

The Mikrotik logo features a stylized, black, curved graphic element above the letter 'i' in 'Mikro'. The word 'Mikro' is written in a black, italicized, sans-serif font. The word 'Tik' is written in a bold, black, sans-serif font, with the 'T' and 'i' being significantly larger and more prominent than the 'k'.

MUM Armenia

October 2017

160 МУМ по всему миру



*Mikro***Tik**

- Established 1996
- RouterOS created in 1997
- RouterBOARD created in 2002
- First MUM event in Prague 2006
- MUM in Indonesia had 2500 people
- 34 events in 2016



The image shows a map of Europe with the country of Latvia highlighted in a bright green color. The Mikrotik logo, featuring a stylized 'M' with a crescent moon and star, is positioned above the word 'Mikrotik' in a bold, black, sans-serif font. The word 'LATVIA' is written in a large, black, sans-serif font across the center of the map, directly over the highlighted country. The map includes labels for various European countries such as Iceland, Norway, Sweden, Finland, Denmark, Poland, Germany, France, Spain, Portugal, and many others.

Mikrotik

LATVIA

Martins Kengis (sales)
Maris Bulans (support)
Sergejs Boginskis (support, training)



STAFF

Agenda

10:00	Presentations
12:00	Lunch with tickets
13:30	Presentations
16:00	Lottery
16:30	Beer and closing of MUM

mt.lv/agenda

WiFi

SSID: MUM_ARMENIA

Password: mikrotik

MUM Live

www.youtube.com/mikrotik

Special Thanks

Topaz-95

Новые продукты



1 Gbit
over wireless

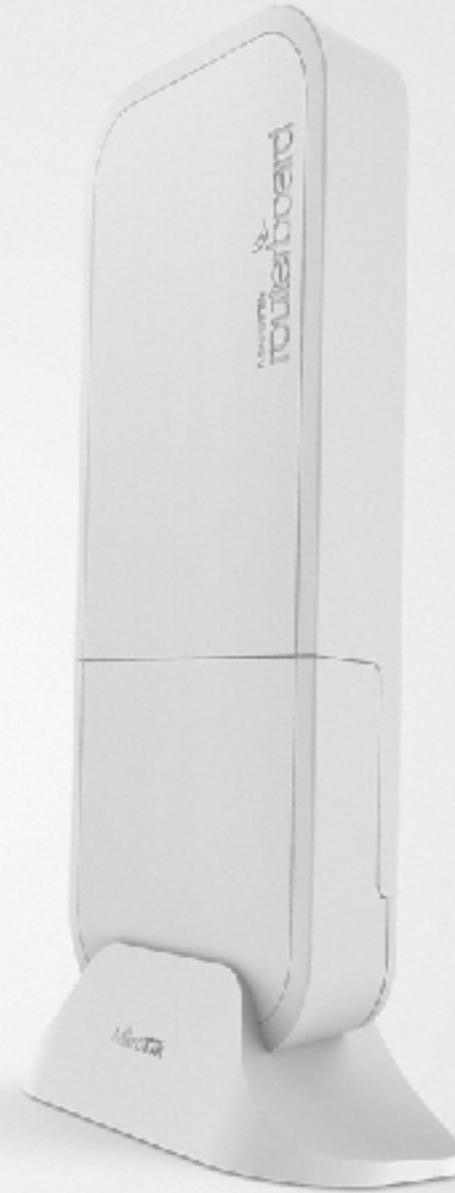
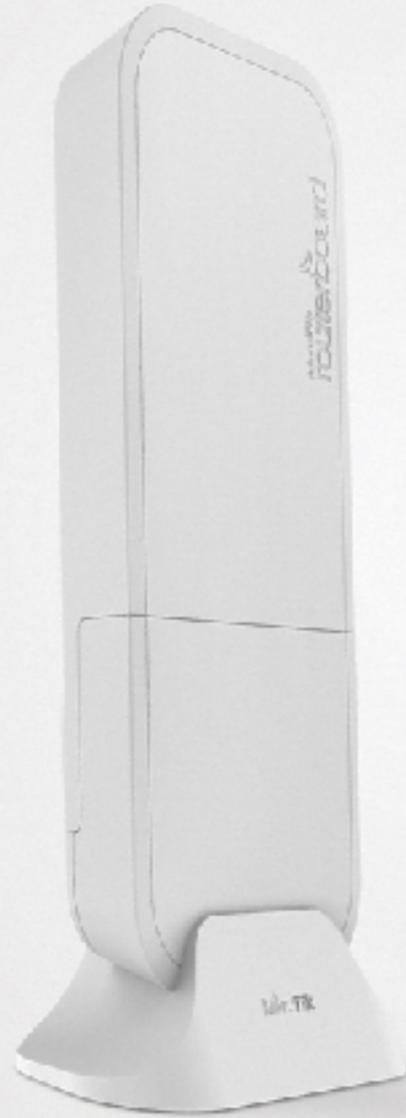
100m+
range

60GHz
radio

Gigabit
Ethernet

Paired
Secure Link
pre-configured

Powered by
IEEE 802.3af Passive
PoE, DC Jack



MikroTik

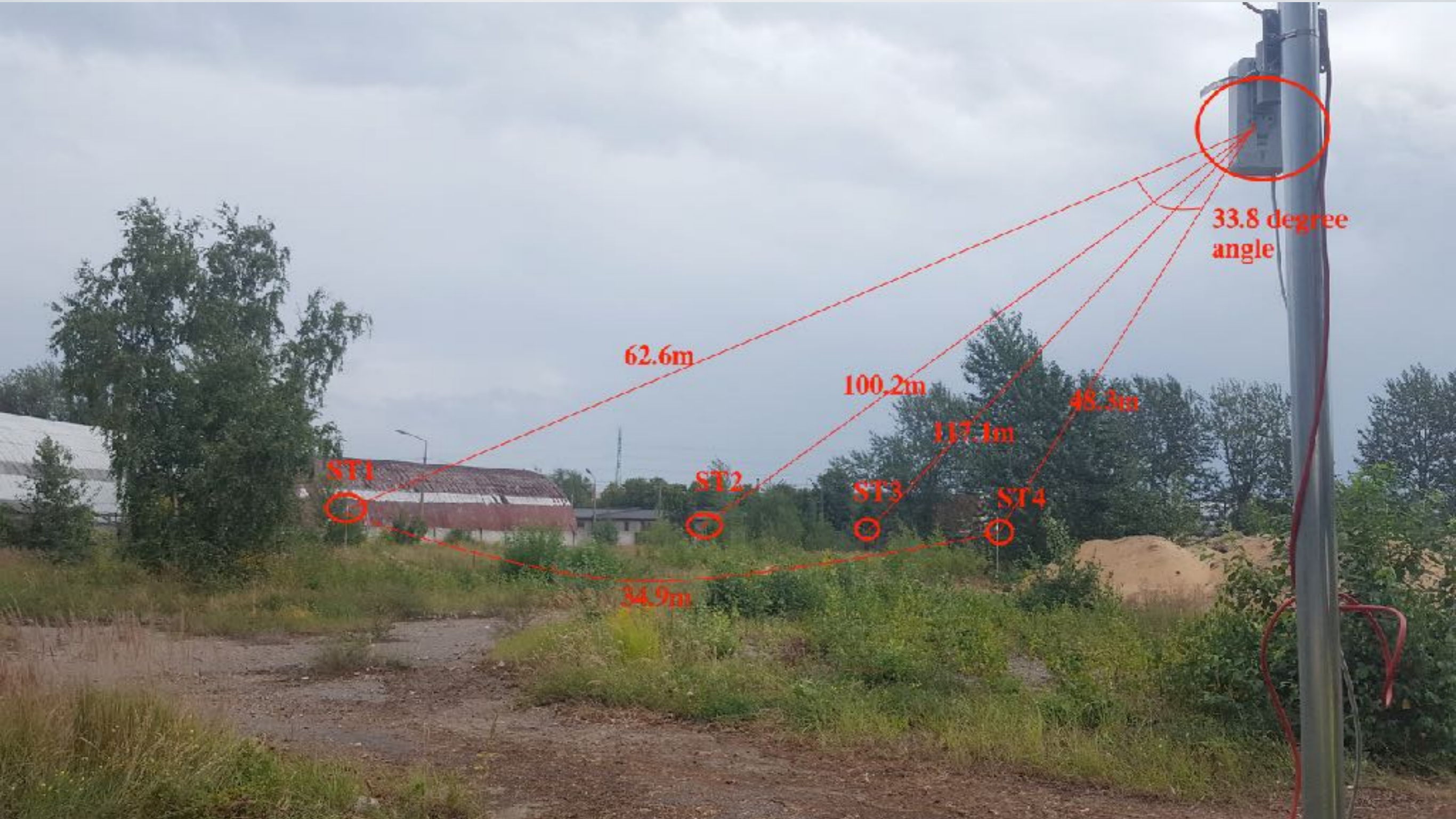
Wireless Wire

Wireless Wire

- 1 Gbps full duplex без проводов
- 100 метров
- 60 GHz beamforming
- Paired Secure Link Preconfigured
- \$198 комплект

