# FCC TEST REPORT

| | |
|---|---|
| **REPORT NO.:** | RF990910E01 |
| **MODEL NO.:** | IS215x |
| **FCC ID:** | X62IDTI10102901 |
| **RECEIVED:** | Sep. 10, 2010 |
| **TESTED:** | Sep. 27, 2010 |
| **ISSUED:** | Oct. 26, 2010 |

| | |
|---|---|
| **APPLICANT:** | Integrated Digital Technologies,Inc. |
| **ADDRESS:** | Room C1,3F,No1.,Lixing 1st rd. Hsinchu Science park, Taiwan, R.O.C. |

| | |
|---|---|
| **ISSUED BY:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory |
| **LAB ADDRESS:** | No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan |

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# 1. CERTIFICATION

| | |
|---|---|
| **PRODUCT :** | Incell Touch 215x |
| **BRAND :** | IDTI |
| **MODEL NO.:** | IS215x |
| **APPLICANT :** | Integrated Digital Technologies,Inc. |
| **TESTED :** | Sep. 27, 2010 |
| **TEST SAMPLE :** | ENGINEERING SAMPLE |
| **STANDARDS :** | **FCC Part 15, Subpart C (Section 15.231)** |
| | ANSI C63.4-2003 |

The above equipment (Model: IS215x) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY :** _____ , **DATE:** *Oct. 26, 2010*
( Claire Kuan, Specialist )

**TECHNICAL ACCEPTANCE :** _____ , **DATE:** *Oct. 26, 2010*
( Hank Chung, Deputy Manager )

**APPROVED BY :** _____ , **DATE:** *Oct. 26, 2010*
( May Chen, Deputy Manager )

# 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 15, Subpart C | | | |
|---|---|---|---|
| **Standard Section** | **Test Type and Limit** | **Result** | **REMARK** |
| 15.207 | AC Power Conducted Emission | PASS | Meet the requirement of limit. Minimum passing margin is -9.59dB at 4.047MHz |
| 15.209<br>15.231(e) | Radiated Emission Test | PASS | Meet the requirement of limit. Minimum passing margin is -9.7dB at 433.9MHz |
| 15.231(c) | Emission Bandwidth Measurement | PASS | Meet the requirement of limit |
| 15.231(a) | De-activation | PASS | Meet the requirement of limit |

## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| **Measurement** | **Value** |
|---|---|
| Radiated emissions (30MHz-1GHz) | 3.94 dB |
| Radiated emissions (1GHz -18GHz) | 2.49 dB |
| Radiated emissions (18GHz -40GHz) | 2.70 dB |

# 3. GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | Incell Touch 215x |
| **MODEL NO.** | IS215x |
| **FCC ID** | X62IDTI10102901 |
| **POWER SUPPLY** | DC 3.7V from battery or<br>DC 5V from host equipment |
| **MODULATION TYPE** | ASK |
| **CARRIER FREQUENCY** | 433.92MHz |
| **NUMBER OF CHANNEL** | 1 |
| **ANTENNA TYPE** | PCB antenna (Antenna Gain : -16.28dBi) |
| **DATA CABLE** | USB cable(Unshielded, 0.55m) |
| **I/O PORT** | USB port x 1 |
| **ASSOCIATED DEVICES** | NA |

**NOTE:**

1. The EUT could be supplied with 3.7V battery as the following table:

| Brand | Model No. | Spec. |
|---|---|---|
| SYNERGY | AHB421045PA | DC3.7V, 160mAh |

2. The EUT was pre-tested in chamber under the following modes:

| Test Mode | Description |
|---|---|
| Mode A | X-Y plane With USB cable |
| **Mode B** | **Y-Z plane With USB cable** |
| Mode C | Z-X plane With USB cable |
| Mode D | Y-Z plane Without USB cable |

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

3. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

## 3.2 DESCRIPTION OF TEST MODES

One channel was provided to this EUT.

| CHANNEL | FREQUENCY |
|---|---|
| 1 | 433.92MHz |

## 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO | | | | | DESCRIPTION |
|---|---|---|---|---|---|---|
| | RE ³ 1G | RE < 1G | PLC | EB | DT | |
| - | √ | √ | √ | √ | √ | - |

Where **RE ³ 1G:** Radiated Emission above 1GHz **RE < 1G:** Radiated Emission below 1GHz

**PLC:** Power Line Conducted Emission **EB:** 20dB Bandwidth measurement

**DT**: Deactivation Time measurement

**NOTE:** No need to concern of Conducted Emission due to the EUT is powered by battery.

**RADIATED EMISSION TEST (ABOVE 1 GHz):**

☒ Following channel(s) was (were) selected for the final test as listed below.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|
| 1 | 1 | ASK |

**RADIATED EMISSION TEST (BELOW 1 GHz):**

☒ Following channel(s) was (were) selected for the final test as listed below.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|
| 1 | 1 | ASK |

**EMISSION BANDWIDTH MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.

☒ Following channel(s) was (were) selected for the final test as listed below.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|
| 1 | 1 | FSK |

**DEACTIVATION TIME MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.

☒ Following channel(s) was (were) selected for the final test as listed below.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|
| 1 | 1 | FSK |

**TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---|---|---|---|
| RE[3]1G | 25deg. C, 66%RH, 1015 hPa | DC 5V | Frank Liu |
| RE<1G | 25deg. C, 66%RH, 1015 hPa | DC 5V | Frank Liu |
| PLC | 22deg. C, 66%RH, 1015 hPa | DC 5V | Kent Liu |
| EB | 25deg. C, 60%RH, 1015 hPa | DC 5V | Kent Liu |
| DT | 25deg. C, 60%RH, 1015 hPa | DC 5V | Kent Liu |

## 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.231)**

**ANSI C63.4-2003**

All test items have been performed and recorded as per the above standards.

