

FCC RF Test Report

APPLICANT : Motorola Mobility Inc
EQUIPMENT : Quad-Band GSM/GPRS/EDGE
(downlink only) and Dual-Band
WCDMA Mobile Phone
BRAND NAME : Motorola
MODEL NAME : WX306
TYPE NAME : M0C40
FCC ID : IHDT56MZ2
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Jul. 07, 2011 and completely tested on Aug. 24, 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR180510	Rev. 01	Initial issue of report	Sep. 01, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	Number of Channels	$\geq 15\text{Chs}$	Pass	-
3.2	15.247(a)(1)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	Channel Separation	$\geq 2/3$ of 20dB BW	Pass	-
3.4	15.247(a)(1)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.5	15.247(b)(1)	Peak Output Power	$\leq 125\text{ mW}$	Pass	-
3.6	15.247(d)	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
0	15.247(d)	Spurious Emission	$< 20\text{ dBc}$	Pass	-
0	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 17.11 dB at 0.18 MHz
3.9	15.247(d)	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.65 dB at 38.91 MHz
3.10	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Motorola Mobility Inc

No.1 Wang Jing East Road, Chao Yang District, 100102 Beijing, P. R. China

1.2 Manufacturer

Gongqingcheng Cellon Communication Technology Co., LTD

New industrial park, GongQingCheng, Jiujiang city, Jiangxi Province, China. Postal code: 332020

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Quad-Band GSM/GPRS/EDGE (downlink only) and Dual-Band WCDMA Mobile Phone
Brand Name	Motorola
Model Name	WX306
Type Name	M0C40
FCC ID	IHDT56MZ2
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) : 8.99 dBm (0.0079 W) Bluetooth EDR (2Mbps) : 8.07 dBm (0.0064 W) Bluetooth EDR (3Mbps) : 8.30 dBm (0.0068 W)
Antenna Type	PIFA Antenna with gain 2 dBi
HW Version	P2b
SW Version	BUNTNG3_U_0A.0C.3RDS
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit

Remark:

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

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		
	TH01-KS	CO01-KS	03CH01-KS

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

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 (Certification), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	R&S	CBT	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

Preliminary tests were performed in different data rate and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Output Power					
		Data Rate / Modulation					
		GFSK		π /4-DQPSK		8-DPSK	
		1Mbps		2Mbps		3Mbps	
Ch00	2402MHz	8.99	dBm	8.07	dBm	8.3	dBm
Ch39	2441MHz	8.54	dBm	7.65	dBm	7.84	dBm
Ch78	2480MHz	8.33	dBm	7.43	dBm	7.6	dBm

Remark:

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

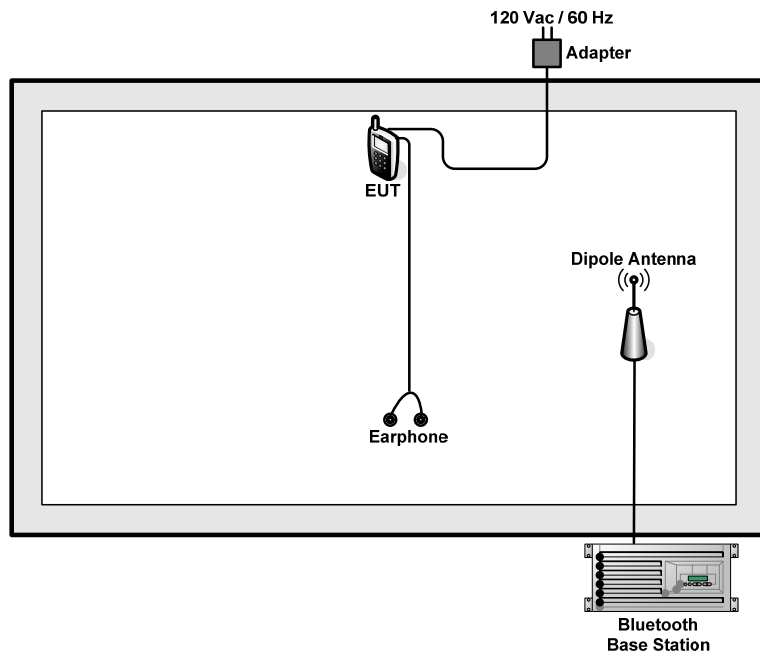
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

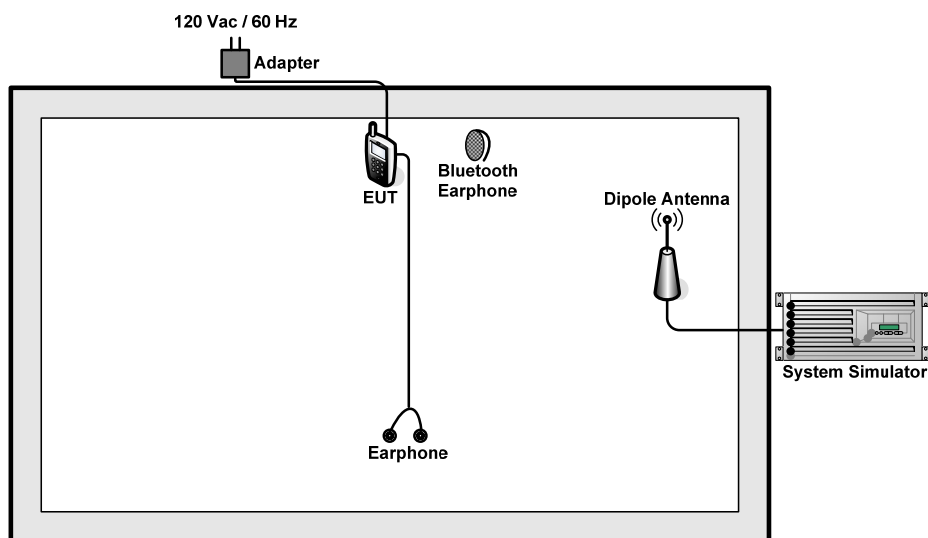
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402MHz Mode 2: CH39_2441MHz Mode 3: CH78_2480MHz	Mode 4: CH00_2402MHz Mode 5: CH39_2441MHz Mode 6: CH78_2480MHz	Mode 7: CH00_2402MHz Mode 8: CH39_2441MHz Mode 9: CH78_2480MHz
Radiated TCs	Mode 1: CH00_2402MHz for Adapter 1 Mode 2: CH39_2441MHz for Adapter 1 Mode 3: CH78_2480MHz for Adapter 1 Mode 4: CH00_2402MHz for Adapter 2 Mode 5: CH39_2441MHz for Adapter 2 Mode 6: CH78_2480MHz for Adapter 2	N/A	N/A
AC Conducted Emission	Mode 1 : GSM 850 Idle + Bluetooth Idle + Adapter 1 + Earphone + Camera Mode 2 : GSM 850 Idle + Bluetooth Idle + Adapter 2 + Earphone + Camera		
Remark:			
1. For radiated TCs, the data rate was set in 1Mbps due to the highest RF output power; only the data of these modes was reported.			
2. For conducted emission, the worst case is mode 2; 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, the RF utility, “* #3646633 #” was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

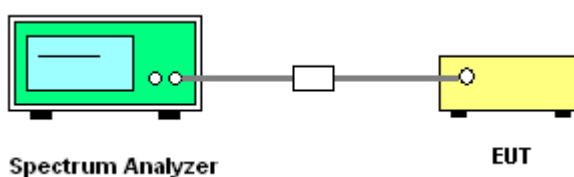
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation; RBW $\geq$ 1% of the span; VBW $\geq$ RBW; Sweep = auto;
Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

3.1.4 Test Setup

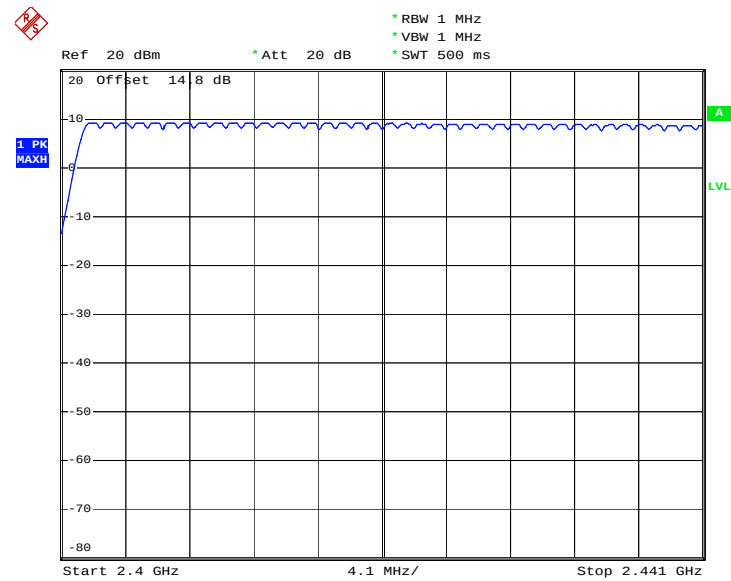


3.1.5 Test Result of Number of Hopping Frequency

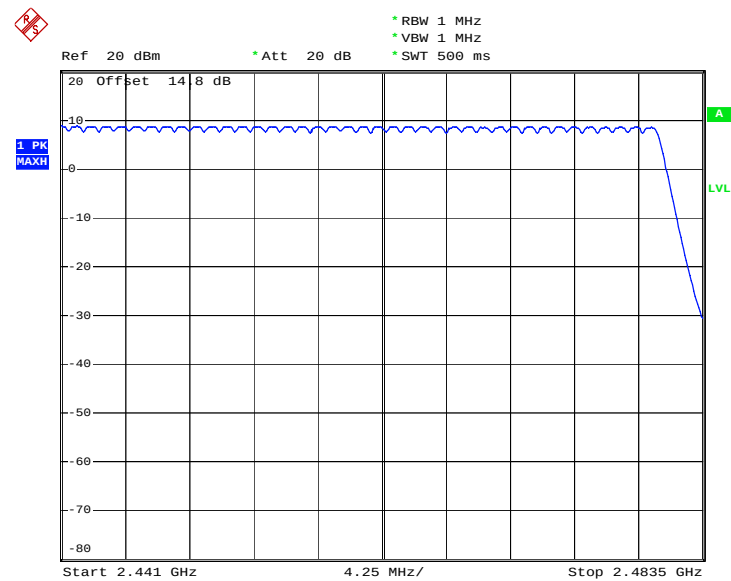
Test Mode :	Mode 1~3	Temperature :	22~23°C
Test Engineer :	Jun Liu	Relative Humidity :	40~42%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass



Number of Hopping Channel Plot on Channel 00 - 78



Date: 15.JUL.2011 16:11:03



Date: 15.JUL.2011 16:15:35

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

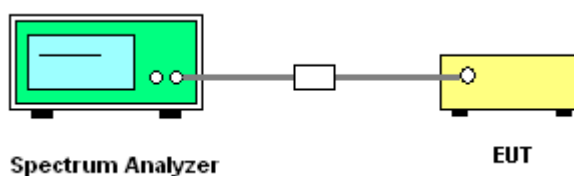
3.2.2 Measuring Instruments

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

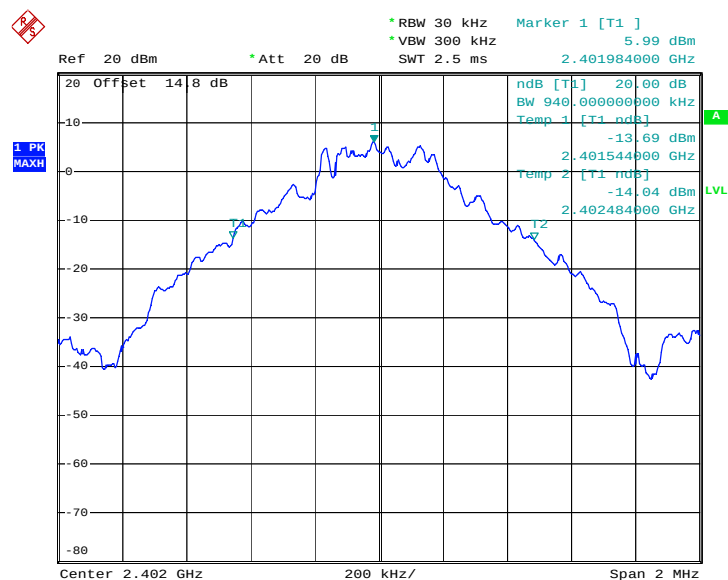


3.2.5 Test Result of 20dB Bandwidth

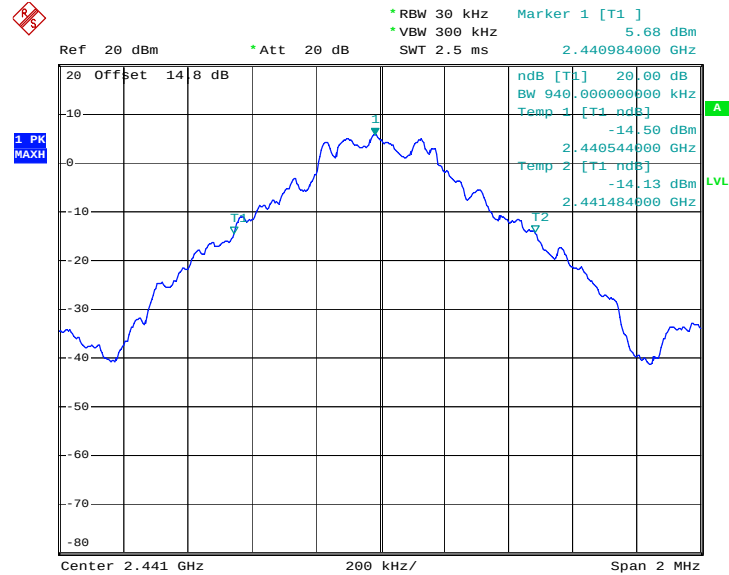
Test Mode :	Mode 1, 2, 3	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.940
39	2441	0.940
78	2480	0.856

