



FCC RF Test Report

APPLICANT : ASUSTek Computer Inc.
EQUIPMENT : Eee Pad
BRAND NAME : ASUS
MODEL NAME : TF201
FCC ID : MSQTF201
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Sep. 28, 2011 and completely tested on Oct. 12, 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 / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

SPORTON INTERNATIONAL INC.

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FCC ID : MSQTF201

Page Number : 1 of 76

Report Issued Date : Oct. 25, 2011

Report Version : Rev. 01



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 6

 1.4 Testing Site 7

 1.5 Applied Standards 7

 1.6 Ancillary Equipment List 8

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST..... 9

 2.1 RF Output Power 9

 2.2 Test Mode..... 10

 2.3 Connection Diagram of Test System..... 11

 2.4 RF Utility 12

3 TEST RESULT 13

 3.1 Number of Channel Measurement 13

 3.2 20dB and 99% Bandwidth Measurement 15

 3.3 Hopping Channel Separation Measurement 28

 3.4 Dwell Time Measurement..... 31

 3.5 Peak Output Power Measurement 33

 3.6 Band Edges Measurement 36

 3.7 Spurious Emission Measurement..... 54

 3.8 AC Conducted Emission Measurement..... 58

 3.9 Radiated Emission Measurement..... 62

 3.10 Antenna Requirements 73

4 LIST OF MEASURING EQUIPMENT..... 74

5 UNCERTAINTY OF EVALUATION..... 75

APPENDIX A. PHOTOGRAPHS OF EUT

APPENDIX B. SETUP PHOTOGRAPHS



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR182445-02A	Rev. 01	Initial issue of report	Oct. 25, 2011



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	-
3.2	-	Gen 4.6.1	99% Bandwidth	-	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 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 6.9 dB at 0.45 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.79 dB at 253.29 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

ASUSTek Computer Inc.

No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan

1.2 Manufacturer

1. PEGATRON CORPORATION Taoyuan Mfg.

No. 5, Shing Yeh St., Kwei Shan Hsiang Taoyuan 333, Taiwan

2. Protek (Shanghai) Limited.

No. 3768, Xiu Yan Rd., Nanhui District, Shanghai, China

3. Tech-Com (Shanghai) Computer Co., Ltd.

No. 68, SanZhuang Road, Songjiang Export Processing Zone (EPZ), Shanghai

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Eee Pad
Brand Name	ASUS
Model Name	TF201
FCC ID	MSQTF201
Integrated Module	Brand Name : AzureWave Model Name : AW-NH615
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) : 4.48 dBm (0.0028 W) Bluetooth EDR (2Mbps) : 6.92 dBm (0.0049 W) Bluetooth EDR (3Mbps) : 5.07 dBm (0.0032 W)
Antenna Type	PIFA Antenna with gain 0.4 dBi
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit

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 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. 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
- ♦ 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 (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.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
7.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
8.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
9.	iPod Earphone	Apple	N/A	FCC DoC	Unshielded, 1.0 m	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	4.04 dBm	6.58 dBm	4.63 dBm
Ch39	2441MHz	4.41 dBm	6.90 dBm	5.00 dBm
Ch78	2480MHz	4.48 dBm	6.92 dBm	5.07 dBm

Remark:

1. The data rate was set in 2Mbps 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

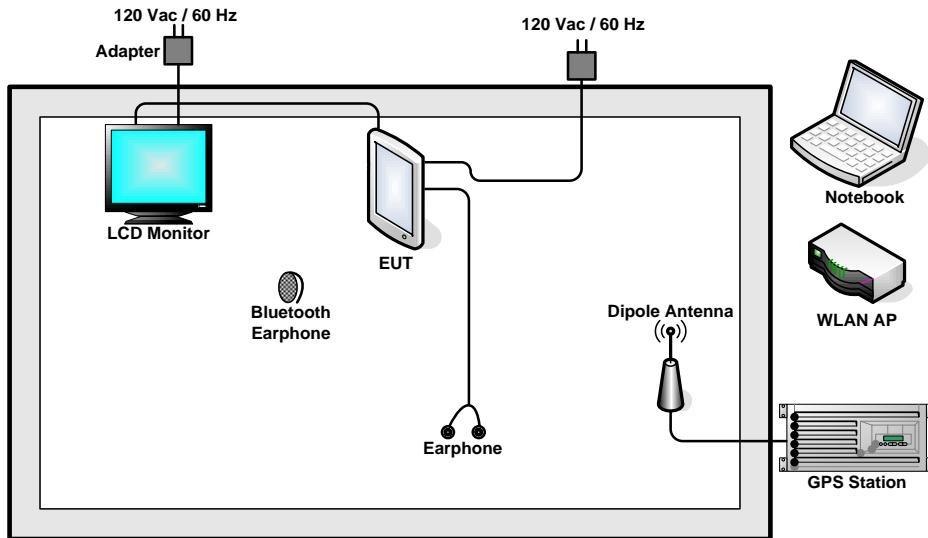
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest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

Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

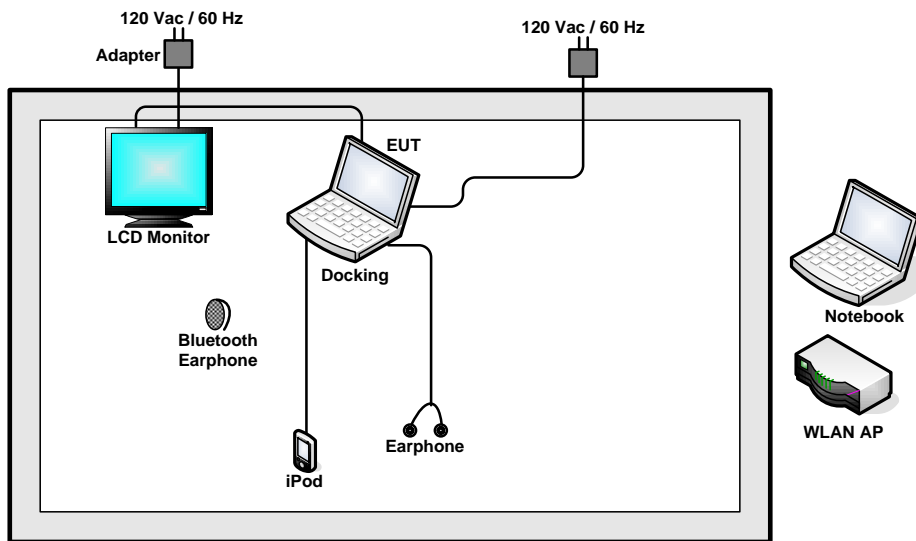
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz Mode 4: CH78_2480 MHz + Docking	N/A
AC Conducted Emission	Mode 1 :WLAN Link + Bluetooth Link + GPS Rx + TC1 + Adapter Mode 2 :WLAN Link + Bluetooth Link + MPEG4 + TC2 + Adapter + Docking		
Remark: <ol style="list-style-type: none"> TC1 stands for Test Configuration, and consists of earphone, and HDMI Monitor. TC2 stands for Test Configuration, and consists of iPod, earphone, and HDMI Monitor. For radiated TCs, the data rate was set in 2Mbps due to the highest RF output power; only the data of these modes was reported. For conducted emission, the worst case is mode 1; only the test data of this mode was reported. 			

2.3 Connection Diagram of Test System

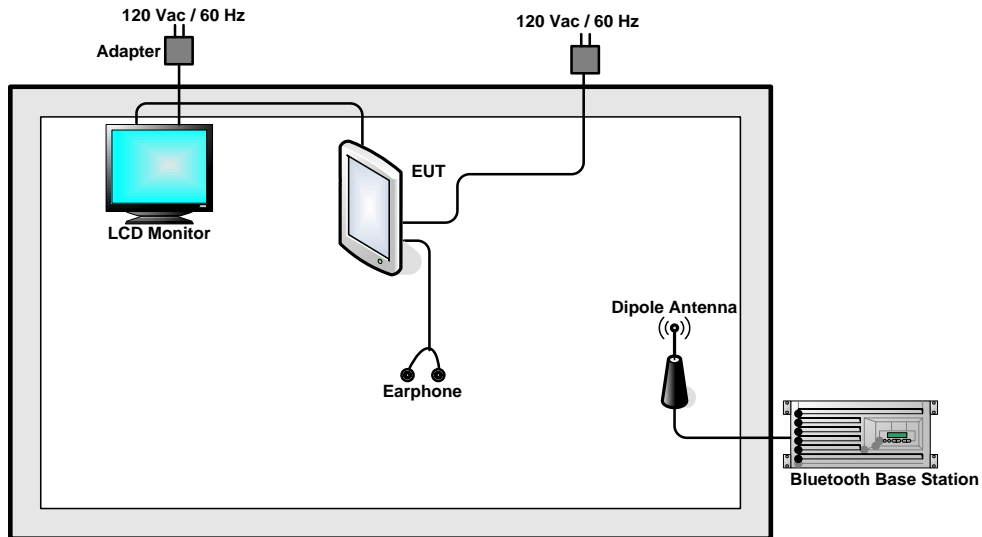
<AC Conducted Emission Mode>



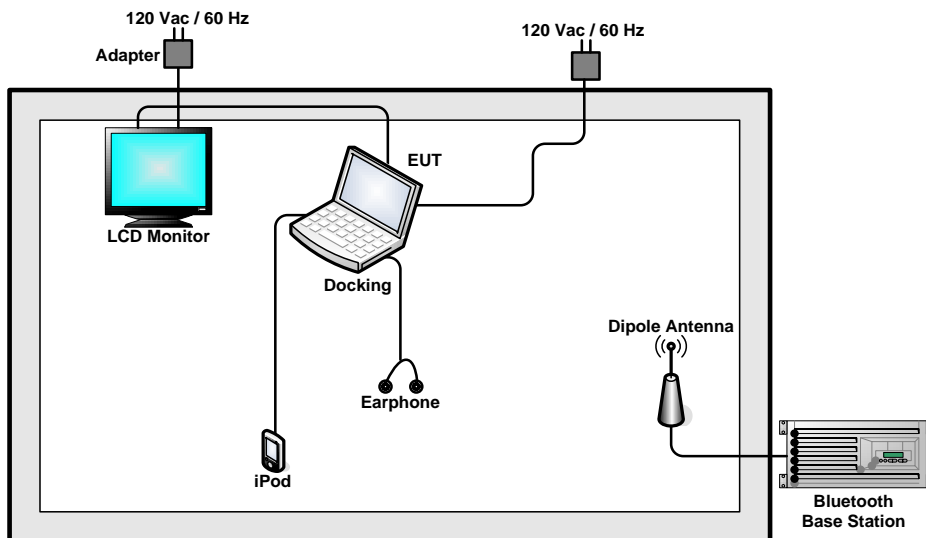
< AC Conducted Emission with Docking Mode >



<Bluetooth Radiation Emission Mode>



<Bluetooth Radiation Emission with Docking Mode >



2.4 RF Utility

For Bluetooth function, the RF utility, "BT Test Tool" was installed in EUT. Then, the EUT will 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.

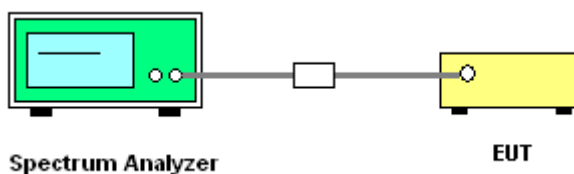
3.1.2 Measuring Instruments

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 \geq 1% of the span; VBW \geq 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

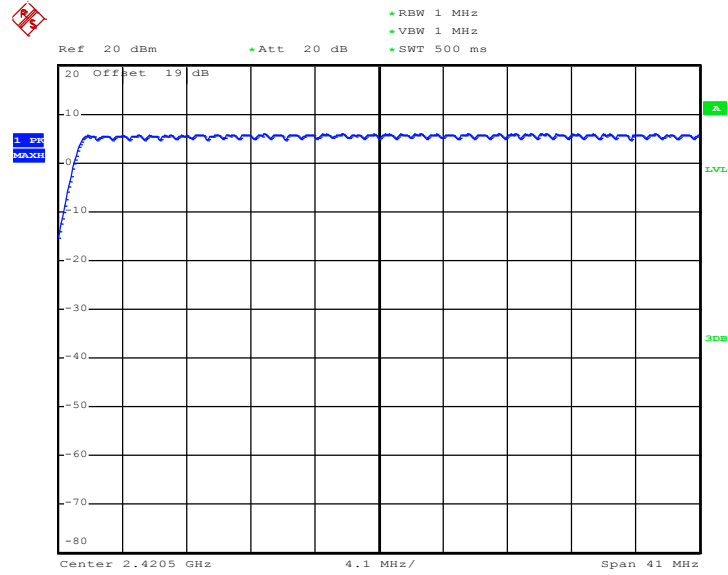


3.1.5 Test Result of Number of Hopping Frequency

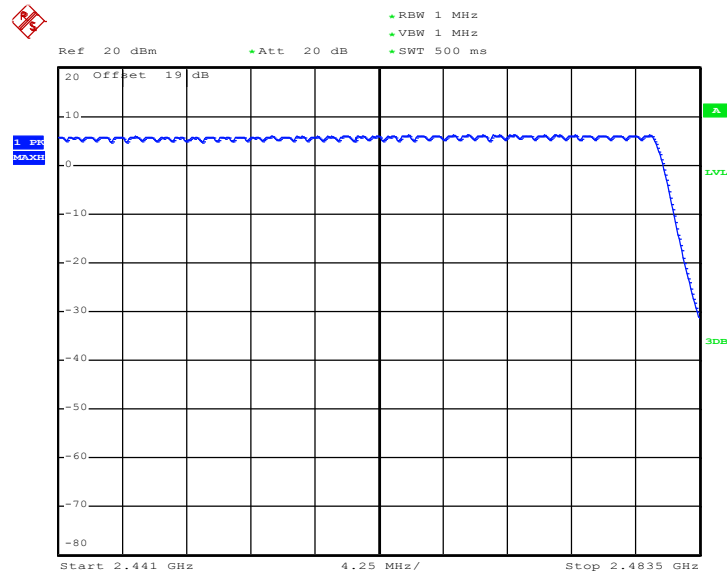
Test Mode :	Mode 4~6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass



Number of Hopping Channel Plot on Channel 00 - 78



Date: 5.OCT.2011 17:10:35



Date: 5.OCT.2011 17:16:13

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

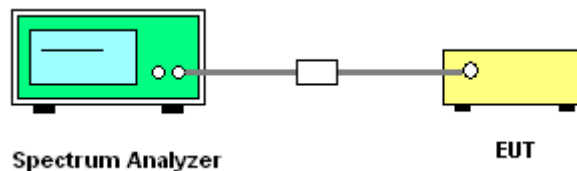
3.2.2 Measuring Instruments

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 \geq 1% of the 20 dB bandwidth; VBW \geq 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



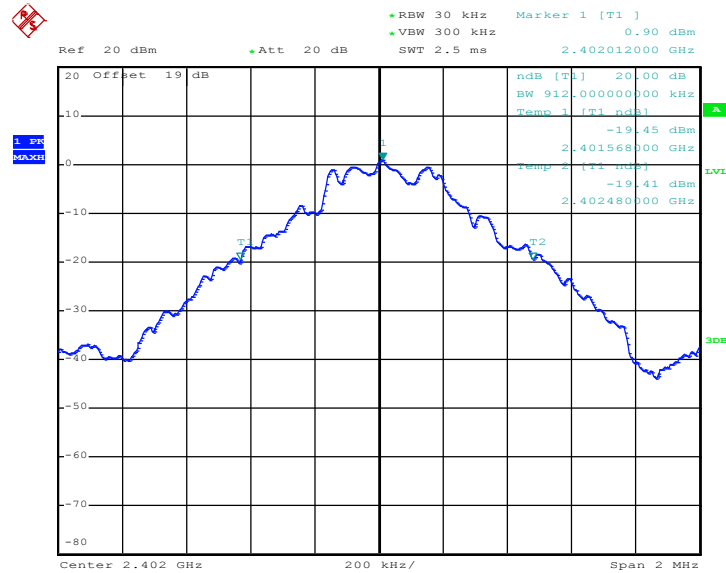


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.912
39	2441	0.904
78	2480	0.908

