

FCC RF Test Report

APPLICANT : Motorola Mobility, Inc.
EQUIPMENT : GSM / WCDMA Mobile Phone
BRAND NAME : Motorola
MODEL NAME : EX431G/EX430
GPPD NUMBER : 3356
FCC ID : IHDT56NE1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Dec. 02, 2011 and completely tested on Jan. 16, 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.

TEL : 886-3-327-3456

FAX : 886-3-328-4978

FCC ID : IHDT56NE1

Page Number : 1 of 61

Report Issued Date : Jan. 18, 2012

Report Version : Rev. 02

TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test	5
1.4 Testing Site	6
1.5 Applied Standards	6
1.6 Ancillary Equipment List	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 RF Output Power	8
2.2 Test Mode	9
2.3 Connection Diagram of Test System	10
2.4 RF Utility	10
3 TEST RESULT	11
3.1 Number of Channel Measurement	11
3.2 20dB Bandwidth Measurement	13
3.3 Hopping Channel Separation Measurement	20
3.4 Dwell Time Measurement	23
3.5 Peak Output Power Measurement	25
3.6 Band Edges Measurement	28
3.7 Spurious Emission Measurement	39
3.8 AC Conducted Emission Measurement	43
3.9 Radiated Emission Measurement	47
3.10 Antenna Requirements	57
4 LIST OF MEASURING EQUIPMENT	58
5 UNCERTAINTY OF EVALUATION	60



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR1D0154-01	Rev. 01	Initial issue of report	Jan. 16, 2012
FR1D0154-01	Rev. 02	Update report for adding model name	Jan. 18, 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 18.36 dB at 0.560 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 14.15 dB at 52.680 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

1.2 Manufacturer

Arima Communications Corp.

6F., No. 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM / WCDMA Mobile Phone
Brand Name	Motorola
Model Name	EX431G/EX430
FCC ID	IHDT56NE1
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) : 7.62 dBm (0.0058 W) Bluetooth EDR (2Mbps) : 7.43 dBm (0.0055 W) Bluetooth EDR (3Mbps) : 7.61 dBm (0.0058 W)
Antenna Type	PIFA Antenna with gain -0.79 dBi
HW Version	P2
SW Version	SILVC_W_01.02.16RDS
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

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 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	FCC/IC Registration No.
	03CH07-HY	722060/4086B-1

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.	
	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
- ♦ 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.	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
4.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 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	7.04 dBm	6.86 dBm	7.03 dBm
Ch39	2441MHz	7.62 dBm	7.43 dBm	7.61 dBm
Ch78	2480MHz	7.56 dBm	7.35 dBm	7.53 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).

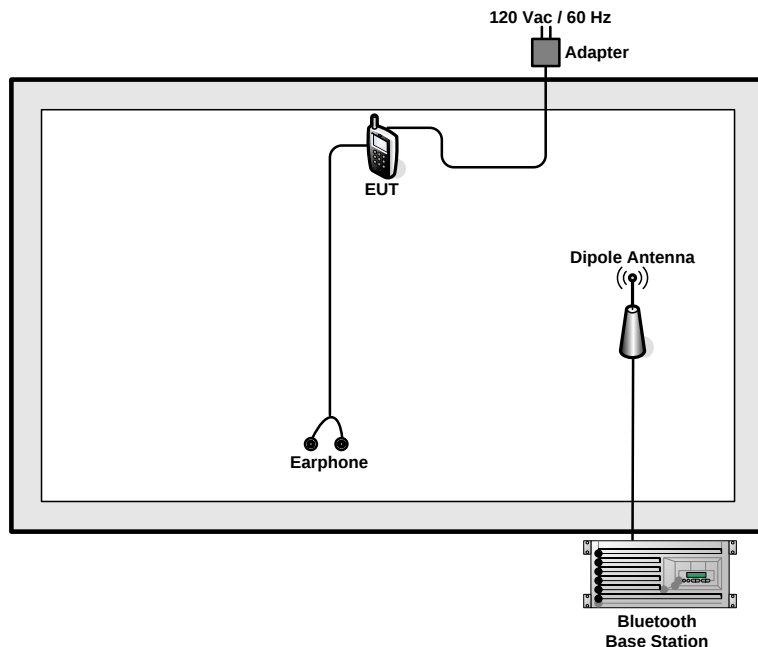
Pre-scanned tests were conducted to determine the final configuration from all possible combinations. Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

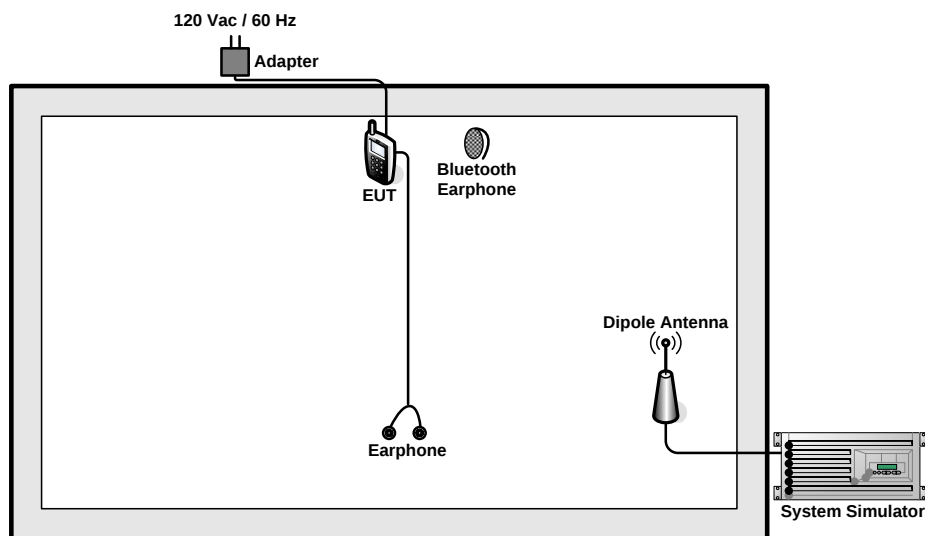
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	N/A	N/A
AC Conducted Emission	Mode 1 :GSM850 Idle + Bluetooth Link + Adapter + Earphone + Camera Mode 2 GSM1900 Idle + Bluetooth Link + Adapter + Earphone + MP3		
Remark: 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.			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, key in “* # * # 3646633 #” 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.

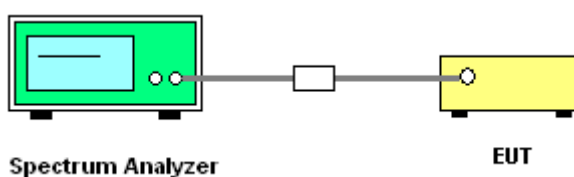
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

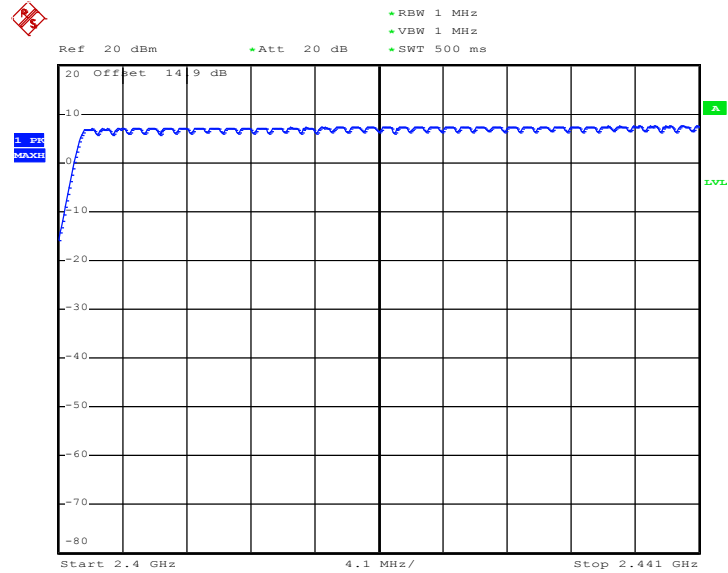
1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use 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

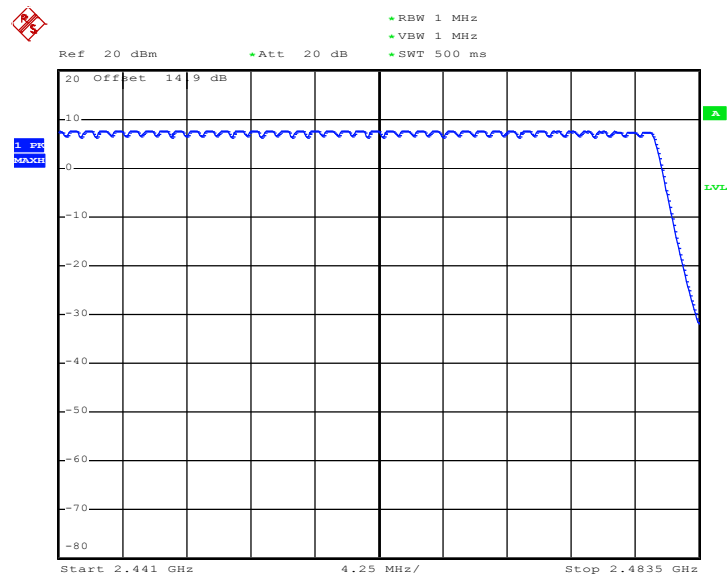


3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	23~24°C
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78


Date: 29.DEC.2011 21:59:24



Date: 29.DEC.2011 22:04:02

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

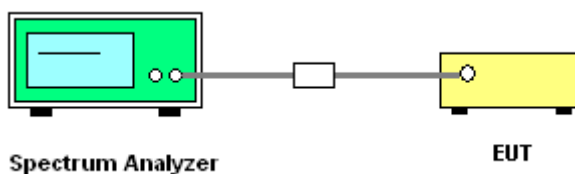
3.2.2 Measuring Instruments

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

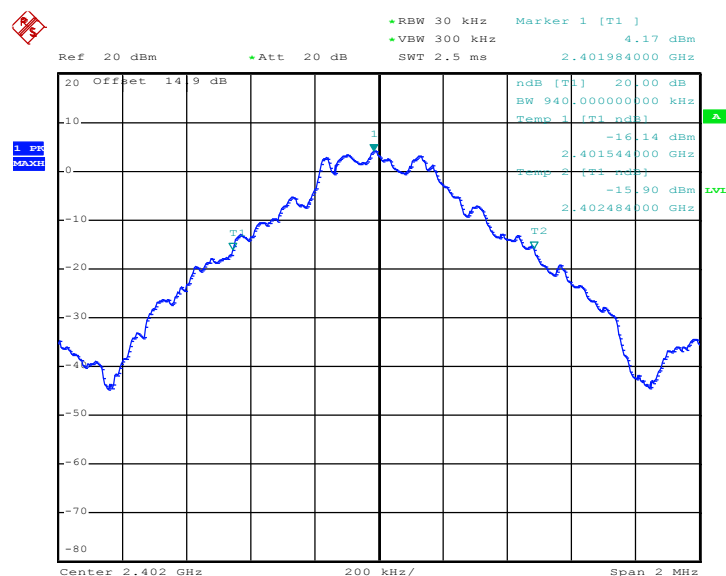


3.2.5 Test Result of 20dB Bandwidth

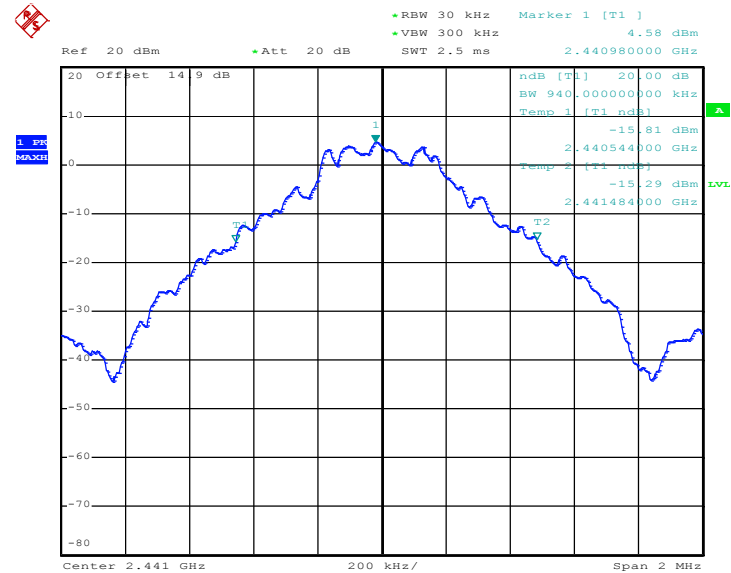
Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.940
39	2441	0.940
78	2480	0.852

