

FCC RF Test Report

APPLICANT : Motorola Mobility, Inc.
EQUIPMENT : Mobile Phone
BRAND NAME : Motorola
MODEL NAME : XT615
MARKETING NAME : XT615
GPPD NUMBER : 3192
FCC ID : IHDP56MM6
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Jan. 18, 2012 and completely tested on Jan. 22, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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

SPORTON INTERNATIONAL INC.

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FCC ID : IHDP56MM6

Page Number : 1 of 59

Report Issued Date : Jan. 31, 2012

Report Version : Rev. 01

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR211846A	Rev. 01	Initial issue of report	Jan. 31, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	$\geq 15\text{Chs}$	Pass	-
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	$\geq 2/3$ 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 5.80 dB at 1.838 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.48 dB at 2483.500 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Motorola Mobility, Inc.

8F., No. 9, Songgao Rd., Taipei 110, Taiwan, R.O.C.

1.2 Manufacturer

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng District, New Taipei City, 23678, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Phone
Brand Name	Motorola
Model Name	XT615
Marketing Name	XT615
FCC ID	IHDP56MM6
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) : 10.41 dBm (0.0110 W) Bluetooth EDR (2Mbps) : 10.14 dBm (0.0103 W) Bluetooth EDR (3Mbps) : 10.52 dBm (0.0113 W)
Antenna Type	PIFA Antenna with gain -0.7 dBi
HW Version	PR3
SW Version	V1_470
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit

Remark: 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	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, recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	HPM-78	PY7DDA-2029	N/A	N/A
5.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
6.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

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	10.09 dBm	9.62 dBm	10.04 dBm
Ch39	2441MHz	10.41 dBm	10.14 dBm	10.52 dBm
Ch78	2480MHz	9.89 dBm	9.62 dBm	10.03 dBm

Remark:

1. The data rate was set in 3Mbps 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).

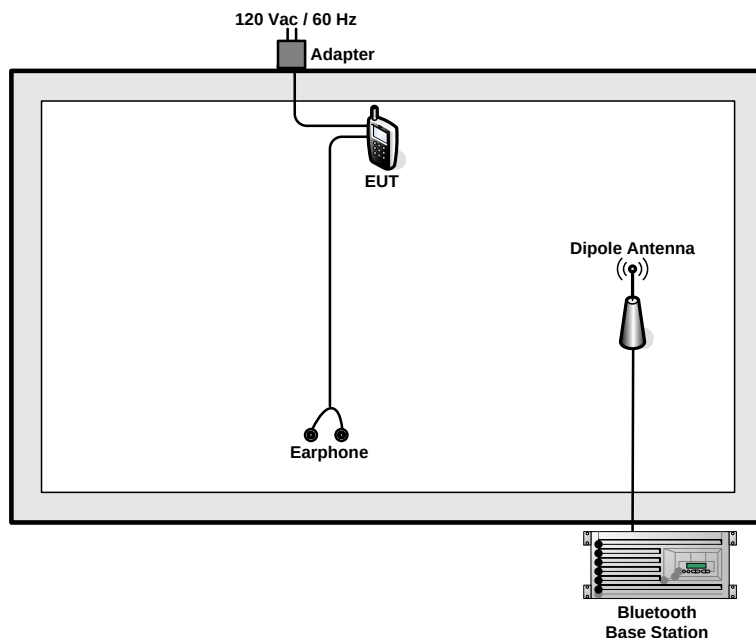
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

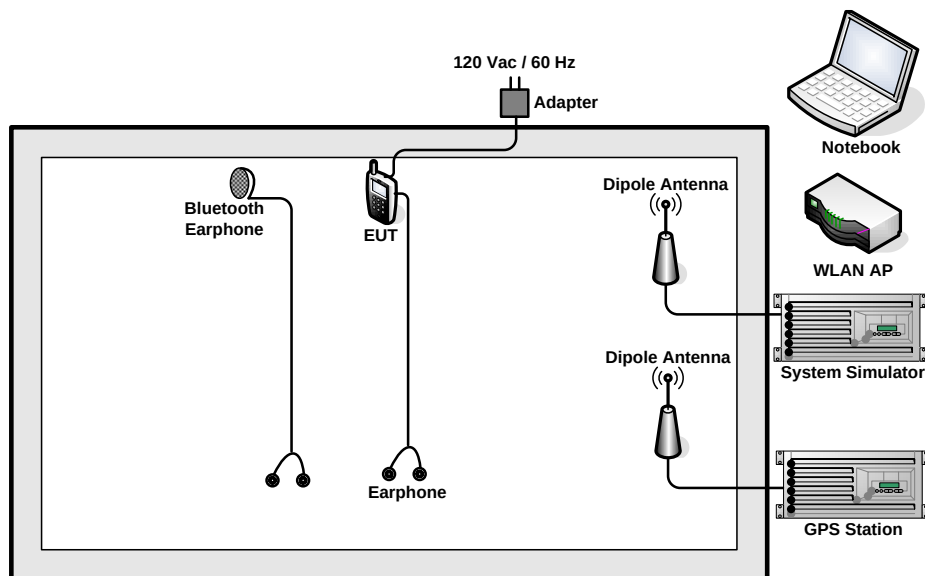
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps π /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :GSM850 Idle + WLAN Link + Bluetooth Link + GPS Rx + Earphone + USB Cable (Charging from Adapter)		
Remark: For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported.			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, key in “* # * # 373 # * # *” on the EUT directly. Then, the EUT will get into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

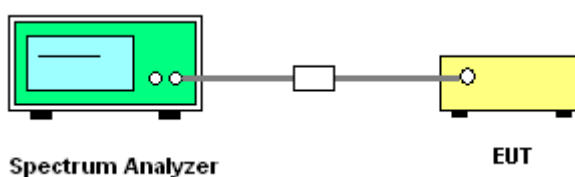
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

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

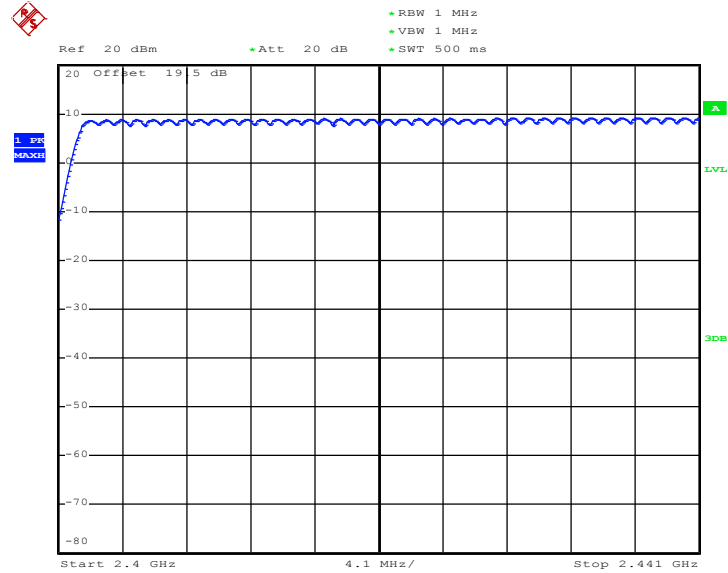
3.1.4 Test Setup



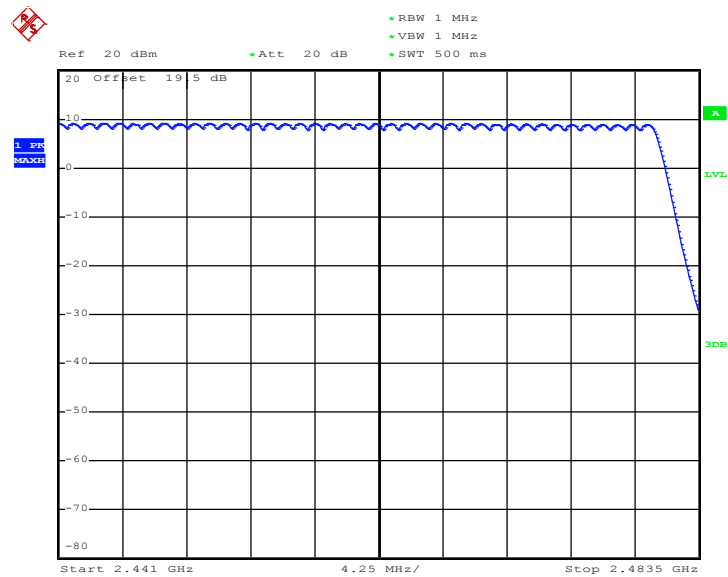
3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 7~9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 19.JAN.2012 19:51:58



Date: 19.JAN.2012 19:56:10

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

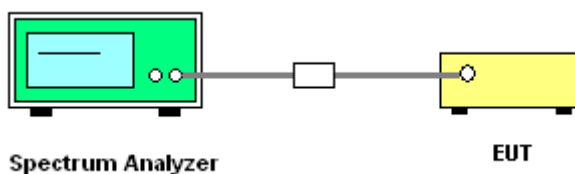
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
RBW $\geq$ 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

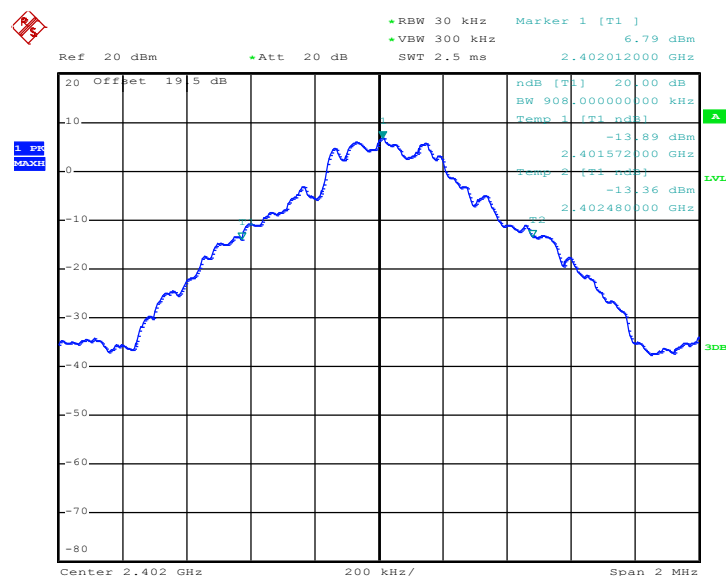


3.2.5 Test Result of 20dB Bandwidth

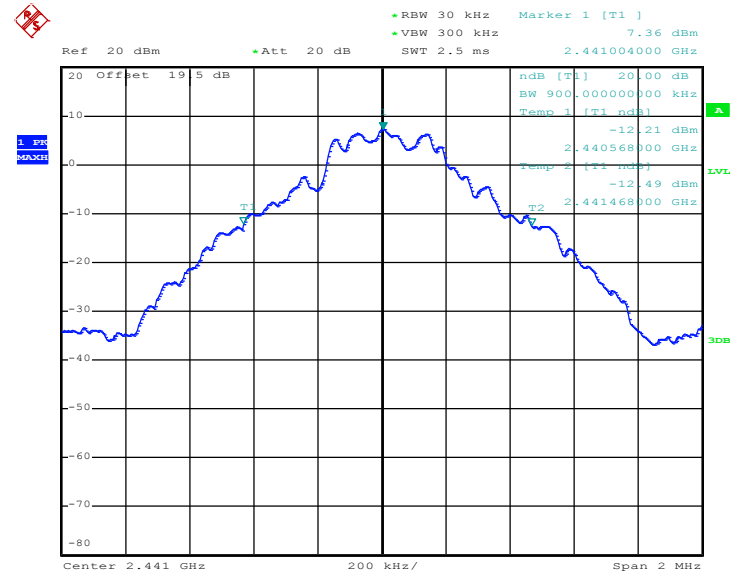
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.908
39	2441	0.900
78	2480	0.916

