

FCC RF Test Report

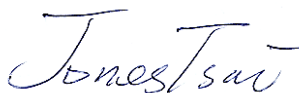
APPLICANT : Samsung Electronics Co., Ltd.
EQUIPMENT : Mobile phone
BRAND NAME : Samsung
MODEL NAME : GT-S5310M, GT-S5312M
MARKETING NAME : Samsung GALAXY POCKET Neo
FCC ID : A3LGTS5310M
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Apr. 24, 2014 and testing was completed on May 06, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and the testing has shown the tested sample to be in 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: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



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FCC ID : A3LGTS5310M

Page Number : 1 of 68

Report Issued Date : May 14, 2014

Report Version : Rev. 01



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	Number of Channels	≥ 15 Chs	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	$\geq 2/3$ of 20dB BW	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	≤ 0.4 sec in 31.6sec period	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	NA	Pass	-
3.5	15.247(b)(1)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	Conducted Band Edges	≤ 20 dBc	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	≤ 20 dBc	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 15.04 dB at 339.200 MHz
3.9	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.30 dB at 1.726 MHz
3.10	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Samsung Electronics Co., Ltd.

129 Samsung-ro, Yeongtong-gu, Suwon City, Gyeonggi – Do, Korea 443-742

1.2 Manufacturer

Samsung Electronics Co., Ltd.

129 Samsung-ro, Yeongtong-gu, Suwon City, Gyeonggi – Do, Korea 443-742

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile phone
Brand Name	Samsung
Model Name	GT-S5310M, GT-S5312M
Marketing Name	Samsung GALAXY POCKET Neo
FCC ID	A3LGTS5310M
IMEI Code	353676060005998 353676060006186
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA WLAN 11b/g/n (HT20) Bluetooth v4.0 EDR/ LE
HW Version	REV1.0
SW Version	S5310M.001
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Maximum Output Power to Antenna	Bluetooth BR(1Mbps) : 12.02 dBm (0.0159 W) Bluetooth EDR (2Mbps) : 11.98 dBm (0.0158 W) Bluetooth EDR (3Mbps) : 12.23 dBm (0.0167 W)
Antenna Type	SUS Antenna type with gain -1.18 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		
	TH02-HY	CO05-HY	03CH07-HY

1.7 Applicable 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: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Descriptions of Test Mode

Preliminary tests were performed in different data rates 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	11.56 dBm	11.56 dBm	12.08 dBm
Ch39	2441MHz	12.02 dBm	11.98 dBm	12.23 dBm
Ch78	2480MHz	11.85 dBm	11.71 dBm	12.03 dBm

Remark:

1. All the test data for each data rate were verified, but only the worst case was reported.
 2. The data rate was set in 3Mbps for all the test items due to the highest RF output power.
- a. The EUT has been associated with peripherals 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, and different data rates were conducted to determine the final configuration (Y plane as worst plane) from all possible combinations, and the worst mode of radiated spurious emissions is Bluetooth 3Mbps mode, and recorded in this report.
 - b. AC power line Conducted Emission was tested under maximum output power.

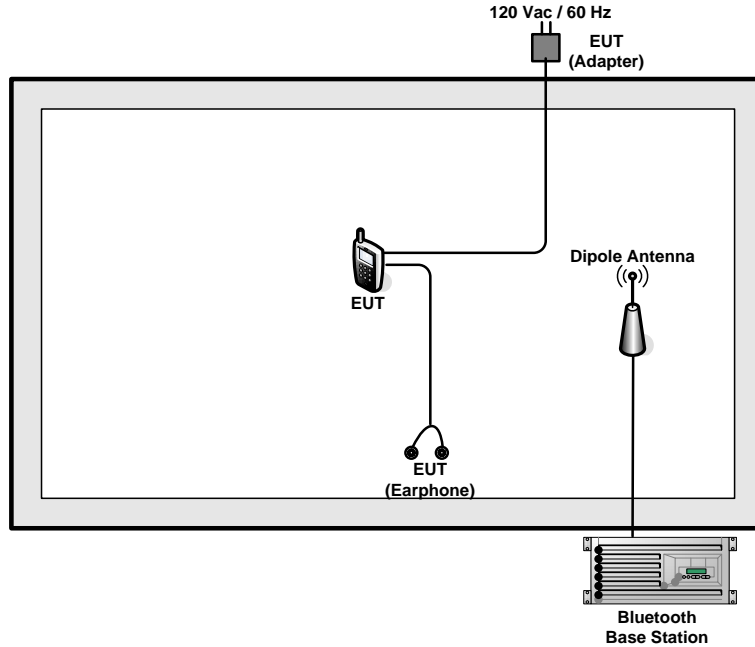
2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

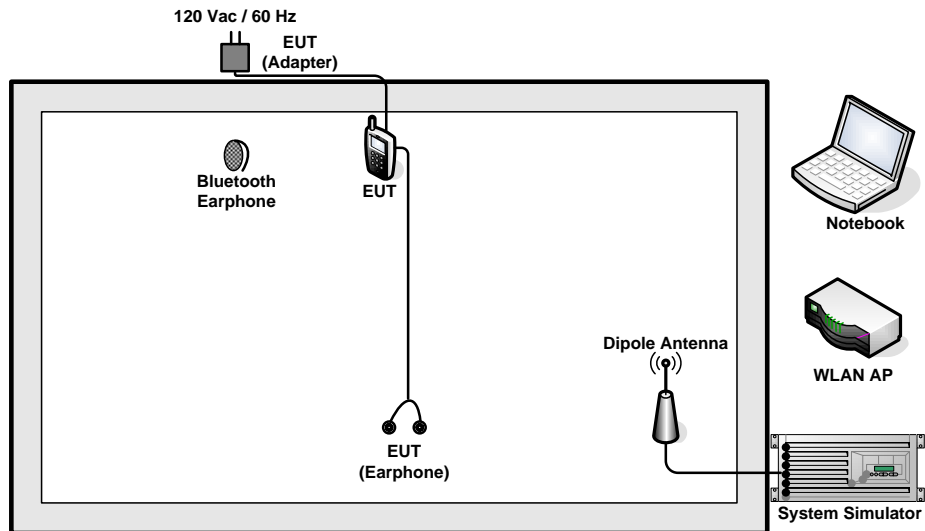
Summary table of Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth BR 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted Test Cases	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated Test Cases	Bluetooth EDR 3Mbps 8-DPSK Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz		
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + Adapter + MP3 + Earphone		
<p>Remark: For radiated test cases, the worst mode data rate 3Mbps was reported only, because this data rate has the highest RF output power at preliminary tests, and the conducted spurious emissions and conducted band edge measurement for each data rate are no worse than 3Mbps, and no other significantly frequencies found in conducted spurious emission.</p>			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

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	CBT32	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
6.	SD Card	San Disk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT contact with Bluetooth base station to continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

$$\text{Offset} = \text{RF cable loss} + \text{attenuator factor}.$$

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$

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.

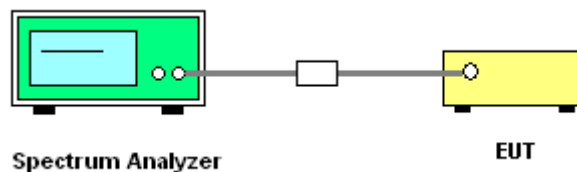
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. 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.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

3.1.4 Test Setup

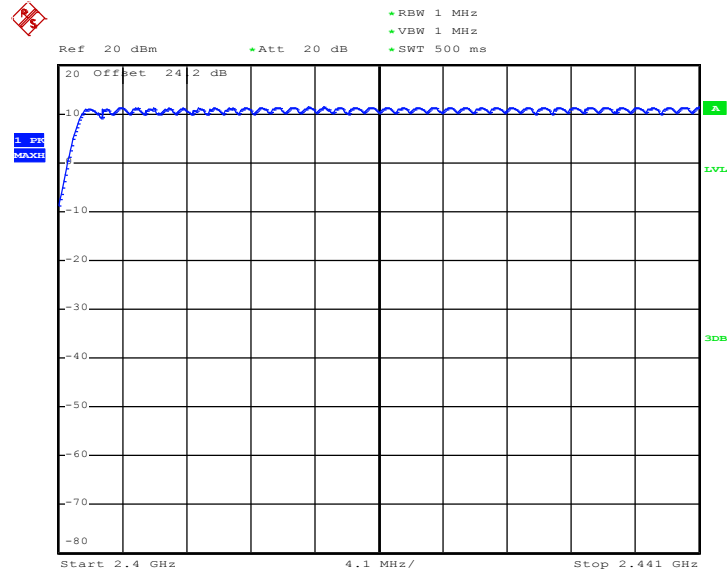


3.1.5 Test Result of Number of Hopping Frequency

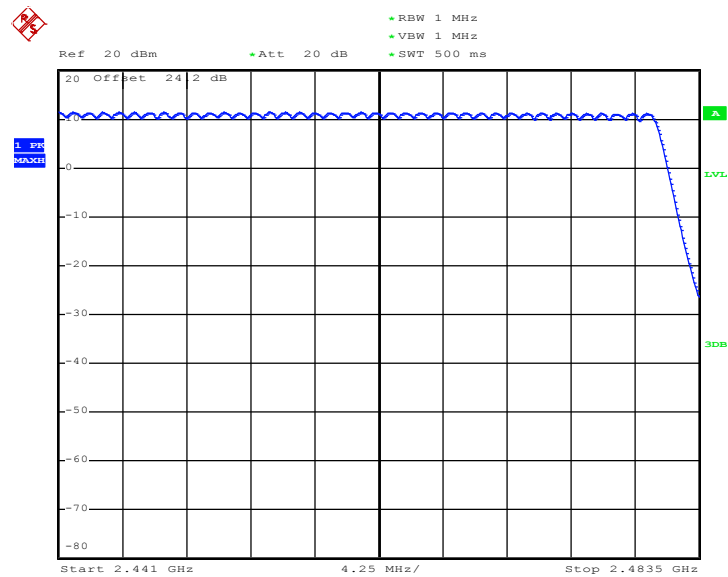
Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%
Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass



Number of Hopping Channel Plot on Channel 00 - 78



Date: 5.MAY.2014 23:20:30



Date: 5.MAY.2014 23:23:12

3.2 Hopping Channel Separation Measurement

3.2.1 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.

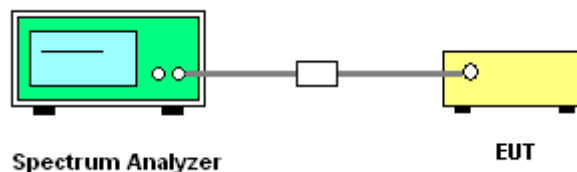
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. 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.
6. Measure and record the results in the test report.

3.2.4 Test Setup



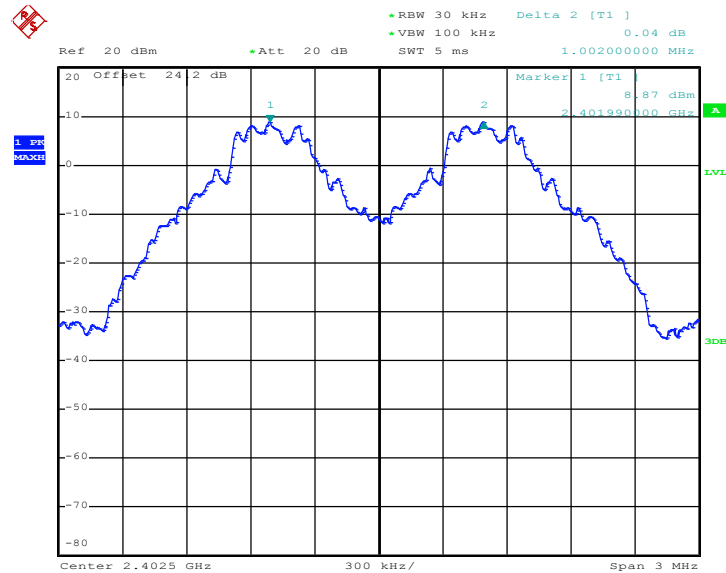


3.2.5 Test Result of Hopping Channel Separation

Test Mode :	1Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.5387	Pass
39	2441	1.002	0.6000	Pass
78	2480	1.002	0.6027	Pass

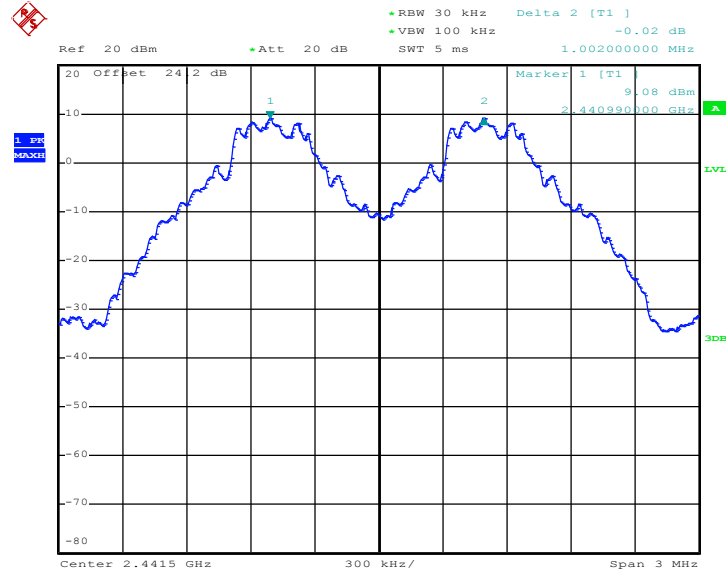
Channel Separation Plot on Channel 00 - 01



