

FCC RF Test Report

APPLICANT : Chi Mei Communication Systems, Inc.
EQUIPMENT : Tablet PC
BRAND NAME : Lenovo
MODEL NAME : 60019 / 2291
MARKETING NAME : IdeaTab S2109A-F
FCC ID : QDJ-GOXW
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Dec. 13, 2011 and completely tested on Feb. 15, 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.

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FCC ID : QDJ-GOXW

Page Number : 1 of 57

Report Issued Date : Mar. 08, 2012

Report Version : Rev. 02

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR220105-01A	Rev. 01	Initial issue of report	Mar. 07, 2012
FR220105-01A	Rev. 02	Update report for adding the calibration data of the required loop antenna into table.	Mar. 08, 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	-
3.2	-	Gen 4.6.1	99% Bandwidth	-	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	$\geq 2/3$ of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 125\text{ mW}$	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.8	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 17.80 dB at 0.190 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit -8.35 dB at 34.860 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Chi Mei Communication Systems, Inc.

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

1.2 Manufacturer

Chi Mei Communication Systems, Inc.

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

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Tablet PC
Brand Name	Lenovo
Model Name	60019 / 2291
Marketing Name	IdeaTab S2109A-F
Integrated Module	Brand Name: Texas Instruments Model Name: WL1281
Sample 1	EUT with eMMC 1
Sample 2	EUT with eMMC 2
Sample 3	EUT with eMMC 3
FCC ID	QDJ-GOXW
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) : -0.13 dBm (0.0010 W) Bluetooth EDR (2Mbps) : 0.27 dBm (0.0011 W) Bluetooth EDR (3Mbps) : 0.97 dBm (0.0012 W)
Antenna Type	PIFA Antenna with gain 1.93 dBi
Type of Antenna Connector	N/A
HW Version	PR3
SW Version	1.180
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit

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

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH05-HY	722060/4086B-1

1.5 Applied Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC Public Notice DA 00-705
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

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.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	T&E	GS-50	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	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	LCD Monitor	Acer	H223HQ	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A
7.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
8.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
9.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

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

<GFSK / 1Mbps>

Channel	Frequency	Bluetooth RF Output Power		
		DH1	DH3	DH5
Ch00	2402MHz	-0.13 dBm	-0.15 dBm	-0.16 dBm
Ch39	2441MHz	-0.78 dBm	-0.79 dBm	-0.80 dBm
Ch78	2480MHz	-1.98 dBm	-1.98 dBm	-1.98 dBm

< π /4-DQPSK / 2Mbps>

Channel	Frequency	Bluetooth RF Output Power		
		DH1	DH3	DH5
Ch00	2402MHz	0.26 dBm	0.26 dBm	0.27 dBm
Ch39	2441MHz	-0.37 dBm	-0.34 dBm	-0.37 dBm
Ch78	2480MHz	-1.56 dBm	-1.58 dBm	-1.58 dBm

<8-DPSK / 3Mbps>

Channel	Frequency	Bluetooth RF Output Power		
		DH1	DH3	DH5
Ch00	2402MHz	0.95 dBm	0.92 dBm	0.97 dBm
Ch39	2441MHz	0.27 dBm	0.28 dBm	0.28 dBm
Ch78	2480MHz	-0.91 dBm	-0.94 dBm	-0.93 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.
3. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 KHz to 30 MHz), radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

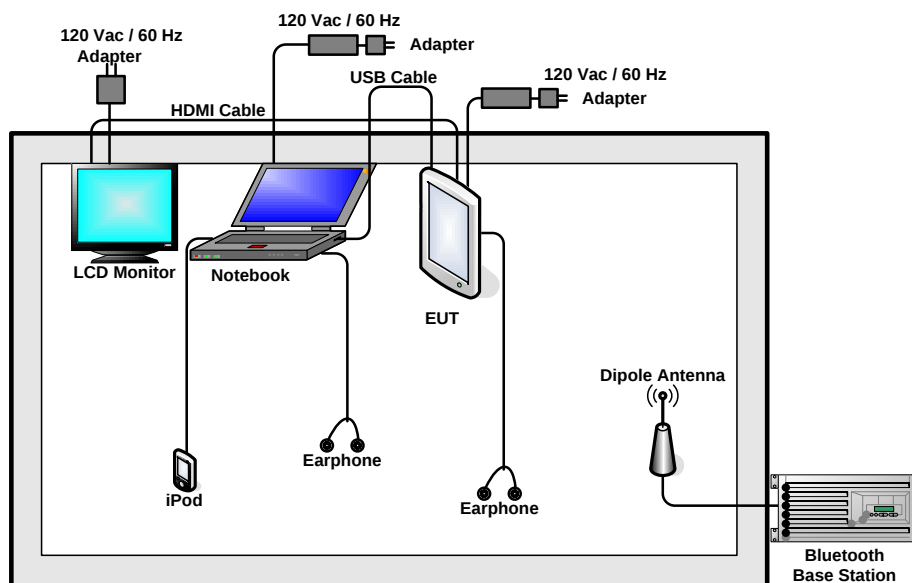
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

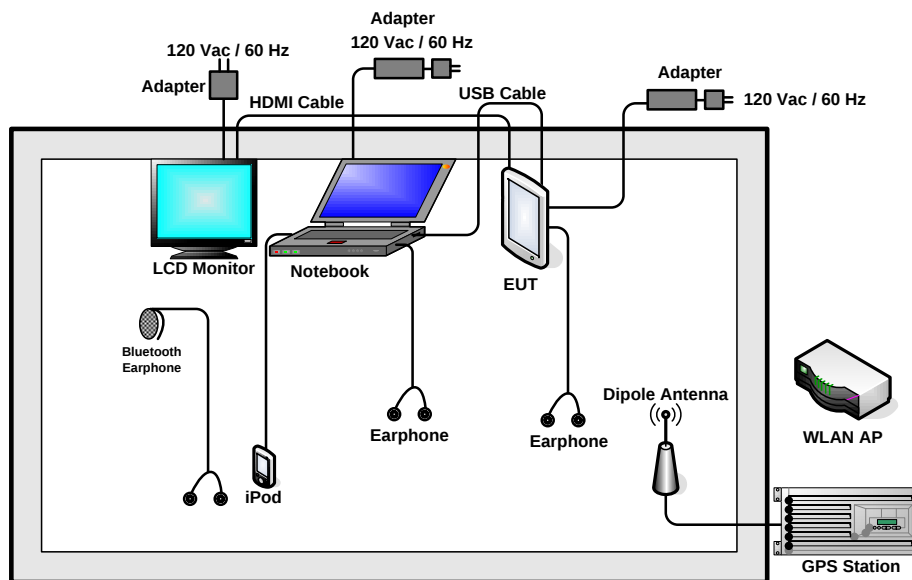
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN Link + Earphone + Adapter + GPS Rx + Battery + HDMI Cable + USB Cable 1 (Data Link with Notebook) Mode 2 :Bluetooth Link + WLAN Link + Earphone + Adapter + Camera + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook) Mode 3 : Bluetooth Link + WLAN Link + Earphone + Adapter + H Pattern + Battery + HDMI Cable + USB Cable 1 (Data Link with Notebook) Mode 4 : Bluetooth Link + WLAN Link + Earphone + Adapter + MPEG4 + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook)		
Remark:			
1. For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported.			
2. For conducted emission, the worst case is mode 2; only the test data of this mode was reported.			
3. Link with Notebook means data application transferred mode between EUT and Notebook.			
4. The output power of Bluetooth (1Mbps) and Bluetooth EDR (2Mbps) are less than Bluetooth EDR (3Mbps), thus the radiation emission can be excluded.			
5. Only Sample 1 was tested.			

2.3 Connection Diagram of Test System

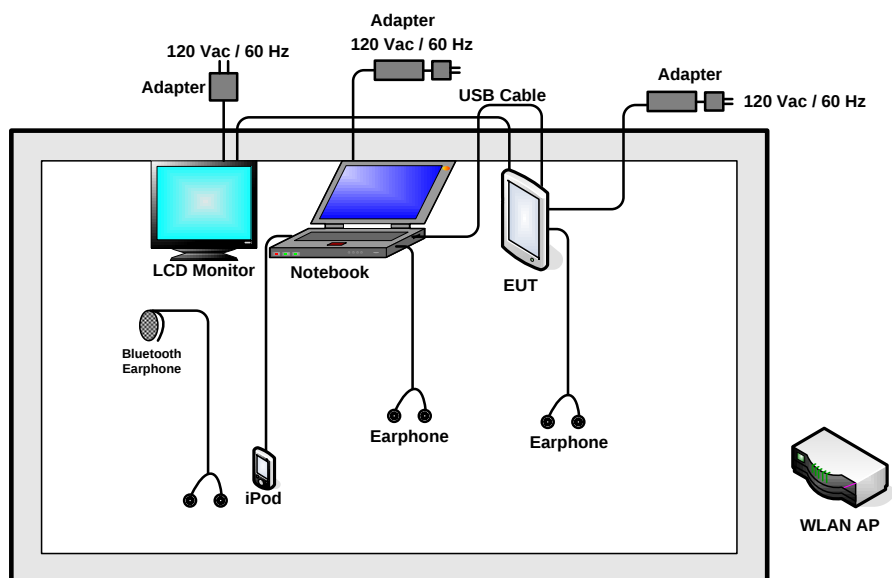
<Bluetooth Tx Mode>



<EUT with USB Cable (Link with Notebook) in GPS Rx Mode>



<EUT with USB Cable (Link with Notebook) Mode>



2.4 RF Utility

For Bluetooth function, the RF utility, "BT Test Tool" was installed in EUT which was programmed in order to make the EUT to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

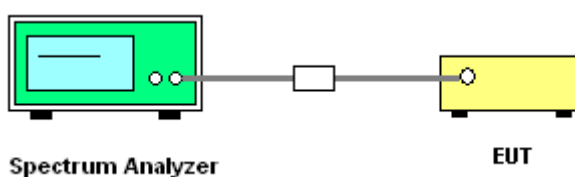
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

