RF EXPOSURE EVALUATION REPORT

Product Name:	Wifi Module
Trade Mark:	N/A
Model No.:	MWH516B.01
HVIN:	MWH516B.01
Report Number:	211230011RFC-5
Test Standards:	FCC 47 CFR Part 1 Subpart I RSS-102 Issue 5
FCC ID:	BBP-WLPIN01
IC:	144D-WLPIN01
Test Result:	PASS
Date of Issue:	April 6, 2022

Prepared for:

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Version

Version No.	Date	Description
V1.0	April 6, 2022	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Ricoh Company Ltd
Address of Applicant:	2-7-1 Izumi, Ebina, Kanagawa 243-0460, Japan
Manufacturer:	Ricoh Company Ltd
Address of Manufacturer:	2-7-1 Izumi, Ebina, Kanagawa 243-0460, Japan

1.2 EUT INFORMATION

Product Name:	Wifi Module		
Model No.:	MWH516B.01		
HVIN:	MWH516B.01		
Trade Mark:	N/A		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth 5.1	
	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
Sample Received Date:	December 31, 2021		

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	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth LE/2LE/LE_125K/LE_500K
Type of Modulation:	GFSK
Number of Channels:	40
Channel Separation:	2 MHz
Antenna Type:	PCB Antenna
Antenna Gain: (Provided by the customer)	-0.5 dBi
Maximum Peak Power:	6.91 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, π/4DQPSK, 8DPSK
Number of Channels:	79
Channel Separation:	1 MHz
Hopping Channel Type:	Adaptive Frequency Hopping Systems
Antenna Type:	PCB Antenna
Antenna Gain: (Provided by the customer)	-0.5 dBi
Maximum Peak Power:	9.69 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 802.11n-HT40	
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)	
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	
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11n-HT40: 7	
Channel Separation:	5 MHz	
Antenna Type:	Chain 0	PCB Antenna
	Chain 1	PCB Antenna
Antenna Gain: (Provided by the customer)	Chain 0	0.3 dBi
	Chain 1	0.2 dBi
Directional gain:	3.26 dBi	
Maximum e.i.r.p	SISO_ Chain 0	IEEE 802.11b: 16.63 dBm IEEE 802.11g: 12.75 dBm
	SISO_ Chain 1	IEEE 802.11b: 16.72 dBm IEEE 802.11g: 13.02 dBm
	MIMO_ Chain 0+1	IEEE 802.11n-HT20: 18.86 dBm IEEE 802.11n-HT40: 18.92 dBm
Maximum conducted output power:	SISO_ Chain 0	IEEE 802.11b: 16.33 dBm IEEE 802.11g: 12.45 dBm
	SISO_ Chain 1	IEEE 802.11b: 16.52 dBm IEEE 802.11g: 12.82 dBm
	MIMO_ Chain 0+1	IEEE 802.11n-HT20: 15.60 dBm IEEE 802.11n-HT40: 15.66 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	
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)	
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz	
	IEEE 802.11n-HT40/ac-VHT40: 40 MHz	
	IEEE 802.11ac-VHT80: 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	
Number of Channels:	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	
Antenna Type:	Chain 0	PCB Antenna
	Chain 1	PCB Antenna
Antenna Gain: (Provided by the customer)	Chain 0	5150 MHz to 5250 MHz: 0.50 dBi
		5250 MHz to 5350 MHz: 0.50 dBi
		5470 MHz to 5725 MHz: 0.38 dBi
		5725 MHz to 5850 MHz: 0.44 dBi
	Chain 1	5150 MHz to 5250 MHz: 0.45 dBi
		5250 MHz to 5350 MHz: 0.45 dBi