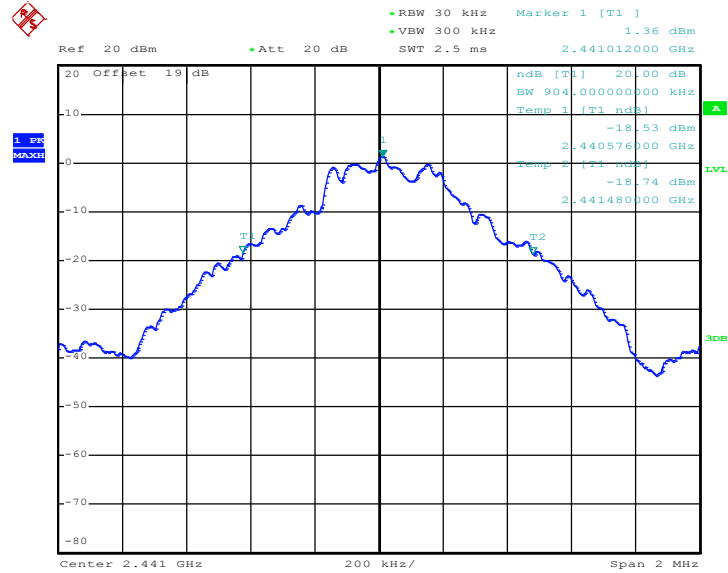
20 dB Bandwidth Plot on Channel 00



Date: 5.OCT.2011 16:43:10

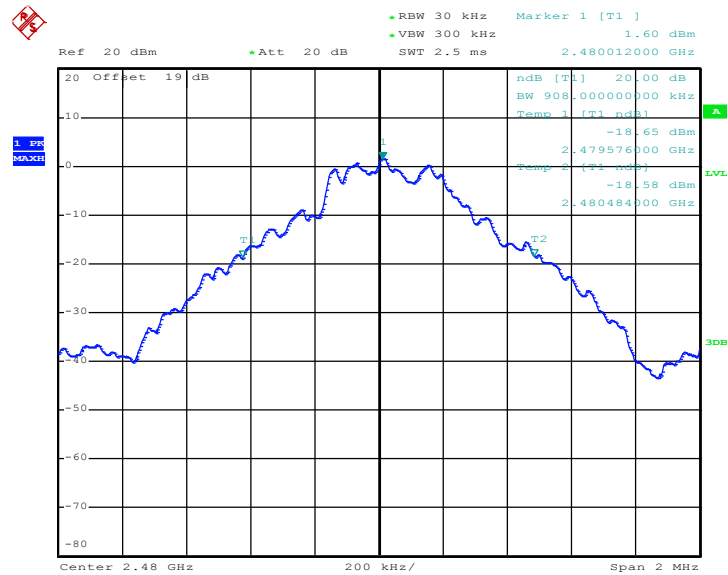


20 dB Bandwidth Plot on Channel 39



Date: 5.OCT.2011 16:44:22

20 dB Bandwidth Plot on Channel 78



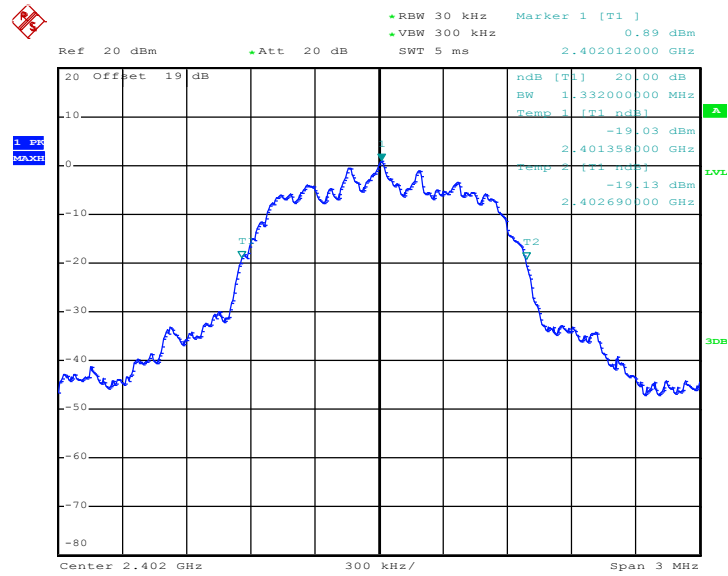
Date: 5.OCT.2011 16:45:39



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

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

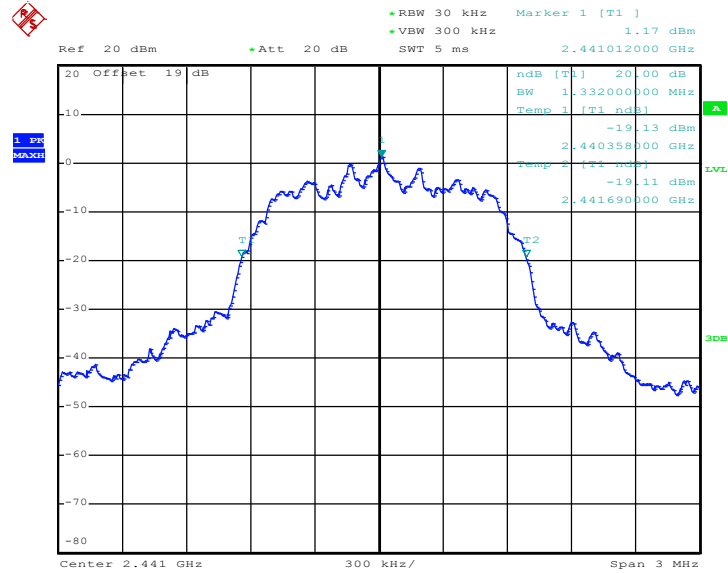
20 dB Bandwidth Plot on Channel 00



Date: 5.OCT.2011 16:46:34

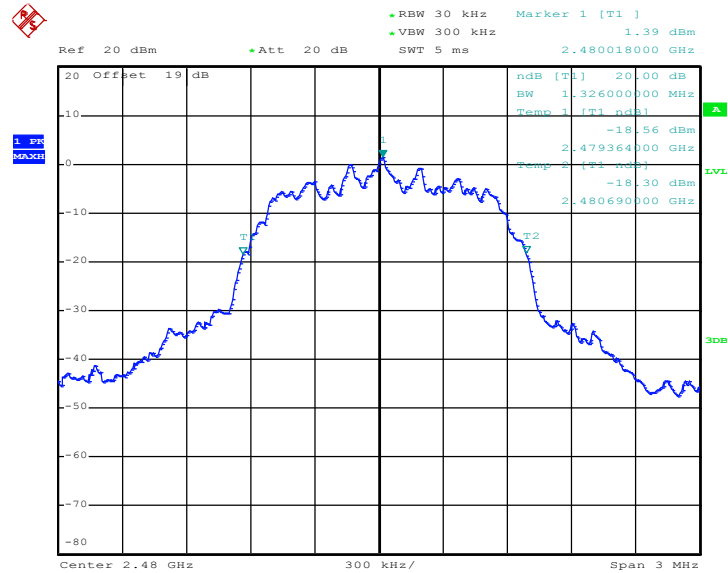


20 dB Bandwidth Plot on Channel 39



Date: 5.OCT.2011 16:47:29

20 dB Bandwidth Plot on Channel 78



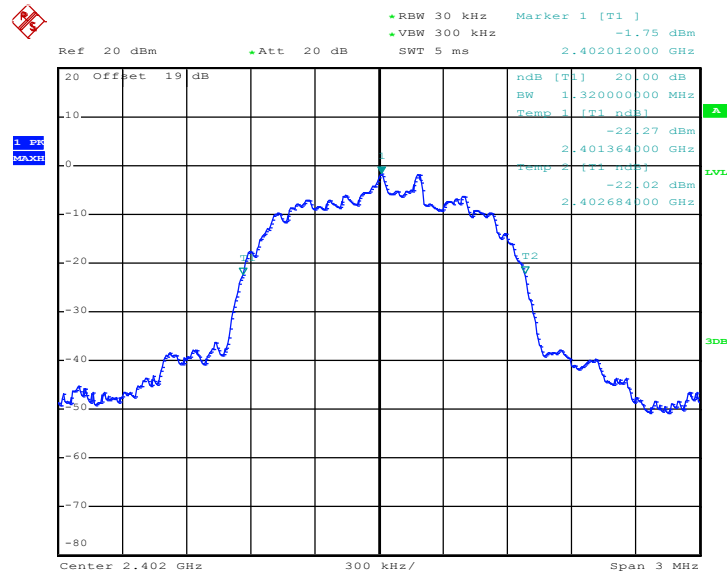
Date: 5.OCT.2011 16:48:18



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.320
39	2441	1.314
78	2480	1.308

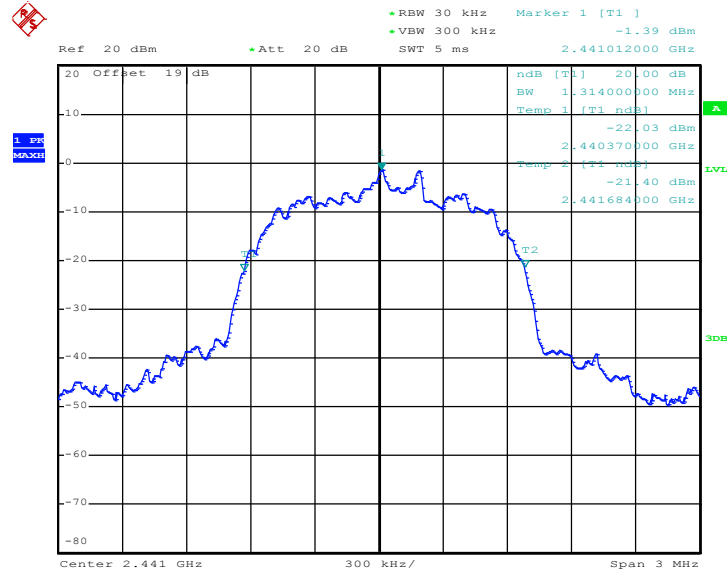
20 dB Bandwidth Plot on Channel 00



Date: 5.OCT.2011 16:49:08

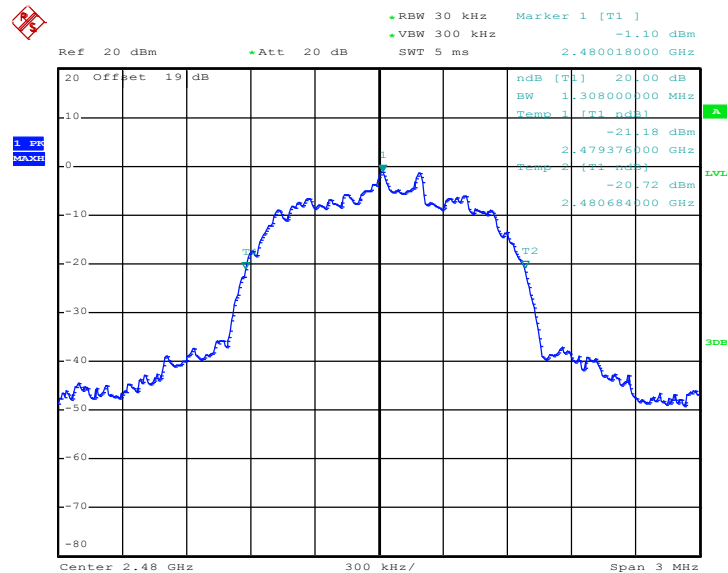


20 dB Bandwidth Plot on Channel 39



Date: 5.OCT.2011 16:50:03

20 dB Bandwidth Plot on Channel 78



Date: 5.OCT.2011 16:50:51

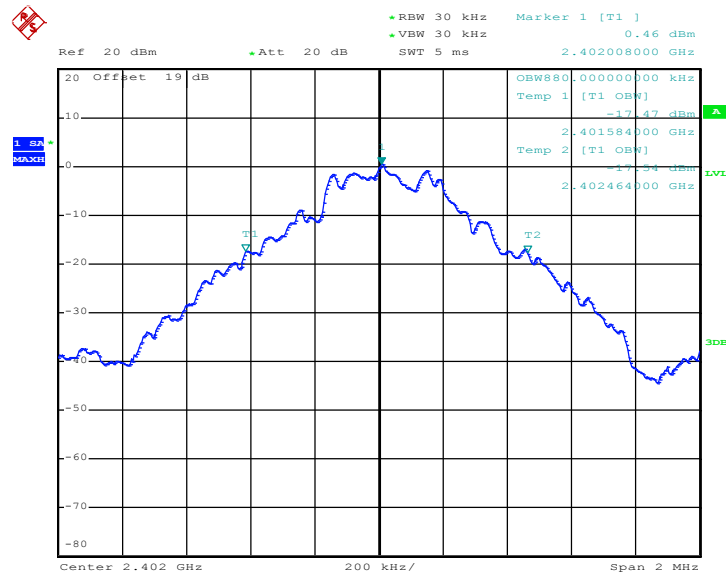


3.2.6 Test Result of 99% Occupied Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.880
39	2441	0.876
78	2480	0.876

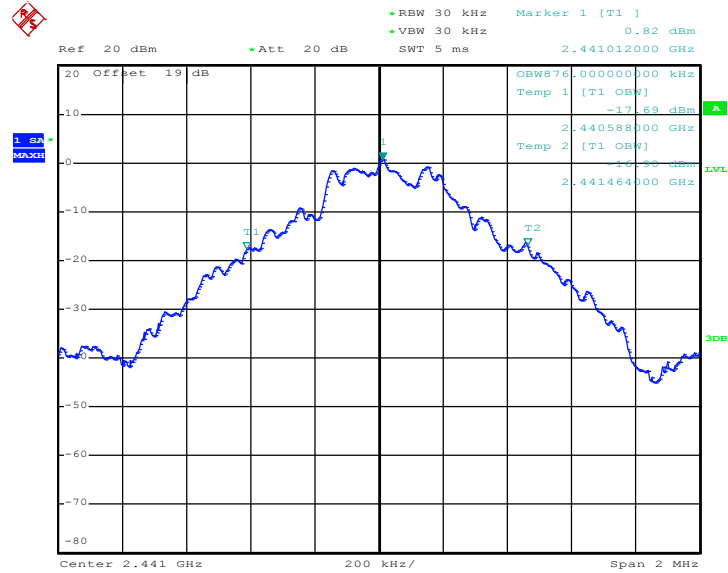
99% Bandwidth Plot on Channel 00



Date: 5.OCT.2011 17:24:14

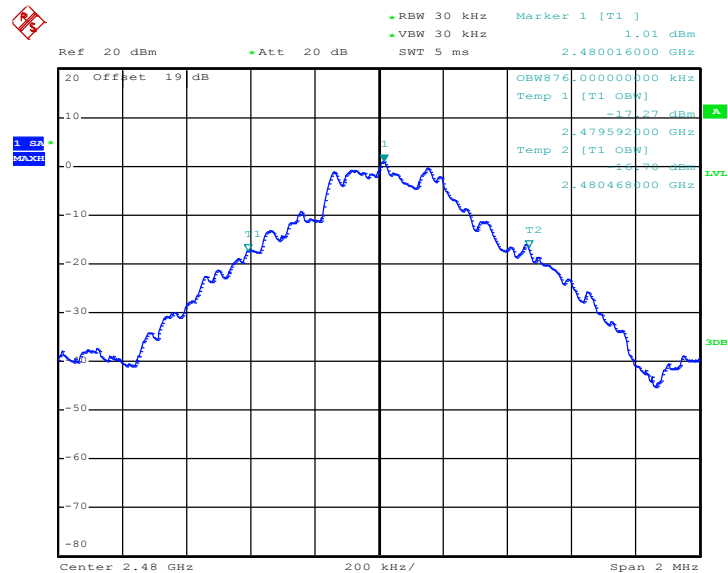


99% Occupied Bandwidth Plot on Channel 39



Date: 5.OCT.2011 16:57:48

99% Occupied Bandwidth Plot on Channel 78



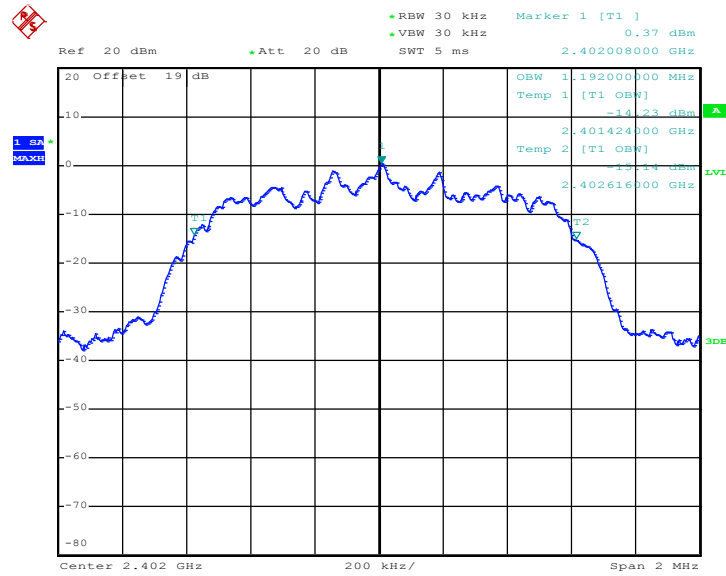
Date: 5.OCT.2011 16:58:23



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.192
39	2441	1.188
78	2480	1.192

