

# RF EXPOSURE EVALUATION REPORT

**Product Name:** WIFI Module  
**Trade Mark:** GSD  
**Model No.:** WC3XM2001  
**HVIN:** WC3XM2001  
**Report Number:** 180323001RFC-3  
**Test Standards:** FCC 47 CFR Part 1 Subpart I  
RSS-102 Issue 5  
**FCC ID:** 2AC23-WC3XM2001  
**IC:** 12290A-WC3XM2001  
**Test Result:** PASS  
**Date of Issue:** May 11, 2018

Prepared for:

**Hui Zhou Gaoshengda Technology Co., LTD**  
**NO.75 Zhongkai Development Area, Huizhou, Guangdong, China**

Prepared by:

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**  
**16/F, Block A, Building 6, Baoneng Science and Technology Park,**  
**Qingxiang Road No.1, Longhua New District, Shenzhen, China**  
**TEL: +86-755-2823 0888**  
**FAX: +86-755-2823 0886**

Tested by: Henry Lu  
Henry Lu  
Project Engineer

Reviewed by: Kevin Liang  
Kevin Liang  
Team Leader

Approved by: Jim Long  
Jim Long  
Assistant Manager

Date: May 11, 2018



**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China  
Tel: +86-755-28230888 Fax: +86-755-28230886 E-mail: info@uttlab.com [Http://www.uttlab.com](http://www.uttlab.com)

**Version**

Version No.	Date	Description
V1.0	May 11, 2018	Original



## CONTENTS

<b>1. GENERAL INFORMATION</b>	<b>4</b>
1.1 CLIENT INFORMATION	4
1.2 EUT INFORMATION	4
1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD	4
1.4 OTHER INFORMATION	6
1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	7
1.6 DEVIATION FROM STANDARDS	7
1.7 ABNORMALITIES FROM STANDARD CONDITIONS	7
1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER	7
<b>2. EQUIPMENT LIST</b>	<b>8</b>
<b>3. MPE EVALUATION</b>	<b>9</b>
3.1 REFERENCE DOCUMENTS FOR EVALUATION	9
3.2 MPE COMPLIANCE REQUIREMENT	9
3.2.1 LIMITS	9
3.2.2 TEST PROCEDURE	10
3.3 MPE CALCULATION METHOD	11
3.3.1 FCC 47 CFR PART 1 SUBPART I	11
3.3.2 RSS-102 ISSUE 5	11
3.4 MPE CALCULATION RESULTS	11
3.4.1 FOR WLAN	11
<b>APPENDIX 1 PHOTOGRAPHS OF TEST SETUP</b>	<b>14</b>
<b>APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS</b>	<b>14</b>

## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	Hui Zhou Gaoshengda Technology Co., LTD
<b>Address of Applicant:</b>	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
<b>Manufacturer:</b>	Hui Zhou Gaoshengda Technology Co., LTD
<b>Address of Manufacturer:</b>	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

### 1.2 EUT INFORMATION

<b>Product Name:</b>	WIFI Module		
<b>Model No.:</b>	WC3XM2001		
<b>Add. Model No.:</b>	N/A		
<b>Trade Mark:</b>	GSD		
<b>DUT Stage:</b>	Identical Prototype		
<b>EUT Supports Function:</b>	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For 2.4 GHz ISM Band of Wi-Fi		
<b>Frequency Range:</b>	2400 MHz to 2483.5 MHz	
<b>Support Standards:</b>	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40	
<b>Type of Modulation:</b>	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM(64-QAM, 16-QAM, QPSK, BPSK)	
<b>Data Rate:</b>	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS15 IEEE 802.11n-HT40: Up to MCS15	
<b>Number of Channels:</b>	IEEE 802.11b: 13 IEEE 802.11g: 13 IEEE 802.11n-HT20: 13 IEEE 802.11n-HT40: 9	
<b>Channel Separation:</b>	5 MHz	
<b>Antenna Type:</b>	Chain 0	PIFA Antenna
	Chain 1	PIFA Antenna
<b>Antenna Gain:</b>	Chain 0	2.18 dBi
	Chain 1	2.18 dBi
<b>Directional gain:</b>	5.19 dBi	
<b>Maximum Peak Power:</b>	SISO_ Chain 0	IEEE 802.11b: 17.53 dBm IEEE 802.11g: 21.60 dBm IEEE 802.11n-HT20: 23.25 dBm IEEE 802.11n-HT40: 22.11 dBm
	SISO_ Chain 1	IEEE 802.11b: 17.28 dBm IEEE 802.11g: 21.11 dBm IEEE 802.11n-HT20: 22.45 dBm IEEE 802.11n-HT40: 22.63 dBm
	MIMO_ Chain 0+1	IEEE 802.11n-HT20: 25.86 dBm IEEE 802.11n-HT40: 25.39 dBm

#### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

[Http://www.uttlab.com](http://www.uttlab.com)

<b>Maximum EIRP:</b>	SISO_ Chain 0	IEEE 802.11b: 19.56 dBm IEEE 802.11g: 23.78 dBm IEEE 802.11n-HT20: 25.43 dBm IEEE 802.11n-HT40: 24.29 dBm
	SISO_ Chain 1	IEEE 802.11b: 19.34 dBm IEEE 802.11g: 23.29 dBm IEEE 802.11n-HT20: 24.63 dBm IEEE 802.11n-HT40: 24.81 dBm
	MIMO_ Chain 0+1	IEEE 802.11n-HT20: 28.04 dBm IEEE 802.11n-HT40: 27.57 dBm

For 5 GHz U-NII Bands of Wi-Fi		
<b>Frequency Range:</b>	5150 MHz to 5250 MHz	
	5250 MHz to 5350 MHz	
	5470 MHz to 5725 MHz	
	5 725 MHz to 5 850 MHz	
<b>Support Standards:</b>	IEEE 802.11a/n/ac	
<b>TPC Function:</b>	Not Support	
<b>DFS Operational mode:</b>	Slave without radar Interference detection function	
<b>Type of Modulation:</b>	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)	
<b>Channel Spacing:</b>	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz	
	IEEE 802.11n-HT40/ac-VHT40: 40 MHz	
	IEEE 802.11ac-VHT80/: 80 MHz	
<b>Data Rate:</b>	IEEE 802.11a: Up to 54 Mbps	
	IEEE 802.11n-HT20: Up to MCS15	
	IEEE 802.11n-HT40: Up to MCS15	
	IEEE 802.11ac-VHT20: Up to MCS8	
	IEEE 802.11ac-VHT40: Up to MCS9	
<b>Number of Channels:</b>	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80	
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80	
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20 5 for IEEE 802.11n-HT40/ac-VHT40 2 for IEEE 802.11ac-VHT80	
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11ac-VHT80	
<b>Antenna Type:</b>	Chain 0	PIFA Antenna
	Chain 1	PIFA Antenna
<b>Antenna Gain:</b>	Chain 0	5150 MHz to 5250 MHz: 3.63 dBi
		5250 MHz to 5350 MHz: 3.63 dBi

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

[Http://www.uttlab.com](http://www.uttlab.com)

