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Test Patterns Library Overview

VideoQ, Inc. Presentation

May 2024

www.videoq.com/vql.html

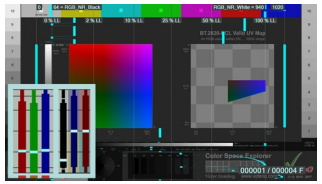
www.videoq.com

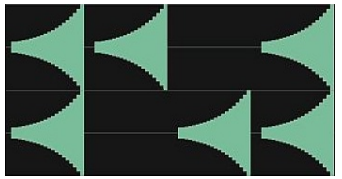
VideoQ Approach to Test Patterns Usage

VideoQ approach combines “classic”, “digital” and “cloud” methodologies, sharing same test patterns and covering all 3 levels of video quality control:

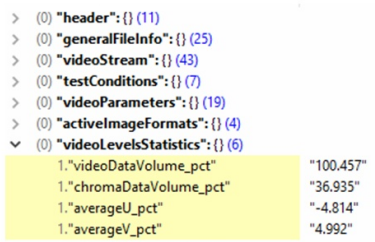
Instant visual-aural quality estimation

Objective measurements of video and audio parameters

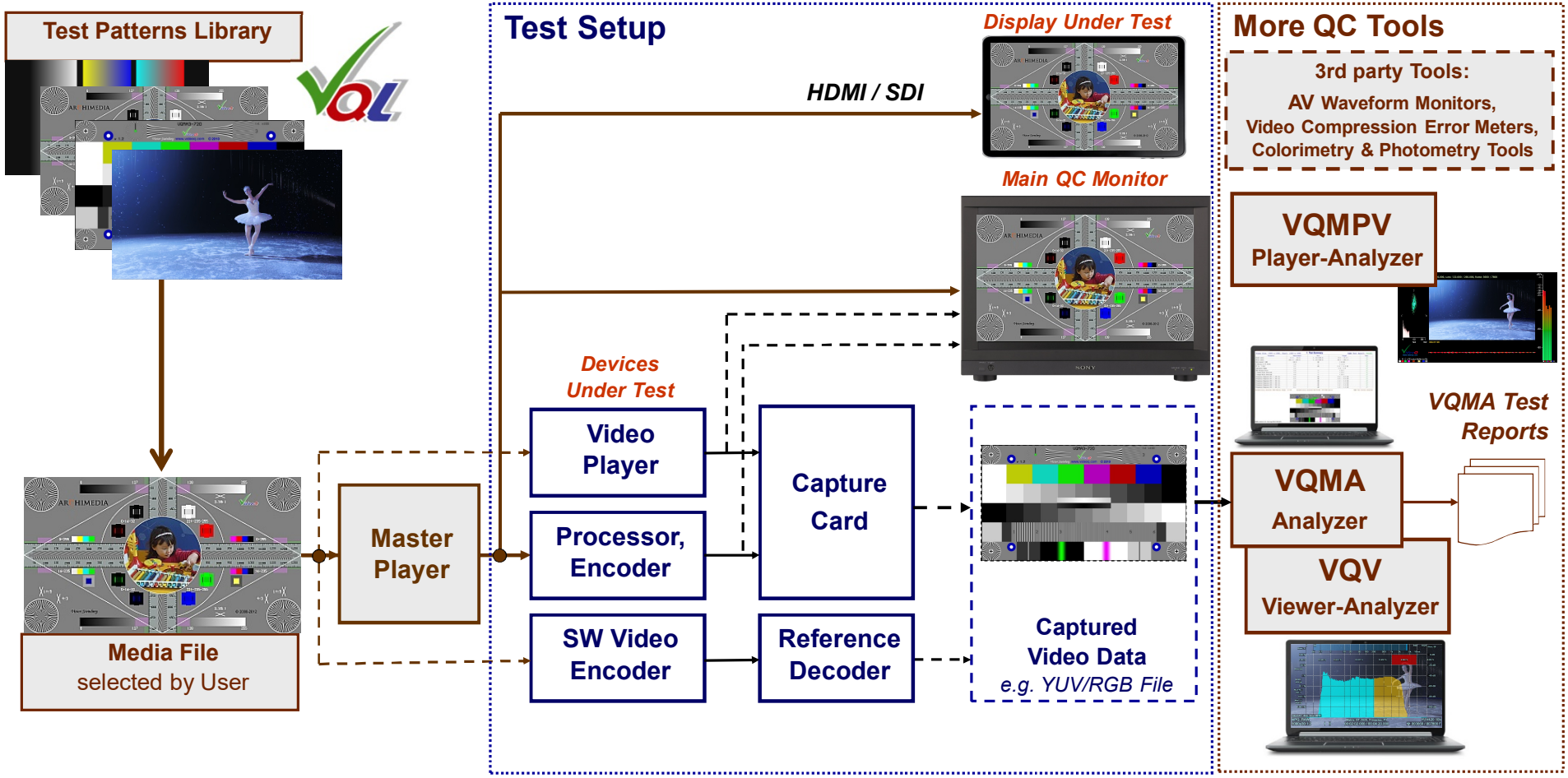




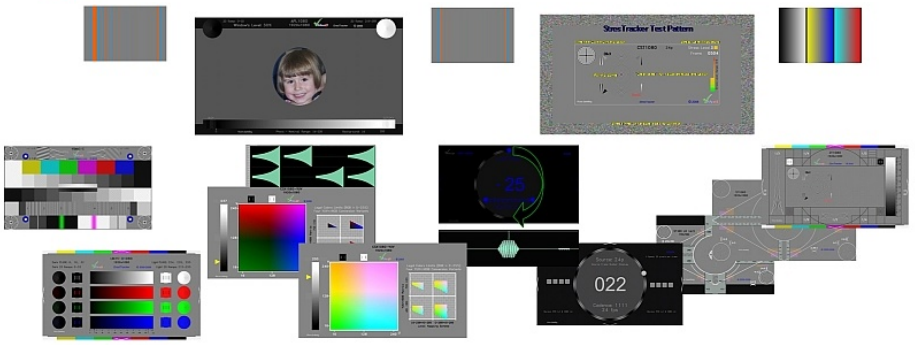
Fully automated Quality Control



Workflow



Software and Hardware Applications



Software Coders, Transcoders, Players, Analyzers

VQL Compatible Hardware Players/Generators

VideoQ Players:
e.g. VideoQ
VQTS series

Other (3rd party) Players:
e.g. Video Clarity

VQL Key Features

- VQL files are designed to be compatible with all commonly used software or hardware codecs and media players.
- Static and dynamic video test patterns are available in a variety of interlace modes, aspect ratios, frame rates and resolutions from 192x108 up to 8K
