dB DiGi++ Noise Meter

Main functions

This application brings the functionalities of a
Sound Level Meter (SLM) and of a
Spectrum Analizer (**RTA**) to your phone:
mobile hardware introduce some limitations
(lower dB range and accuracy), but using it
properly you can collect useful information
from your surveys.

Some functions:
Spectrum Analizer
- 5 RTA measuring modes
- 4 values displayed versus Hz
- SPL versus linear frequency chart
- SPL versus log frequency chart

Sound Level Meter
- 3 SLM measuring modes
- 4 values displayed
- 3 weighting curves
- SPL versus time chart
- SPL distribution chart
- cumulative SPL chart and TNI

Quick Start

1. **Calibration (only the first time)**: check/set the **calibration values** of your mobile (see the **settings page** and the **calibration page** of this guide)
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** suitable for ambient and traffic noise analysis.
6. A long click on the decibel number resets the current measurement

Start Page

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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. Minimum value, maximum value and Average value of the entire observation period are also provided. In this mode it is possible (**menu functions**) to set an **instantaneous threshold** (if exceeded it changes the max value color to red) and to **share text/screen data**.

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. Minimum value, maximum value and Average value of the entire observation period are also provided. In this mode it is possible (**menu functions**) to set an **average threshold** (if exceeded it changes the max value color to red) and to **share text/screen data**

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 levels L10, L50, L90 of the entire observation period are also provided. In this mode it is possible (**menu functions**) to **share text/screen data**.

4. **Spectrum** : this mode is useful to make an analysis of the signal frequency spectrum in **real time**; 2 measuring modes (dynamic, avg smoothing) with 2 frequency bands (linear and logarithmic); 4 values (current, mean, max, min) related to any specified frequency of the entire observation period. In this mode it is possible (**menu functions**) to **share text/screen data**.

Menu functions:
1. **HELP**: it shows the app help
2. **INFO**: link to our site
3. **SETTINGS**: app settings page
4. **HELP US**: email link to our service

Digi++ edition

Frequency spectrum analysis :

- **5 spectrum measuring modes** (selection list displayed via menu or long press on the mode label): dynamic (value of each frequency component of the entire observation period), average (mean value of each frequency component of the entire observation period), peak (max value of each frequency component of the entire observation period), Avg smoothing (SMA model, mean value of the last n observations, n can be specified in settings), Exp smoothing (SES model, the smoothing constant can be specified in settings)
- **scroll of a specific frequency** using the forward/back buttons (the blue marker in positioned automatically on the current chart)
- **selection of the proper frequency step** (large/small scroll values selection with a tap on the frequency label)
- **linear frequency axis with interactive zoom**

- **logarithmic frequency axis with interactive zoom**
- **interactive zoom** (long press on the current chart triggers the zoom centered on the marked frequency);
- **4 values displayed**: current, mean, max, min related to any specified frequency of the entire observation period
- **sharing** of all the displayed values with other apps
- **Start/Stop** measuring button: in stop mode it is still possible to measure any frequency component amplitude of the displayed chart just scrolling the frequency marker
- automatic system **volume on/off** (button click sound muting)

Amplitude analysis:

- in Dynamic and Average mode different **weighting curves** can be selected (default dB SPL and **dBA, dBB, dBC** according to **DIN-IEC 651**)
- in Cumulative mode it is possible to view also the signal **distribution chart** (signal amplitude versus counts %)
- **Start/Stop** measuring button
- automatic system **volume on/off** (button click sound muting)
- **sharing** of all the displayed values with other apps

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. **Maximum SPL***: it is possible to specify the microphone maximum SPL in dB (default 90, suitable for most mobiles)
3. **30 dB 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)
4. **50 dB 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)
5. **70 dB SPL** *: it is possible to specify the calibration value for a 50 dB SPL signal (default 0 dB); sometimes this level needs a calibration (as low as – 6 dB)
6. **Refresh rate * *** : 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)

7. **FFT size * * ** : it is possible to specify FFT (Fast Fourier Tarsform) 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)

8. **AVG smooth** : 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.

9. **EXP smooth** : t 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.

* Remember that a wrong setting will effect the accuracy of your measurements.
If you do not have the correct information of your mobile leave the default values or see the calibration information section.

** 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.

Calibration

The **default calibration values are suitable for most smart phones**. Some mobiles are automatically calibrated in the first installation phase (Samsung GT-I9000, GT-9300, GT-S5570). If necessary it is possible to change the calibration parameters in the settings page. For a perfect calibration you need a **signal generator**, but you can get a fair calibration with the following:

1. **Lower level**: start the dynamic function in a silent room (no external noises no talking, like a library or a bedroom), read after 10 seconds the average value, calculate the fix with (30 - average value) and select it in the 30 dB SPL setting

2. **Medium level:** start the dynamic function in a quite room (no external noises, some low talking but not closer than 5 meters, like a quite office), read after 10 seconds the average value, s calculate the fix with (50 - average value) and select it in the 50 dB SPL setting

3. **High level:** start the dynamic function in a noisy room (many people talking , like a noisy office or pub), read after 10 seconds the average value, calculate the fix with (70 - average value) and select it in the 70 dB SPL setting

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 section and type the right calibration values.
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.). Turn down the volume of your mobile and restart android (there is a signal return from the speaker to microphone and an attenuation is still active on the microphone)
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
7. **Your mobile employes AGC**: Automatic Gain Control may introduce significant measurement errors and in this case we do not recommend to use this application on your mobile.