

FCC ID: XFT-AIRDIAL2

KDB447498 D01 General RF Exposure Guidance v06

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

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type:PCB antenna

Antenna gain:-0.56dBi;

R=20cm

mW=10^{^(dBm/10)}

antenna gain Numeric=10^{^(dBi/10)}= 10^{^(-0.56/10)}=0.88

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2402	GFSK	7.52	7.5±1	8.5	7.079	-0.56	0.88	0.0012	1
2441		7.68	7.5±1	8.5	7.079	-0.56	0.88	0.0012	1
2480		8.16	7.5±1	8.5	7.079	-0.56	0.88	0.0012	1

Note: BLE Test data reference to FCC ID: X8WBM833

Antenna Type: Stick antenna

Antenna gain:Band 2:1.59dBi,Band 4:2dBi,Band 5:1.59dBi,Band 12:1.66dBi,Band 13:4.45dBi

R=20cm

Channel Freq. (MHz)	modulation	conducted pow er	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up pow er	Gain		(mW/cm2)		(mW/cm2)
				(dBm)	(mW)	(dBi)		Numeric	
1850	Band 2	25.63	25±1	26	398.107	1.59	1.44	0.1142	1
1710	Band 4	25.14	25±1	26	398.107	2	1.58	0.1255	1
824	Band 5	22.25	23±1	24	251.189	1.59	1.44	0.0721	1
699	Band 12	19.7	20±1	21	125.893	1.66	1.47	0.0367	1
777	Band 13	22.41	22±1	23	199.526	4.45	2.79	0.1106	1

Note: BLE Test data reference to FCC ID: XMR202008EC25AFXD

Operation Frequency: NFC: 13.56MHz

Antenna Type: Induction coil

R=20cm

Transmit power

NFC

Frequency (MHz)	Max Output power (dBuV/m)	EIRP power (dBm)
13.56	63.23	-32

$EIRP = E - 104.8 + 20 \log(D)$

Mode	Channel Freq. (MHz)	EIRP power (dBm)	EIRP power (mW)	Tune-up power (dBm)	Max tune-up power (dBm)	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
NFC	13.56	-32	0.00063	-32±1	-31	0.00000016	0.98

$BLE + LTE \text{ Band 4} + NFC = 0.0012 + 0.1255 + 0.00000016 = 0.12670016 < 0.98$

Conclusion:

For the max result : $0.12670016 \leq 0.98$ for Max field strength, compliance RF exposure..

Signature:



Date: 2024-11-22

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