



Certificate #4312.01

# RF EXPOSURE EVALUATION REPORT

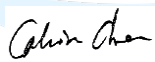
**Product Name:** In-Wall Wi-Fi Access Point  
**Trade Mark:** GRANDSTREAM  
**Model No. / HVIN:** GWN7624  
**Report Number:** 220216022RFC-4  
**Test Standards:** FCC 47 CFR Part 1 Subpart I  
 RSS-102 Issue 5  
**FCC ID:** YZZGWN7624  
**IC:** 11964A-GWN7624  
**Test Result:** PASS  
**Date of Issue:** July 29, 2022


Prepared for:

**Grandstream Networks, Inc.**  
**126 Brookline Ave., 3rd Floor Boston, MA 02215, USA**

Prepared by:

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**  
**Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China**  
**TEL: +86-755-2823 0888**  
**FAX: +86-755-2823 0886**

Prepared by:   
 Calvin Chen  
 Senior Project Engineer

Reviewed by:   
 Eric Yu  
 Project Supervisor

Approved by:   
 Kevin Liang  
 Assistant Manager

Date: July 29, 2022

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

**Version**

Version No.	Date	Description
V1.0	July 29, 2022	Original

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

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: [info@uttlab.com](mailto:info@uttlab.com)<http://www.uttlab.com>UTTR-RF-RSS102-V1.1

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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	Grandstream Networks, Inc.
<b>Address of Applicant:</b>	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
<b>Manufacturer:</b>	Grandstream Networks, Inc.
<b>Address of Manufacturer:</b>	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

### 1.2 EUT INFORMATION

<b>Product Name:</b>	In-Wall Wi-Fi Access Point		
<b>Model No. / HVIN:</b>	GWN7624		
<b>Trade Mark:</b>	GRANDSTREAM		
<b>DUT Stage:</b>	Identical Prototype		
<b>EUT Supports Function:</b> (Provided by the customer)	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
<b>Sample Received Date:</b>	February 17, 2022		

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For 2.4 GHz ISM Band of Wi-Fi	
<b>Frequency Band:</b>	2400 MHz to 2483.5 MHz
<b>Frequency Range:</b>	2412 MHz to 2462 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: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11n-HT40: 7
<b>Channel Separation:</b>	5 MHz
<b>Antenna Type:</b>	Chain 0 Dipole Antenna
	Chain 1 Dipole Antenna
<b>Antenna Gain:</b> (Provided by the customer)	Chain 0 2.5dBi
	Chain 1 3.0dBi
<b>Maximum Avg Power:</b>	SISO_ Chain 0 IEEE 802.11b: 19.77 dBm IEEE 802.11g: 16.49 dBm
	SISO_ Chain 1 IEEE 802.11b: 18.93 dBm IEEE 802.11g: 15.31 dBm
	MIMO_ Chain 0+1 IEEE 802.11n-HT20: 17.62 dBm IEEE 802.11n-HT40: 13.46 dBm

For 5GHz Band of Wi-Fi	
<b>Frequency Bands:</b>	5150 MHz to 5250 MHz (U-NII-1)
	5250 MHz to 5350 MHz (U-NII-2A)
	5470 MHz to 5725 MHz (U-NII-2C)
	5 725 MHz to 5 850 MHz (U-NII-3)
<b>Frequency Ranges:</b>	5180 MHz to 5240 MHz
	5260 MHz to 5320 MHz
	5500 MHz to 5700 MHz
	5 745 MHz to 5 825 MHz
<b>Support Standards:</b>	IEEE 802.11a/n/ac
<b>TPC Function:</b>	Not Support
<b>DFS Operational mode:</b>	Master
<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 MCS31
	IEEE 802.11n-HT40: Up to MCS31
	IEEE 802.11ac-VHT20: Up to MCS9

