FCC RF Test Report

APPLICANT	:	Green Packet Berhad, Taiwan Branch
EQUIPMENT	:	WiMAX 802.16e Indoor IAD
BRAND NAME	:	Greenpacket
MODEL NAME	:	DX-250
FCC ID	:	W9V-DX250-GP
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Mar. 13, 2012 and completely tested on Apr. 28, 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

Testing Laboratory
1190

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
FR231328	Rev. 01	Initial issue of report	May 11, 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	≥ 0.5MHz	Pass	-
3.2	15.247(b)	A8.4	Power Output	≤ 30dBm	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	≤ 8dBm	Pass	-
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 21.1 dB at 3.910 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.65 dB at 407.800 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Green Packet Berhad, Taiwan Branch
6F., No. 21, Lane 583, Rueiguang Rd., Neihu District, Taipei City, Taiwan (R.O.C.)

1.2 Manufacturer

Green Packet Berhad, Taiwan Branch

1. 6F., No. 21, Lane 583, Rueiguang Rd., Neihu District, Taipei City, Taiwan (R.O.C.)
2. Suite 21211, 498 Guoshoujing Road, Pudong New Area, Shanghai P.C. 201203, China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	WiMAX 802.16e Indoor IAD
Brand Name	Greenpacket
Model Name	DX-250
FCC ID	W9V-DX250-GP
Tx/Rx Frequency Range	2412 MHz ~ 2437 MHz
Number of Channels	6
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~6
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 18.87 dBm (0.0771 W) 802.11g : 22.20 dBm (0.1660 W) 802.11g/n (BW 20MHz) : 22.26 dBm (0.1683 W) 802.11g/n (BW 40MHz) : 22.24 dBm (0.1675 W)
Duty Cycle	802.11b : 98.59% 802.11g : 86.84% 802.11g/n (BW 20MHz) : 84.31% 802.11g/n (BW 40MHz) : 83.78%
Antenna Type	Dipole Antenna with gain 2.00 dBi
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 1st 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	03CH06-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 D01 DTS Meas. Guidance DR01
- ANSI C63.4-2003
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 3

Remark:

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

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Agilent	E6651A	N/A	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
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	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	iPod	Apple	A1199	FCC DoC	Unshielded, 1.2 m	N/A
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
7.	Phone	HTT	HTT-806	N/A	N/A	N/A
8.	Phone	HTT	HTT-198	N/A	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 Pre-Scanned RF Power

Preliminary tests were performed in different data rate as below table and the highest power data rates (11b, 11g, 11g/n (BW 20MHz), 11g/n (BW 40MHz) modes) were chosen for full test in the following sections to demonstrate compliance to the FCC limit line.

2.4GHz 802.11b mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm) (Chain A)	18.80	18.79	18.26	18.68
Peak Power (dBm) (Chain B)	18.87	18.28	18.40	18.64

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm) (Chain A)	22.18	21.57	21.50	21.45	22.07	22.09	22.06	21.94
Peak Power (dBm) (Chain B)	22.20	22.00	21.66	21.75	22.19	21.82	22.17	22.05

2.4GHz 802.11g/n (BW 20MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm) (Chain A)	22.15	21.64	21.87	22.03	21.74	21.94	22.07	22.04
Peak Power (dBm) (Chain B)	22.26	21.92	22.01	22.22	21.83	22.07	22.07	22.08

2.4GHz 802.11g/n (BW 20MHz) mode								
Data Rate (MHz)	MCS 8	MCS 9	MCS 10	MCS 11	MCS12	MCS13	MCS 14	MCS 15
Peak Power (dBm) (Chain A)	21.95	21.92	22.00	22.06	21.71	21.91	22.03	22.10
Peak Power (dBm) (Chain B)	22.12	22.07	22.11	22.09	21.98	22.05	22.21	22.16

2.4GHz 802.11g/n (BW 40MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm) (Chain A)	22.05	22.02	21.90	21.79	21.89	21.97	22.00	21.66
Peak Power (dBm) (Chain B)	22.24	22.10	21.97	22.11	22.00	22.17	22.00	21.88

2.4GHz 802.11g/n (BW 40MHz) mode								
Data Rate (MHz)	MCS 8	MCS 9	MCS 10	MCS 11	MCS12	MCS13	MCS 14	MCS 15
Peak Power (dBm) (Chain A)	21.80	21.67	21.83	21.86	21.82	21.55	21.95	21.78
Peak Power (dBm) (Chain B)	22.18	22.09	21.87	22.15	22.18	21.95	22.06	21.96

2.2 Maximum Peak Conducted Output Power:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
Channel	1	3	6	1	3	6
Frequency (MHz)	2412	2422	2437	2412	2422	2437
Peak Power (Chain A)	18.80	18.78	18.71	22.18	22.11	21.94
Peak Power (Chain B)	18.87	18.86	18.72	22.20	22.17	22.18

Band	2.4GHz 802.11g/n (BW 20MHz) RF Power (dBm)		
Channel	1	3	6
Frequency (MHz)	2412	2422	2437
Peak Power (Chain A)	22.15	22.13	21.70
Peak Power (Chain B)	22.12	22.20	22.26

Band	2.4GHz 802.11g/n (BW 40MHz) RF Power (dBm)	
Channel	3	6
Frequency (MHz)	2422	2437
Peak Power (Chain A)	22.05	21.94
Peak Power (Chain B)	22.24	22.13

Remark:

The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, MCS0 for 802.11g/n (BW 20MHz), MCS0 for 802.11g/n (BW 40MHz) for all the test cases due to the highest RF output power.

2.3 Maximum Average Conducted Output Power:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
Channel	1	3	6	1	3	6
Frequency (MHz)	2412	2422	2437	2412	2422	2437
Average Power (Chain A)	16.43	16.57	16.65	13.03	13.00	13.33
Average Power (Chain B)	16.60	16.53	16.54	13.29	13.30	13.33

Band	2.4GHz 802.11g/n (BW 20MHz) RF Power (dBm)		
Channel	1	3	6
Frequency (MHz)	2412	2422	2437
Average Power (Chain A)	13.07	13.23	13.25
Average Power (Chain B)	13.38	13.35	13.42

Band	2.4GHz 802.11g/n (BW 40MHz) RF Power (dBm)	
Channel	3	6
Frequency (MHz)	2422	2437
Average Power (Chain A)	13.10	12.95
Average Power (Chain B)	13.29	13.31

Remark:

1. The average power, which is used by the test method, AVG2, in DTS Meas. Guidance v01, is reporting only.
2. The EUT is programmed to transmit signals continuously.

2.4 Test Mode

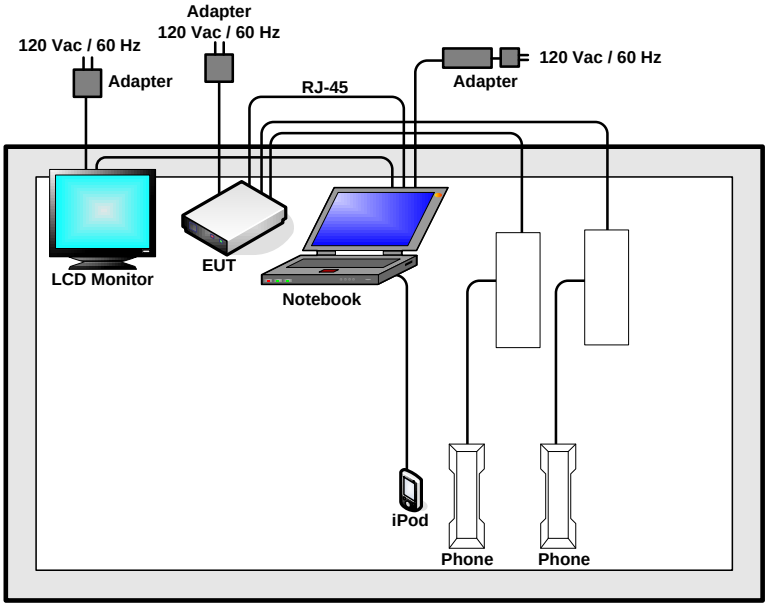
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic 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.

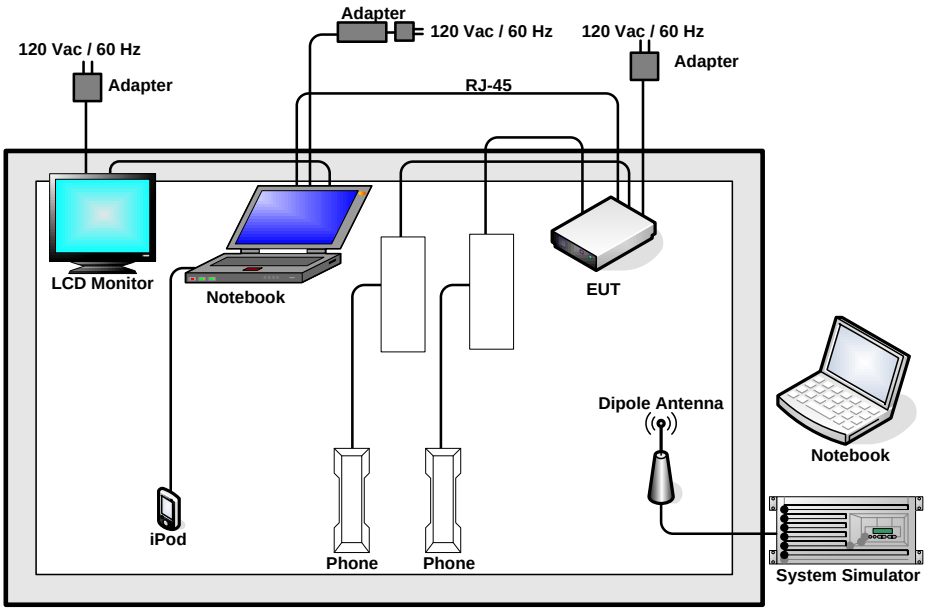
Test Cases		
Test Item	**802.11b (Modulation : DSSS)**	**802.11g/n (Modulation : OFDM)**
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz (Chain B) Mode 2 : 802.11b CH03_2422 MHz (Chain B) Mode 3 : 802.11b CH06_2437 MHz (Chain B)	Mode 4: 802.11g_CH01_2412 MHz (Chain B) Mode 5: 802.11g_CH03_2422 MHz (Chain B) Mode 6: 802.11g_CH06_2437 MHz (Chain B) Mode 7: 802.11g/n (BW 20M)_CH01_2412 MHz (Chain B) Mode 8: 802.11g/n (BW 20M)_CH03_2422 MHz (Chain B) Mode 9: 802.11g/n (BW 20M)_CH06_2437 MHz (Chain B) Mode 10: 802.11g/n (BW 40M)_CH03_2422 MHz (Chain B) Mode 11: 802.11g/n (BW 40M)_CH06_2437 MHz (Chain B)
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz (Chain B) Mode 2 : 802.11b CH03_2422 MHz (Chain B) Mode 3 : 802.11b CH06_2437 MHz (Chain B)	Mode 4: 802.11g_CH01_2412 MHz (Chain B) Mode 5: 802.11g_CH03_2422 MHz (Chain B) Mode 6: 802.11g_CH06_2437 MHz (Chain B) Mode 7: 802.11g/n (BW 20M)_CH01_2412 MHz (Chain B) Mode 8: 802.11g/n (BW 20M)_CH03_2422 MHz (Chain B) Mode 9: 802.11g/n (BW 20M)_CH06_2437 MHz (Chain B) Mode 10: 802.11g/n (BW 40M)_CH03_2422 MHz (Chain B) Mode 11: 802.11g/n (BW 40M)_CH06_2437 MHz (Chain B) Mode 12: 802.11g/n (BW 40M)_CH03_2422 MHz (Chain A)
AC Conducted Emission	Mode 1 : WiMAX Idle + WLAN (2.4G) Link + RJ-45 Link + VIOP + Adapter	

2.5 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.6 RF Utility

The programmed RF utility “comment” is installed in notebook 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.

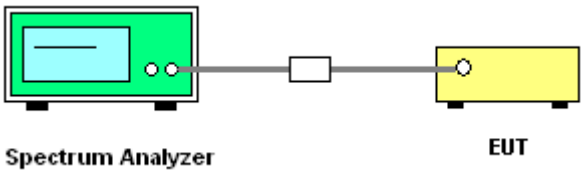
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW).Set the Video bandwidth (VBW) ≥ 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

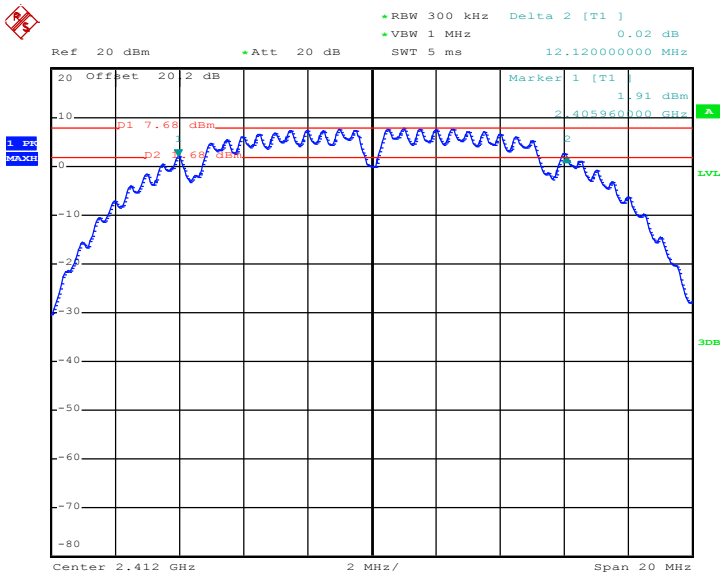


3.1.5 Test Result of 6dB Bandwidth

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

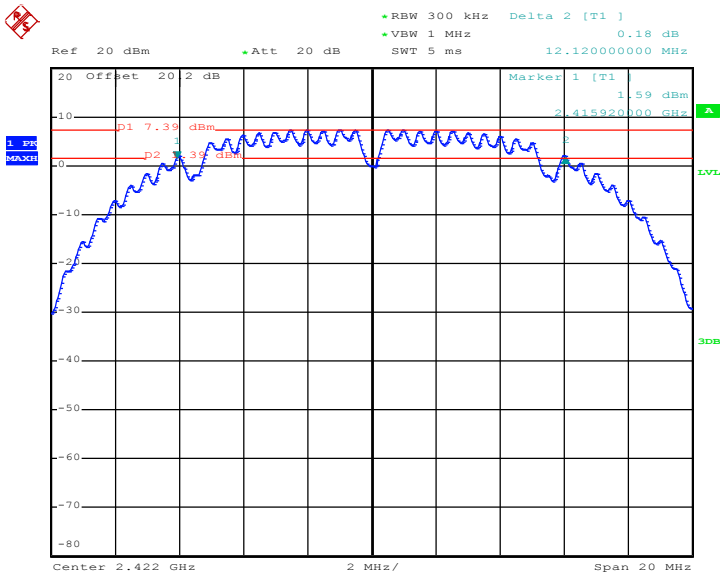
Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	12.12	0.5	Pass
03	2422	12.12	0.5	Pass
06	2437	12.12	0.5	Pass

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



Date: 21.APR.2012 02:05:01

Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 03



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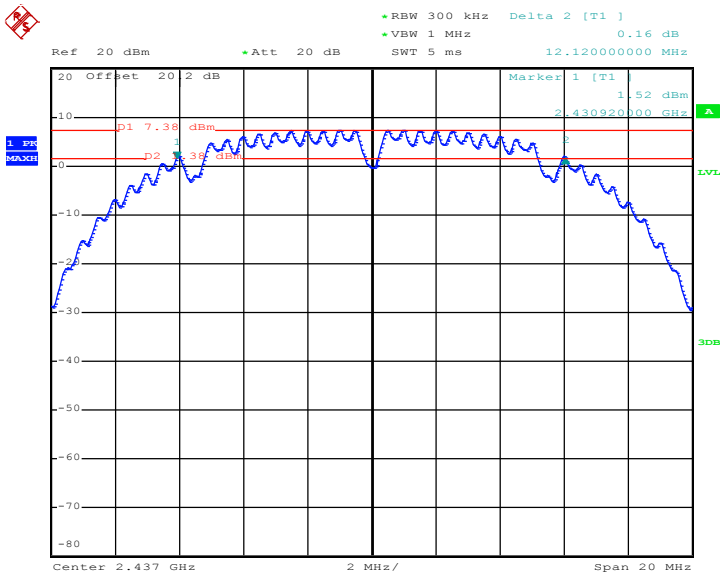
Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 06

