


FCC RF Test Report

APPLICANT : Unimax Communications
EQUIPMENT : CDMA1X handset
BRAND NAME : UMX
MODEL NAME : C5610/COMPANION
FCC ID : P46-C5610
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Oct. 11, 2012 and completely tested on Nov. 08, 2012. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.



TABLE OF CONTENTS

REVISION HISTORY..... 3

SUMMARY OF TEST RESULT 4

1 GENERAL DESCRIPTION..... 5

 1.1 Applicant 5

 1.2 Manufacturer..... 5

 1.3 Feature of Equipment Under Test 5

 1.4 Testing Site 6

 1.5 Applied Standards 6

 1.6 Ancillary Equipment List 7

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST..... 8

 2.1 RF Output Power 8

 2.2 Test Mode..... 9

 2.3 Connection Diagram of Test System..... 10

 2.4 RF Utility 10

3 TEST RESULT 11

 3.1 Number of Channel Measurement 11

 3.2 Hopping Channel Separation Measurement 13

 3.3 Dwell Time Measurement..... 20

 3.4 20dB and 99% Bandwidth Measurement 22

 3.5 Peak Output Power Measurement 35

 3.6 Conducted Band Edges Measurement 42

 3.7 Conducted Spurious Emission Measurement 49

 3.8 Radiated Band Edges and Spurious Emission Measurement 53

 3.9 AC Conducted Emission Measurement..... 63

 3.10 Antenna Requirements..... 67

4 LIST OF MEASURING EQUIPMENT..... 68

5 UNCERTAINTY OF EVALUATION..... 69

APPENDIX A. PHOTOGRAPHS OF EUT

APPENDIX B. SETUP PHOTOGRAPHS



REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|------------|---------|-------------------------|---------------|
| FR2O1106 | Rev. 01 | Initial issue of report | Nov. 09, 2012 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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(b) | Hopping Channel Separation | ≥ 2/3 of 20dB BW | Pass | - |
| 3.3 | 15.247(a)(1) | A8.1(d) | Dwell Time of Each Channel | ≤ 0.4sec in 31.6sec period | Pass | - |
| 3.4 | 15.247(a)(1) | A8.1(a) | 20dB Bandwidth | NA | Pass | - |
| 3.4 | - | Gen 4.6.1 | 99% Bandwidth | - | Pass | - |
| 3.5 | 15.247(b)(1) | A8.1(b) | Peak Output Power | ≤ 1 w for 1Mbps ≤ 125 Mw for 2, 3Mbps | Pass | - |
| 3.6 | 15.247(d) | A8.5 | Conducted Band Edges | ≤ 20dBc | Pass | - |
| 3.7 | 15.247(d) | A8.5 | Conducted Spurious Emission | ≤ 20dBc | Pass | - |
| 3.8.8 | 15.247(d) | A8.5 | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d) | Pass | Under limit 4.7 dB at 2483.520 MHz |
| 3.9 | 15.207 | Gen 7.2.4 | AC Conducted Emission | 15.207(a) | Pass | Under limit 7.91 dB at 0.440 MHz |
| 3.10 | 15.203 & 15.247(b) | A8.4 | Antenna Requirement | N/A | Pass | - |



1 General Description

1.1 Applicant

Unimax Communications
18201 McDermott Street W.Suite E Irvine, CA 92614

1.2 Manufacturer

Unimax Communications
18201 McDermott Street W.Suite E Irvine, CA 92614

1.3 Feature of Equipment Under Test

| Product Feature | |
|---------------------------------|---------------------|
| Equipment | CDMA1X handset |
| Brand Name | UMX |
| Model Name | C5610/COMPANION |
| FCC ID | P46-C5610 |
| EUT supports Radios application | CDMA/Bluetooth |
| HW Version | C5610-Main_V1.0 |
| SW Version | C5610_01.11. |
| EUT Stage | Identical Prototype |

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

| Product Specification subjective to this standard | |
|---|---|
| Tx/Rx Frequency Range | 2402 MHz ~ 2480 MHz |
| Number of Channels | 79 |
| Carrier Frequency of Each Channel | 2402+n*1 MHz; n=0~78 |
| Maximum Output Power to Antenna | Bluetooth (1Mbps) : 9.26 dBm (0.0084 W) Bluetooth EDR (2Mbps) : 8.40 dBm (0.0069 W) Bluetooth EDR (3Mbps) : 8.18 dBm (0.0066 W) |
| 99% Occupied Bandwidth | Bluetooth (1Mbps) : 0.9200MHz Bluetooth EDR (2Mbps) : 1.1760MHz Bluetooth EDR (3Mbps) : 1.1880MHz |
| Antenna Type | PIFA Antenna type with gain -1 dBi |
| Type of Modulation | Bluetooth (1Mbps) : GFSK Bluetooth 2.1 EDR (2Mbps) : π /4-DQPSK Bluetooth 2.1 EDR (3Mbps) : 8-DPSK |

1.4 Testing Site

| | | | | |
|---------------------------|--|---------|-----------|--------------------------------|
| Test Site | SPORTON INTERNATIONAL (KUNSHAN) INC. | | | |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958 | | | |
| Test Site No. | Sporton Site No. | | | FCC/IC Registration No. |
| | TH01-KS | CO01-KS | 03CH01-KS | 149928/4086E-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 and ANSI C63.10-2009
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

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, 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. | Bluetooth Base Station | R&S | CBT | FCC DoC | N/A | Unshielded, 1.8m |
| 3. | DC Power Supply | GWINSTEK | GPS-3030D | N/A | N/A | Unshielded, 1.8 m |
| 4. | Bluetooth Earphone | Nokia | BH-106 | QTLBH-106 | 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 | $\pi/4$ -DQPSK | 8-DPSK |
| | | 1Mbps | 2Mbps | 3Mbps |
| Ch00 | 2402MHz | 7.51 dBm | 6.90 dBm | 6.47 dBm |
| Ch39 | 2441MHz | 7.93 dBm | 7.31 dBm | 6.76 dBm |
| Ch78 | 2480MHz | 9.26 dBm | 8.40 dBm | 8.18 dBm |

Remark:

1. All the test data for each data rate were verified, but only the worst case was reported.
2. The data rate was set in 1Mbps for all the test items due to the highest RF output power.
3. 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 ANSI C63.10-2009 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).

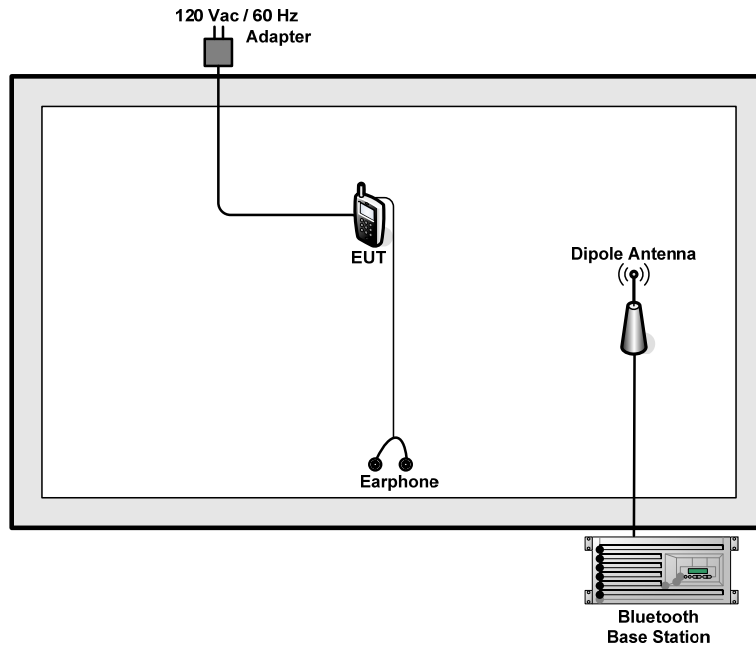
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases (X plane) and recorded in this report.

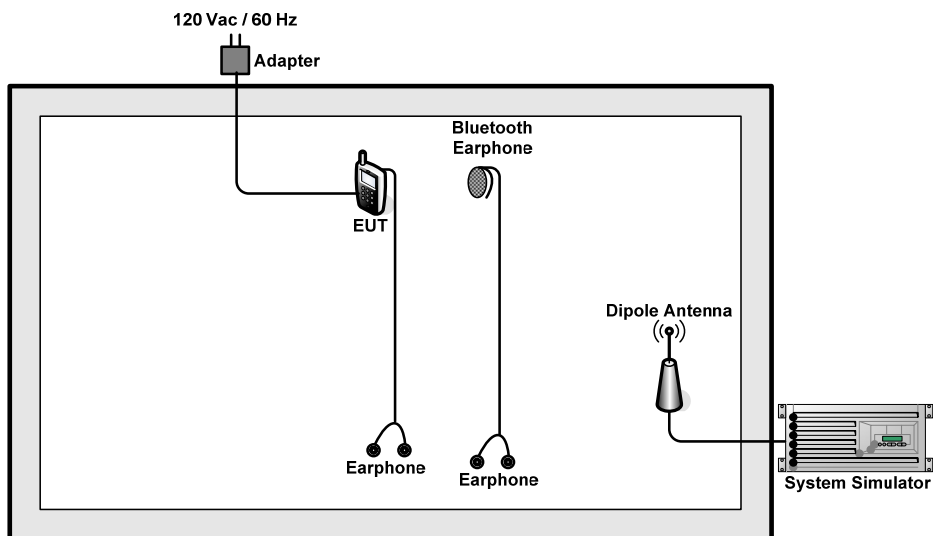
| Test Cases | | | |
|--|---|---|---|
| Test Item | Data Rate / Modulation | | |
| | Bluetooth 1Mbps GFSK | Bluetooth EDR 2Mbps $\pi/4$ -DQPSK | Bluetooth EDR 3Mbps 8-DPSK |
| Conducted TCs | Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz | Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz | Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz |
| Radiated TCs | Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz | Pretest | Pretest |
| AC Conducted Emission | Mode 1 :CDMA BC0 Idle + Bluetooth Link + USB Cable (Charging from Adapter) + Earphone | | |
| Remark: 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. | | | |

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, key in “*01763*918#” on the EUT directly. Then, the EUT will get into the engineering modes to contact with Bluetooth base station for continuous transmitting and receiving signals.

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.

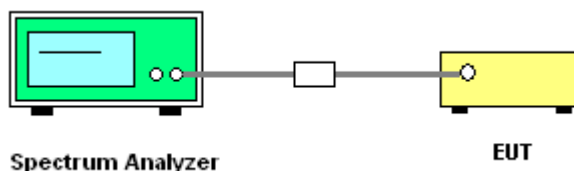
3.1.2 Measuring Instruments

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. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW \geq 1% of the span; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.

3.1.4 Test Setup

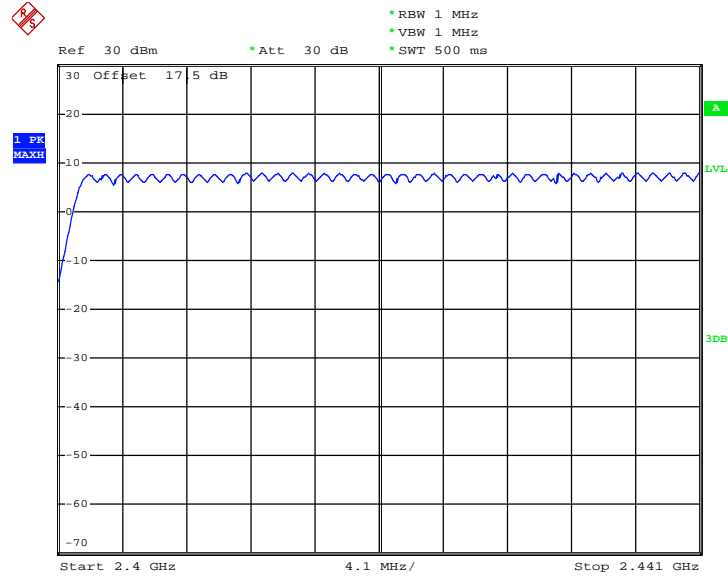


3.1.5 Test Result of Number of Hopping Frequency

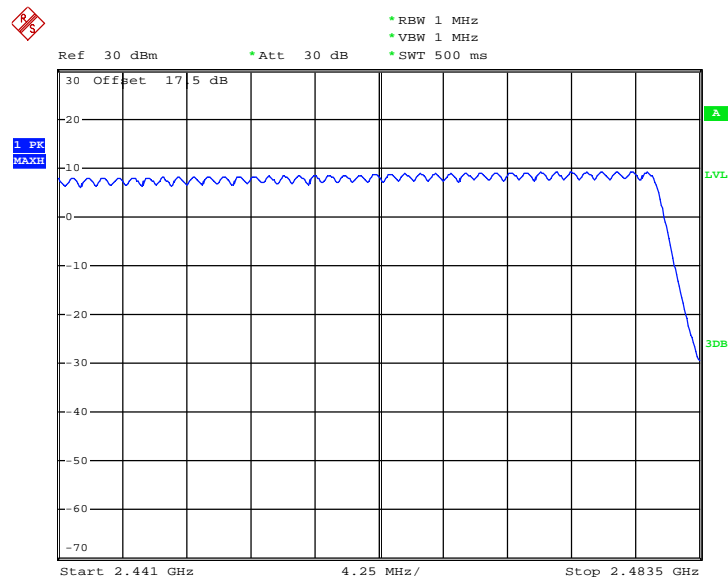
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
|---|--------|---------------------|-----------|
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |
| Number of Hopping Channels (Channel) | | Limits (Channel) | Pass/Fail |
| 79 | | > 15 | Pass |



Number of Hopping Channel Plot on Channel 00 - 78



Date: 2.NOV.2012 08:08:00



Date: 2.NOV.2012 08:17:17

3.2 Hopping Channel Separation Measurement

3.2.1 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.

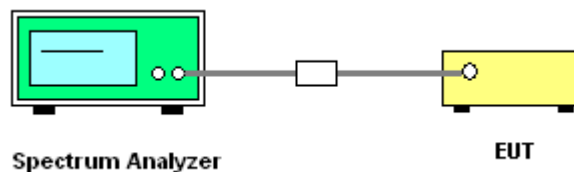
3.2.2 Measuring Instruments

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. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels; RBW \geq 1% of the span;
VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.

3.2.4 Test Setup

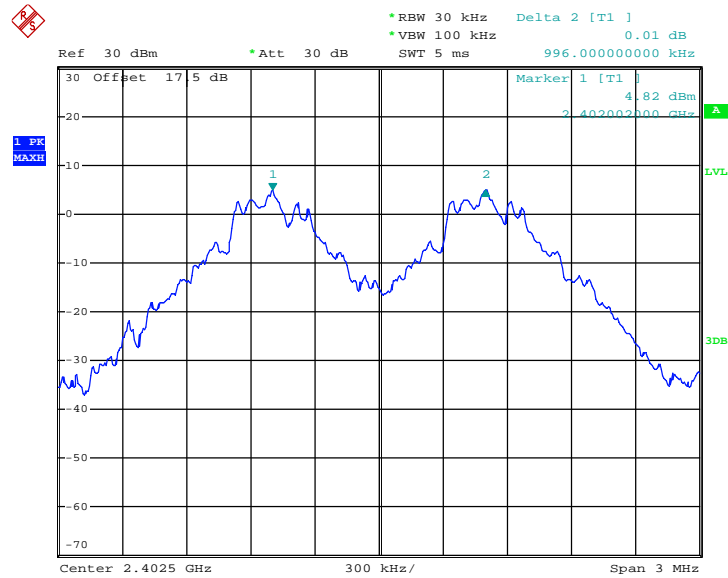


3.2.5 Test Result of Hopping Channel Separation

| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | Frequency Separation (MHz) | (2/3 of 20dB BW) Limits (MHz) | Pass/Fail |
|---------|-----------------|----------------------------|-------------------------------|-----------|
| 00 | 2402 | 0.996 | 0.6320 | Pass |
| 39 | 2441 | 1.008 | 0.6240 | Pass |
| 78 | 2480 | 1.002 | 0.5760 | Pass |

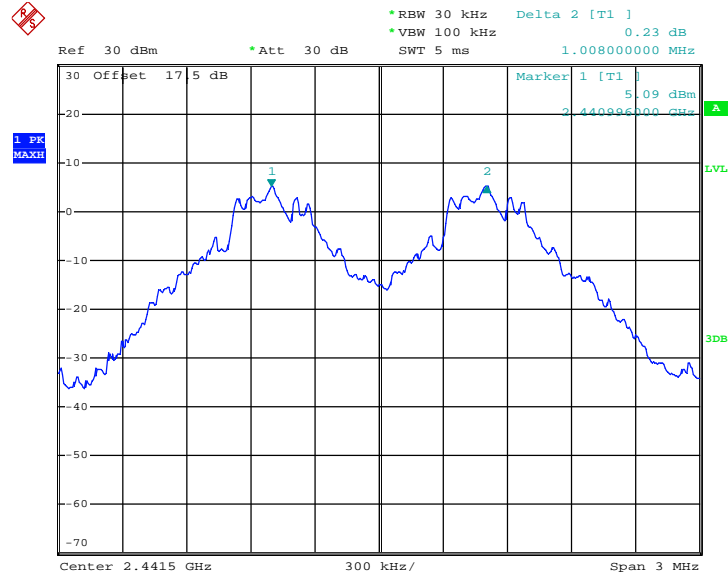
Channel Separation Plot on Channel 00 - 01



