

FCC RF Test Report

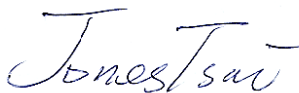
APPLICANT : Lenovo(Shanghai) Electronics
Technology Co., Ltd.
EQUIPMENT : Portable Tablet Computer
BRAND NAME : Lenovo
MODEL NAME : Lenovo YT3-X90F
FCC ID : O57YT3X90F
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jul. 08, 2015 and testing was completed on Aug. 05, 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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR570804-01C	Rev. 01	Initial issue of report	Sep. 01, 2015



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-247 5.2(1)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	RSS-Gen 6.6	99% Bandwidth	-	Pass	-
3.2	15.247(b)	RSS-247 A5.4(4)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	RSS-247 5.2(2)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	RSS-247 5.5	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
			Conducted Spurious Emission		Pass	-
3.5	15.247(d)	RSS-247 5.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.3 dB at 4874.000 MHz
3.6	15.207	RSS-GEN 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 6.47 dB at 25.190 MHz
3.7	15.203 & 15.247(b)	N/A	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-X90F
FCC ID	O57YT3X90F
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/ WLAN5GHz 802.11a/n HT20/HT40/ WLAN5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.1 LE
HW Version	LenovoPad YT3-X90F
SW Version	YT3-X90F_150714
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 : 20.58 dBm (0.1143 W) 802.11g : 23.67 dBm (0.2328 W) 802.11n HT20 : 25.28 dBm (0.3373 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
		802.11 g	V
		802.11 n SISO	V
		802.11 n MIMO	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
Flash	Samsung_K3QF1F1 OEM AGCE EMMC;KLMAG2WEPD-B031;16GB; FBGA153 LPDDR3;K3QF1F1 OEM-AGCE ; 1GB;1600Mbps	Toshiba & Micron_ ELPIDA FA164A2MA 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 L15D2K32	SCUD_ L15D2K32 L15D2K32
Ancillary Battery	SCUD_L15D1P31 L15D1P31	SUNWODA_ L15D1P31 L15D1P31

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 (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC/IC Registration No.
	03CH01-SZ	831040/4086F

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.	
	CO01-KS	

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
- ♦ IC RSS-247 Issue 1
- ♦ IC RSS-Gen Issue 4

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 (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.

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	20.58	CH 01	20.57	20.56	20.56
CH 06	2437	1	20.42				
CH 11	2462	1	20.18				

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	22.81	CH 01	22.78	22.74	22.75	22.76	22.67	22.69	22.71
CH 06	2437	0	22.73								
CH 11	2462	0	22.75								
CH 01	2412	1	23.67	CH 01	23.56	23.61	23.58	23.59	23.55	23.51	23.57
CH 06	2437	1	23.53								
CH 11	2462	1	23.41								



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)	21.62	CH 01	21.60	21.52	21.56	21.57	21.49	21.60	21.54
CH 06	2437	0+1(0)	21.58								
CH 11	2462	0+1(0)	21.33								
CH 01	2412	0+1(1)	22.84	CH 01	22.57	22.78	22.79	22.81	22.75	22.74	22.73
CH 06	2437	0+1(1)	22.34								
CH 11	2462	0+1(1)	22.32								
CH 01	2412	0+1	25.28	CH 01	25.12	25.21	25.23	25.24	25.18	25.22	25.19
CH 06	2437	0+1	24.99								
CH 11	2462	0+1	24.86								

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.

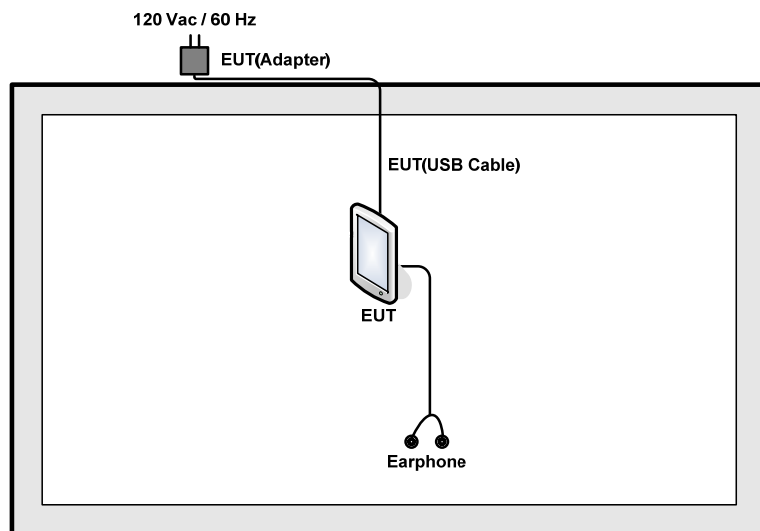
<2.4GHz>

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

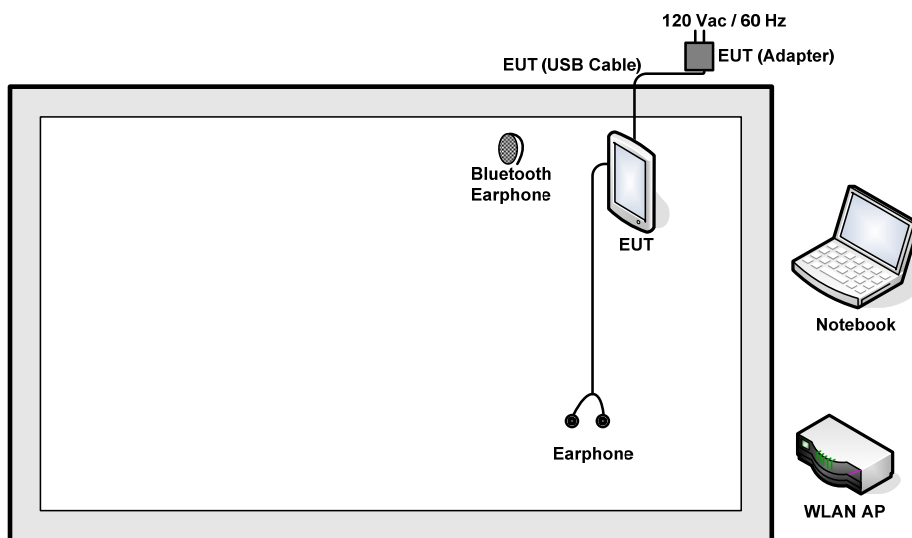
Test Cases	
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable 1 (Charging from Adapter) 12V + Battery 1 + Sample 1
	Mode 2 : Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable 2 (Charging from Adapter) 5.2V + Battery 2 + Sample 2
Remark: - For radiated TCs, the tests were performed with adapter, Earphone, USB Cable 1 for Sample 1. - For conducted emission test cases, the worst case 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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Lenovo	LBH301	N/A	N/A	N/A
4.	Earphone	Lenovo	SH100	N/A	N/A	N/A

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.

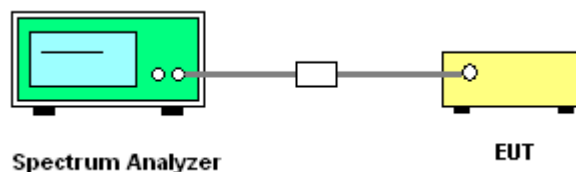
3.1.2 Measuring Instruments

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.

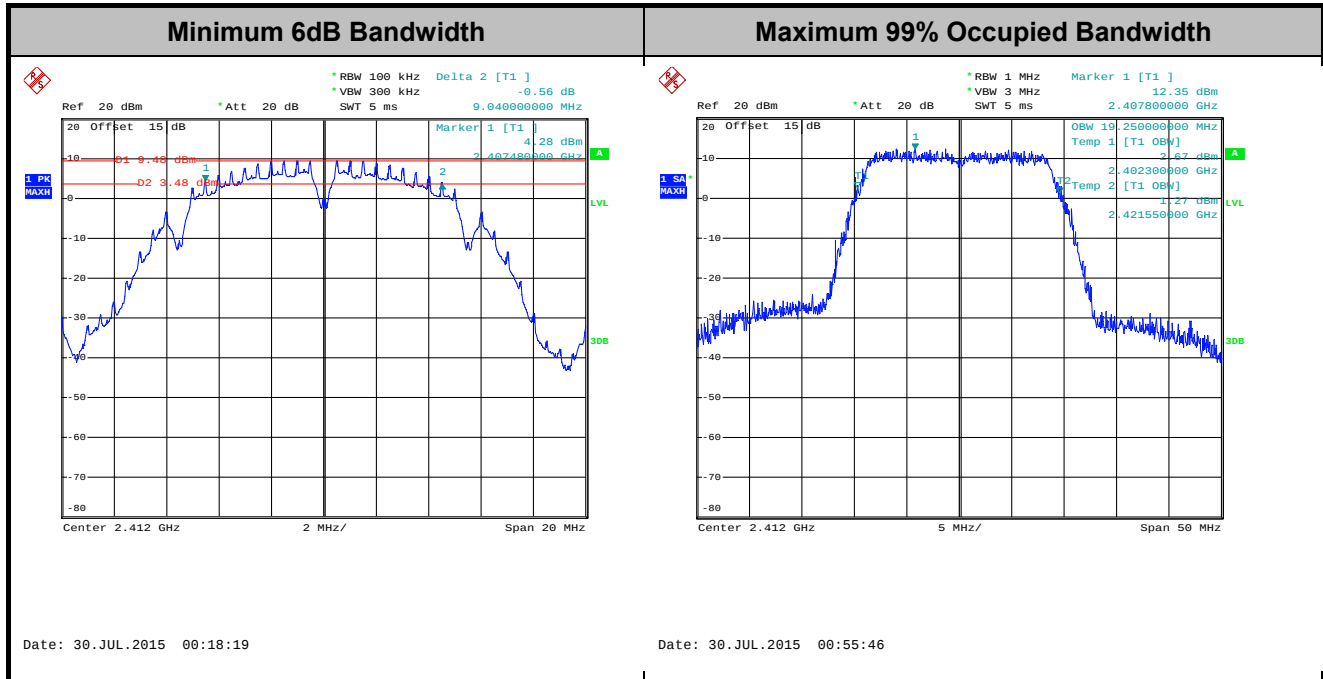
3.1.4 Test Setup





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.

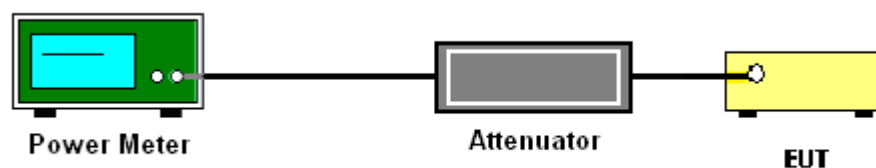
3.2.2 Measuring Instruments

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.

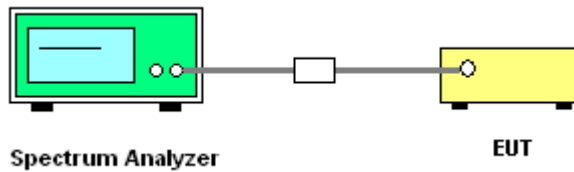
If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

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.

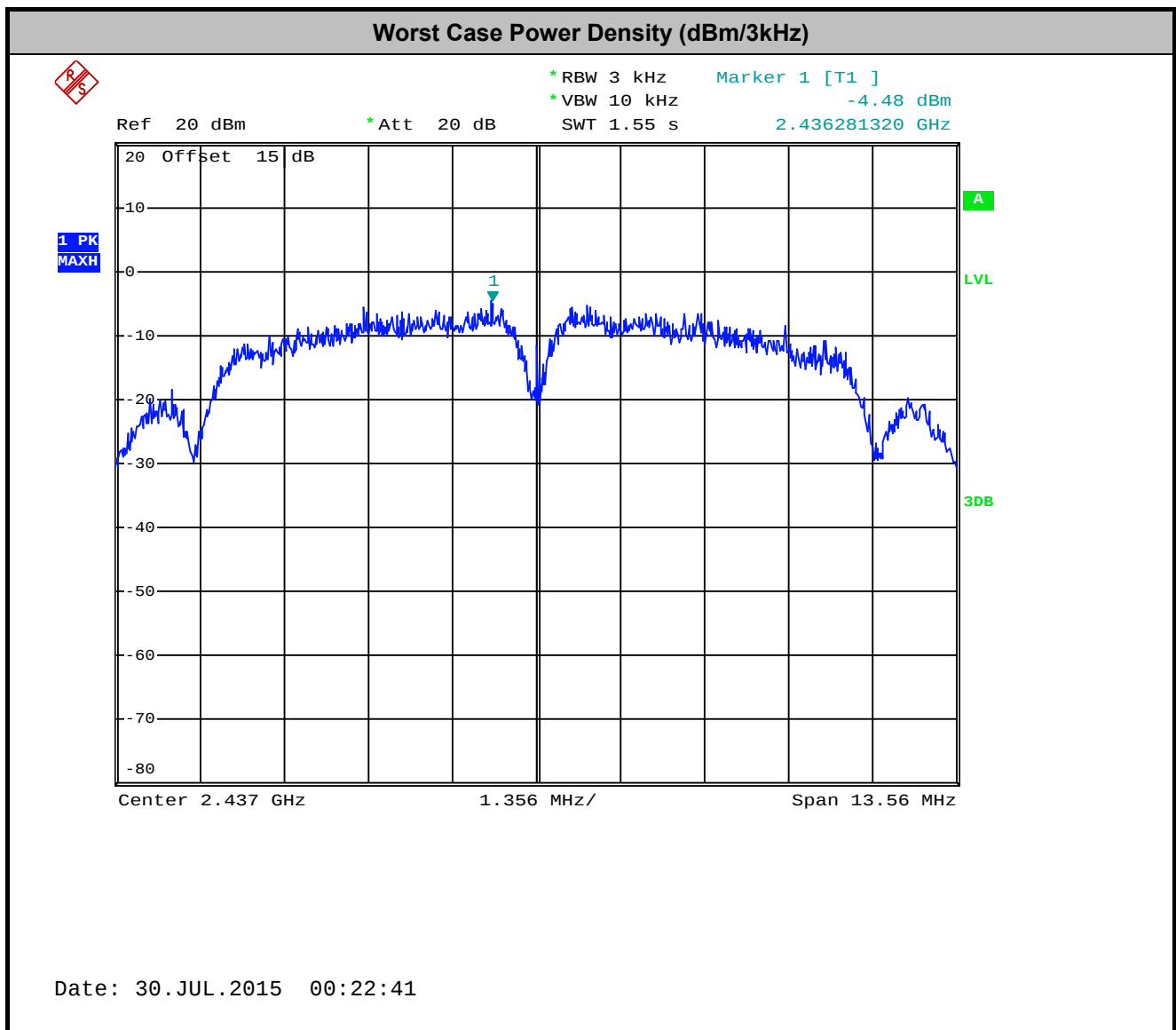
Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)

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).

