FCC RF Test Report

APPLICANT	**:**	**BYD Precision Manufacture Co., Ltd.**
EQUIPMENT	**:**	**Trident**
BRAND NAME	**:**	**iRobot**
MODEL NAME	**:**	**AXC-Y1**
FCC ID	**:**	**ZW9AXCY1**
STANDARD	**:**	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	**:**	**(DTS) Digital Transmission System**

The product was received on May 29, 2018 and testing was completed on Jun. 16, 2018. 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

Approved by: James Huang / Manager

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TESTING
NVLAP LAB CODE 600155-0

Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR852902B	Rev. 01	Initial issue of report	Jun. 22, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
-	-	99% Bandwidth	-	Not Required	-
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 4.62 dB at 2483.51 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Required	-
3.6	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Remark: Not required means after assessing, test items are not necessary to carry out.

1 General Description

1.1 Applicant

BYD Precision Manufacture Co., Ltd.
No.3001, Bao He Road, Baolong Industry Zone, Longgang, Shenzhen, Guangdong Province, P.R.China

1.2 Manufacturer

Huizhou BYD Electronic Co.,Ltd.
Xiangshui River, Economic Development Zone, Daya Bay, Huizhou, Guangdong Province, P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Trident
Brand Name	iRobot
Model Name	AXC-Y1
FCC ID	ZW9AXCY1
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40/ Bluetooth v4.0 LE /Bluetooth v4.2 LE
HW Version	Trident LV
SW Version	Trident_00.00.29_20180208
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. This is a variant report for AXC-Y1. The product equality declaration could be referred to Appendix E. Based on the similarity between current and previous project, only the Conducted test items and worst case of Radiated Emission from original test report (Sporton Report Number FR792901-03B) were verified for the differences.

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 : 17.16 dBm (0.0520 W) 802.11g : 20.82 dBm (0.1208 W) 802.11n HT20 : 20.32 dBm (0.1076 W)
Antenna Type / Gain	Please see Remark 1
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

Remark:

1. The antenna provided to the EUT, please refer to the following table:

2. We only evaluate the Antenna of max Gain to test.

Antenna No.	Brand	Model	Gain(dBi)	Antenna Type	Frequency range (GHz to GHz)	Cable length (mm)
1(External)	Laird	EMN2449A 2S-25UFL	3.50	PCB dipole antenna	2.4-2.4835	250
1(External)	Laird	EMN2449A 2S-25UFL	5.75	PCB dipole antenna	5.15-5.25	250
1(External)	Laird	EMN2449A 2S-25UFL	6.26	PCB dipole antenna	5.25-5.35	250
1(External)	Laird	EMN2449A 2S-25UFL	6.24	PCB dipole antenna	5.47-5.725	250
1(External)	Laird	EMN2449A 2S-25UFL	5.18	PCB dipole antenna	5.725-5.85	250

Antenna No.	Brand	Model	Gain(dBi)	Antenna Type	Frequency range (GHz to GHz)	Cable length (mm)
2(External)	Laird	MAF94264	3.33	PCB dipole antenna	2.4-2.4835	80
2(External)	Laird	MAF94264	5.52	PCB dipole antenna	5.15-5.25	80
2(External)	Laird	MAF94264	6.14	PCB dipole antenna	5.25-5.35	80
2(External)	Laird	MAF94264	6.06	PCB dipole antenna	5.47-5.725	80
2(External)	Laird	MAF94264	5.33	PCB dipole antenna	5.725-5.85	80

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**		**FCC Test Firm Registration No.**
	TH01-KS	03CH02-KS	630927

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 v04
- 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: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

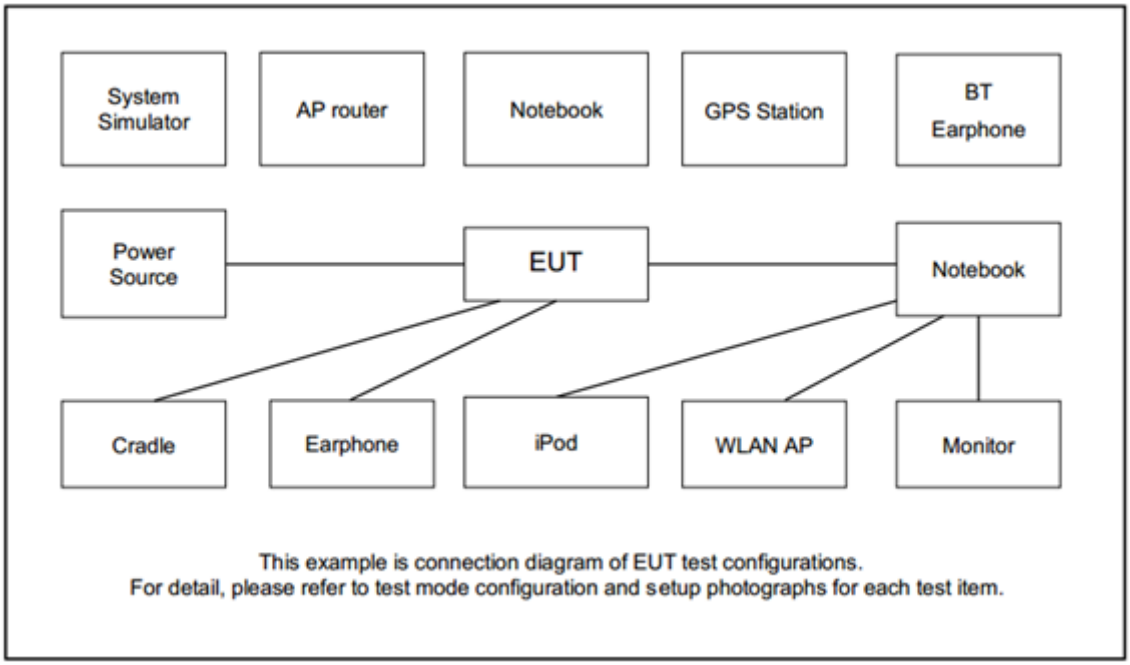
2.1 Carrier Frequency and Channel

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

Modulation	Data Rate
802.11g	**6 Mbps**

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.	Battery	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Dell	Latitude3440	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	USB Cable	N/A	N/A	N/A	Unshielded, 1.2m	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously 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 Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

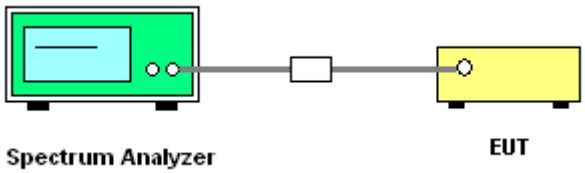
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

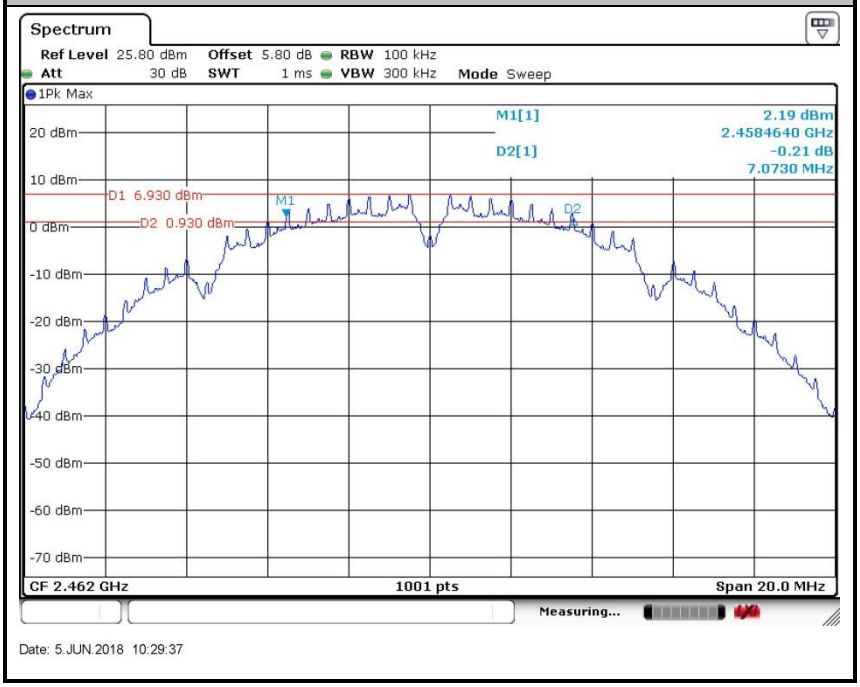
3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

