



# FCC RF Test Report

APPLICANT : VeriFone Inc.  
EQUIPMENT : BT printer  
BRAND NAME : VeriFone  
MODEL NAME : PAYware Mobile Printer  
FCC ID : B32VX600BT  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on May 24, 2011 and completely tested on Jun. 01, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

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SPORTON INTERNATIONAL INC.

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FCC ID : B32VX600BT

Page Number : 1 of 52

Report Issued Date : Jun. 13, 2011

Report Version : Rev. 01



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR152445	Rev. 01	Initial issue of report	Jun. 13, 2011



### 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	≥ 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(b)(1)	A8.1(b)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.8	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 14.5 dB at 0.19 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.53 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

VeriFone Inc.

1400 West Stanford Ranch Road Suit 200 Rocklin CA 95765 U.S.A.

## 1.2 Manufacturer

Inventec Appliances (Pudong) Co., Ltd.

No. 789 Pu Xing Road, Shanghai, P.R.C.

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	BT printer
Brand Name	VeriFone
Model Name	PAYware Mobile Printer
FCC ID	B32VX600BT
Battery 1	Manufacturer: Palladium Energy
Battery 2	Manufacturer : SANYO
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) : 0.00 dBm (0.01 W) Bluetooth EDR (2Mbps) : -0.02 dBm (0.01 W) Bluetooth EDR (3Mbps) : 0.37 dBm (0.01 W)
Antenna Type	Fixed Internal Antenna with gain -1.64 dBi
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi$ /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

<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	03CH05-HY	722060/4086B-1

### 1.5 Applied Standards

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

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

**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.	iPhone	Apple	A1303	BCGA1303B	N/A	N/A
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	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
6.	USB Cable	N/A	N/A	N/A	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	-0.22 dBm	-0.21 dBm	0.17 dBm
Ch39	2441MHz	0.00 dBm	-0.02 dBm	<b>0.37 dBm</b>
Ch78	2480MHz	-0.11 dBm	-0.12 dBm	0.24 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).

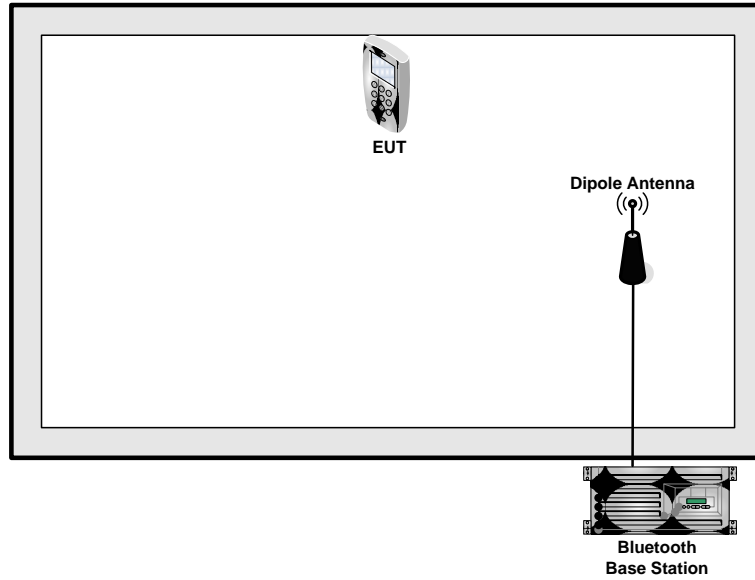
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

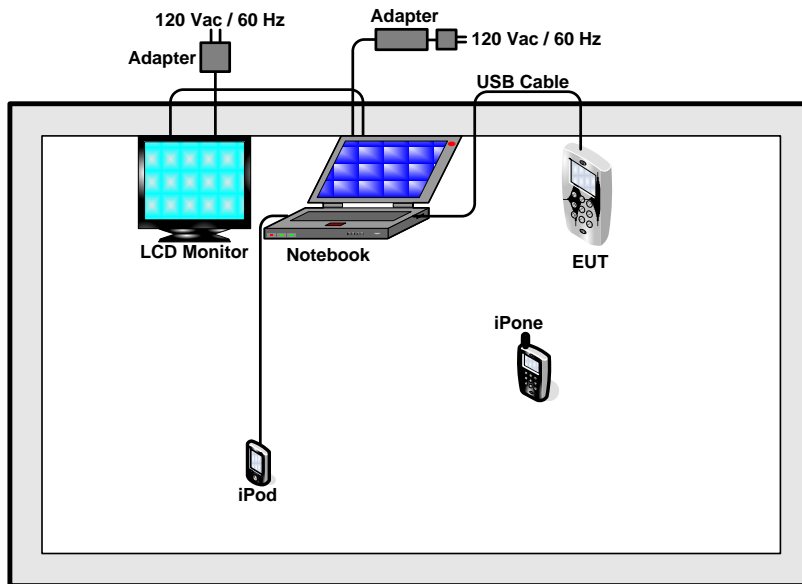
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi$ /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :EUT + Battery 1 + Printer + USB Cable (Charging from Notebook) + Bluetooth Link with iPhone Mode 2 :EUT + Battery 2 + Printer + USB Cable (Charging from Notebook) + Bluetooth Link with iPhone		
<b>Remark:</b> 1. For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported. 2. For conducted emission, the worst case is mode 1; only the test data of this mode was reported.			

## 2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



## 2.4 RF Utility

For Bluetooth function, "RF Utility" 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.

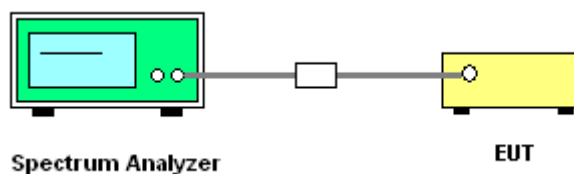
##### 3.1.2 Measuring Instruments

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

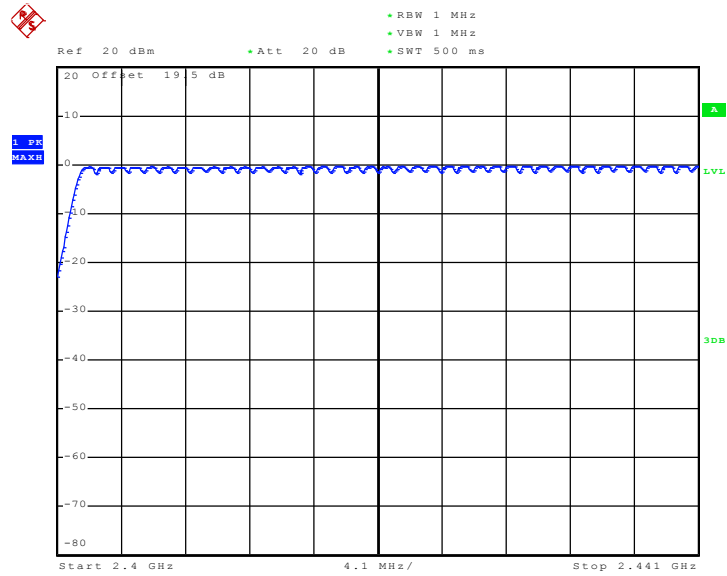


##### 3.1.5 Test Result of Number of Hopping Frequency

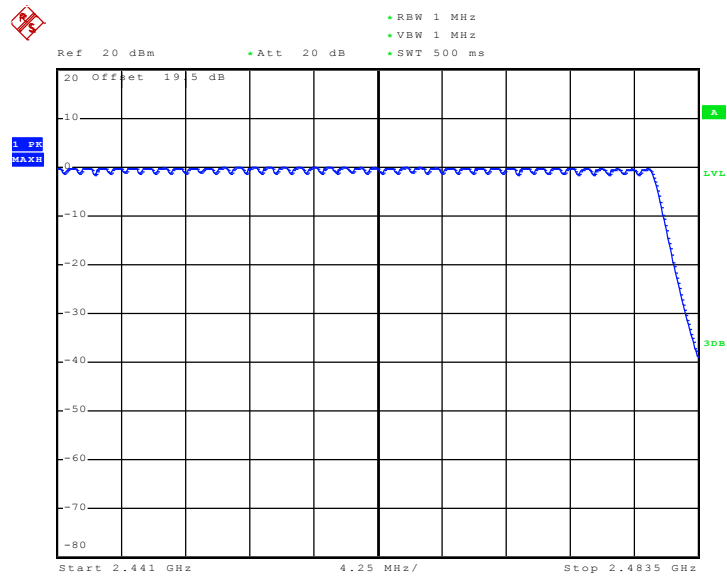
Test Mode :	Mode 7~9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass