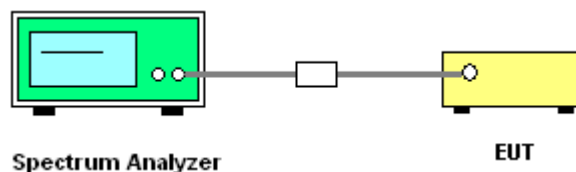
3.4.2 Measuring Instruments

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





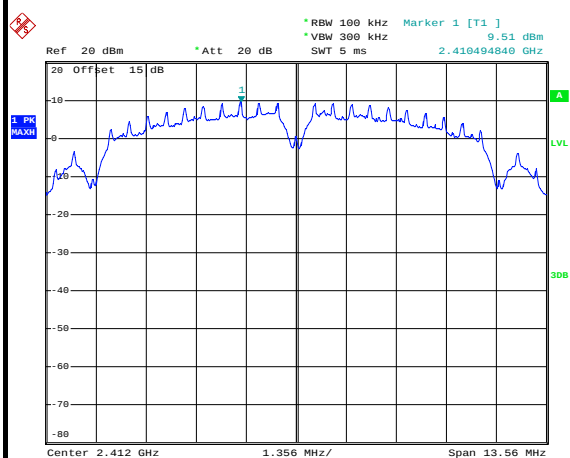
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

