

FCC RF Test Report

APPLICANT : Acer Incorporated
EQUIPMENT : Tablet Computer
BRAND NAME : Acer
MODEL NAME : A100
FCC ID : HLZTMDMA100
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Mar. 23, 2011 and completely tested on Mar. 29, 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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR132346A	Rev. 01	Initial issue of report	May 20, 2011
FR132346A	Rev. 02	Added descriptions at section 1.3	May 26, 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	$\geq 15\text{Chs}$	Pass	-
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.2	-	Gen 4.4.1	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 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 5.3 dB at 0.17 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.5 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	A100
FCC ID	HLZTMDMA100
Sample 1	EUT with LP DDR2 Main and eMMC Main
Sample 2	EUT with LP DDR2 2nd and eMMC 2nd
Sample 3	EUT with LP DDR2 3rd and eMMC Main
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) : 3.69 dBm (0.002 W) Bluetooth EDR (2Mbps) : 6.42 dBm (0.004 W) Bluetooth EDR (3Mbps) : 4.27 dBm (0.003 W)
Antenna Type	PIFA Antenna with gain -2.38 dBi
HW Version	LA7251PR10 Rev. 1.0
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.
4. The RF parts (antenna, transmitter) in three samples are electric identical, and the output power are quite close. Because the change parts (memory) are far away radio parts, the sample 1 is mainly tested and the results are worst. The sample 2, and 3 are mainly tested in FCC 15B due to it is related to digital part, and there are no non-compliance found.

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	03CH07-HY	722060/4086B-1

1.5 Applied Standards

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

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

Remark:

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

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	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.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	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	3.20 dBm	5.97 dBm	3.60 dBm
Ch39	2441MHz	3.61 dBm	6.42 dBm	3.88 dBm
Ch78	2480MHz	3.69 dBm	6.38 dBm	4.27 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).

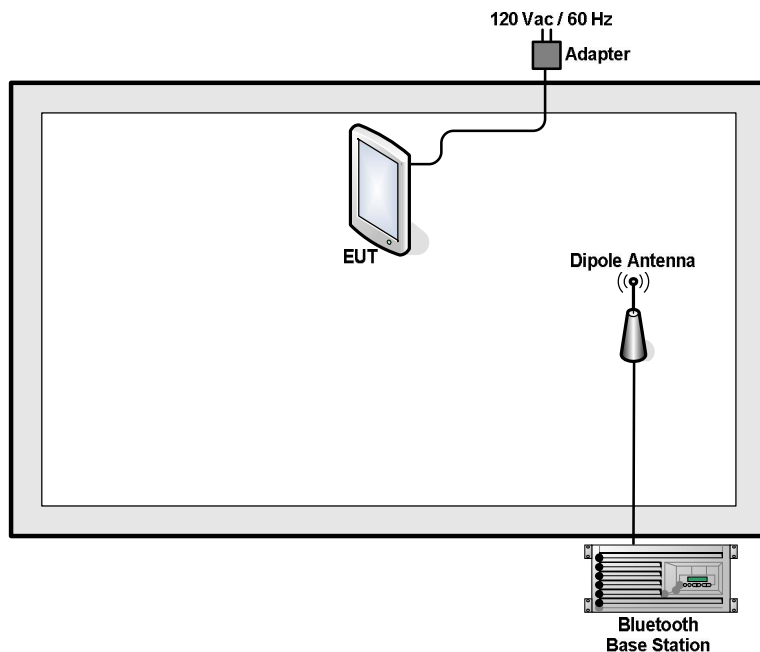
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

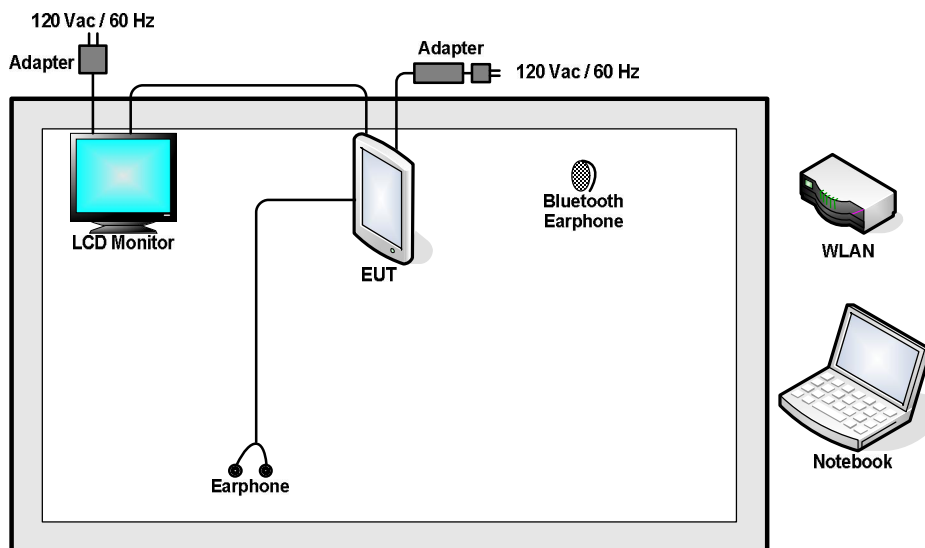
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz 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 2	N/A
AC Conducted Emission	Mode 1 :WLAN Link + Bluetooth Link + TC + Adapter 1 for Sample 1 Mode 2 :WLAN Link + Bluetooth Link + TC + Adapter 2 for Sample 2		
Remark:			
1. TC stands for Test Configuration, and consists of iPod, earphone, camera, MP3 function, HDMI and monitor.			
2. 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.			
3. 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

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, execute command 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.

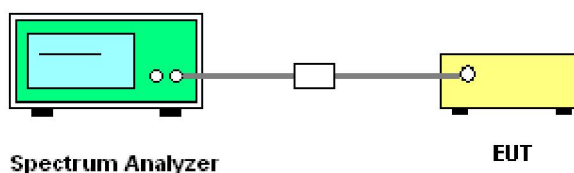
3.1.2 Measuring Instruments

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.

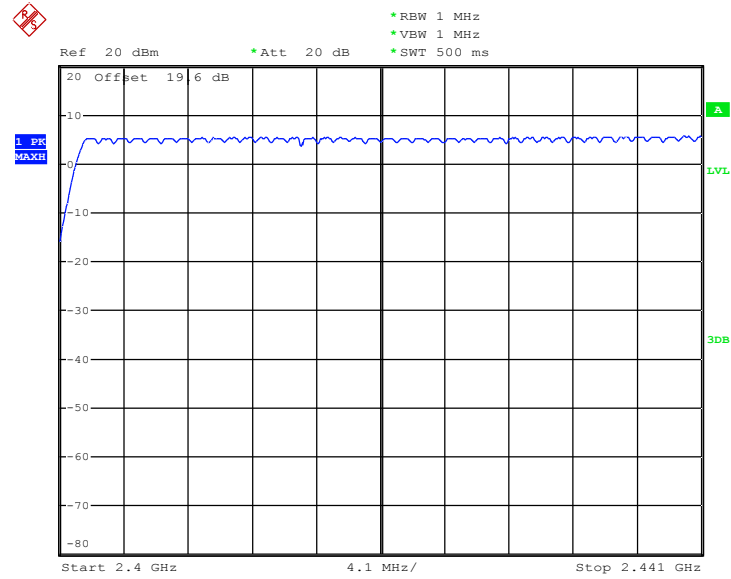
3.1.4 Test Setup



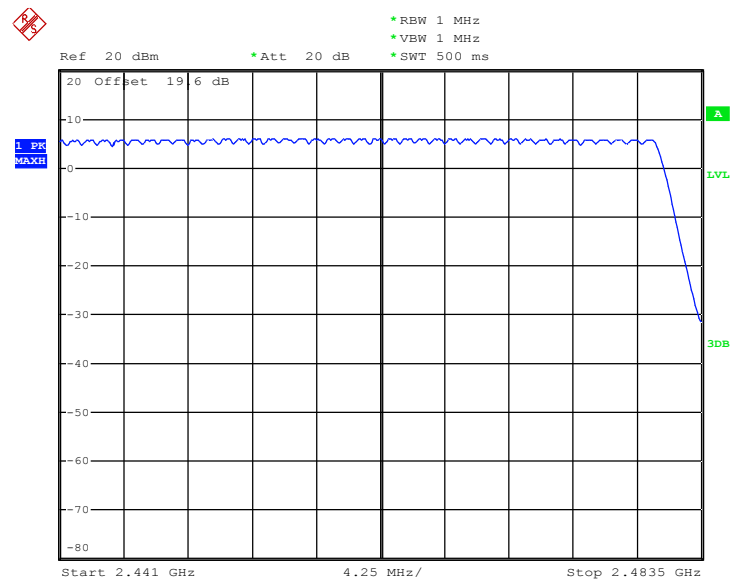
3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Phoenix Chen	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: 25.MAR.2011 10:16:52



Date: 25.MAR.2011 10:20:32

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

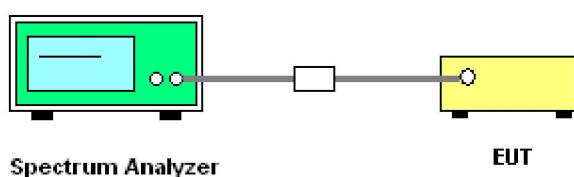
3.2.2 Measuring Instruments

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

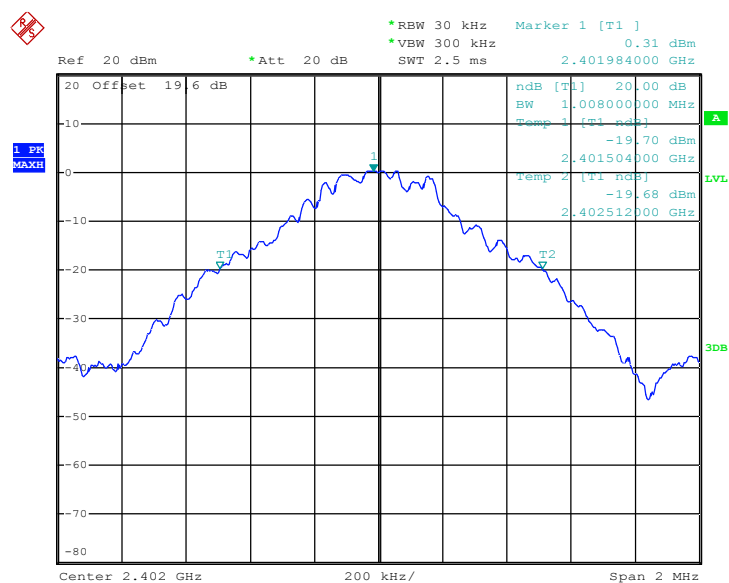


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Phoenix Chen	Relative Humidity :	50~53%

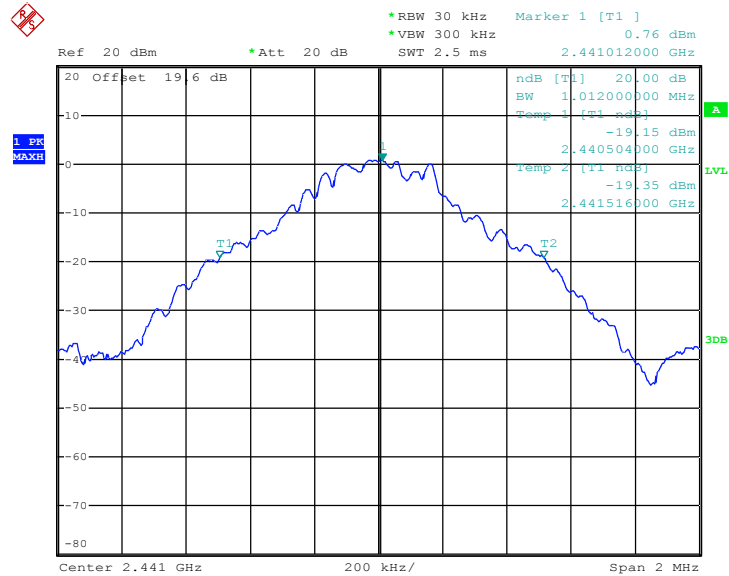
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.008
39	2441	1.012
78	2480	1.016

20 dB Bandwidth Plot on Channel 00



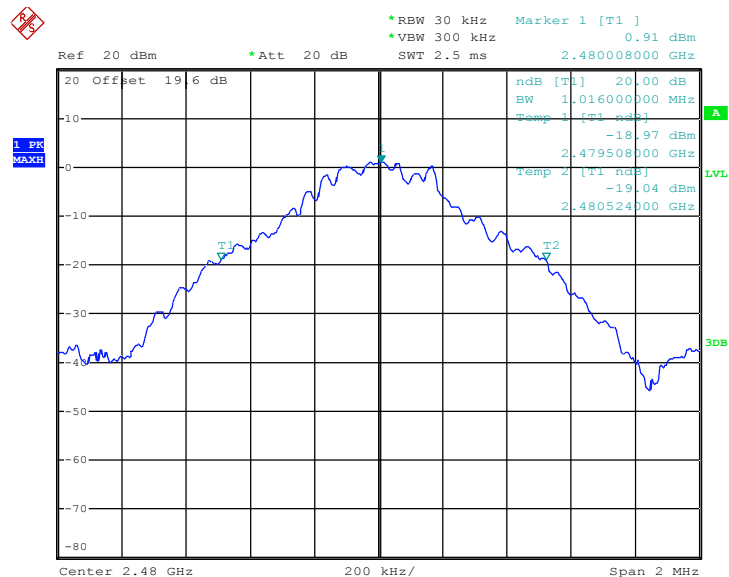
Date: 25.MAR.2011 09:54:54

20 dB Bandwidth Plot on Channel 39



Date: 25.MAR.2011 09:55:21

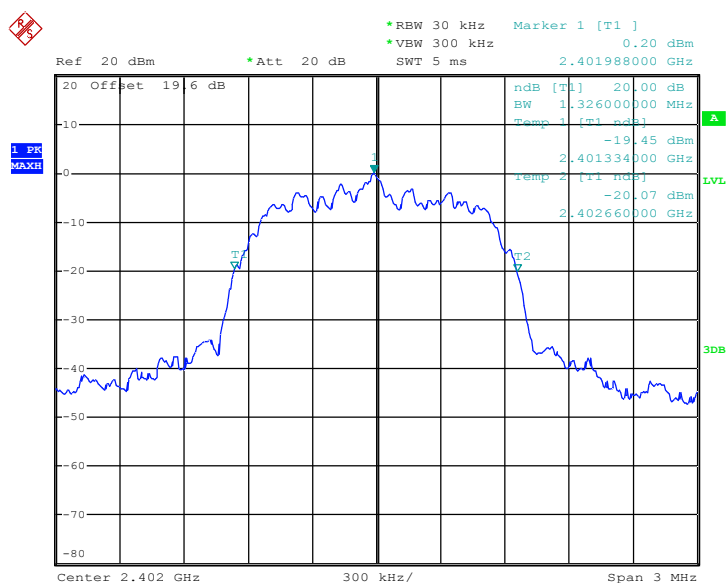
20 dB Bandwidth Plot on Channel 78



Date: 25.MAR.2011 09:55:35

Test Mode :	Mode 4, 5, 6	Temperature :	24~26℃
Test Engineer :	Phoenix Chen	Relative Humidity :	50~53%

