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/cm2)	Limit (mW/cm2)	SAR Test Exclusion
			dBm	mW			
BT4.1	2402	20	6.707	4.909	0.0009	1	Yes
BLE	2402	20	5.303	3.39	0.0007	1	Yes
WIFI	2412	20	19.55	90.16	0.0179	1	Yes
GSM	836.6	20	31.36	1367.73	0.3427	0.54947	Yes
WCDMA	846.6	20	27.13	516.42	0.1294	0.54947	Yes
UHF	410.125	20	25.11	324.340	0.1622	0.27333	Yes

Maximum Simultaneous transmission MPE Ratios for BT4.1+WIFI +GSM:

Max MPE ratio $_{BT4.1}$/Limit	Max MPE ratio $_{WIFI}$/Limit	Max MPE ratio $_{GSM}$/Limit	∑MPE ratios	Limit	Result
0.0009	0.0179	0.6237	0.6425	1	PASS

BT&WIFI Antenna Gain: 0dBi, 1(numeric)

GSM 850 & WCDMA Band V Antenna Gain: 1dBi, 1.26(numeric)

DCS 1900 & WCDMA Band II Antenna Gain: 2.5dBi, 1.78(numeric)

UHF Antenna Gain: 4dBi, 2.51(numeric)

Then SAR evaluation is not required.