



# FCC RF Test Report

APPLICANT : Motorola Mobility, Inc.  
EQUIPMENT : GSM / EGPRS Mobile Phone  
BRAND NAME : Motorola  
MODEL NAME /  
MARKETING NAME : EX117  
GPPD NUMBER : 3355  
FCC ID : IHDT56NE4  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Mar. 15, 2012 and completely tested on Apr. 02, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:

Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

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

SPORTON INTERNATIONAL INC.

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FCC ID : IHDT56NE4

Page Number : 1 of 57

Report Issued Date : Apr. 02, 2012

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### 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 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 15.82 dB at 0.390 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.97 dB at 31.890 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Motorola Mobility, Inc.**

No. 1, Wang Jing East Road, Chao Yang District, Beijing, China 100102

## 1.2 Manufacturer

**Arima Communications Corp.**

6F., No. 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM / EGPRS Mobile Phone
Brand Name	Motolora
Model Name / Marketing Name	EX117
FCC ID	IHDT56NE4
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) : 9.25 dBm (0.0084 W) Bluetooth EDR (2Mbps) : 8.58 dBm (0.0072 W) Bluetooth EDR (3Mbps) : 8.47 dBm (0.0070 W)
Antenna Type	PIFA Antenna with gain -0.22 dBi
HW Version	P2
SW Version	SQMN3S_G_07.07.03RDT
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
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.

## 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>
	03CH05-HY	722060/4086B-1

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.	
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC/IC Registration No.</b>
	CO01-KS	149928/4086E-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, 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.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	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	8.85 dBm	8.30 dBm	8.14 dBm
Ch39	2441MHz	<b>9.25 dBm</b>	8.58 dBm	8.47 dBm
Ch78	2480MHz	9.07 dBm	8.53 dBm	8.39 dBm

**Remark:**

1. The data rate was set in 1Mbps 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).

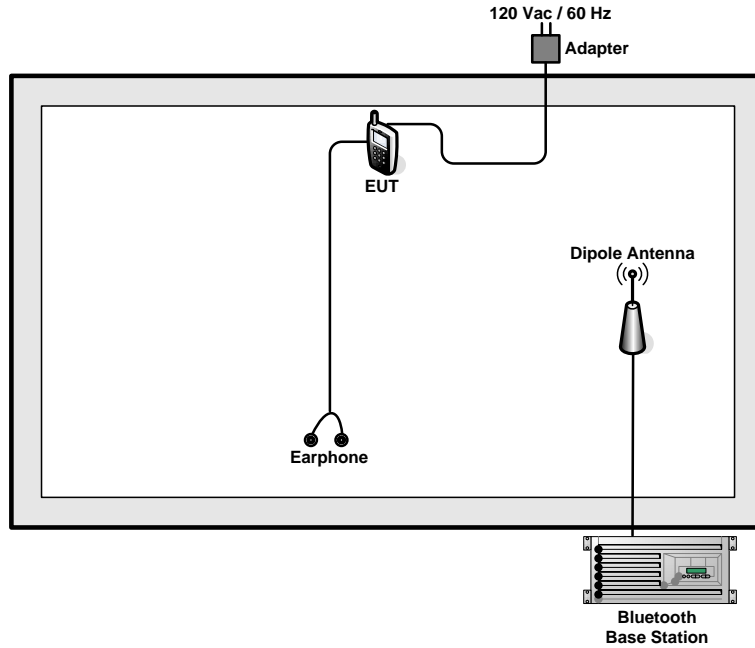
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

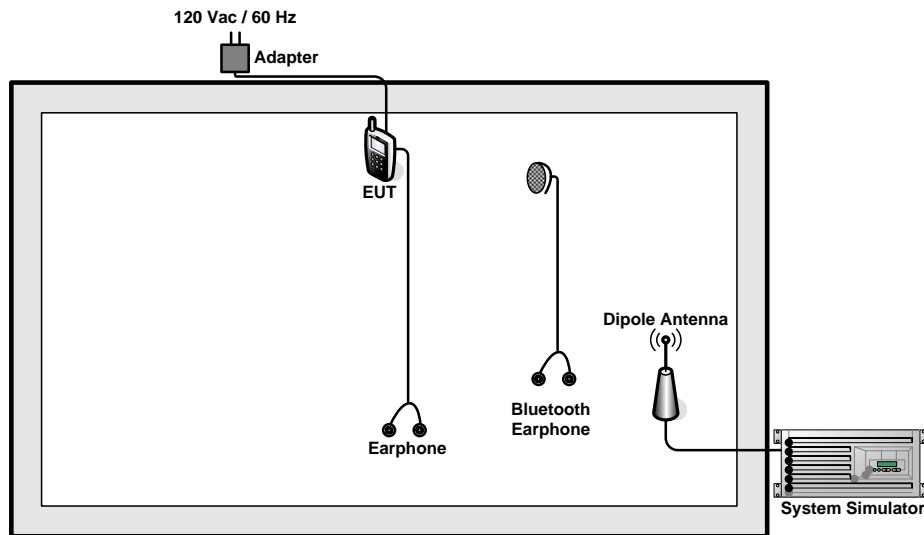
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi$ /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
<b>Conducted TCs</b>	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
<b>Radiated TCs</b>	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	N/A	N/A
<b>AC Conducted Emission</b>	Mode 1 :GSM850 Idle + Bluetooth Link + Earphone + Camera + Adapter Mode 2 :GSM1900 Idle + Bluetooth Link + Earphone + MP3 + Adapter		
<b>Remark:</b>			
1. For radiated TCs, the data rate was set in 1Mbps due to the highest RF output power; only the data of these modes was reported.			
2. The worst case of AC is mode 2; 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, key in “\* #3646633 #” on the EUT directly. Then, the EUT will get into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

### 3 Test Result

#### 3.1 Number of Channel Measurement

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

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

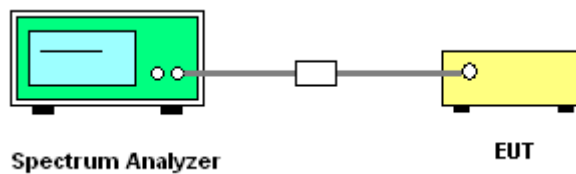
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedure

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

##### 3.1.4 Test Setup

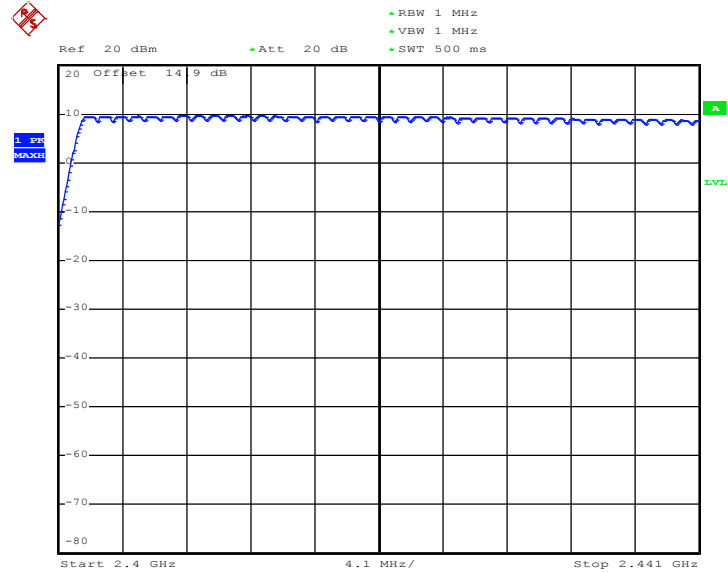


##### 3.1.5 Test Result of Number of Hopping Frequency

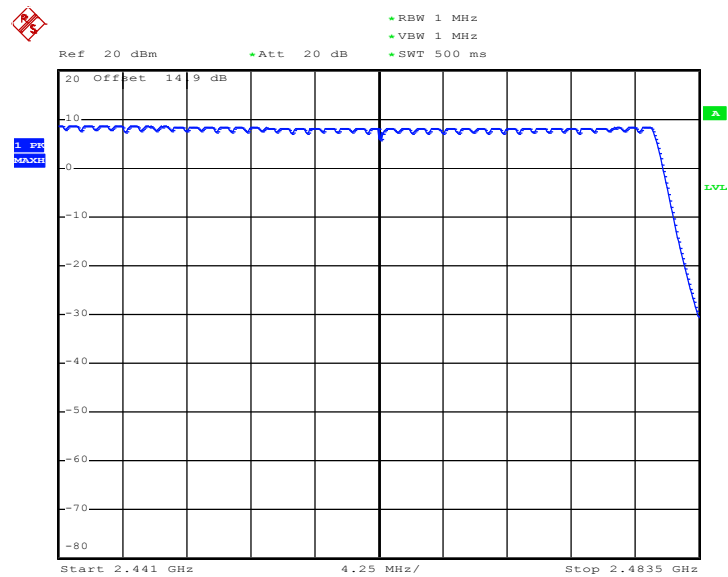
Test Mode :	Mode 1~3	Temperature :	24~26°C
Test Engineer :	Zhi Lu	Relative Humidity :	41~48%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass



Number of Hopping Channel Plot on Channel 00 - 78



Date: 30.MAR.2012 18:21:49



Date: 30.MAR.2012 18:25:59

## 3.2 20dB Bandwidth Measurement

### 3.2.1 Limit of 20dB Bandwidth

N/A

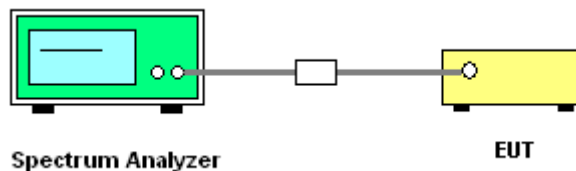
### 3.2.2 Measuring Instruments

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



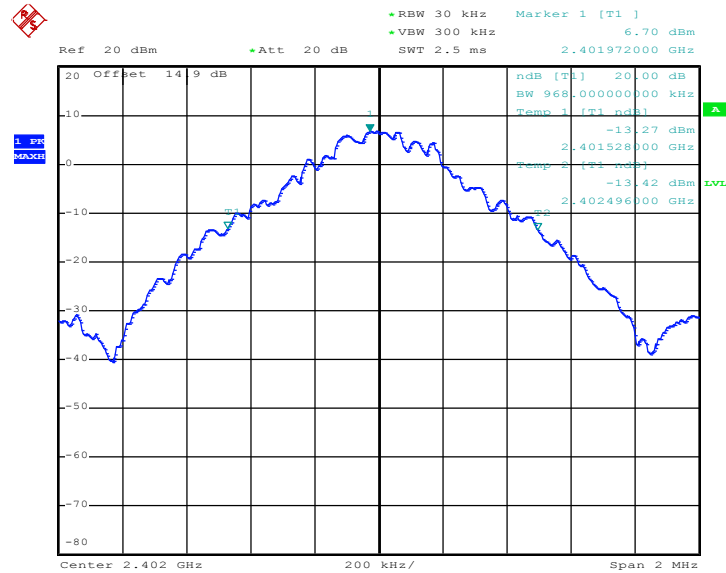


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Zhi Lu	Relative Humidity :	41~48%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.968
39	2441	0.964
78	2480	0.964