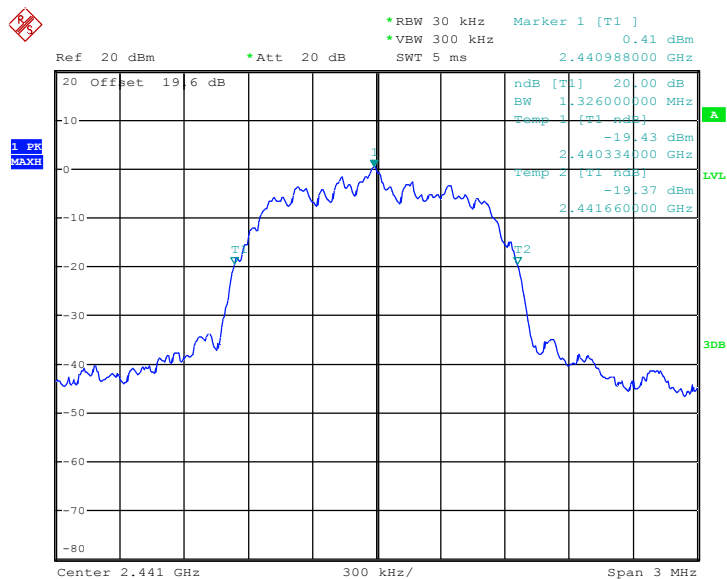
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.326
39	2441	1.326
78	2480	1.332

20 dB Bandwidth Plot on Channel 00


Date: 25.MAR.2011 09:56:00

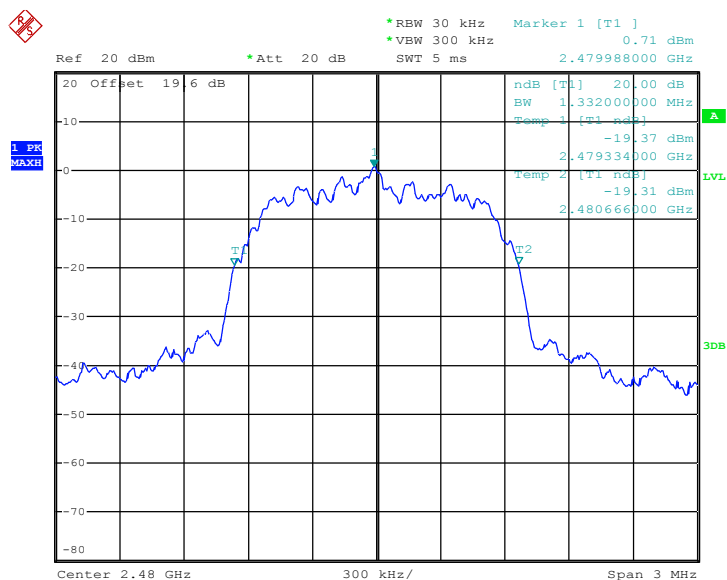


20 dB Bandwidth Plot on Channel 39



Date: 25.MAR.2011 09:56:19

20 dB Bandwidth Plot on Channel 78



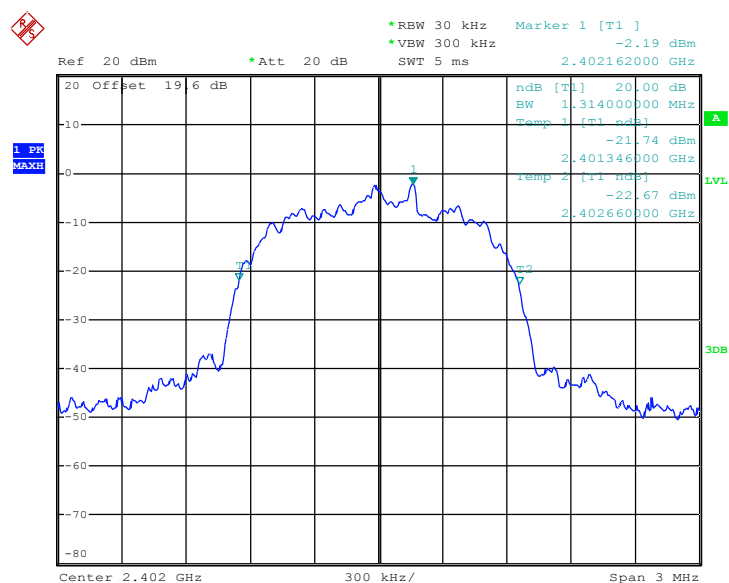
Date: 25.MAR.2011 09:56:48



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

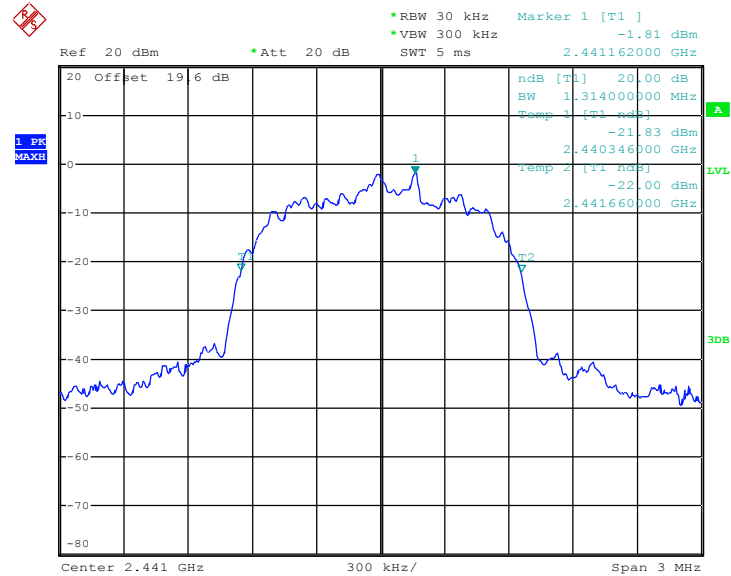
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.314
39	2441	1.314
78	2480	1.314

20 dB Bandwidth Plot on Channel 00



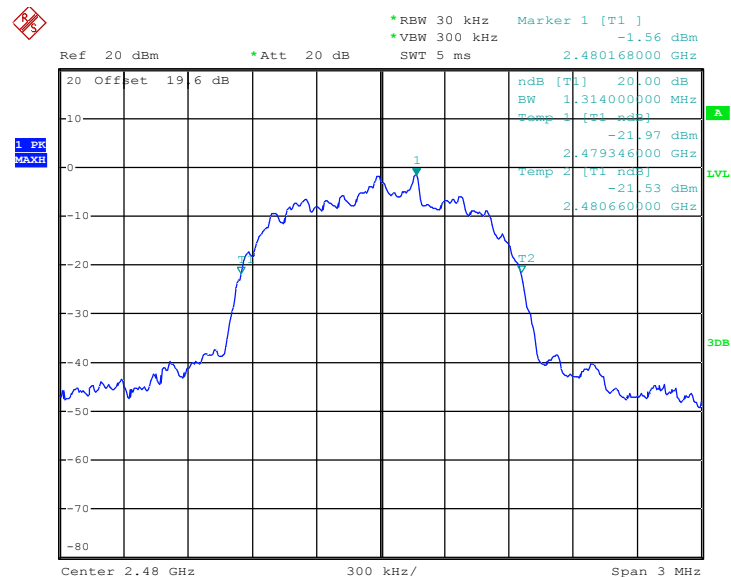
Date: 25.MAR.2011 09:57:11

20 dB Bandwidth Plot on Channel 39



Date: 25.MAR.2011 09:57:41

20 dB Bandwidth Plot on Channel 78



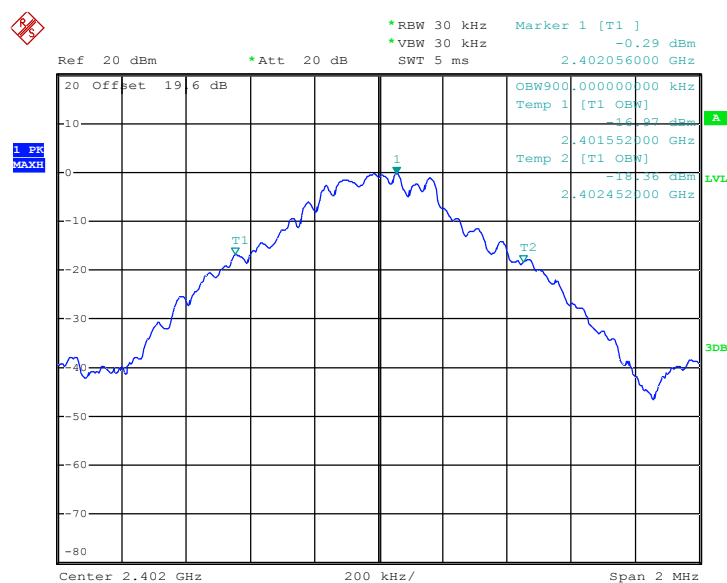
Date: 25.MAR.2011 09:58:12

3.2.6 Test Result of 99% Occupied Bandwidth

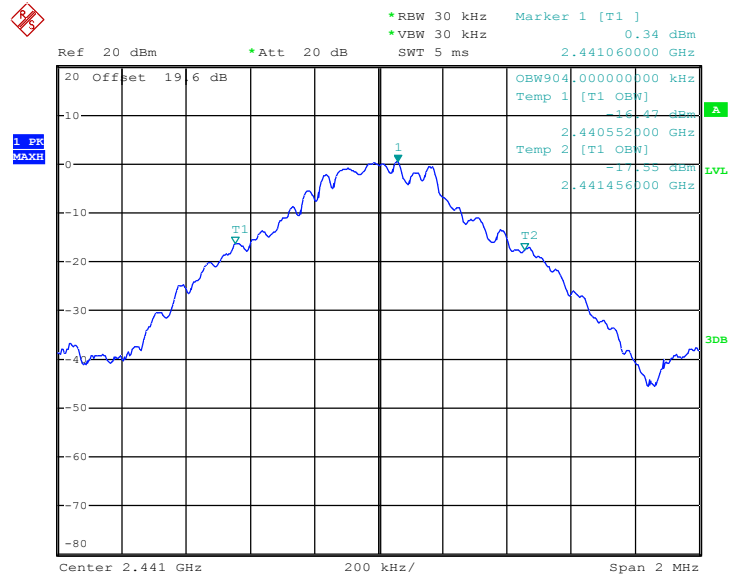
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Phoenix Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.900
39	2441	0.904
78	2480	0.908

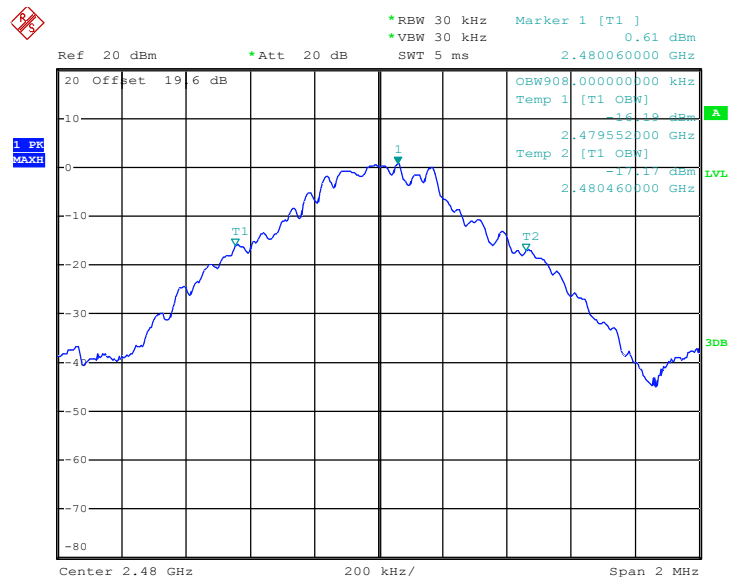
99% Bandwidth Plot on Channel 00



Date: 25.MAR.2011 10:22:56

99% Occupied Bandwidth Plot on Channel 39


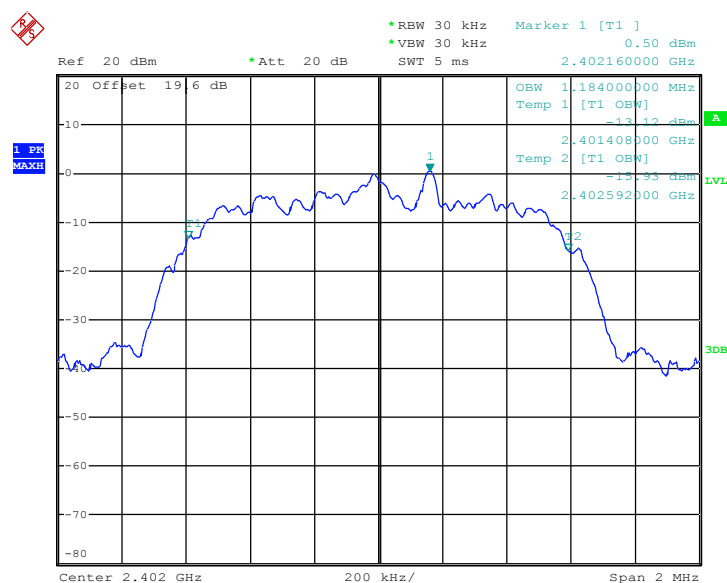
Date: 25.MAR.2011 10:05:08

99% Occupied Bandwidth Plot on Channel 78


Date: 25.MAR.2011 10:05:43

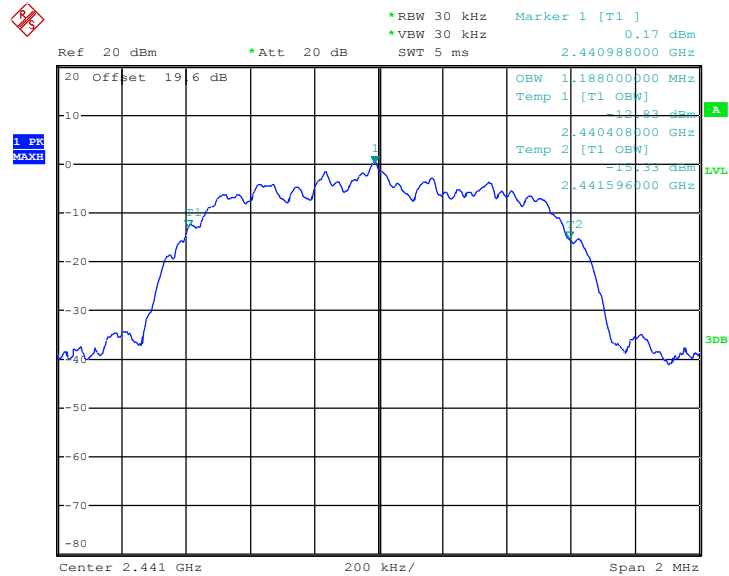
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Phoenix Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.184
39	2441	1.188
78	2480	1.192

