SADiA 3

(*Surveillance Acoustique de la Diffusion Amplifiée*)

Acoustic Monitoring System for Public Address

General Information

The SADiA perfectly displays the sound pressure levels measured in public area together with the sound levels optionally measured in the neighborhood of the musical event; the sound engineer can then freely control the emission levels without any action from the SADiA on the musical signal.

If a sound limiter is installed, SADiA clearly displays the same kind of information as those calculated and used inside the limiter, allowing the sound engineer to make level adjustments before the limiter goes into action.

With the SADiA, it's the sound man that shapes the sound, not the machine !

Displayed data

Thanks to a dedicated screen positionned at the mixing desk, SADiA enables the sound engineer to watch over the time-averaged Leq plotted on a graph. The time span can be set from 1 to 60 minutes. The frequency weighting can be chosen between A, C or Z (lin). In addition, SADiA displays the Leq1s (short time Leqs), the Peak levels and the spectrum measured in 3rd octaves (optional). Derived from French standards, SADiA is now available for an extensive set of usages and regulations.

Thanks to these informations, the sound engineer can do his job without getting any complaint due to excessive sound level, from the public or from the authorities.
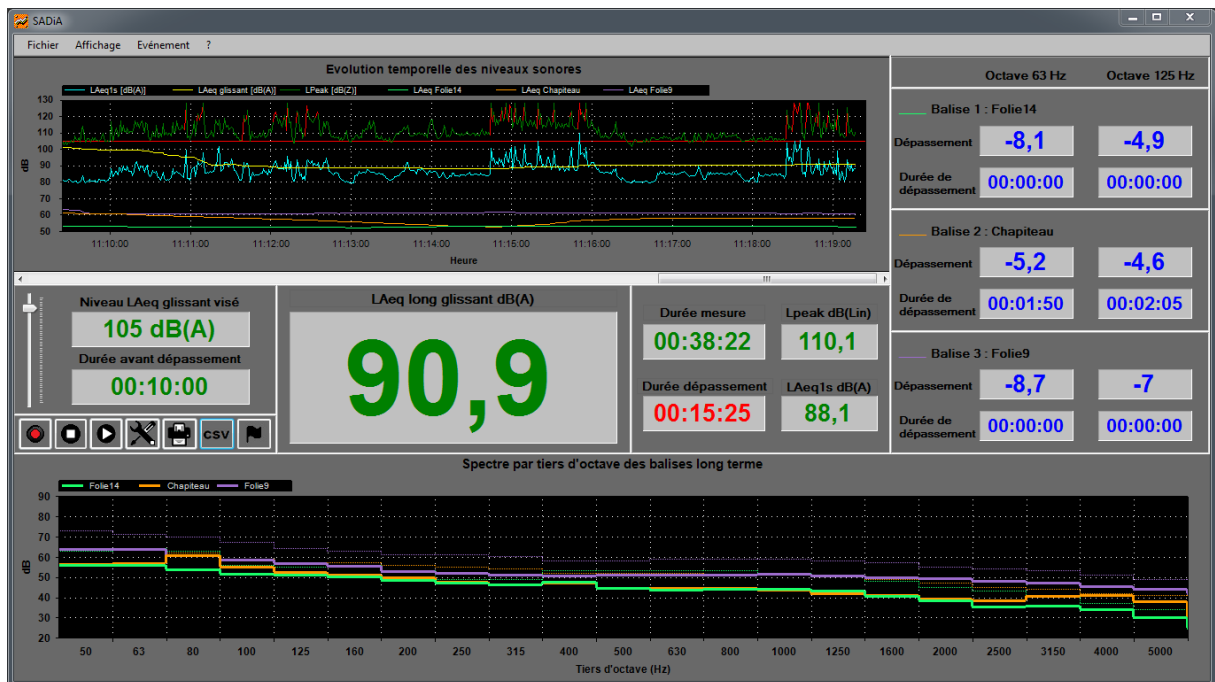
The evolution of the following different measured data are plotted in real time on the temporal graph (top left) :

- The leq 1s (blue);
- The target level (red straight line);
- The time-averaged Leq (yellow, turns red above target level);
- The LZpeak (green, turns red above limit level);
- The time-averaged Leq for each optional remote monitoring stations.

When neighbours can be potentially bothered by the sound level coming from the event, especially when the event takes place outside or when the acoustic insulation is insufficient, a maximum sound level can be defined. The SADiA compares sound levels in real time so manual level control can be done before any excess level is reached.

It is also possible to install some long term monitoring tags outside in the neighbourhood, on strategic locations. These tags will send level information every second over the web, allowing the sound engineer to adjust the level to prevent any discomfort.