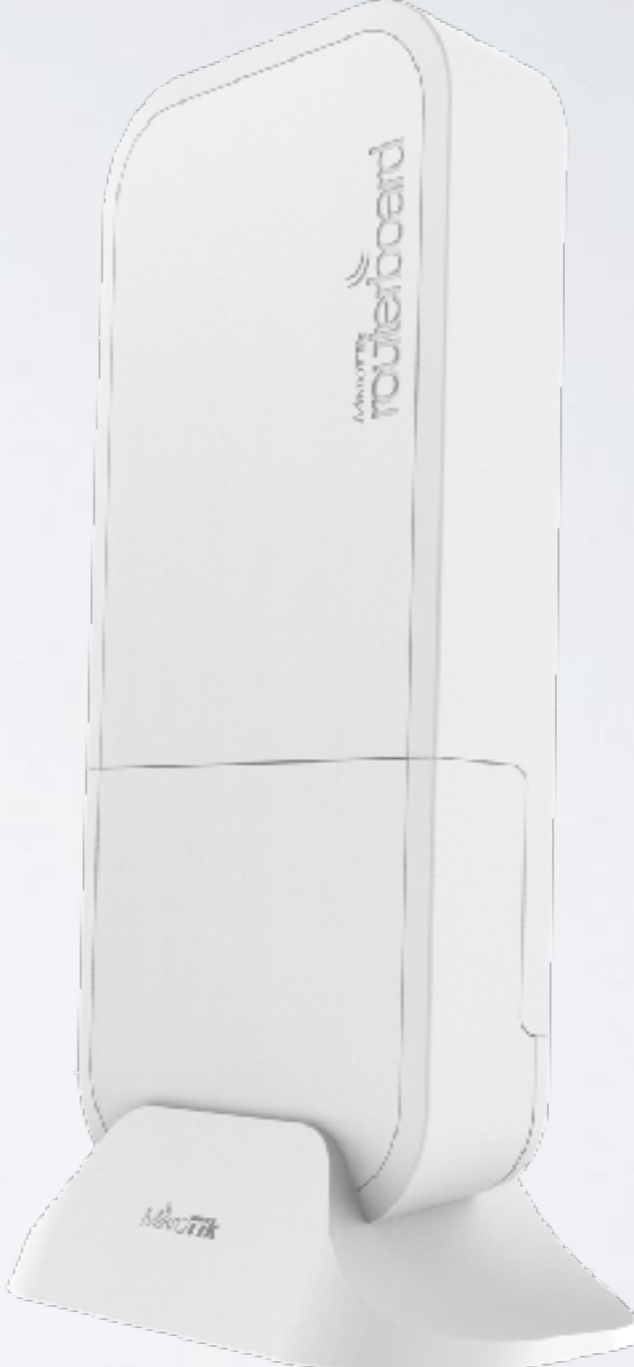
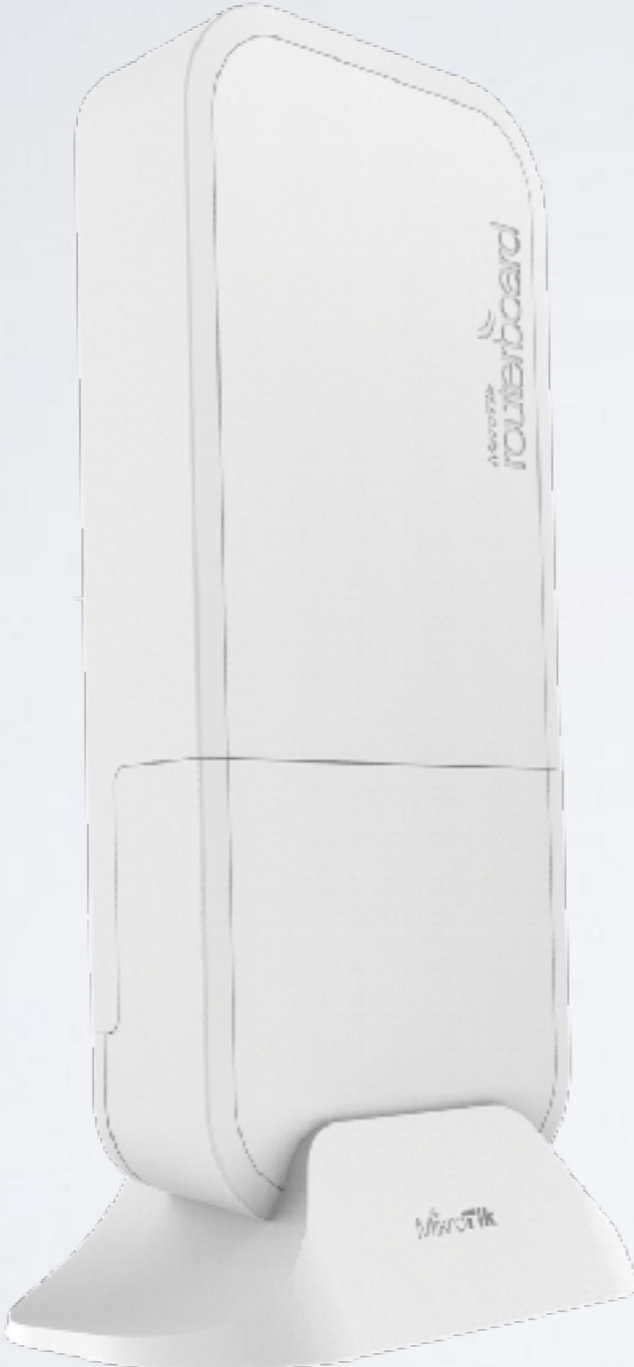


Wireless Wire



now

Wireless Wire Demo



LHG 60G

- 1 Gbit full duplex
- 60GHz спектр
- LHG дизайн
- Доступный и легкий
- Для 1 км+ дистанций

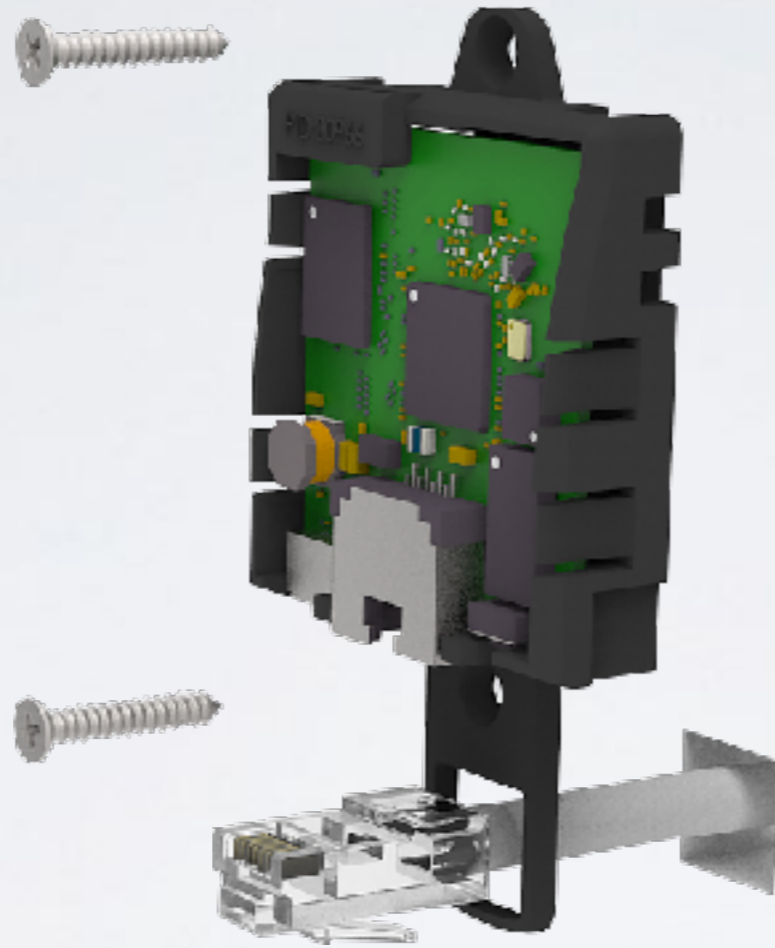


cAP lite

- Маленький 2.4 GHz AP
- Сменный корпус
- Распечатайте свой корпус
- Для отелей и других публичных мест для доступа Интернет

