

FCC RF Test Report

APPLICANT : Acer Incorporated
EQUIPMENT : Tablet Computer
BRAND NAME : Acer
MODEL NAME : A200
FCC ID : HLZTMDMA200
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Oct. 14, 2011 and completely tested on Oct. 28, 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.

TEL : 886-3-327-3456

FAX : 886-3-328-4978

FCC ID : HLZTMDMA200

Page Number : 1 of 75

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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	11
3 TEST RESULT	12
3.1 Number of Channel Measurement	12
3.2 20dB and 99% Bandwidth Measurement	14
3.3 Hopping Channel Separation Measurement	27
3.4 Dwell Time Measurement	30
3.5 Peak Output Power Measurement	32
3.6 Band Edges Measurement	35
3.7 Spurious Emission Measurement	53
3.8 AC Conducted Emission Measurement	57
3.9 Radiated Emission Measurement	61
3.10 Antenna Requirements	72
4 LIST OF MEASURING EQUIPMENT	73
5 UNCERTAINTY OF EVALUATION	74
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	$\geq 15\text{Chs}$	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	$\geq 2/3$ of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 125\text{ mW}$	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.8	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 12.5 dB at 0.182 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.28 dB at 2483.5 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Acer Incorporated

8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22181, Taiwan (R.O.C)

1.2 Manufacturer

1. Compal Electronics, Inc.

No. 581, Ruiguang Rd., Neihu District, Taipei City 11492, Taiwan

2. Compal Electronics Technology (Kunshan) Co., Ltd.

No. 25, Third Avenue, A Zone, Kunshan Comprehensive Free Trade Zone, Kunshan, Jiangsu, China

3. Compal Information (Kunshan) Co., Ltd.

No. 15, Third Avenue, A Zone, Kunshan Comprehensive Free Trade Zone, Kunshan, Jiangsu, China

4. Compal Information Technology (Kunshan) Co., Ltd.

No. 58, First Avenue, A Zone, Kunshan Comprehensive Free Trade Zone, Kunshan, Jiangsu, China

5. Compalead Eletrônica Do Brasil Indústria E Comércio Ltda

Rua Kanebo 175, Galpões C1, C2, C3, C4, C5 C6 E C12, Bairro Distrito Industrial Jundiaí Business Park, Cep 13213-090, Jundiaí - São Paulo, Brasil

6. Compal (Vietnam) Co., Ltd.

Ba Thien Industrial Zone, Ba Hien Commune, Binh Xuyen County, Vinh Phuc Province, Vietnam

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Tablet Computer
Brand Name	Acer
Model Name	A200
FCC ID	HLZTMDMA200
Sample 1	EUT with eMMC 1 and LP DDR2
Sample 2	EUT with eMMC 2 and LP DDR2
Sample 3	EUT with eMMC 3 and LP DDR2
Sample 4	EUT with eMMC 4 and LP DDR2
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) : 1.32 dBm (0.0014 W) Bluetooth EDR (2Mbps) : 3.97 dBm (0.0025 W) Bluetooth EDR (3Mbps) : 1.69 dBm (0.0015 W)
Antenna Type	PIFA Antenna with gain -0.03 dBi
Type of Antenna Connector	N/A
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

Remark:

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

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 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	03CH06-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, 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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	USB 2.0 HD	WD	WDBAAR3200AB K-PESN	FCC DoC	N/A	Shielded, 1.8 m
7.	Bluetooth Earphone	Motorola	S705	IHDT6GH1	N/A	N/A
8.	iPod Earphone	Apple	N/A	FCC DoC	Unshielded, 1.2 m	N/A
9.	iPod	Apple	A1285	FCC DoC	Shielded, 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	-0.12 dBm	2.43 dBm	0.15 dBm
Ch39	2441MHz	0.56 dBm	3.22 dBm	1.01 dBm
Ch78	2480MHz	1.32 dBm	3.97 dBm	1.69 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).

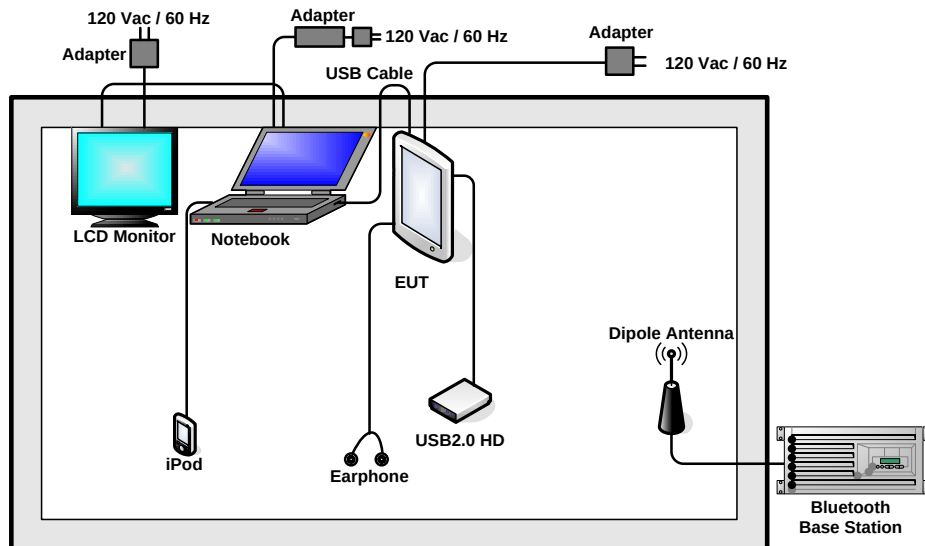
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

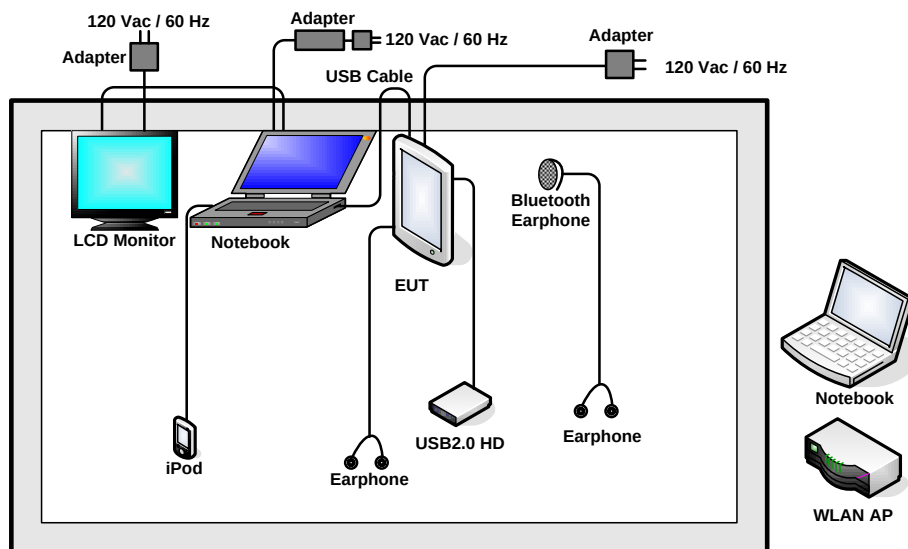
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	Mode 1: CH00_2402 MHz for Sample 1 Mode 2: CH39_2441 MHz for Sample 1 Mode 3: CH78_2480 MHz for Sample 1 Mode 4: CH78_2480 MHz for Sample 3	N/A
AC Conducted Emission	Mode 1 :WLAN Link + Bluetooth Link + Earphone + USB Cable 1 (Data Link with Notebook) + Camera + USB 2.0 HD + Adapter for Sample 1 Mode 2 :WLAN Link + Bluetooth Link + Earphone + USB Cable 2 (Data Link with Notebook) + MPEG4 + USB 2.0 HD + Adapter for Sample 3		
Remark:			
1. 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.			
2. For conducted emission, the worst case is mode 2; only the test data of this mode was reported.			
3. Link with Notebook means data application transferred mode between DUT and Notebook.			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, the RF utility, “AT Command” was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

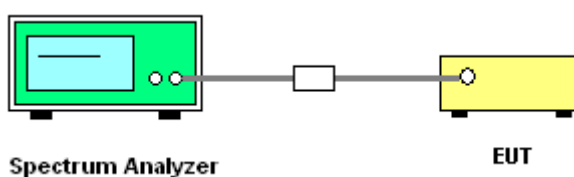
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation; RBW $\geq$ 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.

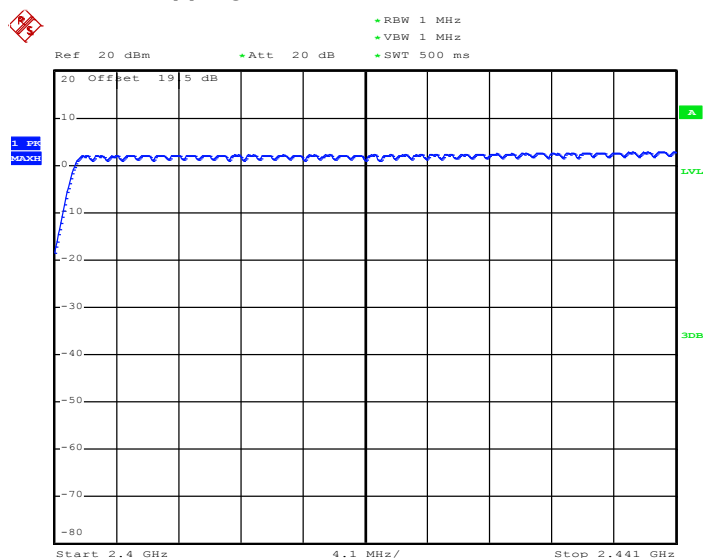
3.1.4 Test Setup



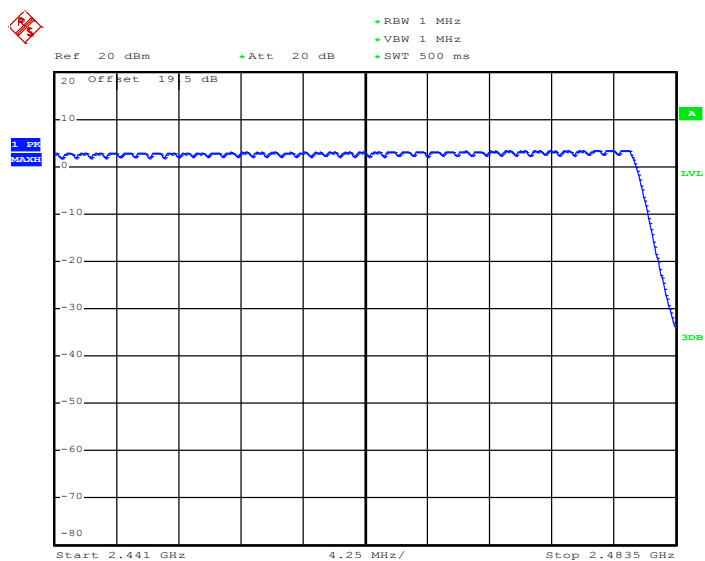
3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 4~6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 25.OCT.2011 13:38:36



Date: 25.OCT.2011 13:47:53

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

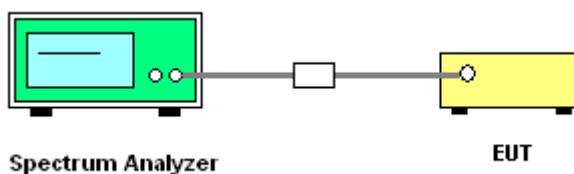
3.2.2 Measuring Instruments

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

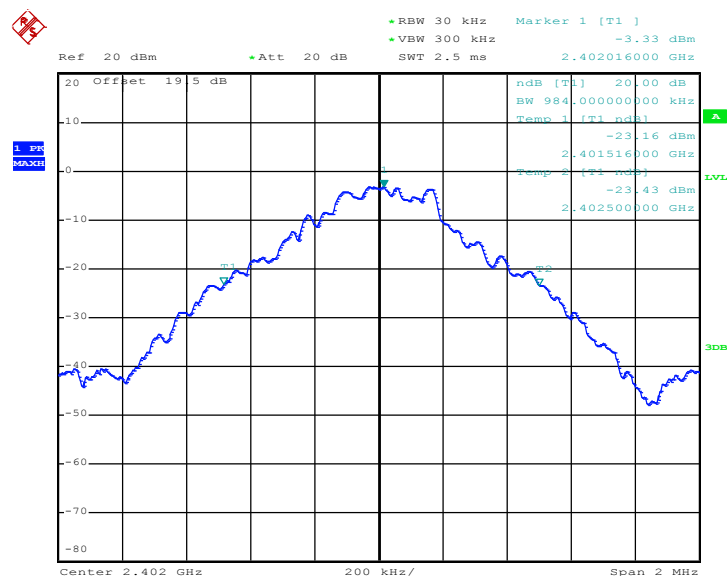


3.2.5 Test Result of 20dB Bandwidth

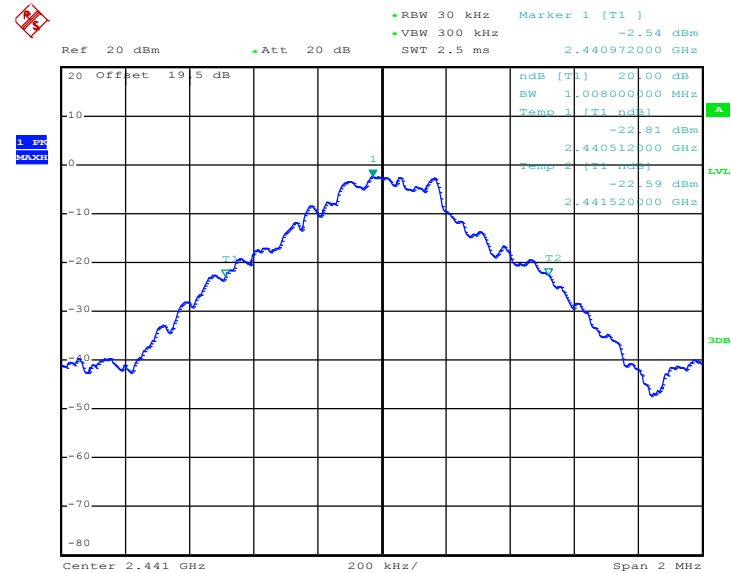
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.984
39	2441	1.008
78	2480	1.012

