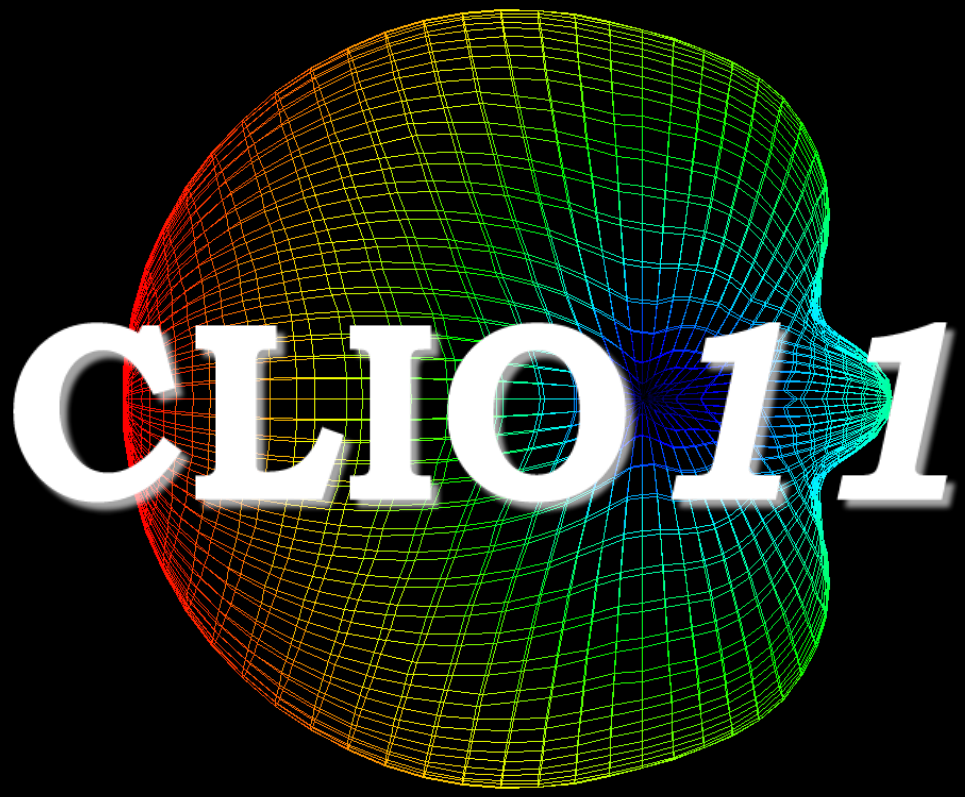
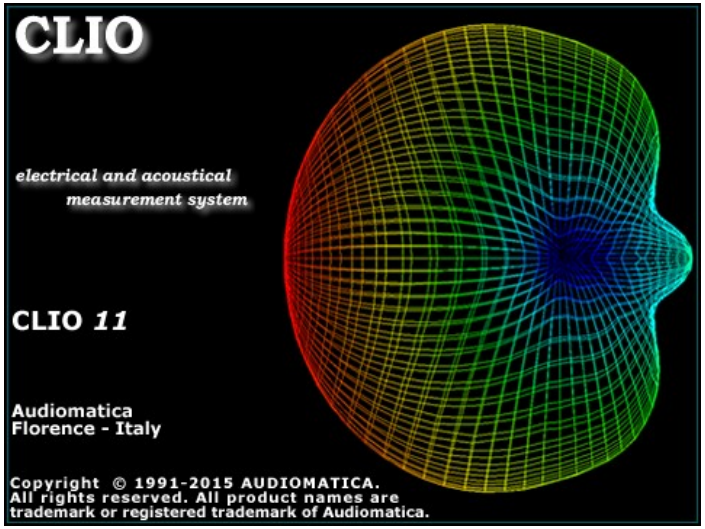


Understanding CLIO 11

Mauro Bigi, Maurizio Jacchia - Audiomatica

AUDIOMATICA

100% warranty by Audiomatica, Italy



CLIO11 is a complete hardware and software solution

Calibration towards International Standards

Pagina 1 di 10
Page 1 of

CERTIFICATO DI TARATURA N. 10-0640
Certificate of Calibration No.

- Data di emissione *date of issue*	2010-06-01
- destinatario *addressee*	AUDIOMATICA S.R.L. Via Manfredi, 12 - 50136 FIRENZE
- richiesta *application*	Rif. Ordine scritto
- in data *date*	2010-06-01
Si riferisce a *referring to*	
- oggetto *item*	SISTEMA DI ACQUISIZIONE DATI (v. pag. 2)
- costruttore *manufacturer*	AUDIOMATICA (FI)
- modello *model*	CLIO FW-01 (v. pag. 2)
- matricola *serial number*	2018070011
- data delle misure *date of measurements*	2010-06-01
- registro di laboratorio *laboratory reference*	01/10

Il presente certificato di taratura è emesso in base all'accreditamento SIT N. 56 rilasciato in accordo ai decreti attuativi della legge n. 273/1991 che ha istituito il Sistema Nazionale di Taratura (SNT). Il SIT garantisce le capacità di misura, le competenze metrologiche del Centro e la riferibilità delle tarature eseguite ai campioni nazionali e internazionali delle unità di misura del Sistema Internazionale delle Unità (SI).
Questo certificato non può essere riprodotto in modo parziale, salvo espressa autorizzazione scritta da parte del Centro.

This certificate of calibration is issued in compliance with the accreditation SIT No. 56 granted according to decrees connected with Italian law No. 273/1991 which has established the National Calibration System. SIT attests the measurement capability and metrological competence of the Centre and the traceability of calibration results to the national and international standards of the International System of Units (SI).
This certificate may not be partially reproduced, except with the prior written permission of the issuing Centre.

I risultati di misura riportati nel presente Certificato sono stati ottenuti applicando le procedure citate alla pagina seguente, dove sono specificati anche i campioni di prima linea da cui inizia la catena di riferibilità del Centro e i rispettivi certificati di taratura, in corso di validità. Essi si riferiscono esclusivamente all'oggetto in taratura e sono validi nel momento e nelle condizioni di taratura, salvo diversamente specificato.

The measurement results reported in this Certificate were obtained following the procedures given in the following page, where the reference standards are indicated as well, from which starts the traceability chain of the laboratory, and the related calibration certificates in their course of validity. They relate only to the calibrated item and they are valid for the time and conditions of calibration, unless otherwise specified.

Le incertezze di misura dichiarate in questo documento sono state determinate conformemente al documento EA-4/02 e sono espresse come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura *k* corrispondente ad livello di fiducia di circa il 95%. Normalmente tale fattore *k* vale 2.

The measurement uncertainties stated in this document have been determined according to EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Il Responsabile del Centro
Head of the Centre

due morsetti). Il valore riportato per la tensione è il valore efficace. La tensione di uscita dello strumento è nominalmente sinusoidale. Lo strumento campione esclude la componente continua ed è sensibile al valore efficace totale su una banda di frequenza che include la gamma da 1 Hz a 10 MHz.

Per tutte le misure il programma di controllo fornisce dei messaggi per l'esecuzione guidata della sequenza e attende la conferma dell'operatore per la progressione fra i vari passi.

Tutte le misure sono state eseguite nell'ordine nel quale sono riportati i relativi risultati, prima quelle relative al canale A, e poi quelle relative al canale B, per ciascune delle fuzioni di misura. Le modalità di taratura sono state indicate dal costruttore. Le portate dello strumento sono state identificate in base alle indicazioni del costruttore.

Incertezze di misura

L'incertezza estesa per i valori di misura riportati nel presente certificato (simmetrica rispetto ai valori di misura), è la seguente:

- per la tensione alternata applicata:	come riportato assieme ai risultati delle misure
- per la tensione alternata misurata:	come riportato assieme ai risultati delle misure
- per la frequenza delle grandezze alternate:	0,5%
- per la temperatura ambiente:	1°C
- per la tensione di alimentazione:	3%

Risultati delle misure

Funzione misuratore di tensione alternata

N	Tensione alternata applicata		Strumento in taratura			Risultati di misura		
	Valore *U*	Frequenza	Portata	Lettura *L*		Errore *L-U*		Incertezza estesa
				Canale A	Canale B	Canale A	Canale B	
1	90,000 V	1 kHz	100 V	90,003 V	90,002 V	0,003 V	0,002 V	30 mV
2	30,000 V		100 V	29,989 V	29,988 V	-0,011 V	-0,012 V	13 mV
3	28,000 V		30 V	28,002 V	28,002 V	0,002 V	0,002 V	12 mV
4	10,0000 V		30 V	9,997 V	9,997 V	-0,0030 V	-0,0030 V	5,8 mV
5	9,0000 V		10 V	9,001 V	9,000 V	0,0010 V	0,0000 V	3,4 mV
6	3,0000 V		10 V	2,999 V	2,999 V	-0,0010 V	-0,0010 V	1,5 mV
7	2,8000 V		3 V	2,805 V	2,805 V	0,0050 V	0,0050 V	1,4 mV
8	1,0000 V		3 V	1,001 V	1,001 V	0,0010 V	0,0010 V	1,1 mV
9	0,9000 V		1 V	0,902 V	0,902 V	0,0020 V	0,0020 V	1,1 mV
10	0,7750 V		1 V	0,776 V	0,776 V	0,0010 V	0,0010 V	1,1 mV
11	0,3000 V		1 V	0,300 V	0,300 V	0,0000 V	0,0000 V	1,0 mV
12	0,28000 V		0,3 V	280,52 mV	280,50 mV	0,52 mV	0,50 mV	0,10 mV
13	100,000 mV		0,3 V	100,131 mV	100,125 mV	0,131 mV	0,125 mV	35 µV
14	90,000 mV		0,1 V	90,158 mV	90,153 mV	0,158 mV	0,153 mV	32 µV
15	30,000 mV		0,1 V	30,041 mV	30,039 mV	0,041 mV	0,039 mV	17 µV
16	28,000 mV		0,03 V	28,049 mV	28,047 mV	0,049 mV	0,047 mV	14 µV
17	5,0000 mV		0,01 V	5,008 mV	5,007 mV	0,0080 mV	0,0070 mV	7,8 µV

Funzione generatore di tensione alternata

N	Tensione impostata sullo strumento in taratura (frequenza nominale 1,03125 kHz) *L*	Risultati di misura				
		Tensione alternata misurata *U*		Errore *U-L*		Incertezza estesa
		Uscita A	Uscita B	Uscita A	Uscita B	
1	6,0000 V	5,9904 V	5,9905 V	-0,0096 V	-0,0095 V	2,1 mV
2	3,0000 V	2,9898 V	2,9901 V	-0,0102 V	-0,0099 V	1,4 mV
3	2,0000 V	1,9937 V	1,9940 V	-0,0063 V	-0,0060 V	1,2 mV
4	1,00000 V	0,99644 V	0,99658 V	-0,00356 V	-0,00342 V	0,85 mV
5	0,77500 V	0,77228 V	0,77241 V	-0,00272 V	-0,00259 V	0,64 mV
6	0,100000 V	99,661 mV	99,672 mV	-0,339 mV	-0,328 mV	85 µV

A CLIO11 instrument traces China National Standards (CNAS)
Calibration certificate available (with fee) upon request

The heart of the CLIO 11 system

FW-01 Audio Interface:

- **IEEE-1394 Firewire interface**
- **24-bit up to 192kHz sampling**
- **Ultra-stable ASIO operation**

The FW-01 front panel

- Two balanced inputs from -40dBV to +40dBV (283V max). MIC phantom power supply.
  XLR-combo connectors.

- Two balanced outputs plus one RCA unbalanced in parallel. Up to +17 dBu. Attenuation with 0.01dB resolution control in 0.1dB steps.

The FW-01 rear panel

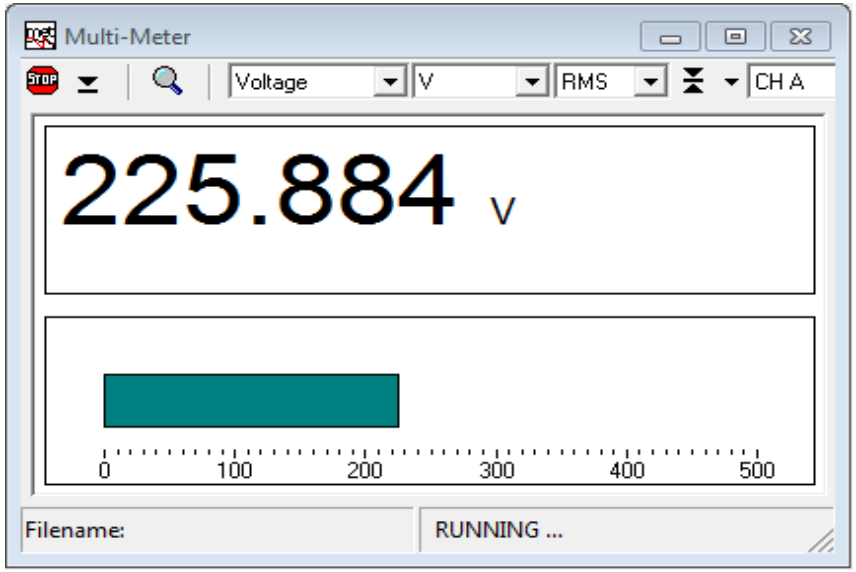
- Standard 6-poles IEEE connector.

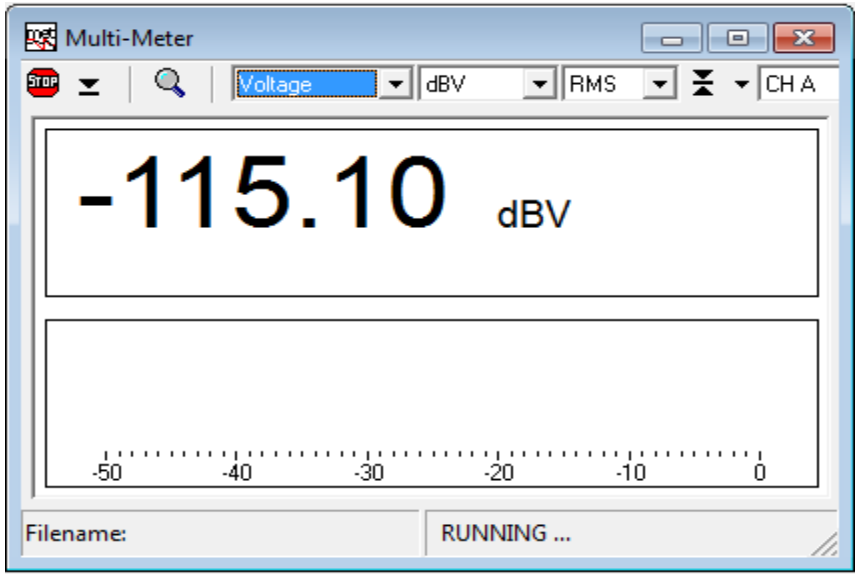
- Optional 12V external supply.

- SPDIF digital output.

Input-Output analog interfacing

- **Wide input acceptance**

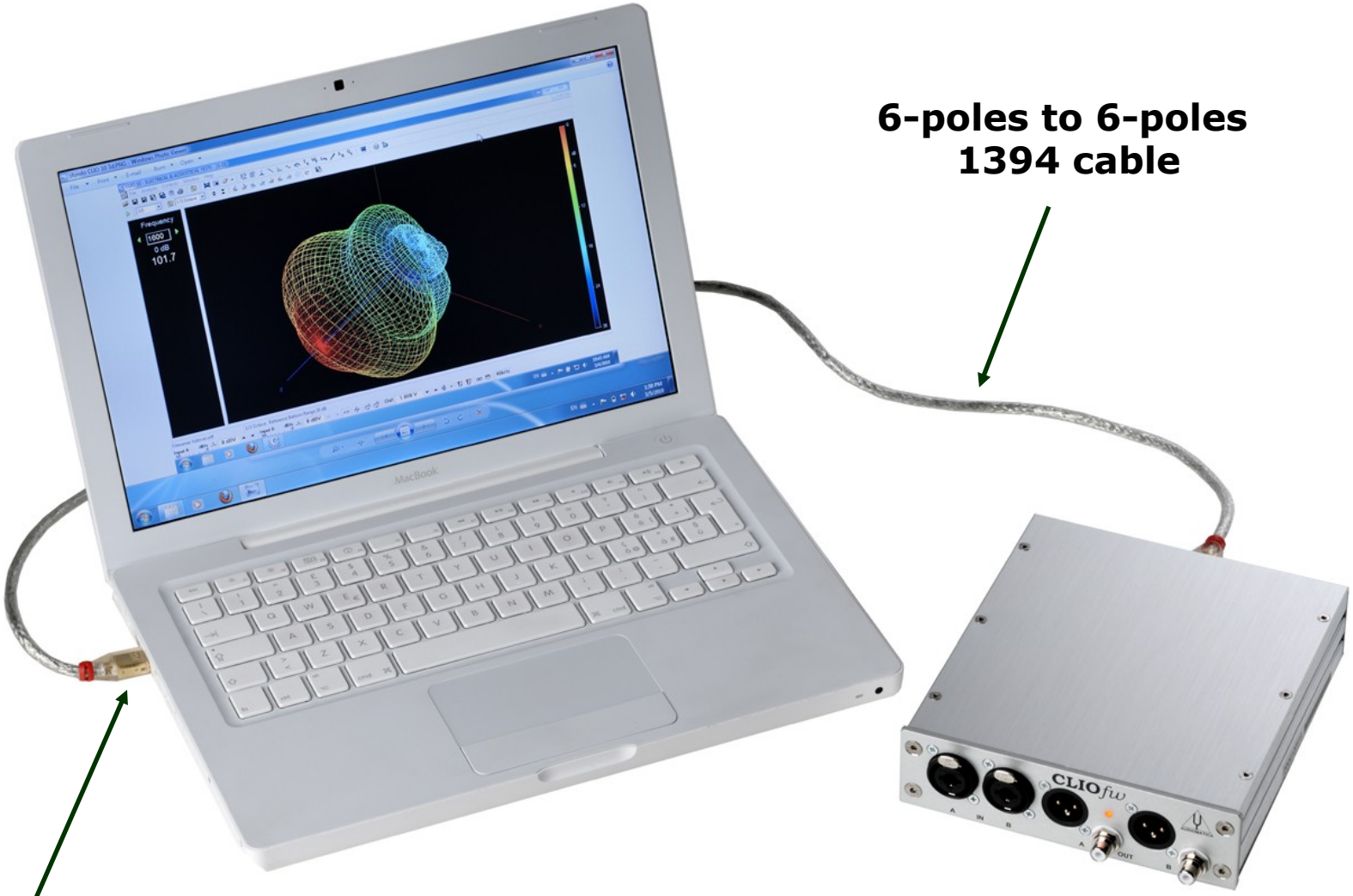




Max **Min**

- **Input is hardware protected resulting in very low failures due to misbehaviour in connecting devices**
- **Input sensitivity in 10dB steps from +40dBV to -40dBV full scale**
- **Max output level (Sine):17dBu (5.5Vrms)**
- **Attenuation: 0.1 dB steps to full mute**
- **Care as failure may result due to output connection to a high voltage sources. (Major User Mistake)**

Portability for On-Field Tests



Powering Options: PC Powered

Portability for On-Field Tests

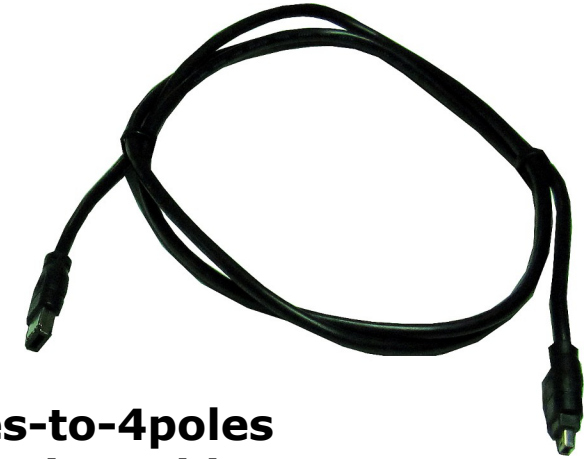
12VDC 1A Power Supply

Powering Options: External power supply

FW-01 Connection Options

Supplied
6poles-to-6poles
Firewire cable

OR



+

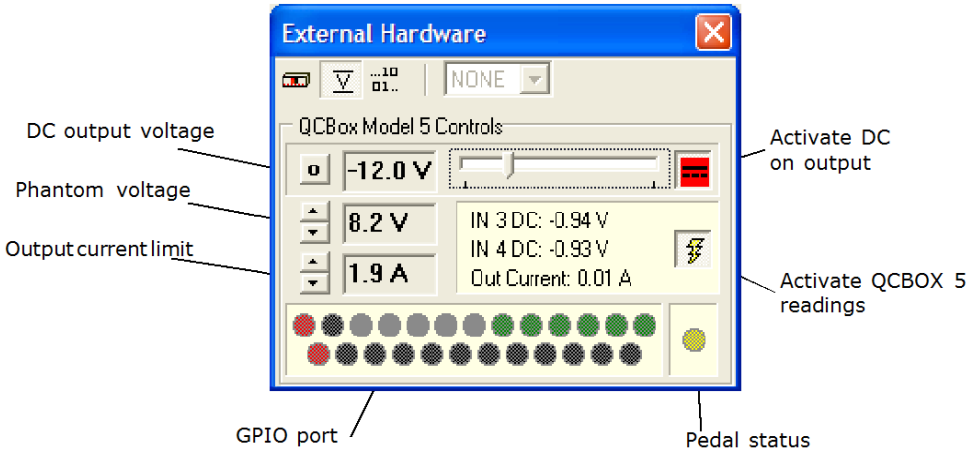
External 12VDC 1A
Power Supply
(not supplied)

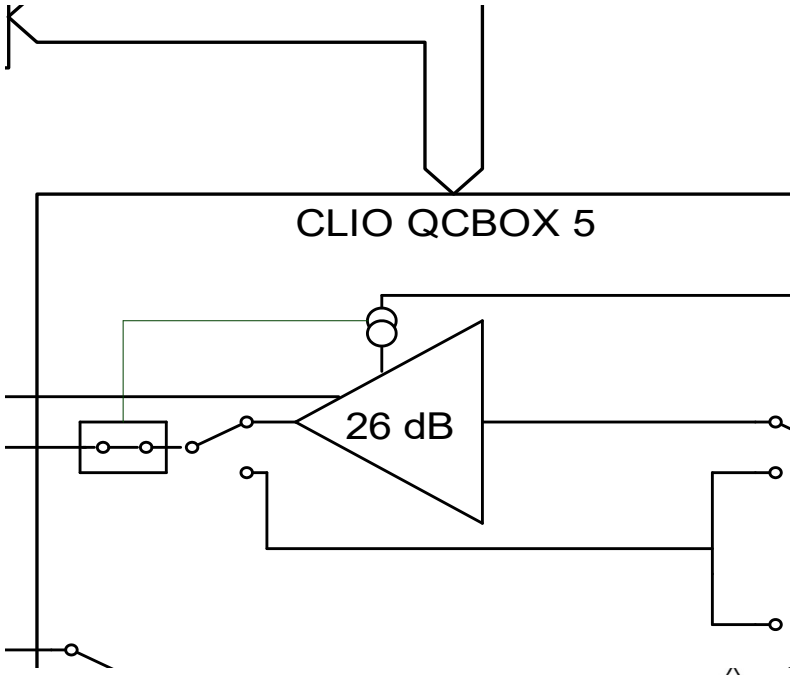
5.5x2.5mm plug
Positive on tip

6poles-to-4poles
Firewire cable
(not supplied)