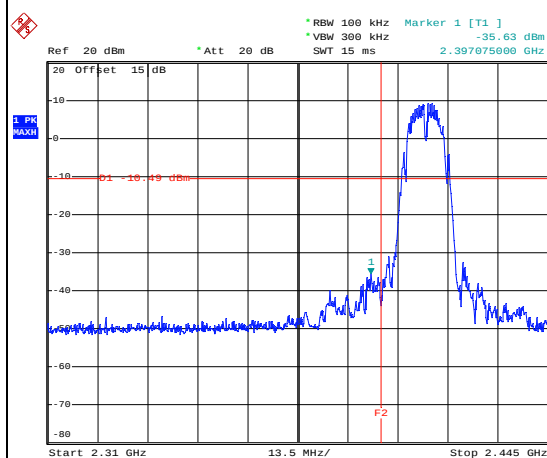
WLAN 802.11b Channel 01

100kHz PSD reference Level



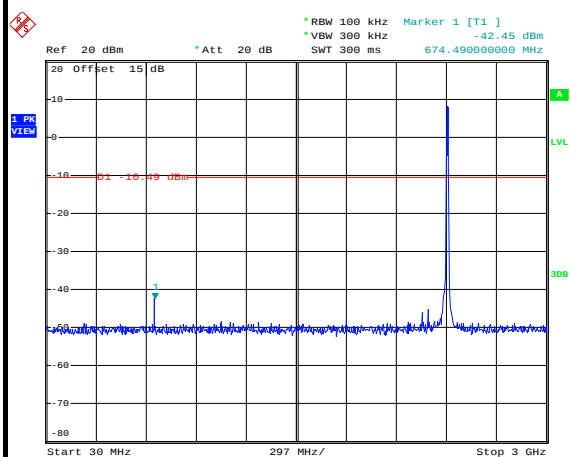
Date: 30.JUL.2015 00:19:07

Low Channel Plot



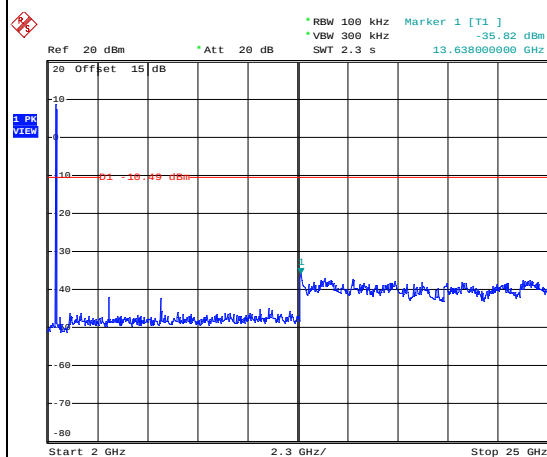
Date: 30.JUL.2015 00:19:23

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



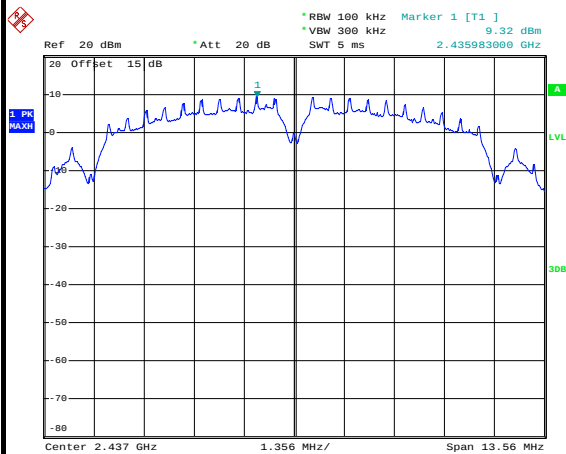
Date: 30.JUL.2015 00:20:35



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

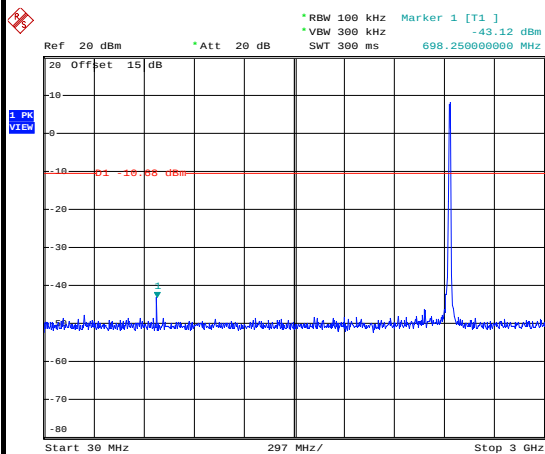
WLAN 802.11b Channel 06

100kHz PSD reference Level



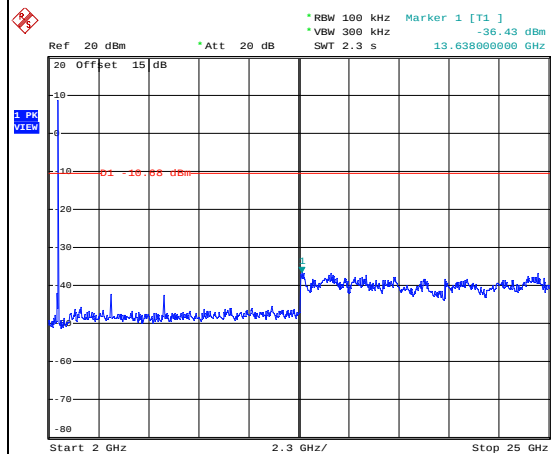
Date: 30.JUL.2015 00:23:06

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



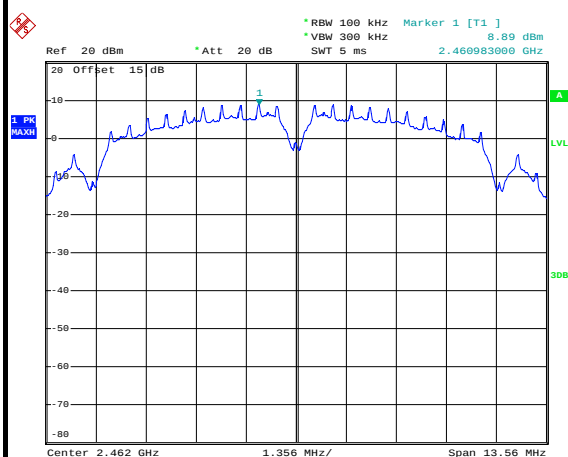
Date: 30.JUL.2015 00:23:58



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

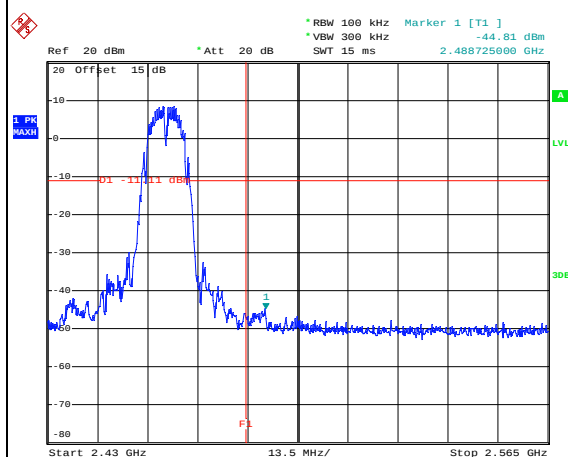
WLAN 802.11b Channel 11

100kHz PSD reference Level



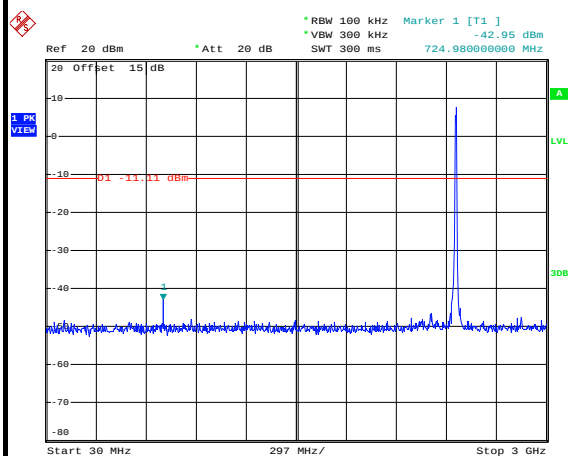
Date: 30.JUL.2015 00:26:34

High Channel Plot



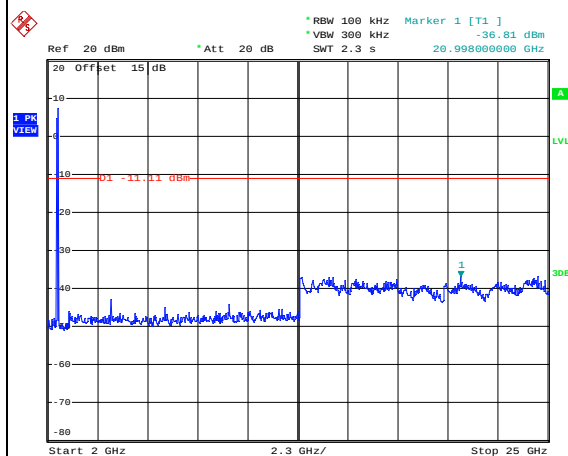
Date: 30.JUL.2015 00:28:03

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



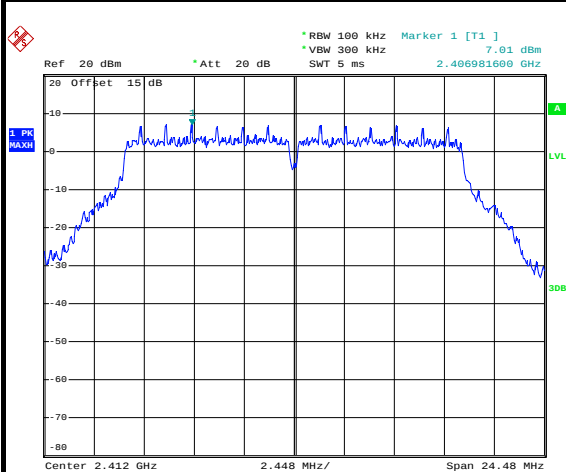
Date: 30.JUL.2015 00:27:45



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

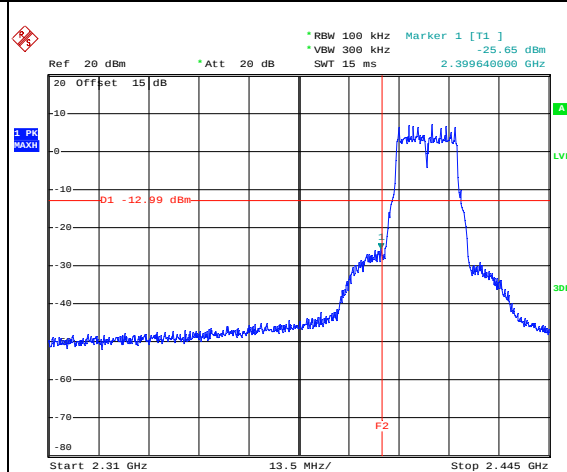
WLAN 802.11g Channel 01

100kHz PSD reference Level



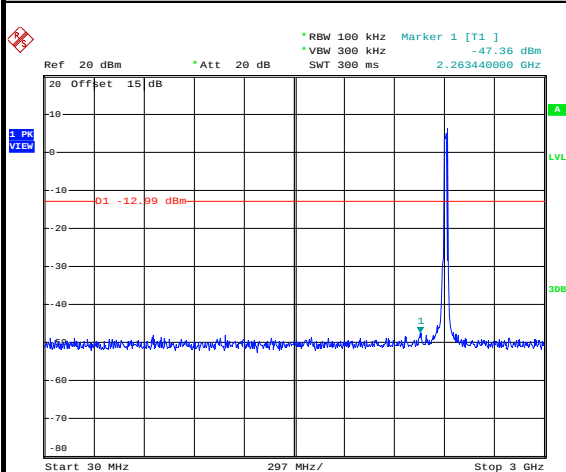
Date: 30.JUL.2015 00:45:16

Low Channel Plot



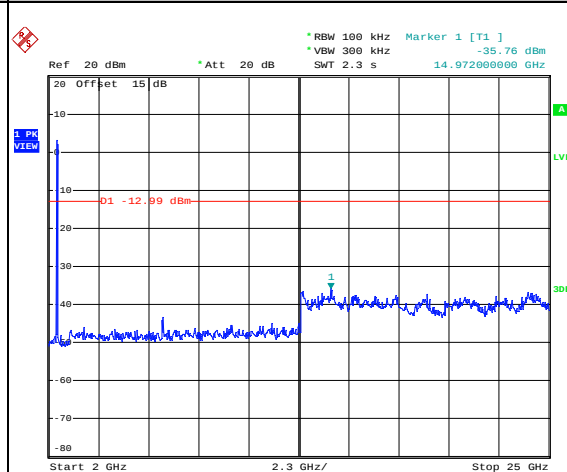
Date: 30.JUL.2015 00:45:52

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



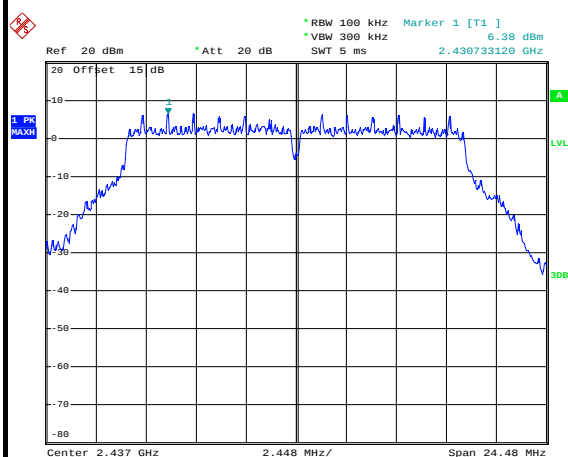
Date: 30.JUL.2015 00:47:16



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

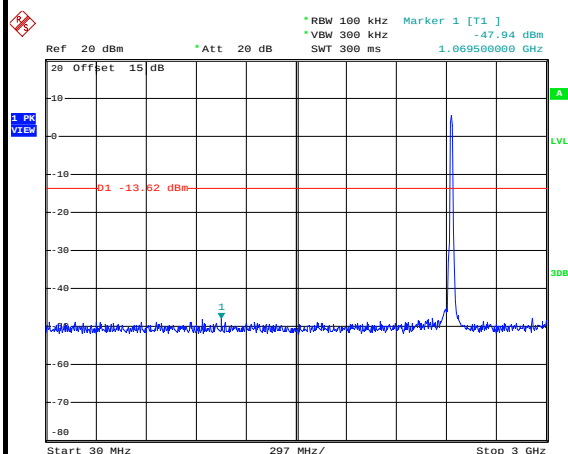
WLAN 802.11g Channel 06

100kHz PSD reference Level



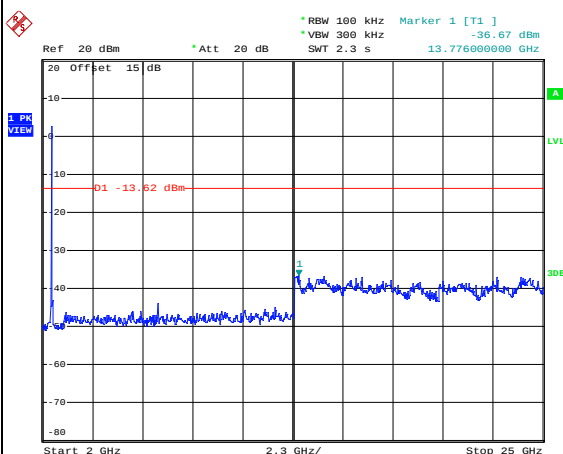
Date: 30.JUL.2015 00:37:25

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



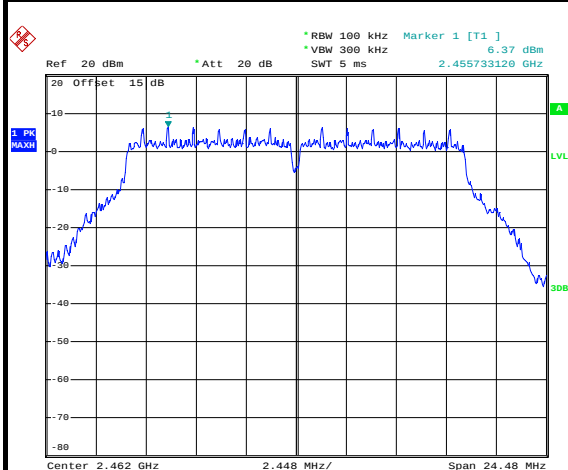
Date: 30.JUL.2015 00:41:40



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

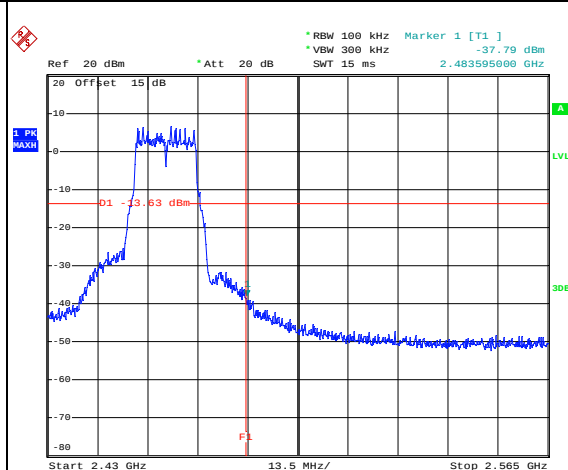
WLAN 802.11g Channel 11

100kHz PSD reference Level



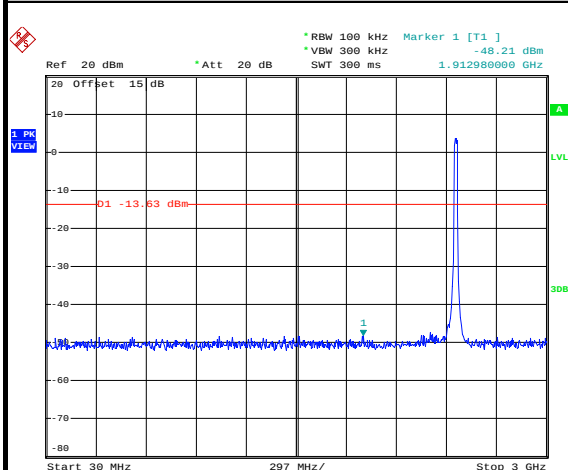
Date: 30.JUL.2015 00:32:12

High Channel Plot



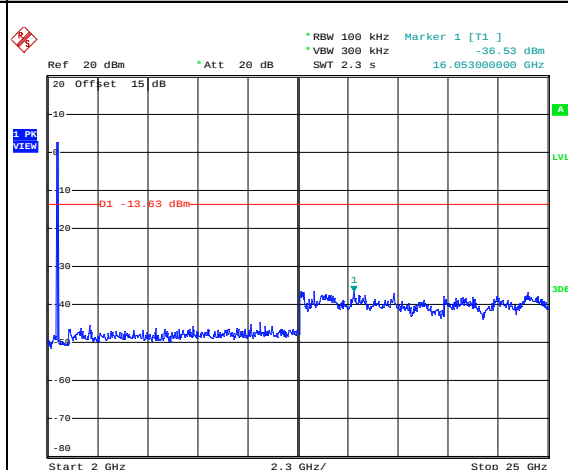
Date: 30.JUL.2015 00:32:31

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



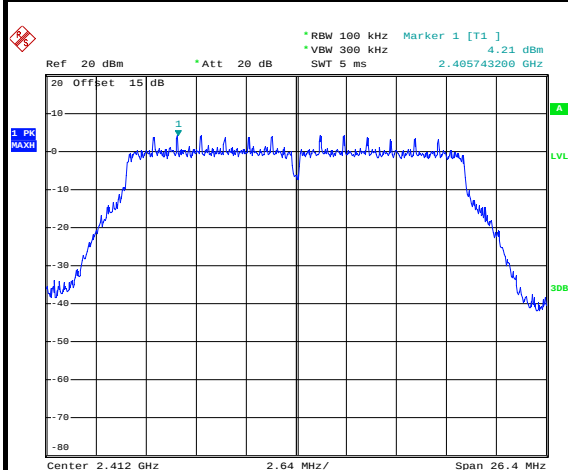
Date: 30.JUL.2015 00:33:29



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

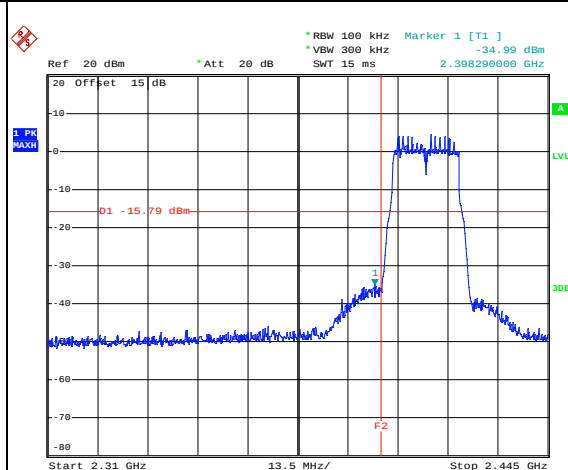
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



