VideoQ Productivity Tools and Media Ambit ™

Extended Technical Metadata Acquisition and Usage

VideoQ Technology Presentation

October 2024

www.videoq.com

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About VideoQ

Customers & Partners

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

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VideoQ Philosophy of Extended Technical Metadata

1. Modern AI-based environment requires **fully automated modular tools** and a **smaller number of human operators** or **supervisors** should focus ***only*** on optional final checks and/or complicated cases.
2. And these operators must be equipped with appropriate **software tools and indicators** presenting all relevant parameters in a time-saving "easy to spot at a glance" way.
3. Automatically generated **Extended Technical Metadata** and **Reports** are must be and must cover:

   *Video and audio level profiles, video spatial and temporal activities, integrated loudness, and other critical parameters, not only affecting the **AV content quality**, but also providing unique **signature data sets** suitable for **content identification** and **content processing optimization**.*

4. The VideoQ **VQPT** (**V**ideo**Q** **P**roductivity **T**ools) modules generate machine-readable **Reports**, including **Timeline Profiles**, which can be used for fast and reliable **automated content identification** and **indexing** of large amount of media files. *See next slides for data derived plots' examples*.

VideoQ tools handle various types of **files** and **streams**, on premises and in the cloud.

They use **ffmpeg** libraries and support all common **containers**, **codecs** and **protocols**,

such as: MP4, MOV, J2K, OGG, AC3, EAC3, AVC, HEVC, VP9, TCP, UDP, SRT, etc.

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About Media Ambits

What it is:

- [*me·dia am·bit*] noun: Technical and semantic **metadata** about moving images, sounds, and timed text; **embedded** in files or **externally centralized**.
- Sentence example: Their system uses media ambits to automate ingest and delivery.
- Variations: Video Ambit, HDR Ambit, Audio Ambit, Timed Text Ambit, etc.

Ambit's Role for AI-based, Automated and Automation-Assisted Workflows:

- AI-based and robot-assisted human decision-making **tools**.
- Robots-learning-from-people (Machine Learning) **tools**.
- **Ambits repositories** and **machine services** optimized for automation, web services, and workflows.
- Automated and manual control of **optimized** video and audio processing/conversion
- Automated and manual **quality assurance** and **quality control** tools
- Measure, annotate and automatically **modify** files to match **target ambits**.
- **Notify** machines, people and dashboards in **automated workflows**.

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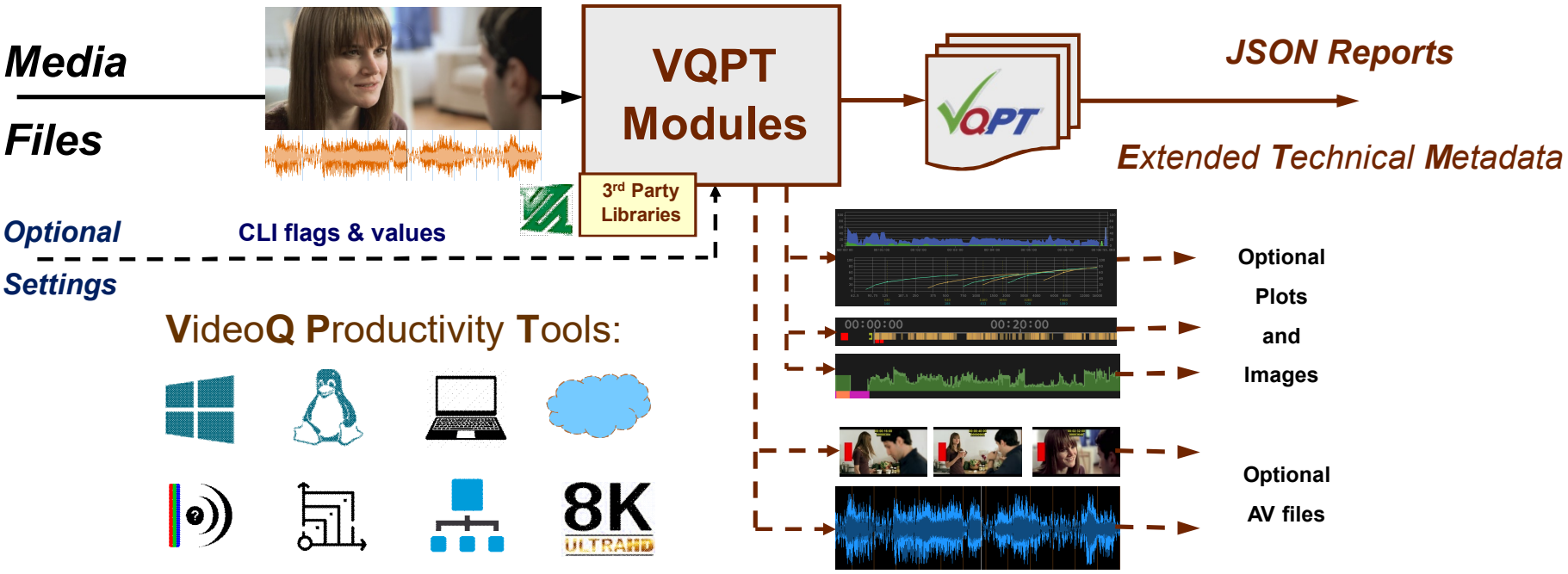
VideoQ Productivity Tools

VQPT is a suite of portable Windows/Linux CLI programs for on premises and cloud computing.