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

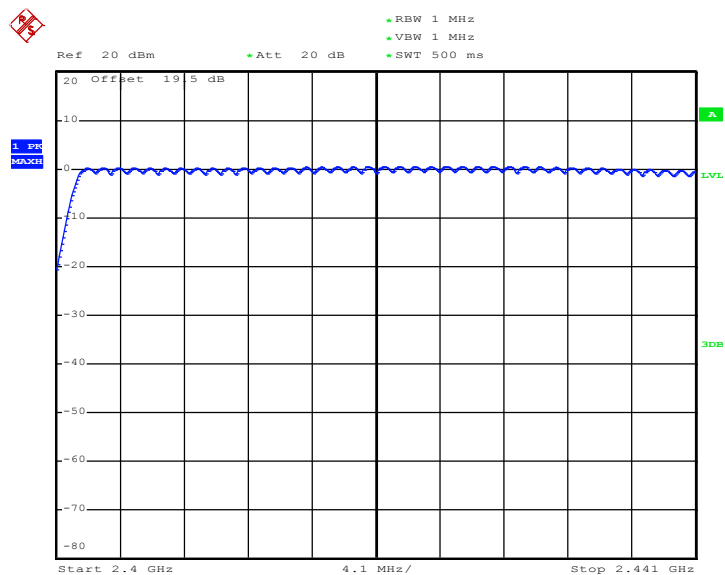
3.1.4 Test Setup



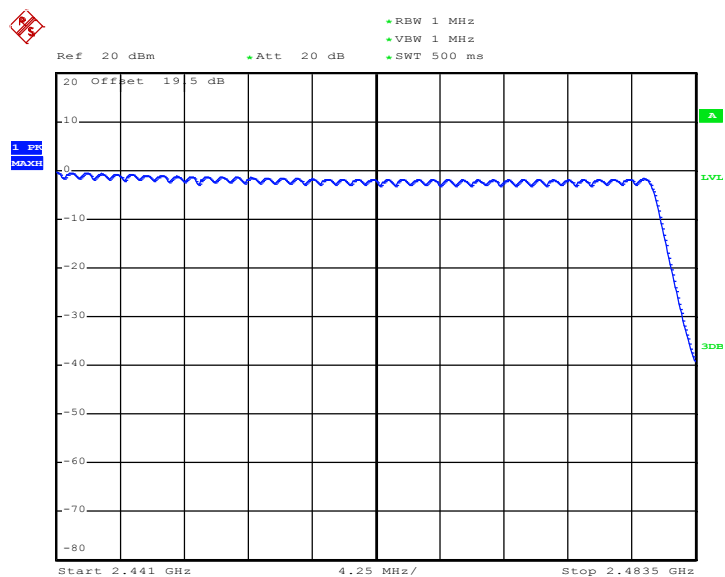
3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 7~9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 13.DEC.2011 18:16:15



Date: 13.DEC.2011 18:20:46

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

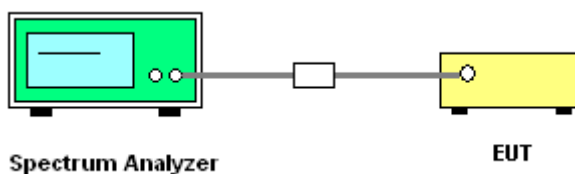
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
RBW $\geq$ 1% of the 20 dB bandwidth; VBW $\geq$ RBW; Sweep = auto; Detector function = peak;
Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

3.2.4 Test Setup

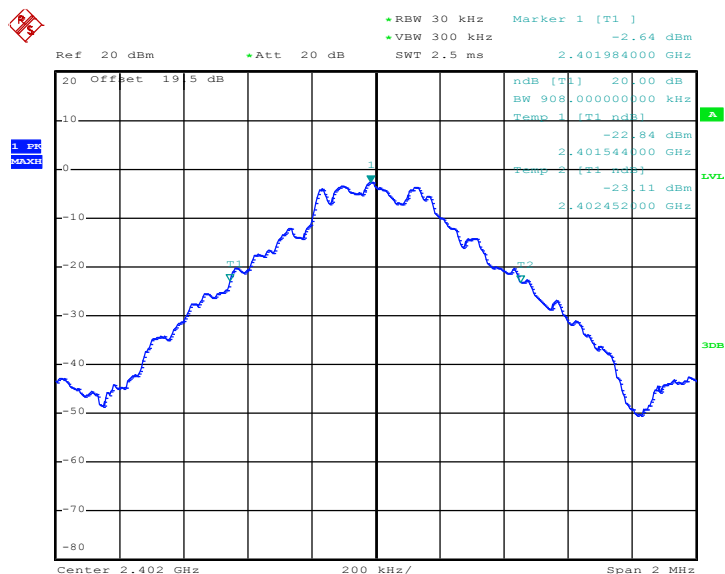


3.2.5 Test Result of 20dB Bandwidth

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

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.908
39	2441	0.904
78	2480	0.904

