



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**Navigation Device**

**Model: X4545 M20; X4545 M40**

**Trade Name: MEDION**

*Issued to*

**Medion AG**

**Am Zehnthof 7745307, Essen, Germany**

*Issued by*

**Compliance Certification Services Inc.**

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Testing Laboratory  
0363

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**Revision History**

| Rev. | Issue Date       | Revisions     | Effect Page | Revised By  |
|------|------------------|---------------|-------------|-------------|
| 00   | February 1, 2010 | Initial Issue | ALL         | Celine Chou |
|      |                  |               |             |             |
|      |                  |               |             |             |
|      |                  |               |             |             |



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## 1. TEST RESULT CERTIFICATION

**Applicant:** Medion AG  
Am Zehnthof 7745307, Essen, Germany

**Equipment Under Test:** Navigation Device

**Trade Name:** MEDION

**Model:** X4545 M20; X4545 M40

**Date of Test:** January 16 ~ 21, 2010

| APPLICABLE STANDARDS         |                         |
|------------------------------|-------------------------|
| STANDARD                     | TEST RESULT             |
| FCC 47 CFR Part 15 Subpart C | No non-compliance noted |

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.239.

The test results of this report relate only to the tested sample EUT identified in this report.

**Approved by:**

Ethan Huang  
Section Manager

**Reviewed by:**

Stan Lin  
Supervisor



## 2. EUT DESCRIPTION

|                            |                                                                                                                                                 |       |                    |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------|
| Product                    | Navigation Device                                                                                                                               |       |                    |
| Trade Name                 | MEDION                                                                                                                                          |       |                    |
| Model Number               | X4545 M20; X4545 M40                                                                                                                            |       |                    |
| Model Name Discrepancy     | Client consigns only one sample to test (model number: X4545 M20). Therefore, the testing Lab. just guarantees the unit, which has been tested. |       |                    |
| EUT Power Rating           | 5VDC, 1A                                                                                                                                        |       |                    |
| Power Adapter              | PHIHONG                                                                                                                                         | Model | PSAA05R-050        |
| Power Adapter Power Rating | I/P: 100-240VAC, 50-60Hz, 0.3A<br>O/P: 5VDC, 1A                                                                                                 |       |                    |
| Car Charger                | MiTAC                                                                                                                                           | Model | CA-051-00U-00      |
| Car Charger Power Rating   | I/P: 12/24VDC, 800mA(Max)<br>O/P: 5V, 1A (Max)                                                                                                  |       |                    |
| Cradle                     | MEDION                                                                                                                                          | Model | X4X4X ActiveCradle |
| Frequency Range            | 88.1-107.9 MHz                                                                                                                                  |       |                    |
| Transmit Power             | 35.96dBuV/m                                                                                                                                     |       |                    |
| Modulation Technique       | Frequency Modulation                                                                                                                            |       |                    |
| Number of Channels         | 100 Channel                                                                                                                                     |       |                    |
| Channels Spacing           | 100 kHz                                                                                                                                         |       |                    |
| Antenna Specification      | PCB Antenna / -25dBi                                                                                                                            |       |                    |

**Remark:** The product is a Transmitter. This submittal(s) (test report) is intended for FCC ID: **WCE-X4545** filing to comply with Section 15.239 of the FCC Part 15 Subpart C Rules.



### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 15 Subpart C.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EUT EXERCISE**

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

##### **Radiated Emissions**

The EUT is placed on a turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4



### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                        | MHz                 | MHz             | GHz              |
|----------------------------|---------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423      | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475 | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67        | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25        | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6           | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2         | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94        | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138           | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05      | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 -         | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.52525           | 2655 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 156.7 - 156.9       | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 162.0125 - 167.17   | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 167.72 - 173.2      | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 240 - 285           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              | 322 - 335.4         |                 |                  |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



### **3.5 DESCRIPTION OF TEST MODES**

The EUT (model: X4545 M20) had been tested under operating condition and had been reported as worst case on this test report.

Test program used to control the EUT for staying in continuous transmitting mode was programmed.

Channel Low (88.1 MHz) 、 Mid (98.1 MHz) and High (107.9 MHz) was chosen for full testing.

For the power line conducted emissions test, the EUT has three charge modes, (USB charge mode, power adapter mode and car charger mode), after the preliminary test, the power adapter mode was found to the worst case and chosen for testing.

Download the audio signal (MP3 songs) to the device, and then play MP3 songs during the 20dB BW test and the volume of audio was tuned to the max during the test.

The tuning controls were manually adjusted to verify maximum tuning range.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.





## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

*Remark: Each piece of equipment is scheduled for calibration once a year.*

| Conducted Emissions Test Site |              |        |               |                 |
|-------------------------------|--------------|--------|---------------|-----------------|
| Name of Equipment             | Manufacturer | Model  | Serial Number | Calibration Due |
| Spectrum Analyzer             | Agilent      | E4446A | MY48250064    | 11/05/2010      |
| Spectrum Analyzer             | R&S          | FSEB   | 825829/011    | 11/02/2010      |
| USB Power Sensor              | BOONTON      | 52012  | 2061194       | 06/08/2010      |

| 3M Semi Anechoic Chamber |                                              |          |               |                 |
|--------------------------|----------------------------------------------|----------|---------------|-----------------|
| Name of Equipment        | Manufacturer                                 | Model    | Serial Number | Calibration Due |
| Spectrum Analyzer        | Agilent                                      | E4446A   | MY48250064    | 11/05/2010      |
| Spectrum Analyzer        | R&S                                          | FSEB     | 825829/011    | 11/02/2010      |
| Pre-Amplifier            | HP                                           | 8447D    | 2944A06530    | 01/02/2011      |
| Pre-Amplifier            | HP                                           | 8449B    | 3008A01738    | 04/17/2010      |
| EMI Test Receiver        | SCHAFFNER                                    | SCR 3501 | 436           | 01/26/2011      |
| Loop Antenna             | EMCO                                         | 6502     | 2356          | 05/28/2010      |
| Bilog Antenna            | SCHWAZBECK                                   | VULB9160 | 3084          | 09/11/2010      |
| Horn Antenna             | EMCO                                         | 3115     | 00022250      | 05/08/2010      |
| Turn Table               | CCS                                          | CC-T-1F  | N/A           | N.C.R           |
| Antenna Tower            | CCS                                          | CC-A-1F  | N/A           | N.C.R           |
| Controller               | CCS                                          | CC-C-1F  | N/A           | N.C.R           |
| Test S/W                 | LabVIEW 6.1 (Wugu Chamber EMI Test V1_4.5.3) |          |               |                 |

| Powerline Conducted Emissions Test Site |              |                             |               |                 |
|-----------------------------------------|--------------|-----------------------------|---------------|-----------------|
| Name of Equipment                       | Manufacturer | Model                       | Serial Number | Calibration Due |
| EMI Test Receiver                       | R&S          | ESCS30                      | 845552/030    | 04/08/2010      |
| LISN                                    | R&S          | ENV216                      | 100074        | 12/09/2010      |
| LISN                                    | FCC          | FCC-LISN-50/<br>250-16-2-07 | 06013         | 10/12/2010      |
| Test S/W                                | CCS-3A1-CE   |                             |               |                 |