**NOTE**: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 3.4 DESCRIPTION OF SUPPORT UNITS

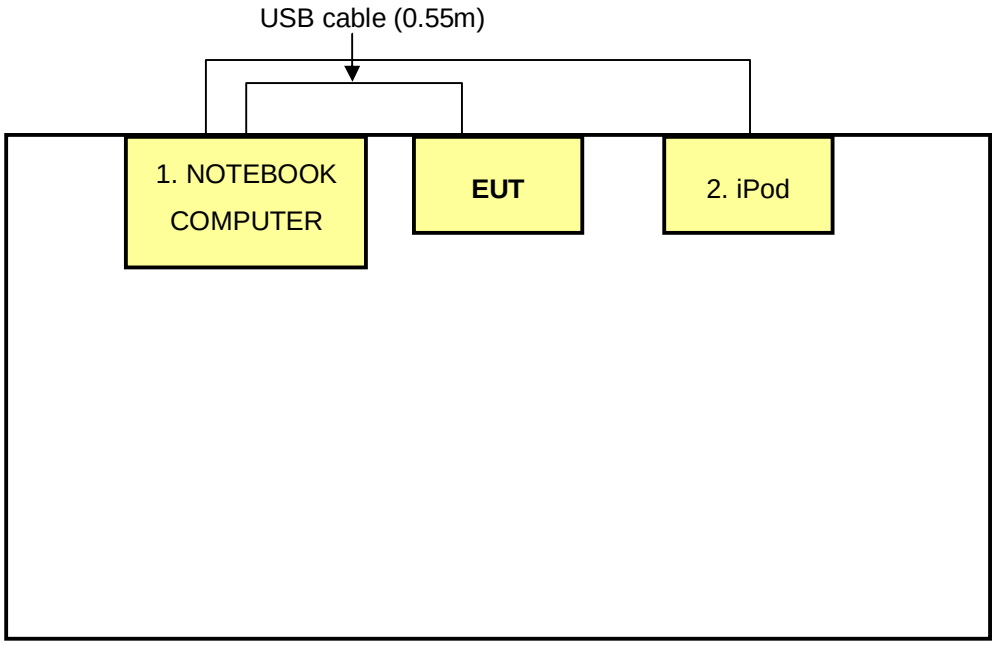
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | NOTEBOOK COMPUTER | DELL | PP17L | CN-ONF743-48643 -7AV-0124 | FCC DoC |
| 2 | iPod | Apple | A1137 | 5K7170JBUPR | FCC DoC |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | 0.55 m USB cable. |
| 2 | 1.2 m shielded cable, terminated with USB connector, w/o core. |

**NOTE:** 1. All power cords of the above support units are non shielded (1.8m).

## 3.5 CONFIGURATION OF SYSTEM UNDER TEST



# 4. TEST TYPES AND RESULTS

## 4.1 CONDUCTED EMISSION MEASUREMENT

### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 | 56 to 46 |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

**NOTE**:
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Test Receiver | ESCS 30 | 100375 | Mar. 09, 2010 | Mar. 08, 2011 |
| Line-Impedance Stabilization Network (for EUT) | NSLK 8127 | 8127-522 | Sep. 23, 2009 | Sep. 22, 2010 |
| Line-Impedance Stabilization Network (for Peripheral) | ESH3-Z5 | 848773/004 | Oct. 26, 2009 | Oct. 25, 2010 |
| RF Cable (JYEBAO) | 5DFB | COBCAB-001 | Nov. 24, 2009 | Nov. 23, 2010 |
| 50 ohms Terminator | 50 | 3 | Oct. 28, 2009 | Oct. 27, 2010 |
| Software | BV ADT_Cond_V7.3.7 | NA | NA | NA |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.

### 4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

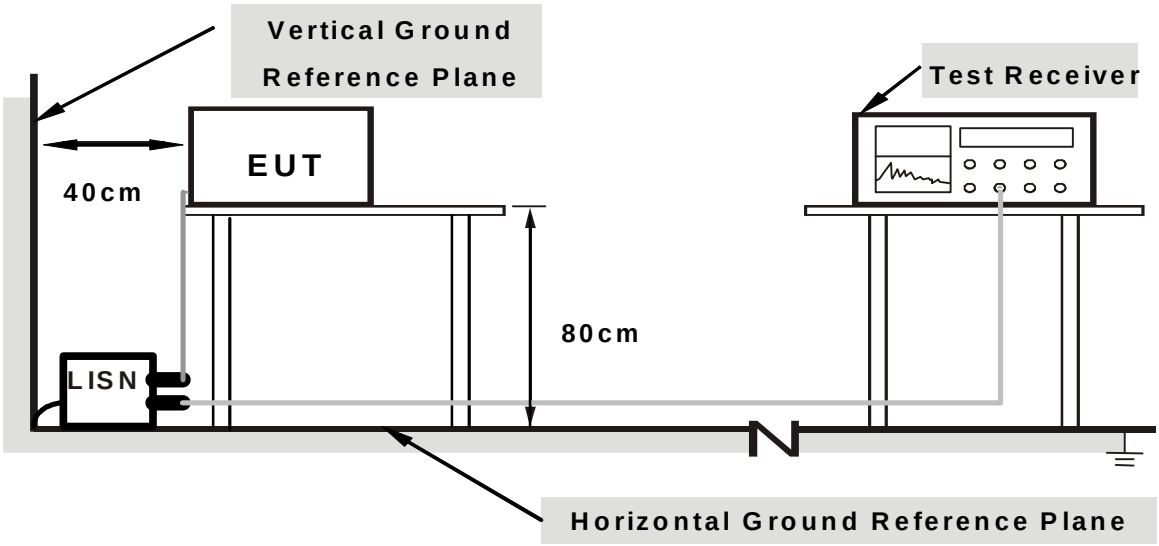
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP