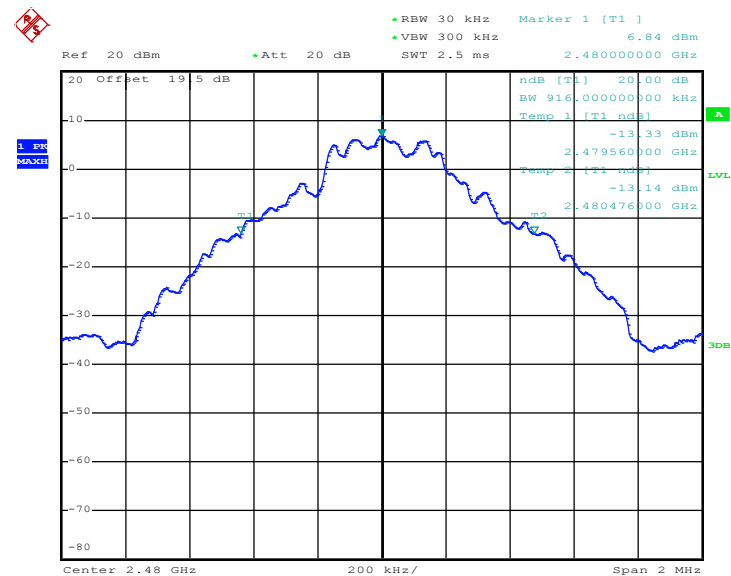
20 dB Bandwidth Plot on Channel 00



Date: 19.JAN.2012 19:20:12

20 dB Bandwidth Plot on Channel 39


Date: 19.JAN.2012 19:21:03

20 dB Bandwidth Plot on Channel 78


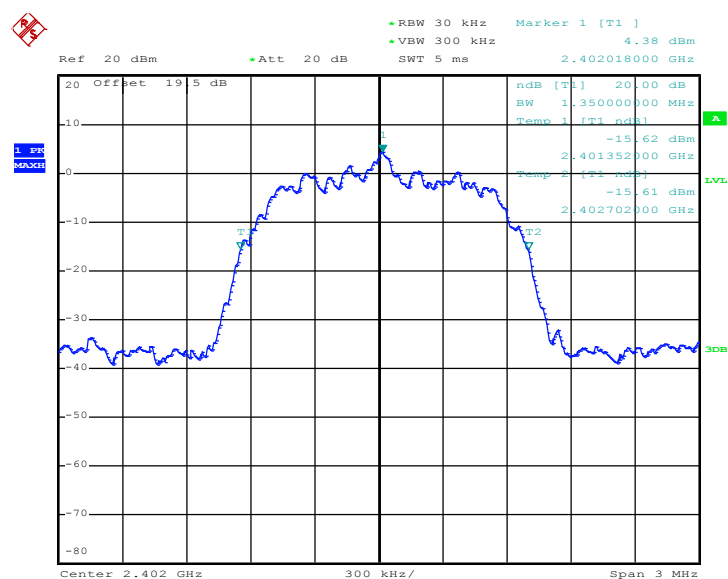
Date: 19.JAN.2012 19:22:17



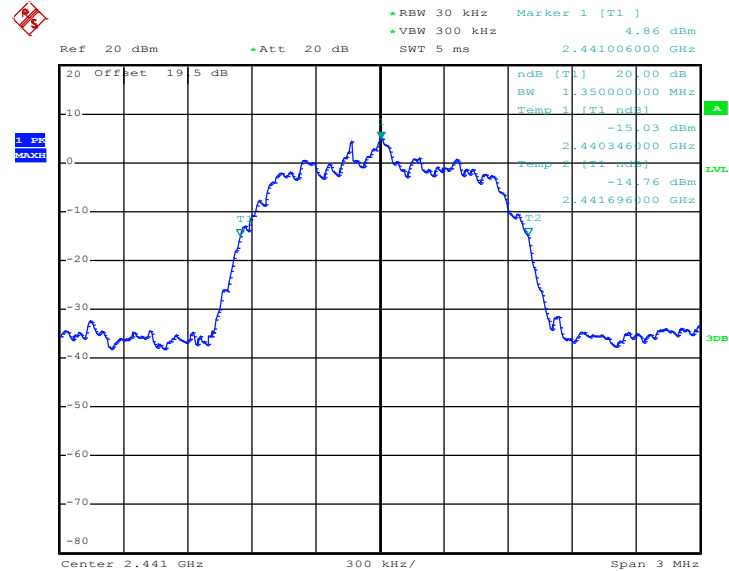
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.350
39	2441	1.350
78	2480	1.362

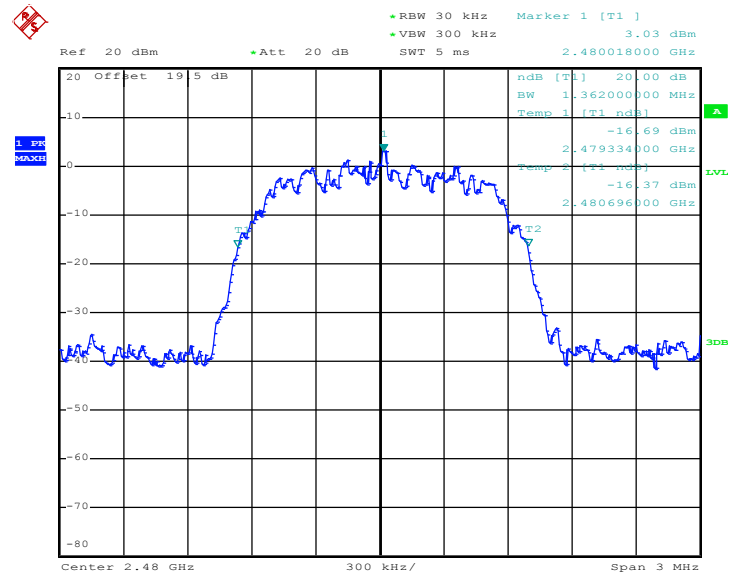
20 dB Bandwidth Plot on Channel 00



Date: 19.JAN.2012 19:23:28

20 dB Bandwidth Plot on Channel 39


Date: 19.JAN.2012 19:24:03

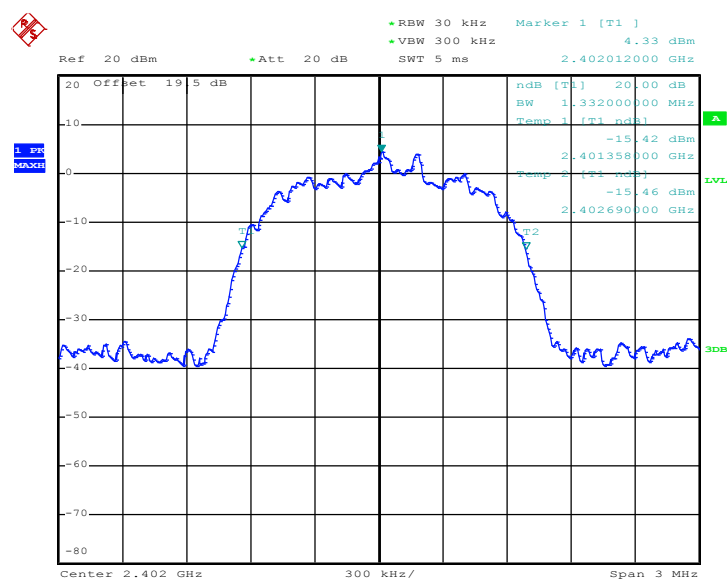
20 dB Bandwidth Plot on Channel 78


Date: 19.JAN.2012 19:24:06



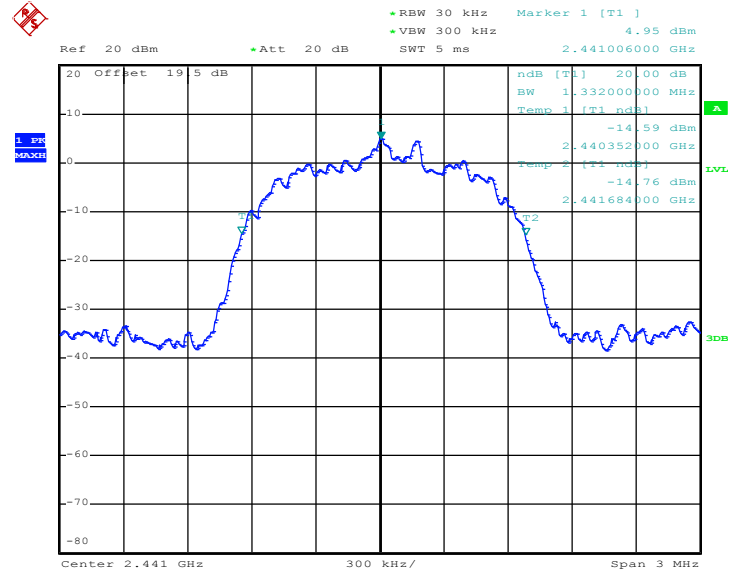
Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%

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

20 dB Bandwidth Plot on Channel 00

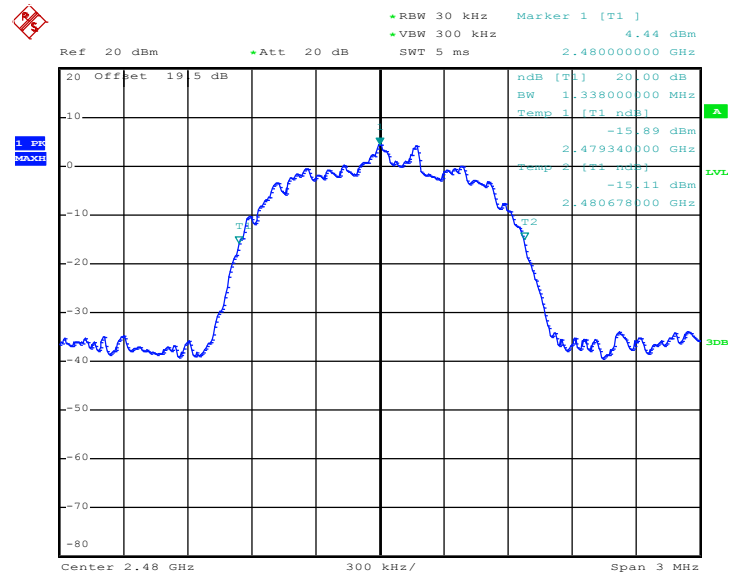
Date: 19.JAN.2012 19:24:25

20 dB Bandwidth Plot on Channel 39



Date: 19.JAN.2012 19:24:53

20 dB Bandwidth Plot on Channel 78



Date: 19.JAN.2012 19:25:24

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.

