

FCC RF Test Report

APPLICANT : VeriFone Inc.
EQUIPMENT : Point of Sale Terminal
BRAND NAME : VeriFone
MODEL NAME : VX680 WiFi
FCC ID : B32VX680WIFICTLS
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Jul. 01, 2011 and completely tested on Aug. 02, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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
FR170108-02	Rev. 01	Initial issue of report	Aug. 17, 2011

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 4.4.1	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 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 10.8 dB at 27.126 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.08 dB at 2483.85 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

VeriFone Inc.

1400 West Stanford Ranch Road Suit 200 Rocklin CA 95765 USA

1.2 Manufacturer

Inventec Appliances (Pudong) Co., Ltd.

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

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Point of Sale Terminal
Brand Name	VeriFone
Model Name	VX680 WiFi
FCC ID	B32VX680WIFICTLS
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 : 17.57 dBm (0.0571 W) 802.11g : 22.47 dBm (0.1766 W) 802.11n (BW 20MHz) : 22.26 dBm (0.1683 W)
Antenna Type	PIFA Antenna with gain 3.06 dBi
Type of Antenna Connector	N/A
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

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 KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ANSI C63.4-2003
- IC RSS-210 Issue 8

Remark:

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

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

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	17.57	17.47	17.55	17.52
CH 06	2437 MHz	17.27	-	-	-
CH 11	2462 MHz	17.05	-	-	-

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	22.47	22.26	22.24	22.11	22.36	22.09	22.01	22.39
CH 06	2437 MHz	22.29	-	-	-	-	-	-	-
CH 11	2462 MHz	21.94	-	-	-	-	-	-	-

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	22.26	21.53	21.69	21.79	21.35	21.66	21.36	22.18
CH 06	2437 MHz	22.14	-	-	-	-	-	-	-
CH 11	2462 MHz	21.62	-	-	-	-	-	-	-

Remark:

1. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, and 6.5Mbps for 802.11n (BW 20MHz) for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.
3. Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

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).

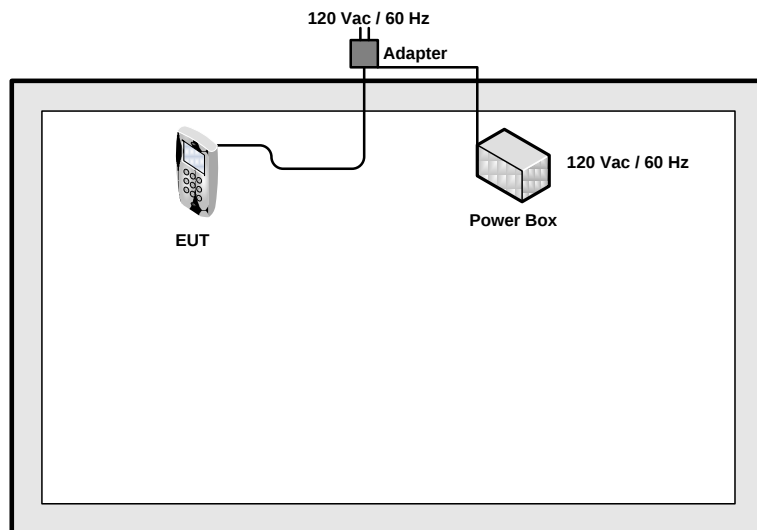
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

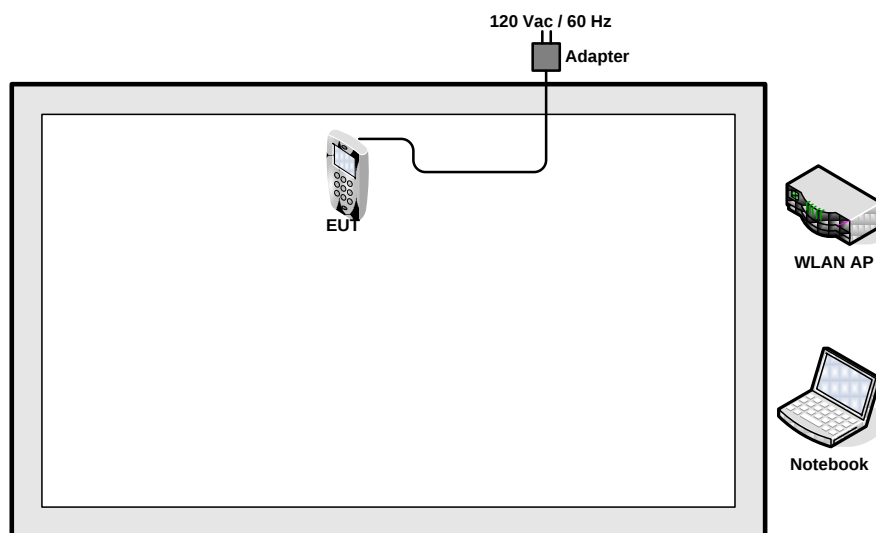
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 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 : WLAN Link + Battery 1 + Print + USB Cable (Charging from Adapter 1)	
Remark:		
1. TC stands for Test Configuration, and consists of battery, and adapter.		
2. The worst case of conducted emission is mode 1; only the test data of it was reported.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode 1>





2.4 RF Utility

When the EUT was turned on, you can enter the setting windows of "WiFi". And key in the argument to set the EUT to transmit signals continuously.

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

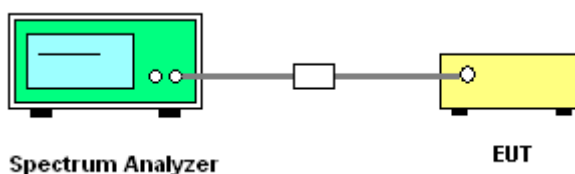
3.1.2 Measuring Instruments

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) = 100 kHz.
In order to make an accurate measurement, set the span greater than RBW. 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

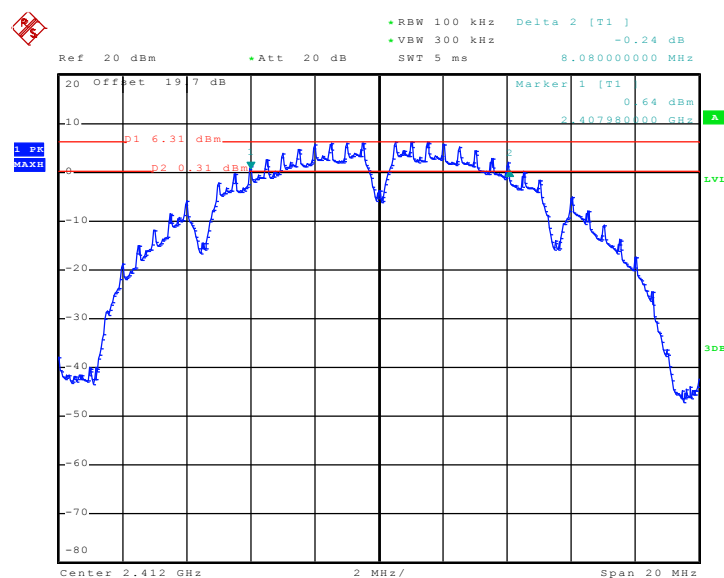


3.1.5 Test Result of 6dB Bandwidth

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

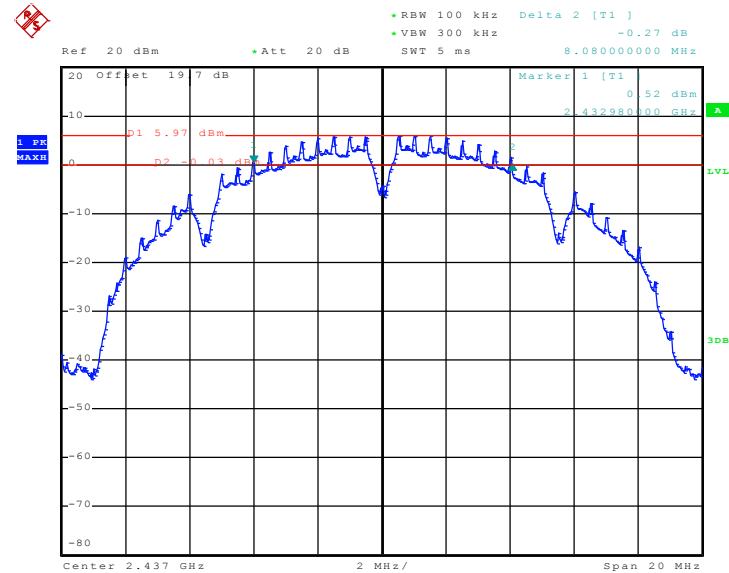
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	8.08	0.5	Pass
06	2437	8.08	0.5	Pass
11	2462	8.08	0.5	Pass

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



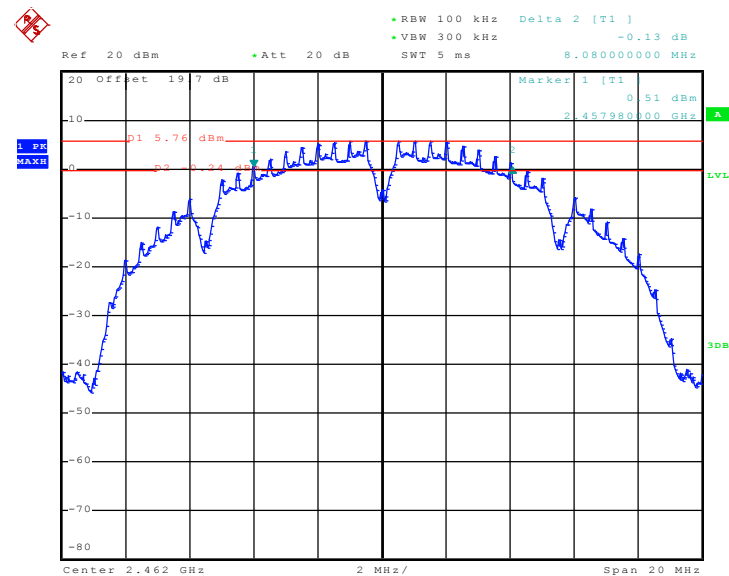
Date: 22.JUL.2011 09:56:30

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



Date: 22.JUL.2011 10:09:31

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



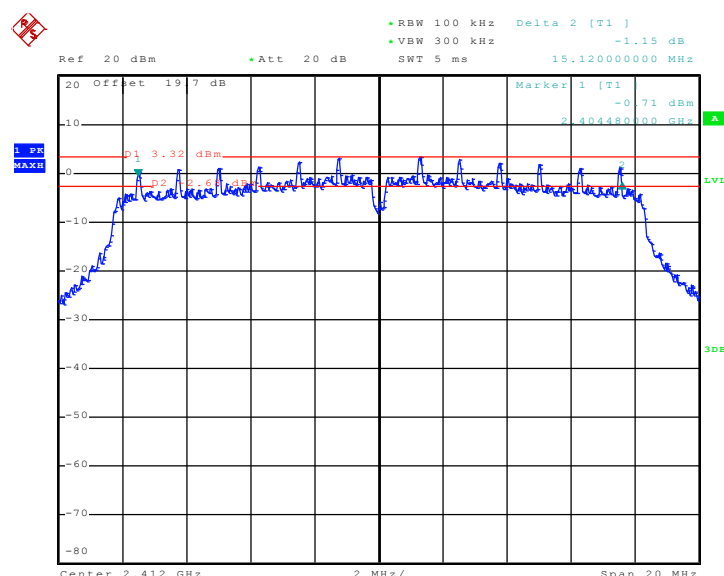
Date: 22.JUL.2011 10:24:08



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

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.12	0.5	Pass
06	2437	15.12	0.5	Pass
11	2462	15.08	0.5	Pass

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



Date: 22.JUL.2011 10:51:44



Ref 20 dBm Att 20 dB RBW 100 kHz Delta 2 [T1] VBW 300 kHz -1.69 dB SWT 5 ms 15.12000000 MHz

Marker 1 [T1] -0.85 dBm 2.429480000 GHz

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 22.JUL.2011 11:06:48

Ref 20 dBm Att 20 dB SWT 5 ms Delta 2 [T1] 0.72 dB
15.080000000 MHz

Marker 1 [T1] -1.21 dBm
2.454480000 GHz

2.67 dBm

2.462 GHz

Center 2.462 GHz Span 20 MHz

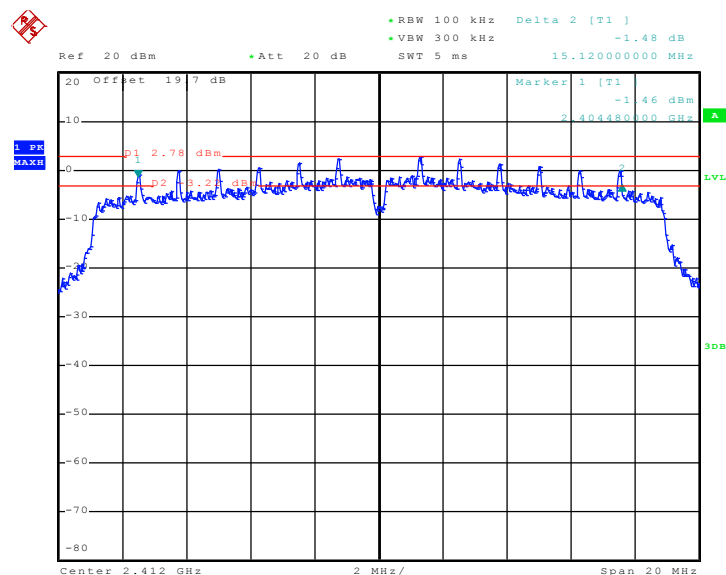
Date: 22.JUL.2011 10:38:00



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

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.12	0.5	Pass
06	2437	15.12	0.5	Pass
11	2462	15.12	0.5	Pass

