



FCC RF Test Report

APPLICANT : Motorola Solutions, Inc.
EQUIPMENT : Enterprise Tablet
BRAND NAME : Motorola
MODEL NAME : ET1N2
FCC ID : UZ7ET1N2
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on May 24, 2012 and completely tested on Jun. 01, 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.

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SPORTON INTERNATIONAL INC.

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FCC ID : UZ7ET1N2

Page Number : 1 of 72

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APPENDIX A. PHOTOGRAPHS OF EUT

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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	-
3.2	-	Gen 4.6.1	99% Bandwidth	-	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 15.40 dB at 0.446 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 8.17 dB at 2483.500 MHz
3.10	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 & Specification	
Equipment	Enterprise Tablet
Brand Name	Motorola
Model Name	ET1N2
FCC ID	UZ7ET1N2
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) : 2.31 dBm (0.0017 W) Bluetooth EDR (2Mbps) : 2.66 dBm (0.0018 W) Bluetooth EDR (3Mbps) : 3.23 dBm (0.0021 W)
Antenna Type	PIFA Antenna with gain 1.72 dBi
HW Version	DV1
SW Version	91-271301-1664-0100-00-D1-051812
FW Version	D3200-STSUGN-1580 1
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth 2.1 EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth 2.1 EDR (3Mbps) : 8-DPSK Bluetooth 3.0 EDR : GFSK, $\pi/4$ -DQPSK, 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

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 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	ASUS	A8M	PPD-AR5BXB6	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
7.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
8.	Flash Disk	Kingston	Datatraveler 100 4GB	N/A	N/A	N/A
9.	Bluetooth Phone	Sony Ericsson	W980	PY7A3052091	N/A	N/A
10.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
11.	iPod Earphone	Apple	N/A	FCC DoC	Shielded, 1.0 m	N/A
12.	Earpiece	Motorola	21-154925-01R	N/A	N/A	Unshielded, 1.3 m

2 Test Configuration of Equipment Under Test

2.1 RF Peak Output Power

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

Channel	Frequency	Bluetooth RF Peak Output Power		
		GFSK / 1Mbps		
		DH1	DH3	DH5
Ch00	2402MHz	2.29 dBm	2.31 dBm	2.25 dBm
Ch39	2441MHz	2.08 dBm	2.08 dBm	2.07 dBm
Ch78	2480MHz	1.94 dBm	1.93 dBm	1.94 dBm

Channel	Frequency	Bluetooth RF Peak Output Power		
		π /4-DQPSK / 2Mbps		
		2DH1	2DH3	2DH5
Ch00	2402MHz	2.66 dBm	2.65 dBm	2.60 dBm
Ch39	2441MHz	2.57 dBm	2.58 dBm	2.58 dBm
Ch78	2480MHz	2.48 dBm	2.46 dBm	2.47 dBm

Channel	Frequency	Bluetooth RF Peak Output Power		
		8-DPSK / 3Mbps		
		3DH1	3DH3	3DH5
Ch00	2402MHz	3.18 dBm	3.18 dBm	3.21 dBm
Ch39	2441MHz	3.23 dBm	3.22 dBm	3.14 dBm
Ch78	2480MHz	3.13 dBm	3.12 dBm	3.12 dBm

Remark:

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

2.2 Average Conducted Output Power

Channel	Frequency	Bluetooth RF Output Power		
		GFSK / 1Mbps		
		DH1	DH3	DH5
Ch00	2402MHz	1.69 dBm	1.80 dBm	1.80 dBm
Ch39	2441MHz	1.69 dBm	1.81 dBm	1.82 dBm
Ch78	2480MHz	1.66 dBm	1.77 dBm	1.75 dBm

Channel	Frequency	Bluetooth RF Output Power		
		$\pi/4$ -DQPSK / 2Mbps		
		2DH1	2DH3	2DH5
Ch00	2402MHz	-0.04 dBm	-0.04 dBm	-0.08 dBm
Ch39	2441MHz	-0.05 dBm	-0.04 dBm	-0.03 dBm
Ch78	2480MHz	-0.09 dBm	-0.06 dBm	-0.10 dBm

Channel	Frequency	Bluetooth RF Output Power		
		8-DPSK / 3Mbps		
		3DH1	3DH3	3DH5
Ch00	2402MHz	-0.05 dBm	-0.08 dBm	-0.08 dBm
Ch39	2441MHz	-0.05 dBm	-0.04 dBm	-0.03 dBm
Ch78	2480MHz	-0.09 dBm	-0.09 dBm	-0.09 dBm

2.3 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).

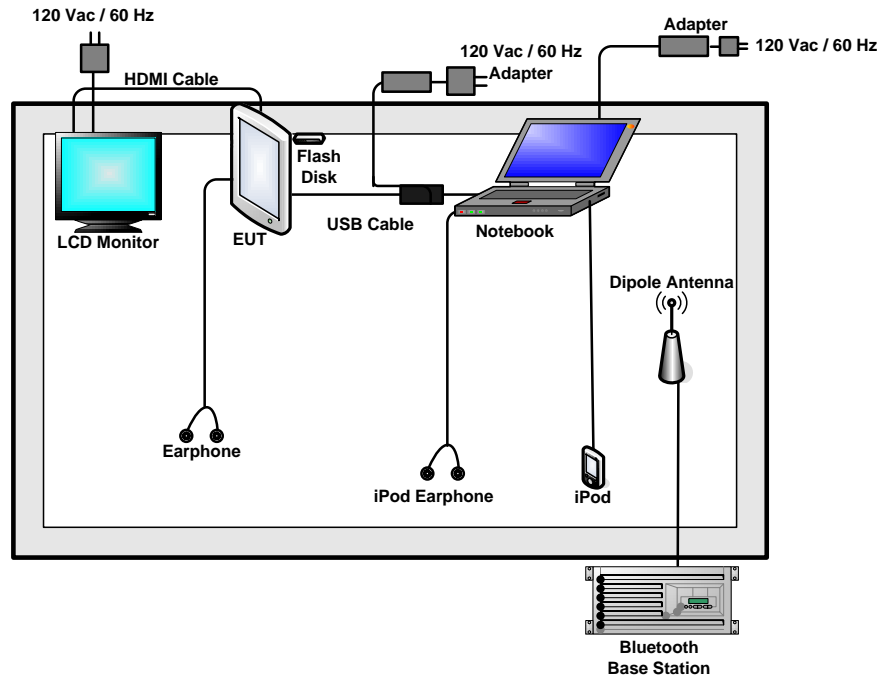
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

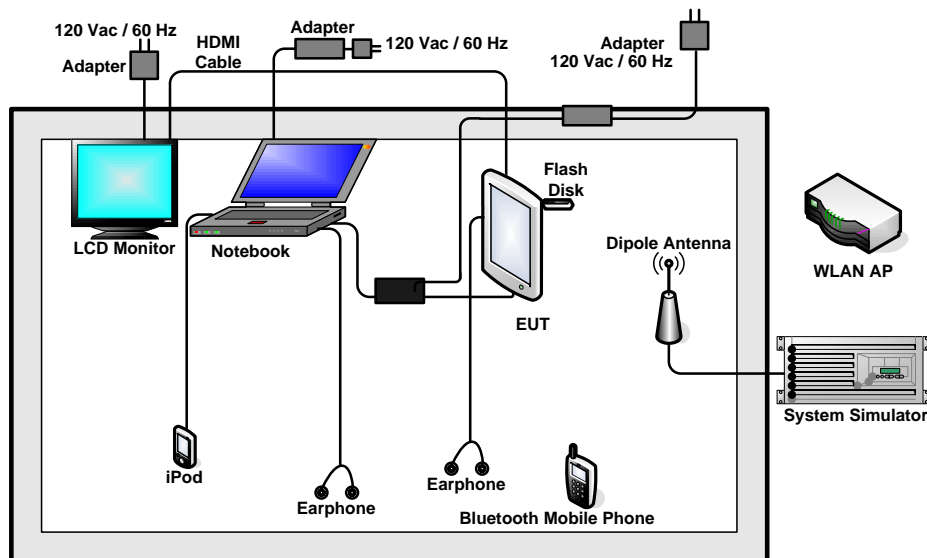
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 : GSM850 (GPRS 8) Idle + Bluetooth Link + WLAN (2.4G) Link + USB Link (Data Link with Notebook) + HDMI Cable with Monitor + Earphone + Micro USB Link + Adapter Mode 2 : GSM850 (GPRS 8) Idle + Bluetooth Link + WLAN (5G) Link + USB Link (Data Link with Notebook) + HDMI Cable with Monitor + Earphone + Micro USB Link + Adapter		
Remark: <ol style="list-style-type: none"> 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. For conducted emission, the worst case is mode 2; and all the test data were reported. “Bluetooth Link” stands for EUT linked to Bluetooth Mobile Phone by Bluetooth function. ”WLAN Link” stands for EUT associated with AP at 2.4GHz and 5GHz band. “USB Link” stands for data application transferred mode between EUT and Notebook. “Micro USB Link” stands for execute the programs, “Test Tool” installed in EUT for files transfer with EUT via flash disk. 			

2.4 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.5 RF Utility

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

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

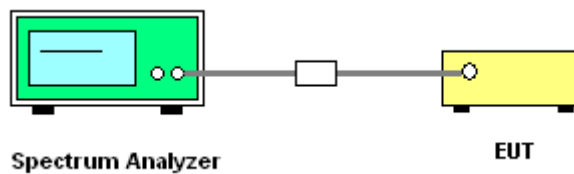
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

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

3.1.4 Test Setup

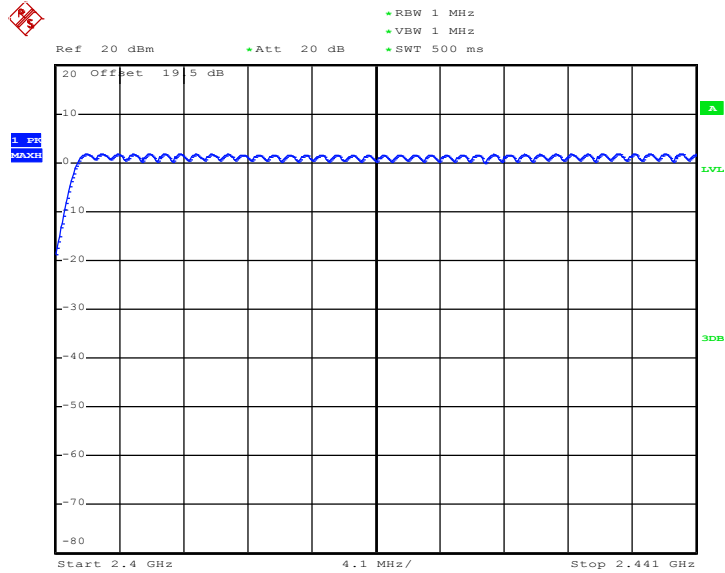


3.1.5 Test Result of Number of Hopping Frequency

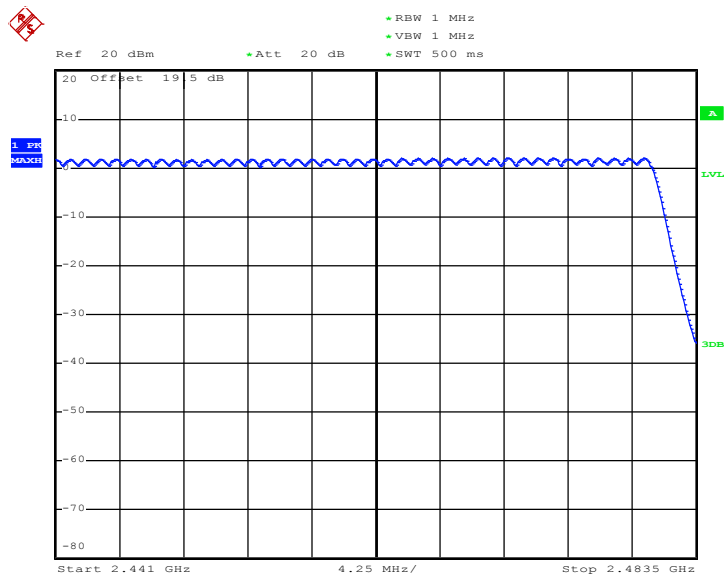
Test Mode :	Mode 7~9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass



Number of Hopping Channel Plot on Channel 00 - 78



Date: 30.MAY.2012 16:37:30



Date: 30.MAY.2012 16:43:53

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

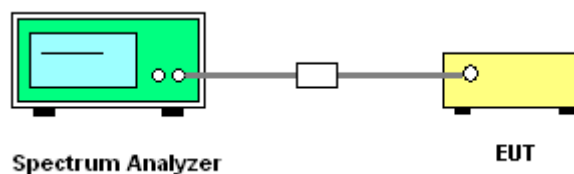
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

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

3.2.4 Test Setup

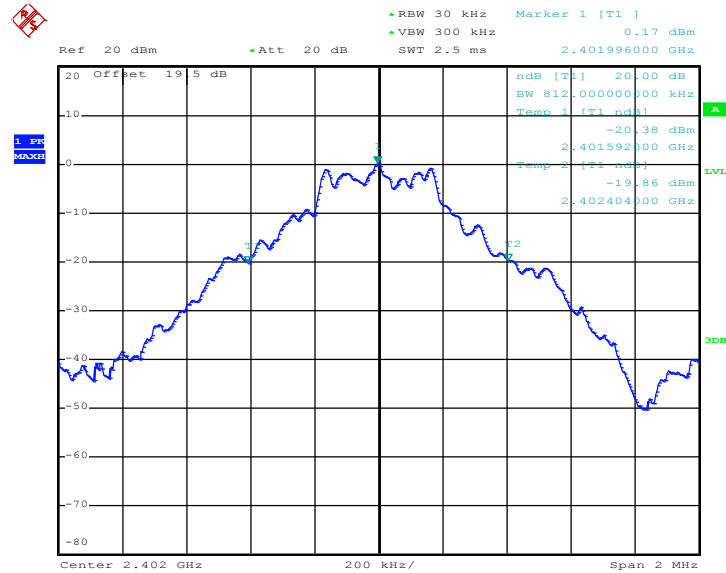


3.2.5 Test Result of 20dB Bandwidth

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

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.812
39	2441	0.896
78	2480	0.896

