

I-TOR

**I-TOR electronic meters
for commercial metering of electricity
in 6-110kV grids and smart-grids**

Company Activities

The main activity of the company i-TOR is the development and production of innovative solutions for the organization of commercial and technical electricity metering in middle and high-voltage grids 6-110 kV.

Today we offer three main product:

- ultra-compact commercial electricity metering points for 35 and 110 kV (i-TOR-35 and i-TOR-110) overhead transmission lines, based on combined digital current and voltage transformers i-TOR;
- ultra-compact voltage measuring devices i-TOR-6(24)-U for cable lines 6-24 kV;
- power takeoff devices e-TOR-110 from high-voltage grids 110 kV for the power supplies organization for own needs (e-TOR-110 110/0.22 kV, power 300-500 VA).

New product:

- non-invasive ultra-compact full stand-alone commercial electricity metering points i-TOR-NI.



Innovative current and voltage meters for MV and HV-lines and line cable 6-110 kV

i-TOR 110 kV
suspendable /
supporting
accuracy figure
0,2/0,2S



i-TOR 35 kV
suspendable /
supporting
accuracy figure
0,5/0,5S



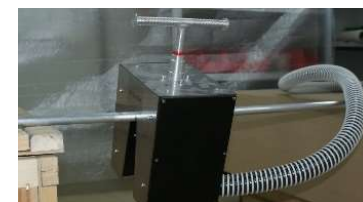
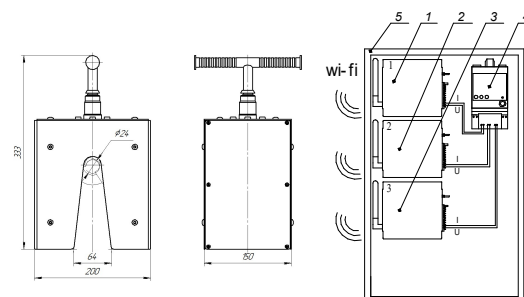
i-TOR-6(24)-U
for air and gas-
insulated switchgear
accuracy figure 0,5



Today

Tomorrow

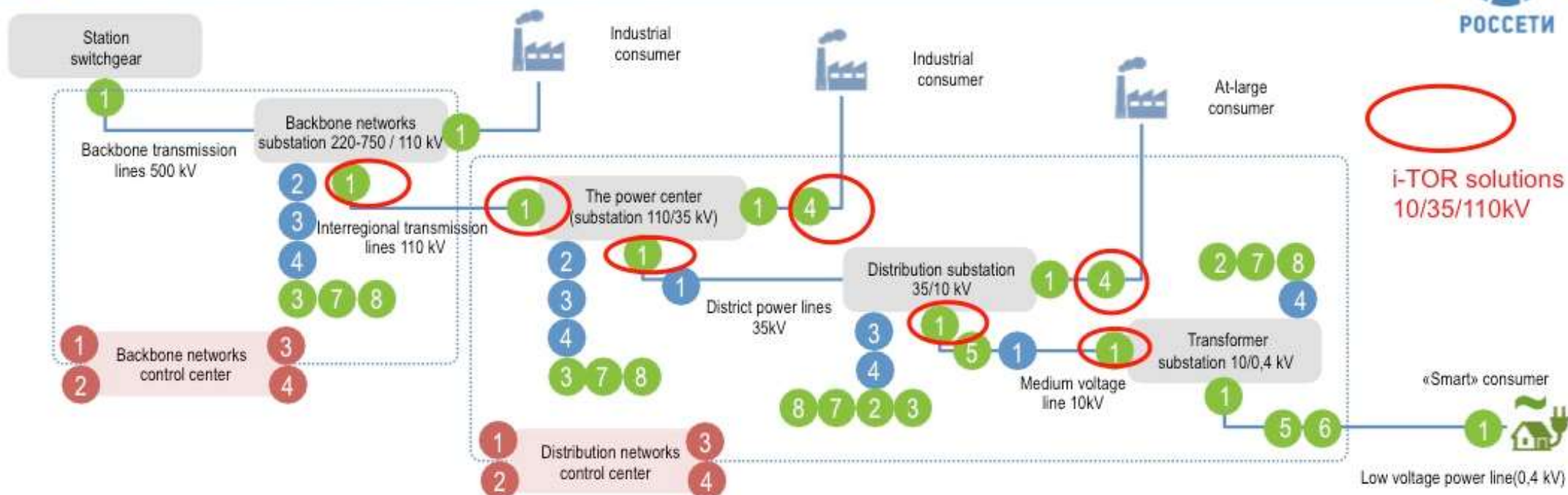
i-TOR-NI
suspendable
non-invasive
accuracy figure
0,5/0,5S