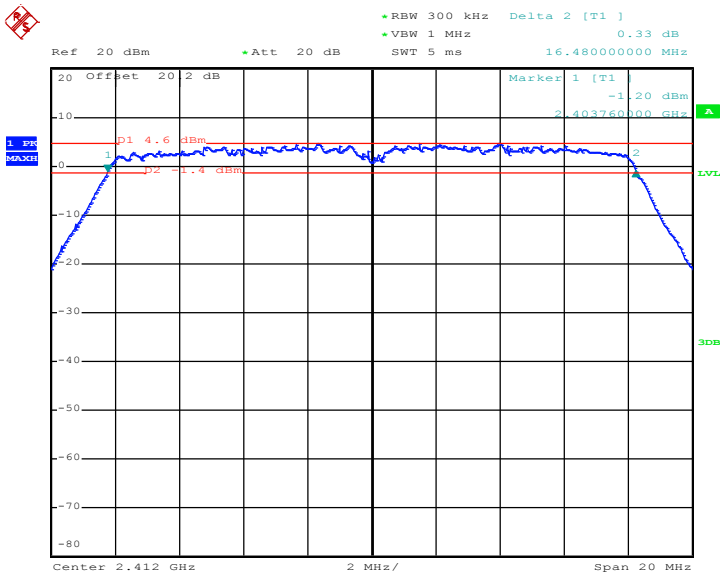


Date: 21.APR.2012 02:12:41

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

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.48	0.5	Pass
03	2422	16.44	0.5	Pass
06	2437	16.44	0.5	Pass

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



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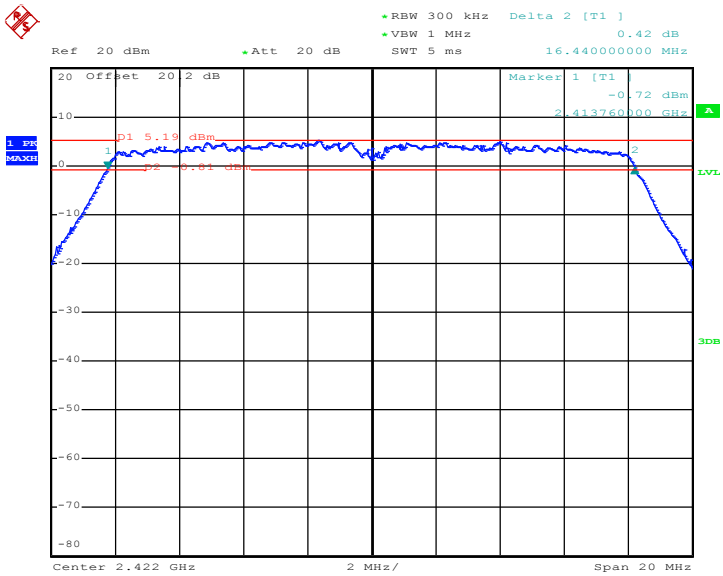
Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 03



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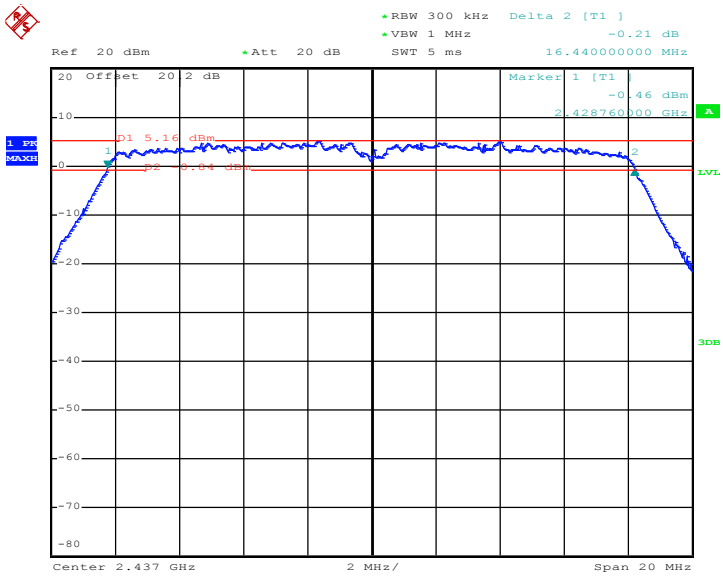
Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 06



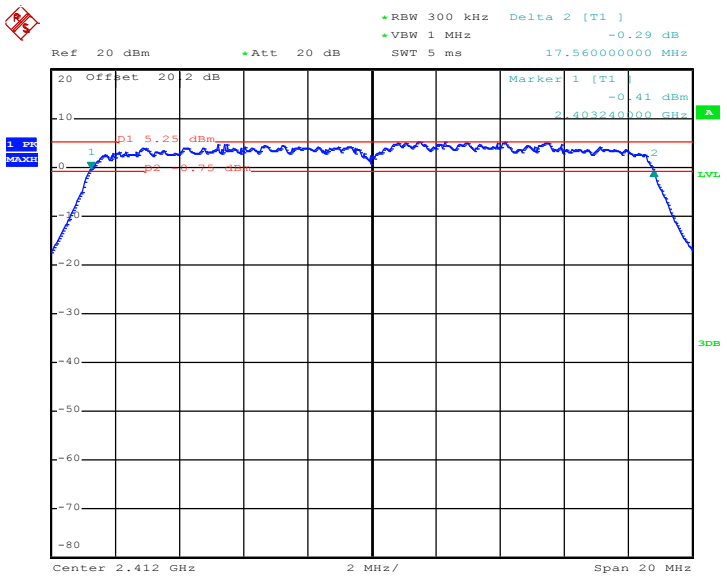
Date: 21.APR.2012 02:17:00

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

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.56	0.5	Pass
03	2422	17.56	0.5	Pass
06	2437	17.52	0.5	Pass

Mode 7 :

6 dB Bandwidth Plot on 802.11g/n(BW 20MHz) Channel 01



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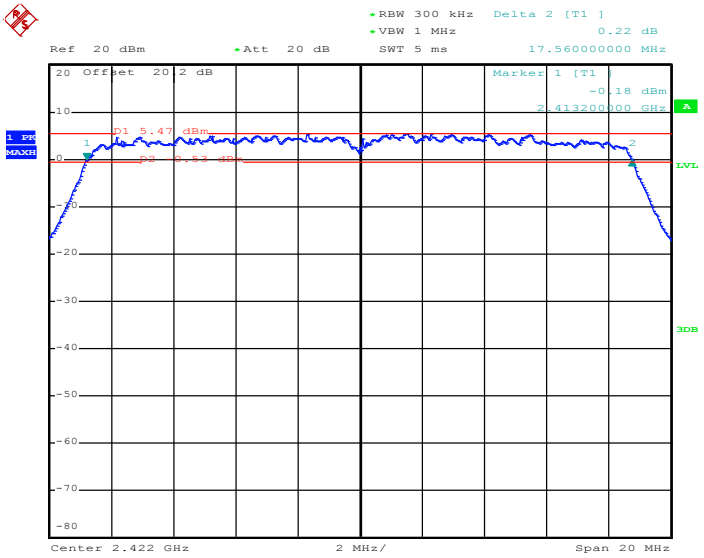
Mode 8 :

6 dB Bandwidth Plot on 802.11g/n(BW 20MHz) Channel 03



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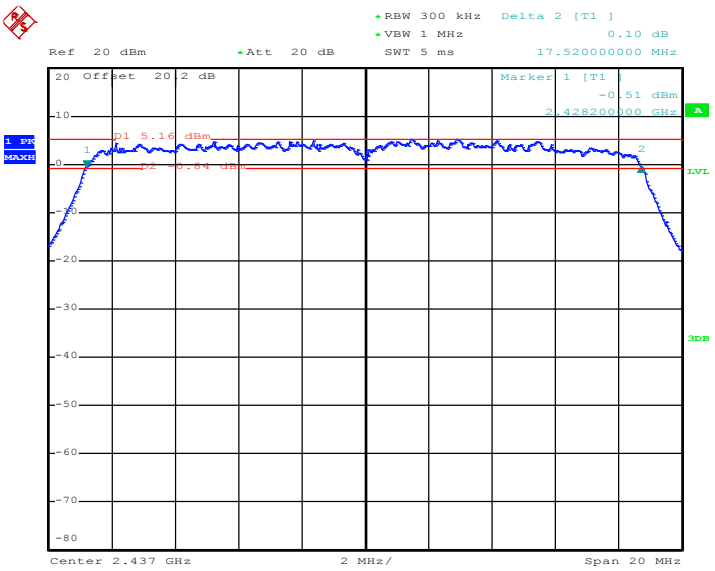
Mode 9 :

6 dB Bandwidth Plot on 802.11g/n(BW 20MHz) Channel 06



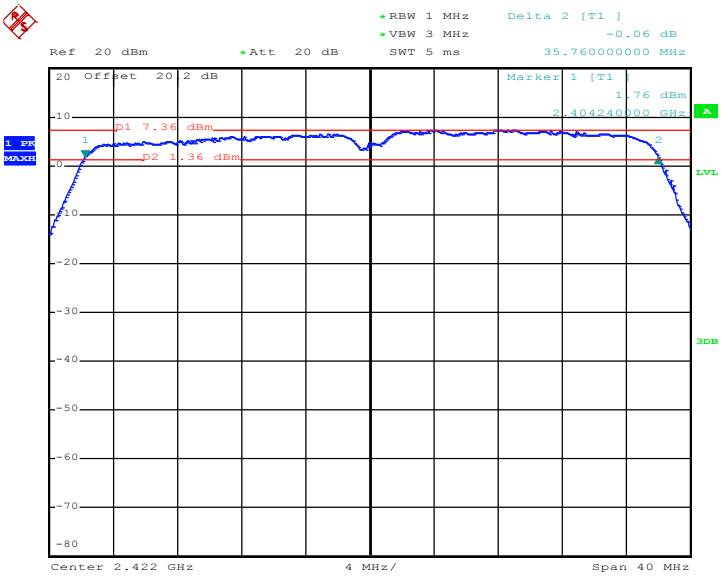
Date: 21.APR.2012 02:38:25

Test Mode :	Mode 10, 11	**Temperature :**	24~26℃
Test Engineer :	Reece Li	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 40MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
03	2422	35.76	0.5	Pass
06	2437	34.72	0.5	Pass

Mode 10 :

6 dB Bandwidth Plot on 802.11g/n(BW 40MHz) Channel 03



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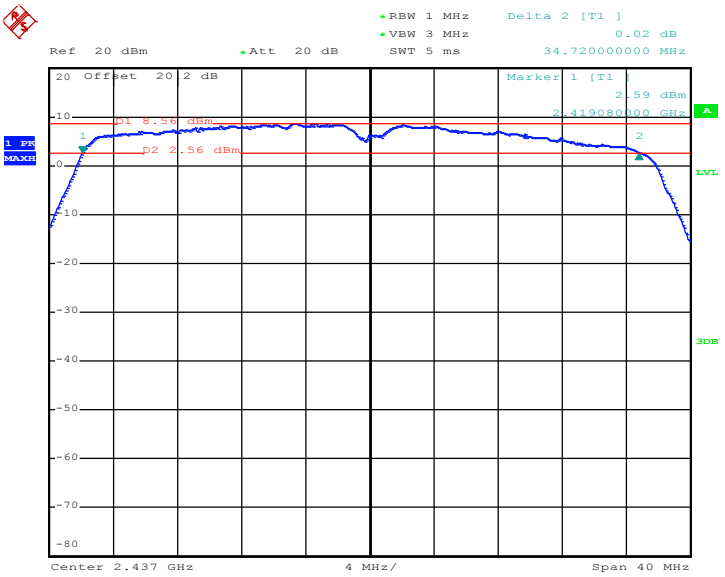
Mode 11 :

6 dB Bandwidth Plot on 802.11g/n(BW 40MHz) Channel 06



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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.

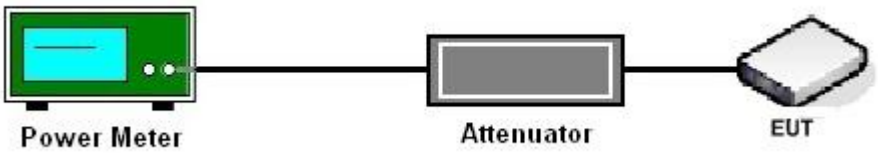
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure PK2 of FCC KDB No. 558074 DTS Meas. Guidance DR01.
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 :	Reece Li	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.87	30	Pass
03	2422	18.86	30	Pass
06	2437	18.72	30	Pass

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

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.20	30	Pass
03	2422	22.17	30	Pass
06	2437	22.18	30	Pass

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

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.12	30	Pass
03	2422	22.20	30	Pass
06	2437	22.26	30	Pass

Test Mode :	Mode 10, 11	**Temperature :**	24~26
Test Engineer :	Reece Li	**Relative Humidity :**	50~53

Channel	Frequency (MHz)	802.11g/n (BW 40MHz) Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
03	2422	22.24	30	Pass
06	2437	22.13	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

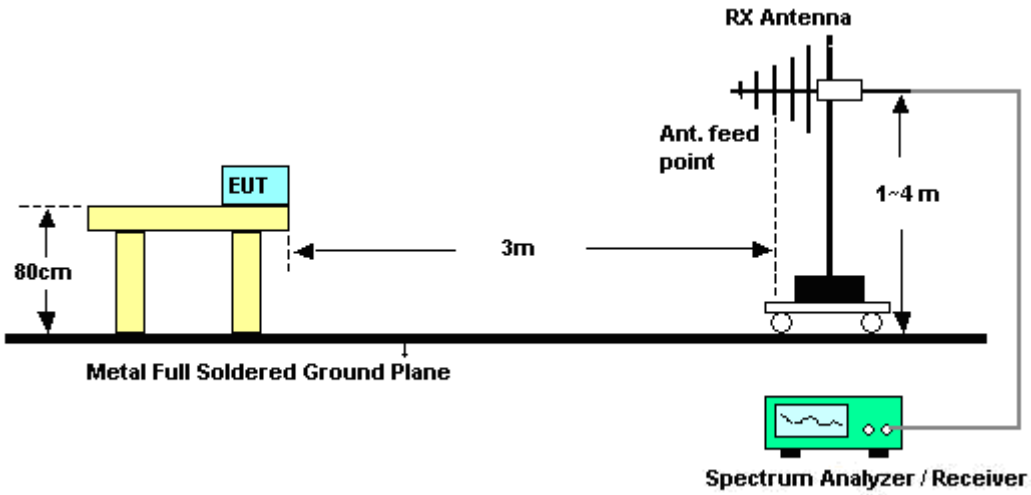
See list of measuring instruments of this test report.