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	IEEE 802.11ac-VHT40: Up to MCS9					
	IEEE 802.11ac-VHT80: 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>	Dipole Antenna					
<b>Antenna Gain:</b> (Provided by the customer)	Chain 0	5150 MHz to 5850 MHz: 4.5 dBi				
	Chain 1	5150 MHz to 5850 MHz: 5.0 dBi				
	Chain 2	5150 MHz to 5850 MHz: 3.0 dBi				
	Chain 3	5150 MHz to 5850 MHz: 3.5 dBi				
<b>Maximum EIRP (dBm):</b>	<b>SISO Mode</b>		<b>U-NII-1</b>			
	IEEE 802.11a:	Chain 0	14.83			
		Chain 1	14.59			
		Chain 2	14.02			
		Chain 3	14.09			
	<b>MIMO Mode (Chain 0+1+2+3)</b>		<b>U-NII-1</b>			
	IEEE 802.11n-HT20:		9.14			
	IEEE 802.11n-HT40:		9.09			
	IEEE 802.11ac-VHT20:		8.42			
	IEEE 802.11ac-VHT40:		8.69			
IEEE 802.11ac-VHT80:		10.50				
<b>Maximum conducted output power (dBm):</b>	<b>SISO Mode</b>		<b>U-NII-1</b>	<b>U-NII-2A</b>	<b>U-NII-2C</b>	<b>U-NII-3</b>
	IEEE 802.11a:	Chain 0	21.59	15.83	15.98	20.08
		Chain 1	22.04	15.59	15.74	20.96
		Chain 2	21.71	15.70	15.9	19.92
		Chain 3	20.27	15.64	15.77	21.30
	<b>MIMO Mode (Chain 0+1+2+3)</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:		21.64	16.17	15.97	25.62
	IEEE 802.11n-HT40:		23.71	18.36	18.37	25.10
	IEEE 802.11ac-VHT20:		21.69	15.97	16.08	25.53
	IEEE 802.11ac-VHT40:		19.76	18.69	18.79	25.15
IEEE 802.11ac-VHT80:		16.78	16.43	17.40	25.84	

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### 1.4 OTHER INFORMATION

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11b	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT40	2422 MHz to 2452 MHz	Channel 3	Channel 6	Channel 9
		2422 MHz	2437 MHz	2452 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	--

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## 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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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

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## 1.6 DEVIATION FROM STANDARDS

None.

## 1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## 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
4	KDB 662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

#### 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 equivalent 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.

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 exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz<sup>6</sup> and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

### 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

### 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)

## 3.4 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 5250 MHz to 5350 MHz for IEEE802.11a/n/ac and operating at 5470 MHz to 5725 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:** Dipole Antenna

**Chain 1:** Dipole Antenna

**Chain 2:** Dipole Antenna

**Chain 3:** Dipole Antenna

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

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

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**Antenna Gain:**

<b>Chain 0:</b>	2412MHz to 2462 MHz: 2.5dBi 5150 MHz to 5250 MHz: 4.5dBi 5250 MHz to 5350 MHz: 4.5dBi 5470 MHz to 5725 MHz: 4.5dBi 5725 MHz to 5850 MHz: 4.5dBi	<b>Chain 1:</b>	2412MHz to 2462 MHz: 3.0dBi 5150 MHz to 5250 MHz: 5.0dBi 5250 MHz to 5350 MHz: 5.0dBi 5470 MHz to 5725 MHz: 5.0dBi 5725 MHz to 5850 MHz: 5.0dBi
<b>Chain 2:</b>	5150 MHz to 5250 MHz: 3.0dBi 5250 MHz to 5350 MHz: 3.0dBi 5470 MHz to 5725 MHz: 3.0dBi 5725 MHz to 5850 MHz: 3.0dBi	<b>Chain 3:</b>	5150 MHz to 5250 MHz: 3.5dBi 5250 MHz to 5350 MHz: 3.5dBi 5470 MHz to 5725 MHz: 3.5dBi 5725 MHz to 5850 MHz: 3.5dBi

**3.4.1.2 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	IEEE 802.11b	2412-2462	18	2	3.0	23	199.5262	1	0.0328
	IEEE 802.11g	2412-2462	15	2	3.0	20	100.0000	1	0.0150
	IEEE 802.11a	5180-5240	20	2.5	5.0	27.5	562.3413	1	0.1119
		5260-5320	16	1	5.0	22	158.4893	1	0.0315
		5500-5700	16	1	5.0	22	158.4893	1	0.0315
		5745-5825	21	2	5.0	28	630.9573	1	0.1255

