FCC RF Test Report

APPLICANT	:	**Lenovo (Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Portable Tablet Computer**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**Lenovo YT3–X50F**
FCC ID	:	**O57YT3X50F**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DTS) Digital Transmission System**

The product was received on Jul. 06, 2015 and testing was completed on Sep. 06, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 2627

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR570302-02C	Rev. 01	Initial issue of report	Sep. 10, 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	≥ 0.5MHz	Pass	-
3.1	-	RSS-Gen 6.6	99% Bandwidth	-	Pass	-
3.2	15.247(b)	RSS-247 A5.4(4)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	RSS-247 5.2(2)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	RSS-247 5.5	Conducted Band Edges	≤ 20dBc	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 4.77 dB at 4824.000 MHz
3.6	15.207	RSS-GEN 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 17.31 dB at 1.540 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 Road, Wai Gao Qiao FTZ, Shanghai, 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–X50F
FCC ID	O57YT3X50F
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	LLAM510
SW Version	LLA3I18 C01
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 : 18.79 dBm (0.0757 W) 802.11g : 22.03 dBm (0.1596 W) 802.11n HT20 : 21.95 dBm (0.1567 W)
99% Occupied Bandwidth	802.11b : 13.40MHz 802.11g : 18.25MHz 802.11n HT20 : 19.00MHz
Antenna Type	PCB Antenna with gain -0.10 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Component List

Note: There are four 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	Sample 3	Sample 4
CPU	Qualcomm APQ8009 0AA	Qualcomm APQ8009 0VV	Qualcomm APQ8009 0VV	Qualcomm APQ8009 0AA
Flash	Samsung KMQ4Z0013M	Samsung KMQ4Z0013M	Samsung KMQ82000SM	Hynix H9TQ17A8GTMC
LCD	AUO B101EAN02.4	AUO B101EAN02.4	AUO B101EAN02.4	BOE TV101WXM-NL0
Camera	O-FILM L8865A80 8MP	O-FILM L8865A80 8MP	O-FILM L8865A80 8MP	O-FILM L8865A80 8MP
Motor	HOCHAR F102730-20Y	HOCHAR F102730-20Y	HOCHAR F102730-20Y	DMEGC DM-B1003-3H
Battery	lenovo (Sunwoda) L15D3K32	lenovo (Sunwoda) L15D3K32	lenovo (Sunwoda) L15D3K32	lenovo(Scud) L15D3K32

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/IC Registration No.**
	CO01-KS	03CH02-KS	418269/4086E

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
- 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 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 (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 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 mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	18.79	18.76	18.75	18.78

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	22.03	21.95	22.01	21.94	21.96	21.98	22.00	21.96

2.4GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	21.95	21.75	21.72	21.76	21.72	21.78	21.79	21.83

2.3 Test Mode

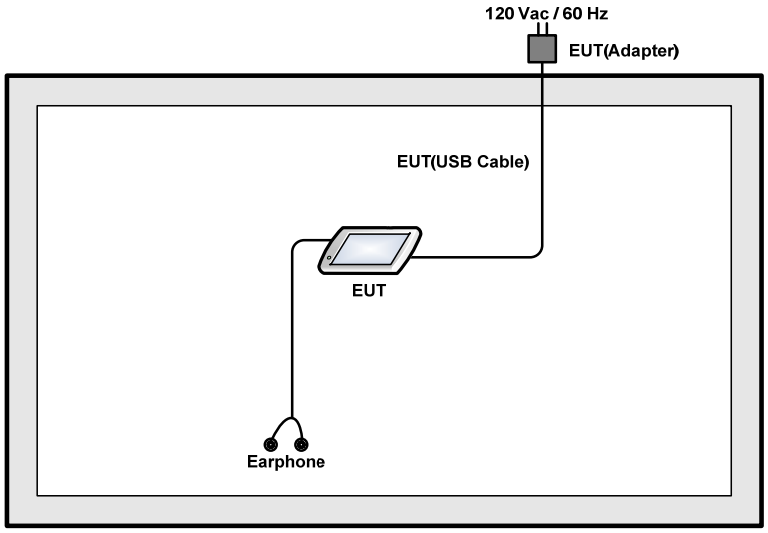
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

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

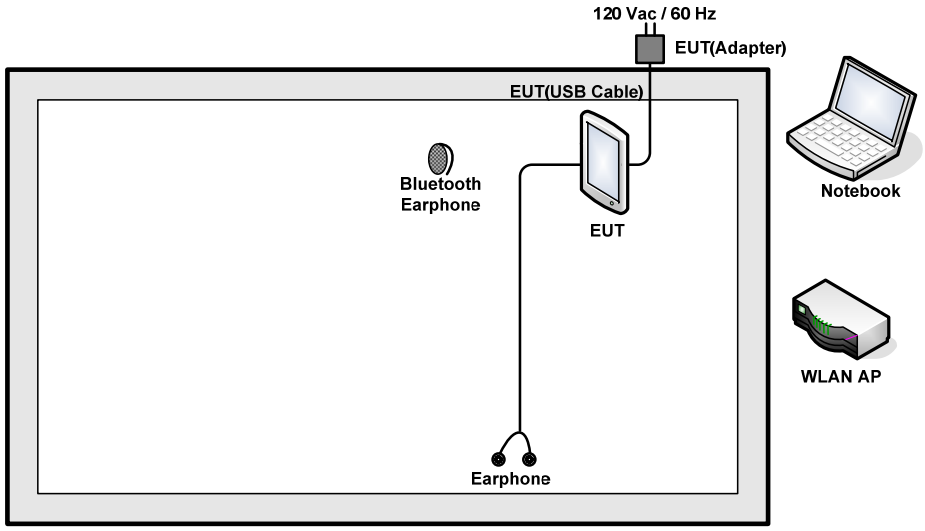
Test Cases	
AC Conducted Emission	Mode 1 : **Bluetooth Link + WLAN Link + Earphone + Battery 1 + USB Cable 1 (Charging from Adapter 1) for Sample 1** Mode 2 : Bluetooth Link + WLAN Link + Earphone + Battery 1 + USB Cable 2 (Charging from Adapter 2) for Sample 1
Remark: 1. The worst case of conducted emission is mode 1; only the test data of it was reported. 2. For Radiated Test Cases, The tests were performance with Adapter 1, Earphone Battery 1 and USB Cable 1. 3. All the conducted and radiated test cases were performance with Sample 1.	

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.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
2.	Notebook	Lenovo	G480	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Lenovo	LBH505	N/A	N/A	N/A
4.	Earphone	Lenovo	LH102	N/A	Unshielded, 1.2 m	N/A

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous 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 dB and 10dB attenuator.

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

= 5 + 10 = 15 (dB)

3. Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

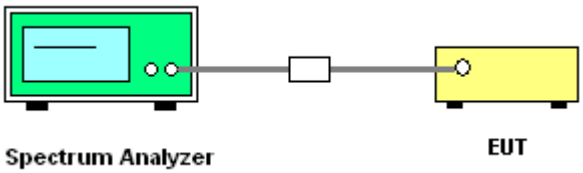
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

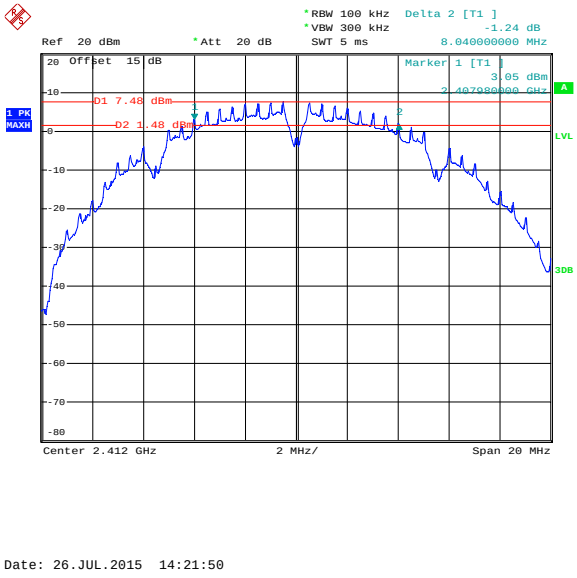
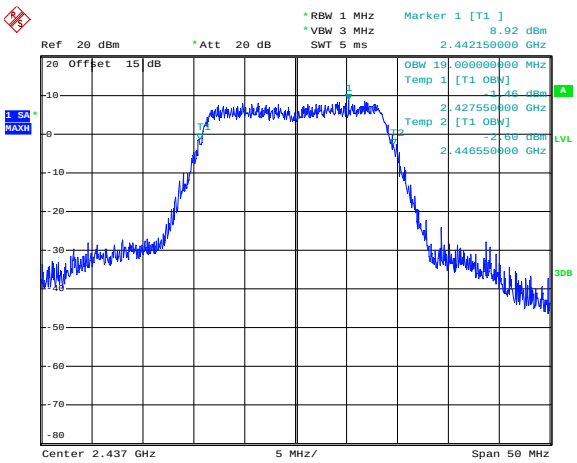
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	

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

3.2 Output Power Measurement

3.2.1 Limit of Output Power

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

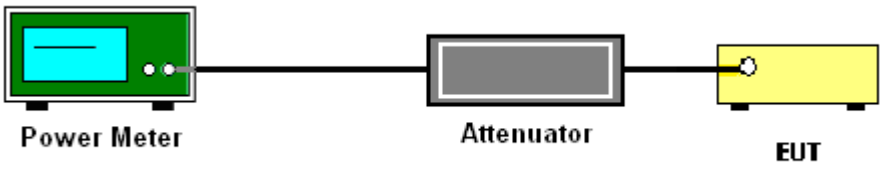
3.2.2 Measuring Instruments

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.