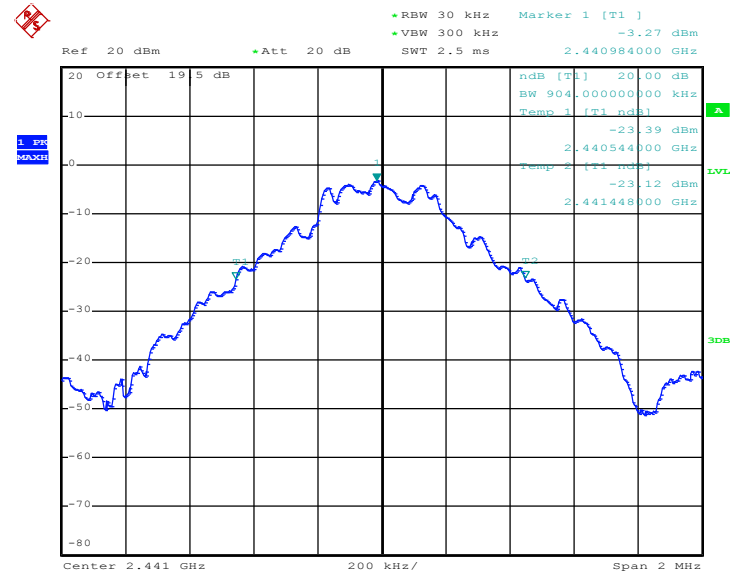
20 dB Bandwidth Plot on Channel 00



Date: 13.DEC.2011 18:02:09

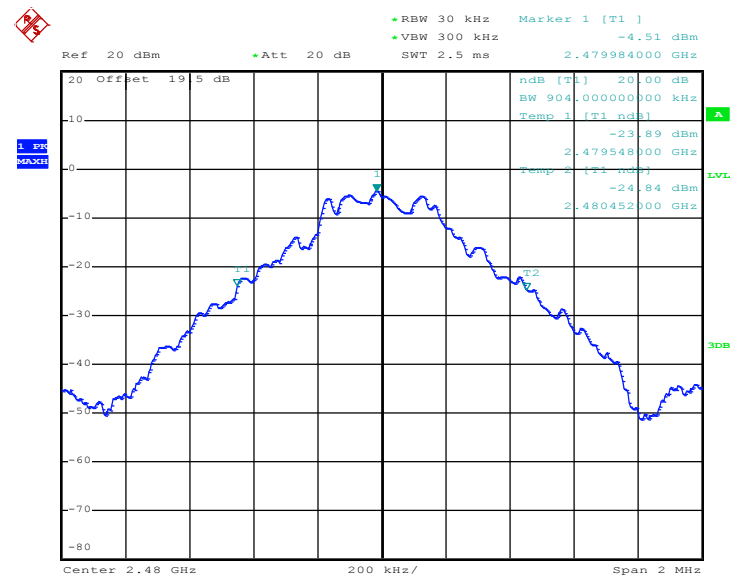


20 dB Bandwidth Plot on Channel 39



Date: 13.DEC.2011 18:02:30

20 dB Bandwidth Plot on Channel 78



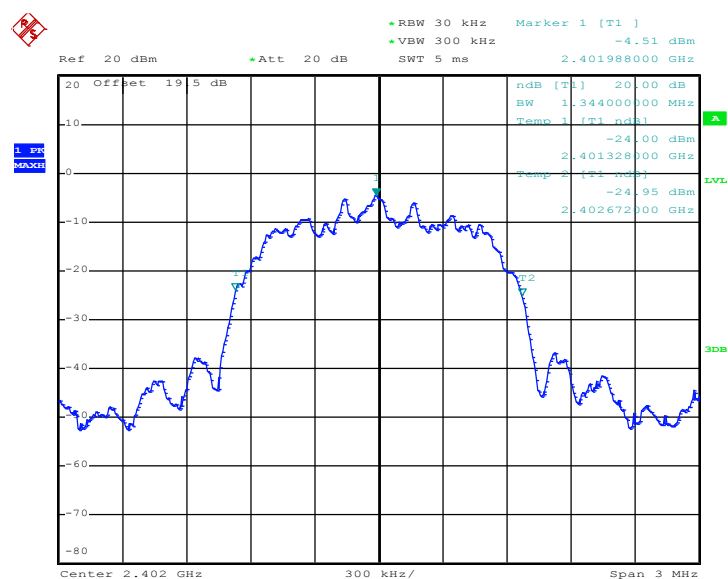
Date: 13.DEC.2011 18:02:54



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

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

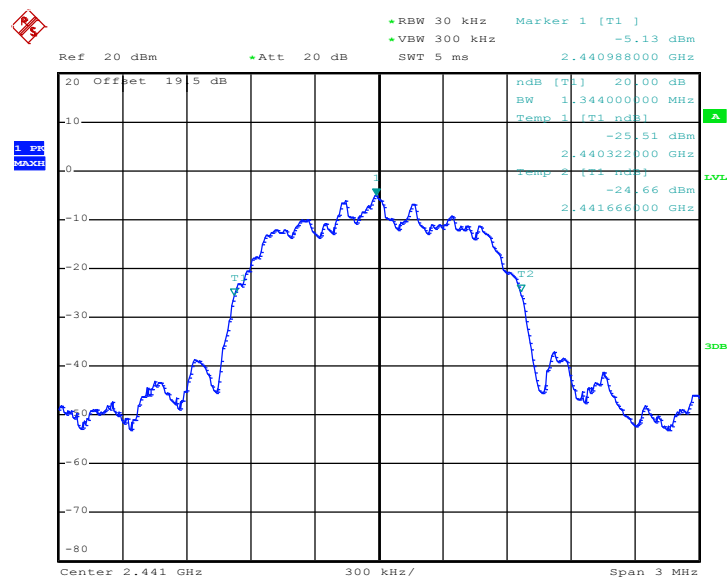
20 dB Bandwidth Plot on Channel 00



Date: 13.DEC.2011 18:03:38

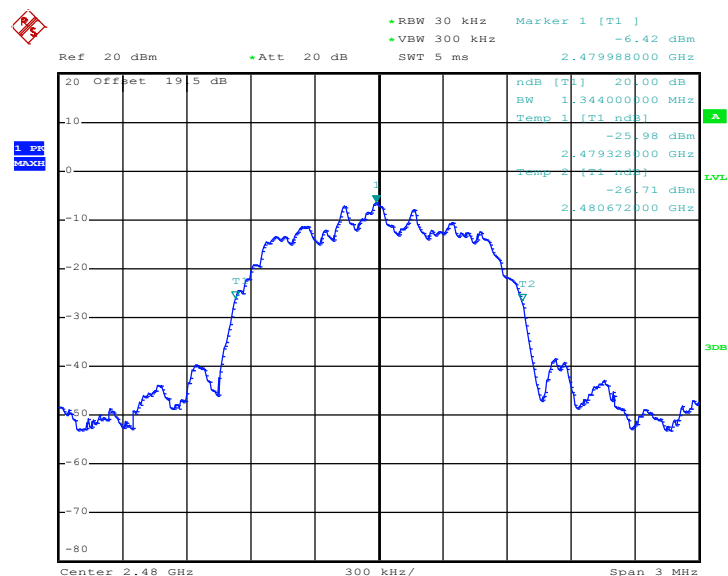


20 dB Bandwidth Plot on Channel 39



Date: 13.DEC.2011 18:04:02

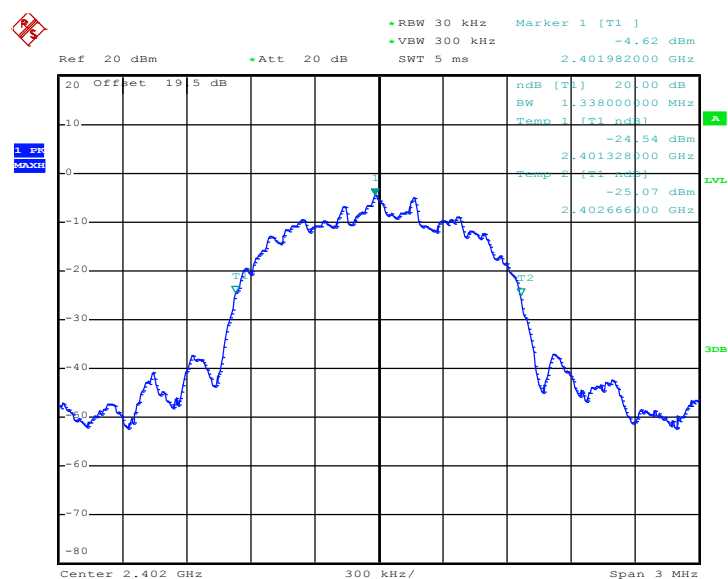
20 dB Bandwidth Plot on Channel 78



Date: 13.DEC.2011 18:04:41

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

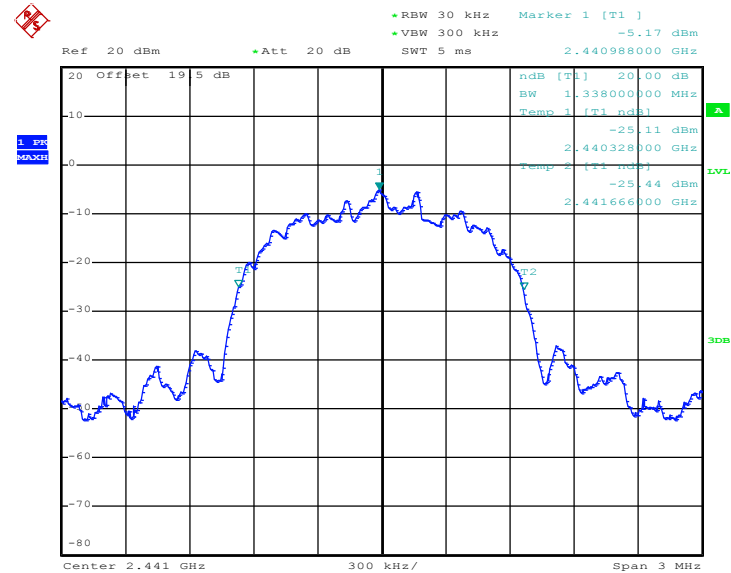
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.338
39	2441	1.338
78	2480	1.338

20 dB Bandwidth Plot on Channel 00


Date: 13.DEC.2011 18:05:29

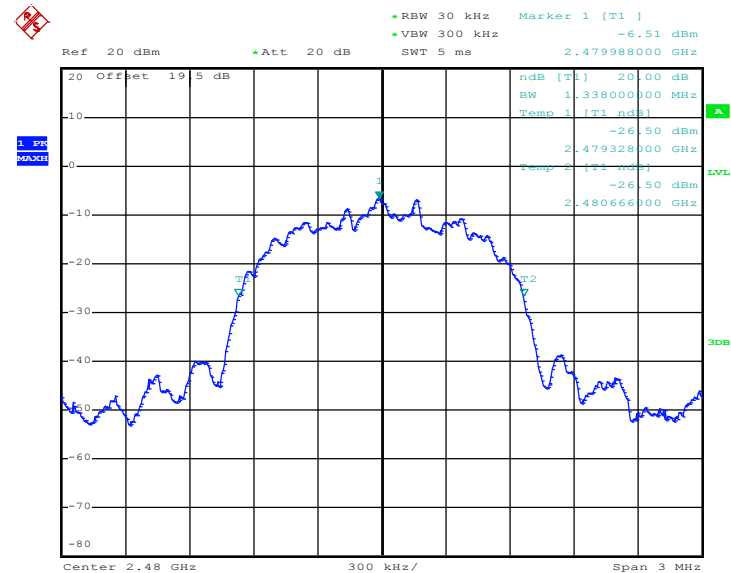


20 dB Bandwidth Plot on Channel 39



Date: 13.DEC.2011 18:06:11

20 dB Bandwidth Plot on Channel 78



Date: 13.DEC.2011 18:06:55

3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 KHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

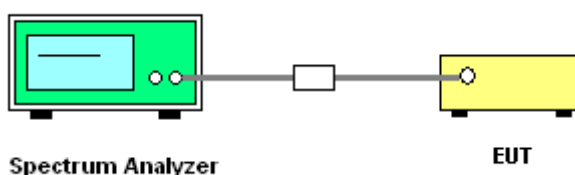
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels; $RBW \geq 1\%$ of the span;
 $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

3.3.4 Test Setup

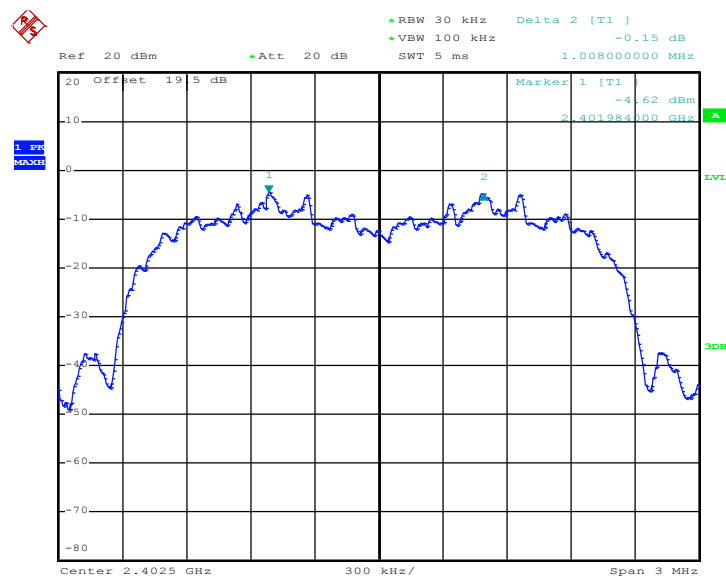


3.3.5 Test Result of Hopping Channel Separation

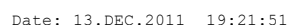
Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.008	0.8920	Pass
39	2441	1.008	0.8920	Pass
78	2480	1.002	0.8920	Pass

Channel Separation Plot on Channel 00 - 01



Date: 13.DEC.2011 19:22:44



Channel Separation Plot on Channel 77 - 78



3.4 Dwell Time Measurement

3.4.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

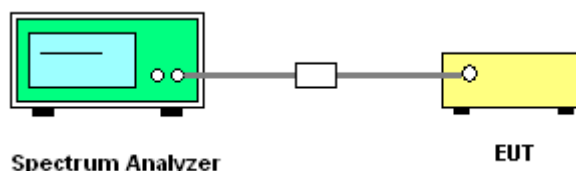
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW $\geq$ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

