FCC RF Test Report

APPLICANT	**:**	**Dell Inc.**
EQUIPMENT	**:**	**Portable Computer**
BRAND NAME	**:**	**DELL**
MODEL NAME	**:**	**T14G**
FCC ID	**:**	**E2K-T14G001**
STANDARD	**:**	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	**:**	**(DTS) Digital Transmission System**

The product was received on Nov. 07, 2014 and testing was completed on Nov. 25, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4N0733C	Rev. 01	Initial issue of report	Dec. 11, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-210 A8.2(a)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	RSS-Gen 4.6.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	RSS-210 A8.4	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	RSS-210 A8.2(b)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	RSS-210 A8.5	Conducted Band Edges	≤ 20dBc	Pass	-
			Conducted Spurious Emission		Pass	-
3.5	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.28 dB at 2484.040 MHz
3.6	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 6.50 dB at 0.478 MHz
3.7	15.203 & 15.247(b)	RSS-210 A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Dell Inc.
One Dell Way Round Rock, TX 78682, USA

1.2 Manufacturer

Dell Inc.
One Dell Way Round Rock, TX 78682, USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Computer
Brand Name	DELL
Model Name	T14G
FCC ID	E2K-T14G001
EUT supports Radios application	WLAN 11b/g/n (HT20) WLAN 11a/n (HT20/HT40) Bluetooth v4.0 EDR/LE
HW Version	DVT1 Stage
SW Version	X12
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 Product Specification subjective to this standard

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>802.11b/g/n : 2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum Output Power to antenna</td><td><Ant. 1>
802.11b : 18.46 dBm (0.0701 W)
802.11g : 23.07 dBm (0.2028 W)
SISO <Ant. 1>
802.11n HT20 : 22.35 dBm (0.1718 W)
<Ant. 2>
802.11b : 18.69 dBm (0.0740 W)
802.11g : 23.09 dBm (0.2037 W)
SISO <Ant. 2>
802.11n HT20 : 22.40 dBm (0.1738 W)
<MIMO Ant. 1+2>
802.11n HT20 : 23.28 dBm (0.2128 W)</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11b : 11.10MHz
802.11g : 17.20MHz
802.11n HT20 : 18.00MHz</td></tr>
<tr><td>Antenna Type</td><td><Ant 1>
802.11b/g/n : PIFA Antenna type with gain -0.61 dBi
<Ant 2>
802.11b/g/n : PIFA Antenna type with gain 0.51 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><th></th><th>Chain
Port 0
Ant. 1</th><th>Chain
Port 1
Ant. 2</th></tr>
<tr><td>802.11 b</td><td>V</td><td>V</td></tr>
<tr><td>802.11 g</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n
SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n
MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

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: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		
	TH02-HY	CO05-HY	03CH05-HY

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 Applicable 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 v03r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.4-2003

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals 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) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X and Y plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

<Ant. 1>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	18.46	18.44	18.33	18.42

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	23.07	23.06	23.04	23.07	22.97	23.07	22.96	22.89

SISO <Ant. 1>

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	22.33	22.19	22.31	22.17	22.34	22.29	22.31	22.35

<Ant. 2>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	18.69	18.65	18.67	18.61

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	23.09	22.98	23.01	23.03	23.07	22.99	22.96	22.92

SISO <Ant. 1>

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	22.40	22.26	22.06	21.93	22.17	22.34	22.24	22.14

MIMO <Ant. 1+2>

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	23.28	23.05	23.24	23.01	22.83	22.70	22.94	23.01

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

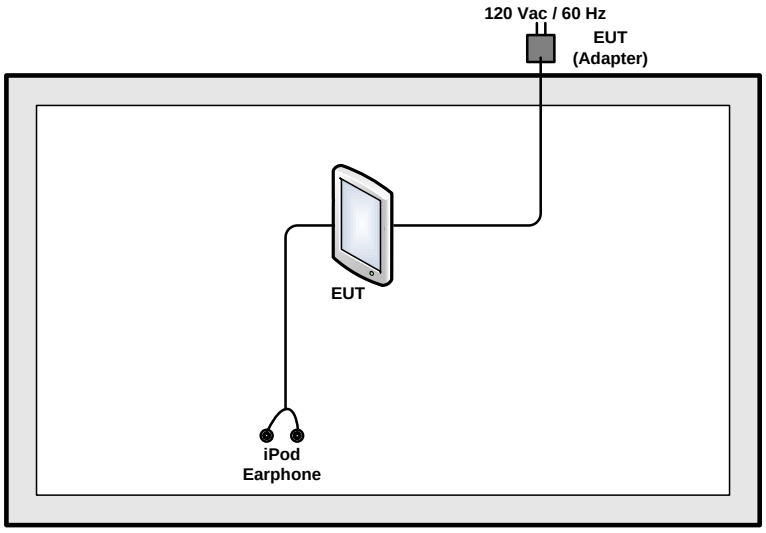
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	**Mode**	**Data Rate**	**Test Channel**
Conducted TCs	**6dB and 99% BW Power Spectral Density**	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**6.5 Mbps**	**1/6/11**
	Output Power	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**6.5 Mbps**	**1/6/11**
	Conducted Band Edge	**802.11b**	**1 Mbps**	**1/11**
		802.11g	**6 Mbps**	**1/11**
		802.11n HT20	**6.5 Mbps**	**1/11**
	Conducted Spurious Emission	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**6.5 Mbps**	**1/6/11**
Radiated TCs	**Radiated Band Edge**	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**6.5 Mbps**	**1/6/11**
	Radiated Spurious Emission	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**6.5 Mbps**	**1/6/11**

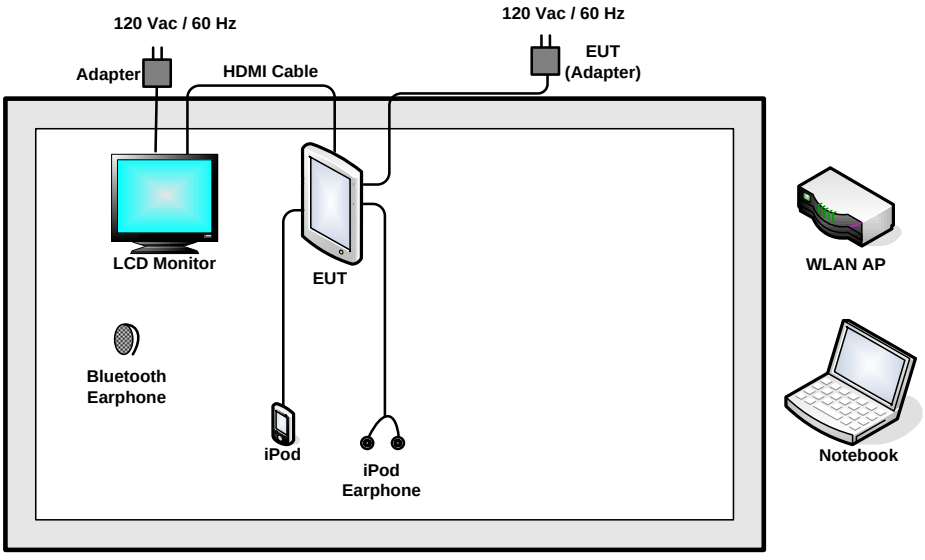
Test Cases	
AC Conducted Emission	Mode 1 : WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	D-Link	DIR-865L	KA2IR865LA1	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
5.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
6.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
7.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.6 EUT Operation Test Setup

The programmed RF utility “cmd” 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.

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

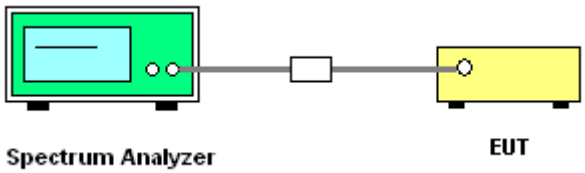
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

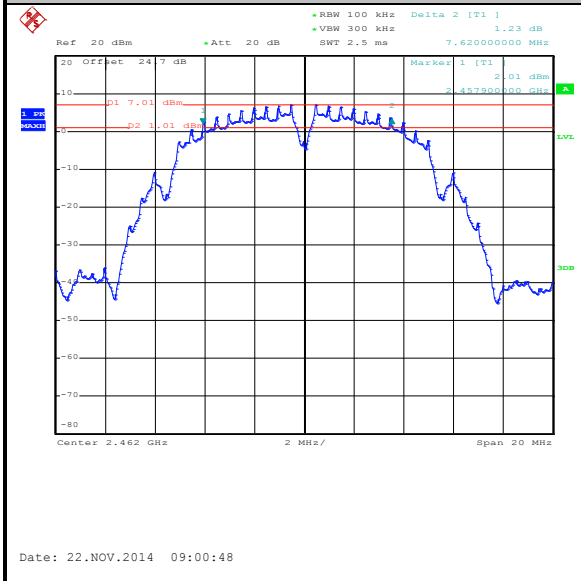
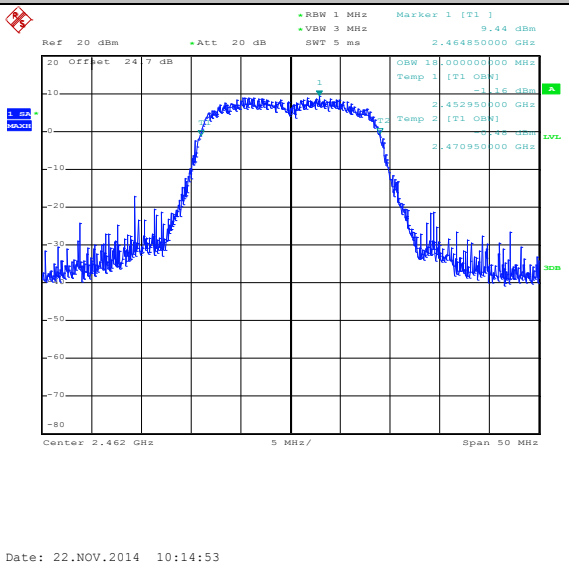
3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Test Band :	2.4GHz	Temperature :	21~25℃
Test Engineer :	Luffy Lin	Relative Humidity :	51~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	99% Bandwidth (MHz)		6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant. 1	Ant. 2	Ant. 1	Ant. 2		
11b	1Mbps	1	1	2412		11.10		8.04	0.5	Pass
11b	1Mbps	1	6	2437		11.10		8.08	0.5	Pass
11b	1Mbps	1	11	2462		11.10		7.62	0.5	Pass
11g	6Mbps	1	1	2412		17.10		15.84	0.5	Pass
11g	6Mbps	1	6	2437		17.20		15.48	0.5	Pass
11g	6Mbps	1	11	2462		17.10		15.74	0.5	Pass
HT20	MCS0	1	1	2412		17.95		15.56	0.5	Pass
HT20	MCS0	1	6	2437		17.85		15.76	0.5	Pass
HT20	MCS0	1	11	2462		18.00		16.18	0.5	Pass
HT20	MCS8	2	1	2412	17.95	17.95	15.92	16.32	0.5	Pass
HT20	MCS8	2	6	2437	17.90	17.90	16.02	16.32	0.5	Pass
HT20	MCS8	2	11	2462	17.95	17.90	16.00	16.36	0.5	Pass

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Peak Output Power Measurement

3.2.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is 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.

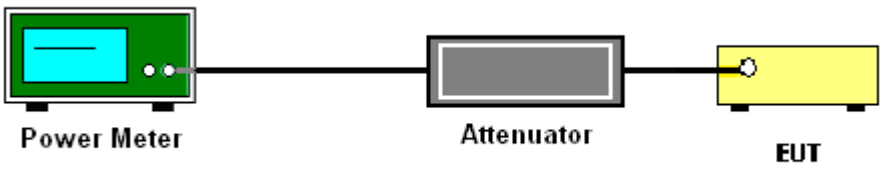
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Test Band :	2.4GHz	Temperature :	21~25℃
Test Engineer :	Luffy Lin	Relative Humidity :	51~54%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Max. Limit (dBm)		DG (dBi)		Pass/Fail
					Ant. 1	Ant. 2	SUM	Ant. 1	Ant. 2	Ant. 1	Ant. 2	
11b	1Mbps	1	1	2412	18.46	18.31		30.00	30.00	-0.61	0.51	Pass
11b	1Mbps	1	6	2437	18.35	18.09		30.00	30.00	-0.61	0.51	Pass
11b	1Mbps	1	11	2462	18.25	18.69		30.00	30.00	-0.61	0.51	Pass
11g	6Mbps	1	1	2412	21.94	22.55		30.00	30.00	-0.61	0.51	Pass
11g	6Mbps	1	6	2437	23.07	23.09		30.00	30.00	-0.61	0.51	Pass
11g	6Mbps	1	11	2462	21.76	22.37		30.00	30.00	-0.61	0.51	Pass
HT20	MCS0	1	1	2412	22.32	22.40		30.00	30.00	-0.61	0.51	Pass
HT20	MCS0	1	6	2437	22.33	22.39		30.00	30.00	-0.61	0.51	Pass
HT20	MCS0	1	11	2462	22.31	22.06		30.00	30.00	-0.61	0.51	Pass
HT20	MCS8	2	1	2412	20.11	20.42	23.28	30.00		2.98		Pass
HT20	MCS8	2	6	2437	20.09	20.41	23.26	30.00		2.98		Pass
HT20	MCS8	2	11	2462	20.08	20.35	23.23	30.00		2.98		Pass

Note: Measured power (dBm) has offset with cable loss.

