

# FCC RF Test Report

APPLICANT : Motorola Solutions, Inc.  
EQUIPMENT : Enterprise Digital Assistant (EDA)  
BRAND NAME : Motorola  
MODEL NAME : MC67NA  
FCC ID : UZ7MC67NA  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Feb. 29, 2012 and completely tested on Jul. 13, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures 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:



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Jones Tsai / 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.

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SPORTON INTERNATIONAL INC.

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FCC ID : UZ7MC67NA

Page Number : 1 of 74

Report Issued Date : Jul. 13, 2012

Report Version : Rev. 01



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR221518-01A	Rev. 01	Initial issue of report	Jul. 13, 2012

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	$\geq 15\text{Chs}$	Pass	-
3.2	15.247(a)(1)	A8.1(b)	Hopping Channel Separation	$\geq 2/3$ of 20dB BW	Pass	-
3.3	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.4	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.4	-	Gen 4.6.1	99% Bandwidth	-	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 1\text{ w}$ for 1Mbps $\leq 125\text{ Mw}$ for 2, 3Mbps	Pass	-
3.6	15.247(d)	A8.5	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
3.7	15.247(d)	A8.5	Conducted Spurious Emission	$\leq 20\text{dBc}$	Pass	-
3.8	15.247(d)	A8.5	Radiated Band Edges	15.209(a) & 15.247(d)	Pass	-
3.9	15.247(d)	A8.5	Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.68 dB at 30.270 MHz
3.10	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 10.70 dB at 0.190 MHz
3.11	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Motorola Solutions, Inc.**

One Motorola Plaza, Holtsville, NY 11742-1300 USA

## 1.2 Manufacturer

**Motorola Solutions, Inc.**

One Motorola Plaza, Holtsville, NY 11742-1300 USA

## 1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Enterprise Digital Assistant (EDA)
Brand Name	Motorola
Model Name	MC67NA
FCC ID	UZ7MC67NA
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA WLAN 11abgn(BW 20MHz)/Bluetooth 2.1 EDR
HW Version	DV2
SW Version	01.21.0010 (RF Fusion Version : X_2.00.0.0.041E)
FW Version	2.28
EUT Stage	Identical Prototype

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

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Maximum Output Power to Antenna	Bluetooth (1Mbps) : 3.82 dBm (0.0024 W) Bluetooth EDR (2Mbps) : 4.10 dBm (0.0026 W) Bluetooth EDR (3Mbps) : 4.67 dBm (0.0029 W)
99% Occupied Bandwidth	Bluetooth (1Mbps) : 0.832MHz Bluetooth EDR (2Mbps) : 1.204MHz Bluetooth EDR (3Mbps) : 1.172MHz
Antenna Type	Fixed Internal Antenna with gain 0.36 dBi
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi$ /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

## 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>
	TH02-HY	CO05-HY	03CH07-HY	722060/4086B-1

## 1.5 Applied Standards

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

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

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
3.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
7.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
8.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A
9.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
10.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

## 2 Test Configuration of Equipment Under Test

### 2.1 RF Output Power

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

The conducted power tables of Sample A are as follows:

Channel	Frequency	Bluetooth RF Output Power		
		GFSK / 1Mbps		
		DH1	DH3	DH5
Ch00	2402MHz	4.22 dBm	4.18 dBm	4.16 dBm
Ch39	2441MHz	4.25 dBm	4.18 dBm	4.24 dBm
Ch78	2480MHz	3.92 dBm	3.92 dBm	3.91 dBm

Channel	Frequency	Bluetooth RF Output Power		
		$\pi$ /4-DQPSK / 2Mbps		
		2DH1	2DH3	2DH5
Ch00	2402MHz	4.08 dBm	4.10 dBm	4.10 dBm
Ch39	2441MHz	4.14 dBm	4.20 dBm	4.18 dBm
Ch78	2480MHz	3.83 dBm	3.83 dBm	3.86 dBm

Channel	Frequency	Bluetooth RF Output Power		
		8-DPSK / 3Mbps		
		3DH1	3DH3	3DH5
Ch00	2402MHz	4.61 dBm	4.58 dBm	4.59 dBm
Ch39	2441MHz	4.66 dBm	4.59 dBm	4.62 dBm
Ch78	2480MHz	4.34 dBm	4.34 dBm	4.34 dBm



The conducted power tables of Sample B are as follows:

Channel	Frequency	Bluetooth RF Output Power		
		GFSK / 1Mbps		
		DH1	DH3	DH5
Ch00	2402MHz	3.81 dBm	3.79 dBm	3.79 dBm
Ch39	2441MHz	<b>3.82 dBm</b>	3.81 dBm	3.81 dBm
Ch78	2480MHz	3.70 dBm	3.65 dBm	3.67 dBm

Channel	Frequency	Bluetooth RF Output Power		
		$\pi$ /4-DQPSK / 2Mbps		
		2DH1	2DH3	2DH5
Ch00	2402MHz	4.09 dBm	4.05 dBm	4.04 dBm
Ch39	2441MHz	4.05 dBm	<b>4.10 dBm</b>	4.09 dBm
Ch78	2480MHz	3.94 dBm	3.93 dBm	3.92 dBm

Channel	Frequency	Bluetooth RF Output Power		
		8-DPSK / 3Mbps		
		3DH1	3DH3	3DH5
Ch00	2402MHz	4.62 dBm	4.59 dBm	4.63 dBm
Ch39	2441MHz	<b>4.67 dBm</b>	4.65 dBm	4.66 dBm
Ch78	2480MHz	4.45 dBm	4.45 dBm	4.48 dBm

**Remark:**

1. The data rate was set in 3Mbps for Sample A, and all the test items due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.
3. The Sample A and Sample B are electric identical,. The maximum output power levels for two samples are close and met the production target. Thus, Sample A was used for conducted measurement at the antenna terminal, and Sample B was used for radiated measurement.

## 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).

### Definition of each configuration about keypad and Camera for EUT

Keypads	Cameras
(1) Qwerty (2) Numeric (3) PIM	(1) With camera (2) Without camera

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

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

Test Modes					
Radiated TCs					
No.	Data Rate	Modulation	Mode	Keypad	Camera
1	Bluetooth EDR 3Mbps	8-DPSK	CH00_2402 MHz	1	1
2	Bluetooth EDR 3Mbps	8-DPSK	CH39_2441 MHz	1	1
3	Bluetooth EDR 3Mbps	8-DPSK	CH78_2480 MHz	1	1

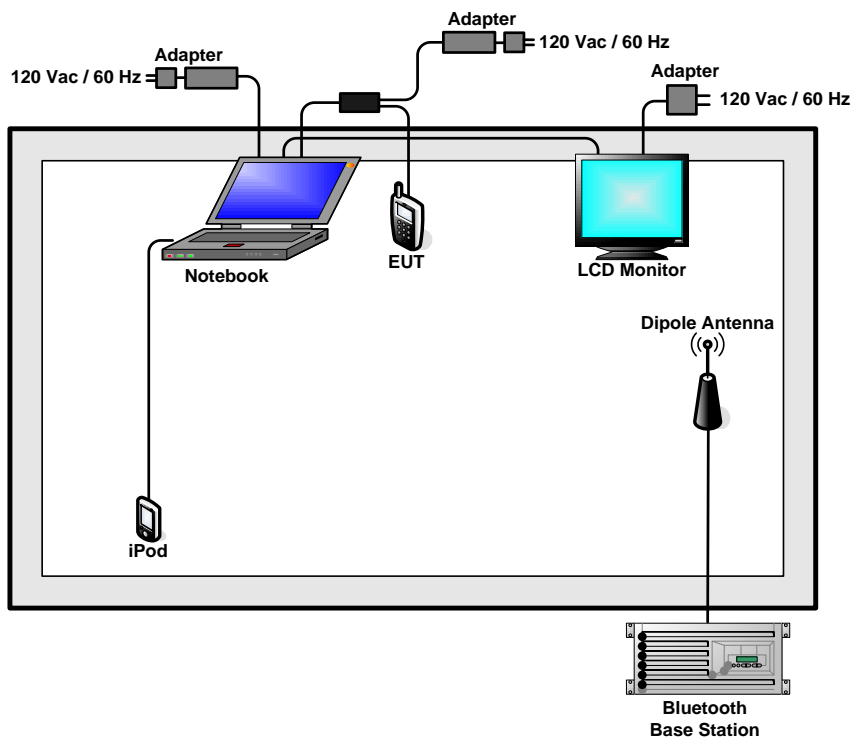
Below table are conducted and AC conducted emission test:

Test Modes			
Conducted TCs			
No.	Data Rate	Modulation	Mode
1	Bluetooth 1Mbps	GFSK	CH00_2402 MHz
2	Bluetooth 1Mbps	GFSK	CH39_2441 MHz
3	Bluetooth 1Mbps	GFSK	CH78_2480 MHz
4	Bluetooth EDR 2Mbps	$\pi/4$ -DQPSK	CH00_2402 MHz
5	Bluetooth EDR 2Mbps	$\pi/4$ -DQPSK	CH39_2441 MHz
6	Bluetooth EDR 2Mbps	$\pi/4$ -DQPSK	CH78_2480 MHz
7	Bluetooth EDR 3Mbps	8-DPSK	CH00_2402 MHz
8	Bluetooth EDR 3Mbps	8-DPSK	CH39_2441 MHz
9	Bluetooth EDR 3Mbps	8-DPSK	CH78_2480 MHz

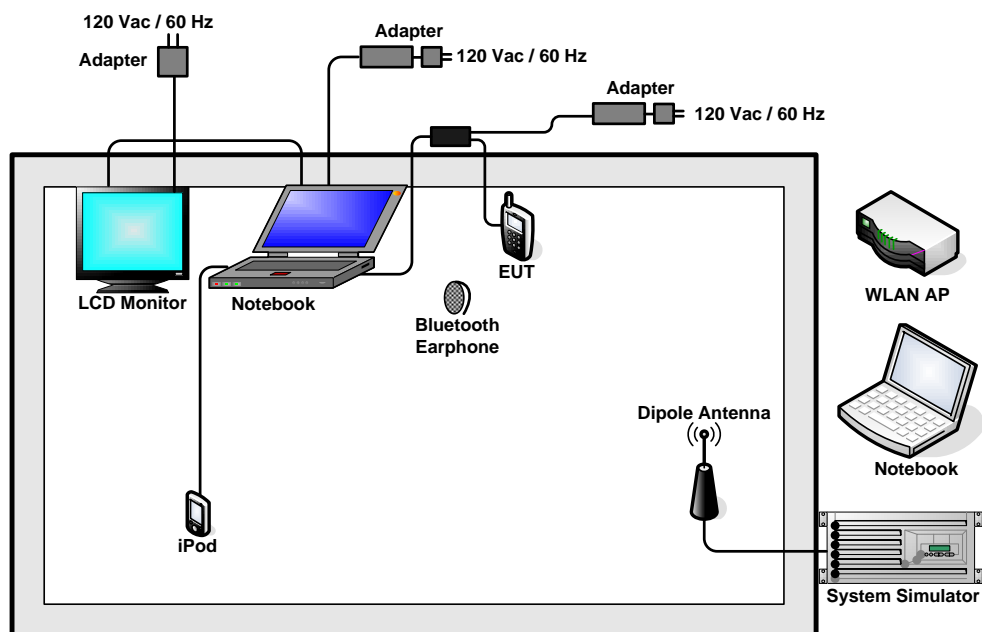
Test Cases
AC Conducted Emission
Mode 1 :GSM850 Idle + WLAN (2.4G) Link + Bluetooth Link + GPS Rx + Qwerty Keypad with Camera + USB Charging Cable with AC Power + USB Link
Mode 2 :WCDMA Band V Idle + WLAN (2.4G) Link + Bluetooth Link + Camera + Numeric Keypad without Camera + USB Charging Cable with AC Power + USB Link
Mode 3 :WCDMA Band II Idle + WLAN (2.4G) Link + Bluetooth Link + Scanner + PIM Keypad without Camera + USB Charging Cable with AC Power + USB Link
Mode 4 :WCDMA Band V Idle + WLAN (5G) Link + Bluetooth Link + Camera + Numeric Keypad without Camera + USB Charging Cable with AC Power + USB Link
<b>Remark:</b> <ol style="list-style-type: none"> <li>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.</li> <li>"BT Link" stands for EUT linked to Bluetooth Base Station by BT function.</li> <li>"WLAN Link" stands for EUT with AP at 2.4GHz or 5GHz band.</li> <li>"Scanner" stands for scanning and decoding a barcode by scanner.</li> <li>"Camera" stands for playing camera to capture picture.</li> <li>"USB Link" stands for Activesync RNDIS file transfer.</li> <li>DSD keypad PCB is the same as Numeric keypad PCB, only difference is printed.</li> </ol>

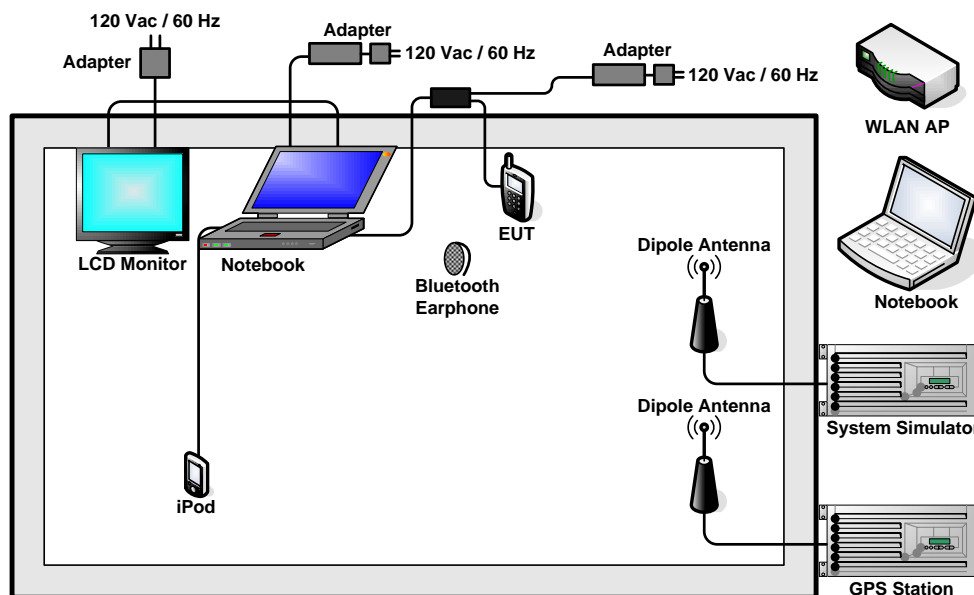
### 2.3 Connection Diagram of Test System

## <Bluetooth Tx Mode>



### <AC Conducted Emission Mode>



**<AC Conducted Emission with GPS Rx Mode>**


## 2.4 RF Utility

For Bluetooth function, the RF utility, "FILE EXPLORER → MPA3WM BT Regulatory → test → Device Under test On" was installed in EUT which was programmed in order to make the EUT to contact with Bluetooth base station for transmitting and receiving signals continuously.

### 3 Test Result

#### 3.1 Number of Channel Measurement

##### 3.1.1 Limits of Number of Hopping Frequency

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

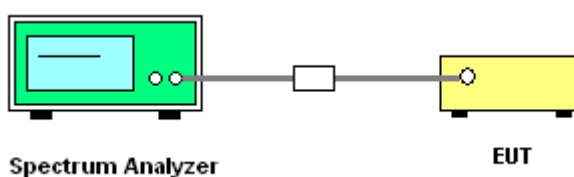
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.  
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.
4. The number of hopping frequency used is defined as the device has the numbers of total channel.