- All test patterns remain suitable for accurate measurements even after low bitrate coding, heavy scaling and/or cropping, e.g. after down-conversion for mobile devices
- Full custom compressed and uncompressed test files and application-specific live video clips are available on request

VQL Files Data Formats

Raw video data formats:

.YUV, interleaved UYVY 4:2:2, 8 bit per component = *default data format*

.YUV, planar YUV 4:4:4, 8, 10, 12 or 16 bit per component

.TIFF, 16 bit per component, 48 bit per pixel

.RGB 4:4:4, 8 bit or 16 bit per component

Frame sizes:

3820x2160 (UHD) and above (4K, 8K, etc.)

1920x1080 (HD) = *default frame size*

1280x720 (Sub-HD)

720x576 (SD-PAL)

720x480 (SD-NTSC)

Frame rates:

23.976 (24), 25, 29.97 (30), 50, 59.94 (60) and above, e.g. 120fps

Raw audio data formats:

.WAV, 48 kHz, 24 bit per sample,

Multi-Mono, LR stereo and/or 5.1, 7.1, 7.1.4 surround sound. *Default audio data format = LR stereo.*

Alternative video formats (e.g. raw planar .YUV 4:2:0, .Y4M with header, wrapped .AVI, .MOV or .MP4), alternative frame sizes and frame rates are available on request.