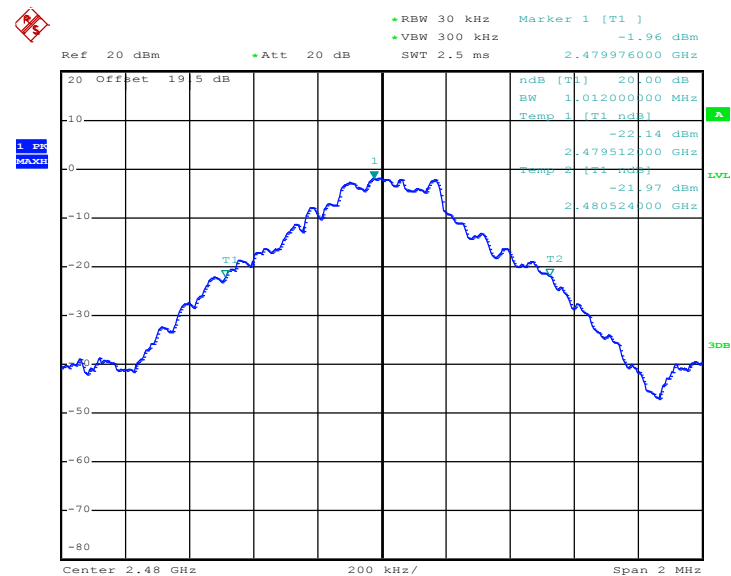
20 dB Bandwidth Plot on Channel 00



Date: 25.OCT.2011 11:07:29

20 dB Bandwidth Plot on Channel 39


Date: 25.OCT.2011 11:08:49

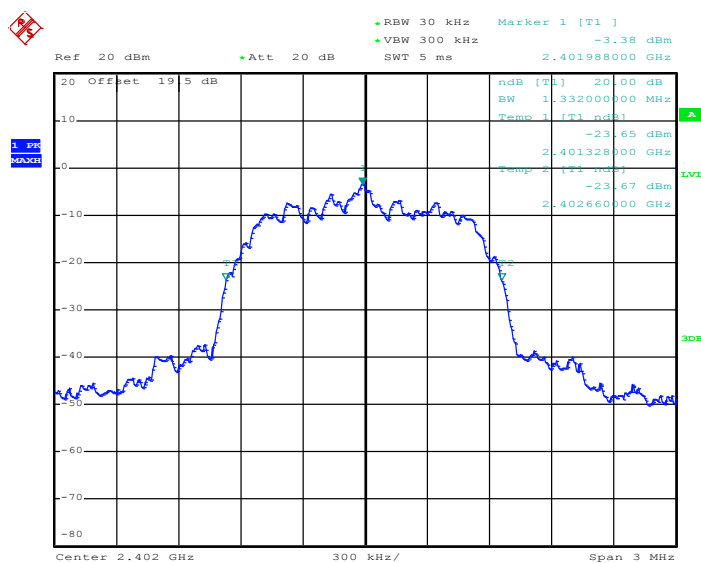
20 dB Bandwidth Plot on Channel 78


Date: 25.OCT.2011 11:09:37

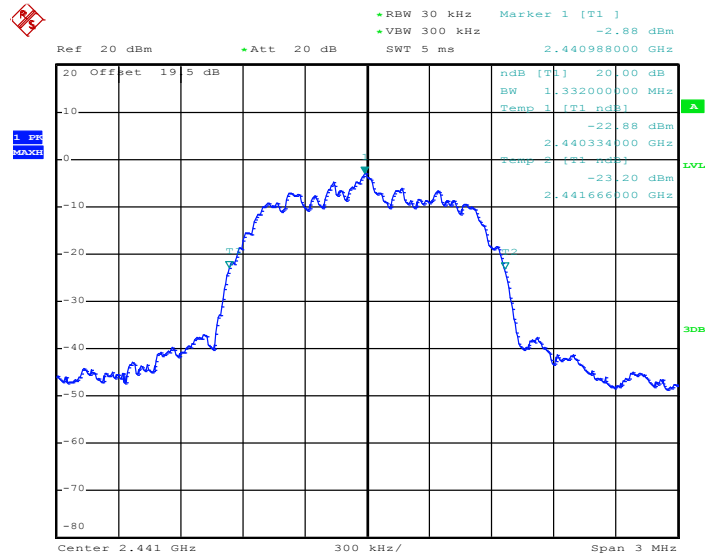


Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

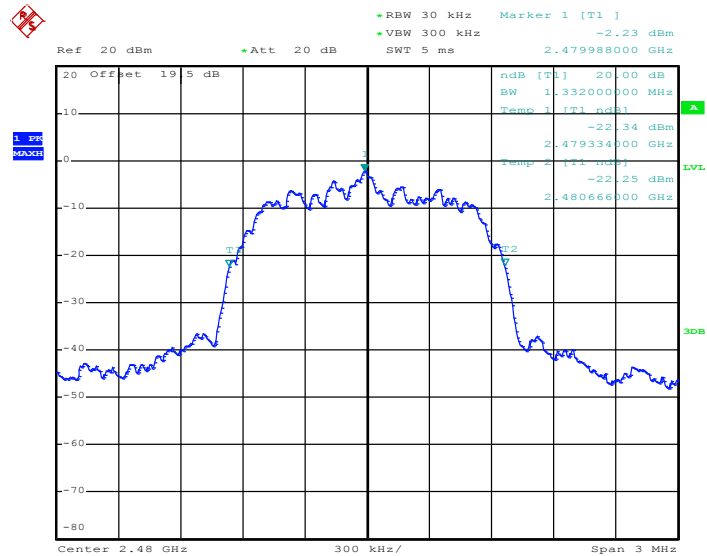
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.332
39	2441	1.332
78	2480	1.332

20 dB Bandwidth Plot on Channel 00

Date: 25.OCT.2011 11:53:50

20 dB Bandwidth Plot on Channel 39


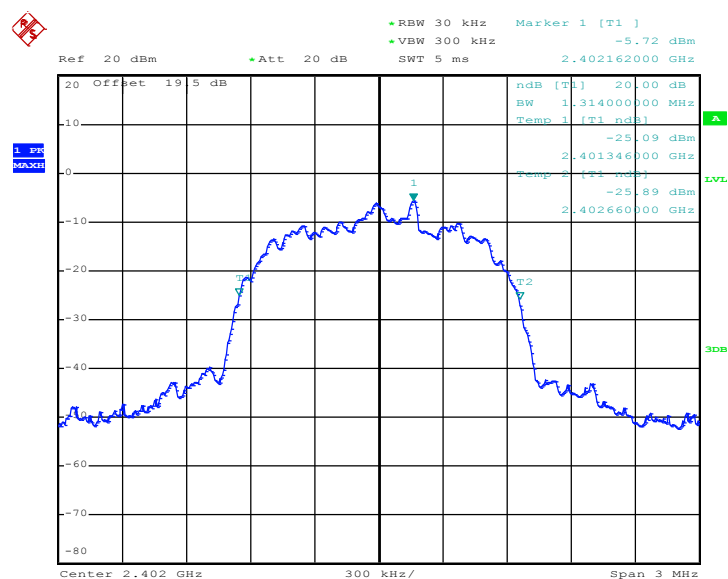
Date: 25.OCT.2011 11:10:45

20 dB Bandwidth Plot on Channel 78


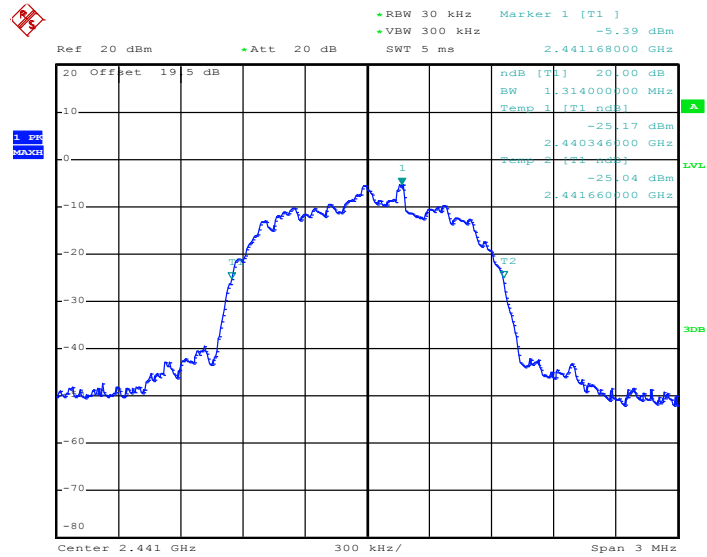
Date: 25.OCT.2011 11:11:29

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

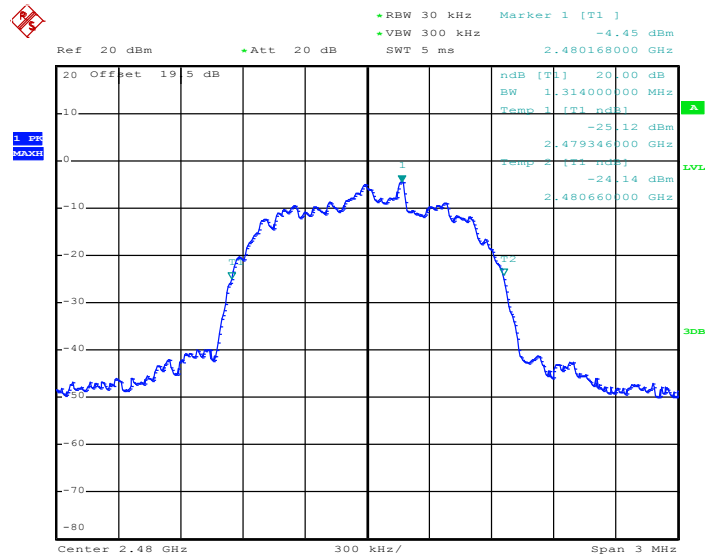
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.314
39	2441	1.314
78	2480	1.314

20 dB Bandwidth Plot on Channel 00


Date: 25.OCT.2011 11:13:09

20 dB Bandwidth Plot on Channel 39


Date: 25.OCT.2011 11:13:25

20 dB Bandwidth Plot on Channel 78


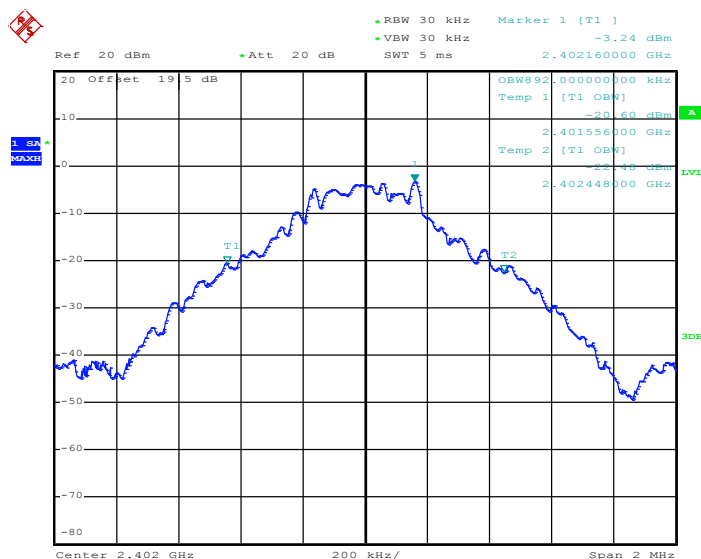
Date: 25.OCT.2011 11:14:26

3.2.6 Test Result of 99% Occupied Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.892
39	2441	0.904
78	2480	0.904

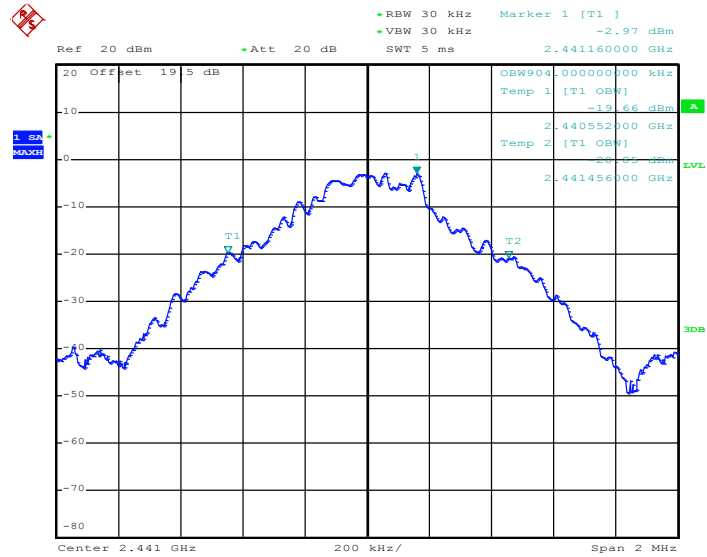
99% Bandwidth Plot on Channel 00



Date: 25.OCT.2011 11:47:59

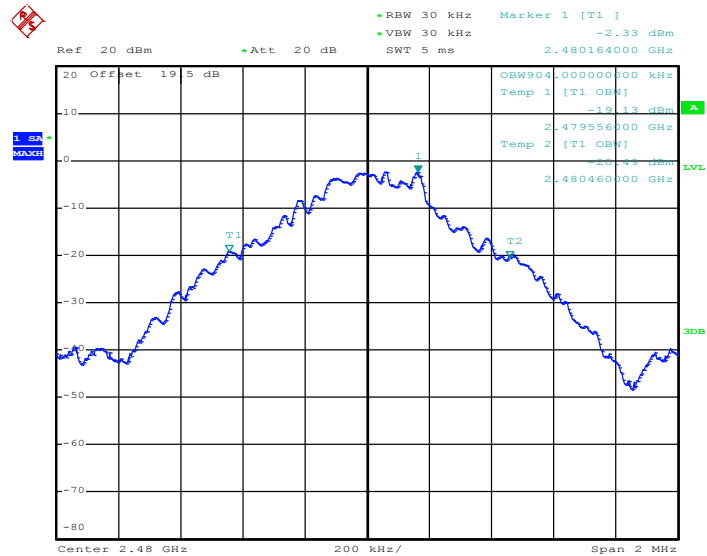


99% Occupied Bandwidth Plot on Channel 39



Date: 25.OCT.2011 11:29:37

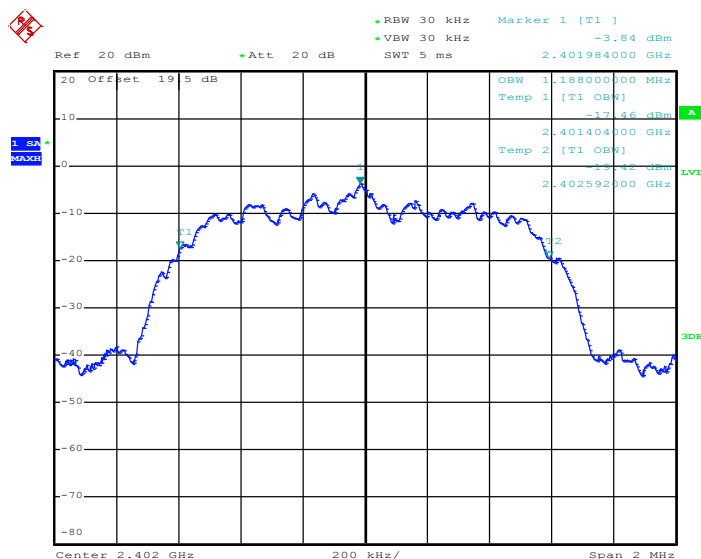
99% Occupied Bandwidth Plot on Channel 78