It can be used for production, post-production and distribution applications.

The program modules can be purchased and used separately or grouped for typical applications.



Learn more about **VQPT** suite: www.videoq.com/vqpt.html www.videoq.com/vqpt_packs.html

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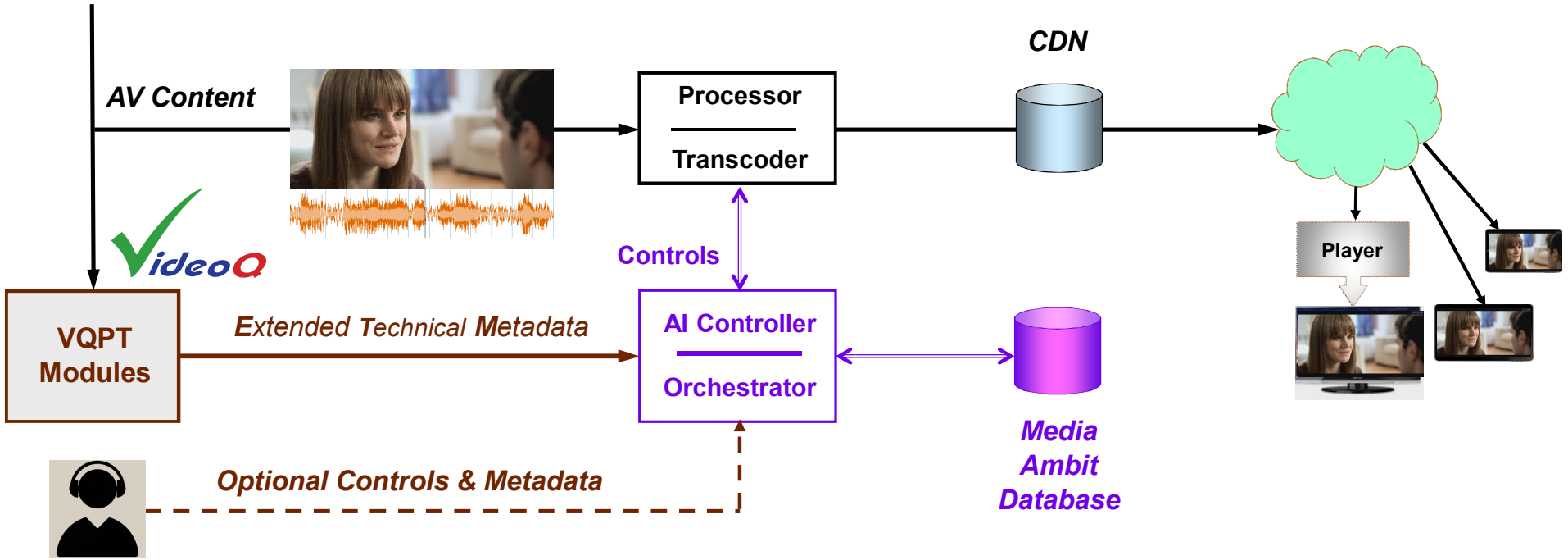
Extended Technical Metadata & AI-based Engines

Extended **T**echnical **M**etadata facilitate AI-based metadata ***auto-tagging*** and content ***indexing***.
The **ETM** provide for faster and easier ***identification*** of content versions (see next slides for examples).
They also provide for the ***optimization*** of the AV content re-versioning, re-purposing, processing and delivery.
Storage of ETM together with other (technical and non-technical) metadata in **global Media Ambit Database** significantly increase the **commercial value** of both the original and the processed content.