99% Bandwidth Plot on Channel 00


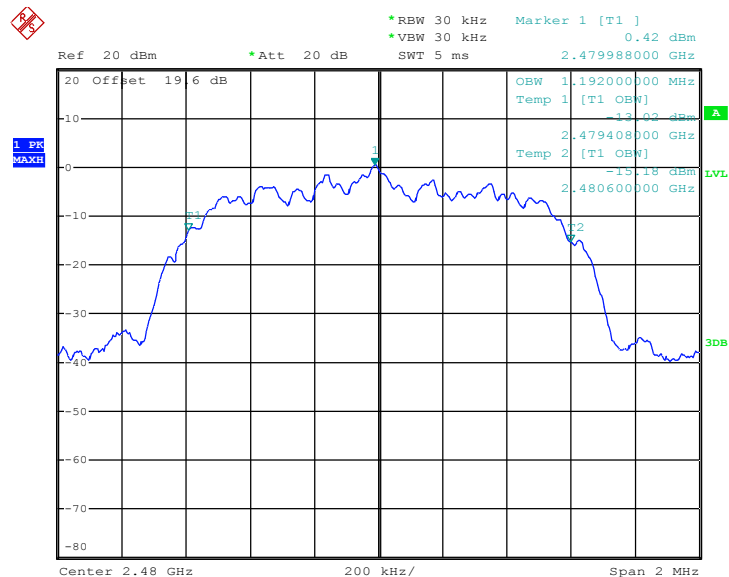
Date: 25.MAR.2011 10:06:19

99% Occupied Bandwidth Plot on Channel 39



Date: 25.MAR.2011 10:06:55

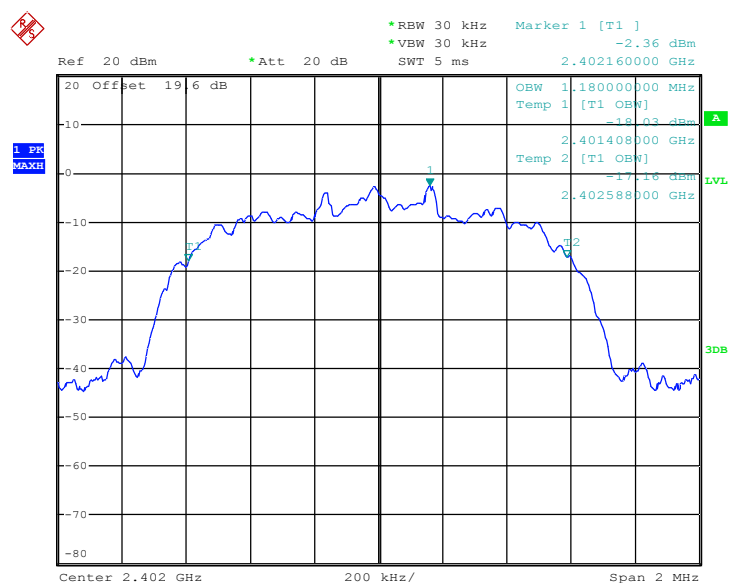
99% Occupied Bandwidth Plot on Channel 78



Date: 25.MAR.2011 10:07:31

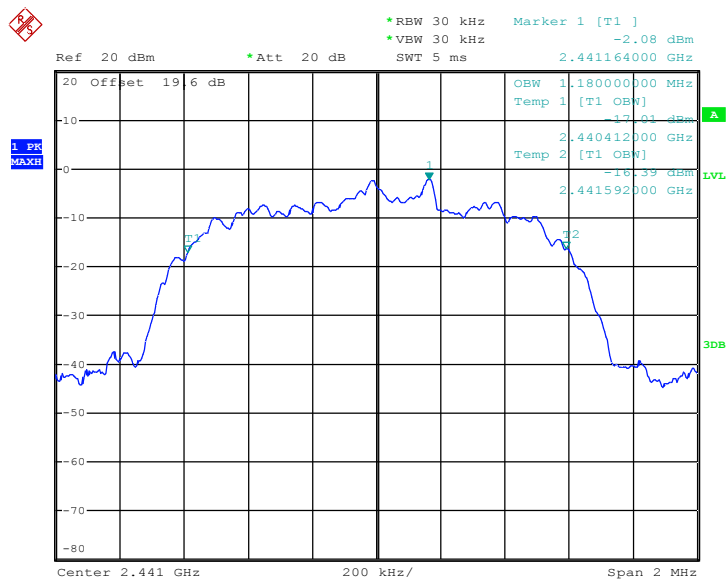
Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Phoenix Chen	Relative Humidity :	50~53%

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

99% Bandwidth Plot on Channel 00


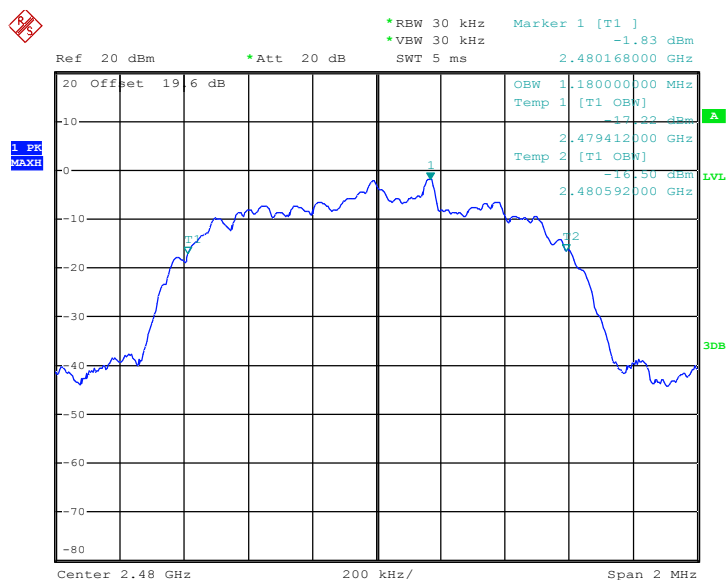
Date: 25.MAR.2011 10:08:07

99% Occupied Bandwidth Plot on Channel 39



Date: 25.MAR.2011 10:08:43

99% Occupied Bandwidth Plot on Channel 78



Date: 25.MAR.2011 10:09:18

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.

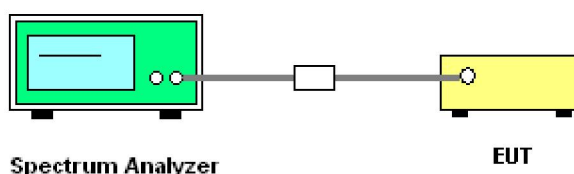
3.3.2 Measuring Instruments

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

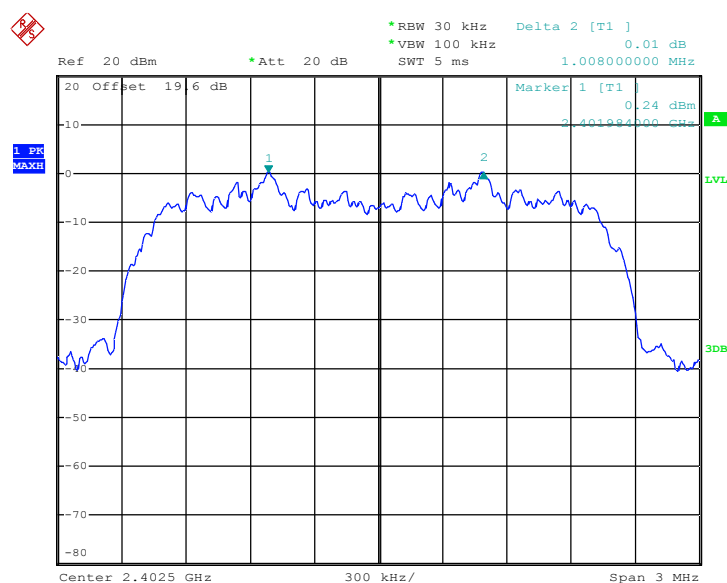


3.3.5 Test Result of Hopping Channel Separation

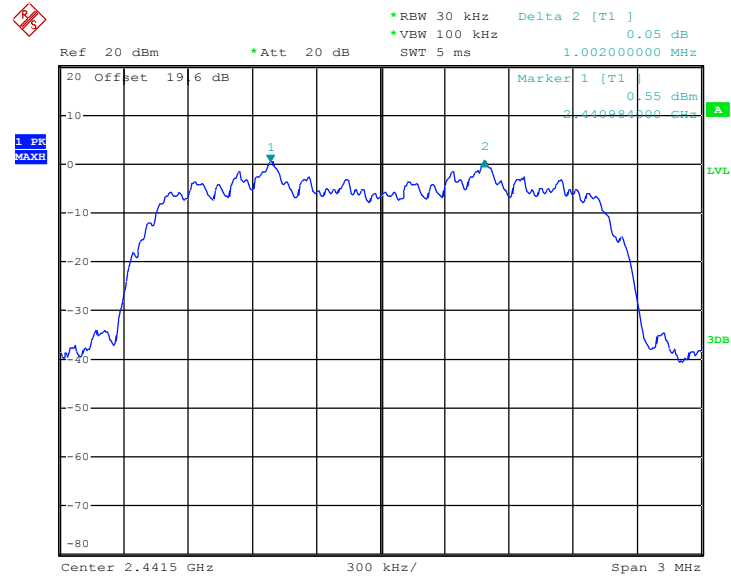
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Phoenix Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.008	0.884	Pass
39	2441	1.002	0.884	Pass
78	2480	1.008	0.888	Pass

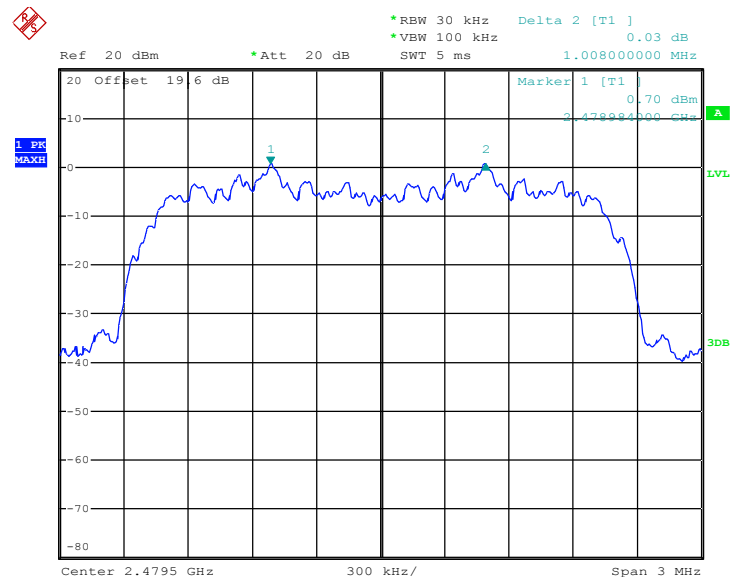
Channel Separation Plot on Channel 00 - 01



Date: 25.MAR.2011 09:45:47

Channel Separation Plot on Channel 39 - 40


Date: 25.MAR.2011 09:46:25

Channel Separation Plot on Channel 77 - 78


Date: 25.MAR.2011 09:47:59

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.

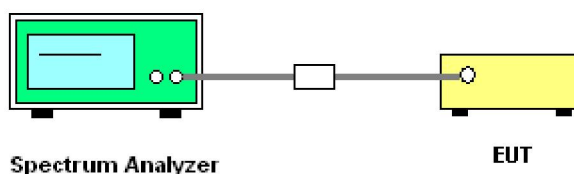
3.4.2 Measuring Instruments

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 :	Phoenix Chen	Relative Humidity :	50~53%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
2DH5	3.00	3014.00	0.29	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)



Ref 20 dBm *Att 20 dB RBW 1 MHz Delta 3 [T1] -0.88 dB
 *VBW 1 MHz SWT 10 ms 3.760000 ms

20 Offset 19.6 dB

Marker 1 [T1] -49.30 dBm 3.760000 ms
 Delta 2 [T1] 0.98 dB 3.014000 ms

1 PK
 MAX

Center 2.441 GHz 1 ms/

Date: 25.MAR.2011 09:38:07

Ref 20 dBm *Att 20 dB RBW 1 MHz VBW 1 MHz SWT 10 s

20 Offset 19.6 dB

1. PK
MAXH

Center 2.441 GHz 1 s/

Date: 25.MAR.2011 09:53:41

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).

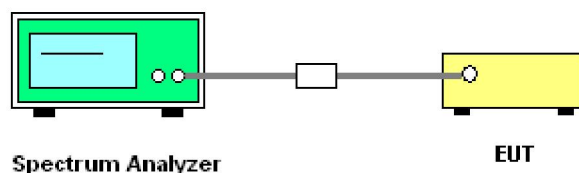
3.5.2 Measuring Instruments

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

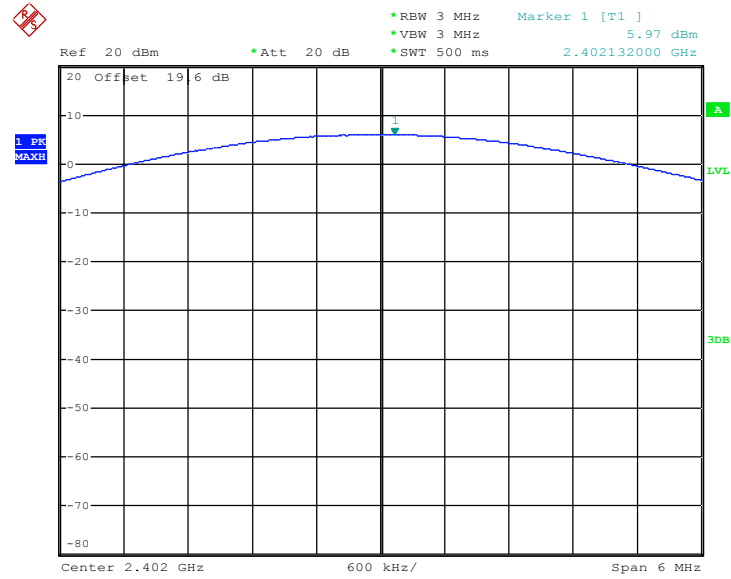


3.5.5 Test Result of Peak Output Power

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

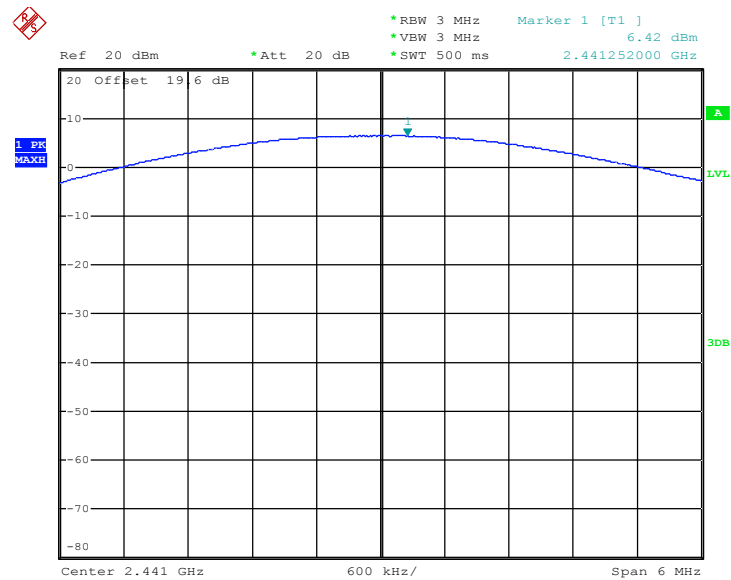
Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	5.97	20.97	Pass
39	2441	6.42	20.97	Pass
78	2480	6.38	20.97	Pass