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



Date: 22.JUL.2011 11:21:02



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

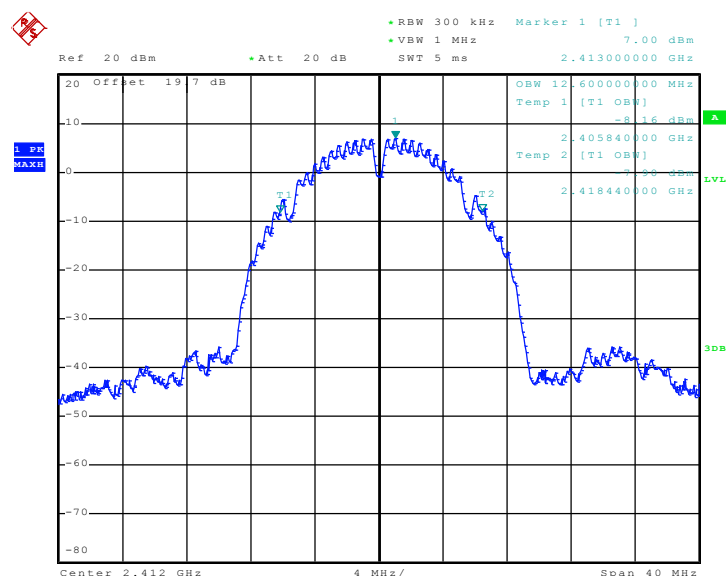


3.1.6 Test Result of 99% Occupied Bandwidth

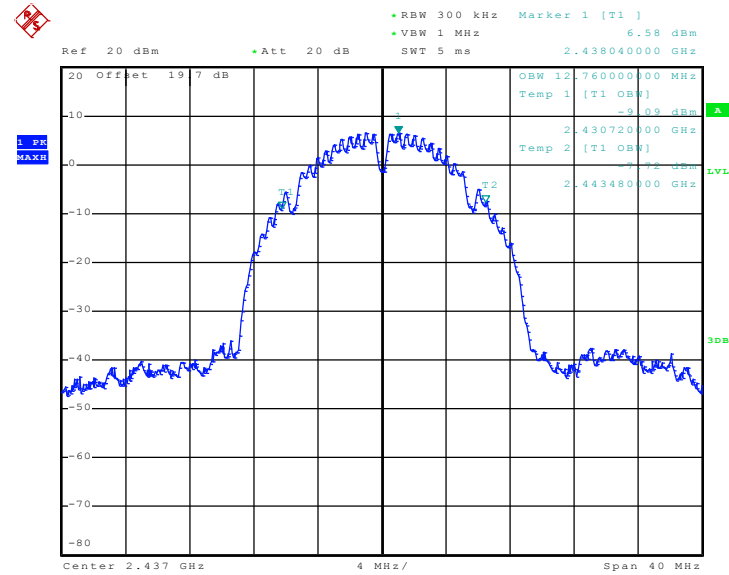
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	12.60	Pass
06	2437	12.76	Pass
11	2462	12.68	Pass

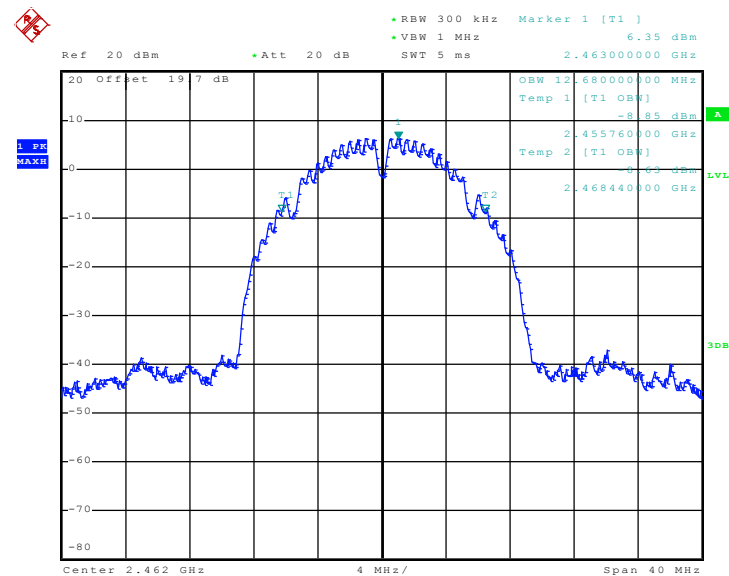
Mode 1 : 99% Occupied Bandwidth Plot on 802.11b Channel 01



Date: 22.JUL.2011 09:58:04

Mode 2 : 99% Occupied Bandwidth Plot on 802.11b Channel 06


Date: 22.JUL.2011 10:10:00

Mode 3 : 99% Occupied Bandwidth Plot on 802.11b Channel 11


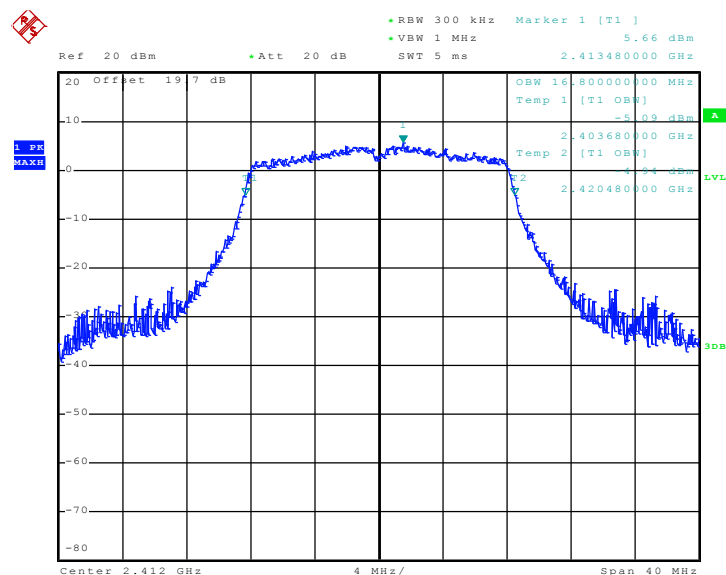
Date: 22.JUL.2011 10:25:20



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

Channel	Frequency (MHz)	802.11g 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	16.80	Pass
06	2437	16.80	Pass
11	2462	16.80	Pass

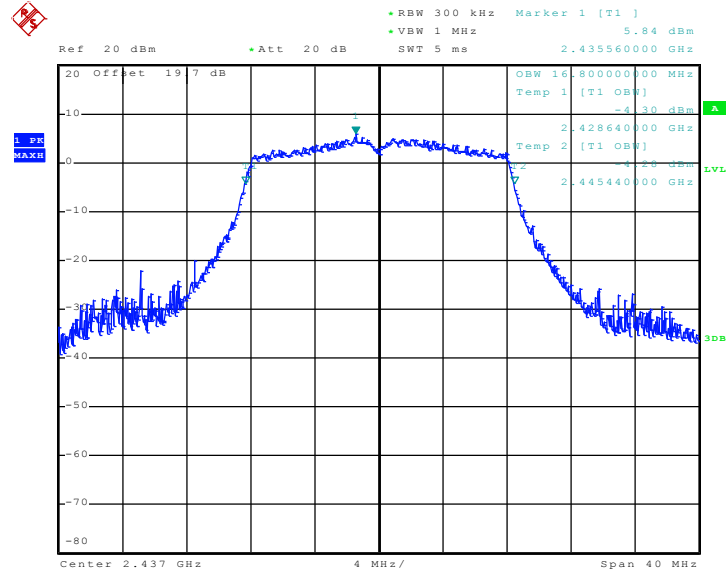
Mode 4 : 99% Occupied Bandwidth Plot on 802.11g Channel 01



Date: 22.JUL.2011 10:53:19

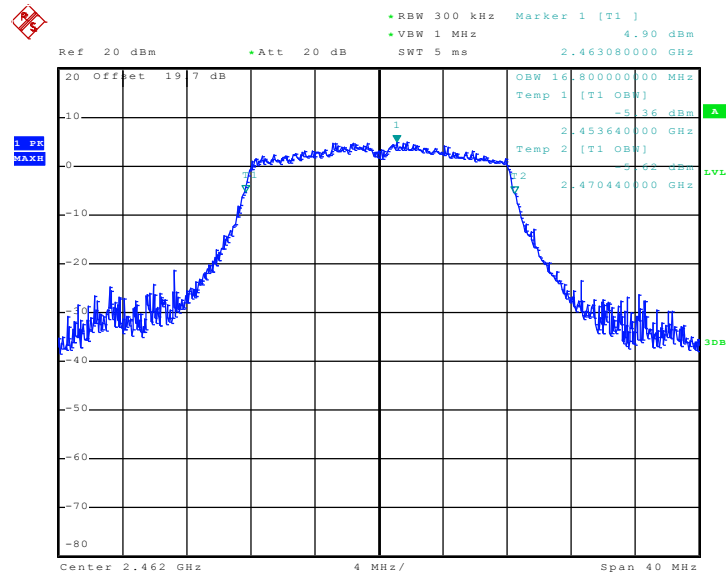


Mode 5 : 99% Occupied Bandwidth Plot on 802.11g Channel 06



Date: 22.JUL.2011 11:07:18

Mode 6 : 99% Occupied Bandwidth Plot on 802.11g Channel 11



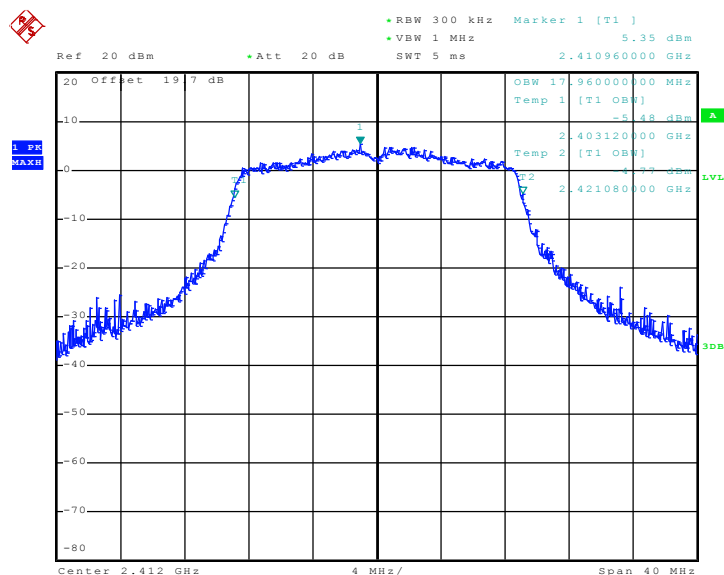
Date: 22.JUL.2011 10:39:12



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

Channel	Frequency (MHz)	802.11n (BW 20MHz) 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	17.96	Pass
06	2437	17.88	Pass
11	2462	17.92	Pass

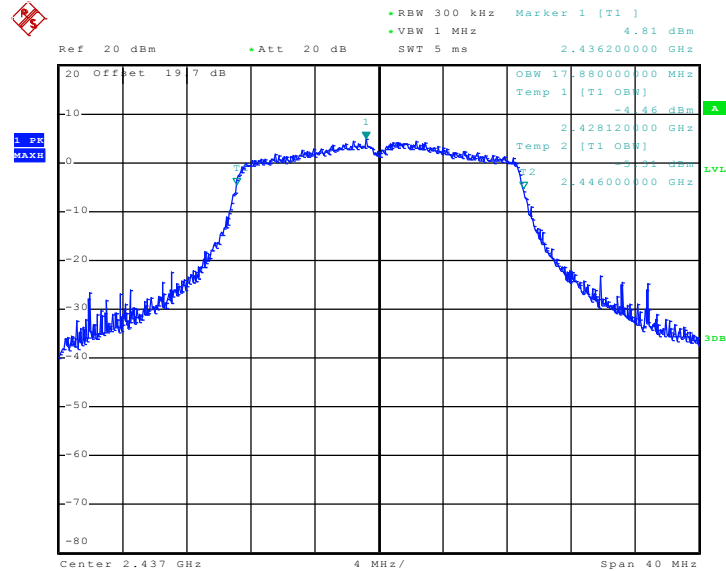
Mode 7 : 99% Occupied Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 22.JUL.2011 11:22:36

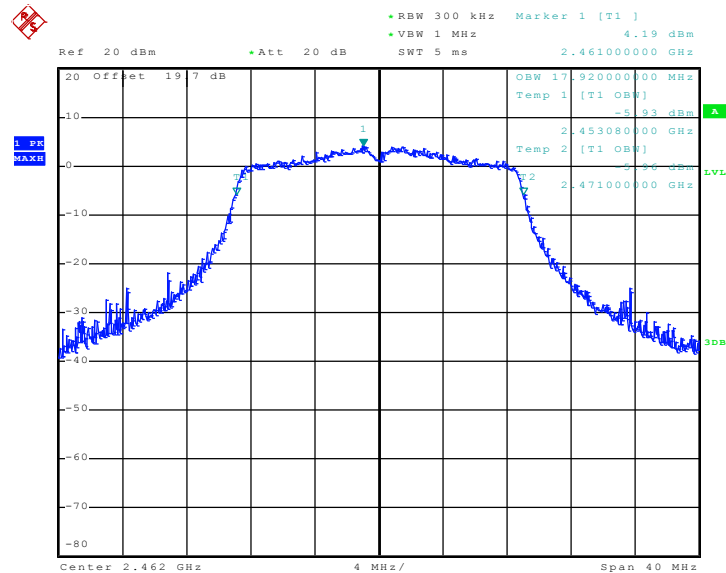


Mode 8 : 99% Occupied Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Date: 22.JUL.2011 11:35:46

Mode 9 : 99% Occupied Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



Date: 22.JUL.2011 11:52:29

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.

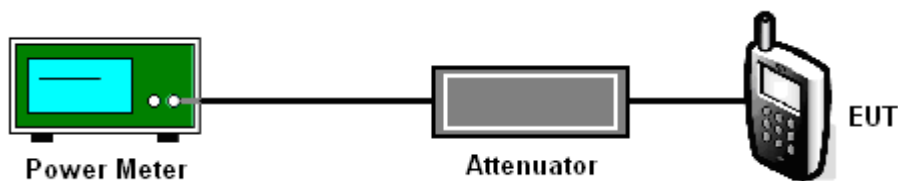
3.2.2 Measuring Instruments

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 power meter by a low loss cable.
3. Measure the power by power meter.