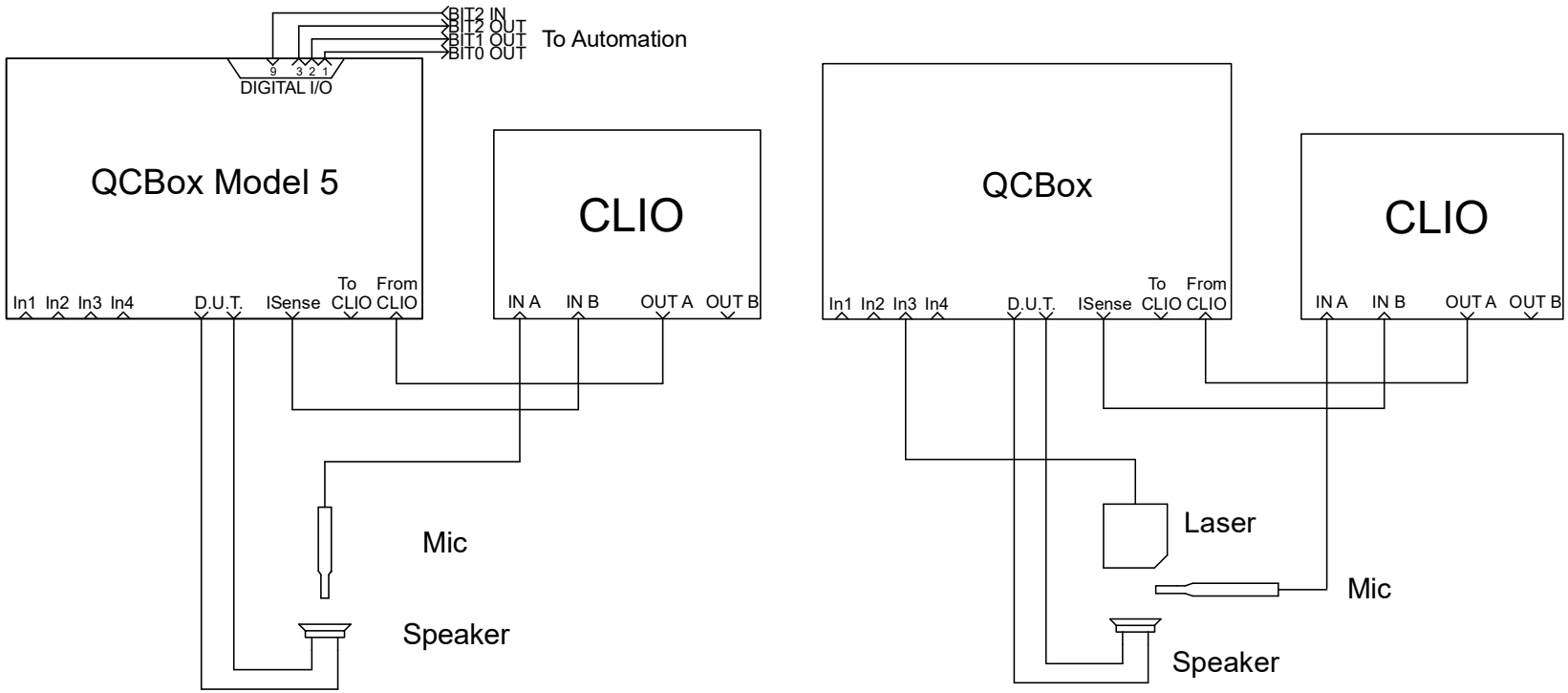
QCBox Model 5 Amplifier, SwitchBox & Accessory Test Unit

Input:	**Four line/microphone inputs with selectable phantom power supply (0÷24V software controlled) TTL pedal input (RCA connector) 5 digital inputs (DB25 connector)**
Output:	**50W (8Ohm) power amplifier (26dB gain) with current sensing and software controlled current limiter 6 digital outputs (DB25 connector)**
THD (@1 kHz):	**0.004 %**
Functions:	**USB controlled internal switches for impedance measurements Isense DC current measurement ±2.25A DC IN measurement (IN 3 range ±2.5V, IN 4 range ±5V)**



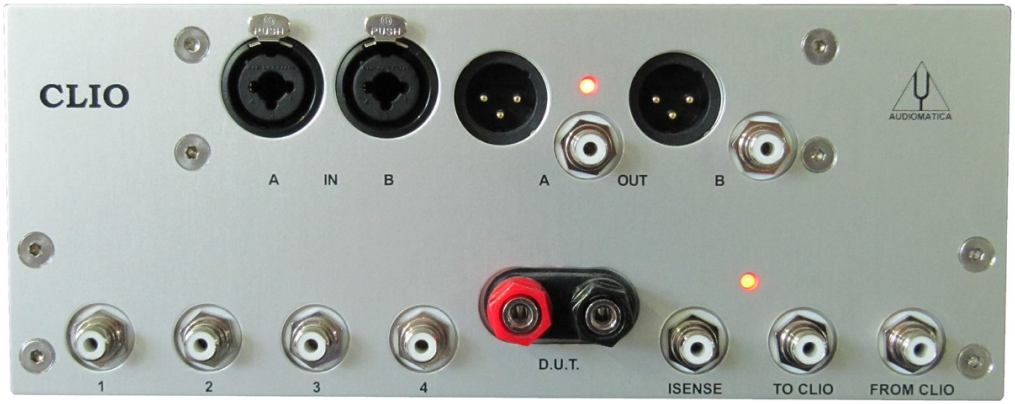


QCBox Model 5 Amplifier, SwitchBox & Accessory Test Unit



QCBox Model 5 & FW-01 Assembly Options

Laboratory Stack Panel



OR

19”Rack Panel

Measuring Microphones

MIC-01
25cm

MIC-03
7cm

MIC-02
12.5cm

Optional PRE-01 preamplifier

MIC-04

Measuring Microphones

Laboratory Grade Performance

AUDIOMATICA

Free-field Microphone
Type MIC 02
Calibration Chart

Serial No:	9802667	
Sensitivity:	-30.7	dB re 1V/Pa
	29.30	mV/Pa

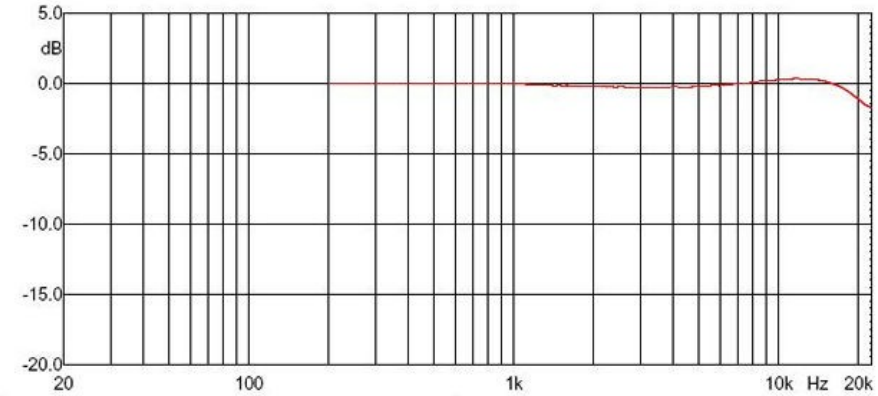
Valid at:

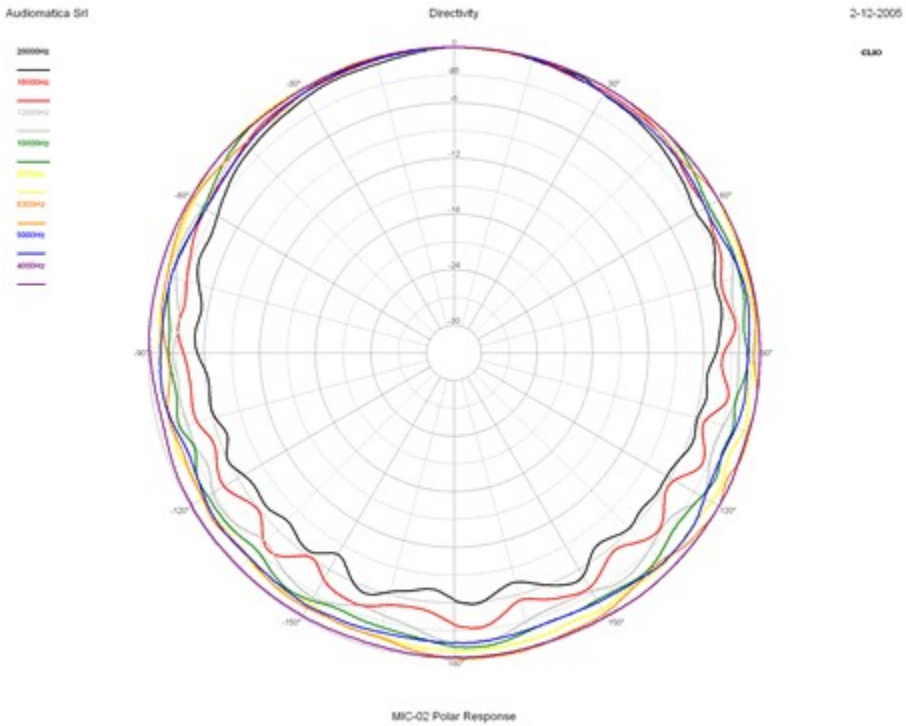
Temperature:	21	°C
Ambient Static Pressure:	100.2	kPa
Relative Umidity:	41	%
Frequency:	1000	Hz
Polarization Conditions:	8.2-5.6	V-KOhm

Reference Instruments:

MANUF.	MODEL	SERIAL NO	CALIB. DATE
HP	3468A	2137A09681	14-04-2008
LARSON DAVIS	812	416	18-04-2008
B&K	4231	1759543	18-04-2008
B&K	4939	55475	29-03-2007

Date: 1/23/2009 Cerificate NO: 9906 Signature : M.J.





Measuring Microphones

Sensitivity Calibration

MIC-03 fitted in standard Sound Calibrator

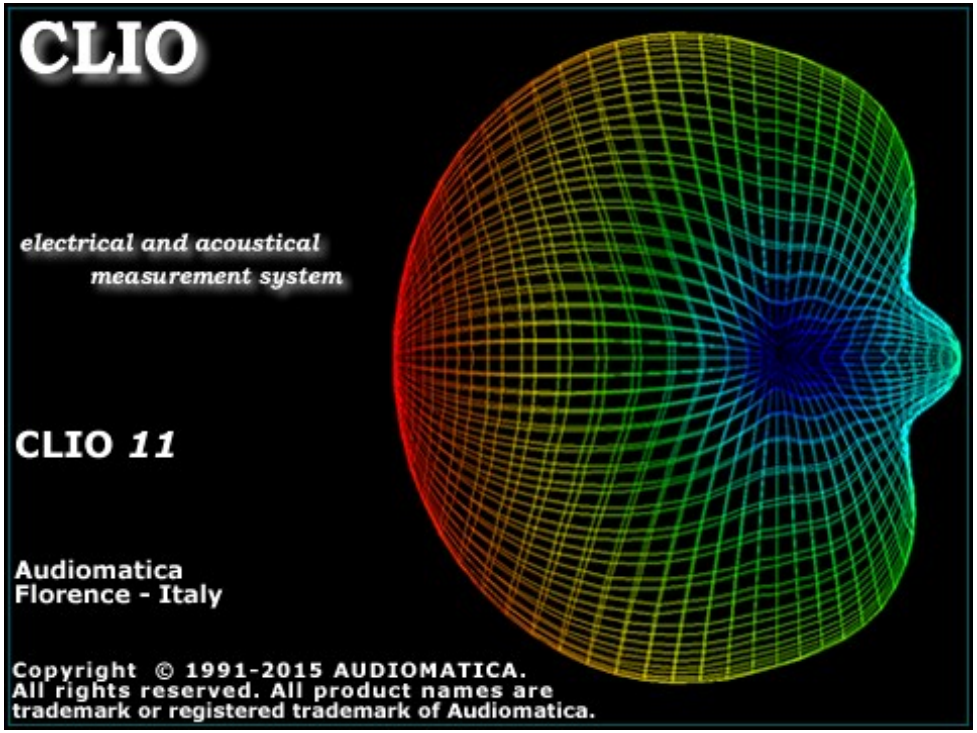
AA-001 1/2" adapter

Microphone marking

10-digits serial number

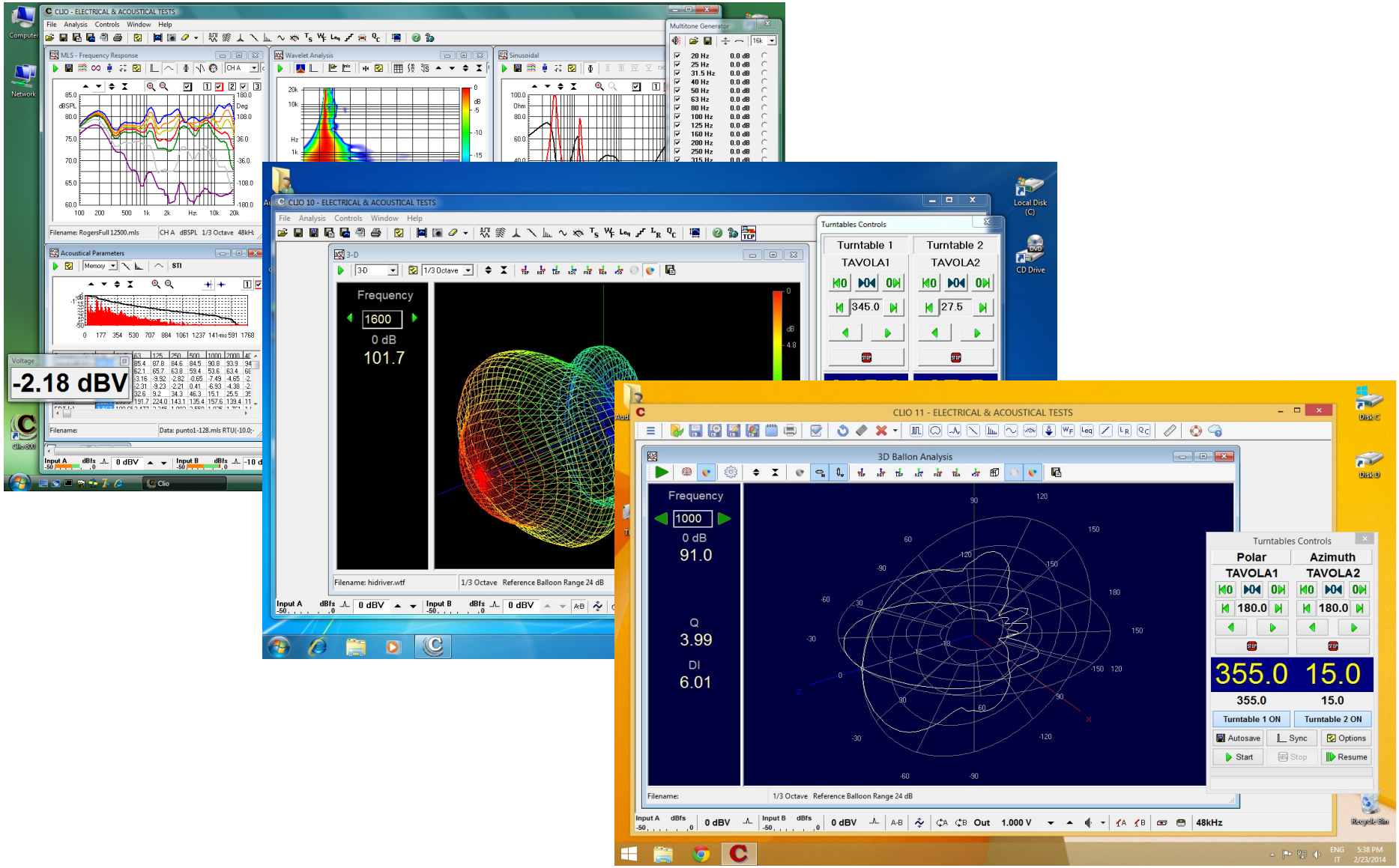
Audiomatica logo

The CLIO 11 Software



- **STANDARD Version**
- **QC Version**

Free Software Upgrade <u>within same release and version</u>.
Examples:
CLIO 11.3 STND is free from CLIO 11.0 STND
CLIO 11.3 QC is not free from CLIO 11.0 STND
CLIO 11.3 STND is not free from CLIO 10.6 STND

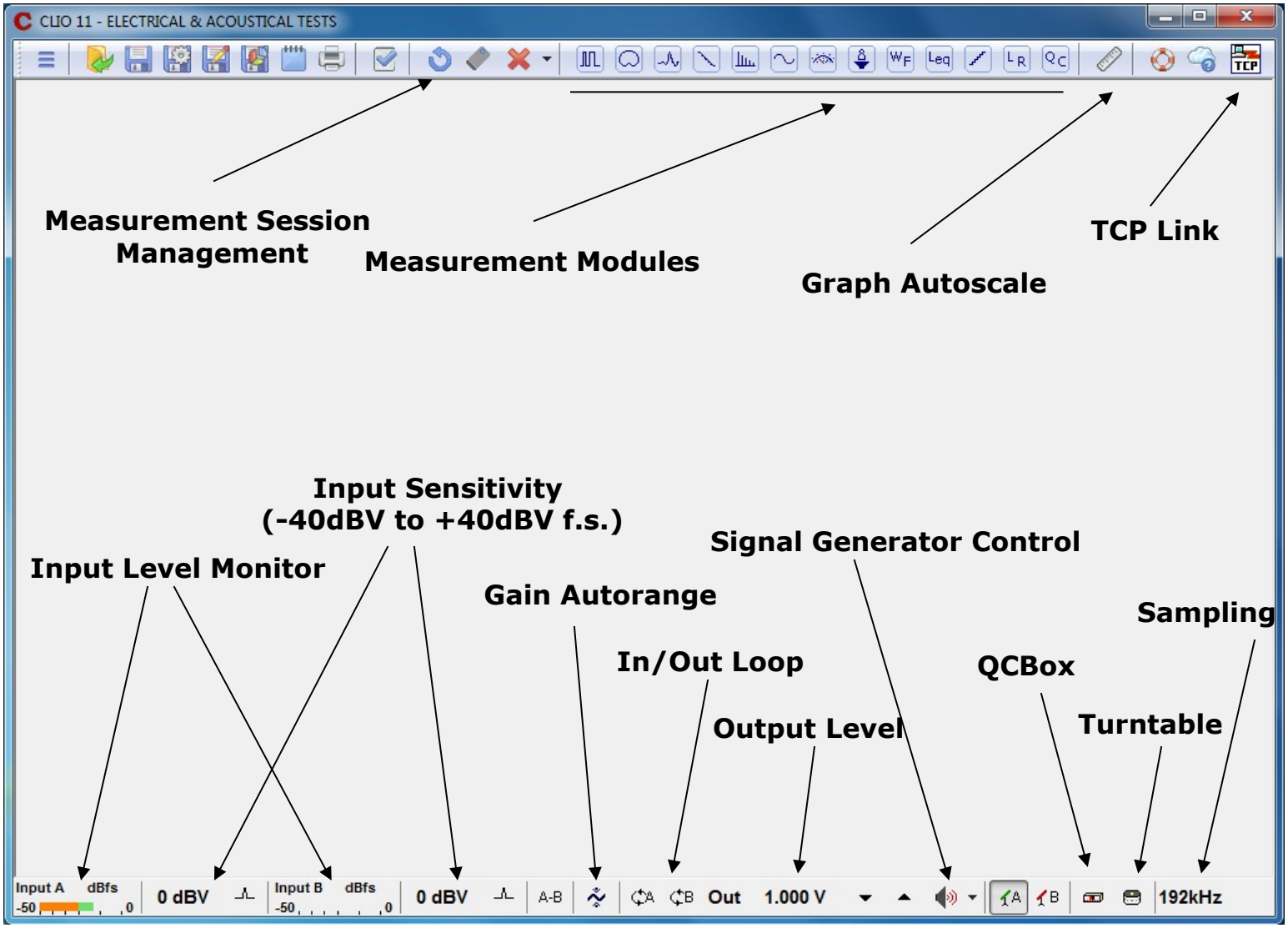


CLIO11 is 100% Windows XP, Vista, 7, 8.1 compliant 32 and 64 bits versions

CLIO 11 AUDIOMATICA

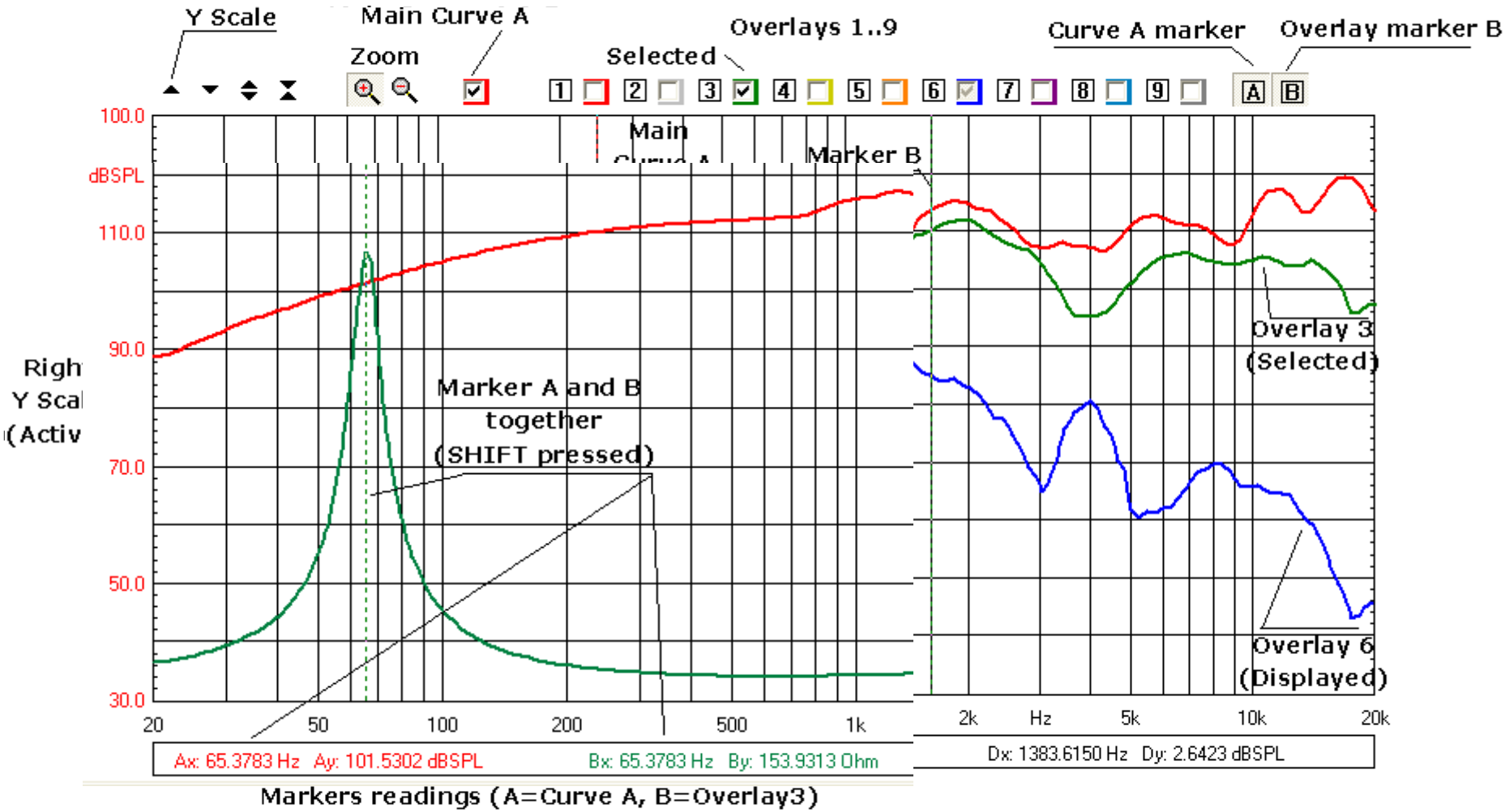
The CLIO 11 Software

Main Desktop & Controls



The CLIO 11 Software

Graphical user interface



The CLIO 11 Software

- **Is composed by several Measurement Menu**

- **Measurement Menu are divided in two categories:**
  - **Interactive, Internal Generator independent**
    - **FFT, Multi-Meter, Leq**
    - **Acquisition is free**
    - **User can take advantage of generator capabilities**
  - **System Handled**
    - **MLS, Sinusoidal, Linearity, W&F**
    - **The software takes care of acquisition and generation**

- **There are also other Menu dedicated to Post-Processing**
    - **T&S, Directivity, Waterfall, 3D, Wavelet, AP**
  - **Do not execute measurements but calculations**

- **The last Menu is devoted to Quality Control**
- **The software can be scripted to execute QC tests**
  - **External custom programming is achieved via TCP/IP**

