FCC RF Test Report

APPLICANT	:	Wistron NeWeb Corporation
EQUIPMENT	:	Connected Cooler Radio Rest of World version
BRAND NAME	:	Wistron NeWeb Corporation
MODEL NAME	:	D52A1
FCC ID	:	NKRD52A1
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Nov. 18, 2016 and testing was completed on Jan. 04, 2017. 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.

James Huang

Prepared by: James Huang / Manager

Jones Tsai

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
FR6N1802B	Rev. 01	Initial issue of report	Jan. 04, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.54 dB at 2483.680 MHz
3.6	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Wistron NeWeb Corporation
20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C

1.2 Manufacturer

Wistron NeWeb Corporation
20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Connected Cooler Radio Rest of World version
Brand Name	Wistron NeWeb Corporation
Model Name	D52A1
FCC ID	NKRD52A1
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v4.1 L E(Uplink Only)
IMEI Code	Conducted: 353180080032231 Radiated: 353180080031977
HW Version	v1.0
SW Version	D52A1_v00.00
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. WLAN supports search capabilities, but unable to connect to other devices.
3. Bluetooth supports TX only, not support RX function.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 18.52 dBm (0.0711 W) 802.11g : 21.05 dBm (0.1274 W) 802.11n HT20 : 21.85 dBm (0.1531 W) 802.11n HT40 : 21.74 dBm (0.1493 W)
99% Occupied Bandwidth	802.11b : 13.34MHz 802.11g : 16.78MHz 802.11n HT20 : 17.78MHz 802.11n HT40 : 36.16MHz
Antenna Type / Gain	PCB Antenna with gain 1.00 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 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	**Sporton Site No.**		**FCC Registration No.**
	TH01-KS	03CH03-KS	306251

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. 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: radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). The worst cases were recorded in this report.

2.1 Carrier Frequency and Channel

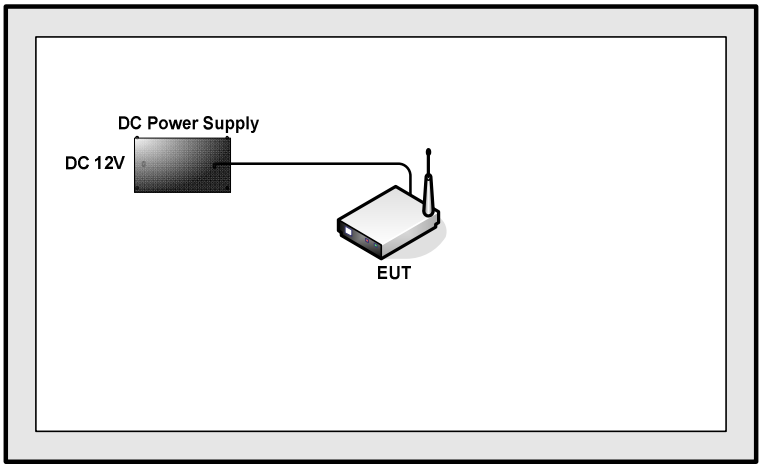
Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 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
802.11n HT40	MCS0

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

2.5 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.8 dB.

Offset(dB) = RF cable loss(dB).

= 5.8 (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.

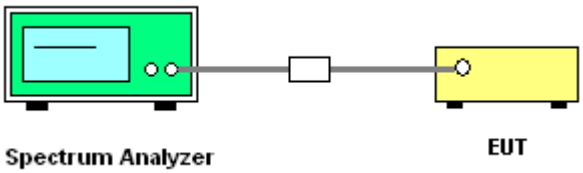
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

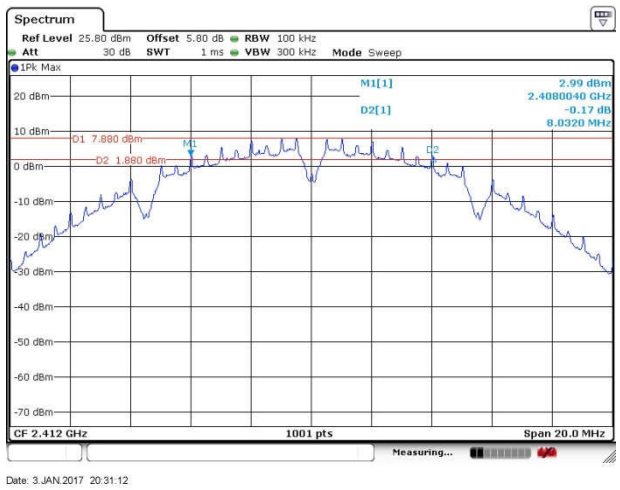
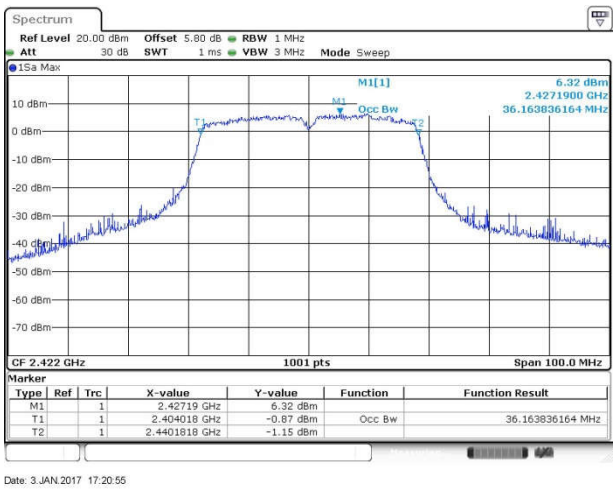
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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.

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.

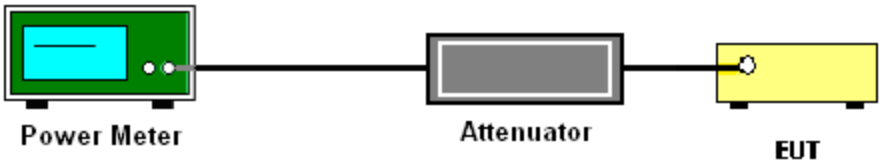
3.2.2 Measuring Instruments

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 v03r05 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.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

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.

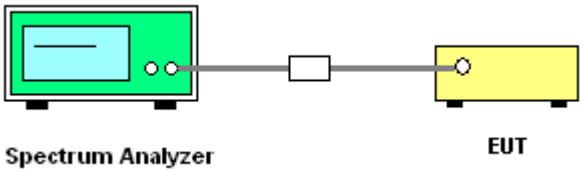
3.3.2 Measuring Instruments

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 v03r05
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.

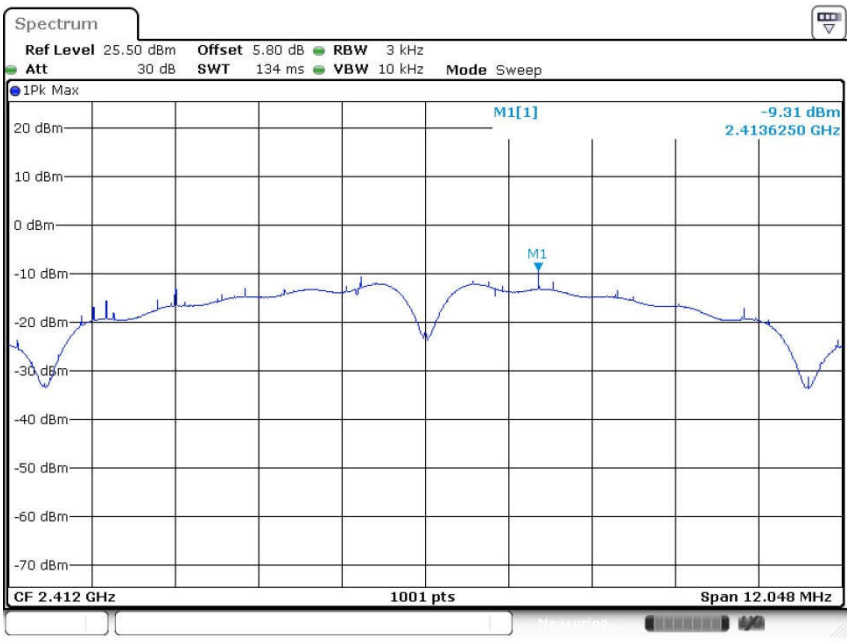
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

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).

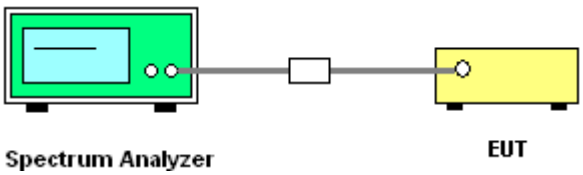
3.4.2 Measuring Instruments

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 v03r05.
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

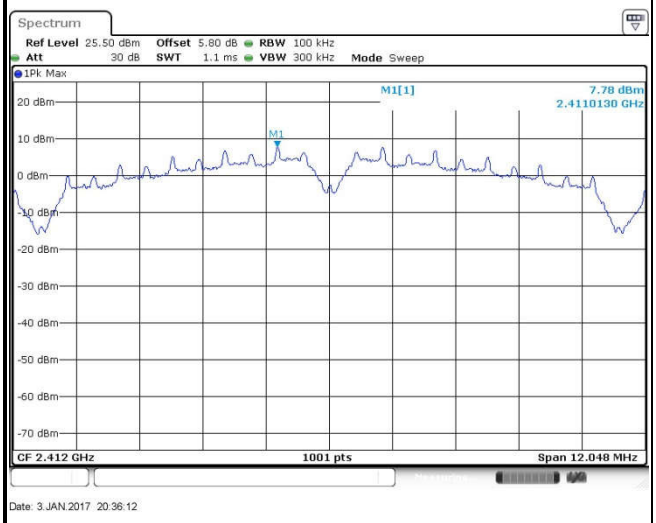


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

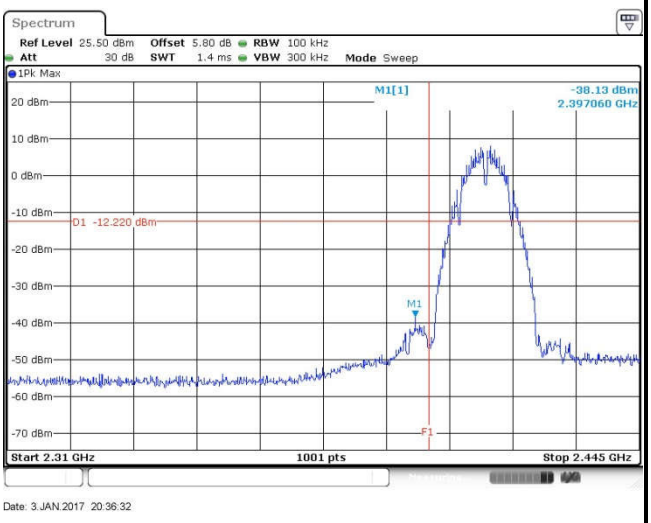
Test Mode :	802.11b	Temperature :	21~25℃
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Len Dong