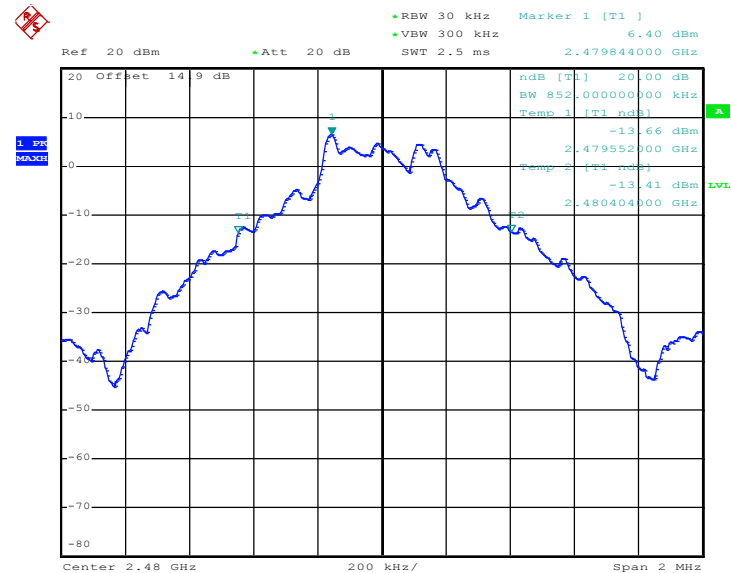
20 dB Bandwidth Plot on Channel 00



Date: 29.DEC.2011 21:34:51

20 dB Bandwidth Plot on Channel 39


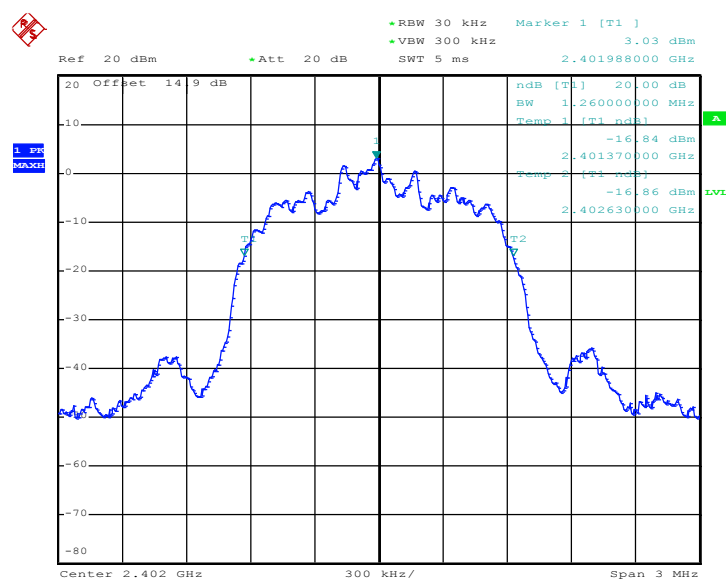
Date: 29.DEC.2011 21:35:06

20 dB Bandwidth Plot on Channel 78


Date: 29.DEC.2011 21:35:22

Test Mode :	Mode 4, 5, 6	Temperature :	23~24°C
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

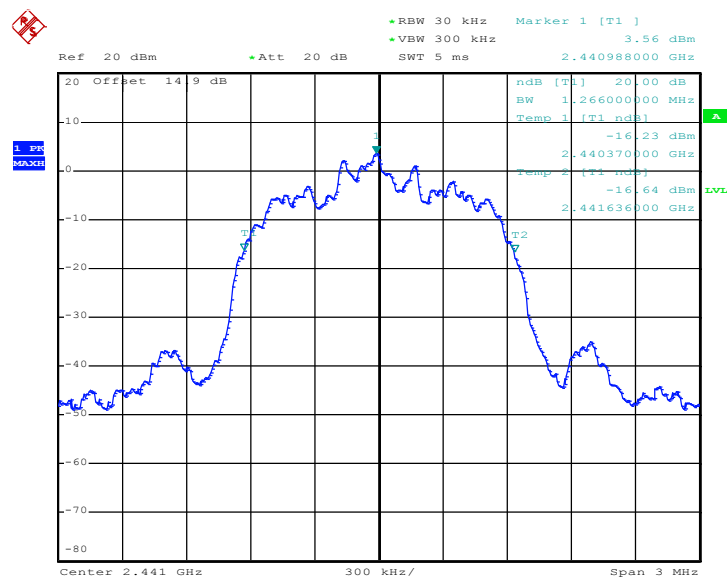
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.260
39	2441	1.266
78	2480	1.224

20 dB Bandwidth Plot on Channel 00


Date: 29.DEC.2011 21:35:50

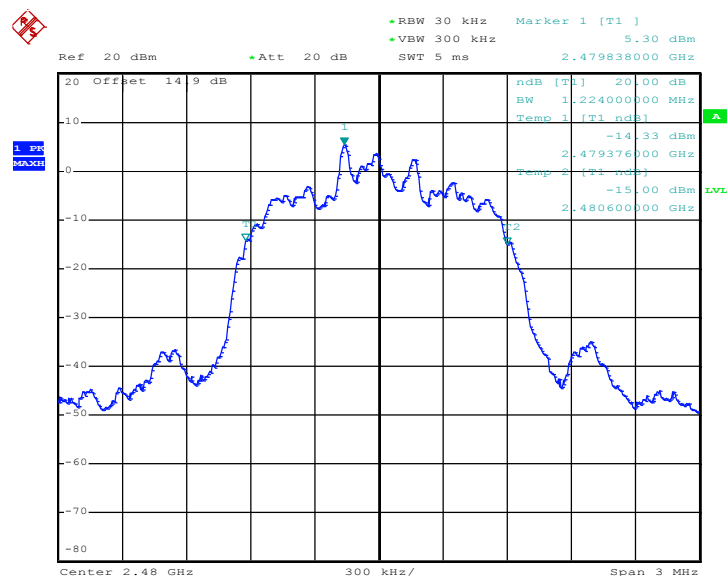


20 dB Bandwidth Plot on Channel 39



Date: 29.DEC.2011 21:36:39

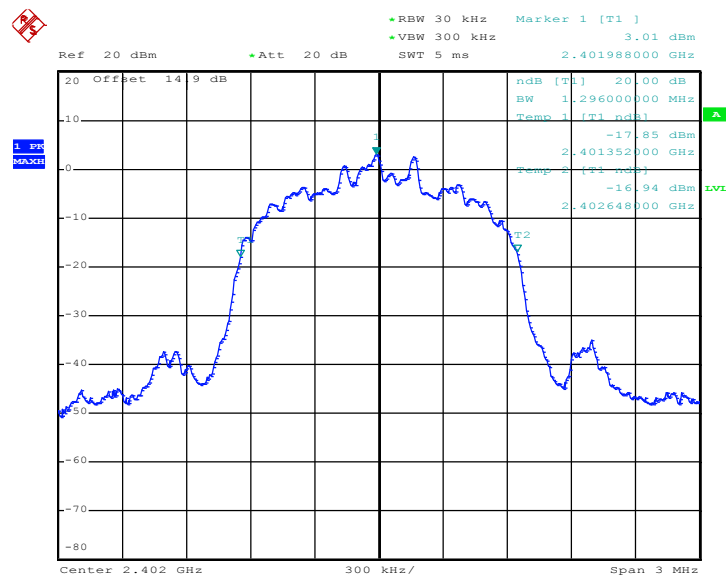
20 dB Bandwidth Plot on Channel 78



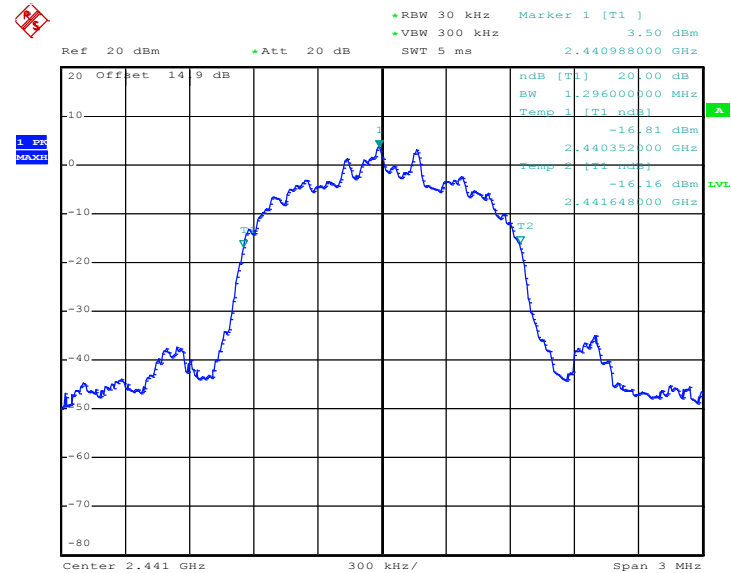
Date: 29.DEC.2011 21:37:38

Test Mode :	Mode 7, 8, 9	Temperature :	23~24°C
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

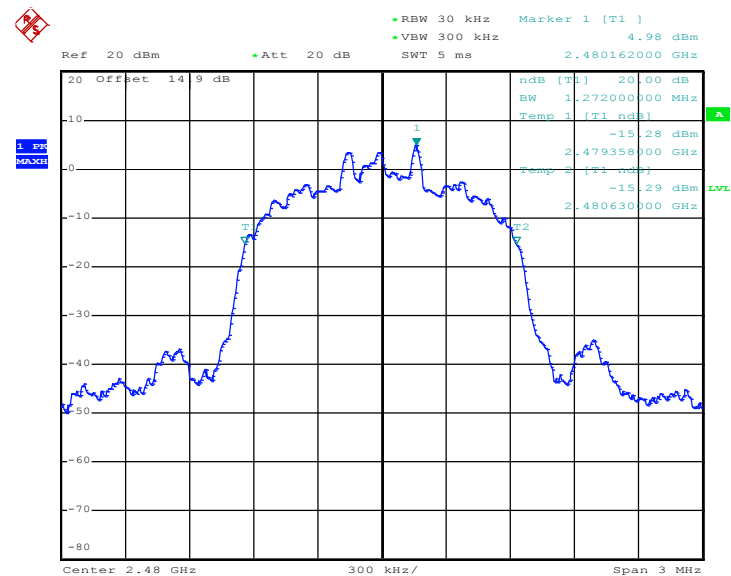
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.296
39	2441	1.296
78	2480	1.272

20 dB Bandwidth Plot on Channel 00


Date: 29.DEC.2011 21:38:50

20 dB Bandwidth Plot on Channel 39


Date: 29.DEC.2011 21:39:12

20 dB Bandwidth Plot on Channel 78


Date: 29.DEC.2011 21:39:45

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.

