PRODUCT DATA

EMU - Environment Monitoring Unit

The EMU Environment Monitoring Unit is ideal for anyone who needs to continuously monitor multiple environmental parameters.

Covering noise, weather, ground vibration and blast overpressure measurement all in the same unit, users can demonstrate compliance with operating limits, manage activities to maintain compliance, and capture data over long periods to inform planning and manage external stakeholders.

The EMU provides the highest quality precision measurement data compliant with

the widest range of applicable legislation. Designed to operate standalone, or in conjunction with other sensors as part of a Omnis or ANOMS managed service, it may be deployed as either a permanent monitor or easily relocatable portable monitor. Each unit comes complete with sensors, analyzer, storage, battery and cellular communication in a rugged waterproof and dustproof enclosure so you don't need to purchase, connect or operate anything else to get going – simply unpack, connect the sensors, switch on and start acquiring data.

| USES | Permanent and portable monitoring of construction, mining, airports, ports and other industrial activities, etc. requiring unattended outdoor measurement, for example: |

- Ensuring compliance with noise and vibration legislation for all purposes in the outdoor environment
- Assessment of background levels
- Combined vibration and blast overpressure monitoring in mining and demolition
- Protecting against structural damage during construction activities
- Ambient vibration monitoring around sensitive imaging equipment at hospitals/manufacturing

FEATURES

- Noise, weather, vibration and blast over-pressure in a single outdoor monitoring unit delivers ease of use and cost savings
- Fully integrated solution combing measurement, remote communication, system monitoring and power supply, so procurement, setup, operation and maintenance is simpler
- Up and running in seconds
- Powered by mains power, external battery pack
- Option for continuous operation on solar power
- Integrated backup battery maintains operation under solar power at night or while external batteries are changed
- Permanent or portable configurations, ground or pole mounted

High Quality

- Precision measurement covering wide range of noise and vibration measurement standards
- Continuous uninterrupted measurement with self-monitoring and auto-restart capabilities for increased uptime and minimal gaps in data
- Robust, IP67 chassis for use in harsh conditions reduces the risk of damage or unit failure
- Independently Accredited IEC61672:2013 Class 1 type approved.
- Vibration: high sensitivity (VC-E) with standard transducer
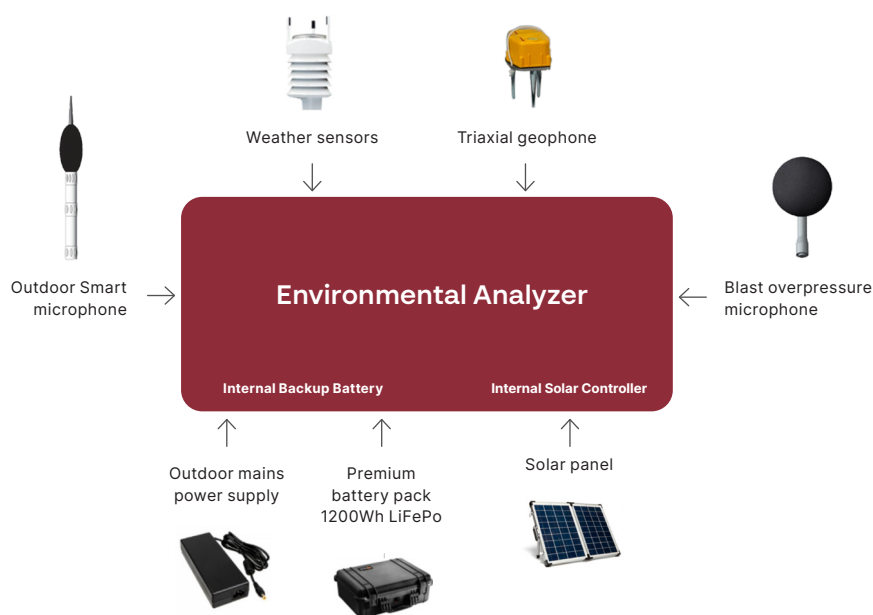
Easy to operate

- Easy to use: connect the transducer (microphone, geophone, weather station) and switch it on you're recording data and streaming it automatically over its cellular router
- Operation status and problem diagnoses can be done on the EMU screen or connect to the web interface
- Remote sensor check ensures data integrity (noise & vibration only)