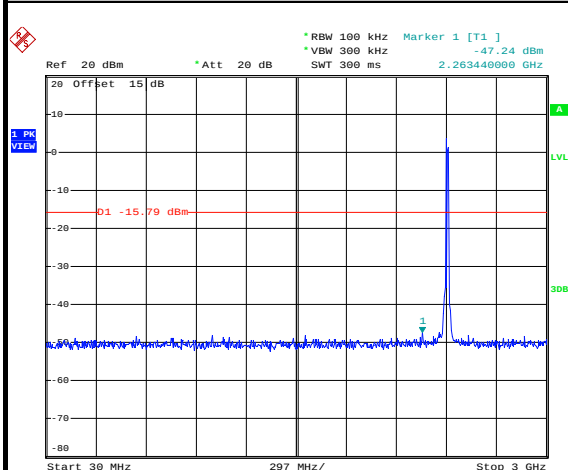
Date: 30.JUL.2015 00:53:16

Low Channel Plot



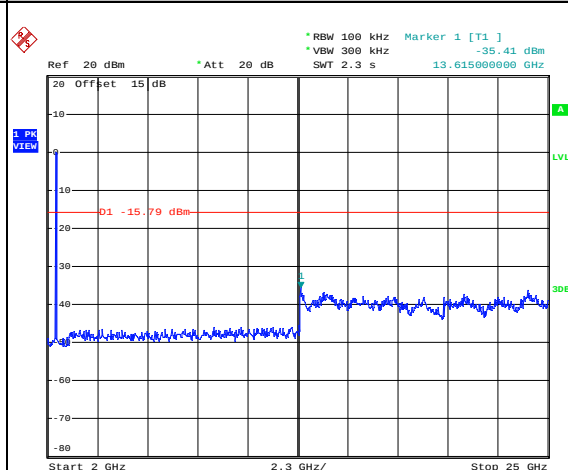
Date: 30.JUL.2015 00:54:38

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



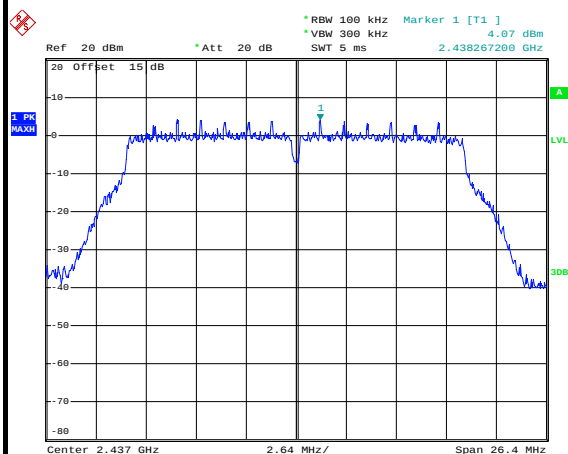
Date: 30.JUL.2015 00:58:24



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

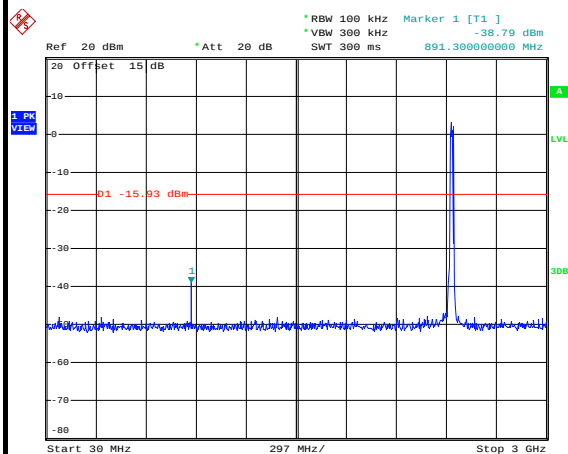
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



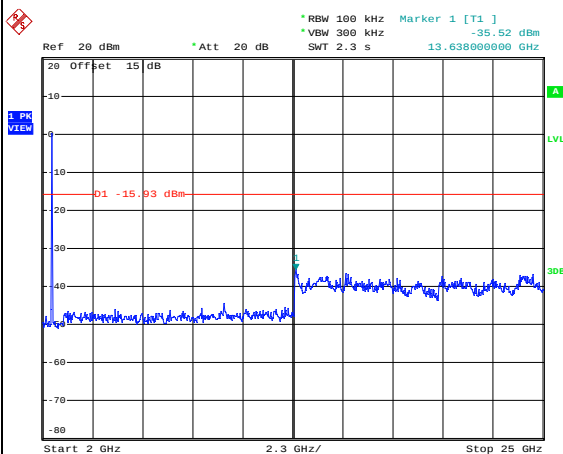
Date: 30.JUL.2015 01:05:18

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



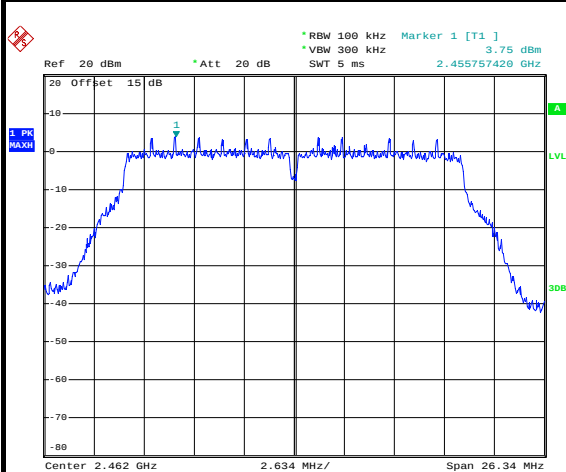
Date: 30.JUL.2015 01:12:41



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

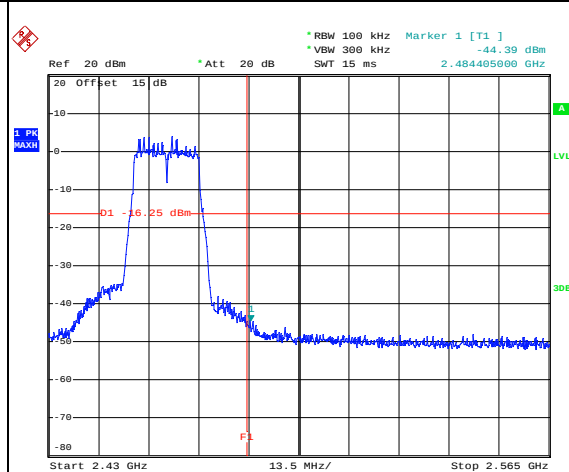
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



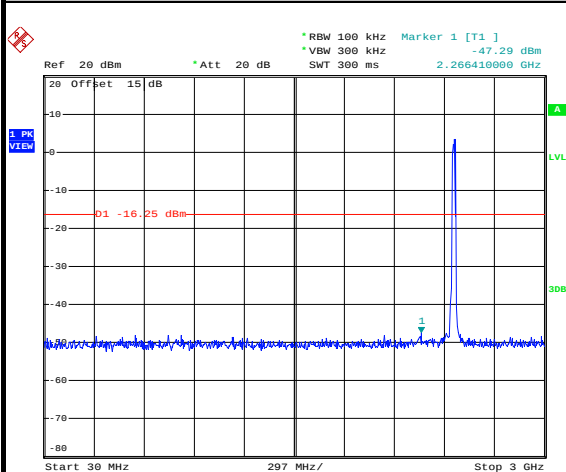
Date: 30.JUL.2015 01:17:40

High Channel Plot



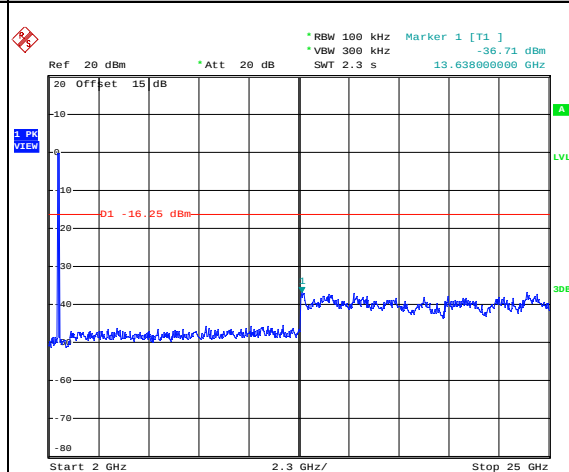
Date: 30.JUL.2015 01:18:08

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



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

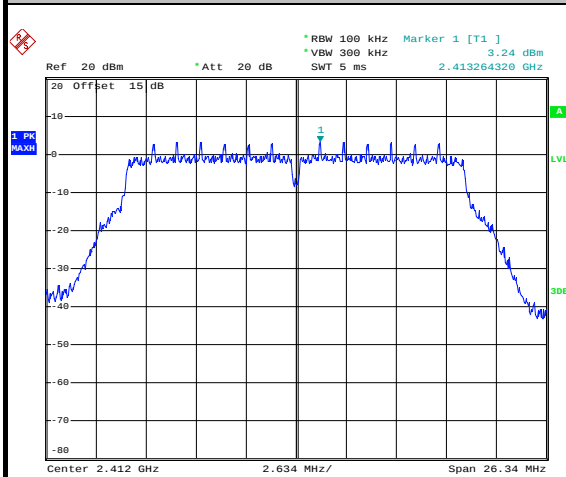


Number of TX = 2, Chain Port 0+1(0) (Measured)

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

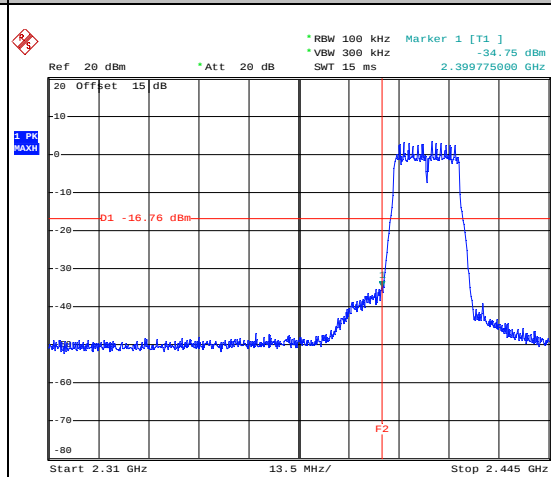
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



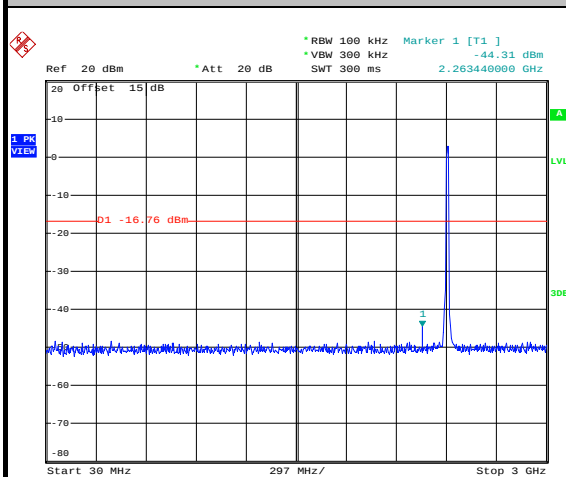
Date: 30.JUL.2015 23:43:26

Low Channel Plot



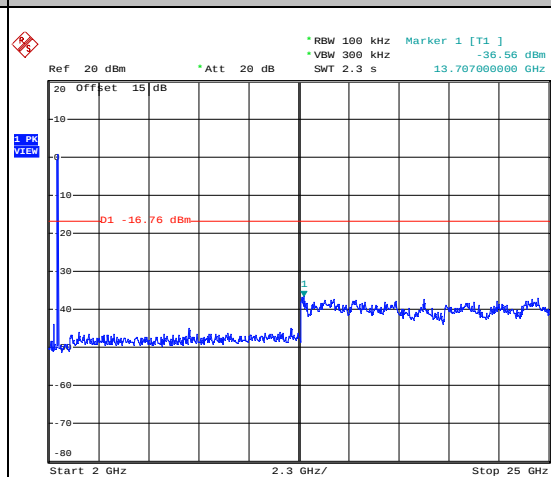
Date: 30.JUL.2015 23:46:14

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



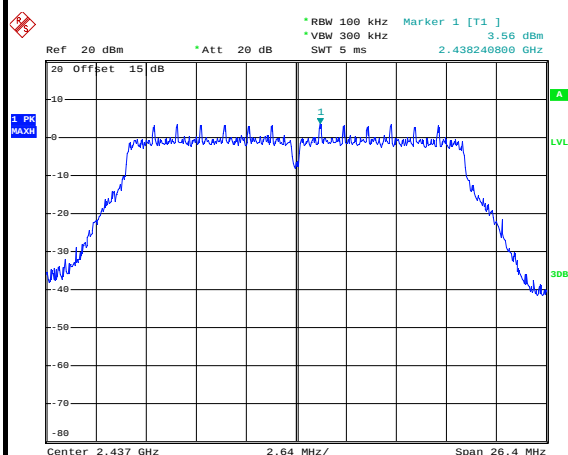
Date: 30.JUL.2015 23:47:21



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

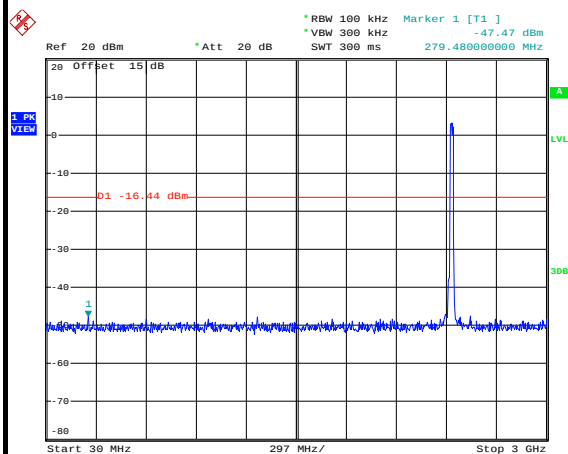
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



