# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | Motorola Mobility, Inc. |
| EQUIPMENT | : | Mobile Phone |
| BRAND NAME | : | MOTOROLA |
| MODEL NAME | : | XT319 |
| GPPD Number | : | 3014 |
| FCC ID | : | IHDP56MC1 |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | Digital Spread Spectrum (DSS) |

**The product was received on May 31, 2011 and completely tested on Jun. 27, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.**

**Reviewed by:**

Jones Tsai

**Jones Tsai / Manager**

Testing Laboratory 1190

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR153127A | Rev. 01 | Initial issue of report | Jun. 30, 2011 |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | IC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|---|
| 3.1 | 15.247(a)(1) | A8.4(2) | Number of Channels | ≥ 15Chs | Pass | - |
| 3.2 | 15.247(a)(1) | A8.1(a) | 20dB Bandwidth | NA | Pass | - |
| 3.3 | 15.247(a)(1) | A8.1(b) | Channel Separation | ≥ 2/3 of 20dB BW | Pass | - |
| 3.4 | 15.247(a)(1) | A8.1(d) | Dwell Time of Each Channel | ≤ 0.4sec in 31.6sec period | Pass | - |
| 3.5 | 15.247(b)(1) | A8.1(b) | Peak Output Power | ≤ 125 mW | Pass | - |
| 3.6 | 15.247(d) | A8.5 | Frequency Band Edges | ≤ 20dBc | Pass | - |
| 3.7 | 15.247(d) | A8.5 | Spurious Emission | < 20 dBc | Pass | - |
| 3.8 | 15.207 | Gen 7.2.2 | AC Conducted Emission | 15.207(a) | Pass | Under limit 10.70 dB at 4.96 MHz |
| 3.9 | 15.247(d) | A8.5 | Transmitter Radiated Emission | 15.209(a) & 15.247(d) | Pass | Under limit 6.07 dB at 7323 MHz |
| 3.10 | 15.203 & 15.247(b) | A8.4 | Antenna Requirement | N/A | Pass | - |

# 1 General Description

## 1.1 Applicant

**Motorola Mobility, Inc.**
8F., No. 9, Songgao Rd., Taipei 110, Taiwan, R.O.C.

## 1.2 Manufacturer

**Chi Mei Communication Systems, Inc.**
No. 4, Mingsheng Street, Tucheng District, New Taipei City, 23678, Taiwan

## 1.3 Feature of Equipment Under Test

| Product Feature & Specification | |
|---|---|
| **Equipment** | Mobile Phone |
| **Brand Name** | MOTOROLA |
| **Model Name** | XT319 |
| **FCC ID** | IHDP56MC1 |
| **Tx/Rx Frequency Range** | 2400 MHz ~ 2483.5 MHz |
| **Number of Channels** | 79 |
| **Carrier Frequency of Each Channel** | 2402+n*1 MHz; n=0~78 |
| **Channel Spacing** | 1 MHz |
| **Maximum Output Power to Antenna** | Bluetooth (1Mbps) : 8.91 dBm (0.008 W)<br>Bluetooth EDR (2Mbps) : 7.53 dBm (0.006 W)<br>Bluetooth EDR (3Mbps) : 8.38 dBm (0.007 W) |
| **Antenna Type** | PIFA Antenna with gain -2.3 dBi |
| **HW Version** | V2.0 |
| **SW Version** | V4.21 |
| **Type of Modulation** | Bluetooth (1Mbps) : GFSK<br>Bluetooth EDR (2Mbps) : π /4-DQPSK<br>Bluetooth EDR (3Mbps) : 8-DPSK |
| **EUT Stage** | Identical Prototype |

**Remark:**

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Testing Site

| Test Site | SPORTON INTERNATIONAL INC. | | |
|---|---|---|---|
| Test Site Location | No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-3273456 / FAX: +886-3-3284978 | | |
| Test Site No. | Sporton Site No. | | FCC/IC Registration No. |
| | CO05-HY | 03CH05-HY | 722060/4086B-1 |

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003
- IC RSS-210 Issue 8

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

## 1.6 Ancillary Equipment List

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | System Simulator | R&S | CMU 200 | N/A | N/A | Unshielded, 1.8 m |
| 2. | WLAN AP | D-Link | DIR-628 | KA2DIR628A2 | N/A | Unshielded, 1.8 m |
| 3. | Bluetooth Base Station | R&S | CBT32 | N/A | N/A | Unshielded, 1.8 m |
| 4. | Notebook | DELL | Vostro 1510 | FCC DoC | N/A | AC I/P: Unshielded, 1.2 m<br>DC O/P: Shielded, 1.8 m |
| 5. | Bluetooth Earphone | Nokia | BH-102 | PYAHS-107W | N/A | N/A |

# 2 Test Configuration of Equipment Under Test

## 2.1 RF Output Power

Preliminary tests were performed in different data rate and recorded the RF output power in the following table:

| Channel | Frequency | Bluetooth RF Output Power | | |
|---|---|---|---|---|
| | | Data Rate / Modulation | | |
| | | GFSK | π /4-DQPSK | 8-DPSK |
| | | 1Mbps | 2Mbps | 3Mbps |
| Ch00 | 2402MHz | 8.77 dBm | 7.53 dBm | 8.29 dBm |
| Ch39 | 2441MHz | 8.67 dBm | 7.32 dBm | 8.12 dBm |
| Ch78 | 2480MHz | **8.91 dBm** | 7.48 dBm | 8.38 dBm |

**Remark:**

1. The data rate was set in 1Mbps for all the test items due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

## 2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

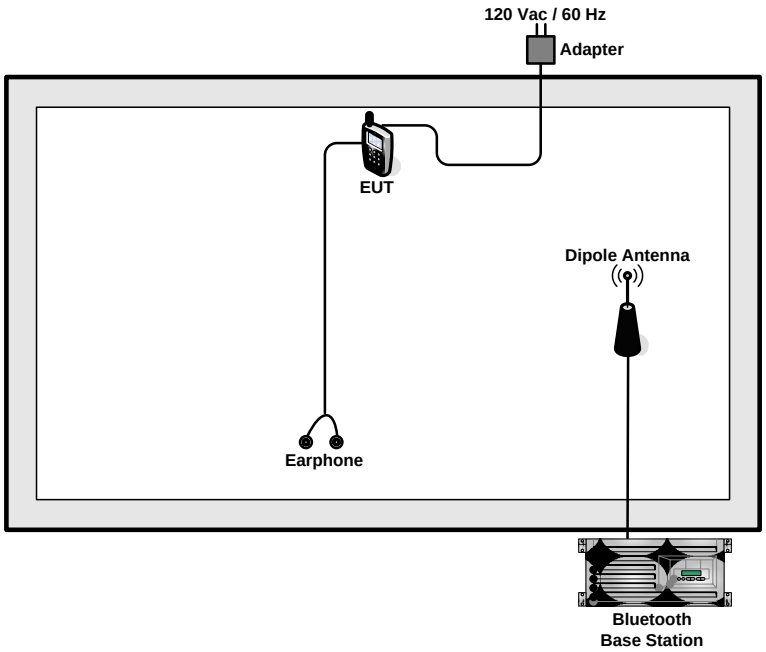
| Test Cases | | | |
|---|---|---|---|
| **Test Item** | **Data Rate / Modulation** | | |
| | **Bluetooth 1Mbps GFSK** | **Bluetooth EDR 2Mbps π /4-DQPSK** | **Bluetooth EDR 3Mbps 8-DPSK** |
| **Conducted TCs** | Mode 1: CH00_2402 MHz<br>Mode 2: CH39_2441 MHz<br>Mode 3: CH78_2480 MHz | Mode 4: CH00_2402 MHz<br>Mode 5: CH39_2441 MHz<br>Mode 6: CH78_2480 MHz | Mode 7: CH00_2402 MHz<br>Mode 8: CH39_2441 MHz<br>Mode 9: CH78_2480 MHz |
| **Radiated TCs** | Mode 1: CH00_2402 MHz<br>Mode 2: CH39_2441 MHz<br>Mode 3: CH78_2480 MHz | N/A | N/A |
| **AC Conducted Emission** | Mode 1 :GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + MPEG4 + USB Cable (Charging from Adapter) | | |

**Remark:**

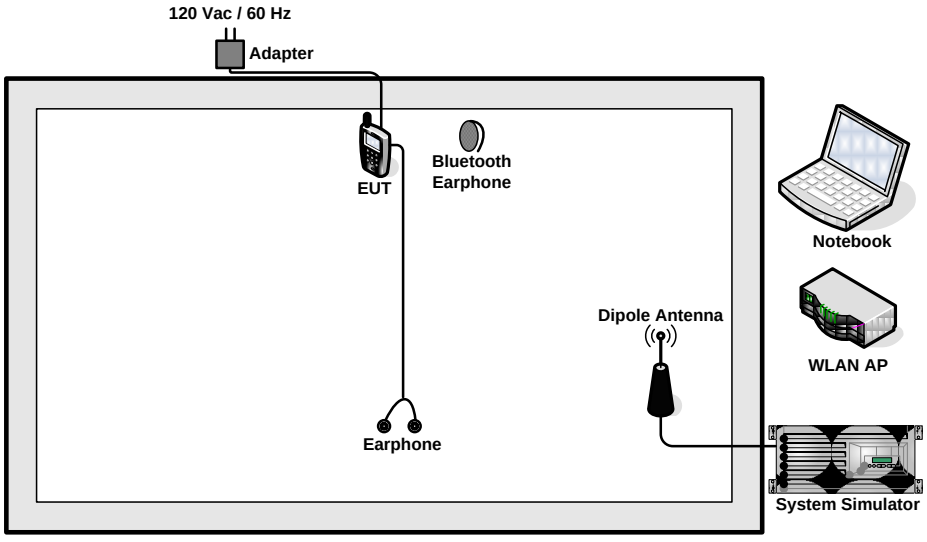
1. For radiated TCs, the data rate was set in 1Mbps due to the highest RF output power; only the data of these modes was reported.
2. TC stands for Test Configuration, and consists of adapter, battery, USB cable, and earphone.

## 2.3 Connection Diagram of Test System

**<Bluetooth Tx Mode>**




**<AC Conducted Emission Mode>**




## 2.4 RF Utility

For Bluetooth function, key in "＊＃＊＃767＃＊＃＊" on the EUT directly. Then, the EUT will get into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

# 3 Test Result

## 3.1 Number of Channel Measurement

### 3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

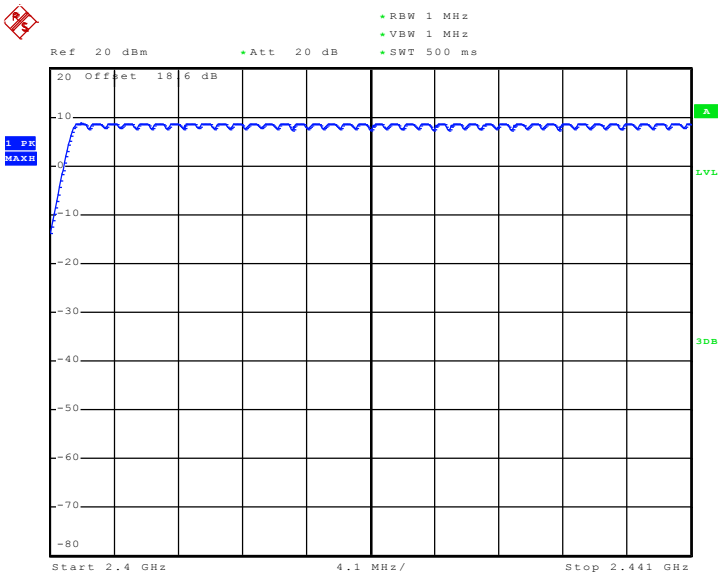
### 3.1.4 Test Setup


### 3.1.5 Test Result of Number of Hopping Frequency

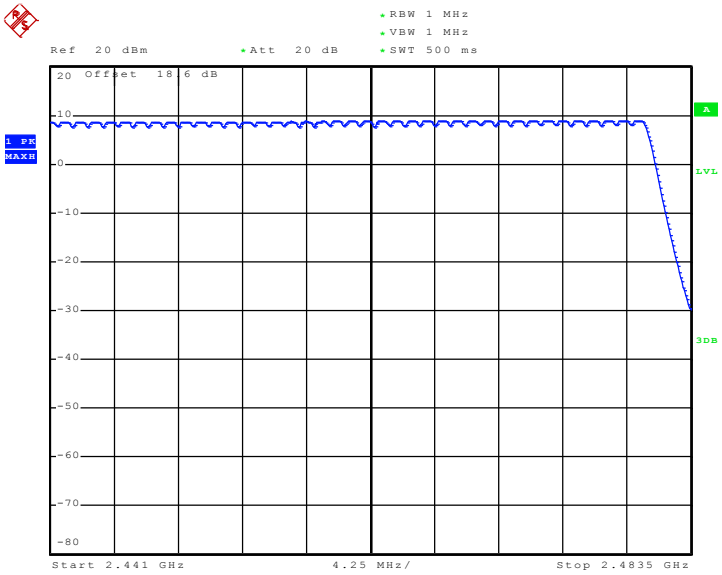
| Test Mode : | Mode 1~3 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Number of Hopping Channels (Channel) | Limits (Channel) | Pass/Fail |
|---|---|---|
| 79 | > 15 | Pass |

## Number of Hopping Channel Plot on Channel 00 - 78




Date: 21.JUN.2011 21:36:03

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## 3.2 20dB Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

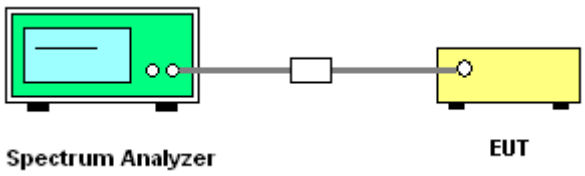
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
   RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