3.3.3 Test Procedures

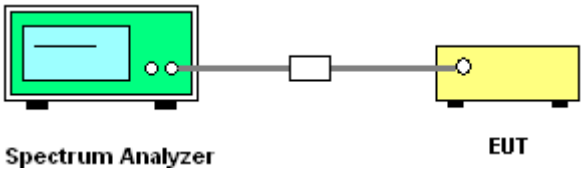
1. The testing follows the guidelines in ANSI C63.4-2003 and the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW) ≥ RBW. Out of the authorized frequency band emissions must be at least 20 dB lower than the highest emission level within the authorized band as measured with a 100 KHz RBW. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
3. Radiated emission test: Apply to band edge emissions that falling on 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 measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, then modify the unit for continuous operation. Use the settings in this paragraph to correct the reading level by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation per 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 :**	24~25℃
Test Band :	802.11b	**Relative Humidity :**	50~51%
Test Channel :	01	**Test Engineer :**	Ivan Chiang

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
2381.82	52.3	-21.7	74	49.58	31.88	5.4	34.56	102	226	Peak
2381.82	41.72	-12.28	54	39	31.88	5.4	34.56	102	226	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
2389.99	50	-24	74	47.26	31.9	5.4	34.56	100	343	Peak
2389.99	39.39	-14.61	54	36.65	31.9	5.4	34.56	100	343	Average

Test Mode :	Mode 3	**Temperature :**	24~25℃
Test Band :	802.11b	**Relative Humidity :**	50~51%
Test Channel :	06	**Test Engineer :**	Ivan Chiang

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
2494	44.47	-29.53	74	41.5	32	5.52	34.55	100	232	Peak
2494	33.34	-20.66	54	30.37	32	5.52	34.55	100	232	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
2492	45.29	-28.71	74	42.32	32	5.52	34.55	100	347	Peak
2492	33.1	-20.9	54	30.13	32	5.52	34.55	100	347	Average

Test Mode :	Mode 4	**Temperature :**	24~25℃
Test Band :	802.11g	**Relative Humidity :**	50~51%
Test Channel :	01	**Test Engineer :**	Ivan Chiang

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
2388.85	55.69	-18.31	74	52.95	31.9	5.4	34.56	102	224	Peak
2388.85	39.11	-14.89	54	36.37	31.9	5.4	34.56	102	224	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
2389.99	54.48	-19.52	74	51.74	31.9	5.4	34.56	100	358	Peak
2389.99	38.32	-15.68	54	35.58	31.9	5.4	34.56	100	358	Average

Test Mode :	Mode 6	**Temperature :**	24~25℃
Test Band :	802.11g	**Relative Humidity :**	50~51%
Test Channel :	06	**Test Engineer :**	Ivan Chiang

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	46.05	-27.95	74	43.1	31.98	5.52	34.55	100	232	Peak
2486	33.19	-20.81	54	30.24	31.98	5.52	34.55	100	232	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
2486	46.31	-27.69	74	43.36	31.98	5.52	34.55	100	343	Peak
2486	33.02	-20.98	54	30.07	31.98	5.52	34.55	100	343	Average

Test Mode :	Mode 7	**Temperature :**	24~25℃
Test Band :	802.11g/n (BW 20MHz)	**Relative Humidity :**	50~51%
Test Channel :	01	**Test Engineer :**	Ivan Chiang

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	56.53	-17.47	74	53.79	31.9	5.4	34.56	101	226	Peak
2389.99	39.22	-14.78	54	36.48	31.9	5.4	34.56	101	226	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	55.53	-18.47	74	52.79	31.9	5.4	34.56	100	359	Peak
2389.61	38.47	-15.53	54	35.73	31.9	5.4	34.56	100	359	Average

Test Mode :	Mode 9	**Temperature :**	24~25℃
Test Band :	802.11g/n (BW 20MHz)	**Relative Humidity :**	50~51%
Test Channel :	06	**Test Engineer :**	Ivan Chiang

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	45.42	-28.58	74	42.47	31.98	5.52	34.55	100	230	Peak
2486	33.2	-20.8	54	30.25	31.98	5.52	34.55	100	230	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
2494	45.24	-28.76	74	42.27	32	5.52	34.55	100	346	Average
2494	33.03	-20.97	54	30.06	32	5.52	34.55	100	346	Peak

Test Mode :	Mode 10	**Temperature :**	24~25℃
Test Band :	802.11g/n (BW 40MHz)	**Relative Humidity :**	50~51%
Test Channel :	03	**Test Engineer :**	Ivan Chiang

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	59.28	-14.72	74	56.54	31.9	5.4	34.56	100	230	Peak
2389.99	44.9	-9.1	54	42.16	31.9	5.4	34.56	100	230	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
2389.99	55.54	-18.46	74	52.8	31.9	5.4	34.56	100	354	Peak
2389.99	42.3	-11.7	54	39.56	31.9	5.4	34.56	100	354	Average

Test Mode :	Mode 11	**Temperature :**	24~25℃
Test Band :	802.11g/n (BW 40MHz)	**Relative Humidity :**	50~51%
Test Channel :	06	**Test Engineer :**	Ivan Chiang

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
2494	46.07	-27.93	74	43.1	32	5.52	34.55	101	233	Peak
2494	33.12	-20.88	54	30.15	32	5.52	34.55	101	233	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
2486	45.48	-28.52	74	42.53	31.98	5.52	34.55	100	348	Peak
2486	33.84	-20.16	54	30.89	31.98	5.52	34.55	100	348	Average

Test Mode :	Mode 12	**Temperature :**	24~25℃
Test Band :	802.11g/n (BW 40MHz)	**Relative Humidity :**	50~51%
Test Channel :	03	**Test Engineer :**	Ivan Chiang

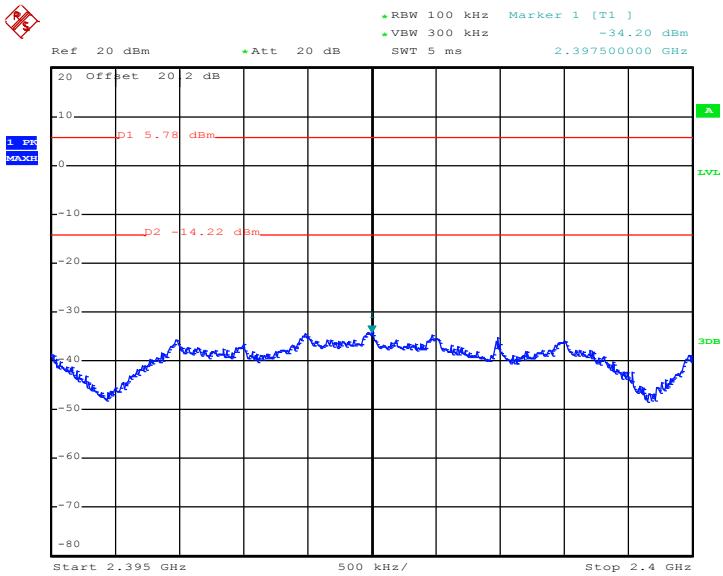
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.66	59.66	-14.34	74	56.92	31.9	5.4	34.56	100	174	Peak
2388.66	44.82	-9.18	54	42.08	31.9	5.4	34.56	100	174	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
2389.99	51.51	-22.49	74	48.77	31.9	5.4	34.56	100	228	Peak
2389.99	38.28	-15.72	54	35.54	31.9	5.4	34.56	100	228	Average

3.3.6 Test Plots of Conducted Band Edges

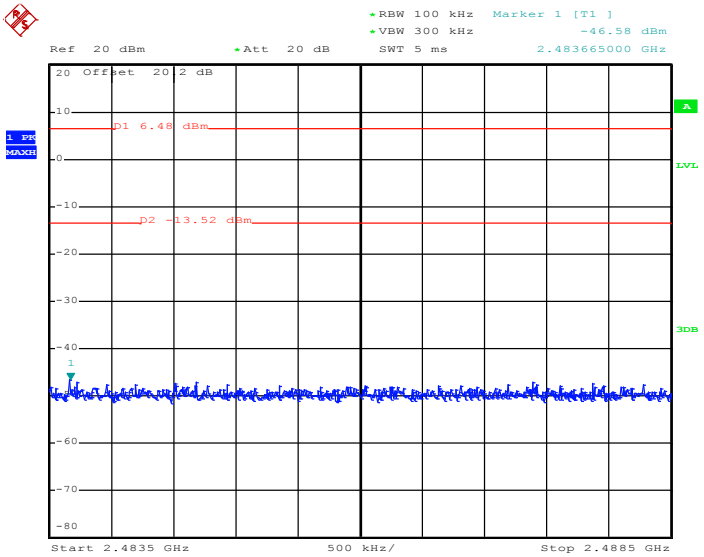
Test Mode :	Mode 1 and 3	**Temperature :**	24~26℃
Test Band :	802.11b	**Relative Humidity :**	50~53%
Test Channel :	01 and 06	**Test Engineer :**	Reece Li

Low Band Edge Plot on 802.11b Channel 01



Date: 21.APR.2012 02:06:05

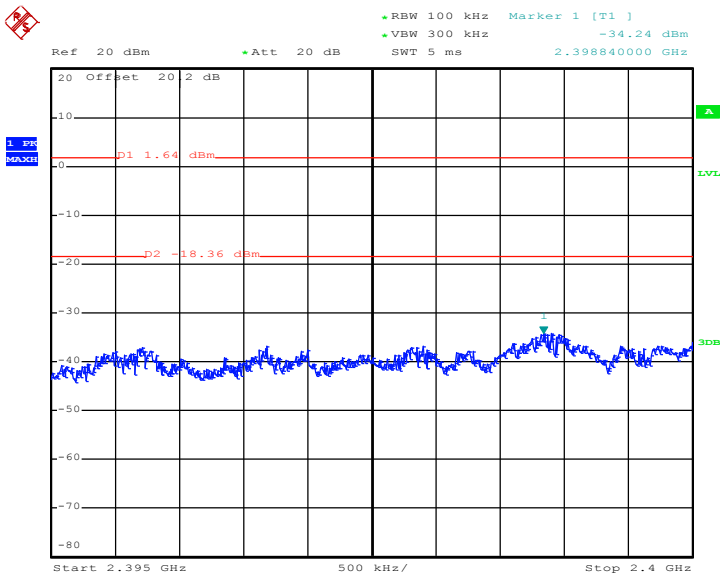
High Band Edge Plot on 802.11b Channel 06



Date: 21.APR.2012 02:50:50

Test Mode :	Mode 4 and 6	**Temperature :**	24~26℃
Test Band :	802.11g	**Relative Humidity :**	50~53%
Test Channel :	01 and 06	**Test Engineer :**	Reece Li

Low Band Edge Plot on 802.11g Channel 01



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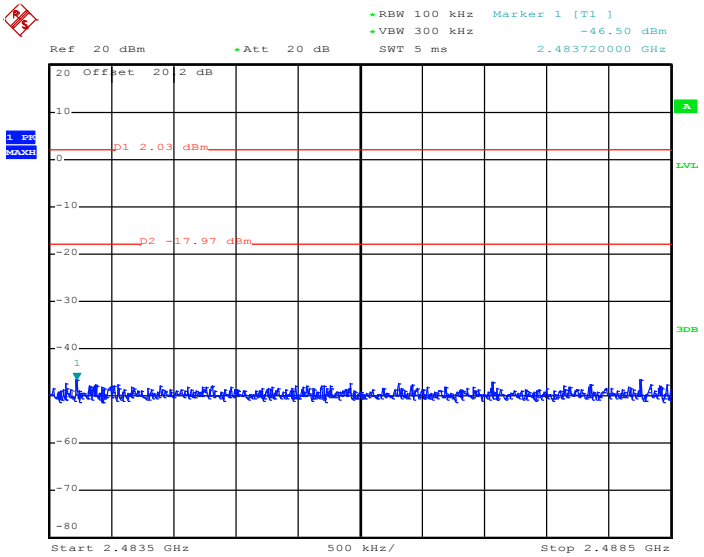
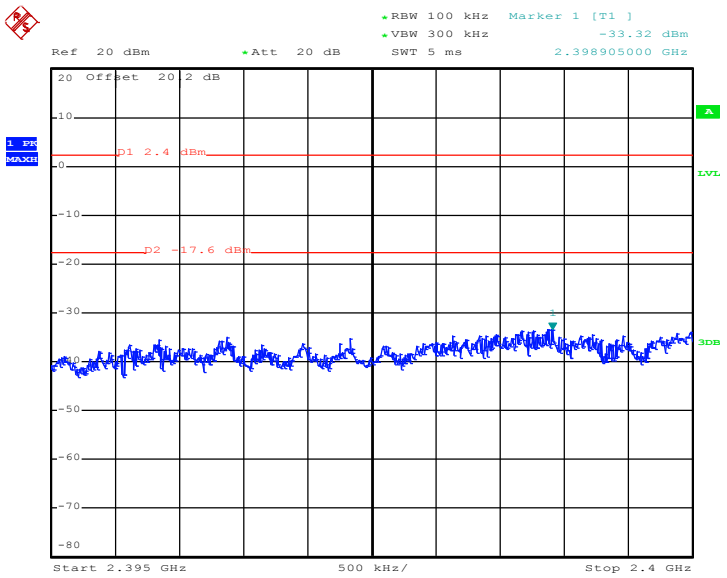
High Band Edge Plot on 802.11g Channel 06



Date: 21.APR.2012 02:53:27

Test Mode :	Mode 7 and 9	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	01 and 06	**Test Engineer :**	Reece Li

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



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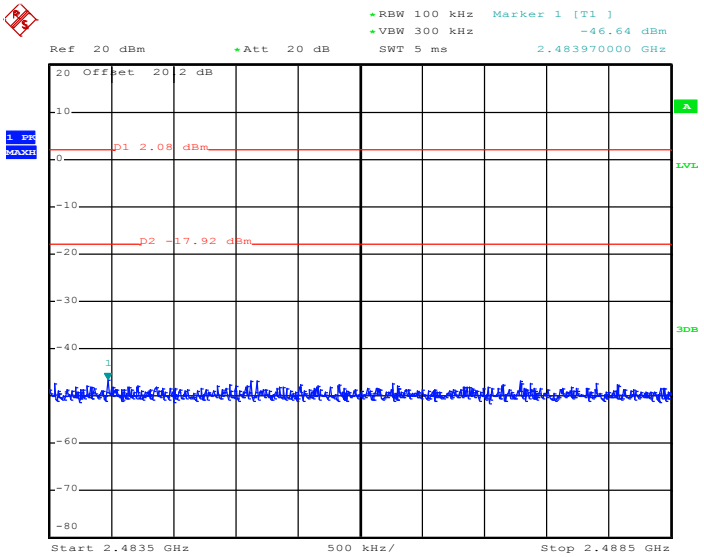
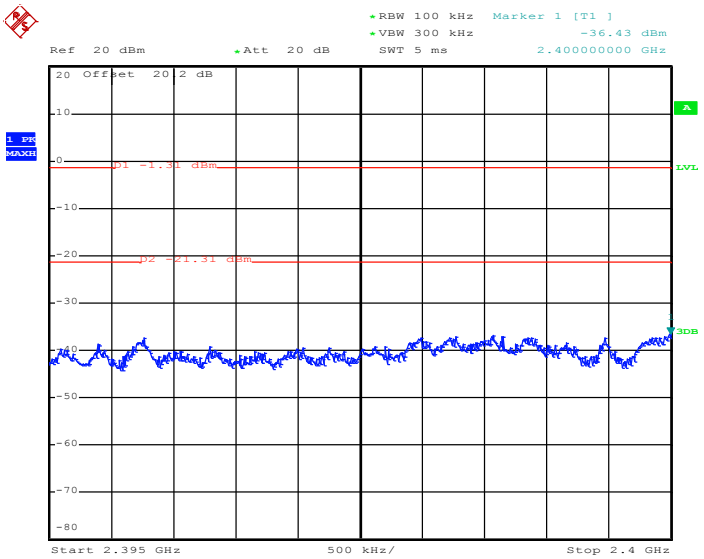
High Band Edge Plot on 802.11g/n (BW 20MHz) Channel 06



Date: 21.APR.2012 02:49:01

Test Mode :	Mode 10 and 11	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	03 and 06	**Test Engineer :**	Reece Li

Low Band Edge Plot on 802.11g/n (BW 40MHz) Channel 03



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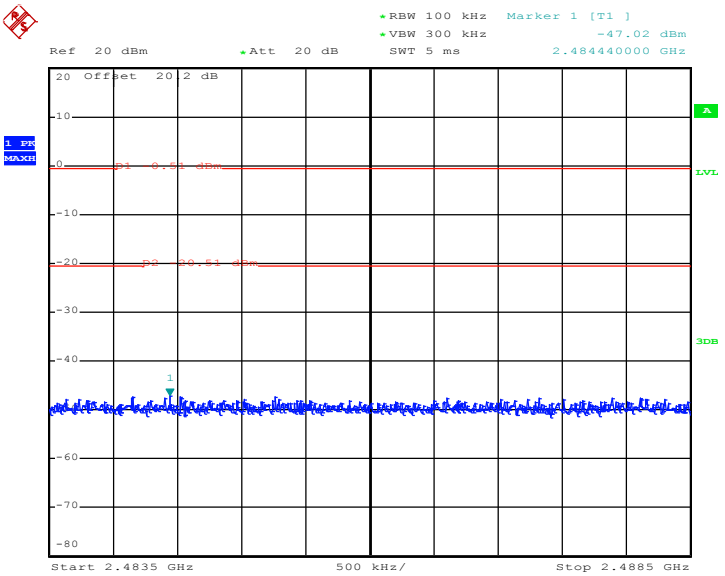
High Band Edge Plot on 802.11g/n (BW 40MHz) Channel 06



Date: 24.APR.2012 04:39:56

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.

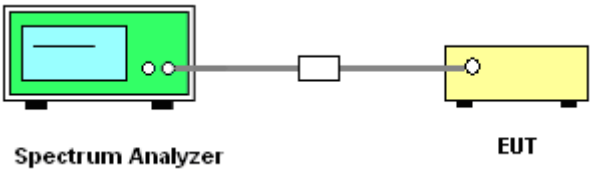
3.4.2 Measuring Instruments

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. The path loss was compensated to the results for each measurement.
2. Set RBW = 100 KHz, Video bandwidth (VBW) ≥ 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.