Peak Output Power Plot on Channel 00



Date: 25.MAR.2011 08:47:19

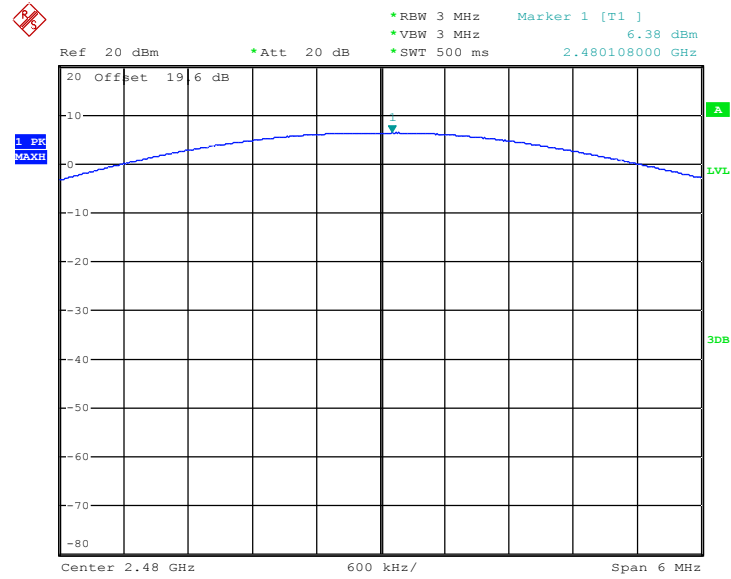
Peak Output Power Plot on Channel 39



Date: 25.MAR.2011 08:48:34



Peak Output Power Plot on Channel 78



Date: 25.MAR.2011 08:49:48

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

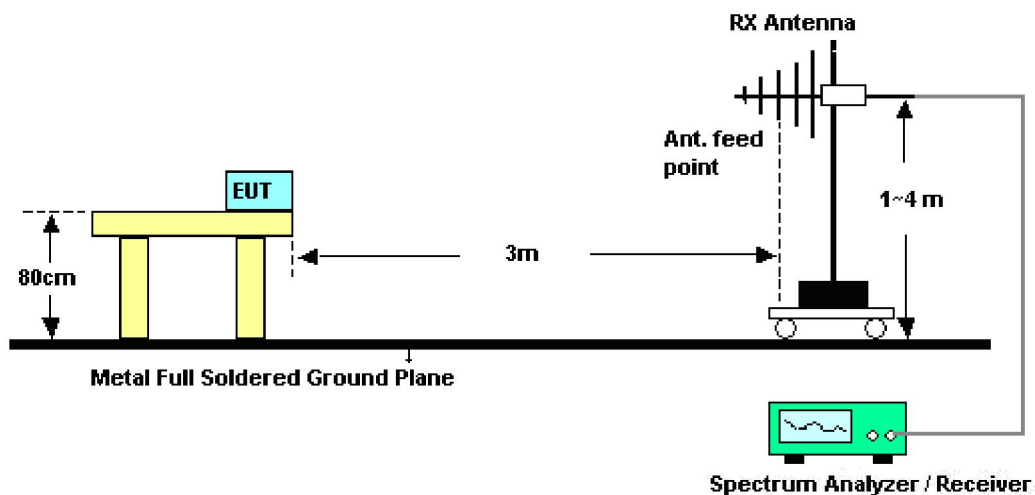
See list of measuring instruments of this test report.

3.6.3 Test Procedures

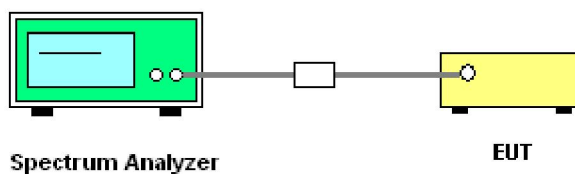
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	21~23°C
Test Channel :	00	Relative Humidity :	46~49%
		Test Engineer :	Jason Wang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.42	50.77	-23.23	74	46.41	32.18	6.03	33.85	103	26	Peak
2389.42	37.19	-16.81	54	32.83	32.18	6.03	33.85	103	26	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
2387.14	48.02	-25.98	74	43.66	32.18	6.03	33.85	100	264	Peak
2387.14	35.48	-18.52	54	31.12	32.18	6.03	33.85	100	264	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
		Test Engineer :	Jason Wang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.95	-5.05	74	64.39	32.28	6.18	33.9	101	312	Peak
2483.5	30.58	-23.42	54	26.02	32.28	6.18	33.9	101	312	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	86.53	55.95	30.58	54	-23.42	Pass
Hopping Mode	86.53	56.95	29.58	54	-24.42	Pass

Note : Average result = Maximum field strength – Delta result

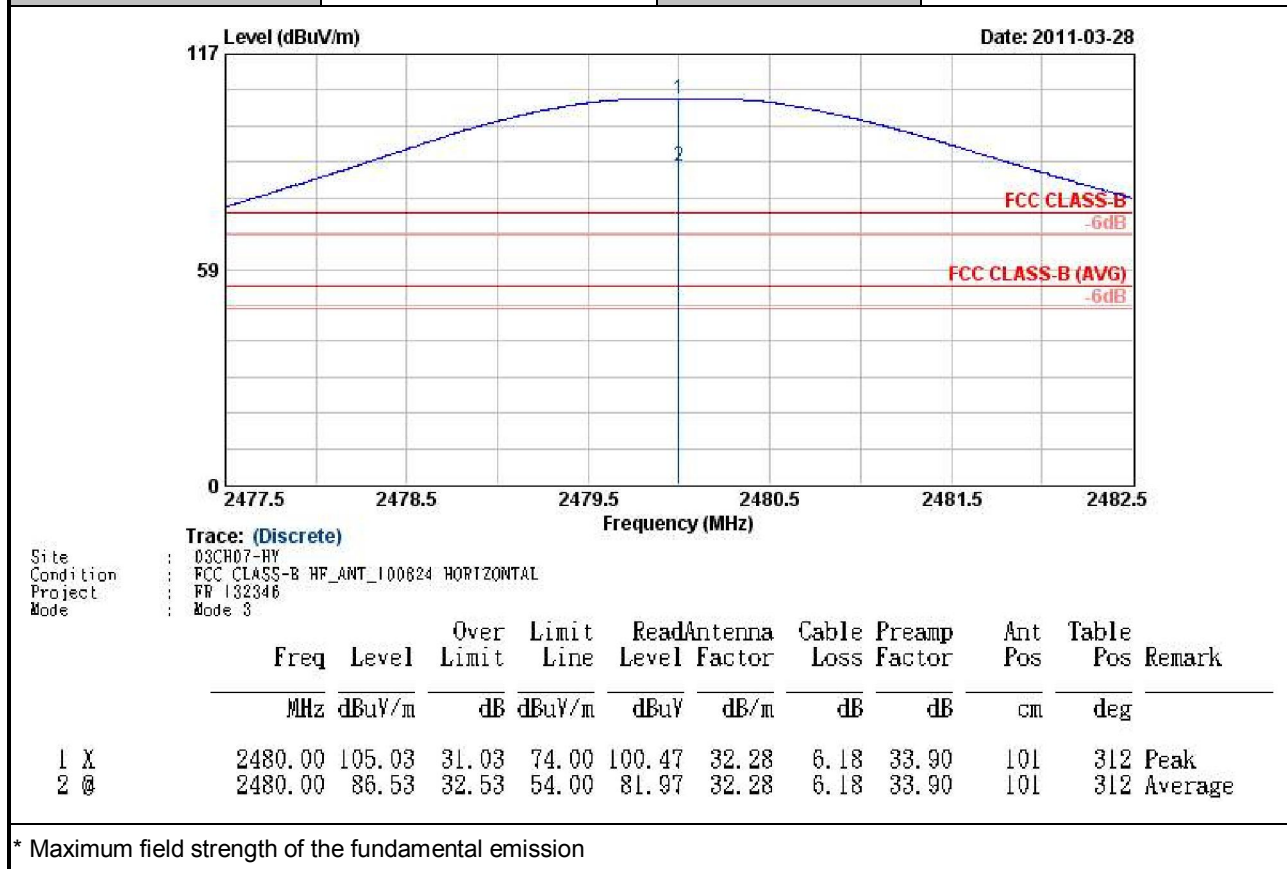
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	67.92	-6.08	74	63.36	32.28	6.18	33.9	119	81	Peak
2483.5	30.41	-23.59	54	25.85	32.28	6.18	33.9	119	81	Average

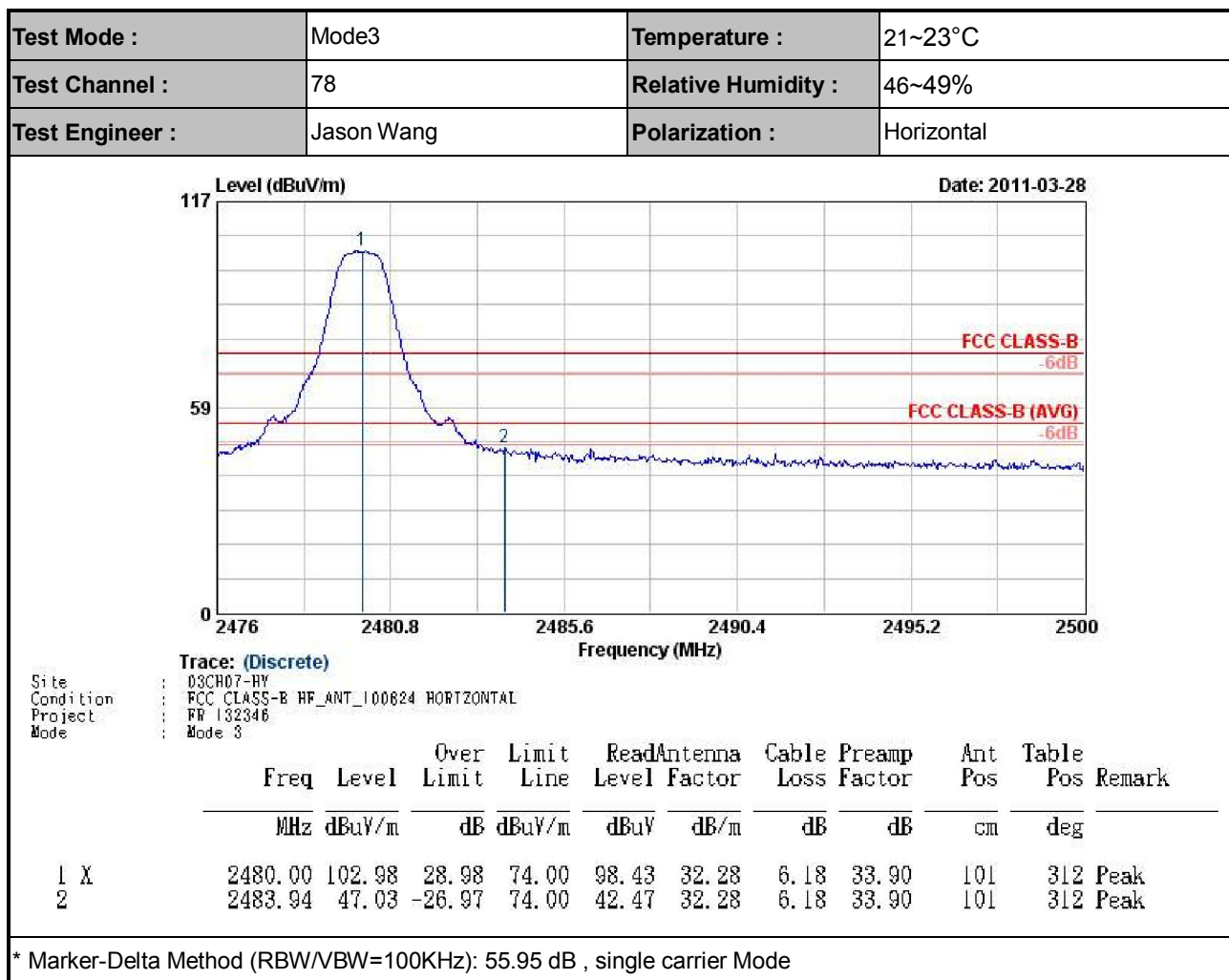
Summary results of marker-delta method:

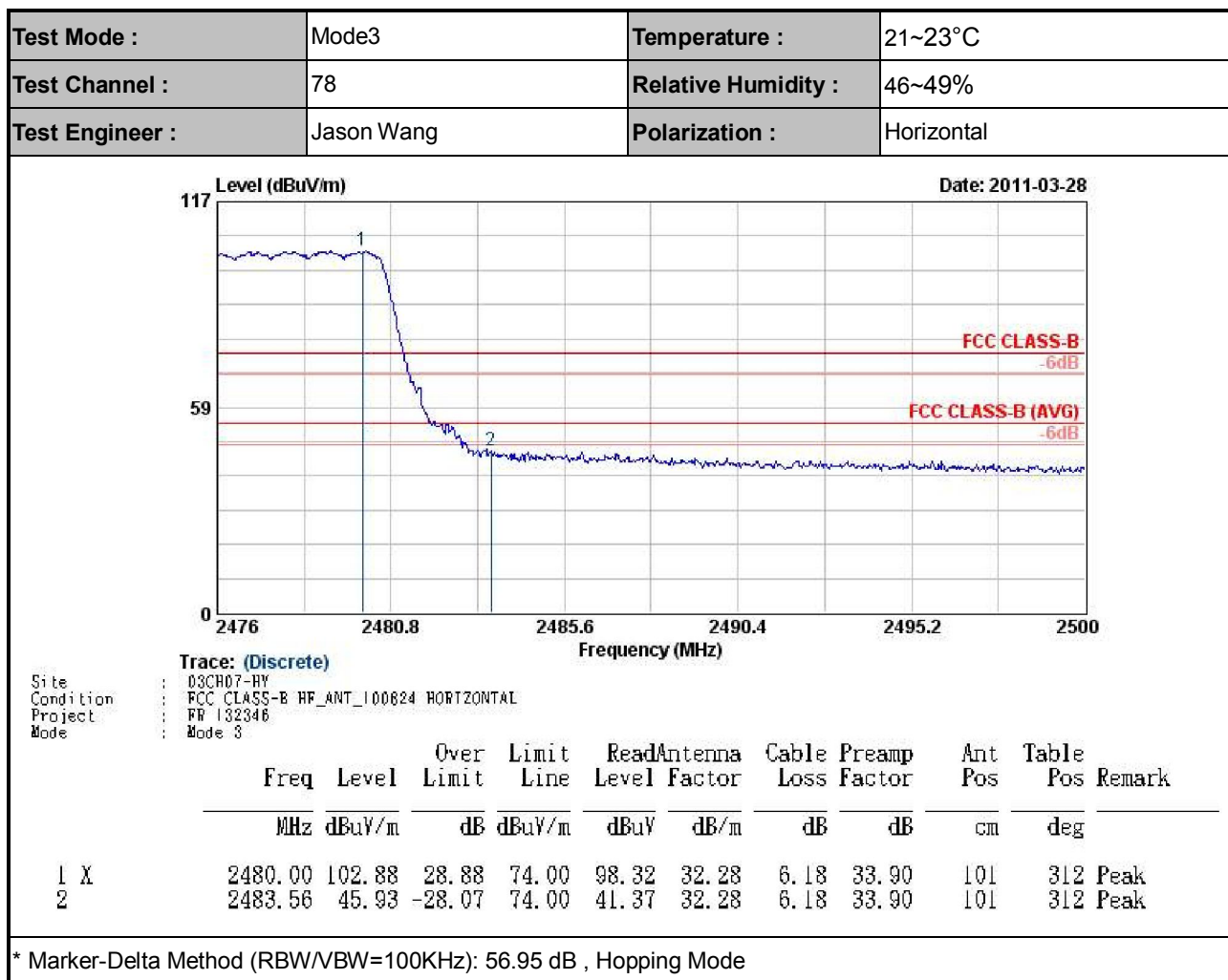
Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	86.55	56.14	30.41	54	-23.59	Pass
Hopping Mode	86.55	56.76	29.79	54	-24.21	Pass