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.

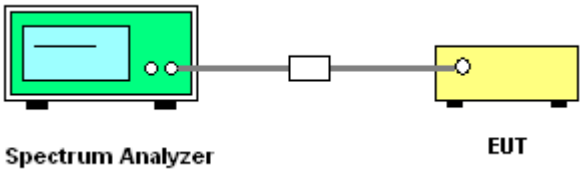
3.3.2 Measuring Instruments

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.

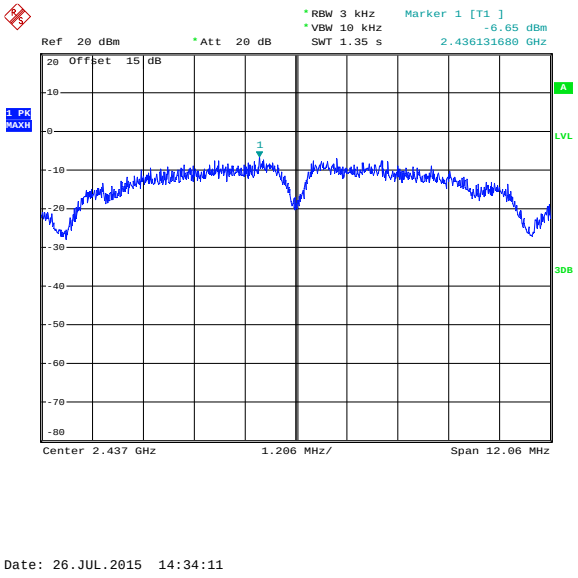
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.

Worst Case Power Density (dBm/3kHz)



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).

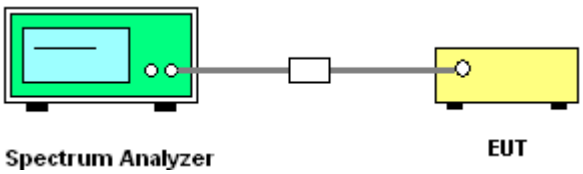
3.4.2 Measuring Instruments

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

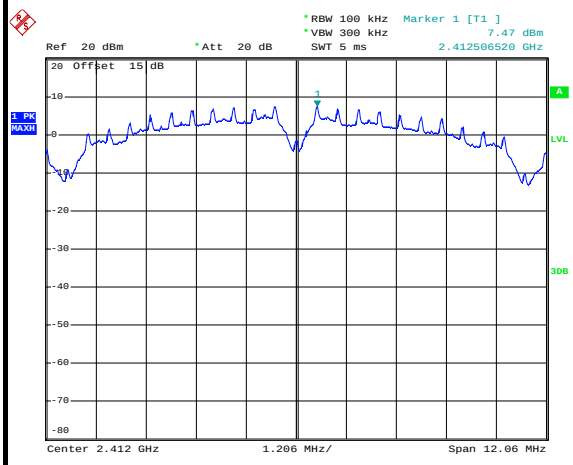


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	**Temperature :**	24~26°C
Test Band :	2.4GHz Low	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Mygai Mo

WLAN 802.11b Channel 01

100kHz PSD reference Level



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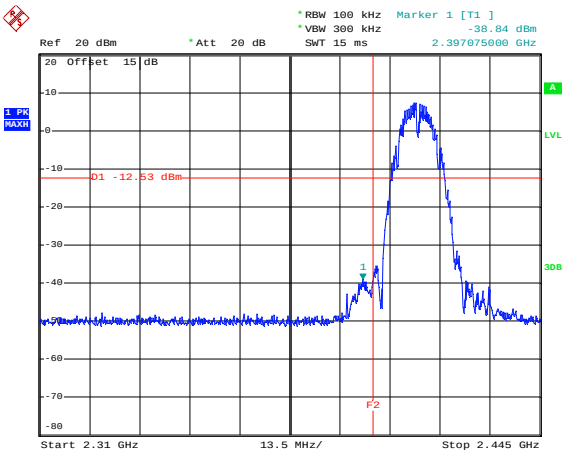
Low Channel Plot



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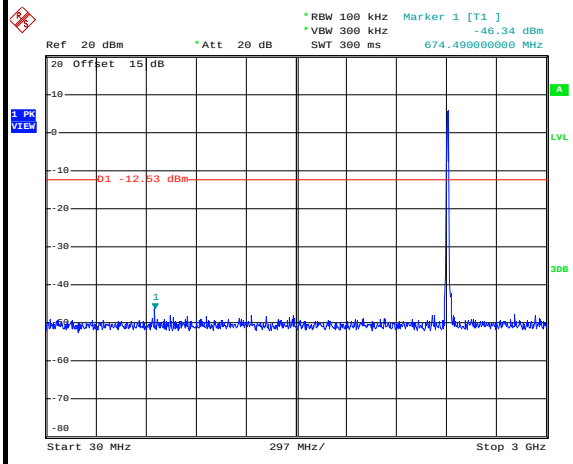
Spurious Emission 30MHz~3GHz



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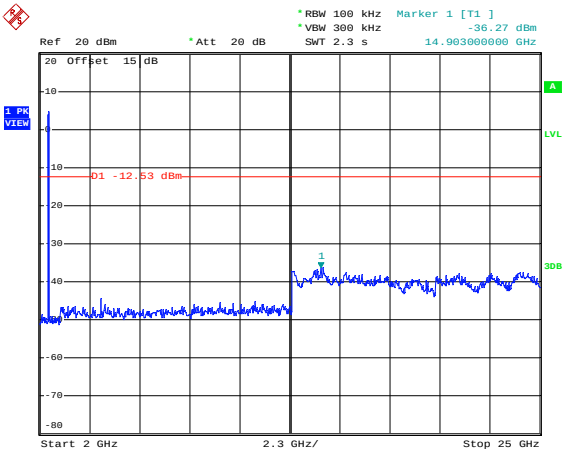
Spurious Emission 2GHz~25GHz



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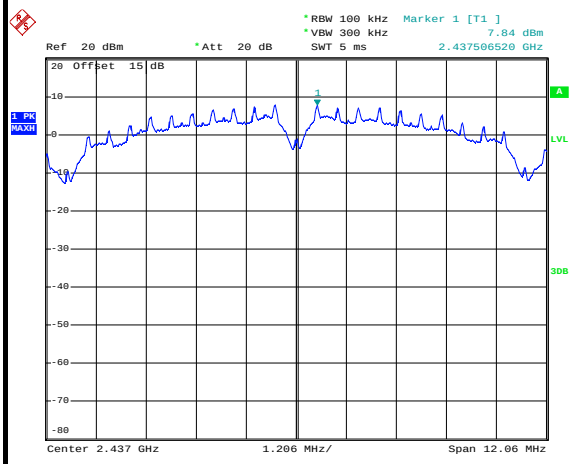
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	50~53%
Test Channel :	06	**Test Engineer :**	Mygai Mo

WLAN 802.11b Channel 06

100kHz PSD reference Level



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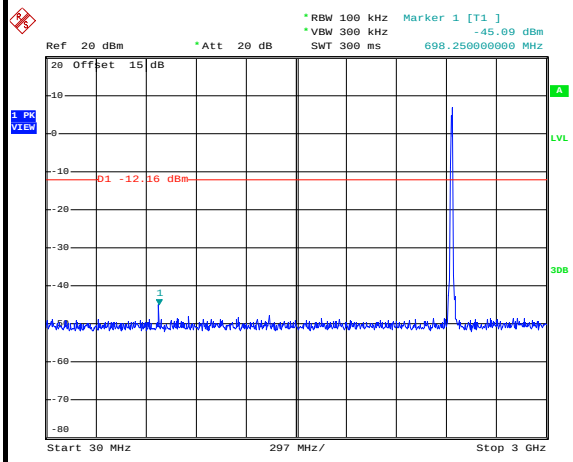
Spurious Emission 30MHz~3GHz



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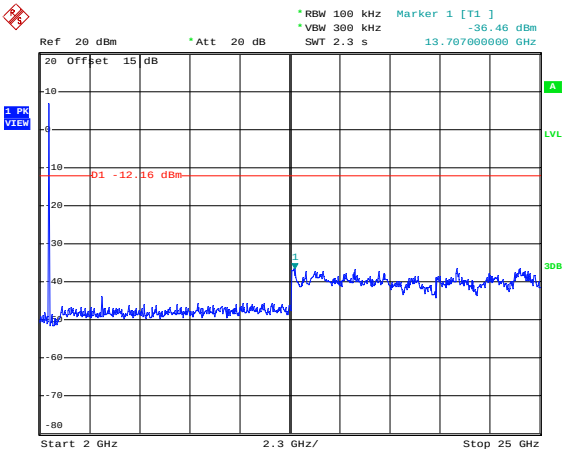
Spurious Emission 2GHz~25GHz