3.4.4 Test Setup



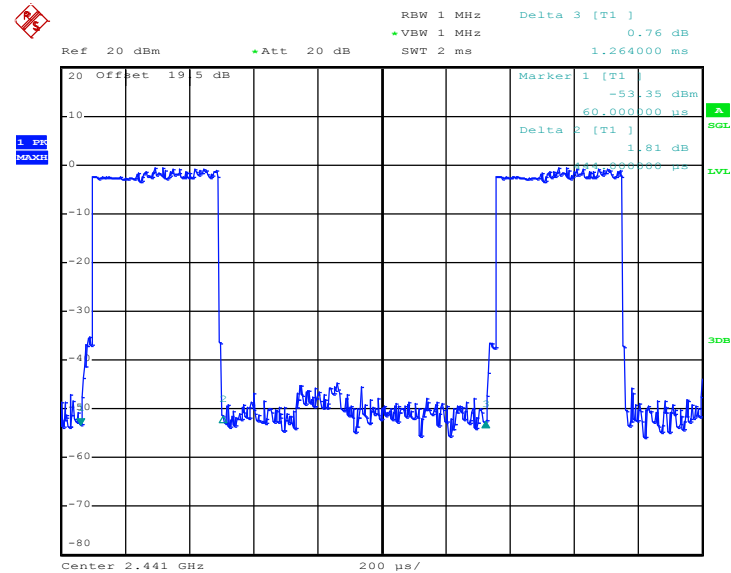
3.4.5 Test Result of Dwell Time

Test Mode :	Mode 8	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

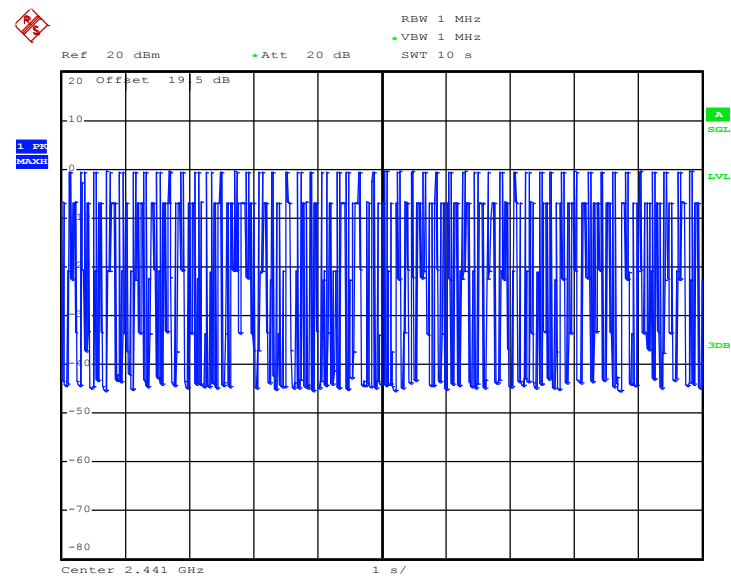
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH1	8.60	444.00	0.12	0.4	Pass
3DH3	5.20	1724.00	0.28	0.4	Pass
3DH5	3.40	3024.00	0.32	0.4	Pass

Remark:

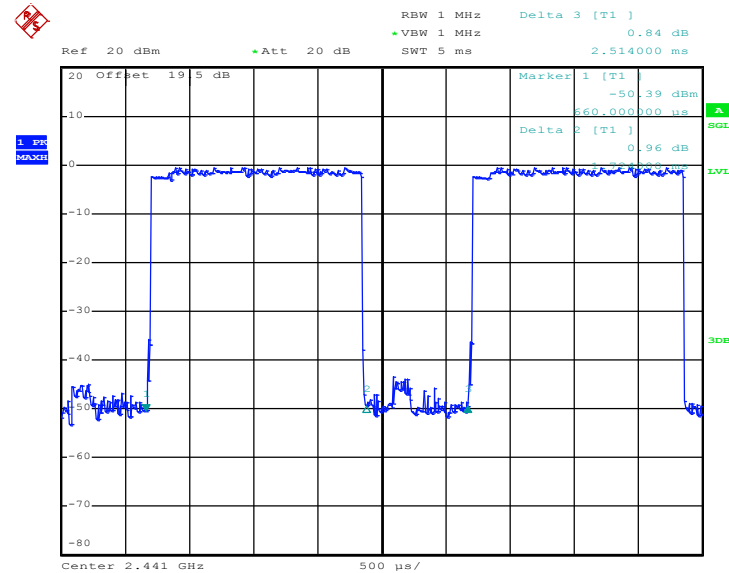
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

3DH1 Dwell Time (One Pulse) Plot on Channel 39


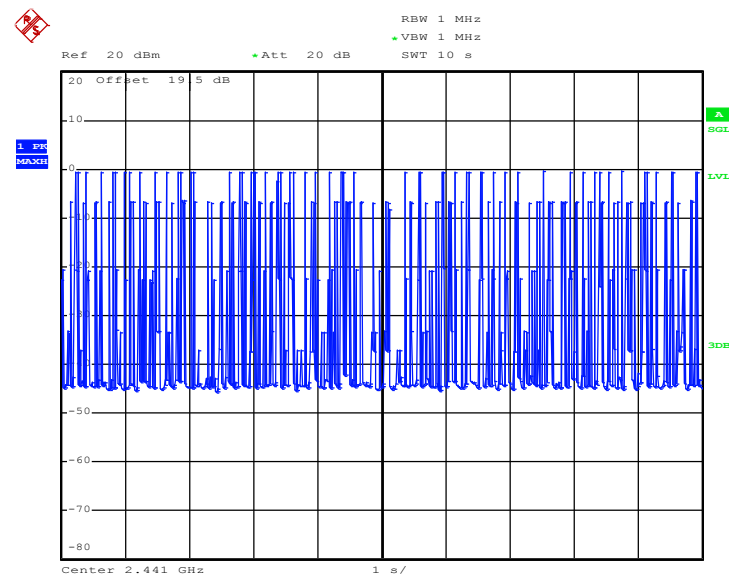
Date: 13.DEC.2011 17:56:36

3DH1 Dwell Time (Count Pulses) Plot on Channel 39


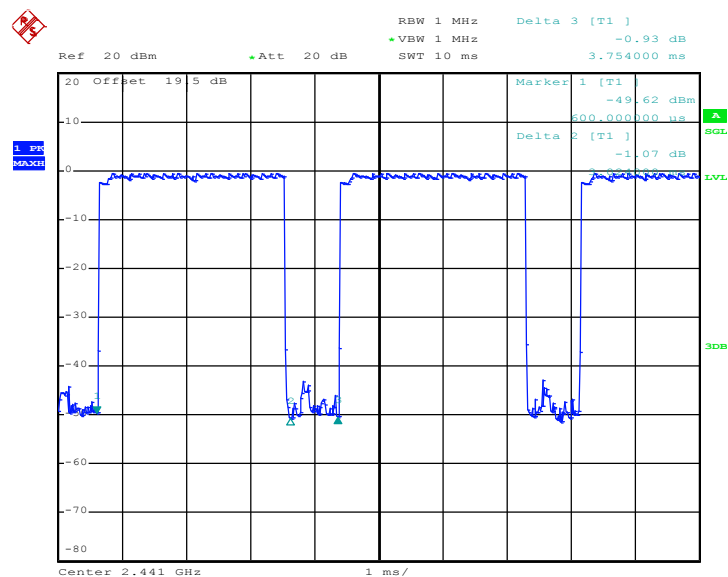
Date: 13.DEC.2011 18:00:32

3DH3 Dwell Time (One Pulse) Plot on Channel 39


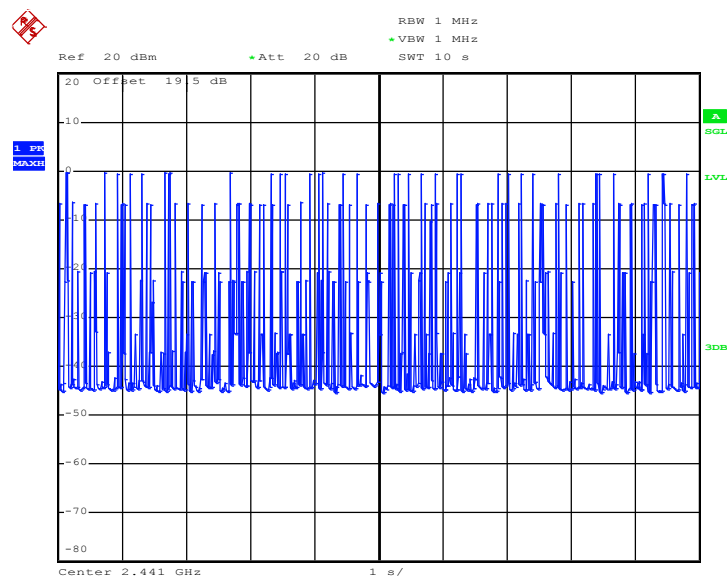
Date: 13.DEC.2011 17:58:00

3DH3 Dwell Time (Count Pulses) Plot on Channel 39


Date: 13.DEC.2011 18:00:47

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


Date: 13.DEC.2011 17:58:49

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


Date: 13.DEC.2011 18:01:01

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

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

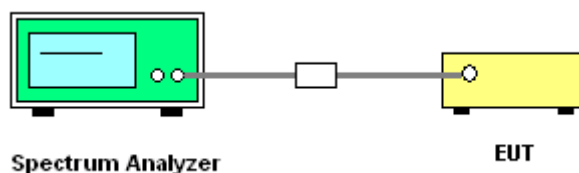
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

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

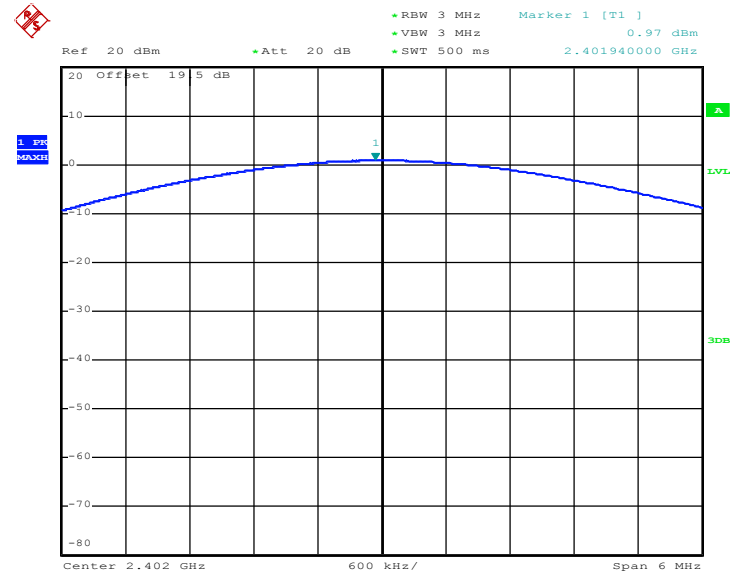
3.5.4 Test Setup



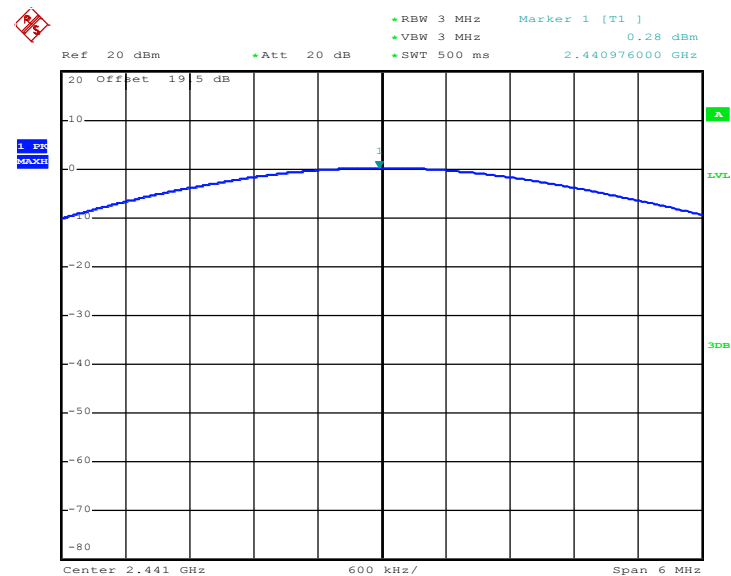
3.5.5 Test Result of Peak Output Power

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

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	0.97	20.97	Pass
39	2441	0.28	20.97	Pass
78	2480	-0.93	20.97	Pass