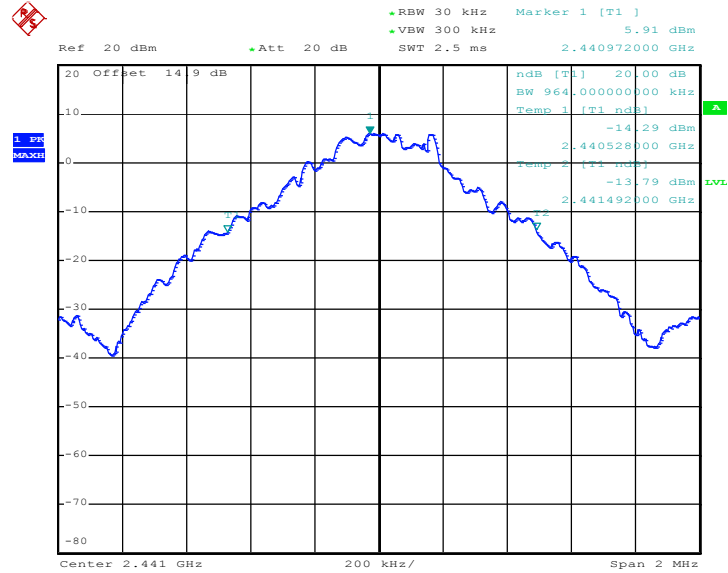
20 dB Bandwidth Plot on Channel 00



Date: 30.MAR.2012 17:57:36

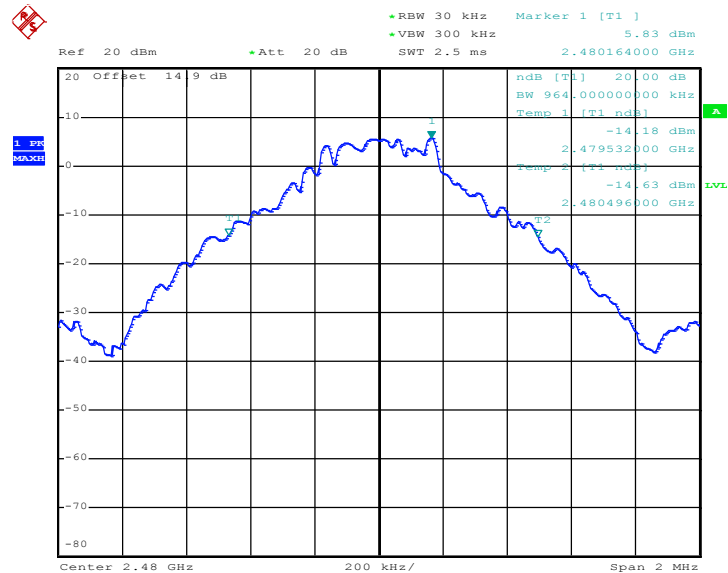


20 dB Bandwidth Plot on Channel 39



Date: 30.MAR.2012 17:58:00

20 dB Bandwidth Plot on Channel 78



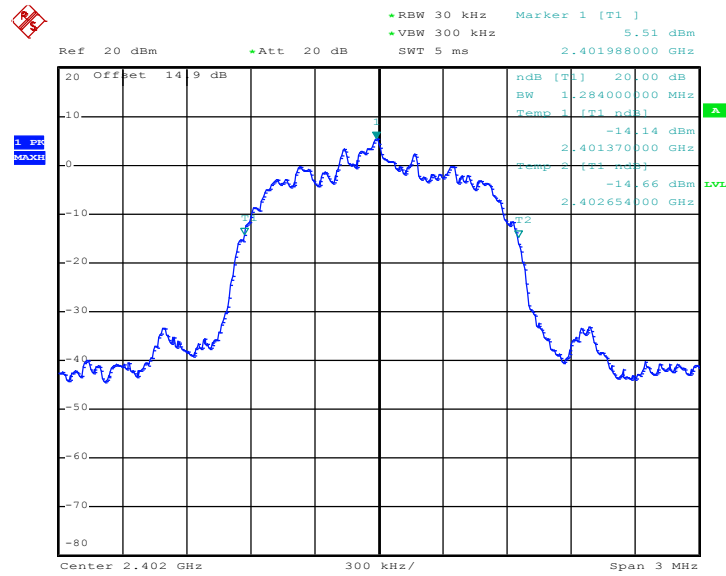
Date: 30.MAR.2012 17:58:36



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Zhi Lu	Relative Humidity :	41~48%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.284
39	2441	1.284
78	2480	1.278

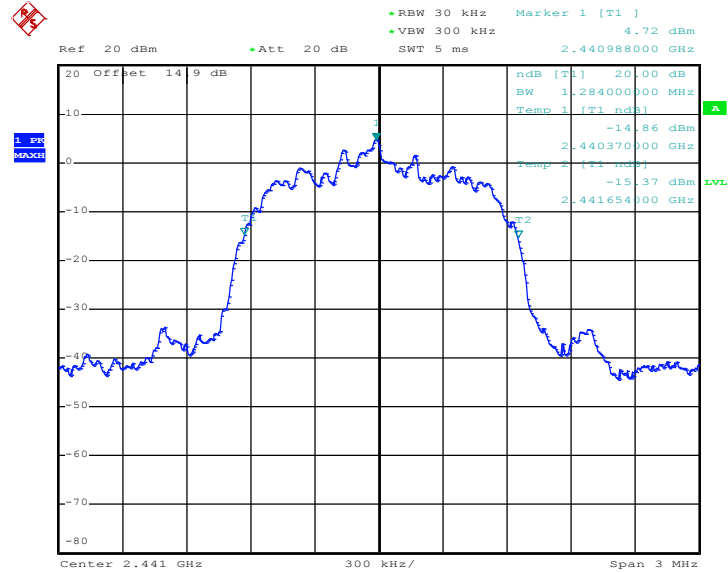
20 dB Bandwidth Plot on Channel 00



Date: 30.MAR.2012 17:59:07

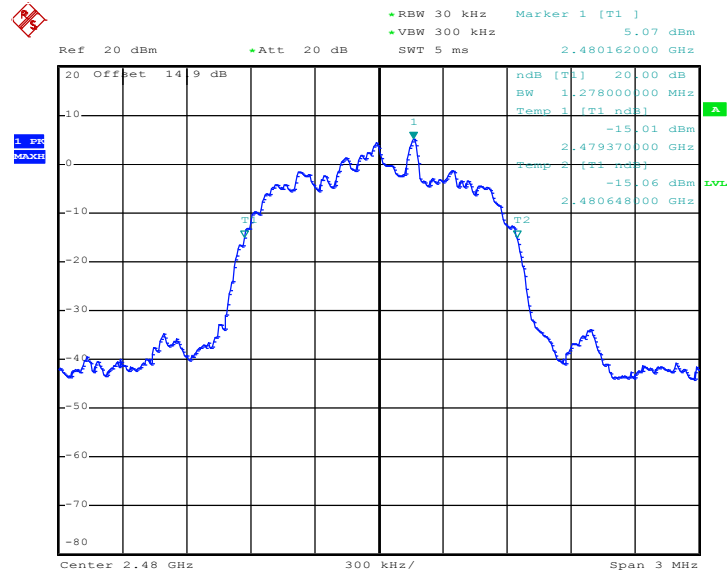


20 dB Bandwidth Plot on Channel 39



Date: 30.MAR.2012 17:59:44

20 dB Bandwidth Plot on Channel 78



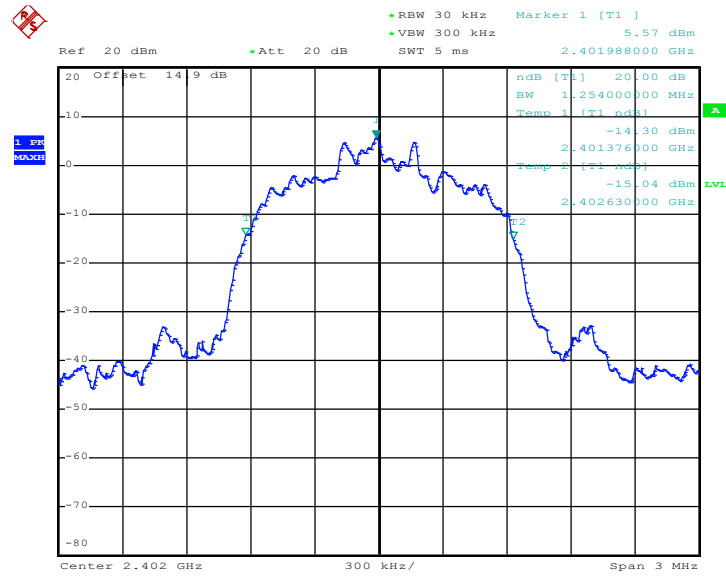
Date: 30.MAR.2012 18:00:27



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Zhi Lu	Relative Humidity :	41~48%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.254
39	2441	1.236
78	2480	1.236

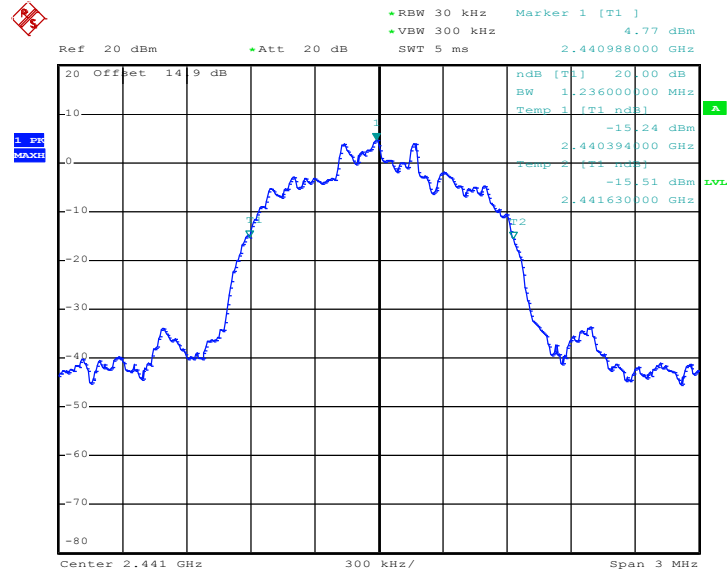
20 dB Bandwidth Plot on Channel 00



Date: 30.MAR.2012 18:01:03

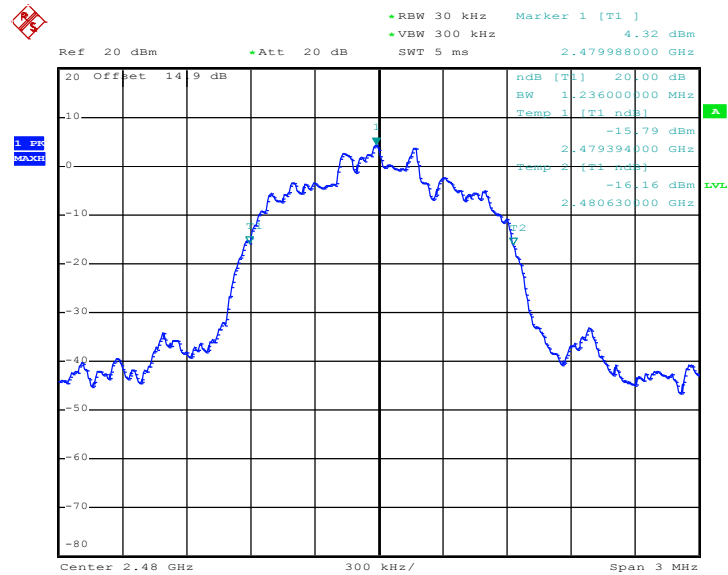


20 dB Bandwidth Plot on Channel 39



Date: 30.MAR.2012 18:01:29

20 dB Bandwidth Plot on Channel 78



Date: 30.MAR.2012 18:02:15

### 3.3 Hopping Channel Separation Measurement

#### 3.3.1 Limit of Hopping Channel Separation

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

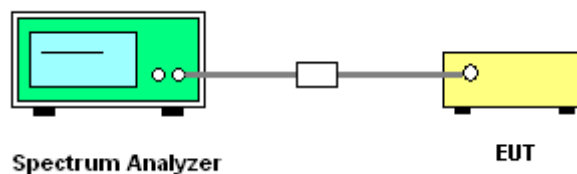
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