**For MIMO Mode**

Operating Mode	Freq.	Ant.	Declared maximum conducted output power	Max. positive Tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value	MIMO		
										(MHz)	(dBm)	(dBi)
MIMO (2TX/2RX)	IEEE 802.11n-HT20	2412-2462	Ant 0	14	1.5	5.76	21.26	133.6596	1	0.0266	0.0477	1
		Ant 1	13	1.5	5.76	20.26	106.1696	1	0.0211			
	IEEE 802.11n-HT40	2422-2452	Ant 0	10	1.5	5.76	17.26	53.2108	1	0.0106	0.0173	1
		Ant 1	8	1.5	5.76	15.26	33.5738	1	0.0067			

Operating Mode	Freq.	Ant.	Declared maximum conducted average output power	Max. positive Tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value	MIMO		
										(MHz)	(dBm)	(dBi)
MIMO	IEEE 802.11n-HT20	5180-5240	Ant0	15	1	5.00	21.00	125.8925	1	0.0250	0.1002	1
			Ant1	15	1	5.00	21.00	125.8925	1	0.0250		
			Ant2	15	1	5.00	21.00	125.8925	1	0.0250		
			Ant3	15	1	5.00	21.00	125.8925	1	0.0250		
	802.11ac-VHT20 (4TX/4RX)	5260-5320	Ant0	10	1	5.00	16.00	39.8107	1	0.0079	0.0317	1
			Ant1	10	1	5.00	16.00	39.8107	1	0.0079		
			Ant2	10	1	5.00	16.00	39.8107	1	0.0079		
			Ant3	10	1	5.00	16.00	39.8107	1	0.0079		

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IEEE 802.11n- HT40 802.11ac- VHT40 (4TX/4RX)	5500- 5700	Ant0	9.5	1	5.00	15.50	35.4813	1	0.0071	0.0282	1	
		Ant1	9.5	1	5.00	15.50	35.4813	1	0.0071			
		Ant2	9.5	1	5.00	15.50	35.4813	1	0.0071			
		Ant3	9.5	1	5.00	15.50	35.4813	1	0.0071			
	5745- 5825	Ant0	19	1	5.00	25.00	316.2278	1	0.0629	0.2550	1	
		Ant1	19	1	5.00	25.00	316.2278	1	0.0629			
		Ant2	18	1	5.00	24.00	251.1886	1	0.0500			
		Ant3	20	1	5.00	26.00	398.1072	1	0.0792			
	IEEE 802.11ac- VHT80 (4TX/4RX)	5190- 5230	Ant0	13	1	5.00	19.00	79.4328	1	0.0158	0.0632	1
			Ant1	13	1	5.00	19.00	79.4328	1	0.0158		
			Ant2	13	1	5.00	19.00	79.4328	1	0.0158		
			Ant3	13	1	5.00	19.00	79.4328	1	0.0158		
5230 (HT40)		Ant0	17	1	5.00	23.00	199.5262	1	0.0397	0.1588	1	
		Ant1	17	1	5.00	23.00	199.5262	1	0.0397			
		Ant2	17	1	5.00	23.00	199.5262	1	0.0397			
		Ant3	17	1	5.00	23.00	199.5262	1	0.0397			
5270- 5310		Ant0	12	1	5.00	18.00	63.0957	1	0.0126	0.0502	1	
		Ant1	12	1	5.00	18.00	63.0957	1	0.0126			
		Ant2	12	1	5.00	18.00	63.0957	1	0.0126			
		Ant3	12	1	5.00	18.00	63.0957	1	0.0126			
5510- 5670	Ant0	12	1	5.00	18.00	63.0957	1	0.0126	0.0502	1		
	Ant1	12	1	5.00	18.00	63.0957	1	0.0126				
	Ant2	12	1	5.00	18.00	63.0957	1	0.0126				
	Ant3	12	1	5.00	18.00	63.0957	1	0.0126				
5755- 5795	Ant0	19	1	5.00	25.00	316.2278	1	0.0629	0.2387	1		
	Ant1	19	1	5.00	25.00	316.2278	1	0.0629				
	Ant2	18	1	5.00	24.00	251.1886	1	0.0500				
	Ant3	19	1	5.00	25.00	316.2278	1	0.0629				
IEEE 802.11ac- VHT80 (4TX/4RX)	5210	Ant0	11	1	5.00	17.00	50.1187	1	0.0100	0.0358	1	
		Ant1	10	1	5.00	16.00	39.8107	1	0.0079			
		Ant2	11	1	5.00	17.00	50.1187	1	0.0100			
		Ant3	10	1	5.00	16.00	39.8107	1	0.0079			
	5290	Ant0	10	1	5.00	16.00	39.8107	1	0.0079	0.0317	1	
		Ant1	10	1	5.00	16.00	39.8107	1	0.0079			
		Ant2	10	1	5.00	16.00	39.8107	1	0.0079			
		Ant3	10	1	5.00	16.00	39.8107	1	0.0079			
	5530	Ant0	11	1	5.00	17.00	50.1187	1	0.0100	0.0399	1	
		Ant1	11	1	5.00	17.00	50.1187	1	0.0100			
		Ant2	11	1	5.00	17.00	50.1187	1	0.0100			
		Ant3	11	1	5.00	17.00	50.1187	1	0.0100			
	5775	Ant0	19	1	5.00	25.00	316.2278	1	0.0629	0.2679	1	
		Ant1	19	1	5.00	25.00	316.2278	1	0.0629			
		Ant2	20	1	5.00	26.00	398.1072	1	0.0792			
		Ant3	19	1	5.00	25.00	316.2278	1	0.0629			