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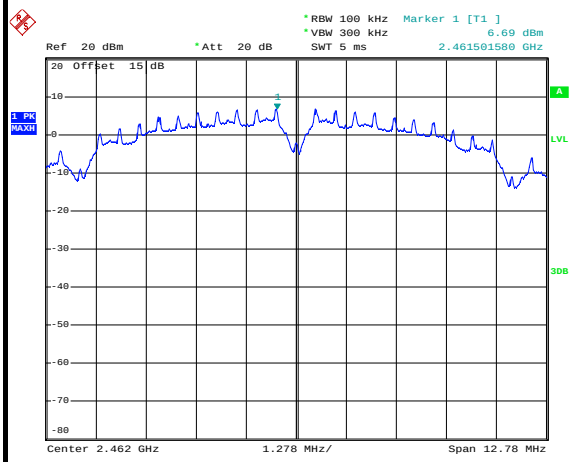
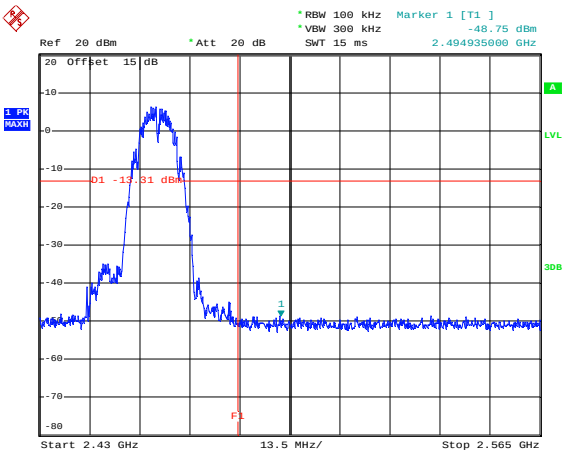
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	50~53%
Test Channel :	11	**Test Engineer :**	Mygai Mo

WLAN 802.11b Channel 11

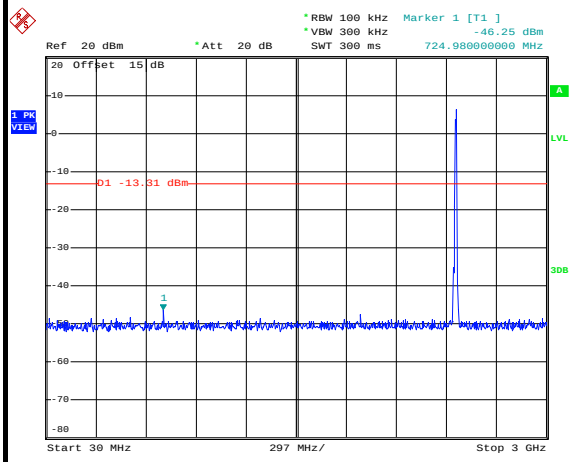
100kHz PSD reference Level



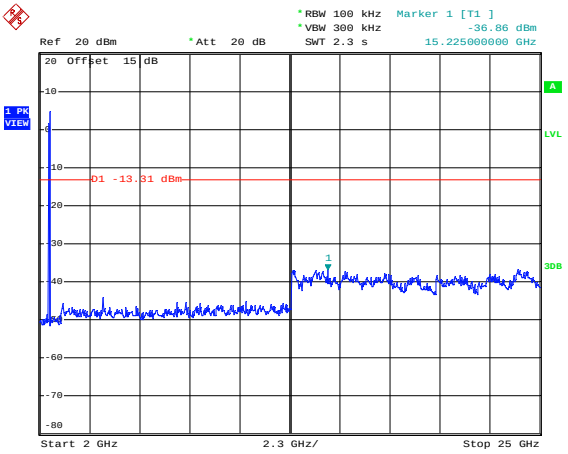
High Channel Plot



Spurious Emission 30MHz~3GHz



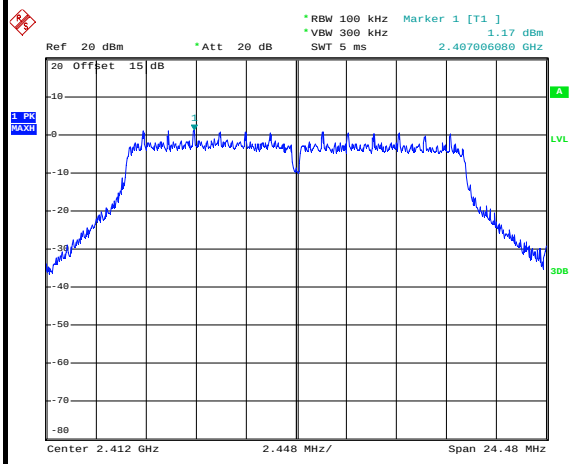
Spurious Emission 2GHz~25GHz



Test Mode :	802.11g	**Temperature :**	24~26°C
Test Band :	2.4GHz Low	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Mygai Mo

WLAN 802.11g Channel 01

100kHz PSD reference Level



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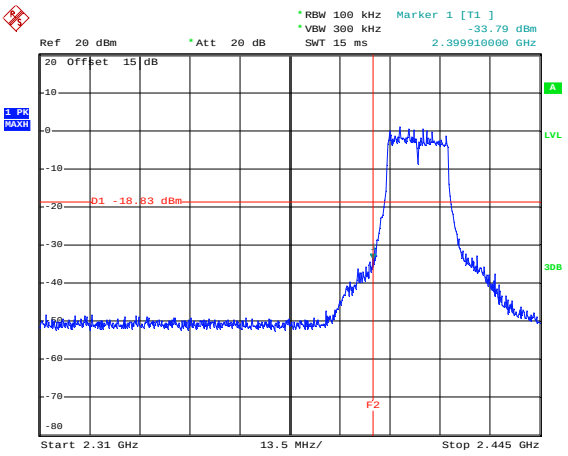
Low Channel Plot



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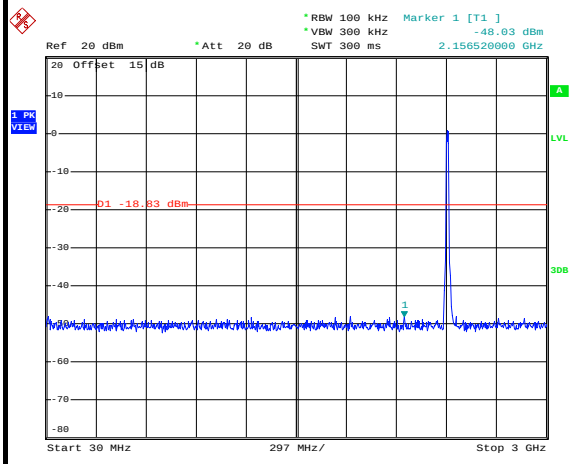
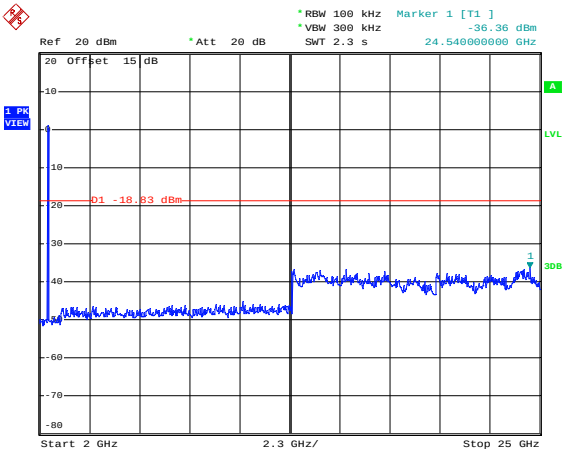
Spurious Emission 30MHz~3GHz



Date: 26.JUL.2015 14:54:14

Spurious Emission 2GHz~25GHz

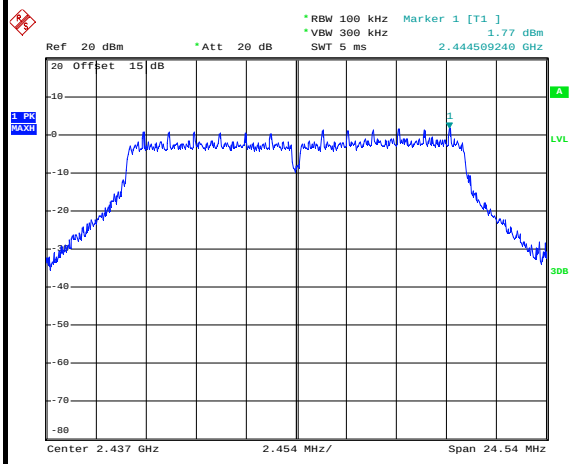


Date: 26.JUL.2015 14:54:32

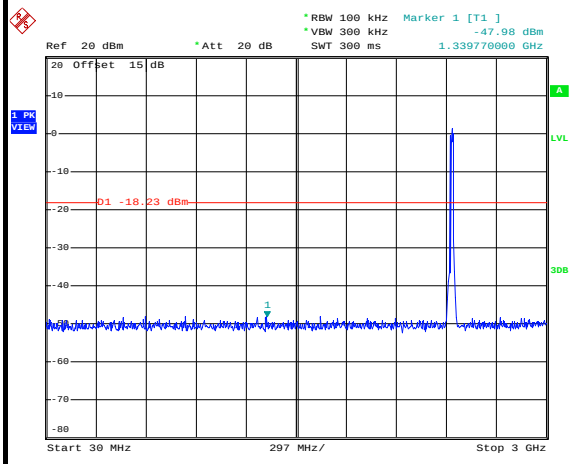
Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Mygai Mo