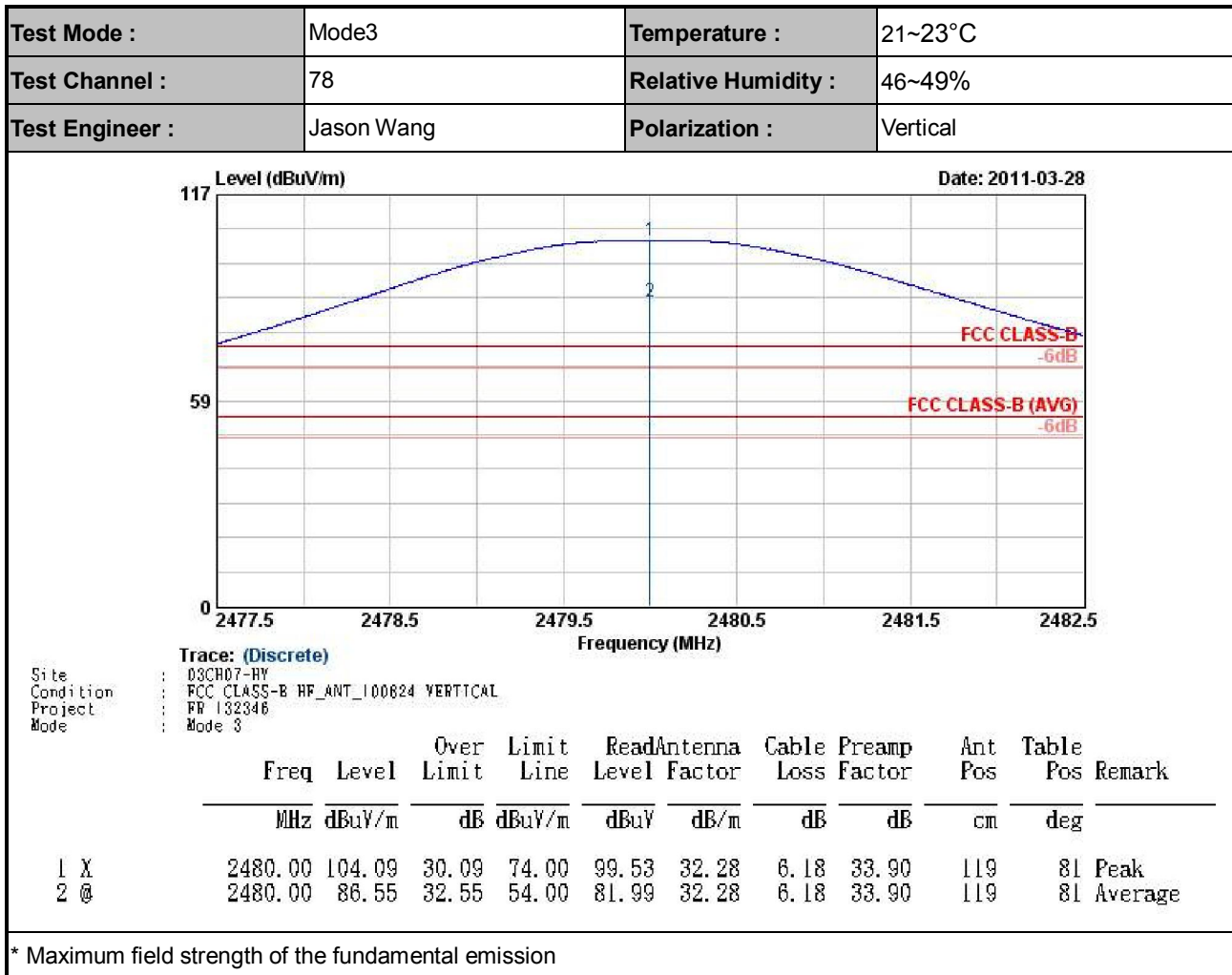
Note : Average result = Maximum field strength – Delta result

Test Mode :	Mode3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal

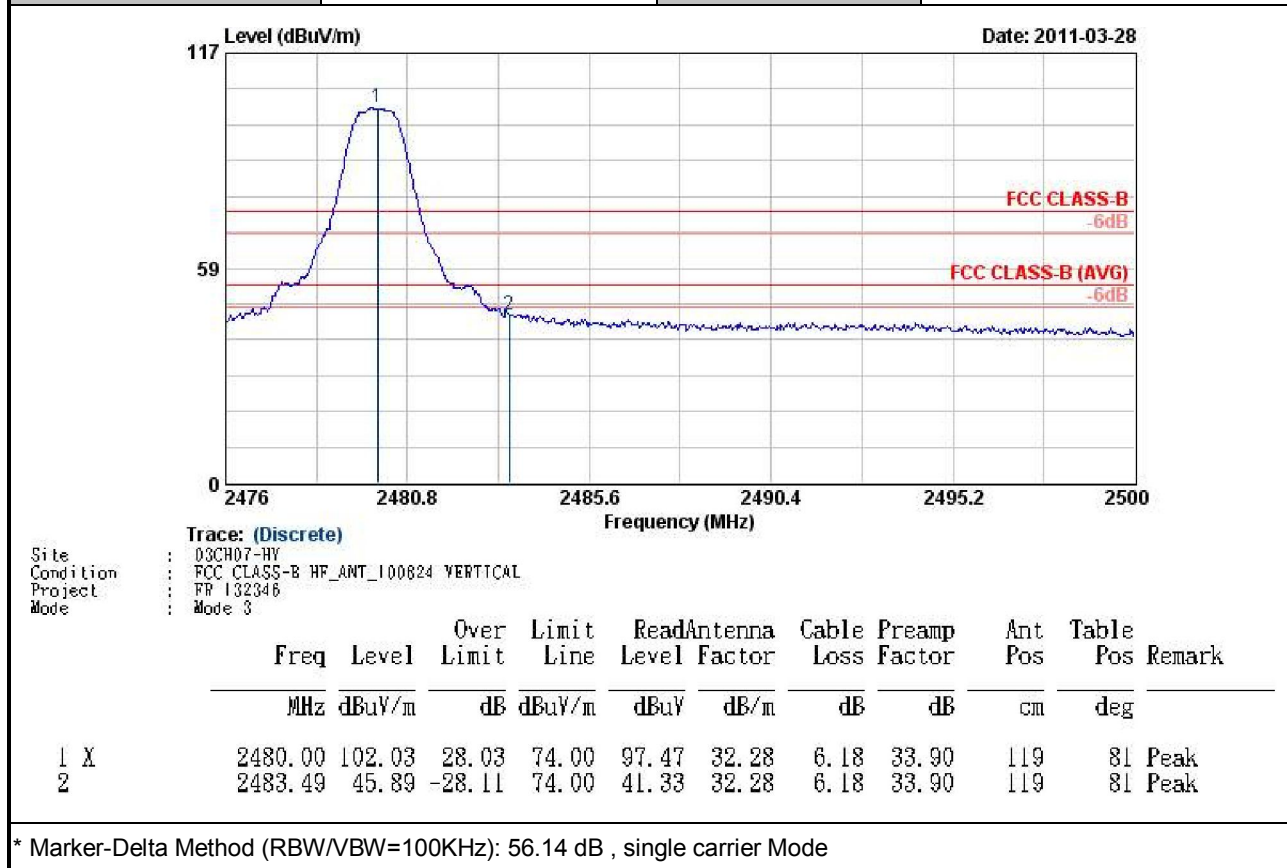




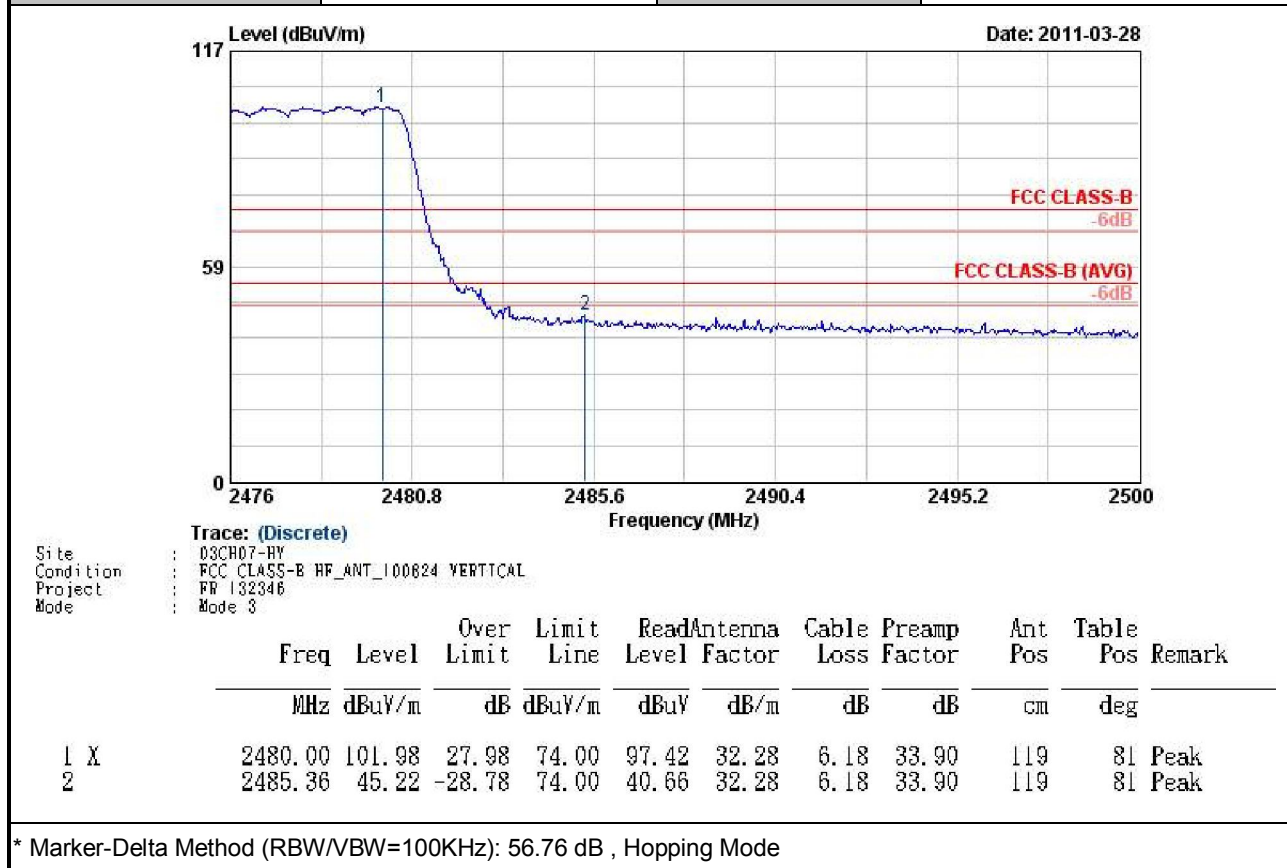




Test Mode :	Mode3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical



Test Mode :	Mode3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
		Test Engineer :	Jason Wang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	69.5	-4.5	74	64.94	32.28	6.18	33.9	101	315	Peak
2483.5	32.52	-21.48	54	27.96	32.28	6.18	33.9	101	315	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	87.43	54.91	32.52	54	-21.48	Pass
Hopping Mode	87.43	56.68	30.75	54	-23.25	Pass

Note : Average result = Maximum field strength – Delta result

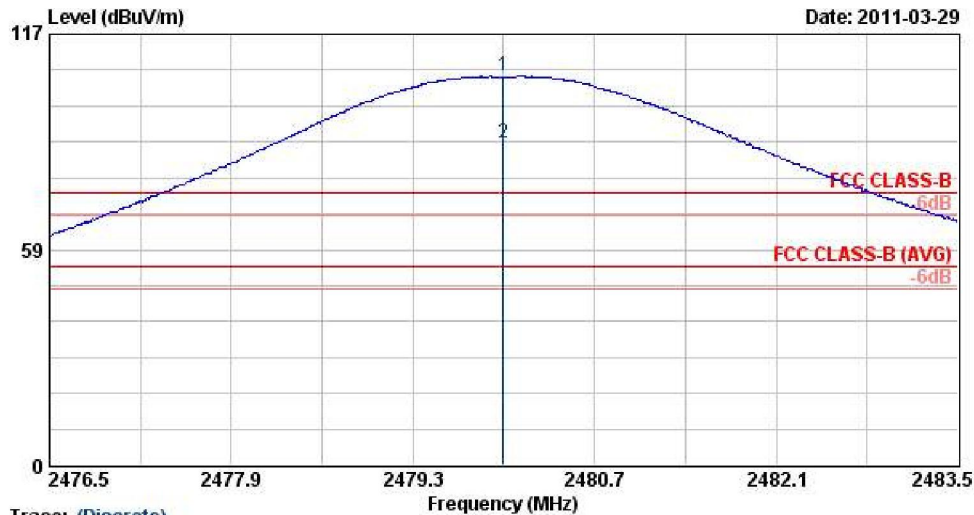
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.45	-5.55	74	63.89	32.28	6.18	33.9	100	81	Peak
2483.5	30.75	-23.25	54	26.19	32.28	6.18	33.9	100	81	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	86.47	55.72	30.75	54	-23.25	Pass
Hopping Mode	86.47	57.46	29.01	54	-24.99	Pass

Note : Average result = Maximum field strength – Delta result

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal



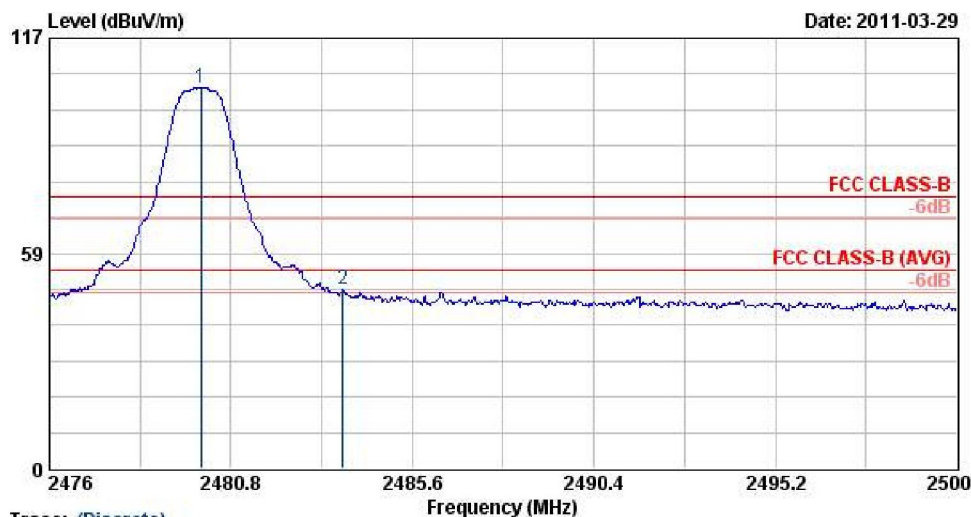
Trace: (Discrete)

Site : 08CH07-RY
Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
Project : FR 132346