Date: 2.NOV.2012 08:18:56

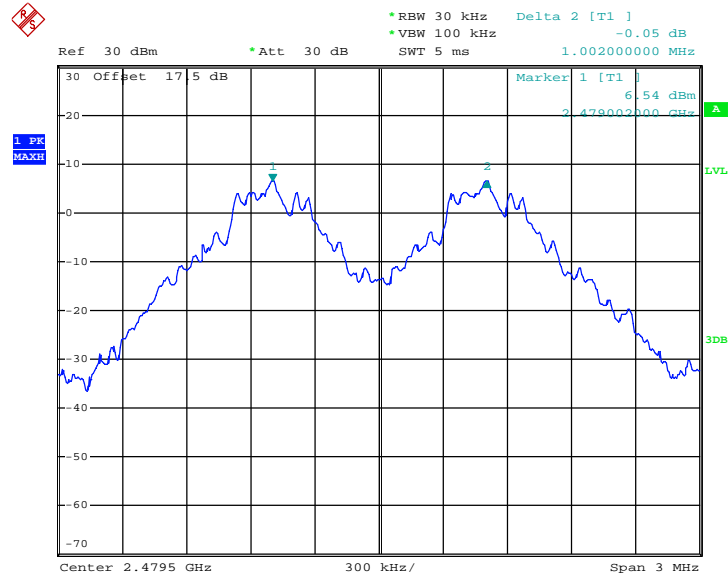


Channel Separation Plot on Channel 39 - 40



Date: 2.NOV.2012 08:19:27

Channel Separation Plot on Channel 77 - 78



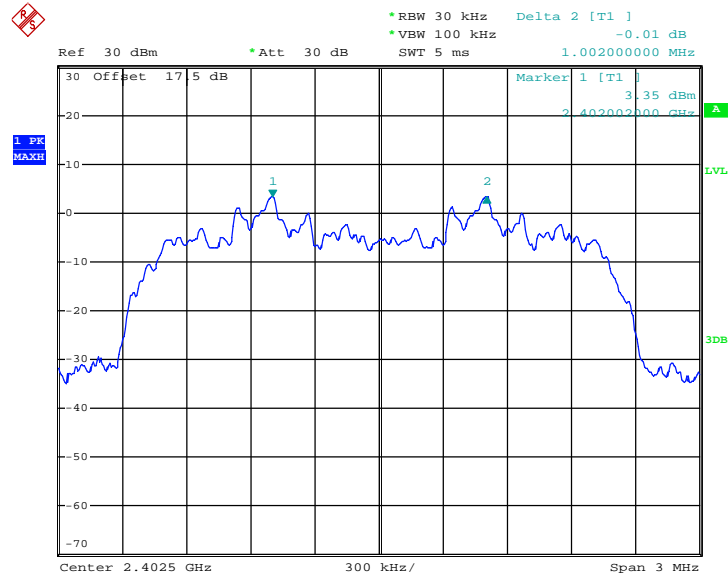
Date: 2.NOV.2012 08:19:51



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 2Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | Frequency Separation (MHz) | (2/3 of 20dB BW) Limits (MHz) | Pass/Fail |
|---------|-----------------|----------------------------|-------------------------------|-----------|
| 00 | 2402 | 1.002 | 0.8587 | Pass |
| 39 | 2441 | 1.008 | 0.8427 | Pass |
| 78 | 2480 | 1.002 | 0.8347 | Pass |

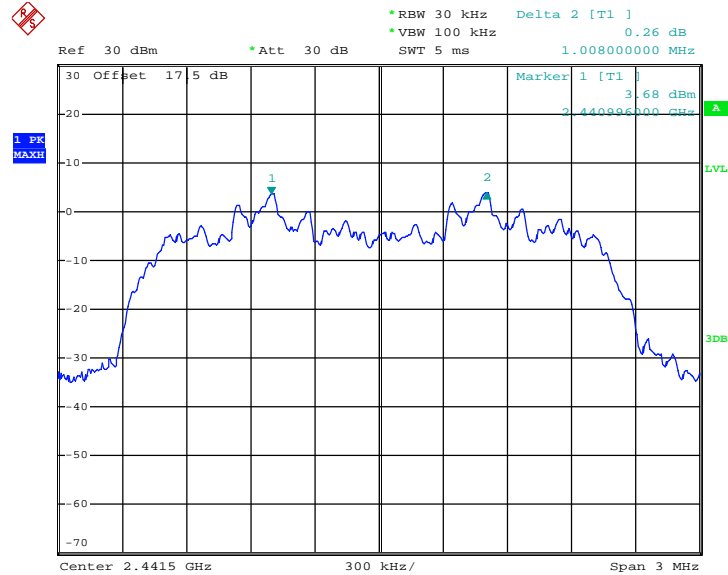
Channel Separation Plot on Channel 00 - 01



Date: 2.NOV.2012 08:20:36

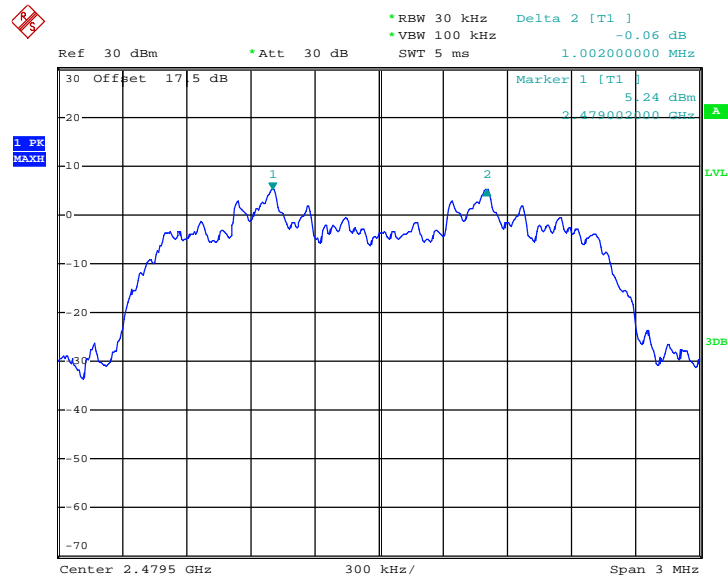


Channel Separation Plot on Channel 39 - 40



Date: 2.NOV.2012 08:21:10

Channel Separation Plot on Channel 77 - 78



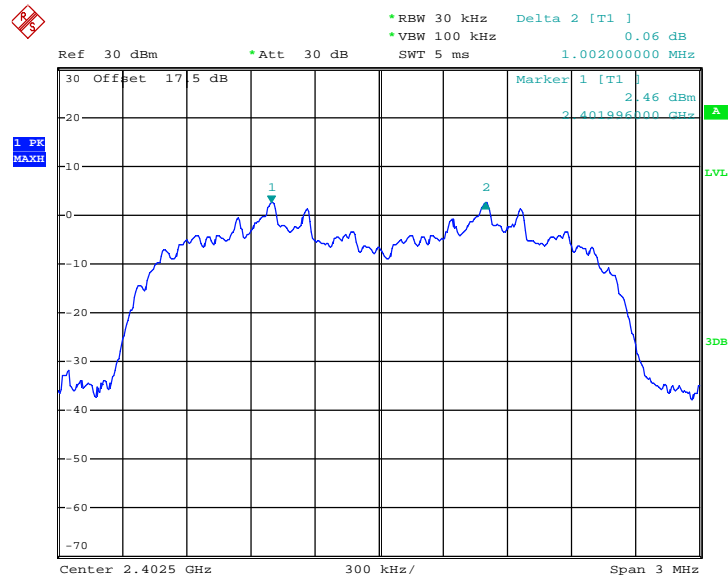
Date: 2.NOV.2012 08:21:48



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 3Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | Frequency Separation (MHz) | (2/3 of 20dB BW) Limits (MHz) | Pass/Fail |
|---------|-----------------|----------------------------|-------------------------------|-----------|
| 00 | 2402 | 1.002 | 0.8507 | Pass |
| 39 | 2441 | 1.002 | 0.8667 | Pass |
| 78 | 2480 | 1.002 | 0.8667 | Pass |

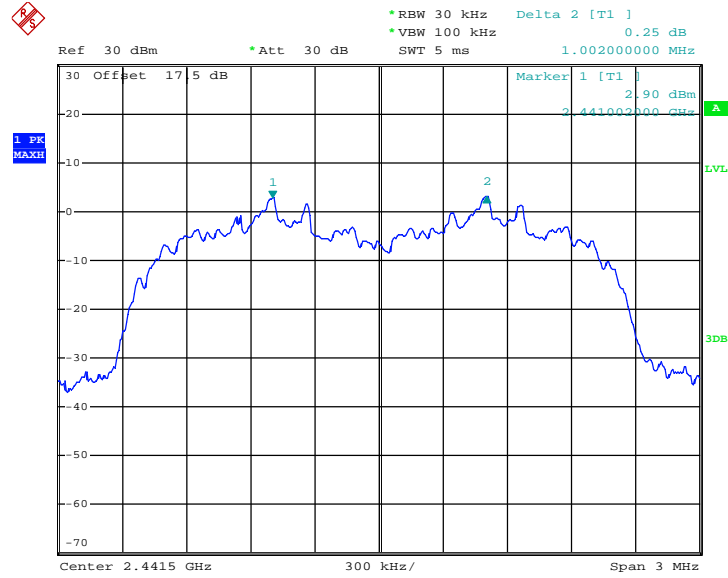
Channel Separation Plot on Channel 00 - 01



Date: 2.NOV.2012 08:22:53

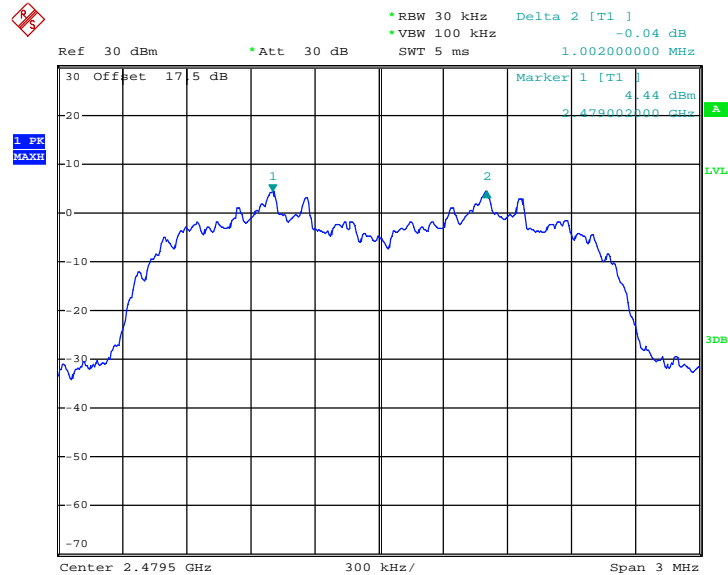


Channel Separation Plot on Channel 39 - 40



Date: 2.NOV.2012 08:23:47

Channel Separation Plot on Channel 77 - 78



Date: 2.NOV.2012 08:24:30

3.3 Dwell Time Measurement

3.3.1 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.

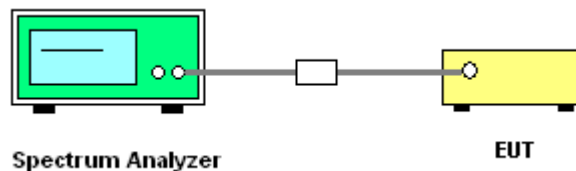
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output connector was connected to the spectrum analyzer through a low loss cable.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. 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.

3.3.4 Test Setup



3.3.5 Test Result of Dwell Time

| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | DH5 | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

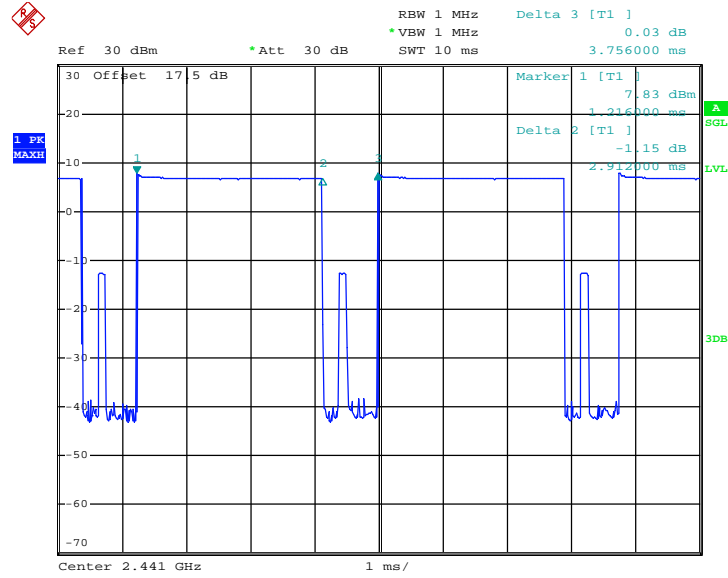
| Package Mode | Average Hopping Channel | Package Transfer Time (usec) | Dwell Time (sec) | Limits (sec) | Pass/Fail |
|--------------|-------------------------|------------------------------|------------------|--------------|-----------|
| DH5 | 4.10 | 2912.00 | 0.38 | 0.4 | Pass |

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)

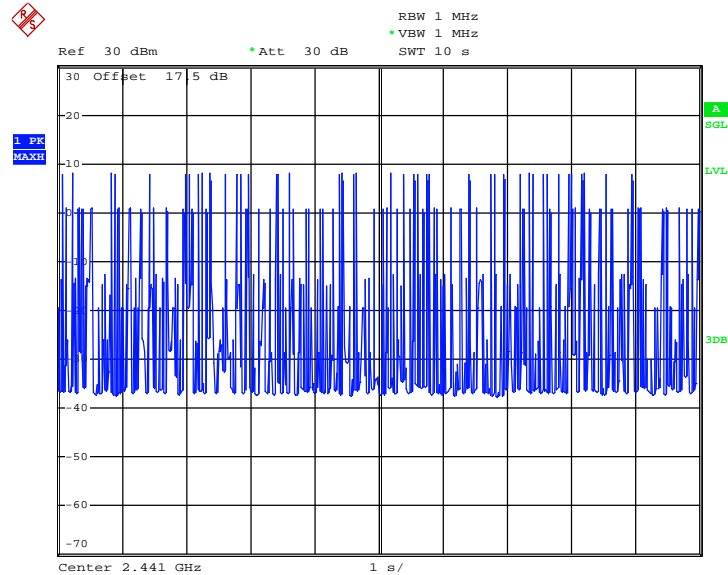


DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 2.NOV.2012 03:54:33

DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 2.NOV.2012 07:56:05

3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB Bandwidth

Reporting only

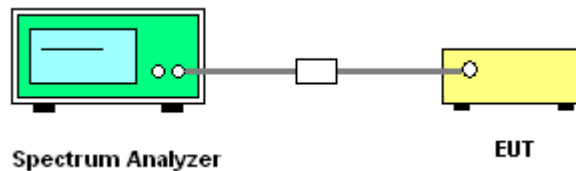
3.4.2 Measuring Instruments

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. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
RBW \geq 1% of the 20 dB bandwidth; VBW \geq RBW; Sweep = auto; Detector function = peak;
Trace = max hold.

