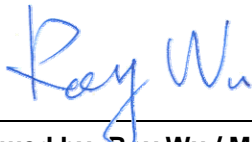


# FCC Test Report

**EQUIPMENT** : Mobile Computer  
**BRAND NAME** : Symbol  
**MODEL NAME** : FR6070  
**FCC ID** : H9PFR6070  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : Digital Spread Spectrum (DSS)  
**APPLICANT** : Symbol Technologies, Inc., A Motorola Company  
230 Victoria Street #12-06/10 Bugis Junction Office Tower  
Singapore 188024

The product sample received on Oct. 30, 2008 and completely tested on Feb. 10, 2009. 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 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: Roy Wu / Manager



## **SPORTON INTERNATIONAL INC.**

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



# TABLE OF CONTENTS

**SUMMARY OF TEST RESULT ..... 3**

**REVISION HISTORY..... 4**

**1 GENERAL DESCRIPTION..... 5**

    1.1 Applicant ..... 5

    1.2 Manufacturer..... 5

    1.3 Feature of Equipment Under Test ..... 5

    1.4 Testing Site..... 7

    1.5 Applied Standards ..... 7

    1.6 Ancillary Equipment List ..... 7

**2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST..... 8**

    2.1 Pre-Scanned RF Power..... 8

    2.2 Test Mode..... 8

    2.3 Connection Diagram of Test System..... 9

    2.4 RF Utility ..... 10

**3 TEST RESULT ..... 11**

    3.1 Number of Channel Measurement ..... 11

    3.2 20dB Bandwidth Measurement ..... 15

    3.3 Hopping Channel Separation Measurement ..... 22

    3.4 Dwell Time Measurement..... 29

    3.5 Peak Output Power Measurement ..... 42

    3.6 Band Edges Measurement..... 51

    3.7 AC Conducted Emission Measurement..... 57

    3.8 Radiated Emission Measurement..... 63

    3.9 Antenna Requirements..... 77

**4 LIST OF MEASURING EQUIPMENTS ..... 78**

**5 UNCERTAINTY OF EVALUATION..... 79**

**6 CERTIFICATION OF TAF ACCREDITATION ..... 81**

**APPENDIX A. PHOTOGRAPHS OF EUT**

**APPENDIX B. SETUP PHOTOGRAPHS**

### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(b)(1)	A8.4(2)	Number of Channels	≥ 15Chs	Pass	
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.5	15.247(a)(1)	A8.1(b)	Peak Output Power	≤ 1W	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 12.5 dB at 0.150 MHz
3.8	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 8.50 dB at 8958.00 MHz
3.9	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR8O3027B	Rev. 01	Initial issue of report	Mar. 16, 2009
FR8O3027B	Rev. 02	Update Set-up Photos	Mar. 18, 2009



# 1 General Description

## 1.1 Applicant

Symbol Technologies, Inc., A Motorola Company

230 Victoria Street #12-06/10 Bugis Junction Office Tower Singapore 188024

## 1.2 Manufacturer

Inventec Appliances Corp.

No. 37, Wugong 5th Road, Wugu Industrial Park, Taipei Country 248, Taiwan, R.O.C.

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Computer
Brand Name	Symbol
Model Name	FR6070
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 : 2.81 dBm (1Mbps) Bluetooth EDR : 2.22dBm (2Mbps) / 2.49dBm (3Mbps)
Antenna Type	PIFA Antenna with gain -4 dBi
Antenna Connector Type	N/A
HW Version	DVT
SW Version	Handy-DVT1-0.26.0050-010709-WWE-P
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

**Accessories List:**

<b>Cradle</b>	<b>Brand Name</b>	Symbol
	<b>Model Name</b>	CRD7X00-1
	<b>Power Rating</b>	12Vdc, 3.33A
<b>Cradle Adapter</b>	<b>Brand Name</b>	HIPRO
	<b>Model Name</b>	HP-O2040D43
	<b>Power Rating</b>	I/P: 100-240Vac, 50-60Hz, 1.5A; O/P: 12V, 3.33A
	<b>Power Cord Type</b>	1.8 meter shielded cable with ferrite core
<b>Product Charging Adapter</b>	<b>Brand Name</b>	MOTOROLA
	<b>Model Name</b>	EADP-16BB A
	<b>Power Rating</b>	I/P: 100-240Vac, 50-60Hz, 0.4A; O/P: 5.4V, 3A
<b>Product Charging Cable 1</b>	<b>Power Cord Type</b>	1.83 meter shielded cable without ferrite core
	<b>Brand Name</b>	MOTOROLA
	<b>Part Number</b>	25-102775-01R
<b>Product Charging Cable 2</b>	<b>Power Rating</b>	I/P: 5.4V, 3A
	<b>Power Cord Type</b>	1.35 meter non-shielded cable with ferrite core
	<b>Brand Name</b>	MOTOROLA
<b>Battery</b>	<b>Part Number</b>	25-118708-01R
	<b>Power Rating</b>	I/P: 5.4V, 3A
	<b>Power Cord Type</b>	1.35 meter non-shielded cable with ferrite core
	<b>Brand Name</b>	MOTOROLA
<b>Earphone</b>	<b>Part Number</b>	82-71364-05
	<b>Power Rating</b>	3.7Vdc, 3600mAh, 13.3Wh
	<b>Type</b>	Li-ion
	<b>Brand Name</b>	MOTOROLA
<b>USB Cable</b>	<b>Part Number</b>	90-17C28-001R
	<b>Signal Line Type</b>	1.24 meter non-shielded cable without ferrite core
	<b>Brand Name</b>	MOTOROLA
<b>USB Cable</b>	<b>Part Number</b>	25-68596-01R
	<b>Type</b>	1.58 meter shielded cable without ferrite core
	<b>Brand Name</b>	MOTOROLA

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. For accessories equipped with this EUT, please refer to the appendix of the external photo.
4. Product Charging Cable 1 (P/N: 25-102775-01R) and Product Charging Cable 2 (P/N: 25-118708-01R) are exactly the same which was declared by the manufacturer, and only Product Charging Cable 1 (P/N: 25-102775-01R) was performed on all the tests.

## 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C TEL: +886-3-3273456 / FAX: +886-3-3284978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO05-HY	03CH07-HY	TW1022/4086B-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

Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
WLAN AP	D-Link	DWL-7100AP	KA22003040018-1	N/A	Unshielded, 1.8 m
Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
LCD Monitor	Lenovo	6135-AB1	FCC DoC	N/A	Unshielded, 1.8m
Bluetooth Earphone	Cellink	BTHS-6025-F	PQY-4710874200357	N/A	N/A
i-pod	Apple	A1199	FCC DoC	Unshielded, 1.0 m	N/A

## 2 Test Configuration of Equipment Under Test

### 2.1 Pre-Scanned RF Power

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

RF Output Power				
Channel	Frequency	Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	2.38 dBm	2.09 dBm	2.28 dBm
Ch39	2441MHz	<b>2.81 dBm</b>	2.22 dBm	2.49 dBm
Ch78	2480MHz	2.50 dBm	1.74 dBm	2.05 dBm

**Remark:**

1. The EUT is programmed to transmit signal continuously for all testing.

### 2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

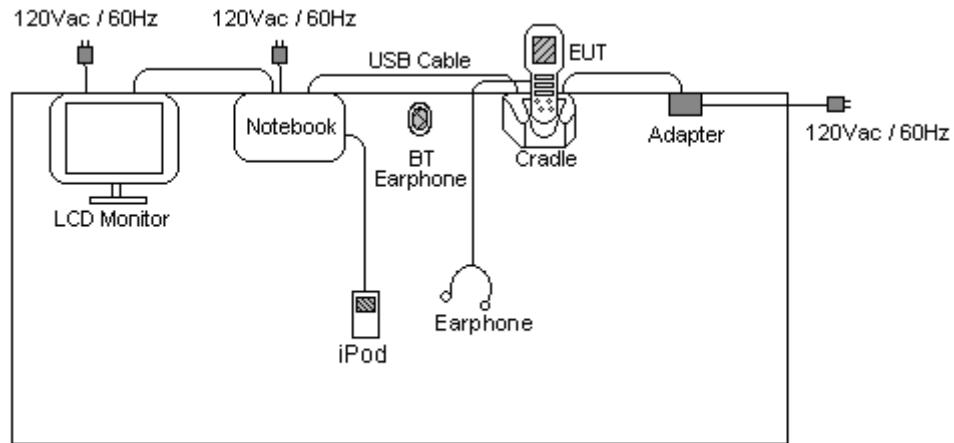
Test Cases			
Test Item	Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	<ul style="list-style-type: none"> <li>■ Mode 1: CH00_2402 MHz</li> <li>■ Mode 2: CH39_2441 MHz</li> <li>■ Mode 3: CH78_2480 MHz</li> </ul>	<ul style="list-style-type: none"> <li>■ Mode 4: CH00_2402 MHz</li> <li>■ Mode 5: CH39_2441 MHz</li> <li>■ Mode 6: CH78_2480 MHz</li> </ul>	<ul style="list-style-type: none"> <li>■ Mode 7: CH00_2402 MHz</li> <li>■ Mode 8: CH39_2441 MHz</li> <li>■ Mode 9: CH78_2480 MHz</li> </ul>
Radiated TCs	<ul style="list-style-type: none"> <li>■ Mode 1: CH00_2402 MHz</li> <li>■ Mode 2: CH39_2441 MHz</li> <li>■ Mode 3: CH78_2480 MHz</li> </ul>	N/A	N/A
AC Conducted Emission	Mode 1 : BT Link + WLAN Link + Earphone + Cradle + Adapter + USB Cable Mode 2 : BT Link + WLAN Link + Earphone + USB Charging Cable with AC Power		
<p><b>Remark:</b></p> <ol style="list-style-type: none"> <li>1. The worst cases of Radiated emission were Bluetooth 1Mbps TX modes; only the test data of these modes were reported.</li> </ol>			



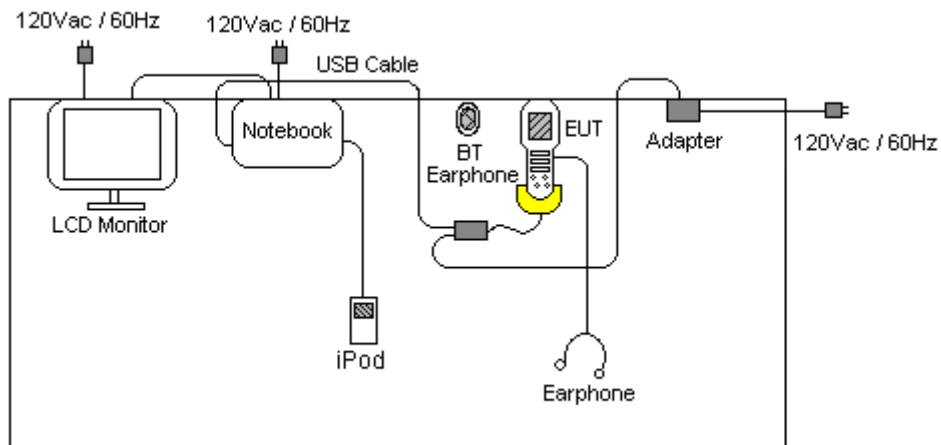
## 2.3 Connection Diagram of Test System

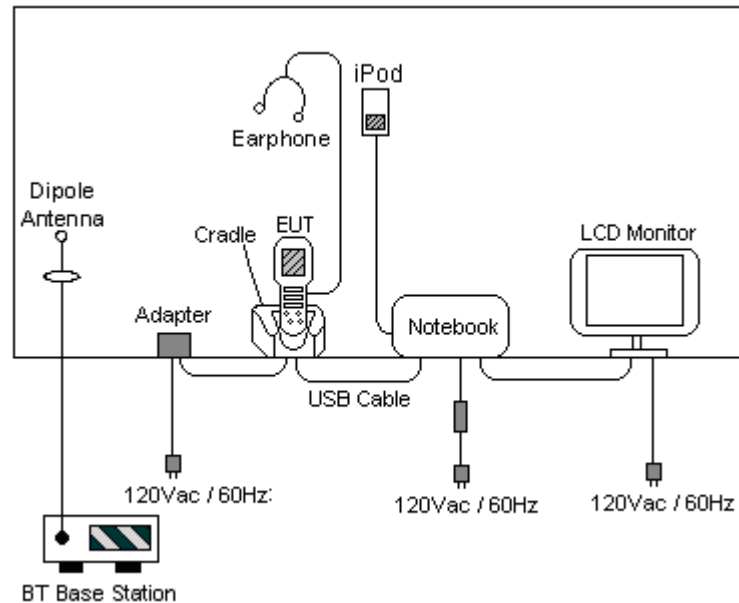
### <Conducted Emission>

EUT with Cradle Mode



EUT with USB Charging cable Mode



**<Radiated Emission>****2.4 RF Utility**

For Bluetooth function, the RF Utility, "BT Test ON" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with BT 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.

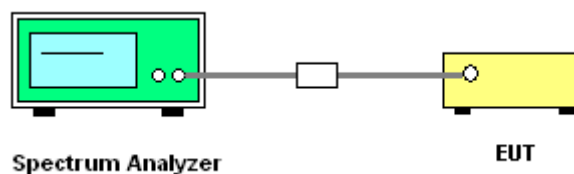
##### 3.1.2 Measuring Instruments

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

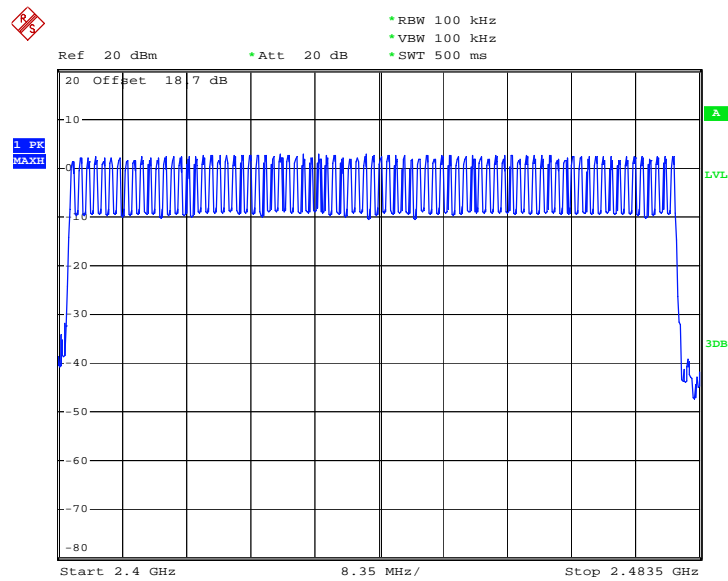




3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1, 2, 3	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%
Number of Hopping Channels (Channel)		Limits (Channel)	
79		> 15	
		Pass/Fail	
		Pass	

Number of Hopping Channel Plot on Channel 00 - 78



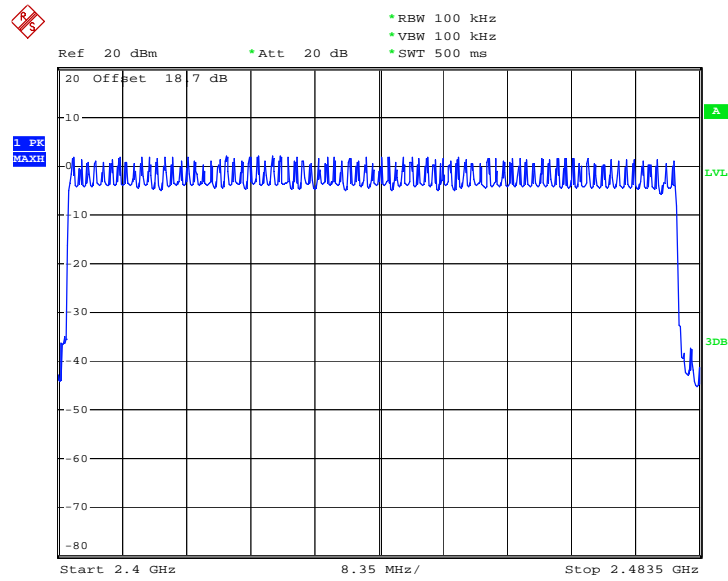
Date: 17.DEC.2008 01:53:47



Test Mode :	Mode 4, 5, 6	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

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

Number of Hopping Channel Plot on Channel 00 - 78



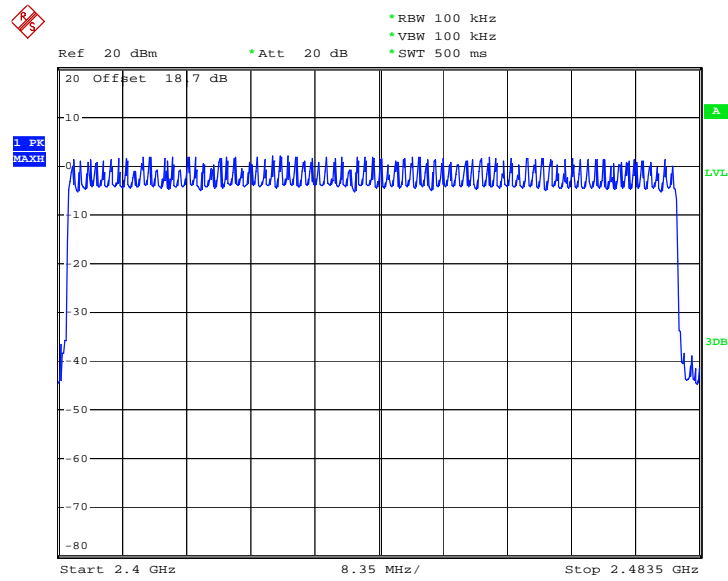
Date: 17.DEC.2008 01:58:08



Test Mode :	Mode 7, 8, 9	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

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

Number of Hopping Channel Plot on Channel 00 - 78



Date: 17.DEC.2008 02:02:47

## 3.2 20dB Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

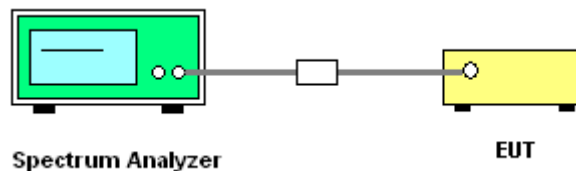
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