WLAN 802.11g Channel 06

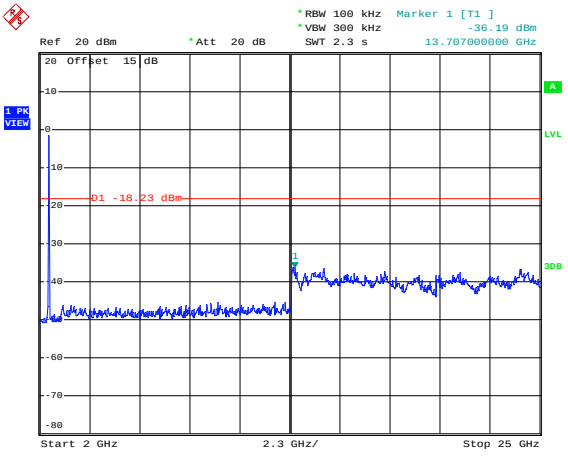
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



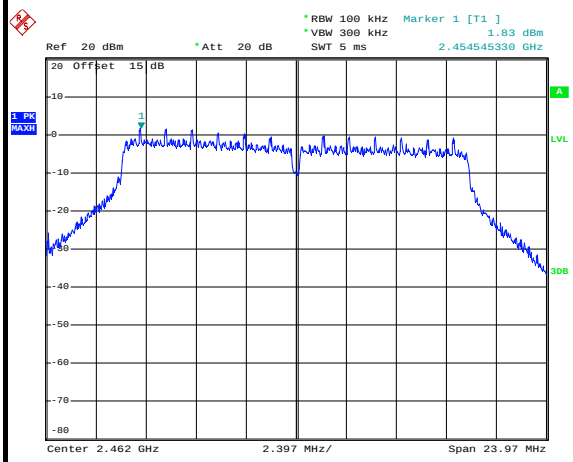
Spurious Emission 2GHz~25GHz



Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	50~53%
Test Channel :	11	**Test Engineer :**	Mygai Mo

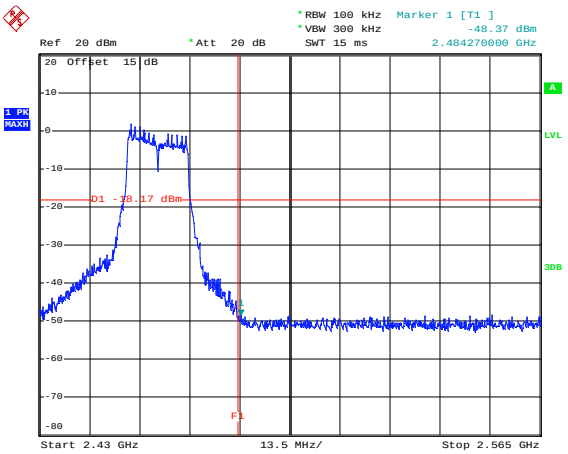
WLAN 802.11g Channel 11

100kHz PSD reference Level



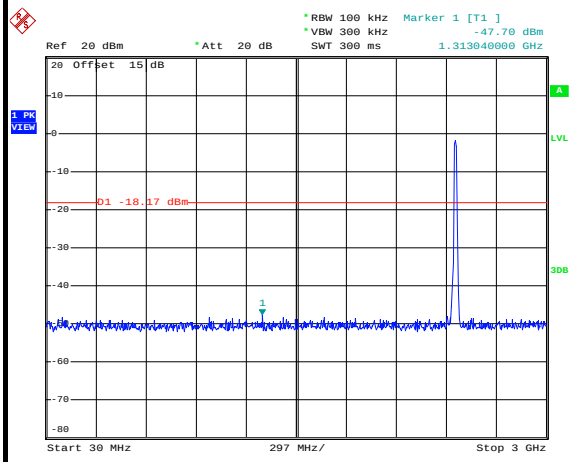
Date: 26.JUL.2015 15:03:42

High Channel Plot



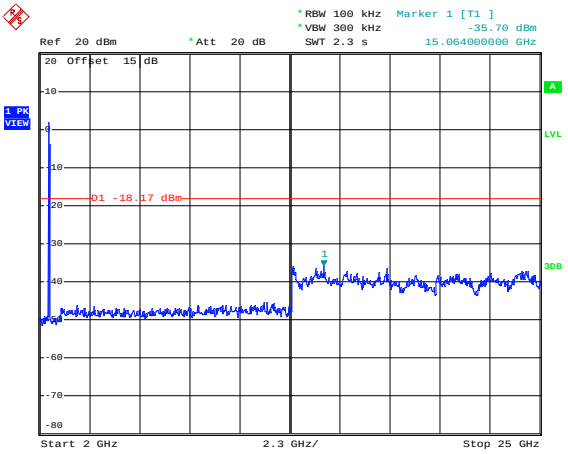
Date: 26.JUL.2015 15:05:32

Spurious Emission 30MHz~3GHz



Date: 26.JUL.2015 15:07:19

Spurious Emission 2GHz~25GHz

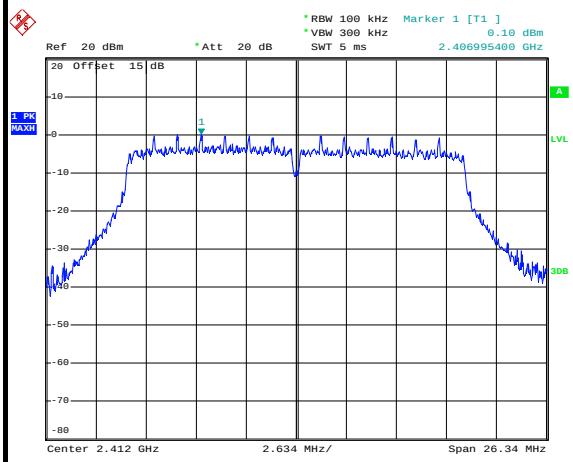


Date: 26.JUL.2015 15:07:37

Test Mode :	802.11n HT20	**Temperature :**	24~26°C
Test Band :	2.4GHz Low	**Relative Humidity :**	50~53%
Test Channel :	01	**Test Engineer :**	Mygai Mo

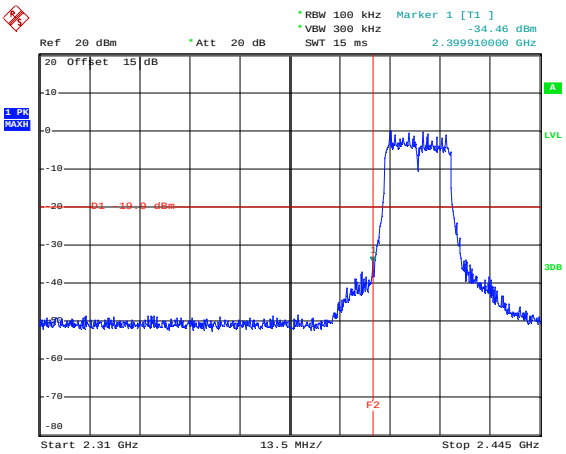
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



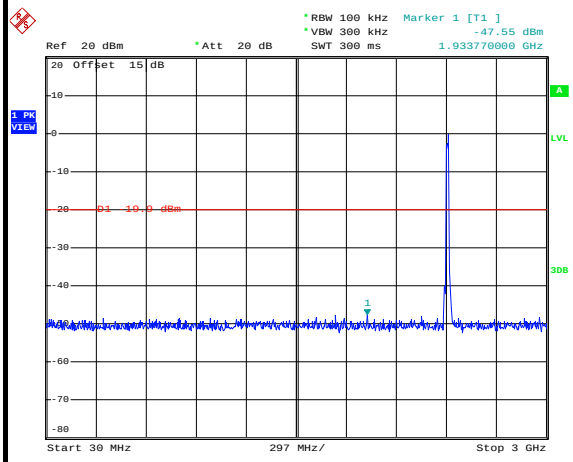
Date: 26.JUL.2015 15:12:01

Low Channel Plot



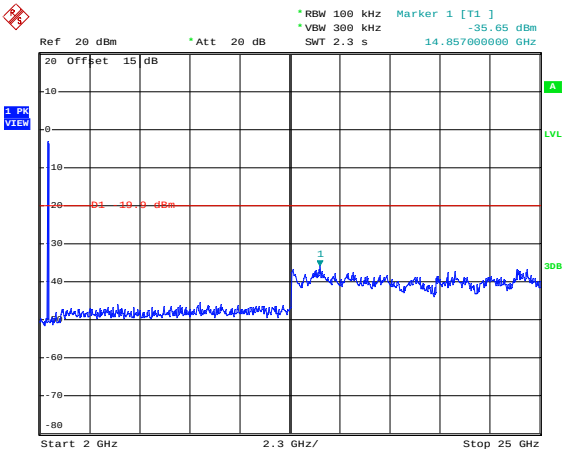
Date: 26.JUL.2015 15:13:13

Spurious Emission 30MHz~3GHz



Date: 26.JUL.2015 15:15:28

Spurious Emission 2GHz~25GHz

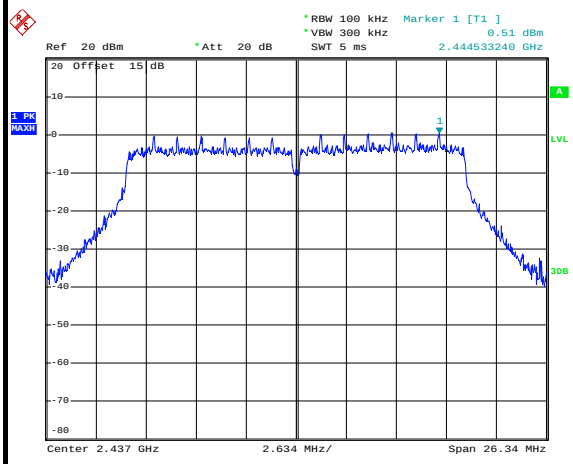


Date: 26.JUL.2015 15:15:45

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Mygai Mo

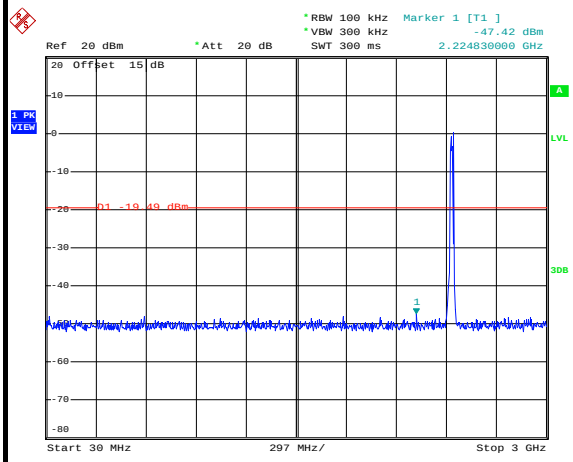
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



