

FCC 47 CFR MPE REPORT

Vesync Corporation

Smart Thermostat

Model Number: AST110

FCC ID: 2AWPP-AST110

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Maximum Permissible Exposure

1. Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

1.1. Limits for Maximum Permissible Exposure (MPE)

(a) 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
1500-10000			5	6

(b) 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
1500-10000			1.0	30

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

1.2. MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric Field (V/m)

P = Peak 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

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak 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

2. Conducted Power Result

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
GFSK	2402	8.60	7.244	8 ± 1	3.7	2.344
	2441	8.33	6.808	8 ± 1	3.7	2.344
	2480	7.64	5.808	7 ± 1	3.7	2.344
8-DPSK	2402	10.93	12.388	10 ± 1	3.7	2.344
	2441	10.73	11.830	10 ± 1	3.7	2.344
	2480	10.14	10.328	10 ± 1	3.7	2.344
BLE GFSK	2402	8.48	7.047	8 ± 1	3.7	2.344
	2440	7.90	6.166	7 ± 1	3.7	2.344
	2480	7.02	5.035	7 ± 1	3.7	2.344
IEEE 802.11b	2412	19.02	79.799	19 ± 1	3.7	2.344
	2437	17.71	59.020	17 ± 1	3.7	2.344
	2462	16.58	45.499	16 ± 1	3.7	2.344
IEEE 802.11g	2412	22.94	196.789	22 ± 1	3.7	2.344
	2437	21.95	156.675	21 ± 1	3.7	2.344
	2462	20.58	114.288	20 ± 1	3.7	2.344
IEEE 802.11n HT20	2412	23.31	214.289	23 ± 1	3.7	2.344
	2437	22.24	167.494	22 ± 1	3.7	2.344
	2462	20.88	122.462	20 ± 1	3.7	2.344
IEEE 802.11n HT40	2422	22.76	188.799	22 ± 1	3.7	2.344
	2437	22.17	164.816	22 ± 1	3.7	2.344
	2452	21.40	138.038	21 ± 1	3.7	2.344

3. Calculated Result and Limit

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
2.4G Band						
GFSK	9	3.7	2.344	0.00370	1	Complies
8-DPSK	11	3.7	2.344	0.00587	1	Complies
BLE GFSK 1M	9	3.7	2.344	0.00370	1	Complies
IEEE 802.11b	20	3.7	2.344	0.04664	1	Complies
IEEE 802.11g	23	3.7	2.344	0.09305	1	Complies
IEEE 802.11n HT20	24	3.7	2.344	0.11715	1	Complies
IEEE 802.11n HT40	23	3.7	2.344	0.09305	1	Complies

End of Test Report