Minimum 6dB Bandwidth



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 with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

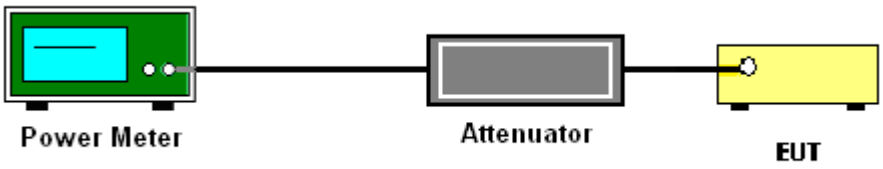
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.3 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.

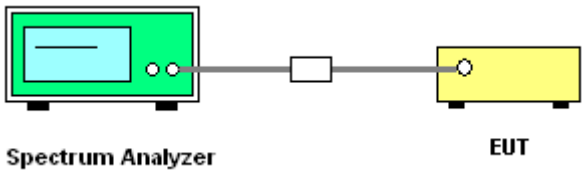
3.3.2 Measuring Instruments

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 v04
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.

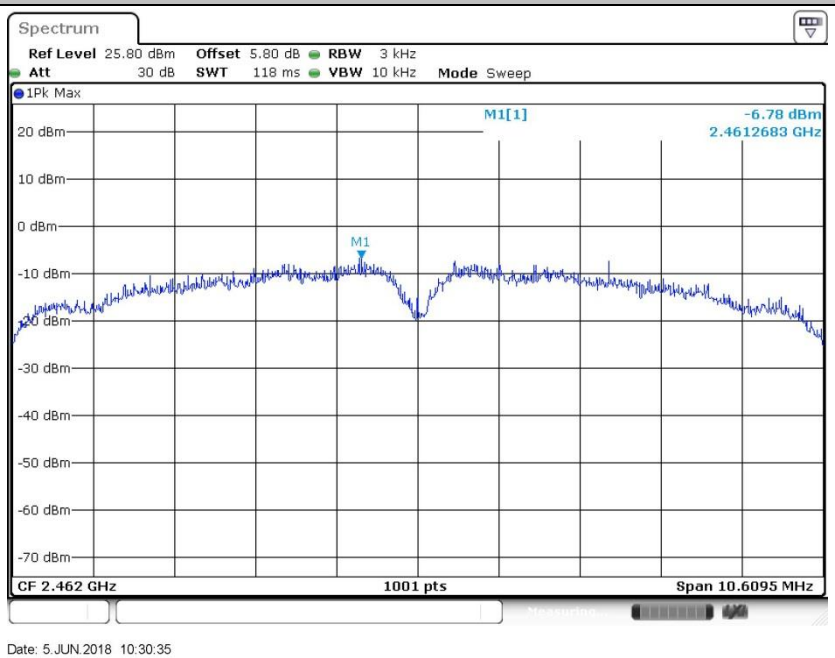
3.3.4 Test Setup



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.

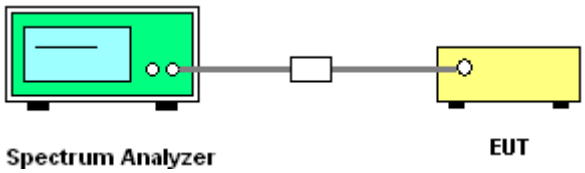
3.4.2 Measuring Instruments

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 v04.
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.

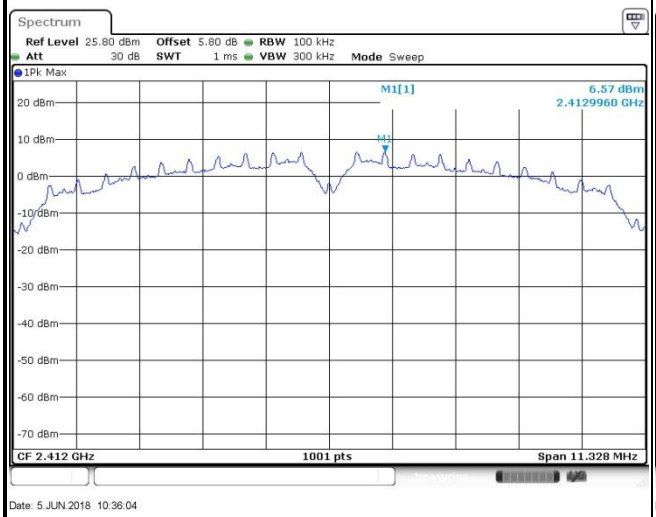
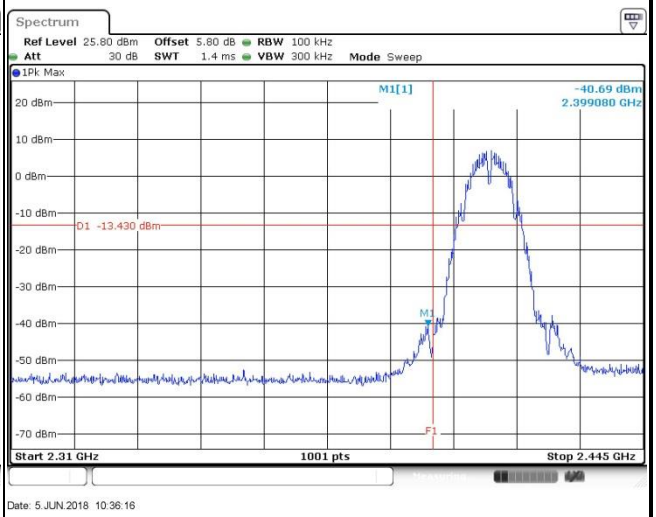
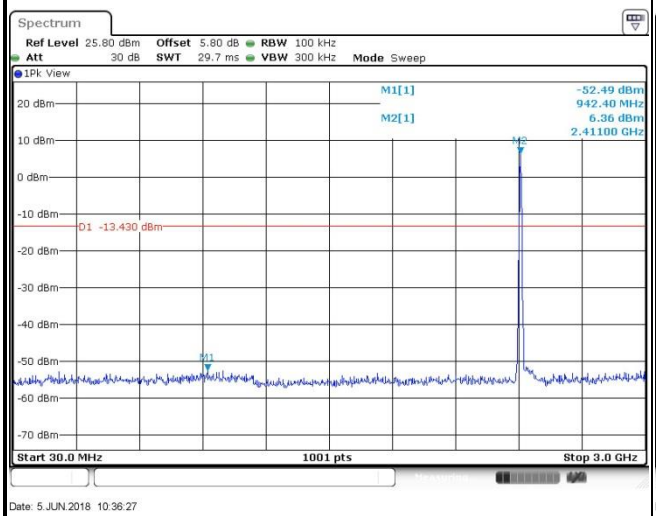
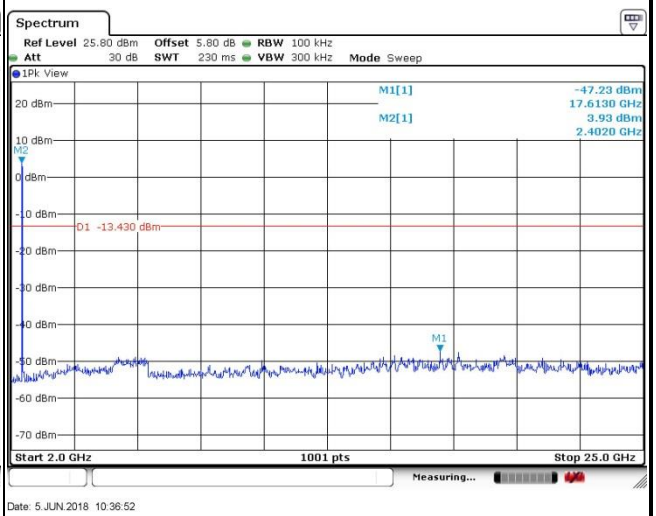
3.4.4 Test Setup



