IEA EA-2 New Generation Electro-Acoustic Integrated System

100% warranty from IEA Made in TAIWAN
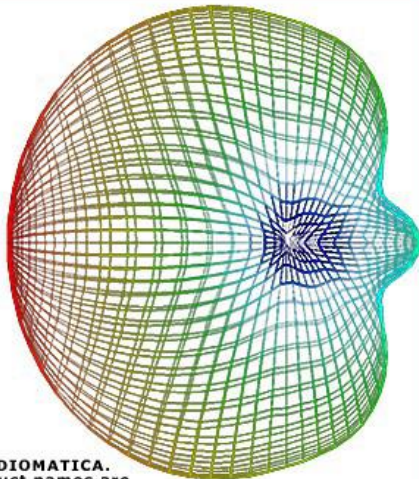

IEA EA-2提供完整硬體與軟體系統整合服務
IEA EA-2
Hardware and Software Turnkey Total Solution

EA-2 Electro-Acoustic Integrated System

**TECHNICAL SPECIFICATIONS**
GENERATOR
Two channels 24 Bit sigma-delta D/A Converter
Frequency range: 1Hz-90kHz (CLIOFW options)
Frequency accuracy: >0.01%
Frequency resolution: 0.01Hz
Output impedance: 660Ohm
Max output level (Sine):17dBu (5.5Vrms)
Attenuation: 0.1 dB steps to full mute
THD+Noise (Sine):0.008%
Digital out: SPDIF

ANALYZER:
Two channels 24 bit sigma-delta A/D Converter
Input range: +40 ÷ -40dBV
Max input acceptance: +40dBV (283Vpp)
Input impedance: 128kOhm (5.6kOhm mic)
Phantom power supply: 24V for ICP/CCP

Build-In Options:
- Measuring Power Amplifier
- Microphone Power Module for 200V B&K/GRAS
- VI-BOX for Impedance & TS Measurements
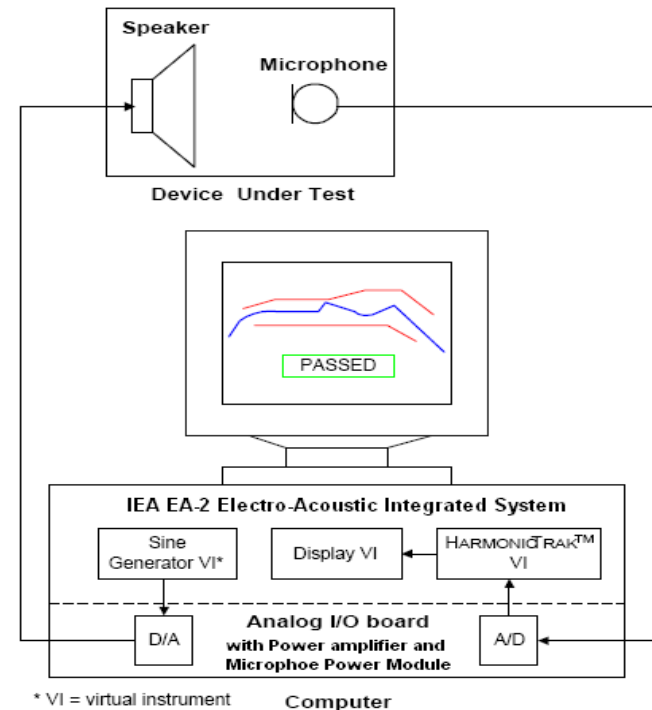
EA-2 Electro-Acoustic Integrated System

Measuring Power Amplifier
- Frequency Response: 10~ 50KHz.
- Max. Power Output: 10Watt RMS. 8 Ohm Loading.
- THD+Noise(Sine)<0.05% (at 1KHz)

Input Microphone Power Module
- Frequency Response: 10~ 100KHz.
- Polarization Voltage:200VDC
- (LEMO Connector, B&K & GRAS Microphone can be Use
- THD+Noise(Sine)<0.001% (at 1KHz)

IPC SYSTEM RESOURCES
- CPU INTEL CORE II MORE, RAM>2G, HD>500G,
- Two free IEEE1394 port and USB port,
- Window 7 or 8 request.

MISCELLANEOUS
- Sampling frequencies: 192kHz, 96kHz and 48kHz.
- Audio connections: 2 XLR combo analog inputs,
- 2 XLR plus 2 RCA analog outputs
- SPDIF 1 RCA digital output
- Digital connection: 6-pin IEEE1394 Power supply: IEEE1394 or 12V DC
- Dimensions: 44(w)x42(d)x10(h)   Weight: 10 kg

EA-2 Electro-Acoustic Software by CLIO11
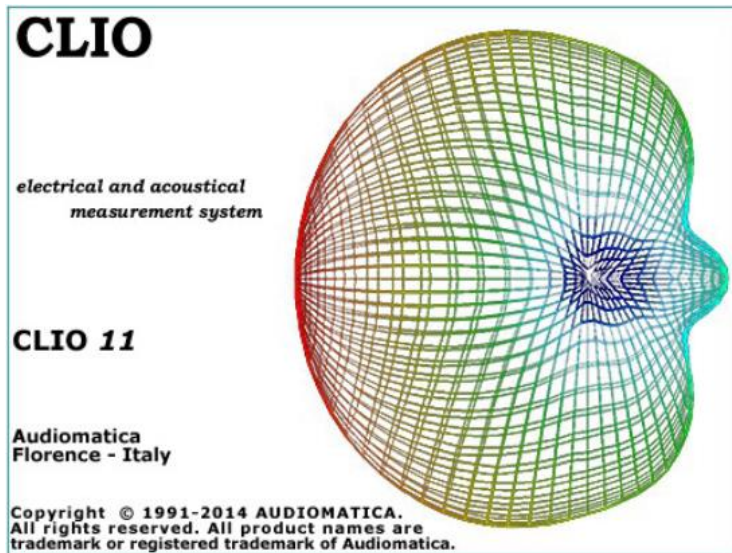
CLIO 11, by Audiomatica, is the newest measurement software for the CLIO System. The CLIO System is capable of measuring:

- Electrical networks
- Electronic equipment
- Loudspeaker / Microphone systems
- Headphone / Telephones & hearing aids
- ISO 7779 Product Noise & Environmental noise
- Building & Rooms acoustics
- Tablet / NB/ Smartphone Sound Analysis.
- Quality of production lines

CLIO 11 the power, precision and reliability of the resulting instrument is 100% warranted.

CLIO 11 is fully compliant with Windows XP, Vista, 7 and 8.

CLIO 11 has a brilliantly fresh new look allowing gesture controls while relying on an incredibly powerful design based on a huge work which is the synthesis of more than 23 years of experience and excellence in electro-acoustic measurements
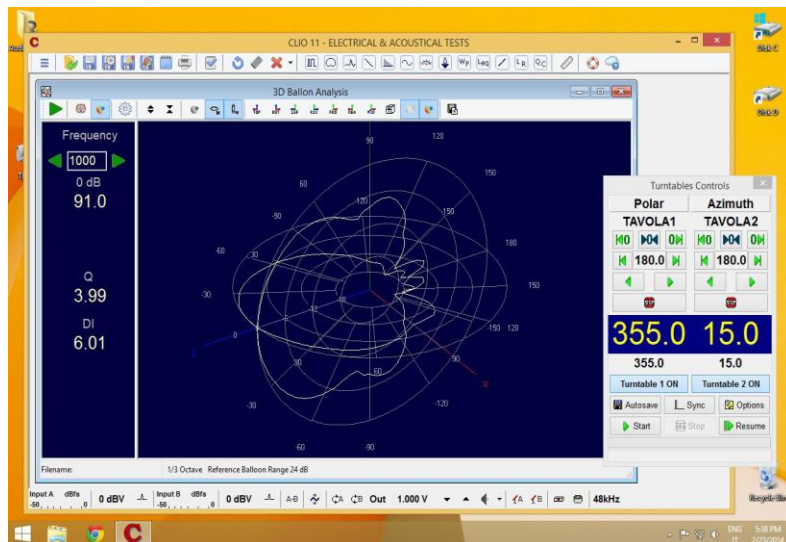
EA-2 Electro-Acoustic Test Ability

IEA MEASUREMENT TECHNIQUES

- Compared to other measurement systems, **EA-2** concentrates the power of many different instruments into a single one. Three different measurement techniques are available for system identification and characterization:
- **MLS & LogChirp analysis** using either pseudorandom noise or logarithmic chirps as stimuli
- **Sinusoidal Sweeps** using sinusoidal signals
- **FFT, RTA and 'Live' Transfer Function** letting you the choice of any stimulus, even music.