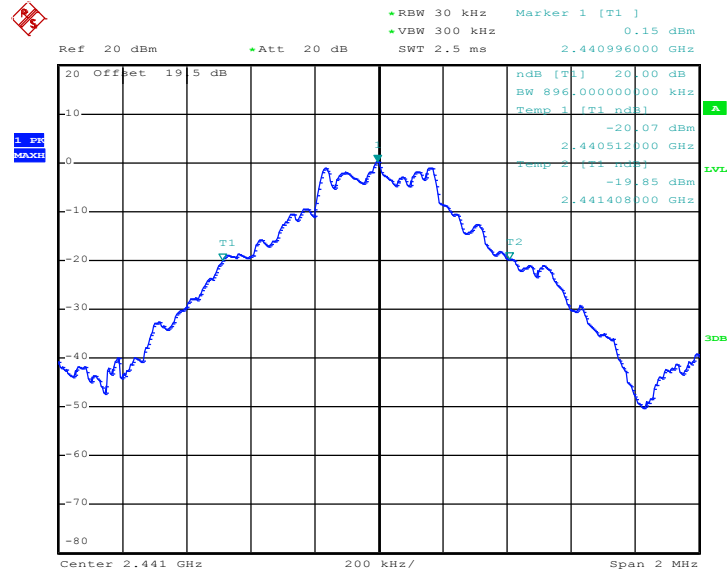
20 dB Bandwidth Plot on Channel 00



Date: 30.MAY.2012 15:03:18

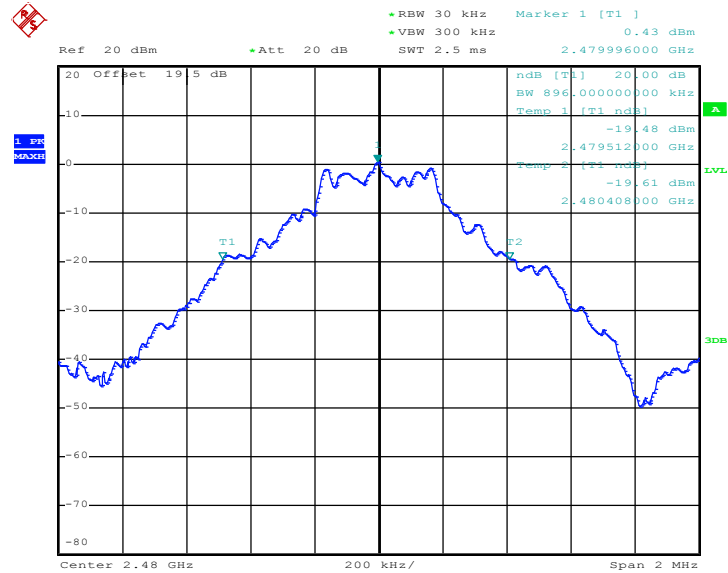


20 dB Bandwidth Plot on Channel 39



Date: 30.MAY.2012 15:16:33

20 dB Bandwidth Plot on Channel 78



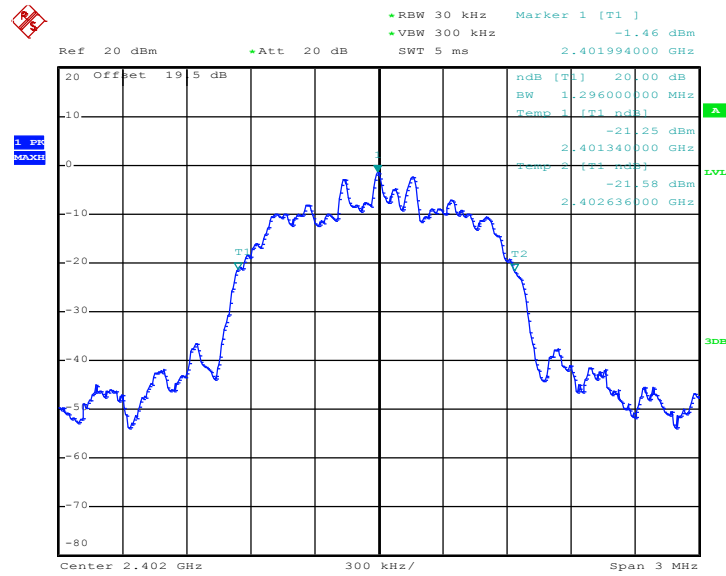
Date: 30.MAY.2012 15:15:47



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

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.296
39	2441	1.302
78	2480	1.272

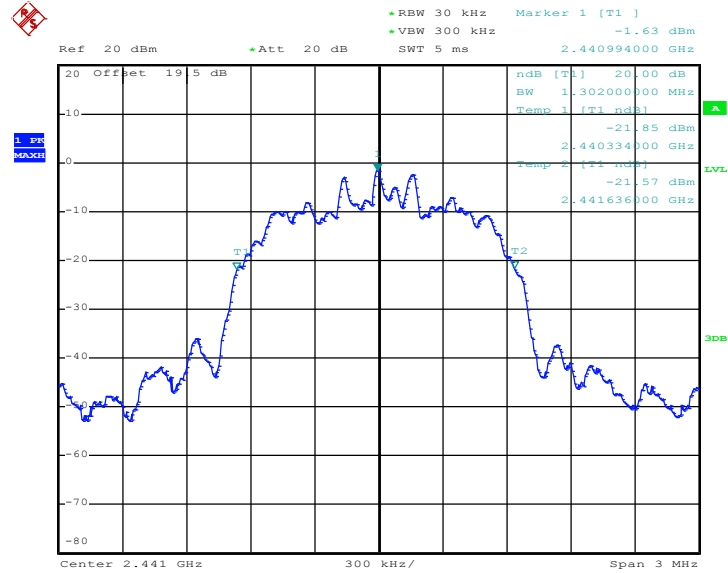
20 dB Bandwidth Plot on Channel 00



Date: 30.MAY.2012 15:23:13

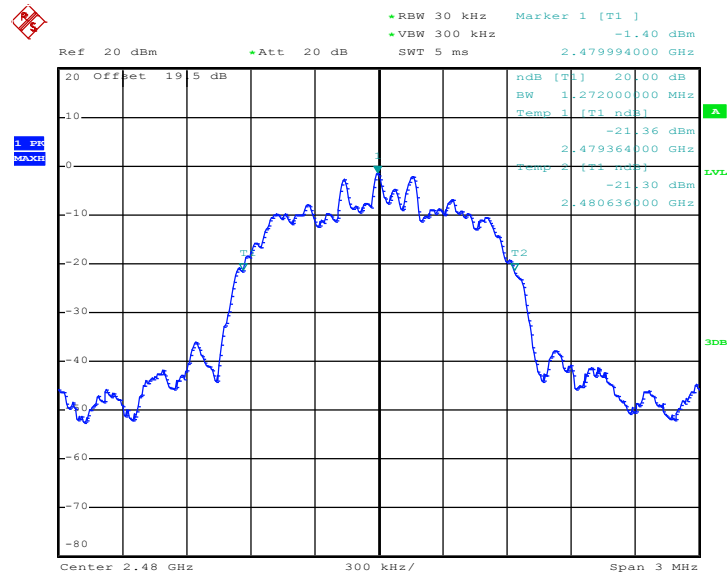


20 dB Bandwidth Plot on Channel 39



Date: 30.MAY.2012 15:37:48

20 dB Bandwidth Plot on Channel 78



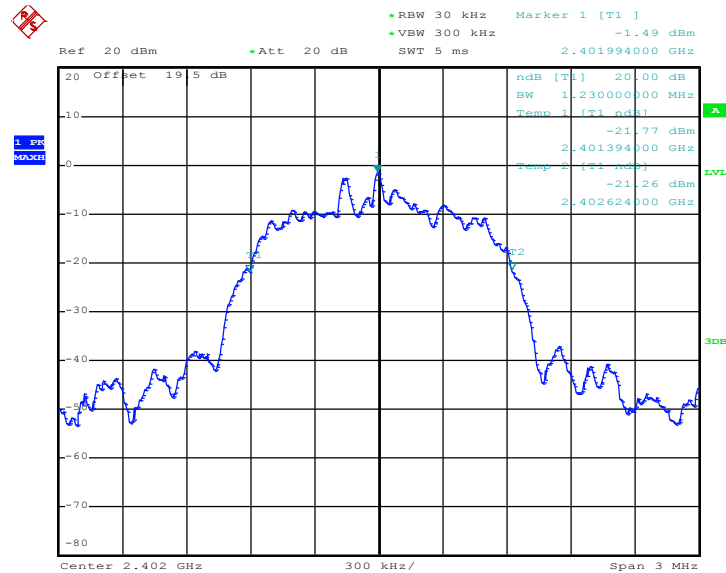
Date: 30.MAY.2012 15:43:22



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

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.230
39	2441	1.266
78	2480	1.236

20 dB Bandwidth Plot on Channel 00



Date: 30.MAY.2012 16:05:25

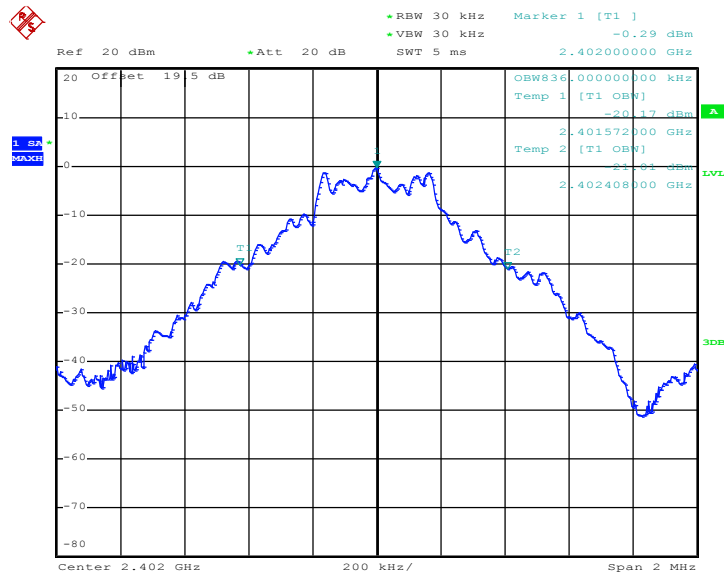


3.2.6 Test Result of 99% Occupied Bandwidth

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

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.836
39	2441	0.836
78	2480	0.840

