

FCC RF Test Report

APPLICANT : Symbol Technologies Inc.
EQUIPMENT : Enterprise Digital Assistant (EDA)
BRAND NAME : Motorola
MODEL NAME : MC55A0
FCC ID : H9PMC55A0
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Oct. 04, 2010 and completely tested on Nov. 05, 2010. 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:



Anderson Chiu / Deputy Manager



SPORTON INTERNATIONAL INC.

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR000411A	Rev. 01	Initial issue of report	Nov. 12, 2010

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 4.4.1	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	$\leq 1\text{W}$	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 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 13.9 dB at 0.454 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.13 dB at 2483.5 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Symbol Technologies Inc.

One Motorola Plaza, Holtsville, NY 11742-1300 USA

1.2 Manufacturer

Symbol Technologies Inc.

One Motorola Plaza, Holtsville, NY 11742-1300 USA

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Enterprise Digital Assistant (EDA)
Brand Name	Motorola
Model Name	MC55A0
FCC ID	H9PMC55A0
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) : 0.61 dBm (0.001 W) Bluetooth EDR (2Mbps) : 2.52 dBm (0.002 W) Bluetooth EDR (3Mbps) : 2.91 dBm (0.002 W)
Antenna Type	PCB Antenna with gain 0.43 dBi
Type of Antenna Connector	N/A
HW Version	DV
SW Version	BSP34
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

Remark:

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

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL 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 7

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 (DoC), 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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	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:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	0.61 dBm	2.52 dBm	2.91 dBm
Ch39	2441MHz	-0.98 dBm	1.03 dBm	1.34 dBm
Ch78	2480MHz	-0.48 dBm	1.55 dBm	1.62 dBm

Remark:

1. The data rate was set in 3Mbps for all the test items due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

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

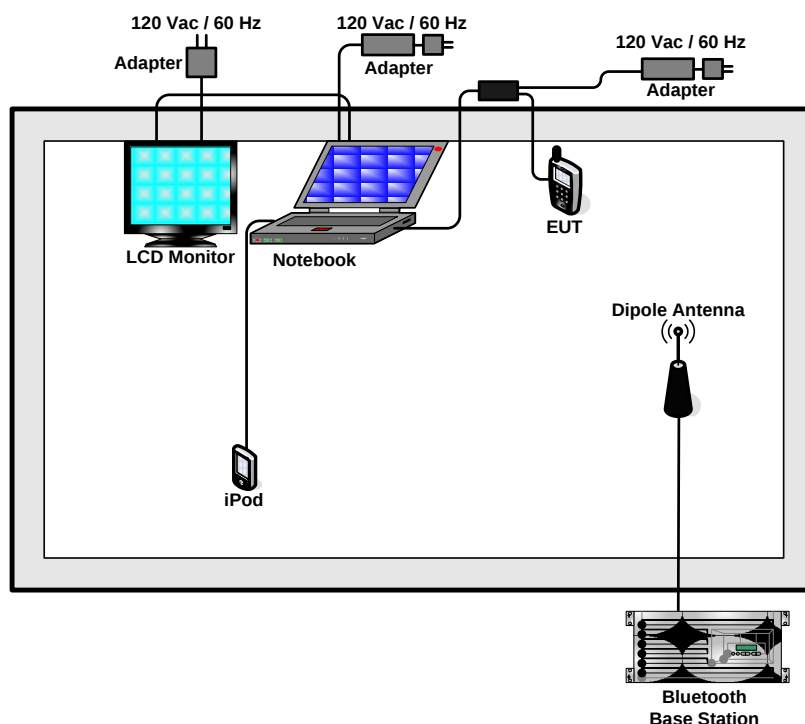
The following tables are showing the test modes as the worst cases and recorded in this report.

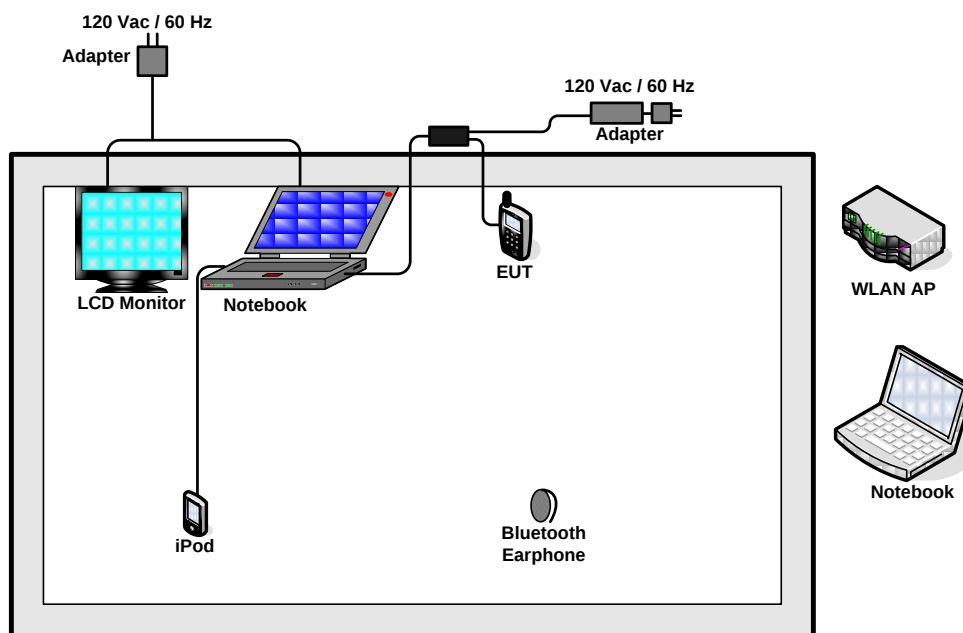
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps π /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz + Qwerty Keypad + Battery (3600mAh) + 2D Scanner Mode 2: CH39_2441 MHz + Qwerty Keypad + Battery (3600mAh) + 2D Scanner Mode 3: CH78_2480 MHz + Qwerty Keypad + Battery (3600mAh) + 2D Scanner Mode 4: CH78_2480 MHz + Numeric Keypad + Battery (2400mAh) + 1D Scanner

Test Cases	
AC Conducted Emission	Mode 1 :WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Qwerty Keypad + Battery (3600mAh) + 2D Scanner
	Mode 2 :WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Numeric Keypad + Battery (3600mAh) + 2D Scanner
	Mode 3 :WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + PIM Keypad + Battery (2400mAh) + 1D Scanner
Remark: - For radiated TCs test was performed together with USB charging cable with AC power. "BT Link" stands for terminal linked to headset by BT function. "WLAN Link" stands for terminal associated with AP at 2.4GHz band. "USB Link" stands for Activesync RNDIS file transfer.	

2.3 Connection Diagram of Test System

<Radiation Test>



<Conduction Test>


2.4 RF Utility

For Bluetooth function, the RF utility, "Ver3.14EDRTest" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

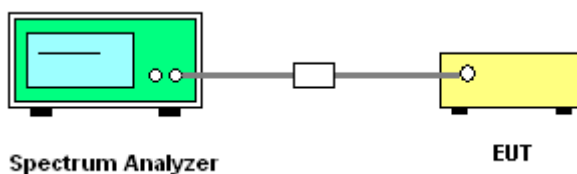
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

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

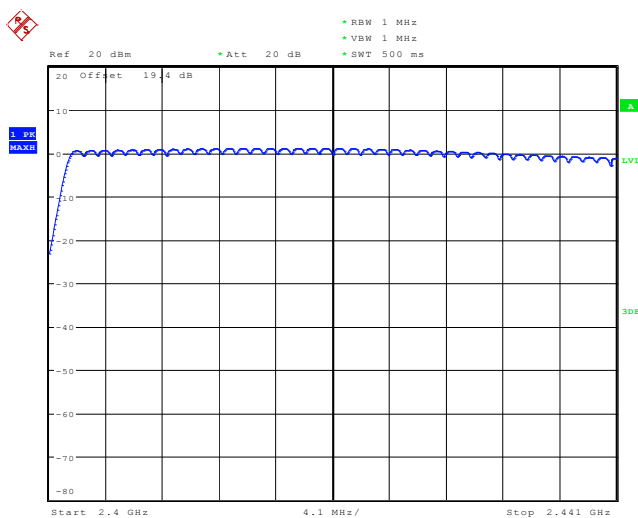
3.1.4 Test Setup



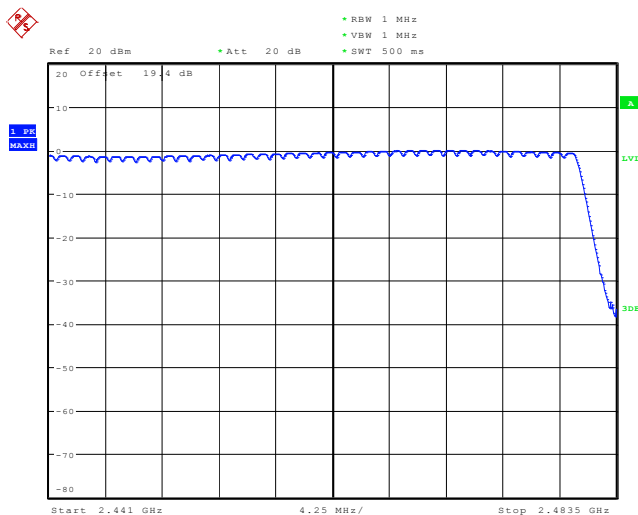
3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 8.OCT.2010 09:55:54



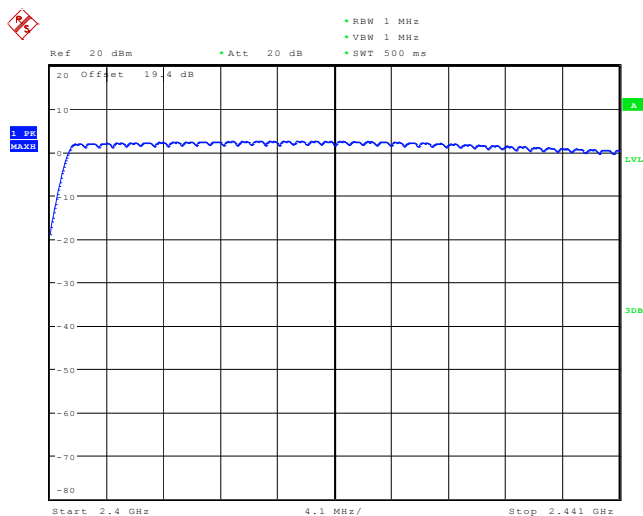
Date: 8.OCT.2010 10:02:44



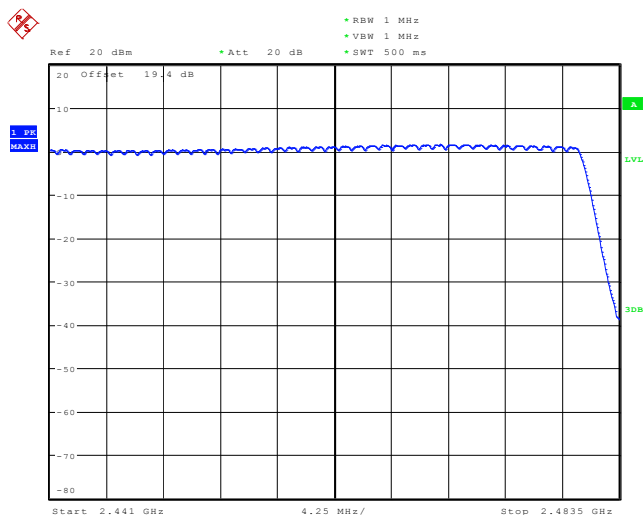
Test Mode :	Mode 4~6	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 8.OCT.2010 10:12:35



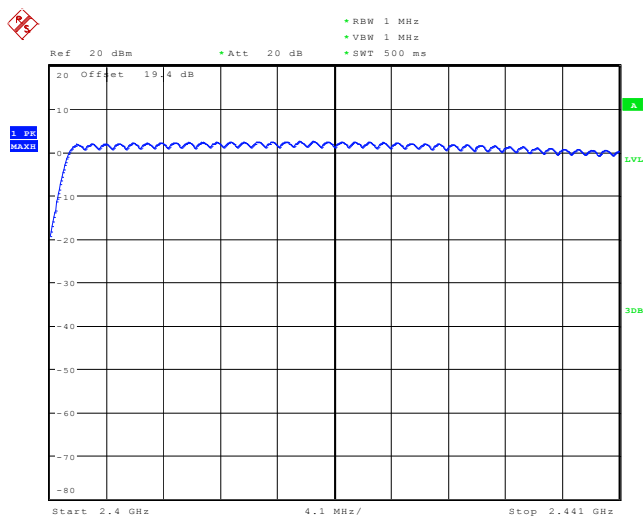
Date: 8.OCT.2010 10:07:33



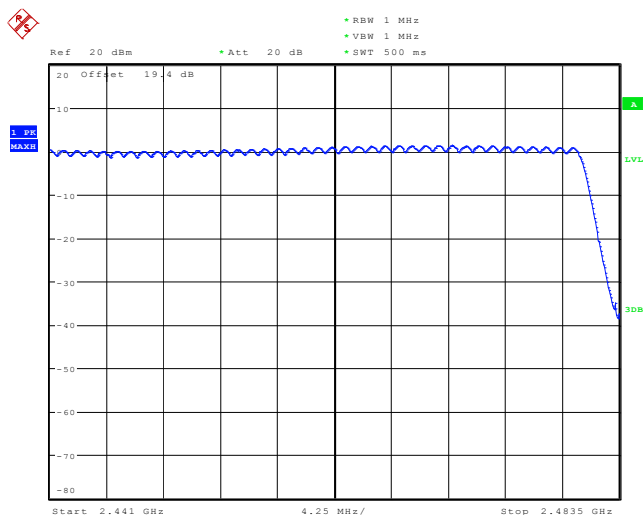
Test Mode :	Mode 7~9	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 7.OCT.2010 21:27:23



Date: 7.OCT.2010 21:34:20

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

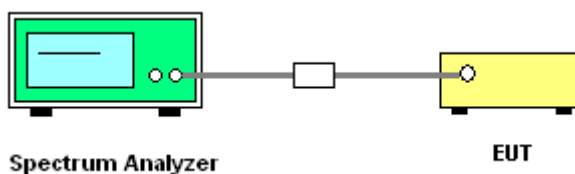
3.2.2 Measuring Instruments

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

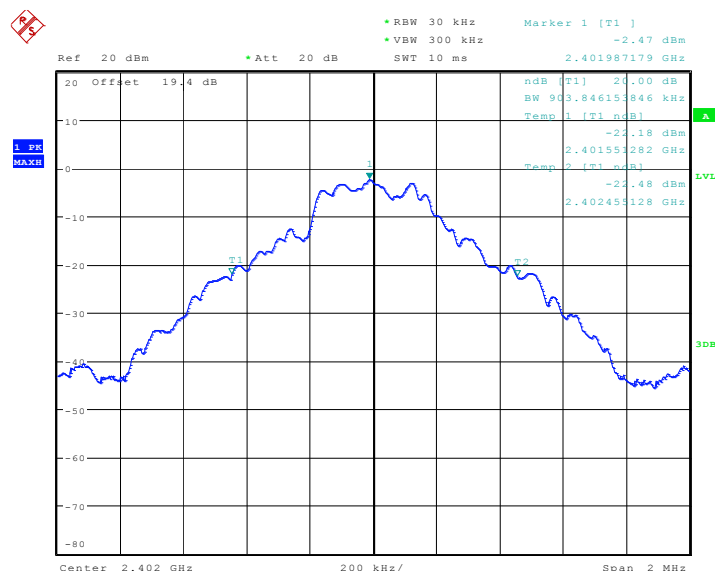


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.904
39	2441	0.901
78	2480	0.897

20 dB Bandwidth Plot on Channel 00



Date: 7.OCT.2010 17:07:48



• RBW 30 kHz
 • VBW 300 kHz
 • SWT 10 ms

Ref 20 dBm
 Att 20 dB

Marker 1 [T1]
 -3.93 dBm
 2.440990385 GHz

1. PK
 MAXH

ndB [T1]	24.00 dB
BW 900.641025641 kHz	
Temp 1 [T1 ndB]	
	-24.20 dBm
	2.44055282 GHz
Temp 2 [T1 ndB]	
	-23.81 dBm
	2.441451923 GHz

LVL
 3dB

Center 2.441 GHz
 200 kHz/
 Span 2 MHz

Date: 7.OCT.2010 17:06:54

Ref 20 dBm • Att 20 dB SWT 10 ms 2.479990385 GHz

• RBW 30 kHz Marker 1 [T1] -3.41 dBm
 • VBW 300 kHz

20 Offset 19.4 dB

ndB [T1] 24.00 dB
 BW 897.43589436 kHz
 Temp 1 [T1 ndB] -23.26 dBm
 2.47955692 GHz
 Temp 2 [T1 ndB] -23.44 dBm
 2.480455128 GHz

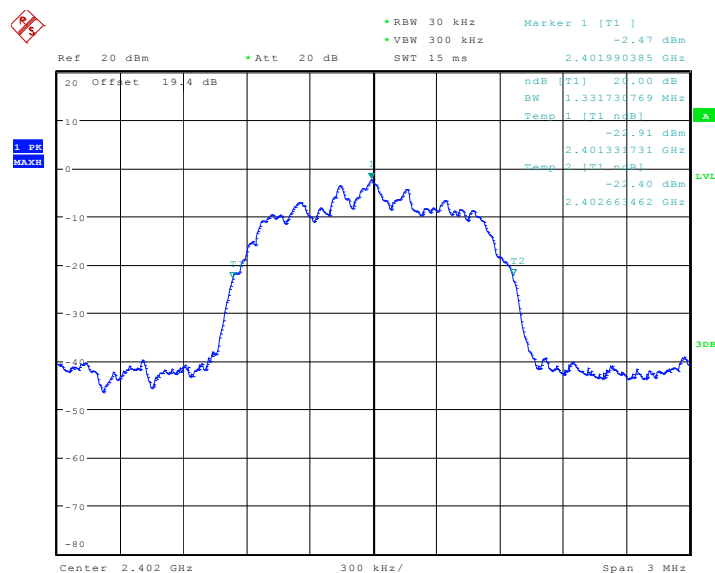
1. V98
 MAXIM

Center 2.48 GHz 200 kHz/ Span 2 MHz

Date: 7.OCT.2010 17:08:25

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

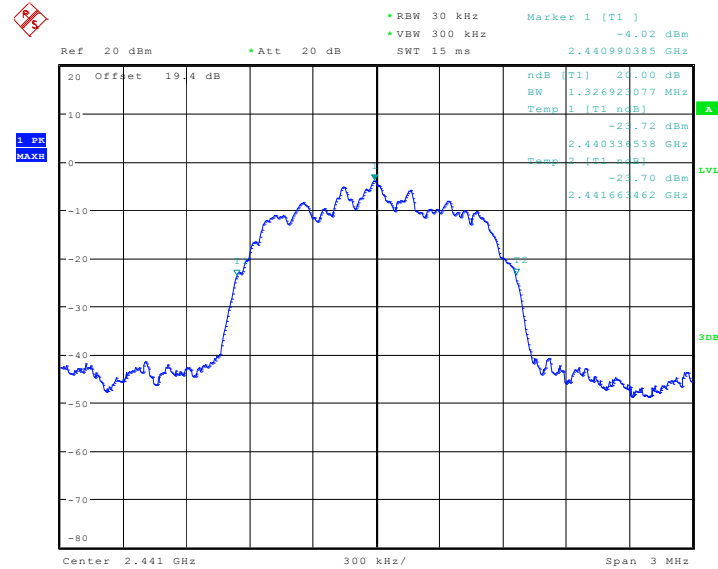
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.332
39	2441	1.327
78	2480	1.322