Date: 5.MAY.2014 22:36:08

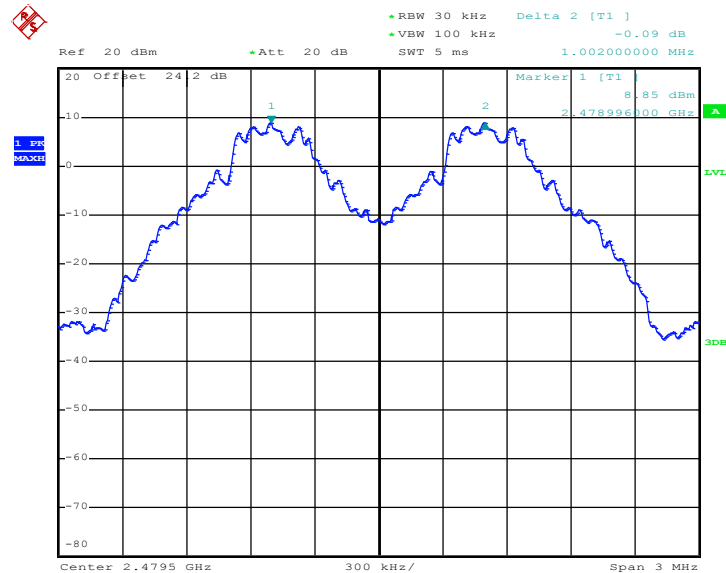


Channel Separation Plot on Channel 39 - 40



Date: 5.MAY.2014 22:37:02

Channel Separation Plot on Channel 77 - 78



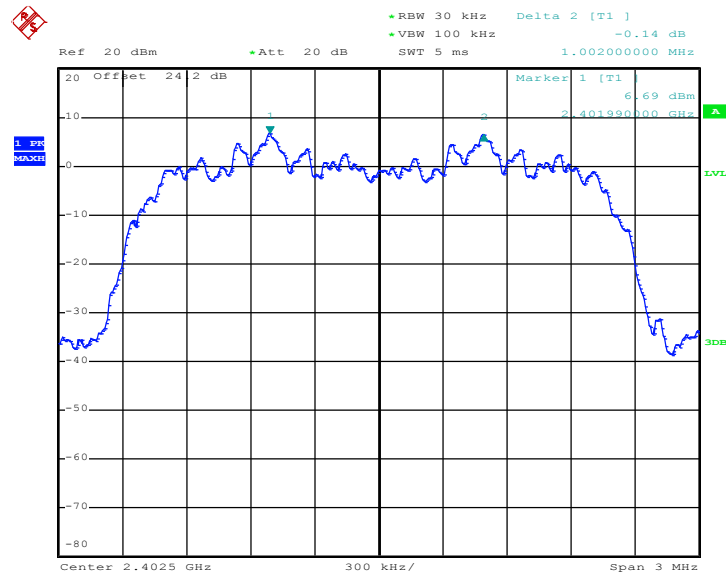
Date: 5.MAY.2014 22:39:56



Test Mode :	2Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8960	Pass
39	2441	1.002	0.8960	Pass
78	2480	1.008	0.9000	Pass

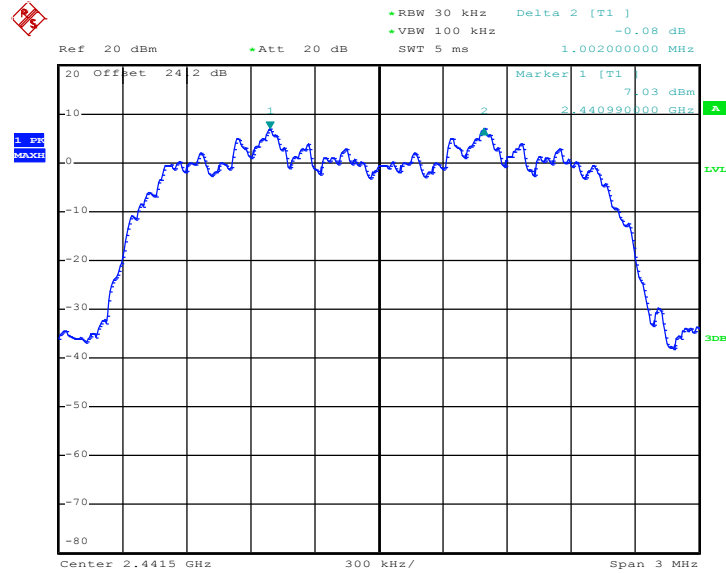
Channel Separation Plot on Channel 00 - 01



Date: 5.MAY.2014 22:43:27

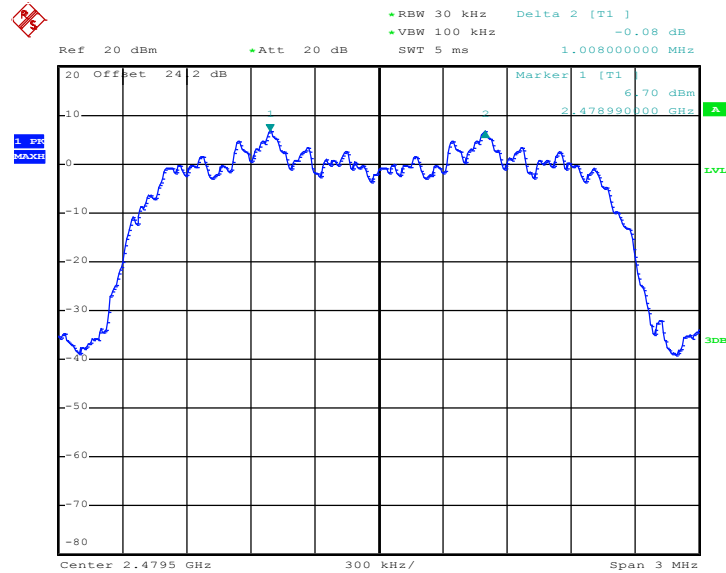


Channel Separation Plot on Channel 39 - 40



Date: 5.MAY.2014 22:44:21

Channel Separation Plot on Channel 77 - 78



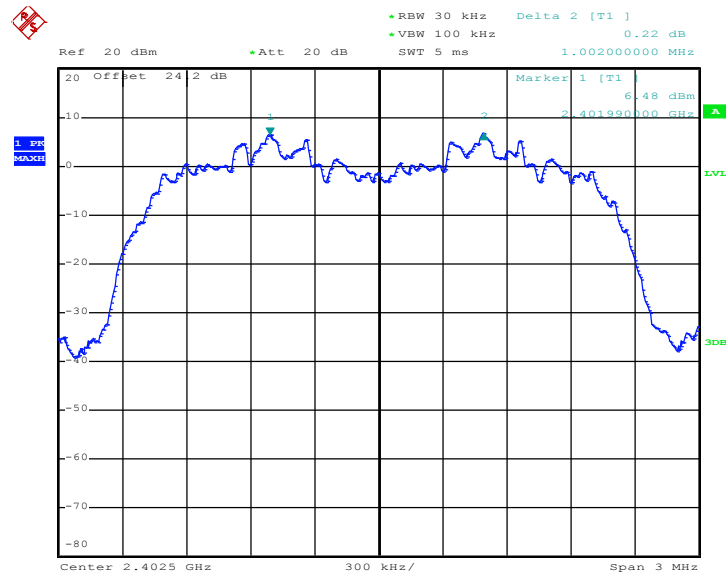
Date: 5.MAY.2014 22:47:26



Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8560	Pass
39	2441	1.002	0.8680	Pass
78	2480	1.002	0.8600	Pass

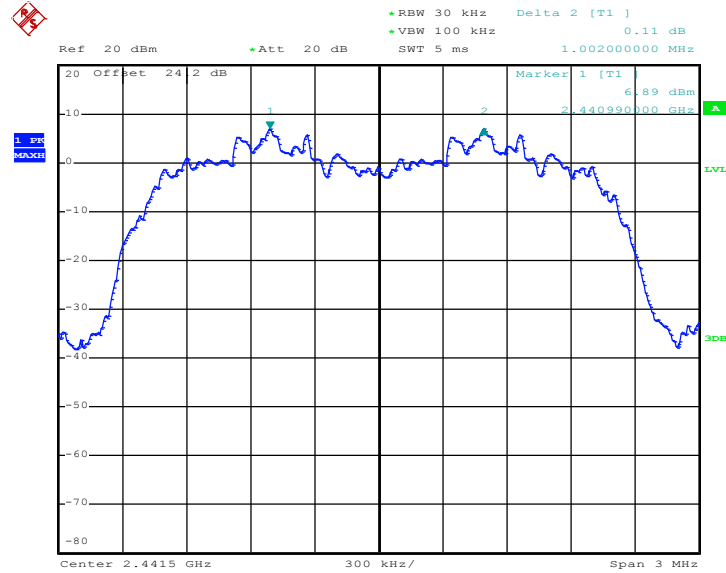
Channel Separation Plot on Channel 00 - 01



Date: 5.MAY.2014 22:48:23

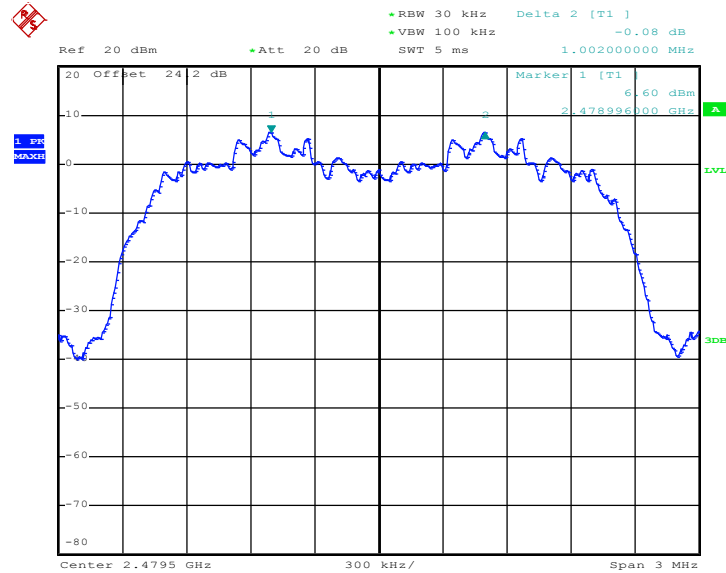


Channel Separation Plot on Channel 39 - 40



Date: 5.MAY.2014 22:49:19

Channel Separation Plot on Channel 77 - 78



Date: 5.MAY.2014 22:50:12

3.3 Dwell Time Measurement

3.3.1 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.

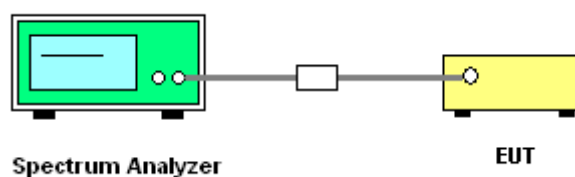
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 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 RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. 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.
6. Measure and record the results in the test report.

3.3.4 Test Setup





3.3.5 Test Result of Dwell Time

Test Mode :	DH5	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

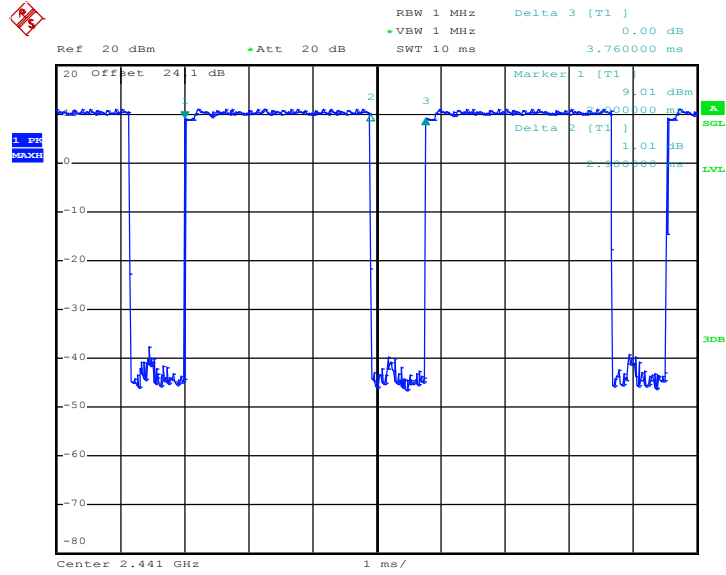
Mode	Hopping Channel Number	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Normal	79	106.67	2.90	0.31	0.4	Pass
AFH	20	53.33	2.90	0.15	0.4	Pass

Remark:

1. In normal mode, hopping rate is 1600 hops/s with 6 slots in 79 hopping channels.
With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) (s),
Hops Over Occupancy Time comes to (1600 / 6 / 79) x (0.4 x 79) = 106.67 hops.
2. In AFH mode, hopping rate is 800 hops/s with 6 slots in 20 hopping channels.
With channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4 x 20) (s),
Hops Over Occupancy Time comes to (800 / 6 / 20) x (0.4 x 20) = 53.33 hops.
3. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time



Package Transfer Time Plot



Date: 2.MAY.2014 16:50:48

3.4 20dB Bandwidth Measurement

3.4.1 Limit of 20dB Bandwidth

Reporting only

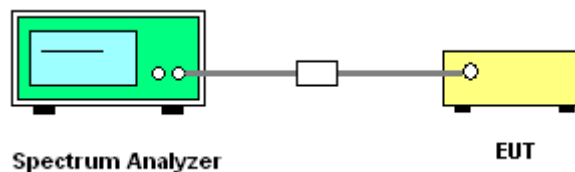
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
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. Measure and record the results in the test report.

