



Noise Monitoring in Smart Cities

## Company

Sonitus Systems Limited specialise in the manufacture of precision monitoring systems for local authorities and the environmental industry. We provide rugged, reliable monitoring equipment supported by a user-friendly online reporting platform. This combination of measurement instruments and online tools delivers a complete noise monitoring and stakeholder management system.

Sonitus Systems have extensive experience with the development of advanced monitoring networks for measuring and analysing environmental noise. We operate on a number of large-scale projects throughout the UK, Ireland, Scandinavia, Australia, South America and Canada. We work in conjunction with numerous stakeholders such as local government, engineering consultants, building contractors and acoustic consultants. Our monitoring equipment and customised online reporting tools are used to monitor noise, ensure compliance with environmental targets and manage stakeholder relationships.

# Sound level monitoring with the EM2030

The EM2030 Sound Level Monitor is designed for long term, automated measurement of sound levels. Ideally suited for unattended monitoring projects, the EM2030 combines accuracy and simplicity to allow users to capture noise levels readings with the minimum amount of manpower and effort.



The EM2030 Monitor is an automated and ruggedized sound level meter. It is based on an embedded Linux operating system and uses our custom designed signal acquisition hardware to capture sound level readings. These readings are logged to on-board memory and subsequently uploaded to the Sonitus Cloud online platform.

The EM2030 is used on projects all over the world; from iron ore mining in India to municipal noise monitoring in Santiago. Our combination of reliable equipment and powerful online support tools make the system an ideal choice for long term sound level measurement.

The EM2030 comes ready to measure. All devices have a global SIM card already installed. Simply power up the monitor and readings are automatically captured and uploaded to our online platform. Users can access all readings, set up project alerts and manage all client interactions online.

The Sonitus Cloud platform can be used to deliver secure user interfaces for system administrators and simplified public websites for communicating with citizens. Our extensive expertise in acoustics and long-term monitoring of noise allows us to work with our clients to develop the best combination of hardware and software for your project.

**Automatic measurement** 

Automatic upload using Wi-Fi, GSM or Ethernet

Readings available online with secure and public interfaces

**Automatic compliance checks** 

Performance monitoring and alerts for power outage

**Email and SMS alerts** 

Audio capture option

Frequency analysis (1/3 octave) option

Flexible power options using mains, battery or solar

Rugged weatherproof design for all conditions

#### **APPLICATIONS**

Smart Cities Construction Mining Manufacturing

#### USERS

Local government Acoustic consultants Engineers Construction teams

#### LOCATIONS

London Manchester Dublin Belfast Stockholm Toronto Vancouver New York Santiago Goa Kuala Lumpur Bangkok Brisbane Melbourne Sydney

EM2030 Sound Level Monitor Specifications					
Accuracy	Class 1 to IEC 61672				
Microphone sensitivity	50mV/Pa – model 378B02				
Frequency weighting	Digital A-weighting and C-weighting				
Frequency range	20Hz to 20kHz				
Noise Floor	16 dB(A)				
Dynamic Range	16 to 121 dB(A)				
Linear Measurement Range	30 to 120 dB(A)				
Sampling Frequency	96kHz				
Measurement parameters	LEQ, L05, L10, L50, L90, L95, Lmax, Lmin at user selected intervals				
Measurement procedure	Measurement is automatic at power up				
Data storage	5 years (5-minute logging)				
Enclosure	IP65 die-cast aluminium				
Operating temperature range	-10°C to 50°C				
Humidity levels	0 to 95%				
Microphone power supply	Constant current ICP supply, 18V 4mA				
Microphone connection	BNC male to BNC male – up to 10m microphone cable				
EM2030 power supply	9V DC, 500mA				
Communications	4G, Wi-Fi and Ethernet				
Dimensions	110 x 140 x 60mm (W x L x H)				
Weight	< 800g				

### **Communication Options**

The EM2030 has several versatile communications options. A combination of communication links allows the user to deploy monitoring networks which leverage all available options for data upload and remote control.

