QMS Video Validation Tool

USER MANUAL

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Edition

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1. ABOUT THIS MANUAL

Purpose

This guide is the User Manual of QMS Video Validation Tool (QMS VVT), a software tool for use in a PC with Windows®, Linux, and other operating systems where Python can be used.

The purpose of this guide is to

- Provide instructions for the user on how to install the software.
- Provide instructions for the user on how to use the tool.

Product and Driver Version

This manual explains features found in QMS VVT **1. 0.** Please consult Unigraf for differences or upgrades of previous versions.

Notes

On certain sections of the manual, when important information or notification is given, text is formatted as follows. Please read these notes carefully.

Note	This text is an important note

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2. BACKGROUND

HDMI GCTS QMS-VRR transition and tolerance tests HF2-73, HFR2-73, HF2-77, and HFR2-77 require validation of the video displayed by the Sink DUT.

To validate that video is not corrupted when QMS transition happen, a high-speed video should be recorded and verified that video is stable, and no video frames are dropped. Manual validation by frame-by-frame scrolling through video is tiresome. The purpose of this tool is to automate validation.

The tool was designed to analyse patterns generated by Unigraf test equipment UCD-323 or UCD-422. See Unigraf MOI documents for more details.

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3. SOFTWARE INSTALLATION

Prerequisites

1. Install Python 3.9 or later
2. Install OpenCV package:
   - ➢ pip install opencv-python
3. Install matplotlib:
   - ➢ pip install matplotlib

Installation Package

This QMS VVT software zip archive can be obtained from Unigraf download page at https://www.unigraf.fi/moi/

The archive contains the following items:

- main.py – the tool itself, it's a Python script
- Sample videos in the *samples* directory
- QMSVideoCheck.pdf – this User Manual.

Software Installation

Download the QMSVVT.zip and uncompress it.

4. VIDEO RECORDING

High Speed Camera

A camera capable of video recording 240fps is required. Consumer cameras like SONY DSC-RX100 Mark V and similar should be considered as an alternative to mobile phones. Even though there are mobile phones capable of 240fps video recording, noise level is not always acceptable.

Dark environment

Recording should be done in a dark environment to avoid visible reflections on the screen.

Camera shake

Camera shaking is not acceptable. A camera should be mounted on a tripod.

Camera position

A camera should be placed perpendicularly to the DUT screen.

A camera should be targeted at the center of the screen.

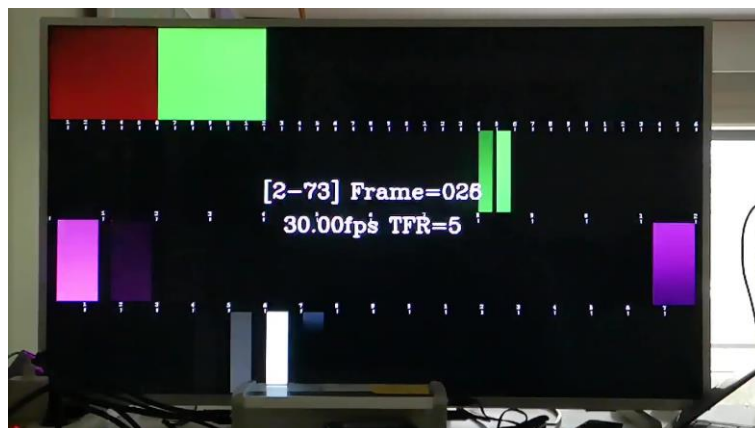The entire screen should fit in the recorded video.

Examples

Figure 1 An example of acceptable video recording.

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Figure 2 An example of not acceptable recording: there are reflections on the screen, and the camera is not placed perpendicularly to the screen. Also, the image is noisy.

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5. RUNNING THE TOOL

Execute the command

> python main.py <video_file_name>

The recorded video should be provided in common formats – mp4, mov, avi.

If the command line argument is not provided, the tool analyses a sample video provided with the tool.