WLAN 802.11b Channel 01

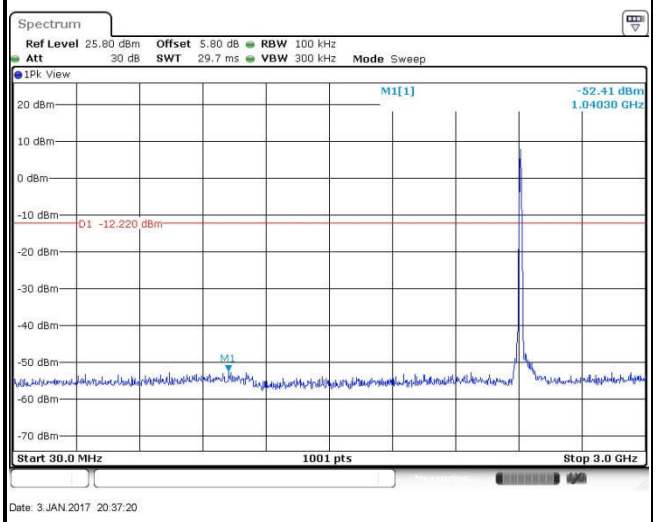
100kHz PSD reference Level



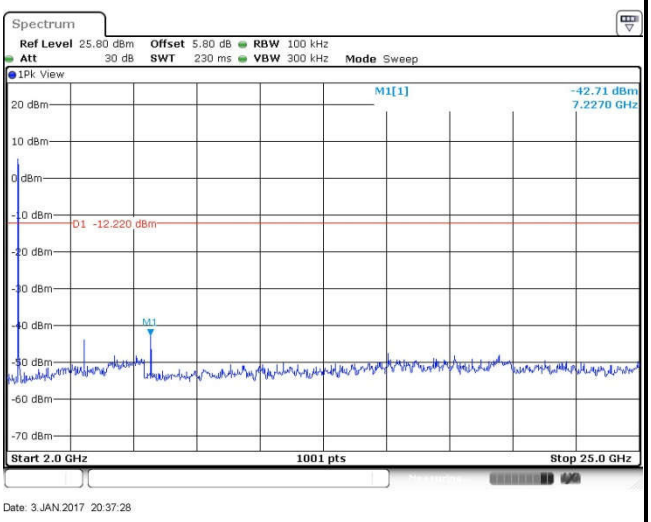
Low Channel Plot



Spurious Emission 30MHz~3GHz



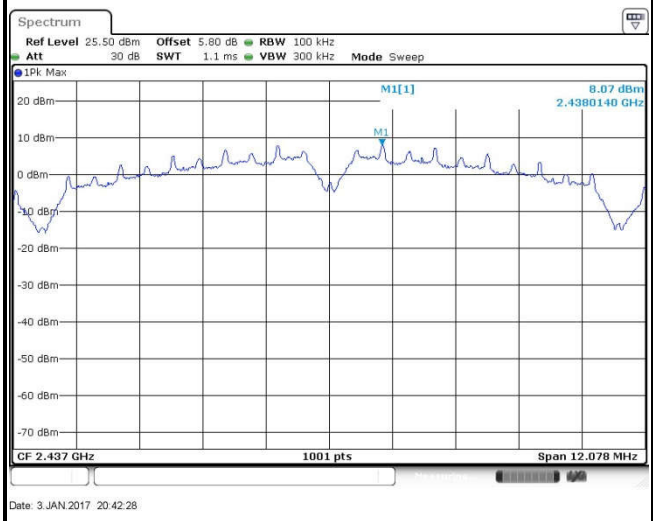
Spurious Emission 2GHz~25GHz



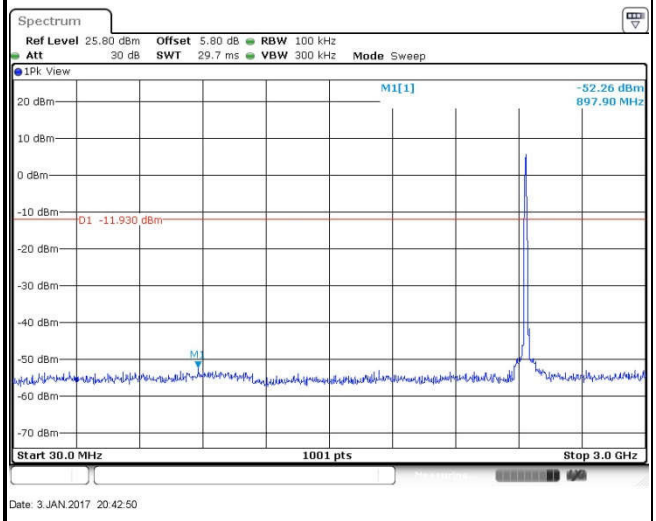
Test Mode :	802.11b	Temperature :	21~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Len Dong

WLAN 802.11b Channel 06

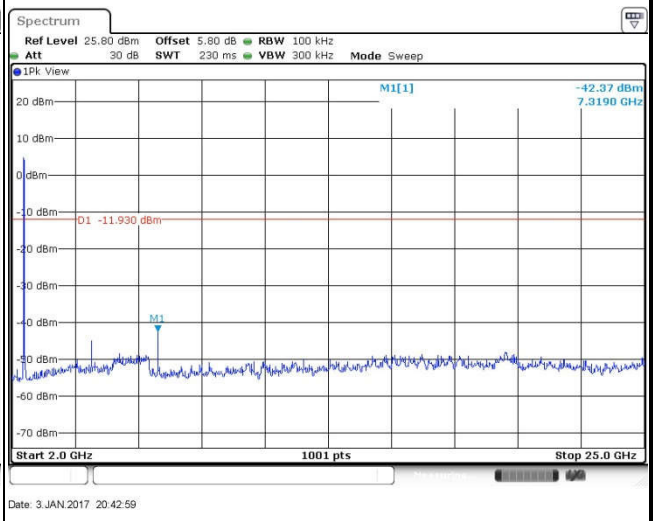
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



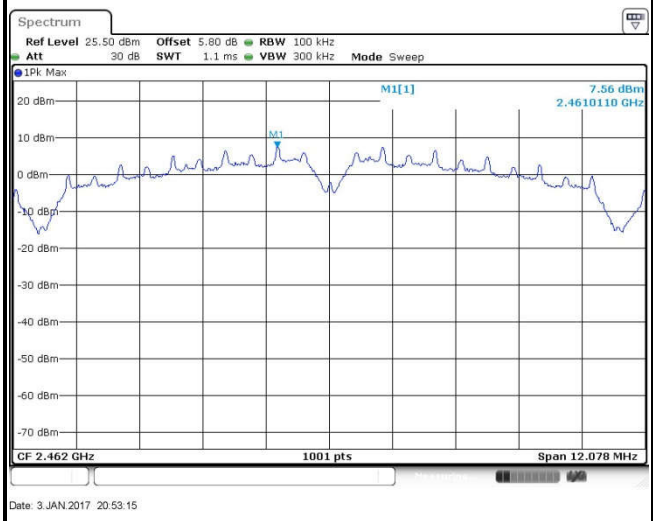
Spurious Emission 2GHz~25GHz



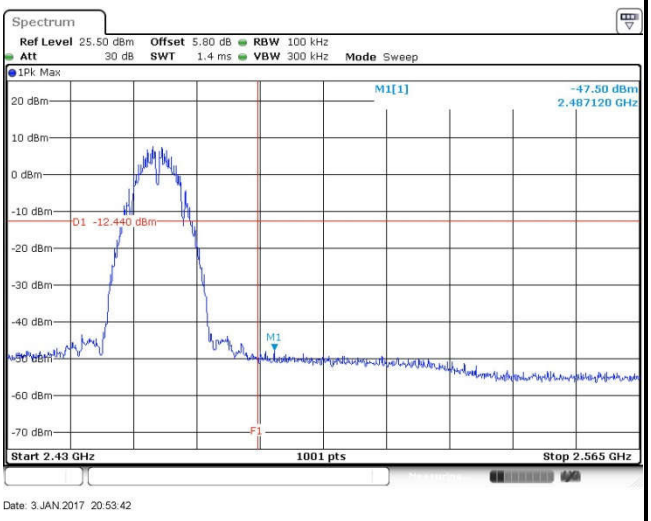
Test Mode :	802.11b	Temperature :	21~25℃
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Len Dong

WLAN 802.11b Channel 11

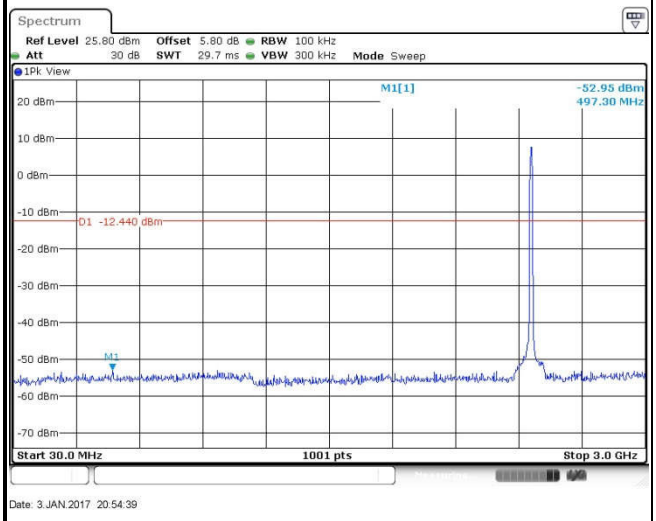
100kHz PSD reference Level



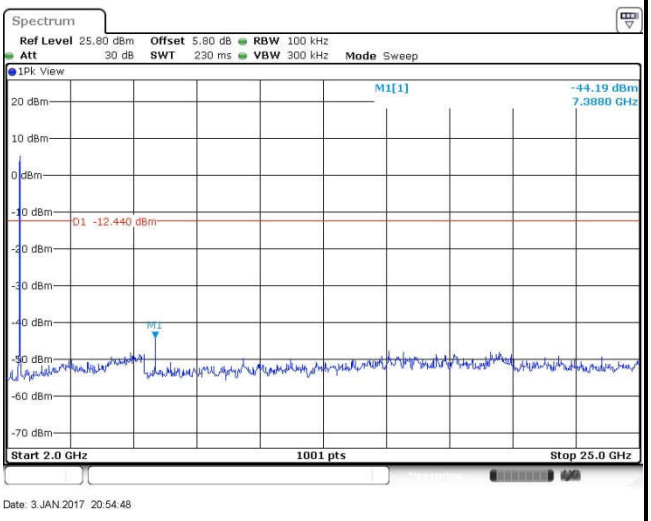
High Channel Plot



Spurious Emission 30MHz~3GHz



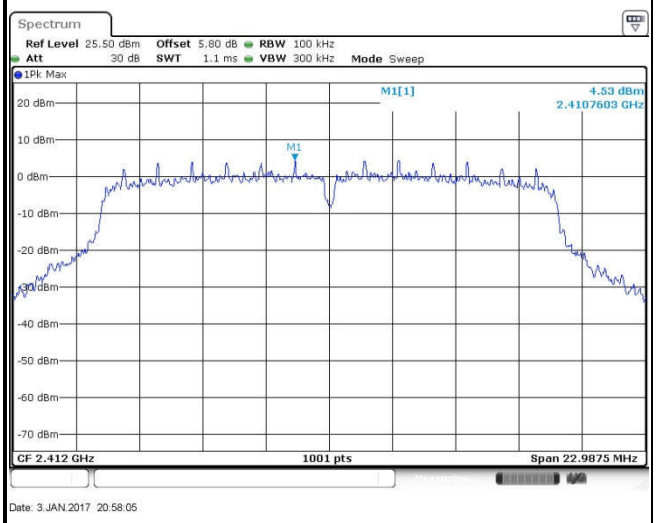
Spurious Emission 2GHz~25GHz



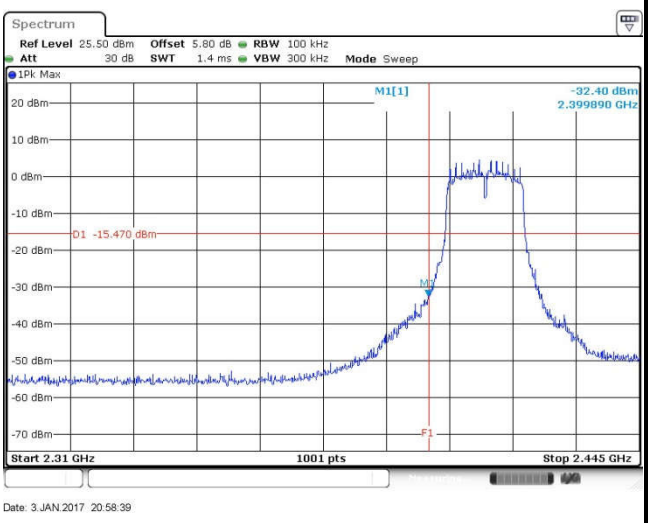
Test Mode :	802.11g	Temperature :	21~25℃
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Len Dong