### 3.2.4 Test Setup

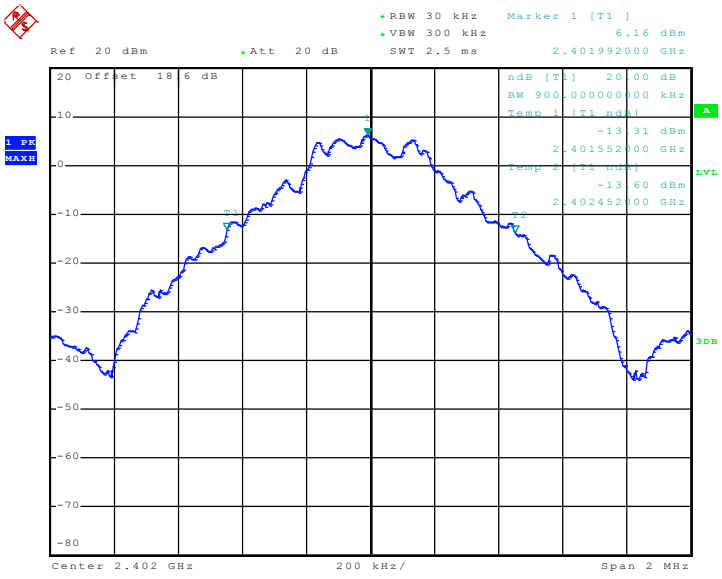


## 3.2.5 Test Result of 20dB Bandwidth

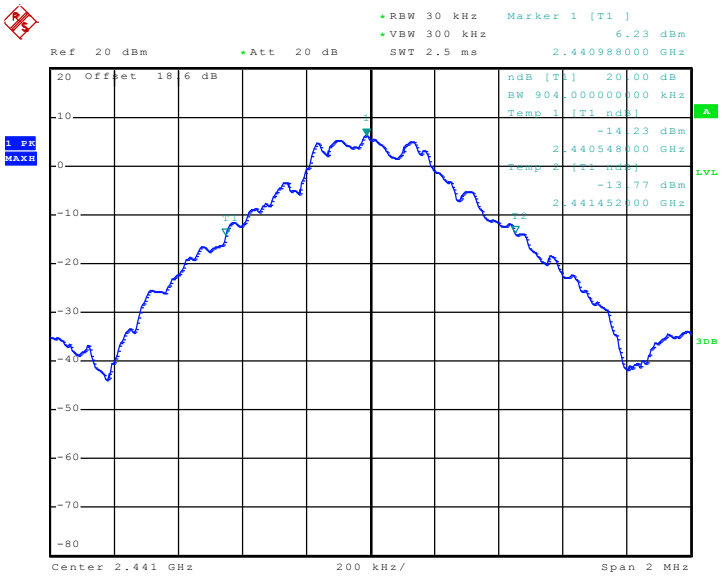
| Test Mode : | Mode 1, 2, 3 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---|---|---|
| 00 | 2402 | 0.900 |
| 39 | 2441 | 0.904 |
| 78 | 2480 | 0.904 |

**20 dB Bandwidth Plot on Channel 00**



## 20 dB Bandwidth Plot on Channel 39

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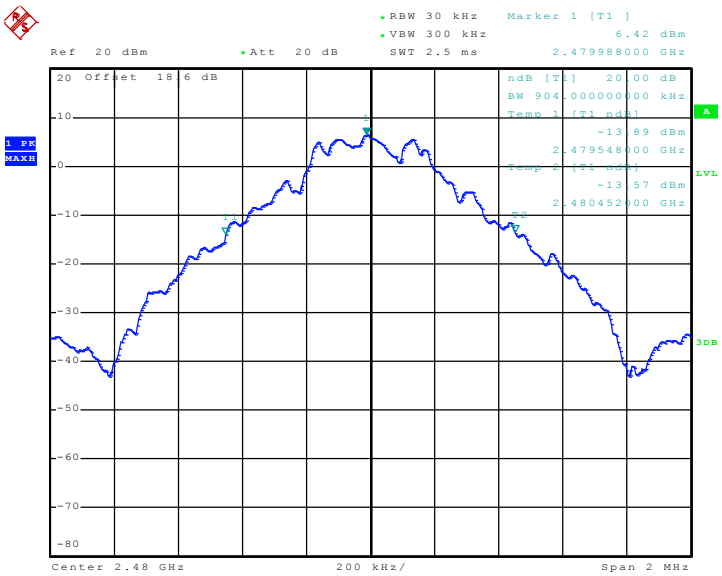
## 20 dB Bandwidth Plot on Channel 78

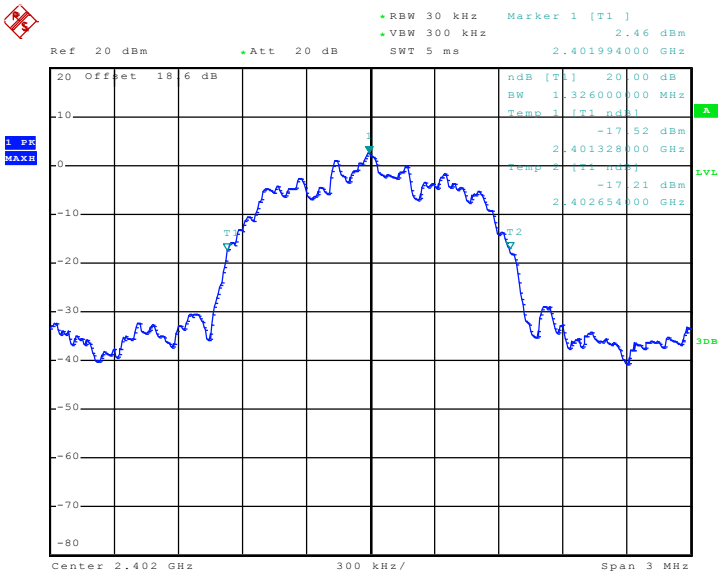



Date: 21.JUN.2011 21:05:04

| Test Mode : | Mode 4, 5, 6 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---|---|---|
| 00 | 2402 | 1.326 |
| 39 | 2441 | 1.326 |
| 78 | 2480 | 1.320 |

**20 dB Bandwidth Plot on Channel 00**

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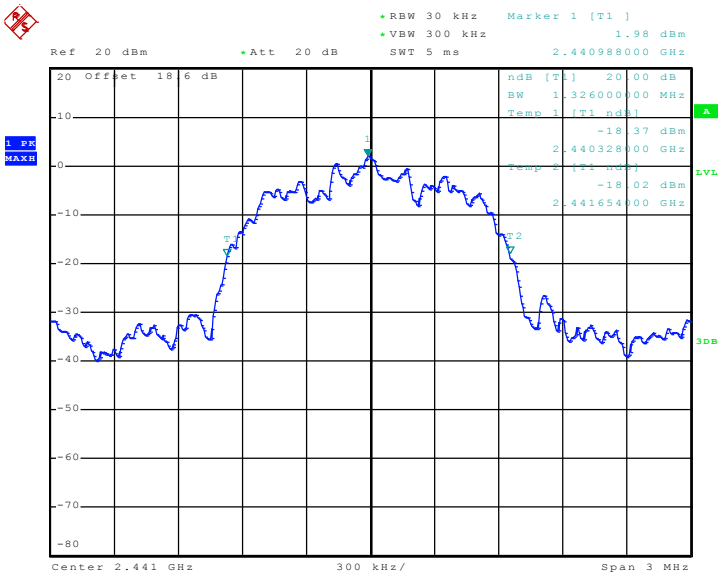
## 20 dB Bandwidth Plot on Channel 39

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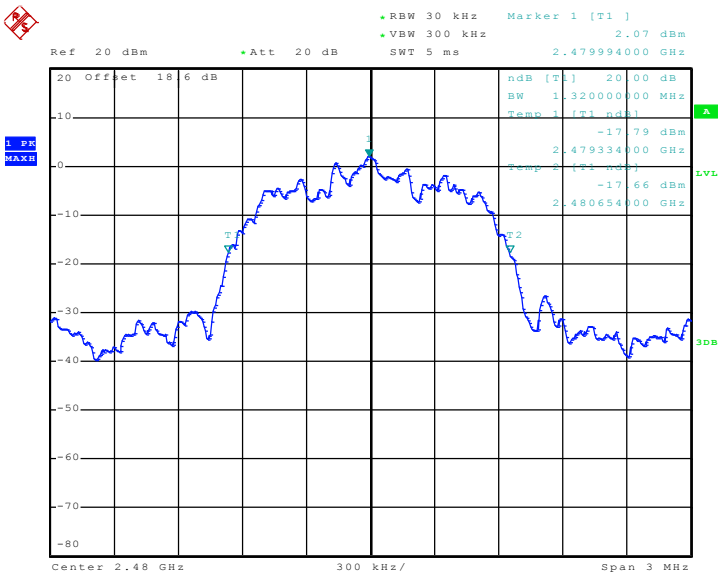
## 20 dB Bandwidth Plot on Channel 78

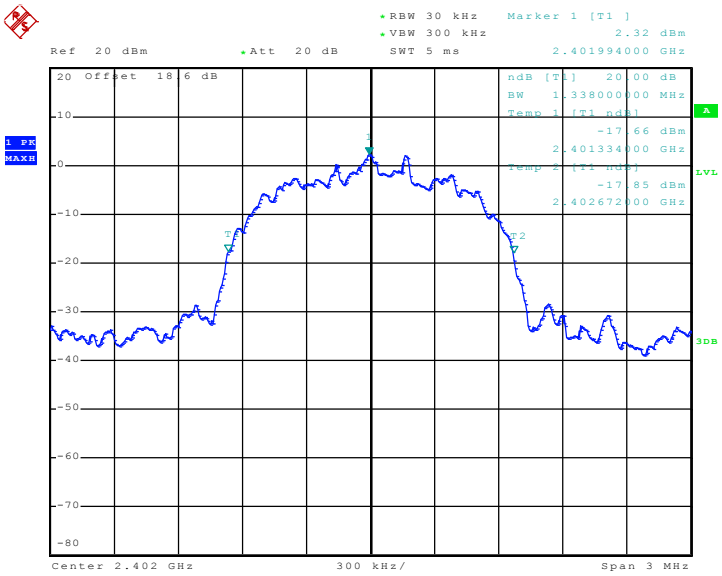



Date: 21.JUN.2011 21:05:59

| Test Mode : | Mode 7, 8, 9 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---|---|---|
| 00 | 2402 | 1.338 |
| 39 | 2441 | 1.332 |
| 78 | 2480 | 1.326 |

**20 dB Bandwidth Plot on Channel 00**

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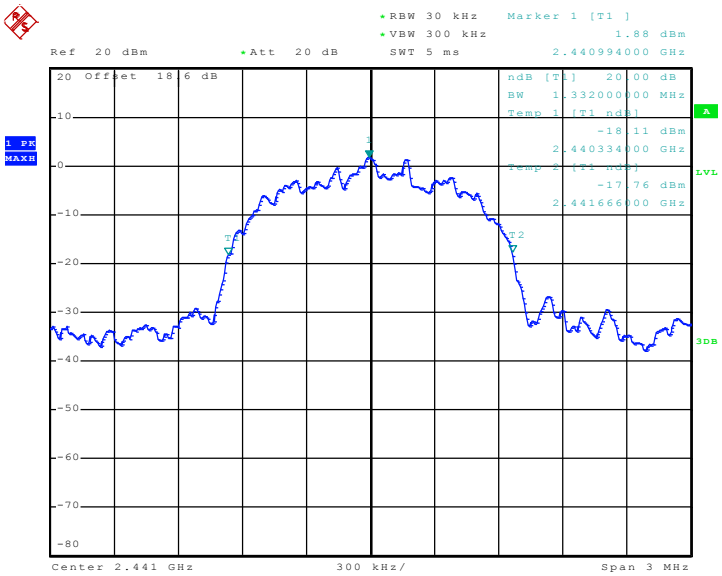
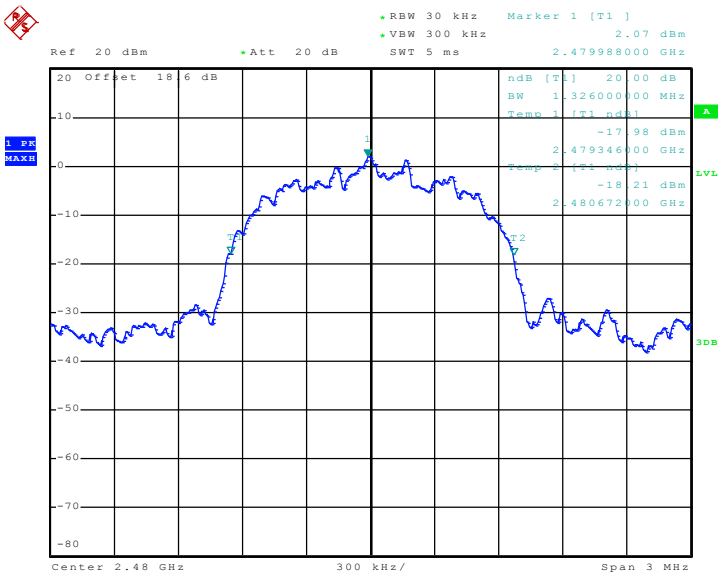
## 20 dB Bandwidth Plot on Channel 39




