Prediction of MPE at a given distance

1. Limits

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)

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

2. Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

3. Result

Worse case is as below:

Mode	Frequency (MHz)	Prediction distance (cm)	RF output power		MPE (mW/cm^2)	Limit (mW/cm^2)	MPE Test Exclusion
			dBm	mW			
EDR	2402-2480	20	5.592	3.6241	0.0017	1	Yes
BLE	2402-2480	20	5.764	3.7705	0.0017	1	Yes
2.4GWIFI	2412-2462	20	19.910	97.9490	0.0831	1	Yes
5GWIFI BAND1	5180-5240	20	20.379	109.1189	0.0974	1	Yes
5GWIFI BAND2	5260-5320	20	20.545	113.3705	0.1012	1	Yes
5GWIFI BAND3	5500-5700	20	20.503	112.2794	0.1002	1	Yes
5GWIFI BAND4	5745-5825	20	20.498	112.1502	0.1001	1	Yes

Maximum Simultaneous transmission MPE Ratios for BLE+WIFI:

Max MPE ratio $_{EDR}$/Limit	Max MPE ratio $_{WIFI}$/Limit	∑MPE ratios	Limit	Result
0.0017	0.1012	0.1029	1	PASS

EDR Antenna Gain: FPC Antenna 1, max gain 3.63dBi, 2.31(numeric)

BLE Antenna Gain: FPC Antenna 1, max gain 3.63dBi, 2.31(numeric)

2.4GWIFI Antenna Gain:

FPC Antenna 1, max gain 3.63dBi, 2.31(numeric).

FPC Antenna 2, max gain 2.93dBi, 1.96(numeric).

The antenna MIMO combining gain is 6.30dBi. 4.27(numeric)

5GWIFI Antenna Gain:

FPC Antenna 1, max gain 3.25dBi, 2.11(numeric)

FPC Antenna 2, max gain 3.77dBi, 2.38(numeric)

The antenna MIMO combining gain is 6.52dBi, 4.49(numeric)

Meet MPE requirements, RF Exposure evaluation is not required.