- **Generative AI**
- **Studio**
- **Live Feed**



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Appendix

More Info and Examples

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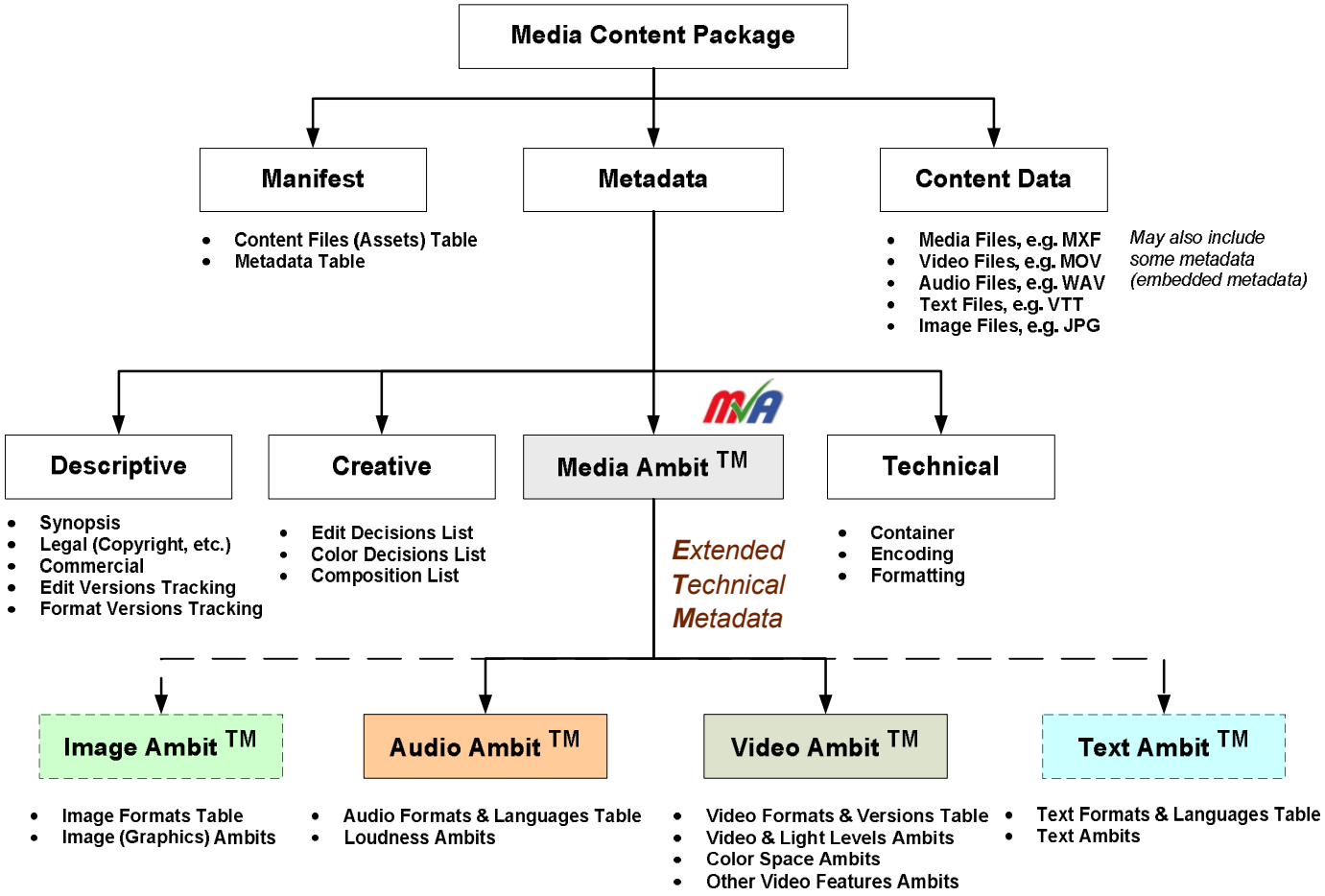
Media Ambit and Media Package Data Structure



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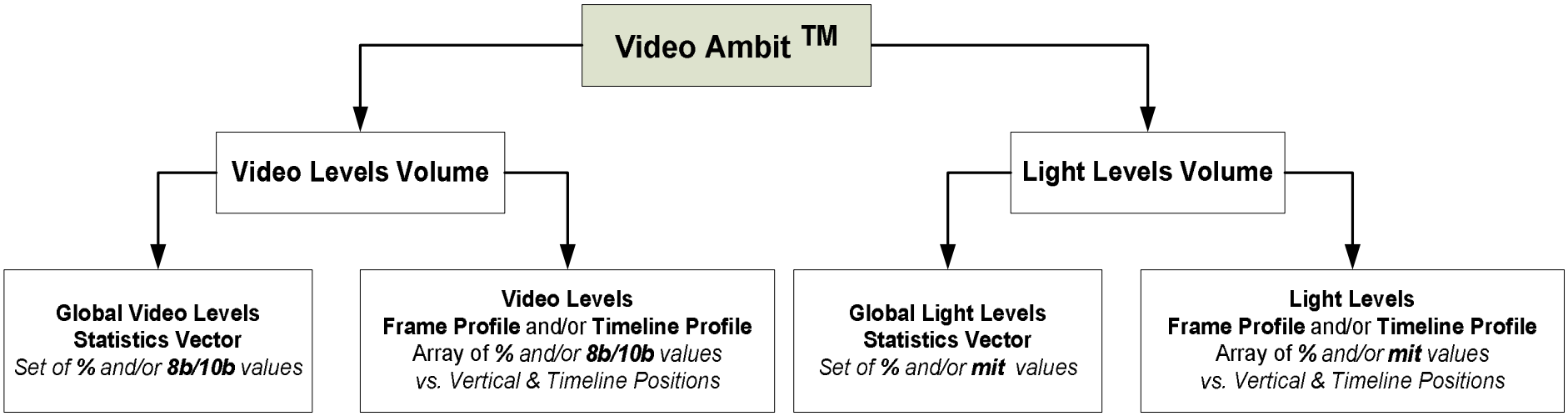
Video Ambit Data Structure Example