**Note: 1.Support units were connected to second LISN.**
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

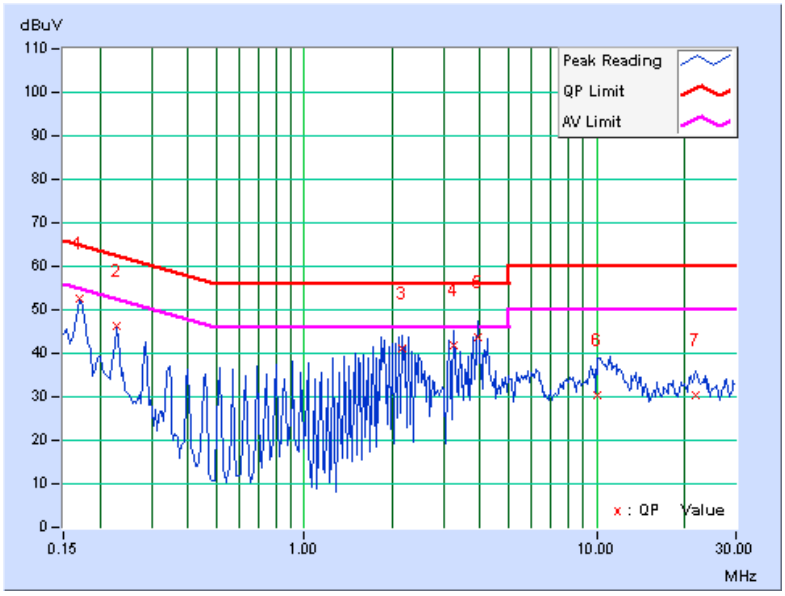
1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed in test table.
2. The support unit 1 (Notebook Computer) runs test program “BOTTURN FUNCTION” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

## 4.1.7 TEST RESULTS

| PHASE | Line (L) | 6dB BANDWIDTH | 9 kHz |
|---|---|---|---|

| | Freq. | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| No | | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.170 | 0.04 | 52.55 | - | 52.59 | - | 64.98 | 54.98 | -12.39 | - |
| 2 | 0.228 | 0.04 | 46.12 | - | 46.16 | - | 62.52 | 52.52 | -16.36 | - |
| 3 | 2.172 | 0.12 | 40.95 | - | 41.07 | - | 56.00 | 46.00 | -14.93 | - |
| 4 | 3.258 | 0.13 | 41.59 | - | 41.72 | - | 56.00 | 46.00 | -14.28 | - |
| 5 | 3.945 | 0.13 | 43.68 | - | 43.81 | - | 56.00 | 46.00 | -12.19 | - |
| 6 | 10.121 | 0.26 | 30.12 | - | 30.38 | - | 60.00 | 50.00 | -29.62 | - |
| 7 | 21.711 | 0.61 | 29.71 | - | 30.32 | - | 60.00 | 50.00 | -29.68 | - |

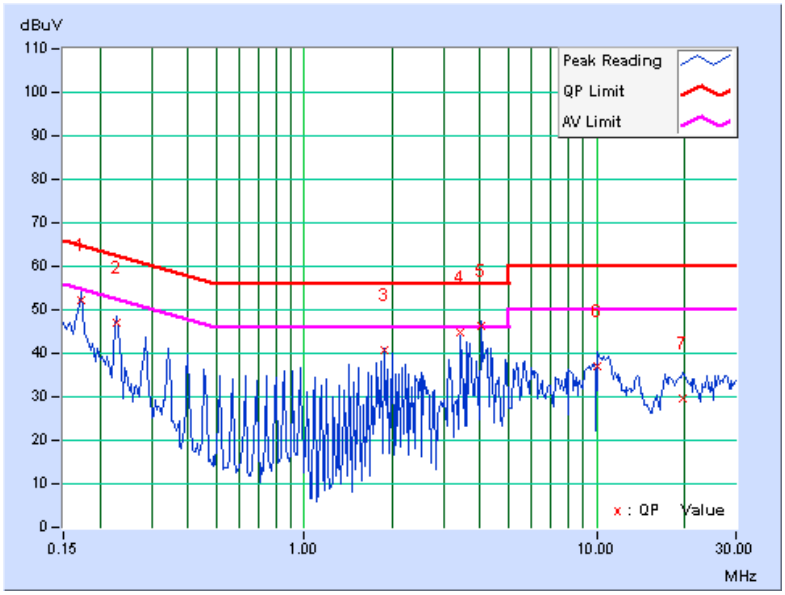
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