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

### 3.2.4 Test Setup



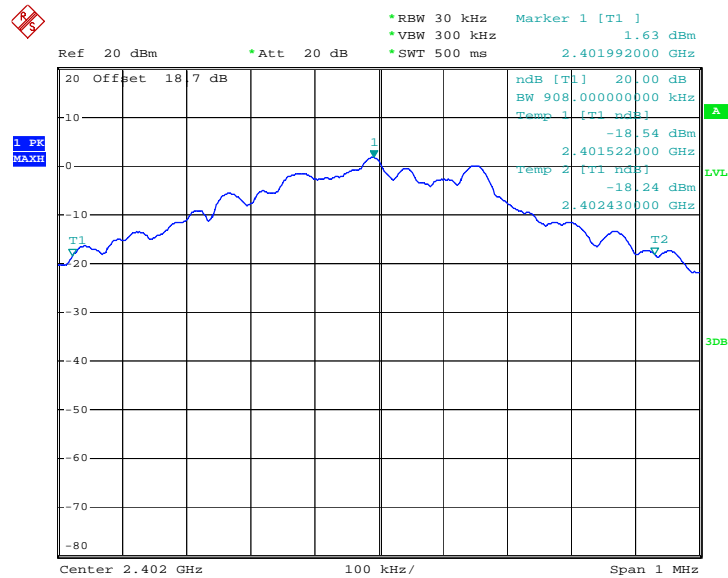


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.908
39	2441	0.906
78	2480	0.908

20 dB Bandwidth Plot on Channel 00

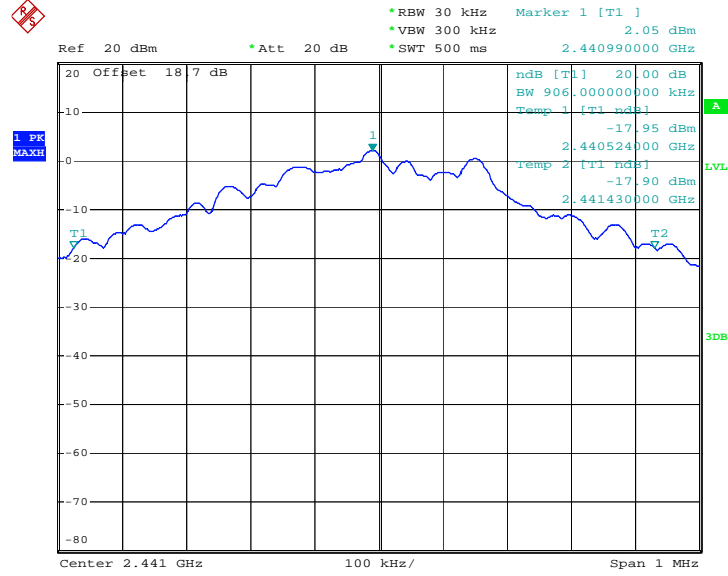


Date: 17.DEC.2008 00:52:03



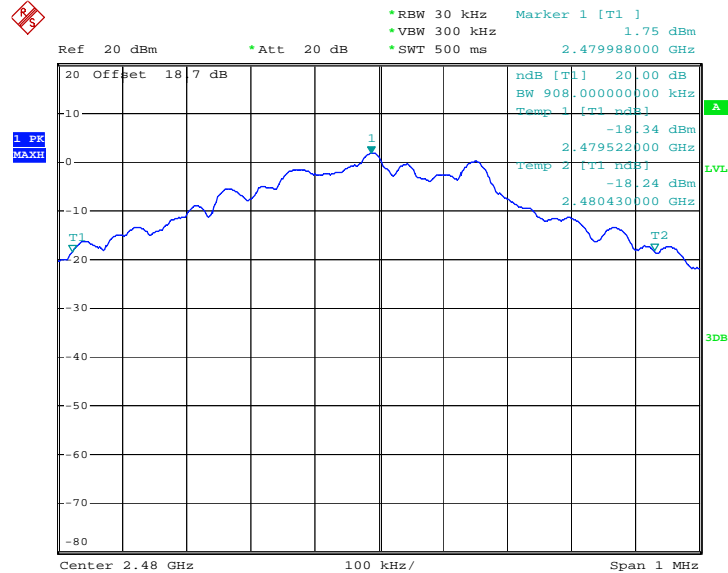


20 dB Bandwidth Plot on Channel 39



Date: 17.DEC.2008 00:52:27

20 dB Bandwidth Plot on Channel 78



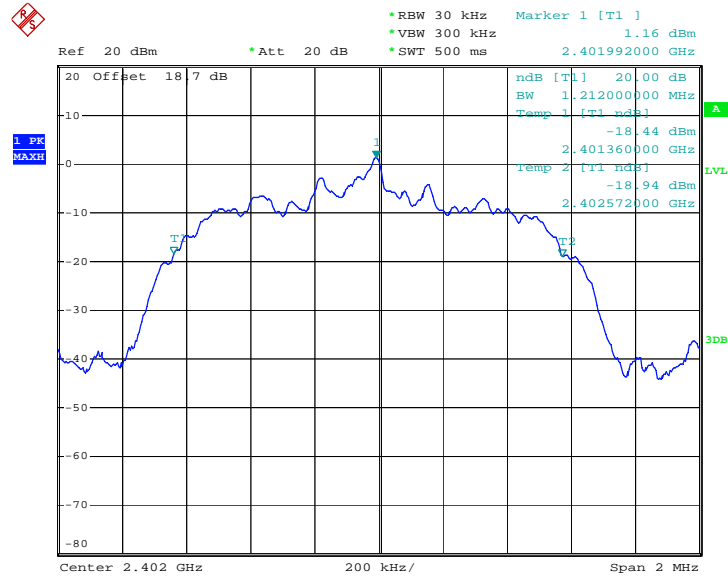
Date: 17.DEC.2008 00:53:03



Test Mode :	Mode 4, 5, 6	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.212
39	2441	1.216
78	2480	1.216

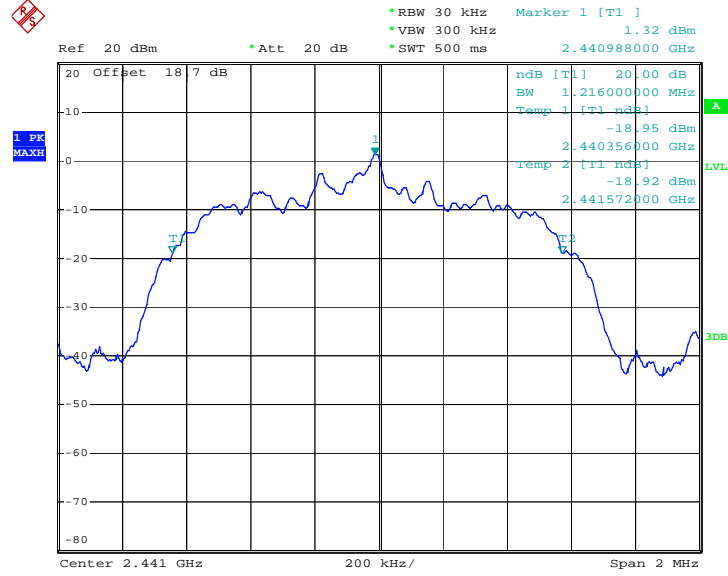
20 dB Bandwidth Plot on Channel 00



Date: 17.DEC.2008 00:53:37

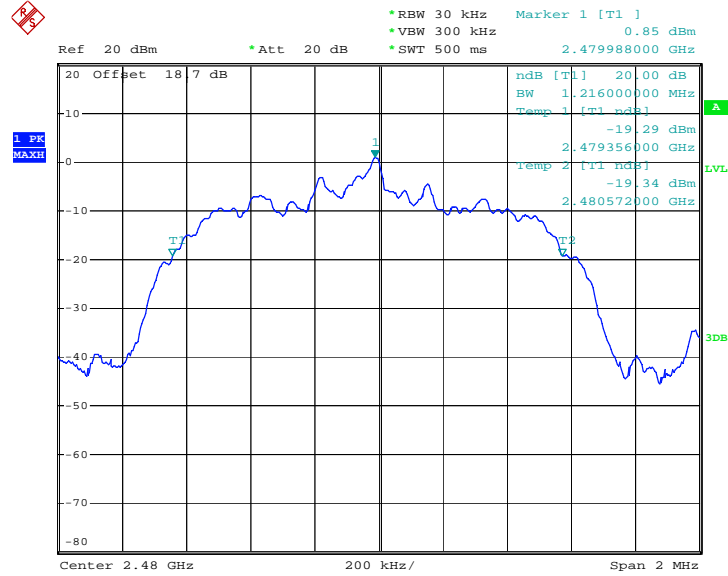


20 dB Bandwidth Plot on Channel 39



Date: 17.DEC.2008 00:53:58

20 dB Bandwidth Plot on Channel 78



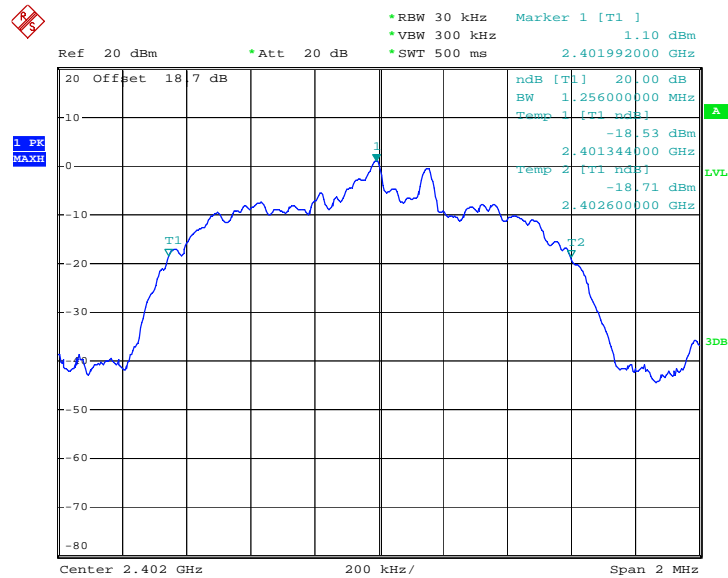
Date: 17.DEC.2008 00:54:18



Test Mode :	Mode 7, 8, 9	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.256
39	2441	1.256
78	2480	1.256

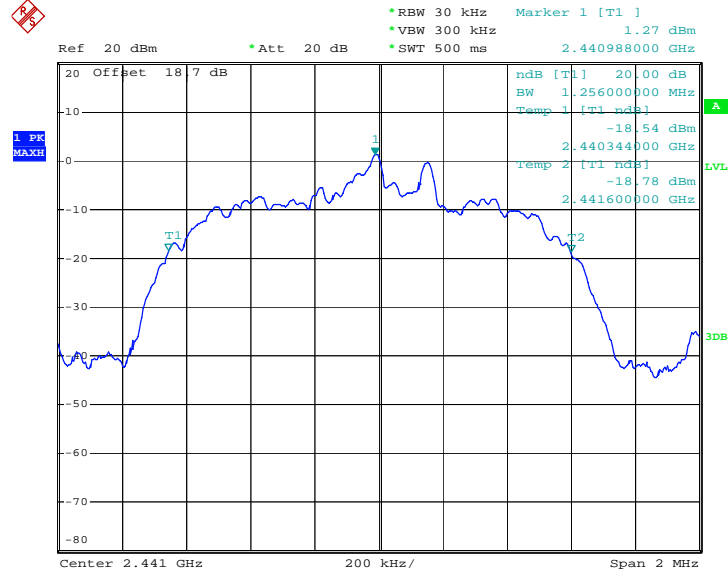
20 dB Bandwidth Plot on Channel 00



Date: 17.DEC.2008 00:54:45

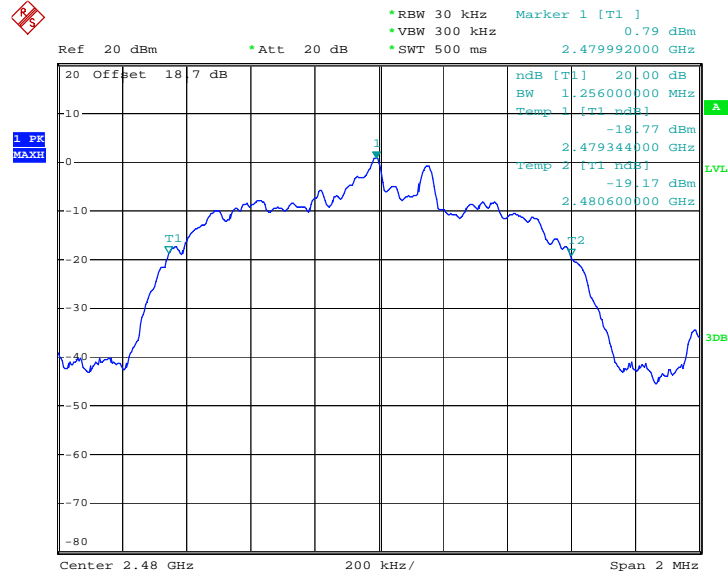


20 dB Bandwidth Plot on Channel 39



Date: 17.DEC.2008 00:55:02

20 dB Bandwidth Plot on Channel 78



Date: 17.DEC.2008 00:55:25

### 3.3 Hopping Channel Separation Measurement

#### 3.3.1 Limit of Hopping Channel Separation

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

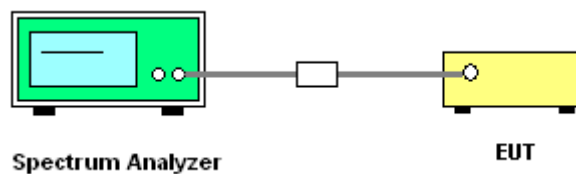
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

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

#### 3.3.4 Test Setup



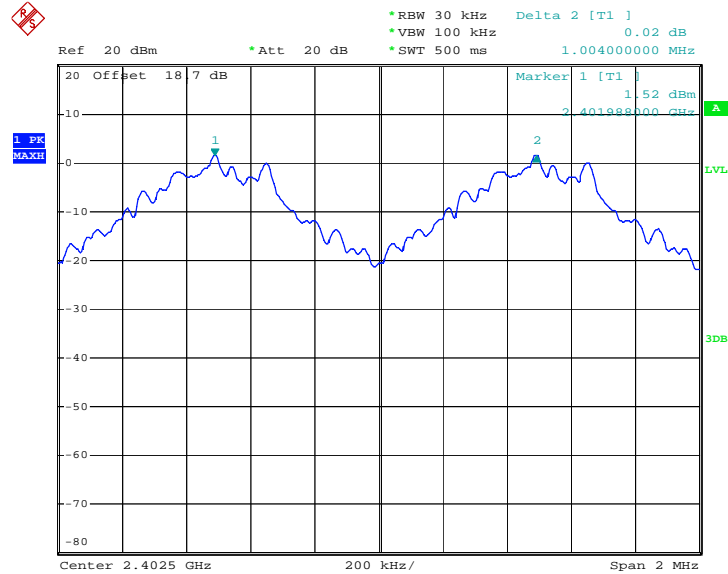


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.004	0.605	Pass
39	2441	1.004	0.604	Pass
78	2480	1.004	0.605	Pass

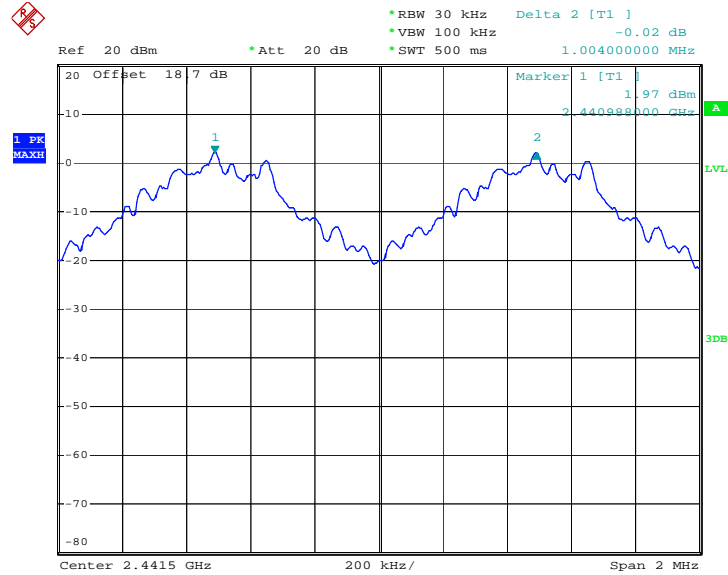
Channel Separation Plot on Channel 00 - 01



Date: 17.DEC.2008 01:16:00

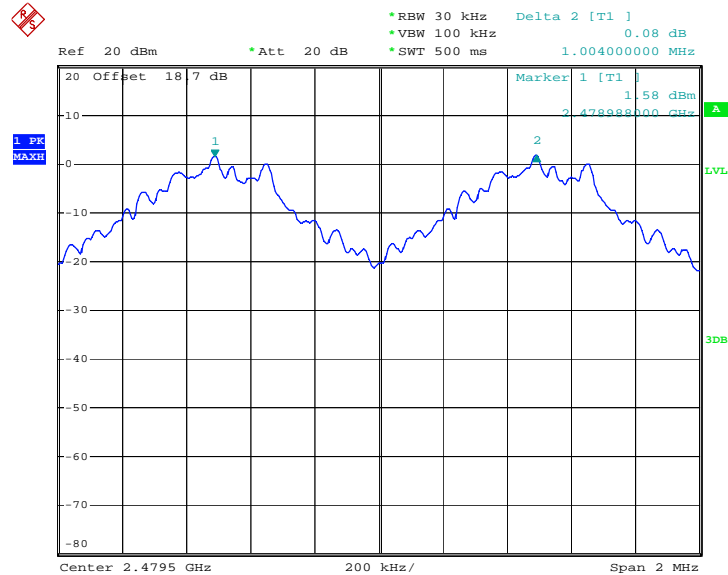


### Channel Separation Plot on Channel 39 - 40



Date: 17.DEC.2008 01:16:32

### Channel Separation Plot on Channel 77 - 78



Date: 17.DEC.2008 01:16:59

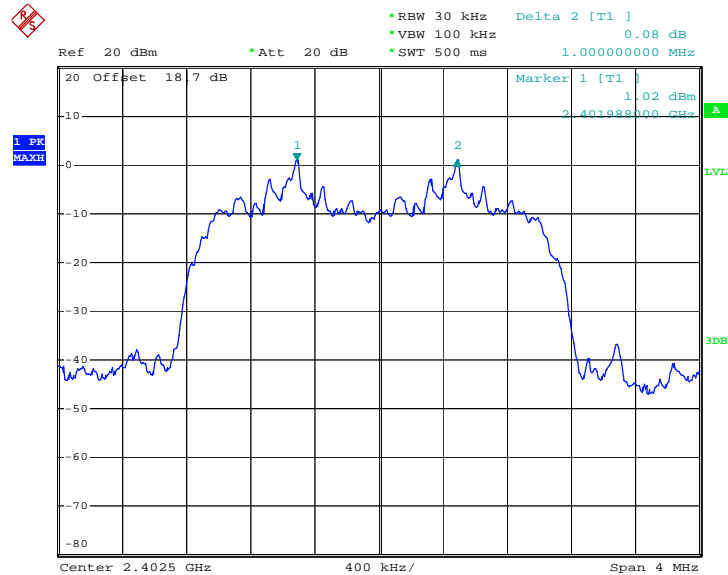




Test Mode :	Mode 4, 5, 6	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.000	0.808	Pass
39	2441	1.000	0.811	Pass
78	2480	1.000	0.811	Pass