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2480.00	105.53	31.53	74.00	100.97	32.28	6.18	33.90	101	315	Peak
2 @	2480.00	87.43	33.43	54.00	82.87	32.28	6.18	33.90	101	315	Average

* Maximum field strength of the fundamental emission

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal



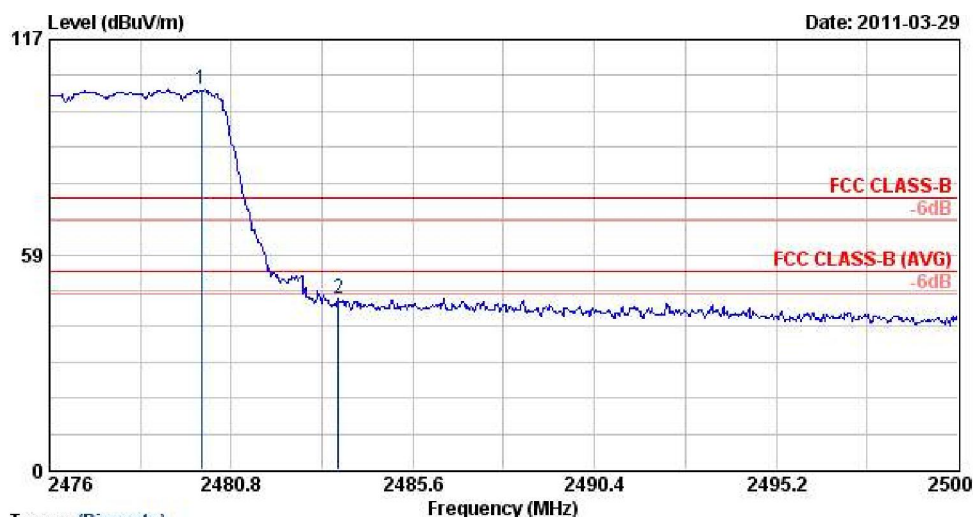
Trace: (Discrete)

Site : 03CH07-HY
Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
Project : FR 132346

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	dB	dBuV/m	Level	Loss	Factor	Pos	Pos	Remark
					Factor					
					dB	dB		cm	deg	
1 @	2480.00	103.50	29.50	74.00	98.94	32.28	6.18	33.90	101	315 Peak
2	2483.75	48.59	-25.41	74.00	44.03	32.28	6.18	33.90	101	315 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 54.91 dB , single carrier Mode

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal



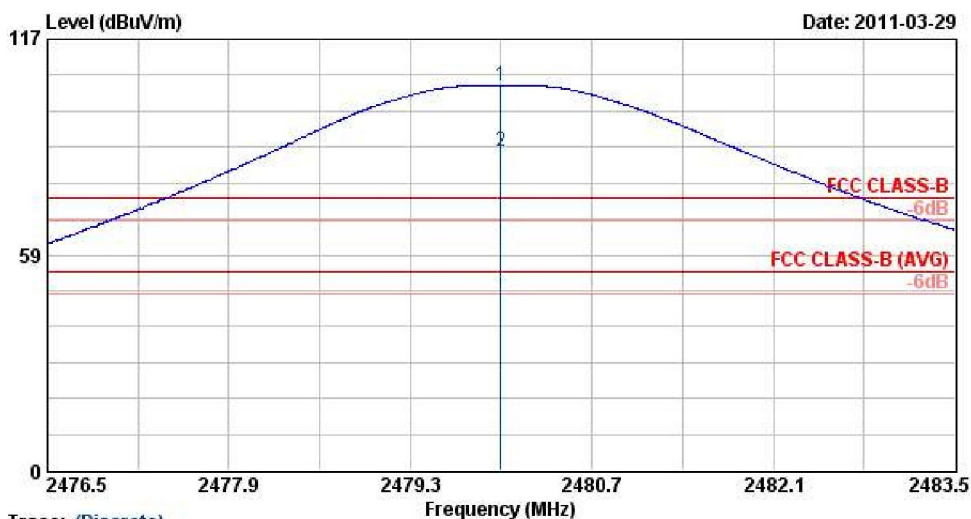
Trace: (Discrete)

Site : D8CH07-RY
Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
Project : FR 132346

	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	103.42	29.42	74.00	98.86	32.28	6.18	33.90	101	315 Peak
2	2483.63	46.74	-27.26	74.00	42.18	32.28	6.18	33.90	101	315 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 56.68 dB , Hopping Mode

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical



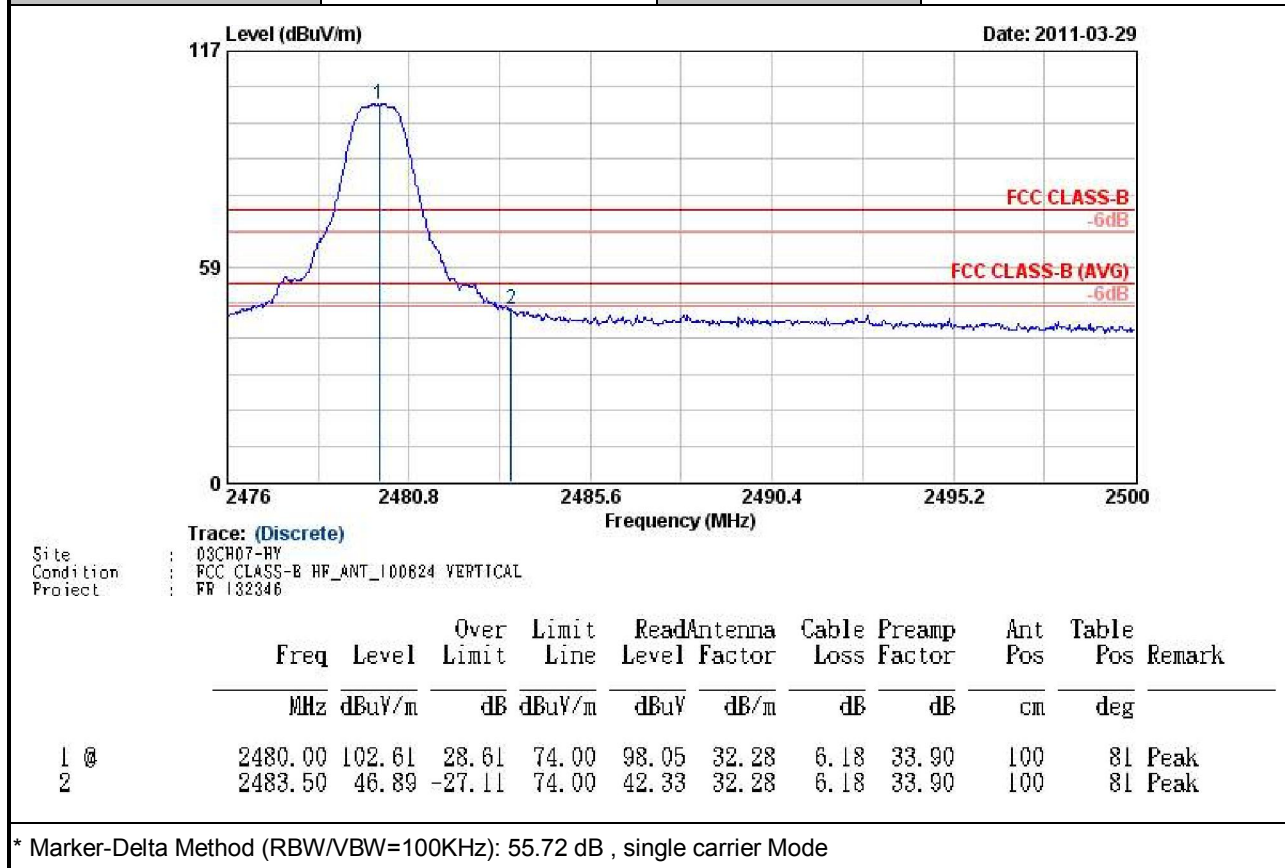
Trace: (Discrete)

Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 132346

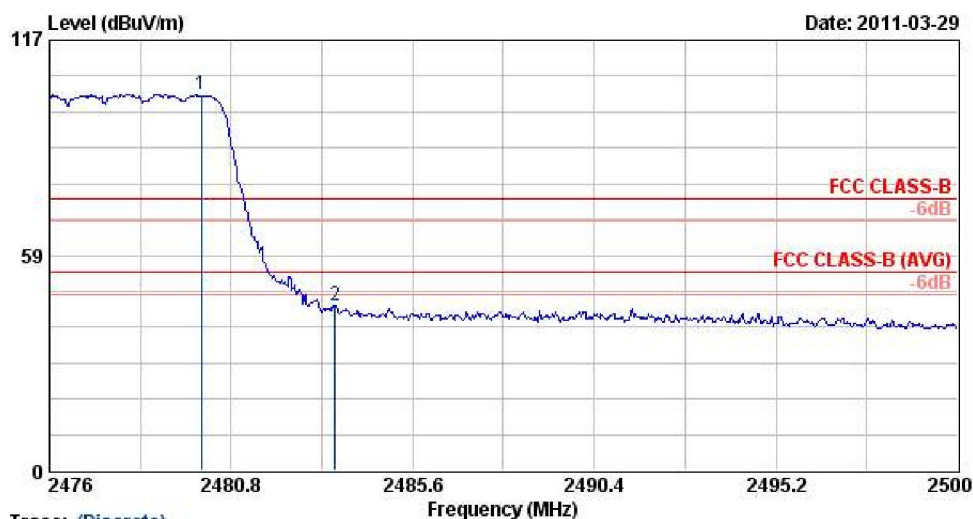
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	2480.00	104.58	30.58	74.00	100.02	32.28	6.18	33.90	100	81 Peak
2 @	2480.00	86.47	32.47	54.00	81.91	32.28	6.18	33.90	100	81 Average

* Maximum field strength of the fundamental emission

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical



Trace: (Discrete)

Site : D3CH07-HY
Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
Project : FR 132346

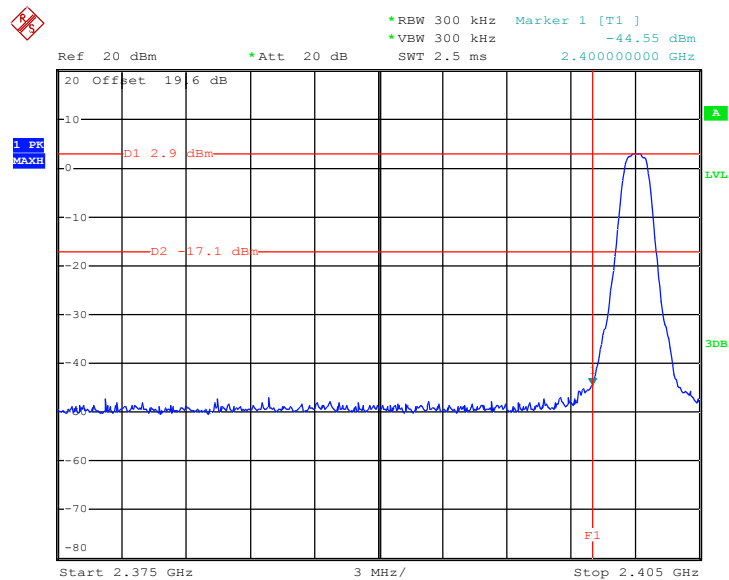
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	2480.00	102.40	28.40	74.00	97.84	32.28	6.18	33.90	100	81 Peak
2	2483.54	44.94	-29.06	74.00	40.38	32.28	6.18	33.90	100	81 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 57.46 dB , Hopping Mode

3.6.6 Test Result of Conducted Band Edges

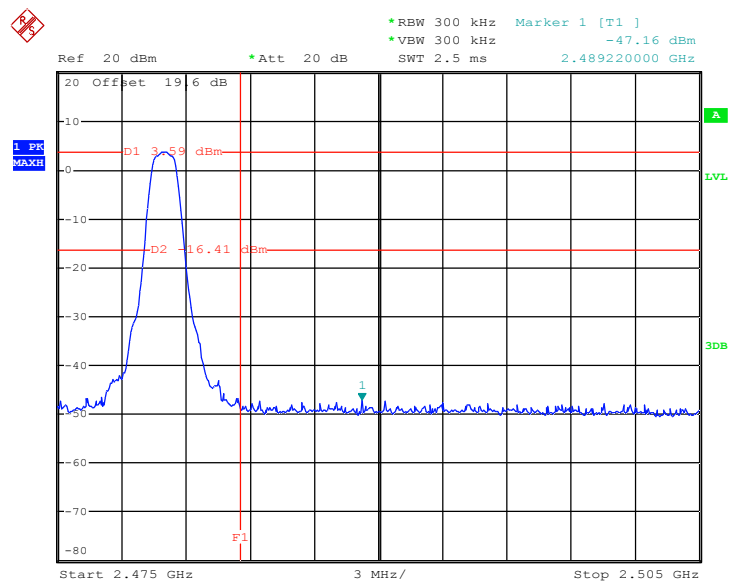
Test Mode :	Mode 4 and 6	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Phoenix Chen

Low Band Edge Plot on Channel 00



Date: 25.MAR.2011 10:00:59

High Band Edge Plot on Channel 78



Date: 25.MAR.2011 10:02:01

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.

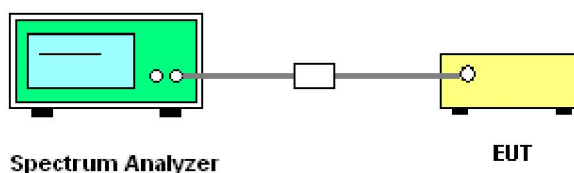
3.7.2 Measuring Instruments

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.

