



RF EXPOSURE EVALUATION REPORT


Product Name: High-End Smart Video Phone for Android™
Trade Mark: GRANDSTREAM
Model No. / HVIN: GXV3470
Report Number: 220421012RFC-5
Test Standards: FCC 47 CFR Part 1 Subpart I
 RSS-102 Issue 5
FCC ID: YZZGXV3470
IC: 11964A-GXV3470
Test Result: PASS
Date of Issue: July 4, 2022


Prepared for:

Grandstream Networks, Inc.
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Prepared by:

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Version

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

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

1.2 EUT INFORMATION

Product Name:	High-End Smart Video Phone for Android™		
Model No. / HVIN:	GXV3470		
Trade Mark:	GRANDSTREAM		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n/ax	
		Bluetooth 5.0	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac/ax
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac/ax
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac/ax
	5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac/ax	
Sample Received Date:	April 21, 2022		

Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BT_LE/2LE			
Frequency Band:	2400 MHz to 2483.5 MHz		
Frequency Range:	2402 MHz to 2480 MHz		
Bluetooth Version:	Bluetooth LE/2LE		
Type of Modulation:	GFSK		
Number of Channels:	40		
Channel Separation:	2 MHz		
Antenna Type:	Dipole Antenna		
Antenna Gain: (Provided by the customer)	4.5 dBi		
Maximum Peak Power:	LE	6.02 dBm	
	2LE	6.26 dBm	

For BT_EDR			
Frequency Band:	2400 MHz to 2483.5 MHz		
Frequency Range:	2402 MHz to 2480 MHz		
Bluetooth Version:	Bluetooth BR + EDR		
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)		
Type of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK		
Number of Channels:	79		
Channel Separation:	1 MHz		
Hopping Channel Type:	Adaptive Frequency Hopping Systems		
Antenna Type:	Dipole Antenna		

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Antenna Gain: (Provided by the customer)	4.5 dBi
Maximum Peak Power:	9.275 dBm

For 2.4 GHz ISM Band of Wi-Fi	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2412 MHz to 2462 MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11ax-HE20
Type of Modulation:	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 802.11ax-HE20: OFDMA(1024-QAM, 256-QAM, 64-QAM, 16-QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS15 IEEE 802.11ax-HE20: Up to MCS11
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11ax-HE20: 11
Channel Separation:	5 MHz
Antenna Type:	Chain 0 Dipole Antenna
	Chain 1 Dipole Antenna
Antenna Gain: (Provided by the customer)	Chain 0 4.5dBi
	Chain 1 2.5dBi
Maximum Conducted Power:	SISO_ Chain 0 IEEE 802.11b: 20.86 dBm IEEE 802.11g: 24.99 dBm IEEE 802.11n-HT20: 24.74 dBm IEEE 802.11ax-HE20: 24.93 dBm
	SISO_ Chain 1 IEEE 802.11b: 20.77 dBm IEEE 802.11g: 25.39 dBm IEEE 802.11n-HT20: 25.48 dBm IEEE 802.11ax-HE20: 25.36 dBm
	MIMO_ Chain 0+1 IEEE 802.11n-HT20: 28.14 dBm IEEE 802.11ax-HE20: 28.16 dBm

For 5 GHz U-NII Bands of Wi-Fi	
Frequency Bands:	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)
Frequency Ranges:	5180 MHz to 5240 MHz
	5260 MHz to 5320 MHz
	5500 MHz to 5700 MHz
	5 745 MHz to 5 825 MHz
Support Standards:	IEEE 802.11a/n/ac/ax
TPC Function:	Not Support
DFS Operational mode:	Slave without radar Interference detection function
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)

