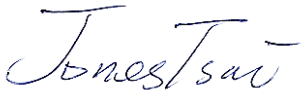
FCC RF Test Report

APPLICANT	:	**Nyle Oswind Parry Limited Liability Company**
EQUIPMENT	:	**Tablet PC**
MODEL NAME	:	**GQY56XZ**
FCC ID	:	**2ABO6-0725**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DTS) Digital Transmission System**

The testing completed on Aug. 06, 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.

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
FR432436-09C	Rev. 01	Initial issue of report	Aug. 15, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.98 dB at 2389.740 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.10 dB at 1.622 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Nyle Oswind Parry Limited Liability Company
7027 Old Madison Pike, Suite 108, Huntsville, Alabama 35806

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Model Name	GQY56XZ
FCC ID	2ABO6-0725
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE **<2.4GHz band>** WLAN 11b/g/n HT20 WLAN 11ac VHT20 Bluetooth v4.0 EDR/LE **<5GHz band>** WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.3 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 21.4 dBm (0.1380 W) 802.11g : 25.5 dBm (0.3548 W) 802.11n HT20 : 25.4 dBm (0.3467 W) 802.11ac VHT20 : 25.5 dBm (0.3548 W)
Antenna Type	Ant. 1 : Fixed Internal Antenna type with gain 2.37 dBi Ant. 2 : Fixed Internal Antenna type with gain 1.40 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Function for Transmitter	

	Chain Ant. 1	Chain Ant. 2
802.11b/g MIMO	V	V
802.11n/ac MIMO	V	V

1.4 Modification of EUT

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

1.5 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	03CH07-HY

1.6 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:

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.

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 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.

MIMO <Ant. 1 + 2>

802.11b				
Data Rate	**1M bps**	**2M bps**	**5.5M bps**	**11M bps**
Peak Power (dBm)	**21.4**	21.3	21.3	21.2

802.11g								
Data Rate	**6M bps**	**9M bps**	**12M bps**	**18M bps**	**24M bps**	**36M bps**	**48M bps**	**54M bps**
Peak Power (dBm)	**25.5**	25.3	24.9	25.0	25.4	25.5	25.2	24.3

2.4GHz 802.11n HT20								
Data Rate	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Peak Power (dBm)	**25.4**	25.2	25.3	25.4	25.3	25.3	25.4	25.3
Data Rate	**MCS8**	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
Peak Power (dBm)	25.3	25.2	25.2	25.3	25.3	25.3	25.3	25.0

2.4GHz 802.11ac VHT20 mode									
Data Rate	**Nss=1**								
	MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**	**MCS8**
Peak Power (dBm)	**25.5**	25.5	25.4	25.3	25.3	25.2	25.4	25.3	25.4
Data Rate	**Nss=2**								
	MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**	**MCS8**
Peak Power (dBm)	25.4	25.3	25.2	25.3	25.4	25.2	25.1	25.3	25.4

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

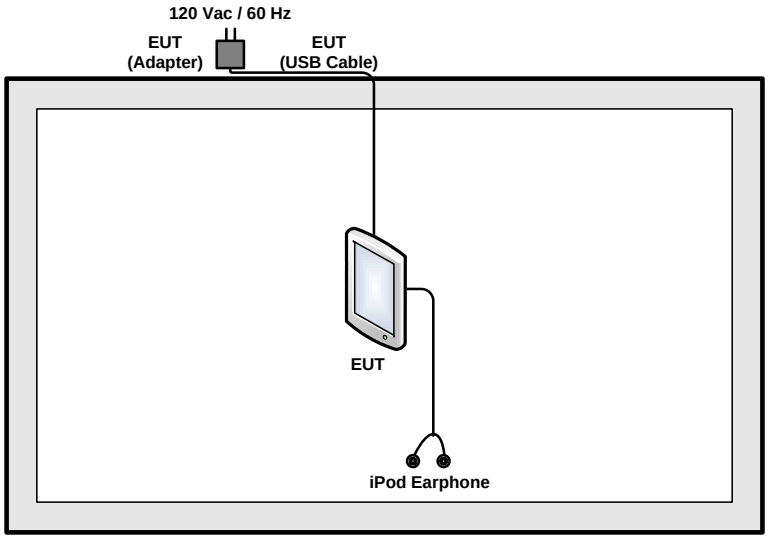
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	**Mode**	**Data Rate**	**Test Channel**
Conducted TCs	**6dB BW Power Spectral Density**	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11ac VHT20	**MCS0**	**1/6/11**
	Output Power	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11ac VHT20	**MCS0**	**1/6/11**
	Conducted Band Edge	**802.11b**	**1 Mbps**	**1/11**
		802.11g	**6 Mbps**	**1/11**
		802.11n HT20	**MCS0**	**1/11**
		802.11ac VHT20	**MCS0**	**1/11**
	Conducted Spurious Emission	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11ac VHT20	**MCS0**	**1/6/11**
Radiated TCs	**Radiated Band Edge**	**802.11b**	**1 Mbps**	**1/11**
		802.11g	**6 Mbps**	**1/11**
		802.11n HT20	**MCS0**	**1/11**
		802.11ac VHT20	**MCS0**	**1/11**
	Radiated Spurious Emission	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11ac VHT20	**MCS0**	**1/6/11**

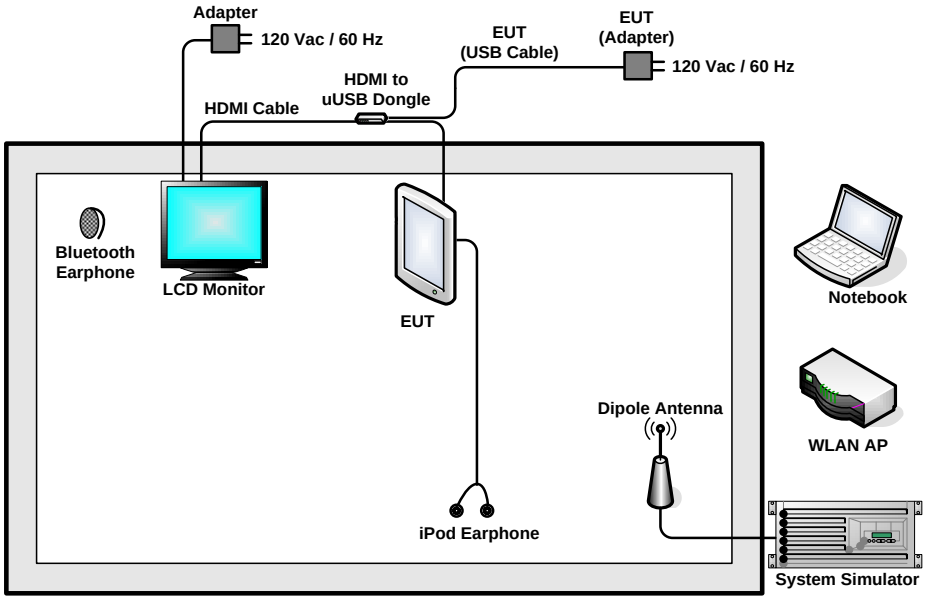
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 (GPRS Class 8) Idle + WLAN (2.4GHz) Link + Bluetooth Link + Earphone + HDMI Cable with Monitor + HDMI to uUSB Dongle + USB Cable (Charging from Adapter) + Camera (Front) Mode 2 : GSM850 (GPRS Class 8) Idle + WLAN (2.4GHz) Link + Earphone + HDMI Cable with Monitor + HDMI to uUSB Dongle + USB Cable (Charging from Adapter) + Camera (Front)
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

2.4 Connection Diagram of Test System

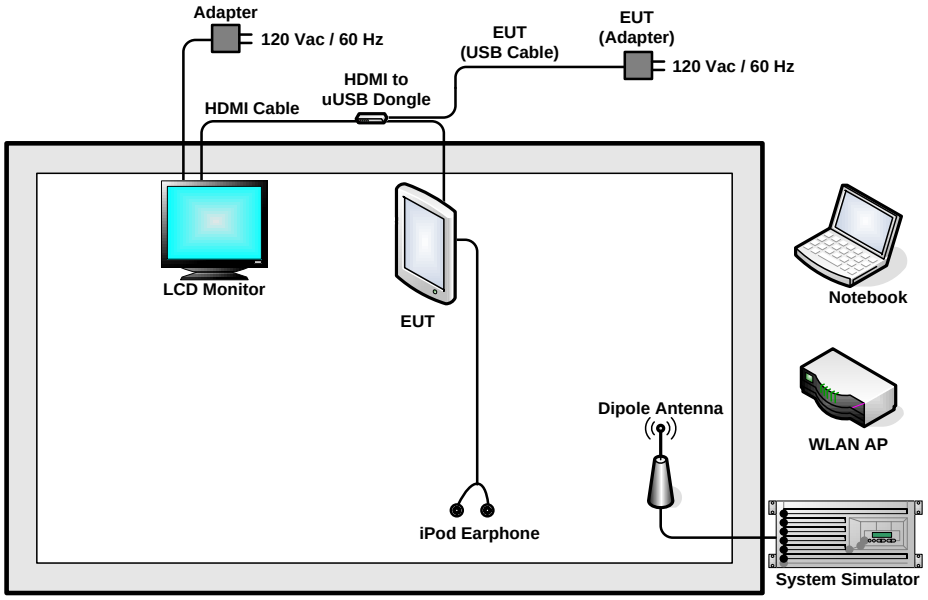
<WLAN Tx Mode>



<EUT with Adapter and Bluetooth Earphone Mode for AC Conducted Emission>



<EUT with Adapter Mode for AC Conducted Emission>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	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
5.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	HDMI to uUSB Dongle	N/A	PS56GR	N/A	Unshielded, 0.17 m	N/A
7.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “ADB” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

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 Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

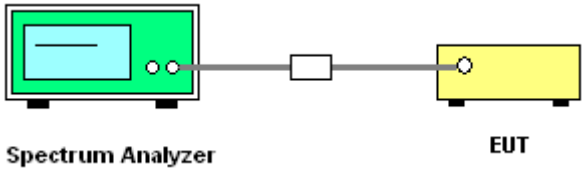
3.1.2 Measuring Instruments

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. Measure and record the results in the test report.

3.1.4 Test Setup

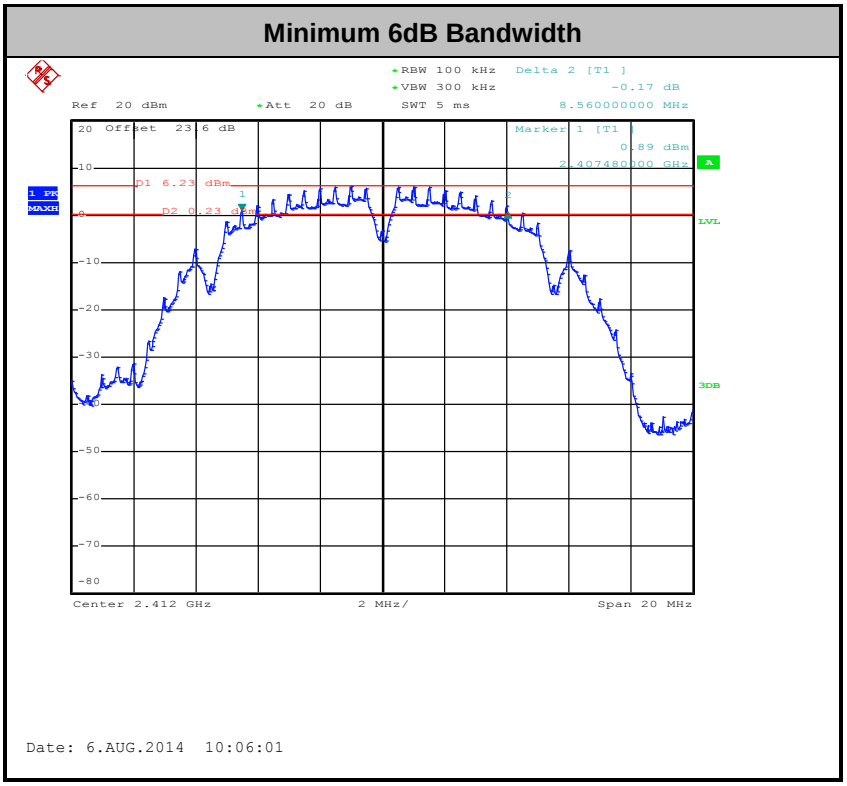


3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Test Band :	2.4GHz	Temperature :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant. 1	Ant. 2		
11b	1Mbps	2	1	2412	8.56	9.06	0.5	Pass
11b	1Mbps	2	6	2437	8.56	9.04	0.5	Pass
11b	1Mbps	2	11	2462	8.56	9.04	0.5	Pass
11g	6Mbps	2	1	2412	16.32	16.36	0.5	Pass
11g	6Mbps	2	6	2437	16.32	16.32	0.5	Pass
11g	6Mbps	2	11	2462	16.32	16.40	0.5	Pass
HT20	MCS0	2	1	2412	17.58	17.62	0.5	Pass
HT20	MCS0	2	6	2437	17.58	17.62	0.5	Pass
HT20	MCS0	2	11	2462	17.56	17.60	0.5	Pass
VHT20	MCS0	2	1	2412	17.58	17.58	0.5	Pass
VHT20	MCS0	2	6	2437	17.58	17.60	0.5	Pass
VHT20	MCS0	2	11	2462	17.56	17.58	0.5	Pass

Minimum 6dB Bandwidth



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.

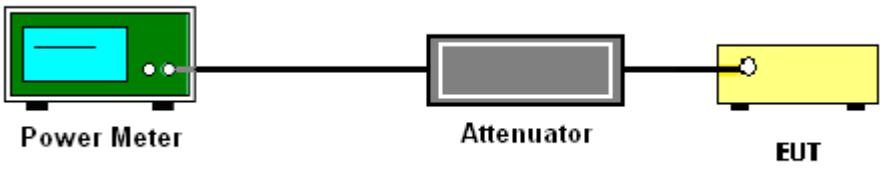
3.2.2 Measuring Instruments

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 :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

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	2	1	2412	18.3	18.5	21.4	30.00		4.91		Pass
11b	1Mbps	2	6	2437	18.4	18.4	21.4	30.00		4.91		Pass
11b	1Mbps	2	11	2462	18.2	18.3	21.3	30.00		4.91		Pass
11g	6Mbps	2	1	2412	21.2	21.7	24.4	30.00		4.91		Pass
11g	6Mbps	2	6	2437	22.3	22.7	25.5	30.00		4.91		Pass
11g	6Mbps	2	11	2462	20.8	21.0	23.9	30.00		4.91		Pass
HT20	MCS0	2	1	2412	20.8	20.7	23.7	30.00		4.91		Pass
HT20	MCS0	2	6	2437	22.2	22.6	25.4	30.00		4.91		Pass
HT20	MCS0	2	11	2462	21.1	21.3	24.2	30.00		4.91		Pass
VHT20	MCS0	2	1	2412	20.8	21.5	24.2	30.00		4.91		Pass
VHT20	MCS0	2	6	2437	22.4	22.5	25.5	30.00		4.91		Pass
VHT20	MCS0	2	11	2462	21.3	21.4	24.4	30.00		4.91		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 :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

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	2	1	2412	0.04	0.04	15.2	15.1	18.1
11b	1Mbps	2	6	2437	0.04	0.04	15.2	15.0	18.1
11b	1Mbps	2	11	2462	0.04	0.04	15.0	15.2	18.1
11g	6Mbps	2	1	2412	0.32	0.29	14.4	14.5	17.4
11g	6Mbps	2	6	2437	0.32	0.29	15.3	15.4	18.4
11g	6Mbps	2	11	2462	0.32	0.29	14.1	14.3	17.2
HT20	MCS0	2	1	2412	0.31	0.34	13.4	13.4	16.4
HT20	MCS0	2	6	2437	0.31	0.34	15.4	15.4	18.4
HT20	MCS0	2	11	2462	0.31	0.34	14.1	14.2	17.2
VHT20	MCS0	2	1	2412	0.31	0.31	13.6	13.3	16.5
VHT20	MCS0	2	6	2437	0.31	0.31	15.4	15.4	18.4
VHT20	MCS0	2	11	2462	0.31	0.31	14.1	14.4	17.3

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.

