

RF EXPOSURE EVALUATION

EUT Specification

EUT	Wireless Meat Barbecue Thermometer
Model Number	HK-01
FCC ID	2A5VWHK-01
Antenna gain (Max)	1.3dBi
Operation Frequency	BT:2.402-2.480GHz WLAN: 2.412GHz ~ 2.462GHz
Input Rating	DC 5V, 1A
Max. output power	BT:6.86dBm WLAN: 802.11b: 16.48dBm 802.11g: 13.61dBm 802.11n(HT20): 13.14dBm 802.11n(HT40): 12.86dBm

Test Requirement:

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)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

11.1 Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = Power density in mW/cm²

P_{out} =output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

$\pi=3.1416$

R= distance between observation point and center of the radiator in cm

Pd the limit of MPE, $1\text{mW}/\text{cm}^2$. If we know the maximum gain of the nd total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

11.2 Measurement Result

Antenna gain: 1.3 dBi

BT:

Mode	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain (Numeric)	Evaluation result (mW/cm^2)	Power density Limits (mW/cm^2)
GFSK	2402	2.78	3 ± 1	4	1.349	0.000644	1
GFSK	2440	4.86	5 ± 1	6	1.349	0.001020	1
GFSK	2480	6.86	7 ± 1	8	1.349	0.001617	1

WIFI:

Operating Mode	Test Channel	Tune up tolerance (dBm)	Max tune up conducted power (dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
802.11b	1	15 ± 1	16	39.811	1.3	1.349	0.010684	1
	6	16 ± 1	17	50.119	1.3	1.349	0.013451	1
	11	16 ± 1	17	50.119	1.3	1.349	0.013451	1
802.11g	1	13 ± 1	14	25.119	1.3	1.349	0.006741	1
	6	10 ± 1	11	12.589	1.3	1.349	0.003379	1
	11	12 ± 1	13	19.953	1.3	1.349	0.005355	1
802.11n (HT20)	1	10 ± 1	11	12.589	1.3	1.349	0.003379	1
	6	12 ± 1	13	19.953	1.3	1.349	0.005355	1
	11	13 ± 1	14	25.119	1.3	1.349	0.006741	1
802.11n (HT40)	3	11 ± 1	12	15.849	1.3	1.349	0.004253	1
	6	12 ± 1	13	19.953	1.3	1.349	0.005355	1
	9	13 ± 1	14	25.119	1.3	1.349	0.006741	1

Signature:

A handwritten signature in black ink, appearing to read "Alan He". The signature is fluid and cursive, with a large initial "A" and "H".

Alan He

Date: 2022-03-23