While other instruments offer one single possible measurement choice, **EA-2** permits you to view the physical phenomenon like frequency response, impedance or other parameters, from different points of view. The final result will be then validated by the consistency of these measurements: as any expert technician knows, this is the correct approach that should always be adopted.

**The following specialized control panels are dedicated to other specific measurements:**

- **Linearity and Distortion** measures the non linear behavior of an electronic equipment
- **Sound Level Meter** a IEC61672 integrating sound level meter with Leq and frequency analysis
- **Interactive L-C-R Bridge** permits passive components measurement on the fly
- **Wow&Flutter Meter** with time and frequency analysis
- **Frequency Counter**
  Beyond measured results you get sophisticated **post-processing tools** for:
- **Thiele&Small Parameters** for loudspeaker characterization
- **ISO 3382 Acoustical Parameters & STI** for rooms and auditoria characterization
- **Directivity analysis** for loudspeaker as 2D Color maps, Circular or waterfall-like plots or 3-D Balloons analysis (only in QC version) for complete spatial characterization
- **Time-Frequency Analysis** to evaluate Cumulative Spectral Decays, Energy Time Frequency and Wavelet Analysis. Either as 3D plots or Color Maps.
- **Loudness Rating Calculator** for assessing RLR, SLR and STMR (only in QC version)
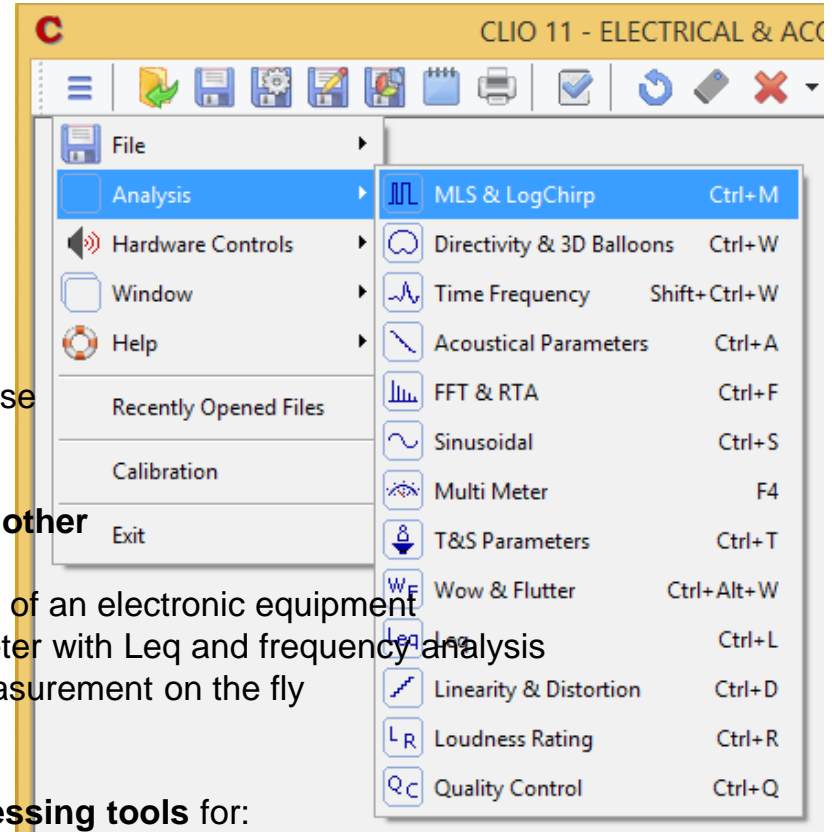
# MLS mode Time Response Waterfall Ability
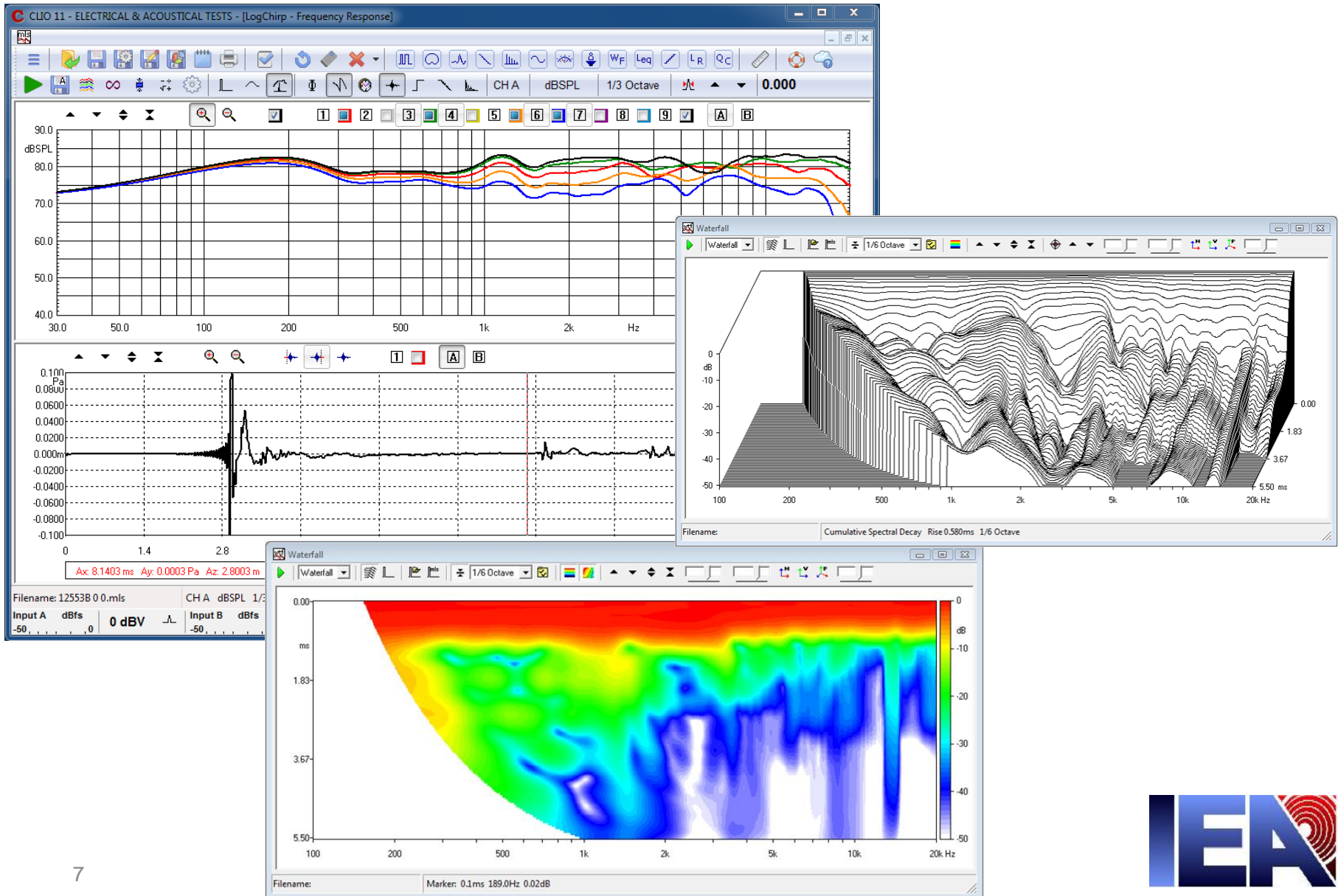
Sinusoidal Mode Analysis Ability