| PHASE | Neutral (N) | 6dB BANDWIDTH | 9 kHz |
|---|---|---|---|

| | Freq. | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| No | | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.173 | 0.05 | 52.08 | - | 52.13 | - | 64.79 | 54.79 | -12.66 | - |
| 2 | 0.228 | 0.05 | 46.82 | - | 46.87 | - | 62.52 | 52.52 | -15.65 | - |
| 3 | 1.883 | 0.13 | 40.60 | - | 40.73 | - | 56.00 | 46.00 | -15.27 | - |
| 4 | 3.418 | 0.14 | 44.58 | - | 44.72 | - | 56.00 | 46.00 | -11.28 | - |
| **5** | **4.047** | **0.14** | **46.27** | **32.01** | **46.41** | **32.15** | **56.00** | **46.00** | **-9.59** | **-13.85** |
| 6 | 10.094 | 0.27 | 36.71 | - | 36.98 | - | 60.00 | 50.00 | -23.02 | - |
| 7 | 19.789 | 0.55 | 29.12 | - | 29.67 | - | 60.00 | 50.00 | -30.33 | - |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.231(e) the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental | | Field Strength of Spurious | |
|---|---|---|---|---|
| | uV/meter | dBuV/meter | uV/meter | dBuV/meter |
| 40.66 ~ 40.70 | 2250 | 67 | 225 | 47 |
| 70 ~ 130 | 1250 | 61.9 | 125 | 41.9 |
| 130 ~ 174 | 1250 ~ 3750 | 61.9 ~ 71.4 | 125 ~ 375 | 41.9 ~ 51.4 |
| 174 ~ 260 | 3750 | 71.4 | 375 | 51.4 |
| 260 ~ 470 | 3750 ~ 12500 | 71.4 ~ 81.9 | 375 ~ 1250 | 51.4 ~ 61.9 |
| Above 470 | 12500 | 81.9 | 1250 | 61.9 |

**NOTE:**

1. Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 56.81818(F) – 6136.3636; for the band 260-470 MHz, μV/m at 3 meters = 41.6667(F) – 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.
2. The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| Frequencies (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

## 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| ROHDE & SCHWARZ Spectrum Analyzer | FSP40 | 100036 | Dec. 18, 2009 | Dec. 17, 2010 |
| Agilent PSA Spectrum Analyzer | E4446A | MY46180622 | May 12 , 2010 | May 11 , 2011 |
| HP Pre_Amplifier | 8449B | 300801923 | Nov. 02, 2009 | Nov. 01, 2010 |
| ROHDE & SCHWARZ Test Receiver | ESCS30 | 847124/029 | Sep. 03, 2010 | Sep. 02, 2011 |
| SCHWARZBECK TRILOG Broadband Antenna | VULB 9168 | 138 | Apr. 28, 2010 | Apr. 27, 2011 |
| Schwarzbeck Horn_Antenna | BBHA9120 | D124 | Dec. 18, 2009 | Dec. 17, 2010 |
| Schwarzbeck Horn_Antenna | BBHA 9170 | BBHA9170153 | Jan. 22, 2010 | Jan. 21, 2011 |
| RF Switches | EMH-011 | 1001 | NA | NA |
| RF CABLE (Chaintek) | Sucoflex 104+ Sucoflex 106 | RF104-101+RF106-101 | Aug. 24, 2010 | Aug. 23, 2011 |
| RF Cable | 8DFB | STCCAB-30M-1GHz | NA | NA |
| Software | ADT_Radiated_V7.6.15.9.2 | NA | NA | NA |
| CT Antenna Tower & Turn Table | NA | NA | NA | NA |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

### 4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10-meter open field site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

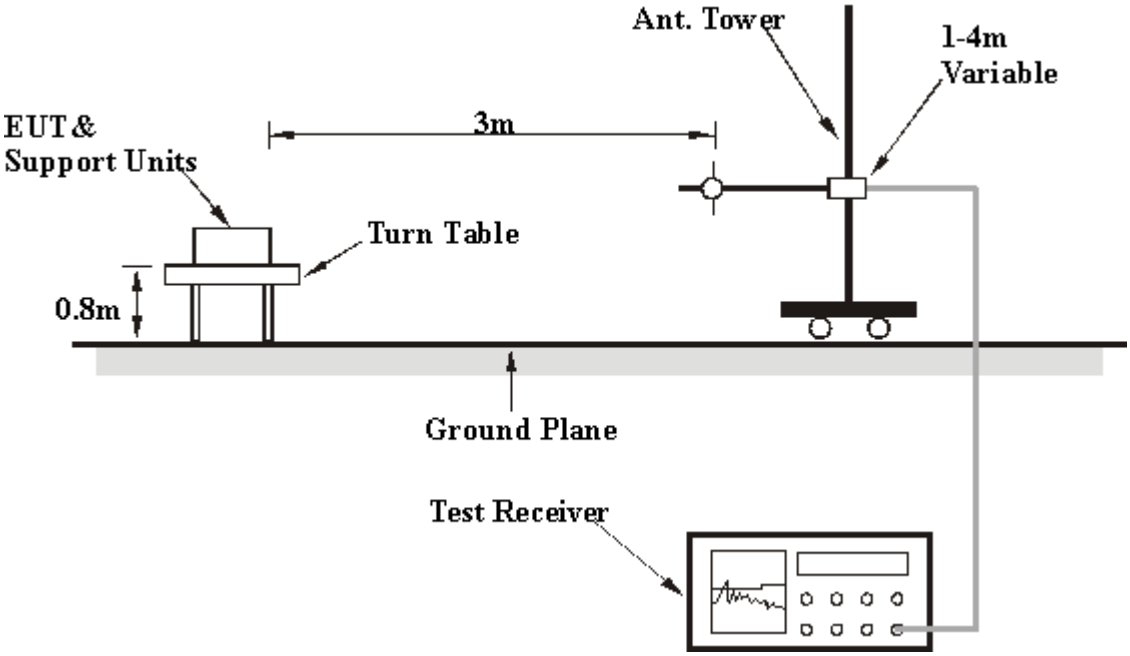
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

