

RF EXPOSURE EVALUATION REPORT

Product Name: ActivPanel 9 WiFi and Bluetooth Module
Trade Mark: Promethean
Model No. / HVIN: AP9-WIFIBT-AB
Report Number: 211213030RFC-5
Test Standards: FCC 47 CFR Part 1 Subpart I
RSS-102 Issue 5
FCC ID: QAM-AP9-WIFIBT-AB
IC: 5459A-AP9WIFIBTAB
Test Result: PASS
Date of Issue: March 14, 2022

Prepared for:

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UTTR-RF-RSS102-V1.1

Version

Version No.	Date	Description
V1.0	March 14, 2022	Original

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CONTENTS

1. GENERAL INFORMATION	4
1.1 CLIENT INFORMATION	4
1.2 EUT INFORMATION	4
1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD	4
1.4 OTHER INFORMATION	7
1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	8
1.6 DEVIATION FROM STANDARDS	8
1.7 ABNORMALITIES FROM STANDARD CONDITIONS	8
1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER	8
2. EQUIPMENT LIST	8
3. MPE EVALUATION	9
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	10
3.4 MPE CALCULATION RESULTS	10
3.4.1 FOR WLAN	10
3.4.2 FOR BT	13
3.4.3 SIMULTANEOUS MULTI-BAND TRANSMISSION MPE ANALYSIS	14
APPENDIX 1 PHOTOS OF TEST SETUP	15
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS	15

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Promethean Ltd
Address of Applicant:	Promethean House, Lower Philips Rd, Blackburn, United Kingdom, BB1 5TH
Manufacturer:	Promethean Ltd
Address of Manufacturer:	Promethean House, Lower Philips Rd, Blackburn, United Kingdom, BB1 5TH

1.2 EUT INFORMATION

Product Name:	ActivPanel 9 WiFi and Bluetooth Module		
Model No. / HVIN:	AP9-WIFIBT-AB		
Trade Mark:	Promethean		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n/ax	
	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:	December 14, 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: (Provided by the customer)	3.9 dBi	
Maximum Peak Power:	LE	5.25 dBm
	2LE	5.60 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: (Provided by the customer)	3.9 dBi	
Maximum Peak Power:	8.21 dBm	

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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 802.11n-HT40, IEEE 802.11ax-HE20, IEEE 802.11ax-HE40	
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 802.11n-HT40: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax-HE20: OFDM(1024-QAM,256-QAM 64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax-HE40: OFDM(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 802.11n-HT40: Up to MCS15 IEEE 802.11ax-HE20: Up to MCS11 IEEE 802.11ax-HE40: Up to MCS11	
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11n-HT40: 7 IEEE 802.11ax-HE20: 11 IEEE 802.11ax-HE40: 7	
Channel Separation:	5 MHz	
Antenna Type:	Chain 1	External Antenna
	Chain 2	External Antenna
Antenna Gain: (Provided by the customer)	Chain 1	3.9 dBi
	Chain 2	3.9 dBi
Maximum Peak Power:	SISO_ Chain 1	IEEE 802.11b: 17.33 dBm IEEE 802.11g: 24.37 dBm IEEE 802.11n-HT20: 22.35 dBm IEEE 802.11n-HT40: 21.65 dBm IEEE 802.11ax-HE20: 21.25 dBm IEEE 802.11ax-HE40: 21.01 dBm
	SISO_ Chain 2	IEEE 802.11b: 17.01 dBm IEEE 802.11g: 23.23 dBm IEEE 802.11n-HT20: 23.00 dBm IEEE 802.11n-HT40: 22.25 dBm IEEE 802.11ax-HE20: 21.53 dBm IEEE 802.11ax-HE40: 19.98 dBm
	MIMO_ Chain 1+2	IEEE 802.11n-HT20: 25.70 dBm IEEE 802.11n-HT40: 24.97 dBm IEEE 802.11ax-HE20: 24.31 dBm IEEE 802.11ax-HE40: 23.44 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)	
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11ac/ax: OFDM(1024-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:	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	
	IEEE 802.11ax HE80: 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 1	External Antenna
	Chain 2	External Antenna
Antenna Gain: (Provided by the customer)	Chain 1	5150 MHz to 5250 MHz: 5.3dBi
		5250 MHz to 5350 MHz: 4.4dBi

