



# 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 E §15.407  
**CLASSIFICATION** : (NII) Unlicensed National Information Infrastructure

The product was received on Jan. 19, 2018 and testing was completed on Feb. 08, 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.

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Approved by: James Huang / Manager



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



## TABLE OF CONTENTS

<b>REVISION HISTORY .....</b>	<b>3</b>
<b>SUMMARY OF TEST RESULT .....</b>	<b>4</b>
<b>1 GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1 Applicant .....	5
1.2 Manufacturer .....	5
1.3 Product Feature of Equipment Under Test.....	5
1.4 Product Specification of Equipment Under Test.....	6
1.5 Modification of EUT .....	7
1.6 Testing Location .....	7
1.7 Applicable Standards.....	8
<b>2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST .....</b>	<b>9</b>
2.1 Carrier Frequency and Channel .....	9
2.2 Test Mode .....	10
2.3 Connection Diagram of Test System.....	11
2.4 Support Unit used in test configuration and system .....	11
2.5 EUT Operation Test Setup .....	11
<b>3 TEST RESULT .....</b>	<b>12</b>
3.1 Unwanted Emissions Measurement.....	12
<b>4 LIST OF MEASURING EQUIPMENT .....</b>	<b>18</b>
<b>5 UNCERTAINTY OF EVALUATION .....</b>	<b>19</b>
<b>APPENDIX A. RADIATED SPURIOUS EMISSION</b>	
<b>APPENDIX B. DUTY CYCLE PLOTS</b>	
<b>APPENDIX C. SETUP PHOTOGRAPHS</b>	
<b>APPENDIX D. PRODUCT EQUALITY DECLARATION</b>	



## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR792901-03D	Rev. 01	Initial issue of report	Feb. 23, 2018

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Not Required	-
-	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Not Required	-
-	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Not Required	-
3.1	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) ≤ -17, -27 dBm/MHz & 15.209(a)	Pass	Under limit 14.47 dB at 5972.400 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Required	-
-	15.407(g)	Frequency Stability	Within Operation Band	Not Required	-
-	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Not Required	-
-	15.203 & 15.407(a)	Antenna Requirement	N/A	Not Required	-

**Remark:** Not required means the change does not affected the test result.

# 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 B2.5
SW Version	Trident_00.00.25_20171223
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 D. Based on the similarity between current and previous project, only the worst cases of RSE from original test report (Sporton Report Number FR792901D) were verified for the differences.

## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx/Rx Channel Frequency Range</b>	5745 MHz ~ 5825 MHz
<b>Type of Modulation</b>	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
<b>Antenna Type/Gain</b>	Please see Remark 1

**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.

<b>Test Site</b>	Sporton International (Kunshan) Inc.	
<b>Test Site Location</b>	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH03-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 E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
- ♦ ANSI C63.10-2013

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.



## 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). For radiated measurement, the worst cases were recorded in this report.

### 2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	-	5775	165	5825

**Note:** The above Frequency and Channel in "\*" was 802.11n HT40.

## 2.2 Test Mode

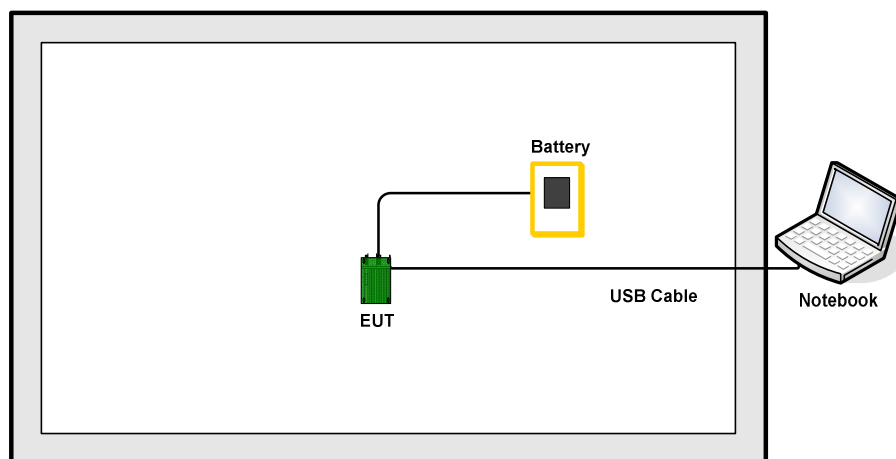
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Ch. #		Band IV : 5745-5825 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



## 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.

### 3 Test Result

#### 3.1 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

##### 3.1.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

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

**Note:** The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

(3) KDB789033 D02 v02r01 G)2)c)

