



# DiGi Spectrum Analyzer

## Quick Start

1. **Calibration (only the first time):** check/set the **calibration values** of your mobile (see the **calibration page**)
2. keep your fingers away from the mobile microphone
3. silence your phone to avoid any ring tones, vibrations and other sounds
4. orient the phone microphone toward the noise source keeping the correct distance
5. click on one of the function buttons: **Dynamic** (100ms , max, min, avg), **Average** (1 sec, max, min, avg), **Cumulative** (TNI, Ln), **Spectrum** (linear chart, logarithmic chart, 1/1 Octave bands, 1/3 Octave bands).
6. A long click on the decibel number **resets** the current measurement

## Start Page

### Button functions:

1. **Dynamic**: this mode (100ms) is useful to measure a steady state sound (small fluctuations) or to plot and view on a chart the details of a dynamic sound. **Leq** of the entire observation period are also provided (Avg).
2. **Average**: this mode may be useful to measure a dynamic sound (1 second averaging time), when the previous mode results in fluctuations of 4 dB or more. A bar chart is displayed and refreshed accordingly. **Leq** of the entire observation period are also provided (Avg)
3. **Cumulative** : this mode is useful to make ambient and traffic noise analysis (TNI); a detailed **Ln** (Level of noise exceeded for n% of the observation time) chart is displayed and refreshed every second. TNI and L10, L50, L90 of the entire observation period are also provided.

4. **Spectrum**: this mode is useful to make an analysis of the signal frequency spectrum in **real time** (linear chart and **logarithmic chart or 1/1 Octave band or 1/3 Octave band chart** in **Pro edition**).  
Moving the frequency marker it is possible to analyze all the **values related to the specified frequency**: current, Leq of the entire observation (avg), maximum, minimum.

#### Menu functions:

1. **HELP**: it shows the app help
2. **INFO**: link to our site
3. **SETTINGS**: app settings page
4. **RATE US**: link to the app google page
5. **HELP US**: email link to our service
6. **OUR APPS**: our apps list in google play

## Spectrum page

This page displays the spectrum data of the current sound signal.

The **active elements** of the page are the following: dB label, Hz label, mode label, back/forward buttons, Start/Stop button, chart long click, chart swipe, Menu buttons.

Button functions:

1. **START/STOP**: to start or stop the sound recording; in stop mode it is still possible to measure any frequency component amplitude of the displayed chart just moving the frequency marker
2. **BACK/FORWARD**: in order to move the frequency marker

Label functions:

1. **dB label**: a long click resets the current measurement
2. **Hz label**: a click changes the current frequency marker step
3. **Mode label (Pro edition)**: a long click displays a list of selectable modes (Dynamic, Average, Peak, Avg Smoothing, Exp Smoothing)

## Chart functions:

1. **chart long click (Pro edition):**  
automatic zoom in/zoom out
2. **chart swipe (Pro edition):** moves the frequency marker accordingly

## Menu functions:

1. **SCALE (Pro edition):** it shows a list of selectable frequency bands (Hearing, Voice, Low, High, Zoom, Hzlog, 1/1Octave, 1/3Octave)
2. **MODE\* (Pro edition):** it shows a list of selectable chart modes (Dynamic, Average, Peak, Avg Smoothing, Exp Smoothing)
3. **HELP:** it shows the User Guide
4. **VIEW(Pro edition):** it shows a list of selectable views (Panel and Chart or Landscape Chart)
5. **EQUALIZER (Pro edition):**  
microphone equalizer
6. **SHARE:** to share measures (CSV) , chart data (CSV), screenshot (PNG)
7. **EXPORT (Pro edition):** to export measures (CSV) , chart data (CSV), screenshot (PNG)

\*Mode details:

1. **dynamic (DIN)**: amplitude of each frequency component of the entire observation period
2. **average (AVG)**: mean value of each frequency component related to the entire observation period (period defined by the user (default 0, infinite: see the settings page))
3. **peak**: max value of each frequency component related to the entire observation period
4. **Avg smoothing (ASM)**: SMA model, mean value of the last n observations, n can be specified in settings
5. **Exp smoothing (ESM)**: SES model, the smoothing constant can be specified in settings

## Dynamic Page

This page displays the level of the current sound signal (100ms). Minimum value, maximum value and Average value of the entire observation period are also provided. This mode (100ms) is useful to measure a steady state sound (small fluctuations) or to plot and view on a chart the details of a dynamic sound

The **active elements** of the page are the following: dB label, Start/Stop button, Menu buttons.