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	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.57	30	Pass
06	2437	17.27	30	Pass
11	2462	17.05	30	Pass

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

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.47	30	Pass
06	2437	22.29	30	Pass
11	2462	21.94	30	Pass

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

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.26	30	Pass
06	2437	22.14	30	Pass
11	2462	21.62	30	Pass

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

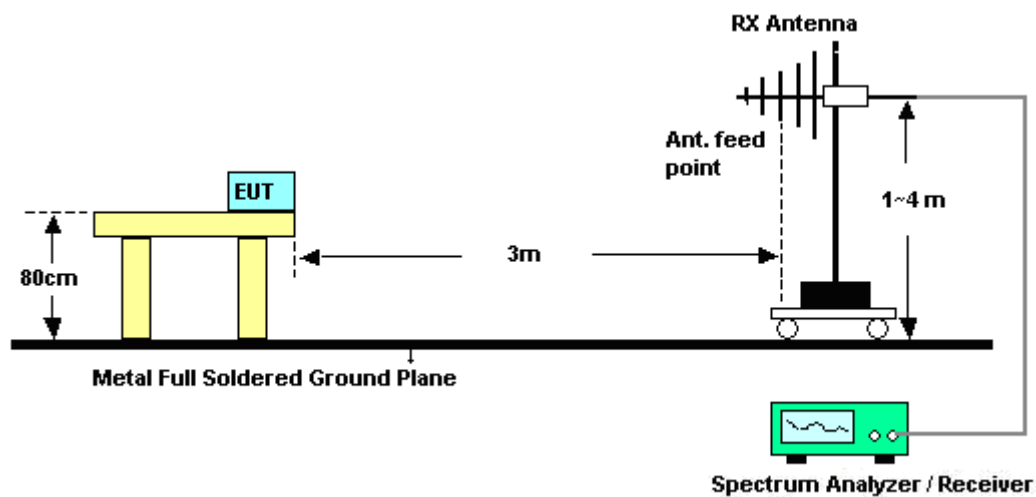
See list of measuring instruments of this test report.

3.3.3 Test Procedures

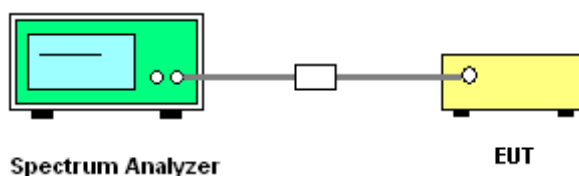
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	21~24℃
Test Band :	802.11b	Relative Humidity :	47~49%
Test Channel :	01	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.66	50.86	-23.14	74	46.5	32.18	6.03	33.85	101	200	Peak
2388.66	38.36	-15.64	54	34	32.18	6.03	33.85	101	200	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	55.58	-18.42	74	51.22	32.18	6.03	33.85	100	67	Peak
2389.99	43.68	-10.32	54	39.32	32.18	6.03	33.85	100	67	Average

Test Mode :	Mode 3	Temperature :	21~24℃
Test Band :	802.11b	Relative Humidity :	47~49%
Test Channel :	11	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2486.13	48.59	-25.41	74	44.03	32.28	6.18	33.9	185	70	Peak
2486.13	36.59	-17.41	54	32.03	32.28	6.18	33.9	185	70	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.61	52.53	-21.47	74	47.97	32.28	6.18	33.9	100	69	Peak
2484.61	40.52	-13.48	54	35.96	32.28	6.18	33.9	100	69	Average



Test Mode :	Mode 4	Temperature :	21~24℃
Test Band :	802.11g	Relative Humidity :	47~49%
Test Channel :	01	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.57	65.37	-8.63	74	61.01	32.18	6.03	33.85	101	201	Peak
2386.57	42.57	-11.43	54	38.21	32.18	6.03	33.85	101	201	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	69.17	-4.83	74	64.81	32.18	6.03	33.85	100	67	Peak
2389.61	48.78	-5.22	54	44.42	32.18	6.03	33.85	100	67	Average

Test Mode :	Mode 6	Temperature :	21~24℃
Test Band :	802.11g	Relative Humidity :	47~49%
Test Channel :	11	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.42	65.19	-8.81	74	60.63	32.28	6.18	33.9	100	100	Peak
2484.42	43.23	-10.77	54	38.67	32.28	6.18	33.9	100	100	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.85	72.92	-1.08	74	68.36	32.28	6.18	33.9	100	340	Peak
2483.85	51.23	-2.77	54	46.67	32.28	6.18	33.9	100	340	Average



Test Mode :	Mode 7	Temperature :	21~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	47~49%
Test Channel :	01	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.66	64.03	-9.97	74	59.67	32.18	6.03	33.85	101	199	Peak
2388.66	43.15	-10.85	54	38.79	32.18	6.03	33.85	101	199	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	70.23	-3.77	74	65.87	32.18	6.03	33.85	100	68	Peak
2389.99	49.9	-4.1	54	45.54	32.18	6.03	33.85	100	68	Average

Test Mode :	Mode 9	Temperature :	21~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	47~49%
Test Channel :	11	Test Engineer :	David Yang

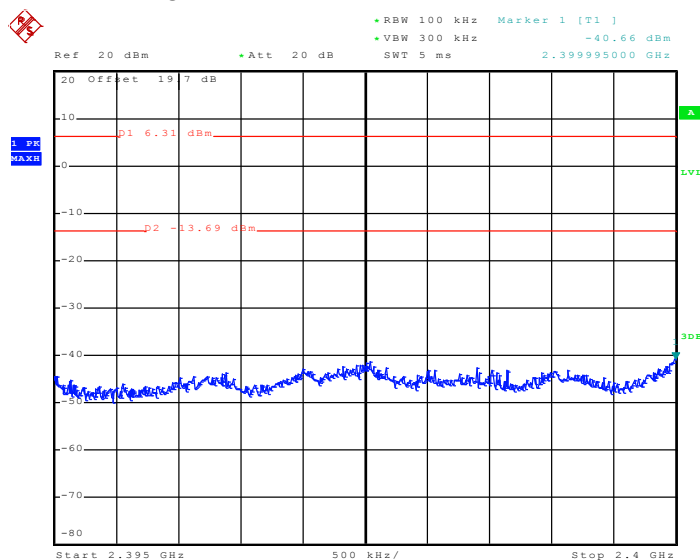
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.85	65.12	-8.88	74	60.56	32.28	6.18	33.9	104	26	Peak
2483.85	43.38	-10.62	54	38.82	32.28	6.18	33.9	104	26	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.66	70.19	-3.81	74	65.63	32.28	6.18	33.9	100	69	Peak
2483.66	47.54	-6.46	54	42.98	32.28	6.18	33.9	100	69	Average

3.3.6 Test Plots of Conducted Band Edges

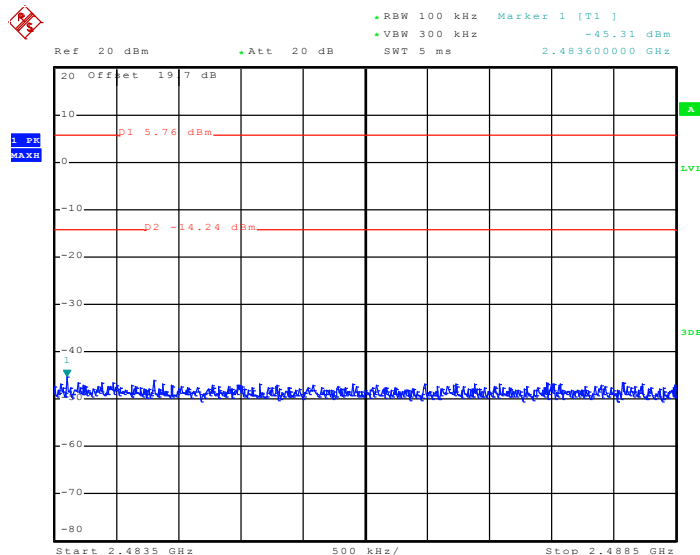
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston

Low Band Edge Plot on 802.11b Channel 01



Date: 22.JUL.2011 09:57:38

High Band Edge Plot on 802.11b Channel 11

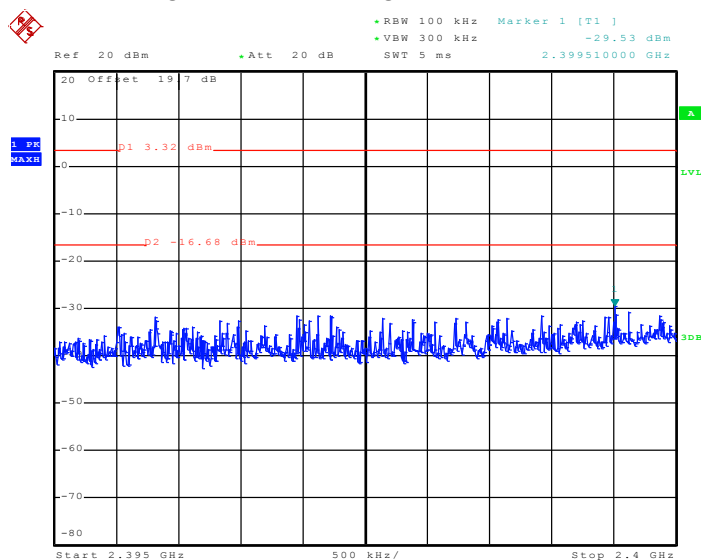


Date: 22.JUL.2011 10:24:54



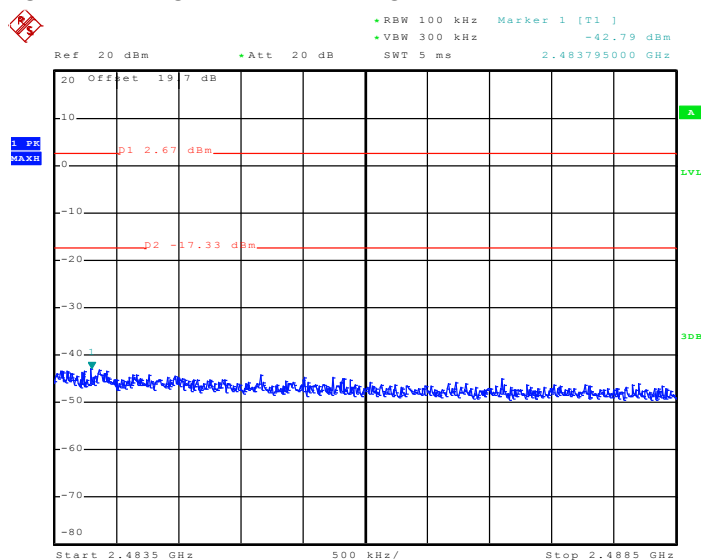
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston

Low Band Edge Plot on 802.11g Channel 01



Date: 22.JUL.2011 10:52:54

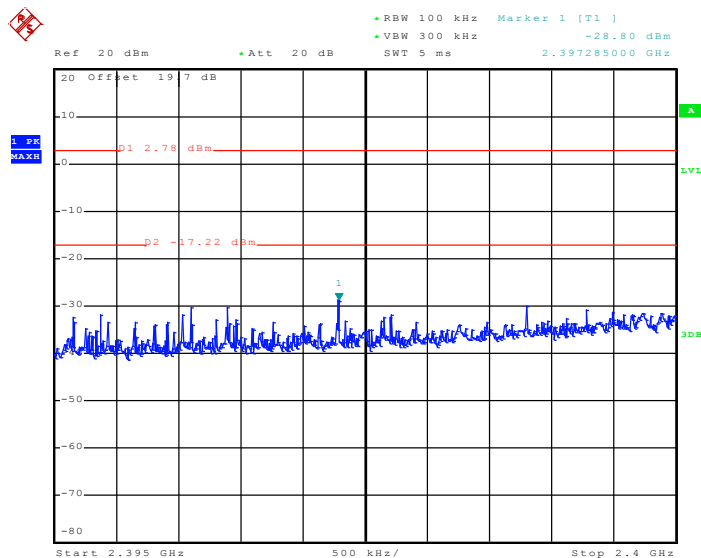
High Band Edge Plot on 802.11g Channel 11



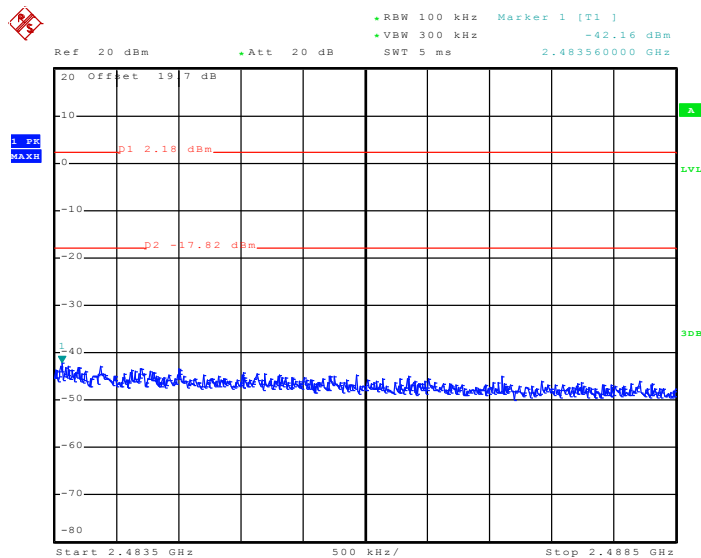
Date: 22.JUL.2011 10:38:46



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

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

Date: 22.JUL.2011 11:22:11

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

Date: 22.JUL.2011 11:52:03

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.

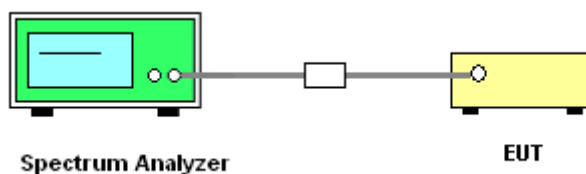
3.4.2 Measuring Instruments

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.

