Margin | Comment |
|---------|--------|--------|-----------|--------|--------|----------|----------|--------|---------|
| Pol.    | Height | Radian | Frequency | Level  | [dB/m] | Level    | [dBμV/m] | [dB]   |         |
| HOR/VER | [m]    | [Deg.] | [MHz]     | [dBμV] |        | [dBμV/m] | [dBμV/m] | [dB]   |         |
| VER     | 1.0    | 110    | 48.03     | 35.5   | -14.7  | 20.8     | 30.0     | 9.2    |         |
| HOR     | 4.0    | 310    | 96.01     | 36.0   | -16.4  | 19.6     | 30.0     | 10.4   |         |
| VER     | 1.0    | 210    | 96.04     | 41.2   | -16.4  | 24.8     | 30.0     | 5.2    |         |
| HOR     | 4.0    | 125    | 108.03    | 34.6   | -14.2  | 20.4     | 30.0     | 9.6    |         |
| HOR     | 4.0    | 340    | 144.01    | 30.4   | -10.6  | 19.8     | 30.0     | 10.2   |         |
| VER     | 1.0    | 250    | 144.01    | 31.3   | -10.6  | 20.7     | 30.0     | 9.3    |         |
| VER     | 1.0    | 15     | 168.12    | 27.2   | -9.4   | 17.8     | 30.0     | 12.2   |         |
| HOR     | 4.0    | 350    | 168.22    | 30.2   | -9.4   | 20.8     | 30.0     | 9.2    |         |
| HOR     | 4.0    | 5      | 180.13    | 34.1   | -8.9   | 25.2     | 30.0     | 4.8    | *       |
| HOR     | 4.0    | 20     | 192.13    | 31.5   | -8.4   | 23.1     | 30.0     | 6.9    |         |
| HOR     | 4.0    | 330    | 216.08    | 28.9   | -8.0   | 20.9     | 30.0     | 9.1    |         |
| VER     | 1.0    | 5      | 216.11    | 28.0   | -8.0   | 20.0     | 30.0     | 10.0   |         |
| VER     | 1.0    | 190    | 240.05    | 31.5   | -7.7   | 23.8     | 37.0     | 13.2   |         |

\* : The worst emission. Factor : Antenna Factor + Attenuator + Cable Loss - Amp Gain Ver.2.81 F3#043

#### 4.4 AC power line Conducted Emissions

##### 4.4.1 Test Procedure [ FCC 15.207, IC RSS-Gen 7.2.2 ]

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

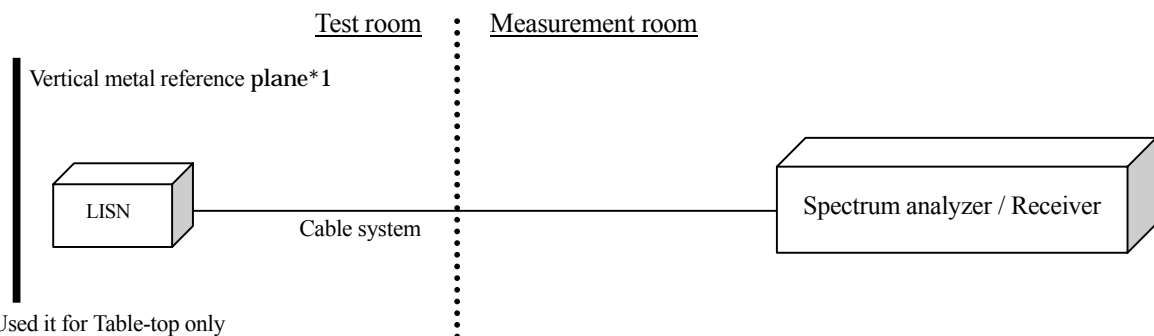
Bandwidth: 9kHz

The test mode of EUT is as follows.