WLAN 802.11g Channel 01

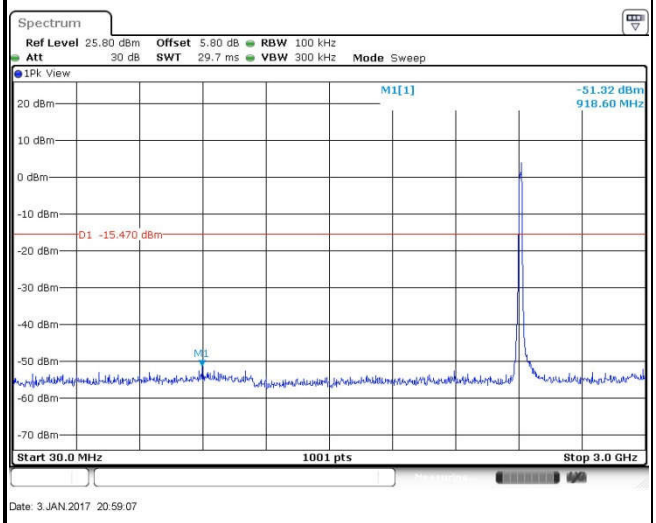
100kHz PSD reference Level



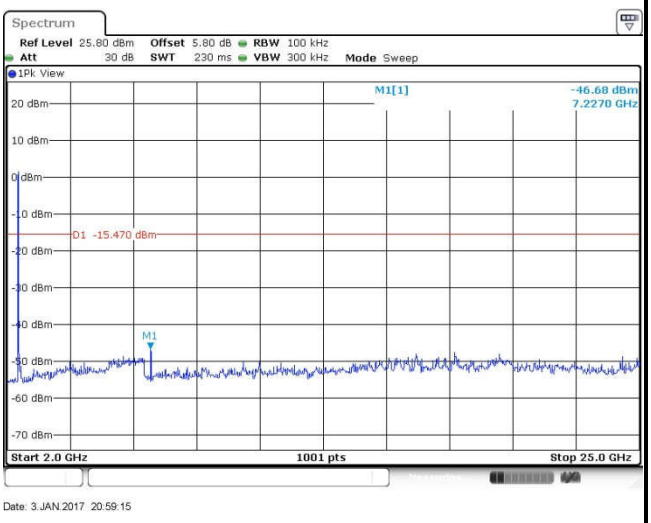
Low Channel Plot



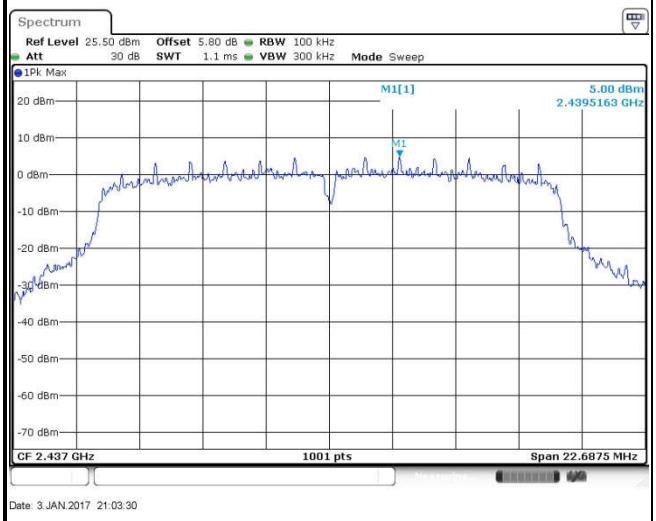
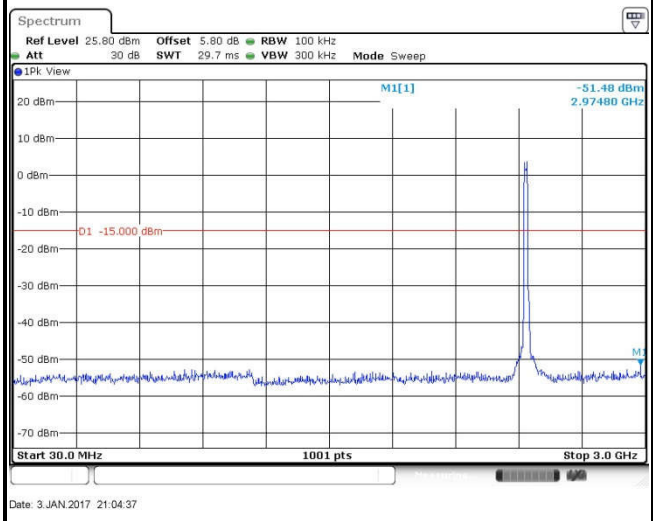
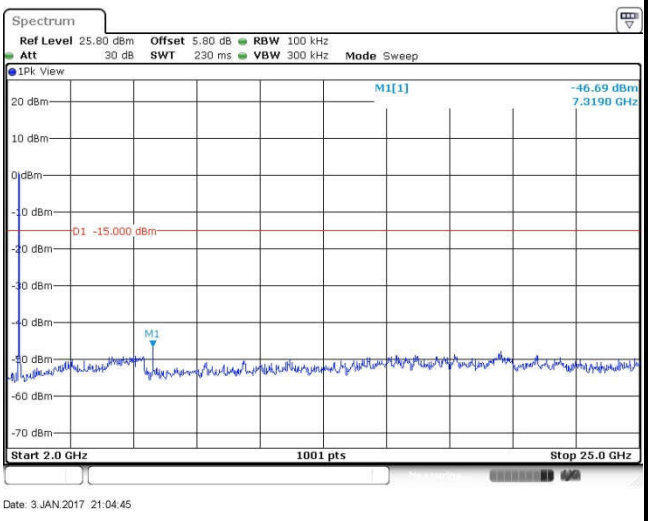
Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



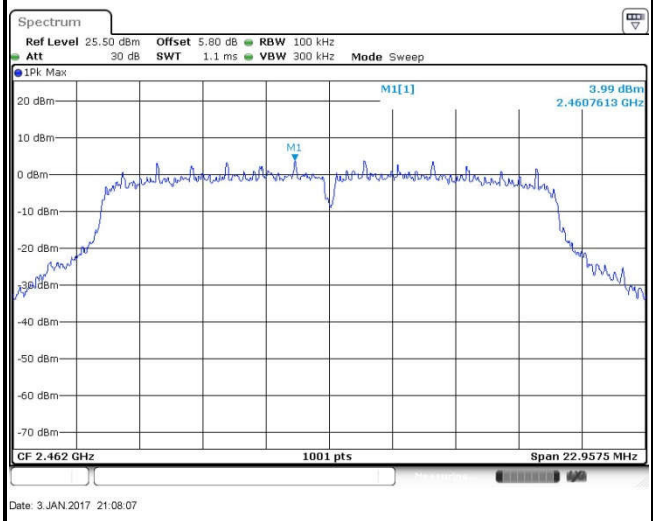
Test Mode :	802.11g	Temperature :	21~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Len Dong

WLAN 802.11g Channel 06	
100kHz PSD reference Level	
	
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

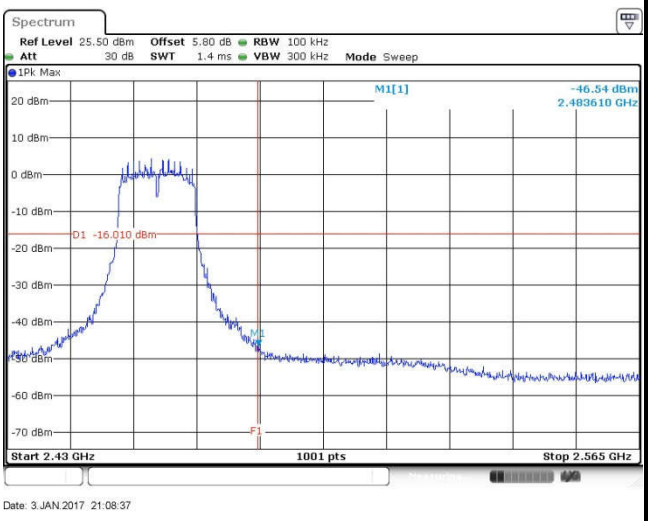
Test Mode :	802.11g	Temperature :	21~25℃
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Len Dong

WLAN 802.11g Channel 11

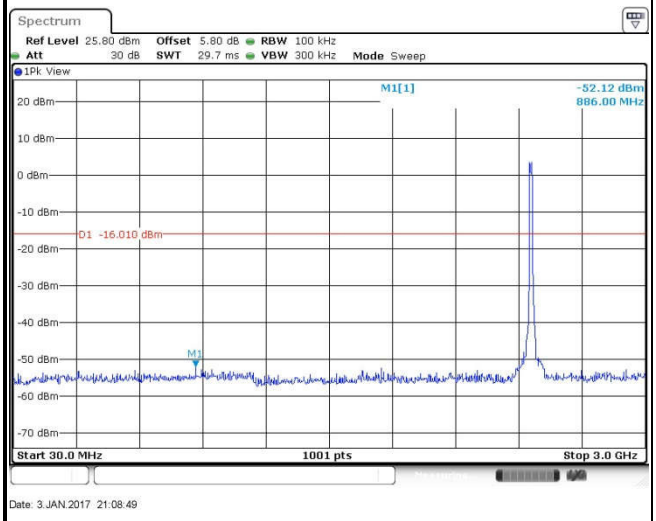
100kHz PSD reference Level



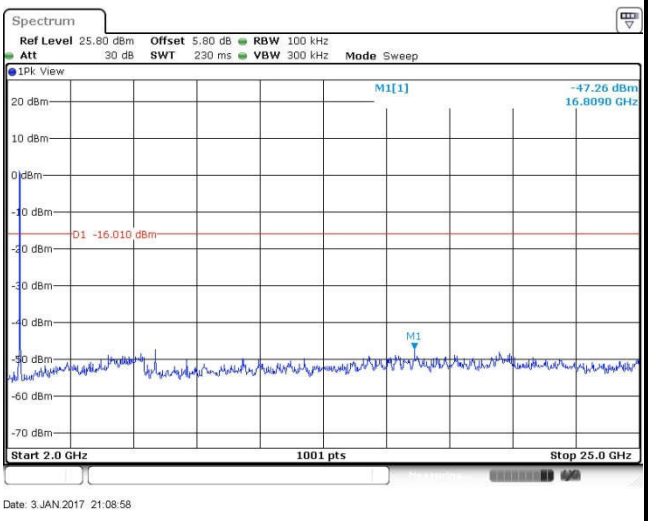
High Channel Plot



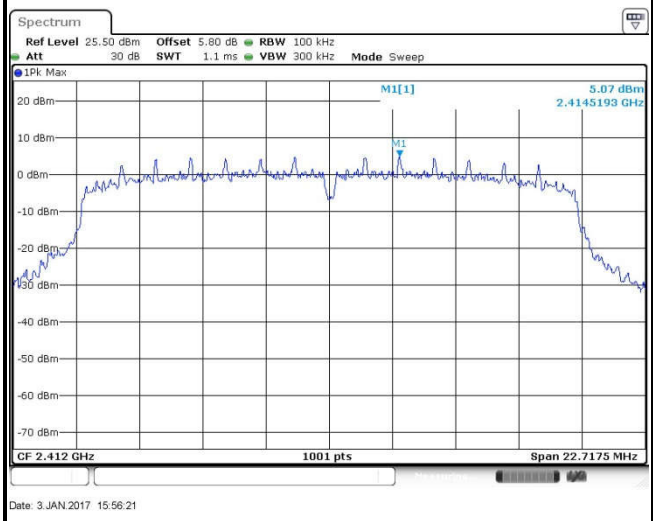
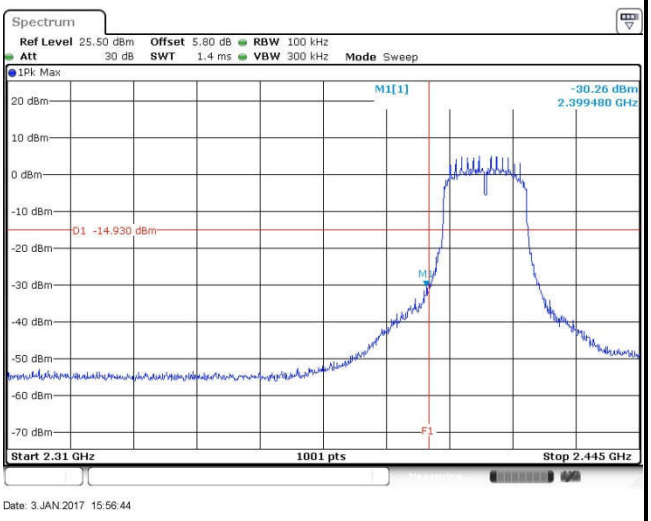
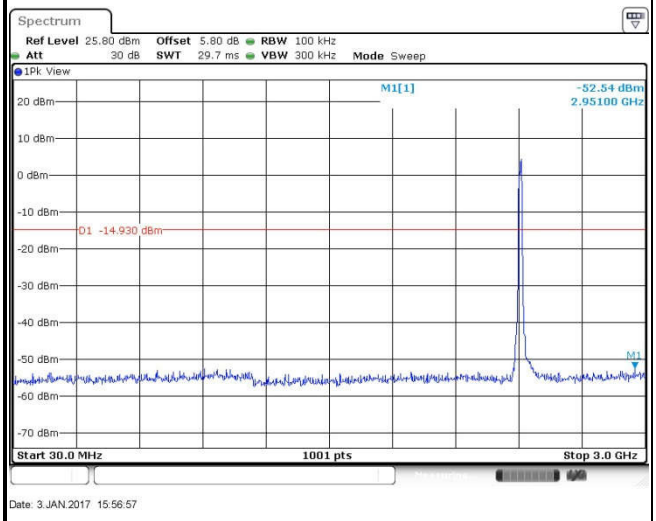
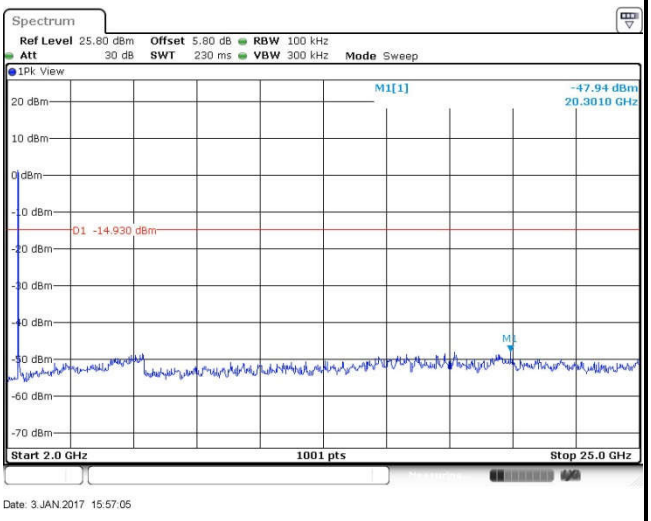
Spurious Emission 30MHz~3GHz