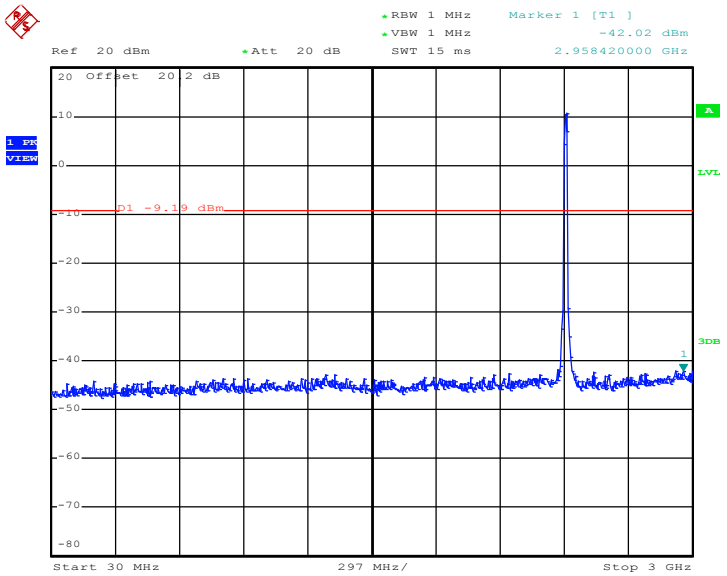
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

Test Mode :	Mode 1	**Temperature :**	24~26℃
Test Band :	802.11b	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



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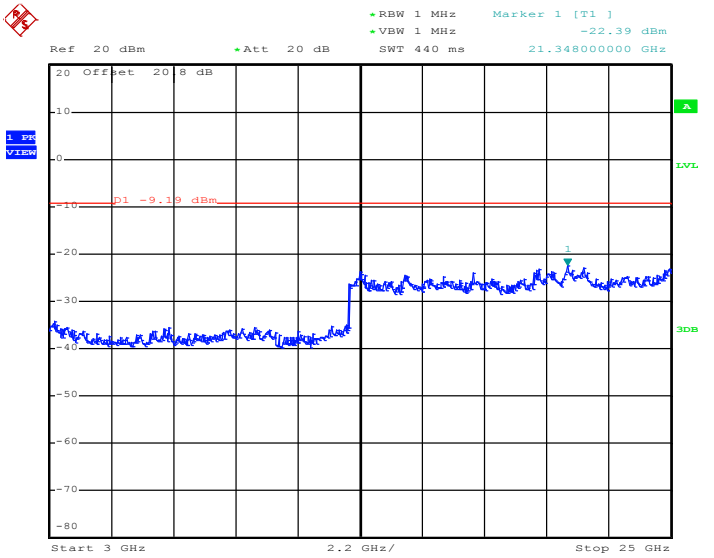
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



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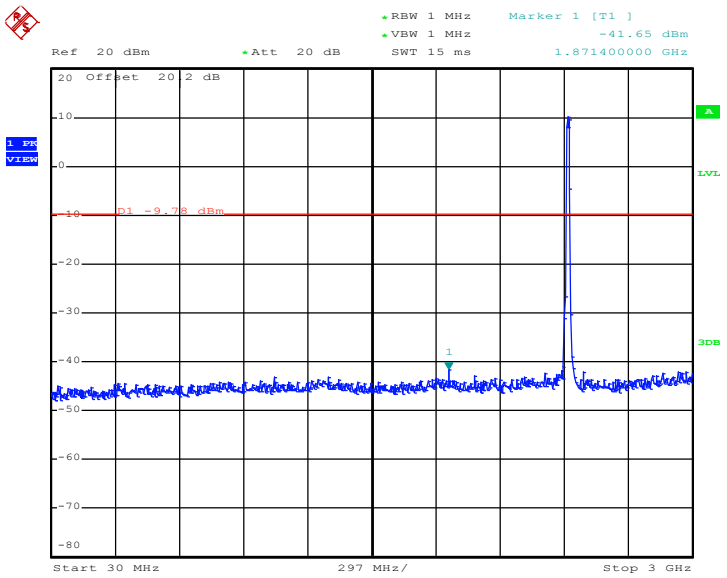
Test Mode :	Mode 2	**Temperature :**	24~26℃
Test Band :	802.11b	**Relative Humidity :**	50~53%
Test Channel :	03	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



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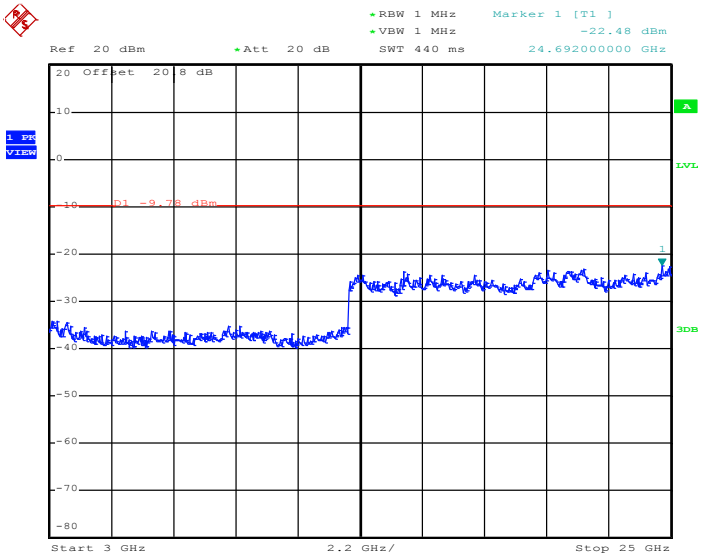
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



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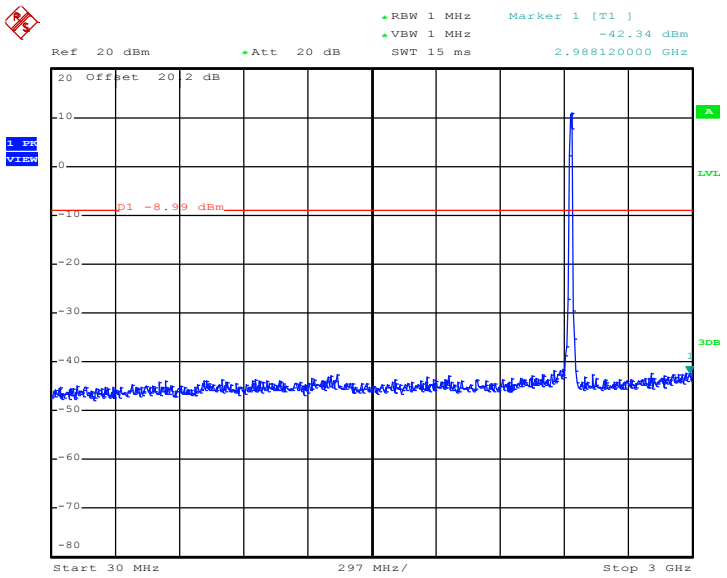
Test Mode :	Mode 3	**Temperature :**	24~26℃
Test Band :	802.11b	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



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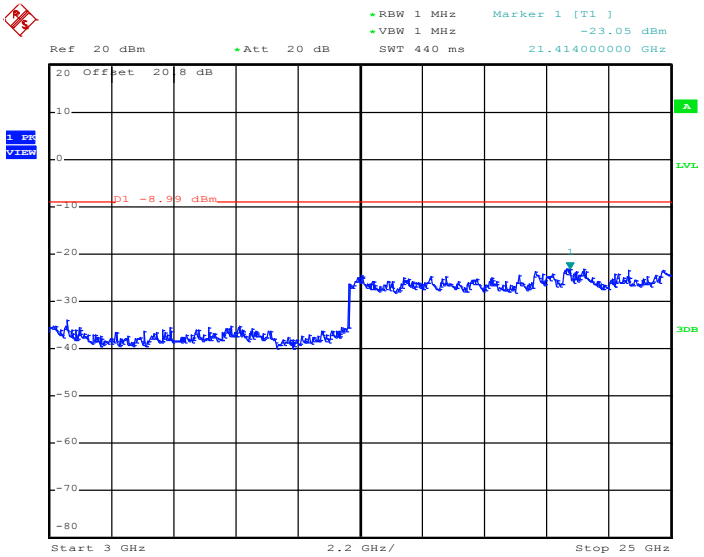
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



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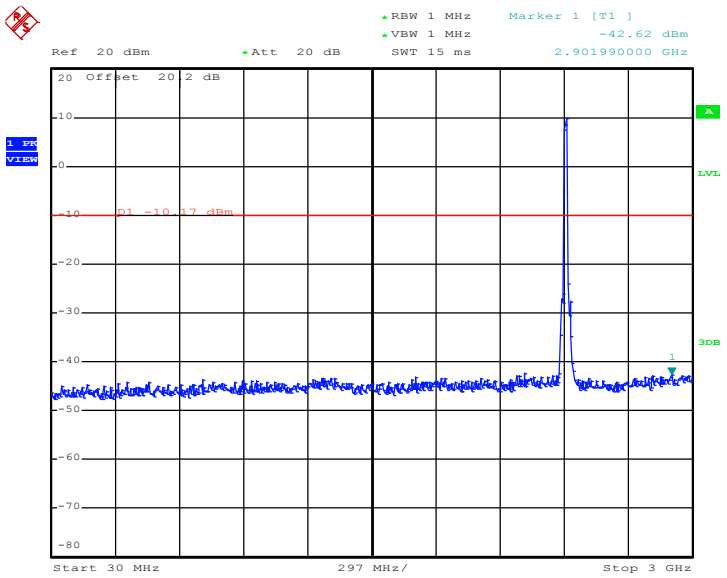
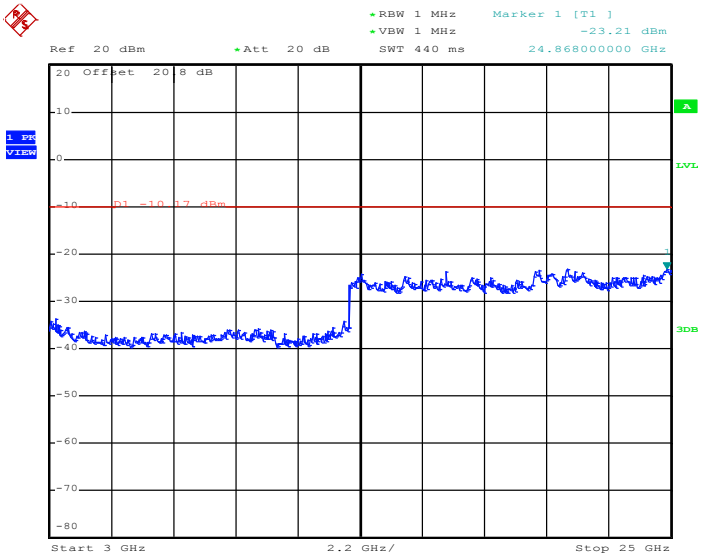
Test Mode :	Mode 4	**Temperature :**	24~26℃
Test Band :	802.11g	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 21.APR.2012 02:28:01

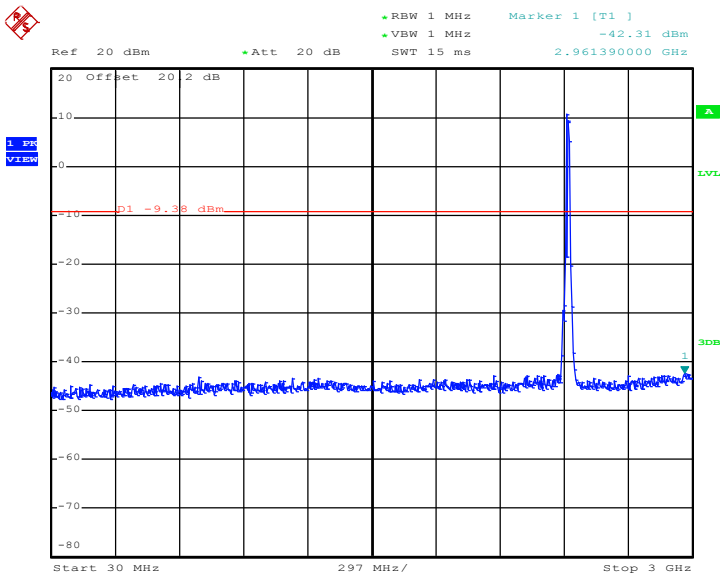
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 21.APR.2012 02:28:19

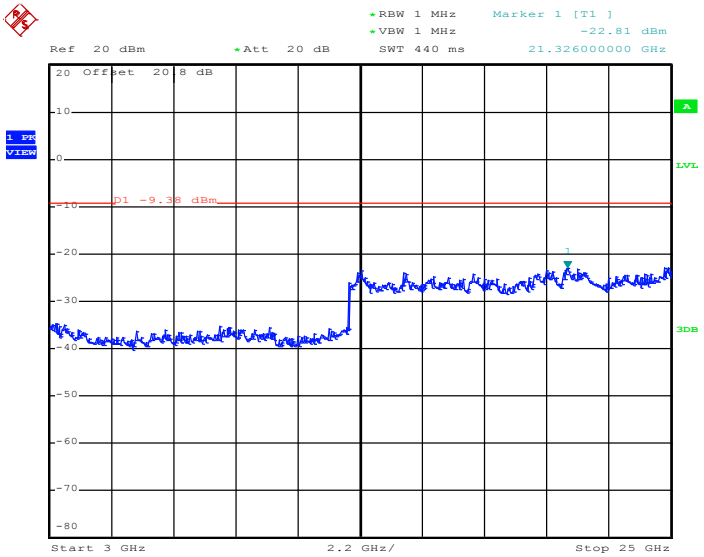
Test Mode :	Mode 5	**Temperature :**	24~26
Test Band :	802.11g	**Relative Humidity :**	50~53
Test Channel :	03	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 21.APR.2012 02:22:57

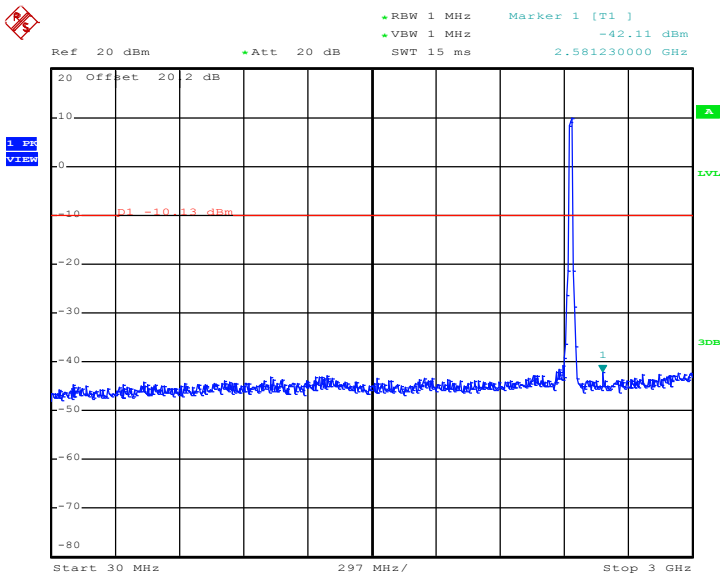
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 21.APR.2012 02:23:15

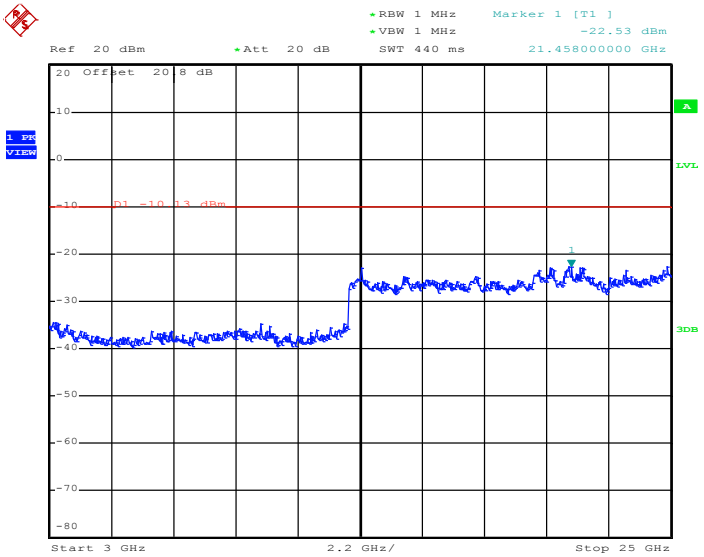
Test Mode :	Mode 6	**Temperature :**	24~26℃
Test Band :	802.11g	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 21.APR.2012 02:54:30

