CELLULAR ROUTER FOR REMOTE POWER QUALITY MONITORING

AGENDA

Introduction

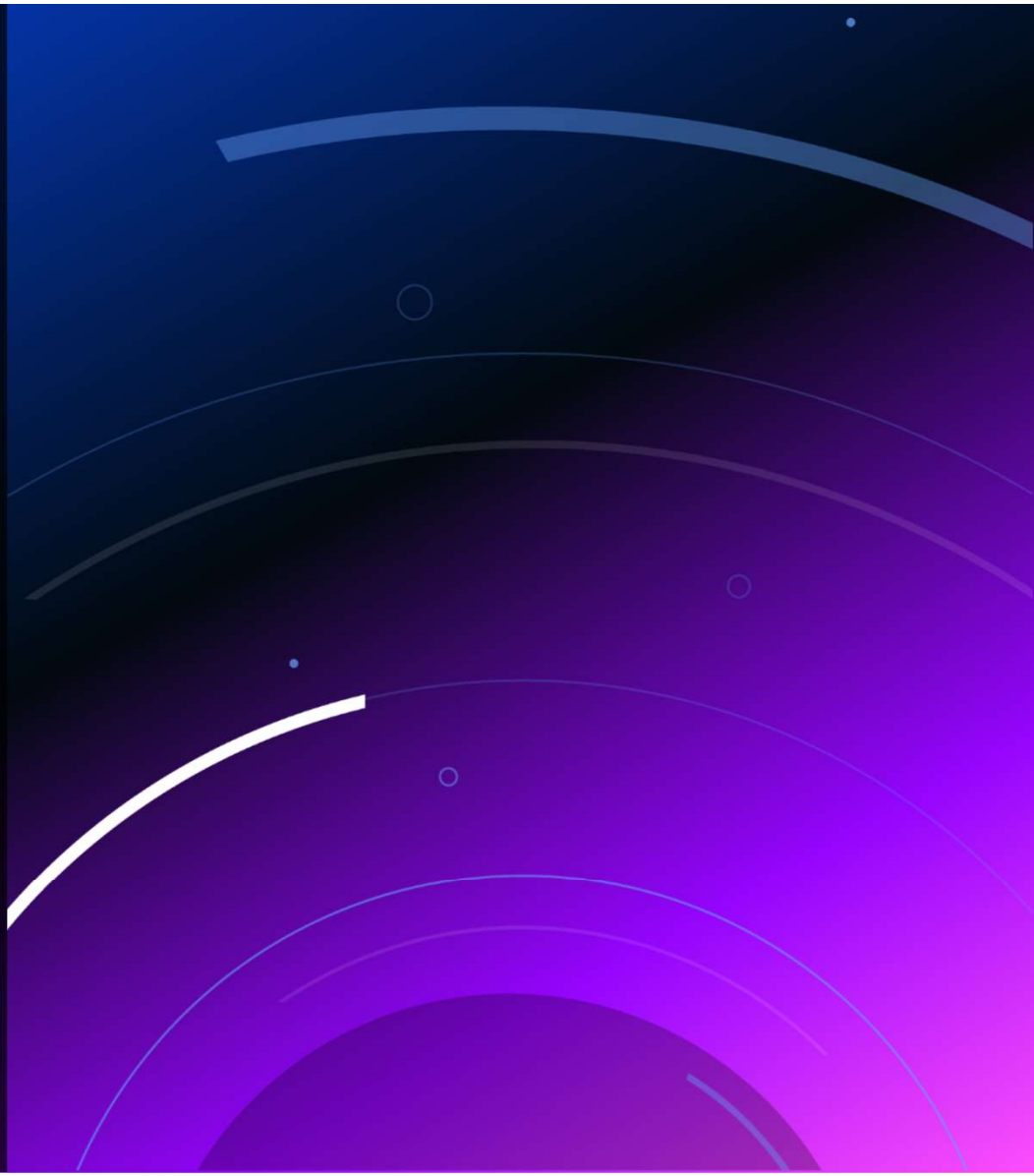
What is a 4G/LTE Wi-Fi router ?

Why you need one?

How it works?

Applications

Final takeaways



INTRODUCTION

TELTONIKA RUT200 - 4G/LTE WI-FI ROUTER

INTRODUCTION

- Remote access is the ability of users to access a device or a network from any location.
- Remote asset management on remote sites is becoming easier than ever thanks to the use of cellular networks.
- Remote access is a cost-effective option for many industries for monitoring equipment in remote locations due to the low cost and high bandwidth available on cellular networks.