Peak Output Power Plot on Channel 00


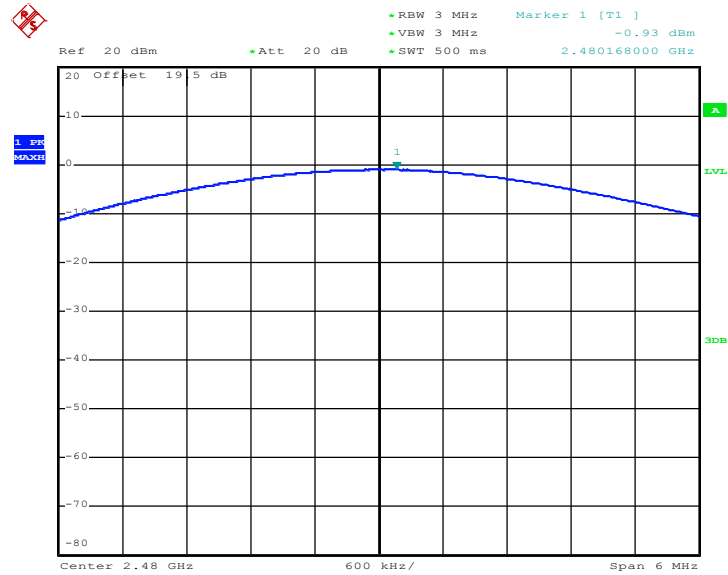
Date: 13.DEC.2011 17:14:30

Peak Output Power Plot on Channel 39


Date: 13.DEC.2011 17:15:43



Peak Output Power Plot on Channel 78



Date: 13.DEC.2011 17:16:57

3.6 Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 KHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

3.6.2 Measuring Instruments

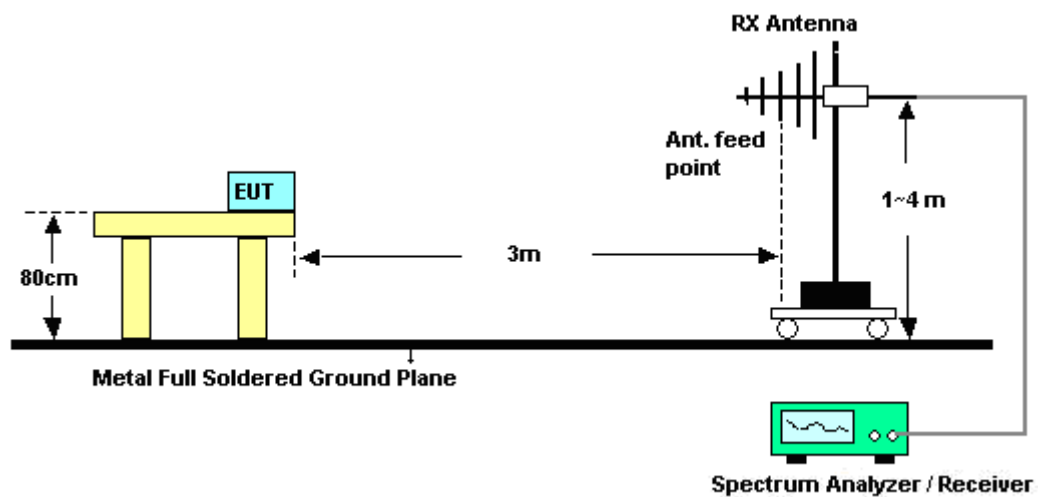
See list of measuring instruments of this test report.

3.6.3 Test Procedures

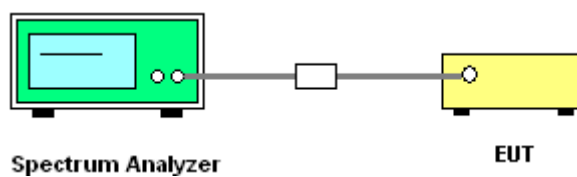
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300KHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.6.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	49~51%
		Test Engineer :	David Ke

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
2389.61	61.2	-12.8	74	60.48	32.02	4.58	35.88	143	316	Peak
2389.61	35.55	-18.45	54	34.83	32.02	4.58	35.88	143	316	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
2389.61	59.92	-14.08	74	59.2	32.02	4.58	35.88	100	42	Peak
2389.61	35.38	-18.62	54	34.66	32.02	4.58	35.88	100	42	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	49~51%
		Test Engineer :	David Ke

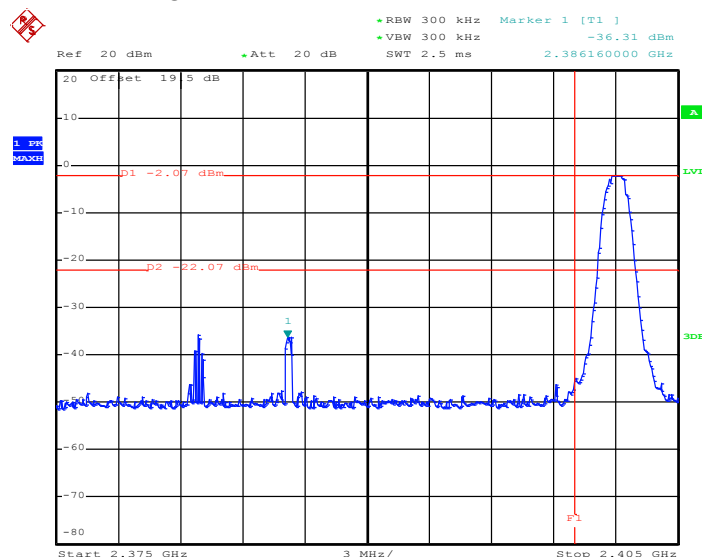
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	53.09	-20.91	74	52.17	32.09	4.64	35.81	100	298	Peak
2483.5	42.91	-11.09	54	41.99	32.09	4.64	35.81	100	298	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
2491.83	57.46	-16.54	74	56.52	32.1	4.64	35.8	121	190	Peak
2491.83	44.91	-9.09	54	43.97	32.1	4.64	35.8	121	190	Average

3.6.6 Test Result of Conducted Band Edges

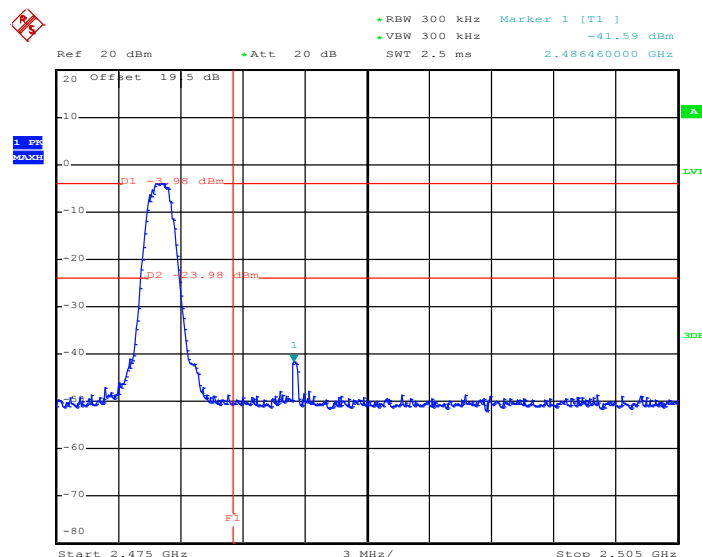
Test Mode :	Mode 7 and 9	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Low Band Edge Plot on Channel 00



Date: 13.DEC.2011 17:40:26

High Band Edge Plot on Channel 78



Date: 13.DEC.2011 17:42:02

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.

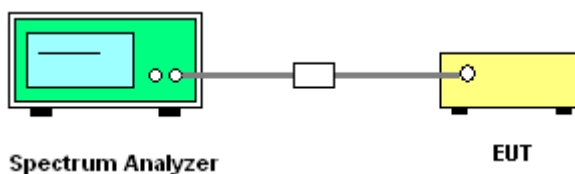
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedure

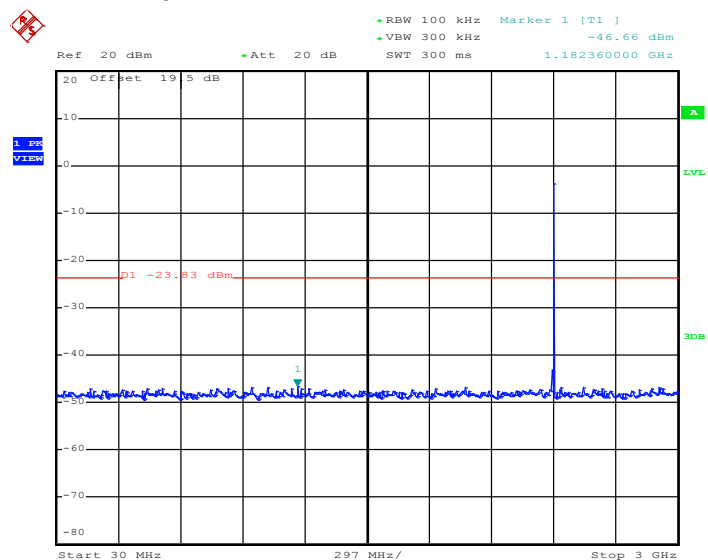
1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 KHz, Video bandwidth (VBW) $\geq$ RBW, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 KHz RBW.