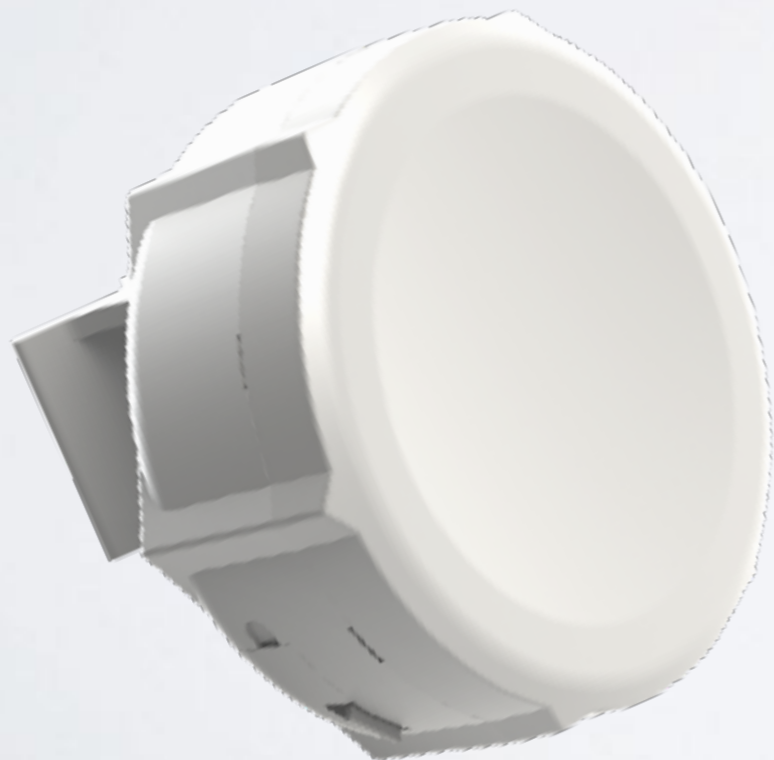






DynaDish 6 and SXT 6

- Для использования в более свободном 6GHz спектре
- Одинаковый дизайн

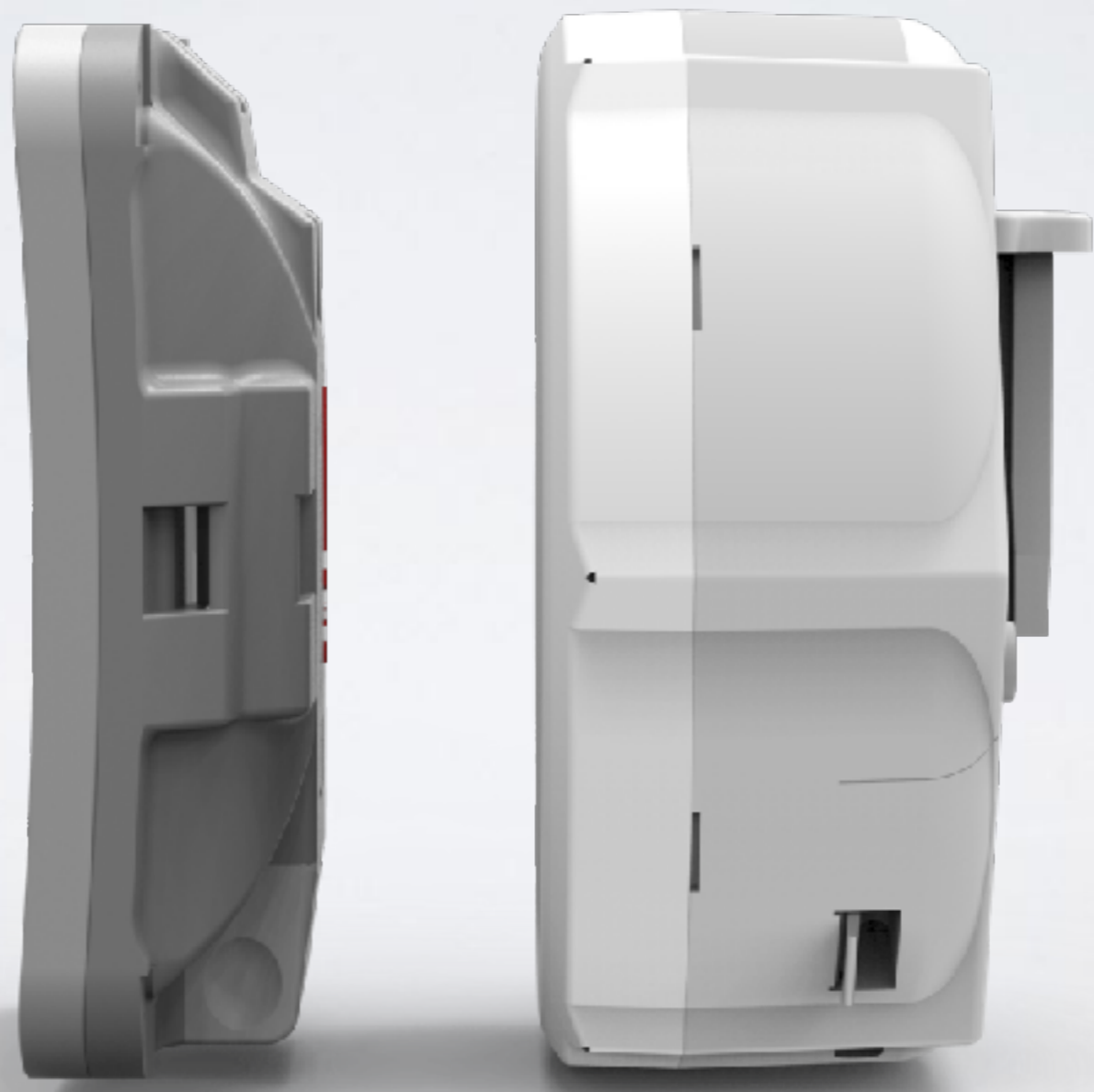


SXTsq Lite5

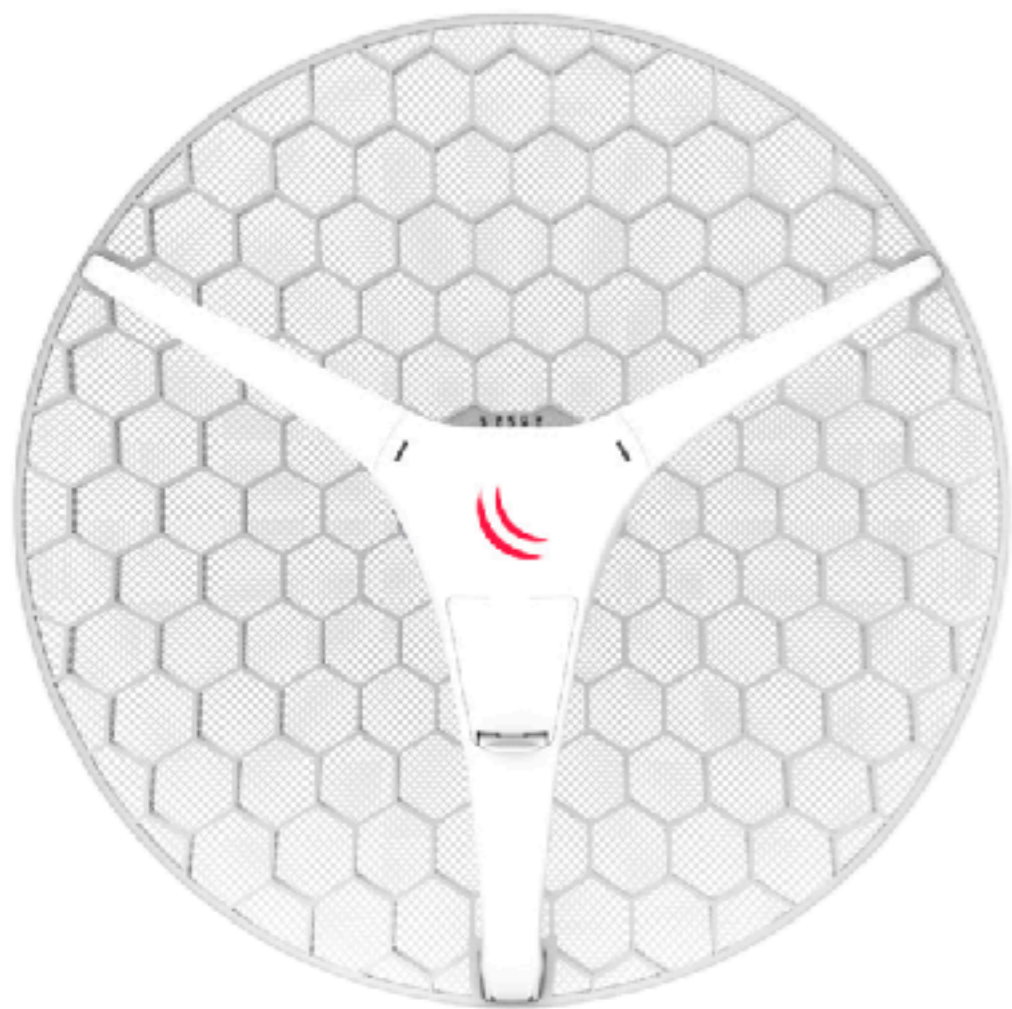
- Компактный и очень легкий
- В 2 раза тоньше
- 16dBi антенна
- Дистанция 12km
- Комплект \$46



SXTsq Lite5



Новый LHG!



LHG XL HP5



LHG HP5



LHG 5

LHG HP5

- 630mW
- Для дистанции 20km
- Тот же самый дизайн
- Доступный и легкий
- Цена комплекта \$69



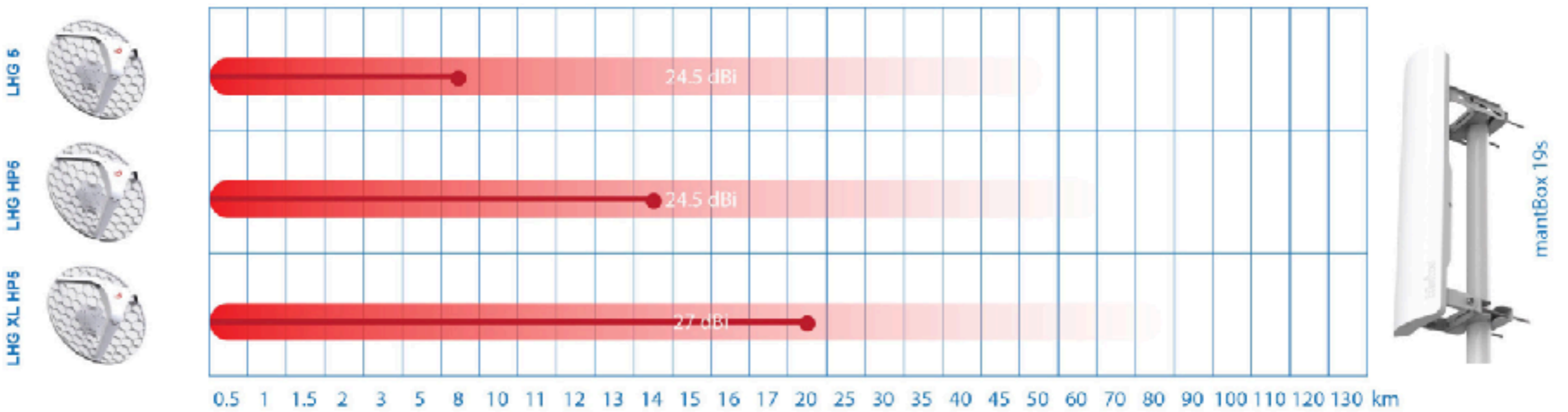
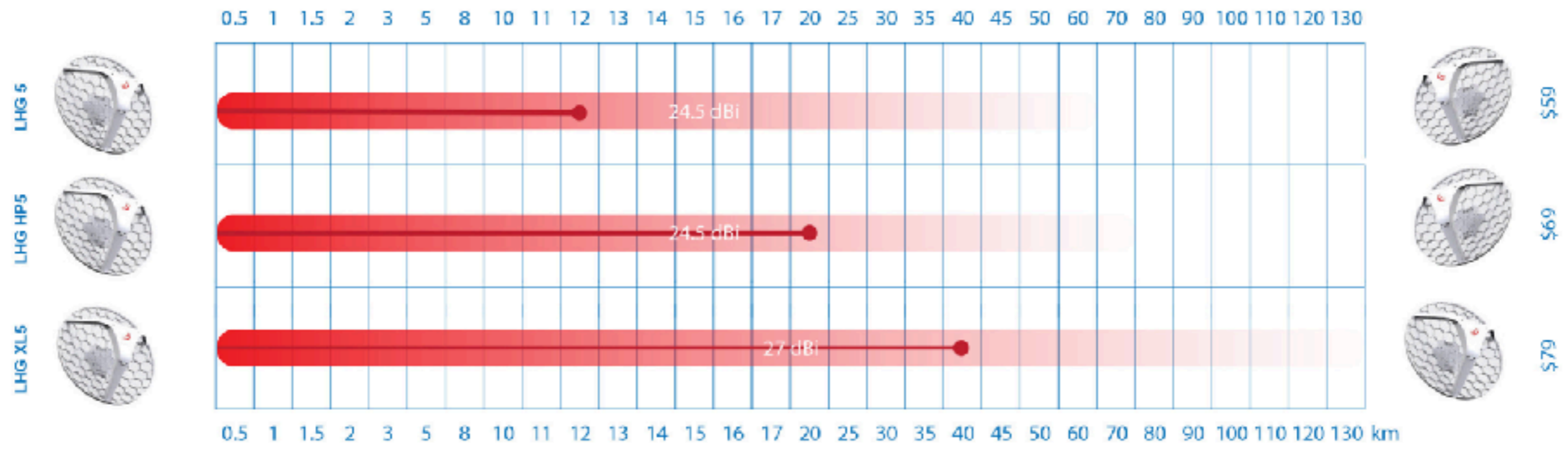
LHG XL HP5

- 630mW
- Для дистанции 40km
- 27 dBi антенна
- Цена комплекта \$79



Новый LHG!