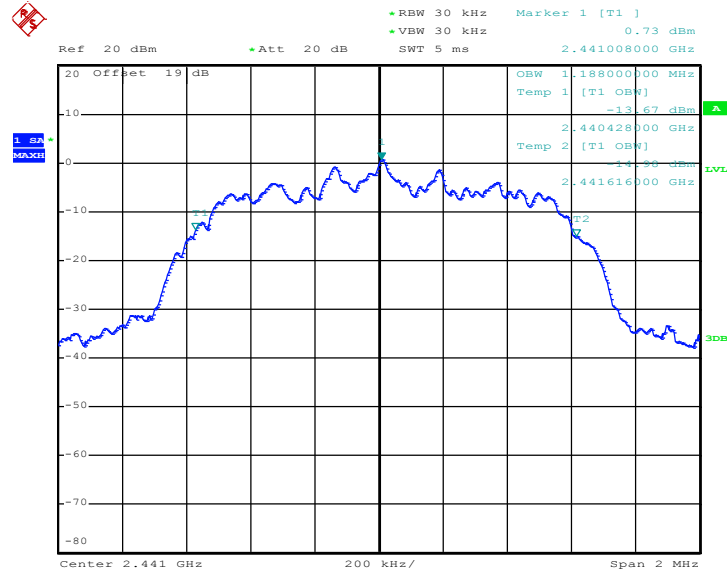
99% Bandwidth Plot on Channel 00



Date: 5.OCT.2011 17:21:01

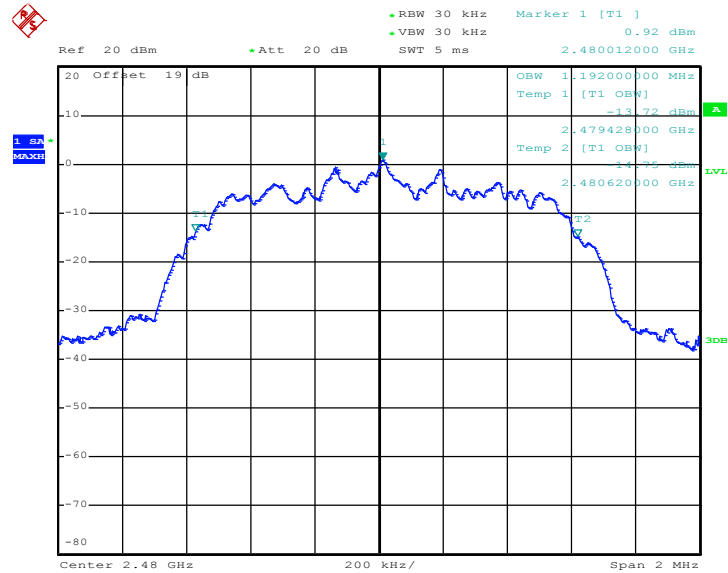


99% Occupied Bandwidth Plot on Channel 39



Date: 5.OCT.2011 17:18:49

99% Occupied Bandwidth Plot on Channel 78



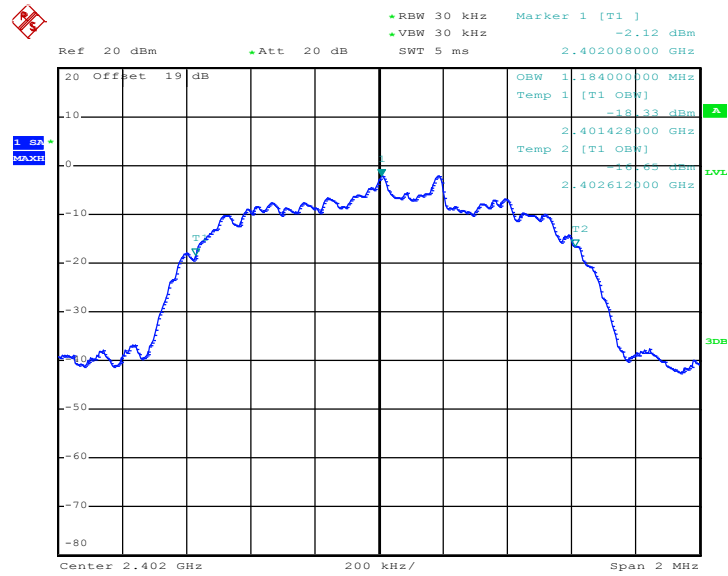
Date: 5.OCT.2011 17:00:11



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.184
39	2441	1.180
78	2480	1.180

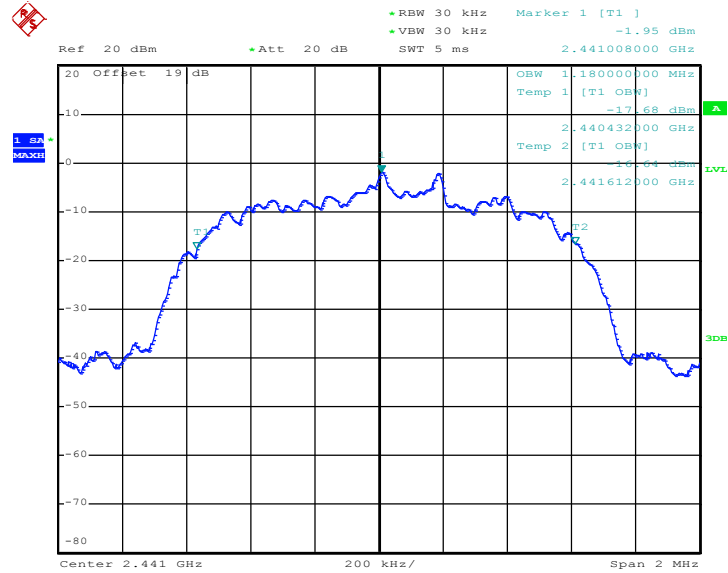
99% Bandwidth Plot on Channel 00



Date: 5.OCT.2011 17:29:10

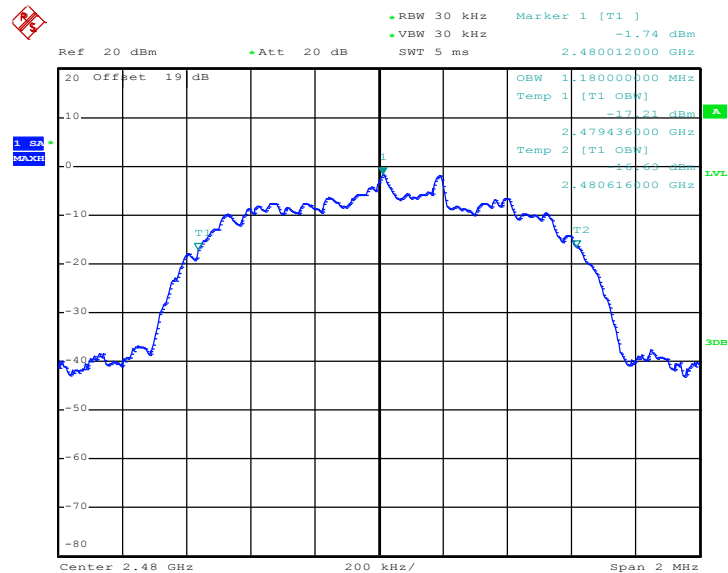


99% Occupied Bandwidth Plot on Channel 39



Date: 5.OCT.2011 17:01:23

99% Occupied Bandwidth Plot on Channel 78



Date: 5.OCT.2011 17:01:58

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.

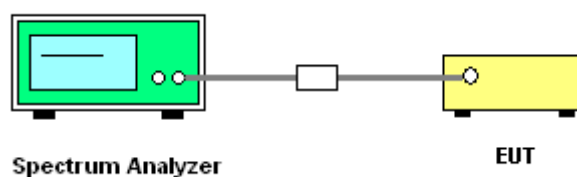
3.3.2 Measuring Instruments

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; $RBW \geq 1\%$ of the span;
VBW \geq 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



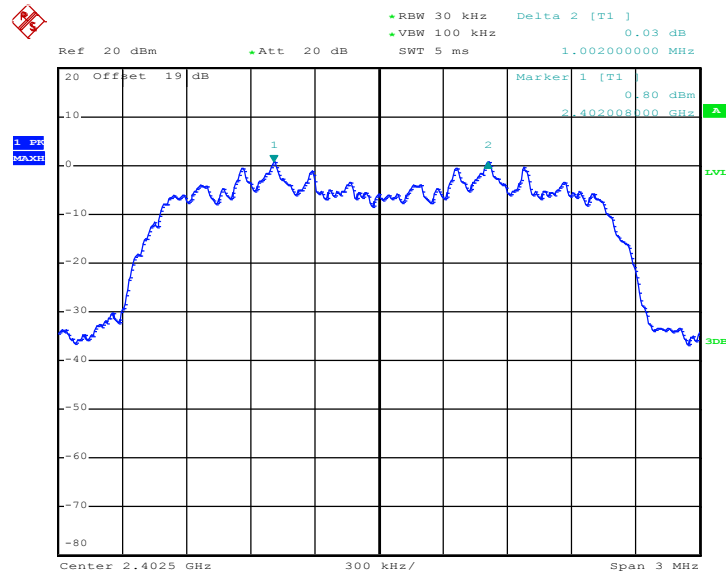


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8880	Pass
39	2441	1.002	0.8880	Pass
78	2480	1.002	0.8840	Pass

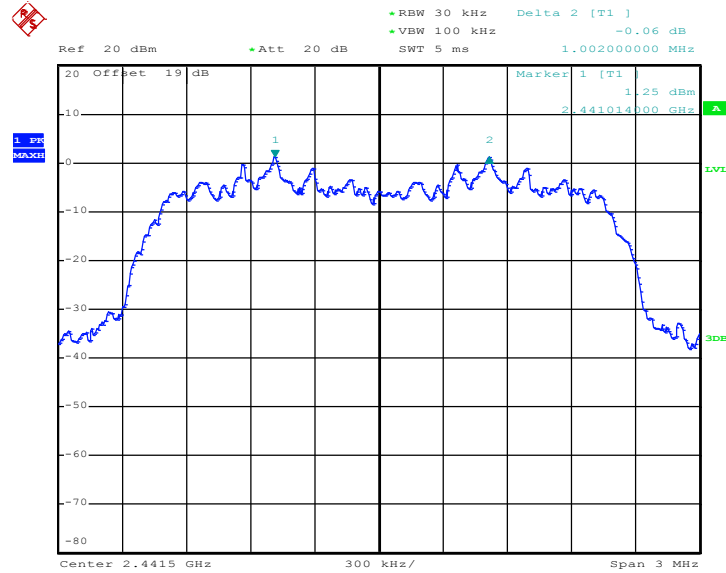
Channel Separation Plot on Channel 00 - 01



Date: 5.OCT.2011 16:34:26

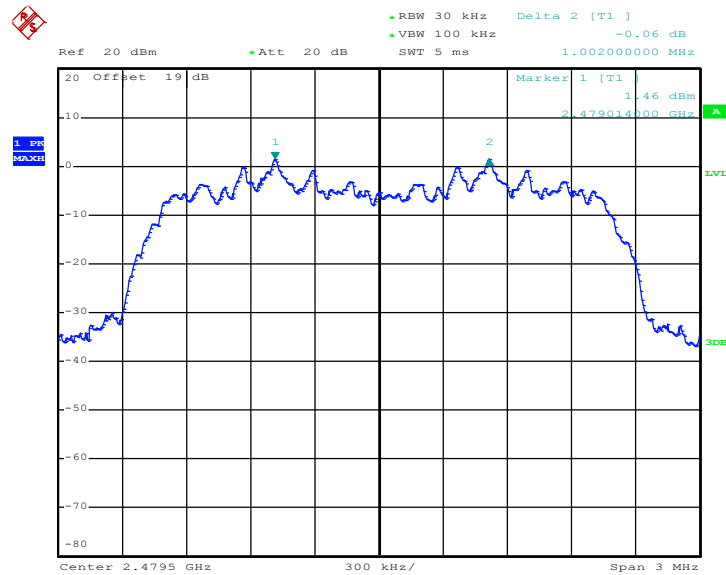


Channel Separation Plot on Channel 39 - 40



Date: 5.OCT.2011 16:35:06

Channel Separation Plot on Channel 77 - 78



Date: 5.OCT.2011 16:35:47

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.