Test Patterns by Categories

1. Color Space, Gradations and Linearity Tests – **GradTracker™** series

   1.A Special HDR (High Dynamic Range) Tests

2. Geometry, Scaling, and Sharpness Tests – **ScalTracker™** series

3. Motion Portrayal Tests: Frames Continuity, De-Interlacing, and AV Sync – **ChronTracker™** series

4. Compression Quality Tests – **StresTracker™** series

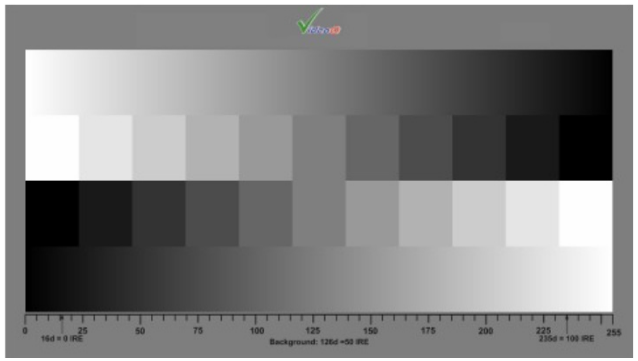
5. Static and Dynamic Multi-purpose Test Charts

6. Live Clips with optional VQCB leader segments

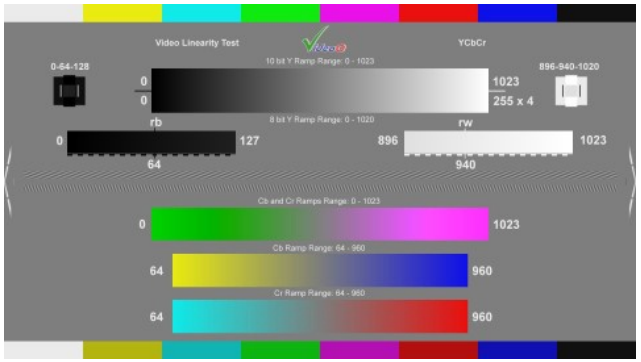
7. Audio Tests

Color Space, Gradations and Linearity Tests Examples

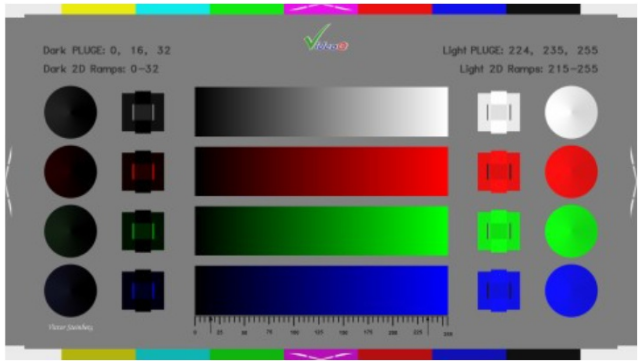
SHGS: Static Horizontal GrayScale, HD, 8 bit



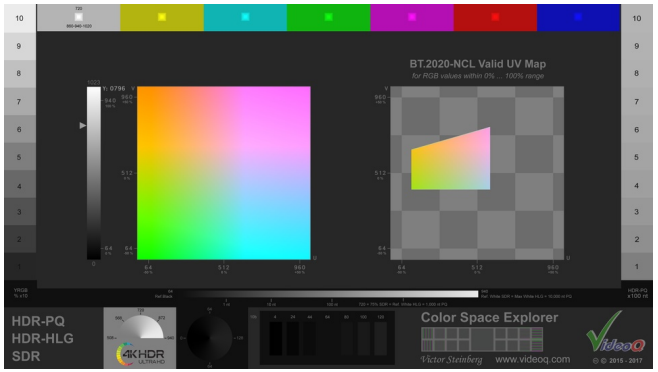
YUVL: Static Y, U (Cb), V (Cr) linearity test, UHD, 10 bit