Distance in Km



○ Distance at max supported 802.11a data rate (eg. 865Mbit/s) ● Distance at max supported 802.11n data rate (eg. 300Mbit/s) ■ Max range at -70dBm signal

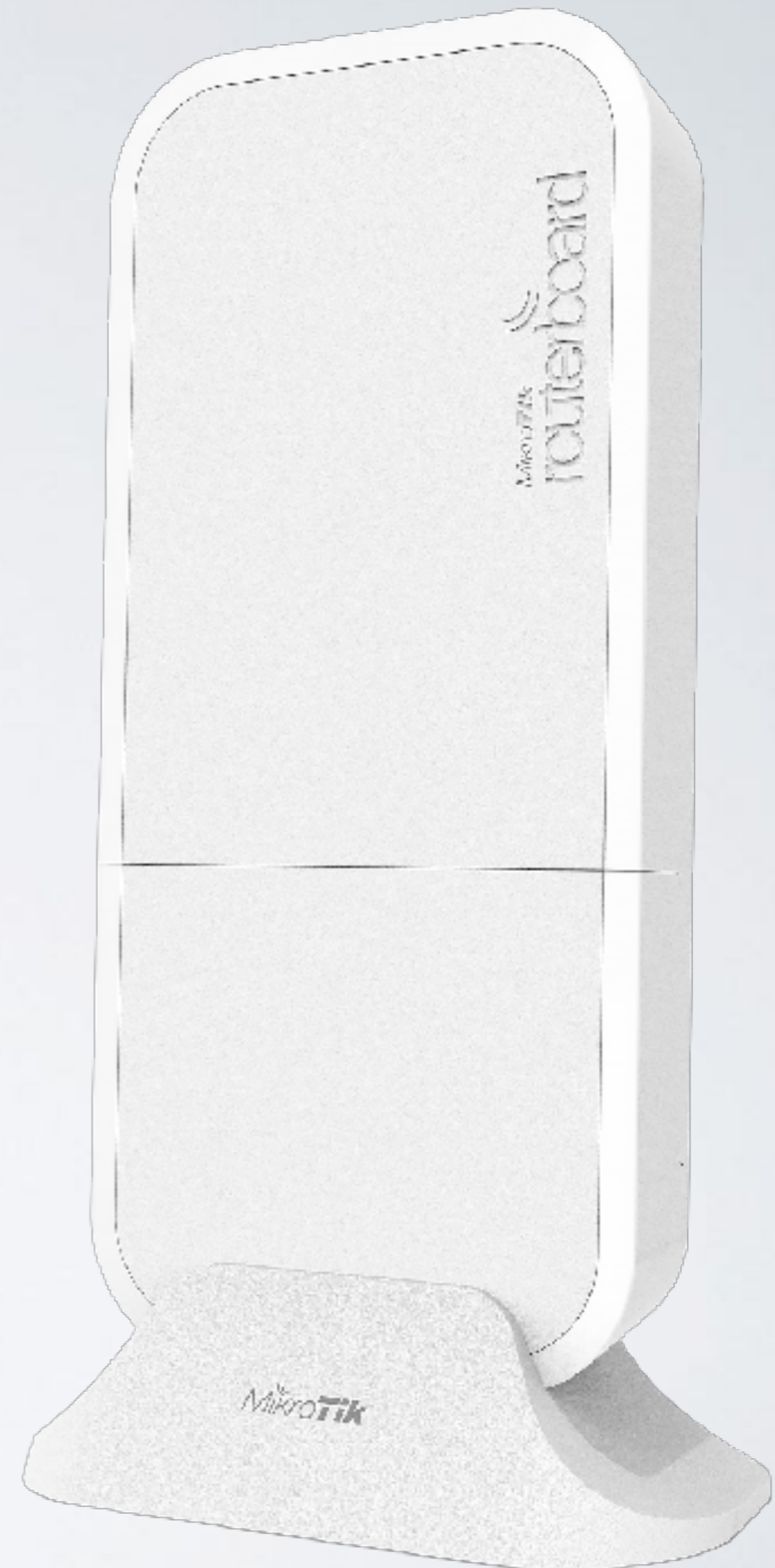
wAP R

- 2.4GHz точка доступа
- miniPCI-e слот для 3G/4G
- Питание по PoE, разъем питания, автомобильный коннектор
- Цена комплекта \$79



wAP LTE KIT

- 2.4GHz точка доступа
- LTE модем (2G, 3G and 4G)
- LTE 1, 2, 3, 7, 8, 20, 38 и 40
- Питание по PoE, разъем питания, автомобильный коннектор
- Цена комплекта \$119



LtAP mini

- 2.4GHz AP в прочном корпусе
- miniPCle для LTE
- Встроенный GPS
- Серийный порт
- Ethernet порт
- Для автомобилей и других мобильных приложений





LtAP

- 2x miniPCIe слота
- 2.4GHz AP
- MMIPS Mediatek 880MHz
- 2x MMCX коннектора
- 1 Gbps Ethernet порт
- Встроенный GPS





Woobm

- Wireless out of band management
- Подключите к устройству и конфигурируйте по беспроводному интерфейсу
- Серийный интерфейс через беспроводные сеть
- Цена \$16



mUPS

- Gigabit PoE инжектор
- Питание по адаптеру или PoE
- При подключенной батарее питает RouterBOARD
- \$29

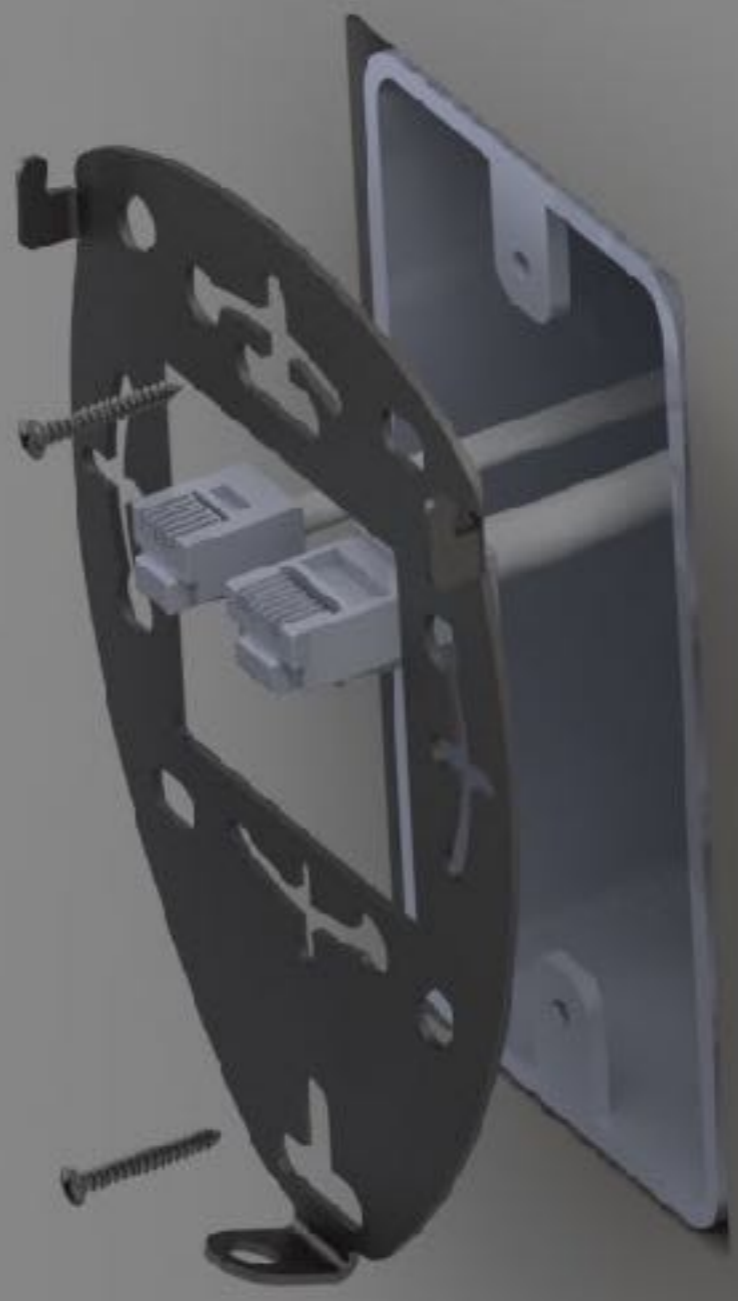


wsAP ac lite

- Встраиваемый в EU или US электрические розетки
- Dual band ac (2.4 и 5GHz)
- Телефонный bypass
- 2 LAN порта
- Полная поддержка USB2