The CLIO 11 Software

- **3 (Three) different but complementary ways to measure frequency response:**

- **FFT**

  Interactive, using user defined stimulus, even live performed music

- **MLS&LogChirp**

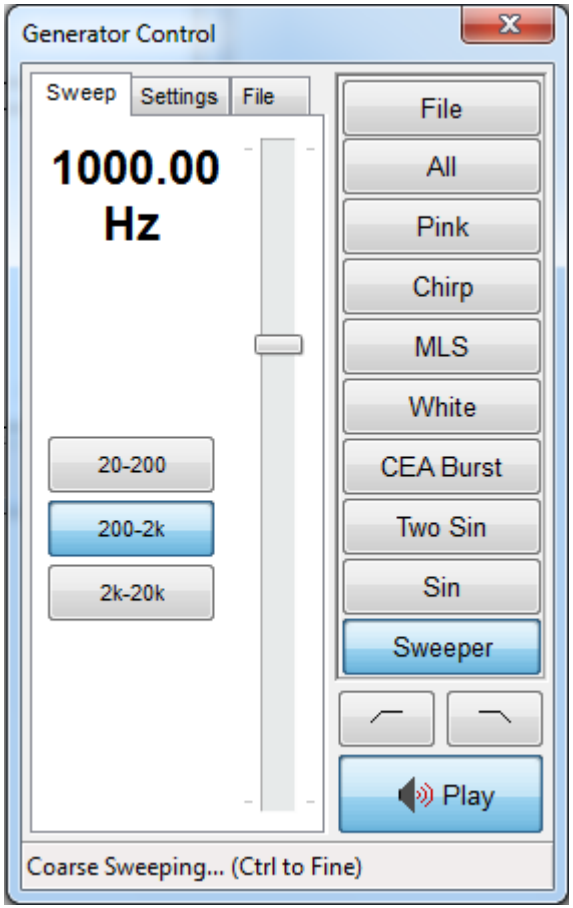
  First measures Impulse response using MLS or Chirp then assess frequency response

- **Sinusoidal**

  Direct measurement using sinusoidal stimulus

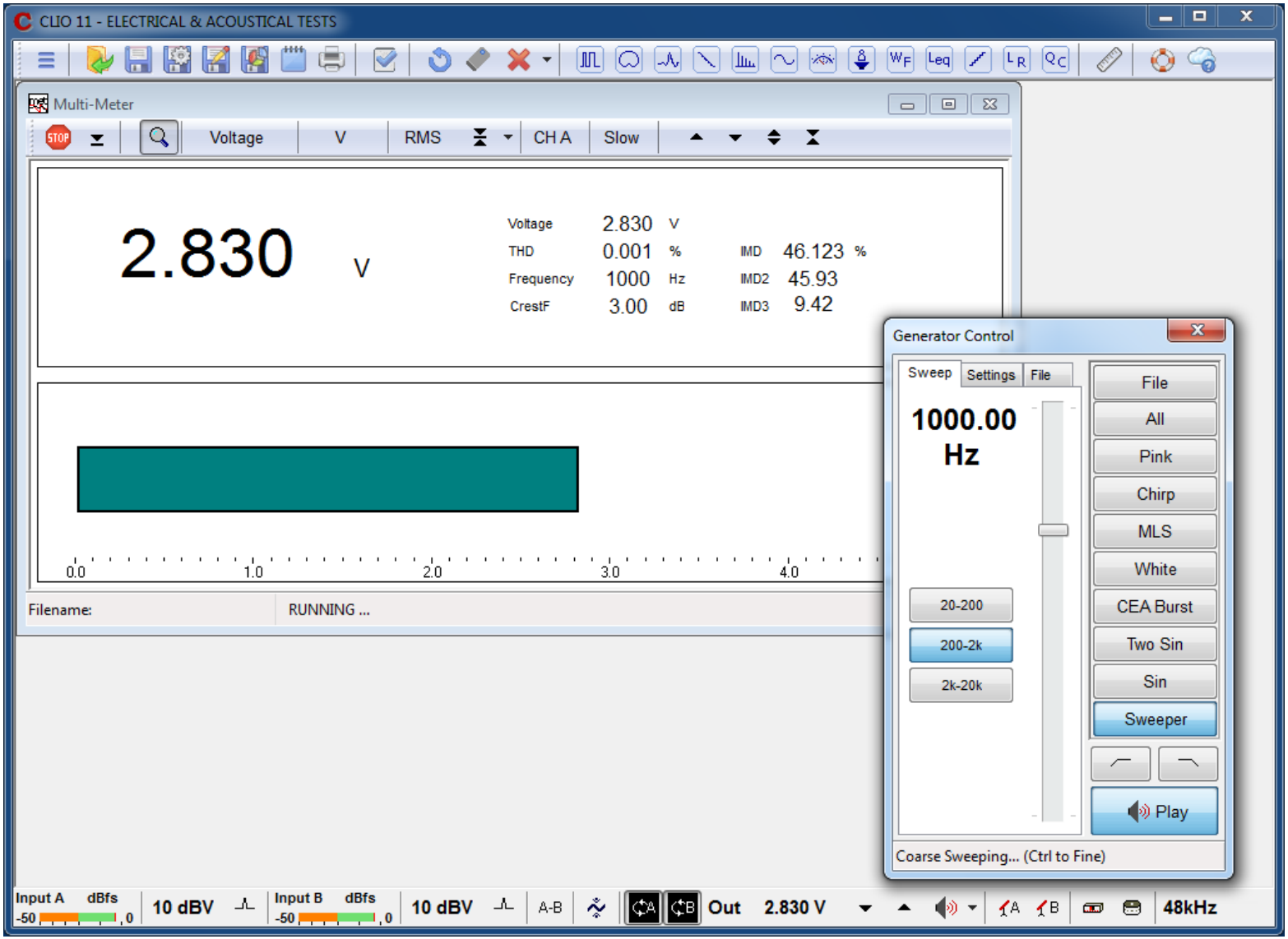
Generator Menu (Interactive)

- **Programmable signal generator**



- **Manually Controlled Sweeper**
- **Sinusoid (also bursted)**
- **CEA bursts**
- **Two Sinusoids**
- **Programmable Multitones**
- **All tones (256 to 256k)**
- **Pink noise (256 to 256k)**
- **MLS (256 to 512k)**
- **Log Chirp (256 to 512k)**
- **Programmable Chirp (log,lin)**
- **White noise**
- **Generic Wav file**

Multimeter Menu (Interactive)

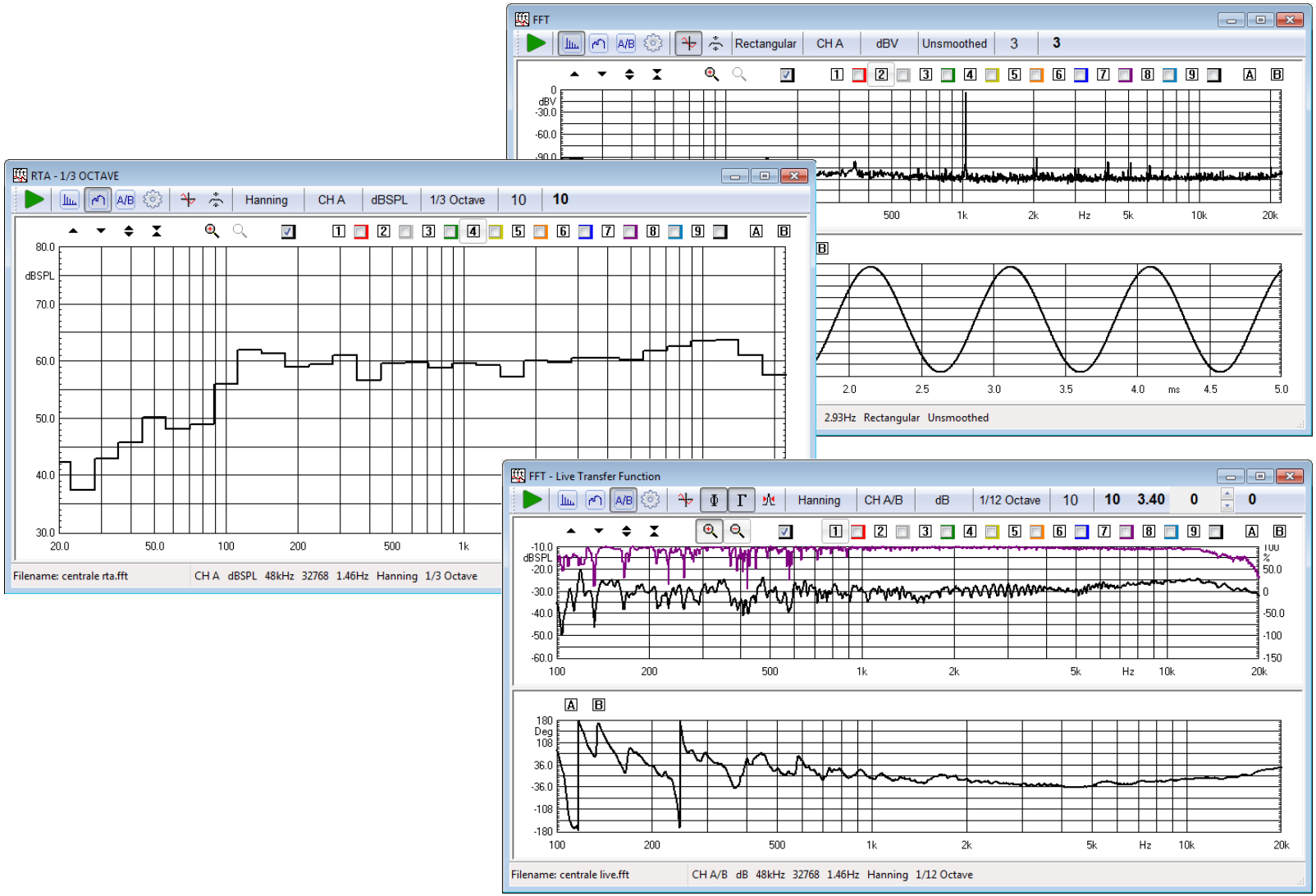


Multimeter Menu (Interactive)

- **Multi-meter measurements**
  - **Voltage (mV,V,dBV,dBu,dBr,dBr(A))**
  - **Power (mW,W)**
  - **Pressure (dBSPL,dBPa,dBA,dBC)**
  - **Inductance (H)**
  - **Capacitance (F)**
  - **Resistance (Ohm @1kHz)**
  - **Frequency (Hz)**
  - **THD (%,dB)**
  - **THD+N (%,dB)**
  - **IMD (%,dB)**
  - **SNR (dBr)**
  - **Displacement (m,dBmeter)**
  - **Velocity (m/s,dBm/s)**
  - **Acceleration (m/s^2,dBm/s^2)**
  - **Crest Factor (dB)**

FFT Menu (Interactive)

■ FFT, RTA and 'Live' Transfer Function

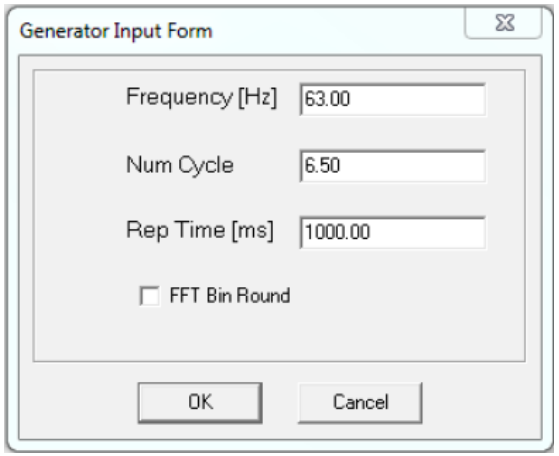


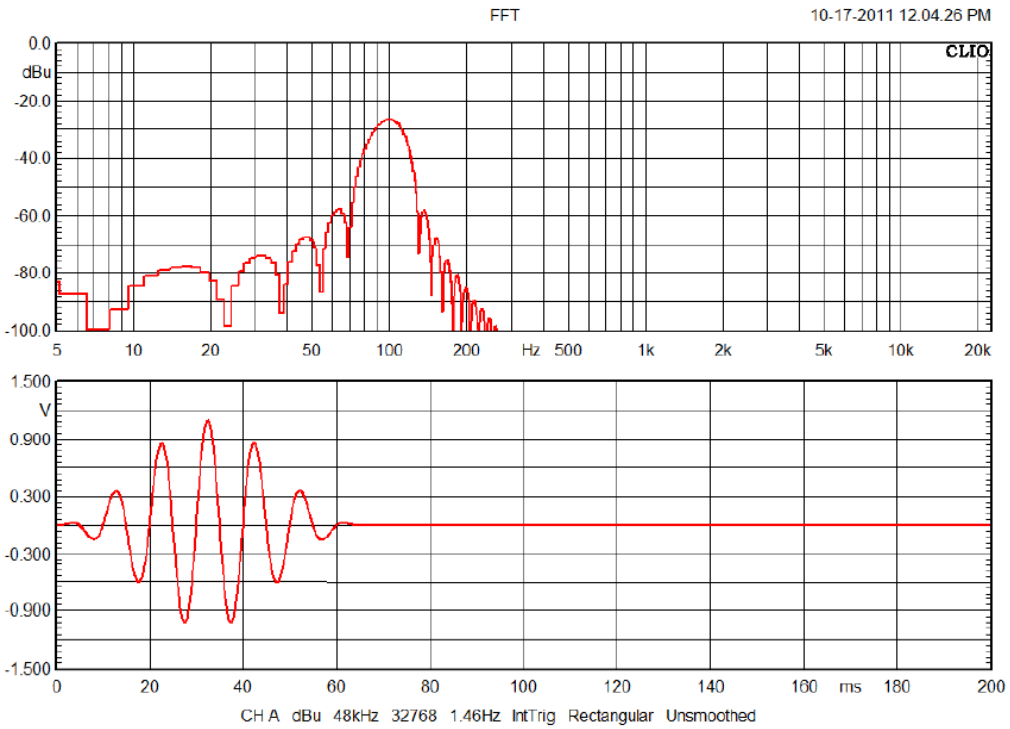
FFT Menu (Interactive)

- **Example of interactive measurement: Measuring Subwoofer Max Output following CEA 2010**

  - **STEP0: position loudspeaker and microphone**

  - **STEP1: program CEA Burst 63Hz, 6.5 cycles, 1s repetition**

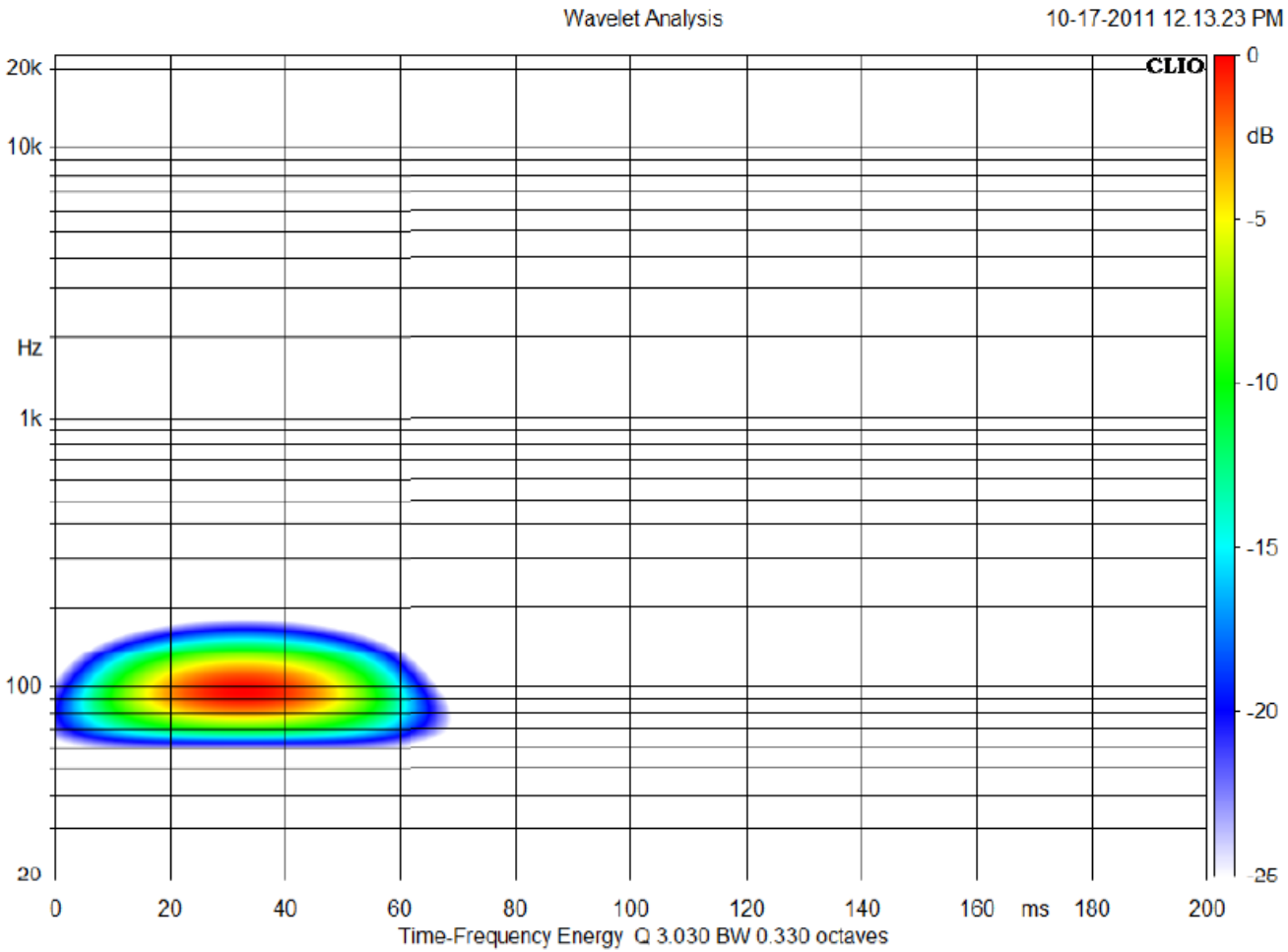




FFT Menu (Interactive)

- **Example of interactive measurement: Measuring Subwoofer Max Output following CEA 2010**

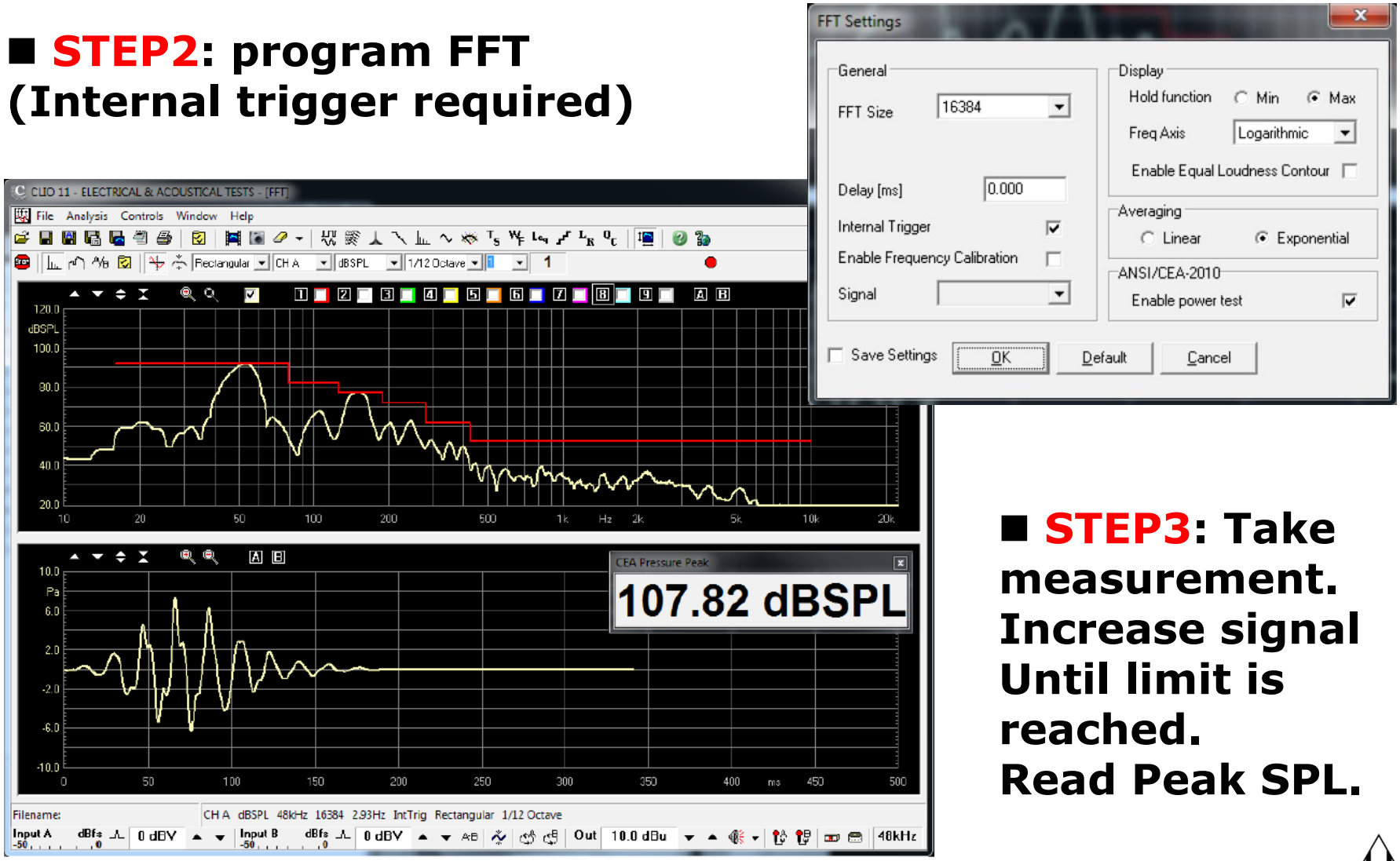
  - **CEA Burst time-frequency characteristics**



FFT Menu (Interactive)

- **Example of interactive measurement: Measuring Subwoofer Max Output following CEA 2010**

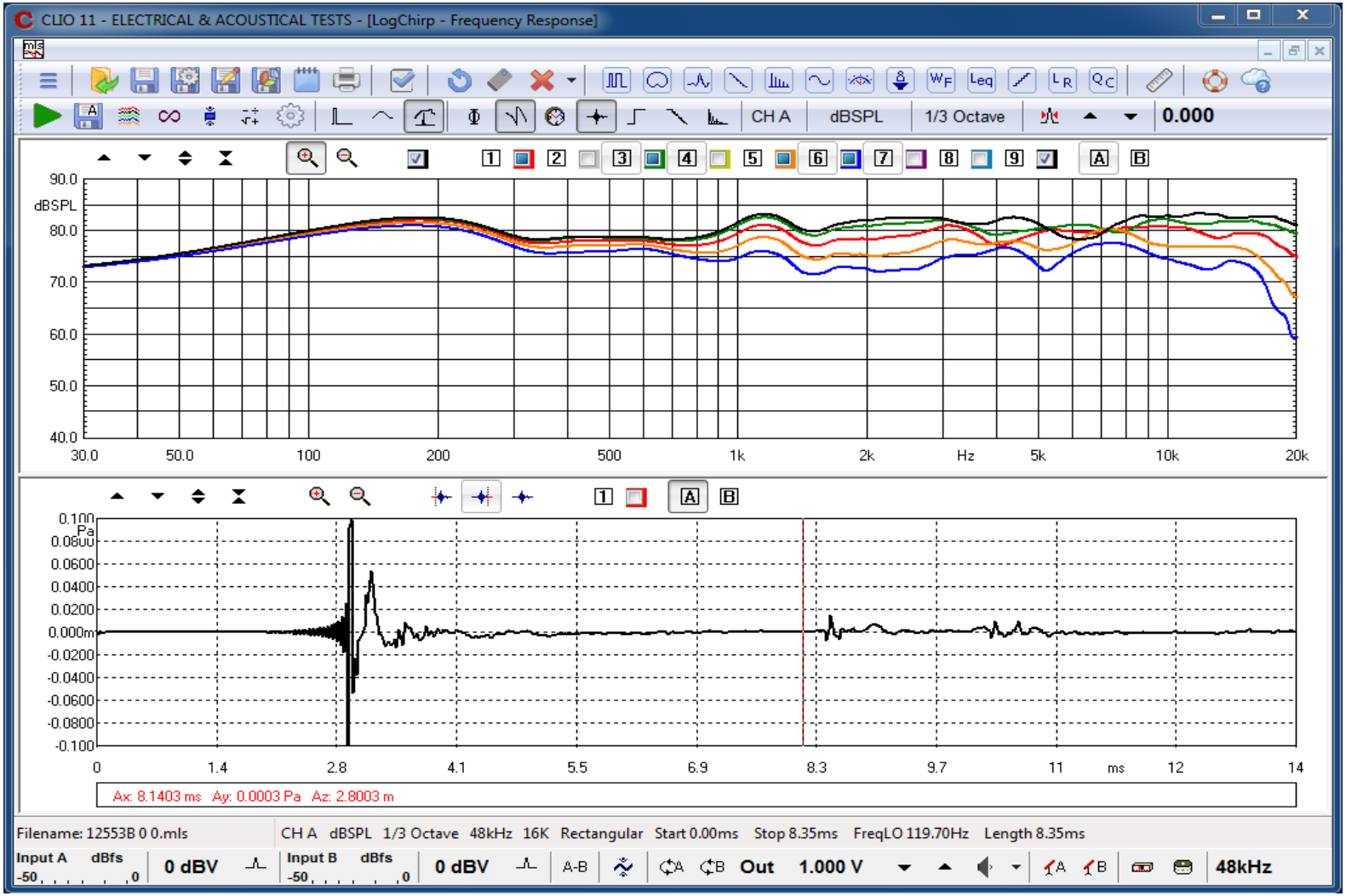
- **STEP2: program FFT (Internal trigger required)**



