



# AQM GUIDE 4.0

**Air Quality Meter** can measure the **PM10** in an **OUTDOOR** environment.

For details see the following:

- **Environmental requirements**
- **Calibration page**
- **Quick start guide**
- **Troubleshooting**

This is an **EXPERIMENTAL** app.

Feel free to contact us:

- for **suggestions**, using the “**Email Us**” button on the **Start page**
- about **issues**, using the “**Send row to service**” in the **History page** menu, selecting the row to analyze and **describing the problem**

## Environmental requirements:

1. an **OVERNIGHT CLEAR SKY** (no clouds: [see pictures](#))
2. an **OUTDOOR OPEN AREA** with a [clear view of the sky](#)
3. **NO OBSTRUCTIONS** (from about 60°: no roofs, trees, buildings, eaves)
4. **NO VARIABLE LIGHTING** (no sunrise, sunset or traffic lights)
5. **NO MOVING OBJECTS** (no sun, moon, car headlights or people in the camera's field of view)
6. **HUMIDITY <90°** (no rain, fog or mist)

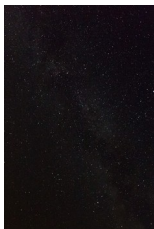
### The best periods for measurements:

- **OVERNIGHT** (2 hours after sunset/before sunrise)

### The best place for measurements (**OUTDOOR with NO overlying lights or structures**):

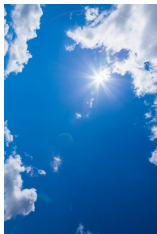
- in the center of a parking area (place the mobile on your car roof)
- in the center of a square/park (place the mobile on a book)
- on a rooftop terrace of a building (place the mobile on a table)

**Overnight clear sky view (OK):**

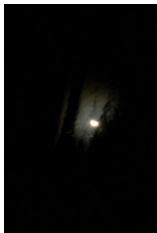


Night (best)

## Wrong sky views (KO):



Clouds & sun (WRONG!)



Clouds & moon (WRONG!)

## Quick start:

1. click on **start button**
2. **place the mobile phone face down** (see [picture below](#)) on a smooth flat support (such as a table or a book). **Do not hold the mobile in your hand** while measuring!
3. **move away** from the **camera's** field of view (about 3 meters)
4. **1<sup>st</sup> BEEP**: measure starts (do not move the mobile)
5. **2<sup>nd</sup> BEEP**: data collection complete (after about **30 sec**), **pick up the mobile**
6. at this point you can **read** the sampling result and **save** it in the **History** database (see the troubleshooting and legend section)



## Start Page

Button functions:

1. **MEASURE**: to measure the PM10
2. **HISTORY**: page with the historical list of saved measurements

Menu functions

1. **Help**: user Guide
2. **Settings**: settings page

## Measurement Page

This page allows to measure the PM10 (access from the Start Page)

Button functions:

1. **START**: to start the measurement
2. **CANCEL**: to close the dialog
3. **MEASURE**: to open the dialog

Menu functions (or action bar) :

1. **Help**: user Guide
2. **Calibration**: calibration page

## History Page

This page allows to display all the saved measurements (access from the Start Page):

### Menu functions

1. **Help:** user Guide
2. **PM10 chart:** to display the last 10 measurements starting from the selected row (measurement)
3. **AQI chart:** to display the last 10 air quality indexes starting from the selected row (calculation)
4. **PM2.5 chart:** to display the last 10 PM2.5 starting from the selected row (calculation on stat. basis)
5. **Share:** to share the selected row (measurement)
6. **Send row to service:** to send the measurement data to the service to analyze an issue (**describe it!**)
7. **Edit row:** to change the group name of the selected row (measurement)
8. **Delete row:** to delete the selected row (measurement)



## Settings Page

This page allows to personalize all the app settings (access from the Start Page menu):

1. **Wallpapers:** select your favorite wallpaper (default “night”)
2. **AQI:** specify the Air Quality Standard to use in charts (remember that the standards refer to day/hourly measurements and that you are collecting only instantaneous samples)
3. **Maximum PM10:** select the maximum PM10 scale (default 500: usually you do not have to change it)
4. **Camera Noise:** select your camera background noise level (default 3: **increase it in case of frequent “noise” errors**)
5. **Background variance:** select the proper variance (default 80: **increase it in case of frequent “wrong shot” errors**)
6. **Image filter:** check it in case of high humidity
7. **Parameter:** it is for service purposes (you do not have to set it unless service sends to you a debugging parameter)

## Calibration Page

The first time that you use the app you may have to calibrate it (**CCD sensibility** and **flash position** may vary depending on the model of the mobile phone, your **cover** may interfere with the measurement).

To calibrate you need at least 2 reference PM10 values and the corresponding measured values with the app.

In this page (you can open it from the Measurement page) you can change the default calibration using the available **sliders** and chart:

**All slider:** overall change (+-50%)

**Low slider:** it changes the measure of the low PM10 (+-30%)

**Mid slider:** it changes the measure of the mid PM10 (+-30%)

**High slider:** it changes the measure of the high PM10 (+-30%)

Tapping on the chart you can select the PM10 that you want to calibrate: when you move the sliders the chart curve and the PM10 change accordingly.

## **AQI LEGEND: EPA (USA)**

<b>AQI</b>	<b>Levels of Health Concern</b>	<b>Colors</b>
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

## AQI LEGEND: CITEAIR (EUROPE)

Pollution	AQI
Very low	0/25
Low	25/50
Medium	50/75
High	75/100
Very high	>100

## Troubleshooting

1. Error 16 "**Wrong shot**": presence of obstructions or clouds in the camera's angle of view
2. Error 8 "**Out of range**": an intensive lighting is saturating the camera CCD (sun or beacon)
3. Error 4 "**Unstable background**": something is moving in the camera's angle of view (clouds, people, lights)
4. Error 2 "**Unstable lighting**": lights are not stable enough (sunrise, sunset, shadows, traffic lights, clouds passing across the sun/moon )
5. Error 2 "**Image noise**": in presence of low levels of lighting and clear air, the background noise is prevailing on signal
6. Error 1 "**Out of calibration**": there is a strong glare maybe due to some nearby obstruction in the camera's angle of view (roofs, trees, building, walls, people)
7. Error "**Your hardware does not support this application, sorry!**": the camera does not meet the minimum requirements (flash and access to Aperture, Shutter speed, ISO speed).

8. In presence of an error message you have to **double check your environment and eventually repeat your measurement: if you cannot remove the ERROR message, save the measurement result and send to us the data from the History page** (selecting the measurement row) and **describing the environment**.
9. If your **measurement is higher or lower than expected** most likely you have to **calibrate your device** (see the calibration page).