Date: 21.JUN.2011 21:06:41

## 20 dB Bandwidth Plot on Channel 78




Date: 21.JUN.2011 21:06:56

## 3.3 Hopping Channel Separation Measurement

### 3.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

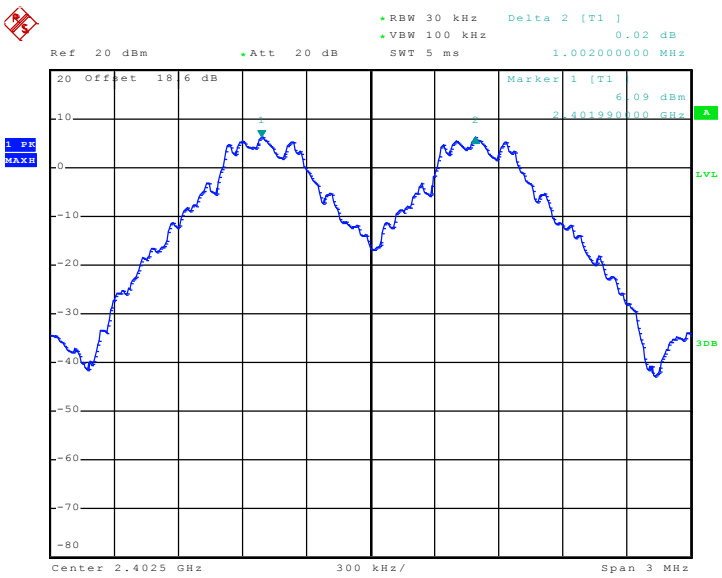
### 3.3.4 Test Setup

### 3.3.5 Test Result of Hopping Channel Separation

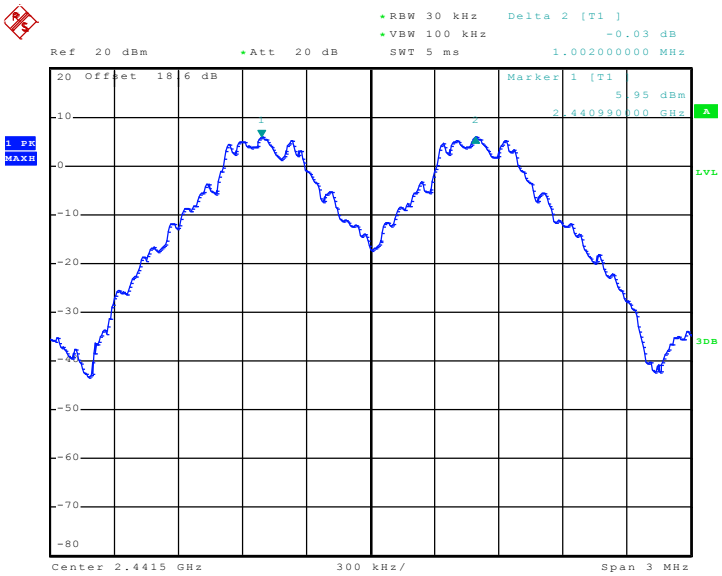
| Test Mode : | Mode 1, 2, 3 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Channel | Frequency (MHz) | Frequency Separation (MHz) | (2/3 of 20dB BW) Limits (MHz) | Pass/Fail |
|---|---|---|---|---|
| 00 | 2402 | 1.002 | 0.600 | Pass |
| 39 | 2441 | 1.002 | 0.603 | Pass |
| 78 | 2480 | 1.002 | 0.603 | Pass |

**Channel Separation Plot on Channel 00 - 01**



## Channel Separation Plot on Channel 39 - 40

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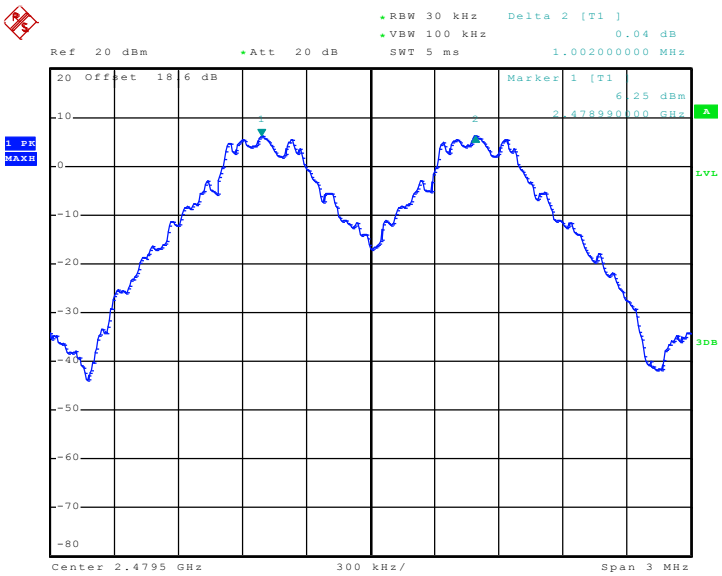
## Channel Separation Plot on Channel 77 - 78

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## 3.4 Dwell Time Measurement

### 3.4.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

### 3.4.4 Test Setup


### 3.4.5 Test Result of Dwell Time

| Test Mode : | Mode 2 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Package Mode | Average Hopping Channel | Package Transfer Time (usec) | Dwell Time (sec) | Limits (sec) | Pass/Fail |
|---|---|---|---|---|---|
| DH5 | 3.20 | 2978.00 | 0.30 | 3.20 | Pass |

**Remark:**

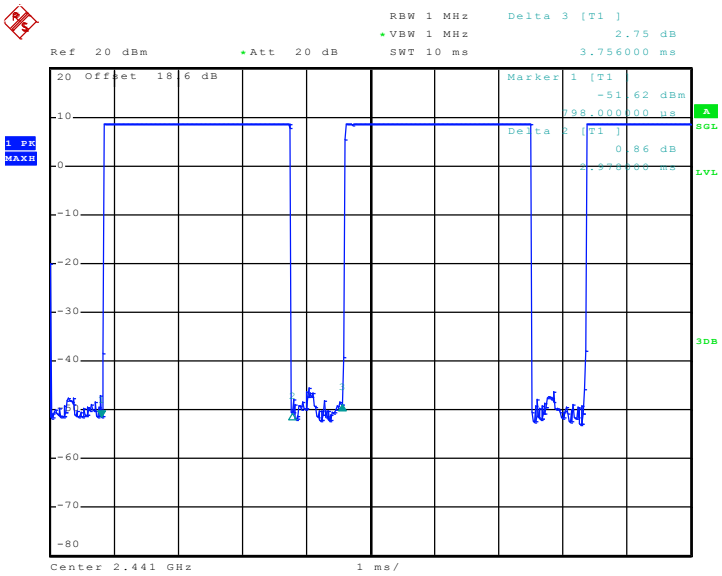
**1.** Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time

**2.** 79 channels come from the Hopping Channel number.

**3.** Average Hopping Channel = hops/sweep time

**4.** t: Package Transfer Time(us)

## DH5 Dwell Time (One Pulse) Plot on Channel 39

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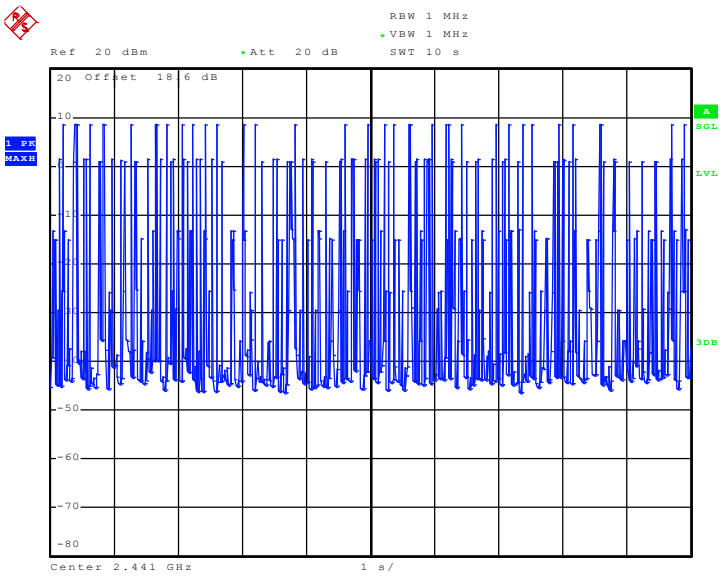
## DH5 Dwell Time (Count Pulses) Plot on Channel 39




Date: 21.JUN.2011 21:02:24

## 3.5 Peak Output Power Measurement

### 3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

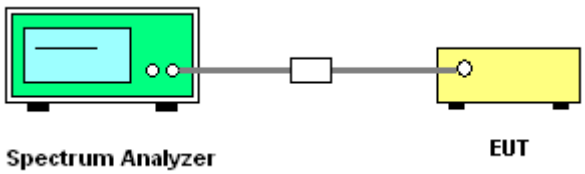
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

### 3.5.4 Test Setup

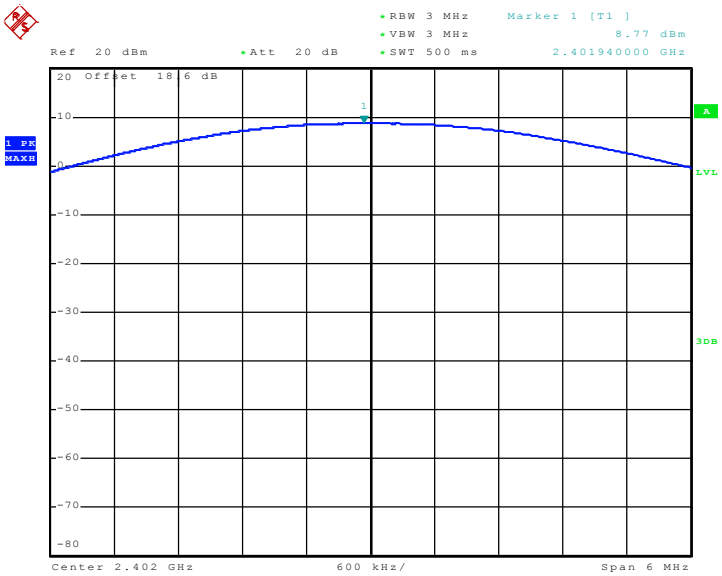



### 3.5.5 Test Result of Peak Output Power

| Test Mode : | Mode 1, 2, 3 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Engineer : | Hank Yu | Relative Humidity : | 47~49% |

| Channel | Frequency (MHz) | RF Power (dBm) | | |
|---|---|---|---|---|
| | | GFSK | Max. Limits (dBm) | Pass/Fail |
| | | 1 Mbps | | |
| 00 | 2402 | 8.77 | 20.97 | Pass |
| 39 | 2441 | 8.67 | 20.97 | Pass |
| 78 | 2480 | 8.91 | 20.97 | Pass |

## Peak Output Power Plot on Channel 00

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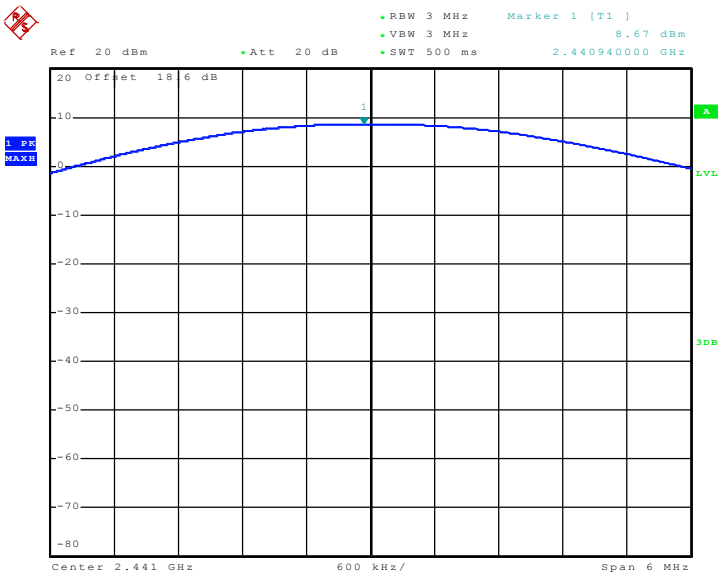
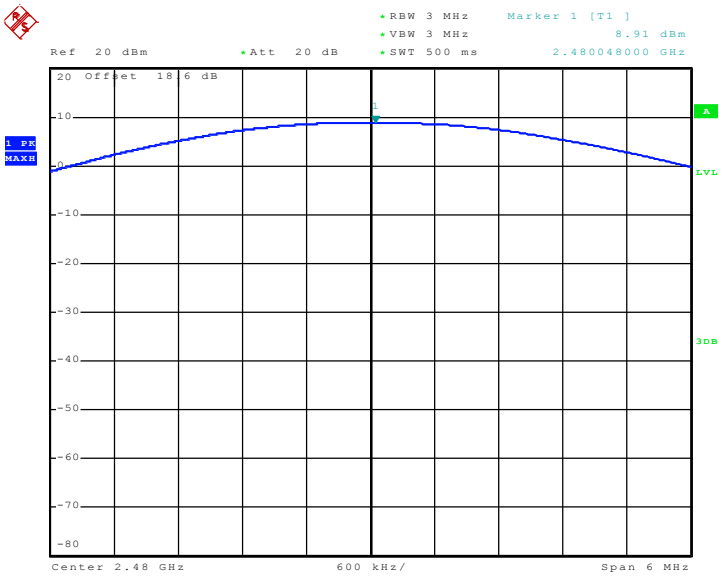
## Peak Output Power Plot on Channel 39




Date: 21.JUN.2011 20:30:34

## Peak Output Power Plot on Channel 78




Date: 21.JUN.2011 20:31:51

# 3.6 Band Edges Measurement

## 3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

## 3.6.2 Measuring Instruments

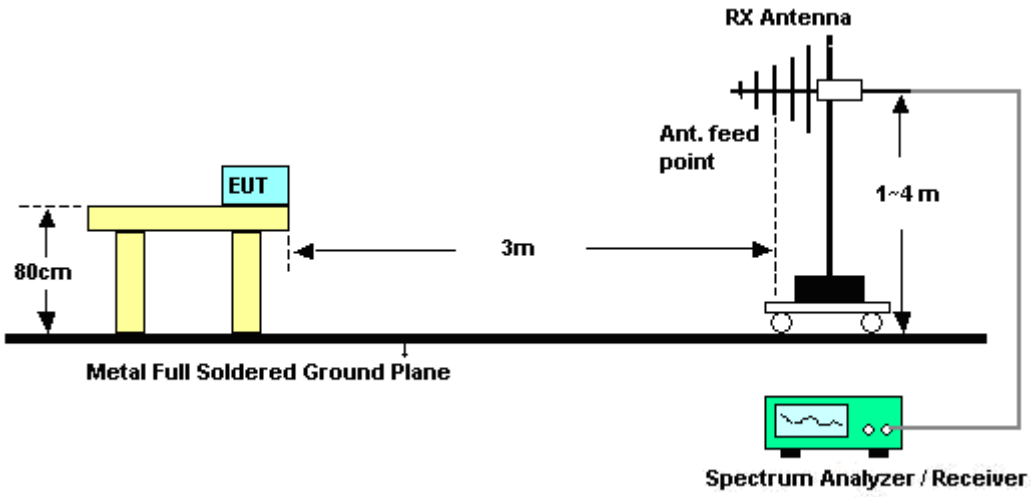
See list of measuring instruments of this test report.