#### 4G mobile link

Sonitus Systems have a worldwide partnership with Vodafone IoT. Our embedded IoT modem provides reliable mobile communications in countries all over the world. The hardware is compliant with all major international mobile regulations and has proven extremely reliable over years of use.

Our global IoT SIM card provides connectivity in over 200 countries. The roaming SIM card connects to the strongest local network, leveraging the best mobile connections in all areas. SIM contracts and administration are managed by Sonitus Systems, allowing end users to focus on running their project while we manage instrumentation details.

**CASE STUDY:** Sonitus Systems recently featured in a case study for Vodafone IoT technology. View the study here –

www.vodafone.com/business/media/document/1508881463607/vodafone-sonitus-casestudy.pdf

From November 2019, all equipment shipped from Sonitus Systems will be 4G compliant.

#### Wi-Fi link

The EM2030 has a built-in Wi-Fi connection which provides the user interface. The Wi-Fi interface allows users to configure settings and download readings using any mobile device or PC, without the need for dedicated software. Setup and calibration are performed using any web browser, with no need for physical access to the device. This means that on site interactions and set up can be done without the need for staff to access monitoring equipment.

- Simple on-site access
- No pood to work at holdh
- No need for physical access
- Use any phone or device
- No dedicated software

The Wi-Fi link can also be used to connect to local networks to return readings to the Sonitus Cloud.

#### Ethernet

Our sound level monitors can also be provided with an Ethernet connection to allow wired access to a local network. This is a factory option that should be specified before shipping. Wired networks generally provide faster and more reliable communications in the field.

#### Power options

Our experience on monitoring projects all over the world have allowed us to develop a number of solutions for powering equipment for remote deployments. The three primary options available to the end user are:

Mains power - from standard power socket or connection to public lighting

Battery - bespoke battery packs to allow portable monitoring stations operate independently

Solar power - stand-alone solar power stations capable of operating continuously all year round

# Sonitus Cloud



The key to our delivery of effective monitoring tools is our online reporting system, the Sonitus Cloud. Our automated measuring systems are linked to a live online platform which stores, analyses and reports noise levels.

In addition to the data reporting functions, our platform provides all the tools necessary for managing all stakeholder relationships and day-to-day interactions. This includes providing guest access to stakeholders, uploading records of on-site activity, auditing limit compliance and communicating results to key personnel.

This display and management system has been developed in conjunction with local authorities and smart city professionals working on major projects, where reliable technical measurement must be balanced with clear public information.

#### Secure reporting

All instrumentation is capable of real time, web-based reporting of readings. Reports showing environmental rating and quality will be automatically made available through this online system.

Customers and end users have access to a secure account on the Sonitus Cloud platform. This secure login gives access to all administration features of the monitoring network and provides detailed measurement data.

The project team have access to all measurement data, for analysis or download. Full control over the administration of the project is done through the Sonitus Cloud account.



#### Online demo

The Sonitus Cloud platform can be tested at any time using our online demo account. The details are below:

Link: app.sonitussystems.com Username: demo@sonitussystems.com Password: demo1234\*

\* details may change

#### Custom branded interface

The Sonitus Cloud can be rebranded to allow our clients deliver monitoring services under their own branding and logo. This has proven particularly useful for consultancy customers who deliver a noise monitoring service as part of a larger offering to end clients. Both the secure client interface and the community information site can be rebranded with the customer's logo and colour scheme. This is an optional feature and is at the full discretion of the customer. Some examples are shown below.

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#### Public Information System – Simple and Reliable

Sonitus Systems have built numerous public information websites for city councils and research groups. These websites take the readings from the monitoring networks around the city and simplify access to the information for the general public. These sites contain dedicated tools to communicate environmental information with citizens and both noise and air quality stations can be included.



#### Reliability

Our monitoring system has been proven over years of long-term testing. The statistics below show the performance of a network of 10 urban monitoring stations over 12 months.

Network Performance						
Data capture rate	97%					
Day time	98%					
Night time	97%					
Max capture rate	99%					
Min capture rate	94%					

All sites involved in the study were on mains power at municipal buildings. Data was uploaded over GSM link and stations were serviced once every 12 months.