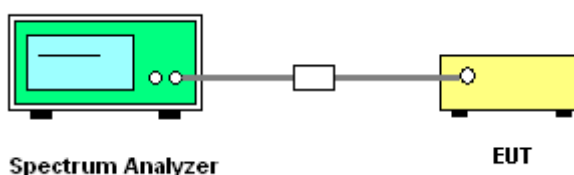
3.3.2 Measuring Instruments

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

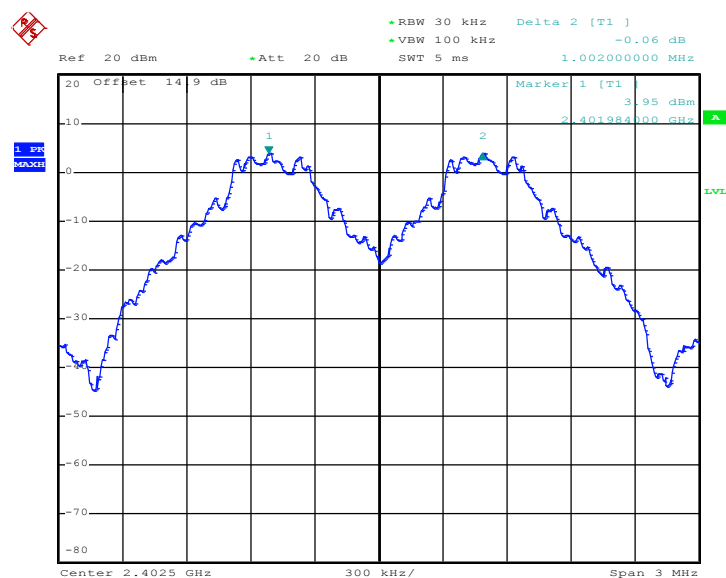


3.3.5 Test Result of Hopping Channel Separation

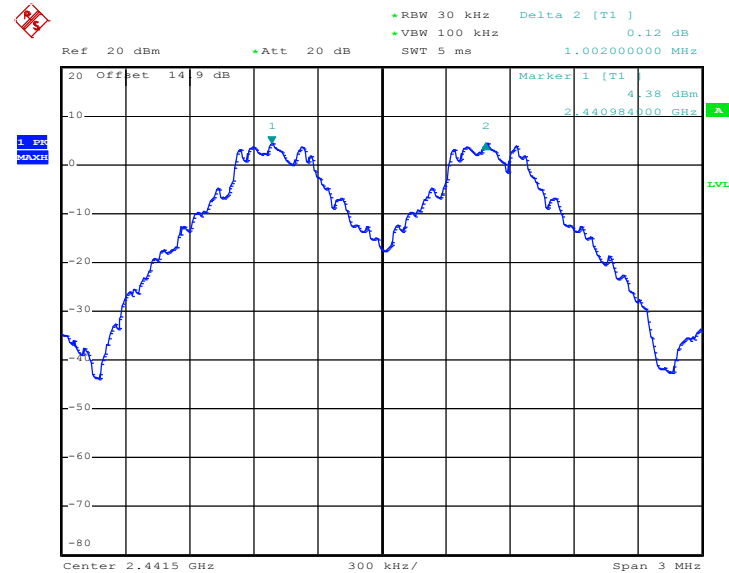
Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.627	Pass
39	2441	1.002	0.627	Pass
78	2480	1.002	0.568	Pass

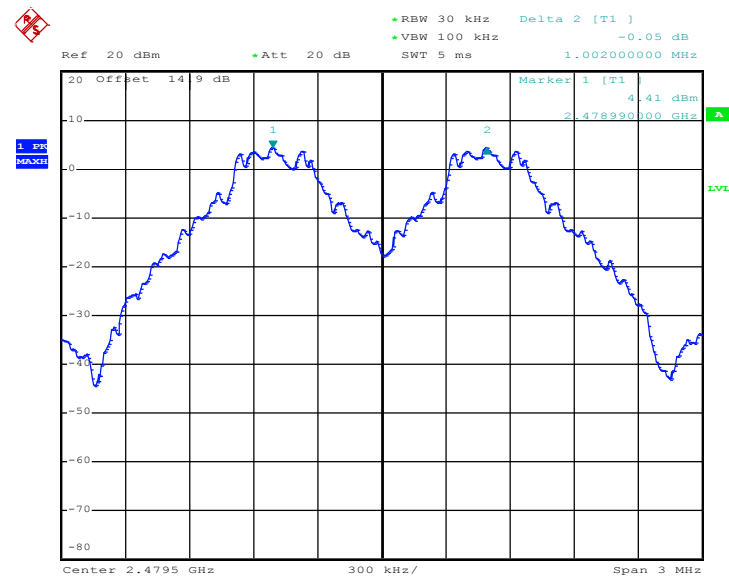
Channel Separation Plot on Channel 00 - 01



Date: 29.DEC.2011 21:24:21

Channel Separation Plot on Channel 39 - 40


Date: 29.DEC.2011 21:25:01

Channel Separation Plot on Channel 77 - 78


Date: 29.DEC.2011 21:25:40

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.

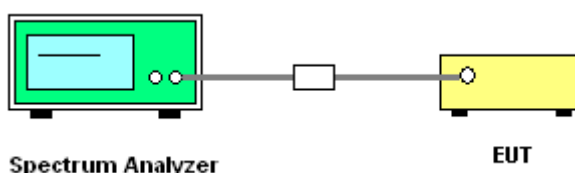
3.4.2 Measuring Instruments

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



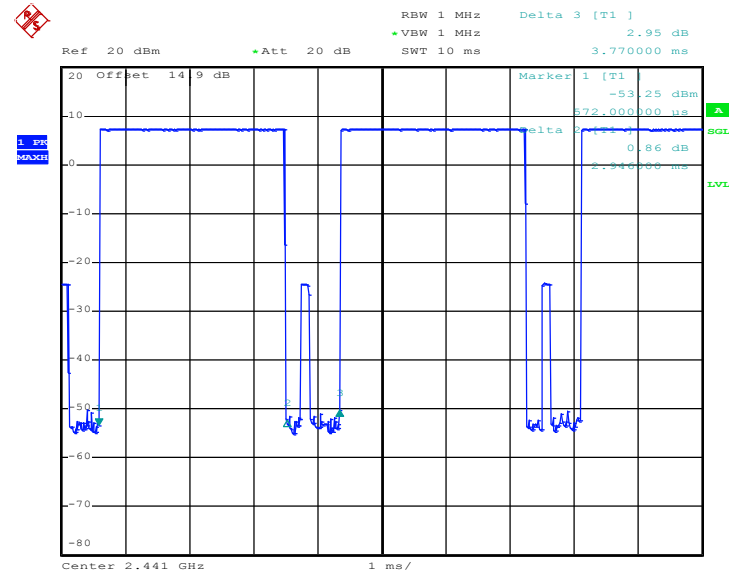
3.4.5 Test Result of Dwell Time

Test Mode :	Mode 2	Temperature :	23~24℃
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%

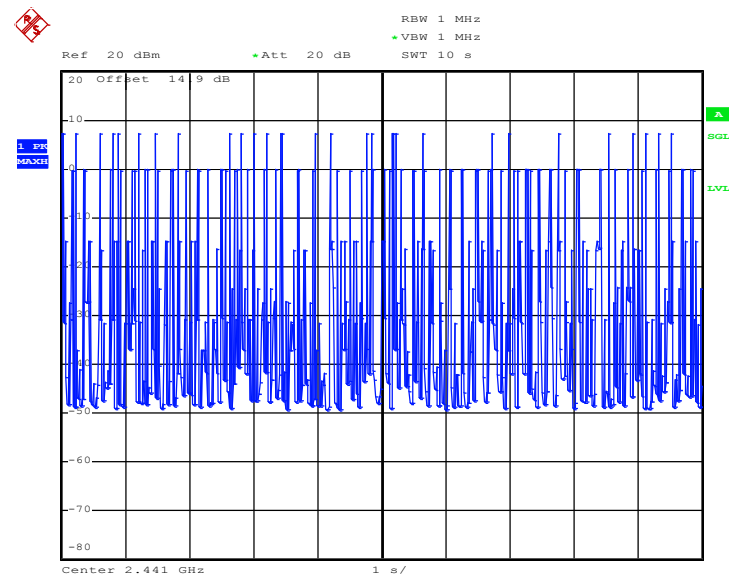
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	2.90	2946.00	0.27	0.4	Pass

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: 29.DEC.2011 20:35:39

DH5 Dwell Time (Count Pulses) Plot on Channel 39


Date: 29.DEC.2011 21:33:08

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.

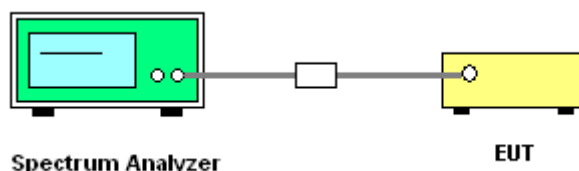
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

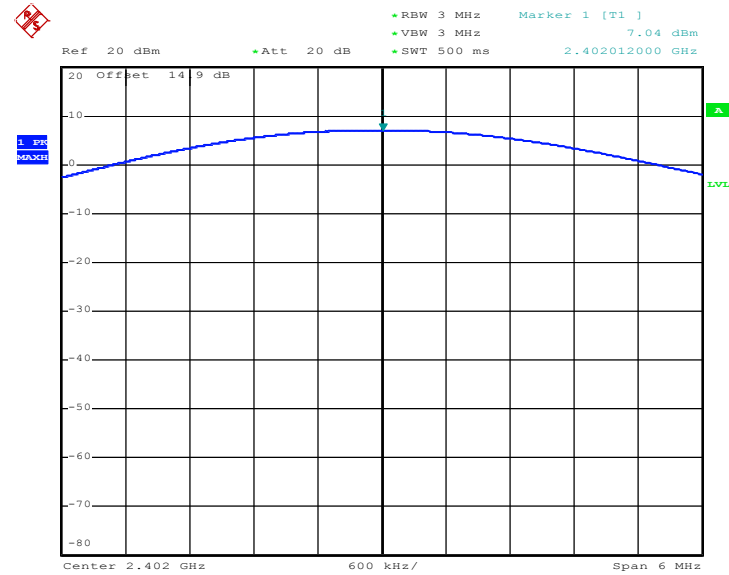
1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