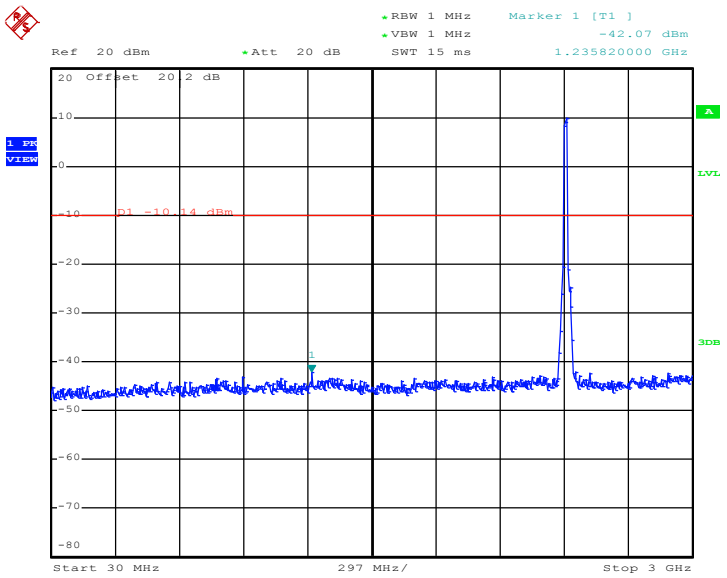
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 21.APR.2012 02:54:47

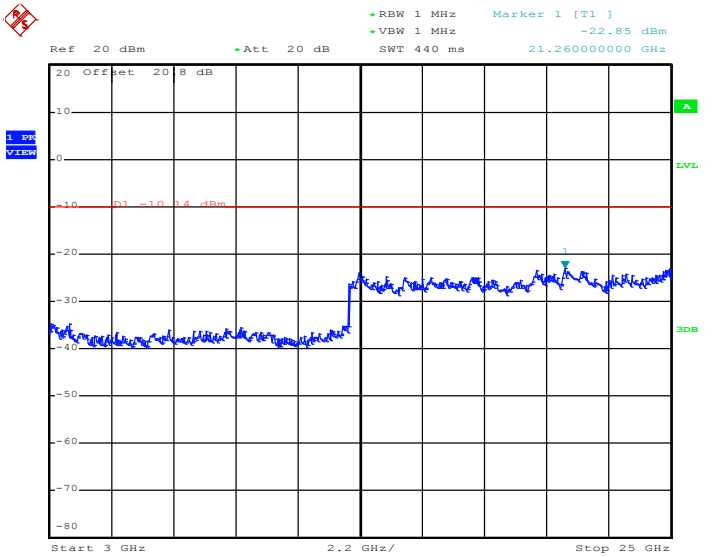
Test Mode :	Mode 7	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 21.APR.2012 02:32:10

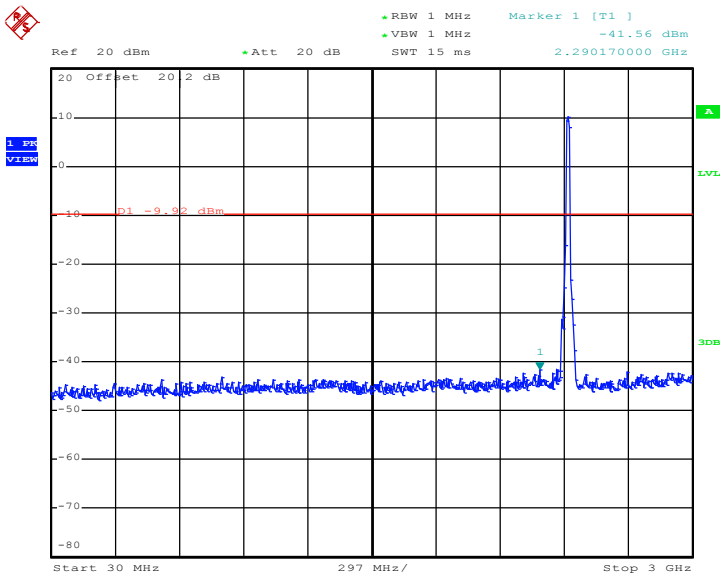
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 21.APR.2012 02:32:27

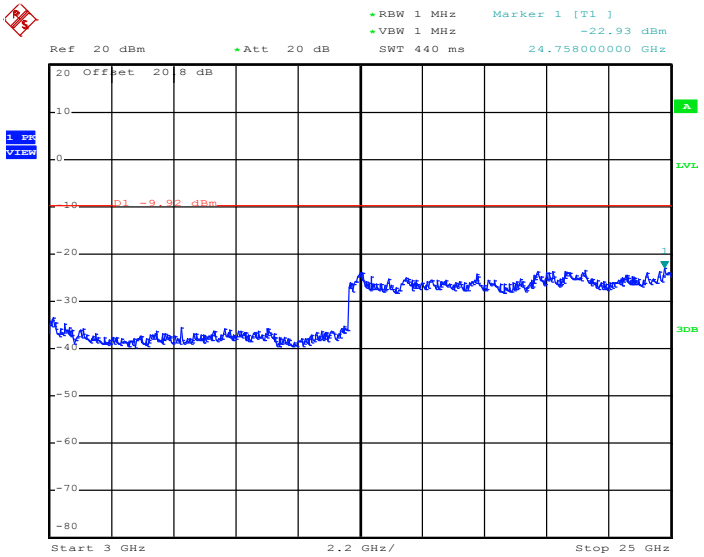
Test Mode :	Mode 8	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	03	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 21.APR.2012 03:05:45

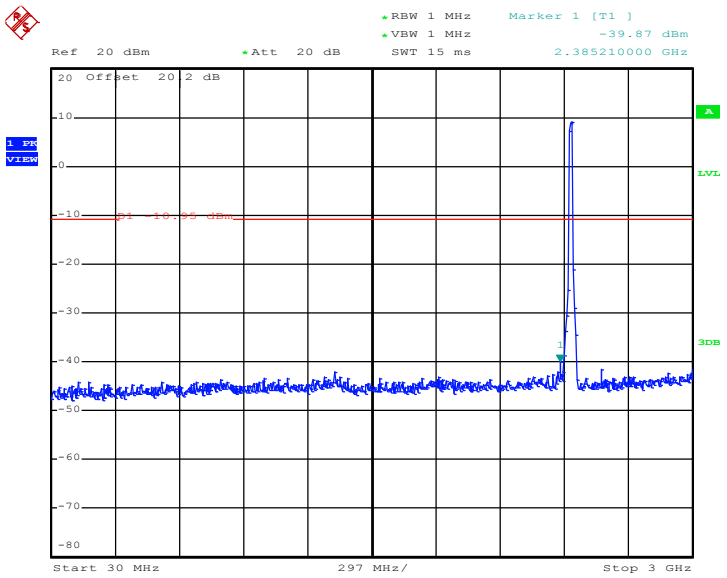
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 21.APR.2012 03:06:02

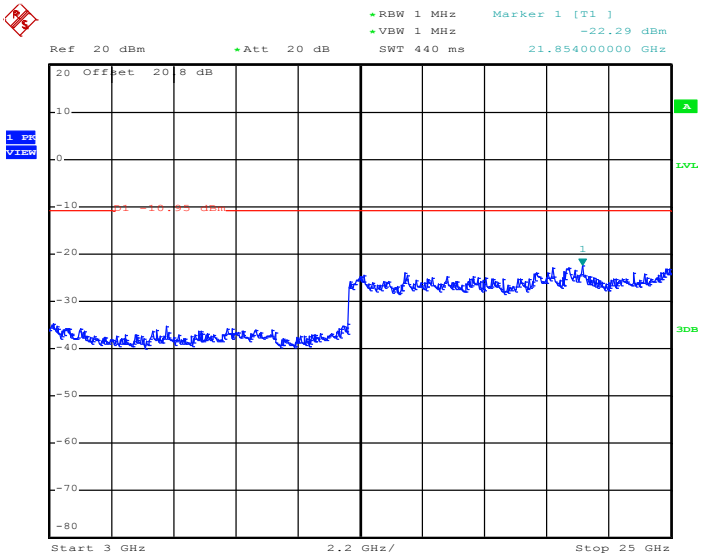
Test Mode :	Mode 9	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 21.APR.2012 02:39:40

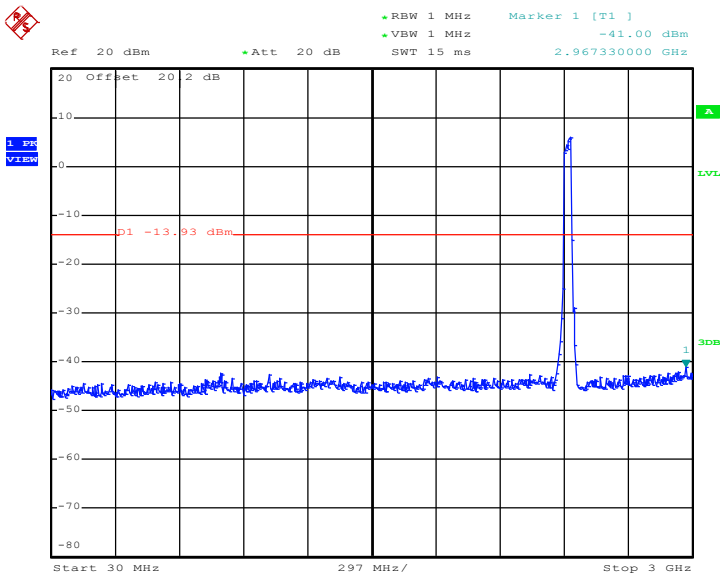
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 21.APR.2012 02:39:57

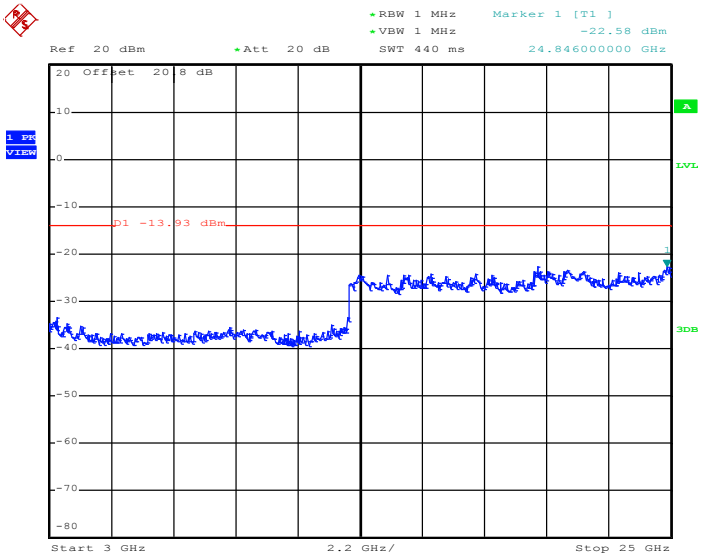
Test Mode :	Mode 10	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	03	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 24.APR.2012 04:33:52

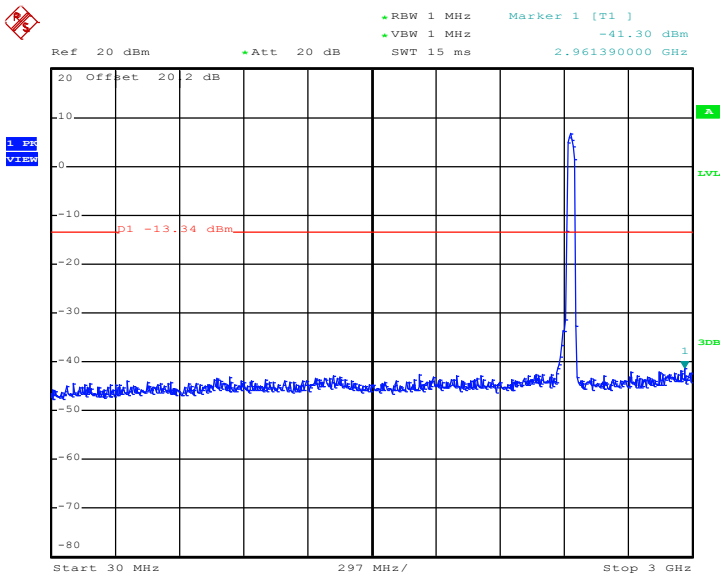
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 24.APR.2012 04:34:10

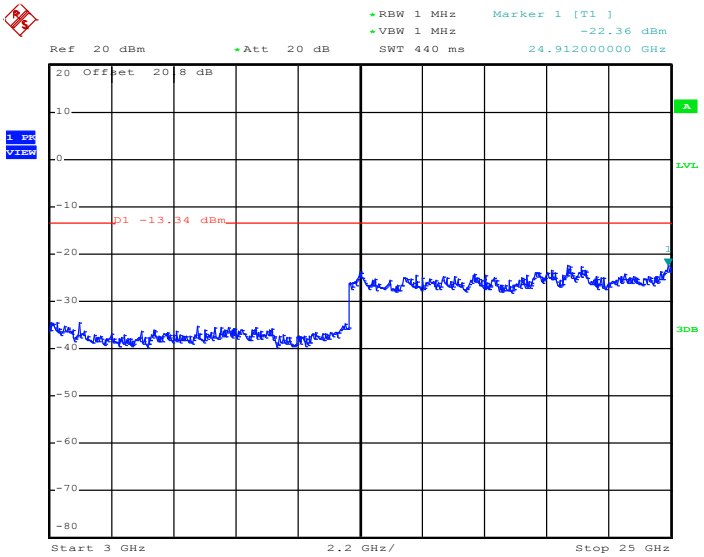
Test Mode :	Mode 11	**Temperature :**	24~26℃
Test Band :	802.11g/n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Reece Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 24.APR.2012 04:40:32

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 24.APR.2012 04:40:49

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.

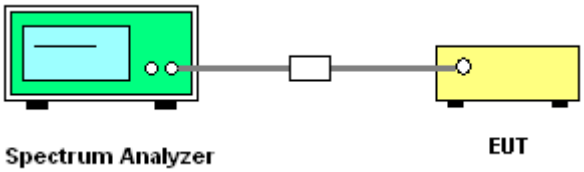
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows Measurement Procedure PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Record the measurement data derived 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. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. 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 = 10log (3 kHz/100 kHz = -15.2 dB).