- (i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.<sup>3</sup>
- (ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.<sup>4</sup>

**Note 3:** An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

**Note 4:** Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

### 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 789033 D02 General UNII Test Procedures New Rules v02r01.  
Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

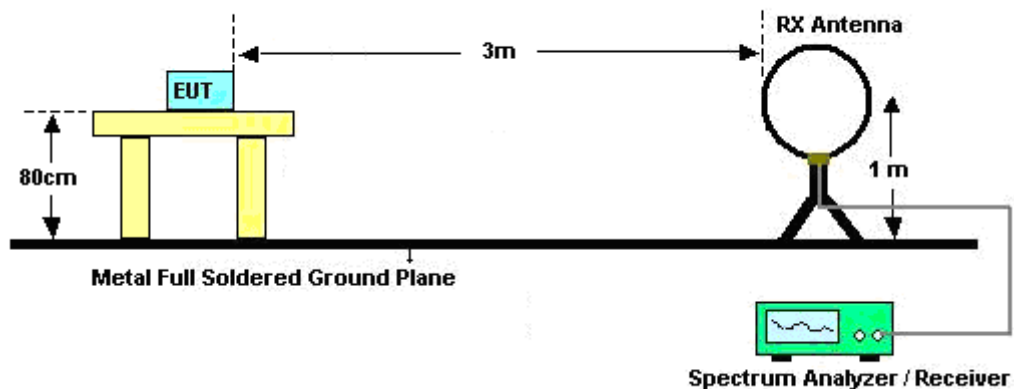
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW  $\geq$  1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

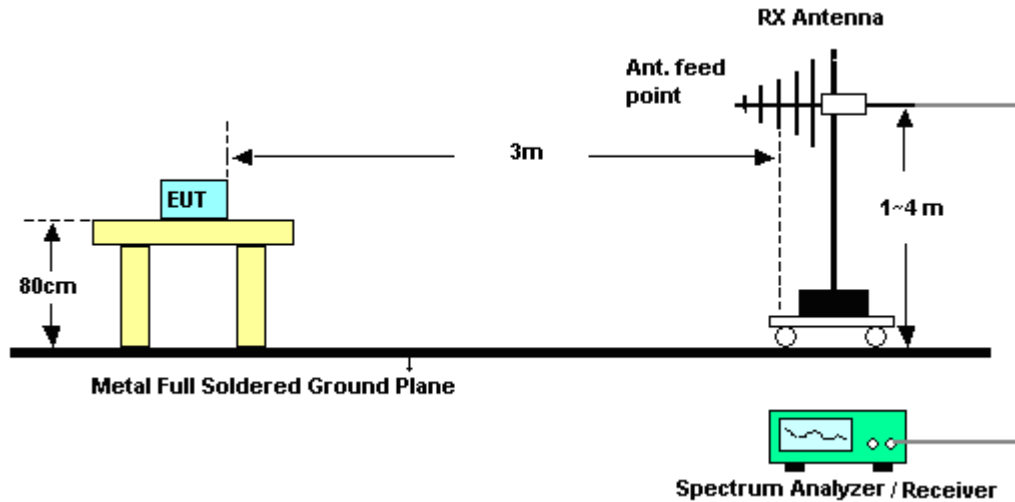
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
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.