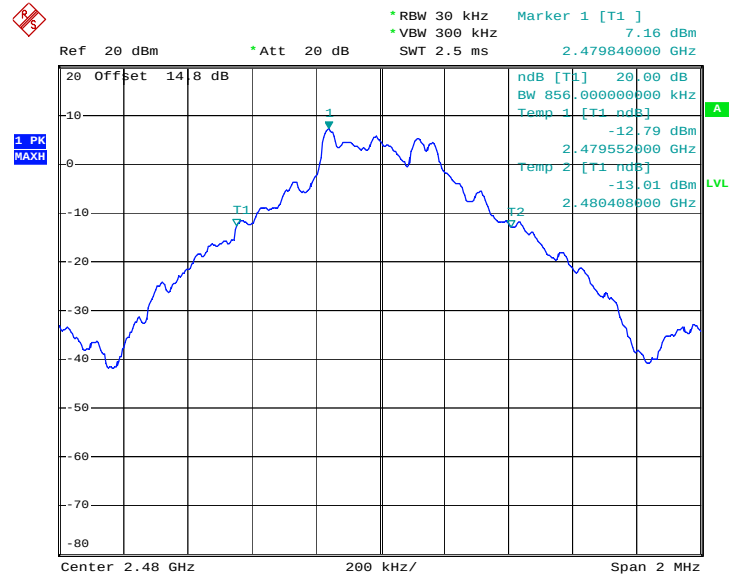
20 dB Bandwidth Plot on Channel 00



Date: 15.JUL.2011 15:46:46

20 dB Bandwidth Plot on Channel 39


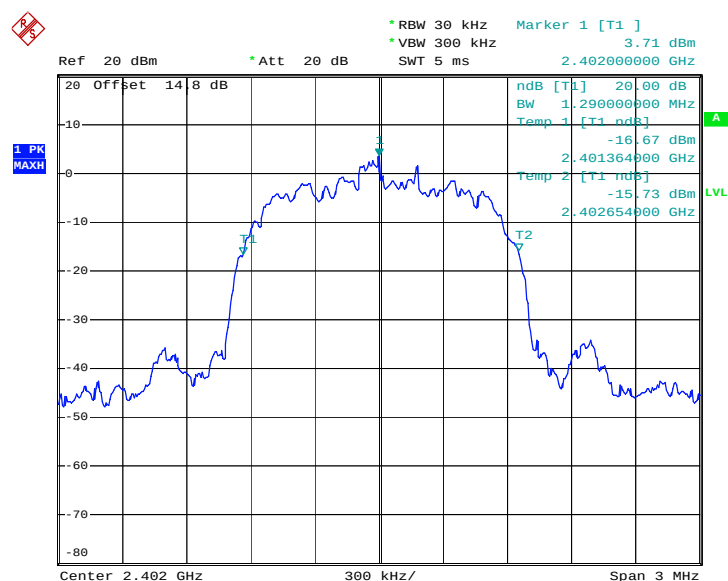
Date: 15.JUL.2011 15:50:22

20 dB Bandwidth Plot on Channel 78


Date: 15.JUL.2011 15:53:40

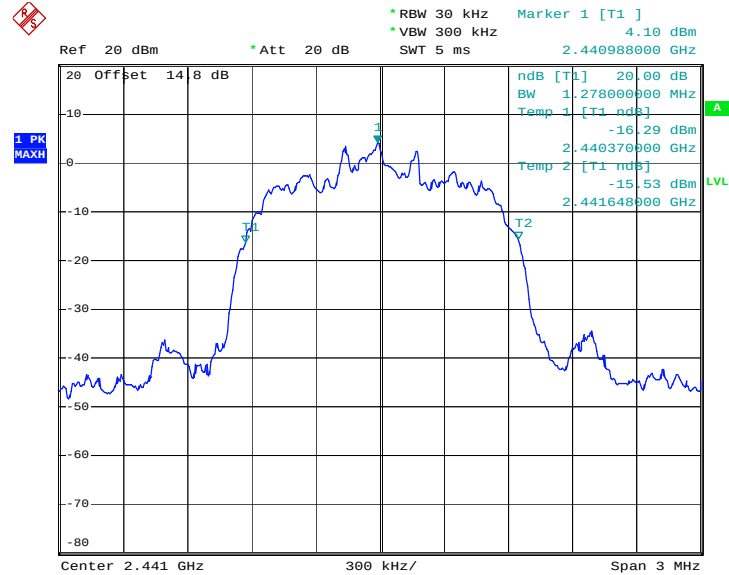
Test Mode :	Mode 4, 5, 6	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.290
39	2441	1.278
78	2480	1.272

20 dB Bandwidth Plot on Channel 00


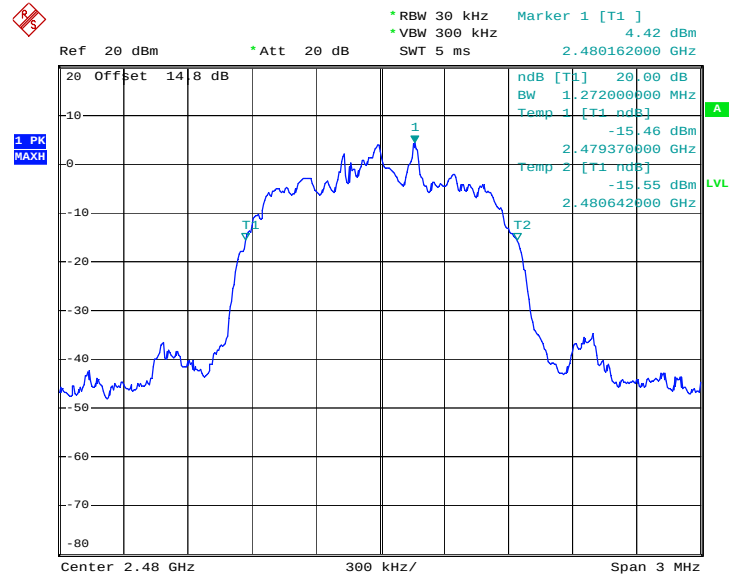
Date: 15.JUL.2011 15:59:39

20 dB Bandwidth Plot on Channel 39



Date: 15.JUL.2011 15:59:19

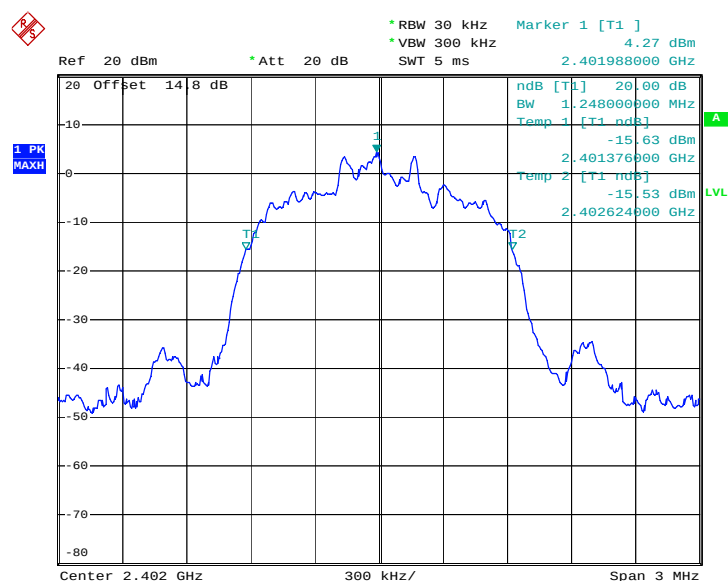
20 dB Bandwidth Plot on Channel 78



Date: 15.JUL.2011 15:58:31

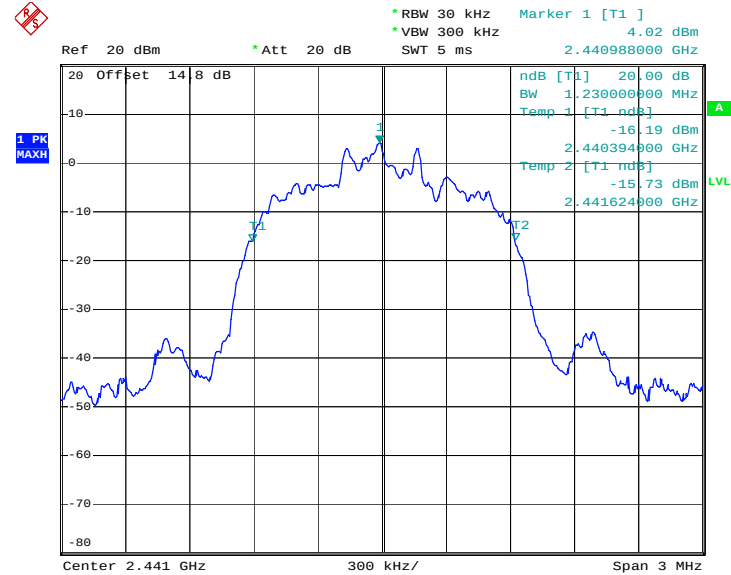
Test Mode :	Mode 7, 8, 9	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.248
39	2441	1.230
78	2480	1.236

20 dB Bandwidth Plot on Channel 00


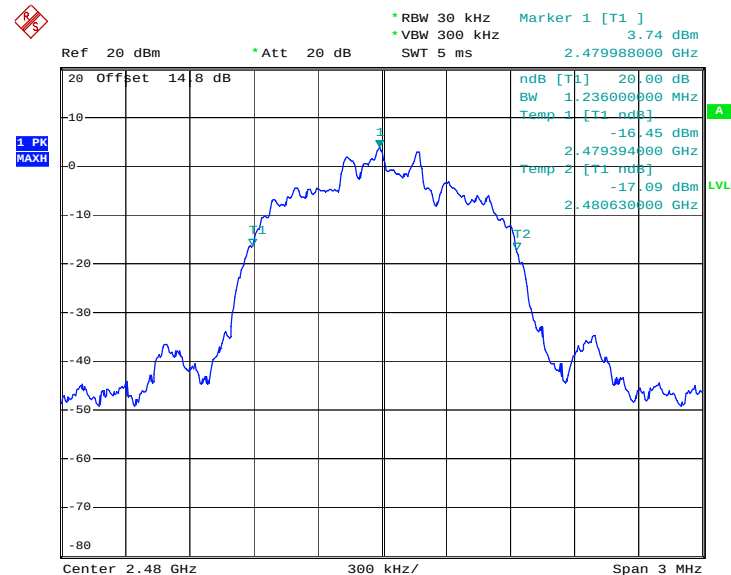
Date: 15.JUL.2011 16:02:36

20 dB Bandwidth Plot on Channel 39



Date: 15.JUL.2011 16:03:23

20 dB Bandwidth Plot on Channel 78



Date: 15.JUL.2011 16:03:56

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.

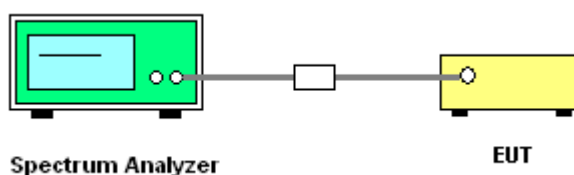
3.3.2 Measuring Instruments

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

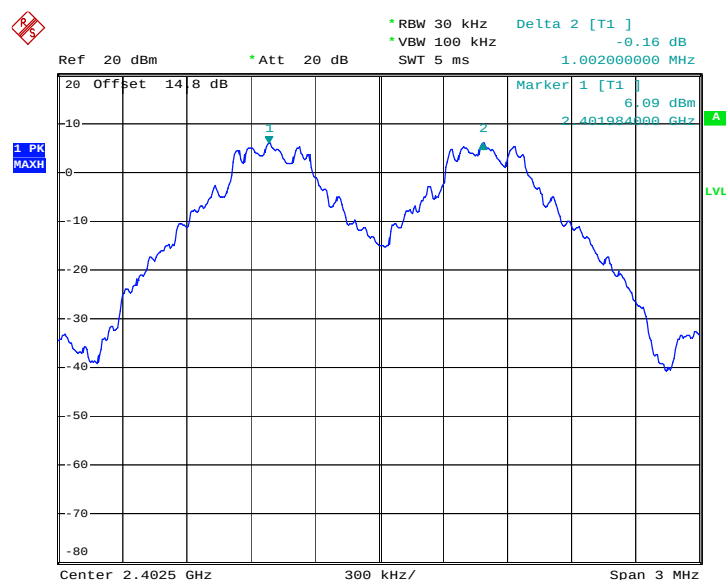


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.62667	Pass
39	2441	1.002	0.62667	Pass
78	2480	1.002	0.57067	Pass

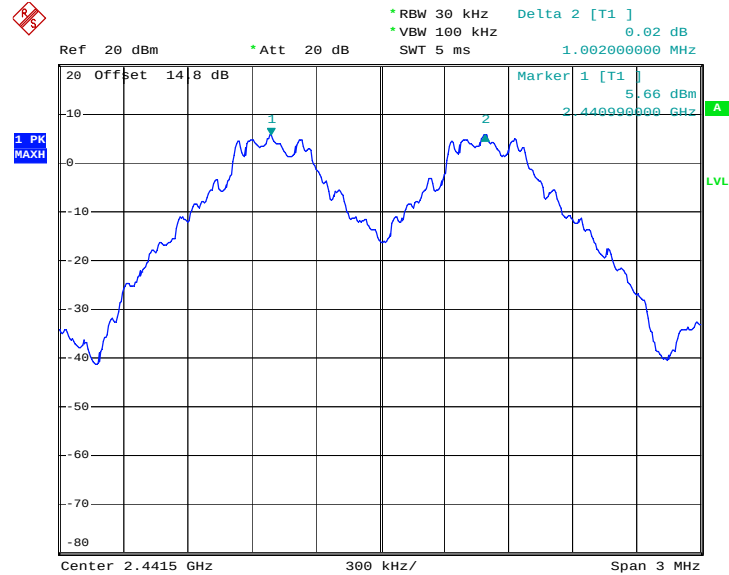
Channel Separation Plot on Channel 00 - 01



Date: 15.JUL.2011 15:47:36

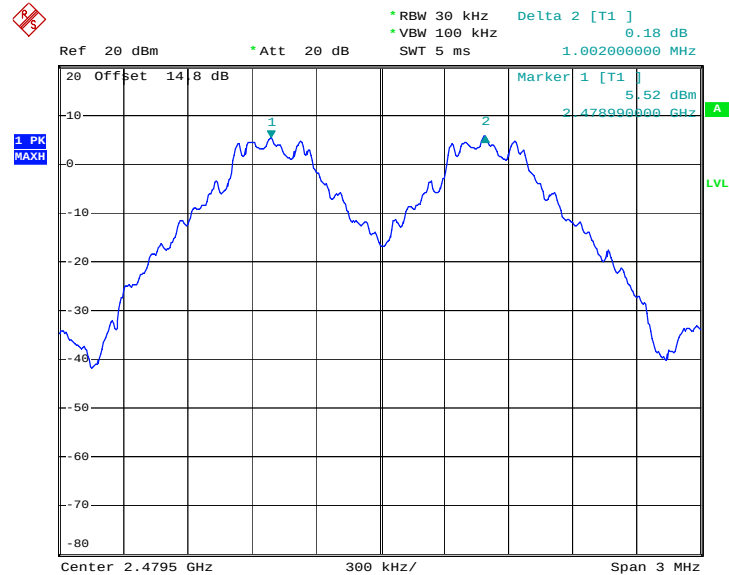


Channel Separation Plot on Channel 39 - 40



Date: 15.JUL.2011 15:51:18

Channel Separation Plot on Channel 77 - 78



Date: 15.JUL.2011 15:54:30

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.