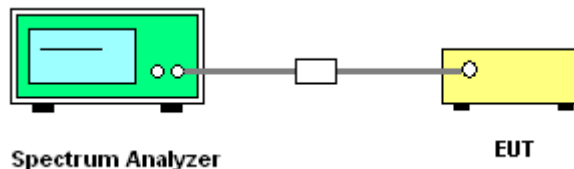
3.4.2 Measuring Instruments

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 5	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

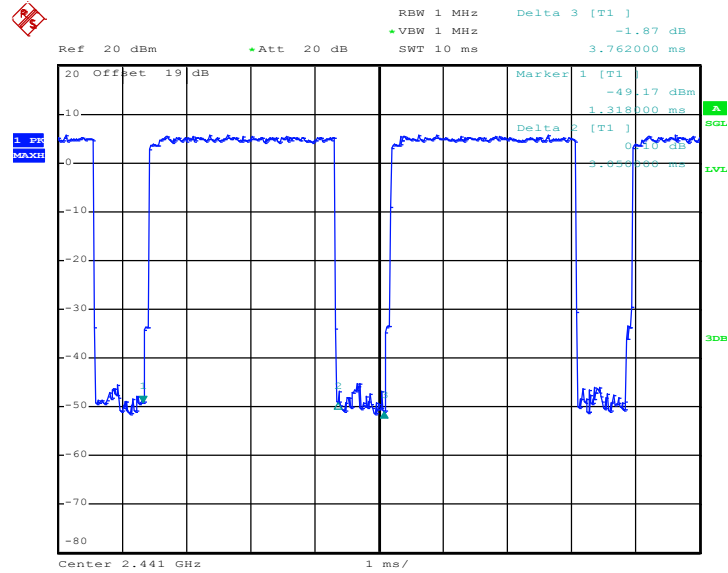
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
2DH5	3.60	3050.00	0.35	0.4	Pass

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)

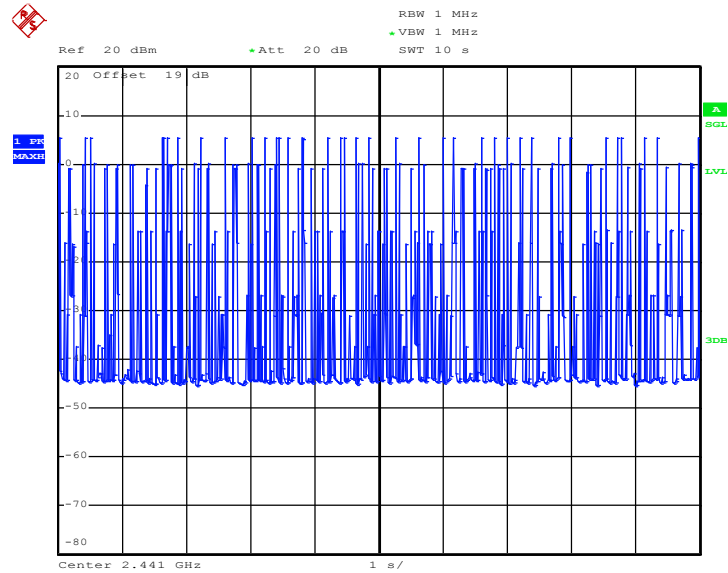


2DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 5.OCT.2011 16:26:41

2DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 5.OCT.2011 16:41:16

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).

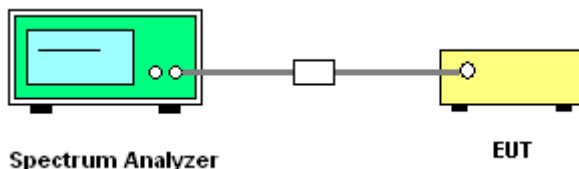
3.5.2 Measuring Instruments

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

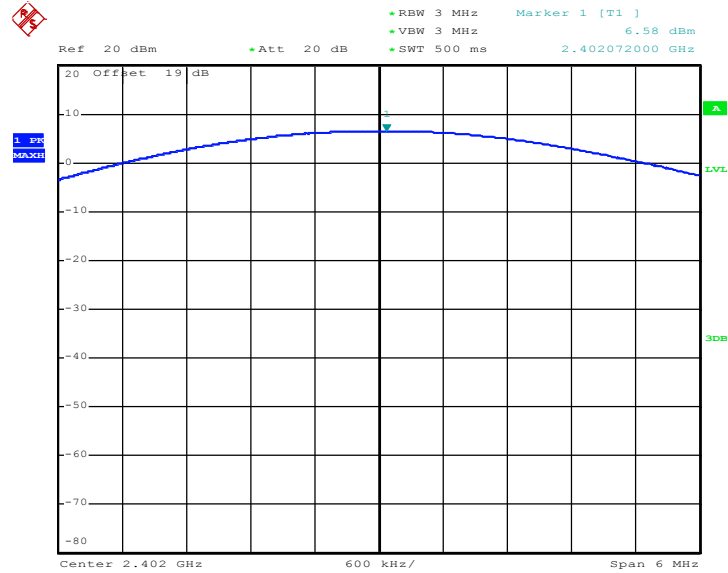


3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C	
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%	
Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	6.58	20.97	Pass
39	2441	6.90	20.97	Pass
78	2480	6.92	20.97	Pass

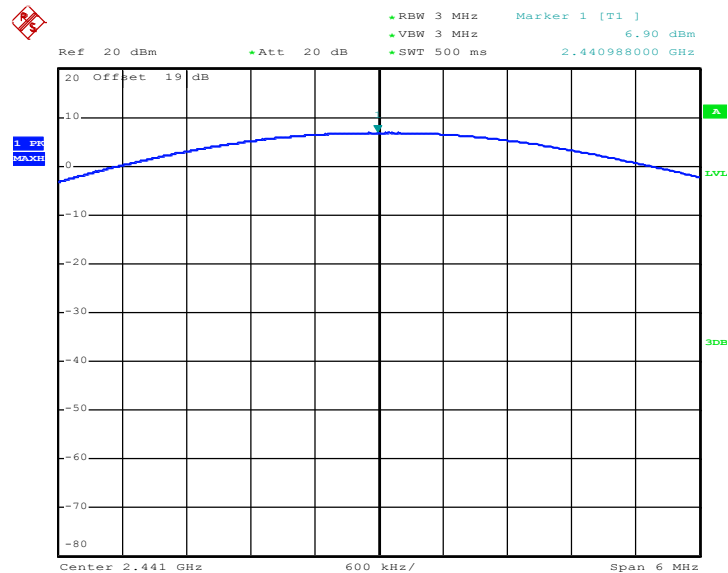


Peak Output Power Plot on Channel 00



Date: 5.OCT.2011 18:34:10

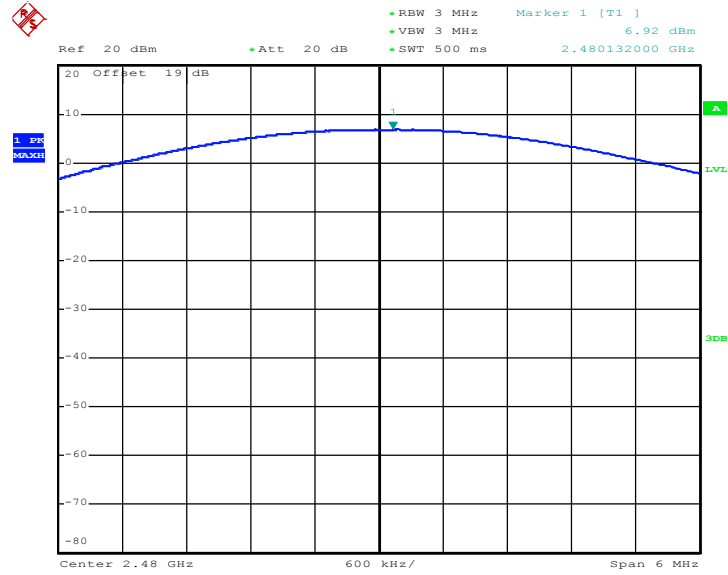
Peak Output Power Plot on Channel 39



Date: 5.OCT.2011 18:35:23



Peak Output Power Plot on Channel 78



Date: 5.OCT.2011 18:36:37



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

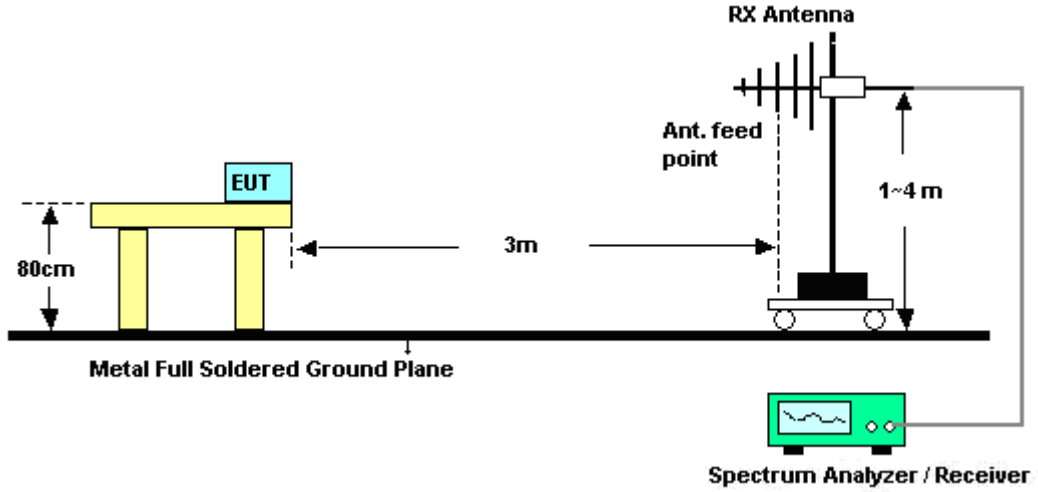
See list of measuring instruments of this test report.

3.6.3 Test Procedures

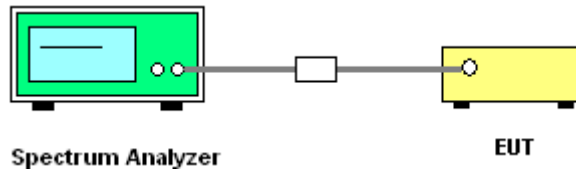
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 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 :	48~50%
		Test Engineer :	David Yang

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
2389.23	48.24	-25.76	74	45.72	32.02	4.58	34.08	138	246	Peak
2389.23	35.12	-18.88	54	32.6	32.02	4.58	34.08	138	246	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
2387.71	47.08	-26.92	74	44.56	32.02	4.58	34.08	165	221	Peak
2387.71	33.85	-20.15	54	31.33	32.02	4.58	34.08	165	221	Average



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
		Test Engineer :	David Yang

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	66.3	-7.7	74	63.65	32.09	4.64	34.08	128	110	Peak
2483.5	30.16	-23.84	54	27.51	32.09	4.64	34.08	128	110	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	84.02	53.86	30.16	54	-23.84	Pass
Hopping Mode	84.02	56.17	27.85	54	-26.15	Pass

Note : Average 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	63.34	-10.66	74	60.69	32.09	4.64	34.08	100	38	Peak
2483.5	28.04	-25.96	54	25.39	32.09	4.64	34.08	100	38	Average

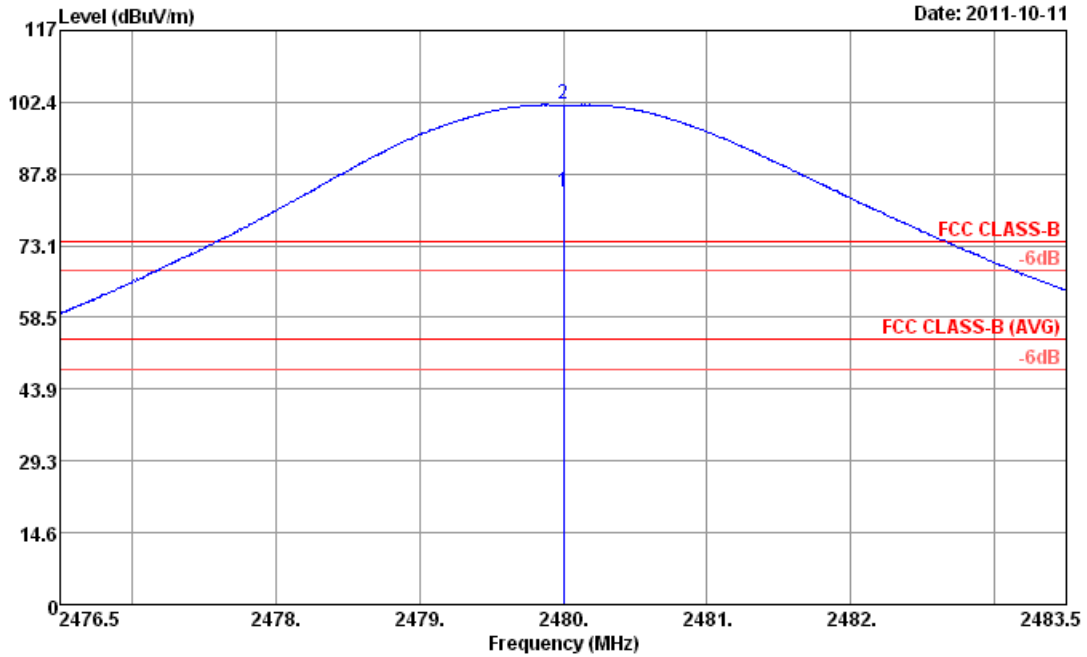
Summary results of marker-delta method:

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	82.14	54.1	28.04	54	-25.96	Pass
Hopping Mode	82.14	54.45	27.69	54	-26.31	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Horizontal



Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 HORIZONTAL

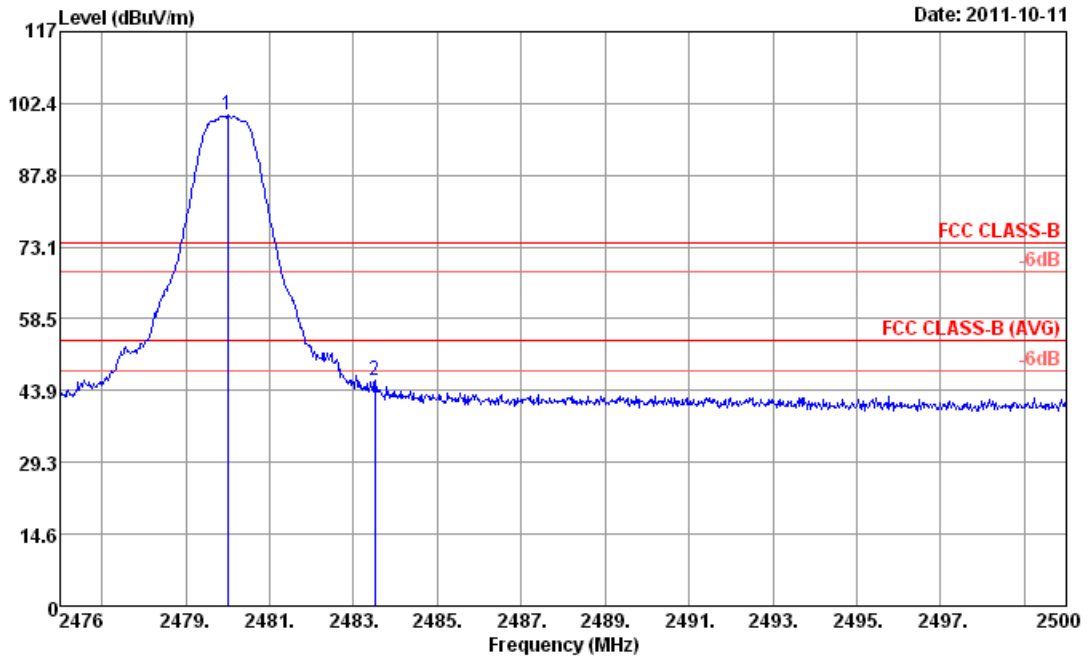
Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 *	2480.00	84.02	30.02	54.00	81.37	32.09	4.64	34.08	128	110 Average
2 *	2480.00	101.88	27.88	74.00	99.23	32.09	4.64	34.08	128	110 Peak