Various monitoring tags can be used provided they allow web requests for getting the data.

Sound levels can be A, C or Z-weighted.

All data acquired during the measurement are encrypted and saved to disk; measurements can be opened later for analysis. Different options are available which allow the user to export data to excel sheets during or after the show.

On the lower part of the window, a large graph shows in real time the running third-octave leqs from remote tags.

It is of course possible to enter a maximum value for each third octave and for each monitoring tag. Spectrum values in excess are turn red.

In the mid part of the screen, other usefull informations are displayed in real time, including a time domain graph (time-average leq, leq1s, peak level,…), the measurement duration and the duration of time-averaged level in excess compared to target level.

All of these data turn red when above the limits.

On the far right, low frequency information related to monitoring tags are displayed, such as headroom in the 63 and 125 Hz octave bands, that is the difference between measured levels and programmed limits.

A series of unique features

The SADiA offers a clear and complete set of indicators among which some are simply unique; they can be customized to fulfill local regulations. They are presented in the next pages.

Display of regulation criteria

Information of major importance regarding regulations are clearly displayed in the central area of the graphical interface :

- time-averaged equivalent level indicated using the largest figures, calculated over the time span that is set from 1 to 60 minutes, with A, C, or no frequency weighting;
- total measurement time (you can choose to make a record for each concert or for the whole day);
- the accumulated time during which the limit Leq was exceeded;
- the Leq calculated every second, upon which averaging occur;
- Peak level measured every second (some regulations indicate a max Peak level).
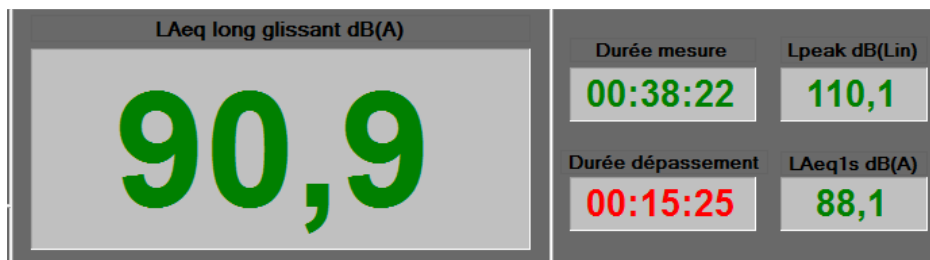
Regulations criteria display are clearly indicated in the central part of the display

## *The time chart : a perfectly clear display*
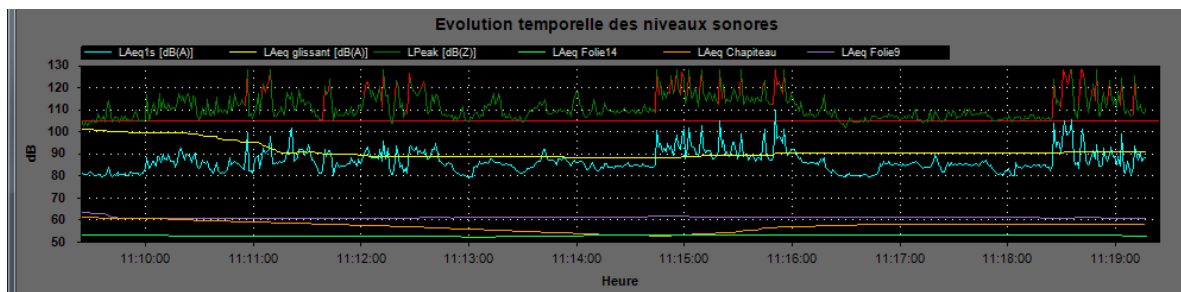
Time evolution of the sound levels is clearly displayed in that graph : you see at a glance what is happening and what happened in the last 10 minutes :

- The time-averaged Leq over 1s (blue curve);
- The target level (red straight line);
- The time-averaged Leq (yellow curve, turns red above target level);
- The LZpeak (green curve, turns red above limit level);
- The time-averaged Leq for each optional remote monitoring stations.

The yelow curve may be the most important one and not only you don't have to make mental calculations based on instant level display, at a glance to this chart you instanteously are informed about your level situation.