3.2.6 Test Result of Average output Power (Reporting Only)

Test Band :	2.4GHz	Temperature :	21~25℃
Test Engineer :	Luffy Lin	Relative Humidity :	51~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant. 1	Ant. 2	Ant. 1	Ant. 2	Sum Power
11b	1Mbps	1	1	2412	0.03	0.03	14.77	14.63	
11b	1Mbps	1	6	2437	0.03	0.03	14.65	14.52	
11b	1Mbps	1	11	2462	0.03	0.03	14.58	14.95	
11g	6Mbps	1	1	2412	0.20	0.17	12.05	12.94	
11g	6Mbps	1	6	2437	0.20	0.17	14.89	14.90	
11g	6Mbps	1	11	2462	0.20	0.17	12.18	12.77	
HT20	MCS0	1	1	2412	0.21	0.21	12.73	12.72	
HT20	MCS0	1	6	2437	0.21	0.21	12.89	12.60	
HT20	MCS0	1	11	2462	0.21	0.21	12.88	12.51	
HT20	MCS8	2	1	2412	0.40	0.40	9.66	9.75	12.72
HT20	MCS8	2	6	2437	0.40	0.40	9.48	9.65	12.58
HT20	MCS8	2	11	2462	0.40	0.40	9.54	9.49	12.53

Note: Measured power (dBm) has offset with cable loss and duty factor.

3.3 Power Spectral Density Measurement

3.3.1 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.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
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.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

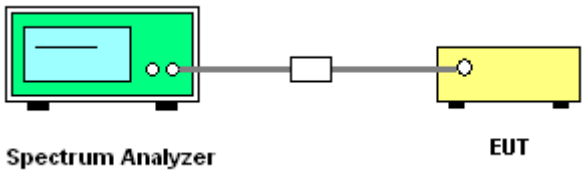
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   Method (1): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

   Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

3.3.4 Test Setup



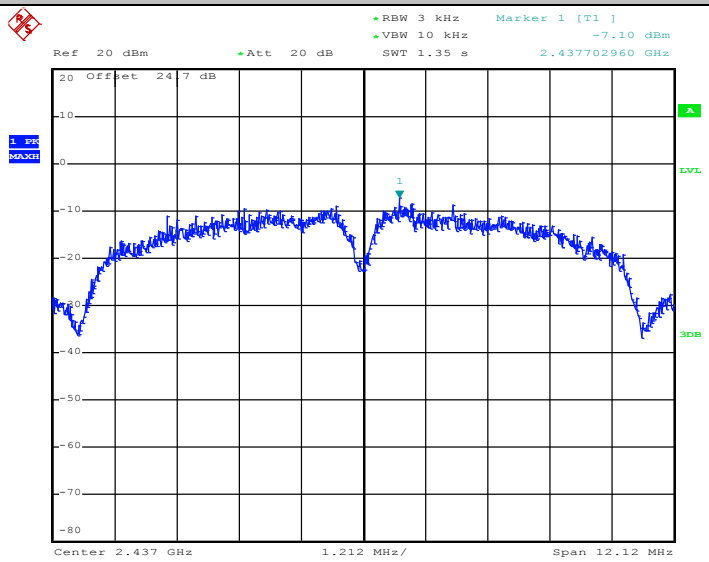
3.3.5 Test Result of Power Spectral Density

Test Band :	2.4GHz	Temperature :	21~25℃
Test Engineer :	Luffy Lin	Relative Humidity :	51~54%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Peak Power Density (dBm/3kHz)			Max. Limit (dBm/3kHz)		DG (dBi)		Pass/Fail
					Ant. 1	Ant. 2	Worst +10log(2)	Ant. 1	Ant. 2	Ant. 1	Ant. 2	
11b	1Mbps	1	1	2412		-8.37		8.00	8.00	-0.61	0.51	Pass
11b	1Mbps	1	6	2437		-7.10		8.00	8.00	-0.61	0.51	Pass
11b	1Mbps	1	11	2462		-7.86		8.00	8.00	-0.61	0.51	Pass
11g	6Mbps	1	1	2412		-13.48		8.00	8.00	-0.61	0.51	Pass
11g	6Mbps	1	6	2437		-11.50	-	8.00	8.00	-0.61	0.51	Pass
11g	6Mbps	1	11	2462		-13.10		8.00	8.00	-0.61	0.51	Pass
HT20	MCS0	1	1	2412		-12.89		8.00	8.00	-0.61	0.51	Pass
HT20	MCS0	1	6	2437		-12.34		8.00	8.00	-0.61	0.51	Pass
HT20	MCS0	1	11	2462		-12.70		8.00	8.00	-0.61	0.51	Pass
HT20	MCS8	2	1	2412	-15.17	-15.31	-12.16	8.00		2.98		Pass
HT20	MCS8	2	6	2437	-16.58	-15.19	-12.18	8.00		2.98		Pass
HT20	MCS8	2	11	2462	-15.61	-16.26	-12.60	8.00		2.98		Pass

Note: Measured power density (dBm) has offset with cable loss.

Worst Case Power Density (dBm/3kHz)



Date: 22.NOV.2014 08:48:30

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

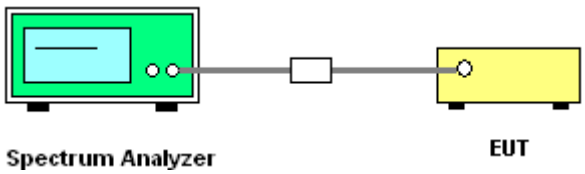
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. 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).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



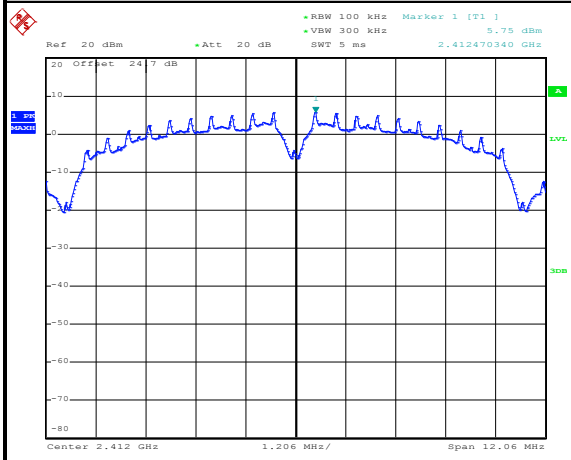
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, Ant. 2 (Measured)