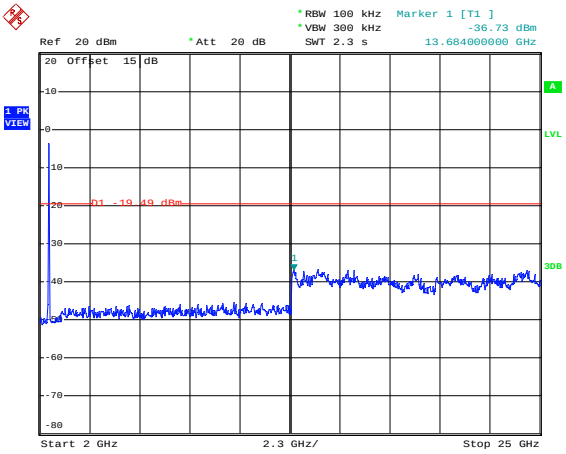
Date: 26.JUL.2015 15:20:26

Spurious Emission 30MHz~3GHz



Date: 26.JUL.2015 15:25:07

Spurious Emission 2GHz~25GHz

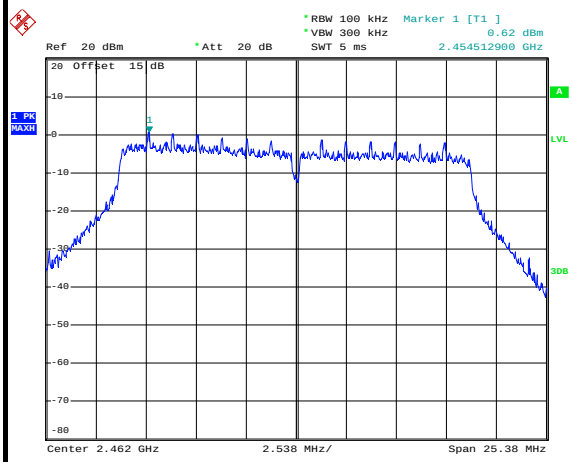


Date: 26.JUL.2015 15:25:25

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Mygai Mo

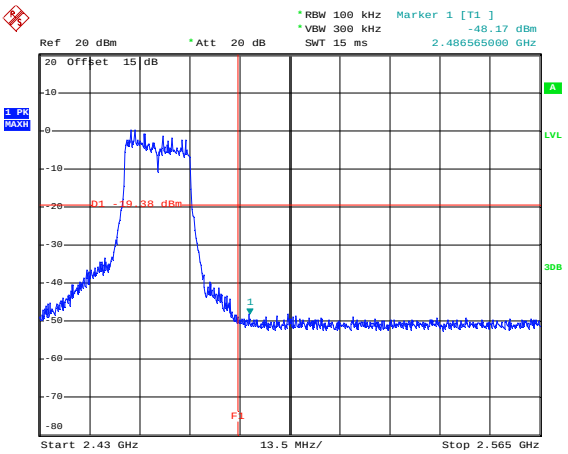
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



Date: 26.JUL.2015 15:32:07

High Channel Plot



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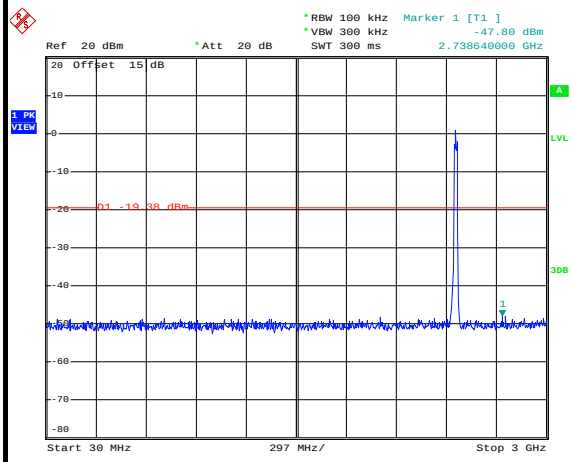
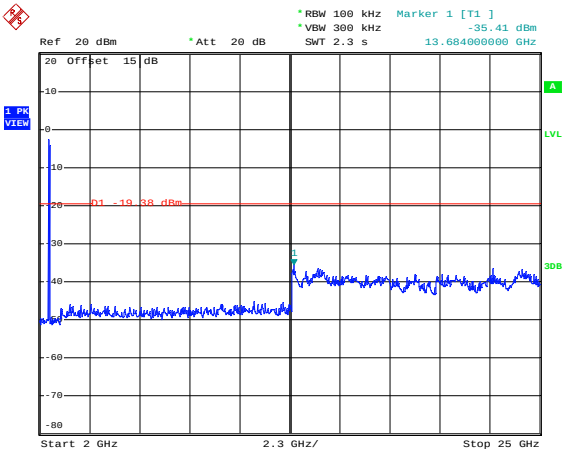
Spurious Emission 30MHz~3GHz



Date: 26.JUL.2015 15:35:32

Spurious Emission 2GHz~25GHz



Date: 26.JUL.2015 15:35:50

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.

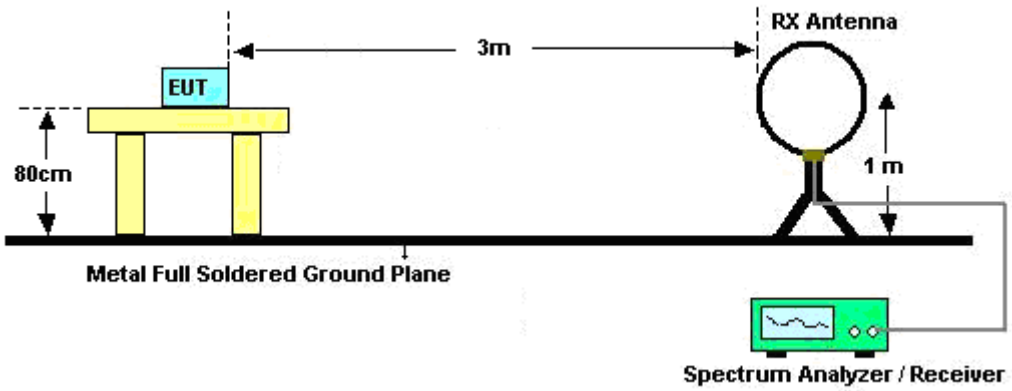
3.5.3 Test Procedures

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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

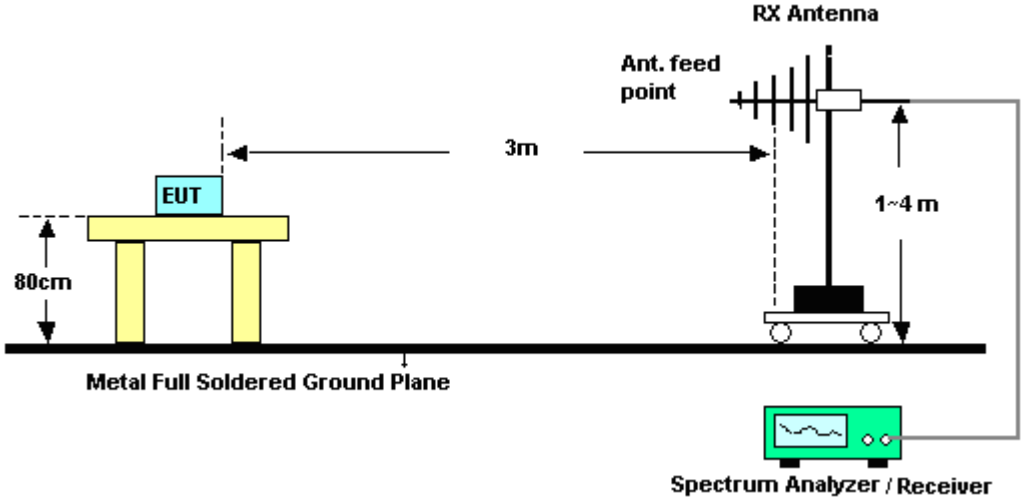
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.41	8.19	0.12	300Hz
802.11g	87.63	1.37	0.73	1kHz
2.4GHz 802.11n HT20	85.98	1.27	0.79	1kHz