Video Levels in % are calculated by offsetting Video Levels by **Nominal Black** value and division by the specified **Nominal Range** of the corresponding **Channel**.

Model nit = **Video Levels** to **Light Level** Model output.
Standard Conversion Models: **SDR**, **HDR-PQ**, **HDR-HLG**

Examples of Video Ambit individual parameters:

Frame **A**verage **L**ight **L**evel = **FALL**

- **FALL T**imeline **P**rofile = **FALLTP**
- **G**lobal **M**ax **L**ight **L**evel = **GMLL**
- **F**rame **A**verage **Y L**evel = **FAYL**
- **L**ine **U**pper **M L**evel **F**rame **P**rofile = **LUMLFP**

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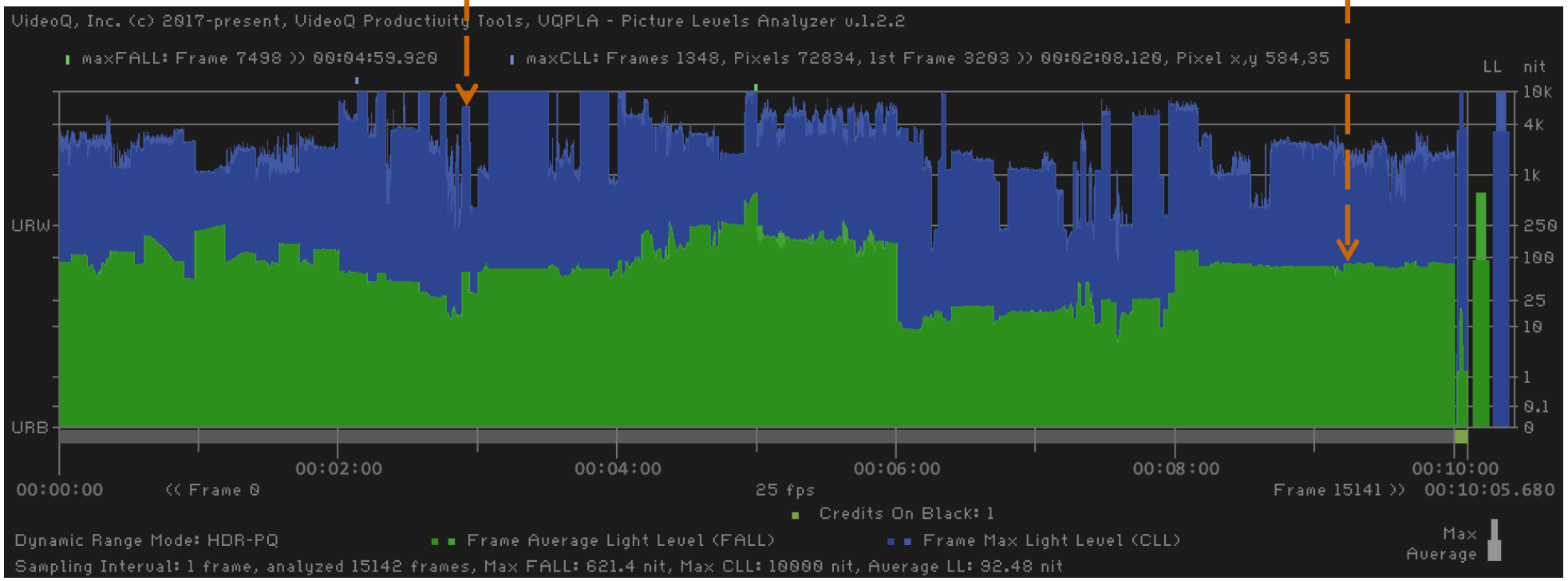
VQPLA – VQPT Picture Levels Analyzer, Plot Example

HDR-PQ file analyzed. **No serious problems found.**

Plot below shows measured FALL and CLL Timeline Profiles.