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	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11ax: OFDMA1024-QAM,256QAM, 64QAM, 16QAM, QPSK, BPSK)	
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20: 20 MHz	
	IEEE 802.11n-HT40/ac-VHT40/ax-HE40: 40 MHz	
	IEEE 802.11ac-VHT80/ax-HE80: 80 MHz	
Data Rate Data Rate:	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	
	IEEE 802.11ac-VHT80: Up to MCS9	
	IEEE 802.11ax-HE20: Up to MCS11	
	IEEE 802.11ax-HE40: Up to MCS11	
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 2 for IEEE 802.11n-HT40/ac-VHT40/ax-HE40 1 for IEEE 802.11acVHT80/ax-HE80	
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 2 for IEEE 802.11n-HT40/ac-VHT40/ax-HE40 1 for IEEE 802.11acVHT80/ax-HE80	
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20//ax-HE20 5 for IEEE 802.11n-HT40/ac-VHT40//ax-HE40 2 for IEEE 802.11ac-VHT80/ax-HE80	
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 2 for IEEE 802.11n-HT40/ac-VHT40//ax-HE40 1 for IEEE 802.11ac-VHT80//ax-HE80	
Antenna Type:	Chain 0	Dipole Antenna
	Chain 1	Dipole Antenna
Antenna Gain: (Provided by the customer)	Chain 0	5150 MHz to 5250 MHz: 4.0dBi
		5250 MHz to 5350 MHz: 4.0dBi
		5470 MHz to 5725 MHz: 4.0dBi
		5725 MHz to 5850 MHz: 4.0dBi
	Chain 1	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
Maximum EIRP (dBm):	SISO_Chain 0	U-NII-1
	IEEE 802.11a:	18.37
	SISO_Chain 1	U-NII-1
	IEEE 802.11a:	18.39
	MIMO_Chain 0+1	U-NII-1
	IEEE 802.11n-HT20:	16.98
	IEEE 802.11n-HT40:	21.18
	IEEE	16.77

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	802.11ac-VHT20:				
	IEEE 802.11ac-VHT40:	21.07			
	IEEE 802.11ac-VHT80:	20.28			
	IEEE 802.11ax-HE20:	17.20			
	IEEE 802.11ax-HE40:	21.47			
	IEEE 802.11ax-HE80:	20.39			
	Maximum conducted output power (dBm):	SISO_Chain 0	U-NII-1	U-NII-2A	U-NII-2C
IEEE 802.11a:		14.37	14.04	14.03	14.02
SISO_Chain 1		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
IEEE 802.11a:		13.39	13.05	13.09	12.82
MIMO_Chain 0+1		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
IEEE 802.11n-HT20:		9.46	16.52	16.61	16.29
IEEE 802.11n-HT40:		13.66	17.54	17.47	17.42
IEEE 802.11ac-VHT20:		9.25	16.53	16.63	16.27
IEEE 802.11ac-VHT40:		13.55	17.18	17.17	17.01
IEEE 802.11ac-VHT80:		12.76	20.10	19.03	19.01
IEEE 802.11ax-HE20:		9.68	16.66	16.70	16.34
IEEE 802.11ax-HE40:		13.95	17.46	17.40	17.22
IEEE 802.11ax-HE80:		12.87	20.25	19.19	19.15

1.4 OTHER INFORMATION

Test channels for BT_LE/2LE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
GFSK	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

Test channels for BT_EDR				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 39	Channel 78
$\pi/4$ DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	2402 MHz	2441 MHz	2480 MHz
		Channel 0	Channel 39	Channel 78
8DPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	2402 MHz	2441 MHz	2480 MHz
		Channel 0	Channel 39	Channel 78

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

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		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
IEEE 802.11ax-HE20		2412 MHz	2437 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 IEEE 802.11ax-HE20	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 IEEE 802.11ax-HE40	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 IEEE 802.11ax-HE80	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.

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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 ²)	Averaging Times E ² , H ² 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 ²)	Averaging Times E ² , H ² 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 MHz⁶ 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/cm²)

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 = 20cm 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/ax and
 operating at 5150 MHz to 5250 MHz for IEEE802.11a/n/ac/ax and
 operating at 5250 MHz to 5350 MHz for IEEE802.11a/n/ac/ax and
 operating at 5470 MHz to 5725 MHz for IEEE802.11a/n/ac/ax and
 operating at 5725 MHz to 5850 MHz for IEEE802.11a/n/ac/ax.

3.4.1.1 Antenna Type:

Chain 0: Dipole Antenna

Chain 1: Dipole Antenna

Antenna Gain:

Chain 0: 2412MHz to 2462 MHz: 4.5dBi
 5150 MHz to 5250 MHz: 4.0dBi
 5250 MHz to 5350 MHz: 4.0dBi
 5470 MHz to 5725 MHz: 4.0dBi
 5725 MHz to 5850 MHz: 4.0dBi

Chain 1: 2412MHz to 2462 MHz: 2.5dBi
 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

