

FCC RF Test Report

APPLICANT : Chi Mei Communication Systems, Inc.
EQUIPMENT : Tablet PC
BRAND NAME : Lenovo
MODEL NAME : 60019 / 2291
MARKETING NAME : IdeaTab S2109A-F
FCC ID : QDJ-GOXW
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Dec. 13, 2011 and completely tested on Feb. 15, 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 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR220105-01B	Rev. 01	Initial issue of report	Mar. 07, 2012
FR220105-01B	Rev. 02	Update report for adding the calibration data of the required loop antenna into table.	Mar. 08, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	Gen 4.6.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 17.80 dB at 0.190 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 5.36 dB at 2389.990 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng City, New Taipei City 23678, Taiwan

1.2 Manufacturer

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng City, New Taipei City 23678, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Tablet PC
Brand Name	Lenovo
Model Name	60019 / 2291
Marketing Name	IdeaTab S2109A-F
Integrated Module	Brand Name: Texas Instruments Model Name: WL1281
FCC ID	QDJ-GOXW
Sample 1	EUT with eMMC 1
Sample 2	EUT with eMMC 2
Sample 3	EUT with eMMC 3
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 16.17 dBm (0.041 W) 802.11g : 18.96 dBm (0.079 W) 802.11n (BW 20MHz) : 18.09 dBm (0.064 W)
Antenna Type	PIFA Antenna with gain 1.93 dBi
Type of Antenna Connector	N/A
HW Version	PR3
SW Version	1.180
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

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	03CH05-HY	722060/4086B-1

1.5 Applied Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- 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.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Acer	H223HQ	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
6.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A
7.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
8.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	16.17	15.88	15.94	16.11
CH 06	2437 MHz	15.16	15.23	14.82	15.38
CH 11	2462 MHz	14.01	14.10	13.99	13.98

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	18.96	18.88	18.67	18.9	18.74	18.89	18.71	18.84
CH 06	2437 MHz	18.27	18.45	18.47	18.27	18.29	17.94	18.00	18.10
CH 11	2462 MHz	16.96	17.10	17.09	17.17	17.09	16.87	16.79	16.77

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	18.09	17.92	17.52	17.93	17.99	17.55	17.43	17.94
CH 06	2437 MHz	17.14	17.13	17.07	17.39	17.23	16.94	16.95	17.11
CH 11	2462 MHz	16.04	16.00	15.96	16.15	16.15	15.73	15.72	15.72

Remark:

1. All the test data for each data rate were verified, but only the worst case was reported.
2. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, and MCS0 for 802.11n (BW 20MHz) for all the test cases due to the highest RF output power.
3. 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: conducted emission (150 KHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

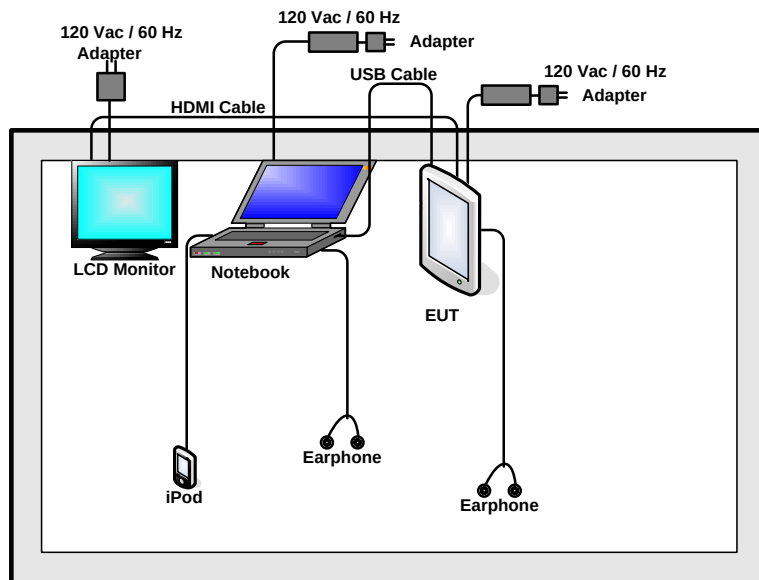
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

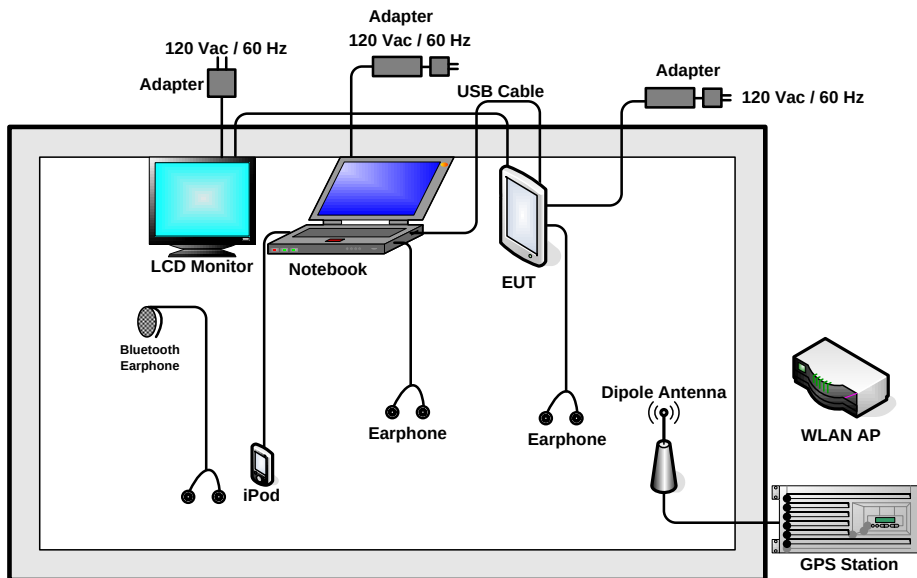
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
AC Conducted Emission	Mode 1: Bluetooth Link + WLAN Link + Earphone + Adapter + GPS Rx + Battery + HDMI Cable + USB Cable 1 (Data Link with Notebook) Mode 2: Bluetooth Link + WLAN Link + Earphone + Adapter + Camera + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook) Mode 3: Bluetooth Link + WLAN Link + Earphone + Adapter + H Pattern + Battery + HDMI Cable + USB Cable 1 (Data Link with Notebook) Mode 4: Bluetooth Link + WLAN Link + Earphone + Adapter + MPEG4 + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook)	
Remark:		
1. The worst case of conducted emission is mode 2; only the test data of it was reported.		
2. Data Link with Notebook means data application transferred mode between EUT and Notebook.		
3. Only Sample 1 was tested.		

2.3 Connection Diagram of Test System

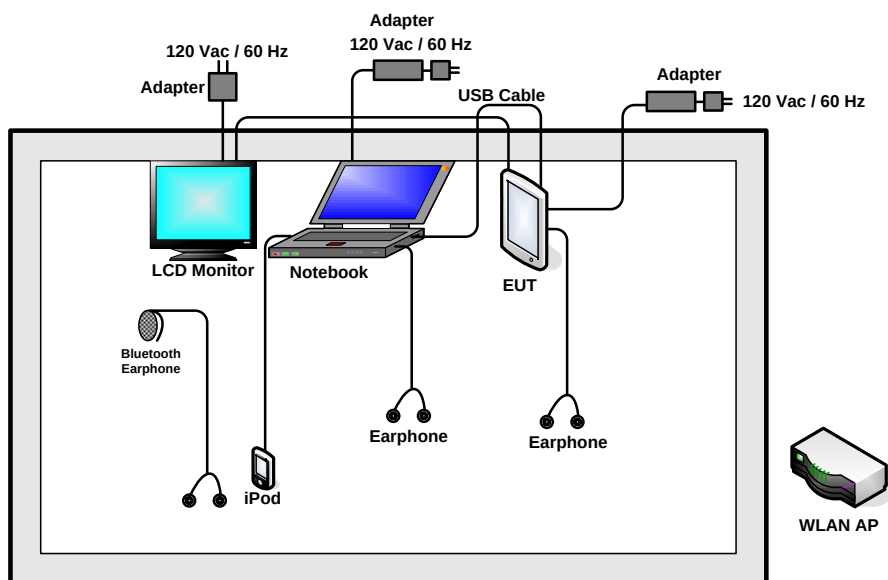
<WLAN Tx Mode>



<EUT with USB Cable (Link with Notebook) in GPS Rx Mode>



<EUT with USB Cable (Link with Notebook) Mode>



2.4 RF Utility

The programmed RF utility "WiFi Test" is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 KHz.

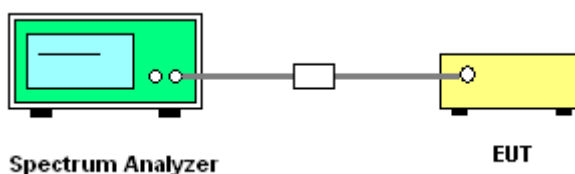
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW). Set the Video bandwidth (VBW) $\geq 3 * RBW$. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.1.4 Test Setup



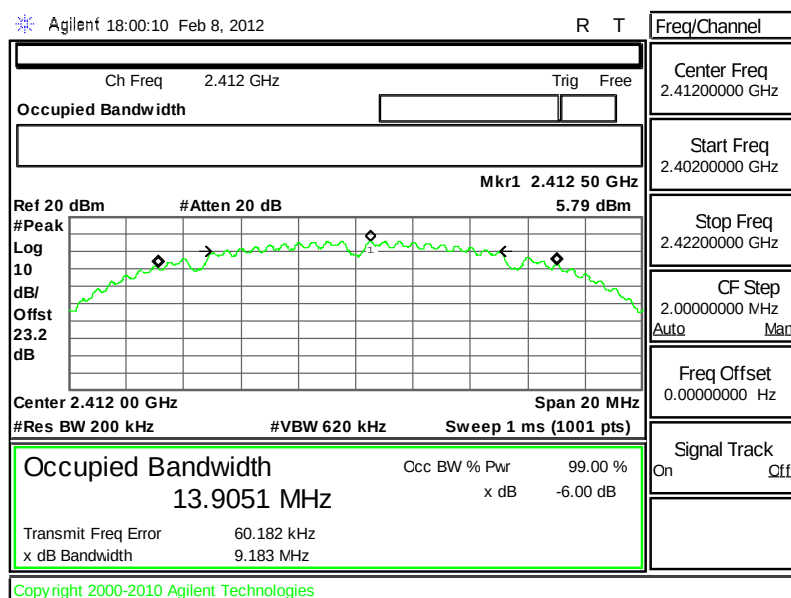


3.1.5 Test Result of 6dB Bandwidth

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

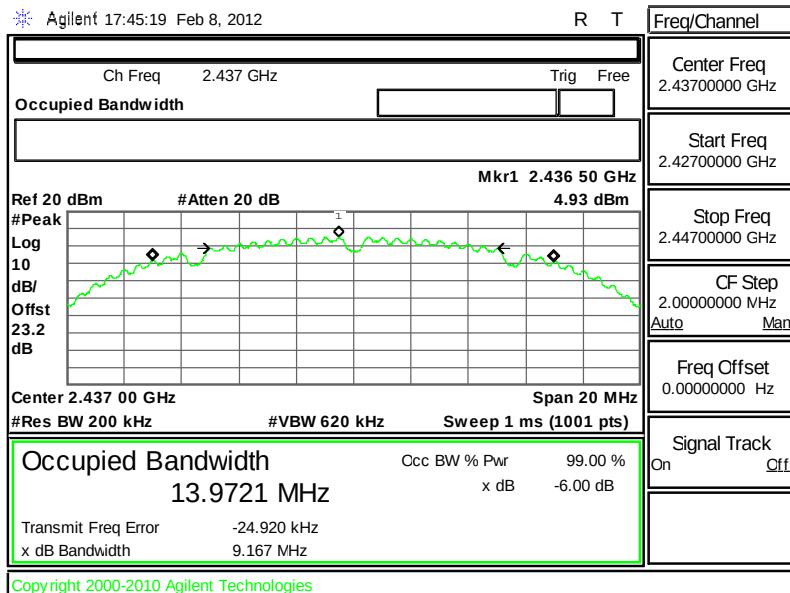
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.183	0.5	Pass
06	2437	9.167	0.5	Pass
11	2462	9.168	0.5	Pass

Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01

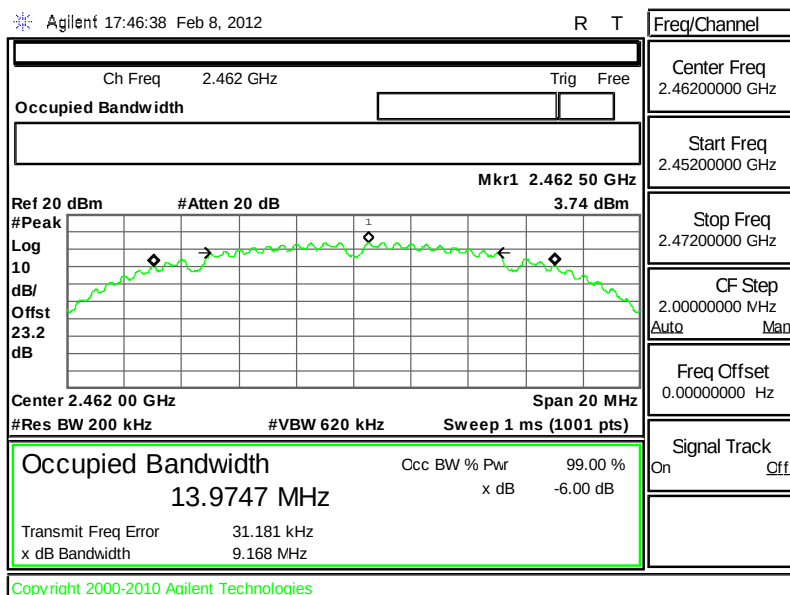




Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11

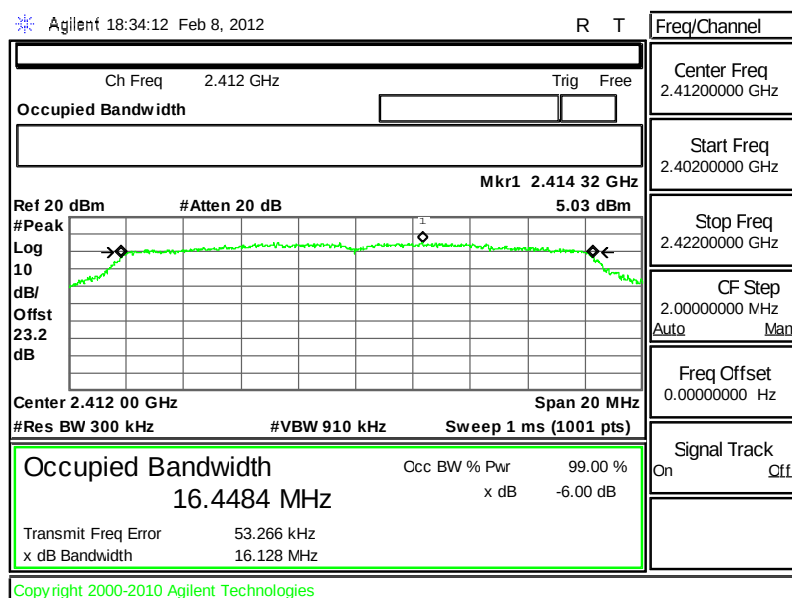




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

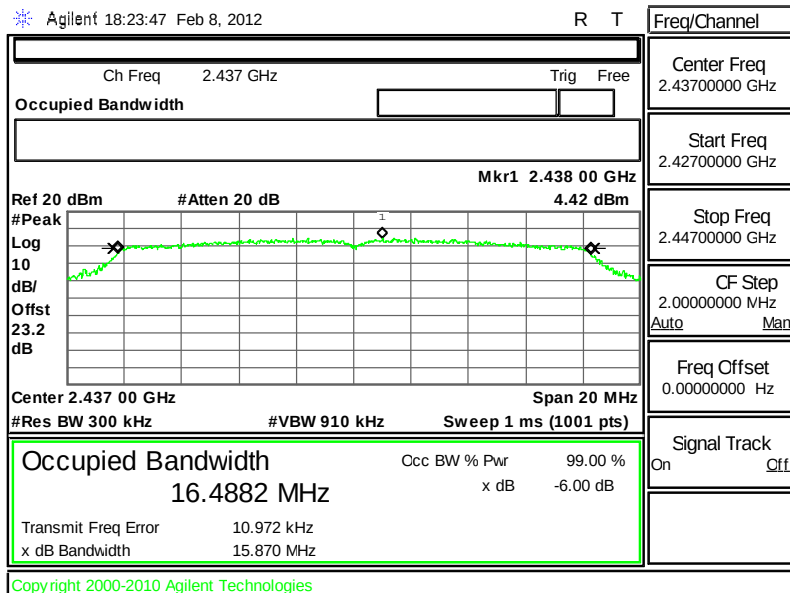
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.128	0.5	Pass
06	2437	15.870	0.5	Pass
11	2462	16.073	0.5	Pass

Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01

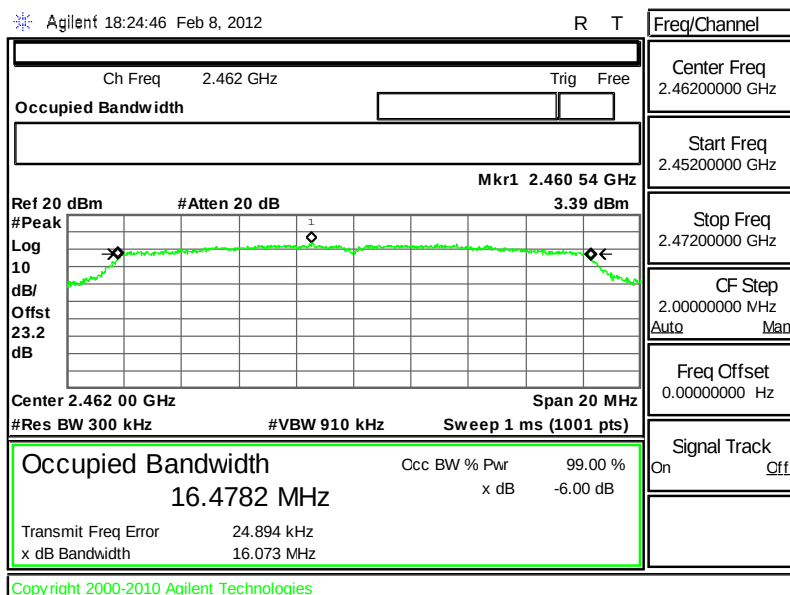




Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



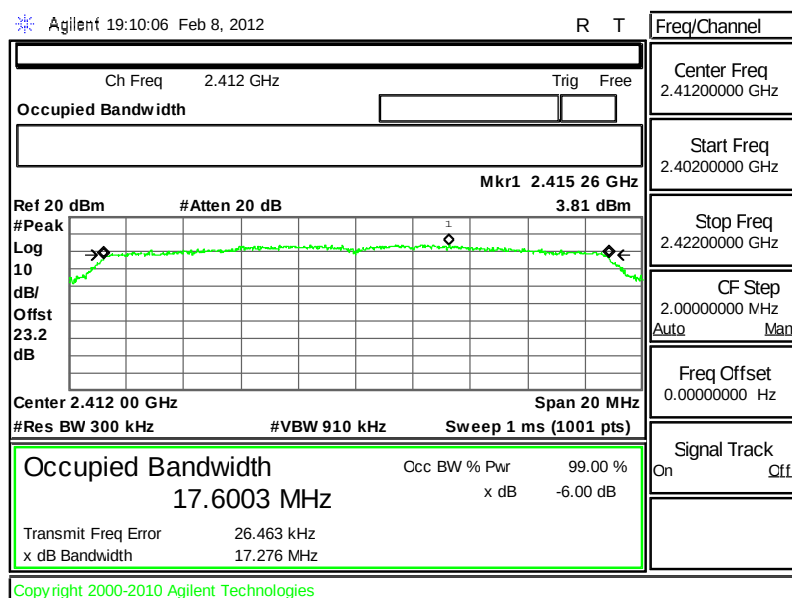
Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11





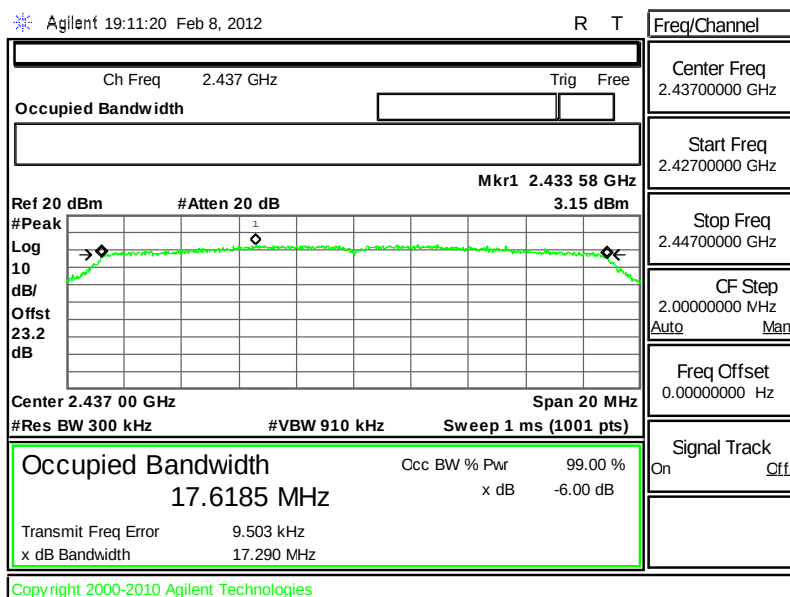
Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.276	0.5	Pass
06	2437	17.290	0.5	Pass
11	2462	17.125	0.5	Pass

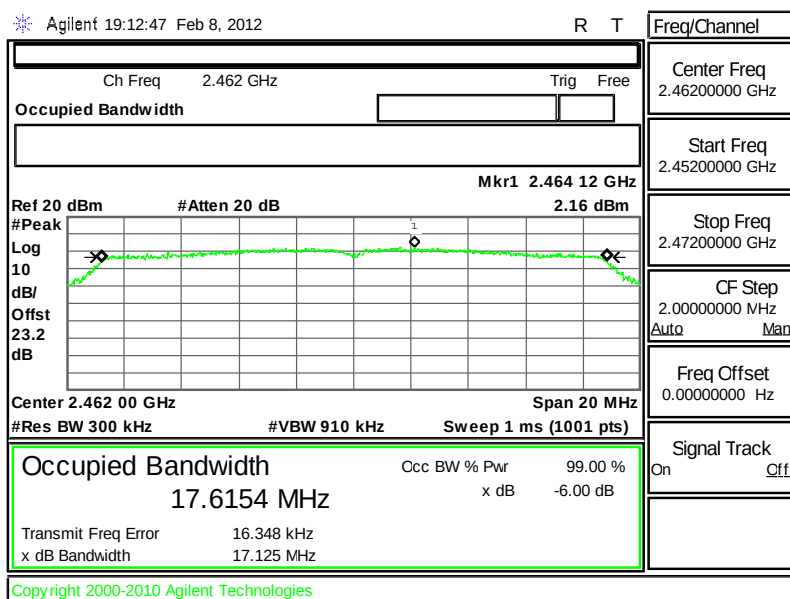
Mode 7 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Mode 8 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Mode 9 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

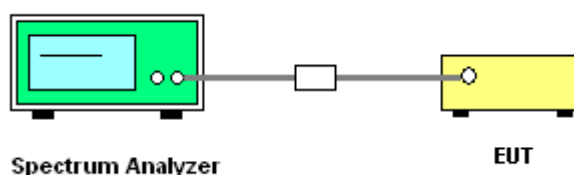
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1MHz. Set the Video bandwidth (VBW) = 3MHz. In order to make an accurate measurement, set the span to a value that is 5-30 % greater than the EBW. The 6 dB bandwidth must be greater than 500 KHz.

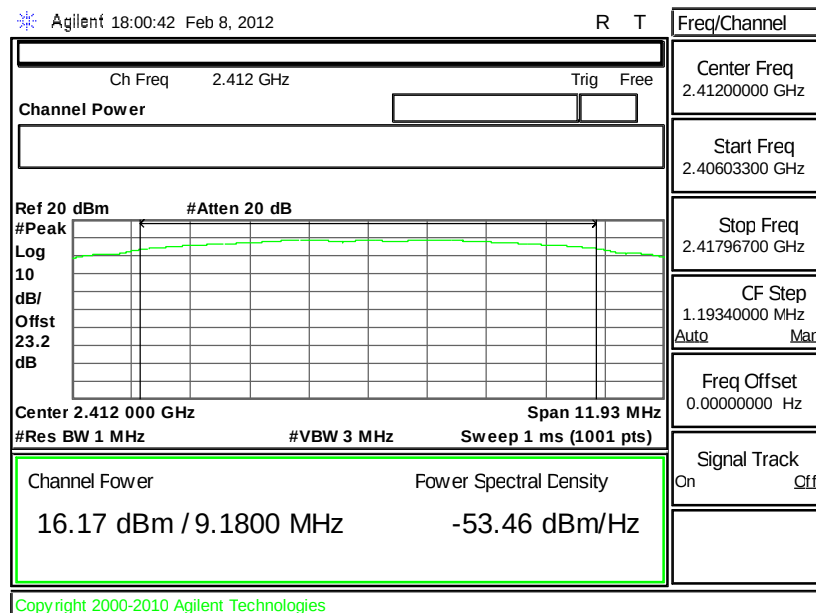
3.2.4 Test Setup



**3.2.5 Test Result of Output Power**

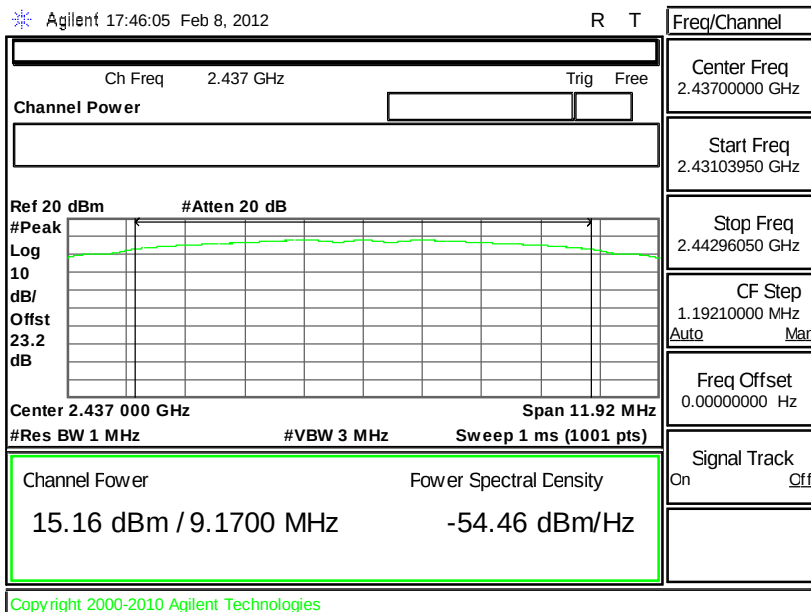
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	16.17	30	Pass
06	2437	15.16	30	Pass
11	2462	14.01	30	Pass

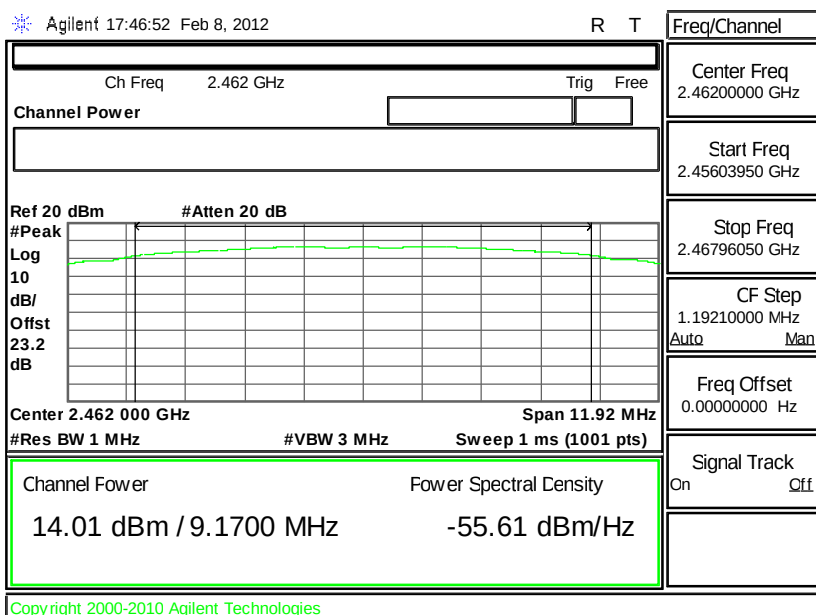
Mode 1 : Output Power Plot on 802.11b Channel 01



Mode 2 : Output Power Plot on 802.11b Channel 06



Mode 3 : Output Power Plot on 802.11b Channel 11

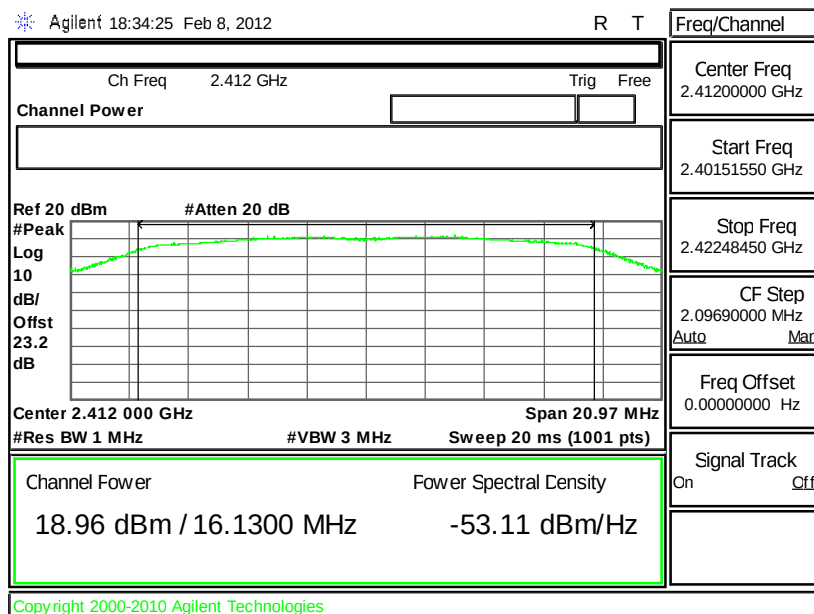




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

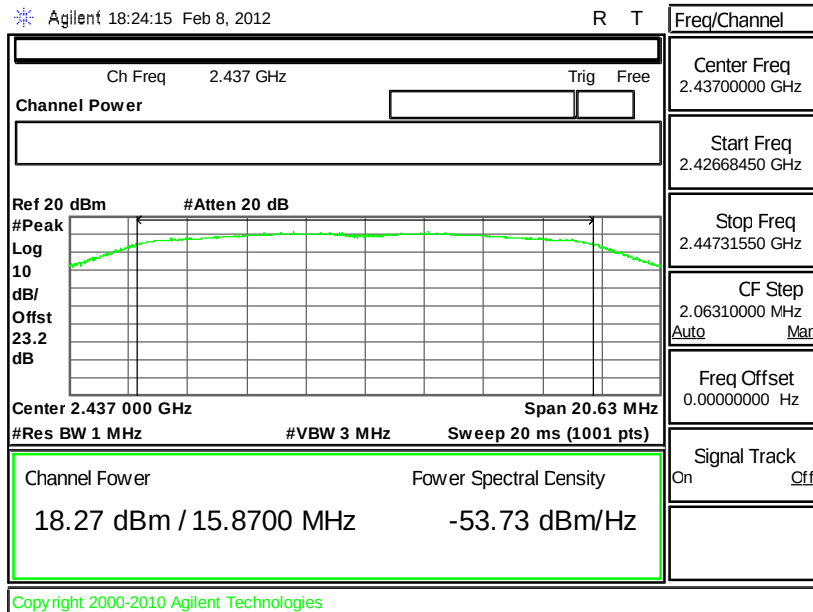
Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.96	30	Pass
06	2437	18.27	30	Pass
11	2462	16.96	30	Pass