		5470 MHz to 5725 MHz: 0.32 dBi			
		5725 MHz to 5850 MHz: 0.30 dBi			
Maximum EIRP (dBm):	**SISO_Chain 0**	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a:	16.27	16.99	16.12	15.78
	SISO_Chain 1	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a:	16.16	16.05	15.95	15.49
	MIMO_Chain 0+1	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11n-HT20:	18.61	18.61	17.58	18.20
	IEEE 802.11n-HT40:	15.53	18.72	17.52	17.86
	IEEE 802.11ac-VHT20:	18.67	18.66	17.58	18.16
	IEEE 802.11ac-VHT40:	15.56	18.72	17.58	17.79
	IEEE 802.11ac-VHT80:	14.00	12.29	19.71	19.56
Maximum conducted output power (dBm):	**SISO_Chain 0**	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a:	15.77	16.49	15.74	15.34
	SISO_Chain 1	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a:	15.71	15.60	15.63	15.19
	MIMO_Chain 0+1	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11n-HT20:	18.11	18.11	17.20	17.76
	IEEE 802.11n-HT40:	15.03	18.22	17.14	17.42
	IEEE 802.11ac-VHT20:	18.17	18.16	17.20	17.72
	IEEE 802.11ac-VHT40:	15.06	18.22	17.20	17.35
	IEEE 802.11ac-VHT80:	13.50	11.79	19.33	19.12

1.4 OTHER INFORMATION

Test channels for BT_LE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
GFSK	2402 MHz to 2480 MHz	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		
		Lowest(L)	Middle(M)	Highest(H)
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
π/4DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
8DPSK (DH1, DH3, DH5)	2402 MHz to 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		
		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 7	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	--

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	FCC Part 1.1307	Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.
3	FCC Part 1.1310	Radiofrequency radiation exposure limits.
4	RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
5	KDB 447498 D04 Interim General RF Exposure Guidance v01	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 §1.1310(e)(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 MHz[6] 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/4πR^2= EIRP/4πR^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 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: PCB Antenna
Chain 1: PCB Antenna

3.4.1.2 Antenna Gain:

Chain 0: 2412MHz to 2462 MHz: 0.30 dBi
5150 MHz to 5250 MHz: 0.50 dBi
5250 MHz to 5350 MHz: 0.50 dBi
5470 MHz to 5725 MHz: 0.38 dBi
5725 MHz to 5850 MHz: 0.44 dBi

Chain 1: 2412MHz to 2462 MHz: 0.20 dBi
5150 MHz to 5250 MHz: 0.45 dBi
5250 MHz to 5350 MHz: 0.45 dBi
5470 MHz to 5725 MHz: 0.32 dBi
5725 MHz to 5850 MHz: 0.30 dBi

3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I

For 2.4GHz

Operating Mode	Freq.	Ant.	Maximum conducted output power	Max. positive tolerance according manufacturer	Max. Antenna Gain	Calculated maximum output power		MPE		MIMO	
								Limit	Value	Value	Limit
	(MHz)		(dBm)	(dB)	(dBi)	(dBm)	(mW)	(mw/cm²)			
IEEE 802.11b	2412-2462	Ant 0	16.33	2	0.3	18.63	72.9458	1	0.0145	/	/
		Ant 1	16.52	2	0.2	18.72	74.4732	1	0.0148		
IEEE 802.11g	2412-2462	Ant 0	12.45	2	0.3	14.75	29.8538	1	0.0059	/	/
		Ant 1	12.82	2	0.2	15.02	31.7687	1	0.0063		
IEEE 802.11n20	2412-2462	Ant 0	12.55	2	0.3	14.85	30.5492	1	0.0061	0.0122	1
		Ant 1	12.64	2	0.2	14.84	30.4789	1	0.0061		
IEEE 802.11n40	2422-2452	Ant 0	12.60	2	0.3	14.9	30.9030	1	0.0061	0.0124	1
		Ant 1	12.83	2	0.2	15.03	31.8420	1	0.0063		