YRGBL: Static Y, R, G, B Linearity test, HD, 8 bit



VQCSE: Dynamic YUV Color Space Explorer ™ test, UHD 10 bit



UHD HDR Tests Examples

VQLA-PQ: HDR Levels Alignment Test

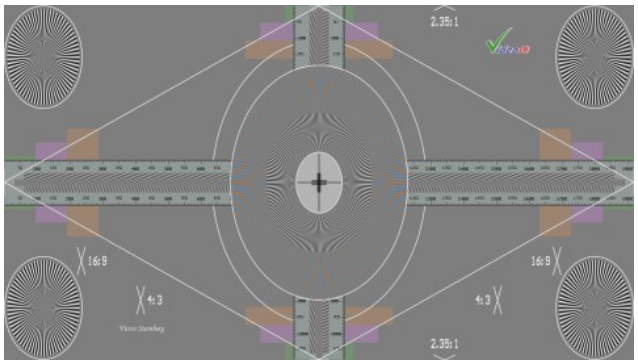
VQLA-HLG: HDR Levels Alignment Test

VQMPC-PQ: Static Multi-Purpose Chart

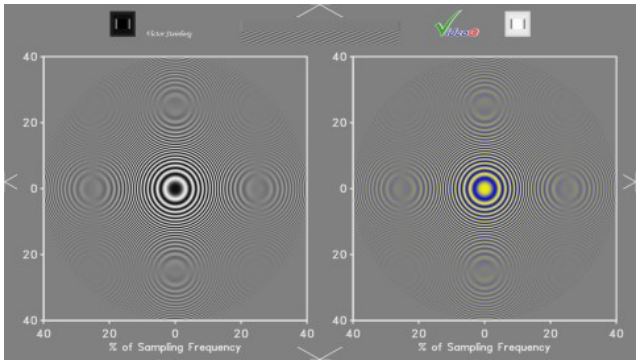
VQMPC-HLG: Static Multi-Purpose Chart

Geometry, Scaling, and Sharpness Tests Examples

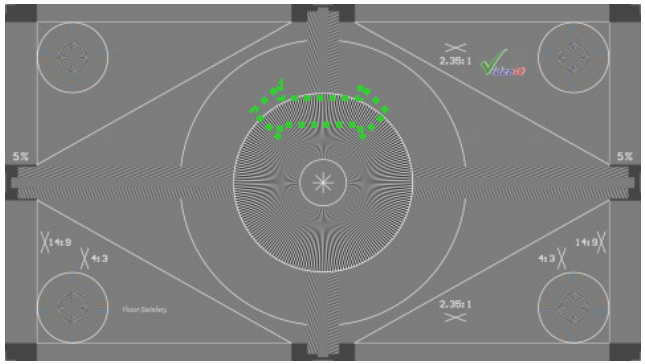
SGS235LB: Static Geometry & Sharpness test
Active Image Aspect Ratio = 2.35:1

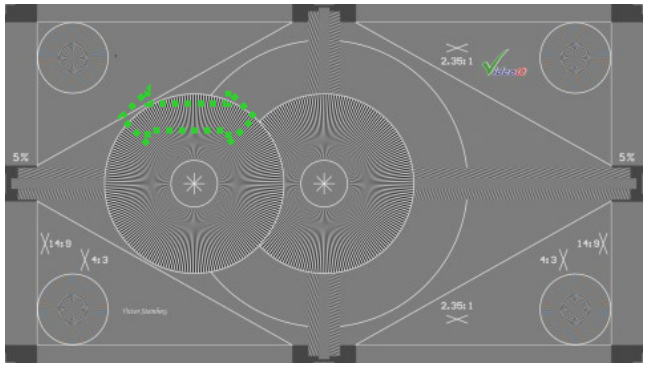


DZP: Dynamic Zone Plate test
Variable zone plates phase speed profile



DGS178: Dynamic Geometry and Scaling test, HD, 8 bit, central sprite moves left-right with pauses