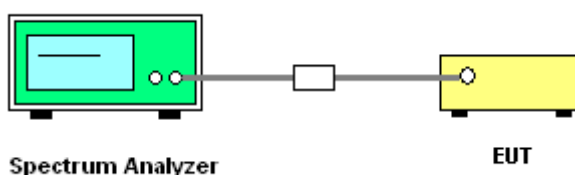
3.3.2 Measuring Instruments

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

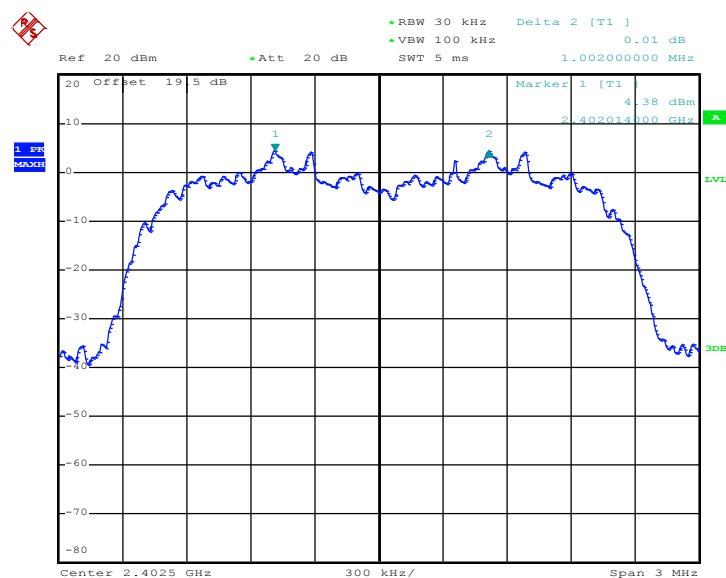


3.3.5 Test Result of Hopping Channel Separation

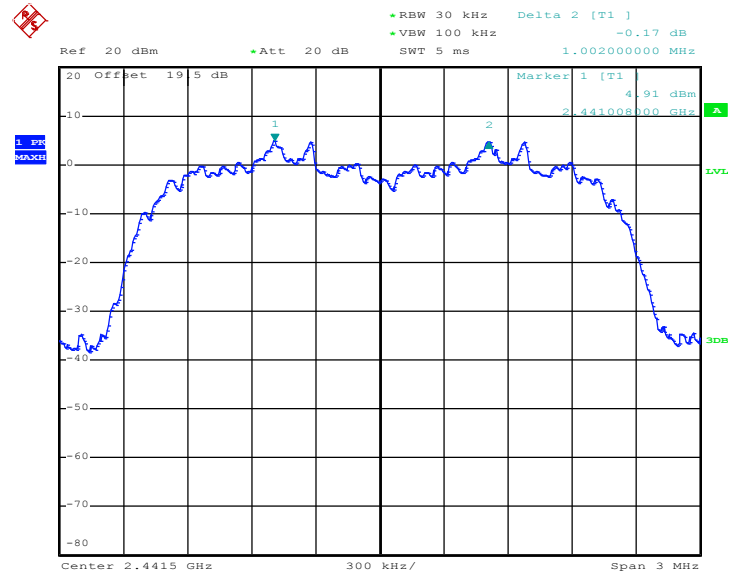
Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%

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	0.8920	Pass

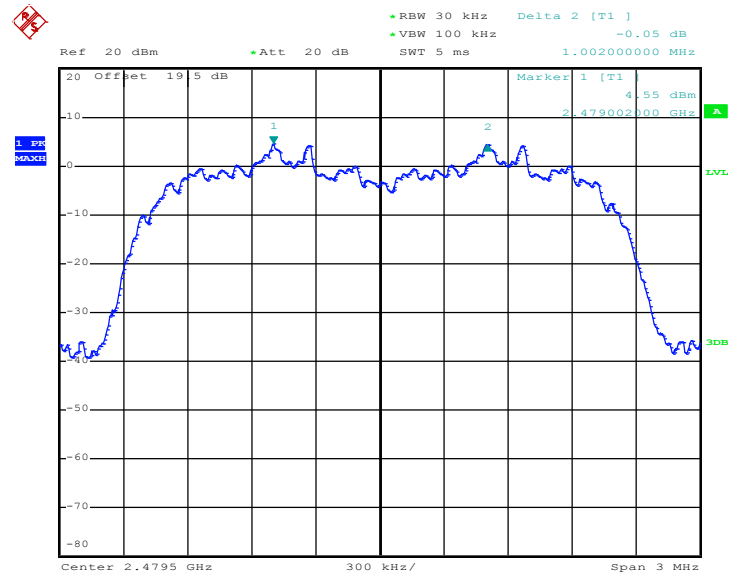
Channel Separation Plot on Channel 00 - 01



Date: 19.JAN.2012 19:15:43

Channel Separation Plot on Channel 39 - 40


Date: 19.JAN.2012 19:16:22

Channel Separation Plot on Channel 77 - 78


Date: 19.JAN.2012 19:17:01

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.

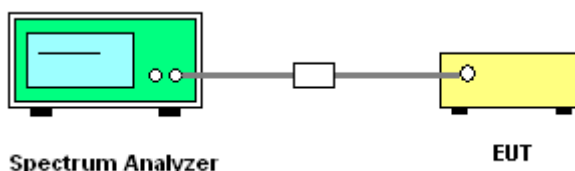
3.4.2 Measuring Instruments

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



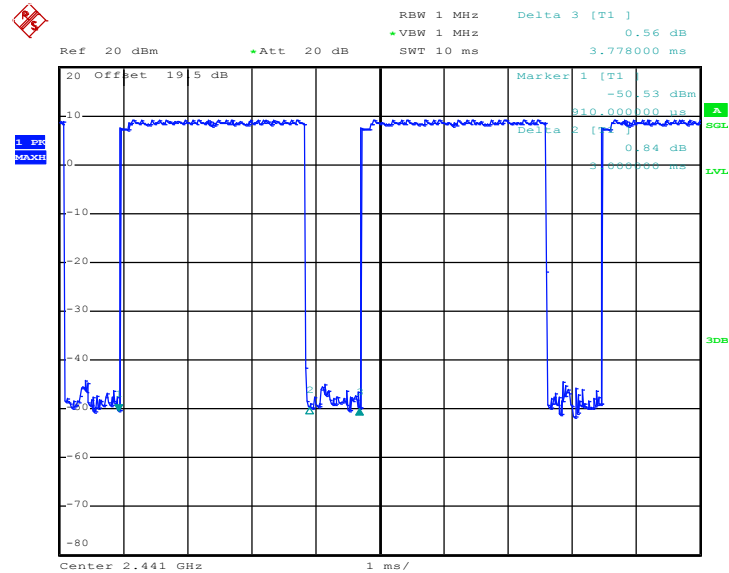
3.4.5 Test Result of Dwell Time

Test Mode :	Mode 8	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%

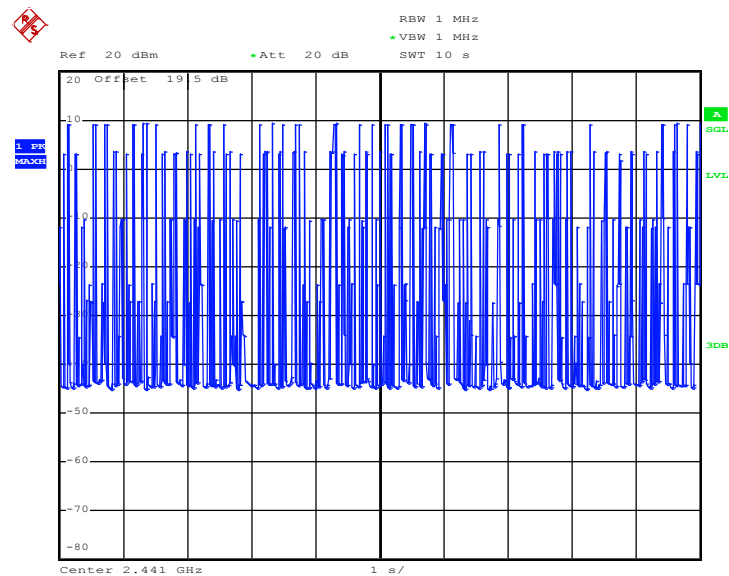
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.40	3000.00	0.32	0.4	Pass

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)

3DH5 Dwell Time (One Pulse) Plot on Channel 39


Date: 19.JAN.2012 19:02:24

3DH5 Dwell Time (Count Pulses) Plot on Channel 39


Date: 19.JAN.2012 19:32:28

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

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

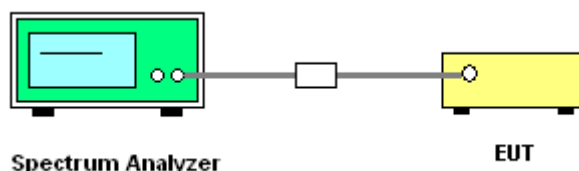
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

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

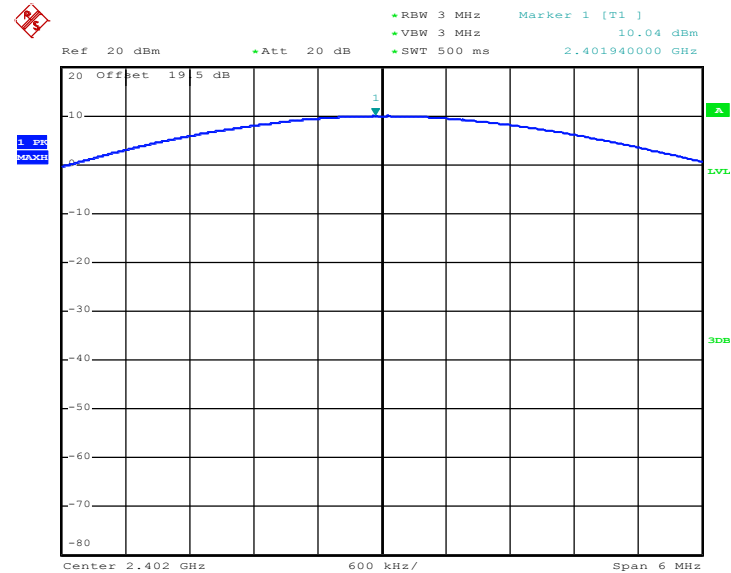
3.5.4 Test Setup



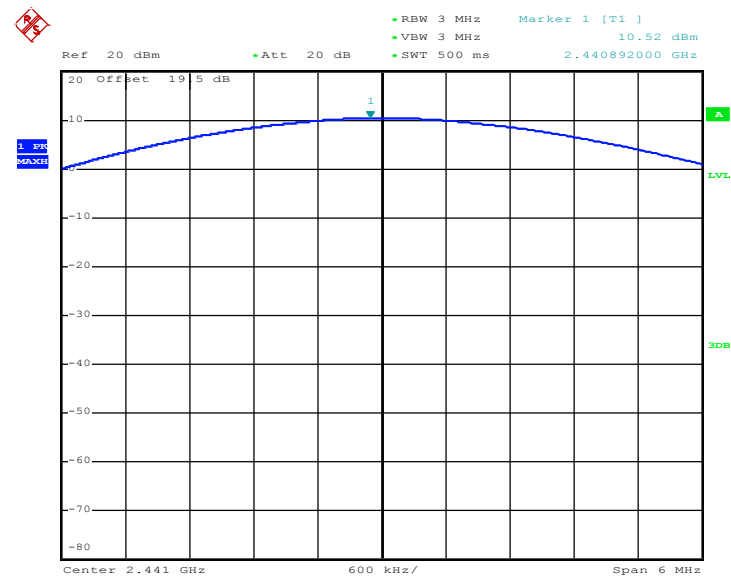
3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃	
Test Engineer :	Pinkston Tu	Relative Humidity :	55~57%	

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	10.04	20.97	Pass
39	2441	10.52	20.97	Pass
78	2480	10.03	20.97	Pass

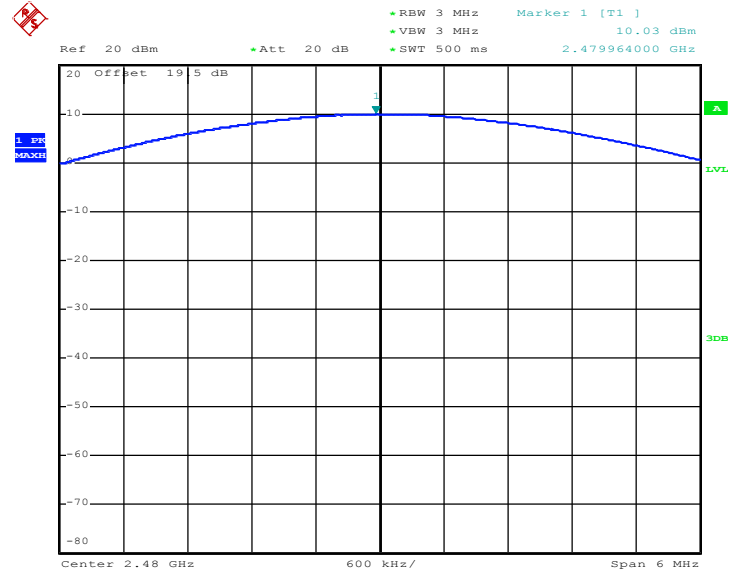
Peak Output Power Plot on Channel 00


Date: 19.JAN.2012 15:25:54

Peak Output Power Plot on Channel 39


Date: 19.JAN.2012 15:27:08

Peak Output Power Plot on Channel 78



Date: 19.JAN.2012 15:28:23

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

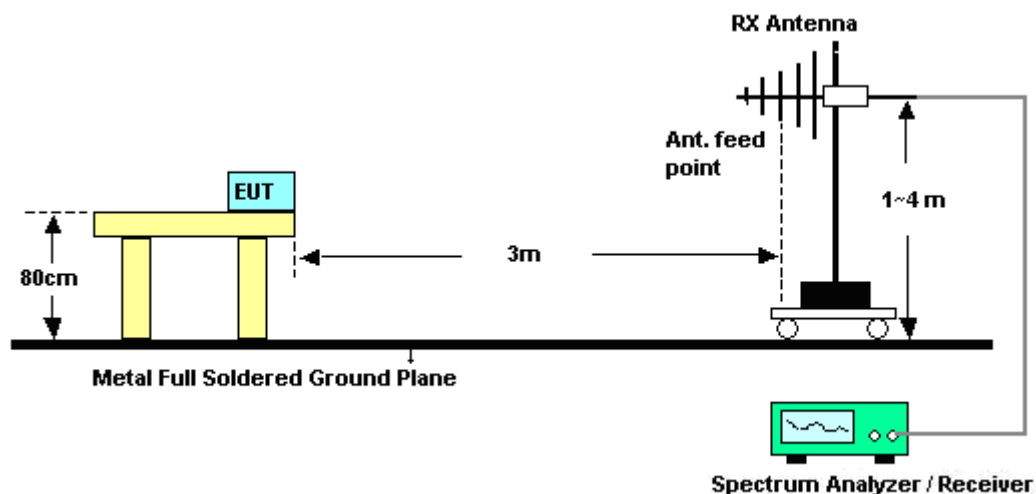
See list of measuring instruments of this test report.