- **STEP3: Take measurement. Increase signal Until limit is reached. Read Peak SPL.**

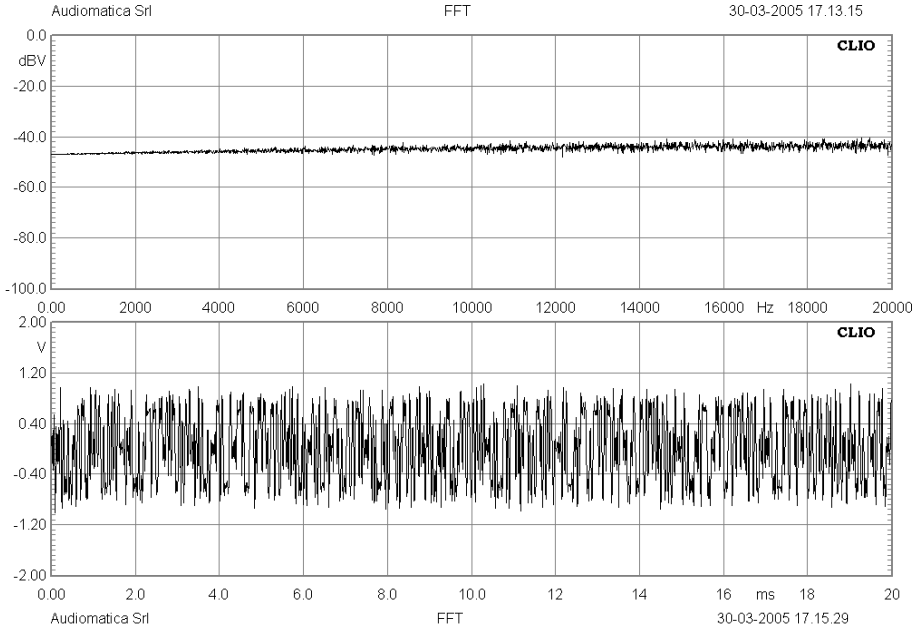
MLS&LogChirp Menu (System Handled)

■ MLS & LogChirp analysis

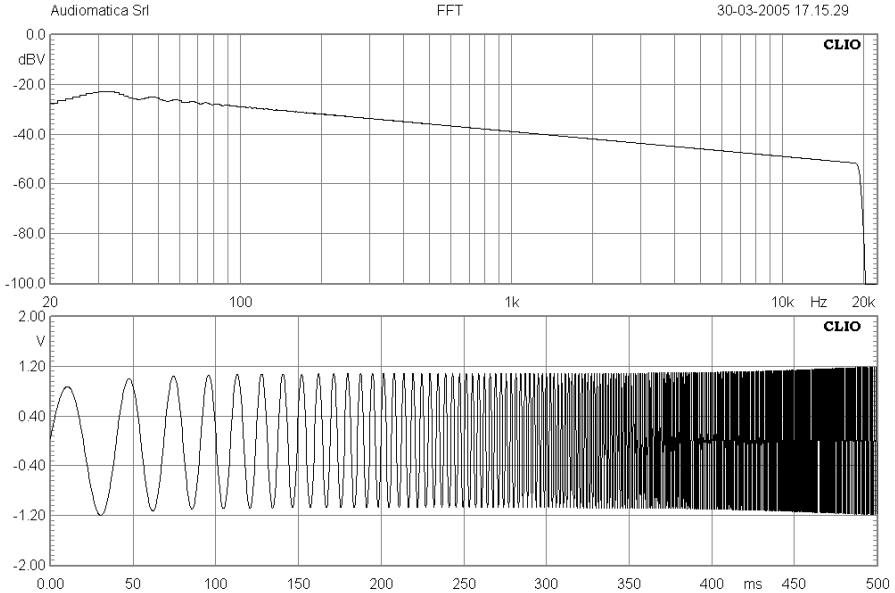


MLS&LogChirp Menu (System Handled)

- **MLS**

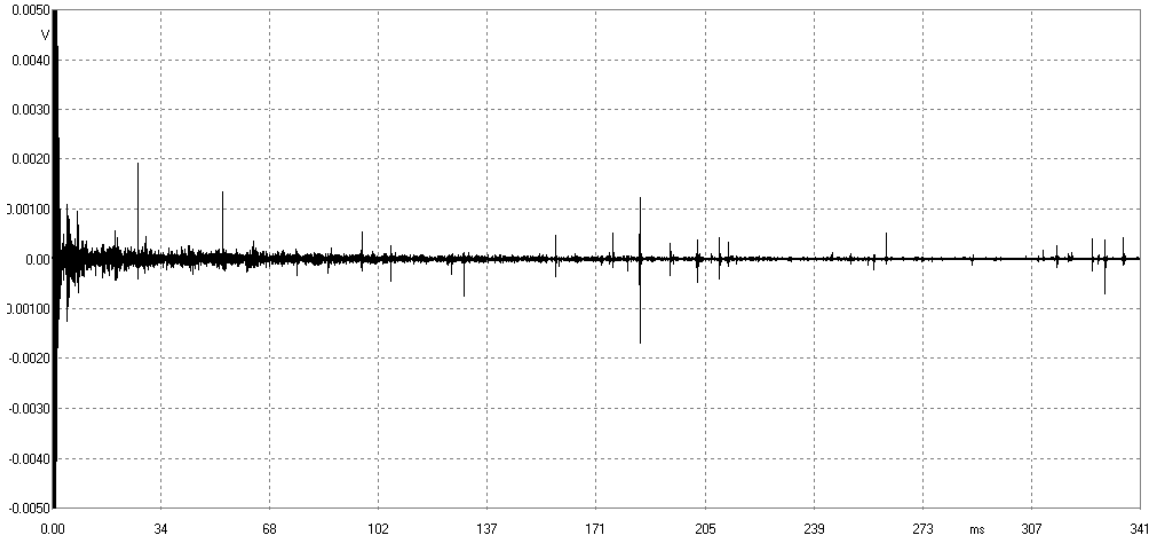


- **LogChirp**

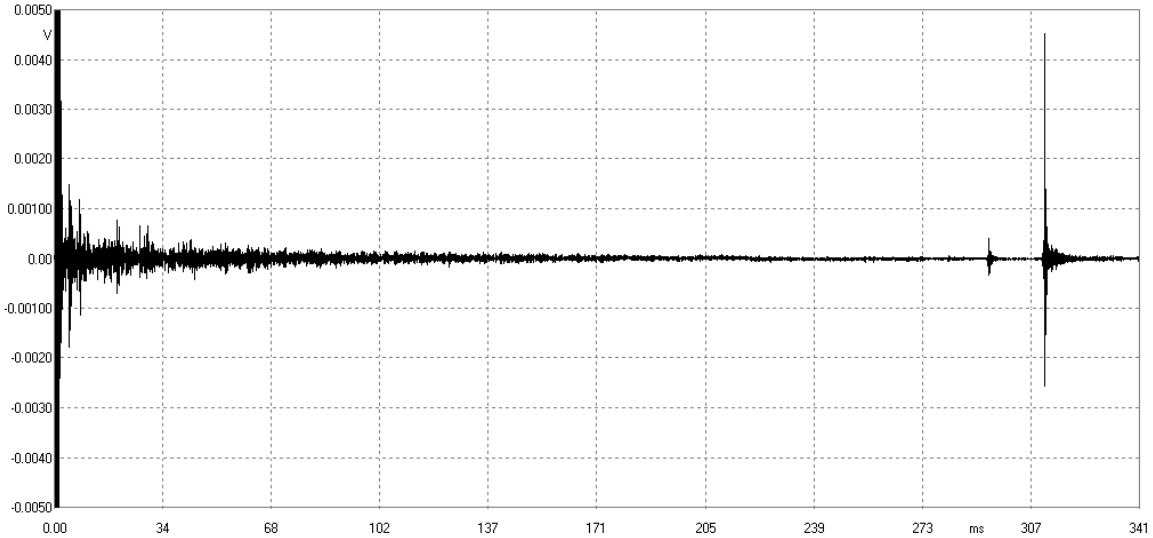


MLS&LogChirp Menu (System Handled)

- **MLS**

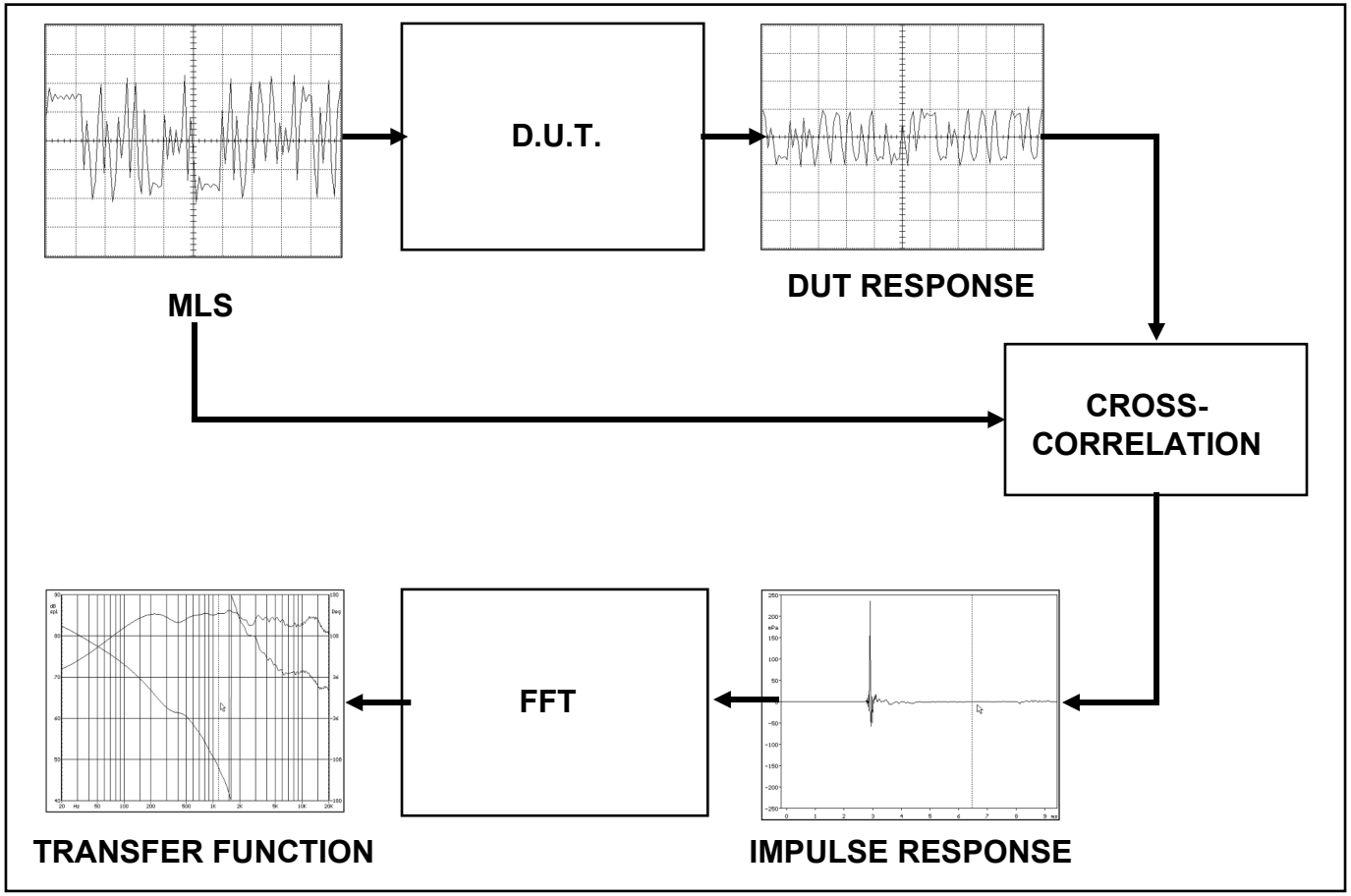


- **LogChirp**



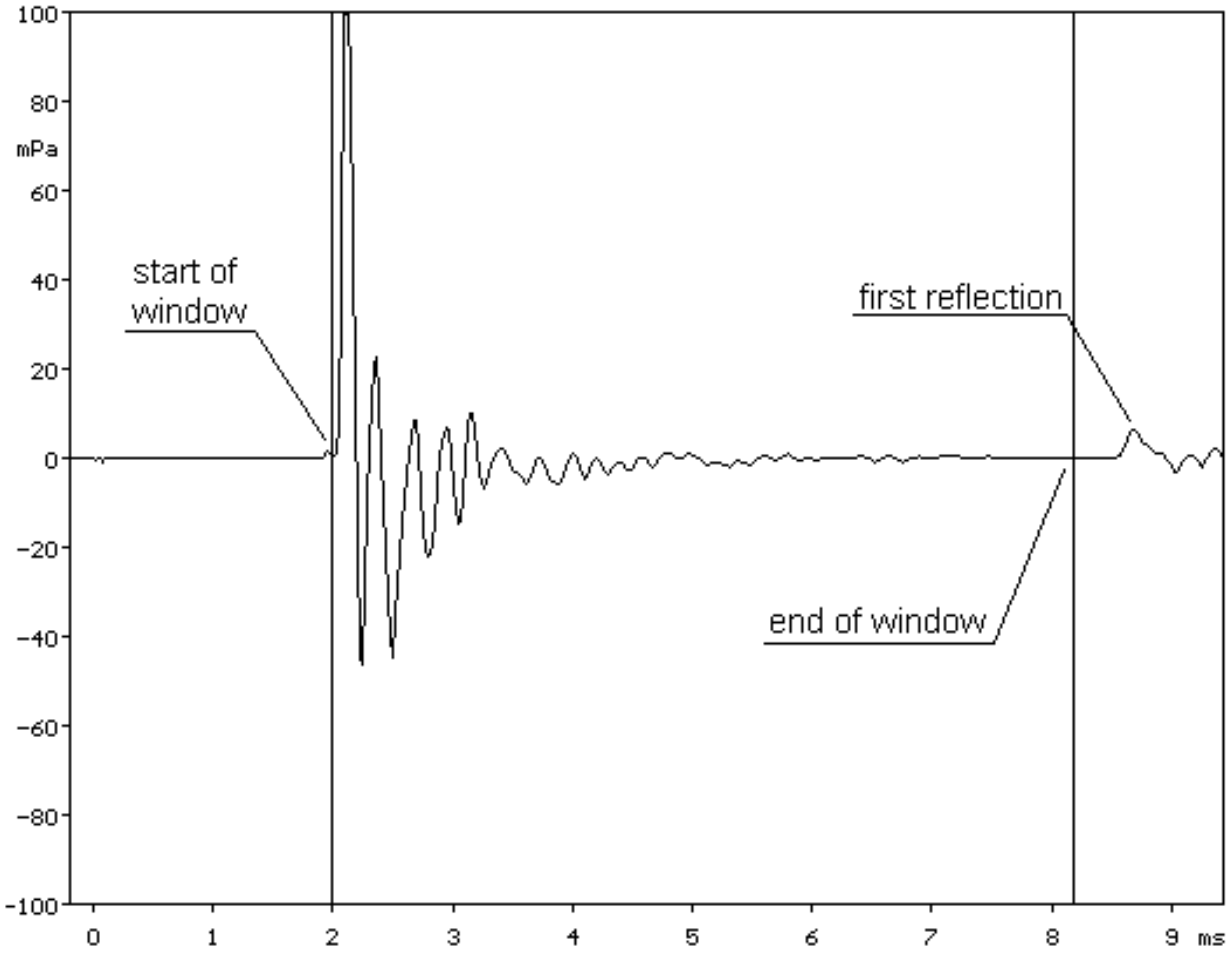
MLS&LogChirp Menu (System Handled)

■ MLS processing algorithm



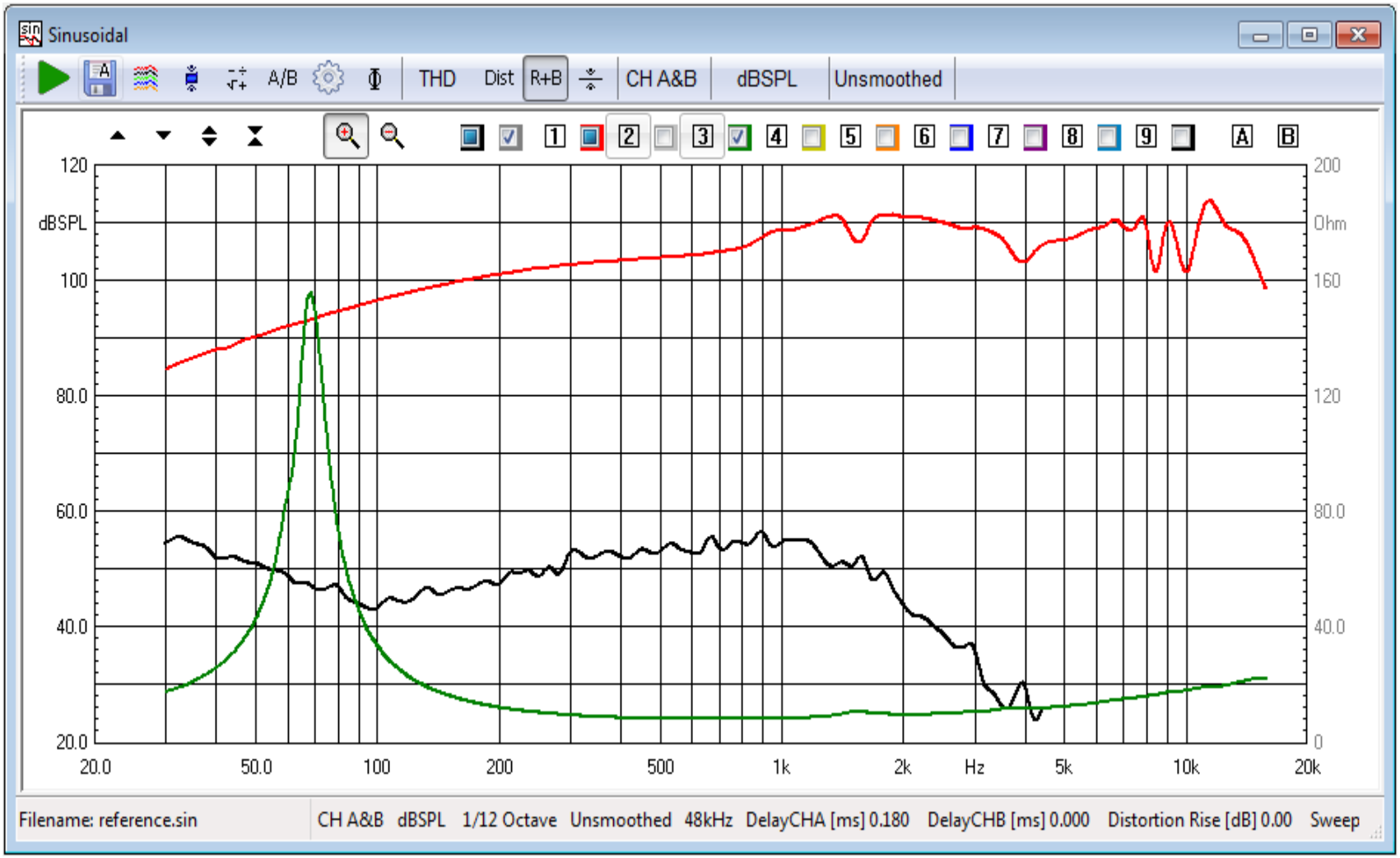
MLS&LogChirp Menu (System Handled)

- **Quasi-anechoic measurement**

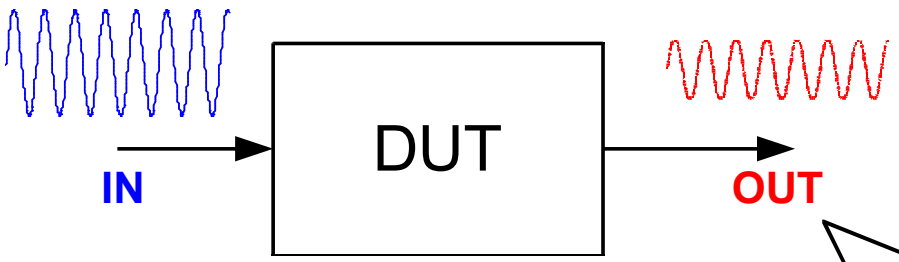


Sinusoidal Menu (System Handled)

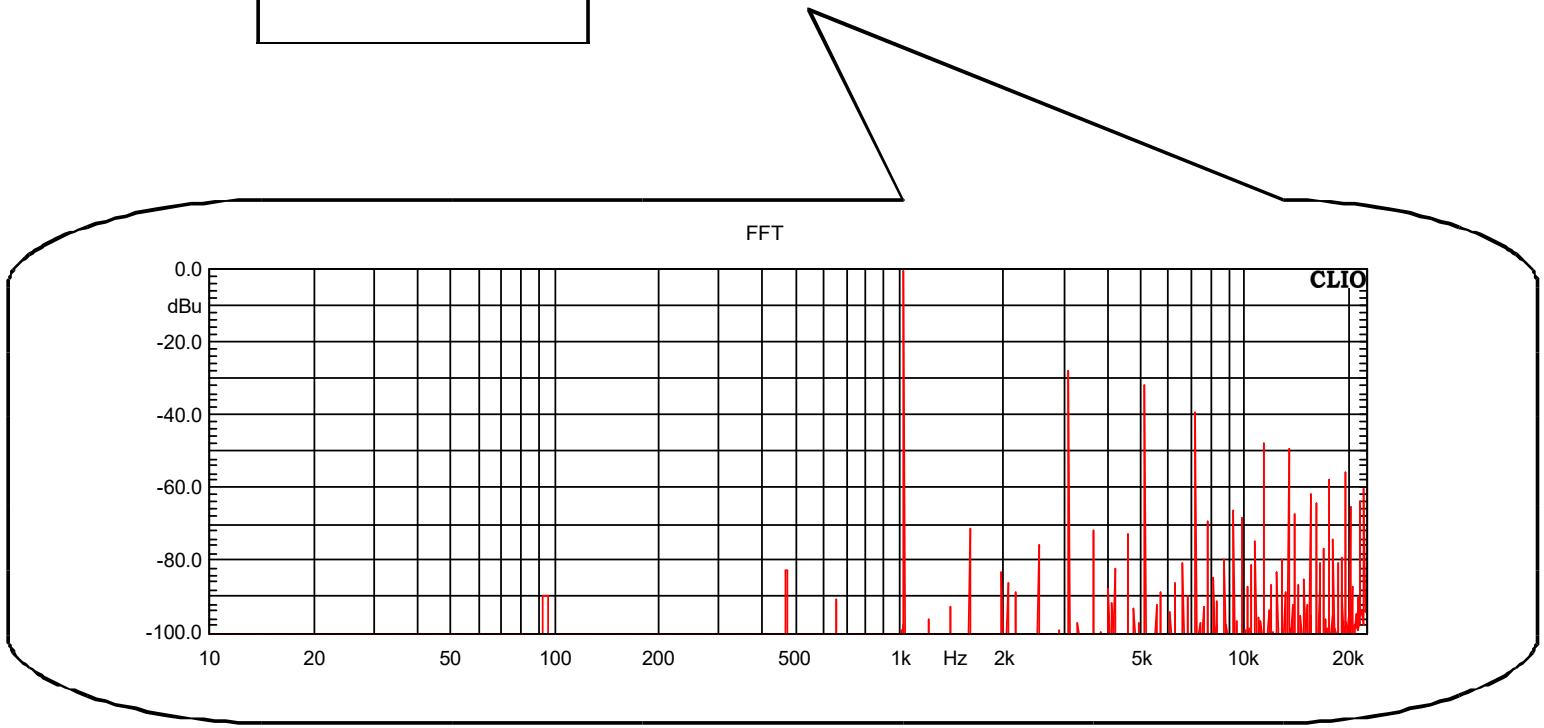
■ Sinusoidal stereo sweep response



Sinusoidal Menu (System Handled)