- Normal Operation

##### 4.4.2 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.

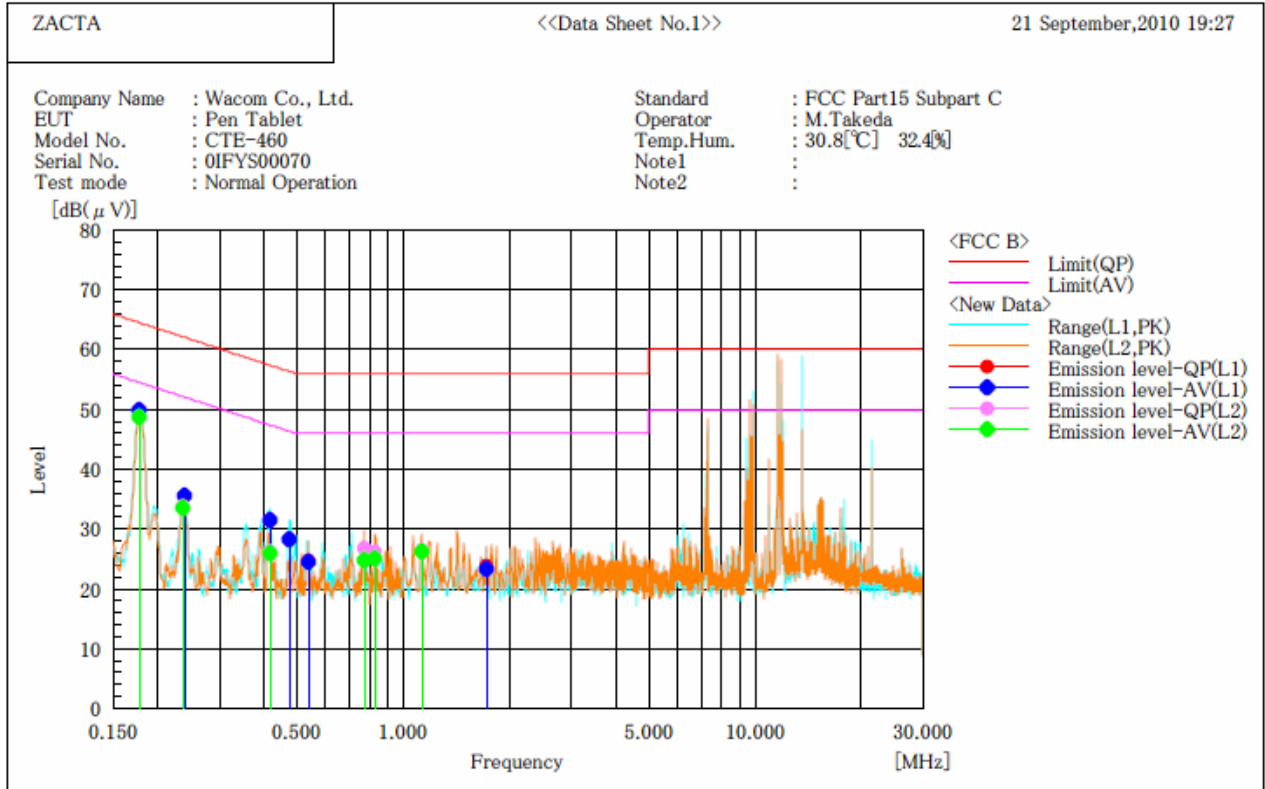
#### ***4.4.4 Calculation method***

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

Margin = Limit – Emission level

**4.4.5 Measurement Result**  
[CTE-460]

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
< Test site 3 >



Final Result

--- L1 Phase ---

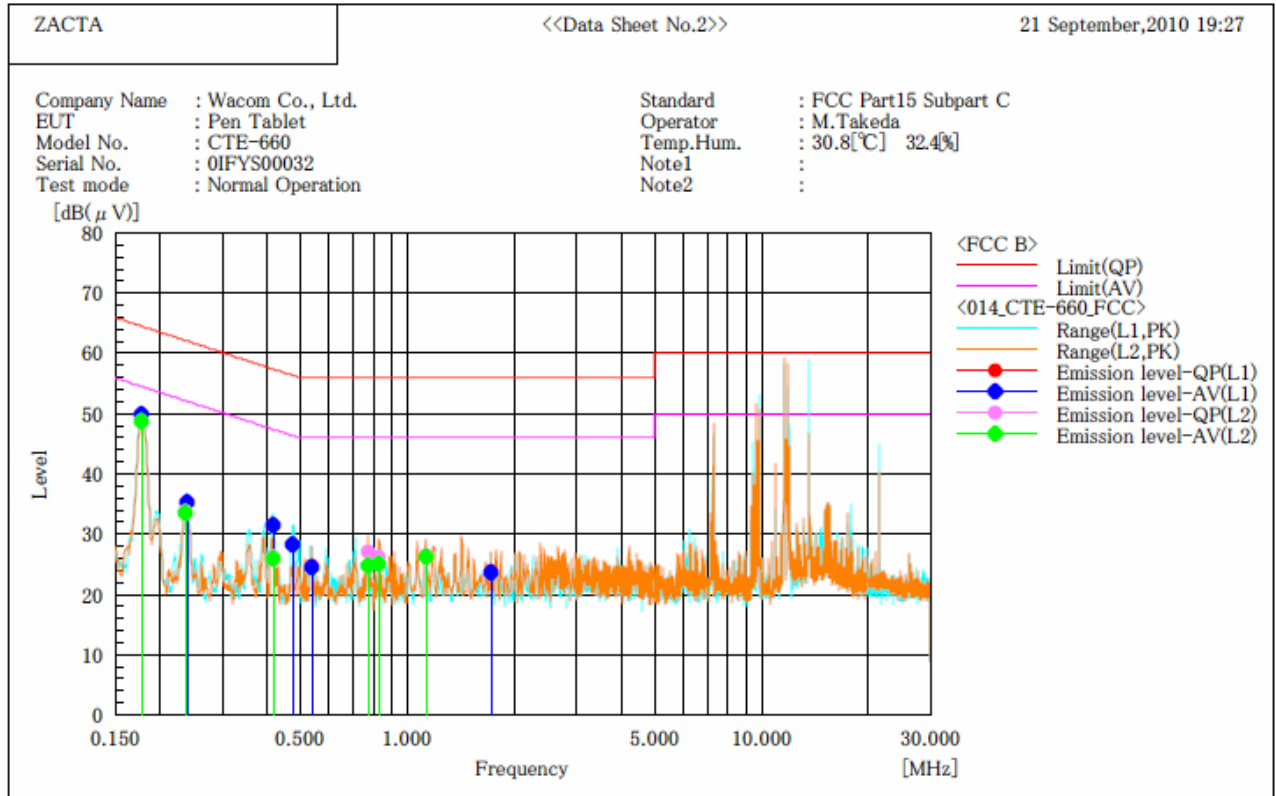
| No. | Frequency [MHz] | Reading QP [dB(μV)] | Reading AV [dB(μV)] | c. f [dB] | Result QP [dB(μV)] | Result AV [dB(μV)] | Limit QP [dB(μV)] | Limit AV [dB(μV)] | Margin QP [dB] | Margin AV [dB] |
|-----|-----------------|---------------------|---------------------|-----------|--------------------|--------------------|-------------------|-------------------|----------------|----------------|
| 1   | 0.179           | 39.7                | 39.7                | 10.1      | 49.8               | 49.8               | 64.5              | 54.5              | 14.7           | 4.7            |
| 2   | 0.239           | 25.4                | 25.4                | 10.1      | 35.5               | 35.5               | 62.1              | 52.1              | 26.6           | 16.6           |
| 3   | 0.417           | 21.5                | 21.5                | 10.0      | 31.5               | 31.5               | 57.5              | 47.5              | 26.0           | 16.0           |
| 4   | 0.477           | 18.4                | 18.4                | 10.0      | 28.4               | 28.4               | 56.4              | 46.4              | 28.0           | 18.0           |
| 5   | 0.536           | 14.9                | 14.4                | 10.0      | 24.9               | 24.4               | 56.0              | 46.0              | 31.1           | 21.6           |
| 6   | 1.728           | 13.9                | 13.4                | 10.1      | 24.0               | 23.5               | 56.0              | 46.0              | 32.0           | 22.5           |