Mode 4 : Output Power Plot on 802.11g Channel 01

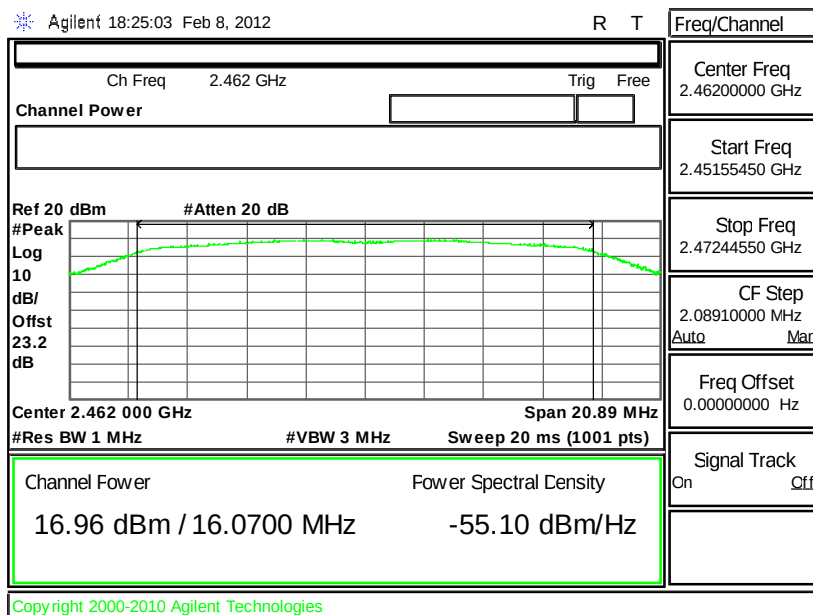




Mode 5 : Output Power Plot on 802.11g Channel 06



Mode 6 : Output Power Plot on 802.11g Channel 11

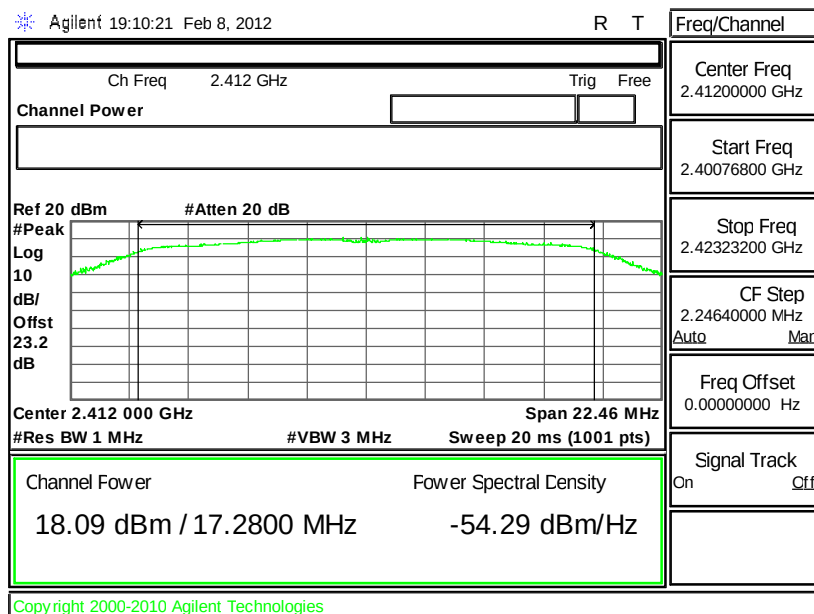




Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

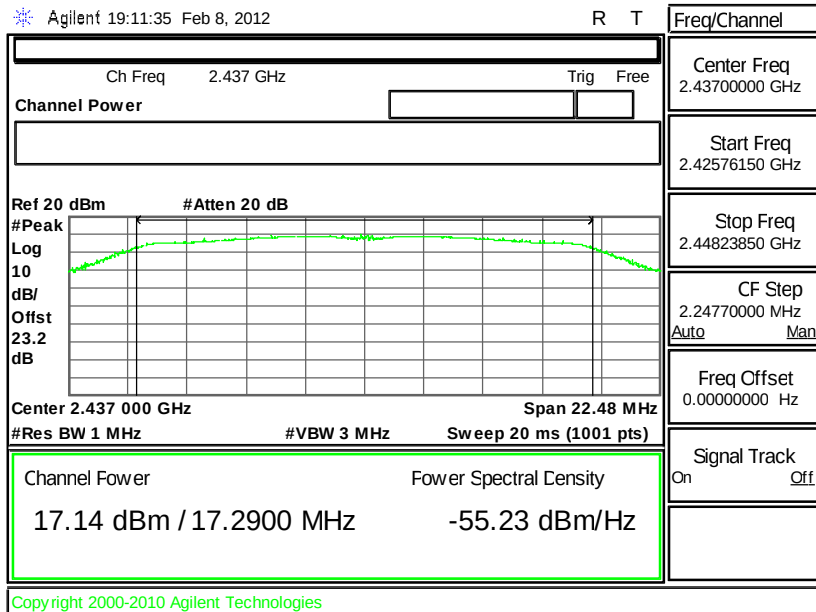
Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.09	30	Pass
06	2437	17.14	30	Pass
11	2462	16.04	30	Pass

Mode 7 : Output Power Plot on 802.11n(BW 20MHz) Channel 01

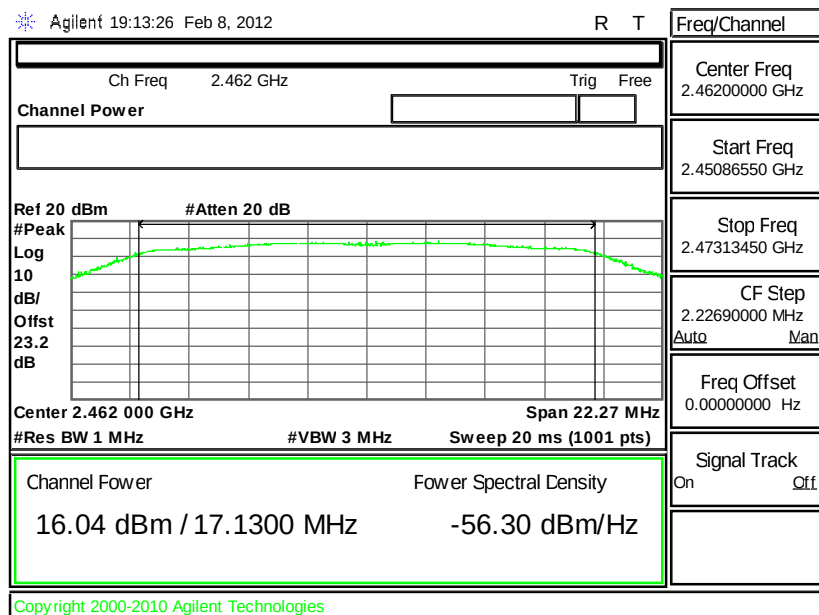




Mode 8 : Output Power Plot on on 802.11n(BW 20MHz) Channel 06



Mode 9 : Output Power Plot on on 802.11n(BW 20MHz) Channel 11



3.3 Band Edges Measurement

3.3.1 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. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

3.3.2 Measuring Instruments

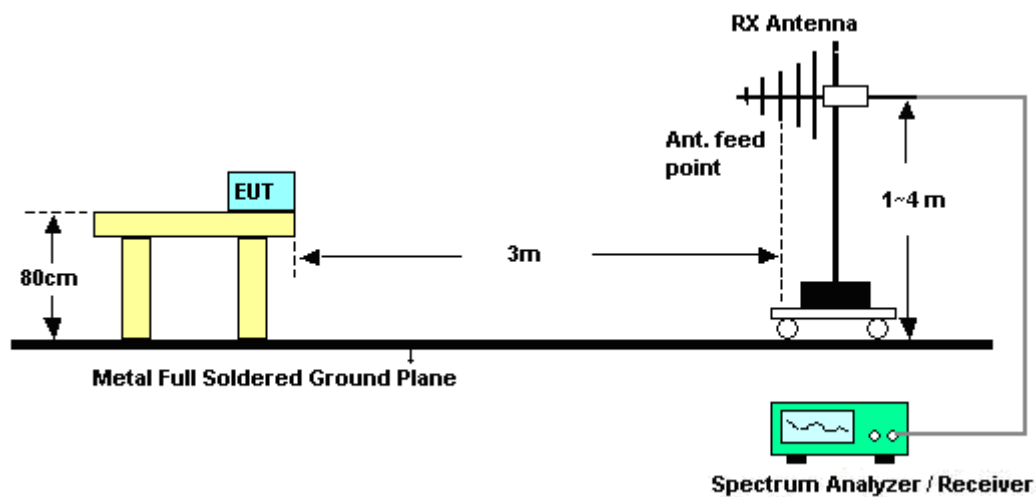
See list of measuring instruments of this test report.

3.3.3 Test Procedures

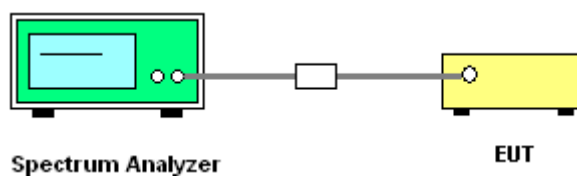
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 KHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

3.3.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	21~23℃
Test Band :	802.11b	Relative Humidity :	49~51%
Test Channel :	01	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
2389.8	57.65	-16.35	74	56.91	32.02	4.58	35.86	166	27	Peak
2389.8	45.68	-8.32	54	44.94	32.02	4.58	35.86	166	27	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
2379.54	51.61	-22.39	74	50.92	32	4.57	35.88	142	201	Peak
2379.54	39.29	-14.71	54	38.6	32	4.57	35.88	142	201	Average

Test Mode :	Mode 3	Temperature :	21~23℃
Test Band :	802.11b	Relative Humidity :	49~51%
Test Channel :	11	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
2486.13	54.63	-19.37	74	53.71	32.09	4.64	35.81	159	6	Peak
2486.13	43.04	-10.96	54	42.12	32.09	4.64	35.81	159	6	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
2498.48	50.07	-23.93	74	49.13	32.1	4.64	35.8	100	319	Peak
2498.48	38.6	-15.4	54	37.66	32.1	4.64	35.8	100	319	Average



Test Mode :	Mode 4	Temperature :	21~23°C
Test Band :	802.11g	Relative Humidity :	49~51%
Test Channel :	01	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
2389.99	66.62	-7.38	74	65.88	32.02	4.58	35.86	165	23	Peak
2389.99	48.64	-5.36	54	47.9	32.02	4.58	35.86	165	23	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
2389.61	58.6	-15.4	74	57.88	32.02	4.58	35.88	171	175	Peak
2389.61	40.85	-13.15	54	40.13	32.02	4.58	35.88	171	175	Average

Test Mode :	Mode 6	Temperature :	21~23°C
Test Band :	802.11g	Relative Humidity :	49~51%
Test Channel :	11	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
2483.66	68.42	-5.58	74	67.5	32.09	4.64	35.81	160	360	Peak
2483.66	48.44	-5.56	54	47.52	32.09	4.64	35.81	160	360	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
2483.66	60.16	-13.84	74	59.24	32.09	4.64	35.81	100	316	Peak
2483.66	41.9	-12.1	54	40.98	32.09	4.64	35.81	100	316	Average



Test Mode :	Mode 7	Temperature :	21~23℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	49~51%
Test Channel :	01	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
2389.61	65.19	-8.81	74	64.47	32.02	4.58	35.88	166	26	Peak
2389.61	47.62	-6.38	54	46.9	32.02	4.58	35.88	166	26	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
2388.47	54.93	-19.07	74	54.21	32.02	4.58	35.88	132	202	Peak
2388.47	39.78	-14.22	54	39.06	32.02	4.58	35.88	132	202	Average

Test Mode :	Mode 9	Temperature :	21~23℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	49~51%
Test Channel :	11	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	65.15	-8.85	74	64.23	32.09	4.64	35.81	160	5	Peak
2483.5	47.11	-6.89	54	46.19	32.09	4.64	35.81	160	5	Average

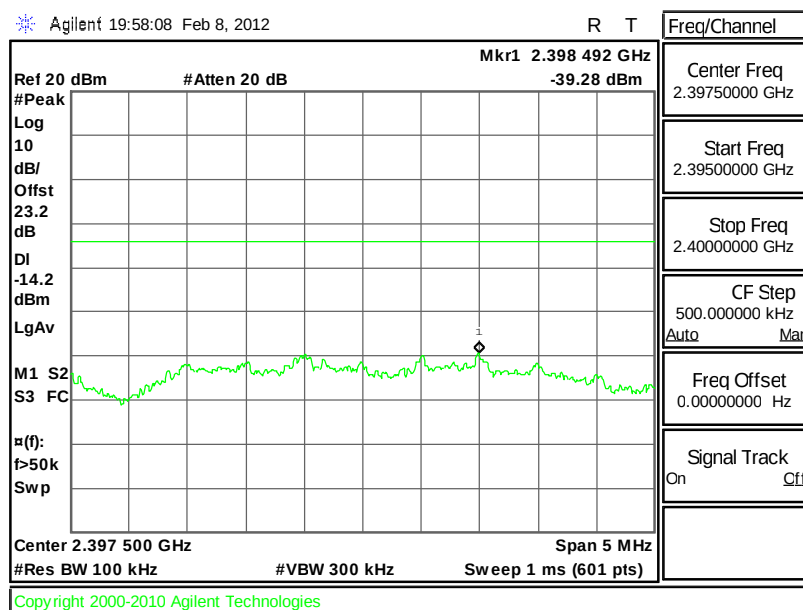
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	57.24	-16.76	74	56.32	32.09	4.64	35.81	100	320	Peak
2483.5	41.01	-12.99	54	40.09	32.09	4.64	35.81	100	320	Average



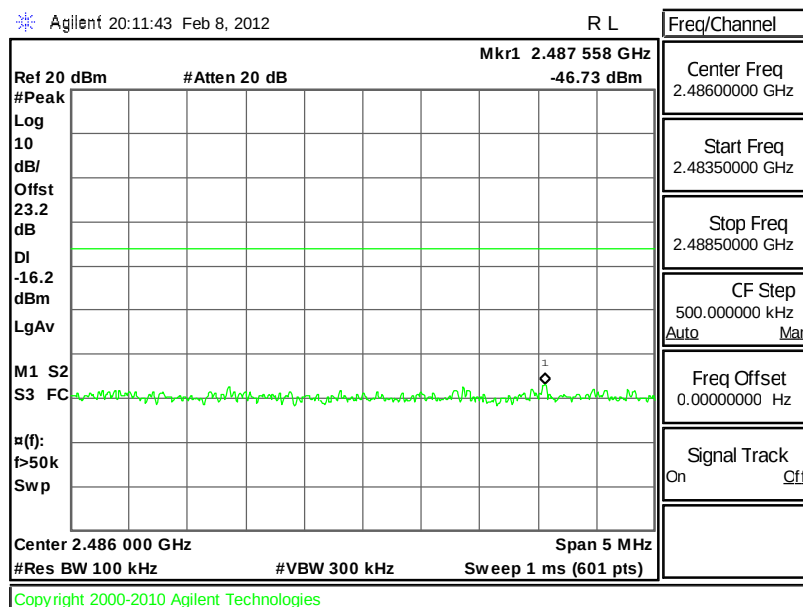
3.3.6 Test Plots of Conducted Band Edges

Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11b Channel 01



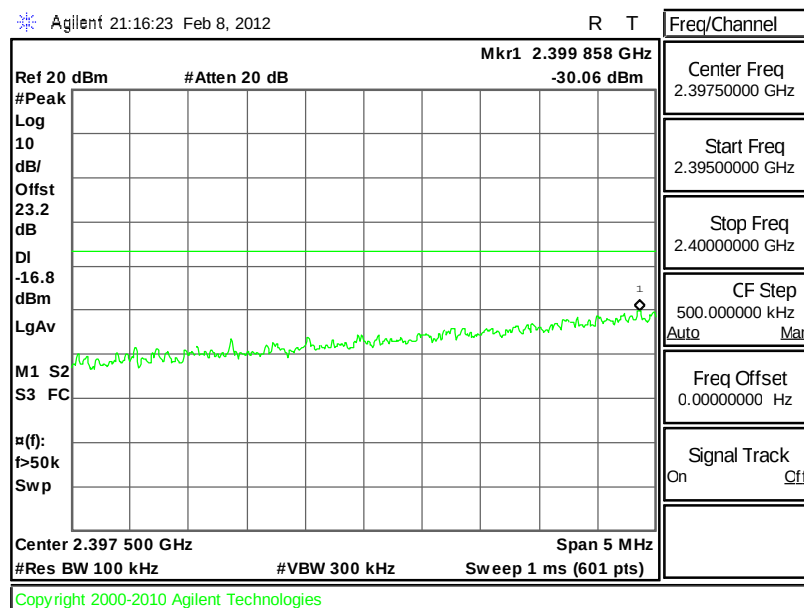
High Band Edge Plot on 802.11b Channel 11