SINUSOIDAL ANALYSIS

IEA EA-2 executes sinusoidal analysis with a digital filtering of input signal to achieve the highest noise-immunity; in this way you add the power of the PC to the most traditional frequency analysis. The sinusoidal technique is oriented to:

- Stereo sweep for simultaneous Frequency,
- THD, Rub&Buzz and Impedance response
- Phase response
- A/B channels difference response
- Continuous and stepped sweeps
- Sweep amplitude equalization vs. frequency
- Frequency resolution from 1/3 to 1/192 oct.
- 2nd to 10th harmonic + THD plot vs. frequency
- Fast-TrackTM Rub&Buzz plot vs. frequency
- Gating system with auto-delay for quasianechoic
- measurements
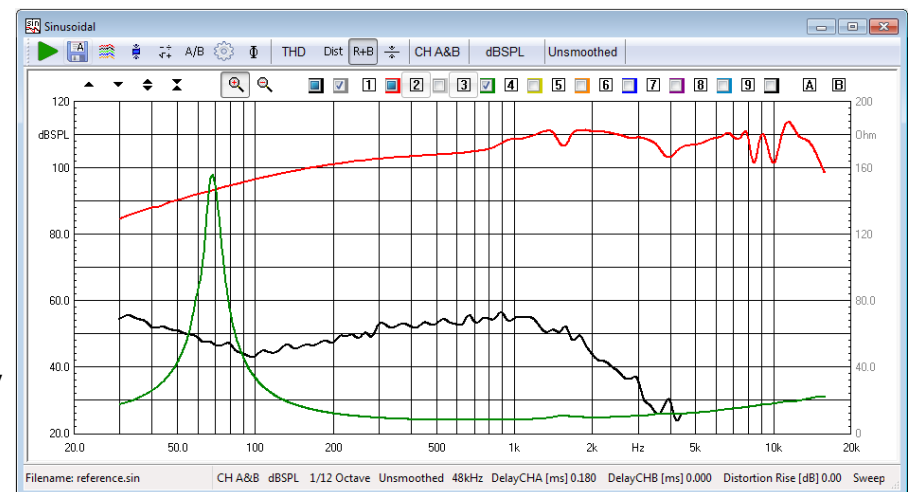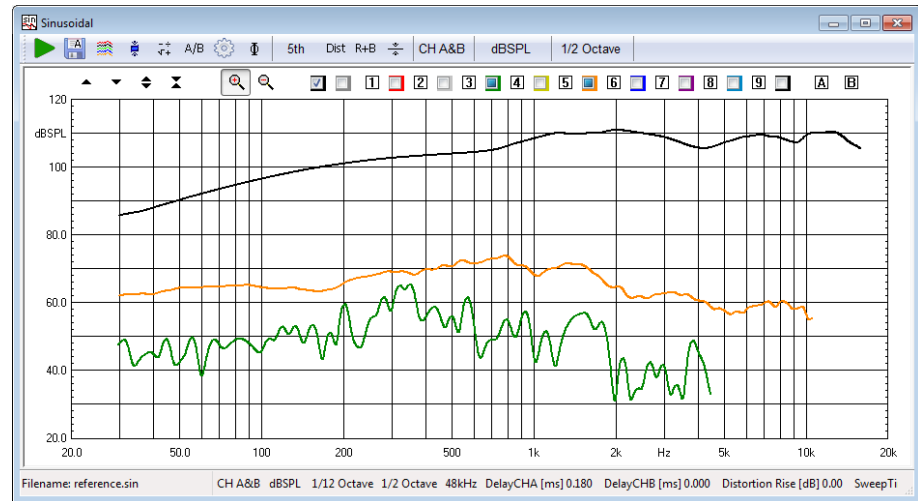
Powerfully FFT & RTA Real Time Analysis

FFT, RTA & 'LIVE' TRANSFER FUNCTION

- These measurements are implemented with an interactive control panel that permits the simultaneous display of time and frequency
- domains. Three operating modes:
- Narrowband FFT
- Octave bands RTA
- 'LIVE' transfer function
- The main features are:
- Two channels measurement and display
- Internal + Event trigger with delay
- FFT from 512 points up to 256k points
- Linear or exponential averaging
- Max hold and min hold functions
- Linear or logarithmic frequency axis
- 1/1, 1/3 octave or 1/6 octave RTA display
- Equal Loudness Contours display
- Frequency smoothing
- ANSI CEA 2010 Power Test

  It is possible to easily execute bursted distortion measurements delivering, for a definable short period of time, very high power to the load.
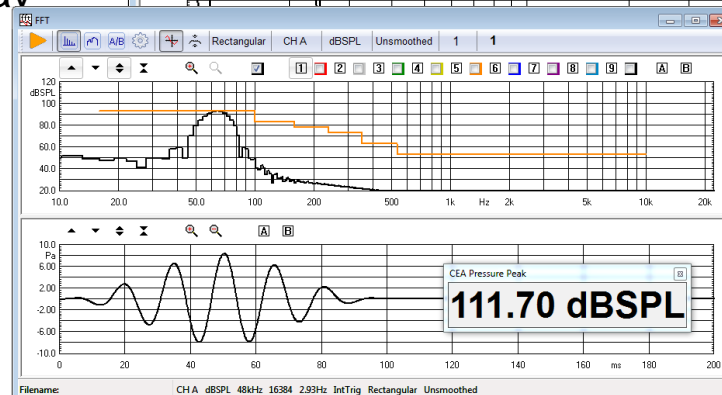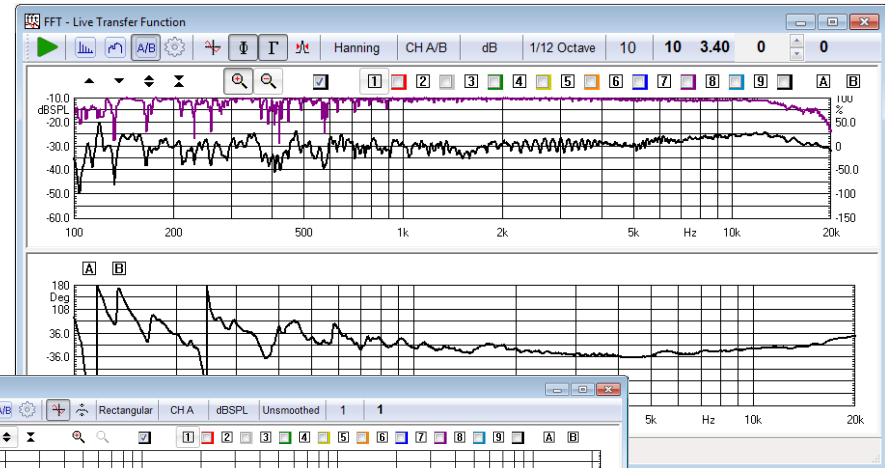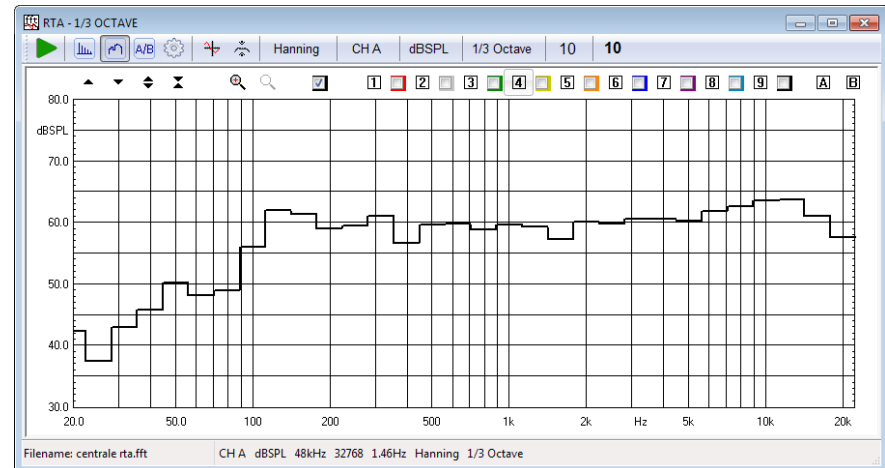
# Universal Multi-Meter & Generator Function