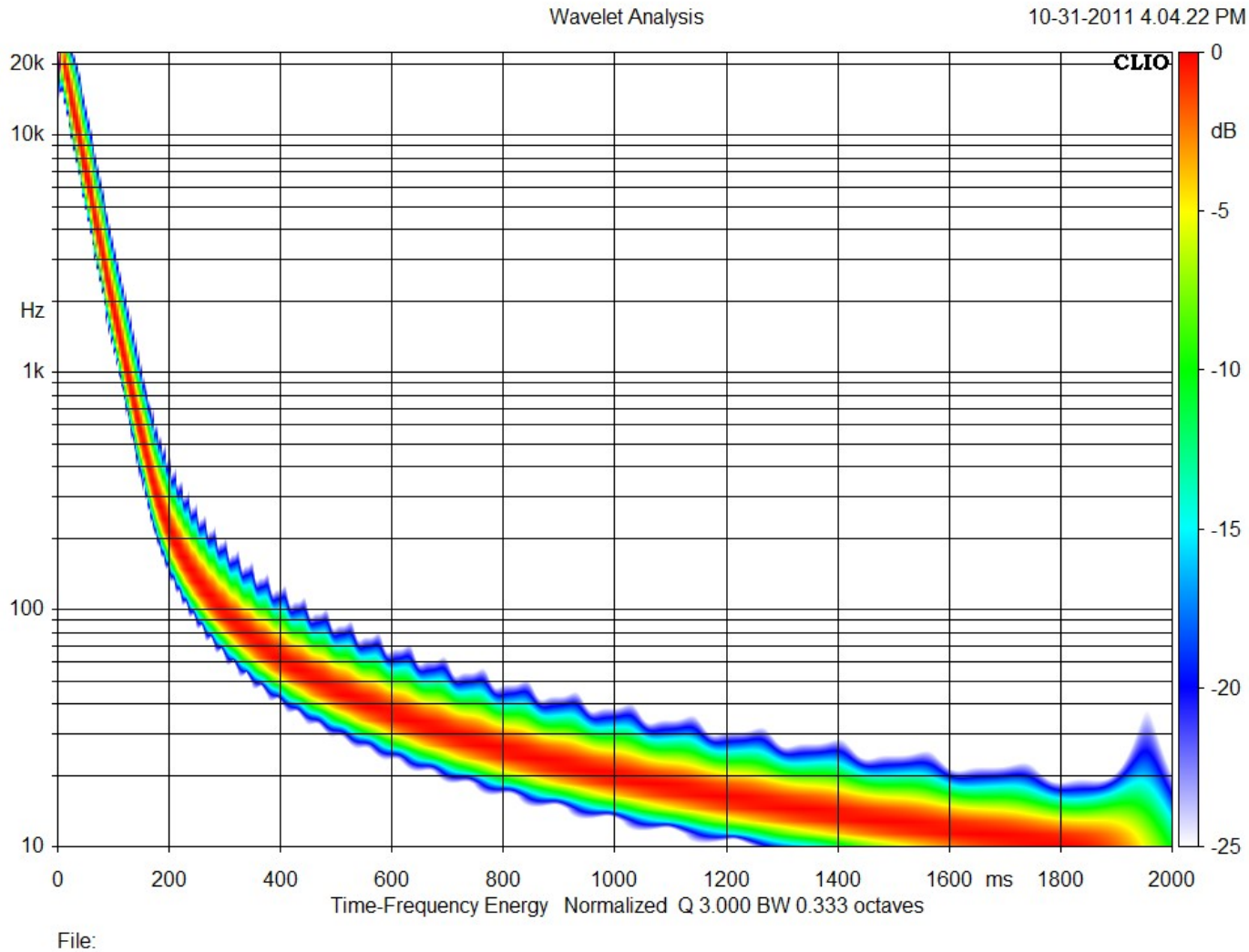


- Magnitude response
- Phase response
- Distortion



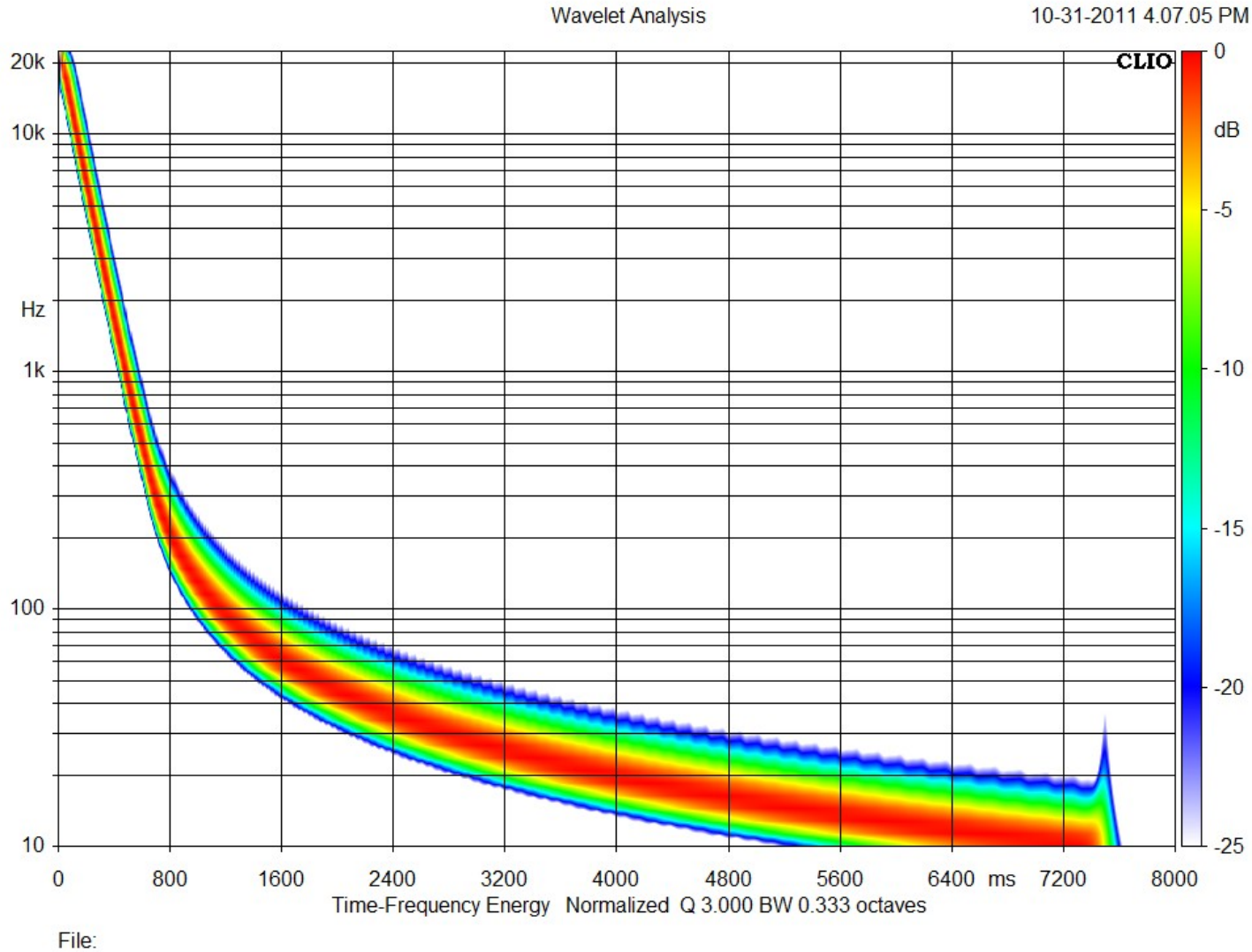
Sinusoidal Menu (System Handled)

- **1/6th Octave sinusoidal stimulus**



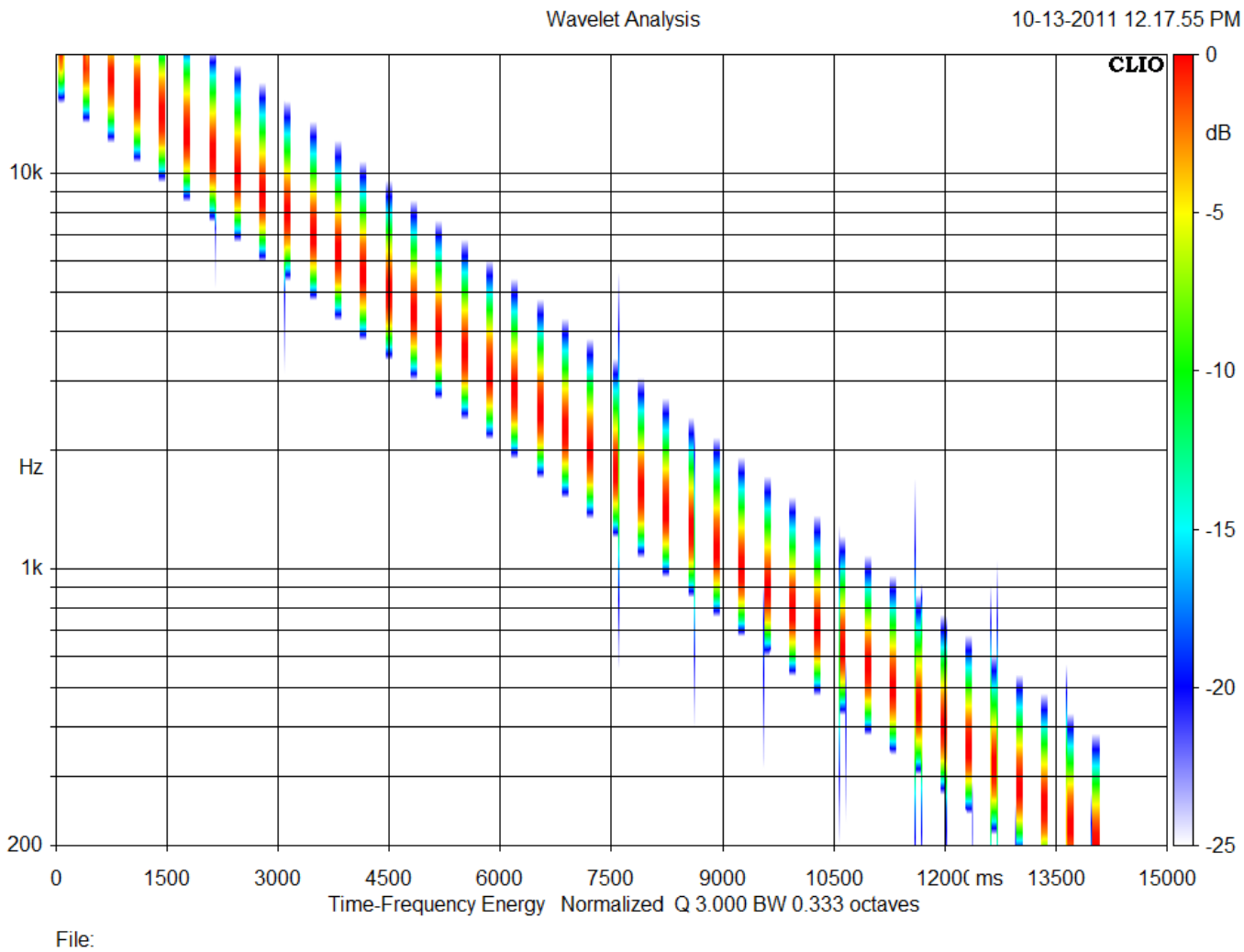
Sinusoidal Menu (System Handled)

- **1/24th Octave sinusoidal stimulus**



Sinusoidal Menu (System Handled)

- **1/6th Octave sinusoidal stepped stimulus**



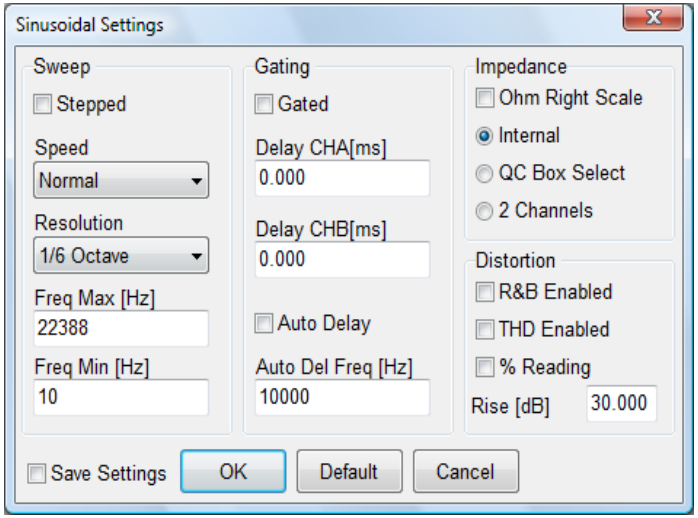
Sinusoidal Menu (System Handled)

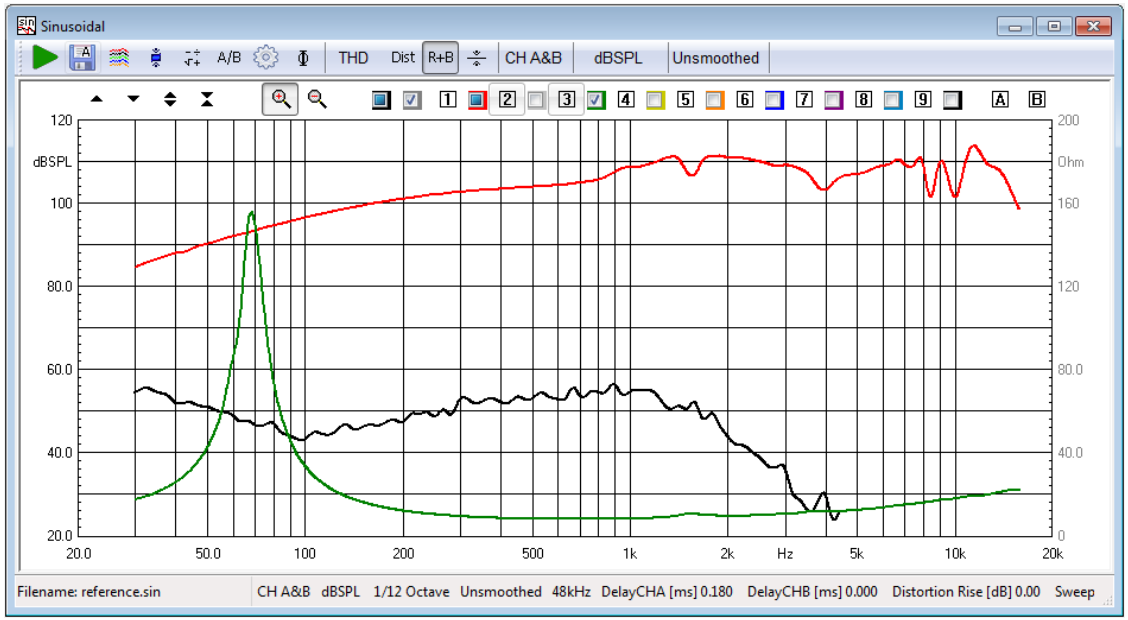
Standard and QC versions:

- **Simultaneous A & B input measurements**
- **Displacement, velocity and acceleration units**
- **Ch A response & ChB impedance**
- **THD + 2nd-10th harmonic**
- **Difference response A/B**
- **Sweep Speed (Normal, Fast, Slow)**

QC version:

- **Fast-Track™ Rub&Buzz detection**
- **TTL pulse synced with sweep**



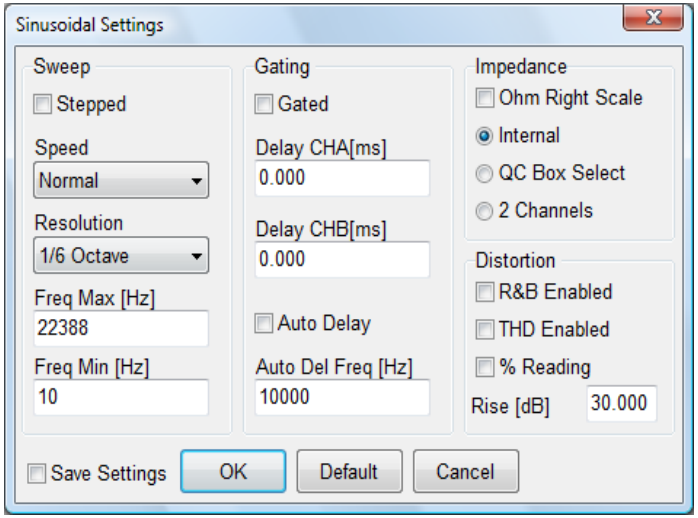


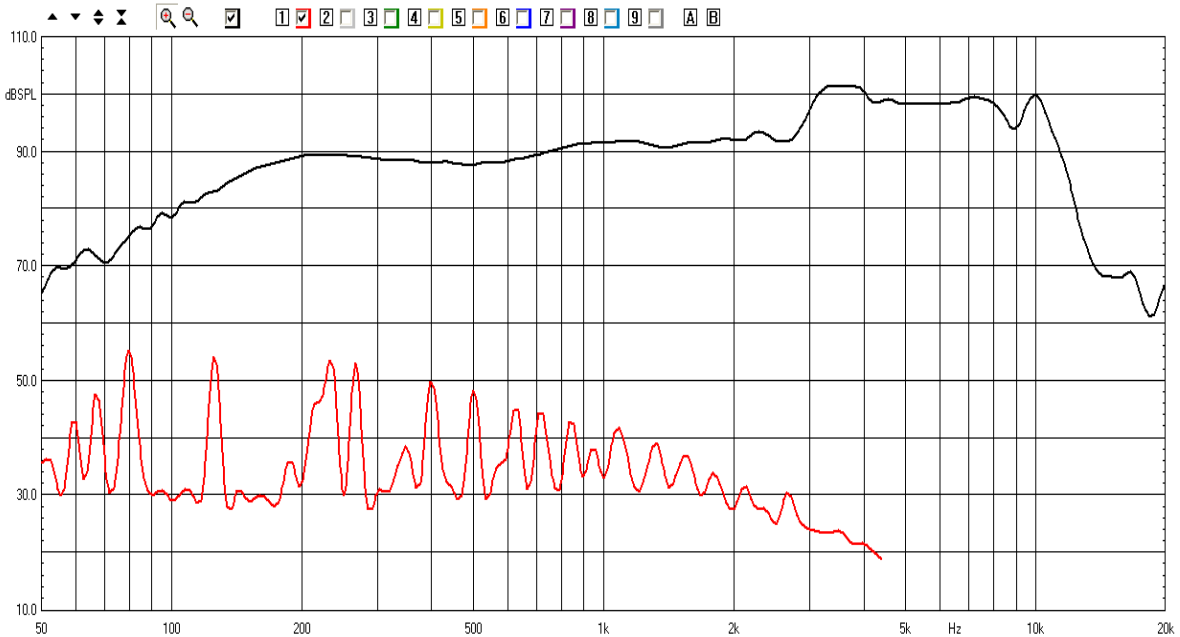
Sinusoidal Menu (System Handled)

QC version:

■ Fast-Track™ Rub&Buzz

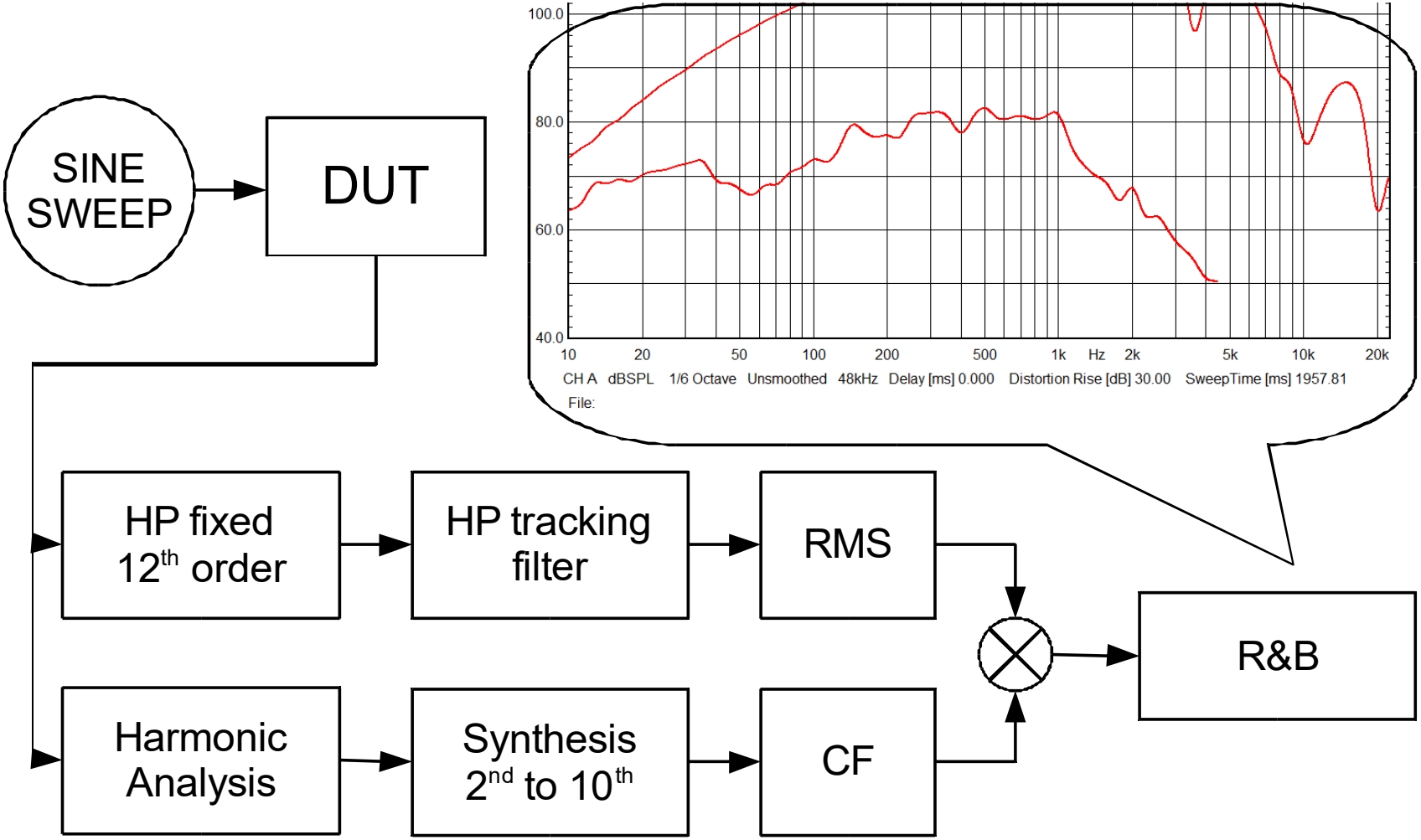
- Removes low order 'good' distortion
- Removes unwanted noise
- Tracks high harmonics
- Detects click and pops