Date: 25.OCT.2011 11:30:13

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

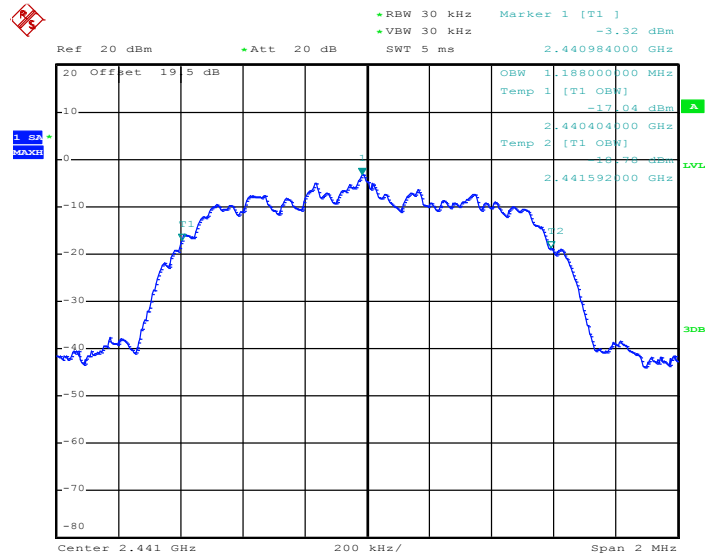
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.188
39	2441	1.188
78	2480	1.188

99% Bandwidth Plot on Channel 00


Date: 25.OCT.2011 11:49:46

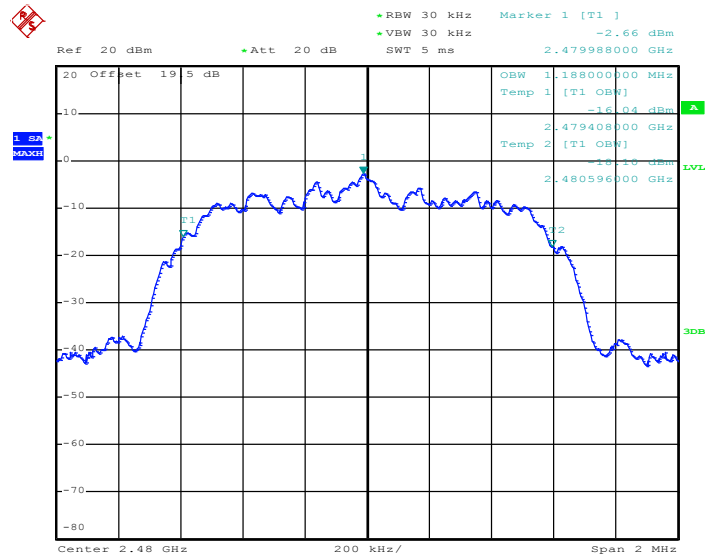


99% Occupied Bandwidth Plot on Channel 39



Date: 25.OCT.2011 11:31:25

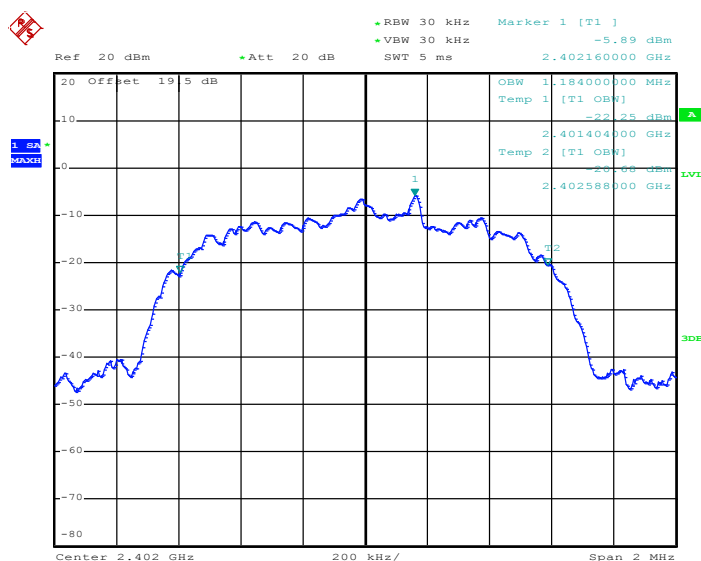
99% Occupied Bandwidth Plot on Channel 78



Date: 25.OCT.2011 11:32:01

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

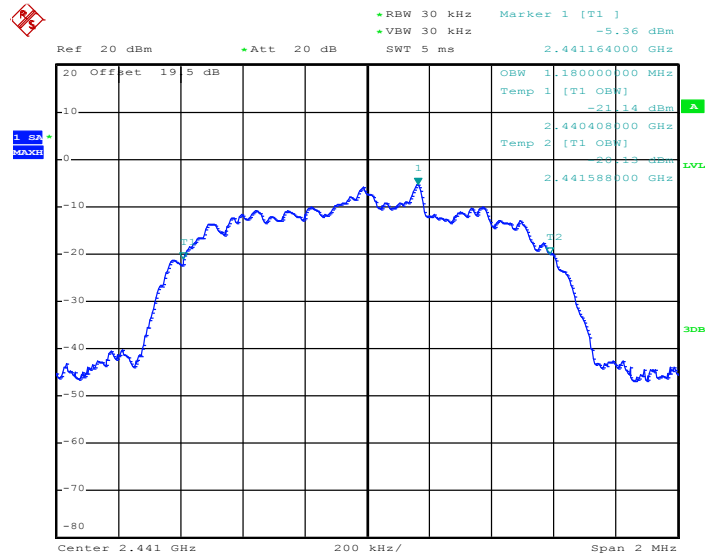
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.184
39	2441	1.180
78	2480	1.180

99% Bandwidth Plot on Channel 00


Date: 25.OCT.2011 11:40:59

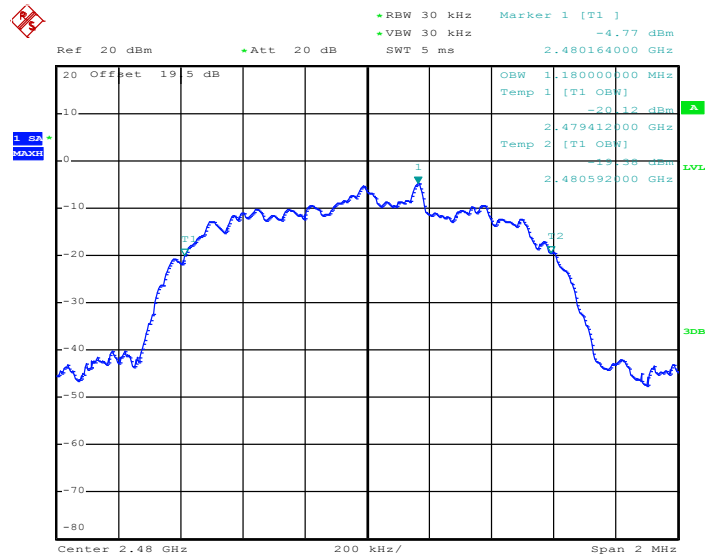


99% Occupied Bandwidth Plot on Channel 39



Date: 25.OCT.2011 11:33:12

99% Occupied Bandwidth Plot on Channel 78



Date: 25.OCT.2011 11:33:48

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.

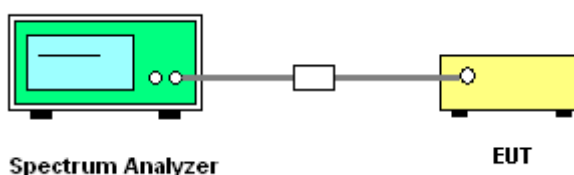
3.3.2 Measuring Instruments

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

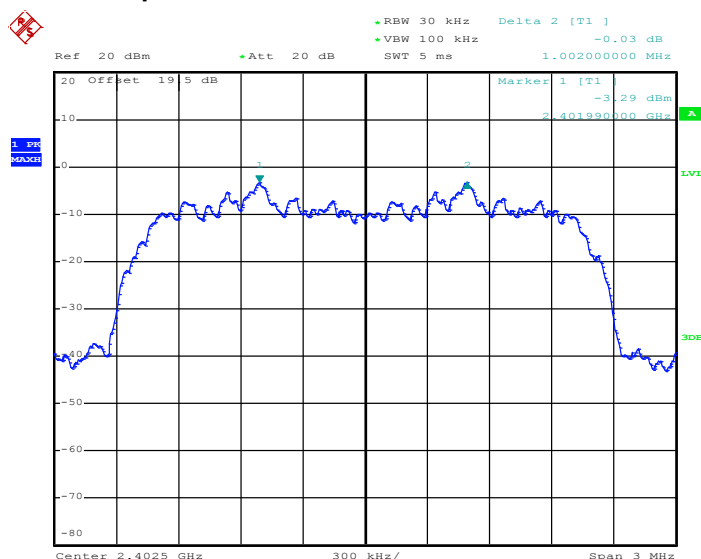


3.3.5 Test Result of Hopping Channel Separation

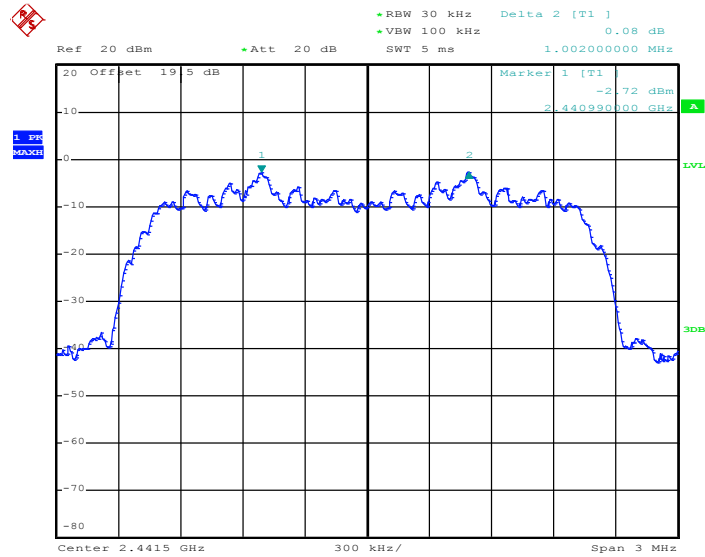
Test Mode :	Mode 4, 5, 6	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

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	0.8880	Pass

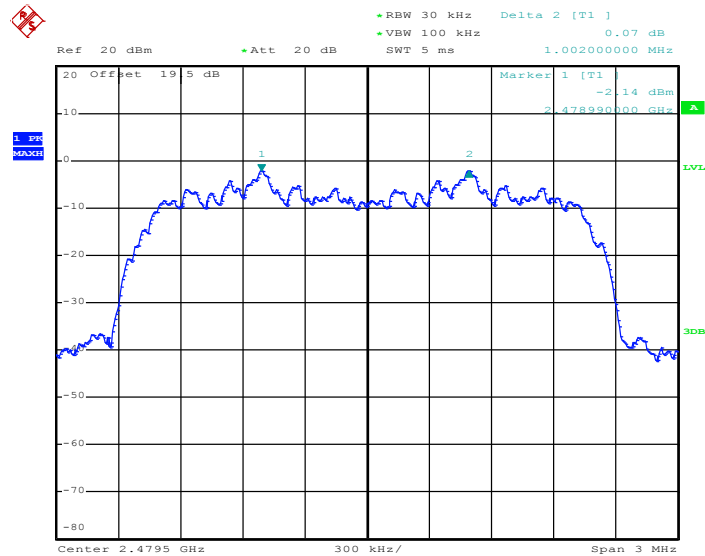
Channel Separation Plot on Channel 00 - 01



Date: 25.OCT.2011 12:26:40

Channel Separation Plot on Channel 39 - 40


Date: 25.OCT.2011 12:27:22

Channel Separation Plot on Channel 77 - 78


Date: 25.OCT.2011 12:28:55

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.

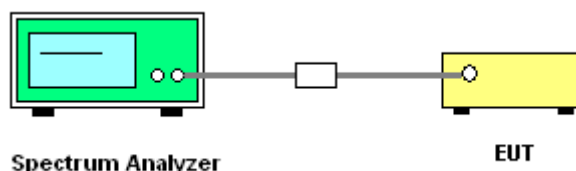
3.4.2 Measuring Instruments

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 $\geq$ 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



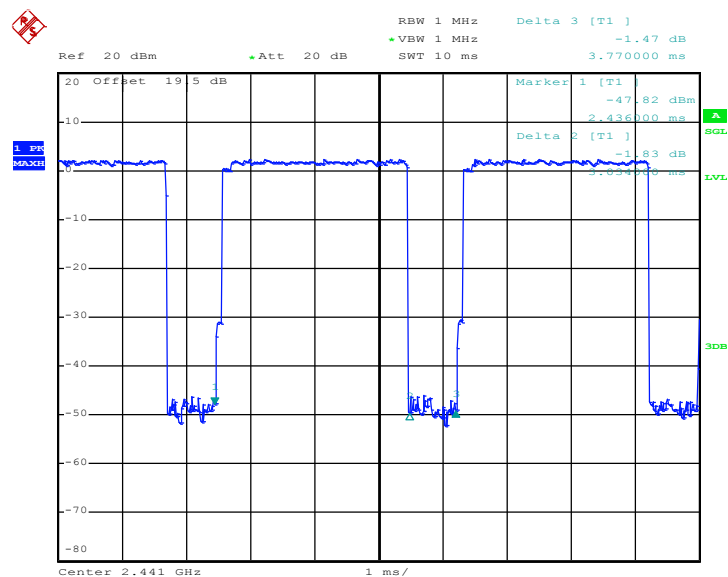
3.4.5 Test Result of Dwell Time

Test Mode :	Mode 5	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

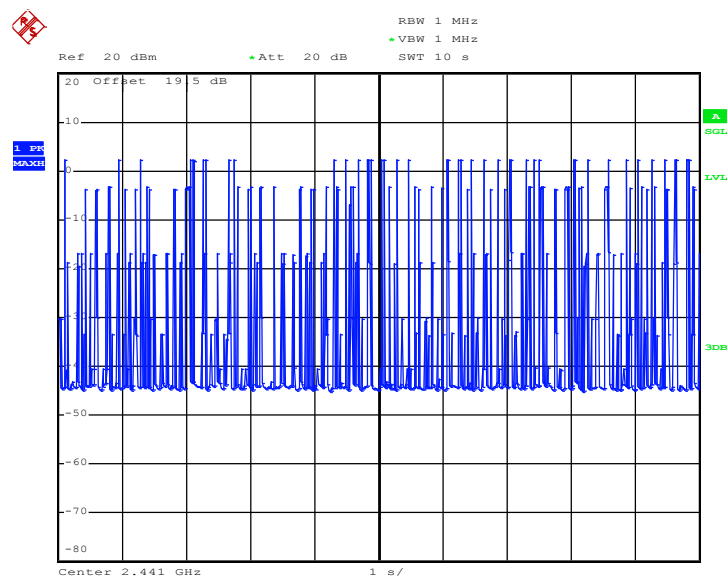
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
2DH5	3.70	3034.00	0.35	0.4	Pass

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)

2DH3 Dwell Time (One Pulse) Plot on Channel 39


Date: 25.OCT.2011 09:55:17

2DH3 Dwell Time (Count Pulses) Plot on Channel 39


Date: 25.OCT.2011 10:17:13

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).

