RF EXPOSURE EVALUATION

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)	Averaging time (minutes)
(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

MPE Calculation Method

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

E = Electric field (V/m)

P = Average 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

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the 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.

Measurement Result

Jeweller :
Operation Frequency: GFSK: 905 MHz~926.5MHz
Antenna Type: Antenna Type: Inverted-F antenna
Antenna gain: Antenna: -2 dBi
R=20cm

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
905.00	GFSK	10.322	10±1	11	12.589	-2.00	0.63	0.0016	0.60
915.85	GFSK	9.989	10±1	11	12.589	-2.00	0.63	0.0016	0.61
926.5	GFSK	9.626	10±1	11	12.589	-2.00	0.63	0.0016	0.62

interconnect:
Operation Frequency: GFSK: 926MHz
Antenna Type: Antenna Type: Inverted-F antenna
Antenna gain: Antenna: -2 dBi
R=20cm

Transmit power:

Frequency (MHz)	EIRP power (dBuV/m)	EIRP power (dBm)
926	90.49	-4.77

EIRP=E-104.8+20log(D)
EIRP=conducted power + antenna gain

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
926	GFSK	-4.77	-4±1	-3	0.501	-2	0.63	0.0001	0.617333333

Conclusion:
For the max result : 0.0016≤ 0.60mW/ cm^2 for Max Power density,compliance with RF exposure.

Alex

Signature: **Date:** 3/5/2024

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