After loading the video, the following dialog with a combined image of multiple overlapping frames is shown. Using a mouse, please select the entire screen of the TV under test (note the blue rectangle selection) and press ENTER when done.
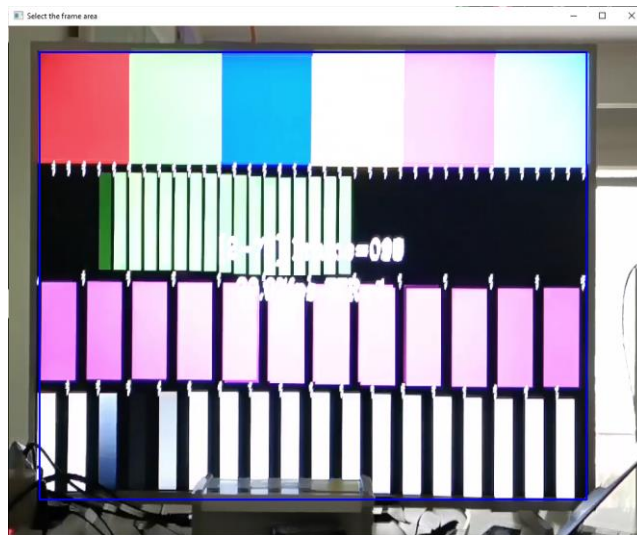

Figure 3 Frame area selection.

Then the analysis begins, and the following window is shown. The software analyses the 1st (i.e. the upper) and the 3rd rows of rectangles on the test pattern.
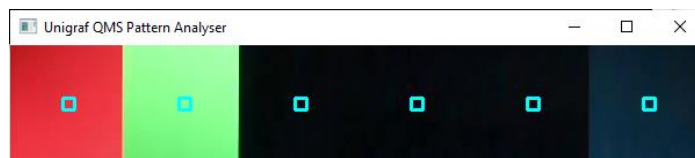

Figure 4 Analysis in progress.
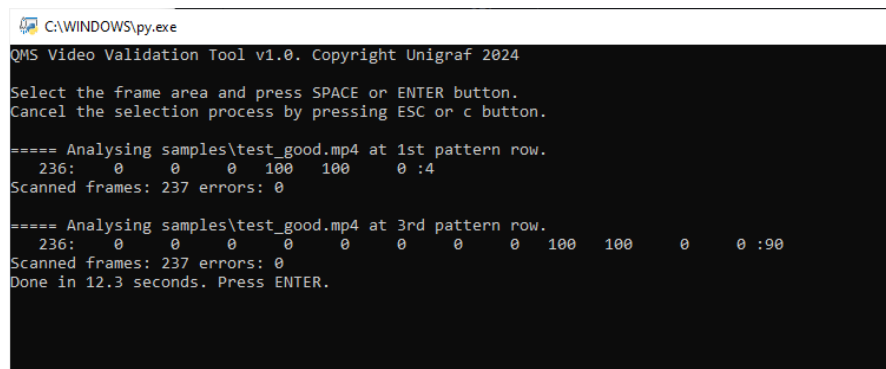
When completed, the result is printed in the console:

Figure 5 Successful test.

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6. UNDERSTANDING FAILURES

For each frame where an error is detected, six files are written to the *failed* directory. They are:

- The failed frame e.g. **fail.jpg*
- A previous frame **previous.jpg*
- The region of interest (ROI) of the failed frame *1st*fail.jpg*
- The ROI of the previous frame *1st*previous.jpg*
- A threshold mask of the failed frame *1st*thresh.jpg*
- A threshold mask of the previous frame *1st*thresh0.jpg*

There may be cases of false error detection due to imperfections in video recording. It is recommended to review the failed frames and compare them with previous ones. Below is an example of such a false error detection. The failed frame is correct – it shows that the next square appears in the expected position, next to the previous.

	Previous	Failed
ROI		
Threshold mask		

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7. LOGGING

The script writes a log in the current directory in the *analyzer.log* file.

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VERSION HISTORY

Rev.	Date	Author	Description
1	27.06.2024	VKh	- Initial version of manual.
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