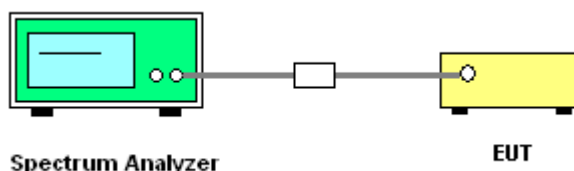
3.4.2 Measuring Instruments

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



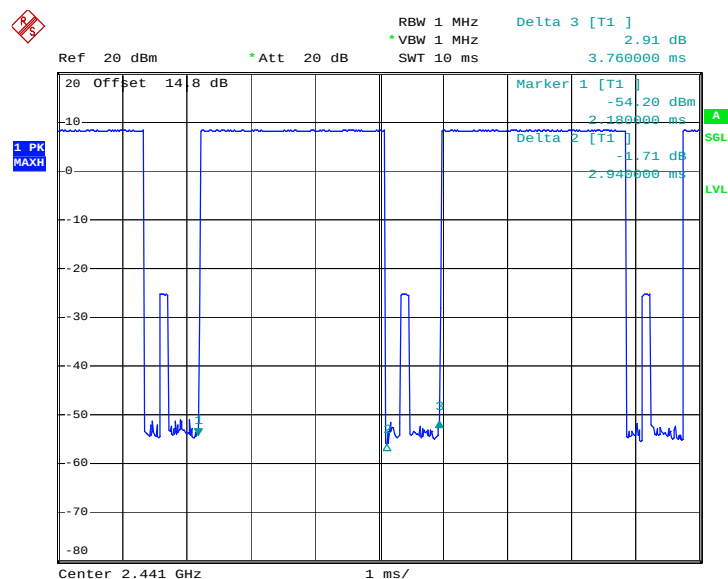
3.4.5 Test Result of Dwell Time

Test Mode :	Mode 2	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

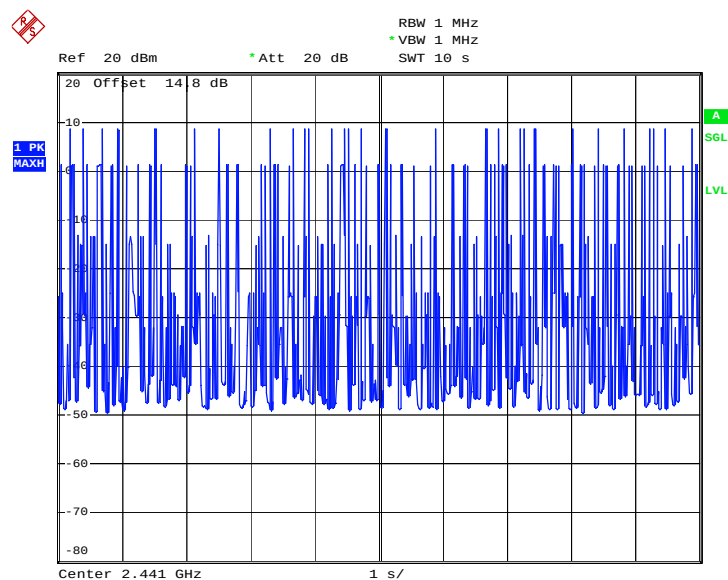
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	2.90	2940.00	0.27	0.4	Pass

Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

DH5 Dwell Time (One Pulse) Plot on Channel 39


Date: 15.JUL.2011 14:48:53

DH5 Dwell Time (Count Pulses) Plot on Channel 39


Date: 15.JUL.2011 15:46:15

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).

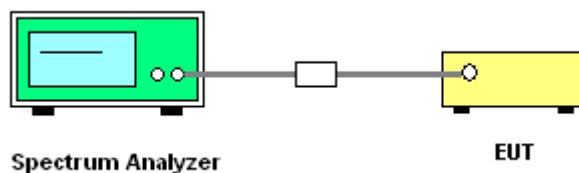
3.5.2 Measuring Instruments

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

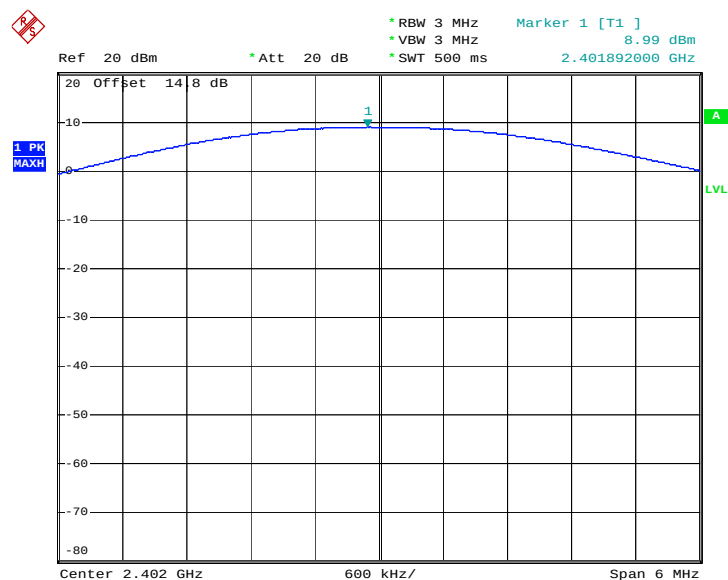


3.5.5 Test Result of Peak Output Power

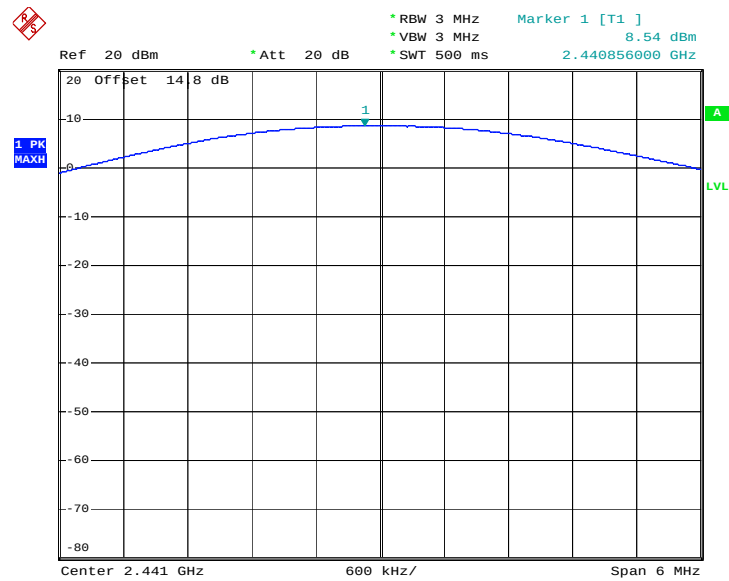
Test Mode :	Mode 1, 2, 3	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits	Pass/Fail
		1 Mbps	(dBm)	
00	2402	8.99	30.00	Pass
39	2441	8.54	30.00	Pass
78	2480	8.33	30.00	Pass

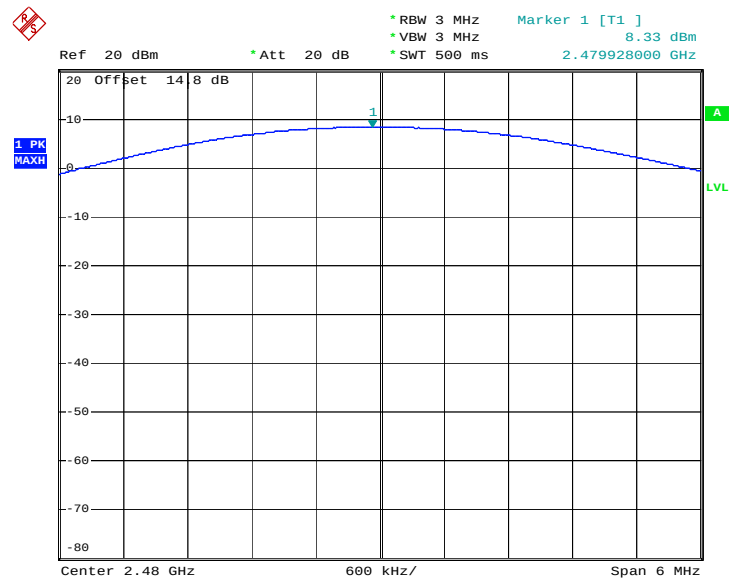
Peak Output Power Plot on Channel 00



Date: 15.JUL.2011 14:53:59

Peak Output Power Plot on Channel 39


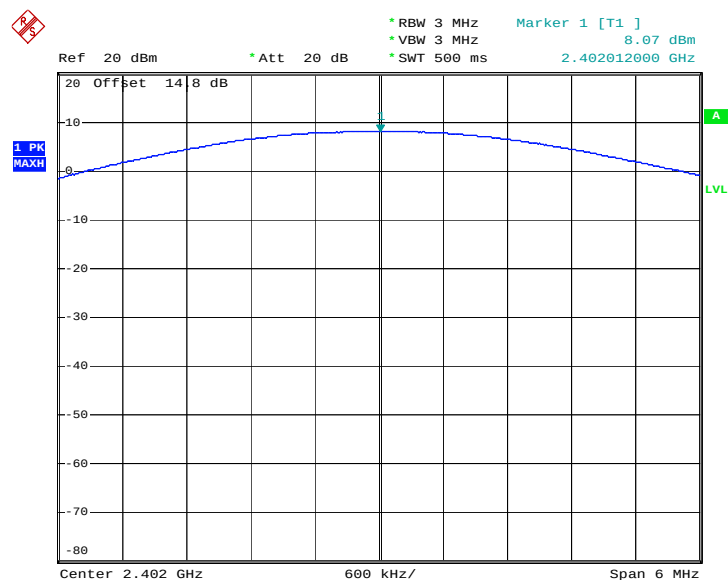
Date: 15.JUL.2011 14:56:37

Peak Output Power Plot on Channel 78


Date: 15.JUL.2011 14:58:56

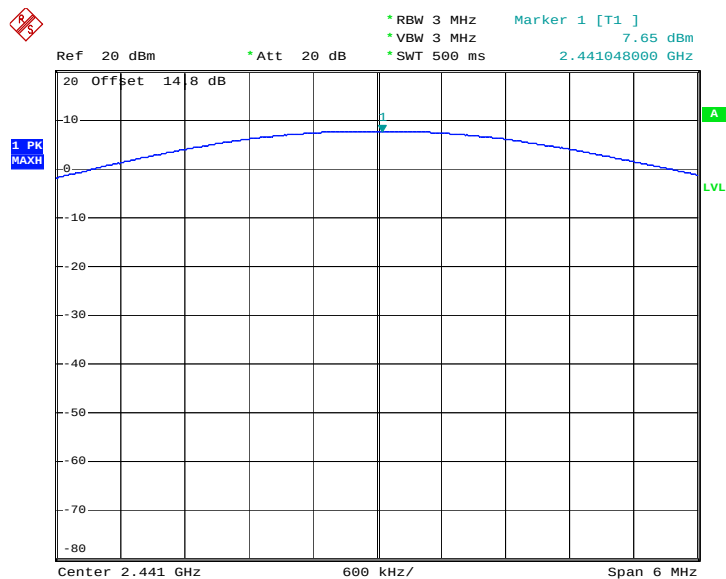
Test Mode :	Mode 4, 5, 6	Temperature :	22~23°C
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	8.07	20.97	Pass
39	2441	7.65	20.97	Pass
78	2480	7.43	20.97	Pass

Peak Output Power Plot on Channel 00


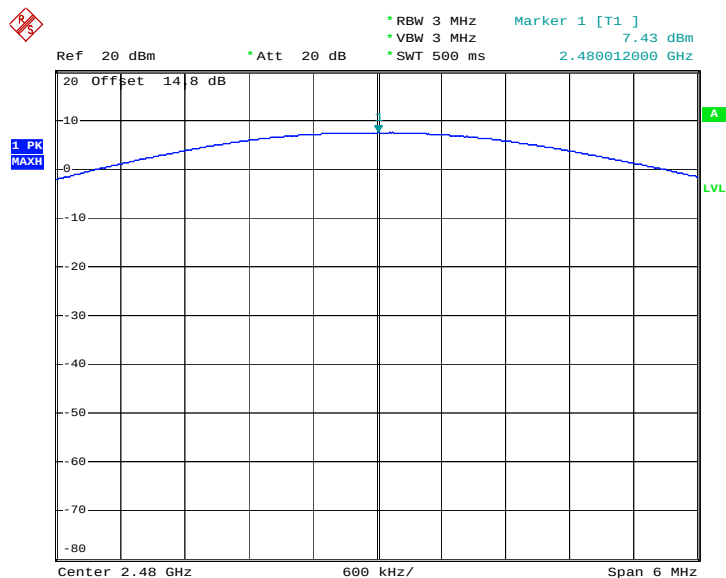
Date: 15.JUL.2011 14:55:24

Peak Output Power Plot on Channel 39



Date: 15.JUL.2011 14:57:50

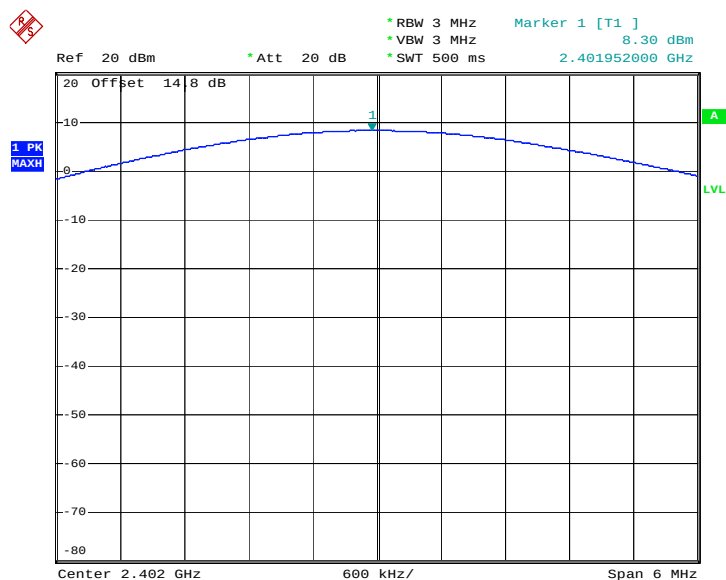
Peak Output Power Plot on Channel 78



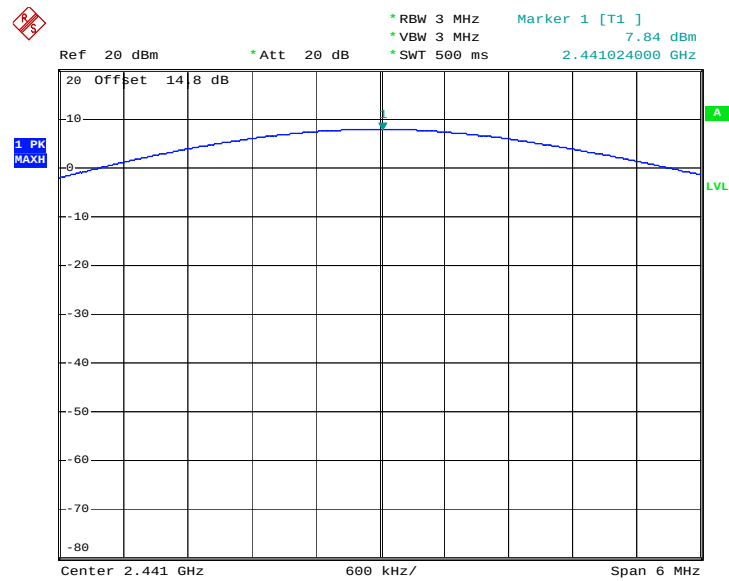
Date: 15.JUL.2011 15:00:36

Test Mode :	Mode 7, 8, 9	Temperature :	22~23℃
Test Engineer :	Jun Liu	Relative Humidity :	40~42%