MULTI-METER

The multi-meter control panel is a real-time, interactive instrument, measuring:

- **SPL (dBSPL, dBPa, dBA, dBC)**
- **Voltage (V, dBV, dBu, dBr)**
- **Displacement (m, dBmeter)**
- **Velocity (m/s, dBm/s)**
- **Acceleration (g, m/s2, dBm/s2)**
- **Current (A)**
- **Power (W)**
- **Frequency Counter (Hz)**
- **Distortion: THD, THD+N, IMD (%, dB)**
- **L-C-R Bridge (H, uF, Ohm)**
- **Crest Factor**
- **Fast and Slow integration**

SIGNAL GENERATOR

The programmable signal generator is capable of the following functions or signals generation:

- **Sinusoids with burst and FFT bin round**
- **Optimized CEA burst**
- **Multitones & All Tones**
- **Linear or Logarithmic Chirps**
- **MLS (Maximum Length Sequences)**
- **Pink and White noise**
- **Wave files (.wav) playback and save**
- **Interactive Sweeper**
- **Real time Hi pass and Lo pass Filters**
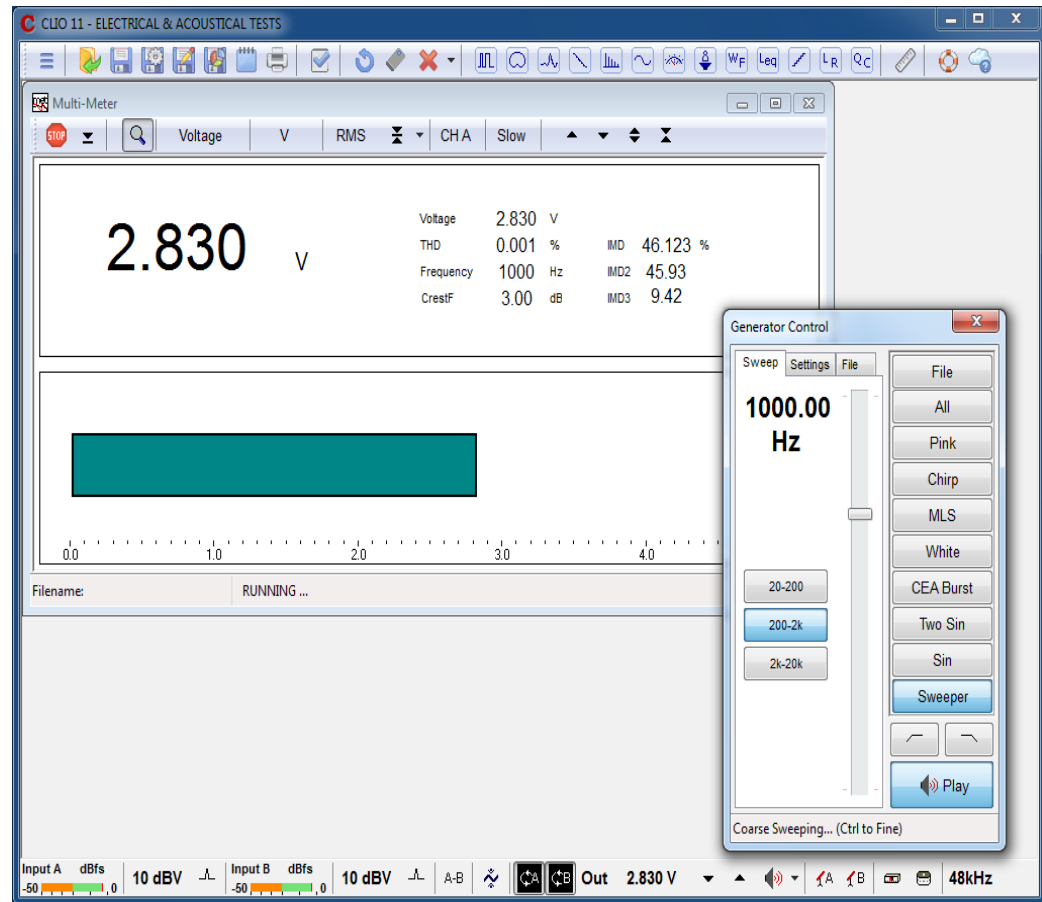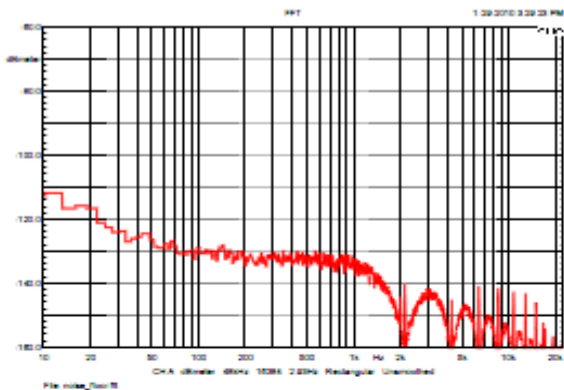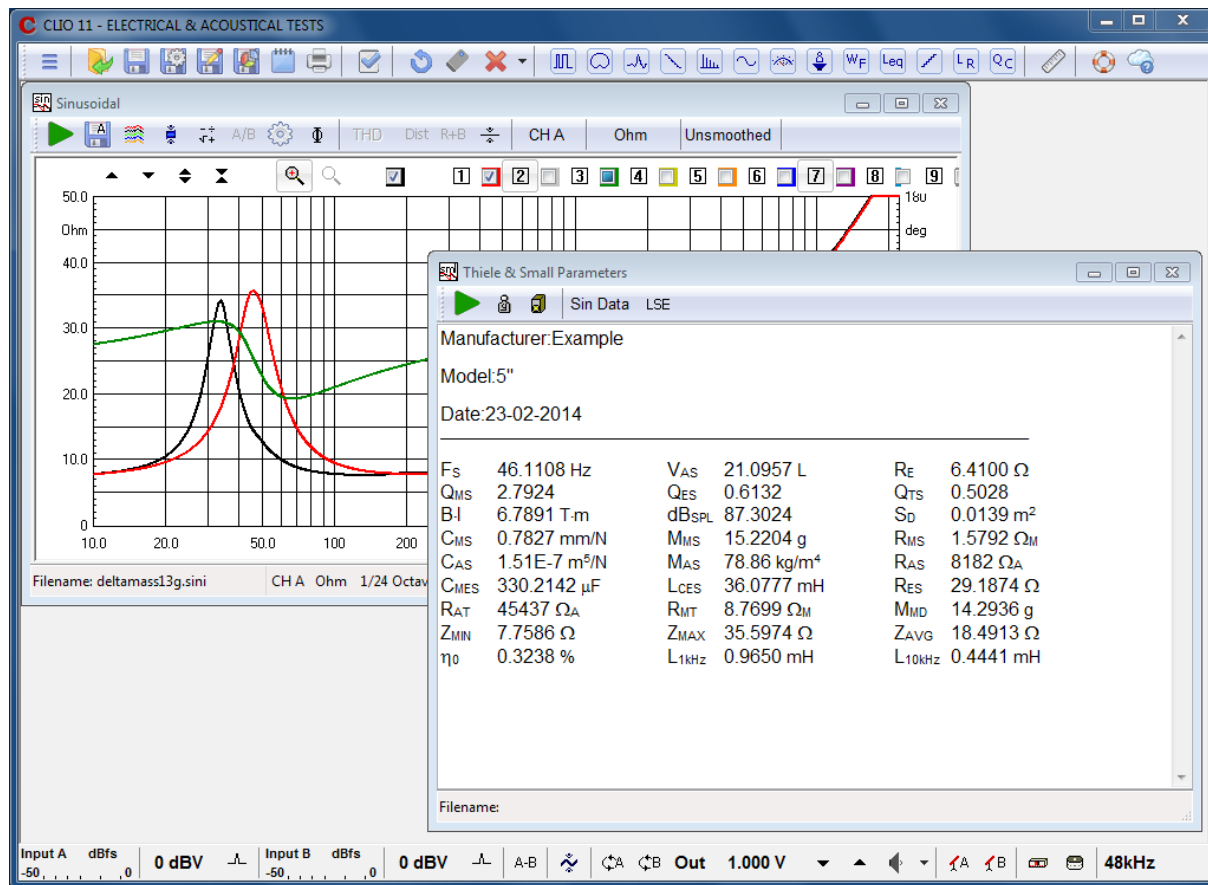
Impedance & TS Parameter Analysis