3.5.4 Test Setup

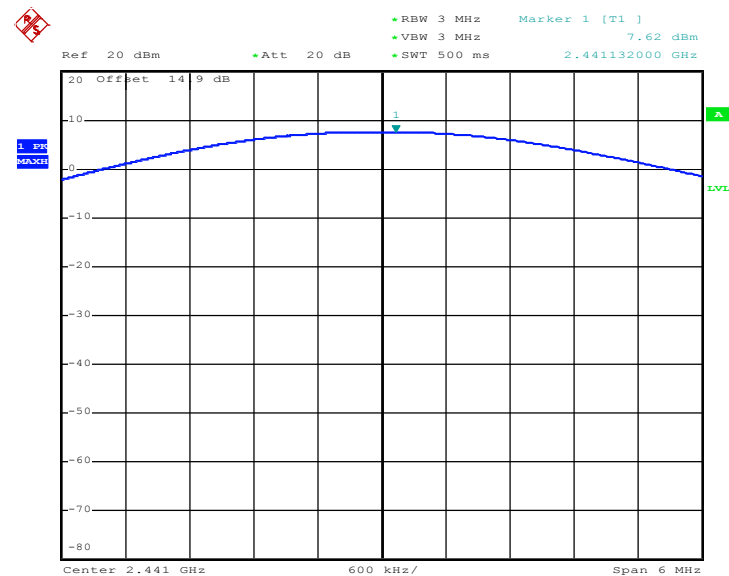


3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃	
Test Engineer :	Zhi Lu	Relative Humidity :	47~48%	
Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	7.04	30	Pass
39	2441	7.62	30	Pass
78	2480	7.56	30	Pass

Peak Output Power Plot on Channel 00


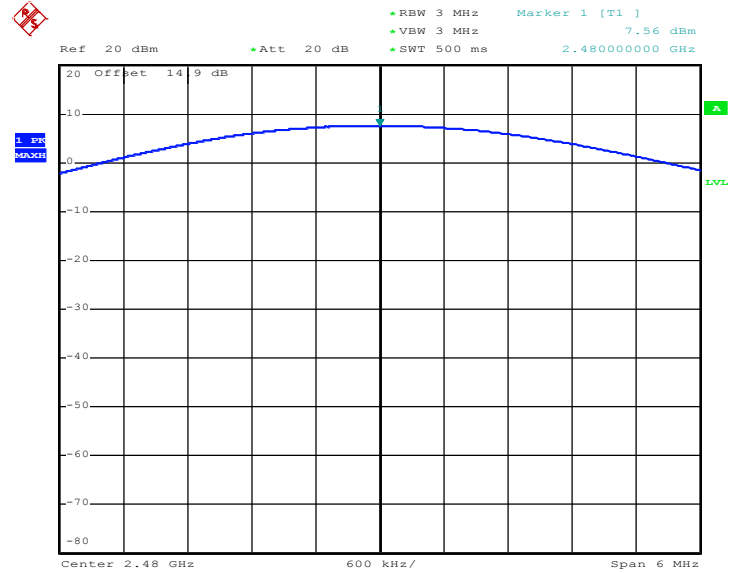
Date: 29.DEC.2011 20:30:48

Peak Output Power Plot on Channel 39


Date: 29.DEC.2011 20:38:36



Peak Output Power Plot on Channel 78



Date: 29.DEC.2011 20:33:18

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

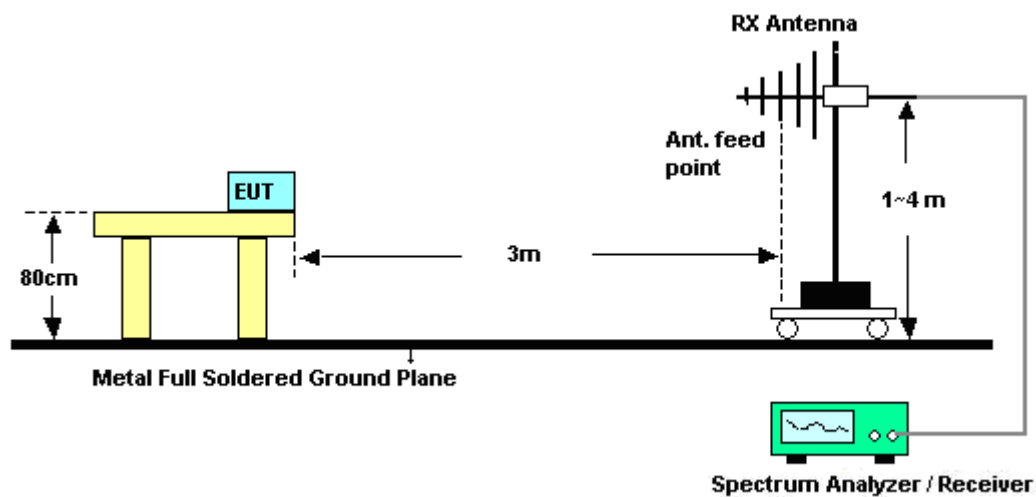
See list of measuring instruments of this test report.

3.6.3 Test Procedures

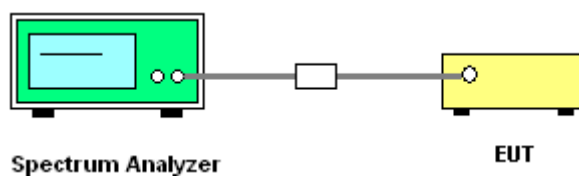
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300KHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	20~21°C
Test Channel :	00	Relative Humidity :	40~41%
		Test Engineer :	Jack Li

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
2388.66	45.39	-28.61	74	43.11	32.86	3.47	34.05	100	360	Peak
2388.66	32.33	-21.67	54	30.05	32.86	3.47	34.05	100	360	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
2326.15	45.24	-28.76	74	43.11	32.76	3.27	33.9	100	302	Peak
2326.15	32.47	-21.53	54	30.34	32.76	3.27	33.9	100	302	Average

Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
		Test Engineer :	Jack Li

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
2483.51	42.12	-31.88	74	39.63	33.01	3.68	34.2	100	0	Peak
2483.51	27.49	-26.51	54	25	33.01	3.68	34.2	100	0	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	81.68	54.19	27.49	54	-26.51	Pass
Hopping Mode	81.68	56.68	25	54	-29	Pass

Note : Average result = Maximum field strength – Delta result

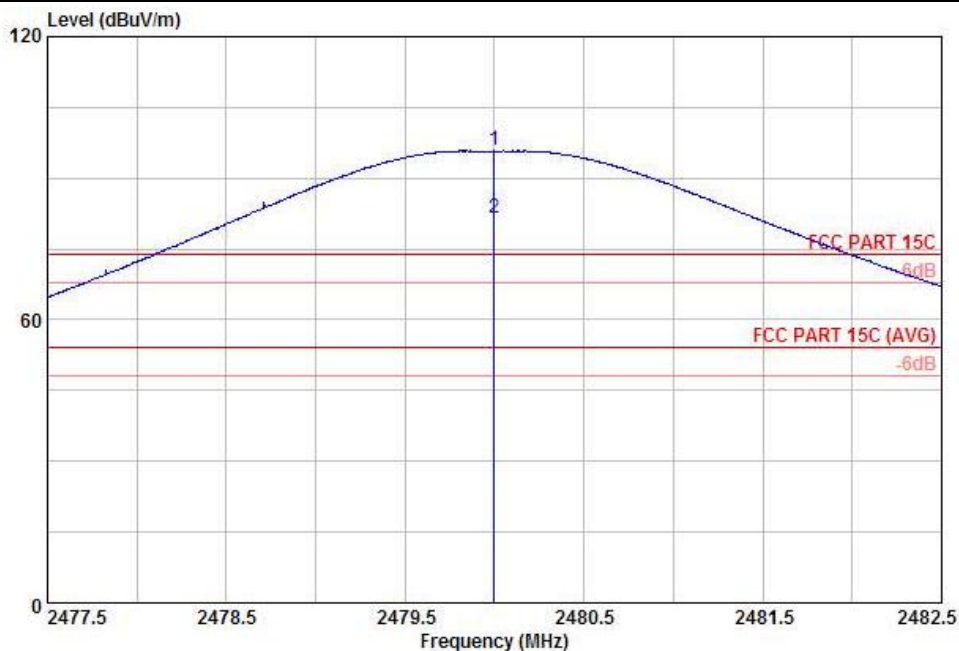
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.1	39.89	-34.11	74	37.4	33.01	3.68	34.2	100	31	Peak
2485.1	27.35	-26.65	54	24.86	33.01	3.68	34.2	100	31	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	76.1	49.32	26.78	54	-27.22	Pass
Hopping Mode	76.1	48.75	27.35	54	-26.65	Pass

Note : Average result = Maximum field strength – Delta result

Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Horizontal

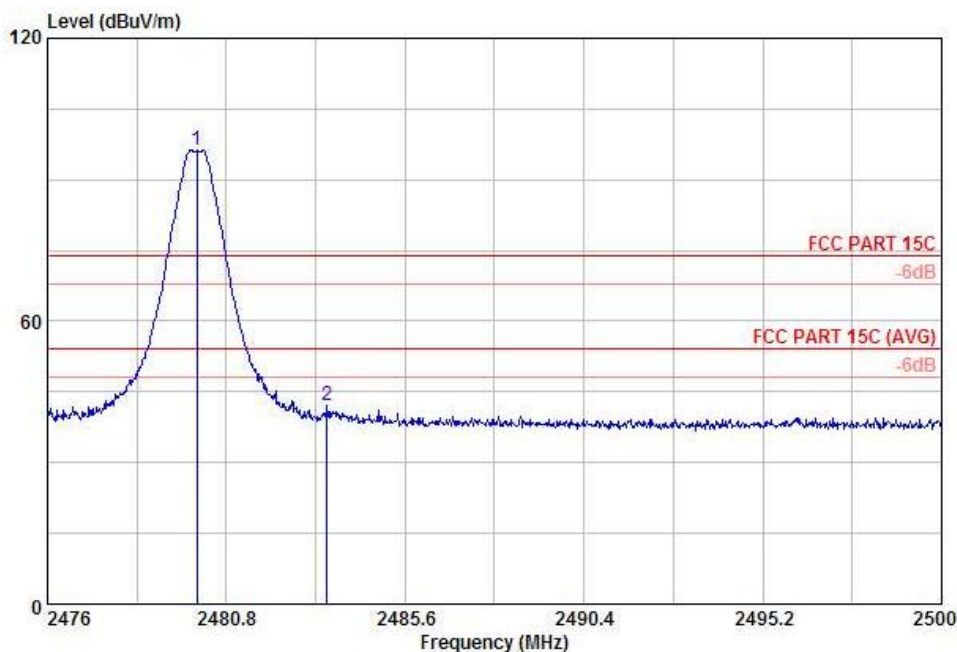


Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
 Project : (FR) 1D0154-01
 Mode : mode 3
 Plane : H

	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	2480.00	95.80	21.80	74.00	93.31	3.68	34.20	100	0	Peak
2 X	2480.00	81.68	27.68	54.00	79.19	3.68	34.20	100	0	Average