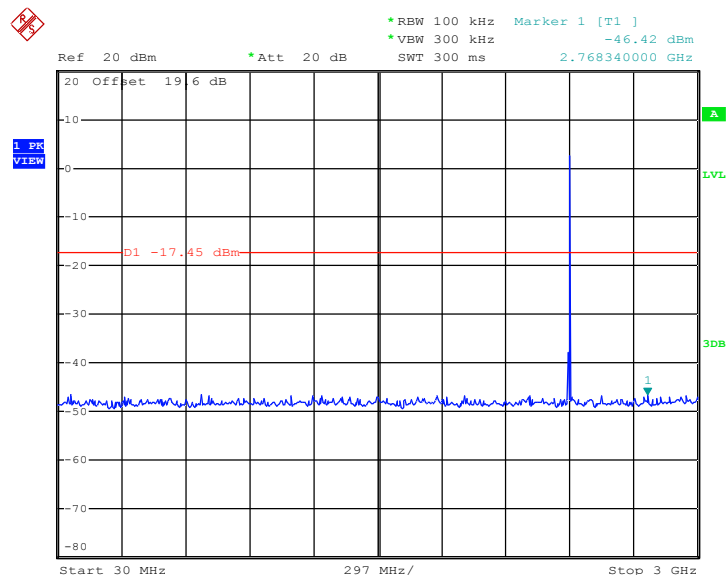
3.7.4 Test Setup



3.7.5 Test Result

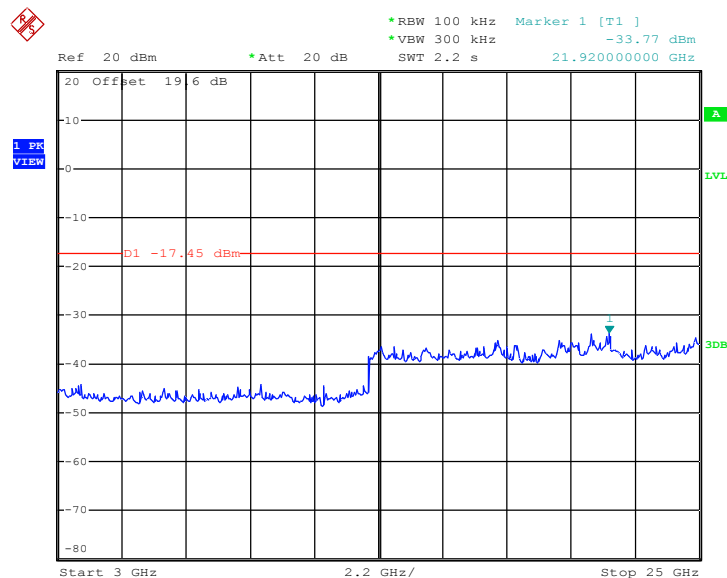
Test Mode :	Mode 4	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Phoenix Chen

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



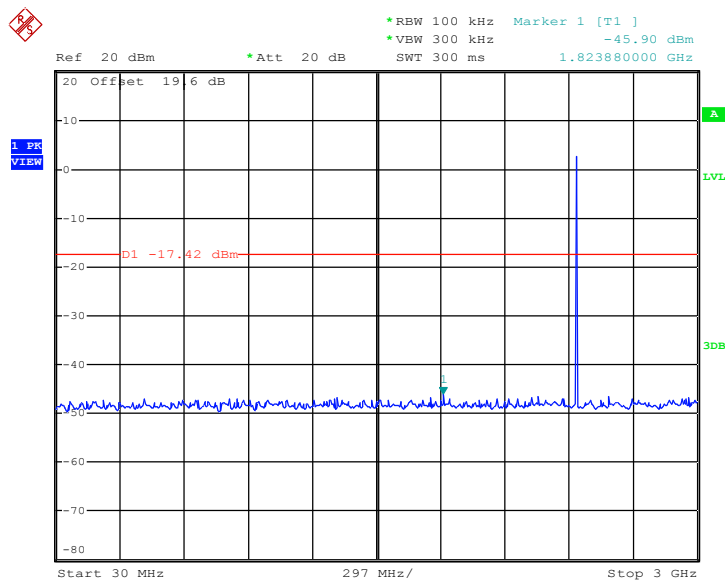
Date: 25.MAR.2011 10:10:12

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

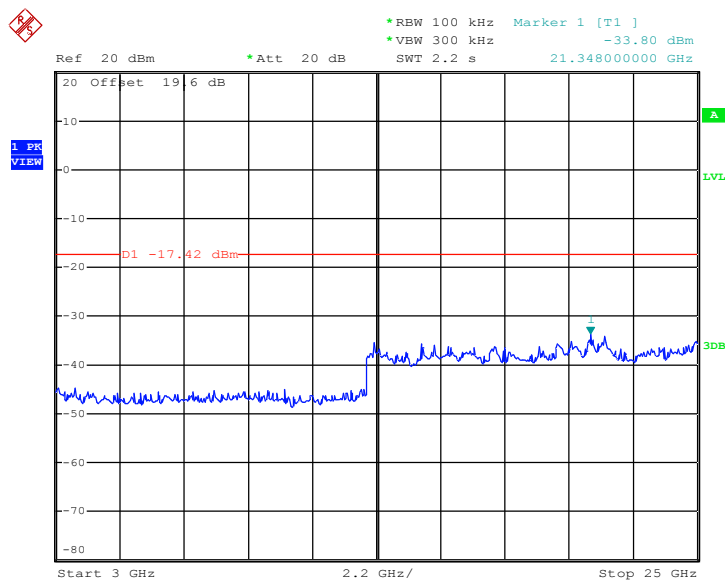


Date: 25.MAR.2011 10:10:24

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

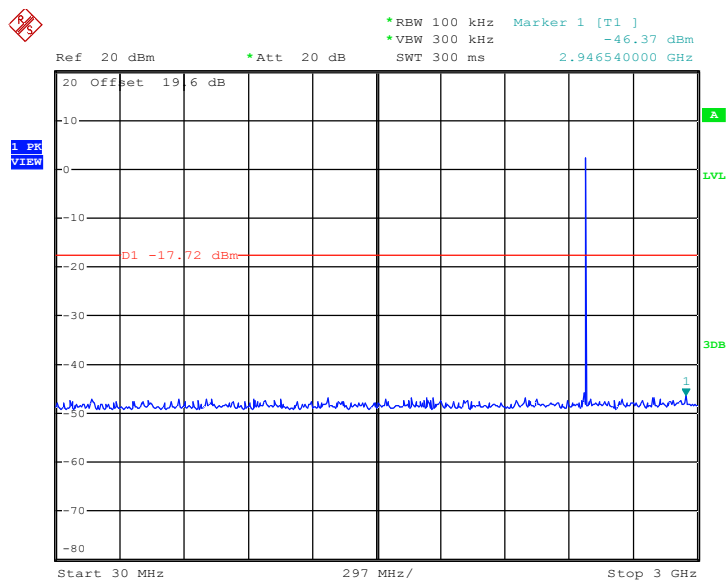
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 25.MAR.2011 10:11:15

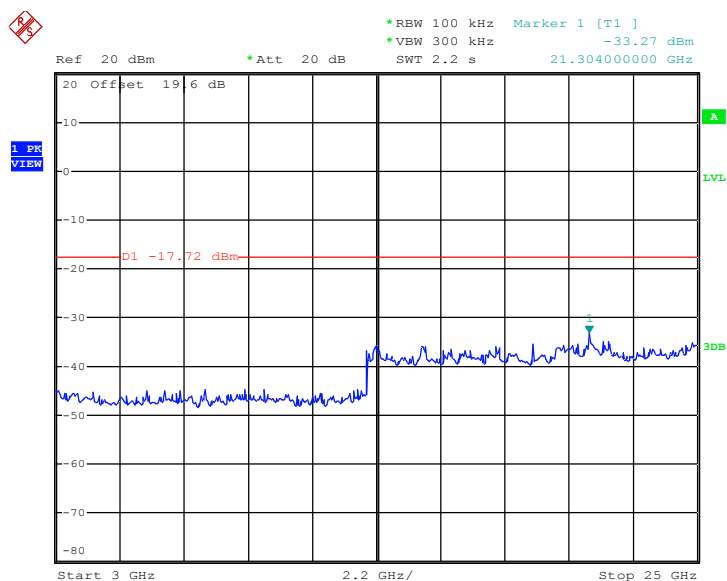
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 25.MAR.2011 10:11:27

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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 25.MAR.2011 10:12:19

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 25.MAR.2011 10:12:31

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.

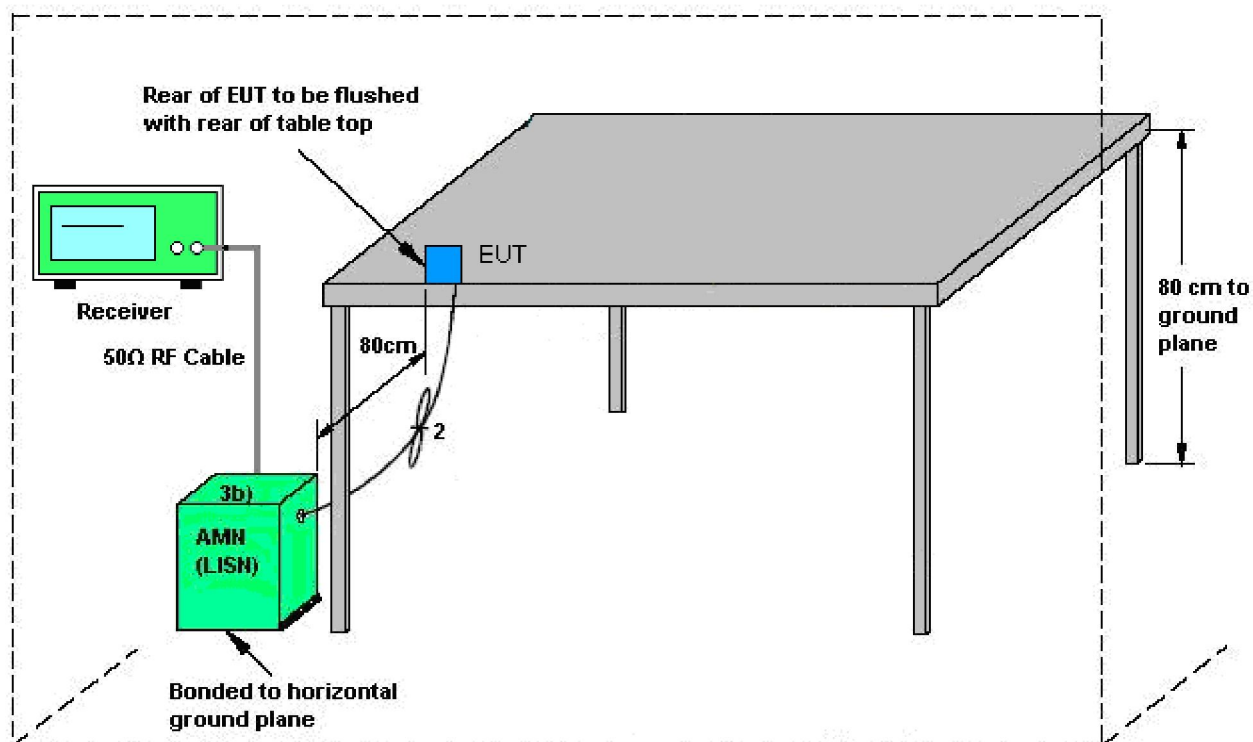
3.8.2 Measuring Instruments

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.

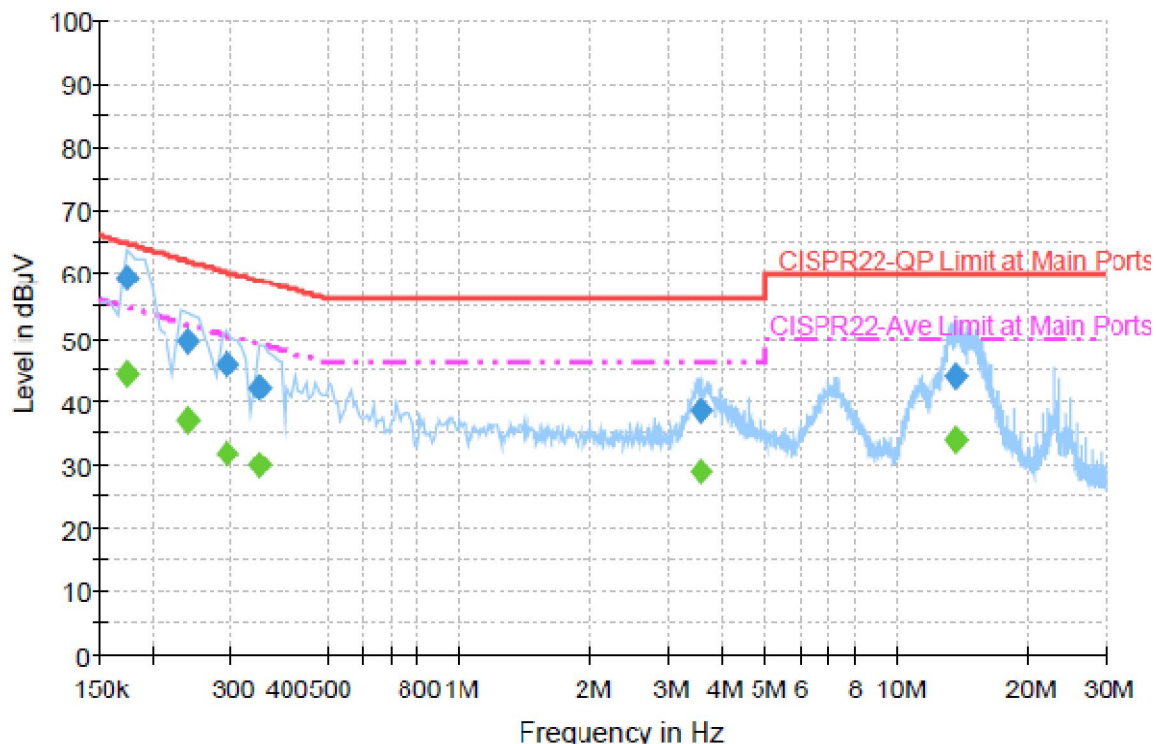
3.8.4 Test Setup



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 :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + TC + Adapter 1 for Sample 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



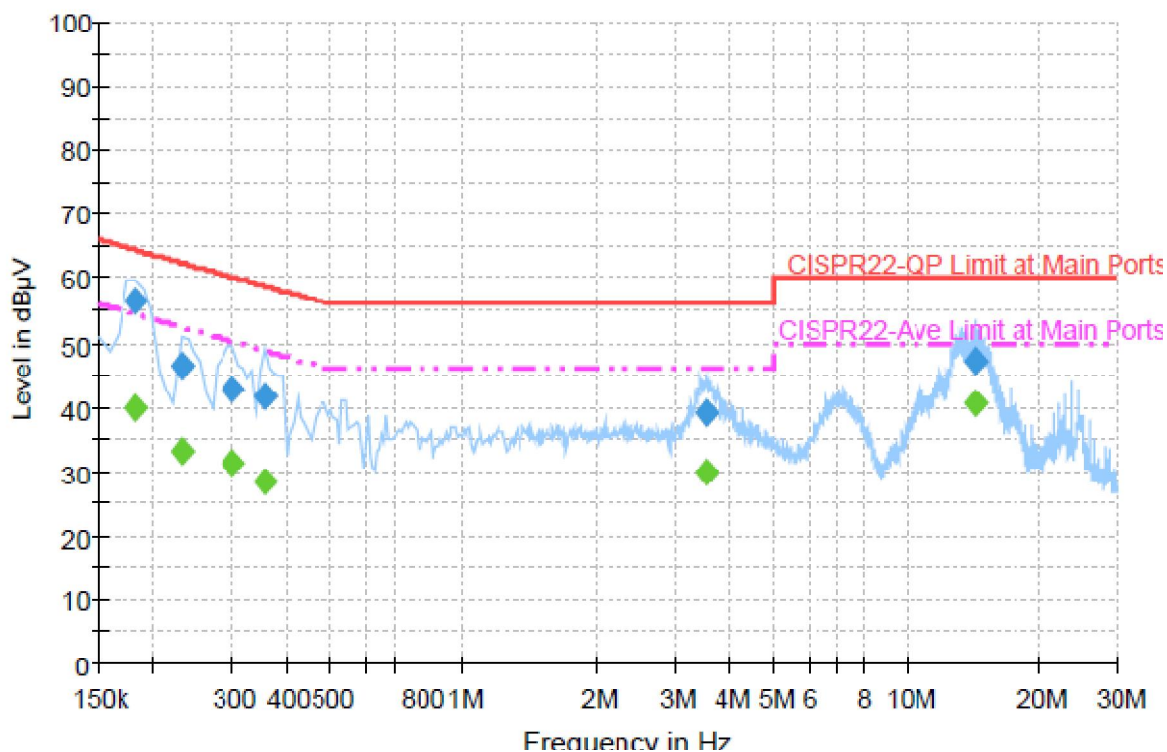
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	59.5	Off	L1	19.4	5.3	64.8
0.238000	49.6	Off	L1	19.4	12.6	62.2
0.294000	45.9	Off	L1	19.4	14.5	60.4
0.350000	42.0	Off	L1	19.4	17.0	59.0
3.550000	38.4	Off	L1	19.5	17.6	56.0
13.662000	44.0	Off	L1	19.6	16.0	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	44.1	Off	L1	19.4	10.7	54.8
0.238000	36.9	Off	L1	19.4	15.3	52.2
0.294000	31.9	Off	L1	19.4	18.5	50.4
0.350000	29.9	Off	L1	19.4	19.1	49.0
3.550000	28.8	Off	L1	19.5	17.2	46.0
13.662000	34.1	Off	L1	19.6	15.9	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + TC + Adapter 1 for Sample 1		
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	56.6	Off	N	19.4	7.8	64.4
0.230000	46.5	Off	N	19.5	15.9	62.4
0.302000	42.9	Off	N	19.4	17.3	60.2
0.358000	41.6	Off	N	19.4	17.2	58.8
3.526000	39.2	Off	N	19.5	16.8	56.0
14.302000	47.3	Off	N	19.7	12.7	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	39.8	Off	N	19.4	14.6	54.4
0.230000	33.1	Off	N	19.5	19.3	52.4
0.302000	31.2	Off	N	19.4	19.0	50.2
0.358000	28.3	Off	N	19.4	20.5	48.8
3.526000	29.7	Off	N	19.5	16.3	46.0
14.302000	40.6	Off	N	19.7	9.4	50.0