	Chain 1	5470 MHz to 5725 MHz: 3.63 dBi			
		5725 MHz to 5850 MHz: 3.63 dBi			
		5150 MHz to 5250 MHz: 3.63 dBi			
		5250 MHz to 5350 MHz: 3.63 dBi			
		5470 MHz to 5725 MHz: 3.63 dBi			
		5725 MHz to 5850 MHz: 3.63 dBi			
<b>Directional gain:</b>	5150 MHz to 5850 MHz:	6.64 dBi			
	5250 MHz to 5350 MHz:	6.64 dBi			
	5470 MHz to 5725 MHz:	6.64 dBi			
	5725 MHz to 5850 MHz:	6.64 dBi			
<b>Maximum conducted output power (dBm):</b>	<b>SISO_Chain 0</b>	<b>U-NII-1</b>	<b>U-NII-2A</b>	<b>U-NII-2C</b>	<b>U-NII-3</b>
	IEEE 802.11a:	14.53	14.54	14.92	16.03
	IEEE 802.11n-HT20:	11.79	12.18	12.25	13.49
	IEEE 802.11n-HT40:	12.51	12.70	12.51	13.78
	IEEE 802.11ac-VHT80:	12.57	12.88	12.51	14.03
	<b>SISO_Chain 1</b>	<b>U-NII-1</b>	<b>U-NII-2A</b>	<b>U-NII-2C</b>	<b>U-NII-3</b>
	IEEE 802.11a:	14.43	14.40	14.70	15.03
	IEEE 802.11n-HT20:	11.74	11.65	11.96	12.16
	IEEE 802.11n-HT40:	12.44	12.59	12.49	13.80
	IEEE 802.11ac-VHT80:	12.66	12.80	12.50	14.00
	<b>MIMO_Chain 0+1</b>	<b>U-NII-1</b>	<b>U-NII-2A</b>	<b>U-NII-2C</b>	<b>U-NII-3</b>
	IEEE 802.11n-HT20:	14.76	14.93	15.12	15.83
	IEEE 802.11n-HT40:	15.49	15.66	15.51	16.80
	IEEE 802.11ac-VHT80:	15.63	15.85	15.52	17.03
<b>Maximum EIRP (dBm):</b>	<b>U-NII-1</b>				
		<b>SISO_Chain 0</b>	<b>SISO_Chain 1</b>	<b>MIMO_Chain 0+1</b>	
	IEEE 802.11a:	18.16	18.06	N/A	
	IEEE 802.11n-HT20:	15.42	15.37	18.39	
	IEEE 802.11n-HT40:	16.14	16.07	19.12	
	IEEE 802.11ac-VHT80:	16.20	16.29	19.26	

### 1.4 OTHER INFORMATION

Mode	Tx/Rx Frequency	Test RF Channel Lists				
		Lowest(L)	Middle(M)	Highest(H11)	Highest(H12)	Highest(H13)
IEEE 802.11b	2412 MHz to 2472 MHz	Channel 1	Channel 7	Channel 11	Channel 12	Channel 13
		2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
IEEE 802.11g	2412 MHz to 2472 MHz	Channel 1	Channel 7	Channel 11	Channel 12	Channel 13
		2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
IEEE 802.11n-HT20	2412 MHz to 2472 MHz	Channel 1	Channel 7	Channel 11	Channel 12	Channel 13
		2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
Mode	Tx/Rx Frequency	Test RF Channel Lists				
IEEE 802.11n-HT40	2422 MHz to 2462 MHz	Lowest(L)	Middle(M)	Highest(H9)	Highest(H10)	Highest(H11)
		Channel 3	Channel 7	Channel 9	Channel 10	Channel 11
		2422 MHz	2437 MHz	2452 MHz	2457 MHz	2462 MHz

Test channels for 5 GHz U-NII Bands of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5150 MHz to 5250 MHz	Channel 36	Channel 44	Channel 48
		5180 MHz	5220 MHz	5240 MHz
	5250 MHz to 5350 MHz	Channel 52	Channel 60	Channel 64
		5260 MHz	5300 MHz	5320 MHz
	5470 MHz to 5725 MHz	Channel 100	Channel 116	Channel 140
		5500 MHz	5580 MHz	5700 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165
		5745 MHz	5785 MHz	5825 MHz
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5150 MHz to 5250 MHz	Channel 38	--	Channel 46
		5190 MHz	--	5230 MHz
	5250 MHz to 5350 MHz	Channel 54	--	Channel 62
		5270 MHz	--	5310 MHz
	5470 MHz to 5725 MHz	Channel 102	Channel 110	Channel 134
		5510 MHz	5550 MHz	5670 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
IEEE 802.11ac-VHT80	5150 MHz to 5250 MHz	--	Channel 42	--
		--	5210 MHz	--
	5250 MHz to 5350 MHz	--	Channel 58	--
		--	5290 MHz	--
	5470 MHz to 5725 MHz	Channel 106	--	--
		5530 MHz	--	--
	5725 MHz to 5850 MHz	--	Channel 155	--
		--	5775 MHz	--

## 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC 47 CFR Part 1 Subpart I**  
**RSS-102 Issue 5**

All test items have been performed and recorded as per the above standards

## 1.6 DEVIATION FROM STANDARDS

None.