--- 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   | 0.179           | 38.7                | 38.7                | 10.1      | 48.8               | 48.8               | 64.5              | 54.5              | 15.7           | 5.7            |
| 2   | 0.238           | 23.9                | 23.5                | 10.1      | 34.0               | 33.6               | 62.2              | 52.2              | 28.2           | 18.6           |
| 3   | 0.418           | 16.3                | 15.9                | 10.0      | 26.3               | 25.9               | 57.5              | 47.5              | 31.2           | 21.6           |
| 4   | 0.775           | 16.9                | 14.8                | 10.1      | 27.0               | 24.9               | 56.0              | 46.0              | 29.0           | 21.1           |
| 5   | 0.834           | 16.3                | 15.0                | 10.0      | 26.3               | 25.0               | 56.0              | 46.0              | 29.7           | 21.0           |
| 6   | 1.132           | 16.6                | 16.3                | 10.1      | 26.7               | 26.4               | 56.0              | 46.0              | 29.3           | 19.6           |

[CTE-660]

\*\*\*\*\* CONDUCTED EMISSION at MAINS PORT \*\*\*\*\*  
 << Test site 3 >>



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   | 0.179           | 39.7                | 39.7                | 10.1      | 49.8               | 49.8               | 64.5              | 54.5              | 14.7           | 4.7            |
| 2   | 0.239           | 25.3                | 25.3                | 10.1      | 35.4               | 35.4               | 62.1              | 52.1              | 26.7           | 16.7           |
| 3   | 0.417           | 21.5                | 21.5                | 10.0      | 31.5               | 31.5               | 57.5              | 47.5              | 26.0           | 16.0           |
| 4   | 0.477           | 18.4                | 18.4                | 10.0      | 28.4               | 28.4               | 56.4              | 46.4              | 28.0           | 18.0           |
| 5   | 0.536           | 14.9                | 14.4                | 10.0      | 24.9               | 24.4               | 56.0              | 46.0              | 31.1           | 21.6           |
| 6   | 1.728           | 13.9                | 13.5                | 10.1      | 24.0               | 23.6               | 56.0              | 46.0              | 32.0           | 22.4           |

--- 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   | 0.179           | 38.7                | 38.7                | 10.1      | 48.8               | 48.8               | 64.5              | 54.5              | 15.7           | 5.7            |
| 2   | 0.238           | 23.9                | 23.5                | 10.1      | 34.0               | 33.6               | 62.2              | 52.2              | 28.2           | 18.6           |
| 3   | 0.418           | 16.4                | 15.9                | 10.0      | 26.4               | 25.9               | 57.5              | 47.5              | 31.1           | 21.6           |
| 4   | 0.775           | 17.0                | 14.8                | 10.1      | 27.1               | 24.9               | 56.0              | 46.0              | 28.9           | 21.1           |
| 5   | 0.834           | 16.3                | 15.0                | 10.0      | 26.3               | 25.0               | 56.0              | 46.0              | 29.7           | 21.0           |
| 6   | 1.132           | 16.6                | 16.3                | 10.1      | 26.7               | 26.4               | 56.0              | 46.0              | 29.3           | 19.6           |

## ***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) | $\pm 3.0\text{dB}$             |
| 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

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**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 19, 2011 |
| 3m Semi-anechoic chamber<br>10m Semi-anechoic chamber | 540072              | February 16, 2013 |

3) Industry Canada Oats site filing:

| Site name                 | Sites on file:<br>Oats 3m/10m | Expiry Date       |
|---------------------------|-------------------------------|-------------------|
| Site 2                    | 4224A-2                       | February 16, 2012 |
| Site 3                    | 4224A-3                       | February 16, 2012 |
| 3m Semi-anechoic chamber  | 4224A-4                       | February 16, 2012 |
| 10m Semi-anechoic chamber | 4224A-5                       | February 16, 2012 |

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                            | Jul. 3, 2011  | T-1474                              | Oct. 8, 2011 |
| 3m Semi-anechoic chamber  | R-2481            | C-2723                            | Jul. 3, 2011  | T-1475                              | Oct. 8, 2011 |
| Shielded room No.1        | R-137             | C-2724                            | Jul. 3, 2011  | 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