#### 4.3 MEASUREMENT UNCERTAINTY

| Parameter                               | Uncertainty  |
|-----------------------------------------|--------------|
| Powerline Conducted Emission            | $\pm 1.7806$ |
| 3M Semi Anechoic Chamber / 30MHz ~ 1GHz | $\pm 4.0235$ |
| 3M Semi Anechoic Chamber / Above 1GHz   | $\pm 3.8718$ |

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

#### 4.4 MEASUREMENT UNCERTAINTY

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

**Table 6: Maximum measurement uncertainty**

| Parameter                     | Uncertainty             |
|-------------------------------|-------------------------|
| RF frequency                  | $\pm 1 \cdot 10^{-5}$   |
| Total RF power conducted      | $\pm 1,5$ dB            |
| RF power density, conducted   | $\pm 3$ dB              |
| Spurious emissions, conducted | $\pm 3$ dB              |
| All emissions, radiated       | $\pm 6$ dB              |
| Humidity                      | $\pm 5$ %               |
| Temperature                   | $\pm 1^{\circ}\text{C}$ |
| DC and low frequency voltages | $\pm 3\%$               |



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Pa-De 2nd Rd., Luchu Hsiang, Taoyuan Shien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.





Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5.3 LABORATORY ACCREDITATIONS AND LISTINGS**

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200600-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 93105 and 90471).

## 5.4 TABLE PF ACCREDITATIONS AND LISTINGS

| Country | Agency          | Scope of Accreditation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Logo                                                                                                                       |
|---------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| USA     | A2LA            | EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, EIC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/ EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001                                                                                                                                         | <br>ACCREDITED<br>TESTING CERT #0824.01 |
| USA     | FCC             | 3M Semi Anechoic Chamber (965860 and 898658) to perform FCC Part 15/18 measurements                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <br>965860, 898658                      |
| Taiwan  | TAF             | LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310<br>IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17<br>FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959<br>FCC Method -47 CFR Part 15 Subpart B<br>IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11 | <br>Testing Laboratory<br>1309         |
| Canada  | Industry Canada | 3M Semi Anechoic Chamber (IC 6106 & IC 6106A-2) to perform RSS 212 Issue 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <br>IC 6106<br>IC 6106A-2             |

**Note:** No part of this report may be used to claim or imply product endorsement by A2LA, TAF or other government agency.



## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

| No. | Device Type | Brand | Model | Series No. | FCC ID | Data Cable | Power Cord |
|-----|-------------|-------|-------|------------|--------|------------|------------|
| 1.  | N/A         |       |       |            |        |            |            |

**\*\*No any support equipment during the test.**

**Remark:** Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



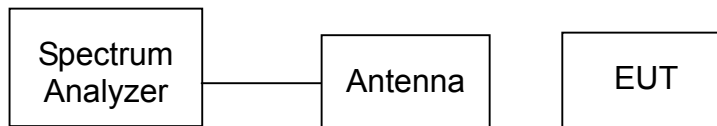
## 7. FCC PART 15.239 REQUIREMENTS

### 7.1 20 DB BANDWIDTH

#### LIMIT

N/A

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10kHz, RBW = 30, Span = 200KHz, Sweep = auto.
4. Repeat until all the rest channels are investigated.

#### TEST RESULTS

*No non-compliance noted*

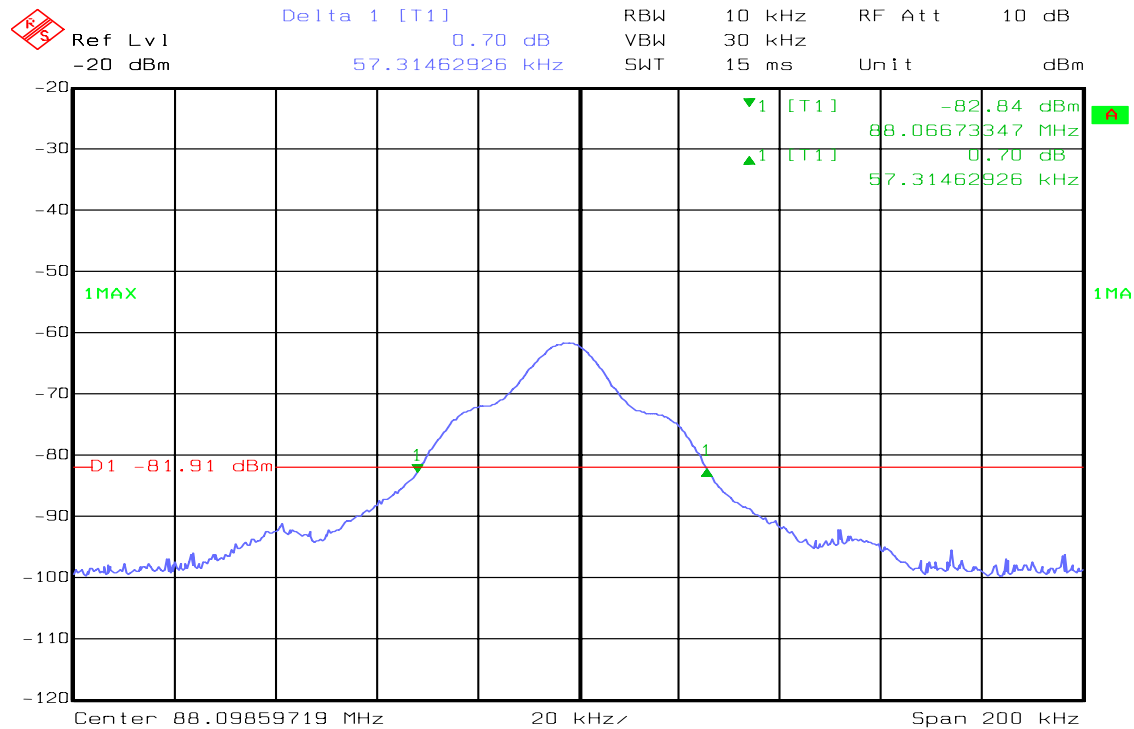
#### Test Data

| Channel | Frequency (MHz) | Bandwidth (kHz) |
|---------|-----------------|-----------------|
| Low     | 88.1            | 57.31           |
| Mid     | 98.1            | 57.72           |
| High    | 107.9           | 56.11           |