## 3.6.3 Test Procedures

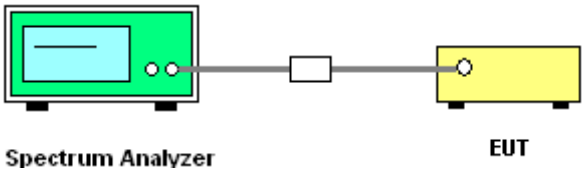
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) ≥ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

### 3.6.4 Test Setup

**<Radiated Band Edges>**




**<Conducted Band Edges>**



### 3.6.5 Test Result of Radiated Band Edges

| | | | |
|---|---|---|---|
| **Test Mode :** | Mode 1 | **Temperature :** | 23~24°C |
| **Test Channel :** | 00 | **Relative Humidity :** | 46~47% |
| | | **Test Engineer :** | Kai Wang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBuV/m )** | **Over Limit ( dB )** | **Limit Line ( dBuV/m )** | **Read Level (dBuV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2382.39 | 64.58 | -9.42 | 74 | 62.17 | 31.68 | 4.58 | 33.85 | 144 | 35 | Peak |
| 2382.39 | 42.77 | -11.23 | 54 | 40.36 | 31.68 | 4.58 | 33.85 | 144 | 35 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBuV/m )** | **Over Limit ( dB )** | **Limit Line ( dBuV/m )** | **Read Level (dBuV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2377.07 | 59.61 | -14.39 | 74 | 57.2 | 31.68 | 4.57 | 33.84 | 100 | 344 | Peak |
| 2377.07 | 41.86 | -12.14 | 54 | 39.45 | 31.68 | 4.57 | 33.84 | 100 | 344 | Average |

| | | | |
|---|---|---|---|
| **Test Mode :** | Mode 3 | **Temperature :** | 23~24°C |
| **Test Channel :** | 78 | **Relative Humidity :** | 46~47% |
| | | **Test Engineer :** | Kai Wang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBuV/m )** | **Over Limit ( dB )** | **Limit Line ( dBuV/m )** | **Read Level (dBuV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2483.5 | 56.35 | -17.65 | 74 | 53.83 | 31.78 | 4.64 | 33.9 | 140 | 25 | Peak |
| 2483.5 | 41.15 | -12.85 | 54 | 38.63 | 31.78 | 4.64 | 33.9 | 140 | 25 | Average |

**Summary results of marker-delta method:**

| Test mode | Maximum field strength of the fundamental emission (dBµV/m) | Delta Result (dB) | Average Result (dBµV/m) | Average Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|---|
| Single Carrier Mode | 95.26 | 54.88 | 40.38 | 54 | -13.62 | Pass |
| Hopping Mode | 95.26 | 54.11 | 41.15 | 54 | -12.85 | Pass |

**Note :** Average result = Maximum field strength – Delta result

**Summary results of marker-delta method:**

| Test mode | Maximum field strength of the fundamental emission (dBµV/m) | Delta Result (dB) | Peak Result (dBuV/m) | Peak Limit (dBuV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|---|
| Single Carrier Mode | 110.46 | 54.88 | 55.58 | 74 | -18.42 | Pass |
| Hopping Mode | 110.46 | 54.11 | 56.35 | 74 | -17.65 | Pass |

**Note :** Peak result = Maximum field strength – Delta result

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.5 | 53.02 | -20.98 | 74 | 50.5 | 31.78 | 4.64 | 33.9 | 153 | 349 | Peak |
| 2483.5 | 39.3 | -14.7 | 54 | 36.78 | 31.78 | 4.64 | 33.9 | 153 | 349 | Average |

**Summary results of marker-delta method:**

| Test mode | Maximum field strength of the fundamental emission (dBµV/m) | Delta Result (dB) | Average Result (dBµV/m) | Average Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|---|
| Single Carrier Mode | 91.81 | 53.31 | 38.50 | 54 | -15.50 | Pass |
| Hopping Mode | 91.81 | 52.51 | 39.30 | 54 | -14.70 | Pass |

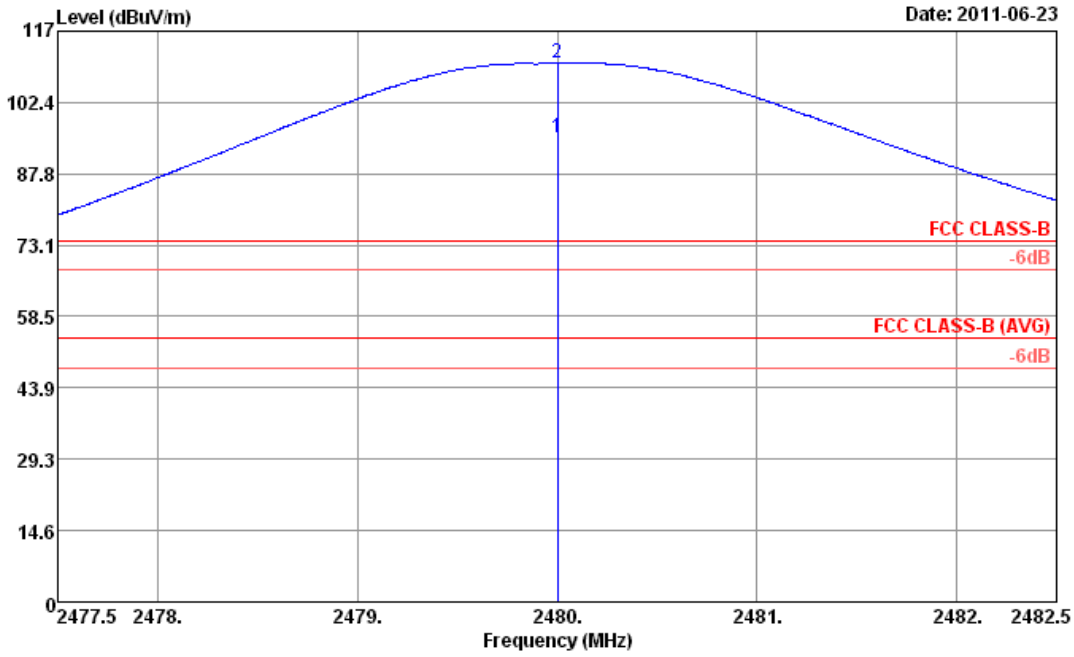
**Note :** Average result = Maximum field strength – Delta result

**Summary results of marker-delta method:**

| Test mode | Maximum field strength of the fundamental emission (dBµV/m) | Delta Result (dB) | Peak Result (dBuV/m) | Peak Limit (dBuV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|---|
| Single Carrier Mode | 105.53 | 53.31 | 52.22 | 74 | -21.78 | Pass |
| Hopping Mode | 105.53 | 52.51 | 53.02 | 74 | -20.98 | Pass |

**Note :** Peak result = Maximum field strength – Delta result

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Horizontal |

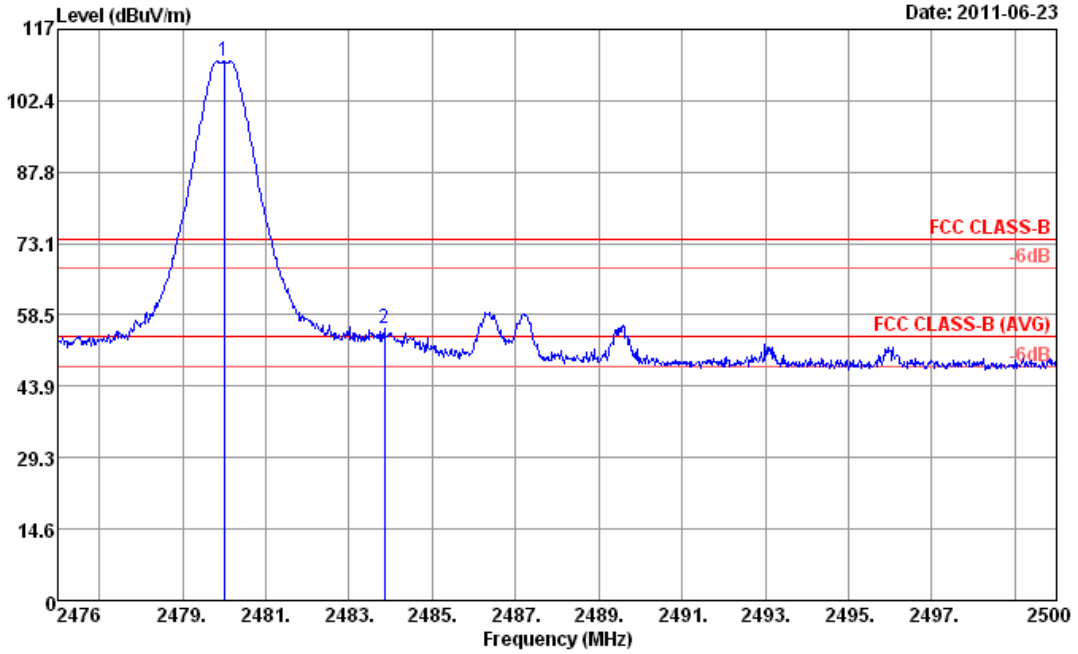



Site : 03CH05-HY
Condition : FCC CLASS-B 3m HF_ANT_100824 HORIZONTAL
Project : FR 153127
Mode : Mode 3

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 * | 2480.00 | 95.26 | 41.26 | 54.00 | 92.74 | 31.78 | 4.64 | 33.90 | 140 | 25 | Average |
| 2 * | 2480.00 | 110.46 | 36.46 | 74.00 | 107.94 | 31.78 | 4.64 | 33.90 | 140 | 25 | Peak |

* Maximum field strength of the fundamental emission

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Horizontal |

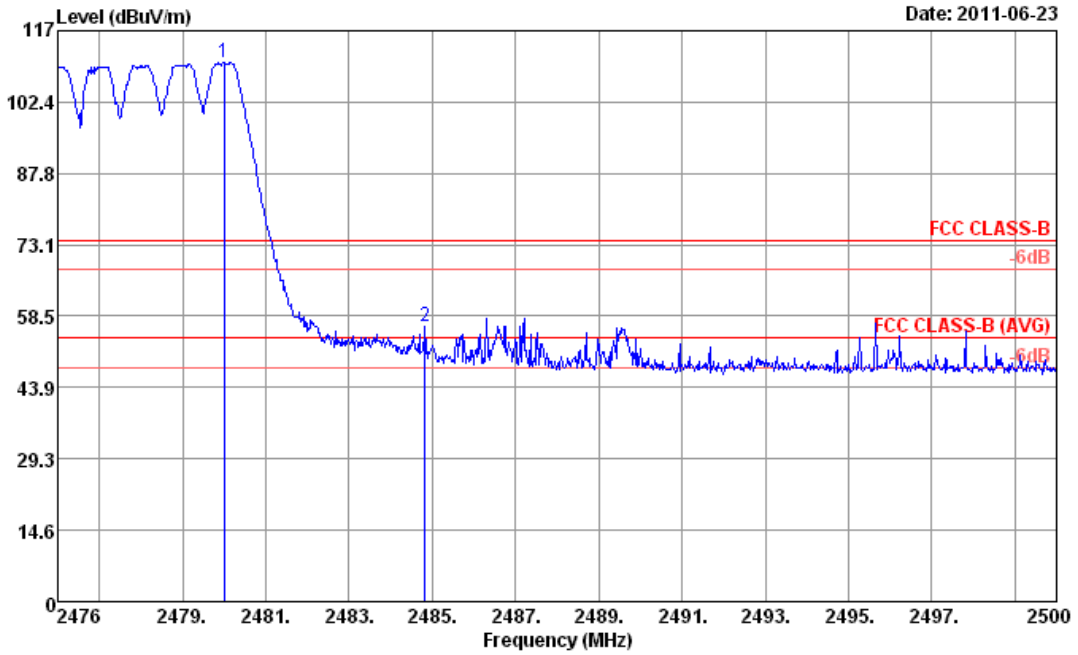



Site : 03CH05-HY
Condition : FCC CLASS-B 3m HF_ANT_100824 HORIZONTAL
Project : FR 153127
Mode : Mode 3

| | | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | * | 2480.00 | 110.45 | 36.45 | 74.00 | 107.93 | 31.78 | 4.64 | 33.90 | 140 | 25 | Peak |
| 2 | | 2483.85 | 55.57 | -18.43 | 74.00 | 53.05 | 31.78 | 4.64 | 33.90 | 140 | 25 | Peak |

* Marker-Delta Method (RBW/VBW=100KHz): 54.88 dB , single carrier Mode

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Horizontal |

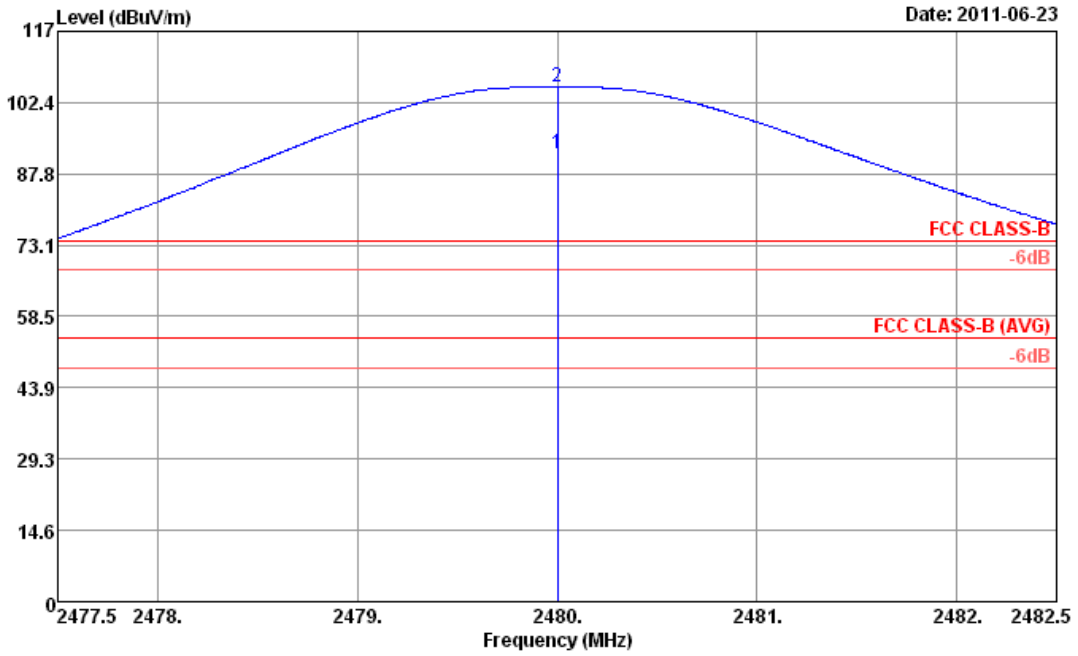



Site : 03CH05-HY
Condition : FCC CLASS-B 3m HF_ANT_100824 HORIZONTAL
Project : FR 153127
Mode : Mode 3

| | | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | * | 2480.00 | 110.40 | 36.40 | 74.00 | 107.88 | 31.78 | 4.64 | 33.90 | 140 | 25 | Peak |
| 2 | | 2484.83 | 56.29 | -17.71 | 74.00 | 53.77 | 31.78 | 4.64 | 33.90 | 140 | 25 | Peak |