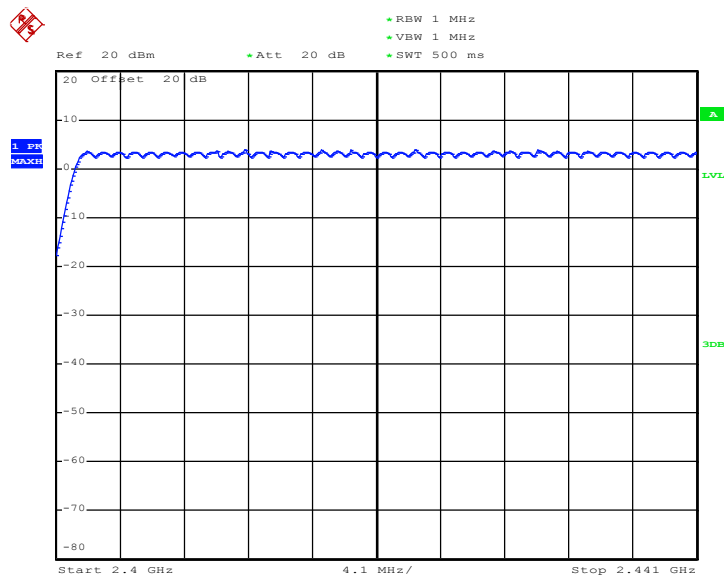
##### 3.1.4 Test Setup



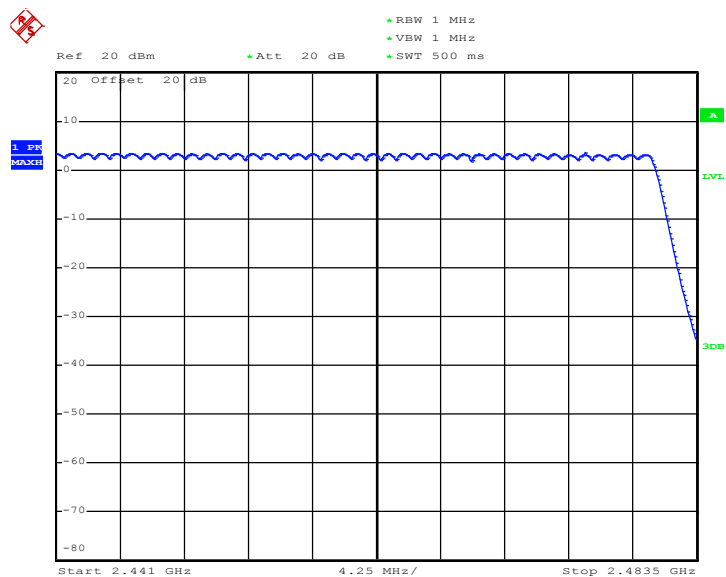
##### 3.1.5 Test Result of Number of Hopping Frequency

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	60~63%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

## Number of Hopping Channel Plot on Channel 00 - 78



Date: 29.FEB.2012 10:38:34



Date: 29.FEB.2012 10:39:45

## 3.2 Hopping Channel Separation Measurement

### 3.2.1 Limit of Hopping Channel Separation

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

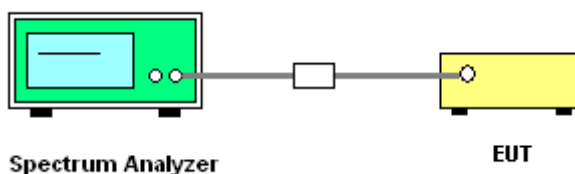
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 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 and enable the hopping function of the EUT.
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.

### 3.2.4 Test Setup



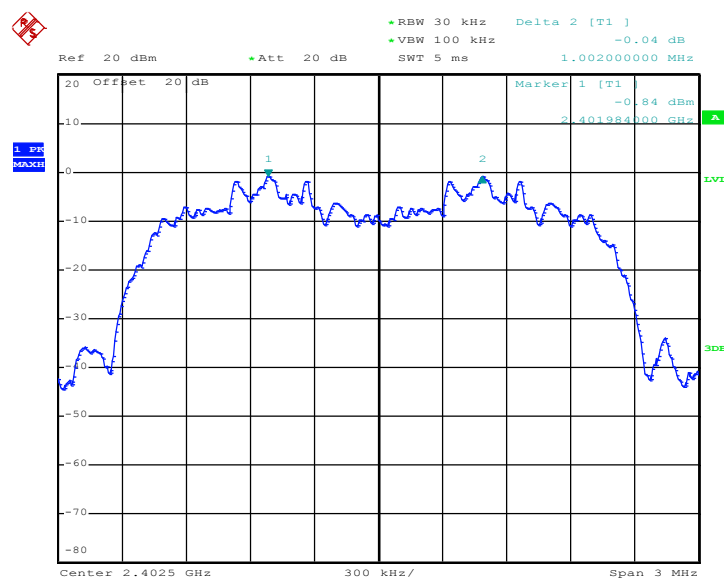


### 3.2.5 Test Result of Hopping Channel Separation

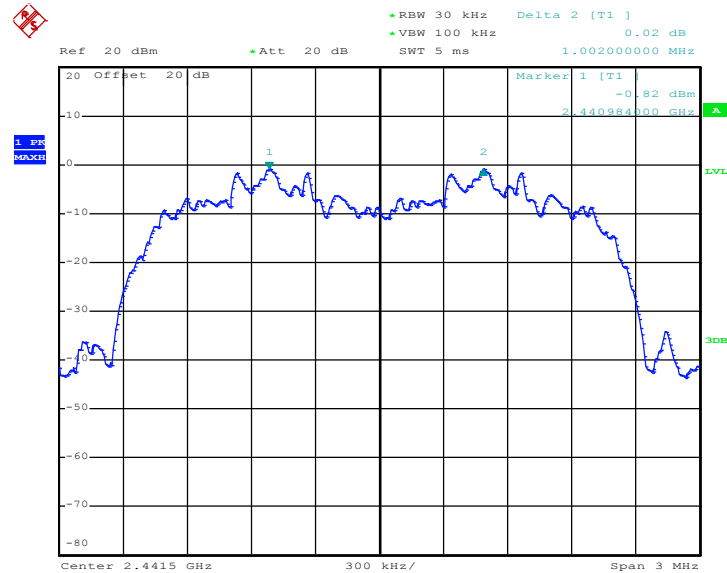
<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	60~63%

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

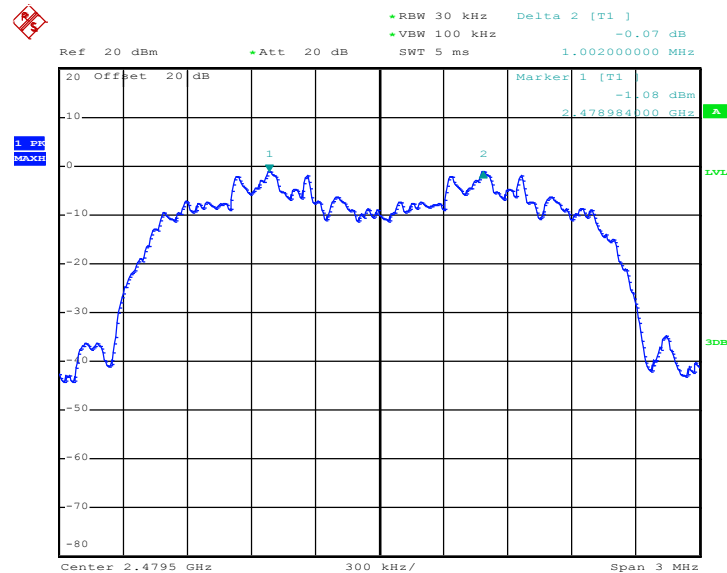
**Channel Separation Plot on Channel 00 - 01**



Date: 29.FEB.2012 10:09:05

**Channel Separation Plot on Channel 39 - 40**


Date: 29.FEB.2012 10:09:44

**Channel Separation Plot on Channel 77 - 78**


Date: 29.FEB.2012 10:11:57

### 3.3 Dwell Time Measurement

#### 3.3.1 Limit of Dwell Time

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

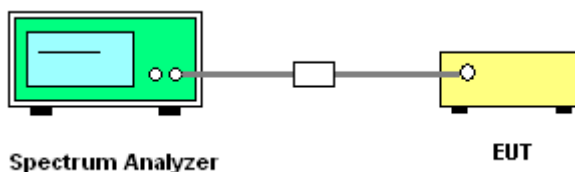
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate and enable the hopping function of the EUT.
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.

#### 3.3.4 Test Setup



### 3.3.5 Test Result of Dwell Time

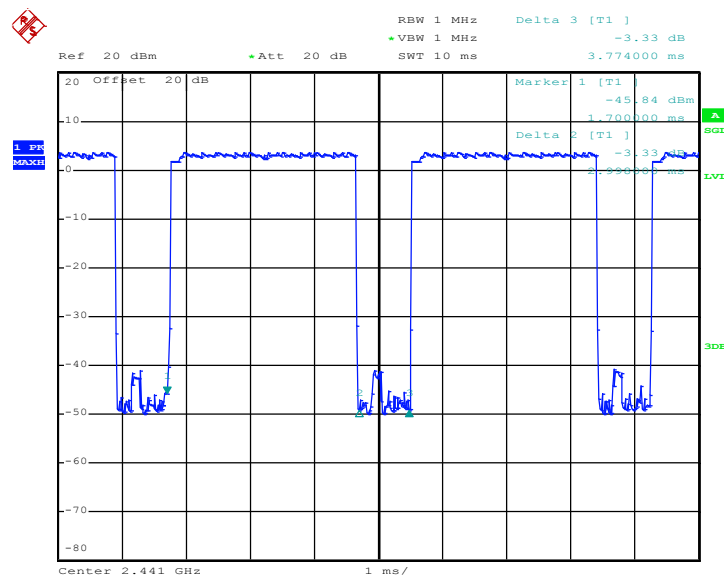
Test Mode :	3DH5	Temperature :	21~23℃
Test Engineer :	Pinkston Tu	Relative Humidity :	60~63%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.30	2998.00	0.31	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)

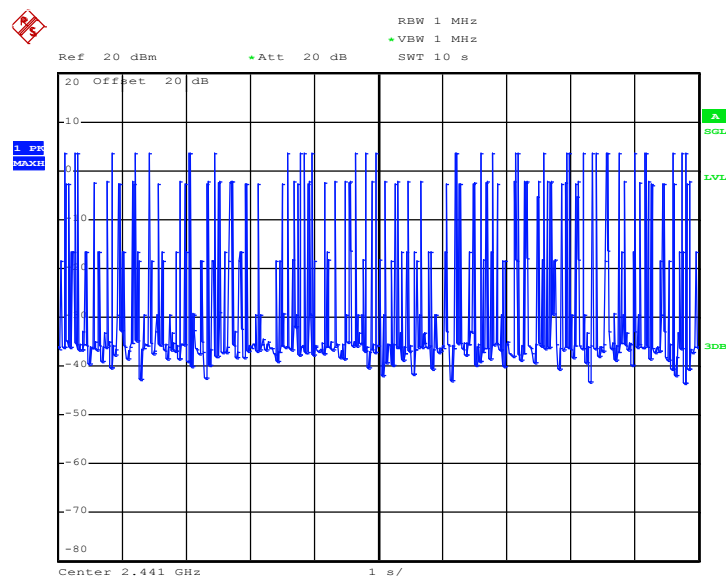
#### 3DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 29.FEB.2012 09:51:08



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



Date: 29.FEB.2012 09:53:20

### 3.4 20dB and 99% Bandwidth Measurement

#### 3.4.1 Limit of 20dB Bandwidth

N/A

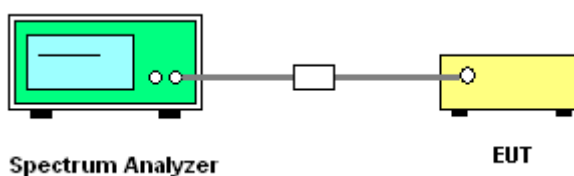
#### 3.4.2 Measuring Instruments

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. 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.

#### 3.4.4 Test Setup

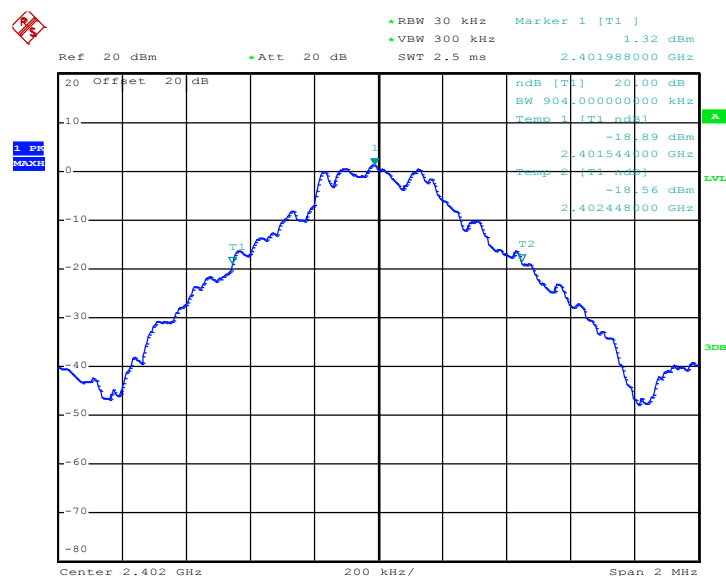


### 3.4.5 Test Result of 20dB Bandwidth

Test Mode :	1Mbps	Temperature :	21~23°C
Test Engineer :	Pinkston Tu	Relative Humidity :	60~63%

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

**20 dB Bandwidth Plot on Channel 00**



Date: 29.FEB.2012 10:12:31

[illegible]

Date: 29.FEB.2012 10:12:58

• RBW 30 kHz      Marker 1 [T1]      1.18 dBm  
 • VBW 300 kHz  
 Ref 20 dBm      Att 20 dB      SWT 2.5 ms      2.479984000 GHz

20 OffSet 20 dB  
 10  
 0  
 -10  
 -20  
 -30  
 -40  
 -50  
 -60  
 -70  
 -80

ndb [T1] 20.00 dB  
 BW 904.00000000 kHz  
 Temp 1 [T1 ndb] -19.23 dBm  
 2.479544000 GHz  
 Temp 2 [T2 ndb] -18.66 dBm  
 2.480448000 GHz