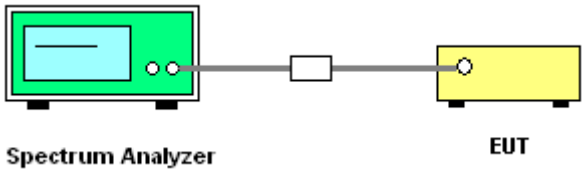
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   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



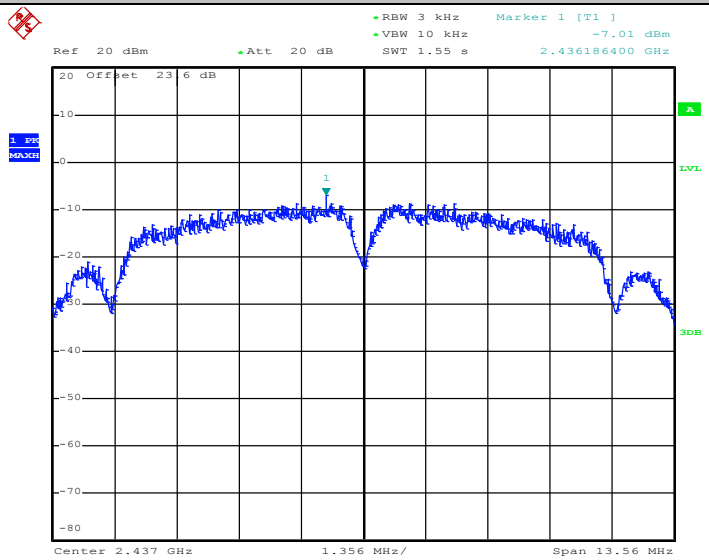
3.3.5 Test Result of Power Spectral Density

Test Band :	2.4GHz	Temperature :	21~26℃
Test Engineer :	Stuart Lin	Relative Humidity :	45~54%

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	2	1	2412	-7.92	-7.38	-4.37	8.00		4.91		Pass
11b	1Mbps	2	6	2437	-7.50	-7.01	-4.00	8.00		4.91		Pass
11b	1Mbps	2	11	2462	-7.51	-7.39	-4.38	8.00		4.91		Pass
11g	6Mbps	2	1	2412	-10.78	-10.47	-7.46	8.00		4.91		Pass
11g	6Mbps	2	6	2437	-9.10	-9.16	-6.09	8.00		4.91		Pass
11g	6Mbps	2	11	2462	-10.92	-10.23	-7.22	8.00		4.91		Pass
HT20	MCS0	2	1	2412	-11.72	-11.52	-8.51	8.00		4.91		Pass
HT20	MCS0	2	6	2437	-10.84	-10.13	-7.12	8.00		4.91		Pass
HT20	MCS0	2	11	2462	-11.30	-11.11	-8.10	8.00		4.91		Pass
VHT20	MCS0	2	1	2412	-12.48	-11.55	-8.54	8.00		4.91		Pass
VHT20	MCS0	2	6	2437	-10.33	-9.76	-6.75	8.00		4.91		Pass
VHT20	MCS0	2	11	2462	-11.53	-12.15	-8.52	8.00		4.91		Pass

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

Worst Case Power Density (dBm/3kHz)



Date: 6.AUG.2014 10:18:34

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).

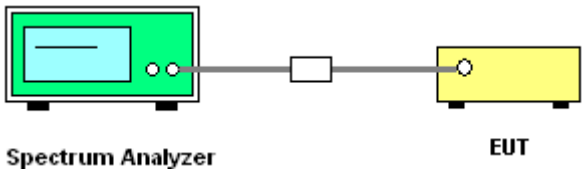
3.4.2 Measuring Instruments

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



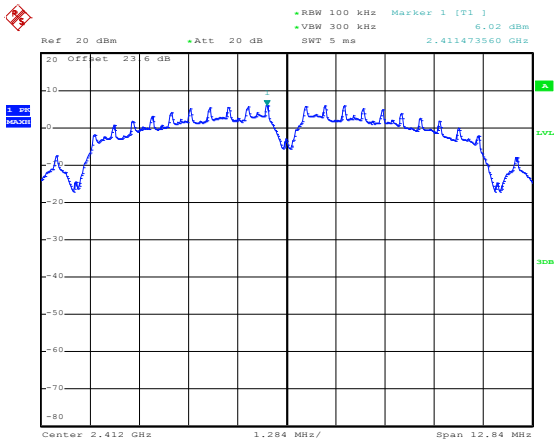
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