Button functions:

- **START/STOP**: to start or stop the sound recording

Label functions:

- **dB label**: a long click resets the current measurement

Menu functions:

1. **CURVE (Pro edition)**: it shows a list of selectable **weighting curves** (dBA, **dBb**, **dBc** according to **DIN-IEC 651**)
2. **THRESHOLD**: in order to set, reset or disable the current threshold (if exceeded it changes the max value color to red)
3. **HELP**: it shows the User Guide

4. **CALIBRATION:** it shows the SLM calibration page
5. **SHARE:** to share measures (CSV) , chart data (CSV), screenshot (PNG)
6. **EXPORT (Pro edition):** to export measures (CSV) , chart data (CSV), screenshot (PNG)



## Average Page

This page displays the level of the current sound signal (1 sec averaging). Minimum value, maximum value and Average value of the entire observation period are also provided. This mode may be useful to measure a dynamic sound (1 second averaging time), when the previous mode results in fluctuations of 4 dB or more

The **active elements** of the page are the following: dB label, Start/Stop button, Menu buttons.

Button functions:

- **START/STOP**: to start or stop the sound recording

Label functions:

- **dB label**: a long click resets the current measurement

Menu functions:

1. **CURVE (Pro edition)**: it shows a list of selectable **weighting curves** (dBA, dBB, dBC according to **DIN-IEC 651**)
2. **THRESHOLD**: in order to set, reset or disable the current threshold (if exceeded it changes the max value color to red)
3. **HELP**: it shows the User Guide

4. **CALIBRATION:** it shows the SLM calibration page
5. **SHARE:** to share measures (CSV) , chart data (CSV), screenshot (PNG)
6. **EXPORT (Pro edition):** to export measures (CSV) , chart data (CSV), screenshot (PNG)

## Cumulative Page

This page displays the level of the current sound signal (1 sec averaging) and it is useful to make ambient and traffic noise analysis (**TNI**); a detailed **Ln** (Level of noise exceeded for n% of the observation time) chart is displayed and refreshed every second. TNI and L10, L50, L90, LEQ of the entire observation period are also provided.

The **active elements** of the page are the following: dB label, Start/Stop button, Menu buttons.

Button functions:

- **START/STOP**: to start or stop the sound recording

Label functions:

- **dB label**: a long click resets the current measurement

Menu functions:

1. **CURVE (Pro edition)**: it shows a list of selectable **weighting curves** (dBA, **dBb**, **dBc** according to **DIN-IEC 651**)
2. **CHART**: it shows a list of selectable charts (Cumulative or Distribution)
3. **HELP**: it shows the User Guide

4. **SHARE:** to share measures (CSV) , chart data (CSV), screenshot (PNG)
5. **EXPORT (Pro edition):** to export measures (CSV) , chart data (CSV), screenshot (PNG)

## Settings Page

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

1. **Wallpapers**: it is possible to select the favorite wallpaper (default: sky)
2. **Night View (Pro edition)**: it is possible to enable the night view colors for all the functions
3. **Maximum SPL\***: it is possible to specify the microphone maximum SPL in dB (default 90, suitable for most mobiles)
4. **Low SPL \***: it is possible to specify the calibration value for a 30 dB SPL signal (default 0 dB); often this level needs calibration (as low as - 10 dB)
5. **Mid SPL \***: it is possible to specify the calibration value for a 50 dB SPL signal (default 0 dB); usually this level does not need significant calibration (+ - 1 dB)
6. **High SPL \***: it is possible to specify the calibration value for a 70 dB SPL signal (default 0 dB); sometimes this level needs a calibration (as low as - 6 dB)
7. **Chart type (Pro edition)**: it is possible to specify the default RTA chart type