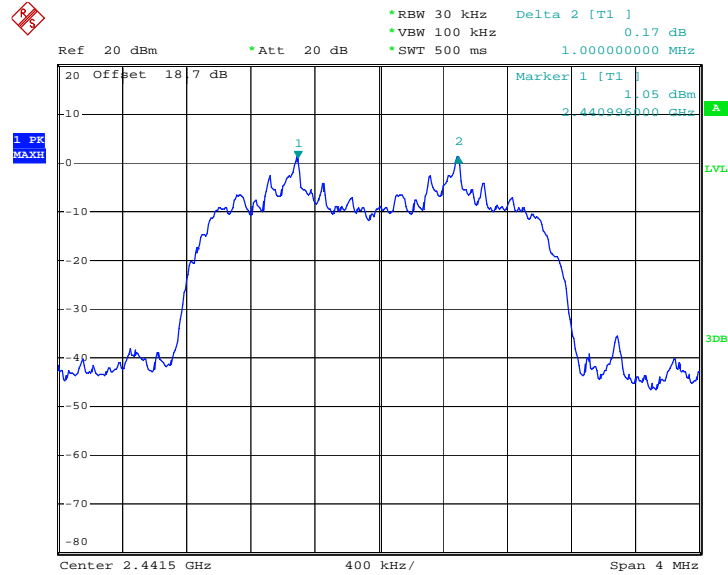
Channel Separation Plot on Channel 00 - 01



Date: 17.DEC.2008 01:18:03

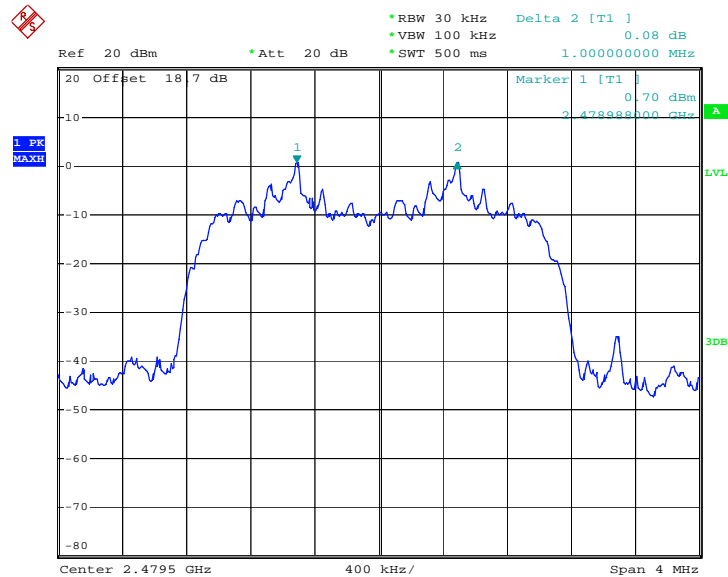


### Channel Separation Plot on Channel 39 - 40



Date: 17.DEC.2008 01:18:47

### Channel Separation Plot on Channel 77 - 78



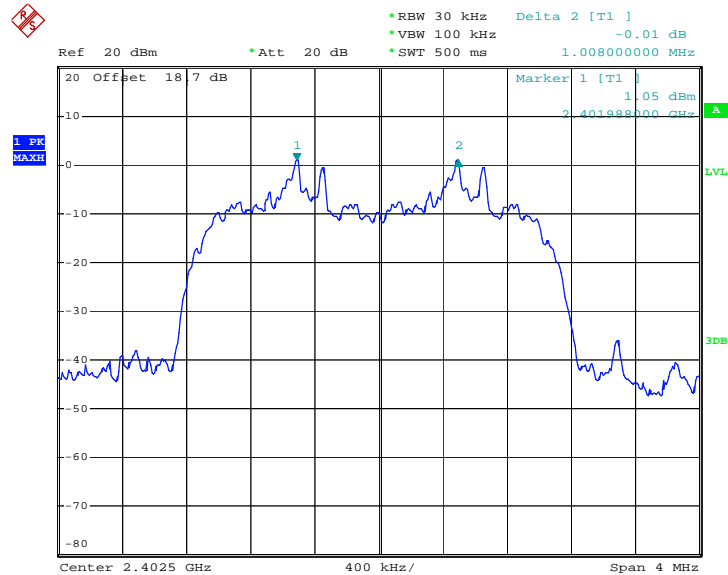
Date: 17.DEC.2008 01:19:10



Test Mode :	Mode 7, 8, 9	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.008	0.837	Pass
39	2441	1.000	0.837	Pass
78	2480	1.008	0.837	Pass

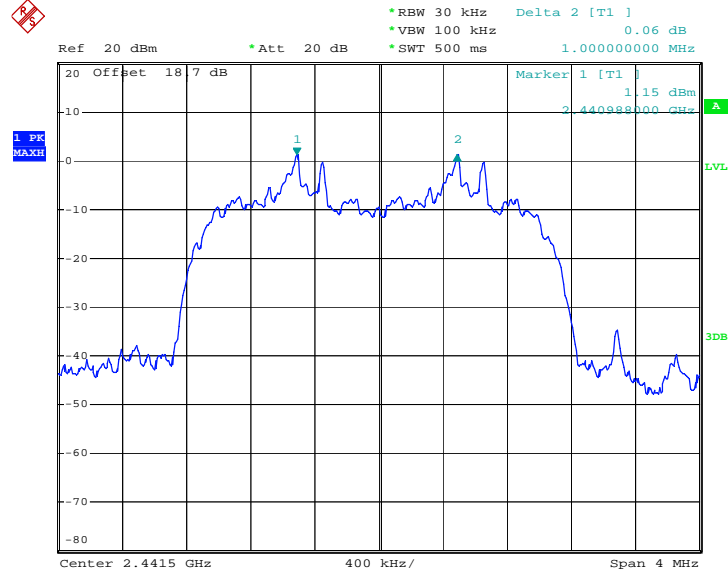
Channel Separation Plot on Channel 00 - 01



Date: 17.DEC.2008 01:20:07

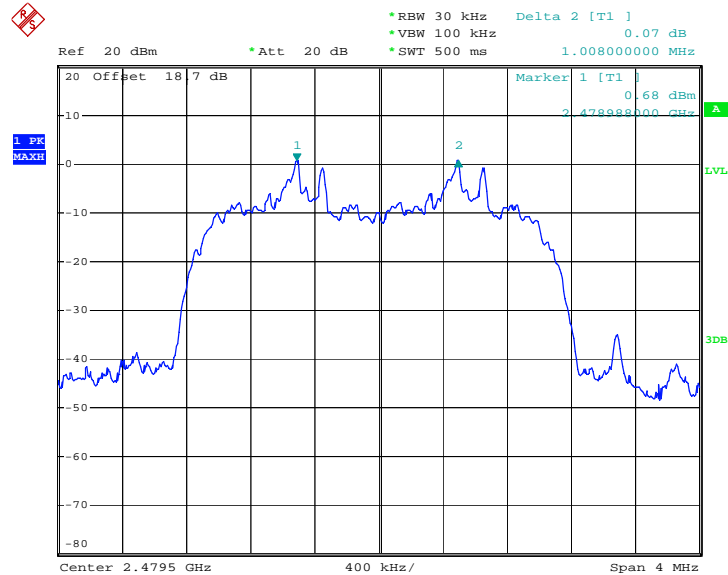


Channel Separation Plot on Channel 39 - 40



Date: 17.DEC.2008 01:20:35

Channel Separation Plot on Channel 77 - 78



Date: 17.DEC.2008 01:20:59

### 3.4 Dwell Time Measurement

#### 3.4.1 Limit of Dwell Time

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

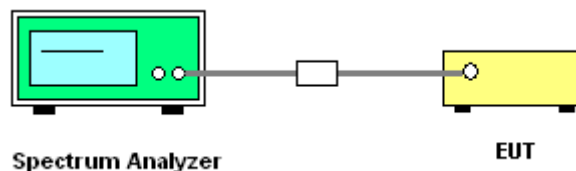
#### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.4.3 Test Procedures

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

#### 3.4.4 Test Setup





3.4.5 Test Result of Dwell Time

Test Mode :	Mode 2	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

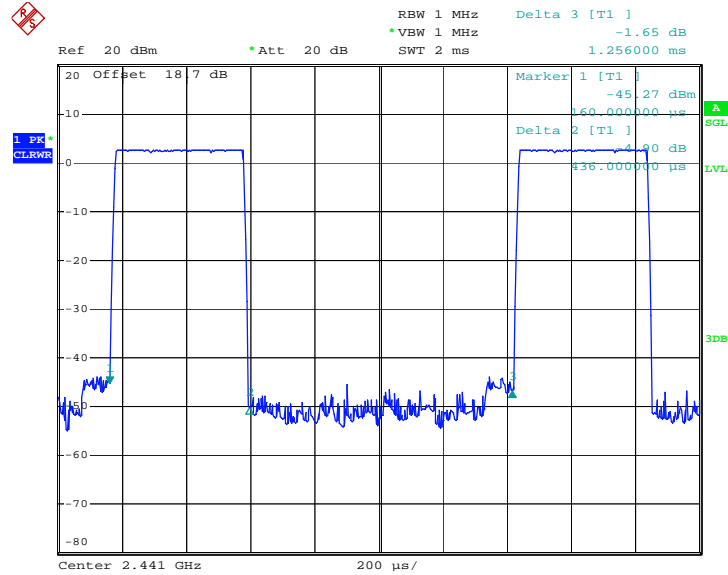
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH1	8.10	436.00	0.11	0.4	Pass
DH3	4.10	1700.00	0.22	0.4	Pass
DH5	3.60	3000.00	0.34	0.4	Pass

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)

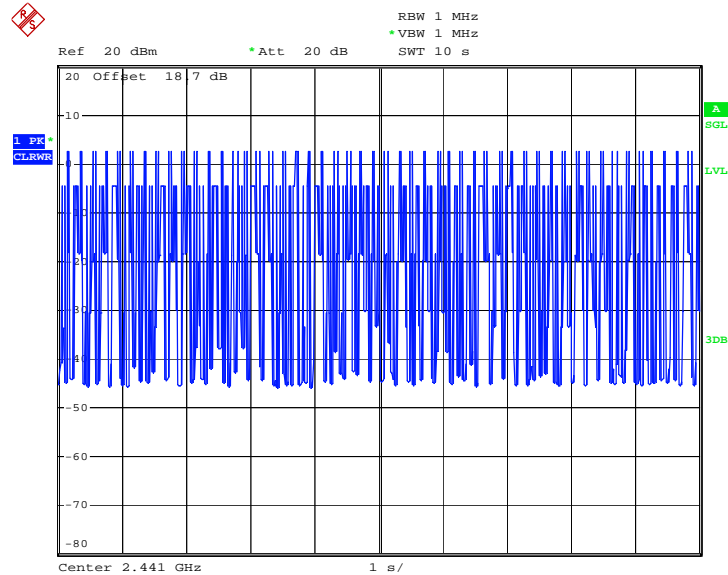


DH1 Dwell Time (One Pulse) Plot on Channel 39\_1Mbps



Date: 17.DEC.2008 01:23:10

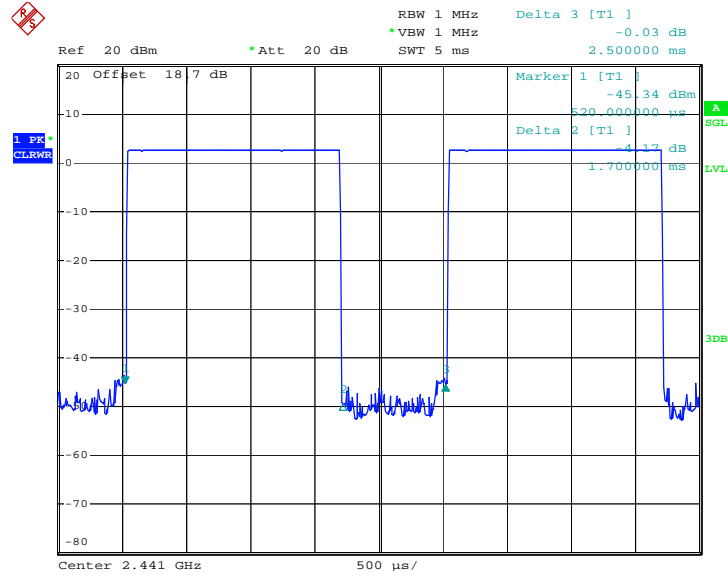
DH1 Dwell Time (Count Pulses) Plot on Channel 39\_1Mbps



Date: 17.DEC.2008 01:35:55

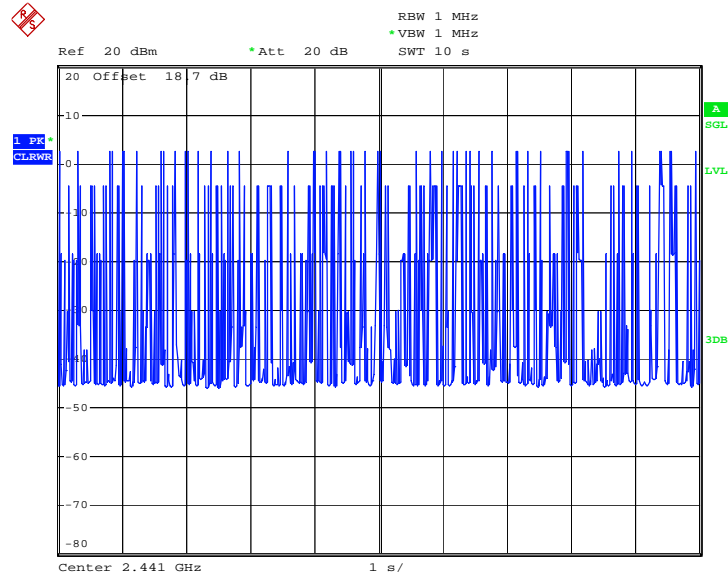


### DH3 Dwell Time (One Pulse) Plot on Channel 39\_1Mbps



Date: 17.DEC.2008 01:23:47

### DH3 Dwell Time (Count Pulses) Plot on Channel 39\_1Mbps

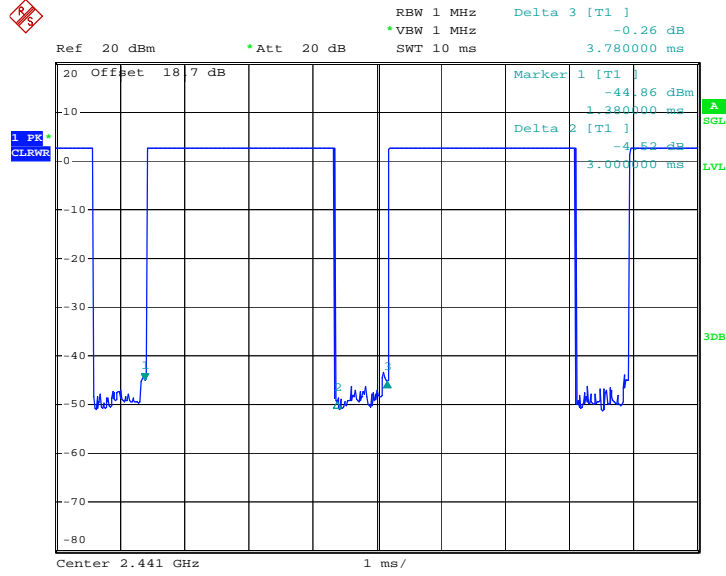


Date: 17.DEC.2008 01:36:26



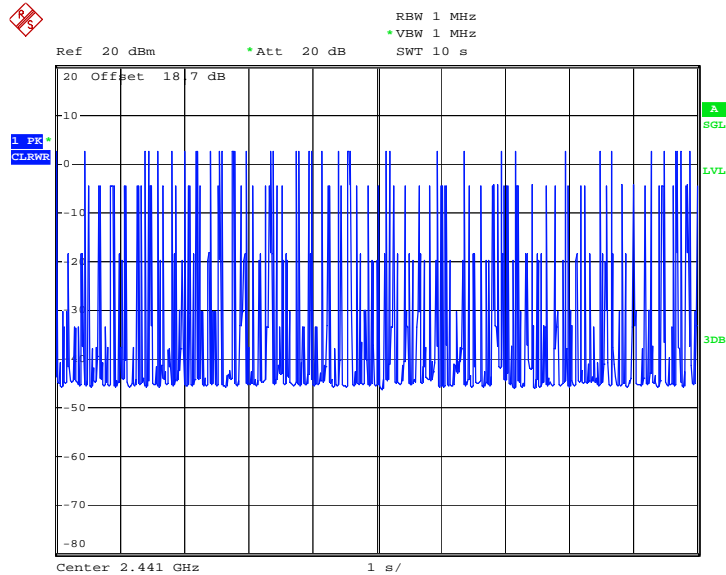


DH5 Dwell Time (One Pulse) Plot on Channel 39\_1Mbps



Date: 17.DEC.2008 01:24:32

DH5 Dwell Time (Count Pulses) Plot on Channel 39\_1Mbps



Date: 17.DEC.2008 01:37:38



Test Mode :	Mode 5	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

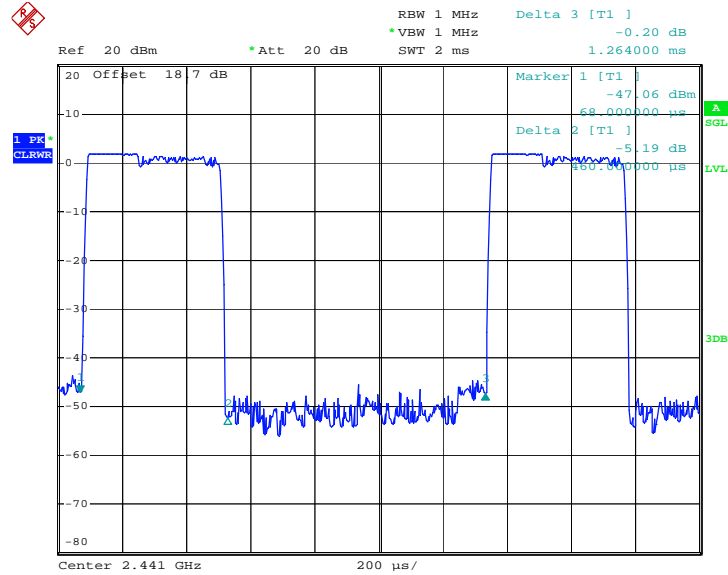
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH1	8.30	460.00	0.12	0.4	Pass
DH3	4.10	1728.00	0.22	0.4	Pass
DH5	3.10	3008.00	0.29	0.4	Pass