20 dB Bandwidth Plot on Channel 00


Date: 7.OCT.2010 17:11:29

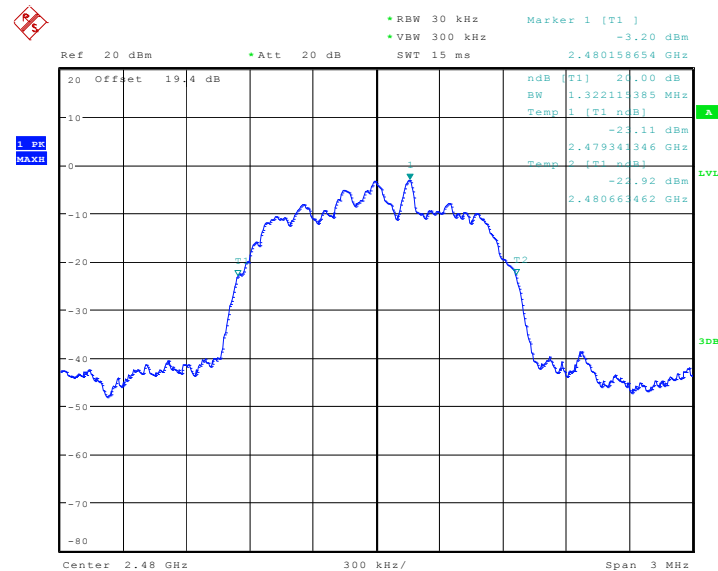


20 dB Bandwidth Plot on Channel 39



Date: 7.OCT.2010 17:10:46

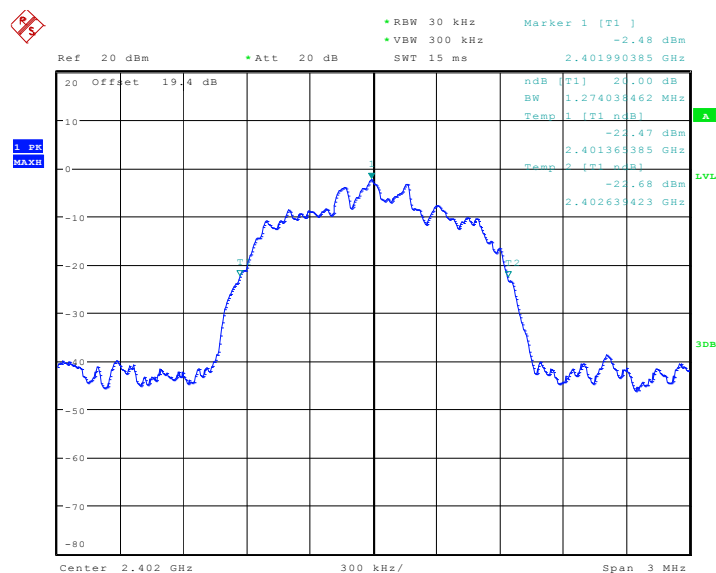
20 dB Bandwidth Plot on Channel 78



Date: 7.OCT.2010 17:10:01

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

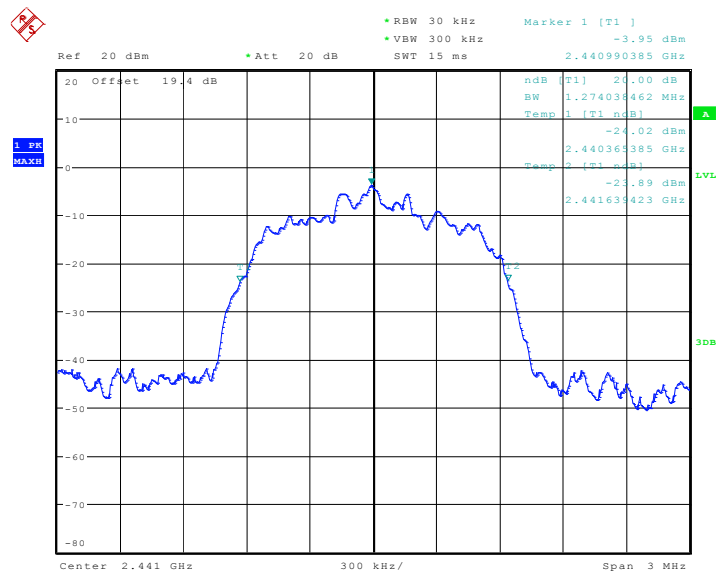
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.274
39	2441	1.274
78	2480	1.269

20 dB Bandwidth Plot on Channel 00


Date: 7.OCT.2010 17:12:49

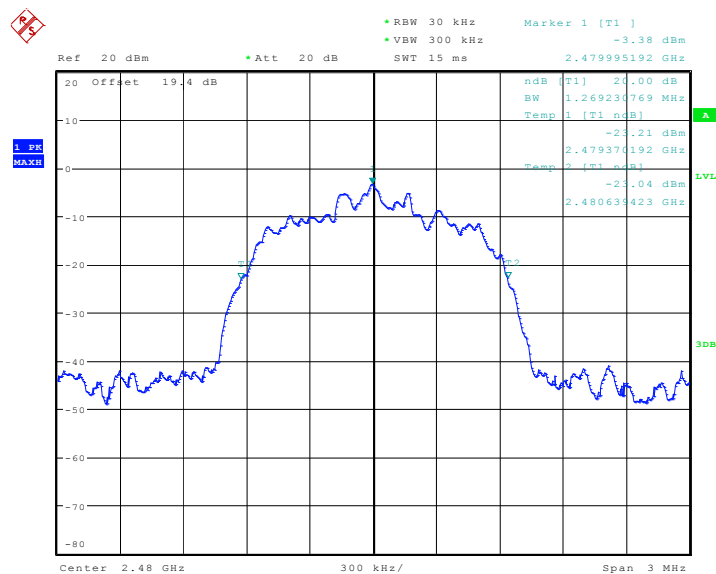


20 dB Bandwidth Plot on Channel 39



Date: 7.OCT.2010 17:13:29

20 dB Bandwidth Plot on Channel 78



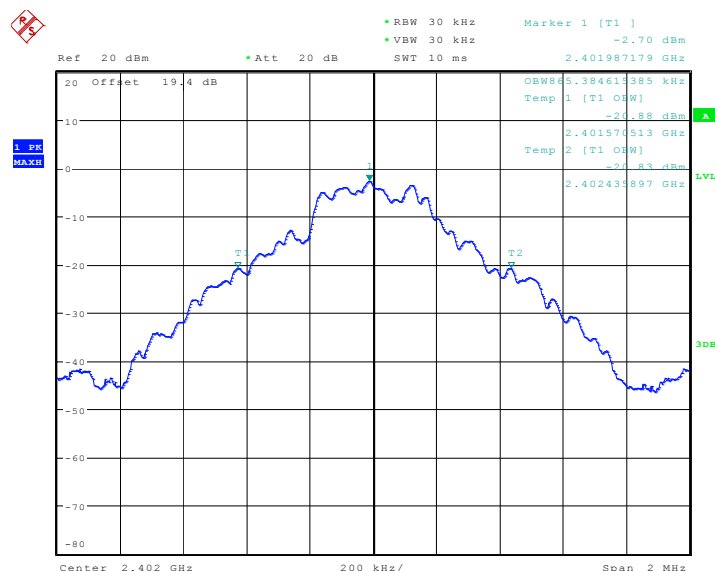
Date: 7.OCT.2010 17:14:03

3.2.6 Test Result of 99% Occupied Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.865
39	2441	0.869
78	2480	0.843

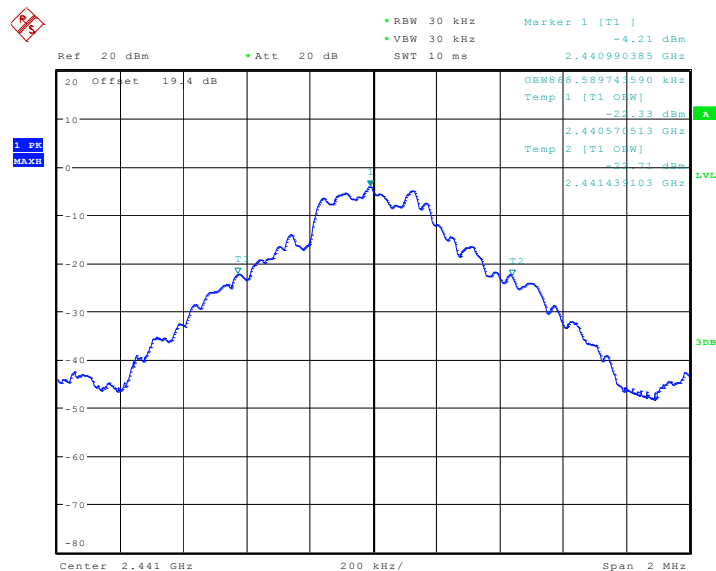
99% Bandwidth Plot on Channel 00



Date: 7.OCT.2010 17:23:32

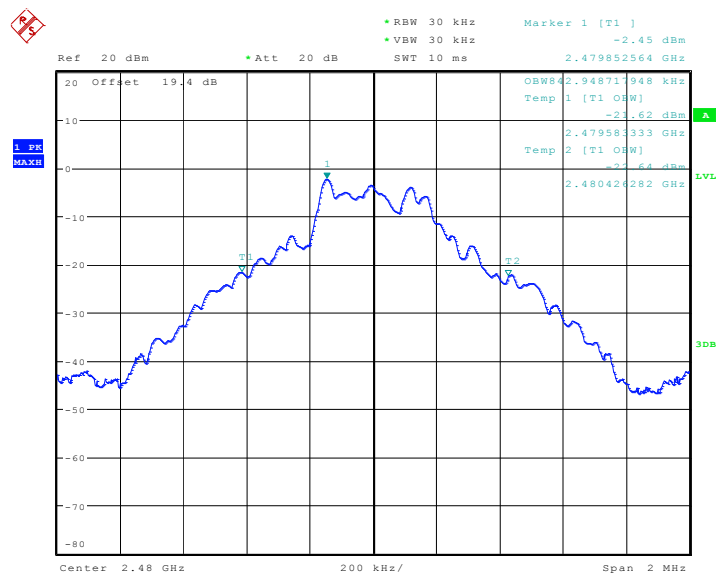


99% Occupied Bandwidth Plot on Channel 39



Date: 7.OCT.2010 17:22:52

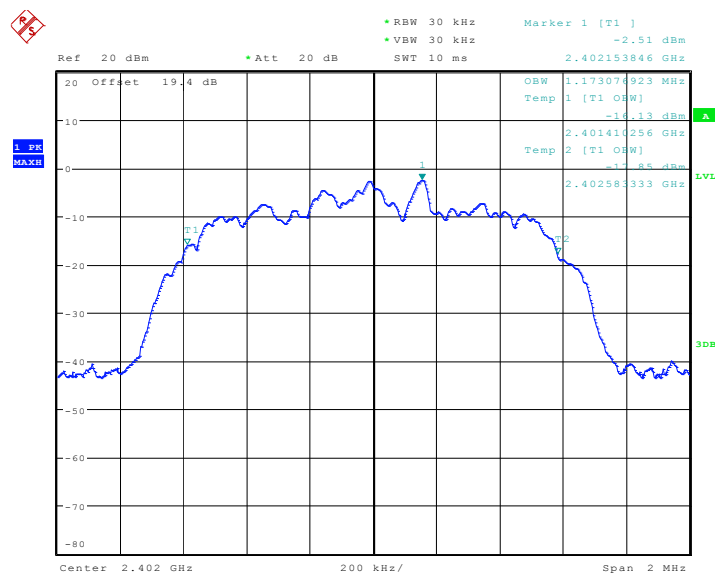
99% Occupied Bandwidth Plot on Channel 78



Date: 7.OCT.2010 17:22:20

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

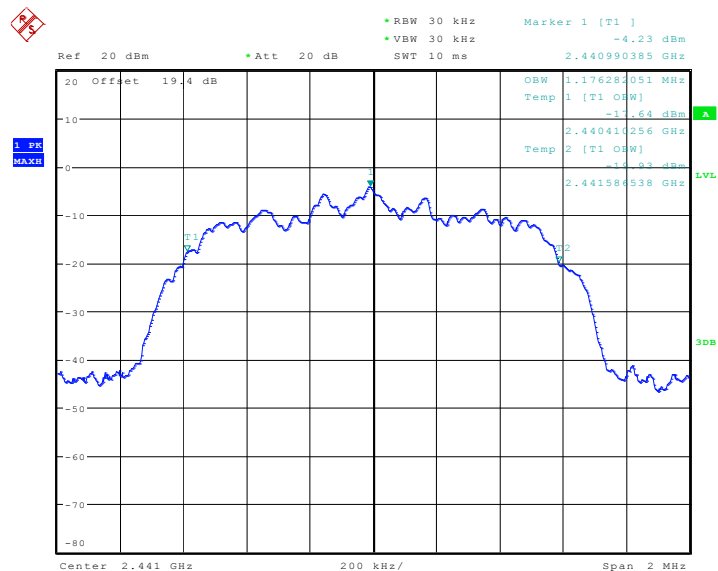
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.173
39	2441	1.176
78	2480	1.179

99% Bandwidth Plot on Channel 00


Date: 7.OCT.2010 17:18:53

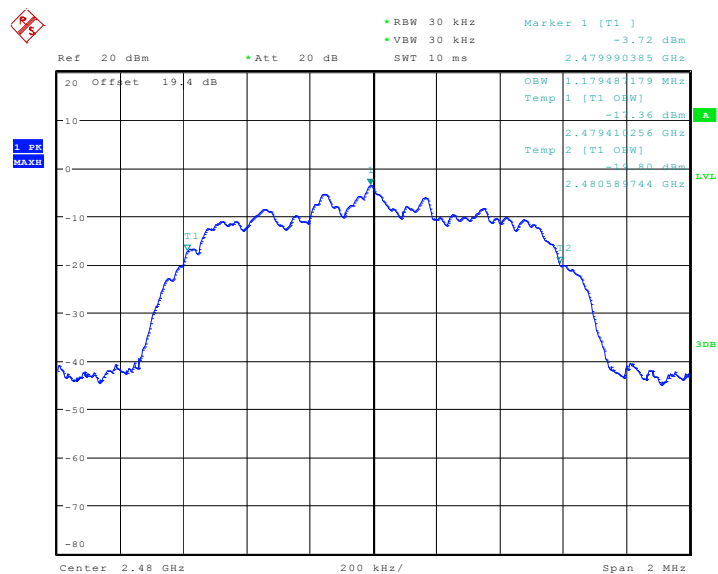


99% Occupied Bandwidth Plot on Channel 39



Date: 7.OCT.2010 17:19:43

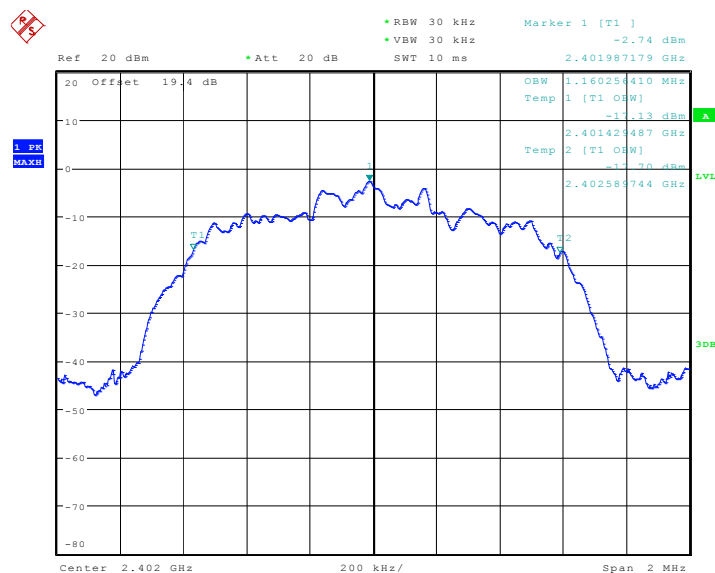
99% Occupied Bandwidth Plot on Channel 78



Date: 7.OCT.2010 17:20:54

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

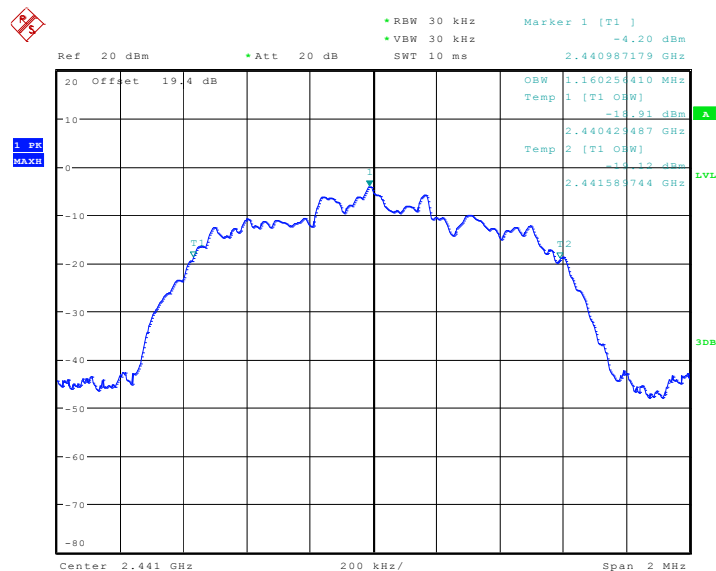
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.160
39	2441	1.160
78	2480	1.160

99% Bandwidth Plot on Channel 00


Date: 7.OCT.2010 17:18:03

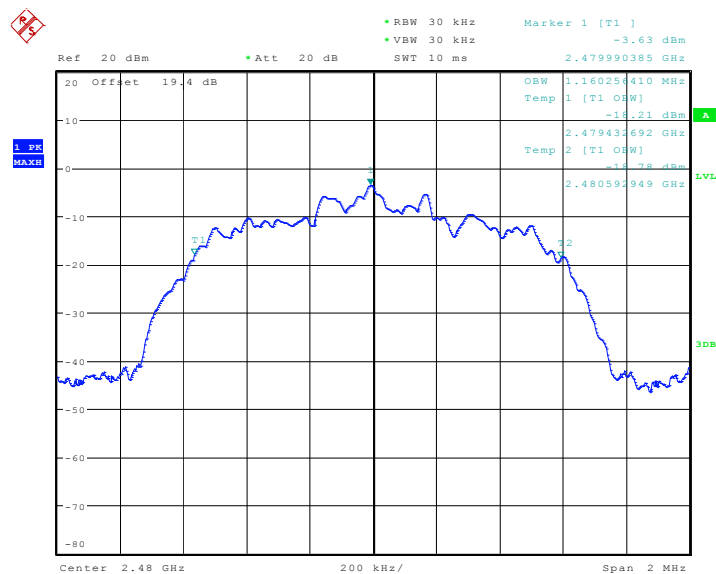


99% Occupied Bandwidth Plot on Channel 39



Date: 7.OCT.2010 17:17:35

99% Occupied Bandwidth Plot on Channel 78



Date: 7.OCT.2010 17:17:04

3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

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

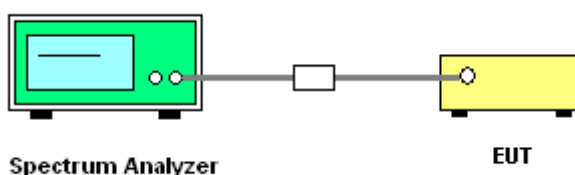
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