Frame Max Light Level (CLL) **Frame Average Light Level (FALL)**



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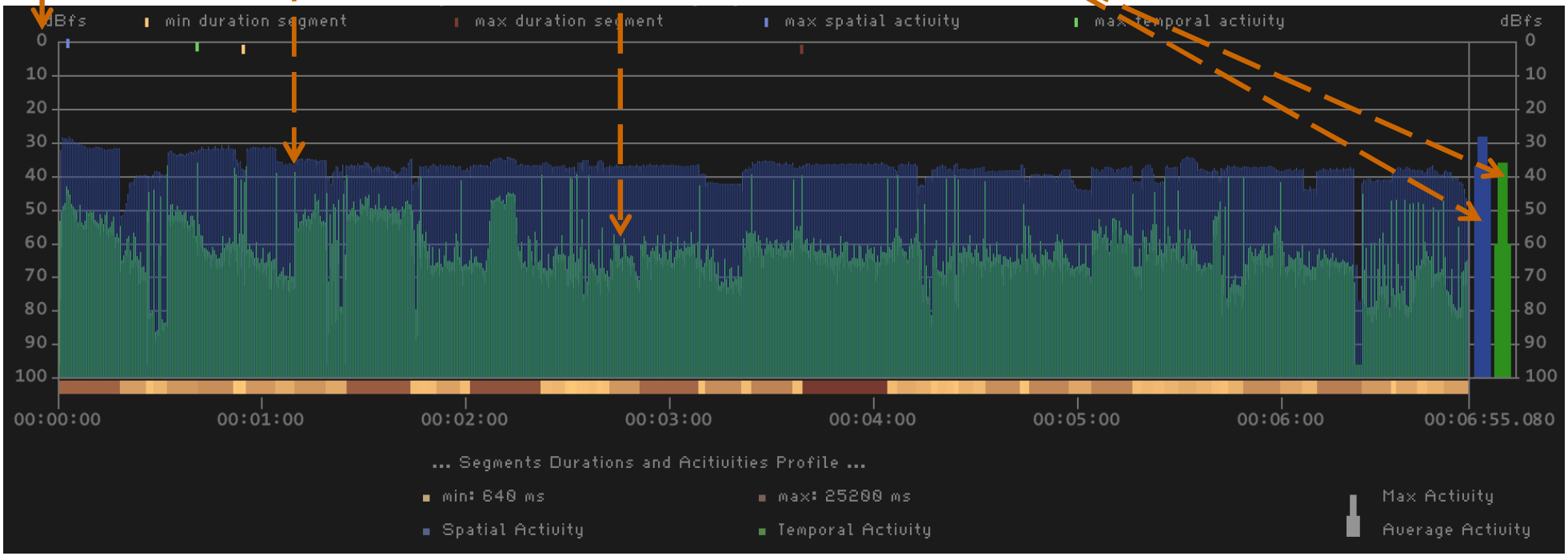
VQTSF – VQPT Transcoding Segments Finder, Plot Example

File duration: 6min 55s. ***74 segments found***, segment durations from 0.64s to 25.2s**.**

*Measured **Activity** profiles are of **medium** strength, so we can get relatively **good quality** at relatively **low bitrates**.*

Activity, % **Intra-frame Activity** (Static Details) **Inter-frame Activity** (Dynamic Details) **Activities Statistics Bargraphs**



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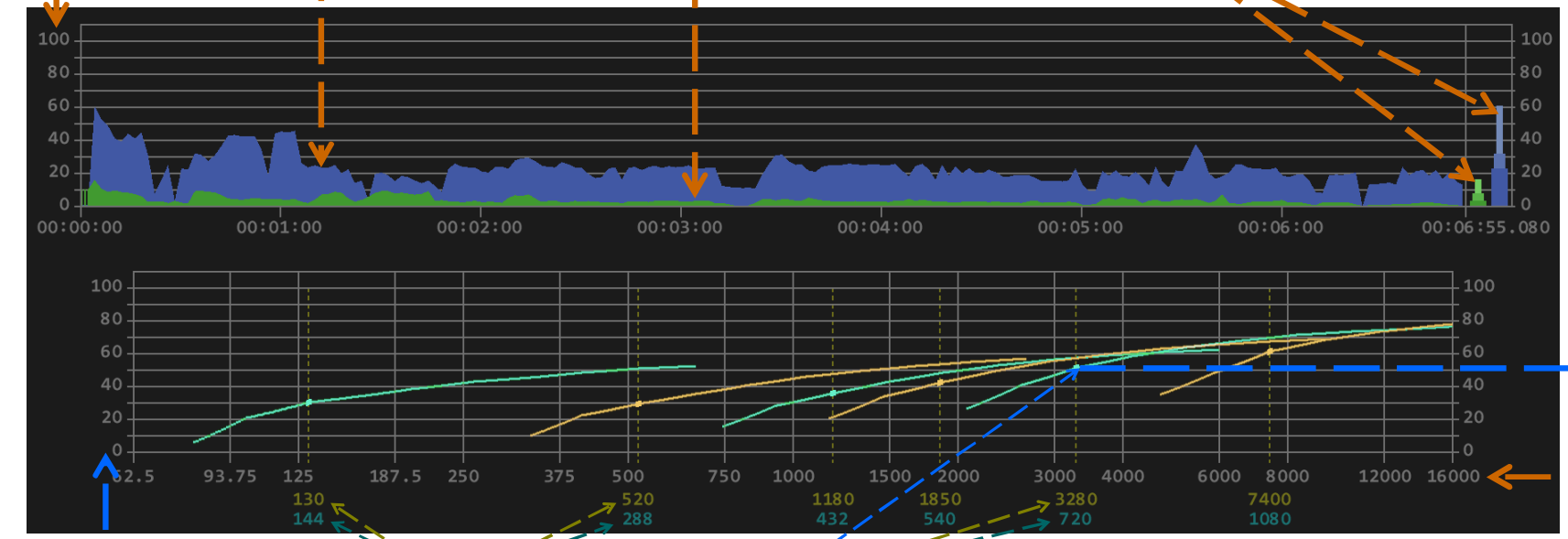
VQBLA – VQPT Bitrate Ladder Analyzer, Plot Example