Note: Directional gain according to KDB 662911 D01 Multiple Transmitter Output v02r01.

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

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

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**3.4.1.3 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	Limit	
	(MHz)	(dBm)		(dBi)	(dBm)	(W)	(W)	
SISO	IEEE 802.11b	2412-2462	18	2	3.0	23	0.1995	2.6840
	IEEE 802.11g	2412-2462	15	2	3.0	20	0.1000	2.6840
	IEEE 802.11a	5180-5240	10	1	5.0	16	0.0398	4.5253
		5260-5320	16	2	5.0	23	0.1995	4.5729
		5500-5700	16	2	5.0	23	0.1995	4.7145
	5745-5825	21	1	5.0	27	0.5012	4.8570	

**For MIMO Mode**

Operating Mode	Freq.	Ant.	Declared maximum conducted average output power	Max. positive Tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit	MIMO		
									(MHz)	(dBm)	(dBi)
MIMO (2TX/2RX)	IEEE 802.11n-HT20	2412-2462	Ant0	14	1.5	5.76	21.26	0.1337	2.6840	0.0894	1
		Ant1	13	1.5	5.76	20.26	0.1062				
	IEEE 802.11n-HT40	2422-2452	Ant0	10	1.5	5.76	17.26	0.0532	2.6916	0.0322	1
		Ant1	8	1.5	5.76	15.26	0.0336				

Operating Mode	Freq.	Ant.	Declared maximum conducted average output power	Max. positive Tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit	MIMO		
									(MHz)	(dBm)	(dBi)
MIMO (4TX/4RX)	IEEE 802.11n-HT20 802.11ac-VHT20	5180-5240	Ant0	-2	2	5.00	5.00	0.0032	4.5253	0.0028	1
			Ant1	-2	2	5.00	5.00	0.0032			
			Ant2	-2	2	5.00	5.00	0.0032			
			Ant3	-2	2	5.00	5.00	0.0032			
		5260-5320	Ant0	10	1	5.00	16.00	0.0398	4.5729	0.0348	1
			Ant1	10	1	5.00	16.00	0.0398			
			Ant2	10	1	5.00	16.00	0.0398			
			Ant3	10	1	5.00	16.00	0.0398			
		5500-5700	Ant0	9.5	1	5.00	15.50	0.0355	4.7145	0.0302	1
			Ant1	9.5	1	5.00	15.50	0.0355			
			Ant2	9.5	1	5.00	15.50	0.0355			
			Ant3	9.5	1	5.00	15.50	0.0355			
	5745-5825	Ant0	19	1	5.00	25.00	0.3162	4.8570	0.2639	1	
		Ant1	19	1	5.00	25.00	0.3162				
		Ant2	18	1	5.00	24.00	0.2512				
		Ant3	20	1	5.00	26.00	0.3981				
	IEEE 802.11n-HT40 802.11ac-VHT40	5190-5230	Ant0	-2	2	5.00	5.00	0.0032	4.5312	0.0028	1
			Ant1	-2	2	5.00	5.00	0.0032			
			Ant2	-2	2	5.00	5.00	0.0032			
			Ant3	-2	2	5.00	5.00	0.0032			
5270-5310		Ant0	12	1	5.00	18.00	0.0631	4.5789	0.0551	1	
		Ant1	12	1	5.00	18.00	0.0631				
		Ant2	12	1	5.00	18.00	0.0631				
		Ant3	12	1	5.00	18.00	0.0631				