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

3.3.4 Test Setup

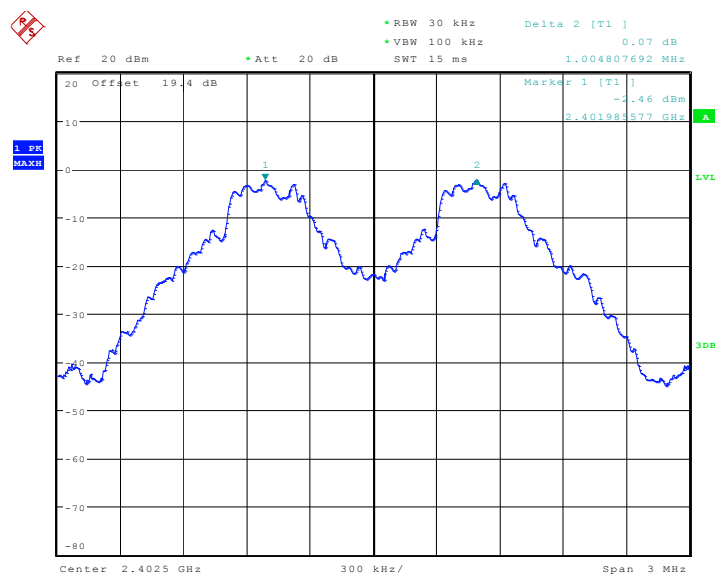


3.3.5 Test Result of Hopping Channel Separation

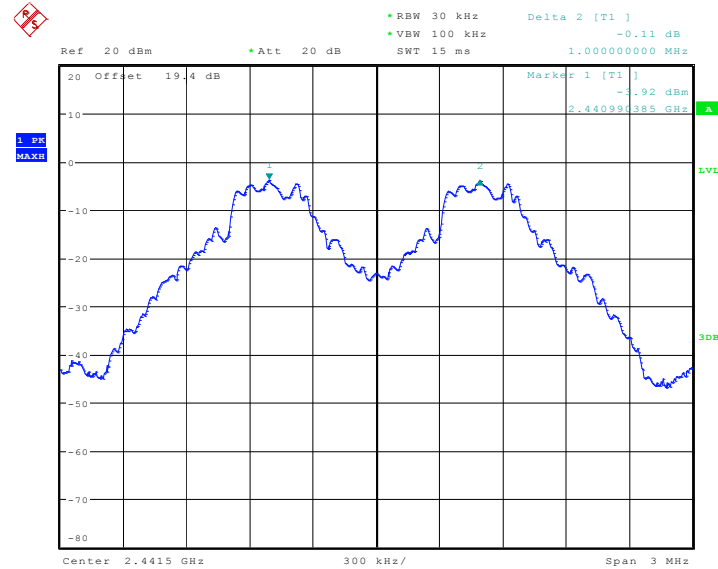
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.005	0.603	Pass
39	2441	1.000	0.600	Pass
78	2480	1.000	0.598	Pass

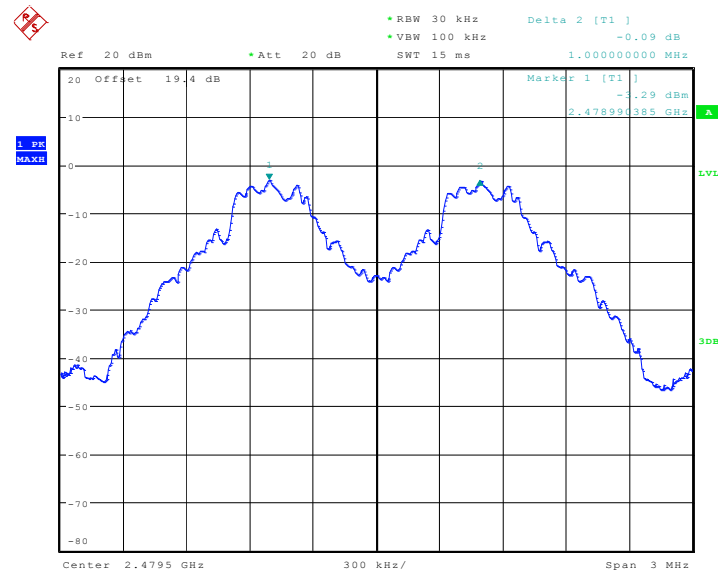
Channel Separation Plot on Channel 00 - 01



Date: 7.OCT.2010 18:17:39

Channel Separation Plot on Channel 39 - 40


Date: 7.OCT.2010 18:19:18

Channel Separation Plot on Channel 77 - 78


Date: 7.OCT.2010 18:20:28

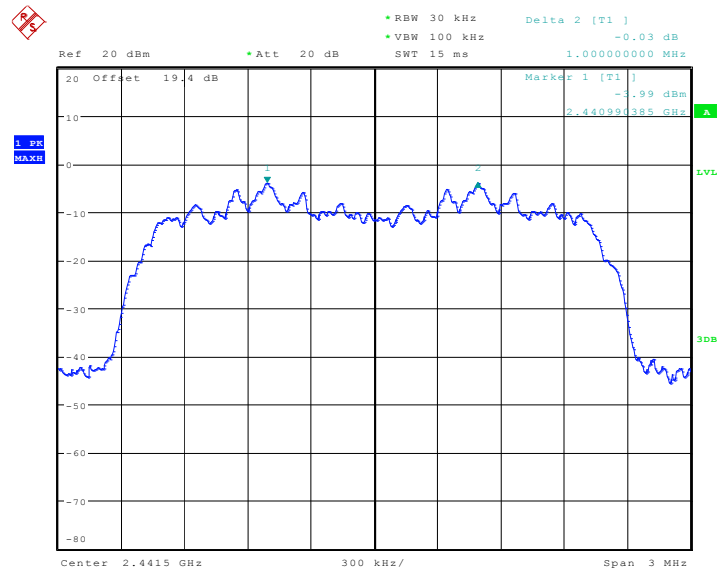


Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.005	0.888	Pass
39	2441	1.000	0.885	Pass
78	2480	0.995	0.881	Pass

Date: 7.OCT.2010 18:26:03

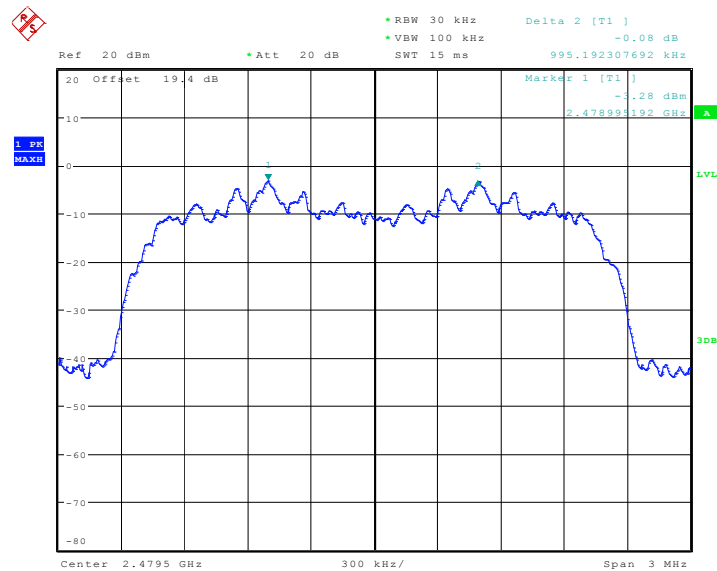


Channel Separation Plot on Channel 39 - 40



Date: 7.OCT.2010 18:24:21

Channel Separation Plot on Channel 77 - 78



Date: 7.OCT.2010 18:22:42

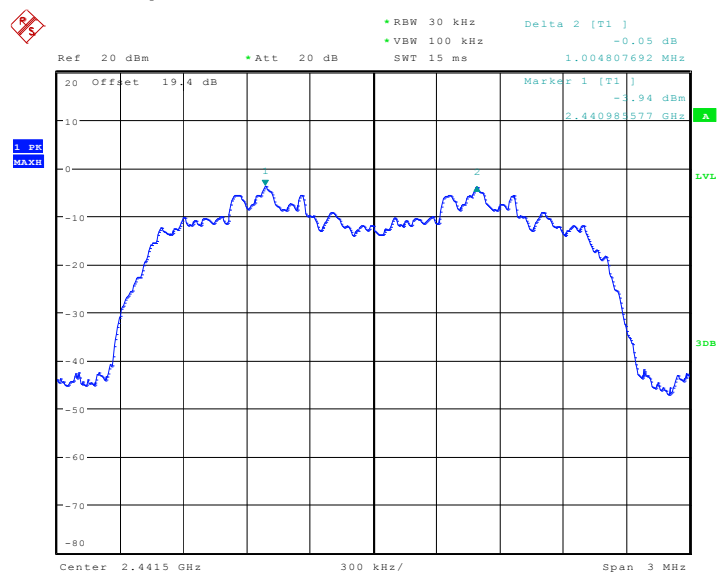


Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.005	0.849	Pass
39	2441	1.005	0.849	Pass
78	2480	1.000	0.846	Pass

Date: 7.OCT.2010 18:27:29

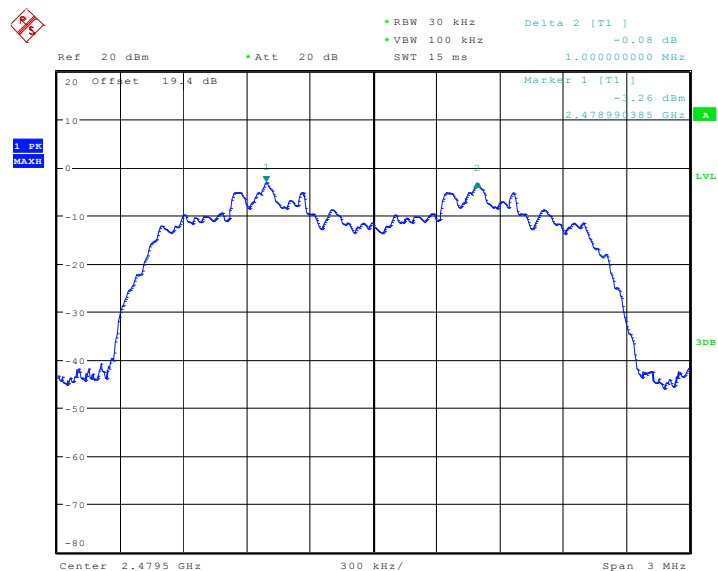


Channel Separation Plot on Channel 39 - 40



Date: 7.OCT.2010 18:28:36

Channel Separation Plot on Channel 77 - 78



Date: 7.OCT.2010 18:30:07

3.4 Dwell Time Measurement

3.4.1 Limit of Dwell Time

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

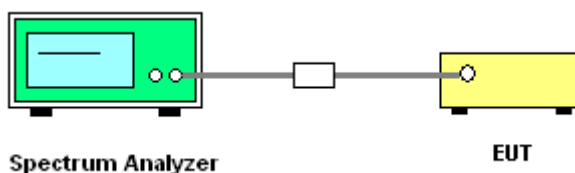
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

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

3.4.4 Test Setup



3.4.5 Test Result of Dwell Time

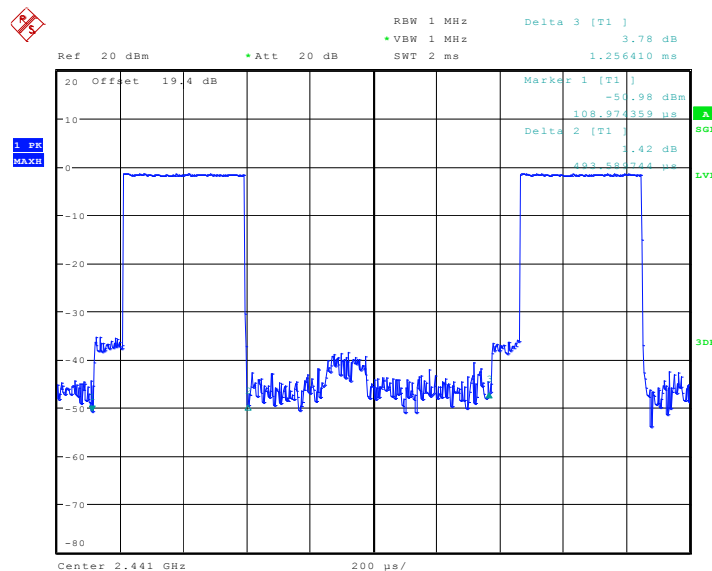
Test Mode :	Mode 2	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH1	9.70	493.59	0.15	0.4	Pass
DH3	4.80	1767.63	0.27	0.4	Pass
DH5	3.90	3033.65	0.37	0.4	Pass

Remark:

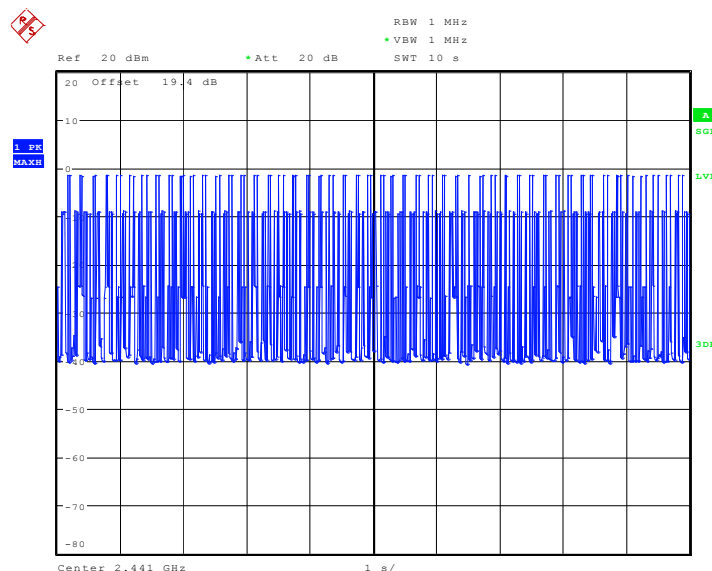
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

DH1 Dwell Time (One Pulse) Plot on Channel 39

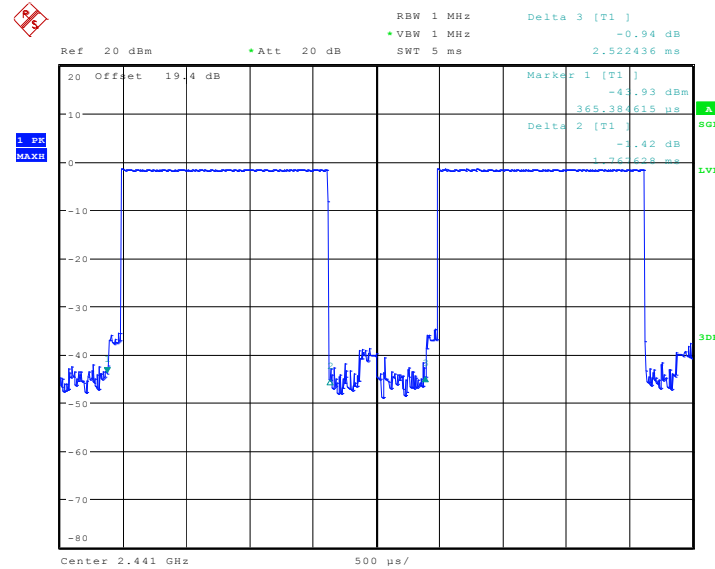


Date: 7.OCT.2010 20:47:10

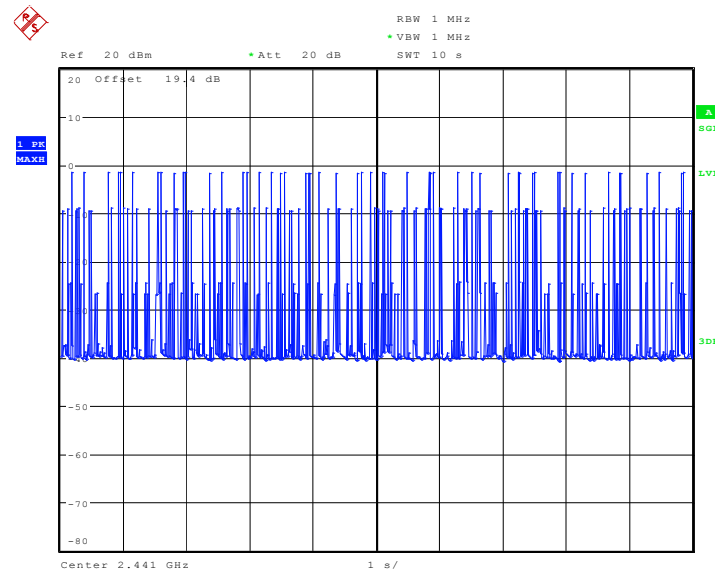
DH1 Dwell Time (Count Pulses) Plot on Channel 39



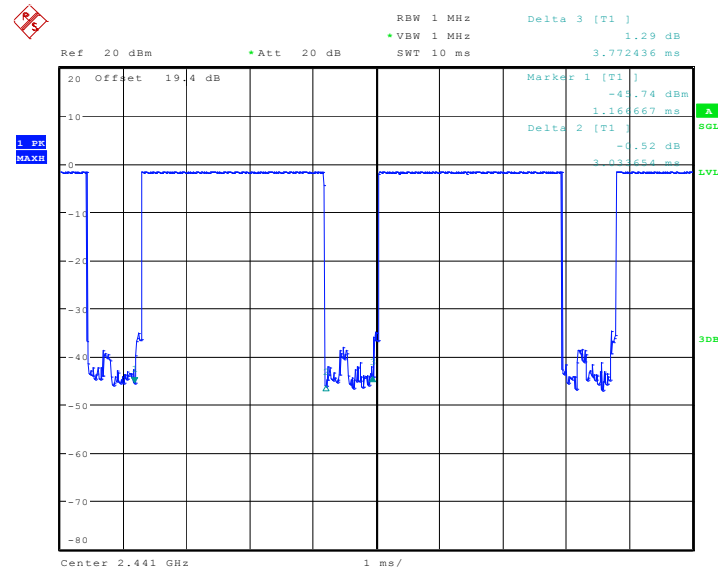
Date: 7.OCT.2010 21:09:51

DH3 Dwell Time (One Pulse) Plot on Channel 39


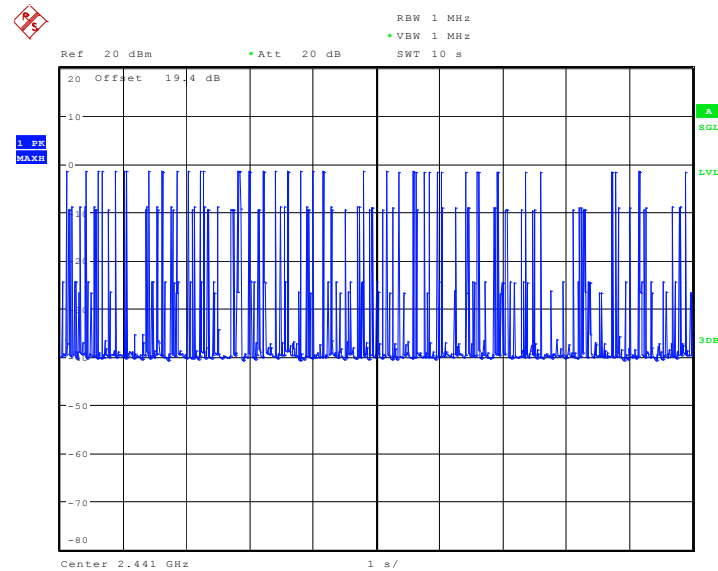
Date: 7.OCT.2010 20:50:25

DH3 Dwell Time (Count Pulses) Plot on Channel 39


Date: 7.OCT.2010 21:09:16

DH5 Dwell Time (One Pulse) Plot on Channel 39


Date: 7.OCT.2010 20:51:44

DH5 Dwell Time (Count Pulses) Plot on Channel 39


Date: 7.OCT.2010 21:10:27

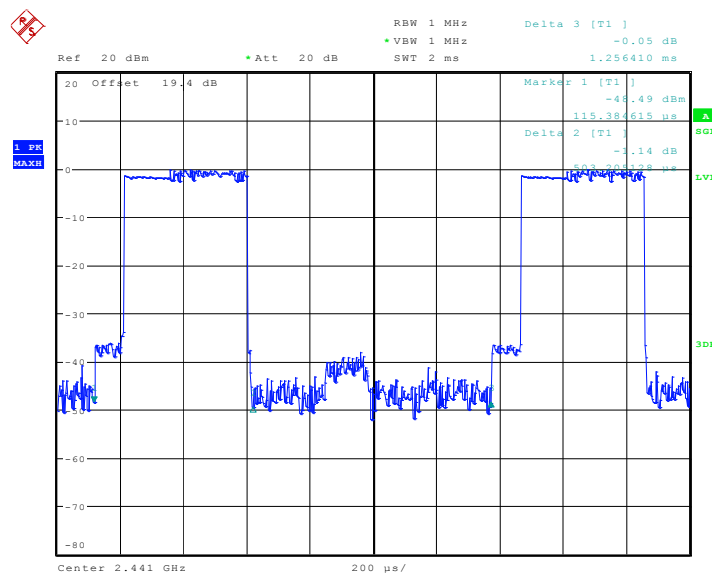
Test Mode :	Mode 5	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
2DH1	9.60	503.21	0.15	0.4	Pass
2DH3	4.10	2498.40	0.32	0.4	Pass
2DH5	3.50	3076.92	0.34	0.4	Pass

