5. RF EXPOSURE EVALUATION

5.1 FCC SAR test exclusion

5.1.1 Applicable Standard

According to subpart 15.247(i)and 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/f²)	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;

According to §1.1310 and §2.1091 RF exposure is calculated.

5.1.2 Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = 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);

5.1.3 Calculated Data:

Operation Mode	**Frequency (MHz)**	**Antenna Gain**		**Conducted output power including Tune-up Tolerance**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
		(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
BLE	2402-2480	2.9	1.95	4	2.51	20.00	0.001	1.0
2.4G WiFi	2412-2462	2.9	1.95	19	79.43	20.00	0.031	1.0
5G WiFi	5150-5250	4.6	2.88	11	12.59	20.00	0.01	1.0
	5250-5350	4.7	2.95	16	39.81	20.00	0.02	1.0
	5470-5725	4.8	3.02	15	31.62	20.00	0.02	1.0
	5725-5850	3.8	2.40	16	39.81	20.00	0.02	1.0

Note:
The Conducted output power including Tune-up Tolerance was declared by manufacturer.
BLE/2.4G WiFi/5G WiFi can`t transmit simultenuously.

Result: The device meet FCC MPE at 20 cm distance.