3.7.4 Test Setup

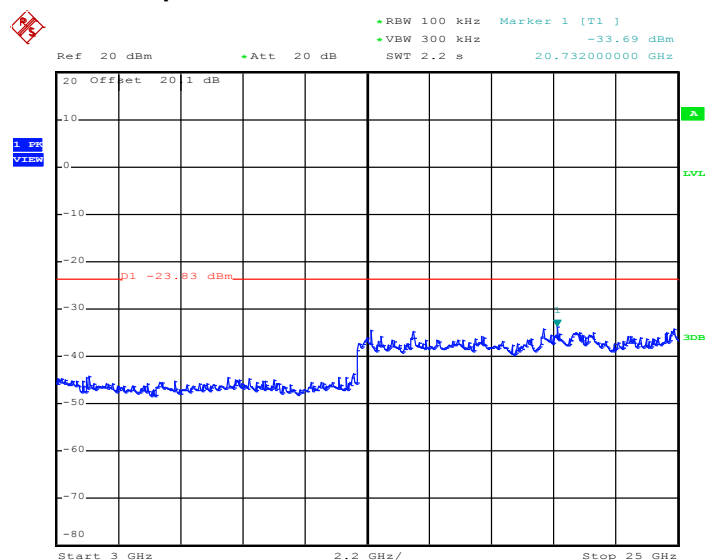




Test Mode :	Mode 7	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

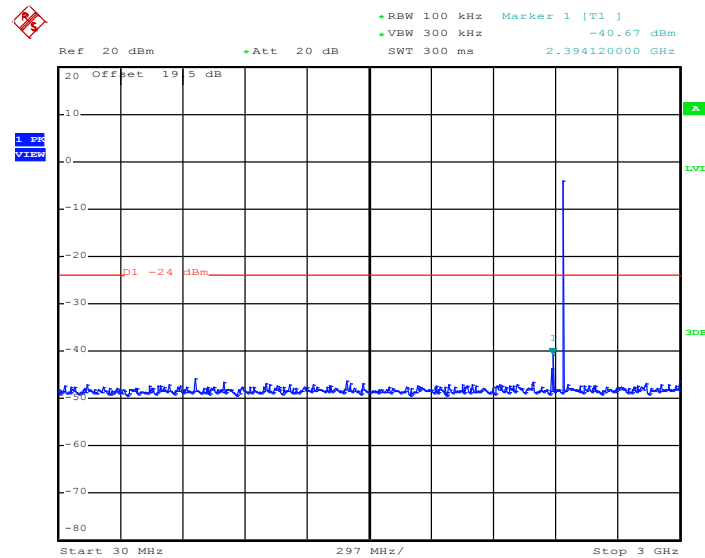


Date: 13.DEC.2011 18:07:51

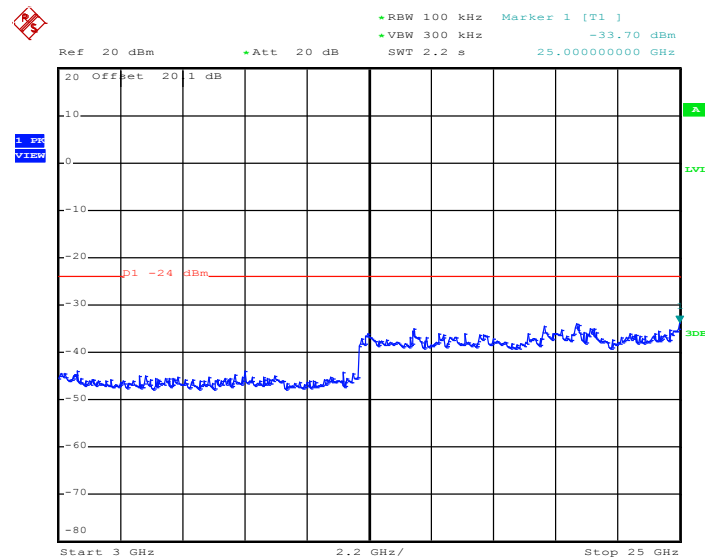


Date: 13.DEC.2011 18:08:03

Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


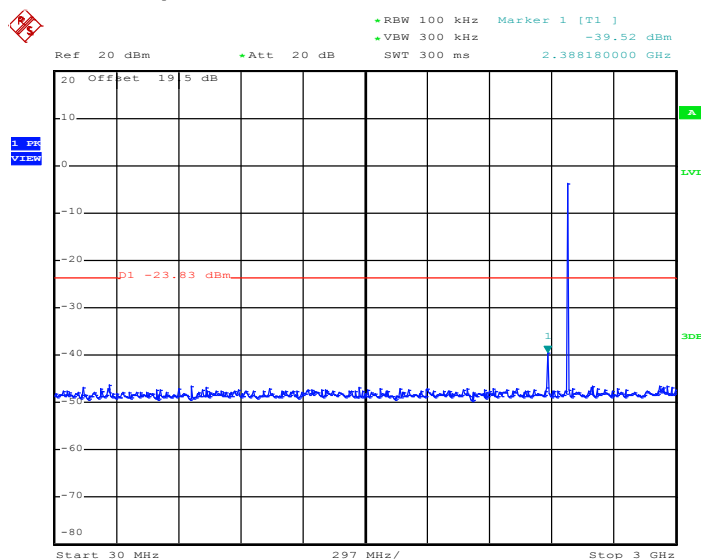
Date: 13.DEC.2011 18:08:54

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


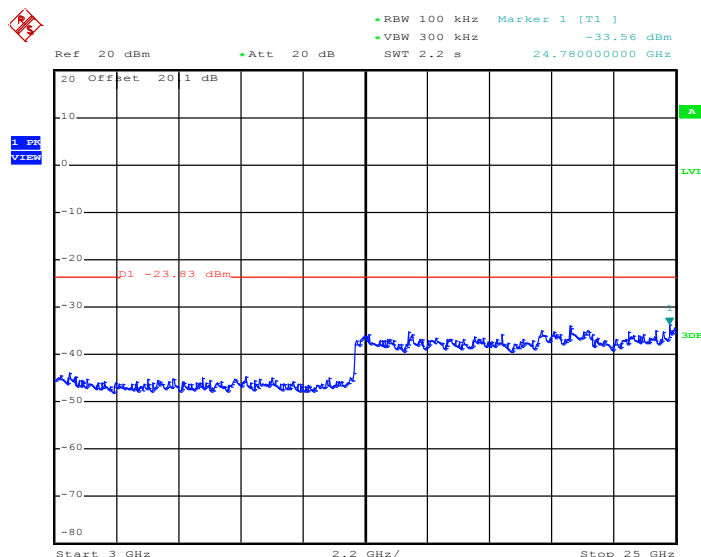
Date: 13.DEC.2011 18:09:06



Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 13.DEC.2011 18:09:58

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 13.DEC.2011 18:10:10

3.8 AC Conducted Emission Measurement

3.8.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

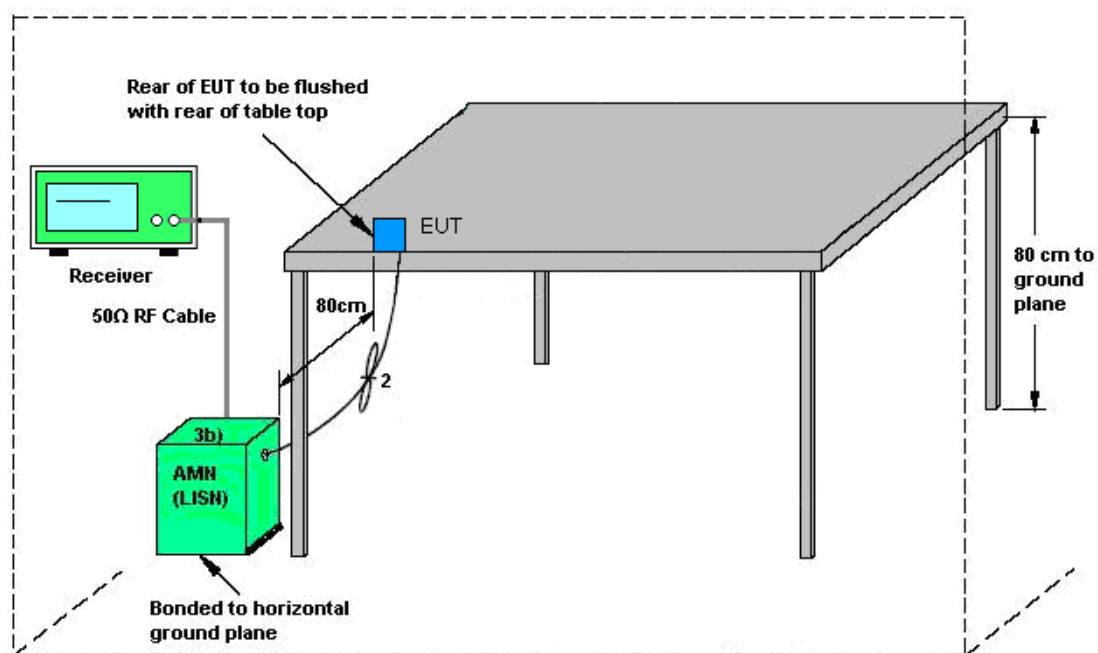
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