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

#### 3.3.4 Test Setup



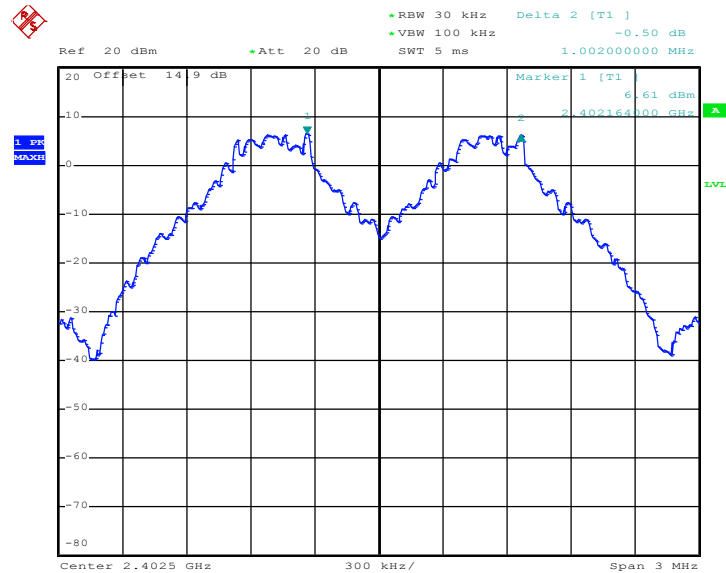


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Zhi Lu	Relative Humidity :	41~48%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.645	Pass
39	2441	1.002	0.643	Pass
78	2480	1.002	0.643	Pass

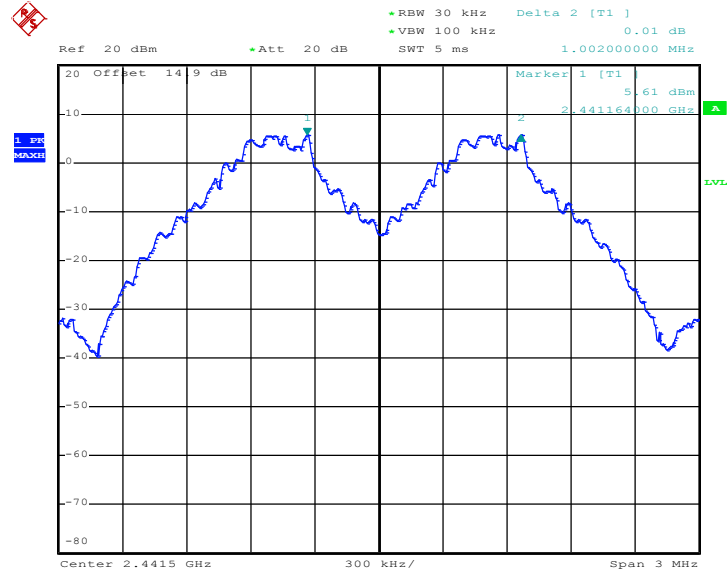
Channel Separation Plot on Channel 00 - 01



Date: 30.MAR.2012 17:43:38

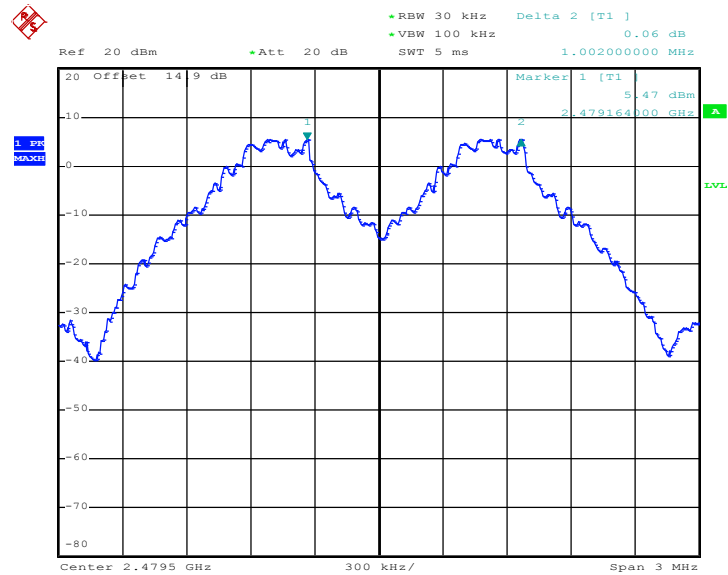


### Channel Separation Plot on Channel 39 - 40



Date: 30.MAR.2012 17:45:23

### Channel Separation Plot on Channel 77 - 78



Date: 30.MAR.2012 17:46:06

### 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.

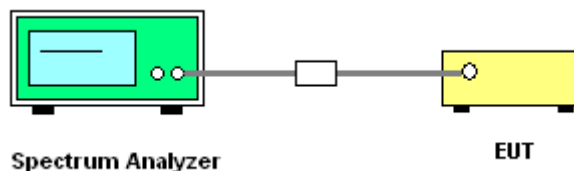
#### 3.4.2 Measuring Instruments

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

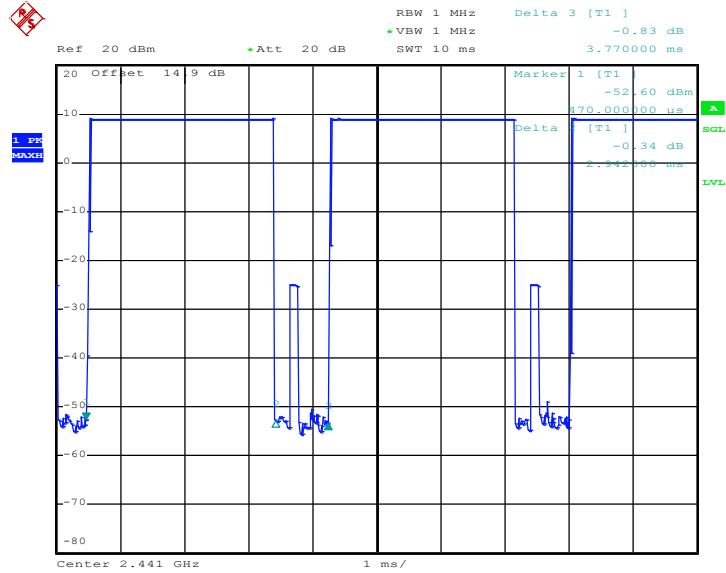
<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	24~26°C		
<b>Test Engineer :</b>	Zhi Lu	<b>Relative Humidity :</b>	41~48%		
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	4.10	2942.00	0.38	0.4	Pass

**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)

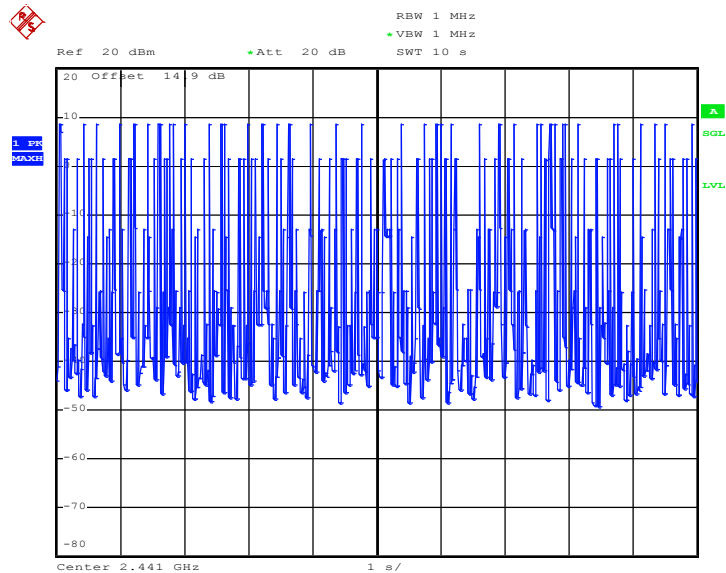


### DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 27.MAR.2012 14:48:15

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



Date: 30.MAR.2012 17:55:34

### 3.5 Peak Output Power Measurement

#### 3.5.1 Limit of Peak Output Power

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

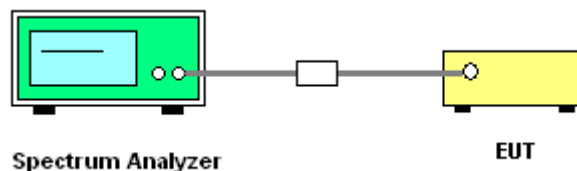
#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.5.3 Test Procedures

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

#### 3.5.4 Test Setup



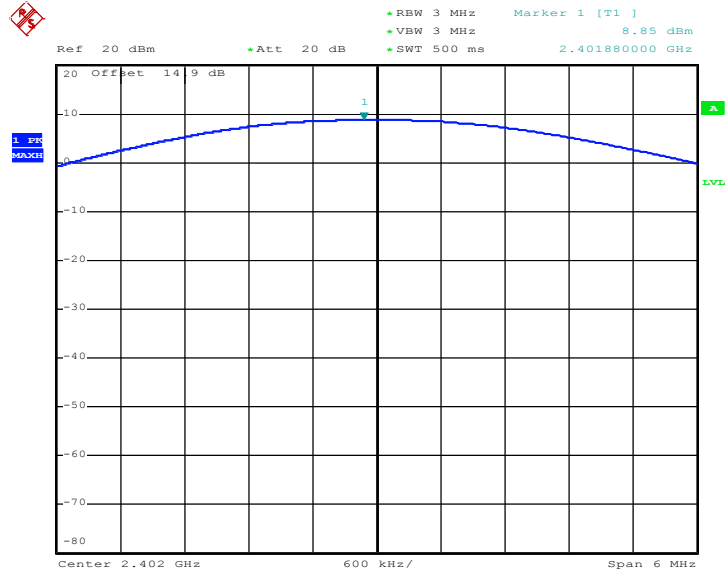
#### 3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Zhi Lu	Relative Humidity :	41~48%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	8.85	30	Pass
39	2441	9.25	30	Pass
78	2480	9.07	30	Pass