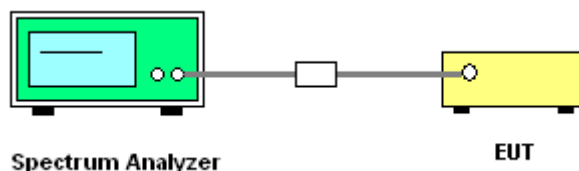
3.5.2 Measuring Instruments

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

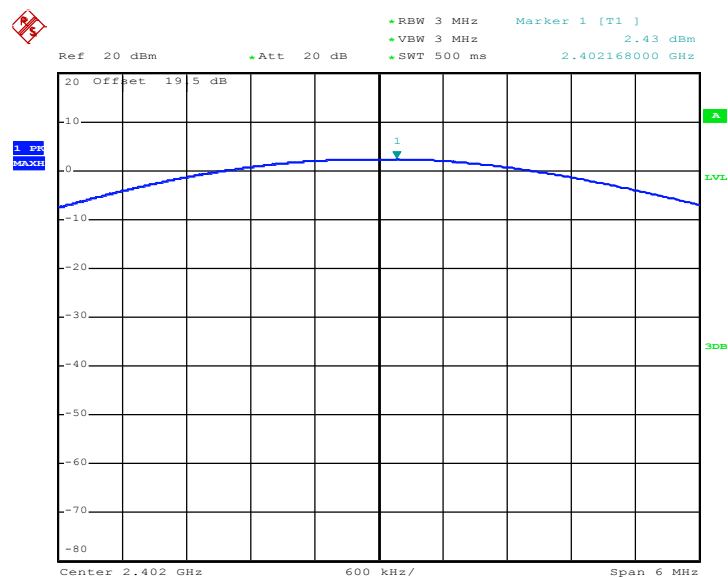


3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	53~55%

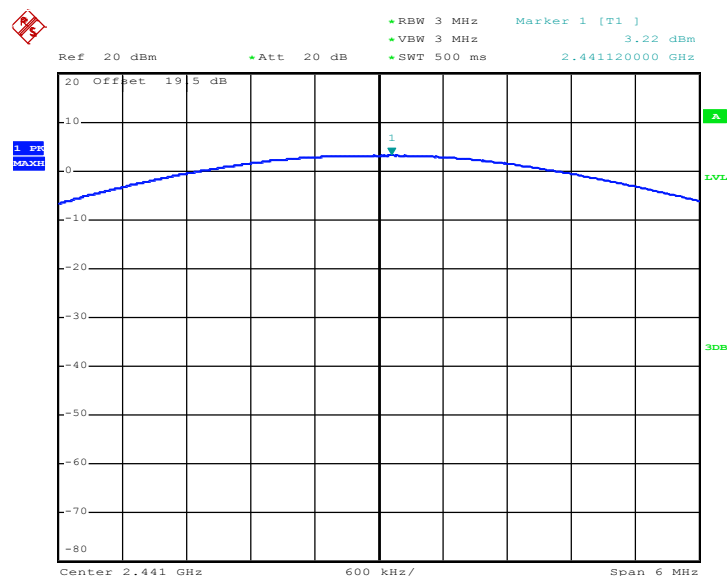
Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	2.43	20.97	Pass
39	2441	3.22	20.97	Pass
78	2480	3.97	20.97	Pass

Peak Output Power Plot on Channel 00

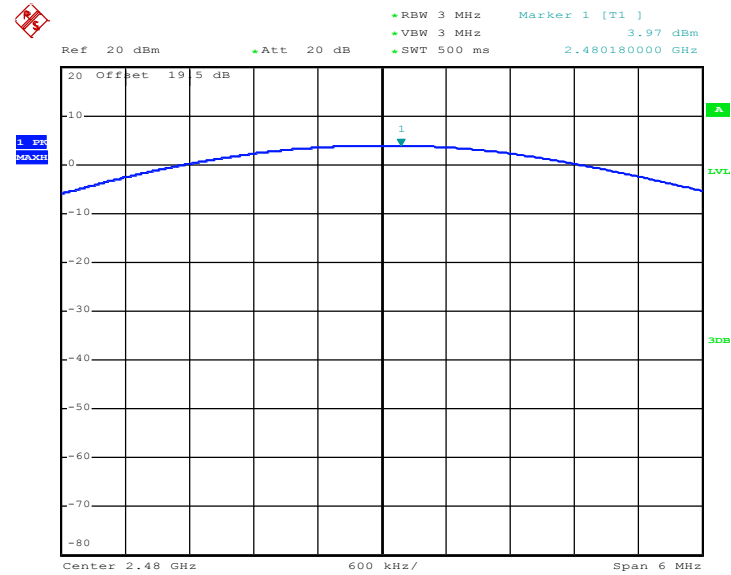


Date: 25.OCT.2011 09:43:27

Peak Output Power Plot on Channel 39



Date: 25.OCT.2011 09:44:41

Peak Output Power Plot on Channel 78


Date: 25.OCT.2011 09:45:55

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

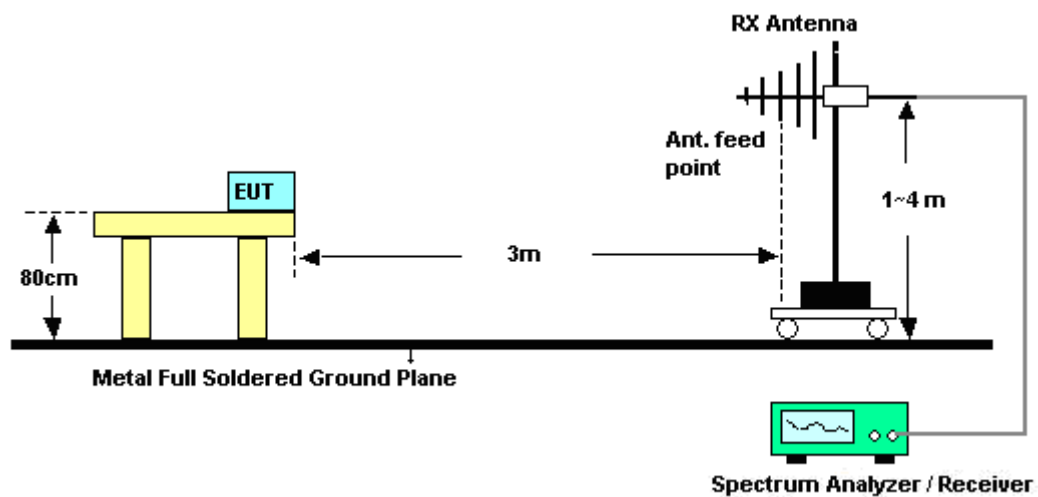
See list of measuring instruments of this test report.

3.6.3 Test Procedures

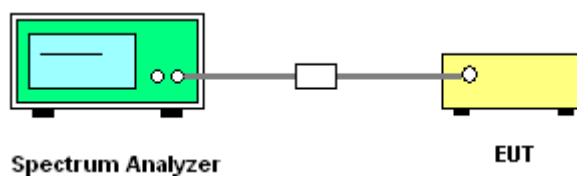
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	23~25°C
Test Channel :	00	Relative Humidity :	41~43%
		Test Engineer :	Elvis Chen

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
2387.14	47.74	-26.26	74	44.83	31.9	5.4	34.39	100	49	Peak
2387.14	34.69	-19.31	54	31.78	31.9	5.4	34.39	100	49	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
2338.5	46.14	-27.86	74	43.37	31.84	5.34	34.41	100	334	Peak
2338.5	33.42	-20.58	54	30.65	31.84	5.34	34.41	100	334	Average

Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
		Test Engineer :	Elvis Chen

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	66.1	-7.9	74	62.97	31.98	5.52	34.37	100	48	Peak
2483.5	28.75	-25.25	54	25.62	31.98	5.52	34.37	100	48	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	83.65	54.9	28.75	54	-25.25	Pass
Hopping Mode	83.65	56.02	27.63	54	-26.37	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	63.69	-10.31	74	60.56	31.98	5.52	34.37	100	12	Peak
2483.5	27.75	-26.25	54	24.62	31.98	5.52	34.37	100	12	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	81.94	54.19	27.75	54	-26.25	Pass
Hopping Mode	81.94	55.57	26.37	54	-27.63	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 3	Temperature :	23~25℃
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	Polarization :	Horizontal

Level (dBuV/m)

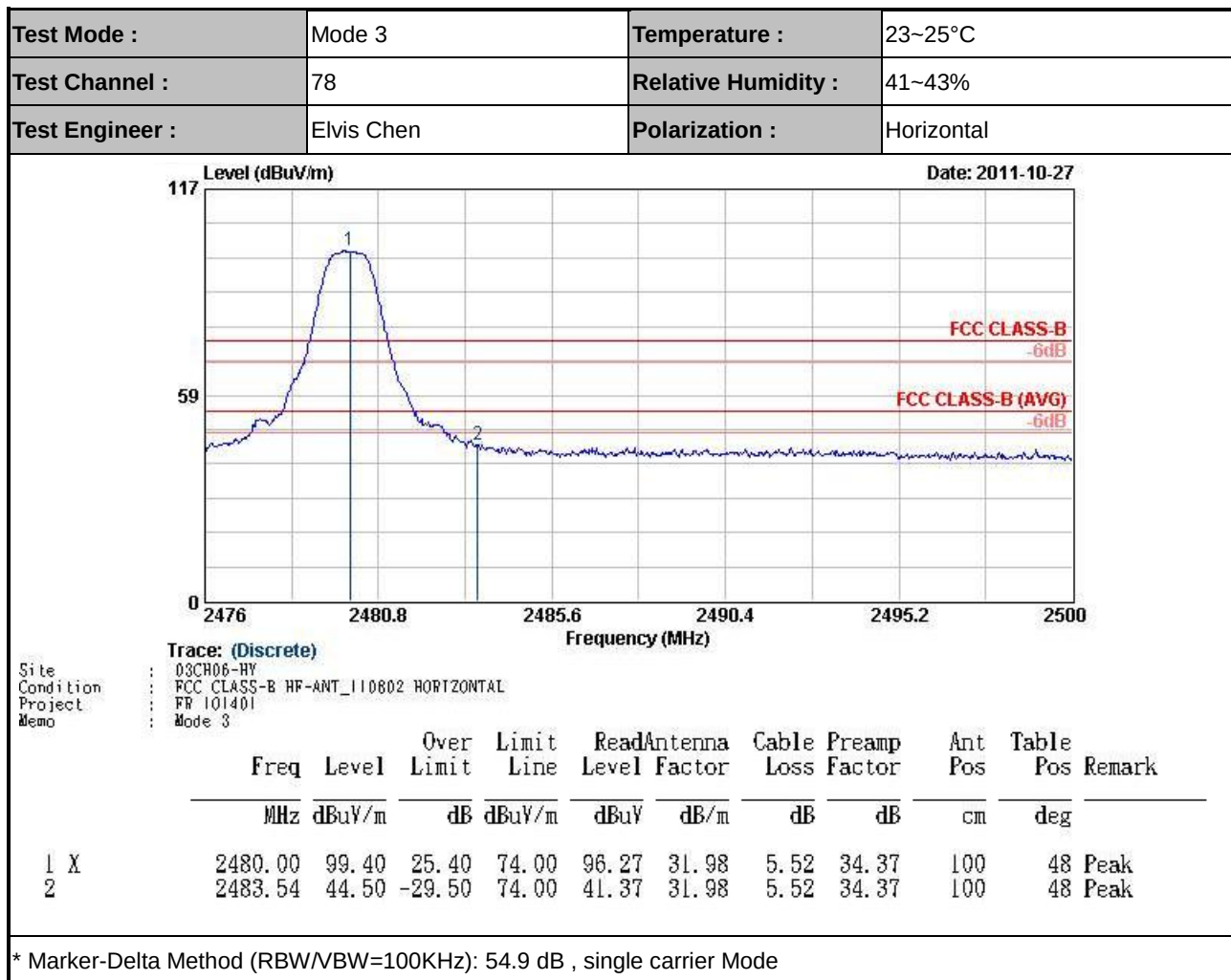
Date: 2011-10-27

Trace: (Discrete)

Site : 03CH06-HV
Condition : FCC CLASS-B HF-ANT_110802 HORIZONTAL
Project : FR 101401
Memo : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table		
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	X	2480.00	101.36	27.36	74.00	98.22	31.98	5.52	34.37	100	48 Peak
2	@	2480.00	83.65	29.65	54.00	80.52	31.98	5.52	34.37	100	48 Average

* Maximum field strength of the fundamental emission





Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	Polarization :	Horizontal

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Frequency (MHz)

Date: 2011-10-27

FCC CLASS-B

-6dB

FCC CLASS-B (AVG)

-6dB

Trace: (Discrete)