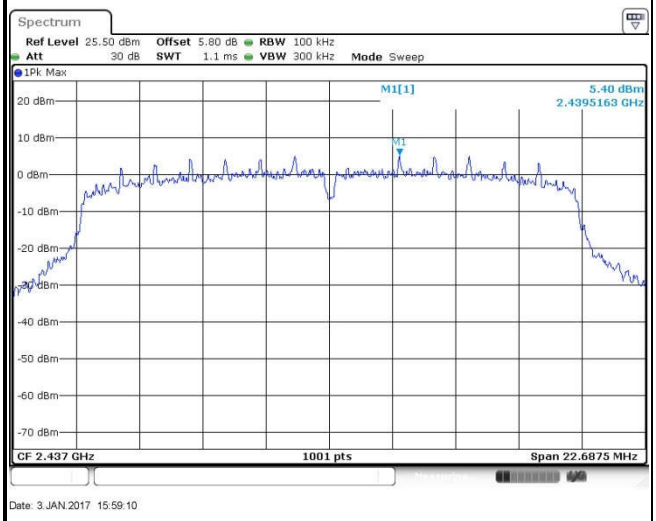
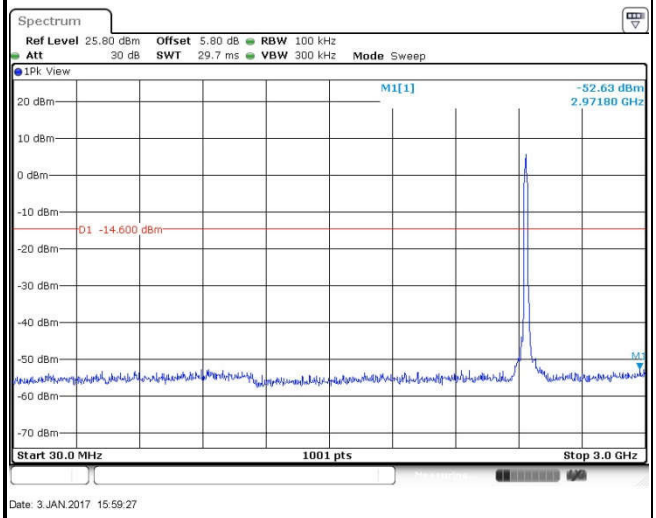
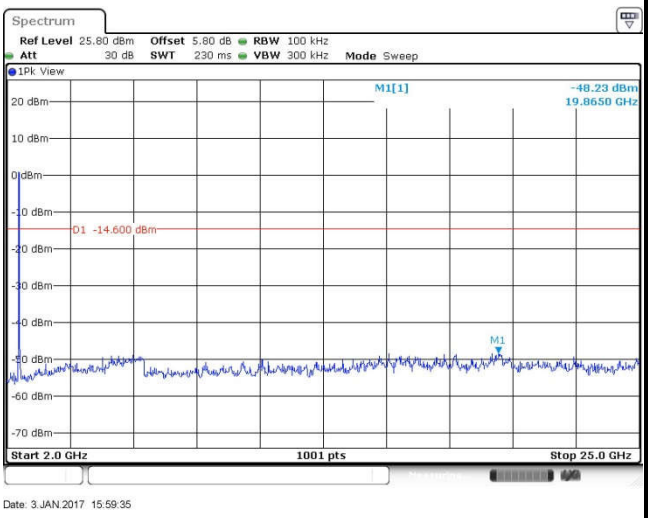
Spurious Emission 2GHz~25GHz



Test Mode :	802.11n HT20	Temperature :	21~25℃
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Len Dong

WLAN 802.11n HT20 Channel 01	
100kHz PSD reference Level	Low Channel Plot
	
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

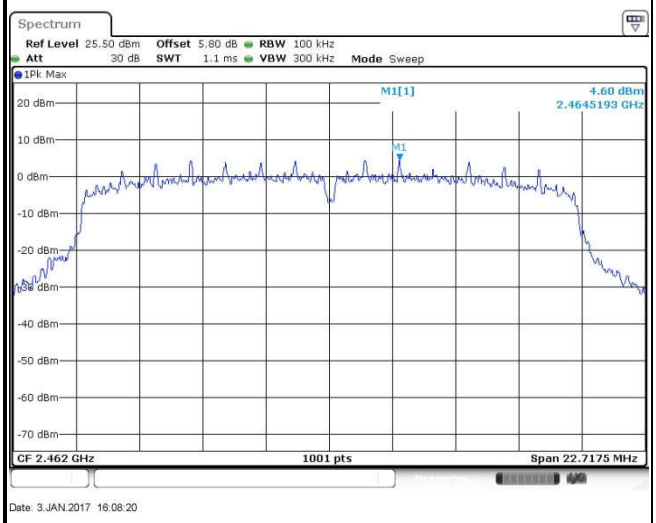
Test Mode :	802.11n HT20	Temperature :	21~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Len Dong

WLAN 802.11n HT20 Channel 06	
100kHz PSD reference Level	
	
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

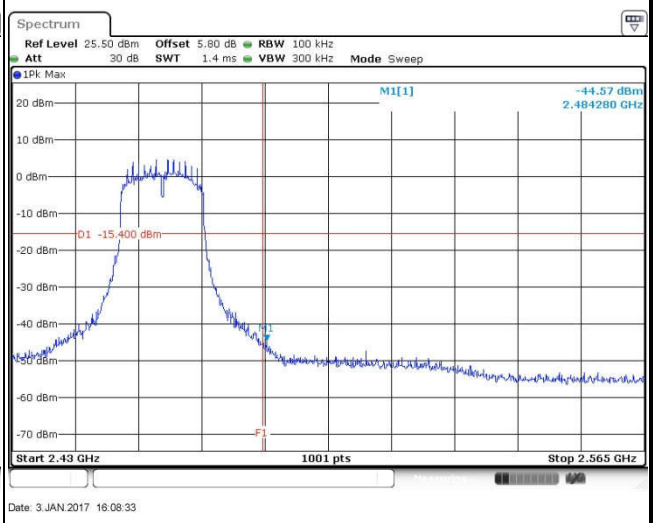
Test Mode :	802.11n HT20	Temperature :	21~25℃
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Len Dong

WLAN 802.11n HT20 Channel 11

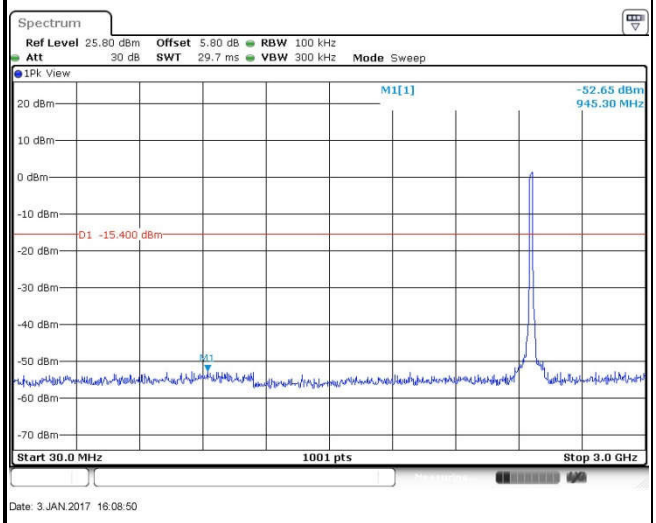
100kHz PSD reference Level



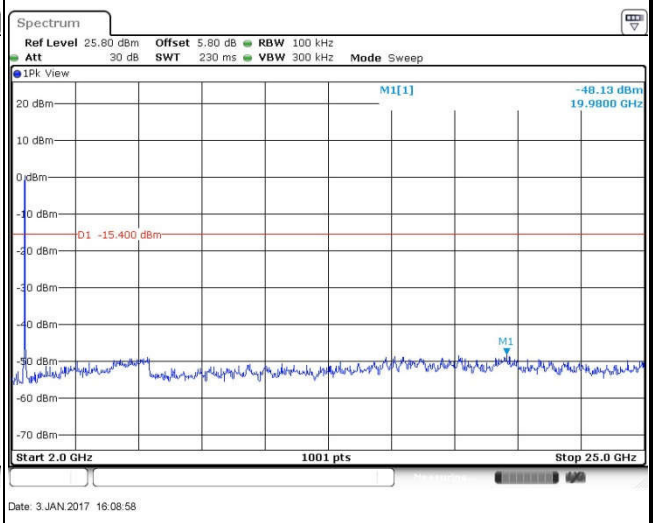
High Channel Plot



Spurious Emission 30MHz~3GHz



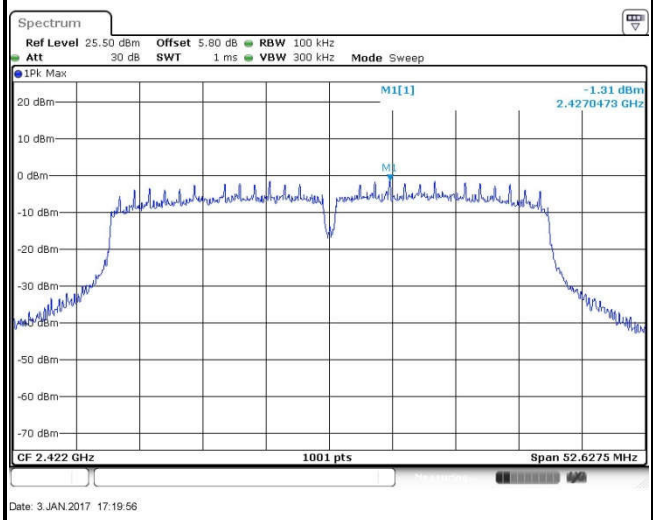
Spurious Emission 2GHz~25GHz



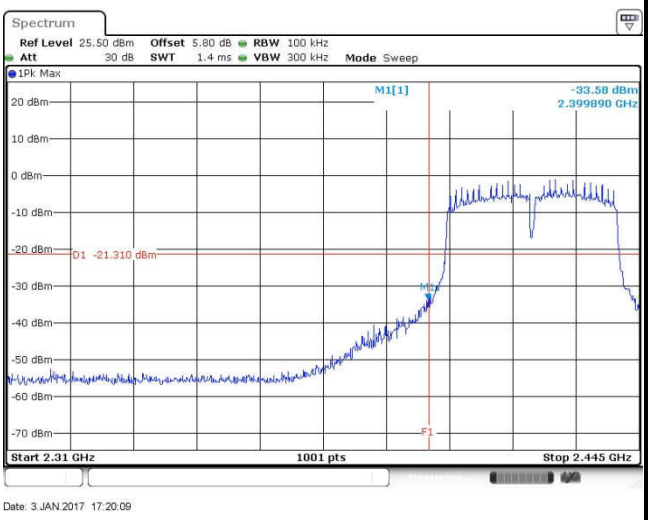
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	03	**Test Engineer :**	Len Dong

WLAN 802.11n HT40 Channel 03

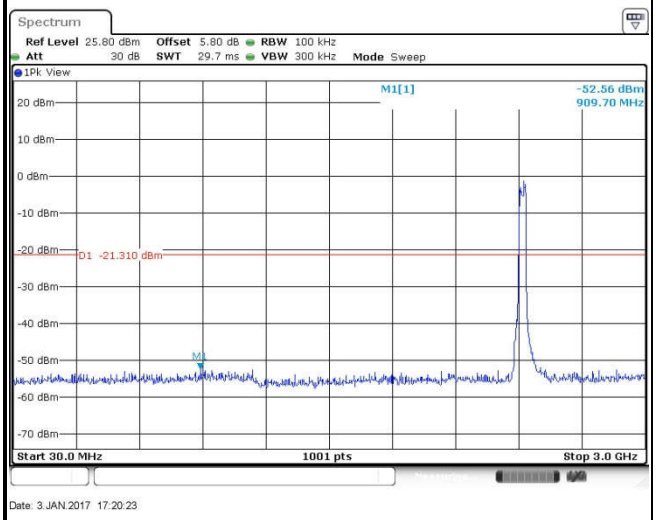
100kHz PSD reference Level



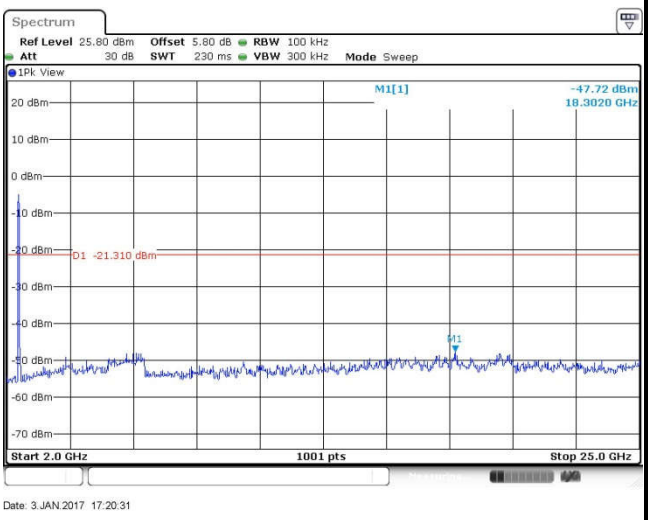
Low Channel Plot



Spurious Emission 30MHz~3GHz



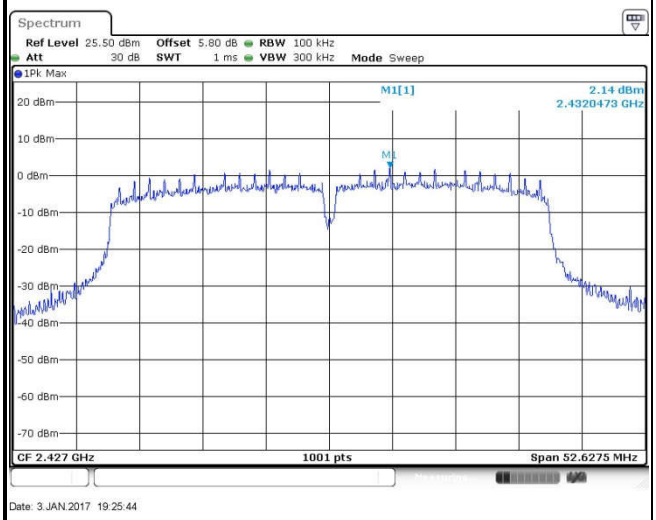
Spurious Emission 2GHz~25GHz



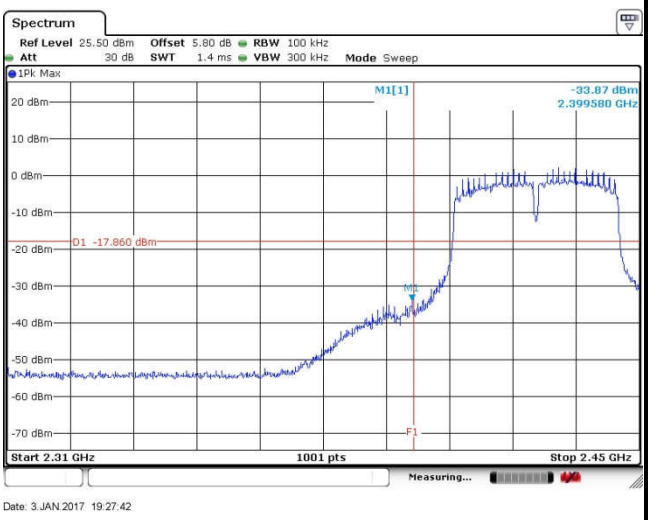
Test Mode :	802.11n HT40	Temperature :	21~25℃
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	04	Test Engineer :	Len Dong