LVL  
 3dB

Center 2.48 GHz      200 kHz/      Span 2 MHz

Date: 29.FEB.2012 10:13:35

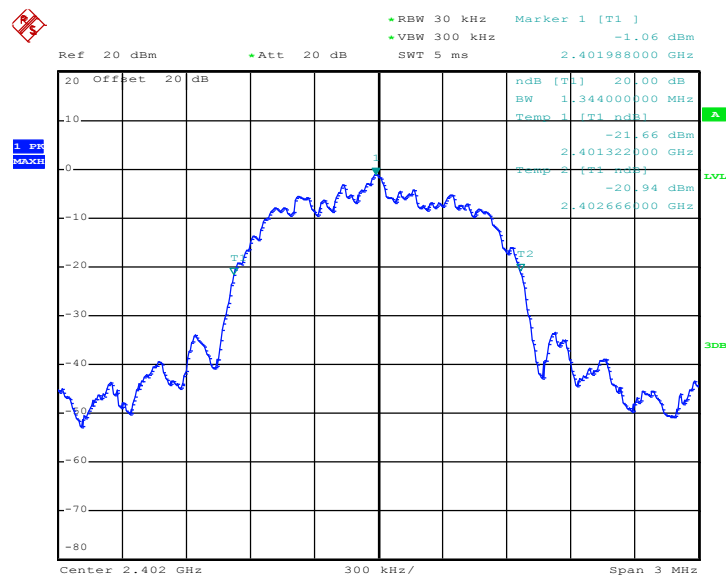




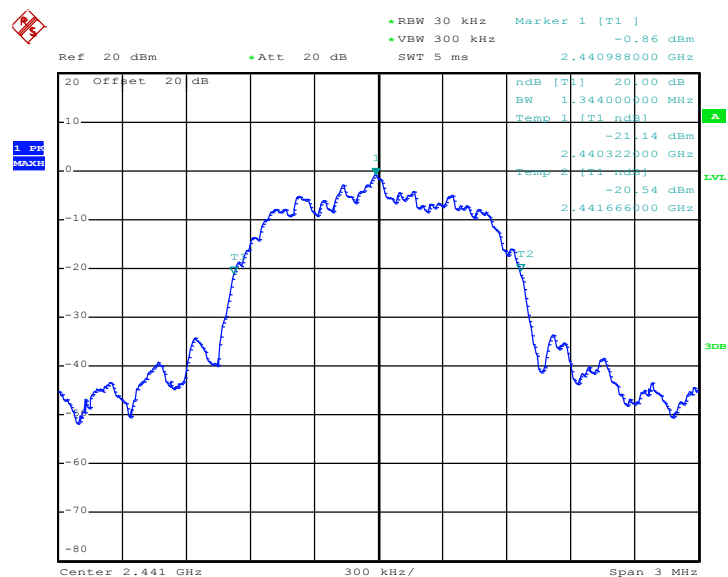
<b>Test Mode :</b>	2Mbps	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	60~63%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.344
39	2441	1.344
78	2480	1.338

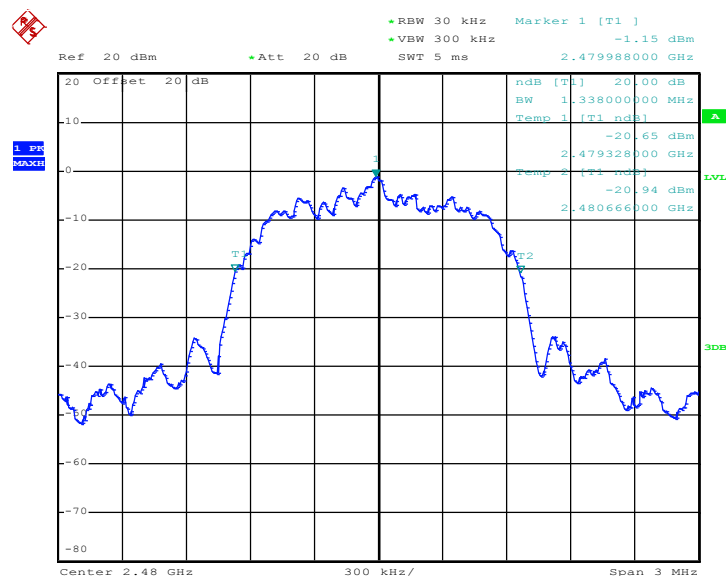
**20 dB Bandwidth Plot on Channel 00**



Date: 29.FEB.2012 10:14:15

**20 dB Bandwidth Plot on Channel 39**


Date: 29.FEB.2012 10:15:08

**20 dB Bandwidth Plot on Channel 78**


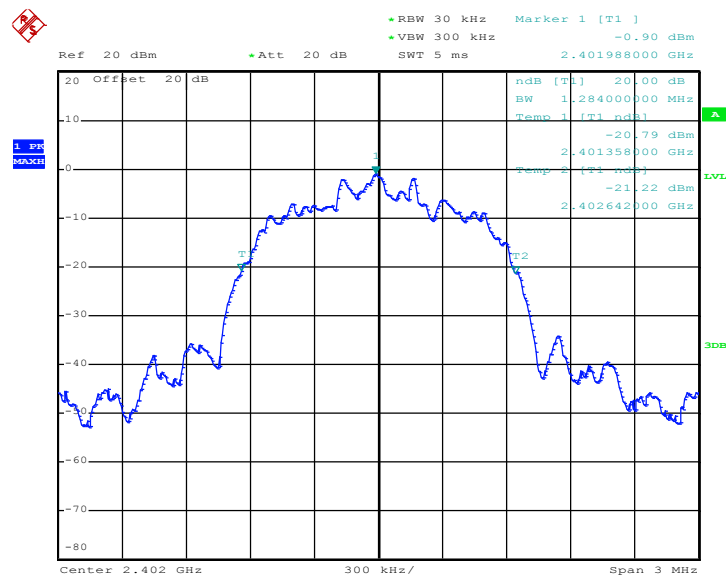
Date: 29.FEB.2012 10:15:41



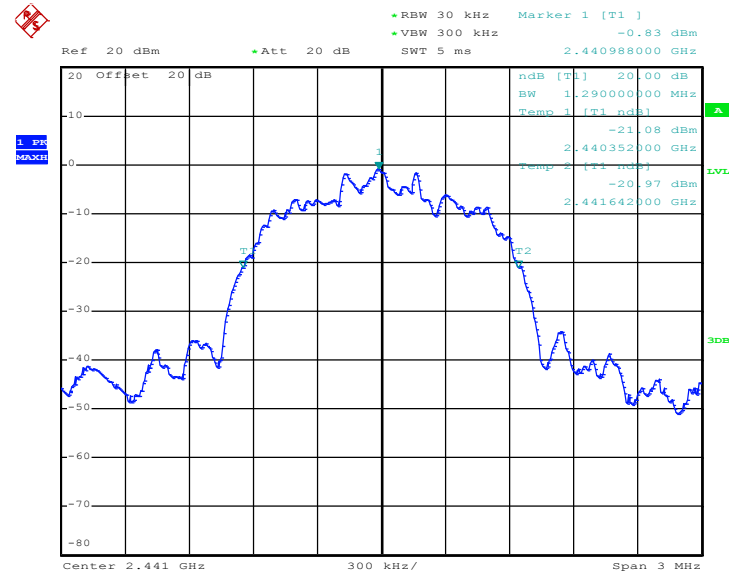
<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	60~63%

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

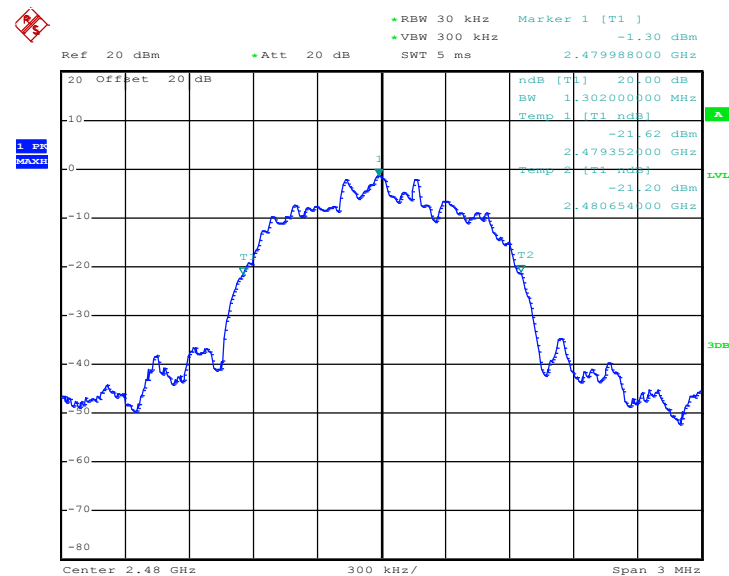
**20 dB Bandwidth Plot on Channel 00**



Date: 29.FEB.2012 10:16:19

**20 dB Bandwidth Plot on Channel 39**


Date: 29.FEB.2012 10:17:27

**20 dB Bandwidth Plot on Channel 78**


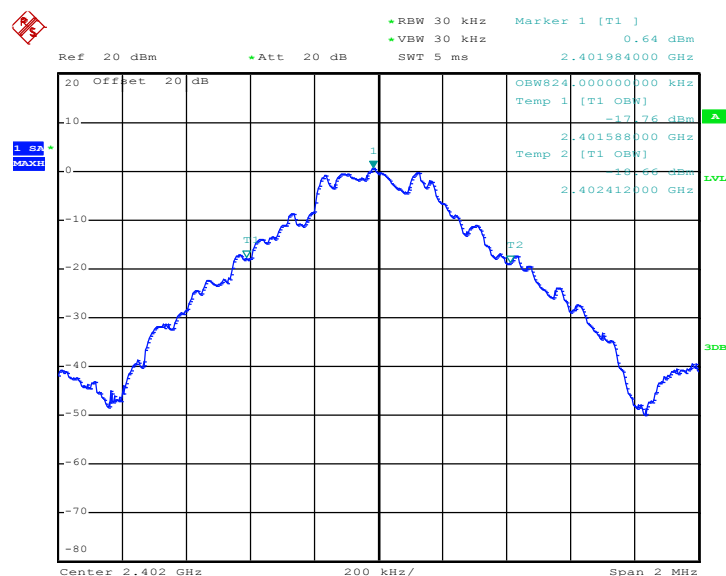
Date: 29.FEB.2012 10:18:21

### 3.4.6 Test Result of 99% Occupied Bandwidth

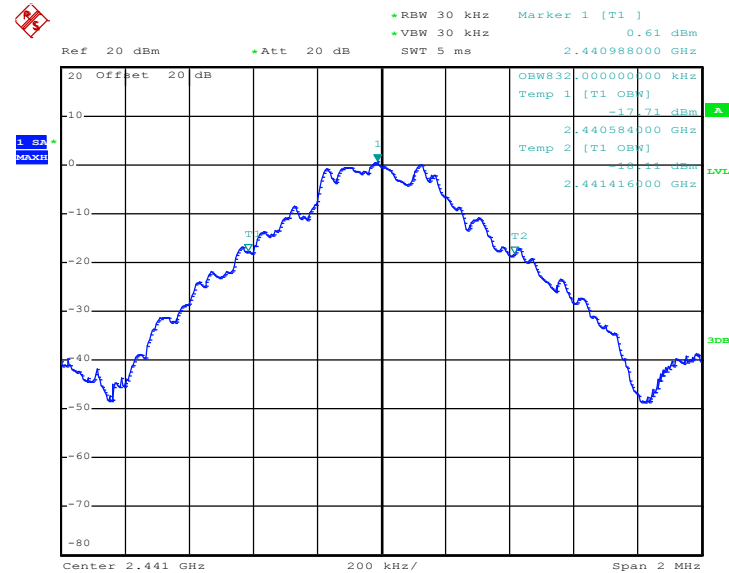
Test Mode :	1Mbps	Temperature :	21~23°C
Test Engineer :	Pinkston Tu	Relative Humidity :	60~63%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.824
39	2441	0.832
78	2480	0.832

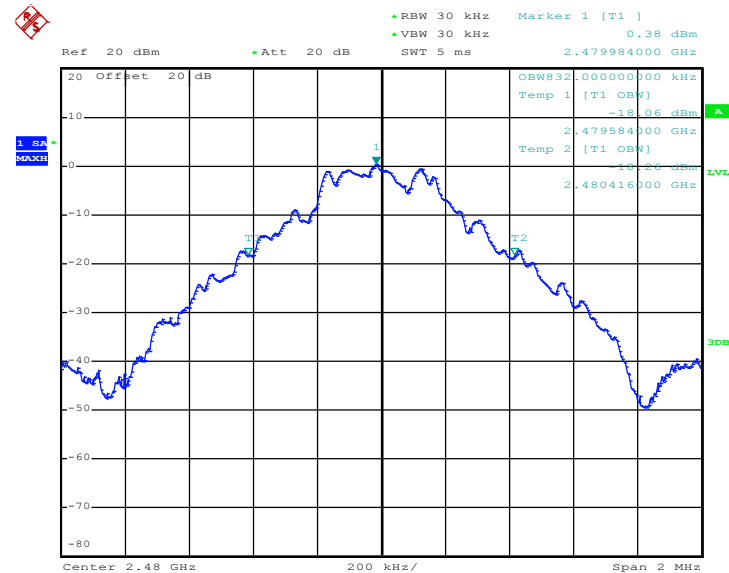
**99% Bandwidth Plot on Channel 00**



Date: 29.FEB.2012 10:25:08

**99% Occupied Bandwidth Plot on Channel 39**


Date: 29.FEB.2012 10:25:44

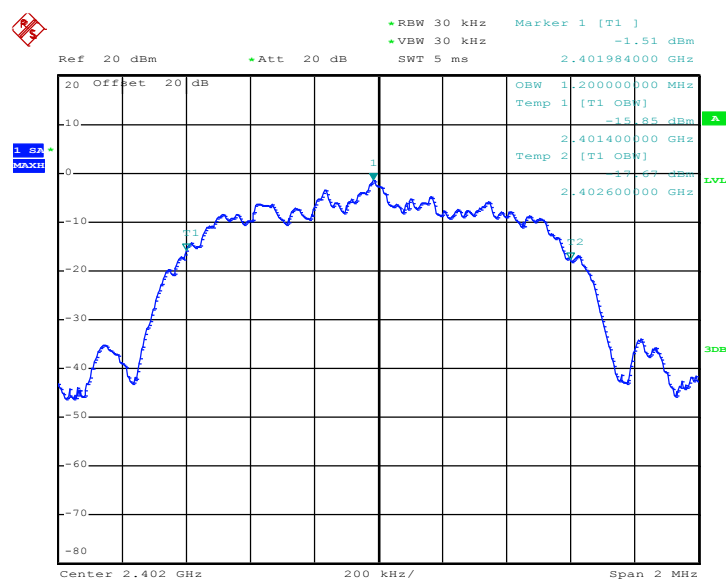
**99% Occupied Bandwidth Plot on Channel 78**


Date: 29.FEB.2012 10:26:20

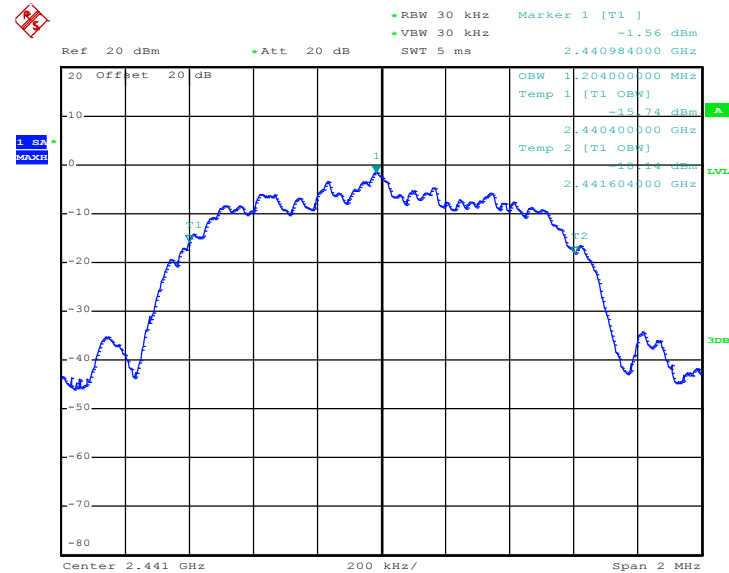


Test Mode :	2Mbps	Temperature :	21~23°C
Test Engineer :	Pinkston Tu	Relative Humidity :	60~63%