3.5.4 Test Setup

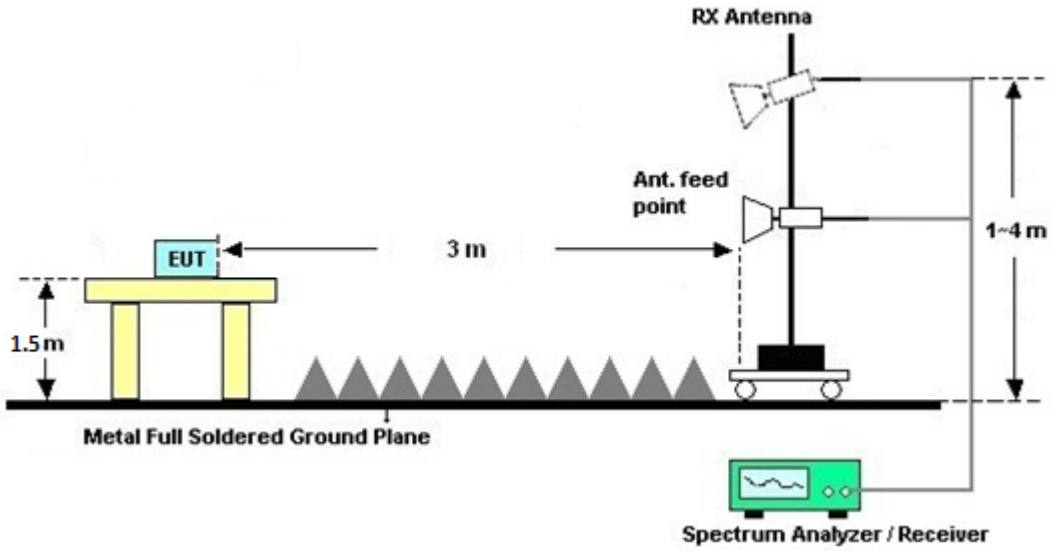
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious 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.

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

Please refer to Appendix B.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

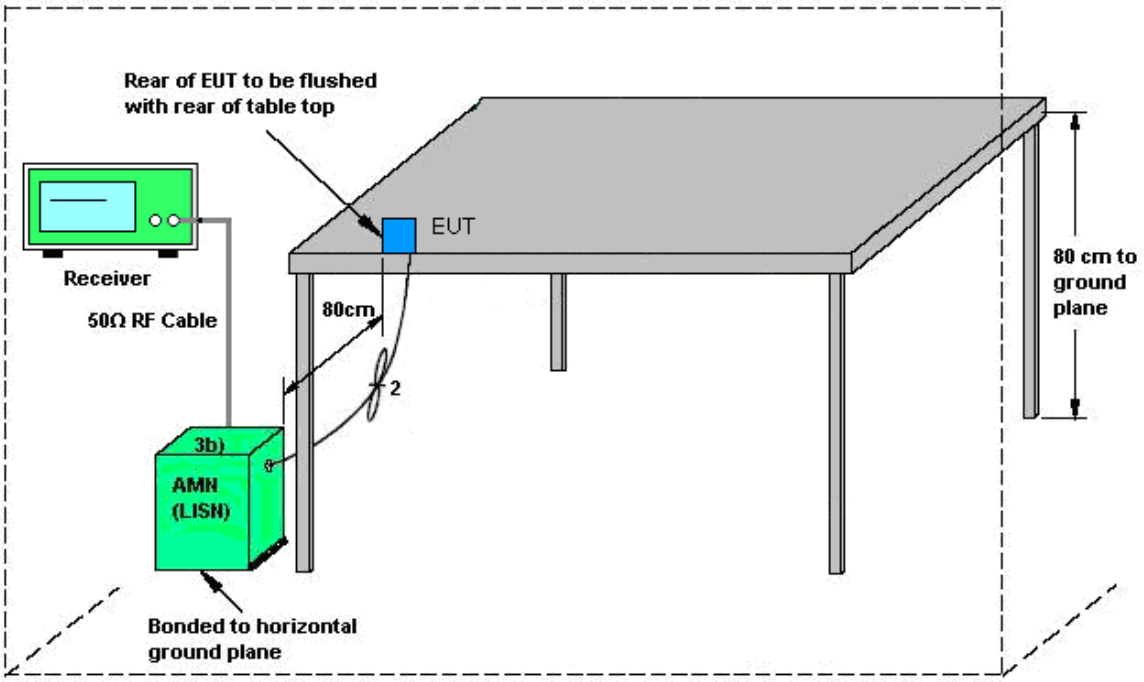
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

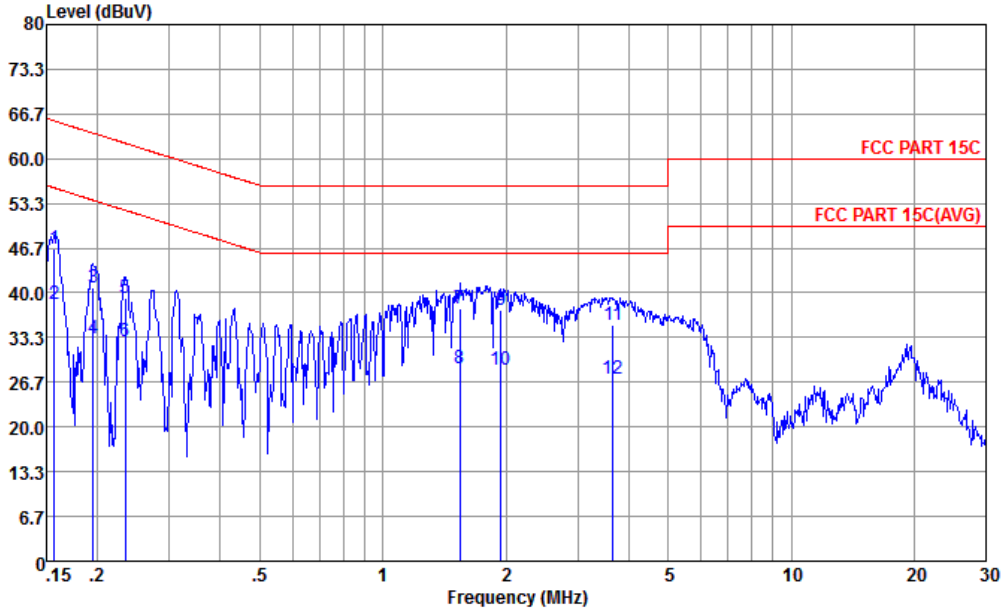
3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link + Earphone + Battery 1 + USB Cable 1 (Charging from Adapter 1) for Sample 1		

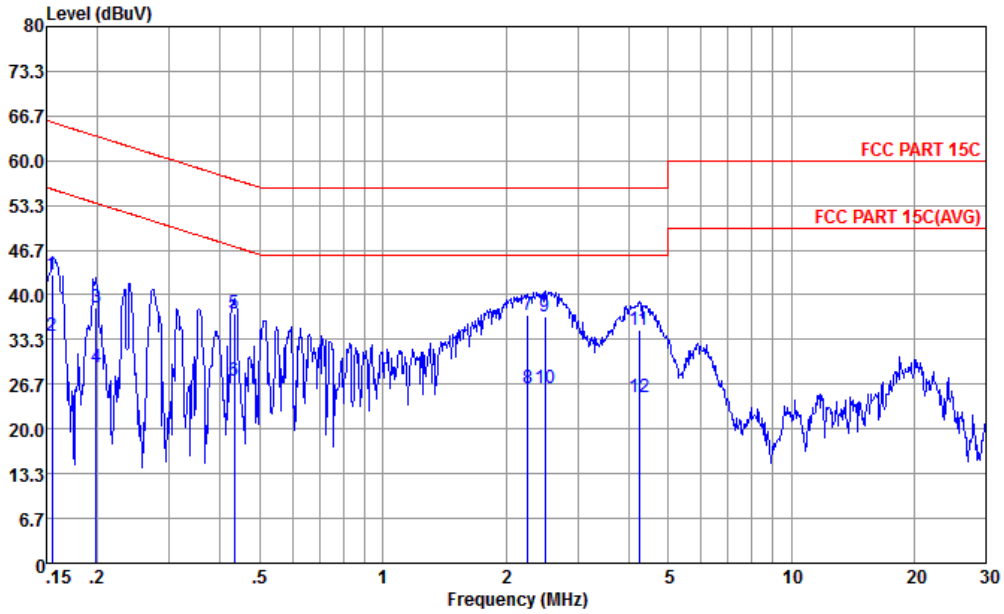


Site : CO01-KS
Condition : FCC PART 15C LISN-L20140306 LINE

mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.16	46.53	-19.12	65.65	34.30	1.85	10.38	QP
2		0.16	38.33	-17.32	55.65	26.10	1.85	10.38	Average
3		0.20	40.84	-22.96	63.80	29.30	1.05	10.49	QP
4		0.20	33.14	-20.66	53.80	21.60	1.05	10.49	Average
5		0.23	39.24	-23.06	62.30	27.80	0.92	10.52	QP
6		0.23	32.74	-19.56	52.30	21.30	0.92	10.52	Average
7		1.54	37.69	-18.31	56.00	26.90	0.10	10.69	QP
8	*	1.54	28.69	-17.31	46.00	17.90	0.10	10.69	Average
9		1.95	37.50	-18.50	56.00	26.70	0.10	10.70	QP
10		1.95	28.60	-17.40	46.00	17.80	0.10	10.70	Average
11		3.66	35.30	-20.70	56.00	24.30	0.18	10.82	QP
12		3.66	27.10	-18.90	46.00	16.10	0.18	10.82	Average