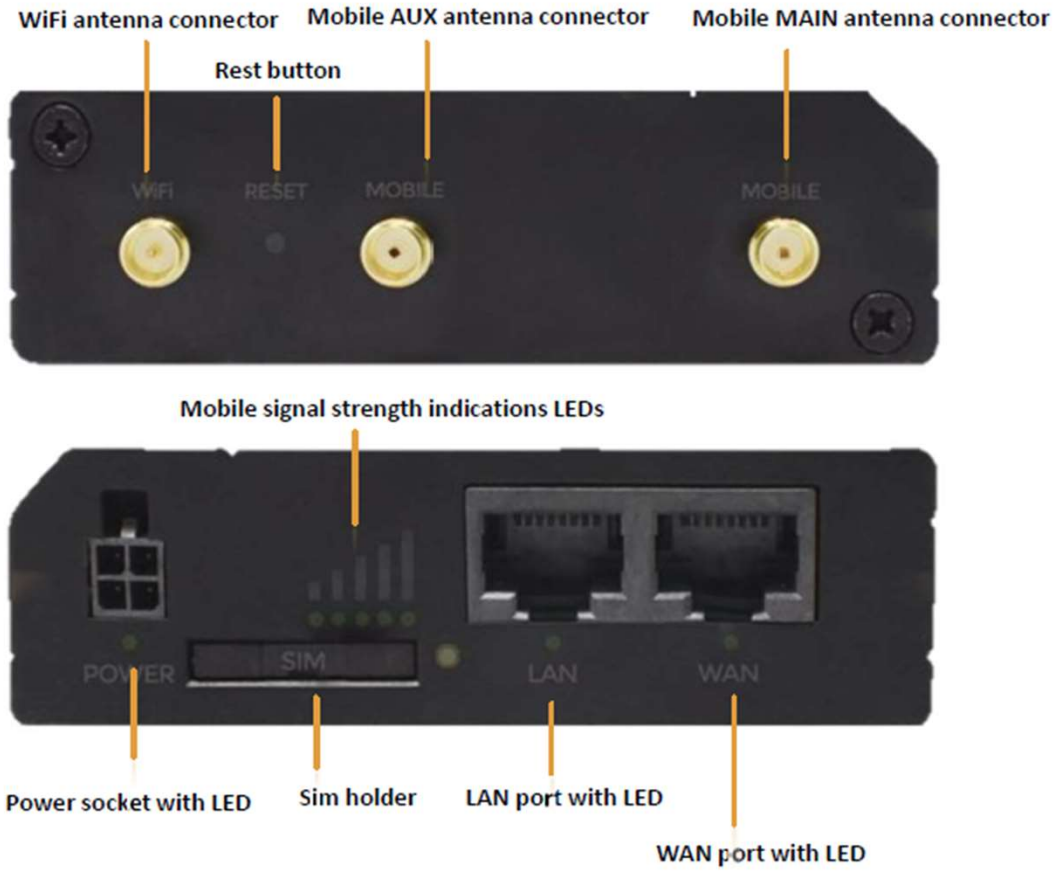
TELTONIKA-NETWORKS

WHAT IS A 4G/LTE WI-FI ROUTER?

4G/LTE WI-FI ROUTER

- A 4G/LTE Wi-Fi router can support mobile technology through a 4G wireless module, unlike a Wi-Fi-only router that only supports wireless standards.
- By utilizing a mini-SIM card with a data plan, the router can access the internet and generate a reliable Wi-Fi signal by communicating with cell towers around the carrier.
- You can easily share this internet access to your power quality meters.


TELTONIKA | Networks
Made in Lithuania
TELTONIKA NETWORKS UAB
K. Barsausko st. 66
LT-51436 Kaunas, Lithuania
RUT200
(9-30V) + INPUT
- (GND) OUTPUT
Default IP: 192.168.1.1
User/Pass: admin/admin01


WiFi antenna connector
Mobile AUX antenna connector
Mobile MAIN antenna connector
Rest button
WiFi
RESET
MOBILE
MOBILE
Mobile signal strength indications LEDs
POWER
SIM
LAN
WAN
Power socket with LED
Sim holder
LAN port with LED
WAN port with LED

Sim card size = Mini Sim

TELTONIKA-NETWORKS

WHY YOU NEED ONE?

WHY YOU NEED ONE?

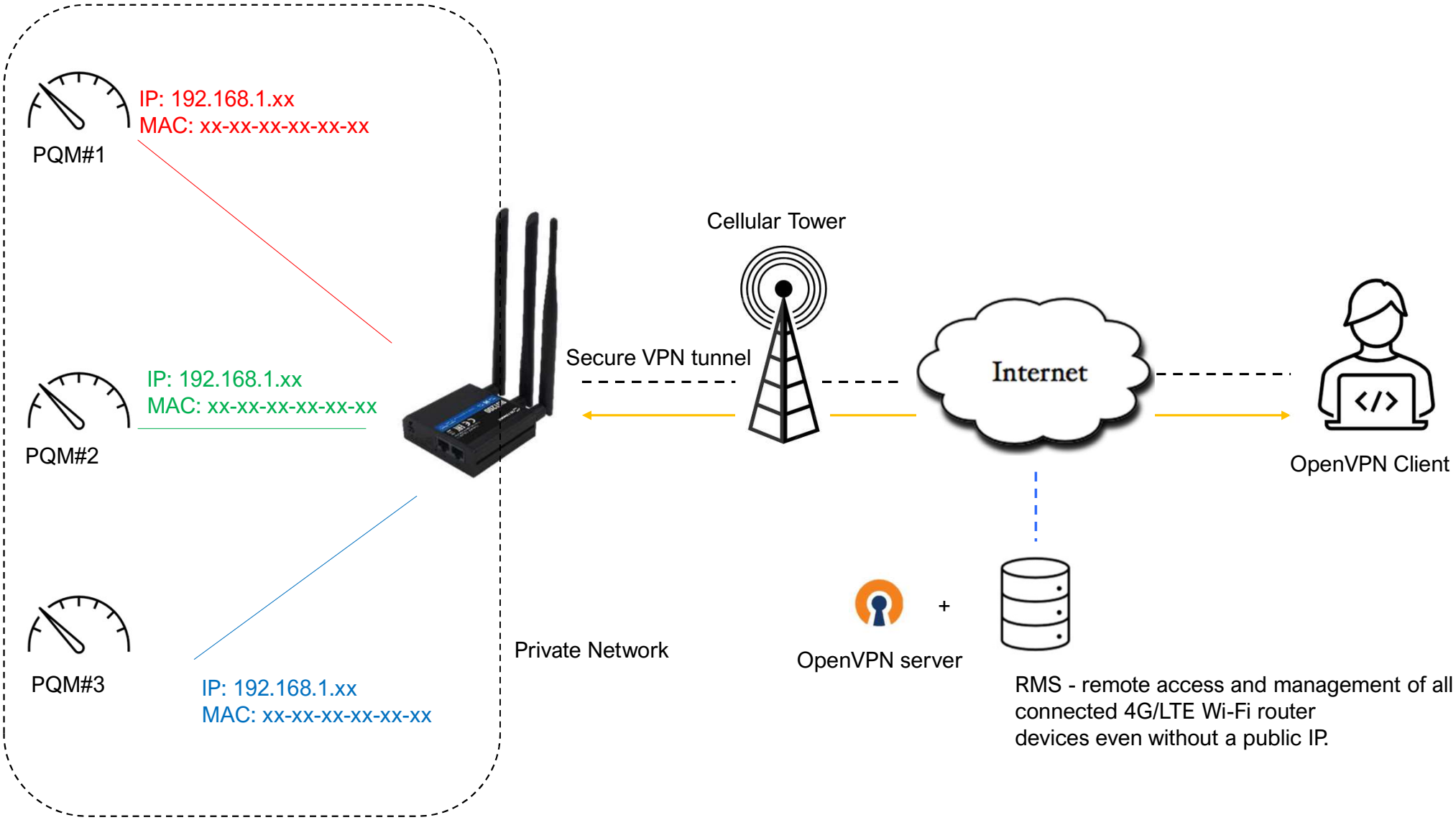
- Power quality monitoring instruments are located where there is no wired or wireless Internet access.
- The site has internet, but the company's IT policy prohibits connections due to security concerns.
- No need of a public or fixed IP
- Remote monitoring (real-time status and values)
- Remote configuration of instruments
- Download data captured by instrument