3.4.1.2 Results for FCC 47 CFR Part 1 Subpart I

For SISO (1TX/1RX) 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	
	(MHz)									(dBm)
SISO	IEEE 802.11b	2412-2462	Ant 0 & Ant1	20	1	4.5	25.5	354.8134	1	0.0706
	IEEE 802.11g	2412-2462	Ant 0 & Ant1	25	1	4.5	30.5	1122.0185	1	0.2232
	IEEE 802.11a	5180-5240	Ant 0 & Ant1	14	1	5.0	20	100.0000	1	0.0199
		5260-5320	Ant 0 & Ant1	13	1.5	5.0	19.5	89.1251	1	0.0177
		5500-5700	Ant 0 & Ant1	13	1.5	5.0	19.5	89.1251	1	0.0177
		5745-5825	Ant 0 & Ant1	13	1.5	5.0	19.5	89.1251	1	0.0177

For MIMO (2TX/2RX) 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 802.11ax-HE20	Ant 0	25	1	4.5	30.5	1122.0185	1	0.2232	0.3640	1
		Ant 1	25	1	2.5	28.5	707.9458	1	0.1408		
	IEEE 802.11n-HT20 802.11ac-VHT20 802.11ax-HE20	Ant 0	6	1.5	4.0	11.5	14.1254	1	0.0028	0.0063	1
		Ant 1	6	1.5	5.0	12.5	17.7828	1	0.0035		
	5260-5320	Ant 0	13	1	4.0	18.0	63.0957	1	0.0126	0.0284	1
		Ant 1	13	1	5.0	19.0	79.4328	1	0.0158		
	5500-5700	Ant 0	13	1.5	4.0	18.5	70.7946	1	0.0141	0.0318	1
		Ant 1	13	1.5	5.0	19.5	89.1251	1	0.0177		

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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)	(dBm)
	5745-5825	Ant 0	13	1	4.0	18.0	63.0957	1	0.0126	0.0284	1	
		Ant 1	13	1	5.0	19.0	79.4328	1	0.0158		1	
IEEE 802.11n-HT40 802.11ac-VHT40 802.11ax-HE40	5190-5230	Ant 0	11	1.5	4.0	16.5	44.6684	1	0.0089	0.0201	1	
		Ant 1	11	1.5	5.0	17.5	56.2341	1	0.0112		1	
	5270-5310	Ant 0	14	2	4.0	20.0	100.0000	1	0.0199	0.0449	1	
		Ant 1	14	2	5.0	21.0	125.8925	1	0.0250		1	
	5510-5670	Ant 0	14	2	4.0	20.0	100.0000	1	0.0199	0.0449	1	
		Ant 1	14	2	5.0	21.0	125.8925	1	0.0250		1	
	5755-5795	Ant 0	14	2	4.0	20.0	100.0000	1	0.0199	0.0449	1	
		Ant 1	14	2	5.0	21.0	125.8925	1	0.0250		1	
	IEEE 802.11ac-VHT80 802.11ax-HE80	5210	Ant 0	10	1	4.0	15.0	31.6228	1	0.0063	0.0142	1
			Ant 1	10	1	5.0	16.0	39.8107	1	0.0079		1
		5290	Ant 0	17	1	4.0	22.0	158.4893	1	0.0315	0.0712	1
			Ant 1	17	1	5.0	23.0	199.5262	1	0.0397		1
5530		Ant 0	16	1	4.0	21.0	125.8925	1	0.0250	0.0565	1	
		Ant 1	16	1	5.0	22.0	158.4893	1	0.0315		1	
5775		Ant 0	16	1	4.0	21.0	125.8925	1	0.0250	0.0565	1	
		Ant 1	16	1	5.0	22.0	158.4893	1	0.0315		1	

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3.4.1.3 Results for RSS-102 Issue 5

For SISO (1TX/1RX) Mode

Operating Mode	Freq.	Ant.	Declared maximum conducted 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	Ant 0 & Ant1	20	1	4.5	25.5	0.3548	2.6840
	IEEE 802.11g	2412-2462	Ant 0 & Ant1	25	1	4.5	30.5	1.1220	2.6840
	IEEE 802.11a	5180-5240	Ant 0 & Ant1	14	1	5.0	20	0.1000	4.5253
		5260-5320	Ant 0 & Ant1	13	1.5	5.0	19.5	0.0891	4.5729
		5500-5700	Ant 0 & Ant1	13	1.5	5.0	19.5	0.0891	4.7145
		5745-5825	Ant 0 & Ant1	13	1.5	5.0	19.5	0.0891	4.8570