- Seamless integration with the EVS suite of software platforms for long term monitoring with multiple locations - switch on the unit and it automatically starts delivering data
- Standalone operation with embedded web server giving:
  - Real time display of data, remote control
  - Transfer of information for reporting and post processing in standard applications like Microsoft Excel, Brüel & Kjær PULSE Reflex and MATLAB, and with predefined report formats (PDF and CSV)*
- Immediate and fast data transfer and alert generation if thresholds exceeded

* Formats available dependent on measurement parameter

INTRODUCTION

The Environmental Monitoring Unit (EMU) is capable of continuously monitoring noise, weather, ground vibration and blast over-pressure all in the same unit. It is a fully integrated solution combining measurement, communication, system monitoring and power supply to ensure that you're up and running in seconds. It provides the highest quality measurement data covering wide range of noise and vibration measurement standards. Designed to operate standalone, or as part of a Omnis or ANOMS managed service, it may be deployed as either a permanent monitor or easily relocatable portable monitor.

Weather sensors   Triaxial geophone

Environmental Analyzer

Outdoor Smart microphone →   ← Blast overpressure microphone

Internal Backup Battery   **Internal Solar Controller**

Outdoor mains power supply   Premium battery pack 1200Wh LiFePo   Solar panel

NOISE

The EMU interfaces to the Outdoor Smart Microphone, with easy maintenance and calibration. It connects directly to the EMU providing the real-time ½ s or 1s parameters that enable the complete unit to fulfill the strictest measurement standards (IEC 61672 Class 1) and give you results you can trust. The logged parameters, including broadband and spectral Leqs and SPLs with multiple frequency and time weightings, as well as the raw signal, are sent live to the EMU for additional processing, storage and data transfer.

The basic design principle is ease of use. The Outdoor Smart Microphone fits directly on top of standard, widely available, 1" water pipe or can be mounted on a tripod. The microphone's exterior housing provides high protection against corrosion. The microphone's long-term stability is suitable for unattended outdoor use. The windscreen and bird spike can be removed in seconds, enabling easy acoustic calibration of the microphone using a compatible Sound Calibrator. Frequency response is precisely controlled such that, with the appropriate linearization, IEC 61672 Class 1 requirements are fulfilled.

Noise event detection parameters can be set in the EMU to capture specific deviations from background levels and can be set up to be compliant with ISO 20906, ICAO Annex 16.

The Outdoor Smart Microphone is set up and controlled from the EMU. Further monitoring and analysis is also performed by EMU.

Outdoor Smart Microphone

WEATHER

EMUs can simultaneously monitor weather conditions from a connected weather station and store the data with noise information for later use. These data are useful for determining the validity of measured noise data and ensuring that measurements are not contaminated by wind noise, increased noise due to heavy rainfall and that temperature and humidity comply with the standards for good measurement practice.

Two types of weather station are available for use with EMUs – one with the two most used parameters: wind speed and wind direction for correlation with wind data; and another with six parameters: wind speed, wind direction, temperature, pressure, humidity and rainfall for full correlation and analysis. The weather stations include a 2m cable to connect to the EMU and an adaptor for mounting on a pole or tripod.

Wind speed / Direction

Wind speed / Direction, Temperature, Pressure, Humidity, Rainfall

VIBRATION

When used with a geophone, the EMU continuously measures ground vibration in three axes, providing metrics for a wide range of applications including monitoring structural damage to buildings, assessing human response to vibration, or monitoring background vibration to ensure sensitive equipment operates correctly.

It continuously measures in compliance with ISEE (2 to 250 Hz), DIN 45669– 1 (1 to 315 Hz), DIN 45669– 1 (1 to 80 Hz), ISO 2631 and a range of other standards. The system's extensive dynamic range from 2 µm/s (VC-E) to over 300 mm/s ensures full coverage of vibration velocity levels. The EMU logs data at 1 second intervals, creates periodic reports at intervals of between 1 second and 60 minutes, and generates, within seconds, vibration alerts in real-time, based on user-configurable trigger levels.

A variety of measurement parameters are available including velocity and acceleration in each axis, expressed as Peak, RMS and in SI (e.g. mm/s) or Imperial (e.g. in/s) units. The dominant frequency in Hz is calculated using either zero crossing frequencies or with FFT depending on the standard chosen. A wide range of measurement weightings can be selected depending on the measurement standard chosen.

Vibration events limits are either a simple threshold on any parameter or compliant with DIN 4150-3. Any or all axes of measurement can be set to trigger an event. If a blast overpressure microphone is attached, this data is added to the event report.