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

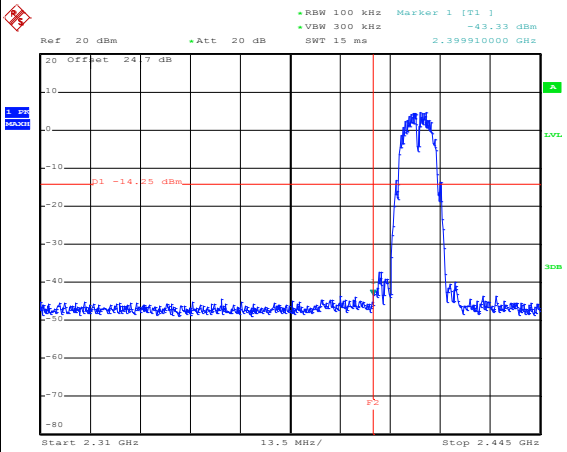
WLAN 802.11b Channel 01

100kHz PSD reference Level



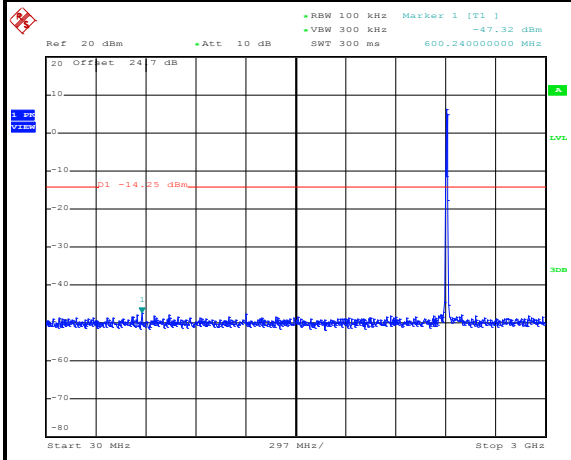
Date: 22.NOV.2014 08:53:20

Low Channel Plot



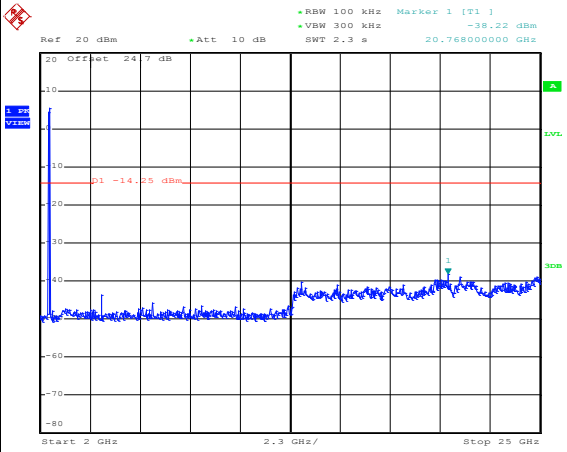
Date: 22.NOV.2014 08:54:35

Spurious Emission 30MHz~3GHz



Date: 25.NOV.2014 22:58:06

Spurious Emission 2GHz~25GHz

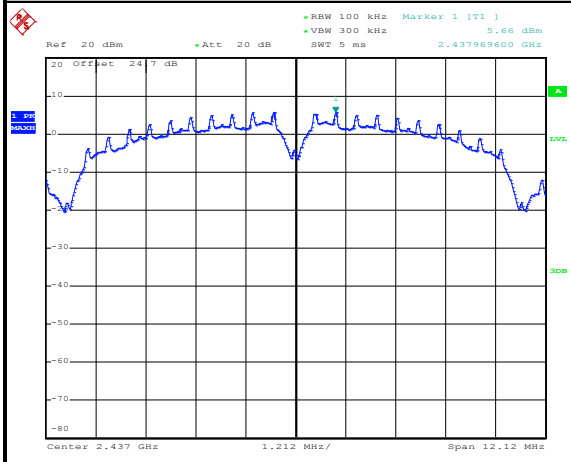


Date: 25.NOV.2014 22:58:24

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

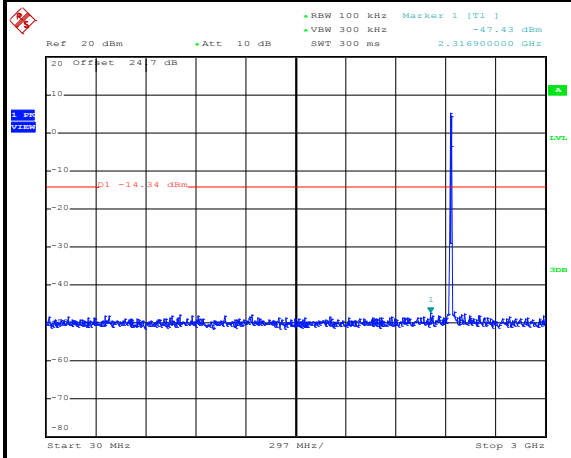
WLAN 802.11b Channel 06

100kHz PSD reference Level



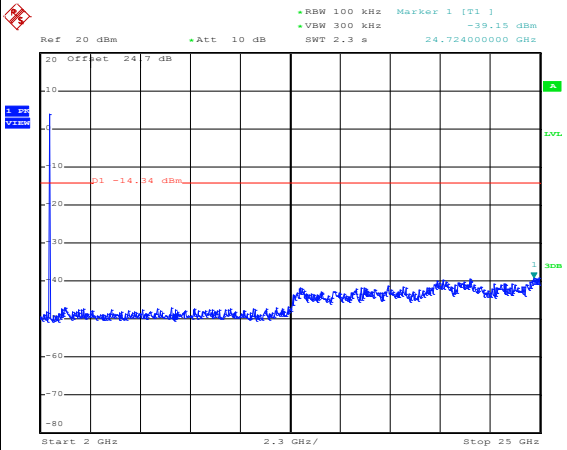
Date: 22.NOV.2014 08:48:52

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 08:49:17

Spurious Emission 2GHz~25GHz

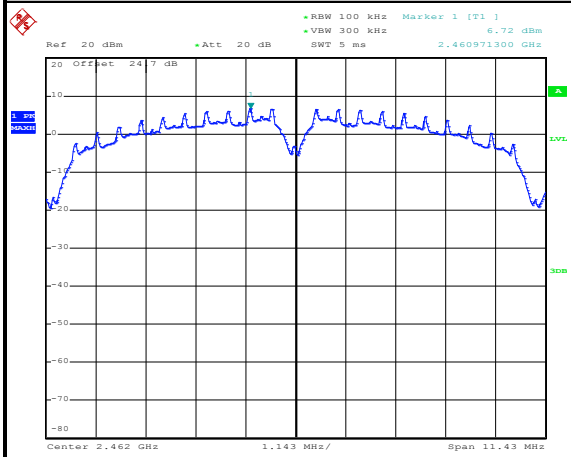


Date: 22.NOV.2014 08:49:35

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

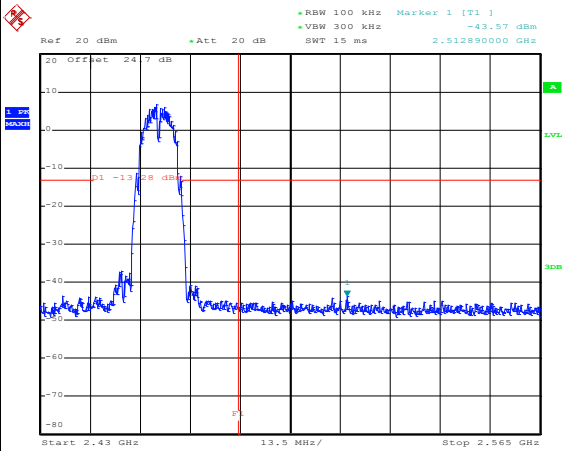
WLAN 802.11b Channel 11

100kHz PSD reference Level



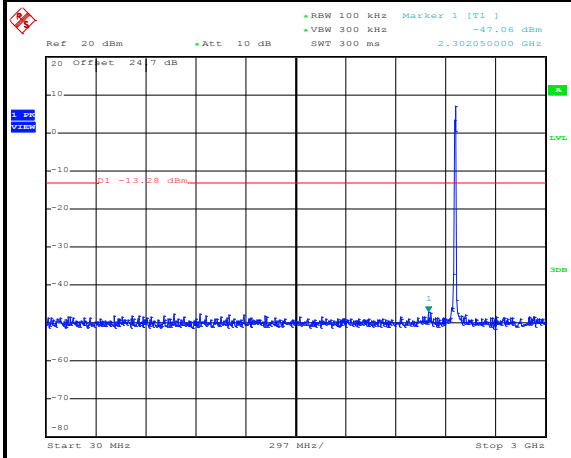
Date: 22.NOV.2014 09:01:45

High Channel Plot



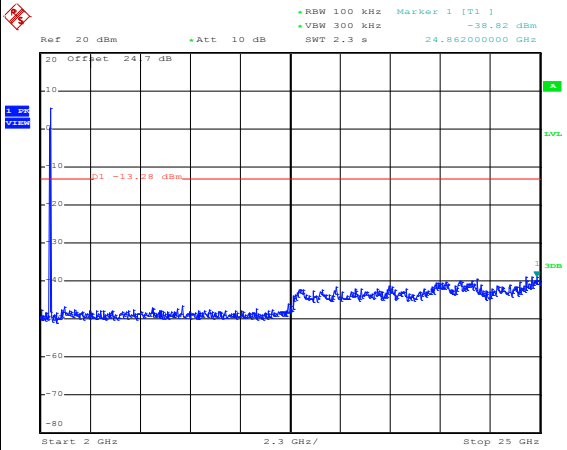
Date: 22.NOV.2014 09:02:04

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 09:02:27

Spurious Emission 2GHz~25GHz

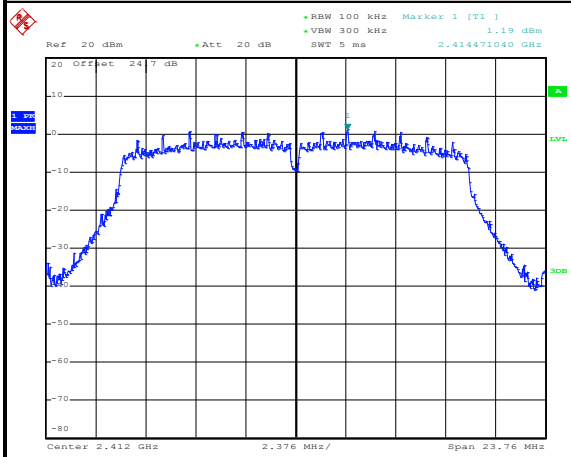


Date: 22.NOV.2014 09:02:45

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

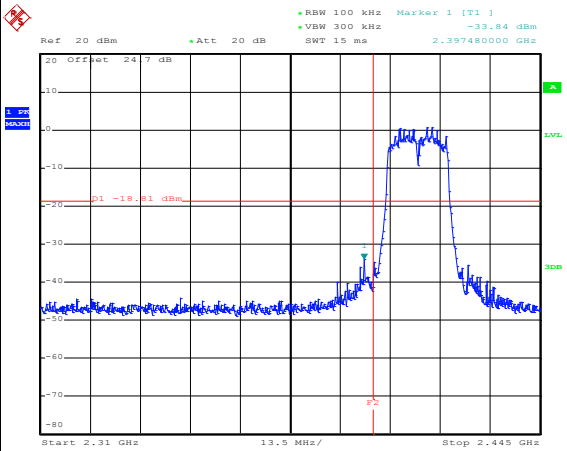
WLAN 802.11g Channel 01

100kHz PSD reference Level



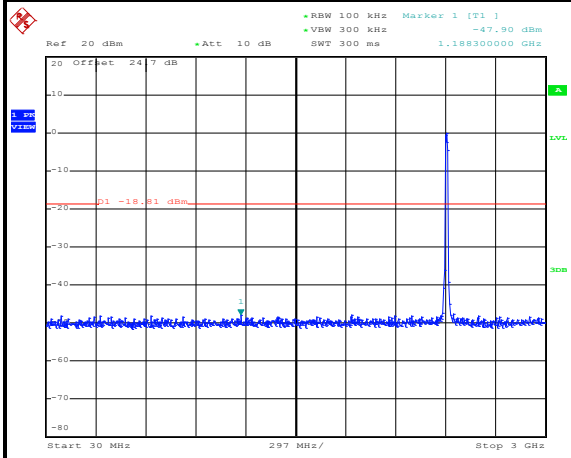
Date: 22.NOV.2014 09:31:04

Low Channel Plot



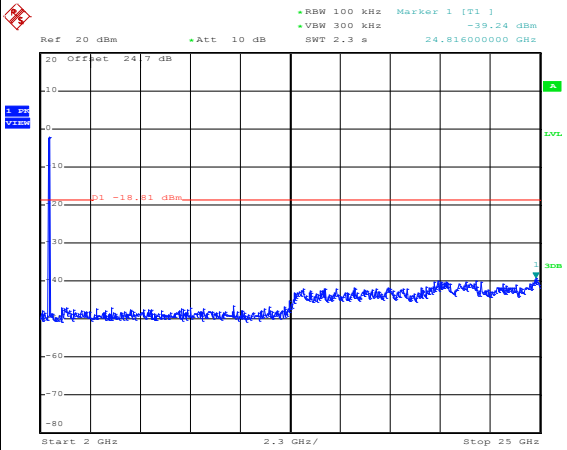
Date: 22.NOV.2014 09:31:32

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 09:31:55

Spurious Emission 2GHz~25GHz

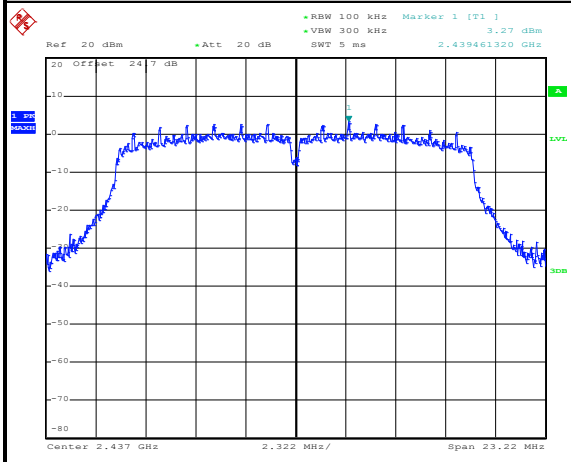


Date: 22.NOV.2014 09:32:13

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

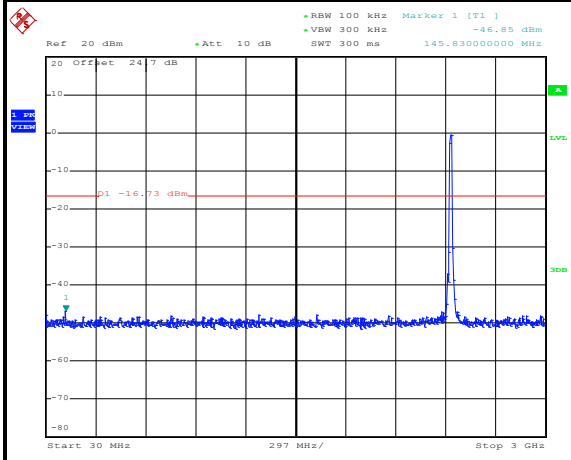
WLAN 802.11g Channel 06

100kHz PSD reference Level



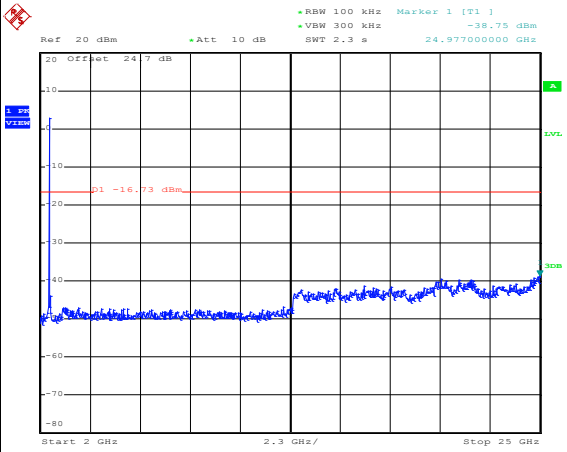
Date: 22.NOV.2014 09:36:33

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 09:37:03