Site : 03CH06-HY

Condition : FCC CLASS-B HF-ANT_110802 HORIZONTAL

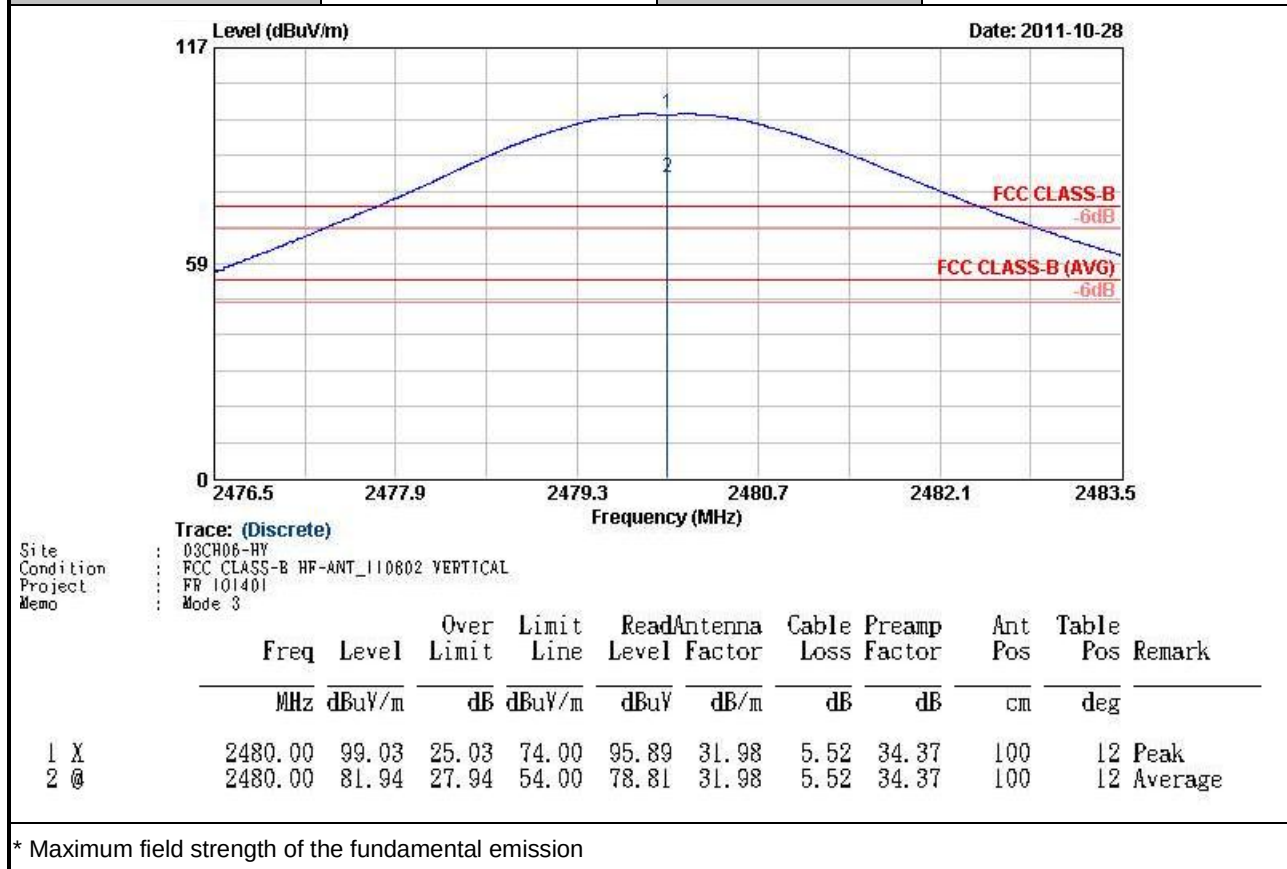
Project : FR 101401

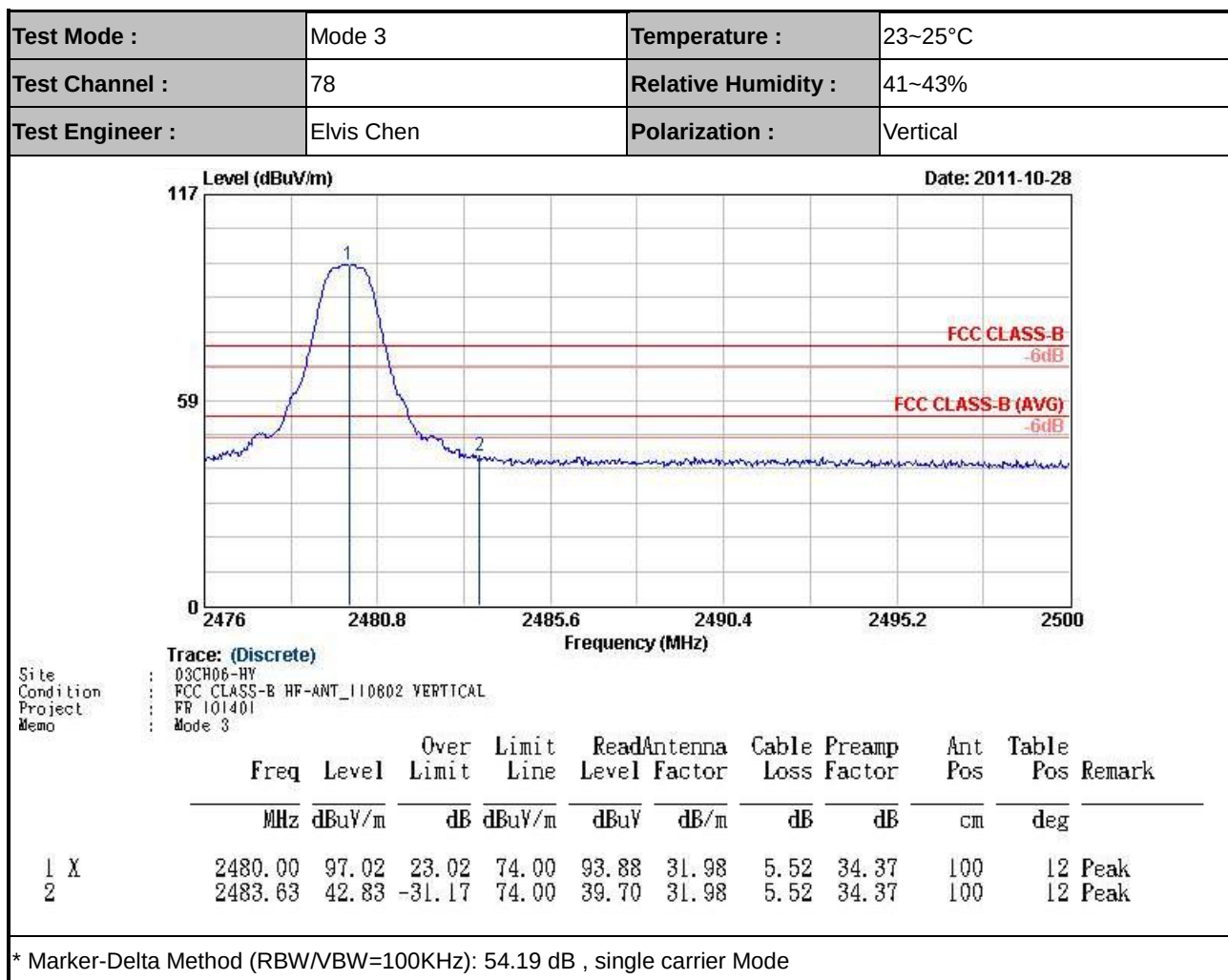
Memo : Mode 3

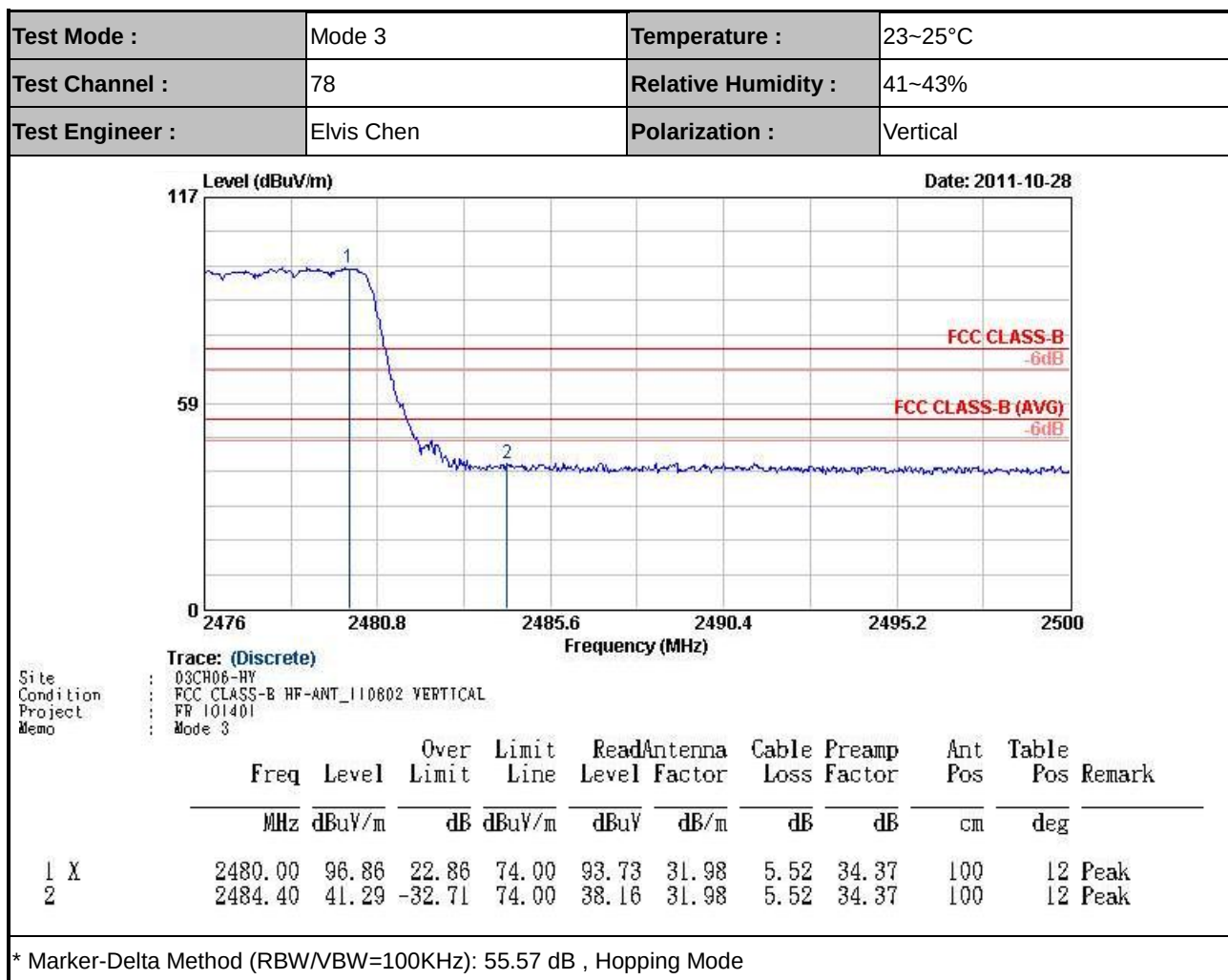
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	99.21	25.21	74.00	96.07	31.98	5.52	34.37	100	48 Peak
2	2484.14	43.19	-30.81	74.00	40.06	31.98	5.52	34.37	100	48 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 56.02 dB , Hopping Mode

Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	Polarization :	Vertical







Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
		Test Engineer :	Elvis Chen

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	67.72	-6.28	74	64.59	31.98	5.52	34.37	100	58	Peak
2483.5	28.04	-25.96	54	24.91	31.98	5.52	34.37	100	58	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	84.4	56.36	28.04	54	-25.96	Pass
Hopping Mode	84.4	58.51	25.89	54	-28.11	Pass

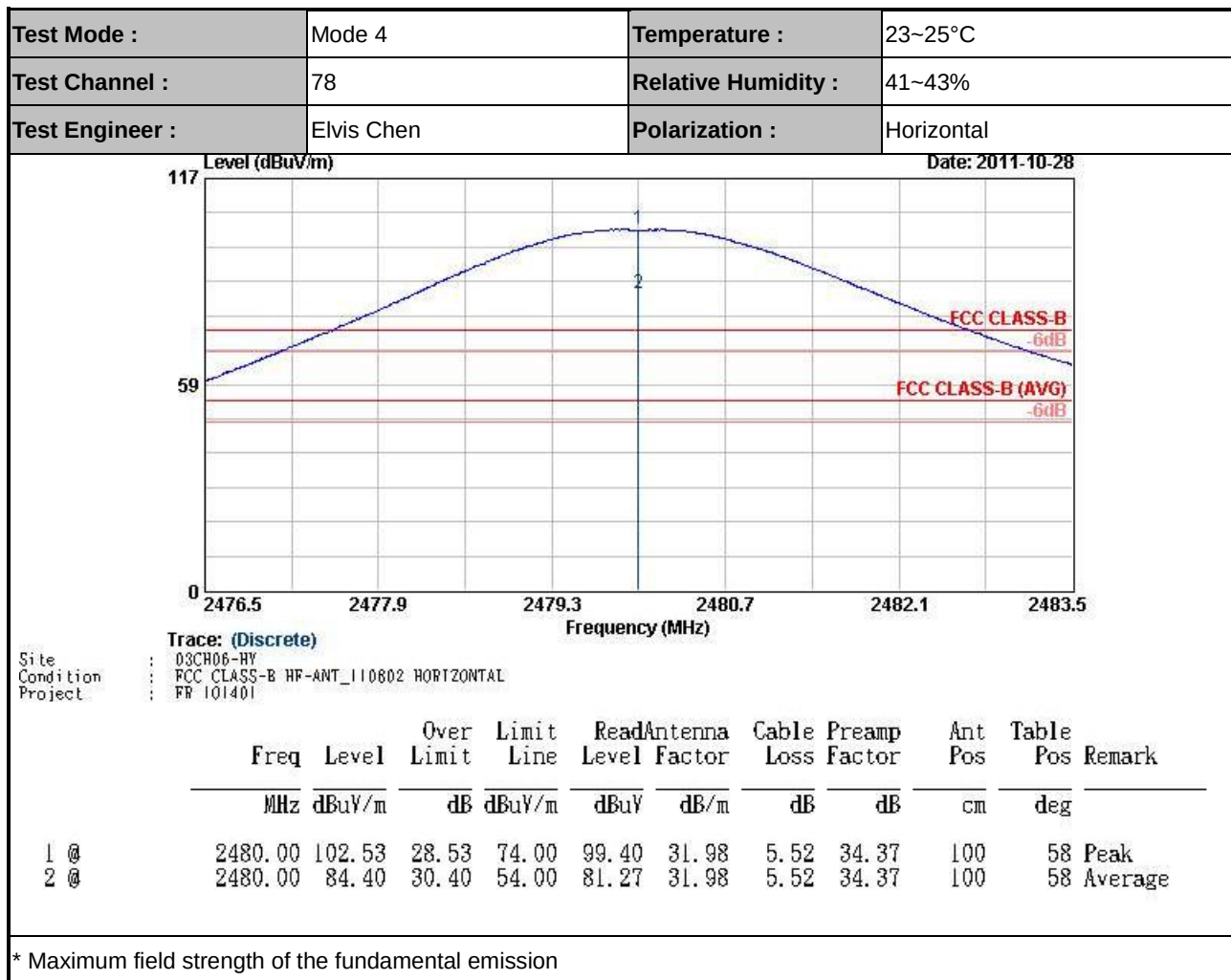
Note : Average result = Maximum field strength – Delta result