## 4.2.5 TEST SETUP




For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

## 4.2.7 TEST RESULTS

**Below 1GHz Worst-Case Data**

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| **CHANNEL** | Channel 1 | **FREQUENCY RANGE** | Below 1000MHz |
| **INPUT POWER** | 5Vdc | **DETECTOR FUNCTION** | Quasi-Peak |
| **ENVIRONMENTAL CONDITIONS** | 25deg. C, 61%RH 960hPa | **TESTED BY** | Eric Lee |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 118.70 | 22.3 QP | 43.50 | -21.2 | 1.00 H | 35 | 10.32 | 12.00 |
| 2 | 127.60 | 30.3 QP | 43.50 | -13.3 | 1.00 H | 150 | 17.04 | 13.21 |
| 3 | 163.00 | 29.4 QP | 43.50 | -14.1 | 1.00 H | 179 | 14.33 | 15.07 |
| 4 | *433.90 | 65.8 PK | 92.86 | -27.0 | 1.00 H | 63 | 46.80 | 19.03 |
| 5 | *433.90 | 46.6 AV | 72.86 | -26.2 | 1.00 H | 63 | 24.70 | 19.03 |
| 6 | 631.67 | 23.7 QP | 46.00 | -22.3 | 1.00 H | 288 | 0.03 | 23.68 |
| 7 | 679.67 | 27.4 QP | 46.00 | -18.6 | 1.00 H | 137 | 3.07 | 24.30 |
| 8 | 757.83 | 24.1 QP | 46.00 | -21.9 | 1.00 H | 148 | -1.03 | 25.14 |
| 9 | 867.80 | 33.6 PK | 72.86 | -39.2 | 1.00 H | 330 | 6.90 | 26.74 |
| 10 | 867.80 | 14.4 AV | 52.86 | -38.4 | 1.00 H | 330 | -12.30 | 26.74 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 130.03 | 27.3 QP | 43.50 | -16.2 | 1.00 V | 25 | 13.74 | 13.53 |
| 2 | 150.00 | 25.1 QP | 43.50 | -18.4 | 1.00 V | 126 | 10.99 | 14.07 |
| 3 | 240.00 | 23.7 QP | 46.00 | -22.3 | 1.00 V | 326 | 10.67 | 13.05 |
| **4** | ***433.90** | **83.1 PK** | **92.86** | **-9.7** | **1.00 V** | **329** | **64.10** | **19.03** |
| 5 | *433.90 | 63.9 AV | 72.86 | -8.9 | 1.00 V | 329 | 42.30 | 19.03 |
| 6 | 525.00 | 24.5 QP | 46.00 | -21.5 | 1.00 V | 20 | 3.13 | 21.39 |
| 7 | 745.83 | 24.8 QP | 46.00 | -21.2 | 1.00 V | 62 | -0.25 | 25.01 |
| 8 | 841.50 | 25.1 QP | 46.00 | -20.9 | 1.00 V | 330 | -1.15 | 26.28 |
| 9 | 867.80 | 45.2 PK | 72.86 | -27.6 | 1.10 V | 129 | 18.50 | 26.74 |
| 10 | 867.80 | 26.0 AV | 52.86 | -26.8 | 1.10 V | 129 | -0.70 | 26.74 |

**REMARKS**:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "*" = Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log (Duty cycle) Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log\frac{3 \times 3.66\text{ms}}{100\text{ms}} = -19.2\text{dB}$$

Please see page 22 for plotted duty.

## 4.2.8 TEST RESULTS

**Above 1GHz Worst-Case Data**

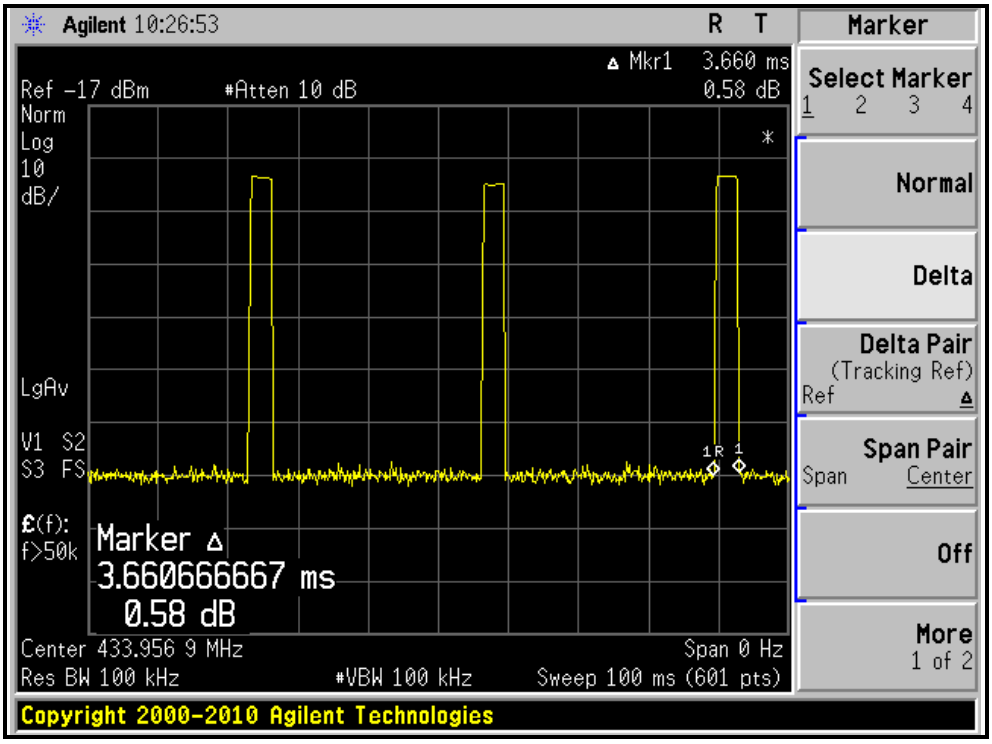
| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|---|---|---|---|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 4.5GHz |
| INPUT POWER | 5Vdc | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 61%RH<br>960hPa | TESTED BY | Eric Lee |