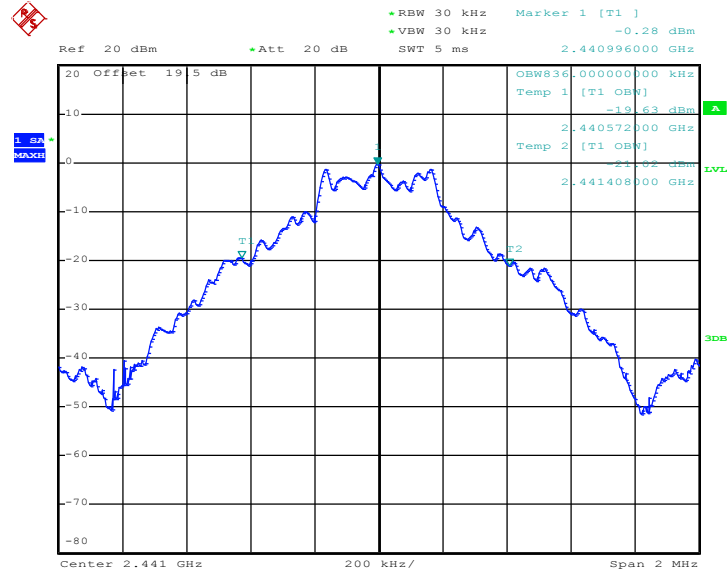
99% Bandwidth Plot on Channel 00



Date: 30.MAY.2012 15:02:37

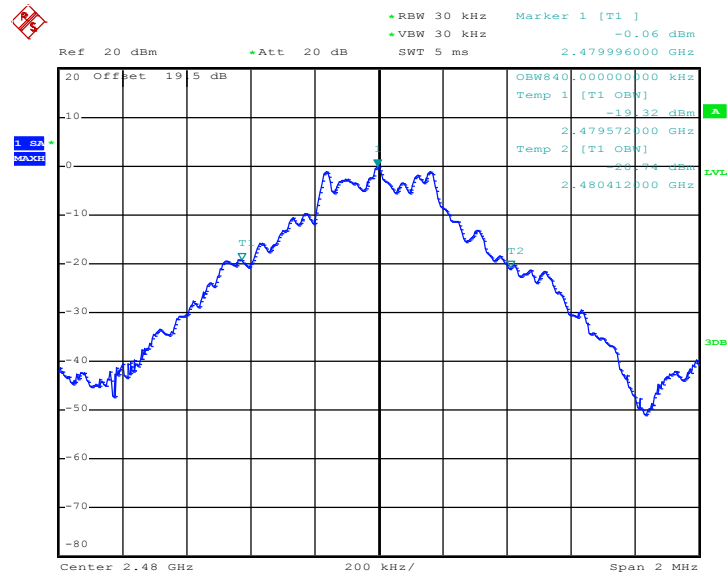


99% Occupied Bandwidth Plot on Channel 39



Date: 30.MAY.2012 15:17:08

99% Occupied Bandwidth Plot on Channel 78



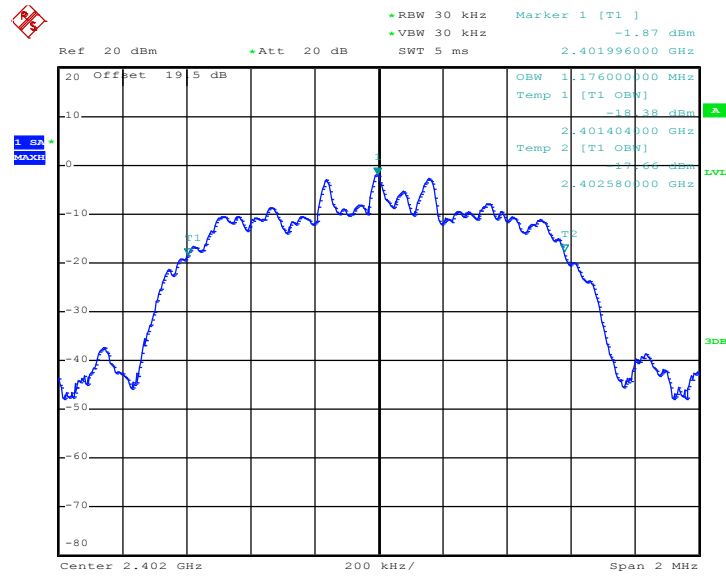
Date: 30.MAY.2012 15:15:19



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

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

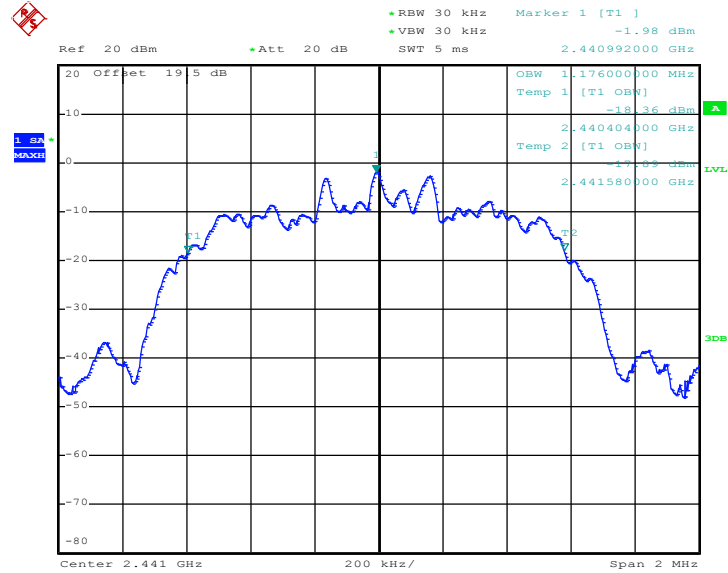
99% Bandwidth Plot on Channel 00



Date: 30.MAY.2012 15:22:48

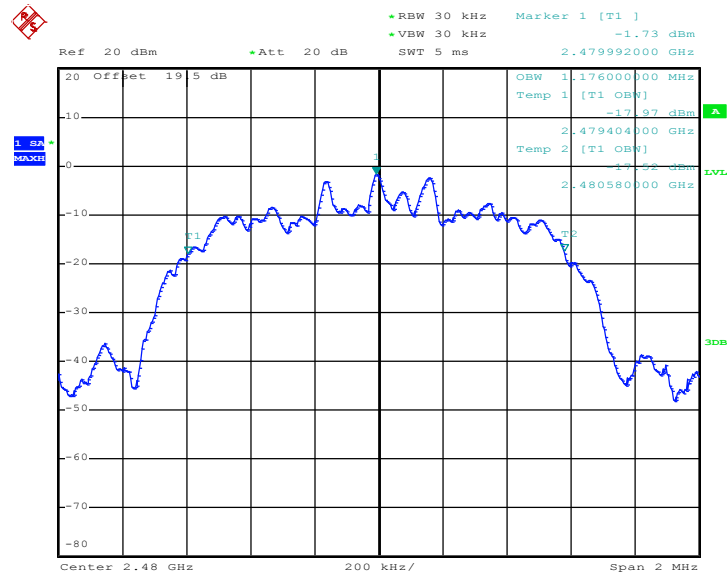


99% Occupied Bandwidth Plot on Channel 39



Date: 30.MAY.2012 15:36:52

99% Occupied Bandwidth Plot on Channel 78



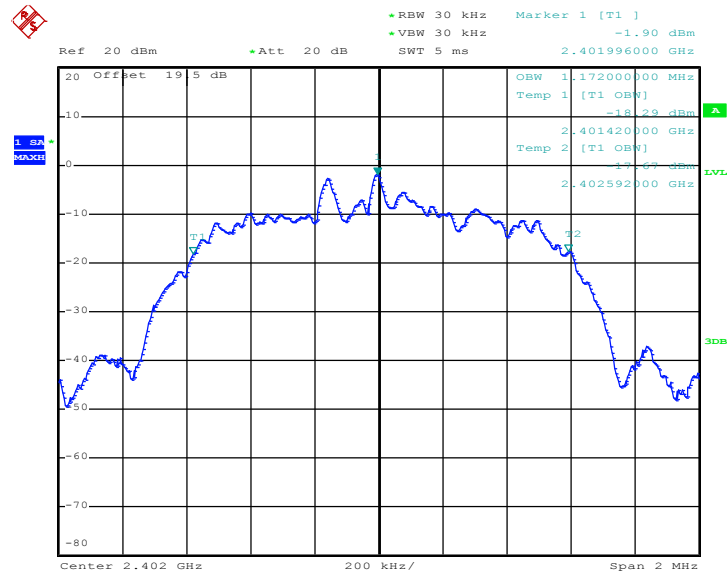
Date: 30.MAY.2012 15:44:57



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

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

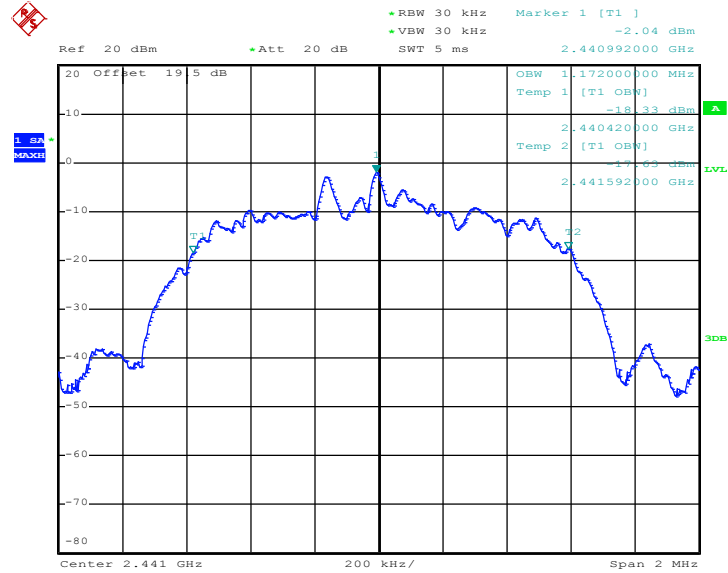
99% Bandwidth Plot on Channel 00



Date: 30.MAY.2012 16:04:21

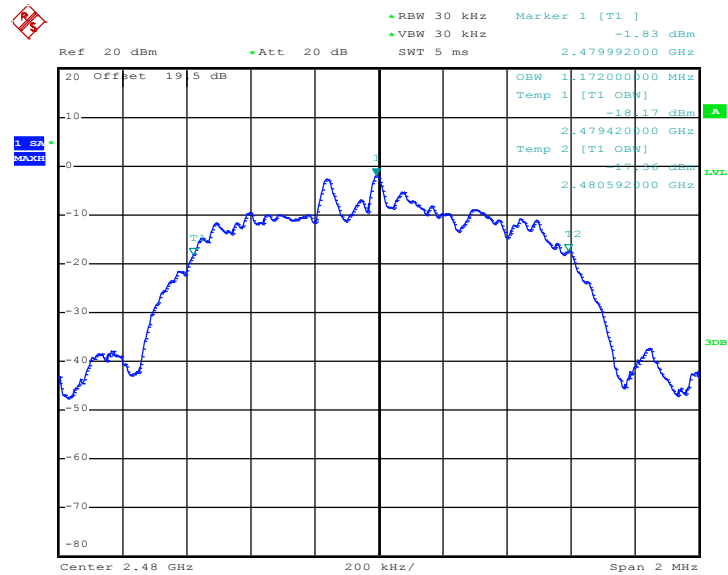


99% Occupied Bandwidth Plot on Channel 39



Date: 30.MAY.2012 16:00:23

99% Occupied Bandwidth Plot on Channel 78



Date: 30.MAY.2012 15:46:57

3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

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

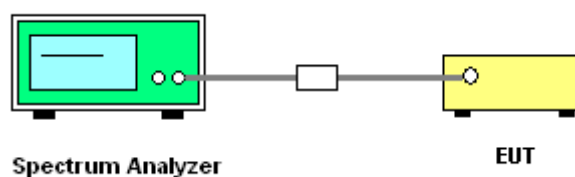
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

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

3.3.4 Test Setup



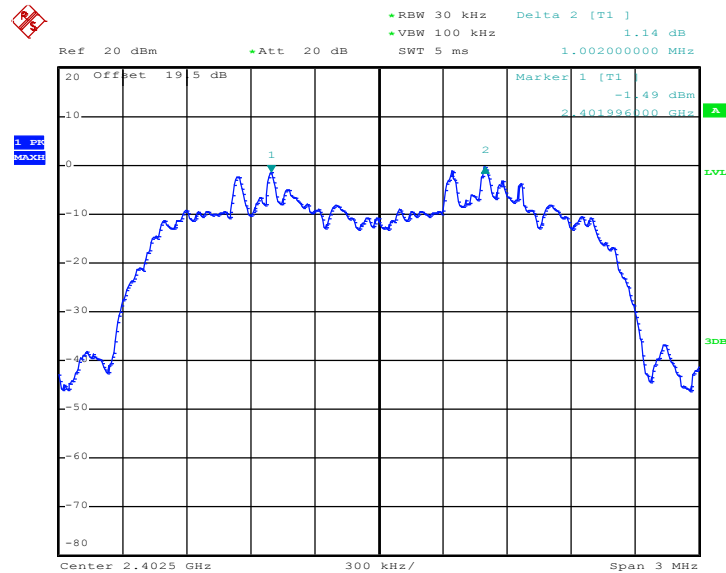


3.3.5 Test Result of Hopping Channel Separation

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

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8200	Pass
39	2441	1.002	0.8440	Pass
78	2480	1.002	0.8240	Pass

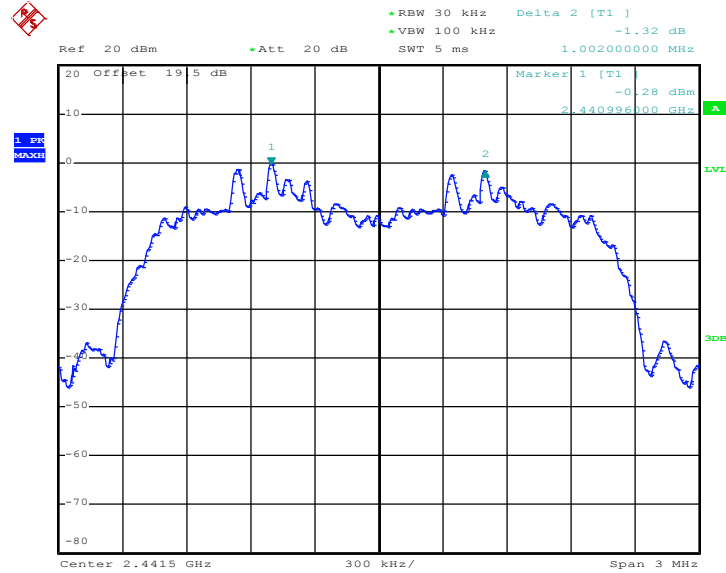
Channel Separation Plot on Channel 00 - 01



Date: 30.MAY.2012 16:09:20

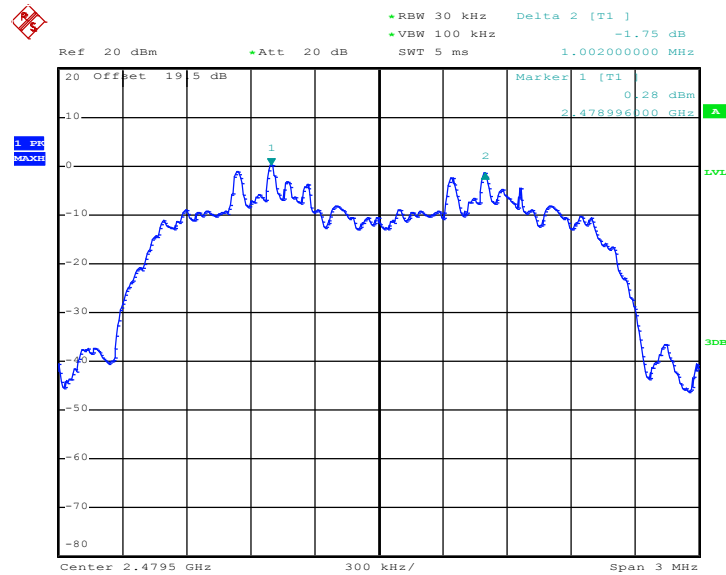


Channel Separation Plot on Channel 39 - 40



Date: 30.MAY.2012 16:03:11

Channel Separation Plot on Channel 77 - 78



Date: 30.MAY.2012 15:59:25

3.4 Dwell Time Measurement

3.4.1 Limit of Dwell Time

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

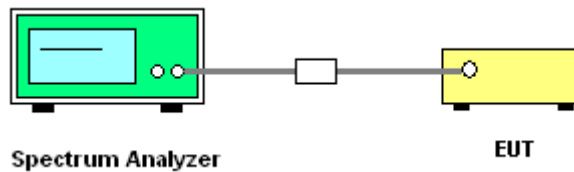
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

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

3.4.4 Test Setup



3.4.5 Test Result of Dwell Time

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

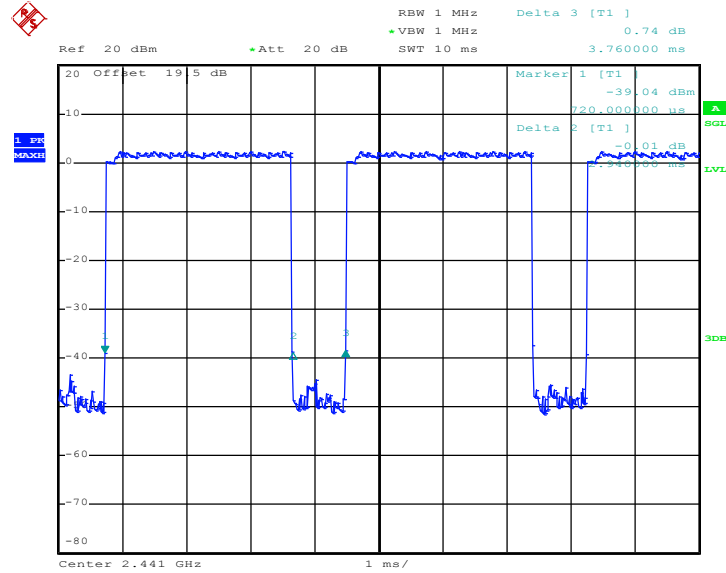
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.20	2940.00	0.30	0.4	Pass

Remark:

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

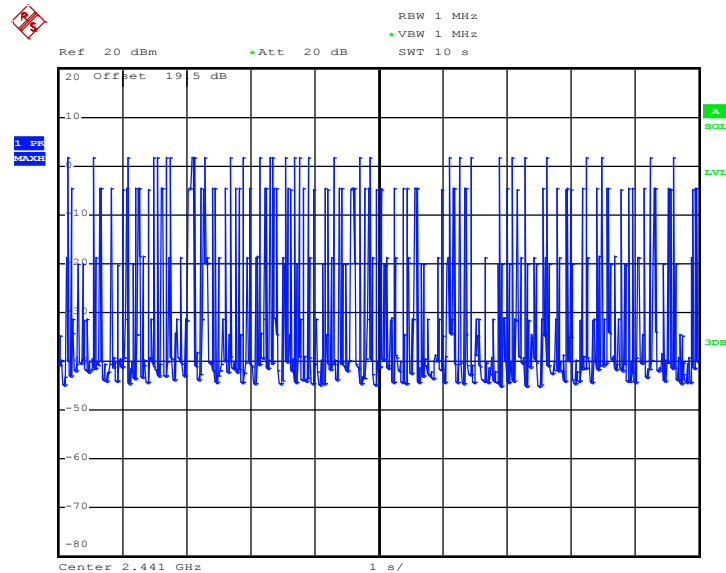


3DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 28.MAY.2012 20:32:19

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



Date: 30.MAY.2012 16:46:23

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.