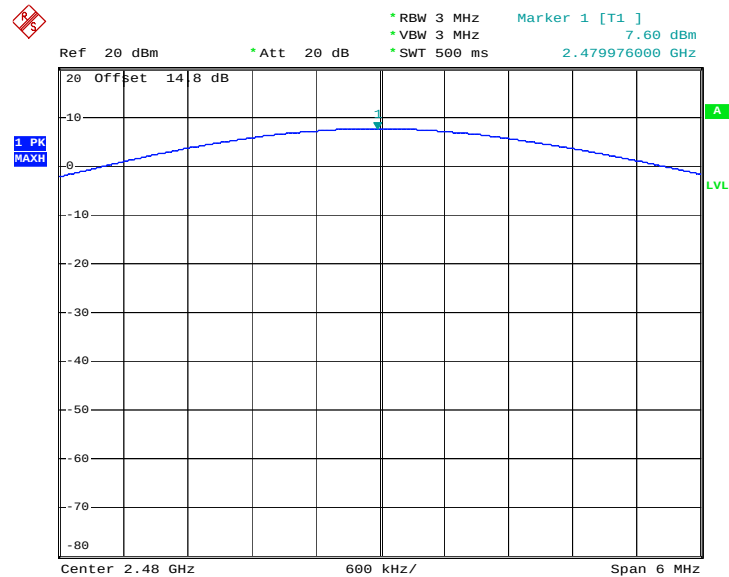
Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	8.30	20.97	Pass
39	2441	7.84	20.97	Pass
78	2480	7.60	20.97	Pass

Peak Output Power Plot on Channel 00


Date: 15.JUL.2011 14:55:41

Peak Output Power Plot on Channel 39


Date: 15.JUL.2011 14:58:06

Peak Output Power Plot on Channel 78


Date: 15.JUL.2011 15:02:18

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

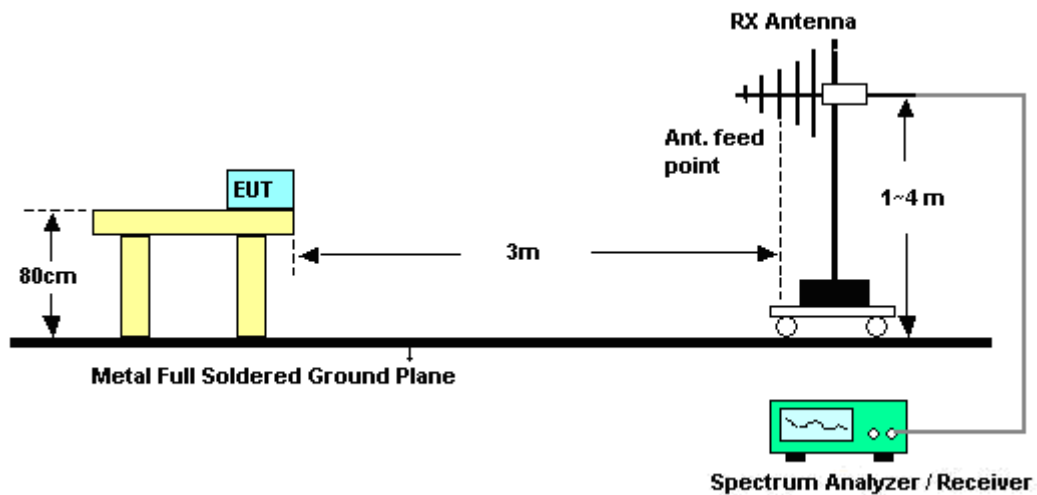
See list of measuring instruments of this test report.

3.6.3 Test Procedures

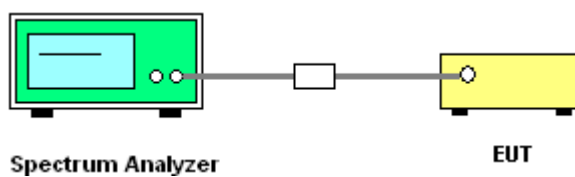
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
		Test Engineer :	Chenmy Cheng

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
2388.85	51.67	-22.33	74	49.39	32.86	3.47	34.05	100	0	Peak
2388.85	40.7	-13.3	54	38.42	32.86	3.47	34.05	100	0	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
2390	41.4	-12.6	54	39.12	32.86	3.47	34.05	100	0	Average
2390	48.58	-25.42	74	46.3	32.86	3.47	34.05	100	0	Peak

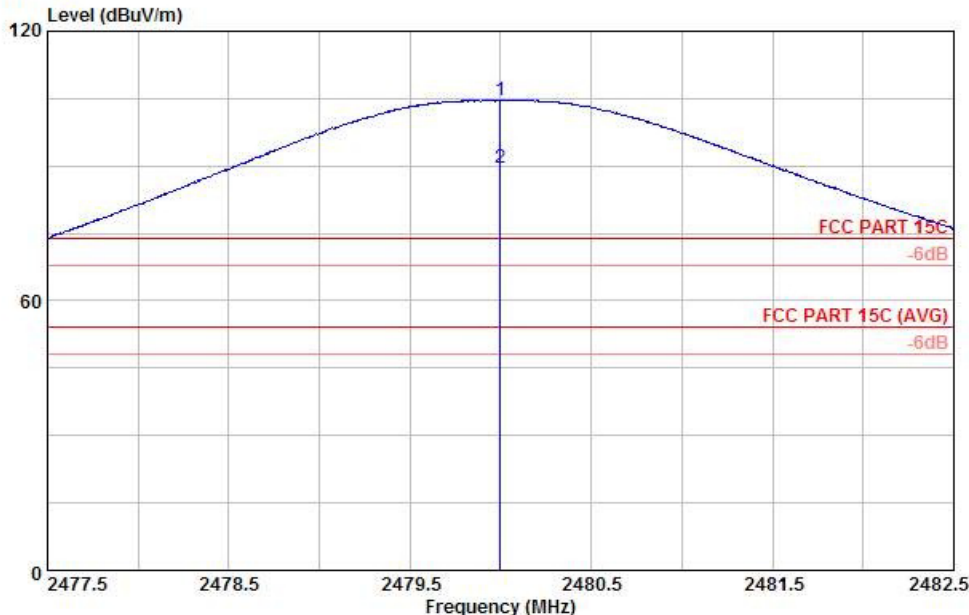
Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
		Test Engineer :	Chenmy Cheng

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	49.65	-24.35	74	47.16	33.01	3.68	34.2	100	338	Peak
2483.5	34.97	-19.03	54	32.48	33.01	3.68	34.2	100	338	Average

Summary results of marker-delta method:

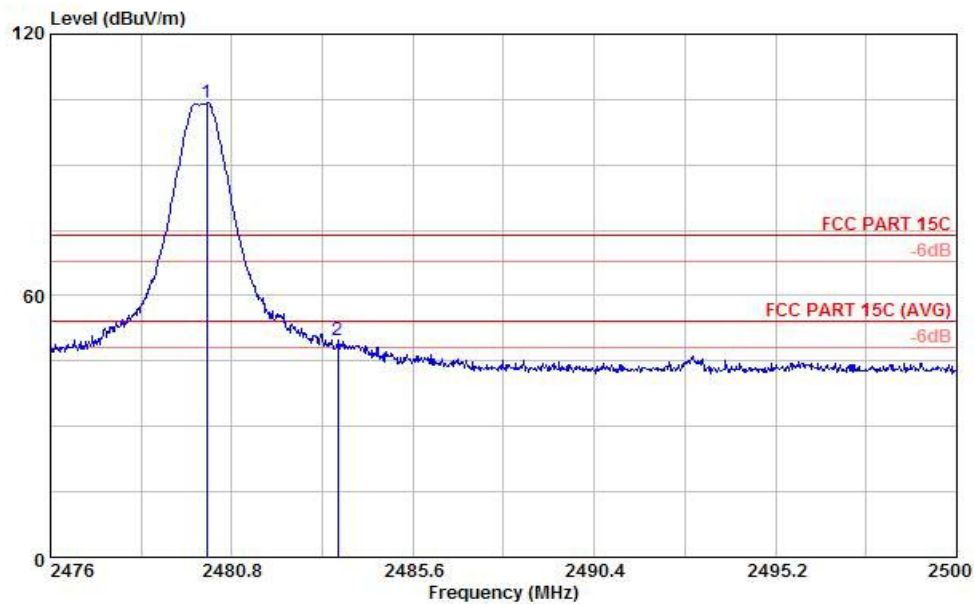
Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	89.56	54.59	34.97	54	-19.03	Pass
Hopping Mode	89.56	56.16	33.4	54	-20.6	Pass

Note : Average result = Maximum field strength – Delta result

Test Plots:


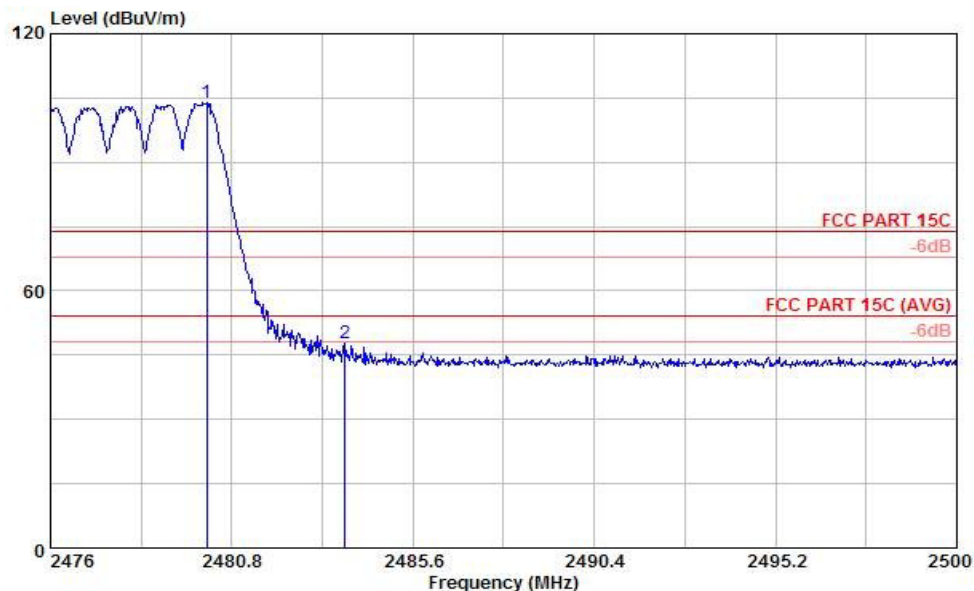
Site : 03CH01-KS
Condition: FCC PART 15C 3m HF_ANT-100803 HORIZONTAL
Project : (FR) 180510
Mode : mode 3
Plane : H

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	104.57	30.57	74.00	102.08	33.01	3.68	34.20	100	360	Peak
2 X	2480.00	89.56	35.56	54.00	87.07	33.01	3.68	34.20	100	360	Average



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF_ANT-100803 HORIZONTAL
Project : (FR) 180510
Mode : mode 3
Plane : H

		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	dB	cm	deg	
1	X	2480.13	104.24	30.24	74.00	101.75	3.68	34.20	---	---	Peak
2		2483.61	49.65	-24.35	74.00	47.16	3.68	34.20	---	---	Peak



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF_ANT-100803 HORIZONTAL
Project : (FR) 180510
Mode : mode 3
Plane : H

		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	dB	cm	deg	
1	X	2480.13	103.93	29.93	74.00	101.44	3.68	34.20	---	---	Peak
2		2483.80	47.77	-26.23	74.00	45.28	3.68	34.20	---	---	Peak

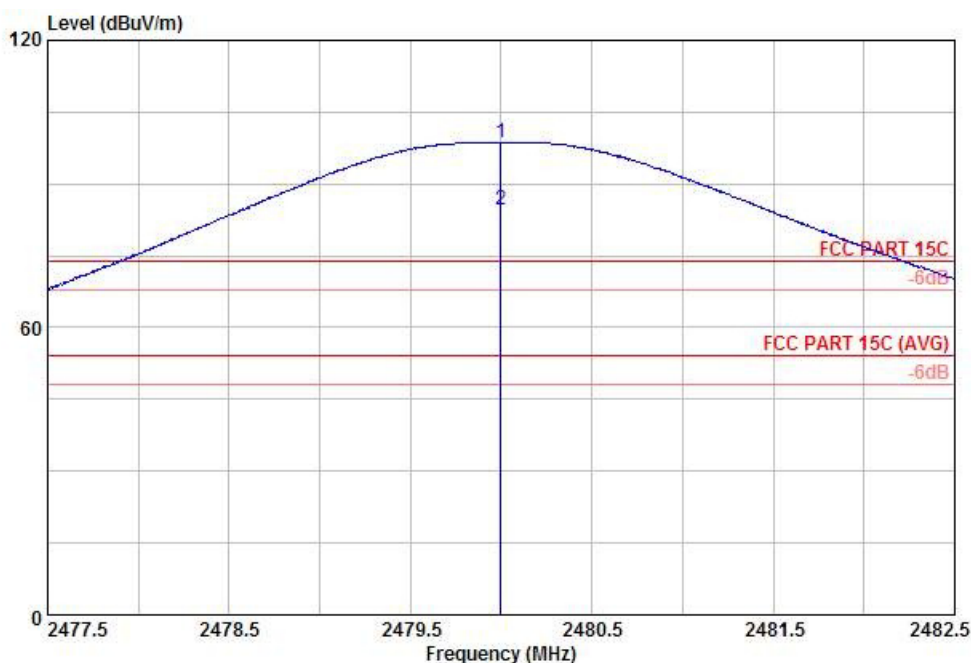
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	45.5	-28.5	74	43.01	33.01	3.68	34.2	100	116	Peak
2483.5	31.71	-22.29	54	29.22	33.01	3.68	34.2	100	116	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	84.73	53.02	31.71	54	-22.29	Pass
Hopping Mode	84.73	53.49	31.24	54	-22.76	Pass