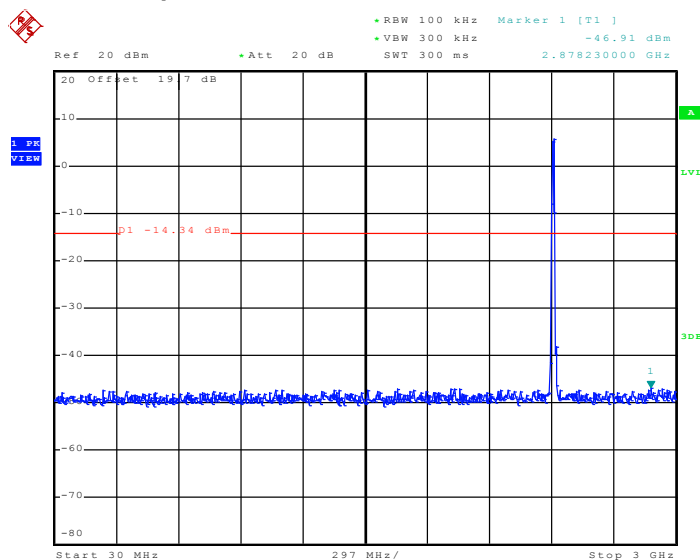
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

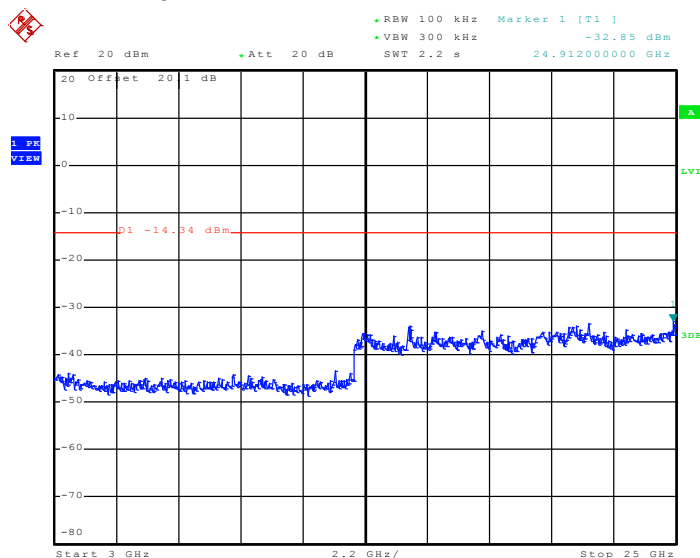
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 22.JUL.2011 10:07:03

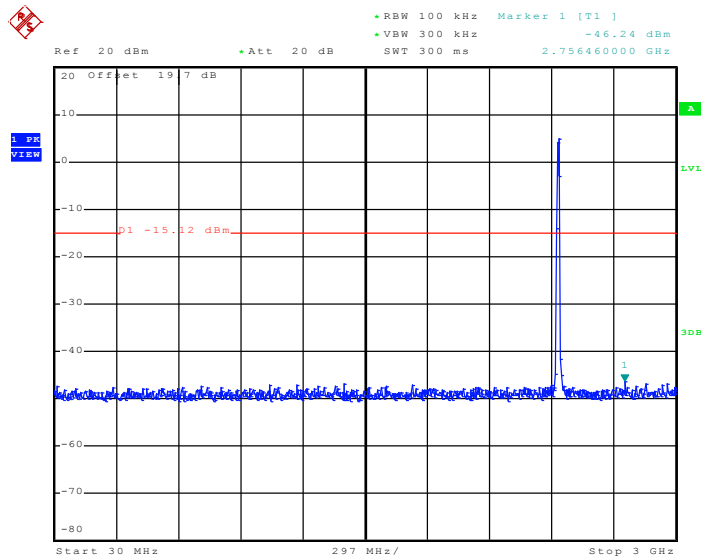
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



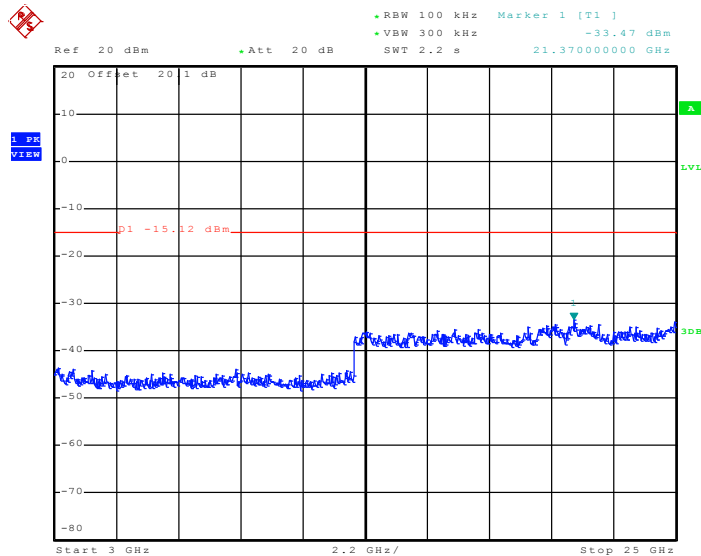
Date: 22.JUL.2011 10:07:20



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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

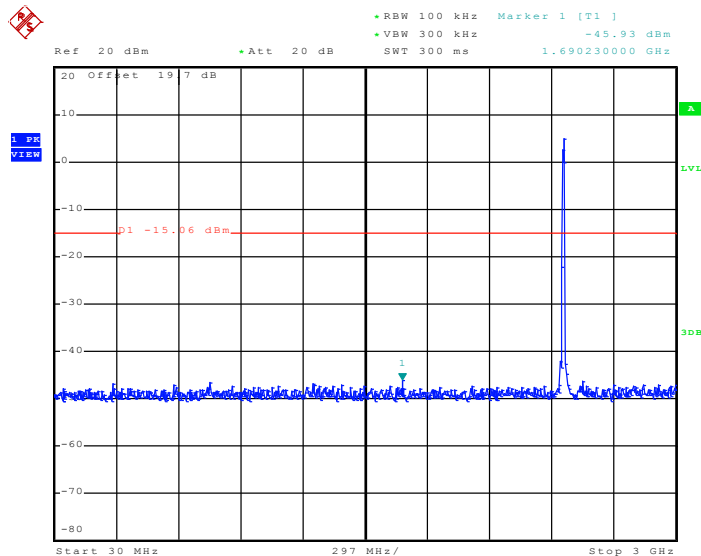
Date: 22.JUL.2011 10:20:37

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

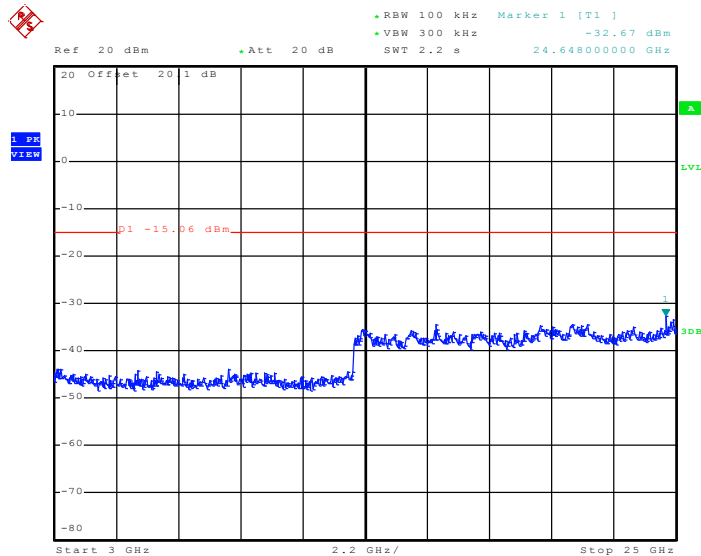
Date: 22.JUL.2011 10:20:54



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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

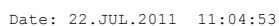
Date: 22.JUL.2011 10:34:29

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 22.JUL.2011 10:34:46

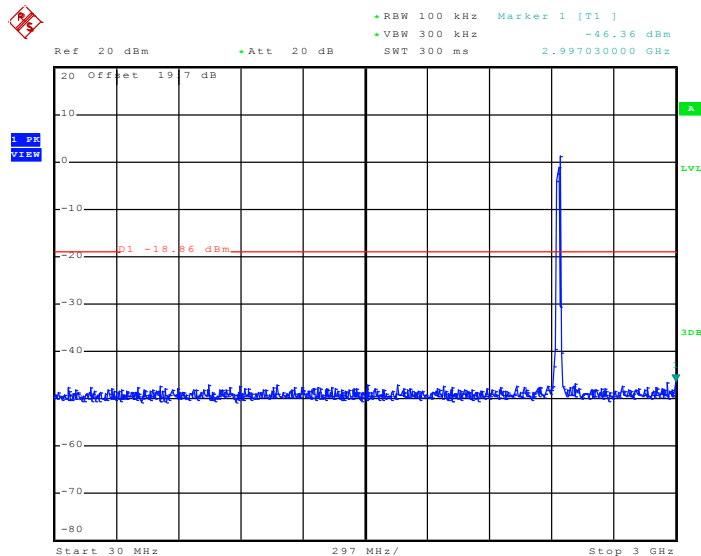


Test Mode :	Mode 4	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston

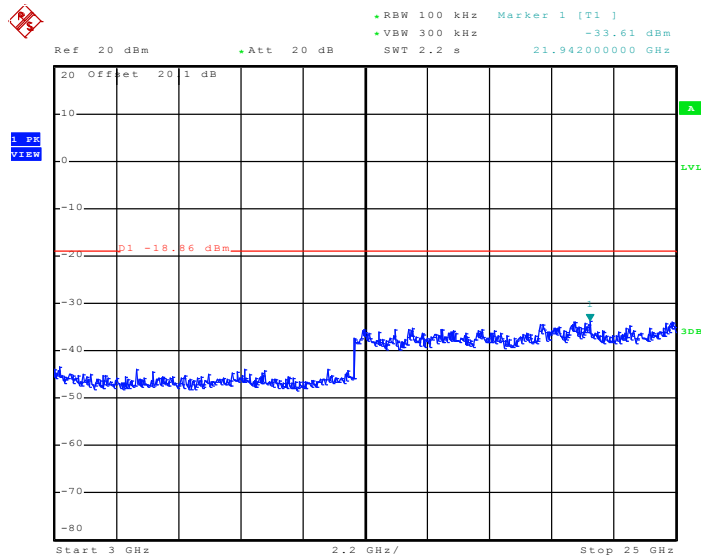




Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Pinkston

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

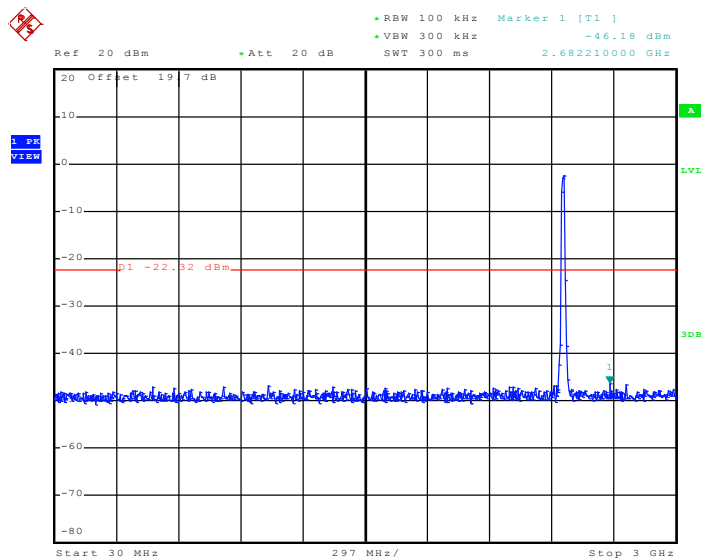
Date: 22.JUL.2011 11:17:23

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

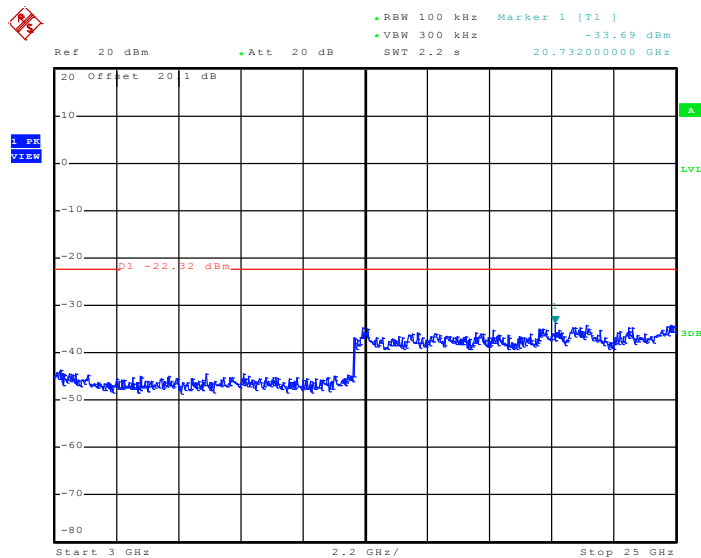
Date: 22.JUL.2011 11:17:40



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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 22.JUL.2011 10:48:15

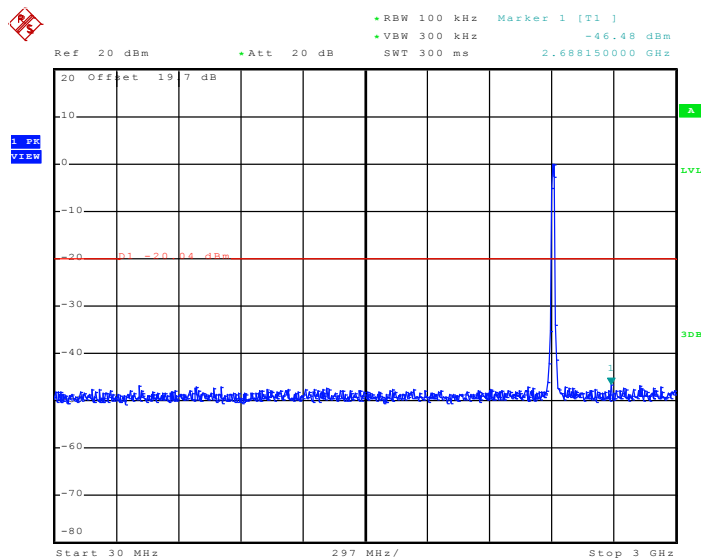
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 22.JUL.2011 10:48:32