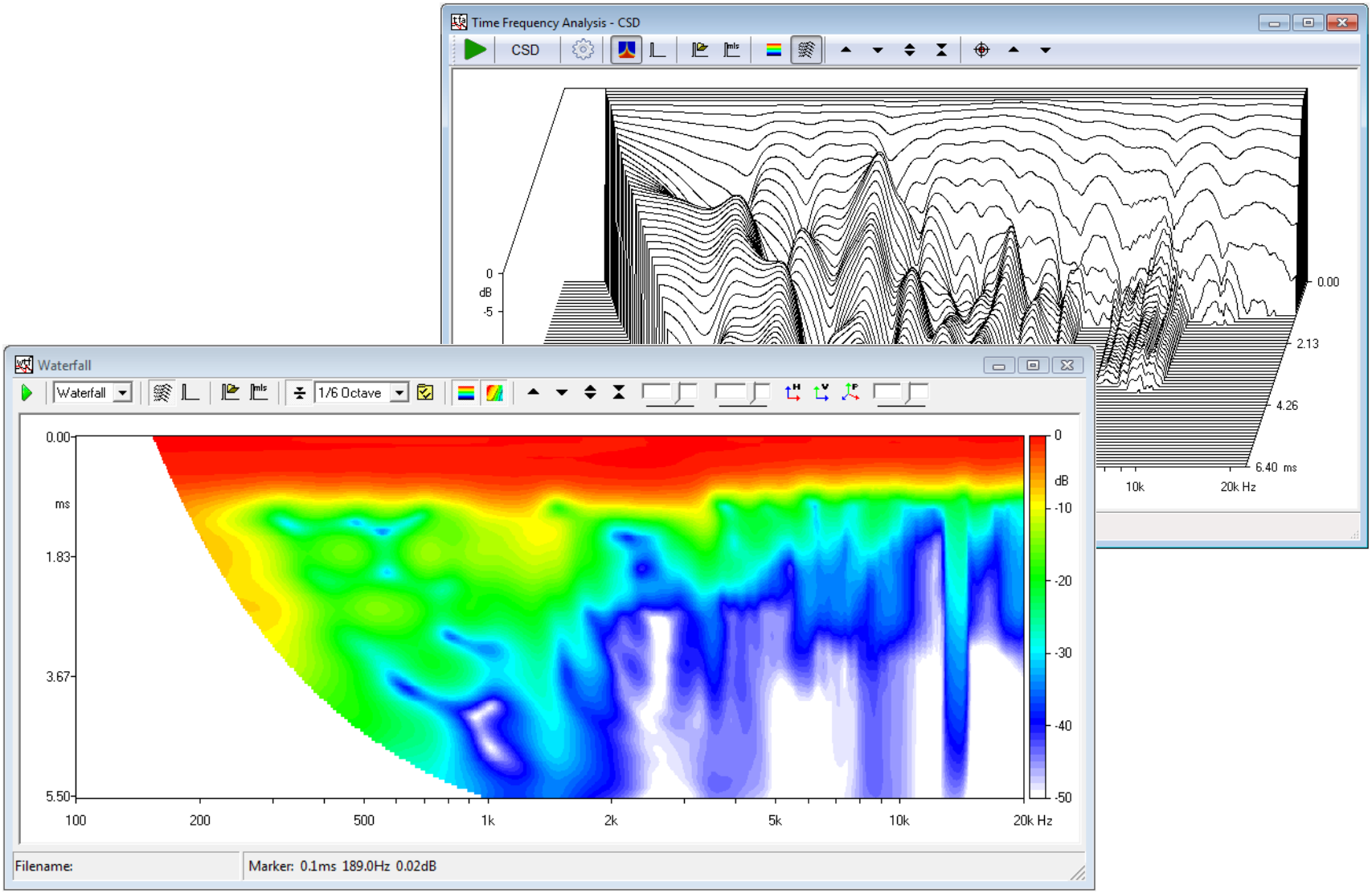
Sinusoidal Menu (System Handled)

- **Fast-Track™ Rub&Buzz detection**



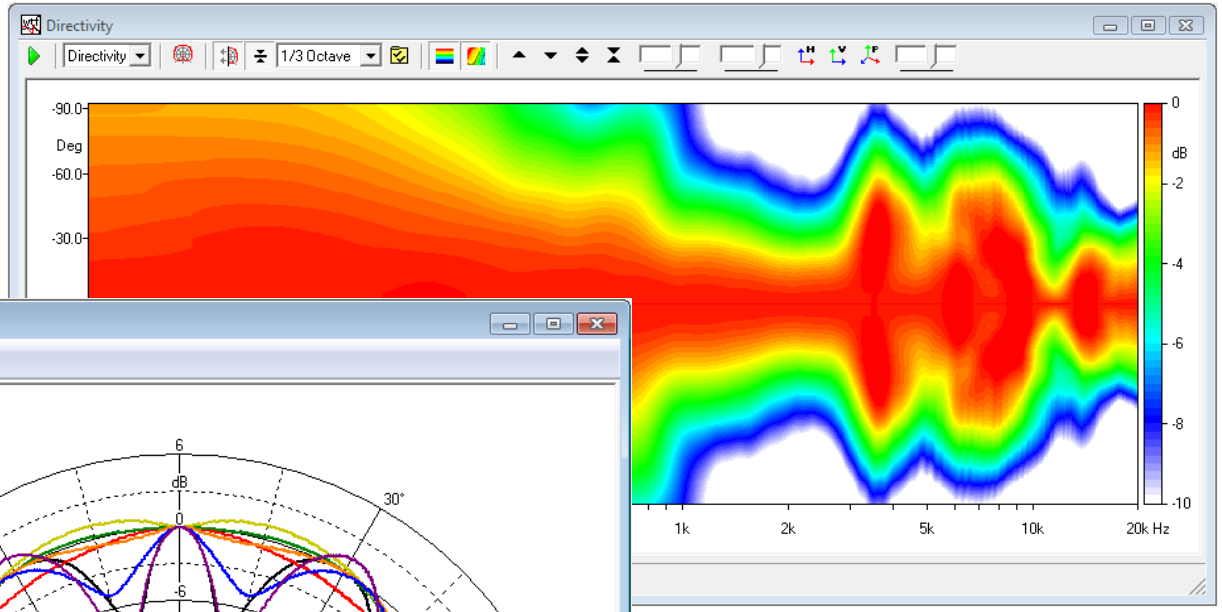
Post-processing Menu

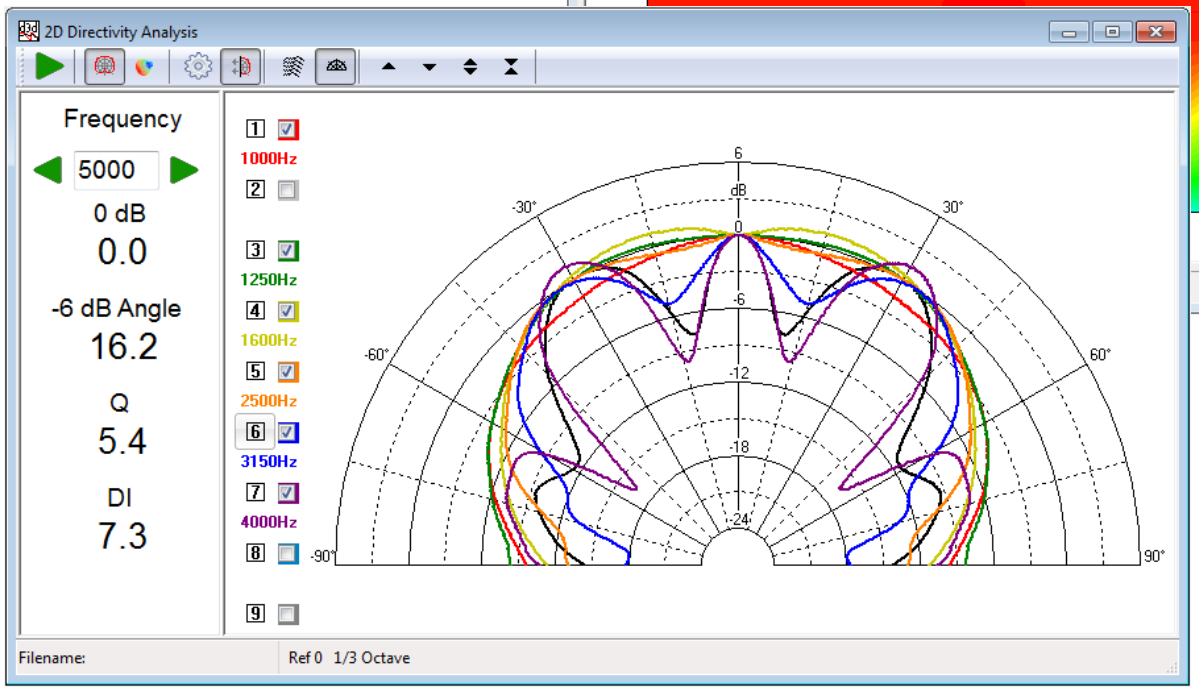
■ Waterfall plots



Post-processing Menu

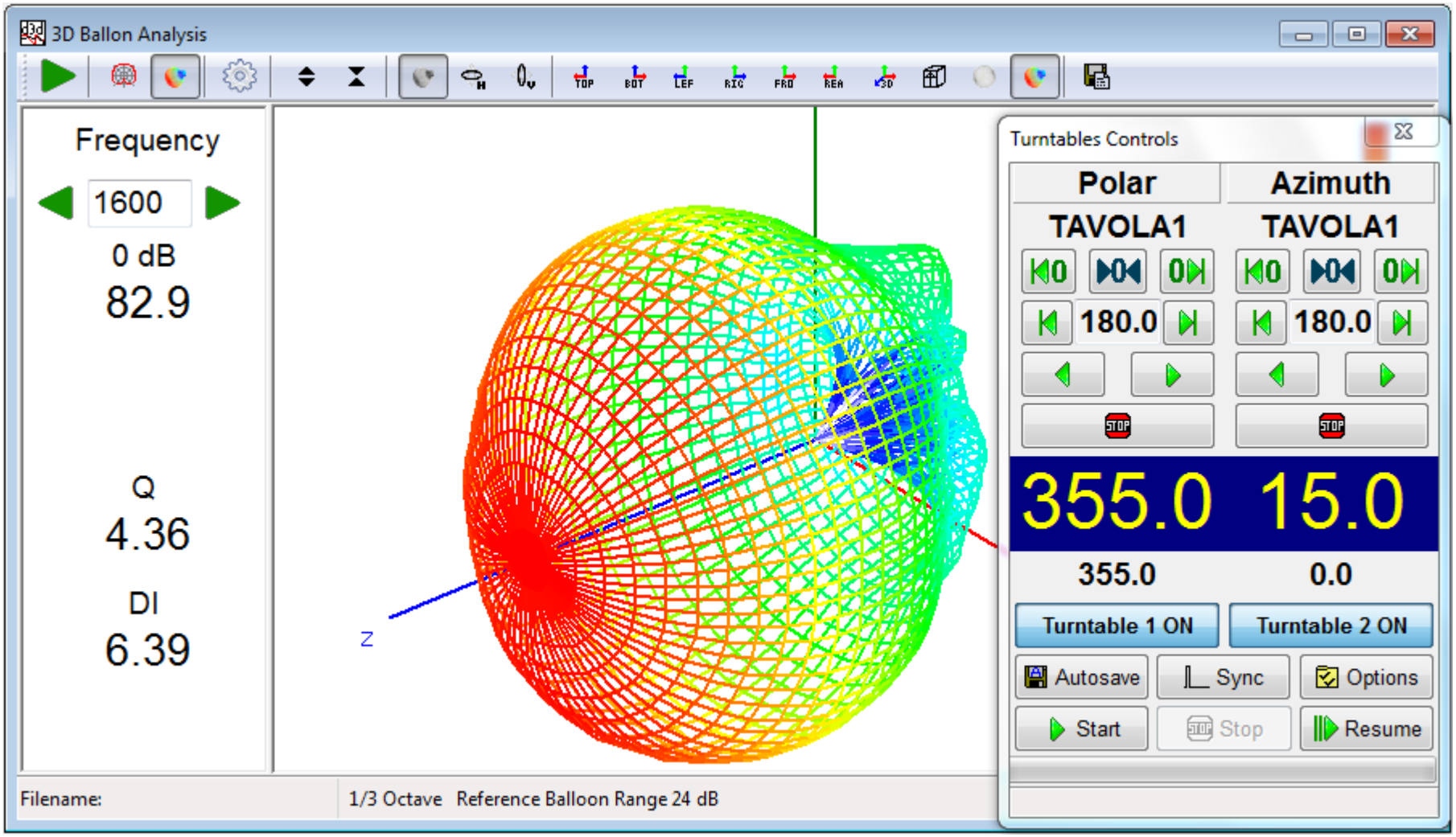
■ Directivity analysis





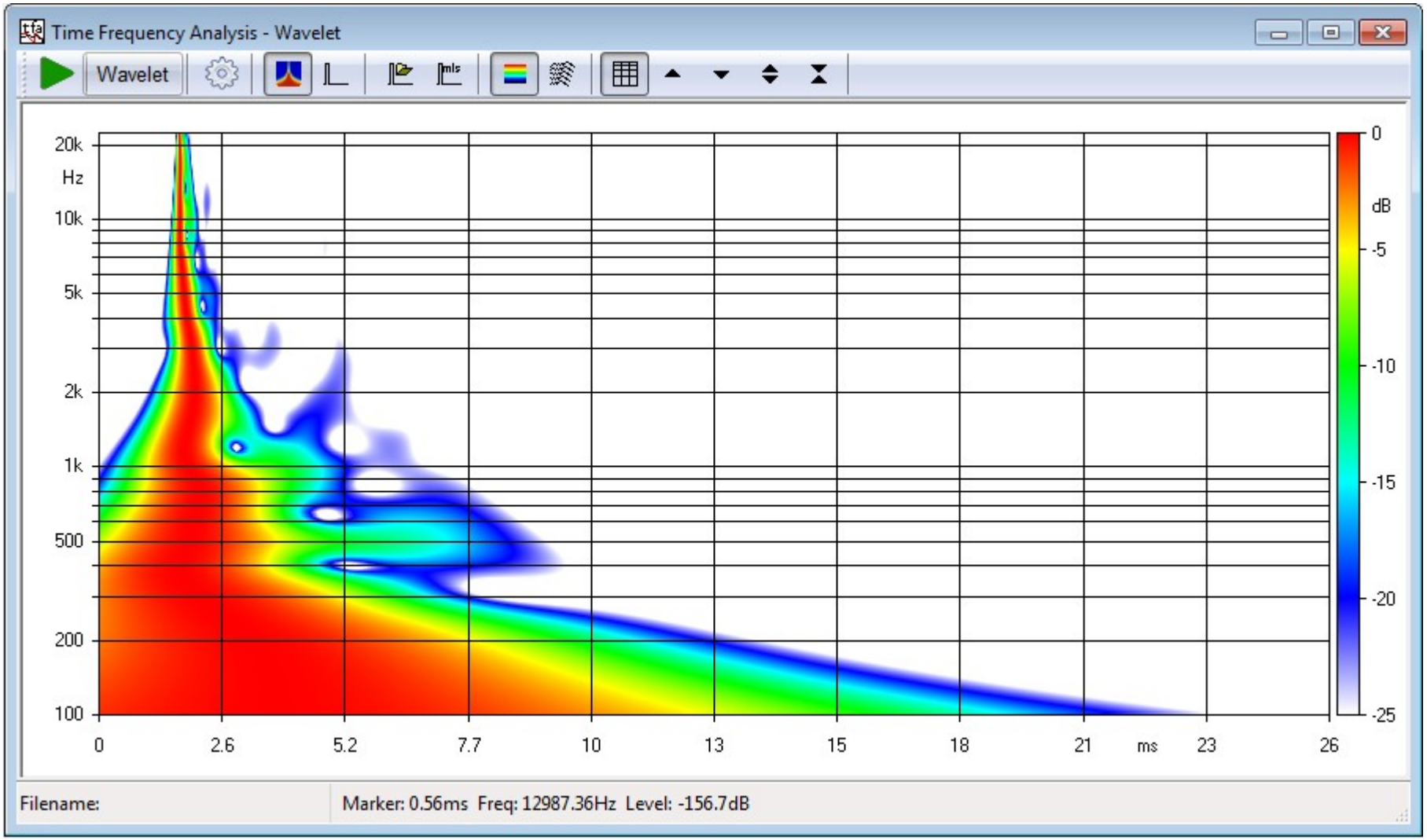
Post-processing Menu

■ 3D data collection & balloon analysis



Post-processing Menu

■ Wavelet analysis



Post-processing Menu

■ Impedance and Thiele/Small Parameters

CLIO 11 - ELECTRICAL & ACOUSTICAL TESTS

Sinusoidal

A/B THD Dist R+B CH A Ohm Unsmoothed

50.0 Ohm 40.0 30.0 20.0 10.0 0

10.0 20.0 50.0 100 200

180 deg

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·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 -50 0 | 0 dBV | Input B dBfs -50 0 | 0 dBV | A-B | Out 1.000 V | 48kHz

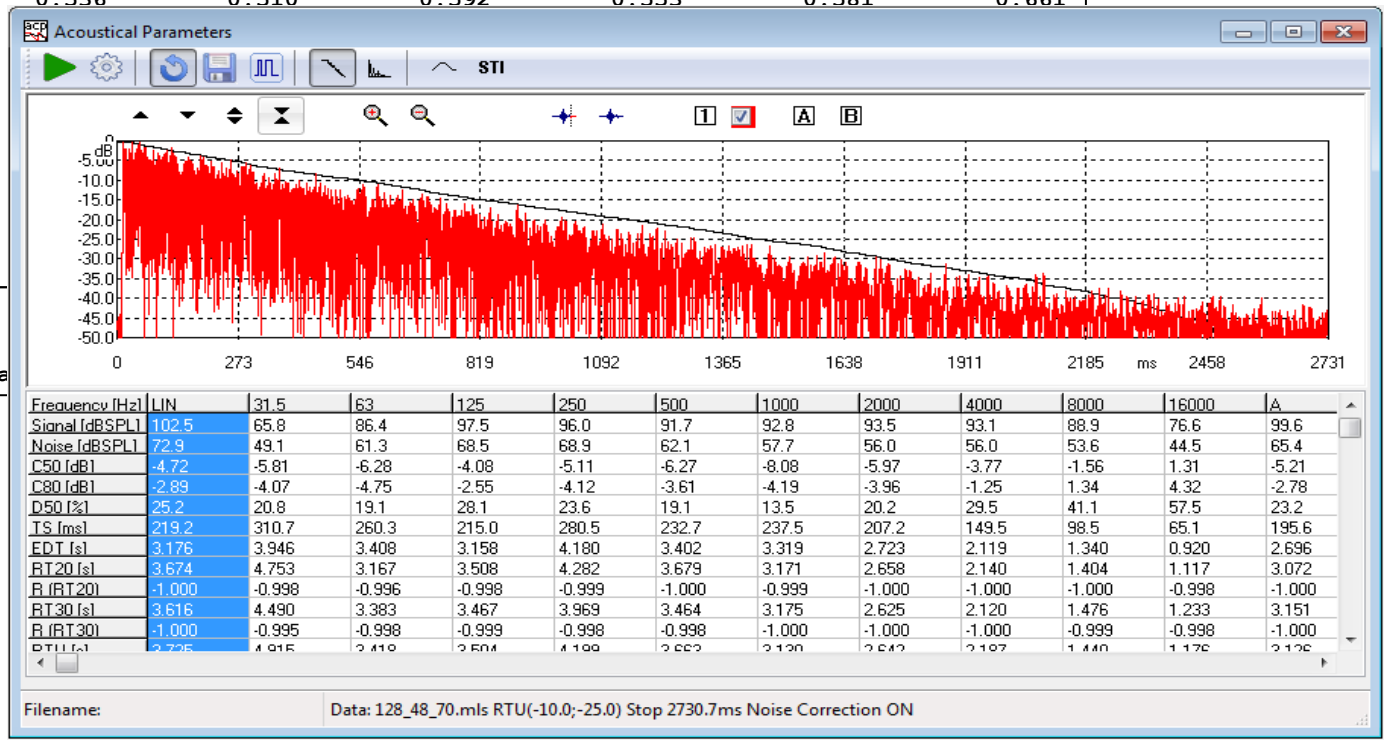
Post-processing Menu

■ Acoustical Parameters & STI

STI index

Oct.Band	125	250	500	1k	2k	4k	8k
f1=0.63	0.745	0.811	0.761	0.813	0.829	0.880	0.972
f2=0.80	0.686	0.739	0.688	0.747	0.755	0.801	0.890
f3=1.00	0.644	0.686	0.633	0.699	0.699	0.741	0.827
f4=1.25	0.579	0.604	0.556	0.635	0.616	0.651	0.733
f5=1.60	0.523	0.536	0.510	0.592	0.553	0.581	0.661
f6=2.00	0.477						
f7=2.50	0.415						
f8=3.15	0.345						
f9=4.00	0.298						
f10=5.00	0.353						
f11=6.30	0.442						
f12=8.00	0.563						
f13=10.00	0.400						
f14=12.50	0.372						
MTI	0.489						

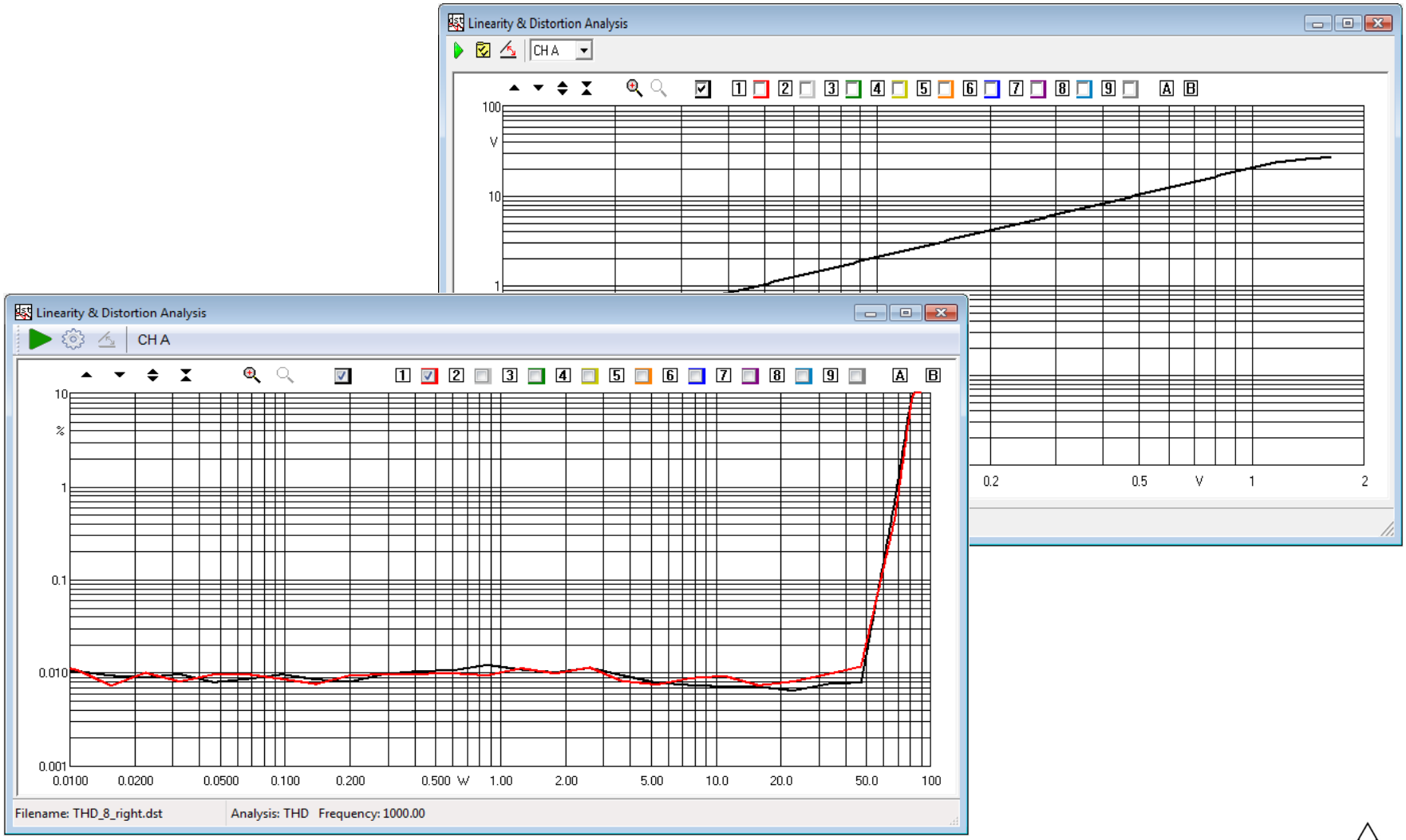
STI=0.512 ALcons=10.6% ra



Frequency [Hz]	LIN	31.5	63	125	250	500	1000	2000	4000	8000	16000	A
Signal [dBSPL]	102.5	65.8	86.4	97.5	96.0	91.7	92.8	93.5	93.1	88.9	76.6	99.6
Noise [dBSPL]	72.9	49.1	61.3	68.5	68.9	62.1	57.7	56.0	56.0	53.6	44.5	65.4
C50 [dB]	-4.72	-5.81	-6.28	-4.08	-5.11	-6.27	-8.08	-5.97	-3.77	-1.56	1.31	-5.21
C80 [dB]	-2.89	-4.07	-4.75	-2.55	-4.12	-3.61	-4.19	-3.96	-1.25	1.34	4.32	-2.78
D50 [%]	25.2	20.8	19.1	28.1	23.6	19.1	13.5	20.2	29.5	41.1	57.5	23.2
TS [ms]	219.2	310.7	260.3	215.0	280.5	232.7	237.5	207.2	149.5	98.5	65.1	195.6
EDT [s]	3.176	3.946	3.408	3.158	4.180	3.402	3.319	2.723	2.119	1.340	0.920	2.696
RT20 [s]	3.674	4.753	3.167	3.508	4.282	3.679	3.171	2.658	2.140	1.404	1.117	3.072
R (RT20)	-1.000	-0.998	-0.996	-0.998	-0.999	-1.000	-0.999	-1.000	-1.000	-1.000	-0.998	-1.000
RT30 [s]	3.616	4.490	3.383	3.467	3.969	3.464	3.175	2.625	2.120	1.476	1.233	3.151
R (RT30)	-1.000	-0.995	-0.998	-0.999	-0.998	-0.998	-1.000	-1.000	-1.000	-0.999	-0.998	-1.000

