

MPE Calculations for FCC ID 2AEAL-SB-850-1900

According to the FCC 47 CFR Sections 1.1307, 2.1091, and 2.1093, the applicable "Limits for General Population/Uncontrolled Exposure" are:

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
300 – 1,500	...	...	F/1,500	30
1,500 – 100,000	...	...	1.0	30

f = Frequency in Mhz; * = Plane-wave equivalent power density.

To predict MPE values, according to OET Bulletin 65, Edition 97-01, the applicable equation is:

$$S = \frac{EIRP}{4\pi R^2}$$

solving for R, we obtain:

$$R = \sqrt{\frac{EIRP}{4\pi S}}$$

where:

S = power density (in mW/cm²)

$EIRP$ = equivalent (or effective) isotropically radiated power (maximum for EUT)

R = distance to the center of radiation of the antenna (in cm)

Given the above, we obtain the following values:

Values with Default Antennas Configuration:

Band	Direction	Prediction Frequency (MHz)	Max Power at EUT (dBm)	Max Power at EUT (mW)	Cable Loss (dB)	Max Power at antenna connector (dBm)	Max Power at antenna connector (mW)	Maximum Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Power DensityS (mW/cm ²)	Minimum Distance R (cm)	MPE (R = 20 cm) (mW/cm ²)	MPE Limit (R = 20 cm) (mW/cm ²)
Cellular	Uplink	825.25	8.47	7.03	2.10	6.37	4.34	12.00	18.37	0.07	0.55	1.63	0.0037	0.5502
Cellular	Uplink	836.50	11.31	13.52	2.10	9.21	8.34	12.00	21.21	0.13	0.56	1.74	0.0042	0.5577
Cellular	Uplink	847.75	9.55	9.02	2.10	7.45	5.56	12.00	19.45	0.09	0.57	1.65	0.0039	0.5652
PCS	Uplink	1850.20	11.30	13.49	3.30	8.00	6.31	15.00	23.00	0.20	1.00	1.35	0.0046	1.0000
PCS	Uplink	1882.50	10.38	10.91	3.30	7.08	5.11	15.00	22.08	0.16	1.00	1.33	0.0044	1.0000
PCS	Uplink	1912.50	9.77	9.48	3.30	6.47	4.44	15.00	21.47	0.14	1.00	1.31	0.0043	1.0000
Cellular	Downlink	869.20	17.43	55.34	1.10	16.33	42.95	4.00	20.33	0.11	0.58	1.67	0.0040	0.5795
Cellular	Downlink	881.50	19.17	82.60	1.10	18.07	64.12	4.00	22.07	0.16	0.59	1.73	0.0044	0.5877
Cellular	Downlink	892.75	19.13	81.85	1.10	18.03	63.53	4.00	22.03	0.16	0.60	1.72	0.0044	0.5952
PCS	Downlink	1931.25	19.08	80.91	1.70	17.38	54.70	6.00	23.38	0.22	1.00	1.36	0.0047	1.0000
PCS	Downlink	1962.50	19.40	87.10	1.70	17.70	58.88	6.00	23.70	0.23	1.00	1.37	0.0047	1.0000
PCS	Downlink	1993.75	19.25	84.14	1.70	17.55	56.89	6.00	23.55	0.23	1.00	1.37	0.0047	1.0000

Values with Highest Possible Gain for Donor and Coverage Antennas:

Band	Direction	Prediction Frequency (MHz)	Max Power at EUT (dBm)	Max Power at EUT (mW)	Cable Loss (dB)	Max Power at antenna connector (dBm)	Max Power at antenna connector (mW)	Maximum Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Power DensityS (mW/cm ²)	Minimum Distance R (cm)	MPE (R = 20 cm) (mW/cm ²)	MPE Limit (R = 20 cm) (mW/cm ²)
Cellular	Uplink	825.25	8.47	7.03	2.10	6.37	4.34	25.00	31.37	1.37	0.55	2.13	0.0062	0.5502
Cellular	Uplink	836.50	11.31	13.52	2.10	9.21	8.34	25.00	34.21	2.64	0.56	2.21	0.0068	0.5577
Cellular	Uplink	847.75	9.55	9.02	2.10	7.45	5.56	25.00	32.45	1.76	0.57	2.14	0.0065	0.5652
PCS	Uplink	1850.20	11.30	13.49	3.30	8.00	6.31	28.00	36.00	3.98	1.00	1.69	0.0072	1.0000
PCS	Uplink	1882.50	10.38	10.91	3.30	7.08	5.11	28.00	35.08	3.22	1.00	1.67	0.0070	1.0000
PCS	Uplink	1912.50	9.77	9.48	3.30	6.47	4.44	28.00	34.47	2.80	1.00	1.66	0.0069	1.0000
Cellular	Downlink	869.20	17.43	55.34	1.10	16.33	42.95	6.40	22.73	0.19	0.58	1.77	0.0045	0.5795
Cellular	Downlink	881.50	19.17	82.60	1.10	18.07	64.12	6.40	24.47	0.28	0.59	1.82	0.0049	0.5877
Cellular	Downlink	892.75	19.13	81.85	1.10	18.03	63.53	6.40	24.43	0.28	0.60	1.81	0.0049	0.5952
PCS	Downlink	1931.25	19.08	80.91	1.70	17.38	54.70	13.40	30.78	1.20	1.00	1.57	0.0061	1.0000
PCS	Downlink	1962.50	19.40	87.10	1.70	17.70	58.88	13.40	31.10	1.29	1.00	1.57	0.0062	1.0000
PCS	Downlink	1993.75	19.25	84.14	1.70	17.55	56.89	13.40	30.95	1.24	1.00	1.57	0.0062	1.0000