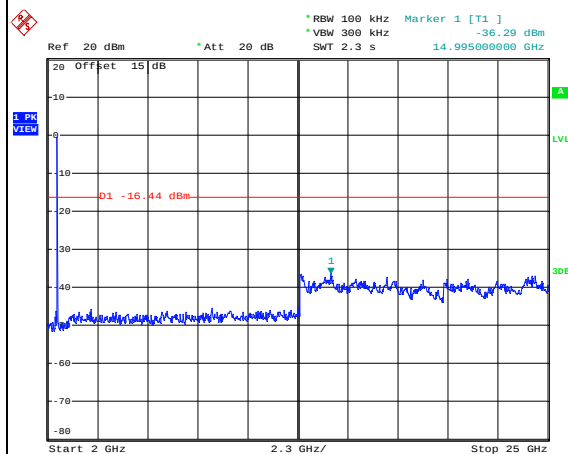
Date: 30.JUL.2015 23:54:04

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



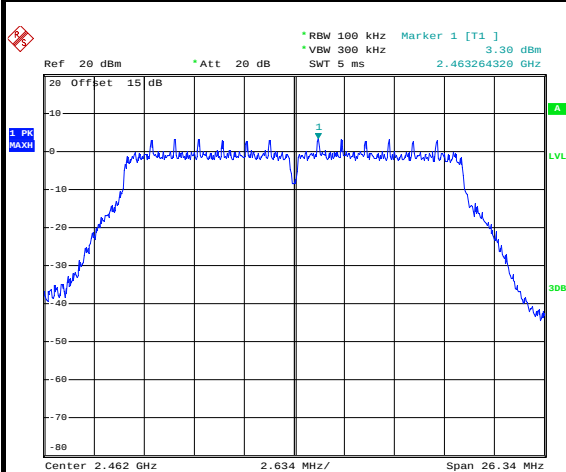
Date: 30.JUL.2015 23:57:20



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

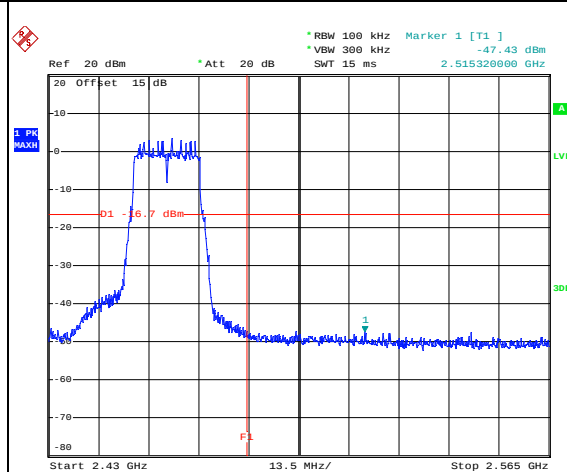
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



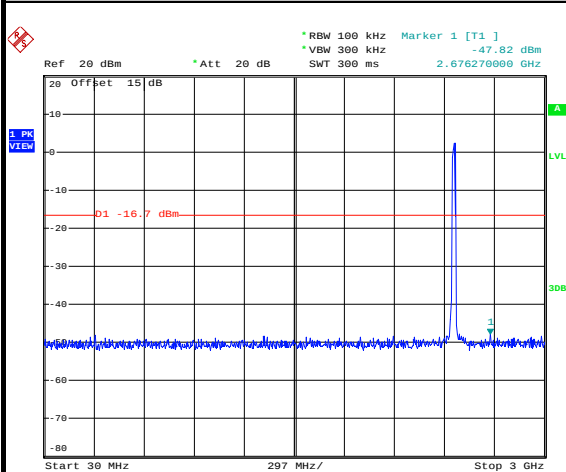
Date: 31.JUL.2015 00:02:22

High Channel Plot



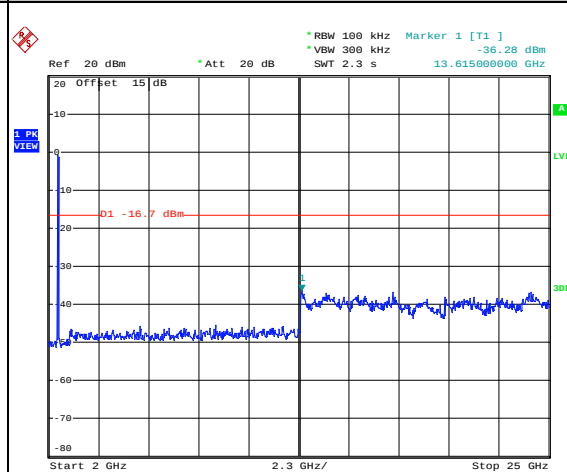
Date: 31.JUL.2015 00:03:32

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



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

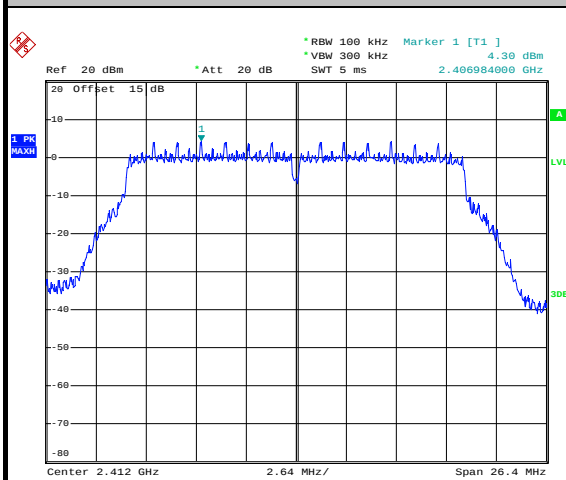


Number of TX = 2, Chain Port 0+1(1) (Measured)

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

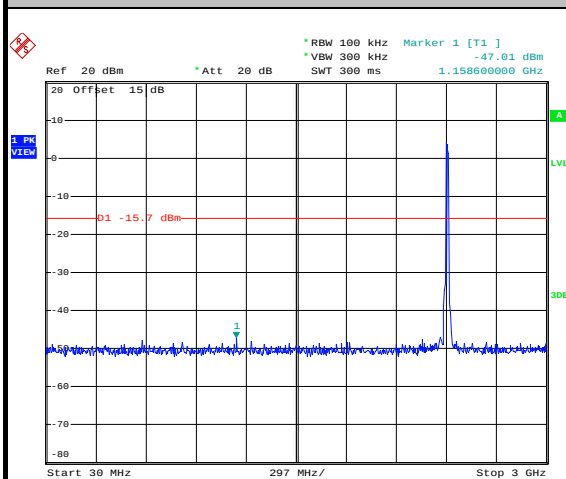
100kHz PSD reference Level



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

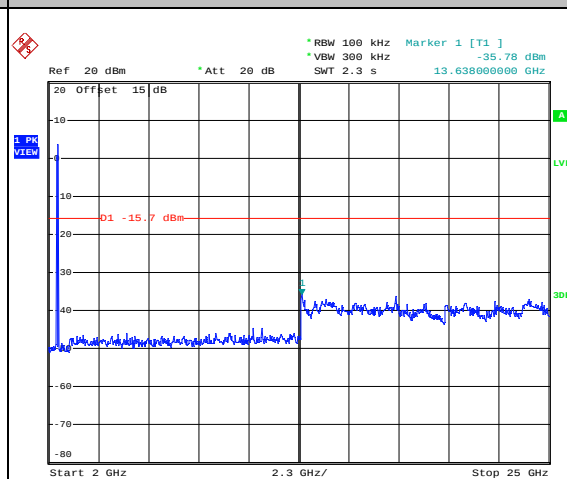
Low Channel Plot

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



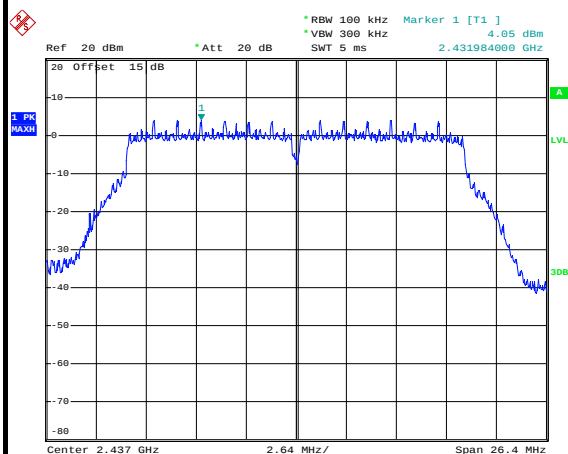
Date: 30.JUL.2015 01:34:31



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

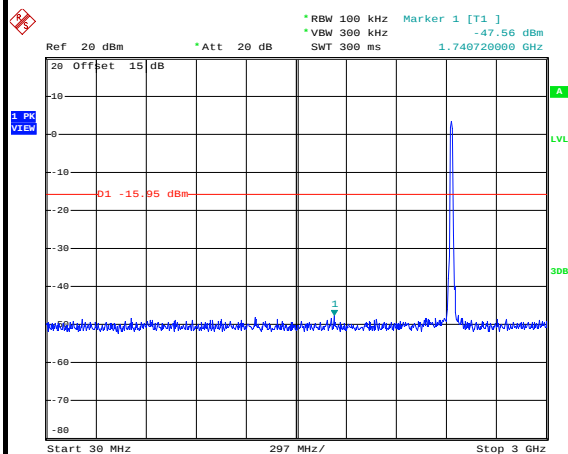
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



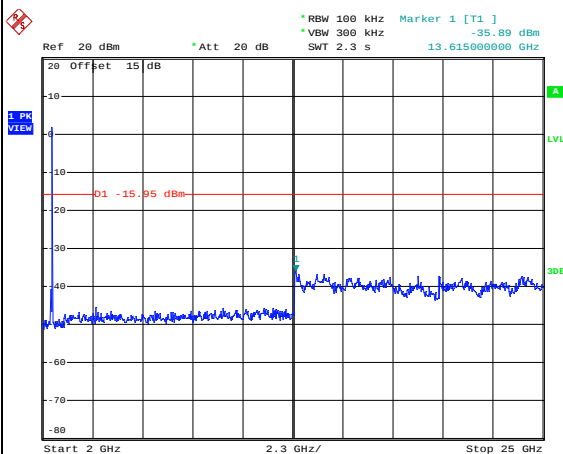
Date: 30.JUL.2015 01:39:00

Spurious Emission 30MHz~3GHz



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

Spurious Emission 2GHz~25GHz



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

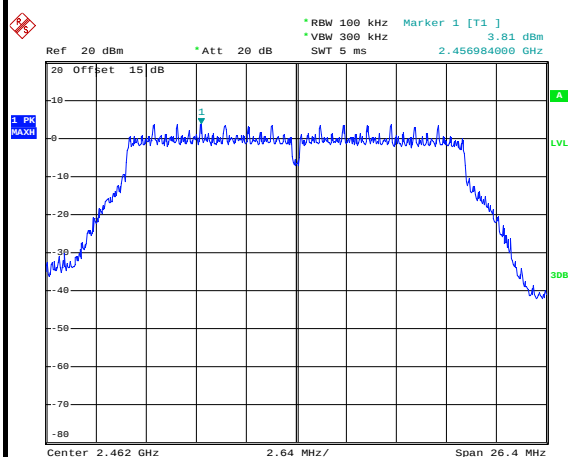


Number of TX :	2	Ant. :	0+1(1)
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Mygai Wang

WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level

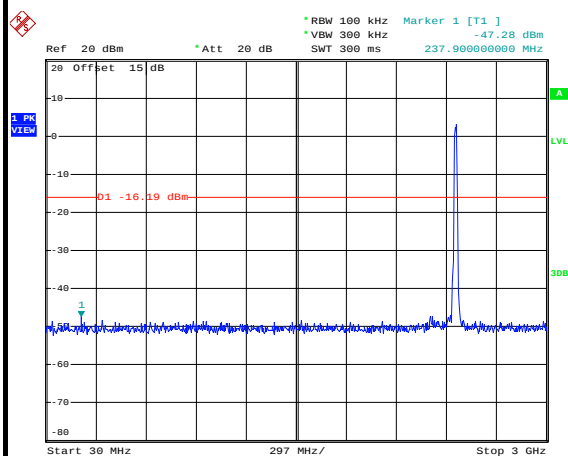
High Channel Plot



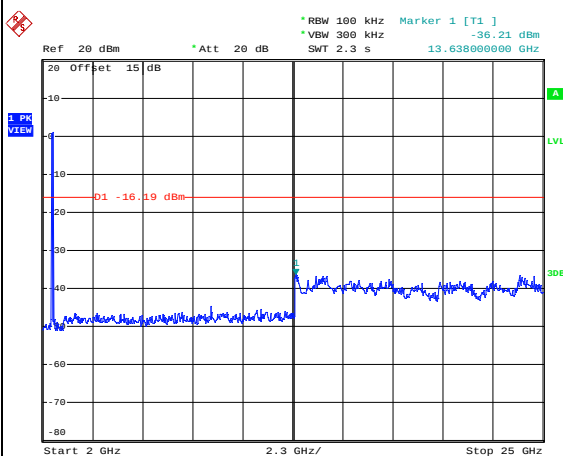
Date: 30.JUL.2015 01:54:49

Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz



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



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.