Number of TX	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

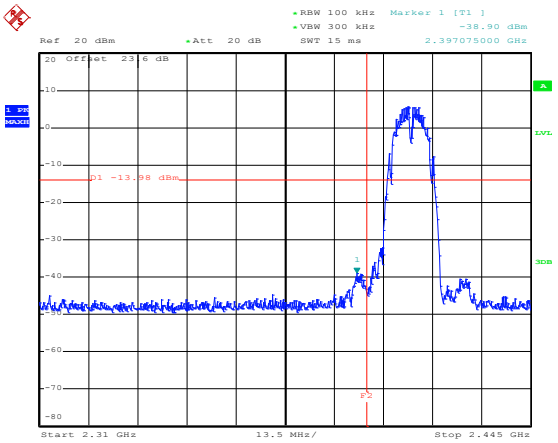
WLAN 802.11b Channel 01

100kHz PSD reference Level



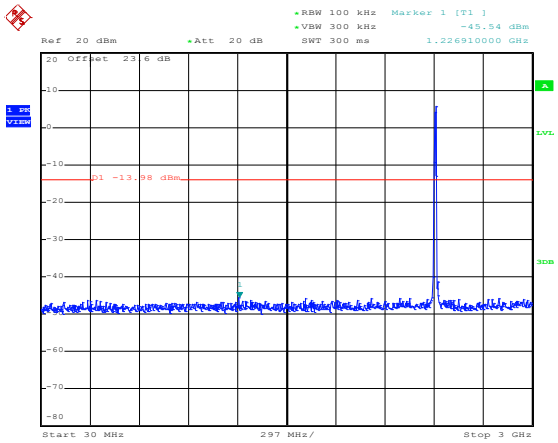
Date: 6.AUG.2014 10:07:08

Low Channel Plot



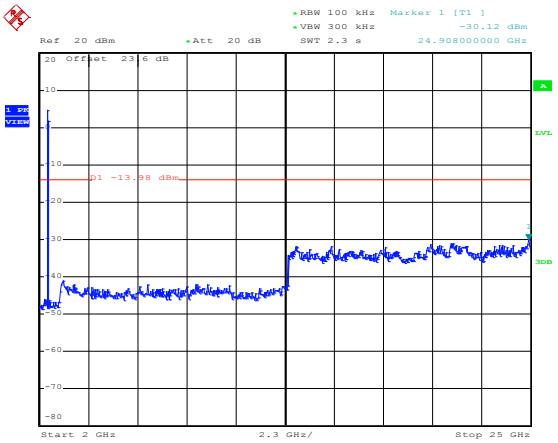
Date: 6.AUG.2014 10:07:25

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 14:14:18

Spurious Emission 2GHz~25GHz

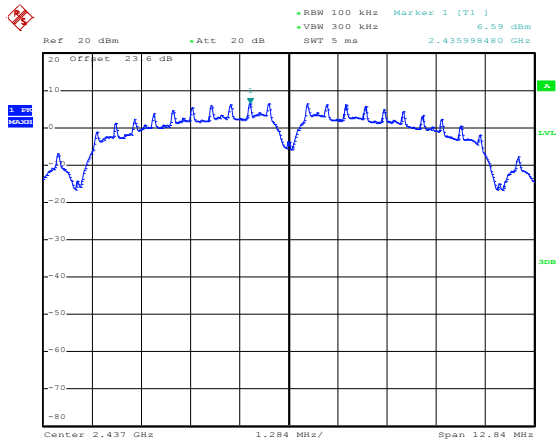


Date: 6.AUG.2014 14:14:36

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

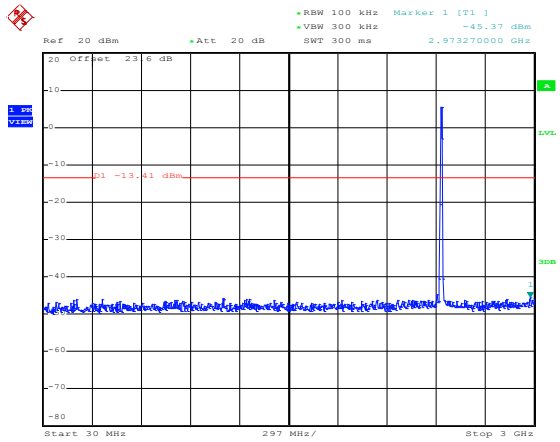
WLAN 802.11b Channel 06

100kHz PSD reference Level



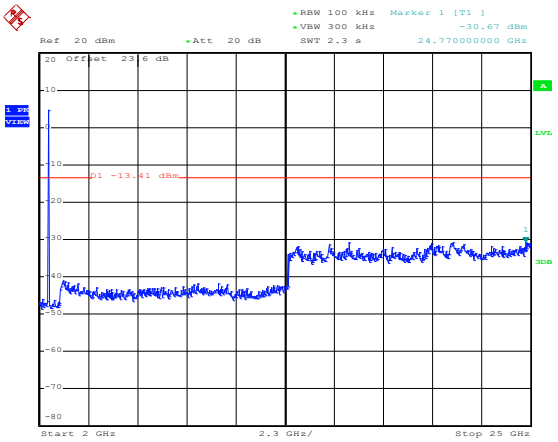
Date: 6.AUG.2014 10:22:12

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:22:34

Spurious Emission 2GHz~25GHz

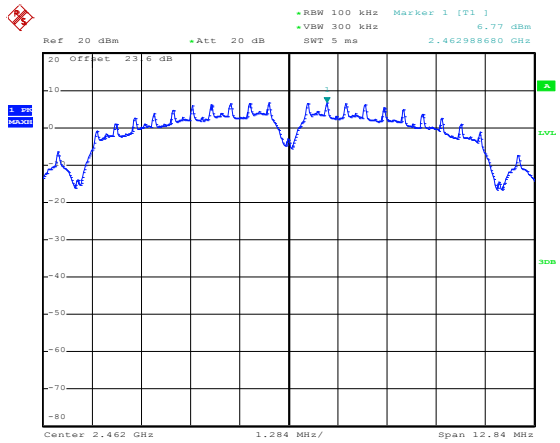


Date: 6.AUG.2014 10:22:52

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

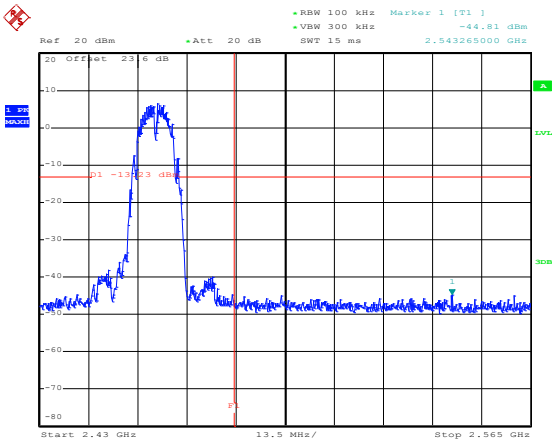
WLAN 802.11b Channel 11

100kHz PSD reference Level



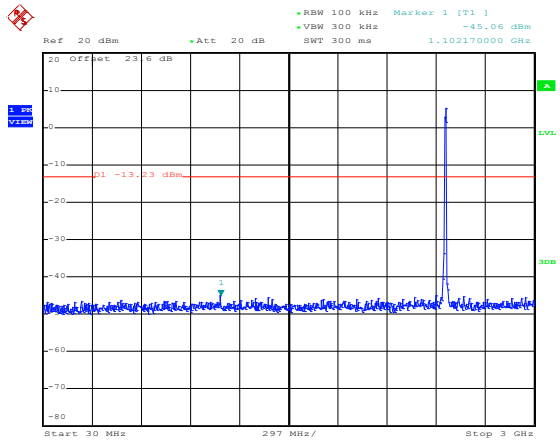
Date: 6.AUG.2014 10:24:58

High Channel Plot



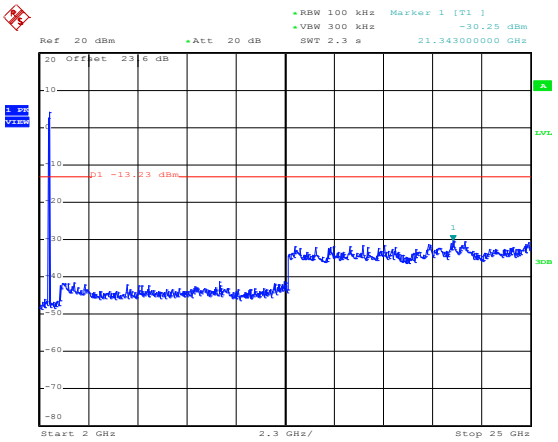
Date: 6.AUG.2014 10:25:20

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 14:15:45

Spurious Emission 2GHz~25GHz

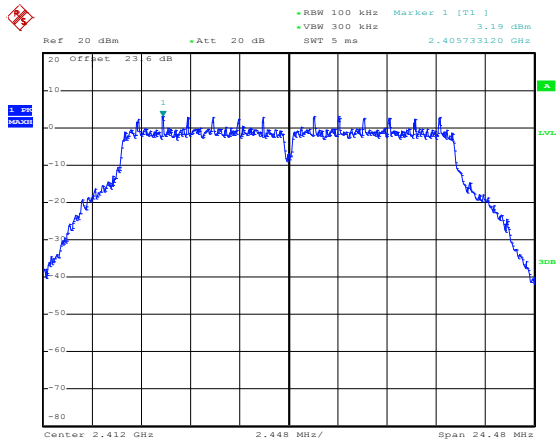


Date: 6.AUG.2014 14:16:03

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

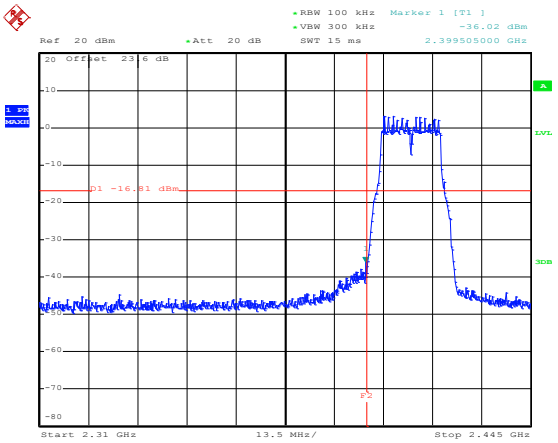
WLAN 802.11g Channel 01

100kHz PSD reference Level



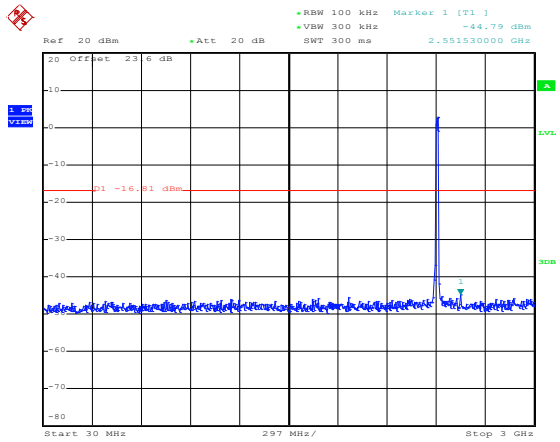
Date: 6.AUG.2014 10:59:22

Low Channel Plot



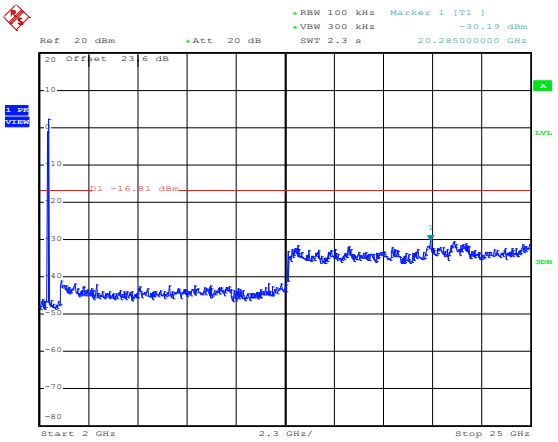
Date: 6.AUG.2014 10:59:57

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:01:36

Spurious Emission 2GHz~25GHz

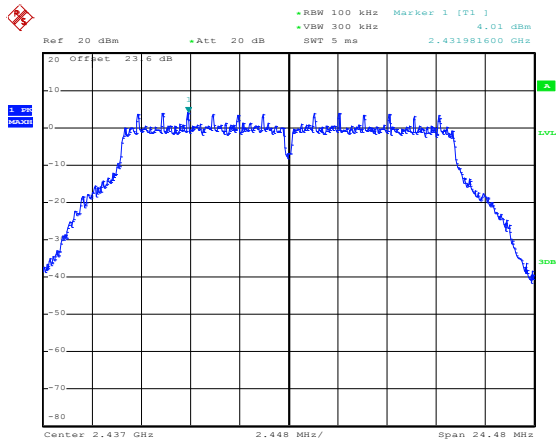


Date: 6.AUG.2014 11:01:54

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

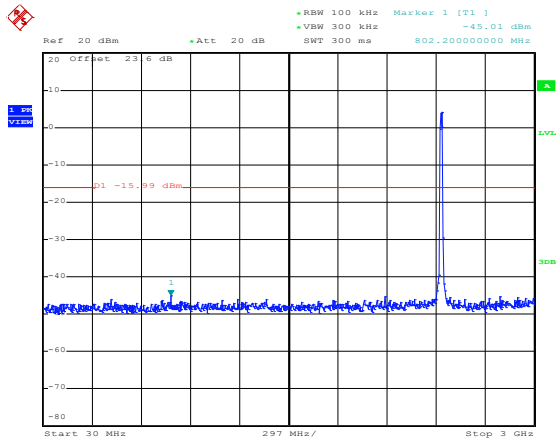
WLAN 802.11g Channel 06

100kHz PSD reference Level



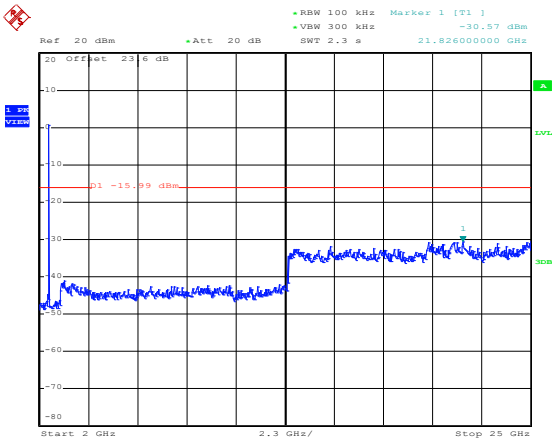
Date: 6.AUG.2014 10:43:15

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:43:45

Spurious Emission 2GHz~25GHz

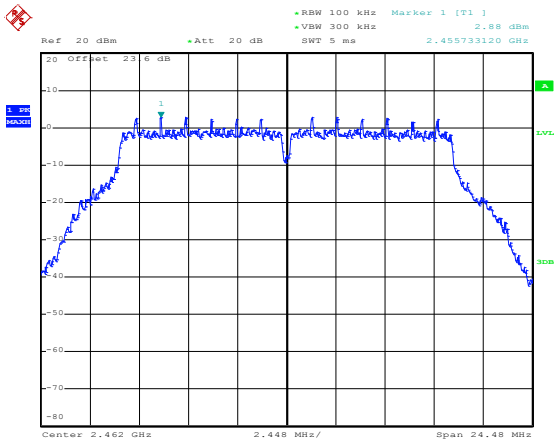


Date: 6.AUG.2014 10:44:03

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

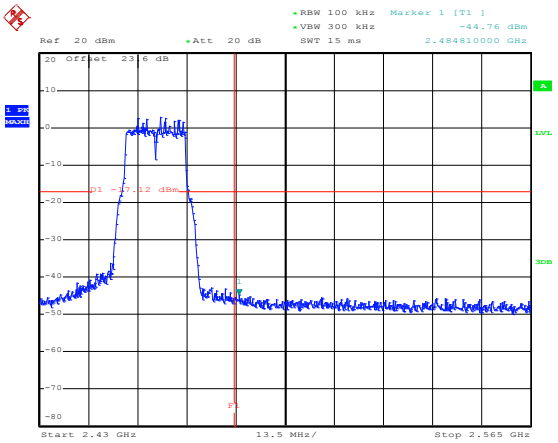
WLAN 802.11g Channel 11

100kHz PSD reference Level



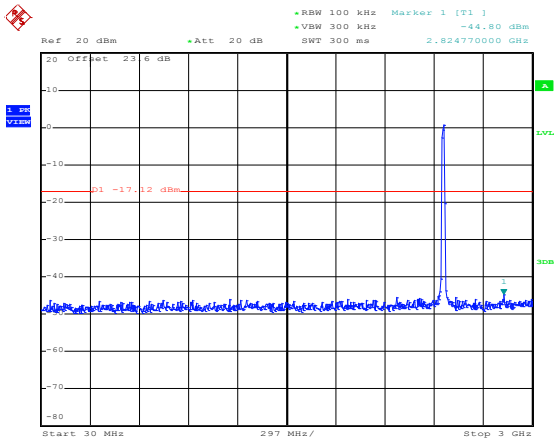
Date: 6.AUG.2014 10:37:41

High Channel Plot



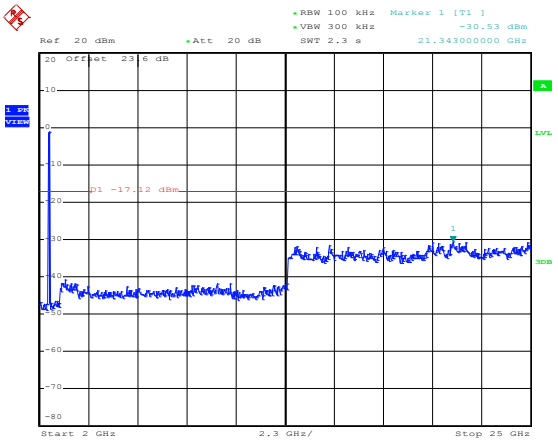
Date: 6.AUG.2014 10:37:59

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 14:17:20

Spurious Emission 2GHz~25GHz

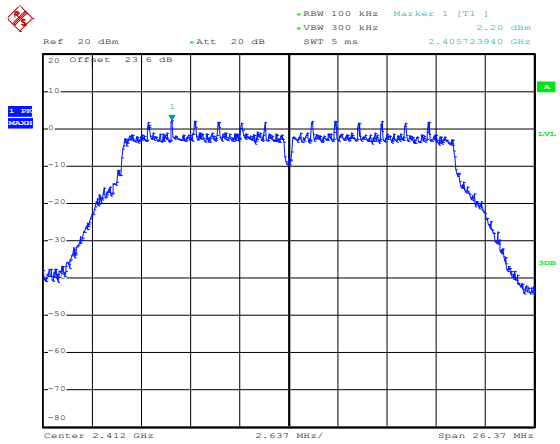


Date: 6.AUG.2014 14:17:38

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

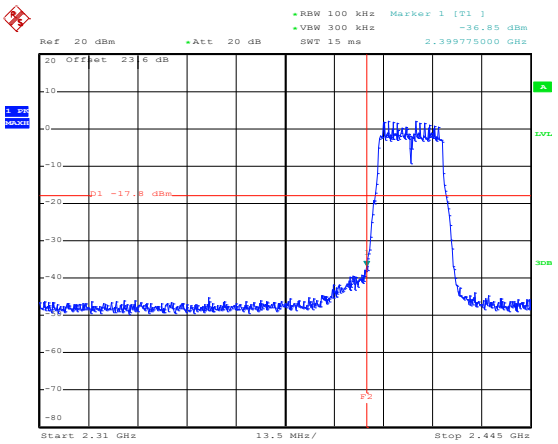
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



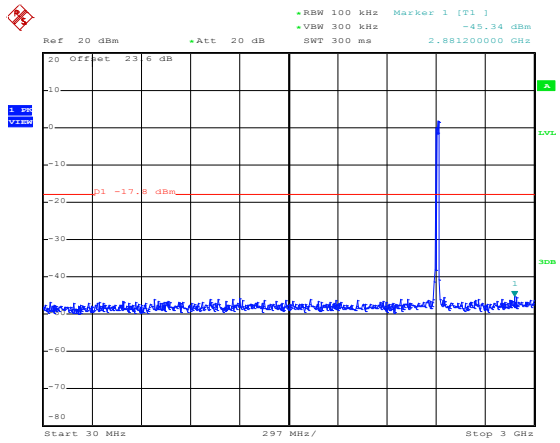
Date: 6.AUG.2014 11:08:29

Low Channel Plot



Date: 6.AUG.2014 11:08:58

Spurious Emission 30MHz~3GHz



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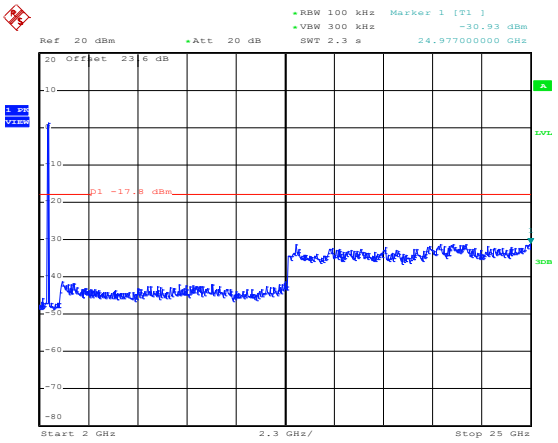
Spurious Emission 2GHz~25GHz

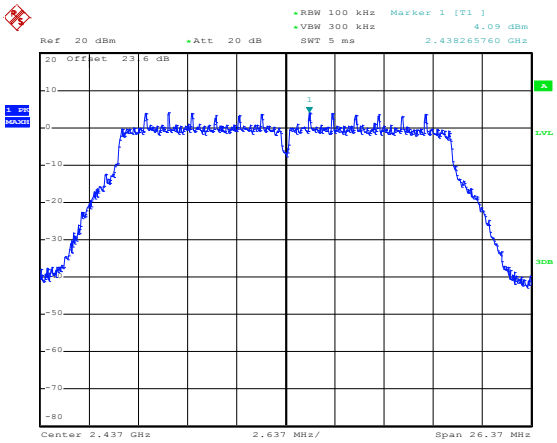


Date: 6.AUG.2014 11:09:43

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

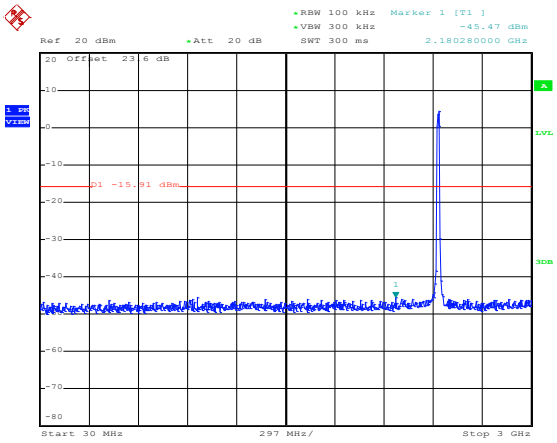
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



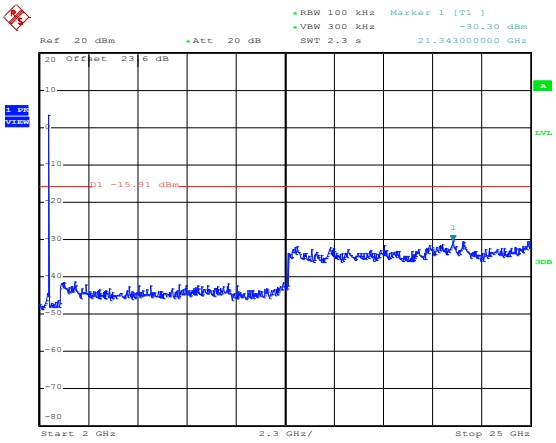
Date: 6.AUG.2014 11:34:15

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:34:37

Spurious Emission 2GHz~25GHz

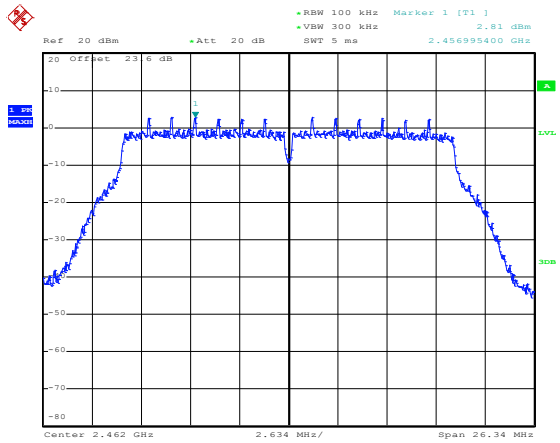


Date: 6.AUG.2014 11:34:55

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

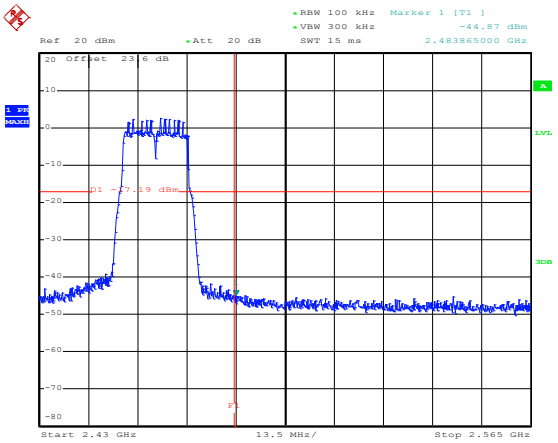
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



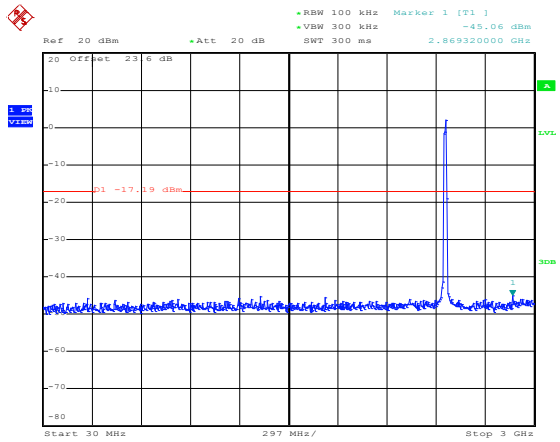
Date: 6.AUG.2014 11:38:44

High Channel Plot



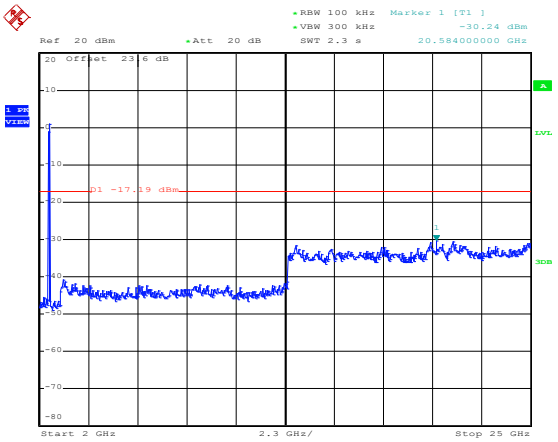
Date: 6.AUG.2014 11:39:01

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:39:24

Spurious Emission 2GHz~25GHz

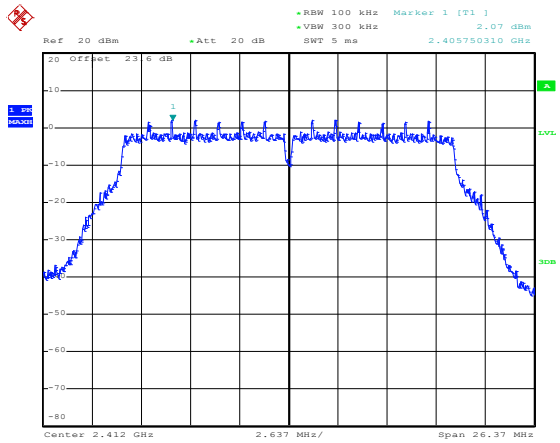


Date: 6.AUG.2014 11:39:42

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11ac VHT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

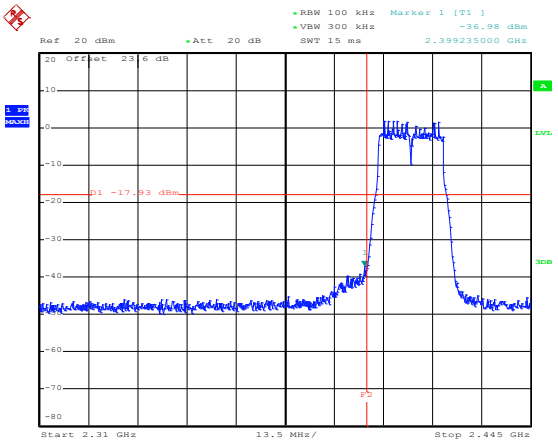
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