Spurious Emission 2GHz~25GHz

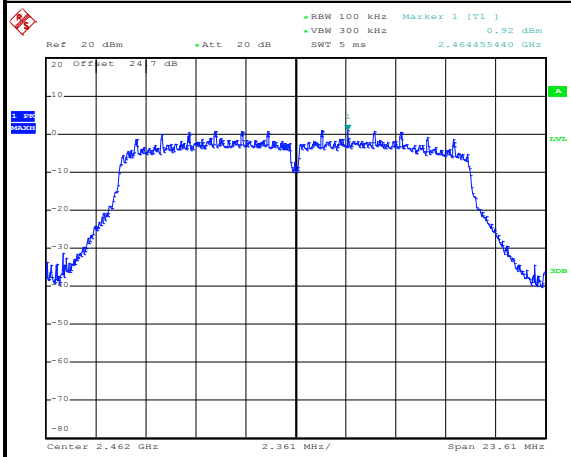


Date: 22.NOV.2014 09:37:21

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

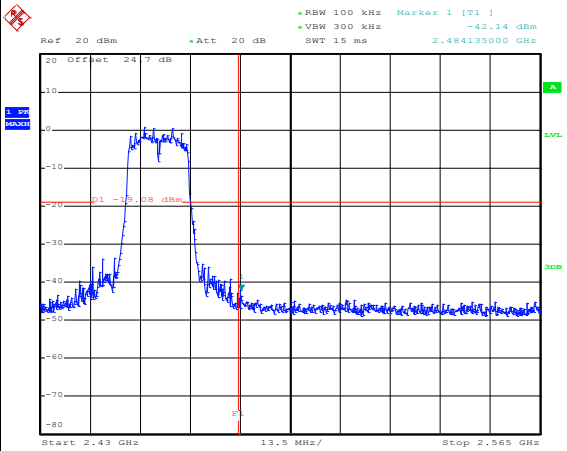
WLAN 802.11g Channel 11

100kHz PSD reference Level



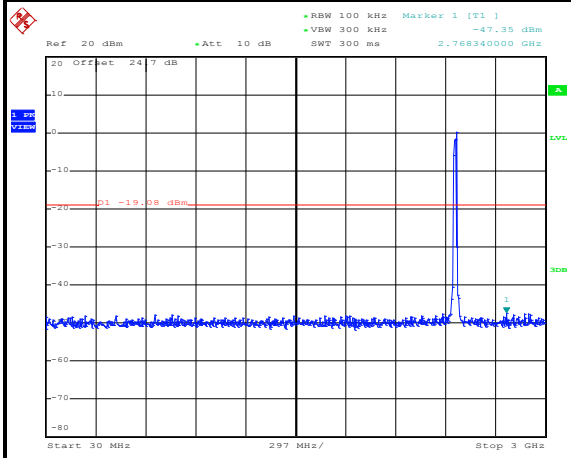
Date: 22.NOV.2014 09:44:34

High Channel Plot



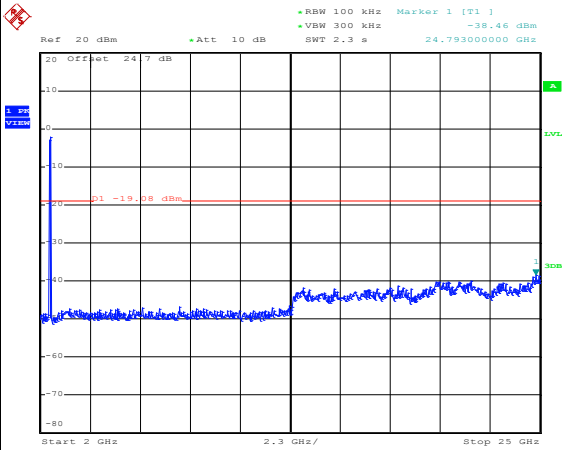
Date: 22.NOV.2014 09:44:57

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 09:45:23

Spurious Emission 2GHz~25GHz

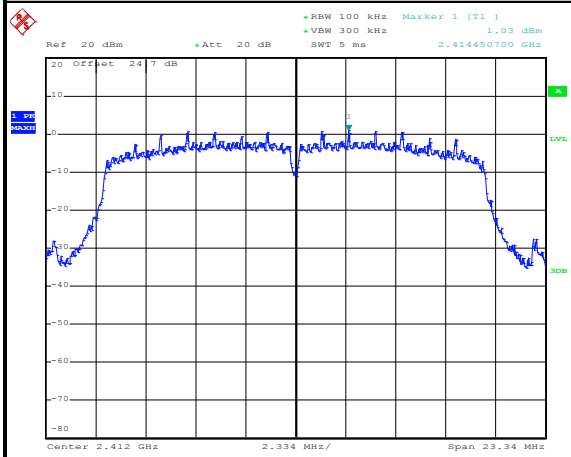


Date: 22.NOV.2014 09:45:41

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

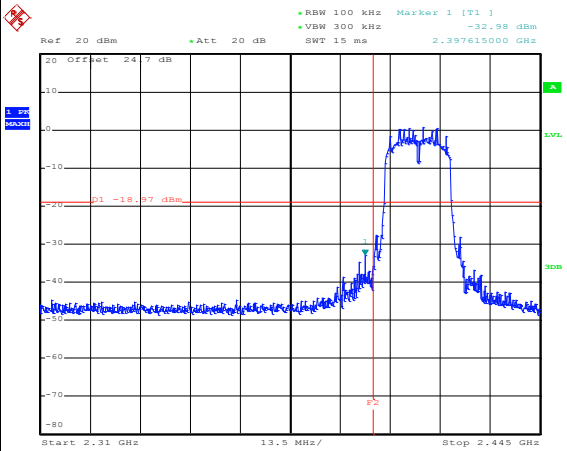
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



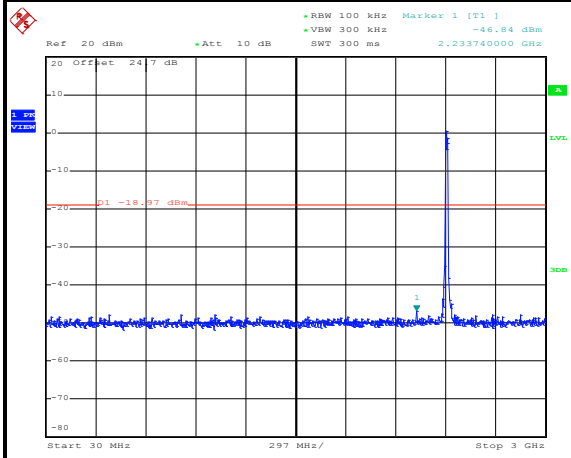
Date: 22.NOV.2014 10:02:22

Low Channel Plot



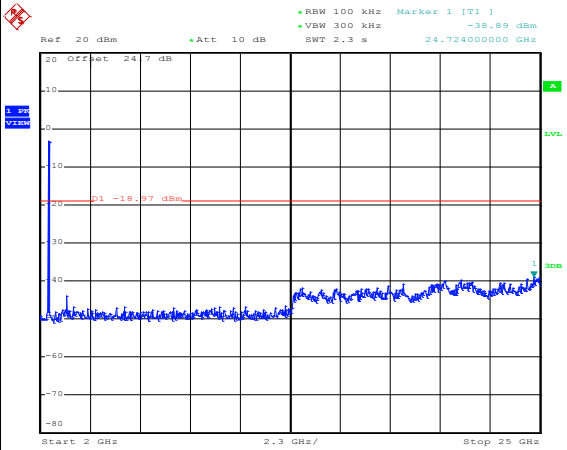
Date: 22.NOV.2014 10:02:43

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 10:03:06

Spurious Emission 2GHz~25GHz

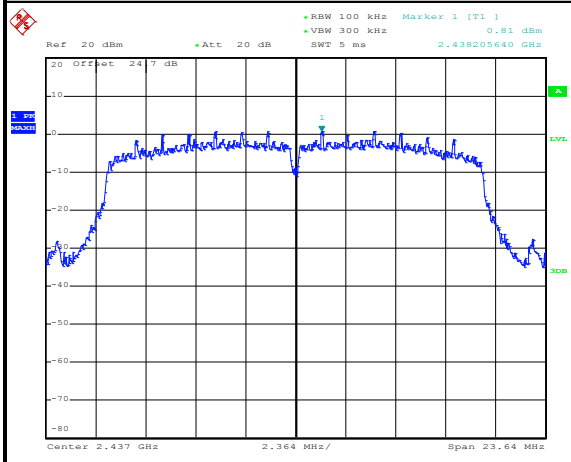


Date: 22.NOV.2014 10:03:24

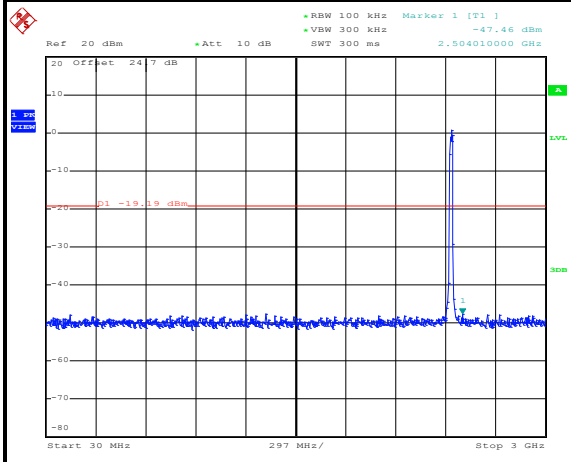
Number of TX :	1	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

WLAN 802.11n HT20 Channel 06

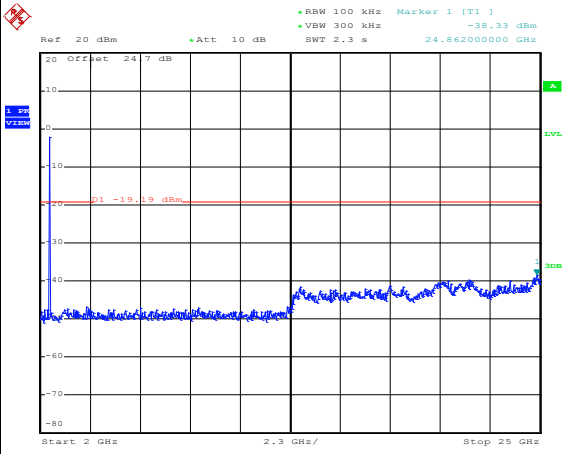
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



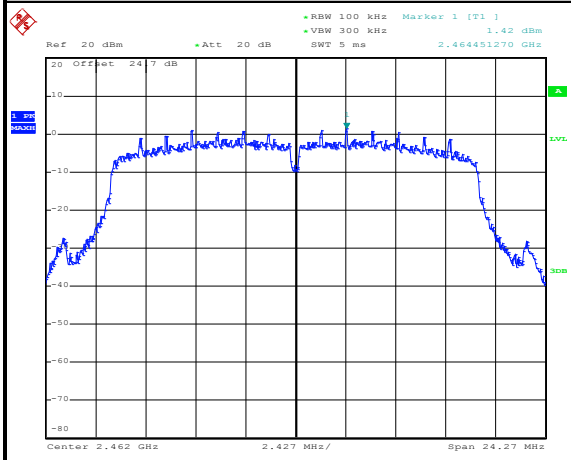
Spurious Emission 2GHz~25GHz



Number of TX :	1	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

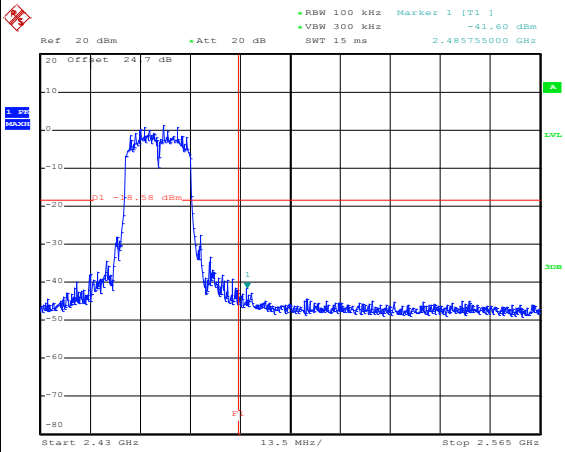
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



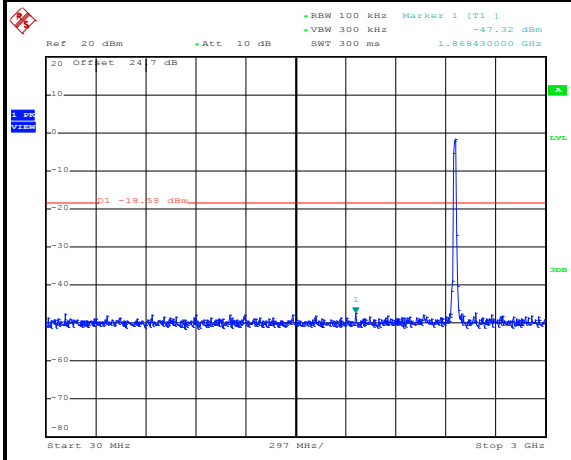
Date: 22.NOV.2014 10:12:38

High Channel Plot



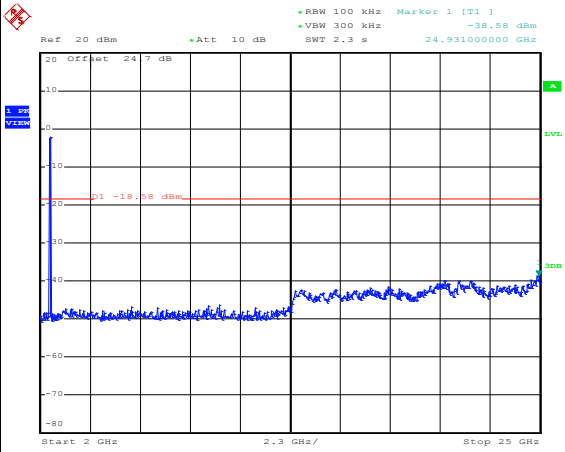
Date: 22.NOV.2014 10:13:47

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 10:14:16

Spurious Emission 2GHz~25GHz



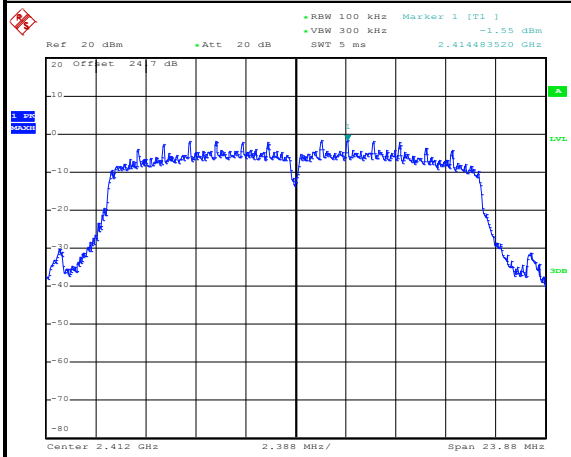
Date: 22.NOV.2014 10:14:34

Number of TX = 2, Ant. 1 (Measured)

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

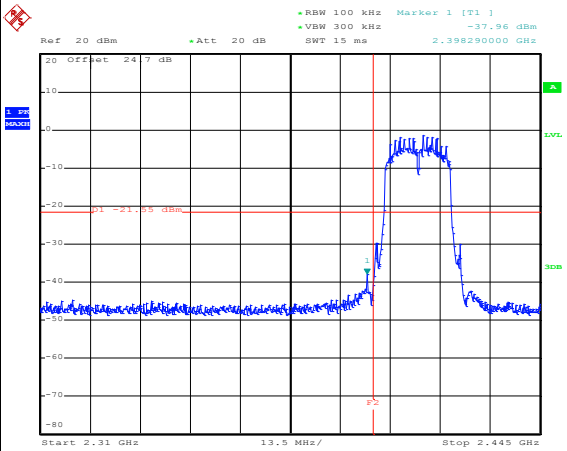
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