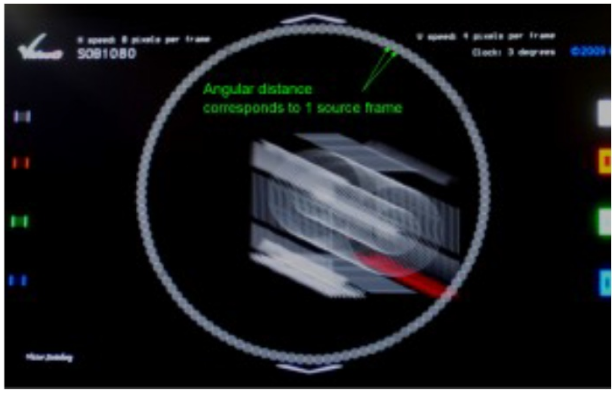




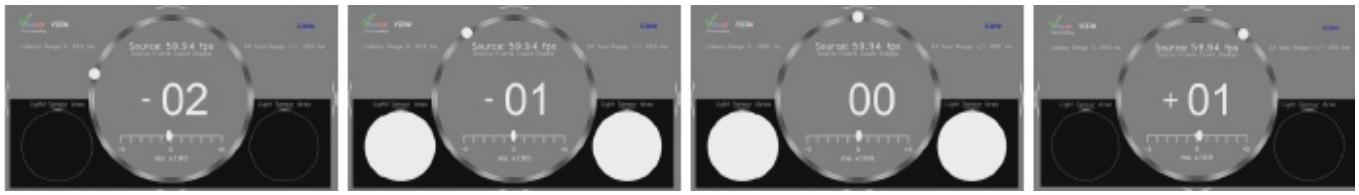
Motion Portrayal Tests Examples

DIFC: De-Interlacing and Frames Continuity test,
NTSC, PAL and HD versions

SOBFC: Sprite and Orbiting Balls Frames Continuity test.
Off-screen photo, long exposure time, consistent frame sequence

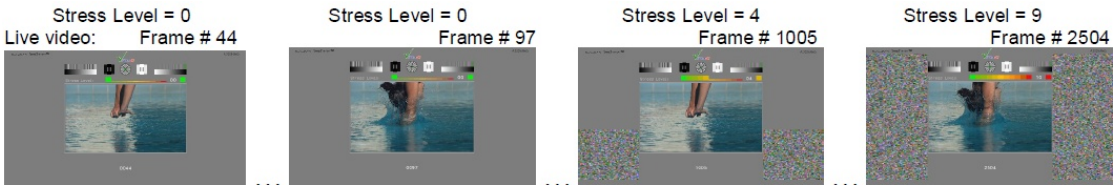


VQDM1 Dynamic AV Delay Measurement test, measurable AV sync error range: +/-500 ms

