



FCC RF Test Report

APPLICANT : Lenovo(Shanghai) Electronics
Technology Co., Ltd.
EQUIPMENT : Portable Tablet Computer
BRAND NAME : Lenovo
MODEL NAME : Lenovo YT3-X90X
FCC ID : O57YT3X90X
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jul. 16, 2015 and testing was completed on Sep. 01, 2015. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (SHENZHEN) INC.

**1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town,
Nanshan District, Shenzhen, Guangdong, P. R. China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR571615C	Rev. 01	Initial issue of report	Sep. 21, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	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 3.93 dB at 2389.920 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 6.46 dB at 26.000 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Lenovo(Shanghai) Electronics Technology Co., Ltd.

NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

1.2 Manufacturer

Lenovo PC HK Limited

23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo YT3-X90X
FCC ID	O57YT3X90X
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(Downlink only)/LTE WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.1 LE
HW Version	LenovoPad YT3-X90X
SW Version	YT3-X90X_150710
EUT Stage	Identical Prototype

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

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard			
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz		
Maximum (Peak) Output Power to antenna	802.11b : 20.16 dBm (0.1038 W) 802.11g : 22.68 dBm (0.1854 W) 802.11n HT20 : 23.82 dBm (0.2410 W)		
99% Occupied Bandwidth	802.11b : 11.85MHz 802.11g : 18.40MHz 802.11n HT20 : 19.25MHz		
Antenna Type	WLAN for Chain Port 0: PIFA Antenna with gain 1.1 dBi WLAN for Chain Port 1: PIFA Antenna with gain 1.2 dBi		
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function for Transmitter			
		Chain Port 0	Chain Port 1
	802.11 b	V	V
	802.11 g	V	V
	802.11 n SISO	V	V
	802.11 n MIMO	V	V

1.5 Component List

Note: there are two types of EUT, the details refer the following table. According to the difference, we evaluate is not affect RF performance, so only choose sample 1 to perform RF test.

Component	Sample 1	Sample 2
CPU	Intel_Z8500 Cherry Trail T4 Z8500,2.55 GHz Quad Core	Intel_Z8500 Cherry Trail T4 Z8500,2.55 GHz Quad Core
BT/WIFI Module	Broadcom_BCM4356XKUBG BT/WIFI;BCM4356XKUBG;WLBGA192	Broadcom_BCM4356XKUBG BT/WIFI;BCM4356XKUBG;WLBGA192
2G/3G/LTE Module	Intel_PMB5747 E302 SMARTi4.5 P20(PMB5747 E302)	Intel_PMB5747 E302 SMARTi4.5 P20(PMB5747 E302)
Flash	Samsung_K3QF2F2 OEMAGCE EMMC;KLMAG2WEPD-B031;16GB; FBGA153 LPDDR3;K3QF2F2 OEM-AGCE ; 1GB;1600Mbps	Toshiba & Micron_ ELPIDA-F8164A3MA-GD-F EMMC;THGBMFG7C2LBAIL;16GB;WFBGA 153LPDDR3;EDF8164A3MA-GD-F-R;1GB;1 600Mbps
LCM	AUO_B101QAN01 B101QAN01.0;10.1inch;IPS;2560x1600	Innolux_P101SFA-AF0 P101SFA-AF0;10.1inch;IPS;2560x1600
TP	Ofilm_IST940E 152011 Yoga3 X10 _GFF TP MCF-101-2261	GIS_S7813 5141 334 0037 ACFM727 YT3X10 _GFF TC101GFL09V.B IST9400E
Front_camera	Sunny_F1521 CCM D5V13C 5M OV5693 COB 25PIN ZIF	Ofilm_L5693F40 CCM L5693F40 5M OV5693 COB 25PIN ZIF
Back_camera	Sunny_F13M01D CCM F13M01D 13M AR1335 COB 30PIN BtoB	Ofilm_L1335A00 CCM L1335A00 13M AR1335 COB 30PIN BtoB
Main Battery	SUNWODA_L15D2K32 LG-ICR18650E1-3200mAh	SCUD_L15D2K32 ICR18650-3200mAh
Ancillary Battery	SCUD_L15D1P31 CA3448F2HV-4000mAh	SUNWODA_L15D1P31 ATL-3448F2 -4000mAh



1.6 Modification of EUT

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

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	1F & 2F,Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	Sporton Site No.		
	TH01-SZ		

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		FCC Registration No.
	CO01-KS	03CH02-KS	418269

Note: The test site complies with ANSI C63.4 2009 requirement.



1.8 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 v03r03
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table for frequency above 1GHz as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. 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 (Y/Z 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.

2.4GHz 802.11b Peak Power (dBm)							
Power vs. Channel				Power vs. Data Rate			
Channel	Frequency (MHz)	Chain Port	Data Rate 1Mbps	Channel	2Mbps	5.5Mbps	11Mbps
CH 01	2412	0	19.17	CH 11	19.22	19.22	19.23
CH 06	2437	0	19.13				
CH 11	2462	0	19.25				
CH 01	2412	1	20.16	CH 01	20.14	20.12	20.14
CH 06	2437	1	19.98				
CH 11	2462	1	19.76				

2.4GHz 802.11g Peak Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412	0	21.97	CH 01	21.91	21.90	21.91	21.92	21.83	21.85	21.87
CH 06	2437	0	21.87								
CH 11	2462	0	21.89								
CH 01	2412	1	22.68	CH 01	22.51	22.50	22.54	22.60	22.52	22.56	22.58
CH 06	2437	1	22.49								
CH 11	2462	1	22.42								



2.4GHz 802.11n HT20 Peak Power (dBm)											
Power vs. Channel				Power vs. MCS Index							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	0	22.23	CH 01	22.12	22.13	22.19	22.15	22.17	22.11	22.14
CH 06	2437	0	21.77								
CH 11	2462	0	21.76								
CH 01	2412	1	22.78	CH 01	22.74	22.71	22.69	22.73	22.68	22.64	22.76
CH 06	2437	1	22.38								
CH 11	2462	1	22.09								

2.4GHz 802.11n HT20 Peak Power (dBm)											
Power vs. Channel				Power vs. MCS Index							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS8	Channel	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 01	2412	0+1(0)	20.21	CH 01	20.12	20.11	20.06	20.07	20.06	20.10	20.04
CH 06	2437	0+1(0)	20.10								
CH 11	2462	0+1(0)	19.83								
CH 01	2412	0+1(1)	21.34	CH 01	21.21	21.29	21.26	21.31	21.25	21.24	21.23
CH 06	2437	0+1(1)	20.75								
CH 11	2462	0+1(1)	20.69								
CH 01	2412	0+1	23.82	CH 01	23.71	23.75	23.71	23.74	23.71	23.72	23.69
CH 06	2437	0+1	23.45								
CH 11	2462	0+1	23.29								

Note: Chain Port 0+1 is a calculated result from sum of the power Chain Port 0+1(0) and Chain Port 0+1(1).

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

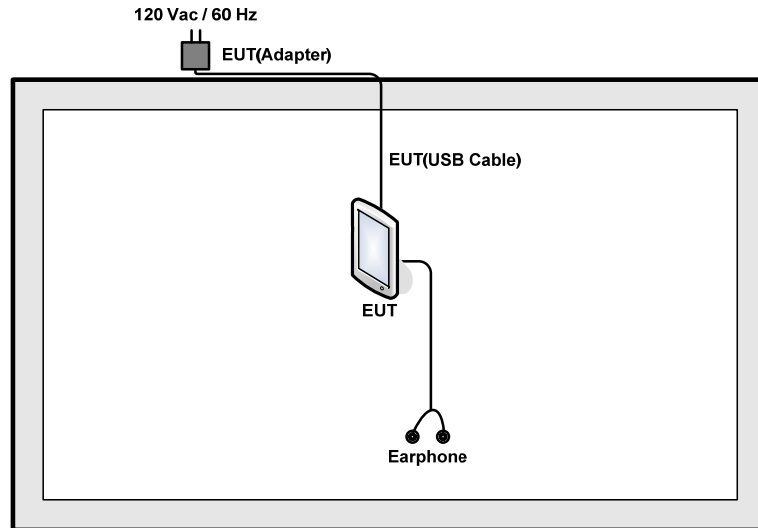
<2.4GHz>

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0/MCS8

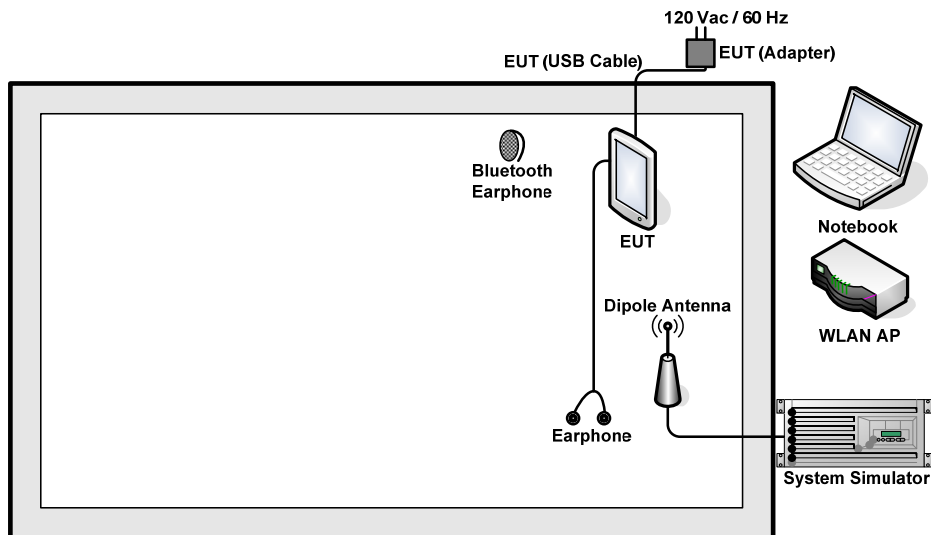
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter) 12V + Battery 1 + Sample 1
	Mode 2 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter) 5.2V + Battery 2 + Sample 2
Remark: - For radiated TCs, the tests were performed with adapter, Earphone, USB Cable 1 for Sample 1. - 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>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
2.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8m
3.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH505	N/A	N/A	N/A
5.	Earphone	Lenovo	LH102	N/A	N/A	Unshielded, 1.2 m

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.



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 5.0 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.0 + 10 = 15.0 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

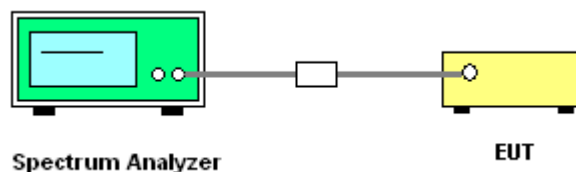
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

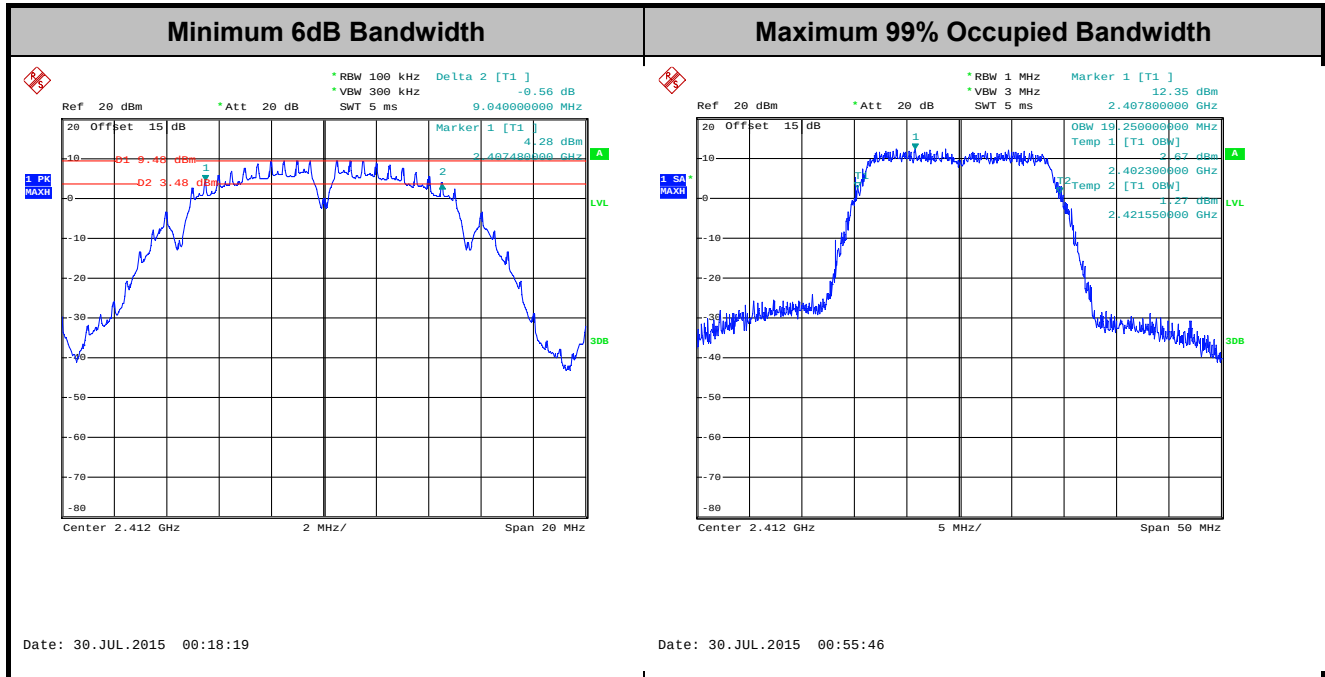
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A of this test report.