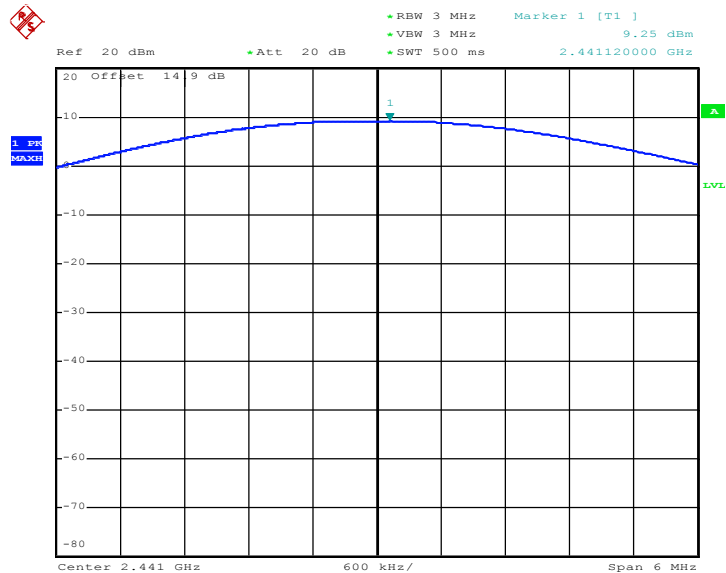


Peak Output Power Plot on Channel 00



Date: 27.MAR.2012 14:41:46

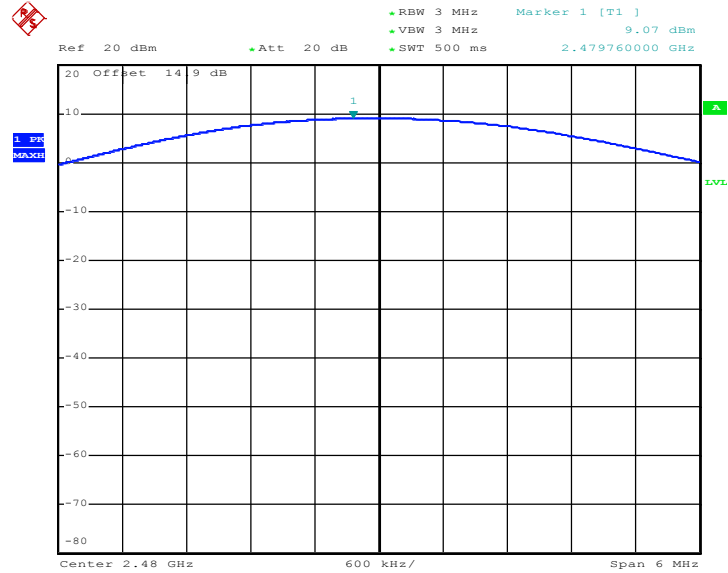
Peak Output Power Plot on Channel 39



Date: 27.MAR.2012 14:53:20



Peak Output Power Plot on Channel 78



Date: 27.MAR.2012 14:44:17



## **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**

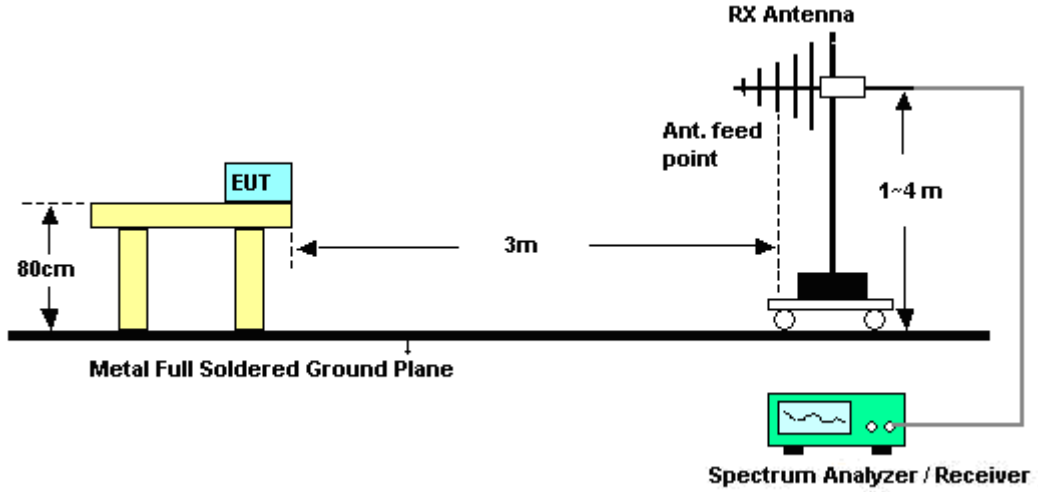
See list of measuring instruments of this test report.

### **3.6.3 Test Procedures**

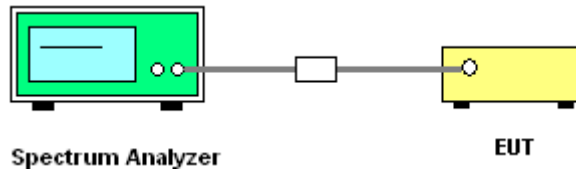
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300KHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
		Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBµV/m )	Over Limit ( dB )	Limit Line ( dBµV/m )	Read Level ( dBµV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.42	52.08	-21.92	74	51.36	32.02	4.58	35.88	159	14	Peak
2389.42	35.32	-18.68	54	34.6	32.02	4.58	35.88	159	14	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBµV/m )	Over Limit ( dB )	Limit Line ( dBµV/m )	Read Level ( dBµV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.42	49.15	-24.85	74	48.43	32.02	4.58	35.88	100	280	Peak
2389.42	35.05	-18.95	54	34.33	32.02	4.58	35.88	100	280	Average



Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
		Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	65.87	-8.13	74	64.95	32.09	4.64	35.81	103	31	Peak
2483.5	35.22	-18.78	54	34.3	32.09	4.64	35.81	103	31	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	90.46	55.24	35.22	54	-18.78	Pass
Hopping Mode	90.46	56.49	33.97	54	-20.03	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	59.87	-14.13	74	58.95	32.09	4.64	35.81	100	227	Peak
2483.5	32.68	-21.32	54	31.76	32.09	4.64	35.81	100	227	Average

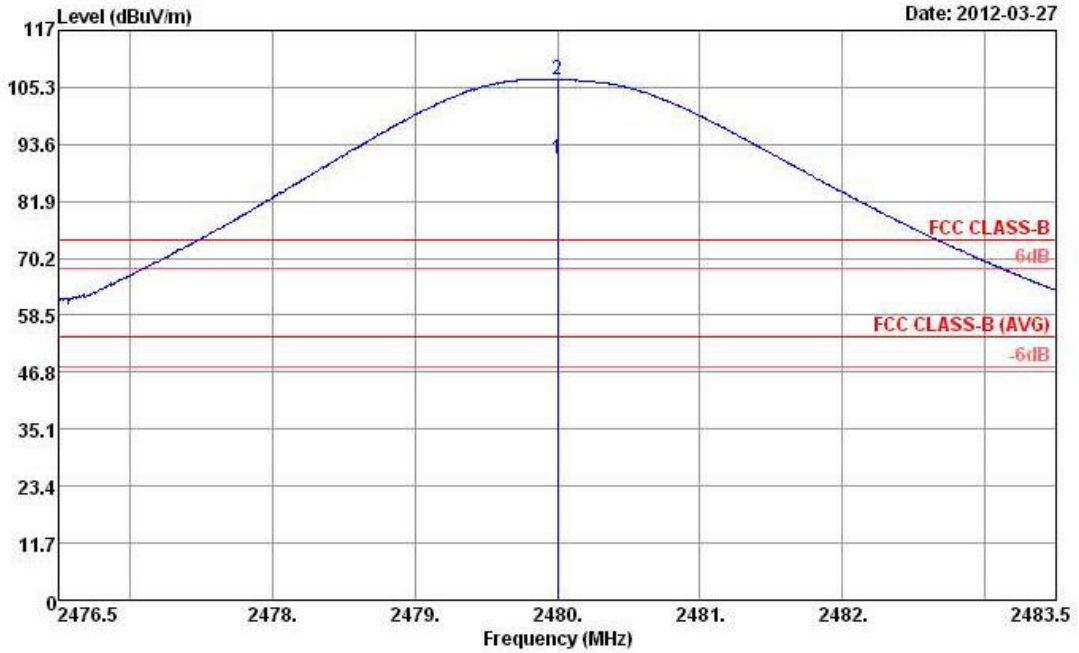
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	85.64	52.96	32.68	54	-21.32	Pass
Hopping Mode	85.64	55.65	29.99	54	-24.01	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal



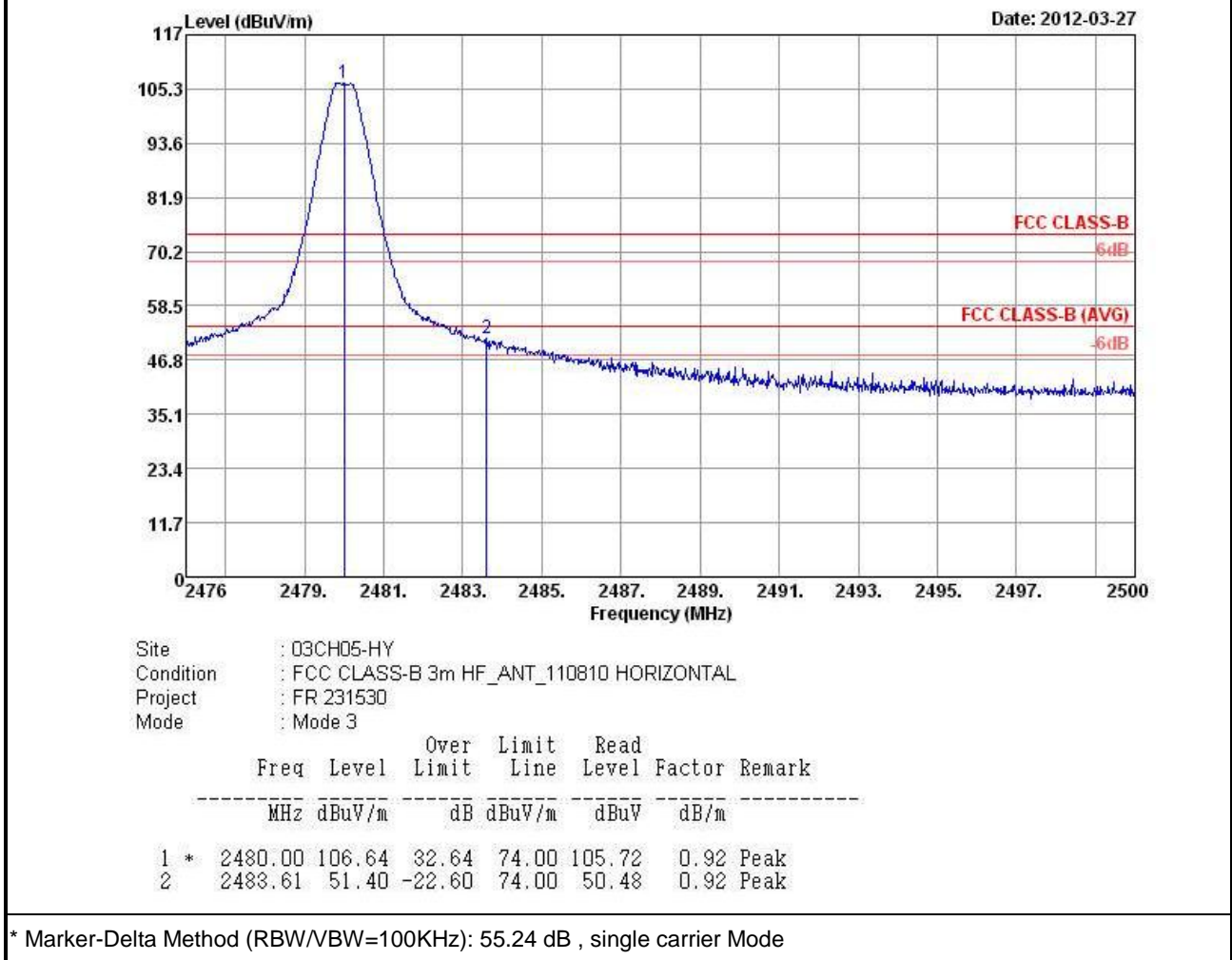
Site : 03CH05-HY  
 Condition : FCC CLASS-B 3m HF\_ANT\_110810 HORIZONTAL  
 Project : FR 231530  
 Mode : Mode 3

	Freq	Level	Over	Limit	Read	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m
1 *	2480.00	90.46	36.46	54.00	89.54	0.92 Average
2 *	2480.00	106.89	32.89	74.00	105.97	0.92 Peak