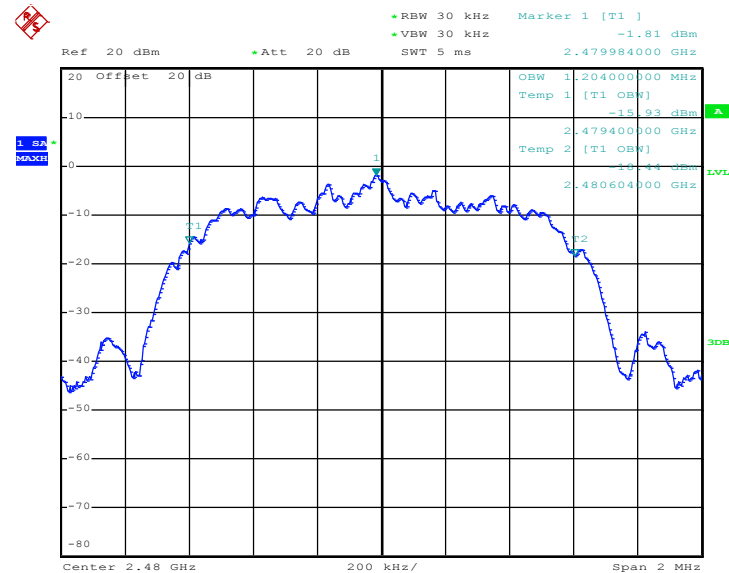
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.200
39	2441	1.204
78	2480	1.204

**99% Bandwidth Plot on Channel 00**

Date: 29.FEB.2012 10:31:59

**99% Occupied Bandwidth Plot on Channel 39**


Date: 29.FEB.2012 10:27:32

**99% Occupied Bandwidth Plot on Channel 78**


Date: 29.FEB.2012 10:28:08

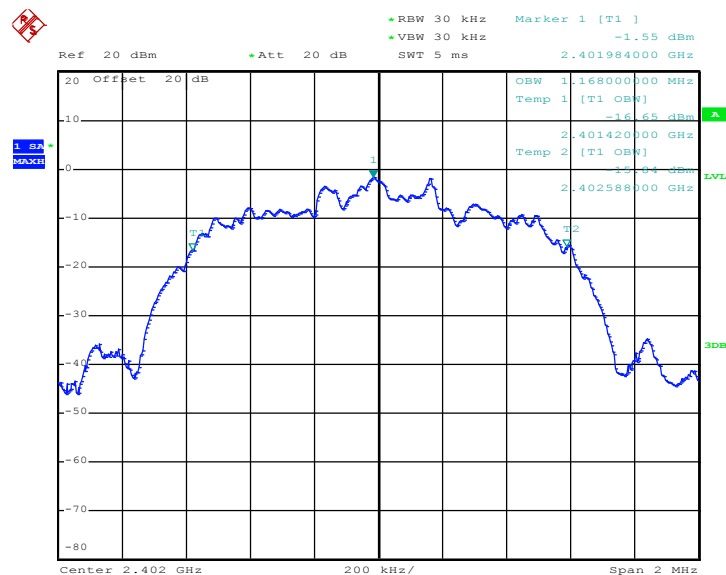




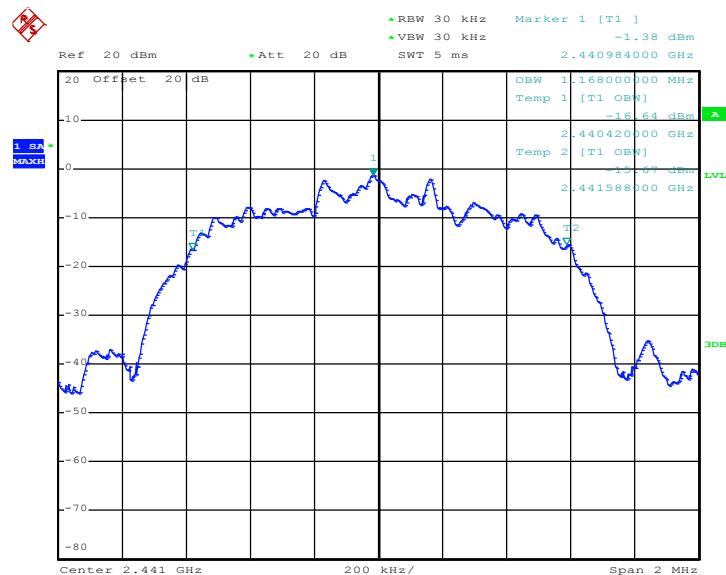
<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Pinkston Tu	<b>Relative Humidity :</b>	60~63%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.168
39	2441	1.168
78	2480	1.172

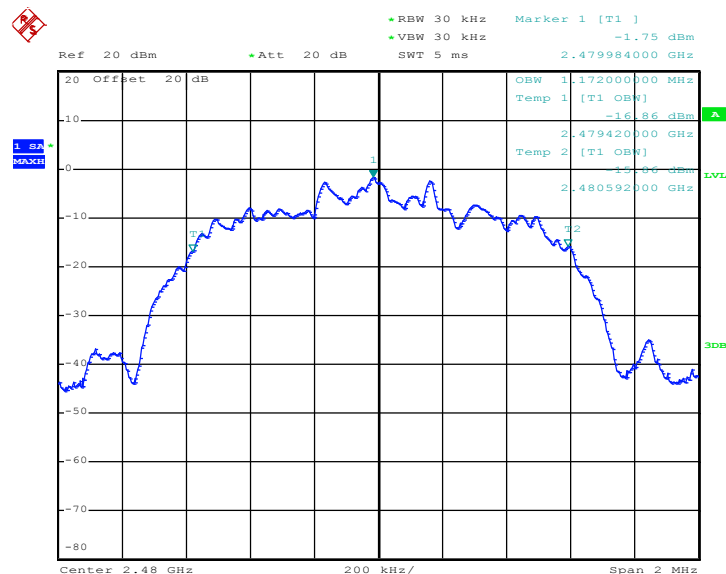
**99% Bandwidth Plot on Channel 00**



Date: 29.FEB.2012 10:28:44

**99% Occupied Bandwidth Plot on Channel 39**


Date: 29.FEB.2012 10:29:20

**99% Occupied Bandwidth Plot on Channel 78**


Date: 29.FEB.2012 10:30:38

### 3.5 Peak Output Power Measurement

#### 3.5.1 Limit of Peak Output Power

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

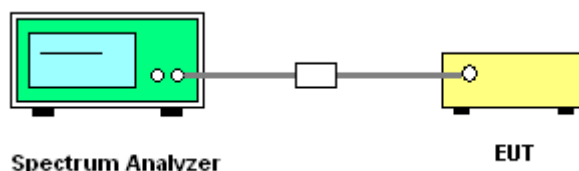
#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.5.3 Test Procedures

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

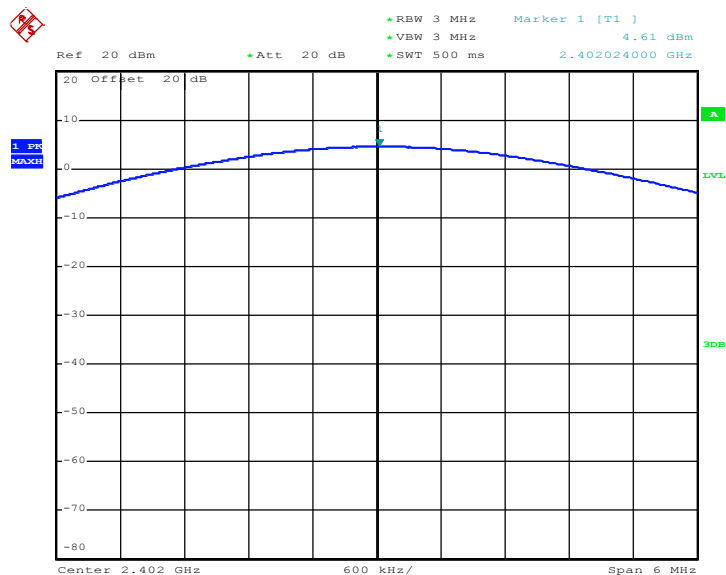
#### 3.5.4 Test Setup



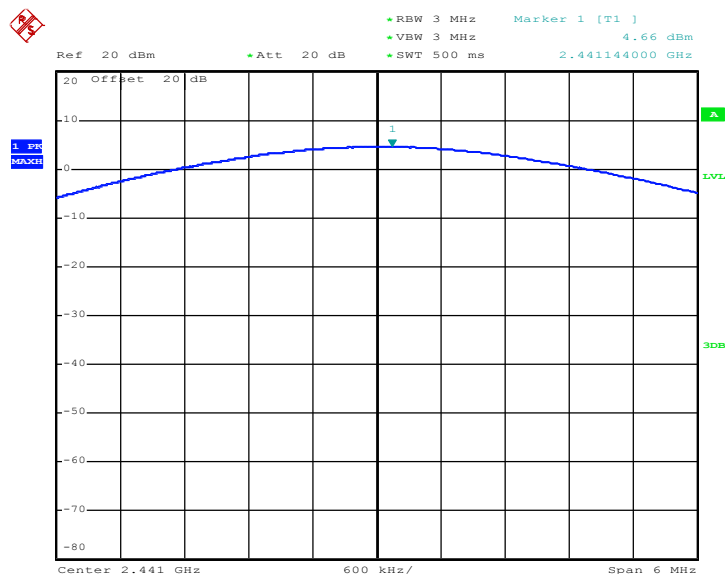
#### 3.5.5 Test Result of Peak Output Power

Test Mode :	3Mbps	Temperature :	21~23℃	
Test Engineer :	Pinkston Tu	Relative Humidity :	60~63%	

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	4.61	20.97	Pass
39	2441	4.66	20.97	Pass
78	2480	4.34	20.97	Pass

**Peak Output Power Plot on Channel 00**


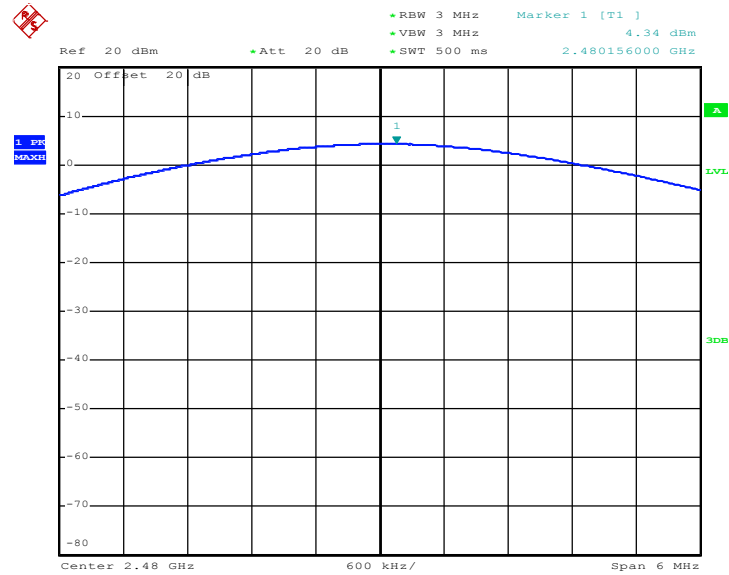
Date: 29.FEB.2012 09:39:00

**Peak Output Power Plot on Channel 39**


Date: 29.FEB.2012 09:40:14



Peak Output Power Plot on Channel 78



Date: 29.FEB.2012 09:41:28

### 3.6 Conducted Band Edges Measurement

#### 3.6.1 Limit of Band Edges

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

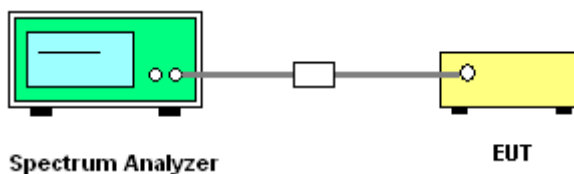
#### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.6.3 Test Procedures

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set RBW = 300KHz ( $\geq 1\%$  span=30MHz ), VBW = 300KHz ( $\geq$  RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 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. 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.
4. Enable hopping function of the EUT and repeat step 2. and 3.

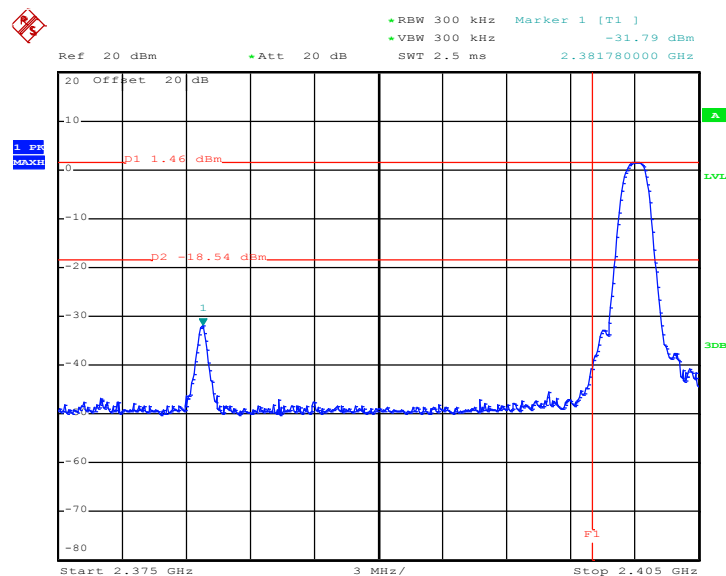
#### 3.6.4 Test Setup



### 3.6.5 Test Result of Conducted Band Edges

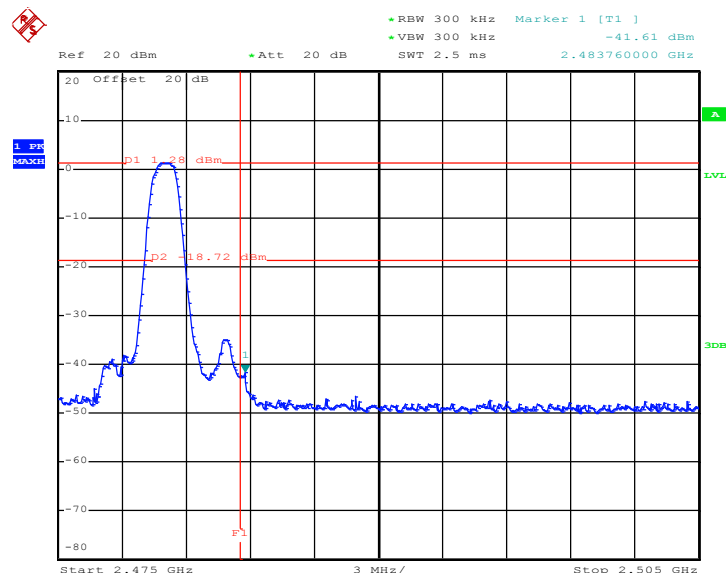
Test Mode :	3Mbps	Temperature :	21~23℃
Test Channel :	00 and 78	Relative Humidity :	60~63%
		Test Engineer :	Pinkston Tu

