

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)	SAR Test Exclusion
			dBm	mW			
BT4.1	2441	50	6.945	4.949	0.0002	1	Yes
BLE	2402	50	4.174	2.615	0.0001	1	Yes
WIFI	2462	50	14.731	29.724	0.0015	1	Yes
GSM	848.80	50	31.11	1291.219	0.0461	0.54947	Yes
WCDMA	1852.4	50	24.20	263.027	0.0094	1	Yes
LTE	1732.5	50	24.59	287.740	0.0103	1	Yes
UHF	410.250	50	30.802	1202.818	0.0962	0.27333	Yes

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

Max MPE ratio BT4.1/Limit	Max MPE ratio WIFI/Limit	Max MPE ratio GSM/Limit	Max MPE ratio UHF/Limit	ΣMPE ratios	Limit	Result
0.0002	0.0015	0.0461	0.0962	0.144	1	PASS

BT&WIFI Antenna Gain: 2dBi, 1.58(numeric)

GSM, WCDMA & LTE Antenna Gain: 0.5dBi, 1.12(numeric)

UHF Antenna Gain: 4dBi, 2.51(numeric)

Then SAR evaluation is not required.