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Horizontal



Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 HORIZONTAL

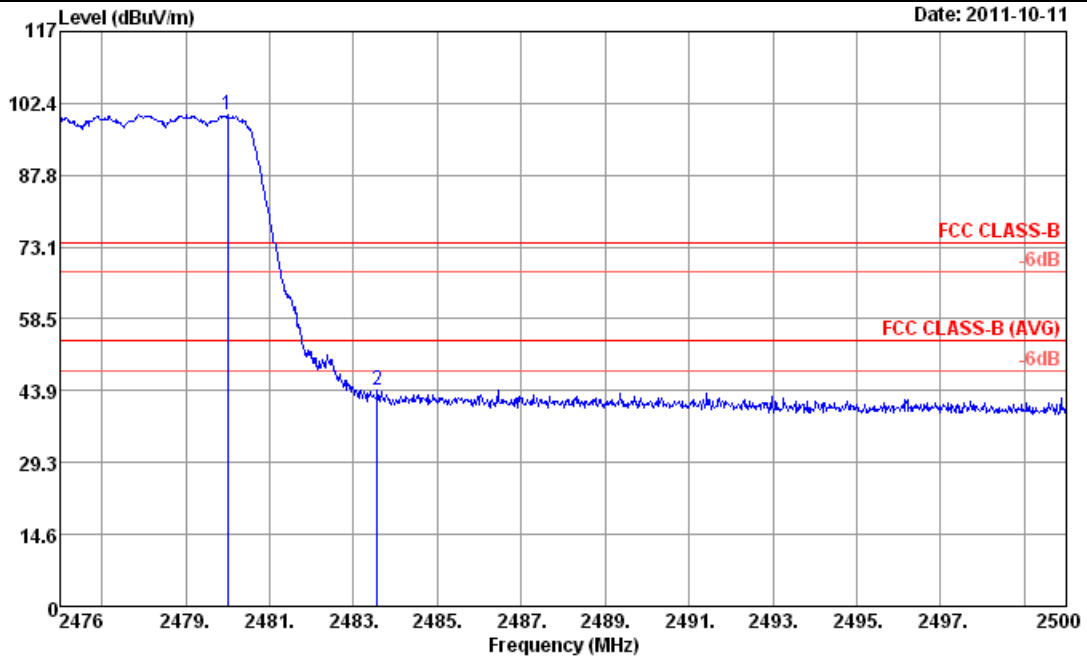
Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 *	2480.00	99.93	25.93	74.00	97.28	32.09	4.64	34.08	128	110 Peak
2	2483.51	46.07	-27.93	74.00	43.42	32.09	4.64	34.08	128	110 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 53.86 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Horizontal



Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 HORIZONTAL

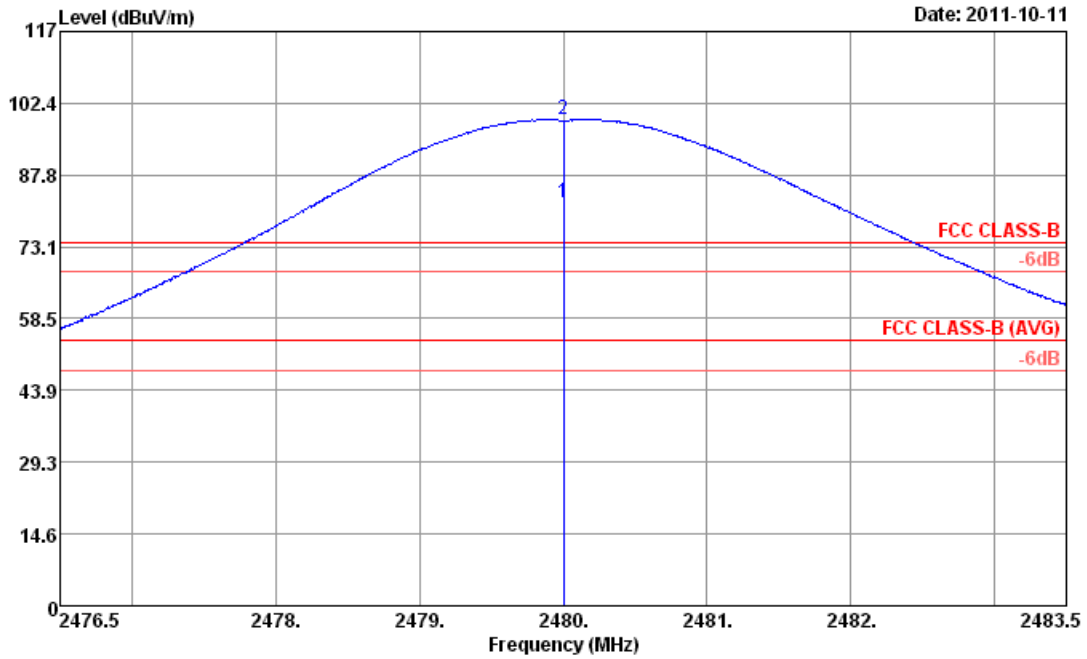
Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	100.06	26.06	74.00	97.41	32.09	4.64	34.08	128	110	Peak
2	2483.56	43.89	-30.11	74.00	41.24	32.09	4.64	34.08	128	110	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 56.17 dB , Hopping Mode



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Vertical



Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 VERTICAL

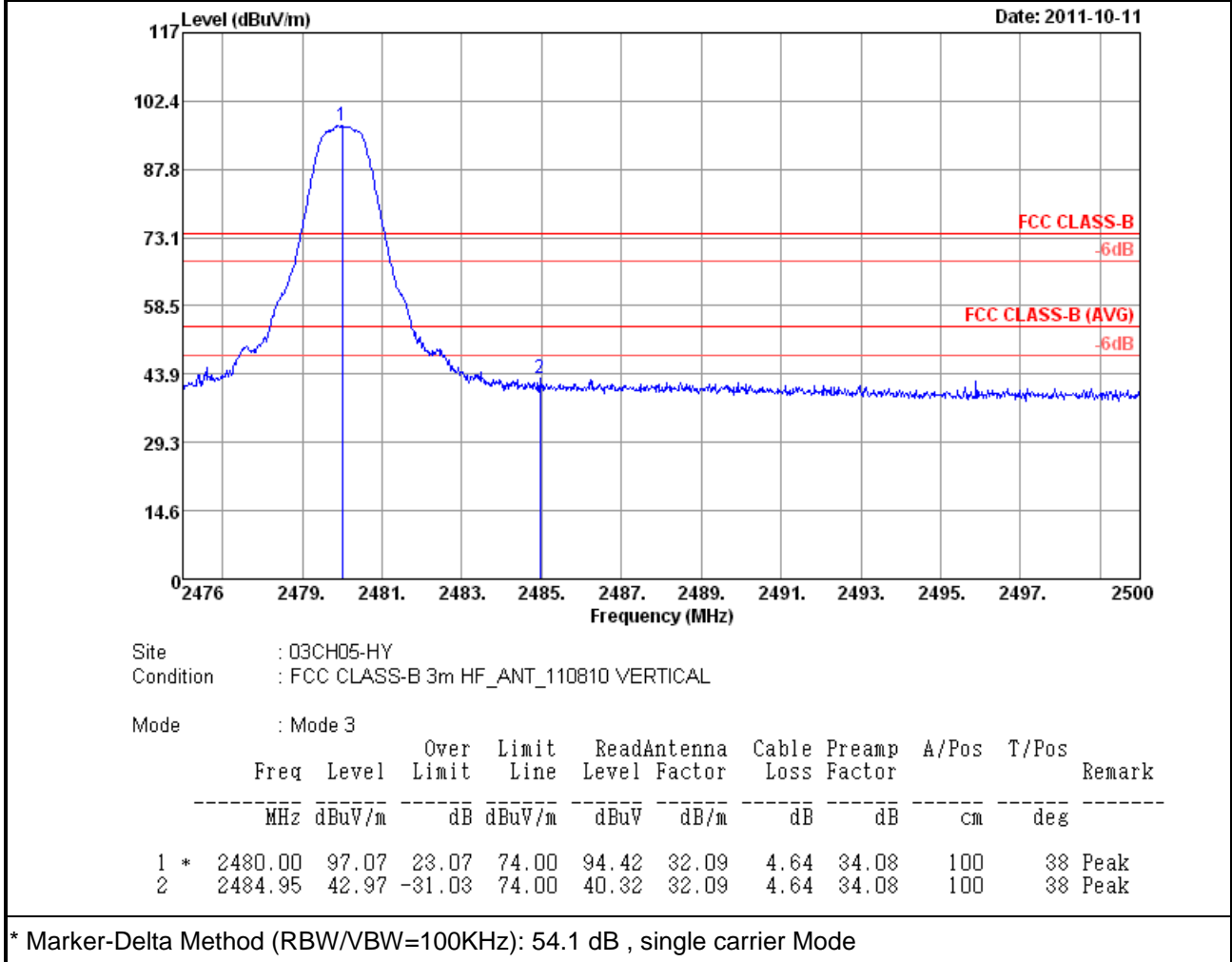
Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	82.14	28.14	54.00	79.49	32.09	4.64	34.08	100	38	Average
2 *	2480.00	99.02	25.02	74.00	96.37	32.09	4.64	34.08	100	38	Peak

* Maximum field strength of the fundamental emission

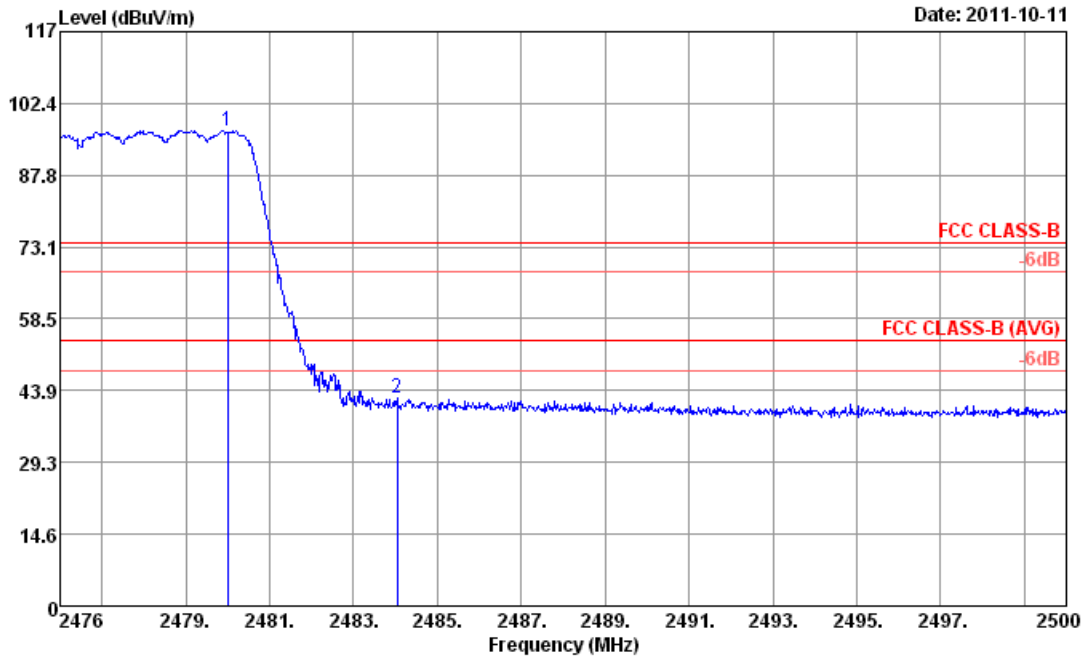


Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Vertical





Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Vertical



Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 VERTICAL

Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 *	2480.00	96.87	22.87	74.00	94.22	32.09	4.64	34.08	100	38 Peak
2	2484.04	42.42	-31.58	74.00	39.77	32.09	4.64	34.08	100	38 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 54.45 dB , Hopping Mode



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
		Test Engineer :	David Yang

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	64.45	-9.55	74	61.8	32.09	4.64	34.08	156	106	Peak
2483.5	28.15	-25.85	54	25.5	32.09	4.64	34.08	156	106	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	83.1	54.95	28.15	54	-25.85	Pass
Hopping Mode	83.1	55.9	27.2	54	-26.8	Pass

Note : Average 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	61.29	-12.71	74	58.64	32.09	4.64	34.08	127	155	Peak
2483.5	27.89	-26.11	54	25.24	32.09	4.64	34.08	127	155	Average

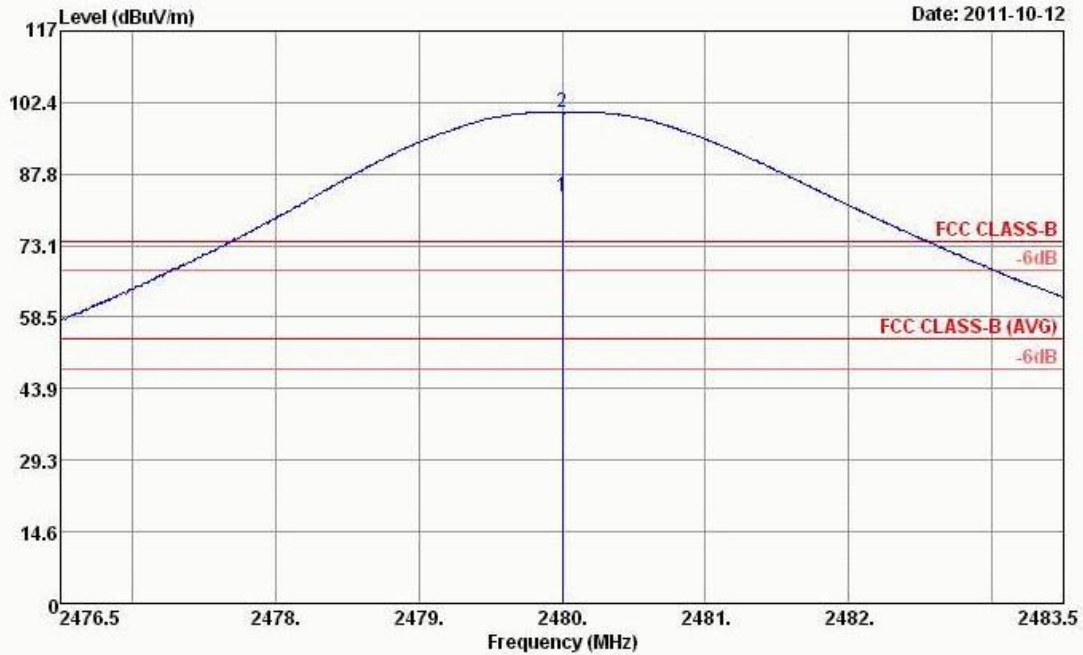
Summary results of marker-delta method:

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	80.75	52.86	27.89	54	-26.11	Pass
Hopping Mode	80.75	53.21	27.54	54	-26.46	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Horizontal



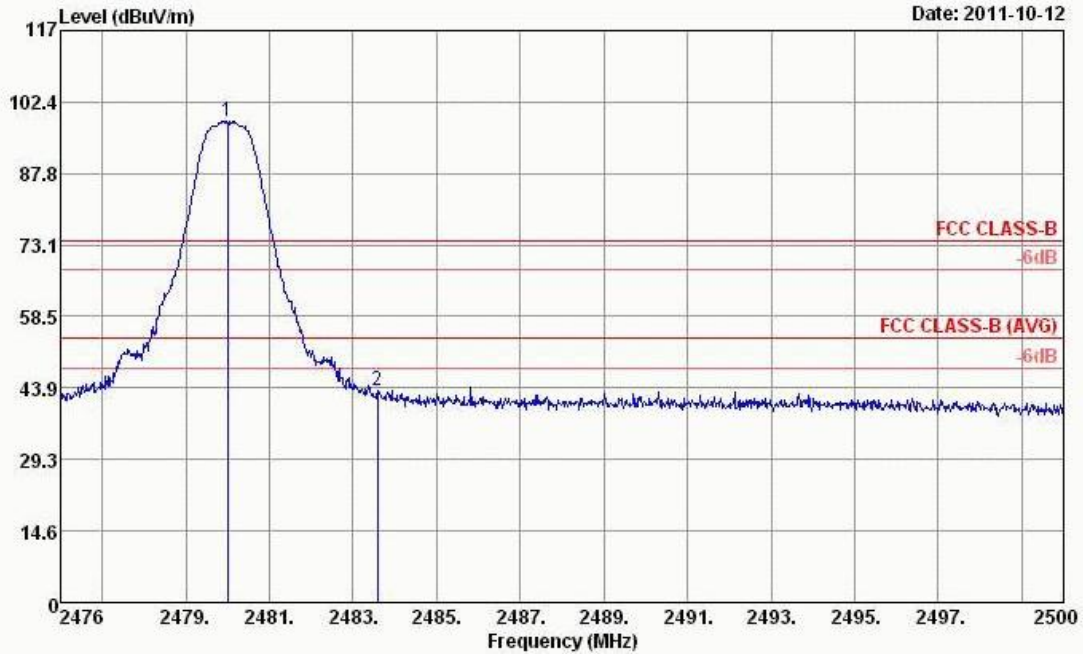
Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 HORIZONTAL

