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Maximum Permissible Exposure

FCC ID: 2AU3BU9W44
 Product Name: Wi-Fi Module
 M/N: U9W44

1. According to FCC CFR 47 §1.1310, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b).

Table 1 Limits for Maximum Permissible Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	---	---	f/300	6
1500-100,000	---	---	5.0	6
(B) Limits for General Population / Uncontrolled Exposures (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	---	---	f/1500	30
1500-100,000	---	---	1.0	30

2. MPE Calculation

We, declares that the product described above has been evaluated and found to comply with the RF exposure limits for humans, as specified based on ANSI/FCC recommendation.

RF Exposure Calculations: $S = (P * G) / (4 * \pi * r^2)$ or $r = \sqrt{(P * G) / (4 * \pi * S)}$

2.1. Estimation Result

Bluetooth

Test Mode	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	MPE
BDR	8.508	7.09	-0.42	0.91	0.0013
EDR	8.442	6.99	-0.42	0.91	0.0013
BLE 1M	9.813	9.58	-0.42	0.91	0.0017
BLE 2M	9.758	9.46	-0.42	0.91	0.0017

WiFi 2.4GHz:

SISO

Test Mode	Output Power (dBm)		Output Power (mW)		Antenna Gain (dBi)		Antenna Gain (Linear)		MPE	
	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB
11b	16.04	15.30	40.18	33.88	-3.77	-1.15	0.42	0.77	0.0034	0.0052
11g	19.05	18.41	80.35	69.34	-3.77	-1.15	0.42	0.77	0.0067	0.0106
11n HT20	18.14	17.34	65.16	54.20	-3.77	-1.15	0.42	0.77	0.0054	0.0083
11n HT40	18.10	17.32	64.57	53.95	-3.77	-1.15	0.42	0.77	0.0054	0.0082

Conclusion: Pass

MIMO

Test Mode	Output Power (dBm)		Output Power (mW)		Antenna Gain (dBi)		Antenna Gain (Linear)		MPE		
	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	Total
11b	16.01	15.25	39.90	33.50	-3.77	-2.02	0.42	0.63	0.0033	0.0042	N/A
11g	19.01	18.40	79.62	69.18	-3.77	-2.02	0.42	0.63	0.0067	0.0086	0.02
11n HT20	17.93	17.36	62.09	54.45	-3.77	-2.02	0.42	0.63	0.0052	0.0068	0.01
11n HT40	18.01	17.22	63.24	52.72	-3.77	-2.02	0.42	0.63	0.0053	0.0066	0.01

Conclusion:Pass



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WiFi 5GHz:

Wifi5G Band1 SISO

Test Mode	Output Power (dBm)		Output Power (mW)		Antenna Gain (dBi)		Antenna Gain (Linear)		MPE	
	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB
11a	13.94	14.05	24.77	25.41	1.91	-2.55	1.55	0.56	0.0077	0.0028
11n20	13.85	13.91	24.27	24.60	1.91	-2.55	1.55	0.56	0.0075	0.0027
11n40	13.73	13.88	23.60	24.43	1.91	-2.55	1.55	0.56	0.0073	0.0027
11ac20	13.80	13.86	23.99	24.32	1.91	-2.55	1.55	0.56	0.0074	0.0027
11ac40	13.81	13.89	24.04	24.49	1.91	-2.55	1.55	0.56	0.0074	0.0027
11ac80	13.13	12.83	20.56	19.19	1.91	-2.55	1.55	0.56	0.0064	0.0021
Conclusion:Pass										

Wifi5G Band3 SISO

Test Mode	Output Power (dBm)		Output Power (mW)		Antenna Gain (dBi)		Antenna Gain (Linear)		MPE	
	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB
11a	14.78	15.06	30.06	32.06	3.12	0.38	2.05	1.09	0.0123	0.0070
11n20	14.66	14.89	29.24	30.83	3.12	0.38	2.05	1.09	0.0119	0.0067
11n40	14.84	15.05	30.48	31.99	3.12	0.38	2.05	1.09	0.0124	0.0069
11ac20	14.61	14.90	28.91	30.90	3.12	0.38	2.05	1.09	0.0118	0.0067
11ac40	14.77	15.07	29.99	32.14	3.12	0.38	2.05	1.09	0.0122	0.0070
11ac80	14.16	14.43	26.06	27.73	3.12	0.38	2.05	1.09	0.0106	0.0060
Conclusion:Pass										

