

MPE Calculator	RF Exposure 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>																																									
	Transmitter Output power (dBm)	15.34																																								
	Transmitter Output power (mW)	34.20																																								
	Transmitter Output power (W)	0.03																																								
Output Power for % duty Cycle operation (Watts)	0.9	0.00		Antenna Gain (dBi)	3.96																																					
	Output Power for 0.9% duty Cycle operation (Watts)	0.0000028		Antenna Gain (Numeric)	2.49																																					
Tx Frequency (MHz)	2442	Calculation power (mW)	0.003	dBd + 2.17 = dBi	dBi to dBd	2.17																																				
					Antenna Gain (dBd)	1.79																																				
Cable Loss (dB)	0.0	Adjusted Power (dBm)	4.42	Antenna minus cable (dBi)	3.96																																					
	Calculated ERP (mw)	4.183		Antenna Gain (Numeric)	2.49																																					
	Calculated EIRP (mw)	6.894		EIRP = Po(dBm) + Gain (dB)																																						
	$\text{Power density (S) mW/cm}^2 = \frac{\text{EIRP}}{4 \pi r^2}$ $r \text{ (cm)} \quad \text{EIRP (mW)}$			Radiated (EIRP) dBm	8.385																																					
				ERP = EIRP - 2.17 dB																																						
				Radiated (ERP) dBm	6.215																																					
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f = Transmit Frequency (MHz)				f (MHz) =																																						
P <sub>T</sub> = Power Input to Antenna (mW)				P <sub>T</sub> (mW) =	0.3078	0.3078 mW																																				
Duty cycle (percentage of operation)				% =	0.9	0.9 %																																				
P <sub>A</sub> = Adjusted Power due to Duty cycle or Cable Loss (mW)				P <sub>A</sub> (mW) =	2.77	2.77 mW																																				
G <sub>N</sub> = Numeric Gain of the Antenna				G <sub>N</sub> (numeric) =	2.49	2.49 numeric																																				
S <sub>20</sub> = Power Density of device at 20cm (mW/m <sup>2</sup> )				S <sub>20</sub> (mW/m <sup>2</sup> ) =	0.00	0.00 mW/m <sup>2</sup>																																				
S <sub>20</sub> = Power Density of device at 20cm (W/m <sup>2</sup> )				S <sub>20</sub> (W/m <sup>2</sup> ) =	0.01	0.01 W/m <sup>2</sup>																																				
S <sub>L</sub> = Power Density Limit (W/m <sup>2</sup> ) FCC				S <sub>L</sub> (W/m <sup>2</sup> ) =	16.280	81.400 W/m <sup>2</sup>																																				
S <sub>L</sub> = Power Density Limit (W/m <sup>2</sup> ) Canada				S <sub>L</sub> (W/m <sup>2</sup> ) =	5.412	31.898 W/m <sup>2</sup>																																				
R <sub>C</sub> = Minimum distance to the Radiating Element for Compliance (cm) FCC				R <sub>C</sub> (cm) =	0.6	0.3 cm																																				
R <sub>C</sub> = Minimum distance to the Radiating Element for Compliance (cm) Canada				R <sub>C</sub> (cm) =	1.0	0.4 cm																																				
S <sub>C</sub> = Power Density of the device at the Compliance Distance R <sub>C</sub> (W/m <sup>2</sup> ) FCC				S <sub>C</sub> (W/m <sup>2</sup> ) =	16.28	81.40 W/m <sup>2</sup>																																				
S <sub>C</sub> = Power Density of the device at the Compliance Distance R <sub>C</sub> (W/m <sup>2</sup> ) Canada				S <sub>C</sub> (W/m <sup>2</sup> ) =	5.41	31.90 W/m <sup>2</sup>																																				
R <sub>20</sub> = 20cm				R <sub>20</sub> =	20	20 cm																																				
<p>For Compliance with Canada General Population Limits, User Manual must indicate a minimum separation distance of 1.0 cm Or in Meters for Compliance with Canada General Population Limits, a minimum separation distance of 0.01 Meters</p>																																										
Summary: Standalone MPE Calculations and Summary				Public Limit		Public																																				
	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)	Antenna Gain (numeric)	S <sub>L</sub> (W/m <sup>2</sup> )	S <sub>20</sub> (W/m <sup>2</sup> )																																				
FCC	0.9	2442	3	2.49	16.280	0.01																																				
Canada	0.9	2442	3	2.49	5.412	0.01																																				
<p>SAR Exemption Per KDB 447498 D01 General RF Exposure Guidance v06 (max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm) * [sqrt(f/GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR,30 where</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Pwr (mw)</th> <th>Min dist (mm)</th> <th>Freq (GHz)</th> </tr> </thead> <tbody> <tr> <td>0.000858263</td> <td>0.003</td> <td>5</td> <td>2.4</td> </tr> <tr> <td>0.000858263</td> <td colspan="3">This value is below the requirement for SAR Exclusion</td></tr> </tbody> </table>							Value	Pwr (mw)	Min dist (mm)	Freq (GHz)	0.000858263	0.003	5	2.4	0.000858263	This value is below the requirement for SAR Exclusion																										
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Rogers Labs, Inc.  
4405 West 259<sup>th</sup> Terrace  
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Phone/Fax: (913) 837-3214  
Revision 1

FireBoard Labs LLC  
HVIN: FBXIR  
Test: 211004  
File: FBXIR21 SAR test exclusion

SN's: FCC1 / FCC2  
FCC ID: 2A29A-FBXIR21  
IC: 27842-FBXIR21  
Date: November 19, 2021  
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**Appendix A*****SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm***

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	