3.4.4 Test Setup

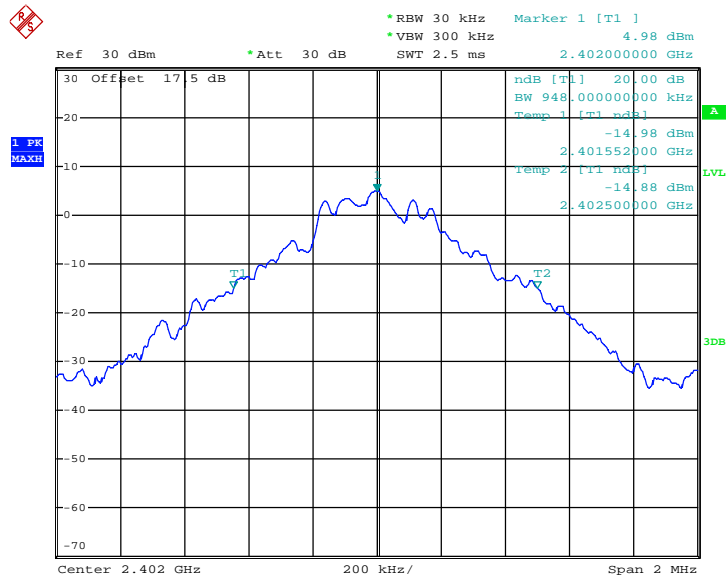


3.4.5 Test Result of 20dB Bandwidth

| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---------|-----------------|----------------------|
| 00 | 2402 | 0.948 |
| 39 | 2441 | 0.936 |
| 78 | 2480 | 0.864 |

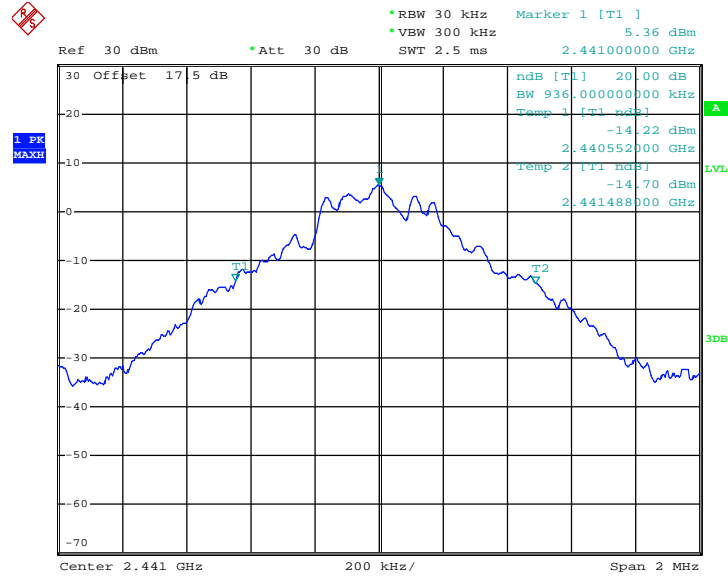
20 dB Bandwidth Plot on Channel 00



Date: 2.NOV.2012 07:39:38

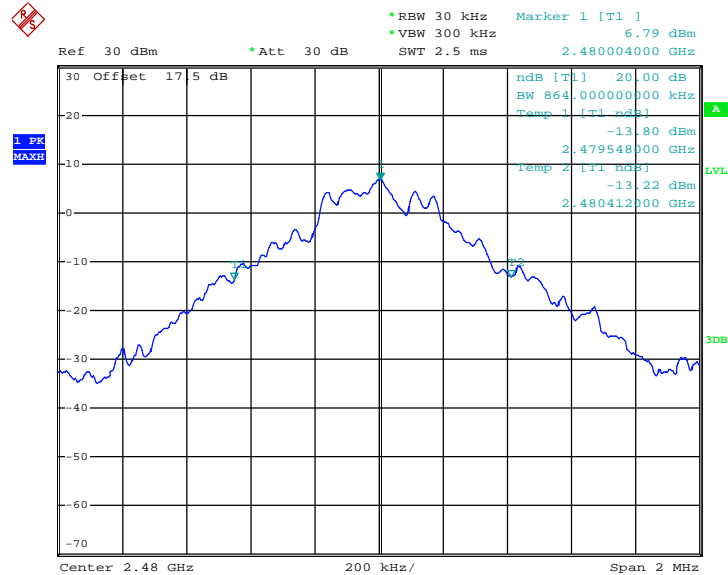


20 dB Bandwidth Plot on Channel 39



Date: 2.NOV.2012 07:40:22

20 dB Bandwidth Plot on Channel 78



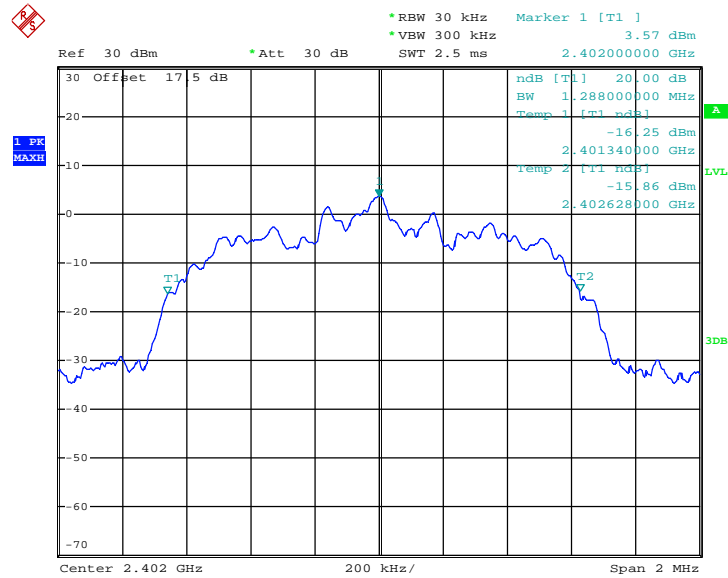
Date: 2.NOV.2012 07:40:47



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 2Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---------|-----------------|----------------------|
| 00 | 2402 | 1.288 |
| 39 | 2441 | 1.264 |
| 78 | 2480 | 1.252 |

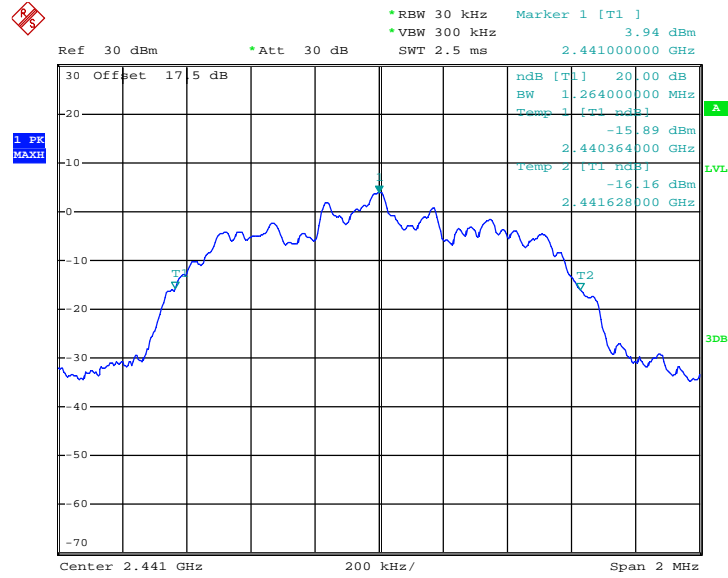
20 dB Bandwidth Plot on Channel 00



Date: 2.NOV.2012 07:42:41

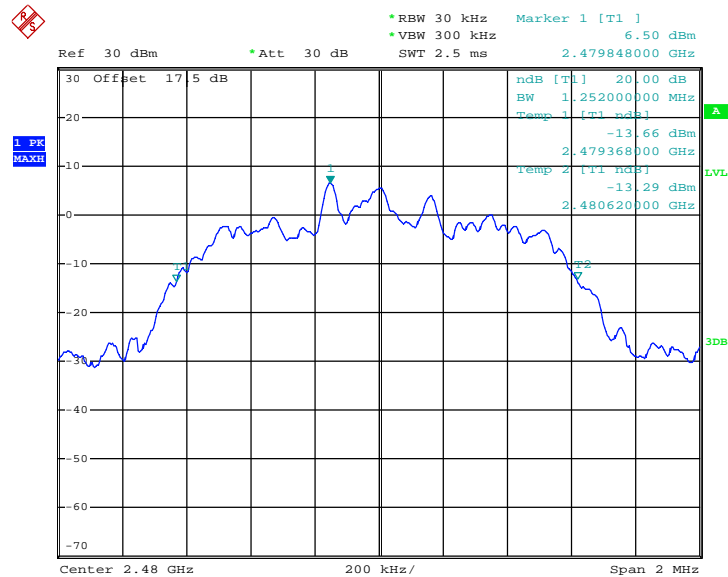


20 dB Bandwidth Plot on Channel 39



Date: 2.NOV.2012 07:42:08

20 dB Bandwidth Plot on Channel 78



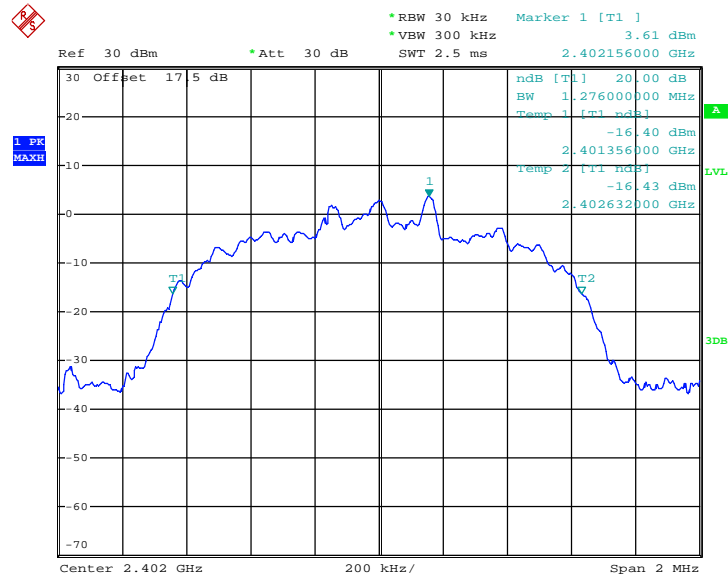
Date: 2.NOV.2012 07:41:39



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 3Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---------|-----------------|----------------------|
| 00 | 2402 | 1.276 |
| 39 | 2441 | 1.300 |
| 78 | 2480 | 1.300 |

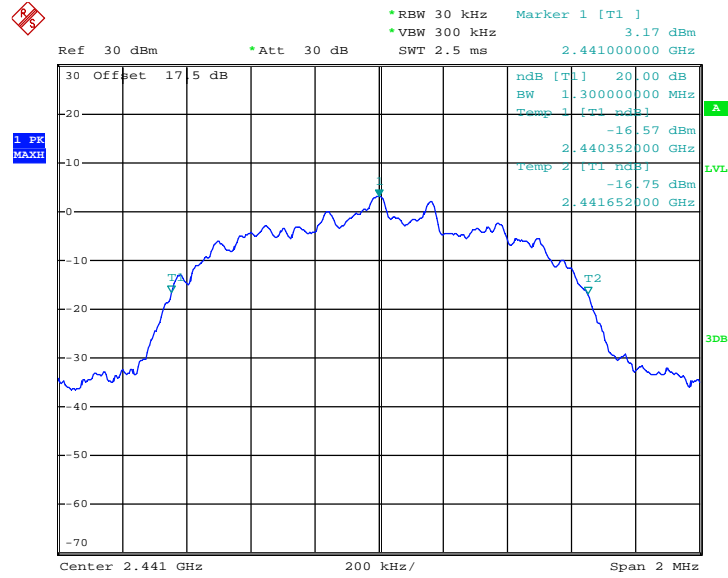
20 dB Bandwidth Plot on Channel 00



Date: 2.NOV.2012 07:43:23

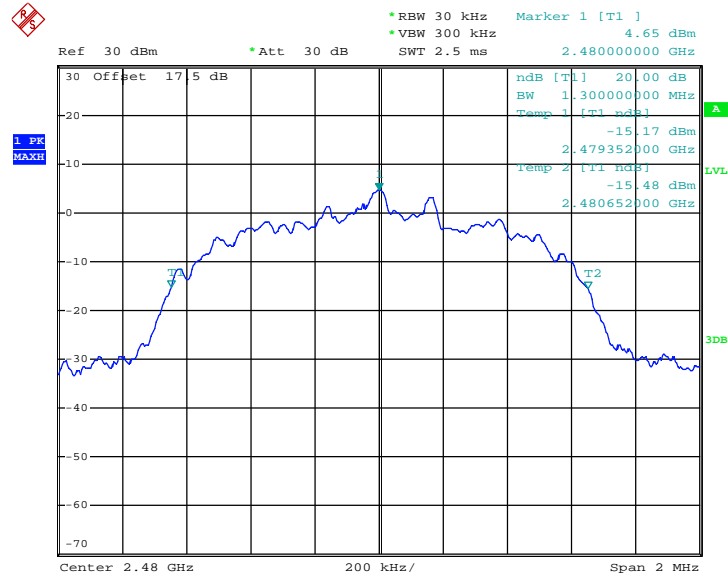


20 dB Bandwidth Plot on Channel 39



Date: 2.NOV.2012 07:44:21

20 dB Bandwidth Plot on Channel 78



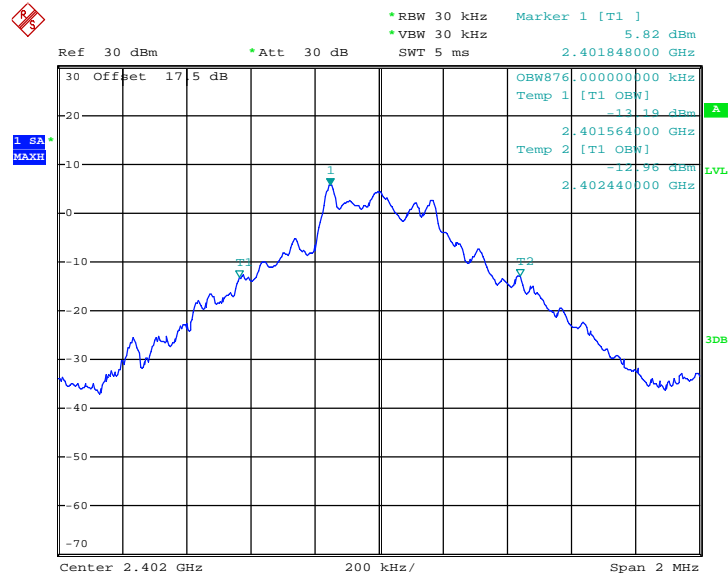
Date: 2.NOV.2012 07:44:56

3.4.6 Test Result of 99% Occupied Bandwidth

| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|
| 00 | 2402 | 0.876 |
| 39 | 2441 | 0.920 |
| 78 | 2480 | 0.892 |

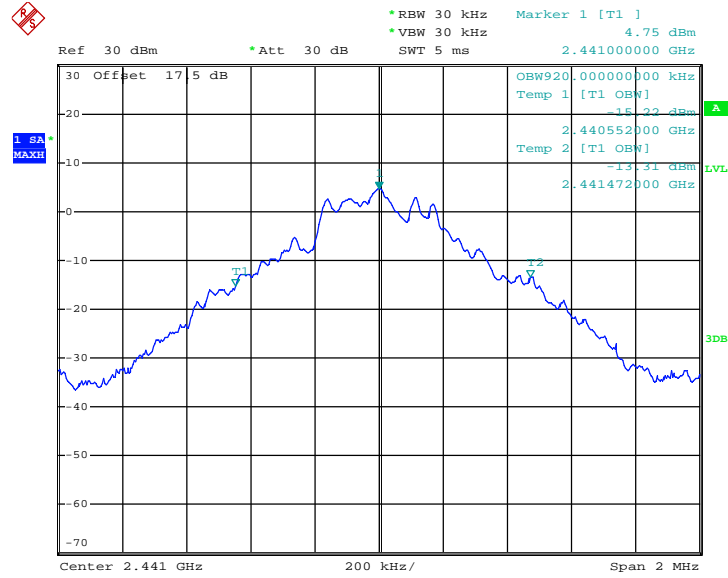
99% Bandwidth Plot on Channel 00



Date : 2.NOV.2012 07:53:06

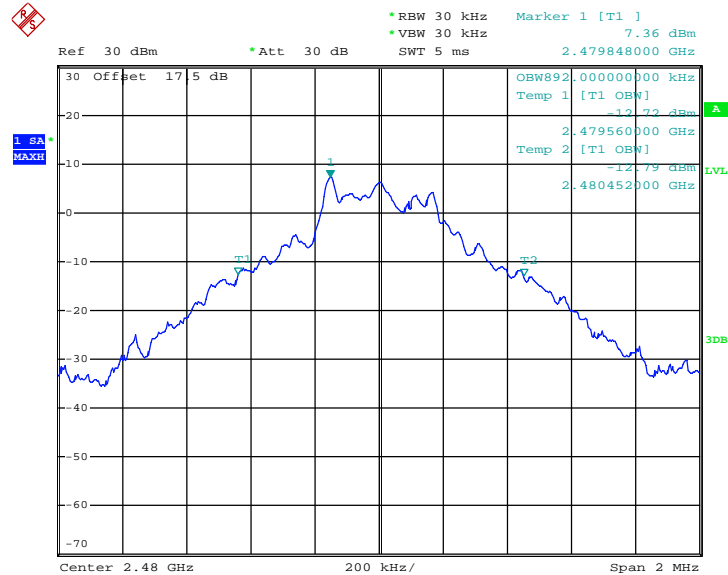


99% Occupied Bandwidth Plot on Channel 39



Date: 2.NOV.2012 07:48:06

99% Occupied Bandwidth Plot on Channel 78



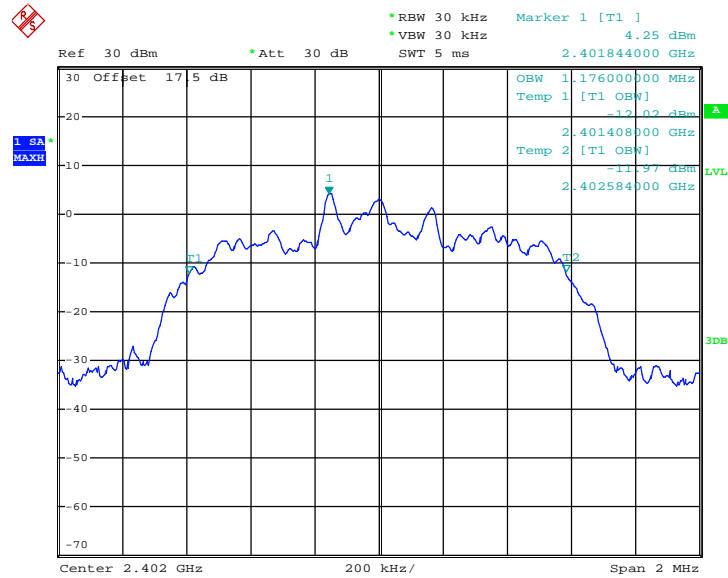
Date: 2.NOV.2012 07:47:25



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 2Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|
| 00 | 2402 | 1.176 |
| 39 | 2441 | 1.168 |
| 78 | 2480 | 1.168 |

