

RF EXPOSURE EVALUATION REPORT

Product Name: WIFI Module
Trade Mark: Prowise
Model No. / HVIN: PW.2.12004.0002
Add. Model No. / HVIN: N/A
Report Number: 210118001RFC-5
Test Standards: FCC 47 CFR Part 1 Subpart I
RSS-102 Issue 5
FCC ID: 2AQ5RWIFIAP6275P
IC: 24301-WIFIAP6275P
Test Result: PASS
Date of Issue: May 6, 2021

Prepared for:

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Prepared by:

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Version

Version No.	Date	Description
V1.0	May 6, 2021	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Shenzhen KTC Commercial Display Technology CO.,LTD.
Address of Applicant:	No.4023, Northern Wuhe Road, Bantian Street, Longgang District, Shenzhen City, Guangdong Province, P.R.China
Manufacturer:	Shenzhen KTC Commercial Display Technology CO.,LTD.
Address of Manufacturer:	No.4023, Northern Wuhe Road, Bantian Street, Longgang District, Shenzhen City, Guangdong Province, P.R.China

1.2 EUT INFORMATION

Product Name:	WIFI Module		
Model No. / HVIN:	PW.2.12004.0002		
Add. Model No. / HVIN:	N/A		
Trade Mark:	Prowise		
DUT Stage:	Identical Prototype		
	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
Software Version:	1.0.28		
Hardware Version:	A1		
Sample Received Date:	January 20, 2021		
Sample Tested Date:	March 11, 2021 to April 10, 2021		

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BT_LE	
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:	External Antenna
Antenna Gain:	2.06 dBi
Maximum Peak Power:	6.97 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
Antenna Type:	External Antenna
Antenna Gain:	2.06dBi
Maximum Peak Power:	8.823 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 802.11ax20
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: OFDM(,1024QAM,256QAM, 64QAM, 16QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7 IEEE 802.11ax20: Up to HE11
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11ax20: 11
Channel Separation:	5 MHz
Antenna Type:	External Antenna
Antenna Gain:	2.06 dBi
Directional gain:	0 dBi
Maximum Peak Power:	IEEE 802.11b: 15.74dBm IEEE 802.11g: 15.37 dBm IEEE 802.11n-HT20: 15.28 dBm IEEE 802.11ax: 14.50 dBm

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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)	
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11ax: OFDM(,1024QAM,256QAM, 64QAM, 16QAM, QPSK, BPSK)	
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz	
	IEEE 802.11n-HT40/ac-VHT40/ax40: 40 MHz	
	IEEE 802.11ac-VHT80/ax80: 80 MHz	
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 802.11ax20: Up to HE11	
	IEEE 802.11ax40: Up to HE11	
	IEEE 802.11ax80: Up to HE11	
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20/ax20 2 for IEEE 802.11n-HT40/ac-VHT40/ax40 1 for IEEE 802.11acVHT80/ax80	
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20/ax20 2 for IEEE 802.11n-HT40/ac-VHT40/ax40 1 for IEEE 802.11acVHT80/ax80	
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20/ax20 5 for IEEE 802.11n-HT40/ac-VHT40/ax40 2 for IEEE 802.11ac-VHT80/ax80	
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20/ax20 2 for IEEE 802.11n-HT40/ac-VHT40/ax40 1 for IEEE 802.11ac-VHT80/ax80	
Antenna Type:	Chain 0	External Antenna
	Chain 1	External Antenna
Antenna Gain:	Chain 0	5150 MHz to 5250 MHz: 1.67 dBi
		5250 MHz to 5350 MHz: 1.75 dBi
		5470 MHz to 5725 MHz: 2.95 dBi