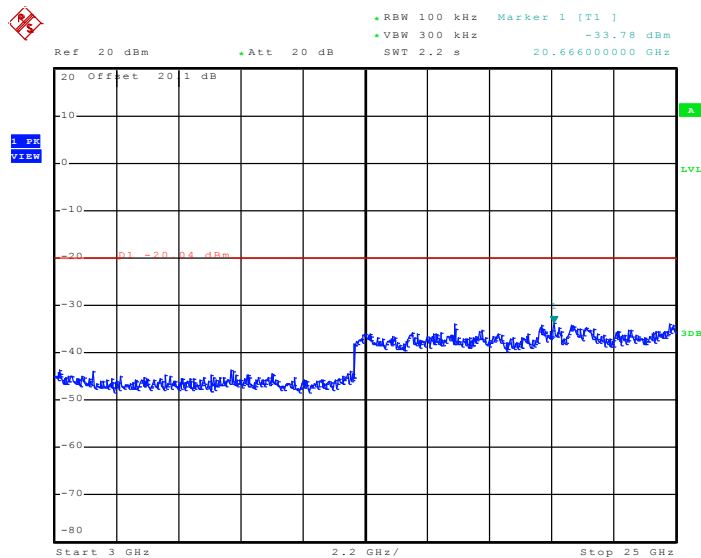
Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 22.JUL.2011 11:32:27

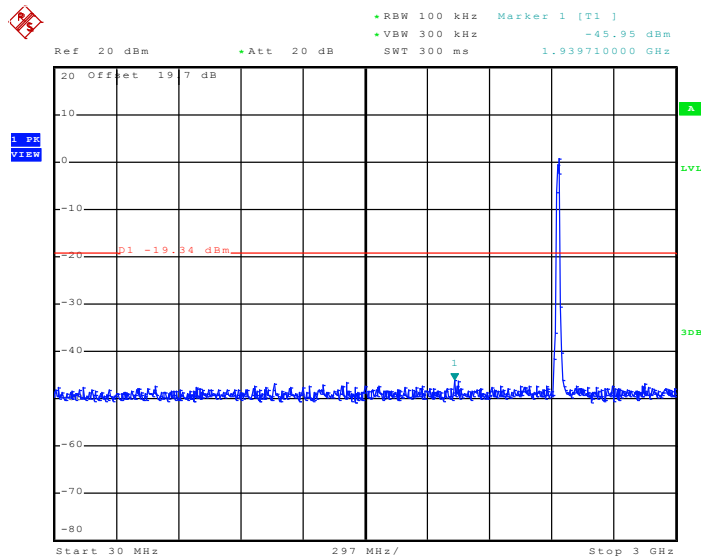
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



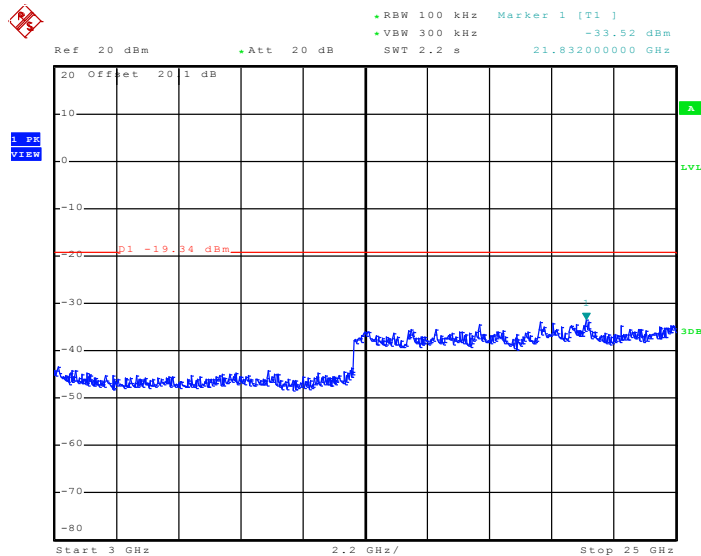
Date: 22.JUL.2011 11:32:44



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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

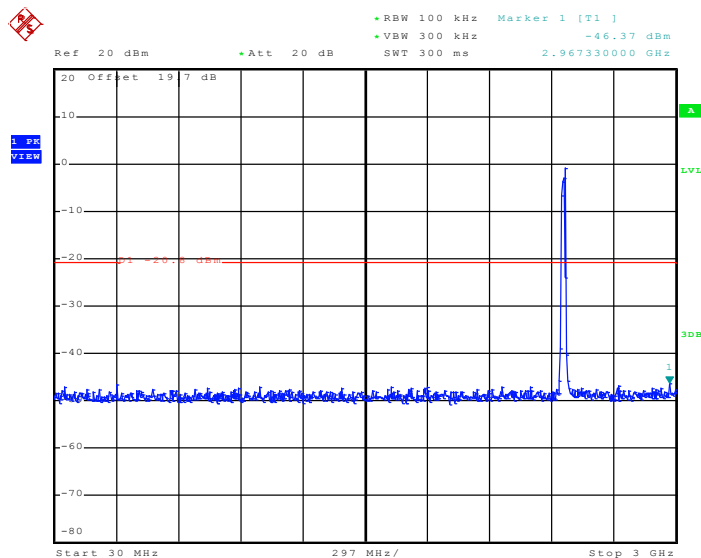
Date: 22.JUL.2011 11:48:55

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

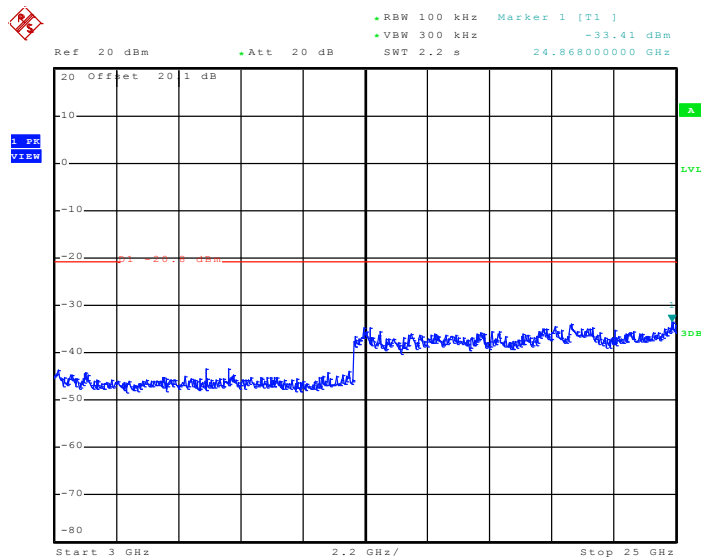
Date: 22.JUL.2011 11:49:12



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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 22.JUL.2011 12:02:44

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 22.JUL.2011 12:03:02

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.

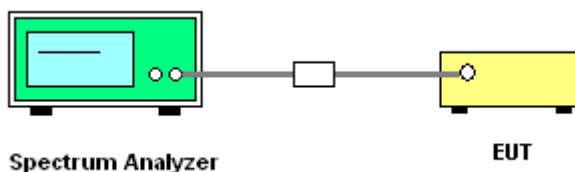
3.5.2 Measuring Instruments

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.

3.5.4 Test Setup

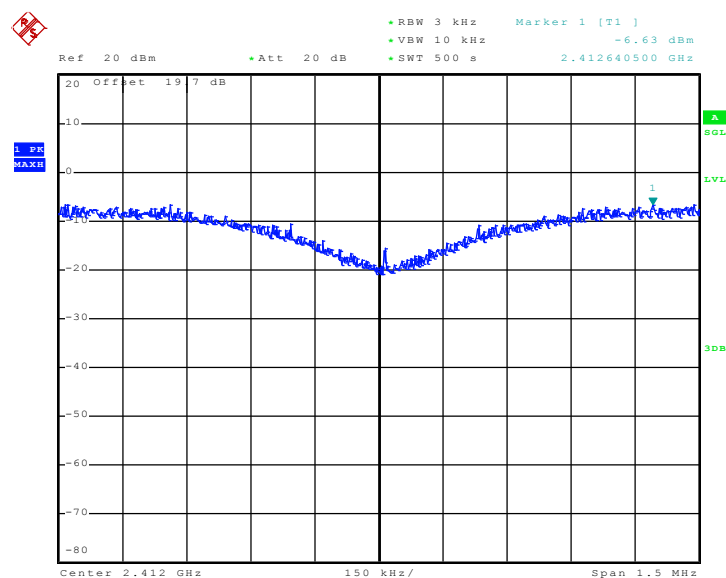


3.5.5 Test Result of Power Spectral Density

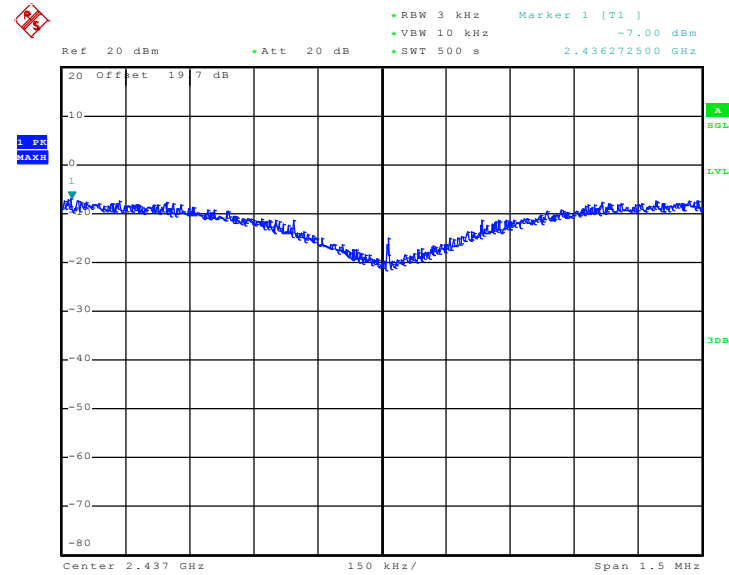
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-6.63	8	Pass
06	2437	-7.00	8	Pass
11	2462	-7.25	8	Pass

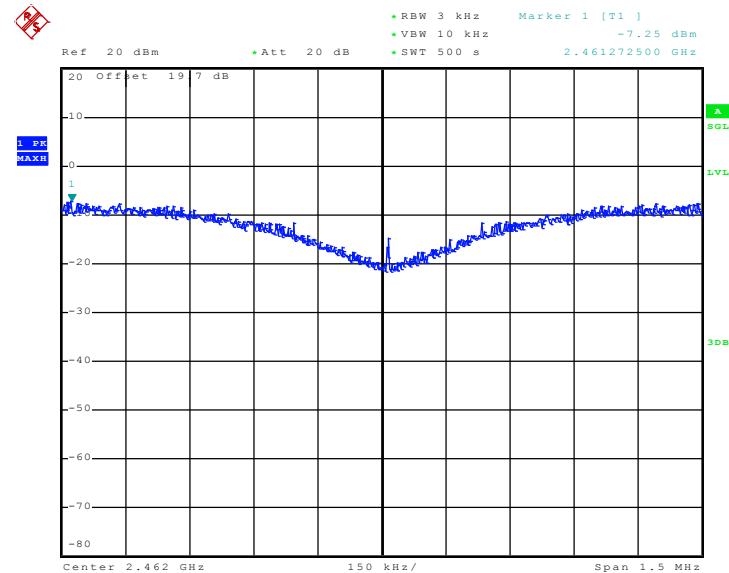
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 22.JUL.2011 10:06:42

Mode 2 : PSD Plot on 802.11b Channel 06


Date: 22.JUL.2011 10:18:39

Mode 3 : PSD Plot on 802.11b Channel 11


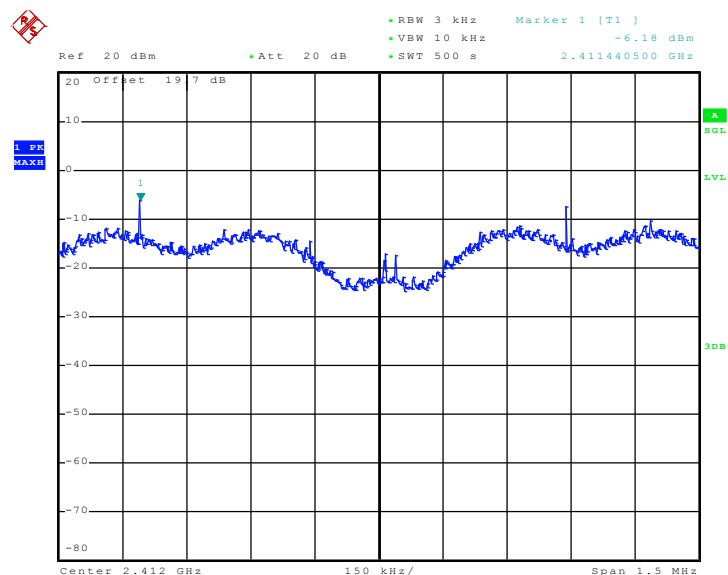
Date: 22.JUL.2011 10:34:08



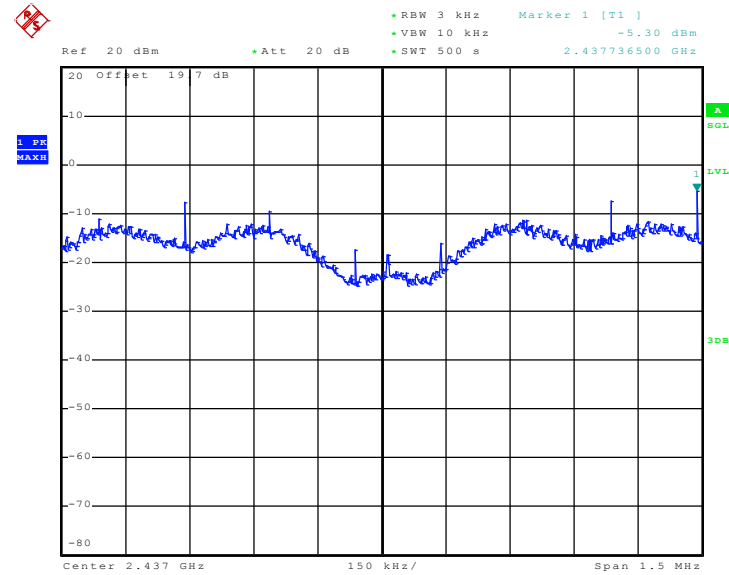
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-6.18	8	Pass
06	2437	-5.30	8	Pass
11	2462	-8.27	8	Pass