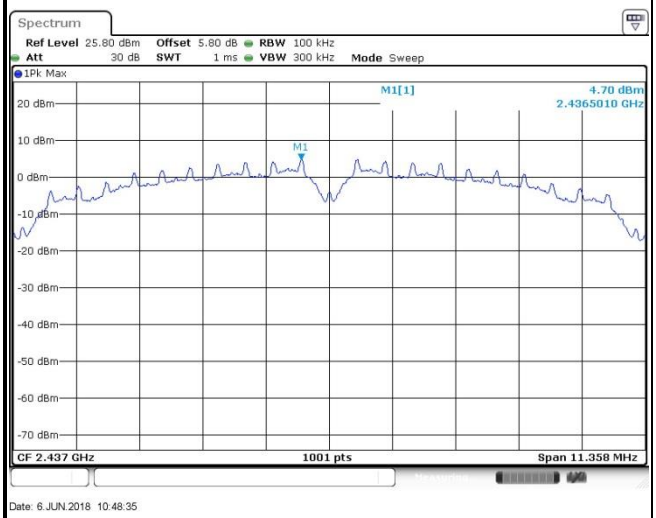
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

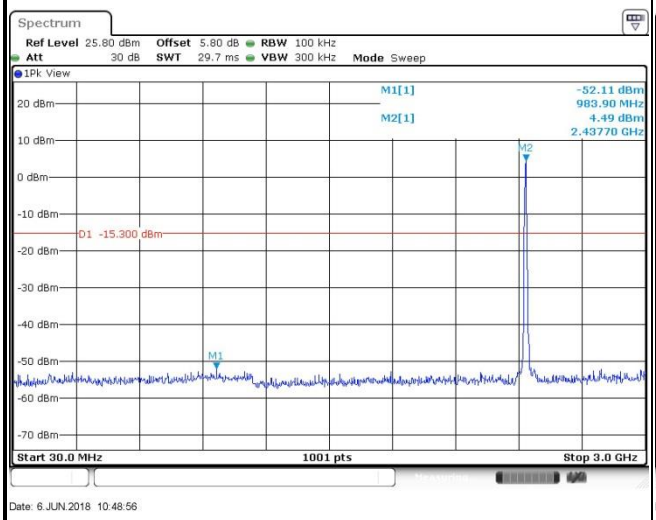
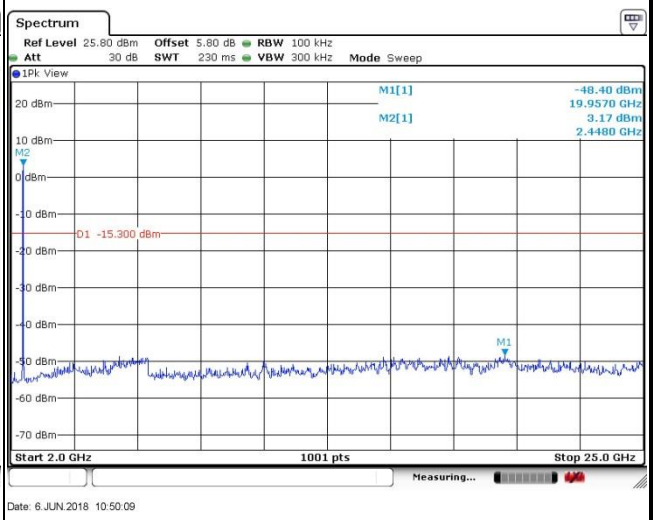
Test Engineer :	Silent Hai	**Temperature :**	21~25℃
		Relative Humidity :	51~55%

Test Mode :	802.11b	**Test Channel :**	01

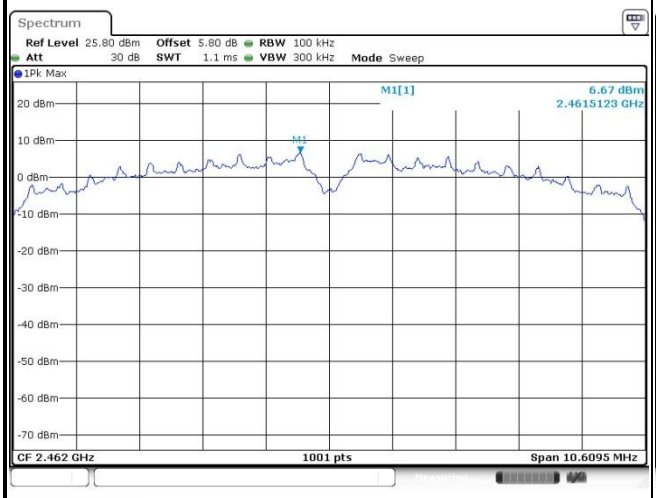
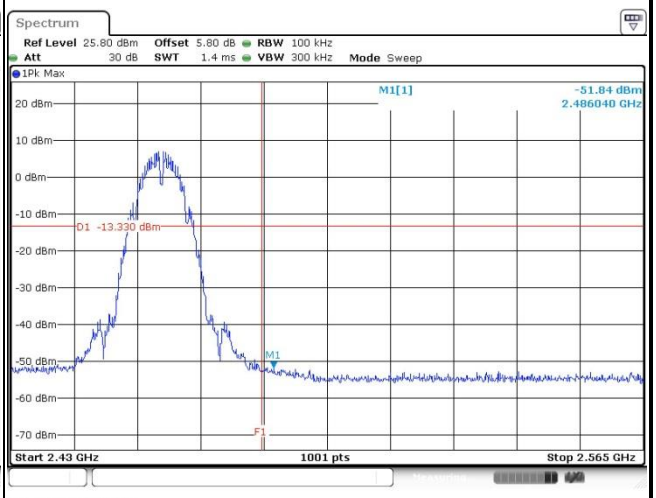
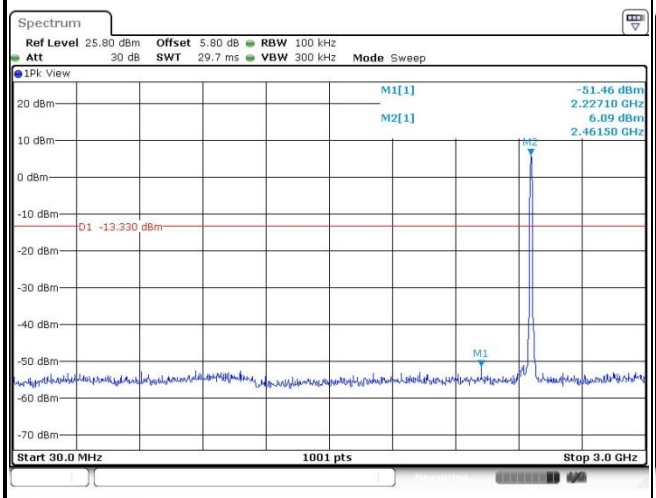
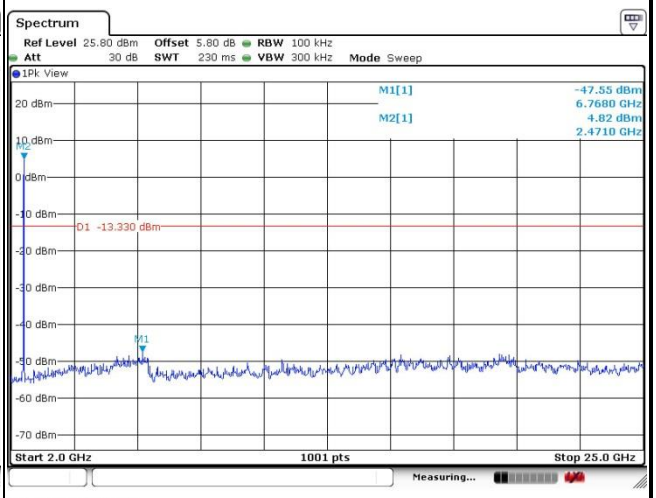
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11b	Test Channel :	06