TELTONIKA-NETWORKS

HOW IT WORKS?

HOW IT WORKS?

- All the devices will be given an IP address by the 4G/LTE Wi-Fi router. → Enable Static IP.
- Set up port forwarding - allows remote servers and devices on the internet to be able to access devices that are on a private network.
- Using Remote Management Service (RMS) and enabling a VPN server.
- To connect the VPN tunnel, you need to install a VPN connection system by downloading OpenVPN and then import a profile license key.


IP: 192.168.1.xx
MAC: xx-xx-xx-xx-xx-xx
PQM#1
IP: 192.168.1.xx
MAC: xx-xx-xx-xx-xx-xx
PQM#2
PQM#3
IP: 192.168.1.xx
MAC: xx-xx-xx-xx-xx-xx
Private Network
Cellular Tower
Secure VPN tunnel
Internet
OpenVPN Client
+
OpenVPN server
RMS - remote access and management of all
connected 4G/LTE Wi-Fi router
devices even without a public IP.

REMOTE MANAGEMENT SYSTEM / CONNECT – VPN

Teltonika Networks Remote Management System (RMS) is designed to conveniently monitor and manage all your Teltonika Networks networking devices.

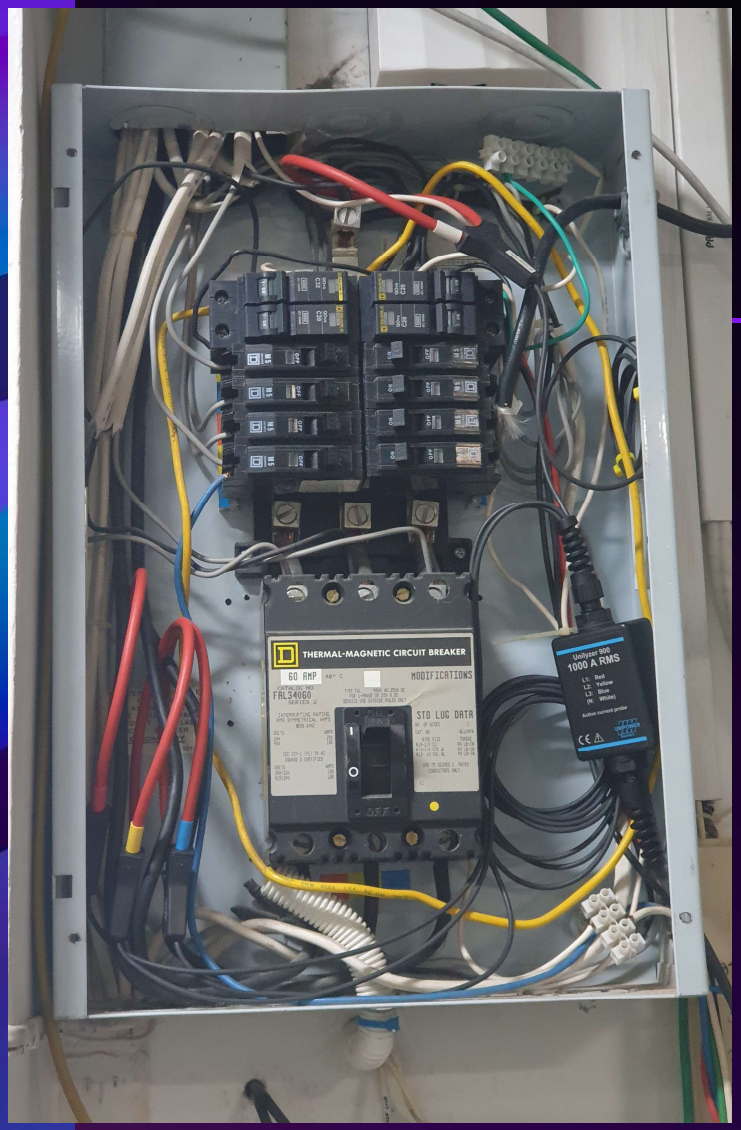
- The system allows to securely gather status information of your devices and to change their configuration even if the devices do not have public IP addresses.

Using the Remote Management Service (RMS) and VPN server. It offers the easiest way to configure these types of connections for your entire infrastructure.