* Maximum field strength of the fundamental emission

Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Horizontal

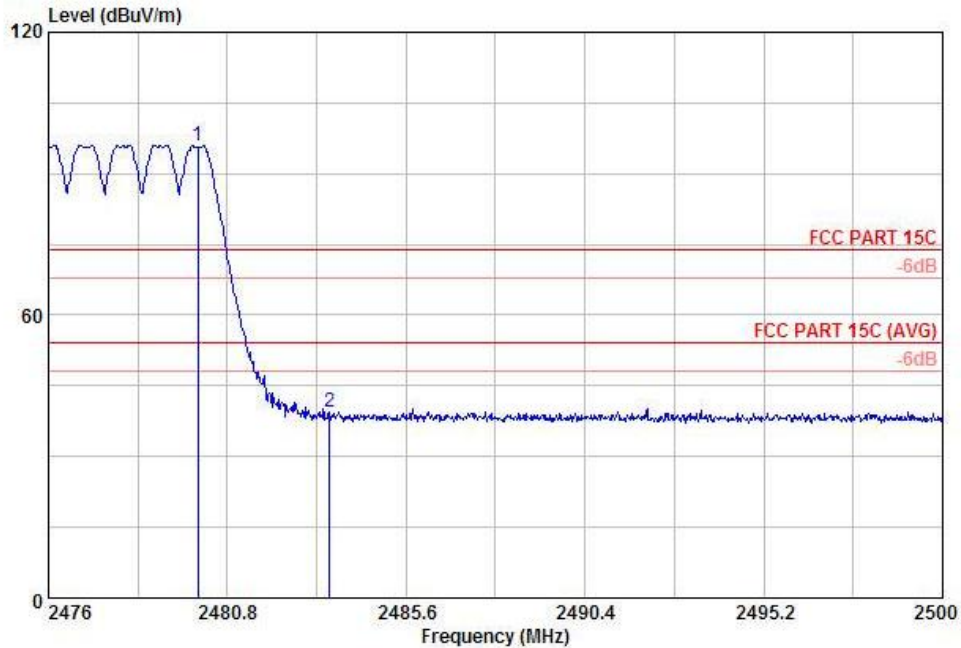


Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
 Project : (FR) 1D0154-01
 Mode : mode 3
 Plane : H

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	96.31	22.31	74.00	93.82	33.01	3.68	34.20	102	0 Peak
2	2483.51	42.12	-31.88	74.00	39.63	33.01	3.68	34.20	100	0 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 54.19 dB , single carrier Mode

Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Horizontal



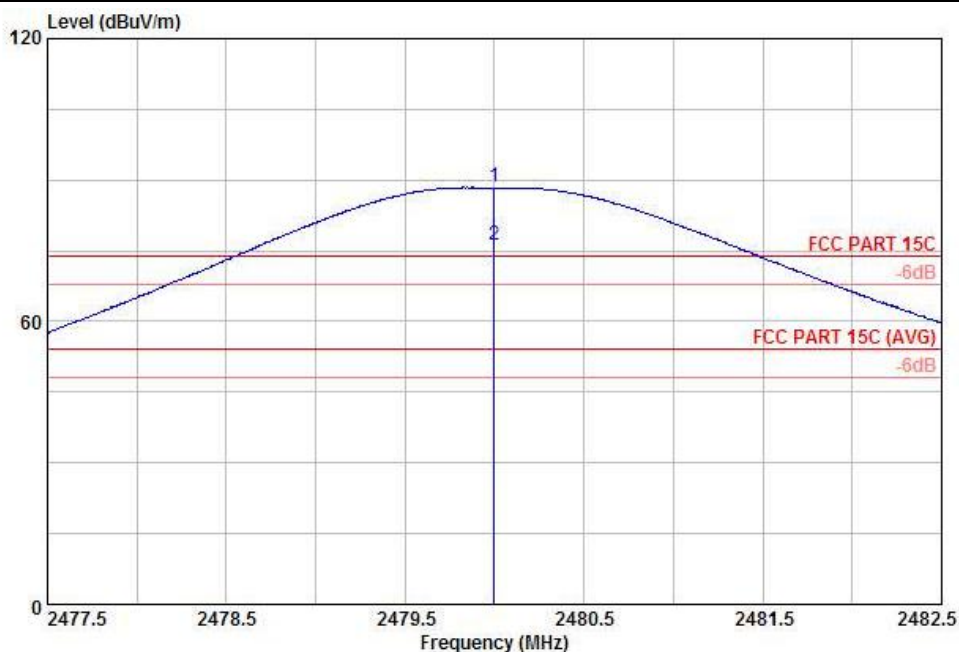
Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
 Project : (FR) 1D0154-01
 Mode : mode 3
 Plane : H

	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/m	dB	dB	cm	deg
1 X	2480.00	96.05	22.05	74.00	93.56	33.01	3.68	34.20	100	0 Peak
2	2483.54	39.37	-34.63	74.00	36.88	33.01	3.68	34.20	164	340 Peak

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



Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Vertical

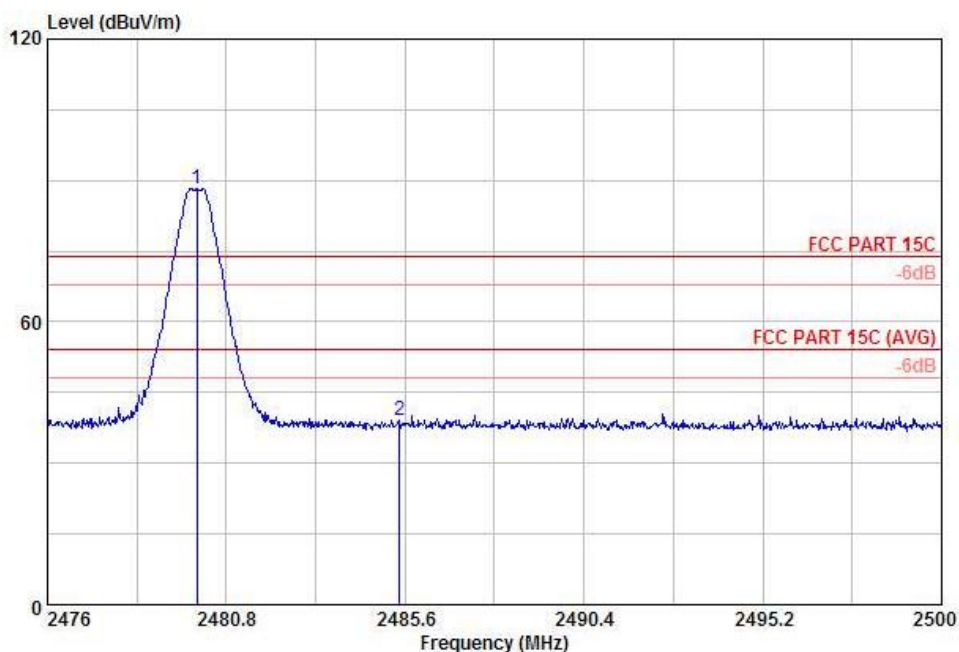


Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
Project : (FR) 1D0154-01
Mode : mode 3
Plane : H

	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	2480.00	88.43	14.43	74.00	85.94	3.68	34.20	104	45	Peak
2 X	2480.00	76.10	22.10	54.00	73.61	3.68	34.20	104	45	Average

* Maximum field strength of the fundamental emission

Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Vertical

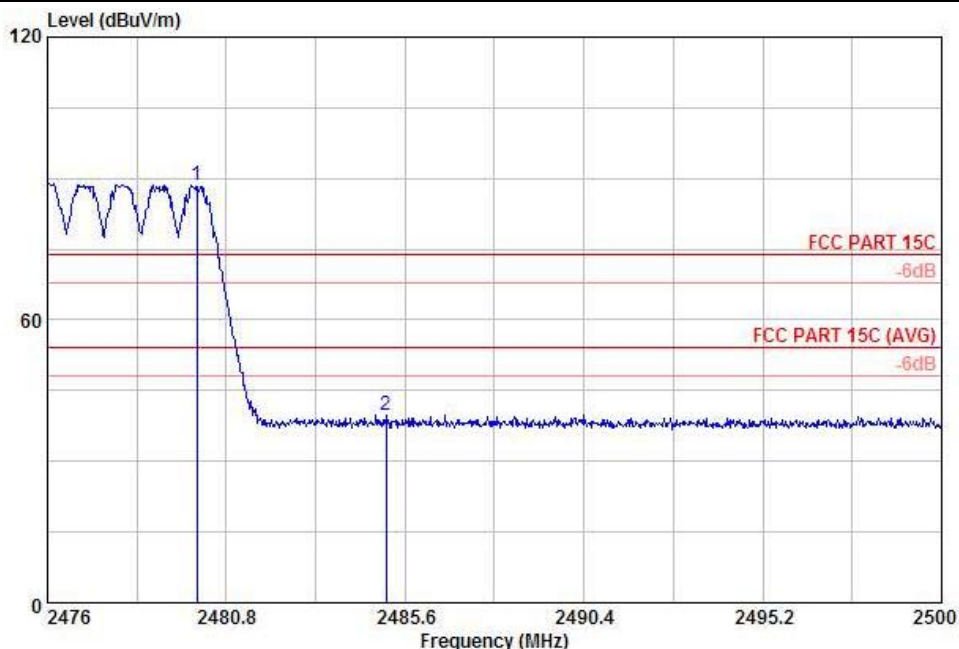


Site : 03CH01-KS
 Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
 Project : (FR) 1D0154-01
 Mode : mode 3
 Plane : H

	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	2480.00	88.30	14.30	74.00	85.81	33.01	3.68	34.20	103	40 Peak
2	2485.46	38.98	-35.02	74.00	36.49	33.01	3.68	34.20	200	360 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 49.32 dB , single carrier Mode

Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Vertical



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
Project : (FR) 1D0154-01
Mode : mode 3
Plane : H

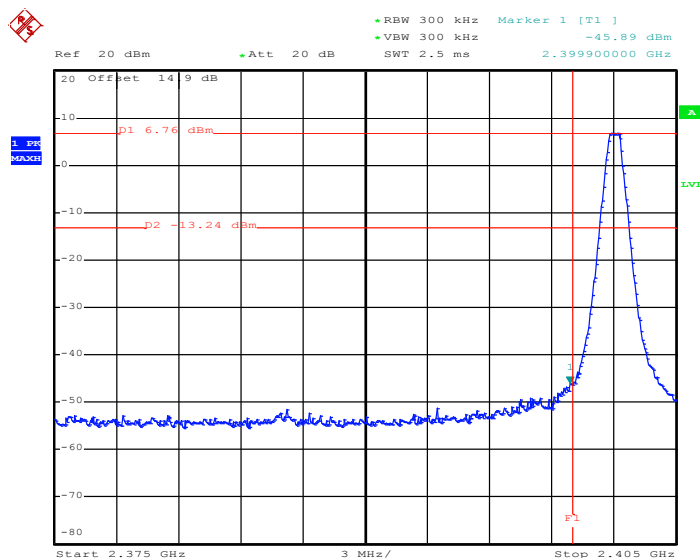
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 X	2480.00	88.64	14.64	74.00	86.15	3.68	34.20	102	40	Peak
2	2485.10	39.89	-34.11	74.00	37.40	3.68	34.20	100	31	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 48.75 dB , Hopping Mode

3.6.6 Test Result of Conducted Band Edges

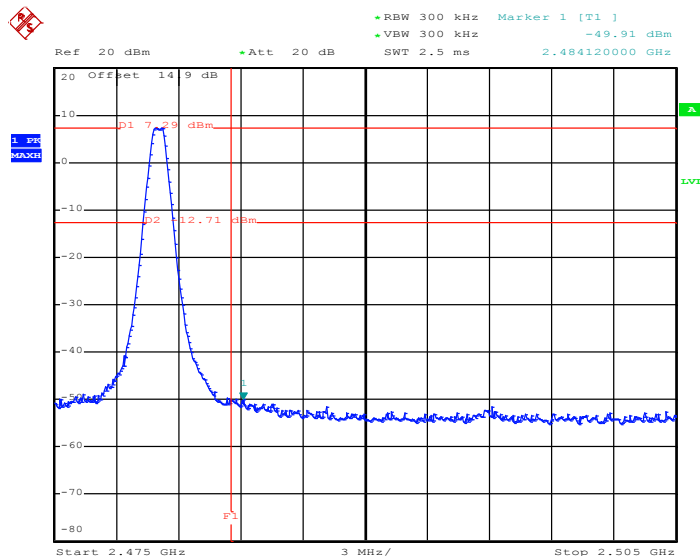
Test Mode :	Mode 1 and 3	Temperature :	23~24℃
Test Channel :	00 and 78	Relative Humidity :	47~48%
		Test Engineer :	Zhi Lu

Low Band Edge Plot on Channel 00



Date: 29.DEC.2011 21:40:39

High Band Edge Plot on Channel 78



Date: 29.DEC.2011 21:41:43

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.