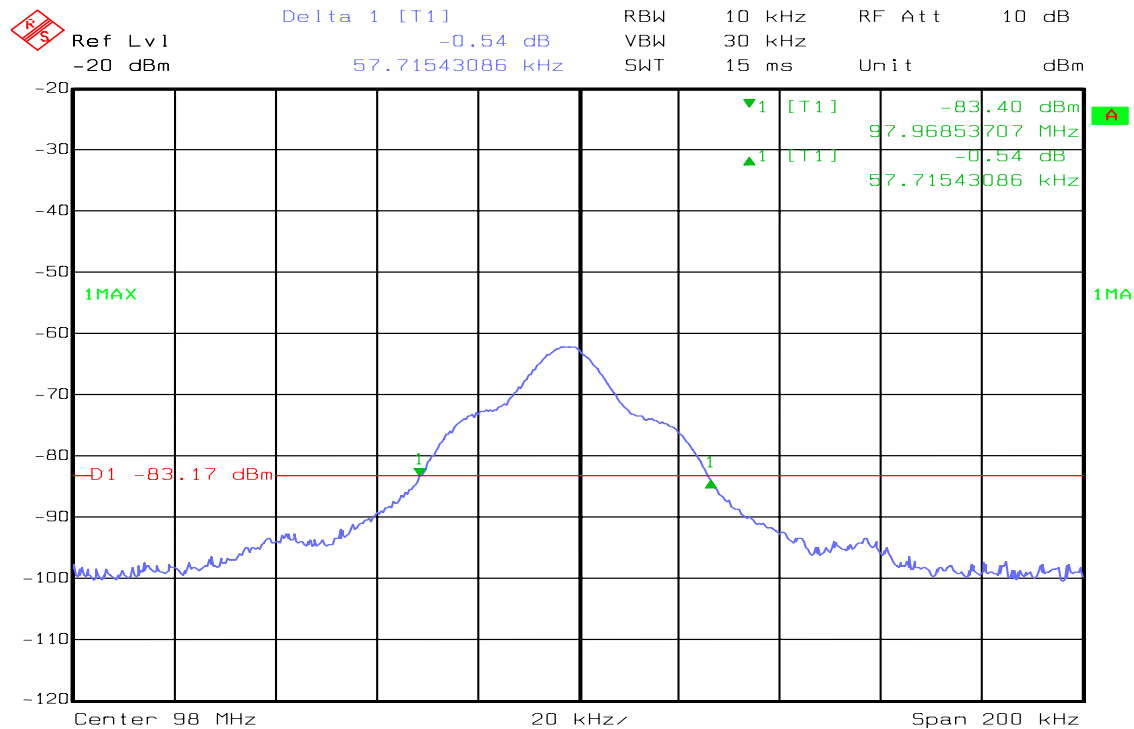
## Test Plot

### CH Low



Date: 20.JAN.2010 13:43:02

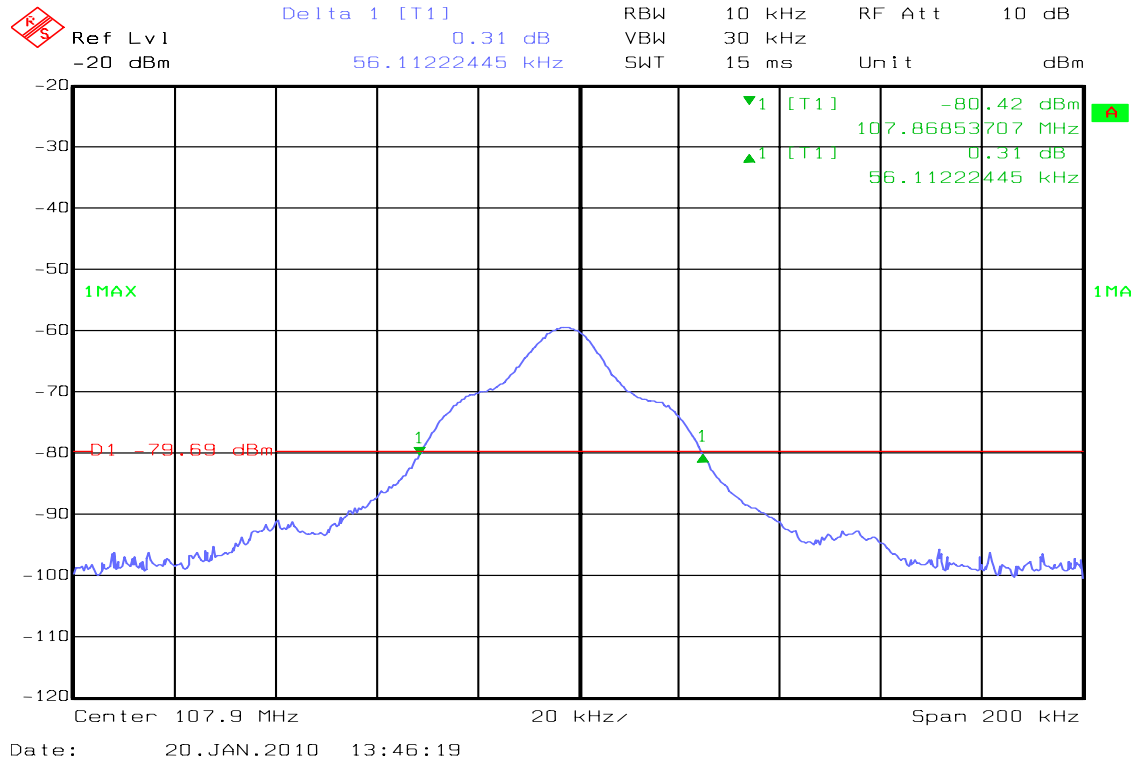
### CH Mid



Date: 20.JAN.2010 13:45:16



## CH High



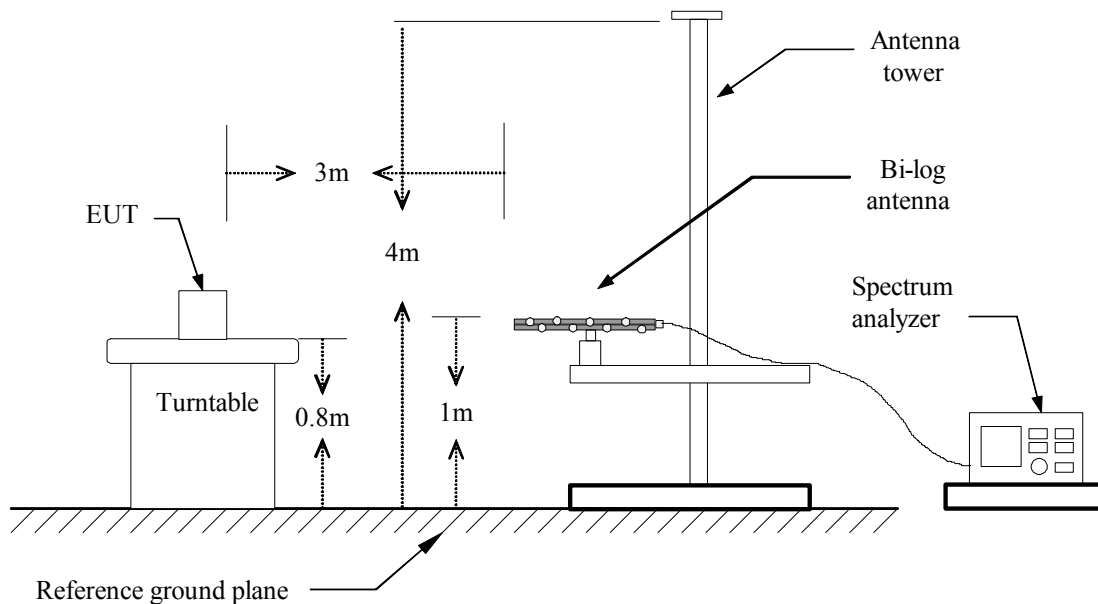


## 7.2 BAND EDGES MEASUREMENT

### LIMIT

According to §15.239(a), emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 1 and measurement the turn on the EUT. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100kHz respectively with a convenient frequency span including 200kHz bandwidth of the emission.
4. Mark the bandwidth of 200kHz points and plot the graph on spectrum analyzer.
5. Repeat the procedures until all measured frequencies were complete.