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

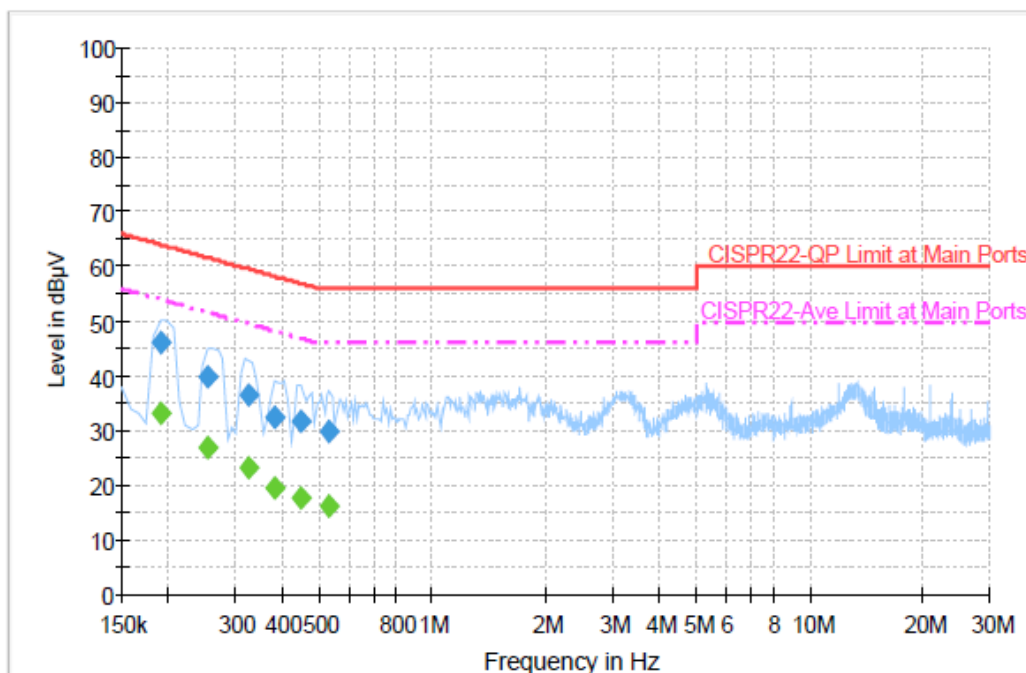
3.8.4 Test Setup



AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	21~23°C
Test Engineer :	Kai Chun Chu	Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link + Earphone + Adapter + Camera + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



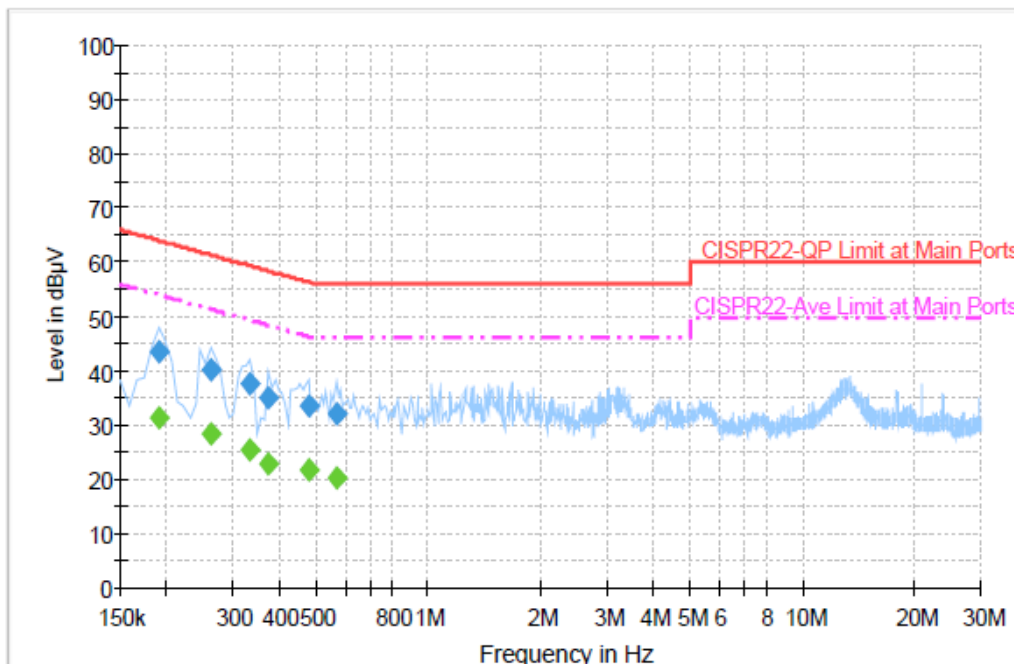
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	46.2	Off	L1	19.4	17.8	64.0
0.254000	40.0	Off	L1	19.3	21.6	61.6
0.326000	36.4	Off	L1	19.3	23.2	59.6
0.382000	32.6	Off	L1	19.4	25.6	58.2
0.446000	31.7	Off	L1	19.3	25.2	56.9
0.534000	30.0	Off	L1	19.3	26.0	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	33.1	Off	L1	19.4	20.9	54.0
0.254000	27.1	Off	L1	19.3	24.5	51.6
0.326000	23.4	Off	L1	19.3	26.2	49.6
0.382000	19.7	Off	L1	19.4	28.5	48.2
0.446000	17.6	Off	L1	19.3	29.3	46.9
0.534000	16.1	Off	L1	19.3	29.9	46.0

Test Mode :	Mode 2	Temperature :	21~23°C
Test Engineer :	Kai Chun Chu	Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + Earphone + Adapter + Camera + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	43.5	Off	N	19.4	20.5	64.0
0.262000	40.3	Off	N	19.4	21.1	61.4
0.334000	37.5	Off	N	19.3	21.9	59.4
0.374000	35.0	Off	N	19.4	23.4	58.4
0.478000	33.6	Off	N	19.4	22.8	56.4
0.566000	32.1	Off	N	19.3	23.9	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	31.4	Off	N	19.4	22.6	54.0
0.262000	28.3	Off	N	19.4	23.1	51.4
0.334000	25.6	Off	N	19.3	23.8	49.4
0.374000	23.0	Off	N	19.4	25.4	48.4
0.478000	21.6	Off	N	19.4	24.8	46.4
0.566000	20.2	Off	N	19.3	25.8	46.0

3.9 Radiated Emission Measurement

3.9.1 Limit of Radiated Emission

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

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

3.9.2 Measuring Instruments

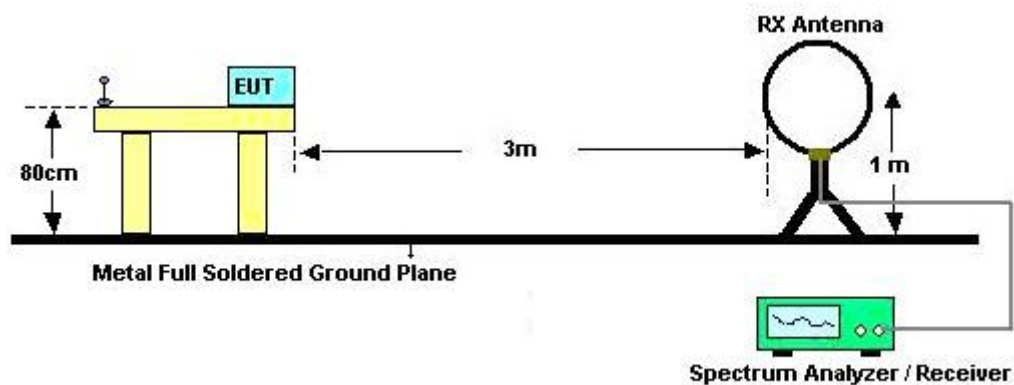
See list of measuring instruments of this test report.

3.9.3 Test Procedures

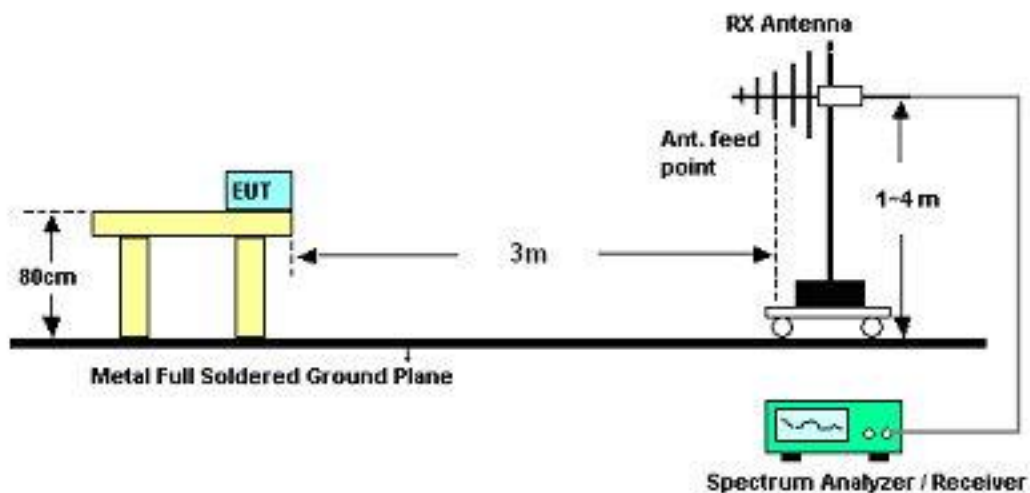
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector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

3.9.4 Test Setup

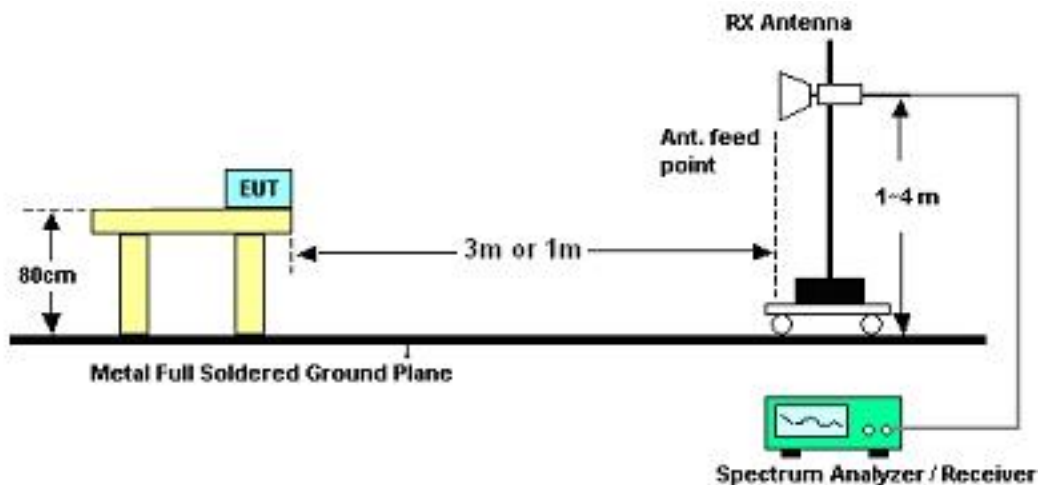
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	David Ke	Temperature :	21~23°C	
		Relative Humidity :	49~51%	