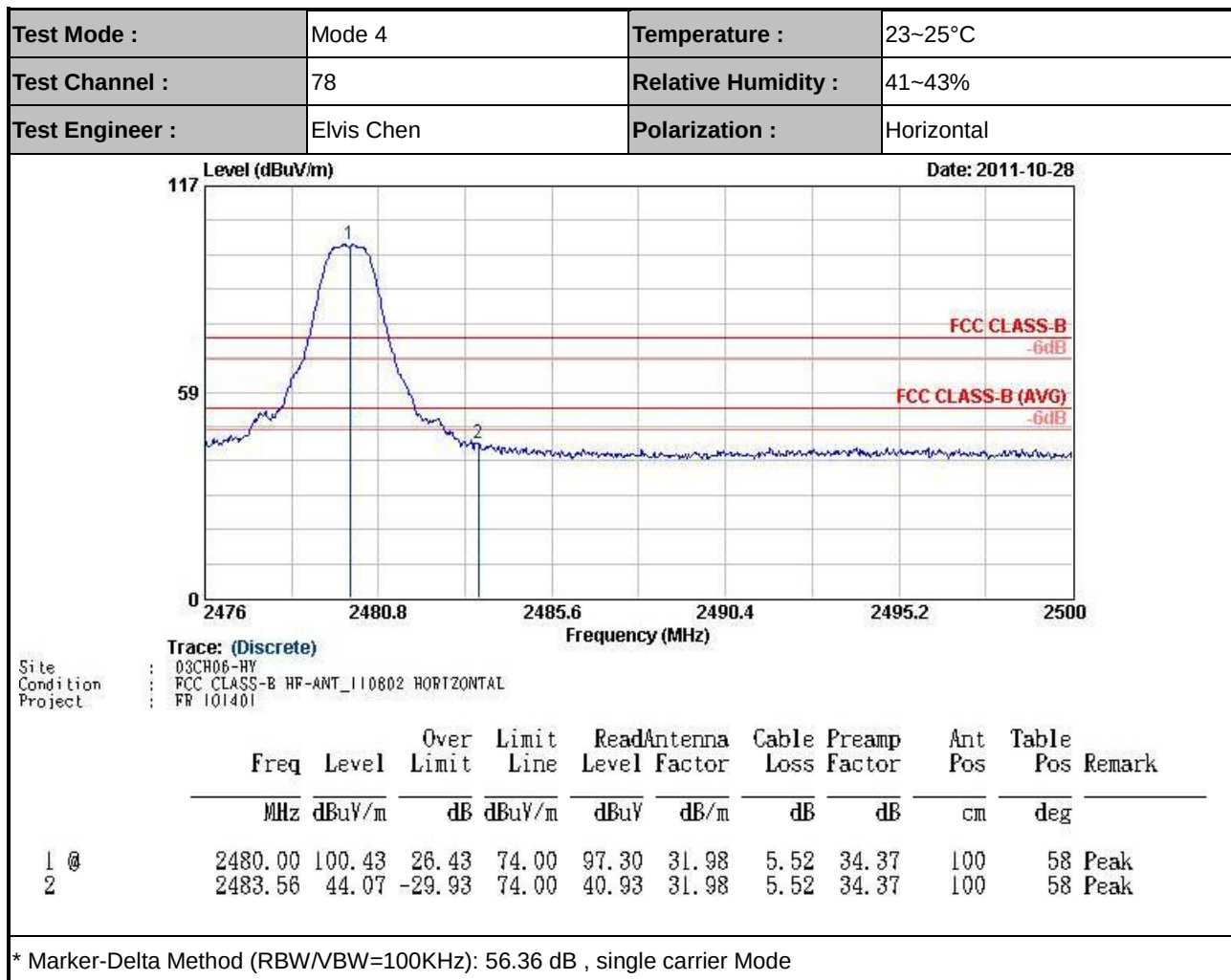
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	63.19	-10.81	74	60.06	31.98	5.52	34.37	100	32	Peak
2483.5	27.93	-26.07	54	24.8	31.98	5.52	34.37	100	32	Average

Summary results of marker-delta method:

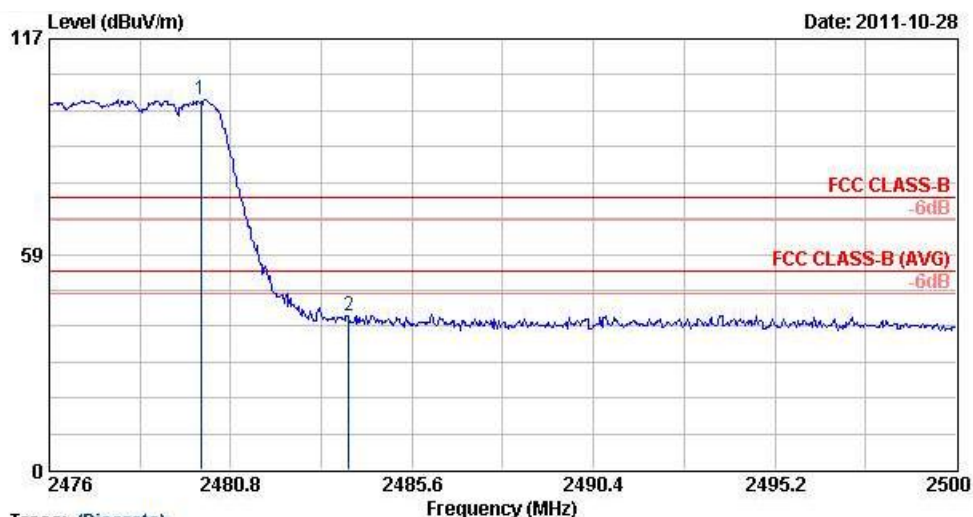
Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	80.97	53.04	27.93	54	-26.07	Pass
Hopping Mode	80.97	54.27	26.7	54	-27.3	Pass

Note : Average result = Maximum field strength – Delta result





Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	Polarization :	Horizontal

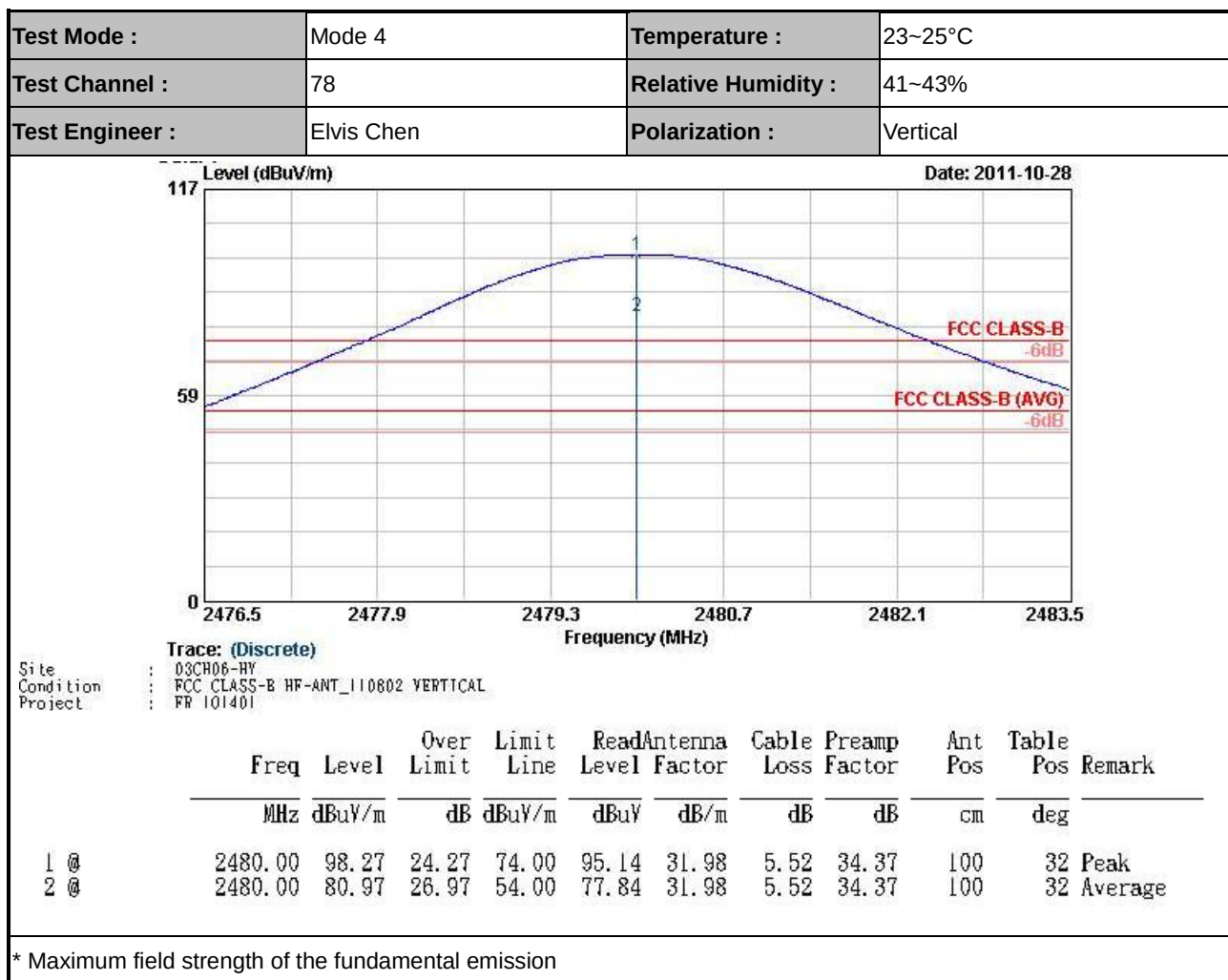


Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B HF-ANT_110802 HORIZONTAL
Project : FR 101401
Memo : Mode 13

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBUV/m	dB	dBUV/m	dBUV	dB/m	dB	dB	cm	deg
1 @	2480.00	100.30	26.30	74.00	97.16	31.98	5.52	34.37	100	58 Peak
2	2483.92	41.79	-32.21	74.00	38.65	31.98	5.52	34.37	100	58 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 58.51 dB , Hopping Mode





Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Frequency (MHz)

Date: 2011-10-28

FCC CLASS-B
-6dB

FCC CLASS-B (AVG)
-6dB

Trace: (Discrete)

Site : 03CH06-HY

Condition : FCC CLASS-B HF-ANT_110802 VERTICAL

Project : FR 101401

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2480.00	96.19	22.19	74.00	93.06	31.98	5.52	34.37	100	32	Peak
2	2492.20	43.15	-30.85	74.00	40.00	32.00	5.52	34.37	100	32	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 53.04 dB , single carrier Mode



Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Frequency (MHz)

Date: 2011-10-28

FCC CLASS-B
-6dB

FCC CLASS-B (AVG)
-6dB

Trace: (Discrete)

Site : 03CH06-HY

Condition : FCC CLASS-B HF-ANT_110802 VERTICAL

Project : FR 101401

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	2480.00	96.04	22.04	74.00	92.91	31.98	5.52	34.37	100	32 Peak
2	2483.85	41.77	-32.23	74.00	38.64	31.98	5.52	34.37	100	32 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 54.27 dB , Hopping Mode



Test Mode :	Mode 4 and 6	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	53~55%
		Test Engineer :	Hank Yu

• RBW 300 kHz
 • VBW 300 kHz
 • Att 20 dB
 • SWT 2.5 ms
 • Marker 1 [T1]
 • -45.43 dBm
 • 2.400000000 GHz

Ref 20 dBm
 Offset 19.5 dB

F1 -45.43 dBm
 F2 -49.63 dBm

Start 2.375 GHz
 3 MHz/
 Stop 2.405 GHz

[illegible]

Date: 25.OCT.2011 11:02:09

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.

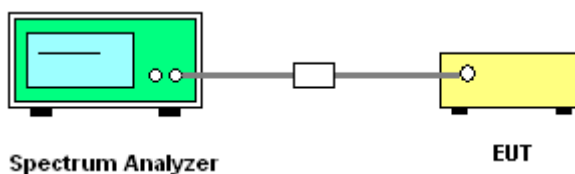
3.7.2 Measuring Instruments

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.

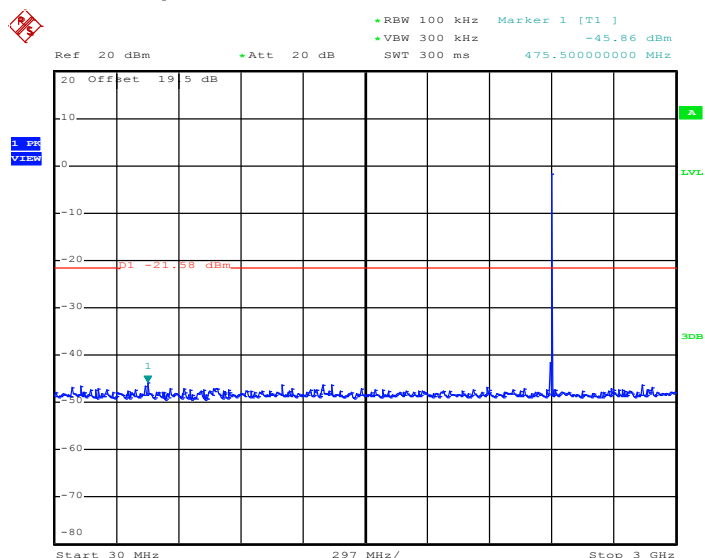
3.7.4 Test Setup



3.7.5 Test Result

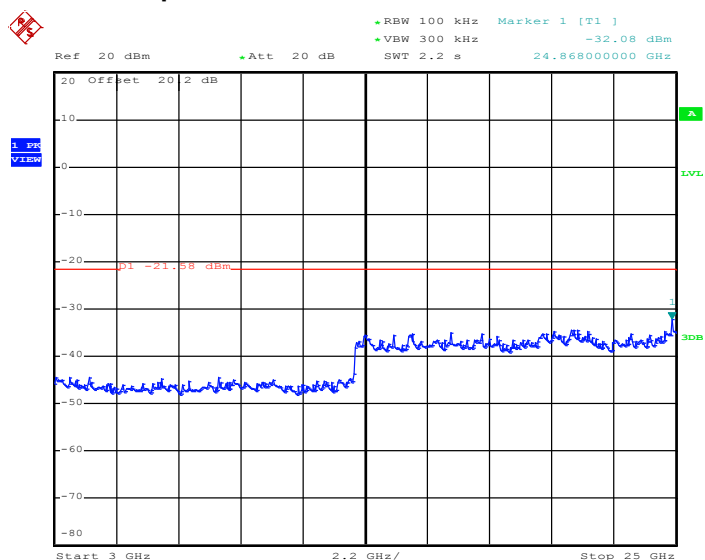
Test Mode :	Mode 4	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	53~55%
		Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