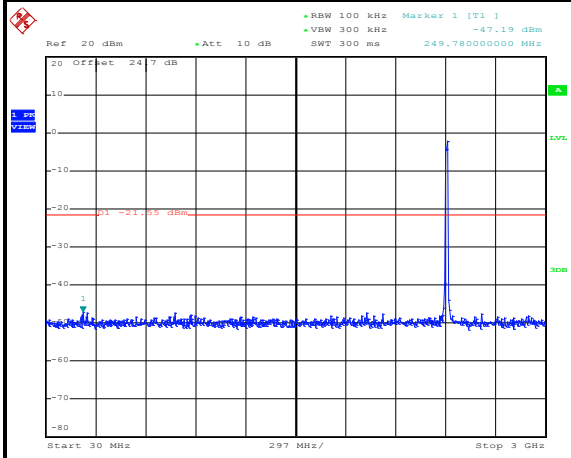
Date: 22.NOV.2014 10:33:49

Low Channel Plot



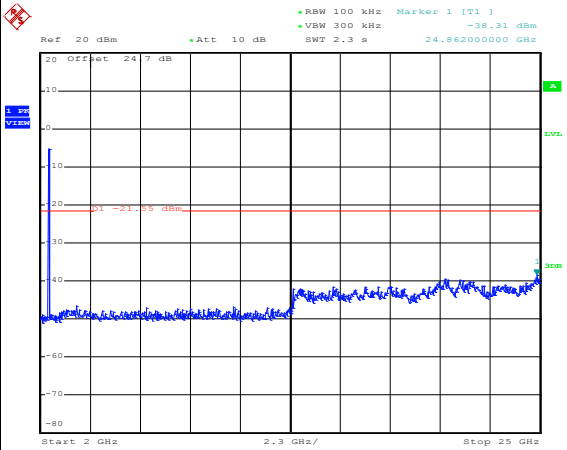
Date: 22.NOV.2014 10:36:20

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 10:35:25

Spurious Emission 2GHz~25GHz

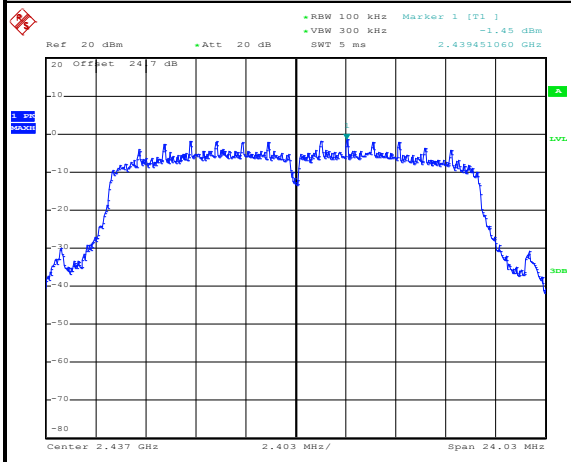


Date: 22.NOV.2014 10:35:43

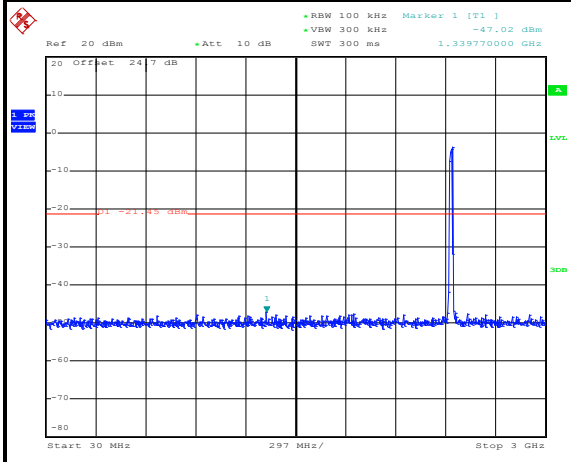
Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

WLAN 802.11n HT20 Channel 06

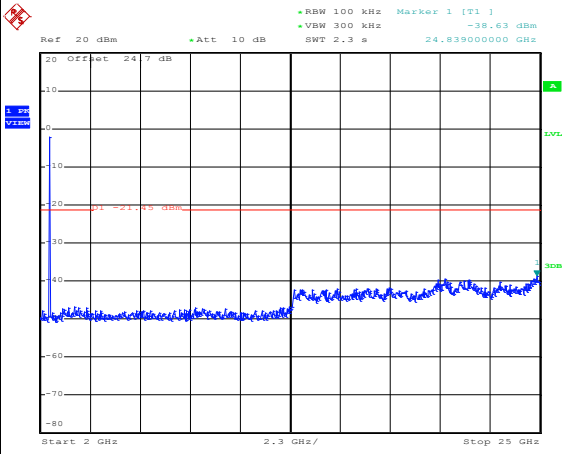
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



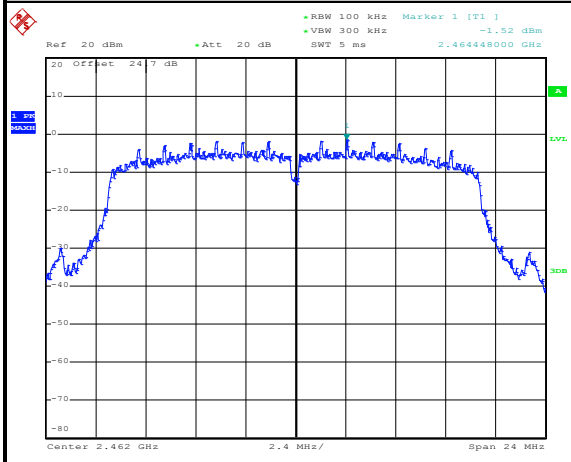
Spurious Emission 2GHz~25GHz



Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

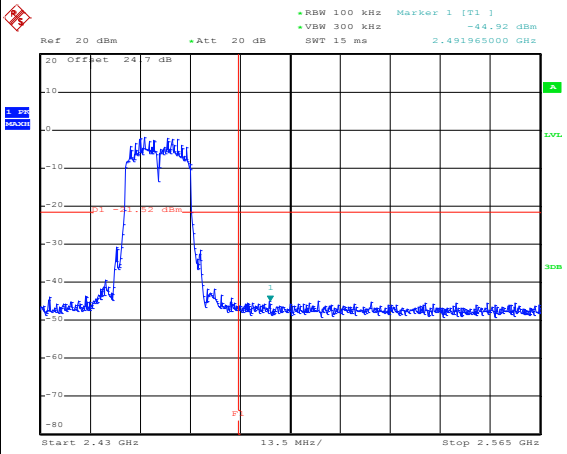
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



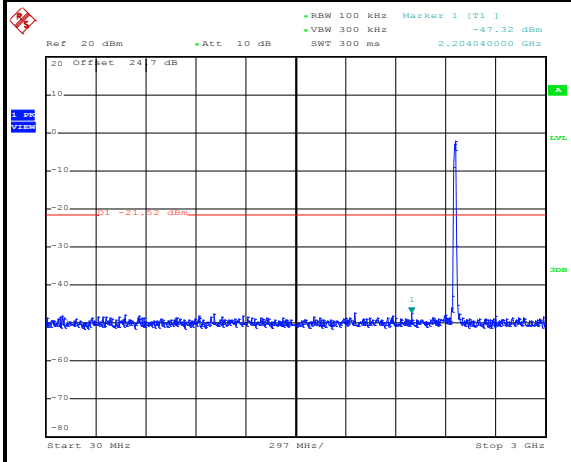
Date: 22.NOV.2014 10:59:22

High Channel Plot



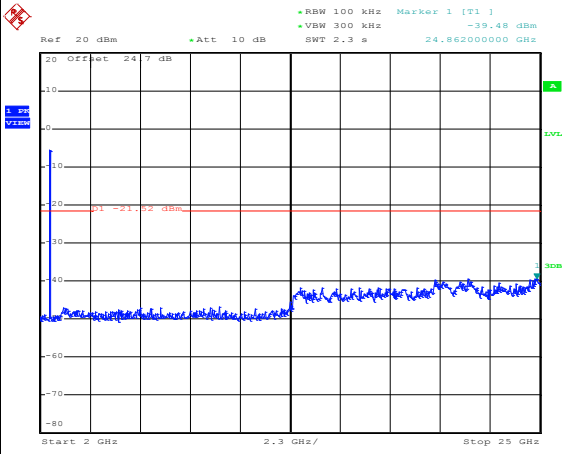
Date: 22.NOV.2014 10:59:42

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 11:00:05

Spurious Emission 2GHz~25GHz



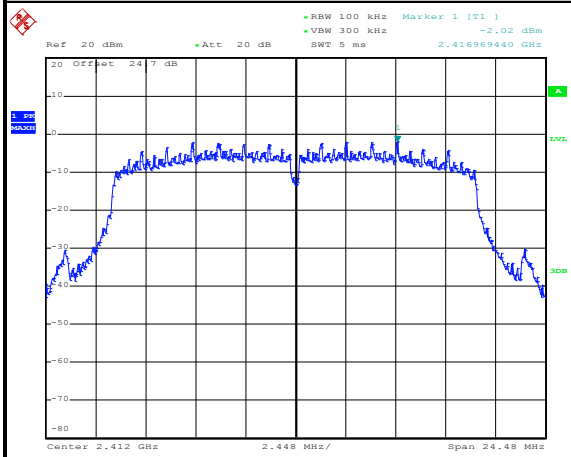
Date: 22.NOV.2014 11:00:23

Number of TX = 2, Ant. 2 (Measured)

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

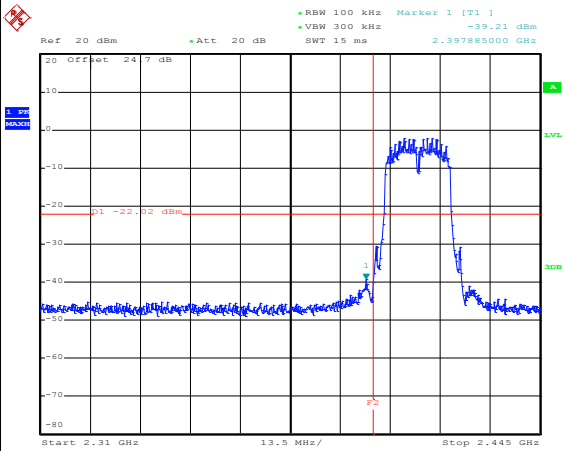
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



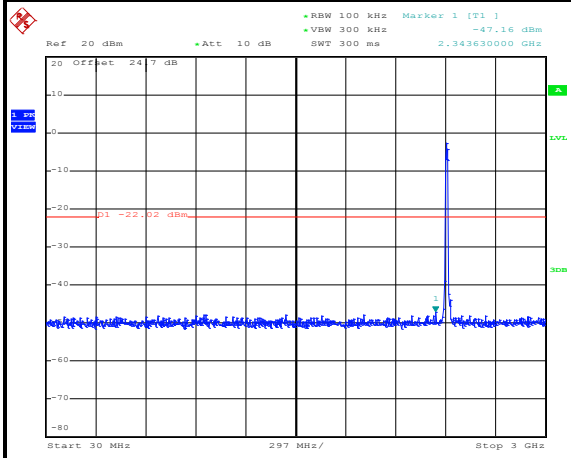
Date: 22.NOV.2014 10:40:35

Low Channel Plot



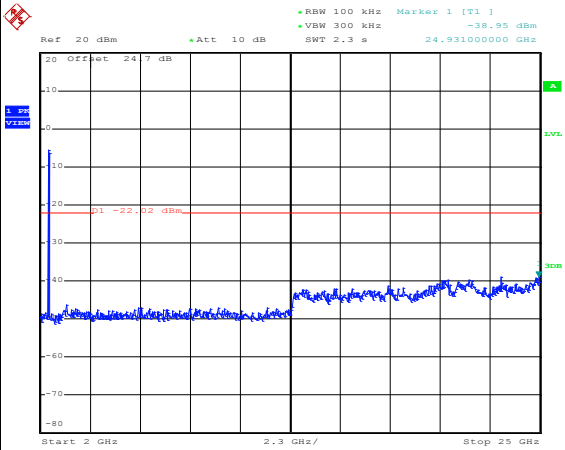
Date: 22.NOV.2014 10:43:25

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 10:41:36

Spurious Emission 2GHz~25GHz

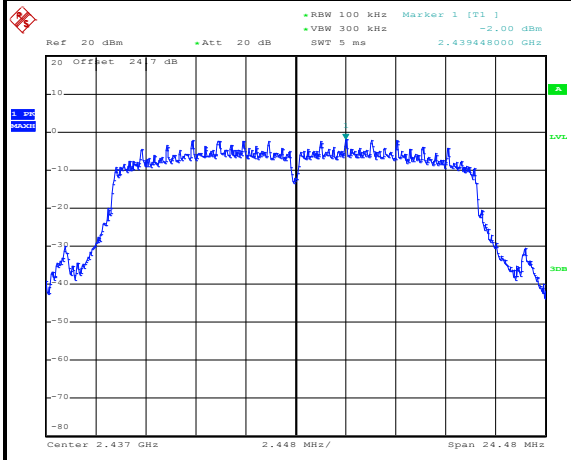


Date: 22.NOV.2014 10:41:54

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

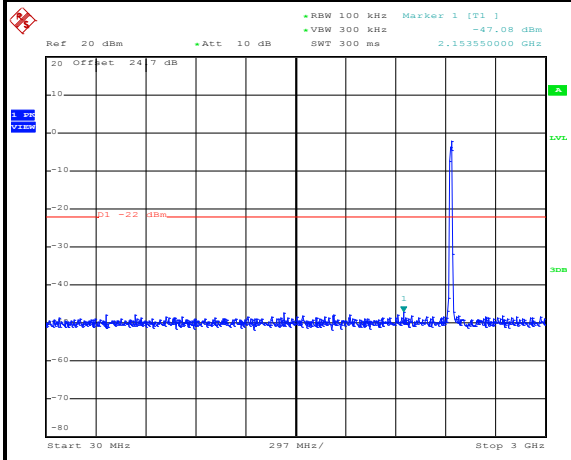
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