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IEEE 802.11ac- VHT80 802.11ax- HE80	5510- 5670	Ant0	12	1	5.00	18.00	0.0631	4.7204	0.0535	1	
		Ant1	12	1	5.00	18.00	0.0631	4.7204			
		Ant2	12	1	5.00	18.00	0.0631	4.7204			
		Ant3	12	1	5.00	18.00	0.0631	4.7204			
	5755- 5795	Ant0	19	1	5.00	25.00	0.3162	4.8628	0.2467	1	
		Ant1	19	1	5.00	25.00	0.3162	4.8628			
		Ant2	18	1	5.00	24.00	0.2512	4.8628			
		Ant3	19	1	5.00	25.00	0.3162	4.8628			
		5210	Ant0	0	1	5.00	6.00	0.0040	4.5432	0.0035	1
			Ant1	0	1	5.00	6.00	0.0040	4.5432		
			Ant2	0	1	5.00	6.00	0.0040	4.5432		
			Ant3	0	1	5.00	6.00	0.0040	4.5432		
5290		Ant0	10	1	5.00	16.00	0.0398	4.5907	0.0347	1	
		Ant1	10	1	5.00	16.00	0.0398	4.5907			
		Ant2	10	1	5.00	16.00	0.0398	4.5907			
		Ant3	10	1	5.00	16.00	0.0398	4.5907			
5530		Ant0	11	1	5.00	17.00	0.0501	4.7321	0.0424	1	
		Ant1	11	1	5.00	17.00	0.0501	4.7321			
		Ant2	11	1	5.00	17.00	0.0501	4.7321			
		Ant3	11	1	5.00	17.00	0.0501	4.7321			
5775	Ant0	19	1	5.00	25.00	0.3162	4.8743	0.2763	1		
	Ant1	19	1	5.00	25.00	0.3162	4.8743				
	Ant2	20	1	5.00	26.00	0.3981	4.8743				
	Ant3	19	1	5.00	25.00	0.3162	4.8743				

Note: Directional gain according to KDB 662911 D01 Multiple Transmitter Output v02r01.

### 3.4.2 Simultaneous Multi-band Transmission MPE Analysis

#### 3.4.2.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4G_WLAN + 5G_WLAN	Support

#### 3.4.2.2 Results for transmit simultaneously

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

No.	Configurations	Maximum MPE Value			Limits
		2.4G WLAN	5G WLAN	Transmit simultaneously	
1	2.4G_WLAN(1TX) + 5G_WLAN(1TX)	0.0328	0.1255	0.1583	1

**Note:**

According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

$$\text{Transmit simultaneously MPE} = \Sigma \text{ of MPE ratios}$$

$$\text{MPE ratios} = \text{Field strengths or power density} / \text{MPE limit at the test frequency}$$

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No.	Configurations	Maximum MPE Value			Limits
		2.4G WLAN	5G WLAN	Transmit simultaneously	
1	2.4G_WLAN(1TX) + 5G_WLAN(1TX)	0.1995	0.5012	0.1775	1

**Note:**

According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

$$\text{Transmit simultaneously MPE} = \Sigma \text{ of MPE ratios}$$

$$\text{MPE ratios} = \text{Field strengths or power density} / \text{MPE limit at the test frequency}$$

**APPENDIX 1 PHOTOS OF TEST SETUP**

N/A

**APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS**

Refer to Appendix 2 for EUT external and internal Photos.

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

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