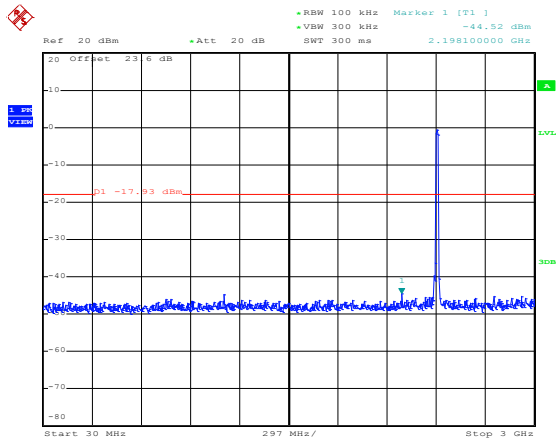
Date: 6.AUG.2014 11:51:23

Low Channel Plot



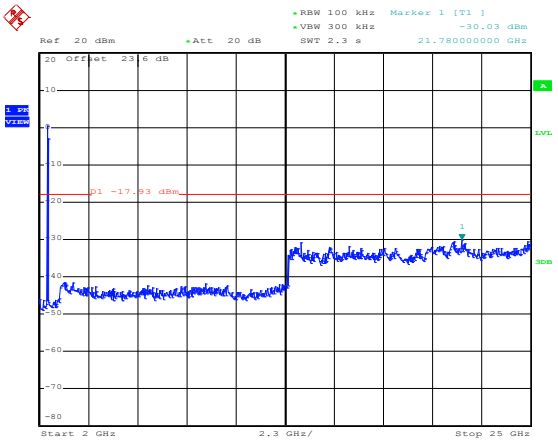
Date: 6.AUG.2014 11:51:41

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:52:03

Spurious Emission 2GHz~25GHz

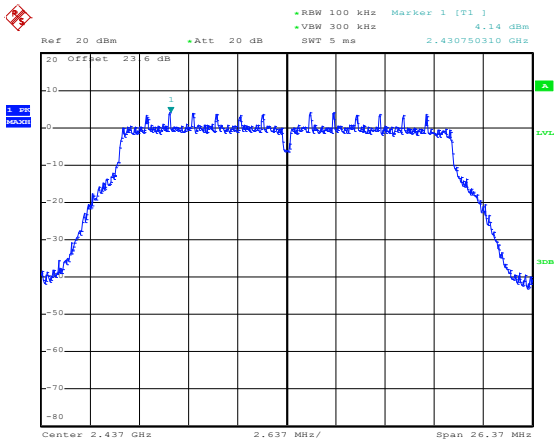


Date: 6.AUG.2014 11:52:21

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11ac VHT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

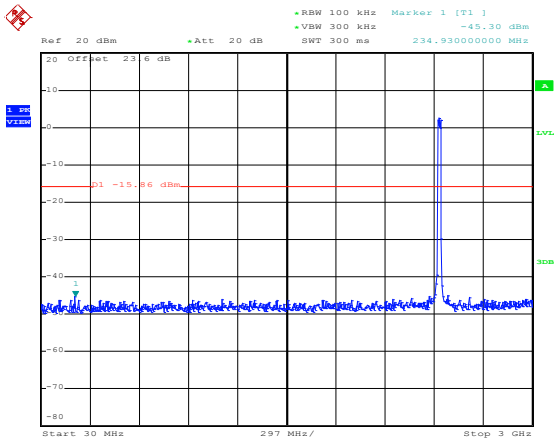
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



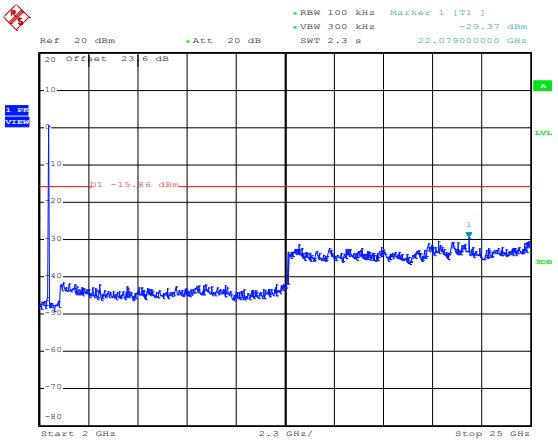
Date: 6.AUG.2014 11:55:21

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:55:43

Spurious Emission 2GHz~25GHz

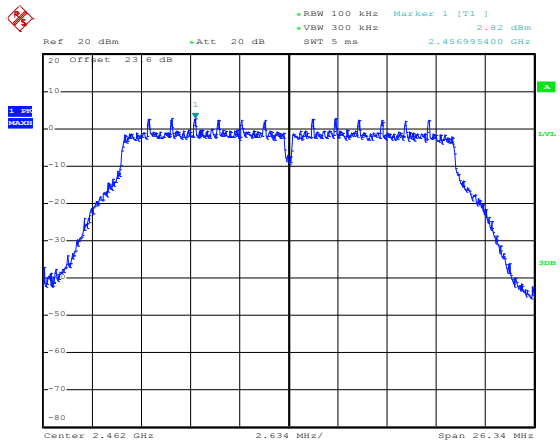


Date: 6.AUG.2014 11:56:01

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11ac VHT20	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

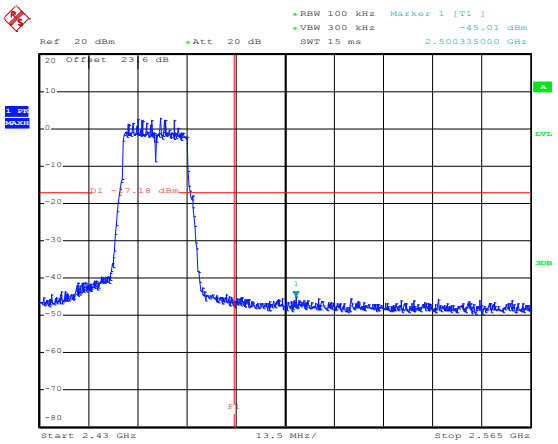
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