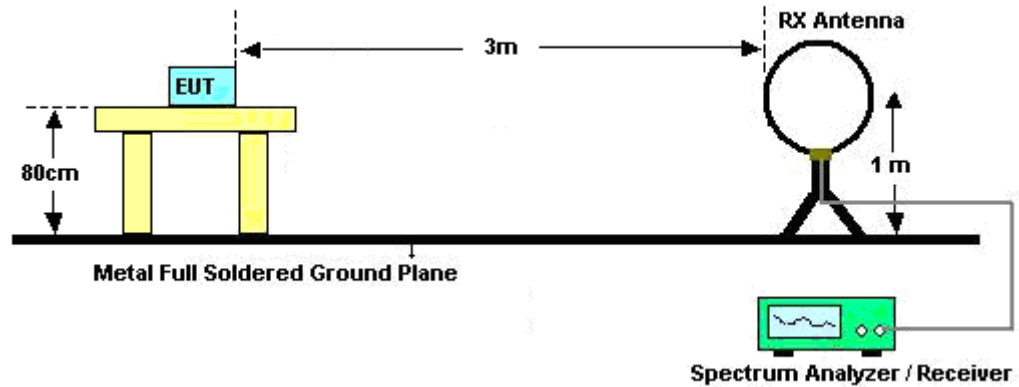
For average measurement:

 - 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.

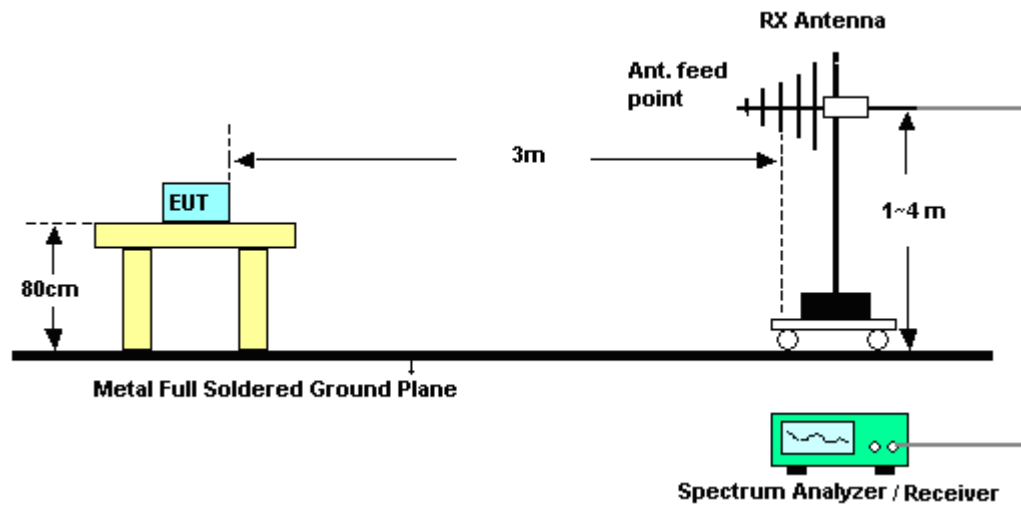
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Ant 0 802.11b	98.86	-	-	10Hz
Ant 1 802.11b	98.86	-	-	10Hz
Ant 0 802.11g	93.64	1.440	0.694	1kHz
Ant 1 802.11g	93.64	1.440	0.694	1kHz
Ant 0+1 802.11n HT20	91.38	0.996	1.004	1kHz

3.5.4 Test Setup

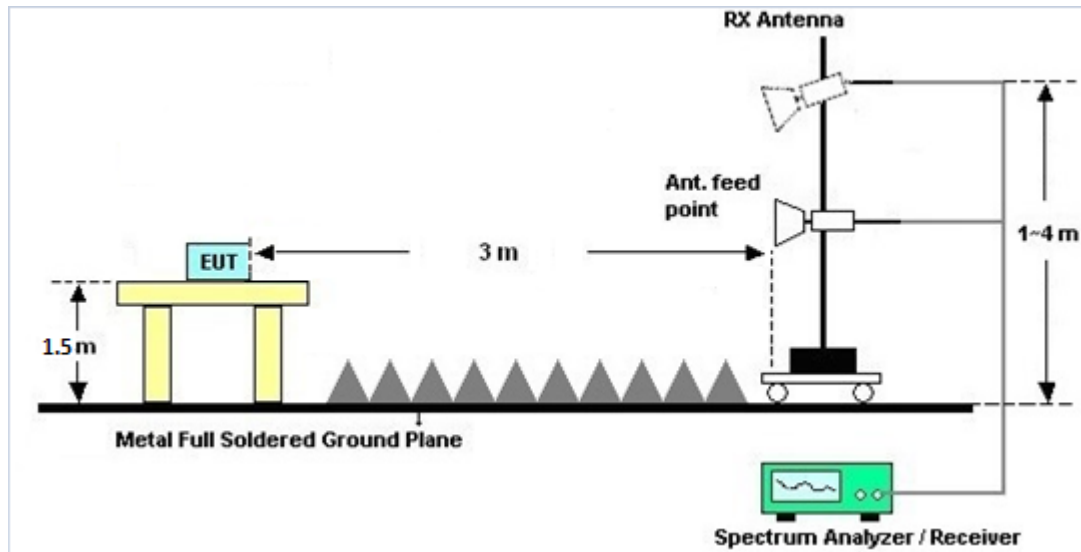
For radiated emissions below 30MHz



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.

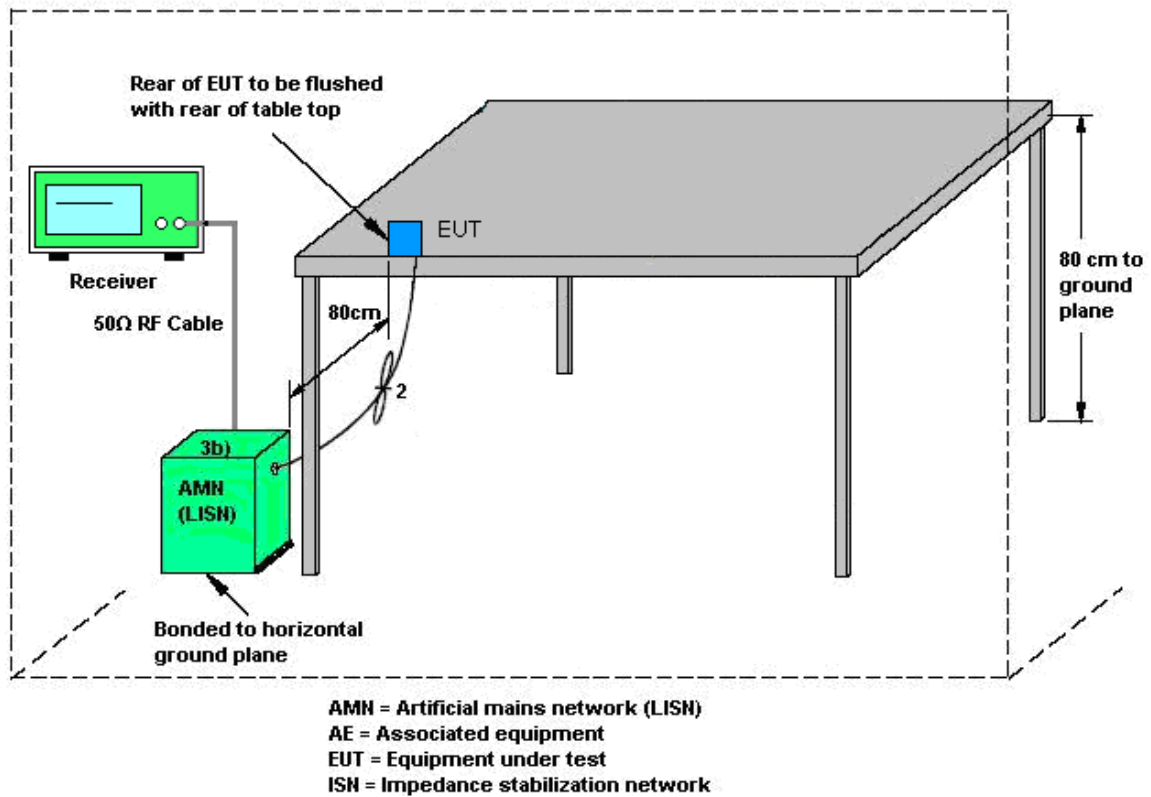
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

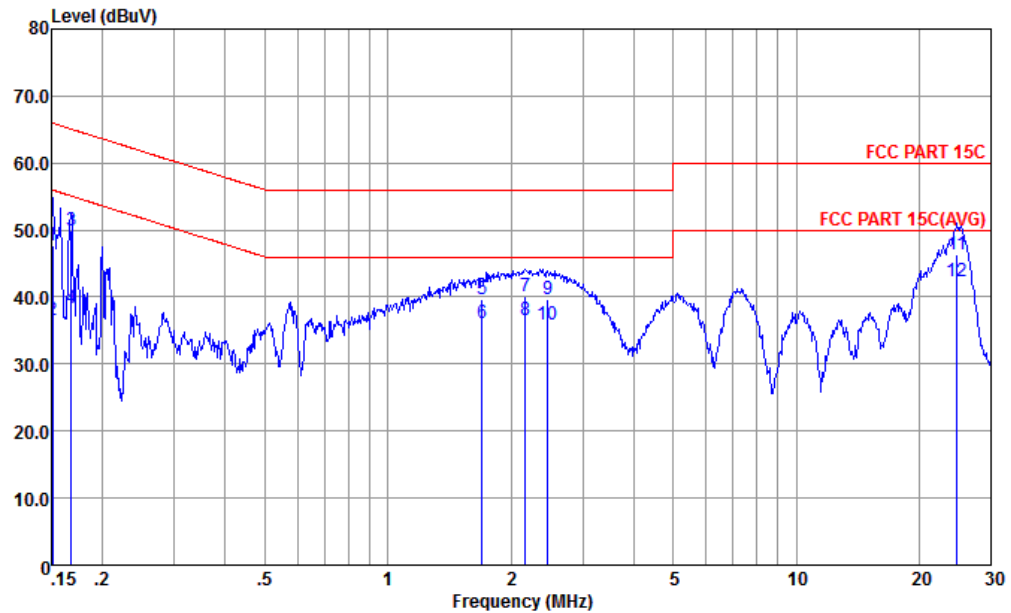
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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 :	Jacky Yang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable 2 (Charging from Adapter) 5.2V + Battery 2 + Sample 2		

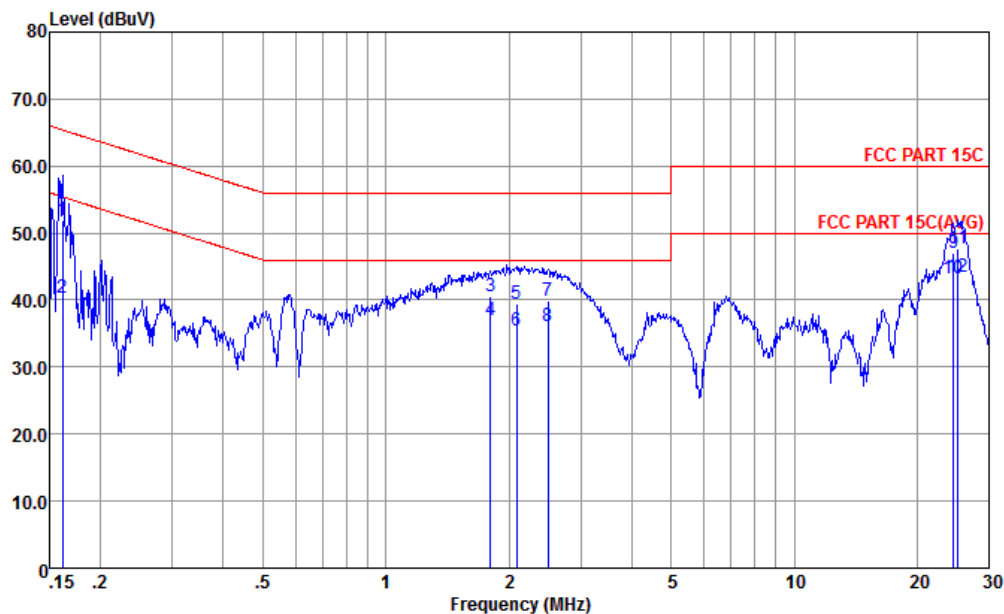


Site : CO01-KS
Condition : FCC PART 15C LISN-L20140306 LINE

mode		: Mode 2						
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	47.61	-18.35	65.96	35.30	1.94	10.37	QP
2	0.15	36.51	-19.45	55.96	24.20	1.94	10.37	Average
3	0.17	49.84	-15.24	65.08	37.80	1.62	10.42	QP
4	0.17	38.24	-16.84	55.08	26.20	1.62	10.42	Average
5	1.70	39.69	-16.31	56.00	28.90	0.10	10.69	QP
6	1.70	35.99	-10.01	46.00	25.20	0.10	10.69	Average
7	2.17	40.21	-15.79	56.00	29.40	0.10	10.71	QP
8	2.17	36.51	-9.49	46.00	25.70	0.10	10.71	Average
9	2.46	39.64	-16.36	56.00	28.80	0.11	10.73	QP
10	2.46	35.94	-10.06	46.00	25.10	0.11	10.73	Average
11	24.79	46.43	-13.57	60.00	35.20	0.10	11.13	QP
12 *	24.79	42.43	-7.57	50.00	31.20	0.10	11.13	Average