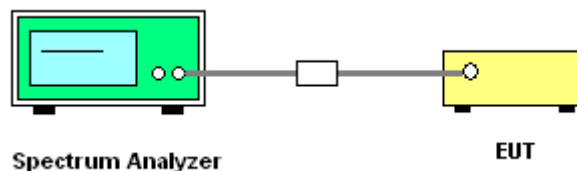
3.5.2 Measuring Instruments

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



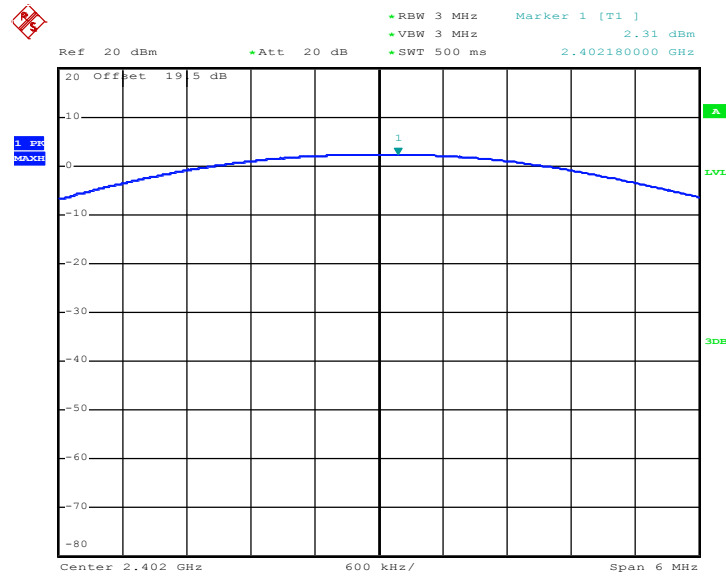


3.5.5 Test Result of Peak Output Power

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

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	2.31	30.00	Pass
39	2441	2.08	30.00	Pass
78	2480	1.93	30.00	Pass

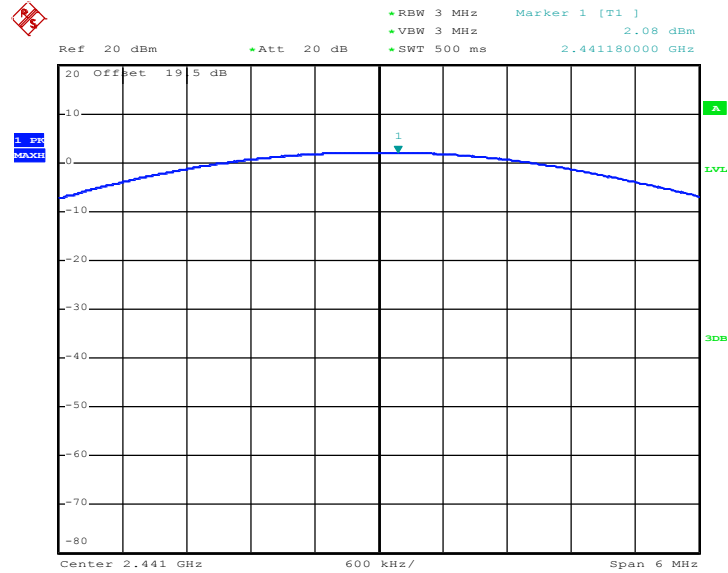
Peak Output Power Plot on Channel 00



Date: 28.MAY.2012 20:12:20

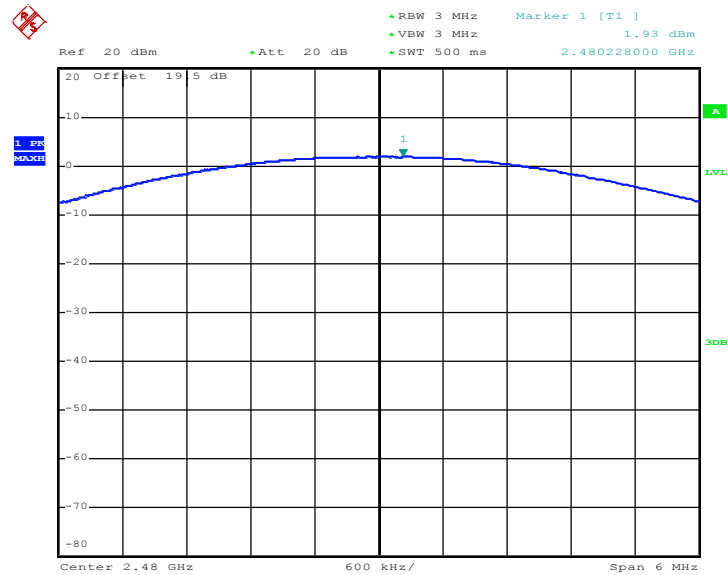


Peak Output Power Plot on Channel 39



Date: 28.MAY.2012 20:13:35

Peak Output Power Plot on Channel 78



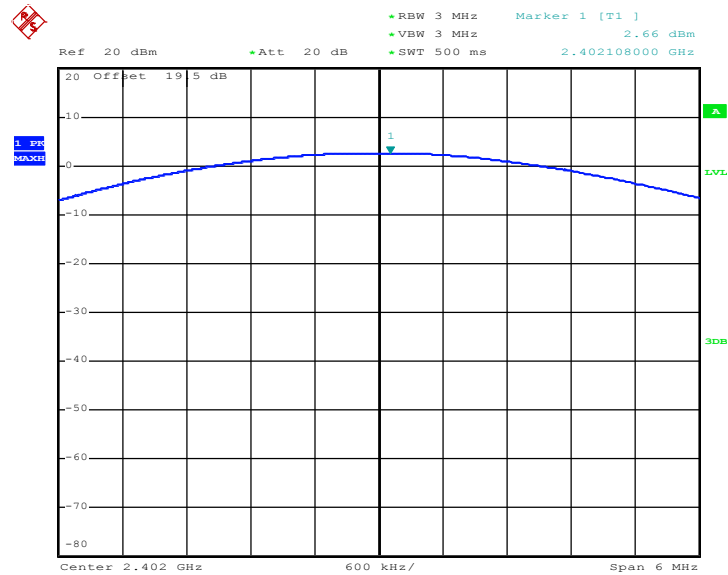
Date: 28.MAY.2012 20:14:51



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

Channel	Frequency (MHz)	RF Power (dBm)		
		π /4-DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	2.66	20.97	Pass
39	2441	2.57	20.97	Pass
78	2480	2.48	20.97	Pass

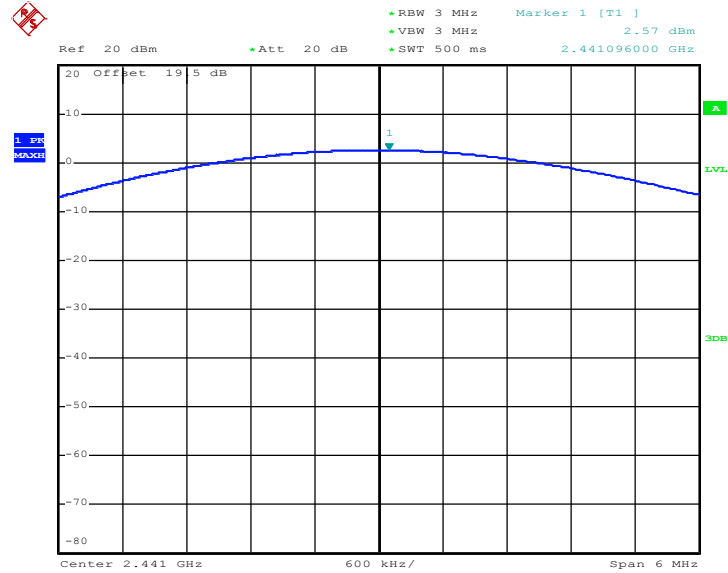
Peak Output Power Plot on Channel 00



Date: 28.MAY.2012 20:12:37

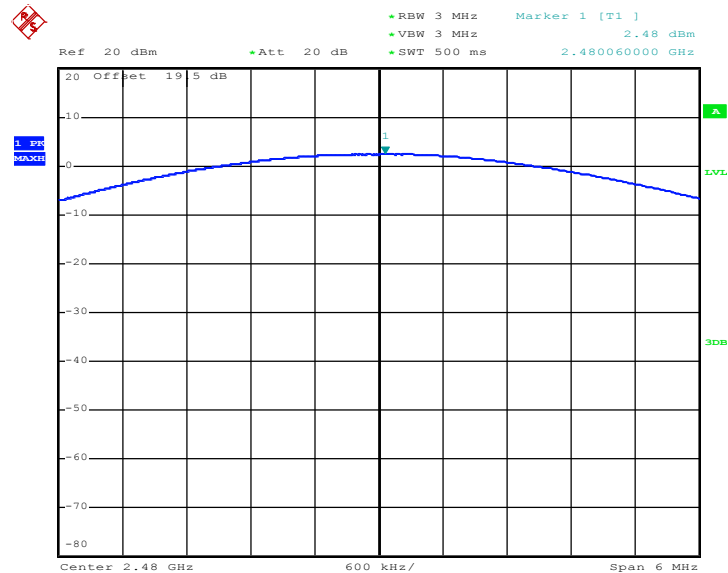


Peak Output Power Plot on Channel 39



Date: 28.MAY.2012 20:13:52

Peak Output Power Plot on Channel 78



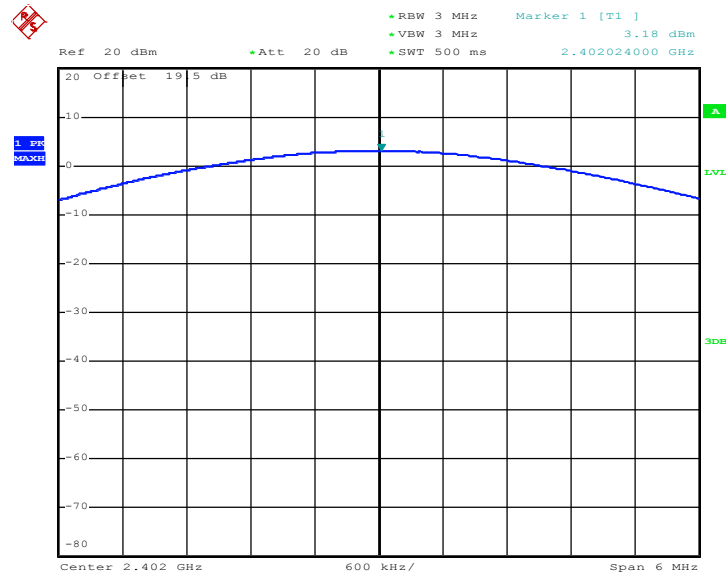
Date: 28.MAY.2012 20:15:07



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

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	3.18	20.97	Pass
39	2441	3.23	20.97	Pass
78	2480	3.13	20.97	Pass

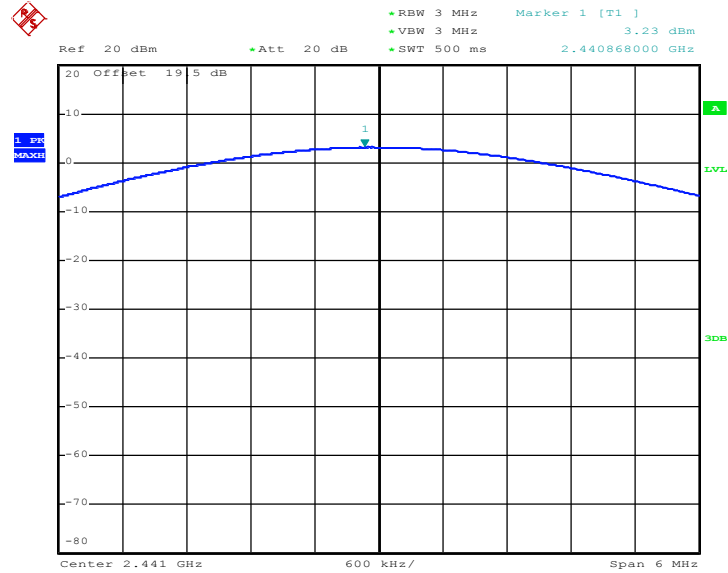
Peak Output Power Plot on Channel 00



Date: 28.MAY.2012 20:13:02

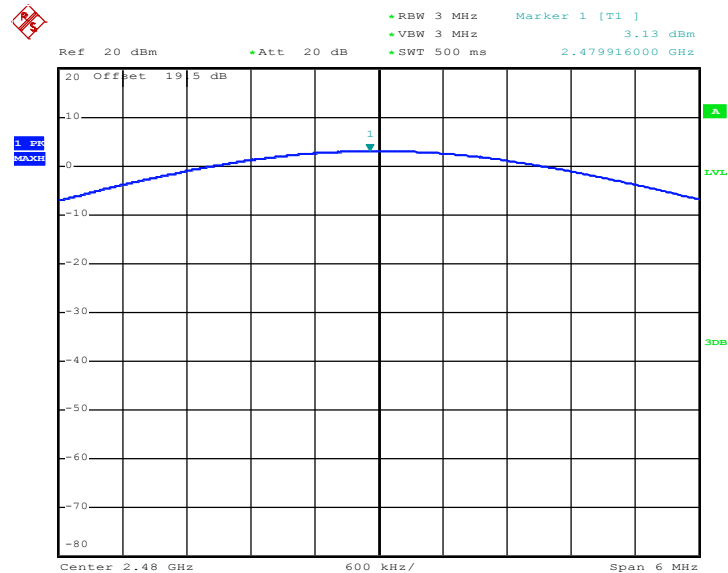


Peak Output Power Plot on Channel 39



Date: 28.MAY.2012 20:14:17

Peak Output Power Plot on Channel 78



Date: 28.MAY.2012 20:15:33



3.6 Band Edges Measurement

3.6.1 Limit of Band Edges

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

3.6.2 Measuring Instruments

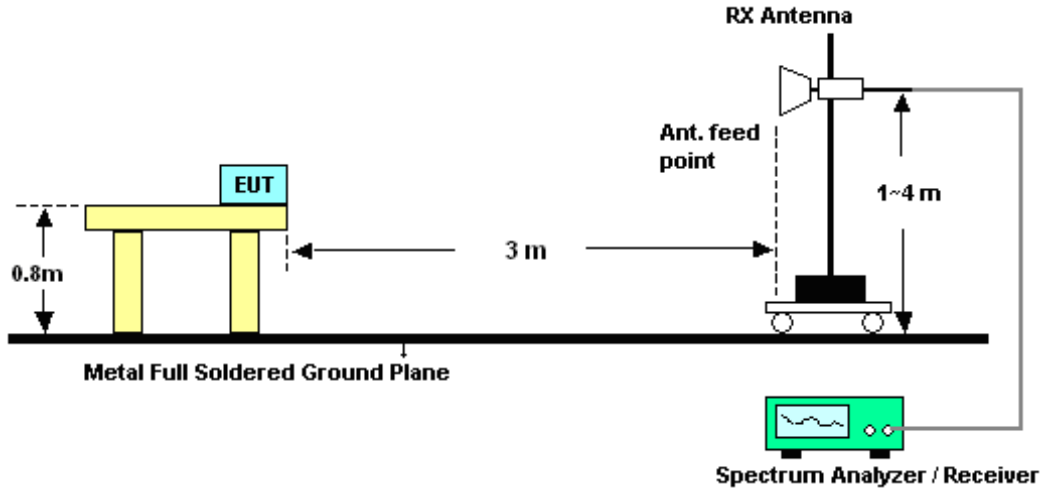
See list of measuring instruments of this test report.