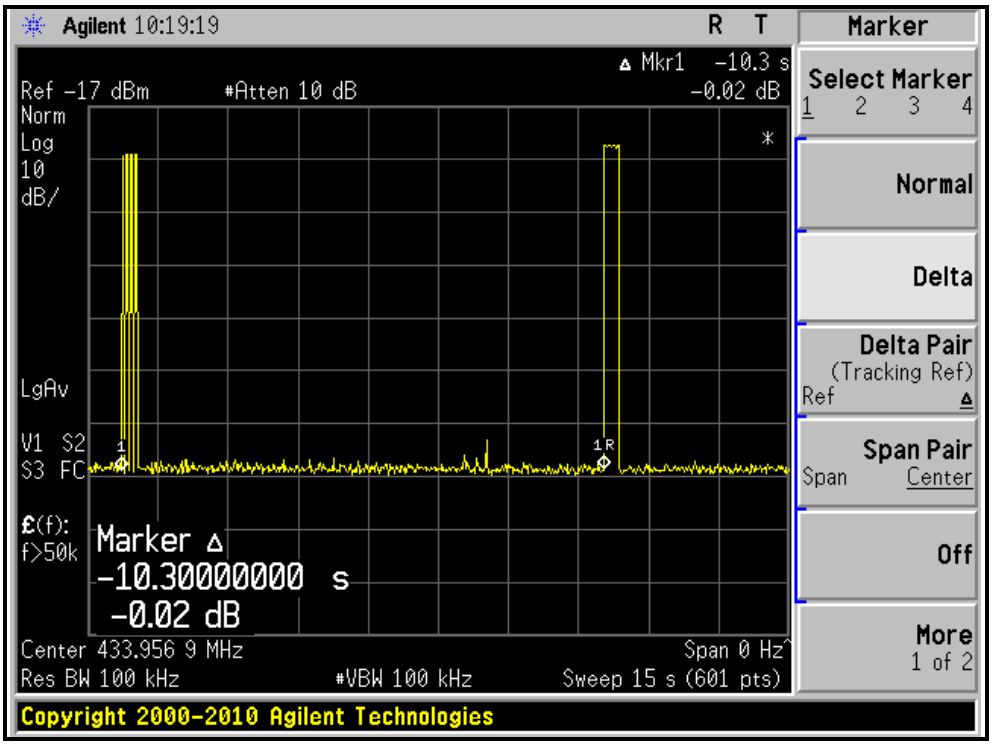
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 1735.00 | 38.9 PK | 74.00 | -35.1 | 1.24 H | 113 | 10.10 | 28.80 |
| 2 | 1735.00 | 19.7 AV | 54.00 | -34.3 | 1.24 H | 113 | -9.10 | 28.80 |
| 3 | 2169.50 | 43.2 PK | 74.00 | -30.8 | 1.00 H | 201 | 13.17 | 30.03 |
| 4 | 2169.50 | 24.0 AV | 54.00 | -30.0 | 1.00 H | 201 | -6.03 | 30.03 |
| 5 | 3905.00 | 44.5 PK | 74.00 | -29.5 | 1.00 H | 26 | 9.91 | 34.59 |
| 6 | 3905.00 | 25.3 AV | 54.00 | -28.7 | 1.00 H | 26 | -9.29 | 34.59 |
| 7 | 4339.00 | 43.1 PK | 74.00 | -30.9 | 1.00 H | 67 | 7.22 | 35.88 |
| 8 | 4339.00 | 23.9 AV | 54.00 | -30.1 | 1.00 H | 67 | -11.98 | 35.88 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 1735.82 | 48.7 PK | 74.00 | -25.3 | 1.09 V | 205 | 19.94 | 28.80 |
| 2 | 1735.82 | 29.5 AV | 54.00 | -24.5 | 1.09 V | 205 | 0.74 | 28.80 |
| 3 | 2170.00 | 54.0 PK | 74.00 | -20.0 | 1.08 V | 72 | 23.99 | 30.03 |
| 4 | 2170.00 | 34.8 AV | 54.00 | -19.2 | 1.15 V | 185 | 4.79 | 30.03 |
| 5 | 3905.00 | 46.7 PK | 74.00 | -27.3 | 1.15 V | 185 | 12.11 | 34.59 |
| 6 | 3905.00 | 27.5 AV | 54.00 | -26.5 | 1.15 V | 185 | -7.09 | 34.59 |
| 7 | 4339.50 | 35.9 PK | 74.00 | -38.1 | 1.36 V | 124 | 0.00 | 35.88 |
| 8 | 4339.50 | 16.7 AV | 54.00 | -37.3 | 1.36 V | 124 | -19.20 | 35.88 |