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

3.2 Peak Output Power Measurement

3.2.1 Limit of Peak Output Power

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

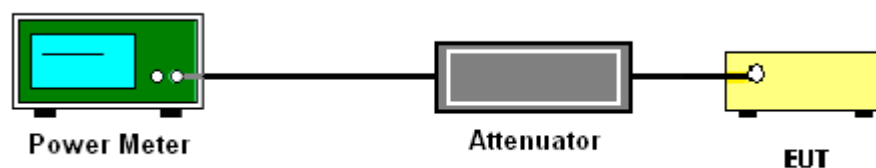
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r03 section 9.1.2 PKPM1 Peak power meter method.
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

Please refer to Appendix A of this test report.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A of this test report.

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 v03r03
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.

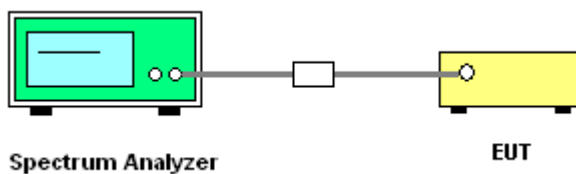
If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

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.

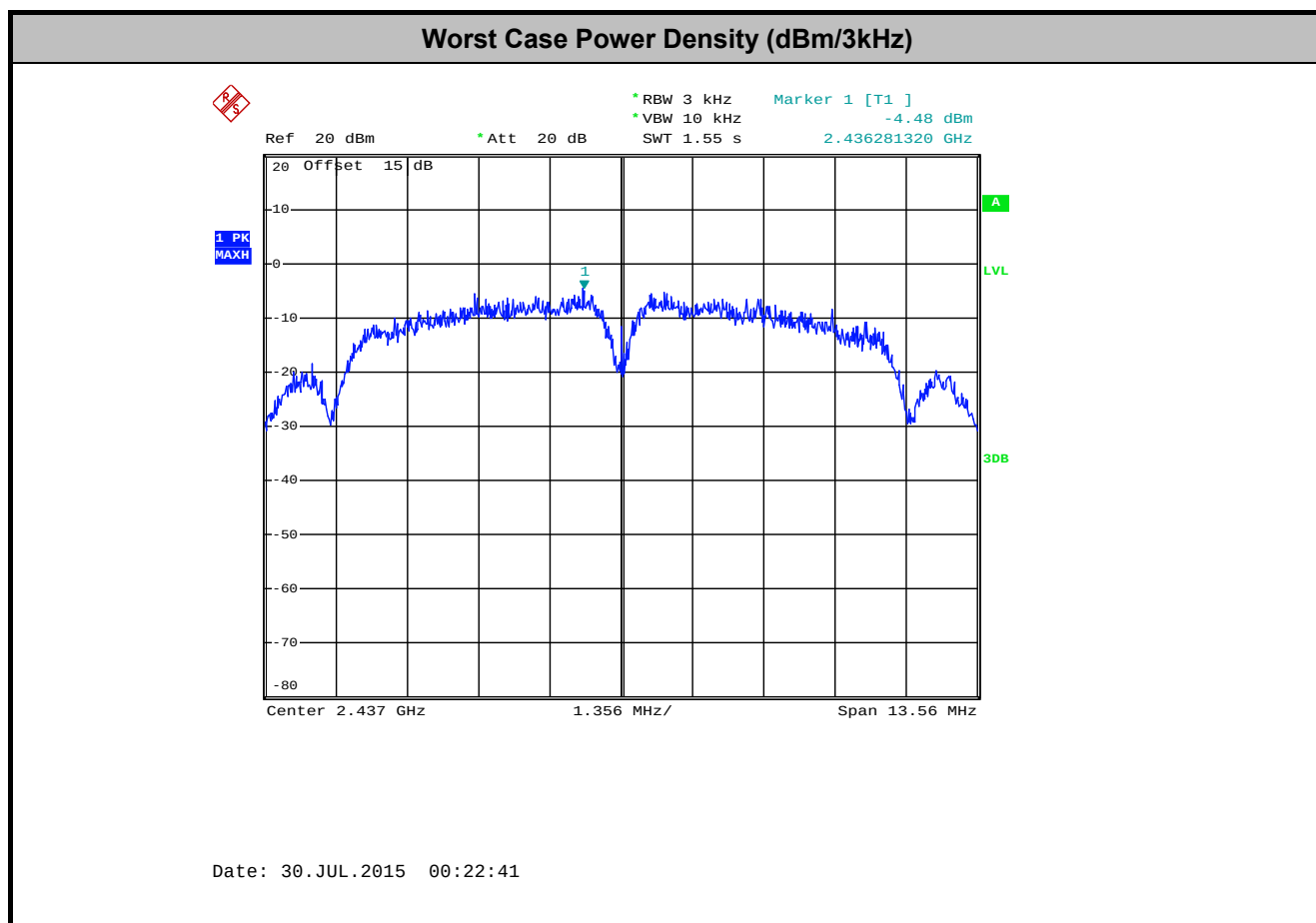
Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.



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).

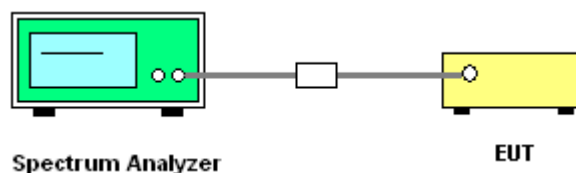
3.4.2 Measuring Instruments

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 v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup





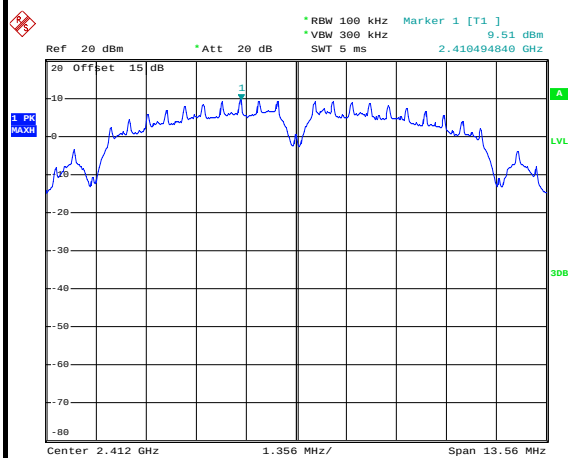
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, Chain Port 1 (Measured)