The EMU comes with ground spikes and a surface mounting plate for the geophone to ensure measurements are correct and valid. Optional items include a geophone wall mount, geophone extension cables and larger antenna options for use in poor cellular coverage areas. A robust, outdoor Blast Overpressure Microphone can be added to the unit (see below).

BLAST OVERPRESSURE

An outdoor Blast Overpressure Microphone can be added to the unit to enable high level measurements of blast overpressure simultaneously with vibration to enable compliance monitoring of blasting activities around mines. It provides a durable and robust solution that, unlike many other industry-standard solutions, continues to meet the ISEE requirements even after being used for a long time in the field.

In addition, the VMT with this microphone is a complete, robust and reliable blast monitoring solution that is easy to operate. The combination fully meets the requirements of the International Society of Explosive Engineers, ISEE 2017 for ground vibration and blast overpressure monitoring.

For more information about the Blast Overpressure Microphone, see the appropriate Product Data sheet.

Blast Overpressure
Microphone

COMMON FUNCTIONALITY

The EMU has some common functionality for noise, weather, ground vibration and blast overpressure.

Events can be detected based on vibration or on noise. They are based on a selected parameter that exceeds a trigger level for a user-defined period of time. Events include maximum levels and time of maximum and fulfil relevant standards for noise and vibration. The EMU can be set up to send alerts via SMS or email. The details of the event detection and the available reports are dependent on how the product is used.

Data can be exported for viewing, processing and reporting for any user-defined period either Excel, PDF, WAV, MATLAB or CSV format. The data sets include:

- Periodic Reports, configurable from 1 second to 60 minutes with selected measurement data

- Sensor Check reports: Results of the sensor checks, which can be performed automatically several times a day and manually initiated as required

- EMU Health Reports on an hourly basis including information on measurement uptime, battery, clock and cellular signal strength. When used with Omnis and ANOMS, EMU system Alarms related to power and internal temperature are available in real time.

Further details can be found in the specifications.

Data can be streamed over LTE cellular (3G/4G) communication to the central control server with Envirosuite's noise management solutions. Once on the server, Envirosuite's central control software client can access and analyse the data. In addition, the EMU's user interface can be viewed directly in a web browser allowing simple remote access to data, listening to the signal, and the status of the EMU from any PC, tablet or smart phone. The EMU can be remotely upgraded to ensure it has the latest software.

The EMU is housed in a rugged aluminum enclosure, water- and dustproof to IP 67, and can operate in ambient temperatures from –20 to +53°C, making it suitable for harsh environments, and reducing the risk of insect ingression. It is a complete unit with sensor conditioning, processing, storage, GPS and wireless communication. All suitable antennas are included, so you simply insert a SIM card to connect to a cellular network. The unit is service-friendly, with simple replacement of field replaceable components in the event of failure, thus requiring no specialist expertise. Correct functionality can be seen on the EMU screen, showing battery, cellular and connectivity status. To confirm data validity, a sensor check can be scheduled at regular intervals and manually initiated as required, and results stored. In addition, the robust and reliable EMU has a heartbeat function to ensure stable operation and, if that fails, its self-healing function ensures continued operation with minimal manual intervention and down time. Hourly instrument status reports include the status of the battery, sensor

check, count of measurements, and wireless and GPS signal strengths. The EMU's clock has a maximum deviation of 1 second relative to the world clock provided there is GPS or communications network coverage.

When used with Omnis and ANOMS, EMUs have a number of alarms that are triggered as soon as the related condition is detected so users can quickly respond to instrumentation issues.

The unit is typically connected to mains power. Alternatively, it can be operated for over 24 hours, depending on use, with its integrated, robust LiFePO4 battery. Directly connect it to solar power systems or external batteries for continuous operation. The EMU is self-starting when power is interrupted, so you do not have to visit the location to turn it on. To enable extended operating life, the EMU can operate in "broadband batch mode" where only broad band data is measured and transmitted every periodically.

The EMU's display and interface eases initial setup and servicing. For noise and blast overpressure, field calibration is done using a sound calibrator. In addition, to confirm data validity, a sensor check is made on a regular basis, storing results for later download and investigation. Normally done daily, this sensor check can be scheduled, if required, several times per day at user-specified times. In addition to measurement data, system health is logged and, where necessary, the unit performs corrective actions to ensure optimal uptime and help make any troubleshooting efficient.

Omnis, ANOMS & Standalone

The EMU can operate standalone, or as part of a Omnis or ANOMS managed service.