Number of Hopping Channel Plot on Channel 00 - 78



Date: 28.MAY.2011 17:01:19



Date: 28.MAY.2011 17:09:10

## 3.2 20dB Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

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

### 3.2.4 Test Setup

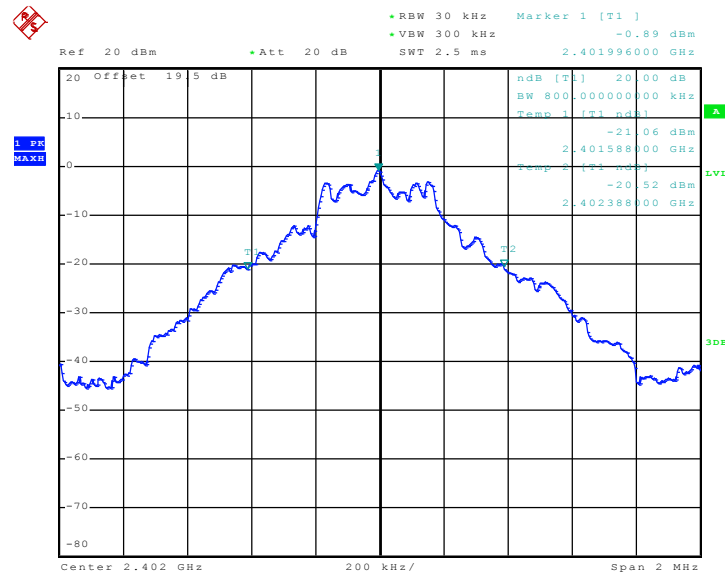


### 3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.800
39	2441	0.832
78	2480	0.860

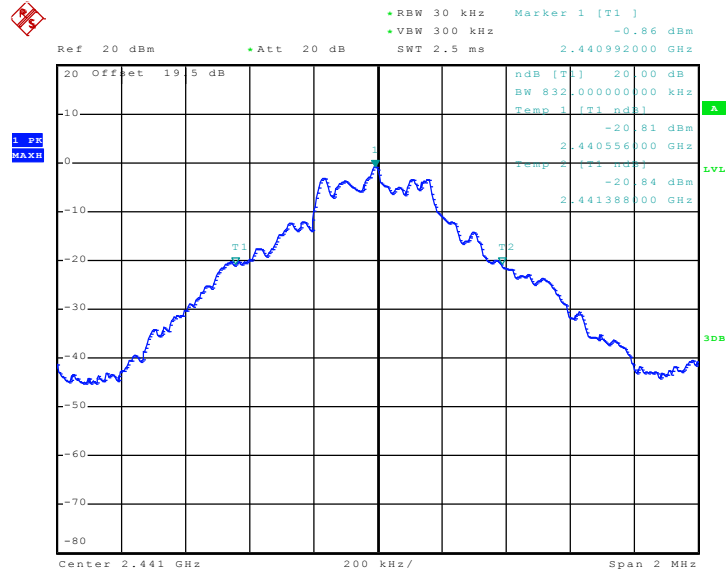
20 dB Bandwidth Plot on Channel 00



Date: 28.MAY.2011 17:43:34

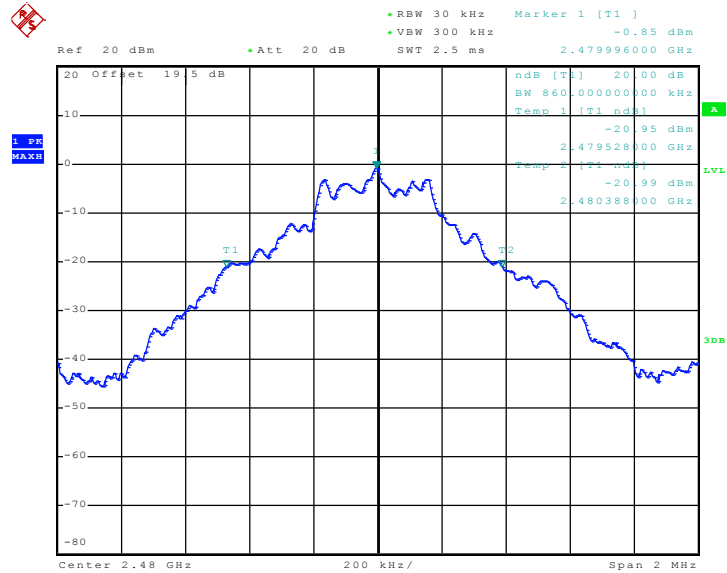


20 dB Bandwidth Plot on Channel 39



Date: 28.MAY.2011 17:49:57

20 dB Bandwidth Plot on Channel 78



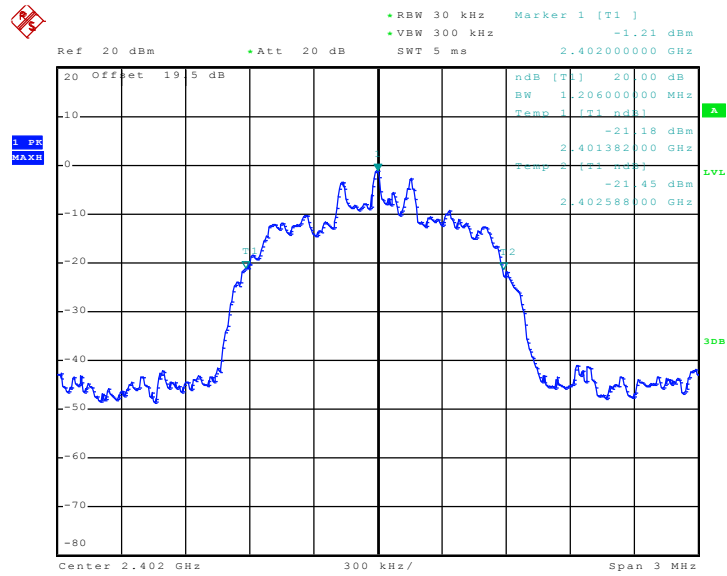
Date: 28.MAY.2011 17:46:09



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

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.206
39	2441	1.206
78	2480	1.212

20 dB Bandwidth Plot on Channel 00

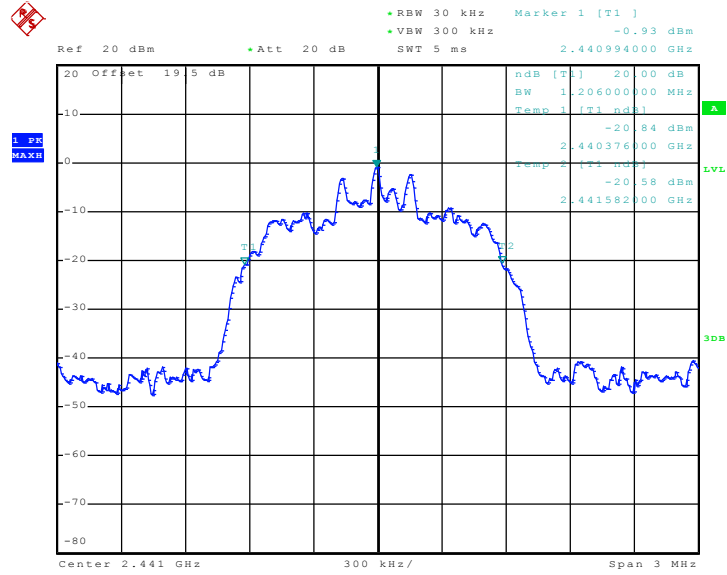


Date: 28.MAY.2011 17:57:17



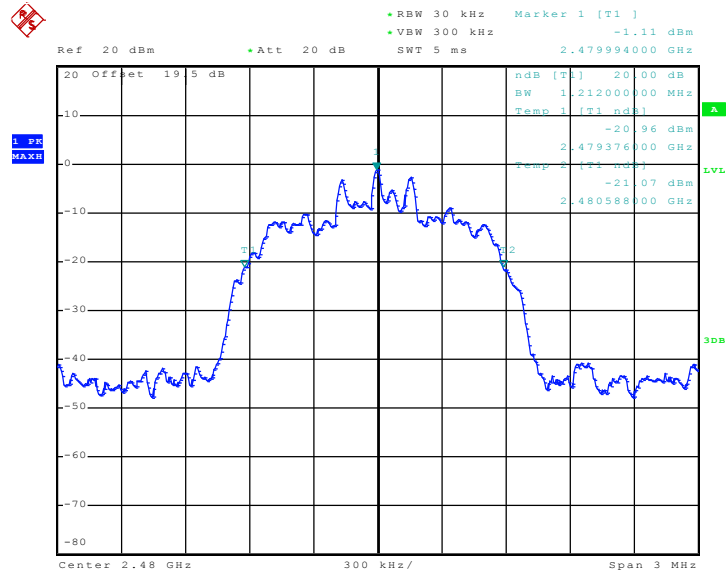


20 dB Bandwidth Plot on Channel 39



Date: 28.MAY.2011 17:56:10

20 dB Bandwidth Plot on Channel 78



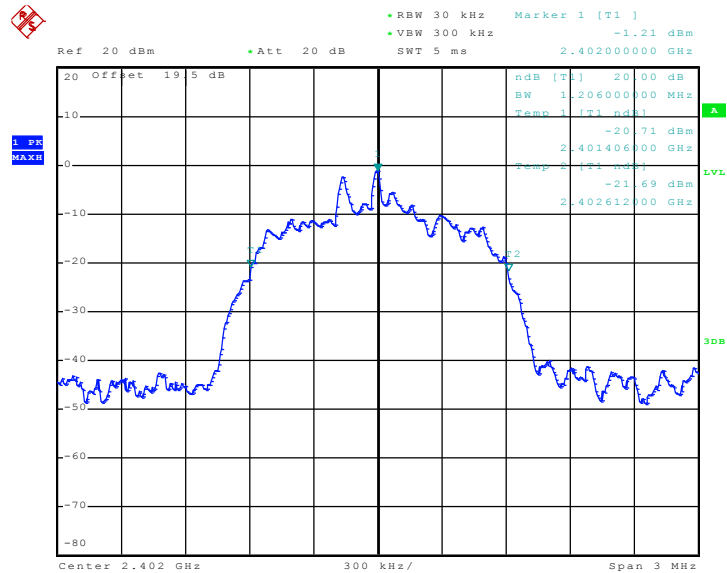
Date: 28.MAY.2011 18:11:05



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

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.206
39	2441	1.206
78	2480	1.212