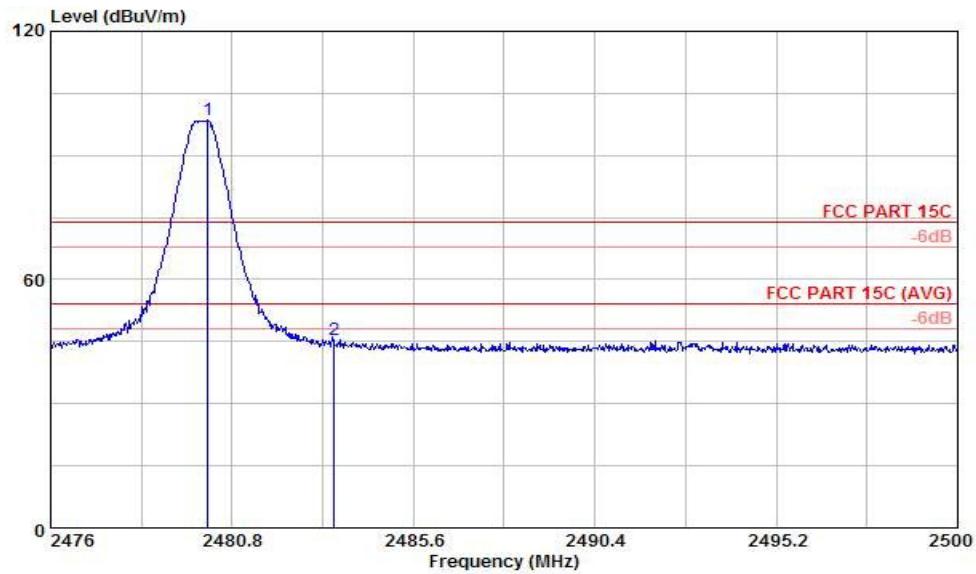
Note : Average result = Maximum field strength – Delta result

Test Plots:



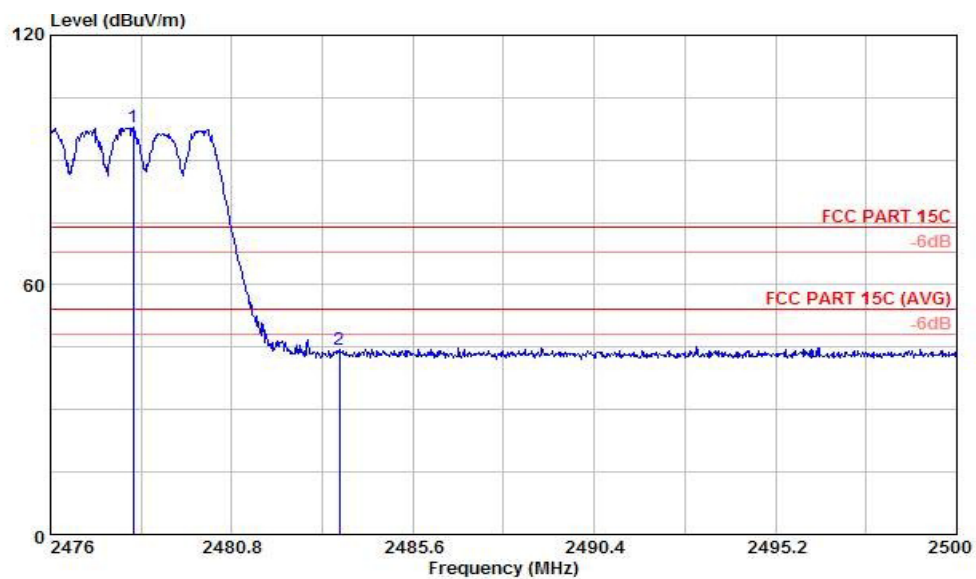
Site : 03CH01-KS
Condition: FCC PART 15C 3m HF_ANTI-100803 VERTICAL
Project : (FR) 180510
Mode : mode 3
Plane : H

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	98.69	24.69	74.00	96.20	33.01	3.68	34.20	113	304	Peak
2 X	2480.00	84.73	30.73	54.00	82.24	33.01	3.68	34.20	113	304	Average



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF_ANTI-100803 VERTICAL
Project : (FR) 180510
Mode : mode 3
Plane : H

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.15	98.52	24.52	74.00	96.03	33.01	3.68	34.20	---	Peak
2	2483.50	45.50	-28.50	74.00	43.01	33.01	3.68	34.20	---	Peak



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF_ANTI-100803 VERTICAL
Project : (FR) 180510
Mode : mode 3
Plane : H

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2478.18	97.89	23.89	74.00	95.40	33.01	3.68	34.20	---	Peak
2	2483.66	44.40	-29.60	74.00	41.91	33.01	3.68	34.20	---	Peak



Test Mode :	Mode 4	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
		Test Engineer :	Chenmy Cheng

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
2388.85	51.69	-22.31	74	49.41	32.86	3.47	34.05	100	0	Peak
2388.85	40.59	-13.41	54	38.31	32.86	3.47	34.05	100	0	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
2362.82	49.43	-24.57	74	47.22	32.81	3.38	33.98	100	112	Peak
2362.82	37.29	-16.71	54	35.08	32.81	3.38	33.98	100	112	Average

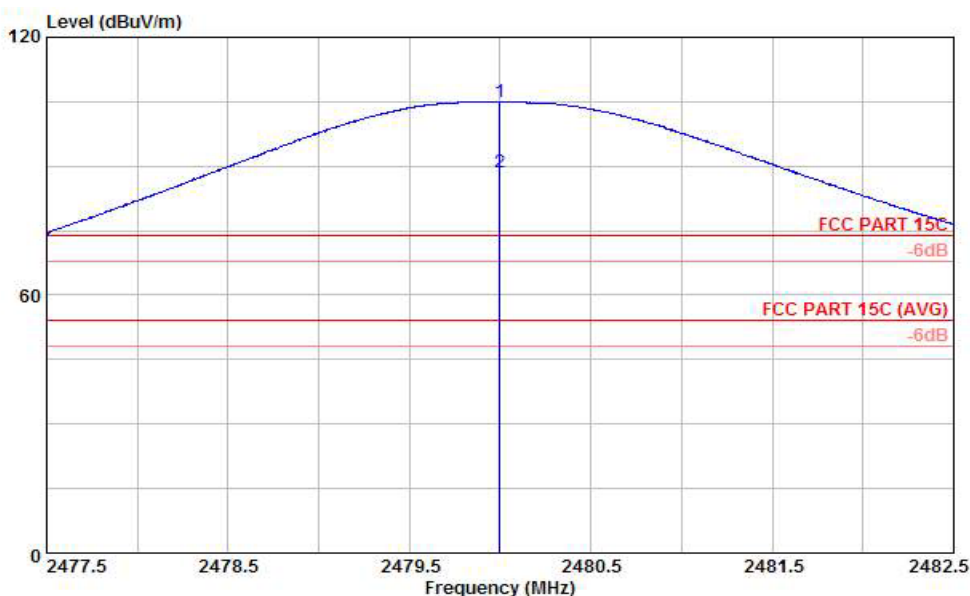
Test Mode :	Mode 6	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
		Test Engineer :	Chenmy Cheng

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
2483.848	35.35	-18.65	54	32.86	33.01	3.68	34.2	100	133	Average
2483.848	49.52	-24.48	74	47.03	33.01	3.68	34.2	100	133	Peak

Summary results of marker-delta method:

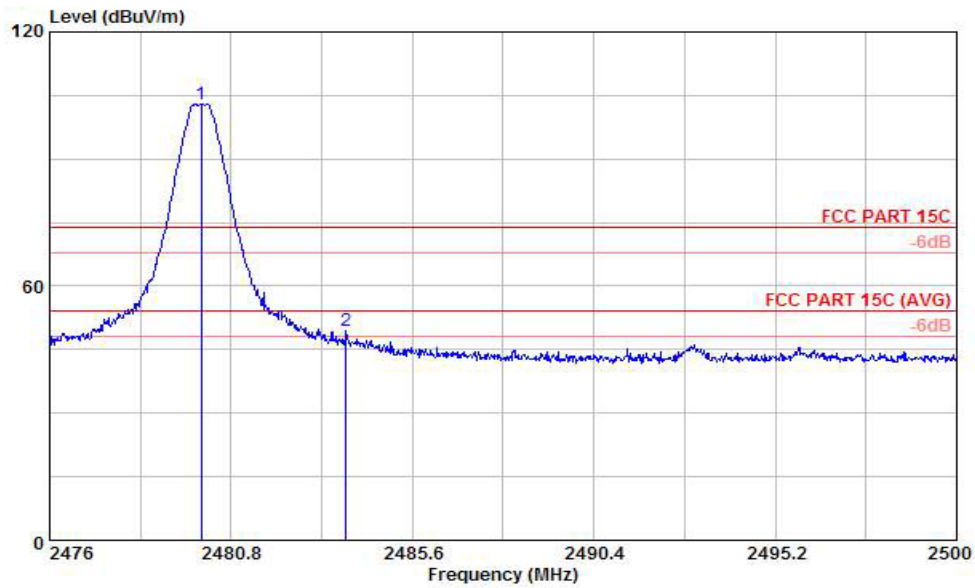
Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	88.72	53.37	35.35	54	-18.65	Pass
Hopping Mode	88.72	55.05	33.67	54	-20.33	Pass

Note : Average result = Maximum field strength – Delta result

Test Plots:


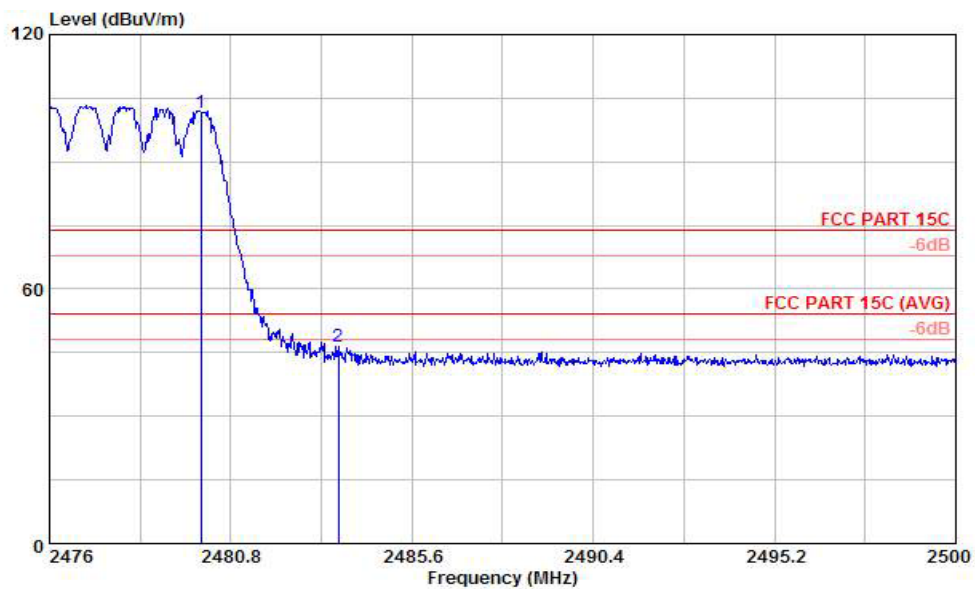
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
 Project : (FR) 180510
 Mode : mode 6
 Plane : H

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	104.82	30.82	74.00	102.33	33.01	3.68	34.20	100	360	Peak
2 X	2480.00	88.72	34.72	54.00	86.23	33.01	3.68	34.20	100	360	Average



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANI-100803 HORIZONTAL
Project : (FR) 180510
Mode : mode 6
Plane : H

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.00	102.89	28.89	74.00	100.40	33.01	3.68	34.20	116	236 Peak
2	2483.85	49.52	-24.48	74.00	47.03	33.01	3.68	34.20	100	133 Peak



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANI-100803 HORIZONTAL
Project : (FR) 180510
Mode : mode 6
Plane : H

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.00	101.46	27.46	74.00	98.97	33.01	3.68	34.20	100	128 Peak
2	2483.66	46.41	-27.59	74.00	43.92	33.01	3.68	34.20	100	163 Peak

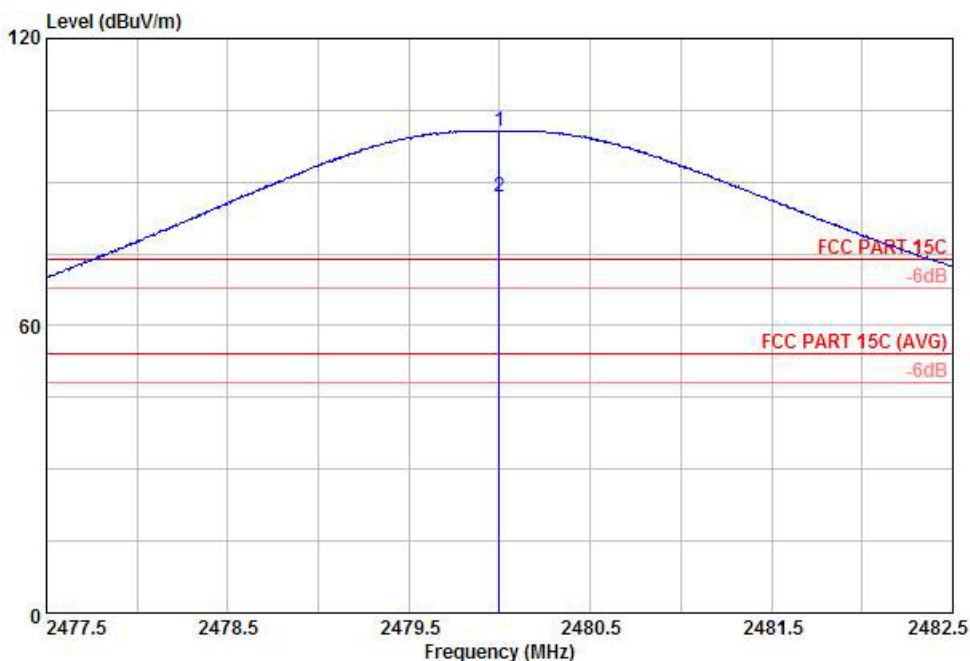
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.992	33.99	-20.01	54	31.5	33.01	3.68	34.2	100	189	Average
2483.992	45.93	-28.07	74	43.44	33.01	3.68	34.2	100	189	Peak

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	86.86	54.32	32.54	54	-21.46	Pass
Hopping Mode	86.86	52.87	33.99	54	-20.01	Pass