**Low Band Edge Plot on Channel 00**



Date: 29.FEB.2012 11:06:33

**High Band Edge Plot on Channel 78**

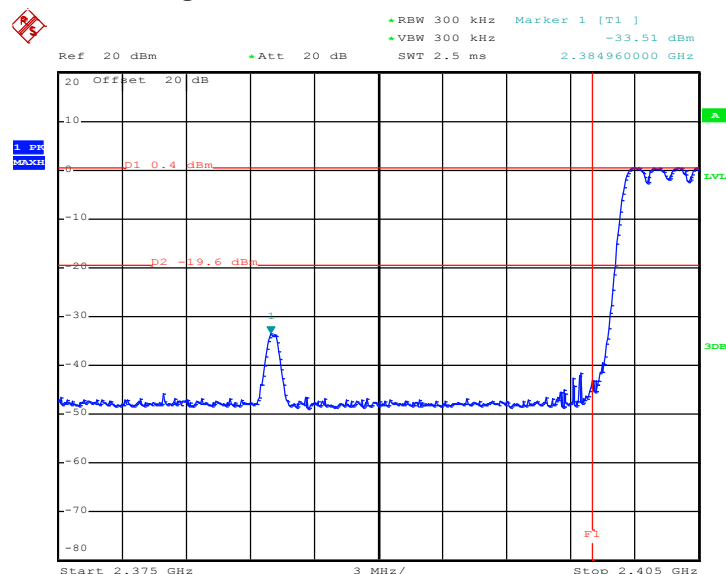


Date: 29.FEB.2012 10:57:28

### 3.6.6 Test Result of Conducted Hopping Mode Band Edges

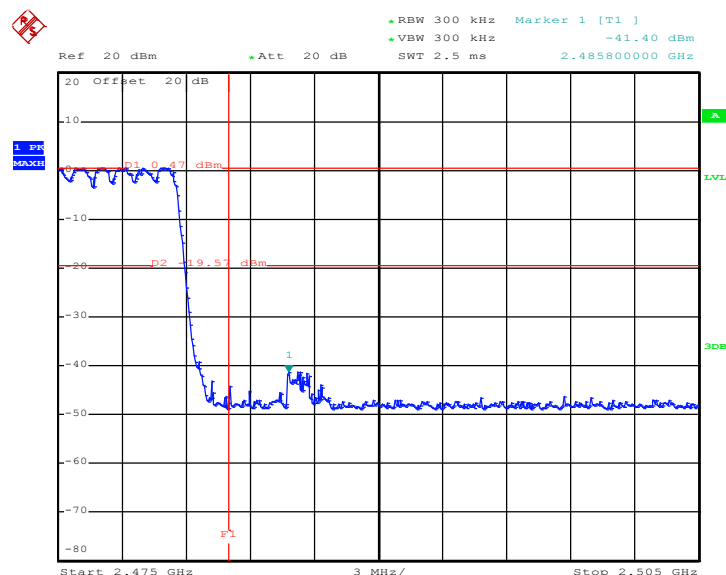
<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	21~23°C
<b>Test Channel :</b>	00 and 78	<b>Relative Humidity :</b>	60~63%
		<b>Test Engineer :</b>	Pinkston Tu

**Low Band Edge Plot on Channel 00**



Date: 13.JUL.2012 00:29:46

**High Band Edge Plot on Channel 78**



Date: 13.JUL.2012 00:32:08



### 3.7 Conducted Spurious Emission Measurement

#### 3.7.1 Limit of Spurious Emission Measurement

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

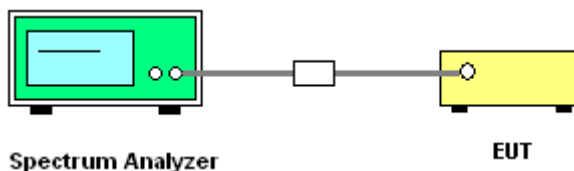
#### 3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.7.3 Test Procedure

1. The testing follows the guidelines in Spurious RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines
2. The transmitter output was connected to the spectrum analyzer via a low lose cable.
3. Set RBW = 100 KHz, VBW = 300KHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 KHz RBW.

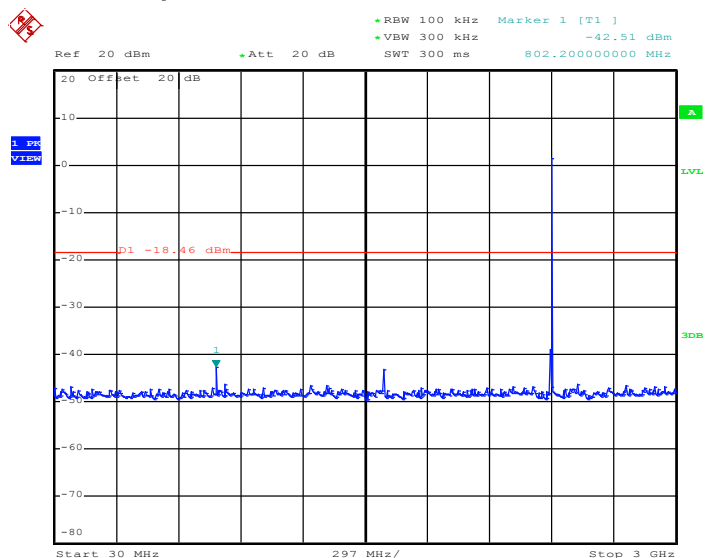
#### 3.7.4 Test Setup



### 3.7.5 Test Result

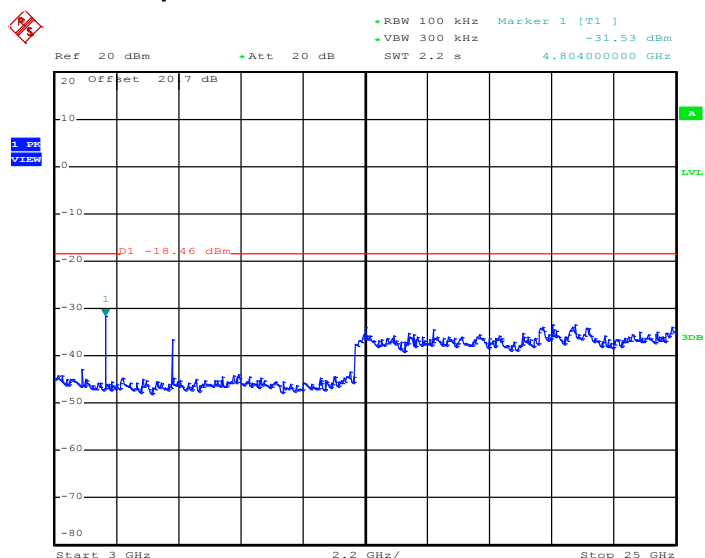
Test Mode :	3Mbps	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	60~63%
		Test Engineer :	Pinkston Tu

#### Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 29.FEB.2012 10:19:17

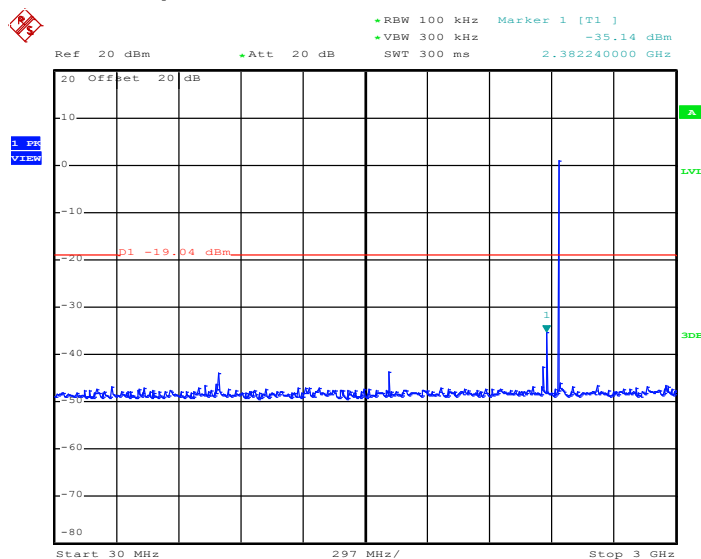
#### Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



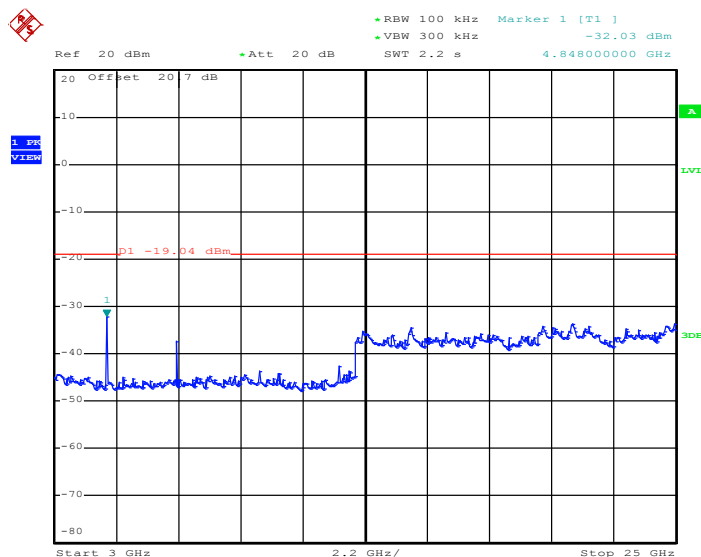
Date: 29.FEB.2012 10:19:29



Test Mode :	3Mbps	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	60~63%
		Test Engineer :	Pinkston Tu

**Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**

Date: 29.FEB.2012 10:20:20

**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

Date: 29.FEB.2012 10:20:32



**Report No. : FR221518-01A**

### Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



### Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



### 3.8 Radiated Band Edges Measurement

#### 3.8.1 Limit of Radiated Band Edges

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

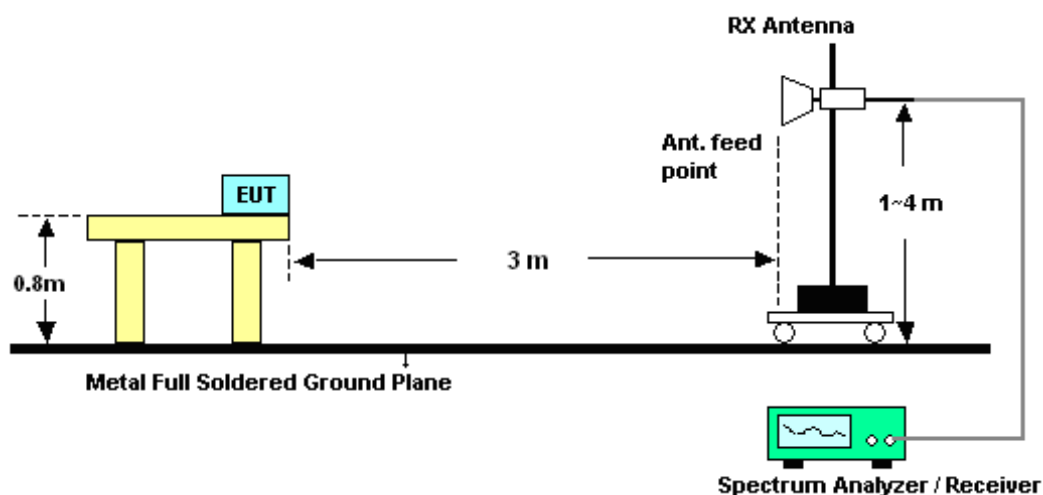
See list of measuring instruments of this test report.

#### 3.8.3 Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines and fulfills ANSI C63.4-2003 test site requirement. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300kHz RBW. For Conducted Band Edge measurement, enable the hopping function of the EUT and repeat. Note: If the device complies with the use of average power the attenuation under this paragraph shall be 30 dB instead of 20 dB.

3. 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.

### 3.8.4 Test Setup



**3.8.5 Test Result of Radiated Band Edges**

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	42~43%
		<b>Test Engineer :</b>	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2380.87	61.05	-12.95	74	56.95	32.03	6.03	33.96	146	2	Peak
2380.87	33.33	-20.67	54	29.23	32.03	6.03	33.96	146	2	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2383.15	53.89	-20.11	74	49.79	32.03	6.03	33.96	100	30	Peak
2383.15	33.25	-20.75	54	29.15	32.03	6.03	33.96	100	30	Average

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	42~43%
		<b>Test Engineer :</b>	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	60.72	-13.28	74	56.36	32.18	6.18	34	110	19	Peak
2483.5	35.55	-18.45	54	-	-	-	-	-	-	Average

**Summary results of marker-delta method:**

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Average	80.51	44.96	35.55	54	-18.45	Pass

**Note :** Average result = Maximum field strength – Delta result

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	56.74	-17.26	74	52.38	32.18	6.18	34	101	78	Peak
2483.5	32.32	-21.68	54	-	-	-	-	-	-	Average

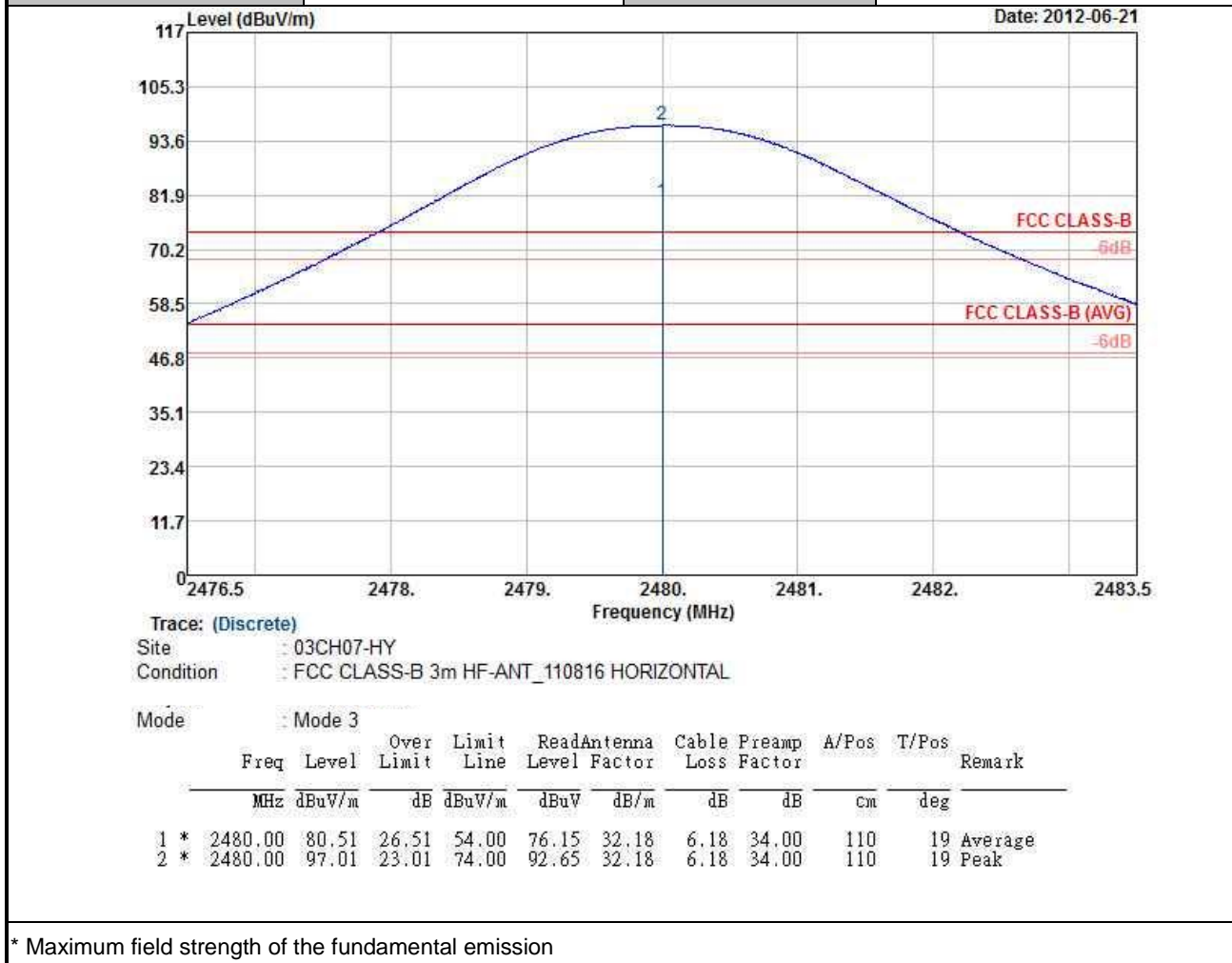
**Summary results of marker-delta method:**

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Average	77.28	44.96	32.32	54	-21.68	Pass