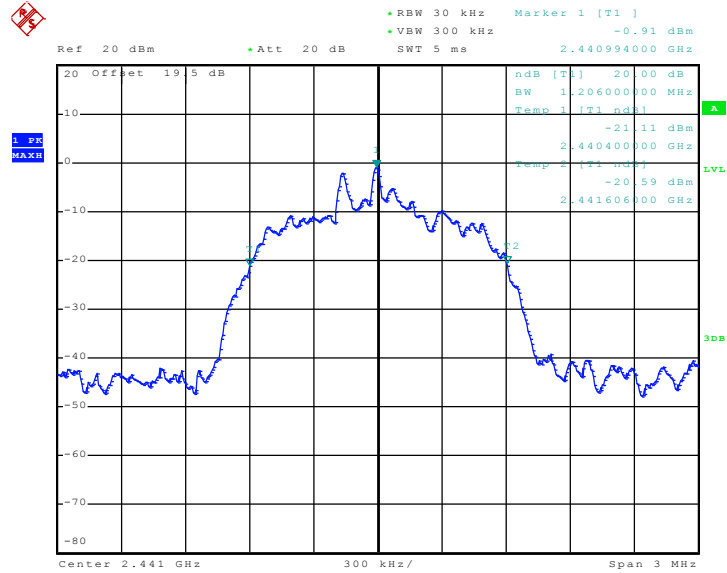
20 dB Bandwidth Plot on Channel 00



Date: 28.MAY.2011 18:01:59

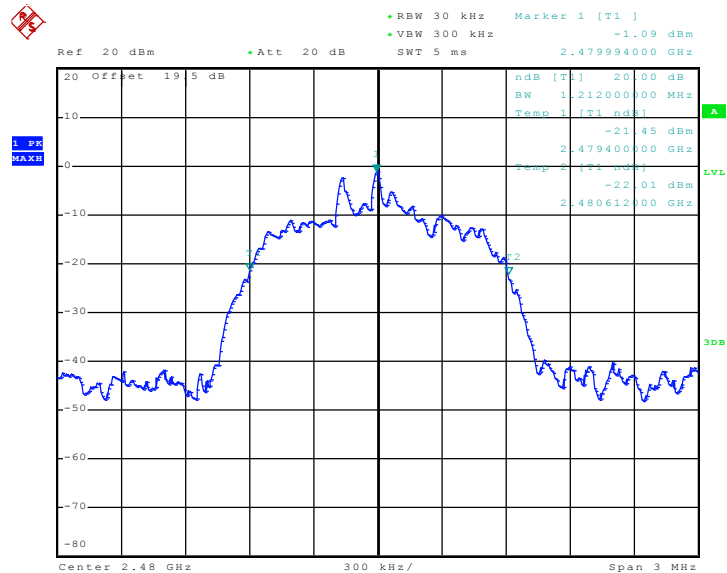


20 dB Bandwidth Plot on Channel 39



Date: 28.MAY.2011 17:51:25

20 dB Bandwidth Plot on Channel 78



Date: 28.MAY.2011 18:05:30

### 3.3 Hopping Channel Separation Measurement

#### 3.3.1 Limit of Hopping Channel Separation

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

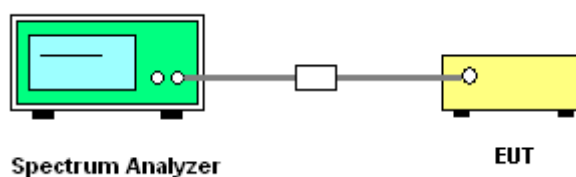
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

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

#### 3.3.4 Test Setup



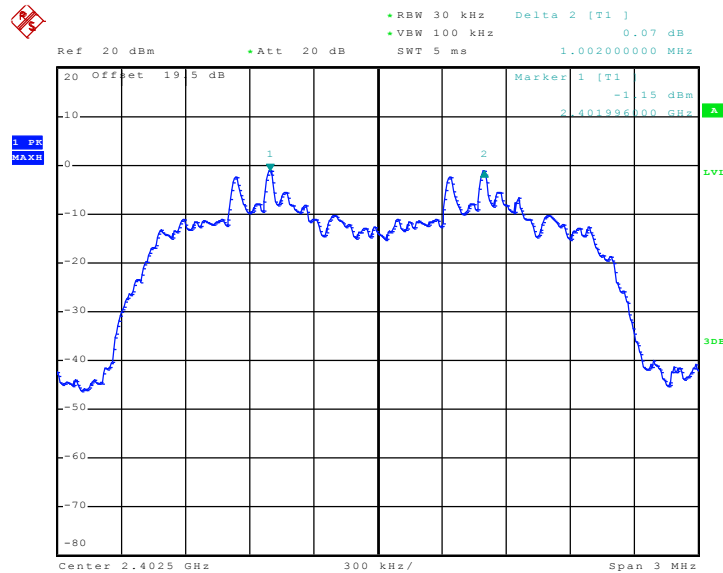


3.3.5 Test Result of Hopping Channel Separation

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

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.804	Pass
39	2441	1.002	0.804	Pass
78	2480	1.002	0.808	Pass

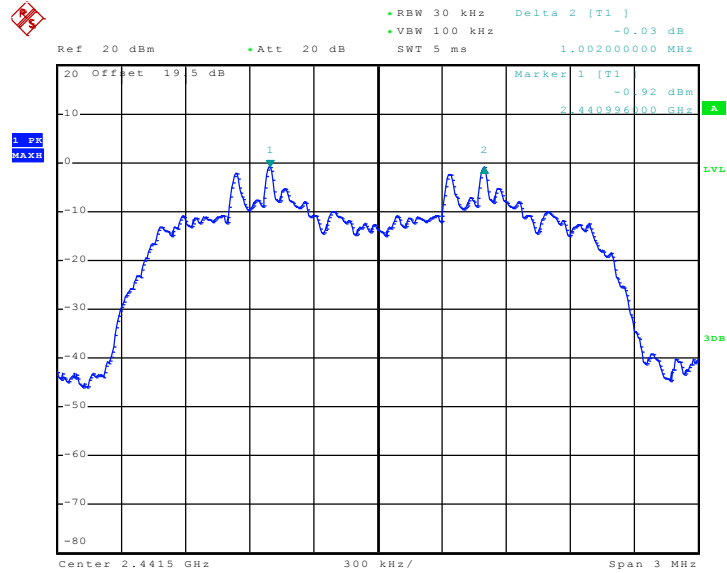
Channel Separation Plot on Channel 00 - 01



Date: 28.MAY.2011 18:01:42

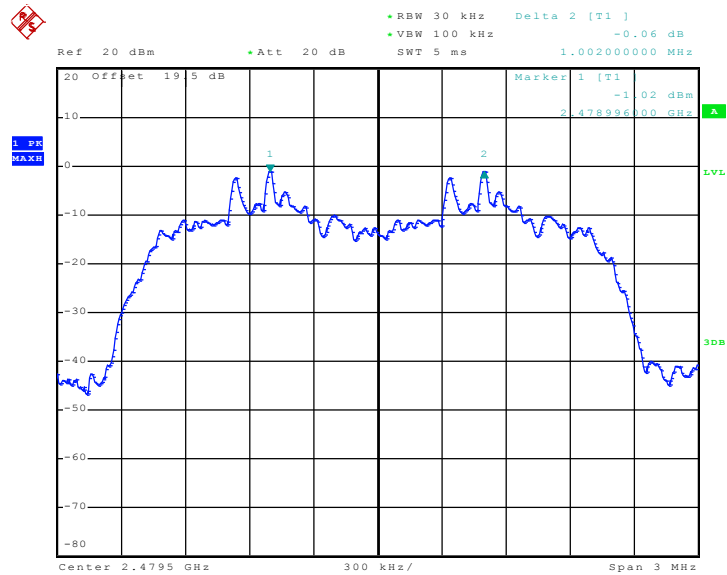


Channel Separation Plot on Channel 39 - 40



Date: 28.MAY.2011 17:53:55

Channel Separation Plot on Channel 77 - 78



Date: 28.MAY.2011 18:08:10

### 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.

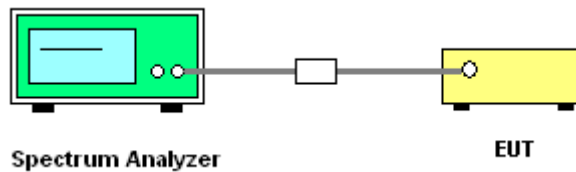
#### 3.4.2 Measuring Instruments

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 ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