## 1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

### **Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

[Http://www.uttlab.com](http://www.uttlab.com)

## 2. EQUIPMENT LIST

Please refer to the RF test report.





### 3. MPE EVALUATION

#### 3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
3	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

#### 3.2 MPE COMPLIANCE REQUIREMENT

##### 3.2.1 Limits

##### 3.2.1.1 FCC 47 CFR Part 1 Subpart I

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

##### Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

##### Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

**Note:** f = frequency in MHz; \* = Plane-wave equivalents power density.

### 3.2.1.2 RSS-102 Issue 5

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

#### RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency range (MHz)	Electric Field (E) (V/m rms)	Magnetic Field (H) (A/m rms)	Power Density (S) (W/m <sup>2</sup> )	Reference Period H   <sup>2</sup> or S (minutes)
0.003-10 <sup>21</sup>	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> <sup>0.25</sup>	0.1540/ <i>f</i> <sup>0.25</sup>	8.944/ <i>f</i> <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> <sup>0.3417</sup>	0.008335 <i>f</i> <sup>0.3417</sup>	<b>0.02619</b> <i>f</i> <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> <sup>1.2</sup>
150000-300000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616000/ <i>f</i> <sup>1.2</sup>

Note: *f* is frequency in MHz.  
 \*Based on nerve stimulation (NS).  
 \*\* Based on specific absorption rate (SAR).

#### RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency range (MHz)	Electric Field (E) (V/m rms)	Magnetic Field (H) (A/m rms)	Power Density (S) (W/m <sup>2</sup> )	Reference Period H   <sup>2</sup> or S (minutes)
0.003-10 <sup>23</sup>	170	180	-	Instantaneous*
1-10	-	1.6/ <i>f</i>	-	6**
1.29-10	193/ <i>f</i> <sup>0.5</sup>	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ <i>f</i> <sup>0.25</sup>	0.3444/ <i>f</i> <sup>0.25</sup>	44.72/ <i>f</i> <sup>0.5</sup>	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 <i>f</i> <sup>0.25</sup>	0.04138 <i>f</i> <sup>0.25</sup>	0.6455 <i>f</i> <sup>0.5</sup>	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ <i>f</i> <sup>1.2</sup>
150000-300000	0.354 <i>f</i> <sup>0.5</sup>	9.40 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	3.33 x 10 <sup>-4</sup> <i>f</i>	616000/ <i>f</i> <sup>1.2</sup>

Note: *f* is frequency in MHz.  
 \*Based on nerve stimulation (NS).  
 \*\* Based on specific absorption rate (SAR).

### 3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### 3.3 MPE CALCULATION METHOD

#### 3.3.1 FCC 47 CFR Part 1 Subpart I

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

#### 3.3.2 RSS-102 Issue 5

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = power density (in appropriate units, e.g., w/m<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., w)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., m)

### 3.4 MPE CALCULATION RESULTS

**Note:** For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

#### 3.4.1 For WLAN

For Wi-Fi function, operating at 2412MHz to 2462 MHz for IEEE802.11b/g/n and  
 operating at 5150 MHz to 5250 MHz for IEEE802.11a/n/ac and  
 operating at 5725 MHz to 5850 MHz for IEEE802.11a/n/ac.