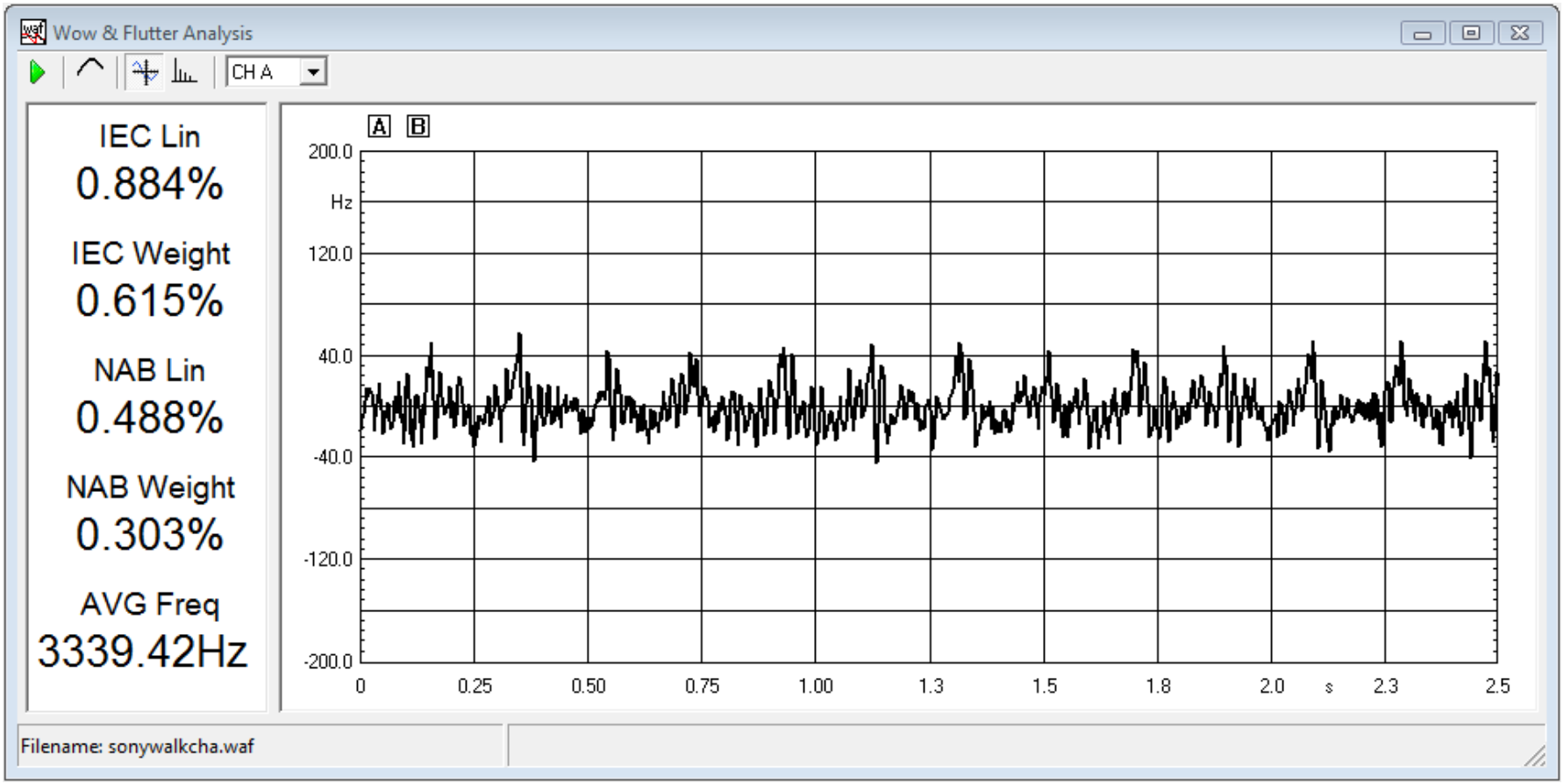
Measurement Menu (System Handled)

■ Linearity and Distortion analysis



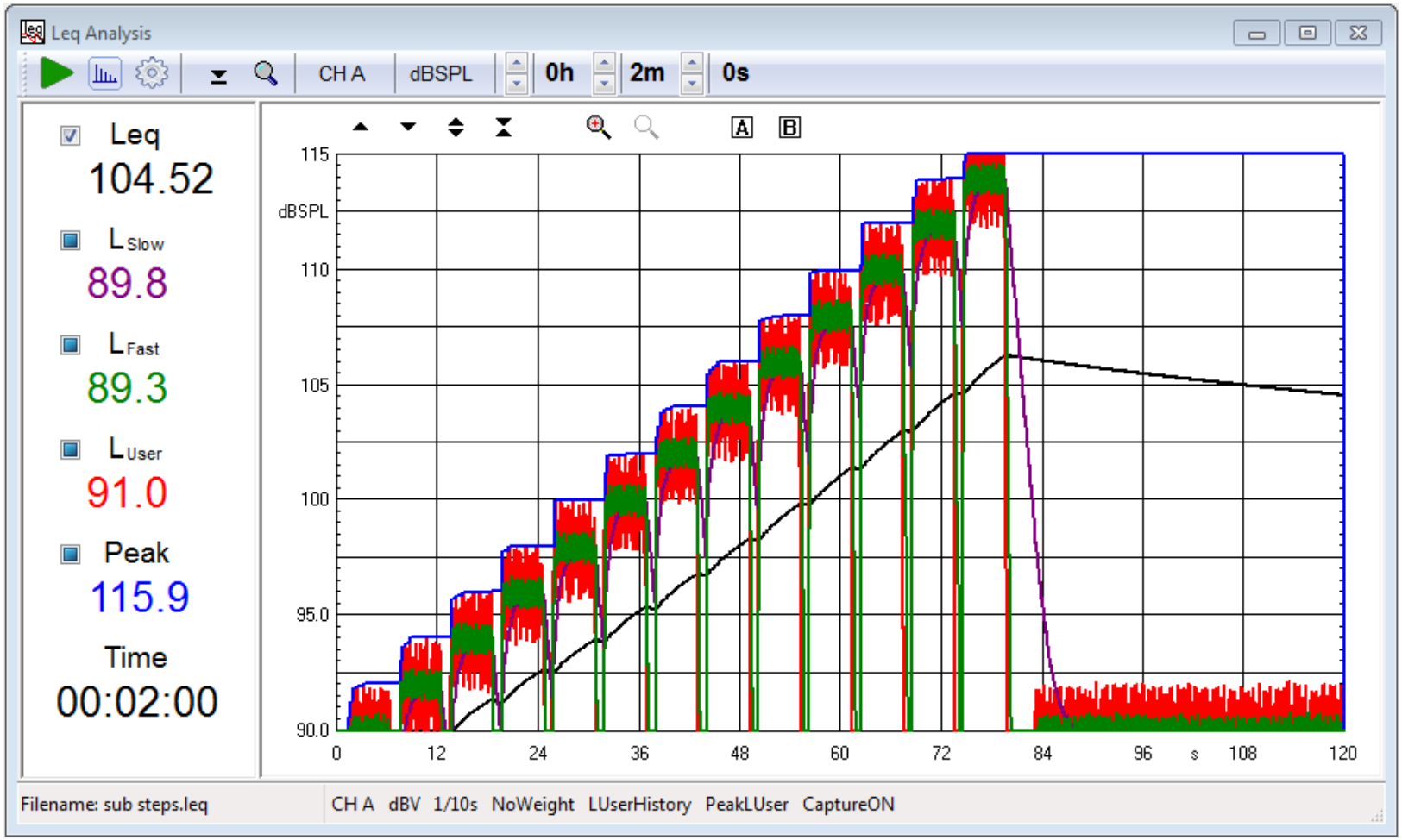
Measurement Menu (System Handled)

■ Wow&Flutter analysis



Measurement Menu (Interactive)

■ Leq analysis

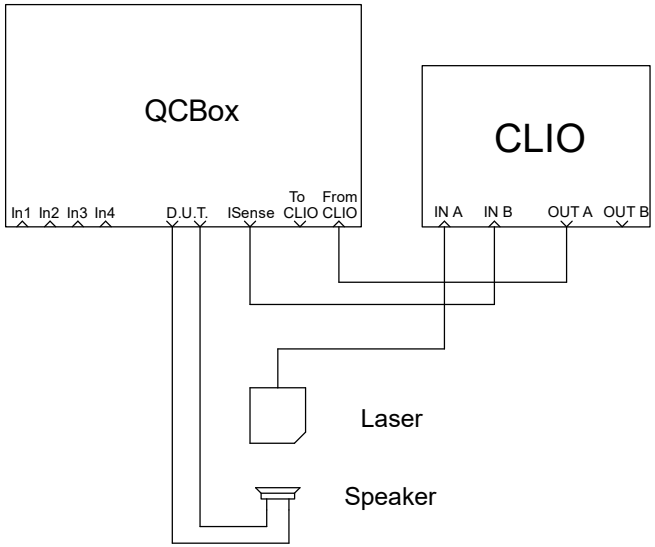


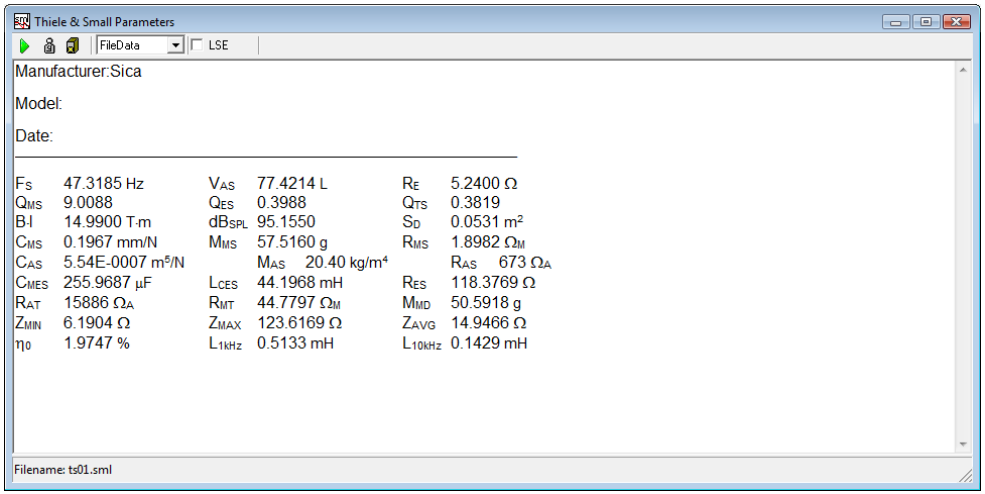
Application: Laser measurements

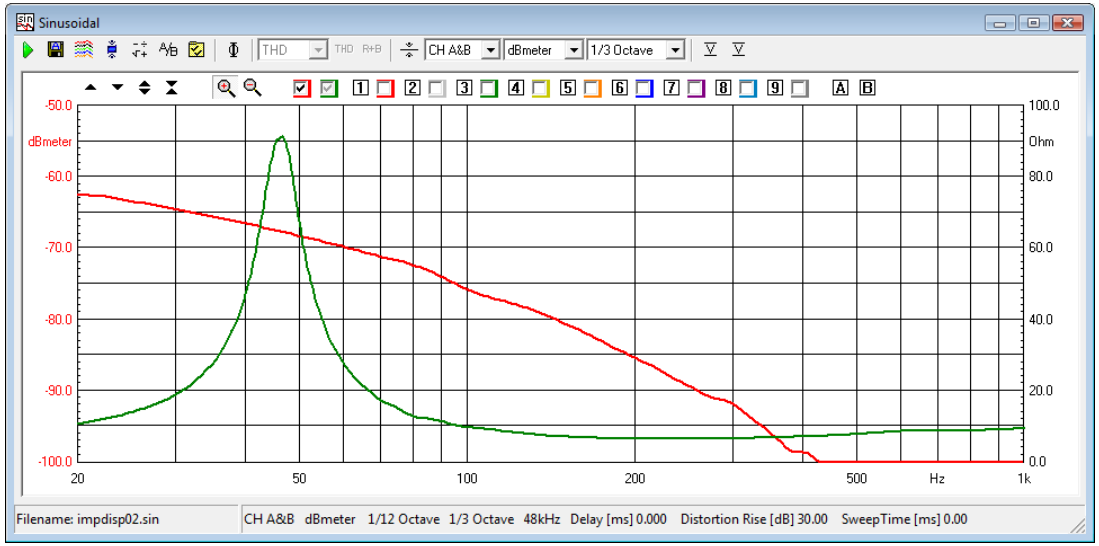
- **Direct measurement of displacement**
- **Direct measurement of velocity**
- **Single-pass non-invasive T&S parameters evaluation**
- **Dynamic large signal T&S parameters evaluation**

Application: Laser measurements

Non-invasive, contactless T&S parameters

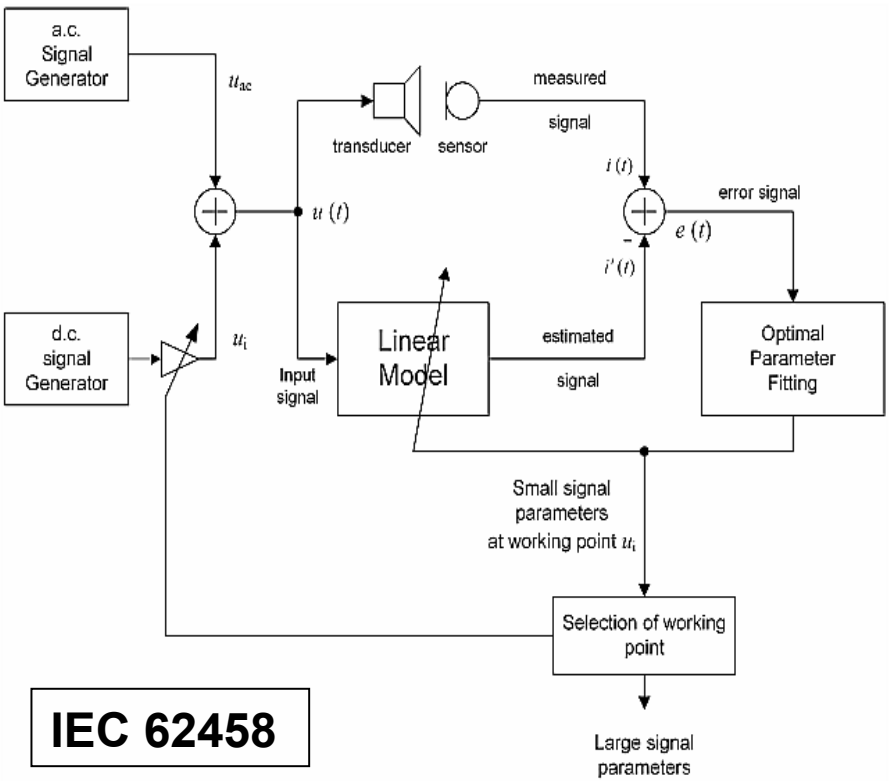




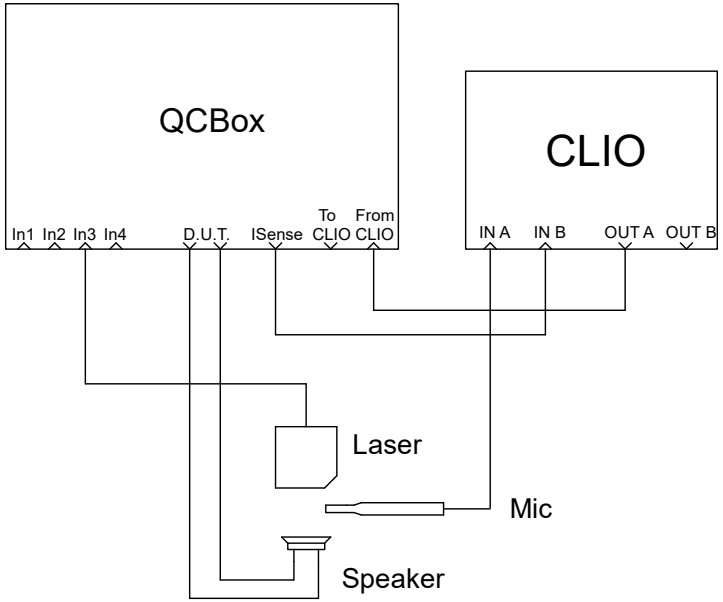


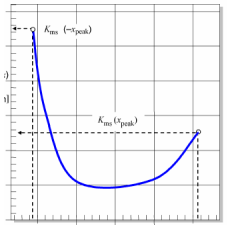
Application: Laser measurements

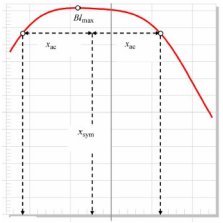
Large signal T&S parameters



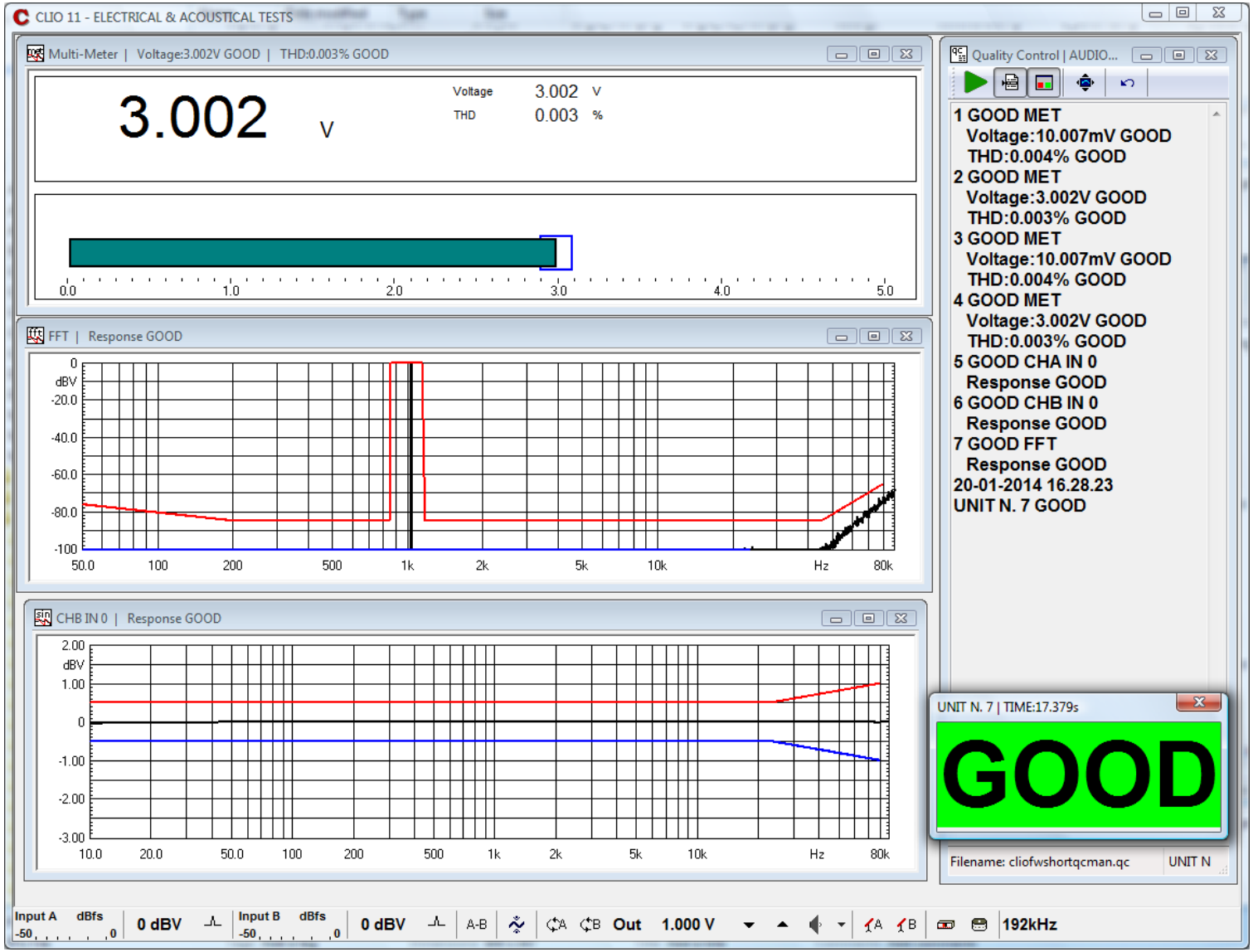
IEC 62458







CLIO 11 Quality Control at its best:



CLIO 11 Quality Control at its best:

- **3 (Three) different approaches to QC:**

1- Using the built-in script engine to realize a sequence of QC tests that fits your need. MLS, Sinusoidal, FFT and Multimeter tests can be mixed as you desire

2- Using the built-in script engine and Sinuoidal to realize a single ultra-fast QC test

3- Creating your custom written QC application using the integrated TCP/IP server.