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	Chain 1	5725 MHz to 5850 MHz: 1.55 dBi			
		5150 MHz to 5250 MHz: 1.67 dBi			
		5250 MHz to 5350 MHz: 1.75 dBi			
		5470 MHz to 5725 MHz: 2.95 dBi			
		5725 MHz to 5850 MHz: 1.55 dBi			
Maximum EIRP (dBm):	SISO_Chain 0	U-NII-1			
	IEEE 802.11a:	14.10			
	SISO_Chain 1	U-NII-1			
	IEEE 802.11a:	14.75			
	MIMO_Chain 0+1	U-NII-1			
	IEEE 802.11n-HT20:	19.37			
	IEEE 802.11n-HT40:	16.39			
	IEEE 802.11ac-VHT20:	17.56			
	IEEE 802.11ac-VHT40:	14.89			
	IEEE 802.11ac-VHT80:	14.28			
	IEEE 802.11ax20	15.02			
	IEEE 802.11ax40	13.52			
	IEEE 802.11ax8	15.51			
Maximum conducted output power (dBm):	SISO_Chain 0	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	12.43	12.36	11.97	12.53
	SISO_Chain 1	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	13.08	13.25	12.52	13.03
	MIMO_Chain 0+1	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11n-HT20:	17.70	17.29	15.59	15.73
	IEEE 802.11n-HT40:	14.72	14.52	14.17	14.33
	IEEE 802.11ac-VHT20:	15.89	15.58	15.01	12.30
	IEEE 802.11ac-VHT40:	13.22	13.67	13.12	13.76
	IEEE 802.11ac-VHT80:	12.61	12.34	12.23	11.08
	IEEE 802.11ax20	13.35	12.98	13.44	11.74
	IEEE 802.11ax40	11.85	11.69	12.25	11.46
	IEEE 802.11ax80	13.84	13.45	13.68	11.65
Normal Test Voltage:		3.3 Vdc			

1.4 OTHER INFORMATION

Test channels for BT_LE				
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
		2402 MHz	2441 MHz	2480 MHz

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
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	2412 MHz	2437 MHz	2462 MHz
		Channel 1	Channel 6	Channel 11
IEEE 802.11ax20	2412 MHz to 2462 MHz	2412 MHz	2437 MHz	2462 MHz
		Channel 1	Channel 6	Channel 11

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-VHT20/802.11ax20	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-VHT40/802.11ax40	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-VHT80/802.11ax80	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.

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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 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 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.

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 = 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: External Antenna

Chain 1: External Antenna

3.4.1.2 Antenna Gain:

Chain 0: 2412MHz to 2462 MHz: 2.06 dBi
5150 MHz to 5250 MHz: 1.67 dBi

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5250 MHz to 5350 MHz: 1.75 dBi
5470 MHz to 5725 MHz: 2.95 dBi
5725 MHz to 5850 MHz: 1.55 dBi

Chain 1: Same as chain 0

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.

$$\text{The directional gain} = G_{\text{ANT}} + 10 \log(N_{\text{ANT}}) \text{ dBi} = 1.67 + 10 \log(2) = 4.68\text{dBi}$$

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

$$\text{The antenna gain} = \text{Chain 0 or Chain 1} = 1.67 \text{ dBi}$$

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)		(dBi)	(dBm)	(mW)	(mw/cm ²)	
SISO	IEEE 802.11b	2412	16	1	2.06	19.06	80.54	1	0.0160
		2437	16	1	2.06	19.06	80.54	1	0.0160
		2462	16	1	2.06	19.06	80.54	1	0.0160
	IEEE 802.11g	2412	16	1	2.56	19.56	90.36	1	0.0180
		2437	16	1	2.56	19.56	90.36	1	0.0180
		2462	16	1	2.56	19.56	90.36	1	0.0180
	IEEE 802.11a	5180	13	1	1.67	15.67	36.90	1	0.0073
		5220	13	1	1.67	15.67	36.90	1	0.0073
		5240	13	1	1.67	15.67	36.90	1	0.0073
		5260	13	1	1.75	15.75	37.58	1	0.0075
		5300	13	1	1.75	15.75	37.58	1	0.0075
		5320	13	1	1.75	15.75	37.58	1	0.0075
		5500	12	1.5	2.8	16.30	42.66	1	0.0085
		5580	12	1.5	2.8	16.30	42.66	1	0.0085
		5700	12	1.5	2.8	16.30	42.66	1	0.0085
		5745	12	1.5	1.12	14.62	28.97	1	0.0058
		5785	12	1.5	1.12	14.62	28.97	1	0.0058
		5805	12	1.5	1.12	14.62	28.97	1	0.0058