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

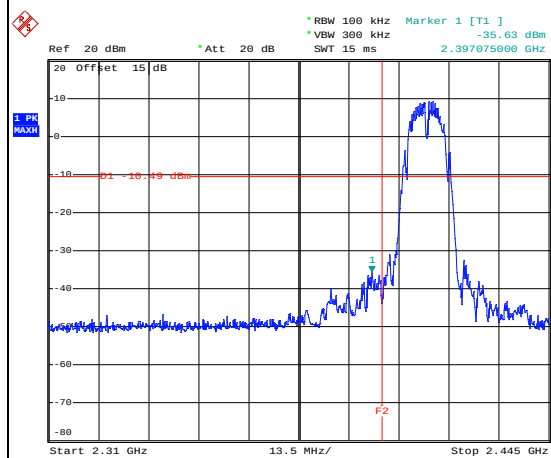
WLAN 802.11b Channel 01

100kHz PSD reference Level



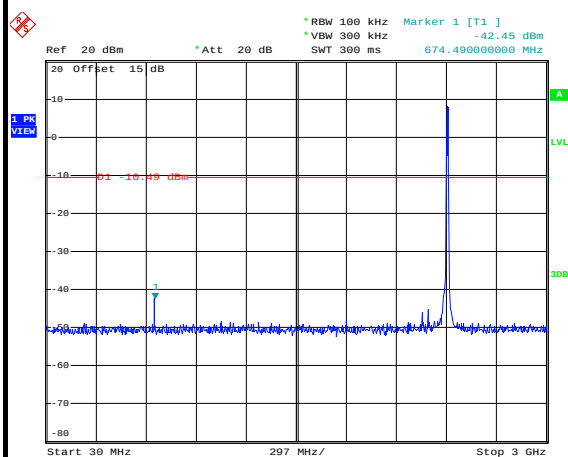
Date: 30.JUL.2015 00:19:07

Low Channel Plot



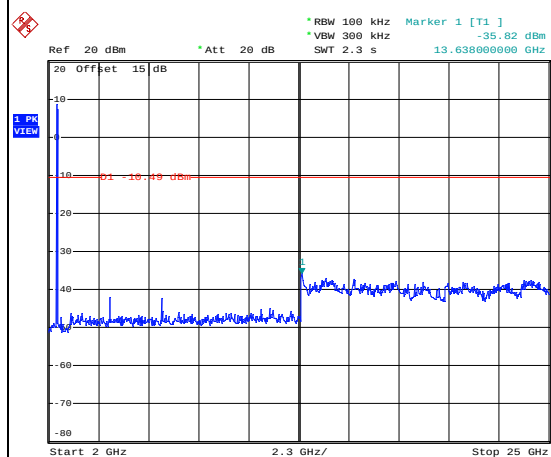
Date: 30.JUL.2015 00:19:23

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:20:17

Spurious Emission 2GHz~25GHz



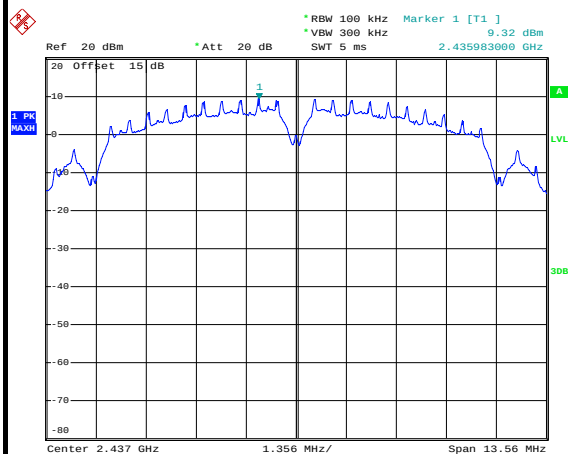
Date: 30.JUL.2015 00:20:35



Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Mygai Wang

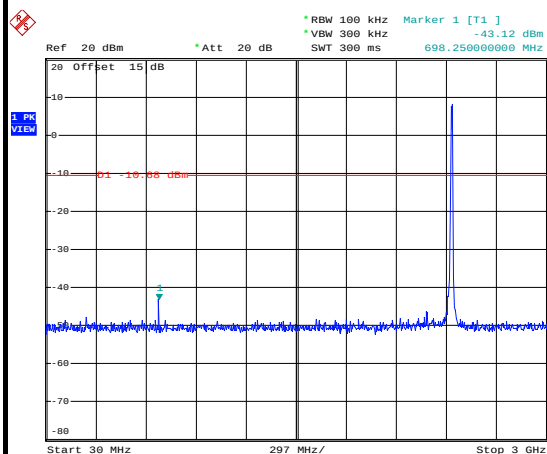
WLAN 802.11b Channel 06

100kHz PSD reference Level



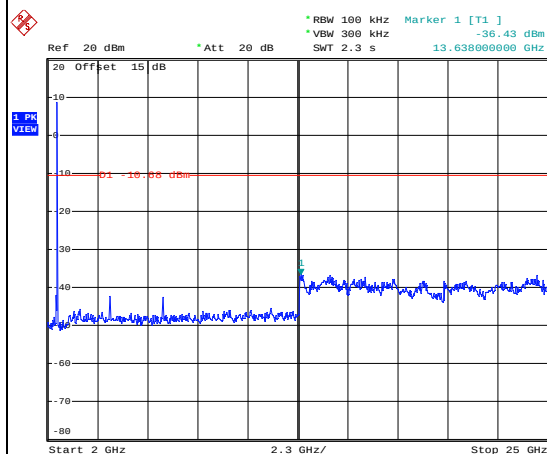
Date: 30.JUL.2015 00:23:06

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:23:41

Spurious Emission 2GHz~25GHz



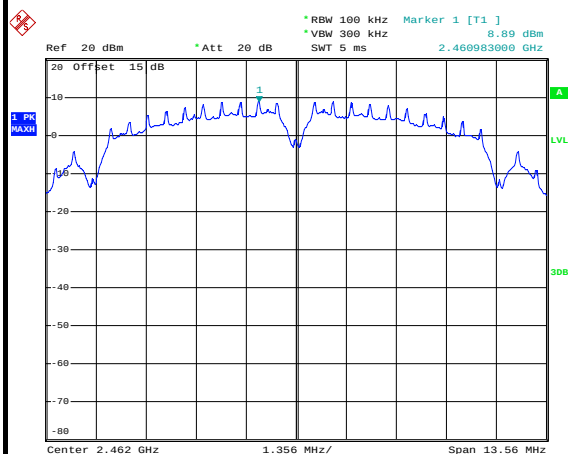
Date: 30.JUL.2015 00:23:58



Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Mygai Wang

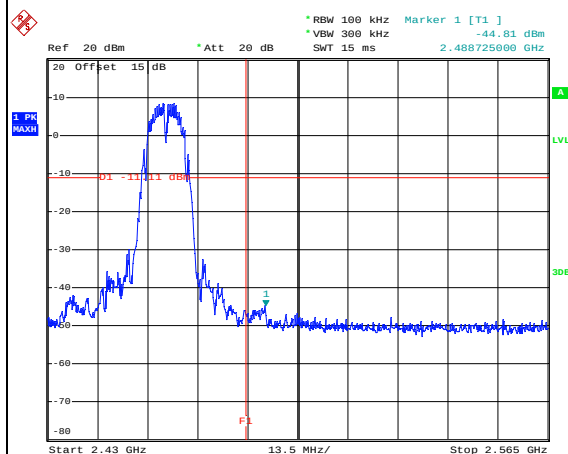
WLAN 802.11b Channel 11

100kHz PSD reference Level



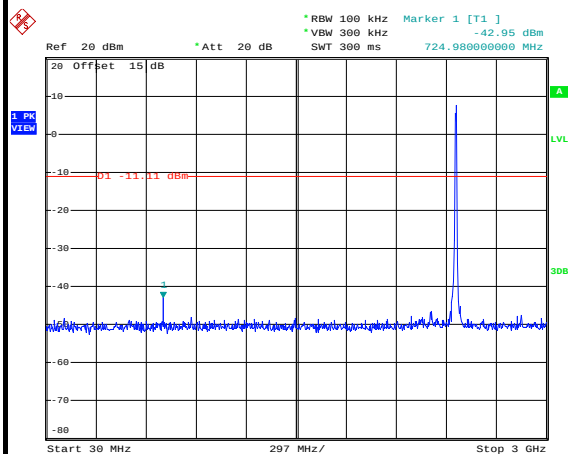
Date: 30.JUL.2015 00:26:34

High Channel Plot



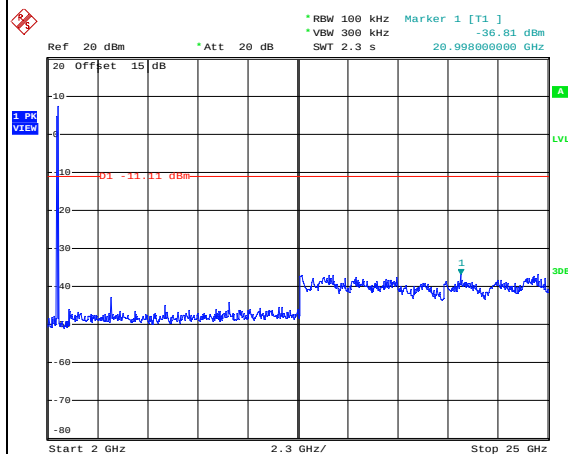
Date: 30.JUL.2015 00:28:03

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:27:28

Spurious Emission 2GHz~25GHz



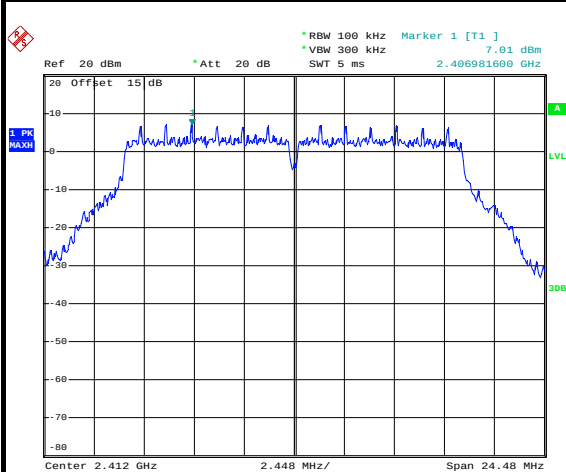
Date: 30.JUL.2015 00:27:45



Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Mygai Wang

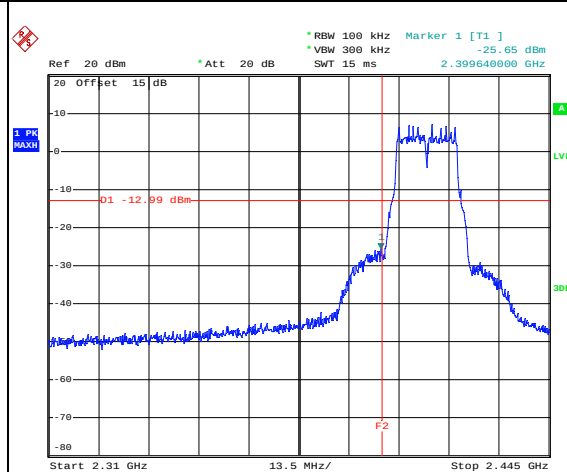
WLAN 802.11g Channel 01

100kHz PSD reference Level



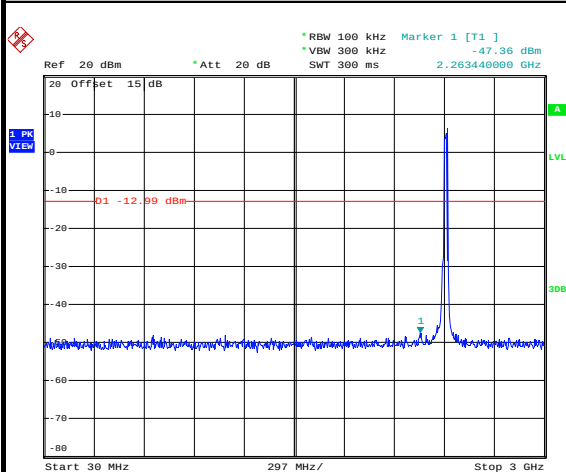
Date: 30.JUL.2015 00:45:16

Low Channel Plot



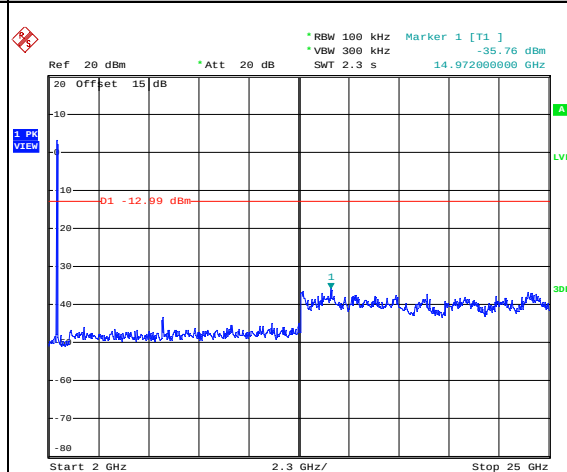
Date: 30.JUL.2015 00:45:52

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:46:58

Spurious Emission 2GHz~25GHz



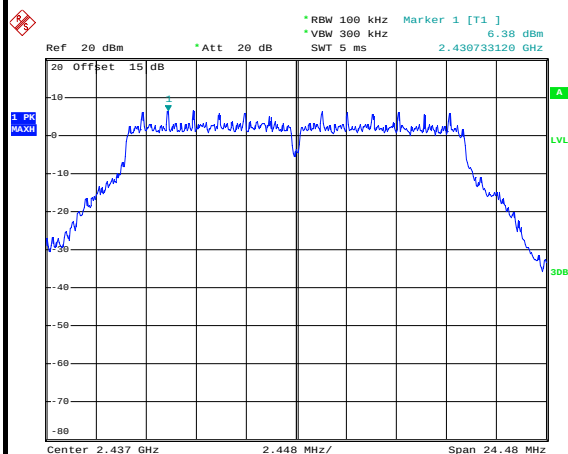
Date: 30.JUL.2015 00:47:16



Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Mygai Wang

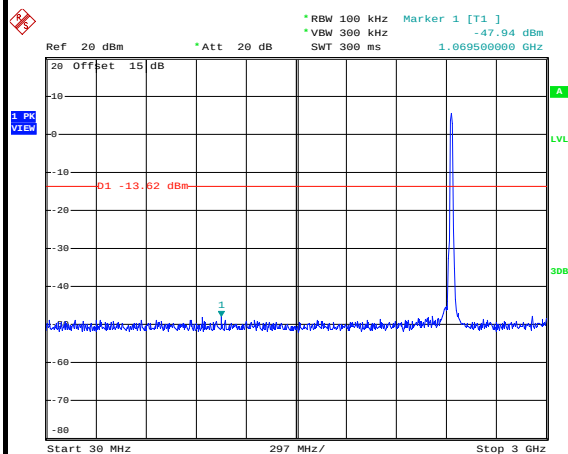
WLAN 802.11g Channel 06

100kHz PSD reference Level



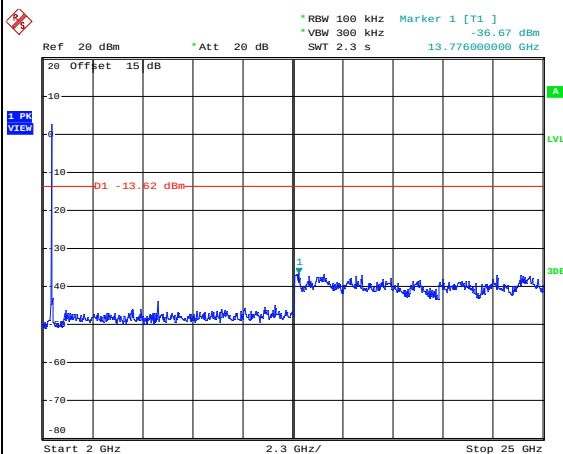
Date: 30.JUL.2015 00:37:25

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:41:23

Spurious Emission 2GHz~25GHz



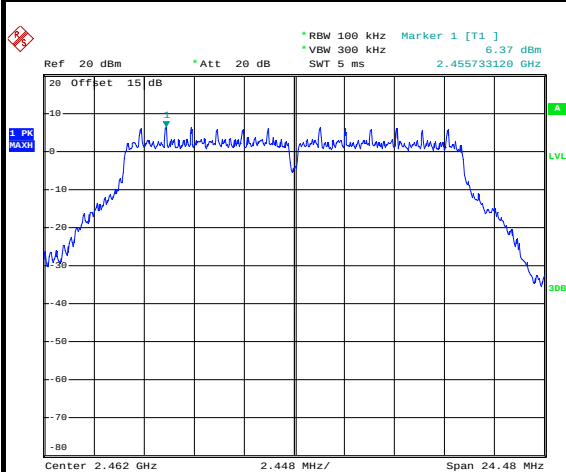
Date: 30.JUL.2015 00:41:40



Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Mygai Wang

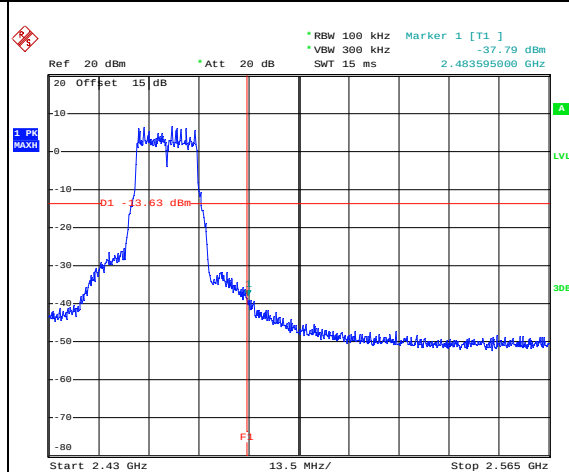
WLAN 802.11g Channel 11

100kHz PSD reference Level



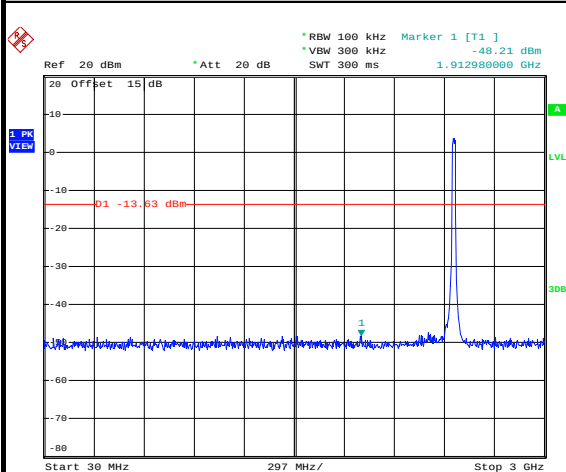
Date: 30.JUL.2015 00:32:12

High Channel Plot



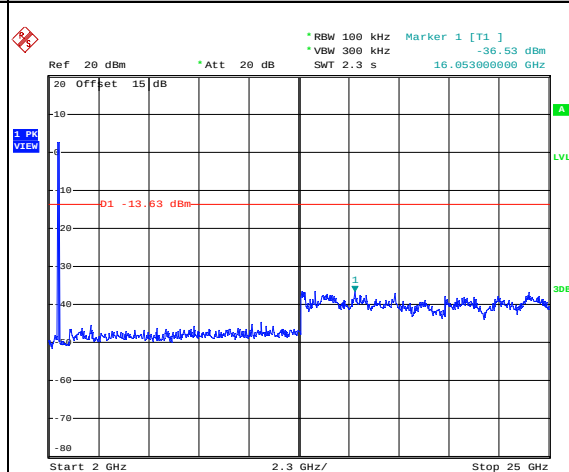
Date: 30.JUL.2015 00:32:31

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:33:11

Spurious Emission 2GHz~25GHz



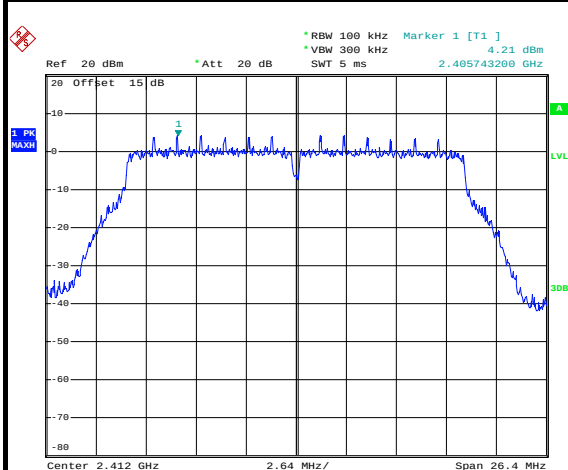
Date: 30.JUL.2015 00:33:29



Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Mygai Wang

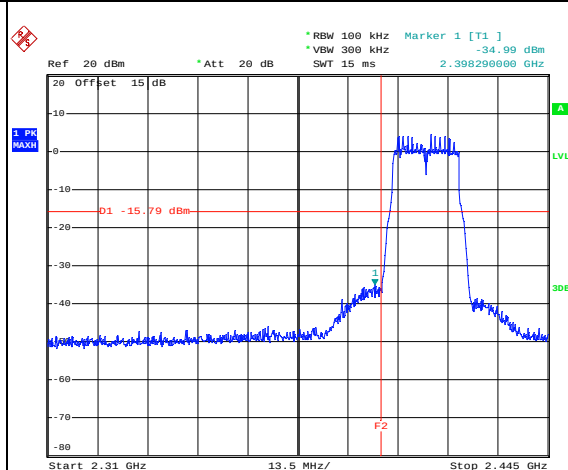
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



