MAGNASCI

# uRADMonitor seeRADON

Automated RADON monitoring

RADON Concentration, Air Temperature and Relative Humidity


## Features

- Advanced technology made easy to use
- Provides a complete set of information for instantaneous and average radon concentrations
- Automated RADON sensor compatible with RADON mitigation solutions
- Reliable semiconductor RADON sensor
- Integrated WiFi Internet connectivity
- USB port for power, debug and configuration
- Direct and Cloud data access via API
- IOT / Internet of Things
- Low power consumption
- Ultra low cost

## Applications

- Low cost Automated Monitoring
- Radon mitigation
- Home monitoring
- Citizen science
- Smart Cities

## Description

seeRADON uses an internal amplification silicon phototransistor sensor (semiconductor / bipolar junction) to detect alpha particles resulting from radioactive decay of Radon. With built-in Wifi connectivity, the device will report all measurements to uRADMonitor servers in real time. The data is immediately accessible via the API but can also be viewed online or used to trigger your RADON mitigation systems (automated ventilation). The uRADMonitor network consists of globally interconnected monitoring stations and is focused on continuous environmental monitoring. Its purpose is to generate completely transparent open data, essential for determining the quality of our environment.

## Sensors

uRADMonitor seeRadon contains a MEMS sensor for temperature and humidity and a semiconductor sensor for Radon. The device connects to the wireless internet router via WiFi to send readings online.

| Sensor | Parameter | Minimum value | Maximum value | Absolute Accuracy |
|---|---|---|---|---|
| MEMs | Temperature | -40 °C | +125 °C | ± 0.3°C |
| | Humidity | 0% RH | 100% RH | ± 2 % |
| Semiconductor | Radon | 0.1 pCi / L | 1750 pCi / L | ±13% (min. error ± 1 pCi/l) |

## Specification

| Parameter | uRADMonitor seeRadon |
|---|---|
| **Internet connection** | WLAN connectivity to WiFi Internet Router |
| **Modem Chip** | Espressif esp8266 |
| **Certifications** | CE, FCC |
| **Antenna connector** | Internal |
| **Supply** | micro USB 5V, 1A max consumption |
| **Weight and size** | 108 grams , 85x85x50 mm |
| **Recommended Use Ratings** | Temperature: 0°C to +40°C Humidity: 0RH to 95RH |

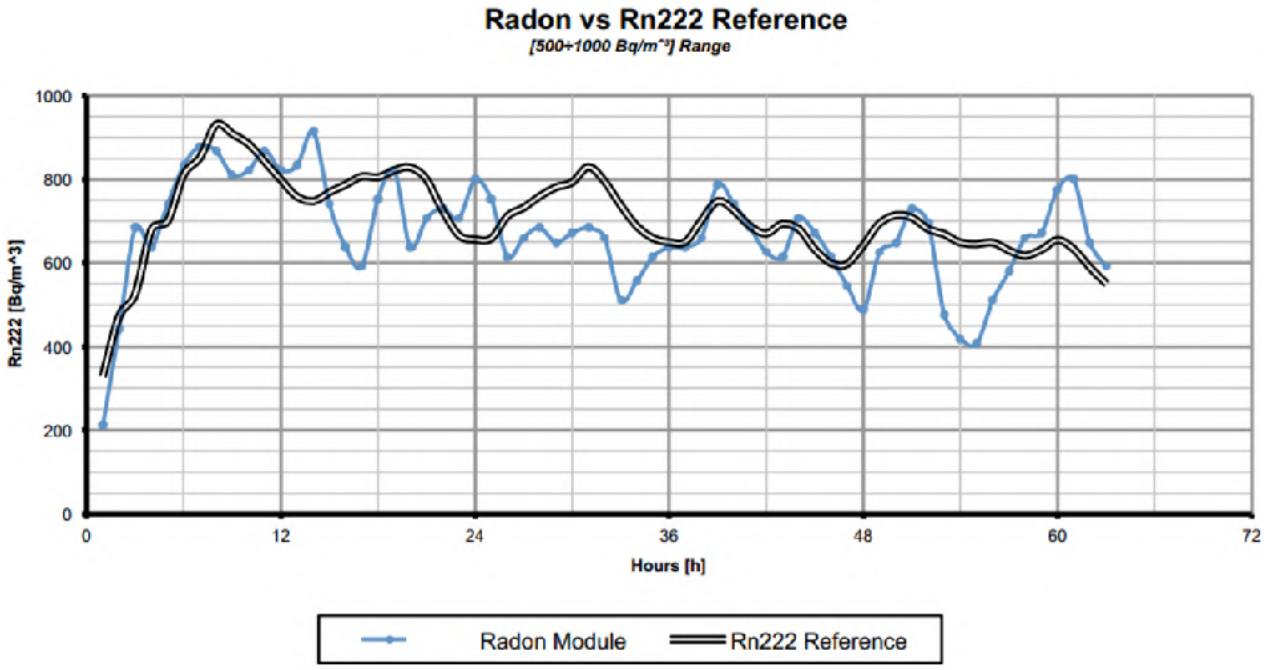
The sensor must not be exposed to strong direct light! This may adversely affect the measurement. During the measurement period, the temperature of the sensor must be maintained in the range 0 - 40 ° C.
The sensor generates a high voltage internally (approx. 300V). Do not disassemble the device under any circumstances, as the contact area between the measuring chamber and the surface of the main board may be exposed to High Voltage.