**REMARKS**:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "*" = Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log (Duty cycle) Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log\frac{3 \times 3.66\text{ms}}{100\text{ms}} = -19.2\text{dB}$$

Please see page 22 for plotted duty.




$$20\log(\text{Duty cycle}) = 20\log\frac{3 \times 3.66\text{ms}}{100\text{ms}} = -19.2\text{dB}$$

## 4.3 DEACTIVATION TIME

### 4.3.1 LIMIT OF DEACTIVATION TIME MEASUREMENT

Device operated automatically shall be limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

### 4.3.2 TEST INSTRAMENT

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Spectrum Analyzer | FSP 40 | 100036 | Dec. 18, 2009 | Dec. 17, 2010 |

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.3.3 TEST PROCEDURE

a. The EUT was placed on the turning table.

b. The signal was coupled to the spectrum analyzer through an antenna.

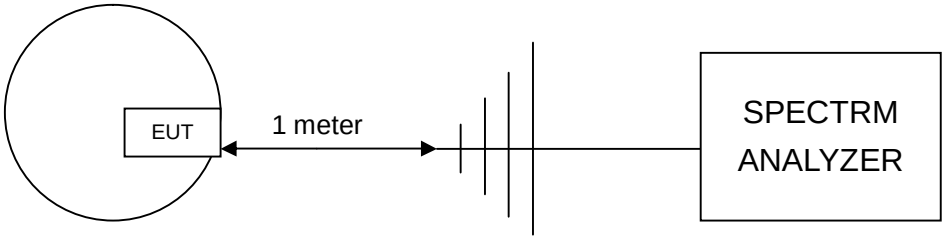
c. Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz. The spectrum analyser was turned to the centre frequency of the transmitter's and the analyser's marker function was used to determine the duration of transmission.

d. The transmission duration was measured and recorded.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 TEST SETUP



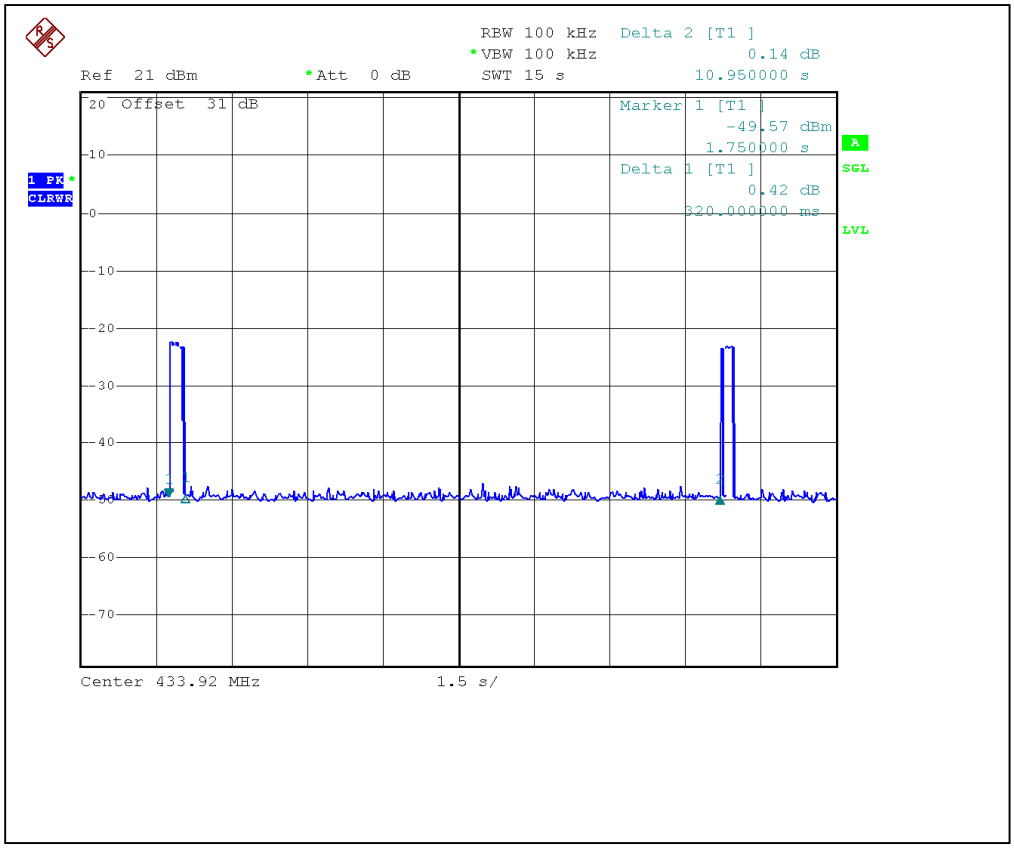

### 4.3.6 EUT OPERATING CONDICTION

Same as 4.2.6

## 4.3.7 TEST RESULT

| CHANNEL FREQUENCY (MHZ) | EACH TRANSMISSION TIME (SECOND) | SILENT PERIOD BETWEEN TRANSMISSIONS (SECOND) | PASS/FAIL |
|---|---|---|---|
| 433.92 | ＜1s | >10s and > 30*( duration of the transmission) | PASS |

The plots of test results are attached as below.