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

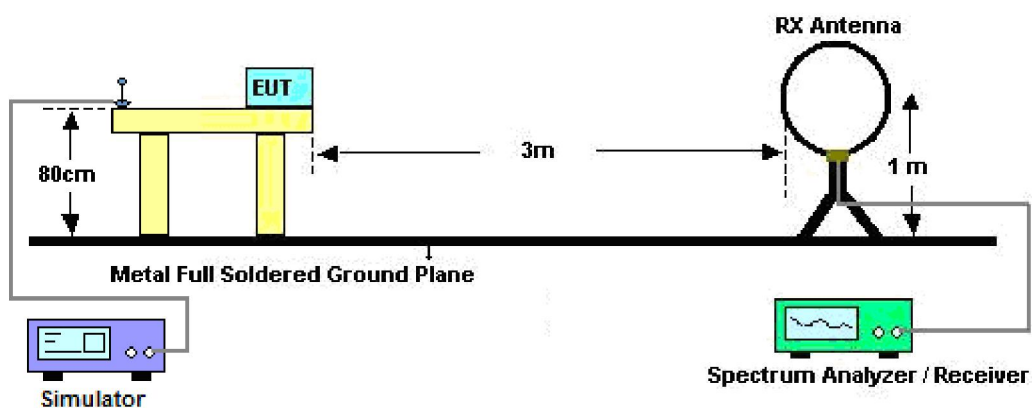
See list of measuring instruments of this test report.

3.9.3 Test Procedures

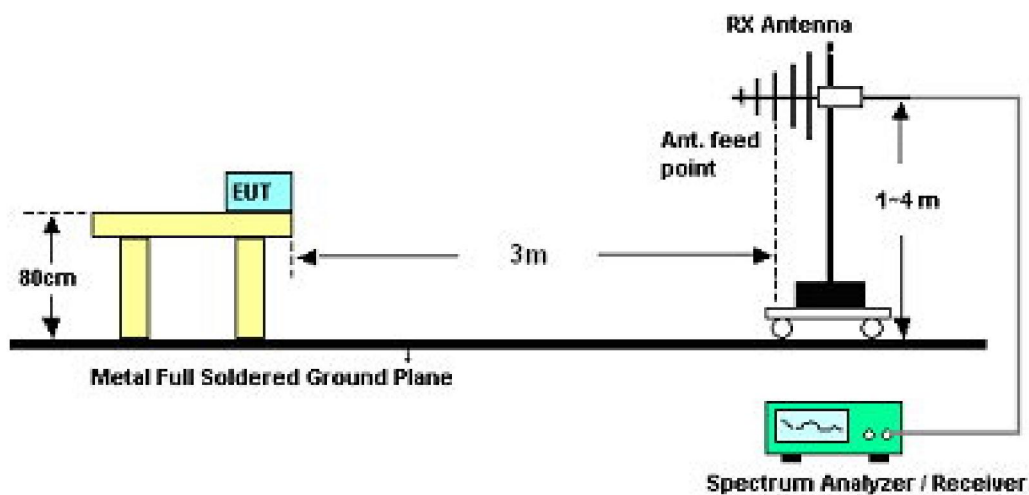
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector 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

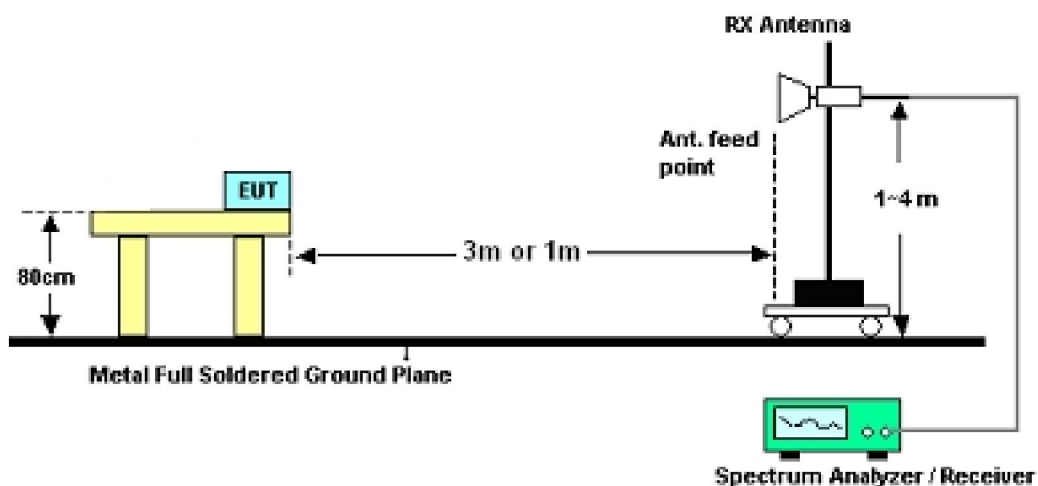
For radiated emissions below 30MHz



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 :	Jason Wang	Temperature :	21~23°C	
		Relative Humidity :	46~49%	

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 :	21~23°C
Test Channel :	00	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
107.49	23.01	-20.49	43.5	43.07	10.45	1.04	31.55	-	-	Peak
216.3	29.09	-16.91	46	48.88	10.27	1.4	31.46	-	-	Peak
240.33	24.27	-21.73	46	42.18	11.98	1.53	31.42	-	-	Peak
724.9	30.15	-15.85	46	36.64	21.27	3	30.76	-	-	Peak
783.7	33.84	-12.16	46	39.21	22.21	3.11	30.69	100	155	Peak
850.2	32.32	-13.68	46	36.72	23.06	3.27	30.73	-	-	Peak
2389.42	37.19	-16.81	54	32.83	32.18	6.03	33.85	103	26	Average
2389.42	50.77	-23.23	74	46.41	32.18	6.03	33.85	103	26	Peak
2402	104.85	-	-	100.49	32.18	6.03	33.85	103	26	Peak
2402	86.68	-	-	82.32	32.18	6.03	33.85	103	26	Average
2486	32.14	-21.86	54	27.58	32.28	6.18	33.9	103	26	Average
2486	43.56	-30.44	74	39	32.28	6.18	33.9	103	26	Peak

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	30.59	-9.41	40	45.24	16.27	0.54	31.46	132	222	Peak
49.98	30.27	-9.73	40	52.83	8.28	0.7	31.54	-	-	Peak
202.26	27.07	-16.43	43.5	47.91	9.31	1.33	31.48	-	-	Peak
377	28.54	-17.46	46	41.82	15.87	2.09	31.24	-	-	Peak
789.3	31.95	-14.05	46	37.21	22.3	3.12	30.68	-	-	Peak
847.4	30.77	-15.23	46	35.22	23.02	3.26	30.73	-	-	Peak
2387.14	35.48	-18.52	54	31.12	32.18	6.03	33.85	100	264	Average
2387.14	48.02	-25.98	74	43.66	32.18	6.03	33.85	100	264	Peak
2402	102.52	-	-	98.16	32.18	6.03	33.85	100	264	Peak
2402	85.1	-	-	80.74	32.18	6.03	33.85	100	264	Average
2492	31.94	-22.06	54	27.36	32.3	6.18	33.9	100	264	Average
2492	44.14	-29.86	74	39.56	32.3	6.18	33.9	100	264	Peak

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
107.49	21.59	-21.91	43.5	41.65	10.45	1.04	31.55	-	-	Peak
216.3	28.68	-17.32	46	48.47	10.27	1.4	31.46	-	-	Peak
253.29	25.21	-20.79	46	42.35	12.72	1.55	31.41	-	-	Peak
590.5	31.1	-14.9	46	39.75	19.62	2.66	30.93	-	-	Peak
788.6	34	-12	46	39.27	22.29	3.12	30.68	111	151	Peak
853	32.43	-13.57	46	36.81	23.08	3.27	30.73	-	-	Peak
2380	44.57	-29.43	74	40.23	32.16	6.03	33.85	102	22	Peak
2380	32.99	-21.01	54	28.65	32.16	6.03	33.85	102	22	Average
2441	104.8	-	-	100.33	32.24	6.11	33.88	102	22	Peak
2441	86.71	-	-	82.24	32.24	6.11	33.88	102	22	Average
2484	43.65	-30.35	74	39.09	32.28	6.18	33.9	102	22	Peak
2484	32.52	-21.48	54	27.96	32.28	6.18	33.9	102	22	Average

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
38.37	28.86	-11.14	40	46.32	13.43	0.61	31.5	-	-	Peak
48.9	29.64	-10.36	40	51.41	9.08	0.68	31.53	111	54	Peak
125.58	25.87	-17.63	43.5	44.75	11.56	1.13	31.57	-	-	Peak
377	26.75	-19.25	46	40.03	15.87	2.09	31.24	-	-	Peak
590.5	27.52	-18.48	46	36.17	19.62	2.66	30.93	-	-	Peak
788.6	31.8	-14.2	46	37.07	22.29	3.12	30.68	-	-	Peak
2358	44.09	-29.91	74	39.81	32.13	5.99	33.84	101	96	Peak
2358	32.84	-21.16	54	28.56	32.13	5.99	33.84	101	96	Average
2441	102.76	-	-	98.29	32.24	6.11	33.88	101	96	Peak
2441	85.14	-	-	80.67	32.24	6.11	33.88	101	96	Average
2484	45.13	-28.87	74	40.57	32.28	6.18	33.9	101	96	Peak
2484	32.19	-21.81	54	27.63	32.28	6.18	33.9	101	96	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
107.49	24.14	-19.36	43.5	44.2	10.45	1.04	31.55	-	-	Peak
216.3	29.04	-16.96	46	48.83	10.27	1.4	31.46	-	-	Peak
261.93	27.54	-18.46	46	44.49	12.86	1.6	31.41	-	-	Peak
589.8	29.55	-16.45	46	38.21	19.61	2.66	30.93	-	-	Peak
721.4	29.62	-16.38	46	36.17	21.23	2.99	30.77	-	-	Peak
786.5	34.96	-11.04	46	40.27	22.26	3.12	30.69	100	154	Peak
2324	44.11	-29.89	74	39.92	32.09	5.92	33.82	101	312	Peak
2324	32.61	-21.39	54	28.42	32.09	5.92	33.82	101	312	Average
2480	104.8	-	-	100.24	32.28	6.18	33.9	101	312	Peak
2480	86.53	-	-	81.97	32.28	6.18	33.9	101	312	Average
2483.5	30.58	-23.42	54	26.02	32.28	6.18	33.9	101	312	Average
2483.5	68.95	-5.05	74	64.39	32.28	6.18	33.9	101	312	Peak

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
49.98	29.59	-10.41	40	52.15	8.28	0.7	31.54	100	157	Peak
230.61	29.38	-16.62	46	48.03	11.3	1.49	31.44	-	-	Peak
277.05	28.34	-17.66	46	44.96	13.1	1.64	31.36	-	-	Peak
377	28.31	-17.69	46	41.59	15.87	2.09	31.24	-	-	Peak
786.5	31.36	-14.64	46	36.67	22.26	3.12	30.69	-	-	Peak
853.7	31.49	-14.51	46	35.85	23.09	3.28	30.73	-	-	Peak
2388	32.87	-21.13	54	28.51	32.18	6.03	33.85	119	81	Average
2388	45.05	-28.95	74	40.69	32.18	6.03	33.85	119	81	Peak
2480	86.55	-	-	81.99	32.28	6.18	33.9	119	81	Average
2480	103.94	-	-	99.38	32.28	6.18	33.9	119	81	Peak
2483.5	30.41	-23.59	54	25.85	32.28	6.18	33.9	119	81	Average
2483.5	67.92	-6.08	74	63.36	32.28	6.18	33.9	119	81	Peak

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
52.14	23.16	-16.84	40	46.23	7.76	0.71	31.54	-	-	Peak
216.03	27.39	-18.61	46	47.18	10.27	1.4	31.46	-	-	Peak
242.22	27.3	-18.7	46	45.07	12.12	1.53	31.42	-	-	Peak
648.6	27.93	-18.07	46	35.65	20.31	2.84	30.87	-	-	Peak
787.2	34.53	-11.47	46	39.83	22.27	3.12	30.69	133	245	Peak
853	32.1	-13.9	46	36.48	23.08	3.27	30.73	-	-	Peak
2388	44.59	-29.41	74	40.23	32.18	6.03	33.85	101	315	Peak
2388	32.29	-21.71	54	27.93	32.18	6.03	33.85	101	315	Average
2480	105.52	-	-	100.96	32.28	6.18	33.9	101	315	Peak
2480	87.55	-	-	82.99	32.28	6.18	33.9	101	315	Average
2483.5	69.5	-4.5	74	64.94	32.28	6.18	33.9	101	315	Peak
2483.5	32.52	-21.48	54	27.96	32.28	6.18	33.9	101	315	Average

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~49%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.26	27.93	-12.07	40	46.31	12.5	0.63	31.51	106	225	Peak
107.49	26.55	-16.95	43.5	46.61	10.45	1.04	31.55	-	-	Peak
215.49	27.55	-15.95	43.5	47.43	10.2	1.39	31.47	-	-	Peak
593.3	28.38	-17.62	46	36.97	19.67	2.67	30.93	-	-	Peak
755.7	29.65	-16.35	46	35.52	21.76	3.07	30.7	-	-	Peak
850.2	30.59	-15.41	46	34.99	23.06	3.27	30.73	-	-	Peak
2382	44.93	-29.07	74	40.59	32.16	6.03	33.85	100	81	Peak
2382	32.71	-21.29	54	28.37	32.16	6.03	33.85	100	81	Average
2480	104.55	-	-	99.99	32.28	6.18	33.9	100	81	Peak
2480	86.72	-	-	82.16	32.28	6.18	33.9	100	81	Average
2483.5	68.45	-5.55	74	63.89	32.28	6.18	33.9	100	81	Peak
2483.5	30.75	-23.25	54	26.19	32.28	6.18	33.9	100	81	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
System Simulator	R&S	CMU200	117995	N/A	Jun. 08, 2009	Jun. 07, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 11, 2010	Jun. 10, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
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)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	May 12, 2009	May 11, 2011	Radiation (03CH07-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 EP132346 as below.