For MIMO (2TX/2RX) 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)		(dBi)	(dBm)	(mW)	(mw/cm ²)	
MIMO	IEEE 802.11n-HT20/ax20	2412	17	1	2.06	20.06	101.39	1	0.0202
		2437	17	1	2.06	20.06	101.39	1	0.0202
		2462	17	1	2.06	20.06	101.39	1	0.0202
	IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5180	15	1.5	1.67	18.17	65.61	1	0.0131
		5220	15	1.5	1.67	18.17	65.61	1	0.0131
		5240	15	1.5	1.67	18.17	65.61	1	0.0131
		5260	16	2	1.75	19.75	94.41	1	0.0188
		5300	16	2	1.75	19.75	94.41	1	0.0188
		5320	16	2	1.75	19.75	94.41	1	0.0188
		5500	16	2	2.95	20.95	124.45	1	0.0248
		5580	16	2	2.95	20.95	124.45	1	0.0248
		5700	16	2	2.95	20.95	124.45	1	0.0248
		5745	14	2	1.55	17.55	56.89	1	0.0113
		5785	14	2	1.55	17.55	56.89	1	0.0113
		5825	14	2	1.55	17.55	56.89	1	0.0113
	IEEE 802.11nax20	5180	13	1	1.67	15.67	36.90	1	0.0073
		5220	13	1	1.67	15.67	36.90	1	0.0073
		5240	13	1	1.67	15.67	36.90	1	0.0073
		5260	13	1	1.75	15.75	37.58	1	0.0075
		5300	13	1	1.75	15.75	37.58	1	0.0075
		5320	13	1	1.75	15.75	37.58	1	0.0075
		5500	13	2	2.95	17.95	62.37	1	0.0124
		5580	13	2	2.95	17.95	62.37	1	0.0124
		5700	13	2	2.95	17.95	62.37	1	0.0124
		5745	11	2	1.55	14.55	28.51	1	0.0057
		5785	11	2	1.55	14.55	28.51	1	0.0057
		5825	11	2	1.55	14.55	28.51	1	0.0057
	IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5190	14	1.5	1.67	17.17	52.12	1	0.0104
		5230	14	1.5	1.67	17.17	52.12	1	0.0104
		5270	14	1.5	1.75	17.25	53.09	1	0.0106
		5310	14	1.5	1.75	17.25	53.09	1	0.0106
		5510	14	1	2.95	17.95	62.37	1	0.0124
		5550	14	1	2.95	17.95	62.37	1	0.0124
		5670	14	1	2.95	17.95	62.37	1	0.0124
		5755	14	1	1.55	16.55	45.19	1	0.0090
		5795	14	1	1.55	16.55	45.19	1	0.0090
	IEEE 802.11nax40	5190	11	1	1.67	13.67	23.28	1	0.0046
		5230	11	1	1.67	13.67	23.28	1	0.0046
		5270	11	1	1.75	13.75	23.71	1	0.0047
		5310	11	1	1.75	13.75	23.71	1	0.0047
		5510	11	2	2.95	15.95	39.36	1	0.0078
		5550	11	2	2.95	15.95	39.36	1	0.0078
		5670	11	2	2.95	15.95	39.36	1	0.0078
		5755	11	2	1.55	14.55	28.51	1	0.0057
		5795	11	2	1.55	14.55	28.51	1	0.0057
	IEEE 802.11ac-VHT80/ IEEE 802.11ax80	5210	13	1	1.67	15.67	36.90	1	0.0073
		5290	13	1	1.75	15.75	37.58	1	0.0075

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UTTR-RF-RSS102-V1.1

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according to manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mw/cm ²)	
	5530	13	1	2.95	16.95	49.55	1	0.0099
	5775	11	1	1.55	13.55	22.65	1	0.0045



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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	Limit
		(MHz)	(dBm)		(dBi)	(dBm)	(W)	(W)
SISO	IEEE 802.11b	2412	16	1	2.06	19.06	0.081	2.6840
		2437	16	1	2.06	19.06	0.081	
		2462	16	1	2.06	19.06	0.081	
	IEEE 802.11g	2412	16	1	2.56	19.56	0.090	2.6840
		2437	16	1	2.56	19.56	0.090	
		2462	16	1	2.56	19.56	0.090	
	IEEE 802.11a	5180	13	1	1.67	15.67	0.037	4.5253
		5220	13	1	1.67	15.67	0.037	
		5240	13	1	1.67	15.67	0.037	
		5260	13	1	1.75	15.75	0.038	4.5729
		5300	13	1	1.75	15.75	0.038	
		5320	13	1	1.75	15.75	0.038	
		5500	12	1.5	2.95	16.45	0.044	4.7145
		5580	12	1.5	2.95	16.45	0.044	
		5700	12	1.5	2.95	16.45	0.044	
		5745	12	1.5	1.55	15.05	0.032	4.8570
		5785	12	1.5	1.55	15.05	0.032	
		5805	12	1.5	1.55	15.05	0.032	