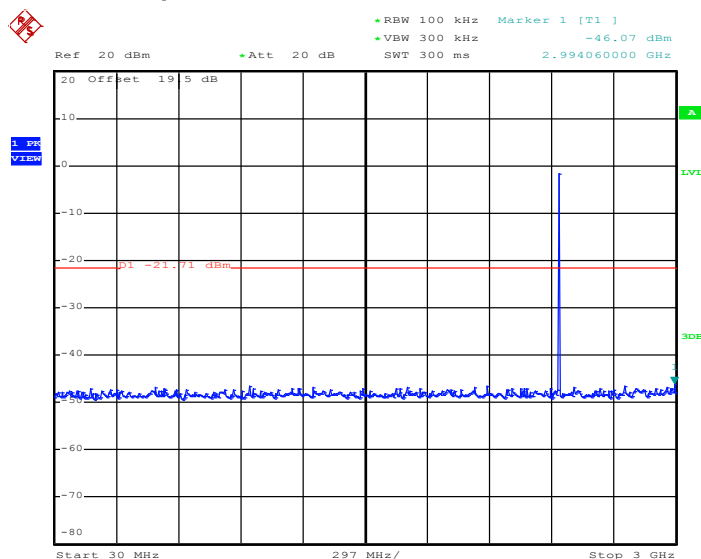
Date: 25.OCT.2011 10:26:21

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

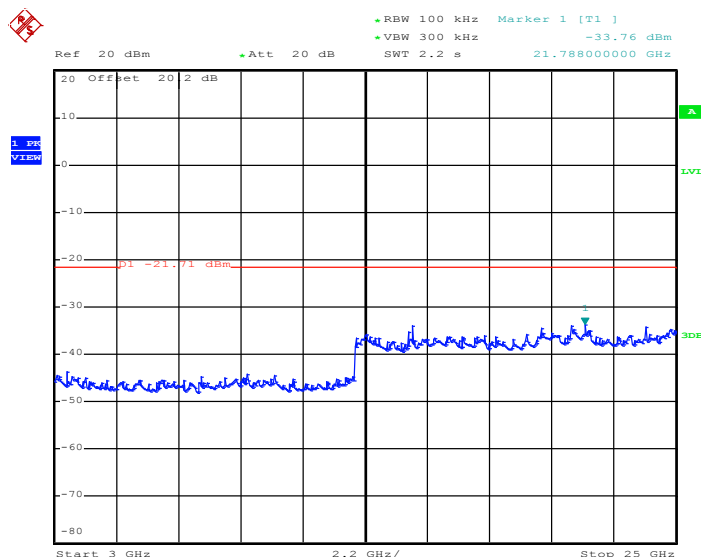


Date: 25.OCT.2011 10:26:33

Test Mode :	Mode 5	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	53~55%
		Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 25.OCT.2011 10:27:25

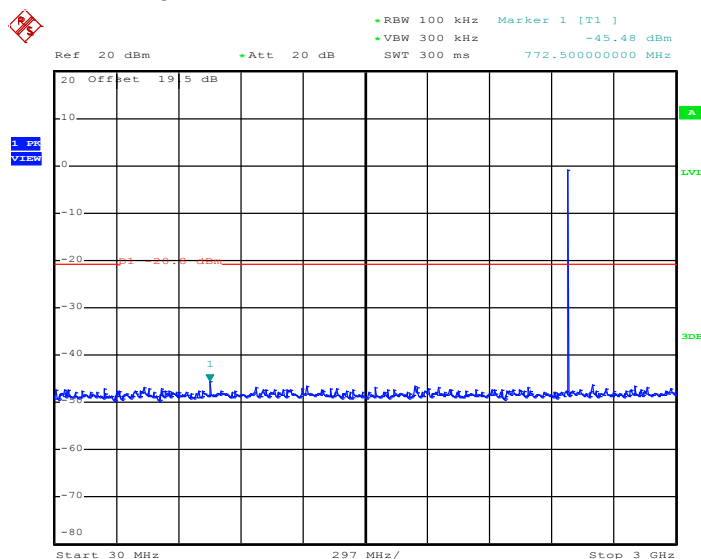
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz


Date: 25.OCT.2011 10:27:37



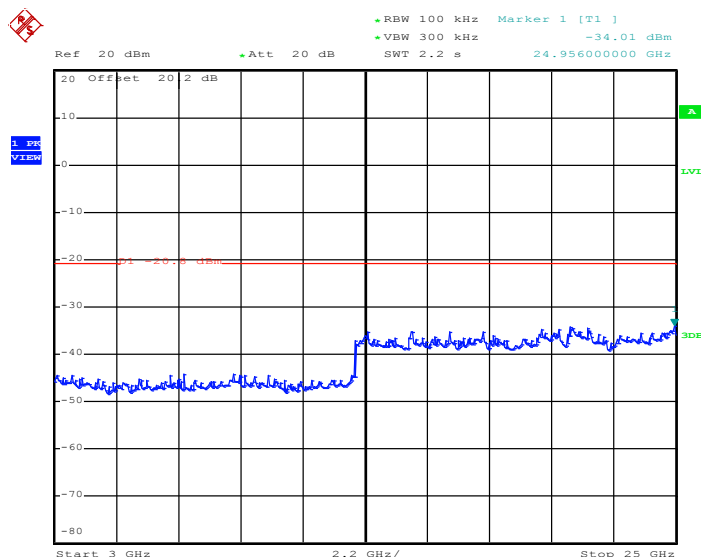
Test Mode :	Mode 6	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	53~55%
		Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 25.OCT.2011 10:28:29

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 25.OCT.2011 10:28:41

3.8 AC Conducted Emission Measurement

3.8.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

*Decreases with the logarithm of the frequency.

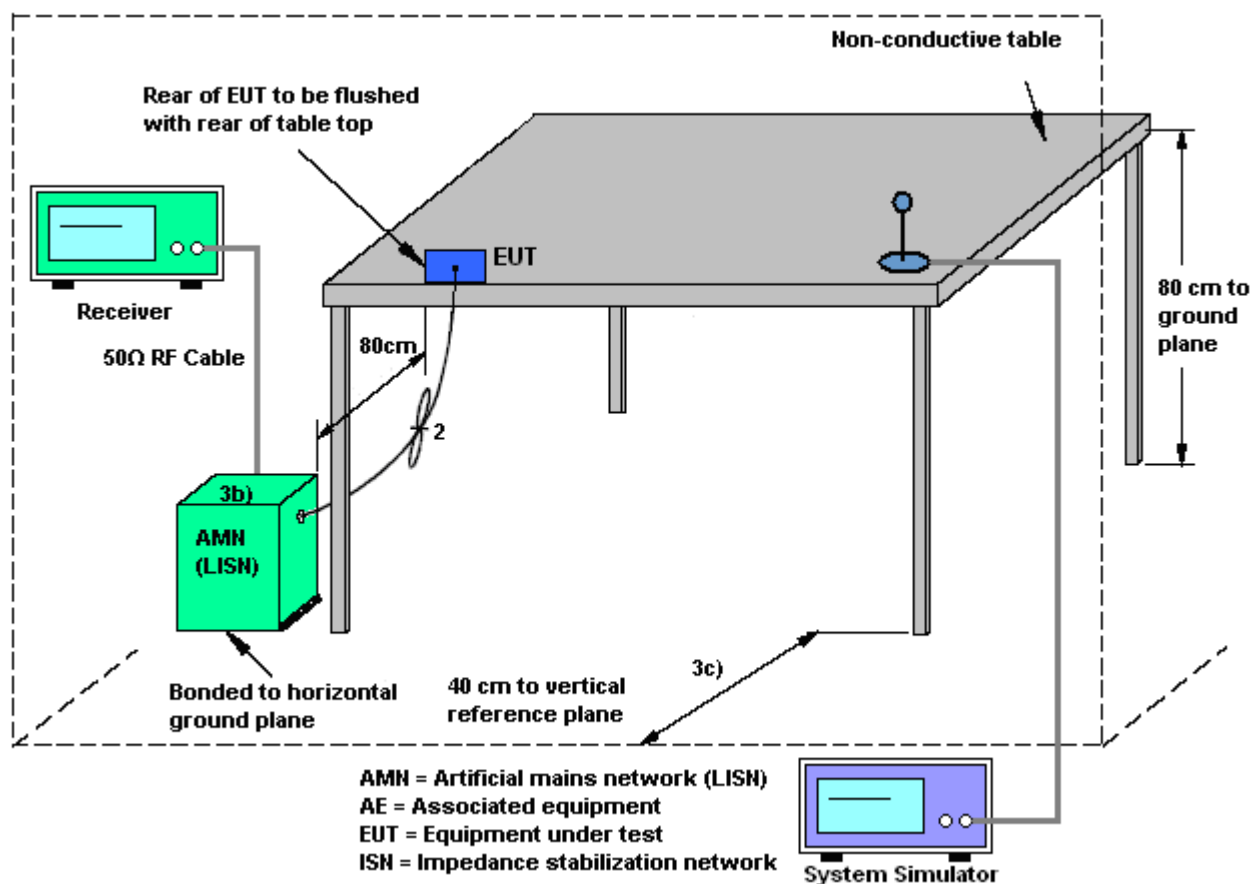
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

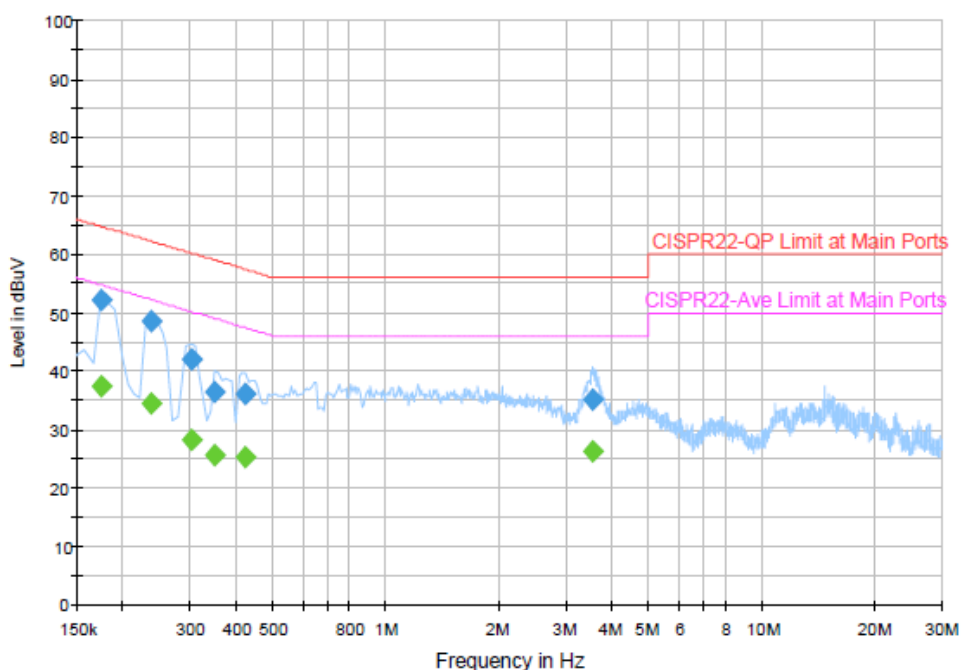
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All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

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + Earphone + USB Cable 2 (Data Link with Notebook) + MPEG4 + USB 2.0 HD + Adapter for Sample 3		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



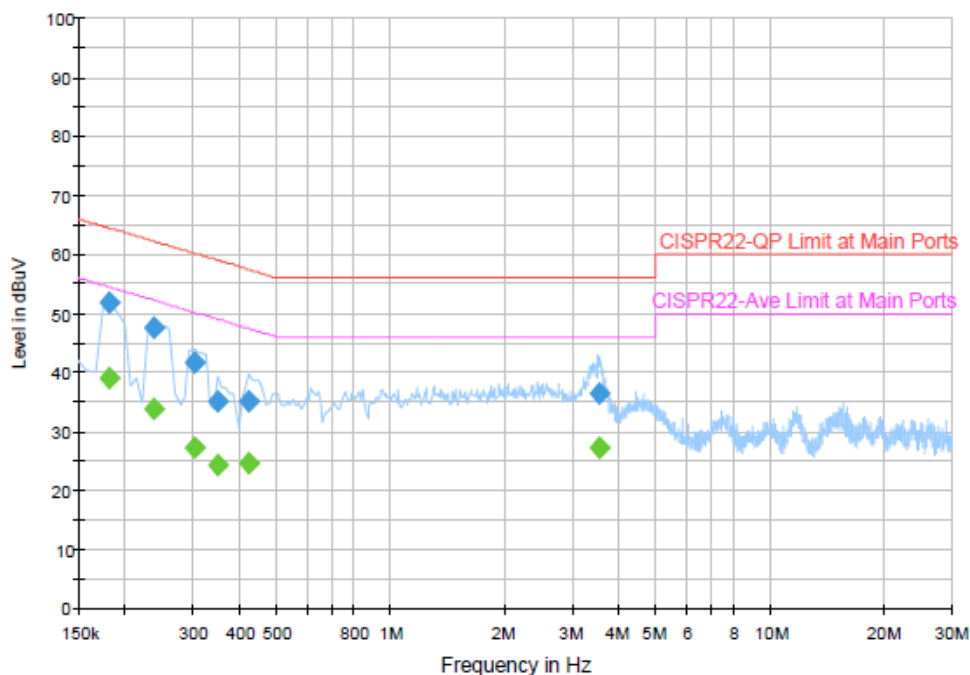
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	52.0	Off	L1	19.4	12.8	64.8
0.238000	48.4	Off	L1	19.4	13.8	62.2
0.302000	42.1	Off	L1	19.4	18.1	60.2
0.350000	36.5	Off	L1	19.4	22.5	59.0
0.422000	36.0	Off	L1	19.5	21.4	57.4
3.534000	35.2	Off	L1	19.5	20.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	37.4	Off	L1	19.4	17.4	54.8
0.238000	34.4	Off	L1	19.4	17.8	52.2
0.302000	28.3	Off	L1	19.4	21.9	50.2
0.350000	25.7	Off	L1	19.4	23.3	49.0
0.422000	25.1	Off	L1	19.5	22.3	47.4
3.534000	26.1	Off	L1	19.5	19.9	46.0

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + Earphone + USB Cable 2 (Data Link with Notebook) + MPEG4 + USB 2.0 HD + Adapter for Sample 3		
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	51.9	Off	N	19.4	12.5	64.4
0.238000	47.6	Off	N	19.4	14.6	62.2
0.302000	41.6	Off	N	19.4	18.6	60.2
0.350000	35.1	Off	N	19.4	23.9	59.0
0.422000	35.2	Off	N	19.5	22.2	57.4
3.550000	36.5	Off	N	19.5	19.5	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	39.0	Off	N	19.4	15.4	54.4
0.238000	33.9	Off	N	19.4	18.3	52.2
0.302000	27.1	Off	N	19.4	23.1	50.2
0.350000	24.3	Off	N	19.4	24.7	49.0
0.422000	24.6	Off	N	19.5	22.8	47.4
3.550000	27.1	Off	N	19.5	18.9	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

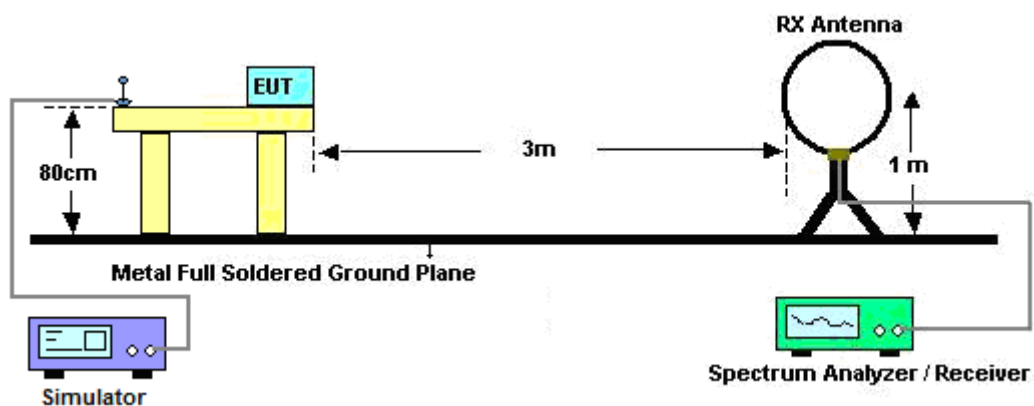
See list of measuring instruments of this test report.