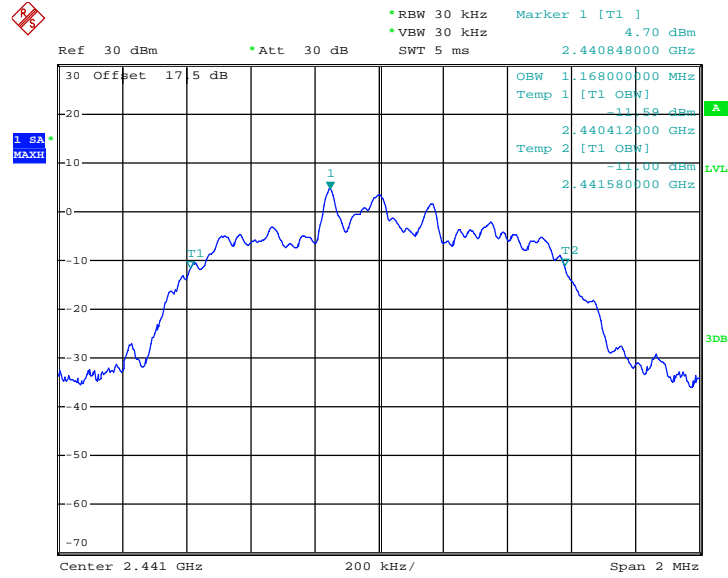
99% Bandwidth Plot on Channel 00



Date: 2.NOV.2012 07:52:28

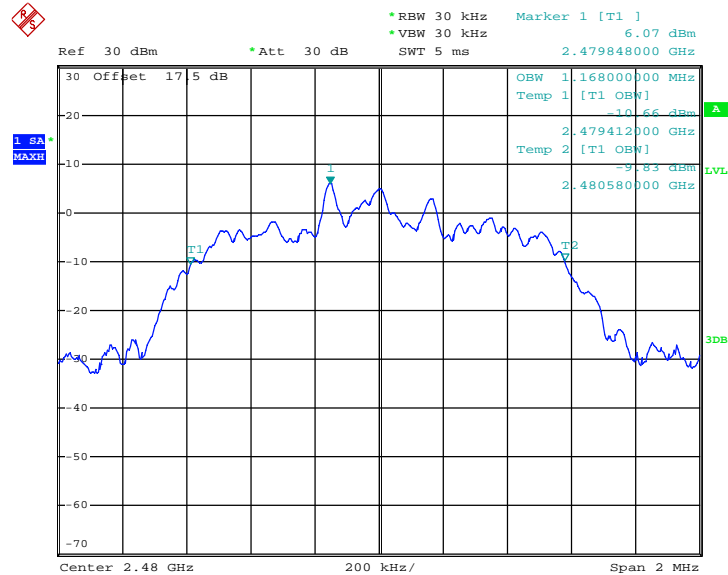


99% Occupied Bandwidth Plot on Channel 39



Date: 2.NOV.2012 07:48:42

99% Occupied Bandwidth Plot on Channel 78



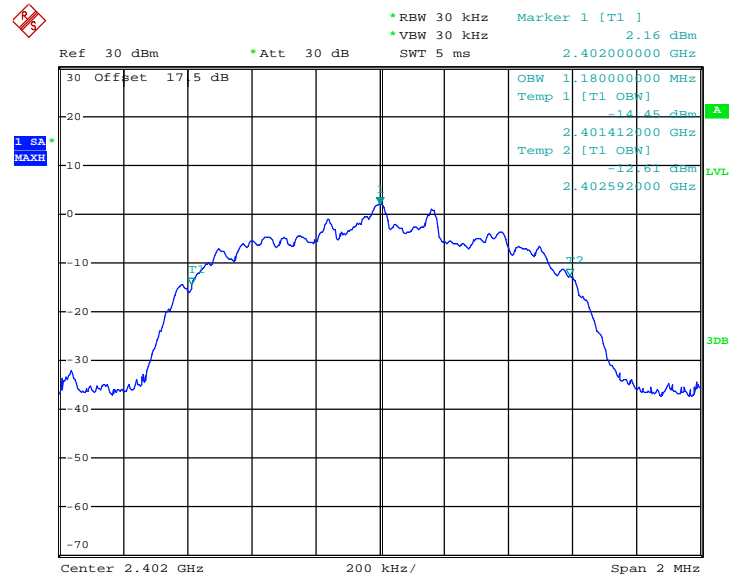
Date: 2.NOV.2012 07:47:01



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 3Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|
| 00 | 2402 | 1.180 |
| 39 | 2441 | 1.168 |
| 78 | 2480 | 1.188 |

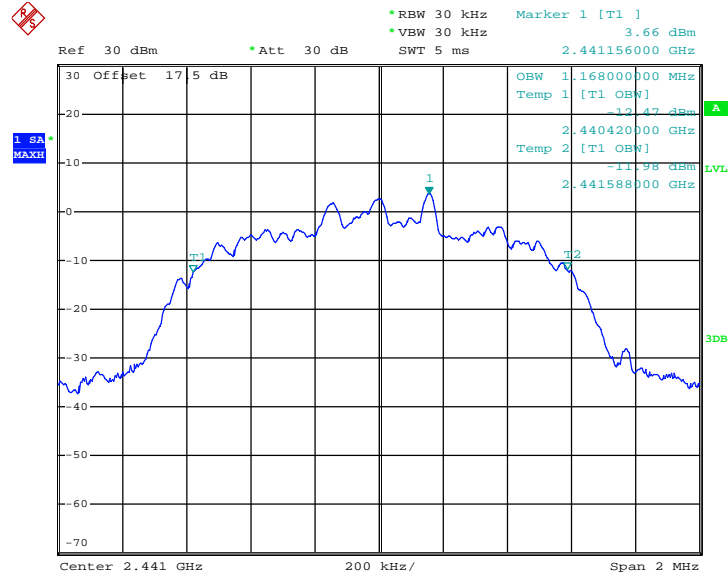
99% Bandwidth Plot on Channel 00



Date: 2.NOV.2012 07:51:46

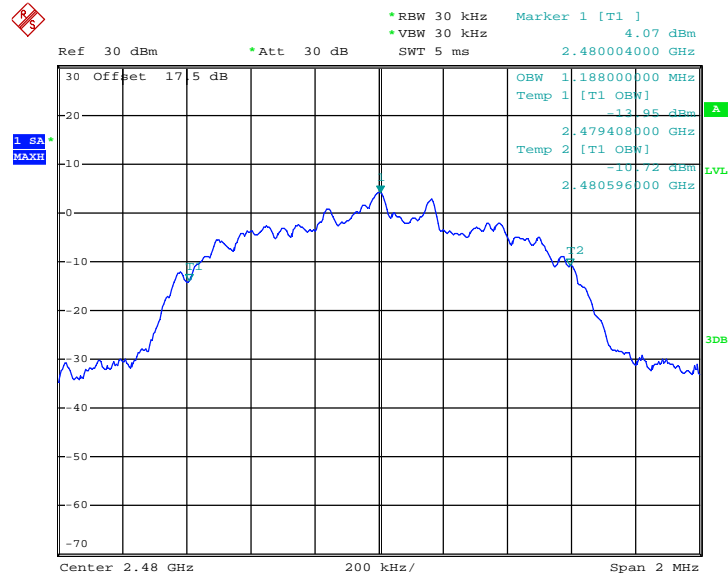


99% Occupied Bandwidth Plot on Channel 39



Date: 2.NOV.2012 07:50:47

99% Occupied Bandwidth Plot on Channel 78



Date: 2.NOV.2012 07:46:22

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts. The power limit for 1Mbps is 1watt, and for 2Mbps, and 3Mbps are 0.125 watts.

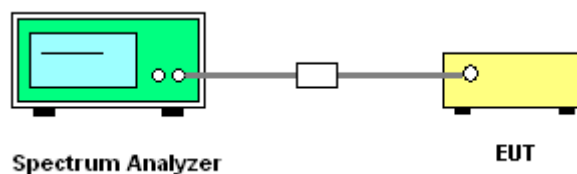
3.5.2 Measuring Instruments

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. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.5.4 Test Setup



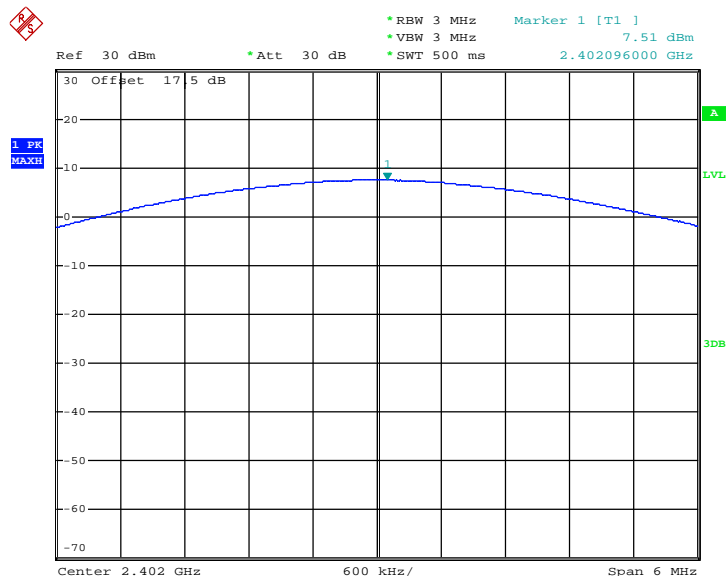


3.5.5 Test Result of Peak Output Power

| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | RF Power (dBm) | | |
|---------|-----------------|----------------|-------------------|-----------|
| | | GFSK | Max. Limits (dBm) | Pass/Fail |
| | | 1 Mbps | | |
| 00 | 2402 | 7.51 | 30.00 | Pass |
| 39 | 2441 | 7.93 | 30.00 | Pass |
| 78 | 2480 | 9.26 | 30.00 | Pass |

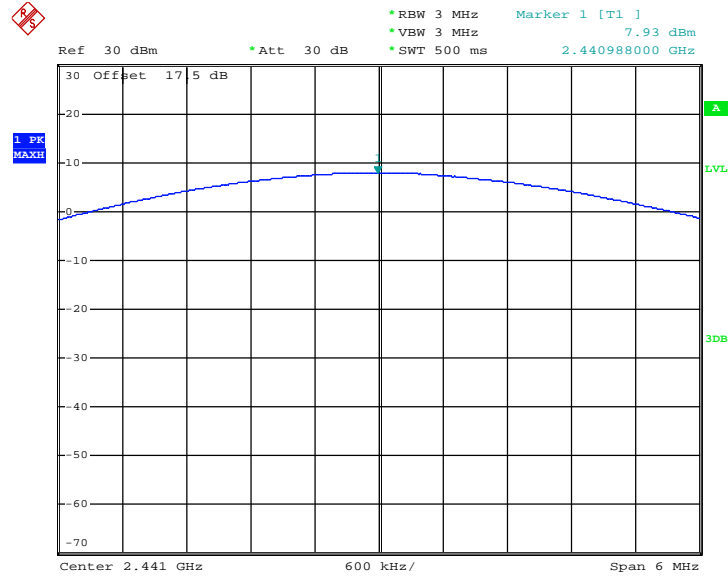
Peak Output Power Plot on Channel 00



Date: 2.NOV.2012 03:17:41

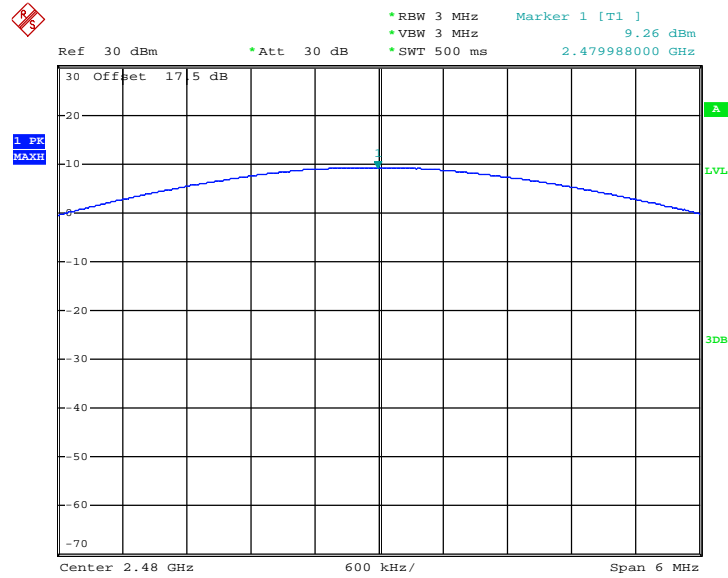


Peak Output Power Plot on Channel 39



Date: 2.NOV.2012 03:21:55

Peak Output Power Plot on Channel 78



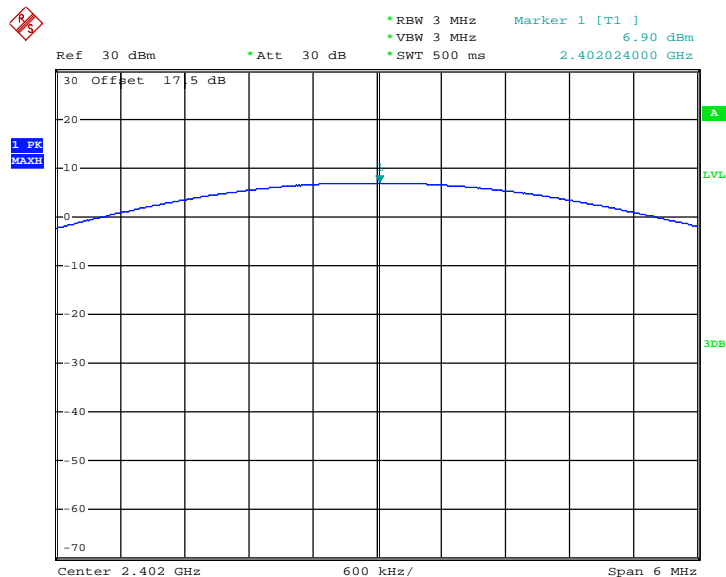
Date: 2.NOV.2012 03:30:53



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 2Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | RF Power (dBm) | | |
|---------|-----------------|----------------|-------------------|-----------|
| | | $\pi/4$ -DQPSK | Max. Limits (dBm) | Pass/Fail |
| | | 2 Mbps | | |
| 00 | 2402 | 6.90 | 20.97 | Pass |
| 39 | 2441 | 7.31 | 20.97 | Pass |
| 78 | 2480 | 8.40 | 20.97 | Pass |

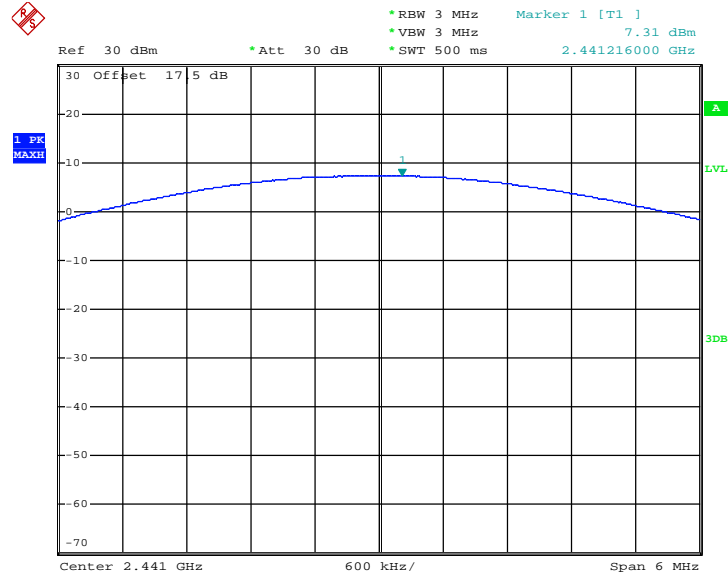
Peak Output Power Plot on Channel 00



Date: 2.NOV.2012 03:19:31

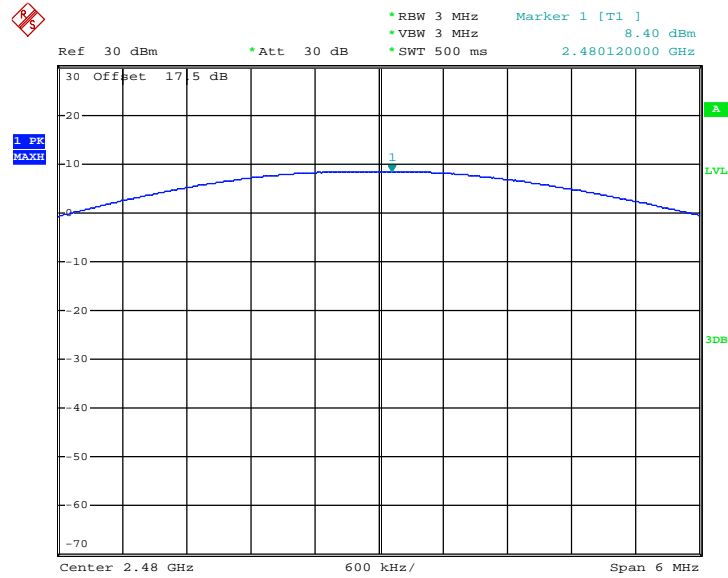


Peak Output Power Plot on Channel 39



Date: 2.NOV.2012 03:23:51

Peak Output Power Plot on Channel 78



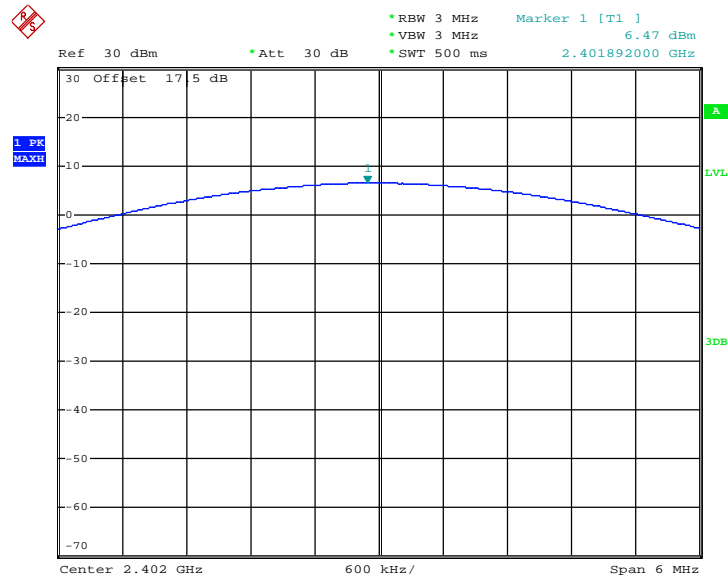
Date: 2.NOV.2012 03:28:18



| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 3Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

| Channel | Frequency (MHz) | RF Power (dBm) | | |
|---------|-----------------|----------------|-------------------|-----------|
| | | 8-DPSK | Max. Limits (dBm) | Pass/Fail |
| | | 3 Mbps | | |
| 00 | 2402 | 6.47 | 20.97 | Pass |
| 39 | 2441 | 6.76 | 20.97 | Pass |
| 78 | 2480 | 8.18 | 20.97 | Pass |