Encoding with bitrates lower than critical results in compression artifacts, usually described as "Noticeable and annoying", bitrates above critical – as "Noticeable, but not annoying"

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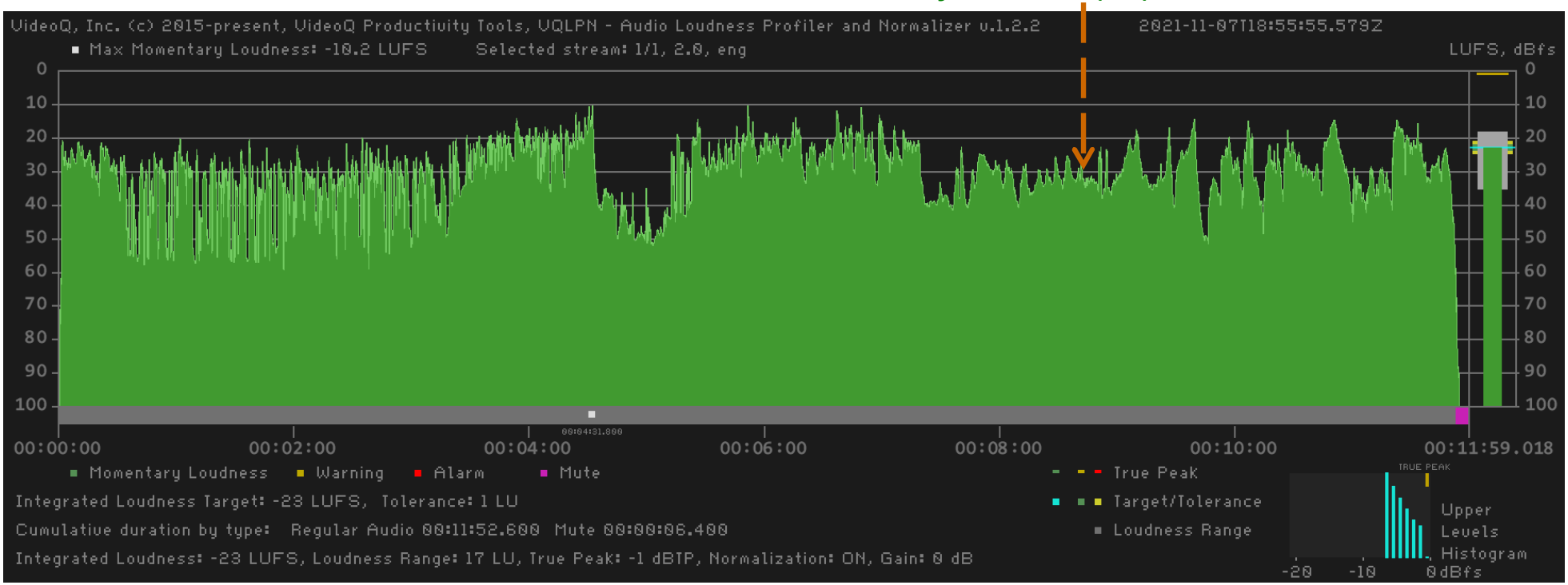
VQLPN – VQPT Loudness Profiler & Normalizer, Plot Example

Professional clip with 6 seconds long Mute Fragment at the end

Normalized audio stream *– Measured* ***Integrated Loudness*** *is exactly equal to* ***-23 LUFS*** *target value*

True Peak *value is* ***quite high,*** *but* ***Upper Levels Histogram*** *shows* ***no significant audio distortions****.*