3.9.3 Test Procedures

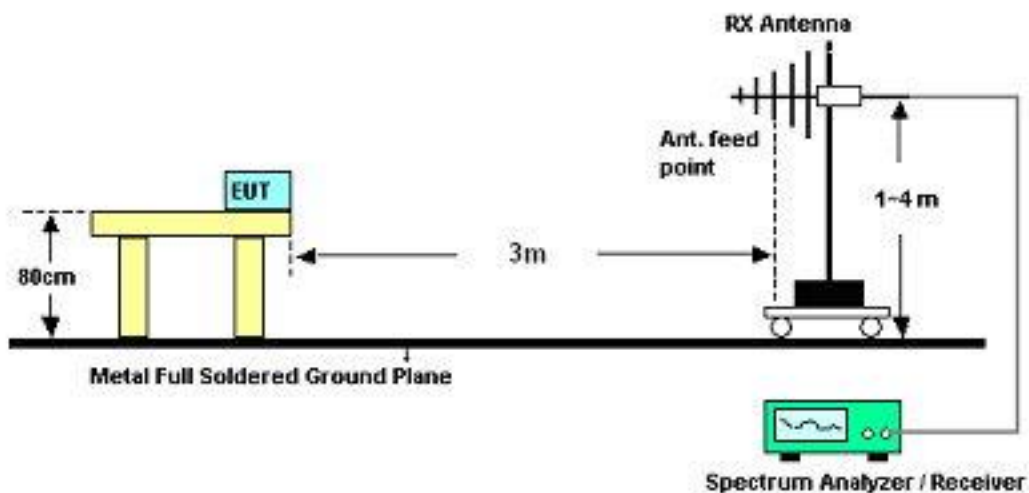
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - 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)
- 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.
- Measured average value for the peak value is greater than 54 dBuV/m

3.9.4 Test Setup

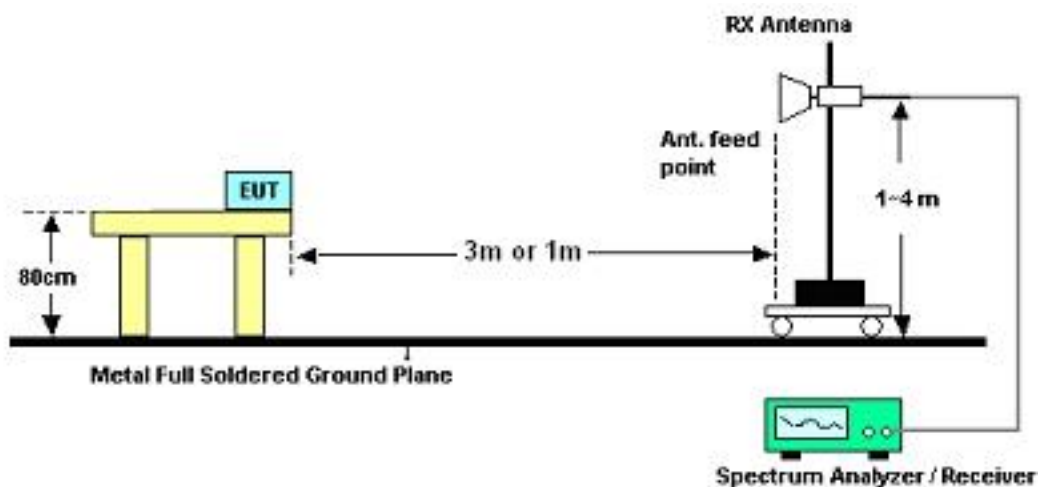
For radiated emissions below 30MHz



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 :	Elvis Chen	Temperature :	23~25°C	
		Relative Humidity :	41~43%	

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 = $40 \log (\text{specific distance} / \text{test distance})$ (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 :	23~25°C
Test Channel :	00	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
44.04	23.32	-16.68	40	43.5	10.71	0.81	31.7	-	-	Peak
85.89	24.15	-15.85	40	46.48	8.26	1.12	31.71	100	67	Peak
253.29	29.18	-16.82	46	46.27	12.72	1.86	31.67	-	-	Peak
421.8	28.11	-17.89	46	41.27	16.22	2.45	31.83	-	-	Peak
775.3	24.22	-21.78	46	32.48	20.42	3.36	32.04	-	-	Peak
901.3	25.03	-20.97	46	31.22	21.63	3.76	31.58	-	-	Peak
2387.14	47.74	-26.26	74	44.83	31.9	5.4	34.39	100	49	Peak
2387.14	34.69	-19.31	54	31.78	31.9	5.4	34.39	100	49	Average
2402	100.26	-	-	97.34	31.91	5.4	34.39	100	49	Peak
2402	82.8	-	-	79.89	31.9	5.4	34.39	100	49	Average
2484	32.23	-21.77	54	29.1	31.98	5.52	34.37	100	49	Average
2484	44.85	-29.15	74	41.72	31.98	5.52	34.37	100	49	Peak



Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	00	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
55.38	31.55	-8.45	40	55.05	7.27	0.9	31.67	100	2	Peak
82.38	25.54	-14.46	40	48.72	7.43	1.09	31.7	-	-	Peak
120.99	25.45	-18.05	43.5	43.64	12.18	1.34	31.71	-	-	Peak
421.8	25.08	-20.92	46	38.24	16.22	2.45	31.83	-	-	Peak
493.9	24.7	-21.3	46	36.14	17.69	2.65	31.78	-	-	Peak
917.4	25.37	-20.63	46	31.32	21.71	3.77	31.43	-	-	Peak
2338.5	46.14	-27.86	74	43.37	31.84	5.34	34.41	100	334	Peak
2338.5	33.42	-20.58	54	30.65	31.84	5.34	34.41	100	334	Average
2402	96.19	-	-	93.27	31.91	5.4	34.39	100	334	Peak
2402	79.8	-	-	76.89	31.9	5.4	34.39	100	334	Average
2494	32.35	-21.65	54	29.2	32	5.52	34.37	100	334	Average
2494	44.62	-29.38	74	41.47	32	5.52	34.37	100	334	Peak



Test Mode :	Mode 2	Temperature :	23~25°C
Test Channel :	39	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
43.23	20.53	-19.47	40	40.71	10.71	0.81	31.7	-	-	Peak
85.08	22.3	-17.7	40	44.85	8.05	1.11	31.71	-	-	Peak
256.53	29.11	-16.89	46	46.14	12.78	1.88	31.69	100	45	Peak
421.8	27.52	-18.48	46	40.68	16.22	2.45	31.83	-	-	Peak
493.9	22.52	-23.48	46	33.96	17.69	2.65	31.78	-	-	Peak
924.4	25.2	-20.8	46	31.06	21.74	3.77	31.37	-	-	Peak
2358	45.17	-28.83	74	42.34	31.86	5.37	34.4	100	53	Peak
2358	32.64	-21.36	54	29.81	31.86	5.37	34.4	100	53	Average
2441	100.79	-	-	97.76	31.95	5.46	34.38	100	53	Peak
2441	83.02	-	-	79.99	31.95	5.46	34.38	100	53	Average
2492	46.57	-27.43	74	43.42	32	5.52	34.37	100	53	Peak
2492	32.33	-21.67	54	29.18	32	5.52	34.37	100	53	Average

Test Mode :	Mode 2	Temperature :	23~25°C
Test Channel :	39	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
54.84	30.92	-9.08	40	54.42	7.27	0.9	31.67	100	32	Peak
85.08	24.11	-15.89	40	46.66	8.05	1.11	31.71	-	-	Peak
122.34	23.69	-19.81	43.5	41.94	12.12	1.34	31.71	-	-	Peak
421.8	27.2	-18.8	46	40.36	16.22	2.45	31.83	-	-	Peak
633.9	25.03	-20.97	46	34.8	19.24	3.01	32.02	-	-	Peak
950.3	25.69	-20.31	46	31.16	21.86	3.79	31.12	-	-	Peak
2350	44.69	-29.31	74	41.92	31.84	5.34	34.41	105	15	Peak
2350	32.64	-21.36	54	29.87	31.84	5.34	34.41	105	15	Average
2441	98.83	-	-	95.8	31.95	5.46	34.38	105	15	Peak
2441	81.44	-	-	78.41	31.95	5.46	34.38	105	15	Average
2492	45.79	-28.21	74	42.64	32	5.52	34.37	105	15	Peak
2492	32.38	-21.62	54	29.23	32	5.52	34.37	105	15	Average

Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
33.24	19.66	-20.34	40	34.52	16.12	0.73	31.71	-	-	Peak
87.24	23.19	-16.81	40	45.33	8.46	1.12	31.72	100	37	Peak
253.83	27.28	-18.72	46	44.36	12.73	1.87	31.68	-	-	Peak
421.8	27.88	-18.12	46	41.04	16.22	2.45	31.83	-	-	Peak
493.9	23.15	-22.85	46	34.59	17.69	2.65	31.78	-	-	Peak
885.9	25.58	-20.42	46	32.07	21.5	3.7	31.69	-	-	Peak
2380	46.04	-27.96	74	43.15	31.88	5.4	34.39	100	48	Peak
2380	32.79	-21.21	54	29.9	31.88	5.4	34.39	100	48	Average
2480	101.01	-	-	97.88	31.98	5.52	34.37	100	48	Peak
2480	83.65	-	-	80.52	31.98	5.52	34.37	100	48	Average
2483.5	66.1	-7.9	74	62.97	31.98	5.52	34.37	100	48	Peak
2483.5	28.75	-25.25	54	25.62	31.98	5.52	34.37	100	48	Average



Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
54.84	30.66	-9.34	40	54.16	7.27	0.9	31.67	100	87	Peak
85.08	24.99	-15.01	40	47.54	8.05	1.11	31.71	-	-	Peak
122.88	22.14	-21.36	43.5	40.43	12.07	1.35	31.71	-	-	Peak
421.8	25.5	-20.5	46	38.66	16.22	2.45	31.83	-	-	Peak
633.9	25.13	-20.87	46	34.9	19.24	3.01	32.02	-	-	Peak
873.3	24.84	-21.16	46	31.56	21.4	3.64	31.76	-	-	Peak
2364	44.83	-29.17	74	42	31.86	5.37	34.4	100	12	Peak
2364	32.8	-21.2	54	29.97	31.86	5.37	34.4	100	12	Average
2480	98.73	-	-	95.6	31.98	5.52	34.37	100	12	Peak
2480	81.94	-	-	78.81	31.98	5.52	34.37	100	12	Average
2483.5	63.69	-10.31	74	60.56	31.98	5.52	34.37	100	12	Peak
2483.5	27.75	-26.25	54	24.62	31.98	5.52	34.37	100	12	Average

Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
36.48	17.85	-22.15	40	34.68	14.1	0.77	31.7	-	-	Peak
83.73	20.86	-19.14	40	43.83	7.64	1.1	31.71	100	59	Peak
254.64	26.17	-19.83	46	43.23	12.75	1.87	31.68	-	-	Peak
421.8	22.7	-23.3	46	35.86	16.22	2.45	31.83	-	-	Peak
824.3	24.45	-21.55	46	31.96	20.98	3.45	31.94	-	-	Peak
955.9	25.79	-20.21	46	31.19	21.89	3.79	31.08	-	-	Peak
2382	44.78	-29.22	74	41.89	31.88	5.4	34.39	100	58	Peak
2382	32.64	-21.36	54	29.75	31.88	5.4	34.39	100	58	Average
2480	84.4	-	-	81.27	31.98	5.52	34.37	100	58	Average
2480	102.65	-	-	99.52	31.98	5.52	34.37	100	58	Peak
2483.5	67.72	-6.28	74	64.59	31.98	5.52	34.37	100	58	Peak
2483.5	28.04	-25.96	54	24.91	31.98	5.52	34.37	100	58	Average

Test Mode :	Mode 4	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	41~43%
Test Engineer :	Elvis Chen	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
54.84	31.86	-8.14	40	55.36	7.27	0.9	31.67	100	35	Peak
83.73	27.18	-12.82	40	50.15	7.64	1.1	31.71	-	-	Peak
122.34	23.86	-19.64	43.5	42.11	12.12	1.34	31.71	-	-	Peak
493.9	23.83	-22.17	46	35.27	17.69	2.65	31.78	-	-	Peak
834.8	24.17	-21.83	46	31.54	21.07	3.49	31.93	-	-	Peak
953.8	25.72	-20.28	46	31.15	21.88	3.79	31.1	-	-	Peak
2350	44.4	-29.6	74	41.63	31.84	5.34	34.41	100	32	Peak
2350	32.32	-21.68	54	29.55	31.84	5.34	34.41	100	32	Average
2480	80.97	-	-	77.84	31.98	5.52	34.37	100	32	Average
2480	97.97	-	-	94.84	31.98	5.52	34.37	100	32	Peak
2483.5	63.19	-10.81	74	60.06	31.98	5.52	34.37	100	32	Peak
2483.5	27.93	-26.07	54	24.8	31.98	5.52	34.37	100	32	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

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

3.10.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	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)
Bluetooth Base Station	R&S	CBT32	100519	N/A	Jun. 01, 2011	May 31, 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)
Spectrum Analyzer	Agilent	E4408B	MY44211028	9kHz~26.5GHz	Jul. 12, 2011	Jul. 11, 2012	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz-1000MHz	May 10, 2011	May 09, 2012	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 01, 2011	Jul. 31, 2012	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 21, 2011	Oct. 20, 2012	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Jan. 13, 2011	Jan. 12, 2012	Radiation (03CH06-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 EP1O1401 as below.