For MIMO (2TX/2RX) Mode

Operating Mode	Freq.	Ant.	Declared maximum conducted output power	Max. positive Tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit	MIMO		
	(MHz)		(dBm)		(dBi)	(dBm)	(W)	(W)	Value	Limit	
MIMO (2TX/2RX)	IEEE 802.11n-HT20 802.11ax-HE20	2412-2462	Ant 0	25	1	4.5	30.5	1.1220	2.6840	0.6818	1
		Ant 1	25	1	2.5	28.5	0.7079	2.6840			
	IEEE 802.11n-HT20 802.11ac-VHT20 802.11ax-HE20	5180-5240	Ant 0	6	1.5	4.0	11.5	0.0141	4.5253	0.0070	1
			Ant 1	6	1.5	5.0	12.5	0.0178	4.5253		
		5260-5320	Ant 0	13	1	4.0	18.0	0.0631	4.5729	0.0312	1
			Ant 1	13	1	5.0	19.0	0.0794	4.5729		
	5500-5700	Ant 0	13	1.5	4.0	18.5	0.0708	4.7145	0.0339	1	
		Ant 1	13	1.5	5.0	19.5	0.0891	4.7145			
	5745-5825	Ant 0	13	1	4.0	18.0	0.0631	4.8570	0.0293	1	
		Ant 1	13	1	5.0	19.0	0.0794	4.8570			
	IEEE 802.11n-HT40 802.11ac-VHT40 802.11ax-HE40	5190-5230	Ant 0	11	1.5	4.0	16.5	0.0447	4.5312	0.0223	1
			Ant 1	11	1.5	5.0	17.5	0.0562	4.5312		
		5270-5310	Ant 0	14	2	4.0	20.0	0.1000	4.5789	0.0493	1
			Ant 1	14	2	5.0	21.0	0.1259	4.5789		
		5510-5670	Ant 0	14	2	4.0	20.0	0.1000	4.7204	0.0479	1
			Ant 1	14	2	5.0	21.0	0.1259	4.7204		
		5755-5795	Ant 0	14	2	4.0	20.0	0.1000	4.8628	0.0465	1
			Ant 1	14	2	5.0	21.0	0.1259	4.8628		

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Operating Mode	Freq.	Ant.	Declared maximum conducted output power	Max. positive Tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit	MIMO	
	(MHz)								(dBm)	(dBi)
IEEE 802.11ac-VHT80 802.11ax-HE80	5210	Ant 0	10	1	4.0	15.0	0.0316	4.5432	0.0157	1
		Ant 1	10	1	5.0	16.0	0.0398	4.5432		1
	5290	Ant 0	17	1	4.0	22.0	0.1585	4.5907	0.0780	1
		Ant 1	17	1	5.0	23.0	0.1995	4.5907		1
	5530	Ant 0	16	1	4.0	21.0	0.1259	4.7321	0.0601	1
		Ant 1	16	1	5.0	22.0	0.1585	4.7321		1
	5775	Ant 0	16	1	4.0	21.0	0.1259	4.8743	0.0583	1
		Ant 1	16	1	5.0	22.0	0.1585	4.8743		1

3.4.2 For BT

For BT_LE/2LE function, operating at 2402MHz to 2480 MHz for GFSK and

For BT_EDR function, operating at 2402MHz to 2480 MHz for GFSK, $\pi/4$ DQPSK, 8DPSK

3.4.2.1 Antenna Type:

Chain 0: Dipole Antenna

3.4.2.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: 4.5 dBi

3.4.2.3 Results for FCC 47 CFR Part 1 Subpart I

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)							
LE/2LE	2402-2480	4	2.5	4.5	11	12.5893	1	0.0025
EDR	2402-2480	6	4	4.5	14.5	28.1838	1	0.0056

3.4.2.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)						
LE/2LE	2402-2480	4	2.5	4.5	11	0.0126	2.6764
EDR	2402-2480	6	4	4.5	14.5	0.0282	2.6764

3.4.3 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 + BT	Support
2	5G _WLAN+ BT	Support
3	2.4G _WLAN + 5G _WLAN	Not 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	BT	Transmit simultaneously	
1	2.4G _WLAN + BT	0.3640	-	0.0056	0.3696	1
2	5G _WLAN+ BT	-	0.0712	0.0056	0.0768	
3	2.4G _WLAN + 5G _WLAN	0.3640	0.0712	-	0.4352	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	BT	Transmit simultaneously	
1	2.4G _WLAN + BT	0.6818	-	0.0105	0.6923	1
2	5G _WLAN+ BT	-	0.0780	0.0105	0.0885	1
3	2.4G _WLAN + 5G _WLAN	0.6818	0.0780	-	0.7598	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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