

# **MPE/RF EXPOSURE EVALUATION**

FCC CFR 47 Part 1.1310

Report No.: MIKO120-U14A Rev A FCC MPE

Company: Mikrotikls SIA

Evaluation of: RBMetalG-52SHPacn-US



# **MPE/RF EXPOSURE EVALUATION**



Evaluation of: Mikrotikls SIA RBMetalG-52SHPacn-US

To: FCC CFR 47 Part 1.1310

Report Serial No.: MIKO120-U14A Rev A FCC MPE

This report supersedes: NONE

Applicant: Mikrotikls SIA Brīvības gatve 214i Rīga, LV 1039 Latvia

Issue Date: 21st October 2021

# This Report is Issued Under the Authority of:

MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA Phone: +1 (925) 462-0304 Fax: +1 (925) 462-0306 www.micomlabs.com



MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



# Calculations for RF Exposure Evaluation

Power Density = Pd (W/m<sup>2</sup>) = EIRP/(4\* $\pi$ \*d<sup>2</sup>) EIRP = P \* G P = Peak output power (W) G = Antenna numeric gain (numeric) d = Separation distance (m) Numeric Gain = 10 ^ (G (dBi)/10)

These calculations represent worst case in terms of the exposure levels.

Limits for Occupational/Controlled Exposure for professional installation: 5 mW/cm<sup>2</sup>

## Point to Point Operation

Freq. Band (MHz)	Ant Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Power Density (mW/cm <sup>2</sup> ) @ 20cm	Power Density Limit (mW/cm <sup>2</sup> )	Min Calculated safe distance for Limit (cm)
2400.0 - 2483.5	24.00	251.19	24.16	260.62	10.04	5.00	32.28
5250.0 - 5350.0	8.00	6.31	19.26	84.33	0.09	5.00	2.91
5470.0 - 5725.0	8.00	6.31	19.04	80.17	0.12	5.00	2.84

#### Point to Point Assessment at calculated minimum safe distance of 33cm

Freq. Band (MHz)	Ant Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Power Density (mW/cm <sup>2</sup> ) @ 33cm	Power Density Limit (mW/cm <sup>2</sup> )
2400.0 - 2483.5	24.00	251.19	24.16	260.62	4.78	5.00
5250.0 - 5350.0	8.00	6.31	19.26	84.33	0.04	5.00
5470.0 - 5725.0	8.00	6.31	19.04	80.17	0.06	5.00

#### Assessment for Simultaneous Operation of 2.4 GHz and 5 GHz radios at 33 cm.

Assessment of worst case exposure conditions with the 2 radios transmitting simultaneously.

	Freq. Band (MHz)	Ant Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm²) E <sub>i</sub>	Power Density Limit (mW/cm <sup>2</sup> ) E <sub>ref</sub>	E <sub>i</sub> /E <sub>ref</sub>
	2400.0 - 2483.5	24.00	251.19	24.16	260.62	4.79	5.00	0.957
	5250.0 - 5350.0	8.00	6.31	19.26	84.33	0.04	5.00	0.008
Summation of Ratio:							0.965	

The Total Evaluation was calculated using the formula:

$$\sum_{i=1}^{n} \frac{Ei}{Eref} \leq 1$$

Where Ei: calculated E-field Strength for transmitter Eref: E-field strength related limit

#### Minimum Safe Distance = 0.33 m

Note: for mobile or fixed location transmitters the minimum separation distance is 0.20m, even if calculations indicate the MPE distance to be less.



## **Specification - RF Exposure Evaluation Limits**

The Limit is defined in Table 1 of FCC §1.1310.

## Specification - Maximum Permissible Exposure Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)				
(A) Limits for Occupational/Controlled Exposure								
0.3-3.0	614	1.63	*100	6				
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6				
30-300	61.4	0.163	1.0	6				
300-1,500			f/300	6				
1,500-100,000			5	6				
(B) Limits for General Population/Uncontrolled Exposure								
0.3-1.34	614	1.63	*100	30				
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30				
30-300	27.5	0.073	0.2	30				
300-1,500			f/1500	30				
1,500-100,000			1.0	30				

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

f = frequency in MHz \* = Plane-wave equivalent power density





575 Boulder Court Pleasanton, California 94566, USA Tel: +1 (925) 462 0304 Fax: +1 (925) 462 0306 www.micomlabs.com