Standalone

For stand-alone use, the EMU has a built-in web server which can be accessed via wi-fi from a laptop or smart device. The same interface enables set-up, display and operation anywhere, as well as data transfer to standard applications like Microsoft® Excel®. Real-time data, updated every second, can be viewed.

The EMU may be setup using cellular connection to the unit from any web browser on a PC, laptop or smart device. The built-in web server provides easy to use configuration profiles to set-up including measurement indices, reporting formats optimized to several standards, and trigger level configurations for alerts and reporting. It is also possible to set up at which times of day trigger levels are active.

The event may be set to trigger an SMS to a smart phone with an overview of the alert and a link to the alert report for viewing. The EMU can also automatically send the PDF report via email. The EMU can present the measured data against a range of trigger or compliance curves.
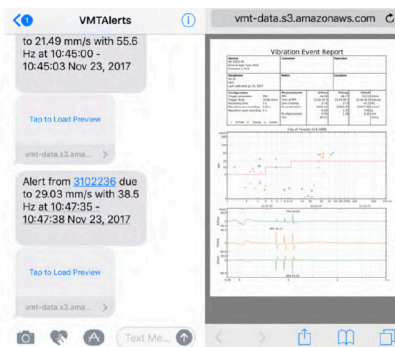
Noise and vibration events occur when levels exceed defined limits easily set up within the browser using a simple threshold on any parameter or compliant with relevant standards. When triggered, the EMU automatically records the noise and vibration waveforms with a pre- and post-trigger to ensure the full waveform is captured. The data is processed and a PDF report produced summarizing the event in

accordance with one of a range of specific standards or formats.

Omnis and ANOMS

The EMU is specifically designed to work seamlessly with Envirosuite's Omnis and ANOMS managed services. Simply switch the unit on and it automatically connects, configures itself and starts delivering data as part of a multi-unit system. All control of the EMU is done remotely including setup, remote display, operation and reporting.

The EMU provides the measured data and metrics required by relevant standards and legislation, and signal recordings for presentation or investigation. Data can be streamed continually and with minimal delay or, alternatively batch-transferred, either at regular intervals or when the unit is connected to the server, either physically or virtually.
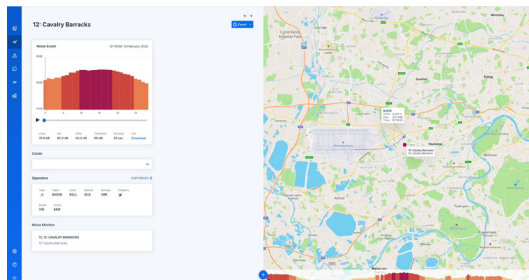
Noise events, with their associated metrics and signal recordings, and system condition alarms are generated within seconds of them occurring and analysed, visualized and reported by the managed service. The EMU can be set up with different trigger levels for different times of the day. The EMU can also provide data for advanced server-side processing. For more information on its use with our systems, please refer to appropriate system product documentation.

CONFIGURATIONS

The Environmental Analyzer comes in three hardware variants: the complete solution, Environmental Analyzer, Noise Analyzer for measuring noise and weather only, and a Vibration Analyzer for vibration and blast overpressure. Each of these configurations are available in different regional versions that ensure that the unit comes with suitable communications and power hardware.

In addition, a LAN-only Noise Analyzer is available. This is identical to a standard unit except that it can only communicate via a LAN cable directly to a network, or to an external LAN-connected router.

Analyzer	Noise	Vibration	Blast Overpressure	Weather
Environmental Analyzer	Y	Y	Y	Y
Noise Analyzer	Y	N	N	Y
Vibration Analyzer	N	Y	Y	Y

Based on these, we have built complete permanent and portable monitoring terminals containing everything you need to be ready for deployment and use.

Configuration vs Function

The EMU is a complete solution for permanent or long-term noise monitoring. Used with an optional compact and lightweight tripod for mounting the Outdoor Smart Microphone it is suitable for shorter term monitoring, for example for periods of a few hours to several weeks. The analyzer can be padlocked to a solid object to reduce the risk of theft.

A complete solution for vibration monitoring, Vibration Monitor, including a padlock for protection and a ground mounting plate is also available.