3.6.3 Test Procedures

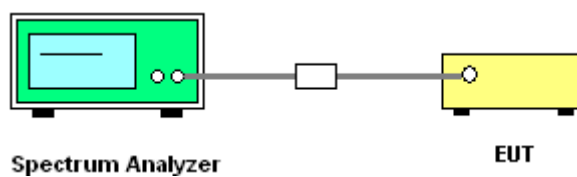
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300KHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	19~20°C
Test Channel :	00	Relative Humidity :	43~44%
		Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.33	45.41	-28.59	74	41.28	32.06	6.03	33.96	130	20	Peak
2387.33	33.2	-20.8	54	29.07	32.06	6.03	33.96	130	20	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2355.41	45.53	-28.47	74	41.51	32.01	5.95	33.94	126	58	Peak
2355.41	32.68	-21.32	54	28.66	32.01	5.95	33.94	126	58	Average

Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
		Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.52	-3.48	74	66.16	32.18	6.18	34	151	29	Peak
2483.5	27.66	-26.34	54	23.3	32.18	6.18	34	151	29	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	87.33	59.67	27.66	54	-26.34	Pass
Hopping Mode	87.33	61.96	25.37	54	-28.63	Pass

Note : Average result = Maximum field strength – Delta result

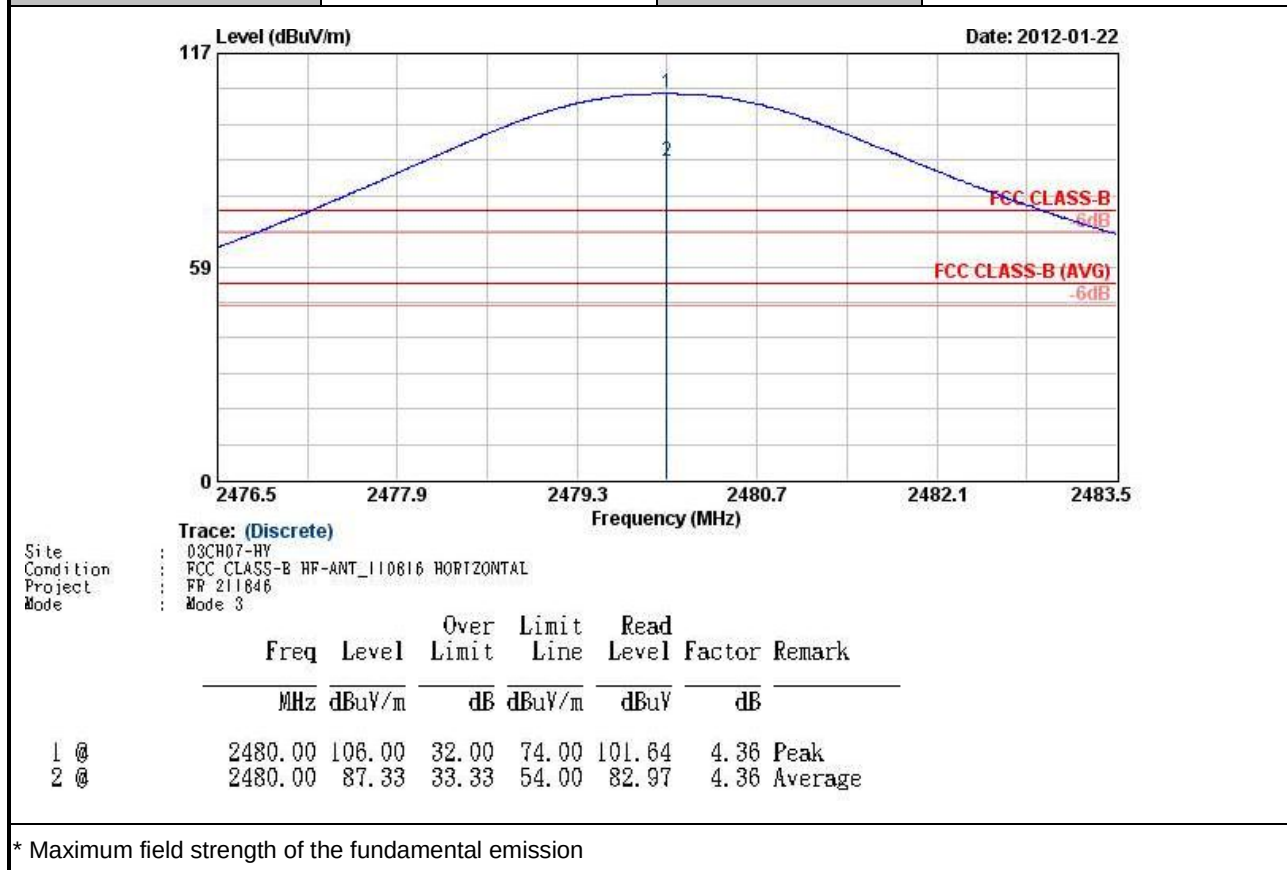
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	65.73	-8.27	74	61.37	32.18	6.18	34	101	97	Peak
2483.5	26.57	-27.43	54	22.21	32.18	6.18	34	101	97	Average

Summary results of marker-delta method:

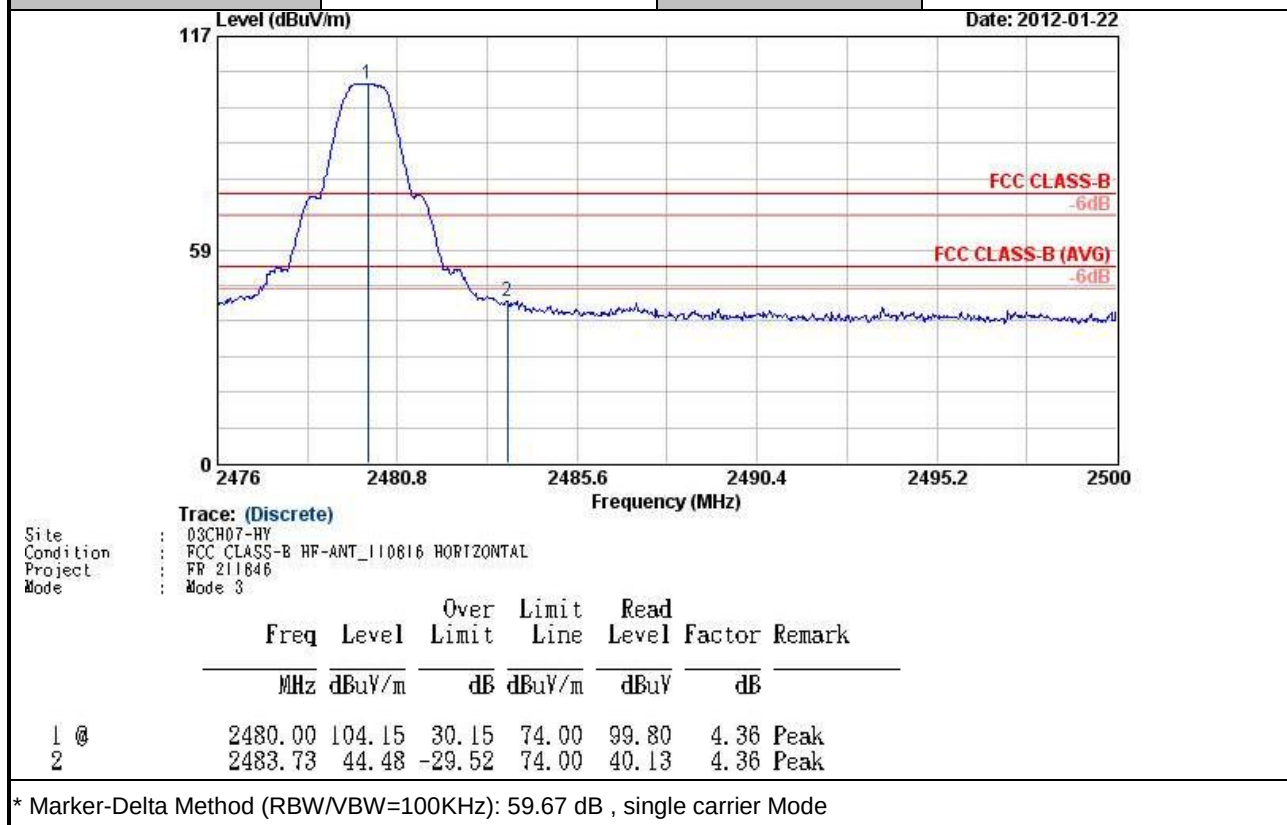
Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	83.79	57.22	26.57	54	-27.43	Pass
Hopping Mode	83.79	58.63	25.16	54	-28.84	Pass

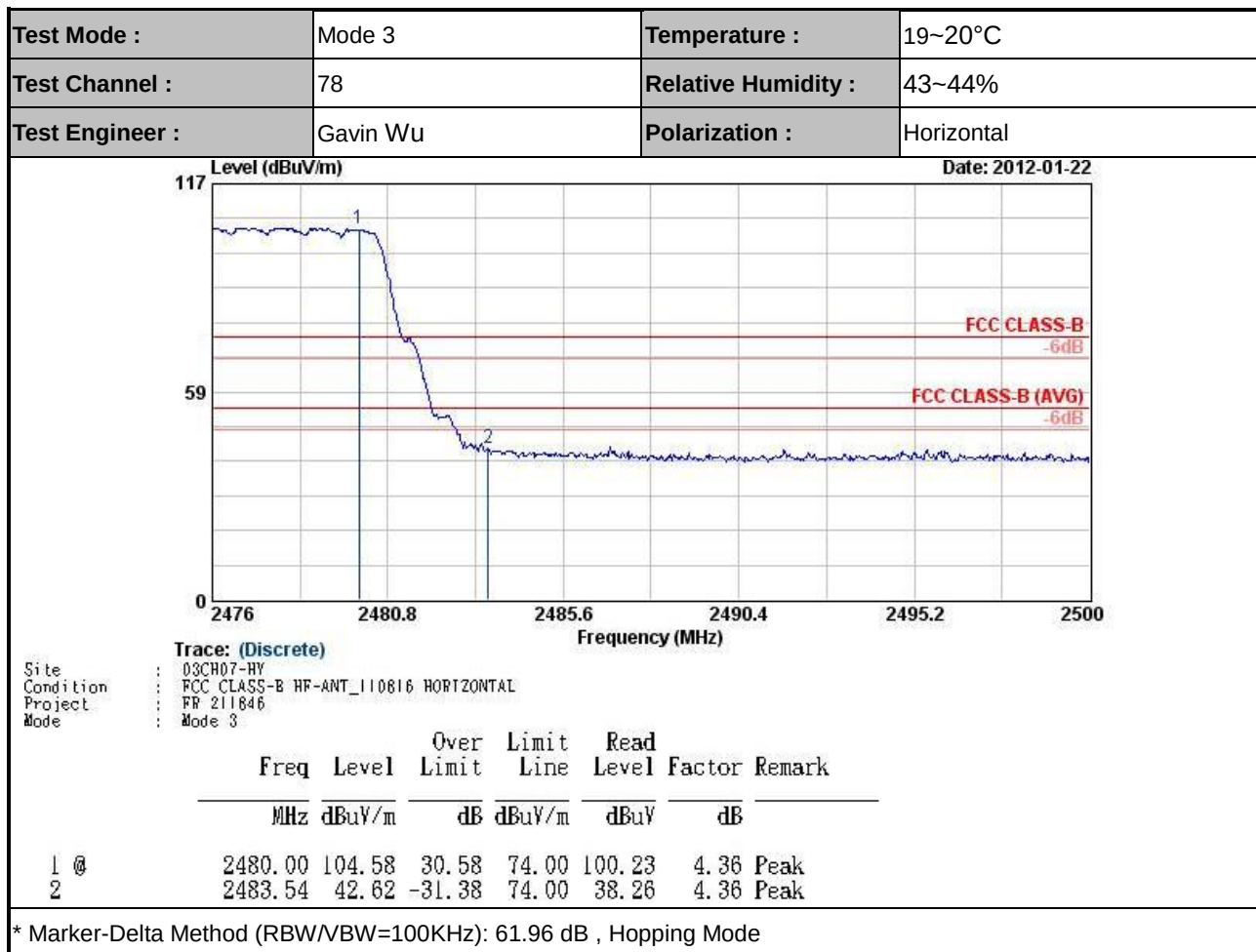
Note : Average result = Maximum field strength – Delta result

Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Horizontal

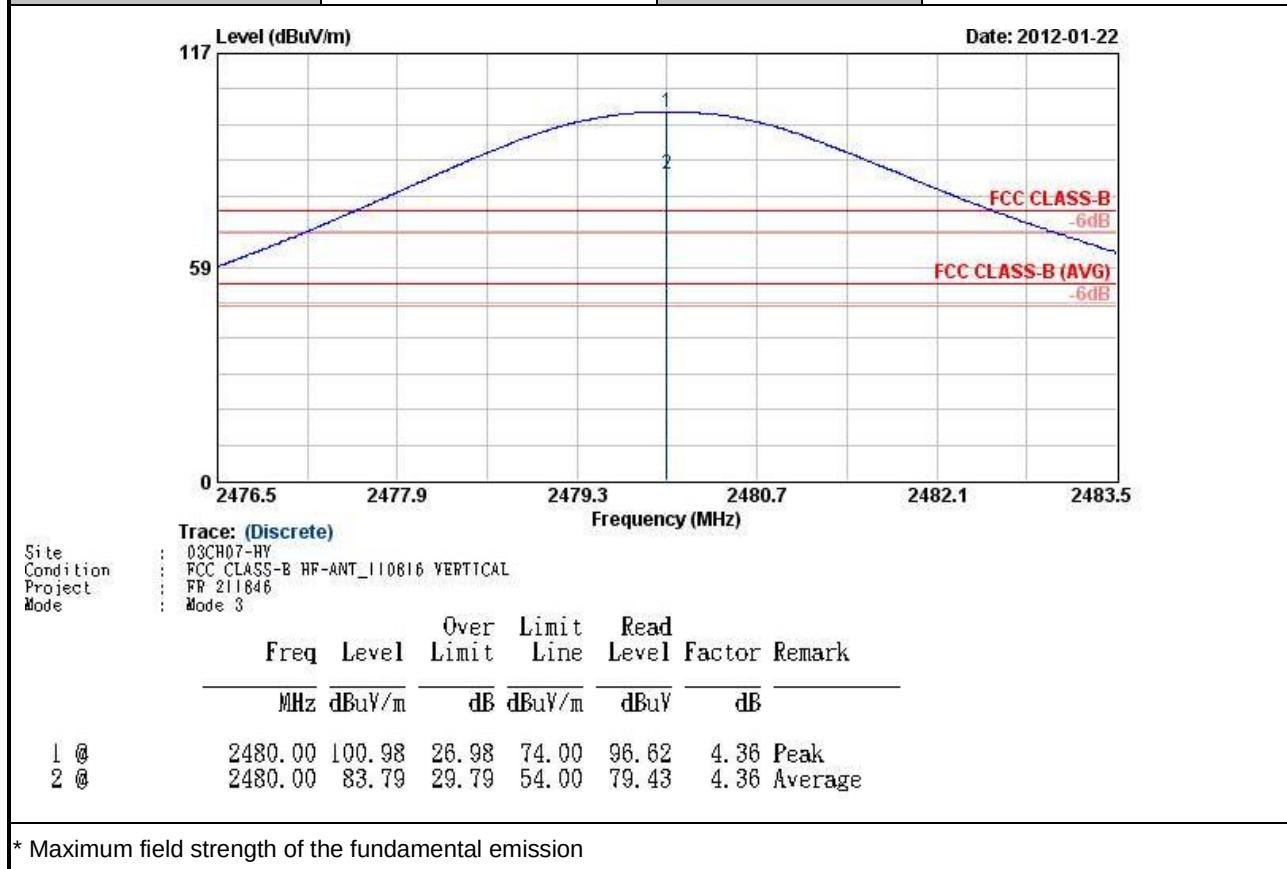


Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Horizontal

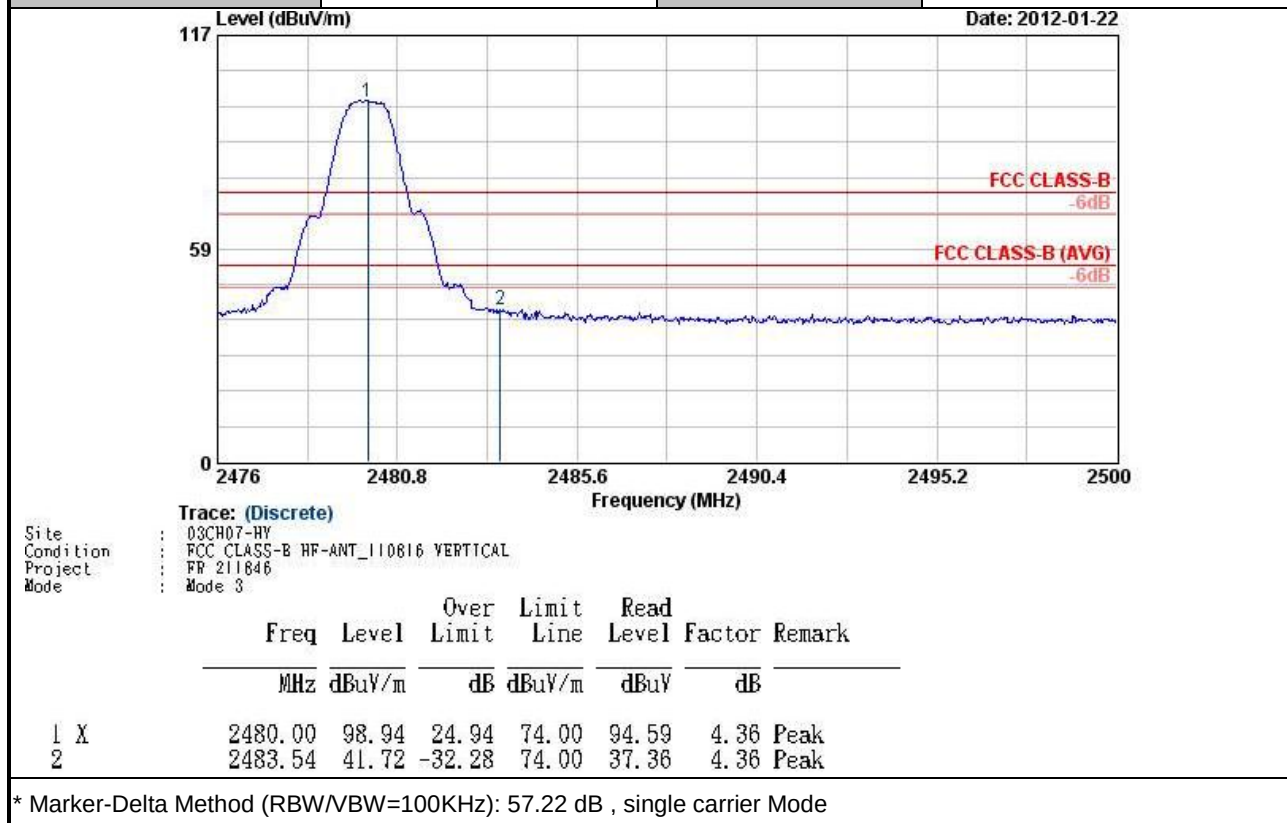


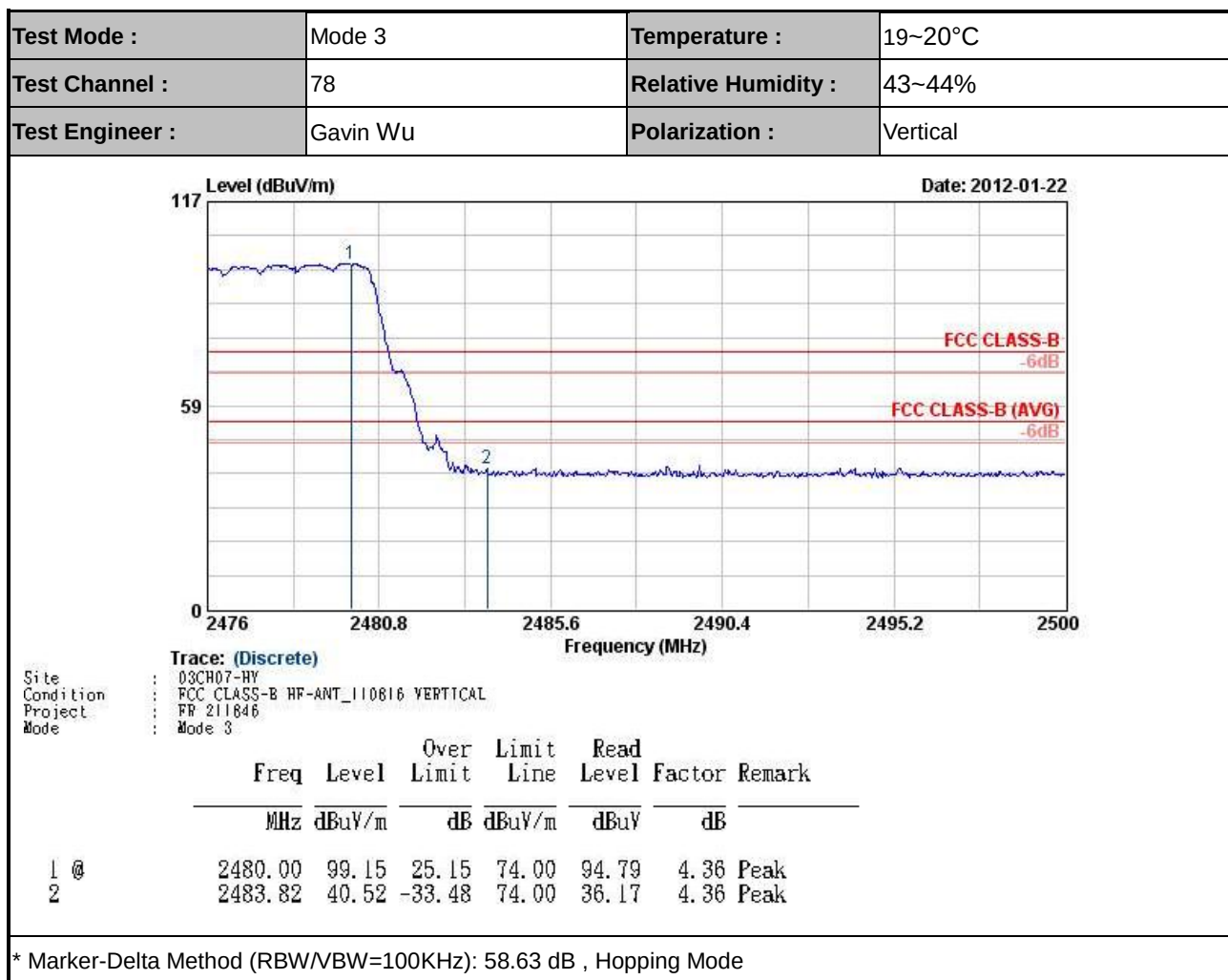


Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Vertical



Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Vertical

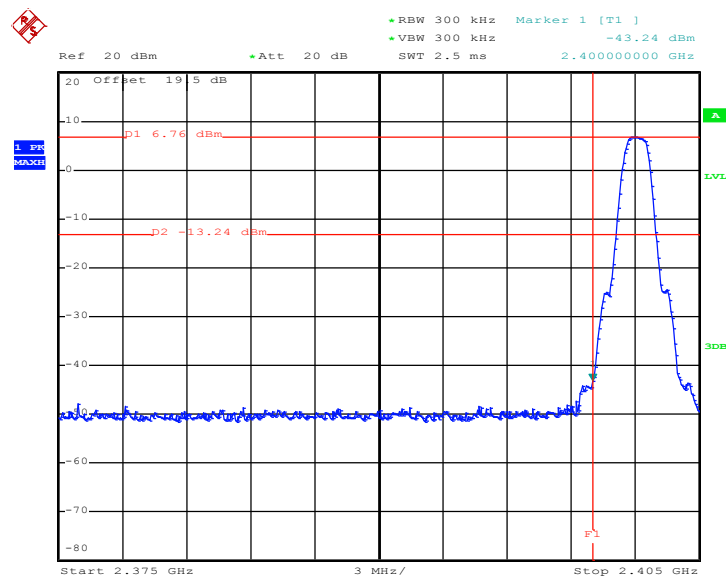




3.6.6 Test Result of Conducted Band Edges

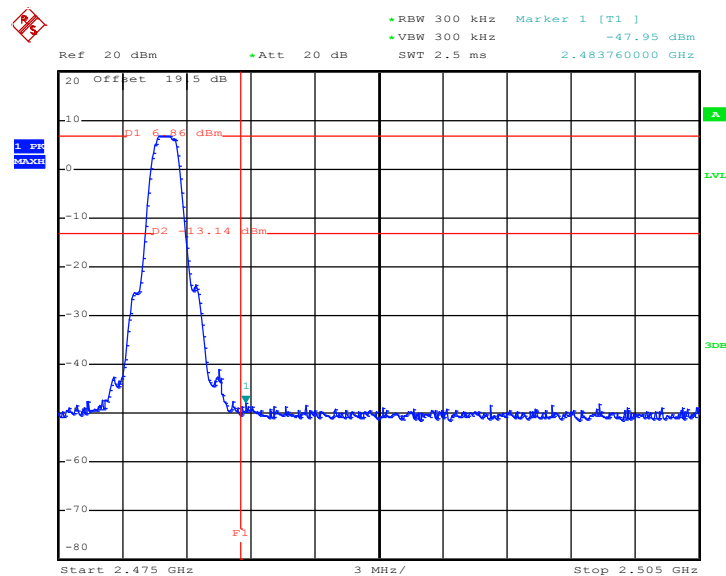
Test Mode :	Mode 7 and 9	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	55~57%
		Test Engineer :	Pinkston Tu

Low Band Edge Plot on Channel 00



Date: 19.JAN.2012 19:36:17

High Band Edge Plot on Channel 78



Date: 19.JAN.2012 19:35:48

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.

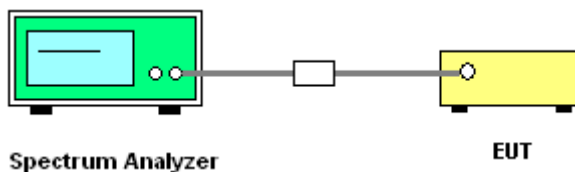
3.7.2 Measuring Instruments