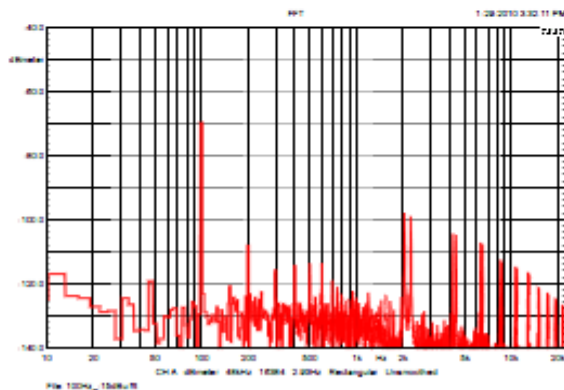Figure 7: Laser Displacement Sensor Noise Floor

Figure 8: 100 Hz Sinewave Displacement

CLIO 11 - ELECTRICAL & ACOUSTICAL TESTS

Sinusoidal

CH A   Ohm   Unsmoothed

Filename: deltamass13g.sini   CH A   Ohm   1/24 Octav

Thiele & Small Parameters   Sin Data   LSE

Manufacturer:Example

Model:5"

Date:23-02-2014

F_S	46.1108 Hz	V_{AS}	21.0957 L	R_E	6.4100 Ω
Q_{MS}	2.7924	Q_{ES}	0.6132	Q_{TS}	0.5028
$B \cdot l$	6.7891 T·m	dB_{SPL}	87.3024	S_D	0.0139 m²
C_{MS}	0.7827 mm/N	M_{MS}	15.2204 g	R_{MS}	1.5792 Ω_M
C_{AS}	1.51E-7 m⁵/N	M_{AS}	78.86 kg/m⁴	R_{AS}	8182 Ω_A
C_{MES}	330.2142 µF	L_{CES}	36.0777 mH	R_{ES}	29.1874 Ω
R_{AT}	45437 Ω_A	R_{MT}	8.7699 Ω_M	M_{MD}	14.2936 g
Z_{MIN}	7.7586 Ω	Z_{MAX}	35.5974 Ω	Z_{AVG}	18.4913 Ω
η_0	0.3238 %	L_{1kHz}	0.9650 mH	L_{10kHz}	0.4441 mH

Filename:

Input A   dBfs   0 dBV   Input B   dBfs   0 dBV   A-B   Out   1.000 V   48kHz

Leq Noise Analysis & Acoustical STI

Leq ANALYSIS

With the Leq Analysis control panel it is possible to execute **real-time capture and level measurement** of any kind of signal present at EA-2 input.

The behaviour of the instrument closely resemble that of a graphical level recorder plus direct-to-disk data capture.

When analyzing an acoustical event this control panel gives you complete information about the equivalent continuous sound level (Leq) and related quantities according to IEC 61672

standard; if used together the RTA frequency analysis you get a complete **integrating sound level meter**.

ACOUSTICAL PARAMETERS & STI

With the Acoustical Parameters control panel it is possible to evaluate the acoustical behaviour of a room and carry out sophisticated post processing of a measured impulse response to calculate the acoustical parameters as defined by the **ISO3382** standard. The **STI, Speech Transmission Index,** is also calculated. All these parameters are of common use to characterize auditoria, concert halls and are applicable to any room intended for speech or music reproduction.
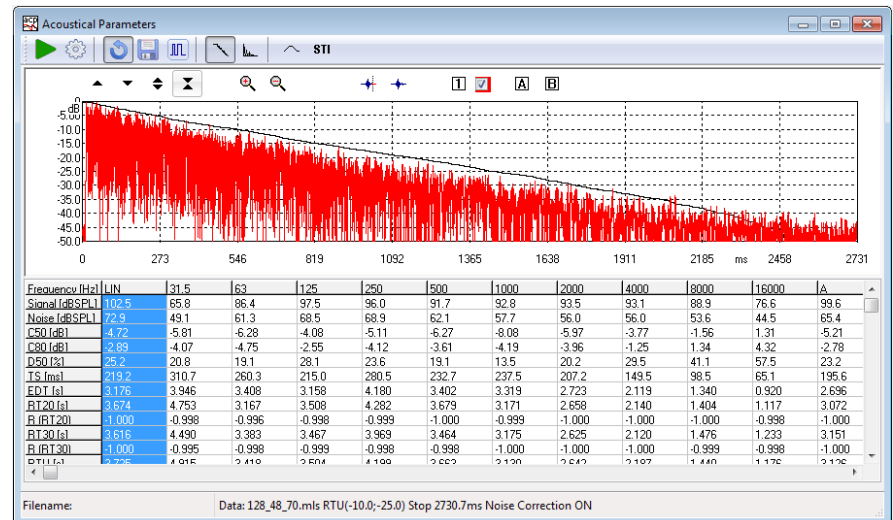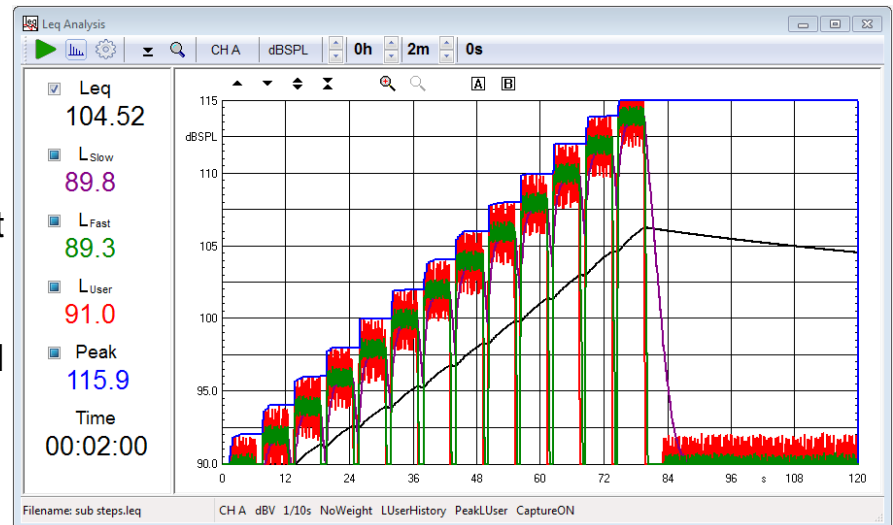
Linearity & Distortion with Wow Flutter Analysis
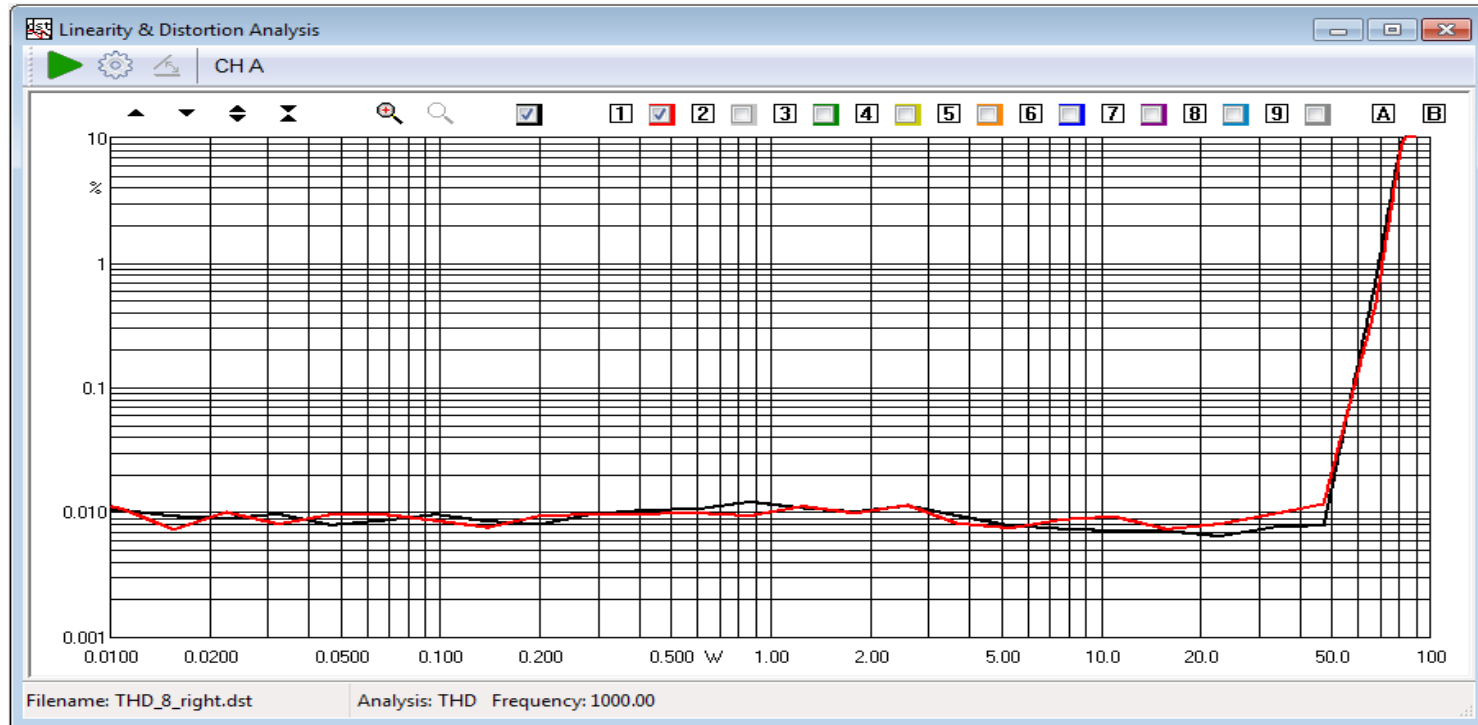
LINEARITY AND DISTORTION