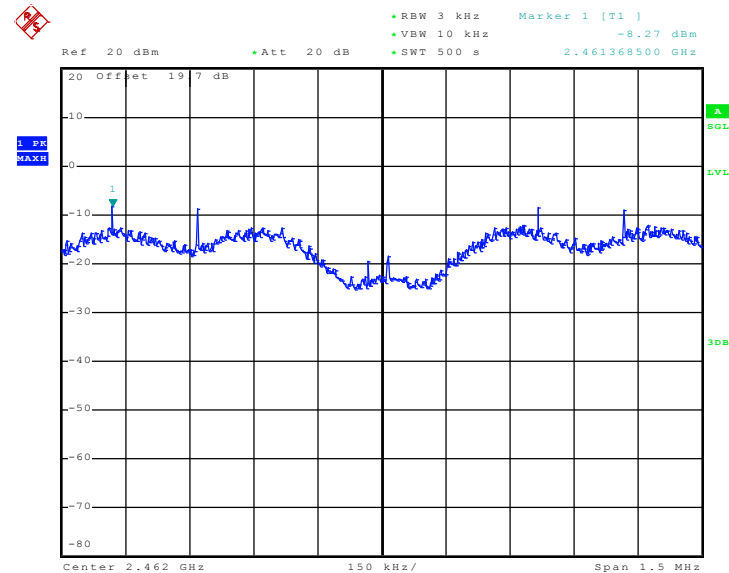
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 22.JUL.2011 11:03:24

Mode 5 : PSD Plot on 802.11g Channel 06


Date: 22.JUL.2011 11:17:02

Mode 6 : PSD Plot on 802.11g Channel 11


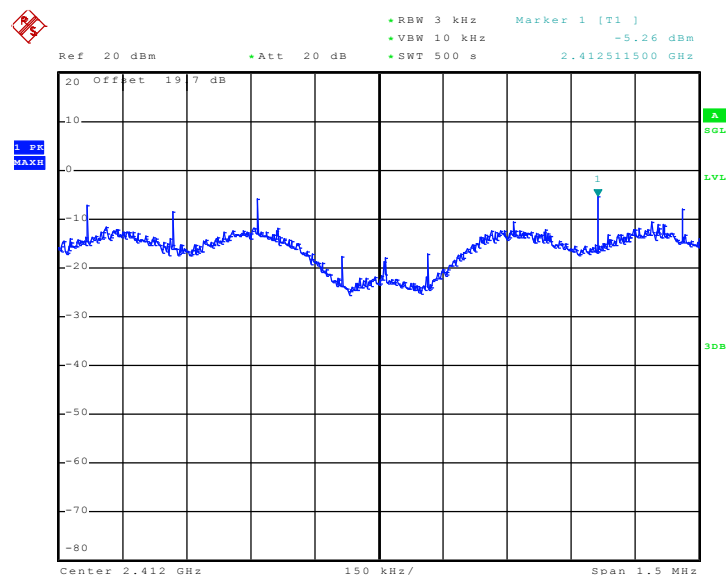
Date: 22.JUL.2011 10:47:54



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

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-5.26	8	Pass
06	2437	-7.64	8	Pass
11	2462	-5.72	8	Pass

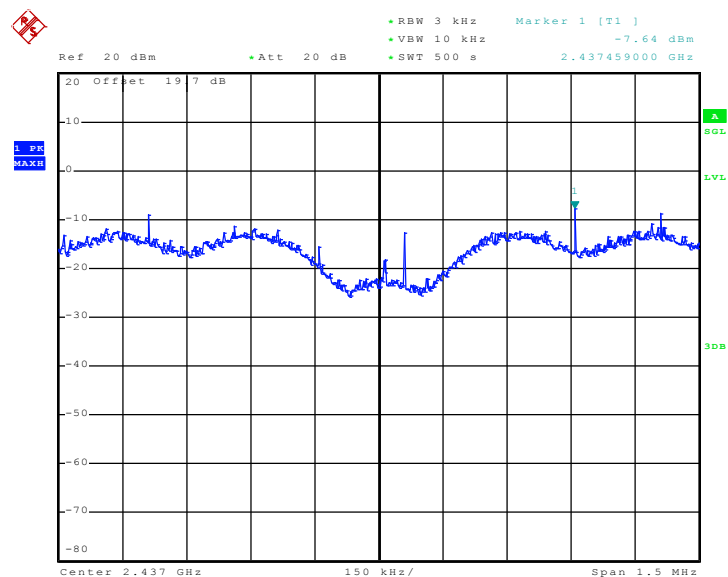
Mode 7 : PSD Plot on 802.11n (BW 20MHz) Channel 01



Date: 22.JUL.2011 11:31:16

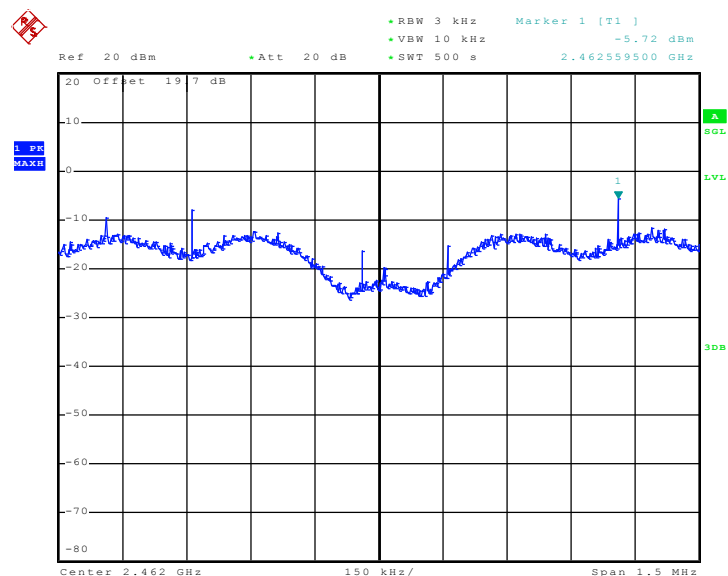


Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Date: 22.JUL.2011 11:48:34

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



Date: 22.JUL.2011 12:01:02

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.

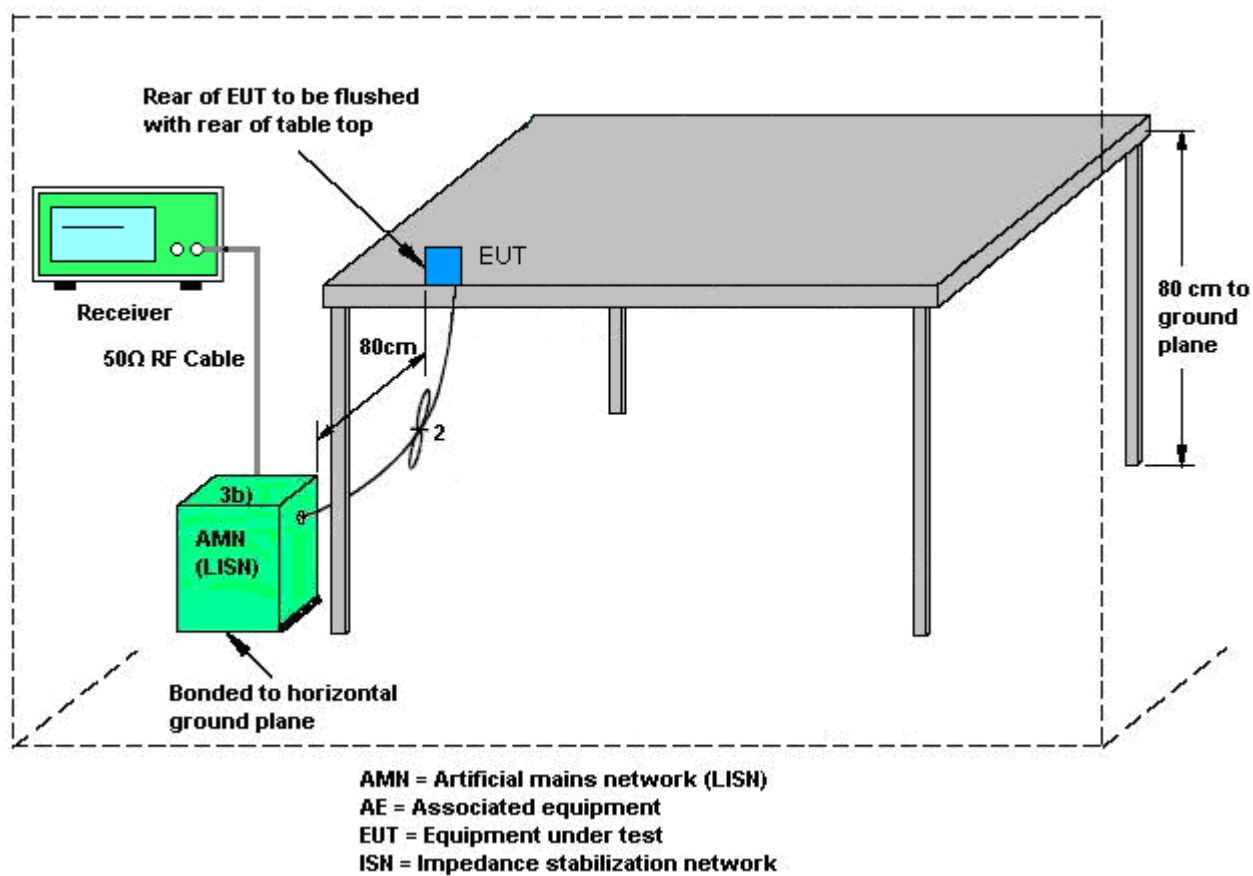
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

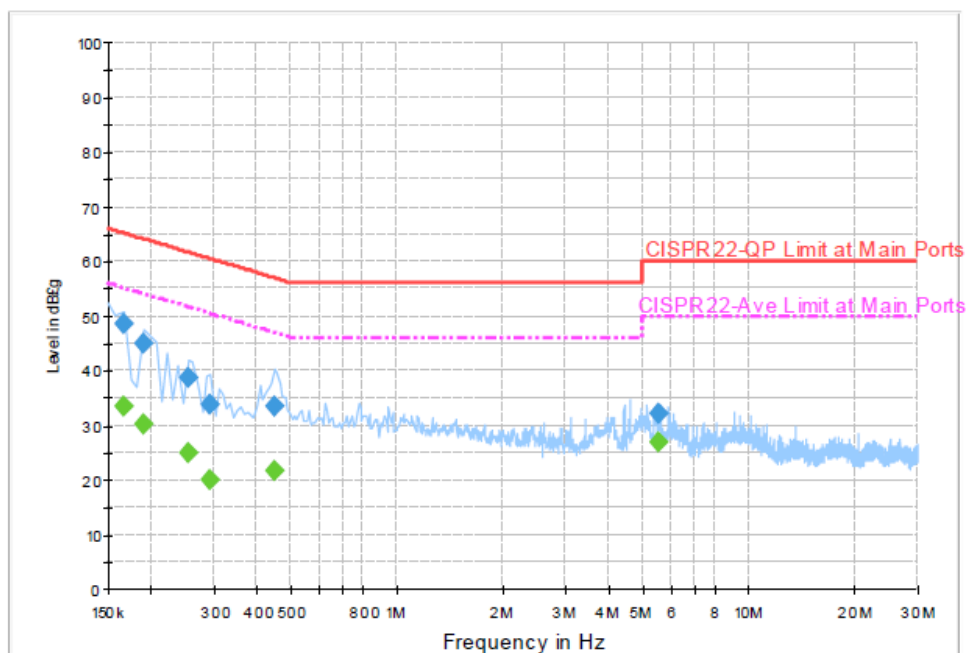
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 1	Temperature :	21~23°C
Test Engineer :	Novic Chiang	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Battery 1 + Print + USB Cable (Charging from Adapter 1)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



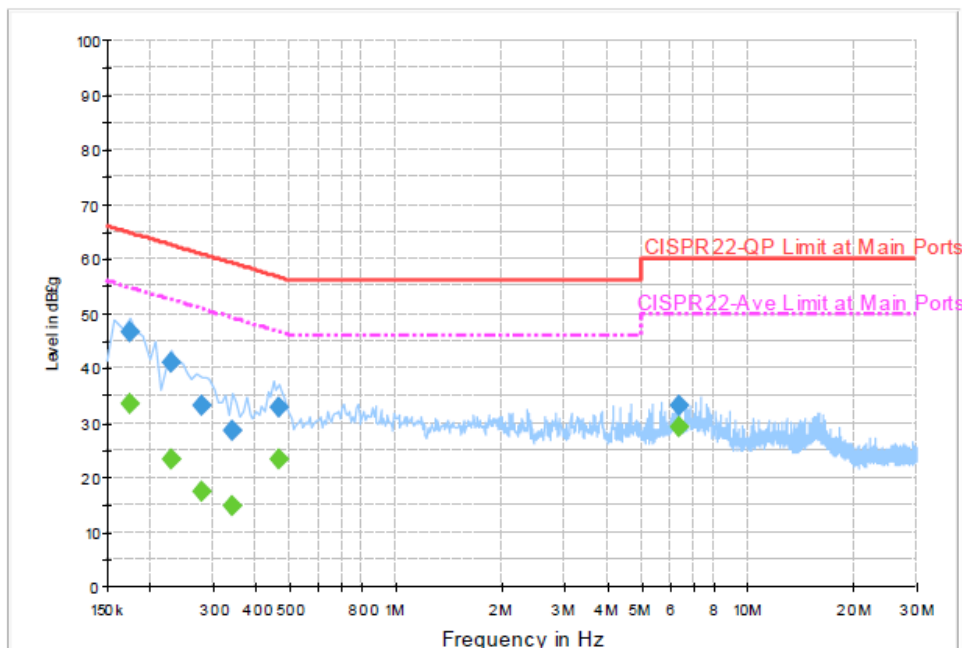
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	48.5	Off	L1	19.4	16.7	65.2
0.190000	44.8	Off	L1	19.4	19.2	64.0
0.254000	38.8	Off	L1	19.4	22.8	61.6
0.294000	33.9	Off	L1	19.4	26.5	60.4
0.446000	33.6	Off	L1	19.4	23.3	56.9
5.518000	32.0	Off	L1	19.7	28.0	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	33.6	Off	L1	19.4	21.6	55.2
0.190000	30.2	Off	L1	19.4	23.8	54.0
0.254000	25.0	Off	L1	19.4	26.6	51.6
0.294000	19.9	Off	L1	19.4	30.5	50.4
0.446000	21.7	Off	L1	19.4	25.2	46.9
5.518000	27.0	Off	L1	19.7	23	50.0