3.6.3 Test Procedures

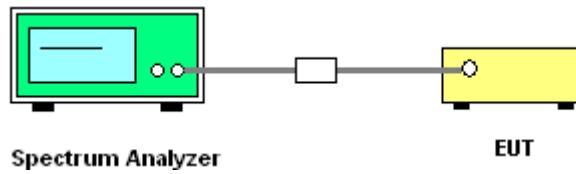
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300KHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.6.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>





3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	41~42%
		Test Engineer :	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
2382.01	59.44	-14.56	74	55.34	32.03	6.03	33.96	101	163	Peak
2382.01	33.75	-20.25	54	29.65	32.03	6.03	33.96	101	163	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
2382.01	49.11	-24.89	74	45.01	32.03	6.03	33.96	140	77	Peak
2382.01	33.02	-20.98	54	28.92	32.03	6.03	33.96	140	77	Average



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
		Test Engineer :	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	65.83	-8.17	74	61.47	32.18	6.18	34	100	134	Peak
2483.5	34.35	-19.65	54	29.99	32.18	6.18	34	100	134	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	85.63	51.28	34.35	54	-19.65	Pass
Hopping Mode	85.63	53.04	32.59	54	-21.41	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	59.07	-14.93	74	54.71	32.18	6.18	34	101	77	Peak
2483.5	28.58	-25.42	54	24.22	32.18	6.18	34	101	77	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	79.45	50.89	28.56	54	-25.44	Pass
Hopping Mode	79.45	52.87	26.58	54	-27.42	Pass

Note : Average result = Maximum field strength – Delta result

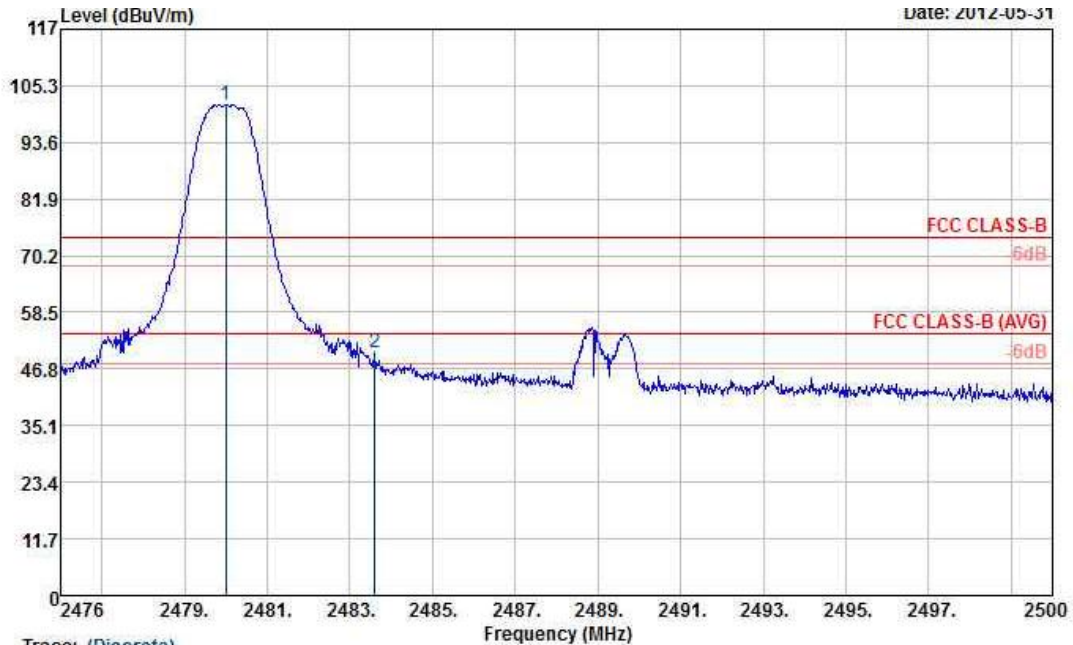


Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal





Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal



Trace: (Discrete)
 Site : 03CH07-HY
 Condition : FCC CLASS-B 3m HF-ANT_110816 HORIZONTAL

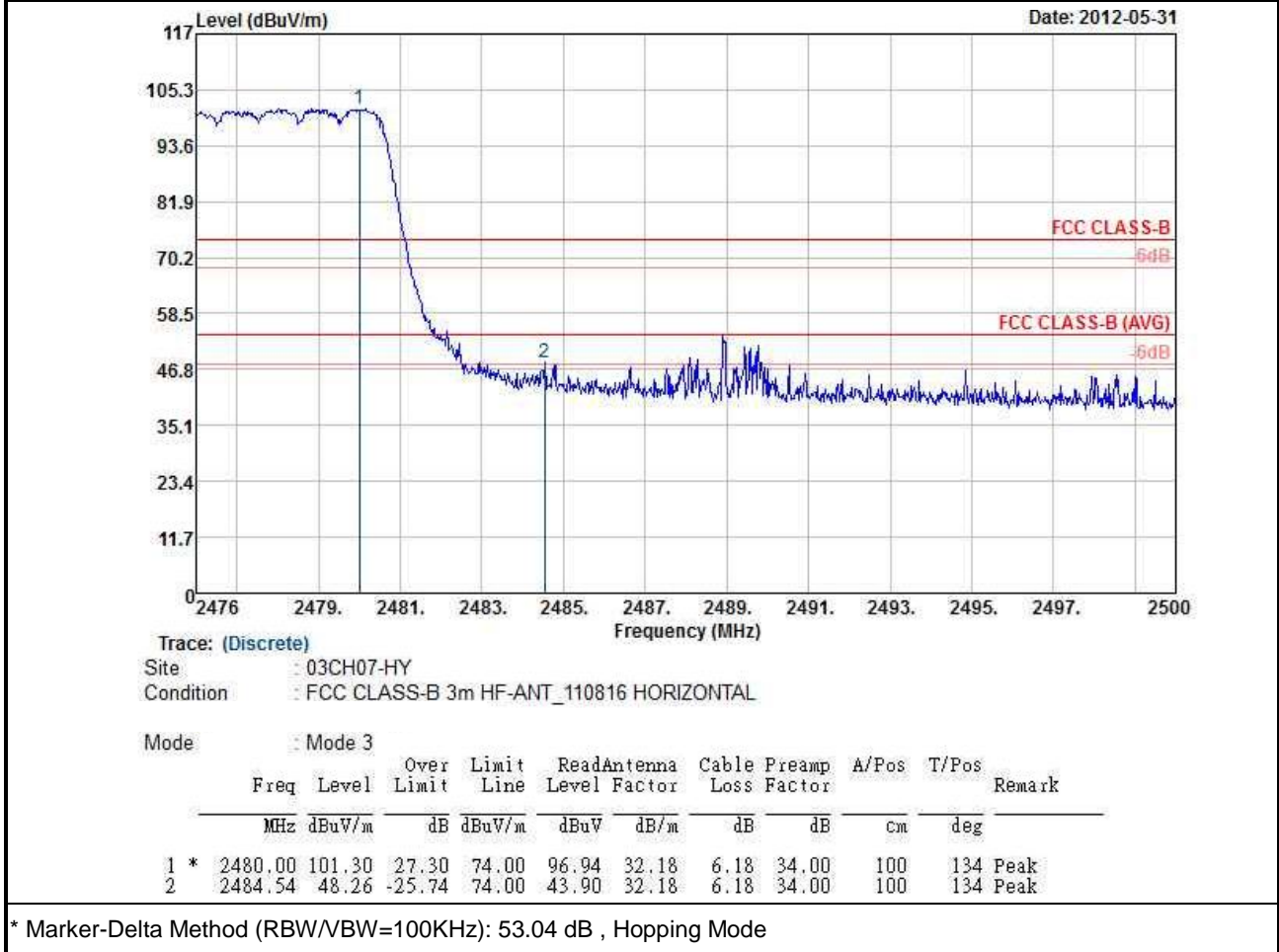
Mode : Mode 3

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBUV/m	dB	dBUV/m	dBUV	dB/m	dB	dB	cm	deg	
1 *	2480.00	101.43	27.43	74.00	97.07	32.18	6.18	34.00	100	134	Peak
2	2483.61	50.15	-23.85	74.00	45.79	32.18	6.18	34.00	100	134	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 51.28 dB , single carrier Mode

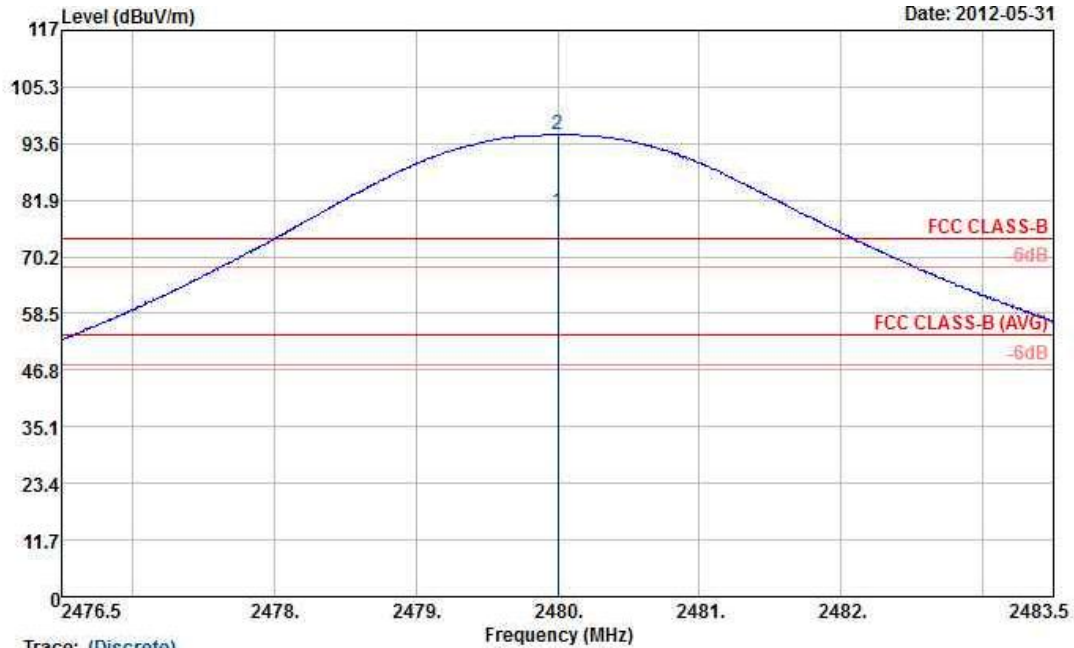


Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal





Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical



Trace: (Discrete)
 Site : 03CH07-HY
 Condition : FCC CLASS-B 3m HF-ANT_110816 VERTICAL

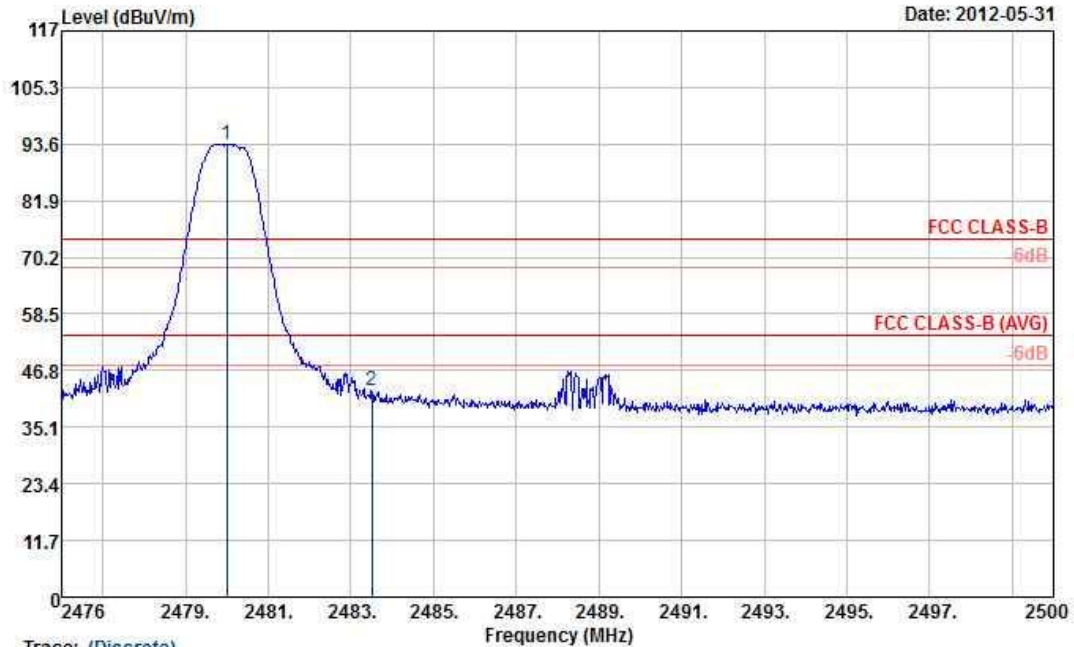
Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	2480.00	79.45	25.45	54.00	75.09	32.18	6.18	34.00	101	77	Average
2 *	2480.00	95.53	21.53	74.00	91.17	32.18	6.18	34.00	101	77	Peak

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical



Trace: (Discrete)
 Site : 03CH07-HY
 Condition : FCC CLASS-B 3m HF-ANT_110816 VERTICAL