Linearity and Distortion analysis is a complete tool to inspect the non linear behavior of any electronic equipment as power amplifiers or preamplifiers.

- Up to 1250W/8Ohm (higher with external attenuator)
- THD vs. input or output
- SMPTE, DIN, CCIFF Intermodulation
- DUT's gain and deviation from linearity

WOW & FLUTTER ANALYSIS

EA-2 executes Wow & Flutter analysis measuring the frequency modulation that follows instantaneous speed variations due to mechanical imperfections in analog recording or playback devices.

- IEC and NAB standards
- Time and frequency display

Directivity & 3D Balloons Analysis
With LT360EX Turntable Control System

DIRECTIVITY & 3-D BALLOONS
EA-2 has the capability of measuring and analysing the radiation characteristic of a loudspeaker in space. Dedicated hardware controls for turntable systems and software management routines help you while capturing the often huge amount of data needed. Then the Directivity Analysis and 3-D Balloons post processing routines permit the following analysis:

- **Classical circular polar plots**
- **Color map directivity plots**
- **Waterfall-like directivity plots**
- **3-D "Balloons" analysis**
- **Data export in text formats as EASE**
- **(.xhn), CLF (.tab) or impulse responses.**
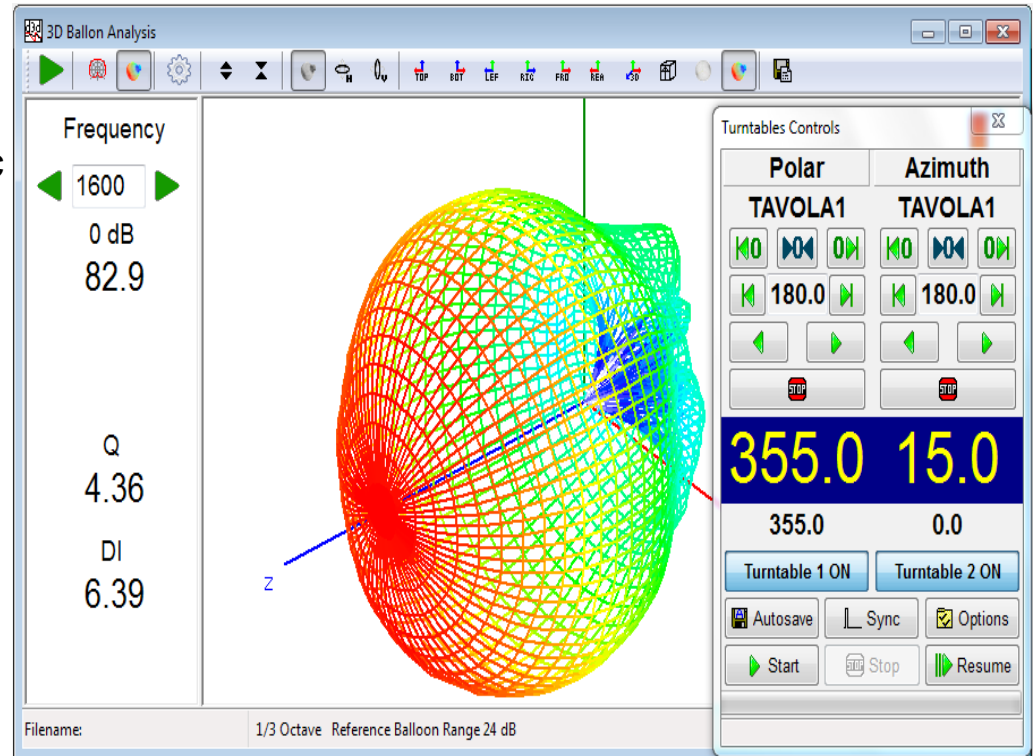
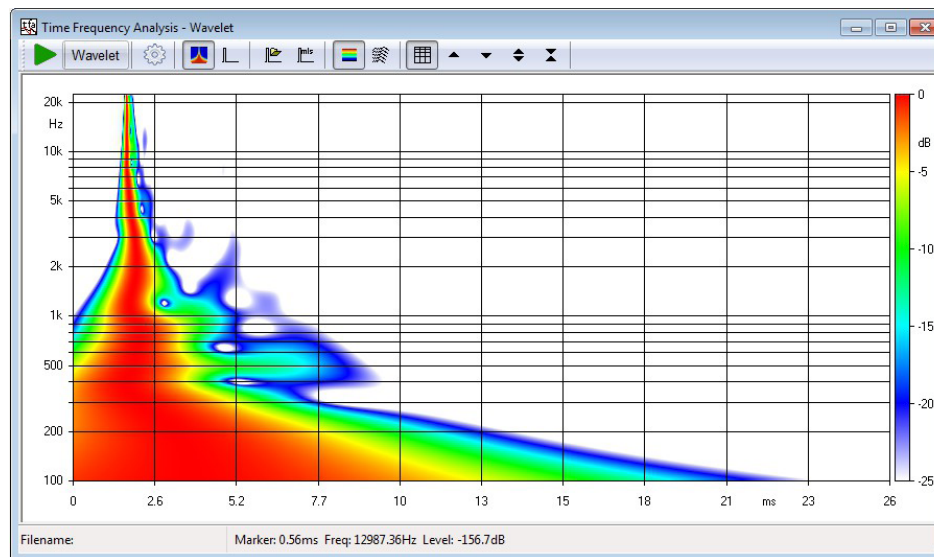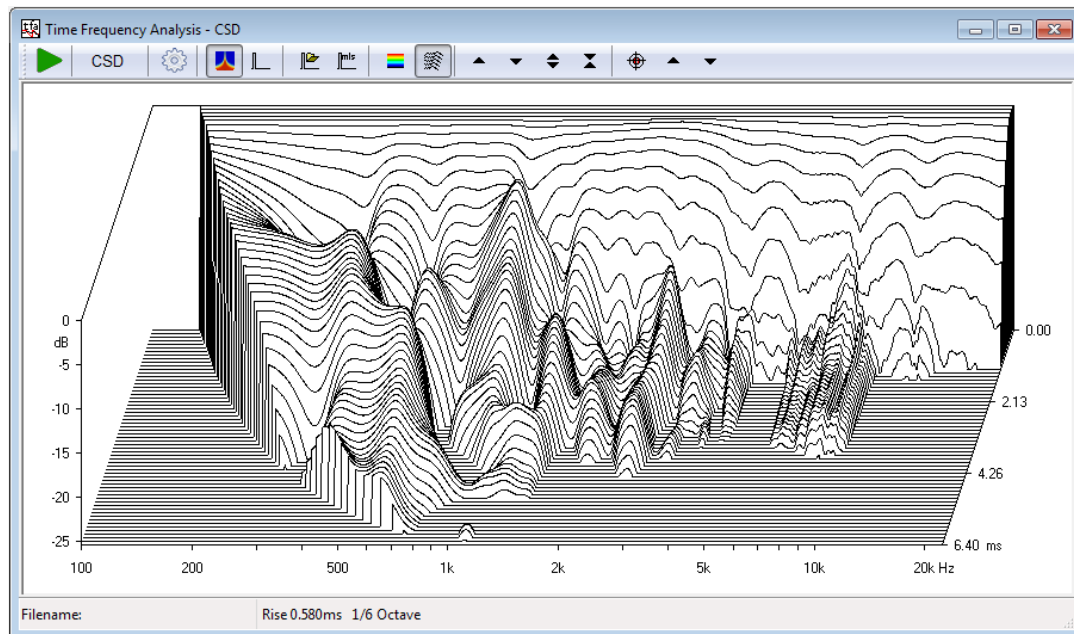# Wavelet & Time Response for Sound Quality Analysis

