Identify air pollution sources with the Black Carbon Module

The Black Carbon Module is based on **microAeth® Black Carbon measurement technology from AethLabs**, and integrates seamlessly into Clarity networks.

Designed to be mounted on street poles and fence lines, the Black Carbon Module requires minimal upkeep and rare on-site inspections. Output black carbon concentration data help determine what's driving this harmful component of particulate matter in your area.

Real-time, 5-wavelength spectrum measurements based on the the optical signatures of various combustion sources such as diesel, woodsmoke, and biomass provide insight into the composition of light-absorbing carbonaceous particles. **DualSpot® loading compensation method** corrects for optical loading effects and provides additional info about aerosol optical properties.
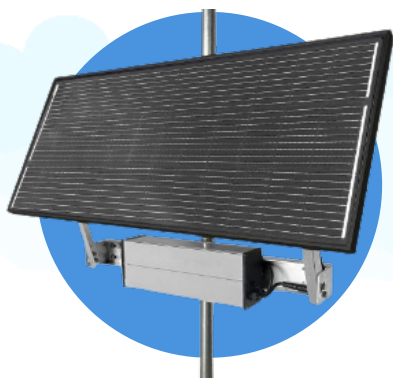
SOLAR-POWERED OR LINE POWER

Purchase a Clarity external solar power system to power your Black Carbon Module off-grid, with the option to use hard line power where available.

LOW MAINTENANCE

Long-term continuous sampling for up to a year depending on the sampling environment conditions and instrument settings. 2 replacement tapes are provided free of charge every year.
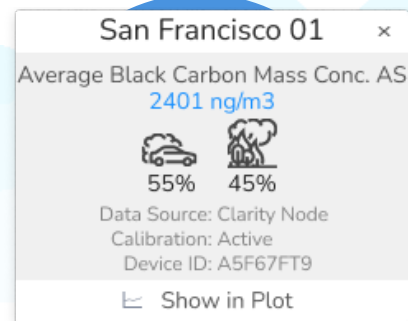
SOURCE APPORTIONMENT

With the 5 wavelengths and the DualSpot® loading compensation method, the Black Carbon Module can help you determine the sources of particulate matter air pollution in your area — so you can take action.

Black Carbon Module Technical Specifications

AIR QUALITY MEASUREMENTS

PARAMETER	TECHNOLOGY	RANGE	RESOLUTION	OUTPUT DATA
Black Carbon (BC) Concentration (ng/m3)	• AethLabs 5 Wavelength Absorption Analysis (880 nm, 625 nm, 528 nm, 470 nm, 375 nm) • DualSpot® loading compensation method	0-1 mg/m3	1 ng/m3	• BC Concentration — All Sources • BC Concentration — Biomass • BC Concentration — Fossil Fuel • BC Concentration — IR, Red, Green, Blue, UV • % ratio of biomass/fossil fuel (percentage)

DATA FLOW

Measurement Frequency	- Default: Once every 3 minutes (non-adjustable)
Data Retrieval from Cloud	- Clarity Dashboard (Web App) - RESTful APIs (Programmatic Access)
Device to Cloud Communication	Global cellular 2G / 3G / 4G SIM card and connectivity provided by companion Clarity Node-S at no additional cost.

OPERATING CONDITIONS

Operating temperature	-10 – 45° C
Operating humidity	Non-condensing
UV Exposure	UV resistant via solar shield

POWER

Externally Powered **Electrical Power or Solar Power System Required**	- Black Carbon Module and companion Node-S must be plugged into an outlet or additional solar power system.
Operation with Optional Solar Power System	- 40 minutes of sunlight per day required for continuous operation. - Can operate for 14 days without sun when battery is fully charged.