Remark:

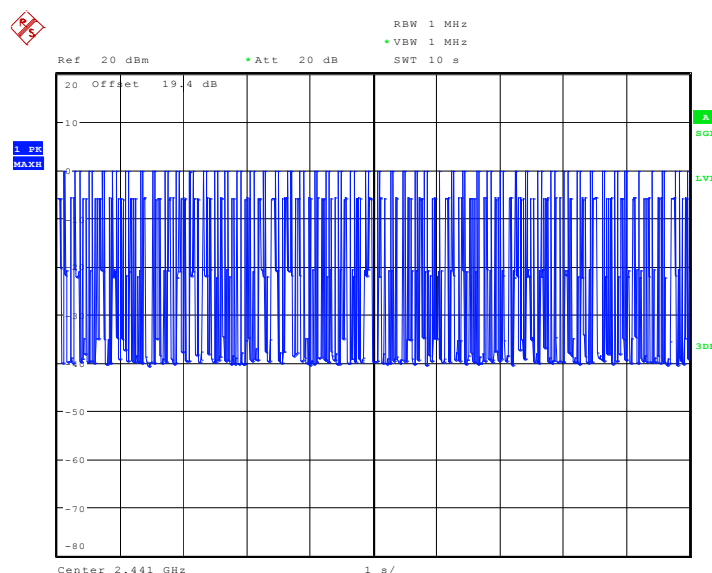
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

2DH1 Dwell Time (One Pulse) Plot on Channel 39

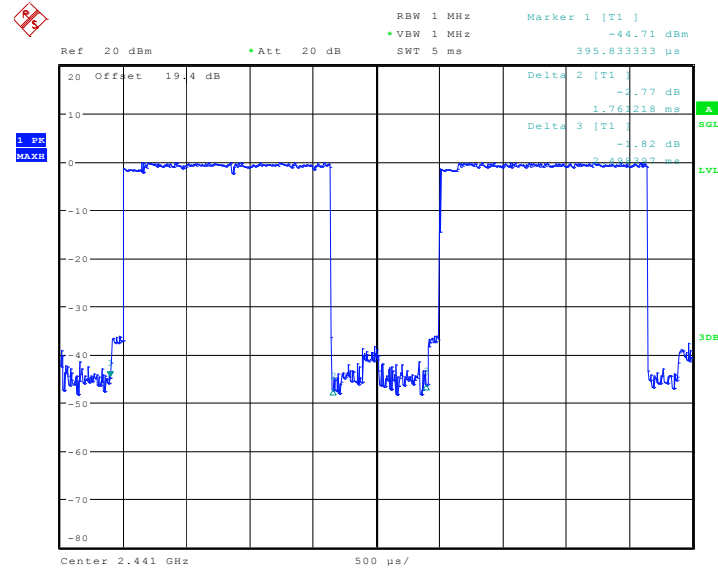


Date: 7.OCT.2010 20:53:40

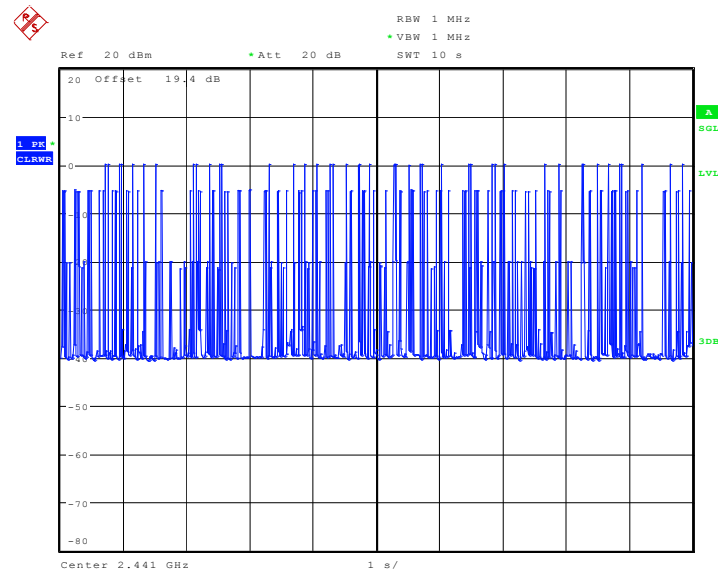
2DH1 Dwell Time (Count Pulses) Plot on Channel 39



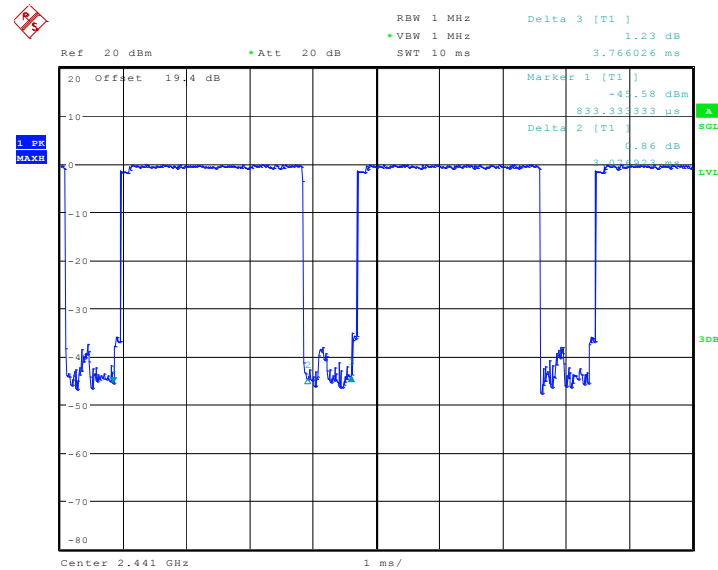
Date: 7.OCT.2010 21:11:04

2DH3 Dwell Time (One Pulse) Plot on Channel 39


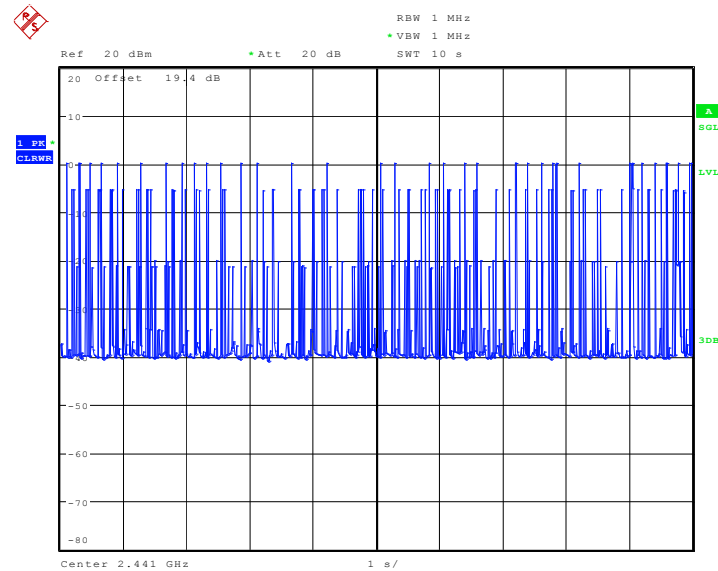
Date: 7.OCT.2010 20:56:46

2DH3 Dwell Time (Count Pulses) Plot on Channel 39


Date: 8.OCT.2010 10:22:46

2DH5 Dwell Time (One Pulse) Plot on Channel 39


Date: 7.OCT.2010 20:58:26

2DH5 Dwell Time (Count Pulses) Plot on Channel 39


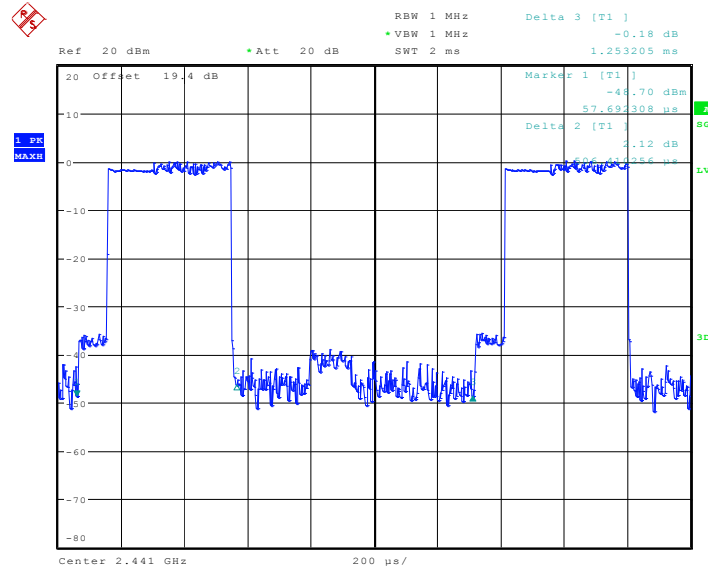
Date: 8.OCT.2010 10:22:10

Test Mode :	Mode 8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

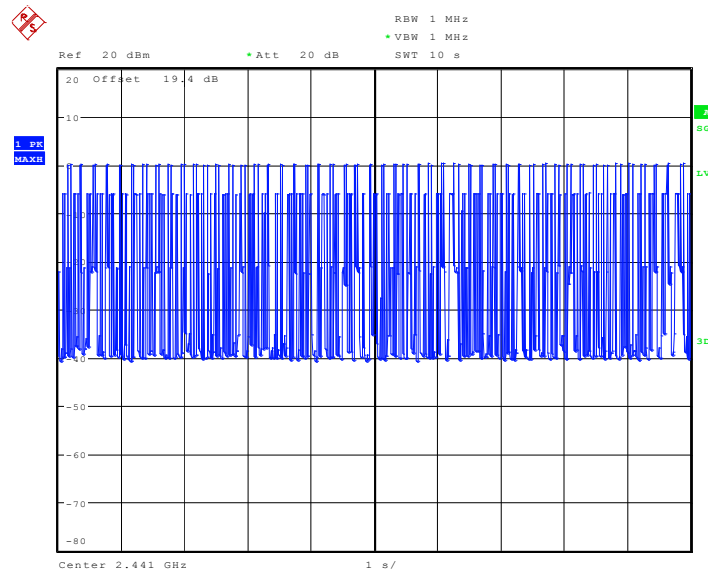
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH1	9.00	506.41	0.14	0.4	Pass
3DH3	5.00	1772.44	0.28	0.4	Pass
3DH5	3.50	3022.44	0.33	0.4	Pass

Remark:

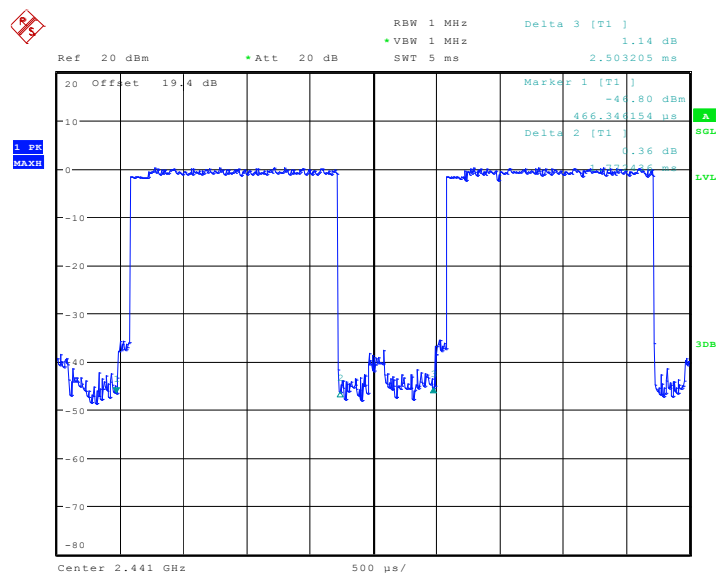
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

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


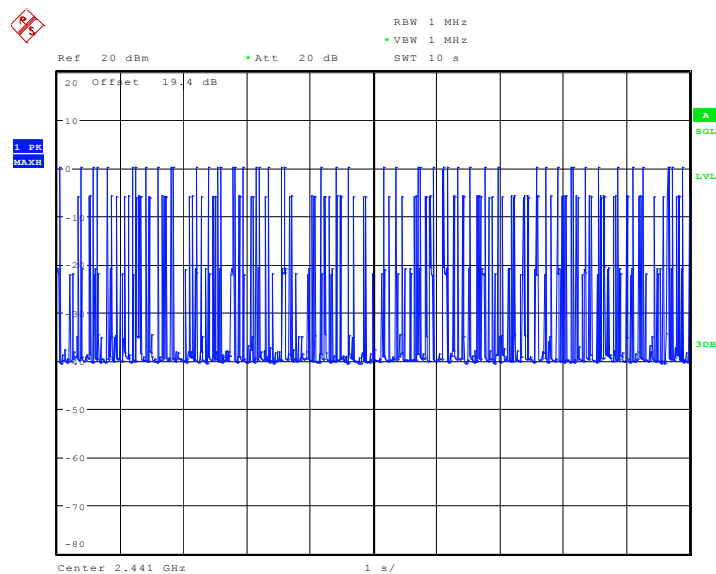
Date: 7.OCT.2010 21:00:27

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


Date: 7.OCT.2010 21:12:48

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


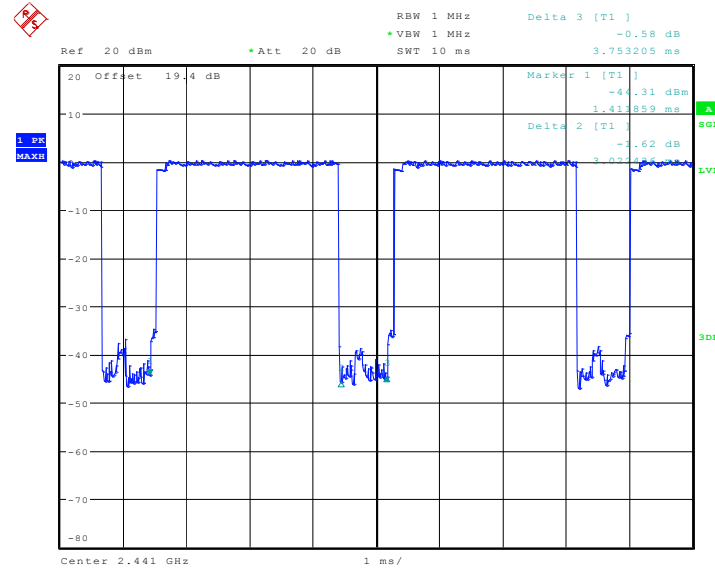
Date: 7.OCT.2010 21:01:38

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


Date: 7.OCT.2010 21:13:12

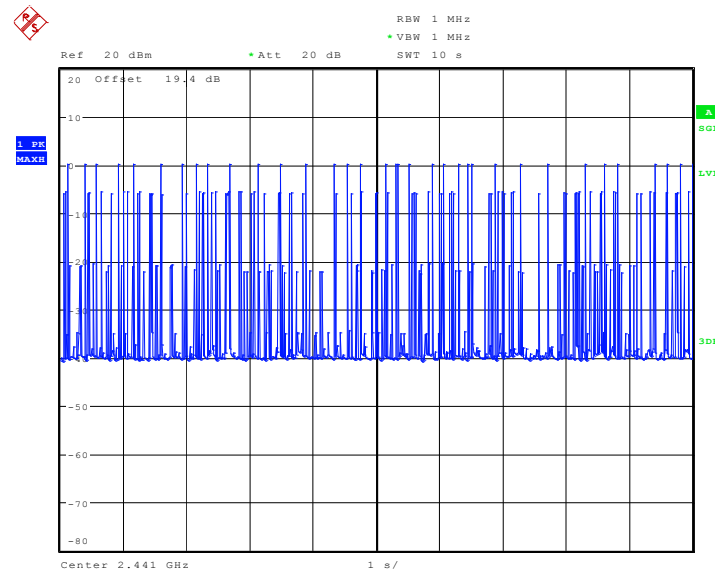


3DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 7.OCT.2010 21:02:33

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



Date: 7.OCT.2010 21:13:46

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1W (30 dBm).