WHAT IS A DIGITAL NETWORK?



5



«Eyes»

- 1 power meter (commercial / technical)
- 2 access control system
- 3 video observation
- 4 commercial accounting points (on customer tapes)
- 5 short-circuit indicators for medium voltage network
- 6 voltage monitor on feeders 0,4 kVB
- 7 data collection and transmission devices from metering devices and telemetry devices
- 8 telemechanics controller

«Intelligence»

- 1 SCADA (supervisory control and data acquisition)
- 2 ADMS (automated data management system)
- 3 OMS (outage management system)
- 4 CRM (customer relationship management)

«Hands»

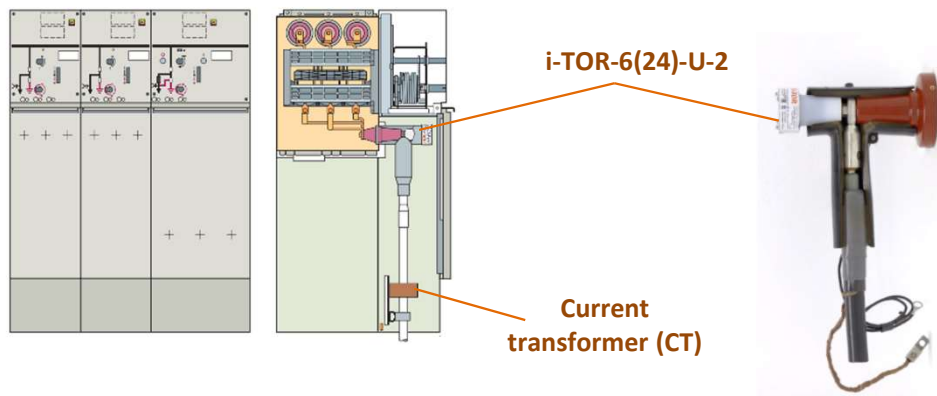
- 1 recloser
- 2 automatic process control system (APCS)
- 3 the digital equipment of relay protection and automatic equipment (RPAE)
- 4 auxiliary systems with automation

A digital network is a highly automated network that provides observability and controllability through digital communications network and equipment

Solutions for gas-insulation switchgear 6(24) kV with SF6 (of 8DJH, RM6, SafeRing, LC and etc.)

SIEMENS

8DJH



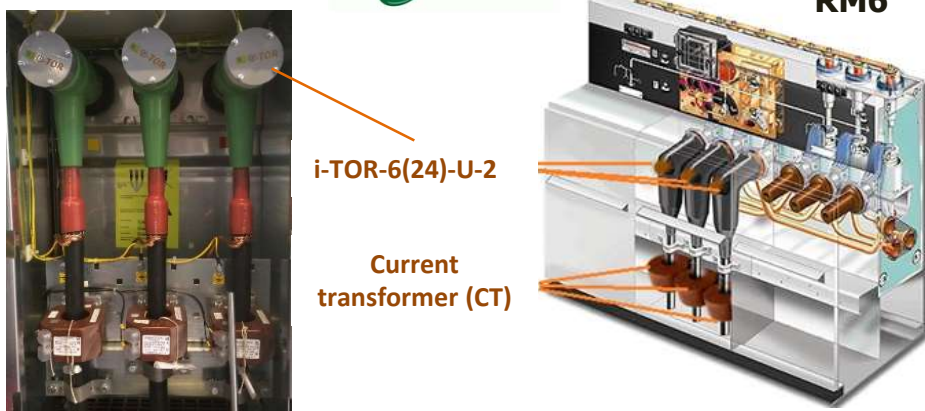
Organization of commercial accounting in gas-insulated cells without significant costs:

Option No. 1 - with the installation of i-TOR-6 (24)-U-2 in any existing cable adapter.