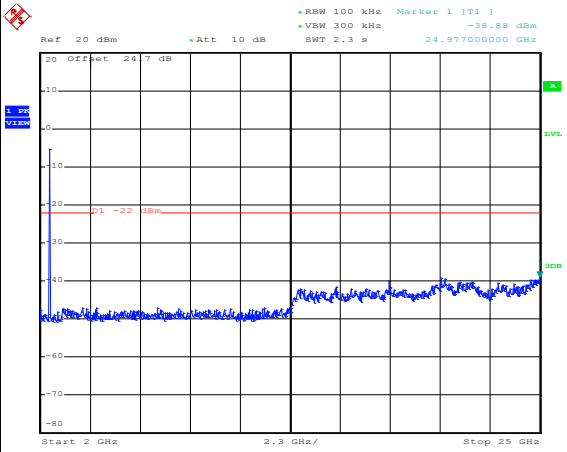
Date: 22.NOV.2014 10:52:57

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 10:53:30

Spurious Emission 2GHz~25GHz

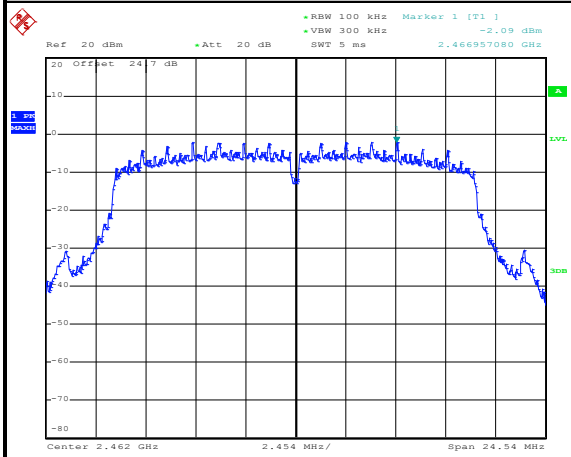


Date: 22.NOV.2014 10:53:48

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

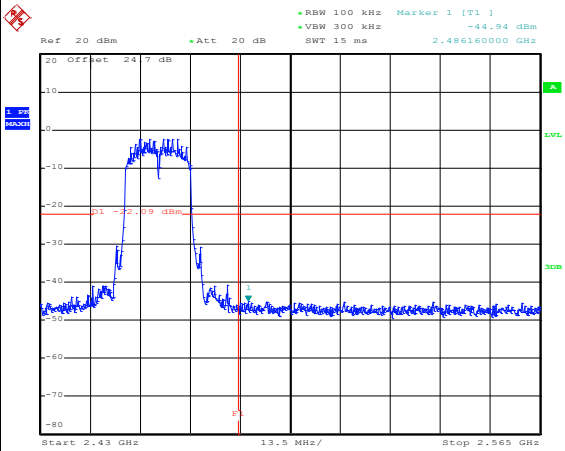
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



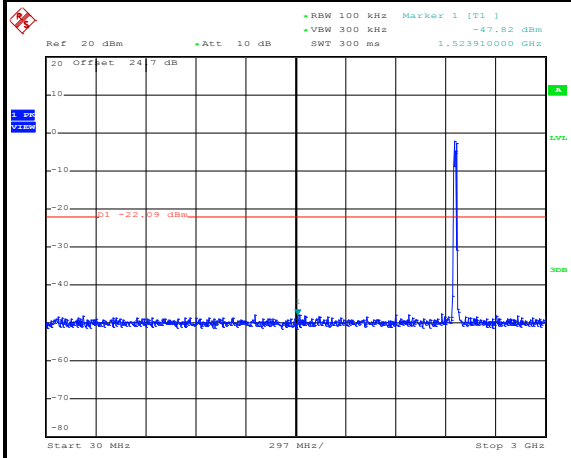
Date: 22.NOV.2014 11:04:22

High Channel Plot



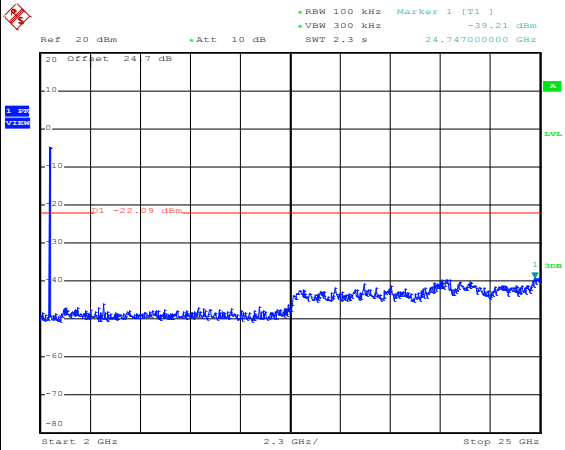
Date: 22.NOV.2014 11:04:42

Spurious Emission 30MHz~3GHz



Date: 22.NOV.2014 11:05:06

Spurious Emission 2GHz~25GHz



Date: 22.NOV.2014 11:05:24

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

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

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

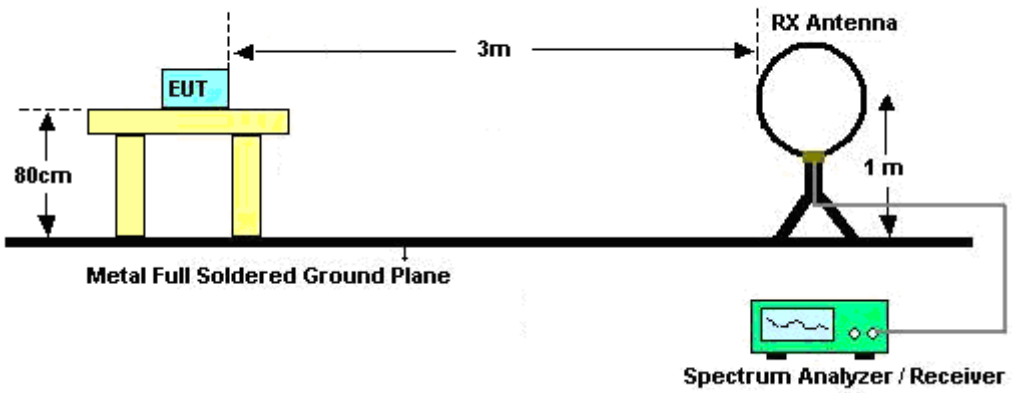
3.5.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

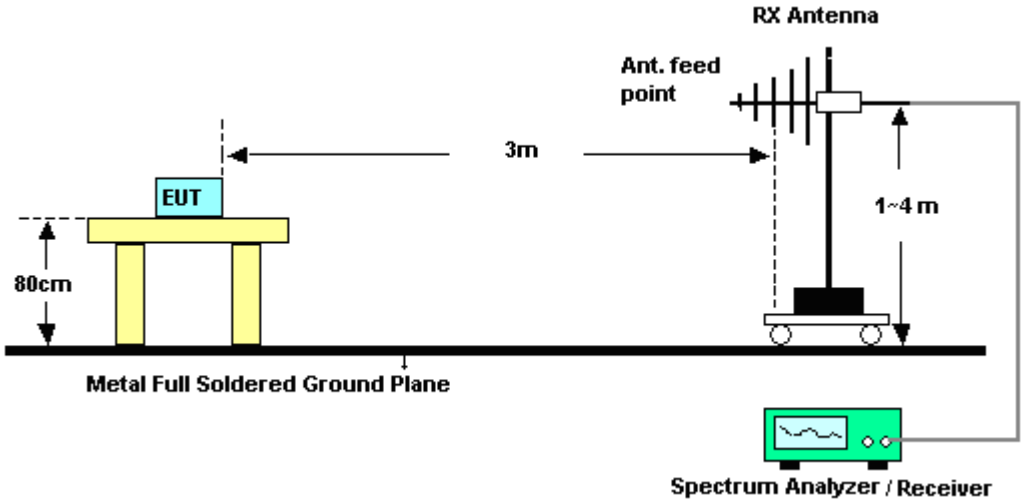
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	802.11b	99.23	-	-	10Hz
1	802.11g	95.55	2067	0.48	1kHz
1	2.4GHz 802.11n HT20	95.24	1923	0.52	
1	2.4GHz 802.11n HT40	90.84	953	1.05	3kHz
1+2	2.4GHz 802.11n HT20 for Ant 1	91.18	993	1.01	
1+2	2.4GHz 802.11n HT20 for Ant 2	91.18	993	1.01	
1+2	2.4GHz 802.11n HT40 for Ant 1	83.56	488	2.05	
1+2	2.4GHz 802.11n HT40 for Ant 2	83.78	496	2.02	
1	802.11a	95.57	2075	0.48	1kHz
1	5GHz 802.11n HT20	95.63	1931	0.52	
1	5GHz 802.11n HT40	90.84	953	1.05	3kHz
1+2	5GHz 802.11n HT20 for Ant 1	90.44	986	1.01	
1+2	5GHz 802.11n HT20 for Ant 2	90.44	986	1.01	
1+2	5GHz 802.11n HT40 for Ant 1	83.87	500	2	
1+2	5GHz 802.11n HT40 for Ant 2	83.87	500	2	

3.5.4 Test Setup

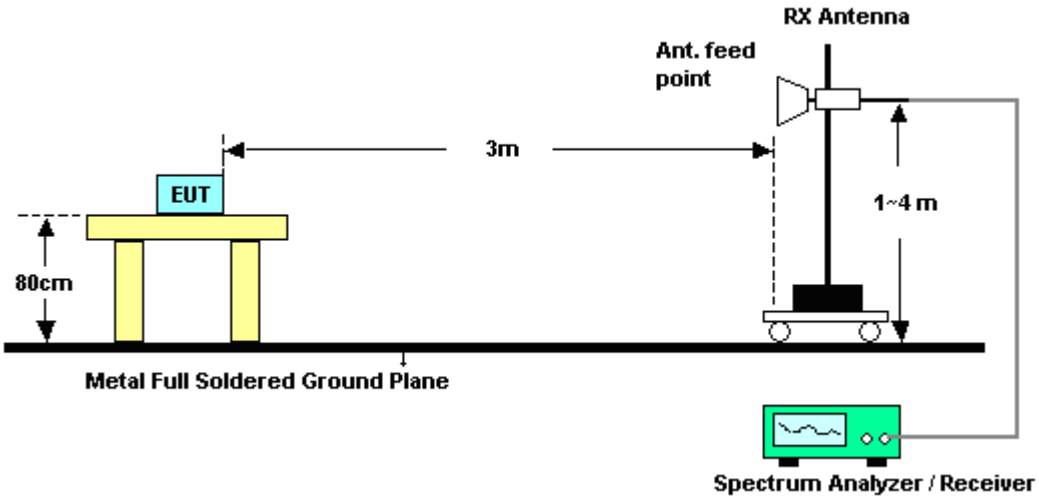
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

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.

3.5.6 Test Result

Please refer to appendix A as below.

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 (dBμV)	
	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.