The underlying data for this network evaluation is publicly available and can be shared upon request.

## Client Platforms and Third-Party Systems

We understand that some customers have already invested in developing their own cloud platforms for reporting all kinds of data. The Sonitus Cloud platform can send noise measurements to third party applications if required. All measurement data can be exported to the end client's application over API or file transfer.

## Offering

Sonitus Systems supply noise monitoring stations comprising monitoring units, weatherproof microphones, environmental cabinets, power supplies, solar panels and all accessories to install and maintain a noise monitoring network.

We work with our customers to understand the needs of the end client and will provide all equipment necessary to ensure smooth and efficient set up of the proposed noise monitoring network.

We draw on our considerable experience in this area to advise where appropriate and to identify opportunities to set the our customers' projects apart as world leading examples of Smart City noise monitoring.

## Calibration and Maintenance

The EM2030 requires laboratory every 2 years, in line with international standards. The EM2030 can be calibrated at most qualified laboratories that service sound level meters under the IEC 61672 standard. Sonitus Systems can work to train third-party laboratories to service the equipment.

We recommend that the microphone windshield be replaced once per year. This should coincide with a planned maintenance visit to check the status of the equipment. We supply all spare parts envisaged for normal maintenance of the system. These can either be delivered at the start of the project or ordered as needed.

This maintenance work is usually carried out by a local team or an agreed third-party maintenance partner. Sonitus Systems can provide full training and ongoing technical support to any partners.

Sonitus Systems also provide full training to the customer teams and the end client staff on all aspects of the hardware and software systems.

Training can be delivered in person and over webinar.

## Case Studies and Examples

Sonitus Systems have delivered a number of monitoring networks to domestic and international customers. We have worked directly as project managers and also through overseas partners to implement reliable, effective noise monitoring projects. Some key examples of these projects are outlined below.

#### Dublin City Air and Noise Monitoring

Sonitus Systems have operated a network of noise monitoring stations in Dublin, Ireland for over 10 years. The network consists of 20 permanent stations which are installed at libraries, parks and other noise sensitive locations around the city.

The monitoring network is supplemented by a public information website, which is used to communicate measurement information and noise policies to the general public. In 2019 Sonitus Systems developed an updated version of these community information tools which includes data from the city's air quality monitoring network.







# Automated city-wide measurement

**ROLE:** Monitoring equipment sales and installation project manager.

Ongoing provision of website and calibration services.



#### Santiago

In November 2018 Sonitus Systems supplied a network of 7 monitoring stations to the Ministry of the Environment, Chile. These stations were installed as part of the Ministry's efforts to tackle noise pollution in the city of Santiago.

The Ministry of the Environment tendered for a noise monitoring solution including measurement stations and a remote online reporting service. Sonitus Systems partnered with a local company, Acustical S.A. for the tender process. Acustical S.A. were successful in the tender and were awarded the contract.

Sonitus Systems supplied all monitoring station and accessories. The Sonitus Cloud platform was integrated with the Ministry's own online platform for real time noise level reporting.

In 2019 the network was extended by a further 3 stations through a local university. These units are not yet displayed on the public platform. It is planned to extend the public network by a further 5 stations in 2020.

**PROJECT:** Santiago Noise Monitoring

WEBSITE: ruido.mma.gob.cl

PROJECT VIDEO: https://youtu.be/pNlyhDMrDF8 (in Spanish)







24/7 automated monitoring

Online integration

Remote support

Long term support contrac



**ROLE:** Equipment sales to tender partner.

Training to technical staff.

Ongoing support of remote monitoring tools.





Sonitus Systems have delivered a number of similar projects throughout the UK and Ireland for local authorities, universities and multinational companies.

## Partner profile

Sonitus Systems can act as equipment supplier and technical support partner to the customer teams. We are available to assist with preparing final tender proposal for the end client.

In addition to support at the tender stage, we can travel to meet with end clients in order to clarify the final details of all installations.

# Get in Touch

## Sonitus Systems

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