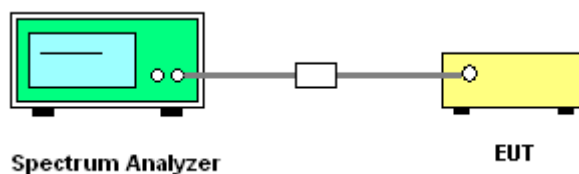
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

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

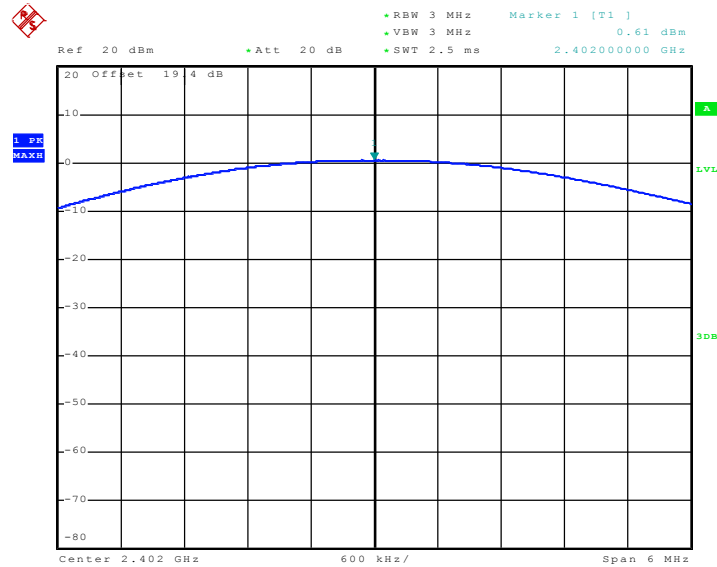
3.5.4 Test Setup



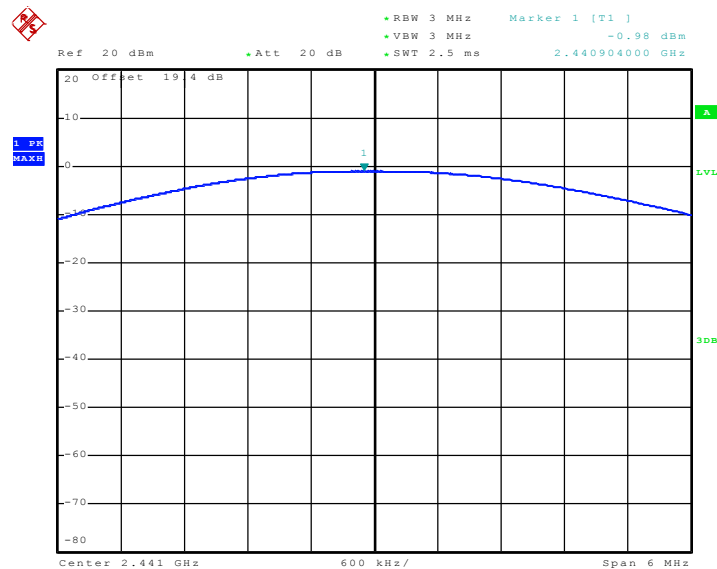
3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	0.61	30	Pass
39	2441	-0.98	30	Pass
78	2480	-0.48	30	Pass

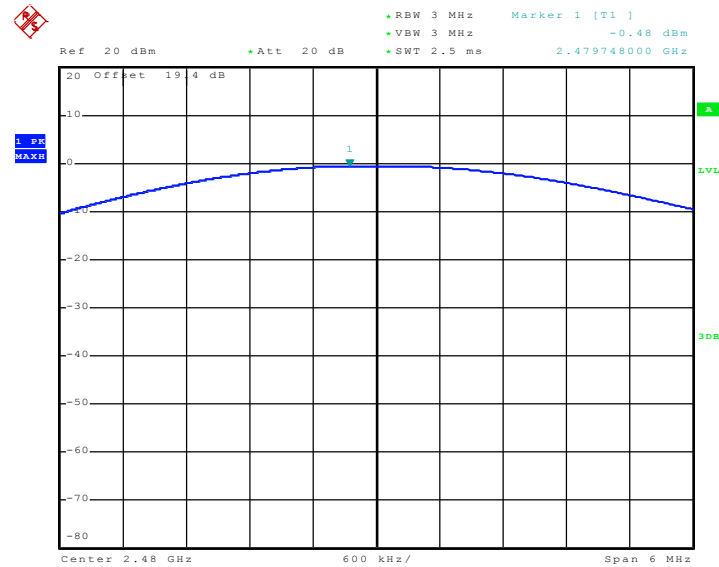
Peak Output Power Plot on Channel 00


Date: 3.SEP.2010 15:19:47

Peak Output Power Plot on Channel 39


Date: 3.SEP.2010 15:20:13

Peak Output Power Plot on Channel 78



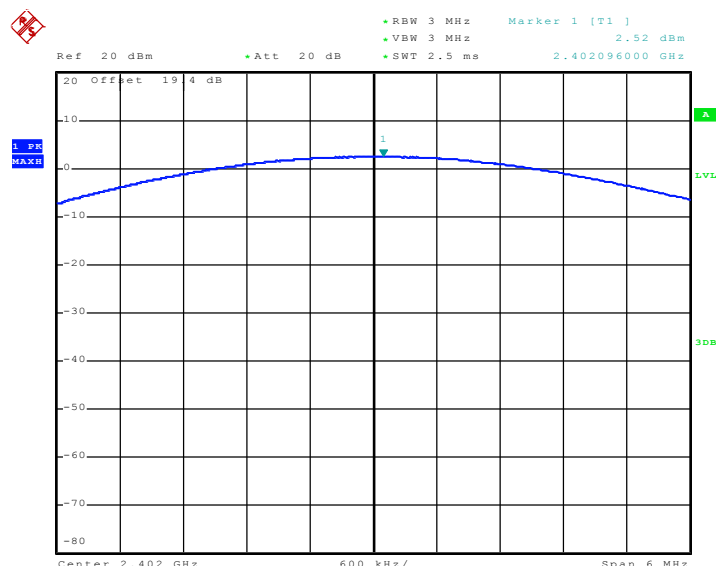
Date: 3.SEP.2010 15:20:39



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Channel	Frequency (MHz)	RF Power (dBm)		
		π /4-DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	2.52	30	Pass
39	2441	1.03	30	Pass
78	2480	1.55	30	Pass

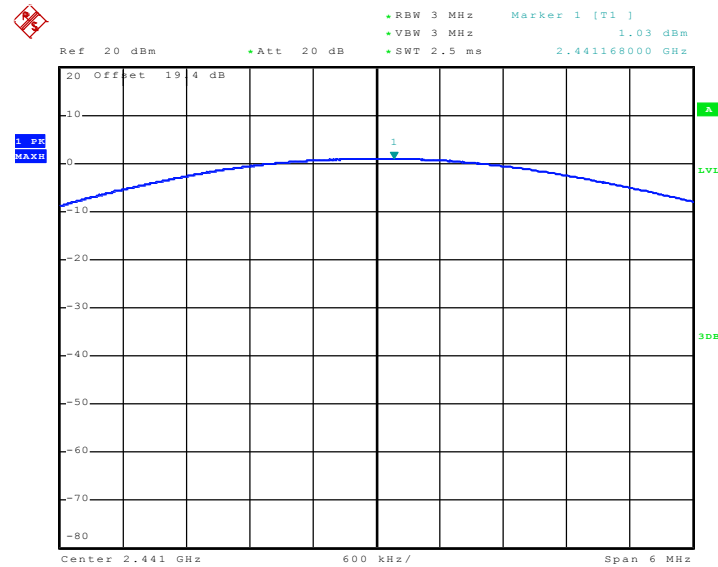
Peak Output Power Plot on Channel 00



Date: 3.SEP.2010 15:26:48

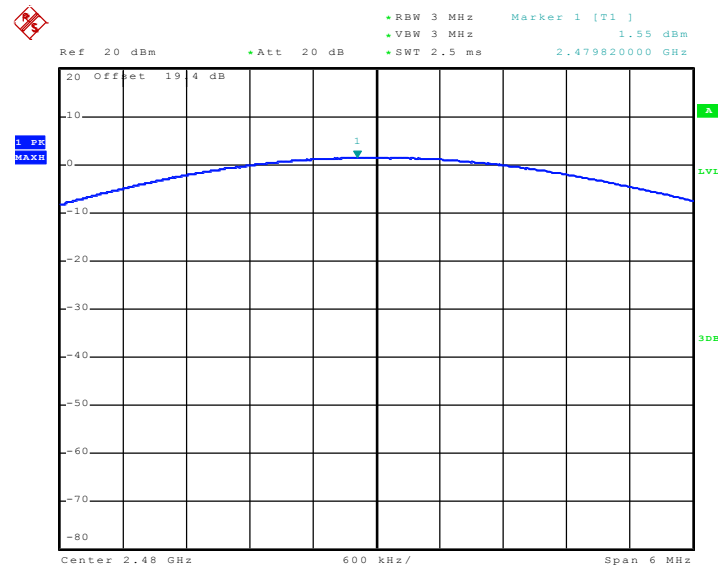


Peak Output Power Plot on Channel 39



Date: 3.SEP.2010 15:26:27

Peak Output Power Plot on Channel 78



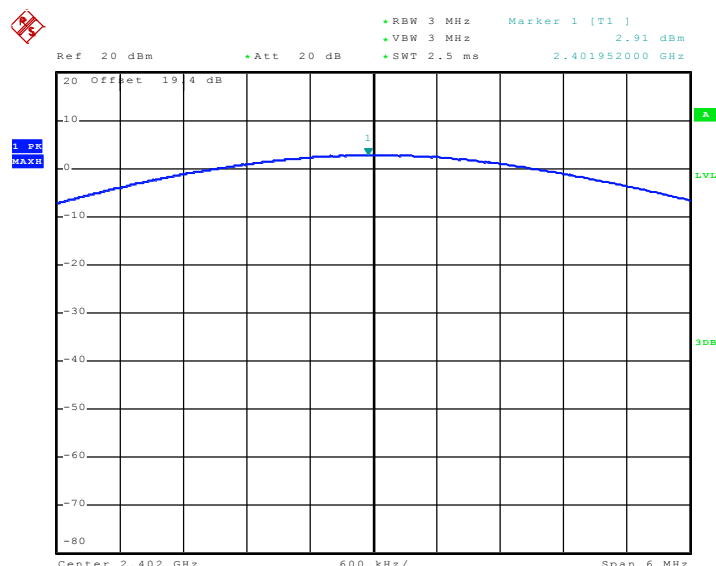
Date: 3.SEP.2010 15:26:07



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	43~46%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	2.91	30	Pass
39	2441	1.34	30	Pass
78	2480	1.62	30	Pass

Peak Output Power Plot on Channel 00



Date: 3.SEP.2010 15:27:17



Peak Output Power Plot on Channel 78



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

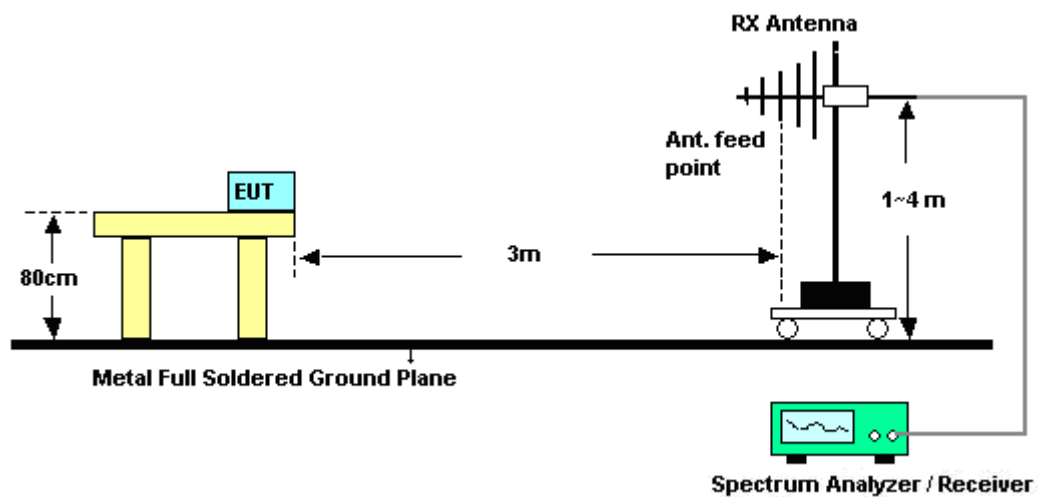
See list of measuring instruments of this test report.

3.6.3 Test Procedures

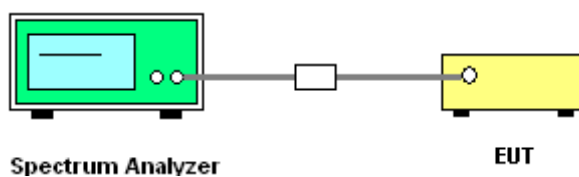
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	22~23°C
Test Channel :	00	Relative Humidity :	49~51%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.85	46.87	-27.13	74	44.22	31.7	4.47	33.52	200	43	Peak
2388.85	33.62	-20.38	54	30.97	31.7	4.47	33.52	200	43	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2384.67	47.32	-26.68	74	44.69	31.68	4.47	33.52	118	0	Peak
2384.67	32.87	-21.13	54	30.24	31.68	4.47	33.52	118	0	Average

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	63.95	-10.05	74	61.15	31.78	4.59	33.57	200	43	Peak
2483.5	32.24	-21.76	54	29.44	31.78	4.59	33.57	200	43	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	82.07	49.83	32.24	54	-21.76	Pass
Hopping Mode	82.07	51.03	31.04	54	-22.96	Pass

Note : Average result = Maximum field strength – Delta result

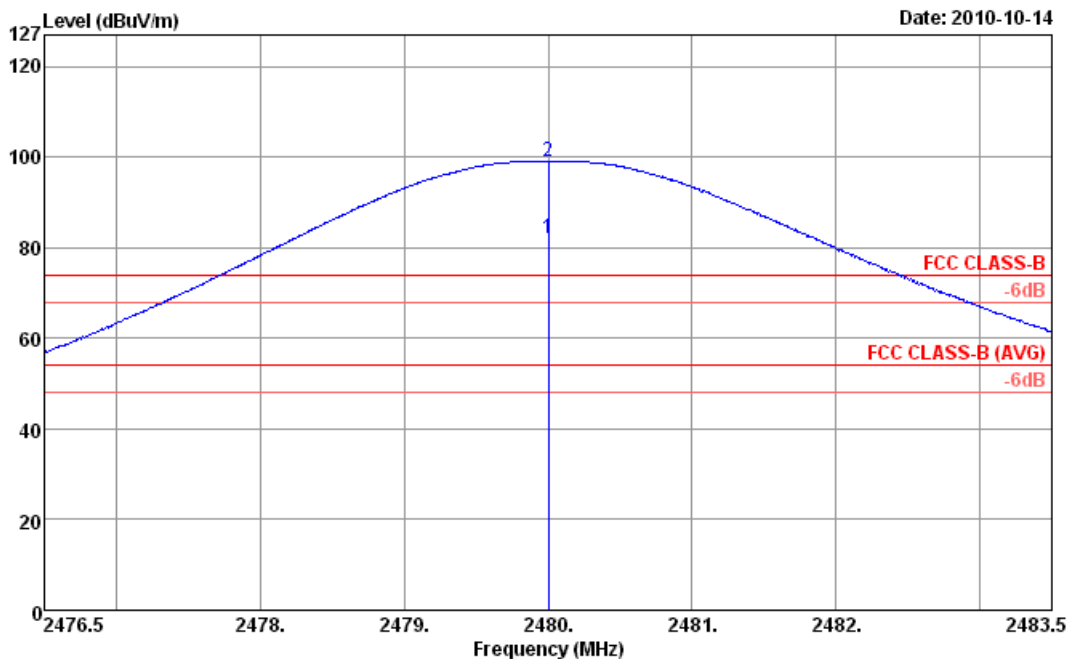
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	60.12	-13.88	74	57.32	31.78	4.59	33.57	147	0	Peak
2483.5	28.42	-25.58	54	25.62	31.78	4.59	33.57	147	0	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	79.38	50.96	28.42	54	-25.58	Pass
Hopping Mode	79.38	54.03	25.35	54	-28.65	Pass

Note : Average result = Maximum field strength – Delta result

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal

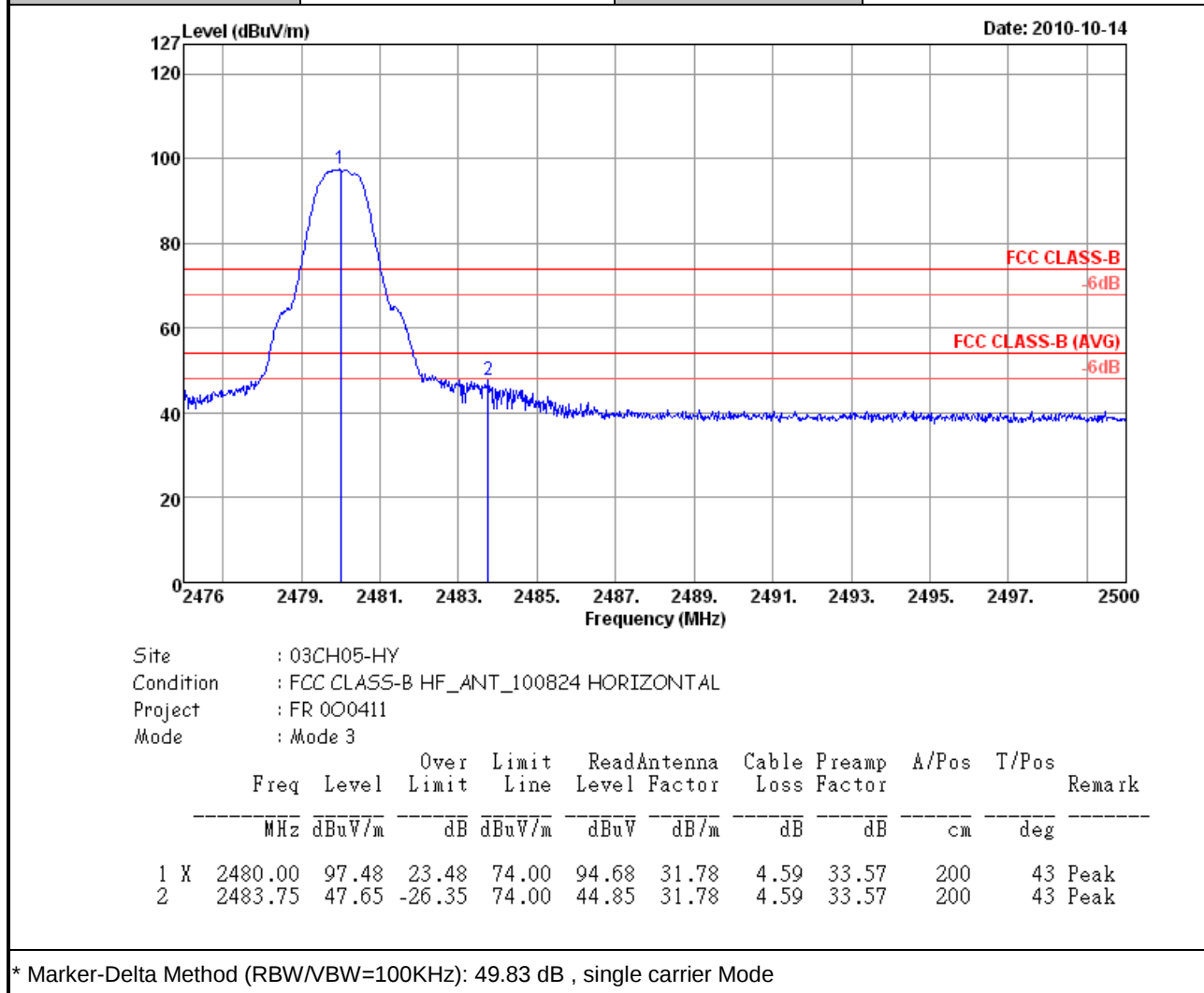


Site : 03CH05-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 000411
 Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	82.07	28.07	54.00	79.27	31.78	4.59	33.57	200	43 Average
2 X	2480.00	99.08	25.08	74.00	96.28	31.78	4.59	33.57	200	43 Peak

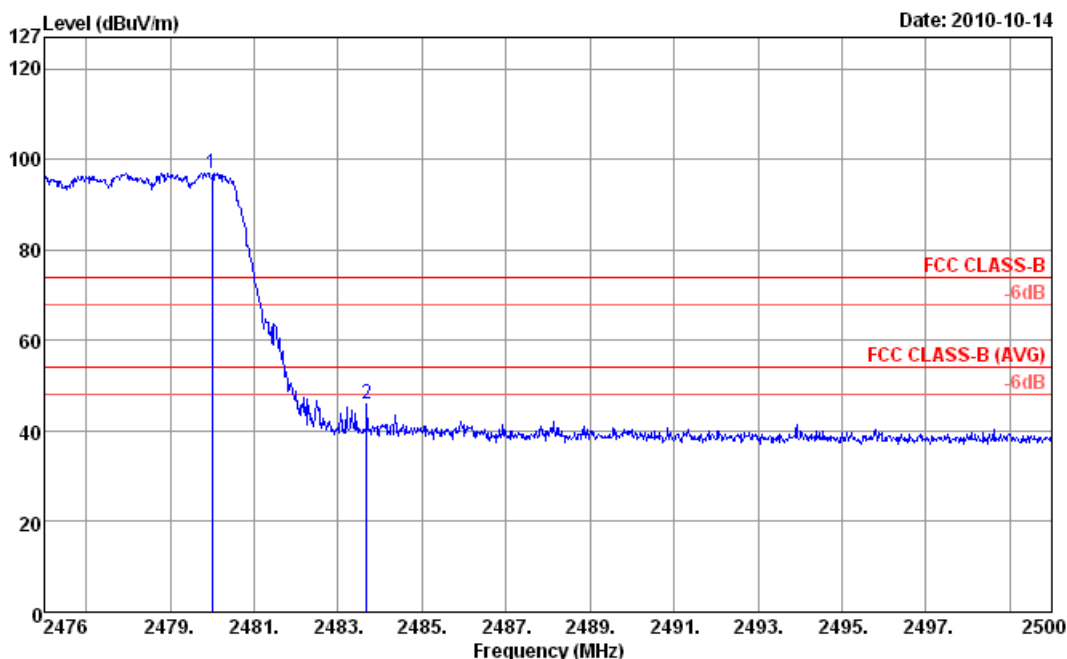
* Maximum field strength of the fundamental emission

