

RF Exposure Evaluation

FCC ID	2BNO5JS21ZD01M
Applicant	JANG EUN FnC CO.,LTD.
Applicant Address	801, DM GRACE SEOCHO, 12-1, Seocho-daero, Seocho-gu, Seoul, 06675, Republic of Korea
Equipment under test	SMART HEATING VEST
Model name	JS21ZD01M
Frequency Range	2 402 MHz ~ 2 480 MHz(Bluetooth Low Energy)
Modulation technique	FHSS(GFSK)
Number of channels	40 CH
Antenna type	PCB Antenna
Antenna gain	-7.62 dBi(Peak Gain)
Power source	5 Vd.c.(External Battery)

1. Limit

According to FCC part 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 (min)
(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

2. Friis Formula

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 = gain of antenna in linear scale

π = 3.1416

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

P_d the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

3. Result

Test Mode	Channel	Channel Frequency (MHz)	Maximum Average Output Power (mW)	Antenna Gain (dBi)	Power Density at 5 mm (mw/cm ²)	Limit (mW/cm ²)
Bluetooth Low Energy	00	2 402	0.23	-7.62	0.012	1
	19	2 440	0.23		0.012	
	39	2 480	0.23		0.012	

* Antenna gain(numeric) : 0.17, $\text{Gain}_{(\text{num})} = 10^{(\text{Gain(dBi)}/10)}$, $0.17 = 10^{(-7.62/10)}$