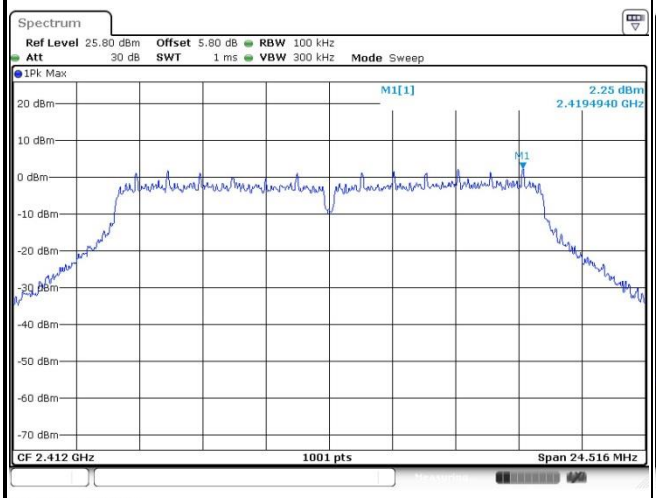
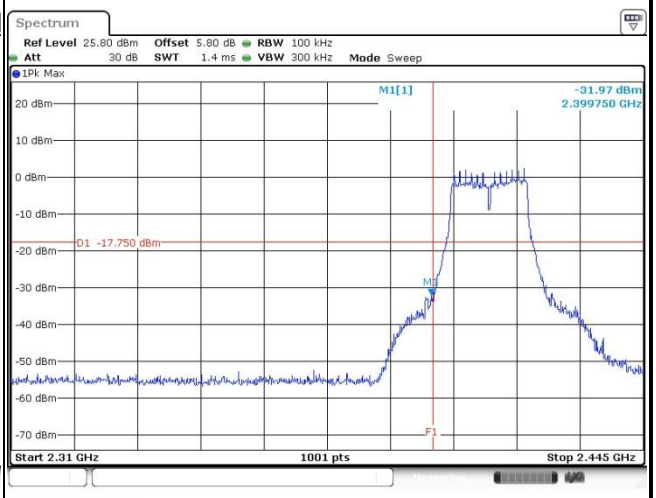
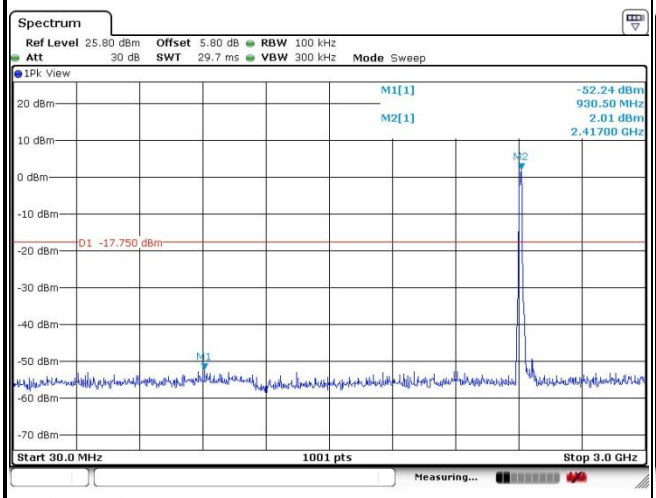
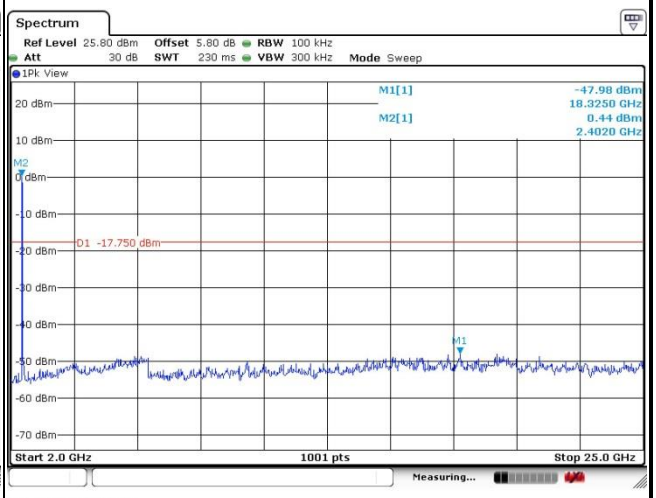
100kHz PSD reference Level	
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

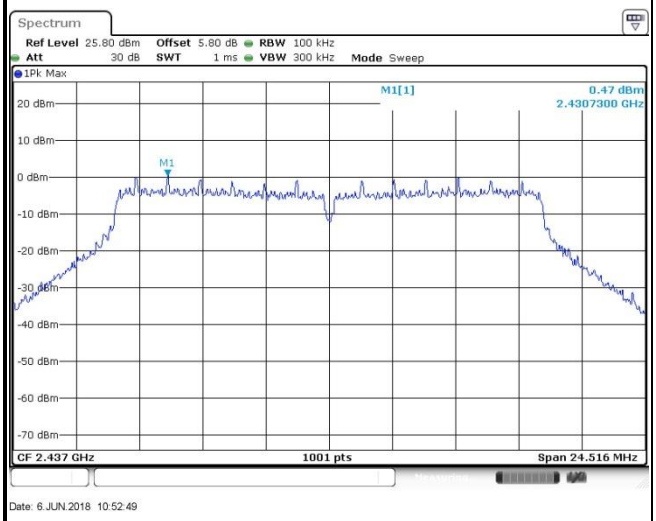
Test Mode :	802.11b	Test Channel :	11

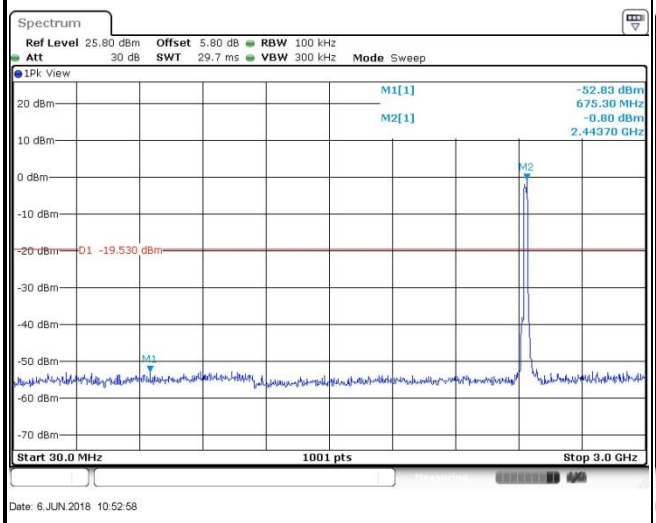
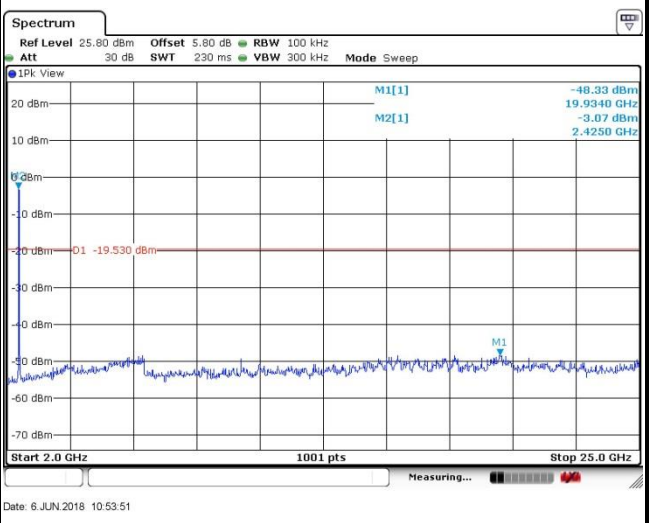
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	01