* Marker-Delta Method (RBW/VBW=100KHz): 54.11 dB , Hopping Mode

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Vertical |

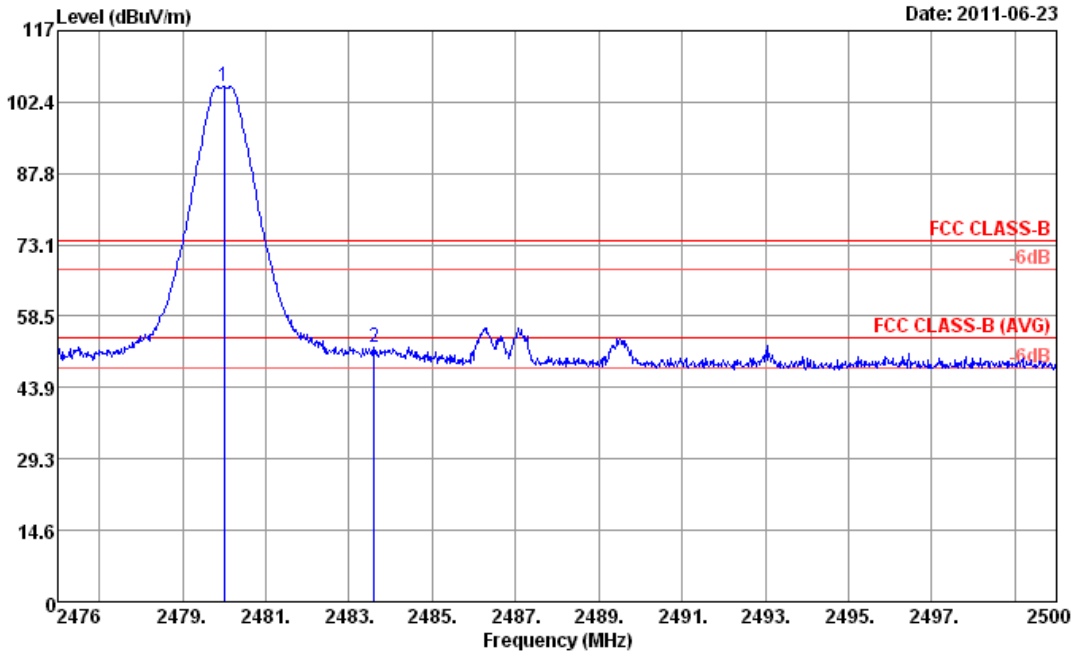



Site : 03CH05-HY
Condition : FCC CLASS-B 3m HF_ANT_100824 VERTICAL
Project : FR 153127
Mode : Mode 3

| | | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | * | 2480.00 | 91.81 | 37.81 | 54.00 | 89.29 | 31.78 | 4.64 | 33.90 | 153 | 349 | Average |
| 2 | * | 2480.00 | 105.53 | 31.53 | 74.00 | 103.01 | 31.78 | 4.64 | 33.90 | 153 | 349 | Peak |

* Maximum field strength of the fundamental emission

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Vertical |

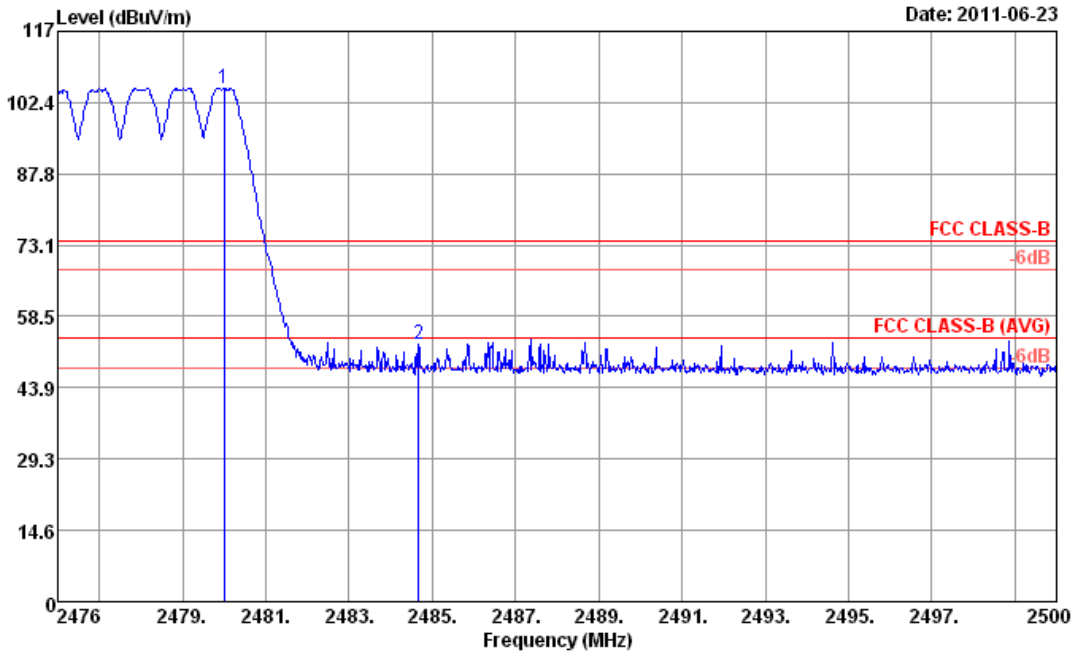



Site : 03CH05-HY
Condition : FCC CLASS-B 3m HF_ANT_100824 VERTICAL
Project : FR 153127
Mode : Mode 3

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 * | 2480.00 | 105.48 | 31.48 | 74.00 | 102.96 | 31.78 | 4.64 | 33.90 | 153 | 349 | Peak |
| 2 | 2483.61 | 52.17 | -21.83 | 74.00 | 49.65 | 31.78 | 4.64 | 33.90 | 153 | 349 | Peak |

* Marker-Delta Method (RBW/VBW=100KHz): 53.31 dB , single carrier Mode

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Vertical |




Site : 03CH05-HY
Condition : FCC CLASS-B 3m HF_ANT_100824 VERTICAL
Project : FR 153127
Mode : Mode 3

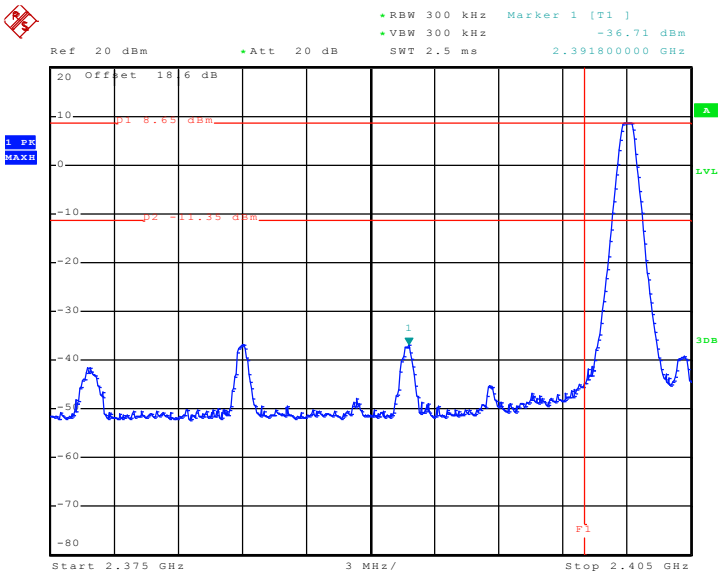
| | | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | * | 2480.00 | 105.43 | 31.43 | 74.00 | 102.91 | 31.78 | 4.64 | 33.90 | 153 | 349 | Peak |
| 2 | | 2484.66 | 52.92 | -21.08 | 74.00 | 50.40 | 31.78 | 4.64 | 33.90 | 153 | 349 | Peak |

* Marker-Delta Method (RBW/VBW=100KHz): 52.51 dB , Hopping Mode

## 3.6.6 Test Result of Conducted Band Edges

| Test Mode : | Mode 1 and 3 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Channel : | 00 and 78 | Relative Humidity : | 47~49% |
| | | Test Engineer : | Hank Yu |

**Low Band Edge Plot on Channel 00**

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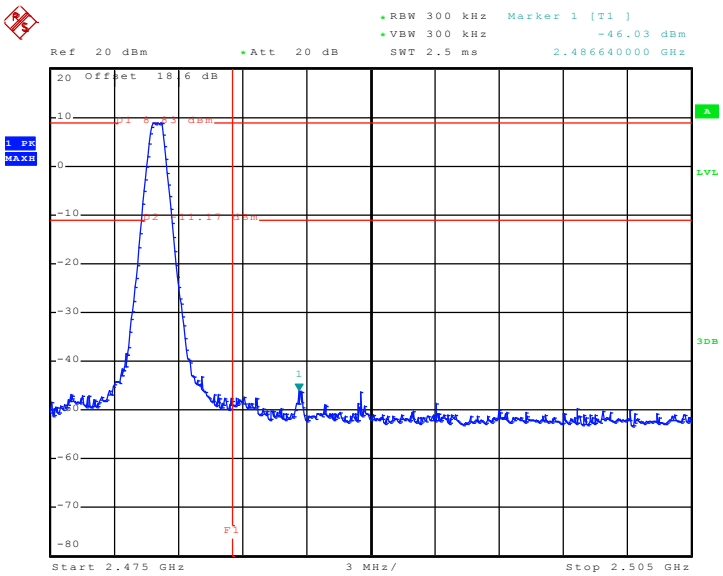
**High Band Edge Plot on Channel 78**




Date: 21.JUN.2011 21:30:08

# 3.7 Spurious Emission Measurement

## 3.7.1 Limit of Spurious Emission Measurement

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

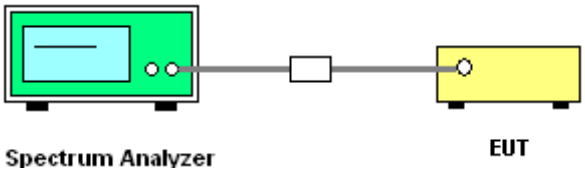
## 3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.7.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) ≥ RBW, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

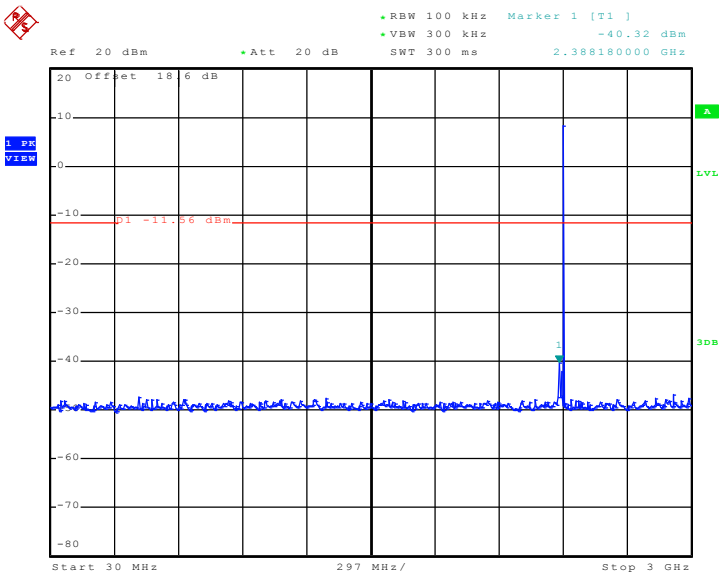
## 3.7.4 Test Setup



### 3.7.5 Test Result

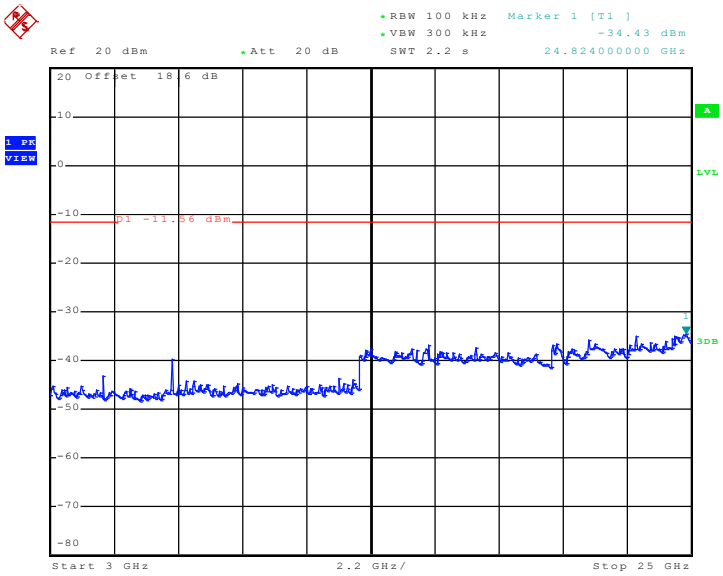
| Test Mode : | Mode 1 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Channel : | 00 | Relative Humidity : | 47~49% |
| | | Test Engineer : | Hank Yu |

**Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**




Date: 21.JUN.2011 21:16:53

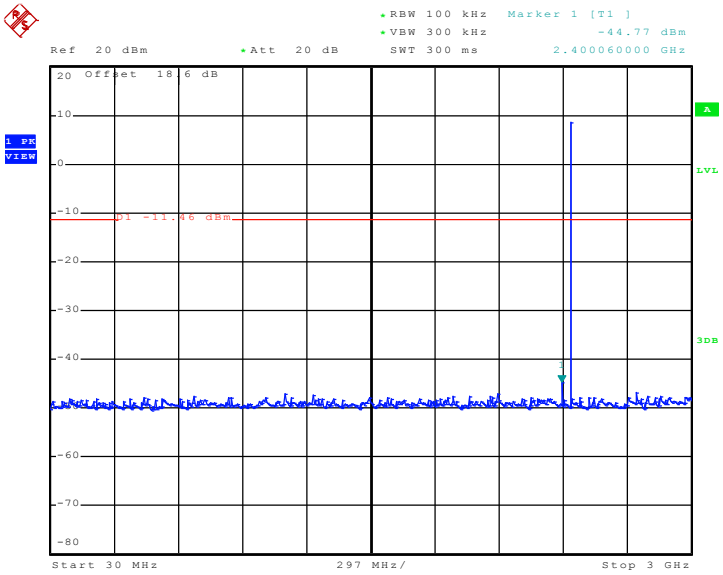
**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**




Date: 21.JUN.2011 21:17:16

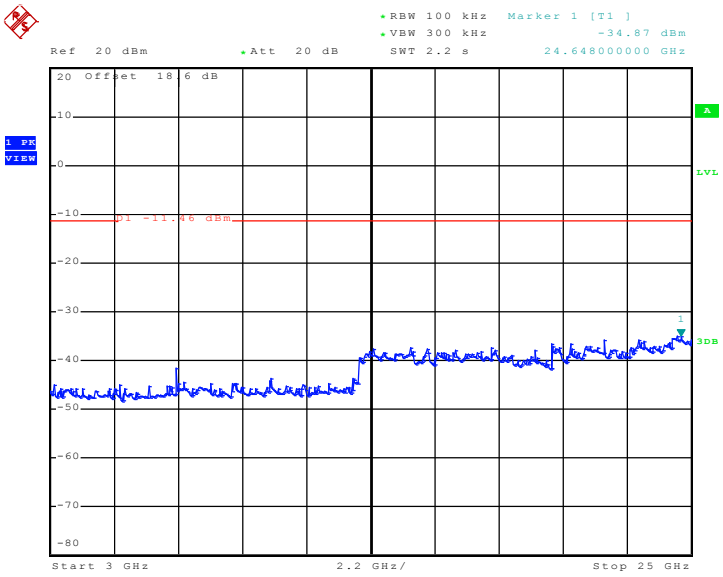
| Test Mode : | Mode 2 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Channel : | 39 | Relative Humidity : | 47~49% |
| | | Test Engineer : | Hank Yu |

**Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**




Date: 21.JUN.2011 21:17:47

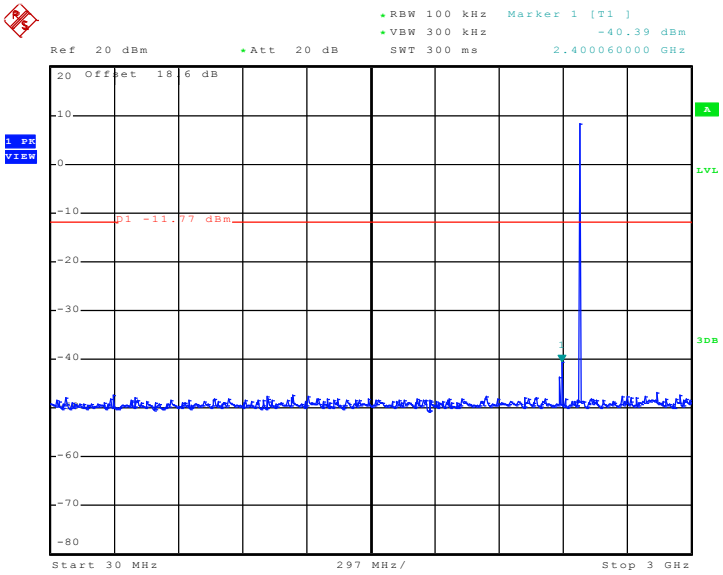
**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**




Date: 21.JUN.2011 21:18:10

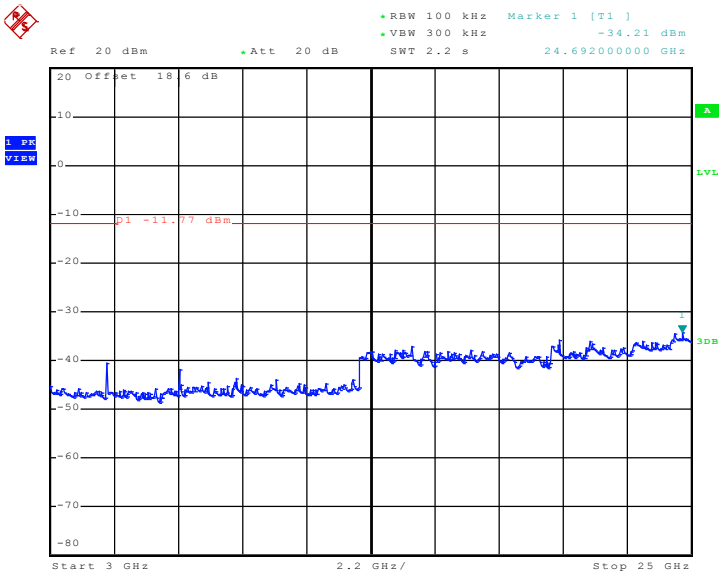
| Test Mode : | Mode 3 | Temperature : | 23~25℃ |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 47~49% |
| | | Test Engineer : | Hank Yu |

**Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**




Date: 21.JUN.2011 21:18:42

**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**




Date: 21.JUN.2011 21:19:05

# 3.8 AC Conducted Emission Measurement

## 3.8.1 Limit of AC Conducted Emission

For equipment that 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 the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

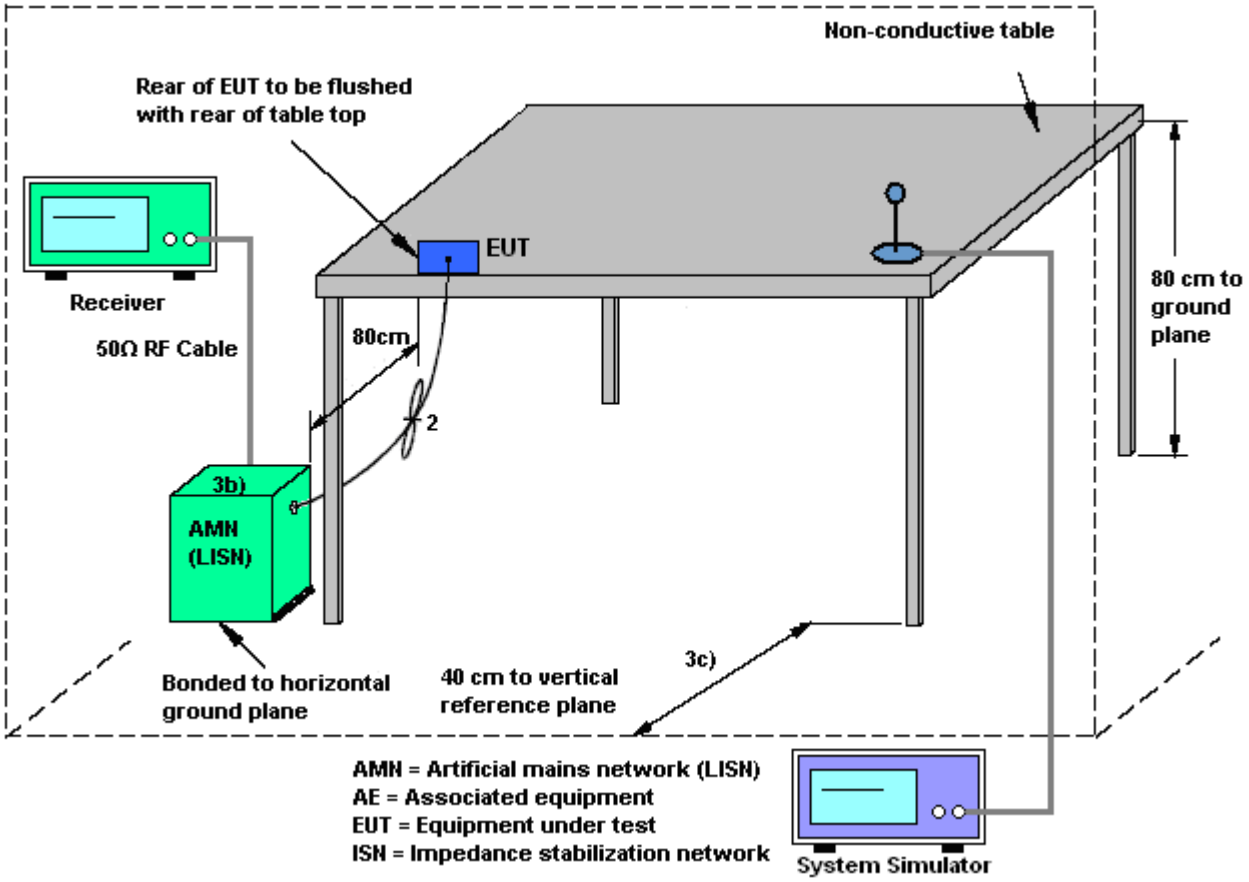
## 3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.8.3 Test Procedures

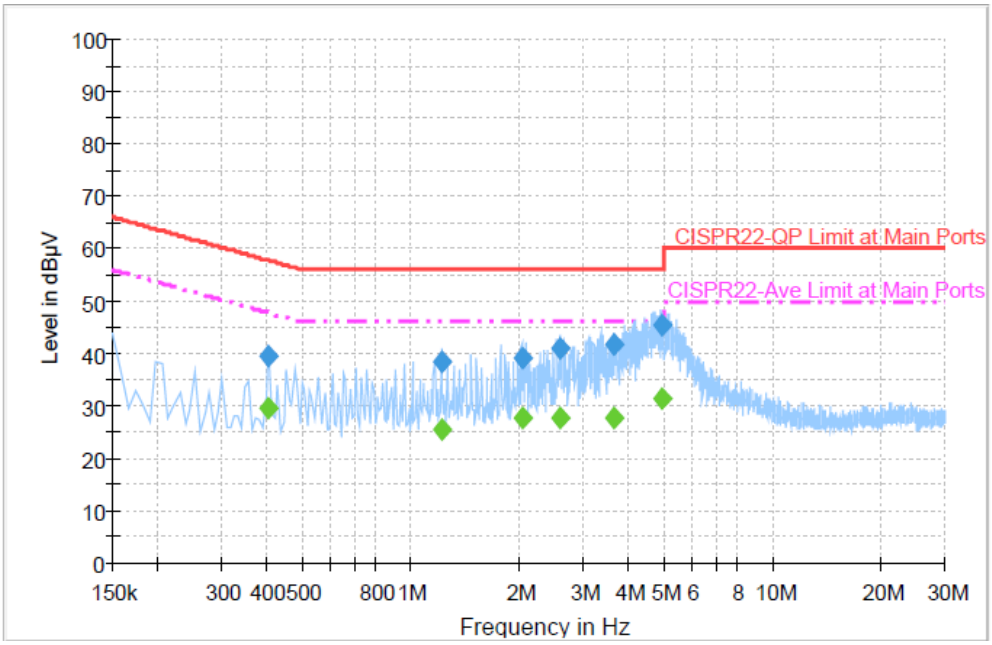
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 3.8.4 Test Setup



### 3.8.5 Test Result of AC Conducted Emission

| | | | |
|---|---|---|---|
| **Test Mode :** | Mode 1 | **Temperature :** | 20~22℃ |
| **Test Engineer :** | Novic Chiang | **Relative Humidity :** | 40~42% |
| **Test Voltage :** | 120Vac / 60Hz | **Phase :** | Line |
| **Function Type :** | GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + MPEG4 + USB Cable (Charging from Adapter) | | |
| **Remark :** | All emissions not reported here are more than 10 dB below the prescribed limit. | | |



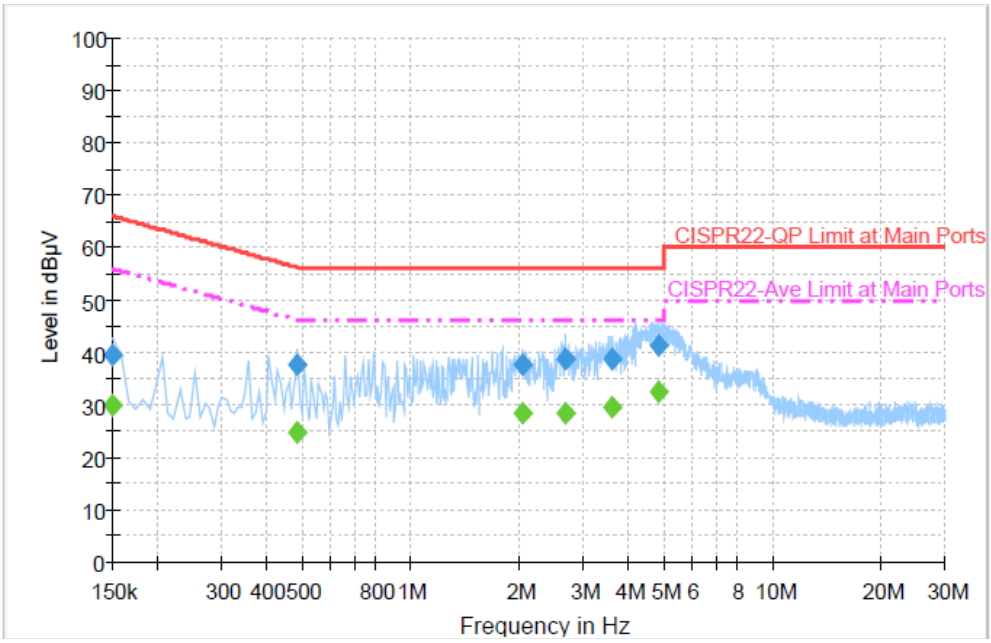

**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.406000 | 39.6 | Off | L1 | 19.4 | 18.1 | 57.7 |
| 1.214000 | 38.4 | Off | L1 | 19.4 | 17.6 | 56.0 |
| 2.030000 | 39.1 | Off | L1 | 19.4 | 16.9 | 56.0 |
| 2.582000 | 41.0 | Off | L1 | 19.5 | 15.0 | 56.0 |
| 3.654000 | 41.6 | Off | L1 | 19.5 | 14.4 | 56.0 |
| 4.966000 | 45.3 | Off | L1 | 19.6 | 10.7 | 56.0 |