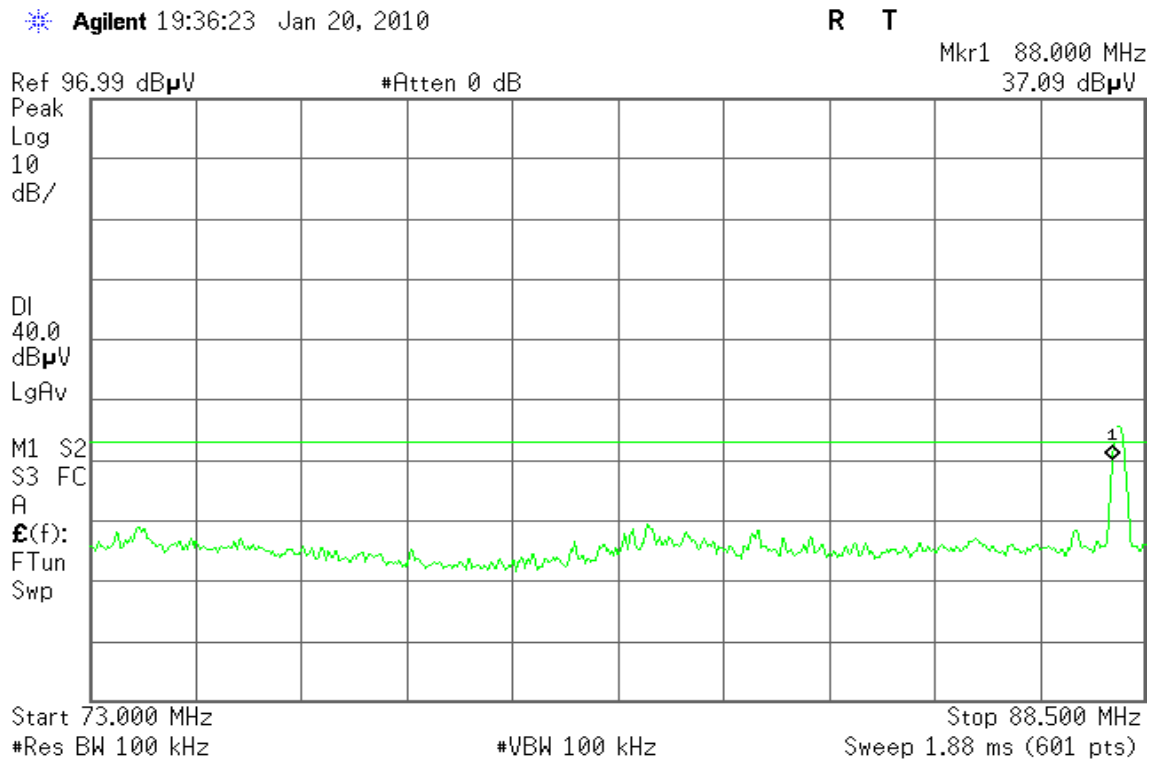


## TEST RESULTS

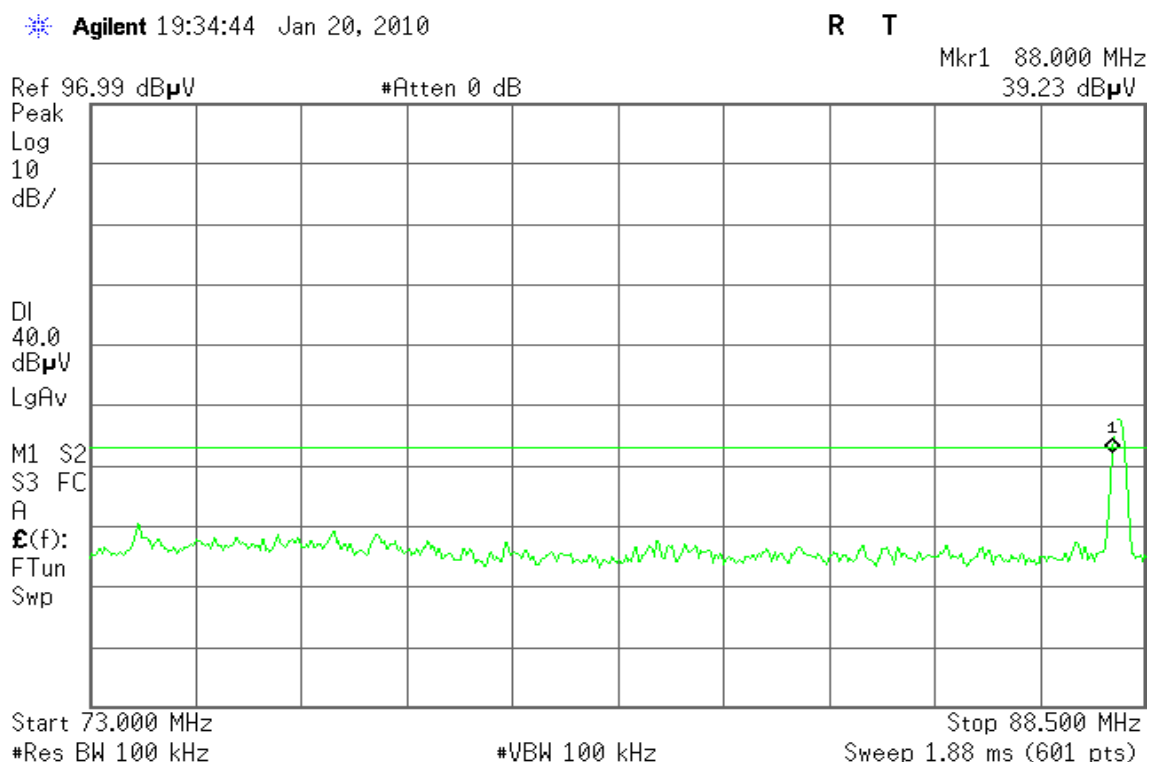
Refer to attach spectrum analyzer data chart.

### Band Edges (CH Low)

#### Polarity: Vertical



#### Polarity: Horizontal





## Band Edges (CH High)

### Polarity: Vertical

Agilent 19:01:16 Jan 20, 2010

R T

Mkr1 108.000 MHz

Ref 96.99 dB $\mu$ V

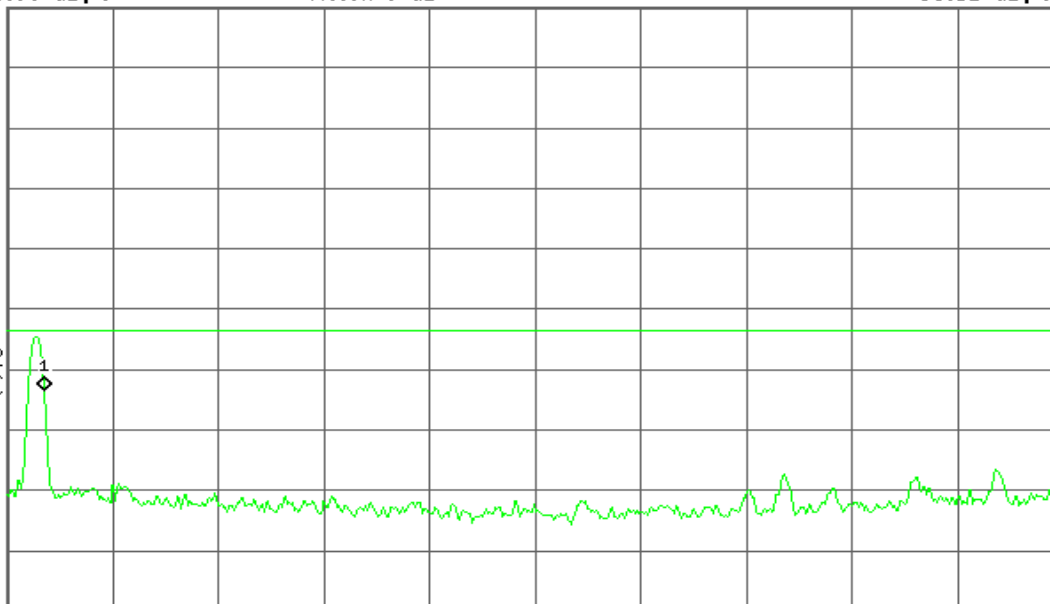
#Atten 0 dB

33.51 dB $\mu$ V

Peak  
Log  
10  
dB/

DI  
43.5  
dB $\mu$ V  
LgAv

M1 S2  
S3 FC  
A  
E(f):  
FTun  
Swp



Start 107.500 MHz

Stop 122.000 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 1.76 ms (601 pts)