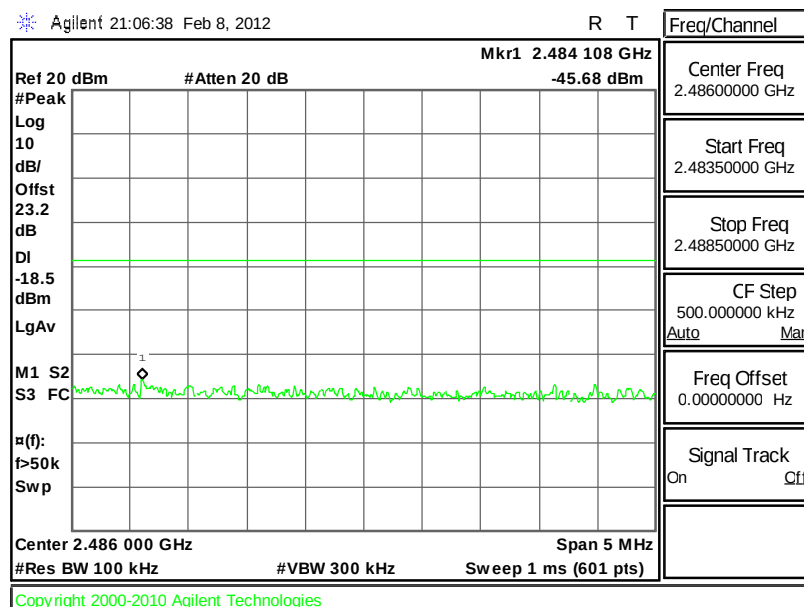


Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11g Channel 01

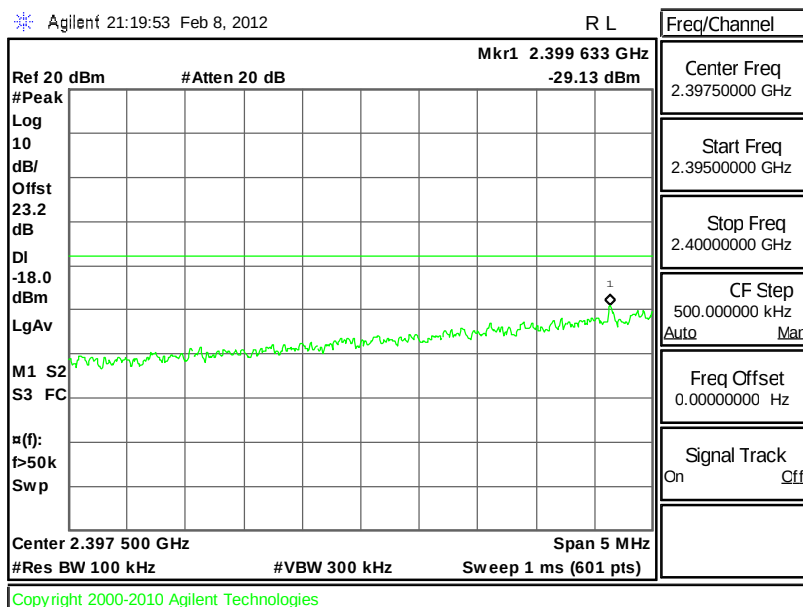
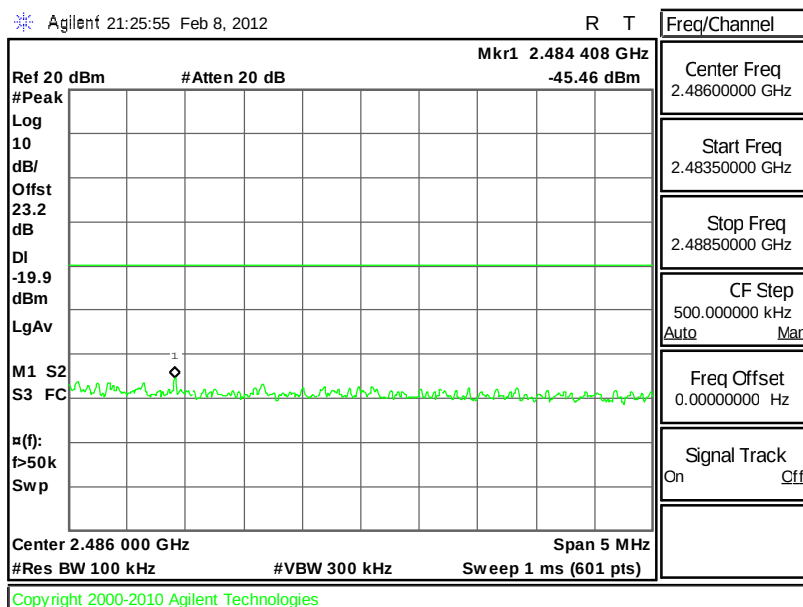


High Band Edge Plot on 802.11g Channel 11





Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 01**High Band Edge Plot on 802.11n (BW 20MHz) Channel 11**

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

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

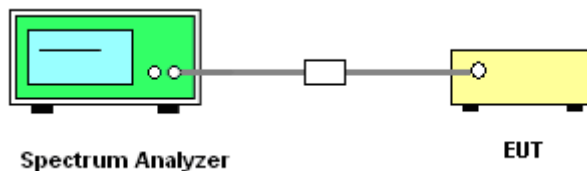
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 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.

3.4.4 Test Setup

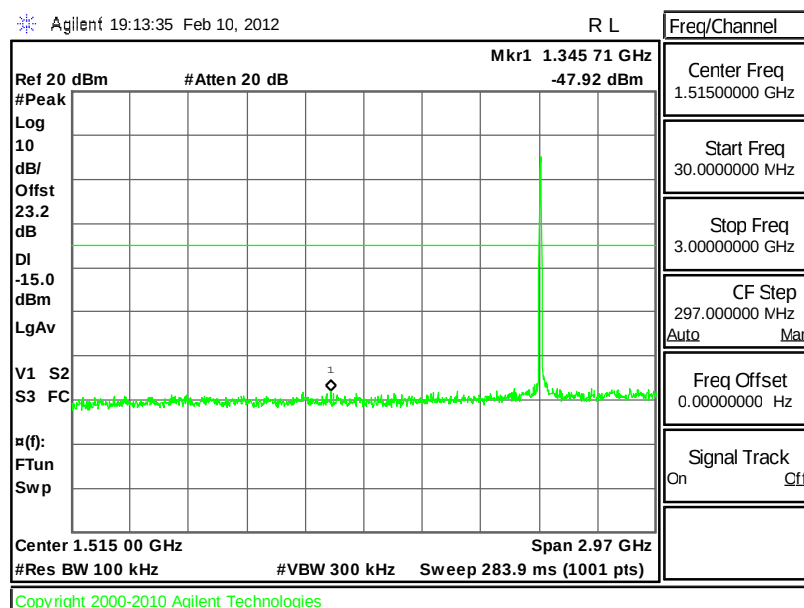




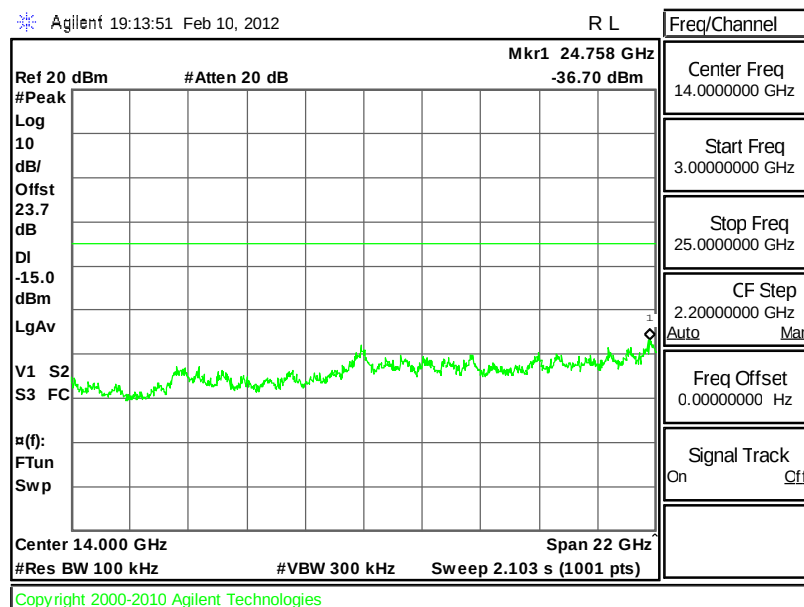
3.4.5 Test Plots of Spurious Emission

Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

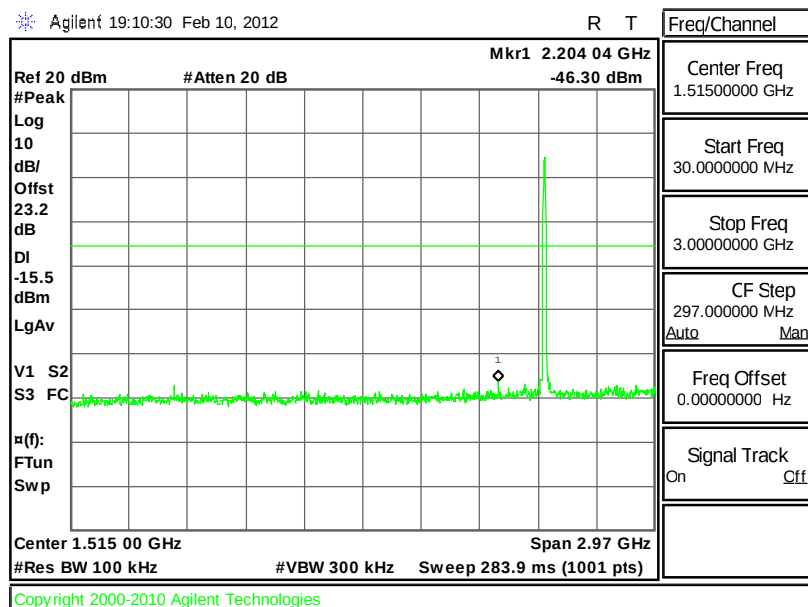
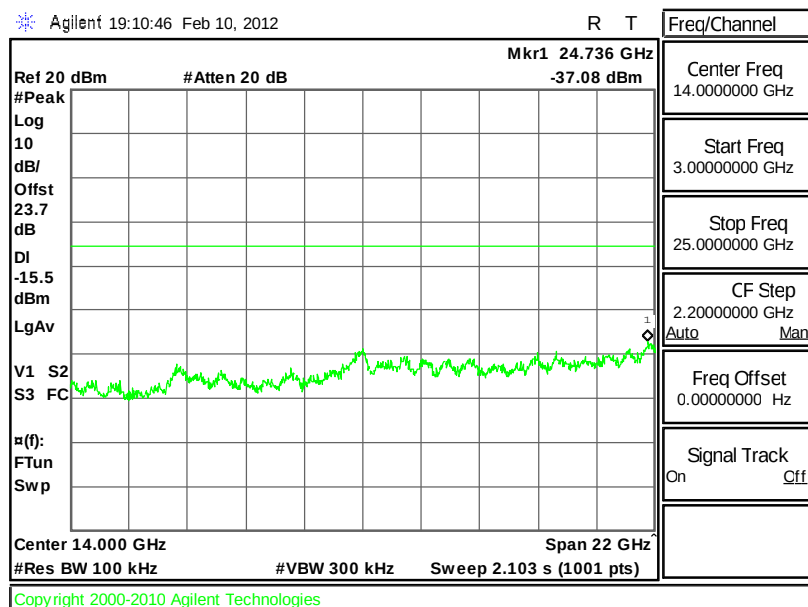


Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



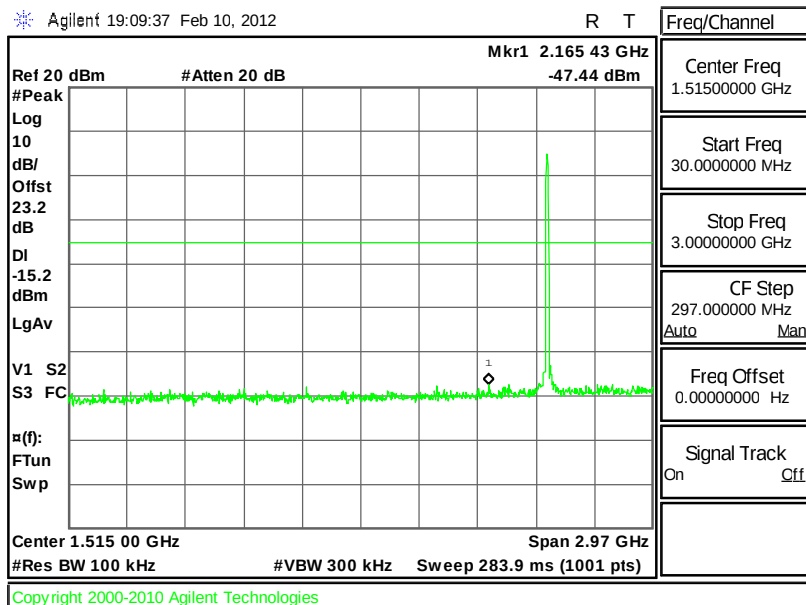
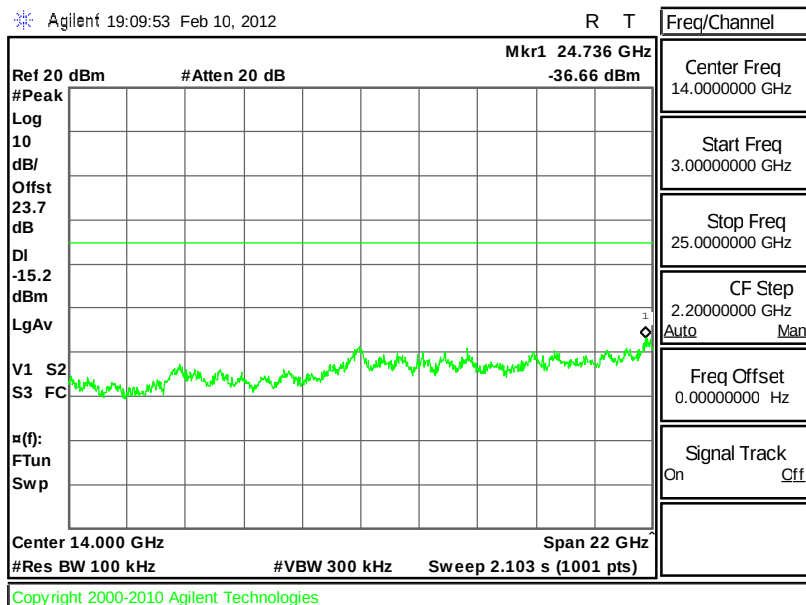


Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

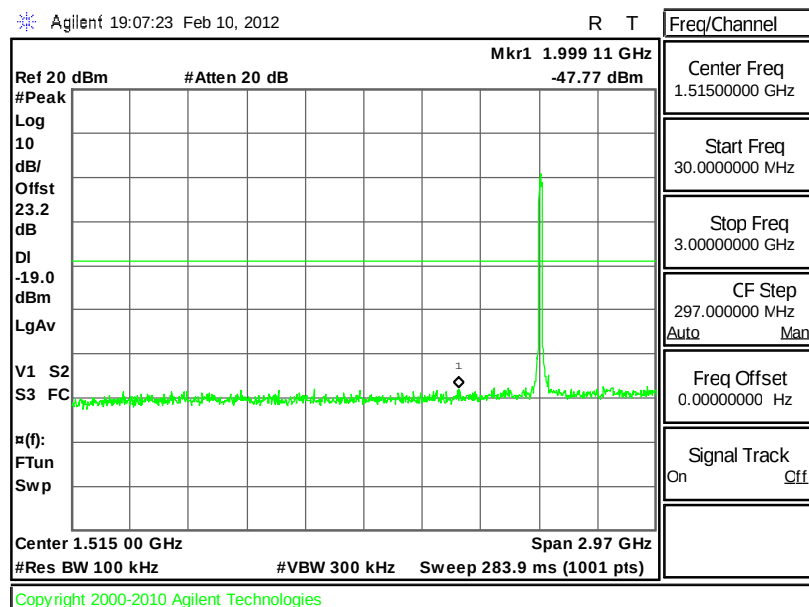
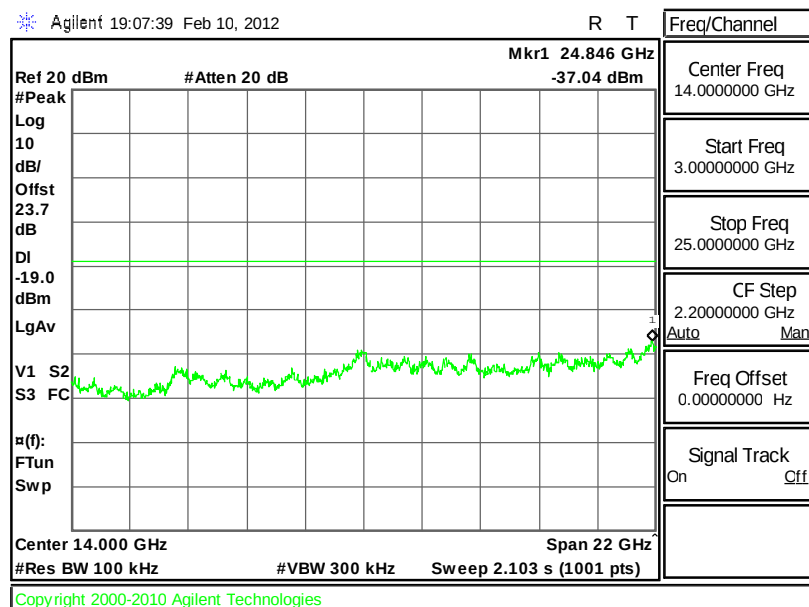


Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

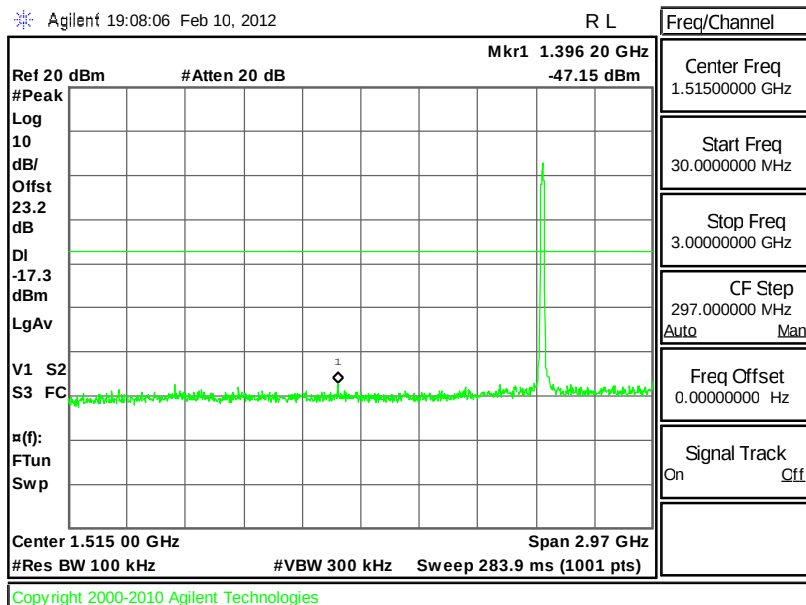
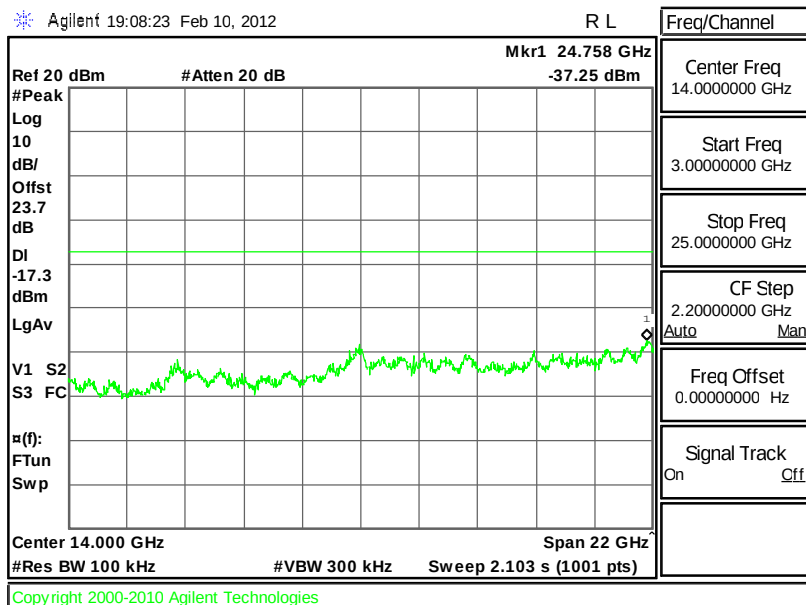


Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

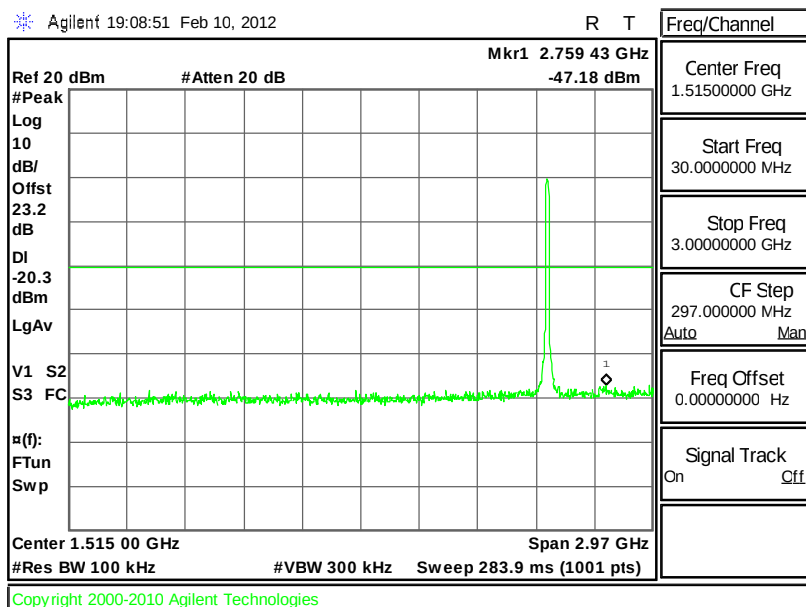
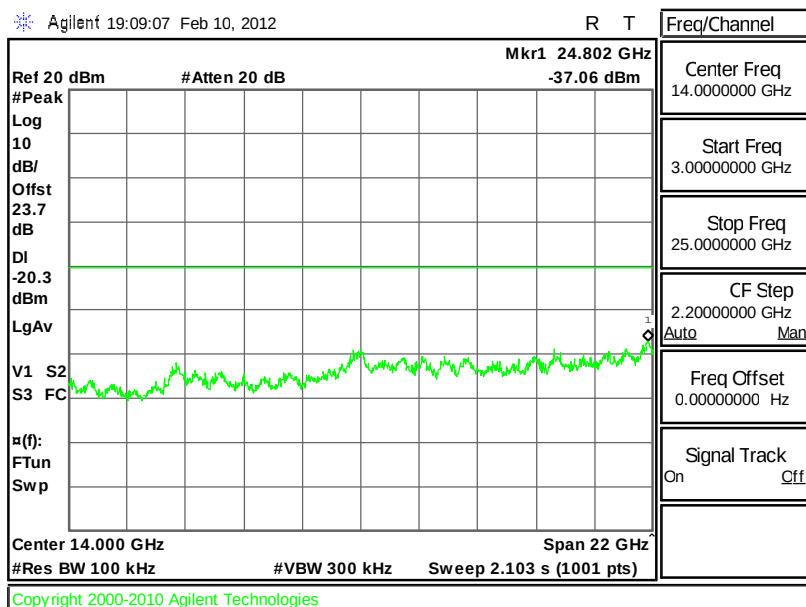


Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

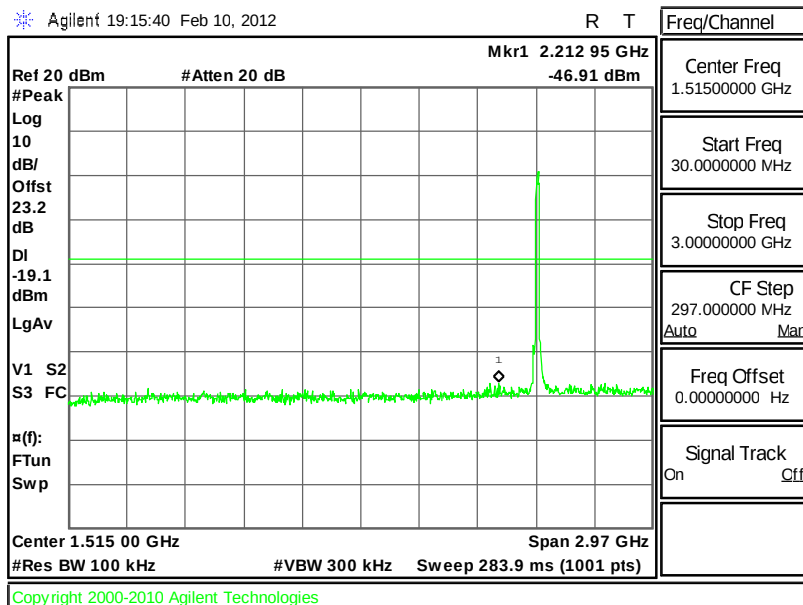
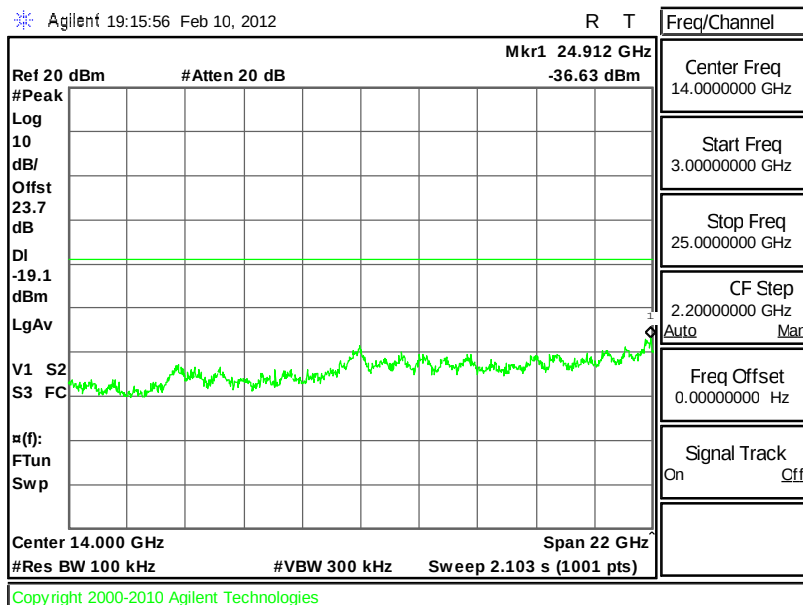


Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

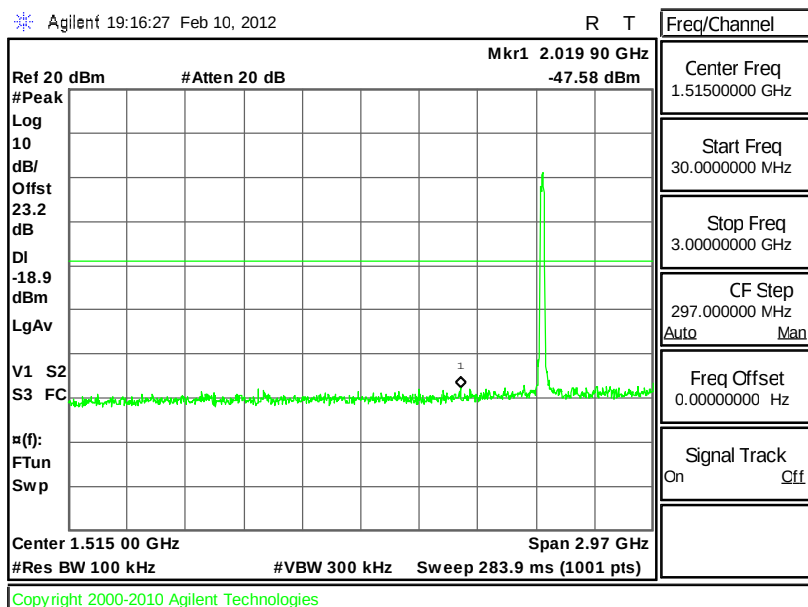
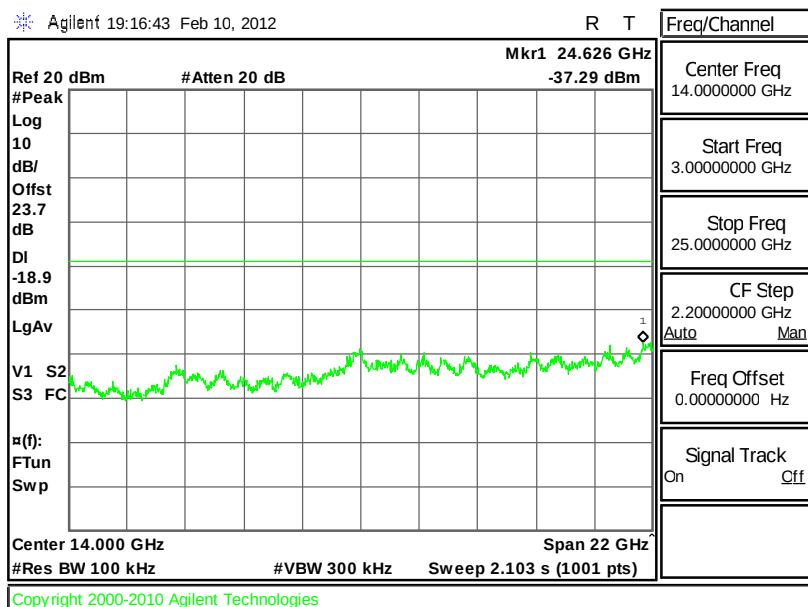


Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

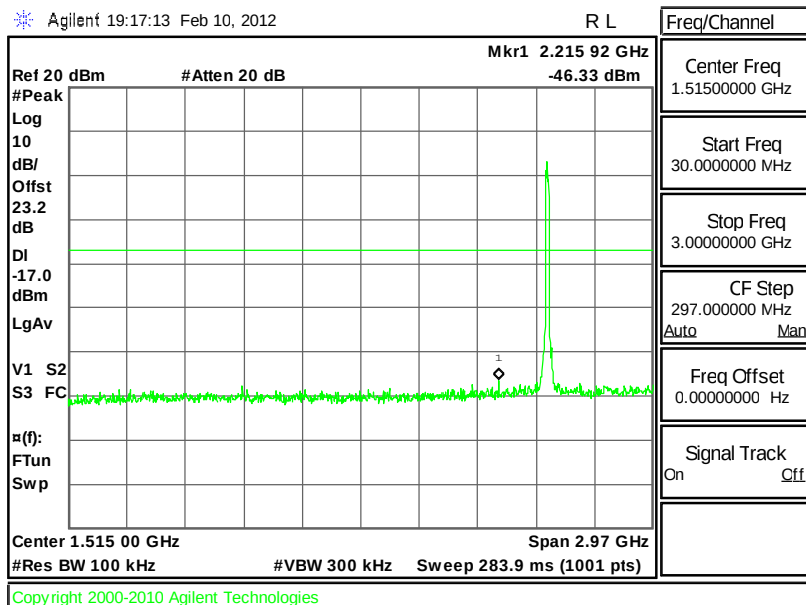
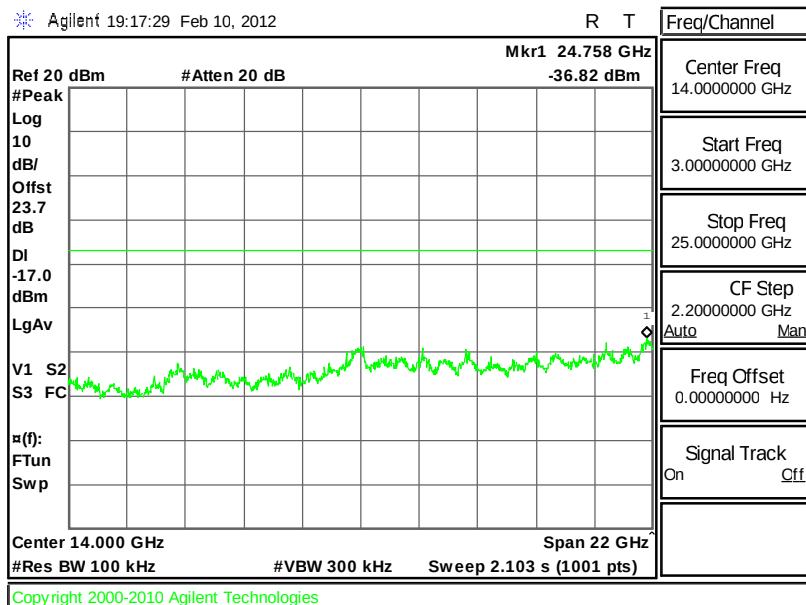


Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**



Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz**Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz**

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3KHz band at any time interval of continuous transmission.

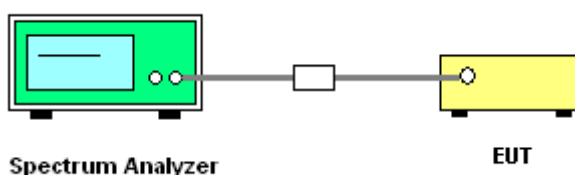
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz. Video bandwidth (VBW) = 300 KHz In order to make an accurate measurement, set the span to 5-30% greater than Emission Bandwidth (EBW).
5. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{ kHz}) = -15.2\text{ dB}$.

