RF Exposure Calculations

2.4 GHz Transmitter

Mikrotik	Model: RBSXT5HacD2n					
MPE Calculator	MPE uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi.					
	dBi = dB gain compared to an isotropic radiator.					
	S = power density in mW/cm^2					
					Antenna Gain (dBi)	2.7
		Output Power		dBd + 2.17 = dBi	dBi to dBd	2.2
Tx Frequency (MHz)	2437	Maximum (Watts)	0.041687		Antenna Gain (dBd)	0.53
Cable Loss (dB)	0.0	(dBm)	16.2		Antenna minus cable (dBi)	2.70
	Calculated ERP (mw)	47.098		EIRP = Po(dBM) + Gain (dB)		
	Calculated EIRP (mw)	77.625			Radiated (EIRP) dBm	18.900
				ERP = EIRP - 2.17 dB		
					Radiated (ERP) dBm	16.730

Power density (S)

EIRP
------- = mW/cm^2
4 p r^2

EIRP (mW), r (cm)

	Occupational Limit	FCC radio frequency radiation exposure limits per 1.1310		
5	mW/cm^2	Frequency (MHz)	Occupational Limit (mW/cm^2)	Public Limit (mW/cm^2)
50	W/m^2	300-1,500	f/300	f/1500
	General Public Limit	1,500-10,000	5	1
1	mW/cm^2			
10	W/m^2			

	Occupational Limit	IC radio frequency radiation exposure limits per RSS-102		
$0.6455f^{0.5}$	W/m^2	Frequency (MHz)	Occupational Limit (W/m^2)	Public Limit (W/m^2)
31.86574	W/m^2	100-6,000	$0.6455f^{0.5}$	
	General Public Limit	6,000-15,000	50	
$0.02619f^{0.6834}$	W/m^2	48-300		1.291
5.40397	W/m^2	300-6,000		$0.02619f^{0.6834}$
		6,000-15,000	50	10

EIRP	S	S	Distance	Distance	Distance	Distance
milliwatts	mW/cm^2	W/m^2	cm	meter	inches	Feet
77.625	0.00076	0.00763	90.00	0.90	35.43	2.95
77.625	0.00097	0.00965	80.00	0.80	31.50	2.62
77.625	0.00126	0.01261	70.00	0.70	27.56	2.30
77.625	0.00172	0.01716	60.00	0.60	23.62	1.97
77.625	0.00247	0.02471	50.00	0.50	19.69	1.64
77.625	0.00386	0.03861	40.00	0.40	15.75	1.31
77.625	0.00686	0.06864	30.00	0.30	11.81	0.98
77.625	0.01544	0.15443	20.00	0.20	7.87	0.66
77.625	0.03655	0.36551	13.00	0.13	5.12	0.43
77.625	0.09652	0.96518	8.00	0.08	3.15	0.26
77.625	0.17159	1.71588	6.00	0.060	2.36	0.20
77.625	0.20420	2.04204	5.50	0.055	2.17	0.18
77.625	0.24709	2.47087	5.00	0.050	1.97	0.16
77.625	0.38607	3.86074	4.00	0.040	1.57	0.13
77.625	0.68635	6.86353	3.00	0.030	1.18	0.10
77.625	1.54429	15.44295	2.00	0.020	0.79	0.07
77.625	6.17718	61.77178	1.00	0.010	0.39	0.03

Frequency (MHz)	Occupational Limit minimum Distance (meters)	Public Limit minimum distance (meters)
47CFR 1.1310	0.02	0.20
RSS-102	0.02	0.20

5 GHz Transmitter

Mikrotik	Model: RBSXT5HacD2n					
MPE Calculator	MPE uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi.					
	dBi = dB gain compared to an isotropic radiator.					
	S = power density in mW/cm^2					
					Antenna Gain (dBi)	19
		Output Power		dBd + 2.17 = dBi	dBi to dBd	2.2
Tx Frequency (MHz)	5785	Maximum (Watts)	0.015922		Antenna Gain (dBd)	16.83
Cable Loss (dB)	0.0	(dBm)	12.0		Antenna minus cable (dBi)	19.00
	Calculated ERP (mw)	767.361		EIRP = Po(dBM) + Gain (dB)		
	Calculated EIRP (mw)	1264.736			Radiated (EIRP) dBm	31.020
				ERP = EIRP - 2.17 dB		
					Radiated (ERP) dBm	28.850

Power density (S)

EIRP
------- = mW/cm^2
4 p r^2

EIRP (mW), r (cm)

		FCC radio frequency radiation exposure limits per 1.1310		
	Occupational Limit			
5	mW/cm^2	Frequency (MHz)	Occupational Limit (mW/cm^2)	Public Limit (mW/cm^2)
50	W/m^2	300-1,500	f/300	f/1500
	General Public Limit	1,500-10,000	5	1
1	mW/cm^2			
10	W/m^2			

		IC radio frequency radiation exposure limits per RSS-102		
	Occupational Limit			
$0.6455f^{0.5}$	W/m^2	Frequency (MHz)	Occupational Limit (W/m^2)	Public Limit (W/m^2)
49.09621	W/m^2	100-6,000	$0.6455f^{0.5}$	
	General Public Limit	6,000-15,000	50	
$0.02619f^{0.6834}$	W/m^2	48-300		1.291
9.75649	W/m^2	300-6,000		$0.02619f^{0.6834}$
		6,000-15,000	50	10

EIRP	S	S	Distance	Distance	Distance	Distance
milliwatts	mW/cm^2	W/m^2	cm	meter	inches	Feet
1264.736	0.01243	0.12425	90.00	0.90	35.43	2.95
1264.736	0.01573	0.15726	80.00	0.80	31.50	2.62
1264.736	0.02054	0.20540	70.00	0.70	27.56	2.30
1264.736	0.02796	0.27957	60.00	0.60	23.62	1.97
1264.736	0.04026	0.40258	50.00	0.50	19.69	1.64
1264.736	0.06290	0.62903	40.00	0.40	15.75	1.31
1264.736	0.11183	1.11827	30.00	0.30	11.81	0.98
1264.736	0.25161	2.51611	20.00	0.20	7.87	0.66
1264.736	0.59553	5.95530	13.00	0.13	5.12	0.43
1264.736	1.57257	15.72571	8.00	0.08	3.15	0.26
1264.736	2.79568	27.95681	6.00	0.060	2.36	0.20
1264.736	3.32709	33.27092	5.50	0.055	2.17	0.18
1264.736	4.02578	40.25781	5.00	0.050	1.97	0.16
1264.736	4.46070	44.60699	4.75	0.048	1.87	0.16
1264.736	4.97010	49.70100	4.50	0.045	1.77	0.15
1264.736	6.29028	62.90283	4.00	0.040	1.57	0.13
1264.736	11.18272	111.82725	3.00	0.030	1.18	0.10

Frequency (MHz)	Occupational Limit minimum Distance (meters)	Public Limit minimum distance (meters)
47CFR 1.1310	0.05	0.20
RSS-102	0.05	0.20