



MPE/RF EXPOSURE EVALUATION

FCC CFR 47 Part 1.1310

Report No.: MIKO120-U2A Rev A FCC MPE

Company: Mikrotiks SIA

Evaluation of: RBGrooveGA-52HPacn-US

MPE/RF EXPOSURE EVALUATION

FROM



Evaluation of: Mikrotikls SIA RBGrooveGA-52HPacn-US

To: FCC CFR 47 Part 1.1310

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Calculations for RF Exposure Evaluation

$$\text{Power Density} = Pd \text{ (W/m}^2\text{)} = \text{EIRP}/(4*\pi*d^2)$$

$$\text{EIRP} = P * G$$

P = Peak output power (W)

G = Antenna numeric gain (numeric)

d = Separation distance (m)

Numeric Gain = $10^{(G \text{ (dBi)}/10)}$

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

Limits for Occupational/Controlled Exposure for professional installation: 5 mW/cm²

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 ²) @ 20cm	Power Density Limit (mW/cm ²)	Min Calculated safe distance for Limit (cm)
2400.0 - 2483.5	24.00	251.19	23.03	200.91	10.04	5.00	28.34
5250.0 - 5350.0	8.00	6.31	18.66	73.45	0.09	5.00	2.72
5470.0 - 5725.0	8.00	6.31	19.81	95.72	0.12	5.00	3.10

Point to Point Assessment at calculated minimum safe distance of 29cm

Freq. Band (MHz)	Ant Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Power Density (mW/cm ²) @ 29cm	Power Density Limit (mW/cm ²)
2400.0 - 2483.5	24.00	251.19	23.03	200.91	4.78	5.00
5250.0 - 5350.0	8.00	6.31	18.66	73.45	0.04	5.00
5470.0 - 5725.0	8.00	6.31	19.81	95.72	0.06	5.00

Assessment for Simultaneous Operation of 2.4 GHz and 5 GHz radios at 29cm

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/cm ²) E _i	Power Density Limit (mW/cm ²) E _{ref}	E _i /E _{ref}
2400.0 - 2483.5	24.00	251.19	23.03	200.91	4.78	5.00	0.955
5470.0 - 5725.0	8.00	6.31	19.81	95.72	0.06	5.00	0.012
Summation of Ratio:							0.967

The Total Evaluation was calculated using the formula:

$$\sum_{i=1}^n E_i / E_{ref} \leq 1$$

Where

E_i: calculated E-field Strength for transmitter

E_{ref}: E-field strength related limit

Minimum Safe Distance = 0.29 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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	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 ²	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 ²	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1500	30
1,500-100,000	--	--	1.0	30

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



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