A range of useful accessories to provide complete solutions for a range of situations are available including tripods, analyzer wall/posts mounts, extension cables, tripods, geophone wall mounts, tripods, solar panels, external power packs, lightning protection, enhanced antennae, etc. For compliance with specific legislation, standards and de facto good practice, the microphone must be placed at, for example, 4 or 6 m height and at some distance from large reflecting surfaces. Envirosuite can supply a range of alternative masts for permanent or temporary mounting of the analyzer and correct positioning of the microphone. These include ground-mounted, wall-mounted and telescopic masts. For continuous monitoring for periods of one week or more, mobile configurations, typically trailer mounted, are available as special orders enabling independent operation. Please contact your Envirosuite representative for more information.

EMUs are delivered with an internal battery so that they can function even when there is no usable local power source or mains power has been disrupted. The internal battery is charged whenever sufficient

power is applied to the EMU. Additionally, the EMU can be powered from a variety of sources connected through the DC supply input. Thus, solar panels can be added to the EMU, which enables lower power use or even permanent 24/7 operation. Additional batteries can be added to provide sufficient backup for operation in overcast conditions, even during winter months.

SERVICE AND SUPPORT

Envirosuite offers a wide range of support and services to ensure efficient and problem-free operation and traceable measurement and reporting. These include a range of calibration services (accredited and traceable), repairs, conformance tests, warranty extensions, installation, training, a help line and equipment rental. These services can be performed on site, locally or at authorized centres.

Annual and long-term service packs for EMUs and for entire environmental management or monitoring systems are also available. In addition, EMUs may be operated from systems hosted by Envirosuite, such as WebTrak for airports and Omnis for urban and industrial applications.

All specifications are valid with EMU Software Version 4.4 and Hardware Version 2

Noise

Conforms with the following National and International Sound Level Meter Standards:

- IEC 61672-1 2013 Class 1. Conforms to the following National and International Frequency Analysis Standards:

- IEC 61260 2014, 1/3-octave. Bands Environmental Monitor Unit is connected to the Environmental Analyzer through a cable

Measuring Ranges (Broadband)

- **Dynamic Range:** 1 kHz pure tone signal, A-weighted: Noise floor to max. level, 17 dBA – 144 dBA

- **Linear Operating Range:** In accordance with IEC 61672, A-weighted: 1 kHz: 28 dBA to 144 dBA

Self-Generated Noise Level

Typical broadband values at 23°C for nominal microphone open-circuit sensitivity:

Weighting	Microphone	Electrical	Total
A	14.0 dB	12.1 dB	16.2 dB
C	13.0 dB	15.9 dB	17.7 dB
Z (10Hz –20 kHz)	14.4 dB	20.8 dB	21.7 dB

Calibration

Initial calibration is stored for comparison with later calibrations

Acoustic calibration:

Using Sound Calibrator AU-4231, the calibration process automatically detects the calibration level

Automatic checks:

Performed as required (up to every minute) using Charge Injection Calibration (CIC)

Basic Measurements

- **Logging Rate:** ½ or 1s broadband and 1/3rd-octave spectral data

- **Detectors:** Parallel detectors on every measurement:

  - A-weighted: Broadband detector channel with Fast, Slow and Impulse exponential time weighting, one linearly averaging detector and one peak detector

- C- or Z-weighted (switchable): As for A-weighted Overload Detector: Monitors the overload outputs of all the frequency weighted channels

A	C	Z	
LAeq	LCeq	LZeq	Equivalent continuous sound level
LAE	LCE	LZE	Sound exposure level (SEL)
LAS,max	LCS,max	LZS,max	Max slow time weighting level
LAF,max	LCF,max	LZF,max	Max fast time weighting level
LAI,max	LCI,max	LZI,max	Max impulse time weighting level
	LCpk	LZpk	Peak level

Measurements:

Frequency Analysis

1/3 octave band Centre Frequencies: 16 Hz – 16 kHz in accordance with IEC 61260:2014, Leq parameter

Event Detection

ISO20906 compliant

- **Settings:** Individual setting for each hour in a 24-hour period
- **Event Start Trigger:** Leq or L(SPL) with

Sound Recording

Continuous audio recording 48kHz 32bit

Format: WAV (Omnis/ANOMS only)

Outdoor Smart Microphone

Extension Cable to Analyzer: Up to 30 m without degradation of the specifications

Display: EINK display shows LAS, LAF, LCS, LCF, Under range, Overload, heartbeat

Noise Reports[1,2]

Periodic:

- Start time; Stop time; Lmax time
- Lmin(SPL) over the period; Lmax(SPL) over the period; Total Leq; eight LN values (L1, L5, L25, L50, L75, L90, L95, L99); Level distribution,
- Leq Event; Leq non event value;
- Overload indicator, under-range indicator

1. Which data is available is dependent on the central system management software the EMU is used with. For more information, see the relevant central system management software's Product Datasheet
2. All trigger levels, Leq values and SPL values can be with any available frequency and time weightings

Event:

- Event data samples are Leq values if the trigger is set to Leq or relevant L(SPL) values if the trigger is set to SPL.