- i-TOR-6 (24)-U-2 measures voltage with an accuracy of 0.5
- «classical» CT of the type ТШЛ-0,66-IV are installed on cables of cross-linked polyethylene and measures the current with an accuracy of 0.5S
- i-TOR and CT work with any meters and allow you to integrate the metering point into the system

Schneider Electric

RM6



Solutions for RM6 gas-insulated switchgear 6(24) kV

**Organization of commercial accounting
in gas-insulated cells without significant costs:**

**Option No. 2 - i-TOR-6 (24) -U-2 is installed on
the expansion contacts of the distribution cell.**

- i-TOR-6 (24)-U-2 measures voltage with an accuracy of 0.5
- «classical» CT of the type ТШЛ-0,66-IV are installed on cables of cross-linked polyethylene and measures the current with an accuracy of 0.5S
- i-TOR and CT work with any meters and allow you to integrate the metering point into the system



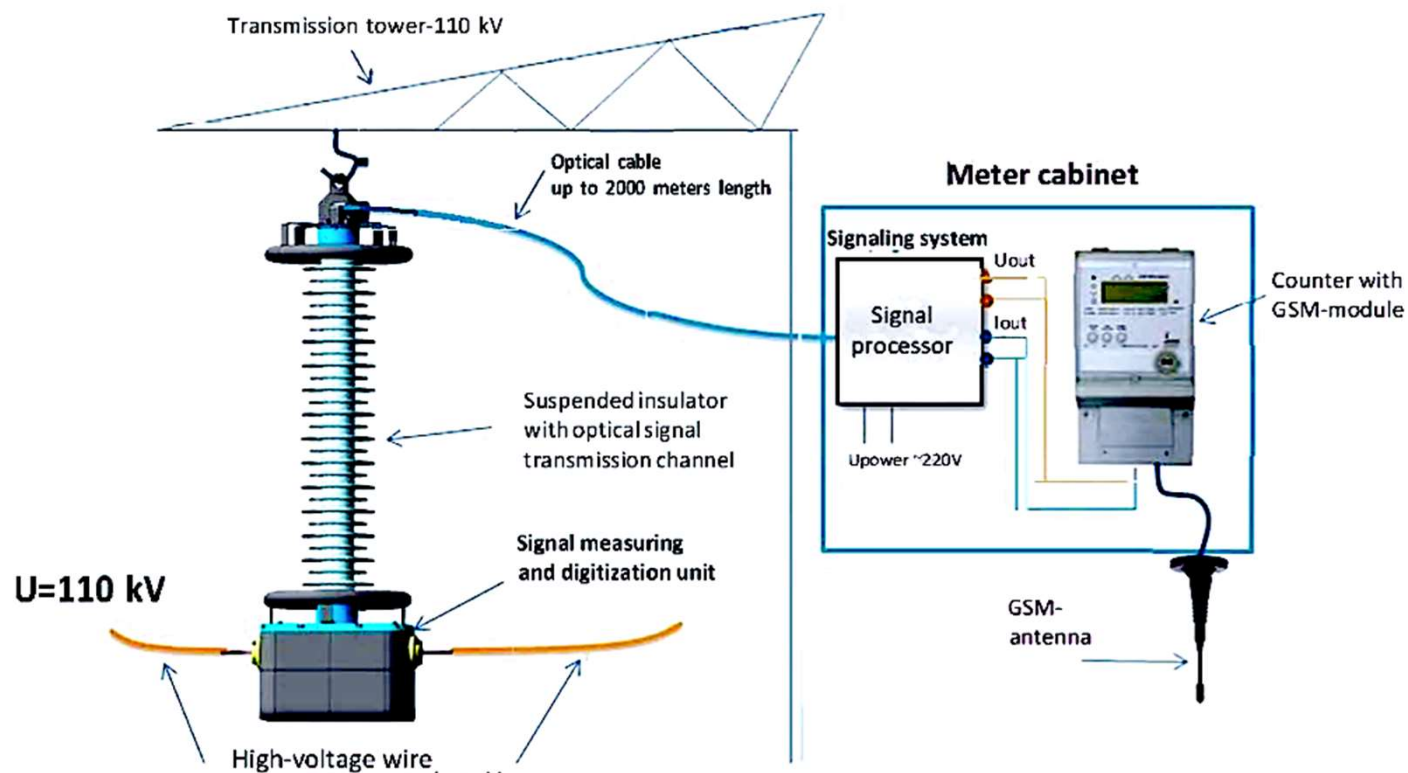
i-TOR-10-U-2-Y2 type Z

Modernization of commercial accounting systems in cable grids of megacities



**More than 2'000 complete sets
in RM6 of i-TOR-6(10-20)-U-2
in Moscow and other cities**

The i-TOP concept for metering in 35-110 kV grids



Digital current and voltage meter 110 kV, weighing only 55 kg, and 35 kg for 35 kV grids, mounted on a support

Commercial accounting for 110 kV

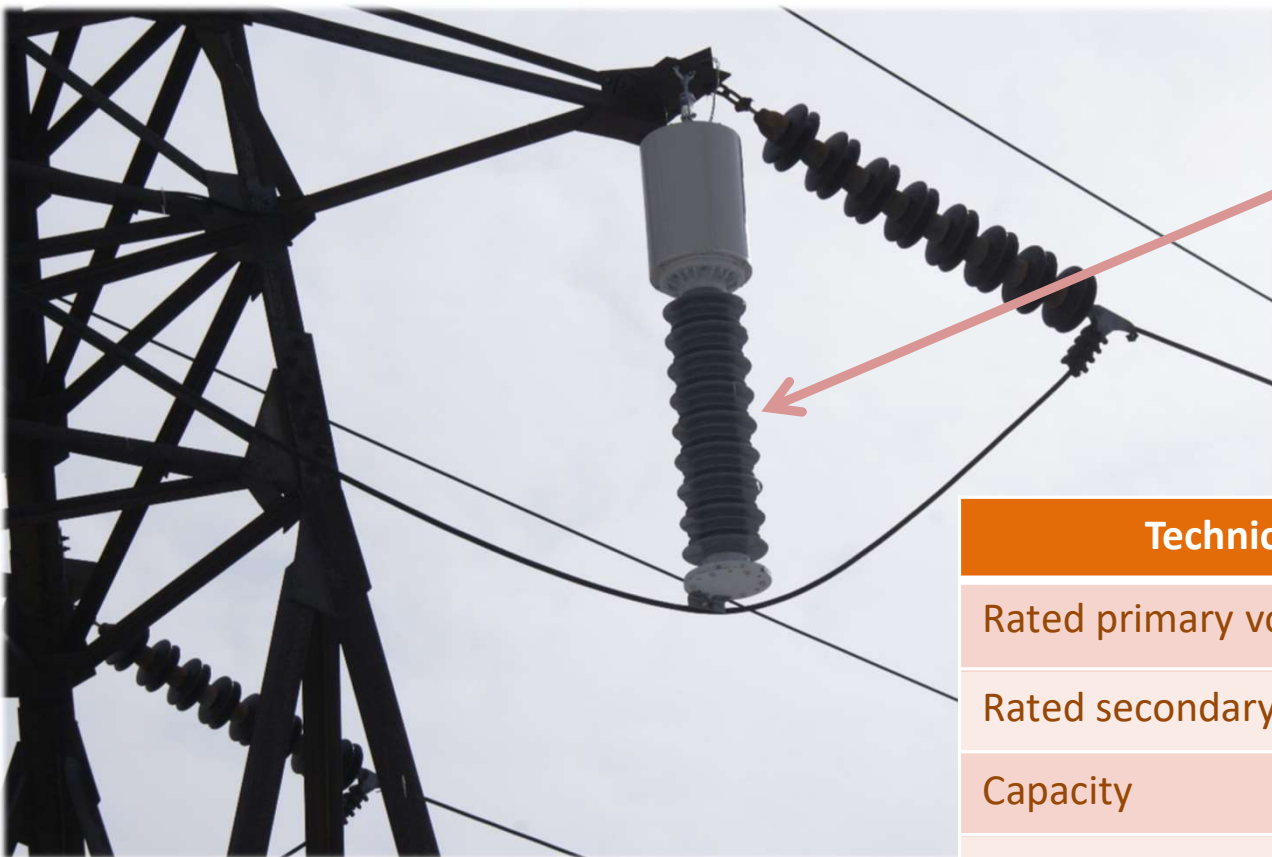
Outlets of commercial accounting i-TOR-35 and i-TOR-110S