#### 3.4.4 Test Setup



#### 3.4.5 Test Result of Dwell Time

Test Mode :	Mode 8	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

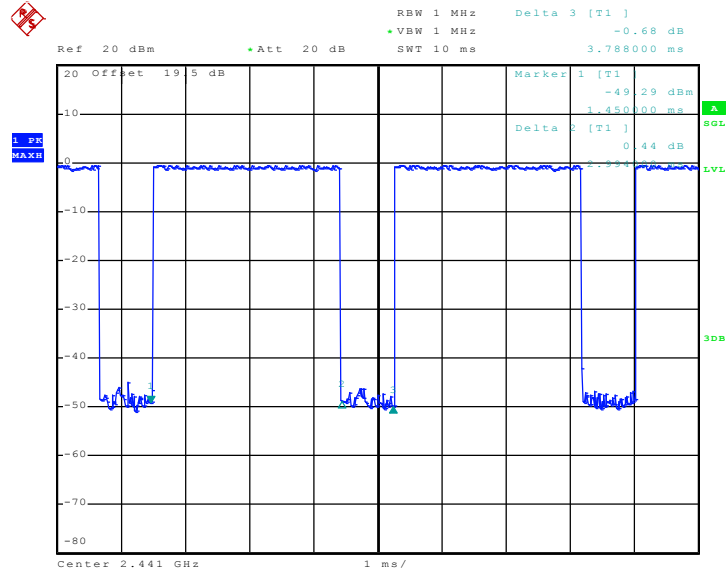
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.40	2994.00	0.32	0.4	Pass

**Remark:**

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

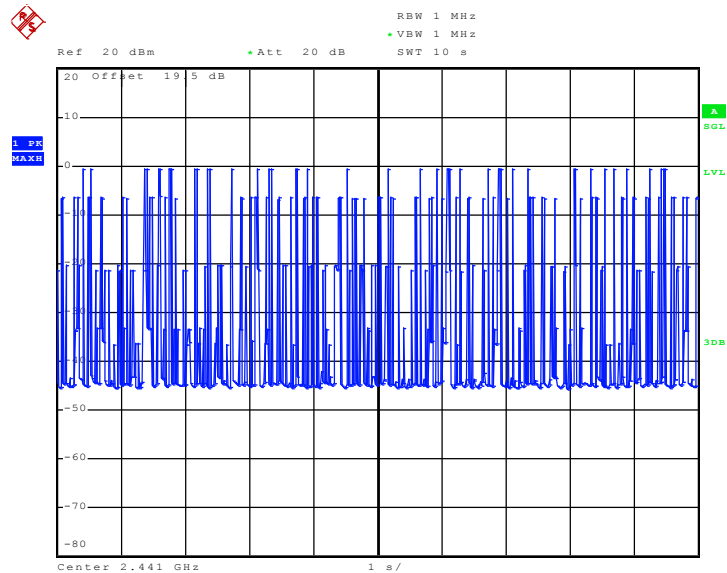


### 3DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 28.MAY.2011 15:48:14

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



Date: 28.MAY.2011 15:48:53



### 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 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, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

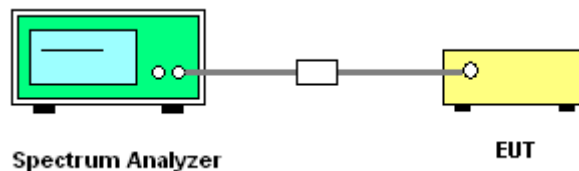
#### 3.5.2 Measuring Instruments

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



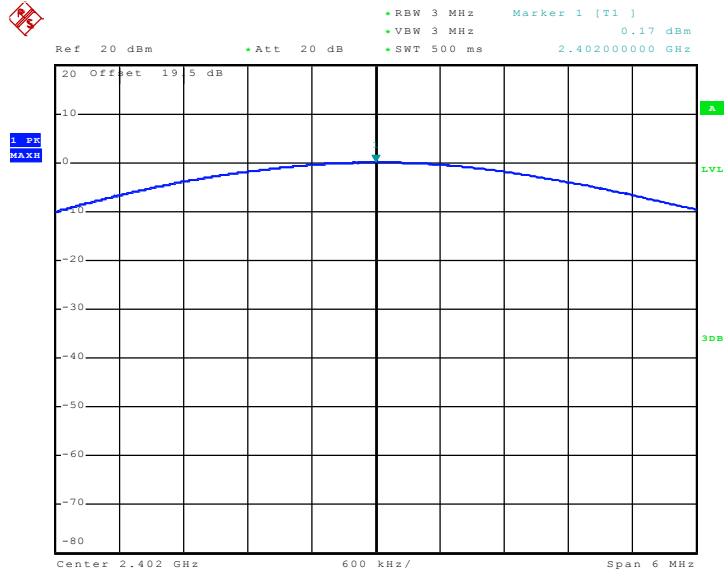
#### 3.5.5 Test Result of Peak Output Power

<b>Test Mode :</b>	Mode 7, 8, 9	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Hank Yu	<b>Relative Humidity :</b>	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	0.17	20.97	Pass
39	2441	0.37	20.97	Pass
78	2480	0.24	20.97	Pass

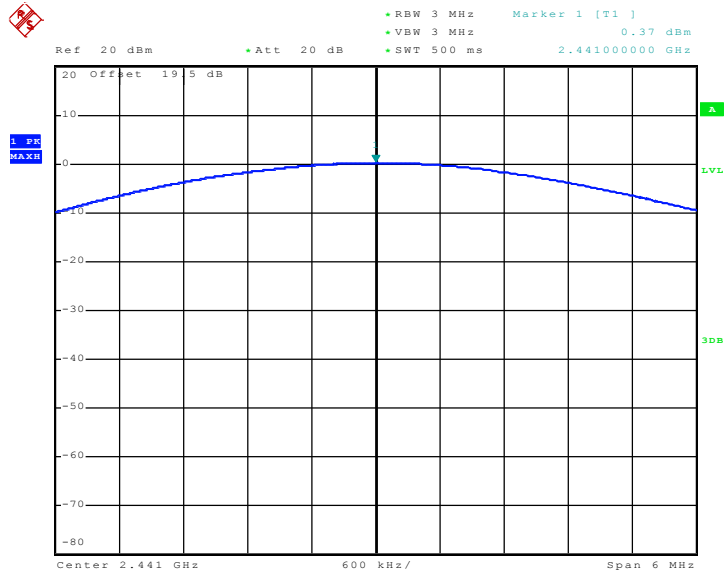


Peak Output Power Plot on Channel 00



Date: 28.MAY.2011 15:33:37

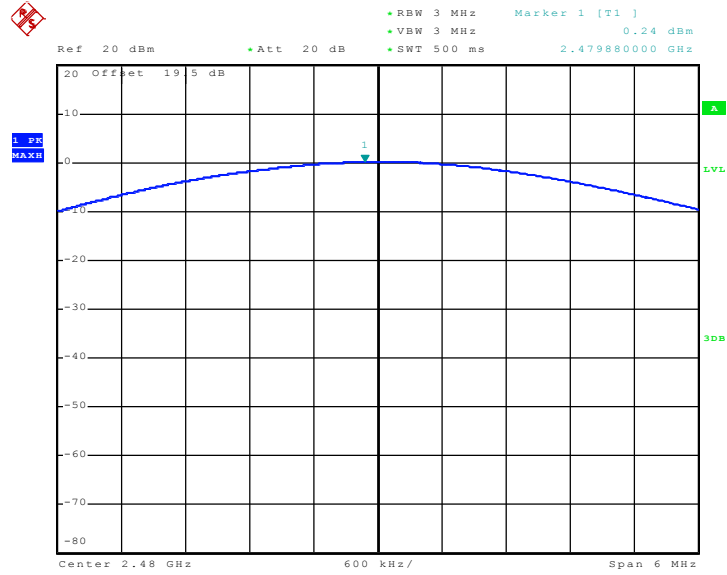
Peak Output Power Plot on Channel 39



Date: 28.MAY.2011 15:37:24



Peak Output Power Plot on Channel 78



Date: 28.MAY.2011 15:41:47



## **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**

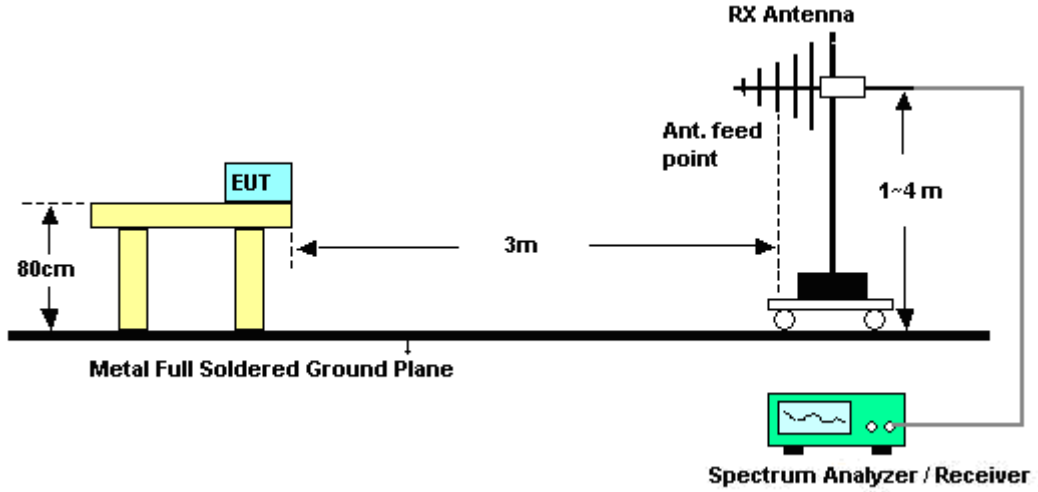
See list of measuring instruments of this test report.