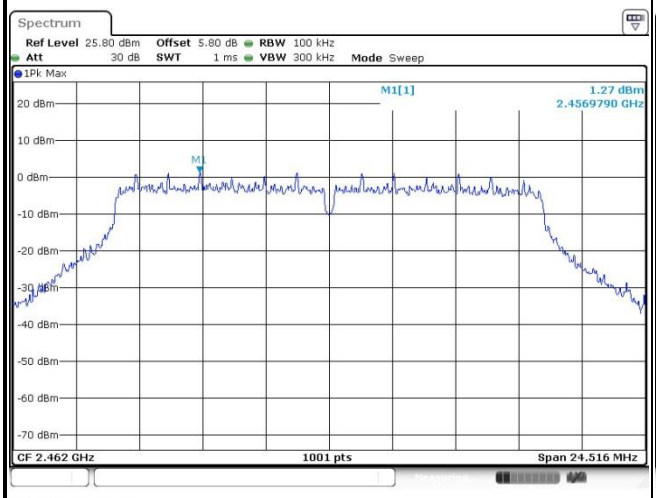
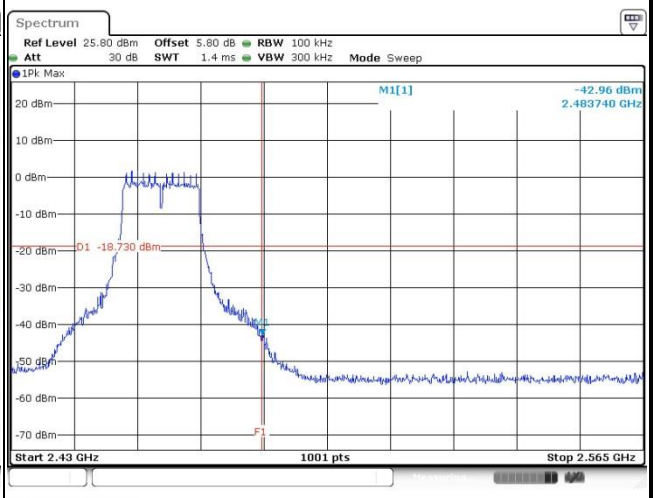
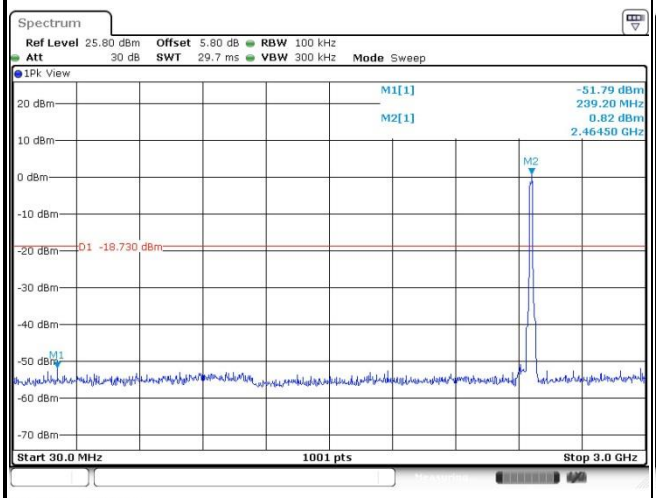
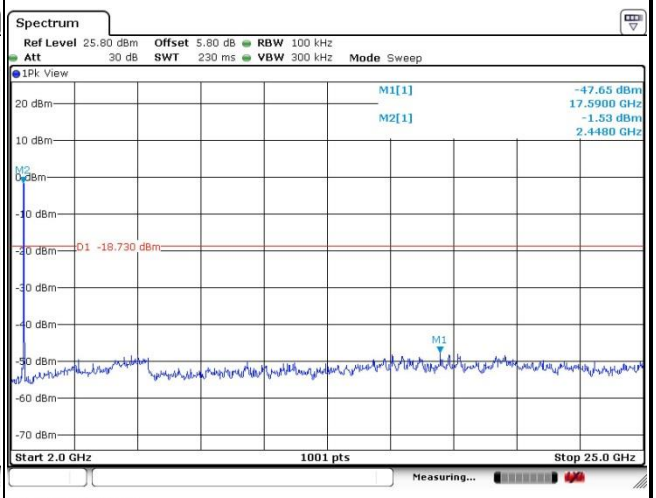
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	06

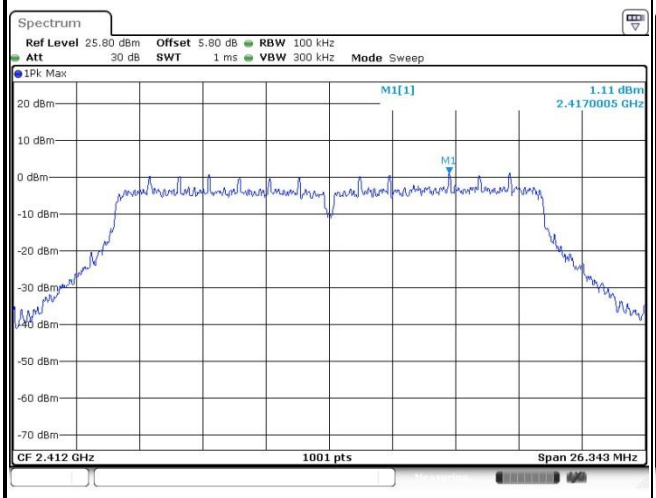
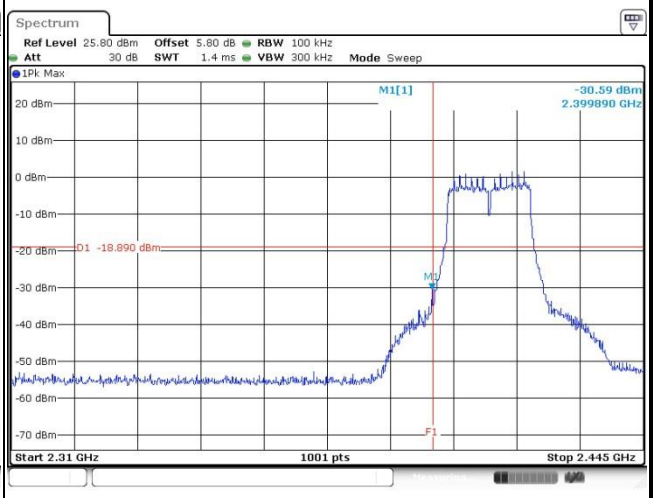
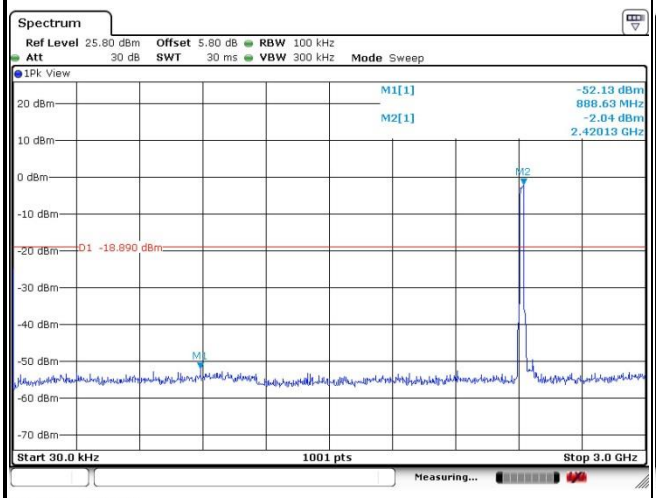
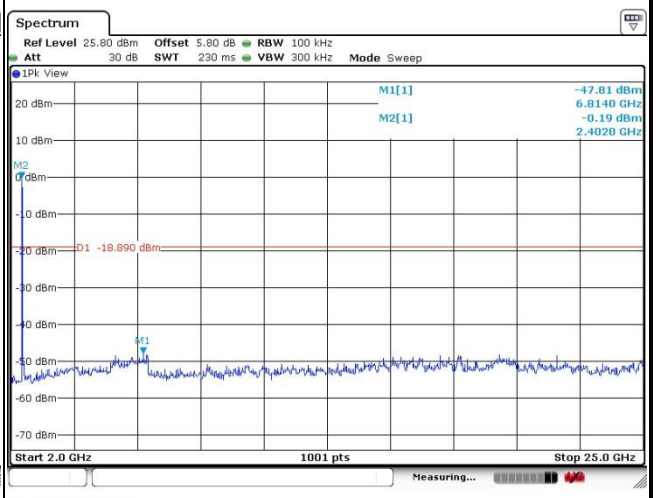
100kHz PSD reference Level	
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