Tex. характеристики	i-TOR-35	i-TOR-110S
Supply voltage, kV	35	110
Transformation rate	$\frac{35 \text{ kV}}{\sqrt{3}} / \frac{100 \text{ V}}{\sqrt{3}}$	$\frac{110 \text{ kV}}{\sqrt{3}} / \frac{100 \text{ V}}{\sqrt{3}}$
Accuracy class of voltage measurement	0,5	0,5 or 0,2
Nominal current, A	50-1000	100-1000
Accuracy class of current measurement	0,5S	0,5S или 0,2S
Weight of one phase, kg	35	55
Installation method	suspendable or supporting	suspendable or supporting
Climatic category	У1 or ХЛ1	У1 or ХЛ1

e-TOR-110 - Compact power supply from grids 110 kV

Power takeoff device 110/0,22kV
e-TOR-110/0,22-500-Y1

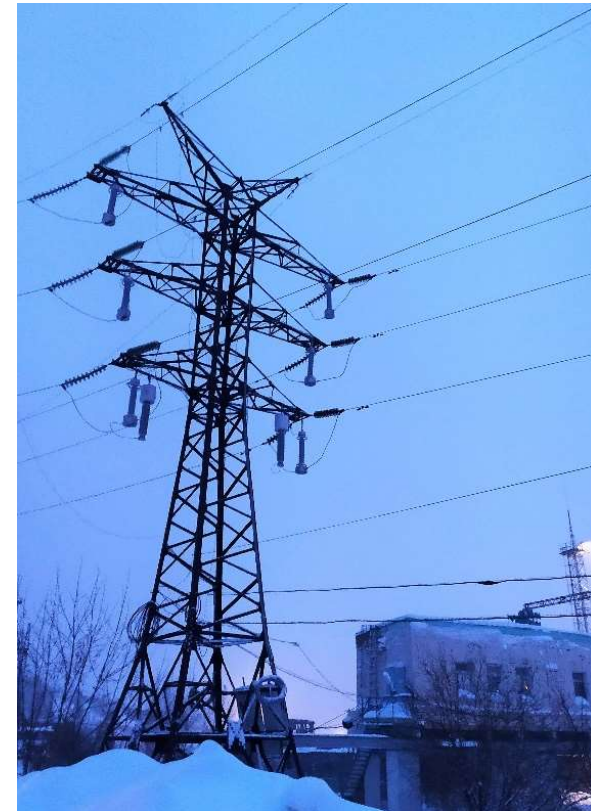
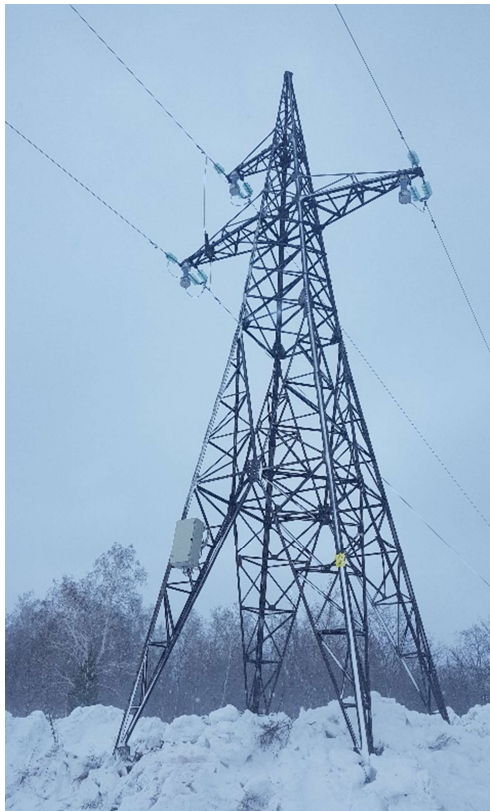