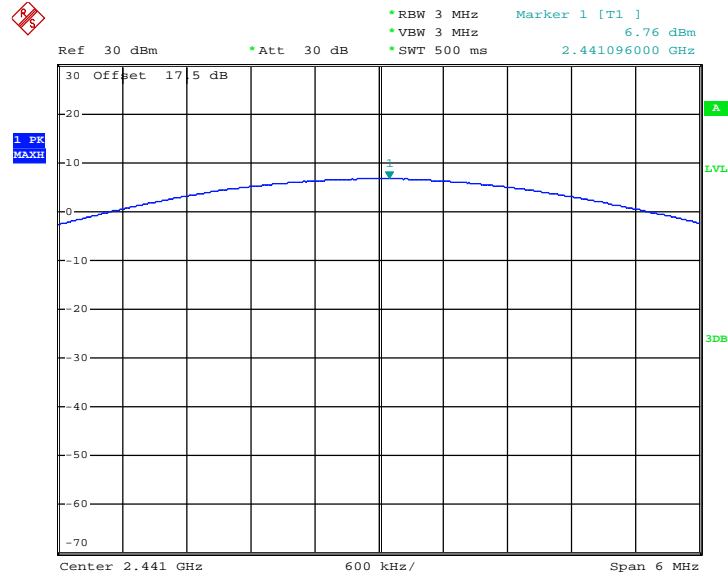
Peak Output Power Plot on Channel 00



Date: 2.NOV.2012 03:21:21

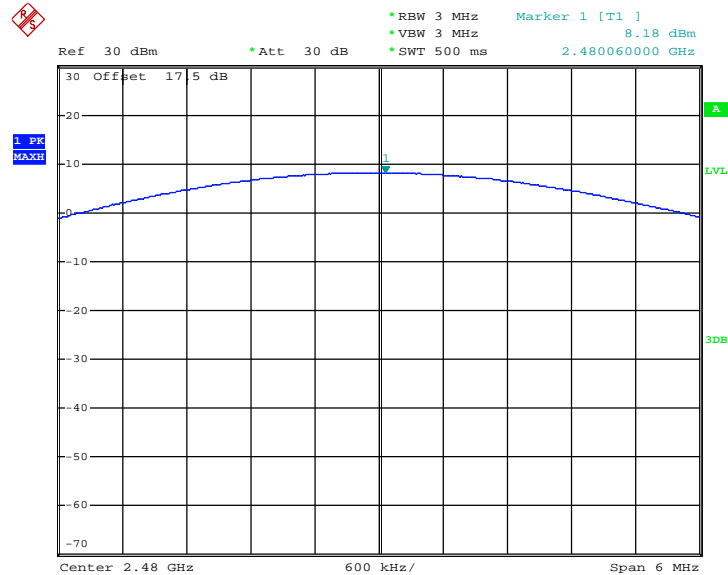


Peak Output Power Plot on Channel 39



Date: 2.NOV.2012 03:25:10

Peak Output Power Plot on Channel 78



Date: 2.NOV.2012 03:26:57

3.6 Conducted 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.

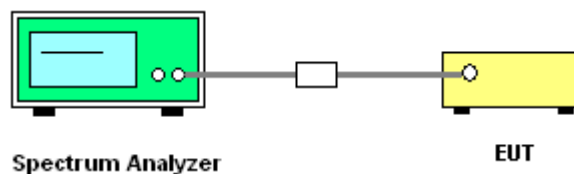
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 300KHz ($\geq 1\%$ span=30MHz), VBW = 300KHz (\geq RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300KHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Record the results in the test report.

3.6.4 Test Setup

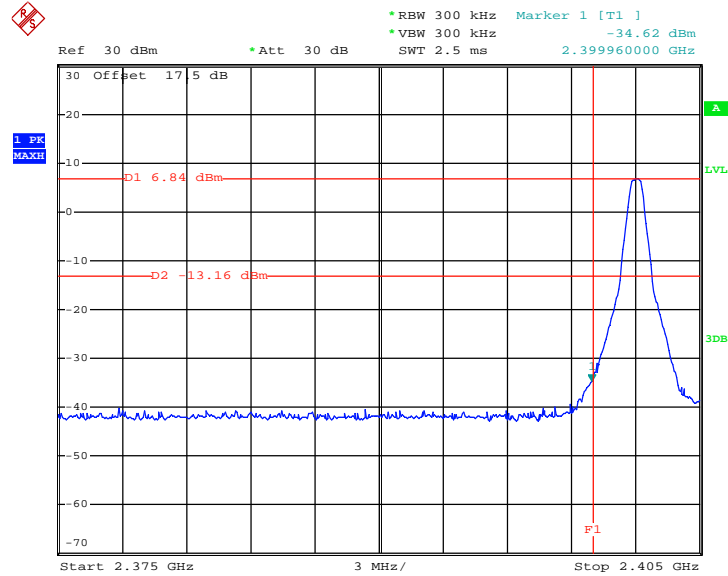




1.6.5 Test Result of Conducted Band Edges

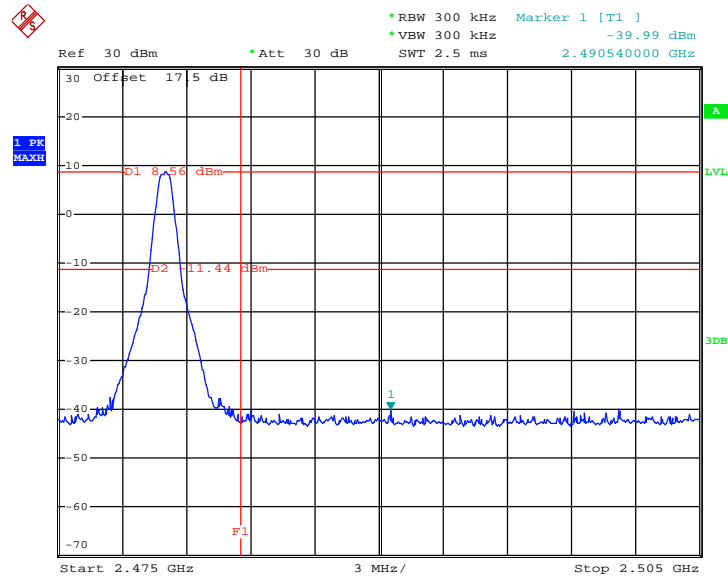
| | | | |
|----------------|-----------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Channel : | 00 and 78 | Relative Humidity : | 41~42% |
| | | Test Engineer : | Zhi Lu |

Low Band Edge Plot on Channel 00



Date: 2.NOV.2012 08:36:55

High Band Edge Plot on Channel 78

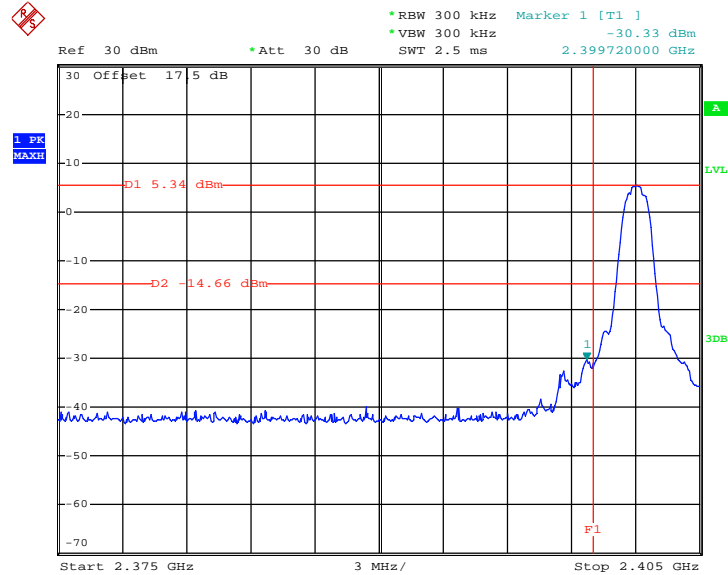


Date: 2.NOV.2012 08:38:46



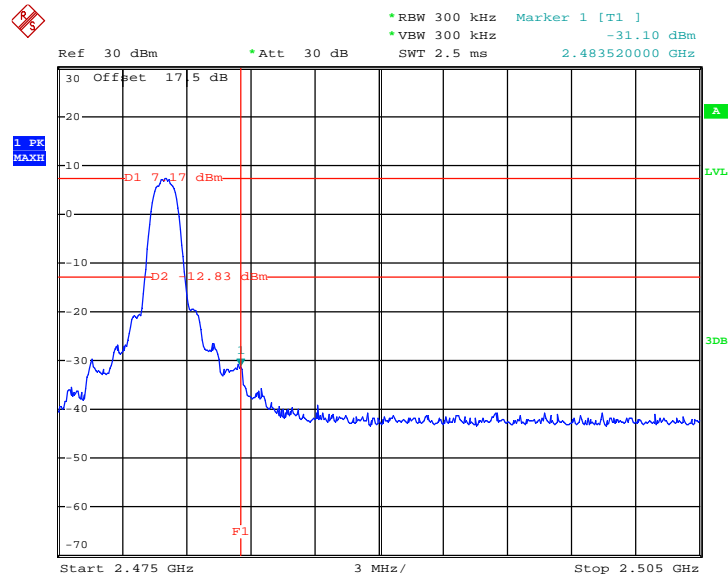
| | | | |
|----------------|-----------|---------------------|---------|
| Test Mode : | 2Mbps | Temperature : | 20~21°C |
| Test Channel : | 00 and 78 | Relative Humidity : | 41~42% |
| | | Test Engineer : | Zhi Lu |

Low Band Edge Plot on Channel 00



Date: 2.NOV.2012 08:40:57

High Band Edge Plot on Channel 78

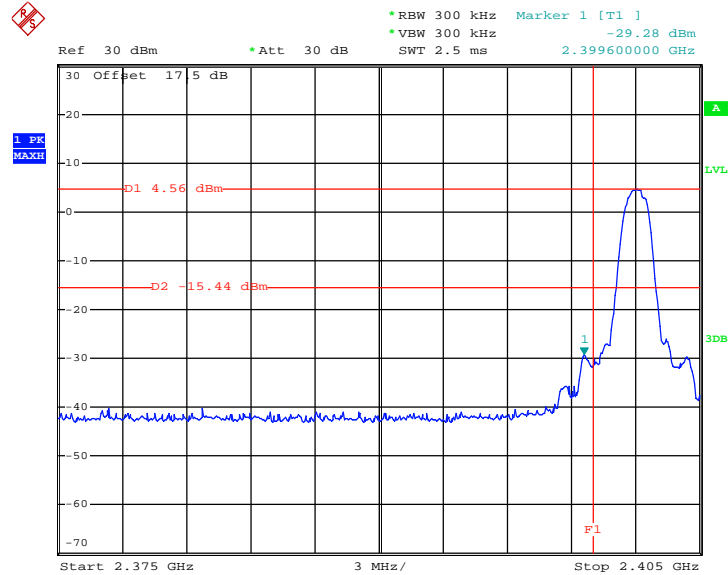


Date: 2.NOV.2012 08:39:48



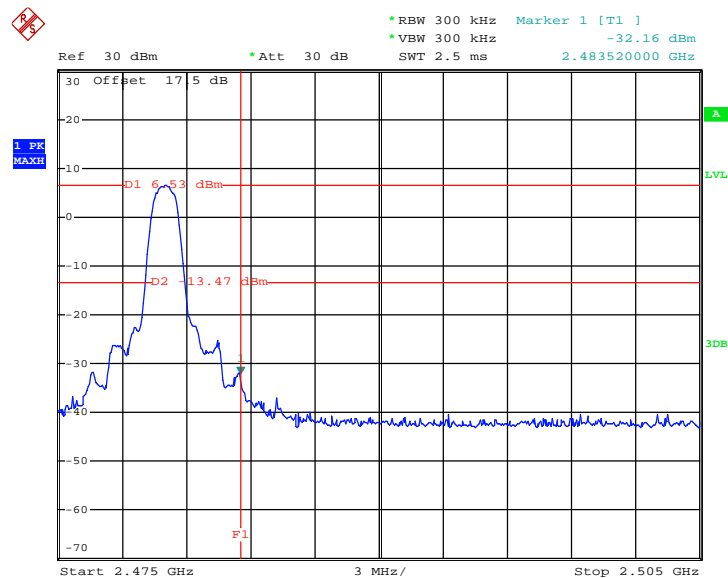
| | | | |
|----------------|-----------|---------------------|---------|
| Test Mode : | 3Mbps | Temperature : | 20~21°C |
| Test Channel : | 00 and 78 | Relative Humidity : | 41~42% |
| | | Test Engineer : | Zhi Lu |

Low Band Edge Plot on Channel 00



Date: 2.NOV.2012 08:43:49

High Band Edge Plot on Channel 78



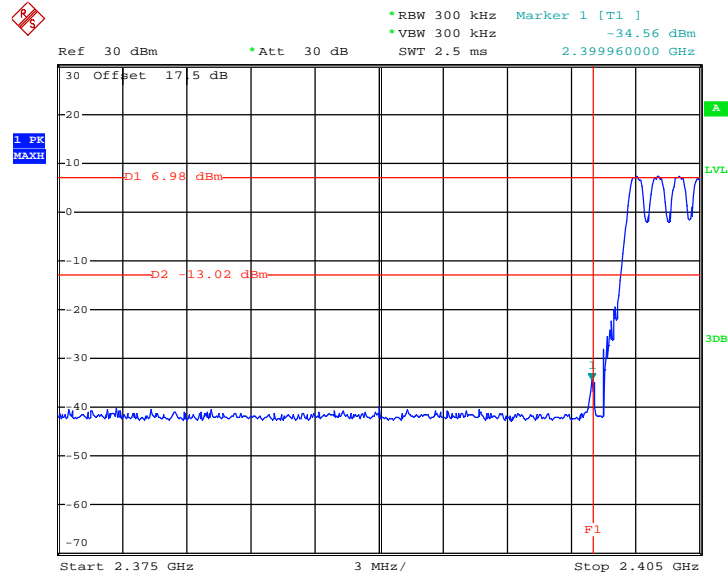
Date: 2.NOV.2012 08:46:03



1.6.6 Test Result of Conducted Hopping Mode Band Edges

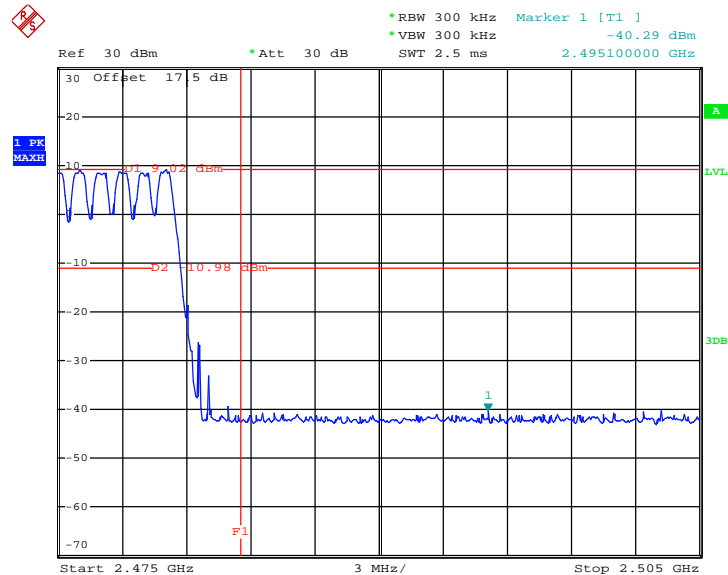
| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