\* Maximum field strength of the fundamental emission

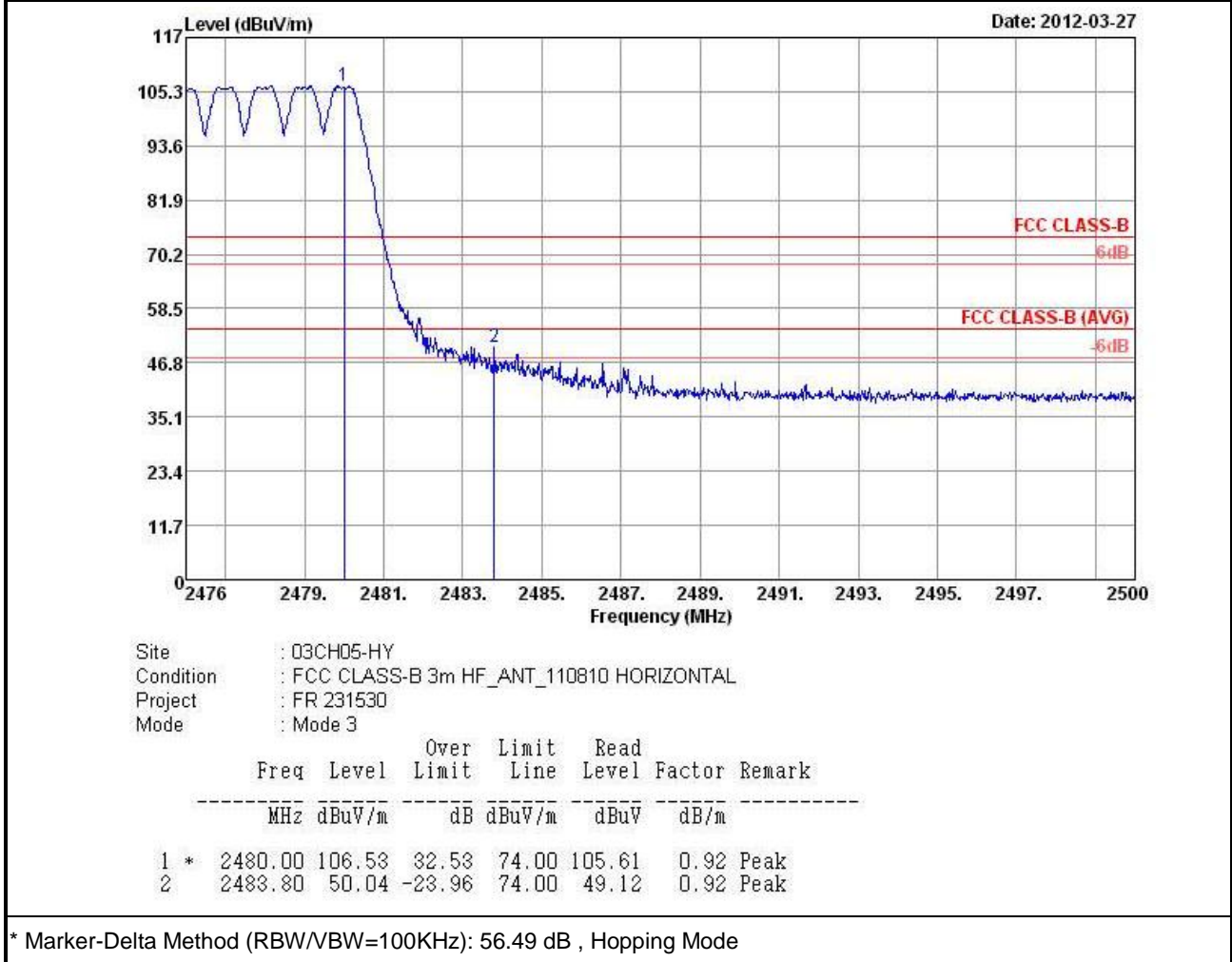


Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal



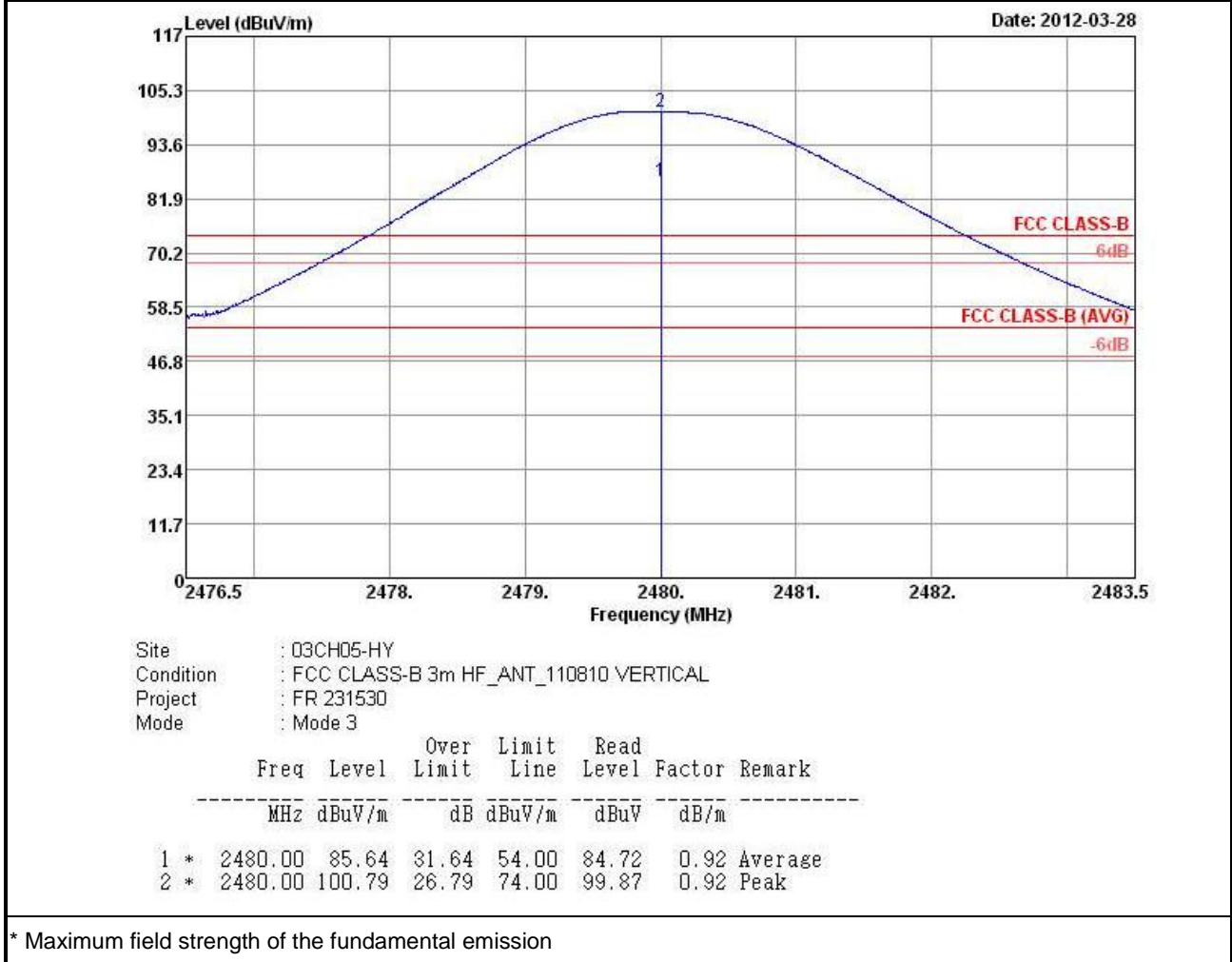


Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal



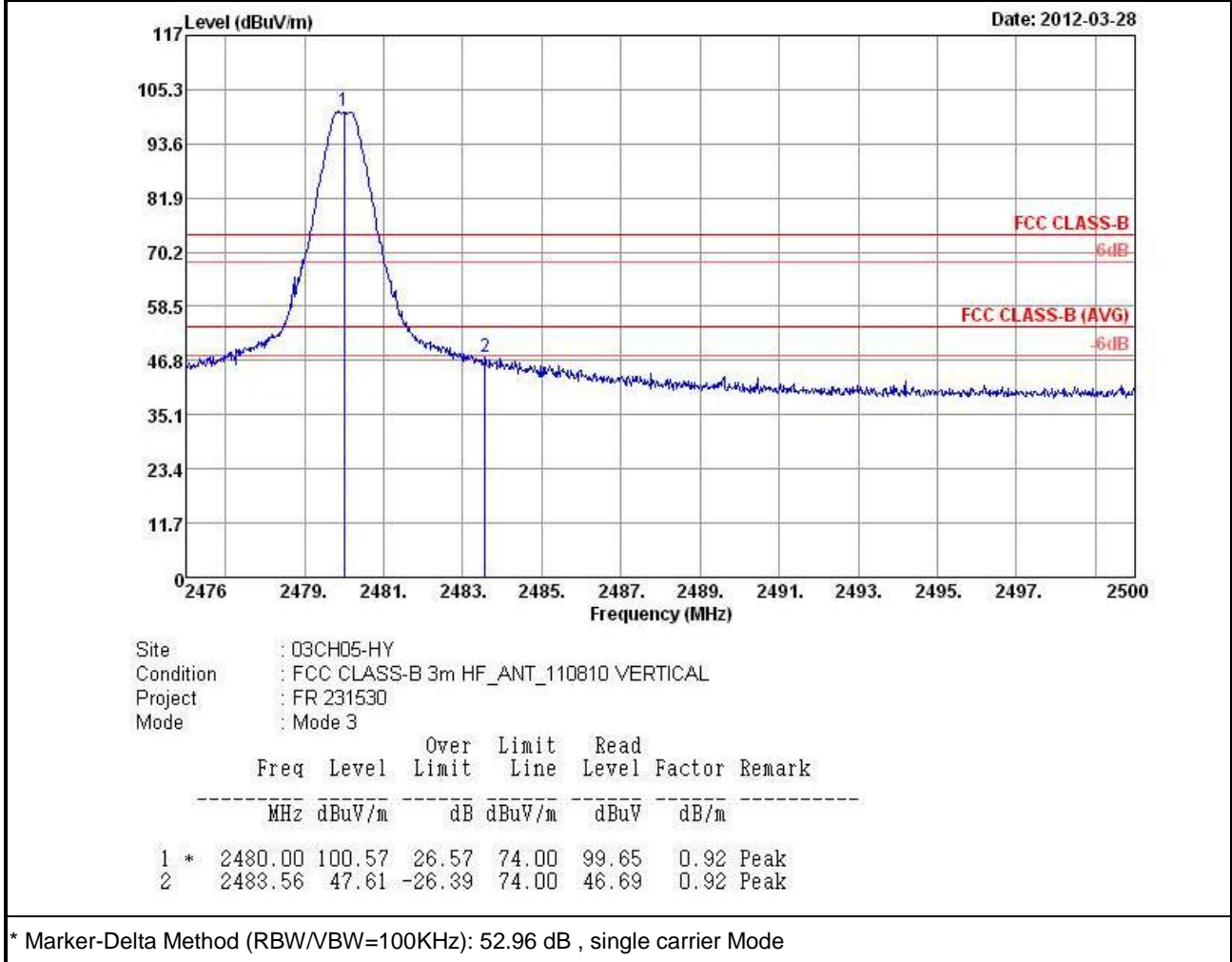


Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical



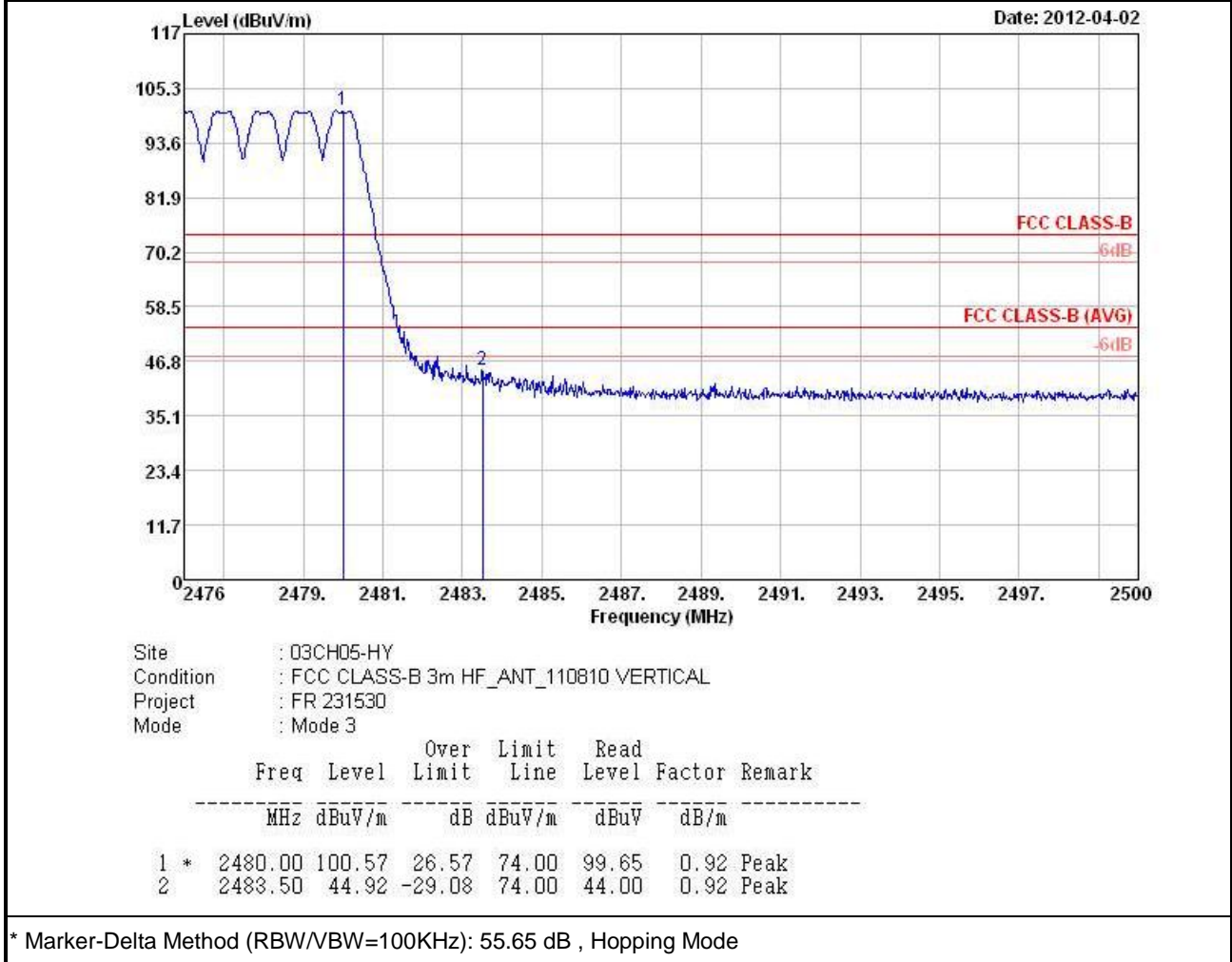


Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical





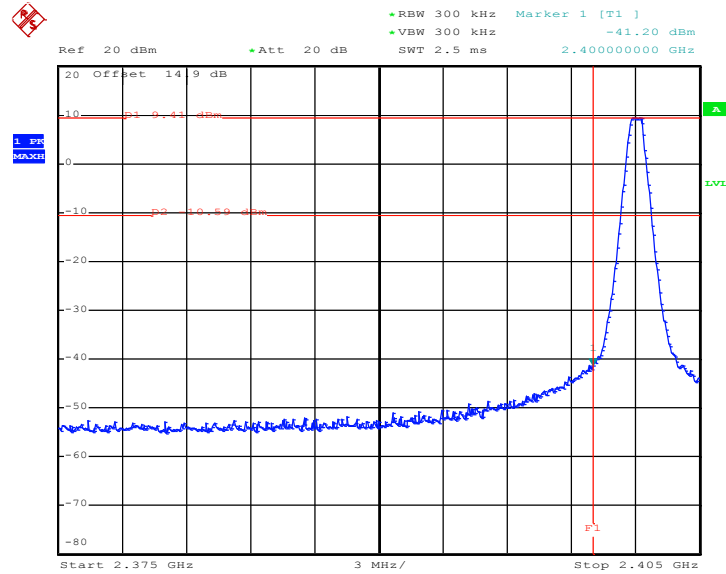
Test Mode :	Mode 3	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical



### 3.6.6 Test Result of Conducted Band Edges

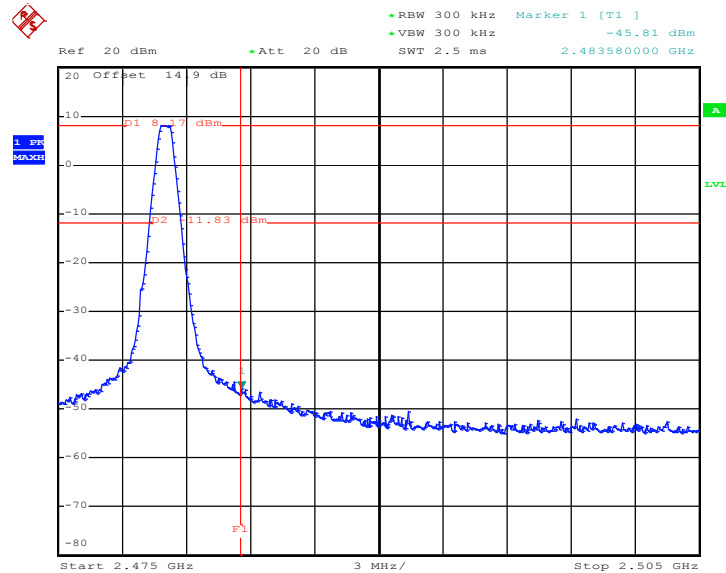
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	41~48%
		Test Engineer :	Zhi Lu

Low Band Edge Plot on Channel 00



Date: 30.MAR.2012 18:03:09

High Band Edge Plot on Channel 78



Date: 30.MAR.2012 18:04:12

## 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.

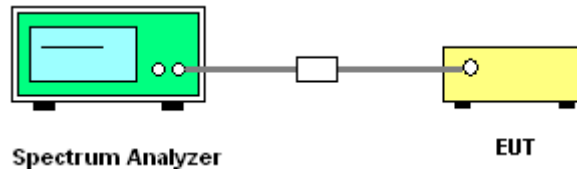