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal





Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal

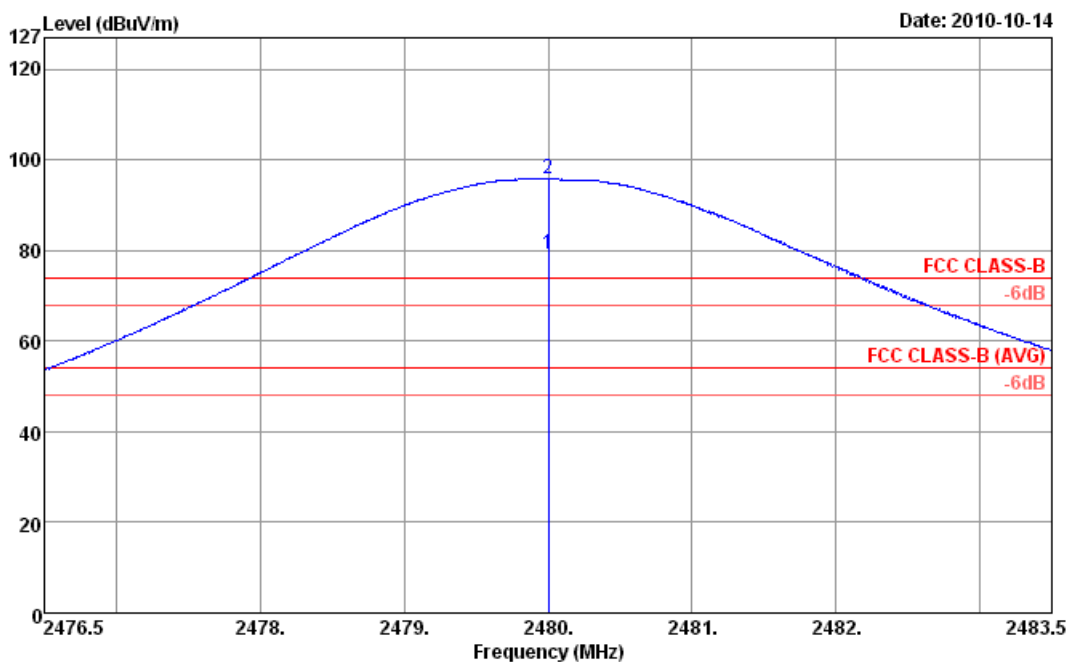


Site : 03CH05-HY
Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
Project : FR 000411
Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Preamp Loss	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	97.10	23.10	74.00	94.30	31.78	4.59	33.57	200	43 Peak
2	2483.68	46.07	-27.93	74.00	43.27	31.78	4.59	33.57	200	43 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 51.03 dB , Hopping Mode

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical



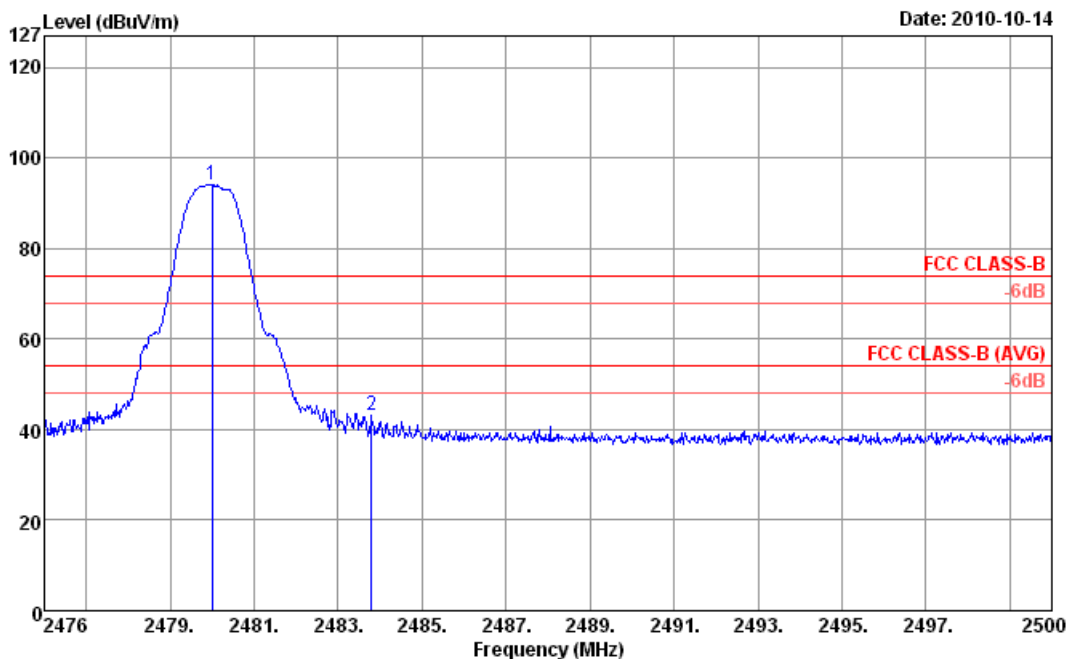
Site : 03CH05-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 000411
 Mode : Mode 3

		Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	X	2480.00	79.38	25.38	54.00	76.58	31.78	4.59	33.57	147	0 Average
2	X	2480.00	95.79	21.79	74.00	92.99	31.78	4.59	33.57	147	0 Peak

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical



Site : 03CH05-HY
Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
Project : FR 000411
Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	94.11	20.11	74.00	91.31	31.78	4.59	33.57	147	0	Peak
2	2483.80	43.15	-30.85	74.00	40.35	31.78	4.59	33.57	147	0	Peak

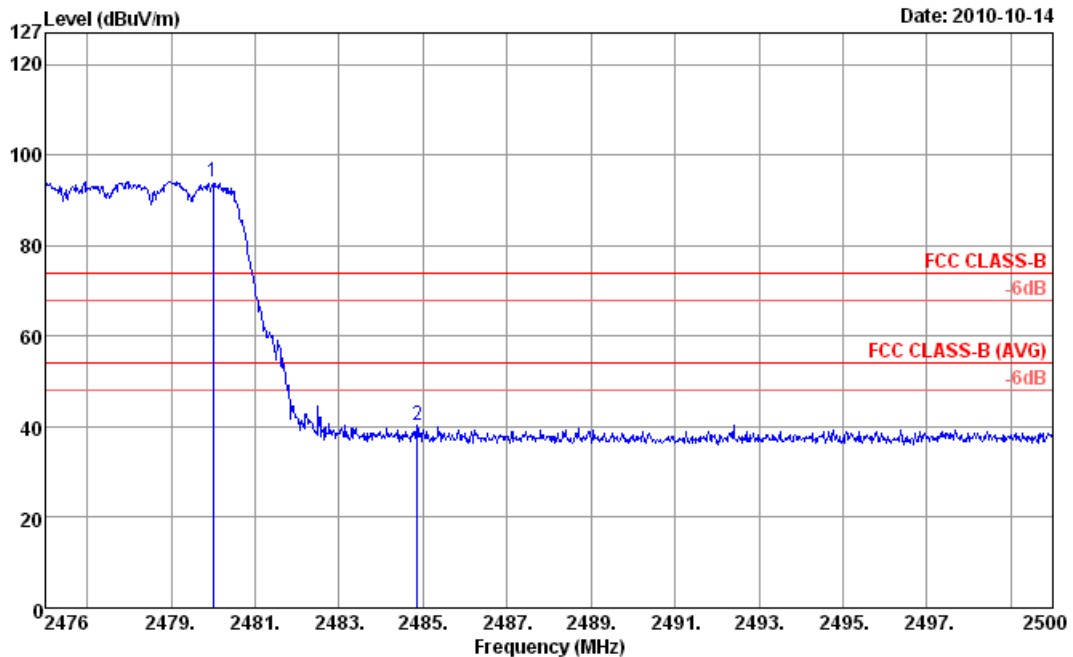
* Marker-Delta Method (RBW/VBW=100KHz): 50.96 dB , single carrier Mode



FCC RF Test Report

Report No. : FR000411A

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical



Site : 03CH05-HY
Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
Project : FR 000411

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	94.19	20.19	74.00	91.39	31.78	4.59	33.57	147	0	Peak
2	2484.86	40.16	-33.84	74.00	37.36	31.78	4.59	33.57	147	0	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 54.03 dB , Hopping Mode



Test Mode :	Mode 4	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
		Test Engineer :	Cona Huang

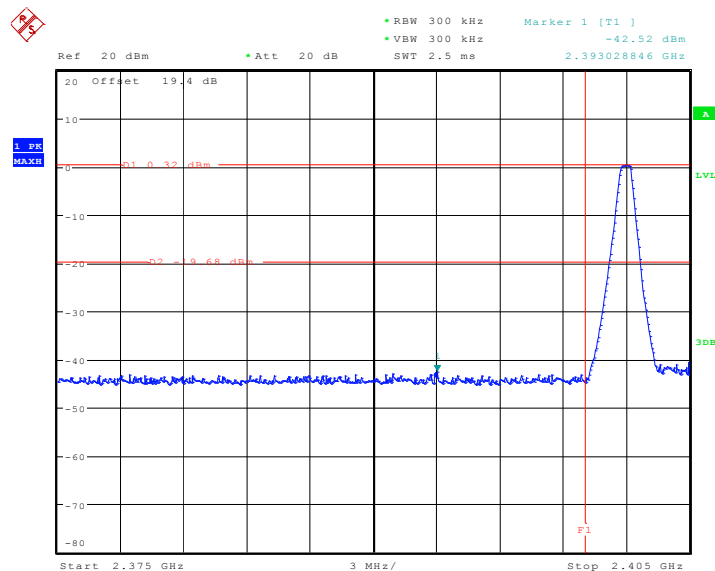
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	56.71	-17.29	74	53.91	31.78	4.59	33.57	110	294	Peak
2483.5	47.87	-6.13	54	45.07	31.78	4.59	33.57	110	294	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	52.46	-21.54	74	49.66	31.78	4.59	33.57	100	285	Peak
2483.5	44.15	-9.85	54	41.35	31.78	4.59	33.57	100	285	Average

3.6.6 Test Result of Conducted Band Edges

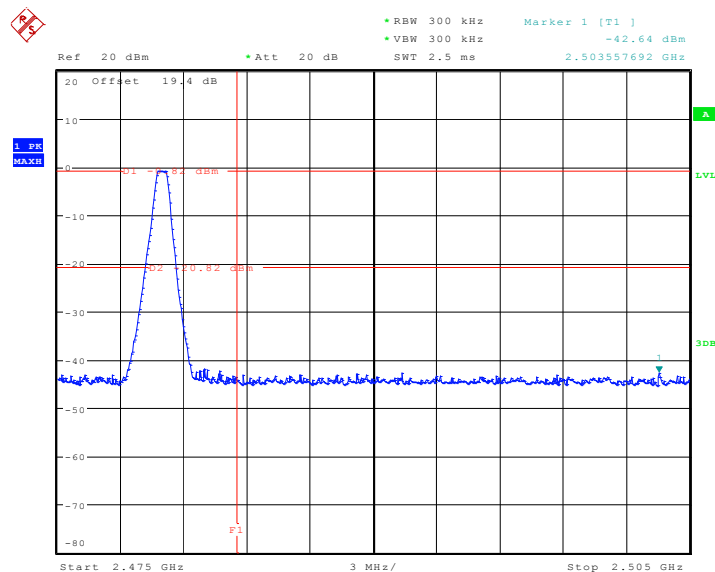
Test Mode :	Mode 1 and 3	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	43~46%
		Test Engineer :	Alan Liu

Low Band Edge Plot on Channel 00



Date: 7.OCT.2010 18:41:54

High Band Edge Plot on Channel 78

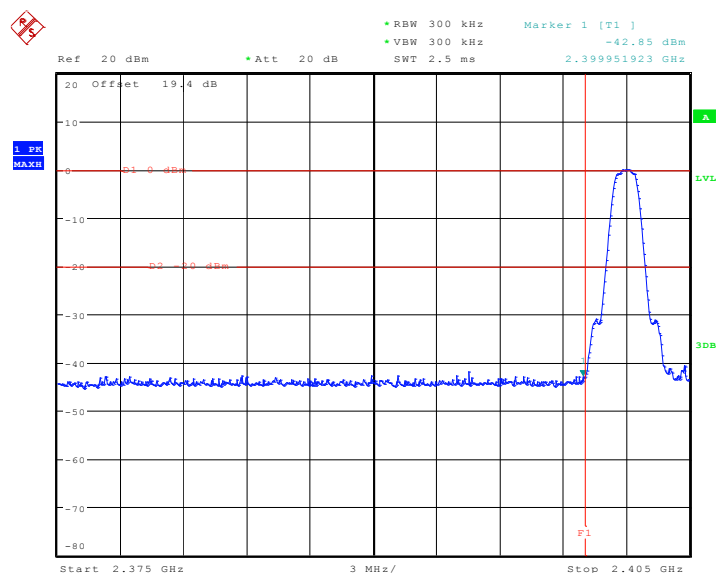


Date: 7.OCT.2010 18:38:24



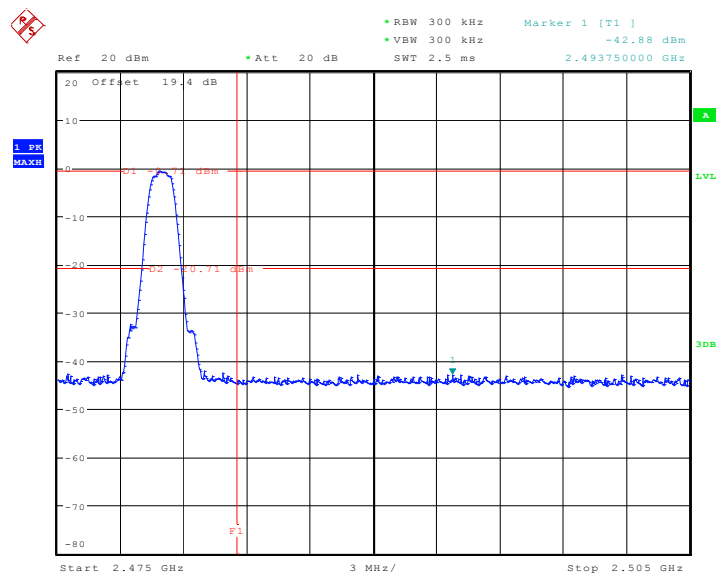
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	43~46%
		Test Engineer :	Alan Liu

Low Band Edge Plot on Channel 00



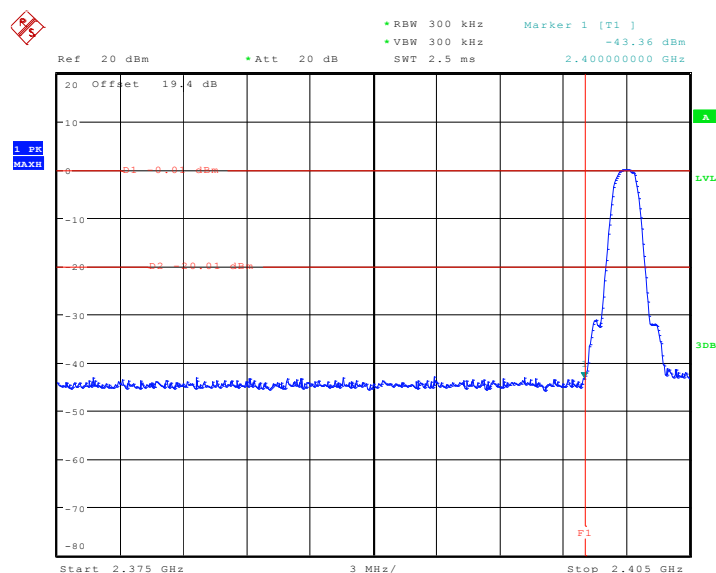
Date: 7.OCT.2010 19:27:30

High Band Edge Plot on Channel 78

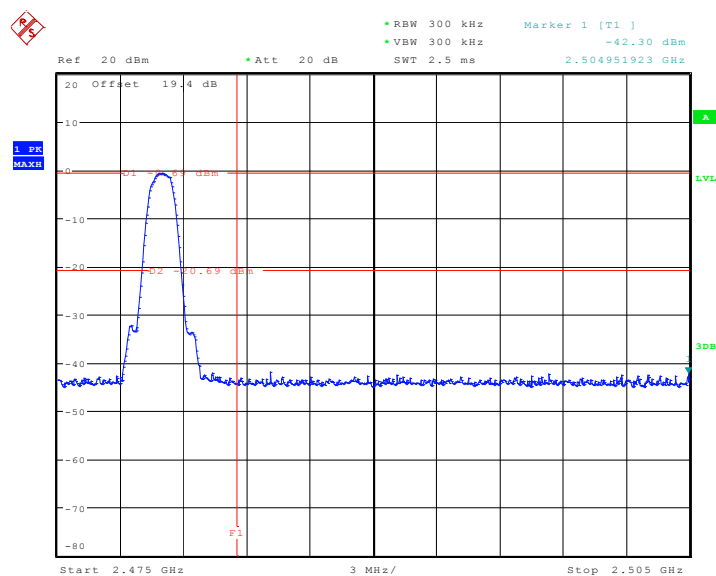


Date: 7.OCT.2010 18:35:46

Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	43~46%
		Test Engineer :	Alan Liu

Low Band Edge Plot on Channel 00


Date: 7.OCT.2010 19:32:11

High Band Edge Plot on Channel 78


Date: 7.OCT.2010 18:33:40

3.7 Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

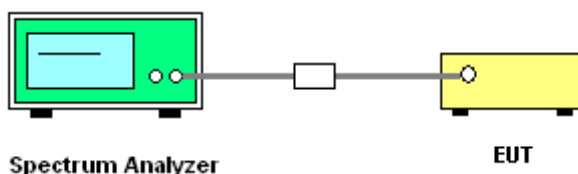
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedure

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

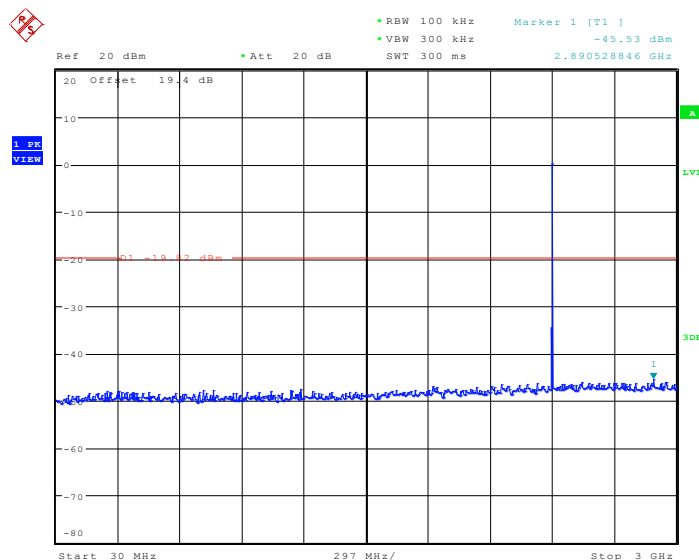
3.7.4 Test Setup



3.7.5 Test Result

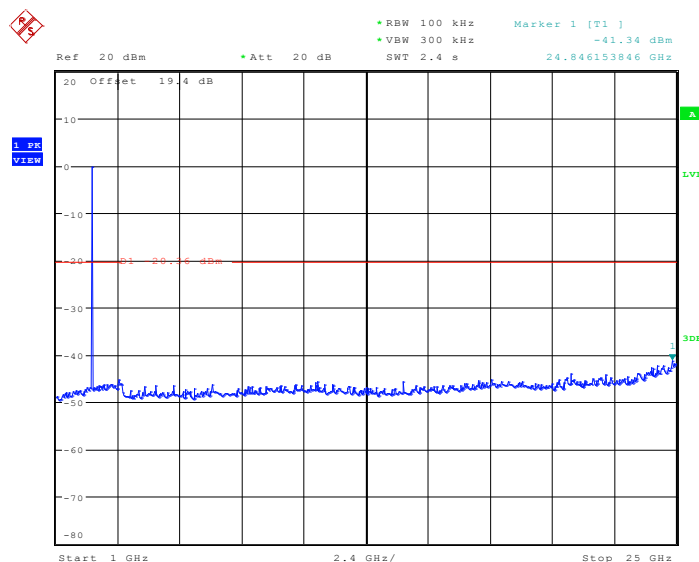
Test Mode :	Mode 7	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	43~46%
		Test Engineer :	Alan Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 7.OCT.2010 18:59:17