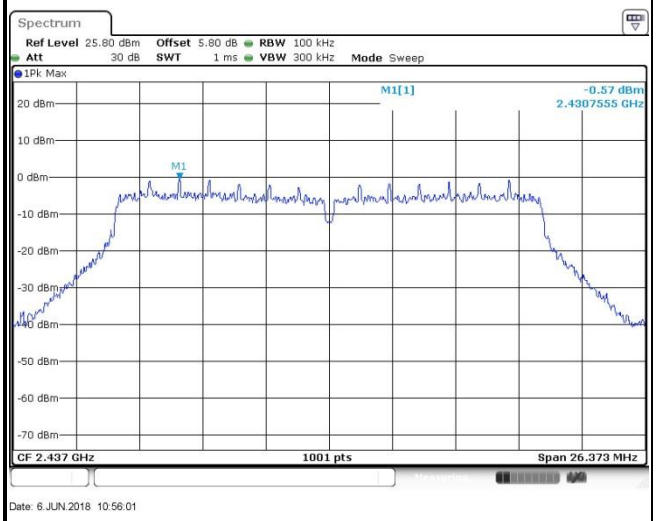
Test Mode :	802.11g	Test Channel :	11

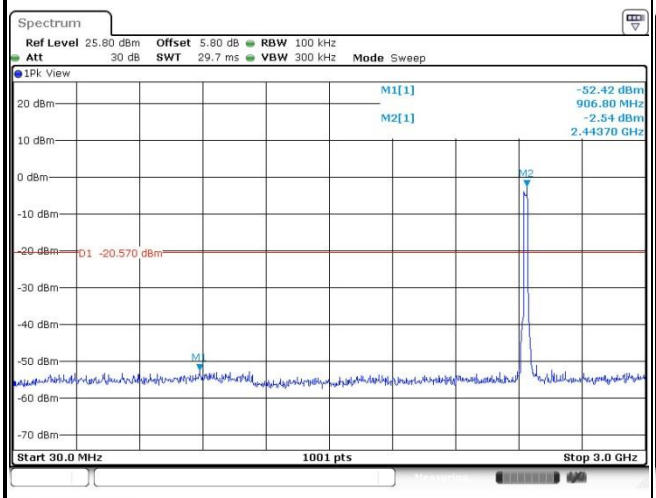
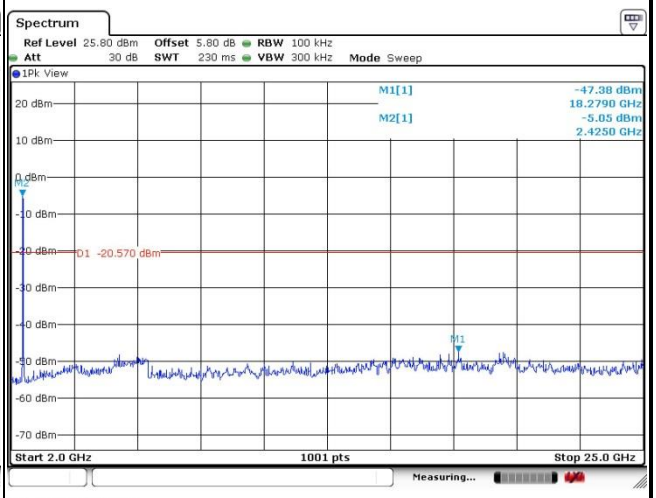
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	01

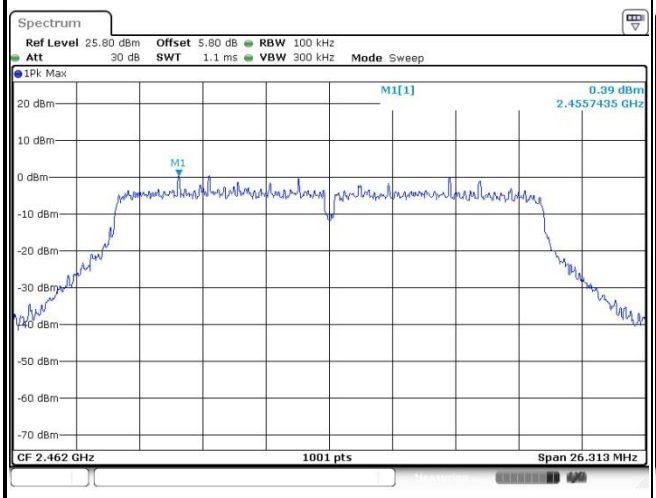
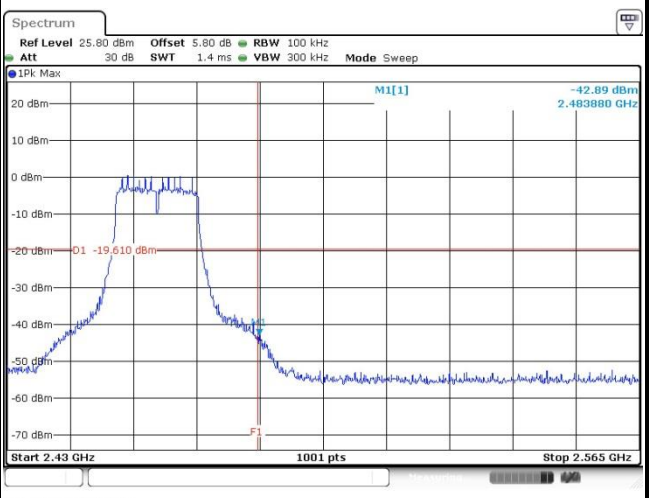
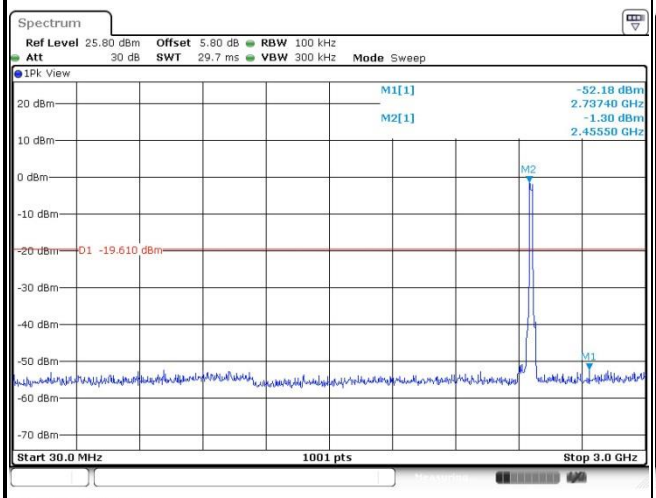
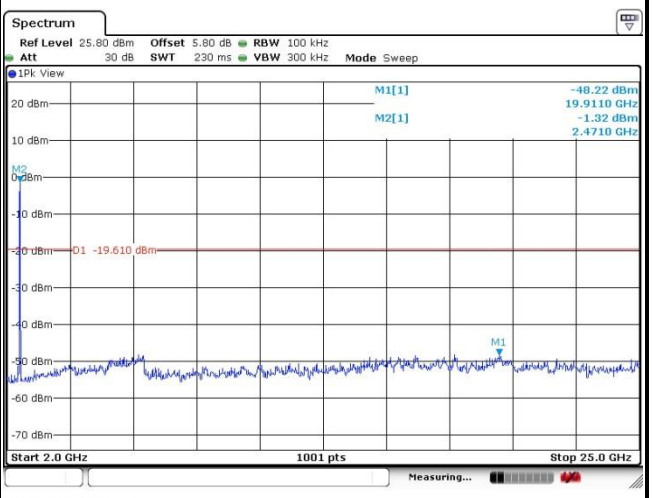
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	06