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.

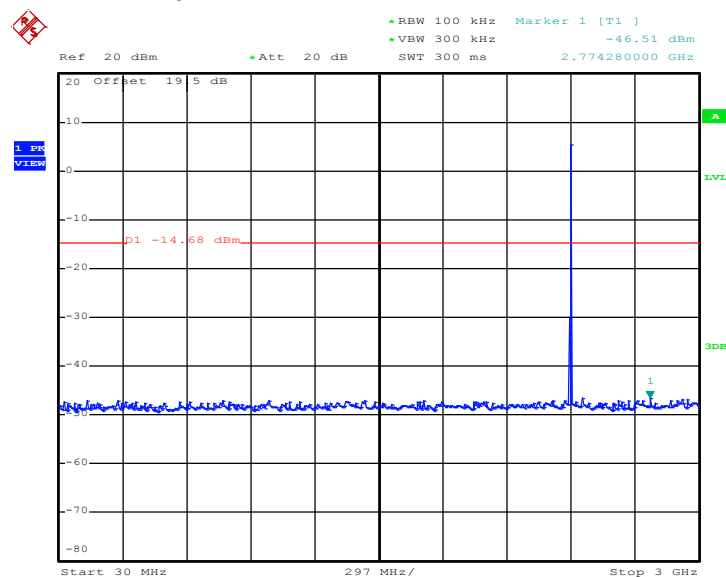
3.7.4 Test Setup



3.7.5 Test Result

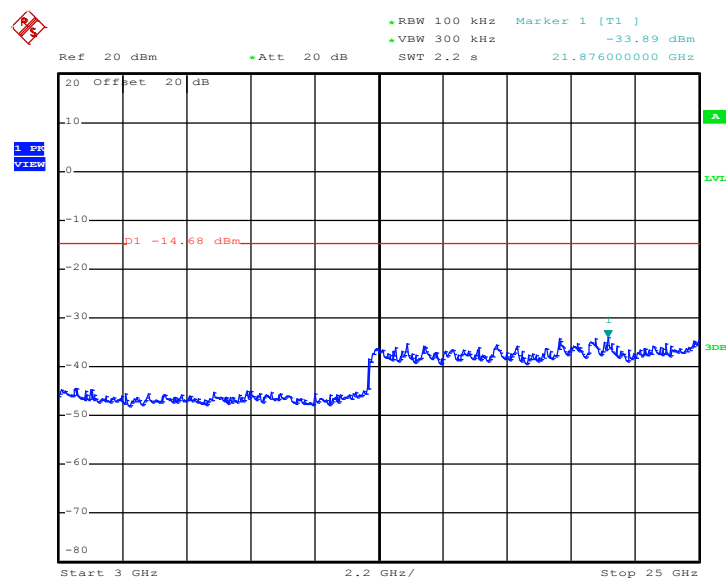
Test Mode :	Mode 7	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	55~57%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 19.JAN.2012 19:44:38

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

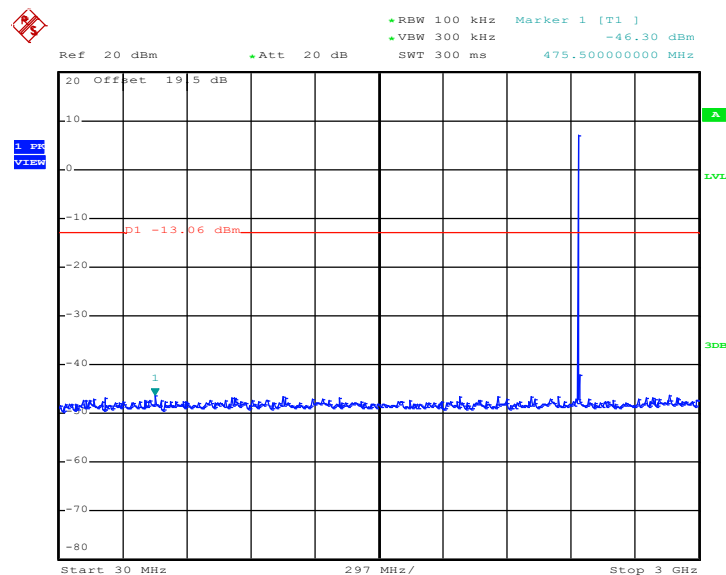


Date: 19.JAN.2012 19:44:50



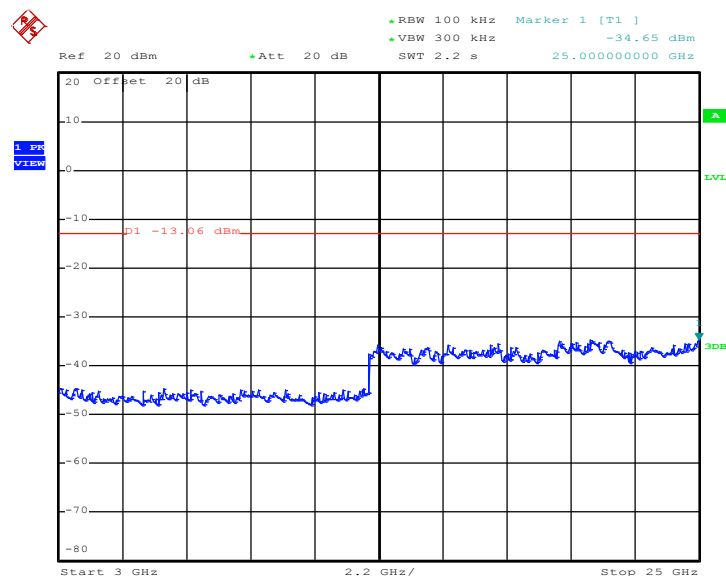
Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	55~57%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 19.JAN.2012 19:45:42

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

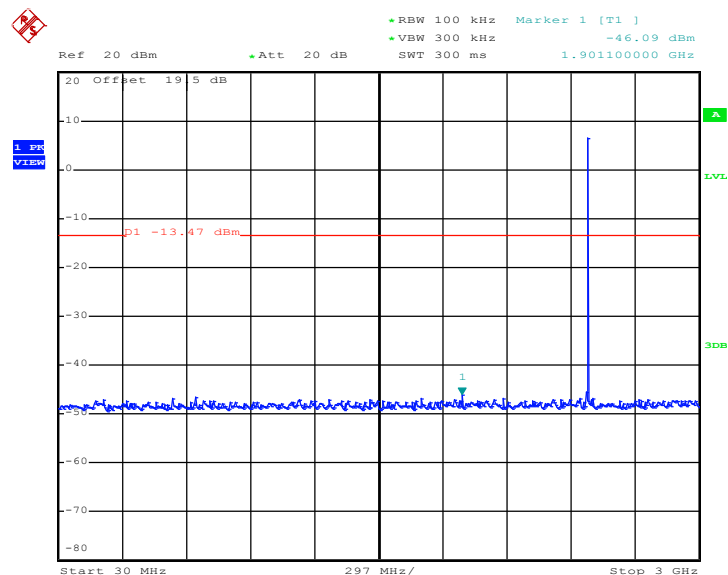


Date: 19.JAN.2012 19:45:54



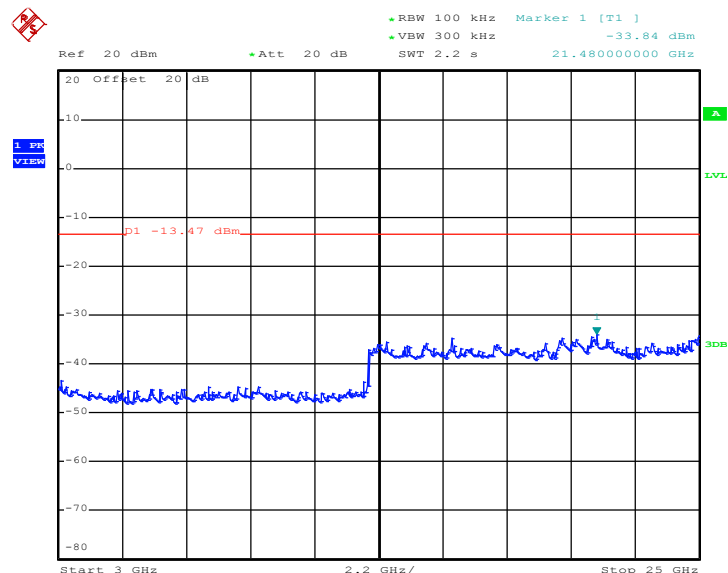
Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	55~57%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 19.JAN.2012 19:46:46