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + Earphone + Battery 1 + USB Cable 1 (Charging from Adapter 1) for Sample 1		



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

mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	43.01	-22.73	65.74	30.80	1.83	10.38	QP
2		0.15	33.81	-21.93	55.74	21.60	1.83	10.38	Average
3		0.20	38.21	-25.46	63.67	26.70	1.01	10.50	QP
4		0.20	29.11	-24.56	53.67	17.60	1.01	10.50	Average
5		0.43	37.18	-20.02	57.20	26.20	0.36	10.62	QP
6		0.43	27.18	-20.02	47.20	16.20	0.36	10.62	Average
7	*	2.26	37.02	-18.98	56.00	26.20	0.11	10.71	QP
8		2.26	26.12	-19.88	46.00	15.30	0.11	10.71	Average
9		2.50	36.75	-19.25	56.00	25.91	0.11	10.73	QP
10		2.50	26.15	-19.85	46.00	15.31	0.11	10.73	Average
11		4.25	34.72	-21.28	56.00	23.70	0.19	10.83	QP
12		4.25	24.82	-21.18	46.00	13.80	0.19	10.83	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

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Jan. 28, 2015	Jul. 26, 2015~ Jul. 30, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 28, 2015	Jul. 26, 2015~ Jul. 30, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 28, 2015	Jul. 26, 2015~ Jul. 30, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	Sep. 06, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Sep. 06, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Sep. 06, 2015	Nov. 12, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	Sep. 06, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Sep. 06, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Sep. 06, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 04, 2014	Sep. 06, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 03, 2015	Sep. 06, 2015	Sep. 02, 2016	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	Sep. 06, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	Sep. 06, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Sep. 06, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Sep. 06, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Sep. 06, 2015	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2015	Aug. 25, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Aug. 25, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Aug. 25, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Aug. 25, 2015	Oct. 24, 2015	Conduction (CO01-KS)

5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.3 dB

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

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

Appendix A. Conducted Test Results

Test Engineer:	Mygai Mo	Temperature:	21~25	°C
Test Date:	2015/7/26~2015/7/30	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
11b	1Mbps	1	1	2412	13.40	8.04	0.50	Pass
11b	1Mbps	1	6	2437	13.25	8.04	0.50	Pass
11b	1Mbps	1	11	2462	13.25	8.52	0.50	Pass
11g	6Mbps	1	1	2412	17.75	16.32	0.50	Pass
11g	6Mbps	1	6	2437	18.25	16.36	0.50	Pass
11g	6Mbps	1	11	2462	18.25	15.98	0.50	Pass
HT20	MCS0	1	1	2412	18.55	17.56	0.50	Pass
HT20	MCS0	1	6	2437	19.00	17.56	0.50	Pass
HT20	MCS0	1	11	2462	18.90	16.92	0.50	Pass

TEST RESULTS DATA
Peak Power Table

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
11b	1Mbps	1	1	2412	18.79	30.00	-0.10	18.69	36.00	Pass
11b	1Mbps	1	6	2437	18.34	30.00	-0.10	18.24	36.00	Pass
11b	1Mbps	1	11	2462	18.11	30.00	-0.10	18.01	36.00	Pass
11g	6Mbps	1	1	2412	22.03	30.00	-0.10	21.93	36.00	Pass
11g	6Mbps	1	6	2437	21.86	30.00	-0.10	21.76	36.00	Pass
11g	6Mbps	1	11	2462	21.65	30.00	-0.10	21.55	36.00	Pass
HT20	MCS0	1	1	2412	21.95	30.00	-0.10	21.85	36.00	Pass
HT20	MCS0	1	6	2437	21.89	30.00	-0.10	21.79	36.00	Pass
HT20	MCS0	1	11	2462	21.36	30.00	-0.10	21.26	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.11	15.92
11b	1Mbps	1	6	2437	0.11	15.47
11b	1Mbps	1	11	2462	0.11	15.25
11g	6Mbps	1	1	2412	0.57	12.61
11g	6Mbps	1	6	2437	0.57	12.46
11g	6Mbps	1	11	2462	0.57	12.33
HT20	MCS0	1	1	2412	0.65	11.57
HT20	MCS0	1	6	2437	0.65	11.43
HT20	MCS0	1	11	2462	0.65	11.36

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-7.01	-0.10	8.00	Pass
11b	1Mbps	1	6	2437	-6.65	-0.10	8.00	Pass
11b	1Mbps	1	11	2462	-7.20	-0.10	8.00	Pass
11g	6Mbps	1	1	2412	-12.72	-0.10	8.00	Pass
11g	6Mbps	1	6	2437	-12.34	-0.10	8.00	Pass
11g	6Mbps	1	11	2462	-13.59	-0.10	8.00	Pass
HT20	MCS0	1	1	2412	-14.31	-0.10	8.00	Pass
HT20	MCS0	1	6	2437	-13.59	-0.10	8.00	Pass
HT20	MCS0	1	11	2462	-13.40	-0.10	8.00	Pass

Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	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 CH 01 2412MHz	*	2410.521	102.57	-	-	103.6	31.23	4.74	37	150	242	P	H
	*	2411.189	98.42	-	-	99.45	31.23	4.74	37	150	242	A	H
		2389.29	47.34	-26.66	74	48.44	31.2	4.72	37.02	150	242	P	H
		2389.92	34.78	-19.22	54	35.88	31.2	4.72	37.02	150	242	A	H
	*	2410.521	93.31	-	-	94.34	31.23	4.74	37	150	329	P	V
	*	2411.189	88.97	-	-	90	31.23	4.74	37	150	329	A	V
		2318.19	44.92	-29.08	74	46.16	31.13	4.64	37.01	150	329	P	V
		2389.65	31.57	-22.43	54	32.67	31.2	4.72	37.02	150	329	A	V
802.11b CH 06 2437MHz	*	2435.822	99.51	-	-	104.48	27.26	4.76	36.99	176	130	P	H
	*	2436.239	95.57	-	-	100.54	27.26	4.76	36.99	176	130	A	H
	*	2435.738	100.5	-	-	105.47	27.26	4.76	36.99	300	95	P	V
	*	2436.239	96.53	-	-	101.5	27.26	4.76	36.99	300	95	A	V
802.11b CH 11 2462MHz	*	2463.376	102.35	-	-	103.21	31.31	4.79	36.96	150	236	P	H
	*	2462.792	97.6	-	-	98.46	31.31	4.79	36.96	150	236	A	H
		2486.36	45.98	-28.02	74	46.78	31.34	4.8	36.94	150	236	P	H
		2483.52	33.79	-20.21	54	34.59	31.34	4.8	36.94	150	236	A	H
	*	2463.46	89.52	-	-	90.38	31.31	4.79	36.96	150	57	P	V
	*	2462.792	84.89	-	-	85.75	31.31	4.79	36.96	150	57	A	V
		2491.12	44.94	-29.06	74	45.68	31.37	4.82	36.93	150	57	P	V
		2493.24	31.02	-22.98	54	31.76	31.37	4.82	36.93	150	57	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	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 CH 01 2412MHz		4824	54.52	-19.48	74	49.44	34.93	6.83	36.68	150	139	P	H
	!	4824	49.23	-4.77	54	44.15	34.93	6.83	36.68	150	139	A	H
		4824	49.12	-24.88	74	44.04	34.93	6.83	36.68	150	0	P	V
		4824	42.91	-11.09	54	37.83	34.93	6.83	36.68	150	0	A	V
802.11b CH 06 2437MHz		4875	44.98	-29.02	74	43.18	31.59	6.87	36.66	172	128	P	H
		7311	45.24	-28.76	74	39.33	34.03	8.57	36.69	165	134	P	H
		4875	43.7	-30.3	74	41.9	31.59	6.87	36.66	300	218	P	V
		7311	46.21	-27.79	74	40.3	34.03	8.57	36.69	285	317	P	V
802.11b CH 11 2462MHz		4923	49.02	-24.98	74	43.78	34.97	6.92	36.65	150	142	P	H
		4923	44.86	-9.14	54	39.62	34.97	6.92	36.65	150	142	A	H
		7386	48.11	-25.89	74	40.43	35.78	8.68	36.78	150	0	P	H
		4923	46.83	-27.17	74	41.59	34.97	6.92	36.65	150	360	P	V
		4923	39.11	-14.89	54	33.87	34.97	6.92	36.65	150	360	A	V
		7386	50.13	-23.87	74	42.45	35.78	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.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	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	*	2407.097	102.9	-	-	103.93	31.23	4.74	37	158	59	P	H
	*	2405.594	92.56	-	-	93.59	31.23	4.74	37	158	59	A	H
		2389.56	62.46	-11.54	74	63.56	31.2	4.72	37.02	158	59	P	H
		2389.92	41.11	-12.89	54	42.21	31.2	4.72	37.02	158	59	A	H
	*	2405.177	102.28	-	-	103.31	31.23	4.74	37	325	75	P	V
	*	2405.344	91.89	-	-	92.92	31.23	4.74	37	325	75	A	V
		2389.92	59.92	-14.08	74	61.02	31.2	4.72	37.02	325	75	P	V
		2389.83	40.63	-13.37	54	41.73	31.2	4.72	37.02	325	75	A	V
802.11g CH 06 2437MHz	*	2439.496	103.58	-	-	104.49	31.29	4.77	36.97	169	126	P	H
	*	2439.83	93.16	-	-	94.07	31.29	4.77	36.97	169	126	A	H
	*	2441.917	103.91	-	-	104.82	31.29	4.77	36.97	319	97	P	V
	*	2440.999	92.67	-	-	93.58	31.29	4.77	36.97	319	97	A	V
802.11g CH 11 2462MHz	*	2460.371	94.64	-	-	99.3	27.51	4.79	36.96	168	118	P	H
	*	2458.951	83.36	-	-	88.02	27.51	4.79	36.96	168	118	A	H
		2491.64	45.35	-28.65	74	49.69	27.77	4.82	36.93	168	118	P	H
		2488.16	31.42	-22.58	54	35.76	27.77	4.82	36.93	168	118	A	H
	*	2458.032	94.87	-	-	99.53	27.51	4.79	36.96	266	91	P	V
	*	2459.702	83.95	-	-	88.61	27.51	4.79	36.96	266	91	A	V
		2498.2	45.77	-28.23	74	50.11	27.77	4.82	36.93	266	91	P	V
		2484.32	31.42	-22.58	54	35.92	27.64	4.8	36.94	266	91	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	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	48.71	-25.29	74	43.63	34.93	6.83	36.68	150	360	P	H
		4824	49.75	-24.25	74	44.67	34.93	6.83	36.68	150	0	P	V
802.11g CH 06 2437MHz		4875	49.4	-24.6	74	44.24	34.95	6.87	36.66	150	360	P	H
		7311	47.97	-26.03	74	40.33	35.76	8.57	36.69	167	89	P	H
		4875	49.6	-24.4	74	44.44	34.95	6.87	36.66	150	0	P	V
		7311	47.05	-26.95	74	39.41	35.76	8.57	36.69	289	335	P	V
802.11g CH 11 2462MHz		4923	42.91	-31.09	74	40.97	31.67	6.92	36.65	150	105	P	H
		7386	44.32	-29.68	74	38.13	34.29	8.68	36.78	150	232	P	H
		4923	42	-32	74	40.06	31.67	6.92	36.65	249	184	P	V
		7386	45.29	-28.71	74	39.1	34.29	8.68	36.78	247	164	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 802.11n HT20 (Band Edge @ 3m)