- Data: Based on ½ or 1 s logging.

- Start time; Stop time; Event data; T10 Duration; LE(T10) calculated; Leq Spectrum; LE calculated; Maximum Leq ; Time of maximum of Leq; Maximum of L(SPL); Time of maximum of (SPL);

- Tonal metrics EPNL; Total Leq; PNL and PNLT data

- Event spectra; Number of event spectra

- GPS: Latitude; Longitude; Altitude

Distribution: A range of resolutions from 1 min to 1 hour in CSV format.

Percentiles: A range of resolutions from 1 min to 1 hour in CSV format.

1/3 octave: A range of resolutions from 10 ms to 1 s in CSV format.

Audio Recording: 24 bit in MP3 or WAV format.

High Resolution: 48kHz sampling, available for last 7 days.

Band Limited: 8 kHz sampling for older recordings

CIC: CSV format.

Calibration: CSV format

Vibration

Sensors

Triaxial geophone, optional blast overpressure microphone

Processing and Analysis

Signal processing with sensor in compliance with ISEE (2 to 250 Hz), DIN 45669–1 (1 to 315 Hz) and DIN 45669–1 (1 to 80 Hz)

Supported Measurement Standards: ISO 4866, DIN 4150-2, DIN 4150-3, BS–7385, DIN 45669–1, ISO 2631 Parts 1, 2 & 4, BS 6472 acceleration, ISEE-2017, SBR 002.13, SBR 001.10, NS 8141-1:2001, NS 8141-2:2013, NS 8141-3:2014

Vibration Signal Recording: Continuous signal recording 2kHz

Format: 3-channel in MATLAB compatible (lossless compressed) or calibrated WAV format

Measurement weighting: DIN 415669-1 1-80Hz, DIN 45669-1 1-315Hz, DIN 45669-1 4-315 Hz, ISEE 2-250Hz, ISO Unweighted 0.5 – 80Hz, ISO Unweighted 1 – 80 Hz, ISO 2631-4 Wd Wb, ISO 2631-1 Wd Wk, ISO 2631-2 Wm, RAW (linear 0.1-400 Hz)

Noise floor: <1.8 µm/s PPV

Dynamic Range: 1.8 µm/s up to 312 mm/s PPV Accuracy: ±5% or 0.5 mm/s PPV between 1 and 315 Hz, whichever is smaller.

Resolution: 0.1 µm/s

Sampling Rate: 24 bit up to 8 ksps

Measurement quantities:

- Peak Particle Velocity, PPV
- Zero-crossing frequencies
- FFT-based frequency detection (DIN 4150-3)
- RMS Velocity
- RMS Acceleration
- KBFti, KBFT, KBFMax

Compliance Curves:
- City of Toronto 514-2008
- DIN 4150-3
- NBR 9653
- USBM RI 8507
- BS 7385-2
- User defined 1/3 Octave RMS Velocity profile
- File formats: Microsoft® Excel®, CSV, PDF, Calibrated WAV files, MATLAB®
- Compatible with Omnis monitoring service and Brüel & Kjær PULSE Reflex

Operating Modes:
- Broad-band batch mode: batch communications every 15 minutes, broadband measurements only
- Full Power mode: all measurement data, continuous streaming communications

Vibration Events
- Triggered from defined vibration level in any measurement parameter.
- Triggered from user-definable 1/3 Octave RMS Velocity profile
- Maximum PPV in each axis, zero-crossing frequencies and time of maximum
- Vibration waveform in each axis between 1 to 3 seconds with pre-trigger
- Alerts via SMS or email
- Event report templates in PDF format with trigger levels visible (for some triggers)

Vibration Periodic Reports
- Maximum PPV in each axis, zero-crossing frequencies
- Time of maximum level

Communications

Web server - Remote access, display and download Real-time Dashboard updated every second, subject to sufficient communication network bandwidth

- Dominant frequency - XYZ
- Peak Particle Velocity - XYZ
- Peak Acceleration – XYZ
- Peak Vector sum – XYZ
- Real time graph of one of the above parameters
- Real time graph of velocity waveform