### **3.6.3 Test Procedures**

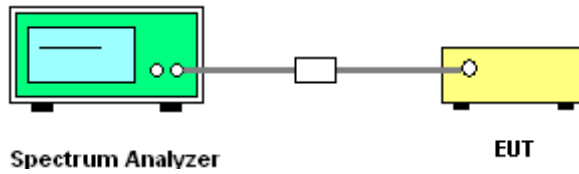
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	23~25°C
Test Channel :	00	Relative Humidity :	49~51%
		Test Engineer :	Brian Chang

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
2370	46.11	-27.89	74	44.04	31.68	4.47	34.08	128	46	Peak
2370.04	34.94	-19.06	54	32.87	31.68	4.47	34.08	128	46	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
2369.66	46.28	-27.72	74	44.21	31.68	4.47	34.08	137	60	Peak
2369.66	34.4	-19.6	54	32.33	31.68	4.47	34.08	137	60	Average

Test Mode :	Mode 3	Temperature :	23~25°C
Test Channel :	78	Relative Humidity :	49~51%
		Test Engineer :	Brian Chang

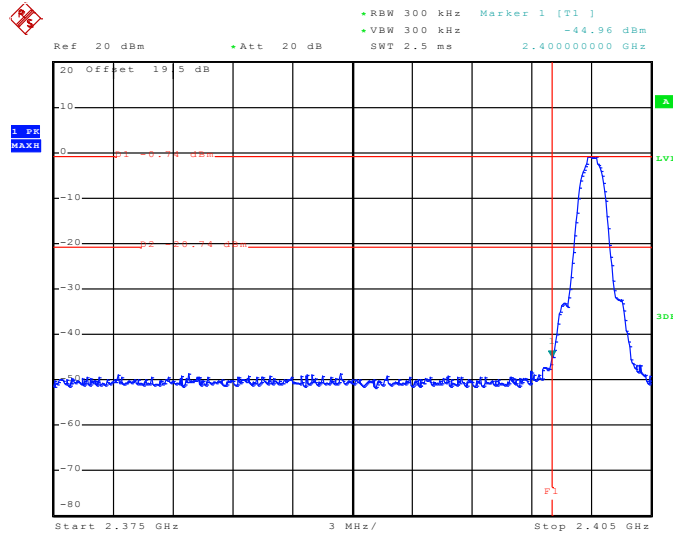
ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	59.7	-14.3	74	57.41	31.78	4.59	34.08	100	259	Peak
2483.5	50.47	-3.53	54	48.18	31.78	4.59	34.08	100	259	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	45.77	-28.23	74	43.48	31.78	4.59	34.08	103	63	Peak
2483.5	37.64	-16.36	54	35.35	31.78	4.59	34.08	103	63	Average

### 3.6.6 Test Result of Conducted Band Edges

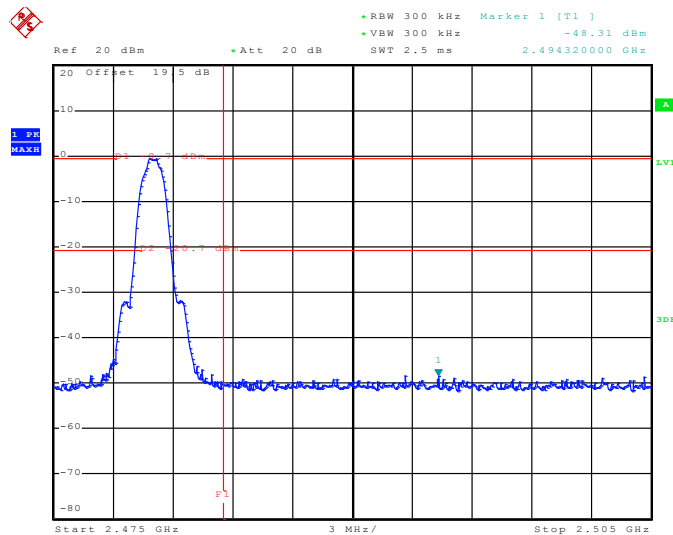
Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Hank Yu

Low Band Edge Plot on Channel 00



Date: 28.MAY.2011 18:02:23

High Band Edge Plot on Channel 78



Date: 28.MAY.2011 18:05:15

## 3.7 Spurious Emission Measurement

### 3.7.1 Limit of Spurious Emission Measurement

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

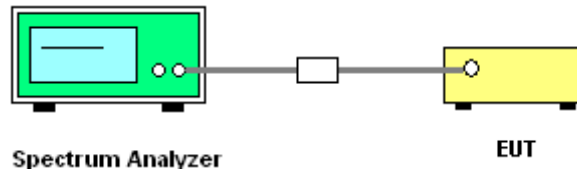
### 3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.7.3 Test Procedure

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

### 3.7.4 Test Setup



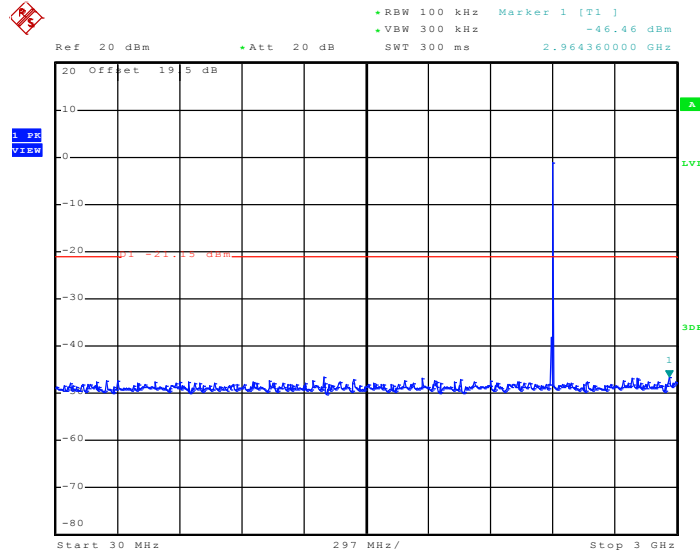




3.7.5 Test Result

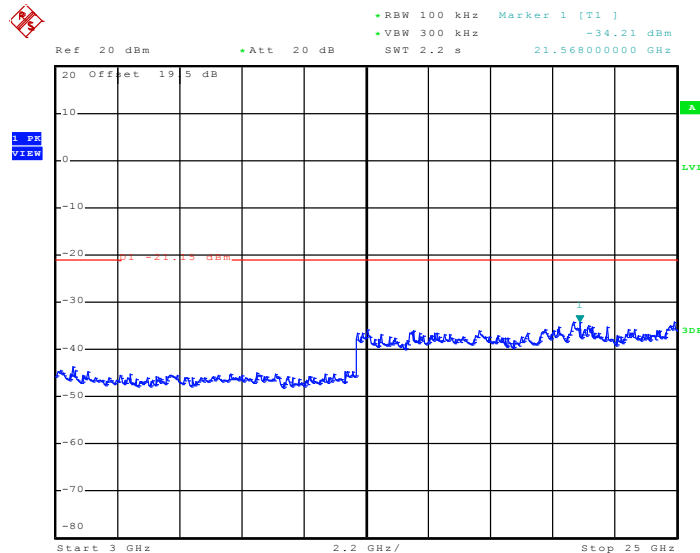
Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 28.MAY.2011 18:03:25

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

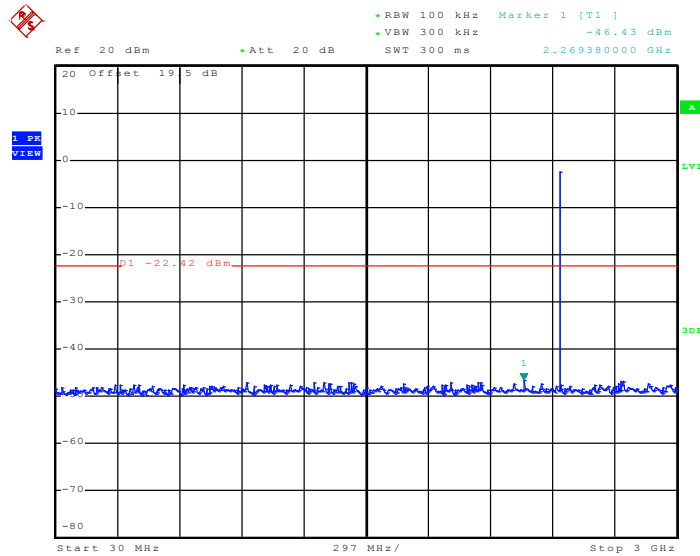


Date: 28.MAY.2011 18:03:47



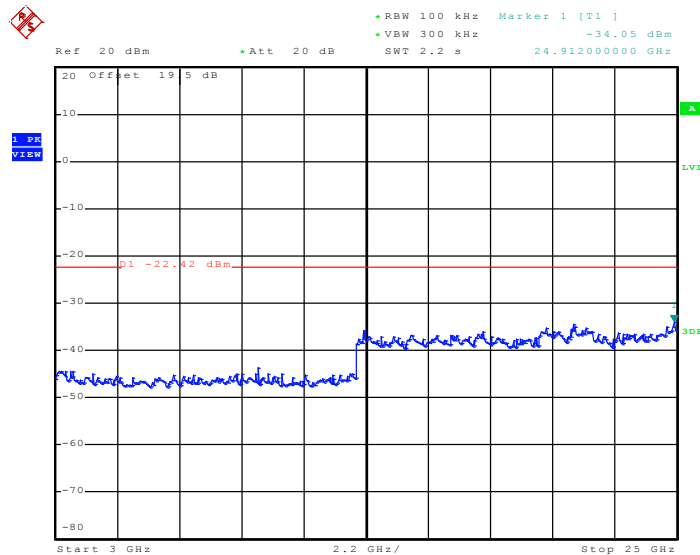
Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 28.MAY.2011 17:52:07