### Polarity: Horizontal

Agilent 19:02:38 Jan 20, 2010

R T

Mkr1 108.000 MHz

Ref 96.99 dB $\mu$ V

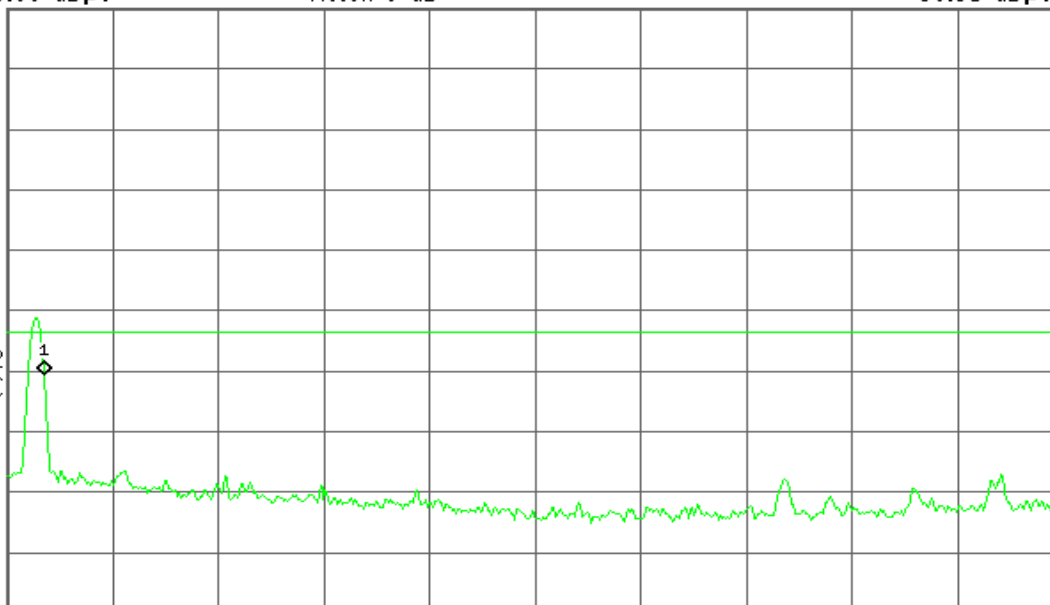
#Atten 0 dB

36.35 dB $\mu$ V

Peak  
Log  
10  
dB/

DI  
43.5  
dB $\mu$ V  
LgAv

M1 S2  
S3 FC  
A  
E(f):  
FTun  
Swp



Start 107.500 MHz

Stop 122.000 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 1.76 ms (601 pts)



## 7.3 RADIATED EMISSIONS

### LIMIT

1. The field strength of any emission within this band (section 15.239 frequency between 88 MHz –108 MHz) shall not exceed 250 microvolts /meter at 3 meters. (48dB $\mu$ V/m at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit), as below.