##### 3.4.1.1 Antenna Type:

**Chain 0:** PIFA Antenna

**Chain 1:** PIFA Antenna

##### 3.4.1.2 Antenna Gain:

Chain 0:	Chain 1:
2412MHz to 2472 MHz: 2.18 dBi	2412MHz to 2472 MHz: 2.18 dBi
5150 MHz to 5250 MHz: 3.63 dBi	5150 MHz to 5250 MHz: 3.63 dBi
5250 MHz to 5350 MHz: 3.63 dBi	5250 MHz to 5350 MHz: 3.63 dBi
5470 MHz to 5725 MHz: 3.63 dBi	5470 MHz to 5725 MHz: 3.63 dBi
5725 MHz to 5850 MHz: 3.63 dBi	5725 MHz to 5850 MHz: 3.63 dBi

For MIMO mode (2Tx/2Rx), there are two transmission antennas. Both Chain 0 and Chain 1 used at the same time and antenna ports have uniform output powers. The Chain 0 and Chain 1 antenna ports can be used alone. The transmit signals are correlated with each other.

For 2.4 GHz WIFI & 5 GHz WIFI

$$Directional\ gain = 10\ log\left[\frac{10^{G1}}{20} + \frac{10^{G2}}{20} + \dots + \frac{10^{GN}}{20}\right]^2 / NANT\ dBi$$

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

For SISO mode (1Tx/1Rx), there are two transmission antennas. Both Chain 0 and Chain 1 used at the same time and antenna ports have uniform output powers. The Chain 0 and Chain 1 antenna ports cannot be used alone

For 2.4 GHz WIFI & 5 GHz WIFI

The antenna gain = Chain 0 or Chain 1

**3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I**

**For SISO (1TX/1RX) Mode**

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value	
	(MHz)								(dBm)
SISO Chain 0 or 1	IEEE 802.11b	2412-2462	17	2	2.18	21.18	131.2200	1	0.0261
	IEEE 802.11b	2467-2472	15	2	2.18	19.18	82.7942	1	0.0165
	IEEE 802.11g	2412-2462	14	2	2.18	18.18	65.7658	1	0.0131
	IEEE 802.11g	2467-2472	12	2	2.18	16.18	41.4954	1	0.0083
	IEEE 802.11a	5180-5240	14	2	3.63	19.63	91.8333	1	0.0183
		5260-5320	14	2	3.63	19.63	91.8333	1	0.0183
		5500-5700	14	2	3.63	19.63	91.8333	1	0.0183
		5745-5825	14	2	3.63	19.63	91.8333	1	0.0183

**For MIMO (2TX/2RX) Mode**

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive Tolerance according manufacturer	Directional Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value	
	(MHz)								(dBm)
MIMO (2TX/2RX)	IEEE 802.11n-HT20	2412-2462	13	2	5.19	20.19	104.4720	1	0.0208
		2467-2472	11	2	5.19	18.19	65.9174	1	0.0131
	IEEE 802.11n-HT40	2422-2452	13	2	5.19	20.19	104.4720	1	0.0208
		2457-2462	11	2	5.19	18.19	65.9174	1	0.0131
	IEEE 802.11n-HT20	5180-5240	12	2	6.64	20.64	115.8777	1	0.0231
		5260-5320	12	2	6.64	20.64	115.8777	1	0.0231
		5500-5700	12	2	6.64	20.64	115.8777	1	0.0231
		5745-5825	12	2	6.64	20.64	115.8777	1	0.0231
	IEEE 802.11n-HT40	5190-5230	12	2	6.64	20.64	115.8777	1	0.0231
		5270-5310	12	2	6.64	20.64	115.8777	1	0.0231
		5510-5670	12	2	6.64	20.64	115.8777	1	0.0231
	IEEE 802.11ac-VHT20	5755-5795	12	2	6.64	20.64	115.8777	1	0.0231
		5180-5240	12	2	6.64	20.64	115.8777	1	0.0231
		5260-5320	12	2	6.64	20.64	115.8777	1	0.0231
	IEEE 802.11ac-VHT40	5500-5700	12	2	6.64	20.64	115.8777	1	0.0231
		5745-5825	12	2	6.64	20.64	115.8777	1	0.0231
		5190-5230	11	2	6.64	19.64	92.0450	1	0.0183
		5270-5310	11	2	6.64	19.64	92.0450	1	0.0183
	IEEE 802.11ac-VHT80	5510-5670	11	2	6.64	19.64	92.0450	1	0.0183
		5755-5795	11	2	6.64	19.64	92.0450	1	0.0183
5210		11	2	6.64	19.64	92.0450	1	0.0183	
5290		11	2	6.64	19.64	92.0450	1	0.0183	
	5530	11	2	6.64	19.64	92.0450	1	0.0183	
	5775	11	2	6.64	19.64	92.0450	1	0.0183	