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

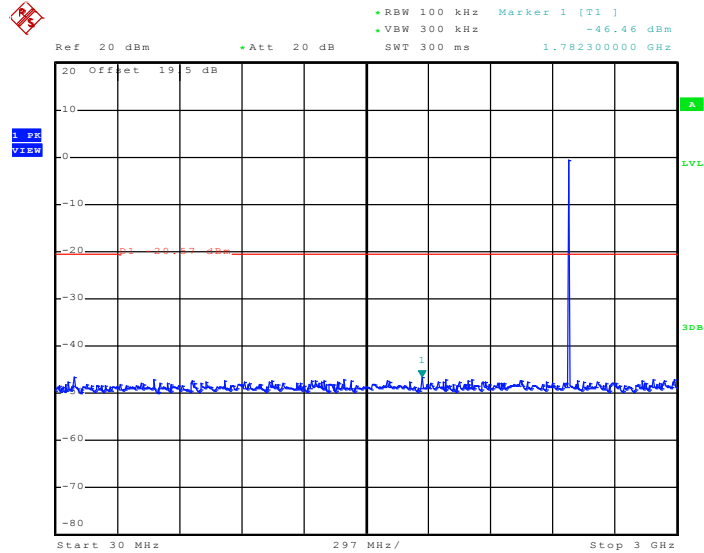


Date: 28.MAY.2011 17:52:29



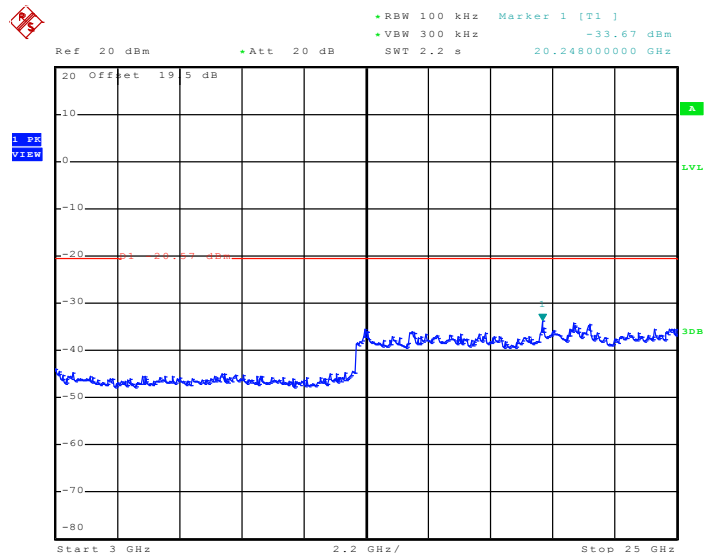
Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 28.MAY.2011 18:04:27

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 28.MAY.2011 18:04:49

## 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.

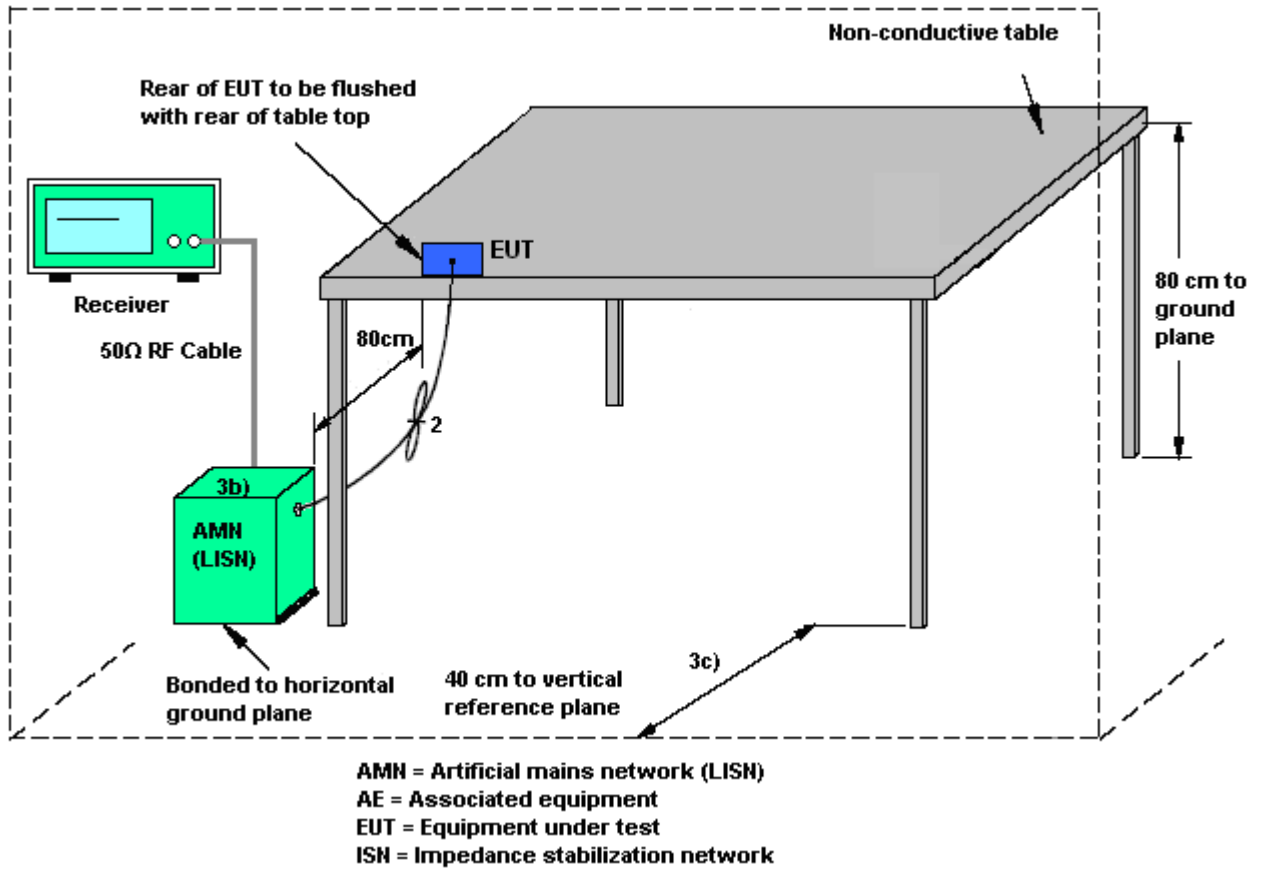
### 3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.8.3 Test Procedures

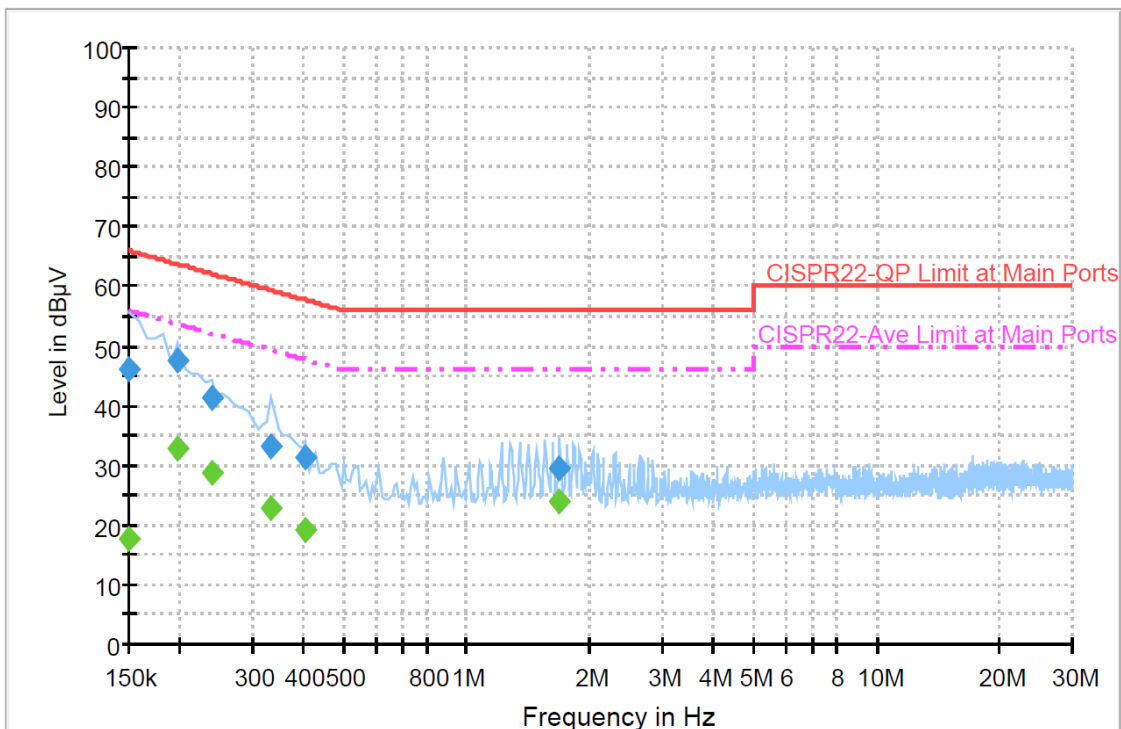
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	EUT + Battery 1 + Printer + USB Cable (Charging from Notebook) + Bluetooth Link with iPhone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