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	cm	deg
1 *	2480.00	83.10	29.10	54.00	80.45	32.09	4.64	34.08	156	106 Average
2 *	2480.00	100.44	26.44	74.00	97.79	32.09	4.64	34.08	156	106 Peak

* Maximum field strength of the fundamental emission



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Horizontal



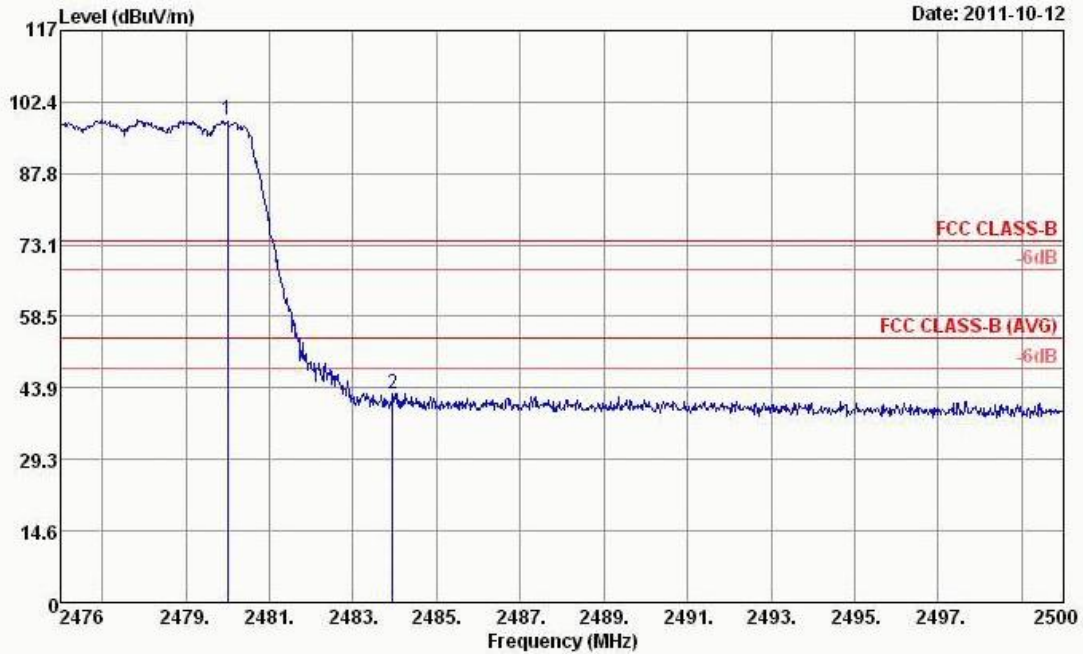
Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	98.45	24.45	74.00	95.80	32.09	4.64	34.08	156	106	Peak
2	2483.58	43.50	-30.50	74.00	40.85	32.09	4.64	34.08	156	106	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 54.95 dB , single carrier Mode



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Horizontal



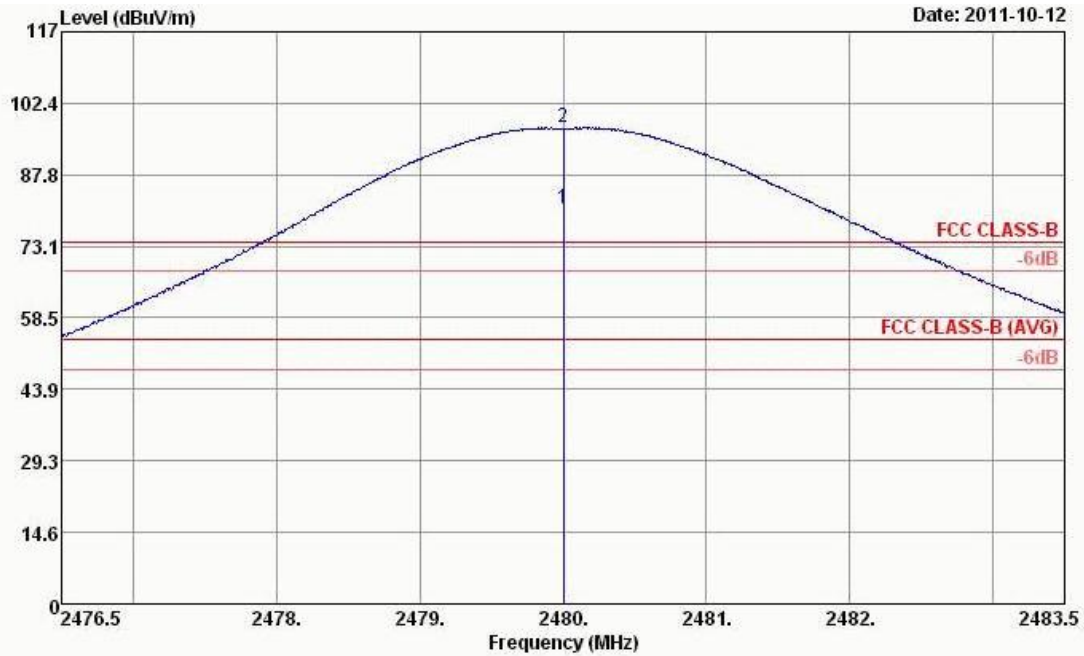
Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	98.67	24.67	74.00	96.02	32.09	4.64	34.08	156	106	Peak
2	2483.94	42.77	-31.23	74.00	40.12	32.09	4.64	34.08	156	106	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 55.9 dB , Hopping Mode



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Vertical



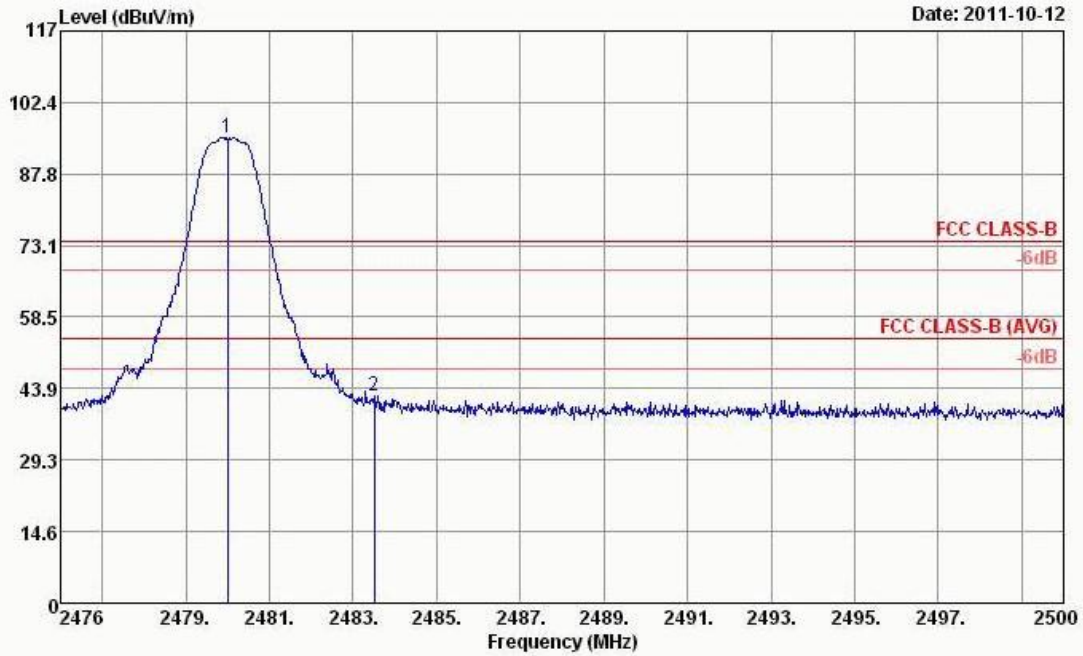
Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	80.75	26.75	54.00	78.10	32.09	4.64	34.08	127	155	Average
2 *	2480.00	97.39	23.39	74.00	94.74	32.09	4.64	34.08	127	155	Peak

* Maximum field strength of the fundamental emission



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Vertical



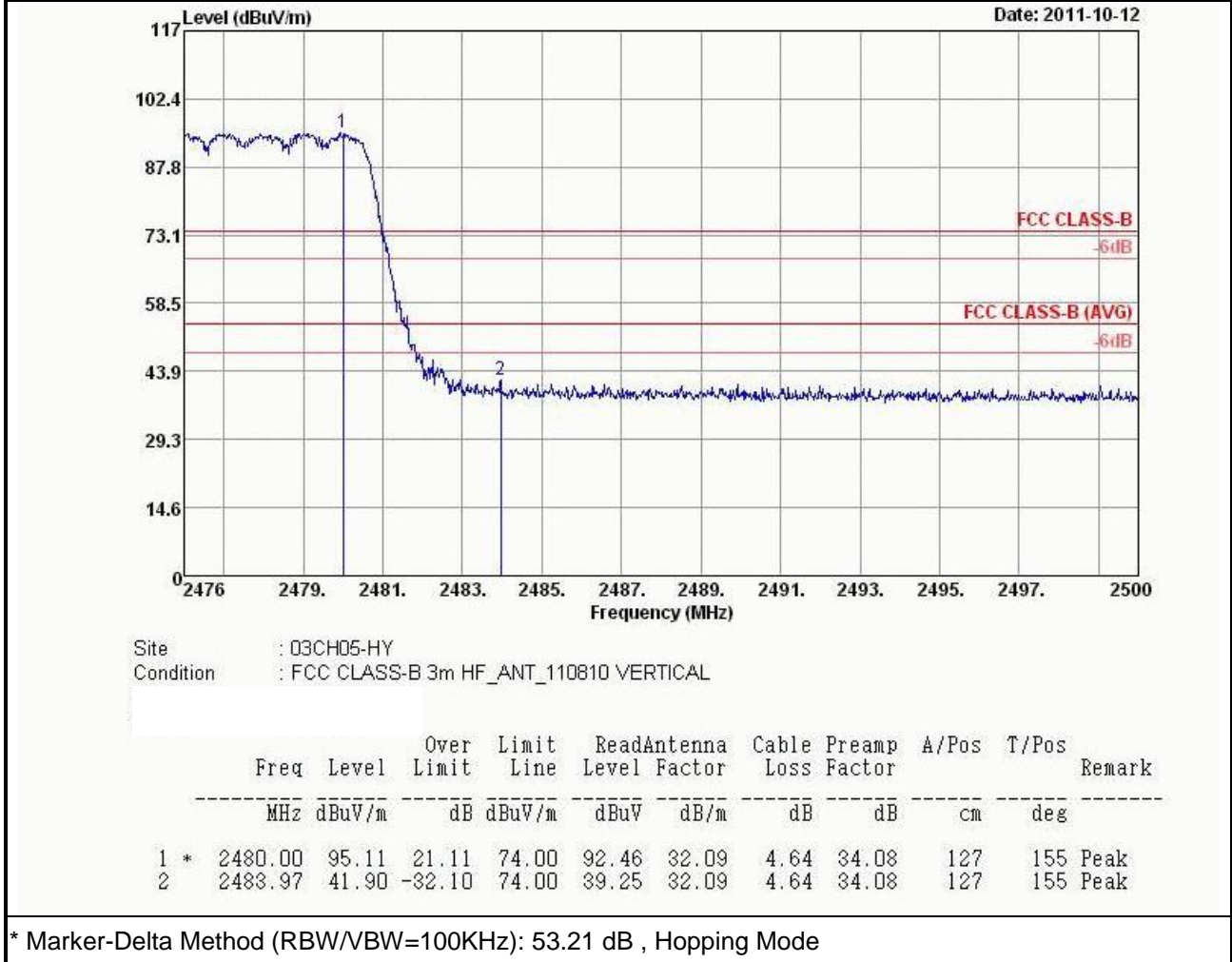
Site : 03CH05-HY
 Condition : FCC CLASS-B 3m HF_ANT_110810 VERTICAL

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 *	2480.00	95.28	21.28	74.00	92.63	32.09	4.64	34.08	127	155 Peak
2	2483.51	42.42	-31.58	74.00	39.77	32.09	4.64	34.08	127	155 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 52.86 dB , single carrier Mode



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	Polarization :	Vertical

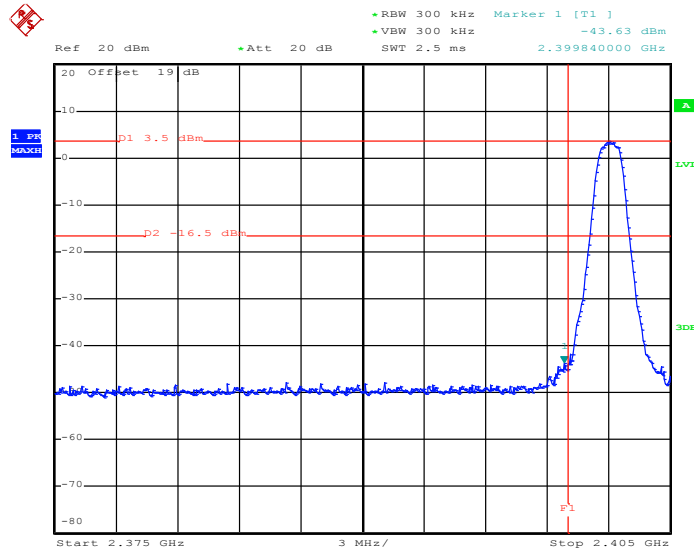




3.6.6 Test Result of Conducted Band Edges

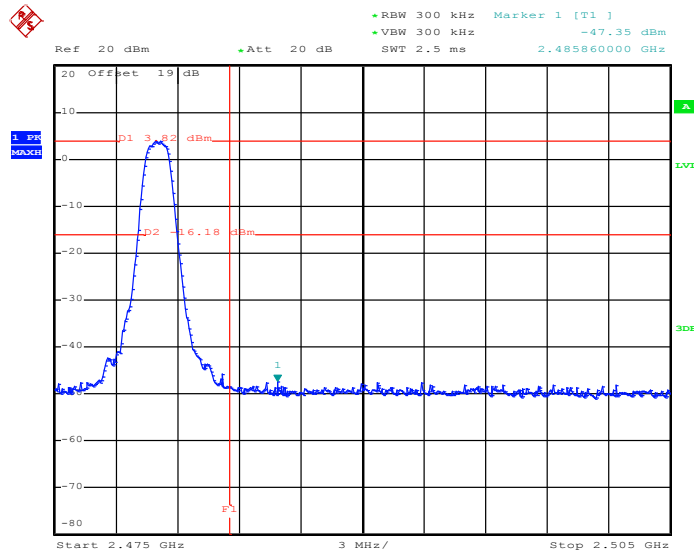
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Low Band Edge Plot on Channel 00



Date: 5.OCT.2011 16:53:38

High Band Edge Plot on Channel 78



Date: 5.OCT.2011 16:54:41

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.