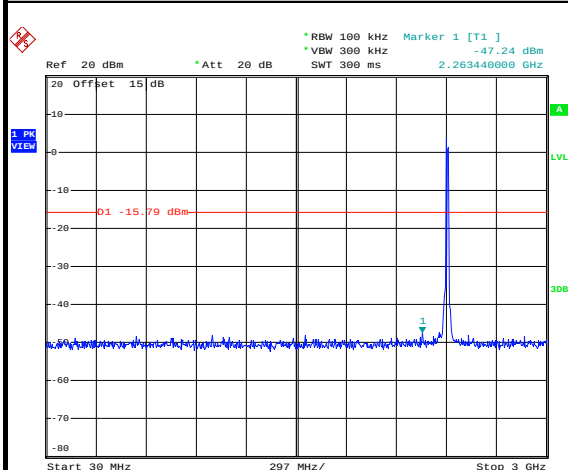
Date: 30.JUL.2015 00:53:16

Low Channel Plot



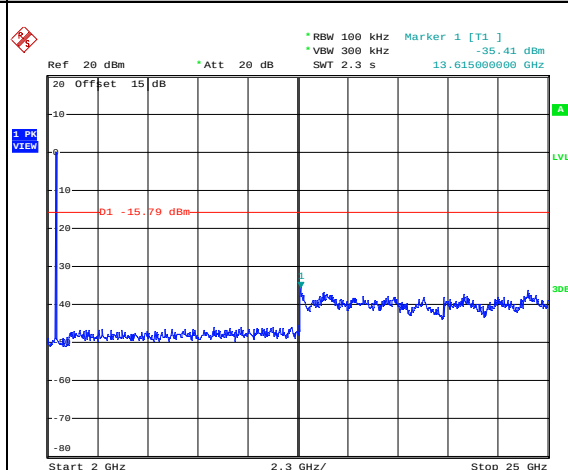
Date: 30.JUL.2015 00:54:38

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 00:58:06

Spurious Emission 2GHz~25GHz



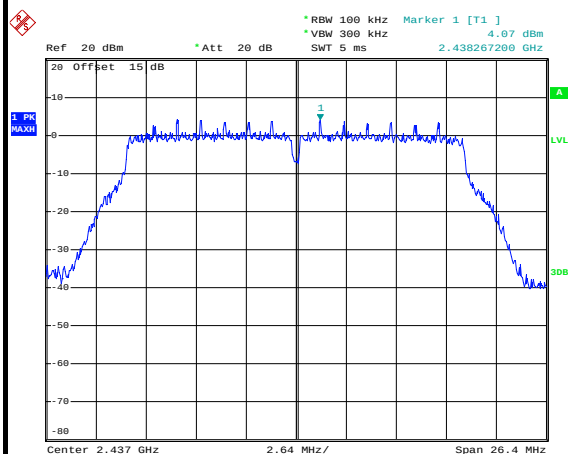
Date: 30.JUL.2015 00:58:24



Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Mygai Wang

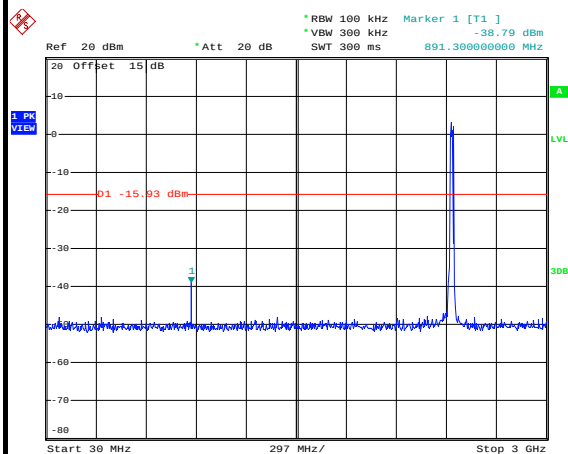
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



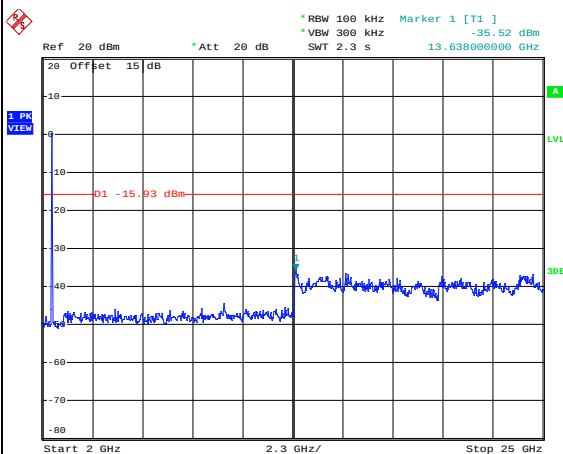
Date: 30.JUL.2015 01:05:18

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 01:12:24

Spurious Emission 2GHz~25GHz



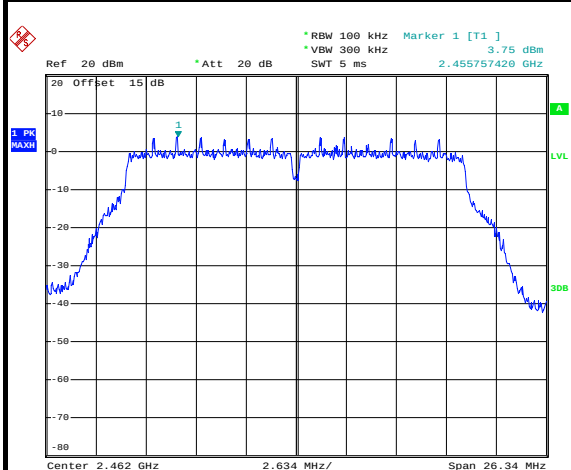
Date: 30.JUL.2015 01:12:41



Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Mygai Wang

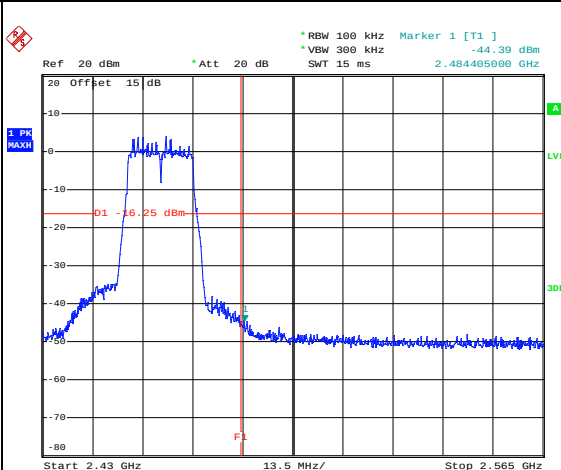
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



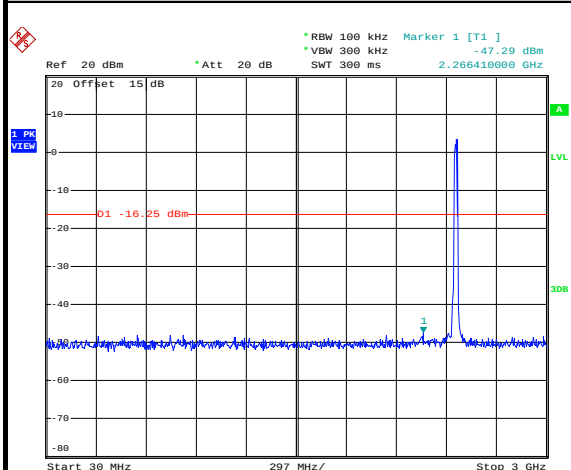
Date: 30.JUL.2015 01:17:40

High Channel Plot



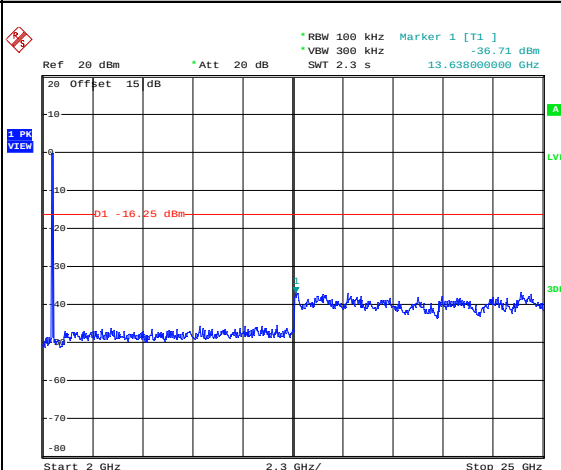
Date: 30.JUL.2015 01:18:08

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 01:20:05

Spurious Emission 2GHz~25GHz



Date: 30.JUL.2015 01:20:22

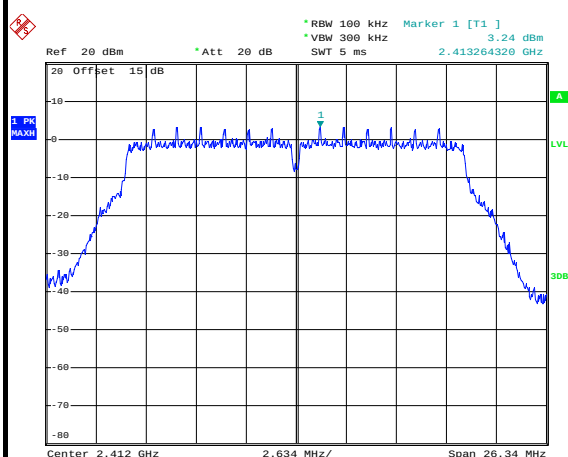


Number of TX = 2, Chain Port 0+1(0) (Measured)

Number of TX :	2	Ant. :	0+1(0)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Mygai Wang

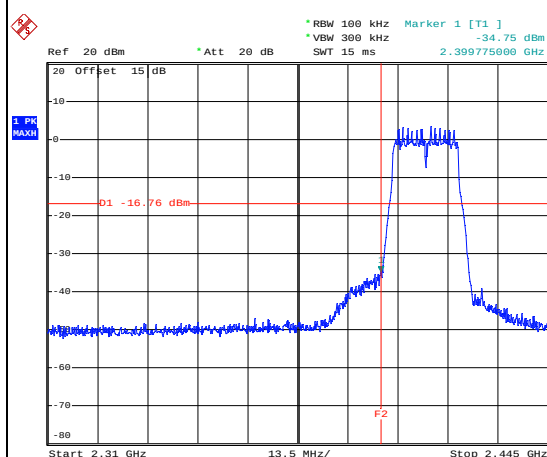
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



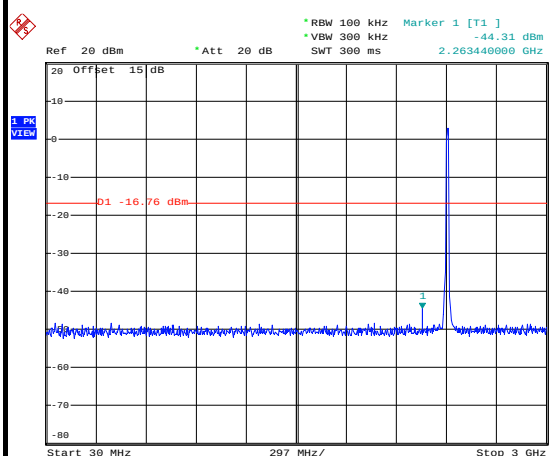
Date: 30.JUL.2015 23:43:26

Low Channel Plot



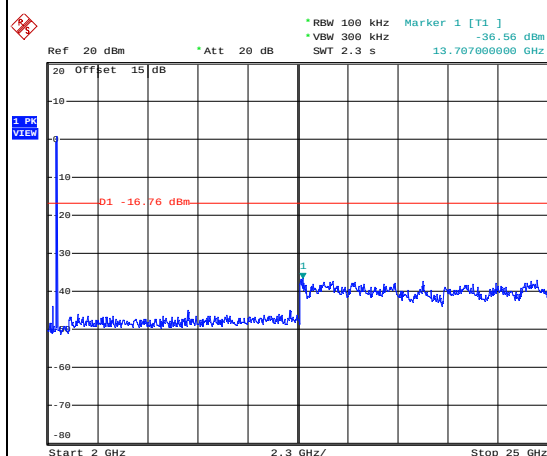
Date: 30.JUL.2015 23:46:14

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 23:47:03

Spurious Emission 2GHz~25GHz



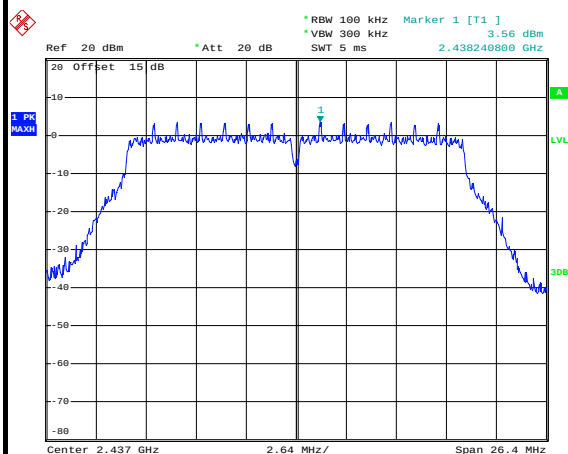
Date: 30.JUL.2015 23:47:21



Number of TX :	2	Ant. :	0+1(0)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Mygai Wang

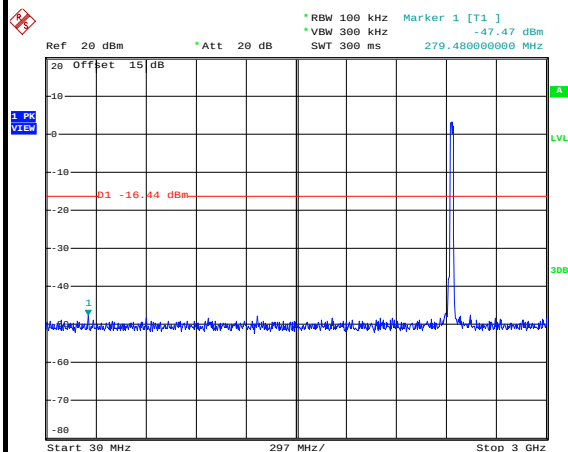
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