### 3.1.4 Test Setup

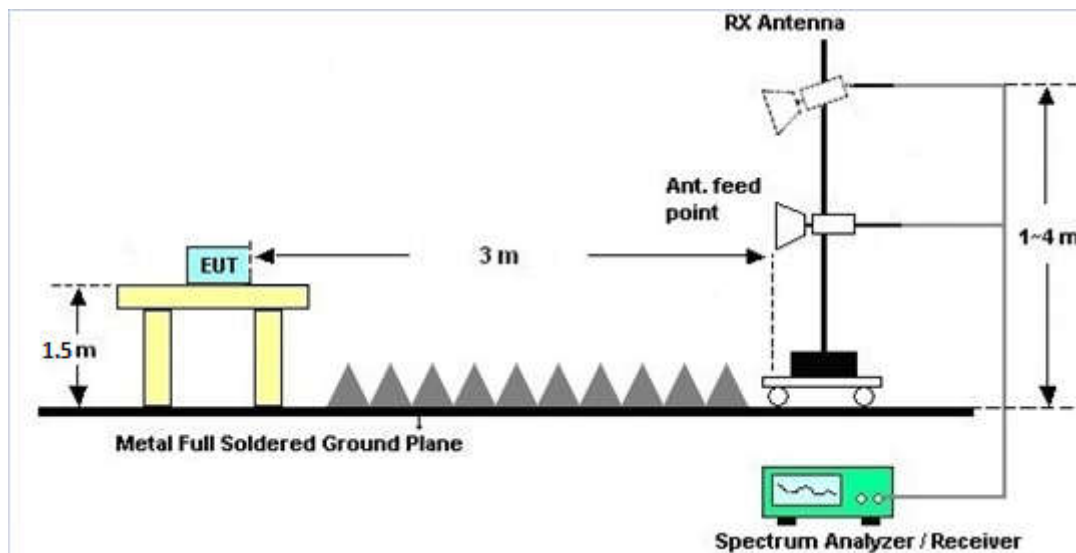
**For radiated emissions below 30MHz**



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





**3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)**

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.

**3.1.6 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix A.

**3.1.7 Duty Cycle**

Please refer to Appendix B.

**3.1.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)**

Please refer to Appendix A.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	Keysight	N9038A	MY564000 04	3Hz~8.5GHz; Max 30dBm	Oct. 19, 2017	Feb. 06, 2018~ Feb. 08, 2018	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 44	10Hz~44GHz	Apr. 18, 2017	Feb. 06, 2018~ Feb. 08, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Feb. 06, 2018~ Feb. 08, 2018	Oct.21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Feb. 06, 2018~ Feb. 08, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-135 6	1GHz~18GHz	Apr. 22, 2017	Feb. 06, 2018~ Feb. 08, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15GHz~40GHz	Feb. 15, 2017	Feb. 06, 2018~ Feb. 08, 2018	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MH z / 32 dB	Apr. 18, 2017	Feb. 06, 2018~ Feb. 08, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35- HG	1887435	18GHz~40GHz	Oct. 12, 2017	Feb. 06, 2018~ Feb. 08, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1GHz~18GHz	Apr. 18, 2017	Feb. 06, 2018~ Feb. 08, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Oct. 12, 2017	Feb. 06, 2018~ Feb. 08, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Feb. 06, 2018~ Feb. 08, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Feb. 06, 2018~ Feb. 08, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Feb. 06, 2018~ Feb. 08, 2018	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% ( $U = 2Uc(y)$ )	4.6dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5dB
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## Appendix A. Radiated Spurious Emission

### Band 4 - 5725~5850MHz

#### WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
802.11a CH 149 5745MHz		5645.2	52.49	-15.81	68.3	41.29	35.4	12.48	36.68	379	15	P	H
		5662.8	53.36	-24.44	77.8	42.16	35.42	12.5	36.72	379	15	P	H
		5719.6	53.41	-57.38	110.79	42.13	35.52	12.57	36.81	379	15	P	H
		5723.6	56.96	-62.15	119.11	45.68	35.52	12.57	36.81	379	15	P	H
		5752	104.78	-	-	93.47	35.56	12.6	36.85	379	15	P	H
		5752	98.29	-	-	86.98	35.56	12.6	36.85	379	15	A	H
		5609.6	53.13	-15.17	68.3	41.99	35.38	12.44	36.68	322	89	P	V
		5693.2	53.66	-46.63	100.29	42.43	35.47	12.53	36.77	322	89	P	V
		5719.2	52.75	-57.93	110.68	41.47	35.52	12.57	36.81	322	89	P	V
		5724.4	58.17	-62.76	120.93	46.89	35.52	12.57	36.81	322	89	P	V
		5738	101.66	-	-	90.38	35.54	12.59	36.85	322	89	P	V
		5738	94.6	-	-	83.32	35.54	12.59	36.85	322	89	A	V



WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11a CH 157 5785MHz		5607.6	52.52	-15.78	68.3	41.38	35.38	12.44	36.68	395	15	P	H
		5687.6	53.15	-43	96.15	41.92	35.47	12.53	36.77	395	15	P	H
		5701.6	52.47	-53.28	105.75	41.2	35.49	12.55	36.77	395	15	P	H
		5720.01	51.33	-59.59	110.92	40.05	35.52	12.57	36.81	395	15	P	H
		5790	105.07	-	-	93.76	35.61	12.64	36.94	395	15	P	H
		5790	97.82	-	-	86.51	35.61	12.64	36.94	395	15	A	H
		5850.01	52.4	-69.88	122.28	41.06	35.68	12.69	37.03	395	15	P	H
		5858	51.81	-58.25	110.06	40.42	35.7	12.71	37.02	395	15	P	H
		5912	53.01	-24.88	77.89	41.53	35.71	12.76	36.99	395	15	P	H
		5938.8	52.86	-15.44	68.3	41.31	35.72	12.8	36.97	395	15	P	H
		5642.8	52.99	-15.31	68.3	41.79	35.4	12.48	36.68	338	286	P	V
		5678.8	52.01	-37.64	89.65	40.76	35.45	12.52	36.72	338	286	P	V
		5712.4	52.32	-56.45	108.77	41.09	35.49	12.55	36.81	338	286	P	V
		5724.4	51.87	-69.06	120.93	40.59	35.52	12.57	36.81	338	286	P	V
		5792	101.4	-	-	90.09	35.61	12.64	36.94	338	286	P	V
		5792	94.58	-	-	83.27	35.61	12.64	36.94	338	286	A	V
		5852.8	51.27	-64.65	115.92	39.93	35.68	12.69	37.03	338	286	P	V
		5857.2	53.21	-57.07	110.28	41.83	35.7	12.71	37.03	338	286	P	V
		5906	52.5	-29.82	82.32	41.03	35.71	12.76	37	338	286	P	V
		5925.2	52.97	-15.33	68.3	41.46	35.72	12.78	36.99	338	286	P	V



WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11a CH 165 5825MHz		5830	105.36	-	-	94.03	35.65	12.67	36.99	390	16	P	H
		5830	98.62	-	-	87.29	35.65	12.67	36.99	390	16	A	H
		5851.2	55.96	-63.6	119.56	44.62	35.68	12.69	37.03	390	16	P	H
		5874.4	52.89	-52.58	105.47	41.48	35.7	12.73	37.02	390	16	P	H
		5878	55.03	-48.04	103.07	43.62	35.7	12.73	37.02	390	16	P	H
		5940.4	53.27	-15.03	68.3	41.72	35.72	12.8	36.97	390	16	P	H
		5826	100.82	-	-	89.49	35.65	12.67	36.99	319	283	P	V
		5826	94.21	-	-	82.88	35.65	12.67	36.99	319	283	A	V
		5850.01	52.02	-70.26	122.28	40.68	35.68	12.69	37.03	319	283	P	V
		5858.8	53.07	-56.76	109.83	41.68	35.7	12.71	37.02	319	283	P	V
		5878.8	52.71	-49.77	102.48	41.3	35.7	12.73	37.02	319	283	P	V
		5939.6	53.45	-14.85	68.3	41.9	35.72	12.8	36.97	319	283	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 4 5725~5850MHz

## WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11a		11490	44.7	-29.3	74	55.23	38.69	16.13	65.35	100	360	P	H
CH 149		11490	42.64	-31.36	74	53.17	38.69	16.13	65.35	100	360	P	V
5745MHz													
802.11a		11570	43.57	-30.43	74	54.01	38.78	16.22	65.44	100	360	P	H
CH 157		11570	43.97	-30.03	74	54.41	38.78	16.22	65.44	100	360	P	V
5785MHz													
802.11a		11650	43.96	-30.04	74	54.34	38.87	16.29	65.54	300	360	P	H
CH 165		11650	43.39	-30.61	74	53.77	38.87	16.29	65.54	300	360	P	V
5825MHz													
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 4 5725~5850MHz

## WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 149 5745MHz		5609.2	53.29	-15.01	68.3	42.15	35.38	12.44	36.68	293	49	P	H
		5670	52.96	-30.18	83.14	41.71	35.45	12.52	36.72	293	49	P	H
		5713.2	51.79	-57.21	109	40.56	35.49	12.55	36.81	293	49	P	H
		5724.8	55.5	-66.34	121.84	44.22	35.52	12.57	36.81	293	49	P	H
		5746	97.21	-	-	85.93	35.54	12.59	36.85	293	49	P	H
		5746	90.64	-	-	79.36	35.54	12.59	36.85	293	49	A	H
		5601.6	53	-15.3	68.3	41.86	35.38	12.44	36.68	328	172	P	V
		5693.6	54.76	-45.82	100.58	43.53	35.47	12.53	36.77	328	172	P	V
		5719.6	59.39	-51.4	110.79	48.11	35.52	12.57	36.81	328	172	P	V
		5724.8	58.63	-63.21	121.84	47.35	35.52	12.57	36.81	328	172	P	V
		5738	105.02	-	-	93.74	35.54	12.59	36.85	328	172	P	V
		5738	97.94	-	-	86.66	35.54	12.59	36.85	328	172	A	V





WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 157 5785MHz		5603.6	53.32	-14.98	68.3	42.18	35.38	12.44	36.68	292	48	P	H
		5660.8	53.73	-22.59	76.32	42.53	35.42	12.5	36.72	292	48	P	H
		5704	52.53	-53.89	106.42	41.26	35.49	12.55	36.77	292	48	P	H
		5723.2	51.2	-67	118.2	39.92	35.52	12.57	36.81	292	48	P	H
		5780	97.65	-	-	86.35	35.58	12.62	36.9	292	48	P	H
		5780	90.36	-	-	79.06	35.58	12.62	36.9	292	48	A	H
		5851.2	52	-67.56	119.56	40.66	35.68	12.69	37.03	292	48	P	H
		5857.2	52.73	-57.55	110.28	41.35	35.7	12.71	37.03	292	48	P	H
		5904.4	52.01	-31.5	83.51	40.55	35.71	12.75	37	292	48	P	H
		5957.2	53.23	-15.07	68.3	41.66	35.72	12.82	36.97	292	48	P	H
		5638.8	52.09	-16.21	68.3	40.89	35.4	12.48	36.68	321	134	P	V
		5662	52.39	-24.82	77.21	41.19	35.42	12.5	36.72	321	134	P	V
		5708	52.3	-55.24	107.54	41.07	35.49	12.55	36.81	321	134	P	V
		5720.01	52.08	-58.84	110.92	40.8	35.52	12.57	36.81	321	134	P	V
		5778	104.91	-	-	93.61	35.58	12.62	36.9	321	134	P	V
		5778	97.87	-	-	86.57	35.58	12.62	36.9	321	134	A	V
		5853.6	53.25	-60.84	114.09	41.87	35.7	12.71	37.03	321	134	P	V
		5867.6	53.27	-54.1	107.37	41.88	35.7	12.71	37.02	321	134	P	V
		5924.4	53.74	-15	68.74	42.23	35.72	12.78	36.99	321	134	P	V
		5925.01	53.64	-14.66	68.3	42.13	35.72	12.78	36.99	321	134	P	V



WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 165 5825MHz		5828	96.96	-	-	85.63	35.65	12.67	36.99	298	49	P	H
		5828	89.84	-	-	78.51	35.65	12.67	36.99	298	49	A	H
		5850.01	53.39	-68.89	122.28	42.05	35.68	12.69	37.03	298	49	P	H
		5868.4	52.74	-54.41	107.15	41.35	35.7	12.71	37.02	298	49	P	H
		5920.4	52.52	-19.17	71.69	41.04	35.71	12.76	36.99	298	49	P	H
		5927.2	52.91	-15.39	68.3	41.4	35.72	12.78	36.99	298	49	P	H
		5824	104.38	-	-	93.05	35.65	12.67	36.99	316	138	P	V
		5824	97.18	-	-	85.85	35.65	12.67	36.99	316	138	A	V
		5852.4	54.37	-62.46	116.83	43.03	35.68	12.69	37.03	316	138	P	V
		5861.2	53.44	-55.72	109.16	42.05	35.7	12.71	37.02	316	138	P	V
		5876.4	53.53	-50.73	104.26	42.12	35.7	12.73	37.02	316	138	P	V
		5943.2	53.45	-14.85	68.3	41.9	35.72	12.8	36.97	316	138	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 4 5725~5850MHz**  
**WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 149 5745MHz		11490	43.42	-30.58	74	53.95	38.69	16.13	65.35	300	360	P	H
		11490	44.3	-29.7	74	54.83	38.69	16.13	65.35	300	360	P	V
802.11n HT20 CH 157 5785MHz		11570	45.04	-28.96	74	55.48	38.78	16.22	65.44	300	360	P	H
		11570	45.34	-28.66	74	55.78	38.78	16.22	65.44	300	360	P	V
802.11n HT20 CH 165 5825MHz		11650	43.58	-30.42	74	53.96	38.87	16.29	65.54	300	360	P	H
		11650	43.64	-30.36	74	54.02	38.87	16.29	65.54	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 4 5725~5850MHz

## WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT40 CH 151 5755MHz		5641.6	53.3	-15	68.3	42.1	35.4	12.48	36.68	318	105	P	H
		5668.4	53.01	-28.94	81.95	41.76	35.45	12.52	36.72	318	105	P	H
		5716	57.22	-52.56	109.78	45.99	35.49	12.55	36.81	318	105	P	H
		5724.8	61.28	-60.56	121.84	50	35.52	12.57	36.81	318	105	P	H
		5758	99.48	-	-	88.22	35.56	12.6	36.9	318	105	P	H
		5758	91.84	-	-	80.58	35.56	12.6	36.9	318	105	A	H
		5852.4	51.61	-65.22	116.83	40.27	35.68	12.69	37.03	318	105	P	H
		5857.6	52.49	-57.68	110.17	41.11	35.7	12.71	37.03	318	105	P	H
		5909.6	53.77	-25.89	79.66	42.29	35.71	12.76	36.99	318	105	P	H
		5950.4	53.72	-14.58	68.3	42.17	35.72	12.8	36.97	318	105	P	H
		5642.8	53.08	-15.22	68.3	41.88	35.4	12.48	36.68	299	27	P	V
		5652.8	54.12	-16.26	70.38	42.88	35.42	12.5	36.68	299	27	P	V
		5719.2	58.28	-52.4	110.68	47	35.52	12.57	36.81	299	27	P	V
		5724	60.21	-59.81	120.02	48.93	35.52	12.57	36.81	299	27	P	V
		5746	101.87	-	-	90.59	35.54	12.59	36.85	299	27	P	V
		5746	94.79	-	-	83.51	35.54	12.59	36.85	299	27	A	V
		5850.4	52.39	-69	121.39	41.05	35.68	12.69	37.03	299	27	P	V
		5858.8	53.54	-56.29	109.83	42.15	35.7	12.71	37.02	299	27	P	V
		5885.6	53.48	-43.95	97.43	42.05	35.7	12.73	37	299	27	P	V
		5988.4	53.65	-14.65	68.3	42.02	35.73	12.84	36.94	299	27	P	V



WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT40 CH 159 5795MHz		5642.4	53.66	-14.64	68.3	42.46	35.4	12.48	36.68	341	105	P	H
		5682.4	53.14	-39.17	92.31	41.94	35.45	12.52	36.77	341	105	P	H
		5719.2	52.63	-58.05	110.68	41.35	35.52	12.57	36.81	341	105	P	H
		5720.8	52.81	-59.91	112.72	41.53	35.52	12.57	36.81	341	105	P	H
		5782	98.54	-	-	87.28	35.58	12.62	36.94	341	105	P	H
		5782	91.31	-	-	80.05	35.58	12.62	36.94	341	105	A	H
		5850.8	52.36	-68.12	120.48	41.02	35.68	12.69	37.03	341	105	P	H
		5873.6	52.54	-53.15	105.69	41.13	35.7	12.73	37.02	341	105	P	H
		5900	53.8	-32.96	86.76	42.34	35.71	12.75	37	341	105	P	H
		5940.4	53.44	-14.86	68.3	41.89	35.72	12.8	36.97	341	105	P	H
		5624.8	53.28	-15.02	68.3	42.11	35.39	12.46	36.68	304	27	P	V
		5690.8	53.16	-45.36	98.52	41.93	35.47	12.53	36.77	304	27	P	V
		5711.2	52.06	-56.38	108.44	40.83	35.49	12.55	36.81	304	27	P	V
		5721.2	52.12	-61.52	113.64	40.84	35.52	12.57	36.81	304	27	P	V
		5806	101.91	-	-	90.56	35.63	12.66	36.94	304	27	P	V
		5806	94.75	-	-	83.4	35.63	12.66	36.94	304	27	A	V
		5853.2	54.08	-60.92	115	42.74	35.68	12.69	37.03	304	27	P	V
		5870.8	52.78	-53.69	106.47	41.37	35.7	12.73	37.02	304	27	P	V
		5907.6	53.11	-28.03	81.14	41.64	35.71	12.76	37	304	27	P	V
		5972.4	53.83	-14.47	68.3	42.25	35.72	12.82	36.96	304	27	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 4 5725~5850MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11510	42.01	-31.99	74	52.51	38.7	16.14	65.34	100	360	P	H
		11510	44.67	-29.33	74	55.17	38.7	16.14	65.34	100	360	P	V
802.11n HT40 CH 159 5795MHz		11590	44.01	-29.99	74	54.44	38.8	16.24	65.47	100	360	P	H
		11590	45.07	-28.93	74	55.5	38.8	16.24	65.47	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Emission below 1GHz