Hopping Mode Low Band Edge Plot



Date: 2.NOV.2012 09:08:56

Hopping Mode High Band Edge Plot

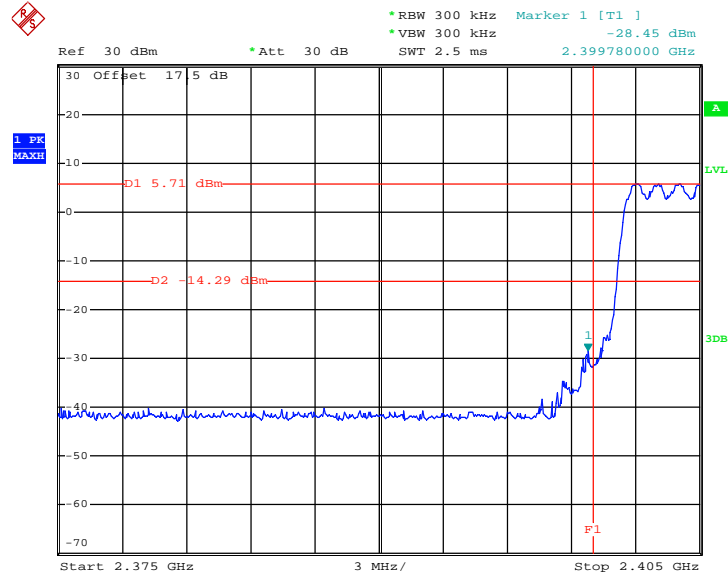


Date: 2.NOV.2012 09:06:18



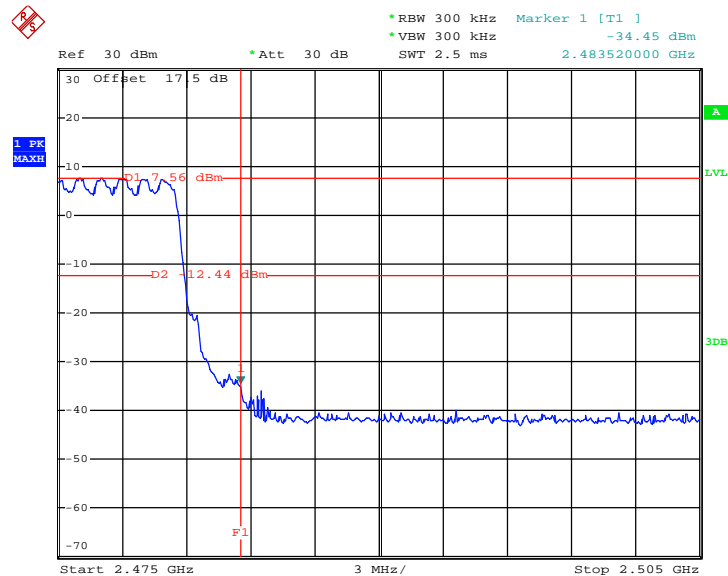
| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 2Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

Hopping Mode Low Band Edge Plot



Date: 2.NOV.2012 09:00:28

Hopping Mode High Band Edge Plot

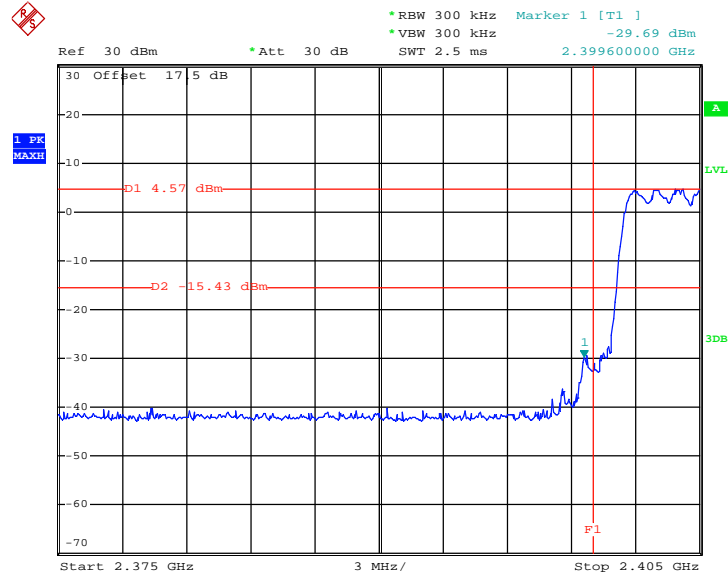


Date: 2.NOV.2012 08:57:23



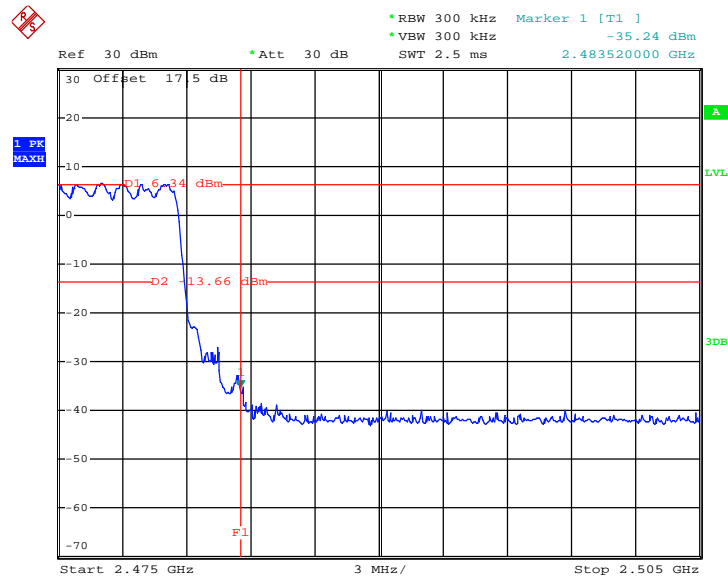
| | | | |
|-----------------|--------|---------------------|---------|
| Test Mode : | 3Mbps | Temperature : | 20~21°C |
| Test Engineer : | Zhi Lu | Relative Humidity : | 41~42% |

Hopping Mode Low Band Edge Plot



Date: 2.NOV.2012 08:51:53

Hopping Mode High Band Edge Plot



Date: 2.NOV.2012 08:49:38

3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

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.

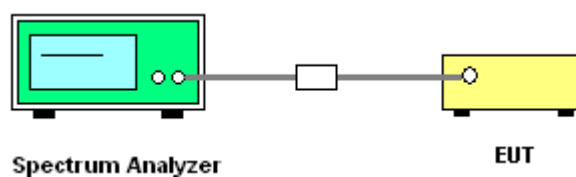
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedure

1. The testing follows the guidelines in Spurious RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines
2. The transmitter output was connected to the spectrum analyzer via a low lose cable.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 KHz, VBW = 300KHz, 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.
5. Record the results in the test report.

3.7.4 Test Setup

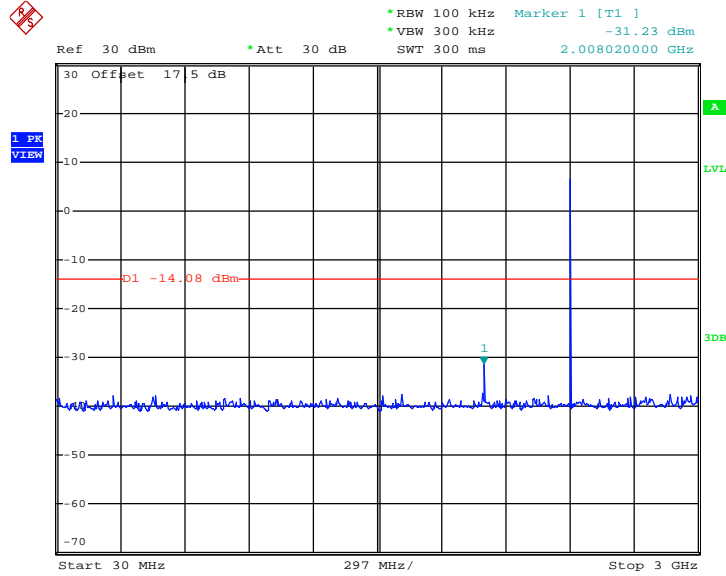




3.7.5 Test Result

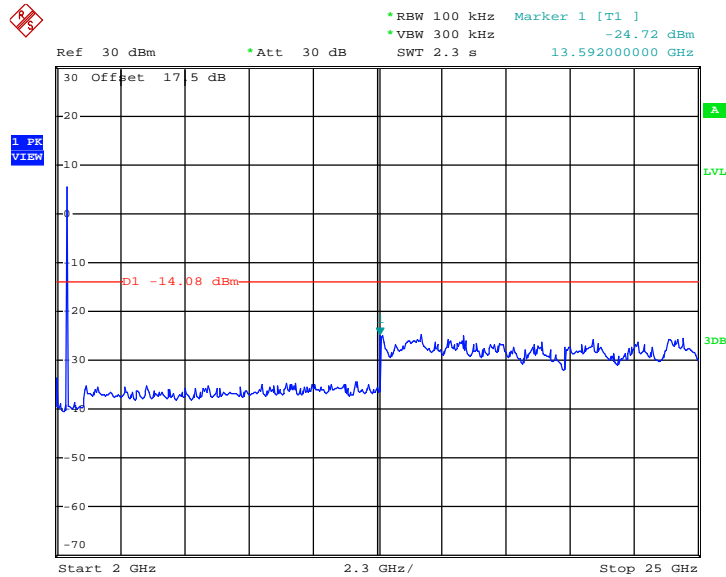
| | | | |
|----------------|-------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Channel : | 00 | Relative Humidity : | 41~42% |
| | | Test Engineer : | Zhi Lu |

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 2.NOV.2012 08:28:30

Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz

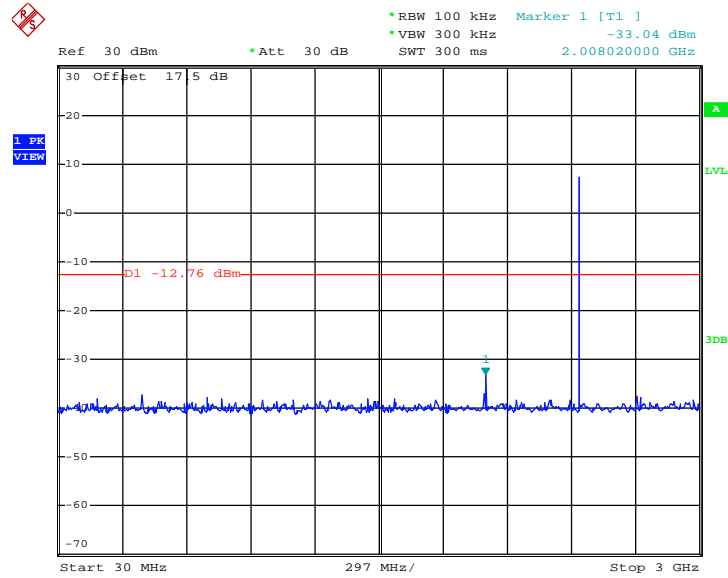


Date: 2.NOV.2012 08:29:02



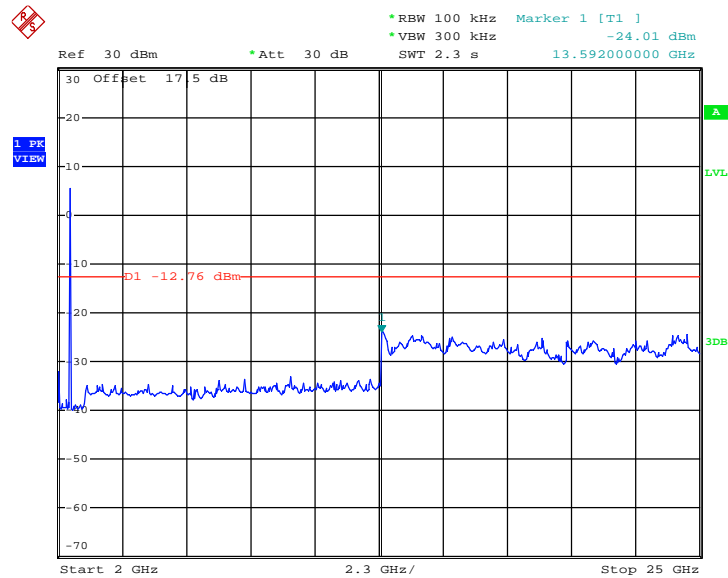
| | | | |
|----------------|-------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Channel : | 39 | Relative Humidity : | 41~42% |
| | | Test Engineer : | Zhi Lu |

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 2.NOV.2012 08:30:11

Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz

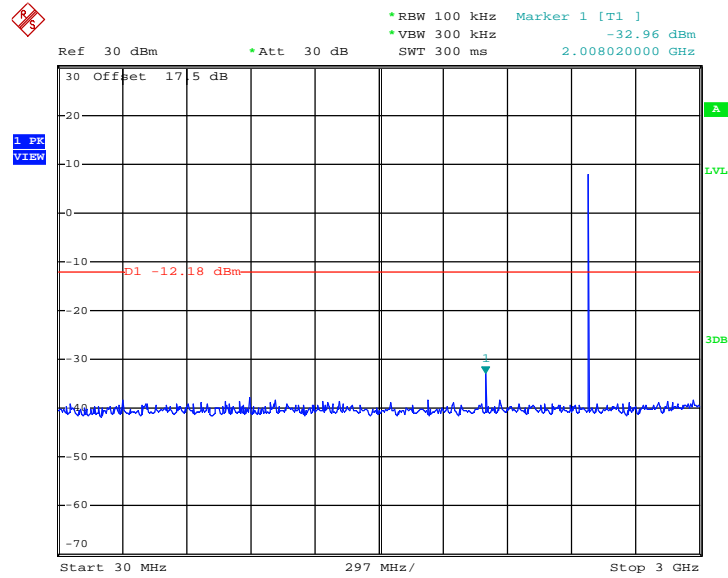


Date: 2.NOV.2012 08:31:30



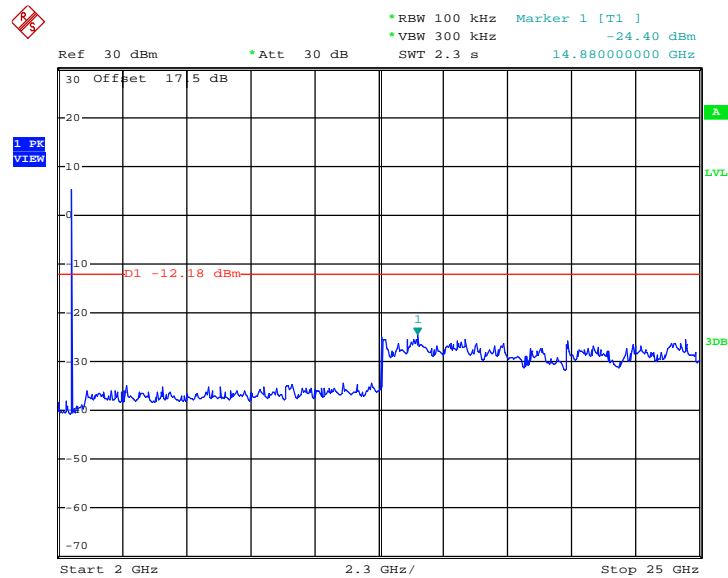
| | | | |
|----------------|-------|---------------------|---------|
| Test Mode : | 1Mbps | Temperature : | 20~21°C |
| Test Channel : | 78 | Relative Humidity : | 41~42% |
| | | Test Engineer : | Zhi Lu |

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 2.NOV.2012 08:32:09

Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz



Date: 2.NOV.2012 08:32:39

3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious 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 |

3.8.2 Measuring Instruments

See list of measuring instruments of this test report.



3.8.3 Test Procedures

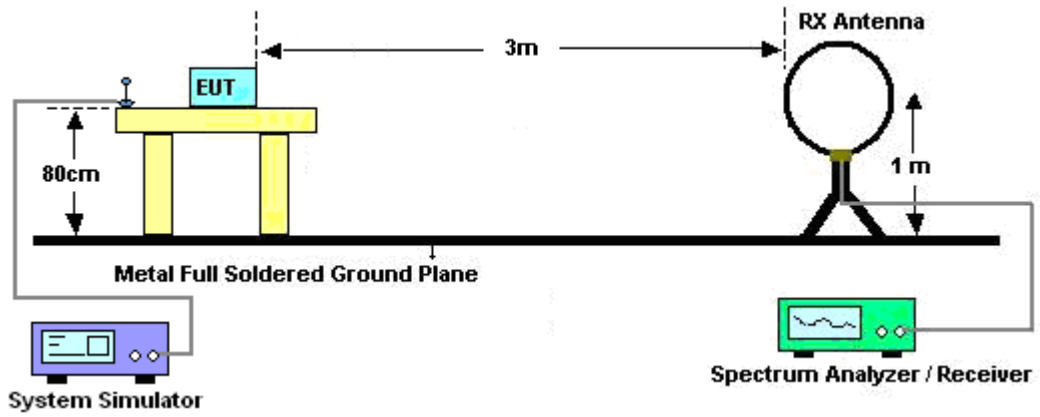
1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines and fulfills ANSI C63.4-2003 and the guidelines in ANSI C63.10-2009 test site requirement.
2. The EUT was placed on a turntable with 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 KHz for $f < 1 \text{ GHz}$, RBW=1MHz for $f > 1\text{GHz}$; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Level = Peak Level + $20 * \log(\text{Duty cycle})$
7. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.5dB) derived from $20 \log(\text{dwell time}/100\text{ms})$.