**Final Result 2**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.406000 | 29.6 | Off | L1 | 19.4 | 18.1 | 47.7 |
| 1.214000 | 25.6 | Off | L1 | 19.4 | 20.4 | 46.0 |
| 2.030000 | 27.7 | Off | L1 | 19.4 | 18.3 | 46.0 |
| 2.582000 | 27.8 | Off | L1 | 19.5 | 18.2 | 46.0 |
| 3.654000 | 27.7 | Off | L1 | 19.5 | 18.3 | 46.0 |
| 4.966000 | 31.2 | Off | L1 | 19.6 | 14.8 | 46.0 |

| | | | |
|---|---|---|---|
| **Test Mode :** | Mode 1 | **Temperature :** | 20~22℃ |
| **Test Engineer :** | Novic Chiang | **Relative Humidity :** | 40~42% |
| **Test Voltage :** | 120Vac / 60Hz | **Phase :** | Neutral |
| **Function Type :** | GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + MPEG4 + USB Cable (Charging from Adapter) | | |
| **Remark :** | All emissions not reported here are more than 10 dB below the prescribed limit. | | |




**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 39.5 | Off | N | 19.4 | 26.5 | 66.0 |
| 0.486000 | 37.7 | Off | N | 19.4 | 18.5 | 56.2 |
| 2.046000 | 37.8 | Off | N | 19.5 | 18.2 | 56.0 |
| 2.678000 | 38.8 | Off | N | 19.5 | 17.2 | 56.0 |
| 3.622000 | 38.8 | Off | N | 19.5 | 17.2 | 56.0 |
| 4.846000 | 41.2 | Off | N | 19.6 | 14.8 | 56.0 |

**Final Result 2**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 29.7 | Off | N | 19.4 | 26.3 | 56.0 |
| 0.486000 | 24.8 | Off | N | 19.4 | 21.4 | 46.2 |
| 2.046000 | 28.3 | Off | N | 19.5 | 17.7 | 46.0 |
| 2.678000 | 28.3 | Off | N | 19.5 | 17.7 | 46.0 |
| 3.622000 | 29.6 | Off | N | 19.5 | 16.4 | 46.0 |
| 4.846000 | 32.6 | Off | N | 19.6 | 13.4 | 46.0 |

## 3.9 Radiated Emission Measurement

### 3.9.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

| Frequency (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 |

### 3.9.2 Measuring Instruments

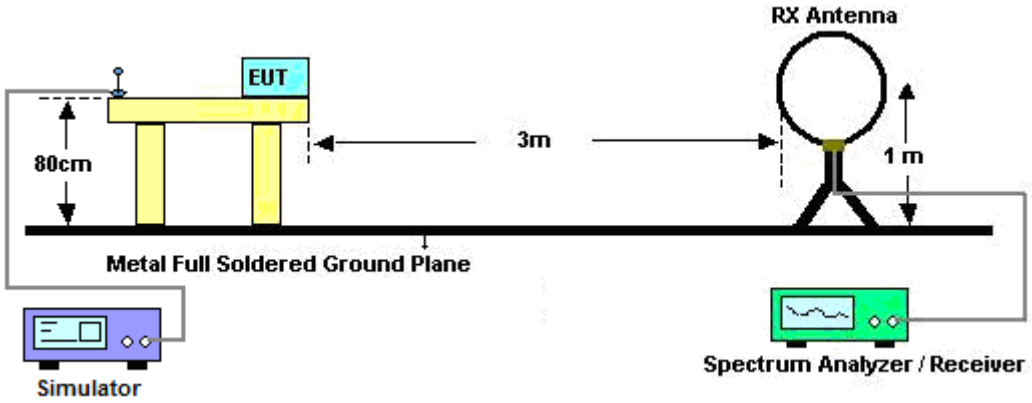
See list of measuring instruments of this test report.

### 3.9.3 Test Procedures

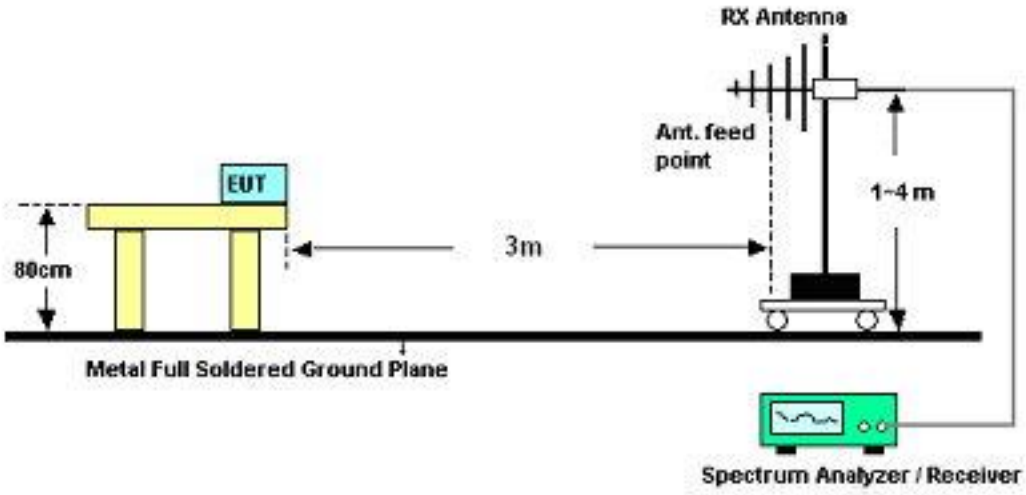
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
   (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
   (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.
4. Measured average value for the peak value is greater than 54 dBuv/m

### 3.9.4 Test Setup

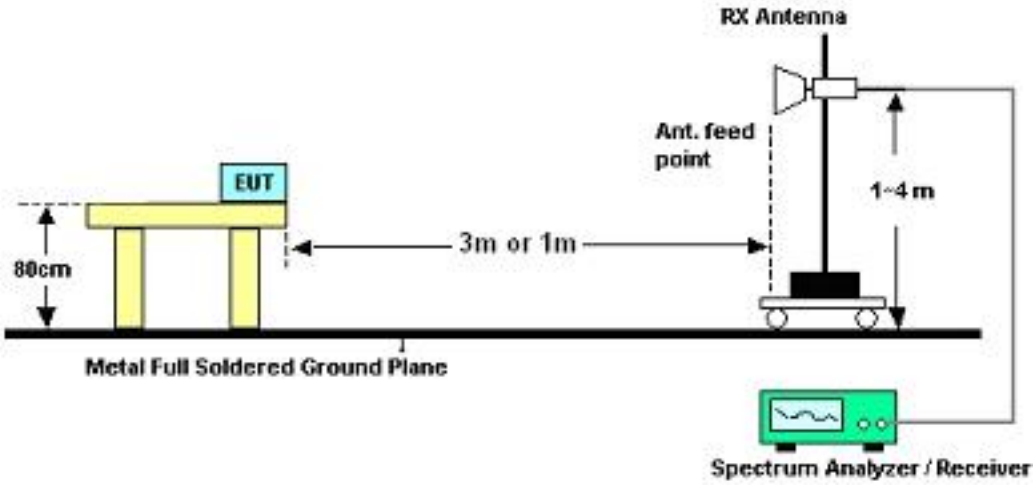
**For radiated emissions below 30MHz**




**For radiated emissions from 30MHz to 1GHz**



**For radiated emissions above 1GHz**




## 3.9.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

| Test Engineer : | Kai Wang | Temperature : | 23~24°C |
|---|---|---|---|
| | | Relative Humidity : | 46~47% |

| Frequency (MHz) | Level (dBuV) | Over Limit (dB) | Limit Line (dBuV) | Remark |
|---|---|---|---|---|
| - | - | - | - | See Note |

**Note:**

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

### 3.9.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

| Test Mode : | Mode 1 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 00 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Horizontal |
| Remark : | 2402 MHz is Fundamental Signals which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 192 | 18.25 | -25.25 | 43.5 | 39.97 | 8.31 | 1.44 | 31.47 | - | - | Peak |
| 249.78 | 23.86 | -22.14 | 46 | 42.06 | 11.67 | 1.66 | 31.53 | - | - | Peak |
| 288.12 | 19.66 | -26.34 | 46 | 37.2 | 12.04 | 1.75 | 31.33 | - | - | Peak |
| 319.6 | 25.31 | -20.69 | 46 | 42.08 | 12.69 | 1.83 | 31.29 | - | - | Peak |
| 384 | 27.78 | -18.22 | 46 | 42.66 | 14.36 | 1.98 | 31.22 | 117 | 246 | Peak |
| 960.1 | 27.65 | -26.35 | 54 | 31.74 | 23.17 | 3.1 | 30.36 | - | - | Peak |
| 2382.39 | 42.77 | -11.23 | 54 | 40.36 | 31.68 | 4.58 | 33.85 | 144 | 35 | Average |
| 2382.39 | 64.58 | -9.42 | 74 | 62.17 | 31.68 | 4.58 | 33.85 | 144 | 35 | Peak |
| 2402 | 95.29 | - | - | 92.86 | 31.7 | 4.58 | 33.85 | 144 | 35 | Average |
| 2402 | 110.45 | - | - | 108.02 | 31.7 | 4.58 | 33.85 | 144 | 35 | Peak |
| 2488 | 41.48 | -12.52 | 54 | 38.94 | 31.8 | 4.64 | 33.9 | 144 | 35 | Average |
| 2488 | 53.79 | -20.21 | 74 | 51.25 | 31.8 | 4.64 | 33.9 | 144 | 35 | Peak |
| 4804 | 44.53 | -9.47 | 54 | 62.76 | 33.76 | 6.5 | 58.49 | 101 | 12 | Average |
| 4804 | 52.08 | -21.92 | 74 | 70.3 | 33.76 | 6.51 | 58.49 | 101 | 12 | Peak |
| 7206 | 49.87 | -40.58 | 90.45 | 64.03 | 35.23 | 8.25 | 57.64 | 100 | 0 | Peak |

| Test Mode : | Mode 1 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 00 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Vertical |
| Remark : | 2402 MHz is Fundamental Signals which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 34.86 | 30.98 | -9.02 | 40 | 46.28 | 15.48 | 0.74 | 31.52 | 128 | 143 | Peak |
| 42.42 | 23.48 | -16.52 | 40 | 42.73 | 11.53 | 0.76 | 31.54 | - | - | Peak |
| 246 | 18.1 | -27.9 | 46 | 36.58 | 11.4 | 1.64 | 31.52 | - | - | Peak |
| 384 | 26.66 | -19.34 | 46 | 41.54 | 14.36 | 1.98 | 31.22 | - | - | Peak |
| 768.3 | 25.35 | -20.65 | 46 | 32.69 | 20.42 | 2.78 | 30.54 | - | - | Peak |
| 960.1 | 28.91 | -25.09 | 54 | 33 | 23.17 | 3.1 | 30.36 | - | - | Peak |
| 2377.07 | 41.86 | -12.14 | 54 | 39.45 | 31.68 | 4.57 | 33.84 | 100 | 344 | Average |
| 2377.07 | 59.61 | -14.39 | 74 | 57.2 | 31.68 | 4.57 | 33.84 | 100 | 344 | Peak |
| 2402 | 91.55 | - | - | 89.12 | 31.7 | 4.58 | 33.85 | 100 | 344 | Average |
| 2402 | 105.3 | - | - | 102.87 | 31.7 | 4.58 | 33.85 | 100 | 344 | Peak |
| 2494 | 41.43 | -12.57 | 54 | 38.89 | 31.8 | 4.64 | 33.9 | 100 | 344 | Average |
| 2494 | 54.68 | -19.32 | 74 | 52.14 | 31.8 | 4.64 | 33.9 | 100 | 344 | Peak |
| 4804 | 47.73 | -26.27 | 74 | 65.96 | 33.76 | 6.5 | 58.49 | 100 | 0 | Peak |
| 7206 | 51.08 | -34.22 | 85.3 | 65.24 | 35.23 | 8.25 | 57.64 | 124 | 342 | Peak |