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 19.JAN.2012 19:46:58

3.8 AC Conducted Emission Measurement

3.8.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

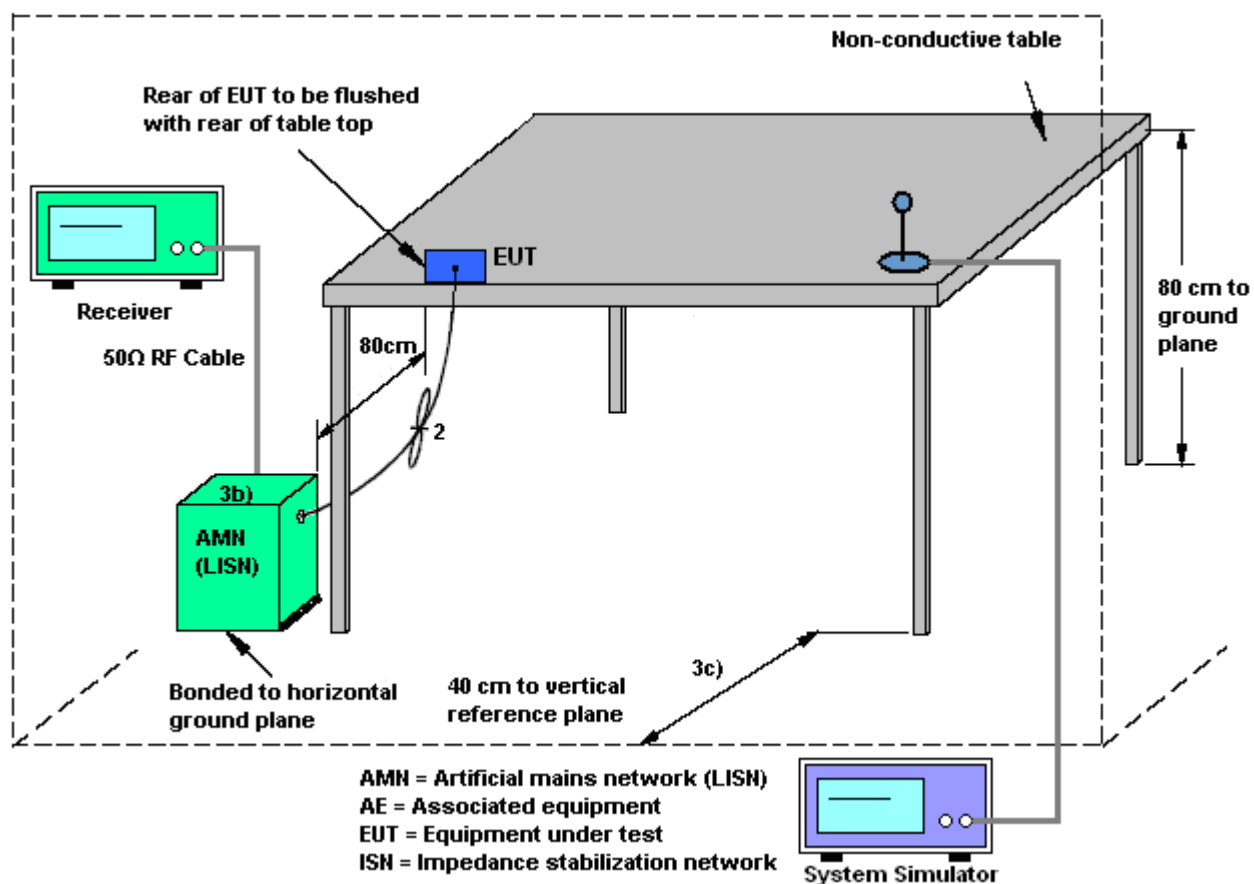
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

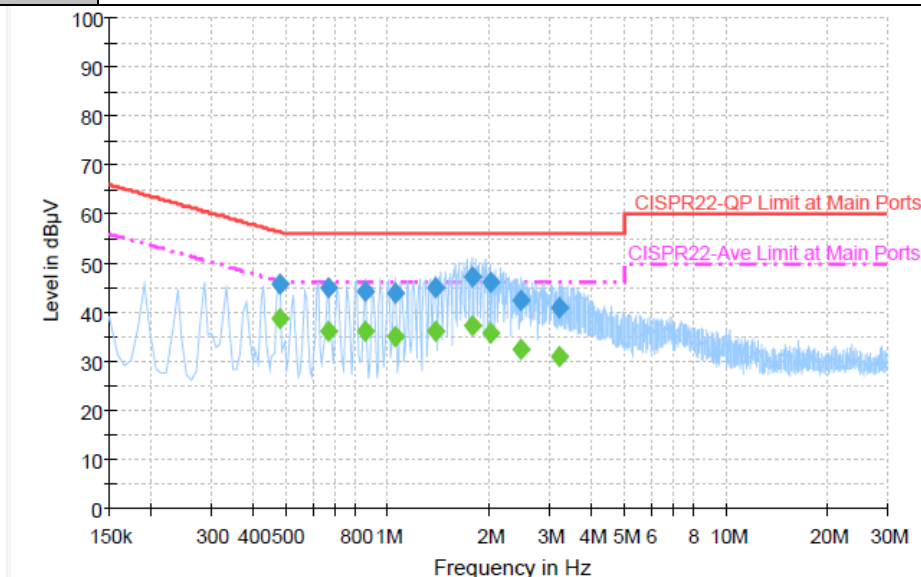
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All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

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	51~53%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + WLAN Link + Bluetooth Link + GPS Rx + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



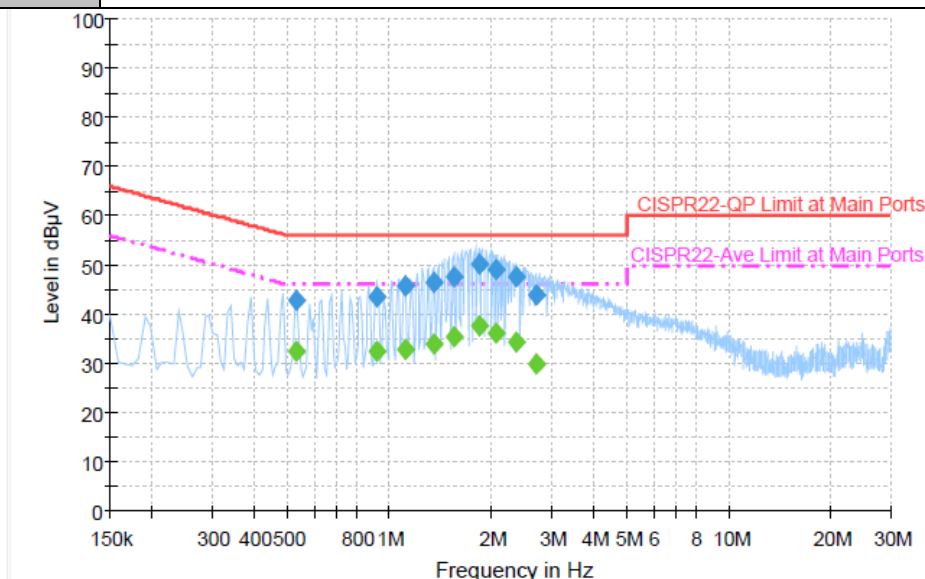
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.478000	45.7	Off	L1	19.4	10.7	56.4
0.670000	44.9	Off	L1	19.4	11.1	56.0
0.862000	44.5	Off	L1	19.5	11.5	56.0
1.054000	43.8	Off	L1	19.4	12.2	56.0
1.390000	44.9	Off	L1	19.4	11.1	56.0
1.774000	47.1	Off	L1	19.4	8.9	56.0
2.014000	46.0	Off	L1	19.4	10.0	56.0
2.486000	42.4	Off	L1	19.4	13.6	56.0
3.222000	41.1	Off	L1	19.5	14.9	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.478000	38.9	Off	L1	19.4	7.5	46.4
0.670000	36.2	Off	L1	19.4	9.8	46.0
0.862000	36.0	Off	L1	19.5	10.0	46.0
1.054000	35.0	Off	L1	19.4	11.0	46.0
1.390000	36.2	Off	L1	19.4	9.8	46.0
1.774000	37.3	Off	L1	19.4	8.7	46.0
2.014000	35.7	Off	L1	19.4	10.3	46.0
2.486000	32.5	Off	L1	19.4	13.5	46.0
3.222000	31.0	Off	L1	19.5	15.0	46.0

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	51~53%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + WLAN Link + Bluetooth Link + GPS Rx + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.534000	42.9	Off	N	19.3	13.1	56.0
0.918000	43.6	Off	N	19.4	12.4	56.0
1.118000	45.7	Off	N	19.4	10.3	56.0
1.350000	46.4	Off	N	19.5	9.6	56.0
1.542000	47.7	Off	N	19.4	8.3	56.0
1.838000	50.2	Off	N	19.5	5.8	56.0
2.070000	49.2	Off	N	19.5	6.8	56.0
2.374000	47.5	Off	N	19.6	8.5	56.0
2.710000	44.0	Off	N	19.5	12.0	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.534000	32.3	Off	N	19.3	13.7	46.0
0.918000	32.6	Off	N	19.4	13.4	46.0
1.118000	33.0	Off	N	19.4	13.0	46.0
1.350000	34.1	Off	N	19.5	11.9	46.0
1.542000	35.5	Off	N	19.4	10.5	46.0
1.838000	37.8	Off	N	19.5	8.2	46.0
2.070000	36.0	Off	N	19.5	10.0	46.0
2.374000	34.4	Off	N	19.6	11.6	46.0
2.710000	30.0	Off	N	19.5	16.0	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

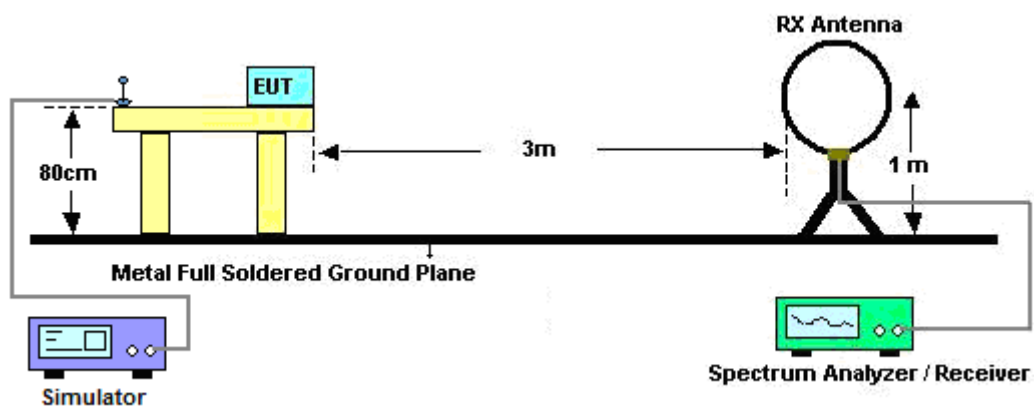
See list of measuring instruments of this test report.