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

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

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2402 MHz is fundamental signals 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
57	24.87	-15.13	40	49.26	6.3	0.85	31.54	100	11	Peak
137.73	26.35	-17.15	43.5	45.26	11.34	1.26	31.51	-	-	Peak
164.46	25.9	-17.6	43.5	45.96	10.1	1.36	31.52	-	-	Peak
392.4	29.4	-16.6	46	42.96	15.65	1.99	31.2	-	-	Peak
477.8	24.04	-21.96	46	35.28	17.68	2.19	31.11	-	-	Peak
607.3	27.52	-18.48	46	35.83	20.11	2.44	30.86	-	-	Peak
2389.61	35.55	-18.45	54	34.83	32.02	4.58	35.88	143	316	Average
2389.61	61.2	-12.8	74	60.48	32.02	4.58	35.88	143	316	Peak
2402	81.27	-	-	80.53	32.02	4.58	35.86	143	316	Average
2402	98.21	-	-	97.47	32.02	4.58	35.86	143	316	Peak
2484	35.04	-18.96	54	34.12	32.09	4.64	35.81	143	316	Average
2484	47.08	-26.92	74	46.16	32.09	4.64	35.81	143	316	Peak
4804	47.83	-26.17	74	65.98	33.84	6.5	58.49	100	0	Peak

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2402 MHz is fundamental signals 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
34.86	31.65	-8.35	40	46.03	16.4	0.74	31.52	100	65	Peak
87.24	25.28	-14.72	40	47.44	8.34	1.05	31.55	-	-	Peak
134.76	30.16	-13.34	43.5	49.02	11.4	1.25	31.51	-	-	Peak
395.9	28.64	-17.36	46	42.03	15.8	2	31.19	-	-	Peak
480.6	28.95	-17.05	46	40.14	17.72	2.2	31.11	-	-	Peak
615	32.11	-13.89	46	40.13	20.35	2.47	30.84	-	-	Peak
2389.61	35.38	-18.62	54	34.66	32.02	4.58	35.88	100	42	Average
2389.61	59.92	-14.08	74	59.2	32.02	4.58	35.88	100	42	Peak
2402	78.74	-	-	78	32.02	4.58	35.86	100	42	Average
2402	95.08	-	-	94.34	32.02	4.58	35.86	100	42	Peak
2484	35.05	-18.95	54	34.13	32.09	4.64	35.81	100	42	Average
2484	46.87	-27.13	74	45.95	32.09	4.64	35.81	100	42	Peak

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2441 MHz is fundamental signals which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	21.63	-18.37	40	32.69	19.8	0.7	31.56	-	-	Peak
140.7	25.12	-18.38	43.5	44.09	11.27	1.27	31.51	-	-	Peak
166.62	25.15	-18.35	43.5	45.46	9.86	1.36	31.53	-	-	Peak
395.9	29.54	-16.46	46	42.93	15.8	2	31.19	100	82	Peak
486.2	24.6	-21.4	46	35.68	17.82	2.2	31.1	-	-	Peak
614.3	27.67	-18.33	46	35.72	20.32	2.47	30.84	-	-	Peak
2390	35.34	-18.66	54	34.6	32.02	4.58	35.86	196	325	Average
2390	61	-13	74	60.26	32.02	4.58	35.86	196	325	Peak
2441	82.35	-	-	81.51	32.06	4.61	35.83	196	325	Average
2441	99.37	-	-	98.53	32.06	4.61	35.83	196	325	Peak
2500	35.09	-18.91	54	34.15	32.1	4.64	35.8	196	325	Average
2500	46.16	-27.84	74	45.22	32.1	4.64	35.8	196	325	Peak
4882	49.6	-24.4	74	67.6	33.82	6.54	58.36	100	0	Peak



Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2441 MHz is fundamental signals 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
34.86	31.1	-8.9	40	45.48	16.4	0.74	31.52	100	24	Peak
86.97	25.22	-14.78	40	47.38	8.34	1.05	31.55	-	-	Peak
135.57	29.02	-14.48	43.5	47.9	11.38	1.25	31.51	-	-	Peak
378.4	27.38	-18.62	46	41.52	15.14	1.96	31.24	-	-	Peak
491.8	28.71	-17.29	46	39.65	17.94	2.21	31.09	-	-	Peak
610.8	31.32	-14.68	46	39.48	20.23	2.46	30.85	-	-	Peak
2390	35.34	-18.66	54	34.6	32.02	4.58	35.86	100	158	Average
2390	56.43	-17.57	74	55.69	32.02	4.58	35.86	100	158	Peak
2441	79.86	-	-	79.02	32.06	4.61	35.83	100	158	Average
2441	96.18	-	-	95.34	32.06	4.61	35.83	100	158	Peak
2500	35.1	-18.9	54	34.16	32.1	4.64	35.8	100	158	Average
2500	46.43	-27.57	74	45.49	32.1	4.64	35.8	100	158	Peak
4882	45.35	-28.65	74	63.35	33.82	6.54	58.36	100	0	Peak

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2480 MHz is fundamental signals 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
34.86	23.04	-16.96	40	37.42	16.4	0.74	31.52	-	-	Peak
140.97	25.13	-18.37	43.5	44.1	11.27	1.27	31.51	-	-	Peak
251.94	28.4	-17.6	46	45.4	12.86	1.66	31.52	-	-	Peak
392.4	29.61	-16.39	46	43.17	15.65	1.99	31.2	100	11	Peak
478.5	24.24	-21.76	46	35.48	17.68	2.19	31.11	-	-	Peak
605.9	27.19	-18.81	46	35.53	20.08	2.44	30.86	-	-	Peak
2390	35.33	-18.67	54	34.59	32.02	4.58	35.86	100	298	Average
2390	56.47	-17.53	74	55.73	32.02	4.58	35.86	100	298	Peak
2480	77.78	-	-	76.86	32.09	4.64	35.81	100	298	Average
2480	93.68	-	-	92.76	32.09	4.64	35.81	100	298	Peak
2483.5	42.91	-11.09	54	41.99	32.09	4.64	35.81	100	298	Average
2483.5	53.09	-20.91	74	52.17	32.09	4.64	35.81	100	298	Peak
4960	49.75	-24.25	74	67.56	33.81	6.57	58.19	100	0	Peak

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	David Ke	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
34.86	31.32	-8.68	40	45.7	16.4	0.74	31.52	100	86	Peak
94.8	25.16	-18.34	43.5	46.42	9.2	1.08	31.54	-	-	Peak
136.11	30.17	-13.33	43.5	49.05	11.38	1.25	31.51	-	-	Peak
381.2	28.11	-17.89	46	42.14	15.23	1.97	31.23	-	-	Peak
489	28.42	-17.58	46	39.43	17.88	2.21	31.1	-	-	Peak
610.8	30.99	-15.01	46	39.15	20.23	2.46	30.85	-	-	Peak
2390	35.34	-18.66	54	34.6	32.02	4.58	35.86	121	190	Average
2390	60.58	-13.42	74	59.84	32.02	4.58	35.86	121	190	Peak
2480	80.01	-	-	79.09	32.09	4.64	35.81	121	190	Average
2480	98.27	-	-	97.35	32.09	4.64	35.81	121	190	Peak
2491.83	44.91	-9.09	54	43.97	32.1	4.64	35.8	121	190	Average
2491.83	57.46	-16.54	74	56.52	32.1	4.64	35.8	121	190	Peak
4960	45.75	-28.25	74	63.56	33.81	6.57	58.19	100	0	Peak

3.10 Antenna Requirements

3.10.1 Standard Applicable

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

3.10.2 Antenna Connected Construction

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

3.10.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Dec. 13, 2011	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Dec. 13, 2011	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Dec. 13, 2011	Sep. 17, 2012	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB412923 44	N/A	Feb. 18, 2011	Dec. 13, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US404415 48	N/A	Feb. 18, 2011	Dec. 13, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	Jun. 01, 2011	Dec. 13, 2011	May 31, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Feb. 11, 2012	Aug. 21, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz~30MHz	Dec. 09, 2011	Feb. 11, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz~30MHz	Dec. 06, 2011	Feb. 11, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Feb. 11, 2012	N/A	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	Feb. 11, 2012	N/A	Conduction (CO05-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101352	9KHz~30GHz	Nov. 03, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Nov. 02, 2012	Radiation (03CH05-HY)
COM-POWER	Double Ridge Horn	AH-118	701030	1GHz~18GHz	N/A	Feb. 12, 2012 ~ Feb. 15, 2012	N/A	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz~1GHz	Oct. 22, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	Feb. 12, 2012 ~ Feb. 15, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m~4 m	N/A	Feb. 12, 2012 ~ Feb. 15, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 04, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
COM-POWER	COM-POWER	PA-103	161075	1KHz~1GHz	Mar. 29, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Mar. 28, 2012	Radiation (03CH05-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz~18GHz	Jul. 19, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Jul. 18, 2012	Radiation (03CH05-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159087	1GHz~18GHz	Feb. 21, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Feb. 20, 2012	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A019 17	1GHz~26.5GHz	Apr. 14, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Apr. 13, 2012	Radiation (03CH05-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	Jun. 01, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	May 31, 2012	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/00 1	9 kHz~30 MHz	Jul. 29, 2010	Feb. 12, 2012 ~ Feb. 15, 2012	Jul. 28, 2012	Radiation (03CH05-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Aug. 21, 2012	Radiation (03CH05-HY)

5 Uncertainty of Evaluation

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP220105-01 as below.