## 4.4 20dB OCCUPIED BANDWIDTH MEASUREMENT

### 4.4.1 LIMIT OF THE EMISSION BANDWIDTH

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

### 4.4.2 TEST INSTRAMENT

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Spectrum Analyzer | FSP 40 | 100036 | Dec. 18, 2009 | Dec. 17, 2010 |

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.4.3 TEST PROCEDURE

a. The EUT was placed on the turning table

b. The signal was coupled to the spectrum analyzer through an antenna

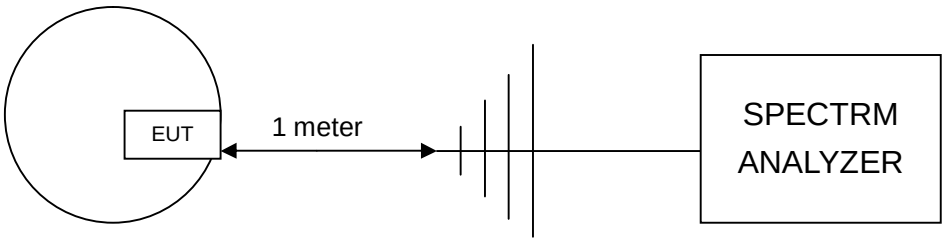
c. Set the resolution bandwidth to 10kHz and video bandwidth to 30kHz then select Peak function to scan the channel frequency

d. The emission bandwidth was measurement and recorded.

### 4.4.4 DEVIATION FROM THE TEST STANDARD

No deviation

### 4.4.5 TEST SETUP



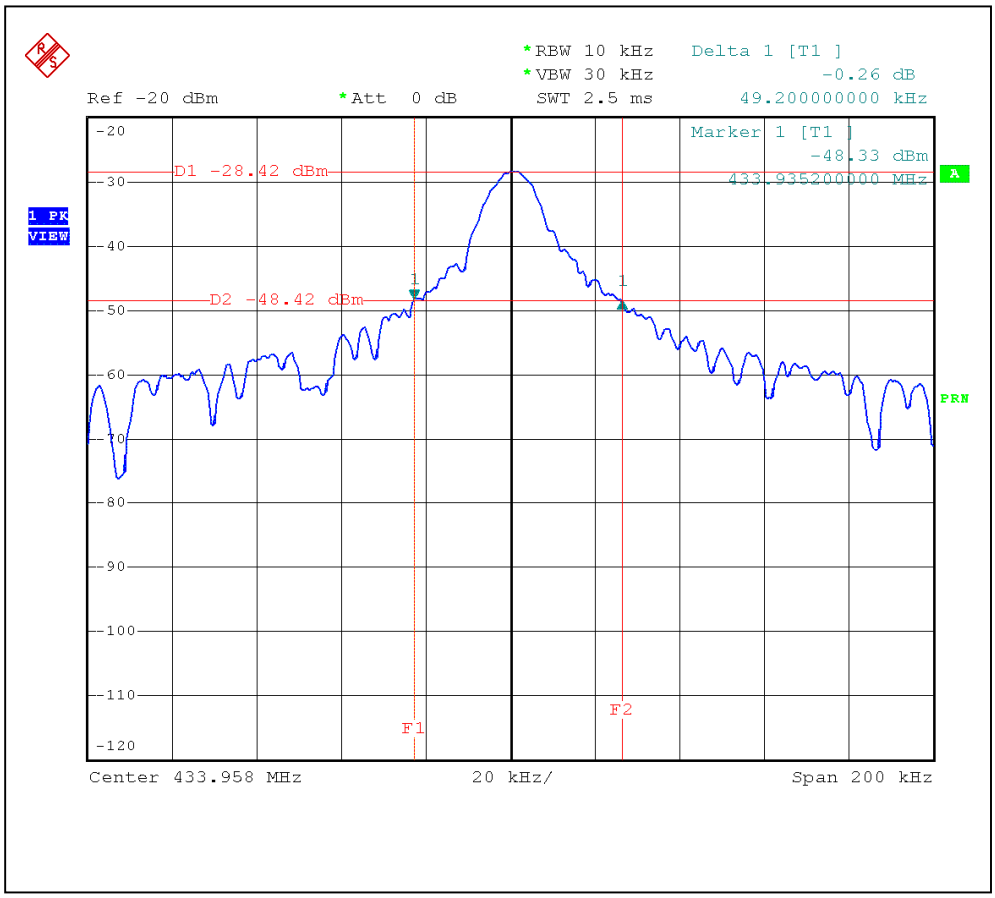

### 4.4.6 EUT OPERATING CONDITION

Same as 4.2.6

## 4.4.7 TEST RESULT

| CHANNEL | CHANNEL FREQUENCY (MHz) | 20dB BANDWIDTH (kHz) | MAXIMUM LIMIT (kHz) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 433.92 | 49.2 | 1084.80 | PASS |

CH1



# 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:


**Linko EMC/RF Lab**:
Tel: 886-2-26052180
Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab**:
Tel: 886-3-5935343
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab**:
Tel: 886-3-3183232
Fax: 886-3-3185050

**Email**: service@adt.com.tw
**Web Site**: www.adt.com.tw


The address and road map of all our labs can be found in our web site also.

# 7. APPENDIX - A MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

**--- END ---**