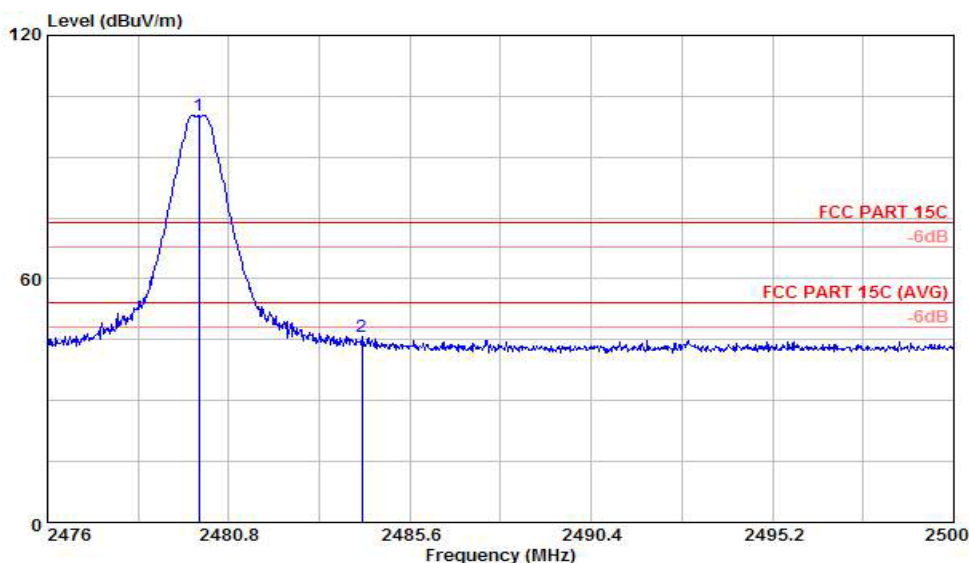
Note : Average result = Maximum field strength – Delta result

Test Plots:



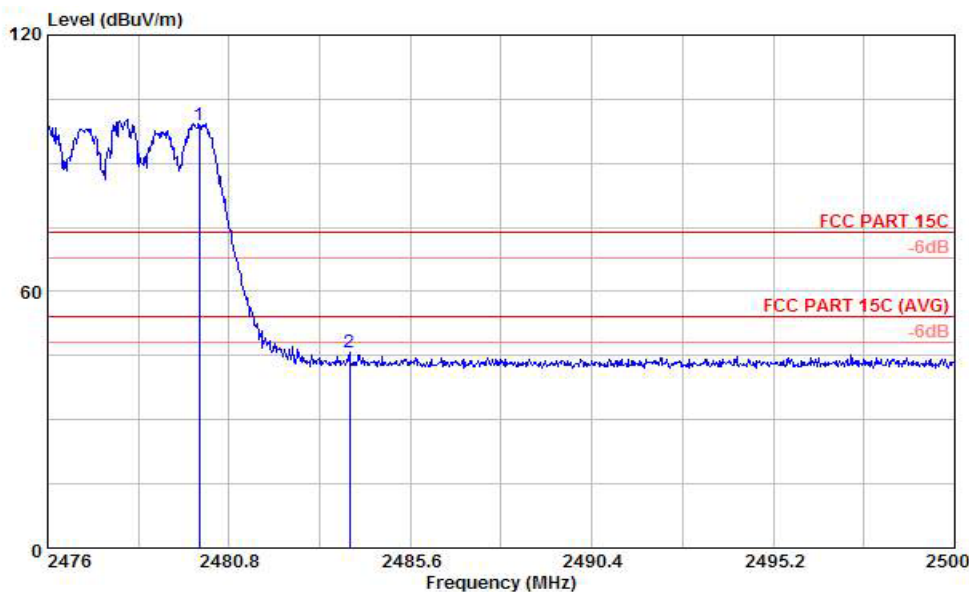
Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
Project : (FR) 180510
Mode : mode 6
Plane : H

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	100.61	26.61	74.00	98.12	33.01	3.68	34.20	100	13	Peak
2 X	2480.00	86.86	32.86	54.00	84.37	33.01	3.68	34.20	100	13	Average



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANI-100803 VERTICAL
Project : (FR) 180510
Mode : mode 6
Plane : H

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	100.18	26.18	74.00	97.69	33.01	3.68	34.20	100	300 Peak
2	2484.33	45.86	-28.14	74.00	43.37	33.01	3.68	34.20	112	306 Peak

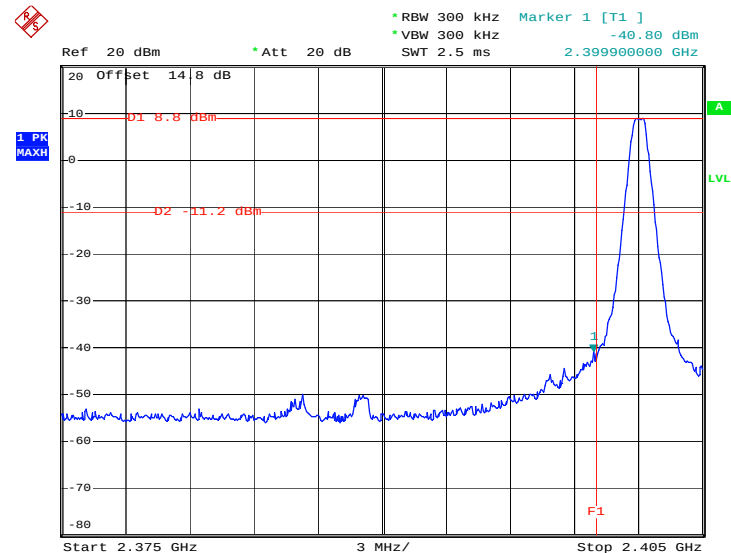


Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANI-100803 VERTICAL
Project : (FR) 180510
Mode : mode 6
Plane : H

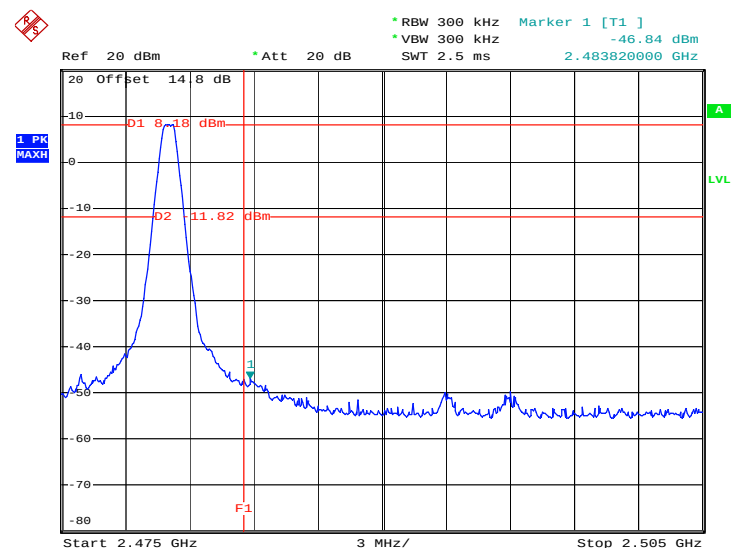
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	98.80	24.80	74.00	96.31	33.01	3.68	34.20	100	63 Peak
2	2483.99	45.93	-28.07	74.00	43.44	33.01	3.68	34.20	100	189 Peak

3.6.6 Test Result of Conducted Band Edges

Test Mode :	Mode 1 and 3	Temperature :	22~23℃
Test Channel :	00 and 78	Relative Humidity :	40~42%
		Test Engineer :	Jun Liu

Low Band Edge Plot on Channel 00


Date: 15.JUL.2011 15:48:00

High Band Edge Plot on Channel 78


Date: 15.JUL.2011 15:55:01

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.

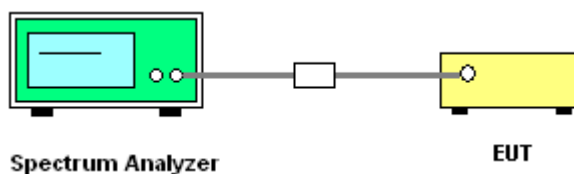
3.7.2 Measuring Instruments

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.

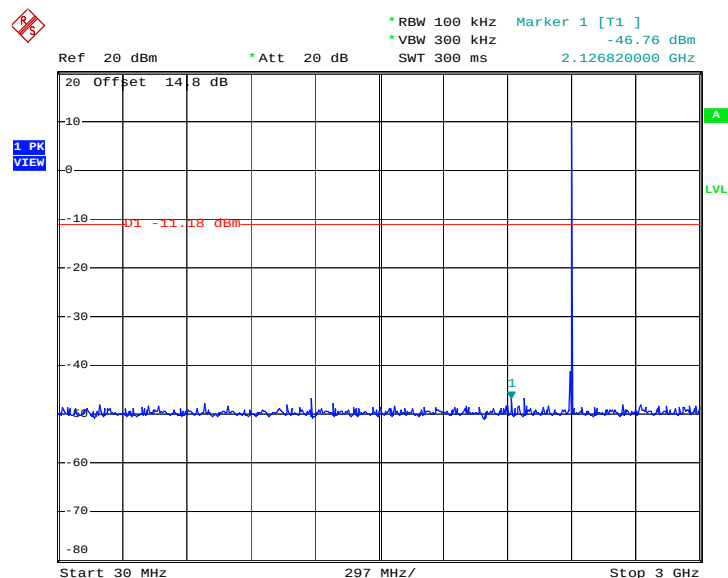
3.7.4 Test Setup



3.7.5 Test Result

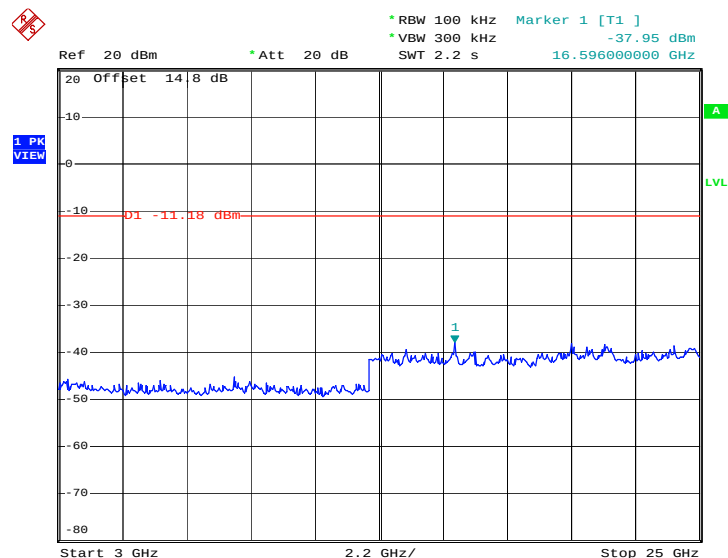
Test Mode :	Mode 1	Temperature :	22~23℃
Test Channel :	00	Relative Humidity :	40~42%
		Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



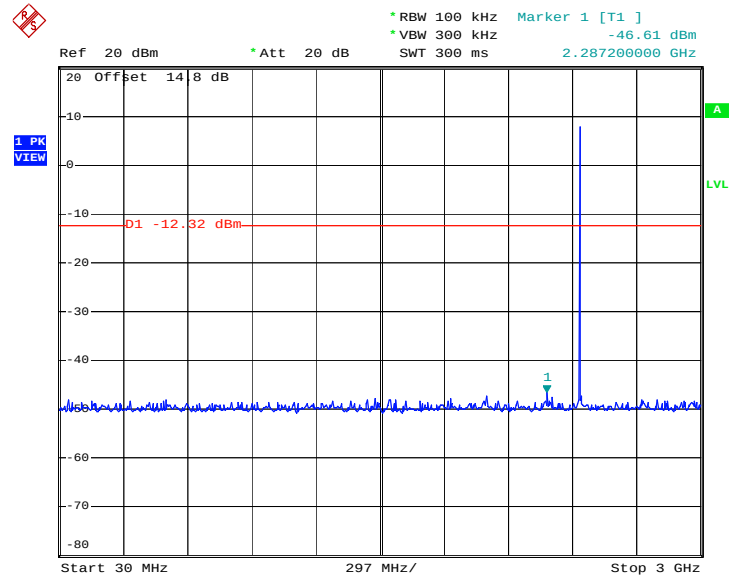
Date: 15.JUL.2011 15:49:04

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

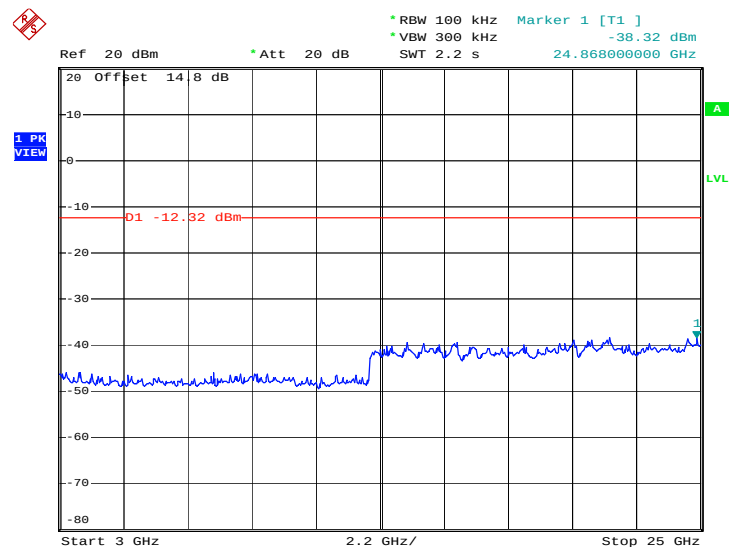


Date: 15.JUL.2011 15:49:26

Test Mode :	Mode 2	Temperature :	22~23℃
Test Channel :	39	Relative Humidity :	40~42%
		Test Engineer :	Jun Liu

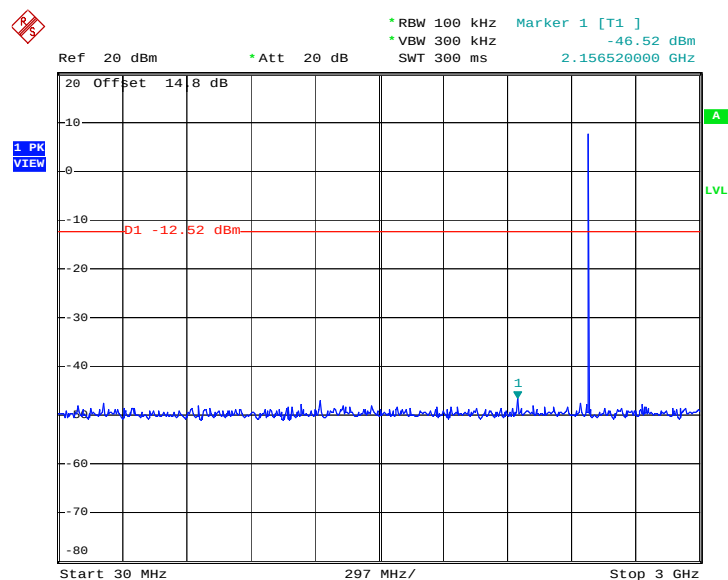
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 15.JUL.2011 15:52:30

