

MPE Report

FCC ID:2AW68-DV8957

Product: DIW586
Trade Mark: 
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Family Model: N/A
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Maximum Permissible Exposure (MPE)

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Measurement Result

BT:

Operation Frequency: 2402MHz~2480MHz
 Power density limited: 1mW/ cm²

Antenna Type: PCB antenna

BT antenna gain: 3.11 dBi ;

R=20cm

mW=10^(dBm/10)

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	6.43	6±1	7	5.012	3.11	2.05	0.0020	1
2441		6.97	6±1	7	5.012	3.11	2.05	0.0020	1
2480		5.36	6±1	7	5.012	3.11	2.05	0.0020	1
2402	π/4-DQPSK	8.64	8±1	9	7.943	3.11	2.05	0.0032	1
2441		9.26	9±1	10	10.000	3.11	2.05	0.0041	1
2480		7.6	8±1	9	7.943	3.11	2.05	0.0032	1
2402	8-DPSK	8.92	9±1	10	10.000	3.11	2.05	0.0041	1
2441		9.71	9±1	10	10.000	3.11	2.05	0.0041	1
2480		8.1	9±1	10	10.000	3.11	2.05	0.0041	1
2402	BLE(1M)	6.54	6±1	7	5.012	3.11	2.05	0.0020	1
2440		7.06	7±1	8	6.310	3.11	2.05	0.0026	1
2480		5.4	6±1	7	5.012	3.11	2.05	0.0020	1
2402	BLE(2M)	6.57	6±1	7	5.012	3.11	2.05	0.0020	1
2440		7.1	7±1	8	6.310	3.11	2.05	0.0026	1
2480		5.42	6±1	7	5.012	3.11	2.05	0.0020	1

2.4G/5G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,
 WIFI 802.11n HT40:2422-2452MHz
 Power density limited: 1mW/ cm²

Operation Frequency: WIFI 802.11a/ac/n(HT20): 5180-5240MHz;5260-5320MHz,5500-5700MHz,5745-5825MHz;WIFI 802.11ac/n(HT40): 5190-5230MHz;5270-5310MHz,5510-5670MHz5755-5795MHz; WIFI 802.11ac80:5210-5210MHz;5290-5290MHz;5530-5610MHz; 5775-5775MHz

Power density limited: 1mW/cm

Antenna Type: PCB antenna

2.4G WIFI antenna1 gain: 3.11dBi; WIFI antenna2 gain: 3.11dBi

5G WIFI antenna1 gain: 3.25dBi; WIFI antenna2 gain: 3.88dBi

R=20cm

mW=10^(dBm/10)

WLAN2.4G SISO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
Ant 1	20.26	3.11	23.37	217.270	20	0.0432	1	Pass
Ant 2	21.54	3.11	24.65	291.743	20	0.0580	1	

WLAN5.2G SISO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
Ant 1	12.07	3.25	15.32	34.041	20	0.0068	1	Pass
Ant 2	11.95	3.88	15.83	38.282	20	0.0076	1	

WLAN5.3G SISO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
Ant 1	12.37	3.25	15.62	36.475	20	0.0073	1	Pass
Ant 2	11.76	3.88	15.64	36.644	20	0.0073	1	

WLAN5.6G SISO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
Ant 1	11.25	3.25	14.5	28.184	20	0.0056	1	Pass
Ant 2	12.54	3.88	16.42	43.853	20	0.0087	1	

WLAN5.8G SISO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
Ant 1	11.72	3.25	14.97	31.405	20	0.0062	1	Pass
Ant 2	11.99	3.88	15.87	38.637	20	0.0077	1	

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E^2 , H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

WLAN2.4G MIMO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Calculation result	Conclusion
Ant 1	20.26	3.11	23.37	217.270	20	0.0432	1	0.1012	Pass
Ant 2	21.54	3.11	24.65	291.743	20	0.0580	1		

WLAN5.2G MIMO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Calculation result	Conclusion
Ant 1	12.07	3.25	15.32	34.041	20	0.0068	1	0.0144	Pass
Ant 2	11.95	3.88	15.83	38.282	20	0.0076	1		

WLAN5.3G MIMO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Calculation result	Conclusion
Ant 1	12.37	3.25	15.62	36.475	20	0.0073	1	0.0146	Pass
Ant 2	11.76	3.88	15.64	36.644	20	0.0073	1		

WLAN5.6G MIMO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Calculation result	Conclusion
Ant 1	11.25	3.25	14.5	28.184	20	0.0056	1	0.0143	Pass
Ant 2	12.54	3.88	16.42	43.853	20	0.0087	1		

WLAN5.8G MIMO MODE

Antenna	Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Calculation result	Conclusion
Ant 1	11.72	3.25	14.97	31.405	20	0.0062	1	0.0139	Pass
Ant 2	11.99	3.88	15.87	38.637	20	0.0077	1		

This product does not support the requirements under multiple sources.

Conclusion:

The conclusion for MIMO mode should be $0.1012 < 1$ for Max Power Density, Compliance the

Signature:

Date: 2022-05-24



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