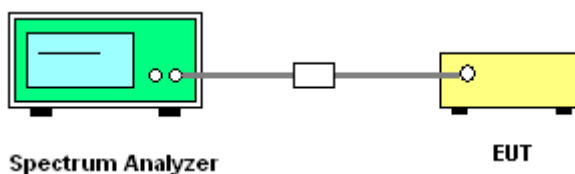
3.7.2 Measuring Instruments

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.

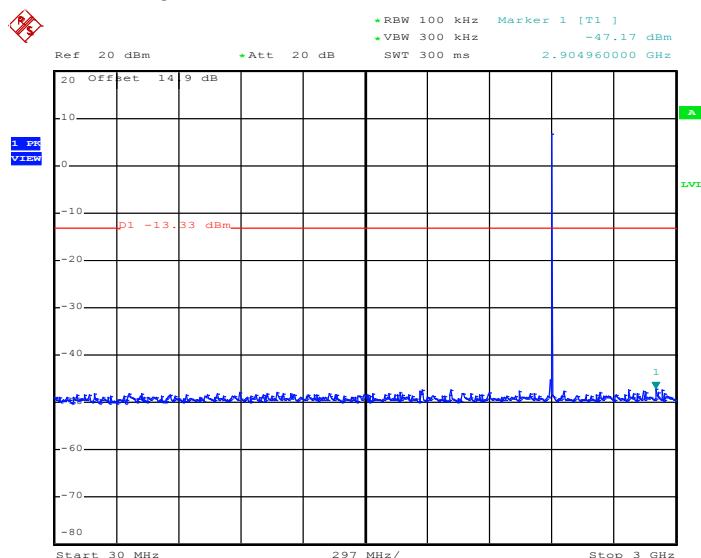
3.7.4 Test Setup



3.7.5 Test Result

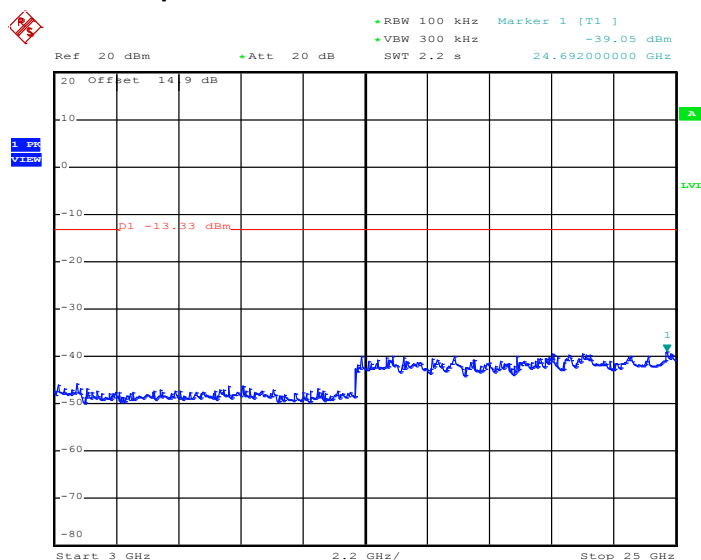
Test Mode :	Mode 1	Temperature :	23~24℃
Test Channel :	00	Relative Humidity :	47~48%
		Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



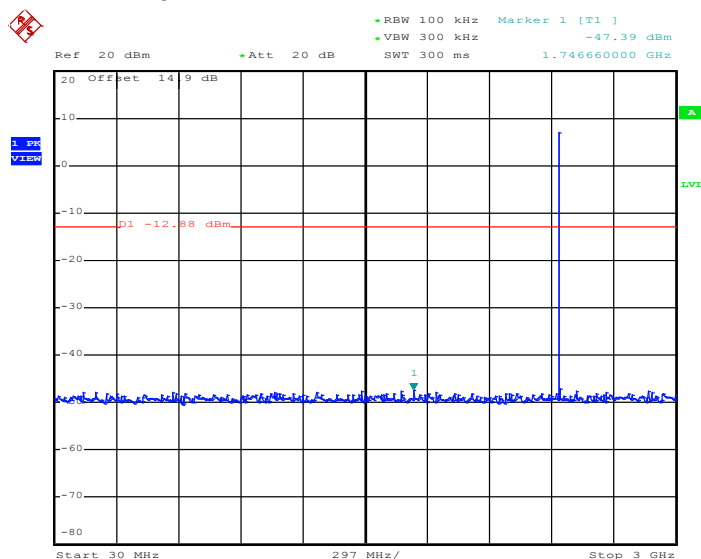
Date: 29.DEC.2011 21:51:54

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

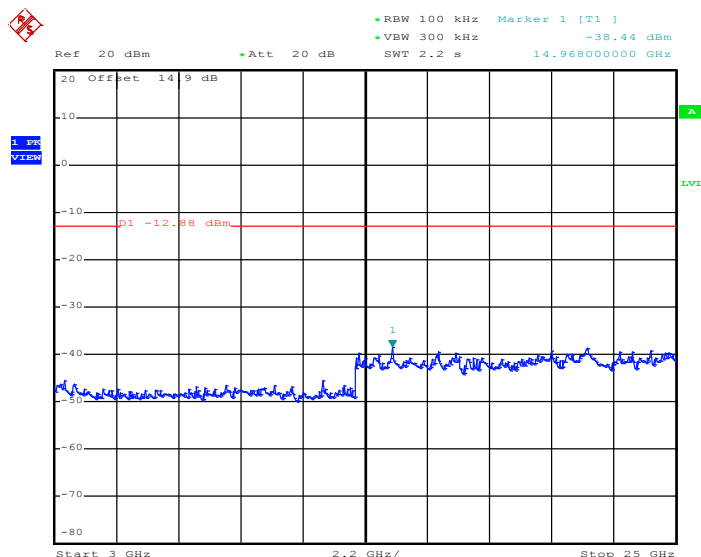


Date: 29.DEC.2011 21:52:06

Test Mode :	Mode 2	Temperature :	23~24°C
Test Channel :	39	Relative Humidity :	47~48%
		Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 29.DEC.2011 21:52:59

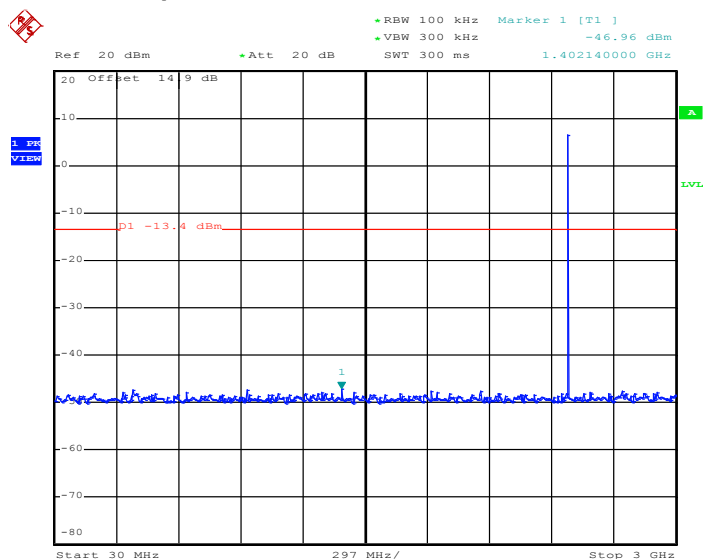
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 29.DEC.2011 21:53:11



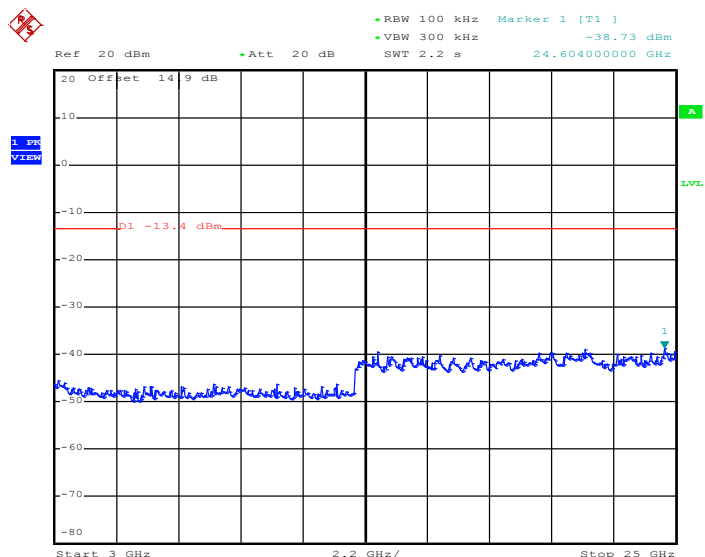
Test Mode :	Mode 3	Temperature :	23~24℃
Test Channel :	78	Relative Humidity :	47~48%
		Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 29.DEC.2011 21:54:03

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 29.DEC.2011 21:54:15

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.

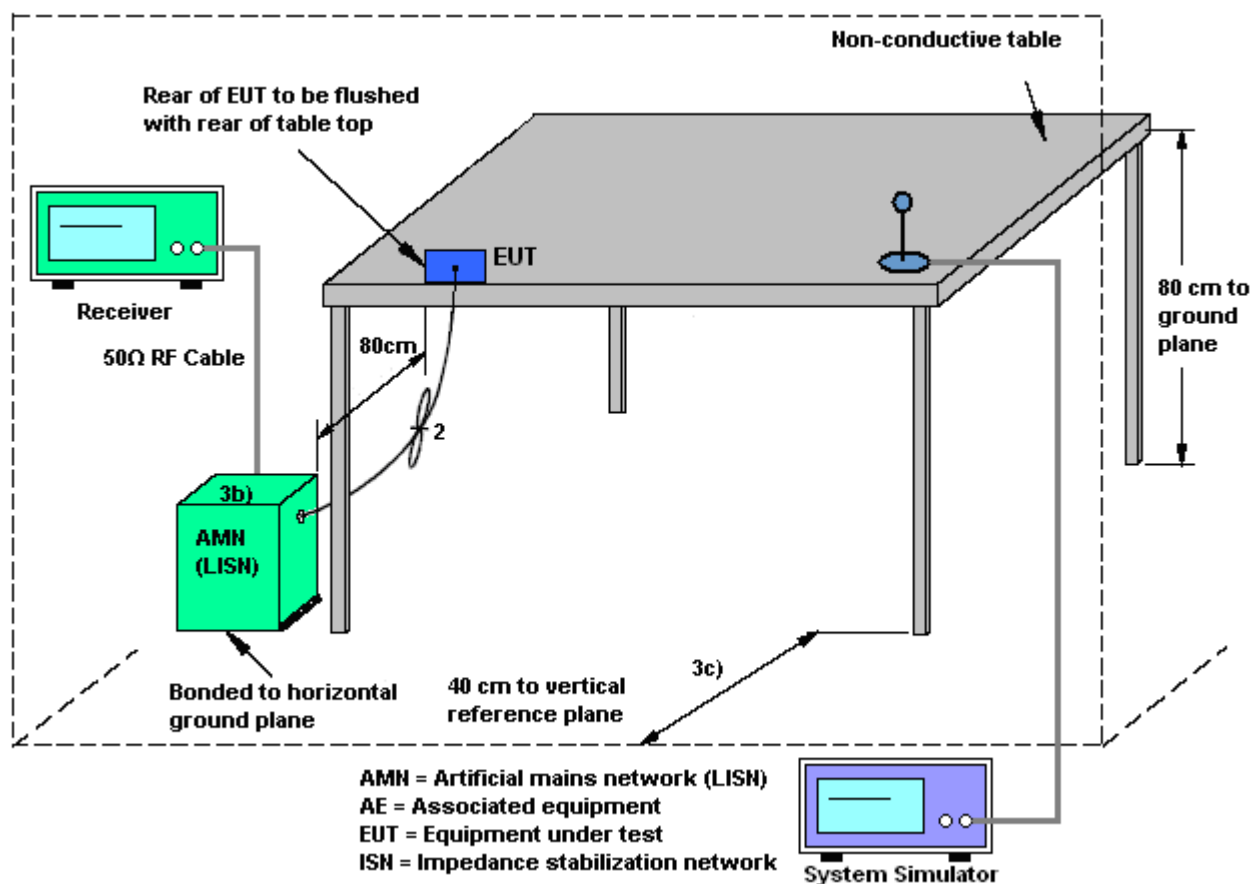
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