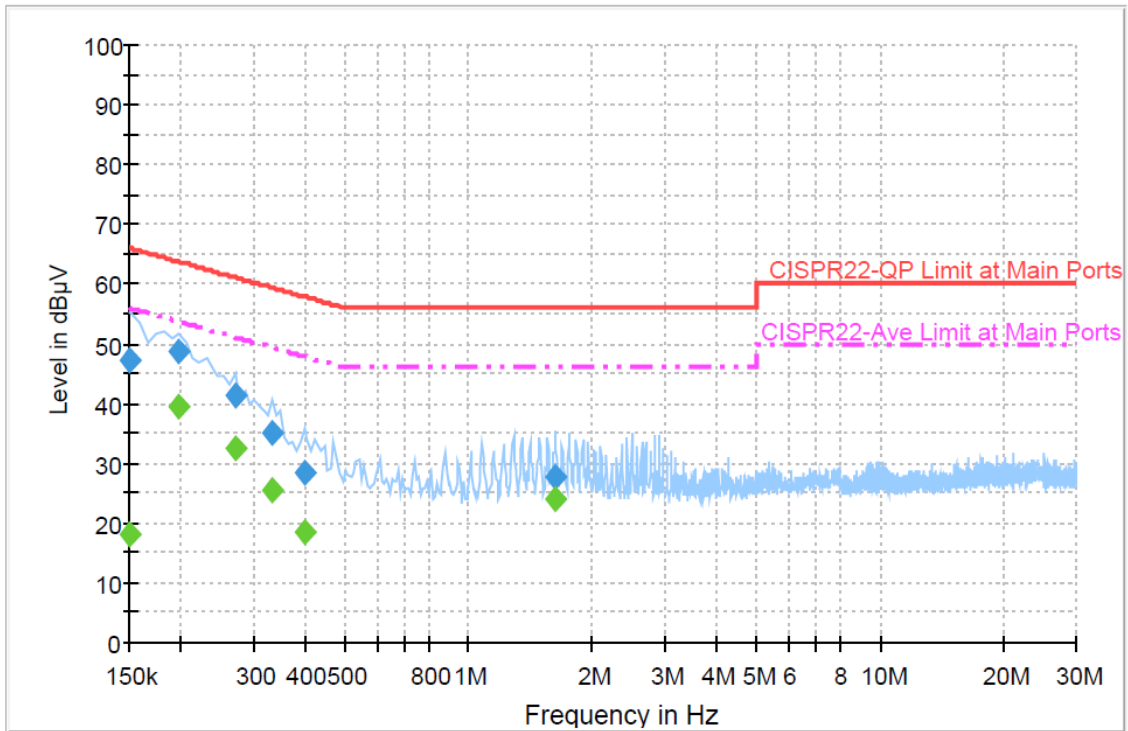
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	46.3	Off	L1	19.4	19.7	66.0
0.198000	47.6	Off	L1	19.4	16.1	63.7
0.238000	41.2	Off	L1	19.4	21.0	62.2
0.334000	33.3	Off	L1	19.4	26.1	59.4
0.406000	31.2	Off	L1	19.5	26.5	57.7
1.686000	29.4	Off	L1	19.4	26.6	56.0

#### Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	17.9	Off	L1	19.4	38.1	56.0
0.198000	32.8	Off	L1	19.4	20.9	53.7
0.238000	28.6	Off	L1	19.4	23.6	52.2
0.334000	22.9	Off	L1	19.4	26.5	49.4
0.406000	19.3	Off	L1	19.5	28.4	47.7
1.686000	24.0	Off	L1	19.4	22.0	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	EUT + Battery 1 + Printer + USB Cable (Charging from Notebook) + Bluetooth Link with iPhone		
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	47.1	Off	N	19.4	18.9	66.0
0.198000	48.6	Off	N	19.4	15.1	63.7
0.270000	41.4	Off	N	19.4	19.7	61.1
0.334000	35.2	Off	N	19.4	24.2	59.4
0.398000	28.5	Off	N	19.5	29.4	57.9
1.622000	27.8	Off	N	19.5	28.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	17.9	Off	N	19.4	38.1	56.0
0.198000	39.6	Off	N	19.4	14.1	53.7
0.270000	32.4	Off	N	19.4	18.7	51.1
0.334000	25.4	Off	N	19.4	24.0	49.4
0.398000	18.4	Off	N	19.5	29.5	47.9
1.622000	24.0	Off	N	19.5	22.0	46.0

### 3.9 Radiated Emission Measurement

#### 3.9.1 Limit of Radiated Emission

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

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

#### 3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

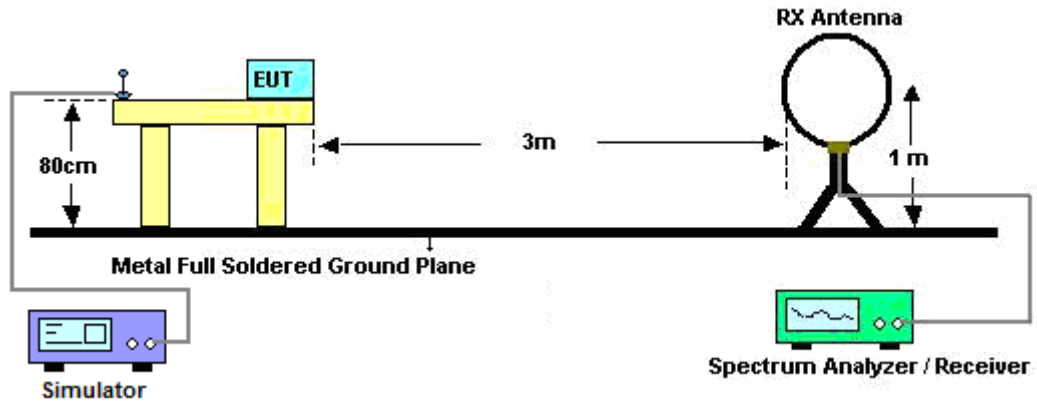
#### 3.9.3 Test Procedures

1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
  - (1) 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.
  - (2) 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)
3. 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.
4. Measured average value for the peak value is greater than 54 dBuV/m