Ultra-fast single-test loudspeakers QC

Parameters measured in a single sinusoidal QC test:

- **Frequency response**
- **Impedance response**
- **Average (or single frequency) level**
- **Polarity**
- **Total harmonic distortion response**
- **Single harmonic response (from 2nd to 10th)**
- **Fast-Track™ Rub&Buzz response**
- **T&S parameters**

(Fs,Qt,Qe,Qm,Cms,Mms,Mmd,Vas,Bl,dBSPL,ZMin)

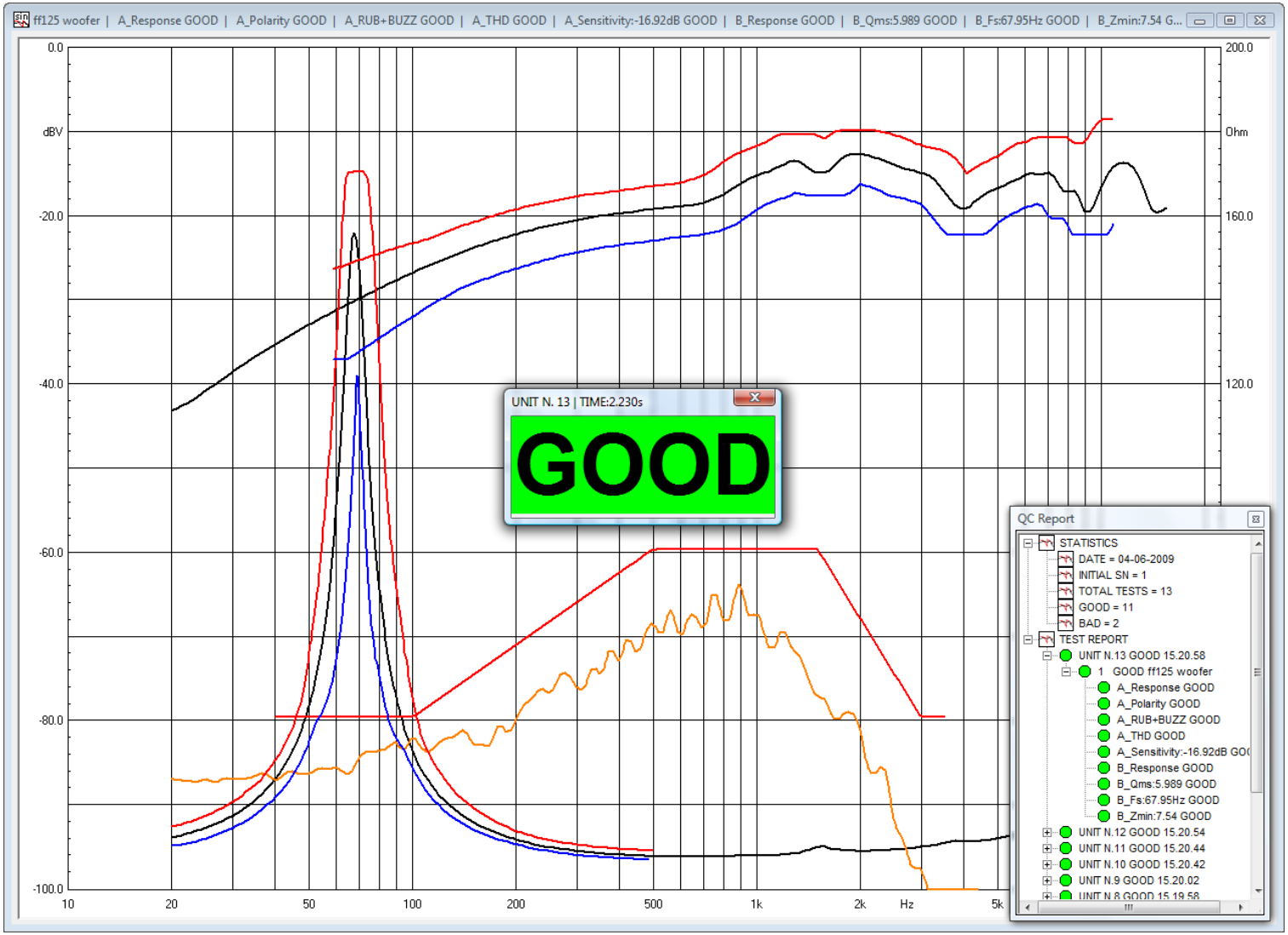
- **Loudness Rating (RLR, SLR, STMR)**
- **Sensitivity (average or up to eight frequencies)**

Sweep time control is achieved by:

- **Frequency resolution**
- **Frequency start and stop**
- **Sweep speed (Normal, Fast, Slow)**
- **Sweep Sync TTL Output Signal**

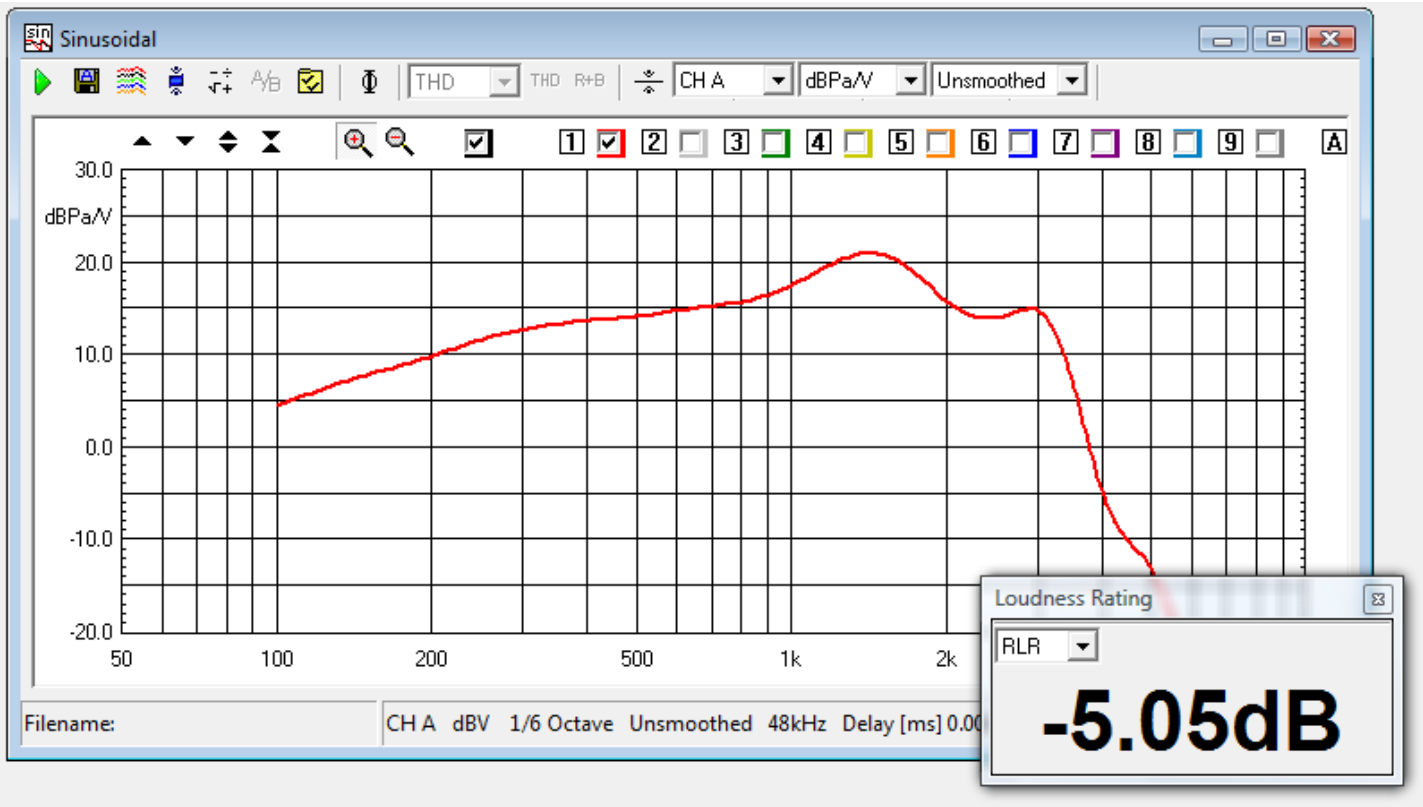
CLIO 11

Loudspeakers QC with Fast-Track™ Rub&Buzz



CLIO 11
Telephone testing with LR

- **Equalized output signal generation for mouth compensation**
- **Interactive loudness rating calculator**
- **Integration under QC scripts**



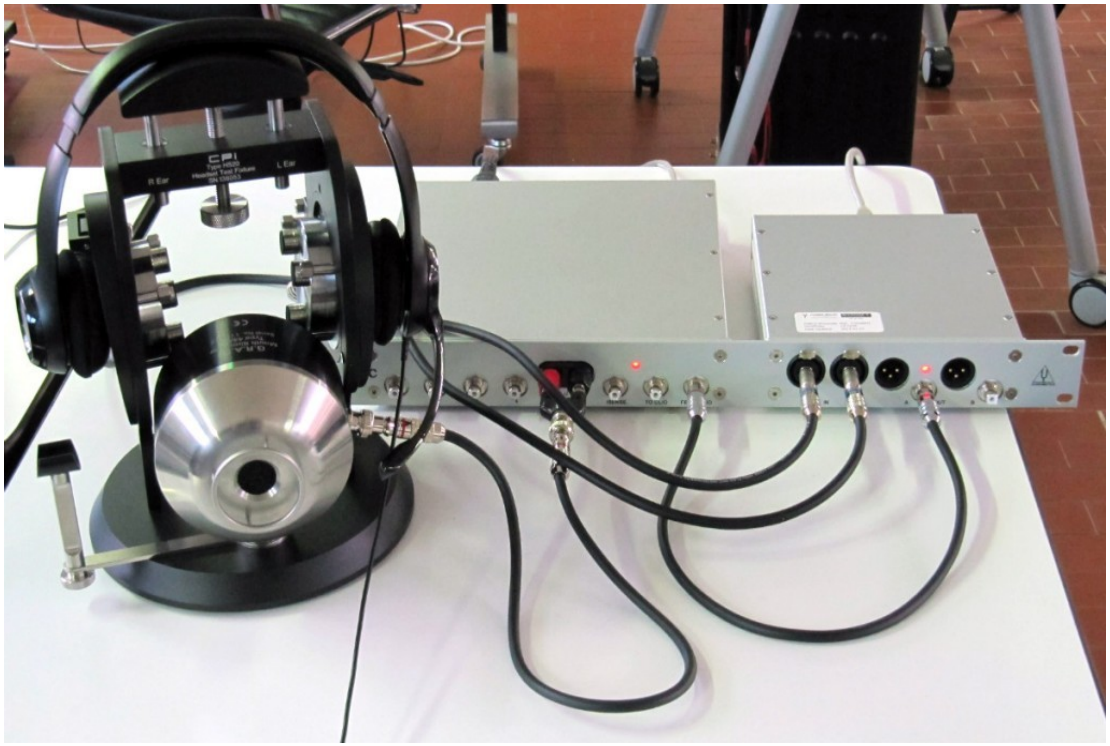
CLIO 11
QC testing of USB audio devices

Quality Control

```
[WAVE DEVICE]
NAME=Logitech USB Headset
PLAY=1

[SETPHANTOMA]
[SETPHANTOMB]
[SETMUTEA]

[MLS]
OUT=-42.0 dBV
IN=-30
REFERENCE=SPK_A.MLS
LIMITS=SPK.LIM

[MLS]
OUT=-42.0 dBV
IN=-30
REFERENCE=SPK_B.MLS
LIMITS=SPK.LIM

[WAVE DEVICE]
NAME=Logitech USB Headset
REC=1

[RESETPHANTOMA]
[RESETPHANTOMB]
[RESETMUTEA]

[MLS]
OUT=-42.0 dBV
IN=0
REFERENCE=MIC.MLS
LIMITS=MIC.LIM
```

Filename:

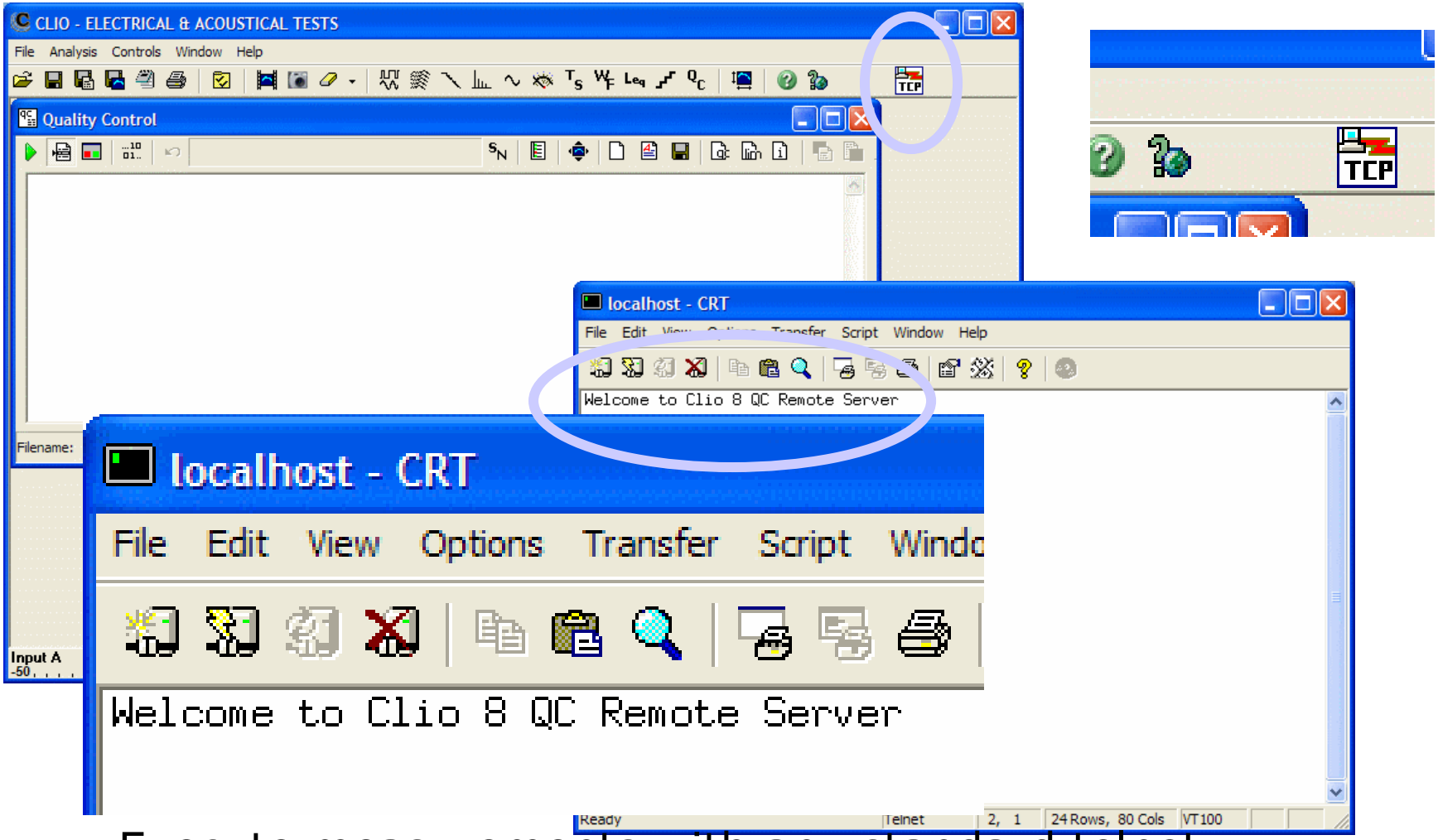
- **Possibility of controlling input or output wave devices**
- **On-the-fly integration under QC scripts permits single-test of duplex devices**



Quality Control TCP/IP Server

- The choice of TCP/IP approach presents several advantages:
- 1) No additional learning curve as same CLIO QC script commands are used
- 2) Prevents the engineer to deal with complex API programming
- 3) It is independent from the Operating System, Programming Language and kind of PC.
- 4) It can be run locally or from another network connected PC
- 5) It is possible to write applications that control more than one QC test workstation

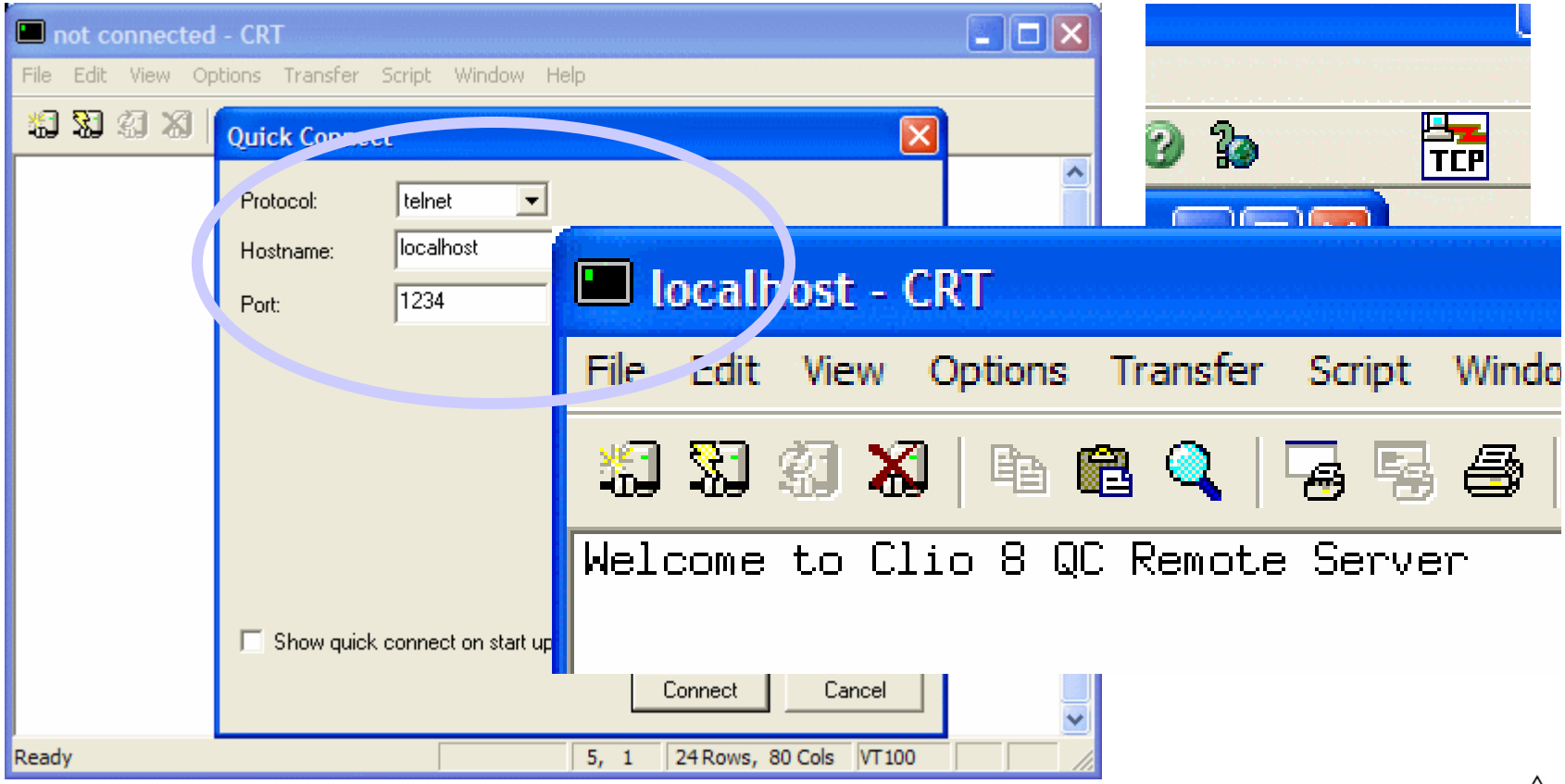
Quality Control TCP/IP Server



- Execute measurements with any standard telnet application

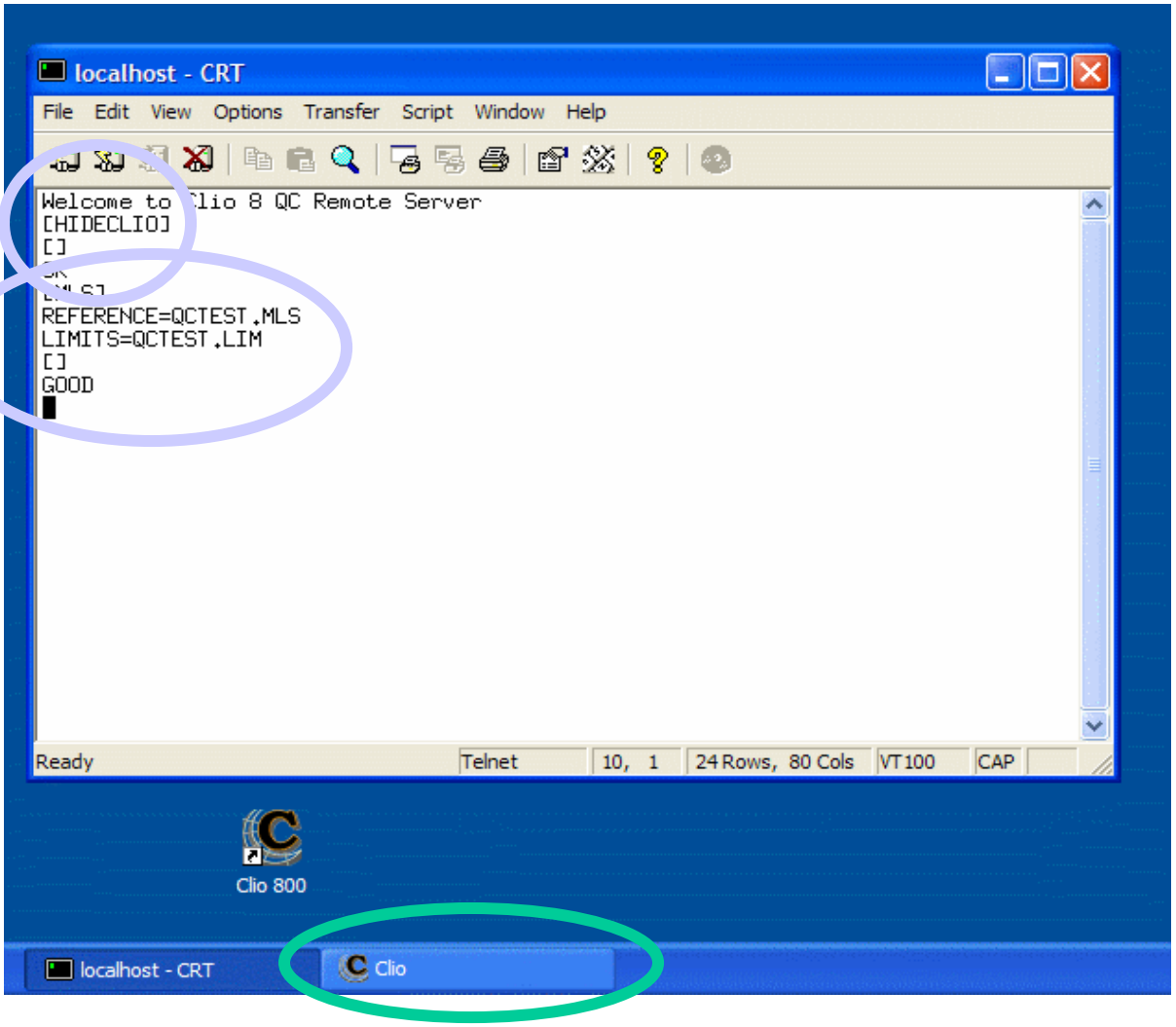
Quality Control TCP/IP Server

- Example
- 1 - Connection to the server



Quality Control TCP/IP Server

- Example 2 - Hide CLIO from desktop
- Execute MLS test and receive result



Quality Control TCP/IP Server

- 4 - Sample C++ application code

```
/* clio client c - code for example client program that uses TCP */
#include <windows.h>
#include <winsock.h>
#include <stdio.h>
#include <string.h>
#define PROTOPORT       1234            /* default protocol port number */
extern  int             errno;
char    localhost[] =   "localhost";    /* default host name            */
int string_length(char str[]);

main(argc, argv)
int     argc;
char    *argv[];
{
        struct  hostent  *ptrh;  /* pointer to a host table entry       */
        struct  protoent *ptrp;  /* pointer to a protocol table entry   */
        struct  sockaddr_in sad; /* structure to hold an IP address     */
        int     sd;              /* socket descriptor                   */
        int     port;            /* protocol port number                */
        char    *host;           /* pointer to host name                */
        int     n;               /* number of characters read           */
        char    ibuf[100];       /* buffer for data from the server     */
        char    obuf[100];       /* buffer for data to the server       */
        WSADATA wsaData;
        WSAStartup(0x0101, &wsaData);
        memset((char *)&sad,0,sizeof(sad)); /* clear sockaddr structure */
        sad.sin_family = AF_INET;        /* set family to Internet     */

        /* Check command-line argument for protocol port and extract    */
        /* port number if one is specified.  Otherwise, use the default */
        /* port value given by constant PROTOPORT                       */

        if (argc > 2) {                  /* if protocol port specified   */
                port = atoi(argv[2]);    /* convert to binary            */
        } else {
                port = PROTOPORT;        /* use default port number      */
        }
        if (port > 0)                    /* test for legal value         */
                sad.sin_port = htons((u_short)port);
        else {                           /* print error message and exit */
                fprintf(stderr,"bad port number %s\n",argv[2]);
                exit(1);
        }

        /* Check host argument and assign host name. */

        if (argc > 1) {
                host = argv[1];          /* if host argument specified   */
        } else {
                host = localhost;
        }

        /* Convert host name to equivalent IP address and copy to sad. */

        ptrh = gethostbyname(host);
        if ( ((char *)ptrh) == NULL ) {
                fprintf(stderr,"invalid host: %s\n", host);
                exit(1);
        }
        memcpy(&sad.sin_addr, ptrh->h_addr, ptrh->h_length);
```

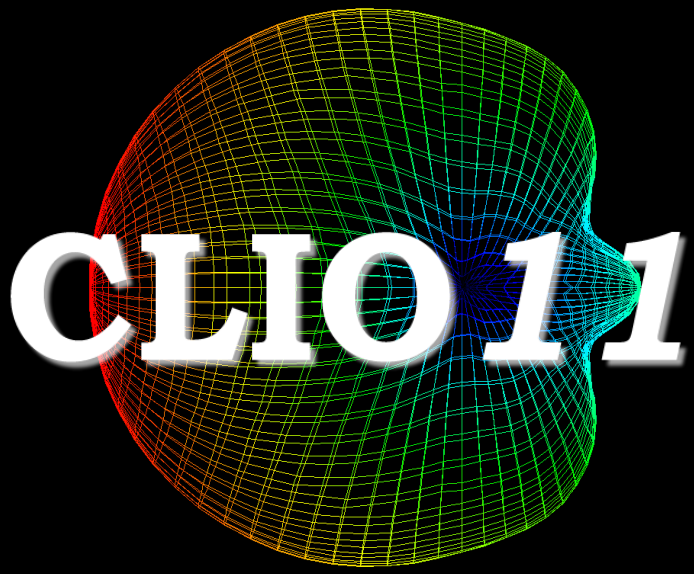
1991 - 2015

since its birthday

CLIO celebrates

24 Years of Excellence!

AUDIOMATICA



Thank you!

For more info:

info@audiomatica.com
www.audiomatica.com

AUDIOMATICA