FCC §18.313, §1.1310, §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE

Applicable Standard

According to subpart §1.1310, 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 of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
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
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

Measurement

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Jason Liu on 2023-06-26.

For Microwave function:

Radiation leakage was measured in the as-received condition with the oven door closed using a microwave leakage meter.

A 275 mL water load was placed in the center of the oven and the oven was operated at maximum output power.

☒ There was no microwave leakage exceeding a power level of 0.1mW/cm^2 observed at any point 5 cm or more from the external surface of the oven.

A maximum of 1.0 mW/cm^2 is allowed in accordance with the applicable Federal Standards. Hence, microwave leakage in the as-received condition with the oven door closed was below the maximum allowed.

For BT/Wi-Fi Function:

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
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 (appropriate units, e.g., cm)

For worst case (PCB antenna 2)

Mode	Frequency (MHz)	Antenna Gain		Tune Up Conducted Power*		Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	4.2	2.63	0	1.00	20	0.0005	1
BDR/EDR	2402-2480	4.2	2.63	3	2.00	20	0.0010	1
Wi-Fi	2412-2462	4.2	2.63	22	158.49	20	0.0829	1

Note 1: Please refer to the certified module of FCC ID: 2AC7Z-RIGEL (Report number: RSHA180913005-00A& RSHA180913005-00B) for the tune up conducted power for the Bluetooth and Wi-Fi.
Note 2: The BT function can't transmit at the same time with the Wi-Fi function.
Note 3: The BT/Wi-Fi function can transmit at the same time with Microwave function.
Note 4: Simultaneous transmitting was considerate to be compliant to the limit, since low power density for BT/Wi-Fi and Microwave functions.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.