For 5GHz

Operating Mode	Freq.	Ant.	Maximum conducted output power	Max. positive tolerance according manufacturer	Max. Antenna Gain	Calculated maximum output power		MPE		MIMO	
								Limit	Value	Value	Limit
	(MHz)		(dBm)	(dB)	(dBi)	(dBm)	(mW)	(mw/cm²)			
IEEE 802.11a	5180-5825	Ant 0	16.49	2	0.50	18.99	79.2501	1	0.0158	/	/
		Ant 1	15.71	2	0.45	18.16	65.4636	1	0.0130	/	/
IEEE 802.11n20	5180-5825	Ant 0	15.07	2	0.50	17.57	57.1479	1	0.0114	0.0230	1
		Ant 1	15.20	2	0.45	17.65	58.2103	1	0.0116		
IEEE 802.11n40	5190-5795	Ant 0	15.16	2	0.50	17.66	58.3445	1	0.0116	0.0233	1
		Ant 1	15.26	2	0.45	17.71	59.0201	1	0.0117		
IEEE 802.11ac20	5180-5825	Ant 0	15.15	2	0.50	17.65	58.2103	1	0.0116	0.0235	1
		Ant 1	15.3	2	0.45	17.75	59.5662	1	0.0119		
IEEE 802.11ac40	5190-5795	Ant 0	15.12	2	0.50	17.62	57.8096	1	0.0115	0.0234	1
		Ant 1	15.30	2	0.45	17.75	59.5662	1	0.0119		
IEEE 802.11ac80	5210-5775	Ant 0	16.25	2	0.50	18.75	74.9894	1	0.0149	0.0301	1
		Ant 1	16.39	2	0.45	18.84	76.5597	1	0.0152		

Note: MIMO MPE Value = Σ of MPE ratios
MPE ratios = Field strengths or power density / MPE limit at the test frequency

3.4.1.4 Results for RSS-102 Issue 5

For 2.4GHz

Operating Mode	Freq.	Ant.	Maximum conducted output power	Ant. Gain	Max. positive tolerance according manufacturer	Calculated maximum output power		Limit	MIMO	
	(MHz)		(dBm)	(dBi)	(dB)	(dBm)	(W)	(W)	Value	Limit
IEEE 802.11b	2412-2462	Ant 0	16.33	0.3	2	18.63	0.0729	2.6840	/	/
		Ant 1	16.52	0.2	2	18.72	0.0745	2.6840	/	/
IEEE 802.11g	2412-2462	Ant 0	12.45	0.3	2	14.75	0.0299	2.6840	/	/
		Ant 1	12.82	0.2	2	15.02	0.0318	2.6840	/	/
IEEE 802.11n20	2412-2462	Ant 0	12.55	0.3	2	14.85	0.0305	2.6840	0.0227	1
		Ant 1	12.64	0.2	2	14.84	0.0305	2.6840		
IEEE 802.11n40	2422-2452	Ant 0	12.60	0.3	2	14.9	0.0309	2.6916	0.0233	1
		Ant 1	12.83	0.2	2	15.03	0.0318	2.6916		

For 5GHz

Operating Mode	Freq.	Ant.	Maximum conducted output power	Ant. Gain	Max. positive tolerance according manufacturer	Calculated maximum output power		Limit	MIMO	
	(MHz)		(dBm)	(dBi)	(dB)	(dBm)	(W)	(W)	Value	Limit
IEEE 802.11a	5180-5320	Ant 0	16.49	0.50	2	18.99	0.0793	4.5253	/	/
		Ant 1	15.71	0.45	2	18.16	0.0655	4.5253		
	5500-5700	Ant 0	15.74	0.38	2	18.12	0.0649	4.6085	/	/
		Ant 1	15.63	0.32	2	17.95	0.0624	4.6085		
	5745-5825	Ant 0	14.83	0.44	2	17.27	0.0533	4.8570	/	/
		Ant 1	14.60	0.30	2	16.9	0.0490	4.8570		
IEEE 802.11n20	5180-5320	Ant 0	15.07	0.50	2	17.57	0.0571	4.5253	0.0255	1
		Ant 1	15.20	0.45	2	17.65	0.0582	4.5253		
	5500-5700	Ant 0	14.15	0.38	2	16.53	0.0450	4.6085	0.0198	1
		Ant 1	14.32	0.32	2	16.64	0.0461	4.6085		
	5745-5825	Ant 0	14.82	0.44	2	17.26	0.0532	4.8570	0.0212	1
		Ant 1	14.68	0.30	2	16.98	0.0499	4.8570		
IEEE 802.1140	5190-5310	Ant 0	15.16	0.50	2	17.66	0.0583	4.5312	0.0259	1
		Ant 1	15.26	0.45	2	17.71	0.0590	4.5312		
	5510-5670	Ant 0	14.08	0.38	2	16.46	0.0443	4.6026	0.0193	1
		Ant 1	14.18	0.32	2	16.5	0.0447	4.6026		
	5755-5795	Ant 0	14.51	0.44	2	16.95	0.0495	4.8628	0.0196	1
		Ant 1	14.31	0.30	2	16.61	0.0458	4.8628		
IEEE 802.11ac 20	5180-5320	Ant 0	15.15	0.50	2	17.65	0.0582	4.5253	0.0260	1
		Ant 1	15.30	0.45	2	17.75	0.0596	4.5253		
	5500-5700	Ant 0	14.16	0.38	2	16.54	0.0451	4.6085	0.0199	1
		Ant 1	14.36	0.32	2	16.68	0.0466	4.6085		
	5745-5825	Ant 0	14.83	0.44	2	17.27	0.0533	4.8570	0.0211	1
		Ant 1	14.60	0.30	2	16.9	0.0490	4.8570		
IEEE 802.11ac 40	5190-5310	Ant 0	15.12	0.50	2	17.62	0.0578	4.5312	0.0259	1
		Ant 1	15.30	0.45	2	17.75	0.0596	4.5312		
	5510-5670	Ant 0	14.12	0.38	2	16.5	0.0447	4.6026	0.0196	1