DIMENSIONS

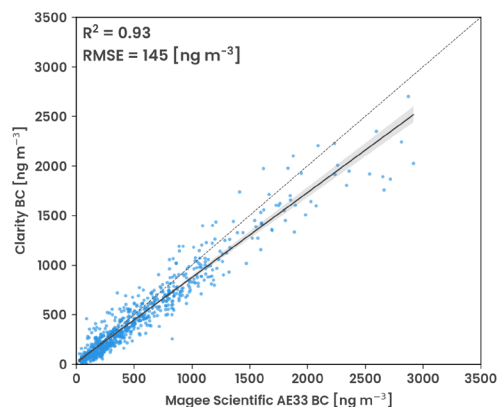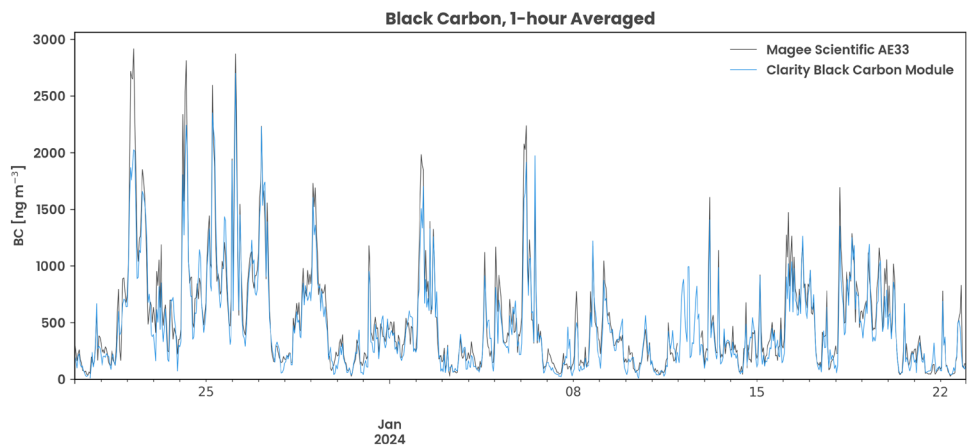| Black Carbon Module	25.4 cm (W) x 29.2 cm (H) x 14.4cm (D) **Weight:** 11 lbs / 5 kg
Optional Solar Power System	**Solar Panel:** 838.2 mm (W) x 736.6 mm (H) x 25.4 mm (D) **Battery:** 533.4 mm (W) x 139.7 mm (H) x 101.6 mm (D) **Total Weight:** 48.5 lbs / 22 kg

MOUNTING & DEPLOYMENT

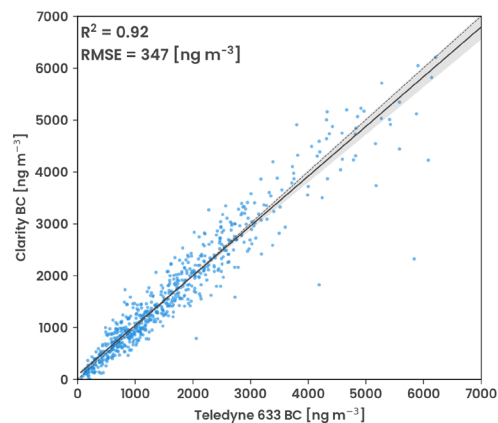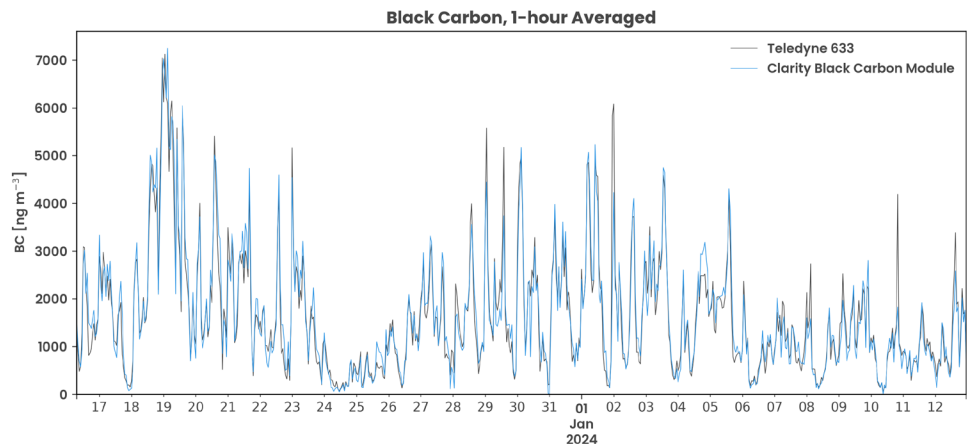| Connect to Node	Plug Module into Clarity Node-S; Node-S will reset and automatically recognize the module .
Black Carbon Module Siting	Install device in an open area with unobstructed air flow where ambient BC concentration can be evaluated — see our siting guide on Knowledge Base for more info.
Mounting	Use provided mounting brackets to affix to a pole or another secure foundation.

BERKELEY, CA, USA

Black Carbon, 1-hour Averaged

Legend: Magee Scientific AE33; Clarity Black Carbon Module

$R^2 = 0.93$
RMSE = 145 [ng m^{-3}]

DENVER, CO, USA

Black Carbon, 1-hour Averaged

Legend: Teledyne 633; Clarity Black Carbon Module

$R^2 = 0.92$
RMSE = 347 [ng m^{-3}]

BROWARD COUNTY, FL, USA

Black Carbon, 1-hour Averaged

Legend: Magee Scientific AE33; Clarity Black Carbon Module

$R^2 = 0.92$
RMSE = 300 [ng m^{-3}]