TIME FREQUENCY ANALYSIS
The Time Frequency Analysis tool allows to post process impulse response measurements to obtain various representations of energy decay versus time.
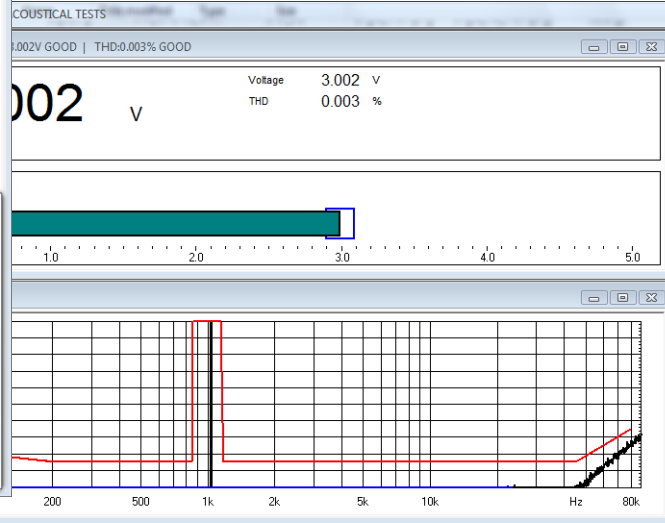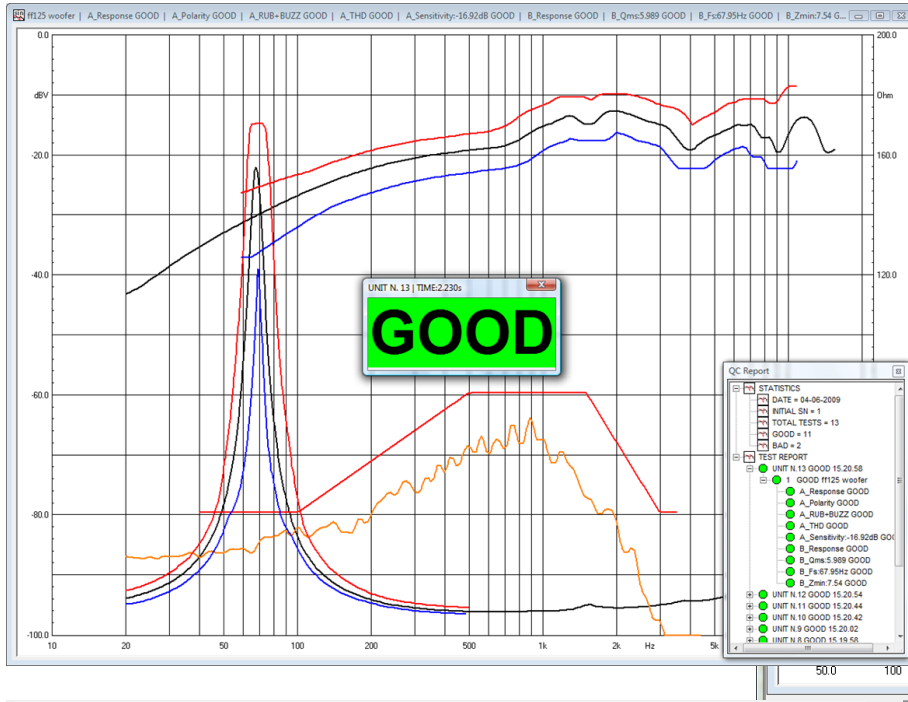The following results are possible:

- **Cumulative spectral decay (CSD)**
- **Energy Time Frequency (ETF)**
- **Wavelet Analysis**

Graphs can be viewed as classical 3D, Waterfall like, plots or as Color maps.

Powerfully Quality Control for Automation

Powerfully Quality Control for Automation

QUALITY CONTROL

The **Quality Control** software extension for **EA-2** is a powerful suite for executing state of the art production line testing. **EA-2 QC** is able to test the production of loudspeakers, drivers, microphones, amplifiers and any other electroacoustic device. **EA-2 QC** can interact with external hardware or production line controllers in addition to PC peripherals to implement a fully automatic line. **EA-2 QC** is also able to behave as a **TCP/IP measurement server** to let you write and implement your custom written code. **EA-2 QC** takes full advantage of all the measurement techniques found in the CLIO standard software adding a versatile script processor capable of handling **a virtually unlimited sequence of tests** to accomplish even the most complex tasks; on the other hand **a single ultra-fast sinusoidal test** may ensure you production **cycle times of less than 1 second.**

Some of the quality control tests possible within one single pass:

- Frequency response and impedance response (mono or stereo tests)
- Average level
- Sensitivity (average or up to eight frequencies)
- Polarity
- THD response
- Single harmonic response (from 2nd to 10th)
- Fast-TrackTM Rub&Buzz
- T&S parameters (Fs, Qt, Qe, Qm, Cms, Mms, Mmd, Vas, Bl, dBSPL, Zmin)
- Loudness Rating (RLR, SLR, STMR)