3.4.4 Test Setup



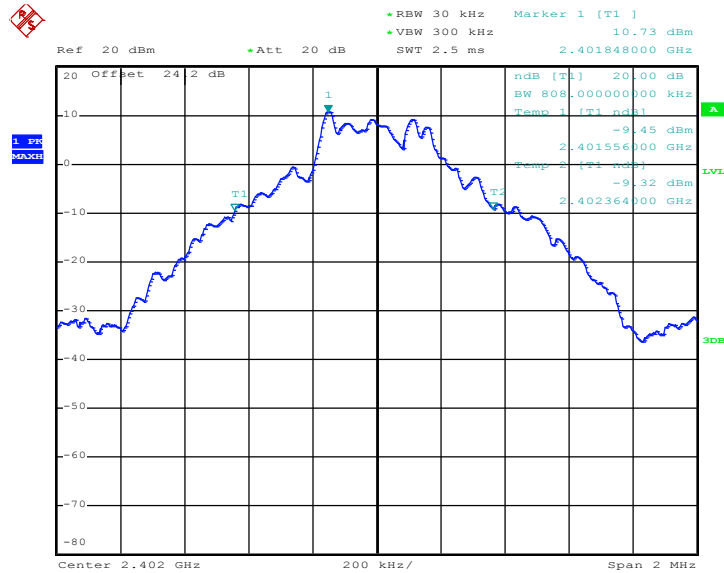


3.4.5 Test Result of 20dB Bandwidth

Test Mode :	1Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.808
39	2441	0.900
78	2480	0.904

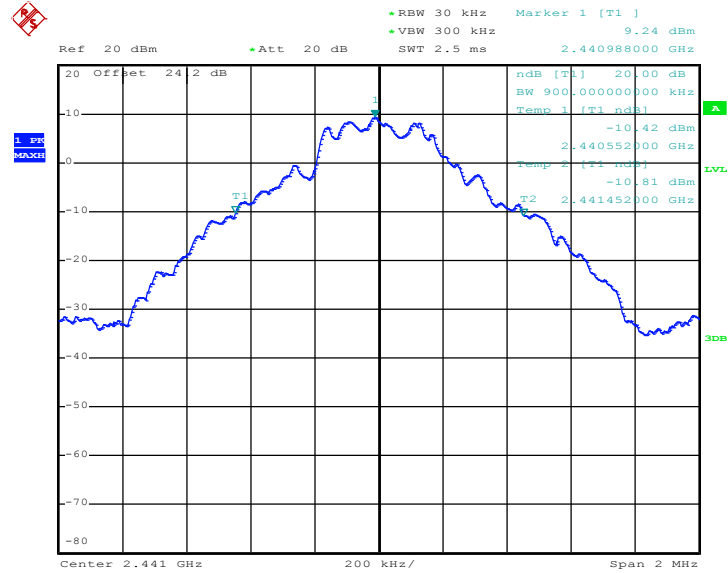
20 dB Bandwidth Plot on Channel 00



Date: 5.MAY.2014 23:45:46

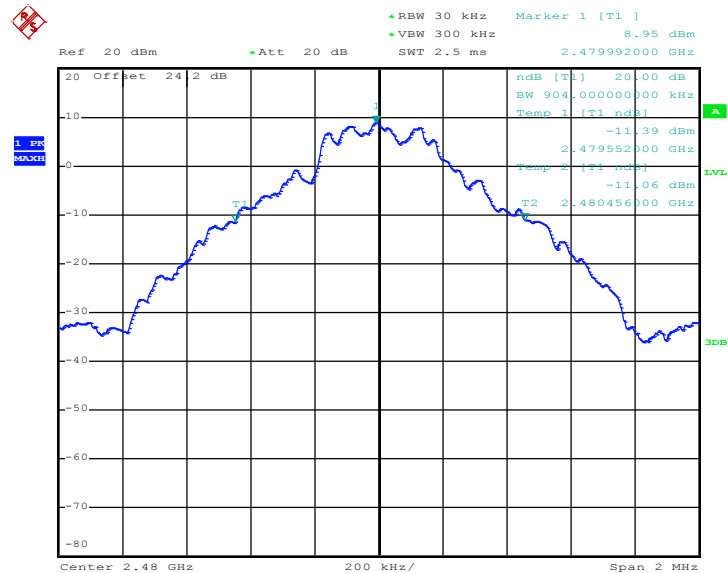


20 dB Bandwidth Plot on Channel 39



Date: 5.MAY.2014 22:51:52

20 dB Bandwidth Plot on Channel 78



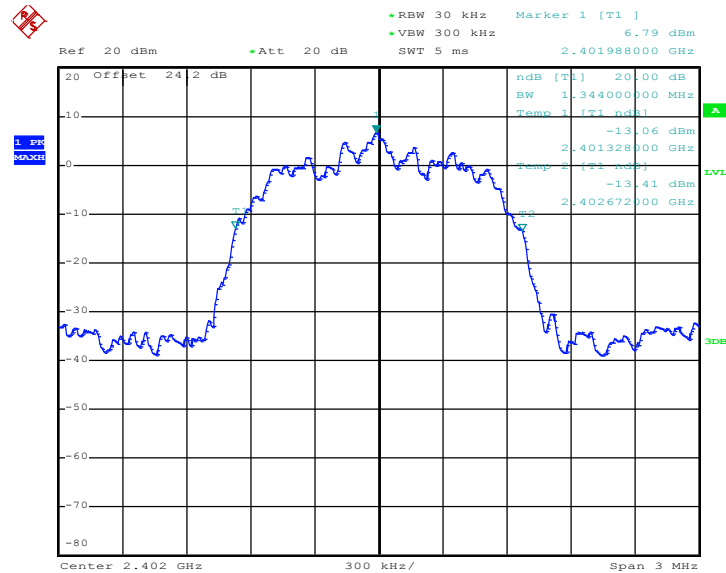
Date: 5.MAY.2014 22:52:25



Test Mode :	2Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.344
39	2441	1.344
78	2480	1.350

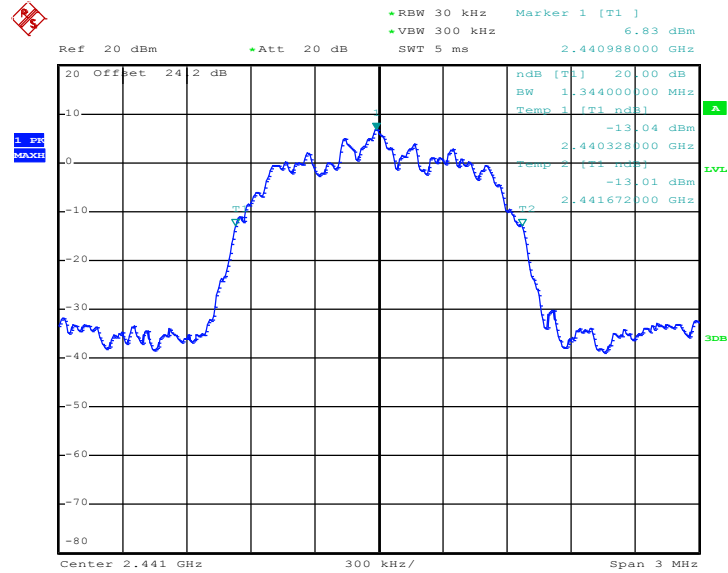
20 dB Bandwidth Plot on Channel 00



Date: 5.MAY.2014 22:53:03

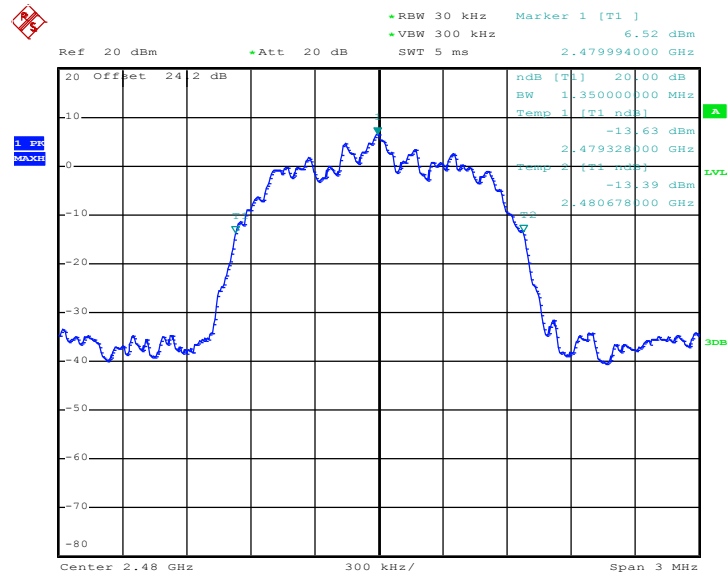


20 dB Bandwidth Plot on Channel 39



Date: 5.MAY.2014 23:01:10

20 dB Bandwidth Plot on Channel 78



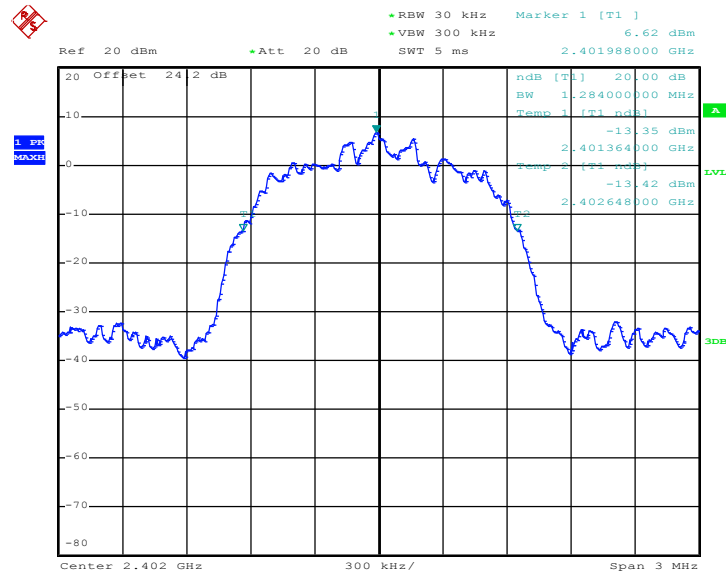
Date: 5.MAY.2014 22:54:03



Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.284
39	2441	1.302
78	2480	1.290

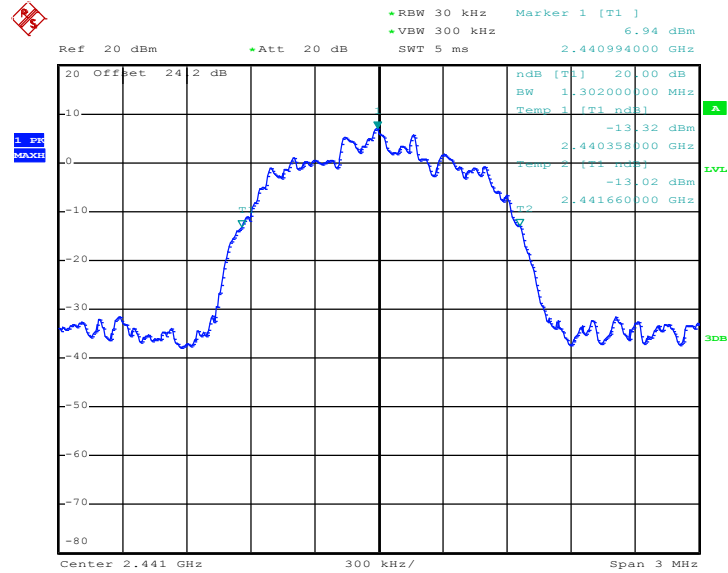
20 dB Bandwidth Plot on Channel 00



Date: 5.MAY.2014 22:54:47

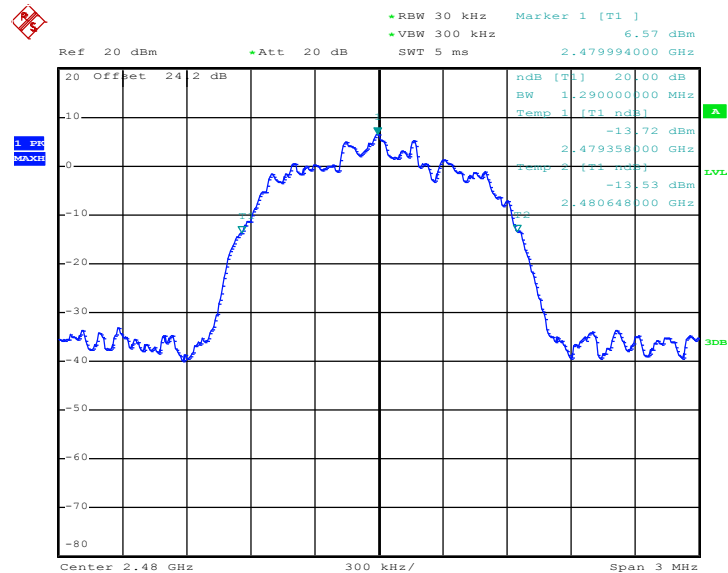


20 dB Bandwidth Plot on Channel 39



Date: 5.MAY.2014 22:55:18

20 dB Bandwidth Plot on Channel 78



Date: 5.MAY.2014 22:55:48

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, 3Mbps and AFH are 0.125 watts.