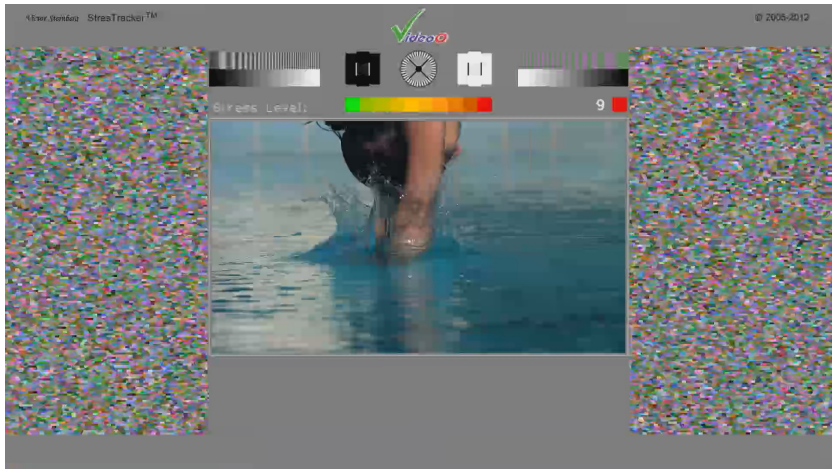


Compression Quality Test Example

VQCST: Compression Stress test, version with live image insert



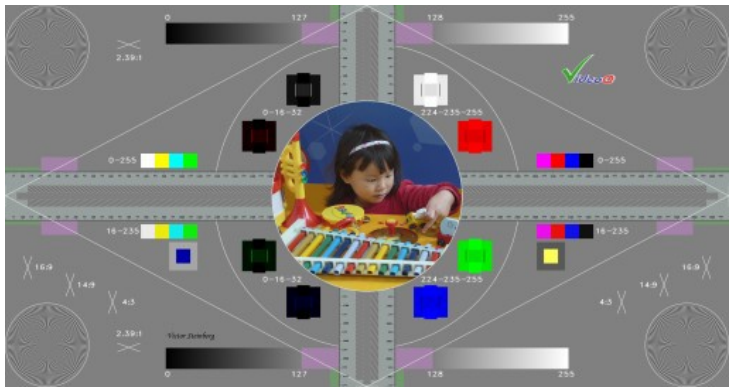
1920x1080, H264, 25 Mbps, Stress Level 9,
slightly noticeable compression artifacts



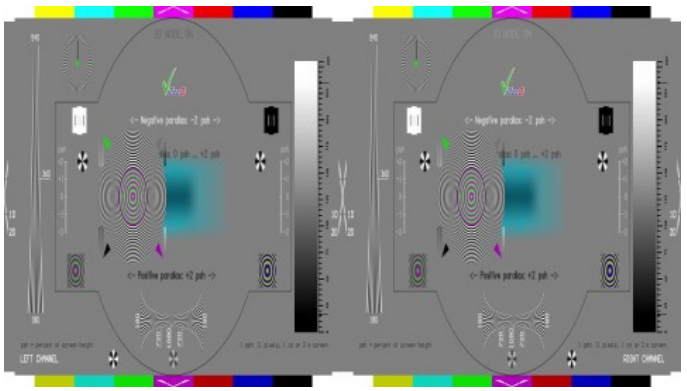
1920x1080, H264, 2.5 Mbps, Stress Level 6,
very strong compression artifacts

Multi-purpose Test Charts Examples

VQMPC-S: Static Multi-Purpose Chart, 4K, 16 bit per component



VQZT-3D: Multi-Purpose Chart with Zone Plate sprite, 3D version



VQMPC-AVS: Multi-Purpose Dynamic Chart with AV Sync component, versions up to UHD, 16 bit per component

"Beep-bop" sound bursts:

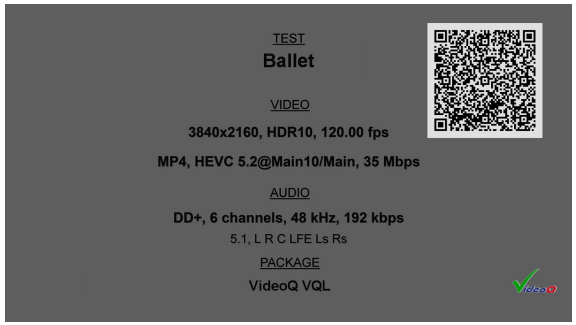
"Bop" burst start marks 0 ms reference moment

Live Test Clips Examples

SFO: Aerial HD video, **high original frame rate**, decimated to various frame rates; the clip versions serve for frame rate conversion testing