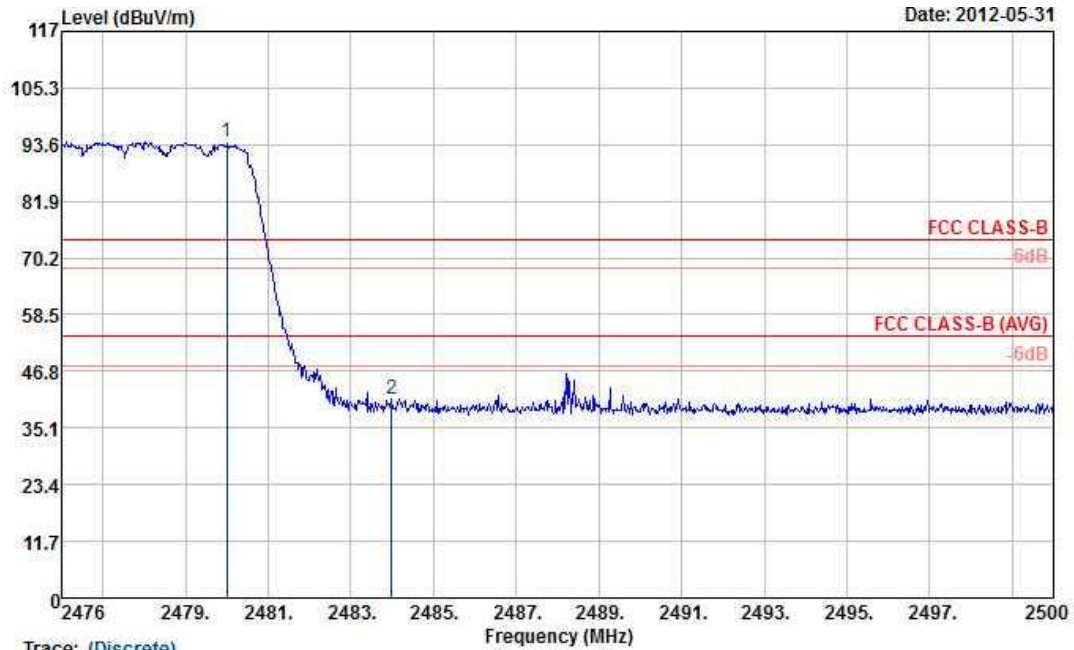
Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 *	2480.00	93.67	19.67	74.00	89.31	32.18	6.18	34.00	101	77 Peak
2	2483.50	42.78	-31.22	74.00	38.42	32.18	6.18	34.00	101	77 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 50.89 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
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	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	2480.00	94.03	20.03	74.00	89.67	32.18	6.18	34.00	101	77	Peak
2	2483.99	41.16	-32.84	74.00	36.80	32.18	6.18	34.00	101	77	Peak

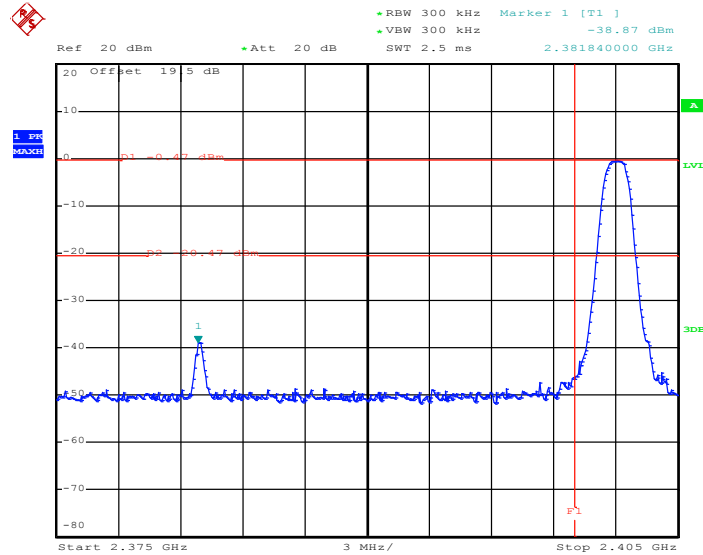
* Marker-Delta Method (RBW/VBW=100KHz): 52.87 dB , Hopping Mode



3.6.6 Test Result of Conducted Band Edges

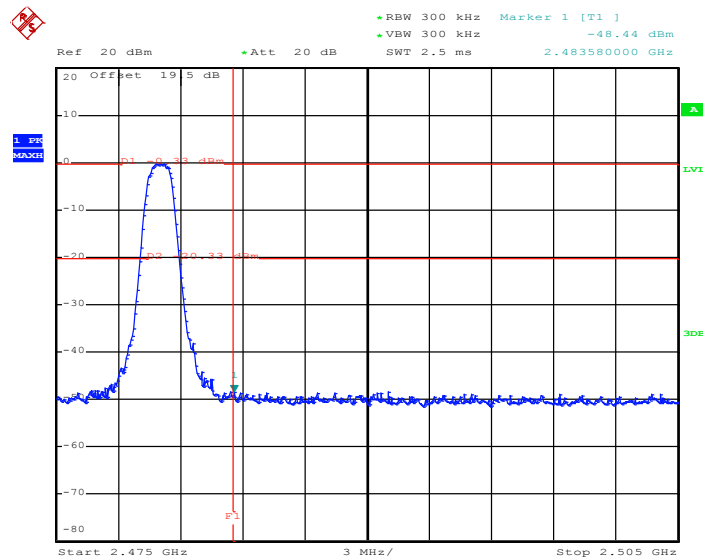
Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Low Band Edge Plot on Channel 00



Date: 30.MAY.2012 16:04:41

High Band Edge Plot on Channel 78



Date: 30.MAY.2012 15:47:47

3.7 Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

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

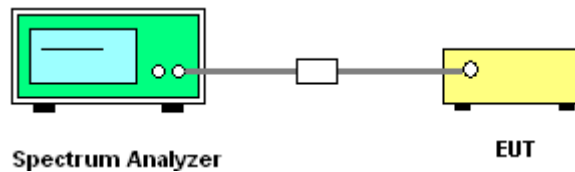
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedure

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

3.7.4 Test Setup

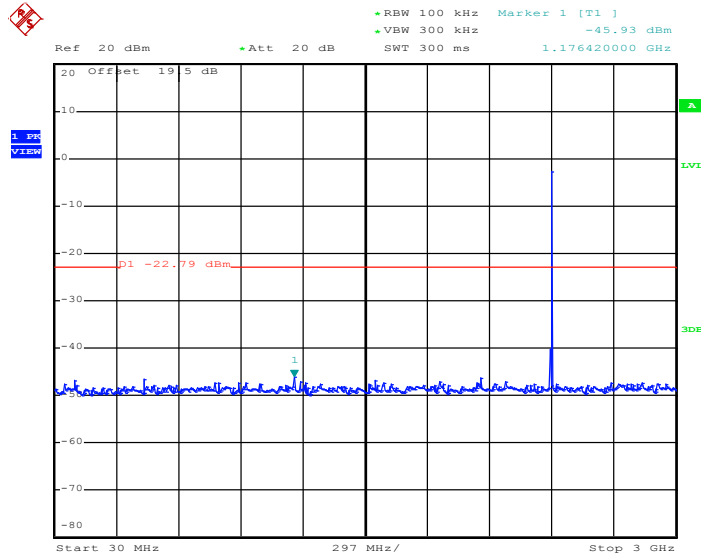




3.7.5 Test Result

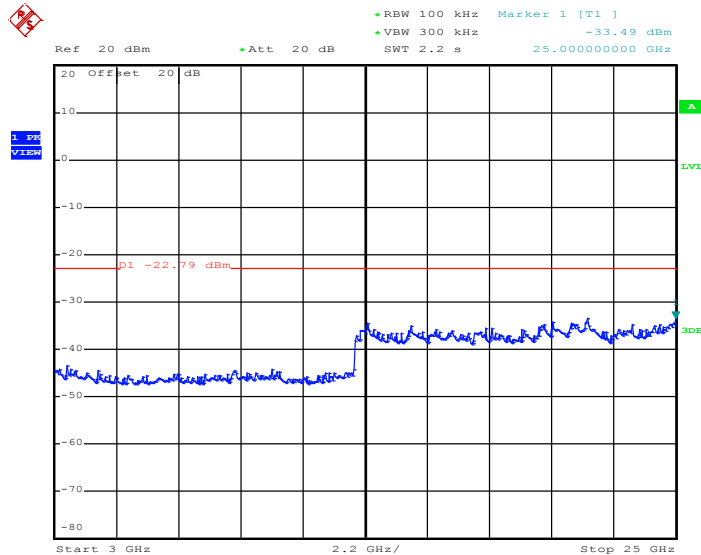
Test Mode :	Mode 7	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAY.2012 16:06:16

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

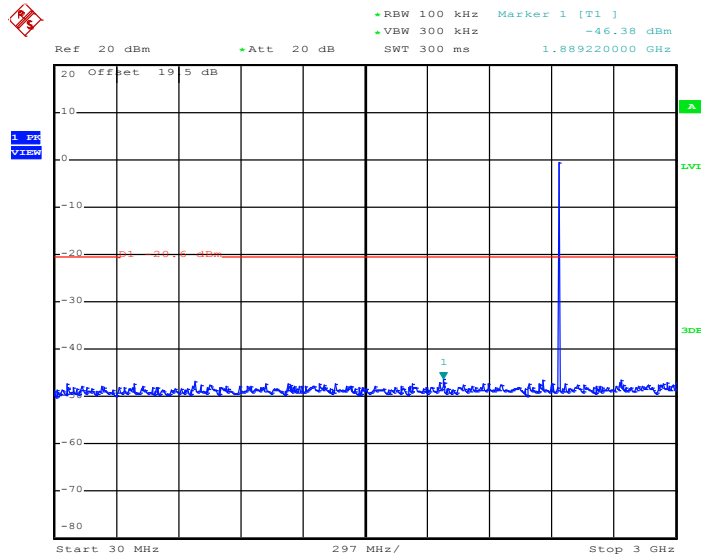


Date: 30.MAY.2012 16:06:38



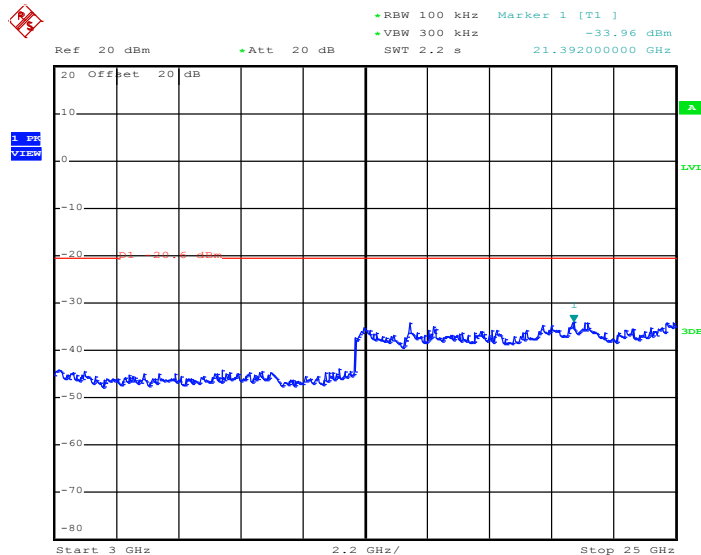
Test Mode :	Mode 8	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAY.2012 16:21:15

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

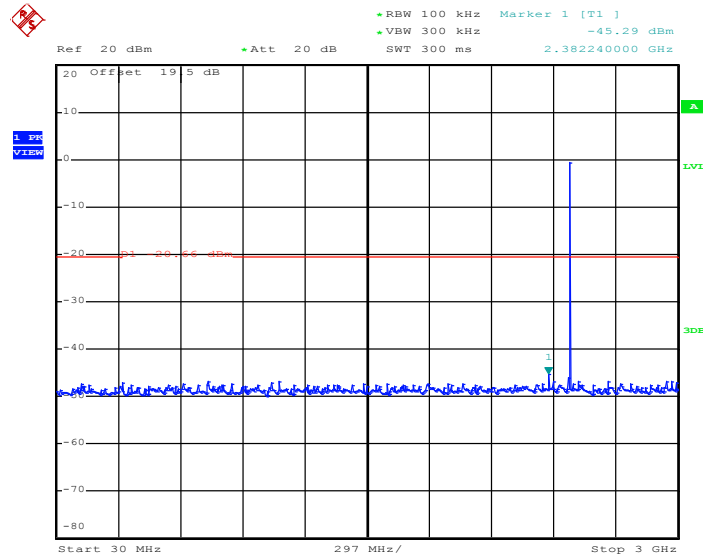


Date: 30.MAY.2012 16:21:37



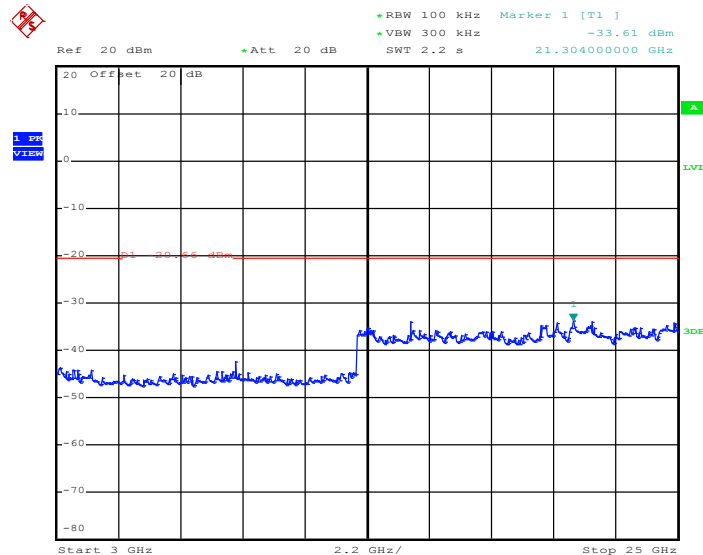
Test Mode :	Mode 9	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAY.2012 15:48:15

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 30.MAY.2012 15:48:41

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.