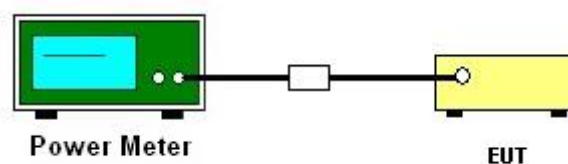
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

3.5.4 Test Setup





3.5.5 Test Result of Peak Output Power

Test Mode :	1Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	11.56	20.97	Pass
39	2441	12.02	20.97	Pass
78	2480	11.85	20.97	Pass

Note: For AFH mode using 20 hopping channels, the maximum output power limit is 20.97dBm.

Test Mode :	2Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	11.56	20.97	Pass
39	2441	11.98	20.97	Pass
78	2480	11.71	20.97	Pass

Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	12.08	20.97	Pass
39	2441	12.23	20.97	Pass
78	2480	12.03	20.97	Pass

3.6 Conducted 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.

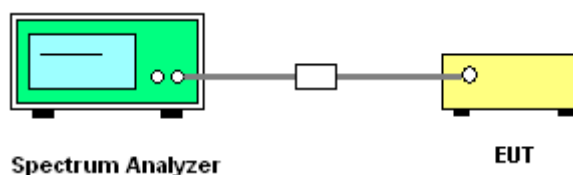
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz ($\geq 1\%$ span=10MHz), VBW = 300kHz (\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 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

3.6.4 Test Setup

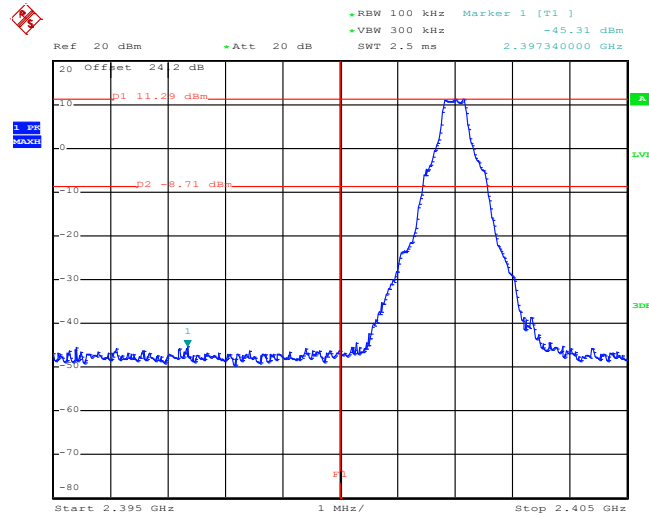




3.6.6 Test Result of Conducted Band Edges

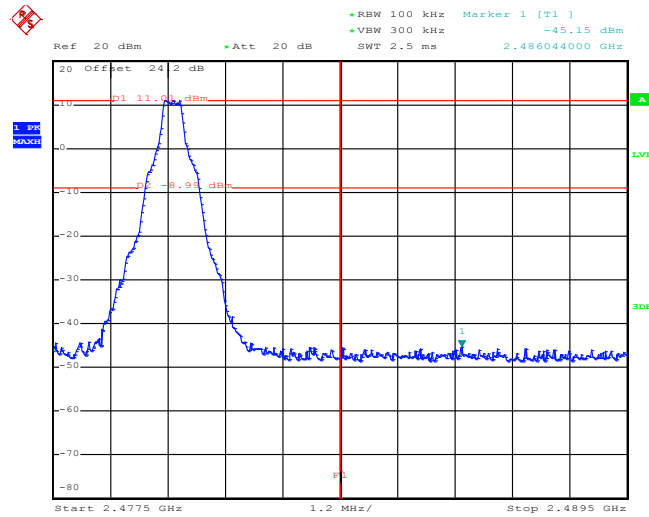
Test Mode :	1Mbps	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

Low Band Edge Plot on Channel 00



Date: 5.MAY.2014 23:41:21

High Band Edge Plot on Channel 78

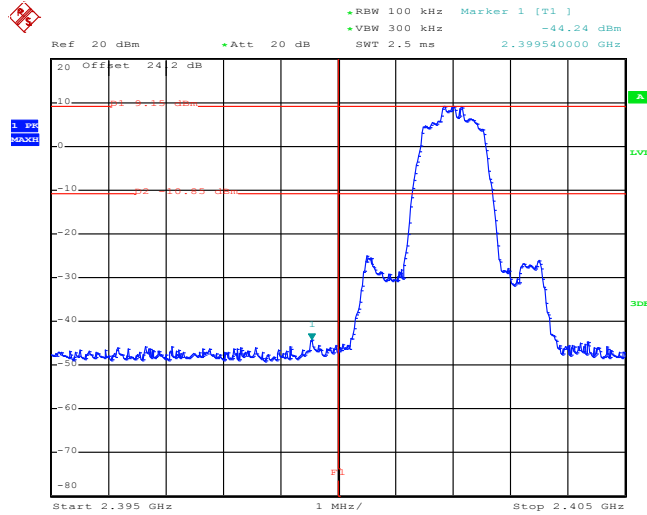


Date: 5.MAY.2014 23:41:45



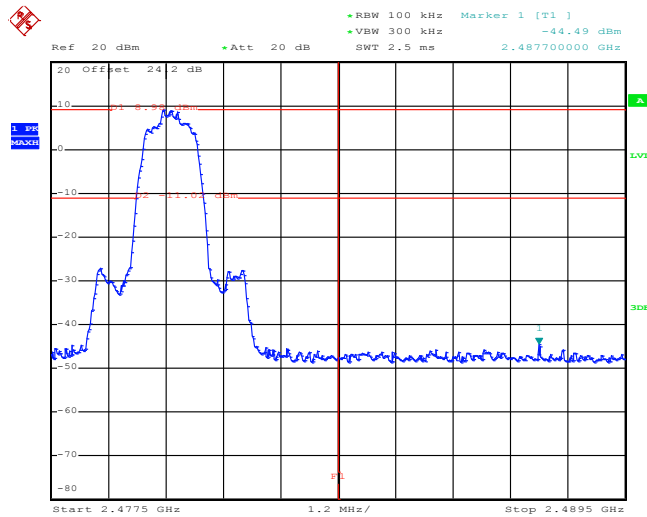
Test Mode :	2Mbps	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

Low Band Edge Plot on Channel 00



Date: 5.MAY.2014 23:42:26

High Band Edge Plot on Channel 78

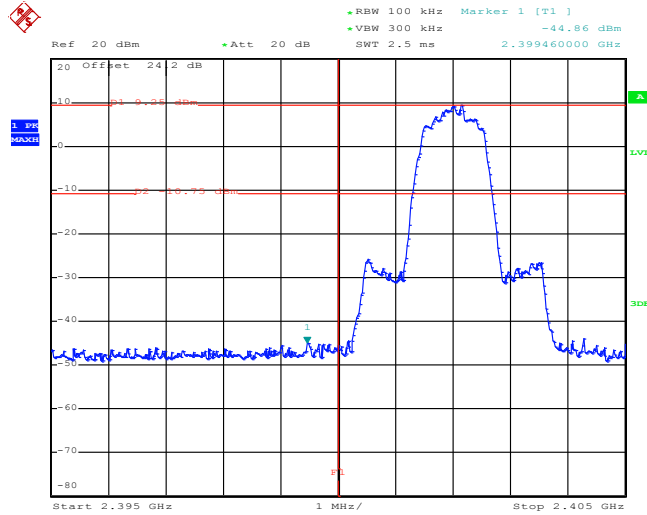


Date: 5.MAY.2014 23:43:03



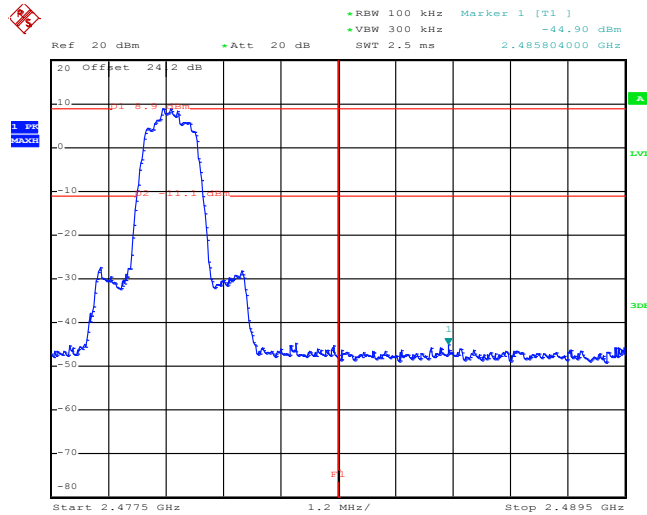
Test Mode :	3Mbps	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

Low Band Edge Plot on Channel 00



Date: 5.MAY.2014 23:43:38

High Band Edge Plot on Channel 78



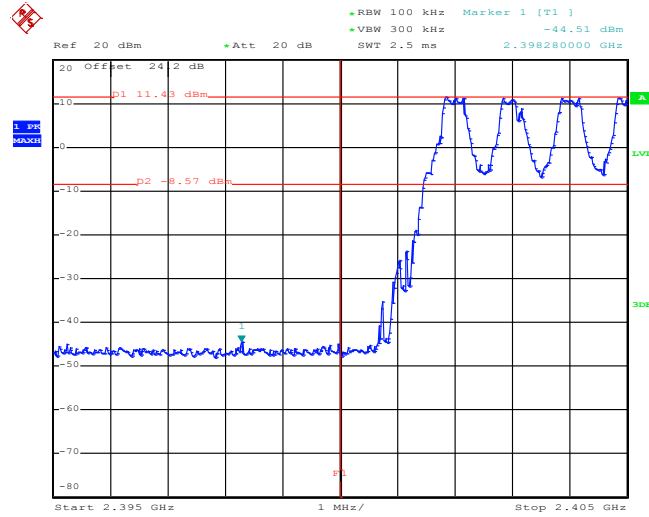
Date: 5.MAY.2014 23:44:26



3.6.7 Test Result of Conducted Hopping Mode Band Edges

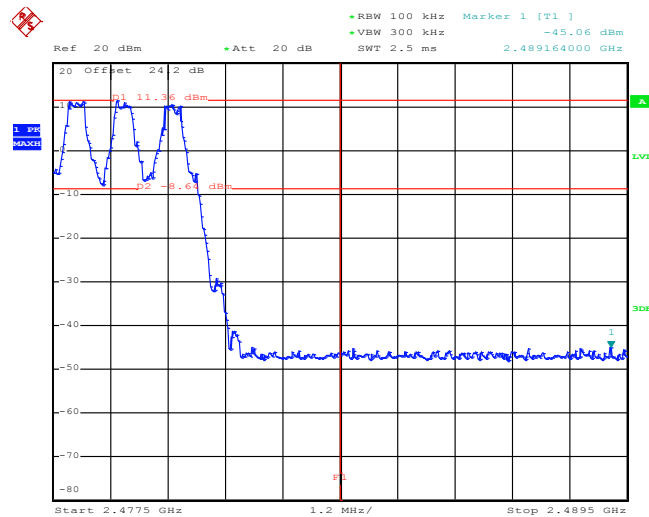
Test Mode :	1Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

1Mbps Hopping Mode Low Band Edge Plot



Date: 5.MAY.2014 23:25:32

1Mbps Hopping Mode High Band Edge Plot

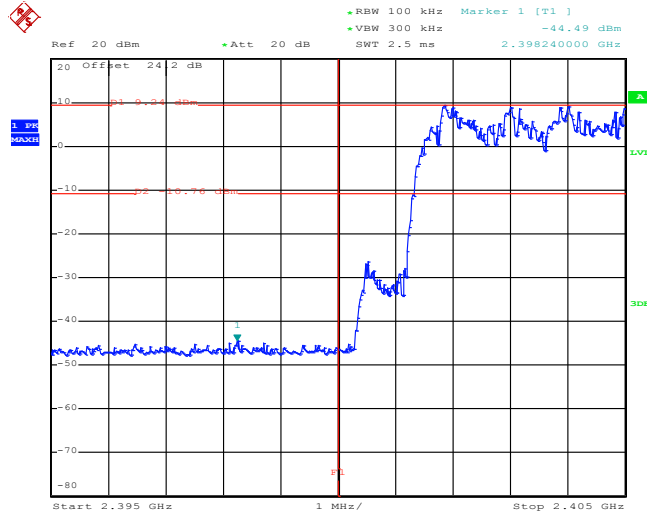


Date: 5.MAY.2014 23:26:32



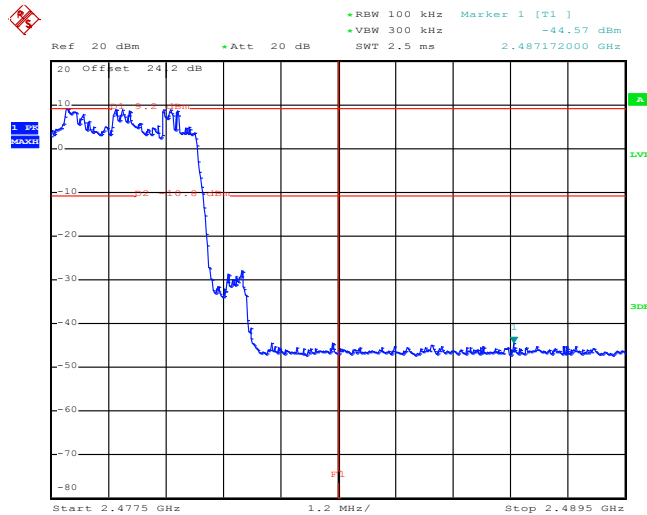
Test Mode :	2Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