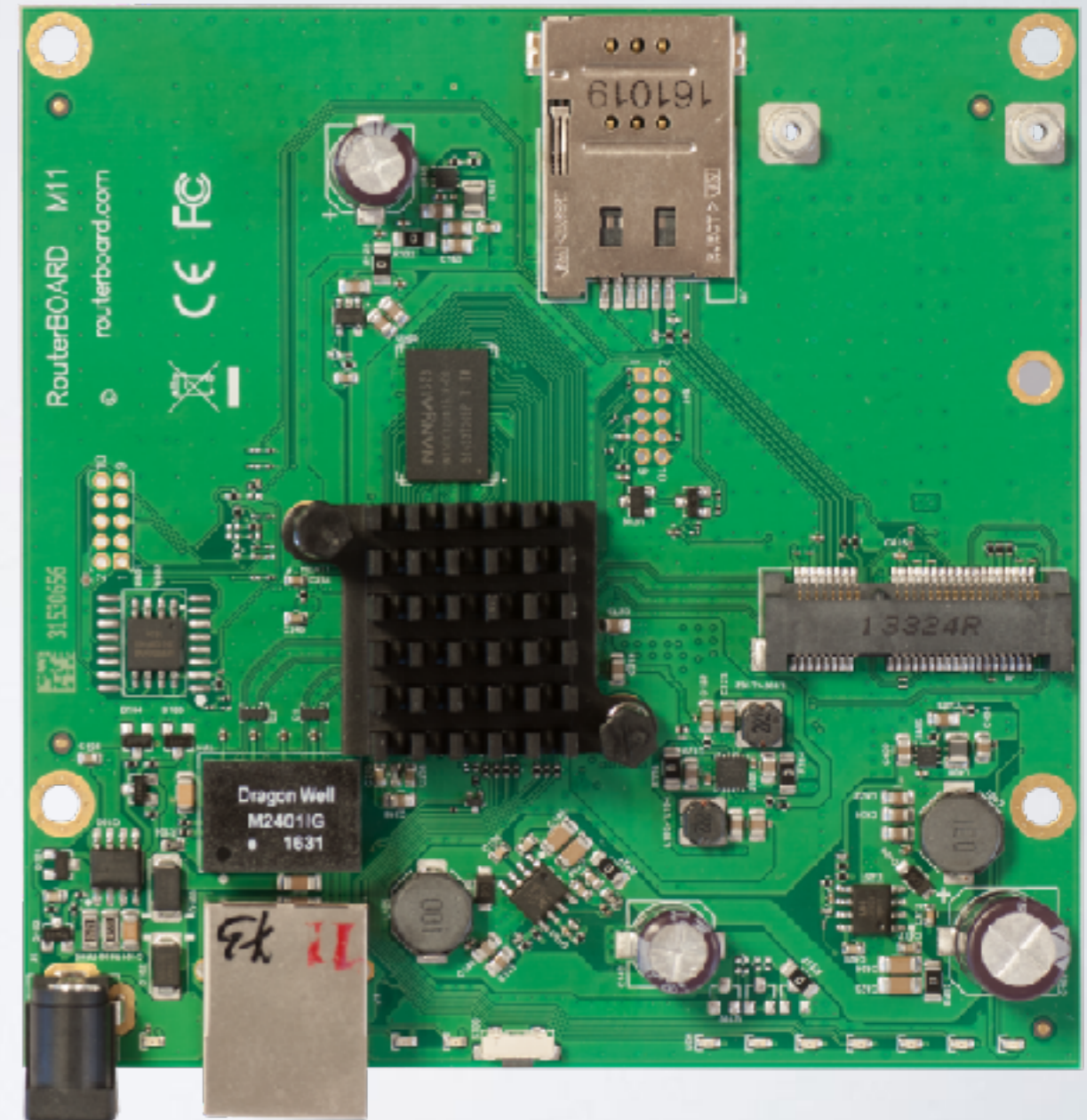






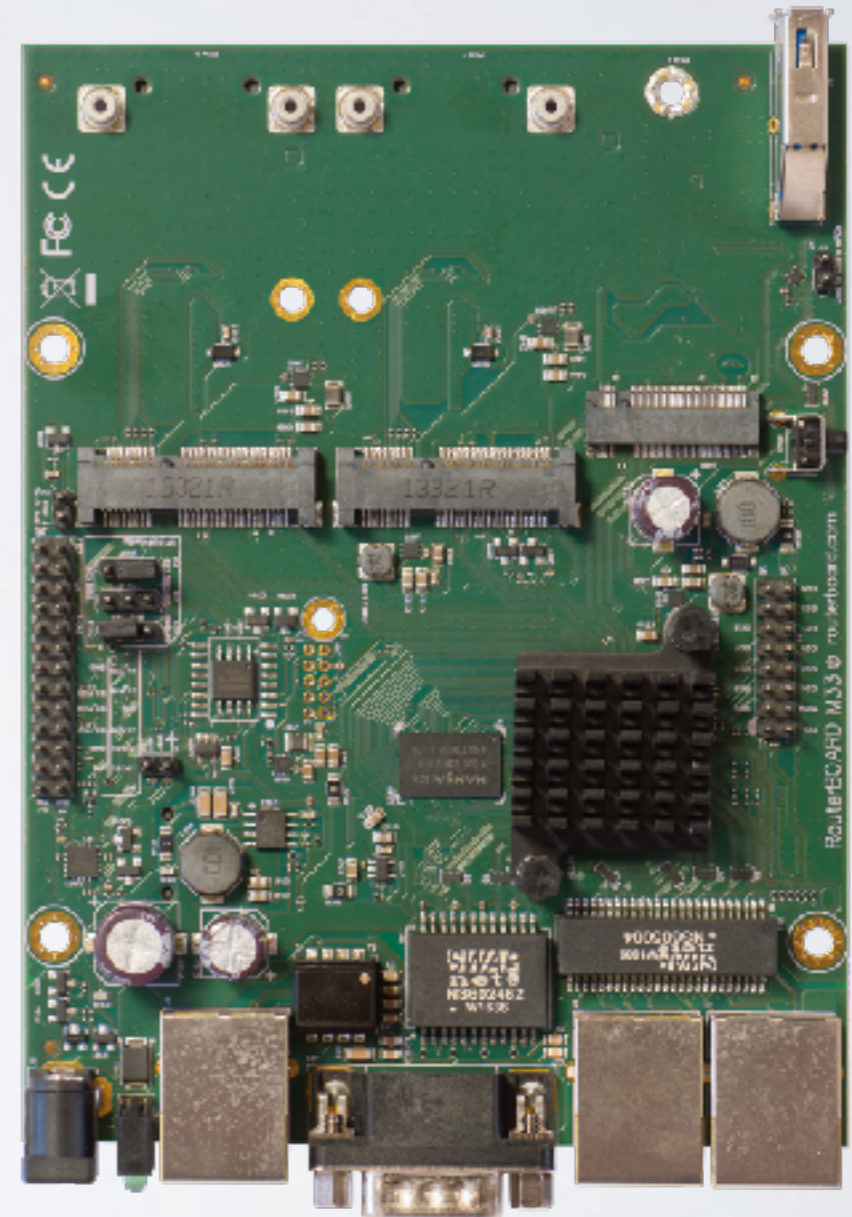
MIIG

- Четыре ядра 880MHz
- 1 miniPCle слот
- 1 Gigabit Ethernet
- Обновление для RB411
- \$39



M33

- Четыре ядра 880MHz
- 3 Gigabit Ethernet
- 2 miniPCIe слота
- 1 M.2 слот
- USB 3.0 и serial port
- Обновление для RB433



S+RJ10

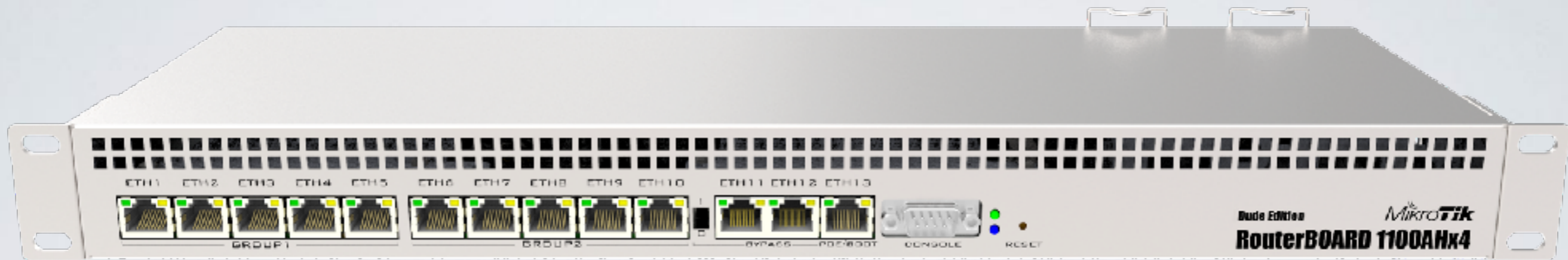
- SFP+ to Ethernet
- 6-скоростной (10/100/1G/
2.5G/5G/10G)
- 2.4W
- Работает со всеми SFP+
- \$65