| | |
|---|---|
| Warmup | **60min** |
| Reporting interval | 1min unit / 10 min radon |
| Sensitivity | 0.03cpm or 1.8cph per pCi / L |
| Measurement interval for RADON | 0.1 - 1750 pCi / L |

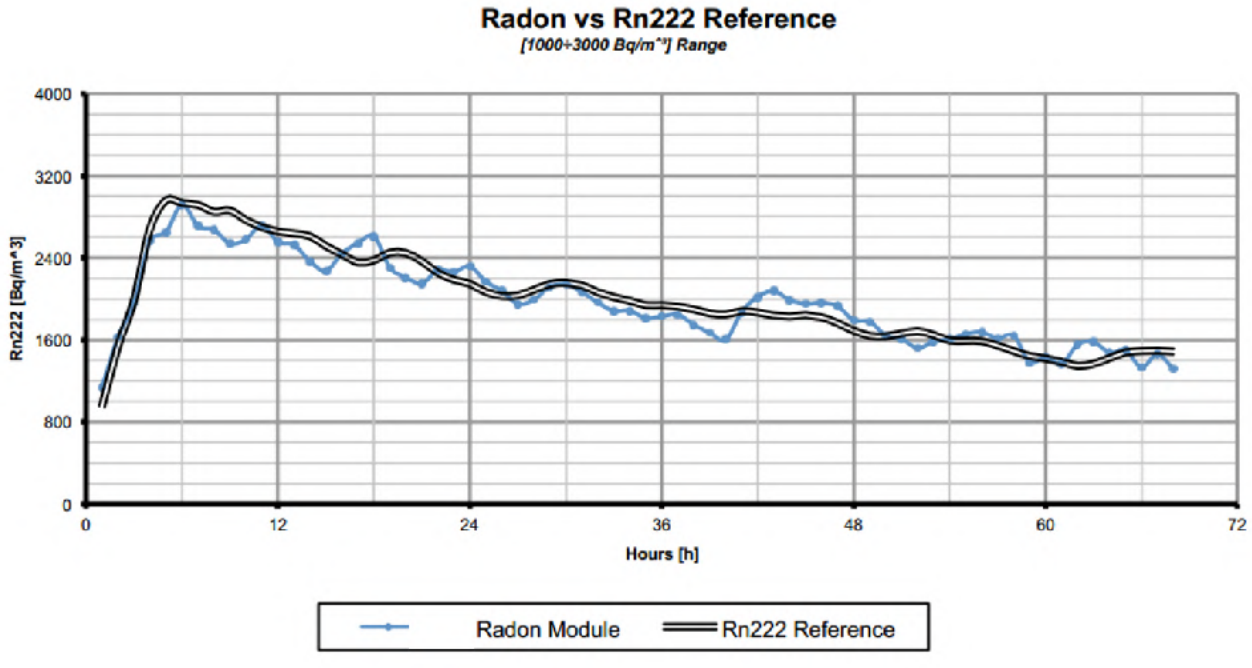
## Performance evaluation for RADON detection

The sensor module has been exposed to various concentrations of radon. The test was performed in a 220L radon chamber with commercial instruments calibrated as a radon reference.

**RADON Interval 500 - 1000 Bq / m³:**




**RADON Interval 1000 - 3000 Bq / m³:**



## Usage guide

- **Power supply**

The uRADMonitor seeRADON uses a standard micro USB connector that is used to power the unit with a regular phone charger. The unit takes 5V to run.

- **Outdoor use and exposure to elements**

The unit comes in a non-sealed housing. Protect the appliance from rain, snow and water in general because the electronic elements inside are very sensitive. Do not cover the air circulation holes.