2Mbps Hopping Mode Low Band Edge Plot



Date: 5.MAY.2014 23:32:05

2Mbps Hopping Mode High Band Edge Plot

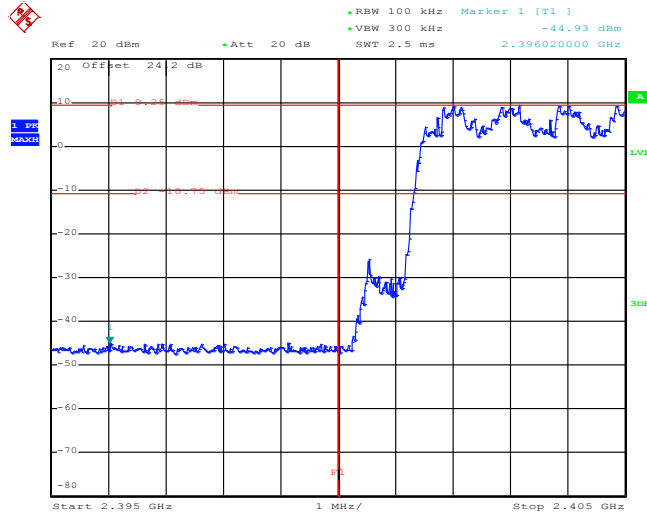


Date: 5.MAY.2014 23:34:54



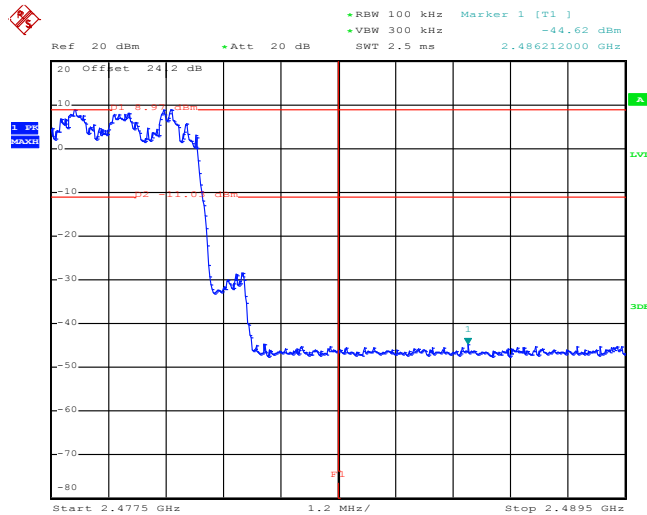
Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Osolemio Chang	Relative Humidity :	50~53%

3Mbps Hopping Mode Low Band Edge Plot



Date: 5.MAY.2014 23:38:45

3Mbps Hopping Mode High Band Edge Plot



Date: 5.MAY.2014 23:40:42

3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

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.

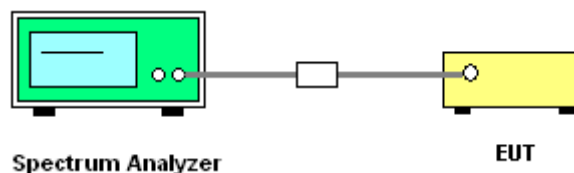
3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedure

1. The testing follows the guidelines in Spurious RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300kHz, 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.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.4 Test Setup

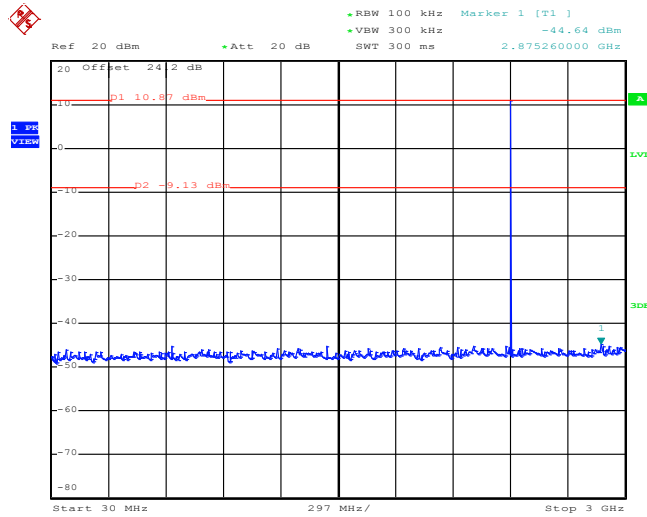




3.7.5 Test Result of Conducted Spurious Emission

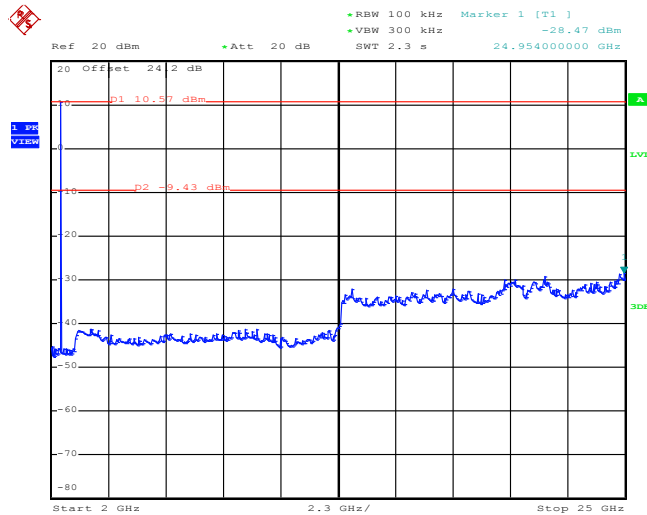
Test Mode :	1Mbps	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

1Mbps CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:06:12

1Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

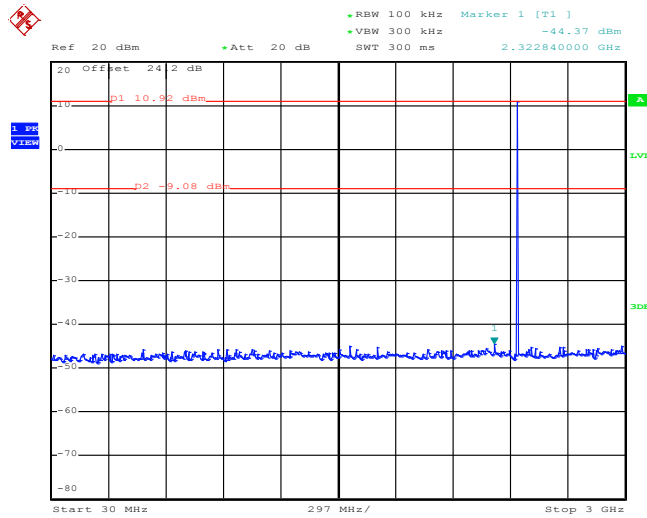


Date: 5.MAY.2014 23:06:34



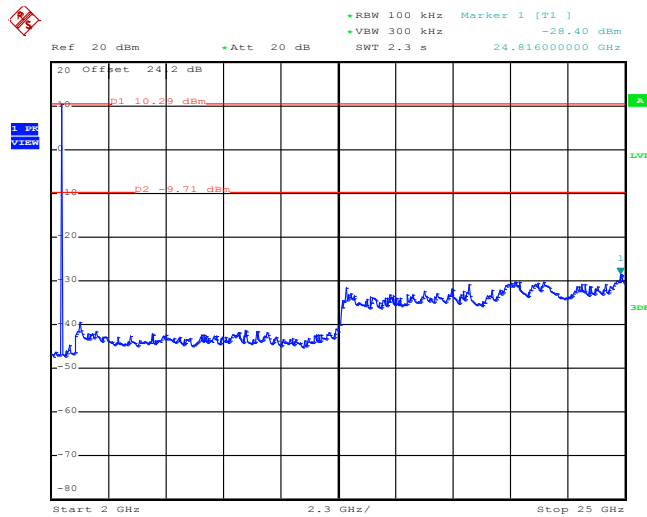
Test Mode :	1Mbps	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

1Mbps CSE Plot on Ch 39 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:07:25

1Mbps CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

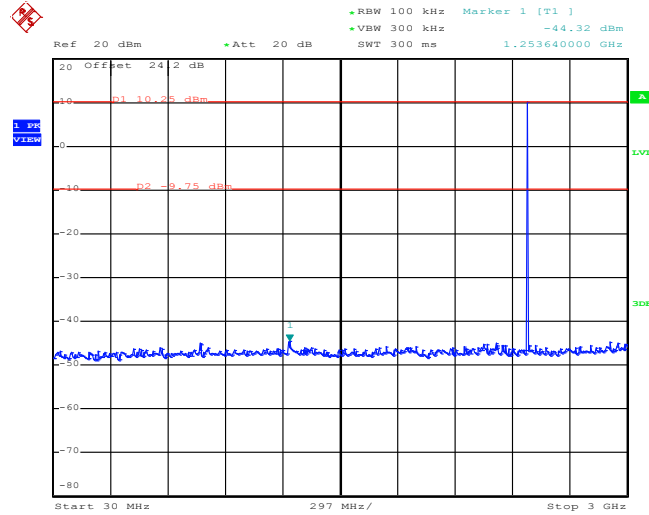


Date: 5.MAY.2014 23:07:47



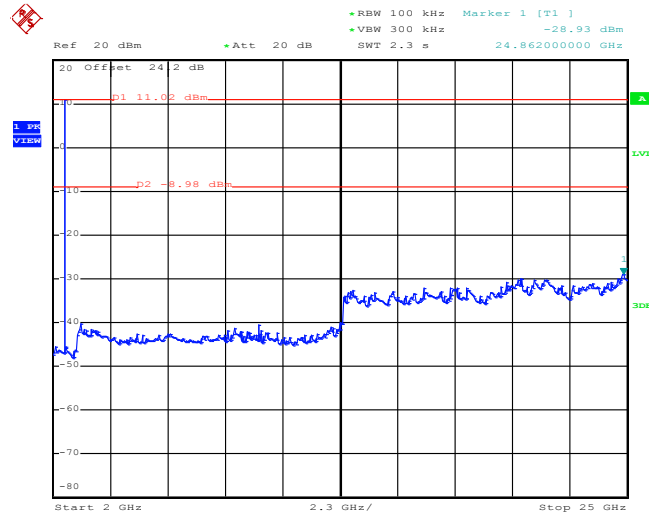
Test Mode :	1Mbps	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

1Mbps CSE Plot on Ch 78 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:08:42

1Mbps CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

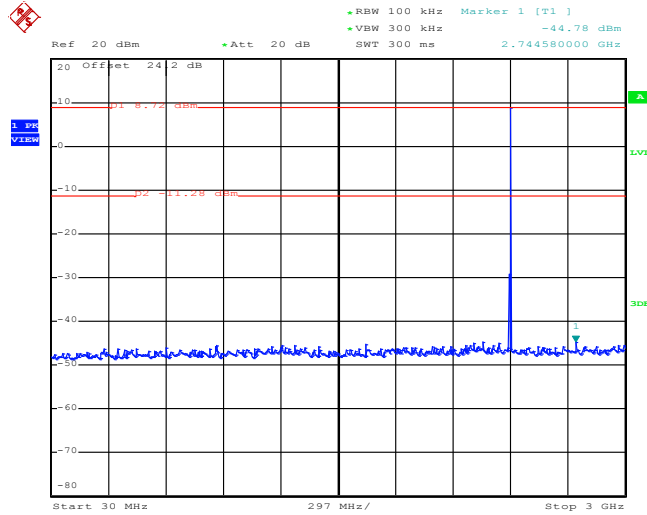


Date: 5.MAY.2014 23:09:04



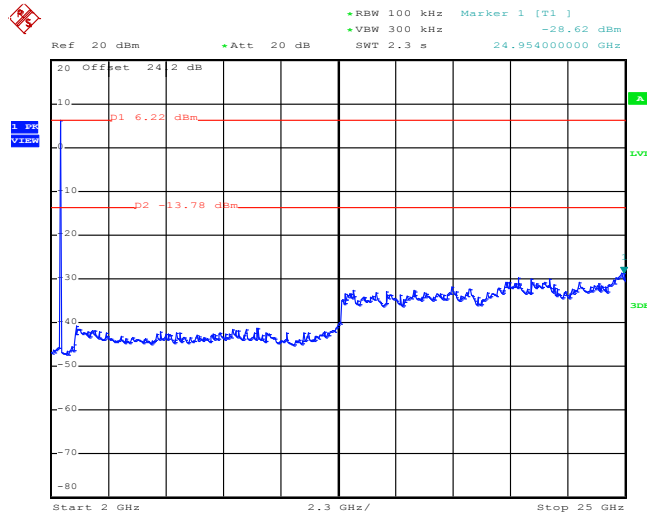
Test Mode :	2Mbps	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