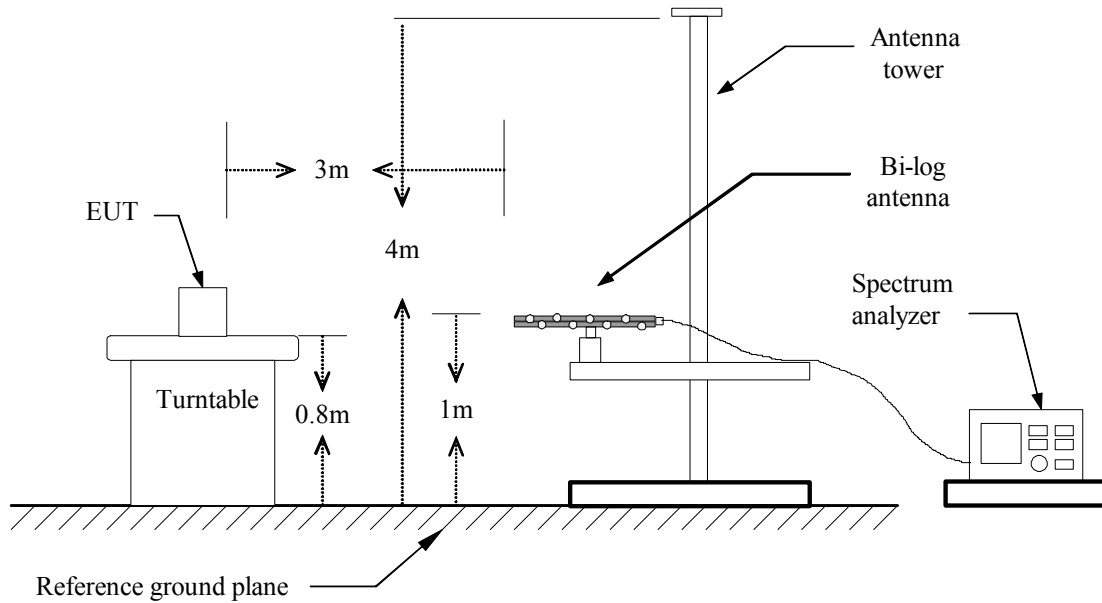
| Frequency (MHz) | Field Strength (mV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 1.705-30        | 30                    | 30                       |
| 30-88           | 100*                  | 3                        |
| 88-216          | 150*                  | 3                        |
| 216-960         | 200*                  | 3                        |
| Above 960       | 500                   | 3                        |

**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

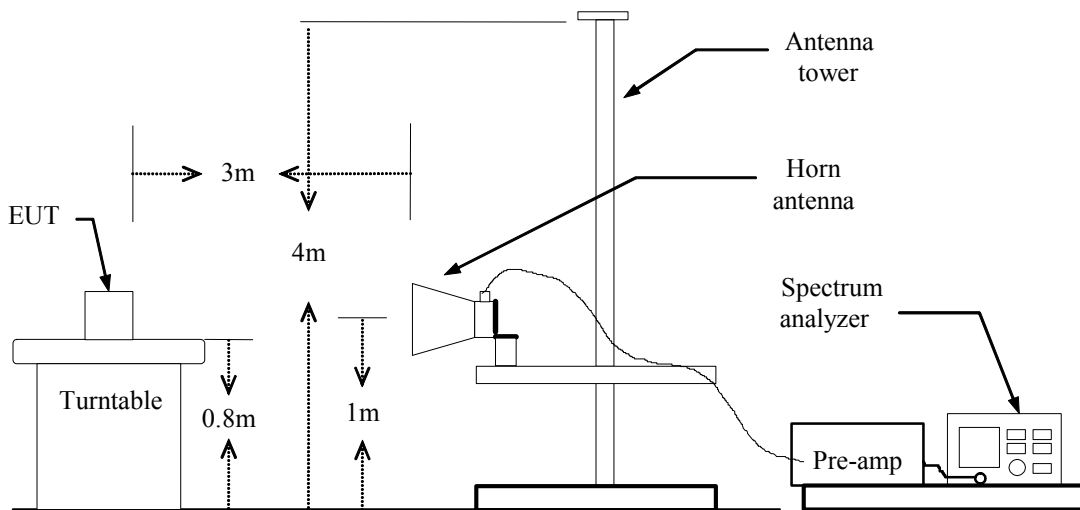
2. In the above emission table, the tighter limit applies at the band edges.

| Frequency (Hz) | Field Strength ( $\mu$ V/m at 3-meter) | Field Strength (dB $\mu$ V/m at 3-meter) |
|----------------|----------------------------------------|------------------------------------------|
| 1.705-30       | 30                                     | 69.54                                    |
| 30-88          | 100                                    | 40                                       |
| 88-216         | 150                                    | 43.5                                     |
| 216-960        | 200                                    | 46                                       |
| Above 960      | 500                                    | 54                                       |

## Below 1 GHz



## Above 1 GHz





## **TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:  
Below 1GHz:  
RBW=100kHz / VBW=100kHz / Sweep=AUTO  
Above 1GHz:  
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.