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Novic Chiang	Relative Humidity :	41~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Battery 1 + Print + USB Cable (Charging from Adapter 1)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	46.7	Off	N	19.4	18.1	64.8
0.230000	40.9	Off	N	19.5	21.5	62.4
0.278000	33.0	Off	N	19.4	27.9	60.9
0.342000	28.4	Off	N	19.4	30.8	59.2
0.462000	32.8	Off	N	19.4	23.9	56.7
6.358000	33.0	Off	N	19.8	27.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	33.3	Off	N	19.4	21.5	54.8
0.230000	23.4	Off	N	19.5	29.0	52.4
0.278000	17.3	Off	N	19.4	33.6	50.9
0.342000	14.8	Off	N	19.4	34.4	49.2
0.462000	23.2	Off	N	19.4	23.5	46.7
6.358000	29.2	Off	N	19.8	20.8	50.0

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

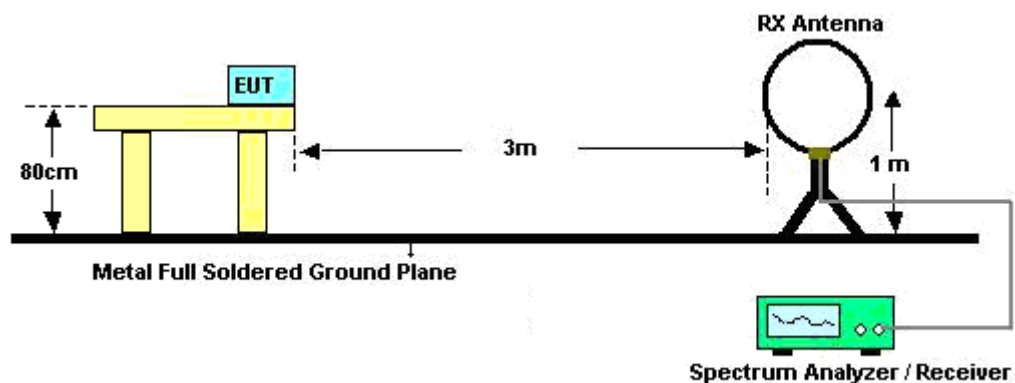
See list of measuring instruments of this test report.

3.7.3 Test Procedures

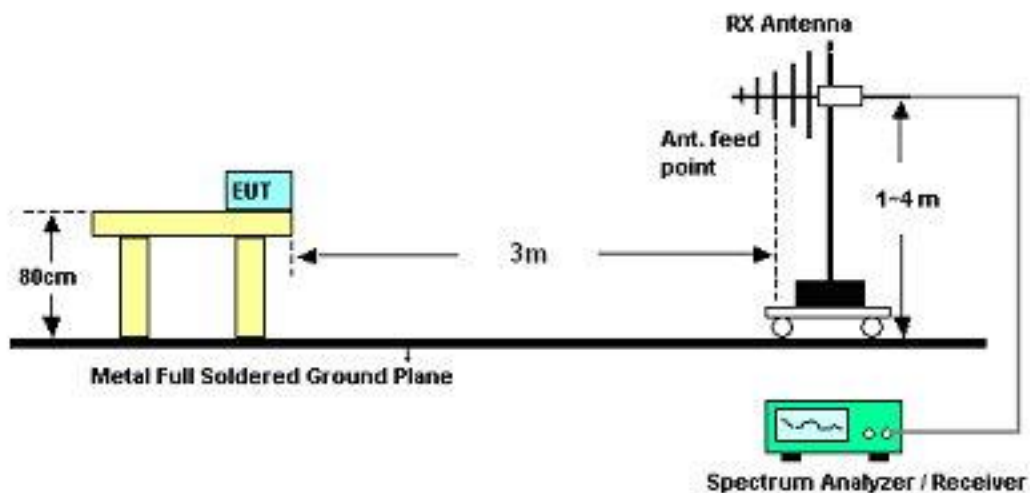
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

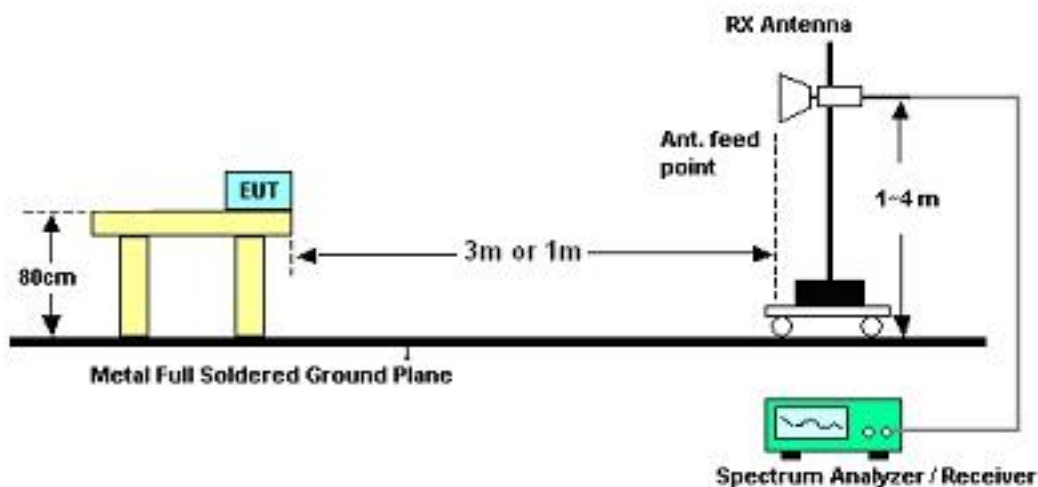
For radiated emissions below 30MHz



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 Yang	Temperature :	21~24℃	
		Relative Humidity :	47~49%	

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 :	21~24℃
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	29.97	-10.03	40	45.08	15.8	0.56	31.47	144	231	Peak
45.93	22.9	-17.1	40	43.47	10.27	0.66	31.5	-	-	Peak
224.94	18.8	-27.2	46	37.91	10.89	1.45	31.45	-	-	Peak
323.8	29.84	-16.16	46	45.12	14.21	1.83	31.32	-	-	Peak
424.6	26.94	-19.06	46	38.87	16.98	2.23	31.14	-	-	Peak
690.6	24.54	-21.46	46	31.67	20.78	2.92	30.83	-	-	Peak
2388.66	50.86	-23.14	74	46.5	32.18	6.03	33.85	101	200	Peak
2388.66	38.36	-15.64	54	34	32.18	6.03	33.85	101	200	Average
2412	106.38	-	-	101.98	32.2	6.07	33.87	101	200	Peak
2412	102.01	-	-	97.61	32.2	6.07	33.87	101	200	Average
2486	36.26	-17.74	54	31.7	32.28	6.18	33.9	101	200	Average
2486	49.48	-24.52	74	44.92	32.28	6.18	33.9	101	200	Peak



Test Mode :	Mode 1	Temperature :	21~24℃
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.05	23.46	-16.54	40	38.79	15.57	0.57	31.47	-	-	Peak
56.46	23.97	-16.03	40	48.07	6.71	0.74	31.55	-	-	Peak
247.62	22.78	-23.22	46	40.2	12.46	1.53	31.41	-	-	Peak
475	30.05	-15.95	46	40.93	17.81	2.37	31.06	-	-	Peak
663.3	33.12	-12.88	46	40.63	20.48	2.87	30.86	121	318	Peak
746.6	32.82	-13.18	46	38.85	21.63	3.05	30.71	-	-	Peak
2389.99	55.58	-18.42	74	51.22	32.18	6.03	33.85	100	67	Peak
2389.99	43.68	-10.32	54	39.32	32.18	6.03	33.85	100	67	Average
2412	107.14	-	-	102.74	32.2	6.07	33.87	100	67	Average
2412	110.3	-	-	105.9	32.2	6.07	33.87	100	67	Peak
2492	39.65	-14.35	54	35.07	32.3	6.18	33.9	100	67	Average
2492	50.94	-23.06	74	46.36	32.3	6.18	33.9	100	67	Peak
4824	45.51	-28.49	74	61.43	34.07	9.12	59.11	100	0	Peak

Test Mode :	Mode 2	Temperature :	21~24℃
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	19.17	-20.83	40	34.28	15.8	0.56	31.47	-	-	Peak
224.94	18.69	-27.31	46	37.8	10.89	1.45	31.45	-	-	Peak
274.89	18.95	-27.05	46	35.61	13.06	1.64	31.36	-	-	Peak
323.8	29.56	-16.44	46	44.84	14.21	1.83	31.32	-	-	Peak
374.2	27.33	-18.67	46	40.71	15.78	2.09	31.25	-	-	Peak
799.8	30.75	-15.25	46	35.82	22.47	3.14	30.68	167	142	Peak
2382	46.73	-27.27	74	42.39	32.16	6.03	33.85	160	29	Peak
2382	34.64	-19.36	54	30.3	32.16	6.03	33.85	160	29	Average
2437	101.23	-	-	96.76	32.24	6.11	33.88	160	29	Average
2437	105.32	-	-	100.87	32.22	6.11	33.88	160	29	Peak
2486	47.09	-26.91	74	42.53	32.28	6.18	33.9	160	29	Peak
2486	34.77	-19.23	54	30.21	32.28	6.18	33.9	160	29	Average



Test Mode :	Mode 2	Temperature :	21~24℃
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.05	23.13	-16.87	40	38.46	15.57	0.57	31.47	-	-	Peak
91.02	16.96	-26.54	43.5	38.74	8.79	0.95	31.52	-	-	Peak
249.78	25.08	-20.92	46	42.29	12.67	1.53	31.41	-	-	Peak
525.4	30.92	-15.08	46	40.82	18.62	2.5	31.02	-	-	Peak
663.3	33.14	-12.86	46	40.65	20.48	2.87	30.86	113	279	Peak
746.6	32.52	-13.48	46	38.55	21.63	3.05	30.71	-	-	Peak
2374	49.07	-24.93	74	44.76	32.16	5.99	33.84	100	69	Peak
2374	37.19	-16.81	54	32.88	32.16	5.99	33.84	100	69	Average
2437	107.97	-	-	103.5	32.24	6.11	33.88	100	69	Peak
2437	103.76	-	-	99.29	32.24	6.11	33.88	100	69	Average
2484	49.08	-24.92	74	44.52	32.28	6.18	33.9	100	69	Peak
2484	36.26	-17.74	54	31.7	32.28	6.18	33.9	100	69	Average
4874	46.07	-27.93	74	61.9	34.08	9.13	59.04	100	0	Peak



Test Mode :	Mode 3	Temperature :	21~24℃
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	19.53	-20.47	40	34.4	16.04	0.55	31.46	-	-	Peak
127.74	14.47	-29.03	43.5	33.33	11.57	1.14	31.57	-	-	Peak
297.3	24.05	-21.95	46	40.2	13.43	1.75	31.33	-	-	Peak
323.8	29.43	-16.57	46	44.71	14.21	1.83	31.32	-	-	Peak
374.2	27.73	-18.27	46	41.11	15.78	2.09	31.25	-	-	Peak
875.4	31.7	-14.3	46	35.75	23.35	3.31	30.71	151	322	Peak
2390	46.38	-27.62	74	42.02	32.18	6.03	33.85	185	70	Peak
2390	34.71	-19.29	54	30.35	32.18	6.03	33.85	185	70	Average
2462	100.04	-	-	95.53	32.26	6.14	33.89	185	70	Average
2462	104.22	-	-	99.71	32.26	6.14	33.89	185	70	Peak
2486.13	48.59	-25.41	74	44.03	32.28	6.18	33.9	185	70	Peak
2486.13	36.59	-17.41	54	32.03	32.28	6.18	33.9	185	70	Average

Test Mode :	Mode 3	Temperature :	21~24℃
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
33.78	23.31	-16.69	40	38.64	15.57	0.57	31.47	-	-	Peak
175.26	18.87	-24.63	43.5	39.76	9.4	1.24	31.53	-	-	Peak
268.14	32.13	-13.87	46	48.92	12.96	1.63	31.38	-	-	Peak
374.2	26.13	-19.87	46	39.51	15.78	2.09	31.25	-	-	Peak
525.4	30.91	-15.09	46	40.81	18.62	2.5	31.02	-	-	Peak
746.6	32.89	-13.11	46	38.92	21.63	3.05	30.71	119	163	Peak
2382	37.54	-16.46	54	33.2	32.16	6.03	33.85	100	69	Average
2382	48.96	-25.04	74	44.62	32.16	6.03	33.85	100	69	Peak
2462	107.34	-	-	102.83	32.26	6.14	33.89	100	69	Peak
2462	103.2	-	-	98.69	32.26	6.14	33.89	100	69	Average
2484.61	52.53	-21.47	74	47.97	32.28	6.18	33.9	100	69	Peak
2484.61	40.52	-13.48	54	35.96	32.28	6.18	33.9	100	69	Average
4924	45.67	-28.33	74	61.39	34.09	9.15	58.96	100	0	Peak