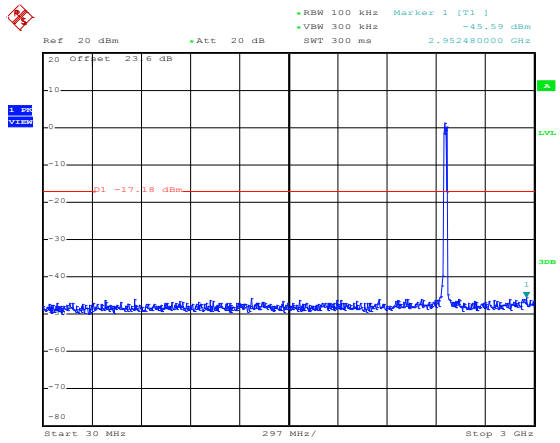
Date: 6.AUG.2014 14:03:45

High Channel Plot



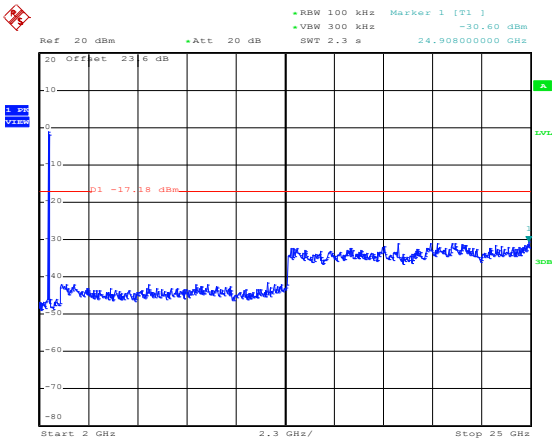
Date: 6.AUG.2014 14:04:05

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 14:09:29

Spurious Emission 2GHz~25GHz



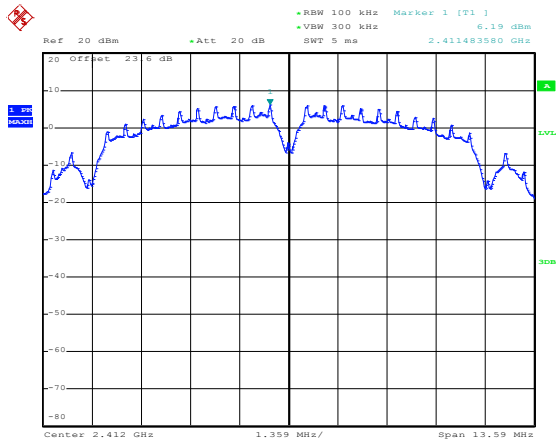
Date: 6.AUG.2014 14:09:47

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

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

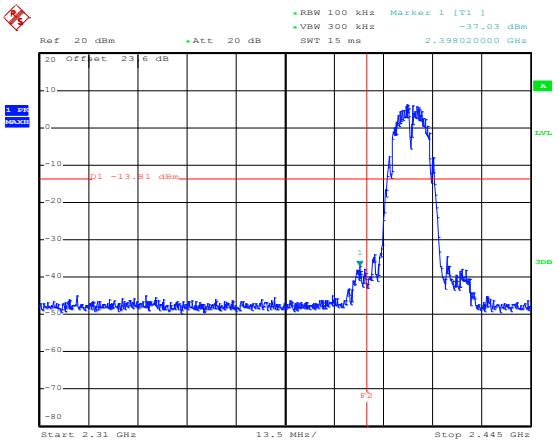
WLAN 802.11b Channel 01

100kHz PSD reference Level



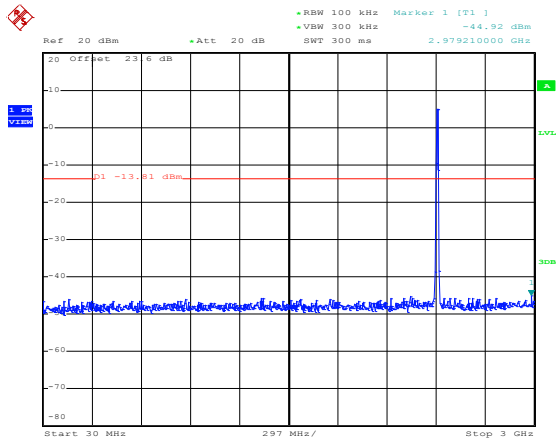
Date: 6.AUG.2014 10:14:21

Low Channel Plot



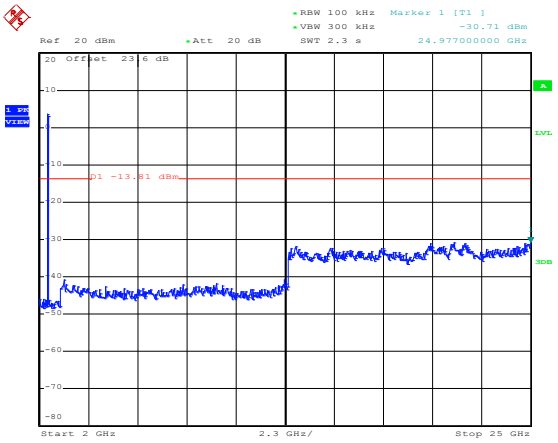
Date: 6.AUG.2014 10:14:46

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:15:37

Spurious Emission 2GHz~25GHz

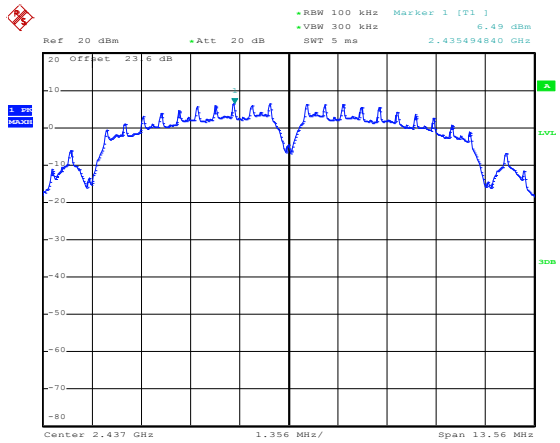


Date: 6.AUG.2014 10:15:55

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

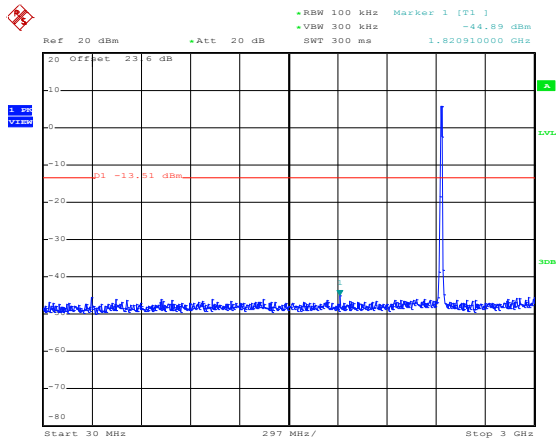
WLAN 802.11b Channel 06

100kHz PSD reference Level



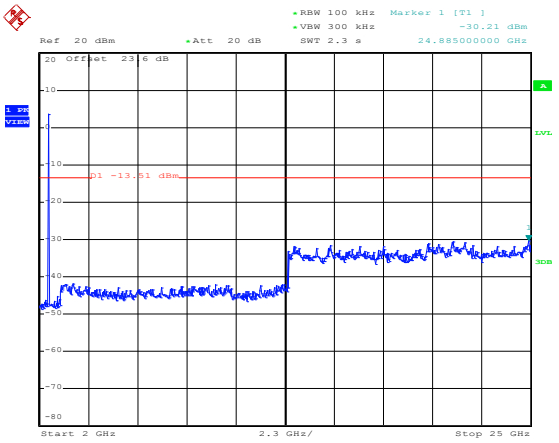
Date: 6.AUG.2014 10:18:55

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:19:15

Spurious Emission 2GHz~25GHz

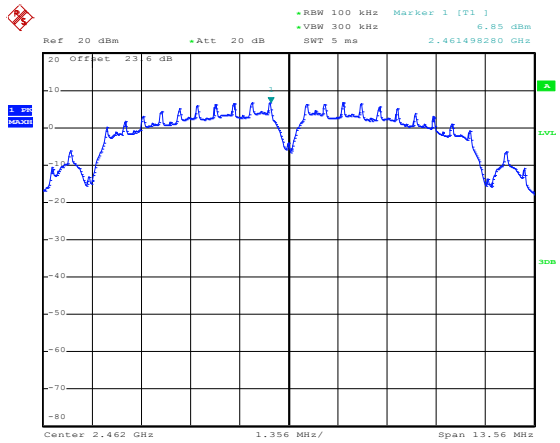


Date: 6.AUG.2014 10:19:33

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

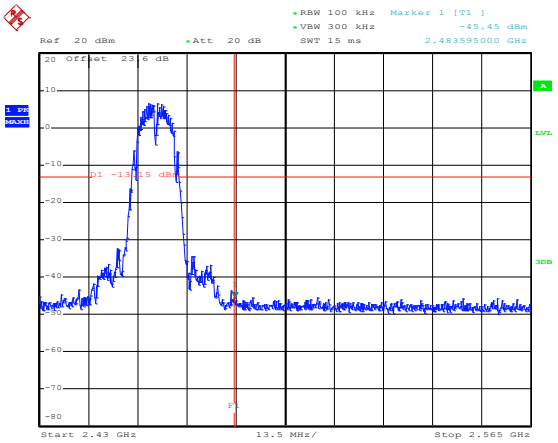
WLAN 802.11b Channel 11

100kHz PSD reference Level



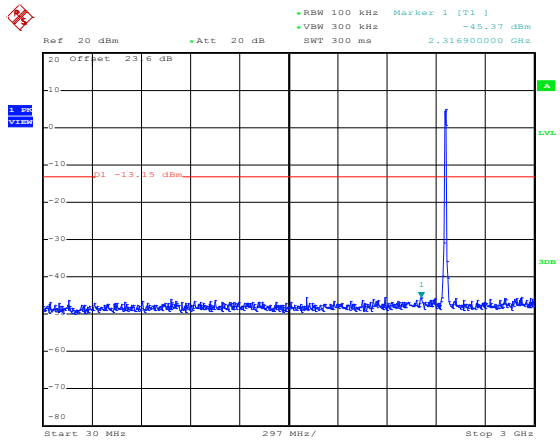
Date: 6.AUG.2014 10:28:36

High Channel Plot



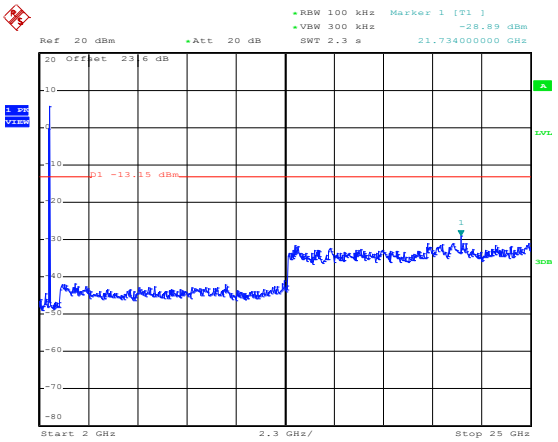
Date: 6.AUG.2014 10:30:05

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:30:32

Spurious Emission 2GHz~25GHz

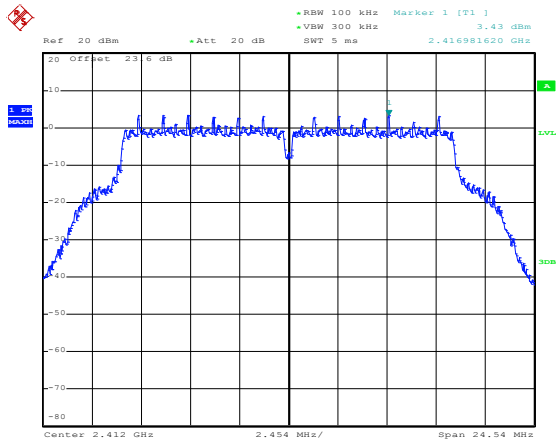


Date: 6.AUG.2014 10:30:50

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

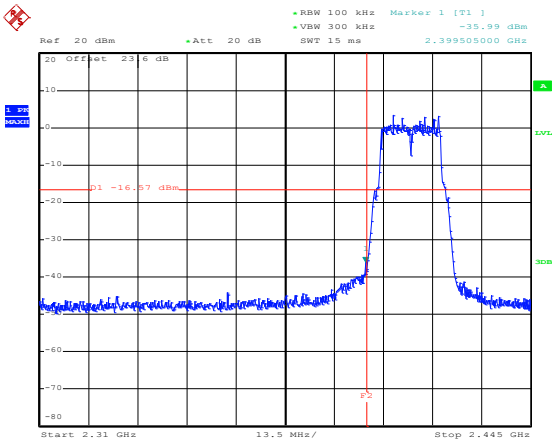
WLAN 802.11g Channel 01

100kHz PSD reference Level



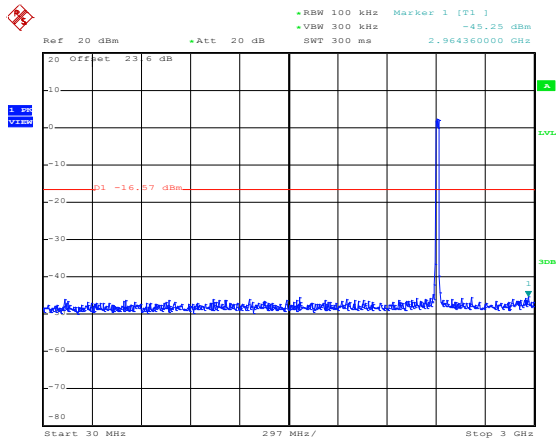
Date: 6.AUG.2014 10:53:22

Low Channel Plot



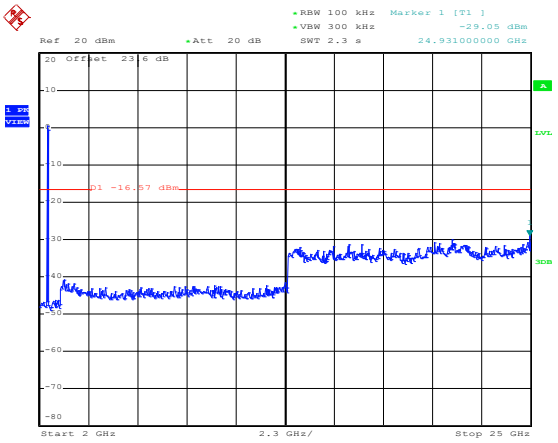
Date: 6.AUG.2014 10:54:47

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:55:16

Spurious Emission 2GHz~25GHz

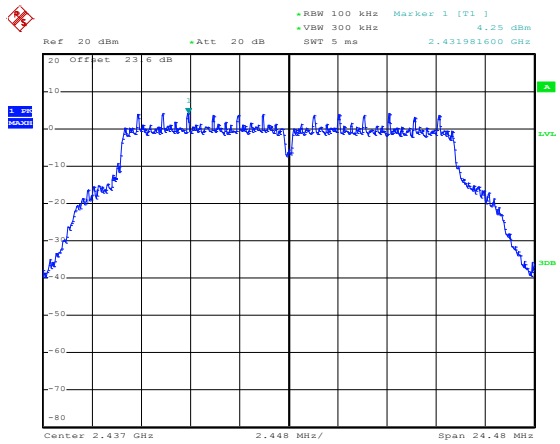


Date: 6.AUG.2014 10:55:34

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

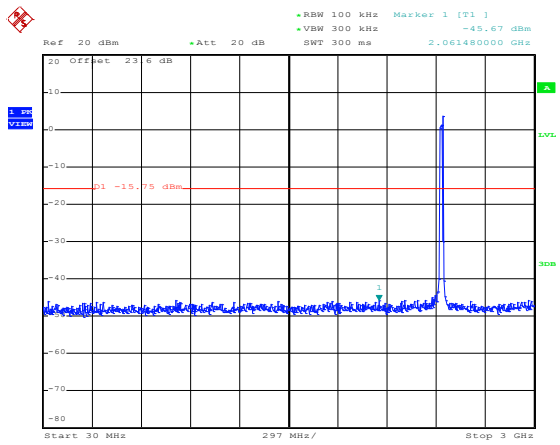
WLAN 802.11g Channel 06

100kHz PSD reference Level



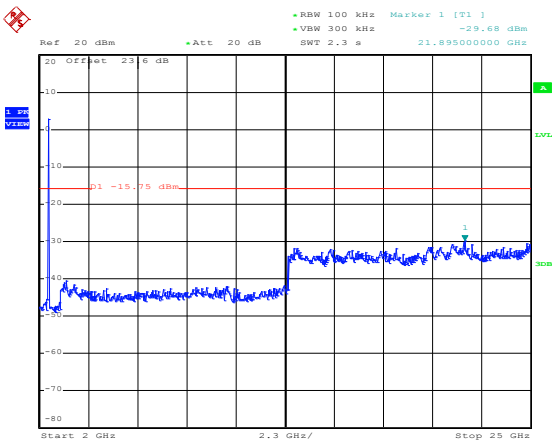
Date: 6.AUG.2014 10:47:19

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:47:44

Spurious Emission 2GHz~25GHz

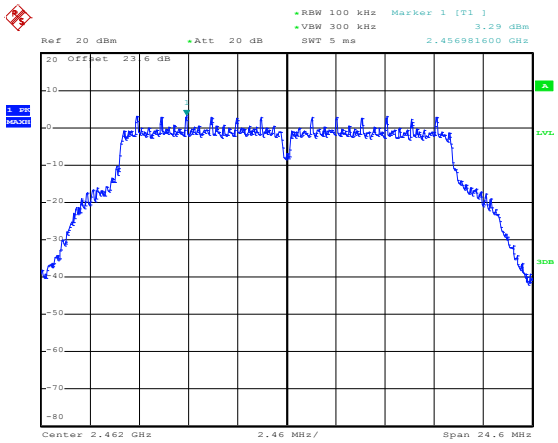


Date: 6.AUG.2014 10:48:02

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

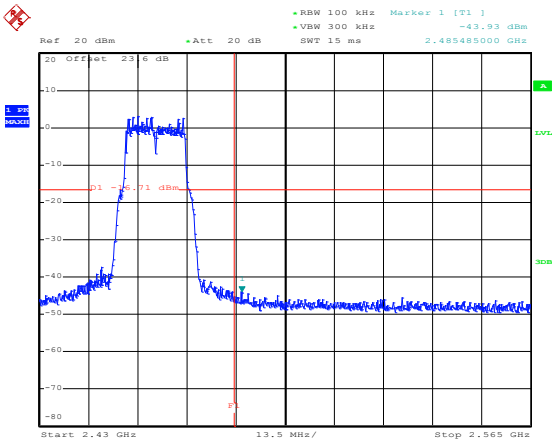
WLAN 802.11g Channel 11

100kHz PSD reference Level



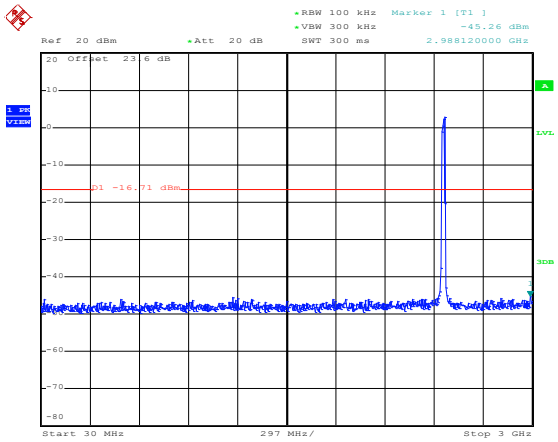
Date: 6.AUG.2014 10:34:01

High Channel Plot



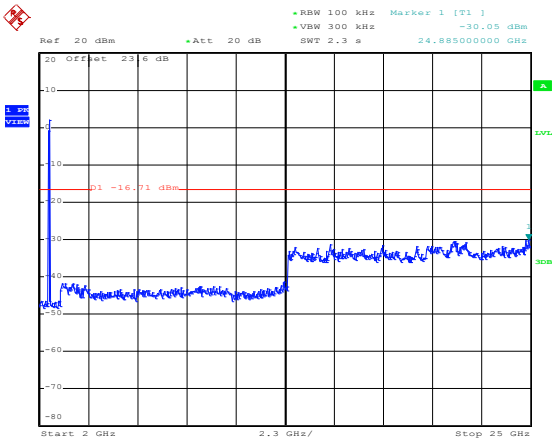
Date: 6.AUG.2014 10:34:23

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 10:34:45

Spurious Emission 2GHz~25GHz

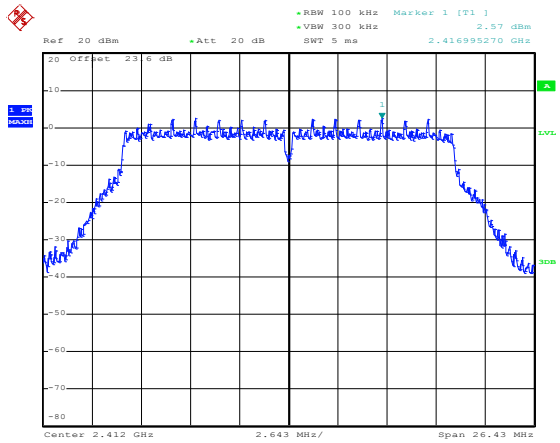


Date: 6.AUG.2014 10:35:03

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

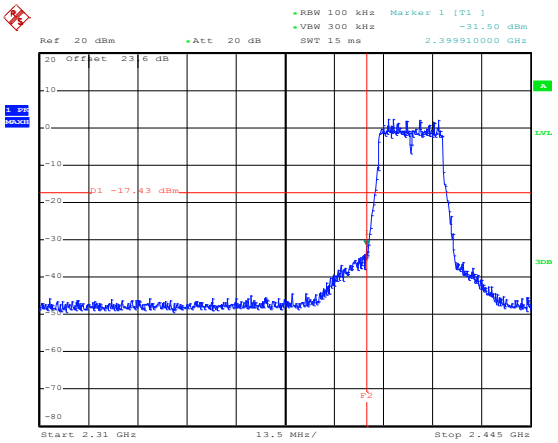
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



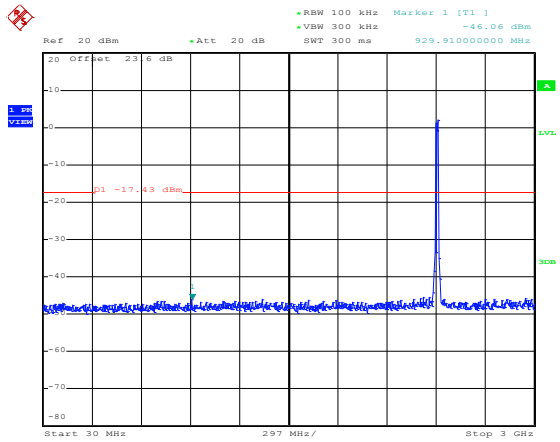
Date: 6.AUG.2014 11:12:50

Low Channel Plot



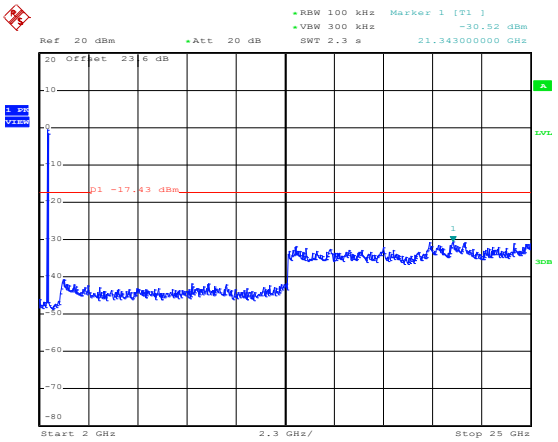
Date: 6.AUG.2014 11:13:13

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:13:37

Spurious Emission 2GHz~25GHz

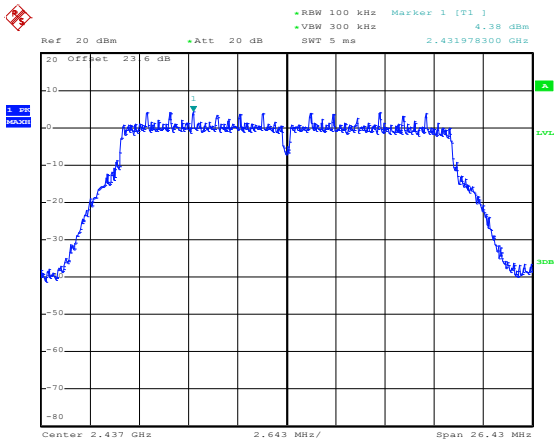


Date: 6.AUG.2014 11:13:55

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

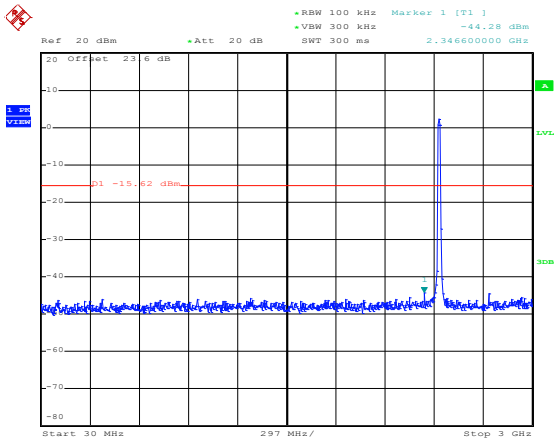
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