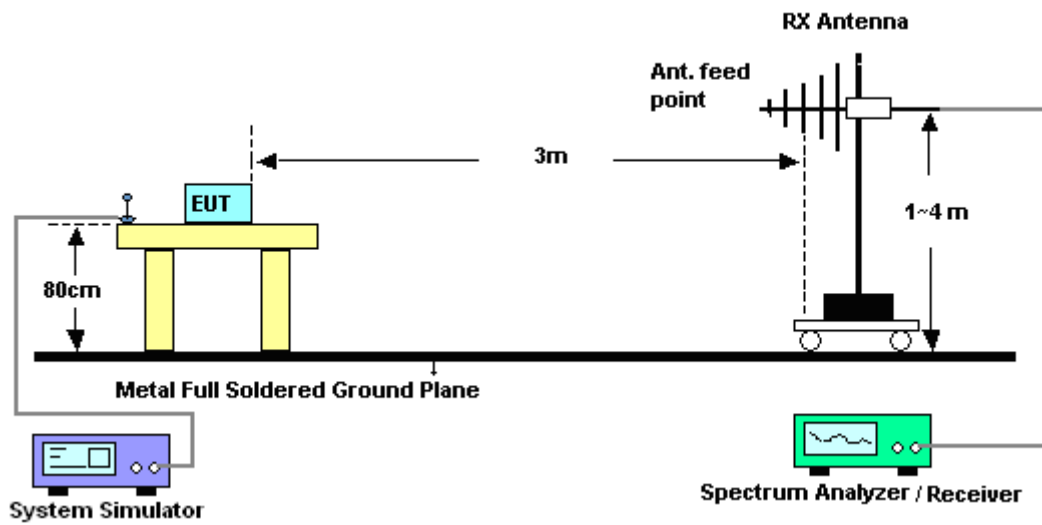
For example: Average level = $45.61\text{dBuV/m} - 24.5 \text{ (dB)} = 21.11\text{dBuV/m}$.

3.8.4 Test Setup

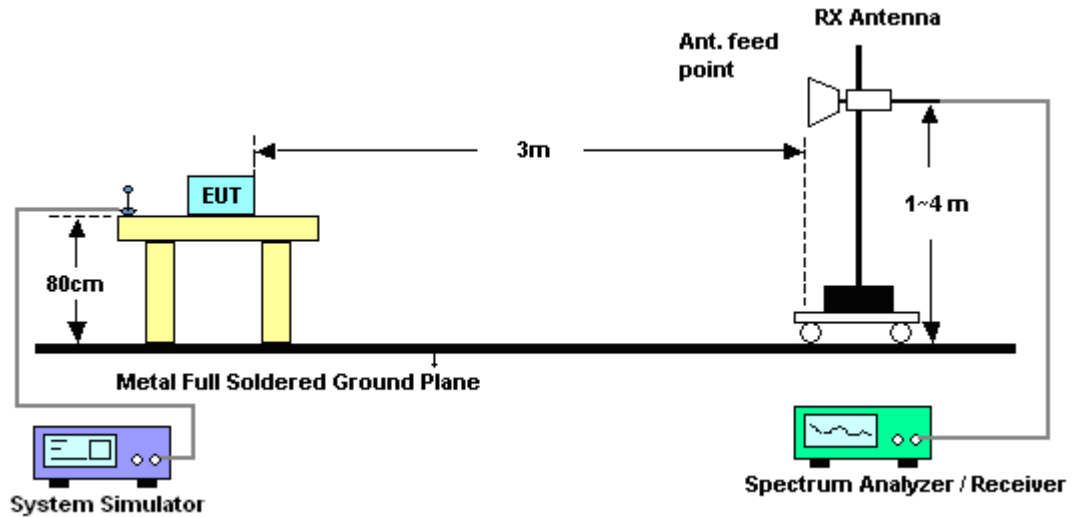
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

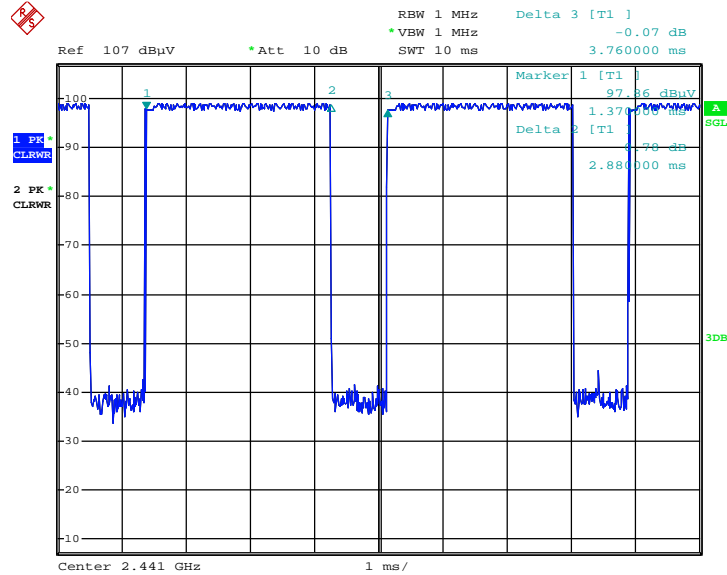


3.8.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

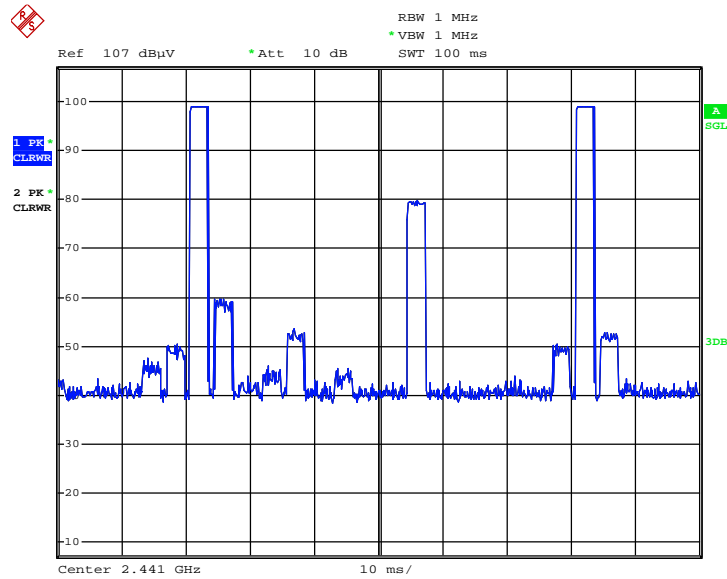
3.8.6 Duty cycle correction factor for average measurement

3DH5 on time/100ms (One Pulse) Plot on Channel 39



Date: 8.NOV.2012 04:08:50

3DH5 on time/100ms (Count Pulses) Plot on Channel 39



Date: 8.NOV.2012 04:08:09

Note:

1. Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
2. Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
3. 3DH5 has the highest duty cycle and is reported.



3.8.7 Test Result of Radiated Band Edges

| | | | |
|----------------|-------|---------------------|--------------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 00 | Relative Humidity : | 46~47% |
| | | Test Engineer : | Chenmy Cheng |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 2383.44 | 47.9 | -26.1 | 74 | 44.49 | 32.83 | 2.09 | 31.51 | 100 | 19 | Peak |
| 2383.44 | 23.11 | -30.89 | 54 | - | - | - | - | - | - | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 2388.39 | 47.35 | -26.65 | 74 | 43.89 | 32.86 | 2.11 | 31.51 | 100 | 12 | Peak |
| 2388.39 | 22.56 | -31.44 | 54 | - | - | - | - | - | - | Average |

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.79dB) derived from 20log (dwell time/100ms).

For example: Average level = 47.35dBuV/m – 24.79 (dB) = 22.56dBuV/m.

| | | | |
|----------------|-------|---------------------|--------------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| | | Test Engineer : | Chenmy Cheng |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|-------------------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 2483.52 | 69.3 | -4.7 | 74 | 65.64 | 33.01 | 2.16 | 31.51 | 100 | 60 | Peak |
| 2483.52 | 44.51 | -9.49 | 54 | - | - | - | - | - | - | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|-----------------------------|------------------|-------------------|-----------------------|---------------------|-----------------------|-------------------|----------------------|----------------|-------------------|---------|
| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
| 2483.5 | 68.17 | -5.83 | 74 | 64.51 | 33.01 | 2.16 | 31.51 | 110 | 0 | Peak |
| 2483.5 | 43.38 | -10.62 | 54 | - | - | - | - | - | - | Average |



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

| | | | |
|-----------------|--|---------------------|------------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 00 | Relative Humidity : | 46~47% |
| Test Engineer : | Chenmy Cheng | Polarization : | Horizontal |
| Remark : | 2402 MHz is fundamental signal which can be ignored. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 31.731 | 19.28 | -20.72 | 40 | 35.96 | 16.55 | 0.35 | 33.58 | - | - | Peak |
| 119.436 | 19.23 | -24.27 | 43.5 | 40.4 | 11.8 | 0.63 | 33.6 | - | - | Peak |
| 193.773 | 18.55 | -24.95 | 43.5 | 42.6 | 8.7 | 0.81 | 33.56 | - | - | Peak |
| 307.831 | 22.39 | -23.61 | 46 | 41.59 | 13.17 | 1 | 33.37 | - | - | Peak |
| 912.862 | 36.2 | -9.8 | 46 | 46.35 | 20.51 | 1.77 | 32.43 | 100 | 116 | Peak |
| 942.131 | 34.27 | -11.73 | 46 | 44.26 | 20.7 | 1.75 | 32.44 | - | - | Peak |
| 2402 | 102.56 | - | - | 99.1 | 32.86 | 2.11 | 31.51 | 100 | 60 | Peak |
| 2402 | 77.77 | - | - | - | - | - | - | - | - | Average |
| 2816 | 56.97 | -17.03 | 74 | 52.8 | 33.52 | 2.16 | 31.51 | 100 | 112 | Peak |
| 2816 | 32.18 | -21.82 | 54 | - | - | - | - | - | - | Average |

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.79dB) derived from 20log (dwell time/100ms).

For example: Average level = 56.97dBuV/m – 24.79 (dB) =32.18dBuV/m.



| | | | |
|-----------------|--|---------------------|----------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 00 | Relative Humidity : | 46~47% |
| Test Engineer : | Chenmy Cheng | Polarization : | Vertical |
| Remark : | 2402 MHz is fundamental signal which can be ignored. | | |

| Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 33.095 | 21.26 | -18.74 | 40 | 38.46 | 16.04 | 0.35 | 33.59 | - | - | Peak |
| 63.092 | 18.22 | -21.78 | 40 | 46.07 | 5.25 | 0.49 | 33.59 | - | - | Peak |
| 110.569 | 21.99 | -21.51 | 43.5 | 43.2 | 11.8 | 0.6 | 33.61 | - | - | Peak |
| 119.018 | 20.65 | -22.85 | 43.5 | 41.82 | 11.8 | 0.63 | 33.6 | - | - | Peak |
| 171.393 | 18.21 | -25.29 | 43.5 | 41.93 | 9.08 | 0.77 | 33.57 | - | - | Peak |
| 945.44 | 33.6 | -12.4 | 46 | 43.58 | 20.71 | 1.75 | 32.44 | 100 | 152 | Peak |
| 2402 | 101.86 | - | - | 98.4 | 32.86 | 2.11 | 31.51 | 110 | 0 | Peak |
| 2402 | 77.07 | - | - | - | - | - | - | - | - | Average |
| 2814 | 61.39 | -12.61 | 74 | 57.22 | 33.52 | 2.16 | 31.51 | 100 | 90 | Peak |
| 2814 | 36.6 | -17.4 | 54 | - | - | - | - | - | - | Average |



| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 39 | Relative Humidity : | 46~47% |
| Test Engineer : | Chenmy Cheng | Polarization : | Horizontal |
| Remark : | 2441 MHz is fundamental signal which can be ignored. | | |

| Frequency (MHz) | Level (dBµV/m) | Over Limit (dB) | Limit Line (dBµV/m) | Read Level (dBµV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 34.156 | 18.52 | -21.48 | 40 | 36.2 | 15.56 | 0.36 | 33.6 | - | - | Peak |
| 118.601 | 19.85 | -23.65 | 43.5 | 41.02 | 11.8 | 0.63 | 33.6 | - | - | Peak |
| 170.195 | 18.4 | -25.1 | 43.5 | 42.07 | 9.14 | 0.76 | 33.57 | - | - | Peak |
| 197.2 | 19.13 | -24.37 | 43.5 | 43.01 | 8.86 | 0.82 | 33.56 | - | - | Peak |
| 303.544 | 21.83 | -24.17 | 46 | 41.12 | 13.08 | 1 | 33.37 | - | - | Peak |
| 942.131 | 32.73 | -13.27 | 46 | 42.72 | 20.7 | 1.75 | 32.44 | 100 | 29 | Peak |
| 2441 | 103.21 | - | - | 99.63 | 32.95 | 2.14 | 31.51 | 100 | 60 | Peak |
| 2441 | 78.42 | - | - | - | - | - | - | - | - | Average |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 39 | Relative Humidity : | 46~47% |
| Test Engineer : | Chenmy Cheng | Polarization : | Vertical |
| Remark : | 2441 MHz is fundamental signal which can be ignored. | | |

| Frequency (MHz) | Level (dBµV/m) | Over Limit (dB) | Limit Line (dBµV/m) | Read Level (dBµV) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 33.211 | 21.03 | -18.97 | 40 | 38.23 | 16.04 | 0.35 | 33.59 | - | - | Peak |
| 63.313 | 18.44 | -21.56 | 40 | 46.29 | 5.25 | 0.49 | 33.59 | - | - | Peak |
| 88.964 | 19.45 | -24.05 | 43.5 | 43.91 | 8.61 | 0.55 | 33.62 | - | - | Peak |
| 111.347 | 22.76 | -20.74 | 43.5 | 43.96 | 11.8 | 0.61 | 33.61 | - | - | Peak |
| 172.599 | 18.55 | -24.95 | 43.5 | 42.34 | 9.01 | 0.77 | 33.57 | - | - | Peak |
| 945.44 | 33.2 | -12.8 | 46 | 43.18 | 20.71 | 1.75 | 32.44 | 100 | 110 | Peak |
| 2441 | 101.21 | - | - | 97.63 | 32.95 | 2.14 | 31.51 | 110 | 0 | Peak |
| 2441 | 76.42 | - | - | - | - | - | - | - | - | Average |

| | | | |
|------------------------|--|----------------------------|------------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Chenmy Cheng | Polarization : | Horizontal |
| Remark : | 2480 MHz is fundamental signal which can be ignored. | | |

| Frequency (MHz) | Level (dB μ V/m) | Over Limit (dB) | Limit Line (dB μ V/m) | Read Level (dB μ V) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------------|-------------------------|-----------------------------------|---------------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 31.51 | 18.56 | -21.44 | 40 | 35.24 | 16.55 | 0.35 | 33.58 | - | - | Peak |
| 118.601 | 20.22 | -23.28 | 43.5 | 41.39 | 11.8 | 0.63 | 33.6 | - | - | Peak |
| 172.599 | 18.94 | -24.56 | 43.5 | 42.73 | 9.01 | 0.77 | 33.57 | - | - | Peak |
| 299.316 | 22.49 | -23.51 | 46 | 41.88 | 13 | 0.99 | 33.38 | - | - | Peak |
| 912.862 | 30.26 | -15.74 | 46 | 40.41 | 20.51 | 1.77 | 32.43 | - | - | Peak |
| 942.131 | 32.92 | -13.08 | 46 | 42.91 | 20.7 | 1.75 | 32.44 | 100 | 221 | Peak |
| 2480 | 104.64 | - | - | 100.98 | 33.01 | 2.16 | 31.51 | 100 | 199 | Peak |
| 2480 | 79.85 | - | - | - | - | - | - | - | - | Average |

| | | | |
|------------------------|--|----------------------------|----------|
| Test Mode : | 1Mbps | Temperature : | 21~22°C |
| Test Channel : | 78 | Relative Humidity : | 46~47% |
| Test Engineer : | Chenmy Cheng | Polarization : | Vertical |
| Remark : | 2480 MHz is fundamental signal which can be ignored. | | |

| Frequency (MHz) | Level (dB μ V/m) | Over Limit (dB) | Limit Line (dB μ V/m) | Read Level (dB μ V) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Remark |
|----------------------|---------------------------|-------------------------|-----------------------------------|---------------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30.638 | 23 | -17 | 40 | 38.95 | 17.29 | 0.34 | 33.58 | - | - | Peak |
| 38.752 | 20.43 | -19.57 | 40 | 40.7 | 12.98 | 0.39 | 33.64 | - | - | Peak |
| 110.957 | 21.77 | -21.73 | 43.5 | 42.98 | 11.8 | 0.6 | 33.61 | - | - | Peak |
| 118.601 | 21.31 | -22.19 | 43.5 | 42.48 | 11.8 | 0.63 | 33.6 | - | - | Peak |
| 171.995 | 18.27 | -25.23 | 43.5 | 41.99 | 9.08 | 0.77 | 33.57 | - | - | Peak |
| 945.44 | 33.46 | -12.54 | 46 | 43.44 | 20.71 | 1.75 | 32.44 | 100 | 91 | Peak |
| 2480 | 103.21 | - | - | 99.55 | 33.01 | 2.16 | 31.51 | 100 | 21 | Peak |
| 2480 | 78.42 | - | - | - | - | - | - | - | - | Average |

3.9 AC Conducted Emission Measurement

3.9.1 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.