Test Mode :	Mode 2	Temperature :	22~24℃
Test Engineer :	Jacky Yang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable 2 (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	0.16	52.01	-13.37	65.38	39.90	1.71	10.40	QP
2	0.16	40.31	-15.07	55.38	28.20	1.71	10.40	Average
3	1.80	40.60	-15.40	56.00	29.80	0.10	10.70	QP
4	1.80	37.00	-9.00	46.00	26.20	0.10	10.70	Average
5	2.09	39.51	-16.49	56.00	28.71	0.10	10.70	QP
6	2.09	35.41	-10.59	46.00	24.61	0.10	10.70	Average
7	2.50	39.95	-16.05	56.00	29.11	0.11	10.73	QP
8	2.50	36.15	-9.85	46.00	25.31	0.11	10.73	Average
9	24.53	47.13	-12.87	60.00	35.80	0.20	11.13	QP
10	24.53	43.23	-6.77	50.00	31.90	0.20	11.13	Average
11	25.19	47.63	-12.37	60.00	36.30	0.20	11.13	QP
12 *	25.19	43.53	-6.47	50.00	32.20	0.20	11.13	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&SA	Agilent Technologies	N9038A	MY522601 85	20Hz~26.5GHz	May 26, 2015	Aug. 05, 2015	May 25, 2016	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSV40	101041	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Aug. 05, 2015	Sep. 24, 2015	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 06, 2015	Aug. 05, 2015	May 05, 2016	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz~2GHz	Nov. 07, 2014	Aug. 05, 2015	Nov. 06, 2015	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-128 5	1GHz~18GHz	Jan. 20, 2015	Aug. 05, 2015	Jan. 19, 2016	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Sep. 04, 2014	Aug. 05, 2015	Sep. 03, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz / 30 dB	Jan. 28, 2015	Aug. 05, 2015	Jan. 27, 2016	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 05, 2015	Aug. 05, 2015	May 04, 2016	Radiation (03CH01-SZ)
Amplifier	Agilent Technologies	83017A	MY395013 02	500MHz~26.5G Hz	Jan. 28, 2015	Aug. 05, 2015	Jan. 27, 2016	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001 985	N/A	NCR	Aug. 05, 2015	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Aug. 05, 2015	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Aug. 05, 2015	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2015	Jul. 24, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Jul. 24, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Jul. 24, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Jul. 24, 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% ($U = 2Uc(y)$)	3.9dB
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Appendix A. Conducted Test Results

Report Number : FR570804-01C

Test Engineer:	Mygai Wang	Temperature:	21~25	℃
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	N _{TX}	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 0	Ant 1	Ant 0	Ant 1		
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	N _{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 0	Ant 1	SUM	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	
11b	1Mbps	1	1	2412	19.17	20.58		30.00	30.00	1.10	1.20	20.27	21.78	36.00	36.00	Pass
11b	1Mbps	1	6	2437	19.13	20.42		30.00	30.00	1.10	1.20	20.23	21.62	36.00	36.00	Pass
11b	1Mbps	1	11	2462	19.25	20.18		30.00	30.00	1.10	1.20	20.35	21.38	36.00	36.00	Pass
11g	6Mbps	1	1	2412	22.81	23.67		30.00	30.00	1.10	1.20	23.91	24.87	36.00	36.00	Pass
11g	6Mbps	1	6	2437	22.73	23.53		30.00	30.00	1.10	1.20	23.83	24.73	36.00	36.00	Pass
11g	6Mbps	1	11	2462	22.75	23.41		30.00	30.00	1.10	1.20	23.85	24.61	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	21.62	22.84	25.28	30.00		4.16		29.44		36.00		Pass
HT20	MCS8	2	6	2437	21.58	22.34	24.99	30.00		4.16		29.15		36.00		Pass
HT20	MCS8	2	11	2462	21.33	22.32	24.86	30.00		4.16		29.02		36.00		Pass

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

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 0	Ant 1	Ant 0	Ant 1	SUM
11b	1Mbps	1	1	2412	0.05	0.05	15.79	17.03	
11b	1Mbps	1	6	2437	0.05	0.05	15.73	16.84	
11b	1Mbps	1	11	2462	0.05	0.05	15.94	16.72	
11g	6Mbps	1	1	2412	0.29	0.29	15.62	16.81	
11g	6Mbps	1	6	2437	0.29	0.29	15.48	16.66	
11g	6Mbps	1	11	2462	0.29	0.29	15.55	16.51	
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	14.05	15.15	17.65
HT20	MCS8	2	6	2437	0.39	0.39	13.97	14.70	17.36
HT20	MCS8	2	11	2462	0.39	0.39	13.94	14.61	17.30

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 0	Ant 1	Worse + 3.01	Ant 0	Ant 1	Ant 0	Ant 1	
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 Spurious Emission

15C 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		2388.03	61.12	-12.88	74	64.1	27.25	4.79	35.02	150	213	P	H
		2389.92	48.99	-5.01	54	51.95	27.25	4.79	35	150	213	A	H
	*	2412	107.03	-	-	109.9	27.31	4.82	35	150	213	P	H
	*	2412	101.53	-	-	104.4	27.31	4.82	35	150	213	A	H
		2388.03	50.25	-23.75	74	53.23	27.25	4.79	35.02	249	59	P	V
		2389.92	39.83	-14.17	54	42.79	27.25	4.79	35	249	59	A	V
	*	2412	98.74	-	-	101.61	27.31	4.82	35	249	59	P	V
	*	2412	93.19	-	-	96.06	27.31	4.82	35	249	59	A	V
802.11b CH 06 2437MHz		2388.75	53.62	-20.38	74	56.6	27.25	4.79	35.02	150	243	P	H
		2389.92	36.11	-17.89	54	39.07	27.25	4.79	35	150	243	A	H
	*	2437	107.06	-	-	109.79	27.42	4.82	34.97	150	243	P	H
	*	2437	101.2	-	-	103.93	27.42	4.82	34.97	150	243	A	H
		2484.72	52.86	-21.14	74	55.39	27.54	4.85	34.92	150	243	P	H
		2483.52	34.12	-19.88	54	36.65	27.54	4.85	34.92	150	243	A	H
		2380.83	44.45	-29.55	74	47.49	27.19	4.79	35.02	159	120	P	V
		2382.54	29.16	-24.84	54	32.2	27.19	4.79	35.02	159	120	A	V
	*	2437	100.85	-	-	103.58	27.42	4.82	34.97	159	120	P	V
	*	2437	95.04	-	-	97.77	27.42	4.82	34.97	159	120	A	V
		2483.68	45.15	-28.85	74	47.68	27.54	4.85	34.92	159	120	P	V
		2483.52	29.11	-24.89	54	31.64	27.54	4.85	34.92	159	120	A	V



802.11b CH 11 2462MHz	*	2462	107.2	-	-	109.82	27.48	4.85	34.95	177	207	P	H
	*	2462	101.26	-	-	103.88	27.48	4.85	34.95	177	207	A	H
		2484.88	60.02	-13.98	74	62.55	27.54	4.85	34.92	177	207	P	H
		2486.36	45.64	-8.36	54	48.17	27.54	4.85	34.92	177	207	A	H
	*	2462	104.43	-	-	107.05	27.48	4.85	34.95	239	135	P	V
	*	2462	98.82	-	-	101.44	27.48	4.85	34.95	239	135	A	V
		2485	56.87	-17.13	74	59.4	27.54	4.85	34.92	239	135	P	V
		2486.36	43.05	-10.95	54	45.58	27.54	4.85	34.92	239	135	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz
WIFI 802.11b (Harmonic @ 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		4824	43.12	-30.88	74	38.94	31.05	6.97	33.84	150	360	P	H
		4824	44.05	-29.95	74	39.87	31.05	6.97	33.84	150	360	P	V
802.11b CH 06 2437MHz		4874	43.57	-30.43	74	64.12	31.12	6.99	58.66	150	360	P	H
		7311	49.82	-24.18	74	64.26	35.96	8.22	58.62	174	100	P	H
		4874	43.32	-30.68	74	63.87	31.12	6.99	58.66	150	360	P	V
		7311	49.65	-24.35	74	64.09	35.96	8.22	58.62	174	100	P	V
802.11b CH 11 2462MHz		4924	43.39	-30.61	74	39	31.19	7	33.8	150	360	P	H
		7386	49.63	-24.37	74	39.33	36.08	8.27	34.05	145	274	P	H
		4924	43.02	-30.98	74	38.63	31.19	7	33.8	150	360	P	V
		7386	48.8	-25.2	74	38.5	36.08	8.27	34.05	145	274	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz
WIFI 802.11g (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)
802.11g CH 01 2412MHz		2386.41	60.47	-13.53	74	63.45	27.25	4.79	35.02	150	242	P	H
		2389.92	44.8	-9.2	54	47.76	27.25	4.79	35	150	242	A	H
	*	2412	106.61	-	-	109.48	27.31	4.82	35	150	242	P	H
	*	2412	96.32	-	-	99.19	27.31	4.82	35	150	242	A	H
		2386.77	50.79	-23.21	74	53.77	27.25	4.79	35.02	150	112	P	V
		2389.74	35.88	-18.12	54	38.86	27.25	4.79	35.02	150	112	A	V
	*	2412	97.81	-	-	100.68	27.31	4.82	35	150	112	P	V
	*	2412	87.12	-	-	89.99	27.31	4.82	35	150	112	A	V
802.11g CH 06 2437MHz		2389.74	54.2	-19.8	74	57.18	27.25	4.79	35.02	151	245	P	H
		2389.92	41.45	-12.55	54	44.41	27.25	4.79	35	151	245	A	H
	*	2437	107.23	-	-	109.96	27.42	4.82	34.97	151	245	P	H
	*	2437	96.77	-	-	99.5	27.42	4.82	34.97	151	245	A	H
		2485.96	52.71	-21.29	74	55.24	27.54	4.85	34.92	151	245	P	H
		2483.6	39.36	-14.64	54	41.89	27.54	4.85	34.92	151	245	A	H
		2386.05	46	-28	74	48.98	27.25	4.79	35.02	171	117	P	V
		2389.92	32.32	-21.68	54	35.28	27.25	4.79	35	171	117	A	V
	*	2437	99	-	-	101.73	27.42	4.82	34.97	171	117	P	V
	*	2437	88.64	-	-	91.37	27.42	4.82	34.97	171	117	A	V
		2489.32	46.54	-27.46	74	48.97	27.6	4.89	34.92	171	117	P	V
		2483.6	31.75	-22.25	54	34.28	27.54	4.85	34.92	171	117	A	V



802.11g CH 11 2462MHz	*	2462	107.74	-	-	110.36	27.48	4.85	34.95	203	204	P	H
	*	2462	97.41	-	-	100.03	27.48	4.85	34.95	203	204	A	H
		2483.68	66.36	-7.64	74	68.89	27.54	4.85	34.92	203	204	P	H
		2483.56	47.58	-6.42	54	50.11	27.54	4.85	34.92	203	204	A	H
	*	2462	104.25	-	-	106.87	27.48	4.85	34.95	246	135	P	V
	*	2462	93.98	-	-	96.6	27.48	4.85	34.95	246	135	A	V
		2483.52	62.34	-11.66	74	64.87	27.54	4.85	34.92	246	135	P	V
		2483.72	43.85	-10.15	54	46.38	27.54	4.85	34.92	246	135	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 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)
802.11g CH 01 2412MHz		4824	43.61	-30.39	74	63.98	31.05	6.97	58.39	150	360	P	H
		4824	42.98	-31.02	74	63.35	31.05	6.97	58.39	150	360	P	V
802.11g CH 06 2437MHz		4874	42.8	-31.2	74	63.35	31.12	6.99	58.66	150	360	P	H
		7311	47.16	-26.84	74	61.6	35.96	8.22	58.62	174	100	P	H
		4874	42.48	-31.52	74	63.03	31.12	6.99	58.66	150	360	P	V
		7311	47.28	-26.72	74	61.72	35.96	8.22	58.62	174	100	P	V
802.11g CH 11 2462MHz		4924	43.65	-30.35	74	63.98	31.19	7	58.52	150	360	P	H
		7386	46.75	-27.25	74	60.94	36.08	8.27	58.54	145	274	P	H
		4924	43.59	-30.41	74	63.92	31.19	7	58.52	150	360	P	V
		7386	48.19	-25.81	74	62.38	36.08	8.27	58.54	145	274	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 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		2389.74	58.35	-15.65	74	61.33	27.25	4.79	35.02	151	298	P	H
		2389.92	48.06	-5.94	54	51.02	27.25	4.79	35	151	298	A	H
	*	2412	106.06	-	-	108.93	27.31	4.82	35	151	298	P	H
	*	2412	100.34	-	-	103.21	27.31	4.82	35	151	298	A	H
		2380.74	45.98	-28.02	74	49.02	27.19	4.79	35.02	175	328	P	V
		2389.92	34.48	-19.52	54	37.44	27.25	4.79	35	175	328	A	V
	*	2412	94.49	-	-	97.36	27.31	4.82	35	175	328	P	V
	*	2412	88.75	-	-	91.62	27.31	4.82	35	175	328	A	V
802.11b CH 06 2437MHz		2383.71	53.76	-20.24	74	56.8	27.19	4.79	35.02	150	108	P	H
		2389.92	35.46	-18.54	54	38.42	27.25	4.79	35	150	108	A	H
	*	2437	107.06	-	-	109.79	27.42	4.82	34.97	150	108	P	H
	*	2437	101.33	-	-	104.06	27.42	4.82	34.97	150	108	A	H
		2484.56	56.29	-17.71	74	58.82	27.54	4.85	34.92	150	108	P	H
		2483.52	38.47	-15.53	54	41	27.54	4.85	34.92	150	108	A	H
		2389.74	49.44	-24.56	74	52.42	27.25	4.79	35.02	155	86	P	V
		2363.82	29.72	-24.28	54	32.9	27.13	4.74	35.05	155	86	A	V
	*	2437	100.66	-	-	103.39	27.42	4.82	34.97	155	86	P	V
	*	2437	94.93	-	-	97.66	27.42	4.82	34.97	155	86	A	V
		2484.8	49.71	-24.29	74	52.24	27.54	4.85	34.92	155	86	P	V
		2483.6	32.23	-21.77	54	34.76	27.54	4.85	34.92	155	86	A	V