3.5.4 Test Setup



3.5.5 Test Result of Power Spectral Density

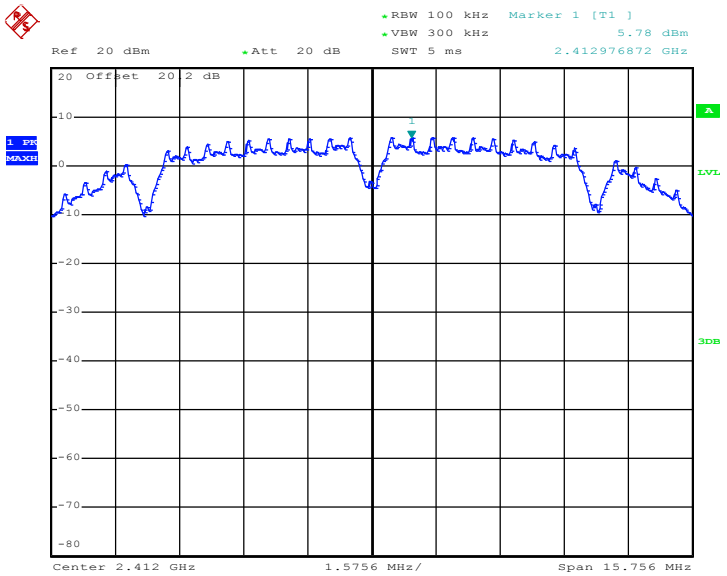
Test Mode :	Mode 1, 2, 3	**Temperature :**	24~26℃
Test Engineer :	Reece Li	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	5.78	-9.42	8	Pass
03	2422	5.31	-9.89	8	Pass
06	2437	6.48	-8.72	8	Pass

Note:

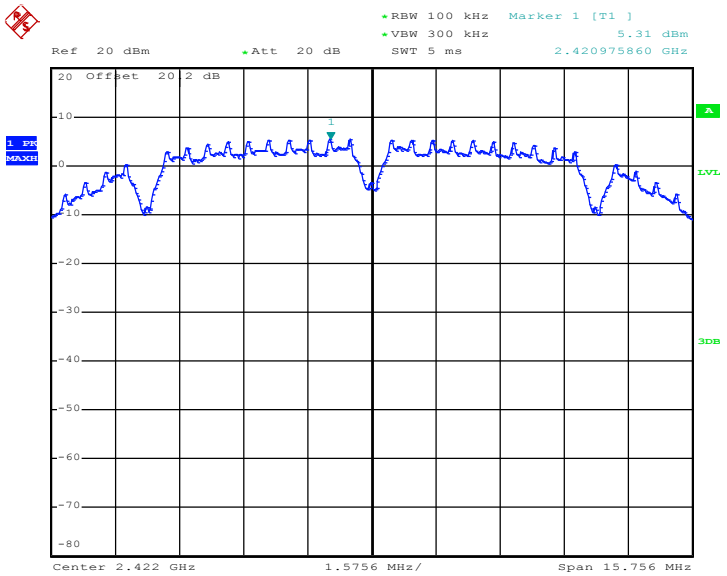
1. *Measured power density (dBm) has offset with cable loss.*
2. *BWCF (dB) = 10 log (3k/100k) = -15.2 dB*
3. *Power Density/ 3kHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)*

Mode 1 : PSD Plot on 802.11b Channel 01



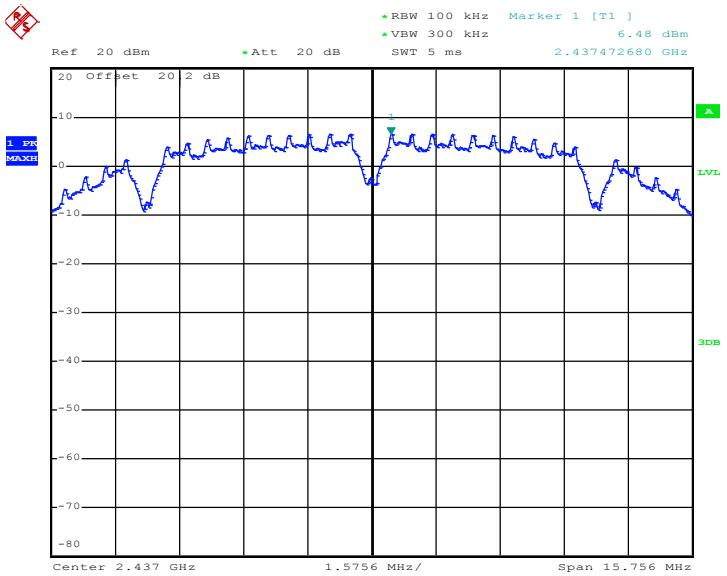
Date: 21.APR.2012 02:05:27

Mode 2 : PSD Plot on 802.11b Channel 03



Date: 21.APR.2012 02:08:51

Mode 3 : PSD Plot on 802.11b Channel 06



Date: 21.APR.2012 02:50:20

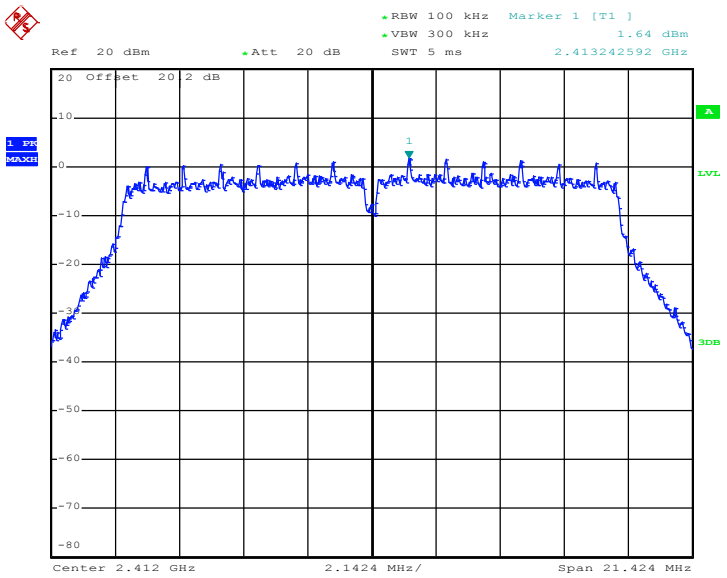
Test Mode :	Mode 4, 5, 6	**Temperature :**	24~26℃
Test Engineer :	Reece Li	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	1.64	-13.56	8	Pass
03	2422	1.94	-13.26	8	Pass
06	2437	2.03	-13.17	8	Pass

Note:

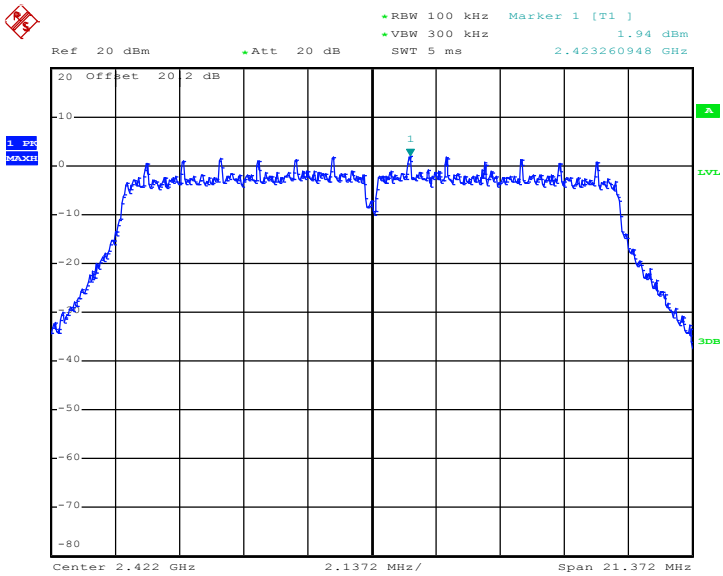
1. *Measured power density (dBm) has offset with cable loss.*
2. *BWCF (dB) = 10 log (3k/100k) = -15.2 dB*
3. *Power Density/ 3KHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)*

Mode 4 : PSD Plot on 802.11g Channel 01



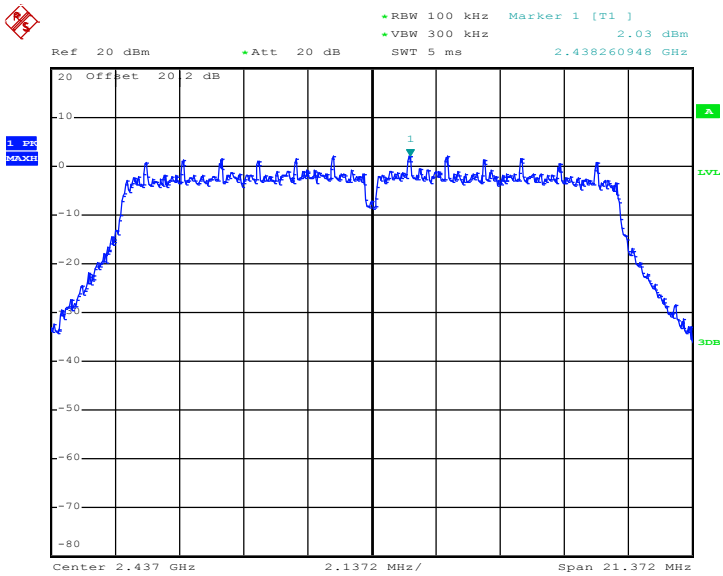
Date: 21.APR.2012 02:27:01

Mode 5 : PSD Plot on 802.11g Channel 03



Date: 21.APR.2012 02:21:58

Mode 6 : PSD Plot on 802.11g Channel 06



Date: 21.APR.2012 02:52:56

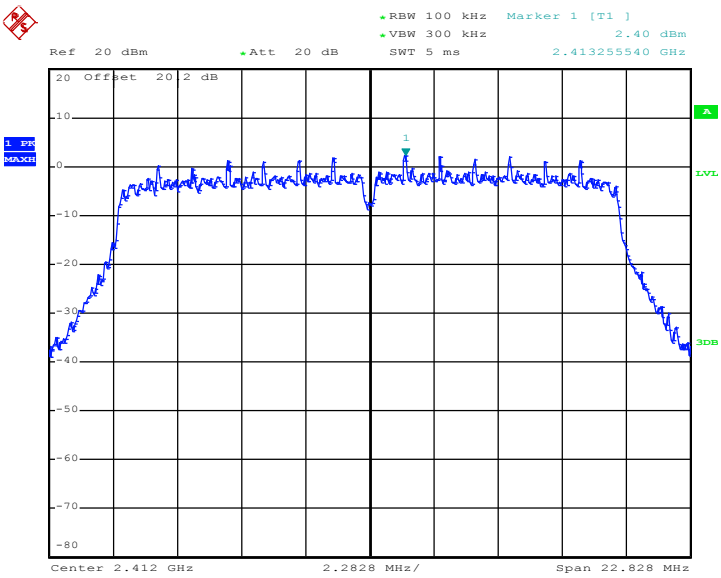
Test Mode :	Mode 7, 8, 9	**Temperature :**	24~26℃
Test Engineer :	Reece Li	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	2.40	-12.80	8	Pass
03	2422	1.97	-13.23	8	Pass
06	2437	2.08	-13.12	8	Pass

Note:

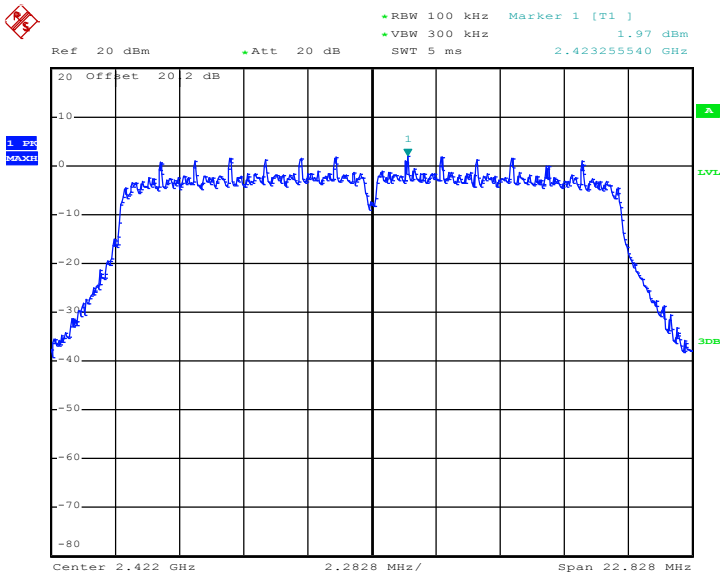
1. *Measured power density (dBm) has offset with cable loss.*
2. *BWCF (dB) = 10 log (3k/100k) = -15.2 dB*
3. *Power Density/ 3KHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)*

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



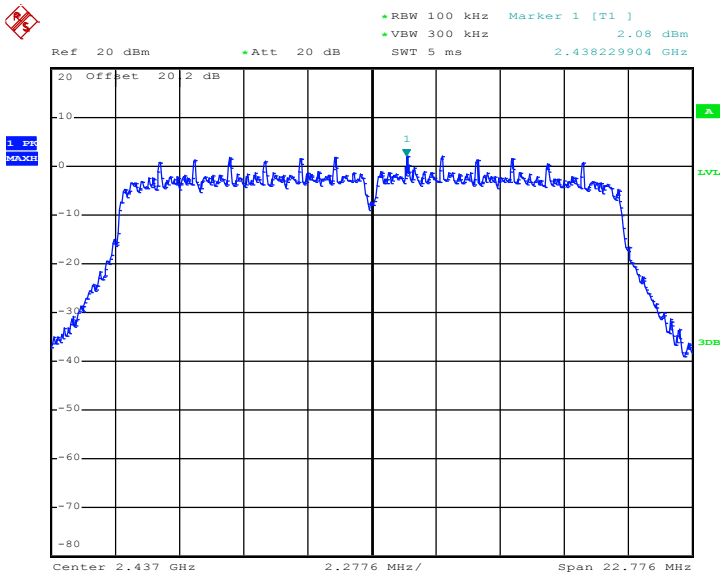
Date: 21.APR.2012 02:31:11

Mode 8 : PSD Plot on802.11g/n (BW 20MHz) Channel 03



Date: 21.APR.2012 02:46:32

Mode 9 : PSD Plot on 802.11g/n (BW 20MHz) Channel 06



Date: 21.APR.2012 02:48:21

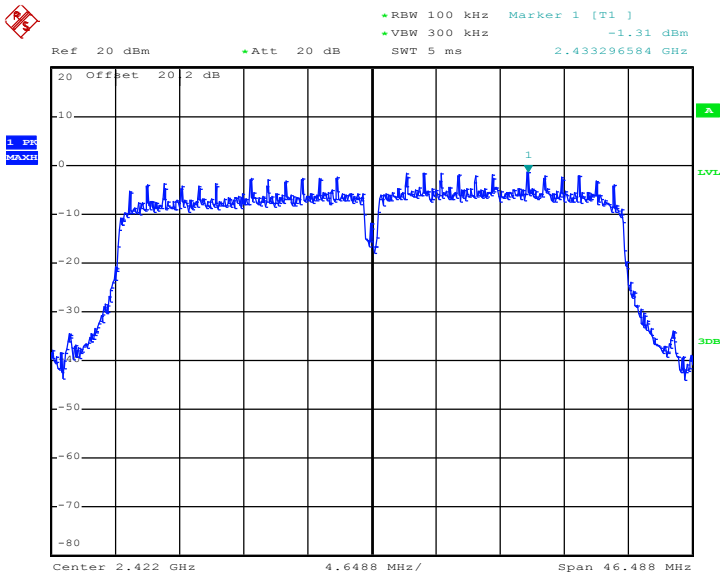
Test Mode :	Mode 10, 11	**Temperature :**	24~26
Test Engineer :	Reece Li	**Relative Humidity :**	50~53

Channel	Frequency (MHz)	802.11g/n (BW 40MHz) Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
03	2422	-1.31	-16.51	8	Pass
06	2437	-0.51	-15.71	8	Pass

Note:

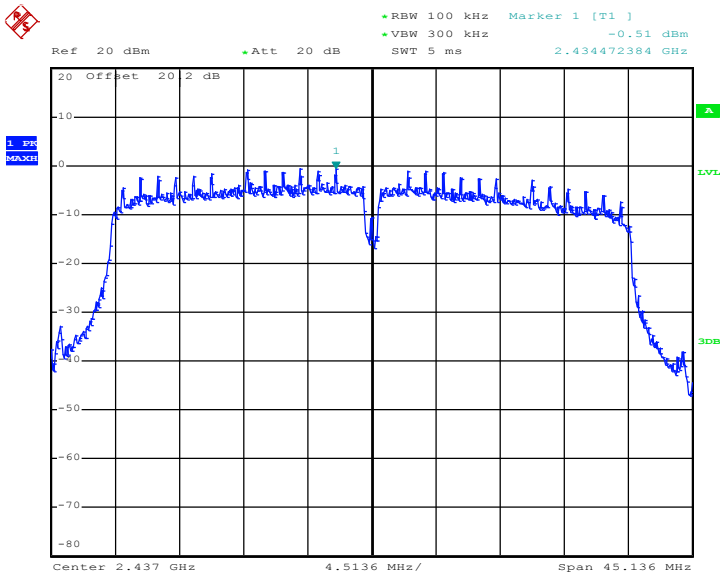
1. *Measured power density (dBm) has offset with cable loss.*
2. *BWCF (dB) = 10 log (3k/100k) = -15.2 dB*
3. *Power Density/ 3KHz (dBm)= Measured power density/ 100KHz (dBm) + BWCF (dB)*

Mode 10 : PSD Plot on 802.11g/n (BW 40MHz) Channel 03



Date: 24.APR.2012 04:32:55

Mode 11 : PSD Plot on802.11g/n (BW 40MHz) Channel 06



Date: 24.APR.2012 04:39:37

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.