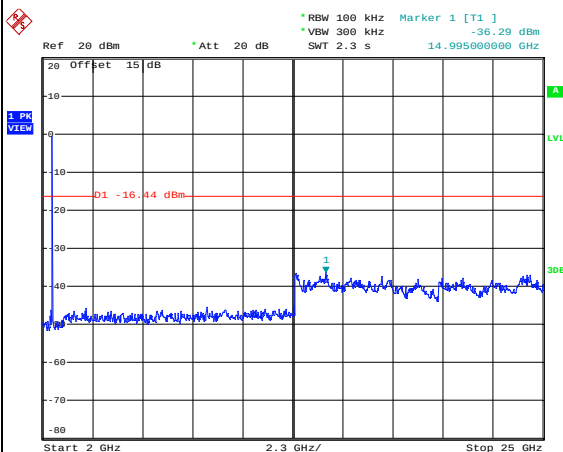
Date: 30.JUL.2015 23:54:04

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 23:57:02

Spurious Emission 2GHz~25GHz



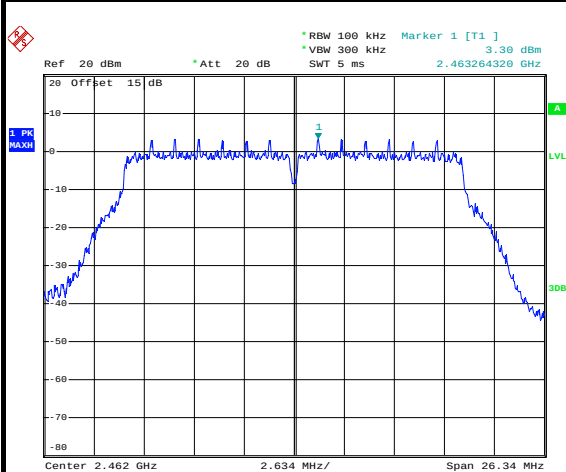
Date: 30.JUL.2015 23:57:20



Number of TX :	2	Ant. :	0+1(0)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Mygai Wang

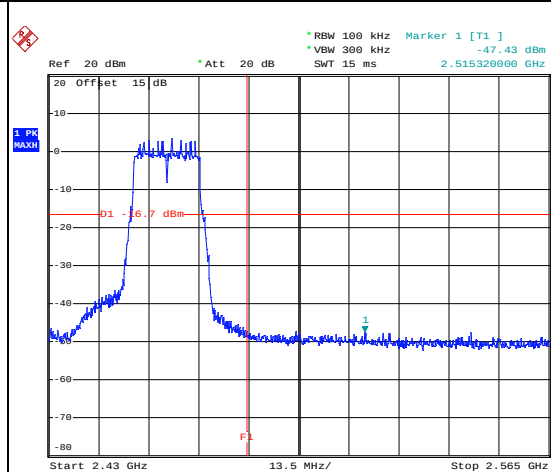
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



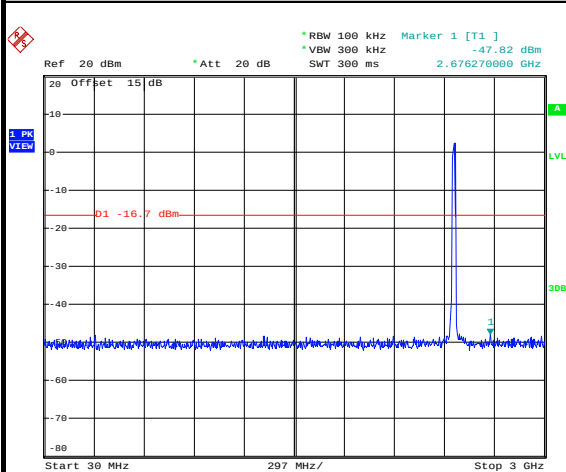
Date: 31.JUL.2015 00:02:22

High Channel Plot



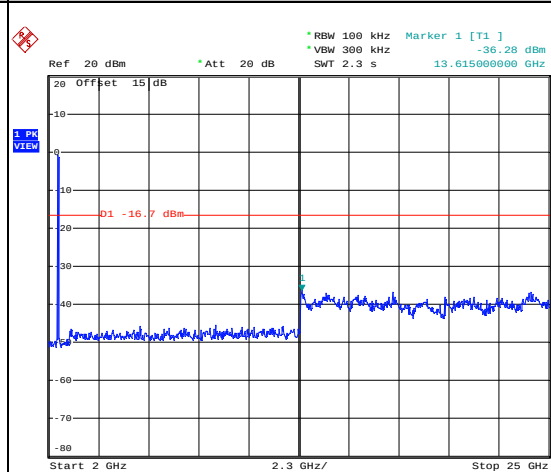
Date: 31.JUL.2015 00:03:32

Spurious Emission 30MHz~3GHz



Date: 31.JUL.2015 00:08:28

Spurious Emission 2GHz~25GHz



Date: 31.JUL.2015 00:08:45



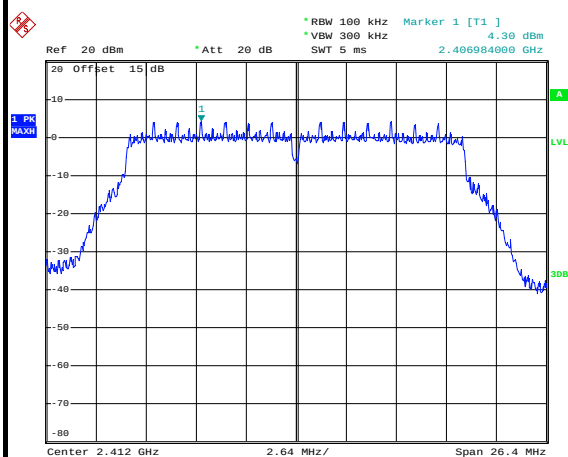
Number of TX = 2, Chain Port 0+1(1) (Measured)

Number of TX :	2	Ant. :	0+1(1)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Mygai Wang

WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level

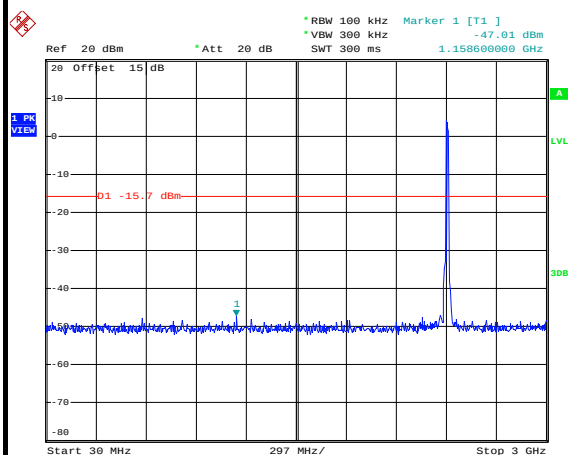
Low Channel Plot



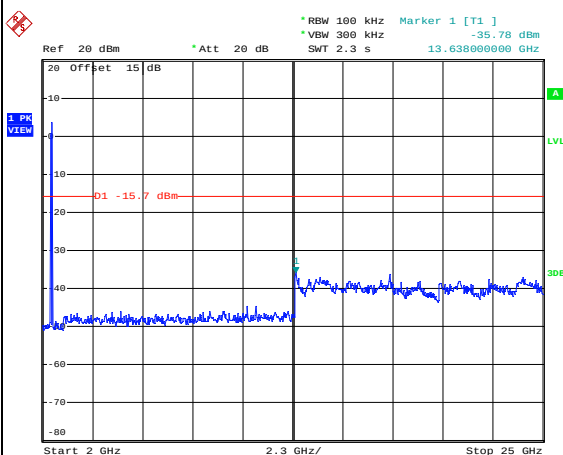
Date: 30.JUL.2015 01:31:57

Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz



Date: 30.JUL.2015 01:34:13



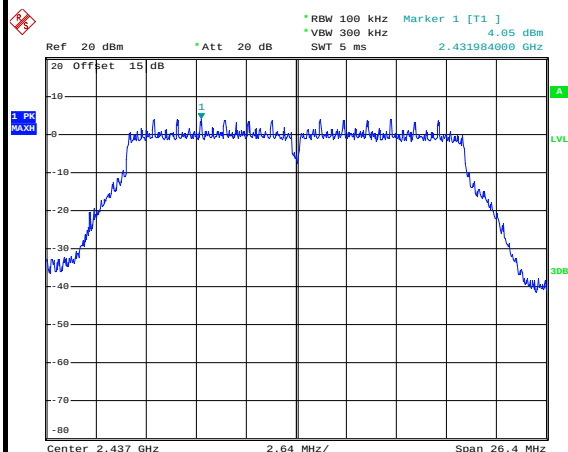
Date: 30.JUL.2015 01:34:31



Number of TX :	2	Ant. :	0+1(1)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Mygai Wang

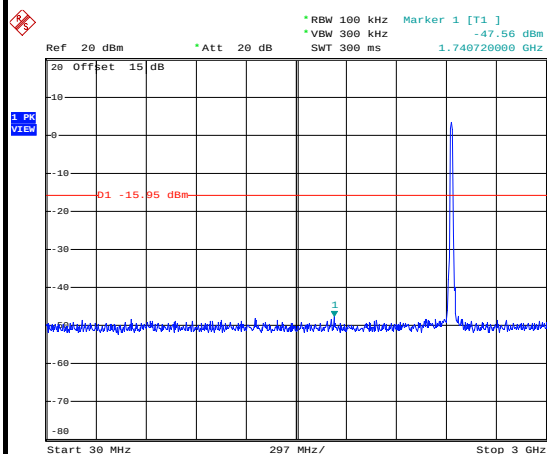
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



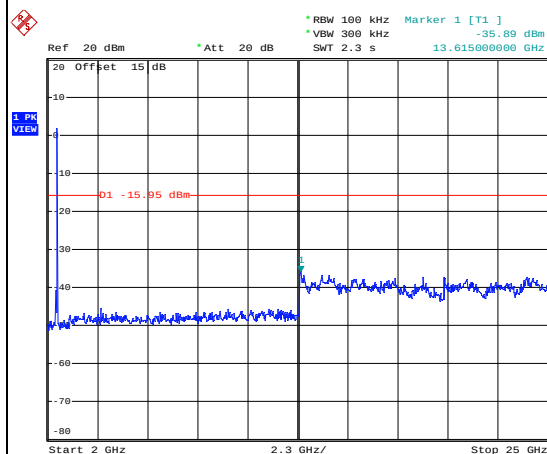
Date: 30.JUL.2015 01:39:00

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 01:43:33

Spurious Emission 2GHz~25GHz



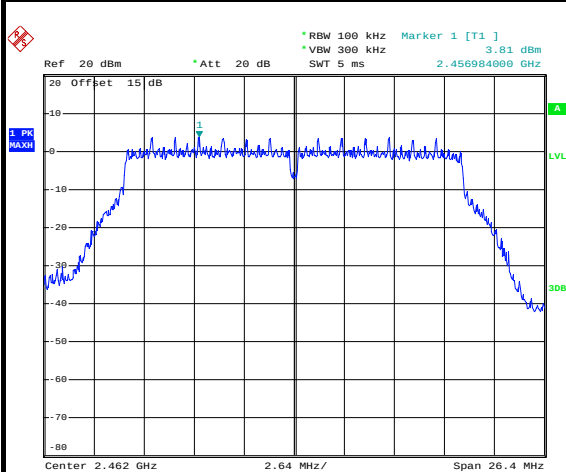
Date: 30.JUL.2015 01:43:51



Number of TX :	2	Ant. :	0+1(1)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Mygai Wang

WLAN 802.11n HT20 Channel 11

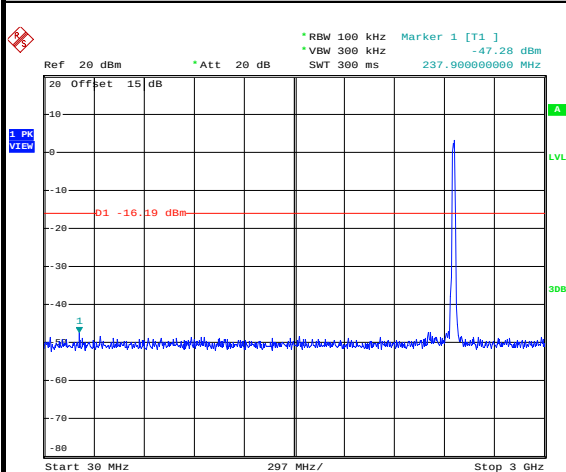
100kHz PSD reference Level



Date: 30.JUL.2015 01:54:49

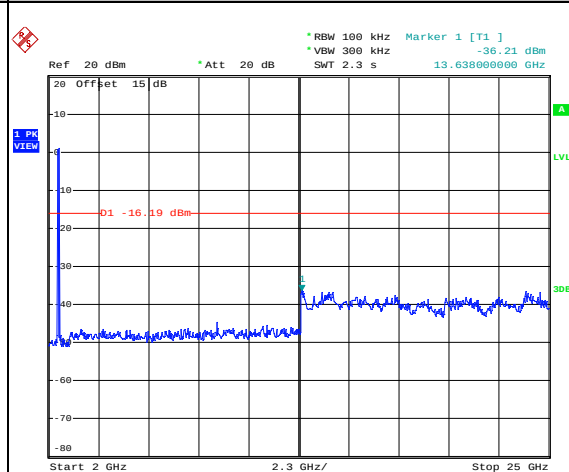
High Channel Plot

Spurious Emission 30MHz~3GHz



Date: 30.JUL.2015 02:00:31

Spurious Emission 2GHz~25GHz



Date: 30.JUL.2015 02:00:49

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 v03r03.
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 for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively 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 $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

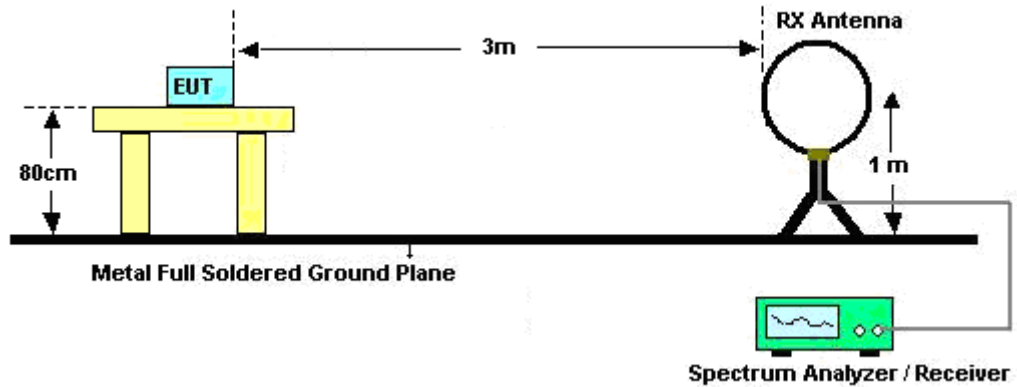
For average measurement:

 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, 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.