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Maximum conducted output power (dBm):	Chain 2	5470 MHz to 5725 MHz: 3.0dBi			
		5725 MHz to 5850 MHz: 3.2dBi			
		5150 MHz to 5250 MHz: 5.3dBi			
		5250 MHz to 5350 MHz: 4.4dBi			
		5470 MHz to 5725 MHz: 3.0dBi			
		5150 MHz to 5250 MHz: 5.3dBi			
	SISO_Chain 1	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	15.31	15.37	14.93	12.53
	SISO_Chain 2	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	15.33	15.10	15.35	12.33
	MIMO_Chain 1+2	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11n-HT20:	15.16	19.03	15.86	14.60
	IEEE 802.11n-HT40:	15.02	17.92	19.05	15.44
	IEEE 802.11ac-VHT20:	15.09	17.02	15.98	15.14
	IEEE 802.11ac-VHT40:	14.92	16.73	16.83	15.39
	IEEE 802.11ac-VHT80:	14.75	15.77	15.01	15.18
	IEEE 802.11ax-HE20:	15.09	15.08	15.04	12.94
	IEEE 802.11ax-HE40:	15.02	15.94	15.01	13.66
	IEEE 802.11ax-HE80:	14.56	14.58	14.37	14.36

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 IEEE 802.11ax-HE20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT40 IEEE 802.11ax-HE40	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 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

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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
IEEE 802.11ac-VHT80 IEEE 802.11ax-HE80	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
	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.

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 1: External Antenna

Chain 2: External Antenna

Antenna Gain:

Chain 1: 2412MHz to 2462 MHz: 3.9 dBi
5150 MHz to 5250 MHz: 5.3 dBi
5250 MHz to 5350 MHz: 4.4 dBi
5470 MHz to 5725 MHz: 3.0 dBi
5725 MHz to 5850 MHz: 3.2 dBi

Chain 2: 2412MHz to 2462 MHz: 3.9 dBi
5150 MHz to 5250 MHz: 5.3 dBi
5250 MHz to 5350 MHz: 4.4 dBi
5470 MHz to 5725 MHz: 3.0 dBi
5725 MHz to 5850 MHz: 3.2 dBi

3.4.1.2 Results for FCC 47 CFR Part 1 Subpart I

For SISO (1TX/1RX) Mode

Operating Mode		Freq.	Declared maximum conducted 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	2412-2462	17	1	3.9	21.9	154.8817	1	0.0997
	IEEE 802.11g	2412-2462	23	2	3.9	28.9	776.2471	1	0.1544
	IEEE 802.11a	5180-5240	15	1	5.3	21.3	134.8963	1	0.0268
		5260-5320	14	2	4.4	20.4	109.6478	1	0.0218
		5500-5700	14	2	3.0	19	79.4328	1	0.0158
		5745-5825	12	1	3.2	16.2	41.6869	1	0.0083

For MIMO (2TX/2RX) Mode

Operating Mode		Freq.	Declared maximum conducted output power	Max. positive Tolerance according manufacturer	Directional Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
		(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mW/cm ²)	
MIMO (2TX/2RX)	IEEE 802.11n-HT20 802.11ax-HE20	2412-2462	24	2	6.91	32.91	1954.3395	1	0.3888
	IEEE 802.11n-HT40 802.11ax-HE40	2422-2452	24	2	6.91	32.91	1954.3395	1	0.3888
	IEEE 802.11n-HT20 802.11ac-VHT20 802.11ax-HE20	5180-5240	16	2	8.31	26.31	427.5629	1	0.0851
		5260-5320	17	3	7.41	27.41	550.8077	1	0.1096
		5500-5700	15	2	6.01	23.01	199.9862	1	0.0398
		5745-5825	14	2	6.21	22.21	166.3413	1	0.0331
	IEEE 802.11n-HT40 802.11ac-VHT40 802.11ax-HE40	5190-5230	16	2	8.31	26.31	427.5629	1	0.0851
		5270-5310	16	2	7.41	25.41	347.5362	1	0.0691
		5510-5670	17	3	6.01	26.01	399.0249	1	0.0794
		5755-5795	14	2	6.21	22.21	166.3413	1	0.0331
	IEEE 802.11ac-VHT80 802.11ax-HE80	5210	15	1	8.31	24.31	269.7739	1	0.0537
		5290	15	1	7.41	23.41	219.2805	1	0.0436
		5530	15	1	6.01	22.01	158.8547	1	0.0316