**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)

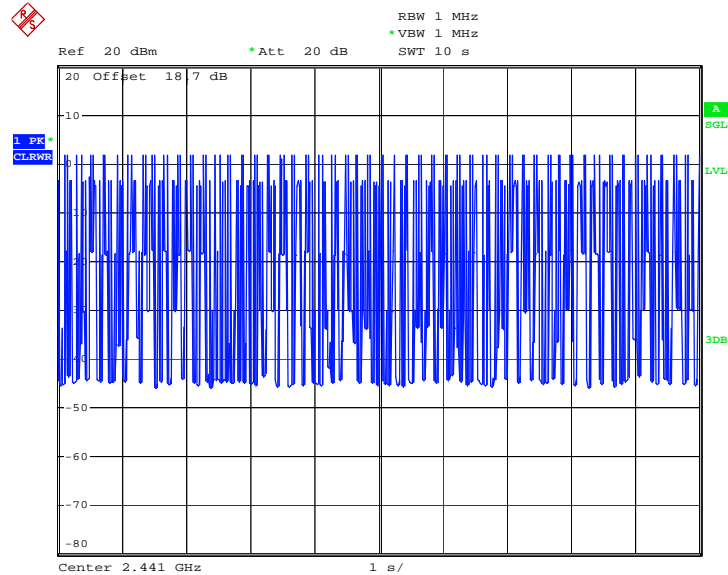


### DH1 Dwell Time (One Pulse) Plot on Channel 39\_2Mbps



Date: 17.DEC.2008 01:26:23

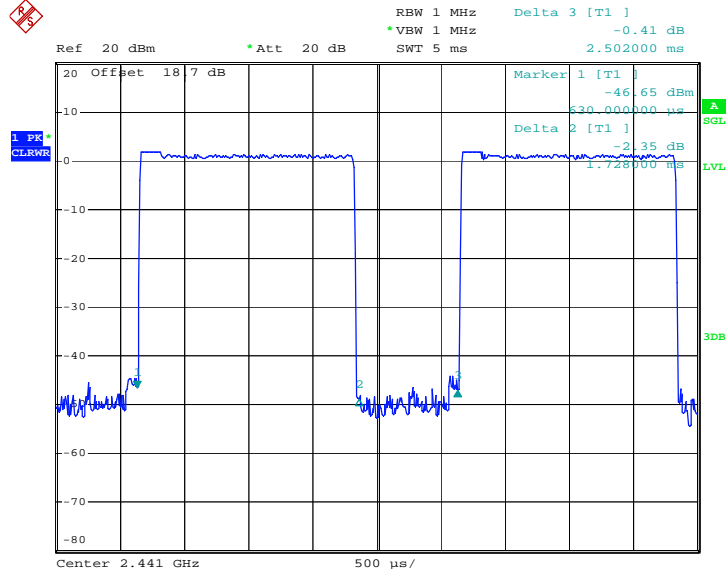
### DH1 Dwell Time (Count Pulses) Plot on Channel 39\_2Mbps



Date: 17.DEC.2008 01:37:58

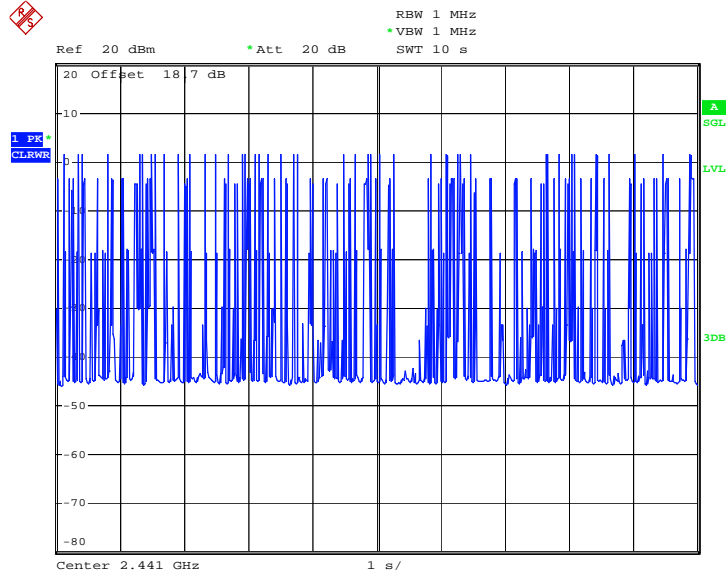


### DH3 Dwell Time (One Pulse) Plot on Channel 39\_2Mbps



Date: 17.DEC.2008 01:27:12

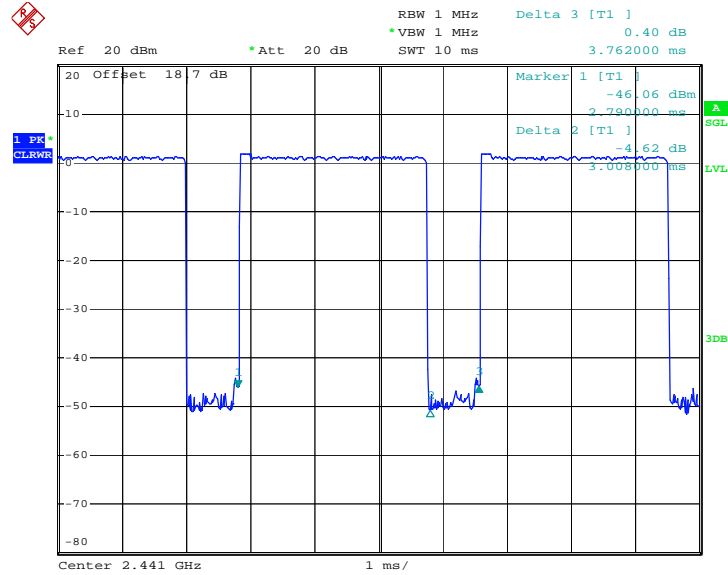
### DH3 Dwell Time (Count Pulses) Plot on Channel 39\_2Mbps



Date: 17.DEC.2008 01:38:21

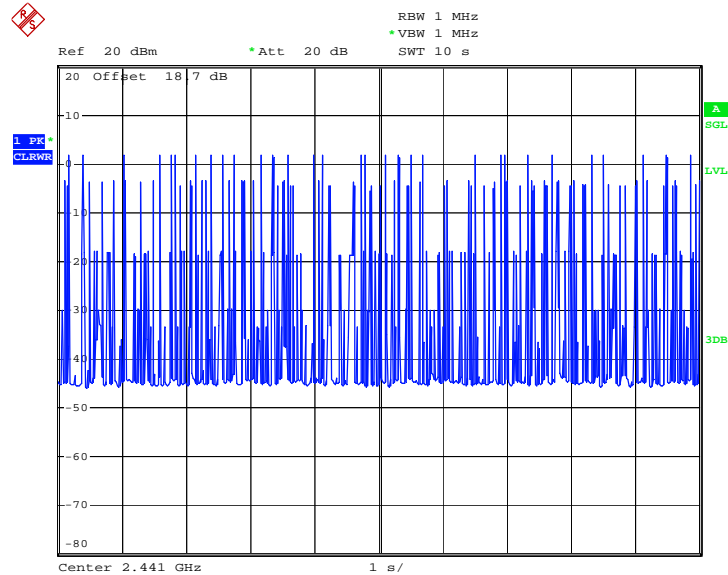


### DH5 Dwell Time (One Pulse) Plot on Channel 39\_2Mbps



Date: 17.DEC.2008 01:27:47

### DH5 Dwell Time (Count Pulses) Plot on Channel 39\_2Mbps



Date: 17.DEC.2008 01:39:09



Test Mode :	Mode 8	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

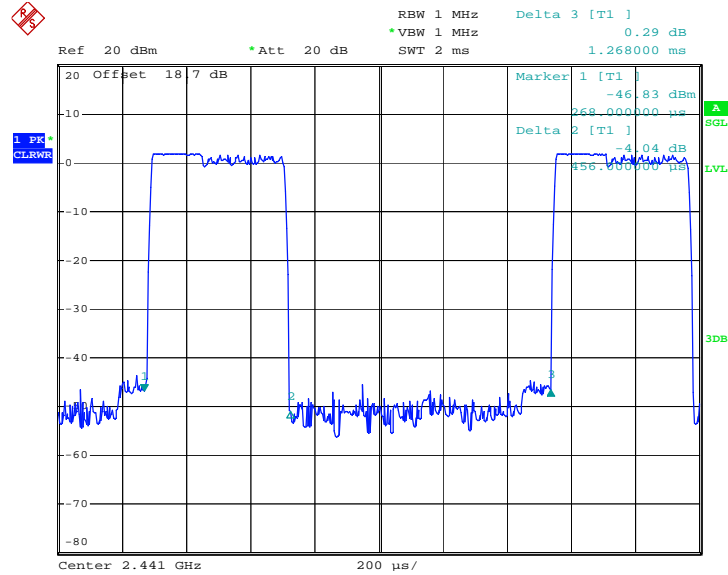
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH1	8.40	456.00	0.12	0.4	Pass
DH3	4.10	1716.00	0.22	0.4	Pass
DH5	3.10	2984.00	0.29	0.4	Pass

**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)

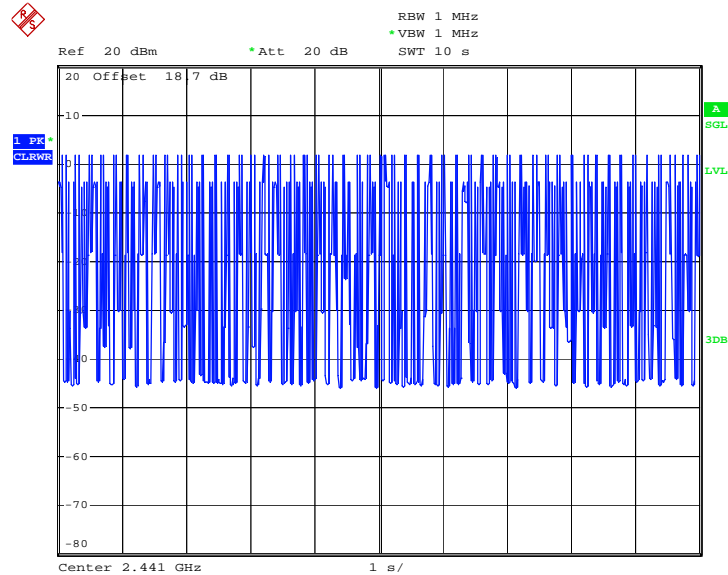


DH1 Dwell Time (One Pulse) Plot on Channel 39\_3Mbps



Date: 17.DEC.2008 01:30:00

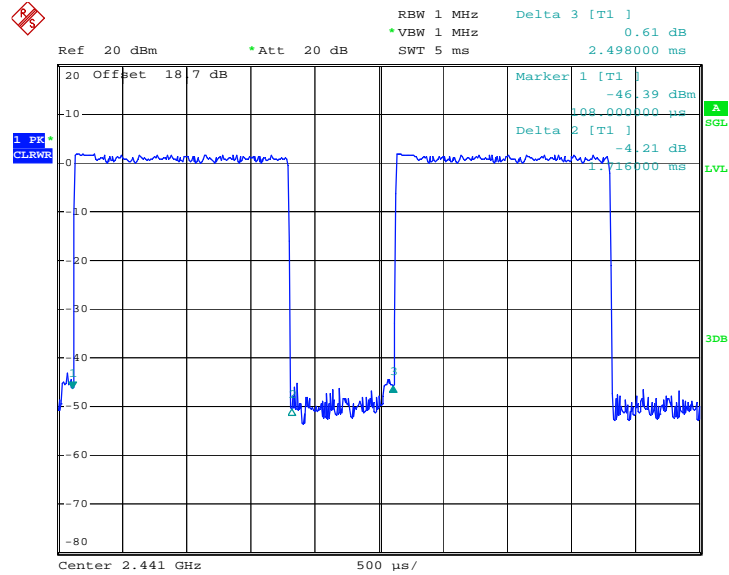
DH1 Dwell Time (Count Pulses) Plot on Channel 39\_3Mbps



Date: 17.DEC.2008 01:39:32

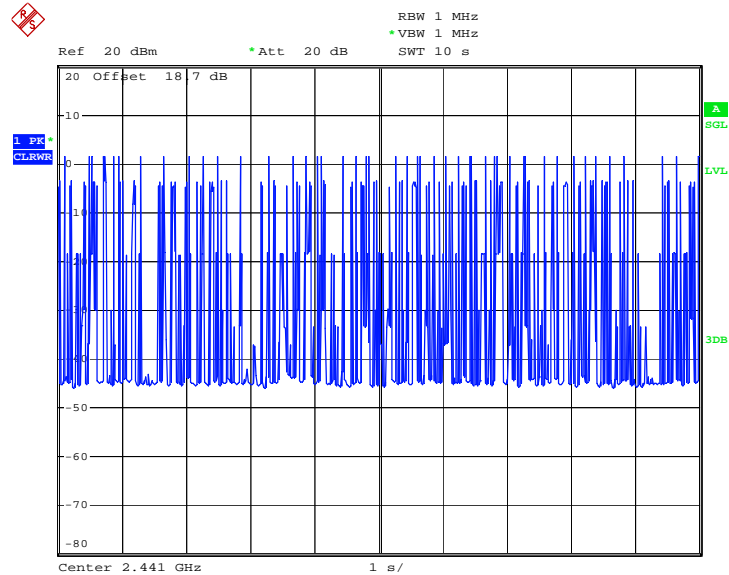


### DH3 Dwell Time (One Pulse) Plot on Channel 39\_3Mbps



Date: 17.DEC.2008 01:30:37

### DH3 Dwell Time (Count Pulses) Plot on Channel 39\_3Mbps

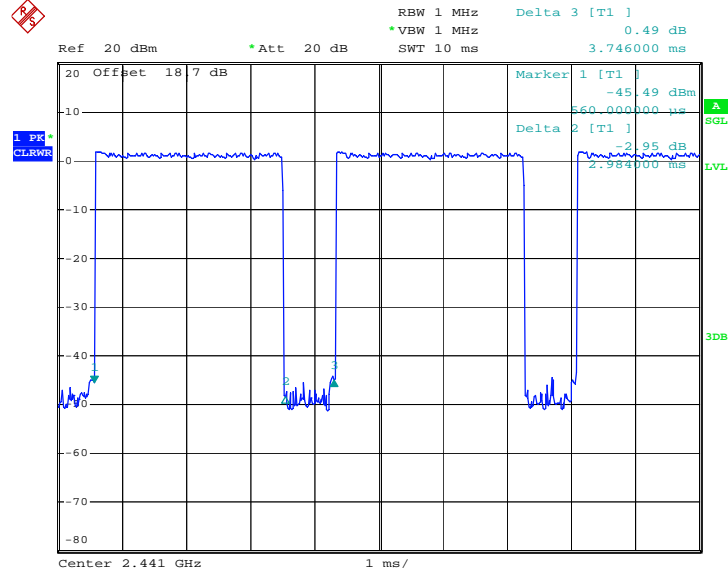


Date: 17.DEC.2008 01:39:56



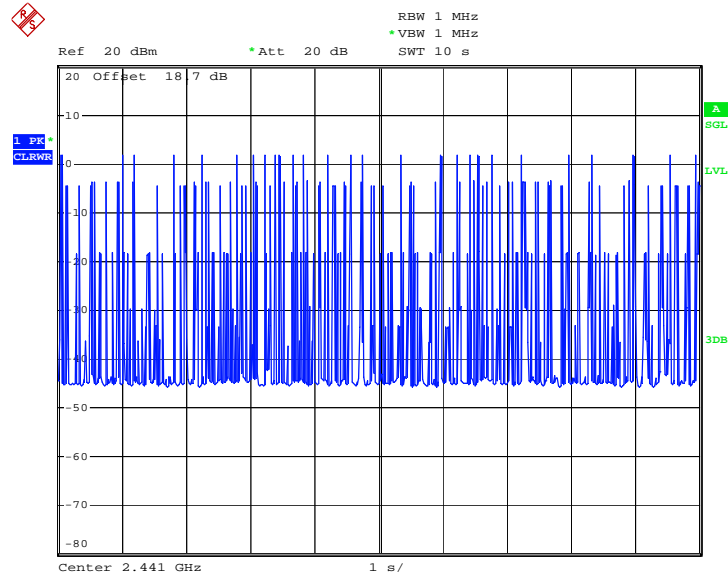


DH5 Dwell Time (One Pulse) Plot on Channel 39\_3Mbps



Date: 17.DEC.2008 01:31:21

DH5 Dwell Time (Count Pulses) Plot on Channel 39\_3Mbps



Date: 17.DEC.2008 01:40:26

### 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).

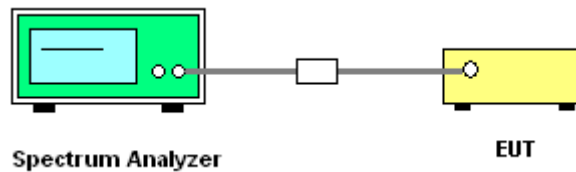
#### 3.5.2 Measuring Instruments

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 peak power meter by a low loss cable.