## 5GHz WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
5GHz 802.11n HT40 LF		31.94	24.8	-15.2	40	30	26.36	0.73	32.29	-	-	P	H
		194.9	28.05	-15.45	43.5	41.21	17.05	2.05	32.26	-	-	P	H
		371.44	27.13	-18.87	46	33.94	22.15	3.09	32.05	-	-	P	H
		696.39	28.96	-17.04	46	28.8	27.8	4.04	31.68	-	-	P	H
		803.09	30.59	-15.41	46	29.87	28.01	4.28	31.57	-	-	P	H
		922.4	30.86	-15.14	46	28.65	29	4.62	31.41	120	102	P	H
		30	24.96	-15.04	40	29.8	26.8	0.65	32.29	100	156	P	V
		71.71	22.87	-17.13	40	39.15	14.66	1.25	32.19	-	-	P	V
		216.24	19.32	-26.68	46	32.3	17.07	2.16	32.21	-	-	P	V
		323.91	26.77	-19.23	46	35.36	20.61	2.88	32.08	-	-	P	V
		451.95	25.03	-20.97	46	28.46	25.32	3.19	31.94	-	-	P	V
		705.12	28.19	-17.81	46	27.98	27.86	4.03	31.68	-	-	P	V
Remark	1. No other spurious found.												
	2. All results are PASS against limit line.												



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>P</b> eak or <b>A</b> verage
H/V	<b>H</b> orizontal or <b>V</b> 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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

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

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

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

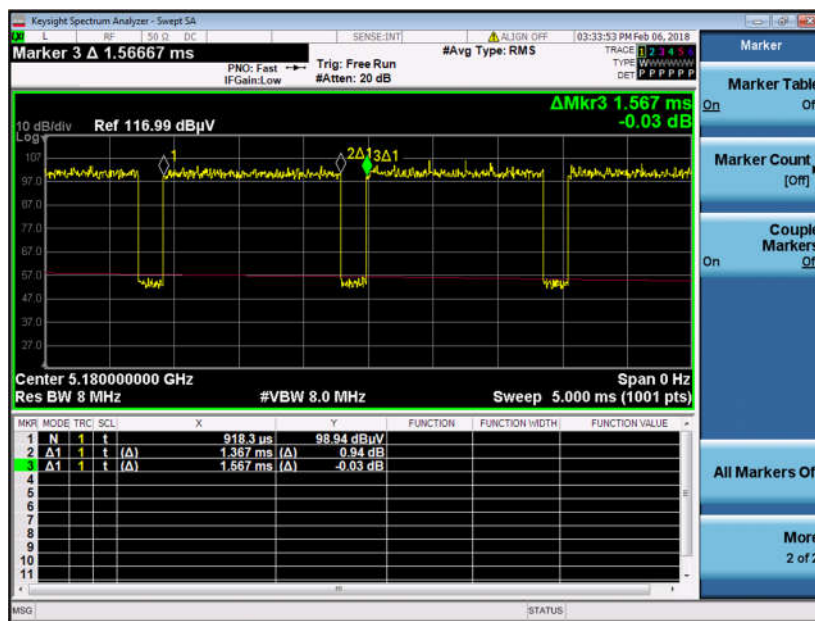
= -10.46(dB)

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

## Appendix B. Duty Cycle Plots

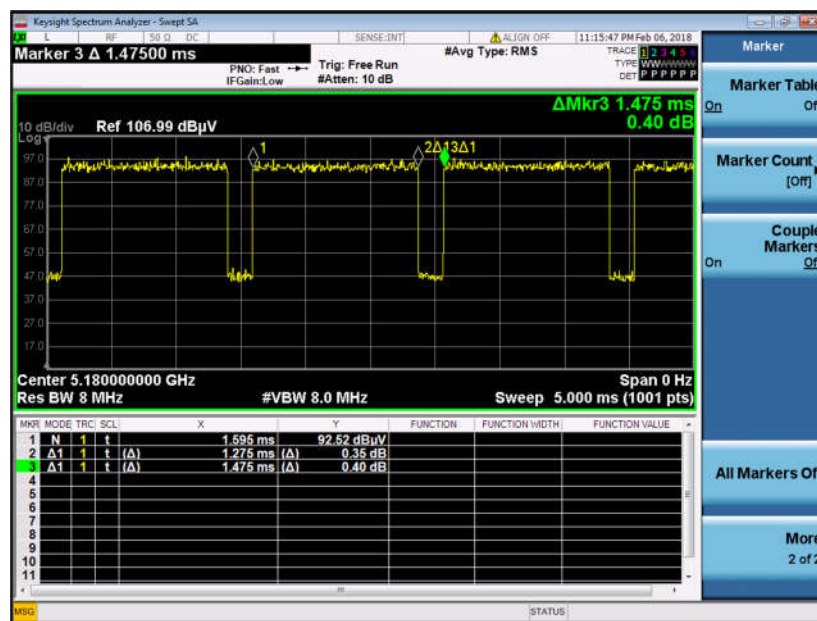
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.24	1.367	0.732	1 kHz
802.11n HT20	86.44	1.275	0.784	1 kHz
802.11n HT40	84.62	1.210	0.826	1 kHz