2Mbps CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:10:03

2Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

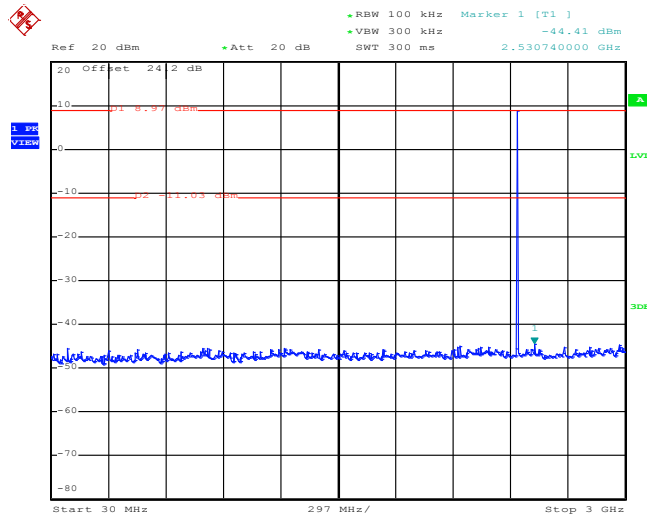


Date: 5.MAY.2014 23:10:24



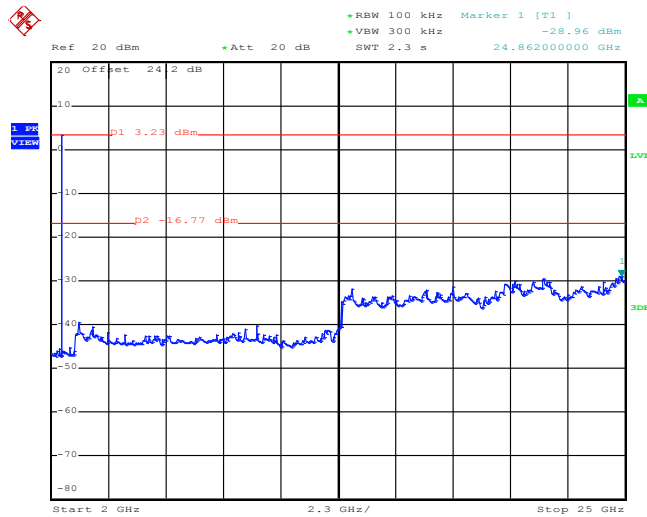
Test Mode :	2Mbps	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

2Mbps CSE Plot on Ch 39 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:10:56

2Mbps CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

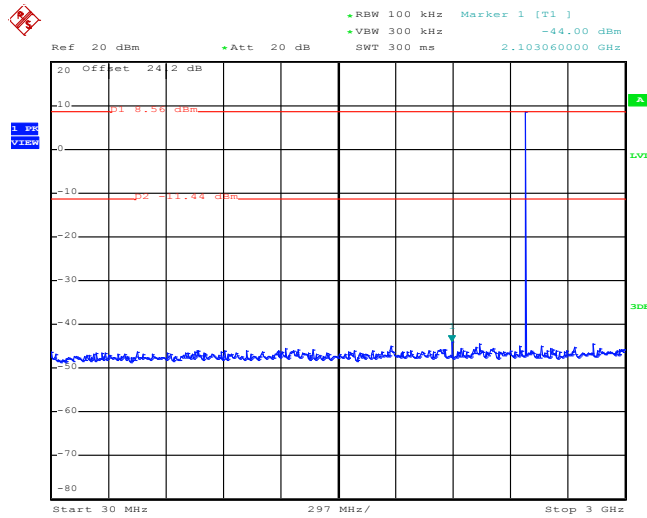


Date: 5.MAY.2014 23:11:18



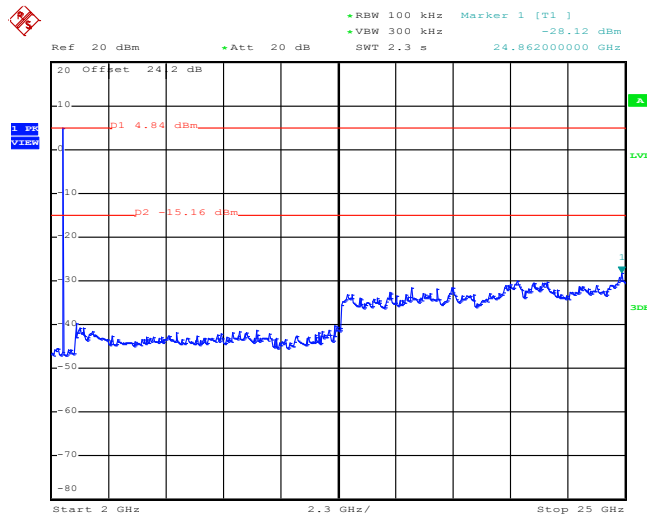
Test Mode :	2Mbps	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

2Mbps CSE Plot on Ch 78 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:12:04

2Mbps CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

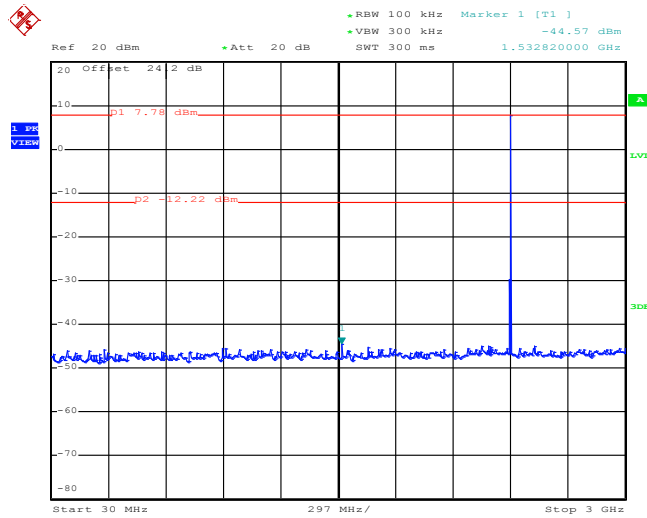


Date: 5.MAY.2014 23:12:26



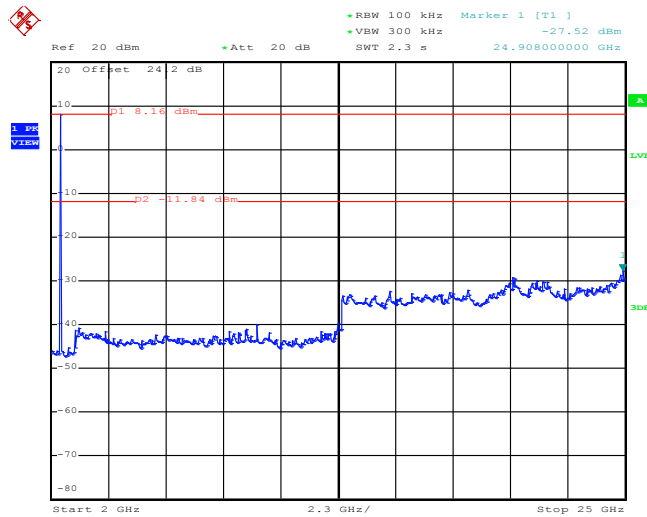
Test Mode :	3Mbps	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

3Mbps CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:13:13

3Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

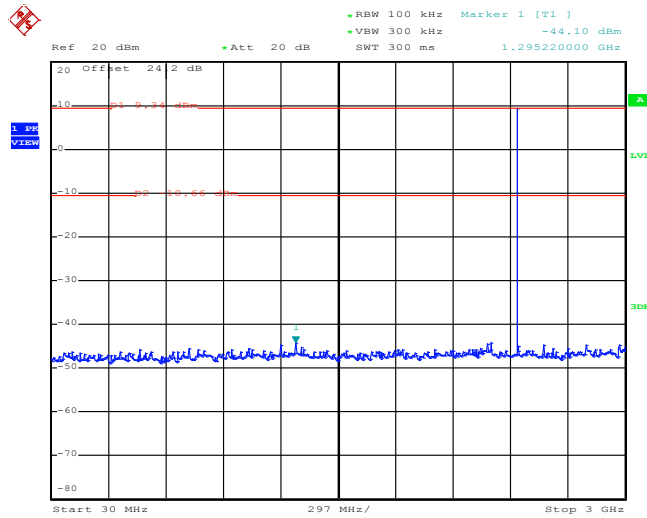


Date: 5.MAY.2014 23:13:34



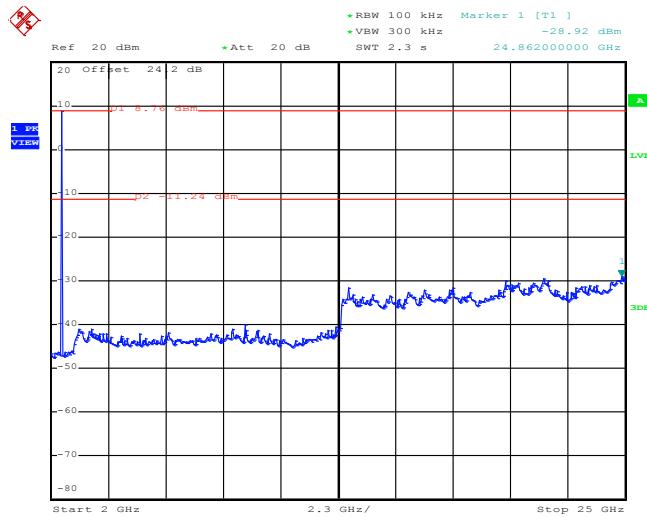
Test Mode :	3Mbps	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

3Mbps CSE Plot on Ch 39 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:14:07

3Mbps CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

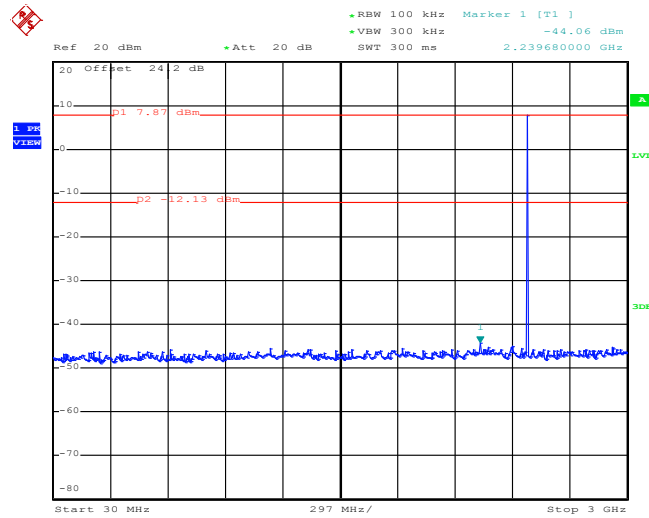


Date: 5.MAY.2014 23:14:29



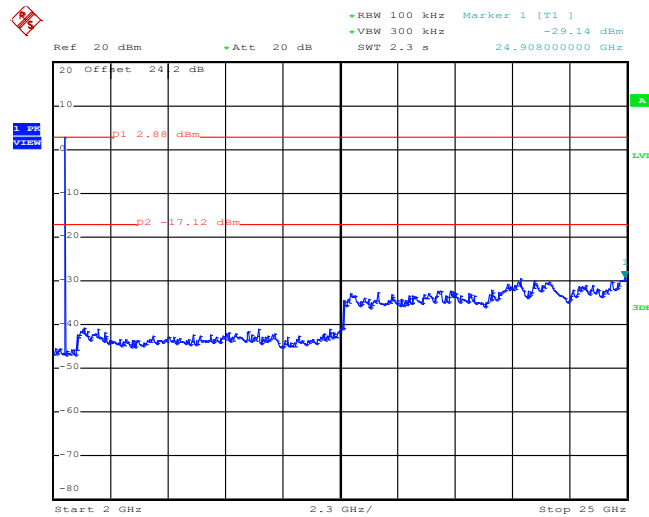
Test Mode :	3Mbps	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Osolemio Chang

3Mbps CSE Plot on Ch 78 between 30MHz ~ 3 GHz



Date: 5.MAY.2014 23:15:08

3Mbps CSE Plot on Ch 78 between 2 GHz ~ 25 GHz



Date: 5.MAY.2014 23:15:30



3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious 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

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



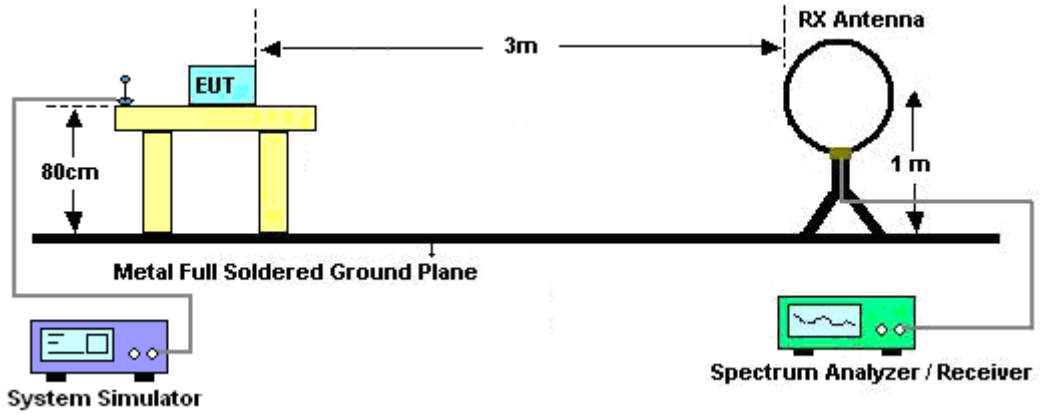
3.8.3 Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. The EUT was placed on a turntable with 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz, RBW=1MHz for $f > 1$ GHz ; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$
7. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