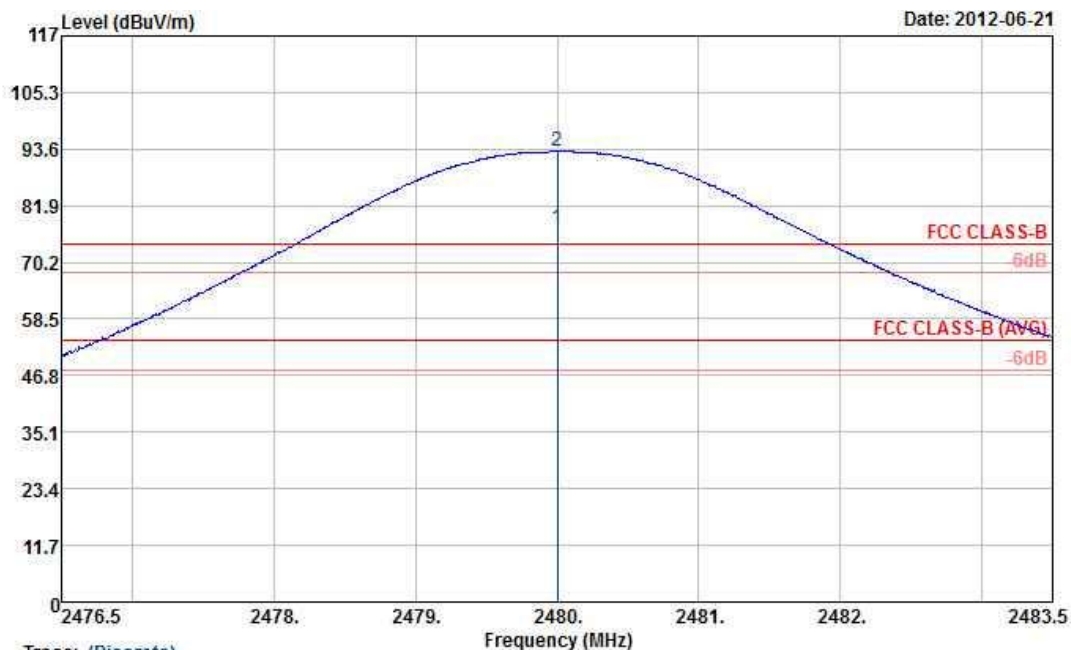
**Note :** Average result = Maximum field strength – Delta result



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Horizontal



Test Mode :	Mode 3	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	42~43%
Test Engineer :	Gavin Wu	Polarization :	Vertical



Trace: (Discrete)

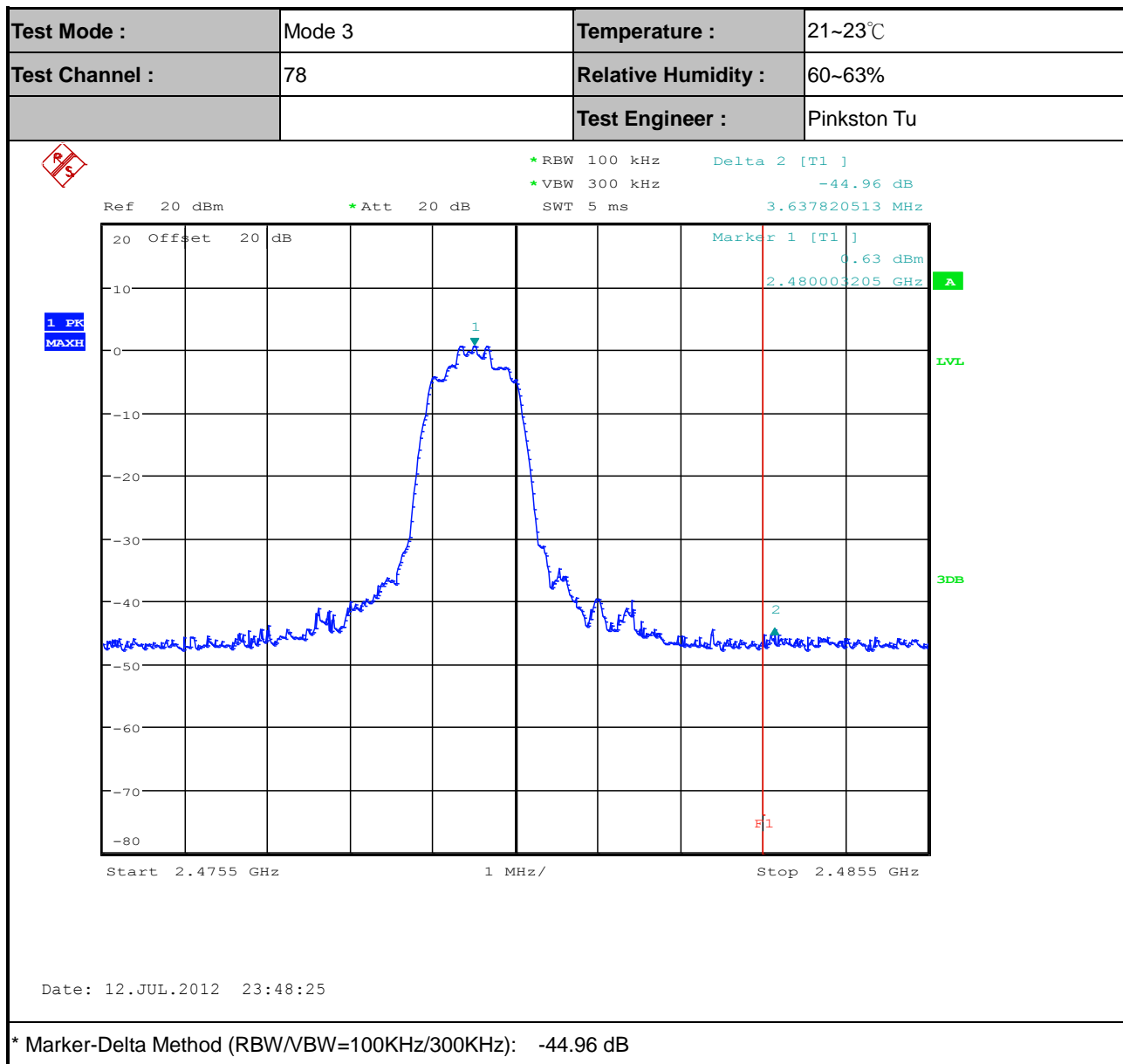
Site : 03CH07-HY

Condition : FCC CLASS-B 3m HF-ANT\_110816 VERTICAL

Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	2480.00	77.28	23.28	54.00	72.92	32.18	6.18	34.00	101	78	Average
2 *	2480.00	93.15	19.15	74.00	88.79	32.18	6.18	34.00	101	78	Peak

\* Maximum field strength of the fundamental emission



### 3.9 Radiated Spurious 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.

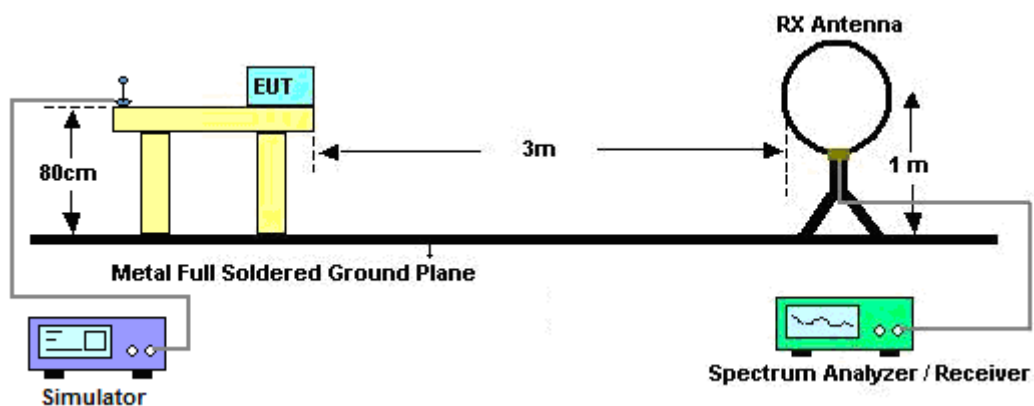
### 3.9.3 Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines and fulfills ANSI C63.4-2003 and the guidelines in ANSI C63.10-2009 test site requirement.
2. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. The table was rotated 360 degrees to determine the position of the highest radiation.
6. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 KHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 1MHz for  $f \geq 1$  GHz for Peak measurement, and then set VBW=10Hz, while maintaining all of the other instrument settings for Average measurement.
- Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
7. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
8. If the emission level of the EUT measured by the peak detector is more than 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

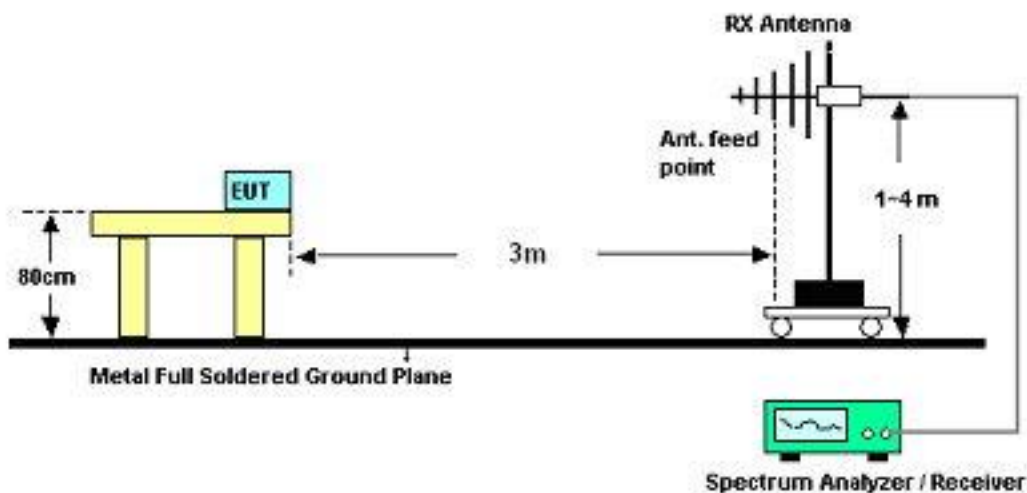
Note: The average measurement for Bluetooth may calculate from the peak level corrected with duty cycle correction factor, derived from the appropriate duty cycle calculation per 15.35(b) and (c). The result by calculation method is no worse than direct measurement by using VBW=10Hz.

### 3.9.4 Test Setup

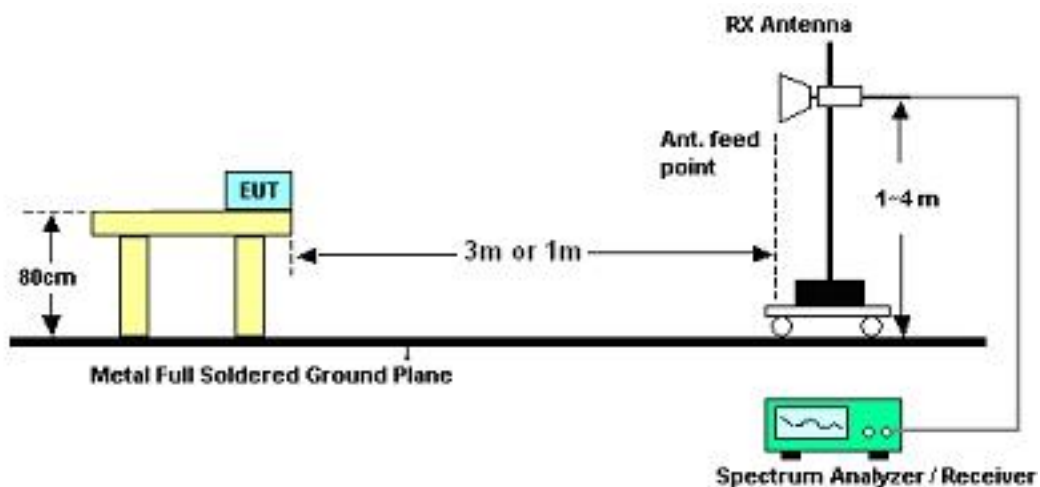
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2402 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.54	22.03	-17.97	40	34.08	19.28	0.54	31.87	-	-	Peak
180.66	30.82	-12.68	43.5	51.86	8.9	1.25	31.19	100	29	Peak
266.25	21.67	-24.33	46	38.5	12.83	1.62	31.28	-	-	Peak
318.9	20.27	-25.73	46	35.77	13.82	1.81	31.13	-	-	Peak
630.4	22.3	-23.7	46	29.91	20.04	2.78	30.43	-	-	Peak
837.6	26.77	-19.23	46	31.5	22.48	3.24	30.45	-	-	Peak
2380.87	33.33	-20.67	54	29.23	32.03	6.03	33.96	146	2	Average
2380.87	61.05	-12.95	74	56.95	32.03	6.03	33.96	146	2	Peak
2402	81.29	-	-	77.16	32.06	6.03	33.96	146	2	Average
2402	98.5	-	-	94.37	32.06	6.03	33.96	146	2	Peak
2498	32.62	-21.38	54	28.24	32.2	6.18	34	146	2	Average
2498	44.93	-29.07	74	40.55	32.2	6.18	34	146	2	Peak



<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2402 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.27	31.01	-8.99	40	42.35	20	0.53	31.87	-	-	Peak
181.2	31.67	-11.83	43.5	52.7	8.91	1.25	31.19	-	-	Peak
226.83	24.26	-21.74	46	43.03	10.98	1.46	31.21	-	-	Peak
318.2	19.71	-26.29	46	35.24	13.8	1.81	31.14	-	-	Peak
743.1	23.65	-22.35	46	29.89	21.24	3.04	30.52	-	-	Peak
897.8	27.49	-18.51	46	31.89	23.08	3.34	30.82	-	-	Peak
2383.15	33.25	-20.75	54	29.15	32.03	6.03	33.96	100	30	Average
2383.15	53.89	-20.11	74	49.79	32.03	6.03	33.96	100	30	Peak
2402	77.9	-	-	73.77	32.06	6.03	33.96	100	30	Average
2402	93.87	-	-	89.74	32.06	6.03	33.96	100	30	Peak
2486	32.75	-21.25	54	28.39	32.18	6.18	34	100	30	Average
2486	44.76	-29.24	74	40.4	32.18	6.18	34	100	30	Peak

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2441 MHz is fundamental signal which can be ignored. 2. 2400 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 97.24 dBuV/m - 20dB = 77.24 dBuV/m.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.27	24.01	-15.99	40	35.35	20	0.53	31.87	-	-	Peak
181.2	30.88	-12.62	43.5	51.91	8.91	1.25	31.19	100	71	Peak
246.27	21.88	-24.12	46	39.2	12.33	1.53	31.18	-	-	Peak
385.4	19.03	-26.97	46	32.66	15.61	2.11	31.35	-	-	Peak
700.4	24.3	-21.7	46	31.25	20.6	2.94	30.49	-	-	Peak
845.3	24.64	-21.36	46	29.32	22.56	3.26	30.5	-	-	Peak
2380	33.02	-20.98	54	28.92	32.03	6.03	33.96	111	1	Average
2380	59.05	-14.95	74	54.95	32.03	6.03	33.96	111	1	Peak
2400	48.38	-28.86	77.24	44.25	32.06	6.03	33.96	100	0	Peak
2441	80.41	-	-	76.15	32.13	6.11	33.98	111	1	Average
2441	97.24	-	-	92.98	32.13	6.11	33.98	111	1	Peak
2494	32.59	-21.41	54	28.21	32.2	6.18	34	111	1	Average
2494	44.4	-29.6	74	40.02	32.2	6.18	34	111	1	Peak