### 3.7.2 Measuring Instruments

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

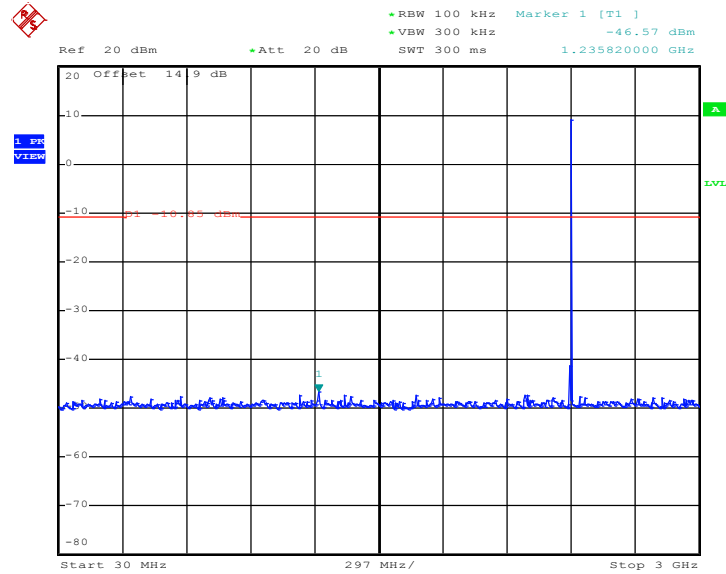




3.7.5 Test Result

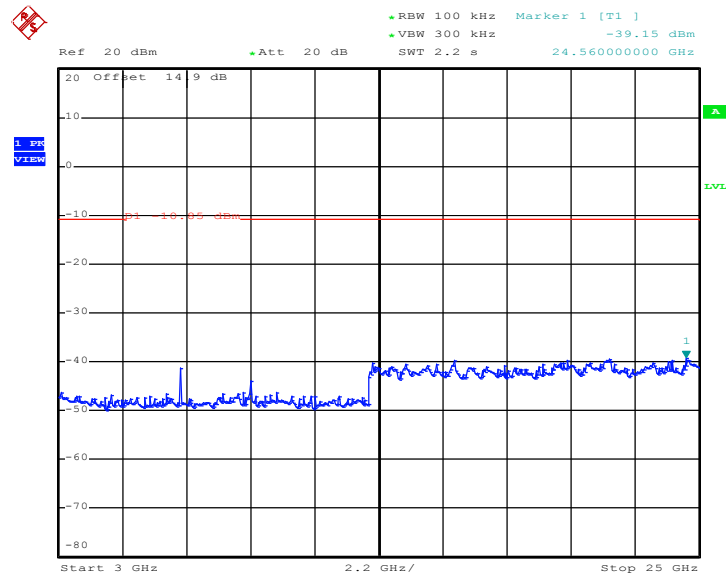
Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	41~48%
		Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAR.2012 18:14:23

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

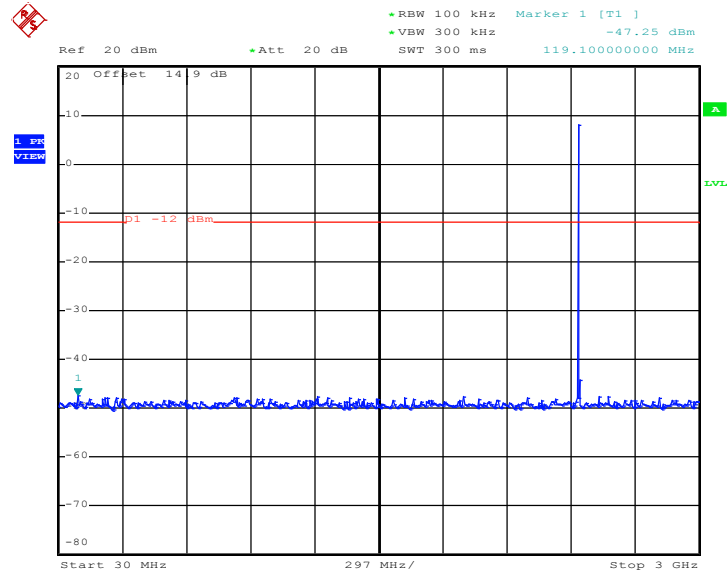


Date: 30 MAR 2012 18:14:35



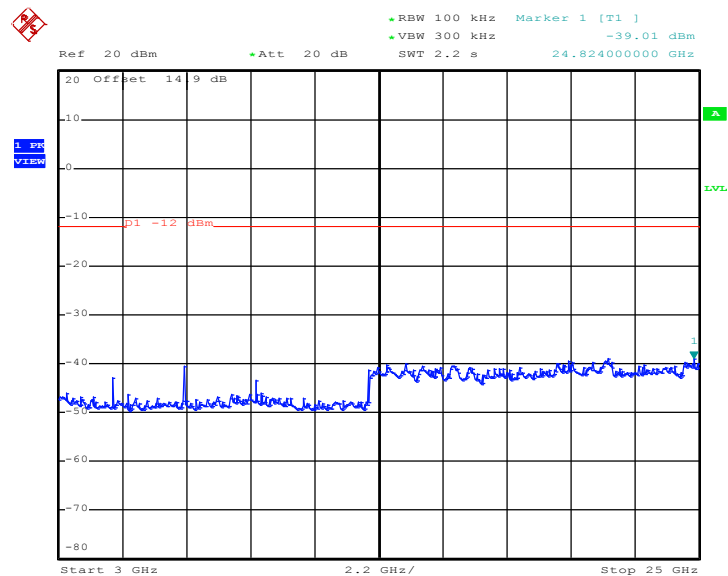
Test Mode :	Mode 2	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	41~48%
		Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAR.2012 18:15:27

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

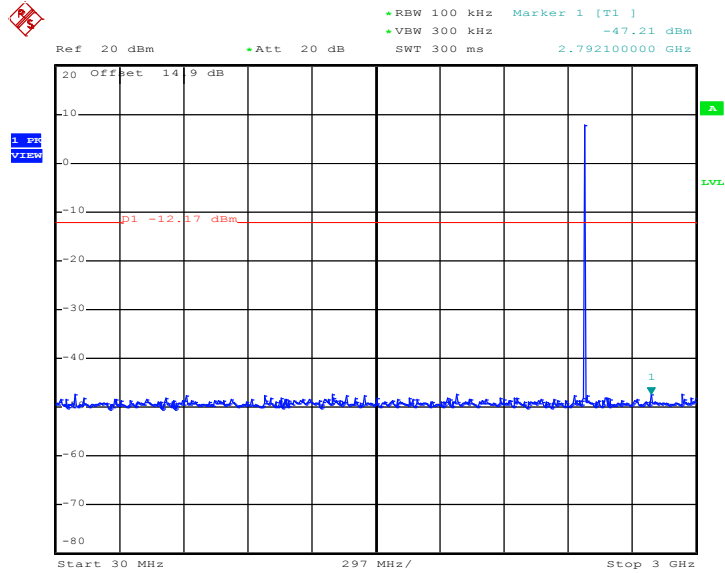


Date: 30.MAR.2012 18:15:39



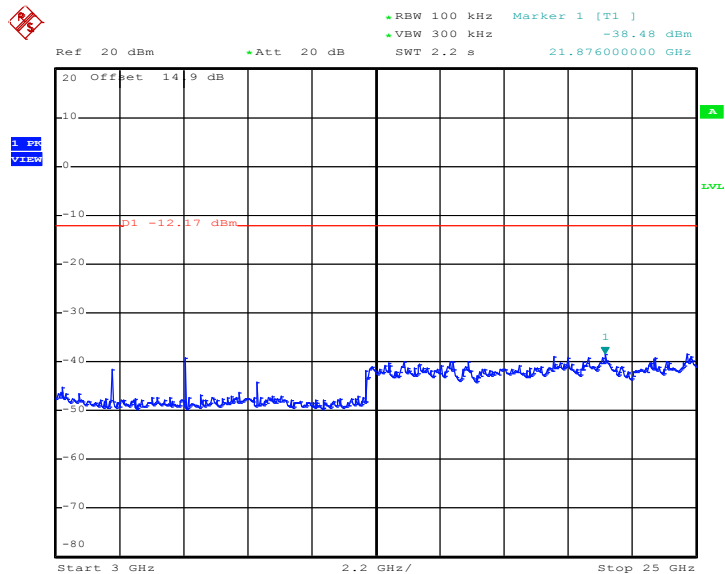
Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	41~48%
		Test Engineer :	Zhi Lu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAR.2012 18:16:30