## TEST RESULTS

### Test Data

**Operation Mode:** CH Low      **Test Date:** January 21, 2010  
**Temperature:** 18°C      **Tested by:** Alonso Lu  
**Humidity:** 60 % RH      **Polarity:** Ver. / Hor.

| Frequency (MHz) | Ant. Pol (H/V) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|----------------|--------------------------|-----------------|----------------|-------------|--------|
| 88.0999         |                | 56.89          | -18.46                   | 38.43           | 48.00          | -9.57       | AVG    |
| 51.8250         | V              | 48.82          | -14.16                   | 34.66           | 40.00          | -5.34       | QP     |
| 61.5250         | V              | 51.12          | -16.03                   | 35.09           | 40.00          | -4.91       | QP     |
| 68.8000         | V              | 53.70          | -17.92                   | 35.78           | 40.00          | -4.22       | QP     |
| 88.2000         | V              | 51.18          | -18.44                   | 32.74           | 43.50          | -10.76      | QP     |
| 105.1750        | V              | 44.07          | -17.27                   | 26.80           | 43.50          | -16.70      | QP     |
| 134.3235        | V              | 38.84          | -13.45                   | 25.39           | 43.50          | -18.11      | QP     |
| 221.5750        | V              | 43.01          | -14.87                   | 28.14           | 46.00          | -17.86      | QP     |
| 454.3750        | V              | 36.03          | -8.19                    | 27.84           | 46.00          | -18.16      | QP     |
| 614.4250        | V              | 33.61          | -4.25                    | 29.36           | 46.00          | -16.64      | QP     |
| 847.2250        | V              | 33.96          | -0.37                    | 33.59           | 46.00          | -12.41      | QP     |
| 88.0875         | H              | 52.79          | -18.46                   | 34.33           | 48.00          | -13.67      | AVG    |
| 61.5250         | H              | 41.65          | -16.03                   | 25.62           | 40.00          | -14.38      | QP     |
| 68.8000         | H              | 43.28          | -17.92                   | 25.36           | 40.00          | -14.64      | QP     |
| 127.4409        | H              | 44.87          | -14.88                   | 29.99           | 43.50          | -13.51      | QP     |
| 180.3499        | H              | 38.56          | -14.56                   | 24.00           | 43.50          | -19.50      | QP     |
| 221.5750        | H              | 42.78          | -14.87                   | 27.91           | 46.00          | -18.09      | QP     |
| 304.0250        | H              | 39.05          | -11.00                   | 28.05           | 46.00          | -17.95      | QP     |
| 347.6750        | H              | 39.72          | -9.74                    | 29.98           | 46.00          | -16.02      | QP     |

### Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



**Operation Mode:** CH Mid

**Test Date:** January 21, 2010

**Temperature:** 18°C

**Tested by:** Alonso Lu

**Humidity:** 60 % RH

**Polarity:** Ver. / Hor.

| Frequency (MHz) | Ant. Pol (H/V) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|----------------|--------------------------|-----------------|----------------|-------------|--------|
| 97.9890         | V              | 55.88          | -17.68                   | 38.20           | 48.00          | -9.80       | AVG    |
| 32.4250         | V              | 48.29          | -14.73                   | 33.56           | 40.00          | -6.44       | QP     |
| 37.2750         | V              | 46.03          | -14.00                   | 32.03           | 40.00          | -7.97       | QP     |
| 51.8250         | V              | 49.68          | -14.16                   | 35.52           | 40.00          | -4.48       | QP     |
| 68.8000         | V              | 52.55          | -17.92                   | 34.63           | 40.00          | -5.37       | QP     |
| 90.6250         | V              | 43.29          | -18.13                   | 25.16           | 43.50          | -18.34      | QP     |
| 129.6950        | V              | 40.25          | -14.42                   | 25.83           | 43.50          | -17.67      | QP     |
| 182.7750        | V              | 40.77          | -14.66                   | 26.11           | 43.50          | -17.39      | QP     |
| 219.4598        | V              | 41.83          | -14.93                   | 26.90           | 46.00          | -19.10      | QP     |
| 616.8500        | V              | 33.42          | -4.32                    | 29.10           | 46.00          | -16.90      | QP     |
| 97.9929         | H              | 51.49          | -17.68                   | 33.81           | 48.00          | -14.19      | AVG    |
| 68.8000         | H              | 42.85          | -17.92                   | 24.93           | 40.00          | -15.07      | QP     |
| 129.4250        | H              | 44.20          | -14.47                   | 29.73           | 43.50          | -13.77      | QP     |
| 182.7750        | H              | 40.19          | -14.66                   | 25.53           | 43.50          | -17.97      | QP     |
| 221.5750        | H              | 41.69          | -14.87                   | 26.82           | 46.00          | -19.18      | QP     |
| 306.4500        | H              | 37.13          | -10.93                   | 26.20           | 46.00          | -19.80      | QP     |
| 345.2500        | H              | 39.42          | -9.80                    | 29.62           | 46.00          | -16.38      | QP     |
| 602.3000        | H              | 33.48          | -4.03                    | 29.45           | 46.00          | -16.55      | QP     |

## Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.





**Operation Mode:** CH High

**Test Date:** January 21, 2010

**Temperature:** 18°C

**Tested by:** Alonso Lu

**Humidity:** 60 % RH

**Polarity:** Ver. / Hor.

| Frequency (MHz) | Ant. Pol (H/V) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|----------------|--------------------------|-----------------|----------------|-------------|--------|
| 107.8979        | V              | 54.51          | -17.11                   | 37.40           | 48.00          | -10.60      | AVG    |
| 51.8250         | V              | 49.12          | -14.16                   | 34.96           | 40.00          | -5.04       | QP     |
| 59.1000         | V              | 47.64          | -15.48                   | 32.16           | 40.00          | -7.84       | QP     |
| 68.8000         | V              | 48.67          | -17.92                   | 30.75           | 40.00          | -9.25       | QP     |
| 102.7500        | V              | 46.11          | -17.41                   | 28.70           | 43.50          | -14.80      | QP     |
| 146.4000        | V              | 41.14          | -12.48                   | 28.66           | 43.50          | -14.84      | QP     |
| 182.7750        | V              | 40.73          | -14.66                   | 26.07           | 43.50          | -17.43      | QP     |
| 219.1500        | V              | 42.53          | -14.94                   | 27.59           | 46.00          | -18.41      | QP     |
| 612.0000        | V              | 33.34          | -4.21                    | 29.13           | 46.00          | -16.87      | QP     |
| 107.8910        | H              | 49.87          | -17.11                   | 32.76           | 48.00          | -15.24      | QP     |
| 68.8000         | H              | 41.56          | -17.92                   | 23.64           | 40.00          | -16.36      | QP     |
| 127.4409        | H              | 43.80          | -14.88                   | 28.92           | 43.50          | -14.58      | QP     |
| 180.3500        | H              | 39.19          | -14.56                   | 24.63           | 43.50          | -18.87      | QP     |
| 219.1500        | H              | 42.37          | -14.94                   | 27.43           | 46.00          | -18.57      | QP     |
| 306.4500        | H              | 38.41          | -10.93                   | 27.48           | 46.00          | -18.52      | QP     |
| 347.6750        | H              | 39.36          | -9.74                    | 29.62           | 46.00          | -16.38      | QP     |
| 604.7250        | H              | 33.59          | -4.07                    | 29.52           | 46.00          | -16.48      | QP     |

**Remark:**

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



## **7.4 POWERLINE CONDUCTED EMISSIONS**

### **LIMIT**

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

| Frequency Range (MHz) | Limits (dB $\mu$ V) |          |
|-----------------------|---------------------|----------|
|                       | Quasi-peak          | Average  |
| 0.15 to 0.50          | 66 to 56            | 56 to 46 |
| 0.50 to 5             | 56                  | 46       |
| 5 to 30               | 60                  | 50       |

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### **TEST CONFIGURATION**

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### **TEST PROCEDURE**

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.