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

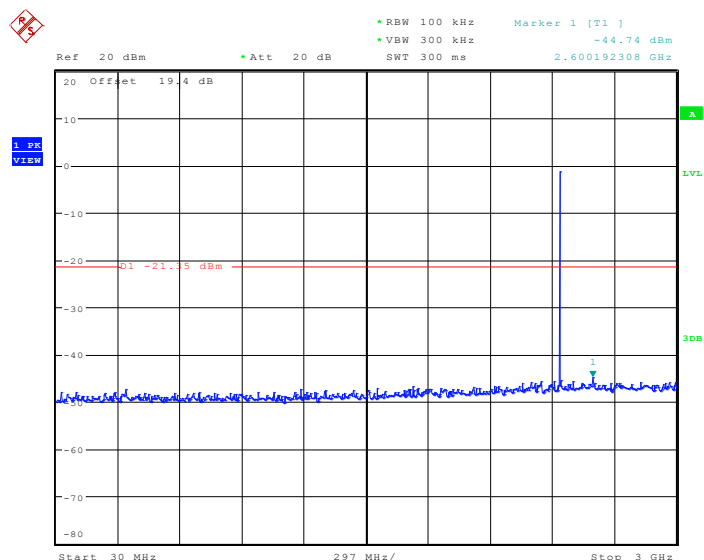


Date: 7.OCT.2010 19:02:45



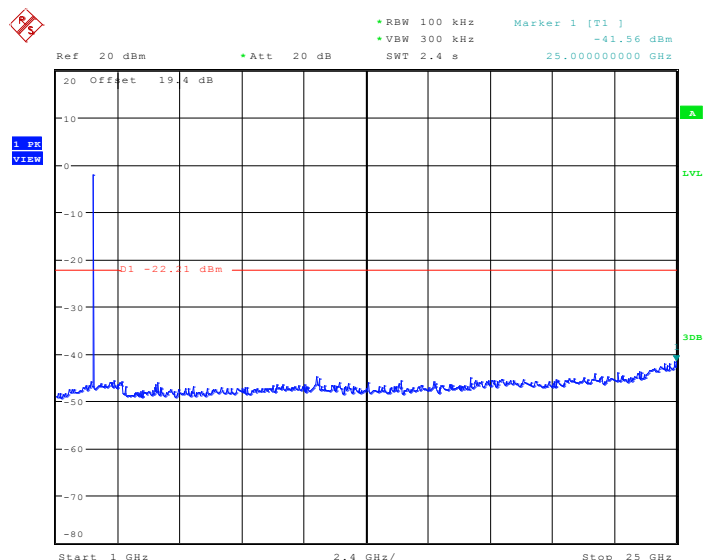
Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	43~46%
		Test Engineer :	Alan Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 7.OCT.2010 19:05:18

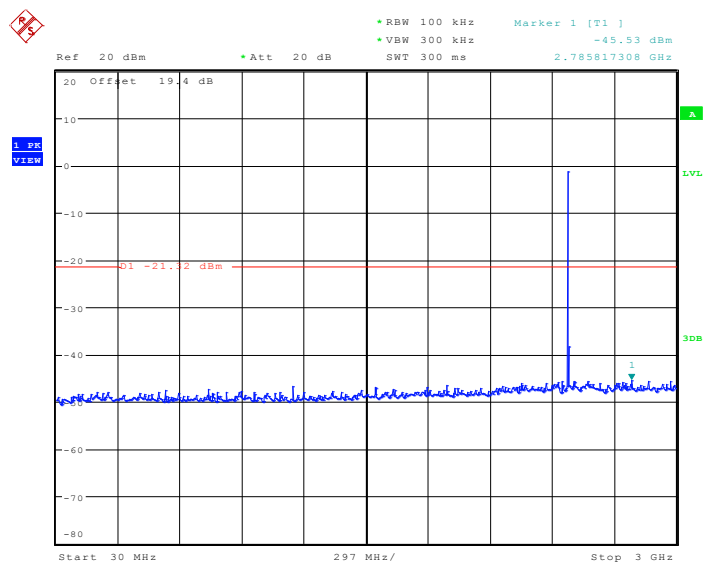
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



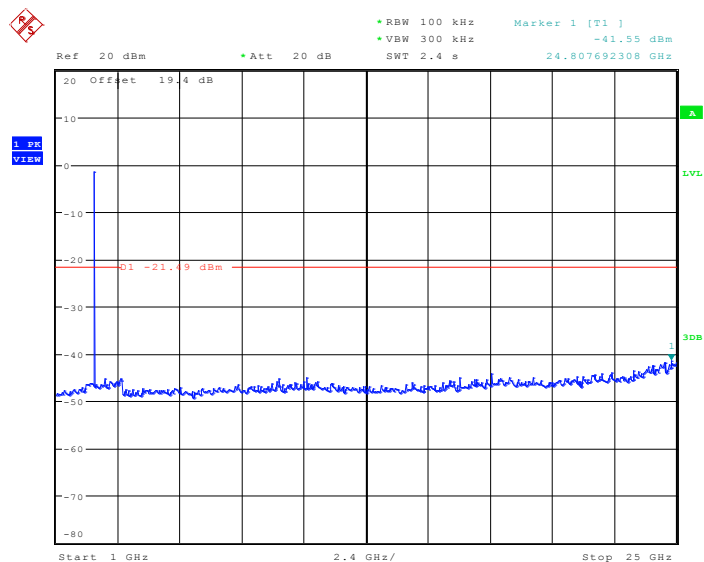
Date: 7.OCT.2010 19:07:53



Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	43~46%
		Test Engineer :	Alan Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 7.OCT.2010 19:14:05

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

Date: 7.OCT.2010 19:12:07

3.8 AC Conducted Emission Measurement

3.8.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

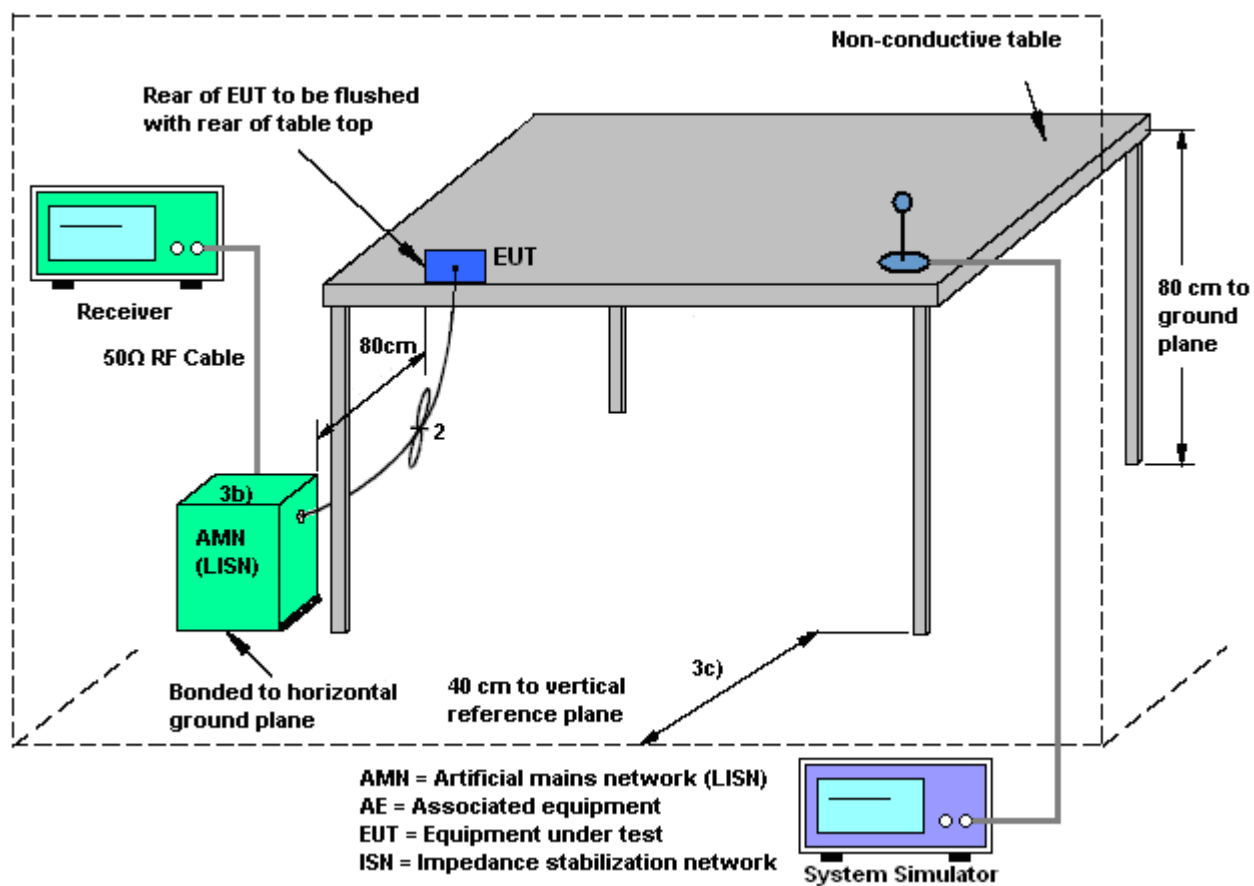
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

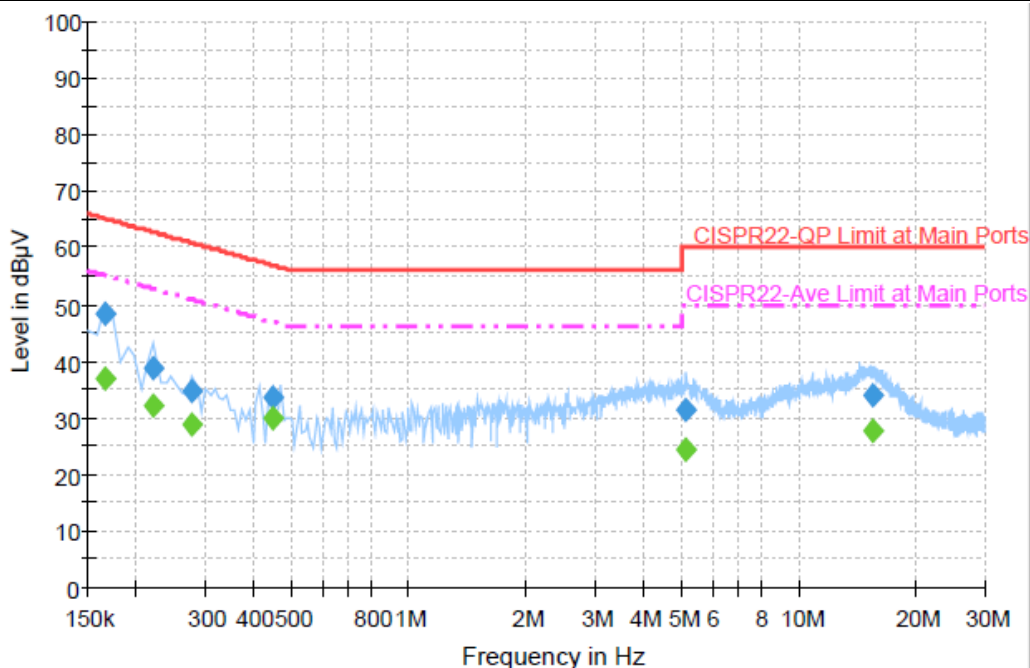
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All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

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Qwerty Keypad + Battery (3600mAh) + 2D Scanner		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



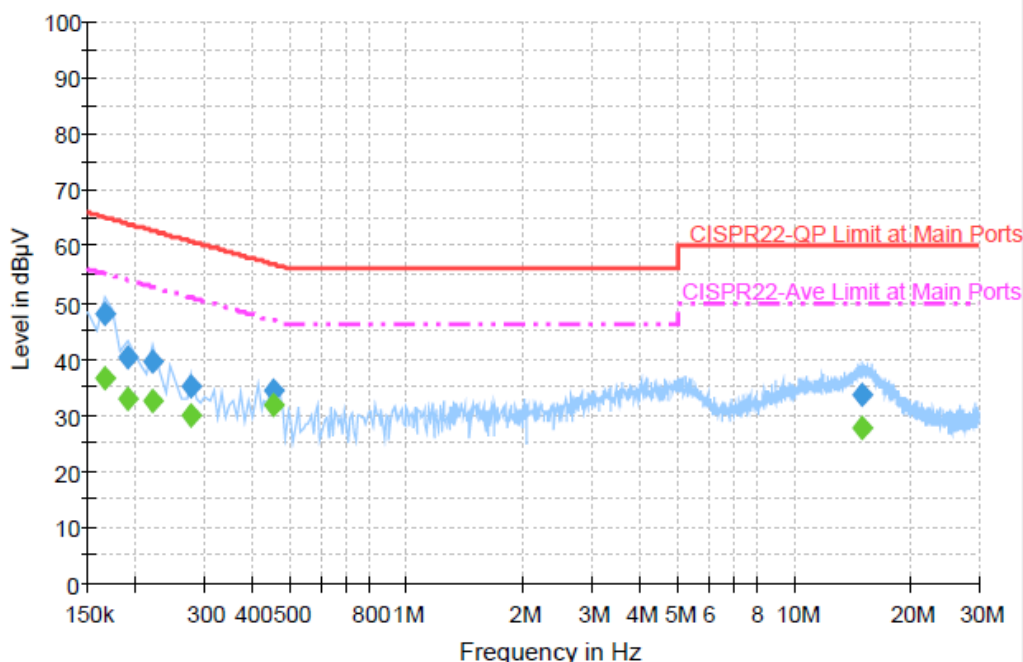
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	48.4	Off	L1	19.3	16.8	65.2
0.222000	38.8	Off	L1	19.3	23.9	62.7
0.278000	34.6	Off	L1	19.3	26.3	60.9
0.446000	33.6	Off	L1	19.3	23.3	56.9
5.158000	31.3	Off	L1	19.5	28.7	60.0
15.414000	33.8	Off	L1	19.8	26.2	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	37.0	Off	L1	19.3	18.2	55.2
0.222000	32.1	Off	L1	19.3	20.6	52.7
0.278000	28.7	Off	L1	19.3	22.2	50.9
0.446000	29.8	Off	L1	19.3	17.1	46.9
5.158000	24.4	Off	L1	19.5	25.6	50.0
15.414000	27.8	Off	L1	19.8	22.2	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Qwerty Keypad + Battery (3600mAh) + 2D Scanner		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

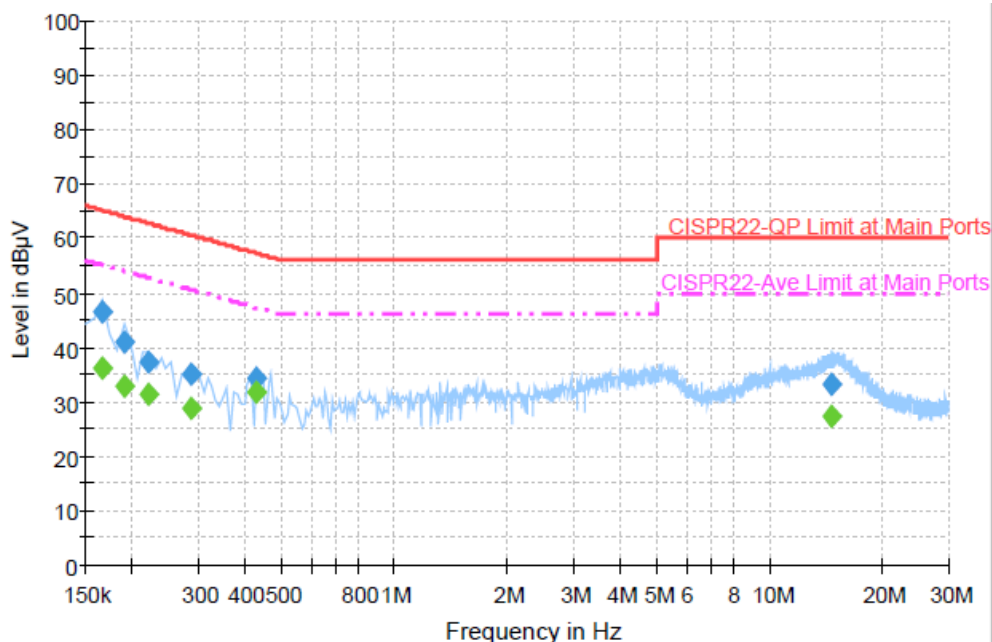

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	47.9	Off	N	19.3	17.3	65.2
0.190000	40.4	Off	N	19.4	23.6	64.0
0.222000	39.4	Off	N	19.3	23.3	62.7
0.278000	34.9	Off	N	19.3	26.0	60.9
0.454000	34.4	Off	N	19.3	22.4	56.8
14.974000	33.5	Off	N	19.8	26.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	36.6	Off	N	19.3	18.6	55.2
0.190000	32.7	Off	N	19.4	21.3	54.0
0.222000	32.4	Off	N	19.3	20.3	52.7
0.278000	30.0	Off	N	19.3	20.9	50.9
0.454000	31.9	Off	N	19.3	14.9	46.8
14.974000	27.6	Off	N	19.8	22.4	50.0

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Numeric Keypad + Battery (3600mAh) + 2D Scanner		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

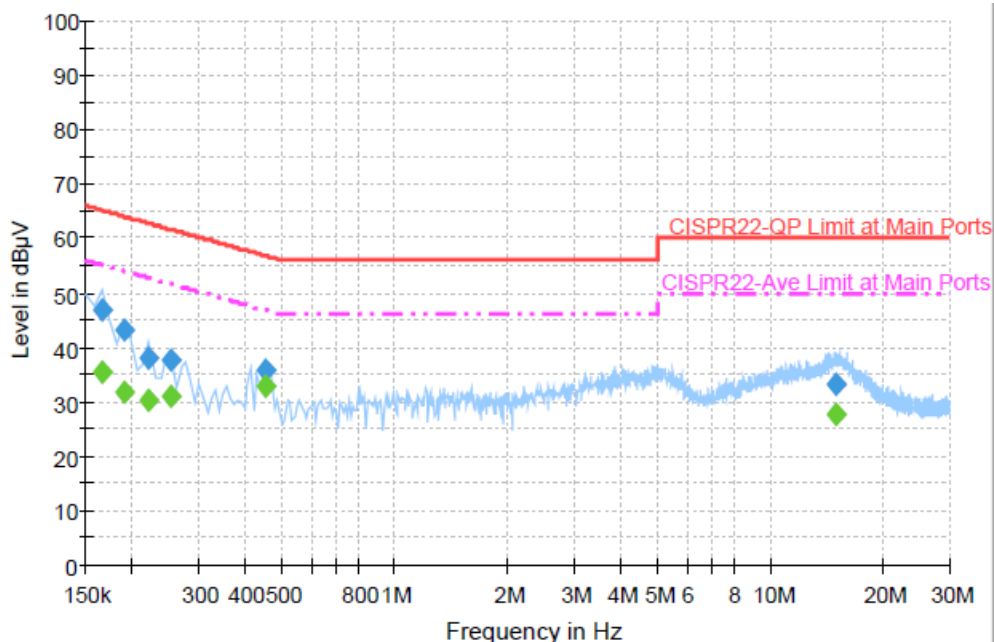

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	46.4	Off	L1	19.3	18.8	65.2
0.190000	41.0	Off	L1	19.4	23.0	64.0
0.222000	37.1	Off	L1	19.3	25.6	62.7
0.286000	34.9	Off	L1	19.3	25.7	60.6
0.430000	34.2	Off	L1	19.4	23.1	57.3
14.614000	33.2	Off	L1	19.8	26.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	36.2	Off	L1	19.3	19.0	55.2
0.190000	32.9	Off	L1	19.4	21.1	54.0
0.222000	31.3	Off	L1	19.3	21.4	52.7
0.286000	28.9	Off	L1	19.3	21.7	50.6
0.430000	31.7	Off	L1	19.4	15.6	47.3
14.614000	27.5	Off	L1	19.8	22.5	50.0