The Equivalent Sound Pressure Level Gauge : a valuable tool

Some regulations rely on time-averaged levels; a simple Sound Pressure Level is in that case of very little help, because what you need to know is not the instantaneous level but the level that is continously averaged over a period of time. The time-averaged Leq is then displayed with large figures in the midle of the graphical interface. It can happen that you would like to know what Leq is allowed over a certain amount of time : this is exactly what the Equivalent Leq gauge is intended for : you just select the time-averaged level (Leq) at which you wish to play and the device automatically calculates and displays the allowed amount of time for that Leq.
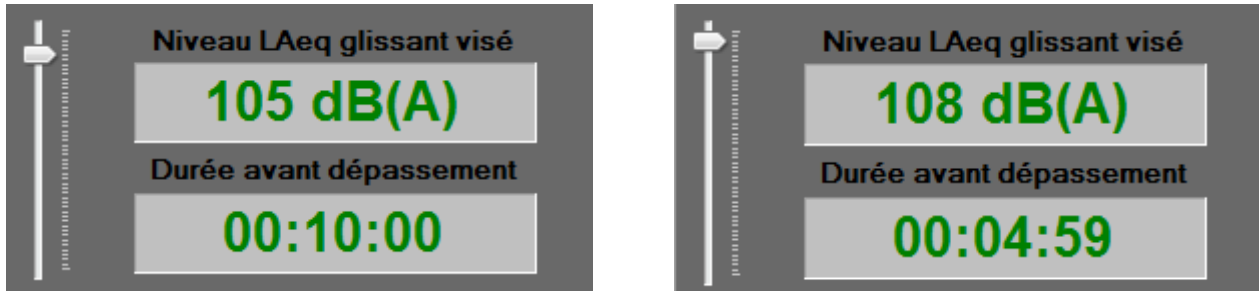
The two figures above show 2 examples; the first one (on the left) shows what is displayed at the begininng of a show when the following settings were chosen :
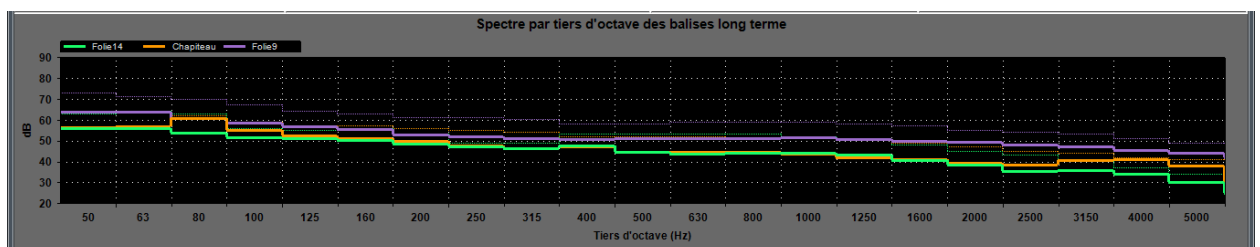
- LAeq (time-averaged equivalent level, A-weighted) is set to 105 dB(A)
- time-span (the time period over which that equivalent level should not be exceeded) is set to 10 min

The figure on the right displays the period time during which you can play at a time-averaged level of 108 dB(A).

Quite simple in fact, as an additionnal level of 3 dB implies the a time ! Simple to calculate indeed but it is allways easier to use the Gauge !

Neighbours can be concerned with certain frequencies

When the concert take splace outdoors or in a venue presenting insufficient acoustic insulation, neighbours can be concerned with sound disagreements. Most of time these occur in the low frequencies area. This is why we developped SADIA version 3; the global idea is to be able to accurately estimate sound levels regarding environment regulations. Monitoring tags connected to the internet are then deployed over the area in order to give real time sound level spreading information.

	Octave 63 Hz	Octave 125 Hz
Balise 1 : Folie14		
Dépassement	-8,1	-4,9
Durée de dépassement	00:00:00	00:00:00
Balise 2 : Chapiteau		
Dépassement	-5,2	-4,6
Durée de dépassement	00:01:50	00:02:05
Balise 3 : Folie9		
Dépassement	-8,7	-7
Durée de dépassement	00:00:00	00:00:00

Not only third-octave spectrum for all measurement locations is displayed (see figure above) but also special attention is put on the 63 and 125 Hz centered octavas and levels in excess are shown on the right side of the display.

Technical specifications

Software versions

The SADiA comes with three different flavours :

- Version A focuses on the public area only, A, C or Z-weighted SPLs, no spectrum.
- Version B adds third-octave spectrum measurement over the audience.
- Version C offers the most extended capabilities with real time monitoring tags (up to 3) that allow real time control of the sound level not only over the audience but also in the neighbourhood, with third-octave spectrum analysis.

Hardware requirements

The SADiA software can be hosted by any decent / recent IBM-compatible PC equipped with i5 or higher Intel CPU. Hard disk shall be 60 Gbyte minimum. Display shall have a XVGA resolution, that is 1368x768 pixels.