- **Precautions**

The sensor must not be exposed to strong direct light! This may adversely affect the measurement.
Do not expose the device to large amounts of dust, such as in woodworking centers. Do not expose the device to solvents or a large amount of concentrated chemical vapors (acetone, paints, alcohol, butane, propane, etc.), as the sensors may wear out or the measurements may become inconclusive. Do not expose the device to mechanical shock.

- **Installing the unit**

See the Quick Start Guide for more information on installing and configuring your sensor.

## Warranty

uRADMonitor SMOGGIE is covered by a 12 months warranty for any defects in material or workmanship, under normal use.

## Data access

uRADMonitor is designed for easy access to open data. The device only needs to be connected to the power and WIFI network and the data will be immediately available:


Real-time measurements from a seeRADON device

The data sets can be accessed directly, for display in third-party software applications, for integration with other systems (Home Assistant, Alexa, etc.) or for display on information panels:

Information panel in Piata Sudului, Sector 4, Bucharest, which displays real-time data from a uRADMonitor monitoring station

- **Local access**

Applies where the uRADMonitor unit is  part of a LAN network. The uRADMonitor unit serves an internal webpage accessible via port 80. To access the content open the unit's IP in your LAN network on a computer or a phone. The webpage served is as follows.
The JSON link points to a JSON formatted data source, that can be polled periodically to access the uRADMonitor unit readings. As this is done directly by connecting to the uRADMonitor unit, the server compensation layer is not used, so you would receive the raw readings. This is not the preferred way, and additional compensation must be implemented (eg. Temperature offset to compensate for internal heating, other corrections, etc). This functionality is offered rather for debugging and decentralized operation in critical situations such as server failure or malfunction.

- **Data access via the Server RESTful API**

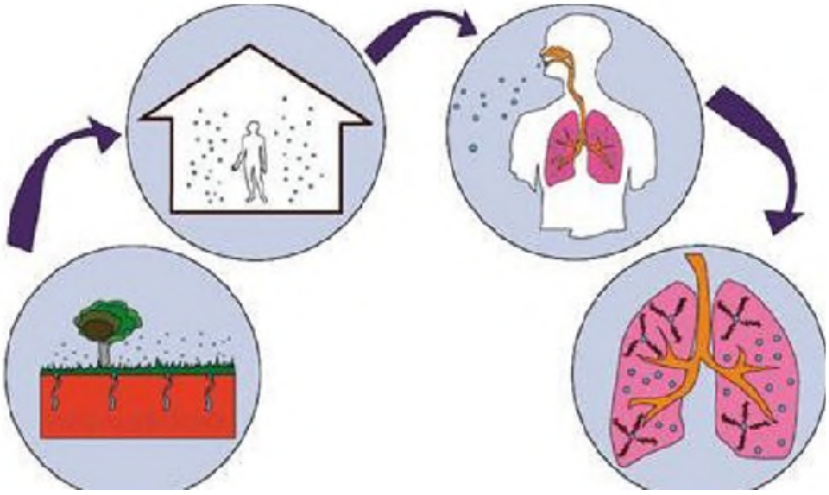
This is the preferred method of accessing data. The API does not require the client to know anything about its structure. Rather, the server must provide any information that the client needs to interact with the service. An HTML form is an example of this: The server specifies the location of the resource and the required fields. The browser does not know in advance where to send the information and does not know in advance what information should be sent. Both forms of information are completely provided by the server.

The API is called for both directions of data transfer, data transmission = upload and download = download. When we talk about access to data, we mean download. uRADMonitor devices use the API to upload their measurements to the server for further processing and storage in the database. The API is then used to access data by the frontend, mobile application, or third-party systems that need uRADMonitor data.

To use the API, please refer to the dedicated manual
https://www.uradmonitor.com/api
https://www.uradmonitor.com/dashboard/
For questions regarding the use of the API you can contact us at support@uradmonitor.com

## Health impact

When radon and its degradation products are inhaled, they emit alpha particles, which can damage living cells in the lungs, causing radon-induced lung cancer.
Thus, radon is the leading cause of lung cancer among non-smokers, according to EPA estimates. In general, radon is the second leading cause of lung cancer. Radon is responsible for approximately 21,000 deaths from lung cancer each year. About 2,900 of these deaths occur among people who have never smoked [1].



Radon circuit and health risk

The purpose of uRADMonitor is to generate completely transparent open data, to raise awareness of environmental issues among the population and to take responsibility in our relationship with the environment. The devices are of Romanian design and are produced in Timișoara. Early monitoring of Radon allows us to take mitigation measures, avoiding the negative impact on our health.

[1] Health Risk of Radon, EPA