

# RF Exposure Calculations

## 2.4 GHz Transmitter

Mikrotik-B2H49k	Model: RBwAPG-5HacT2HnD-US	Test Number:	160707			
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 <sup>2</sup>					
		Output Power		dBd + 2.17 = dBi	Antenna Gain (dBi)	5.7
		Maximum (Watts)	0.266860		dBd to dBd	2.2
Tx Frequency (MHz)	2437				Antenna Gain (dBd)	3.53
Cable Loss (dB)	0.0	(dBm)		24.3	Antenna minus cable (dBi)	5.70
	Calculated ERP (mw)	601.566		EIRP = Po(dBm) + Gain (dB)		
	Calculated EIRP (mw)	991.479			Radiated (EIRP) dBm	29.963
		Power density (S)		ERP = EIRP - 2.17 dB		
		EIRP			Radiated (ERP) dBm	27.793
		----- = mW/cm <sup>2</sup>				
		4 π r <sup>2</sup>				
		EIRP (mW), r (cm)				
	<b>Occupational Limit</b>	FCC radio frequency radiation exposure limits per 1.1310				
	5	mW/cm <sup>2</sup>	Frequency (MHz)	Occupational Limit (mW/cm <sup>2</sup> )	Public Limit (mW/cm <sup>2</sup> )	
	50	W/m <sup>2</sup>	300-1,500	ƒ300	ƒ1500	
	<b>General Public Limit</b>		1,500-10,000	5	1	
	1	mW/cm <sup>2</sup>				
	10	W/m <sup>2</sup>				
	<b>Occupational Limit</b>	IC radio frequency radiation exposure limits per RSS-102				
	0.6455/ <sup>0.5</sup>	W/m <sup>2</sup>	Frequency (MHz)	Occupational Limit (W/m <sup>2</sup> )	Public Limit (W/m <sup>2</sup> )	
	31.86574	W/m <sup>2</sup>	100-6,000	0.6455/ <sup>0.5</sup>		
	<b>General Public Limit</b>		6,000-15,000	50		
	0.02619/ <sup>0.6834</sup>	W/m <sup>2</sup>	48-300		1.291	
	5.40397	W/m <sup>2</sup>	300-6,000		0.02619/ <sup>0.6834</sup>	
			6,000-15,000	50	10	
EIRP	S	S	Distance	Distance	Distance	Distance
milliwatts	mW/cm <sup>2</sup>	W/m <sup>2</sup>	cm	meter	inches	Feet
991.479	0.00974	0.09741	90.00	0.90	35.43	2.95
991.479	0.01233	0.12328	80.00	0.80	31.50	2.62
991.479	0.01610	0.16102	70.00	0.70	27.56	2.30
991.479	0.02192	0.21916	60.00	0.60	23.62	1.97
991.479	0.03156	0.31560	50.00	0.50	19.69	1.64
991.479	0.04931	0.49312	40.00	0.40	15.75	1.31
991.479	0.08767	0.87666	30.00	0.30	11.81	0.98
991.479	0.19725	1.97248	20.00	0.20	7.87	0.66
991.479	0.46686	4.66860	13.00	0.13	5.12	0.43
991.479	1.23280	12.32803	8.00	0.08	3.15	0.26
991.479	2.19165	21.91650	6.00	0.060	2.36	0.20
991.479	2.60824	26.08244	5.50	0.055	2.17	0.18
991.479	3.15598	31.55975	5.00	0.050	1.97	0.16
991.479	4.93121	49.31212	4.00	0.040	1.57	0.13
991.479	8.76660	87.66598	3.00	0.030	1.18	0.10
991.479	19.72485	197.24846	2.00	0.020	0.79	0.07
991.479	78.89938	788.99385	1.00	0.010	0.39	0.03
			Frequency (MHz)	Occupational Limit minimum Distance (meters)	Public Limit minimum distance (meters)	
			47CFR 1.1310	0.04	0.20	
			RSS-102	0.05	0.20	

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 Revision 1

Mikrotik SIA  
 Model: RBwAPG-5HacT2HnD-US  
 Test #: 160707  
 Test to: CFR47 (15(c), 15(e), RSS-247)  
 File: RBwAPG5HacT2HnD-US RFExp