SADiA doesn't come with its own measuring hardware, thus various measuring microphones and sound cards can be used; however, we advice to use class I (IEC 61672-1) compliant microphones with 1/2" cartridge that can be easily calibrated with sound calibrators, such as NTI M2211 or M2215. For sound cards, we advice only high quality sound cards, not with rotatable input level buttons that could easily lead to uncalibrated measurements, but with software programmable gains only, such as RME Fireface UC.

For environment tags, please contact us or your distributor.

Measurement data reporting

All mesaurement data are encrypted and stored to disk. They can be opened for analysis are report edition. An automatic report can be generated.

Below is an excerpt of an automatically generated report showing the 125 Hz centered octava results, levels in excess are shown in red.
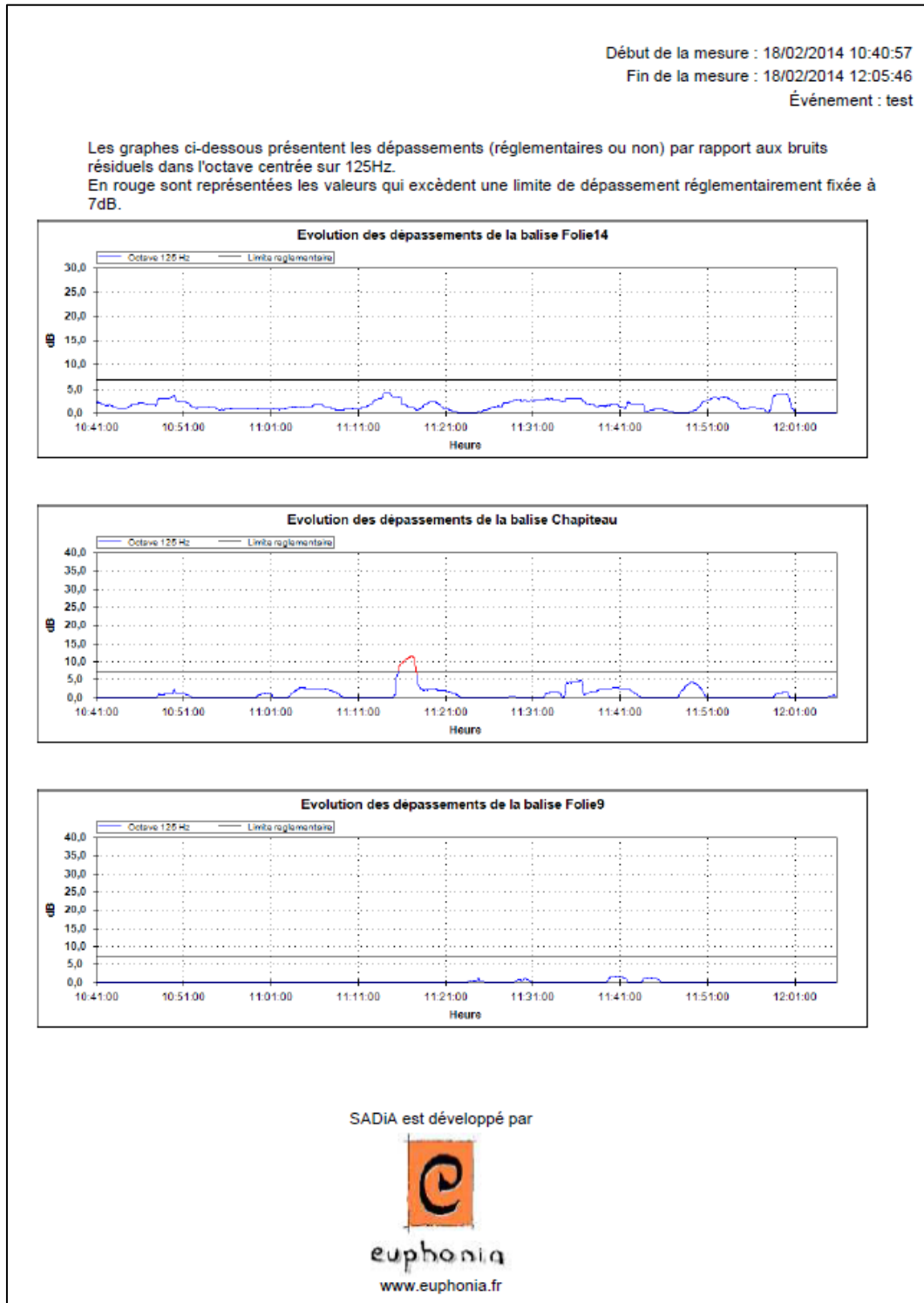
SADiA measurement data can be exported in .csv format for further spreadsheet calculations and editing. Data export can be made afterwards but also during a measurement, allowing partial report in order to inform event organizers as the show goes on.