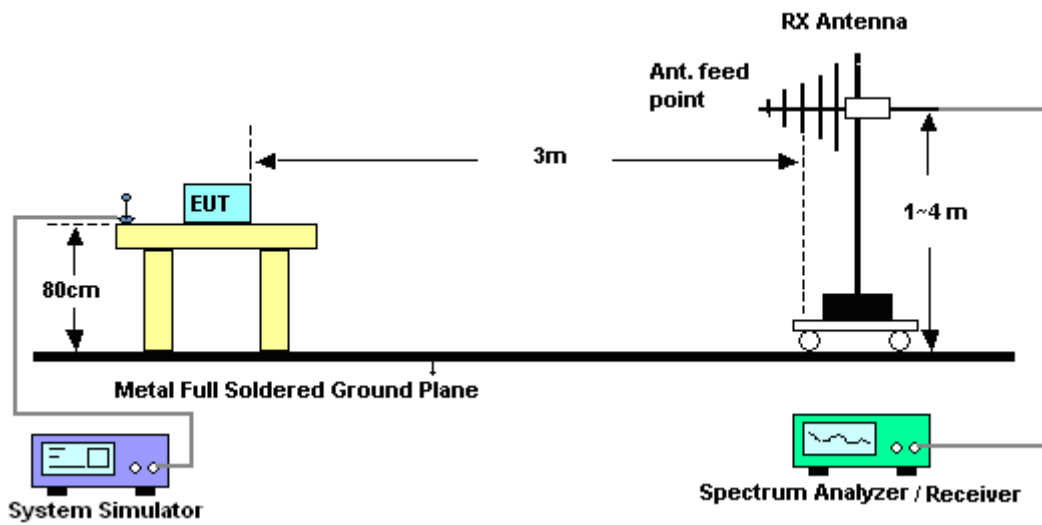
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.76dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.8.4 Test Setup

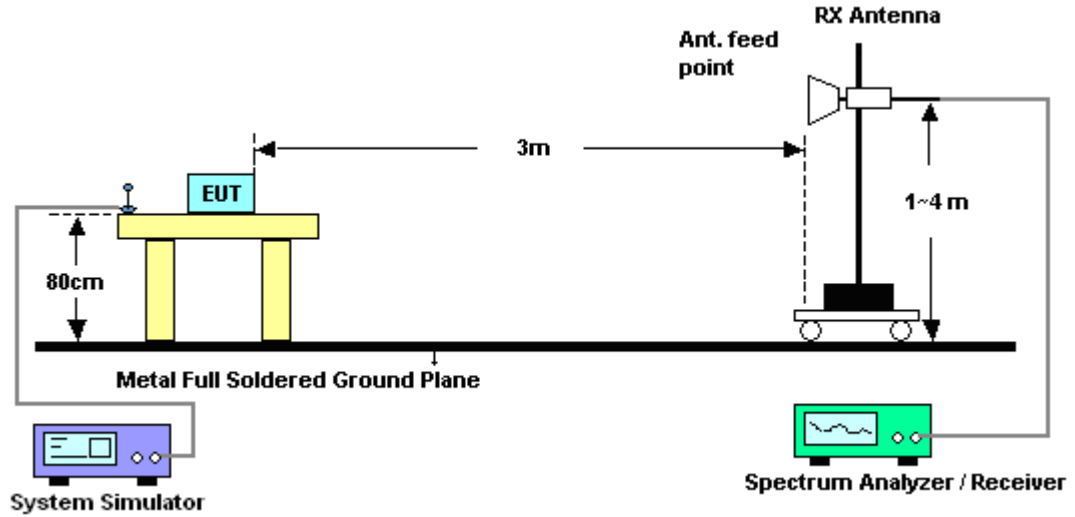
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

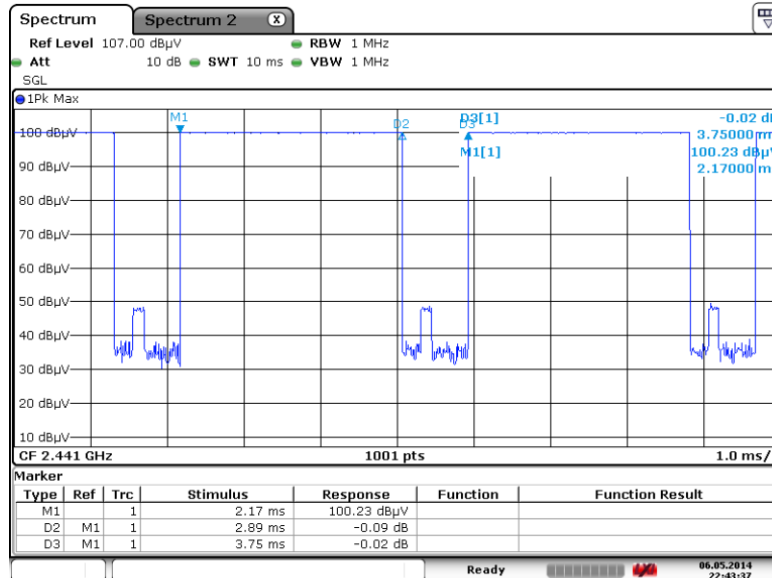


3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

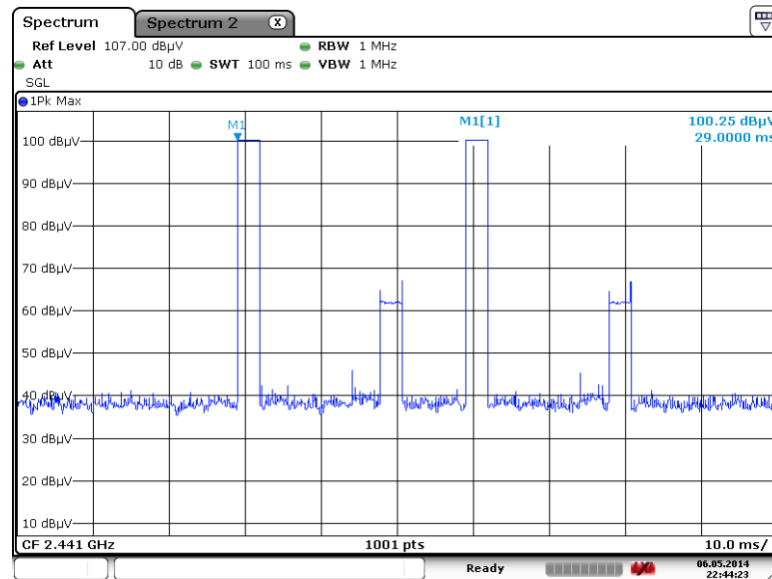
3.8.6 Duty cycle correction factor for average measurement

3DH5 on time (One Pulse) Plot on Channel 39



Date: 6.MAY.2014 22:43:37

3DH5 on time (Count Pulses) Plot on Channel 39



Date: 6.MAY.2014 22:44:23

Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.89 / 100 = 5.78 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. 3DH5 has the highest duty cycle worst case and is reported.



Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

$$2.89 \text{ ms} \times 20 \text{ channels} = 57.8 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100\text{ms} / 57.6\text{ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.89 \text{ ms} \times 2 = 5.78 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.78 \text{ ms}/100\text{ms}) = -24.76 \text{ dB}$$



3.8.7 Test Result of Radiated Spurious at Band Edges

Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	00	Relative Humidity :	49~54%
		Test Engineer :	Eric Shih

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.48	48.45	-25.55	74	43.51	32.3	6.91	34.27	117	60	Peak
2388.48	23.69	-30.31	54	-	-	-	-	-	-	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2320.17	46.53	-27.47	74	41.72	32.23	6.8	34.22	100	51	Peak
2320.17	21.77	-32.23	54	-	-	-	-	-	-	Average

Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	78	Relative Humidity :	49~54%
		Test Engineer :	Eric Shih

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.92	52	-22	74	46.99	32.38	7.06	34.43	111	84	Peak
2483.92	27.24	-26.76	54	-	-	-	-	-	-	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.73	47.31	-26.69	74	42.3	32.38	7.06	34.43	171	115	Peak
2484.73	22.55	-31.45	54	-	-	-	-	-	-	Average

Note: Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76dB)



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

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	00	Relative Humidity :	49~54%
Test Engineer :	Eric Shih	Polarization :	Horizontal
Remark :	2402 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2402	108.35	-	-	103.44	32.3	6.91	34.3	117	60	Peak
2402	83.59	-	-	-	-	-	-	-	-	Average
4803	45.32	-28.68	74	61.55	33.98	8.75	58.96	100	0	Peak
4803	20.56	-33.44	54	-	-	-	-	-	-	Average

- Note:** 1. Other harmonics are lower than background noise.
 2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76)

Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	00	Relative Humidity :	49~54%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	2402 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2402	100.54	-	-	95.63	32.3	6.91	34.3	100	51	Peak
2402	75.78	-	-	-	-	-	-	-	-	Average
4803	45.61	-28.39	74	61.84	33.98	8.75	58.96	100	0	Peak
4803	20.85	-33.15	54	-	-	-	-	-	-	Average

- Note:** 1. Other harmonics are lower than background noise.
 2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76)



Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	39	Relative Humidity :	49~54%
Test Engineer :	Eric Shih	Polarization :	Horizontal
Remark :	2442 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2442	108.54	-	-	103.59	32.35	6.99	34.39	116	266	Peak
2442	83.78	-	-	-	-	-	-	-	-	Average
4882	45.68	-28.32	74	61.71	33.95	8.85	58.83	100	0	Peak
4882	20.92	-33.08	54	-	-	-	-	-	-	Average
7323	41.92	-32.08	74	53.22	35.53	10.91	57.74	100	0	Peak
7323	17.16	-36.84	54	-	-	-	-	-	-	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76)

Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	39	Relative Humidity :	49~54%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	2442 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2442	102.77	-	-	97.82	32.35	6.99	34.39	176	114	Peak
2442	78.01	-	-	-	-	-	-	-	-	Average
4882	46.05	-27.95	74	62.08	33.95	8.85	58.83	100	0	Peak
4882	21.29	-32.71	54	-	-	-	-	-	-	Average
7323	42.45	-31.55	74	53.75	35.53	10.91	57.74	100	0	Peak
7323	17.69	-36.31	54	-	-	-	-	-	-	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76)



Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	78	Relative Humidity :	49~54%
Test Engineer :	Eric Shih	Polarization :	Horizontal
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.96	19.89	-20.11	40	38.55	11.9	0.64	31.2	117	14	Peak
161.49	16.7	-26.8	43.5	36.44	10.22	1.22	31.18	-	-	Peak
283.26	16.85	-29.15	46	33.27	12.89	1.65	30.96	-	-	Peak
384	20.12	-25.88	46	33.73	15.26	2.11	30.98	-	-	Peak
727.7	24.52	-21.48	46	30.07	21.84	3.01	30.4	-	-	Peak
976.2	27.87	-26.13	54	29.75	24.92	3.49	30.29	-	-	Peak
2480	110.51	-	-	105.5	32.38	7.06	34.43	111	84	Peak
2480	85.75	-	-	-	-	-	-	-	-	Average
4962	45.57	-28.43	74	61.4	33.91	8.92	58.66	100	0	Peak
4962	20.81	-33.19	54	-	-	-	-	-	-	Average
7440	40.84	-33.16	74	52.14	35.51	11.04	57.85	100	0	Peak
7440	16.08	-37.92	54	-	-	-	-	-	-	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76)



Test Mode :	3Mbps	Temperature :	21~25°C
Test Channel :	78	Relative Humidity :	49~54%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.16	20.82	-19.18	40	33.93	17.76	0.55	31.42	-	-	Peak
93.45	24.07	-19.43	43.5	45.21	9	0.96	31.1	-	-	Peak
161.49	16.5	-27	43.5	36.24	10.22	1.22	31.18	-	-	Peak
339.2	30.96	-15.04	46	46	14.07	1.89	31	174	118	Peak
567.4	21.66	-24.34	46	30.01	19.78	2.6	30.73	-	-	Peak
924.4	27.35	-18.65	46	30.18	24.12	3.4	30.35	-	-	Peak
2480	102.37	-	-	97.36	32.38	7.06	34.43	171	115	Peak
2480	77.61	-	-	-	-	-	-	-	-	Average
4959	44.21	-29.79	74	60.04	33.91	8.92	58.66	100	0	Peak
4959	19.45	-34.55	54	-	-	-	-	-	-	Average
7440	40.97	-33.03	74	52.27	35.51	11.04	57.85	100	0	Peak
7440	16.21	-37.79	54	-	-	-	-	-	-	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.76)

3.9 AC Conducted Emission Measurement

3.9.1 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 (dB μ V)	
	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.