802.11a

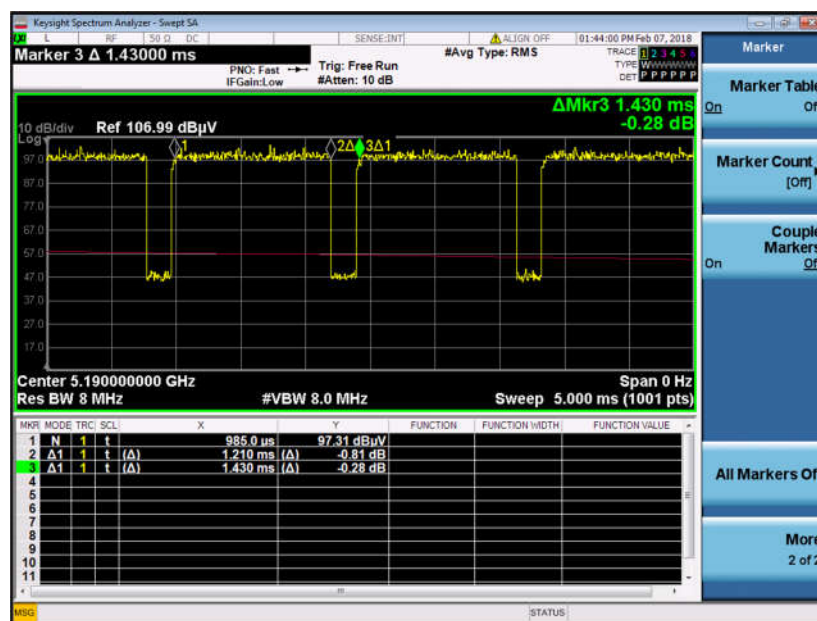




## 802.11n HT20



## 802.11n HT40





## **Appendix D. 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 and B2.5 are as below:

Category	First Supplier	Specification	Second Supplier	Specification
PCB	GCE	8layers_FR-4	Elec&Eltek	8layers_FR-4
Capacitance	Eyang	10nF_±10%_10V_X5R	Eyang	10nF_±10%_10V_X7R
Capacitance	Eyang	100nF_±10%_6.3V_X5R	Eyang	100nF_±10%_10V_X6S
Capacitance	Eyang	470nF_±10%_4V_-55℃~85℃	Eyang	470nF_±10%_6.3V_X6S
Capacitance	SAMSUNG	1uF_±20%_6.3V_X5R	Murata	1uF_±20%_6.3V_X6S
Capacitance	Eyang	1uF_±10%_10V_-55~125℃	Eyang	1uF_±10%_10V_X6S
Capacitance	Eyang	2.2uF_±10%_10V_X5R	Murata	2.2uF_±10%_10V_X7S
Capacitance	Murata	4.7uF_±20%_10V_X5R	Murata	4.7uF_±20%_6.3V_X6S
Capacitance	Eyang	10uF_±20%_6.3V_X5R	Eyang	10uF_±20%_10V_X5R
			Murata	10uF_±20%_6.3V_X6S
Capacitance	TAIYO	22uF_±20%_6.3V_X5R	Murata	22uF_±20%_10V_X5R
Capacitance	Eyang	47uF_±20%_6.3V_X5R	Murata	47uF_±20%_2.5V_X6S
Crystal	TXC	48MHz_±20PPM	KYOCERA	48MHz_±20PPM
External PCB Dipole Antenna	Laird	Antenna Model No: MAF94109 Cable Length: 100mm Peak Gain(dBi): 2400~2483.5MHz:3.2 5150~5250MHz:2.7 5250~5350MHz:3.1 5470~5725MHz:2.7 5725~5850MHz:2.6	Laird	Antenna Model No: EMN2449A2S-25UFL Cable Length: 250mm Peak Gain(dBi): 2400~2483.5MHz:3.50 5150~5250MHz:5.75 5250~5350MHz:6.26 5470~5725MHz:6.24 5725~5850MHz:5.18
				Antenna Model No: MAF94264 Cable Length: 80mm Peak Gain(dBi): 2400~2483.5MHz:3.33 5150~5250MHz:5.52

				5250~5350MHz:6.14 5470~5725MHz:6.06 5725~5850MHz:5.33
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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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