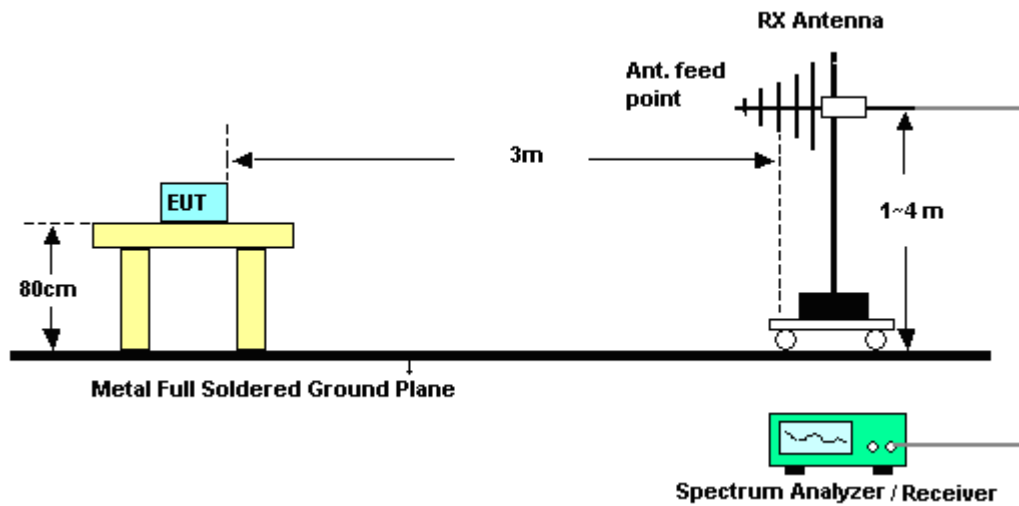
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Ant 0 802.11b	98.86	-	-	10Hz
Ant 1 802.11b	98.86	-	-	10Hz
Ant 0 802.11g	93.64	1.440	0.694	1kHz
Ant 1 802.11g	93.64	1.440	0.694	1kHz
Ant 0+1 802.11n HT20	91.38	0.996	1.004	3kHz

3.5.4 Test Setup

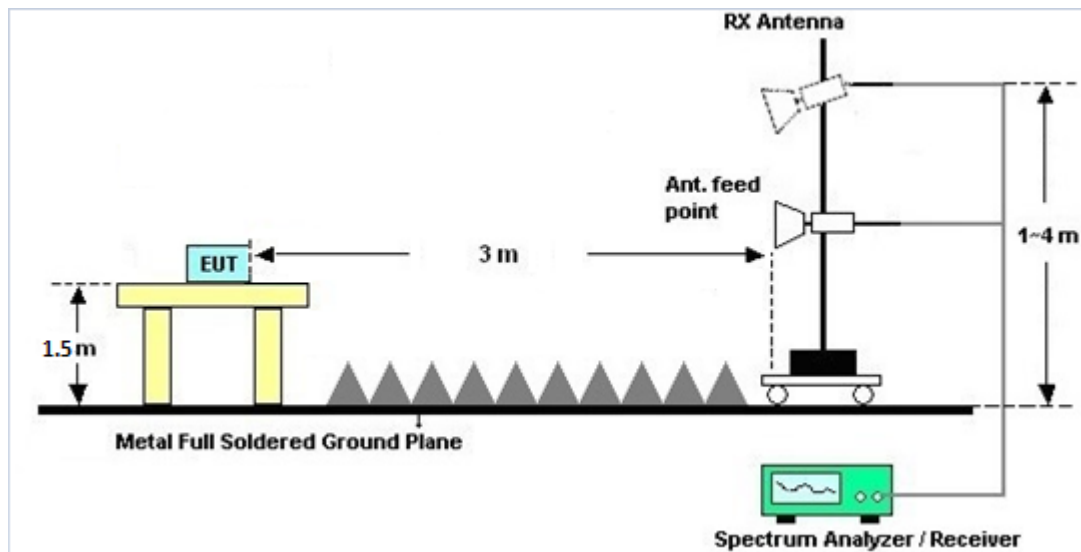
For radiated emissions below 30MHz



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

Please refer to Appendix B of this test report.

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

Please refer to Appendix B of this test report.

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 (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

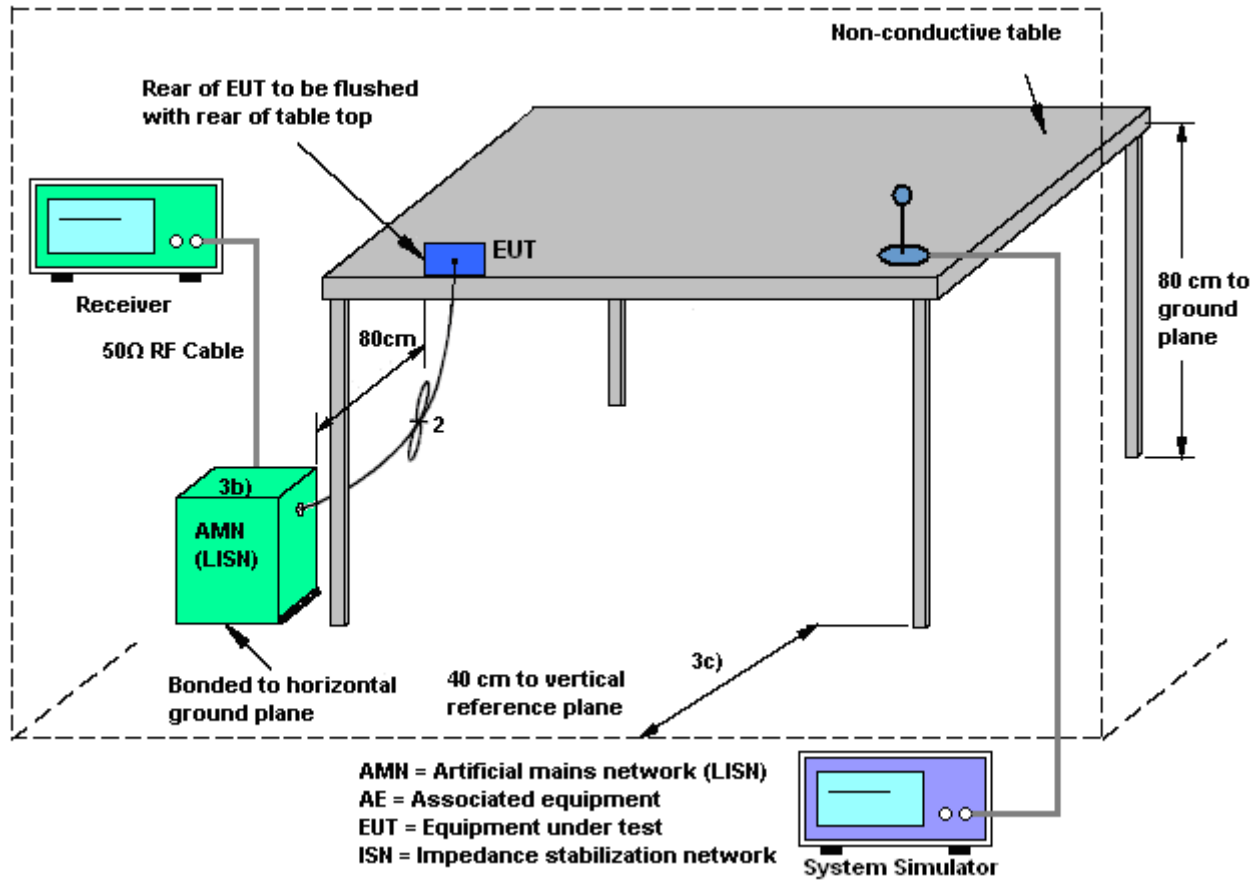
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

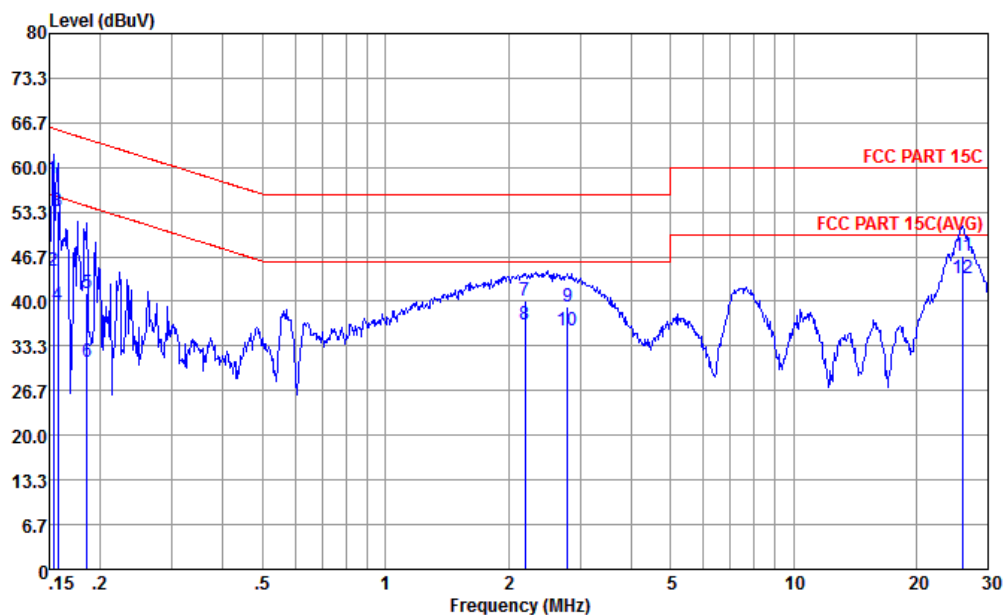
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter) 5.2V + Battery 2 + Sample 2		

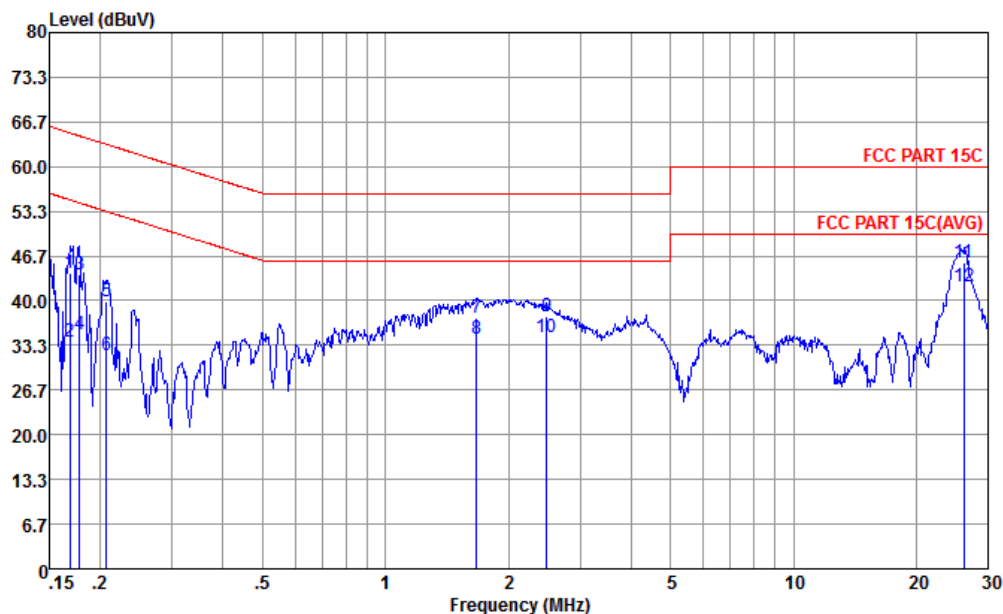


Site : CO01-KS
Condition : FCC PART 15C LISN-L20140306 LINE

mode		: Mode 2						
	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.15	58.38	-7.44	65.82	46.10	1.90	10.38	QP
2	0.15	44.58	-11.24	55.82	32.30	1.90	10.38	Average
3	0.16	53.52	-12.08	65.60	41.30	1.83	10.39	QP
4	0.16	39.42	-16.18	55.60	27.20	1.83	10.39	Average
5	0.19	41.17	-23.07	64.24	29.50	1.20	10.47	QP
6	0.19	30.87	-23.37	54.24	19.20	1.20	10.47	Average
7	2.20	40.12	-15.88	56.00	29.30	0.11	10.71	QP
8	2.20	36.62	-9.38	46.00	25.80	0.11	10.71	Average
9	2.79	39.19	-16.81	56.00	28.30	0.13	10.76	QP
10	2.79	35.69	-10.31	46.00	24.80	0.13	10.76	Average
11	26.00	46.84	-13.16	60.00	35.60	0.10	11.14	QP
12 *	26.00	43.54	-6.46	50.00	32.30	0.10	11.14	Average



Test Mode :	Mode 2	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter) 5.2V + Battery 2 + Sample 2		



Site : CO01-KS
Condition : FCC PART 15C LISN-N20140306 NEUTRAL

mode	: Mode 2							
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	44.19	-20.84	65.03	32.20	1.57	10.42	QP
2	0.17	33.79	-21.24	55.03	21.80	1.57	10.42	Average
3	0.18	43.98	-20.61	64.59	32.20	1.33	10.45	QP
4	0.18	35.08	-19.51	54.59	23.30	1.33	10.45	Average
5	0.21	39.79	-23.53	63.32	28.30	0.99	10.50	QP
6	0.21	31.79	-21.53	53.32	20.30	0.99	10.50	Average
7	1.67	37.49	-18.51	56.00	26.70	0.10	10.69	QP
8	1.67	34.29	-11.71	46.00	23.50	0.10	10.69	Average
9	2.49	37.64	-18.36	56.00	26.80	0.11	10.73	QP
10	2.49	34.44	-11.56	46.00	23.60	0.11	10.73	Average
11	26.14	45.62	-14.38	60.00	34.30	0.18	11.14	QP
12 *	26.14	42.22	-7.78	50.00	30.90	0.18	11.14	Average

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

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

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 k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th 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.