8. **Chart mode (Pro edition)**: it is possible to specify the default RTA chart mode
9. **Refresh rate \* \* (Pro edition)**: it is possible to specify the frame refresh rate (FPS) of the spectrum chart (default 5: a higher rate implies a smoother vision and it requires a fast mobile processor)
10. **FFT size \* \* (Pro edition)**: it is possible to specify FFT (Fast Fourier Transform) window size in bytes (default 2048: a greater size implies higher Hz accuracy and it requires a fast mobile processor to ensure real time processing)
11. **AVG period (Pro edition)**: it is possible to specify an AVG period in seconds: it may be useful to stop automatically a spectrum average analysis.
12. **AVG smooth (Pro edition)**: it is possible to specify a SMA smoothing factor: it is the mean value of the last n observations (default 3 observations: a greater size implies a higher smoothing but a lower sensibility). It may be useful to capture peak sequences.
13. **EXP smooth (Pro edition)**: it is possible to specify a SES smoothing factor for the weighted moving average (default 0.5: a smaller size implies a higher smoothing

but a lower sensibility). It may be useful to capture peak sequences.

14. **Weighting curve (Pro edition)**: it is possible to specify the default SLM weighting curve.

\* Remember that a wrong setting will effect the accuracy of your measurements. **Use the calibration page** to set this values (it is much faster & easier)

\*\* Remember that increasing the value of this setting (FPS or FFT) requires more processing power for **real time processing**: if you change the default always check the chart behavior: if you notice some pauses in displaying the chart then it is recommended to decrease the setting value.

## Microphone Calibration (**Pro edition**)

The default mic calibration values are suitable for most smart phones. If necessary it is possible to equalize the microphone response.

For a perfect calibration you need a **white noise generator** and to set the equalizer sliders in the Spectrum mode page (open the Equalizer menu item)



## SLM Calibration Page

In this page (to open it use the Dynamic/Average page Menu) you can change the default SLM calibration using the available **sliders** and interactive chart:

**All slider:** to calibrate all SPL (Sound Pressure Level)

**Low slider:** to calibrate low SPL

**Mid slider:** to calibrate mid SPL

**High slider:** to calibrate high SPL

For a **perfect calibration** you need a **white noise generator**, but you can get a **fair calibration** measuring some **typical environmental noises**.

To measure a known SPL read the average value after 10 seconds.

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

**Fast way to calibrate the analyzer:**

a) Measure a known **medium SPL (quite office, detached low talking: about 50 dB)**, tap on the **horizontal chart axis the measured value and match the known SPL (50 dB on vertical axis)** using the **Mid slider** (if you cannot match the known SPL, use also the **All slider**)

b) Measure a known **low SPL** (**quite bedroom**, no talking: about **30 dB**), tap on the horizontal chart axis the measured value and match the known SPL (30 dB on the vertical axis) using the **Low slider**

c) Measure a known **high SPL** (**noisy pub**, many people talking: about **70 dB**), tap on the horizontal chart axis the measured value and match the known SPL (70 dB on the vertical axis) using the **High slider**

## Troubleshooting

1. **Wrong SPL maximum value:** all your measurement are higher or lower than expected. Enter in the settings menu and select the correct SPL maximum value
2. **Wrong SPL calibration:** only low or/and high level measurements are higher or lower than expected. See the Calibration page.
3. **Attenuation on mobile microphone:** your measurements never reach the full scale (-3/6 dB) even with a high noise (or just blowing on the mic.). Restart android
4. **In the cumulative mode some signals exceed the full scale:** your TNI measurements are still valid as long as the L90 level is lower than the full scale.
5. **No signals detected below 20dB or over 100dB:** The smart phone microphones do not work under 20 dB or over 100 dB (they are calibrated for human voice, 30/70 dB)
6. **Signal attenuation near RTA band limits:** the mobile mic may attenuate frequencies  $<300$  Hz and  $>15000$  Hz