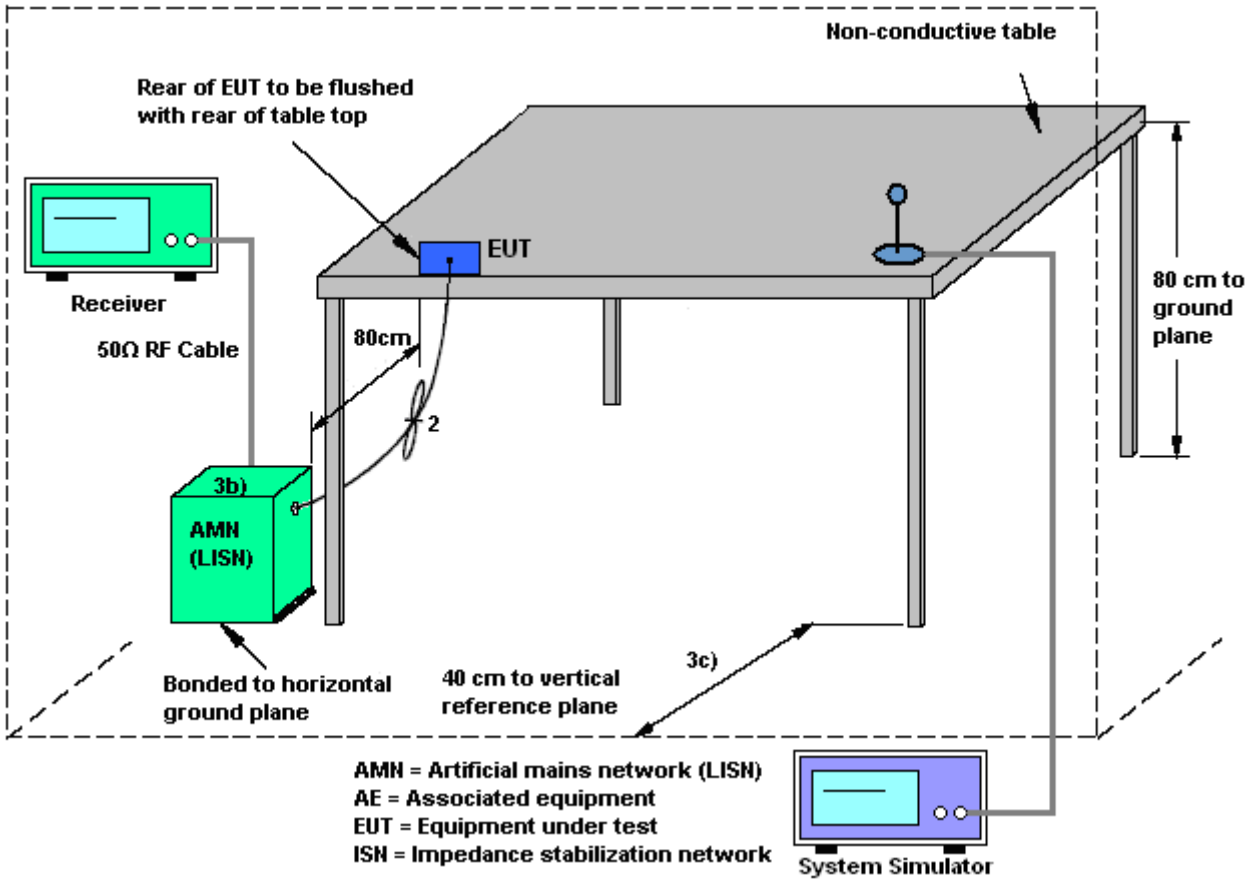
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

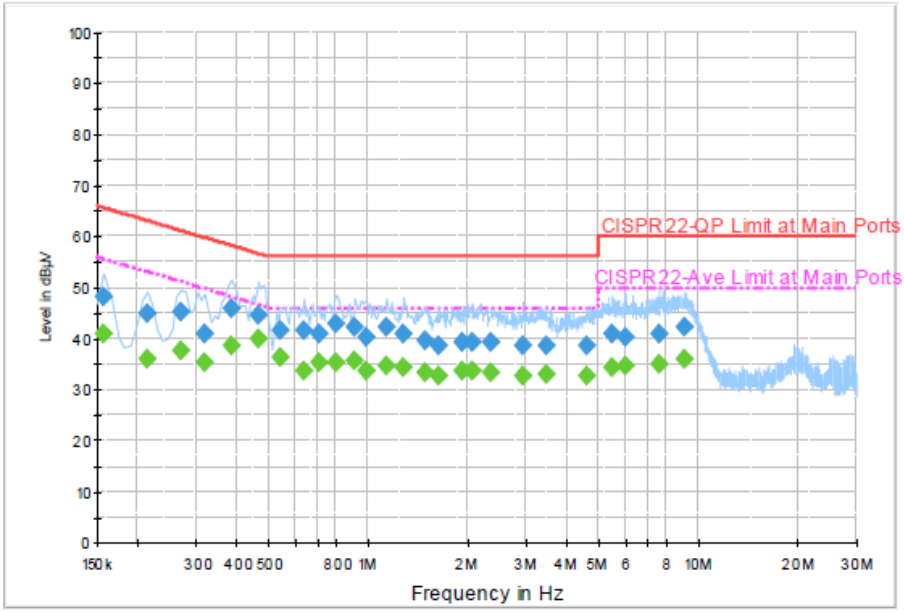
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

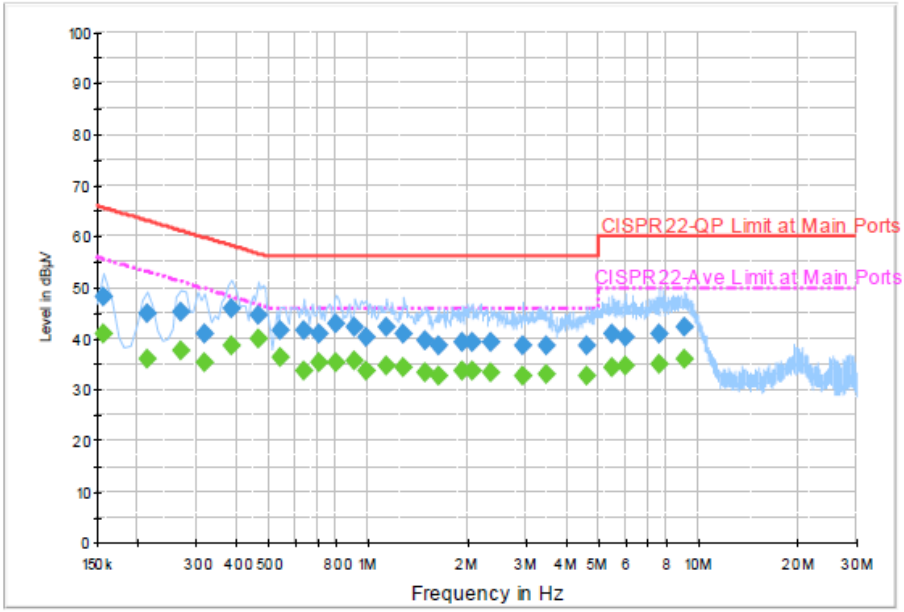
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	48.2	Off	L1	19.4	17.4	65.6
0.214000	44.9	Off	L1	19.4	18.1	63.0
0.270000	45.2	Off	L1	19.4	15.9	61.1
0.318000	40.9	Off	L1	19.4	18.9	59.8
0.382000	46.0	Off	L1	19.4	12.2	58.2
0.462000	44.5	Off	L1	19.4	12.2	56.7
0.542000	41.7	Off	L1	19.4	14.3	56.0
0.638000	41.6	Off	L1	19.5	14.4	56.0
0.710000	41.0	Off	L1	19.5	15.0	56.0
0.798000	42.8	Off	L1	19.5	13.2	56.0
0.910000	42.3	Off	L1	19.5	13.7	56.0
0.982000	40.3	Off	L1	19.5	15.7	56.0
1.126000	42.3	Off	L1	19.5	13.7	56.0
1.278000	40.8	Off	L1	19.5	15.2	56.0
1.486000	39.7	Off	L1	19.5	16.3	56.0

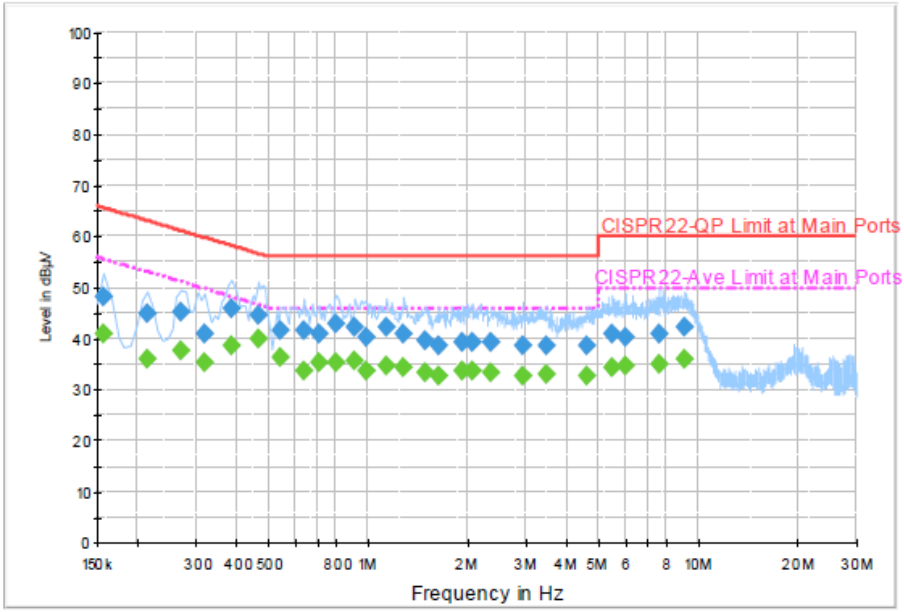
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.622000	38.7	Off	L1	19.5	17.3	56.0
1.918000	39.2	Off	L1	19.5	16.8	56.0
2.070000	39.3	Off	L1	19.2	16.7	56.0
2.342000	39.1	Off	L1	19.4	16.9	56.0
2.926000	38.7	Off	L1	19.6	17.3	56.0
3.454000	38.8	Off	L1	19.6	17.2	56.0
4.558000	38.6	Off	L1	19.6	17.4	56.0
5.470000	40.8	Off	L1	19.6	19.2	60.0
5.974000	40.4	Off	L1	19.7	19.6	60.0
7.574000	40.8	Off	L1	19.6	19.2	60.0
9.054000	42.2	Off	L1	19.7	17.8	60.0

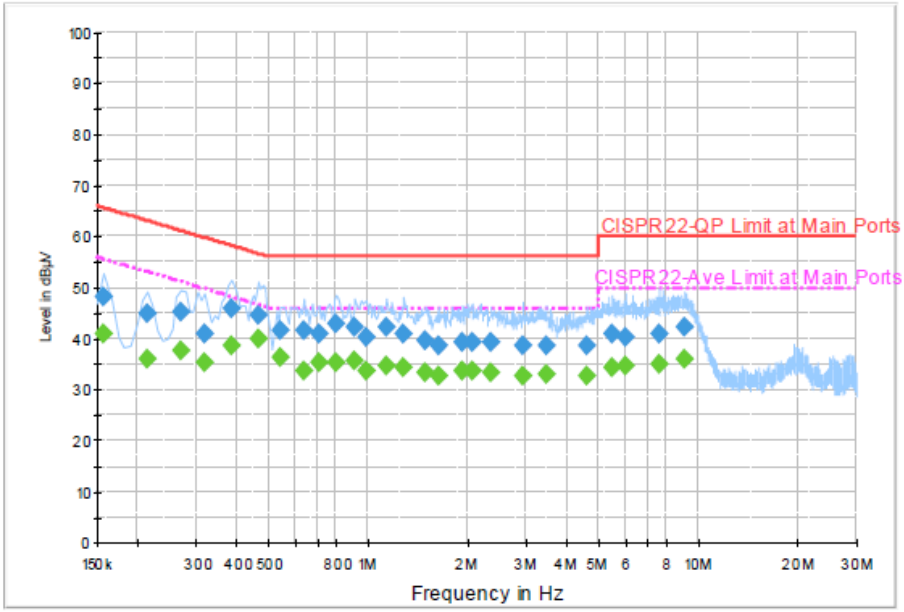
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	41.1	Off	L1	19.4	14.5	55.6
0.214000	35.9	Off	L1	19.4	17.1	53.0
0.270000	37.6	Off	L1	19.4	13.5	51.1
0.318000	35.5	Off	L1	19.4	14.3	49.8
0.382000	38.6	Off	L1	19.4	9.6	48.2
0.462000	39.8	Off	L1	19.4	6.9	46.7
0.542000	36.3	Off	L1	19.4	9.7	46.0
0.638000	33.6	Off	L1	19.5	12.4	46.0
0.710000	35.5	Off	L1	19.5	10.5	46.0
0.798000	35.3	Off	L1	19.5	10.7	46.0
0.910000	35.5	Off	L1	19.5	10.5	46.0
0.982000	33.7	Off	L1	19.5	12.3	46.0
1.126000	34.8	Off	L1	19.5	11.2	46.0
1.278000	34.3	Off	L1	19.5	11.7	46.0