WiFi5G Band1 MIMO

Test Mode	Output Power (dBm)		Output Power (mW)		Antenna Gain (dBi)		Antenna Gain (Linear)		MPE		
	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	Total
11a	13.88	13.91	24.43	24.60	1.91	-2.55	1.55	0.56	0.0076	0.0027	0.0103
11n20	13.68	13.68	23.33	23.33	1.91	-2.55	1.55	0.56	0.0072	0.0026	0.0098
11n40	13.65	13.70	23.17	23.44	1.91	-2.55	1.55	0.56	0.0072	0.0026	0.0098
11ac20	13.62	13.63	23.01	23.07	1.91	-2.55	1.55	0.56	0.0071	0.0026	0.0097
11ac40	13.63	13.57	23.07	22.75	1.91	-2.55	1.55	0.56	0.0071	0.0025	0.0096
11ac80	12.95	12.86	19.72	19.32	1.91	-2.55	1.55	0.56	0.0061	0.0021	0.0082
Conclusion:Pass											

WiFi5G Band3 MIMO

Test Mode	Output Power (dBm)		Output Power (mW)		Antenna Gain (dBi)		Antenna Gain (Linear)		MPE		
	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	ANTA	ANTB	Total
11a	14.58	15.13	28.71	32.58	3.12	0.38	2.05	1.09	0.0117	0.0071	0.0188
11n20	14.47	14.98	27.99	31.48	3.12	0.38	2.05	1.09	0.0114	0.0068	0.0182
11n40	14.67	14.85	29.31	30.55	3.12	0.38	2.05	1.09	0.0120	0.0066	0.0186
11ac20	14.37	14.80	27.35	30.20	3.12	0.38	2.05	1.09	0.0112	0.0066	0.0178
11ac40	14.55	14.85	28.51	30.55	3.12	0.38	2.05	1.09	0.0116	0.0066	0.0182
11ac80	14.02	14.12	25.23	25.82	3.12	0.38	2.05	1.09	0.0103	0.0056	0.0159

Conclusion:Pass

The antenna gain (G) numerical as below:

Antenna System	
Type of Antenna & Antenna Peak Gain	Bluetooth (2.402-2.480GHz) Antenna Antenna Type : External PCB Antenna Antenna Gain: -0.42dBi max Wi-Fi 2.4GHz Antenna Antenna Type : Embedded Pattern Antennas (Antenna A/B) Antenna Gain: -3.77dBi max (Antenna A) -1.15dBi max (Antenna B) Wi-Fi U-NII-1 Band (5.15-5.25GHz) Antenna Antenna Type : Embedded Pattern Antennas(Antenna A/B) Antenna Gain: 1.91dBi max (Antenna A) -2.55dBi max (Antenna B) Wi-Fi U-NII-3 Band (5.725-5.85GHz) Antenna Antenna Type : PCB Antennas (Antenna A/B) Antenna Gain: 3.12dBi max (Antenna A) 0.38dBi max (Antenna B)

The condition of simultaneous transmission is as following:

BT and Wi-Fi 2.4GHz can be transmitted simultaneously.

BT and Wi-Fi 5GHz can be transmitted simultaneously.

Wi-Fi 2.4GHz and Wi-Fi 5GHz cannot be transmitted simultaneously.

Based on safety distance (r) **20cm**, and the WiFi 2.4GHz highest power output (P) is **80.35mW**, and the WiFi 5GHz highest power output (P) is **32.58mW**;

the WiFi 2.4GHz power density (S) is **0.02 mW/cm²**, the WiFi 5GHz power density (S) is **0.0188mW/cm²**.,And, WIFI 2.4GHz+ Bluetooth is **0.037 mW/cm²**; WIFI 5GHz+Bluetooth is **0.0258 mW/cm²**, hence the EUT is excluded from SAR evaluation

..... **THE END**