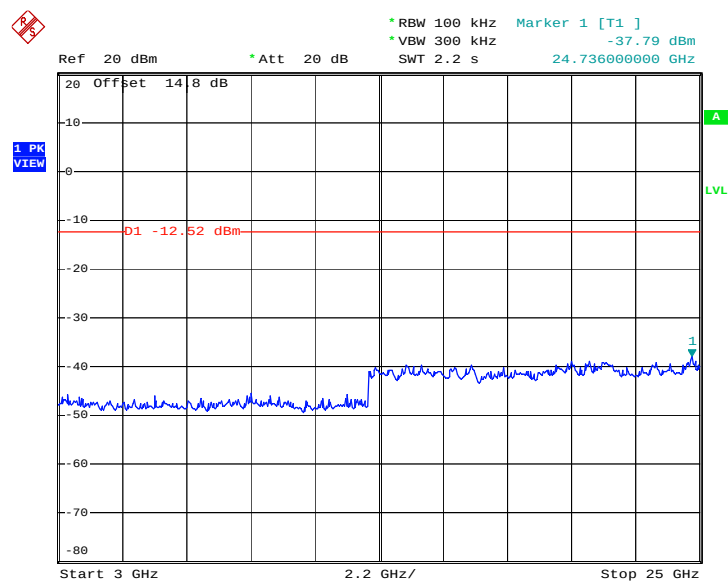
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 15.JUL.2011 15:52:52

Test Mode :	Mode 3	Temperature :	22~23℃
Test Channel :	78	Relative Humidity :	40~42%
		Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 15.JUL.2011 15:55:45

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 15.JUL.2011 15:56:07

3.8 AC Conducted Emission Measurement

3.8.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

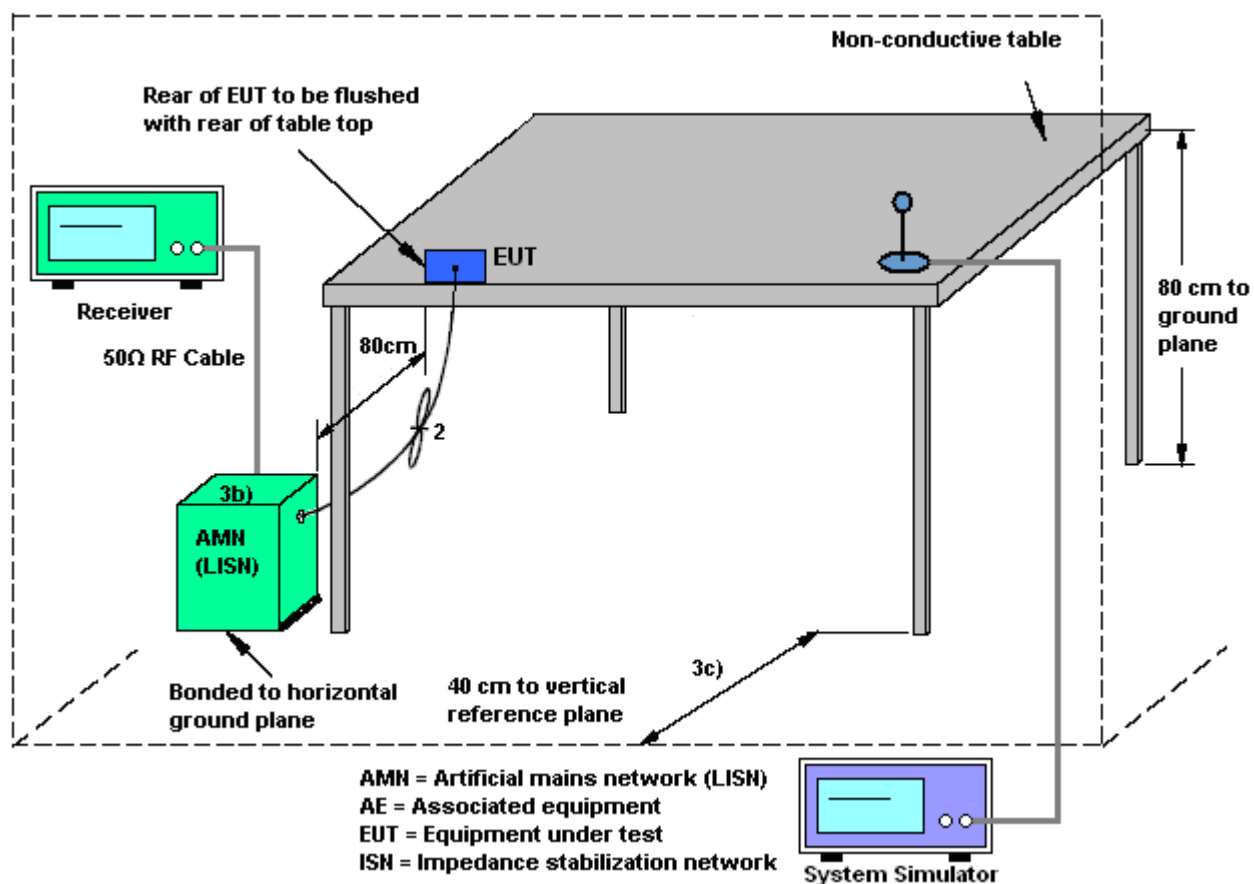
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

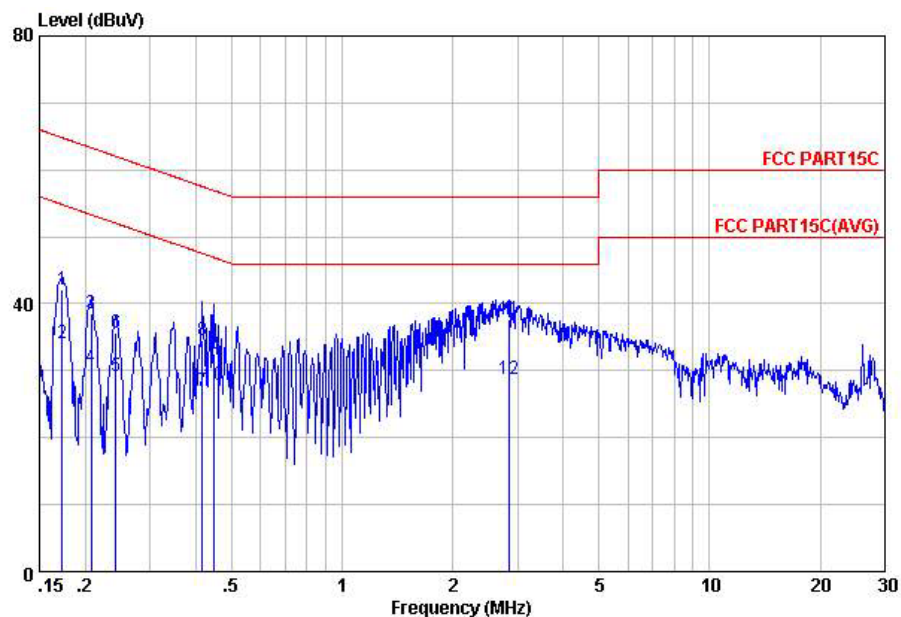
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All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

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

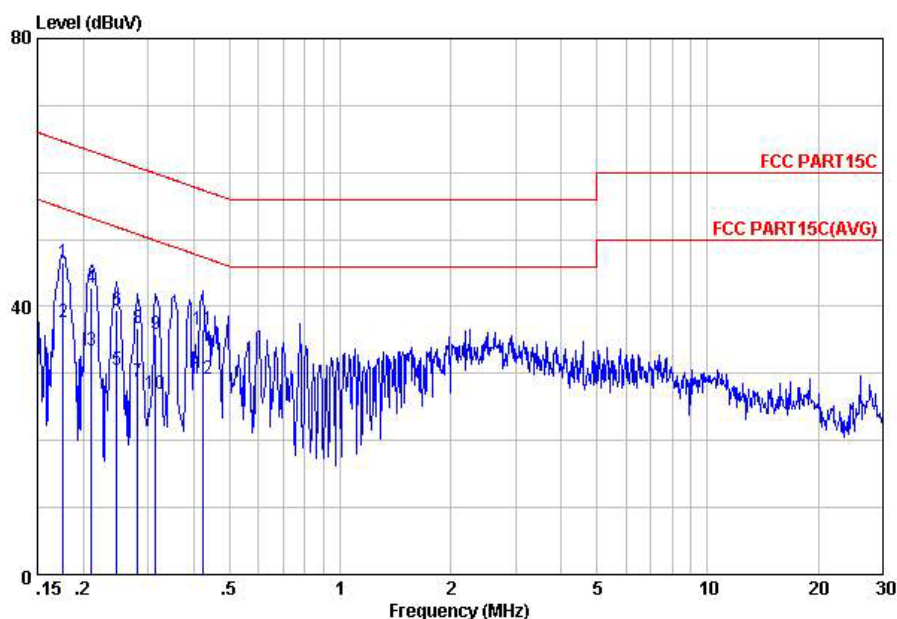
Test Mode :	Mode 2	Temperature :	21~22℃
Test Engineer :	Chenmy Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM 850 Idle + Bluetooth Idle + Adapter 2 + Earphone + Camera		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-100807 LINE
Project : (FR) 180510
mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.17	42.17	-22.64	64.81	32.10	-0.07	10.14	QP
2	0.17	34.07	-20.74	54.81	24.00	-0.07	10.14	Average
3	0.21	38.48	-24.84	63.32	28.40	-0.07	10.15	QP
4	0.21	30.48	-22.84	53.32	20.40	-0.07	10.15	Average
5	0.24	29.09	-22.95	52.04	19.00	-0.07	10.16	Average
6	0.24	35.59	-26.45	62.04	25.50	-0.07	10.16	QP
7	0.42	26.91	-20.60	47.51	16.80	-0.08	10.19	Average
8	0.42	34.51	-23.00	57.51	24.40	-0.08	10.19	QP
9	0.45	32.62	-24.27	56.89	22.50	-0.08	10.20	QP
10	0.45	27.82	-19.07	46.89	17.70	-0.08	10.20	Average
11	2.85	37.65	-18.35	56.00	27.41	-0.12	10.36	QP
12	2.85	28.65	-17.35	46.00	18.41	-0.12	10.36	Average

Test Mode :	Mode 2	Temperature :	21~22°C
Test Engineer :	Chenmy Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM 850 Idle + Bluetooth Idle + Adapter 2 + Earphone + Camera		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
 Condition: FCC PART15C LISN-100807 NEUTRAL
 Project : (FR) 180510
 mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.18	46.67	-18.01	64.68	36.60	-0.08	10.15	QP
2	0.18	37.57	-17.11	54.68	27.50	-0.08	10.15	Average
3	0.21	33.38	-19.80	53.18	23.30	-0.07	10.15	Average
4	0.21	42.68	-20.50	63.18	32.60	-0.07	10.15	QP
5	0.25	30.49	-21.37	51.86	20.40	-0.07	10.16	Average
6	0.25	39.39	-22.47	61.86	29.30	-0.07	10.16	QP
7	0.28	28.69	-22.07	50.76	18.59	-0.07	10.17	Average
8	0.28	36.79	-23.97	60.76	26.69	-0.07	10.17	QP
9	0.31	35.90	-23.94	59.84	25.81	-0.08	10.17	QP
10	0.31	27.00	-22.84	49.84	16.91	-0.08	10.17	Average
11	0.42	36.52	-20.90	57.42	26.41	-0.08	10.19	QP
12	0.42	29.22	-18.20	47.42	19.11	-0.08	10.19	Average

3.9 Radiated Emission Measurement

3.9.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.9.2 Measuring Instruments

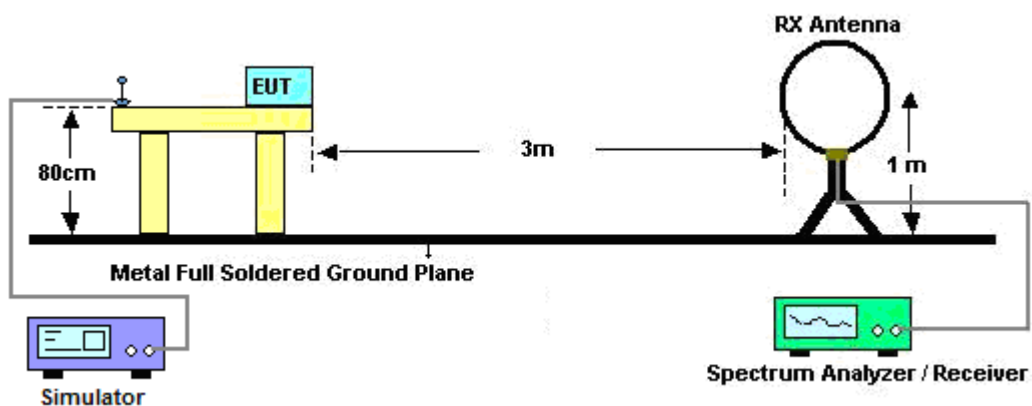
See list of measuring instruments of this test report.

3.9.3 Test Procedures

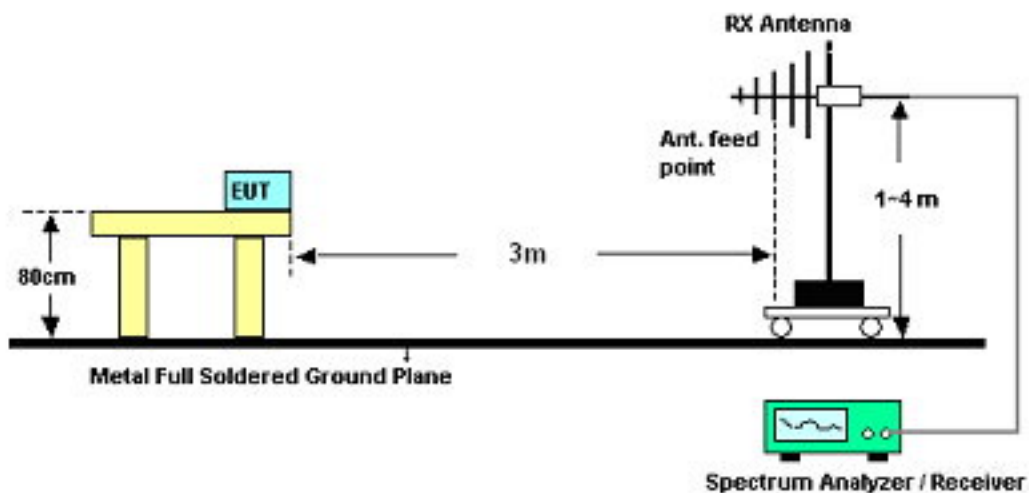
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.
4. Measured average value for the peak value is greater than 54 dBuV/m