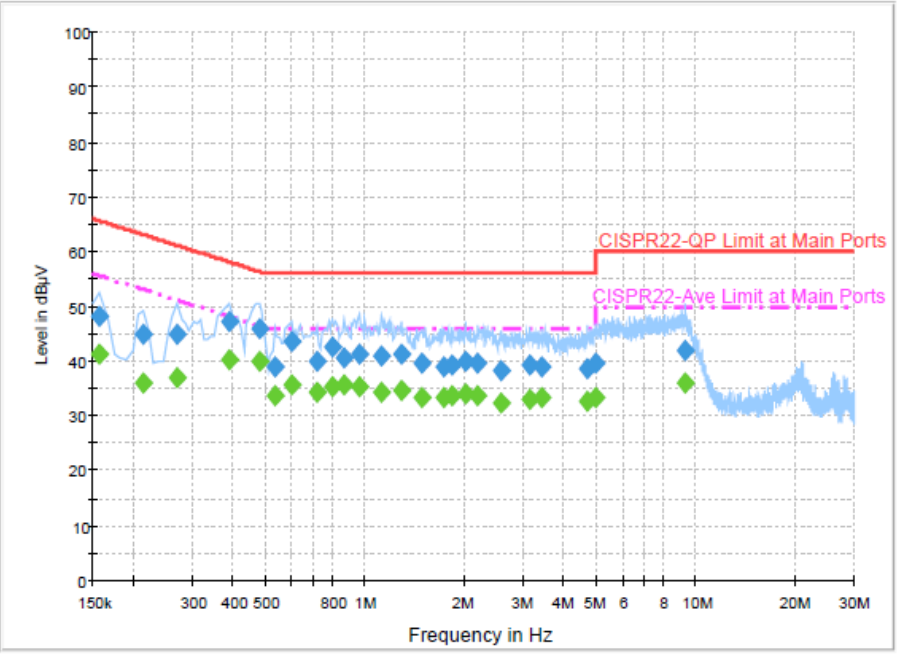
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.486000	33.3	Off	L1	19.5	12.7	46.0
1.622000	32.8	Off	L1	19.5	13.2	46.0
1.918000	33.6	Off	L1	19.5	12.4	46.0
2.070000	33.6	Off	L1	19.2	12.4	46.0
2.342000	33.3	Off	L1	19.4	12.7	46.0
2.926000	32.6	Off	L1	19.6	13.4	46.0
3.454000	32.9	Off	L1	19.6	13.1	46.0
4.558000	32.6	Off	L1	19.6	13.4	46.0
5.470000	34.4	Off	L1	19.6	15.6	50.0
5.974000	34.5	Off	L1	19.7	15.5	50.0
7.574000	34.9	Off	L1	19.6	15.1	50.0
9.054000	36.0	Off	L1	19.7	14.0	50.0

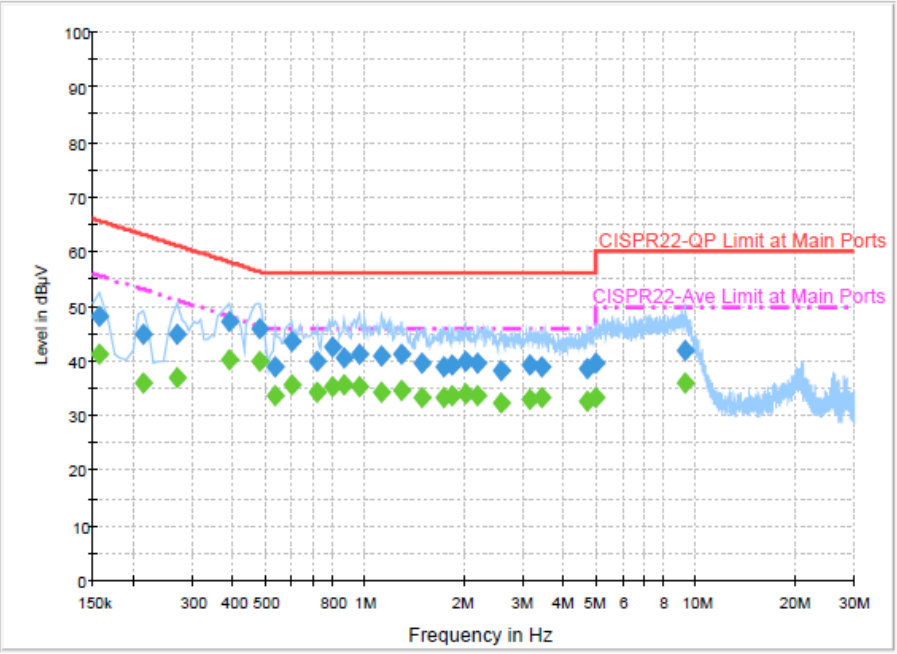
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	48.2	Off	N	19.4	17.4	65.6
0.214000	45.0	Off	N	19.4	18.0	63.0
0.270000	44.8	Off	N	19.4	16.3	61.1
0.390000	47.1	Off	N	19.4	11.0	58.1
0.478000	45.7	Off	N	19.5	10.7	56.4
0.534000	38.9	Off	N	19.4	17.1	56.0
0.598000	43.4	Off	N	19.5	12.6	56.0
0.718000	39.9	Off	N	19.5	16.1	56.0
0.798000	42.7	Off	N	19.5	13.3	56.0
0.862000	40.5	Off	N	19.5	15.5	56.0
0.958000	41.3	Off	N	19.5	14.7	56.0
1.118000	41.1	Off	N	19.5	14.9	56.0
1.286000	41.2	Off	N	19.5	14.8	56.0

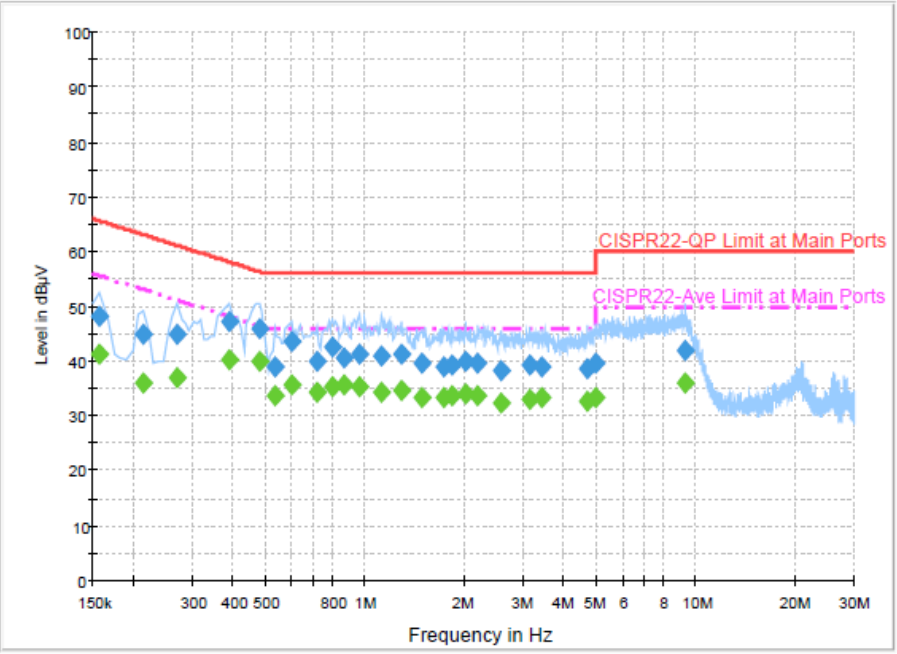
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.486000	39.6	Off	N	19.5	16.4	56.0
1.718000	39.0	Off	N	19.5	17.0	56.0
1.822000	39.1	Off	N	19.6	16.9	56.0
2.014000	39.8	Off	N	19.5	16.2	56.0
2.190000	39.5	Off	N	19.3	16.5	56.0
2.590000	38.4	Off	N	19.5	17.6	56.0
3.142000	39.2	Off	N	19.6	16.8	56.0
3.406000	38.9	Off	N	19.6	17.1	56.0
4.694000	38.5	Off	N	19.6	17.5	56.0
4.958000	39.6	Off	N	19.7	16.4	56.0
9.270000	41.9	Off	N	19.7	18.1	60.0

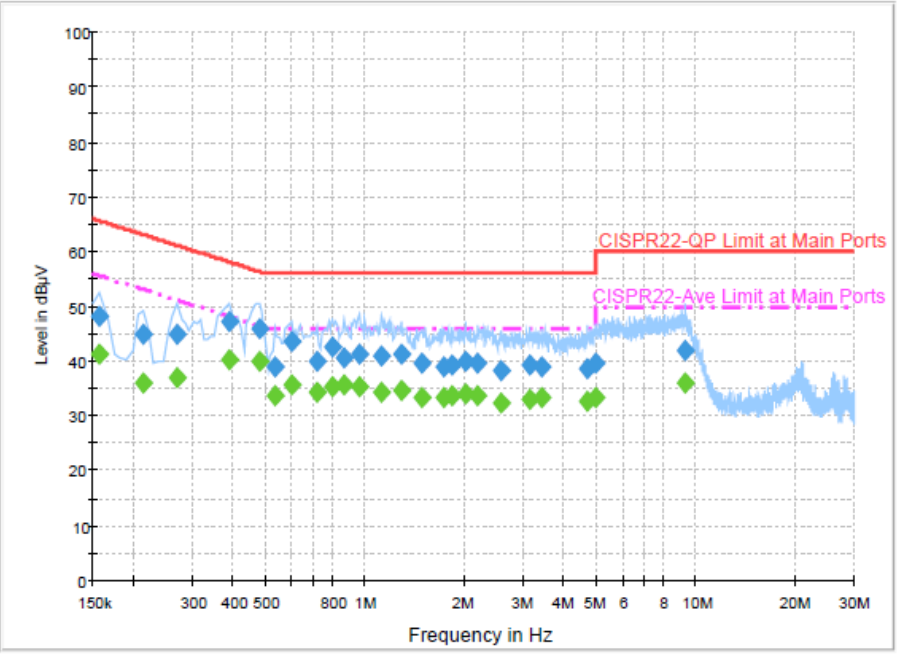
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	41.1	Off	N	19.4	14.5	55.6
0.214000	35.8	Off	N	19.4	17.2	53.0
0.270000	36.9	Off	N	19.4	14.2	51.1
0.390000	40.2	Off	N	19.4	7.9	48.1
0.478000	39.9	Off	N	19.5	6.5	46.4
0.534000	33.7	Off	N	19.4	12.3	46.0
0.598000	35.5	Off	N	19.5	10.5	46.0
0.718000	34.4	Off	N	19.5	11.6	46.0
0.798000	35.3	Off	N	19.5	10.7	46.0
0.862000	35.8	Off	N	19.5	10.2	46.0
0.958000	35.2	Off	N	19.5	10.8	46.0
1.118000	34.4	Off	N	19.5	11.6	46.0
1.286000	34.8	Off	N	19.5	11.2	46.0

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eric Jeng	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (2.4GHz) Link + Bluetooth Link + H Patten + Camera + MPEG4 + Earphone + Data Link with iPod + HDMI Cable + SD Card + Adapter		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.486000	33.2	Off	N	19.5	12.8	46.0
1.718000	33.2	Off	N	19.5	12.8	46.0
1.822000	33.5	Off	N	19.6	12.5	46.0
2.014000	33.9	Off	N	19.5	12.1	46.0
2.190000	33.8	Off	N	19.3	12.2	46.0
2.590000	32.4	Off	N	19.5	13.6	46.0
3.142000	33.2	Off	N	19.6	12.8	46.0
3.406000	33.2	Off	N	19.6	12.8	46.0
4.694000	32.7	Off	N	19.6	13.3	46.0
4.958000	33.4	Off	N	19.7	12.6	46.0
9.270000	35.9	Off	N	19.7	14.1	50.0

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

For CDD and beamforming transmissions, directional gain is calculated as

$$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The EUT supports CDD mode and beamforming.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	-0.61	0.51	2.98	2.98	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Nov. 12, 2014 ~ Nov. 25, 2014	Jun. 08, 2015	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 09, 2014	Nov. 12, 2014 ~ Nov. 25, 2014	Aug. 08, 2015	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 09, 2014	Nov. 12, 2014 ~ Nov. 25, 2014	Aug. 08, 2015	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 12, 2014	Nov. 13, 2014	Nov. 11, 2015	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Nov. 13, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Nov. 13, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 13, 2014	N/A	Conduction (CO05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Jun. 08, 2015	Radiation (03CH05-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~1GHz	Sep. 27, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Sep. 26, 2015	Radiation (03CH05-HY)
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz~18GHz	Apr. 16, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Apr. 15, 2015	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Oct. 02, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Oct. 01, 2015	Radiation (03CH05-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	100kHz~18GHz	Jul. 07, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Jul. 06, 2015	Radiation (03CH05-HY)
Preamplifier	EMCI	EMC011830	980148	DC~18GHz	Jun. 23, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Jun. 22, 2015	Radiation (03CH05-HY)
Preamplifier	COM-POWER	PA-103	161075	9kHz~30MHz	Apr. 15, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	Apr. 14, 2015	Radiation (03CH05-HY)
Preamplifier	Miteq	TTA0204	1872107	18GHz~40GHz	May 23, 2014	Nov. 18, 2014 ~ Nov. 19, 2014	May 22, 2015	Radiation (03CH05-HY)
Turn Table	HD	HD100	420/611	0 - 360 degree	N/A	Nov. 18, 2014 ~ Nov. 19, 2014	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	HD100	240/666	1 m - 4 m	N/A	Nov. 18, 2014 ~ Nov. 19, 2014	N/A	Radiation (03CH05-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MhZ	Dec. 02, 2012	Nov. 18, 2014 ~ Nov. 19, 2014	Dec. 01, 2014	Radiation (03CH05-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1**