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 30.MAR.2012 18:16:42

## 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.

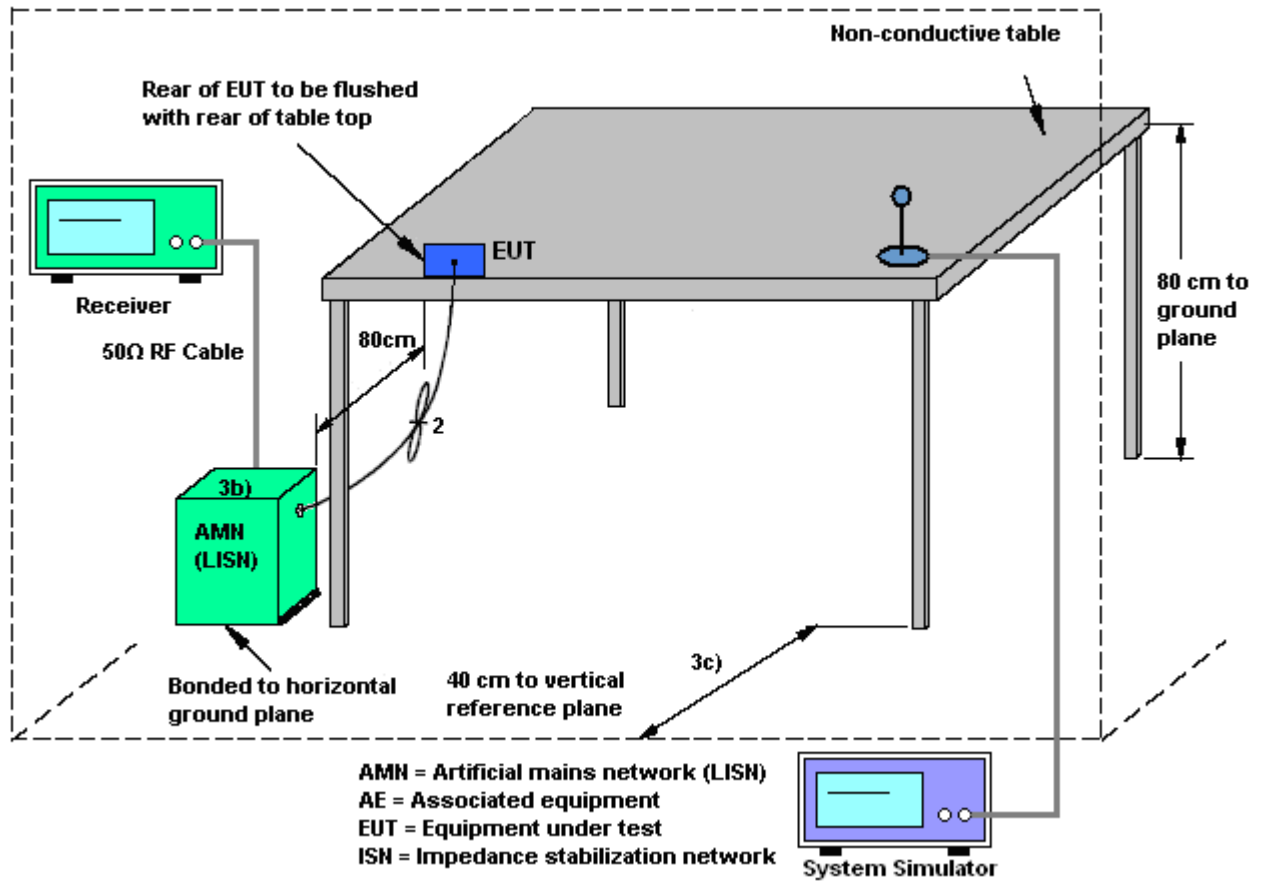
### 3.8.2 Measuring Instruments

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.

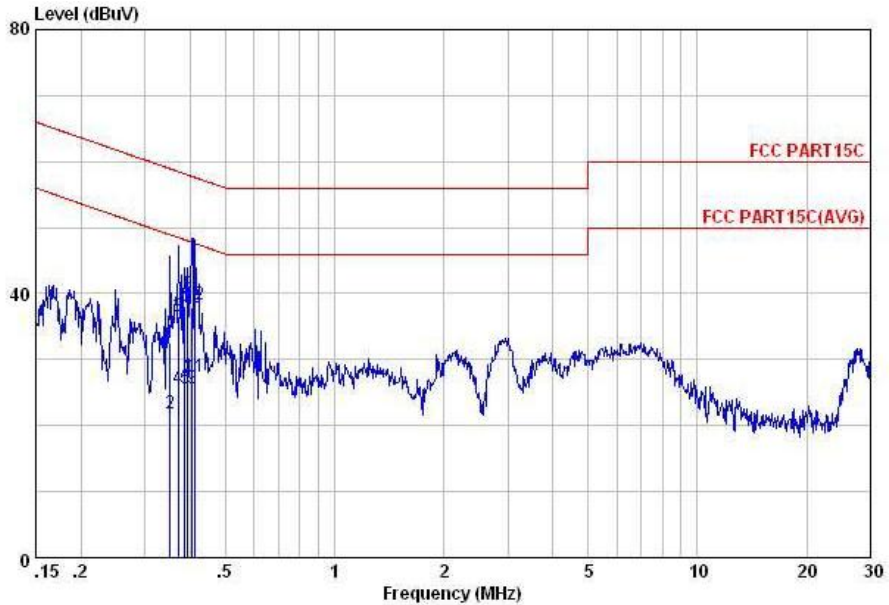
### 3.8.4 Test Setup





3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM1900 Idle + Bluetooth Link + Earphone + MP3 + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

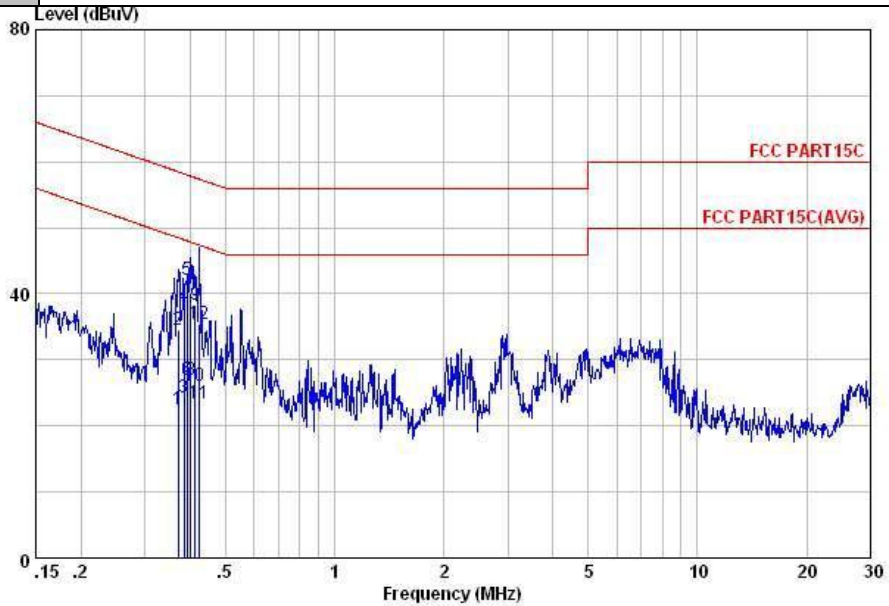


Site : C001-KS  
 Condition: FCC PART15C LISN-100807 LINE  
 Project : (FR) 231530  
 mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.35	32.50	-26.41	58.91	22.40	-0.08	10.18	QP
2	0.35	21.90	-27.01	48.91	11.80	-0.08	10.18	Average
3	0.37	36.51	-21.96	58.47	26.40	-0.08	10.19	QP
4	0.37	25.71	-22.76	48.47	15.60	-0.08	10.19	Average
5	0.39	25.71	-22.41	48.12	15.60	-0.08	10.19	Average
6	0.39	38.01	-20.11	58.12	27.90	-0.08	10.19	QP
7	0.39	27.21	-20.78	47.99	17.10	-0.08	10.19	Average
8	0.39	39.81	-18.18	57.99	29.70	-0.08	10.19	QP
9	0.40	25.61	-22.16	47.77	15.50	-0.08	10.19	Average
10	0.40	37.91	-19.86	57.77	27.80	-0.08	10.19	QP
11	0.41	27.31	-20.28	47.59	17.20	-0.08	10.19	Average
12	0.41	38.31	-19.28	57.59	28.20	-0.08	10.19	QP



Test Mode :	Mode 2	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM1900 Idle + Bluetooth Link + Earphone + MP3 + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS  
 Condition: FCC PART15C LISN-100807 NEUTRAL  
 Project : (FR) 231530  
 mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.37	22.61	-25.86	48.47	12.50	-0.08	10.19	Average
2	0.37	34.51	-23.96	58.47	24.40	-0.08	10.19	QP
3	0.38	24.31	-23.89	48.20	14.20	-0.08	10.19	Average
4	0.38	38.11	-20.09	58.20	28.00	-0.08	10.19	QP
5	0.39	42.21	-15.82	58.03	32.10	-0.08	10.19	QP
6	0.39	27.01	-21.02	48.03	16.90	-0.08	10.19	Average
7	0.40	40.11	-17.70	57.81	30.00	-0.08	10.19	QP
8	0.40	26.91	-20.90	47.81	16.80	-0.08	10.19	Average
9	0.41	38.31	-19.28	57.59	28.20	-0.08	10.19	QP
10	0.41	26.01	-21.58	47.59	15.90	-0.08	10.19	Average
11	0.42	23.42	-23.95	47.37	13.30	-0.08	10.20	Average
12	0.42	35.42	-21.95	57.37	25.30	-0.08	10.20	QP

### 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

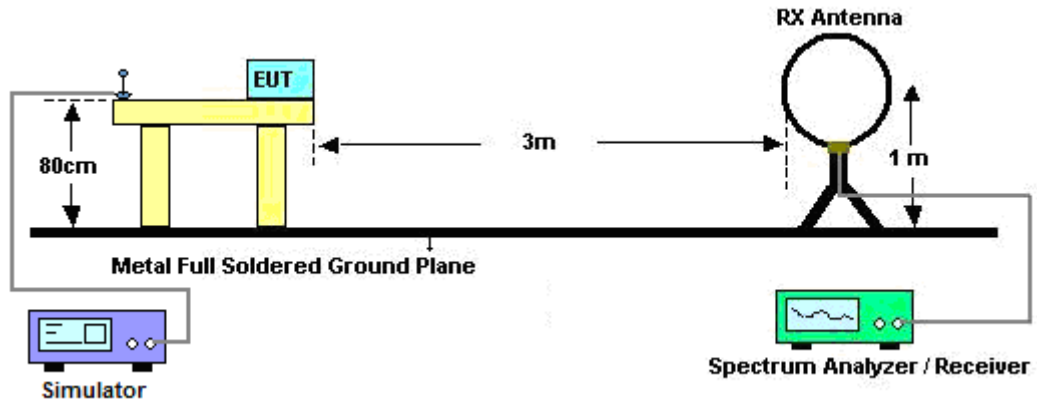
See list of measuring instruments of this test report.