IEA EA-2 for all Electro-Acoustic Measurements

IEA EA-2 for Customized Design Fixture Application
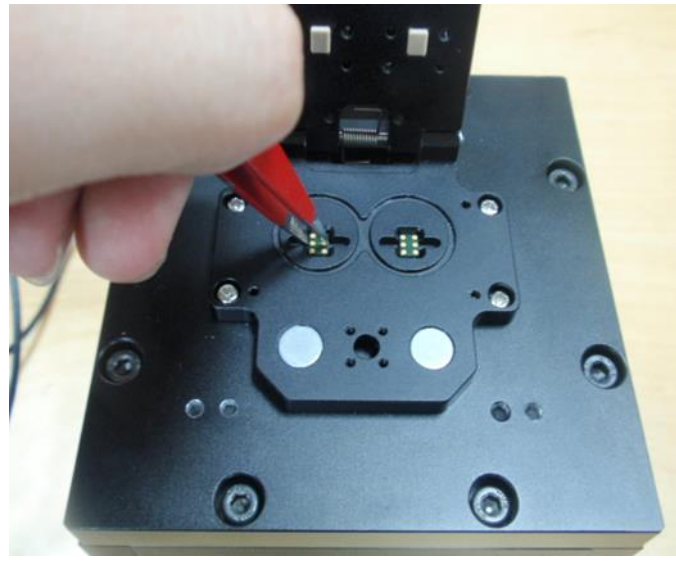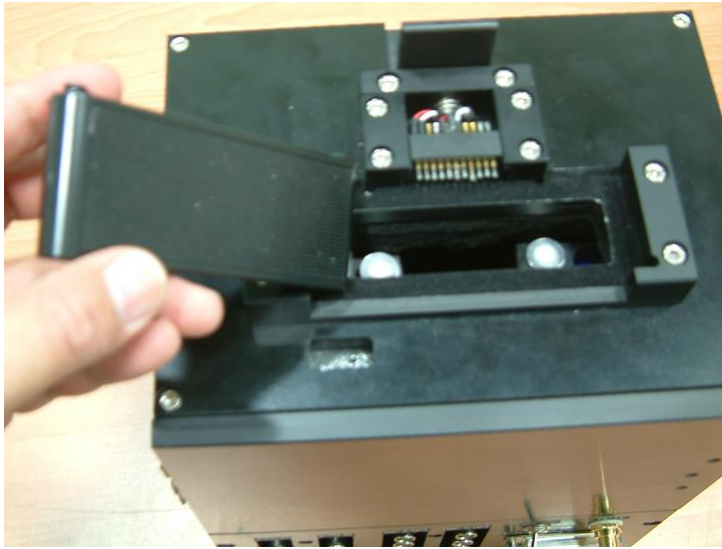
IEA Earphone Product Testing Automation
耳機成品測試系統

Special designed for Earphone Acoustical Measurement Automation System.

Application:
- Stereo Earphone
- Insert Type
- Intra Concha Type
- Issue IEC-60711 and ITU-T P.57 Type 3.3 Ear Pinna Simulator

Features:
- Precision Repetition Mechanical Control System.
- High insulation against airborne noise
- PC remote control easy to use.
- Production Line & QC testing system.

Test Items:
According to IEC-60268-7 and EN-50332-1 & 2

- Frequency Response L/R
- Sensitivity and LR difference
- Total Harmonics Distortion.
- Noise Rub and Buzz.
- Crosstalk.
- Noise Cancellation Ability.
- Fully QC Control functions.
- Index Meas. time typical < 6 sec. L/R
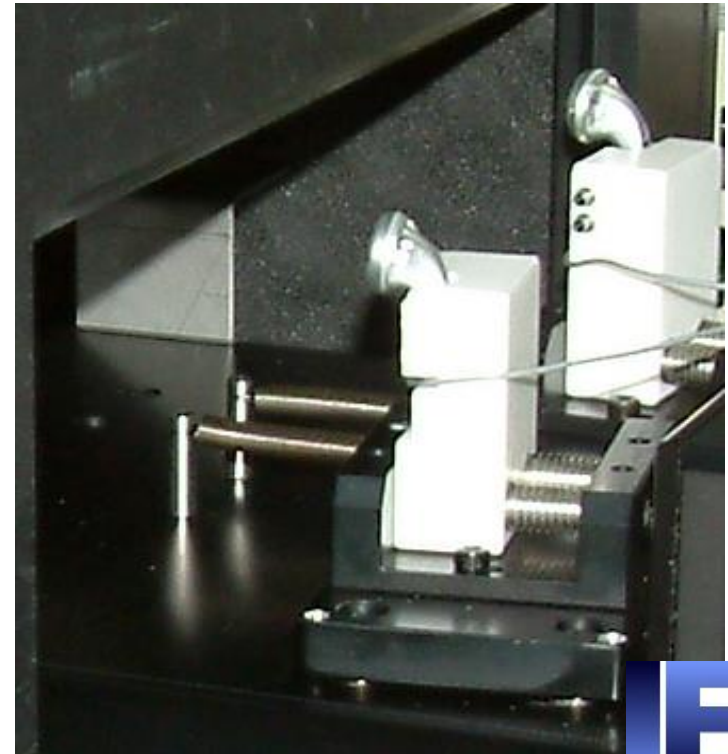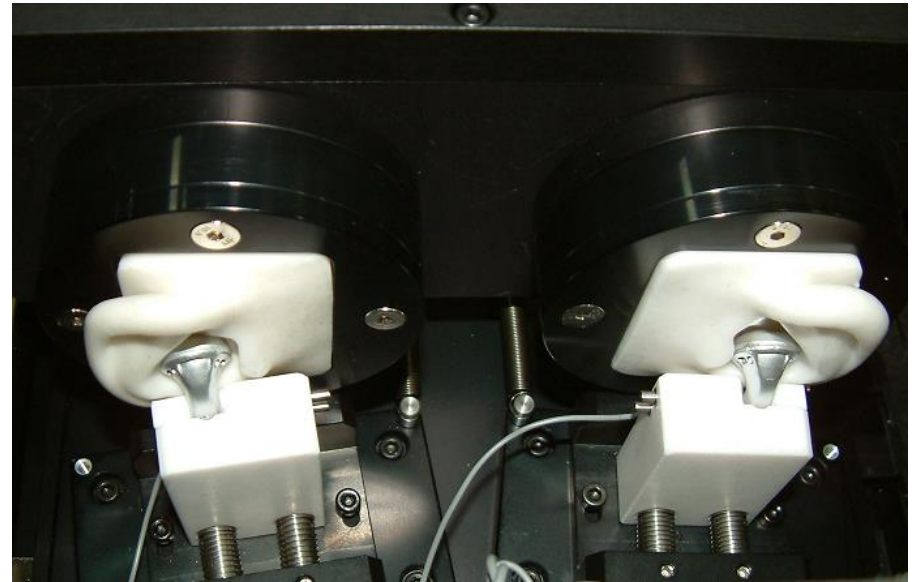
The World's First Tablet Electro-Acoustic System

Smart Phone ATE system for RIM & Motolora

•Total Index ~30 sec Smart Phone Acoustical Measurements
•Receiver
•Microphone
•Speaker
•Vibration Motor
•The others Transducer

•RLR/SLR/STMR for ITU-T
•Frequency Response
•THD, THD+N
•Rub & Buzz
•Sound Quality Analysis

World Wide Customers & Partners

Key Product Development Partner: Google, beats by dr. dre

Key Main Customer: Google, intel, ASUS, HTC, acer

EMS Customer: wistron, COMPAL, Quanta Computer, LITEON, Arima COMMUNICATIONS, PEGATRON, 英華達 Inventec Appliances, FOXCONN, CMCS 奇美通訊, 5xLink

Electro-Acoustic Main Customer: KINGSTATE, MONSTER, audio-technica, ST life.augmented, KNOWLES, BOSE, Pioneer, SONY, PHILIPS sense and simplicity, Logitech, FG Forgrand, VECO, LG Corp., JVC The Perfect Experience, POWERTECH, CAROL, LR, DARFON, 工業技術研究院 Industrial Technology Research Institute, AV-LEADER CORPORATION AV-JEFE

HannStar

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Thank you!