			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Chain Port 0 (dBi)	Chain Port 1 (dBi)				
2.4 GHz	1.10	1.20	4.16	4.16	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	R&S	FSP30	101400	9kHz~30GHz	Jan. 28, 2015	Jul. 30, 2015~ Jul. 31, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 28, 2015	Jul. 30, 2015~ Jul. 31, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 28, 2015	Jul. 30, 2015~ Jul. 31, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	Sep. 01, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Sep. 01, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Sep. 01, 2015	Nov. 12, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	Sep. 01, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Sep. 01, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Sep. 01, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 04, 2014	Sep. 01, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	Sep. 01, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A023 84	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	Sep. 01, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002 473	N/A	NCR	Sep. 01, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Sep. 01, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Sep. 01, 2015	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2015	Aug. 21, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Aug. 21, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Aug. 21, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Aug. 21, 2015	Oct. 24, 2015	Conduction (CO01-KS)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Appendix A. Conducted Test Results

Report Number : FR571615C

Test Engineer:	Mygai Wang	Temperature:	21~25	°C
Test Date:	2015/7/30~2015/7/31	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	1	1	2412		11.85		9.04	0.50	Pass
11b	1Mbps	1	6	2437		11.80		9.04	0.50	Pass
11b	1Mbps	1	11	2462		11.80		9.04	0.50	Pass
11g	6Mbps	1	1	2412		18.35		16.32	0.50	Pass
11g	6Mbps	1	6	2437		18.30		16.32	0.50	Pass
11g	6Mbps	1	11	2462		18.40		16.32	0.50	Pass
HT20	MCS0	1	1	2412		19.25		17.60	0.50	Pass
HT20	MCS0	1	6	2437		19.10		17.60	0.50	Pass
HT20	MCS0	1	11	2462		19.15		17.56	0.50	Pass
HT20	MCS8	2	1	2412	19.15	19.05	17.56	17.60	0.50	Pass
HT20	MCS8	2	6	2437	19.15	18.95	17.60	17.60	0.50	Pass
HT20	MCS8	2	11	2462	19.05	19.05	17.56	17.60	0.50	Pass

TEST RESULTS DATA
Peak Output Power

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	19.17	20.16		30.00	30.00	1.10	1.20	20.27	21.36	36.00	36.00	Pass
11b	1Mbps	1	6	2437	19.13	19.98		30.00	30.00	1.10	1.20	20.23	21.18	36.00	36.00	Pass
11b	1Mbps	1	11	2462	19.25	19.76		30.00	30.00	1.10	1.20	20.35	20.96	36.00	36.00	Pass
11g	6Mbps	1	1	2412	21.97	22.68		30.00	30.00	1.10	1.20	23.07	23.88	36.00	36.00	Pass
11g	6Mbps	1	6	2437	21.87	22.49		30.00	30.00	1.10	1.20	22.97	23.69	36.00	36.00	Pass
11g	6Mbps	1	11	2462	21.89	22.42		30.00	30.00	1.10	1.20	22.99	23.62	36.00	36.00	Pass
HT20	MCS0	1	1	2412	22.23	22.78		30.00	30.00	1.10	1.20	23.33	23.98	36.00	36.00	Pass
HT20	MCS0	1	6	2437	21.77	22.38		30.00	30.00	1.10	1.20	22.87	23.58	36.00	36.00	Pass
HT20	MCS0	1	11	2462	21.76	22.09		30.00	30.00	1.10	1.20	22.86	23.29	36.00	36.00	Pass
HT20	MCS8	2	1	2412	20.21	21.34	23.82	30.00		4.16		27.98		36.00		Pass
HT20	MCS8	2	6	2437	20.10	20.75	23.45	30.00		4.16		27.61		36.00		Pass
HT20	MCS8	2	11	2462	19.83	20.69	23.29	30.00		4.16		27.45		36.00		Pass

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

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.05	0.05	15.79	16.12	
11b	1Mbps	1	6	2437	0.05	0.05	15.73	15.92	
11b	1Mbps	1	11	2462	0.05	0.05	15.94	15.80	
11g	6Mbps	1	1	2412	0.29	0.29	13.87	15.07	
11g	6Mbps	1	6	2437	0.29	0.29	13.72	14.98	
11g	6Mbps	1	11	2462	0.29	0.29	13.80	14.90	
HT20	MCS0	1	1	2412	0.21	0.21	14.13	15.05	
HT20	MCS0	1	6	2437	0.21	0.21	14.12	14.84	
HT20	MCS0	1	11	2462	0.21	0.21	13.87	14.43	
HT20	MCS8	2	1	2412	0.39	0.39	11.27	12.45	14.91
HT20	MCS8	2	6	2437	0.39	0.39	11.20	12.17	14.72
HT20	MCS8	2	11	2462	0.39	0.39	11.13	12.00	14.60

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412		-4.84	-	1.10	1.20	8.00	8.00	Pass
11b	1Mbps	1	6	2437		-4.48		1.10	1.20	8.00	8.00	Pass
11b	1Mbps	1	11	2462		-5.27		1.10	1.20	8.00	8.00	Pass
11g	6Mbps	1	1	2412		-6.14		1.10	1.20	8.00	8.00	Pass
11g	6Mbps	1	6	2437		-7.25		1.10	1.20	8.00	8.00	Pass
11g	6Mbps	1	11	2462		-7.53		1.10	1.20	8.00	8.00	Pass
HT20	MCS0	1	1	2412		-10.41		1.10	1.20	8.00	8.00	Pass
HT20	MCS0	1	6	2437		-10.42		1.10	1.20	8.00	8.00	Pass
HT20	MCS0	1	11	2462		-10.89		1.10	1.20	8.00	8.00	Pass
HT20	MCS8	2	1	2412	-10.68	-9.47	-6.46	4.16		8.00		Pass
HT20	MCS8	2	6	2437	-11.39	-10.70	-7.69	4.16		8.00		Pass
HT20	MCS8	2	11	2462	-11.49	-11.03	-8.02	4.16		8.00		Pass