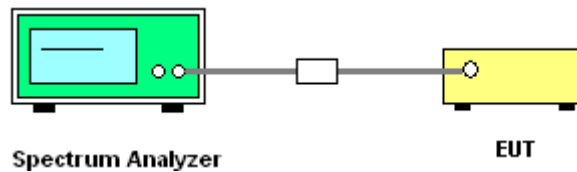
3.7.2 Measuring Instruments

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) \geq 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

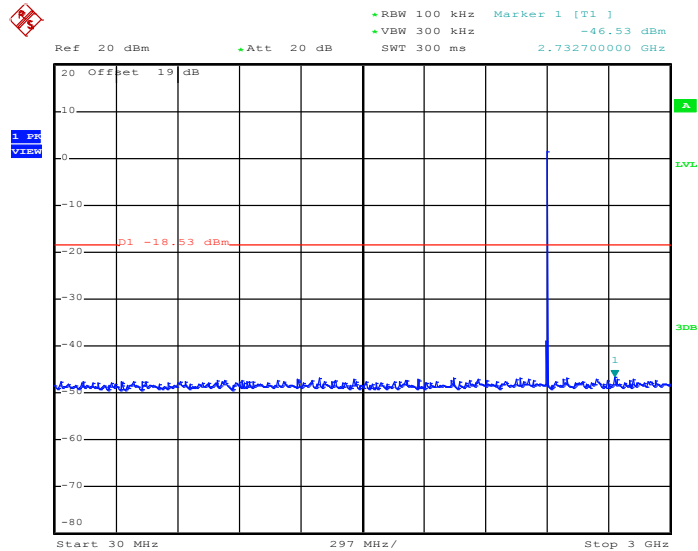




3.7.5 Test Result

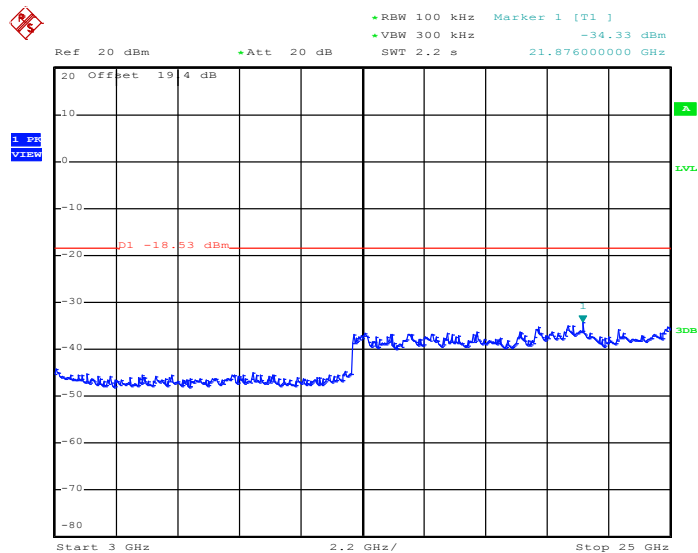
Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 5.OCT.2011 17:02:52

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

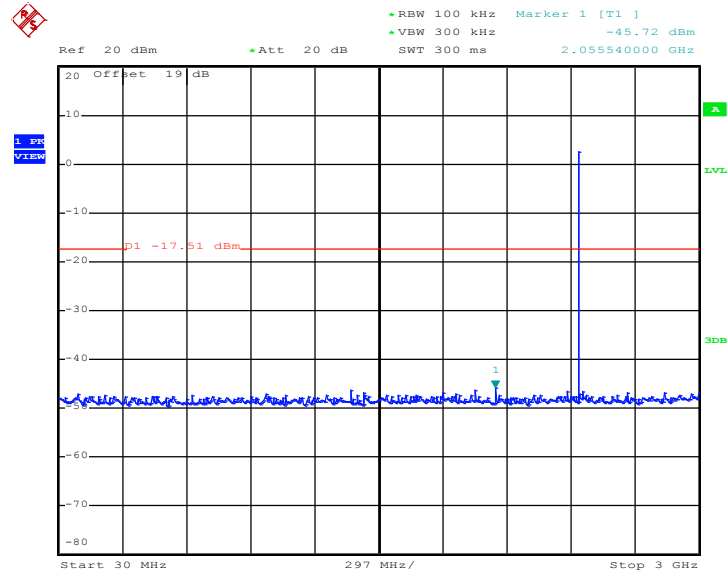


Date: 5.OCT.2011 17:03:04



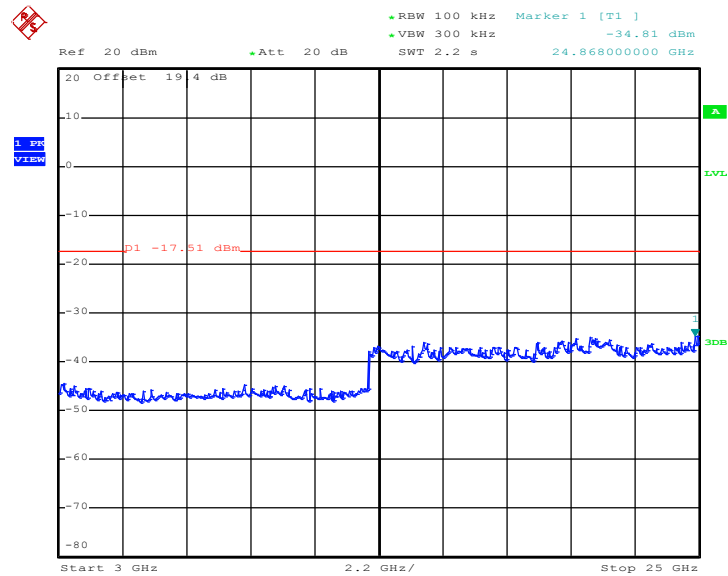
Test Mode :	Mode 5	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 5.OCT.2011 17:03:56

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

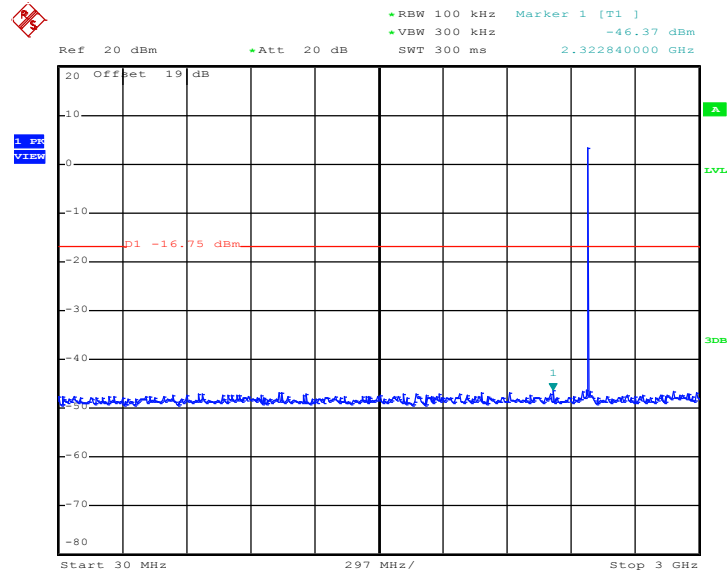


Date: 5.OCT.2011 17:04:08



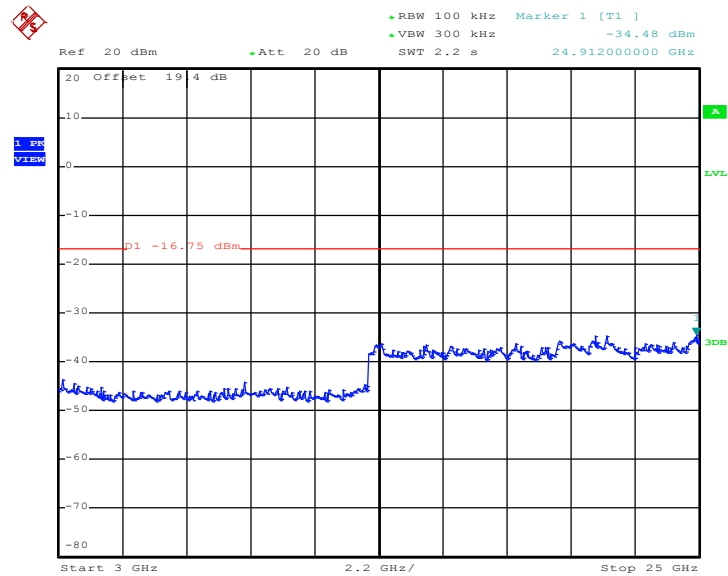
Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 5.OCT.2011 17:04:59

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 5.OCT.2011 17:05:10

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.

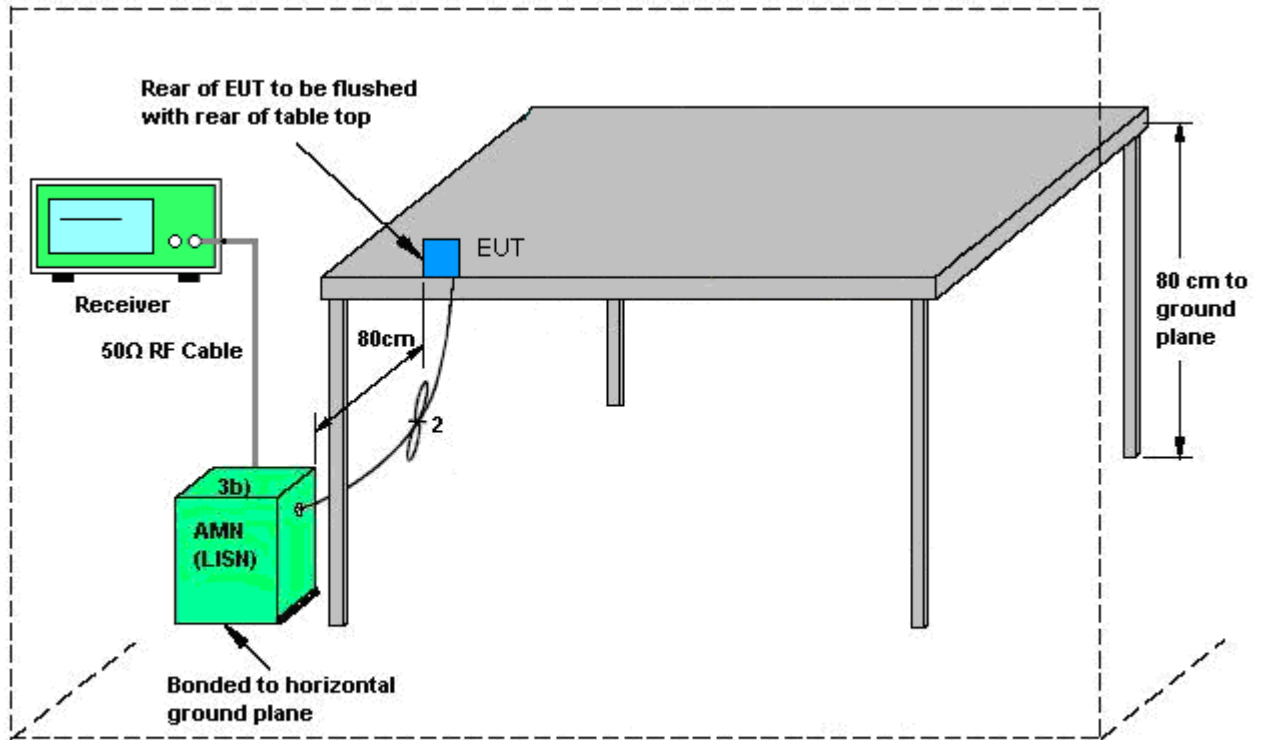
3.8.2 Measuring Instruments

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.

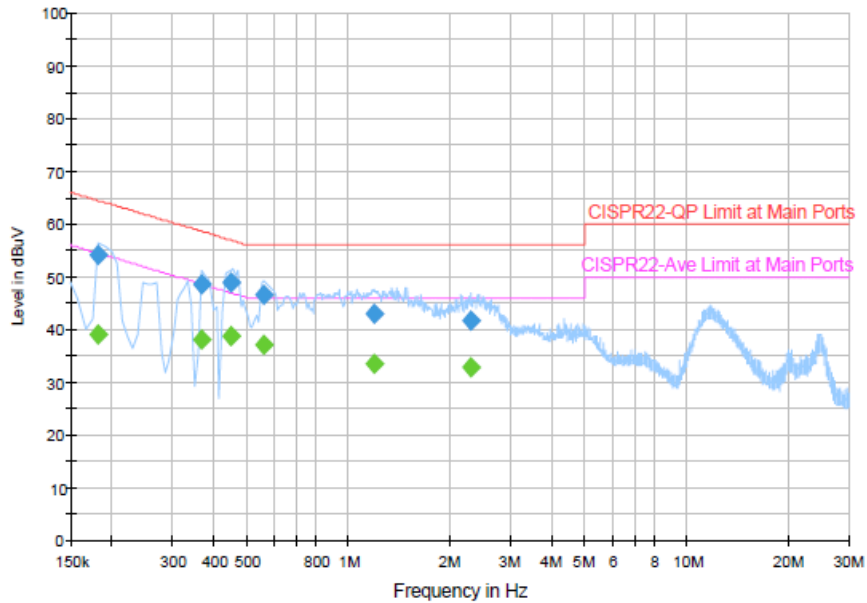
3.8.4 Test Setup



AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + GPS Rx + TC1 + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

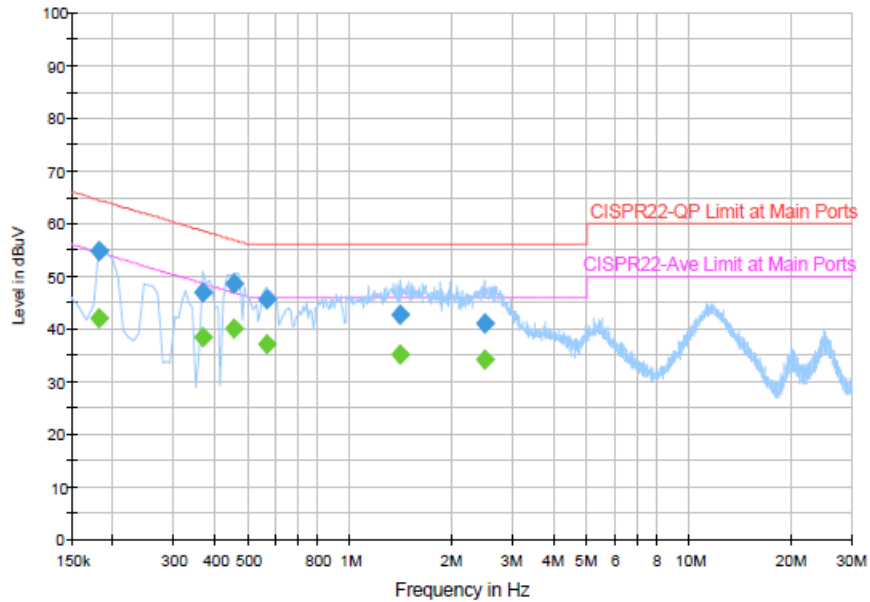
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	54.2	Off	L1	19.4	10.2	64.4
0.366000	48.5	Off	L1	19.4	10.1	58.6
0.446000	48.9	Off	L1	19.4	8.0	56.9
0.558000	46.7	Off	L1	19.4	9.3	56.0
1.182000	42.9	Off	L1	19.4	13.1	56.0
2.286000	41.8	Off	L1	19.5	14.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	39.2	Off	L1	19.4	15.2	54.4
0.366000	38.1	Off	L1	19.4	10.5	48.6
0.446000	38.8	Off	L1	19.4	8.1	46.9
0.558000	36.9	Off	L1	19.4	9.1	46.0
1.182000	33.3	Off	L1	19.4	12.7	46.0
2.286000	32.8	Off	L1	19.5	13.2	46.0



Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + GPS Rx + TC1 + 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)
0.182000	54.6	Off	N	19.4	9.8	64.4
0.366000	47.0	Off	N	19.4	11.6	58.6
0.454000	48.5	Off	N	19.4	8.3	56.8
0.566000	45.5	Off	N	19.4	10.5	56.0
1.406000	42.5	Off	N	19.5	13.5	56.0
2.478000	41.1	Off	N	19.5	14.9	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	42.0	Off	N	19.4	12.4	54.4
0.366000	38.5	Off	N	19.4	10.1	48.6
0.454000	39.9	Off	N	19.4	6.9	46.8
0.566000	37.0	Off	N	19.4	9.0	46.0
1.406000	35.2	Off	N	19.5	10.8	46.0
2.478000	34.2	Off	N	19.5	11.8	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

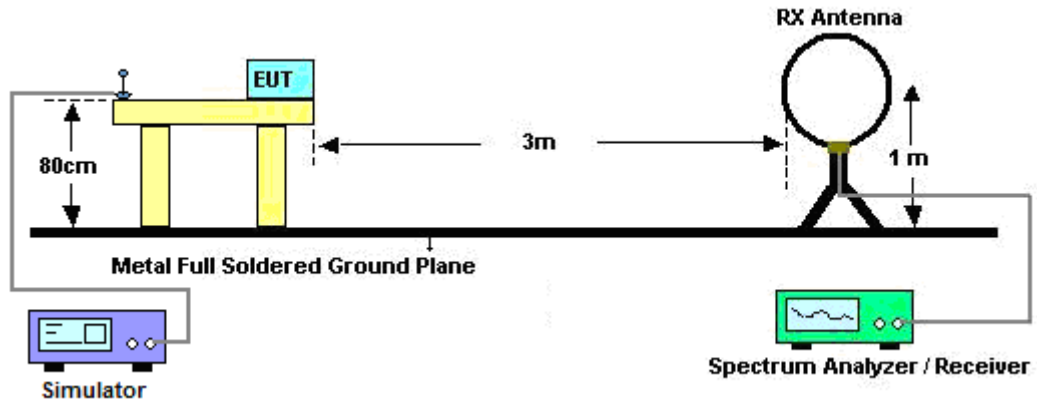
See list of measuring instruments of this test report.