| Test Mode : | Mode 2 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 39 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Horizontal |
| Remark : | 2441 MHz is Fundamental Signals which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 159.87 | 19.32 | -24.18 | 43.5 | 39.84 | 9.63 | 1.35 | 31.5 | - | - | Peak |
| 249.78 | 24.02 | -21.98 | 46 | 42.22 | 11.67 | 1.66 | 31.53 | - | - | Peak |
| 288.12 | 20.35 | -25.65 | 46 | 37.89 | 12.04 | 1.75 | 31.33 | - | - | Peak |
| 384 | 26.49 | -19.51 | 46 | 41.37 | 14.36 | 1.98 | 31.22 | 117 | 21 | Peak |
| 621.3 | 22.69 | -23.31 | 46 | 32.22 | 18.81 | 2.49 | 30.83 | - | - | Peak |
| 832 | 24.09 | -21.91 | 46 | 30.45 | 21.26 | 2.89 | 30.51 | - | - | Peak |
| 2382 | 41.88 | -12.12 | 54 | 39.47 | 31.68 | 4.58 | 33.85 | 138 | 28 | Average |
| 2382 | 60.64 | -13.36 | 74 | 58.23 | 31.68 | 4.58 | 33.85 | 138 | 28 | Peak |
| 2441 | 95.84 | - | - | 93.36 | 31.75 | 4.61 | 33.88 | 138 | 28 | Average |
| 2441 | 111.02 | - | - | 108.54 | 31.75 | 4.61 | 33.88 | 138 | 28 | Peak |
| 2492 | 42 | -12 | 54 | 39.46 | 31.8 | 4.64 | 33.9 | 138 | 28 | Average |
| 2492 | 57.99 | -16.01 | 74 | 55.45 | 31.8 | 4.64 | 33.9 | 138 | 28 | Peak |
| 4882 | 44.46 | -9.54 | 54 | 62.5 | 33.78 | 6.54 | 58.36 | 102 | 13 | Average |
| 4882 | 51.85 | -22.15 | 74 | 69.89 | 33.78 | 6.54 | 58.36 | 102 | 13 | Peak |
| 7323 | 48.81 | -25.19 | 74 | 62.96 | 35.14 | 8.42 | 57.71 | 100 | 0 | Peak |

| Test Mode : | Mode 2 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 39 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Vertical |
| Remark : | 2441 MHz is Fundamental Signals which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 34.86 | 31.27 | -8.73 | 40 | 46.57 | 15.48 | 0.74 | 31.52 | 100 | 293 | Peak |
| 42.42 | 25.59 | -14.41 | 40 | 44.84 | 11.53 | 0.76 | 31.54 | - | - | Peak |
| 92.1 | 19.56 | -23.94 | 43.5 | 41.41 | 8.62 | 1.07 | 31.54 | - | - | Peak |
| 384 | 26.36 | -19.64 | 46 | 41.24 | 14.36 | 1.98 | 31.22 | - | - | Peak |
| 479.9 | 25.71 | -20.29 | 46 | 38.02 | 16.61 | 2.19 | 31.11 | - | - | Peak |
| 768.3 | 25.23 | -20.77 | 46 | 32.57 | 20.42 | 2.78 | 30.54 | - | - | Peak |
| 2346 | 41.8 | -12.2 | 54 | 39.44 | 31.64 | 4.55 | 33.83 | 154 | 339 | Average |
| 2346 | 57.43 | -16.57 | 74 | 55.07 | 31.64 | 4.55 | 33.83 | 154 | 339 | Peak |
| 2441 | 91.83 | - | - | 89.35 | 31.75 | 4.61 | 33.88 | 154 | 339 | Average |
| 2441 | 105.49 | - | - | 103.01 | 31.75 | 4.61 | 33.88 | 154 | 339 | Peak |
| 2496 | 41.5 | -12.5 | 54 | 38.96 | 31.8 | 4.64 | 33.9 | 154 | 339 | Average |
| 2496 | 53.99 | -20.01 | 74 | 51.45 | 31.8 | 4.64 | 33.9 | 154 | 339 | Peak |
| 4882 | 47.16 | -26.84 | 74 | 65.2 | 33.78 | 6.54 | 58.36 | 100 | 0 | Peak |
| 7323 | 47.93 | -6.07 | 54 | 62.08 | 35.14 | 8.42 | 57.71 | 121 | 340 | Average |
| 7323 | 54.54 | -19.46 | 74 | 68.69 | 35.14 | 8.42 | 57.71 | 121 | 340 | Peak |

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Horizontal |
| Remark : | 2480 MHz is Fundamental Signals which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 159.87 | 20.16 | -23.34 | 43.5 | 40.68 | 9.63 | 1.35 | 31.5 | - | - | Peak |
| 249.78 | 23.56 | -22.44 | 46 | 41.76 | 11.67 | 1.66 | 31.53 | - | - | Peak |
| 288.12 | 19.67 | -26.33 | 46 | 37.21 | 12.04 | 1.75 | 31.33 | - | - | Peak |
| 384 | 28.14 | -17.86 | 46 | 43.02 | 14.36 | 1.98 | 31.22 | 178 | 307 | Peak |
| 768.3 | 23.64 | -22.36 | 46 | 30.98 | 20.42 | 2.78 | 30.54 | - | - | Peak |
| 893.6 | 24.41 | -21.59 | 46 | 30.16 | 21.73 | 3 | 30.48 | - | - | Peak |
| 2382 | 41.84 | -12.16 | 54 | 39.43 | 31.68 | 4.58 | 33.85 | 140 | 25 | Average |
| 2382 | 60.96 | -13.04 | 74 | 58.55 | 31.68 | 4.58 | 33.85 | 140 | 25 | Peak |
| 2480 | 95.26 | - | - | 92.74 | 31.78 | 4.64 | 33.9 | 140 | 25 | Average |
| 2480 | 110.36 | - | - | 107.84 | 31.78 | 4.64 | 33.9 | 140 | 25 | Peak |
| 2483.5 | 41.15 | -12.85 | 54 | 38.63 | 31.78 | 4.64 | 33.9 | 140 | 25 | Average |
| 2483.5 | 56.35 | -17.65 | 74 | 53.83 | 31.78 | 4.64 | 33.9 | 140 | 25 | Peak |
| 4960 | 44.48 | -9.52 | 54 | 62.31 | 33.79 | 6.57 | 58.19 | 121 | 26 | Average |
| 4960 | 51.99 | -22.01 | 74 | 69.82 | 33.79 | 6.57 | 58.19 | 121 | 26 | Peak |
| 7440 | 48.12 | -25.88 | 74 | 62.24 | 35.04 | 8.63 | 57.79 | 100 | 0 | Peak |

| Test Mode : | Mode 3 | Temperature : | 23~24°C |
|---|---|---|---|
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Kai Wang | Polarization : | Vertical |
| Remark : | 2480 MHz is Fundamental Signals which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBuV/m ) | Over Limit ( dB ) | Limit Line ( dBuV/m ) | Read Level (dBuV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 34.86 | 30.41 | -9.59 | 40 | 45.71 | 15.48 | 0.74 | 31.52 | 155 | 42 | Peak |
| 42.42 | 25.1 | -14.9 | 40 | 44.35 | 11.53 | 0.76 | 31.54 | - | - | Peak |
| 159.87 | 20.5 | -23 | 43.5 | 41.02 | 9.63 | 1.35 | 31.5 | - | - | Peak |
| 384 | 25.04 | -20.96 | 46 | 39.92 | 14.36 | 1.98 | 31.22 | - | - | Peak |
| 479.9 | 25.48 | -20.52 | 46 | 37.79 | 16.61 | 2.19 | 31.11 | - | - | Peak |
| 575.8 | 24.97 | -21.03 | 46 | 35.18 | 18.32 | 2.38 | 30.91 | - | - | Peak |
| 2382 | 41.77 | -12.23 | 54 | 39.36 | 31.68 | 4.58 | 33.85 | 153 | 349 | Average |
| 2382 | 57.39 | -16.61 | 74 | 54.98 | 31.68 | 4.58 | 33.85 | 153 | 349 | Peak |
| 2480 | 91.81 | - | - | 89.29 | 31.78 | 4.64 | 33.9 | 153 | 349 | Average |
| 2480 | 105.52 | - | - | 103 | 31.78 | 4.64 | 33.9 | 153 | 349 | Peak |
| 2483.5 | 39.3 | -14.7 | 54 | 36.78 | 31.78 | 4.64 | 33.9 | 153 | 349 | Average |
| 2483.5 | 53.02 | -20.98 | 74 | 50.5 | 31.78 | 4.64 | 33.9 | 153 | 349 | Peak |
| 4960 | 47.31 | -26.69 | 74 | 65.14 | 33.79 | 6.57 | 58.19 | 100 | 0 | Peak |
| 7440 | 46.79 | -7.21 | 54 | 60.91 | 35.04 | 8.63 | 57.79 | 126 | 338 | Average |
| 7440 | 53 | -21 | 74 | 67.12 | 35.04 | 8.63 | 57.79 | 126 | 338 | Peak |

# 3.10 Antenna Requirements

## 3.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

## 3.10.2 Antenna Connected Construction

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

## 3.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

# 4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP30 | 101329 | 9kHz~30GHz | May. 03, 2011 | May. 02, 2012 | Conducted (TH02-HY) |
| Power Meter | Anritsu | ML2495A | 0932001 | N/A | Sep. 13, 2010 | Sep. 12, 2011 | Conducted (TH02-HY) |
| Power Sensor | Anritsu | MA2411B | 0846202 | N/A | Sep. 14, 2010 | Sep. 13, 2011 | Conducted (TH02-HY) |
| Thermal Chamber | Ten Billion | TTH-D35P | TBN-930701 | N/A | Jul. 30, 2010 | Jul. 29, 2011 | Conducted (TH02-HY) |
| EMI Test Receive | R&S | ESCS 30 | 100356 | 9KHz – 2.75GHz | Aug. 16, 2010 | Aug. 15, 2011 | Conduction (CO05-HY) |
| Two-LISN | R&S | ENV216 | 11-100081 | 9KHz – 30MHz | Dec. 03, 2010 | Dec. 02, 2011 | Conduction (CO05-HY) |
| Two-LISN | R&S | ENV216 | 11-100080 | 9KHz – 30MHz | Dec. 01, 2010 | Nov. 30, 2011 | Conduction (CO05-HY) |
| AC Power Source | APC | APC-1000W | N/A | N/A | N/A | N/A | Conduction (CO05-HY) |
| System Simulator | R&S | CMU200 | 114256 | N/A | Feb. 15, 2011 | Feb. 14, 2012 | Conduction (CO05-HY) |
| Spectrum Analyzer | R&S | FSP30 | 101352 | 9KHz-40GHz | Nov. 03, 2010 | Nov. 02, 2011 | Radiation (03CH05-HY) |
| Amplifier | COM-POWER | PA-103 | 161075 | 1KHz - 1GHz | Mar. 29, 2011 | Mar. 28, 2012 | Radiation (03CH05-HY) |
| Bilog Antenna | SCHAFFNER | CBL6111C | 2725 | 30MHz ~ 1GHz | Nov. 06, 2010 | Nov. 05, 2011 | Radiation (03CH05-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170251 | 15GHz- 40GHz | Oct. 18, 2010 | Oct. 17, 2011 | Radiation (03CH05-HY) |
| Pre Amplifier | Agilent | 8449B | 3008A01917 | 1GHz- 26.5GHz | Apr. 14, 2011 | Apr. 13, 2012 | Radiation (03CH05-HY) |
| Turn Table | HD | Deis HD 2000 | 420/611 | 0 - 360 degree | N/A | N/A | Radiation (03CH05-HY) |
| Antenna Mast | HD | MA 240 | 240/666 | 1 m - 4 m | N/A | N/A | Radiation (03CH05-HY) |
| Horn Antenna | ESCO | 3117 | 00066584 | 1GHz ~ 18GHz | Aug. 05, 2010 | Aug. 04, 2011 | Radiation (03CH05-HY) |
| Loop Antenna | R&S | HFH2-Z2 | 860004/001 | 9 kHz~30 MHz | Jul. 29, 2010 | Jul. 28, 2011 | Radiation (03CH05-HY) |
| Bluetooth Base Station | R&S | CBT32 | 100522 | N/A | Jan.13, 2011 | Jan.13, 2012 | Radiation (03CH05-HY) |

# 5 Uncertainty of Evaluation

**Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)**

| Contribution | Uncertainty of $X_i$ | | $u(X_i)$ |
|---|---|---|---|
| | dB | Probability Distribution | |
| Receiver Reading | 0.10 | Normal (k=2) | 0.05 |
| Cable Loss | 0.10 | Normal (k=2) | 0.05 |
| AMN Insertion Loss | 2.50 | Rectangular | 0.63 |
| Receiver Specification | 1.50 | Rectangular | 0.43 |
| Site Imperfection | 1.39 | Rectangular | 0.80 |
| Mismatch | +0.34 / -0.35 | U-Shape | 0.24 |
| **Combined Standard Uncertainty Uc(y)** | **1.13** | | |
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.26** | | |

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| Contribution | Uncertainty of $X_i$ | | $u(X_i)$ |
|---|---|---|---|
| | dB | Probability Distribution | |
| Receiver Reading | 0.41 | Normal (k=2) | 0.21 |
| Antenna Factor Calibration | 0.83 | Normal (k=2) | 0.42 |
| Cable Loss Calibration | 0.25 | Normal (k=2) | 0.13 |
| Pre-Amplifier Gain Calibration | 0.27 | Normal (k=2) | 0.14 |
| RCV/SPA Specification | 2.50 | Rectangular | 0.72 |
| Antenna Factor Interpolation for Frequency | 1.00 | Rectangular | 0.29 |
| Site Imperfection | 1.43 | Rectangular | 0.83 |
| Mismatch | +0.39 / -0.41 | U-Shape | 0.28 |
| **Combined Standard Uncertainty Uc(y)** | **1.27** | | |
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.54** | | |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)**

| Contribution | Uncertainty of $X_i$ | | $u(X_i)$ | $C_i$ | $C_i * u(X_i)$ |
|---|---|---|---|---|---|
| | dB | Probability Distribution | | | |
| Receiver Reading | ±0.10 | Normal (k=2) | 0.10 | 1 | 0.10 |
| Antenna Factor Calibration | ±1.70 | Normal (k=2) | 0.85 | 1 | 0.85 |
| Cable Loss Calibration | ±0.50 | Normal (k=2) | 0.25 | 1 | 0.25 |
| Receiver Correction | ±2.00 | Rectangular | 1.15 | 1 | 1.15 |
| Antenna Factor Directional | ±1.50 | Rectangular | 0.87 | 1 | 0.87 |
| Site Imperfection | ±2.80 | Triangular | 1.14 | 1 | 1.14 |
| Mismatch<br>Receiver VSWR Γ1 = 0.197<br>Antenna VSWR Γ2 = 0.194<br>Uncertainty = 20Log(1-Γ1*Γ2) | +0.34 / -0.35 | U-Shape | 0.244 | 1 | 0.244 |
| **Combined Standard Uncertainty Uc(y)** | **2.36** | | | | |
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.72** | | | | |