100kHz PSD reference Level	
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11n HT20	Test Channel :	11

100kHz PSD reference Level	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 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

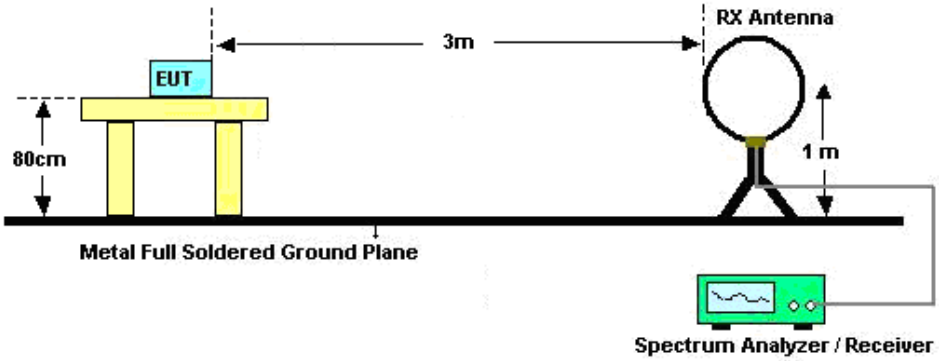
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

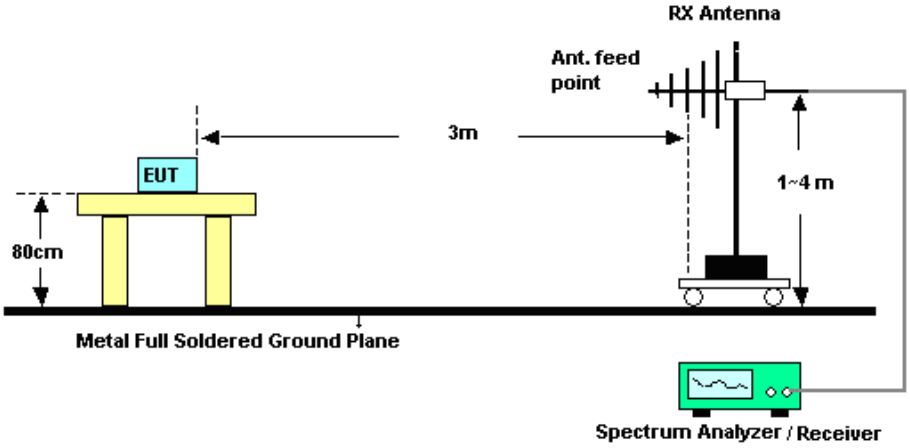
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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 testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. 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

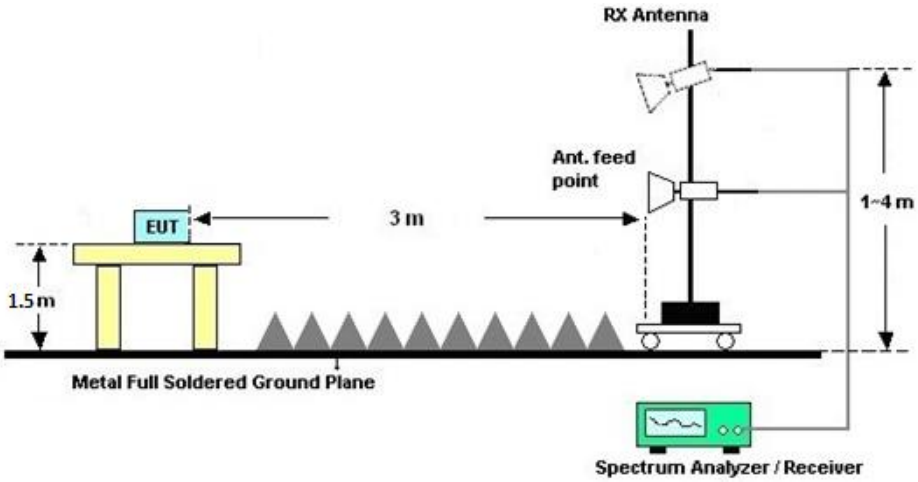
For radiated emissions below 30MHz



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 was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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 rule.

3.6.2 Antenna Anti-Replacement Construction

Non-standard antenna connector 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. 08, 2017	Jun. 05, 2018~ Jun. 06, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Jun. 05, 2018~ Jun. 06, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Jun. 05, 2018~ Jun. 06, 2018	Jan. 17, 2019	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Aug. 08, 2017	Jun. 16, 2018	Aug. 07, 2018	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44G,MAX 30dB	Apr. 17, 2018	Jun. 16, 2018	Apr. 16, 2019	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Jun. 16, 2018	Oct. 21, 2018	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-2GHz	Jan. 29, 2018	Jun. 16, 2018	Jan. 28, 2019	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 21, 2017	Jun. 16, 2018	Oct. 20, 2018	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Jun. 16, 2018	Feb. 06, 2019	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	100MHz-18GHz	Apr. 17, 2018	Jun. 16, 2018	Apr. 16, 2019	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 07, 2017	Jun. 16, 2018	Aug. 06, 2018	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz	Oct. 12, 2017	Jun. 16, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18~40GHz	Oct. 12, 2017	Jun. 16, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jun. 16, 2018	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jun. 16, 2018	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jun. 16, 2018	NCR	Radiation (03CH02-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))	**4.2dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.2dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7dB**

Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2018/6/5~2018/6/6	Relative Humidity:	51~55	%

TEST RESULTS DATA
6dB Bandwidth

2.4GHz Band							
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	7.55	0.50	Pass
11b	1Mbps	1	6	2437	7.57	0.50	Pass
11b	1Mbps	1	11	2462	7.07	0.50	Pass
11g	6Mbps	1	1	2412	16.34	0.50	Pass
11g	6Mbps	1	6	2437	16.34	0.50	Pass
11g	6Mbps	1	11	2462	16.34	0.50	Pass
HT20	MCS0	1	1	2412	17.56	0.50	Pass
HT20	MCS0	1	6	2437	17.58	0.50	Pass
HT20	MCS0	1	11	2462	17.54	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	17.16	30.00	3.50	20.66	36.00	Pass
11b	1Mbps	1	6	2437	16.45	30.00	3.50	19.95	36.00	Pass
11b	1Mbps	1	11	2462	16.95	30.00	3.50	20.45	36.00	Pass
11g	6Mbps	1	1	2412	20.82	30.00	3.50	24.32	36.00	Pass
11g	6Mbps	1	6	2437	20.76	30.00	3.50	24.26	36.00	Pass
11g	6Mbps	1	11	2462	20.52	30.00	3.50	24.02	36.00	Pass
HT20	MCS0	1	1	2412	20.32	30.00	3.50	23.82	36.00	Pass
HT20	MCS0	1	6	2437	20.15	30.00	3.50	23.65	36.00	Pass
HT20	MCS0	1	11	2462	20.31	30.00	3.50	23.81	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	0.09	14.20
11b	1Mbps	1	6	2437	0.09	13.42
11b	1Mbps	1	11	2462	0.09	13.93
11g	6Mbps	1	1	2412	0.58	12.00
11g	6Mbps	1	6	2437	0.58	12.03
11g	6Mbps	1	11	2462	0.58	11.86
HT20	MCS0	1	1	2412	0.62	11.05
HT20	MCS0	1	6	2437	0.62	10.75
HT20	MCS0	1	11	2462	0.62	10.94