3.5.4 Test Setup

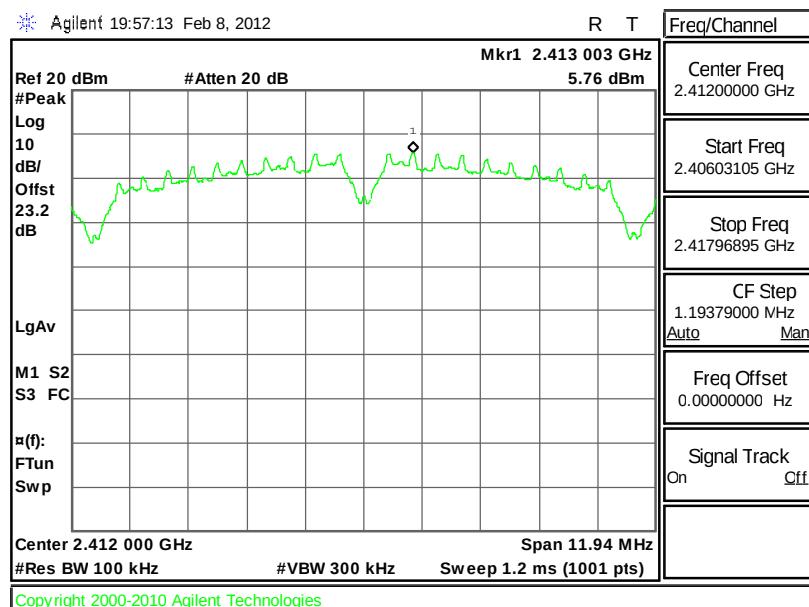


3.5.5 Test Result of Power Spectral Density

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

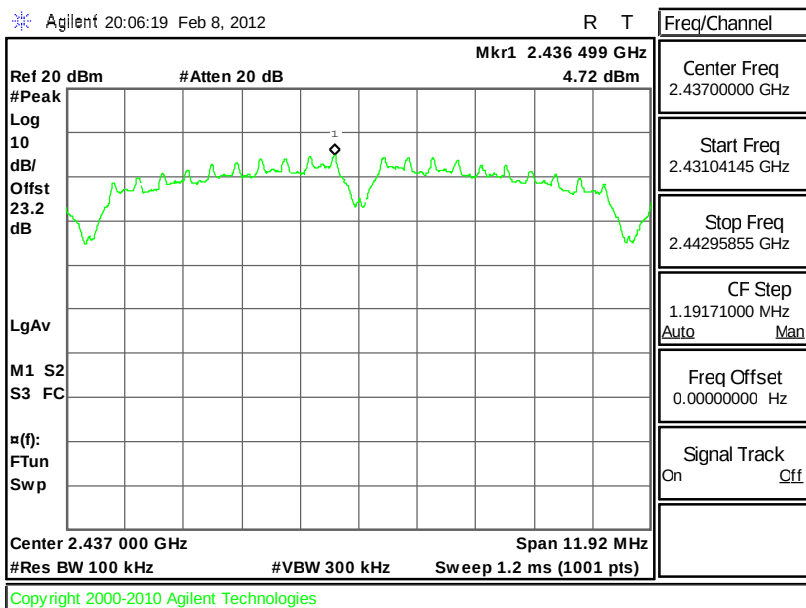
Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	5.76	8	Pass
06	2437	4.72	8	Pass
11	2462	3.75	8	Pass

Mode 1 : PSD Plot on 802.11b Channel 01

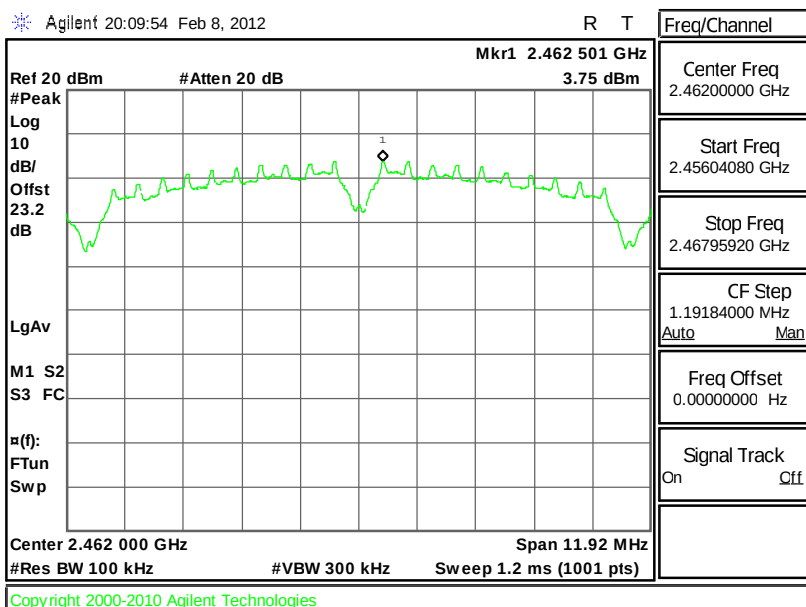




Mode 2 : PSD Plot on 802.11b Channel 06



Mode 3 : PSD Plot on 802.11b Channel 11

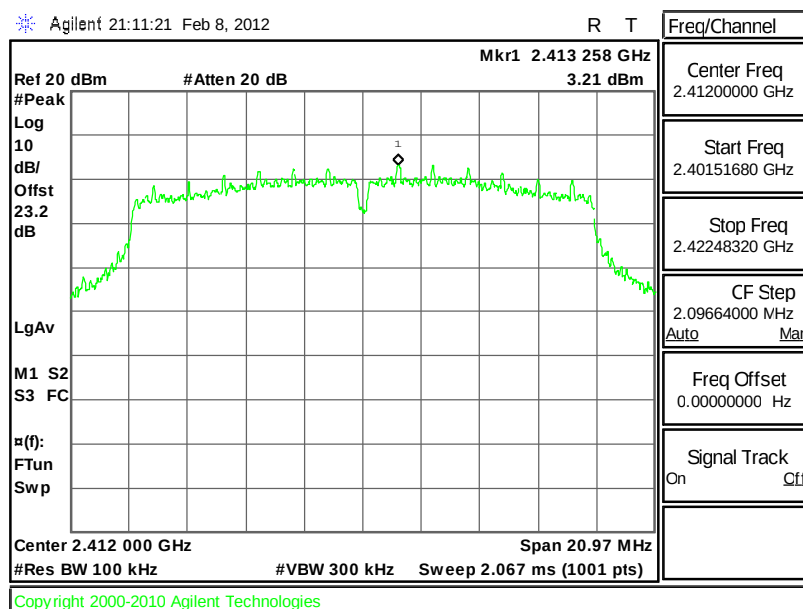




Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

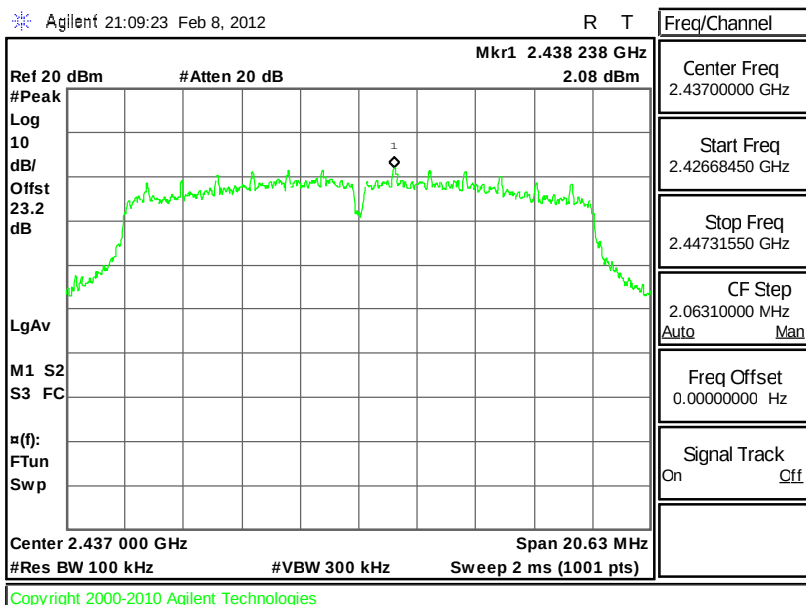
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	3.21	8	Pass
06	2437	2.08	8	Pass
11	2462	1.45	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01

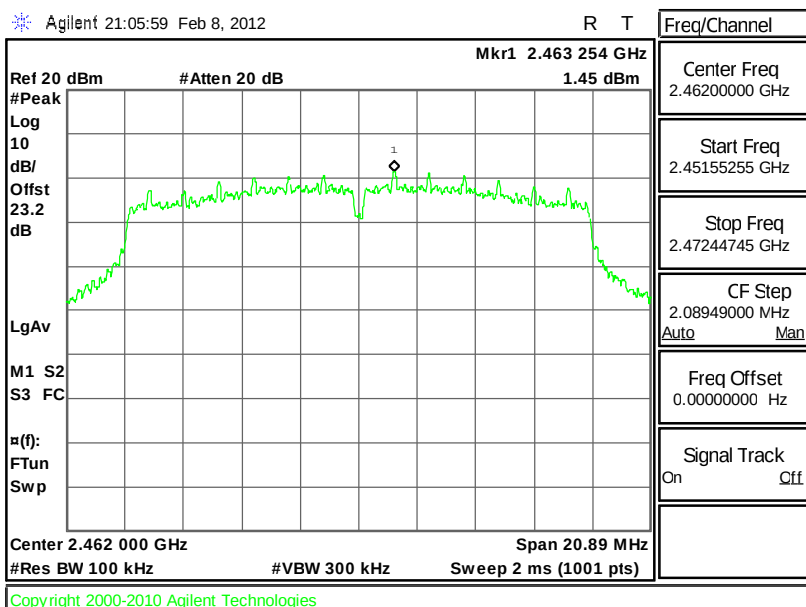




Mode 5 : PSD Plot on 802.11g Channel 06



Mode 6 : PSD Plot on 802.11g Channel 11

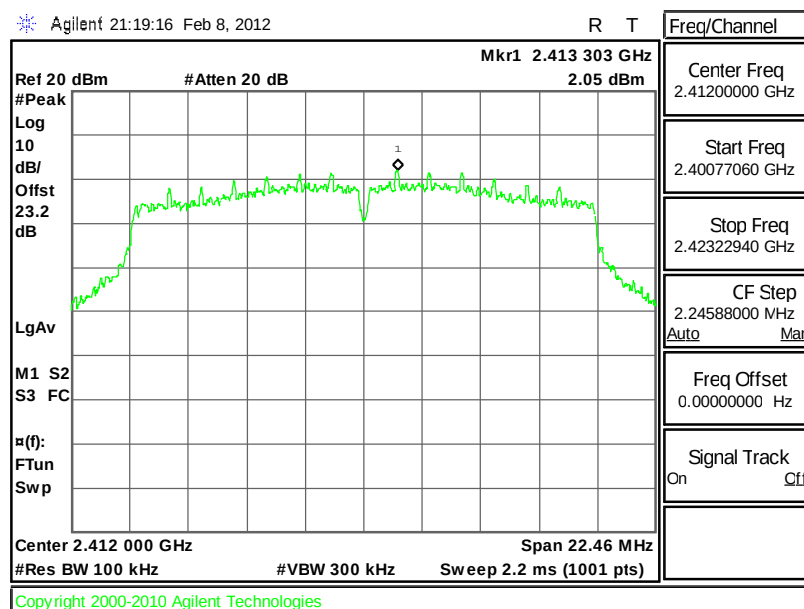




Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

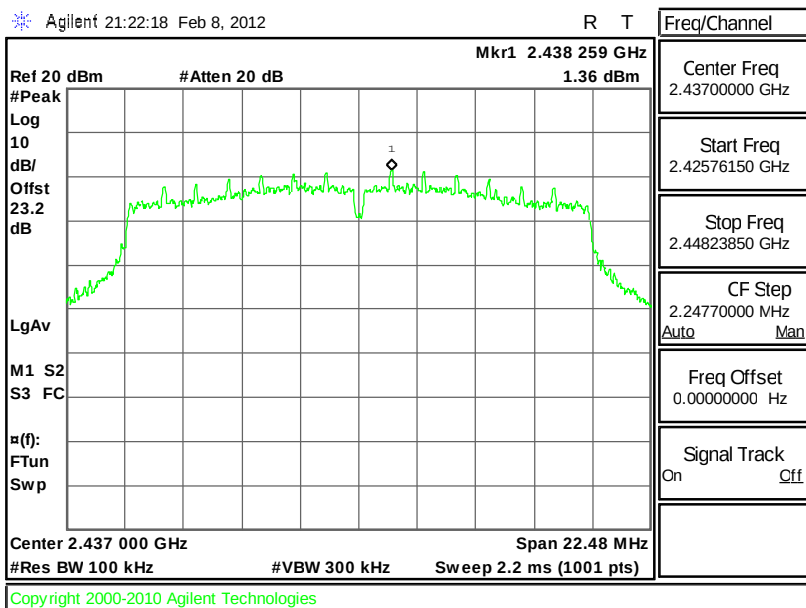
Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	2.05	8	Pass
06	2437	1.36	8	Pass
11	2462	0.15	8	Pass

Mode 7 : PSD Plot on 802.11n (BW 20MHz) Channel 01

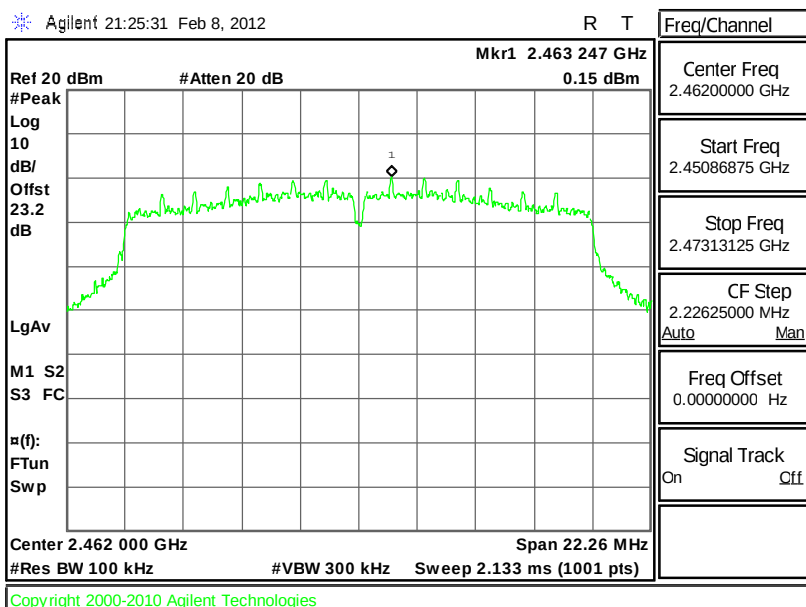




Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Mode 9 : PSD Plot on 802.11n (BW 20MHz) Channel 11



3.6 AC Conducted Emission Measurement

3.6.1 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.

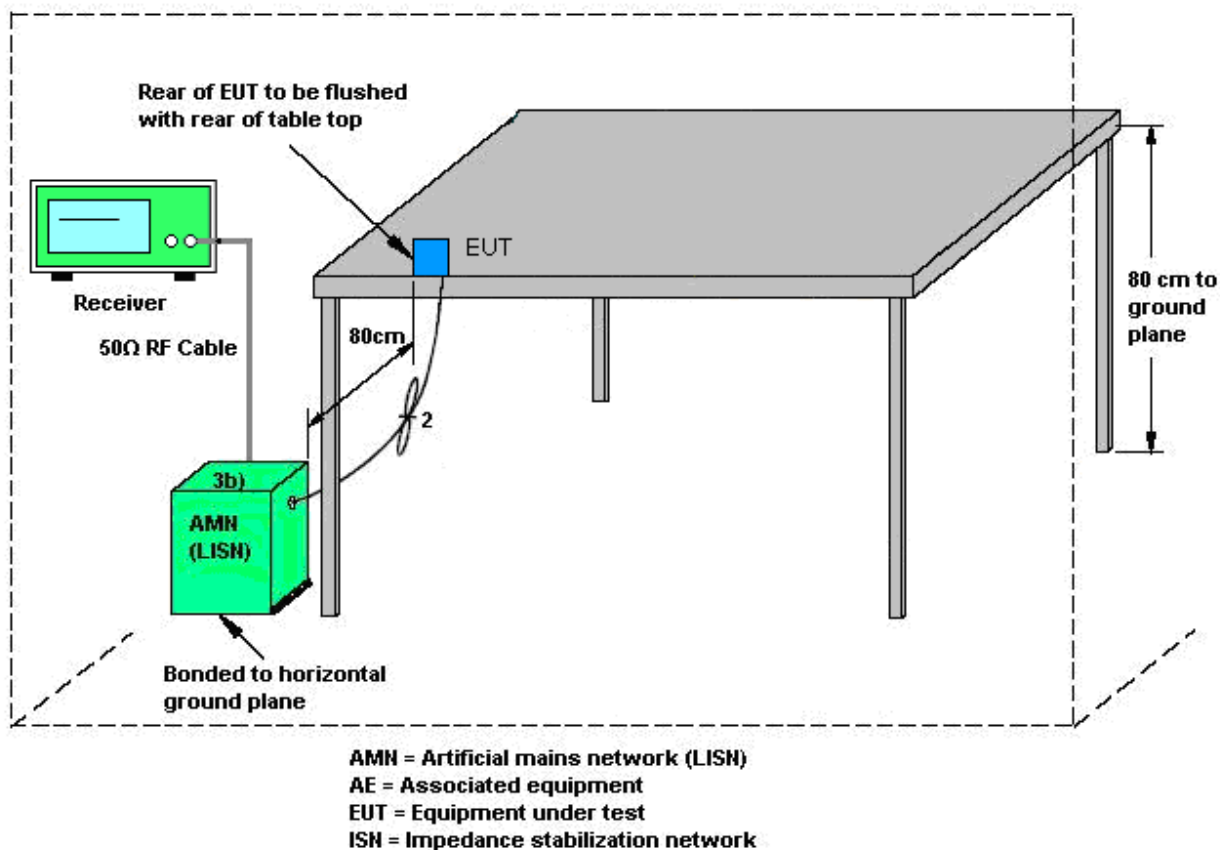
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