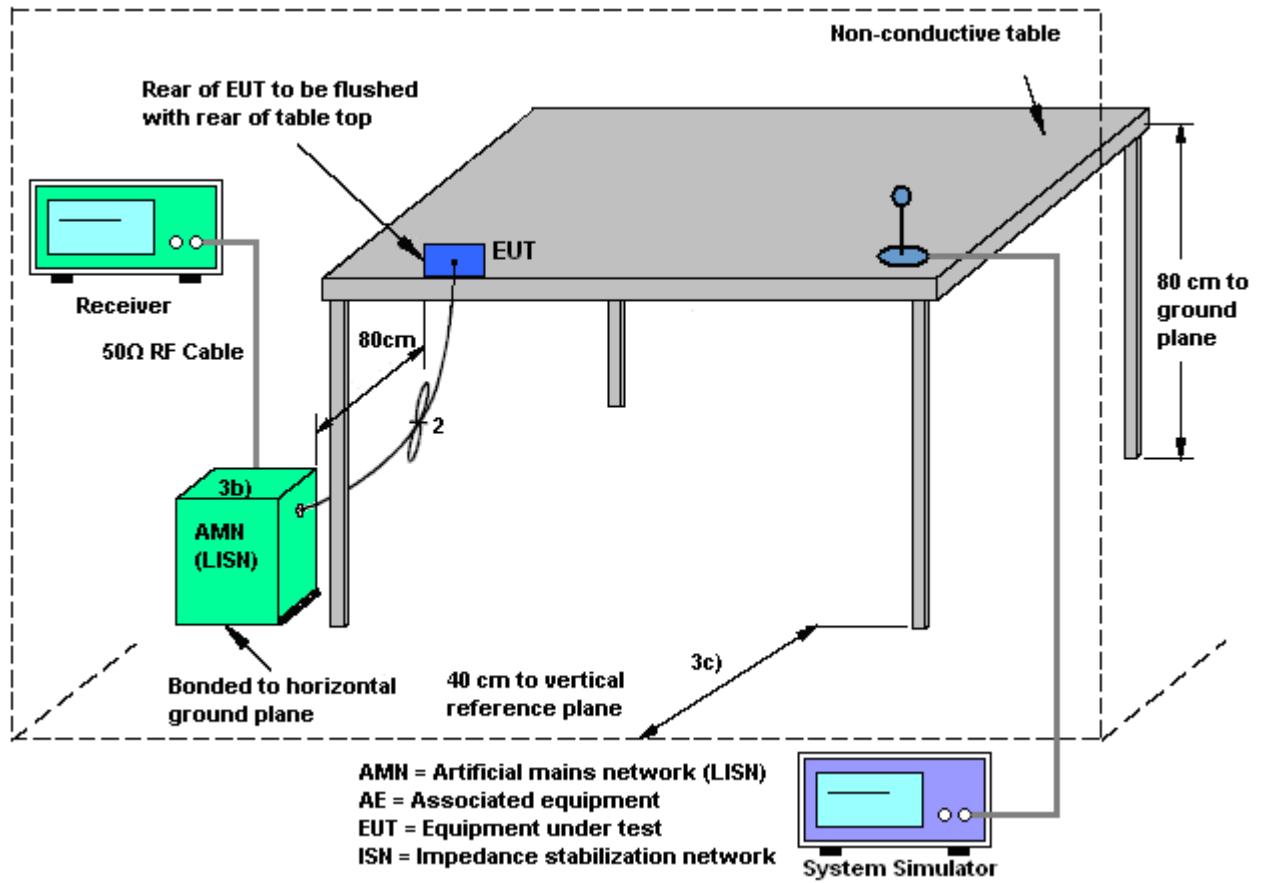
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

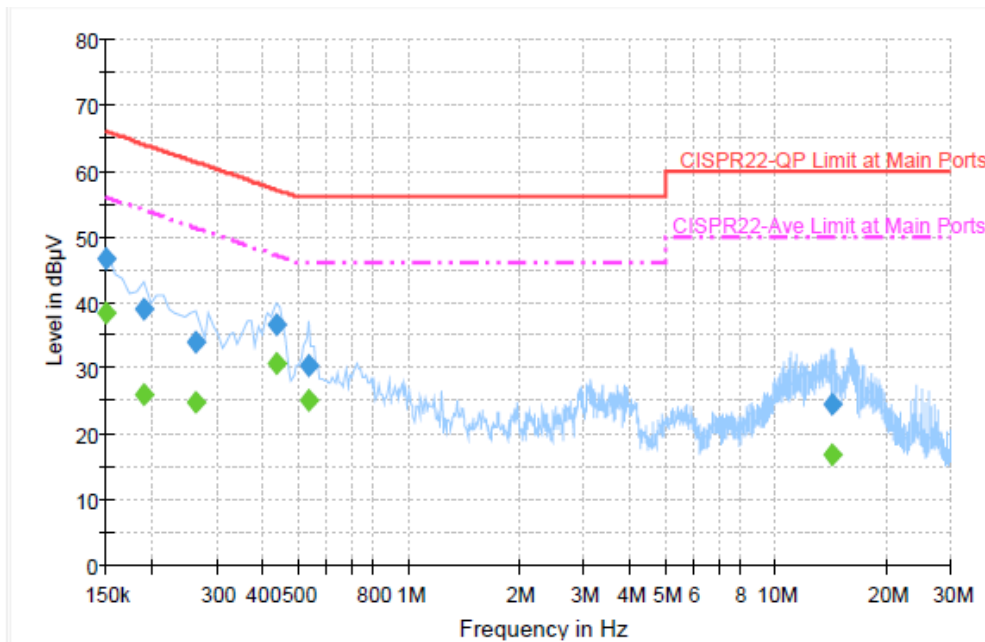
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).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

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Slash Huang	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 (GPRS 8) Idle + Bluetooth Link + WLAN (2.4G) Link + USB Link (Data Link with Notebook) + HDMI Cable with Monitor + Earphone + Micro USB Link + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



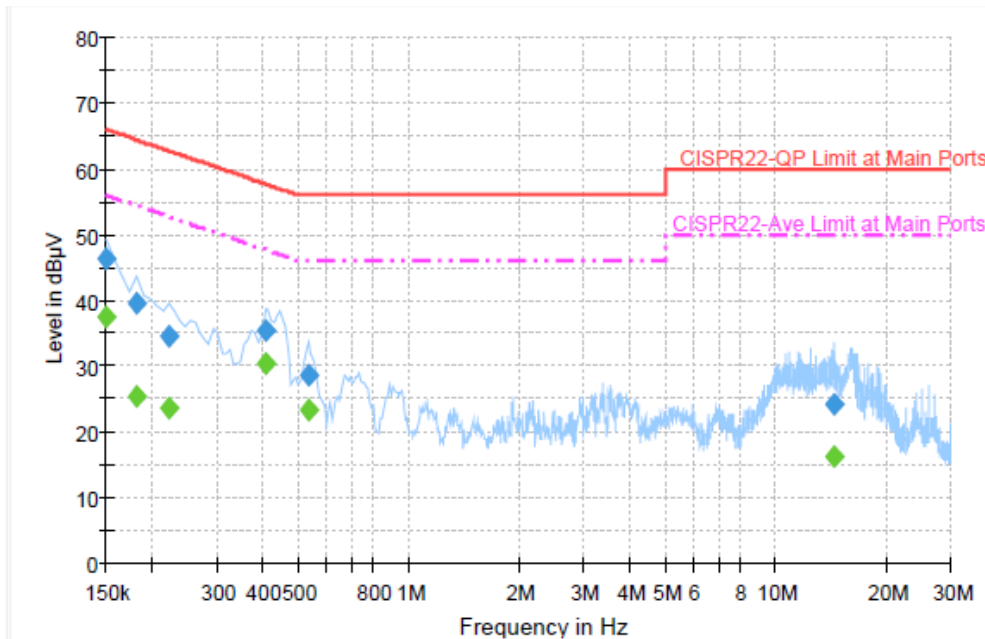
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	46.7	Off	L1	19.4	19.3	66.0
0.190000	38.9	Off	L1	19.4	25.1	64.0
0.262000	34.0	Off	L1	19.4	27.4	61.4
0.438000	36.7	Off	L1	19.5	20.4	57.1
0.534000	30.5	Off	L1	19.4	25.5	56.0
14.358000	24.5	Off	L1	19.6	35.5	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	38.3	Off	L1	19.4	17.7	56.0
0.190000	26.1	Off	L1	19.4	27.9	54.0
0.262000	24.8	Off	L1	19.4	26.6	51.4
0.438000	30.8	Off	L1	19.5	16.3	47.1
0.534000	25.2	Off	L1	19.4	20.8	46.0
14.358000	16.8	Off	L1	19.6	33.2	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Slash Huang	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 (GPRS 8) Idle + Bluetooth Link + WLAN (2.4G) Link + USB Link (Data Link with Notebook) + HDMI Cable with Monitor + Earphone + Micro USB Link + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

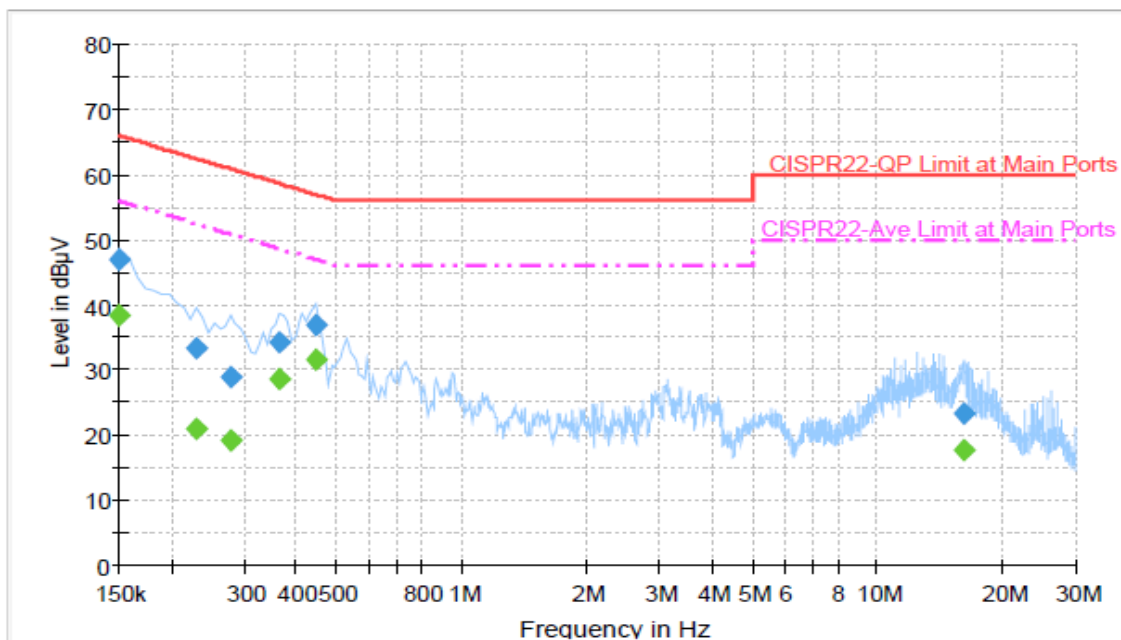
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	46.3	Off	N	19.4	19.7	66.0
0.182000	39.7	Off	N	19.4	24.7	64.4
0.222000	34.5	Off	N	19.4	28.2	62.7
0.406000	35.5	Off	N	19.5	22.2	57.7
0.534000	28.8	Off	N	19.4	27.2	56.0
14.390000	24.1	Off	N	19.7	35.9	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	37.5	Off	N	19.4	18.5	56.0
0.182000	25.4	Off	N	19.4	29.0	54.4
0.222000	23.6	Off	N	19.4	29.1	52.7
0.406000	30.5	Off	N	19.5	17.2	47.7
0.534000	23.3	Off	N	19.4	22.7	46.0
14.390000	16.1	Off	N	19.7	33.9	50.0



Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Slash Huang	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 (GPRS 8) Idle + Bluetooth Link + WLAN (5G) Link + USB Link (Data Link with Notebook) + HDMI Cable with Monitor + Earphone + Micro USB Link + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

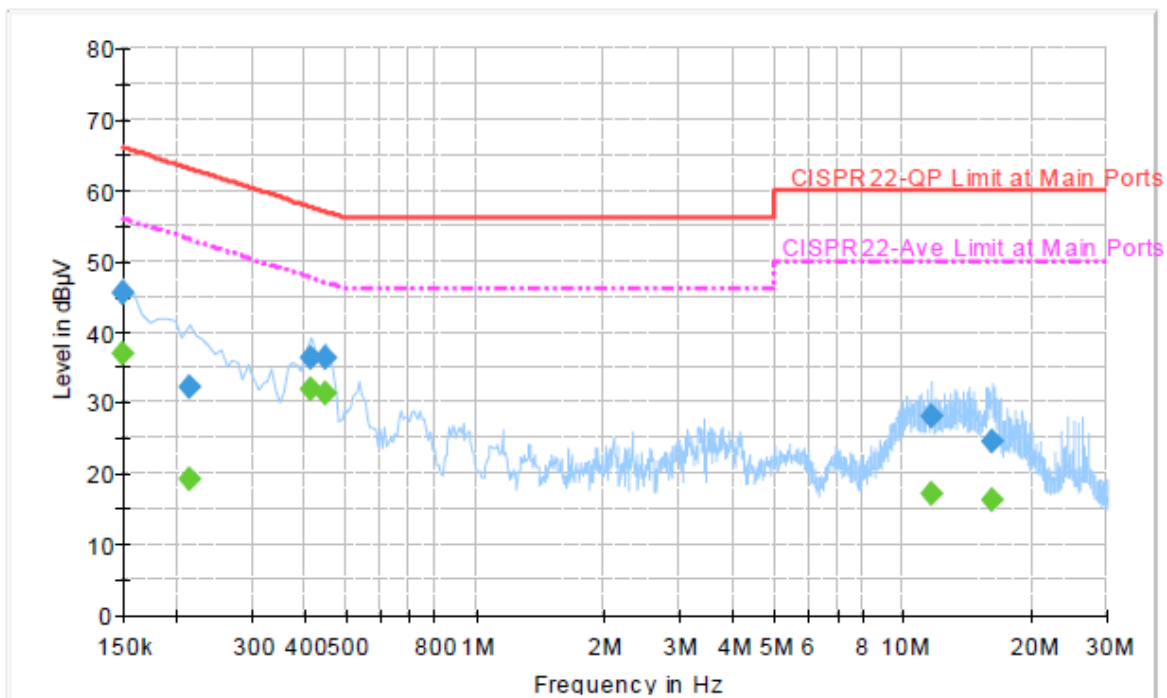
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	46.9	Off	L1	19.4	19.1	66.0
0.230000	33.4	Off	L1	19.4	29.0	62.4
0.278000	28.8	Off	L1	19.4	32.1	60.9
0.366000	34.1	Off	L1	19.4	24.5	58.6
0.446000	36.8	Off	L1	19.4	20.1	56.9
16.086000	23.4	Off	L1	19.6	36.6	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	38.5	Off	L1	19.4	17.5	56.0
0.230000	21.1	Off	L1	19.4	31.3	52.4
0.278000	19.1	Off	L1	19.4	31.8	50.9
0.366000	28.5	Off	L1	19.4	20.1	48.6
0.446000	31.5	Off	L1	19.4	15.4	46.9
16.086000	17.7	Off	L1	19.6	32.3	50.0



Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Slash Huang	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 (GPRS 8) Idle + Bluetooth Link + WLAN (5G) Link + USB Link (Data Link with Notebook) + HDMI Cable with Monitor + Earphone + Micro USB Link + Adapter		
Remark :	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	45.5	Off	N	19.4	20.5	66.0
0.214000	32.3	Off	N	19.4	30.7	63.0
0.414000	36.2	Off	N	19.5	21.4	57.6
0.446000	36.2	Off	N	19.4	20.7	56.9
11.710000	28.1	Off	N	19.6	31.9	60.0
16.230000	24.5	Off	N	19.7	35.5	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	36.9	Off	N	19.4	19.1	56.0
0.214000	19.1	Off	N	19.4	33.9	53.0
0.414000	31.8	Off	N	19.5	15.8	47.6
0.446000	31.2	Off	N	19.4	15.7	46.9
11.710000	17.2	Off	N	19.6	32.8	50.0
16.230000	16.3	Off	N	19.7	33.7	50.0

3.9 Radiated Emission Measurement

3.9.1 Limit of Radiated Emission

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

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

3.9.2 Measuring Instruments

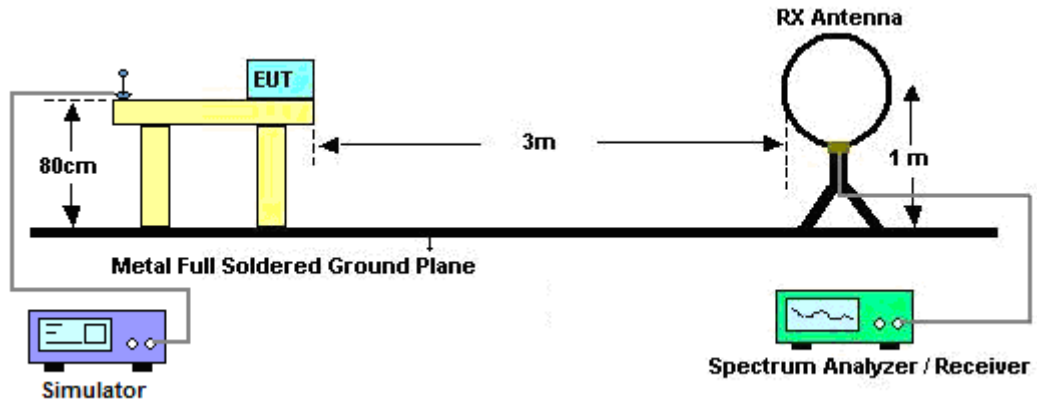
See list of measuring instruments of this test report.

