



RF Exposure Evaluation Declaration

FCC ID: TV7SXTS5AX
Applicant: Mikrotiks SIA
Product: SXTsq 5 ax, LHG 5 ax, LHG XL 5 ax
Model No.: SXTsq-5axD-US, LHG-5axD-US, LHG-5axD-XL-US
Brand Name: MikroTik
FCC Rule Part(s): FCC Part 2.1091
Result: Complies
Evaluation Date: 2025-01-10

Reviewed By:

Vincent Yu

Approved By:

Robin Wu



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 Date	Note
2408RSU034-U4	V01	Initial Report	2025-02-14	Valid

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1. General Information

1.1. Applicant

Mikrotikls SIA

Unijas iela 2, Riga, LV-1039 LATVIA

1.2. Manufacturer

Mikrotikls SIA

Unijas iela 2, Riga, LV-1039 LATVIA

1.3. Testing Facility

<input checked="" type="checkbox"/>	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, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China Laboratory Location (Suzhou - Wujiang) Building 1, No.1 Xingdong Road, Wujiang, Suzhou, Jiangsu, People's Republic of China Laboratory Accreditations A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001 VCCI: <input type="checkbox"/> R-20025 <input type="checkbox"/> G-20034 <input type="checkbox"/> C-20020 <input type="checkbox"/> T-20020 <input type="checkbox"/> R-20141 <input type="checkbox"/> G-20134 <input type="checkbox"/> C-20103 <input type="checkbox"/> T-20104
<input type="checkbox"/>	Test Site – MRT Shenzhen Laboratory Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China Laboratory Accreditations A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
<input type="checkbox"/>	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: 3261 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	SXTsq 5 ax, LHG 5 ax, LHG XL 5 ax
Model No.	SXTsq-5axD-US, LHG-5axD-US, LHG-5axD-XL-US
Brand Name	MikroTik
Wi-Fi Specification	802.11a/n/ac/ax
Antenna Specification	Refer to selection 1.5
Operating Temp.	-40 ~ 70°C
Operating Environment	Outdoor Use
Power Type	By PoE
Accessory	
Gigabit PoE	Input: 18-57V PIN 4, 5: 18-57V PIN 7, 8 Return
AC/DC Adapter	Model No.: MLF-A00122400380U0141 Input Power: 100 - 240V ~ 50/60Hz, Max. 0.4A Output Power: 24.0V, 0.38A
<p>Notes:</p> <ol style="list-style-type: none"> The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer. The three models have different housings and antennas, but the PCBs (including components mounted on the PCB, circuit design and PCB Layout, etc.) used are exactly the same. SXTsq-5axD-US uses the Directional antenna with the smallest antenna gain. Both LHG-5axD-US and LHG-5axD-XL-US use the Dish antenna, but the difference is that the sizes of Dish antennas are different, resulting in different gains, the antenna size of LHG-5axD-XL-US is larger and the antenna gain is the highest. 	

1.5. Antenna Details

Antenna Type	Frequency Range (MHz)	Tx Paths	Max. Ant Gain (dBi) (For Power)	Directional Gain (dBi) (For PSD)
For SXTsq-5axD-US				
Directional Antenna	5150 ~ 5250 5250 ~ 5350 5470 ~ 5725 5725 ~ 5850	2	16.0	19.01
For LHG-5axD-US				
Dish Antenna	5150 ~ 5250 5250 ~ 5350 5470 ~ 5725 5725 ~ 5850	2	24.0	27.01
For LHG-5axD-XL-US				
Dish Antenna	5150 ~ 5250 5250 ~ 5350 5470 ~ 5725 5725 ~ 5850	2	27.0	30.01
<p>Remark:</p> <ol style="list-style-type: none"> The antenna gain and directional gain refer to manufacturer's antenna specification. The device supports CDD Mode, details refer to the table as below. The directional gain as follows, For power measurements: Array Gain = 0 dB for $N_{ANT} \leq 4$, the directional gain = max antenna gain + array gain For power spectral density (PSD) measurements: Array Gain = $10 \cdot \log(N_{ANT}/N_{SS})$ dB, the directional gain = max antenna gain + array gain The maximum antenna gain of any elevation angle above 30 degrees is the same as the max. antenna gain. 				

1.6. Device Classification

According to the user manual, 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.

1.7. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01

2. RF Exposure Evaluation

2.1. Limits

According to FCC §1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
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 Exposures				
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.

2.2. MPE Exemptions

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

(Option A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

(Option B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P_{th}(mW) = \{ERP_{20cm}(d / 20cm)^x \quad d \leq 20cm$$

$$P_{th}(mW) = \{ERP_{20cm} \quad 20cm < d \leq 40cm$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm}\sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20cm}(mW) = \{2040f \quad 0.3GHz \leq f < 1.5GHz$$

$$ERP_{20cm}(mW) = \{3060 \quad 1.5GHz \leq f \leq 6GHz$$

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. 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 (1.64 linear value).

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	1920R ²
1.34-30	3450R ² /f ²
30-300	3.83R ²
300-1,500	0.0128R ² f
1,500-100,000	19.2R ²

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(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.

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

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P_{th} , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i .

ERP_j = the ERP of fixed, mobile, or portable RF source j .

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

$Exposure Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k , as applicable from §1.1310 of this chapter.

2.3. Calculated Result

Product	SXTsq 5 ax
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Antenna Gain (dBi)	Max. ERP (dBm)	Max. ERP (mW)
5GHz Wi-Fi	5180 ~ 5240	4.50	16.00	18.35	68.39
	5260 ~ 5320	13.76	16.00	27.61	576.77
	5500 ~ 5720	13.59	16.00	27.44	554.63
	5745 ~ 5825	19.90	16.00	33.75	2371.37

Notes:

1. The Max. Conducted Power extracts from module report (report No.: 2408RSU034-U2).
2. Max. ERP = Max. Conducted Power + Antenna Gain - 2.15.

For single RF source, Option B

Test Mode	Frequency Band (MHz)	$\lambda / 2 \pi$ (m)	R (m)	Max. ERP (mW)	Thresholds ERP (mW)
5GHz Wi-Fi	5180 ~ 5240	0.01	0.20	68.39	3060
	5260 ~ 5320	0.01	0.20	576.77	3060
	5500 ~ 5720	0.01	0.20	554.63	3060
	5745 ~ 5825	0.01	0.20	2371.37	3060

Note: R is from user manual.

Product	LHG 5 ax, LHG XL 5 ax
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Antenna Gain (dBi)	Max. ERP (dBm)	Max. ERP (mW)
5GHz Wi-Fi	5180 ~ 5240	-6.04	27.00	18.81	76.03
	5260 ~ 5320	2.52	27.00	27.37	545.76
	5500 ~ 5720	2.73	27.00	27.58	572.80
	5745 ~ 5825	8.86	27.00	33.71	2349.63

Notes:

1. The Max. Conducted Power extracts from module report (report No.: 2408RSU034-U2).
2. Max. ERP = Max. Conducted Power + Antenna Gain - 2.15.

For single RF source, Option B

Test Mode	Frequency Band (MHz)	$\lambda / 2 \pi$ (m)	R (m)	Max. ERP (mW)	Thresholds ERP (mW)
5GHz Wi-Fi	5180 ~ 5240	0.01	0.20	76.03	3060
	5260 ~ 5320	0.01	0.20	545.76	3060
	5500 ~ 5720	0.01	0.20	572.80	3060
	5745 ~ 5825	0.01	0.20	2349.63	3060

Note: R is from user manual.

CONCLUSION:

The device qualifies for RF exposure test exemption at 20cm distance.

The End