16 RF Exposure

KDB 447498

Prediction of MPE limit at a given distance

Equation from IEEE C95.1

$$S = \frac{EIRP}{4\pi R^2} \quad \text{re - arranged} \quad R = \sqrt{\frac{EIRP}{S\ 4\pi}}$$

Where:

S = power density
R = distance to the centre of radiation of the antenna
EIRP = EUT Maximum power

Note:

The EIRP was calculated by addition of the maximum conducted carrier power plus the maximum directional antenna gain (determined as per KDB 662911)

Results:

Modulation: 802.11a						
Prediction Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	Minimum Distance (cm)	Power density at distance (mW/cm^2)	Power density limit (S) (mW/cm^2)
5180	17.7	9.4	512.9	20.0	0.102	1
5260	17.3	9.5	478.6	20.0	0.095	1
5320	17.2	9.8	501.2	20.0	0.100	1
5500	17.3	9.9	524.8	20.0	0.104	1
5620	17.2	10.2	549.5	20.0	0.109	1
5720	17.2	10.0	524.8	20.0	0.104	1
5745	23.6	10.0	2290.9	20.0	0.456	1
5785	23.9	9.8	2344.2	20.0	0.466	1
5825	22.6	9.8	1737.8	20.0	0.346	1

Modulation: 802.11n HT20						
Prediction Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	Minimum Distance (cm)	Power density at distance (mW/cm^2)	Power density limit (S) (mW/cm^2)
5180	19.0	9.4	691.8	20.0	0.138	1
5260	18.9	9.5	691.8	20.0	0.138	1
5320	18.8	9.8	724.4	20.0	0.144	1
5500	18.3	9.9	660.7	20.0	0.131	1
5620	18.2	10.2	691.8	20.0	0.138	1
5720	18.3	10.0	676.1	20.0	0.135	1
5745	23.2	10.0	2089.3	20.0	0.416	1
5785	24.0	9.8	2398.8	20.0	0.477	1
5825	22.8	9.8	1819.7	20.0	0.362	1

Modulation: 802.11n HT40						
Prediction Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	Minimum Distance (cm)	Power density at distance (mW/cm^2)	Power density limit (S) (mW/cm^2)
5190	20.1	9.6	933.3	20.0	0.186	1
5270	20.0	9.5	891.3	20.0	0.177	1
5310	20.0	9.8	955.0	20.0	0.190	1
5510	19.6	10.2	955.0	20.0	0.190	1
5630	19.6	10.2	955.0	20.0	0.190	1
5710	19.5	10.2	933.3	20.0	0.186	1
5755	21.6	10.0	1445.4	20.0	0.288	1
5795	23.9	9.8	2344.2	20.0	0.466	1

Modulation: 802.11ac VHT20						
Prediction Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	Minimum Distance (cm)	Power density at distance (mW/cm^2)	Power density limit (S) (mW/cm^2)
5180	18.9	9.4	676.1	20.0	0.135	1
5260	19.1	9.5	724.4	20.0	0.144	1
5320	19.1	9.8	776.2	20.0	0.154	1
5500	17.4	9.9	537.0	20.0	0.107	1
5620	17.5	10.2	588.8	20.0	0.117	1
5720	17.6	10.0	575.4	20.0	0.114	1
5745	23.7	10.0	2344.2	20.0	0.466	1
5785	23.6	9.8	2187.8	20.0	0.435	1
5825	22.7	9.8	1778.3	20.0	0.354	1

Modulation: 802.11ac VHT40						
Prediction Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	Minimum Distance (cm)	Power density at distance (mW/cm^2)	Power density limit (S) (mW/cm^2)
5190	20.2	9.6	955.0	20.0	0.190	1
5270	20.0	9.5	891.3	20.0	0.177	1
5310	20.0	9.8	955.0	20.0	0.190	1
5510	18.9	10.2	812.8	20.0	0.162	1
5630	18.9	10.2	812.8	20.0	0.162	1
5710	18.9	10.2	812.8	20.0	0.162	1
5755	21.8	10.0	1513.6	20.0	0.301	1
5795	24.2	9.8	2511.9	20.0	0.500	1
5190	20.2	9.6	955.0	20.0	0.190	1

Modulation: 802.11ac VHT80						
Prediction Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	Minimum Distance (cm)	Power density at distance (mW/cm^2)	Power density limit (S) (mW/cm^2)
5210	19.8	9.6	871.0	20.0	0.173	1
5290	19.8	9.8	912.0	20.0	0.181	1
5530	19.6	10.3	977.2	20.0	0.194	1
5610	19.6	10.2	955.0	20.0	0.190	1
5690	19.6	10.3	977.2	20.0	0.194	1
5775	20.5	10.0	1122.0	20.0	0.223	1