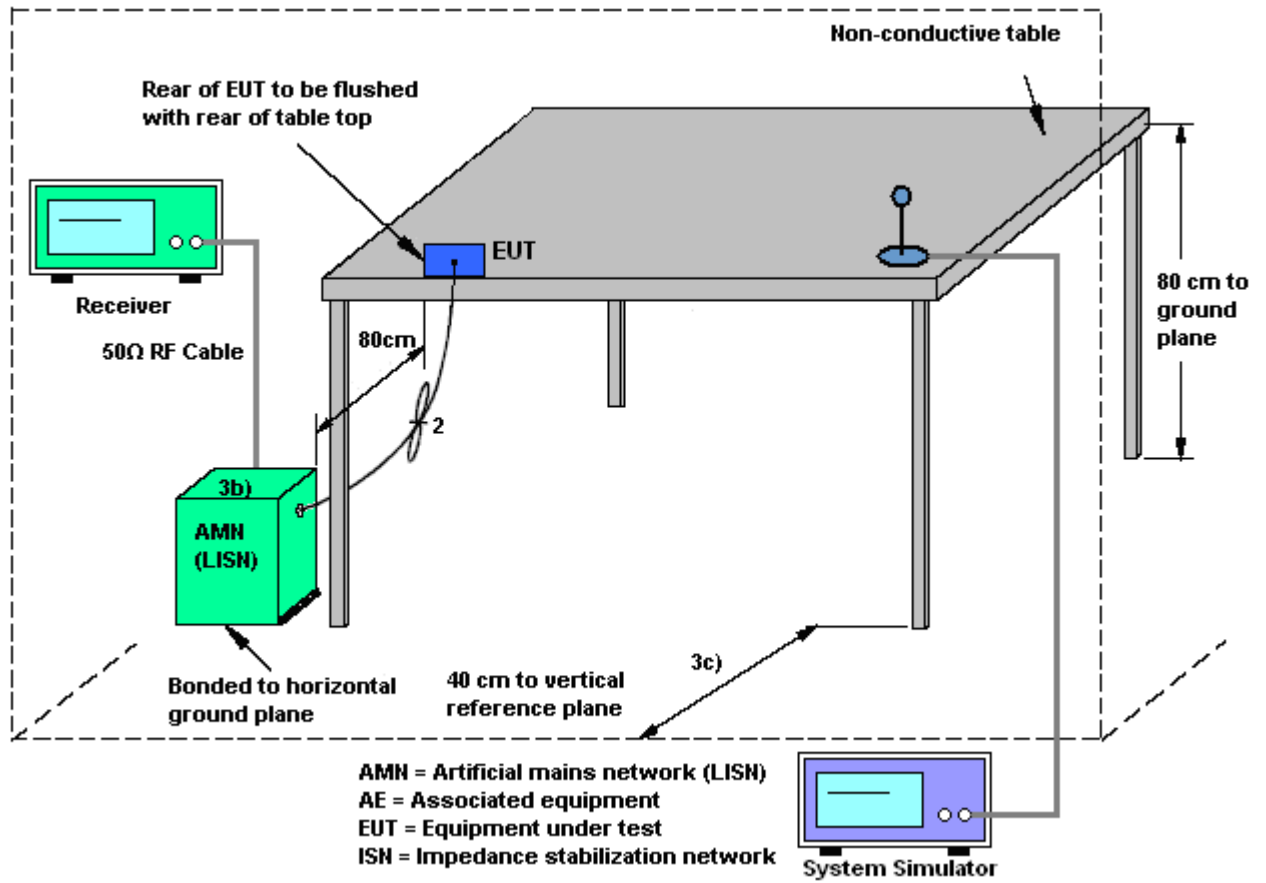
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Procedures

1. The test follows the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009 test site requirement.
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.

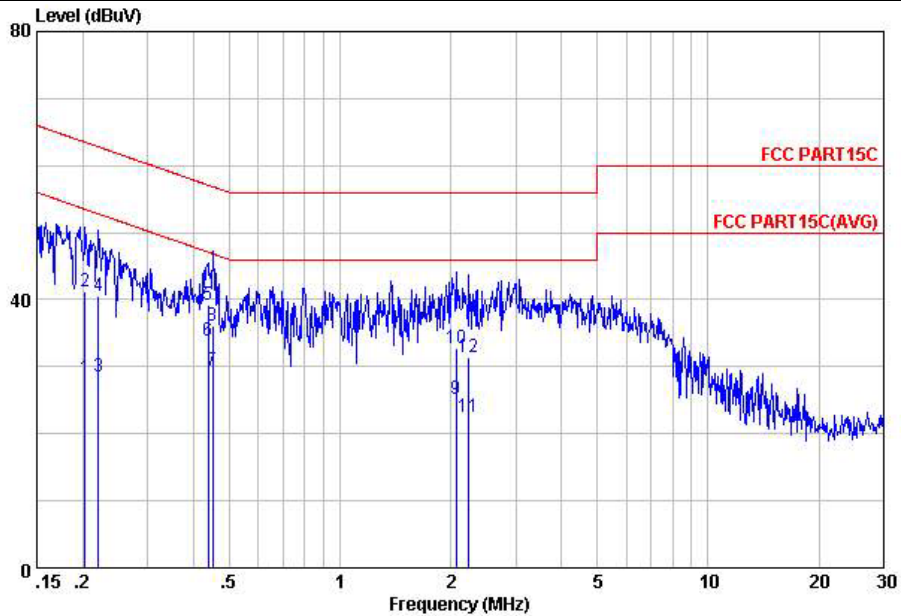
3.9.4 Test Setup





3.9.5 Test Result of AC Conducted Emission

| | | | |
|-----------------|---|---------------------|---------|
| Test Mode : | Mode 1 | Temperature : | 19~20°C |
| Test Engineer : | Tom Wang | Relative Humidity : | 39~40% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Line |
| Function Type : | CDMA BC0 Idle + Bluetooth Link + USB Cable (Charging from Adapter) + Earphone | | |
| Remark : | All emissions not reported here are more than 10 dB below the prescribed limit. | | |

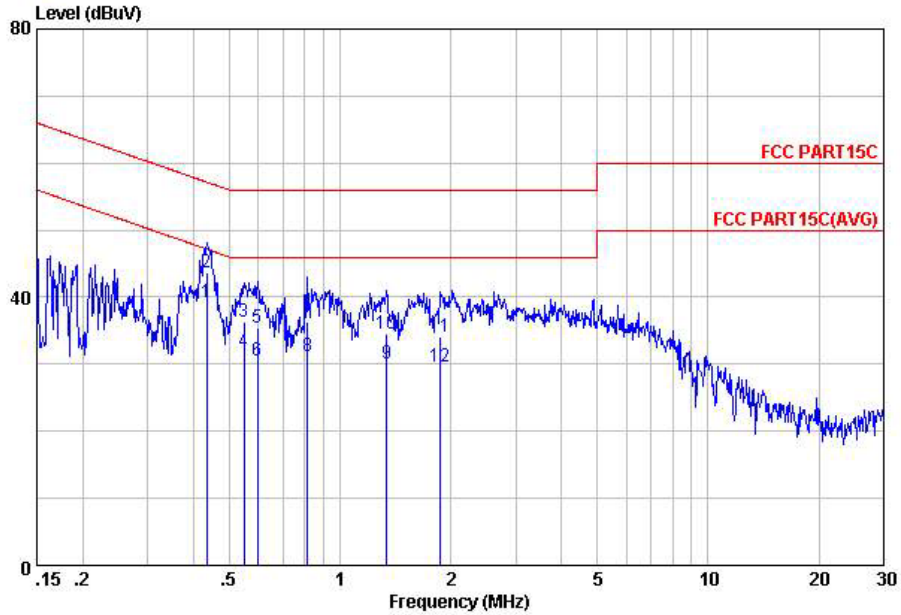


Site : C001-KS
 Condition: FCC PART15C LISN-111230 LINE

| | Freq | Level | Over | Limit | Read | LISN | Cable | |
|----|------|-------|--------|-------|-------|--------|-------|---------|
| | MHz | dBuV | Limit | Line | Level | Factor | Loss | Remark |
| | | | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.20 | 28.23 | -25.26 | 53.49 | 17.80 | -0.07 | 10.50 | Average |
| 2 | 0.20 | 41.13 | -22.36 | 63.49 | 30.70 | -0.07 | 10.50 | QP |
| 3 | 0.22 | 28.54 | -24.25 | 52.79 | 18.10 | -0.07 | 10.51 | Average |
| 4 | 0.22 | 40.54 | -22.25 | 62.79 | 30.10 | -0.07 | 10.51 | QP |
| 5 | 0.44 | 39.24 | -17.87 | 57.11 | 28.70 | -0.08 | 10.62 | QP |
| 6 | 0.44 | 33.84 | -13.27 | 47.11 | 23.30 | -0.08 | 10.62 | Average |
| 7 | 0.45 | 29.44 | -17.41 | 46.85 | 18.90 | -0.08 | 10.62 | Average |
| 8 | 0.45 | 36.14 | -20.71 | 56.85 | 25.60 | -0.08 | 10.62 | QP |
| 9 | 2.07 | 25.19 | -20.81 | 46.00 | 14.60 | -0.11 | 10.70 | Average |
| 10 | 2.07 | 32.69 | -23.31 | 56.00 | 22.10 | -0.11 | 10.70 | QP |
| 11 | 2.24 | 22.60 | -23.40 | 46.00 | 12.00 | -0.11 | 10.71 | Average |
| 12 | 2.24 | 31.40 | -24.60 | 56.00 | 20.80 | -0.11 | 10.71 | QP |



| | | | |
|-----------------|---|---------------------|---------|
| Test Mode : | Mode 1 | Temperature : | 19~20°C |
| Test Engineer : | Tom Wang | Relative Humidity : | 39~40% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Neutral |
| Function Type : | CDMA BC0 Idle + Bluetooth Link + USB Cable (Charging from Adapter) + Earphone | | |
| Remark : | All emissions not reported here are more than 10 dB below the prescribed limit. | | |



Site : C001-KS
 Condition: FCC PART15C LISN-111230 NEUTRAL

| | Freq | Level | Over | Limit | Read | LISN | Cable | Remark |
|----|------|-------|--------|-------|-------|--------|-------|---------|
| | MHz | dBuV | Limit | Line | Level | Factor | Loss | |
| | | | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.44 | 39.24 | -7.91 | 47.15 | 28.70 | -0.08 | 10.62 | Average |
| 2 | 0.44 | 43.64 | -13.51 | 57.15 | 33.10 | -0.08 | 10.62 | QP |
| 3 | 0.55 | 36.35 | -19.65 | 56.00 | 25.80 | -0.08 | 10.63 | QP |
| 4 | 0.55 | 31.95 | -14.05 | 46.00 | 21.40 | -0.08 | 10.63 | Average |
| 5 | 0.60 | 35.35 | -20.65 | 56.00 | 24.80 | -0.08 | 10.63 | QP |
| 6 | 0.60 | 30.45 | -15.55 | 46.00 | 19.90 | -0.08 | 10.63 | Average |
| 7 | 0.82 | 36.26 | -19.74 | 56.00 | 25.69 | -0.08 | 10.65 | QP |
| 8 | 0.82 | 31.16 | -14.84 | 46.00 | 20.59 | -0.08 | 10.65 | Average |
| 9 | 1.34 | 30.07 | -15.93 | 46.00 | 19.50 | -0.10 | 10.67 | Average |
| 10 | 1.34 | 34.47 | -21.53 | 56.00 | 23.90 | -0.10 | 10.67 | QP |
| 11 | 1.88 | 33.99 | -22.01 | 56.00 | 23.40 | -0.11 | 10.70 | QP |
| 12 | 1.88 | 29.59 | -16.41 | 46.00 | 19.00 | -0.11 | 10.70 | Average |



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

Non-standard connector used.

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 | Test Date | Due Date | Remark |
|---------------------------|--------------|-----------|------------------|-----------------|------------------|---------------------------------|---------------|-----------------------|
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9kHz~40GHz | Dec. 30, 2011 | Nov. 02, 2012~ Nov. 08, 2012 | Dec. 29, 2012 | Conducted (TH01-KS) |
| Power Meter | Agilent | E4416A | MY45101555 | N/A | Aug. 22, 2012 | Nov. 02, 2012~ Nov. 08, 2012 | Aug. 21, 2013 | Conducted (TH01-KS) |
| Power Sensor | Agilent | E9327A | MY44421198 | N/A | Aug. 22, 2012 | Nov. 02, 2012~ Nov. 08, 2012 | Aug. 21, 2013 | Conducted (TH01-KS) |
| DC Power Supply | GWINSTEK | GPS-3030D | E1884515 | N/A | Aug. 22, 2012 | Nov. 02, 2012~ Nov. 08, 2012 | Aug. 21, 2013 | Conducted (TH01-KS) |
| Thermal Chamber | Ten Billion | TTC-B3S | TBN-960502 | N/A | Dec. 30, 2011 | Nov. 02, 2012~ Nov. 08, 2012 | Dec. 29, 2012 | Conducted (TH01-KS) |
| Bluetooth Base Station | R&S | CBT | 100783 | N/A | Aug. 17, 2012 | Nov. 02, 2012~ Nov. 08, 2012 | Aug. 16, 2013 | Conducted (TH01-KS) |
| EMI Test Receiver | R&S | ESCI | 100534 | 9kHz~3GHz | Nov. 09, 2011 | Nov. 06, 2012 | Nov. 08, 2012 | Radiation (03CH01-KS) |
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9kHz~40GHz | Dec. 30, 2011 | Nov. 06, 2012 | Dec. 29, 2012 | Radiation (03CH01-KS) |
| Bilog Antenna | SCHAFFNER | CBL6112D | 23182 | 25MHz~2GHz | Dec. 08, 2011 | Nov. 06, 2012 | Dec. 07, 2012 | Radiation (03CH01-KS) |
| Loop Antenna | R&S | HFH2-Z2 | 860004/ 001 | 9 kHz~30 MHz | Jul. 03, 2012 | Nov. 06, 2012 | Jul. 02, 2014 | Radiation (03CH01-KS) |
| Double Ridge Horn Antenna | EMCO | 3117 | 00075959 | 1GHz~18GHz | Jan. 06, 2012 | Nov. 06, 2012 | Jan. 05, 2013 | Radiation (03CH01-KS) |
| Amplifier | Wireless | FPA-6592G | 060004 | 30MHz~2GHz | Dec. 30, 2011 | Nov. 06, 2012 | Dec. 29, 2012 | Radiation (03CH01-KS) |
| Amplifier | Agilent | 8449B | 3008A02370 | 1GHz~26.5GHz | Dec. 30, 2011 | Nov. 06, 2012 | Dec. 29, 2012 | Radiation (03CH01-KS) |
| Active Horn Antenna | com-power | AHA-118 | 701023 | 1GHz~18GHz | Nov. 07, 2011 | Nov. 06, 2012 | Nov. 06, 2012 | Radiation (03CH01-KS) |
| SHF-EHF Horn | Schwarzbeck | BBHA 9170 | BBHA170249 | 15GHz~40GHz | Oct. 10, 2012 | Nov. 06, 2012 | Oct. 09, 2013 | Radiation (03CH01-KS) |
| Bluetooth Base Station | R&S | CBT | 100783 | N/A | Aug. 17, 2012 | Nov. 06, 2012 | Aug. 16, 2013 | Radiation (03CH01-KS) |
| EMI Receiver | R&S | ESCI7 | 100768 | 9kHz~7GHz | Jun. 01, 2012 | Nov. 06, 2012 | May 31, 2013 | Conduction (CO01-KS) |
| LISN | MessTec | AN3016 | 60103 | 9kHz~30MHz | Dec. 30, 2011 | Nov. 06, 2012 | Dec. 29, 2012 | Conduction (CO01-KS) |
| LISN | MessTec | AN3016 | 60105 | 9kHz~30MHz | Dec. 30, 2011 | Nov. 06, 2012 | Dec. 29, 2012 | Conduction (CO01-KS) |
| AC Power Source | Chroma | 61602 | ABP0000008 11 | N/A | Nov. 16, 2011 | Nov. 06, 2012 | Nov. 15, 2012 | Conduction (CO01-KS) |
| System Simulator | R&S | CMU200 | 837587/066 | 2G Full-Band | Dec. 30, 2011 | Nov. 06, 2012 | Dec. 29, 2012 | Conduction (CO01-KS) |

5 Uncertainty of Evaluation

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

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 2.54 |
|---|------|

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

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 4.72 |
|---|------|

Uncertainty of Conducted Emission Measurement (150 KHz ~ 30 MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 2.26 |
|---|------|



Appendix A. Photographs of EUT

Please refer to Sporton report number EP2O1106 as below.