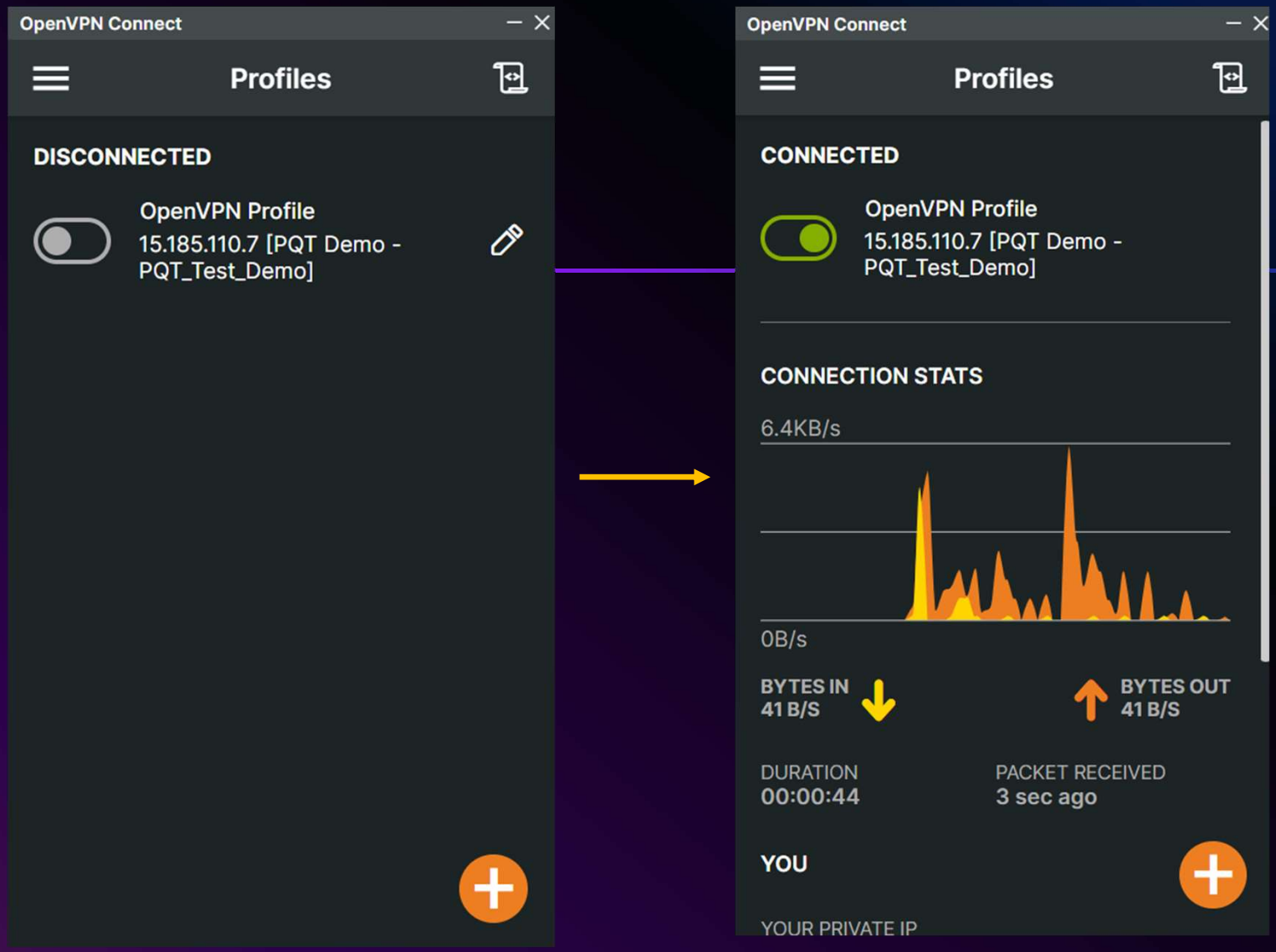
- Now you can easily and securely remotely access multiple endpoints at the same time without having to worry about configuration and special requirements.