**3.4.1.4 Results for RSS-102 Issue 5**

**For SISO (1TX/1RX) Mode**

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value	
	(MHz)								(dBm)
SISO Chain 0 or 1	IEEE 802.11b	2412-2462	17	2	2.18	21.18	0.1312	5.35	0.2610
	IEEE 802.11b	2467-2472	15	2	2.18	19.18	0.0828	5.35	0.1647
	IEEE 802.11g	2412-2462	14	2	2.18	18.18	0.0658	5.35	0.1308
	IEEE 802.11g	2467-2472	12	2	2.18	16.18	0.0415	5.35	0.0826
	IEEE 802.11a	5180-5240	14	2	3.63	19.63	0.0918	9.01	0.1827
		5260-5320	14	2	3.63	19.63	0.0918	9.01	0.1827
		5500-5700	14	2	3.63	19.63	0.0918	9.01	0.1827
		5745-5825	14	2	3.63	19.63	0.0918	9.01	0.1827

**For MIMO (2TX/2RX) Mode**

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive Tolerance according manufacturer	Directional Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)							
IEEE 802.11n-HT20	2412-2462	13	2	5.19	20.19	0.1045	5.35	0.2078
	2467-2472	11	2	5.19	18.19	0.0659	5.35	0.1311
IEEE 802.11n-HT40	2422-2452	13	2	5.19	20.19	0.1045	5.35	0.2078
	2457-2462	11	2	5.19	18.19	0.0659	5.35	0.1311
IEEE 802.11n-HT20	5180-5240	12	2	6.64	20.64	0.1159	9.01	0.2305
	5260-5320	12	2	6.64	20.64	0.1159	9.01	0.2305
	5500-5700	12	2	6.64	20.64	0.1159	9.01	0.2305
	5745-5825	12	2	6.64	20.64	0.1159	9.01	0.2305
IEEE 802.11n-HT40	5190-5230	12	2	6.64	20.64	0.1159	9.01	0.2305
	5270-5310	12	2	6.64	20.64	0.1159	9.01	0.2305
	5510-5670	12	2	6.64	20.64	0.1159	9.01	0.2305
IEEE 802.11ac-VHT20	5755-5795	12	2	6.64	20.64	0.1159	9.01	0.2305
	5180-5240	12	2	6.64	20.64	0.1159	9.01	0.2305
	5260-5320	12	2	6.64	20.64	0.1159	9.01	0.2305
IEEE 802.11ac-VHT40	5500-5700	12	2	6.64	20.64	0.1159	9.01	0.2305
	5745-5825	12	2	6.64	20.64	0.1159	9.01	0.2305
	5190-5230	11	2	6.64	19.64	0.0920	9.01	0.1831
IEEE 802.11ac-VHT80	5270-5310	11	2	6.64	19.64	0.0920	9.01	0.1831
	5510-5670	11	2	6.64	19.64	0.0920	9.01	0.1831
	5755-5795	11	2	6.64	19.64	0.0920	9.01	0.1831
IEEE 802.11ac-VHT80	5210	11	2	6.64	19.64	0.0920	9.01	0.1831
	5290	11	2	6.64	19.64	0.0920	9.01	0.1831
	5530	11	2	6.64	19.64	0.0920	9.01	0.1831
	5775	11	2	6.64	19.64	0.0920	9.01	0.1831

## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

N/A

## APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photographs.

\*\*\* End of Report \*\*\*

---

---

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.

---

---