3.9.3 Test Procedures

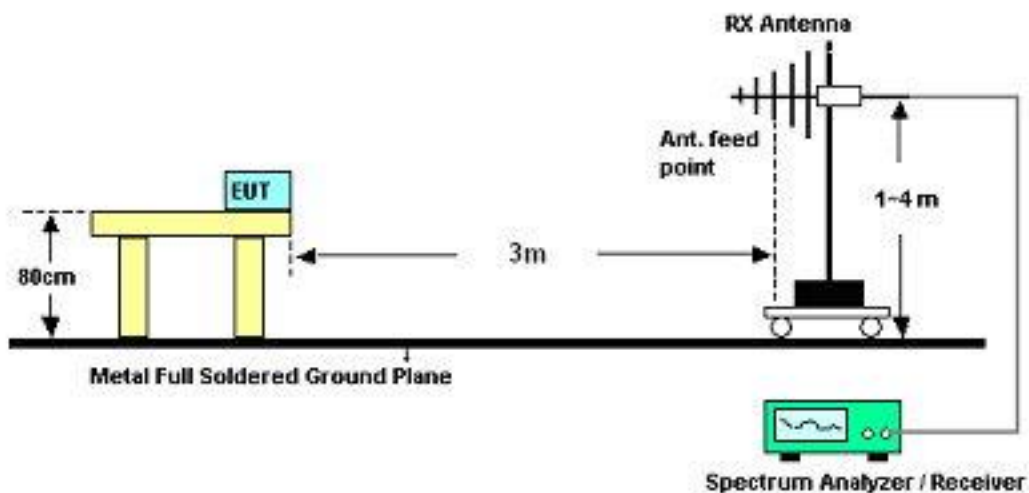
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector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

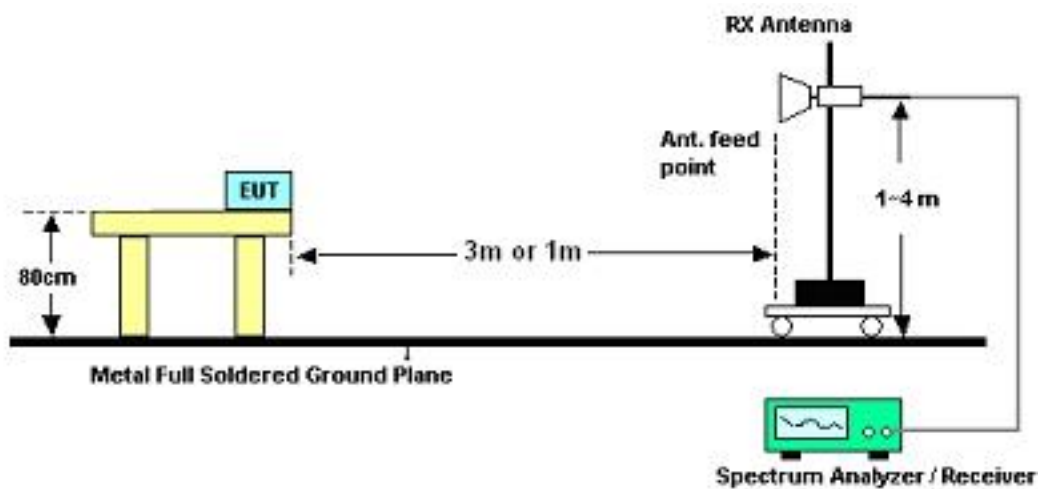
For radiated emissions below 30MHz



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 :	Gavin Wu	Temperature :	19~20°C
		Relative Humidity :	43~44%

Frequency	Measurement Distance	Field Strength	Antenna Factor	Distance Factor	Limit Distance	Field Strength at Limit Distance (30m)	Limit (30m)
(MHz)	(m)	(dBμV/m)	(dB/m)	(dB/decade)	(m)	(dBμV/m)	(dBμV/m)
0.03277	3	-1.70	20.10	40	30	-41.70	29.54
19.20	3	10.78	19.70	40	30	-29.22	29.54
26.0000	3	9.91	20.50	40	30	-30.09	29.54

Note:

- In accordance with 15.33 (a): For each frequency at which a measurement is made at only one distance, the square of an inverse linear distance extrapolation factor (40 dB/decade) is applied.
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.
- The field strength measured is direct conversion of all parameters (antenna factor and distance extrapolation factor) and loaded into the spectrum.
- For example 1:
Field Strength at 3m=10 (dBuV/m)
Field Strength at 30m=10- $40 \log (30\text{m}/3\text{m})$ =-30 (dBuV/m)
For example 2:
Field Strength at 10m=10 (dBuV/m)
Field Strength at 30m=10- $40 \log (30\text{m}/10\text{m})$ =-9.08 (dBuV/m)

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

Test Mode :	Mode 1	Temperature :	19~20°C
Test Channel :	00	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2402 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
51.33	22.82	-17.18	40	45.75	7.9	0.71	31.54	100	88	Peak
132.33	12.18	-31.32	43.5	31.03	11.56	1.16	31.57	-	-	Peak
299.46	12.86	-33.14	46	29.12	13.3	1.77	31.33	-	-	Peak
620.6	22.17	-23.83	46	30.36	19.96	2.75	30.9	-	-	Peak
833.4	25.22	-20.78	46	30.27	22.43	3.23	30.71	-	-	Peak
973.4	26.34	-27.66	54	29.22	24.21	3.48	30.57	-	-	Peak
2387.33	45.41	-28.59	74	41.28	32.06	6.03	33.96	130	20	Peak
2387.33	33.2	-20.8	54	29.07	32.06	6.03	33.96	130	20	Average
2402	104.44	-	-	100.29	32.08	6.03	33.96	130	20	Peak
2402	86.16	-	-	82.03	32.06	6.03	33.96	130	20	Average
2500	32.35	-21.65	54	27.97	32.2	6.18	34	130	20	Average
2500	45.73	-28.27	74	41.35	32.2	6.18	34	130	20	Peak

Test Mode :	Mode 1	Temperature :	19~20°C
Test Channel :	00	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2402 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	26.06	-13.94	40	37.7	19.28	0.54	31.46	100	36	Peak
91.02	24.63	-18.87	43.5	46.48	8.72	0.95	31.52	-	-	Peak
216.57	16.98	-29.02	46	36.8	10.24	1.4	31.46	-	-	Peak
526.1	19.9	-26.1	46	29.89	18.53	2.5	31.02	-	-	Peak
825	24.23	-21.77	46	29.37	22.35	3.21	30.7	-	-	Peak
993	27.04	-26.96	54	29.62	24.5	3.5	30.58	-	-	Peak
2355.41	45.53	-28.47	74	41.51	32.01	5.95	33.94	126	58	Peak
2355.41	32.68	-21.32	54	28.66	32.01	5.95	33.94	126	58	Average
2402	99.28	-	-	95.13	32.08	6.03	33.96	126	58	Peak
2402	81.79	-	-	77.66	32.06	6.03	33.96	126	58	Average
2484	32.34	-21.66	54	27.98	32.18	6.18	34	126	58	Average
2484	44.14	-29.86	74	39.78	32.18	6.18	34	126	58	Peak

Test Mode :	Mode 2	Temperature :	19~20°C
Test Channel :	39	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2441 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
54.57	23.3	-16.7	40	46.83	7.3	0.72	31.55	100	41	Peak
216.57	20.52	-25.48	46	40.34	10.24	1.4	31.46	-	-	Peak
274.62	20.88	-25.12	46	37.66	12.94	1.64	31.36	-	-	Peak
519.8	19.41	-26.59	46	29.52	18.43	2.49	31.03	-	-	Peak
855.8	23.91	-22.09	46	28.71	22.65	3.28	30.73	-	-	Peak
998.6	25.67	-28.33	54	28.15	24.59	3.51	30.58	-	-	Peak
2342	44.16	-29.84	74	40.17	31.98	5.95	33.94	124	22	Peak
2342	33.05	-20.95	54	29.06	31.98	5.95	33.94	124	22	Average
2441	106.14	-	-	101.88	32.13	6.11	33.98	124	22	Peak
2441	87.37	-	-	83.11	32.13	6.11	33.98	124	22	Average
2486	44.41	-29.59	74	40.05	32.18	6.18	34	124	22	Peak
2486	33.06	-20.94	54	28.7	32.18	6.18	34	124	22	Average

Test Mode :	Mode 2	Temperature :	19~20°C
Test Channel :	39	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2441 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	29.55	-10.45	40	40.48	20	0.53	31.46	100	62	Peak
91.02	25.67	-17.83	43.5	47.52	8.72	0.95	31.52	-	-	Peak
282.18	25.27	-20.73	46	41.91	13.05	1.65	31.34	-	-	Peak
302.8	21.69	-24.31	46	37.86	13.38	1.78	31.33	-	-	Peak
746.6	21.76	-24.24	46	28.12	21.3	3.05	30.71	-	-	Peak
990.2	25.56	-28.44	54	28.19	24.45	3.5	30.58	-	-	Peak
2358	44.14	-29.86	74	40.09	32.01	5.99	33.95	102	93	Peak
2358	32.85	-21.15	54	28.8	32.01	5.99	33.95	102	93	Average
2441	101.22	-	-	96.96	32.13	6.11	33.98	102	93	Peak
2441	83.57	-	-	79.31	32.13	6.11	33.98	102	93	Average
2494	45.17	-28.83	74	40.79	32.2	6.18	34	102	93	Peak
2494	32.22	-21.78	54	27.84	32.2	6.18	34	102	93	Average

Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
54.57	25.07	-14.93	40	48.6	7.3	0.72	31.55	100	27	Peak
212.25	17.62	-25.88	43.5	37.74	9.98	1.37	31.47	-	-	Peak
230.34	26.31	-19.69	46	45.01	11.25	1.49	31.44	-	-	Peak
635.3	20.85	-25.15	46	28.86	20.08	2.8	30.89	-	-	Peak
825	24.02	-21.98	46	29.16	22.35	3.21	30.7	-	-	Peak
954.5	25.45	-20.55	46	28.64	23.92	3.46	30.57	-	-	Peak
2340	44.52	-29.48	74	40.53	31.98	5.95	33.94	151	29	Peak
2340	32.75	-21.25	54	28.76	31.98	5.95	33.94	151	29	Average
2480	106.07	-	-	101.71	32.18	6.18	34	151	29	Peak
2480	87.33	-	-	82.97	32.18	6.18	34	151	29	Average
2483.5	70.52	-3.48	74	66.16	32.18	6.18	34	151	29	Peak
2483.5	27.66	-26.34	54	23.3	32.18	6.18	34	151	29	Average
4960	42.85	-31.15	74	58.5	34.1	9.16	58.91	100	0	Peak

Test Mode :	Mode 3	Temperature :	19~20°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	30.9	-9.1	40	41.83	20	0.53	31.46	100	22	Peak
91.02	25.3	-18.2	43.5	47.15	8.72	0.95	31.52	-	-	Peak
228.45	30.91	-15.09	46	49.76	11.12	1.47	31.44	-	-	Peak
301.4	22.68	-23.32	46	38.89	13.35	1.77	31.33	-	-	Peak
808.9	23.58	-22.42	46	28.92	22.19	3.16	30.69	-	-	Peak
998.6	25.94	-28.06	54	28.42	24.59	3.51	30.58	-	-	Peak
2324	45.03	-28.97	74	41.08	31.96	5.92	33.93	101	97	Peak
2324	32.72	-21.28	54	28.77	31.96	5.92	33.93	101	97	Average
2480	101.13	-	-	96.77	32.18	6.18	34	101	97	Peak
2480	83.79	-	-	79.43	32.18	6.18	34	101	97	Average
2483.5	65.73	-8.27	74	61.37	32.18	6.18	34	101	97	Peak
2483.5	26.57	-27.43	54	22.21	32.18	6.18	34	101	97	Average
4960	44.81	-29.19	74	60.46	34.1	9.16	58.91	100	0	Peak

3.10 Antenna Requirements

3.10.1 Standard Applicable

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

3.10.2 Antenna Connected Construction

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

3.10.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jan. 19, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Jan. 19, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Jan. 19, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Jan. 19, 2012	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Jan. 19, 2012	Feb. 17, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Jan. 20, 2012	Aug. 21, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz~30MHz	Dec. 09, 2011	Jan. 20, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz~30MHz	Dec. 06, 2011	Jan. 20, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Jan. 20, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	112403	N/A	Feb. 22, 2011	Jan. 20, 2012	Feb. 21, 2012	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	Jan. 20, 2012	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	Jan. 22, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Jan. 22, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Jan. 22, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 05, 2011	Jan. 22, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB.GAIN	Mar. 29, 2011	Jan. 22, 2012	Mar. 28, 2012	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Jan. 22, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-00101800-30-10P	159088	1GHz ~ 18GHz	Feb. 21, 2011	Jan. 22, 2012	Feb. 20, 2012	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	Jun. 01, 2011	Jan. 22, 2012	May 31, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jan. 22, 2012	Jul. 28, 2012	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				