3.9.3 Test Procedures

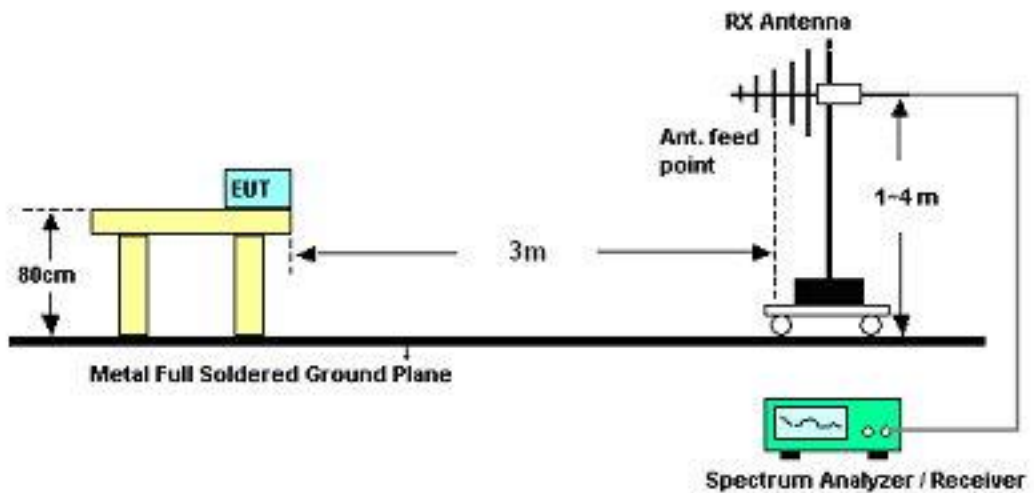
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector 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 = $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$ (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

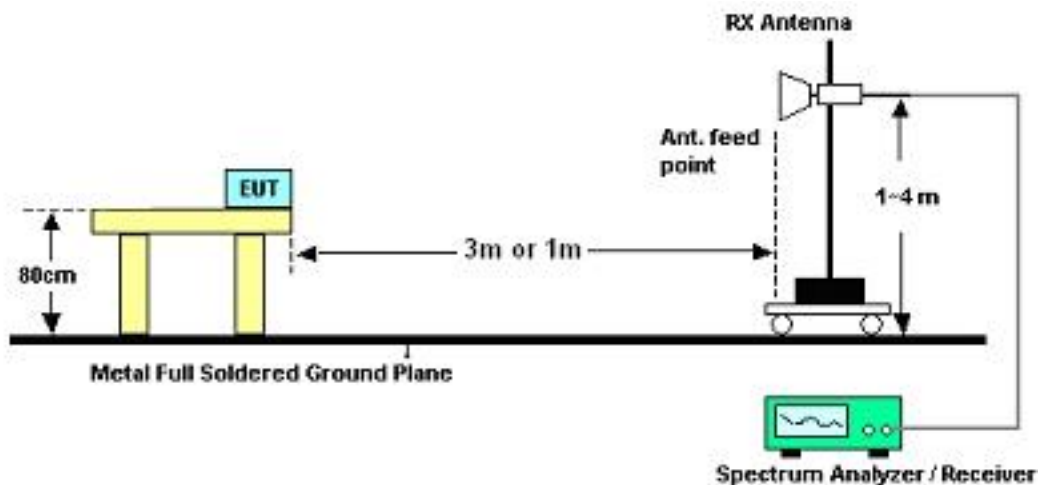
For radiated emissions below 30MHz



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 :	David Yang	Temperature :	23~24°C	
		Relative Humidity :	48~50%	
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 :	48~50%
Test Engineer :	David Yang	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
30	20.04	-19.96	40	32.54	18.36	0.7	31.56	-	-	Peak
182.28	24.09	-19.41	43.5	45.68	8.5	1.41	31.5	-	-	Peak
251.67	25.83	-20.17	46	44	11.69	1.66	31.52	-	-	Peak
339.9	30.48	-15.52	46	46.72	13.19	1.87	31.3	129	336	Peak
475.7	24.57	-21.43	46	37	16.5	2.18	31.11	-	-	Peak
748	26.86	-19.14	46	34.63	20.03	2.75	30.55	-	-	Peak
2389.23	35.12	-18.88	54	32.6	32.02	4.58	34.08	138	246	Average
2389.23	48.24	-25.76	74	45.72	32.02	4.58	34.08	138	246	Peak
2402	84.49	-	-	81.97	32.02	4.58	34.08	138	246	Average
2402	102.31	-	-	99.79	32.02	4.58	34.08	138	246	Peak
2484	32.74	-21.26	54	30.09	32.09	4.64	34.08	138	246	Average
2484	45.2	-28.8	74	42.55	32.09	4.64	34.08	138	246	Peak



Test Mode :	Mode 1	Temperature :	23~24°C
Test Channel :	00	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
139.89	17.22	-26.28	43.5	36.76	10.7	1.27	31.51	-	-	Peak
247.08	21.41	-24.59	46	39.82	11.47	1.65	31.53	-	-	Peak
277.32	21.84	-24.16	46	39.56	11.94	1.73	31.39	-	-	Peak
475.7	28.33	-17.67	46	40.76	16.5	2.18	31.11	-	-	Peak
612.2	38.59	-7.41	46	48.21	18.77	2.46	30.85	109	187	Peak
748	37.22	-8.78	46	44.99	20.03	2.75	30.55	-	-	Peak
2387.71	33.85	-20.15	54	31.33	32.02	4.58	34.08	165	221	Average
2387.71	47.08	-26.92	74	44.56	32.02	4.58	34.08	165	221	Peak
2402	80.88	-	-	78.36	32.02	4.58	34.08	165	221	Average
2402	97.49	-	-	94.97	32.02	4.58	34.08	165	221	Peak
2484	32.65	-21.35	54	30	32.09	4.64	34.08	165	221	Average
2484	44.93	-29.07	74	42.28	32.09	4.64	34.08	165	221	Peak



Test Mode :	Mode 2	Temperature :	23~24°C
Test Channel :	39	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
30	20.31	-19.69	40	32.81	18.36	0.7	31.56	-	-	Peak
183.9	17.95	-25.55	43.5	39.57	8.46	1.42	31.5	-	-	Peak
247.08	26.27	-19.73	46	44.68	11.47	1.65	31.53	-	-	Peak
339.9	29.94	-16.06	46	46.18	13.19	1.87	31.3	137	215	Peak
475.7	25.78	-20.22	46	38.21	16.5	2.18	31.11	-	-	Peak
612.2	27.98	-18.02	46	37.6	18.77	2.46	30.85	-	-	Peak
2360	33.2	-20.8	54	30.72	31.99	4.57	34.08	186	105	Average
2360	46.12	-27.88	74	43.64	31.99	4.57	34.08	186	105	Peak
2441	83.81	-	-	81.22	32.06	4.61	34.08	186	105	Average
2441	101.59	-	-	99	32.06	4.61	34.08	186	105	Peak
2494	32.85	-21.15	54	30.19	32.1	4.64	34.08	186	105	Average
2494	46.18	-27.82	74	43.52	32.1	4.64	34.08	186	105	Peak



Test Mode :	Mode 2	Temperature :	23~24°C
Test Channel :	39	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
31.62	31.6	-8.4	40	45.21	17.21	0.72	31.54	-	-	Peak
55.38	27.26	-12.74	40	51.42	6.53	0.83	31.52	-	-	Peak
150.42	27.72	-15.78	43.5	47.7	10.25	1.27	31.5	-	-	Peak
339.9	31.5	-14.5	46	47.74	13.19	1.87	31.3	-	-	Peak
612.2	37.86	-8.14	46	47.48	18.77	2.46	30.85	112	187	Peak
748	35.69	-10.31	46	43.46	20.03	2.75	30.55	-	-	Peak
2326	33.08	-20.92	54	30.68	31.96	4.53	34.09	100	144	Average
2326	45.55	-28.45	74	43.15	31.96	4.53	34.09	100	144	Peak
2441	80.1	-	-	77.51	32.06	4.61	34.08	100	144	Average
2441	97.04	-	-	94.45	32.06	4.61	34.08	100	144	Peak
2484	32.73	-21.27	54	30.08	32.09	4.64	34.08	100	144	Average
2484	45.54	-28.46	74	42.89	32.09	4.64	34.08	100	144	Peak



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
32.97	20.67	-19.33	40	34.86	16.63	0.72	31.54	-	-	Peak
204.15	23.44	-20.06	43.5	44.93	8.49	1.48	31.46	-	-	Peak
249.24	26.27	-19.73	46	44.54	11.6	1.66	31.53	-	-	Peak
339.9	30.48	-15.52	46	46.72	13.19	1.87	31.3	121	103	Peak
475.7	24.75	-21.25	46	37.18	16.5	2.18	31.11	-	-	Peak
612.2	28.72	-17.28	46	38.34	18.77	2.46	30.85	-	-	Peak
2350	33.18	-20.82	54	30.74	31.98	4.55	34.09	128	110	Average
2350	45.49	-28.51	74	43.05	31.98	4.55	34.09	128	110	Peak
2480	84.02	-	-	81.37	32.09	4.64	34.08	128	110	Average
2480	101.9	-	-	99.25	32.09	4.64	34.08	128	110	Peak
2483.5	30.16	-23.84	54	27.51	32.09	4.64	34.08	128	110	Average
2483.5	66.3	-7.7	74	63.65	32.09	4.64	34.08	128	110	Peak



Test Mode :	Mode 3	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
31.62	31.73	-8.27	40	45.34	17.21	0.72	31.54	106	312	Peak
57.27	26.84	-13.16	40	51.49	6.04	0.85	31.54	-	-	Peak
154.47	27.82	-15.68	43.5	48.02	10	1.3	31.5	-	-	Peak
339.9	31.47	-14.53	46	47.71	13.19	1.87	31.3	-	-	Peak
612.2	36.11	-9.89	46	45.73	18.77	2.46	30.85	-	-	Peak
748	36.34	-9.66	46	44.11	20.03	2.75	30.55	-	-	Peak
2352	33.2	-20.8	54	30.75	31.99	4.55	34.09	100	38	Average
2352	45.28	-28.72	74	42.83	31.99	4.55	34.09	100	38	Peak
2480	82.14	-	-	79.49	32.09	4.64	34.08	100	38	Average
2480	98.86	-	-	96.21	32.09	4.64	34.08	100	38	Peak
2483.5	28.04	-25.96	54	25.39	32.09	4.64	34.08	100	38	Average
2483.5	63.34	-10.66	74	60.69	32.09	4.64	34.08	100	38	Peak



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
152.04	33.42	-10.08	43.5	53.5	10.13	1.29	31.5	-	-	Peak
253.29	42.21	-3.79	46	60.35	11.7	1.67	31.51	100	87	Peak
297.03	41.91	-4.09	46	59.3	12.13	1.77	31.29	-	-	Peak
370.7	39.19	-6.81	46	54.5	14	1.95	31.26	-	-	Peak
400.1	41.31	-4.69	46	55.7	14.78	2.01	31.18	-	-	Peak
445.6	35.44	-10.56	46	48.65	15.81	2.13	31.15	-	-	Peak
2344	32.64	-21.36	54	30.2	31.98	4.55	34.09	156	106	Average
2344	44.21	-29.79	74	41.77	31.98	4.55	34.09	156	106	Peak
2480	83.1	-	-	80.45	32.09	4.64	34.08	156	106	Average
2480	100.44	-	-	97.79	32.09	4.64	34.08	156	106	Peak
2483.5	28.15	-25.85	54	25.5	32.09	4.64	34.08	156	106	Average
2483.5	64.45	-9.55	74	61.8	32.09	4.64	34.08	156	106	Peak



Test Mode :	Mode 4	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	48~50%
Test Engineer :	David Yang	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
35.13	32.5	-7.5	40	47.8	15.48	0.74	31.52	-	-	Peak
118.29	34.88	-8.62	43.5	54.46	10.74	1.2	31.52	-	-	Peak
253.02	39.14	-6.86	46	57.28	11.7	1.67	31.51	-	-	Peak
370.7	36.57	-9.43	46	51.88	14	1.95	31.26	-	-	Peak
400.1	41.51	-4.49	46	55.9	14.78	2.01	31.18	100	57	Peak
445.6	36.74	-9.26	46	49.95	15.81	2.13	31.15	-	-	Peak
2350	33.1	-20.9	54	30.66	31.98	4.55	34.09	127	155	Average
2350	45.41	-28.59	74	42.97	31.98	4.55	34.09	127	155	Peak
2480	80.75	-	-	78.1	32.09	4.64	34.08	127	155	Average
2480	97.4	-	-	94.75	32.09	4.64	34.08	127	155	Peak
2483.5	27.89	-26.11	54	25.24	32.09	4.64	34.08	127	155	Average
2483.5	61.29	-12.71	74	58.64	32.09	4.64	34.08	127	155	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
Bluetooth Base Station	R&S	CBT32	100522	N/A	Jan. 13, 2011	Jan. 12, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Sep. 17, 2012	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Aug. 21, 2012	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)
GPS Station	Pendulum	GSG-54	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-30GHz	Nov. 03, 2010	Nov. 02, 2011	Radiation (03CH05-HY)
COM-POWER	Double Ridge Horn	AH-118	701030	1HGz~18GHz	N/A	N/A	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 1GHz	Nov. 06, 2010	Nov. 05, 2011	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	66584	1GHz ~ 18GHz	Aug. 04, 2011	Aug. 03, 2012	Radiation (03CH05-HY)
COM-POWER	COM-POWER	PA-103	161075	1KHz - 1GHz	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH05-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz~18GHz	Jul. 19, 2011	Jul. 18, 2012	Radiation (03CH05-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	159087	1GHz~18GHz	Feb. 21, 2011	Feb. 20, 2012	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A019 17	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH05-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Jan. 13, 2011	Jan. 12, 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 $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP182445-02 as below.