3.9.4 Test Setup

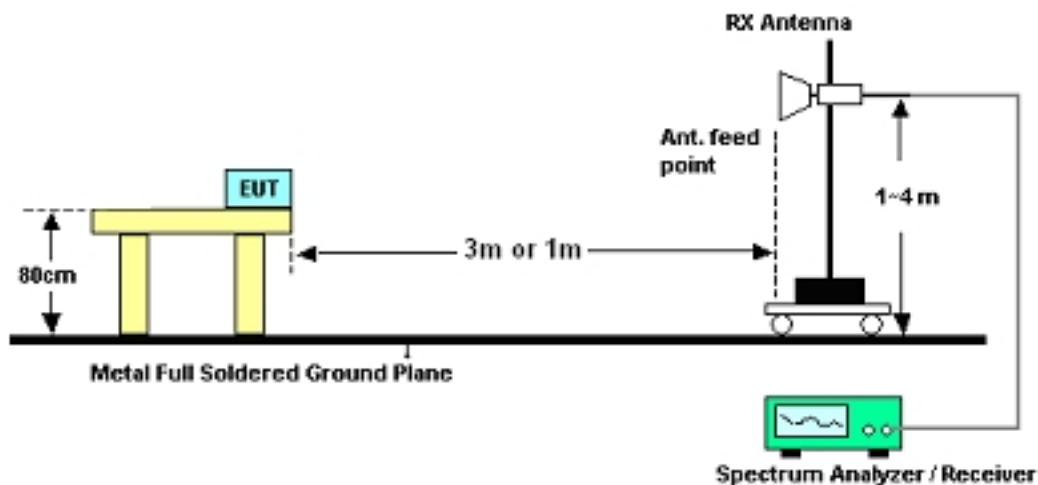
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.9.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Chenmy Cheng	Temperature :	21~22°C	
		Relative Humidity :	41~42%	

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 :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
39.99	17.4	-22.6	40	34.87	12.3	0.25	30.02			Peak
121.53	16.06	-27.44	43.5	33.79	11.79	0.45	29.97			Peak
262.74	15.8	-30.2	46	32.78	12.21	0.68	29.87			Peak
551.3	21.91	-24.09	46	32.09	18.5	1	29.68			Peak
796.3	23.21	-22.79	46	31.7	19.85	1.25	29.59			Peak
871.9	25.54	-20.46	46	33.35	20.49	1.29	29.59	110	20	Peak
2388.85	51.67	-22.33	74	49.39	32.86	3.47	34.05	100	0	Peak
2388.85	40.7	-13.3	54	38.42	32.86	3.47	34.05	100	0	Average
2402	103.93			101.65	32.86	3.47	34.05	157	304	Peak
2402	86.8			84.52	32.86	3.47	34.05	157	304	Average
2483.5	37.26	-16.74	54	34.77	33.01	3.68	34.2	100	10	Average
2483.5	48.39	-25.61	74	45.9	33.01	3.68	34.2	100	10	Peak

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
38.91	33.35	-6.65	40	50.16	12.98	0.25	30.04	100	120	Peak
52.41	28	-12	40	50.83	7.01	0.29	30.13			Peak
135.84	18.39	-25.11	43.5	36.69	11.21	0.48	29.99			Peak
651.4	22.05	-23.95	46	31.7	18.91	1.09	29.65			Peak
871.9	25.64	-20.36	46	33.45	20.49	1.29	29.59			Peak
894.3	29.18	-16.82	46	36.92	20.46	1.3	29.5			Peak
2390	41.4	-12.6	54	39.12	32.86	3.47	34.05	100	0	Average
2390	48.58	-25.42	74	46.3	32.86	3.47	34.05	100	0	Peak
2402	99.3			97.02	32.86	3.47	34.05	130	13	Peak
2402	85.97			83.69	32.86	3.47	34.05	130	13	Average
2483.5	48.95	-25.05	74	46.46	33.01	3.68	34.2	100	285	Peak
2483.5	38.59	-15.41	54	36.1	33.01	3.68	34.2	100	285	Average

Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
39.18	18.22	-21.78	40	35.03	12.98	0.25	30.04	112	230	Peak
55.92	14.48	-25.52	40	38.34	5.98	0.3	30.14			Peak
116.94	17.78	-25.72	43.5	35.5	11.8	0.45	29.97			Peak
551.3	22.3	-23.7	46	32.48	18.5	1	29.68			Peak
750.8	22.6	-23.4	46	31.06	19.9	1.18	29.54			Peak
871.9	24.04	-21.96	46	31.85	20.49	1.29	29.59			Peak
2390	38.4	-15.6	54	36.12	32.86	3.47	34.05	100	0	Average
2390	49	-25	74	46.72	32.86	3.47	34.05	100	0	Peak
2441	103.37			100.97	32.95	3.6	34.15	106	48	Peak
2441	86.28			83.88	32.95	3.6	34.15	106	48	Average
2483.5	39.59	-14.41	54	37.1	33.01	3.68	34.2	100	0	Average
2483.5	49.45	-24.55	74	46.96	33.01	3.68	34.2	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
38.91	32.81	-7.19	40	49.62	12.98	0.25	30.04	100	110	Peak
51.33	27.33	-12.67	40	49.97	7.21	0.28	30.13			Peak
135.03	19.75	-23.75	43.5	37.96	11.3	0.48	29.99			Peak
551.3	22.3	-23.7	46	32.48	18.5	1	29.68			Peak
794.2	22.6	-23.4	46	31.1	19.85	1.24	29.59			Peak
872.6	24.82	-21.18	46	32.63	20.48	1.29	29.58			Peak
2390	40.93	-13.07	54	38.65	32.86	3.47	34.05	200	123	Average
2390	48.57	-25.43	74	46.29	32.86	3.47	34.05	200	123	Peak
2441	100.77			98.37	32.95	3.6	34.15	133	18	Peak
2441	86.08			83.68	32.95	3.6	34.15	133	18	Average
2483.5	41.5	-12.5	54	39.01	33.01	3.68	34.2	100	118	Average
2483.5	48.24	-25.76	74	45.75	33.01	3.68	34.2	100	118	Peak

Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
38.64	18.1	-21.9	40	34.91	12.98	0.25	30.04			Peak
121.8	17.42	-26.08	43.5	35.16	11.78	0.45	29.97			Peak
288.66	16.83	-29.17	46	33.23	12.84	0.71	29.95			Peak
541.5	21.07	-24.93	46	31.44	18.33	0.99	29.69			Peak
820.1	22.41	-23.59	46	30.68	20.09	1.26	29.62			Peak
871.9	25.34	-20.66	46	33.15	20.49	1.29	29.59	100	260	Peak
2319.88	49.5	-24.5	74	47.37	32.76	3.27	33.9	100	342	Peak
2319.88	36.78	-17.22	54	34.65	32.76	3.27	33.9	100	342	Average
2480	104.57			102.08	33.01	3.68	34.2	100	360	Peak
2480	89.56			87.07	33.01	3.68	34.2	100	360	Average
2483.5	49.65	-24.35	74	47.16	33.01	3.68	34.2	100	338	Peak
2483.5	34.97	-19.03	54	32.48	33.01	3.68	34.2	100	338	Average

Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
38.64	32.88	-7.12	40	49.69	12.98	0.25	30.04	100	10	Peak
52.14	27.63	-12.37	40	50.46	7.01	0.29	30.13			Peak
131.79	20.01	-23.49	43.5	37.98	11.55	0.47	29.99			Peak
711.6	22.47	-23.53	46	31.61	19.41	1.14	29.69			Peak
792.1	23.18	-22.82	46	31.66	19.86	1.24	29.58			Peak
871.9	24.45	-21.55	46	32.26	20.49	1.29	29.59			Peak
2320.26	49.41	-24.59	74	47.28	32.76	3.27	33.9	100	120	Peak
2320.26	37.26	-16.74	54	35.13	32.76	3.27	33.9	100	120	Average
2480	98.69			96.2	33.01	3.68	34.2	113	304	Peak
2480	84.76			82.27	33.01	3.68	34.2	113	304	Average
2483.5	45.5	-28.5	74	43.01	33.01	3.68	34.2	100	116	Peak
2483.5	31.71	-22.29	54	29.22	33.01	3.68	34.2	100	116	Average



Test Mode :	Mode 4	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
146.91	18.23	-25.27	43.5	37.5	10.21	0.5	29.98			Peak
217.11	22.55	-23.45	46	42.03	9.89	0.61	29.98			Peak
234.12	21.01	-24.99	46	39.05	11.17	0.65	29.86			Peak
696.9	23.09	-22.91	46	32.41	19.28	1.13	29.73			Peak
767.6	22.48	-23.52	46	30.94	19.89	1.2	29.55			Peak
872.6	26.85	-19.15	46	34.66	20.48	1.29	29.58	100	26	Peak
2388.85	51.69	-22.31	74	49.41	32.86	3.47	34.05	100	0	Peak
2388.85	40.59	-13.41	54	38.31	32.86	3.47	34.05	100	0	Average
2402	105.92			103.64	32.86	3.47	34.05	121	0	Peak
2402	90.01			87.73	32.86	3.47	34.05	121	0	Average
2489.36	49.53	-24.47	74	46.99	33.05	3.72	34.23	110	20	Peak
2489.36	37.3	-16.7	54	34.76	33.05	3.72	34.23	110	20	Average

Test Mode :	Mode 4	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
33.51	24.44	-15.56	40	38.74	15.56	0.23	30.09	100	122	Peak
149.07	23.96	-19.54	43.5	43.35	10.07	0.51	29.97			Peak
184.71	23.61	-19.89	43.5	44.5	8.44	0.57	29.9			Peak
554.8	21.1	-24.9	46	31.27	18.51	1	29.68			Peak
827.8	21.95	-24.05	46	30.09	20.22	1.27	29.63			Peak
872.6	26.86	-19.14	46	34.67	20.48	1.29	29.58			Peak
2362.82	49.43	-24.57	74	47.22	32.81	3.38	33.98	100	112	Peak
2362.82	37.29	-16.71	54	35.08	32.81	3.38	33.98	100	112	Average
2402	101.72			99.44	32.86	3.47	34.05	100	59	Peak
2402	86.53			84.25	32.86	3.47	34.05	100	59	Average
2488.03	49.4	-24.6	74	46.86	33.05	3.72	34.23	100	197	Peak
2488.03	37.32	-16.68	54	34.78	33.05	3.72	34.23	100	197	Average

Test Mode :	Mode 5	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
76.71	16.91	-23.09	40	40.55	6.06	0.35	30.05			Peak
148.8	18.58	-24.92	43.5	37.91	10.14	0.51	29.98			Peak
219	21.67	-24.33	46	41	10.03	0.62	29.98			Peak
692	21.51	-24.49	46	30.86	19.25	1.12	29.72			Peak
823.6	22.47	-23.53	46	30.69	20.14	1.26	29.62			Peak
873.3	27.05	-18.95	46	34.86	20.48	1.29	29.58	100	116	Peak
2340.59	50.18	-23.82	74	48.01	32.78	3.33	33.94	100	89	Peak
2340.59	37.43	-16.57	54	35.26	32.78	3.33	33.94	100	89	Average
2441	105.63			103.23	32.95	3.6	34.15	100	4	Peak
2441	90.01			87.61	32.95	3.6	34.15	100	4	Average
2487.27	49.35	-24.65	74	46.86	33.01	3.68	34.2	100	73	Peak
2487.27	37.32	-16.68	54	34.83	33.01	3.68	34.2	100	73	Average

Test Mode :	Mode 5	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
33.51	24.88	-15.12	40	39.18	15.56	0.23	30.09	100	62	Peak
40.26	23.16	-16.84	40	41.32	11.64	0.25	30.05			Peak
150.42	24.08	-19.42	43.5	43.54	10	0.51	29.97			Peak
646.5	21.75	-24.25	46	31.42	18.89	1.09	29.65			Peak
872.6	27.29	-18.71	46	35.1	20.48	1.29	29.58			Peak
960.1	25.53	-28.47	54	32.94	20.79	1.34	29.54			Peak
2347.43	50	-24	74	47.83	32.78	3.33	33.94	100	236	Peak
2347.43	38.03	-15.97	54	35.86	32.78	3.33	33.94	100	236	Average
2441	98.66			96.26	32.95	3.6	34.15	136	348	Peak
2441	85.23			82.83	32.95	3.6	34.15	136	348	Average
2489.17	50.15	-23.85	74	47.61	33.05	3.72	34.23	100	18	Peak
2489.17	37.31	-16.69	54	34.77	33.05	3.72	34.23	100	18	Average

Test Mode :	Mode 6	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
30.54	19.99	-20.01	40	32.53	17.29	0.25	30.08			Peak
214.95	20.95	-22.55	43.5	40.56	9.77	0.61	29.99			Peak
234.12	21.17	-24.83	46	39.21	11.17	0.65	29.86			Peak
375.6	22.19	-23.81	46	35.99	15.25	0.83	29.88			Peak
872.6	27.09	-18.91	46	34.9	20.48	1.29	29.58	100	29	Peak
960.1	24.92	-29.08	54	32.33	20.79	1.34	29.54			Peak
2350	48.58	-25.42	74	46.41	32.78	3.33	33.94	100	78	Peak
2350	37.43	-16.57	54	35.26	32.78	3.33	33.94	100	78	Average
2480	88.72			86.23	33.01	3.68	34.2	100	360	Average
2480	104.82			102.33	33.01	3.68	34.2	100	360	Peak
2483.848	35.35	-18.65	54	32.86	33.01	3.68	34.2	100	133	Average
2483.848	49.52	-24.48	74	47.03	33.01	3.68	34.2	100	133	Peak

Test Mode :	Mode 6	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Chenmy Cheng	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
33.24	24.7	-15.3	40	38.51	16.04	0.24	30.09	100	115	Peak
148.53	25.61	-17.89	43.5	44.94	10.14	0.51	29.98			Peak
184.44	22.95	-20.55	43.5	43.84	8.44	0.57	29.9			Peak
628.3	22.56	-23.44	46	32.34	18.78	1.08	29.64			Peak
873.3	26.73	-19.27	46	34.54	20.48	1.29	29.58			Peak
960.1	25.08	-28.92	54	32.49	20.79	1.34	29.54			Peak
2354	48.74	-25.26	74	46.53	32.81	3.38	33.98	100	118	Peak
2354	36.83	-17.17	54	34.62	32.81	3.38	33.98	100	118	Average
2480	86.86			84.37	33.01	3.68	34.2	100	13	Average
2480	100.61			98.12	33.01	3.68	34.2	100	13	Peak
2483.992	33.99	-20.01	54	31.5	33.01	3.68	34.2	100	189	Average
2483.992	45.93	-28.07	74	43.44	33.01	3.68	34.2	100	189	Peak

3.10 Antenna Requirements

3.10.1 Standard Applicable

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

3.10.2 Antenna Connected Construction

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

3.10.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 24, 2010	Aug. 23, 2011	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 24, 2010	Aug. 23, 2011	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 02, 2011	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Jan. 07, 2011	Jan. 06, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Jan. 07, 2011	Jan. 06, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 10, 2010	Nov. 09, 2011	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 16, 2010	Nov. 15, 2011	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2010	Dec. 06, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 09, 2010	Dec. 08, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Active horn antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 09, 2010	Nov. 08, 2011	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 06, 2011	Jan. 05, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15-40GHz	Oct. 15, 2010	Oct. 14, 2011	Radiation (03CH01-KS)
Bluetooth Base Station	R&S	CBT	100783	N/A	Aug. 17, 2010	Aug. 16, 2011	-
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 07, 2011	Jan. 06, 2012	-

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 EP180510 as below.