WLAN 802.11n HT40 Channel 04

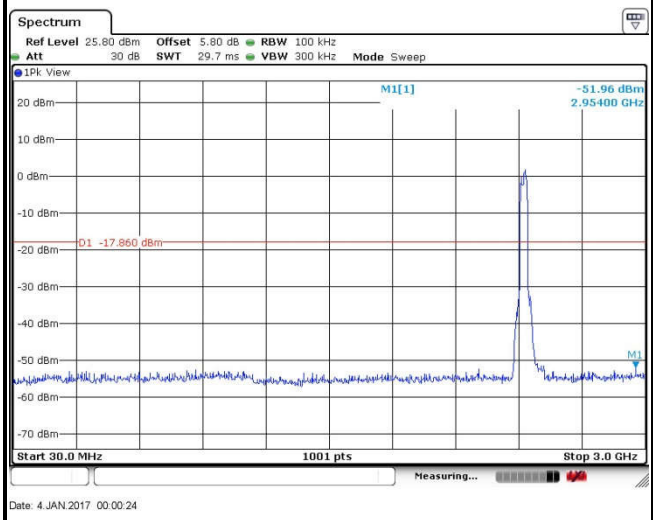
100kHz PSD reference Level



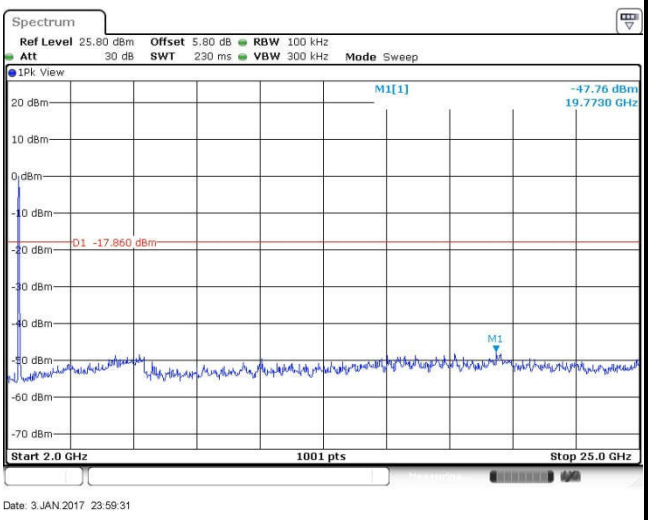
Low Channel Plot



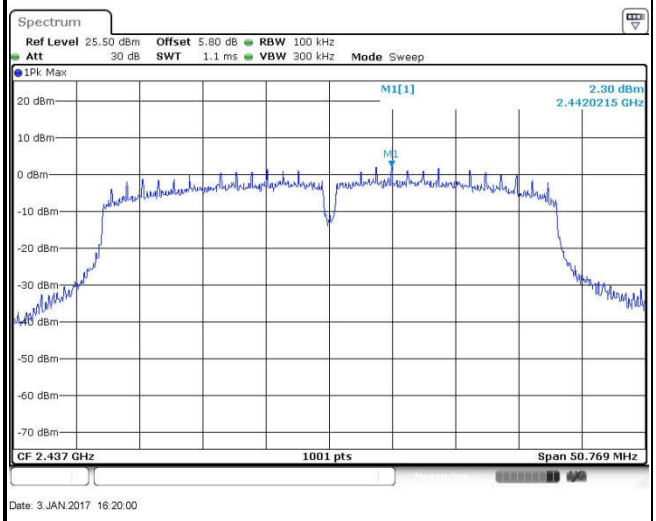
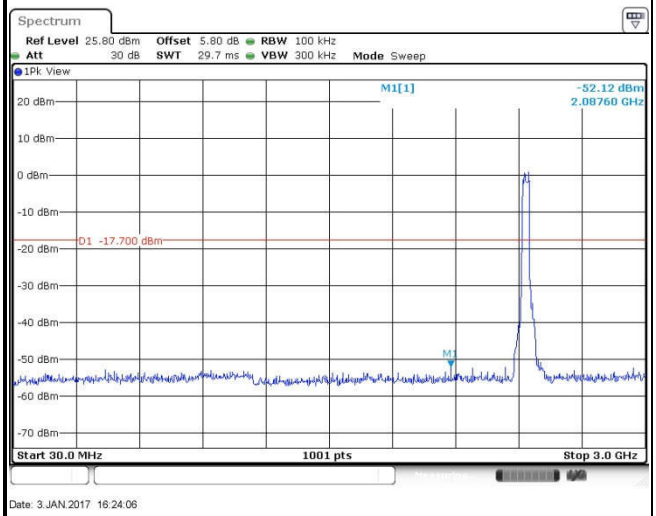
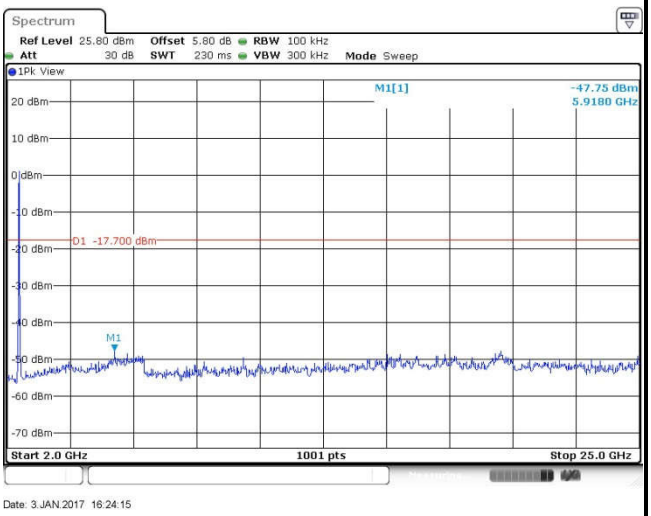
Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



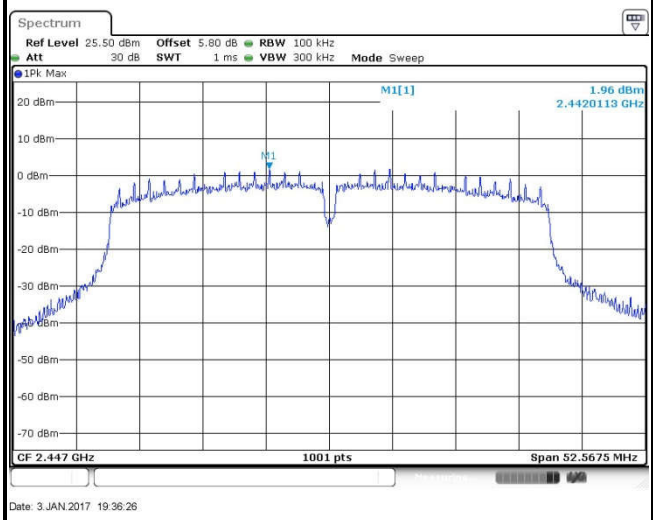
Test Mode :	802.11n HT40	Temperature :	21~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Len Dong

WLAN 802.11n HT40 Channel 06	
100kHz PSD reference Level	
	
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

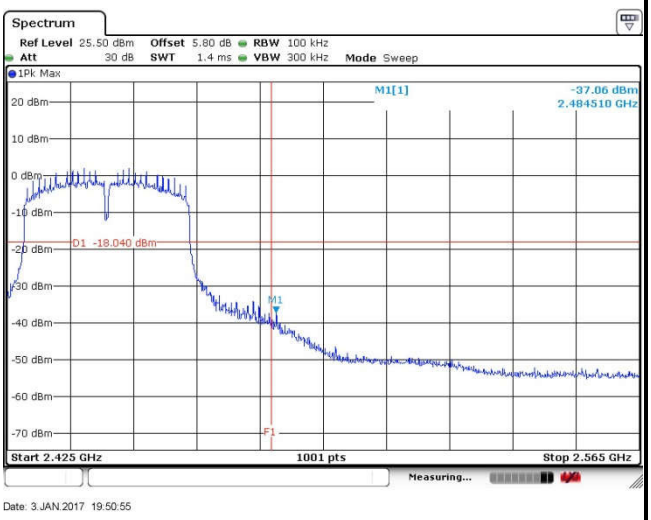
Test Mode :	802.11n HT40	Temperature :	21~25℃
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	08	Test Engineer :	Len Dong

WLAN 802.11n HT40 Channel 08

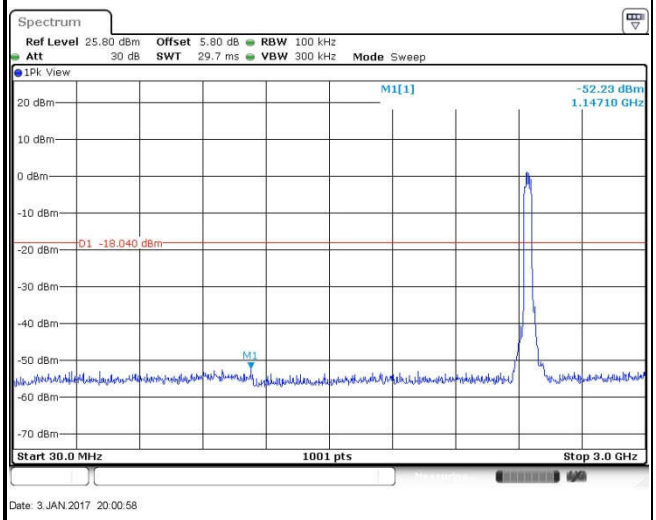
100kHz PSD reference Level



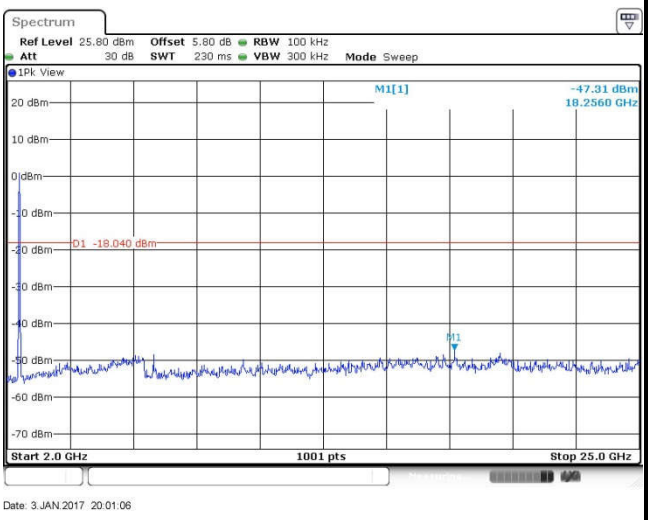
High Channel Plot



Spurious Emission 30MHz~3GHz



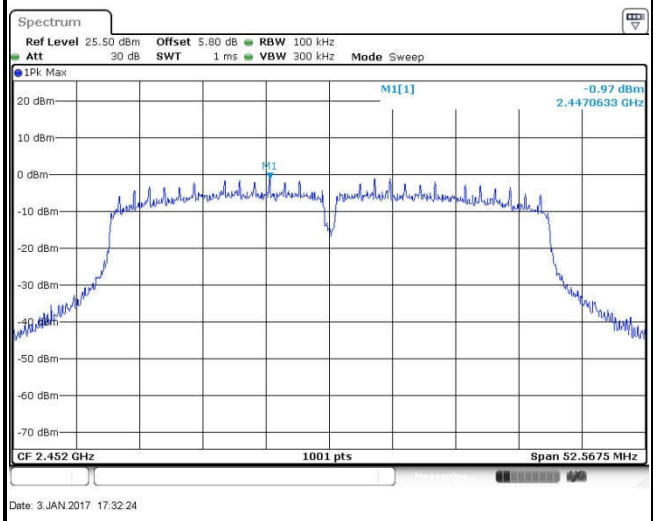
Spurious Emission 2GHz~25GHz



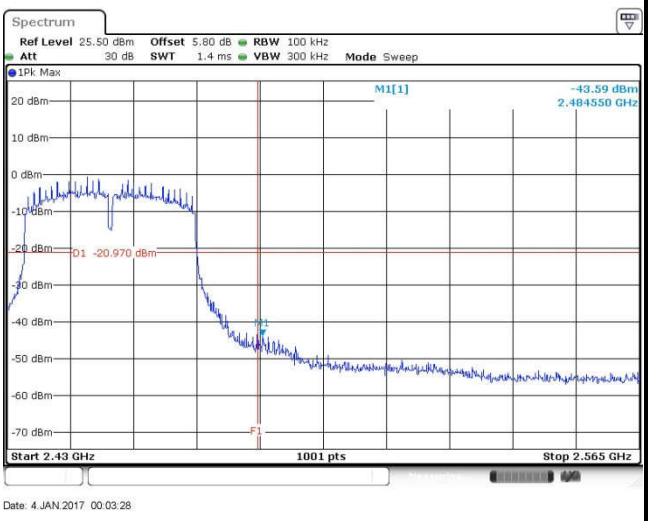
Test Mode :	802.11n HT40	Temperature :	21~25℃
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	09	Test Engineer :	Len Dong