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2441 MHz is fundamental signal which can be ignored. 2. 2420 MHz is not within a restricted band.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.81	32.63	-7.37	40	44.68	19.28	0.54	31.87	100	72	Peak
108.84	30.73	-12.77	43.5	50.82	10.61	1.04	31.74	-	-	Peak
181.2	31.6	-11.9	43.5	52.63	8.91	1.25	31.19	-	-	Peak
485.5	19.28	-26.72	46	30.02	17.8	2.4	30.94	-	-	Peak
636.7	22.41	-23.59	46	29.92	20.09	2.8	30.4	-	-	Peak
821.5	25.04	-20.96	46	29.85	22.31	3.2	30.32	-	-	Peak
2380	33.03	-20.97	54	28.93	32.03	6.03	33.96	108	104	Average
2380	56.42	-17.58	74	52.32	32.03	6.03	33.96	108	104	Peak
2420	48.91	-25.12	74.03	44.71	32.1	6.07	33.97	100	0	Peak
2441	78.07	-	-	73.81	32.13	6.11	33.98	108	104	Average
2441	94.03	-	-	89.77	32.13	6.11	33.98	108	104	Peak
2494	32.61	-21.39	54	28.23	32.2	6.18	34	108	104	Average
2494	43.88	-30.12	74	39.5	32.2	6.18	34	108	104	Peak

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2480 MHz is fundamental signal which can be ignored. 2. 2420 MHz and 2458 MHz are not within the restricted bands.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.54	21.51	-18.49	40	33.56	19.28	0.54	31.87	-	-	Peak
180.66	30.91	-12.59	43.5	51.95	8.9	1.25	31.19	100	52	Peak
247.35	22.22	-23.78	46	39.46	12.4	1.53	31.17	-	-	Peak
320.3	20.02	-25.98	46	35.48	13.85	1.81	31.12	-	-	Peak
594.7	21.71	-24.29	46	29.95	19.7	2.67	30.61	-	-	Peak
897.8	28.12	-17.88	46	32.52	23.08	3.34	30.82	-	-	Peak
2382	32.94	-21.06	54	28.84	32.03	6.03	33.96	110	19	Average
2382	59.48	-14.52	74	55.38	32.03	6.03	33.96	110	19	Peak
2420	47.92	-28.95	76.87	43.72	32.1	6.07	33.97	100	0	Peak
2458	49.06	-27.81	76.87	44.76	32.15	6.14	33.99	100	0	Peak
2480	80.51	-	-	76.15	32.18	6.18	34	110	19	Average
2480	96.87	-	-	92.51	32.18	6.18	34	110	19	Peak
2483.5	35.55	-18.45	54	-	-	-	-	-	-	Average
2483.5	60.72	-13.28	74	56.36	32.18	6.18	34	110	19	Peak

<b>Test Mode :</b>	3Mbps	<b>Temperature :</b>	24~25°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	42~43%
<b>Test Engineer :</b>	Gavin Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2480 MHz is fundamental signal which can be ignored. 2. 2456 MHz is not within a restricted band.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30.27	33.32	-6.68	40	44.66	20	0.53	31.87	100	87	Peak
132.33	30.68	-12.82	43.5	49.51	11.56	1.16	31.55	-	-	Peak
181.2	31.82	-11.68	43.5	52.85	8.91	1.25	31.19	-	-	Peak
479.9	19.14	-26.86	46	30.03	17.68	2.38	30.95	-	-	Peak
666.8	22.39	-23.61	46	29.59	20.33	2.87	30.4	-	-	Peak
885.2	25.61	-20.39	46	30.08	22.95	3.32	30.74	-	-	Peak
2380	33.01	-20.99	54	28.91	32.03	6.03	33.96	101	78	Average
2380	53.12	-20.88	74	49.02	32.03	6.03	33.96	101	78	Peak
2456	47.07	-25.96	73.03	42.77	32.15	6.14	33.99	100	0	Peak
2480	77.28	-	-	72.92	32.18	6.18	34	101	78	Average
2480	93.03	-	-	88.67	32.18	6.18	34	101	78	Peak
2483.5	32.32	-21.68	54	-	-	-	-	-	-	Average
2483.5	56.74	-17.26	74	52.38	32.18	6.18	34	101	78	Peak

### 3.10 AC Conducted Emission Measurement

#### 3.10.1 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.

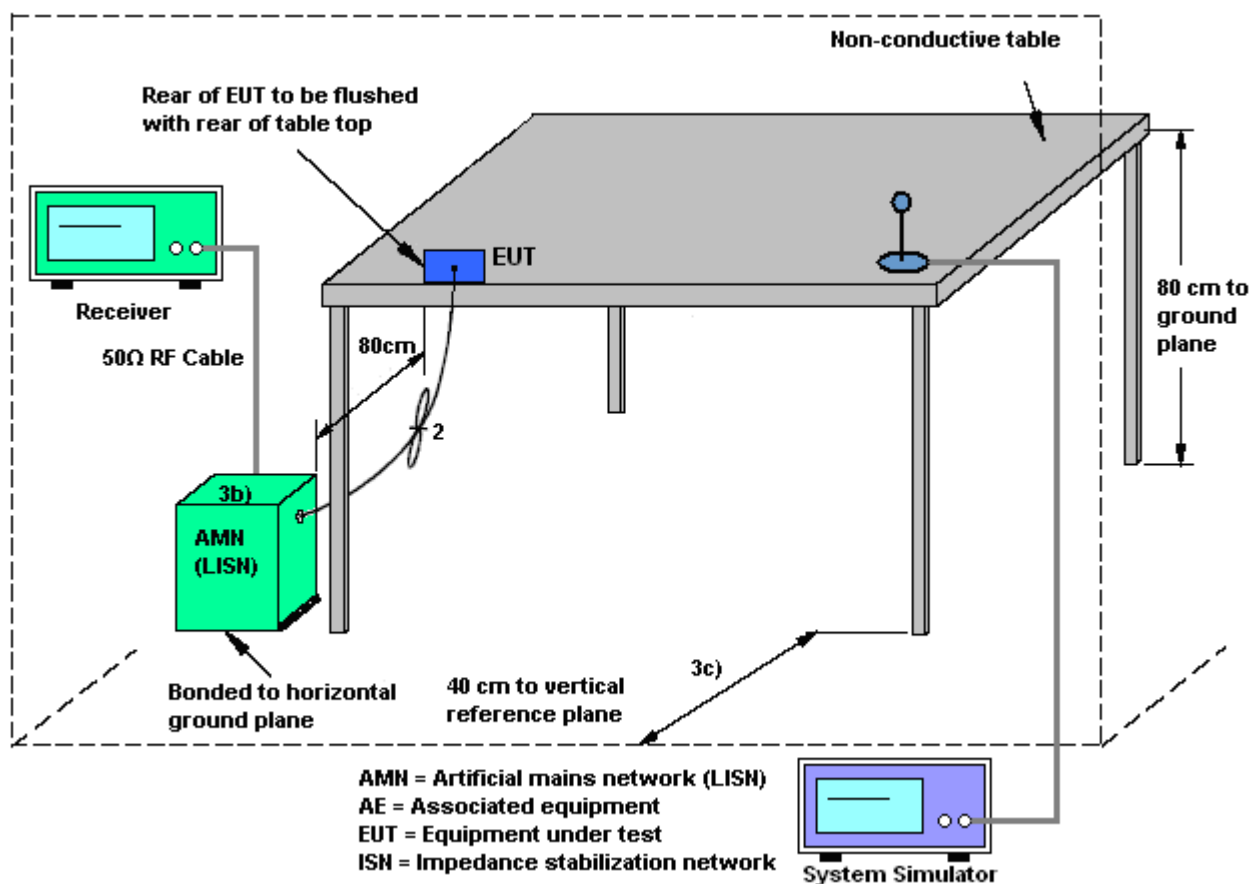
#### 3.10.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.10.3 Test Procedures

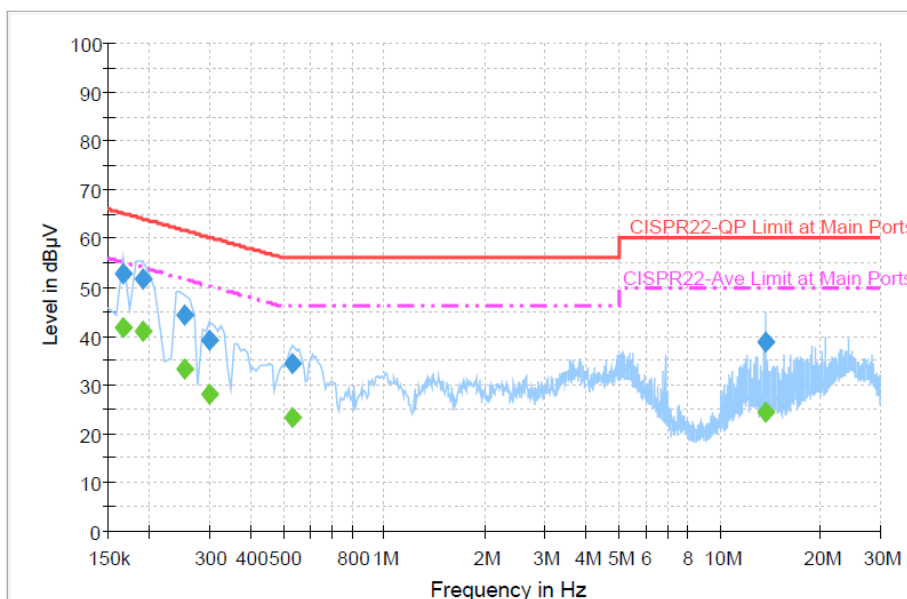
1. Please follow the guidelines in ANSI C63.4-2003 test site requirement.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization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

### 3.10.4 Test Setup



### 3.10.5 Test Result of AC Conducted Emission

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	GSM850 Idle + WLAN (2.4G) Link + Bluetooth Link + GPS Rx + Qwerty Keypad with Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		



#### Final Result : Quasi-Peak

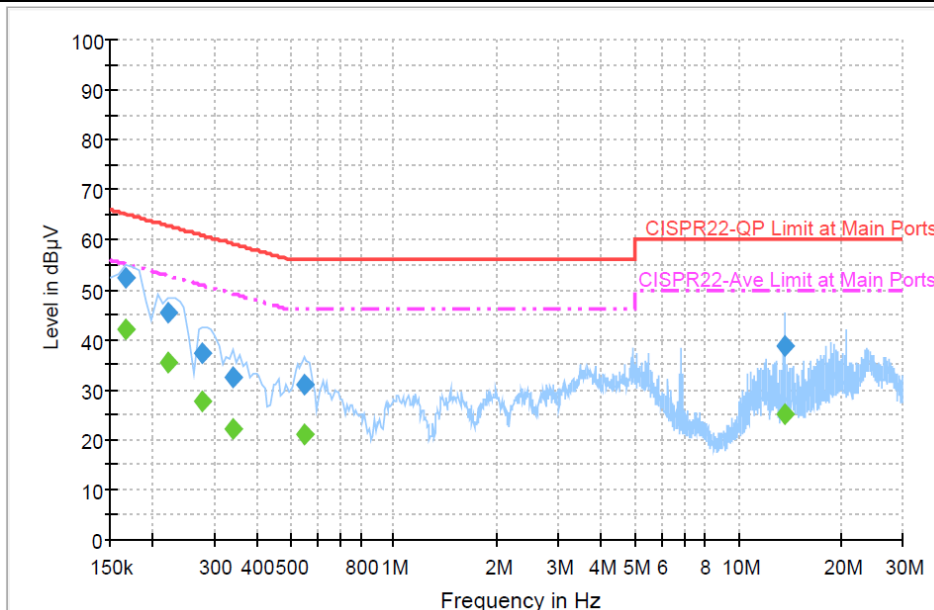
Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	52.8	Off	L1	19.3	12.4	65.2
0.190000	51.7	Off	L1	19.4	12.3	64.0
0.254000	44.3	Off	L1	19.3	17.3	61.6
0.302000	39.0	Off	L1	19.3	21.2	60.2
0.534000	34.4	Off	L1	19.3	21.6	56.0
13.678000	38.6	Off	L1	19.7	21.4	60.0

#### Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	41.7	Off	L1	19.3	13.5	55.2
0.190000	40.8	Off	L1	19.4	13.2	54.0
0.254000	33.2	Off	L1	19.3	18.4	51.6
0.302000	27.9	Off	L1	19.3	22.3	50.2
0.534000	23.3	Off	L1	19.3	22.7	46.0
13.678000	24.5	Off	L1	19.7	25.5	50.0



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	GSM850 Idle + WLAN (2.4G) Link + Bluetooth Link + GPS Rx + Qwerty Keypad with Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

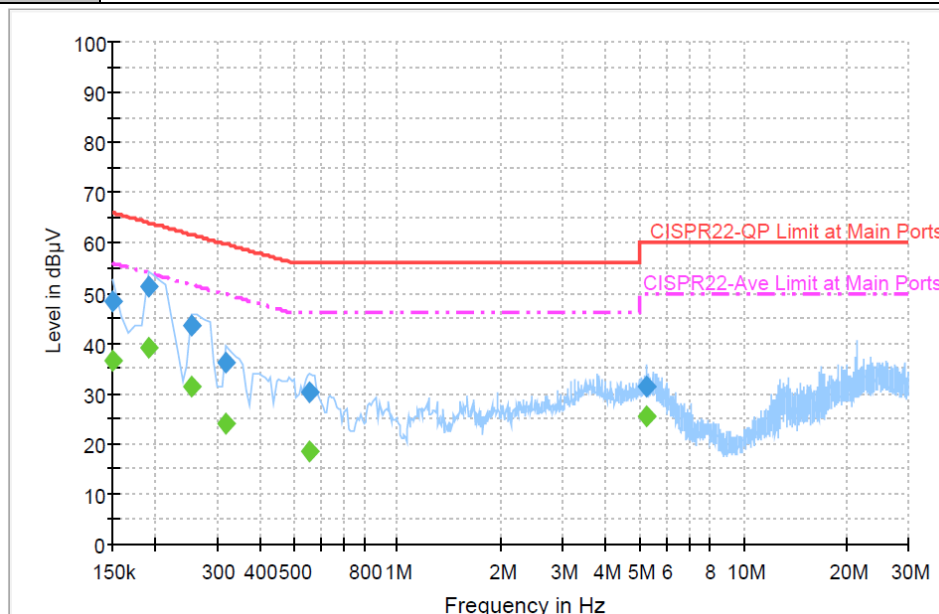

**Final Result : Quasi-Peak**

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	52.4	Off	N	19.3	12.8	65.2
0.222000	45.4	Off	N	19.3	17.3	62.7
0.278000	37.4	Off	N	19.3	23.5	60.9
0.342000	32.4	Off	N	19.3	26.8	59.2
0.550000	31.1	Off	N	19.3	24.9	56.0
13.678000	38.9	Off	N	19.7	21.1	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	42.2	Off	N	19.3	13.0	55.2
0.222000	35.3	Off	N	19.3	17.4	52.7
0.278000	27.5	Off	N	19.3	23.4	50.9
0.342000	22.3	Off	N	19.3	26.9	49.2
0.550000	21.0	Off	N	19.3	25.0	46.0
13.678000	25.0	Off	N	19.7	25.0	50.0

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WCDMA Band V Idle + WLAN (2.4G) Link + Bluetooth Link + Camera + Numeric Keypad without Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