#### 3.5.4 Test Setup



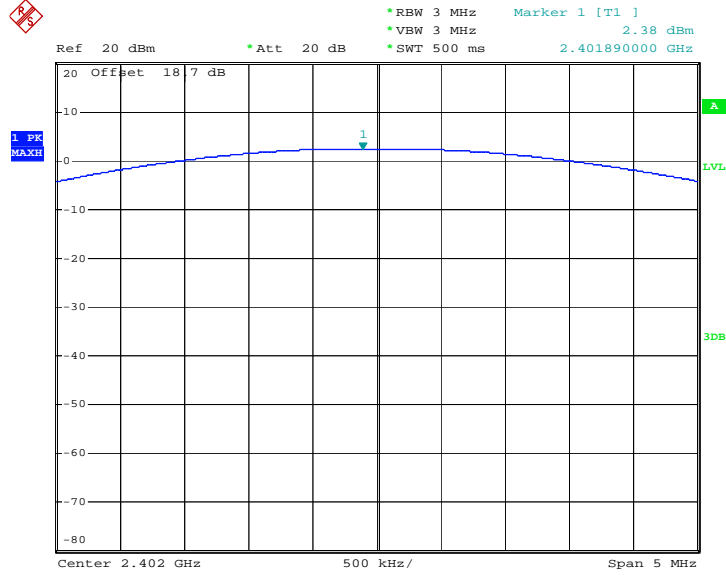
#### 3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	2.38	30	Pass
39	2441	2.81	30	Pass
78	2480	2.50	30	Pass

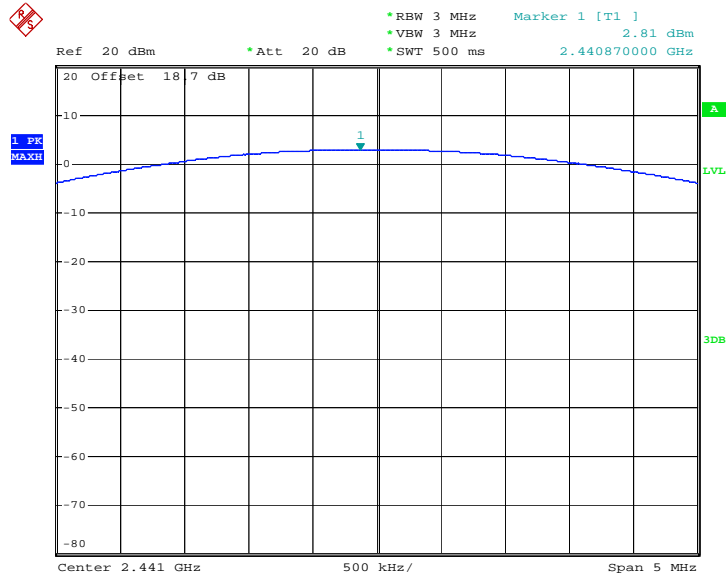


Peak Output Power Plot on Channel 00



Date: 17.DEC.2008 00:36:17

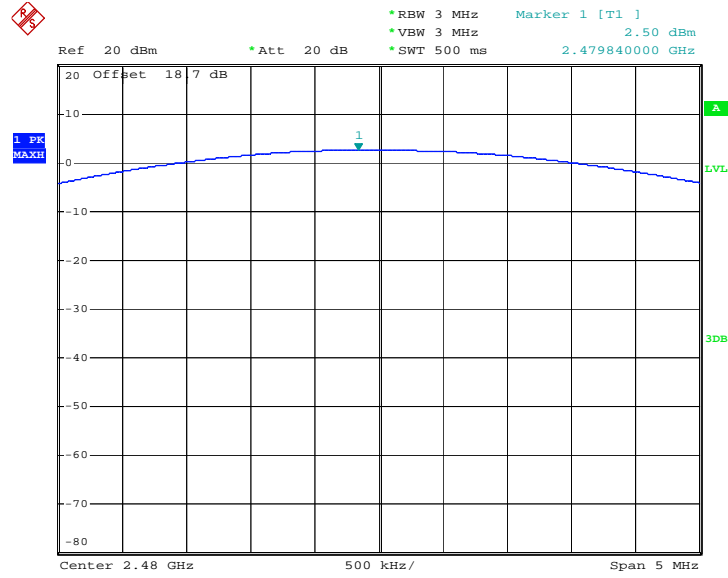
Peak Output Power Plot on Channel 39



Date: 17.DEC.2008 00:36:33



Peak Output Power Plot on Channel 78



Date: 17.DEC.2008 00:36:50

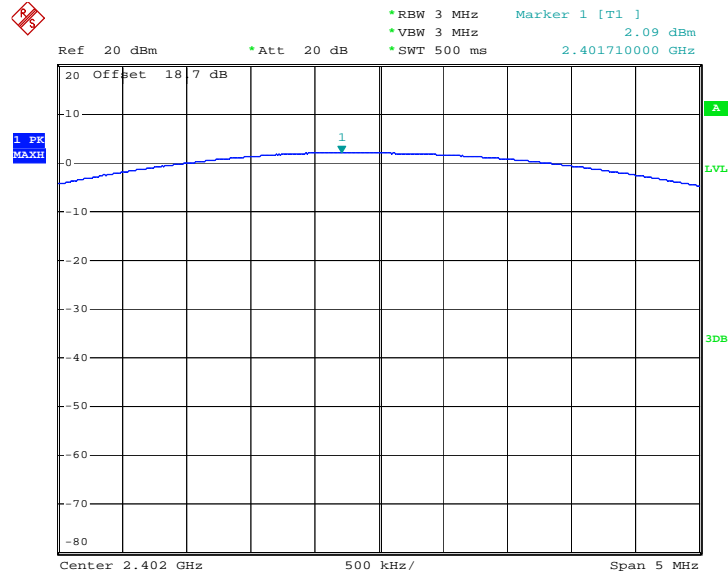


Test Mode :	Mode 4, 5, 6	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	2.09	30	Pass
39	2441	2.22	30	Pass
78	2480	1.74	30	Pass

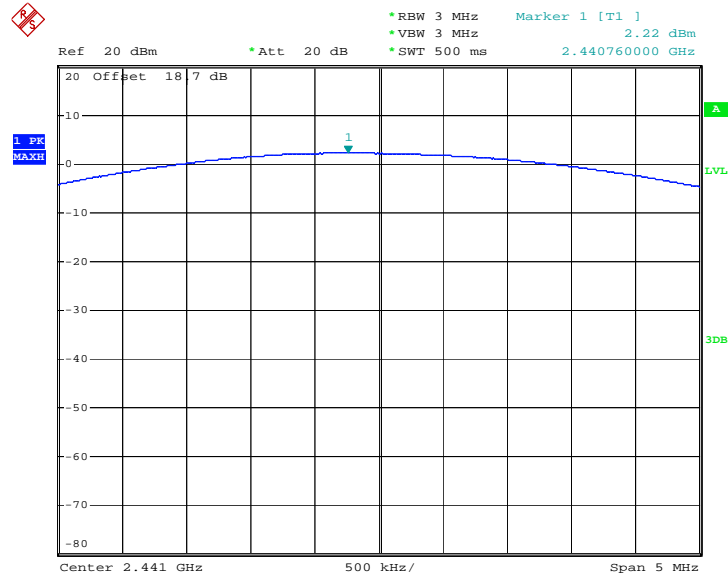


Peak Output Power Plot on Channel 00



Date: 17.DEC.2008 00:39:07

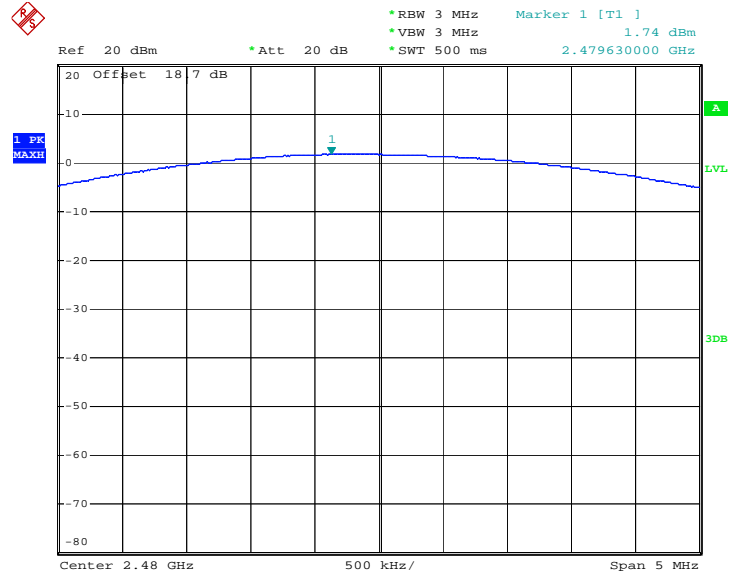
Peak Output Power Plot on Channel 39



Date: 17.DEC.2008 00:39:24



Peak Output Power Plot on Channel 78



Date: 17.DEC.2008 00:39:39



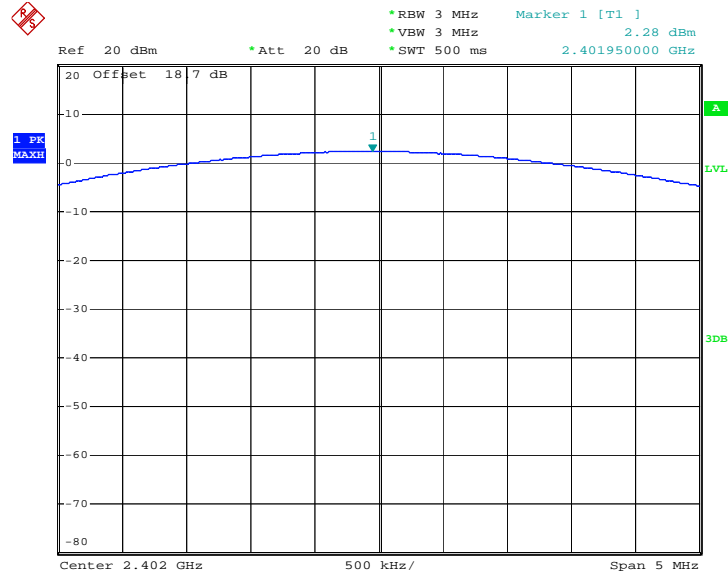
Test Mode :	Mode 7, 8, 9	Temperature :	23~24°C
Test Engineer :	Eric Hum	Relative Humidity :	40~41%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	2.28	30	Pass
39	2441	2.49	30	Pass
78	2480	2.05	30	Pass



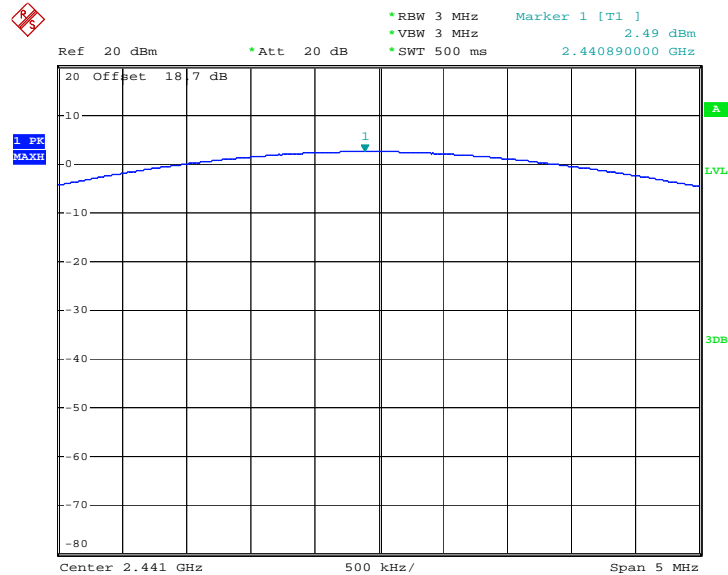


### Peak Output Power Plot on Channel 00



Date: 17.DEC.2008 00:42:09

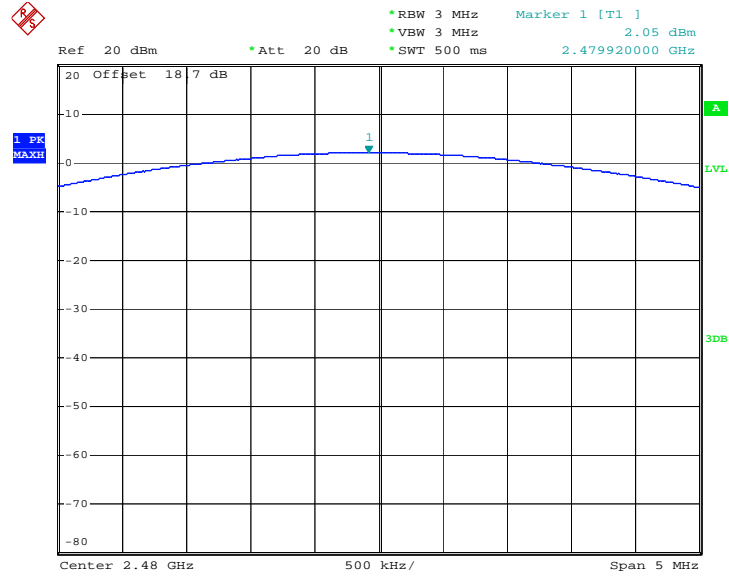
### Peak Output Power Plot on Channel 39



Date: 17.DEC.2008 00:42:27



Peak Output Power Plot on Channel 78



Date: 17.DEC.2008 00:42:48

## 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.

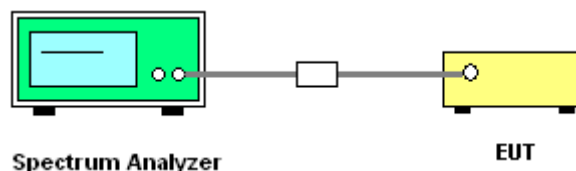
### 3.6.2 Measuring Instruments

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 = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz 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 = 10 Hz, Sweep: Auto. 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).

### 3.6.4 Test Setup





3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	CH00_2402 MHz	Relative Humidity :	42~43%
Test Engineer :	Mac Lin		

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
2375.74	56.52	-17.48	74	54.4	32.32	5.47	35.67	100	0	Peak
2375.74	17.19	-36.81	54	15.07	32.32	5.47	35.67	100	44	Average

Remark:

<Delta Marker>

Delta marker at 1% RBW of span = 38.01 dB

Peak band edge at 2375.74 MHz (RBW = VBW = 1MHz) = 94.53 dBuV/m – 38.01 dB = 56.52 dBuV/m

Duty factor = 20 log (Package Transfer Times x Avg Hopping Channel) = 20 log (0.003x 3.6) = -39.33

Average band edge = Peak band edge + Duty factor = 56.52 dBuV/m + (-39.33) = 17.19 dBuV/m

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
2375.17	56.18	-17.82	74	54.08	32.3	5.47	35.67	100	0	Peak
2375.17	16.85	-37.15	54	14.75	32.3	5.47	35.67	147	251	Average

Remark:

<Delta Marker>

Delta marker at 1% RBW of span = 38.01 dB

Peak band edge at 2375.17 MHz (RBW = VBW = 1MHz) = 94.19 dBuV/m – 38.01 dB = 56.18 dBuV/m

Duty factor = 20 log (Package Transfer Times x Avg Hopping Channel) = 20 log (0.003 x 3.6) = -39.33

Average band edge = Peak band edge + Duty factor = 56.18 dBuV/m + (-39.33) = 16.85 dBuV/m



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	CH78_2480 MHz	Relative Humidity :	42~43%
Test Engineer :	Mac Lin		

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	49.76	-24.24	74	47.77	32.3	5.38	35.69	100	0	Peak
2483.5	10.43	-43.57	54	8.44	32.3	5.38	35.69	174	17	Average

**Remark:**

<Delta Marker>

Delta marker at 1% RBW of span = 43.89 dB

Peak band edge at 2483.50 MHz (RBW = VBW = 1MHz) = 93.65 dBuV/m – 43.89 dB = 49.76 dBuV/m

Duty factor = 20 log (Package Transfer Times x Avg Hopping Channel) = 20 log (0.003 x 3.6) = -39.33

Average band edge = Peak band edge + Duty factor = 49.76 dBuV/m + (-39.33) = 10.43 dBuV/m

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	47.89	-26.11	74	45.9	32.3	5.38	35.69	100	0	Peak
2483.5	8.56	-45.44	54	6.57	32.3	5.38	35.69	105	289	Average

**Remark:**

<Delta Marker>

Delta marker at 1% RBW of span = 43.89 dB

Peak band edge at 2483.50 MHz (RBW = VBW = 1MHz) = 91.78 dBuV/m – 43.89 dB = 47.89 dBuV/m

Duty factor = 20 log (Package Transfer Times x Avg Hopping Channel) = 20 log (0.003x 3.6) = -39.33

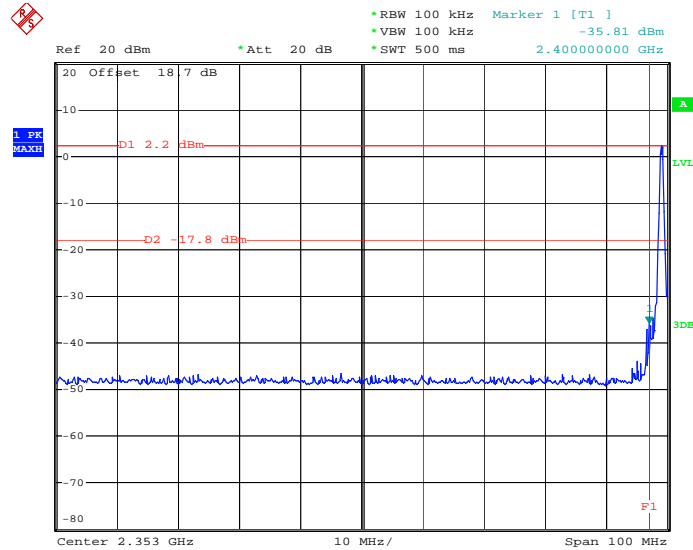
Average band edge = Peak band edge + Duty factor = 47.89 dBuV/m + (-39.33) = 8.56 dBuV/m