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + Numeric Keypad + Battery (3600mAh) + 2D Scanner		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

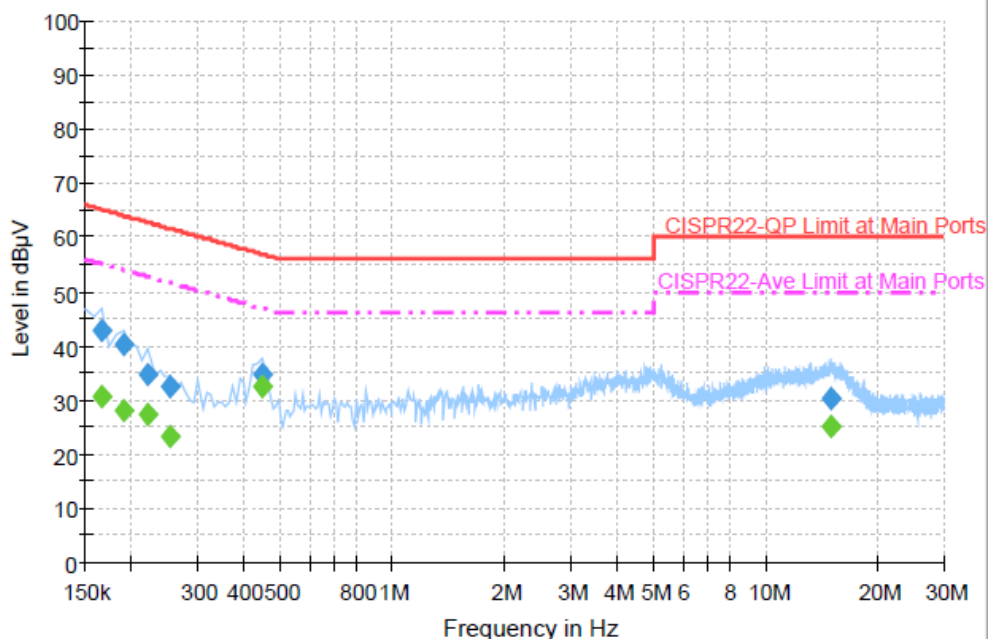

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	46.8	Off	N	19.3	18.4	65.2
0.190000	43.1	Off	N	19.4	20.9	64.0
0.222000	38.2	Off	N	19.3	24.5	62.7
0.254000	37.6	Off	N	19.4	24.0	61.6
0.454000	35.9	Off	N	19.3	20.9	56.8
15.046000	33.1	Off	N	19.8	26.9	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	35.4	Off	N	19.3	19.8	55.2
0.190000	31.8	Off	N	19.4	22.2	54.0
0.222000	30.3	Off	N	19.3	22.4	52.7
0.254000	31.0	Off	N	19.4	20.6	51.6
0.454000	32.9	Off	N	19.3	13.9	46.8
15.046000	27.7	Off	N	19.8	22.3	50.0

Test Mode :	Mode 3	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + PIM Keypad + Battery (2400mAh) + 1D Scanner		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

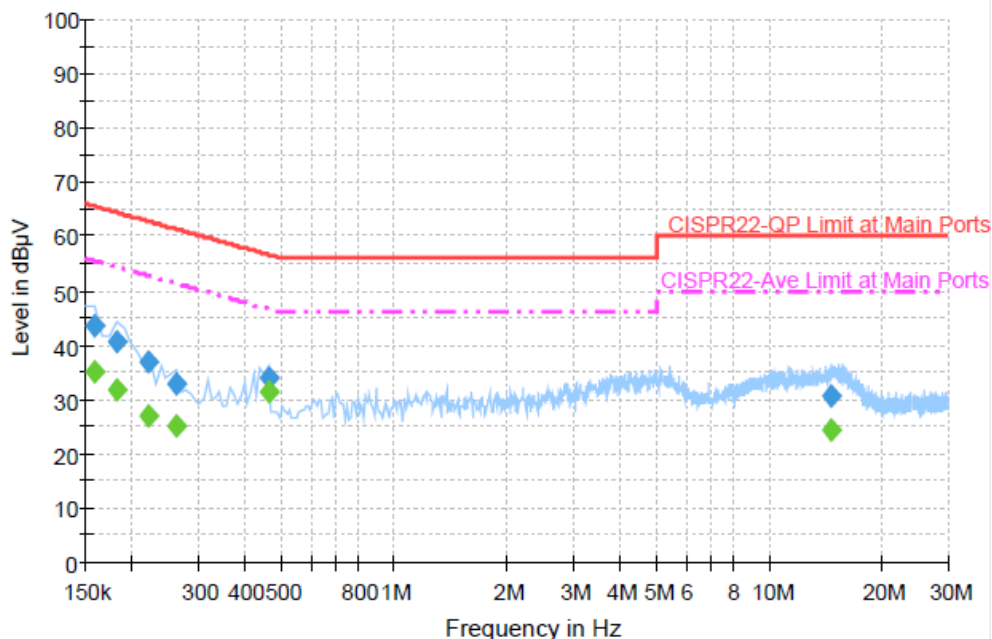

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	42.7	Off	L1	19.3	22.5	65.2
0.190000	40.2	Off	L1	19.4	23.8	64.0
0.222000	34.6	Off	L1	19.3	28.1	62.7
0.254000	32.4	Off	L1	19.3	29.2	61.6
0.446000	34.7	Off	L1	19.3	22.2	56.9
15.022000	30.1	Off	L1	19.8	29.9	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	30.8	Off	L1	19.3	24.4	55.2
0.190000	28.0	Off	L1	19.4	26.0	54.0
0.222000	27.3	Off	L1	19.3	25.4	52.7
0.254000	23.1	Off	L1	19.3	28.5	51.6
0.446000	32.4	Off	L1	19.3	14.5	46.9
15.022000	25.1	Off	L1	19.8	24.9	50.0

Test Mode :	Mode 3	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link (2.4G) + Bluetooth Link + USB Charging Cable with AC Power + USB Link + PIM Keypad + Battery (2400mAh) + 1D Scanner		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	43.7	Off	N	19.4	21.9	65.6
0.182000	40.5	Off	N	19.4	23.9	64.4
0.222000	37.0	Off	N	19.3	25.7	62.7
0.262000	32.9	Off	N	19.4	28.5	61.4
0.462000	34.1	Off	N	19.3	22.6	56.7
14.702000	30.5	Off	N	19.8	29.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	35.0	Off	N	19.4	20.6	55.6
0.182000	31.9	Off	N	19.4	22.5	54.4
0.222000	27.1	Off	N	19.3	25.6	52.7
0.262000	25.2	Off	N	19.4	26.2	51.4
0.462000	31.3	Off	N	19.3	15.4	46.7
14.702000	24.4	Off	N	19.8	25.6	50.0

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

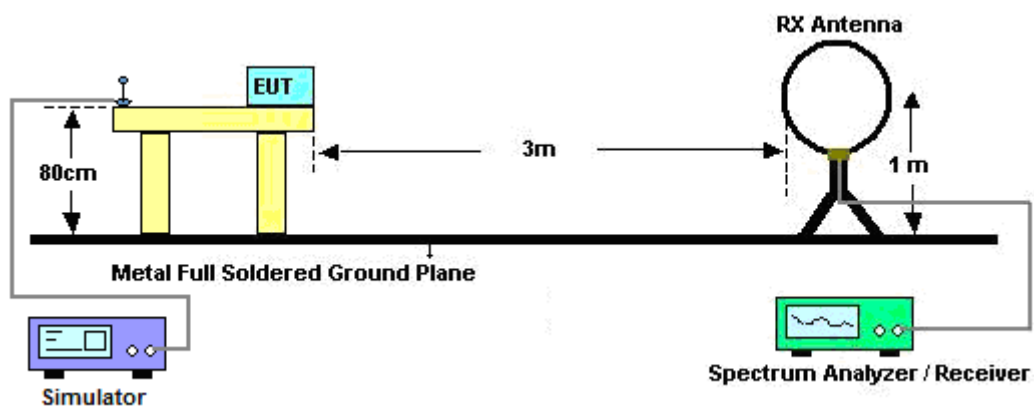
See list of measuring instruments of this test report.

3.9.3 Test Procedures

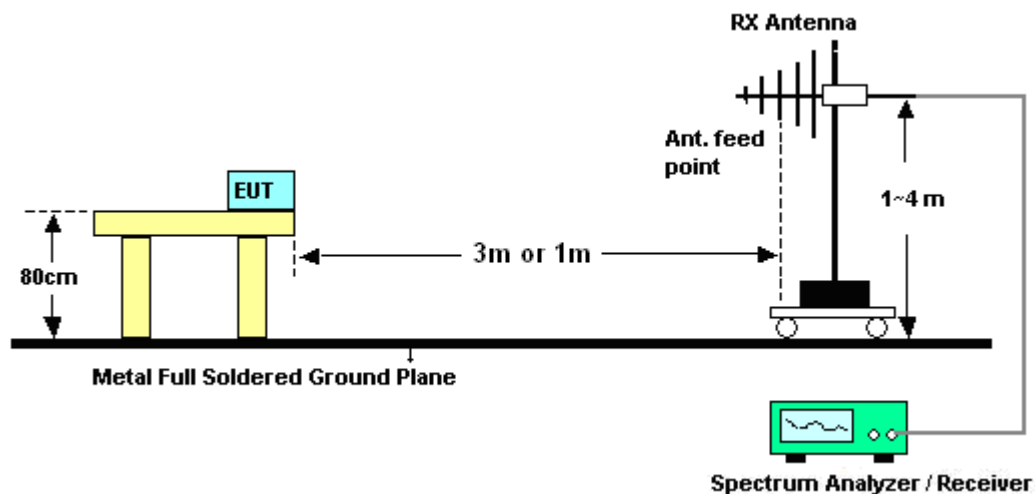
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector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

3.9.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Test Engineer :	Cona Huang	Temperature :	22~23°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 :	22~23°C
Test Channel :	00	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
95.88	28.62	-14.88	43.5	48.7	10.52	0.95	31.55	-	-	Peak
169.05	28.37	-15.13	43.5	48.93	9.76	1.23	31.55	-	-	Peak
294.06	32.43	-13.57	46	48.71	13.47	1.55	31.3	-	-	Peak
332.9	33.31	-12.69	46	48.37	14.61	1.63	31.3	100	241	Peak
503.7	31.79	-14.21	46	42.63	18.19	2.04	31.07	-	-	Peak
664	31.82	-14.18	46	40.56	19.72	2.3	30.76	-	-	Peak
2388.85	33.62	-20.38	54	30.97	31.7	4.47	33.52	200	43	Average
2388.85	46.87	-27.13	74	44.22	31.7	4.47	33.52	200	43	Peak
2402	82.08	-	-	79.4	31.7	4.5	33.52	200	43	Average
2402	98.96	-	-	96.28	31.7	4.5	33.52	200	43	Peak
2490	31.92	-22.08	54	29.07	31.8	4.62	33.57	200	43	Average
2490	43.83	-30.17	74	40.98	31.8	4.62	33.57	200	43	Peak

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.94	30.95	-9.05	40	46.95	14.94	0.58	31.52	-	-	Peak
63.48	32.46	-7.54	40	57.01	6.24	0.73	31.52	-	-	Peak
74.55	33.32	-6.68	40	57.46	6.57	0.84	31.55	100	3	Peak
332.9	31.58	-14.42	46	46.64	14.61	1.63	31.3	-	-	Peak
473.6	36.27	-9.73	46	47.7	17.71	1.98	31.12	-	-	Peak
664	34.57	-11.43	46	43.31	19.72	2.3	30.76	-	-	Peak
2384.67	32.87	-21.13	54	30.24	31.68	4.47	33.52	118	0	Average
2384.67	47.32	-26.68	74	44.69	31.68	4.47	33.52	118	0	Peak
2402	78.41	-	-	75.73	31.7	4.5	33.52	118	0	Average
2402	94.42	-	-	91.74	31.7	4.5	33.52	118	0	Peak
2494	32.06	-21.94	54	29.21	31.8	4.62	33.57	118	0	Average
2494	44.23	-29.77	74	41.38	31.8	4.62	33.57	118	0	Peak

Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	39	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
95.88	22.86	-20.64	43.5	42.94	10.52	0.95	31.55	-	-	Peak
199.02	27.44	-16.06	43.5	48.03	9.6	1.26	31.45	-	-	Peak
276.51	31.26	-14.74	46	47.85	13.32	1.48	31.39	-	-	Peak
332.9	34.03	-11.97	46	49.09	14.61	1.63	31.3	100	269	Peak
456.1	32.87	-13.13	46	44.88	17.21	1.92	31.14	-	-	Peak
664	31.93	-14.07	46	40.67	19.72	2.3	30.76	-	-	Peak
2348	32.24	-21.76	54	29.66	31.64	4.44	33.5	200	50	Average
2348	44.18	-29.82	74	41.6	31.64	4.44	33.5	200	50	Peak
2441	81.67	-	-	78.91	31.75	4.56	33.55	200	50	Average
2441	98.29	-	-	95.53	31.75	4.56	33.55	200	50	Peak
2494	32.6	-21.4	54	29.75	31.8	4.62	33.57	200	50	Average
2494	43.92	-30.08	74	41.07	31.8	4.62	33.57	200	50	Peak

Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	39	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
47.82	31	-9	40	52.56	9.27	0.73	31.56	-	-	Peak
63.75	30.52	-9.48	40	55.11	6.2	0.73	31.52	-	-	Peak
74.82	33.2	-6.8	40	57.34	6.57	0.84	31.55	100	10	Peak
331.5	31.75	-14.25	46	46.85	14.57	1.63	31.3	-	-	Peak
503.7	28.72	-17.28	46	39.56	18.19	2.04	31.07	-	-	Peak
666.8	34.38	-11.62	46	43.04	19.74	2.35	30.75	-	-	Peak
2358	32.15	-21.85	54	29.56	31.66	4.44	33.51	120	0	Average
2358	44.69	-29.31	74	42.1	31.66	4.44	33.51	120	0	Peak
2441	79.22	-	-	76.46	31.75	4.56	33.55	120	0	Average
2441	95.51	-	-	92.75	31.75	4.56	33.55	120	0	Peak
2484	32.08	-21.92	54	29.28	31.78	4.59	33.57	120	0	Average
2484	43.63	-30.37	74	40.83	31.78	4.59	33.57	120	0	Peak

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
95.61	22.8	-20.7	43.5	43.05	10.35	0.95	31.55	-	-	Peak
199.83	27.79	-15.71	43.5	48.33	9.65	1.26	31.45	-	-	Peak
294.6	32.42	-13.58	46	48.68	13.49	1.55	31.3	-	-	Peak
332.9	35.03	-10.97	46	50.09	14.61	1.63	31.3	100	111	Peak
456.1	30.35	-15.65	46	42.36	17.21	1.92	31.14	-	-	Peak
664	31.71	-14.29	46	40.45	19.72	2.3	30.76	-	-	Peak
2310	32.11	-21.89	54	29.61	31.61	4.38	33.49	200	43	Average
2310	44.38	-29.62	74	41.88	31.61	4.38	33.49	200	43	Peak
2480	82.07	-	-	79.27	31.78	4.59	33.57	200	43	Average
2480	99.15	-	-	96.35	31.78	4.59	33.57	200	43	Peak
2483.5	32.24	-21.76	54	29.44	31.78	4.59	33.57	200	43	Average
2483.5	63.95	-10.05	74	61.15	31.78	4.59	33.57	200	43	Peak



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
51.06	30.97	-9.03	40	53.94	7.86	0.73	31.56	-	-	Peak
63.75	30.43	-9.57	40	55.02	6.2	0.73	31.52	-	-	Peak
74.55	32.93	-7.07	40	57.07	6.57	0.84	31.55	100	121	Peak
331.5	31.93	-14.07	46	47.03	14.57	1.63	31.3	-	-	Peak
666.8	34.92	-11.08	46	43.58	19.74	2.35	30.75	-	-	Peak
697.6	37.75	-8.25	46	46.12	19.95	2.4	30.72	-	-	Peak
2328	32.05	-21.95	54	29.5	31.63	4.41	33.49	147	0	Average
2328	44.68	-29.32	74	42.13	31.63	4.41	33.49	147	0	Peak
2480	79.65	-	-	76.85	31.78	4.59	33.57	147	0	Average
2480	95.73	-	-	92.93	31.78	4.59	33.57	147	0	Peak
2483.5	28.42	-25.58	54	25.62	31.78	4.59	33.57	147	0	Average
2483.5	60.12	-13.88	74	57.32	31.78	4.59	33.57	147	0	Peak

Test Mode :	Mode 4	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
95.88	29.73	-13.77	43.5	49.81	10.52	0.95	31.55	-	-	Peak
199.29	27.44	-16.06	43.5	47.98	9.65	1.26	31.45	-	-	Peak
295.95	32.55	-13.45	46	48.78	13.51	1.55	31.29	-	-	Peak
331.5	34.63	-11.37	46	49.73	14.57	1.63	31.3	-	-	Peak
473.6	37.58	-8.42	46	49.01	17.71	1.98	31.12	100	255	Peak
664	32.36	-13.64	46	41.1	19.72	2.3	30.76	-	-	Peak
2380	35.53	-18.47	54	32.9	31.68	4.47	33.52	110	294	Average
2380	46.16	-27.84	74	43.53	31.68	4.47	33.52	110	294	Peak
2480	81.23	-	-	78.43	31.78	4.59	33.57	110	294	Average
2480	96.09	-	-	93.29	31.78	4.59	33.57	110	294	Peak
2483.5	47.87	-6.13	54	45.07	31.78	4.59	33.57	110	294	Average
2483.5	56.71	-17.29	74	53.91	31.78	4.59	33.57	110	294	Peak

Test Mode :	Mode 4	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	49~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.94	33.79	-6.21	40	49.79	14.94	0.58	31.52	100	197	Peak
48.9	32.15	-7.85	40	54.55	8.44	0.73	31.57	-	-	Peak
72.93	33.64	-6.36	40	58	6.33	0.84	31.53	-	-	Peak
332.9	31.63	-14.37	46	46.69	14.61	1.63	31.3	-	-	Peak
503.7	29.79	-16.21	46	40.63	18.19	2.04	31.07	-	-	Peak
666.8	35.28	-10.72	46	43.94	19.74	2.35	30.75	-	-	Peak
2372	35.64	-18.36	54	33	31.68	4.47	33.51	100	285	Average
2372	46.04	-27.96	74	43.4	31.68	4.47	33.51	100	285	Peak
2480	76.96	-	-	74.16	31.78	4.59	33.57	100	285	Average
2480	90.66	-	-	87.86	31.78	4.59	33.57	100	285	Peak
2483.5	44.15	-9.85	54	41.35	31.78	4.59	33.57	100	285	Average
2483.5	52.46	-21.54	74	49.66	31.78	4.59	33.57	100	285	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 PCB Antenna without connector and it is considered to meet antenna requirement.

3.10.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	Apr. 26, 2010	Apr. 25, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-40GHz	Nov. 3, 2010	Nov. 2, 2011	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161069	1KHz - 1GHz	Mar. 29, 2010	Mar. 28, 2011	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 1GHz	Nov. 6, 2010	Nov. 5, 2011	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m - 4 m	N/A	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz ~ 18GHz	Aug. 05, 2010	Aug. 04, 2011	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH05-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	May 12, 2009	May 11, 2011	Radiation (03CH05-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-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 EP000411 as below.