Momentary Loudness (ML) Timeline Profile



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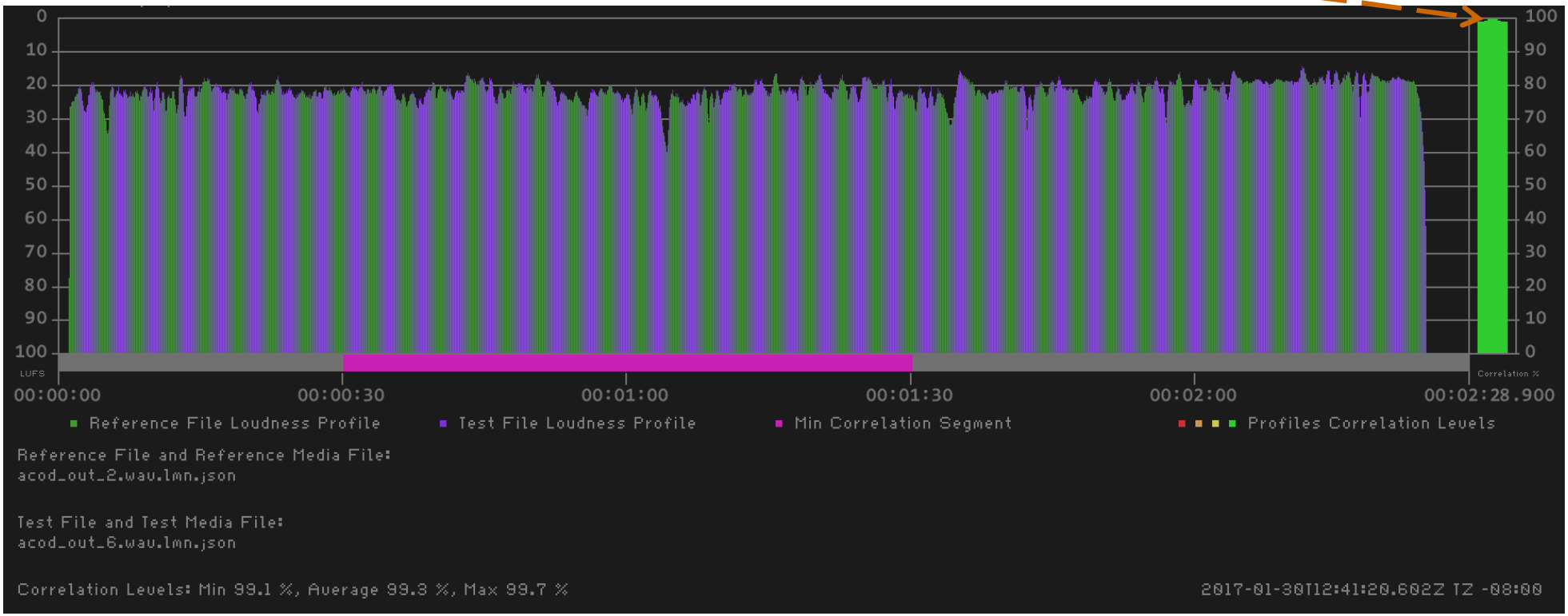
VQLPC – VQPT Loudness Profiles Correlator, Plot Example 1

Two inputs are two different versions (2.0 and 5.1) of the **same audio track**:
correlation is very high – about 100%



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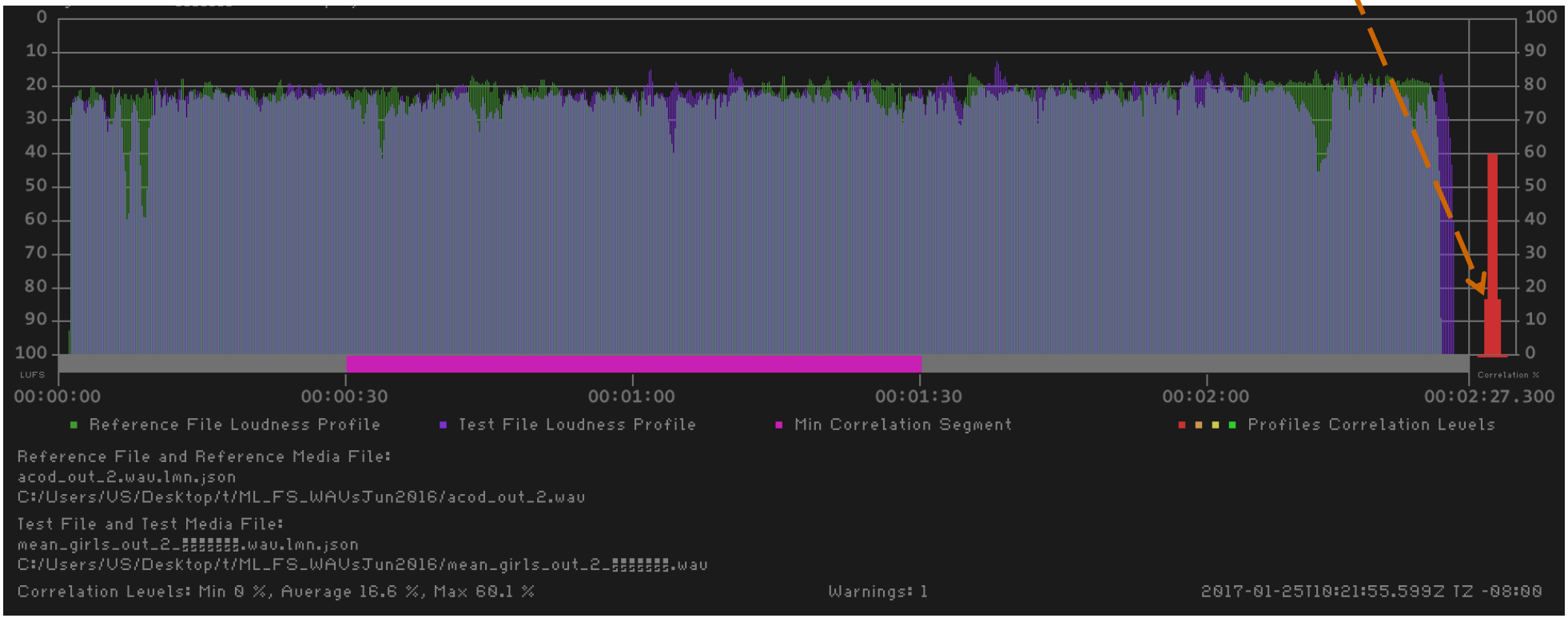
VQLPC – VQPT Loudness Profiles Correlator, Plot Example 2