PW48V

- Hot Swap -48 и +48 V DC telecom блок питания
- Для CCRI072
- \$100

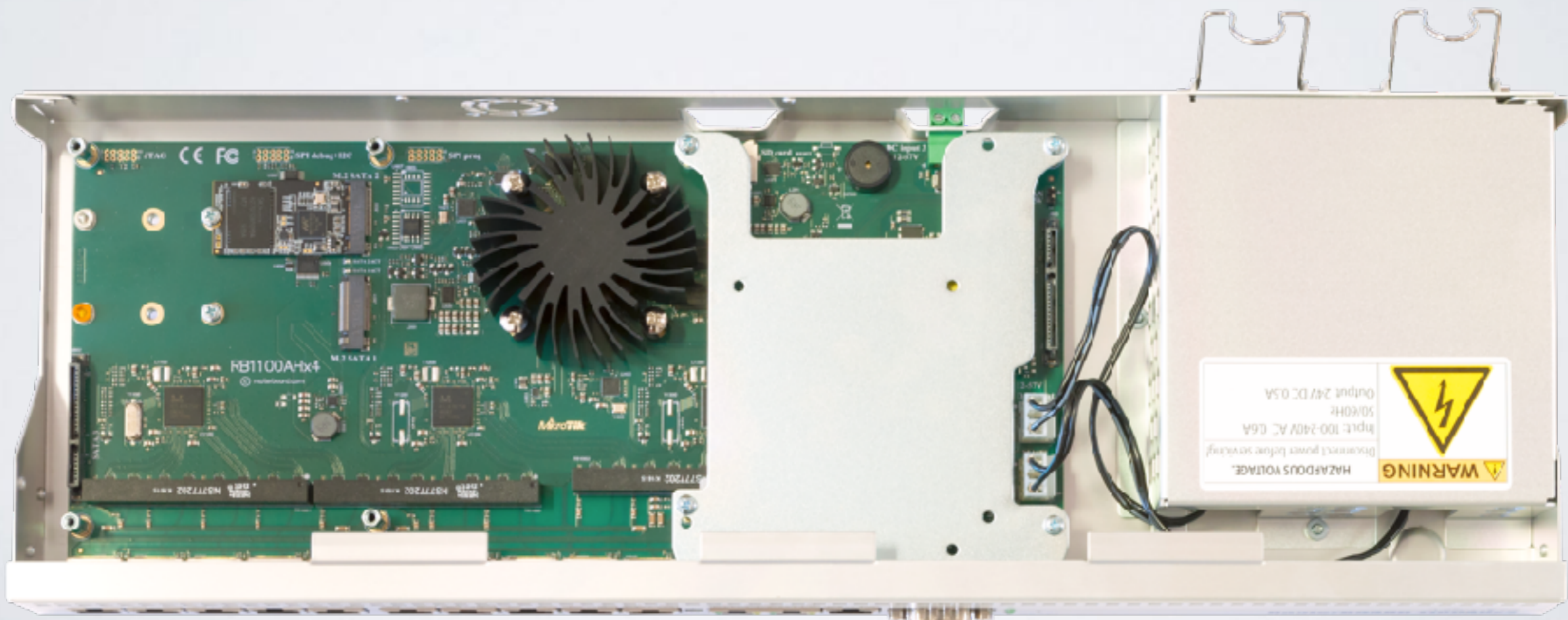




RB 1100AHx4

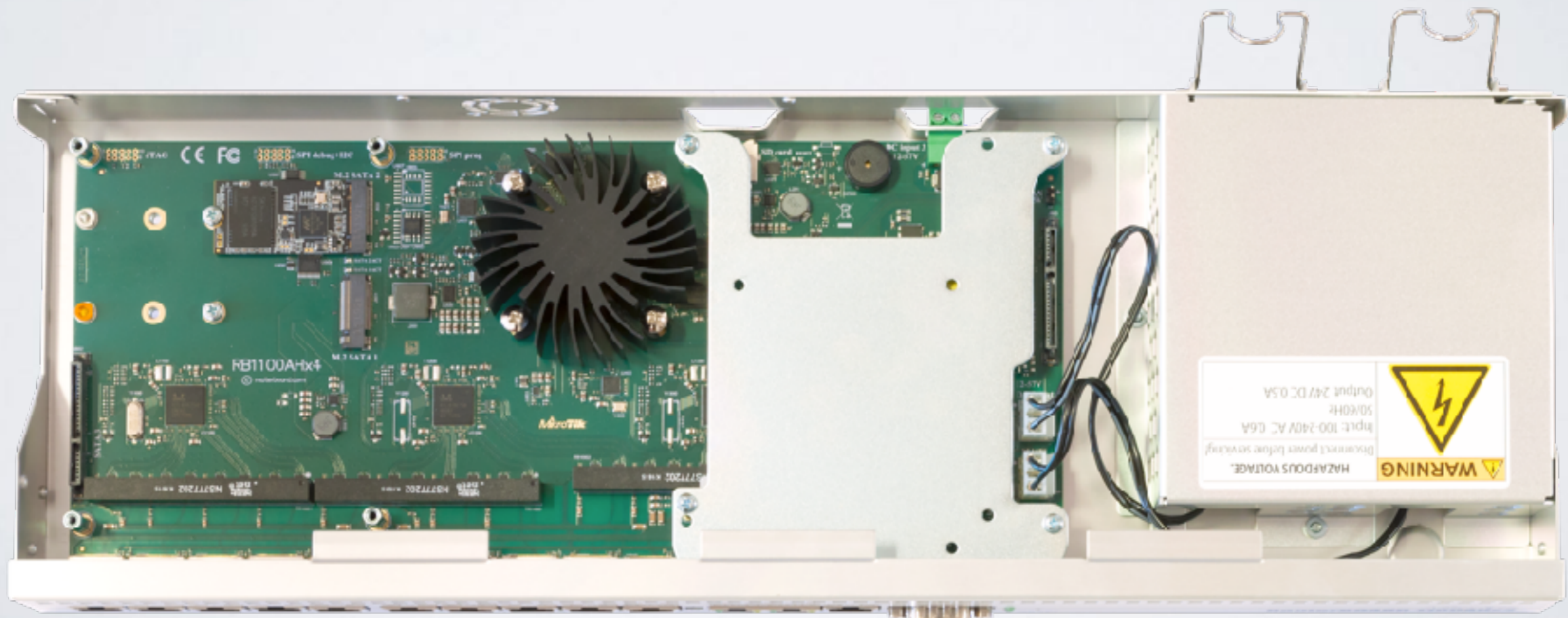
“Классика” стала еще лучше с 4-х ядерным процессором