Blast Overpressure

Sensor: ½" microphone with stainless steel diaphragm

Microphone Noise Floor: 75 dB (112 mPa)

Microphone Maximum input: 160 dB peak SPL (2000 Pa)

Microphone frequency range: 2 Hz to 250 Hz (-3 dB)

Accuracy: ISEE compliant

Other features:
- Windscreen
- Anti-bird spikes
- 3 m microphone cable
- Field calibration with acoustic calibrator

Environmental

Connectors are water- and dust-proof to IP 66

Weather

Inputs: Weather Station (6 channels) or Weather Station (2 channels)

Weather Reports:
- Wind speed; Wind direction; Temperature; Relative humidity; Atmospheric pressure; Liquid precipitation
- 1-minute resolution, wind speed and direction can be set to 1-second resolution
- Additional Data for ANOMS: Wind speed at time of event maximum Leq; Wind direction at time of event maximum Leq; event Humidity; event Temperature
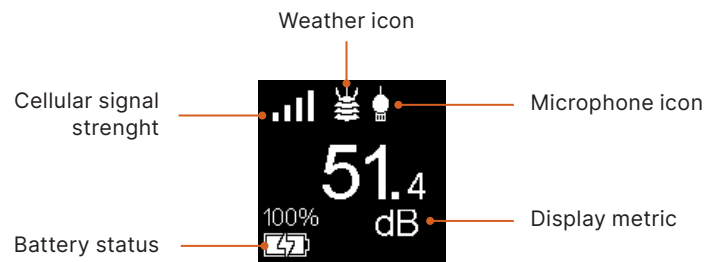
Common Specifications

Configuration

- Password reset
- Instrument reboot
- Time zone
- Measurement units
- Measurement Weighting

Export

- User defined time period of noise or vibration level
- Noise or Vibration waveforms, events, periodic reports, 1/3 octaves and system health
- Transferred in either Excel, PDF, WAV, MATLAB, CSV

Instrument Display

Weather icon

Cellular signal strenght

Microphone icon

51.4 dB

100%

Battery status

Display metric

Connections

- Microphone/Geophone/Blast Overpressure Microphone
- Auxiliary: weather station
- External 4G antenna[*]
- External GPS antenna
- Mains power

Processing and Analysis

Features:

- Sensor check
- Built in Web server for set-up, display and data download
- Heartbeat and self-healing operation

Communications

- 2G/3G/4G/LTE cellular with SIM card (not supplied)

[*] Not available in LAN-only variant

Storage

- 256GB of data storage: all vibration measurements, alerts and data
- Retention duration depends on what sensors are active

For signal recordings and data logged < 1s resolution:

- High resolution audio recording (MP3 & WAV): 7 days
- Band Limited waveforms (Noise, Vibration & Blast): 3 months
- 500ms noise broadband period: 3 months
- 10 ms noise broadband period: 7 days
- 125 ms noise broadband period: 7 days

All other output files except those indicated above:

- EMU - Noise Only: 8 months
- EMU - Noise + Weather: 8 months
- EMU - Vibration Only: 4 years
- EMU - Vibration + Blast: 2 years
- EMU - Noise + Vibration + Blast: 3 months
- EMU - Noise + Vibration + Blast + Weather: 3 months
- EMU - Noise + Vibration: 4 months

System Information

Diagnostics, battery-life, temperature, wireless signal strength, uptime, unit health

Reports[3,4]

Periodic Reports:
- Periods available:
- 10ms, 125ms, 500ms, 1s, 1min, 5min, 10min, 15 min, 20min, 30min, 60min
- Periods <1 s are not available for vibration measurements
- Data is dependent on whether noise or vibration is selected

Events
- Report Data is dependent on whether noise or vibration is selected
- Alerts via SMS or email

Vibration Spectra (CSV format)
- Velocity: RMS and PPV data in 3 axes
- Acceleration: RMS data in 3 axes
- Air Overpressure: LPk data

---

3. Which data is available is dependent on the central system management software the EMU is used with. For more information, see the relevant central system management software's Product Datasheet

4. All trigger levels, Leq values and SPL values can be with any available frequency and time weightings

Weather Reports:

- Weather (with optional Weather Station: Wind speed; Wind direction; Temperature; Relative humidity; Atmospheric pressure; Liquid precipitation. 1-minute resolution, wind speed and direction can be set to 1-second resolution