Two inputs are in fact **two different audio tracks**

Loudness profiles and durations may look similar, but actual **average correlation value is very low**



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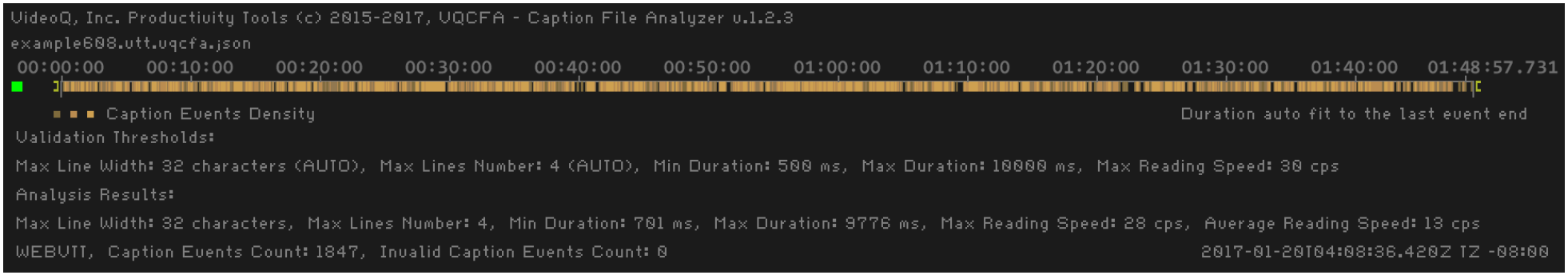
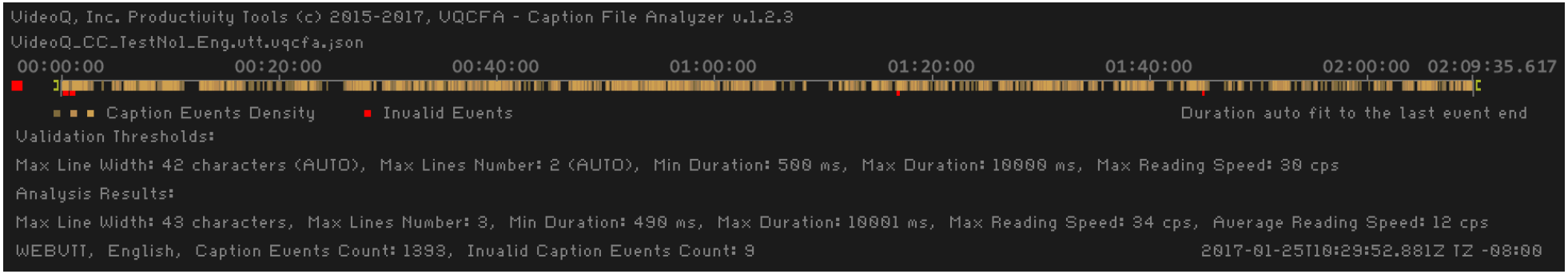
VQCFA – VQPT Captions Files Analyzer, Plot Examples

Normal Caption Events – **No problems found**



Multiple Caption Events are **Out of Specs:**
Reading Speed, Min Duration, Max Duration,
Overlapping Events, Max Lines Number, Max Chars Per Line



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