4 ядерный ARM процессор



4 ядерный ARM процессор

- 2 SATA3 порта



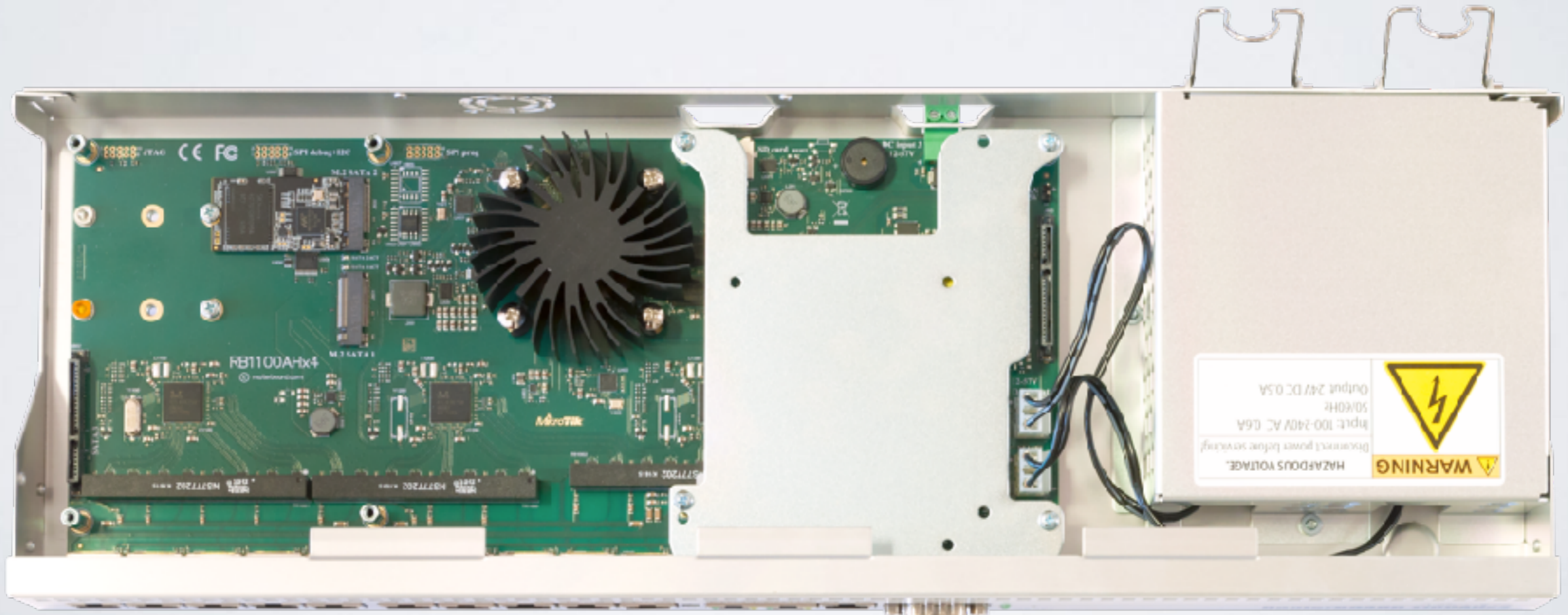
4 ядерный ARM процессор

- 2 SATA3 порта
- 2 M.2 порта



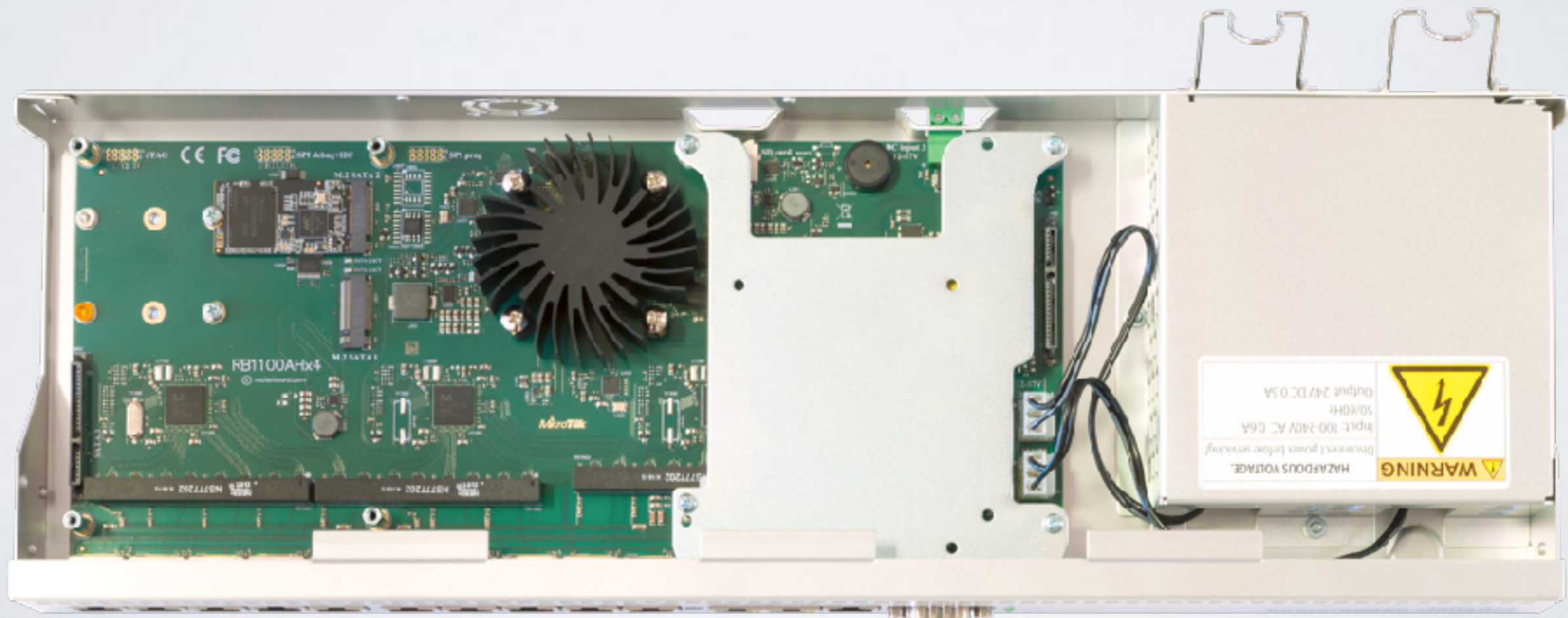
4 ядерный ARM процессор

- 2 SATA3 порта
- 2 M.2 порта
- 60GB SSD включен



4 ядерный ARM процессор

- 2 SATA3 порта
- 2 M.2 порта
- 60GB SSD включен
- Поддержка hardware IPsec



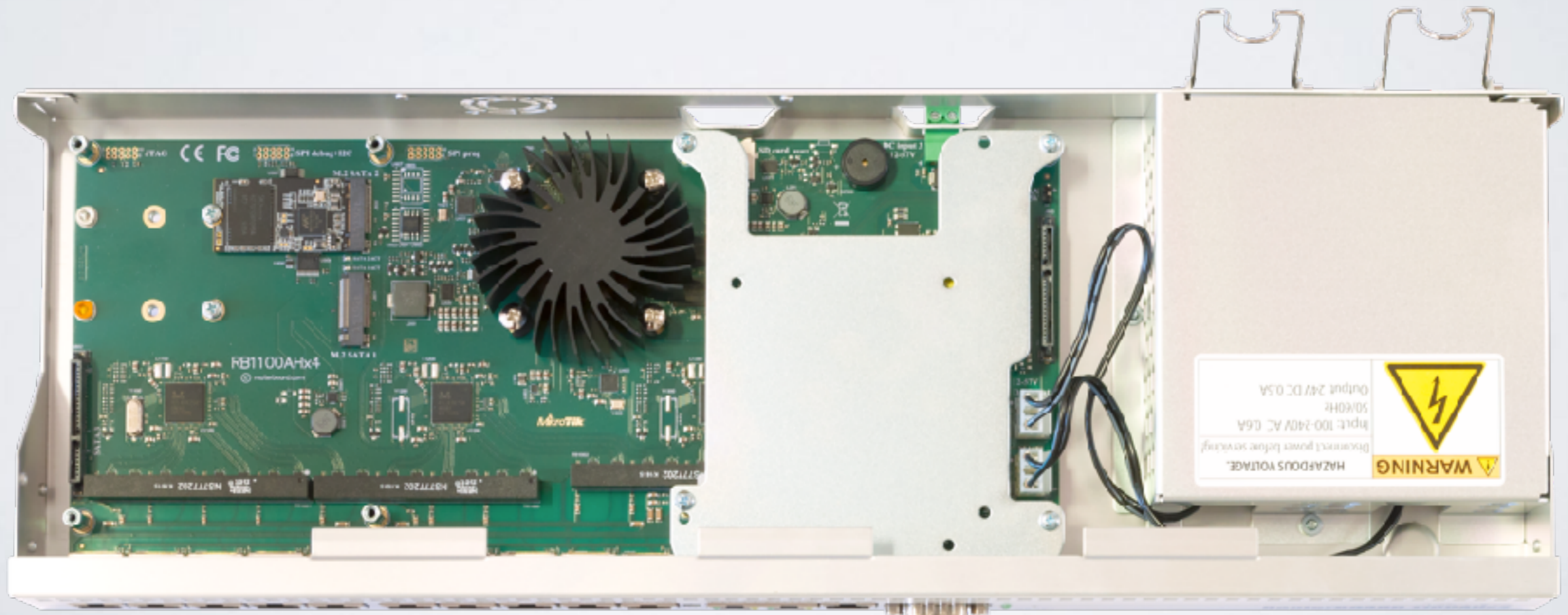
4 ядерный ARM процессор

- 2 SATA3 порта
- 2 M.2 порта
- 60GB SSD включен
- Поддержка hardware IPsec
- -48V DC



4 ядерный ARM процессор

- 2 SATA3 порта
- 2 M.2 порта
- 60GB SSD включен
- Поддержка hardware IPsec
- -48V DC
- Двойной блок питания





- 5.5 миллионов PPS
- 7.5Gbps
- IPsec до 2.2Gbps с AES 128
- Overclock до 2GHz

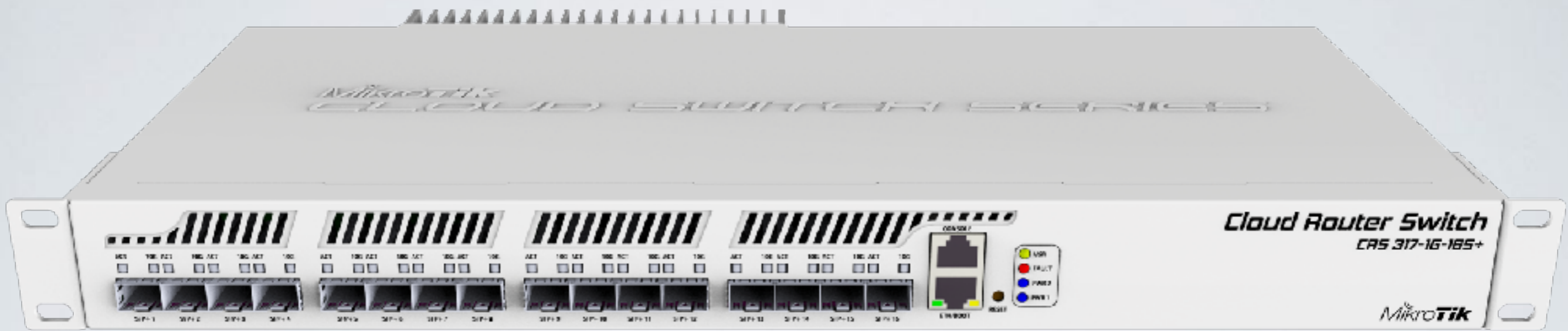
2 выпуска

- **RB I 100AHx4 - \$299**
- **RB I 100AHx4 Dude edition**
включает 2x M.2 и 2x SATA3 - **\$349**

FiberBox

- Погодоустойчивый корпус
- 5 SFP портов
- RJ45 SFP (S-RJ01) включен
- \$79





CRS317-1G-16S+

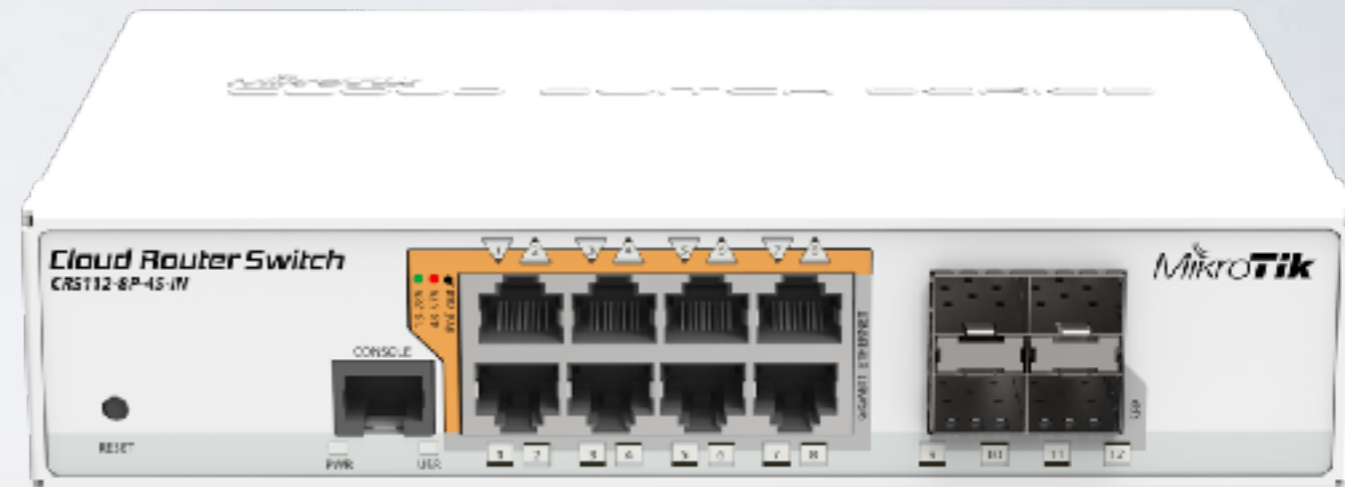
Очень мощный SFP+ свитч

CRS317-1G-16S+

- 16 SFP+ портов
- Проводная скорость для 10GbE портов
- Hardware-based Spanning Tree Protocol
- SwOS или RouterOS

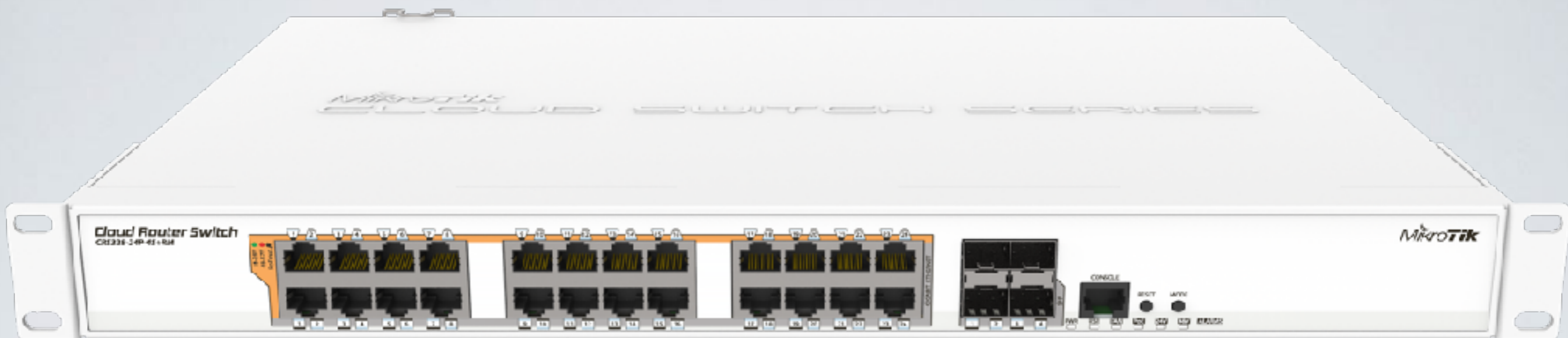
CRS112-8P-4S

- PoE out 802.3af/at
- 8 Gigabit портов
- 4 SFP порта
- Отдельный блок питания для пассивного или 802.3af/at
- Автодетекция используемого PoE стандарта



CRS328-24P-4S+RM

PoE out свитч 28 портов!



