



FCC RADIO EXPOSURE TEST REPORT

FCC ID : TV7WAPG60ADM
Equipment : wAPG60adM
Brand Name : MikroTik
Model Name : wAPG60adM
Applicant : Mikrotikls SIA
Brivibas gatve 214i, Riga, LV-1039 Latvia
Manufacturer : MIKROTIKLS SIA
Brivibas gatve 214i, Riga, LV-1039 Latvia
Standard : 47 CFR Part 2.1091

The product was received on Nov. 15, 2018, and testing was started from Nov. 17, 2018 and completed on Feb. 13, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.


Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Photographs of EUT v01



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Cliff Chang

Report Producer: Vicky Huang

1 General Description

1.1 EUT General Information

The Channel Plan(s)			
Evaluation Mode	Frequency Range	Operating Frequency (GHz)	Modulation Type
60GHz	57-71 GHz	58.32 GHz 60.48 GHz 62.64 GHz	$\pi/2 - BPSK, \pi/2 - QPSK, \pi/2 - 16QAM$

Note1: The EUT is a limited module which only limited to the host (Brand Name: MikroTik / Model No.: RBwAPG-60ad-SA, RBwAPG-60ad).

Note2: The EUT was installed to the host (Brand Name: MikroTik / Model No.: RBwAPG-60ad-SA) to perform all the tests.

1.2 Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

15.255(g) Regardless of the power density levels permitted under this section, devices operating under the provisions of this section are subject to the radio frequency radiation exposure requirements specified in §§1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

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



2.2 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

2.3 Calculated Result and Limit

Maximum Permissible Exposure of Fundamental Emissions								
Separation Distance (cm)		20						
Maximum EIRP Power of Test Frequency (GHz)		Ant. Gain (dBi)	Average EIRP Power (dBm)	Tolerance (dB)	Tune-up Average EIRP Power (dBm)	Tune-up Average EIRP Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
60.48	GHz	13.48	15.58	0.50	16.08	40.55	0.008	1.00

The host system(Brand Name: MikroTik / Model No.: RBwAPG-60ad-SA) will install three 60GHz modules.

Simultaneous Transmission Analysis Mode: 60GHz + 60GHz + 60GHz

Mode	EIRP (dBm)	Tolerance (dB)	Tune-up Average EIRP Power (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
60GHz	15.58	0.50	16.08	0.04055	20	0.00807	1	0.00807
60GHz	15.58	0.50	16.08	0.04055	20	0.00807	1	0.00807
60GHz	15.58	0.50	16.08	0.04055	20	0.00807	1	0.00807
							Sum Ratio	0.02421
							Ratio Limit	1

————THE END————