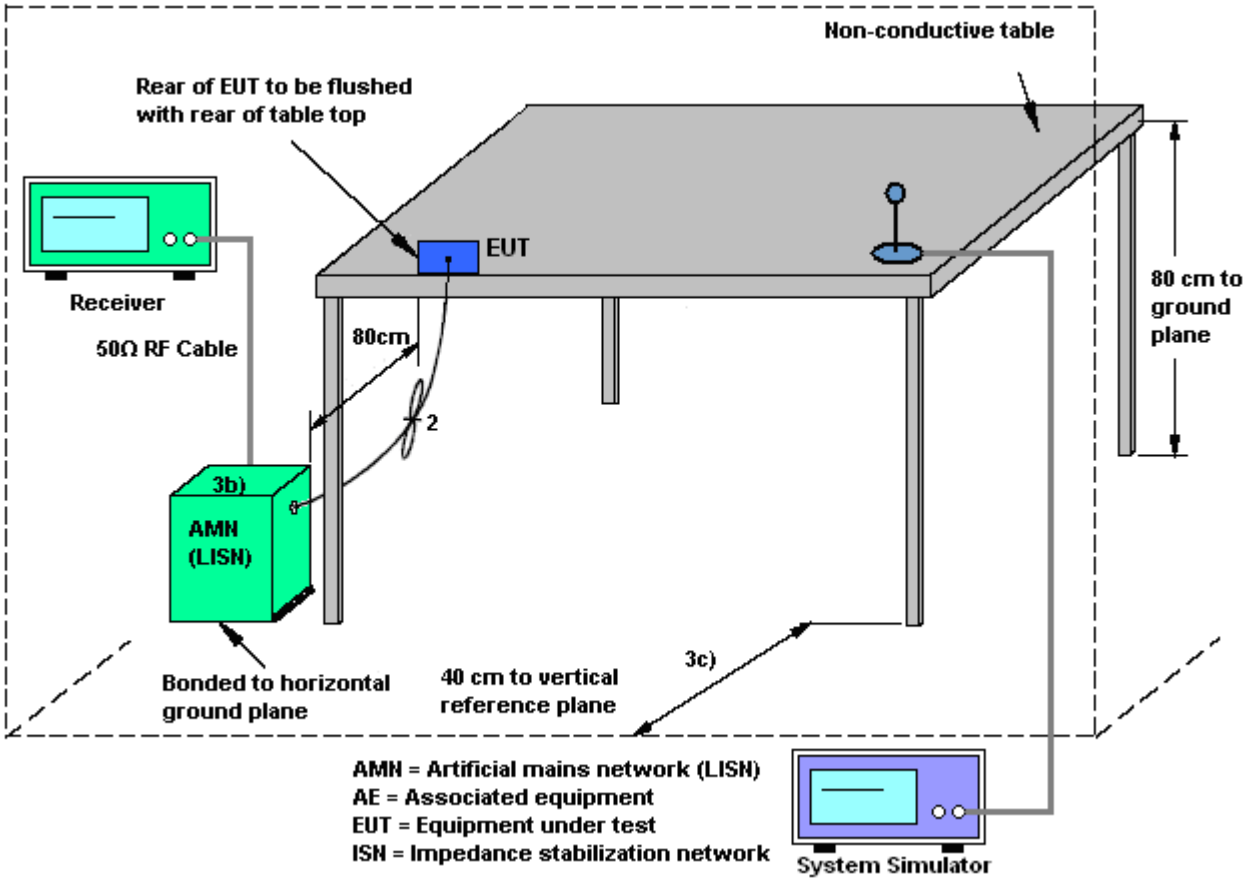
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

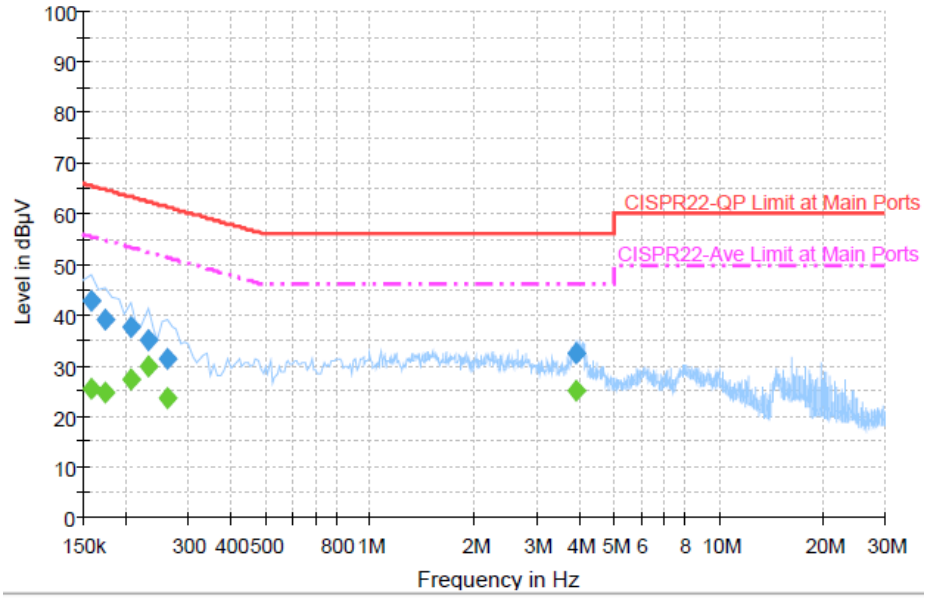
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 :**	20~23℃
Test Engineer :	Slash Huang	**Relative Humidity :**	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WiMAX Idle + WLAN (2.4G) Link + RJ-45 Link + VIOP + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



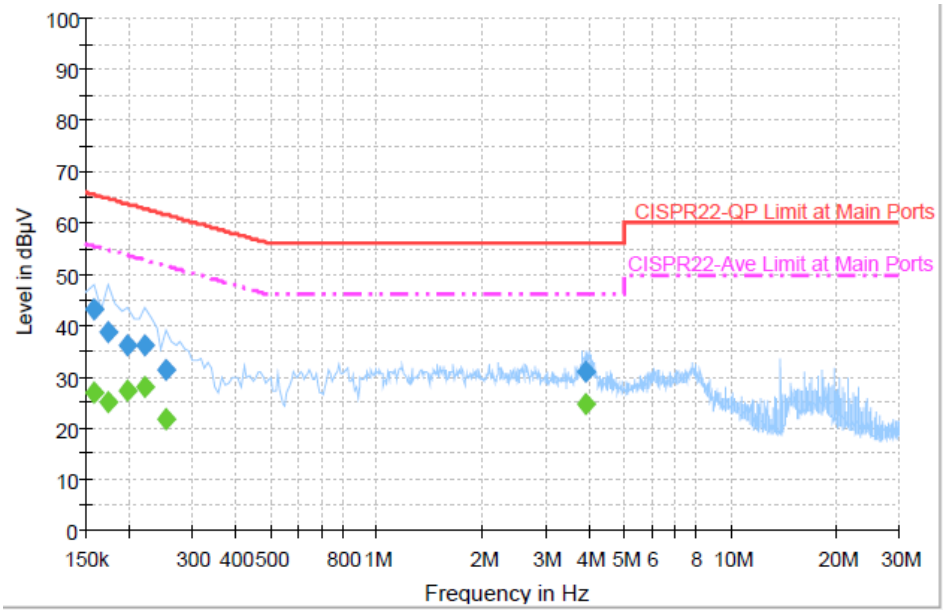
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	42.9	Off	L1	19.4	22.7	65.6
0.174000	38.9	Off	L1	19.4	25.9	64.8
0.206000	37.5	Off	L1	19.4	25.9	63.4
0.230000	35.2	Off	L1	19.4	27.2	62.4
0.262000	31.3	Off	L1	19.4	30.1	61.4
3.910000	32.3	Off	L1	19.5	23.7	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	25.4	Off	L1	19.4	30.2	55.6
0.174000	24.8	Off	L1	19.4	30.0	54.8
0.206000	27.4	Off	L1	19.4	26.0	53.4
0.230000	29.7	Off	L1	19.4	22.7	52.4
0.262000	23.4	Off	L1	19.4	28.0	51.4
3.910000	24.9	Off	L1	19.5	21.1	46.0

Test Mode :	Mode 1	**Temperature :**	20~23℃
Test Engineer :	Slash Huang	**Relative Humidity :**	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WiMAX Idle + WLAN (2.4G) Link + RJ-45 Link + VIOP + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	43.1	Off	N	19.4	22.5	65.6
0.174000	38.8	Off	N	19.4	26.0	64.8
0.198000	36.2	Off	N	19.4	27.5	63.7
0.222000	36.2	Off	N	19.4	26.5	62.7
0.254000	31.5	Off	N	19.4	30.1	61.6
3.910000	31.1	Off	N	19.5	24.9	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	26.9	Off	N	19.4	28.7	55.6
0.174000	25.1	Off	N	19.4	29.7	54.8
0.198000	27.3	Off	N	19.4	26.4	53.7
0.222000	28.1	Off	N	19.4	24.6	52.7
0.254000	21.8	Off	N	19.4	29.8	51.6
3.910000	24.8	Off	N	19.5	21.2	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

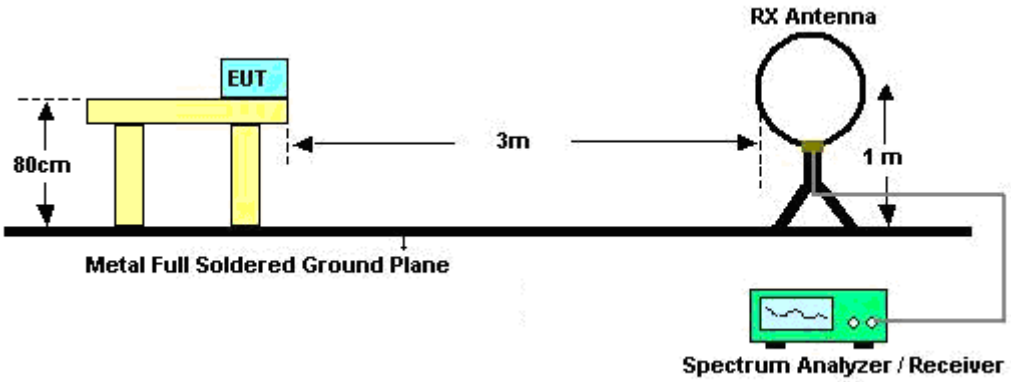
See list of measuring instruments of this test report.

3.7.3 Test Procedures

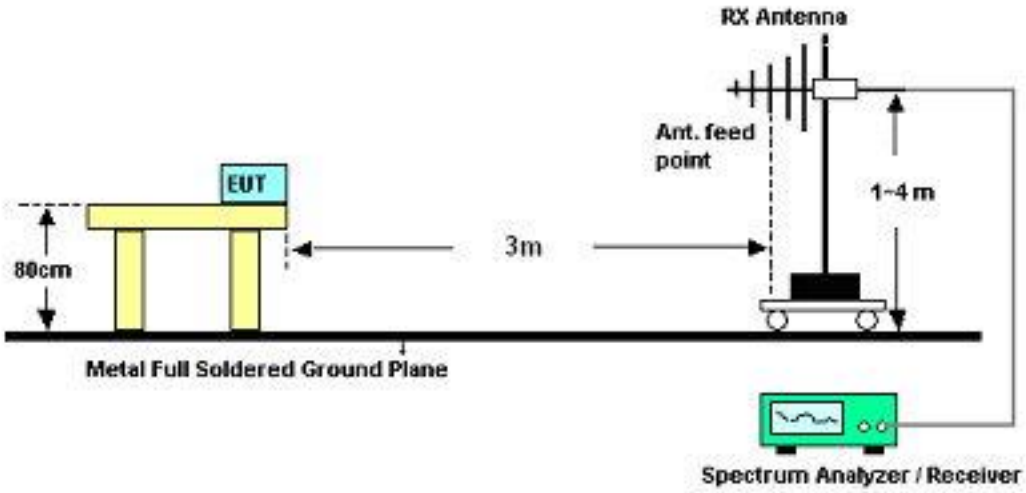
1. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW = 1 MHz for f ≥ 1 GHz, 100 KHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Measurement above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB per decade from 3m to 1m.
   Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB)
2. Maximize the emission by rotating the EUT for three orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines in ANSI C63.4-2003.

3.7.4 Test Setup

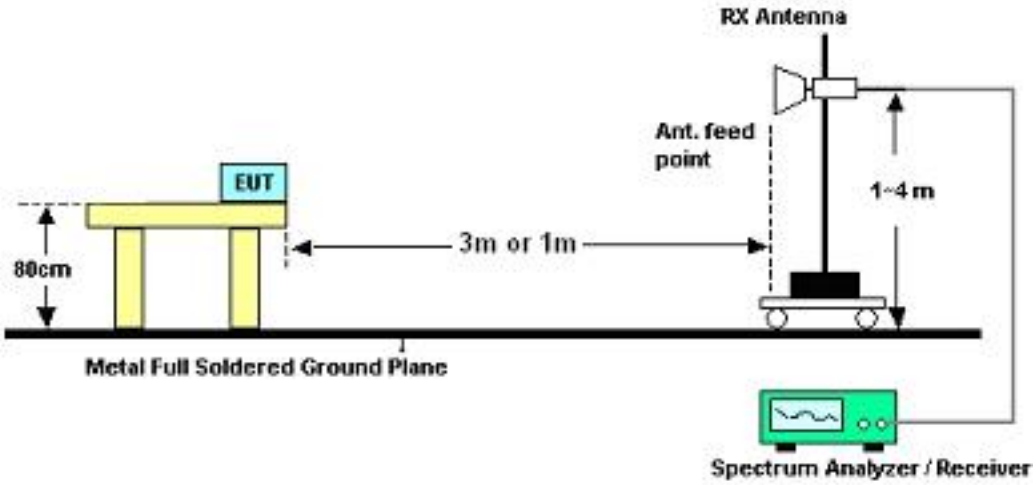
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

Test Mode :	Mode 1	**Temperature :**	24~25℃
Test Channel :	01	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz and 9648 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 108.7 dBuV/m - 20dB = 88.7 dBuV/m.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2381.82	41.72	-12.28	54	39	31.88	5.4	34.56	102	226	Average
2381.82	52.3	-21.7	74	49.58	31.88	5.4	34.56	102	226	Peak
2412	108.7	-	-	105.92	31.91	5.43	34.56	102	226	Peak
2412	104.95	-	-	102.17	31.91	5.43	34.56	102	226	Average
2484	33.22	-20.78	54	30.27	31.98	5.52	34.55	102	226	Average
2484	45.06	-28.94	74	42.11	31.98	5.52	34.55	102	226	Peak
4824	50.93	-23.07	74	64.42	34.4	7.96	55.85	102	85	Peak
7236	51.87	-36.83	88.7	61.54	35.66	11.02	56.35	103	84	Peak
9648	56.2	-32.5	88.7	65.38	36.79	10.32	56.29	108	345	Peak

Test Mode :	Mode 1	**Temperature :**	24~25℃
Test Channel :	01	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz and 9648 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level.		