CRS328-24P-4S+RM

PoE out свитч 28 портов!

CRS328-24P-4S+RM

- SwOS или RouterOS
- 24 ports с PoE out функцией
- Поддерживает 802.3af/at
- Авто-детекция PoE стандарта
- 4 SFP+ порта для 10GbE
- Один 120/220V IEC для питания

Все продукты

- Бесплатное пожизненное обновление лицензии
- Одна RouterOS версия
- Подробная информация
<https://mikrotik.com/products>

ROUTEROS ФУНКЦИИ

CHR

Cloud Hosted Router

- RouterOS для виртуальных машин
- Работает на VMware, VirtualBox, HyperV, KVM, XenServer, etc.
- На облачных сервисах - Amazon, Azure и других
- CHR доступен как OVA (Open Virtual Appliance)

CHR

Лицензирование

Лицензия	Скорость	Цена
Бесплатная	1 Mbit	Бесплатно
P1	1 Gbit	US\$45
P10	10Gbit	US\$95
P-Unlimited	Неограничено	US\$250

- 60 дневная тестовая версия
- Лицензии переносятся

CHR

Лицензирование

1

Licence

System ID: 6R1ZP/utuJ

Level: free

Next Renewal At:

Deadline At:

Limited Upgrades

OK

Generate New ID

Renew Licence

Renew Licence

Account: mymikrotikcomaccount

Password: *****

Level: P1

Start

Stop

Close

done

2

Licence

System ID: 6R1ZP/utuJ

Level: P1

Next Renewal At: Jan/10/2016 21:59:59

Deadline At: Feb/09/2016 21:59:59

Limited Upgrades

OK

Generate New ID

Renew Licence

WinBox → System → License

CHR

Лицензирование

3

The screenshot shows the MikroTik client account interface. At the top, the MikroTik logo is on the left, and navigation links for Home, Buy, About, Jobs, Hardware, Software, Support, Training, and Account are on the right. The 'Account' link is circled in red. Below the navigation bar is a blue header with 'My account' on the left and 'Log out MikroTik' on the right. A 'Toggle menu' icon is on the left side. The main content area is divided into two columns. The left column contains sections for 'ACCOUNT INFORMATION', 'WEB ORDERS', 'ROUTEROS KEYS', and 'CHR LICENCES'. The 'CHR LICENCES' section is highlighted with a red rounded rectangle. The right column displays a 'Welcome, MikroTik!' message, 'Account notices' (with a notification about 5 prepaid license keys), and 'Visit upcoming MUM events!' with a list of events including Indonesia in Yogyakarta, Brazil in Maceio, Uruguay in Montevideo, and South Africa in Cape Town. A red arrow points from the 'CHR LICENCES' section to the 'Account notices' notification box.

Account

My account Log out MikroTik

≡ Toggle menu

ACCOUNT INFORMATION
Home
Balance
Edit account details
MUM registration history
Hardware orders

WEB ORDERS
Your orders and invoices
Purchase a RouterOS license key

ROUTEROS KEYS
Search and view all keys
Request key from another account
Transfer prepaid keys (21)
Make a demo key
Make a key from prepaid key (21)

CHR LICENCES
All CHR keys
CHR orders and invoices
Transfer CHR prepaid keys

Welcome, MikroTik!

Account notices

Prepaid keys: You have 5 prepaid license keys available

Visit upcoming MUM events!

- Indonesia in Yogyakarta, Oct 27 - 28
- Brazil in Maceio, Alagoas, Nov 9 - 10
- Uruguay in Montevideo, Nov 13
- South Africa in Cape Town, Nov 24

mikrotik.com/client

CHR

Лицензирование

4

User keys

Show entries

10

Search

System ID	Issued	Expires	Level	Transfer	Action	Status	Note
vmxAucZ7VtK	2016-05-31	---	P1-Perpetual	Transfer	Upgrade	🚩	📄
OMaZwuXjj4N	2016-04-04	---	P10-Perpetual	Transfer	Upgrade	🚩	📄
Cm8ATgygn2H	2017-09-13	---	P-Unlimited	Transfer		🚩	📄
+OfzKswA4TC	2017-08-24	---	P10-Perpetual	Transfer	Upgrade	🚩	📄
4Mc+U51oLoN	2016-06-10	---	P1-Perpetual	Transfer	Upgrade	🚩	📄
10971UBIKZK	2015-12-28	---	P1-Perpetual	Transfer	Upgrade	🚩	📄
JPyotBTRsJK	2015-12-09	---	P10-Perpetual	Transfer	Upgrade	🚩	📄

mikrotik.com/client/cloudhosting

CHR

Лицензирование

5

Upgrade system license

System ID

AuykNnBPF/E

Level

P1-Perpetual (\$ 45.00)

 Upgrade key

1Gbit per interface (\$45 one time payment)

You have following prepaid balance keys available to purchase a CHR license:

- P1-Perpetual - 5 keys

mikrotik.com/client/cloudhosting

CHR

Лицензирование

6

Payment i

You have selected	System ID
P1-Perpetual	AuykNnBPF/E
Total price: \$54.45	

Pay using deposit (left: \$100)

Pay using CC

Pay using PayPal

Pay using Balance key (5)

Note: Price includes VAT 21% because you have specified EU country as your residence. To avoid this you have to enter your VAT registration number in your account settings.

mikrotik.com/client/cloudhosting

RouterOS changelog

- 6.40 - 161 запись
- 6.40.1 - 14 записей
- 6.40.2 - 10 записей
- 6.40.3 - 28 записей
- 6.40.4 - 33 записей
- 246 записей!

LTE passthrough

- Bridge LTE на следующее устройство
- IPv4/IPv6 на следующее устройство
- На LTE конфигурируются установки модема
- Работает только на одно устройство
- Поддерживаются конкретные модемы

Bridge функции

- MSTP поддержка
- IGMP snooping на CRS и других устройствах
- Hardware offload на CRS

TR069 клиент

- RouterOS data модель базирована TR-181 Issue 2 Amendment 11
- Работает с AVSystem, Axiros, Friendly Tech, GenieACS
- Инсталируется отдельным пакетом
- Рекомендуется <https://github.com/voicelabs/routeros-tr069-client>

IPSec результаты

IPsec test results

RB750Gr3		RB750Gr3 IPsec throughput					
Mode	Configuration	1400 byte		512 byte		64 byte	
		kpps	Mbps	kpps	Mbps	kpps	Mbps
Single tunnel	AES-128-CBC + SHA1	42.6	477.1	56.9	233.1	55.2	28.3
256 tunnels	AES-128-CBC + SHA1	42.9	480.5	49.5	202.8	51.3	26.3
256 tunnels	AES-128-CBC + SHA256	42.9	480.5	49.5	202.8	51.3	26.3
256 tunnels	AES-256-CBC + SHA1	32.0	358.4	49.1	201.1	49.2	25.2
256 tunnels	AES-256-CBC + SHA256	32.0	358.4	49.1	201.1	49.2	25.2

1. All tests are done with Xena Networks specialized test equipment (XenaBay), and done according to RFC2544 (Xena2544)
2. Max throughput is determined with 30+ second attempts with 0,1% packet loss tolerance in 64, 512, 1400 byte packet sizes
3. Test results show device maximum performance, and are reached using mentioned hardware and software configuration, different configurations most likely will result in lower results

Wireless link calculator

The screenshot displays a web-based wireless link calculator interface. The browser address bar shows 'mikrotik.com'. The interface is divided into several sections:

- Specifications and results:** A sidebar on the left containing input fields for:
 - Frequency: 5 GHz
 - Desired data rate: 1300 Mbps
 - Tx device: DISC Lite5
 - Rx device: A dropdown menu is open, listing various antenna models such as BaseBox 2, BaseBox 5, DISC Lite5, DynaDish 5, DynaDish 6, Groove 52, Groove 52 ac, GrooveA 52, GrooveA 52 ac, LDF 5, LHG 6, LHG HP5, LHG XL HP5, Metal 2, Metal 6, Metal 52 ac, Metal 9, NetBox 5, NetMetal 5, NetMetal 5, NetMetal 5, NetMetal 5, OmniTIK 5, OmniTIK 5 PoE, OmniTIK 5 PoE ac, OmniTIK 5 ac, QRT 2, and QRT 5.
 - Tx Gain (dBi): 21
 - RX Sensitivity (dBm): [Empty field]
 - Output Power (dBm): [Empty field]
- Results:** Located at the bottom of the sidebar, it displays:
 - Distance: 16.0 Km (9.94 miles)
 - Free Space Path Loss:
 - Theoretical signal level at TX:
 - Theoretical signal level at RX:
 - Link status:
- Map:** A map of Latvia showing a red line connecting a Tx (Transmitter) location near Rīga to an Rx (Receiver) location near Ādaži. A terrain profile graph is overlaid on the map, showing elevation in meters (0 to 20) along the path. Other locations visible on the map include Sigulda, Vangaži, Ropāži, Jugla, Ķekava, Ogre, Olaine, and Daugavpils sala.

DETNET

- Функция детекции типа интерфейсов

```
[[sergejs@3B12_SergejsGW_CCR1036] > interface detect-internet state print
```

#	NAME	STATE
0	sfp1	no-link
1	ether1	no-link
2	ether2	no-link
3	ether3	no-link
4	ether4	no-link
5	ether5	lan
6	ether6	lan
7	ether7	lan
8	ether8	internet
9	bridge1	lan

```
[[sergejs@3B12_SergejsGW_CCR1036] > █
```

Нужна помощь?

- Просите у локального **distributor**
- Официальная документация
wiki.mikrotik.com
- MikroTik **support@mikrotik.com**
- Наймите **консультанта**
- Посетите курсы обучения!

После MUM

- Все презентации - mum.mikrotik.com
- Видео - youtube.com/mikrotik
- Лицензия придет по e-майл

The logo for MikroTik, featuring the word "MikroTik" in a stylized, italicized font. The "i" in "Mikro" has a unique graphic element above it consisting of three curved lines. The "T" in "Tik" is bold and blocky. The entire logo is rendered in a dark gray color and is reflected on a light gray surface below it.

MikroTik