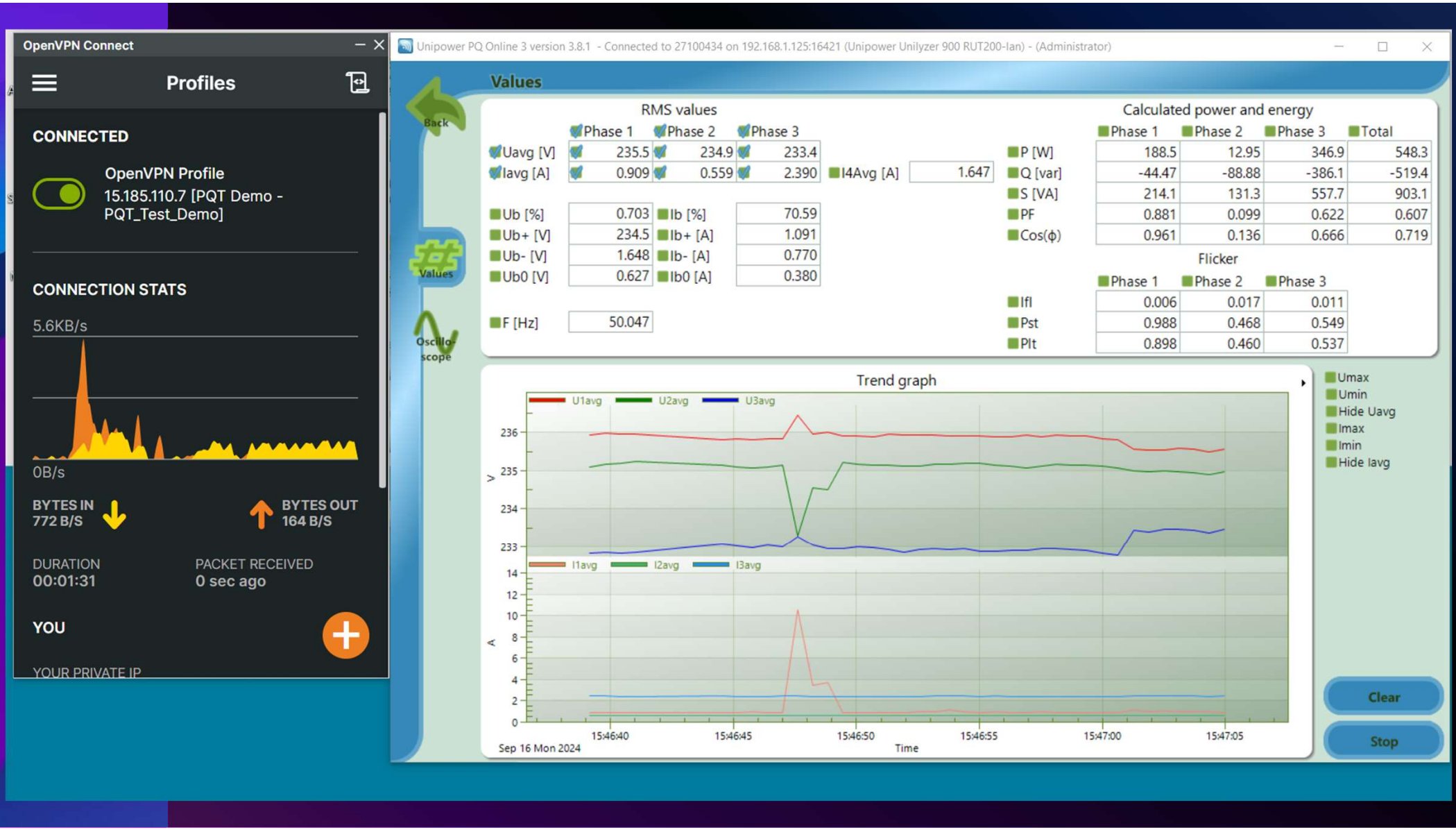
POWER QUALITY MONITORING

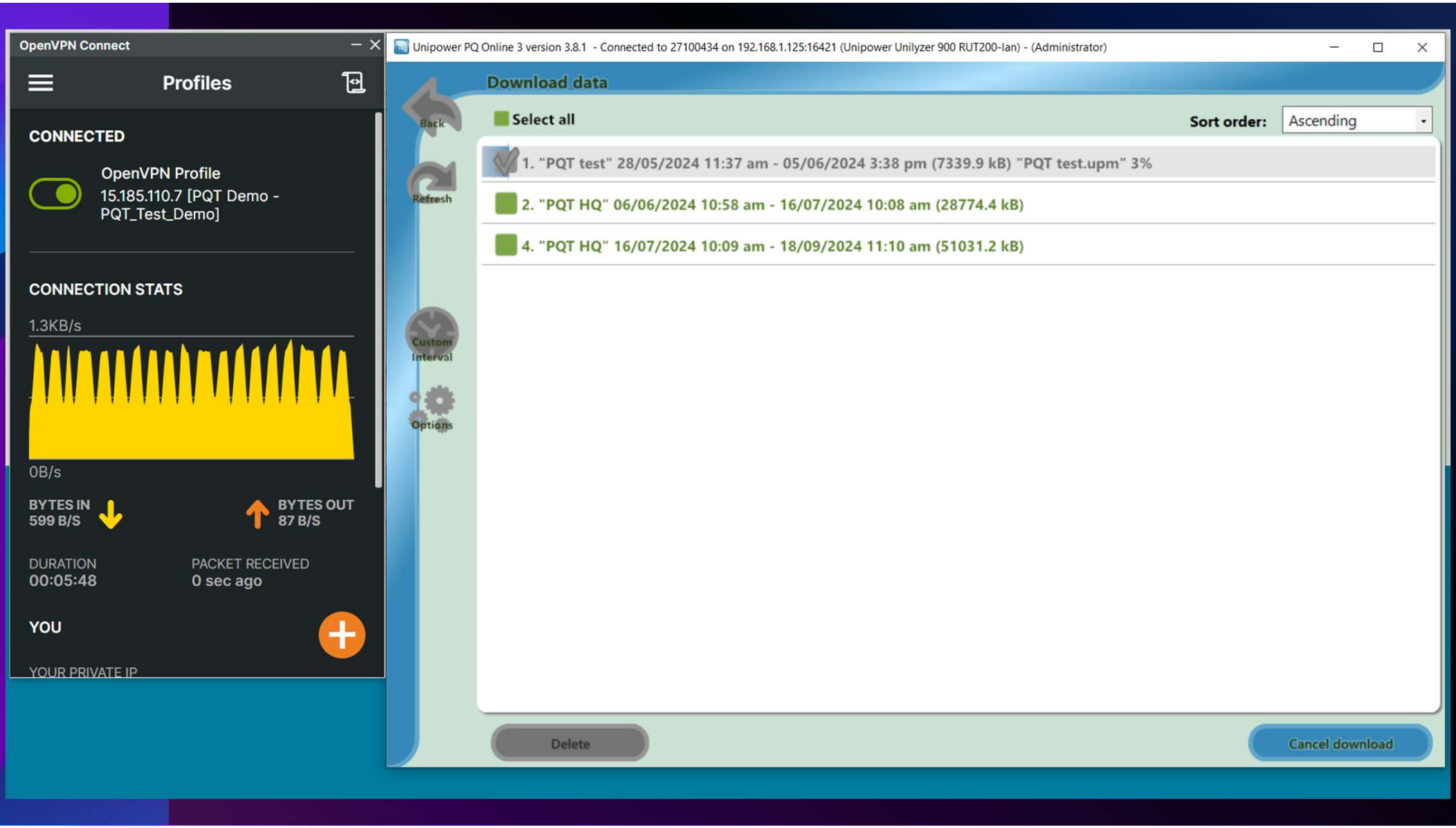
APPLICATIONS

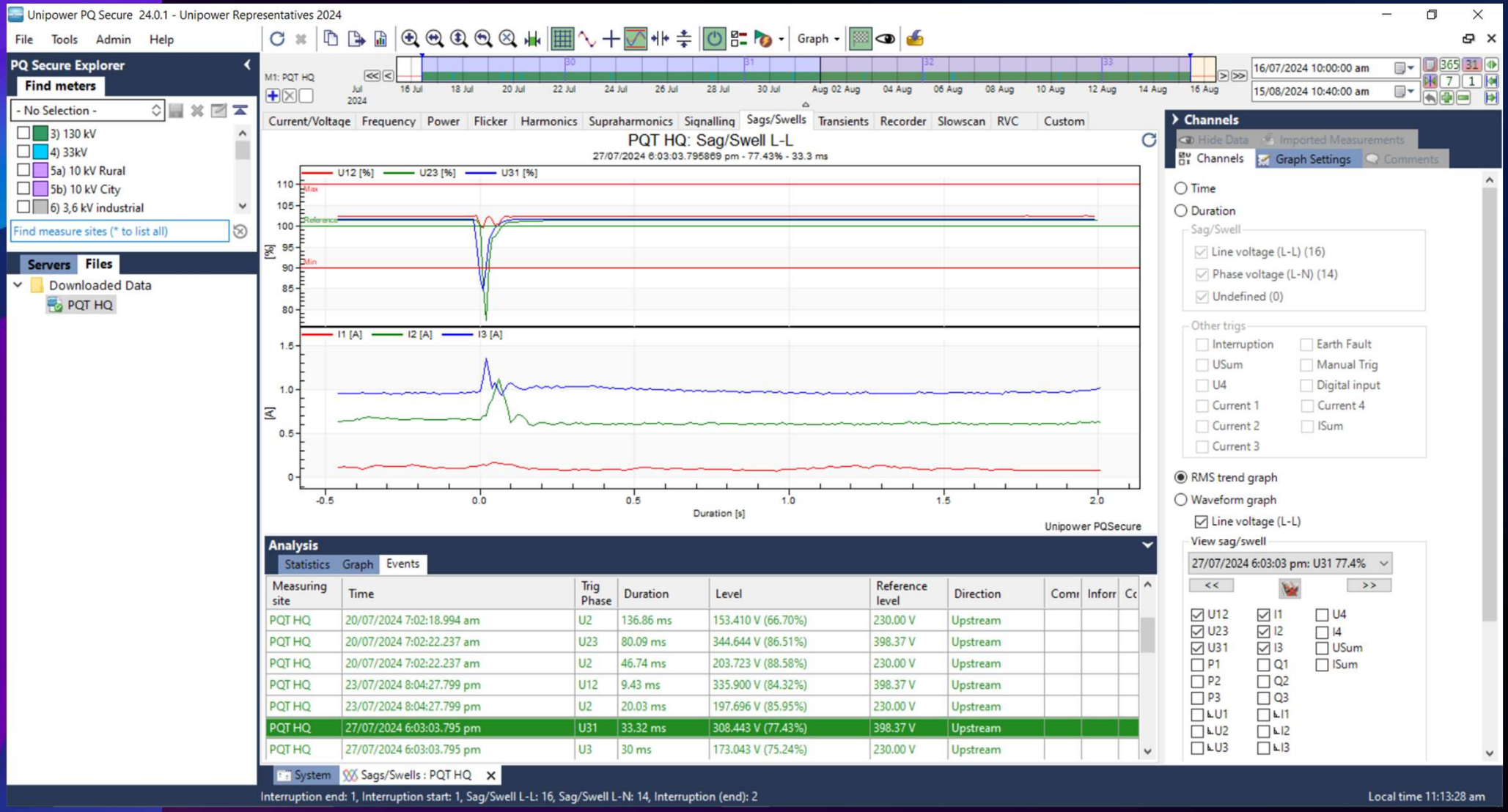

THERMAL-MAGNETIC CIRCUIT BREAKER
60 AMP
MODIFICATIONS
FAL34060
STD LUG DATA
Unilyzer 900
1000 A RMS


RUT200
Unilyzer 900
Power Quality Analyser
VISI-SAFE
Load Center
SQUARE D


OpenVPN Connect
Profiles
DISCONNECTED
OpenVPN Profile
15.185.110.7 [PQT Demo - PQT_Test_Demo]
OpenVPN Connect
Profiles
CONNECTED
OpenVPN Profile
15.185.110.7 [PQT Demo - PQT_Test_Demo]
CONNECTION STATS
6.4KB/s
0B/s
BYTES IN
41 B/S
BYTES OUT
41 B/S
DURATION
00:00:44
PACKET RECEIVED
3 sec ago
YOU
YOUR PRIVATE IP


OpenVPN Connect
Profiles
CONNECTED
OpenVPN Profile
15.185.110.7 [PQT Demo - PQT_Test_Demo]
CONNECTION STATS
5.6KB/s
0B/s
BYTES IN
772 B/S
BYTES OUT
164 B/S
DURATION
00:01:31
PACKET RECEIVED
0 sec ago
YOU
YOUR PRIVATE IP