3.9.3 Test Procedures

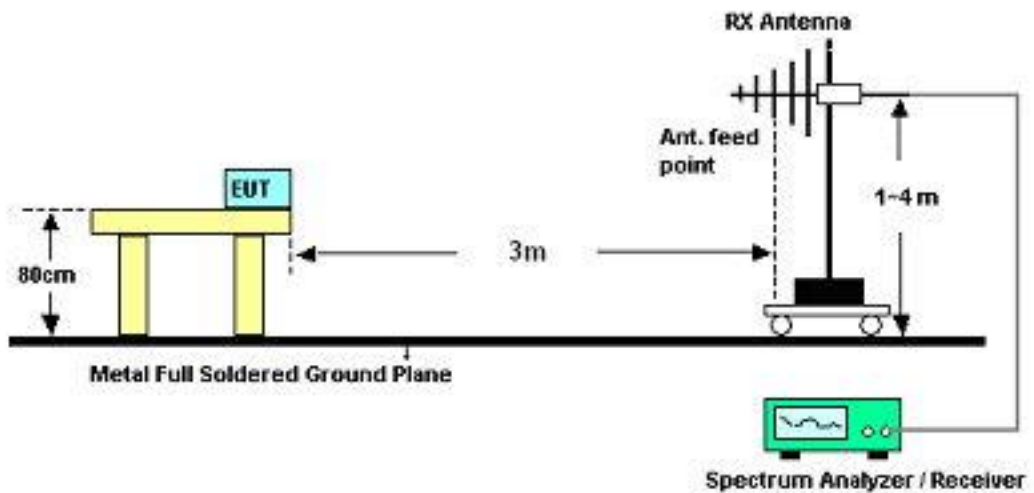
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector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

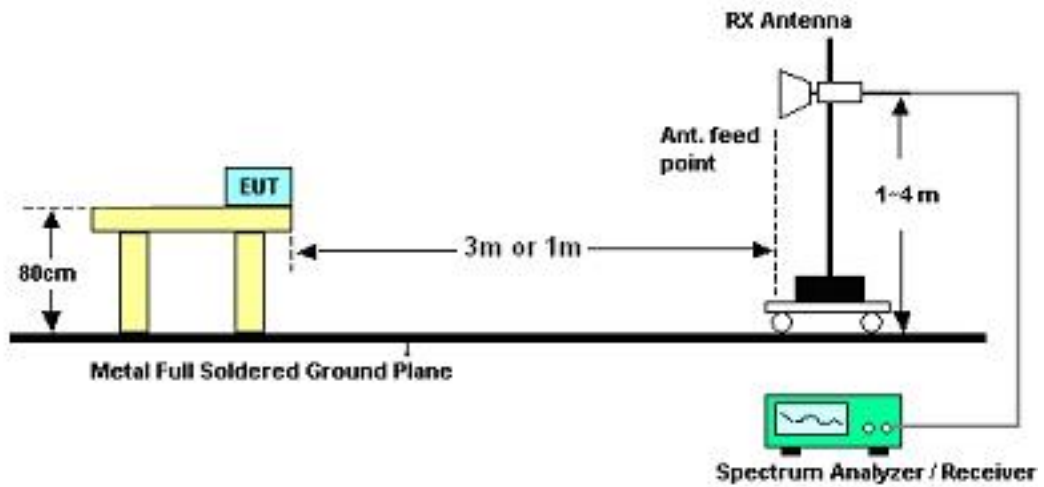
For radiated emissions below 30MHz



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 ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	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
49.17	27.04	-12.96	40	49.48	8.5	0.69	31.63	100	76	Peak
96.96	14.22	-29.28	43.5	35.47	9.44	0.98	31.67	-	-	Peak
170.67	15.91	-27.59	43.5	36.48	9.47	1.23	31.27	-	-	Peak
454.7	22.25	-23.75	46	33.95	17.15	2.31	31.16	-	-	Peak
568.8	22.6	-23.4	46	31.73	19.26	2.6	30.99	-	-	Peak
805.4	24.46	-21.54	46	29.36	22.15	3.15	30.2	-	-	Peak
2346	32.59	-21.41	54	28.6	31.98	5.95	33.94	101	163	Average
2346	52.19	-21.81	74	48.2	31.98	5.95	33.94	101	163	Peak
2382.01	33.75	-20.25	54	29.65	32.03	6.03	33.96	101	163	Average
2382.01	59.44	-14.56	74	55.34	32.03	6.03	33.96	101	163	Peak
2402	84.11	-	-	79.98	32.06	6.03	33.96	101	163	Average
2402	101.26	-	-	97.13	32.06	6.03	33.96	101	163	Peak
2496	32.65	-21.35	54	28.27	32.2	6.18	34	101	163	Average
2496	44.33	-29.67	74	39.95	32.2	6.18	34	101	163	Peak
4804	43.67	-30.33	74	60.52	34.1	9.11	60.06	100	0	Peak



Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	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
49.17	28.54	-11.46	40	50.98	8.5	0.69	31.63	100	31	Peak
170.67	20.57	-22.93	43.5	41.14	9.47	1.23	31.27	-	-	Peak
227.64	20.05	-25.95	46	38.74	11.05	1.47	31.21	-	-	Peak
341.3	21.85	-24.15	46	36.93	14.43	1.9	31.41	-	-	Peak
568.8	26.59	-19.41	46	35.72	19.26	2.6	30.99	-	-	Peak
682.9	26.09	-19.91	46	33.16	20.46	2.91	30.44	-	-	Peak
2382.01	33.02	-20.98	54	28.92	32.03	6.03	33.96	140	77	Average
2382.01	49.11	-24.89	74	45.01	32.03	6.03	33.96	140	77	Peak
2402	79.95	-	-	75.82	32.06	6.03	33.96	140	77	Average
2402	95.94	-	-	91.81	32.06	6.03	33.96	140	77	Peak
2496	32.57	-21.43	54	28.19	32.2	6.18	34	140	77	Average
2496	44.43	-29.57	74	40.05	32.2	6.18	34	140	77	Peak
4804	42.14	-31.86	74	58.99	34.1	9.11	60.06	100	0	Peak



Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	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
30.27	24.65	-15.35	40	35.99	20	0.53	31.87	-	-	Peak
49.17	28.63	-11.37	40	51.07	8.5	0.69	31.63	121	147	Peak
227.64	16.43	-29.57	46	35.12	11.05	1.47	31.21	-	-	Peak
341.3	24.36	-21.64	46	39.44	14.43	1.9	31.41	-	-	Peak
454.7	22.13	-23.87	46	33.83	17.15	2.31	31.16	-	-	Peak
796.3	26.3	-19.7	46	31.32	22.04	3.13	30.19	-	-	Peak
2346	32.61	-21.39	54	28.62	31.98	5.95	33.94	100	163	Average
2346	52.33	-21.67	74	48.34	31.98	5.95	33.94	100	163	Peak
2382	33.18	-20.82	54	29.08	32.03	6.03	33.96	100	163	Average
2382	57.11	-16.89	74	53.01	32.03	6.03	33.96	100	163	Peak
2441	85.82	-	-	81.56	32.13	6.11	33.98	100	163	Average
2441	103.57	-	-	99.31	32.13	6.11	33.98	100	163	Peak
2492	32.8	-21.2	54	28.42	32.2	6.18	34	100	163	Average
2492	48.5	-25.5	74	44.12	32.2	6.18	34	100	163	Peak
4882	46.13	-27.87	74	62.67	34.1	9.14	59.78	100	0	Peak



Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	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
49.17	28.84	-11.16	40	51.28	8.5	0.69	31.63	111	52	Peak
106.95	19.86	-23.64	43.5	40.12	10.43	1.03	31.72	-	-	Peak
170.67	20.87	-22.63	43.5	41.44	9.47	1.23	31.27	-	-	Peak
398	21.35	-24.65	46	34.76	15.95	2.14	31.5	-	-	Peak
568.8	26.41	-19.59	46	35.54	19.26	2.6	30.99	-	-	Peak
796.3	26.72	-19.28	46	31.74	22.04	3.13	30.19	-	-	Peak
2346	33	-21	54	29.01	31.98	5.95	33.94	104	74	Average
2346	49.58	-24.42	74	45.59	31.98	5.95	33.94	104	74	Peak
2441	79.87	-	-	75.61	32.13	6.11	33.98	104	74	Average
2441	95.99	-	-	91.73	32.13	6.11	33.98	104	74	Peak
2488	32.64	-21.36	54	28.26	32.2	6.18	34	104	74	Average
2488	44.29	-29.71	74	39.91	32.2	6.18	34	104	74	Peak
4882	44.53	-29.47	74	61.07	34.1	9.14	59.78	100	0	Peak



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	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
32.7	23.12	-16.88	40	36.6	17.84	0.56	31.88	-	-	Peak
49.17	27.62	-12.38	40	50.06	8.5	0.69	31.63	132	74	Peak
227.64	17.83	-28.17	46	36.52	11.05	1.47	31.21	-	-	Peak
341.3	23.82	-22.18	46	38.9	14.43	1.9	31.41	-	-	Peak
454.7	22.62	-23.38	46	34.32	17.15	2.31	31.16	-	-	Peak
874	25.22	-20.78	46	29.76	22.84	3.3	30.68	-	-	Peak
2348	32.56	-21.44	54	28.57	31.98	5.95	33.94	100	134	Average
2348	54.33	-19.67	74	50.34	31.98	5.95	33.94	100	134	Peak
2384	33.1	-20.9	54	29	32.03	6.03	33.96	100	134	Average
2384	57.33	-16.67	74	53.23	32.03	6.03	33.96	100	134	Peak
2480	85.63	-	-	81.27	32.18	6.18	34	100	134	Average
2480	102.5	-	-	98.14	32.18	6.18	34	100	134	Peak
2483.5	34.35	-19.65	54	29.99	32.18	6.18	34	100	134	Average
2483.5	65.83	-8.17	74	61.47	32.18	6.18	34	100	134	Peak
4960	48.83	-25.17	74	65.01	34.1	9.16	59.44	100	0	Peak



Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	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
49.17	30	-10	40	52.44	8.5	0.69	31.63	107	98	Peak
106.95	21.12	-22.38	43.5	41.38	10.43	1.03	31.72	-	-	Peak
170.67	21.17	-22.33	43.5	41.74	9.47	1.23	31.27	-	-	Peak
341.3	21.82	-24.18	46	36.9	14.43	1.9	31.41	-	-	Peak
568.8	26.55	-19.45	46	35.68	19.26	2.6	30.99	-	-	Peak
796.3	26.43	-19.57	46	31.45	22.04	3.13	30.19	-	-	Peak
2346	49.72	-24.28	74	45.73	31.98	5.95	33.94	101	77	Peak
2384	33.14	-20.86	54	29.04	32.03	6.03	33.96	101	77	Average
2384	50.75	-23.25	74	46.65	32.03	6.03	33.96	101	77	Peak
2480	79.45	-	-	75.09	32.18	6.18	34	101	77	Average
2480	95.63	-	-	91.27	32.18	6.18	34	101	77	Peak
2483.5	28.58	-25.42	54	24.22	32.18	6.18	34	101	77	Average
2483.5	59.07	-14.93	74	54.71	32.18	6.18	34	101	77	Peak
4960	46.47	-27.53	74	62.65	34.1	9.16	59.44	200	360	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

Non-standard connector used.

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	100055	9kHz~40GHz	Jun. 13, 2011	May 28, 2012 ~ May 30, 2012	Jun. 12, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	May 24, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	May 24, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	May 24, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	May 24, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	May 24, 2012	Jul. 27, 2013	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	May 25, 2012 ~ Jun. 01, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	May 25, 2012 ~ Jun. 01, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	May 25, 2012 ~ Jun. 01, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 251	15GHz ~ 40GHz	Oct. 21, 2011	May 25, 2012 ~ Jun. 01, 2012	Oct. 20, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A023 62	1GHz ~ 26.5GHz	Dec. 05, 2011	May 25, 2012 ~ Jun. 01, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Feb. 27, 2012	May 25, 2012 ~ Jun. 01, 2012	Feb. 26, 2013	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz ~ 7GHz	Aug. 22, 2011	May 25, 2012 ~ Jun. 01, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Mar. 10, 2012	May 25, 2012 ~ Jun. 01, 2012	Mar. 09, 2013	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/00 1	9 kHz~30 MHz	Jul. 29, 2010	May 25, 2012 ~ Jun. 01, 2012	Jul. 28, 2012	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Feb. 09, 2012	May 25, 2012 ~ Jun. 01, 2012	Feb. 08, 2014	-

5 Uncertainty of Evaluation

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

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

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		



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

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP252422 as below.