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Operating Mode	Freq.	Declared maximum conducted output power	Max. positive Tolerance according manufacturer	Directional Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mW/cm ²)	
	5775	15	1	6.21	22.21	166.3413	1	0.0331

3.4.1.3 Results for RSS-102 Issue 5

For SISO (1TX/1RX) Mode

Operating Mode		Freq.	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	17	1	3.9	21.9	0.1549	2.6840
	IEEE 802.11g	2412-2462	23	2	3.9	28.9	0.7762	2.6840
	IEEE 802.11a	5180-5240	15	1	5.3	21.3	0.1349	4.5253
		5260-5320	14	2	4.4	20.4	0.1096	4.5729
		5500-5700	14	2	3.0	19	0.0794	4.7145
		5745-5825	12	1	3.2	16.2	0.0417	4.8570

For MIMO (2TX/2RX) Mode

Operating Mode		Freq.	Declared maximum conducted output power	Max. positive Tolerance according manufacturer	Directional Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
		(MHz)	(dBm)		(dBi)	(dBm)	(W)	(W)
MIMO (2TX/2RX)	IEEE 802.11n-HT20 802.11ax-HE20	2412-2462	24	2	6.91	32.91	1.9543	2.6840
	IEEE 802.11n-HT40 802.11ax-HE40	2422-2452	24	2	6.91	32.91	1.9543	2.6916
	IEEE 802.11n-HT20 802.11ac-VHT20 802.11ax-HE20	5180-5240	16	2	8.31	26.31	0.4276	4.5253
		5260-5320	17	3	7.41	27.41	0.5508	4.5729
		5500-5700	15	2	6.01	23.01	0.2000	4.7145
		5745-5825	14	2	6.21	22.21	0.1663	4.8570
	IEEE 802.11n-HT40 802.11ac-VHT40 802.11ax-HE40	5190-5230	16	2	8.31	26.31	0.4276	4.5312
		5270-5310	16	2	7.41	25.41	0.3475	4.5789
		5510-5670	17	3	6.01	26.01	0.3990	4.7204
		5755-5795	14	2	6.21	22.21	0.1663	4.8628
	IEEE 802.11ac-VHT80 802.11ax-HE80	5210	15	1	8.31	24.31	0.2698	4.5432
		5290	15	1	7.41	23.41	0.2193	4.5907
		5530	15	1	6.01	22.01	0.1589	4.7321
		5775	15	1	6.21	22.21	0.1663	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:

External Antenna

3.4.2.2 Antenna Gain:

2402MHz to 2480 MHz: 3.9 dBi

3.4.2.3 Results for FCC 47 CFR Part 1 Subpart I

Operating Mode	Freq.	Declared maximum conducted 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	5	1	3.9	9.9	9.7724	1	0.0019
EDR	2402-2480	7	2	3.9	12.9	19.4984	1	0.0039

3.4.2.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	Declared maximum conducted output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(W)	(W)
LE/2LE	2402-2480	5	1	3.9	9.9	0.0098	2.6764
EDR	2402-2480	7	2	3.9	12.9	0.0195	2.6764

3.4.3 Simultaneous Multi-band Transmission MPE Analysis

3.4.3.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4G_WLAN + BT	Support
2	5G_WLAN + BT	Support

3.4.3.2 Results for transmit simultaneously

FCC 47 CFR Part 1 Subpart I

No.	Configurations	Maximum MPE Value			Limits
		WLAN	BT	Transmit simultaneously	
1	2.4G_WLAN + BT	0.3888	0.0039	0.3927	1
2	5G_WLAN + BT	0.1096	0.0039	0.1135	1

Note:
According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:
$$\text{Transmit simultaneously MPE} = \Sigma \text{ of MPE ratios}$$
$$\text{MPE ratios} = \text{Field strengths or power density} / \text{MPE limit at the test frequency}$$

RSS-102 Issue 5

No.	Configurations	Maximum MPE Value			Limits
		WLAN	BT	Transmit simultaneously	
1	2.4G_WLAN + BT	1.9543	0.0195	0.7354	1
2	5G_WLAN + BT	0.5508	0.0195	0.1277	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 ***

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.