802.11b CH 11 2462MHz	*	2462	107	-	-	109.62	27.48	4.85	34.95	150	297	P	H
	*	2462	101.27	-	-	103.89	27.48	4.85	34.95	150	297	A	H
		2484.84	60.77	-13.23	74	63.3	27.54	4.85	34.92	150	297	P	H
		2483.52	48.11	-5.89	54	50.64	27.54	4.85	34.92	150	297	A	H
	*	2462	95	-	-	97.62	27.48	4.85	34.95	160	329	P	V
	*	2462	89.38	-	-	92	27.48	4.85	34.95	160	329	A	V
		2485.32	48.75	-25.25	74	51.28	27.54	4.85	34.92	160	329	P	V
		2488.12	36.28	-17.72	54	38.75	27.6	4.85	34.92	160	329	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz
WIFI 802.11b (Harmonic @ 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		4824	48.33	-25.67	74	44.15	31.05	6.97	33.84	150	360	P	H
		4824	44.03	-29.97	74	39.85	31.05	6.97	33.84	150	360	P	V
802.11b CH 06 2437MHz		4874	54.65	-19.35	74	75.2	31.12	6.99	58.66	150	253	P	H
		4874	50.7	-3.3	54	71.25	31.12	6.99	58.66	150	253	A	H
		7311	55.94	-18.06	74	70.38	35.96	8.22	58.62	155	260	P	H
		7311	50.22	-3.78	54	64.66	35.96	8.22	58.62	155	260	A	H
		4874	46.98	-27.02	74	67.53	31.12	6.99	58.66	150	360	P	V
		7311	55.19	-18.81	74	69.63	35.96	8.22	58.62	150	141	P	V
802.11b CH 11 2462MHz		7311	49.71	-4.29	54	64.15	35.96	8.22	58.62	150	141	A	V
		4924	50.77	-23.23	74	46.38	31.19	7	33.8	150	360	P	H
		7386	54.71	-19.29	74	44.41	36.08	8.27	34.05	150	280	P	H
		7386	46.44	-7.56	54	36.14	36.08	8.27	34.05	150	280	A	H
		4924	45.75	-28.25	74	41.36	31.19	7	33.8	150	360	P	V
		7386	55.8	-18.2	74	45.5	36.08	8.27	34.05	221	265	P	V
Remark		7386	49.02	-4.98	54	38.72	36.08	8.27	34.05	221	265	A	V
	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz
WIFI 802.11g (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)
802.11g CH 01 2412MHz		2389.56	66.67	-7.33	74	69.65	27.25	4.79	35.02	172	299	P	H
		2389.92	48.96	-5.04	54	51.92	27.25	4.79	35	172	299	A	H
	*	2412	106.63	-	-	109.5	27.31	4.82	35	172	299	P	H
	*	2412	96.1	-	-	98.97	27.31	4.82	35	172	299	A	H
		2389.65	51.87	-22.13	74	54.85	27.25	4.79	35.02	171	328	P	V
		2389.92	35.27	-18.73	54	38.23	27.25	4.79	35	171	328	A	V
	*	2412	94.86	-	-	97.73	27.31	4.82	35	171	328	P	V
	*	2412	84.19	-	-	87.06	27.31	4.82	35	171	328	A	V
802.11g CH 06 2437MHz		2389.29	56.24	-17.76	74	59.22	27.25	4.79	35.02	150	114	P	H
		2388.3	43.03	-10.97	54	46.01	27.25	4.79	35.02	150	114	A	H
	*	2437	109.28	-	-	112.01	27.42	4.82	34.97	150	114	P	H
	*	2437	98.96	-	-	101.69	27.42	4.82	34.97	150	114	A	H
		2488.24	58.39	-15.61	74	60.82	27.6	4.89	34.92	150	114	P	H
		2483.52	45.47	-8.53	54	48	27.54	4.85	34.92	150	114	A	H
		2389.02	49.05	-24.95	74	52.03	27.25	4.79	35.02	235	100	P	V
		2389.56	36.14	-17.86	54	39.12	27.25	4.79	35.02	235	100	A	V
	*	2437	103.26	-	-	105.99	27.42	4.82	34.97	235	100	P	V
	*	2437	92.56	-	-	95.29	27.42	4.82	34.97	235	100	A	V
		2488.12	53.9	-20.1	74	56.37	27.6	4.85	34.92	235	100	P	V
		2485.24	37.91	-16.09	54	40.44	27.54	4.85	34.92	235	100	A	V



802.11g CH 11 2462MHz	*	2462	107.81	-	-	110.43	27.48	4.85	34.95	177	298	P	H
	*	2462	97.52	-	-	100.14	27.48	4.85	34.95	177	298	A	H
		2483.56	67.3	-6.7	74	69.83	27.54	4.85	34.92	177	298	P	H
		2483.52	49.95	-4.05	54	52.48	27.54	4.85	34.92	177	298	A	H
	*	2462	96.16	-	-	98.78	27.48	4.85	34.95	160	328	P	V
	*	2462	85.52	-	-	88.14	27.48	4.85	34.95	160	328	A	V
		2483.6	56.42	-17.58	74	58.95	27.54	4.85	34.92	160	328	P	V
		2483.52	35.48	-18.52	54	38.01	27.54	4.85	34.92	160	328	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 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)
802.11g CH 01 2412MHz		4824	47.88	-26.12	74	68.25	31.05	6.97	58.39	150	360	P	H
		4824	44.34	-29.66	74	64.71	31.05	6.97	58.39	150	360	P	V
802.11g CH 06 2437MHz		4874	49.47	-24.53	74	70.02	31.12	6.99	58.66	150	360	P	H
		7311	57.28	-16.72	74	71.72	35.96	8.22	58.62	150	259	P	H
		7311	42.62	-11.38	54	57.06	35.96	8.22	58.62	150	259	A	H
		4874	43.73	-30.27	74	64.28	31.12	6.99	58.66	150	360	P	V
		7311	56.65	-17.35	74	71.09	35.96	8.22	58.62	150	141	P	V
		7311	41.6	-12.4	54	56.04	35.96	8.22	58.62	150	141	A	V
802.11g CH 11 2462MHz		4932	50.3	-23.7	74	70.61	31.19	7.02	58.52	150	360	P	H
		7386	57.44	-16.56	74	71.63	36.08	8.27	58.54	250	259	P	H
		7386	42.68	-11.32	54	56.87	36.08	8.27	58.54	250	259	A	H
		4924	44.24	-29.76	74	64.57	31.19	7	58.52	150	360	P	V
		7386	56.81	-17.19	74	71	36.08	8.27	58.54	150	140	P	V
		7386	42.38	-11.62	54	56.57	36.08	8.27	58.54	150	140	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



15C 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		45.52	28.37	-11.63	40	50.04	10.72	1	33.39	150	210	P	H
		137.67	25.1	-18.4	43.5	45.37	11.47	1.53	33.27			P	H
		177.44	26.16	-17.34	43.5	47.19	10.59	1.57	33.19			P	H
		275.41	25.77	-20.23	46	44.11	12.9	1.83	33.07			P	H
		393.75	25.8	-20.2	46	40.13	16.34	2.12	32.79			P	H
		484.93	28.1	-17.9	46	40.64	17.68	2.31	32.53			P	H
		45.52	34.82	-5.18	40	56.49	10.72	1	33.39	150	110	P	V
		76.56	26.48	-13.52	40	49.98	8.74	1.14	33.38			P	V
		165.8	25.43	-18.07	43.5	46.26	10.85	1.53	33.21			P	V
		241.46	31.7	-14.3	46	51.37	11.64	1.8	33.11			P	V
		345.25	30.06	-15.94	46	45.91	15.03	2.04	32.92			P	V
		414.12	27.12	-18.88	46	40.94	16.7	2.22	32.74			P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (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+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		2389.65	63.79	-10.21	74	66.77	27.25	4.79	35.02	172	216	P	H
		2389.92	49.85	-4.15	54	52.81	27.25	4.79	35	172	216	A	H
	*	2412	107.87	-	-	110.74	27.31	4.82	35	172	216	P	H
	*	2412	97.36	-	-	100.23	27.31	4.82	35	172	216	A	H
		2389.83	61.88	-12.12	74	64.84	27.25	4.79	35	249	136	P	V
		2389.56	46.13	-7.87	54	49.11	27.25	4.79	35.02	249	136	A	V
	*	2412	104.81	-	-	107.68	27.31	4.82	35	249	136	P	V
	*	2412	93.62	-	-	96.49	27.31	4.82	35	249	136	A	V
802.11n HT20 CH 06 2437MHz		2386.23	52.36	-21.64	74	55.34	27.25	4.79	35.02	150	300	P	H
		2388.84	40.42	-13.58	54	43.4	27.25	4.79	35.02	150	300	A	H
	*	2437	107.99	-	-	110.72	27.42	4.82	34.97	150	300	P	H
	*	2437	96.97	-	-	99.7	27.42	4.82	34.97	150	300	A	H
		2487.48	56.42	-17.58	74	58.95	27.54	4.85	34.92	150	300	P	H
		2486.92	42.59	-11.41	54	45.12	27.54	4.85	34.92	150	300	A	H
		2387.76	44.16	-29.84	74	47.14	27.25	4.79	35.02	210	295	P	V
		2389.74	31.77	-22.23	54	34.75	27.25	4.79	35.02	210	295	A	V
	*	2437	99.67	-	-	102.4	27.42	4.82	34.97	210	295	P	V
	*	2437	87.9	-	-	90.63	27.42	4.82	34.97	210	295	A	V
		2488.96	47.42	-26.58	74	49.85	27.6	4.89	34.92	210	295	P	V
		2487.04	34.72	-19.28	54	37.25	27.54	4.85	34.92	210	295	A	V



802.11n HT20 CH 11 2462MHz	*	2462	108.85	-	-	111.47	27.48	4.85	34.95	155	296	P	H
	*	2462	97.34	-	-	99.96	27.48	4.85	34.95	155	296	A	H
		2483.56	67.22	-6.78	74	69.75	27.54	4.85	34.92	155	296	P	H
		2483.56	49.42	-4.58	54	51.95	27.54	4.85	34.92	155	296	A	H
	*	2462	104.75	-	-	107.37	27.48	4.85	34.95	239	135	P	V
	*	2462	93.84	-	-	96.46	27.48	4.85	34.95	239	135	A	V
		2483.72	63.26	-10.74	74	65.79	27.54	4.85	34.92	239	135	P	V
		2483.52	45.48	-8.52	54	48.01	27.54	4.85	34.92	239	135	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 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+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		4824	45.75	-28.25	74	66.12	31.05	6.97	58.39	150	360	P	H
		4824	42.77	-31.23	74	63.14	31.05	6.97	58.39	150	360	P	V
802.11n HT20 CH 06 2437MHz		4874	47.54	-26.46	74	68.09	31.12	6.99	58.66	150	360	P	H
		7311	53.92	-20.08	74	68.36	35.96	8.22	58.62	163	257	P	H
		7311	41.21	-12.79	54	55.65	35.96	8.22	58.62	163	257	A	H
		4874	43.37	-30.63	74	63.92	31.12	6.99	58.66	150	360	P	V
		7311	50.31	-23.69	74	64.75	35.96	8.22	58.62	174	100	P	V
802.11n HT20 CH 11 2462MHz		4924	47.91	-26.09	74	68.24	31.19	7	58.52	150	360	P	H
		7386	54.03	-19.97	74	68.22	36.08	8.27	58.54	150	142	P	H
		7386	40.54	-13.46	54	54.73	36.08	8.27	58.54	150	142	A	H
		4924	44.73	-29.27	74	65.06	31.19	7	58.52	150	360	P	V
		7386	50.43	-23.57	74	64.62	36.08	8.27	58.54	145	274	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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 per 15.209(c).
!	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.	
1+2		(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”.