Operating Mode	Freq.	Ant.	Maximum conducted output power	Ant. Gain	Max. positive tolerance according manufacturer	Calculated maximum output power		Limit	MIMO	
	(MHz)		(dBm)	(dBi)	(dB)	(dBm)	(W)	(W)	Value	Limit
		Ant 1	14.25	0.32	2	16.57	0.0454	4.6026		
	5755-5795	Ant 0	14.48	0.44	2	16.92	0.0492	4.8628	0.0194	1
		Ant 1	14.24	0.30	2	16.54	0.0451	4.8628		
IEEE 802.11ac 80	5210-5290	Ant 0	10.47	0.50	2	12.97	0.0198	4.5432	0.0087	1
		Ant 1	10.51	0.45	2	12.96	0.0198	4.5432		
	5530	Ant 0	16.25	0.38	2	18.63	0.0729	4.5907	0.0320	1
		Ant 1	16.39	0.32	2	18.71	0.0743	4.5907		
	5775	Ant 0	16.23	0.44	2	18.67	0.0736	4.8743	0.0289	1
		Ant 1	15.98	0.30	2	18.28	0.0673	4.8743		

Note: The maximum ERP/EIRP is calculated from max output power and antenna gain, the antenna gain provided by the customer, and the customer takes all the responsibilities for the accuracy of antenna gain.

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, π/4 DQPSK, 8DPSK

3.4.2.1 Antenna Type:

Chain 0: PCB Antenna

3.4.2.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: -0.5 dBi

3.4.2.3 Results for FCC 47 CFR Part 1 Subpart I

Operating Mode	Freq.	Maximum conducted output power	Max. positive tolerance according manufacturer	Calculated output power	Calculated output power	MPE Limit	MPE Value
	(MHz)	(dBm)	(dBm)	(dBm)	(mW)	(mW /cm2)	
LE/2LE/LE_125K/LE_500K	2402-2480	6.91	2	8.91	7.7804	1	0.0014
EDR	2402-2480	9.69	2	11.69	14.7571	1	0.0026

3.4.2.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	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/LE_125K/LE_500K	2402-2480	6.91	2	-0.5	8.41	0.0069	2.6764
EDR	2402-2480	9.69	2	-0.5	11.19	0.0132	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_SISO_WLAN + BT	Support
2	2.4G_MIMO_WLAN + BT	Support
3	5G_SISO_WLAN + BT	Support
4	5G_MIMO_WLAN + BT	Support

3.4.3.2 Results for transmit simultaneously

FCC 47 CFR Part 1 Subpart I

No.	Configurations	Maximum MPE Value/ Ratios			Limits
		WLAN	BT	Transmit simultaneously	
1	2.4G _WLAN + BT	0.0148 (SISO)	0.0026	0.0174	1
2	5G _WLAN + BT	0.0301 (MIMO)	0.0026	0.0327	1

Note:

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

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / 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	0.0745 (SISO)	0.0132	0.0327	1
4	5G _WLAN + BT	0.0320 (MIMO)	0.0132	0.0369	1

Note:

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

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / 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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