For MIMO (2TX/2RX) 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)	(mW)	(W)
MIMO	IEEE 802.11n-HT20/ IEEE 802.11ax20	2412	17	1	2.06	25.06	0.3206	2.6840
		2437	17	1	2.06	25.06	0.3206	
		2462	17	1	2.06	25.06	0.3206	
	IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5180	15	1.5	1.67	18.17	0.066	4.5253
		5220	15	1.5	1.67	18.17	0.066	
		5240	15	1.5	1.67	18.17	0.066	
		5260	16	2	1.75	19.75	0.094	4.5729
		5300	16	2	1.75	19.75	0.094	
		5320	16	2	1.75	19.75	0.094	
		5500	16	2	2.95	20.95	0.124	4.7145
		5580	16	2	2.95	20.95	0.124	
		5700	16	2	2.95	20.95	0.124	
		5745	14	2	1.55	17.55	0.057	4.8570
		5785	14	2	1.55	17.55	0.057	
		5825	14	2	1.55	17.55	0.057	
	IEEE 802.11ax20	5180	13	1	1.67	15.67	0.037	4.5253
		5220	13	1	1.67	15.67	0.037	
		5240	13	1	1.67	15.67	0.037	

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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)	(mW)	(W)
	5260	13	1	1.75	15.75	0.038	4.5729
	5300	13	1	1.75	15.75	0.038	
	5320	13	1	1.75	15.75	0.038	
	5500	13	2	2.95	17.95	0.062	4.7145
	5580	13	2	2.95	17.95	0.062	
	5700	13	2	2.95	17.95	0.062	
	5745	11	2	1.55	14.55	0.029	4.8570
	5785	11	2	1.55	14.55	0.029	
	5825	11	2	1.55	14.55	0.029	
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5190	14	1.5	1.67	17.17	0.052	4.5312
	5230	14	1.5	1.67	17.17	0.052	
	5270	14	1.5	1.75	17.25	0.053	4.5789
	5310	14	1.5	1.75	17.25	0.053	
	5510	14	1	2.95	17.95	0.062	4.7204
	5550	14	1	2.95	17.95	0.062	
	5670	14	1	2.95	17.95	0.062	
	5755	14	1	1.55	16.55	0.045	4.8628
	5795	14	1	1.55	16.55	0.045	
IEEE 802.11ax40	5190	11	1	1.67	13.67	0.023	4.5312
	5230	11	1	1.67	13.67	0.023	
	5270	11	1	1.75	13.75	0.024	4.5789
	5310	11	1	1.75	13.75	0.024	
	5510	11	2	2.95	15.95	0.039	4.7204
	5550	11	2	2.95	15.95	0.039	
	5670	11	2	2.95	15.95	0.039	
	5755	11	2	1.55	14.55	0.029	4.8628
	5795	11	2	1.55	14.55	0.029	
IEEE 802.11ac-VHT80/ IEEE 802.11ax80	5210	13	1	1.67	15.67	0.037	4.5432
	5290	13	1	1.75	15.75	0.038	4.5907
	5530	13	1	2.95	16.95	0.050	4.7321
	5775	11	1	1.55	13.55	0.023	4.8743

3.4.2 For BT

For BT_LE 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: External Antenna

3.4.2.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: 2.06 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)	(dBm)	(dBm)	(dBm)	(dBm)	(mW)	(mW/cm ²)	
LE/2LE	2402-2480	7	1	2.06	10.06	10.139	1	0.0020
EDR	2402-2480	9	1	2.06	12.06	16.069	1	0.0032

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)	(dBm)	(dBm)	(dBm)	(dBm)	(W)	(W)
LE	2402-2480	7	1	2.06	10.06	0.0101	2.6764
EDR	2402-2480	9	1	2.06	12.06	0.0161	2.6764

3.4.3 Simultaneous Multi-band Transmission MPE Analysis

3.4.4.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4G_SISO_WLAN + BT	Support
2	2.4G_MIMO_WLAN + BT	Support
3	5G_SISO_WLAN + BT	Support
4	5G_MIMO_WLAN + BT	Support

3.4.4.2 Results for transmit simultaneously

FCC 47 CFR Part 1 Subpart I

No.	Configurations	Maximum MPE Value			Limits
		WLAN	BT	Transmit simultaneously	
1	2.4G_SISO_WLAN + BT	0.018	0.0032	0.0212	1
2	2.4G_MIMO_WLAN + BT	0.0202	0.0032	0.0234	1
3	5G_SISO_WLAN + BT	0.0085	0.0032	0.0117	1
4	5G_MIMO_WLAN + BT	0.0248	0.0032	0.0280	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
		WLAN	BT	Transmit simultaneously	
1	2.4G_SISO_WLAN + BT	0.0335	0.0038	0.0373	1
2	2.4G_MIMO_WLAN + BT	0.1194	0.0038	0.1232	1
3	5G (Band 1)_SISO_WLAN + BT	0.0082	0.0038	0.0120	1
4	5G (Band 1)_MIMO_WLAN + BT	0.0263	0.0038	0.0301	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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