## **TEST RESULTS**

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

## **TEST DATA**

**Operation Mode:** Power Adapter Charging      **Test Date:** January 16, 2010  
**Temperature:** 25°C      **Tested by:** Louis Shen  
**Humidity:** 57% RH      **Test**

| Freq. (MHz) | QP Reading | AV Reading | Corr. factor | QP Result | AV Result | QP Limit | AV Limit | QP Margin | AV Margin | Note |
|-------------|------------|------------|--------------|-----------|-----------|----------|----------|-----------|-----------|------|
| 0.3766      | 43.50      | 30.20      | 0.10         | 43.60     | 30.30     | 58.35    | 48.35    | -14.75    | -18.05    | L1   |
| 0.4977      | 41.90      | 30.40      | 0.00         | 41.90     | 30.40     | 56.04    | 46.04    | -14.14    | -15.64    | L1   |
| 0.5367      | 43.90      | 31.70      | 0.00         | 43.90     | 31.70     | 56.00    | 46.00    | -12.10    | -14.30    | L1   |
| 0.6813      | 41.10      | 26.60      | 0.00         | 41.10     | 26.60     | 56.00    | 46.00    | -14.90    | -19.40    | L1   |
| 0.8180      | 41.70      | 27.50      | 0.00         | 41.70     | 27.50     | 56.00    | 46.00    | -14.30    | -18.50    | L1   |
| 0.8961      | 40.50      | 28.70      | 0.00         | 40.50     | 28.70     | 56.00    | 46.00    | -15.50    | -17.30    | L1   |
| 0.4083      | 43.91      | 32.11      | 0.09         | 44.00     | 32.20     | 57.68    | 47.68    | -13.68    | -15.48    | L2   |
| 0.5250      | 43.30      | 31.20      | 0.00         | 43.30     | 31.20     | 56.00    | 46.00    | -12.70    | -14.80    | L2   |
| 0.8023      | 42.80      | 31.20      | 0.00         | 42.80     | 31.20     | 56.00    | 46.00    | -13.20    | -14.80    | L2   |
| 0.9586      | 39.80      | 28.20      | 0.00         | 39.80     | 28.20     | 56.00    | 46.00    | -16.20    | -17.80    | L2   |
| 1.2164      | 40.88      | 29.18      | 0.02         | 40.90     | 29.20     | 56.00    | 46.00    | -15.10    | -16.80    | L2   |
| 2.9977      | 37.70      | 28.50      | 0.10         | 37.80     | 28.60     | 56.00    | 46.00    | -18.20    | -17.40    | L2   |

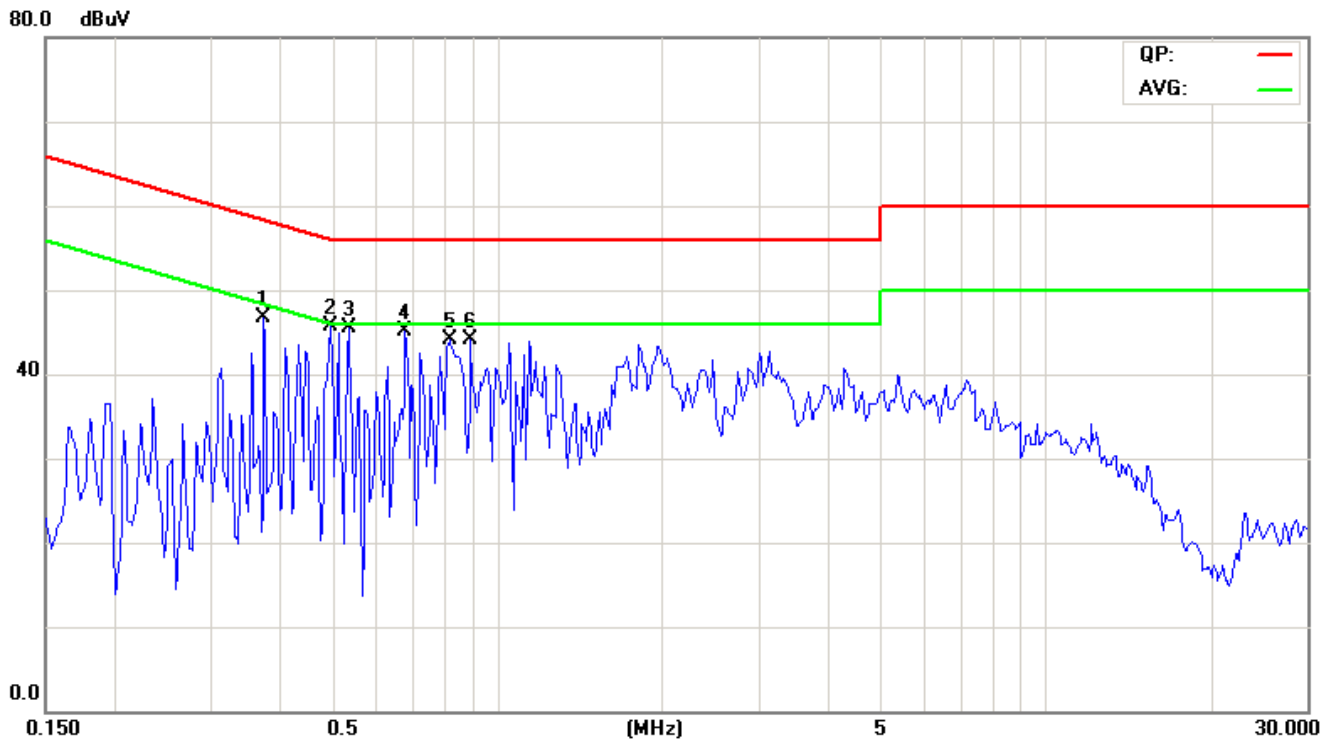
**Remark:**

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. "---" denotes the emission level was or more than 2dB below the Average limit
4. The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;
5. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



## Test Plots

### Conducted emissions (Line 1)



### Conducted emissions (Line 2)