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



Appendix B. Radiated Test Results

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz	*	2413.36	104.7	-	-	109.83	27.13	4.74	37	263	44	P	H
	*	2412.692	100.31	-	-	105.44	27.13	4.74	37	263	44	A	H
		2389.83	54.11	-19.89	74	59.41	27	4.72	37.02	263	44	P	H
		2390	38.33	-15.67	54	43.63	27	4.72	37.02	263	44	A	H
	*	2413.36	100.77	-	-	105.9	27.13	4.74	37	156	260	P	V
	*	2412.692	96.39	-	-	101.52	27.13	4.74	37	156	260	A	V
		2389.29	46.23	-27.77	74	51.53	27	4.72	37.02	156	260	P	V
		2390	35.31	-18.69	54	40.61	27	4.72	37.02	156	260	A	V
802.11b CH 06 2437MHz	*	2435.655	103.12	-	-	108.09	27.26	4.76	36.99	300	44	P	H
	*	2436.239	98.74	-	-	103.71	27.26	4.76	36.99	300	44	A	H
	*	2438.326	99.93	-	-	104.74	27.39	4.77	36.97	150	80	P	V
	*	2437.742	95.58	-	-	100.39	27.39	4.77	36.97	150	80	A	V
802.11b CH 11 2462MHz	*	2460.621	104.6	-	-	109.26	27.51	4.79	36.96	300	46	P	H
	*	2461.289	99.89	-	-	104.55	27.51	4.79	36.96	300	46	A	H
		2487.96	51.42	-22.58	74	55.76	27.77	4.82	36.93	300	46	P	H
		2483.52	41.39	-12.61	54	45.89	27.64	4.8	36.94	300	46	A	H
	*	2460.705	101.64	-	-	106.3	27.51	4.79	36.96	150	261	P	V
	*	2461.289	97.36	-	-	102.02	27.51	4.79	36.96	150	261	A	V
		2487.72	49.64	-24.36	74	53.98	27.77	4.82	36.93	150	261	P	V
		2483.52	37.33	-16.67	54	41.83	27.64	4.8	36.94	150	261	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 0	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b		4824	42.67	-31.33	74	41.01	31.51	6.83	36.68	150	221	P	H
CH 01		4824	42.57	-31.43	74	40.91	31.51	6.83	36.68	150	174	P	H
2412MHz													
802.11b		4874	42.66	-31.34	74	40.86	31.59	6.87	36.66	150	118	P	H
CH 06		7311	45.38	-28.62	74	39.47	34.03	8.57	36.69	150	185	P	H
2437MHz		4874	42.64	-31.36	74	40.84	31.59	6.87	36.66	150	199	P	V
		7311	44.72	-29.28	74	38.81	34.03	8.57	36.69	150	185	P	V
802.11b		4923	42.39	-31.61	74	40.45	31.67	6.92	36.65	167	246	P	V
CH 11		7386	45.43	-28.57	74	39.24	34.29	8.68	36.78	150	28	P	V
2462MHz		4923	42.3	-31.7	74	40.36	31.67	6.92	36.65	150	242	P	V
		7386	46.21	-27.79	74	40.02	34.29	8.68	36.78	150	216	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 0	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2390	60.89	-13.11	74	66.19	27	4.72	37.02	150	225	P	H
		2390	44.55	-9.45	54	49.85	27	4.72	37.02	150	225	A	H
	*	2414.78	106	-	-	111.13	27.13	4.74	37	150	225	P	H
	*	2413.861	95.71	-	-	100.84	27.13	4.74	37	150	225	A	H
		2389.38	58.23	-15.77	74	63.53	27	4.72	37.02	167	81	P	V
		2390	41.88	-12.12	54	47.18	27	4.72	37.02	167	81	A	V
	*	2414.78	104.24	-	-	109.37	27.13	4.74	37	167	81	P	V
	*	2414.112	94.07	-	-	99.2	27.13	4.74	37	167	81	A	V
802.11g CH 06 2437MHz	*	2432.147	99.66	-	-	104.63	27.26	4.76	36.99	239	260	P	H
	*	2430.728	89.22	-	-	94.19	27.26	4.76	36.99	239	260	A	H
	*	2442.251	103.12	-	-	107.93	27.39	4.77	36.97	277	260	P	V
	*	2430.728	92.56	-	-	97.53	27.26	4.76	36.99	277	260	A	V
802.11g CH 11 2462MHz	*	2460.287	107.09	-	-	111.75	27.51	4.79	36.96	150	318	P	H
	*	2461.122	96.63	-	-	101.29	27.51	4.79	36.96	150	318	A	H
	!	2484.12	69.15	-4.85	74	73.65	27.64	4.8	36.94	150	318	P	H
	!	2483.52	48.9	-5.1	54	53.4	27.64	4.8	36.94	150	318	A	H
	*	2460.287	104.28	-	-	108.94	27.51	4.79	36.96	186	77	P	V
	*	2461.122	93.9	-	-	98.56	27.51	4.79	36.96	186	77	A	V
		2483.56	64.46	-9.54	74	68.96	27.64	4.8	36.94	186	77	P	V
		2483.52	45.75	-8.25	54	50.25	27.64	4.8	36.94	186	77	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 0	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	42.15	-31.85	74	40.49	31.51	6.83	36.68	150	182	P	H
		4824	41.56	-32.44	74	39.9	31.51	6.83	36.68	150	178	P	H
802.11g CH 06 2437MHz		4875	41.96	-32.04	74	40.16	31.59	6.87	36.66	150	181	P	H
		7311	45.56	-28.44	74	39.65	34.03	8.57	36.69	150	360	P	H
		4875	42.31	-31.69	74	40.51	31.59	6.87	36.66	150	178	P	V
		7311	45.21	-28.79	74	39.3	34.03	8.57	36.69	150	0	P	V
802.11g CH 11 2462MHz		4923	42.08	-31.92	74	40.14	31.67	6.92	36.65	150	182	P	V
		7386	46.82	-27.18	74	40.63	34.29	8.68	36.78	150	360	P	V
		4923	42.03	-31.97	74	40.09	31.67	6.92	36.65	150	178	P	V
		7386	46.36	-27.64	74	40.17	34.29	8.68	36.78	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		31.94	26.48	-13.52	40	42.47	18.5	0.75	35.24	152	213	P	H
		53.28	21.98	-18.02	40	48.58	7.85	0.96	35.41	-	-	P	H
		136.7	23.85	-19.65	43.5	45.91	11.44	1.51	35.01	-	-	P	H
		272.5	23.32	-22.68	46	43.62	12.35	2.17	34.82	-	-	P	H
		309.36	25.26	-20.74	46	44.06	13.71	2.31	34.82	-	-	P	H
		452.92	28.49	-17.51	46	43.53	17.02	2.81	34.87	-	-	P	H
		31.94	32.13	-7.87	40	48.12	18.5	0.75	35.24	215	315	P	V
		53.28	24.54	-15.46	40	51.14	7.85	0.96	35.41	-	-	P	V
		77.53	21.04	-18.96	40	46.65	8.65	1.14	35.4	-	-	P	V
		323.91	23.08	-22.92	46	41.61	14.03	2.36	34.92	-	-	P	V
		378.23	21.96	-24.04	46	39.06	15.51	2.56	35.17	-	-	P	V
		475.23	26.19	-19.81	46	40.88	17.15	2.88	34.72	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		31.94	27.48	-12.52	40	43.47	18.5	0.75	35.24	155	219	P	H
		53.28	22.98	-17.02	40	49.58	7.85	0.96	35.41	-	-	P	H
		136.7	23.85	-19.65	43.5	45.91	11.44	1.51	35.01	-	-	P	H
		272.5	23.32	-22.68	46	43.62	12.35	2.17	34.82	-	-	P	H
		309.36	25.26	-20.74	46	44.06	13.71	2.31	34.82	-	-	P	H
		452.92	28.49	-17.51	46	43.53	17.02	2.81	34.87	-	-	P	H
		31.94	33.13	-6.87	40	49.12	18.5	0.75	35.24	150	318	P	V
		53.28	25.54	-14.46	40	52.14	7.85	0.96	35.41	-	-	P	V
		77.53	21.04	-18.96	40	46.65	8.65	1.14	35.4	-	-	P	V
		323.91	23.08	-22.92	46	41.61	14.03	2.36	34.92	-	-	P	V
		378.23	21.96	-24.04	46	39.06	15.51	2.56	35.17	-	-	P	V
		475.23	26.19	-19.81	46	40.88	17.15	2.88	34.72	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz	*	2410.604	106.25	-	-	111.38	27.13	4.74	37	150	238	P	H
	*	2411.189	101.86	-	-	106.99	27.13	4.74	37	150	238	A	H
		2389.11	52.74	-21.26	74	58.04	27	4.72	37.02	150	238	P	H
		2390	39.73	-14.27	54	45.03	27	4.72	37.02	150	238	A	H
	*	2413.444	104.97	-	-	110.1	27.13	4.74	37	300	264	P	V
	*	2412.692	100.6	-	-	105.73	27.13	4.74	37	300	264	A	V
		2390	51.79	-22.21	74	57.09	27	4.72	37.02	300	264	P	V
		2390	38.16	-15.84	54	43.46	27	4.72	37.02	300	264	A	V
802.11b CH 06 2437MHz	*	2438.41	104.66	-	-	109.47	27.39	4.77	36.97	150	236	P	H
	*	2437.742	100.17	-	-	104.98	27.39	4.77	36.97	150	236	A	H
	*	2435.655	103.97	-	-	108.94	27.26	4.76	36.99	291	266	P	V
	*	2436.239	99.39	-	-	104.36	27.26	4.76	36.99	291	266	A	V
802.11b CH 11 2462MHz	*	2460.705	106.15	-	-	110.81	27.51	4.79	36.96	150	238	P	H
	*	2461.289	101.58	-	-	106.24	27.51	4.79	36.96	150	238	A	H
		2484.12	55.37	-18.63	74	59.87	27.64	4.8	36.94	150	238	P	H
		2483.52	43.74	-10.26	54	48.24	27.64	4.8	36.94	150	238	A	H
	*	2460.621	106.39	-	-	111.05	27.51	4.79	36.96	300	280	P	V
	*	2461.289	101.91	-	-	106.57	27.51	4.79	36.96	300	280	A	V
		2485.28	54.82	-19.18	74	59.32	27.64	4.8	36.94	300	280	P	V
		2483.52	44.02	-9.98	54	48.52	27.64	4.8	36.94	300	280	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b		4824	42.65	-31.35	74	40.99	31.51	6.83	36.68	150	132	P	H
CH 01		4824	43.29	-30.71	74	41.63	31.51	6.83	36.68	150	96	P	V
2412MHz													
802.11b		4874	41.68	-32.32	74	39.88	31.59	6.87	36.66	150	116	P	H
CH 06		7311	45.07	-28.93	74	39.16	34.03	8.57	36.69	150	145	P	H
2437MHz		4874	41.01	-32.99	74	39.21	31.59	6.87	36.66	150	126	P	V
		7311	45.45	-28.55	74	39.54	34.03	8.57	36.69	150	177	P	V
802.11b		4924	41.82	-32.18	74	39.88	31.67	6.92	36.65	150	85	P	H
CH 11		7386	46.39	-27.61	74	40.2	34.29	8.68	36.78	150	221	P	H
2462MHz		4924	41.8	-32.2	74	39.86	31.67	6.92	36.65	150	78	P	V
		7386	45.84	-28.16	74	39.65	34.29	8.68	36.78	150	231	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.56	65.12	-8.88	74	70.42	27	4.72	37.02	168	234	P	H
		2390.00	46.89	-7.11	54	52.19	27	4.72	37.02	168	234	A	H
	*	2410.187	107.83	-	-	112.96	27.13	4.74	37	168	234	P	H
	*	2413.945	97.63	-	-	102.76	27.13	4.74	37	168	234	A	H
		2389.74	64.22	-9.78	74	69.52	27	4.72	37.02	300	261	P	V
		2390.00	46.09	-7.91	54	51.39	27	4.72	37.02	300	261	A	V
	*	2410.187	107.53	-	-	112.66	27.13	4.74	37	300	261	P	V
	*	2414.028	97.33	-	-	102.46	27.13	4.74	37	300	261	A	V
802.11g CH 06 2437MHz	*	2432.064	107.82	-	-	112.79	27.26	4.76	36.99	150	56	P	H
	*	2430.728	97.46	-	-	102.43	27.26	4.76	36.99	150	32	A	H
	*	2432.064	107.46	-	-	112.43	27.26	4.76	36.99	300	84	P	V
	*	2438.994	97.02	-	-	101.83	27.39	4.77	36.97	300	84	A	V
802.11g CH 11 2462MHz	*	2460.287	108.43	-	-	113.09	27.51	4.79	36.96	190	239	P	H
	*	2459.201	98.03	-	-	102.69	27.51	4.79	36.96	190	239	A	H
		2483.6	66.34	-7.66	74	70.84	27.64	4.8	36.94	190	239	P	H
		2483.52	47.49	-6.51	54	51.99	27.64	4.8	36.94	190	239	A	H
	*	2460.287	107.86	-	-	112.52	27.51	4.79	36.96	295	285	P	V
	*	2461.039	97.45	-	-	102.11	27.51	4.79	36.96	295	285	A	V
		2483.68	65.13	-8.87	74	69.63	27.64	4.8	36.94	295	285	P	V
		2483.52	46.43	-7.57	54	50.93	27.64	4.8	36.94	295	285	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g		4824	41.75	-32.25	74	40.09	31.51	6.83	36.68	150	182	P	H
CH 01		4824	41.69	-32.31	74	40.03	31.51	6.83	36.68	150	178	P	V
2412MHz													
802.11g		4874	42.8	-31.2	74	41	31.59	6.87	36.66	150	81	P	H
CH 06		7311	44.68	-29.32	74	38.77	34.03	8.57	36.69	150	163	P	H
2437MHz		4875	41.56	-32.44	74	39.76	31.59	6.87	36.66	150	288	P	V
		7311	44.47	-29.53	74	38.56	34.03	8.57	36.69	150	163	P	V
802.11g		4923	41.8	-32.2	74	39.86	31.67	6.92	36.65	150	115	P	H
CH 11		7386	46.06	-27.94	74	39.87	34.29	8.68	36.78	150	85	P	H
2462MHz		4923	41.98	-32.02	74	40.04	31.67	6.92	36.65	150	96	P	V
		7386	47.26	-26.74	74	41.07	34.29	8.68	36.78	150	85	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		31.94	28.48	-11.52	40	44.47	18.5	0.75	35.24	184	243	P	H
		53.28	23.98	-16.02	40	50.58	7.85	0.96	35.41	-	-	P	H
		136.7	24.85	-18.65	43.5	46.91	11.44	1.51	35.01	-	-	P	H
		272.5	23.32	-22.68	46	43.62	12.35	2.17	34.82	-	-	P	H
		309.36	25.26	-20.74	46	44.06	13.71	2.31	34.82	-	-	P	H
		452.92	28.49	-17.51	46	43.53	17.02	2.81	34.87	-	-	P	H
		31.94	32.13	-7.87	40	48.12	18.5	0.75	35.24	207	318	P	V
		53.28	24.54	-15.46	40	51.14	7.85	0.96	35.41	-	-	P	V
		77.53	21.04	-18.96	40	46.65	8.65	1.14	35.4	-	-	P	V
		288.02	21.88	-24.12	46	41.42	13.01	2.23	34.78	-	-	P	V
		323.91	23.08	-22.92	46	41.61	14.03	2.36	34.92	-	-	P	V
		475.23	26.19	-19.81	46	40.88	17.15	2.88	34.72	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		31.94	28.48	-11.52	40	44.47	18.5	0.75	35.24	214	237	P	H
		53.28	23.98	-16.02	40	50.58	7.85	0.96	35.41	-	-	P	H
		136.7	23.85	-19.65	43.5	45.91	11.44	1.51	35.01	-	-	P	H
		272.5	23.32	-22.68	46	43.62	12.35	2.17	34.82	-	-	P	H
		309.36	25.26	-20.74	46	44.06	13.71	2.31	34.82	-	-	P	H
		452.92	28.49	-17.51	46	43.53	17.02	2.81	34.87	-	-	P	H
		31.94	32.13	-7.87	40	48.12	18.5	0.75	35.24	158	317	P	V
		53.28	24.54	-15.46	40	51.14	7.85	0.96	35.41	-	-	P	V
		77.53	20.04	-19.96	40	45.65	8.65	1.14	35.4	-	-	P	V
		278.32	20.95	-25.05	46	40.97	12.59	2.19	34.8	-	-	P	V
		323.91	23.08	-22.92	46	41.61	14.03	2.36	34.92	-	-	P	V
		475.23	26.19	-19.81	46	40.88	17.15	2.88	34.72	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.83	67.95	-6.05	74	73.25	27	4.72	37.02	150	238	P	H
	!	2389.92	50.07	-3.93	54	55.37	27	4.72	37.02	150	238	A	H
	*	2410.271	106.99	-	-	112.12	27.13	4.74	37	150	238	P	H
	*	2410.02	95.94	-	-	101.07	27.13	4.74	37	150	238	A	H
	*	2413.945	107.03	-	-	112.16	27.13	4.74	37	300	278	P	V
	*	2413.444	95.73	-	-	100.86	27.13	4.74	37	300	278	A	V
		2388.75	66.3	-7.7	74	71.6	27	4.72	37.02	300	278	P	V
	!	2389.92	48.54	-5.46	54	53.84	27	4.72	37.02	300	278	A	V
802.11n HT20 CH 06 2437MHz	*	2441.166	105.15	-	-	109.96	27.39	4.77	36.97	167	235	P	H
	*	2441.166	94.52	-	-	99.33	27.39	4.77	36.97	167	235	A	H
	*	2432.231	105.99	-	-	110.96	27.26	4.76	36.99	159	263	P	V
	*	2429.559	94.63	-	-	99.6	27.26	4.76	36.99	159	263	A	V
802.11n HT20 CH 11 2462MHz	*	2459.034	106.88	-	-	111.54	27.51	4.79	36.96	187	233	P	H
	*	2460.371	96.06	-	-	100.72	27.51	4.79	36.96	187	233	A	H
		2483.76	65.3	-8.7	74	69.8	27.64	4.8	36.94	187	233	P	H
		2483.56	47.22	-6.78	54	51.72	27.64	4.8	36.94	187	233	A	H
	*	2457.114	107.15	-	-	111.81	27.51	4.79	36.96	300	264	P	V
	*	2459.452	96.62	-	-	101.28	27.51	4.79	36.96	300	264	A	V
		2483.72	65.57	-8.43	74	70.07	27.64	4.8	36.94	300	264	P	V
		2483.52	47.92	-6.08	54	52.42	27.64	4.8	36.94	300	264	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	43.01	-30.99	74	41.35	31.51	6.83	36.68	150	231	P	H
		4824	42.36	-31.64	74	40.7	31.51	6.83	36.68	150	25	P	V
802.11n HT20 CH 06 2437MHz		4874	41.67	-32.33	74	39.87	31.59	6.87	36.66	150	118	P	H
		7311	45	-29	74	39.09	34.03	8.57	36.69	150	216	P	H
		4874	41.43	-32.57	74	39.63	31.59	6.87	36.66	150	51	P	V
		7311	45.01	-28.99	74	39.1	34.03	8.57	36.69	150	200	P	V
802.11n HT20 CH 11 2462MHz		4924	41.88	-32.12	74	39.94	31.67	6.92	36.65	150	166	P	H
		7386	47.06	-26.94	74	40.87	34.29	8.68	36.78	150	174	P	H
		4924	41.79	-32.21	74	39.85	31.67	6.92	36.65	150	45	P	V
		7386	45.85	-28.15	74	39.66	34.29	8.68	36.78	150	186	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		31.94	28.48	-11.52	40	44.47	18.5	0.75	35.24	167	284	P	H
		53.28	23.98	-16.02	40	50.58	7.85	0.96	35.41	-	-	P	H
		65.89	19.64	-20.36	40	46.88	6.68	1.04	34.96	-	-	P	H
		136.7	23.85	-19.65	43.5	45.91	11.44	1.51	35.01	-	-	P	H
		309.36	25.26	-20.74	46	44.06	13.71	2.31	34.82	-	-	P	H
		452.92	28.49	-17.51	46	43.53	17.02	2.81	34.87	-	-	P	H
		31.94	32.13	-7.87	40	48.12	18.5	0.75	35.24	213	276	P	V
		53.28	24.54	-15.46	40	51.14	7.85	0.96	35.41	-	-	P	V
		77.53	22.04	-17.96	40	47.65	8.65	1.14	35.4	-	-	P	V
		288.02	21.88	-24.12	46	41.42	13.01	2.23	34.78	-	-	P	V
		323.91	23.08	-22.92	46	41.61	14.03	2.36	34.92	-	-	P	V
		475.23	26.19	-19.81	46	40.88	17.15	2.88	34.72	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.