

MRT Technology (Suzhou) Co., Ltd Phone: +86-512-66308358 Web: www.mrt-cert.com Report No.: 2207RSU013-U4 Report Version: V02 Issue Date: 2022-11-03

RF Exposure Evaluation Declaration

FCC ID: TV7C53-5AXD2AXD

Applicant: Mikrotikls SIA

Product: hAP ax³

Model No.: C53UiG+5HPaxD2HPaxD-US

Brand Name: MikroTik

FCC Classification: Digital Transmission System (DTS)

Unlicensed National Information Infrastructure (NII)

FCC Rule Part(s): Part15 Subpart C (Section 15.247)

Result: Complies

Approved By:

Reviewed By:

Vincent Yu

Robin Wu

Robin Wu

Vincent Yu

ACCREDITED

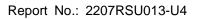
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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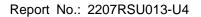
Revision History

Report No.	Version	Description Issue		Note
2207RSU013-U4	Rev. 01	Initial Report	2022-09-28	Invalid
2207RSU013-U4 Rev. 02		Update the antenna gain for NII-2C band in clause 1.5 and update the calculation results in clause 2.2	2022-11-03	Valid



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1. General Information

1.1. Applicant

Mikrotikls SIA

Brivibas gatve 214i, Riga, LV-1039 LATVIA

1.2. Manufacturer

Mikrotikls SIA

Brivibas gatve 214i, Riga, LV-1039 LATVIA

1.3. Testing Facility

	Test Site - MRT	Test Site – MRT Suzhou Laboratory						
Laboratory Location (Suzhou - Wuzhong)								
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China							
	Laboratory Location (Suzhou - SIP)							
	4b Building, Liand	do U Valley, No.200	Xingpu Rd., Shengpu	u Town, Suzhou Indu	ıstrial Park, China			
	Laboratory Accre	editations						
Ĭ	A2LA: 3628.01		CNAS	CNAS: L10551				
	FCC: CN1166		ISED:	: CN0001				
	NOO!	□R-20025	□G-20034	□C-20020	□T-20020			
	VCCI:	□R-20141	□G-20134	□C-20103	□T-20104			
	Test Site – MRT Shenzhen Laboratory							
	Laboratory Loca	tion (Shenzhen)						
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, Chir							
	Laboratory Accre	editations						
	A2LA: 3628.02		CNAS	S: L10551				
	FCC: CN1284		ISED:	CN0105				
	Test Site – MRT Taiwan Laboratory							
	Laboratory Location (Taiwan)							
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)							
	Laboratory Accreditations							
	TAF: L3261-19072	25						
	FCC: 291082, TW	√3261	ISED:	TW3261				



1.4. Product Information

D 1 (N	LAD 2		
Product Name	hAP ax ³		
Model No. C53UiG+5HPaxD2HPaxD-US			
Wi-Fi Specification	802.11a/b/g/n/ac/ax, VHT		
Hardware Version	r3		
Software Version	RouterOS v7		
Antenna Information Refer to section 1.7			
Working Voltage Range 12~28VDC (24VDC Nominal)			
Working Temperature 0 ~ 70°C			
Accessory			
Adapter Model: SAW36-240-1500U			
Input: 100-240V ~ 50/60Hz, 1.3A			
	Output: 24V, 1.5A		
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall			
be the responsibility of the ma	be the responsibility of the manufacturer.		

1.5. Antenna Details

Antenna	Frequency Band	Number of	Max Peak Gain	CDD Direction	DD Directional Gain (dBi)		
Туре	(MHz)	spatial streams	(dBi)	For Power	For PSD		
Wi-Fi Antenna	a (2*2 MIMO)						
	2412 ~ 2462	1	3.3	3.3	6.31		
Disala	5180 ~ 5240		5.5	5.5	8.51		
Dipole	5260 ~ 5320		5.5	5.5	8.51		
Antenna	Antenna 1 5500 ~ 5720	6.0	6.0	9.01			
	5745 ~ 5825		5.5	5.5	8.51		

Note: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

If all antennas have the same gain, G_{ANT} , Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

• For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log (N_{ANT}/N_{SS}) dB = 3.01;

• For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB for $N_{ANT} \le 4$;



1.6. Device Classification

According to the user manual, the antenna of this device is at least 37 cm away from the body of the user, this device is classified as a Mobile Device. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.



2. RF Exposure Evaluation

2.1. Test Limits

According to FCC Part 2.1091, A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons.

According to FCC Part 1.1307(b)(3)(i)(C), for the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)		
0.3-1.34	1.920 R ²		
1.34-30	3.450 R ² /f ²		
30-300	3.83 R ²		
300-1500	0.0128 R ² f		
1500-100,000	19.2 R ²		
f = frequency in MHz, R = minimum separation distance in meters.			

According to FCC Part 1.1307(b)(3)(ii)(B), in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$



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2.2. Test Result

Product	hAP ax ³
Test Item	RF Exposure Evaluation

Test	Frequency	Max.	Max.	Max. EIRP	Compliance	ERP	Threshold
Mode	Band	Conducted	Antenna	(dBm)	Distance (R)	(W)	ERP
	(MHz)	Power	Gain		(m)		(W)
		(dBm)	(dBi)				
802.11b/g/n/ax, VHT	2412 ~ 2462	28.72	3.3	32.02	0.37	0.9705	2.628
	5180 ~ 5240	28.78	5.5	34.28	0.37	1.6331	2.628
200 44 / /	5260 ~ 5320	22.88	5.5	28.38	0.37	0.4198	2.628
802.11a/n/ac/ax	5500 ~ 5720	23.67	6.0	29.67	0.37	0.5649	2.628
	5745 ~ 5825	28.65	5.5	34.15	0.37	1.5849	2.628

Note:

- 1. EIRP (dBm) = Max. Conducted Power (dBm) + Max. Antenna Gain (dBi)
- 2. ERP (W) = $10^{[ERP (dBm) 30)]/10}$ = $10^{[EIRP (dBm) 2.15 (dB) 30]/10}$
- 3. Threshold ERP (W) = $19.2 * R^2$ (W) = $19.2 * 0.37^2$ (W) = 2.628 (W)

The 2.4GHz WLAN and 5GHz WLAN can transmit simultaneously.

Exposure Ratio = 0.9705 / 2.772 + 1.6331 / 2.772 = 0.9905 < 1.

Therefore, this device meets the RF Exposure requirements when it is installed and operated with a minimum distance of 37cm between the radiator and user.