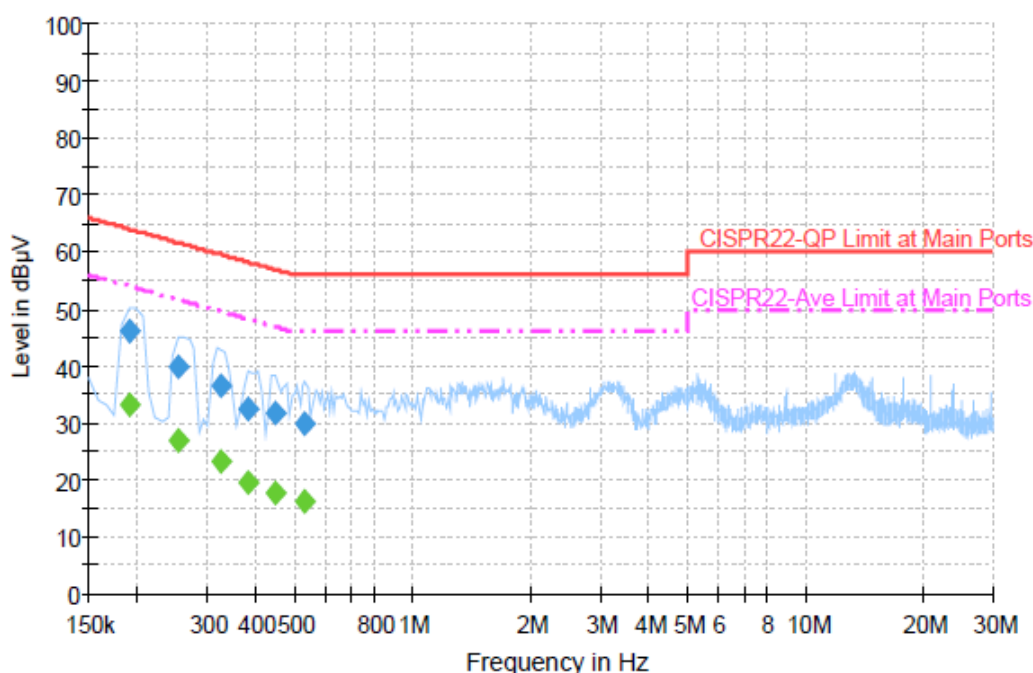
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link + Earphone + Adapter + Camera + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



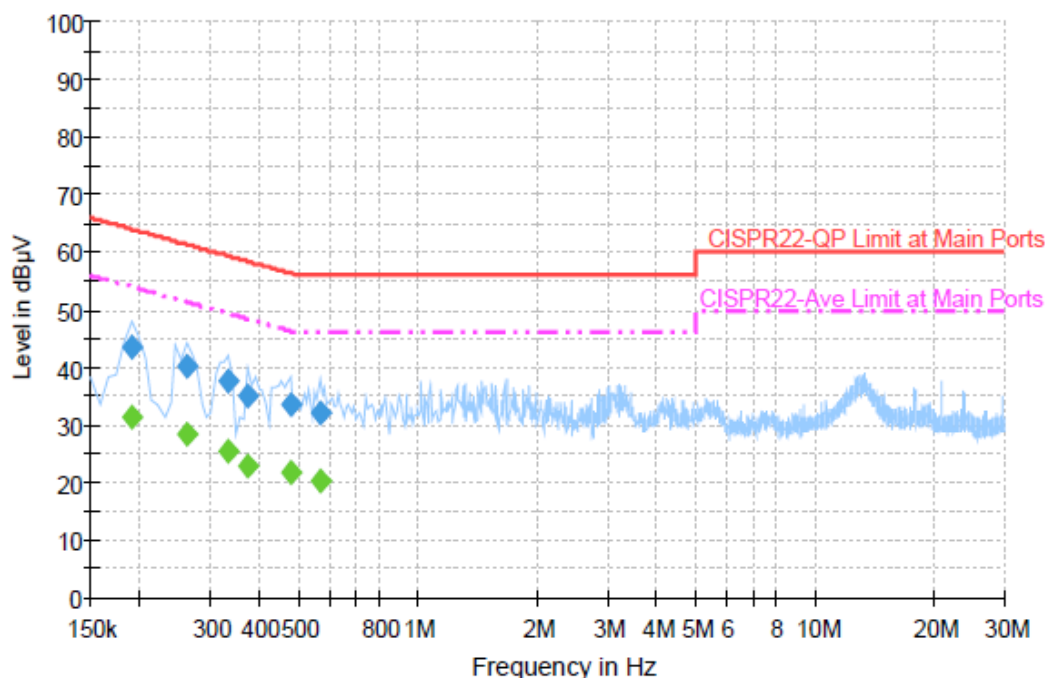
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	46.2	Off	L1	19.4	17.8	64.0
0.254000	40.0	Off	L1	19.3	21.6	61.6
0.326000	36.4	Off	L1	19.3	23.2	59.6
0.382000	32.6	Off	L1	19.4	25.6	58.2
0.446000	31.7	Off	L1	19.3	25.2	56.9
0.534000	30.0	Off	L1	19.3	26.0	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	33.1	Off	L1	19.4	20.9	54.0
0.254000	27.1	Off	L1	19.3	24.5	51.6
0.326000	23.4	Off	L1	19.3	26.2	49.6
0.382000	19.7	Off	L1	19.4	28.5	48.2
0.446000	17.6	Off	L1	19.3	29.3	46.9
0.534000	16.1	Off	L1	19.3	29.9	46.0

Test Mode :	Mode 2	Temperature :	21~23°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + Earphone + Adapter + Camera + Battery + HDMI Cable + USB Cable 2 (Data Link with Notebook)		
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)
0.190000	43.5	Off	N	19.4	20.5	64.0
0.262000	40.3	Off	N	19.4	21.1	61.4
0.334000	37.5	Off	N	19.3	21.9	59.4
0.374000	35.0	Off	N	19.4	23.4	58.4
0.478000	33.6	Off	N	19.4	22.8	56.4
0.566000	32.1	Off	N	19.3	23.9	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	31.4	Off	N	19.4	22.6	54.0
0.262000	28.3	Off	N	19.4	23.1	51.4
0.334000	25.6	Off	N	19.3	23.8	49.4
0.374000	23.0	Off	N	19.4	25.4	48.4
0.478000	21.6	Off	N	19.4	24.8	46.4
0.566000	20.2	Off	N	19.3	25.8	46.0

3.7 Radiated Emission Measurement

3.7.1 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. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. 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

3.7.2 Measuring Instruments

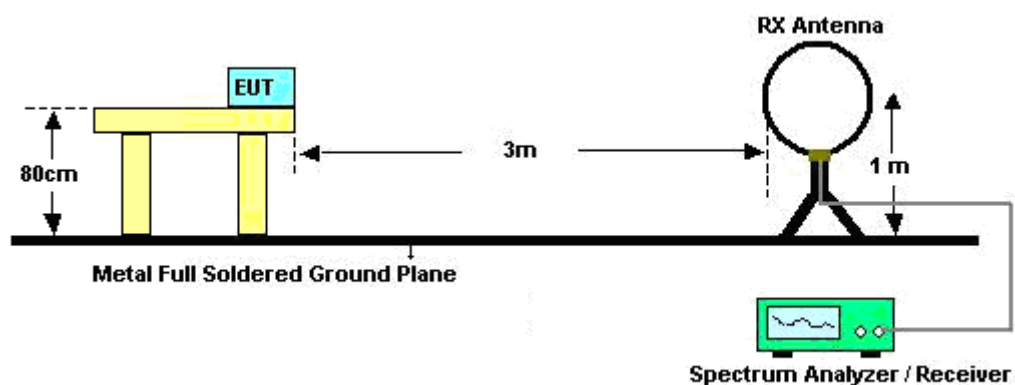
See list of measuring instruments of this test report.

3.7.3 Test Procedures

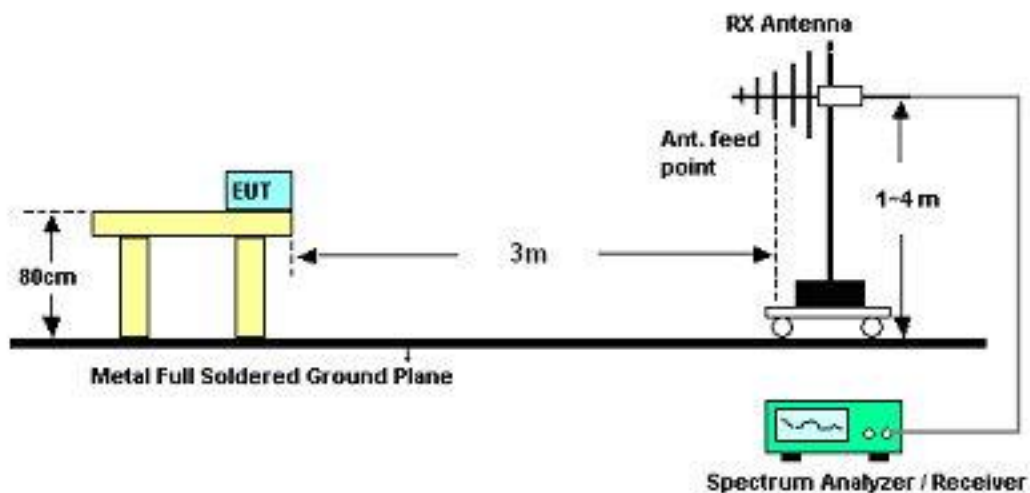
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - 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)
- 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.

3.7.4 Test Setup

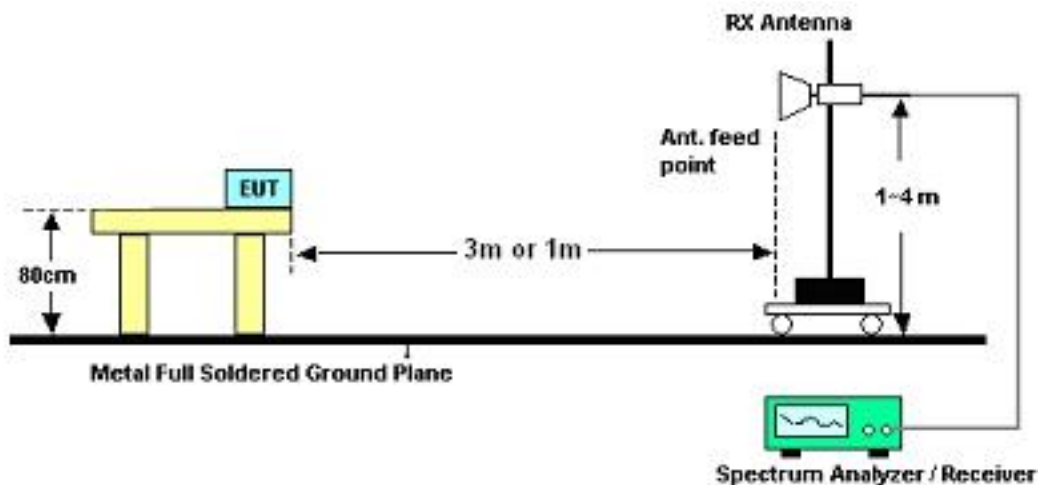
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	David Ke	Temperature :	21~23℃	
		Relative Humidity :	49~51%	

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

3.7.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	21~23℃
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 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	20.09	-19.91	40	31.15	19.8	0.7	31.56	-	-	Peak
56.73	19.53	-20.47	40	43.92	6.3	0.85	31.54	-	-	Peak
192.27	27.9	-15.6	43.5	49.19	8.74	1.44	31.47	-	-	Peak
435.8	29.35	-16.65	46	41.6	16.81	2.1	31.16	-	-	Peak
504.4	35.39	-10.61	46	46.08	18.14	2.24	31.07	100	61	Peak
850.2	26.5	-19.5	46	30.69	23.39	2.92	30.5	-	-	Peak
2389.8	45.68	-8.32	54	44.94	32.02	4.58	35.86	166	27	Average
2389.8	57.65	-16.35	74	56.91	32.02	4.58	35.86	166	27	Peak
2412	106.63	-	-	105.87	32.03	4.59	35.86	166	27	Average
2412	110.7	-	-	109.94	32.03	4.59	35.86	166	27	Peak
2492	41.25	-12.75	54	40.31	32.1	4.64	35.8	166	27	Average
2492	51.68	-22.32	74	50.74	32.1	4.64	35.8	166	27	Peak
4824	47.76	-26.24	74	65.88	33.83	6.51	58.46	100	0	Peak

Test Mode :	Mode 1	Temperature :	21~23℃
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2412 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
39.72	30.15	-9.85	40	47.61	13.3	0.75	31.51	100	42	Peak
59.97	29.06	-10.94	40	53.75	6	0.87	31.56	-	-	Peak
192	29.54	-13.96	43.5	50.83	8.74	1.44	31.47	-	-	Peak
498.1	30.37	-15.63	46	41.16	18.06	2.23	31.08	-	-	Peak
717.2	26.82	-19.18	46	33.38	21.42	2.68	30.66	-	-	Peak
958	26.66	-19.34	46	29.06	24.88	3.09	30.37	-	-	Peak
2379.54	39.29	-14.71	54	38.6	32	4.57	35.88	142	201	Average
2379.54	51.61	-22.39	74	50.92	32	4.57	35.88	142	201	Peak
2412	99.56	-	-	98.8	32.03	4.59	35.86	142	201	Average
2412	103.57	-	-	102.81	32.03	4.59	35.86	142	201	Peak
2490	39.29	-14.71	54	38.36	32.1	4.64	35.81	142	201	Average
2490	49.75	-24.25	74	48.82	32.1	4.64	35.81	142	201	Peak
4824	43.2	-30.8	74	61.32	33.83	6.51	58.46	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~23℃
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 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	20.04	-19.96	40	31.1	19.8	0.7	31.56	-	-	Peak
62.94	19.4	-20.6	40	44.11	5.94	0.88	31.53	-	-	Peak
192.27	28.19	-15.31	43.5	49.48	8.74	1.44	31.47	-	-	Peak
437.9	29.26	-16.74	46	41.45	16.86	2.11	31.16	-	-	Peak
498.8	35.67	-10.33	46	46.46	18.06	2.23	31.08	100	61	Peak
715.1	26.7	-19.3	46	33.39	21.3	2.68	30.67	-	-	Peak
2382	38.5	-15.5	54	37.8	32	4.58	35.88	162	12	Average
2382	49.33	-24.67	74	48.63	32	4.58	35.88	162	12	Peak
2437	106.03	-	-	105.2	32.06	4.61	35.84	162	12	Average
2437	110.02	-	-	109.19	32.06	4.61	35.84	162	12	Peak
2484	39.76	-14.24	54	38.84	32.09	4.64	35.81	162	12	Average
2484	50.36	-23.64	74	49.44	32.09	4.64	35.81	162	12	Peak
4874	48.76	-25.24	74	66.77	33.82	6.53	58.36	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~23℃
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 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
39.72	29.3	-10.7	40	46.76	13.3	0.75	31.51	100	83	Peak
57	29.15	-10.85	40	53.54	6.3	0.85	31.54	-	-	Peak
192	28.49	-15.01	43.5	49.78	8.74	1.44	31.47	-	-	Peak
498.1	30.44	-15.56	46	41.23	18.06	2.23	31.08	-	-	Peak
721.4	27.83	-18.17	46	34.11	21.67	2.69	30.64	-	-	Peak
953.1	26.79	-19.21	46	29.26	24.84	3.07	30.38	-	-	Peak
2382	35.59	-18.41	54	34.89	32	4.58	35.88	103	319	Average
2382	46.54	-27.46	74	45.84	32	4.58	35.88	103	319	Peak
2437	99.91	-	-	99.08	32.06	4.61	35.84	103	319	Average
2437	103.87	-	-	103.04	32.06	4.61	35.84	103	319	Peak
2484	36.23	-17.77	54	35.31	32.09	4.64	35.81	103	319	Average
2484	47.56	-26.44	74	46.64	32.09	4.64	35.81	103	319	Peak

Test Mode :	Mode 3	Temperature :	21~23℃
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 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	20.03	-19.97	40	31.09	19.8	0.7	31.56	-	-	Peak
57	19.68	-20.32	40	44.07	6.3	0.85	31.54	-	-	Peak
192.27	27.76	-15.74	43.5	49.05	8.74	1.44	31.47	-	-	Peak
434.4	28.84	-17.16	46	41.11	16.79	2.1	31.16	-	-	Peak
498.8	36	-10	46	46.79	18.06	2.23	31.08	100	34	Peak
935.6	27.01	-18.99	46	29.94	24.44	3.05	30.42	-	-	Peak
2384	39.96	-14.04	54	39.26	32	4.58	35.88	159	6	Average
2384	50.75	-23.25	74	50.05	32	4.58	35.88	159	6	Peak
2462	106.07	-	-	105.21	32.07	4.62	35.83	159	6	Average
2462	110.29	-	-	109.43	32.07	4.62	35.83	159	6	Peak
2486.13	43.04	-10.96	54	42.12	32.09	4.64	35.81	159	6	Average
2486.13	54.63	-19.37	74	53.71	32.09	4.64	35.81	159	6	Peak
4924	47.63	-26.37	74	65.52	33.81	6.56	58.26	100	0	Peak

Test Mode :	Mode 3	Temperature :	21~23℃
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 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
39.72	28.76	-11.24	40	46.22	13.3	0.75	31.51	-	-	Peak
51.06	28.9	-11.1	40	52.03	7.62	0.81	31.56	100	7	Peak
192	29.04	-14.46	43.5	50.33	8.74	1.44	31.47	-	-	Peak
498.8	30.34	-15.66	46	41.13	18.06	2.23	31.08	-	-	Peak
718.6	26.65	-19.35	46	33.07	21.54	2.69	30.65	-	-	Peak
939.1	26.95	-19.05	46	29.76	24.56	3.05	30.42	-	-	Peak
2380	36.58	-17.42	54	35.88	32	4.58	35.88	100	319	Average
2380	47.52	-26.48	74	46.82	32	4.58	35.88	100	319	Peak
2462	99.9	-	-	99.04	32.07	4.62	35.83	100	319	Average
2462	103.9	-	-	103.04	32.07	4.62	35.83	100	319	Peak
2498.48	38.6	-15.4	54	37.66	32.1	4.64	35.8	100	319	Average
2498.48	50.07	-23.93	74	49.13	32.1	4.64	35.8	100	319	Peak
4924	43.2	-30.8	74	61.09	33.81	6.56	58.26	100	0	Peak