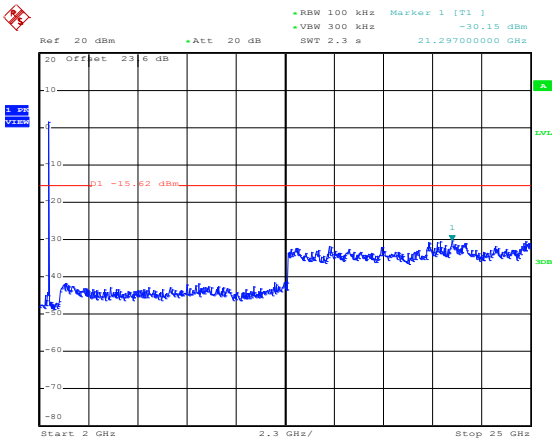
Date: 6.AUG.2014 11:18:26

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:18:47

Spurious Emission 2GHz~25GHz

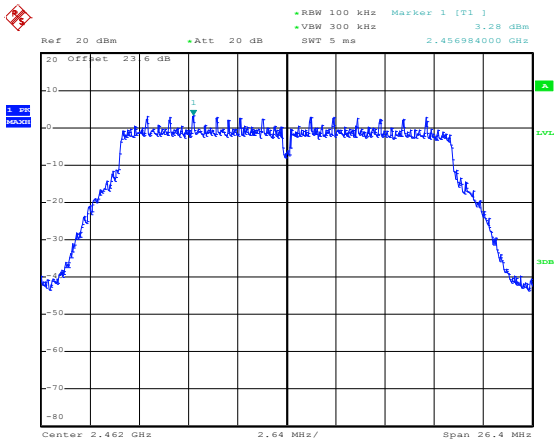


Date: 6.AUG.2014 11:19:05

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

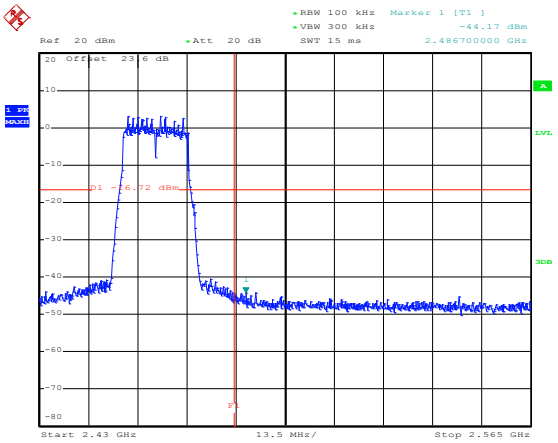
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



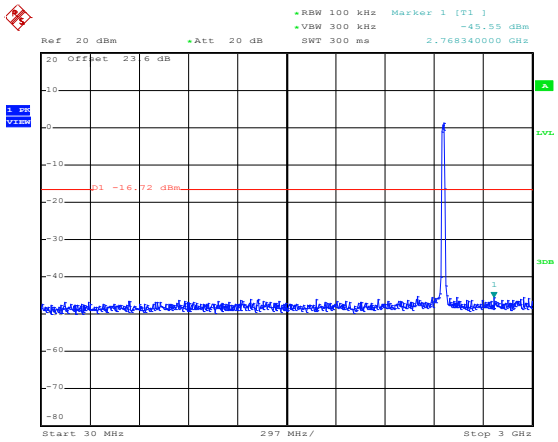
Date: 6.AUG.2014 11:43:43

High Channel Plot



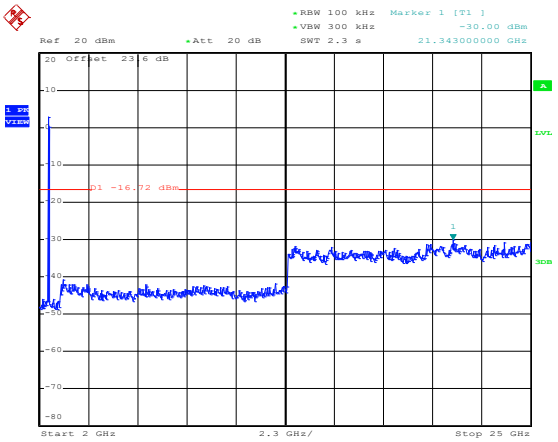
Date: 6.AUG.2014 11:44:13

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:44:38

Spurious Emission 2GHz~25GHz

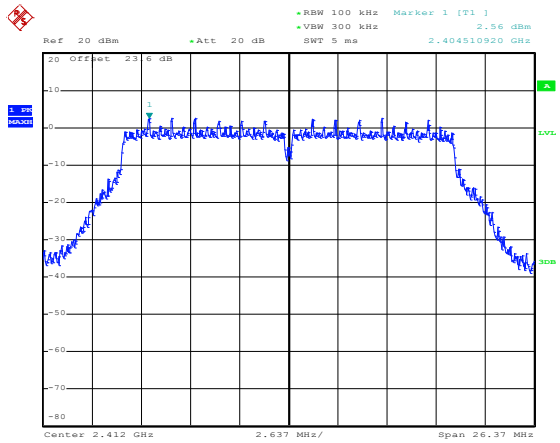


Date: 6.AUG.2014 11:44:56

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11ac VHT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Stuart Lin

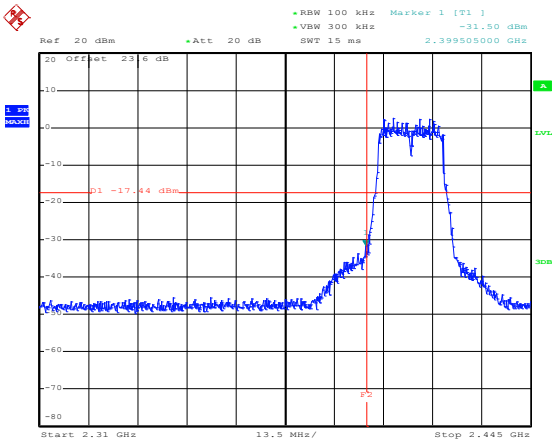
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



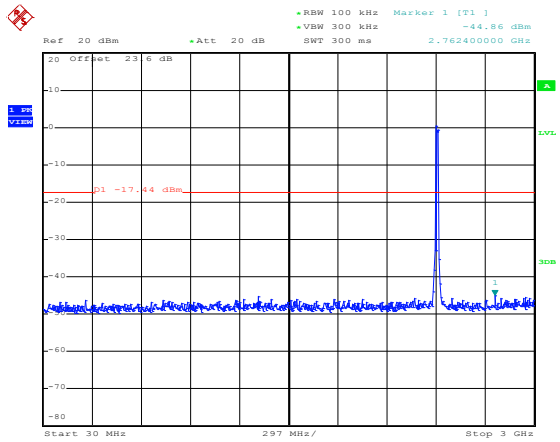
Date: 6.AUG.2014 11:47:31

Low Channel Plot



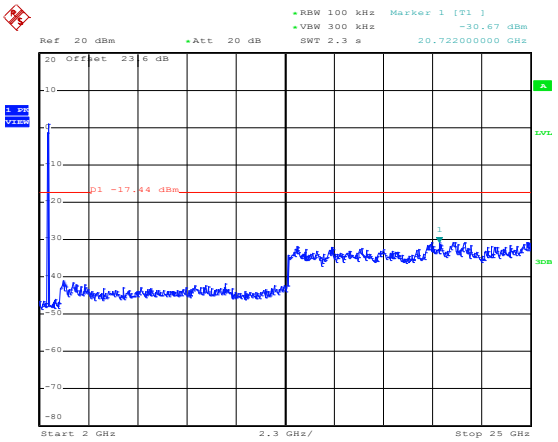
Date: 6.AUG.2014 11:47:46

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:48:14

Spurious Emission 2GHz~25GHz

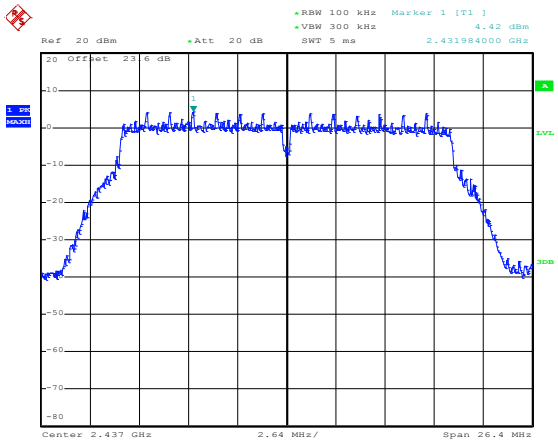


Date: 6.AUG.2014 11:48:32

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11ac VHT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid.	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Stuart Lin

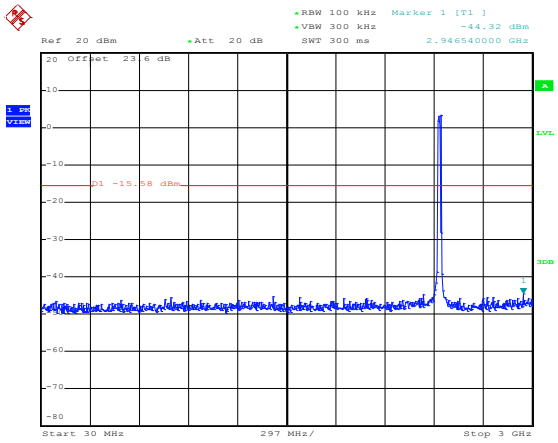
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



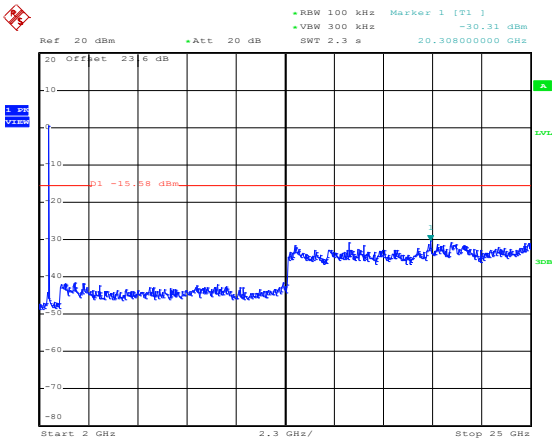
Date: 6.AUG.2014 11:58:43

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 11:59:25

Spurious Emission 2GHz~25GHz

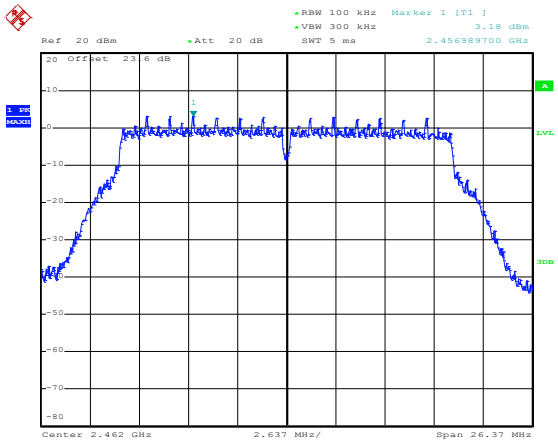


Date: 6.AUG.2014 11:59:43

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11ac VHT20	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Stuart Lin

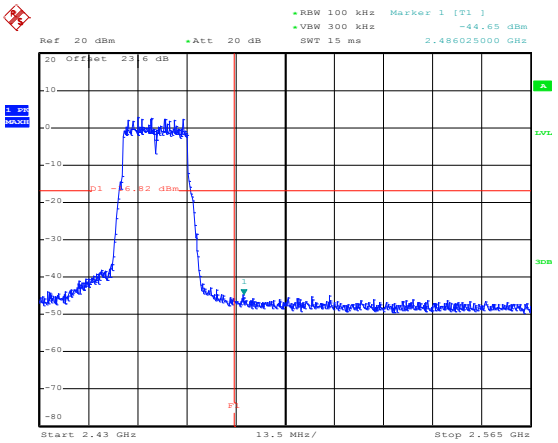
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



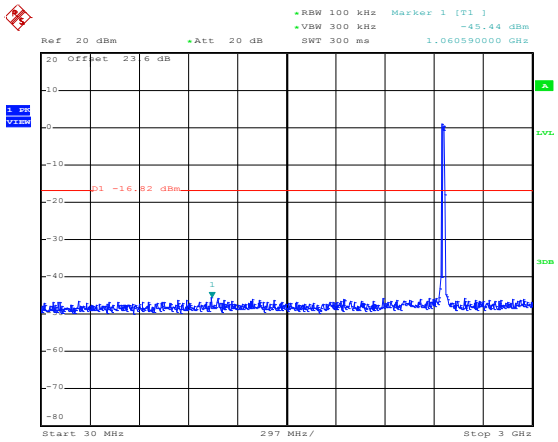
Date: 6.AUG.2014 13:36:37

High Channel Plot



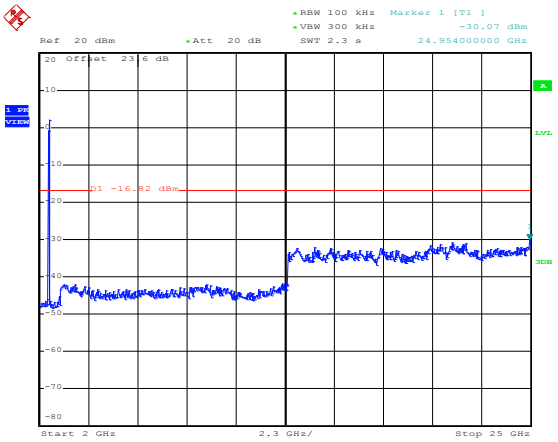
Date: 6.AUG.2014 13:37:00

Spurious Emission 30MHz~3GHz



Date: 6.AUG.2014 13:37:22

Spurious Emission 2GHz~25GHz



Date: 6.AUG.2014 13:37:40

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.

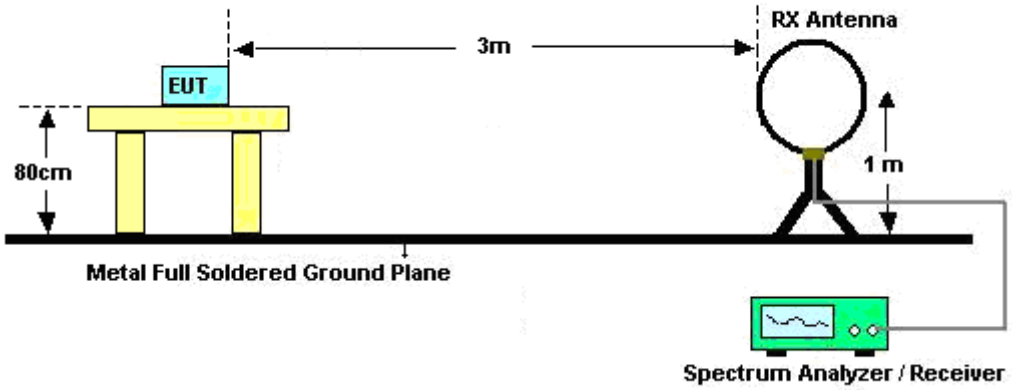
3.5.3 Test Procedure

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.