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	39.39	-14.61	54	36.65	31.9	5.4	34.56	100	343	Average
2389.99	50	-24	74	47.26	31.9	5.4	34.56	100	343	Peak
2412	103.49	-	-	100.71	31.91	5.43	34.56	100	343	Peak
2412	100.3	-	-	97.52	31.91	5.43	34.56	100	343	Average
2500	33.05	-20.95	54	30.08	32	5.52	34.55	100	343	Average
2500	45.56	-28.44	74	42.59	32	5.52	34.55	100	343	Peak
4824	50.15	-23.85	74	63.64	34.4	7.96	55.85	100	2	Peak
7236	51.13	-32.36	83.49	60.8	35.66	11.02	56.35	112	214	Peak
9648	53.41	-30.08	83.49	62.59	36.79	10.32	56.29	121	54	Peak

Test Mode :	Mode 2	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	1. 2422 MHz is fundamental signal which can be ignored. 2. 9688 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
2372	49.96	-24.04	74	47.27	31.88	5.37	34.56	104	240	Peak
2372	39.62	-14.38	54	36.93	31.88	5.37	34.56	104	240	Average
2422	107.47	-	-	104.67	31.93	5.43	34.56	104	240	Peak
2422	103.97	-	-	101.17	31.93	5.43	34.56	104	240	Average
2494	45.2	-28.8	74	42.23	32	5.52	34.55	104	240	Peak
2494	33.11	-20.89	54	30.14	32	5.52	34.55	104	240	Average
4844	49.68	-24.32	74	63.17	34.39	7.98	55.86	103	58	Peak
7266	50.79	-23.21	74	60.44	35.63	11.06	56.34	102	92	Peak
9688	54.09	-33.38	87.47	63.23	36.83	10.33	56.3	105	64	Peak

Test Mode :	Mode 2	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	1. 2422 MHz is fundamental signal which can be ignored. 2. 9688 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
2390	49.03	-24.97	74	46.29	31.9	5.4	34.56	100	354	Peak
2390	38.35	-15.65	54	35.61	31.9	5.4	34.56	100	354	Average
2422	104.5	-	-	101.7	31.93	5.43	34.56	100	354	Peak
2422	100.52	-	-	97.72	31.93	5.43	34.56	100	354	Average
2500	45.24	-28.76	74	42.27	32	5.52	34.55	100	354	Peak
2500	33.11	-20.89	54	30.14	32	5.52	34.55	100	354	Average
4844	49.47	-24.53	74	62.96	34.39	7.98	55.86	120	74	Peak
7266	50.13	-23.87	74	59.78	35.64	11.06	56.35	127	125	Peak
9688	52.07	-32.43	84.5	61.21	36.83	10.33	56.3	137	58	Peak

Test Mode :	Mode 3	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. 9748 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
2390	50.46	-23.54	74	47.72	31.9	5.4	34.56	100	232	Peak
2390	39.75	-14.25	54	37.01	31.9	5.4	34.56	100	232	Average
2437	108.55	-	-	105.7	31.95	5.46	34.56	100	232	Peak
2437	104.67	-	-	101.82	31.95	5.46	34.56	100	232	Average
2494	44.47	-29.53	74	41.5	32	5.52	34.55	100	232	Peak
2494	33.34	-20.66	54	30.37	32	5.52	34.55	100	232	Average
4874	47.7	-26.3	74	61.2	34.37	8	55.87	105	35	Peak
7311	50.92	-23.08	74	60.51	35.61	11.12	56.32	127	97	Peak
9748	53.54	-35.01	88.55	62.6	36.89	10.35	56.3	155	65	Peak

Test Mode :	Mode 3	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. 9748 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
2390	49.85	-24.15	74	47.11	31.9	5.4	34.56	100	347	Peak
2390	39.57	-14.43	54	36.83	31.9	5.4	34.56	100	347	Average
2437	104.05	-	-	101.2	31.95	5.46	34.56	100	347	Peak
2437	100.33	-	-	97.48	31.95	5.46	34.56	100	347	Average
2492	45.29	-28.71	74	42.32	32	5.52	34.55	100	347	Peak
2492	33.1	-20.9	54	30.13	32	5.52	34.55	100	347	Average
4874	48.03	-25.97	74	61.52	34.37	8.01	55.87	105	127	Peak
7311	49.94	-24.06	74	59.53	35.61	11.12	56.32	108	12	Peak
9748	51.36	-32.69	84.05	60.42	36.89	10.35	56.3	127	12	Peak

Test Mode :	Mode 4	**Temperature :**	24~25℃
Test Channel :	01	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2388.85	39.11	-14.89	54	36.37	31.9	5.4	34.56	102	224	Average
2388.85	55.69	-18.31	74	52.95	31.9	5.4	34.56	102	224	Peak
2412	97.83	-	-	95.05	31.91	5.43	34.56	102	224	Average
2412	107.15	-	-	104.37	31.91	5.43	34.56	102	224	Peak
2484	45.05	-28.95	74	42.1	31.98	5.52	34.55	102	224	Peak
2484	33.2	-20.8	54	30.25	31.98	5.52	34.55	102	224	Average

Test Mode :	Mode 4	**Temperature :**	24~25℃
Test Channel :	01	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2389.99	38.32	-15.68	54	35.58	31.9	5.4	34.56	100	358	Average
2389.99	54.48	-19.52	74	51.74	31.9	5.4	34.56	100	358	Peak
2412	93.63	-	-	90.85	31.91	5.43	34.56	100	358	Average
2412	103.4	-	-	100.62	31.91	5.43	34.56	100	358	Peak
2492	45.01	-28.99	74	42.04	32	5.52	34.55	100	358	Peak
2492	33.05	-20.95	54	30.08	32	5.52	34.55	100	358	Average

Test Mode :	Mode 5	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	2422 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
2390	53.74	-20.26	74	51	31.9	5.4	34.56	102	235	Peak
2390	39.8	-14.2	54	37.06	31.9	5.4	34.56	102	235	Average
2422	105.97	-	-	103.14	31.93	5.46	34.56	102	235	Peak
2422	96.31	-	-	93.51	31.93	5.43	34.56	102	235	Average
2494	45.07	-28.93	74	42.1	32	5.52	34.55	102	235	Peak
2494	33.14	-20.86	54	30.17	32	5.52	34.55	102	235	Average

Test Mode :	Mode 5	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	2422 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
2390	49.85	-24.15	74	47.11	31.9	5.4	34.56	100	353	Peak
2390	38.18	-15.82	54	35.44	31.9	5.4	34.56	100	353	Average
2422	102.51	-	-	99.71	31.93	5.43	34.56	100	353	Peak
2422	92.78	-	-	89.98	31.93	5.43	34.56	100	353	Average
2484	45.21	-28.79	74	42.26	31.98	5.52	34.55	100	353	Peak
2484	32.93	-21.07	54	29.98	31.98	5.52	34.55	100	353	Average

Test Mode :	Mode 6	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2390	51.31	-22.69	74	48.57	31.9	5.4	34.56	100	232	Peak
2390	39.76	-14.24	54	37.02	31.9	5.4	34.56	100	232	Average
2437	107.38	-	-	104.53	31.95	5.46	34.56	100	232	Peak
2437	97.65	-	-	94.8	31.95	5.46	34.56	100	232	Average
2486	46.05	-27.95	74	43.1	31.98	5.52	34.55	100	232	Peak
2486	33.19	-20.81	54	30.24	31.98	5.52	34.55	100	232	Average

Test Mode :	Mode 6	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2382	48.59	-25.41	74	45.87	31.88	5.4	34.56	100	343	Peak
2382	37.42	-16.58	54	34.7	31.88	5.4	34.56	100	343	Average
2437	102.86	-	-	100.03	31.93	5.46	34.56	100	343	Peak
2437	93.48	-	-	90.63	31.95	5.46	34.56	100	343	Average
2486	46.31	-27.69	74	43.36	31.98	5.52	34.55	100	343	Peak
2486	33.02	-20.98	54	30.07	31.98	5.52	34.55	100	343	Average

Test Mode :	Mode 7	**Temperature :**	24~25℃
Test Channel :	01	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2389.99	39.22	-14.78	54	36.48	31.9	5.4	34.56	101	226	Average
2389.99	56.53	-17.47	74	53.79	31.9	5.4	34.56	101	226	Peak
2412	96.87	-	-	94.09	31.91	5.43	34.56	101	226	Average
2412	106.47	-	-	103.69	31.91	5.43	34.56	101	226	Peak
2484	46.04	-27.96	74	43.09	31.98	5.52	34.55	101	226	Peak
2484	33.25	-20.75	54	30.3	31.98	5.52	34.55	101	226	Average

Test Mode :	Mode 7	**Temperature :**	24~25℃
Test Channel :	01	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2389.61	38.47	-15.53	54	35.73	31.9	5.4	34.56	100	359	Average
2389.61	55.53	-18.47	74	52.79	31.9	5.4	34.56	100	359	Peak
2412	92.65	-	-	89.87	31.91	5.43	34.56	100	359	Average
2412	102.42	-	-	99.64	31.91	5.43	34.56	100	359	Peak
2492	45.38	-28.62	74	42.41	32	5.52	34.55	100	359	Peak
2492	32.98	-21.02	54	30.01	32	5.52	34.55	100	359	Average

Test Mode :	Mode 8	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	2422 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
2390	52.38	-21.62	74	49.64	31.9	5.4	34.56	100	234	Peak
2390	39.87	-14.13	54	37.13	31.9	5.4	34.56	100	234	Average
2422	104.84	-	-	102.04	31.93	5.43	34.56	100	234	Peak
2422	95.15	-	-	92.35	31.93	5.43	34.56	100	234	Average
2486	45.09	-28.91	74	42.14	31.98	5.52	34.55	100	234	Peak
2486	32.97	-21.03	54	30.02	31.98	5.52	34.55	100	234	Average

Test Mode :	Mode 8	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	2422 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
2380	49.3	-24.7	74	46.58	31.88	5.4	34.56	100	353	Peak
2380	38	-16	54	35.28	31.88	5.4	34.56	100	353	Average
2422	101.76	-	-	98.96	31.93	5.43	34.56	100	353	Peak
2422	92.76	-	-	89.96	31.93	5.43	34.56	100	353	Average
2500	45.39	-28.61	74	42.42	32	5.52	34.55	100	353	Peak
2500	32.98	-21.02	54	30.01	32	5.52	34.55	100	353	Average

Test Mode :	Mode 9	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2390	49.93	-24.07	74	47.19	31.9	5.4	34.56	100	230	Peak
2390	38.33	-15.67	54	35.59	31.9	5.4	34.56	100	230	Average
2437	106.76	-	-	103.91	31.95	5.46	34.56	100	230	Peak
2437	97.16	-	-	94.31	31.95	5.46	34.56	100	230	Average
2486	45.42	-28.58	74	42.47	31.98	5.52	34.55	100	230	Peak
2486	33.2	-20.8	54	30.25	31.98	5.52	34.55	100	230	Average

Test Mode :	Mode 9	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2390	48.72	-25.28	74	45.98	31.9	5.4	34.56	100	346	Peak
2390	36.78	-17.22	54	34.04	31.9	5.4	34.56	100	346	Average
2437	102	-	-	99.17	31.93	5.46	34.56	100	346	Peak
2437	92.21	-	-	89.36	31.95	5.46	34.56	100	346	Average
2494	45.24	-28.76	74	42.27	32	5.52	34.55	100	346	Peak
2494	33.03	-20.97	54	30.06	32	5.52	34.55	100	346	Average

Test Mode :	Mode 10	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	2422 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	17.29	-22.71	40	29.64	18.8	0.4	31.55	-	-	Peak
125.04	20.8	-22.7	43.5	38.94	11.8	1.35	31.29	-	-	Peak
225.48	33.6	-12.4	46	52.76	9.76	2.14	31.06	100	179	Peak
409.9	31.86	-14.14	46	44.66	16.3	2.41	31.51	-	-	Peak
498.8	31.01	-14.99	46	42.43	17.6	2.92	31.94	-	-	Peak
875.4	30.05	-15.95	46	36.74	20.56	3.83	31.08	-	-	Peak
2389.99	44.9	-9.1	54	42.16	31.9	5.4	34.56	100	230	Average
2389.99	59.28	-14.72	74	56.54	31.9	5.4	34.56	100	230	Peak
2422	92.28	-	-	89.48	31.93	5.43	34.56	100	230	Average
2422	102.02	-	-	99.19	31.93	5.46	34.56	100	230	Peak
2484	45.73	-28.27	74	42.78	31.98	5.52	34.55	100	230	Peak
2484	33.08	-20.92	54	30.13	31.98	5.52	34.55	100	230	Average

Test Mode :	Mode 10	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	2422 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	25.34	-14.66	40	38.46	18.02	0.4	31.54	-	-	Peak
54.03	25.61	-14.39	40	49.29	7.2	0.67	31.55	-	-	Peak
257.88	26.71	-19.29	46	42.21	13.44	2.19	31.13	-	-	Peak
407.8	42.35	-3.65	46	55.33	16.19	2.4	31.57	128	293	Peak
491.8	33.31	-12.69	46	44.37	17.6	2.88	31.54	-	-	Peak
649.3	30.5	-15.5	46	38.93	19.2	3.4	31.03	-	-	Peak
2389.99	42.3	-11.7	54	39.56	31.9	5.4	34.56	100	354	Average
2389.99	55.54	-18.46	74	52.8	31.9	5.4	34.56	100	354	Peak
2422	88.33	-	-	85.53	31.93	5.43	34.56	100	354	Average
2422	97.82	-	-	94.99	31.93	5.46	34.56	100	354	Peak
2500	45.56	-28.44	74	42.59	32	5.52	34.55	100	354	Peak
2500	33.01	-20.99	54	30.04	32	5.52	34.55	100	354	Average

Test Mode :	Mode 11	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2390	54.94	-19.06	74	52.2	31.9	5.4	34.56	101	233	Peak
2390	41.58	-12.42	54	38.84	31.9	5.4	34.56	101	233	Average
2437	102.95	-	-	100.12	31.93	5.46	34.56	101	233	Peak
2437	93.69	-	-	90.84	31.95	5.46	34.56	101	233	Average
2494	46.07	-27.93	74	43.1	32	5.52	34.55	101	233	Peak
2494	33.12	-20.88	54	30.15	32	5.52	34.55	101	233	Average

Test Mode :	Mode 11	**Temperature :**	24~25℃
Test Channel :	06	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**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
2390	50.61	-23.39	74	47.87	31.9	5.4	34.56	100	348	Peak
2390	36.43	-17.57	54	33.69	31.9	5.4	34.56	100	348	Average
2437	98.51	-	-	95.68	31.93	5.46	34.56	100	348	Peak
2437	88.74	-	-	85.89	31.95	5.46	34.56	100	348	Average
2486	45.48	-28.52	74	42.53	31.98	5.52	34.55	100	348	Peak
2486	33.84	-20.16	54	30.89	31.98	5.52	34.55	100	348	Average

Test Mode :	Mode 12	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Horizontal
Remark :	2422 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
125.04	20.83	-22.67	43.5	38.97	11.8	1.35	31.29	-	-	Peak
224.94	34.51	-11.49	46	53.8	9.65	2.13	31.07	110	100	Peak
241.14	27.67	-18.33	46	45	11.5	2.25	31.08	-	-	Peak
409.9	31.5	-14.5	46	44.3	16.3	2.41	31.51	-	-	Peak
423.9	28.92	-17.08	46	41.12	16.5	2.46	31.16	-	-	Peak
491.8	30.24	-15.76	46	41.3	17.6	2.88	31.54	-	-	Peak
2388.66	59.66	-14.34	74	56.92	31.9	5.4	34.56	100	174	Peak
2388.66	44.82	-9.18	54	42.08	31.9	5.4	34.56	100	174	Average
2422	100.94	-	-	98.11	31.93	5.46	34.56	100	174	Peak
2422	91.84	-	-	89.04	31.93	5.43	34.56	100	174	Average
2486	46.47	-27.53	74	43.52	31.98	5.52	34.55	100	174	Peak
2486	33.31	-20.69	54	30.36	31.98	5.52	34.55	100	174	Average

Test Mode :	Mode 12	**Temperature :**	24~25℃
Test Channel :	03	**Relative Humidity :**	50~51%
Test Engineer :	Ivan Chiang	**Polarization :**	Vertical
Remark :	2422 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
53.49	27.47	-12.53	40	50.92	7.5	0.66	31.61	-	-	Peak
60.24	26.54	-13.46	40	51.1	6.3	0.65	31.51	-	-	Peak
249.24	25.8	-20.2	46	42.33	12.3	2.28	31.11	-	-	Peak
413.4	32.64	-13.36	46	45.26	16.36	2.42	31.4	-	-	Peak
423.9	37.26	-8.74	46	49.46	16.5	2.46	31.16	100	234	Peak
491.8	33.3	-12.7	46	44.36	17.6	2.88	31.54	-	-	Peak
2389.99	38.28	-15.72	54	35.54	31.9	5.4	34.56	100	228	Average
2389.99	51.51	-22.49	74	48.77	31.9	5.4	34.56	100	228	Peak
2422	83.98	-	-	81.18	31.93	5.43	34.56	100	228	Average
2422	93.78	-	-	90.95	31.93	5.46	34.56	100	228	Peak
2500	45.21	-28.79	74	42.24	32	5.52	34.55	100	228	Peak
2500	32.89	-21.11	54	29.92	32	5.52	34.55	100	228	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 Dipole 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	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Apr. 21, 2012~ Apr. 28, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Apr. 21, 2012~ Apr. 28, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Apr. 21, 2012~ Apr. 28, 2012	Sep. 17, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Apr. 16, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Apr. 16, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Apr. 16, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	Apr. 16, 2012	N/A	Conduction (CO05-HY)
WiMAX Base Station (System Simulator)	Agilent	E6651A	N/A	N/A	N/A	Apr. 16, 2012	N/A	Conduction (CO05-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz ~ 26.5GHz	Nov. 23, 2011	Apr. 24, 2012	Nov. 22, 2012	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-30GHz	Nov. 01, 2011	Apr. 24, 2012	Oct. 31, 2012	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz ~ 1000MHz	May 10, 2011	Apr. 24, 2012	May 09, 2012	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz ~ 2GHz	Oct. 22, 2011	Apr. 24, 2012	Oct. 21, 2012	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 01, 2011	Apr. 24, 2012	Jul. 31, 2012	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz ~ 40GHz	Oct. 21, 2011	Apr. 24, 2012	Oct. 20, 2012	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz ~ 26.5GHz	Apr. 13, 2012	Apr. 24, 2012	Apr. 12, 2013	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz ~ 1GHz	Apr. 11, 2012	Apr. 24, 2012	Apr. 10, 2013	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 18, 2011	Apr. 24, 2012	Jul. 17, 2012	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 29, 2010	Apr. 24, 2012	Jul. 28, 2012	Radiation (03CH06-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 Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(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 Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(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 Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

Appendix A. Photographs of EUT

Please refer to Sporton report number EP231328 as below.