Test Mode :	Mode 4	Temperature :	21~23℃
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 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	19.97	-20.03	40	31.03	19.8	0.7	31.56	-	-	Peak
62.94	19.37	-20.63	40	44.08	5.94	0.88	31.53	-	-	Peak
191.73	28.67	-14.83	43.5	49.96	8.74	1.44	31.47	-	-	Peak
435.8	29.14	-16.86	46	41.39	16.81	2.1	31.16	-	-	Peak
498.1	35.49	-10.51	46	46.28	18.06	2.23	31.08	100	45	Peak
847.4	27.41	-18.59	46	31.61	23.38	2.92	30.5	-	-	Peak
2389.99	48.64	-5.36	54	47.9	32.02	4.58	35.86	165	23	Average
2389.99	66.62	-7.38	74	65.88	32.02	4.58	35.86	165	23	Peak
2412	100.14	-	-	99.38	32.03	4.59	35.86	165	23	Average
2412	111.85	-	-	111.09	32.03	4.59	35.86	165	23	Peak
2492	40.92	-13.08	54	39.98	32.1	4.64	35.8	165	23	Average
2492	52.36	-21.64	74	51.42	32.1	4.64	35.8	165	23	Peak
4824	45.91	-28.09	74	64.03	33.83	6.51	58.46	100	0	Peak



Test Mode :	Mode 4	Temperature :	21~23℃
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2412 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
42.15	28.87	-11.13	40	48.09	11.56	0.76	31.54	-	-	Peak
57	29.05	-10.95	40	53.44	6.3	0.85	31.54	100	24	Peak
192.27	29.24	-14.26	43.5	50.53	8.74	1.44	31.47	-	-	Peak
498.1	30.26	-15.74	46	41.05	18.06	2.23	31.08	-	-	Peak
706	27.45	-18.55	46	34.61	20.88	2.66	30.7	-	-	Peak
957.3	26.25	-19.75	46	28.66	24.87	3.09	30.37	-	-	Peak
2389.61	40.85	-13.15	54	40.13	32.02	4.58	35.88	171	175	Average
2389.61	58.6	-15.4	74	57.88	32.02	4.58	35.88	171	175	Peak
2412	93.85	-	-	93.09	32.03	4.59	35.86	171	175	Average
2412	106.16	-	-	105.4	32.03	4.59	35.86	171	175	Peak
2490	38.61	-15.39	54	37.68	32.1	4.64	35.81	171	175	Average
2490	51.37	-22.63	74	50.44	32.1	4.64	35.81	171	175	Peak

Test Mode :	Mode 5	Temperature :	21~23℃
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 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	20.16	-19.84	40	31.22	19.8	0.7	31.56	-	-	Peak
62.94	18.63	-21.37	40	43.34	5.94	0.88	31.53	-	-	Peak
192.27	27.32	-16.18	43.5	48.61	8.74	1.44	31.47	-	-	Peak
435.1	29.03	-16.97	46	41.28	16.81	2.1	31.16	-	-	Peak
498.1	35.38	-10.62	46	46.17	18.06	2.23	31.08	100	91	Peak
848.8	26.49	-19.51	46	30.68	23.39	2.92	30.5	-	-	Peak
2390	40.66	-13.34	54	39.92	32.02	4.58	35.86	163	8	Average
2390	52.29	-21.71	74	51.55	32.02	4.58	35.86	163	8	Peak
2437	99.6	-	-	98.77	32.06	4.61	35.84	163	8	Average
2437	111.73	-	-	110.9	32.06	4.61	35.84	163	8	Peak
2486	42.3	-11.7	54	41.38	32.09	4.64	35.81	163	8	Average
2486	54.63	-19.37	74	53.71	32.09	4.64	35.81	163	8	Peak
4874	46.87	-27.13	74	64.88	33.82	6.53	58.36	100	0	Peak



Test Mode :	Mode 5	Temperature :	21~23℃
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 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
41.88	28.6	-11.4	40	47.23	12.14	0.76	31.53	-	-	Peak
50.79	29.42	-10.58	40	52.28	7.9	0.81	31.57	100	133	Peak
192.27	28.75	-14.75	43.5	50.04	8.74	1.44	31.47	-	-	Peak
495.3	31.15	-14.85	46	42.01	18.01	2.22	31.09	-	-	Peak
728.4	28.03	-17.97	46	34.01	21.93	2.71	30.62	-	-	Peak
954.5	26.21	-19.79	46	28.66	24.85	3.08	30.38	-	-	Peak
2390	35.77	-18.23	54	35.03	32.02	4.58	35.86	100	307	Average
2390	46.78	-27.22	74	46.04	32.02	4.58	35.86	100	307	Peak
2437	92.4	-	-	91.57	32.06	4.61	35.84	100	307	Average
2437	103.63	-	-	102.8	32.06	4.61	35.84	100	307	Peak
2484	37.02	-16.98	54	36.1	32.09	4.64	35.81	100	307	Average
2484	48.86	-25.14	74	47.94	32.09	4.64	35.81	100	307	Peak

Test Mode :	Mode 6	Temperature :	21~23℃
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 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
34.86	33.64	-6.36	40	48.02	16.4	0.74	31.52	100	41	Peak
39.72	32.62	-7.38	40	50.08	13.3	0.75	31.51	-	-	Peak
192	28.9	-14.6	43.5	50.19	8.74	1.44	31.47	-	-	Peak
435.8	29.05	-16.95	46	41.3	16.81	2.1	31.16	-	-	Peak
498.1	36.94	-9.06	46	47.73	18.06	2.23	31.08	-	-	Peak
842.5	27.45	-18.55	46	31.72	23.33	2.91	30.51	-	-	Peak
2386	38.91	-15.09	54	38.19	32.02	4.58	35.88	160	360	Average
2386	50.35	-23.65	74	49.63	32.02	4.58	35.88	160	360	Peak
2462	99.7	-	-	98.84	32.07	4.62	35.83	160	360	Average
2462	110.41	-	-	109.55	32.07	4.62	35.83	160	360	Peak
2483.66	48.44	-5.56	54	47.52	32.09	4.64	35.81	160	360	Average
2483.66	68.42	-5.58	74	67.5	32.09	4.64	35.81	160	360	Peak
4924	45.83	-28.17	74	63.72	33.81	6.56	58.26	100	0	Peak

Test Mode :	Mode 6	Temperature :	21~23℃
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 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
39.99	29.31	-10.69	40	46.77	13.3	0.75	31.51	100	53	Peak
57	29.01	-10.99	40	53.4	6.3	0.85	31.54	-	-	Peak
192	28.74	-14.76	43.5	50.03	8.74	1.44	31.47	-	-	Peak
500.9	33.03	-12.97	46	43.78	18.1	2.23	31.08	-	-	Peak
722.8	27.64	-18.36	46	33.87	21.71	2.7	30.64	-	-	Peak
843.2	27.88	-18.12	46	32.15	23.33	2.91	30.51	-	-	Peak
2386	36.17	-17.83	54	35.45	32.02	4.58	35.88	100	316	Average
2386	47.46	-26.54	74	46.74	32.02	4.58	35.88	100	316	Peak
2462	93.96	-	-	93.1	32.07	4.62	35.83	100	316	Average
2462	106.13	-	-	105.27	32.07	4.62	35.83	100	316	Peak
2483.66	41.9	-12.1	54	40.98	32.09	4.64	35.81	100	316	Average
2483.66	60.16	-13.84	74	59.24	32.09	4.64	35.81	100	316	Peak

Test Mode :	Mode 7	Temperature :	21~23℃
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 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
34.86	19.84	-20.16	40	34.22	16.4	0.74	31.52	-	-	Peak
59.97	19.21	-20.79	40	43.9	6	0.87	31.56	-	-	Peak
192.27	27.55	-15.95	43.5	48.84	8.74	1.44	31.47	-	-	Peak
437.9	30.58	-15.42	46	42.77	16.86	2.11	31.16	-	-	Peak
498.8	35.82	-10.18	46	46.61	18.06	2.23	31.08	100	47	Peak
836.9	27.13	-18.87	46	31.5	23.24	2.9	30.51	-	-	Peak
2389.61	47.62	-6.38	54	46.9	32.02	4.58	35.88	166	26	Average
2389.61	65.19	-8.81	74	64.47	32.02	4.58	35.88	166	26	Peak
2412	97.74	-	-	96.98	32.03	4.59	35.86	166	26	Average
2412	112.23	-	-	111.47	32.03	4.59	35.86	166	26	Peak
2490	39.44	-14.56	54	38.51	32.1	4.64	35.81	166	26	Average
2490	52.23	-21.77	74	51.3	32.1	4.64	35.81	166	26	Peak
4824	45.72	-28.28	74	63.84	33.83	6.51	58.46	100	0	Peak



Test Mode :	Mode 7	Temperature :	21~23℃
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2412 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
39.99	30.05	-9.95	40	47.51	13.3	0.75	31.51	100	8	Peak
51.06	29.35	-10.65	40	52.48	7.62	0.81	31.56	-	-	Peak
192.27	29.54	-13.96	43.5	50.83	8.74	1.44	31.47	-	-	Peak
496	30.5	-15.5	46	41.36	18.01	2.22	31.09	-	-	Peak
701.1	27.28	-18.72	46	34.62	20.73	2.65	30.72	-	-	Peak
954.5	27.01	-18.99	46	29.46	24.85	3.08	30.38	-	-	Peak
2388.47	39.78	-14.22	54	39.06	32.02	4.58	35.88	132	202	Average
2388.47	54.93	-19.07	74	54.21	32.02	4.58	35.88	132	202	Peak
2412	91.03	-	-	90.27	32.03	4.59	35.86	132	202	Average
2412	104.9	-	-	104.14	32.03	4.59	35.86	132	202	Peak
2490	38.29	-15.71	54	37.36	32.1	4.64	35.81	132	202	Average
2490	51.19	-22.81	74	50.26	32.1	4.64	35.81	132	202	Peak

Test Mode :	Mode 8	Temperature :	21~23℃
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 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
34.86	20.38	-19.62	40	34.76	16.4	0.74	31.52	-	-	Peak
62.94	20.11	-19.89	40	44.82	5.94	0.88	31.53	-	-	Peak
192	28.06	-15.44	43.5	49.35	8.74	1.44	31.47	-	-	Peak
437.9	30.17	-15.83	46	42.36	16.86	2.11	31.16	-	-	Peak
498.1	35.57	-10.43	46	46.36	18.06	2.23	31.08	100	21	Peak
848.1	27.83	-18.17	46	32.03	23.38	2.92	30.5	-	-	Peak
2390	40.21	-13.79	54	39.47	32.02	4.58	35.86	163	12	Average
2390	53.32	-20.68	74	52.58	32.02	4.58	35.86	163	12	Peak
2437	97.12	-	-	96.29	32.06	4.61	35.84	163	12	Average
2437	111.99	-	-	111.16	32.06	4.61	35.84	163	12	Peak
2486	40.99	-13.01	54	40.07	32.09	4.64	35.81	163	12	Average
2486	53.56	-20.44	74	52.64	32.09	4.64	35.81	163	12	Peak
4874	46.36	-27.64	74	64.37	33.82	6.53	58.36	100	0	Peak



Test Mode :	Mode 8	Temperature :	21~23℃
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 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
39.72	29.13	-10.87	40	46.59	13.3	0.75	31.51	-	-	Peak
59.97	29.75	-10.25	40	54.44	6	0.87	31.56	100	22	Peak
192	29.66	-13.84	43.5	50.95	8.74	1.44	31.47	-	-	Peak
500.9	29.55	-16.45	46	40.3	18.1	2.23	31.08	-	-	Peak
729.1	27.81	-18.19	46	33.75	21.96	2.71	30.61	-	-	Peak
949.6	27.86	-18.14	46	30.4	24.8	3.06	30.4	-	-	Peak
2384	36	-18	54	35.3	32	4.58	35.88	102	318	Average
2384	46.97	-27.03	74	46.27	32	4.58	35.88	102	318	Peak
2437	91.23	-	-	90.4	32.06	4.61	35.84	102	318	Average
2437	105.47	-	-	104.64	32.06	4.61	35.84	102	318	Peak
2488	37.12	-16.88	54	36.19	32.1	4.64	35.81	102	318	Average
2488	48.78	-25.22	74	47.85	32.1	4.64	35.81	102	318	Peak

Test Mode :	Mode 9	Temperature :	21~23℃
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 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
62.67	19.93	-20.07	40	44.64	5.94	0.88	31.53	-	-	Peak
192	28.11	-15.39	43.5	49.4	8.74	1.44	31.47	-	-	Peak
210.09	24.35	-19.15	43.5	45.12	9.2	1.5	31.47	-	-	Peak
435.1	29.56	-16.44	46	41.81	16.81	2.1	31.16	-	-	Peak
498.1	35.89	-10.11	46	46.68	18.06	2.23	31.08	100	44	Peak
720	28.44	-17.56	46	34.8	21.6	2.69	30.65	-	-	Peak
2382	38.69	-15.31	54	37.99	32	4.58	35.88	160	5	Average
2382	50.33	-23.67	74	49.63	32	4.58	35.88	160	5	Peak
2462	97.47	-	-	96.61	32.07	4.62	35.83	160	5	Average
2462	111.34	-	-	110.48	32.07	4.62	35.83	160	5	Peak
2483.5	47.11	-6.89	54	46.19	32.09	4.64	35.81	160	5	Average
2483.5	65.15	-8.85	74	64.23	32.09	4.64	35.81	160	5	Peak
4924	44.56	-29.44	74	62.45	33.81	6.56	58.26	100	0	Peak



Test Mode :	Mode 9	Temperature :	21~23℃
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 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
38.64	29.3	-10.7	40	46.14	13.92	0.75	31.51	100	67	Peak
57	29.02	-10.98	40	53.41	6.3	0.85	31.54	-	-	Peak
192.27	28.3	-15.2	43.5	49.59	8.74	1.44	31.47	-	-	Peak
497.4	29.89	-16.11	46	40.7	18.05	2.22	31.08	-	-	Peak
696.9	28.93	-17.07	46	36.33	20.67	2.65	30.72	-	-	Peak
958.7	27.16	-18.84	46	29.56	24.88	3.09	30.37	-	-	Peak
2382	35.98	-18.02	54	35.28	32	4.58	35.88	100	320	Average
2382	47.56	-26.44	74	46.86	32	4.58	35.88	100	320	Peak
2462	91.71	-	-	90.85	32.07	4.62	35.83	100	320	Average
2462	105.13	-	-	104.27	32.07	4.62	35.83	100	320	Peak
2483.5	41.01	-12.99	54	40.09	32.09	4.64	35.81	100	320	Average
2483.5	57.24	-16.76	74	56.32	32.09	4.64	35.81	100	320	Peak

3.8 Antenna Requirements

3.8.1 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. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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.

3.8.2 Antenna Connected Construction

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

3.8.3 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	Agilent	E4446A	MY50180136	3Hz~44GHz	Apr. 03, 2011	Feb. 08, 2012 ~ Feb. 10, 2012	Apr. 02, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Feb. 08, 2012 ~ Feb. 10, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Feb. 08, 2012 ~ Feb. 10, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 08, 2012 ~ Feb. 10, 2012	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 08, 2012 ~ Feb. 10, 2012	Feb. 17, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Feb. 11, 2012	Aug. 21, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz~30MHz	Dec. 09, 2011	Feb. 11, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz~30MHz	Dec. 06, 2011	Feb. 11, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Feb. 11, 2012	N/A	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	Feb. 11, 2012	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz~30GHz	Nov. 03, 2011	Feb. 12, 2012~ Feb. 15, 2012	Nov. 02, 2012	Radiation (03CH05-HY)
COM-POWER	Double Ridge Horn	AH-118	701030	1GHz~18GHz	N/A	Feb. 12, 2012~ Feb. 15, 2012	N/A	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz~1GHz	Oct. 22, 2011	Feb. 12, 2012~ Feb. 15, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	Feb. 12, 2012~ Feb. 15, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m~4 m	N/A	Feb. 12, 2012~ Feb. 15, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 04, 2011	Feb. 12, 2012~ Feb. 15, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
COM-POWER	COM-POWER	PA-103	161075	1KHz~1GHz	Mar. 29, 2011	Feb. 12, 2012~ Feb. 15, 2012	Mar. 28, 2012	Radiation (03CH05-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz~18GHz	Jul. 19, 2011	Feb. 12, 2012~ Feb. 15, 2012	Jul. 18, 2012	Radiation (03CH05-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159087	1GHz~18GHz	Feb. 21, 2011	Feb. 12, 2012~ Feb. 15, 2012	Feb. 20, 2012	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Apr. 14, 2011	Feb. 12, 2012~ Feb. 15, 2012	Apr. 13, 2012	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Feb. 12, 2012 ~ Feb. 15, 2012	Jul. 28, 2012	Radiation (03CH05-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Feb. 12, 2012 ~ Feb. 15, 2012	Aug. 21, 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
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 EP220105-01 as below.