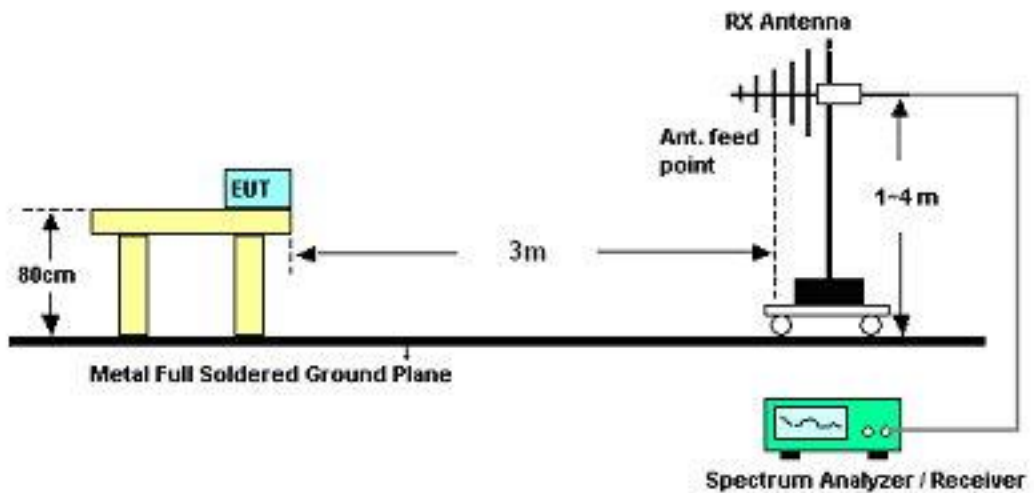


### 3.9.4 Test Setup

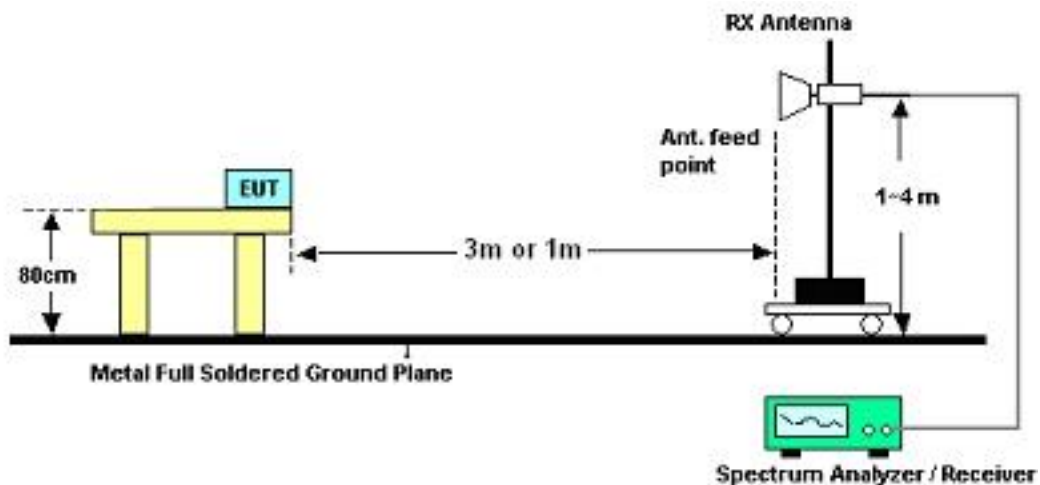
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Brian Chang	Temperature :	23~25°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 (specific distance / test distance) (dB);

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



3.9.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	00	Relative Humidity :	49~51%
Test Engineer :	Brian Chang	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
94.26	19.88	-23.62	43.5	41.66	8.81	0.95	31.54	-	-	Peak
102.09	19.35	-24.15	43.5	40.44	9.53	0.95	31.57	-	-	Peak
172.29	14.51	-28.99	43.5	36.02	8.8	1.23	31.54	-	-	Peak
508.6	18.6	-27.4	46	30.41	17.21	2.04	31.06	-	-	Peak
743.8	21.76	-24.24	46	29.85	19.96	2.51	30.56	-	-	Peak
806.8	23.08	-22.92	46	29.97	21.07	2.57	30.53	114	89	Peak
2370	46.11	-27.89	74	44.04	31.68	4.47	34.08	128	46	Peak
2370.04	34.94	-19.06	54	32.87	31.68	4.47	34.08	128	46	Average
2402	100.54	-	-	98.42	31.7	4.5	34.08	128	46	Peak
2402	84.17	-	-	81.88	31.78	4.59	34.08	128	46	Average
2484	32.43	-21.57	54	30.14	31.78	4.59	34.08	128	46	Average
2484	45.75	-28.25	74	43.46	31.78	4.59	34.08	128	46	Peak



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	49~51%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
57.81	33.95	-6.05	40	58.96	5.8	0.73	31.54	101	340	Peak
63.21	29.48	-10.52	40	54.82	5.46	0.73	31.53	-	-	Peak
124.23	23.74	-19.76	43.5	43.25	10.94	1.07	31.52	-	-	Peak
620.6	20.08	-25.92	46	29.85	18.81	2.25	30.83	-	-	Peak
731.9	21.46	-24.54	46	29.87	19.74	2.45	30.6	-	-	Peak
797	22.44	-23.56	46	29.44	20.97	2.57	30.54	-	-	Peak
2369.66	34.4	-19.6	54	32.33	31.68	4.47	34.08	137	60	Average
2369.66	46.28	-27.72	74	44.21	31.68	4.47	34.08	137	60	Peak
2402	81.27	-	-	79.15	31.7	4.5	34.08	137	60	Average
2402	97.31	-	-	95.19	31.7	4.5	34.08	137	60	Peak
2492	32.54	-21.46	54	30.2	31.8	4.62	34.08	137	60	Average
2492	45.25	-28.75	74	42.91	31.8	4.62	34.08	137	60	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	49~51%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
38.64	16.46	-23.54	40	33.69	13.7	0.58	31.51	-	-	Peak
57.81	13.75	-26.25	40	38.76	5.8	0.73	31.54	-	-	Peak
170.67	14.02	-29.48	43.5	35.41	8.93	1.23	31.55	-	-	Peak
547.1	19.19	-26.81	46	30.16	17.84	2.15	30.96	-	-	Peak
711.6	20.82	-25.18	46	29.74	19.36	2.4	30.68	-	-	Peak
820.8	23.03	-22.97	46	29.77	21.17	2.61	30.52	100	15	Peak
2390	34.04	-19.96	54	31.92	31.7	4.5	34.08	122	48	Average
2390	45.6	-28.4	74	43.48	31.7	4.5	34.08	122	48	Peak
2441	81.6	-	-	79.37	31.75	4.56	34.08	122	48	Average
2441	97.89	-	-	95.66	31.75	4.56	34.08	122	48	Peak
2492	32.57	-21.43	54	30.23	31.8	4.62	34.08	122	48	Average
2492	44.32	-29.68	74	41.98	31.8	4.62	34.08	122	48	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	49~51%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
57.81	34.71	-5.29	40	59.72	5.8	0.73	31.54	105	223	Peak
62.13	30.97	-9.03	40	56.37	5.41	0.73	31.54	-	-	Peak
123.96	23.77	-19.73	43.5	43.28	10.94	1.07	31.52	-	-	Peak
547.8	18.29	-27.71	46	29.24	17.86	2.15	30.96	-	-	Peak
657.7	21.13	-24.87	46	30.63	18.96	2.3	30.76	-	-	Peak
759.9	22.2	-23.8	46	29.98	20.25	2.51	30.54	-	-	Peak
2376	32.36	-21.64	54	30.29	31.68	4.47	34.08	162	64	Average
2376	45.28	-28.72	74	43.21	31.68	4.47	34.08	162	64	Peak
2441	77.8	-	-	75.57	31.75	4.56	34.08	162	64	Average
2441	93.01	-	-	90.78	31.75	4.56	34.08	162	64	Peak
2500	32.59	-21.41	54	30.25	31.8	4.62	34.08	162	64	Average
2500	45.18	-28.82	74	42.84	31.8	4.62	34.08	162	64	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	49~51%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	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
38.64	21.4	-18.6	40	38.63	13.7	0.58	31.51	120	307	Peak
94.53	21.86	-21.64	43.5	43.54	8.91	0.95	31.54	-	-	Peak
172.56	14.74	-28.76	43.5	36.25	8.8	1.23	31.54	-	-	Peak
480.6	17.25	-28.75	46	29.75	16.63	1.98	31.11	-	-	Peak
572.3	20.23	-25.77	46	30.7	18.26	2.18	30.91	-	-	Peak
685	20.53	-25.47	46	29.85	19.07	2.35	30.74	-	-	Peak
2348	31.96	-22.04	54	29.97	31.64	4.44	34.09	100	259	Average
2348	44.97	-29.03	74	42.98	31.64	4.44	34.09	100	259	Peak
2480	79.86	-	-	77.57	31.78	4.59	34.08	100	259	Average
2480	96.71	-	-	94.42	31.78	4.59	34.08	100	259	Peak
2483.5	50.47	-3.53	54	48.18	31.78	4.59	34.08	100	259	Average
2483.5	59.7	-14.3	74	57.41	31.78	4.59	34.08	100	259	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	49~51%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	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
58.08	34.13	-5.87	40	59.14	5.8	0.73	31.54	115	68	Peak
62.4	30.04	-9.96	40	55.44	5.41	0.73	31.54	-	-	Peak
122.88	23.5	-20	43.5	43.02	10.93	1.07	31.52	-	-	Peak
544.3	19.66	-26.34	46	30.68	17.8	2.15	30.97	-	-	Peak
711.6	21.17	-24.83	46	30.09	19.36	2.4	30.68	-	-	Peak
788.6	21.87	-24.13	46	29.07	20.8	2.54	30.54	-	-	Peak
2354	30.11	-23.89	54	28.1	31.66	4.44	34.09	103	63	Average
2354	44.73	-29.27	74	42.72	31.66	4.44	34.09	103	63	Peak
2480	78.9	-	-	76.61	31.78	4.59	34.08	103	63	Average
2480	96.09	-	-	93.8	31.78	4.59	34.08	103	63	Peak
2483.5	37.64	-16.36	54	35.35	31.78	4.59	34.08	103	63	Average
2483.5	45.77	-28.23	74	43.48	31.78	4.59	34.08	103	63	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 Fixed Internal 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
System Simulator	R&S	CMU200	117995	N/A	Jun. 08, 2009	Jun. 07, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 11, 2010	Jun. 10, 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)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-9307 01	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-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	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-40GHz	Nov. 03, 2010	Nov. 02, 2011	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161075	1KHz - 1GHz	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 1GHz	Nov. 06, 2010	Nov. 05, 2011	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A019 17	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	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	860004/00 1	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH05-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Jan.13, 2011	Jan.13, 2013	Radiation (03CH05-HY)

## 5 Uncertainty of Evaluation

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

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

### 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
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		



**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
<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>				



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

Please refer to Sporton report number EP152445 as below.