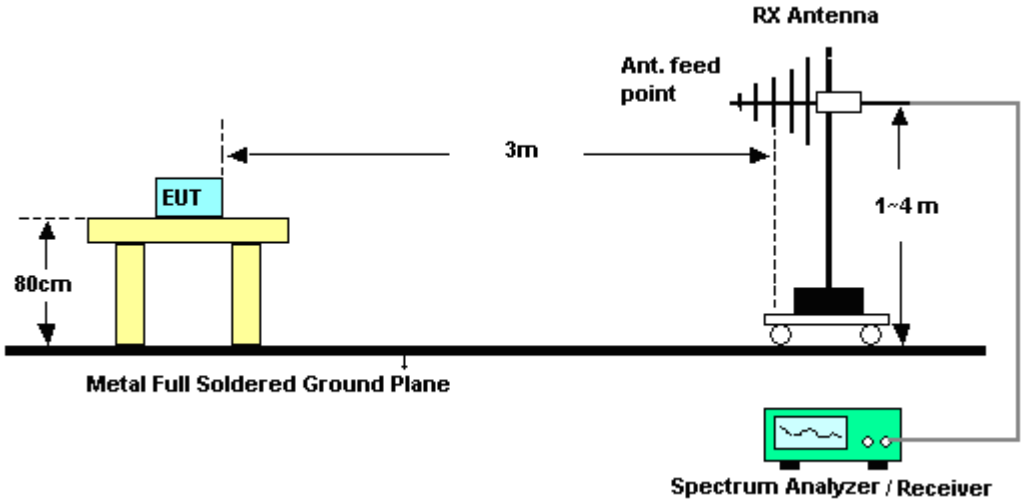
Antenna	Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting
1+2	802.11b	99.08	-	-	10Hz
1+2	802.11b	99.08	-	-	
1+2	802.11g	92.86	1430	0.70	1kHz
1+2	802.11g	93.51	1440	0.69	
1+2	802.11n HT20 for Ant. 1	93.06	1340	0.75	1kHz
1+2	802.11n HT20 for Ant. 2	92.41	1340	0.75	
1+2	802.11ac VHT20 for Ant. 1	93.10	1340	0.75	1kHz
1+2	802.11ac VHT20 for Ant. 2	93.10	1350	0.74	

3.5.4 Test Setup

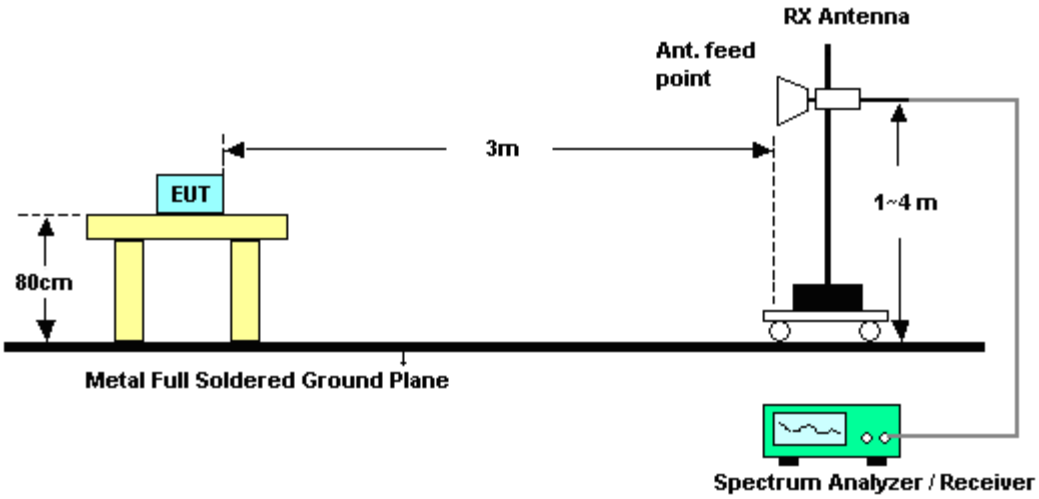
For radiated emissions below 30MHz



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 of Radiated Spurious at Band Edges

MIMO <Ant. 1+2>

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Band :	Low	**Relative Humidity :**	49~53%
Test Channel :	01	**Test Engineer :**	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2383.71	58.8	-15.2	74	54	32.16	6.91	34.27	137	360	Peak
2389.83	45.17	-8.83	54	40.38	32.18	6.91	34.3	137	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2337.09	57.14	-16.86	74	52.41	32.11	6.84	34.22	100	217	Peak
2390	43.2	-10.8	54	38.41	32.18	6.91	34.3	100	217	Average

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Band :	High	**Relative Humidity :**	49~53%
Test Channel :	11	**Test Engineer :**	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2483.71	61.42	-12.58	74	56.51	32.28	7.06	34.43	175	0	Peak
2483.59	50.06	-3.94	54	45.15	32.28	7.06	34.43	175	0	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**
2492.56	56.85	-17.15	74	51.97	32.3	7.06	34.48	200	59	Peak
2483.59	42.99	-11.01	54	38.08	32.28	7.06	34.43	200	59	Average

Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	Low	Relative Humidity :	49~53%
Test Channel :	01	Test Engineer :	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390.01	65.99	-8.01	74	61.2	32.18	6.91	34.3	148	7	Peak
2390.01	52.44	-1.56	54	47.65	32.18	6.91	34.3	148	7	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
2390.01	60.65	-13.35	74	55.86	32.18	6.91	34.3	184	123	Peak
2389.92	47.82	-6.18	54	43.03	32.18	6.91	34.3	184	123	Average

Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	High	Relative Humidity :	49~53%
Test Channel :	11	Test Engineer :	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.06	64.52	-9.48	74	59.61	32.28	7.06	34.43	114	1	Peak
2484.25	51.47	-2.53	54	46.56	32.28	7.06	34.43	114	1	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
2484.79	59.37	-14.63	74	54.46	32.28	7.06	34.43	100	89	Peak
2485.18	46.02	-7.98	54	41.11	32.28	7.06	34.43	100	89	Average

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	Low	Relative Humidity :	49~53%
Test Channel :	01	Test Engineer :	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.47	70.46	-3.54	74	65.64	32.18	6.91	34.27	115	4	Peak
2389.74	53.02	-0.98	54	48.2	32.18	6.91	34.27	115	4	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.93	67.68	-6.32	74	62.86	32.18	6.91	34.27	185	338	Peak
2390.01	50.51	-3.49	54	45.72	32.18	6.91	34.3	185	338	Average

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	High	Relative Humidity :	49~53%
Test Channel :	11	Test Engineer :	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.61	66.18	-7.82	74	61.27	32.28	7.06	34.43	115	4	Peak
2483.71	52.91	-1.09	54	48	32.28	7.06	34.43	115	4	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
2484.19	61.63	-12.37	74	56.72	32.28	7.06	34.43	184	343	Peak
2483.53	48	-6	54	43.09	32.28	7.06	34.43	184	343	Average

Test Mode :	802.11ac VHT20	Temperature :	21~25°C
Test Band :	Low	Relative Humidity :	49~53%
Test Channel :	01	Test Engineer :	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.2	68.99	-5.01	74	64.17	32.18	6.91	34.27	114	9	Peak
2389.65	52.36	-1.64	54	47.54	32.18	6.91	34.27	114	9	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
2389.65	66.81	-7.19	74	61.99	32.18	6.91	34.27	186	340	Peak
2390.01	50.08	-3.92	54	45.29	32.18	6.91	34.3	186	340	Average

Test Mode :	802.11ac VHT20	Temperature :	21~25°C
Test Band :	High	Relative Humidity :	49~53%
Test Channel :	11	Test Engineer :	Stan Hsieh and Ken Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.74	65.16	-8.84	74	60.25	32.28	7.06	34.43	145	5	Peak
2483.65	51.24	-2.76	54	46.33	32.28	7.06	34.43	145	5	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	61.67	-12.33	74	56.76	32.28	7.06	34.43	183	348	Peak
2483.74	47.35	-6.65	54	42.44	32.28	7.06	34.43	183	348	Average

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

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

MIMO <Ant. 1+2>

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2414	112.39	-	-	107.54	32.2	6.95	34.3	137	360	Peak
2414	108.74	-	-	103.89	32.2	6.95	34.3	137	360	Average
4824	47.42	-6.58	54	63.32	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2412	101.18	-	-	96.33	32.2	6.95	34.3	100	217	Peak
2412	96.98	-	-	92.13	32.2	6.95	34.3	100	217	Average
4824	47.14	-6.86	54	63.04	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Channel :	06	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2439	113.19	-	-	108.31	32.24	6.99	34.35	108	2	Peak
2439	109	-	-	104.12	32.24	6.99	34.35	108	2	Average
4874	45.67	-8.33	54	61.38	34.3	8.82	58.83	100	0	Peak
7311	49.12	-4.88	54	60.34	35.6	10.91	57.73	100	0	Peak

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Channel :	06	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2438 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2438	101.56	-	-	96.68	32.24	6.99	34.35	195	58	Peak
2438	97.55	-	-	92.67	32.24	6.99	34.35	195	58	Average
4875	44.99	-9.01	54	60.7	34.3	8.82	58.83	100	0	Peak
7311	47.17	-6.83	54	58.39	35.6	10.91	57.73	100	0	Peak

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Channel :	11	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
33.24	31.36	-8.64	40	44.94	17.24	0.56	31.38	120	66	Peak
142.05	27.45	-16.05	43.5	45.85	11.5	1.2	31.1	-	-	Peak
260.04	23.98	-22.02	46	39.39	14	1.59	31	-	-	Peak
368.6	22.32	-23.68	46	36.44	14.86	2.08	31.06	-	-	Peak
419.7	22.42	-23.58	46	34.31	16.7	2.21	30.8	-	-	Peak
842.5	26.43	-19.57	46	30.33	23.23	3.25	30.38	-	-	Peak
2462	114.18	-	-	109.29	32.26	7.02	34.39	175	0	Peak
2462	108.29	-	-	103.4	32.26	7.02	34.39	175	0	Average
4924	48	-6	54	63.49	34.34	8.9	58.73	100	0	Peak
7386	53.74	-20.26	74	64.95	35.6	10.99	57.8	100	75	Peak
7386	48.27	-5.73	54	59.48	35.6	10.99	57.8	100	75	Average

Test Mode :	802.11b	**Temperature :**	21~25°C
Test Channel :	11	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
48.9	34.24	-5.76	40	55.66	9.1	0.68	31.2	100	230	Peak
62.67	21.23	-18.77	40	45.69	6	0.78	31.24	-	-	Peak
86.97	22.82	-17.18	40	44.66	8.34	0.92	31.1	-	-	Peak
595.4	23.77	-22.23	46	32.16	19.55	2.68	30.62	-	-	Peak
839.7	26.19	-19.81	46	30.13	23.2	3.24	30.38	-	-	Peak
989.5	28.3	-25.7	54	30.22	24.82	3.5	30.24	-	-	Peak
2462	101.26	-	-	96.37	32.26	7.02	34.39	200	59	Peak
2462	96.89	-	-	92	32.26	7.02	34.39	200	59	Average
4924	43.76	-10.24	54	59.25	34.34	8.9	58.73	100	0	Peak
7386	49.01	-4.99	54	60.22	35.6	10.99	57.8	100	0	Peak

Test Mode :	802.11g	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
33.24	32.46	-7.54	40	46.04	17.24	0.56	31.38	123	57	Peak
46.47	28.27	-11.73	40	49	9.8	0.67	31.2	-	-	Peak
142.05	27.37	-16.13	43.5	45.77	11.5	1.2	31.1	-	-	Peak
327.3	24.44	-21.56	46	39.92	13.68	1.84	31	-	-	Peak
595.4	23.16	-22.84	46	31.55	19.55	2.68	30.62	-	-	Peak
983.2	28.07	-25.93	54	29.92	24.93	3.49	30.27	-	-	Peak
2411	114.84	-	-	109.99	32.2	6.95	34.3	148	7	Peak
2411	105.46	-	-	100.61	32.2	6.95	34.3	148	7	Average
4824	42.13	-11.87	54	58.03	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11g	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
93.72	20.39	-23.11	43.5	41.42	9.1	0.97	31.1	-	-	Peak
129.63	21.13	-22.37	43.5	39.08	12	1.15	31.1	-	-	Peak
259.5	21.33	-24.67	46	36.74	14	1.59	31	-	-	Peak
545.7	22.97	-23.03	46	31.89	19.32	2.54	30.78	-	-	Peak
595.4	23.65	-22.35	46	32.04	19.55	2.68	30.62	-	-	Peak
841.8	26.4	-19.6	46	30.31	23.22	3.25	30.38	144	221	Peak
2411	107.69	-	-	102.84	32.2	6.95	34.3	184	123	Peak
2411	98.4	-	-	93.55	32.2	6.95	34.3	184	123	Average
4824	44.37	-9.63	54	60.27	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11g	**Temperature :**	21~25°C
Test Channel :	06	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2435 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2435	115.03	-	-	110.17	32.22	6.99	34.35	114	1	Peak
2435	105.58	-	-	100.72	32.22	6.99	34.35	114	1	Average
4875	42.39	-11.61	54	58.1	34.3	8.82	58.83	100	0	Peak
7311	53.99	-20.01	74	65.21	35.6	10.91	57.73	100	113	Peak
7311	40.8	-13.2	54	52.02	35.6	10.91	57.73	100	113	Average

Test Mode :	802.11g	**Temperature :**	21~25°C
Test Channel :	06	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2436 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2436	104.99	-	-	100.13	32.22	6.99	34.35	198	55	Peak
2436	95.6	-	-	90.74	32.22	6.99	34.35	198	55	Average
4874	44.18	-9.82	54	59.89	34.3	8.82	58.83	100	0	Peak
7311	48.87	-5.13	54	60.09	35.6	10.91	57.73	100	0	Peak

Test Mode :	802.11g	**Temperature :**	21~25°C
Test Channel :	11	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2461 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2461	115.63	-	-	110.74	32.26	7.02	34.39	114	1	Peak
2461	106.32	-	-	101.43	32.26	7.02	34.39	114	1	Average
4924	42.47	-11.53	54	57.96	34.34	8.9	58.73	100	0	Peak
7386	50.97	-3.03	54	62.18	35.6	10.99	57.8	100	0	Peak

Test Mode :	802.11g	**Temperature :**	21~25°C
Test Channel :	11	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2463 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2463	107.03	-	-	102.14	32.26	7.02	34.39	100	89	Peak
2463	97.12	-	-	92.23	32.26	7.02	34.39	100	89	Average
4923	41.19	-12.81	54	56.71	34.34	8.87	58.73	100	0	Peak
7386	49.34	-4.66	54	60.55	35.6	10.99	57.8	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
33.24	32.28	-7.72	40	45.86	17.24	0.56	31.38	126	48	Peak
46.47	29.73	-10.27	40	50.46	9.8	0.67	31.2	-	-	Peak
142.32	27.3	-16.2	43.5	45.7	11.5	1.2	31.1	-	-	Peak
328	23.71	-22.29	46	39.15	13.72	1.84	31	-	-	Peak
421.8	23.44	-22.56	46	35.27	16.74	2.22	30.79	-	-	Peak
951	27.74	-18.26	46	30.25	24.43	3.46	30.4	-	-	Peak
2411	112.41	-	-	107.56	32.2	6.95	34.3	115	4	Peak
2411	103.51	-	-	98.66	32.2	6.95	34.3	115	4	Average
4824	41.9	-12.1	54	57.8	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
48.9	36.34	-3.66	40	57.76	9.1	0.68	31.2	100	166	Peak
62.67	22.43	-17.57	40	46.89	6	0.78	31.24	-	-	Peak
116.67	23.25	-20.25	43.5	42.12	11.18	1.08	31.13	-	-	Peak
645.1	23.98	-22.02	46	31.26	20.4	2.83	30.51	-	-	Peak
850.9	26.44	-19.56	46	30.28	23.29	3.27	30.4	-	-	Peak
979.7	28.71	-25.29	54	30.5	25	3.49	30.28	-	-	Peak
2411	106.63	-	-	101.78	32.2	6.95	34.3	185	338	Peak
2411	96.6	-	-	91.75	32.2	6.95	34.3	185	338	Average
4824	42.65	-11.35	54	58.55	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	06	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2436 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2436	113.36	-	-	108.5	32.22	6.99	34.35	143	5	Peak
2436	103.52	-	-	98.66	32.22	6.99	34.35	143	5	Average
4874	42.84	-11.16	54	58.55	34.3	8.82	58.83	100	0	Peak
7311	49.61	-4.39	54	60.83	35.6	10.91	57.73	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	21~25°C
Test Channel :	06	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2436 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2436	107.98	-	-	103.12	32.22	6.99	34.35	199	54	Peak
2436	97.02	-	-	92.16	32.22	6.99	34.35	199	54	Average
4875	41.8	-12.2	54	57.51	34.3	8.82	58.83	100	0	Peak
7311	48.35	-5.65	54	59.57	35.6	10.91	57.73	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Channel :	11	Relative Humidity :	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	Polarization :	Horizontal
Remark :	1. 2461 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2461	114.11	-	-	109.22	32.26	7.02	34.39	115	4	Peak
2461	105.01	-	-	100.12	32.26	7.02	34.39	115	4	Average
4924	43.56	-10.44	54	59.05	34.34	8.9	58.73	100	0	Peak
7386	49.21	-4.79	54	60.42	35.6	10.99	57.8	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Channel :	11	Relative Humidity :	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2462	108.55	-	-	103.66	32.26	7.02	34.39	184	343	Peak
2462	97.71	-	-	92.82	32.26	7.02	34.39	184	343	Average
4924	42.91	-11.09	54	58.4	34.34	8.9	58.73	100	0	Peak
7386	46.74	-7.26	54	57.95	35.6	10.99	57.8	100	0	Peak

Test Mode :	802.11ac VHT20	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
33.24	32.21	-7.79	40	45.79	17.24	0.56	31.38	122	50	Peak
46.47	29.57	-10.43	40	50.3	9.8	0.67	31.2	-	-	Peak
141.78	27.12	-16.38	43.5	45.52	11.5	1.2	31.1	-	-	Peak
595.4	23.74	-22.26	46	32.13	19.55	2.68	30.62	-	-	Peak
722.1	24.79	-21.21	46	30.64	21.56	2.99	30.4	-	-	Peak
978.3	27.92	-26.08	54	29.74	24.98	3.49	30.29	-	-	Peak
2411	112.02	-	-	107.17	32.2	6.95	34.3	114	9	Peak
2411	103.18	-	-	98.33	32.2	6.95	34.3	114	9	Average
4824	42.04	-11.96	54	57.94	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11ac VHT20	**Temperature :**	21~25°C
Test Channel :	01	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
33.24	32.56	-7.44	40	46.14	17.24	0.56	31.38	100	123	Peak
48.9	29.71	-10.29	40	51.13	9.1	0.68	31.2	-	-	Peak
116.13	23.36	-20.14	43.5	42.24	11.18	1.08	31.14	-	-	Peak
323.8	22.8	-23.2	46	38.41	13.56	1.83	31	-	-	Peak
595.4	25.25	-20.75	46	33.64	19.55	2.68	30.62	-	-	Peak
916.7	26.64	-19.36	46	29.77	23.82	3.38	30.33	-	-	Peak
2411	106.09	-	-	101.24	32.2	6.95	34.3	186	340	Peak
2411	96.17	-	-	91.32	32.2	6.95	34.3	186	340	Average
4824	42.52	-11.48	54	58.42	34.26	8.77	58.93	100	0	Peak