Technical characteristics	Values
Rated primary voltage	110 kV
Rated secondary voltage	220 V AC; 24-48 V DC
Capacity	300 or 500 VA
Climatic version	Mild climate 1
Weight, kg	Less than 100

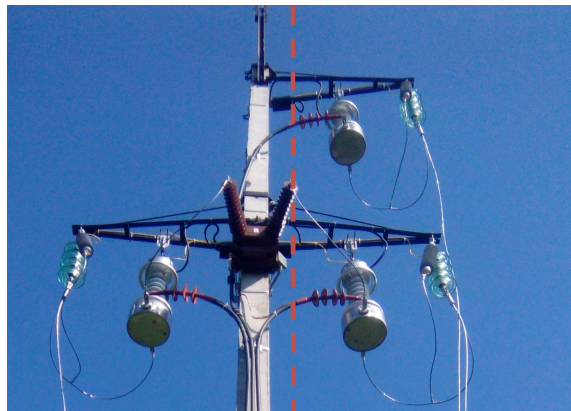
Projects at outdoor switchgear 35-110 kV



Accurate accounting at the borders of the balance sheet in air grids of 35-110 kV



Stages of development of Smart- meters i-TOR meters for energy



Yesterday

Today

Tomorrow

Invasive

Non-invasive

Analog,
massive and overall
systems

Electronic,
compact
solution sets

Digital,
ultra-compact
devices



THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

CISQ/IMQ has issued an IQNet recognized certificate that the organization:

I-TOR LLC

MASHINNAYA ST., 42A, OFFICE 1002, EKATERINBURG, 620089,
RUSSIAN FEDERATION
SCHORSA STR., 7A, EKATERINBURG, 620142, RUSSIAN FEDERATION

has implemented and maintains a
Quality Management System

for the following scope:

Development and production of voltage measuring devices in high voltage grids 6, 10, 15, 20, 24, and current and voltage measuring devices in high voltage grids 35 and 110 kV

Further clarifications regarding the applicability of ISO 9001:2015 requirements may be obtained by consulting the organization

which fulfills the requirements of the following standard:

ISO 9001:2015

Issued on: 2019 - 11 - 15

Expires on: 2022 - 11 - 14

This attestation is directly linked to the IQNet Partner's original certificate
and shall not be used as a stand-alone document

Registration Number: IT - 126372



Alex Stoichitov

Alex Stoichitov
President of IQNET



Ing. Claudio Provetti

Ing. Claudio Provetti
President of CISQ

IQNet Partners*:

AENOR Spain AFNOR Certification France APCER Portugal CCC Cyprus CISQ Italy
CQI China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany FCAV Brazil
FONDONORMA Venezuela ICONTEC Colombia Inspecta Serfiointi Oy Finland INTECO Costa Rica
IRAM Argentina IOA Japan KPO Korea MIREC Greece MSZT Hungary NAIK AS Norway NSAI Ireland
NYCE-SIGIE Mexico PCBC Poland Quality Austria Austria IR Russia SHI Israel SIQ Slovenia
SIRIM QAS International Malaysia SQS Switzerland SRAC Romania TEST St Petersburg Russia TSE Turkey YUQS Serbia
IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