3.6.6 Test Result of Conducted Band Edges

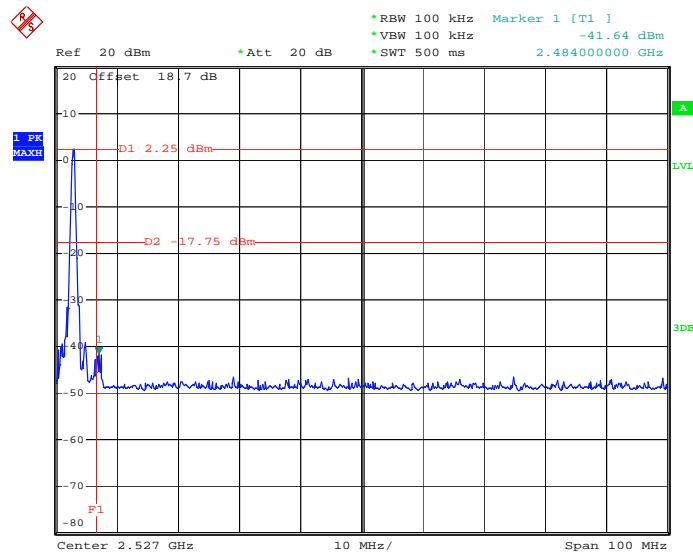
Test Mode :	Mode 1, 3	Temperature :	23~24°C
Test Channel :	00, 78	Relative Humidity :	40~41%
Test Engineer :	Eric Hum		

Low Band Edge Plot on Channel 00



Date: 17.DEC.2008 02:08:51

High Band Edge Plot on Channel 78

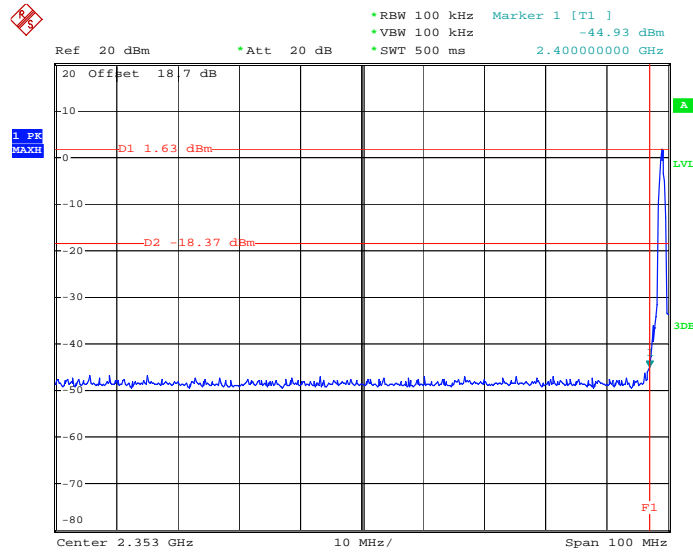


Date: 17.DEC.2008 01:08:54



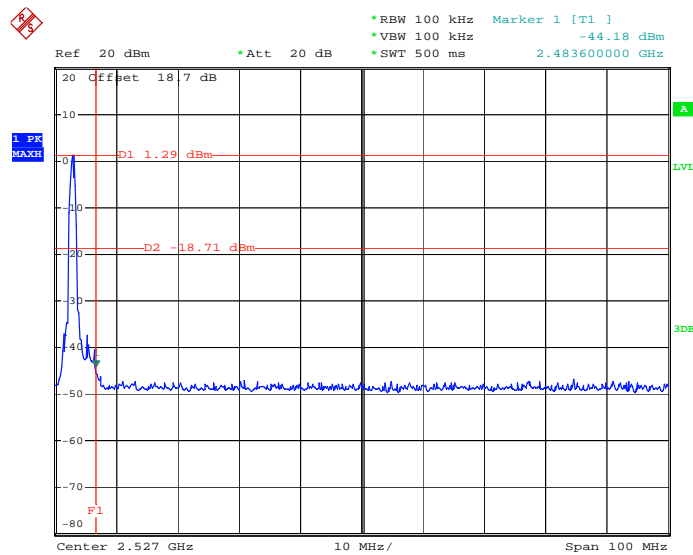
Test Mode :	Mode 4, 6	Temperature :	23~24°C
Test Channel :	00, 78	Relative Humidity :	40~41%
Test Engineer :	Eric Hum		

Low Band Edge Plot on Channel 00



Date: 17.DEC.2008 01:10:26

High Band Edge Plot on Channel 78

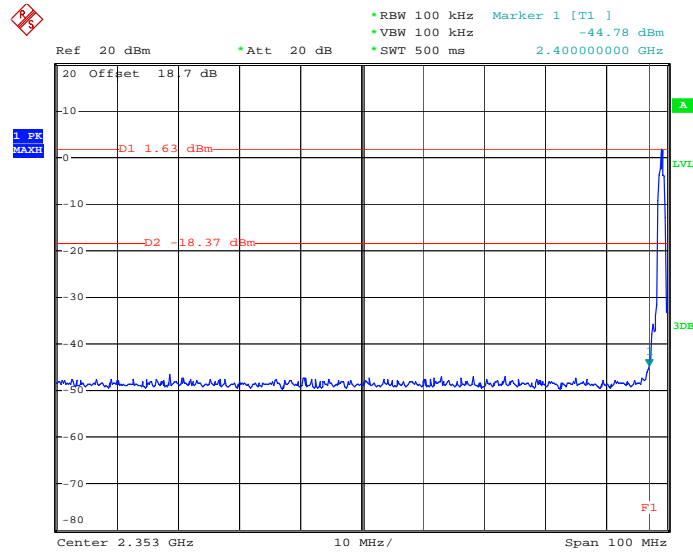


Date: 17.DEC.2008 01:11:28



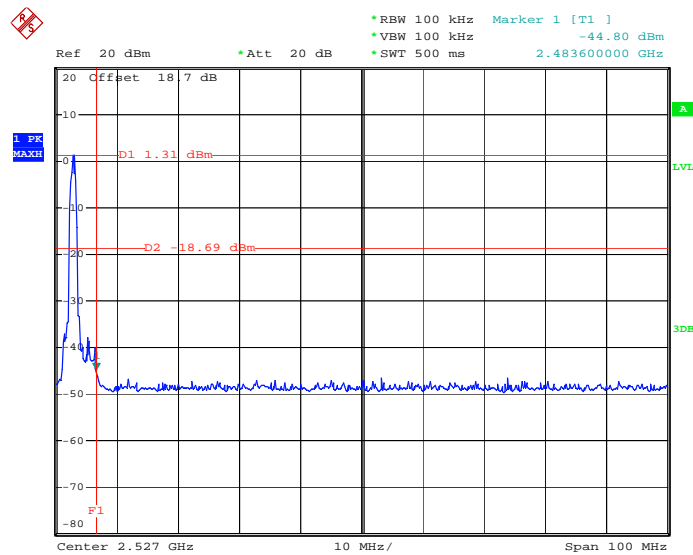
Test Mode :	Mode 7, 9	Temperature :	23~24°C
Test Channel :	00, 78	Relative Humidity :	40~41%
Test Engineer :	Eric Hum		

Low Band Edge Plot on Channel 00



Date: 17.DEC.2008 01:12:45

High Band Edge Plot on Channel 78



Date: 17.DEC.2008 01:13:41



## 3.7 AC Conducted Emission Measurement

### 3.7.1 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.

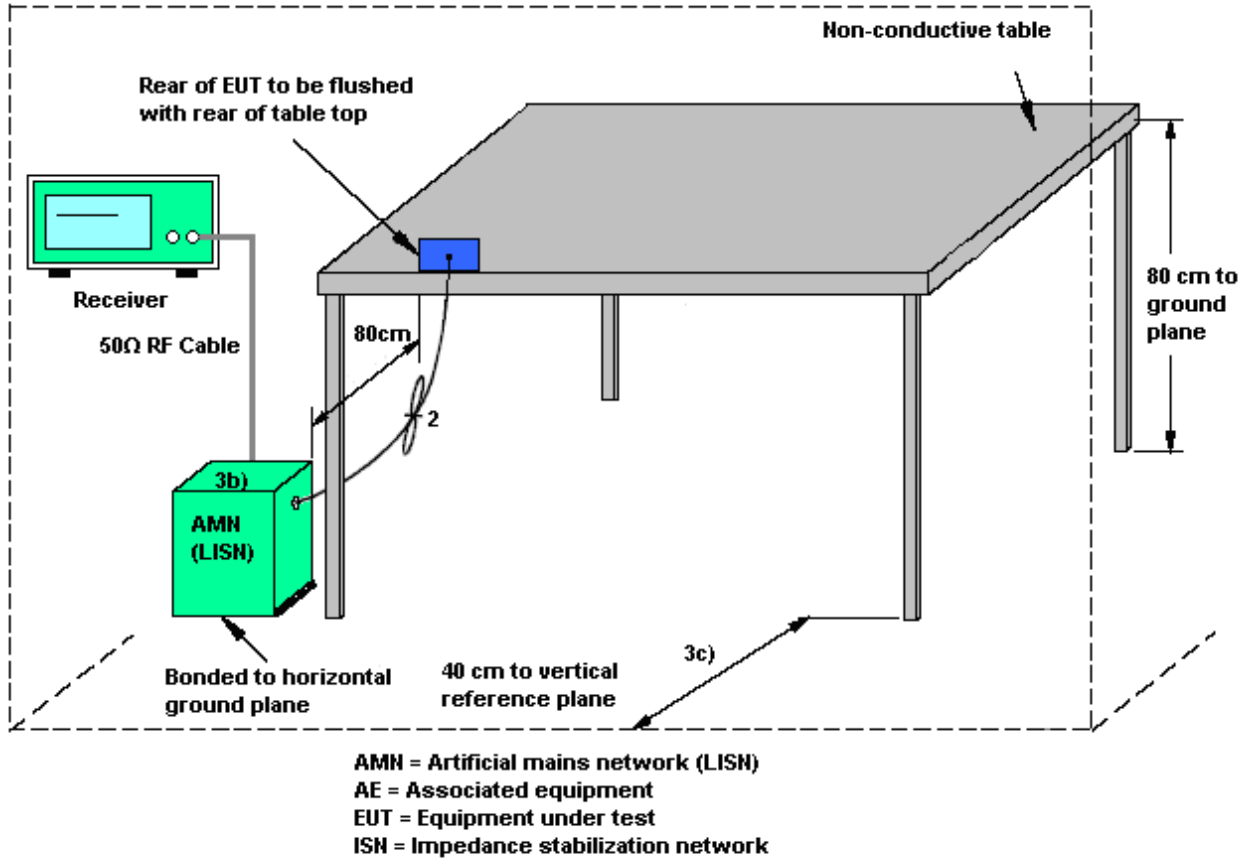
### 3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.7.3 Test Procedures

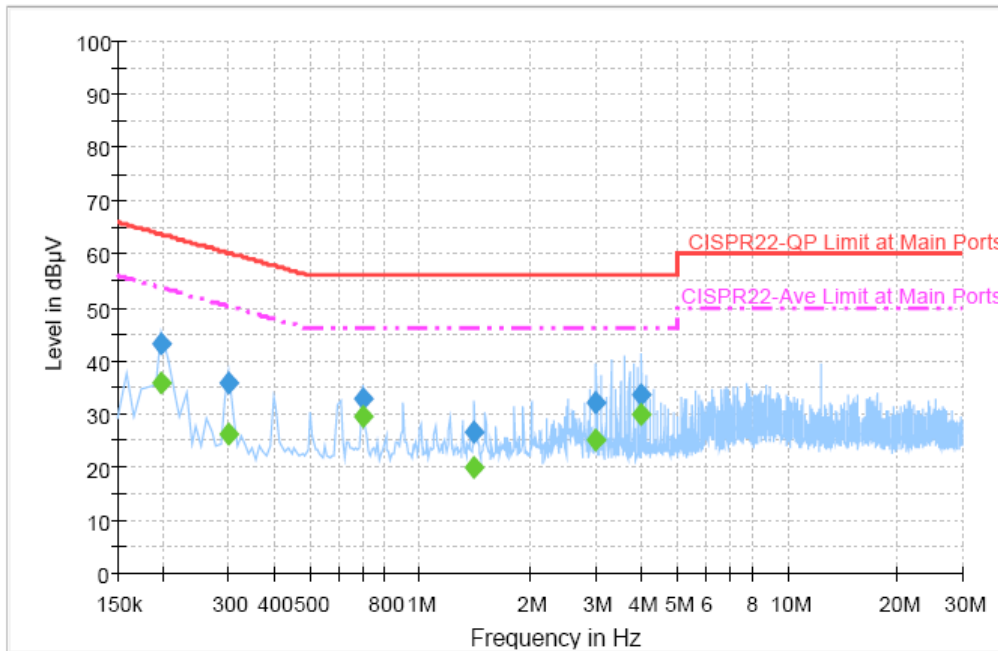
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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.

### 3.7.4 Test Setup



### 3.7.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Cona Huang	Relative Humidity :	40~41%
		Phase :	Line
Function Type :	BT Link + WLAN Link + Earphone + Cradle + Adapter + USB Cable		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



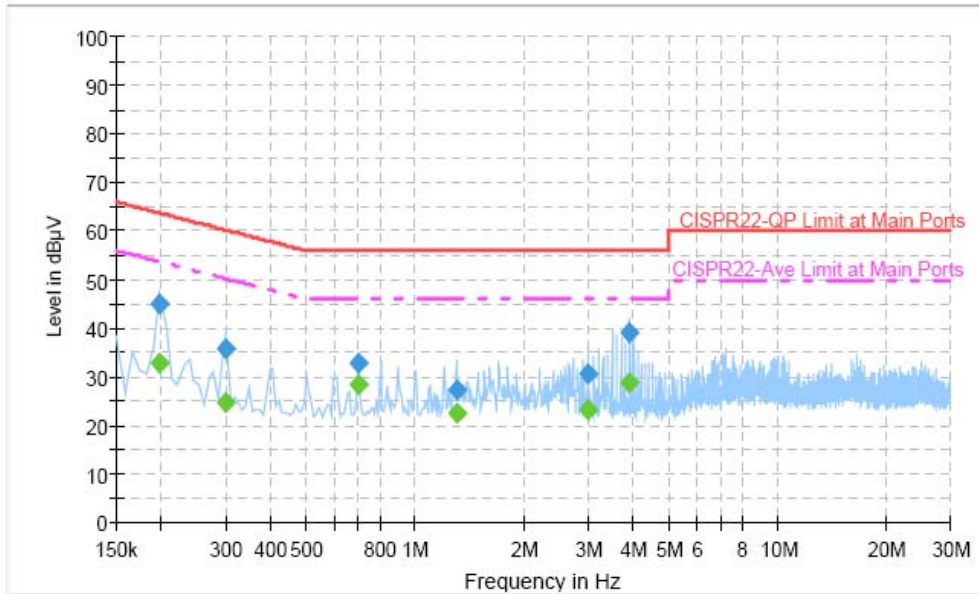
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	43.1	Off	L1	19.3	20.6	63.7
0.302000	35.8	Off	L1	19.3	24.4	60.2
0.702000	32.8	Off	L1	19.5	23.2	56.0
1.406000	26.5	Off	L1	19.4	29.5	56.0
3.014000	32.1	Off	L1	19.5	22.9	56.0
4.014000	33.7	Off	L1	19.5	22.3	56.0

#### Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	35.7	Off	L1	19.3	18.0	53.7
0.302000	26.3	Off	L1	19.3	23.9	50.2
0.702000	29.5	Off	L1	19.5	16.5	46.0
1.406000	20.0	Off	L1	19.4	26.0	46.0
3.014000	25.0	Off	L1	19.5	21.0	46.0
4.014000	30.0	Off	L1	19.5	16.0	46.0

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Cona Huang	Relative Humidity :	40~41%
		Phase :	Neutral
Function Type :	BT Link + WLAN Link + Earphone + Cradle + Adapter + USB Cable		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



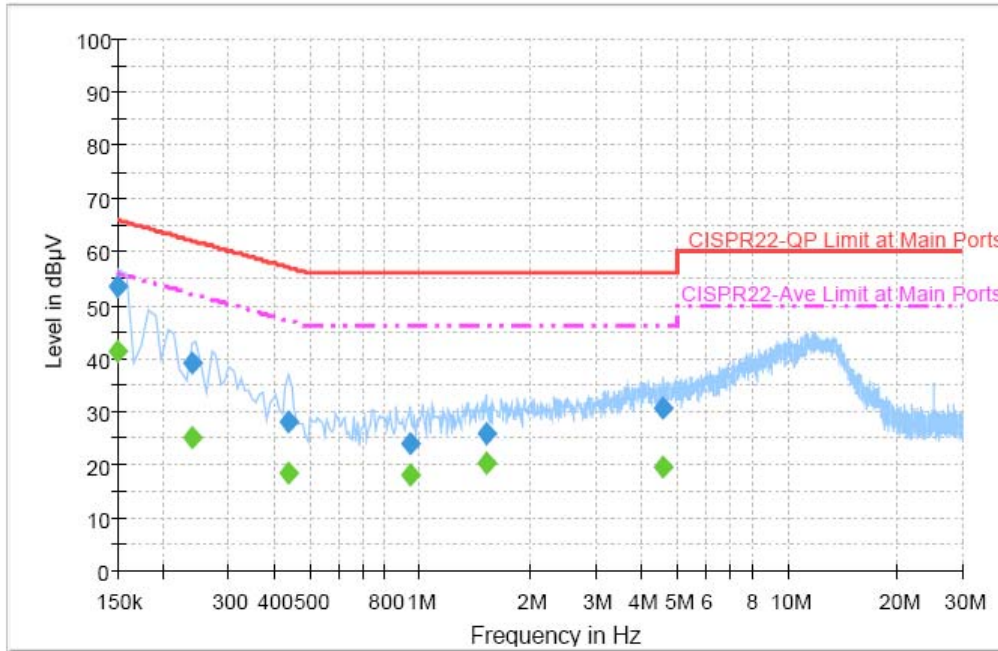
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	45.1	Off	N	19.3	18.6	63.7
0.302000	36.0	Off	N	19.3	24.2	60.2
0.702000	32.7	Off	N	19.5	23.3	56.0
1.302000	27.5	Off	N	19.4	28.5	56.0
3.006000	30.7	Off	N	19.5	25.3	56.0
3.918000	39.2	Off	N	19.5	16.8	56.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	32.7	Off	N	19.3	21.0	53.7
0.302000	24.6	Off	N	19.3	25.6	50.2
0.702000	28.6	Off	N	19.5	17.4	46.0
1.302000	22.5	Off	N	19.4	23.5	46.0
3.006000	23.3	Off	N	19.5	22.7	46.0
3.918000	28.6	Off	N	19.5	17.4	46.0