Unipower PQ Online 3 version 3.8.1 - Connected to 27100434 on 192.168.1.125:16421 (Unipower Unilyzer 900 RUT200-lan) - (Administrator)
Back
Values
Oscillo-scope
Values
RMS values
Phase 1
Phase 2
Phase 3
Uavg [V] 235.5 234.9 233.4
Iavg [A] 0.909 0.559 2.390
I4Avg [A] 1.647
Ub [%] 0.703
Ub+ [V] 234.5
Ub- [V] 1.648
Ub0 [V] 0.627
Ib [%] 70.59
Ib+ [A] 1.091
Ib- [A] 0.770
Ib0 [A] 0.380
F [Hz] 50.047
Calculated power and energy
Phase 1 Phase 2 Phase 3 Total
P [W] 188.5 12.95 346.9 548.3
Q [var] -44.47 -88.88 -386.1 -519.4
S [VA] 214.1 131.3 557.7 903.1
PF 0.881 0.099 0.622 0.607
Cos(ϕ) 0.961 0.136 0.666 0.719
Flicker
Phase 1 Phase 2 Phase 3
Ifl 0.006 0.017 0.011
Pst 0.988 0.468 0.549
Plt 0.898 0.460 0.537
Trend graph
U1avg U2avg U3avg
I1avg I2avg I3avg
V
A
Sep 16 Mon 2024
Time
15:46:40
15:46:45
15:46:50
15:46:55
15:47:00
15:47:05
Umax
Umin
Hide Uavg
Imax
Imin
Hide Iavg
Clear
Stop