#### 3.9.3 Test Procedures

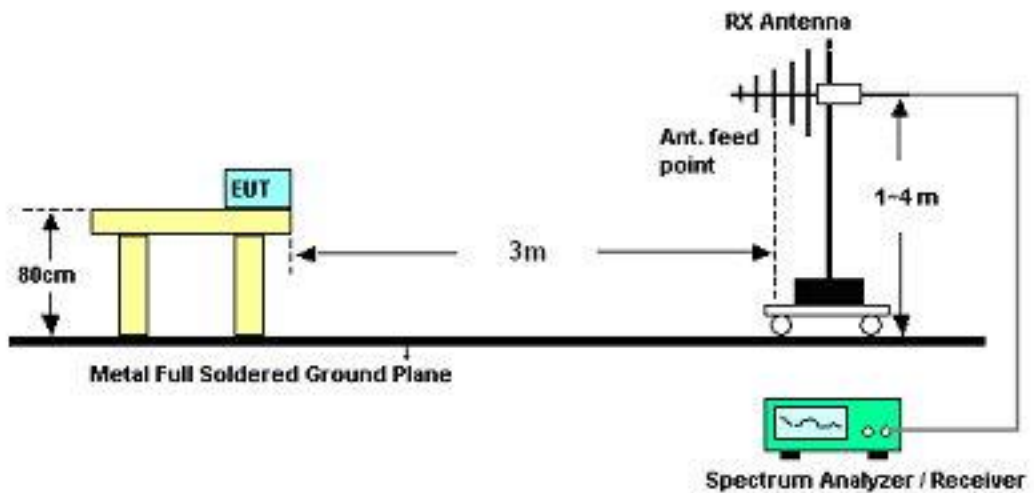
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 KHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep =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

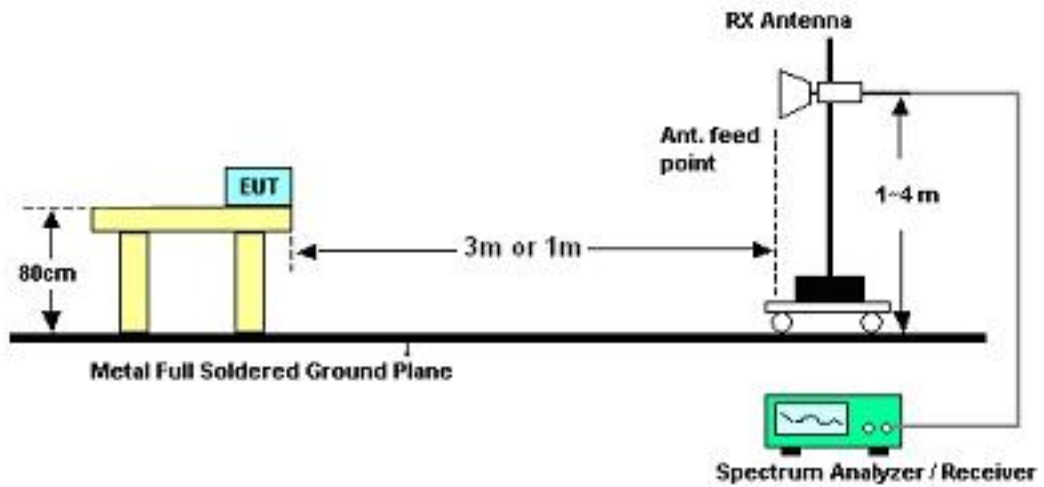
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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>	Mode 1	<b>Temperature :</b>	20~22°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	40~42%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2402 MHz is fundamental signals which can be ignored. 2. 7206 MHz and 9608 MHz are not within restricted bands, and there's limit lines are 20dB below the highest emission level. For example, 105.83 dBuV/m - 20dB = 85.83 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
2389.42	35.32	-18.68	54	34.6	32.02	4.58	35.88	159	14	Average
2389.42	52.08	-21.92	74	51.36	32.02	4.58	35.88	159	14	Peak
2402	89.28	-	-	88.54	32.02	4.58	35.86	159	14	Average
2402	105.83	-	-	105.09	32.02	4.58	35.86	159	14	Peak
2496	34.79	-19.21	54	33.85	32.1	4.64	35.8	159	14	Average
2496	45.92	-28.08	74	44.98	32.1	4.64	35.8	159	14	Peak
7206	49.27	-36.56	85.83	63.06	35.6	8.25	57.64	100	0	Peak
9608	47.05	-38.78	85.83	57.65	36.54	9.48	56.62	100	0	Peak

<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	20~22°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	40~42%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2402 MHz is fundamental signal which can be ignored. 2. 7206 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
2389.42	35.05	-18.95	54	34.33	32.02	4.58	35.88	100	280	Average
2389.42	49.15	-24.85	74	48.43	32.02	4.58	35.88	100	280	Peak
2402	85.61	-	-	84.87	32.02	4.58	35.86	100	280	Average
2402	100.58	-	-	99.84	32.02	4.58	35.86	100	280	Peak
2488	34.76	-19.24	54	33.83	32.1	4.64	35.81	100	280	Average
2488	45.46	-28.54	74	44.53	32.1	4.64	35.81	100	280	Peak
7206	51.75	-28.83	80.58	65.54	35.6	8.25	57.64	100	0	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	20~22°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	40~42%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2441 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
2324	34.9	-19.1	54	34.31	31.96	4.53	35.9	104	14	Average
2324	46.29	-27.71	74	45.7	31.96	4.53	35.9	104	14	Peak
2441	89.61	-	-	88.77	32.06	4.61	35.83	104	14	Average
2441	105.8	-	-	104.96	32.06	4.61	35.83	104	14	Peak
2488	34.78	-19.22	54	33.85	32.1	4.64	35.81	104	14	Average
2488	45.6	-28.4	74	44.67	32.1	4.64	35.81	104	14	Peak
7323	48.46	-25.54	74	62.15	35.6	8.42	57.71	100	0	Peak

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	20~22°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	40~42%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2441 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
2314	34.89	-19.11	54	34.31	31.95	4.53	35.9	108	223	Average
2314	46.88	-27.12	74	46.3	31.95	4.53	35.9	108	223	Peak
2441	86.19	-	-	85.35	32.06	4.61	35.83	108	223	Average
2441	101.39	-	-	100.55	32.06	4.61	35.83	108	223	Peak
2498	34.79	-19.21	54	33.85	32.1	4.64	35.8	108	223	Average
2498	45.54	-28.46	74	44.6	32.1	4.64	35.8	108	223	Peak
7323	47.15	-26.85	74	60.84	35.6	8.42	57.71	100	0	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	20~22°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	40~42%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2480 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	22.2	-17.8	40	33.34	19.8	0.7	31.64	100	78	Peak
57.54	13.68	-26.32	40	38.09	6.3	0.85	31.56	-	-	Peak
135.57	20.1	-23.4	43.5	38.77	11.38	1.25	31.3	-	-	Peak
333.6	15.59	-30.41	46	30.89	13.91	1.86	31.07	-	-	Peak
545	19.24	-26.76	46	28.68	19.25	2.32	31.01	-	-	Peak
767.6	24.71	-21.29	46	29.76	22.23	2.78	30.06	-	-	Peak
2352	35.06	-18.94	54	34.41	31.99	4.55	35.89	103	31	Average
2352	46.32	-27.68	74	45.67	31.99	4.55	35.89	103	31	Peak
2480	90.34	-	-	89.42	32.09	4.64	35.81	103	31	Average
2480	106.86	-	-	105.94	32.09	4.64	35.81	103	31	Peak
2483.5	35.22	-18.78	54	34.3	32.09	4.64	35.81	103	31	Average
2483.5	65.87	-8.13	74	64.95	32.09	4.64	35.81	103	31	Peak
7440	47.21	-26.79	74	60.77	35.6	8.63	57.79	100	0	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	20~22°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	40~42%
<b>Test Engineer :</b>	David Ke	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2480 MHz is fundamental signal which can be ignored.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
31.89	35.03	-4.97	40	47.51	18.44	0.72	31.64	100	59	Peak
39.18	24.79	-15.21	40	41.71	13.92	0.75	31.59	-	-	Peak
133.68	29.33	-14.17	43.5	48	11.4	1.24	31.31	-	-	Peak
370	16.66	-29.34	46	30.84	14.9	1.95	31.03	-	-	Peak
484.8	19.71	-26.29	46	30.38	17.8	2.2	30.67	-	-	Peak
647.2	22.15	-23.85	46	29.31	20.39	2.58	30.13	-	-	Peak
2354	34.99	-19.01	54	34.34	31.99	4.55	35.89	100	227	Average
2354	45.72	-28.28	74	45.07	31.99	4.55	35.89	100	227	Peak
2480	85.64	-	-	84.72	32.09	4.64	35.81	100	227	Average
2480	100.44	-	-	99.52	32.09	4.64	35.81	100	227	Peak
2483.5	32.68	-21.32	54	31.76	32.09	4.64	35.81	100	227	Average
2483.5	59.87	-14.13	74	58.95	32.09	4.64	35.81	100	227	Peak
7440	46.08	-27.92	74	59.64	35.6	8.63	57.79	100	0	Peak



## **3.10 Antenna Requirements**

### **3.10.1 Standard Applicable**

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

### **3.10.2 Antenna Connected Construction**

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

### **3.10.3 Antenna Gain**

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



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Mar. 27, 2012 ~ Mar. 30, 2012	Dec. 29, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 23, 2011	Mar. 27, 2012 ~ Mar. 30, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 23, 2011	Mar. 27, 2012 ~ Mar. 30, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Bluetooth Base Station	R&S	CBT	100783	N/A	Aug. 18, 2011	Mar. 27, 2012 ~ Mar. 30, 2012	Aug. 17, 2012	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESC17	100768	9kHz~7GHz	Jun. 02, 2011	Mar. 22, 2012	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 30, 2011	Mar. 22, 2012	Dec. 29, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	060105	9kHz~30MHz	Dec. 30, 2011	Mar. 22, 2012	Dec. 29, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000811	N/A	Nov. 16, 2011	Mar. 22, 2012	Nov. 15, 2012	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/066	GSM/GPRS850/900/1800/1900,	Dec. 30, 2011	Mar. 22, 2012	Dec. 29, 2012	Conduction (CO01-KS)
Spectrum Analyzer	R&S	ESU26	100390	20Hz ~ 26.5GHz	Dec. 22, 2011	Mar. 27, 2012 ~ Apr. 02, 2012	Dec. 21, 2012	Radiation (03CH05-HY)
COM-POWER	Double Ridge Horn	AH-118	701030	1GHz ~ 18GHz	N/A	Mar. 27, 2012 ~ Apr. 02, 2012	N/A	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 2GHz	Oct. 22, 2011	Mar. 27, 2012 ~ Apr. 02, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Mar. 27, 2012 ~ Apr. 02, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Mar. 27, 2012 ~ Apr. 02, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz ~ 18GHz	Aug. 04, 2011	Mar. 27, 2012 ~ Apr. 02, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
COM-POWER	COM-POWER	PA-103	161075	10Hz~1000MHz Gain:32dB	Feb. 27, 2012	Mar. 27, 2012 ~ Apr. 02, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz~18GHz	Jul. 18, 2011	Mar. 27, 2012 ~ Apr. 02, 2012	Jul. 17, 2012	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Aug. 30, 2011	Mar. 27, 2012 ~ Apr. 02, 2012	Aug. 29, 2012	Radiation (03CH05-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Feb. 09, 2012	Mar. 27, 2012 ~ Apr. 02, 2012	Feb. 08, 2013	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Mar. 27, 2012 ~ Apr. 02, 2012	Jul. 28, 2012	Radiation (03CH05-HY)

## 5 Uncertainty of Evaluation

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

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
<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>				