Test Mode :	Mode 4	Temperature :	21~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.7	18.94	-21.06	40	34.05	15.8	0.56	31.47	-	-	Peak
67.26	16.84	-23.16	40	41.47	6.1	0.82	31.55	-	-	Peak
224.94	19.63	-26.37	46	38.74	10.89	1.45	31.45	-	-	Peak
323.8	29.56	-16.44	46	44.84	14.21	1.83	31.32	-	-	Peak
374.2	27.37	-18.63	46	40.75	15.78	2.09	31.25	-	-	Peak
799.8	30.7	-15.3	46	35.77	22.47	3.14	30.68	161	232	Peak
2386.57	65.37	-8.63	74	61.01	32.18	6.03	33.85	101	201	Peak
2386.57	42.57	-11.43	54	38.21	32.18	6.03	33.85	101	201	Average
2412	105.1	-	-	100.7	32.2	6.07	33.87	101	201	Peak
2412	92.7	-	-	88.3	32.2	6.07	33.87	101	201	Average
2486	36.48	-17.52	54	31.92	32.28	6.18	33.9	101	201	Average
2486	49.04	-24.96	74	44.48	32.28	6.18	33.9	101	201	Peak



Test Mode :	Mode 4	Temperature :	21~24℃
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	23.48	-16.52	40	38.35	16.04	0.55	31.46	-	-	Peak
127.74	17.17	-26.33	43.5	36.03	11.57	1.14	31.57	-	-	Peak
175.26	18.64	-24.86	43.5	39.53	9.4	1.24	31.53	-	-	Peak
525.4	30.9	-15.1	46	40.8	18.62	2.5	31.02	-	-	Peak
663.3	33.12	-12.88	46	40.63	20.48	2.87	30.86	121	70	Peak
746.6	32.78	-13.22	46	38.81	21.63	3.05	30.71	-	-	Peak
2389.61	69.17	-4.83	74	64.81	32.18	6.03	33.85	100	67	Peak
2389.61	48.78	-5.22	54	44.42	32.18	6.03	33.85	100	67	Average
2412	109.96	-	-	105.56	32.2	6.07	33.87	100	67	Peak
2412	96.59	-	-	92.19	32.2	6.07	33.87	100	67	Average
2500	40.46	-13.54	54	35.88	32.3	6.18	33.9	100	67	Average
2500	52.16	-21.84	74	47.58	32.3	6.18	33.9	100	67	Peak



Test Mode :	Mode 5	Temperature :	21~24℃
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	18.93	-21.07	40	33.8	16.04	0.55	31.46	-	-	Peak
127.74	14.53	-28.97	43.5	33.39	11.57	1.14	31.57	-	-	Peak
224.94	20.01	-25.99	46	39.12	10.89	1.45	31.45	-	-	Peak
323.8	30.05	-15.95	46	45.33	14.21	1.83	31.32	-	-	Peak
475	25.47	-20.53	46	36.35	17.81	2.37	31.06	-	-	Peak
925.8	33.65	-12.35	46	36.92	23.96	3.4	30.63	131	100	Peak
2382	47.34	-26.66	74	43	32.16	6.03	33.85	100	201	Peak
2382	35.33	-18.67	54	30.99	32.16	6.03	33.85	100	201	Average
2437	104.47	-	-	100	32.24	6.11	33.88	100	201	Peak
2437	91.16	-	-	86.69	32.24	6.11	33.88	100	201	Average
2484	47.82	-26.18	74	43.26	32.28	6.18	33.9	100	201	Peak
2484	35.43	-18.57	54	30.87	32.28	6.18	33.9	100	201	Average



Test Mode :	Mode 5	Temperature :	21~24℃
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.05	23.36	-16.64	40	38.69	15.57	0.57	31.47	-	-	Peak
127.74	17.97	-25.53	43.5	36.83	11.57	1.14	31.57	-	-	Peak
250.86	22.98	-23.02	46	40.16	12.69	1.54	31.41	-	-	Peak
525.4	31.16	-14.84	46	41.06	18.62	2.5	31.02	-	-	Peak
663.3	33.19	-12.81	46	40.7	20.48	2.87	30.86	132	168	Peak
746.6	32.71	-13.29	46	38.74	21.63	3.05	30.71	-	-	Peak
2390	50.55	-23.45	74	46.19	32.18	6.03	33.85	100	67	Peak
2390	38.01	-15.99	54	33.65	32.18	6.03	33.85	100	67	Average
2437	108.5	-	-	104.05	32.22	6.11	33.88	100	67	Peak
2437	94.72	-	-	90.25	32.24	6.11	33.88	100	67	Average
2486	50.43	-23.57	74	45.87	32.28	6.18	33.9	100	67	Peak
2486	38.08	-15.92	54	33.52	32.28	6.18	33.9	100	67	Average



Test Mode :	Mode 6	Temperature :	21~24℃
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	19.56	-20.44	40	34.43	16.04	0.55	31.46	133	147	Peak
91.02	13.78	-29.72	43.5	35.56	8.79	0.95	31.52	-	-	Peak
229.26	14.75	-31.25	46	33.56	11.16	1.47	31.44	-	-	Peak
405	18.42	-27.58	46	30.77	16.66	2.16	31.17	-	-	Peak
551.3	21.07	-24.93	46	30.49	19.01	2.55	30.98	-	-	Peak
783	24.63	-21.37	46	30.02	22.19	3.11	30.69	-	-	Peak
2382	46.05	-27.95	74	41.71	32.16	6.03	33.85	100	100	Peak
2382	34.64	-19.36	54	30.3	32.16	6.03	33.85	100	100	Average
2462	92.06	-	-	87.55	32.26	6.14	33.89	100	100	Average
2462	105.27	-	-	100.76	32.26	6.14	33.89	100	100	Peak
2484.42	65.19	-8.81	74	60.63	32.28	6.18	33.9	100	100	Peak
2484.42	43.23	-10.77	54	38.67	32.28	6.18	33.9	100	100	Average



Test Mode :	Mode 6	Temperature :	21~24℃
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	19.09	-20.91	40	33.96	16.04	0.55	31.46	-	-	Peak
71.58	16.8	-23.2	40	41.05	6.46	0.84	31.55	-	-	Peak
256.53	22.08	-23.92	46	39.15	12.78	1.57	31.42	-	-	Peak
346.2	17.87	-28.13	46	32.32	14.9	1.94	31.29	-	-	Peak
562.5	20.44	-25.56	46	29.63	19.19	2.59	30.97	-	-	Peak
828.5	25.27	-20.73	46	29.97	22.8	3.21	30.71	119	342	Peak
2382	50.13	-23.87	74	45.79	32.16	6.03	33.85	100	340	Peak
2382	37.18	-16.82	54	32.84	32.16	6.03	33.85	100	340	Average
2462	97.34	-	-	92.83	32.26	6.14	33.89	100	340	Average
2462	110.24	-	-	105.73	32.26	6.14	33.89	100	340	Peak
2483.85	72.92	-1.08	74	68.36	32.28	6.18	33.9	100	340	Peak
2483.85	51.23	-2.77	54	46.67	32.28	6.18	33.9	100	340	Average



Test Mode :	Mode 7	Temperature :	21~24℃
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	18.97	-21.03	40	34.08	15.8	0.56	31.47	-	-	Peak
127.74	14.58	-28.92	43.5	33.44	11.57	1.14	31.57	-	-	Peak
234.66	20.55	-25.45	46	38.91	11.57	1.5	31.43	-	-	Peak
323.8	29.97	-16.03	46	45.25	14.21	1.83	31.32	-	-	Peak
424.6	26.92	-19.08	46	38.85	16.98	2.23	31.14	-	-	Peak
799.8	32.25	-13.75	46	37.32	22.47	3.14	30.68	166	231	Peak
2388.66	64.03	-9.97	74	59.67	32.18	6.03	33.85	101	199	Peak
2388.66	43.15	-10.85	54	38.79	32.18	6.03	33.85	101	199	Average
2412	104.42	-	-	100.02	32.2	6.07	33.87	101	199	Peak
2412	91.72	-	-	87.32	32.2	6.07	33.87	101	199	Average
2492	36.29	-17.71	54	31.71	32.3	6.18	33.9	101	199	Average
2492	48.6	-25.4	74	44.02	32.3	6.18	33.9	101	199	Peak



Test Mode :	Mode 7	Temperature :	21~24℃
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.86	23.3	-16.7	40	38.86	15.33	0.58	31.47	-	-	Peak
91.02	17.34	-26.16	43.5	39.12	8.79	0.95	31.52	-	-	Peak
243.3	24.18	-21.82	46	41.88	12.19	1.53	31.42	-	-	Peak
525.4	30.77	-15.23	46	40.67	18.62	2.5	31.02	-	-	Peak
663.3	33.28	-12.72	46	40.79	20.48	2.87	30.86	112	94	Peak
746.6	32.58	-13.42	46	38.61	21.63	3.05	30.71	-	-	Peak
2389.99	70.23	-3.77	74	65.87	32.18	6.03	33.85	100	68	Peak
2389.99	49.9	-4.1	54	45.54	32.18	6.03	33.85	100	68	Average
2412	108.7	-	-	104.3	32.2	6.07	33.87	100	68	Peak
2412	95.75	-	-	91.35	32.2	6.07	33.87	100	68	Average
2500	39.91	-14.09	54	35.33	32.3	6.18	33.9	100	68	Average
2500	52.58	-21.42	74	48	32.3	6.18	33.9	100	68	Peak

Test Mode :	Mode 8	Temperature :	21~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	19.16	-20.84	40	34.03	16.04	0.55	31.46	-	-	Peak
160.14	14.01	-29.49	43.5	33.93	10.38	1.22	31.52	-	-	Peak
224.94	19.48	-26.52	46	38.59	10.89	1.45	31.45	-	-	Peak
323.8	30.27	-15.73	46	45.55	14.21	1.83	31.32	-	-	Peak
799.8	33.34	-12.66	46	38.41	22.47	3.14	30.68	-	-	Peak
925.8	33.35	-12.65	46	36.62	23.96	3.4	30.63	171	334	Peak
2380	46.81	-27.19	74	42.47	32.16	6.03	33.85	100	200	Peak
2380	35.1	-18.9	54	30.76	32.16	6.03	33.85	100	200	Average
2437	103.24	-	-	98.77	32.24	6.11	33.88	100	200	Peak
2437	90.04	-	-	85.57	32.24	6.11	33.88	100	200	Average
2486	47.75	-26.25	74	43.19	32.28	6.18	33.9	100	200	Peak
2486	35.23	-18.77	54	30.67	32.28	6.18	33.9	100	200	Average



Test Mode :	Mode 8	Temperature :	21~24℃
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.05	23.64	-16.36	40	38.97	15.57	0.57	31.47	-	-	Peak
86.97	21.15	-18.85	40	43.52	8.24	0.92	31.53	-	-	Peak
251.13	24.45	-21.55	46	41.63	12.69	1.54	31.41	-	-	Peak
424.6	26.66	-19.34	46	38.59	16.98	2.23	31.14	-	-	Peak
525.4	31.36	-14.64	46	41.26	18.62	2.5	31.02	-	-	Peak
746.6	32.72	-13.28	46	38.75	21.63	3.05	30.71	132	108	Peak
2382	50.36	-23.64	74	46.02	32.16	6.03	33.85	100	67	Peak
2382	37.7	-16.3	54	33.36	32.16	6.03	33.85	100	67	Average
2437	93.77	-	-	89.3	32.24	6.11	33.88	100	67	Average
2437	106.84	-	-	102.37	32.24	6.11	33.88	100	67	Peak
2500	50.36	-23.64	74	45.78	32.3	6.18	33.9	100	67	Peak
2500	37.95	-16.05	54	33.37	32.3	6.18	33.9	100	67	Average



Test Mode :	Mode 9	Temperature :	21~24℃
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.81	19.44	-20.56	40	34.09	16.27	0.54	31.46	-	-	Peak
96.42	17.77	-25.73	43.5	38.97	9.35	0.98	31.53	-	-	Peak
224.94	20.29	-25.71	46	39.4	10.89	1.45	31.45	-	-	Peak
323.8	29.74	-16.26	46	45.02	14.21	1.83	31.32	-	-	Peak
663.3	24.22	-21.78	46	31.73	20.48	2.87	30.86	-	-	Peak
799.8	32.37	-13.63	46	37.44	22.47	3.14	30.68	151	239	Peak
2372	46.52	-27.48	74	42.21	32.16	5.99	33.84	104	26	Peak
2372	34.06	-19.94	54	29.75	32.16	5.99	33.84	104	26	Average
2462	90.51	-	-	86	32.26	6.14	33.89	104	26	Average
2462	103.31	-	-	98.8	32.26	6.14	33.89	104	26	Peak
2483.85	65.12	-8.88	74	60.56	32.28	6.18	33.9	104	26	Peak
2483.85	43.38	-10.62	54	38.82	32.28	6.18	33.9	104	26	Average



Test Mode :	Mode 9	Temperature :	21~24℃
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.7	23.24	-16.76	40	38.35	15.8	0.56	31.47	-	-	Peak
103.17	23.38	-20.12	43.5	43.87	10.04	1.01	31.54	-	-	Peak
175.26	19.12	-24.38	43.5	40.01	9.4	1.24	31.53	-	-	Peak
374.2	26.47	-19.53	46	39.85	15.78	2.09	31.25	-	-	Peak
525.4	30.98	-15.02	46	40.88	18.62	2.5	31.02	-	-	Peak
746.6	33.42	-12.58	46	39.45	21.63	3.05	30.71	121	100	Peak
2380	48.67	-25.33	74	44.33	32.16	6.03	33.85	100	69	Peak
2380	37.06	-16.94	54	32.72	32.16	6.03	33.85	100	69	Average
2462	93.53	-	-	89.02	32.26	6.14	33.89	100	69	Average
2462	107	-	-	102.49	32.26	6.14	33.89	100	69	Peak
2483.66	70.19	-3.81	74	65.63	32.28	6.18	33.9	100	69	Peak
2483.66	47.54	-6.46	54	42.98	32.28	6.18	33.9	100	69	Average

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	Due Date	Remark
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conducted (TH02-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conducted (TH02-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conducted (TH02-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-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 EP170108-02 as below.