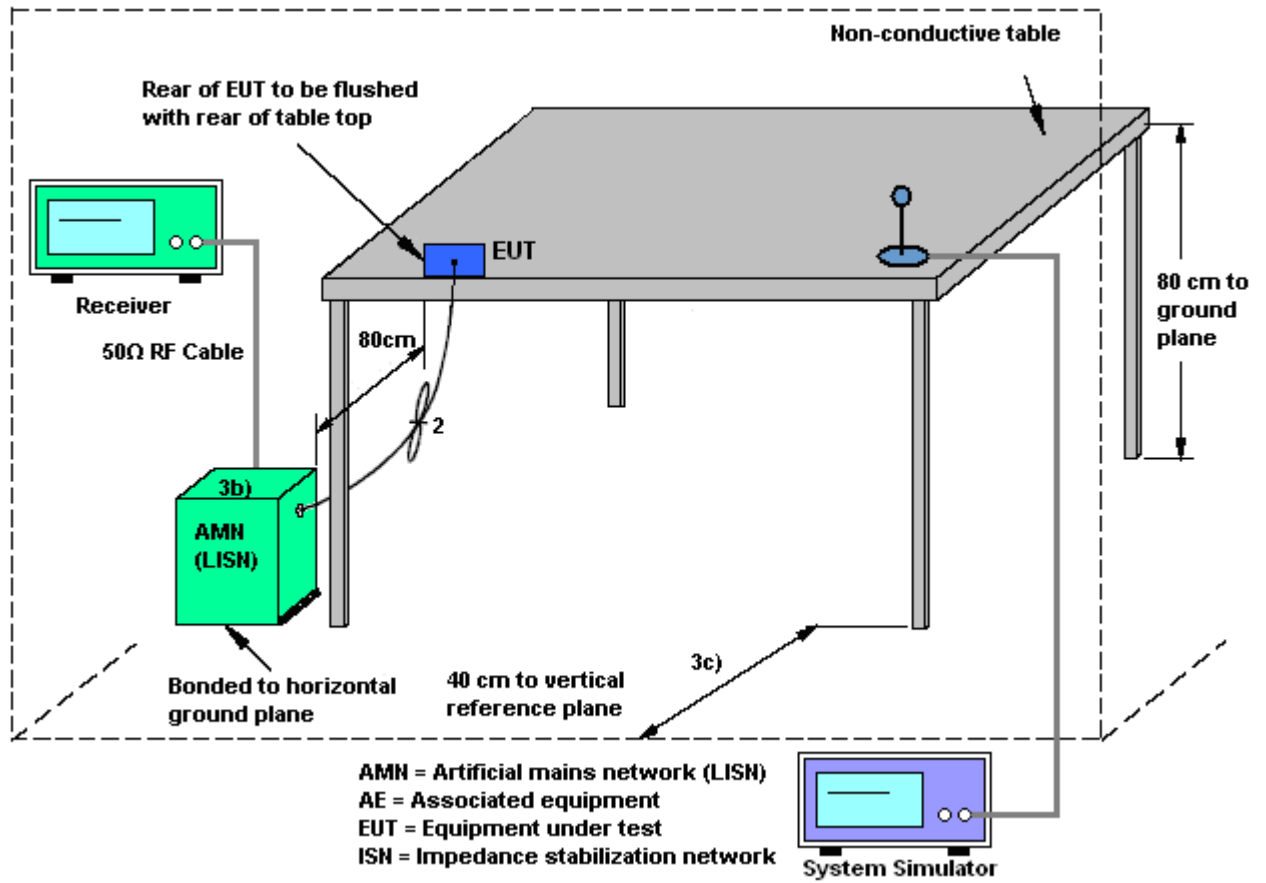
3.9.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.9.3 Test Procedures

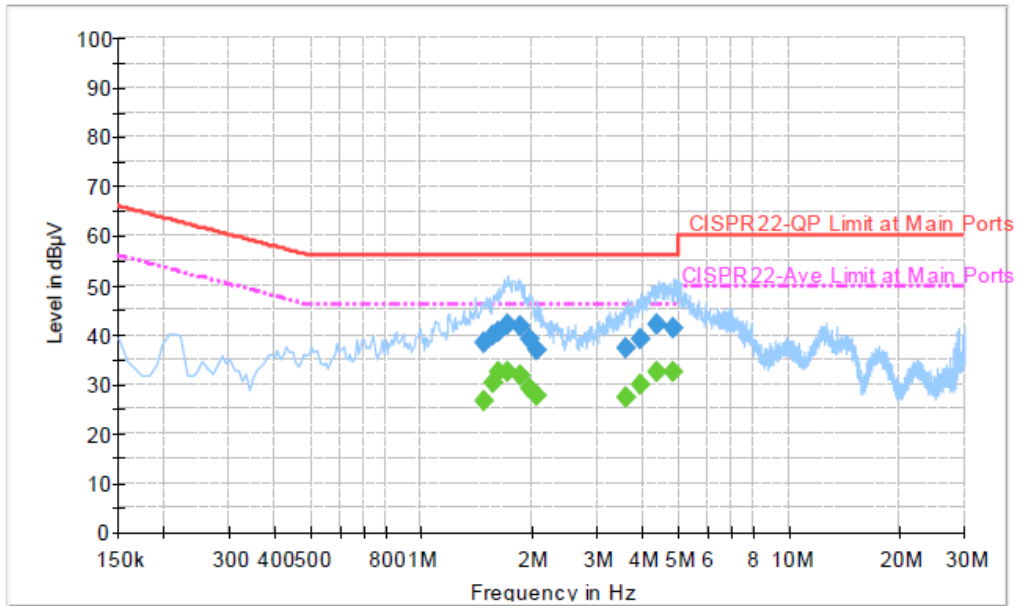
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Adapter + MP3 + Earphone		

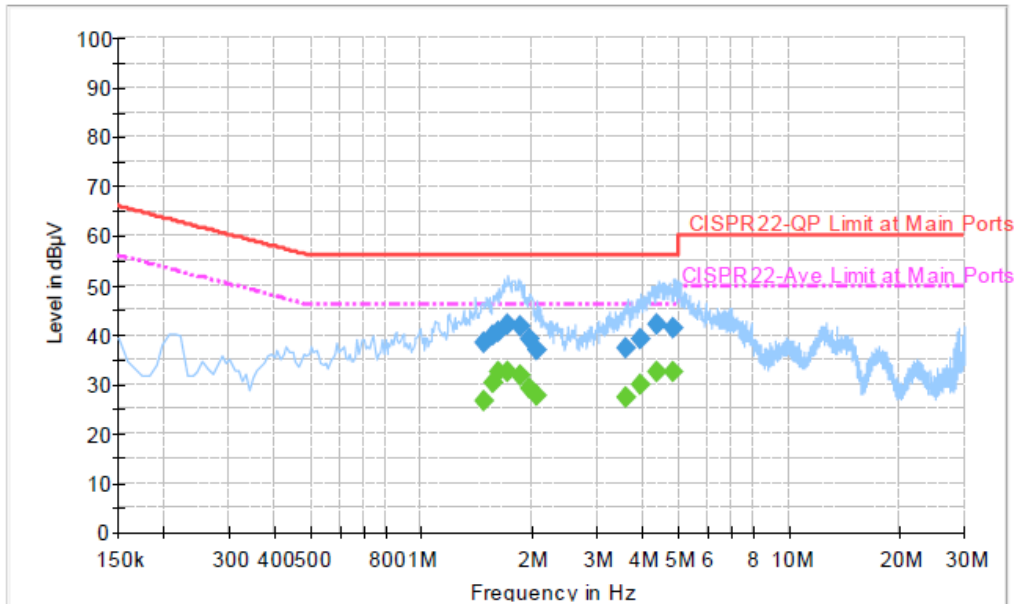


Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.478000	38.2	Off	L1	19.4	17.8	56.0
1.574000	39.8	Off	L1	19.5	16.2	56.0
1.630000	40.5	Off	L1	19.5	15.5	56.0
1.726000	42.1	Off	L1	19.5	13.9	56.0
1.862000	41.5	Off	L1	19.5	14.5	56.0
1.974000	39.0	Off	L1	19.5	17.0	56.0
2.062000	37.0	Off	L1	19.5	19.0	56.0
3.590000	37.2	Off	L1	19.6	18.8	56.0
3.966000	39.0	Off	L1	19.6	17.0	56.0
4.390000	41.9	Off	L1	19.6	14.1	56.0
4.838000	41.5	Off	L1	19.6	14.5	56.0



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Adapter + MP3 + Earphone		

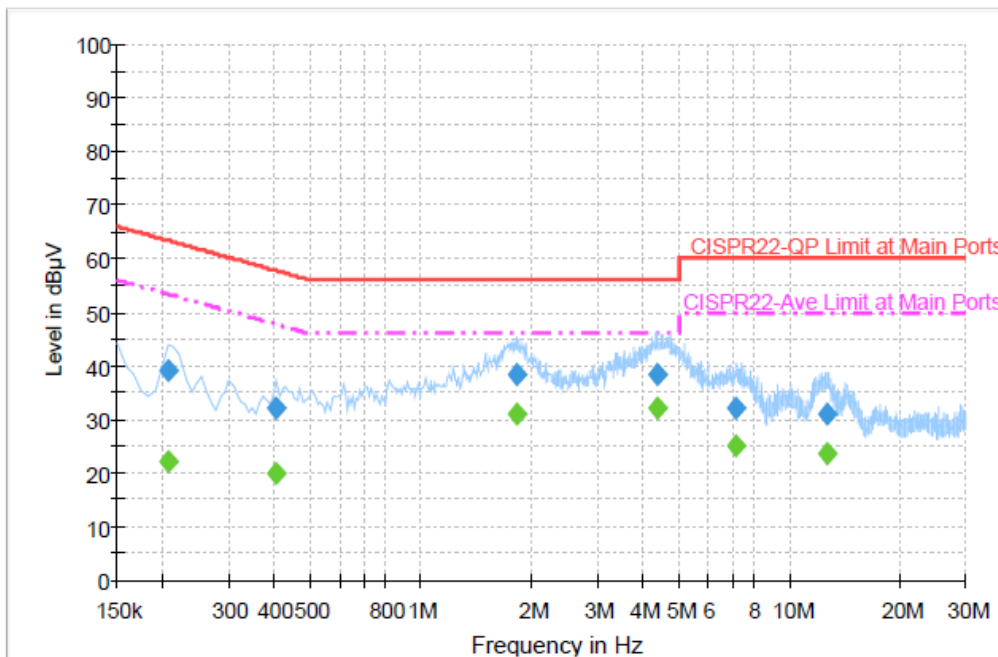


Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.478000	26.6	Off	L1	19.4	19.4	46.0
1.574000	30.4	Off	L1	19.5	15.6	46.0
1.630000	32.4	Off	L1	19.5	13.6	46.0
1.726000	32.7	Off	L1	19.5	13.3	46.0
1.862000	31.8	Off	L1	19.5	14.2	46.0
1.974000	29.3	Off	L1	19.5	16.7	46.0
2.062000	27.5	Off	L1	19.5	18.5	46.0
3.590000	27.2	Off	L1	19.6	18.8	46.0
3.966000	29.7	Off	L1	19.6	16.3	46.0
4.390000	32.6	Off	L1	19.6	13.4	46.0
4.838000	32.4	Off	L1	19.6	13.6	46.0



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Adapter + MP3 + Earphone		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	39.1	Off	N	19.3	24.3	63.4
0.406000	32.0	Off	N	19.4	25.7	57.7
1.814000	38.5	Off	N	19.6	17.5	56.0
4.390000	38.4	Off	N	19.6	17.6	56.0
7.158000	32.0	Off	N	19.7	28.0	60.0
12.590000	31.0	Off	N	19.8	29.0	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	22.2	Off	N	19.3	31.2	53.4
0.406000	20.0	Off	N	19.4	27.7	47.7
1.814000	31.1	Off	N	19.6	14.9	46.0
4.390000	32.2	Off	N	19.6	13.8	46.0
7.158000	25.2	Off	N	19.7	24.8	50.0
12.590000	23.6	Off	N	19.8	26.4	50.0



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 Anti-Replacement Construction

An embedded-in antenna design is used.

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	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 07, 2013	May 02, 2014 ~ May 06, 2014	Jun. 06, 2014	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	300MHz~40GHz	Jan. 28, 2014	May 02, 2014 ~ May 06, 2014	Jan. 27, 2015	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	300MHz~40GHz	Jan. 28, 2014	May 02, 2014 ~ May 06, 2014	Jan. 27, 2015	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9 kHz~7 GHz	Sep. 06, 2013	May 03, 2014	Sep. 05, 2014	Radiation (03CH07-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 10, 2014	May 03, 2014	Feb. 09, 2015	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	860004/0001	9 kHz~30 MHz	Jul. 03, 2012	May 03, 2014	Jul. 03, 2014	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30 MHz ~ 1 GHz	Oct. 10, 2013	May 03, 2014	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1 GHz~18 GHz	Aug. 22, 2013	May 03, 2014	Aug. 21, 2014	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15 GHz- 40 GHz	Oct. 03, 2013	May 03, 2014	Oct. 02, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz 32dB GAIN	Mar. 17, 2014	May 03, 2014	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Nov. 29, 2013	May 03, 2014	Nov. 28, 2014	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	DC~18 G High Gain	Jul. 09, 2013	May 03, 2014	Jul. 08, 2014	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	May 03, 2014	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	May 03, 2014	N/A	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	Apr. 28, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Apr. 28, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Apr. 28, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Apr. 28, 2014	N/A	Conduction (CO05-HY)



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.50
-------------------------------------------------------------------------	------