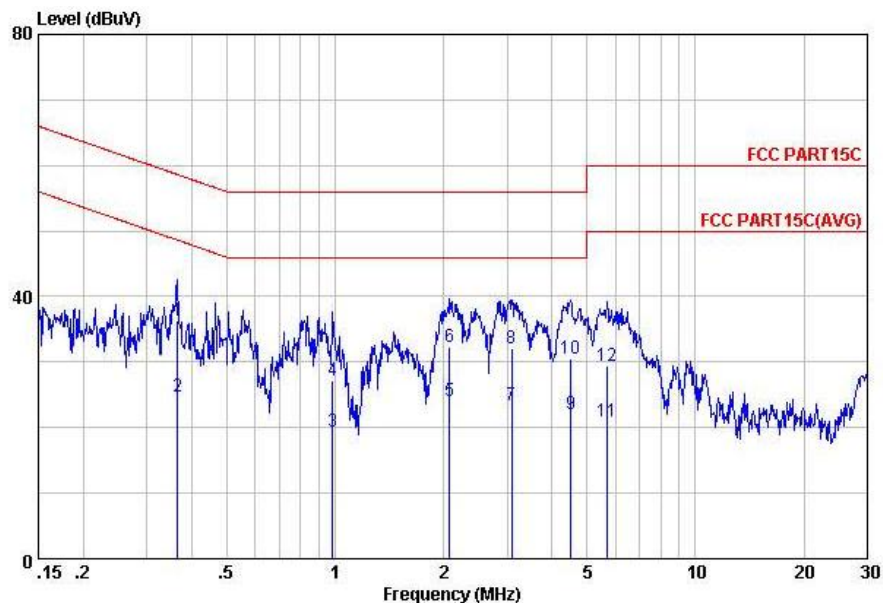
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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 :	Jack Li	Relative Humidity :	40~41%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM1900 Idle + Bluetooth Link + Adapter + Earphone + MP3		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

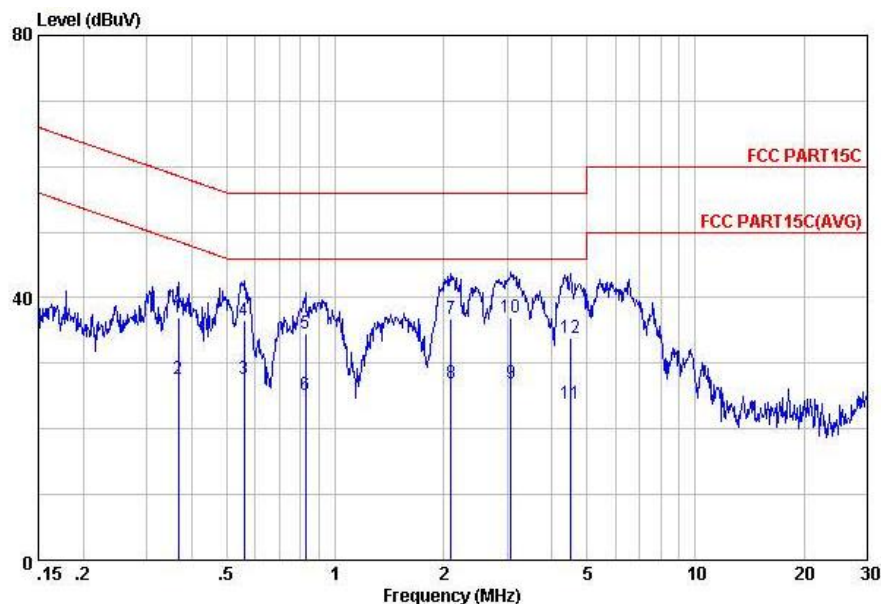


Site : C001-KS
Condition: FCC PART15C LISN-100807 LINE

mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
1	0.37	36.31	-22.30	58.61	26.21	-0.08	10.18	QP
2	0.37	24.71	-23.90	48.61	14.61	-0.08	10.18	Average
3	0.98	19.36	-26.64	46.00	9.20	-0.10	10.26	Average
4	0.98	27.26	-28.74	56.00	17.10	-0.10	10.26	QP
5	2.08	24.02	-21.98	46.00	13.80	-0.11	10.33	Average
6	2.08	32.32	-23.68	56.00	22.10	-0.11	10.33	QP
7	3.09	23.45	-22.55	46.00	13.20	-0.12	10.37	Average
8	3.09	32.05	-23.95	56.00	21.80	-0.12	10.37	QP
9	4.50	22.16	-23.84	46.00	11.90	-0.13	10.39	Average
10	4.50	30.56	-25.44	56.00	20.30	-0.13	10.39	QP
11	5.68	20.88	-29.12	50.00	10.60	-0.13	10.41	Average
12	5.68	29.38	-30.62	60.00	19.10	-0.13	10.41	QP

Test Mode :	Mode 2	Temperature :	21~22°C
Test Engineer :	Jack Li	Relative Humidity :	40~41%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM1900 Idle + Bluetooth Link + Adapter + Earphone + MP3		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-100807 NEUTRAL

mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.37	37.01	-21.55	58.56	26.91	-0.08	10.18	QP
2	0.37	27.71	-20.85	48.56	17.61	-0.08	10.18	Average
3	0.56	27.64	-18.36	46.00	17.50	-0.08	10.22	Average
4	0.56	36.54	-19.46	56.00	26.40	-0.08	10.22	QP
5	0.83	34.46	-21.54	56.00	24.29	-0.08	10.25	QP
6	0.83	25.26	-20.74	46.00	15.09	-0.08	10.25	Average
7	2.10	36.72	-19.28	56.00	26.50	-0.11	10.33	QP
8	2.10	26.92	-19.08	46.00	16.70	-0.11	10.33	Average
9	3.07	26.95	-19.05	46.00	16.70	-0.12	10.37	Average
10	3.07	37.05	-18.95	56.00	26.80	-0.12	10.37	QP
11	4.50	23.76	-22.24	46.00	13.50	-0.13	10.39	Average
12	4.50	33.76	-22.24	56.00	23.50	-0.13	10.39	QP

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

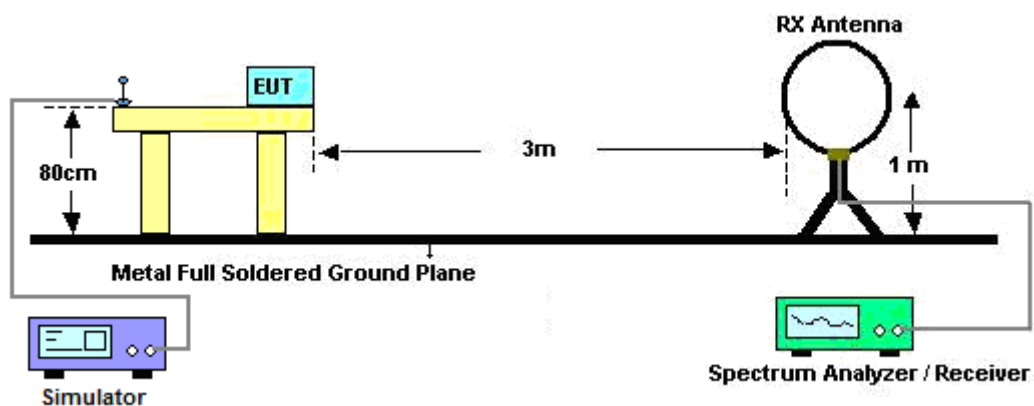
See list of measuring instruments of this test report.

3.9.3 Test Procedures

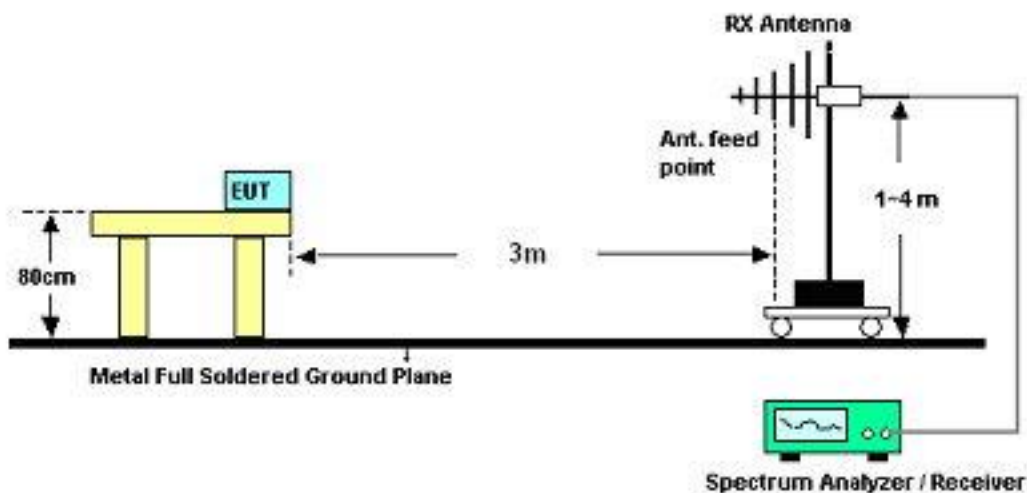
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector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