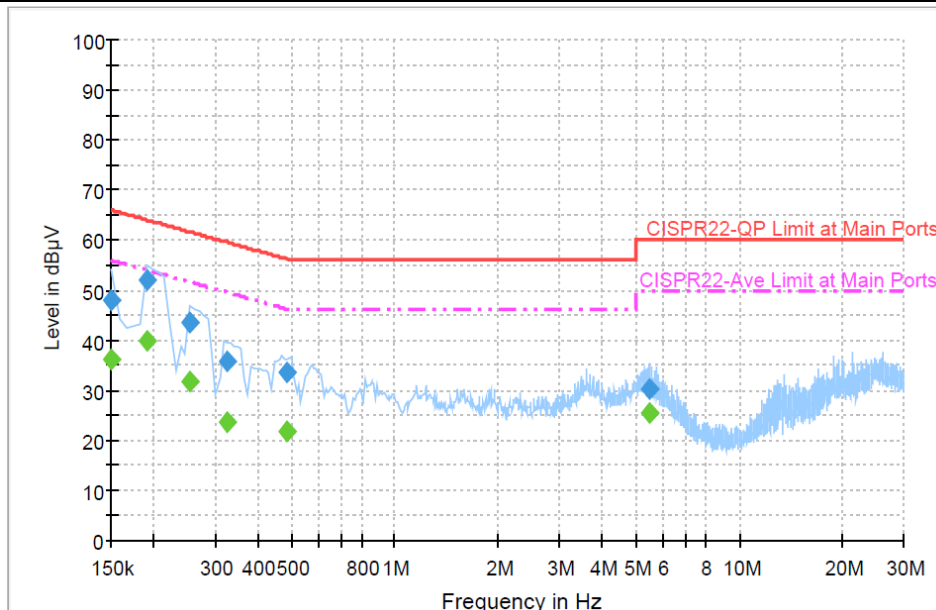

**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.3	Off	L1	19.4	17.7	66.0
0.190000	51.4	Off	L1	19.4	12.6	64.0
0.254000	43.5	Off	L1	19.3	18.1	61.6
0.318000	36.2	Off	L1	19.3	23.6	59.8
0.558000	30.2	Off	L1	19.3	25.8	56.0
5.270000	31.2	Off	L1	19.4	28.8	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	36.5	Off	L1	19.4	19.5	56.0
0.190000	39.2	Off	L1	19.4	14.8	54.0
0.254000	31.4	Off	L1	19.3	20.2	51.6
0.318000	24.0	Off	L1	19.3	25.8	49.8
0.558000	18.3	Off	L1	19.3	27.7	46.0
5.270000	25.4	Off	L1	19.4	24.6	50.0

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WCDMA Band V Idle + WLAN (2.4G) Link + Bluetooth Link + Camera + Numeric Keypad without Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

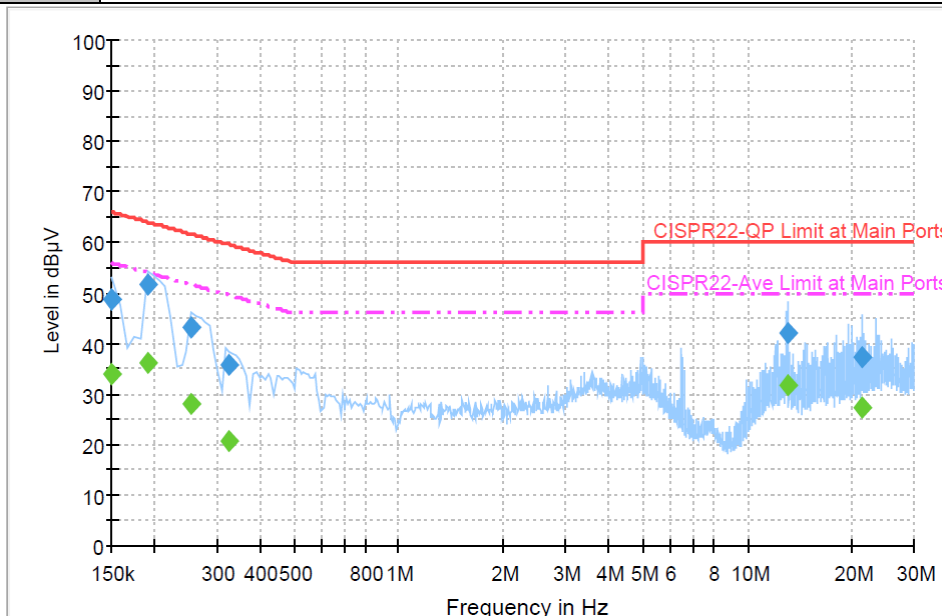

**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.1	Off	N	19.4	17.9	66.0
0.190000	52.0	Off	N	19.4	12.0	64.0
0.254000	43.7	Off	N	19.4	17.9	61.6
0.326000	35.7	Off	N	19.3	23.9	59.6
0.486000	33.6	Off	N	19.4	22.6	56.2
5.462000	30.3	Off	N	19.5	29.7	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	36.3	Off	N	19.4	19.7	56.0
0.190000	39.9	Off	N	19.4	14.1	54.0
0.254000	31.6	Off	N	19.4	20.0	51.6
0.326000	23.5	Off	N	19.3	26.1	49.6
0.486000	21.8	Off	N	19.4	24.4	46.2
5.462000	25.4	Off	N	19.5	24.6	50.0

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WCDMA Band II Idle + WLAN (2.4G) Link + Bluetooth Link + Scanner + PIM Keypad without Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

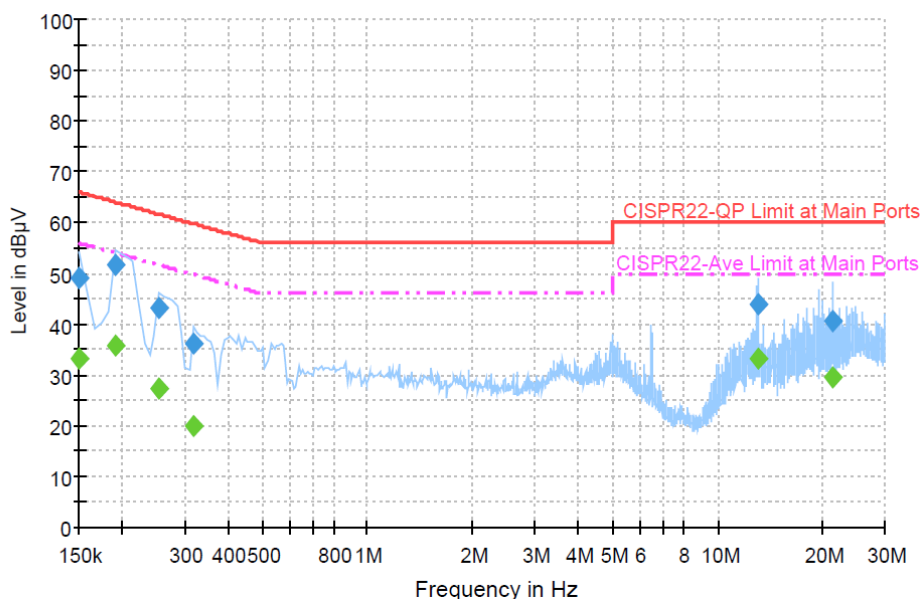

**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.6	Off	L1	19.4	17.4	66.0
0.190000	51.5	Off	L1	19.4	12.5	64.0
0.254000	43.1	Off	L1	19.3	18.5	61.6
0.326000	35.8	Off	L1	19.3	23.8	59.6
13.006000	42.0	Off	L1	19.7	18.0	60.0
21.222000	37.3	Off	L1	19.8	22.7	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	33.8	Off	L1	19.4	22.2	56.0
0.190000	36.3	Off	L1	19.4	17.7	54.0
0.254000	28.0	Off	L1	19.3	23.6	51.6
0.326000	20.6	Off	L1	19.3	29.0	49.6
13.006000	31.9	Off	L1	19.7	18.1	50.0
21.222000	27.4	Off	L1	19.8	22.6	50.0

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WCDMA Band II Idle + WLAN (2.4G) Link + Bluetooth Link + Scanner + PIM Keypad without Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

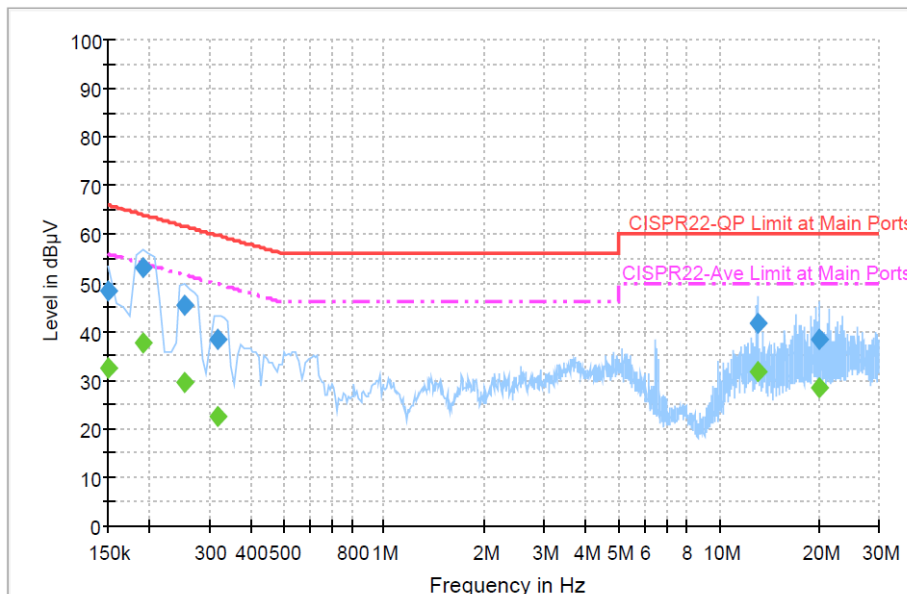

**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	49.0	Off	N	19.4	17.0	66.0
0.190000	51.6	Off	N	19.4	12.4	64.0
0.254000	43.2	Off	N	19.4	18.4	61.6
0.318000	36.0	Off	N	19.3	23.8	59.8
13.006000	44.0	Off	N	19.7	16.0	60.0
21.222000	40.6	Off	N	19.9	19.4	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	33.1	Off	N	19.4	22.9	56.0
0.190000	35.7	Off	N	19.4	18.3	54.0
0.254000	27.4	Off	N	19.4	24.2	51.6
0.318000	20.1	Off	N	19.3	29.7	49.8
13.006000	33.2	Off	N	19.7	16.8	50.0
21.222000	29.6	Off	N	19.9	20.4	50.0

<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WCDMA Band V Idle + WLAN (5G) Link + Bluetooth Link + Camera + Numeric Keypad without Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

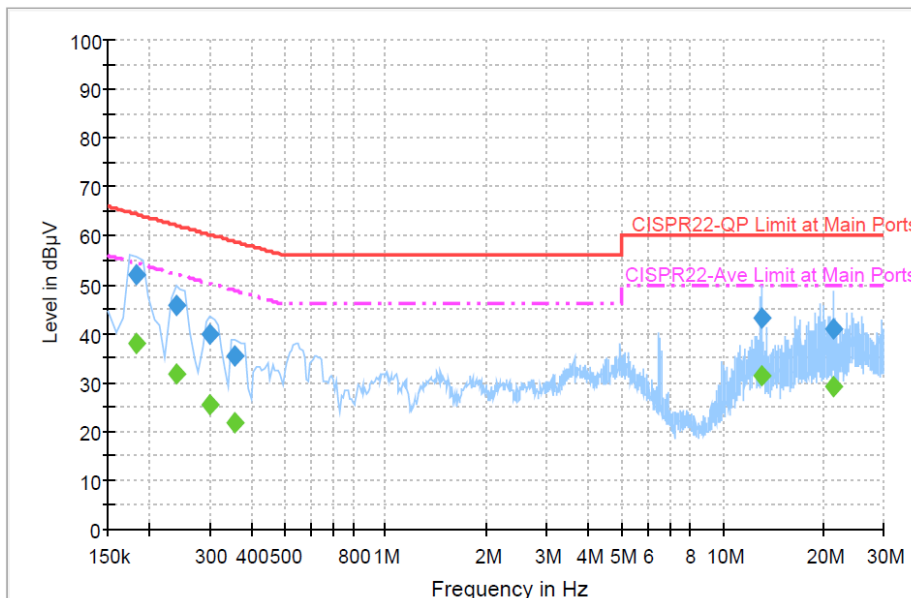

**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.4	Off	L1	19.4	17.6	66.0
0.190000	53.3	Off	L1	19.4	10.7	64.0
0.254000	45.4	Off	L1	19.3	16.2	61.6
0.318000	38.4	Off	L1	19.3	21.4	59.8
13.006000	41.7	Off	L1	19.7	18.3	60.0
19.870000	38.2	Off	L1	19.8	21.8	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	32.3	Off	L1	19.4	23.7	56.0
0.190000	37.5	Off	L1	19.4	16.5	54.0
0.254000	29.6	Off	L1	19.3	22.0	51.6
0.318000	22.4	Off	L1	19.3	27.4	49.8
13.006000	31.6	Off	L1	19.7	18.4	50.0
19.870000	28.3	Off	L1	19.8	21.7	50.0

<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Kai Chun Chu	<b>Relative Humidity :</b>	50~52%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WCDMA Band V Idle + WLAN (5G) Link + Bluetooth Link + Camera + Numeric Keypad without Camera + USB Charging Cable with AC Power + USB Link		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		


**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	52.2	Off	N	19.4	12.2	64.4
0.238000	45.8	Off	N	19.4	16.4	62.2
0.302000	39.7	Off	N	19.3	20.5	60.2
0.358000	35.4	Off	N	19.3	23.4	58.8
13.006000	43.1	Off	N	19.7	16.9	60.0
21.222000	41.1	Off	N	19.9	18.9	60.0

**Final Result : Average**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	38.0	Off	N	19.4	16.4	54.4
0.238000	31.6	Off	N	19.4	20.6	52.2
0.302000	25.5	Off	N	19.3	24.7	50.2
0.358000	21.6	Off	N	19.3	27.2	48.8
13.006000	31.3	Off	N	19.7	18.7	50.0
21.222000	29.2	Off	N	19.9	20.8	50.0

## **3.11 Antenna Requirements**

### **3.11.1 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.

### **3.11.2 Antenna Connected Construction**

Non-standard connector used.

### **3.11.3 Antenna Gain**

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



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Feb. 29, 2012 ~ Jun. 06, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	Jun. 06, 2012 ~ Jul. 13, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Feb. 09, 2012	Feb. 29, 2012 ~ Jul. 13, 2012	Feb. 08, 2014	Conducted (TH02-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	Jun. 21, 2012 ~ Jul. 03, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Jun. 21, 2012 ~ Jul. 03, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Jun. 21, 2012 ~ Jul. 03, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz ~ 26.5GHz	Dec. 05, 2011	Jun. 21, 2012 ~ Jul. 03, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Feb. 27, 2012	Jun. 21, 2012 ~ Jul. 03, 2012	Feb. 26, 2013	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz ~ 7GHz	Aug. 22, 2011	Jun. 21, 2012 ~ Jul. 03, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Mar. 10, 2012	Jun. 21, 2012 ~ Jul. 03, 2012	Mar. 09, 2013	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz ~ 40GHz	Oct. 21, 2011	Jun. 21, 2012 ~ Jul. 03, 2012	Oct. 20, 2012	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Feb. 09, 2012	Jun. 21, 2012 ~ Jul. 03, 2012	Feb. 08, 2014	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jun. 21, 2012 ~ Jul. 03, 2012	Jul. 28, 2012	Radiation (03CH07-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Mar. 09, 2012~ Mar. 17, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Mar. 09, 2012~ Mar. 17, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Mar. 09, 2012~ Mar. 17, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Mar. 09, 2012~ Mar. 17, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117997	N/A	Aug. 22, 2011	Mar. 09, 2012~ Mar. 17, 2012	Aug. 21, 2012	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	Mar. 09, 2012~ Mar. 17, 2012	N/A	Conduction (CO05-HY)

## 5 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.54
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.72
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## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP221518-01 as below.