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	-7.10	3.50	8.00	Pass
11b	1Mbps	1	6	2437	-9.06	3.50	8.00	Pass
11b	1Mbps	1	11	2462	-6.78	3.50	8.00	Pass
11g	6Mbps	1	1	2412	-10.46	3.50	8.00	Pass
11g	6Mbps	1	6	2437	-12.44	3.50	8.00	Pass
11g	6Mbps	1	11	2462	-12.82	3.50	8.00	Pass
HT20	MCS0	1	1	2412	-12.86	3.50	8.00	Pass
HT20	MCS0	1	6	2437	-14.30	3.50	8.00	Pass
HT20	MCS0	1	11	2462	-13.89	3.50	8.00	Pass

Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 11 2462MHz	*	2466	96.83	-	-	93.94	31.41	5.73	34.25	105	224	P	H
	*	2466	88.97	-	-	86.08	31.41	5.73	34.25	105	224	A	H
		2483.8	55.67	-18.33	74	52.76	31.44	5.75	34.28	105	224	P	H
		2483.62	44	-10	54	41.09	31.44	5.75	34.28	105	224	A	H
	*	2456	103.69	-	-	100.8	31.41	5.73	34.25	300	120	P	V
	*	2456	96.04	-	-	93.15	31.41	5.73	34.25	300	210	A	V
		2483.86	63.9	-10.1	74	60.99	31.44	5.75	34.28	300	120	P	V
	!	2483.51	49.38	-4.62	54	46.47	31.44	5.75	34.28	300	120	A	V

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz		4926	41.78	-32.22	74	62.95	35.57	7.94	64.68	100	360	P	H
		7386	40.76	-33.24	74	60.34	35.94	9.53	65.05	100	360	P	H
		4926	40.12	-33.88	74	61.29	35.57	7.94	64.68	100	0	P	V
		7386	41.13	-32.87	74	60.71	35.94	9.53	65.05	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		33.88	22.92	-17.08	40	29.46	24.87	0.63	32.04	100	69	P	H
		102.75	16.93	-26.57	43.5	29.94	17.88	1.03	31.92	-	-	P	H
		409.27	24.06	-21.94	46	27.17	25.48	2.09	30.68	-	-	P	H
		603.27	23.92	-22.08	46	26.27	24.66	2.63	29.64	-	-	P	H
		737.13	26.33	-19.67	46	25.62	26.63	2.8	28.72	-	-	P	H
		870.02	27.71	-18.29	46	25.14	27.25	3.07	27.75	-	-	P	H
		39.7	25.11	-14.89	40	34.41	22.1	0.64	32.04	100	57	P	V
		406.36	24.08	-21.92	46	27.11	25.57	2.09	30.69	-	-	P	V
		500.45	29.06	-16.94	46	34.09	22.9	2.38	30.31	-	-	P	V
		660.5	24.83	-21.17	46	25.76	25.6	2.7	29.23	-	-	P	V
		710.94	26.56	-19.44	46	26.15	26.47	2.77	28.83	-	-	P	V
		866.14	27	-19	46	24.5	27.22	3.07	27.79	-	-	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)

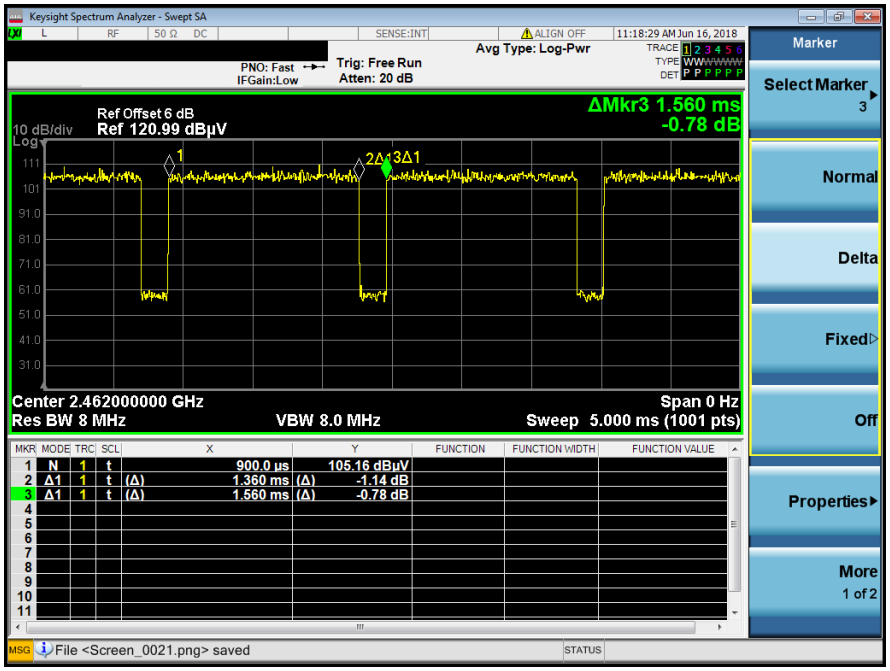
= 43.54(dBμV/m) – 54(dBμV/m)

= -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
802.11g	87.18	1.360	0.735	1KHz



Appendix E. Product Equality Declaration

BYD Precision Manufacture Co.,Ltd.

Add: No.3001,Bao He Road,Baolong Industry Zone,Longgang,Shenzhen,Guangdong Province,P.R.China

Product Equality Declaration

We, BYD Precision Manufacture Co.,Ltd. **, declare on our sole responsibility for the product of** AXC-Y1 **as below:**

The differences between AXC-Y1 B2.5 and LV are as below:

Category	First Supplier	Specification	Second Supplier	Specification
Crystal	KYOCERA	48MHz_±20PPM	TXC	48MHz_±20PPM
Capacitance	Eyang	10uF_±20%_10V_X5R	Murata	10uF_±20%_10V_X5R
Capacitance	TAIYO	22uF_±20%_6.3V_X5R	SAMSUNG	22uF_±20%_6.3V_X5R
Resistance	WALSIN	0Ω_±5%_1/20W	FENGHUA	0Ω_±5%_1/20W
Resistance	WALSIN	0Ω_Jumper_1/16W	FENGHUA	0Ω_±5%_1/16W
Resistance	WALSIN	0Ω_±1%_1/10W	FENGHUA	0Ω_Jumper_1/16W
Resistance	YAGEO	1Ω_±1%_1/16W	FENGHUA	1Ω_±1%_1/16W
Resistance	WALSIN	33Ω_±5%_1/20W	FENGHUA	33Ω_±5%_1/20W
Resistance	WALSIN	200Ω_±1%_1/20W	FENGHUA	200Ω_±1%_1/20W
Resistance	WALSIN	240Ω_±1%_1/20W	FENGHUA	240Ω_±1%_1/20W
Resistance	WALSIN	1KΩ_±5%_1/20W	FENGHUA	1KΩ_±5%_1/20W
Resistance	WALSIN	2.2KΩ_±1%_1/20W	FENGHUA	2.2KΩ_±1%_1/20W
Resistance	WALSIN	3.92KΩ_±1%_1/20W	FENGHUA	3.92KΩ_±1%_1/20W
Resistance	WALSIN	10KΩ_±5%_1/20W	FENGHUA	10KΩ_±5%_1/20W
Resistance	WALSIN	10KΩ_±5%_1/16W	FENGHUA	10KΩ_±5%_1/16W
Resistance	WALSIN	47KΩ_±5%_1/20W	FENGHUA	47kΩ_±5%_1/20W
Resistance	WALSIN	100KΩ_±5%_1/20W	FENGHUA	100kΩ_±5%_1/20W
Resistance	WALSIN	1MΩ_±5%_1/20W	FENGHUA	1MΩ_±5%_1/20W

Except listings above, the others are all the same as previous version.
Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,

Xu Pengfei

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