- Weather (with optional Weather Station: Wind speed; Wind direction. 1-minute resolution: Wind speed and direction can be set to 1-second resolution

- Additional Data for ANOMS: Wind speed at time of event maximum Leq; Wind direction at time of event Temperature

Sensor Check Reports:

Sensor check. Start time; Leq during check; Leq before check; Leq after check Instrument Health Reports: One-hour reports with Count of measurements; Battery level (%); Battery voltage; Clock difference to NTP server; Cellular signal strength; internal temperature, pressure and relative humidity of analyzer; Firmware version

EMU Alarms (Omnis and ANOMS only):

Power off/ on, Battery voltage below/ above set value, Temperature above/below set value, Router power off/ on

Version 1 Hardware (Vibration only):

- 15-hour battery backup in Broad-band Batch mode (6.1 W)

- 7-hour battery backup in Full Power mode   (12.4 W)

Mains Power:

90 – 264 VAC

External DC Power Supply:

Voltage: 8 – 24 V DC

External AC Power Supply:

- Voltage: 90 – 132 and 180 – 264 VRMS,

- Auto ranging

- Frequency: 47 – 66 Hz

Operating Temp. (ambient):

- With Battery: –20 to +53°C (–4 to +127°F)

- With Power Supply Plugged In: –45 to +53°C (–49 to +127°F)

- Recommended to store at room temperature

- All temperatures are indicated in shade and subject to operating conditions

Physical

Size
140x200x155 mm (5.5 × 7.9 × 6.1")

Weight

Without sensors 4kg

Geophone

Weight: 0.80 kg (1.77lb)

Size: 113mm x 85mm x 65mm excluding Mounting plate and Ground Spike

Outdoor smart microphone

Weight: 1.3 kg (2.9 lb)

Size: 590mm x 38mm x 38mm including Bird Spike Wind Shield Assembly 145 x 75mm x 75mm

Pole/Wall Mounting Kit: 1.4 kg (3.1 lb)

Environmental

- Water- and dust-proof to IP67 (microphone capsule IP44)
- Integrated LiFePO4 battery (ROHS compliant)

COMPLIANCE WITH STANDARDS

CE FC ♻ 🗑	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives
	RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME
	China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China
	WEEE mark indicates compliance with the EU WEEE Directive
Safety	EN/IEC 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements
EMC Emission	EN 61326–1 (2013): Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements ▪ EN 301489: EMC standard for radio equipment and services: ▪ EN 301489–1: V1.9.2 (2011–09): Common technical requirements ▪ EN 301489–17: V2.2.1 (2012–09): Specific conditions for broadband data transmission systems ▪ EN 301489–24: V1.5.1 (2010–10): Specific conditions for IMT-2000 CDMA Direct Spread (UTRA and E-UTRA) for mobile and portable (UE) radio and ancillary equipment CISPR 22: Information technology equipment – Radio disturbance characteristics of information technology equipment. Class B Limits CISPR 25: Vehicles, boats and internal combustion engines – Radio disturbance characteristics – Limits and methods of measurement for the protection of on-board receivers EN 55022: Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement. Class B equipment, device and apparatus FCC Rules, Part 15: Complies with the limits for a Class B digital device Canadian ICES–003: Information technology equipment (including digital apparatus) — Limits and methods of measurement IEC 61672 –1, IEC 61260, IEC 60651 and IEC 60804: Instrumentation standards
EMC Immunity	EN 61000–4–3: A2 (2010): Electromagnetic compatibility (EMC). Testing and measurement techniques – Radiated, radio frequency, electromagnetic field immunity test EN 61326–1 (2013): Electrical equipment for measurement, control and laboratory use – EMC requirements Note: The above is only guaranteed using accessories listed in this document
Temperature & Humidity	IEC 60068–2–1 & IEC 60068–2–2: Environmental Testing. Cold and Dry Heat Operating Temperature: –20 to +53°C (–4 to 127°F) Storage Temperature: –40 to +60 °C (–40 to 140 °F) Humidity up to 100%
Enclosure	IEC 60529 Protection provided by enclosure: 3710 IP66, 3720 & 3730 IP67
Communications Certification	EU RED Directive 2014/53/EU, FCC, ASA/CA S042, MTC (Peru), Anatel, WPC (India), TRCSL (Sri Lanka), CRC (Colombia), CTT (Macau)

Note: The International IEC Standards are adopted as European standards by CENELEC. When this happens, the letters IEC are replaced with EN and the number is retained. The analyzers also conform to these EN Standards