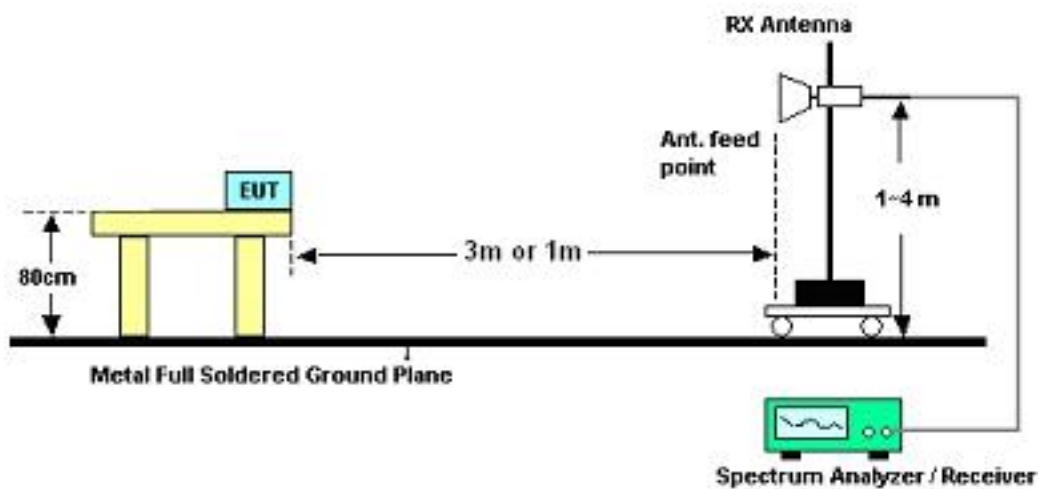
For radiated emissions below 30MHz



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 :	Kyle Jhuang	Temperature :	21~23°C
		Relative Humidity :	55~58%

Frequency	Measurement Distance	Field Strength	Antenna Factor	Distance Factor	Limit Distance	Field Strength at Limit Distance (30m)	Limit (30m)
(MHz)	(m)	(dBuV/m)	(dB/m)	(dB/decade)	(m)	(dBuV/m)	(dBuV/m)
0.03277	3	-2.08	20.1	40	30	-42.08	29.54
26.0000	3	6.64	20.5	40	30	33.36	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- $40 \cdot \log(30\text{m}/3\text{m})$ =-30 (dBuV/m)
For example 2:
Field Strength at 10m=10 (dBuV/m)
Field Strength at 30m=10- $40 \cdot \log(30\text{m}/10\text{m})$ =-9.08 (dBuV/m)

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

Test Mode :	Mode 1	Temperature :	20~21°C
Test Channel :	00	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2402 MHz is fundamental signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.81	20.1	-19.9	40	32.64	17.29	0.25	30.08	100	0	Peak
138.54	17.75	-25.75	43.5	36.29	10.97	0.49	30	-	-	Peak
147.72	18.11	-25.39	43.5	37.38	10.21	0.5	29.98	-	-	Peak
588.4	22.08	-23.92	46	32.07	18.58	1.06	29.63	-	-	Peak
827.1	24.78	-21.22	46	32.92	20.22	1.27	29.63	-	-	Peak
946.8	27.64	-26.36	54	35.13	20.72	1.33	29.54	-	-	Peak
2388.66	45.39	-28.61	74	43.11	32.86	3.47	34.05	100	360	Peak
2388.66	32.33	-21.67	54	30.05	32.86	3.47	34.05	100	360	Average
2402	95.47	-	-	93.19	32.86	3.47	34.05	106	360	Peak
2402	81.43	-	-	79.15	32.86	3.47	34.05	106	360	Average
2493.35	45.27	-28.73	74	42.73	33.05	3.72	34.23	110	316	Peak
2493.35	32.33	-21.67	54	29.79	33.05	3.72	34.23	110	316	Average



Test Mode :	Mode 1	Temperature :	20~21°C
Test Channel :	00	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2402 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
52.68	25.85	-14.15	40	48.68	7.01	0.29	30.13	122	360	Peak
60.24	24.22	-15.78	40	48.75	5.3	0.31	30.14	-	-	Peak
93.45	20.49	-23.01	43.5	40.56	9.51	0.4	29.98	-	-	Peak
515.6	22.48	-23.52	46	33.68	17.55	0.97	29.72	-	-	Peak
550.6	23.39	-22.61	46	33.57	18.5	1	29.68	-	-	Peak
946.8	27.94	-26.06	54	35.43	20.72	1.33	29.54	-	-	Peak
2326.15	45.24	-28.76	74	43.11	32.76	3.27	33.9	100	302	Peak
2326.15	32.47	-21.53	54	30.34	32.76	3.27	33.9	100	302	Average
2402	90.39	-	-	88.11	32.86	3.47	34.05	101	260	Peak
2402	77.39	-	-	75.11	32.86	3.47	34.05	101	260	Average
2490.69	44.95	-29.05	74	42.41	33.05	3.72	34.23	106	143	Peak
2490.69	32.55	-21.45	54	30.01	33.05	3.72	34.23	106	143	Average



Test Mode :	Mode 2	Temperature :	20~21°C
Test Channel :	39	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2441 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	20.57	-19.43	40	32.39	18	0.26	30.08	200	0	Peak
88.86	16.52	-26.98	43.5	37.51	8.61	0.39	29.99	-	-	Peak
149.07	17.95	-25.55	43.5	37.34	10.07	0.51	29.97	-	-	Peak
563.9	21.81	-24.19	46	31.94	18.52	1.02	29.67	-	-	Peak
824.3	26.02	-19.98	46	34.22	20.16	1.26	29.62	-	-	Peak
946.8	27.27	-26.73	54	34.76	20.72	1.33	29.54	-	-	Peak
2369.85	45.46	-28.54	74	43.22	32.83	3.42	34.01	120	0	Peak
2369.85	32.27	-21.73	54	30.03	32.83	3.42	34.01	120	0	Average
2441	96.27	-	-	93.87	32.95	3.6	34.15	131	0	Peak
2441	83.2	-	-	80.8	32.95	3.6	34.15	131	0	Average
2487.65	44.77	-29.23	74	42.23	33.05	3.72	34.23	134	360	Peak
2487.65	32.59	-21.41	54	30.05	33.05	3.72	34.23	134	360	Average



Test Mode :	Mode 2	Temperature :	20~21°C
Test Channel :	39	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2441 MHz is fundamental signal 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
51.33	24.55	-15.45	40	47.19	7.21	0.28	30.13	134	328	Peak
93.72	20.46	-23.04	43.5	40.38	9.66	0.4	29.98	-	-	Peak
173.1	17.05	-26.45	43.5	37.45	8.95	0.55	29.9	-	-	Peak
743.8	21.88	-24.12	46	30.41	19.85	1.18	29.56	-	-	Peak
876.8	24.05	-21.95	46	31.84	20.48	1.29	29.56	-	-	Peak
946.8	27.28	-26.72	54	34.77	20.72	1.33	29.54	-	-	Peak
2384.48	45.72	-28.28	74	43.48	32.83	3.42	34.01	102	360	Peak
2384.48	32.4	-21.6	54	30.16	32.83	3.42	34.01	102	360	Average
2441	90.08	-	-	87.68	32.95	3.6	34.15	100	337	Peak
2441	77.39	-	-	74.99	32.95	3.6	34.15	100	337	Average
2488.6	44.76	-29.24	74	42.22	33.05	3.72	34.23	113	302	Peak
2488.6	32.54	-21.46	54	30	33.05	3.72	34.23	113	302	Average



Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Horizontal
Remark :	2480 MHz is fundamental signal 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	19.88	-20.12	40	31.7	18	0.26	30.08	100	0	Peak
88.86	17.04	-26.46	43.5	38.03	8.61	0.39	29.99	-	-	Peak
145.29	18.08	-25.42	43.5	37.2	10.37	0.5	29.99	-	-	Peak
733.3	22.42	-23.58	46	31.11	19.73	1.17	29.59	-	-	Peak
822.2	25.42	-20.58	46	33.66	20.12	1.26	29.62	-	-	Peak
946.8	27.53	-26.47	54	35.02	20.72	1.33	29.54	-	-	Peak
2370	44.58	-29.42	74	42.34	32.83	3.42	34.01	134	173	Peak
2370	32.27	-21.73	54	30.03	32.83	3.42	34.01	134	173	Average
2480	95.8	-	-	93.31	33.01	3.68	34.2	100	0	Peak
2480	81.68	-	-	79.19	33.01	3.68	34.2	100	0	Average
2483.51	27.49	-26.51	54	25	33.01	3.68	34.2	100	0	Average
2483.51	42.12	-31.88	74	39.63	33.01	3.68	34.2	100	0	Peak



Test Mode :	Mode 3	Temperature :	20~21°C
Test Channel :	78	Relative Humidity :	40~41%
Test Engineer :	Jack Li	Polarization :	Vertical
Remark :	2480 MHz is fundamental signal 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
51.6	25.33	-14.67	40	47.97	7.21	0.28	30.13	100	360	Peak
60.78	24.01	-15.99	40	48.55	5.28	0.31	30.13	-	-	Peak
93.72	20.39	-23.11	43.5	40.31	9.66	0.4	29.98	-	-	Peak
538	23.34	-22.66	46	33.78	18.26	0.99	29.69	-	-	Peak
577.9	23.61	-22.39	46	33.65	18.56	1.04	29.64	-	-	Peak
946.8	28.26	-25.74	54	35.75	20.72	1.33	29.54	-	-	Peak
2366	44.78	-29.22	74	42.57	32.81	3.38	33.98	110	50	Peak
2366	31.59	-22.41	54	29.38	32.81	3.38	33.98	110	50	Average
2480	88.43	-	-	85.94	33.01	3.68	34.2	104	45	Peak
2480	76.1	-	-	73.61	33.01	3.68	34.2	104	45	Average
2485.1	39.89	-34.11	74	37.4	33.01	3.68	34.2	100	31	Peak
2485.1	27.35	-26.65	54	24.86	33.01	3.68	34.2	100	31	Average

3.10 Antenna Requirements

3.10.1 Standard Applicable

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

3.10.2 Antenna Connected Construction

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

3.10.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Dec. 29, 2011~ Dec. 30, 2011	Jan. 06, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY451015 55	N/A	Aug. 23, 2011	Dec. 29, 2011~ Dec. 30, 2011	Aug. 22, 2012	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY444211 98	N/A	Aug. 23, 2011	Dec. 29, 2011~ Dec. 30, 2011	Aug. 22, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030D	E1884515	N/A	Aug. 23, 2011	Dec. 29, 2011~ Dec. 30, 2011	Aug. 22, 2012	Conducted (TH01-KS)
Bluetooth Base Station	R&S	CBT	100783	N/A	Aug. 18, 2011	Dec. 29, 2011~ Dec. 30, 2011	Aug. 17, 2012	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 02, 2011	Jan. 02, 2012	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 30, 2011	Jan. 02, 2012	Dec. 29, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	060105	9kHz~30MHz	Dec. 30, 2011	Jan. 02, 2012	Dec. 29, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	N/A	Nov. 16, 2011	Jan. 02, 2012	Nov. 15, 2012	Conduction (CO01-KS)
System Simulator	R&S	CMU200	116456	Full-Band	Sep. 20, 2011	Jan. 02, 2012	Sep. 19, 2012	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 09, 2011	Jan. 02, 2012	Nov. 08, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Jan. 02, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Jun. 02, 2011	Jan. 02, 2012	Jun. 01, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Jan. 02, 2012	Dec. 07, 2012	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 02, 2012	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060029	9KHz~2GHz	Jan. 10, 2011	Jan. 02, 2012	Jan. 09, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 30, 2011	Jan. 02, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Dec. 30, 2011	Jan. 02, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 07, 2011	Jan. 02, 2012	Nov. 06, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15-40GHz	Oct. 11, 2011	Jan. 02, 2012	Oct. 10, 2012	Radiation (03CH01-KS)
Bluetooth Base Station	R&S	CBT	100783	N/A	Aug. 18, 2011	Jan. 02, 2012	Aug. 17, 2012	Radiation (03CH01-KS)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Jan. 16, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Jan. 16, 2012	Mar. 28, 2012	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Jan. 16, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jan. 16, 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				