| Equipment   | Company                         | Model No.       | Serial No.     | Cal. due  | Cal. date     |
|---|---------------------------------|-----------------|----------------|-----------|---------------|
| EMI Receiver  | ROHDE&SCHWARZ                   | ESCI            | 100451         | May 2011  | May 28, 2010  |
| EMI Receiver  | ROHDE&SCHWARZ                   | ESCI            | 100764         | Jun. 2011 | Jun. 14, 2010 |
| Spectrum Analyzer                                   | Agilent Technologies            | E4447A          | MY46180188     | Mar. 2011 | Mar. 4, 2010  |
| Spectrum Analyzer                                   | Agilent Technologies            | 8656B           | 2634A03228     | Dec. 2010 | Dec. 8, 2009  |
|   |                                 | 85662A          | 2648A14093     |           |               |
| Preamplifier  | ANRITSU                         | MH648A          | M08067         | Jun. 2011 | Jun. 12, 2010 |
| Preamplifier  | ANRITSU                         | MH648A          | M96157         | May 2011  | May 28, 2010  |
| Coaxial switch                                      | ANRITSU                         | MP59B           | 6200611581     | May 2011  | May 28, 2010  |
| Attenuator  | TYC                             | BA-PJ-10        | N/A (S348)     | Apr. 2011 | Apr. 26, 2010 |
| Line impedance stabilization network for EUT        | Kyoritsu Electrical Works, Ltd. | KNW-407         | 8-693-20       | Mar. 2011 | Mar. 12, 2010 |
| Line impedance stabilization network for peripheral | Kyoritsu Electrical Works, Ltd. | KNW-242C        | 8-1094-5       | Mar. 2011 | Mar. 12, 2010 |
| 50Ω terminator                                      | HRS                             | UG-88/U         | N/A (S065)     | Mar. 2011 | Mar. 5, 2010  |
| Loop antenna  | ROHDE&SCHWARZ                   | HFH2-Z2         | 892246/010     | Feb.2011  | Feb. 25, 2010 |
| Biconical antenna                                   | Schwarzbeck                     | VHA9103/BBA9106 | 2322           | Jun. 2011 | Jun. 12, 2010 |
| Log Periodic antenna                                | Schwarzbeck                     | UHALP9108A      | 0398           | Jun. 2011 | Jun. 12, 2010 |
| Attenuator  | TDC                             | TAT-43B-03      | N/A (S204)     | Jun. 2011 | Jun. 12, 2010 |
| Attenuator  | TDC                             | TAT-43B-03      | N/A (S206)     | Jun. 2011 | Jun. 12, 2010 |
| Coaxial cable                                       | Fujikura                        | 5D-2W/10m       | #AEC3R-001     | Feb. 2011 | Feb. 5, 2010  |
|   |                                 | 5D-2W/1.5m      | #AEC3R-003     | Feb. 2011 | Feb. 5, 2010  |
|   |                                 | 5D-2W/0.5m      | #AEC3R-004     | Feb. 2011 | Feb. 5, 2010  |
|   | SUHNER                          | SUCOFLEX_106/7m | #AEC3R-002     | Feb. 2011 | Feb. 5, 2010  |
| Coaxial cable                                       | Fujikura                        | 8D-SFA/15m      | OATS#3R-001    | May 2011  | May 28, 2010  |
|   |                                 | 8D-SFA/15m      | OATS#3R-002    | May 2011  | May 28, 2010  |
|   |                                 | 8D-2W/8m        | OATS#3R-003    | May 2011  | May 28, 2010  |
|   |                                 | 5D-2W/1m        | OATS#3RC-001   | May 2011  | May 28, 2010  |
|   |                                 | 5D-2W/1m        | OATS#3RC-002   | May 2011  | May 28, 2010  |
| Coaxial cable                                       | Fujikura                        | 5D-2W/15m       | OATS#3C        | May 2011  | May 28, 2010  |
| PC  | DELL                            | DIMENSION E521  | 75465BX        | N/A       | N/A           |
| PC  | IBM                             | 6892-44J        | 97-43012       | N/A       | N/A           |
| Software  | TOYO Corporation                | EP5/RE-AJ       | 0611193/V3.4   | N/A       | N/A           |
| Software  | ZACTA                           | EMI Data Sheet  | Ver.2.81       | N/A       | N/A           |
| Software  | TOYO Corporation                | EP5/CE-AJ       | 0611193/V3.3   | N/A       | N/A           |
| 3m Semi-anechoic chamber                            | TOKIN                           | N/A             | N/A (9002-NSA) | May 2011  | May 18, 2010  |
| Normalized Site Attenuation                         | ZACTA Technology Corp.          | N/A             | OATS#3         | Jul. 2011 | Jul. 3, 2010  |

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