WLAN 802.11n HT40 Channel 09

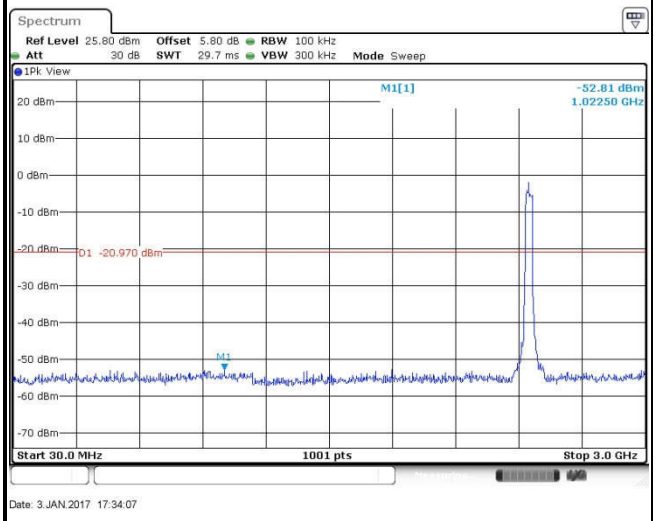
100kHz PSD reference Level



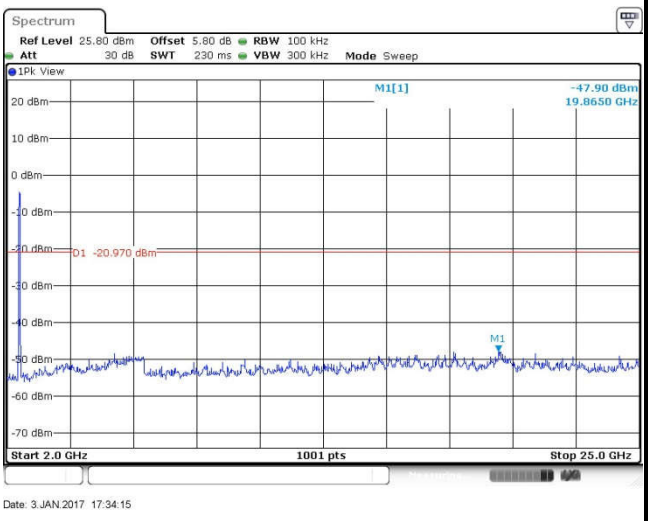
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



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

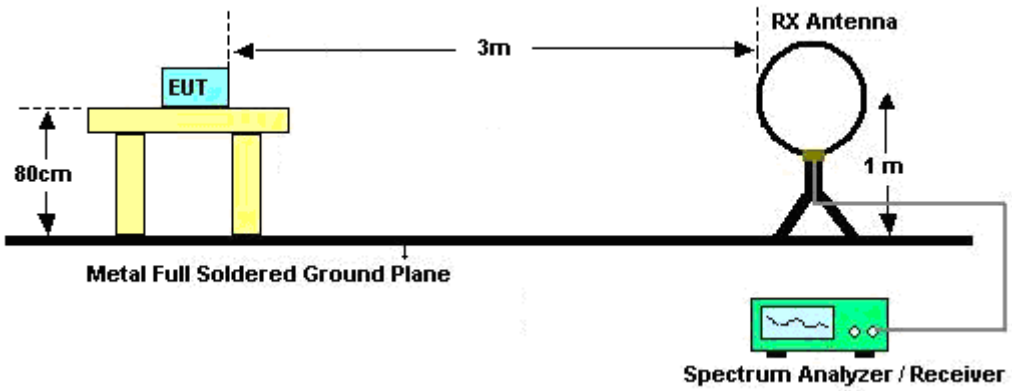
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

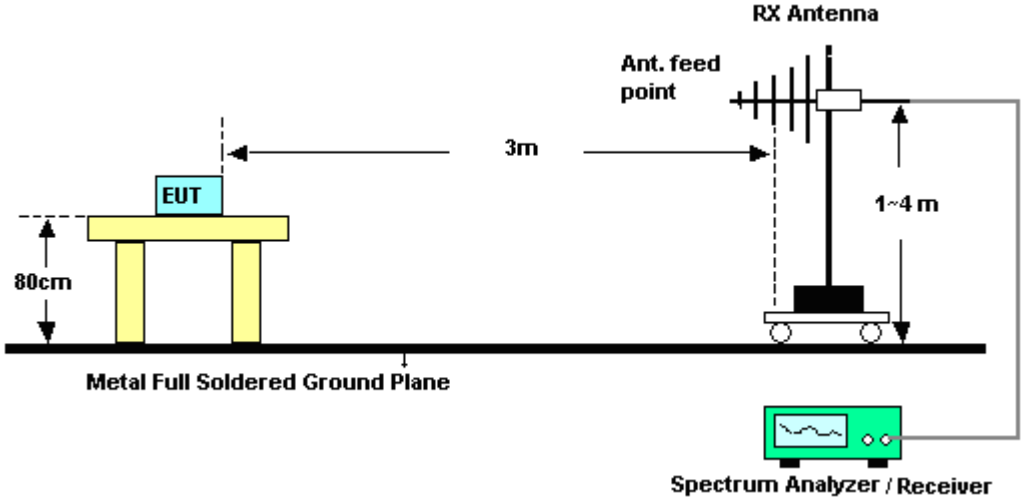
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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.

3.5.4 Test Setup

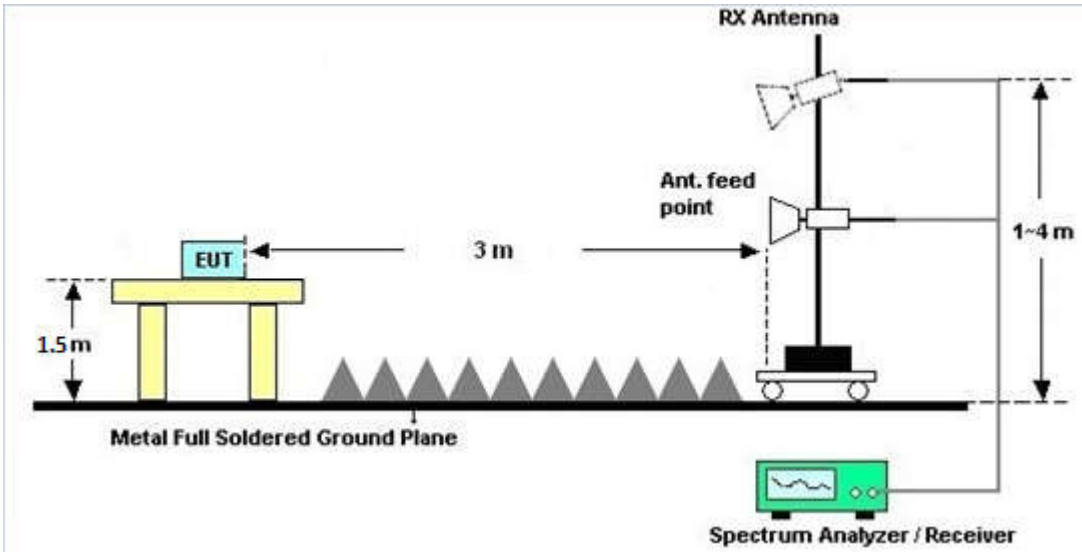
For radiated emissions below 30MHz



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 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix B.

3.6 Antenna Requirements

3.6.1 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. 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.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 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	FSV40	101040	10Hz~40GHz	Aug. 09, 2016	Jan. 03, 2014~ Jan. 04, 2014	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Jan. 03, 2014~ Jan. 04, 2014	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Jan. 03, 2014~ Jan. 04, 2014	Jan. 19, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Jan. 03, 2014~ Jan. 04, 2014	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Jan. 03, 2014~ Jan. 04, 2014	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Jan. 03, 2014~ Jan. 04, 2014	Nov. 22, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Jan. 03, 2014~ Jan. 04, 2014	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Jan. 03, 2014~ Jan. 04, 2014	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Jan. 03, 2014~ Jan. 04, 2014	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Jan. 03, 2014~ Jan. 04, 2014	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jan. 20, 2016	Jan. 03, 2014~ Jan. 04, 2014	Jan. 19, 2017	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	1943529	1GHz~18GHz	Jan. 20, 2016	Jan. 03, 2014~ Jan. 04, 2014	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Jan. 03, 2014~ Jan. 04, 2014	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 03, 2014~ Jan. 04, 2014	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 03, 2014~ Jan. 04, 2014	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 03, 2014~ Jan. 04, 2014	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5 dB**

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5 dB**

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.6 dB**

Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Len Dong	Temperature:	21~25	°C
Test Date:	2017/1/3~2017/1/4	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	13.34	8.03	0.50	Pass
11b	1Mbps	1	6	2437	13.24	8.05	0.50	Pass
11b	1Mbps	1	11	2462	13.34	8.05	0.50	Pass
11g	6Mbps	1	1	2412	16.78	15.33	0.50	Pass
11g	6Mbps	1	6	2437	16.68	15.13	0.50	Pass
11g	6Mbps	1	11	2462	16.73	15.31	0.50	Pass
HT20	MCS0	1	1	2412	17.78	15.15	0.50	Pass
HT20	MCS0	1	6	2437	17.68	15.13	0.50	Pass
HT20	MCS0	1	11	2462	17.73	15.15	0.50	Pass
HT40	MCS0	1	3	2422	36.16	35.09	0.50	Pass
HT40	MCS0	1	4	2427	36.06	35.09	0.50	Pass
HT40	MCS0	1	6	2437	35.86	33.85	0.50	Pass
HT40	MCS0	1	8	2447	35.96	35.05	0.50	Pass
HT40	MCS0	1	9	2452	35.96	35.05	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	18.45	30.00	1.00	19.45	36.00	Pass
11b	1Mbps	1	6	2437	18.52	30.00	1.00	19.52	36.00	Pass
11b	1Mbps	1	11	2462	18.12	30.00	1.00	19.12	36.00	Pass
11g	6Mbps	1	1	2412	21.01	30.00	1.00	22.01	36.00	Pass
11g	6Mbps	1	6	2437	21.05	30.00	1.00	22.05	36.00	Pass
11g	6Mbps	1	11	2462	20.31	30.00	1.00	21.31	36.00	Pass
HT20	MCS0	1	1	2412	21.85	30.00	1.00	22.85	36.00	Pass
HT20	MCS0	1	6	2437	21.73	30.00	1.00	22.73	36.00	Pass
HT20	MCS0	1	11	2462	21.22	30.00	1.00	22.22	36.00	Pass
HT40	MCS0	1	3	2422	18.14	30.00	1.00	19.14	36.00	Pass
HT40	MCS0	1	4	2427	21.53	30.00	1.00	22.53	36.00	Pass
HT40	MCS0	1	6	2437	21.74	30.00	1.00	22.74	36.00	Pass
HT40	MCS0	1	8	2447	21.51	30.00	1.00	22.51	36.00	Pass
HT40	MCS0	1	9	2452	18.06	30.00	1.00	19.06	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	0.03	15.84
11b	1Mbps	1	6	2437	0.03	15.97
11b	1Mbps	1	11	2462	0.03	15.59
11g	6Mbps	1	1	2412	0.21	14.94
11g	6Mbps	1	6	2437	0.21	14.98
11g	6Mbps	1	11	2462	0.21	14.43
HT20	MCS0	1	1	2412	0.22	15.18
HT20	MCS0	1	6	2437	0.22	15.16
HT20	MCS0	1	11	2462	0.22	14.73
HT40	MCS0	1	3	2422	0.38	11.31
HT40	MCS0	1	4	2427	0.38	14.87
HT40	MCS0	1	6	2437	0.38	14.93
HT40	MCS0	1	8	2447	0.38	14.65
HT40	MCS0	1	9	2452	0.38	11.37