Test Mode :	Mode 2	Temperature :	23~24°C
Test Engineer :	Cona Huang	Relative Humidity :	40~41%
		Phase :	Line
Function Type :	BT Link + WLAN Link + Earphone + USB Charging Cable with AC Power		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



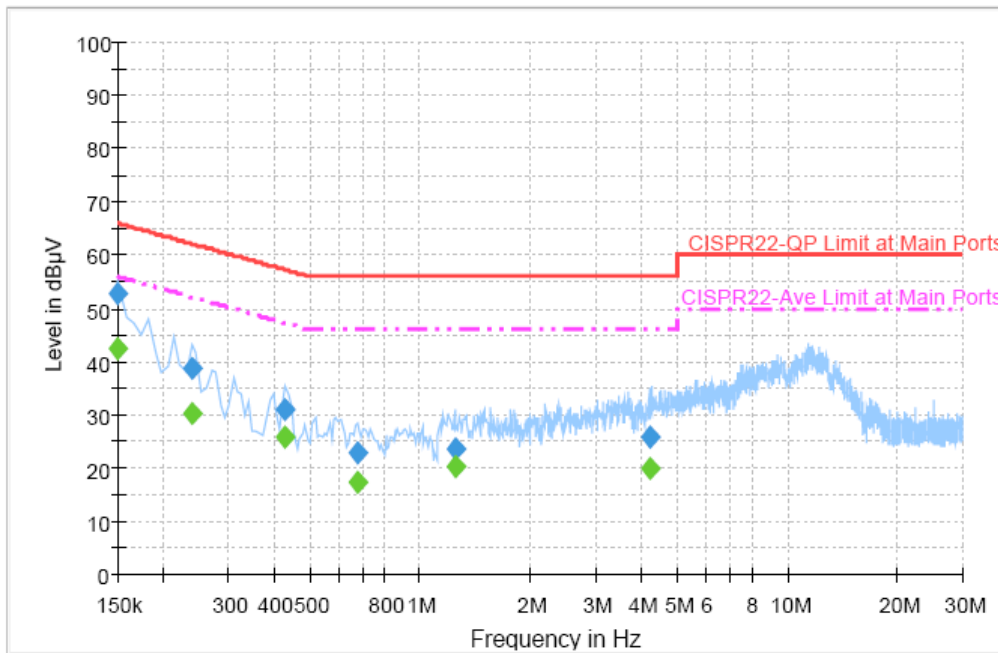
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	53.5	Off	L1	19.4	12.5	66.0
0.238000	39.2	Off	L1	19.4	23.0	62.2
0.438000	28.0	Off	L1	19.4	29.1	57.1
0.934000	23.9	Off	L1	19.4	32.1	56.0
1.510000	25.8	Off	L1	19.4	30.2	56.0
4.590000	30.6	Off	L1	19.6	25.4	56.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	41.5	Off	L1	19.4	14.5	56.0
0.238000	25.1	Off	L1	19.4	27.1	52.2
0.438000	18.5	Off	L1	19.4	28.6	47.1
0.934000	18.1	Off	L1	19.4	27.9	46.0
1.510000	20.3	Off	L1	19.4	25.7	46.0
4.590000	19.5	Off	L1	19.6	26.5	46.0

Test Mode :	Mode 2	Temperature :	23~24°C
Test Engineer :	Cona Huang	Relative Humidity :	40~41%
		Phase :	Neutral
Function Type :	BT Link + WLAN Link + Earphone + USB Charging Cable with AC Power		
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)
0.150000	52.8	Off	N	19.4	13.2	66.0
0.238000	38.8	Off	N	19.4	23.4	62.2
0.430000	30.8	Off	N	19.4	26.5	57.3
0.678000	23.0	Off	N	19.5	33.0	56.0
1.246000	23.6	Off	N	19.5	32.4	56.0
4.206000	25.8	Off	N	19.5	30.2	56.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	42.3	Off	N	19.4	13.7	56.0
0.238000	30.1	Off	N	19.4	22.1	52.2
0.430000	25.9	Off	N	19.4	21.4	47.3
0.678000	17.5	Off	N	19.5	28.5	46.0
1.246000	20.3	Off	N	19.5	25.7	46.0
4.206000	19.8	Off	N	19.5	26.2	46.0

### 3.8 Radiated Emission Measurement

#### 3.8.1 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

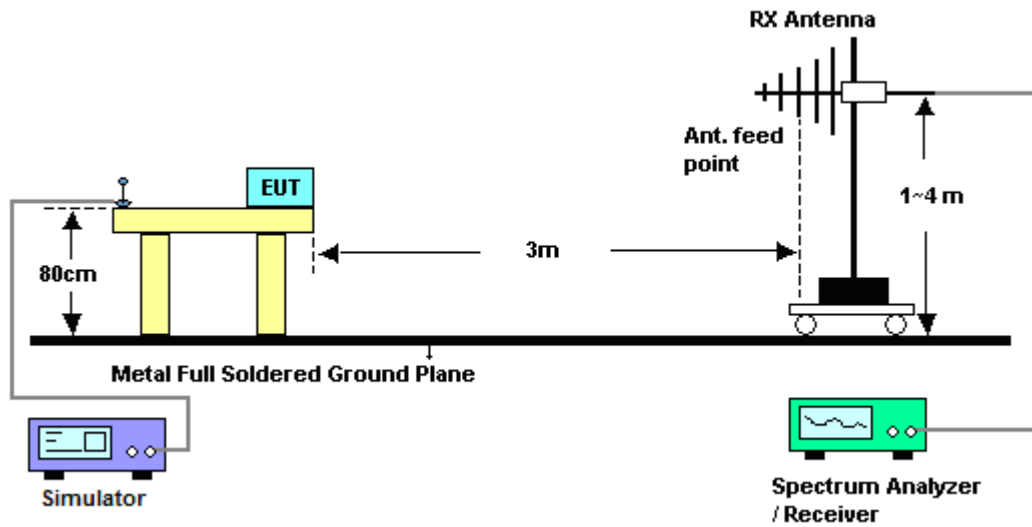
#### 3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.8.3 Test Procedures

1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:  
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.
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by measuring the emission for EUT H plane, 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.

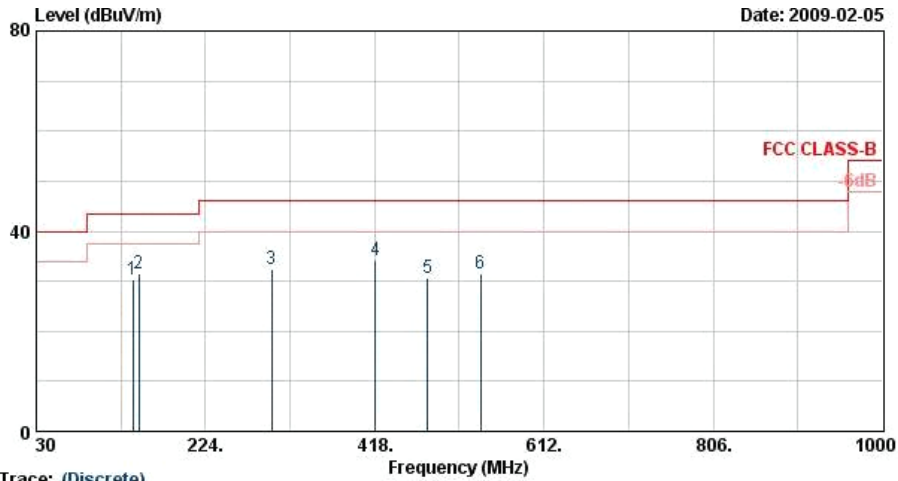
### 3.8.4 Test Setup





3.8.5 Test Result of Radiated Emission < 1GHz

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	00	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Horizontal
Remark :			

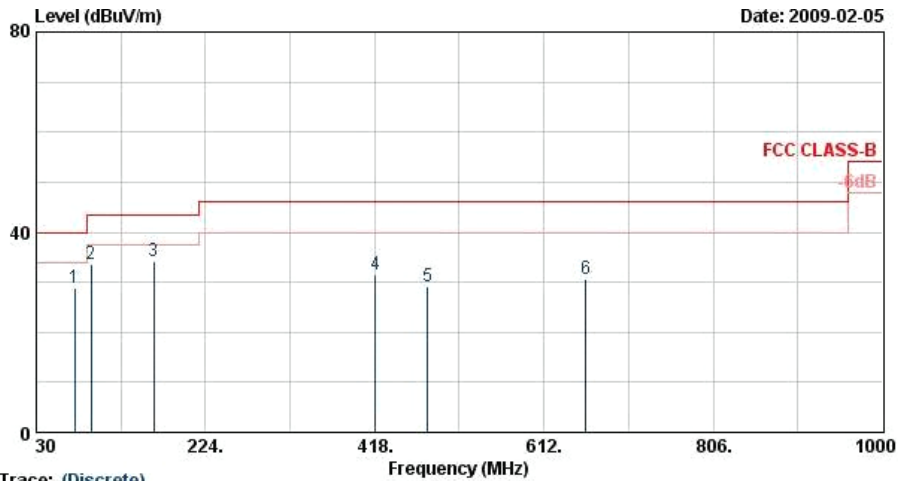


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m BILOG\_081118 HORIZONTAL  
 Project : FR 803027  
 Mode : Mode 1

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	140.97	30.27	-13.23	43.50	49.09	11.08	1.41	31.31	---	---	Peak
2	147.45	31.49	-12.01	43.50	50.82	10.57	1.45	31.35	---	---	Peak
3	299.73	32.28	-13.72	46.00	48.50	13.06	2.13	31.41	---	---	Peak
4 @	419.00	34.32	-11.68	46.00	46.97	15.98	2.66	31.30	100	13	Peak
5	478.50	30.71	-15.29	46.00	42.06	16.96	2.86	31.16	---	---	Peak
6	539.40	31.41	-14.59	46.00	41.51	17.89	3.06	31.05	---	---	Peak



Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	00	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Vertical
Remark :			

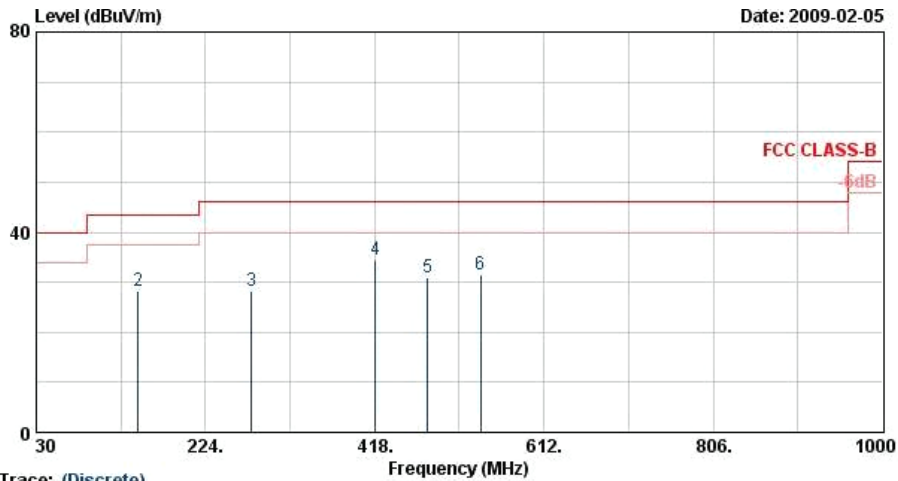


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m BILOG\_081118 VERTICAL  
 Project : FR 803027  
 Mode : Mode 1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	74.01	28.74	-11.26	40.00	52.55	6.57	0.97	31.36	---	---	Peak
2 @	93.18	33.49	-10.01	43.50	54.11	9.67	1.13	31.42	---	---	Peak
3 @	164.73	34.33	-9.17	43.50	54.31	9.81	1.53	31.32	100	53	Peak
4	419.00	31.38	-14.62	46.00	44.03	15.98	2.66	31.30	---	---	Peak
5	478.50	29.02	-16.98	46.00	40.36	16.96	2.86	31.16	---	---	Peak
6	659.80	30.74	-15.26	46.00	39.21	18.99	3.44	30.90	---	---	Peak



Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	39	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Horizontal
Remark :			

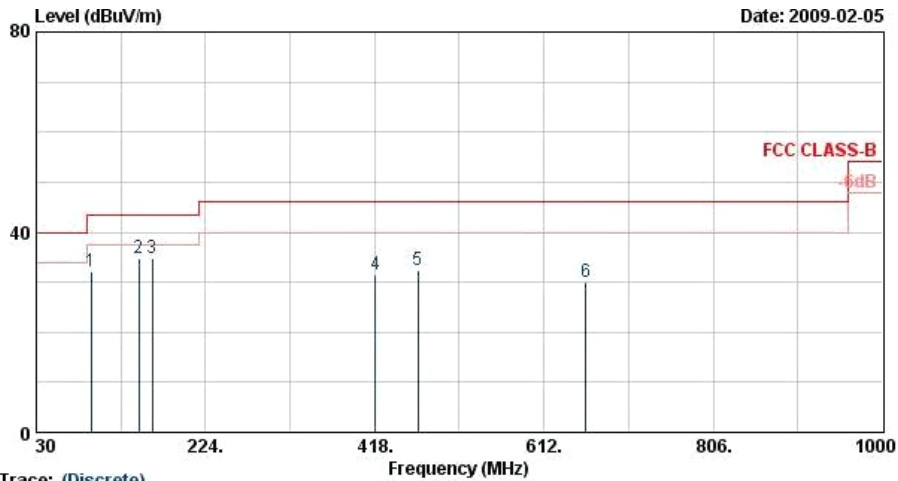


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m BILOG\_081118 HORIZONTAL  
 Project : FR 803027  
 Mode : Mode 2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	22.83	-17.17	40.00	34.29	19.21	0.64	31.31	---	---	Peak
2	147.18	28.16	-15.34	43.50	47.49	10.57	1.45	31.35	---	---	Peak
3	276.78	28.36	-17.64	46.00	44.73	13.09	2.01	31.46	---	---	Peak
4	419.00	34.39	-11.61	46.00	47.05	15.98	2.66	31.30	100	10	Peak
5	478.50	31.06	-14.94	46.00	42.40	16.96	2.86	31.16	---	---	Peak
6	539.40	31.52	-14.48	46.00	41.62	17.89	3.06	31.05	---	---	Peak



Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	39	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Vertical
Remark :			

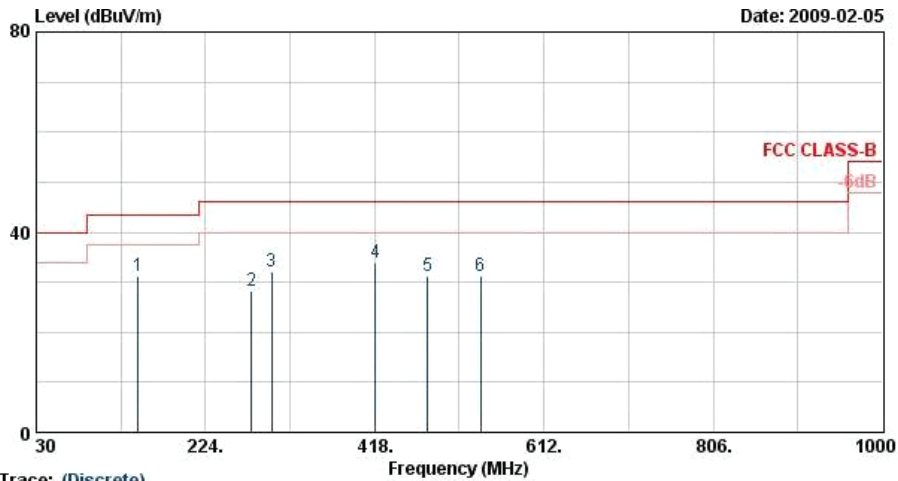


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m BILOG\_081118 VERTICAL  
 Project : FR 803027  
 Mode : Mode 2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	93.18	31.98	-11.52	43.50	52.60	9.67	1.13	31.42	---	---	Peak
2	147.45	34.86	-8.64	43.50	54.19	10.57	1.45	31.35	100	325	Peak
3	163.38	34.82	-8.68	43.50	54.75	9.85	1.53	31.32	---	---	Peak
4	419.00	31.66	-14.34	46.00	44.31	15.98	2.66	31.30	---	---	Peak
5	467.30	32.46	-13.54	46.00	44.03	16.78	2.84	31.19	---	---	Peak
6	659.80	30.11	-15.89	46.00	38.59	18.99	3.44	30.90	---	---	Peak



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Horizontal
Remark :			

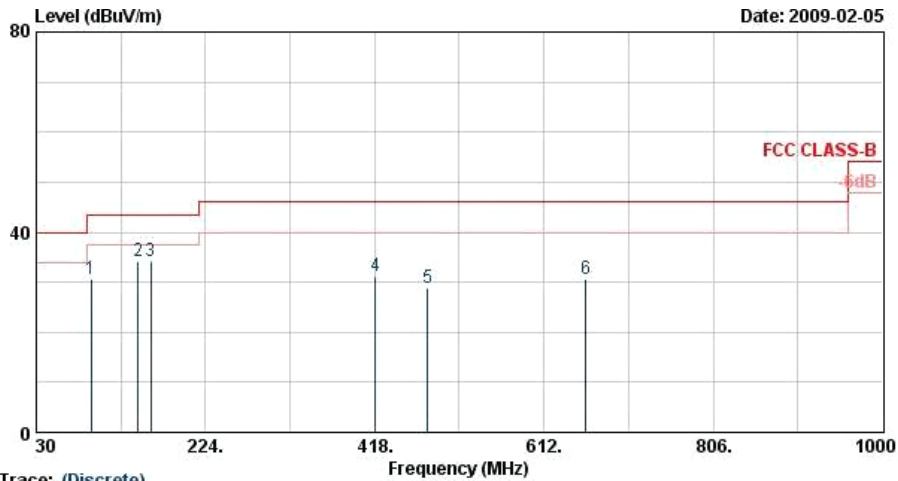


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m BILOG\_081118 HORIZONTAL  
 Project : FR 803027  
 Mode : Mode 3