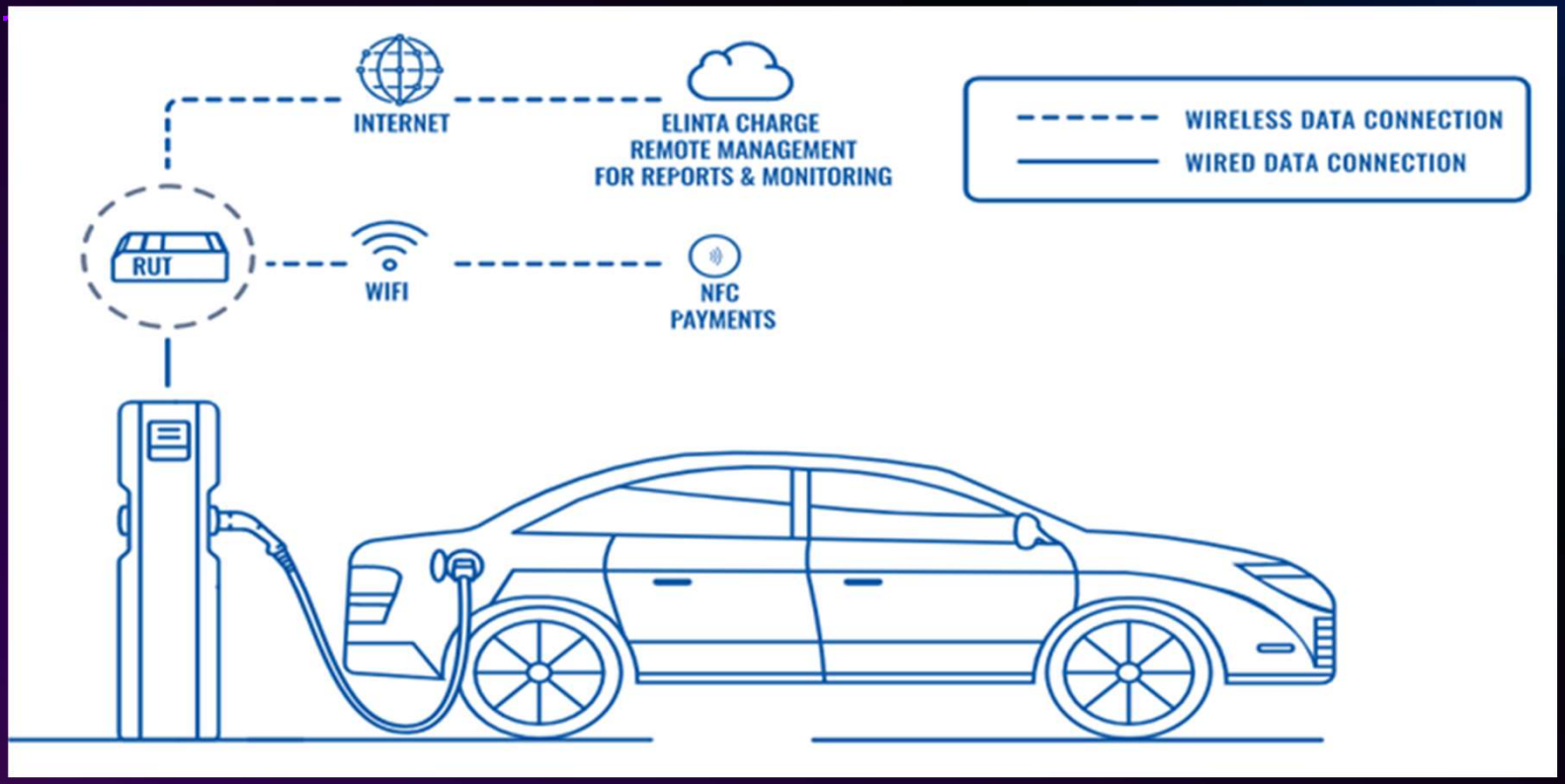

OpenVPN Connect
Profiles
CONNECTED
OpenVPN Profile
15.185.110.7 [PQT Demo - PQT_Test_Demo]
CONNECTION STATS
1.3KB/s
0B/s
BYTES IN
599 B/S
BYTES OUT
87 B/S
DURATION
00:05:48
PACKET RECEIVED
0 sec ago
YOU
YOUR PRIVATE IP
Unipower PQ Online 3 version 3.8.1 - Connected to 27100434 on 192.168.1.125:16421 (Unipower Unilyzer 900 RUT200-lan) - (Administrator)
Download data
Back
Refresh
Custom Interval
Options
Select all
Sort order:
Ascending
1. "PQT test" 28/05/2024 11:37 am - 05/06/2024 3:38 pm (7339.9 kB) "PQT test.upm" 3%
2. "PQT HQ" 06/06/2024 10:58 am - 16/07/2024 10:08 am (28774.4 kB)
4. "PQT HQ" 16/07/2024 10:09 am - 18/09/2024 11:10 am (51031.2 kB)
Delete
Cancel download