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	-9.31	1.00	8.00	Pass
11b	1Mbps	1	6	2437	-9.45	1.00	8.00	Pass
11b	1Mbps	1	11	2462	-10.76	1.00	8.00	Pass
11g	6Mbps	1	1	2412	-11.54	1.00	8.00	Pass
11g	6Mbps	1	6	2437	-11.64	1.00	8.00	Pass
11g	6Mbps	1	11	2462	-12.45	1.00	8.00	Pass
HT20	MCS0	1	1	2412	-11.05	1.00	8.00	Pass
HT20	MCS0	1	6	2437	-11.33	1.00	8.00	Pass
HT20	MCS0	1	11	2462	-11.70	1.00	8.00	Pass
HT40	MCS0	1	3	2422	-17.07	1.00	8.00	Pass
HT40	MCS0	1	4	2427	-14.53	1.00	8.00	Pass
HT40	MCS0	1	6	2437	-14.00	1.00	8.00	Pass
HT40	MCS0	1	8	2447	-14.32	1.00	8.00	Pass
HT40	MCS0	1	9	2452	-16.62	1.00	8.00	Pass

Appendix B. Radiated Spurious Emission

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.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2385.27	55.06	-18.94	74	59.68	26.95	5.45	37.02	105	264	P	H
		2383.84	43.71	-10.29	54	48.33	26.95	5.45	37.02	105	264	A	H
	*	2414	104.46	-	-	108.86	27.13	5.47	37	105	264	P	H
	*	2414	101.24	-	-	105.64	27.13	5.47	37	105	264	A	H
		2389.69	53.67	-20.33	74	58.22	27	5.47	37.02	377	44	P	V
		2389.82	42.59	-11.41	54	47.14	27	5.47	37.02	377	44	A	V
	*	2412	103.93	-	-	108.33	27.13	5.47	37	377	44	P	V
	*	2410	100.56	-	-	104.96	27.13	5.47	37	377	44	A	V
802.11b CH 06 2437MHz		2389.82	51.98	-22.02	74	56.53	27	5.47	37.02	138	265	P	H
		2389.17	40.76	-13.24	54	45.31	27	5.47	37.02	138	265	A	H
	*	2436	104.35	-	-	108.6	27.26	5.48	36.99	138	265	P	H
	*	2436	100.98	-	-	105.23	27.26	5.48	36.99	138	265	A	H
		2489.74	53.15	-20.85	74	56.79	27.77	5.52	36.93	138	265	P	H
		2484.7	42.09	-11.91	54	45.88	27.64	5.51	36.94	138	265	A	H
		2388.65	50.57	-23.43	74	55.12	27	5.47	37.02	105	46	P	V
		2388.78	40	-14	54	44.55	27	5.47	37.02	105	46	A	V
	*	2436	100.61	-	-	104.86	27.26	5.48	36.99	105	46	P	V
	*	2436	97.3	-	-	101.55	27.26	5.48	36.99	105	46	A	V
		2490.64	52.44	-21.56	74	56.08	27.77	5.52	36.93	105	46	P	V
		2483.8	40.99	-13.01	54	44.78	27.64	5.51	36.94	105	46	A	V

802.11b CH 11 2462MHz	*	2462	105.39	-	-	109.34	27.51	5.5	36.96	105	263	P	H
	*	2462	102.07	-	-	106.02	27.51	5.5	36.96	105	263	A	H
		2485.9	57.36	-16.64	74	61.15	27.64	5.51	36.94	105	263	P	H
		2489.14	45.69	-8.31	54	49.33	27.77	5.52	36.93	105	263	A	H
	*	2462	101.26	-	-	105.21	27.51	5.5	36.96	100	66	P	V
	*	2460	97.89	-	-	101.84	27.51	5.5	36.96	100	66	A	V
		2493.88	54.13	-19.87	74	57.77	27.77	5.52	36.93	100	66	P	V
		2489.08	43.06	-10.94	54	46.7	27.77	5.52	36.93	100	66	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	50.78	-23.22	74	48.23	31.51	7.72	36.68	300	0	P	H
		4824	47.58	-26.42	74	45.03	31.51	7.72	36.68	300	41	P	V
802.11b CH 06 2437MHz		4872	44.85	-29.15	74	42.16	31.59	7.76	36.66	300	320	P	H
		7311	45.14	-28.86	74	38.04	34.03	9.76	36.69	300	320	P	H
		4872	42.47	-31.53	74	39.78	31.59	7.76	36.66	300	0	P	V
		7311	46.02	-27.98	74	38.92	34.03	9.76	36.69	300	0	P	V
802.11b CH 11 2462MHz		4926	48.59	-25.41	74	45.77	31.67	7.8	36.65	300	360	P	H
		7386	46.48	-27.52	74	39.11	34.29	9.86	36.78	300	360	P	H
		4926	45.48	-28.52	74	42.66	31.67	7.8	36.65	300	360	P	V
		7386	46.09	-27.91	74	38.72	34.29	9.86	36.78	300	360	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		2389.82	59.67	-14.33	74	64.22	27	5.47	37.02	103	267	P	H
	!	2389.95	48.13	-5.87	54	52.68	27	5.47	37.02	103	267	A	H
	*	2416	106.45	-	-	110.85	27.13	5.47	37	103	267	P	H
	*	2416	98.35	-	-	102.75	27.13	5.47	37	103	267	A	H
		2389.17	56.54	-17.46	74	61.09	27	5.47	37.02	380	32	P	V
		2389.95	45.72	-8.28	54	50.27	27	5.47	37.02	380	32	A	V
	*	2414	103.74	-	-	108.14	27.13	5.47	37	380	32	P	V
	*	2416	95.93	-	-	100.33	27.13	5.47	37	380	32	A	V
802.11g CH 06 2437MHz		2387.74	51.94	-22.06	74	56.49	27	5.47	37.02	355	91	P	H
		2388.78	42.22	-11.78	54	46.77	27	5.47	37.02	355	91	A	H
	*	2434	106.26	-	-	110.51	27.26	5.48	36.99	355	91	P	H
	*	2434	98.03	-	-	102.28	27.26	5.48	36.99	355	91	A	H
		2489.92	54.58	-19.42	74	58.22	27.77	5.52	36.93	355	91	P	H
		2483.68	44.19	-9.81	54	47.98	27.64	5.51	36.94	355	91	A	H
		2384.49	51.81	-22.19	74	56.43	26.95	5.45	37.02	321	29	P	V
		2388.13	41.25	-12.75	54	45.8	27	5.47	37.02	321	29	A	V
	*	2436	102.81	-	-	107.06	27.26	5.48	36.99	321	29	P	V
	*	2434	94.55	-	-	98.8	27.26	5.48	36.99	321	29	A	V
		2488.36	52.77	-21.23	74	56.41	27.77	5.52	36.93	321	29	P	V
		2484.16	42.16	-11.84	54	45.95	27.64	5.51	36.94	321	29	A	V

802.11g CH 11 2462MHz	*	2460	106.59	-	-	110.54	27.51	5.5	36.96	160	267	P	H
	*	2460	98.53	-	-	102.48	27.51	5.5	36.96	160	267	A	H
		2483.62	56.84	-17.16	74	60.63	27.64	5.51	36.94	160	267	P	H
		2483.5	46.93	-7.07	54	50.72	27.64	5.51	36.94	160	267	A	H
	*	2466	102.11	-	-	106.06	27.51	5.5	36.96	104	63	P	V
	*	2464	93.89	-	-	97.84	27.51	5.5	36.96	104	63	A	V
		2488.84	54.77	-19.23	74	58.41	27.77	5.52	36.93	104	63	P	V
		2483.56	44.39	-9.61	54	48.18	27.64	5.51	36.94	104	63	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	47.37	-26.63	74	44.82	31.51	7.72	36.68	100	360	P	H
		4824	43.08	-30.92	74	40.53	31.51	7.72	36.68	200	0	P	V
802.11g CH 06 2437MHz		4872	43	-31	74	40.31	31.59	7.76	36.66	100	360	P	H
		7311	45.15	-28.85	74	38.05	34.03	9.76	36.69	100	360	P	H
		4872	41.27	-32.73	74	38.58	31.59	7.76	36.66	100	360	P	V
		7311	45.11	-28.89	74	38.01	34.03	9.76	36.69	100	360	P	V
802.11g CH 11 2462MHz		4926	43.72	-30.28	74	40.9	31.67	7.8	36.65	100	360	P	H
		7386	45.35	-28.65	74	37.98	34.29	9.86	36.78	100	360	P	H
		4924	43.14	-30.86	74	40.32	31.67	7.8	36.65	100	360	P	V
		7386	45.72	-28.28	74	38.35	34.29	9.86	36.78	100	360	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)
802.11n HT20 CH 01 2412MHz		2389.95	59.51	-14.49	74	64.06	27	5.47	37.02	104	249	P	H
	!	2389.95	48.39	-5.61	54	52.94	27	5.47	37.02	104	249	A	H
	*	2416	104.76	-	-	109.16	27.13	5.47	37	104	249	P	H
	*	2416	96.71	-	-	101.11	27.13	5.47	37	104	249	A	H
		2389.56	59.01	-14.99	74	63.56	27	5.47	37.02	380	51	P	V
	!	2389.95	48.48	-5.52	54	53.03	27	5.47	37.02	380	51	A	V
	*	2414	105.66	-	-	110.06	27.13	5.47	37	380	51	P	V
	*	2414	97.54	-	-	101.94	27.13	5.47	37	380	51	A	V
802.11n HT20 CH 06 2437MHz		2387.87	52.5	-21.5	74	57.05	27	5.47	37.02	161	253	P	H
		2389.3	42.3	-11.7	54	46.85	27	5.47	37.02	161	253	A	H
	*	2434	104.22	-	-	108.47	27.26	5.48	36.99	161	253	P	H
	*	2434	96.12	-	-	100.37	27.26	5.48	36.99	161	253	A	H
		2485.36	54	-20	74	57.79	27.64	5.51	36.94	161	253	P	H
		2483.56	43.18	-10.82	54	46.97	27.64	5.51	36.94	161	253	A	H
		2388.65	51.79	-22.21	74	56.34	27	5.47	37.02	323	51	P	V
		2388.65	41.82	-12.18	54	46.37	27	5.47	37.02	323	51	A	V
	*	2436	104.96	-	-	109.21	27.26	5.48	36.99	323	51	P	V
	*	2436	96.86	-	-	101.11	27.26	5.48	36.99	323	51	A	V
		2485	53.96	-20.04	74	57.75	27.64	5.51	36.94	323	51	P	V
		2484.64	43.06	-10.94	54	46.85	27.64	5.51	36.94	323	51	A	V

802.11n HT20 CH 11 2462MHz	*	2460	104.65	-	-	108.6	27.51	5.5	36.96	161	253	P	H
	*	2460	96.29	-	-	100.24	27.51	5.5	36.96	161	253	A	H
		2487.16	55.66	-18.34	74	59.45	27.64	5.51	36.94	161	253	P	H
		2483.5	46.27	-7.73	54	50.06	27.64	5.51	36.94	161	253	A	H
	*	2460	104.27	-	-	108.22	27.51	5.5	36.96	367	53	P	V
	*	2460	96.11	-	-	100.06	27.51	5.5	36.96	367	53	A	V
		2484.46	55.93	-18.07	74	59.72	27.64	5.51	36.94	367	53	P	V
		2483.5	46.44	-7.56	54	50.23	27.64	5.51	36.94	367	53	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	45.1	-28.9	74	42.55	31.51	7.72	36.68	100	360	P	H
		4824	43.67	-30.33	74	41.12	31.51	7.72	36.68	100	360	P	V
802.11n HT20 CH 06 2437MHz		4872	42.07	-31.93	74	39.38	31.59	7.76	36.66	100	360	P	H
		7308	44.72	-29.28	74	37.62	34.03	9.76	36.69	100	360	P	H
		4872	41.91	-32.09	74	39.22	31.59	7.76	36.66	100	360	P	V
		7308	45.24	-28.76	74	38.14	34.03	9.76	36.69	100	360	P	V
802.11n HT20 CH 11 2462MHz		4926	44	-30	74	41.18	31.67	7.8	36.65	100	360	P	H
		7386	44.23	-29.77	74	36.86	34.29	9.86	36.78	100	360	P	H
		4926	43.37	-30.63	74	40.55	31.67	7.8	36.65	100	360	P	V
		7386	46.12	-27.88	74	38.75	34.29	9.86	36.78	100	360	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 HT40 (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)
802.11n HT40 CH 03 2422MHz		2388.52	61.75	-12.25	74	66.3	27	5.47	37.02	333	240	P	H
		2389.04	46.8	-7.2	54	51.35	27	5.47	37.02	333	240	A	H
	*	2424	99.26	-	-	103.51	27.26	5.48	36.99	333	240	P	H
	*	2426	91.49	-	-	95.74	27.26	5.48	36.99	333	240	A	H
		2483.5	53.44	-20.56	74	57.23	27.64	5.51	36.94	333	240	P	H
		2489.38	42.21	-11.79	54	45.85	27.77	5.52	36.93	333	240	A	H
		2388.52	62.7	-11.3	74	67.25	27	5.47	37.02	330	36	P	V
		2389.04	46.94	-7.06	54	51.49	27	5.47	37.02	330	36	A	V
	*	2426	99.52	-	-	103.77	27.26	5.48	36.99	330	36	P	V
	*	2426	91.51	-	-	95.76	27.26	5.48	36.99	330	36	A	V
		2484.58	54.89	-19.11	74	58.68	27.64	5.51	36.94	330	36	P	V
		2484.28	42.48	-11.52	54	46.27	27.64	5.51	36.94	330	36	A	V
802.11n HT40 CH 04 2427MHz		2388.13	63.51	-10.49	74	68.06	27	5.47	37.02	192	267	P	H
	!	2389.69	49.8	-4.2	54	54.35	27	5.47	37.02	192	267	A	H
	*	2432	102.96	-	-	107.21	27.26	5.48	36.99	192	267	P	H
	*	2432	94.83	-	-	99.08	27.26	5.48	36.99	192	267	A	H
		2388.39	62.4	-11.6	74	66.95	27	5.47	37.02	367	169	P	V
	!	2389.56	49.39	-4.61	54	53.94	27	5.47	37.02	367	169	A	V
	*	2430	100.5	-	-	104.75	27.26	5.48	36.99	367	169	P	V
	*	2420	92.74	-	-	96.99	27.26	5.48	36.99	367	169	A	V