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	146.37	31.34	-12.16	43.50	50.60	10.64	1.44	31.34	---	---	Peak
2	276.78	28.36	-17.64	46.00	44.72	13.09	2.01	31.46	---	---	Peak
3	299.73	32.03	-13.97	46.00	48.25	13.06	2.13	31.41	---	---	Peak
4 @	419.00	34.03	-11.97	46.00	46.68	15.98	2.66	31.30	100	183	Peak
5	478.50	31.28	-14.72	46.00	42.62	16.96	2.86	31.16	---	---	Peak
6	539.40	31.17	-14.83	46.00	41.27	17.89	3.06	31.05	---	---	Peak



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Vertical
Remark :			



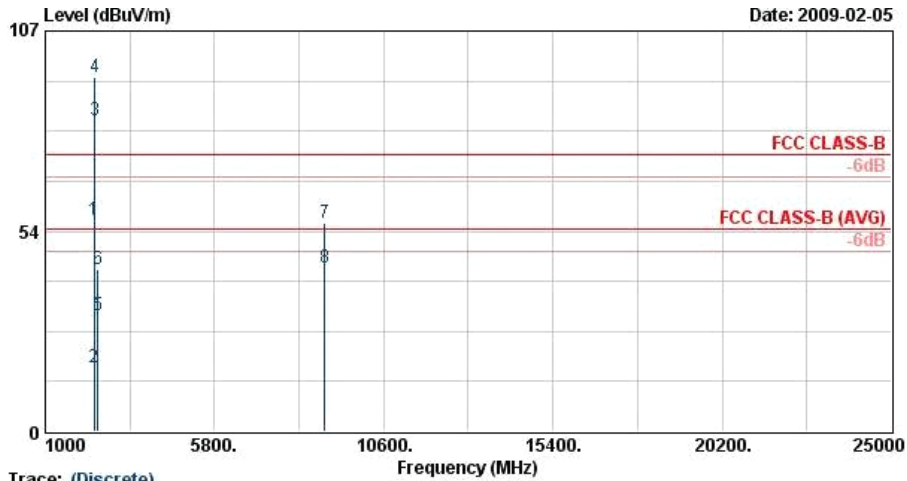
Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m BILOG\_081118 VERTICAL  
 Project : FR 803027  
 Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	93.18	30.66	-12.84	43.50	51.28	9.67	1.13	31.42	---	---	Peak
2 @	147.18	34.24	-9.26	43.50	53.57	10.57	1.45	31.35	---	---	Peak
3 @	161.49	34.29	-9.21	43.50	54.14	9.94	1.52	31.31	100	166	Peak
4	419.00	31.11	-14.89	46.00	43.77	15.98	2.66	31.30	---	---	Peak
5	478.50	28.95	-17.05	46.00	40.29	16.96	2.86	31.16	---	---	Peak
6	659.80	30.55	-15.45	46.00	39.03	18.99	3.44	30.90	---	---	Peak



3.8.6 Test Result of Radiated Emission  $\geq 1$ GHz

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	00	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Horizontal
Remark :	#3 and #4 are Fundamental Signals		

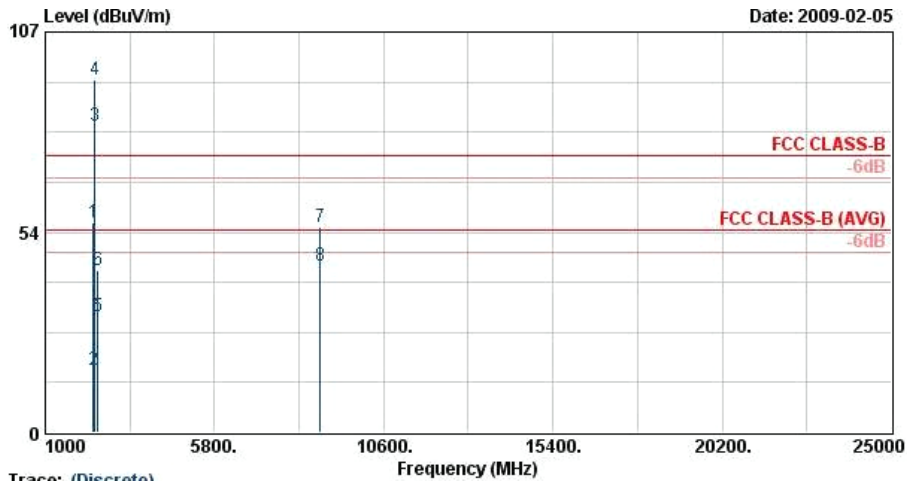


Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 Project : FR 803027  
 Mode : Mode 1

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2375.74	56.52	-17.48	74.00	54.40	32.32	5.47	35.68	100	0	Peak
2	2375.74	17.19	-36.81	54.00	15.07	32.32	5.47	35.68	100	44	Average
3 @	2402.00	83.26			81.16	32.32	5.46	35.68	100	44	Average
4 @	2402.00	94.53			92.45	32.32	5.44	35.68	100	0	Peak
5	2500.00	31.09	-22.91	54.00	29.12	32.30	5.37	35.70	100	44	Average
6	2500.00	43.52	-30.48	74.00	41.55	32.30	5.37	35.70	100	0	Peak
7	8925.00	55.68	-18.32	74.00	43.47	38.38	10.12	36.30	100	0	Peak
8 @	8925.00	43.83	-10.17	54.00	31.63	38.38	10.12	36.30	100	96	Average



Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	00	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Vertical
Remark :	#3 and #4 are Fundamental Signals		



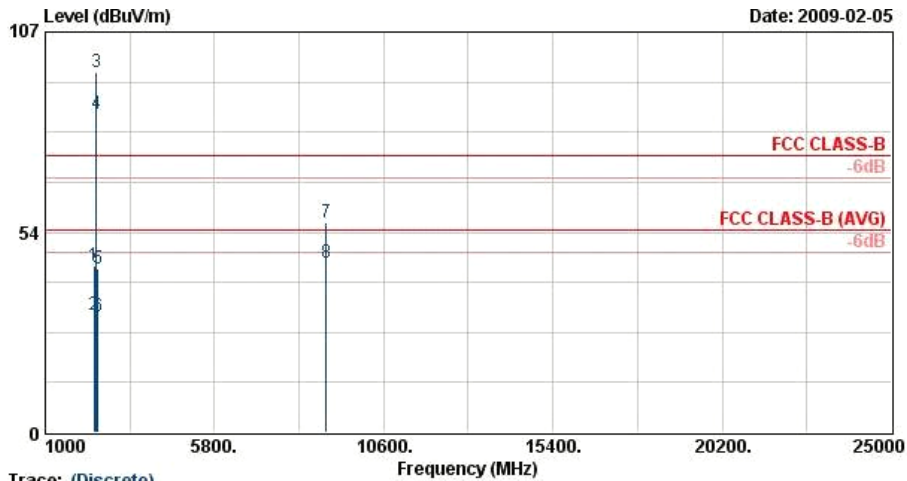
Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 Project : FR 803027  
 Mode : Mode 1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2375.17	56.18	-17.82	74.00	54.08	32.30	5.47	35.68	100	0 Peak
2	2375.17	16.85	-37.15	54.00	14.75	32.30	5.47	35.68	147	251 Average
3 @	2402.00	81.78			79.70	32.30	5.46	35.68	147	251 Average
4 @	2402.00	94.19			92.13	32.30	5.44	35.68	100	0 Peak
5	2494.00	30.95	-23.05	54.00	28.98	32.30	5.37	35.70	147	251 Average
6	2494.00	43.49	-30.51	74.00	41.52	32.30	5.37	35.70	100	0 Peak
7	8793.00	54.77	-19.23	74.00	43.51	37.47	10.27	36.48	100	0 Peak
8 @	8793.00	44.52	-9.48	54.00	33.26	37.47	10.27	36.48	100	52 Average





Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	39	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Horizontal
Remark :	#3 and #4 are Fundamental Signals		

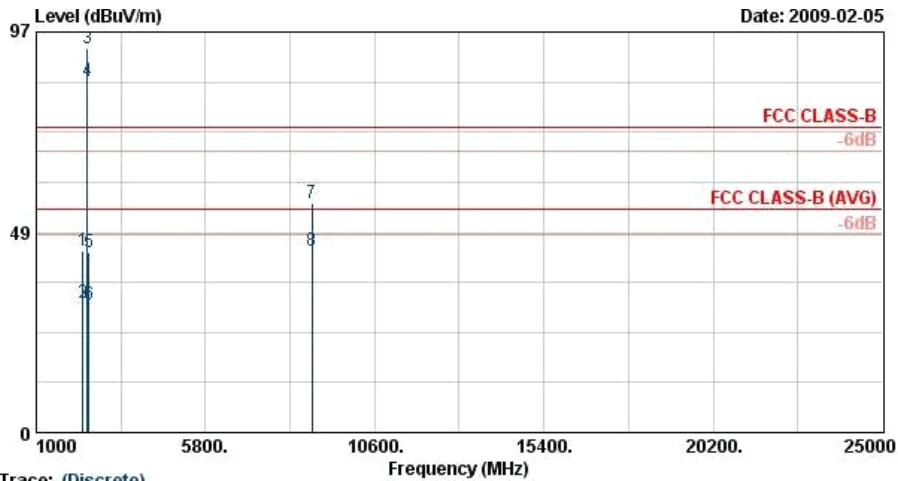


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 Project : FR 803027  
 Mode : Mode 2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2390.00	44.39	-29.61	74.00	42.29	32.32	5.46	35.68	100	0 Peak
2	2390.00	31.52	-22.48	54.00	29.42	32.32	5.46	35.68	100	8 Average
3 X	2441.00	96.36			94.33	32.31	5.41	35.69	100	0 Peak
4 @	2441.00	85.17			83.14	32.31	5.41	35.69	100	8 Average
5	2492.00	43.57	-30.43	74.00	41.60	32.30	5.37	35.70	100	0 Peak
6	2492.00	30.90	-23.10	54.00	28.93	32.30	5.37	35.70	100	8 Average
7	8958.00	56.15	-17.85	74.00	43.93	38.39	10.13	36.30	100	0 Peak
8	8958.00	45.50	-8.50	54.00	33.28	38.39	10.13	36.30	100	33 Average



Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	39	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Vertical
Remark :	#3 and #4 are Fundamental Signals		

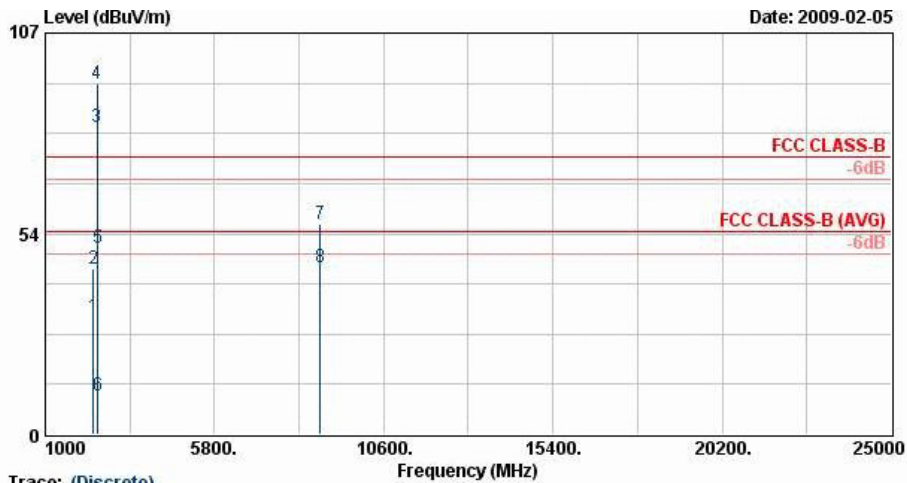


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 Project : FR 803027  
 Mode : Mode 2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2316.00	44.07	-29.93	74.00	41.90	32.30	5.53	35.67	100	0 Peak
2	2316.00	31.25	-22.75	54.00	29.09	32.30	5.53	35.67	108	289 Average
3 X	2441.00	93.10			91.07	32.30	5.41	35.69	100	0 Peak
4 @	2441.00	85.09			83.07	32.30	5.41	35.69	108	289 Average
5	2500.00	43.66	-30.34	74.00	41.69	32.30	5.37	35.70	100	0 Peak
6	2500.00	31.07	-22.93	54.00	29.10	32.30	5.37	35.70	108	289 Average
7	8814.00	55.50	-18.50	74.00	44.49	37.22	10.09	36.30	100	0 Peak
8	8814.00	43.89	-10.11	54.00	32.89	37.22	10.09	36.30	100	163 Average



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Horizontal
Remark :	#3 and #4 are Fundamental Signals		

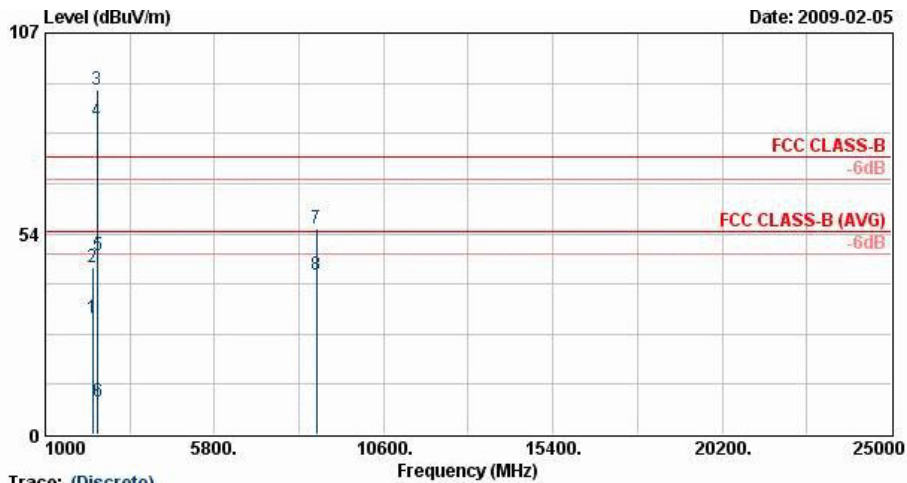


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 Project : FR 803027  
 Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2366.00	31.28	-22.72	54.00	29.14	32.33	5.49	35.68	174	17 Average
2	2366.00	44.06	-29.94	74.00	41.92	32.33	5.49	35.68	100	0 Peak
3 @	2480.00	81.99			80.00	32.30	5.38	35.70	174	17 Average
4 @	2480.00	93.65			91.66	32.30	5.38	35.70	100	0 Peak
5	2483.50	49.76	-24.24	74.00	47.77	32.30	5.38	35.70	100	0 Peak
6	2483.50	10.43	-43.57	54.00	8.44	32.30	5.38	35.70	174	17 Average
7	8802.00	55.91	-18.09	74.00	44.15	38.25	9.78	36.27	100	0 Peak
8 @	8802.00	44.38	-9.62	54.00	32.62	38.25	9.78	36.27	100	310 Average



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	42~43%
Test Engineer :	Mac Lin	Polarization :	Vertical
Remark :	#3 and #4 are Fundamental Signals		



Site : 03CH07-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 Project : FR 803027  
 Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2340.00	31.20	-22.80	54.00	29.07	32.30	5.50	35.67	105	289 Average
2	2340.00	44.50	-29.50	74.00	42.37	32.30	5.50	35.67	100	0 Peak
3 @	2480.00	91.78			89.79	32.30	5.38	35.70	100	0 Peak
4 @	2480.00	83.59			81.60	32.30	5.38	35.70	105	289 Average
5	2483.50	47.89	-26.11	74.00	45.90	32.30	5.38	35.70	100	0 Peak
6	2483.50	8.56	-45.44	54.00	6.57	32.30	5.38	35.70	105	289 Average
7	8694.00	54.83	-19.17	74.00	43.58	37.42	10.24	36.42	100	0 Peak
8 @	8694.00	42.68	-11.32	54.00	31.44	37.42	10.24	36.42	100	255 Average



## **3.9 Antenna Requirements**

### **3.9.1 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.

### **3.9.2 Antenna Connected Construction**

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

### **3.9.3 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 Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 26, 2008	Jun. 25, 2009	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 21, 2008	Feb. 20, 2009	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 21, 2008	Feb. 20, 2009	Conducted (TH02-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz~1GHz	Nov. 20, 2008	Nov. 19, 2009	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9kHz~30GHz	Dec. 02, 2008	Dec. 01, 2009	Radiation (03CH07-HY)
BT Base Station	R&S	CBT 2	100519	N/A	May 10, 2007	May 09, 2009	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15G - 40GHz	Oct. 16, 2008	Oct. 15, 2009	Radiation (03CH06-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1G~18GHz	Aug. 13, 2008	Aug. 12, 2009	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1G~26.5GHz	Dec. 17, 2008	Dec. 16, 2009	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10~1000MHz. 32dB.GAIN	Mar. 31, 2008	Mar. 30, 2009	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	66584	1G~18GHz	Aug. 06, 2008	Aug. 05, 2009	Radiation (03CH07-HY)
EMI Receiver	R&S	ESCS 30	100356	9kHz~2.75GHz	Aug. 01, 2008	Jul. 31, 2009	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 26, 2008	Nov. 25, 2009	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 26, 2008	Nov. 25, 2009	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 (150kHz ~ 30MHz)

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 Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
<b>Combined standard uncertainty Uc(y)</b>	<b>1.13</b>		
<b>Measuring uncertainty for a level of confidence of 95% U=2Uc(y)</b>	<b>2.26</b>		

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

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-shaped	0.28
<b>Combined standard uncertainty Uc(y)</b>	<b>1.27</b>		
<b>Measuring uncertainty for a level of confidence of 95% U=2Uc(y)</b>	<b>2.54</b>		



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

Contribution	Uncertainty of $x_i$		$u(x_i)$	$C_i$	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	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 = $20 \log(1 - \Gamma_1 * \Gamma_2)$	+0.34/-0.35	U-shaped	0.244	1	0.244
<b>Combined standard uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring uncertainty for a level of confidence of 95% <math>U = 2U_c(y)</math></b>	<b>4.72</b>				



## 6 Certification of TAF Accreditation



Certificate No. : L1190-081212

財團法人全國認證基金會  
Taiwan Accreditation Foundation

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

<b>Accreditation Criteria</b>	: ISO/IEC 17025:2005
<b>Accreditation Number</b>	: 1190
<b>Originally Accredited</b>	: December 15, 2003
<b>Effective Period</b>	: January 10, 2007 to January 09, 2010
<b>Accredited Scope</b>	: Testing Field, see described in the Appendix
<b>Specific Accreditation Program</b>	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities

  
Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date : December 12, 2008

PI, total 18 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP8O3027 as below.