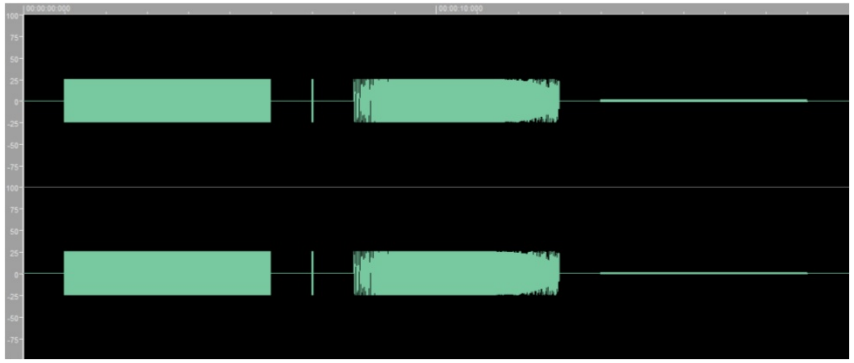


Ballet: based on Netflix open content 'Nocturne' clip; **HDR** and **SDR** versions, variety of **frame sizes** (up to **4K**) and **frame rates** (up to **120fps**).
Each test clip starts with 20s long **VQCB** leader: text box with QR code, followed by VQCB test pattern, followed by test clip live content.



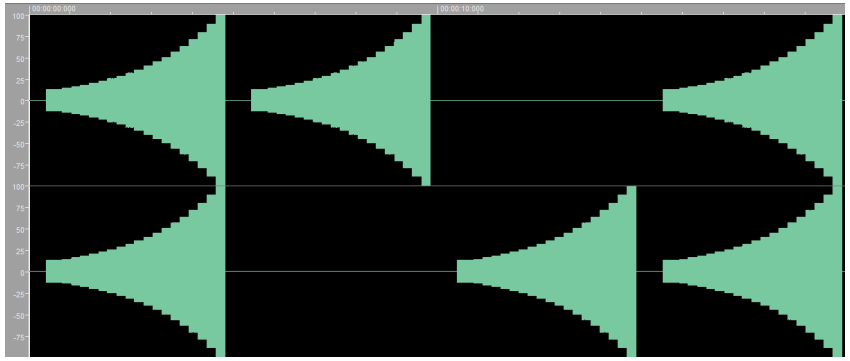
Audio Tests Examples

AUD1: Audio Frequency and Pulse Response Test; 20 s Sequence



- 1 sec mute
- 5 sec of 1kHz@-12dBFs
- 1 sec mute
- Pulse 0.02 sec, 1kHz@-12dBFs
  (Modulated Pulse Duration= 1 TV frame in 50p)
- 1 sec mute
- 5 sec of Logarithmic (Exponential) Sweep:
  2 octaves/sec, 10 octaves,
  20-20,000Hz @-12dBFs
- 1 sec mute
- 5 sec 1kHz@-40dBFs
- 1 sec mute

AUD2: Stereo Balance and Levels Test; 20 s Sequence



- 0.4 sec mute
- 4.4 sec L&R, 1kHz,
  18 steps Raiser from -18dBFs to 0dBFs
- 0.6 sec mute
- 4.4 sec, L only (R=mute) 1kHz,
  18 steps Raiser from -18dBFs to 0dBFs
- 0.6 sec mute
- 4.4 sec, R only (L=mute) 1kHz,
  18 steps Raiser from -18dBFs to 0dBFs
- 0.6 sec mute
- 4.4 sec, R & Inverted L, 1kHz,
  18 steps Raiser from -18dBFs to 0dBFs
- 0.13 sec mute

About VideoQ

Company History

- Founded in 2005
- Formed by an Engineering Awards winning team sharing between them decades of global video technology.
- VideoQ is a renown player in calibration and benchmarking of Video Processors, Transcoders and Displays, providing tools and technologies instantly revealing artifacts, problems and deficiencies, thus raising the bar in productivity and video quality experience.
- VideoQ products and services cover all aspects of video processing and quality assurance - from visual picture quality estimation and quality control to fully automated processing, utilizing advanced VideoQ algorithms and robotic video quality analyzers, including latest UHD and HDR developments.

Operations

- Headquarters in CA, USA
- Software developers in Silicon Valley and worldwide
- Distributors and partners in several countries
- Sales & support offices in USA, UK