Test Mode :	802.11ac VHT20	Temperature :	21~25°C
Test Channel :	06	Relative Humidity :	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	Polarization :	Horizontal
Remark :	1. 2435 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2435	114.83	-	-	109.97	32.22	6.99	34.35	112	3	Peak
2435	104.62	-	-	99.76	32.22	6.99	34.35	112	3	Average
4875	40.66	-13.34	54	56.37	34.3	8.82	58.83	100	0	Peak
7316	48.42	-5.58	54	59.65	35.6	10.91	57.74	100	0	Peak

Test Mode :	802.11ac VHT20	Temperature :	21~25°C
Test Channel :	06	Relative Humidity :	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2439	101.97	-	-	97.09	32.24	6.99	34.35	200	44	Peak
2439	92.13	-	-	87.25	32.24	6.99	34.35	200	44	Average
4875	40.52	-13.48	54	56.23	34.3	8.82	58.83	100	0	Peak
7317	47.7	-6.3	54	58.93	35.6	10.91	57.74	100	0	Peak

Test Mode :	802.11ac VHT20	**Temperature :**	21~25°C
Test Channel :	11	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Horizontal
Remark :	1. 2461 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2461	114.08	-	-	109.19	32.26	7.02	34.39	145	5	Peak
2461	104.22	-	-	99.33	32.26	7.02	34.39	145	5	Average
4920	44.66	-9.34	54	60.18	34.34	8.87	58.73	100	0	Peak
7386	50.94	-3.06	54	62.15	35.6	10.99	57.8	100	0	Peak

Test Mode :	802.11ac VHT20	**Temperature :**	21~25°C
Test Channel :	11	**Relative Humidity :**	49~53%
Test Engineer :	Stan Hsieh and Ken Wu	**Polarization :**	Vertical
Remark :	1. 2463 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. No spurious emissions are detected other than listed points as below.		

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
2463	107.23	-	-	102.34	32.26	7.02	34.39	183	348	Peak
2463	97.11	-	-	92.22	32.26	7.02	34.39	183	348	Average
4923	41.78	-12.22	54	57.3	34.34	8.87	58.73	100	0	Peak
7386	47.09	-6.91	54	58.3	35.6	10.99	57.8	100	0	Peak

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.

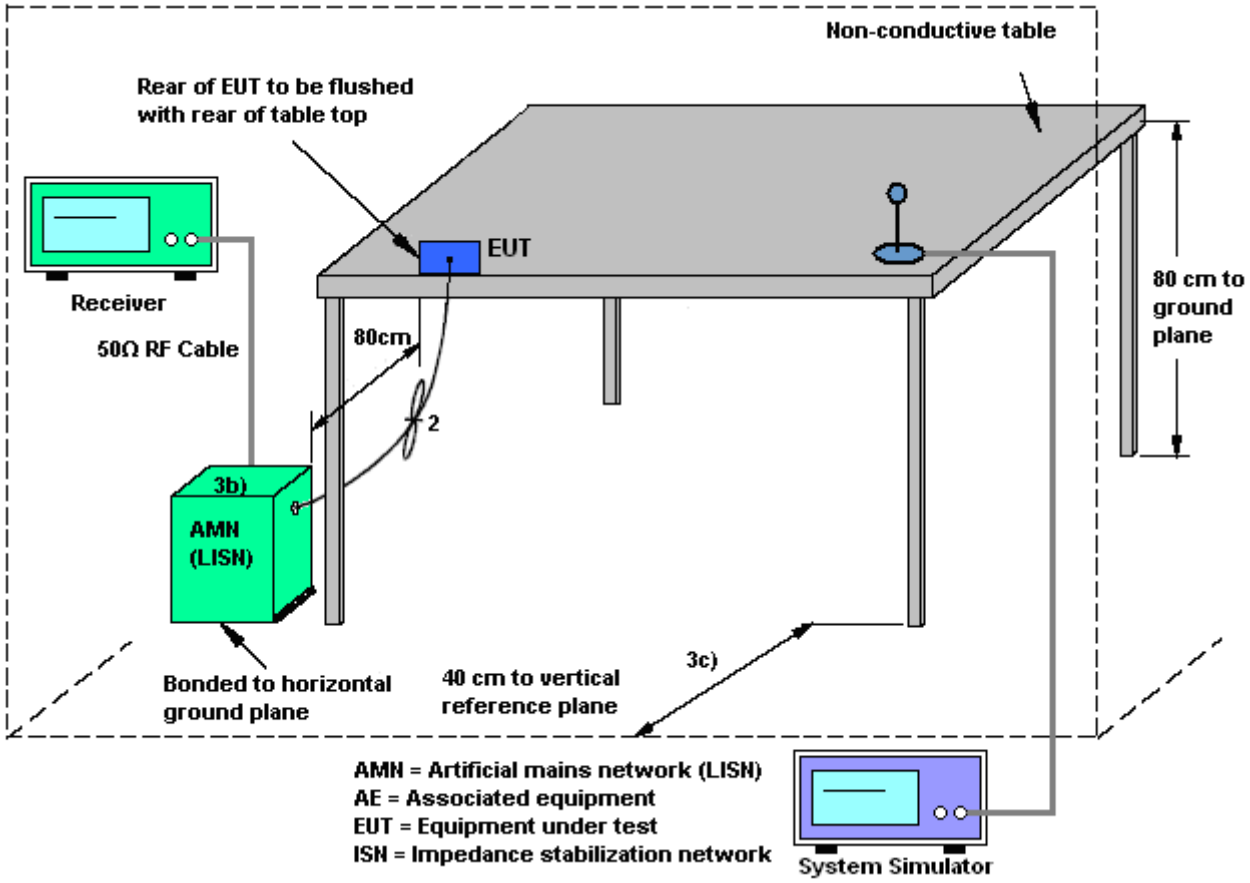
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

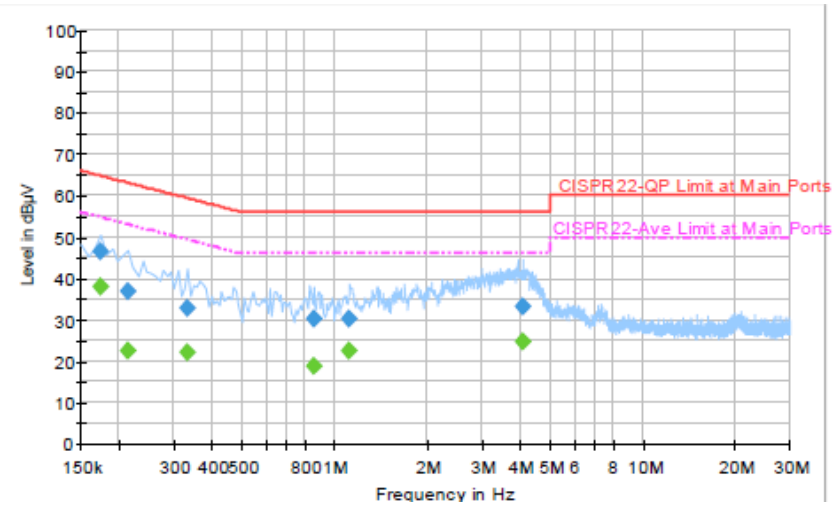
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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 with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22℃
Test Engineer :	Cosmo Xu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 (GPRS Class 8) Idle + WLAN (2.4GHz) Link + Earphone + HDMI Cable with Monitor + HDMI to uUSB Dongle + USB Cable (Charging from Adapter) + Camera (Front)		



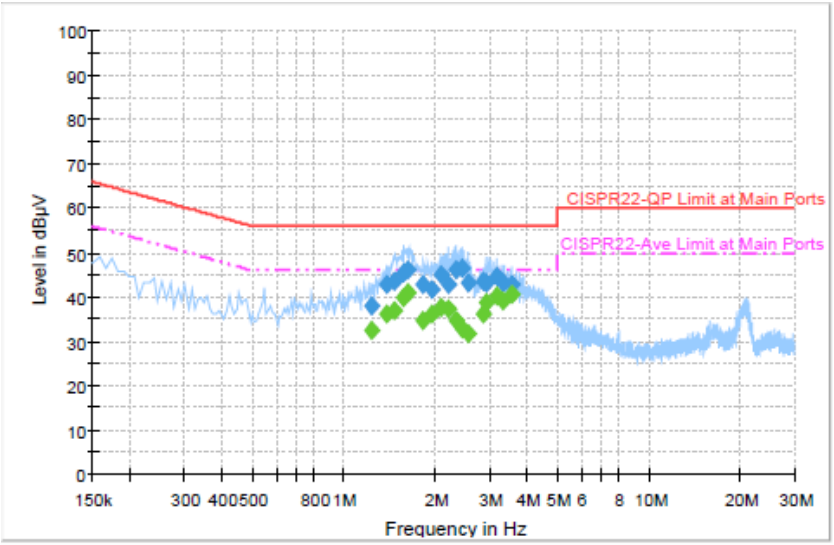
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	46.7	Off	L1	19.3	18.1	64.8
0.214000	36.8	Off	L1	19.4	26.2	63.0
0.334000	32.9	Off	L1	19.4	26.5	59.4
0.854000	30.1	Off	L1	19.6	25.9	56.0
1.118000	30.3	Off	L1	19.5	25.7	56.0
4.070000	33.4	Off	L1	19.6	22.6	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	37.9	Off	L1	19.3	16.9	54.8
0.214000	22.3	Off	L1	19.4	30.7	53.0
0.334000	22.2	Off	L1	19.4	27.2	49.4
0.854000	18.8	Off	L1	19.6	27.2	46.0
1.118000	22.5	Off	L1	19.5	23.5	46.0
4.070000	24.8	Off	L1	19.6	21.2	46.0

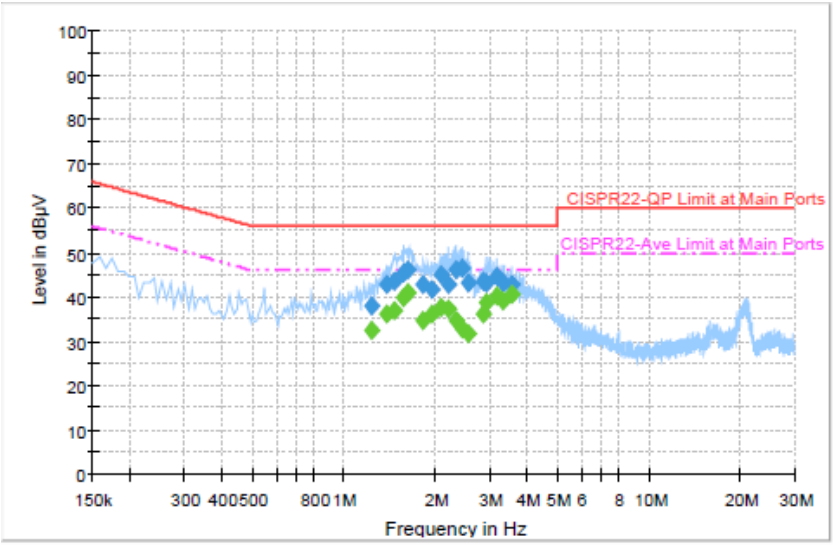
Test Mode :	Mode 2	**Temperature :**	20~22℃
Test Engineer :	Cosmo Xu	**Relative Humidity :**	46~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	GSM850 (GPRS Class 8) Idle + WLAN (2.4GHz) Link + Earphone + HDMI Cable with Monitor + HDMI to uUSB Dongle + USB Cable (Charging from Adapter) + Camera (Front)		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.230000	38.0	Off	N	19.5	18.0	56.0
1.382000	42.8	Off	N	19.5	13.2	56.0
1.462000	43.6	Off	N	19.6	12.4	56.0
1.574000	45.3	Off	N	19.5	10.7	56.0
1.622000	46.3	Off	N	19.5	9.7	56.0
1.822000	42.7	Off	N	19.6	13.3	56.0
1.950000	41.8	Off	N	19.5	14.2	56.0
2.078000	45.1	Off	N	19.5	10.9	56.0
2.206000	42.6	Off	N	19.6	13.4	56.0
2.334000	46.2	Off	N	19.5	9.8	56.0
2.438000	46.3	Off	N	19.6	9.7	56.0
2.566000	43.0	Off	N	19.5	13.0	56.0
2.854000	43.7	Off	N	19.6	12.3	56.0
2.926000	43.0	Off	N	19.5	13.0	56.0
3.182000	44.6	Off	N	19.6	11.4	56.0
3.310000	43.1	Off	N	19.6	12.9	56.0
3.574000	42.7	Off	N	19.6	13.3	56.0

Test Mode :	Mode 2	**Temperature :**	20~22℃
Test Engineer :	Cosmo Xu	**Relative Humidity :**	46~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	GSM850 (GPRS Class 8) Idle + WLAN (2.4GHz) Link + Earphone + HDMI Cable with Monitor + HDMI to uUSB Dongle + USB Cable (Charging from Adapter) + Camera (Front)		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.230000	32.4	Off	N	19.5	13.6	46.0
1.382000	36.3	Off	N	19.5	9.7	46.0
1.462000	37.1	Off	N	19.6	8.9	46.0
1.574000	39.9	Off	N	19.5	6.1	46.0
1.622000	40.9	Off	N	19.5	5.1	46.0
1.822000	34.5	Off	N	19.6	11.5	46.0
1.950000	36.1	Off	N	19.5	9.9	46.0
2.078000	37.7	Off	N	19.5	8.3	46.0
2.206000	37.4	Off	N	19.6	8.6	46.0
2.334000	34.7	Off	N	19.5	11.3	46.0
2.438000	32.8	Off	N	19.6	13.2	46.0
2.566000	31.8	Off	N	19.5	14.2	46.0
2.854000	36.1	Off	N	19.6	9.9	46.0
2.926000	38.7	Off	N	19.5	7.3	46.0
3.182000	40.3	Off	N	19.6	5.7	46.0
3.310000	39.2	Off	N	19.6	6.8	46.0
3.574000	40.6	Off	N	19.6	5.4	46.0

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 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.

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	2.37	1.40	4.91	4.91	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	Jul. 24, 2014~ Aug. 06, 2014	Jun. 08, 2015	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 17, 2013	Jul. 24, 2014~ Aug. 06, 2014	Aug. 16, 2014	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 17, 2013	Jul. 24, 2014~ Aug. 06, 2014	Aug. 16, 2014	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	Jul. 14, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Jul. 14, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Jul. 14, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 14, 2014	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9 kHz~7 GHz	Sep. 06, 2013	Aug. 04, 2014~ Aug. 06, 2014	Sep. 05, 2014	Radiation (03CH07-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 10, 2014	Aug. 04, 2014~ Aug. 06, 2014	Feb. 09, 2015	Radiation (03CH07-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	Dec. 02, 2012	Aug. 04, 2014~ Aug. 06, 2014	Dec. 03, 2014	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30 MHz ~ 1 GHz	Oct. 10, 2013	Aug. 04, 2014~ Aug. 06, 2014	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1 GHz~18 GHz	Aug. 22, 2013	Aug. 04, 2014~ Aug. 06, 2014	Aug. 21, 2014	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15 GHz- 40 GHz	Oct. 03, 2013	Aug. 04, 2014~ Aug. 06, 2014	Oct. 02, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz 32dB GAIN	Mar. 17, 2014	Aug. 04, 2014~ Aug. 06, 2014	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Nov. 29, 2013	Aug. 04, 2014~ Aug. 06, 2014	Nov. 28, 2014	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	DC~18 G High Gain	Jul. 07, 2014	Aug. 04, 2014~ Aug. 06, 2014	Jul. 06, 2015	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Aug. 04, 2014~ Aug. 06, 2014	N/A	Radiation (03CH07-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))	**4.50**