Unipower PQ Secure 24.0.1 - Unipower Representatives 2024
File Tools Admin Help
PQ Secure Explorer
Find meters
- No Selection -
3) 130 kV
4) 33kV
5a) 10 kV Rural
5b) 10 kV City
6) 3,6 kV industrial
Find measure sites (* to list all)
Servers Files
Downloaded Data
PQT HQ
Graph
M1: PQT HQ
16/07/2024 10:00:00 am
15/08/2024 10:40:00 am
Current/Voltage Frequency Power Flicker Harmonics Supraharmonics Signalling Sags/Swells Transients Recorder Slowscan RVC Custom
PQT HQ: Sag/Swell L-L
27/07/2024 6:03:03.795869 pm - 77.43% - 33.3 ms
U12 [%] U23 [%] U31 [%]
I1 [A] I2 [A] I3 [A]
Duration [s]
Unipower PQSecure
Analysis
Statistics Graph Events
Measuring site | Time | Trig Phase | Duration | Level | Reference level | Direction
PQT HQ | 20/07/2024 7:02:18.994 am | U2 | 136.86 ms | 153.410 V (66.70%) | 230.00 V | Upstream
PQT HQ | 20/07/2024 7:02:22.237 am | U23 | 80.09 ms | 344.644 V (86.51%) | 398.37 V | Upstream
PQT HQ | 20/07/2024 7:02:22.237 am | U2 | 46.74 ms | 203.723 V (88.58%) | 230.00 V | Upstream
PQT HQ | 23/07/2024 8:04:27.799 pm | U12 | 9.43 ms | 335.900 V (84.32%) | 398.37 V | Upstream
PQT HQ | 23/07/2024 8:04:27.799 pm | U2 | 20.03 ms | 197.696 V (85.95%) | 230.00 V | Upstream
PQT HQ | 27/07/2024 6:03:03.795 pm | U31 | 33.32 ms | 308.443 V (77.43%) | 398.37 V | Upstream
PQT HQ | 27/07/2024 6:03:03.795 pm | U3 | 30 ms | 173.043 V (75.24%) | 230.00 V | Upstream
Channels
Hide Data Imported Measurements
Channels Graph Settings Comments
Time
Duration
Sag/Swell
Line voltage (L-L) (16)
Phase voltage (L-N) (14)
Undefined (0)
Other trigs
Interruption Earth Fault
USum Manual Trig
U4 Digital input
Current 1 Current 4
Current 2 ISum
Current 3
RMS trend graph
Waveform graph
Line voltage (L-L)
View sag/swell
27/07/2024 6:03:03 pm: U31 77.4%
U12 U23 U31 P1 P2 P3 U1 U2 U3
I1 I2 I3 Q1 Q2 Q3 I1 I2 I3
U4 I4 USum ISum
System
Sags/Swells : PQT HQ
Interruption end: 1, Interruption start: 1, Sag/Swell L-L: 16, Sag/Swell L-N: 14, Interruption (end): 2
Local time 11:13:28 am

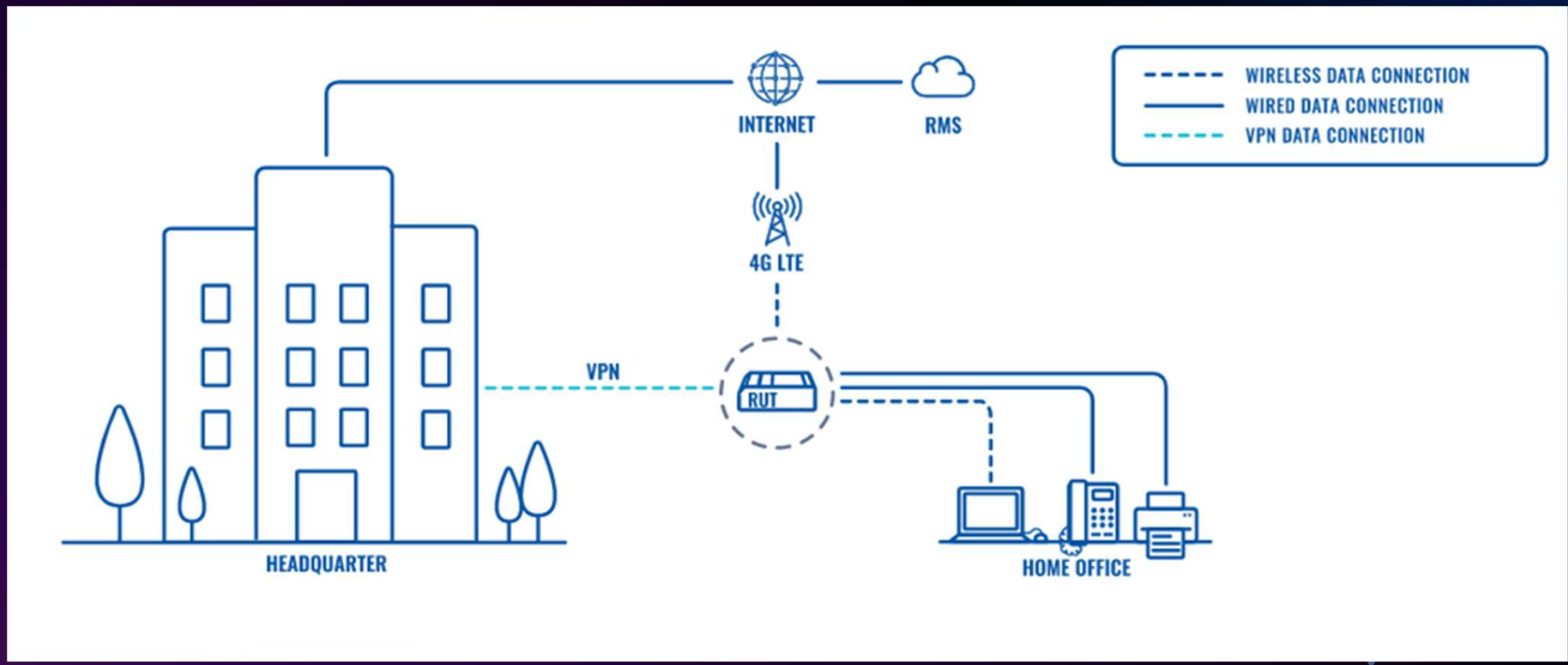

D-Link
10/100 Fast Ethernet Switch
RUT240
WiFi


COMMUNICATION
POWER
CAUTION
REMOVAL OF COVER PANELS MAY RESULT IN SHOCK HAZARD. NO USER SERVICEABLE PARTS INSIDE. REFER TO QUALIFIED SERVICE PERSONNEL.
CURRENT INPUTS
VOLTAGE / CURRENT INPUTS

CONTROL, MONITOR AN ENERGY USAGE OF EV STATION - APPLICATION SUITS A CONNECTIVITY FOR MANAGING A MONITORING/REPORTING OF EV CHARGER STATION



APPLICATION: A REMOTE CONTROL TO YOUR END-DEVICE AT YOUR HOME



FINAL TAKEAWAYS

- Ease of use and flexibility
- Connectivity from any type of device.
- Cloud/Web service without requiring dedicated public IP.
- Remote efficient, low-cost management of large-scale networks
- Encrypted VPN tunnels for secure access of multiple endpoints

THANK YOU

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roberts@powerquality.co.th

powerquality.co.th