S/N: 5C7301DDBBE/523  
 FCC ID: TV7RBWAP5AC2D  
 IC: 7442A-WAP5AC2D  
 Date: November 4, 2016  
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# 5 GHz Transmitter

Mikrotik	Model: RBwAPG-5HacT2HnD-US	Test Number:	151229 160707			
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 <sup>2</sup>					
		Output Power	dBd + 2.17 = dBi	Antenna Gain (dBi)	8.4	
		Maximum (Watts)		dBi to dBd	2.2	
Tx Frequency (MHz)	5785			Antenna Gain (dBd)	6.23	
Cable Loss (dB)	0.0	(dBm)	18.6	Antenna minus cable (dBi)	8.40	
	Calculated ERP (mw)	302.226	EIRP = Po(dBm) + Gain (dB)			
	Calculated EIRP (mw)	498.118		Radiated (EIRP) dBm	26.973	
			ERP = EIRP - 2.17 dB			
				Radiated (ERP) dBm	24.803	
	Power density (S) EIRP ----- = mW/cm <sup>2</sup> 4 π r <sup>2</sup> EIRP (mW), r (cm)					
	<b>Occupational Limit</b>					
	FCC radio frequency radiation exposure limits per 1.1310					
	5	mW/cm <sup>2</sup>	Frequency (MHz)	Occupational Limit (mW/cm <sup>2</sup> )	Public Limit (mW/cm <sup>2</sup> )	
	50	W/m <sup>2</sup>	300-1,500	ƒ300	ƒ1500	
	<b>General Public Limit</b>					
	1	mW/cm <sup>2</sup>	1,500-10,000	5	1	
	10	W/m <sup>2</sup>				
	<b>Occupational Limit</b>					
	IC radio frequency radiation exposure limits per RSS-102					
	0.6455f <sup>0.5</sup>	W/m <sup>2</sup>	Frequency (MHz)	Occupational Limit (W/m <sup>2</sup> )	Public Limit (W/m <sup>2</sup> )	
	49.09621	W/m <sup>2</sup>	100-6,000	0.6455f <sup>0.5</sup>		
	<b>General Public Limit</b>					
	0.02619f <sup>0.6834</sup>	W/m <sup>2</sup>	6,000-15,000	50		
	9.75649	W/m <sup>2</sup>	48-300		1.291	
			300-6,000		0.02619f <sup>0.6834</sup>	
			6,000-15,000	50	10	
EIRP	S	S	Distance	Distance	Distance	Distance
milliwatts	mW/cm <sup>2</sup>	W/m <sup>2</sup>	cm	meter	inches	Feet
498.118	0.00489	0.04894	90.00	0.90	35.43	2.95
498.118	0.00619	0.06194	80.00	0.80	31.50	2.62
498.118	0.00809	0.08090	70.00	0.70	27.56	2.30
498.118	0.01101	0.11011	60.00	0.60	23.62	1.97
498.118	0.01586	0.15856	50.00	0.50	19.69	1.64
498.118	0.02477	0.24774	40.00	0.40	15.75	1.31
498.118	0.04404	0.44043	30.00	0.30	11.81	0.98
498.118	0.09910	0.99097	20.00	0.20	7.87	0.66
498.118	0.23455	2.34550	13.00	0.13	5.12	0.43
498.118	0.61936	6.19359	8.00	0.08	3.15	0.26
498.118	0.80896	8.08959	7.00	0.070	2.76	0.23
498.118	0.93820	9.38201	6.50	0.065	2.56	0.21
498.118	1.10108	11.01083	6.00	0.060	2.36	0.20
498.118	1.58556	15.85560	5.00	0.050	1.97	0.16
498.118	2.47744	24.77437	4.00	0.040	1.57	0.13
498.118	4.40433	44.04333	3.00	0.030	1.18	0.10
498.118	9.90975	99.09749	2.00	0.020	0.79	0.07
			Frequency (MHz)	Occupational Limit minimum Distance (meters)	Public Limit minimum distance (meters)	
			47CFR 1.1310	0.03	0.20	
			RSS-102	0.03	0.20	

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