Exported table below lists levels in excess report during a measurement.

A	B
18/02/2014 10:41:56	105,2
18/02/2014 10:41:57	105,1
18/02/2014 10:41:58	105,1
18/02/2014 10:41:59	105
18/02/2014 10:42:00	105
18/02/2014 10:42:41	105
18/02/2014 10:42:42	105
18/02/2014 10:42:43	105
18/02/2014 10:42:44	105,1
18/02/2014 10:42:45	105,2
18/02/2014 10:42:46	105,1
18/02/2014 10:42:47	105,1
18/02/2014 10:42:48	105,1
18/02/2014 10:42:49	105,1
18/02/2014 10:42:50	105
18/02/2014 10:42:51	105
18/02/2014 10:42:52	105
18/02/2014 10:42:53	105
18/02/2014 10:42:54	105
18/02/2014 10:42:55	105
18/02/2014 10:42:56	105
18/02/2014 10:49:22	105
18/02/2014 10:49:23	105,1
18/02/2014 10:49:24	105,1
18/02/2014 10:49:25	105,1
18/02/2014 10:49:26	105,2
18/02/2014 10:49:27	105,2
18/02/2014 10:49:28	105,2
18/02/2014 10:49:29	105,2
18/02/2014 10:49:30	105,2
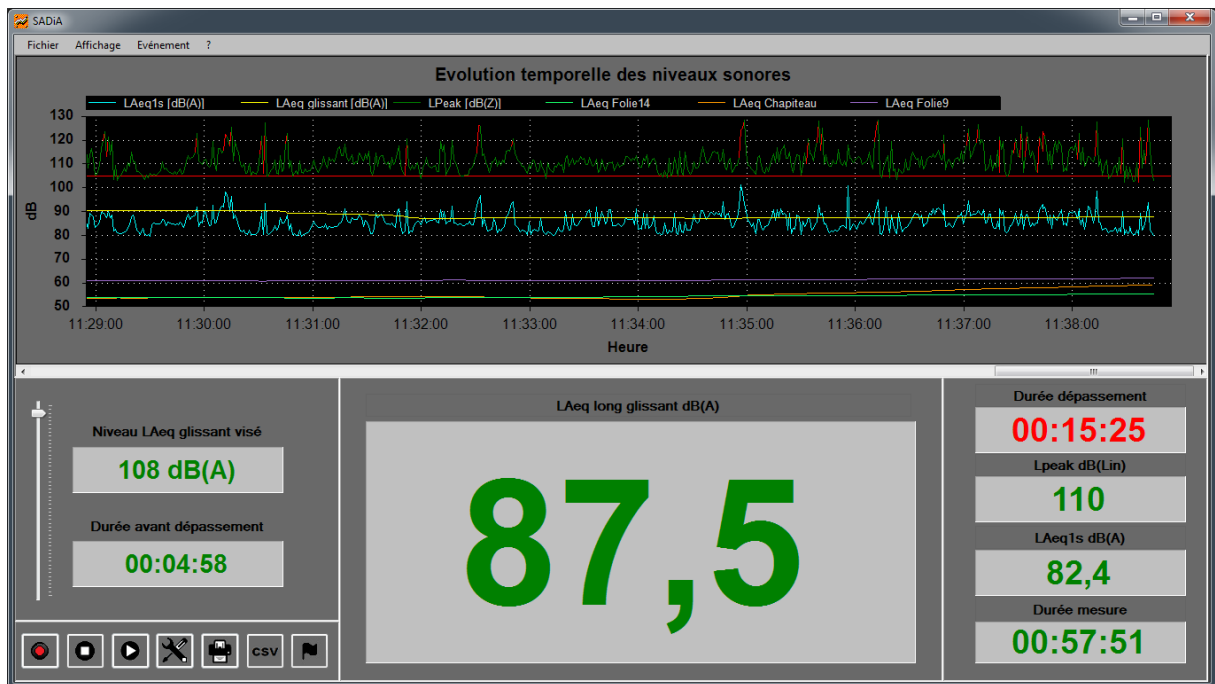
Version A of the SADiA emphasizes on global levels only when neighbouring aspects are not of importance. This display can be chosen with any version if special attention is to be put on over the audience levels.

SADiA is developped by Euphonia. For any further information, please contact us :

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