		2389.56	61.47	-12.53	74	66.02	27	5.47	37.02	162	296	P	H
		2389.69	46.61	-7.39	54	51.16	27	5.47	37.02	162	296	A	H
	*	2434	102.26	-	-	106.51	27.26	5.48	36.99	162	296	P	H
	*	2430	94.5	-	-	98.75	27.26	5.48	36.99	162	296	A	H
802.11n		2494.84	60.96	-13.04	74	64.6	27.77	5.52	36.93	162	296	P	H
HT40		2483.68	46.82	-7.18	54	50.61	27.64	5.51	36.94	162	296	A	H
CH 06		2388.78	59.99	-14.01	74	64.54	27	5.47	37.02	108	67	P	V
2437MHz		2389.82	45.09	-8.91	54	49.64	27	5.47	37.02	108	67	A	V
	*	2436	99.43	-	-	103.68	27.26	5.48	36.99	108	67	P	V
	*	2434	91.56	-	-	95.81	27.26	5.48	36.99	108	67	A	V
		2483.98	59.43	-14.57	74	63.22	27.64	5.51	36.94	108	67	P	V
		2483.56	45.61	-8.39	54	49.4	27.64	5.51	36.94	108	67	A	V
	*	2438	102.9	-	-	106.99	27.39	5.49	36.97	320	91	P	H
	*	2444	95.33	-	-	99.42	27.39	5.49	36.97	320	91	A	H
802.11n		2485.9	64.38	-9.62	74	68.17	27.64	5.51	36.94	320	91	P	H
HT40	!	2483.68	50.46	-3.54	54	54.25	27.64	5.51	36.94	320	91	A	H
CH 08	*	2436	100.81	-	-	105.06	27.26	5.48	36.99	322	48	P	V
2447MHz	*	2436	92.77	-	-	97.02	27.26	5.48	36.99	322	48	A	V
		2487.16	60.24	-13.76	74	64.03	27.64	5.51	36.94	322	48	P	V
		2485.06	46.99	-7.01	54	50.78	27.64	5.51	36.94	322	48	A	V

		2388.39	57.07	-16.93	74	61.62	27	5.47	37.02	196	280	P	H
		2389.56	42.48	-11.52	54	47.03	27	5.47	37.02	196	280	A	H
	*	2448	99.51	-	-	103.6	27.39	5.49	36.97	196	280	P	H
	*	2446	91.75	-	-	95.84	27.39	5.49	36.97	196	280	A	H
802.11n		2486.38	64.23	-9.77	74	68.02	27.64	5.51	36.94	196	280	P	H
HT40	!	2484.4	49.61	-4.39	54	53.4	27.64	5.51	36.94	196	280	A	H
CH 09		2388.78	57.76	-16.24	74	62.31	27	5.47	37.02	363	43	P	V
2452MHz		2388.65	42.48	-11.52	54	47.03	27	5.47	37.02	363	43	A	V
	*	2446	98.77	-	-	102.86	27.39	5.49	36.97	363	43	P	V
	*	2440	91.81	-	-	95.9	27.39	5.49	36.97	363	43	A	V
		2484.82	61.82	-12.18	74	65.61	27.64	5.51	36.94	363	43	P	V
		2484.4	46.85	-7.15	54	50.64	27.64	5.51	36.94	363	43	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 HT40 (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		4854	43.43	-30.57	74	40.79	31.56	7.75	36.67	200	0	P	H
HT40		7284	46.68	-27.32	74	39.64	33.98	9.74	36.68	200	0	P	H
CH 03		4854	41.92	-32.08	74	39.28	31.56	7.75	36.67	100	0	P	V
2422MHz		7281	45.24	-28.76	74	38.25	33.93	9.72	36.66	100	0	P	V
802.11n		4854	43.43	-30.57	74	40.79	31.56	7.75	36.67	200	0	P	H
HT40		7284	46.68	-27.32	74	39.64	33.98	9.74	36.68	200	0	P	H
CH 04		4854	41.92	-32.08	74	39.28	31.56	7.75	36.67	100	0	P	V
2427MHz		7281	45.24	-28.76	74	38.25	33.93	9.72	36.66	100	0	P	V
802.11n		4872	42.44	-31.56	74	39.75	31.59	7.76	36.66	100	360	P	H
HT40		7308	47.05	-26.95	74	39.95	34.03	9.76	36.69	100	360	P	H
CH 06		4872	41.57	-32.43	74	38.88	31.59	7.76	36.66	100	360	P	V
2437MHz		7308	45.24	-28.76	74	38.14	34.03	9.76	36.69	100	360	P	V
802.11n		4896	43.34	-30.66	74	40.62	31.61	7.77	36.66	100	360	P	H
HT40		7341	46.31	-27.69	74	39.11	34.13	9.8	36.73	100	360	P	H
CH 08		4896	42.17	-31.83	74	39.45	31.61	7.77	36.66	100	360	P	V
2447MHz		7341	44.76	-29.24	74	37.56	34.13	9.8	36.73	100	360	P	V
802.11n		4896	43.34	-30.66	74	40.62	31.61	7.77	36.66	100	360	P	H
HT40		7341	46.31	-27.69	74	39.11	34.13	9.8	36.73	100	360	P	H
CH 09		4896	42.17	-31.83	74	39.45	31.61	7.77	36.66	100	360	P	V
2452MHz		7341	44.76	-29.24	74	37.56	34.13	9.8	36.73	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (LF)

WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT40 LF		66.86	33.8	-6.2	40	50.85	13.46	0.98	31.49	100	360	P	H
		96.93	30.5	-13	43.5	42.1	18.66	1.19	31.45	-	-	P	H
		152.22	34.16	-9.34	43.5	46.4	17.82	1.49	31.55	-	-	P	H
		295.78	30.95	-15.05	46	41.37	18.85	2.1	31.37	-	-	P	H
		338.46	31.62	-14.38	46	39.85	20.76	2.26	31.25	-	-	P	H
		589.69	27.78	-18.22	46	31.79	24.56	3.04	31.61	-	-	P	H
		33.88	32.27	-7.73	40	37.06	25.84	0.7	31.33	-	-	P	V
		66.86	33.3	-6.7	40	50.35	13.46	0.98	31.49	100	10	P	V
		97.9	34.14	-9.36	43.5	45.64	18.74	1.2	31.44	-	-	P	V
		152.22	31.81	-11.69	43.5	44.05	17.82	1.49	31.55	-	-	P	V
		335.55	29.29	-16.71	46	37.63	20.67	2.25	31.26	-	-	P	V
		524.7	29.47	-16.53	46	33.75	24.06	2.87	31.21	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(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)

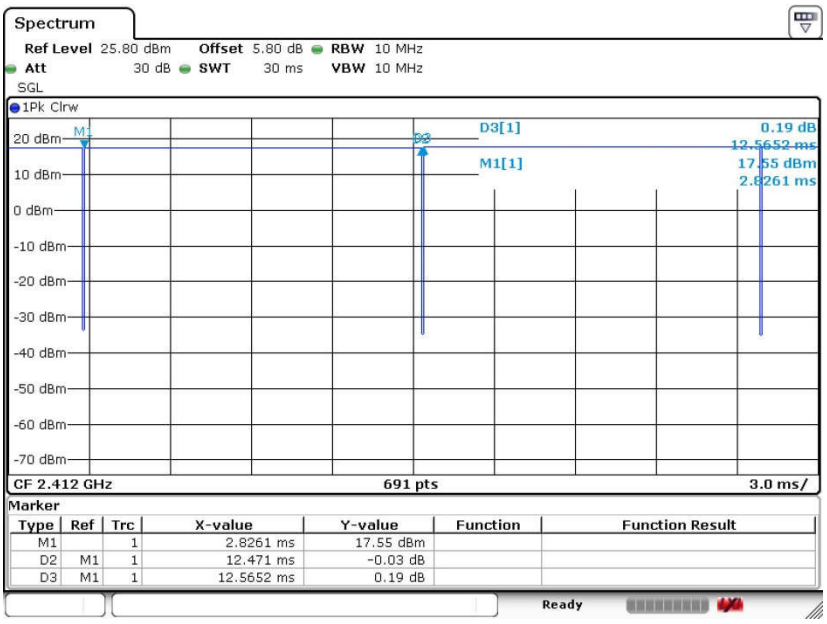
= -10.46(dB)

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

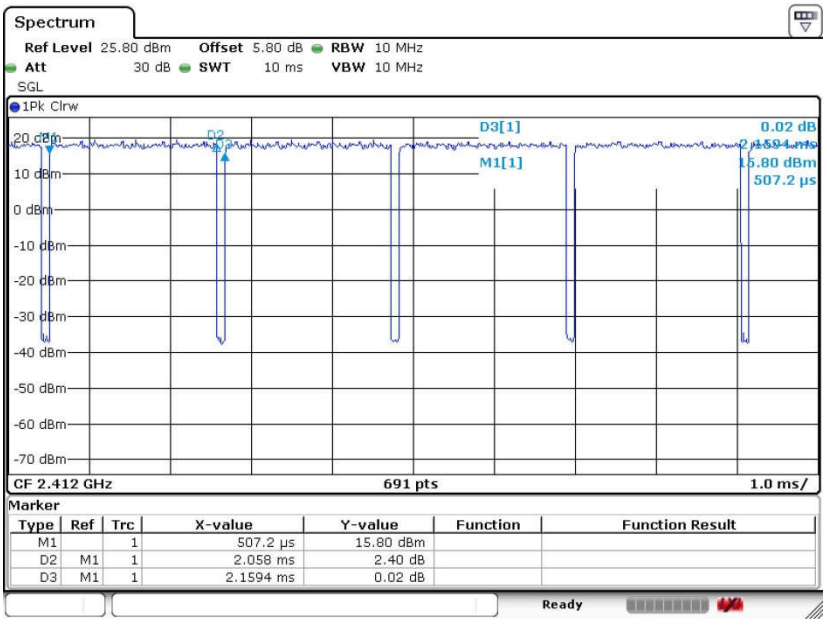
Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.25	-	-	10Hz
802.11g	95.30	2.06	0.49	1kHz
802.11n HT20	95.00	1.93	0.52	1kHz
802.11n HT40	91.61	0.95	1.05	3kHz

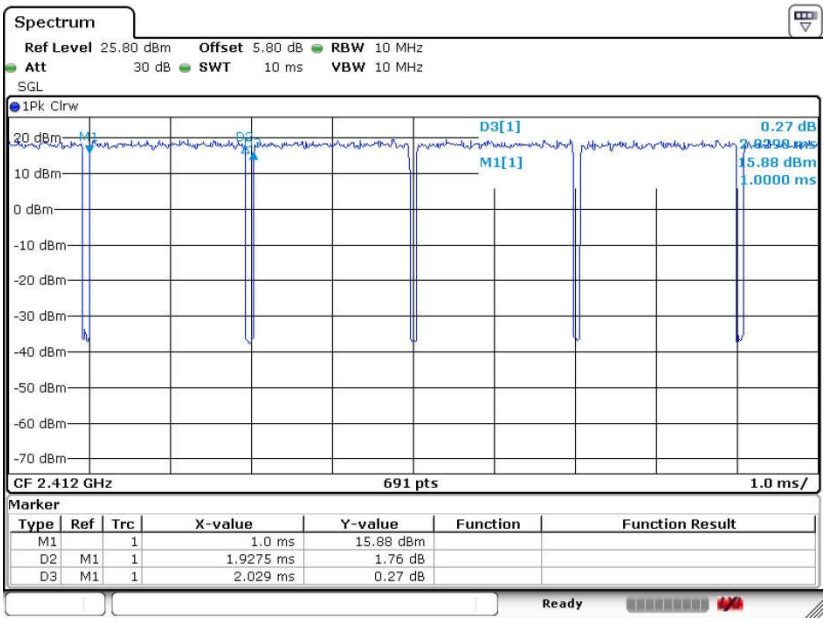
802.11b



802.11g



802.11n HT20



802.11n HT40