WIFI	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)
	*	2407.515	102	-	-	103.03	31.23	4.74	37	150	122	P	H
	*	2406.429	91.68	-	-	92.71	31.23	4.74	37	150	122	A	H
802.11n		2389.92	57.99	-16.01	74	59.09	31.2	4.72	37.02	150	122	P	H
HT20		2389.83	38.78	-15.22	54	39.88	31.2	4.72	37.02	150	122	A	H
CH 01	*	2406.095	101.1	-	-	102.13	31.23	4.74	37	150	73	P	V
2412MHz	*	2406.68	90.37	-	-	91.4	31.23	4.74	37	150	73	A	V
		2389.83	55.91	-18.09	74	57.01	31.2	4.72	37.02	150	73	P	V
		2389.92	37.99	-16.01	54	39.09	31.2	4.72	37.02	150	73	A	V
802.11n	*	2441.082	102.61	-	-	103.52	31.29	4.77	36.97	163	122	P	H
HT20	*	2438.66	91.65	-	-	92.56	31.29	4.77	36.97	163	122	A	H
CH 06	*	2440.581	102.46	-	-	103.37	31.29	4.77	36.97	317	93	P	V
2437MHz	*	2440.581	91.98	-	-	92.89	31.29	4.77	36.97	317	93	A	V
	*	2461.707	94.24	-	-	98.9	27.51	4.79	36.96	150	124	P	H
	*	2460.454	83.87	-	-	88.53	27.51	4.79	36.96	150	124	A	H
802.11n		2485.28	43.73	-30.27	74	48.23	27.64	4.8	36.94	150	124	P	H
HT20		2483.52	31.13	-22.87	54	35.63	27.64	4.8	36.94	150	124	A	H
CH 11	*	2461.874	94.9	-	-	99.56	27.51	4.79	36.96	300	88	P	V
2462MHz	*	2460.621	84	-	-	88.66	27.51	4.79	36.96	300	88	A	V
		2483.56	44.24	-29.76	74	48.74	27.64	4.8	36.94	300	88	P	V
		2483.52	31.21	-22.79	54	35.71	27.64	4.8	36.94	300	88	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	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	46.09	-27.91	74	41.01	34.93	6.83	36.68	150	360	P	H
		4824	46.72	-27.28	74	41.64	34.93	6.83	36.68	150	0	P	V
802.11n HT20 CH 06 2437MHz		4875	46.51	-27.49	74	41.35	34.95	6.87	36.66	150	360	P	H
		7311	48.13	-25.87	74	40.49	35.76	8.57	36.69	150	268	P	H
		4875	46.04	-27.96	74	40.88	34.95	6.87	36.66	150	98	P	V
		7311	48.59	-25.41	74	40.95	35.76	8.57	36.69	150	128	P	V
802.11n HT20 CH 11 2462MHz		4923	42.53	-31.47	74	40.59	31.67	6.92	36.65	150	97	P	H
		7386	46.86	-27.14	74	40.67	34.29	8.68	36.78	150	81	P	H
		4923	41.9	-32.1	74	39.96	31.67	6.92	36.65	195	241	P	V
		7386	46.3	-27.7	74	40.11	34.29	8.68	36.78	284	173	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 (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)
2.4GHz 802.11b LF		31.94	21.4	-18.6	40	37.39	18.5	0.75	35.24	-	-	P	H
		104.69	17.13	-26.37	43.5	39.13	12.01	1.32	35.33	-	-	P	H
		173.56	20.31	-23.19	43.5	43.21	10.35	1.7	34.95	-	-	P	H
		218.18	31.27	-14.73	46	54.22	10.13	1.93	35.01	194	271	P	H
		298.69	25.2	-20.8	46	44.23	13.46	2.27	34.76	-	-	P	H
		421.88	30.79	-15.21	46	46.61	16.55	2.71	35.08	-	-	P	H
		30	28.29	-11.71	40	43.68	19.1	0.73	35.22	165	246	P	V
		90.14	23.05	-20.45	43.5	46.19	10.6	1.22	34.96	-	-	P	V
		158.04	22.75	-20.75	43.5	45.12	10.92	1.62	34.91	-	-	P	V
		218.18	28.84	-17.16	46	51.79	10.13	1.93	35.01	-	-	P	V
		434.49	26.54	-19.46	46	42.04	16.75	2.75	35	-	-	P	V
		472.32	27.52	-18.48	46	42.26	17.13	2.87	34.74	-	-	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 (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)
2.4GHz 802.11g LF		31.94	22.4	-17.6	40	38.39	18.5	0.75	35.24	-	-	P	H
		104.69	18.13	-25.37	43.5	40.13	12.01	1.32	35.33	-	-	P	H
		173.56	21.31	-22.19	43.5	44.21	10.35	1.7	34.95	-	-	P	H
		218.18	31.27	-14.73	46	54.22	10.13	1.93	35.01	153	248	P	H
		298.69	26.2	-19.8	46	45.23	13.46	2.27	34.76	-	-	P	H
		421.88	30.79	-15.21	46	46.61	16.55	2.71	35.08	-	-	P	H
		30	29.29	-10.71	40	44.68	19.1	0.73	35.22	249	314	P	V
		46.49	23.96	-16.04	40	47.68	10.15	0.9	34.77	-	-	P	V
		90.14	24.05	-19.45	43.5	47.19	10.6	1.22	34.96	-	-	P	V
		158.04	22.75	-20.75	43.5	45.12	10.92	1.62	34.91	-	-	P	V
		218.18	29.84	-16.16	46	52.79	10.13	1.93	35.01	-	-	P	V
		472.32	27.52	-18.48	46	42.26	17.13	2.87	34.74	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	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)
2.4GHz 802.11n HT20 LF		31.94	23.4	-16.6	40	39.39	18.5	0.75	35.24	-	-	P	H
		104.69	19.13	-24.37	43.5	41.13	12.01	1.32	35.33	-	-	P	H
		173.56	21.31	-22.19	43.5	44.21	10.35	1.7	34.95	-	-	P	H
		218.18	29.27	-16.73	46	52.22	10.13	1.93	35.01	-	-	P	H
		298.69	26.2	-19.8	46	45.23	13.46	2.27	34.76	-	-	P	H
		421.88	30.79	-15.21	46	46.61	16.55	2.71	35.08	150	107	P	H
		30	28.29	-11.71	40	43.68	19.1	0.73	35.22	287	157	P	V
		46.49	22.96	-17.04	40	46.68	10.15	0.9	34.77	-	-	P	V
		90.14	23.05	-20.45	43.5	46.19	10.6	1.22	34.96	-	-	P	V
		158.04	21.75	-21.75	43.5	44.12	10.92	1.62	34.91	-	-	P	V
		218.18	28.84	-17.16	46	51.79	10.13	1.93	35.01	-	-	P	V
		472.32	27.52	-18.48	46	42.26	17.13	2.87	34.74	-	-	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 Ant. 1+2	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 CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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".