VQV

VideoQ Viewer

Media Files Viewer-Analyzer

Training Presentation

Appendix A – For Advanced Users

December 2024

www.videoq.com/vqv.html

www.videoq.com

Table Of Content

*Click on **VQV Logo** in the upper-right corner of any slide for this global **Table Of Content***

Learn more about VQV*:* http://www.videoq.com/vqv.html

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A1. Tools Control Details and Examples

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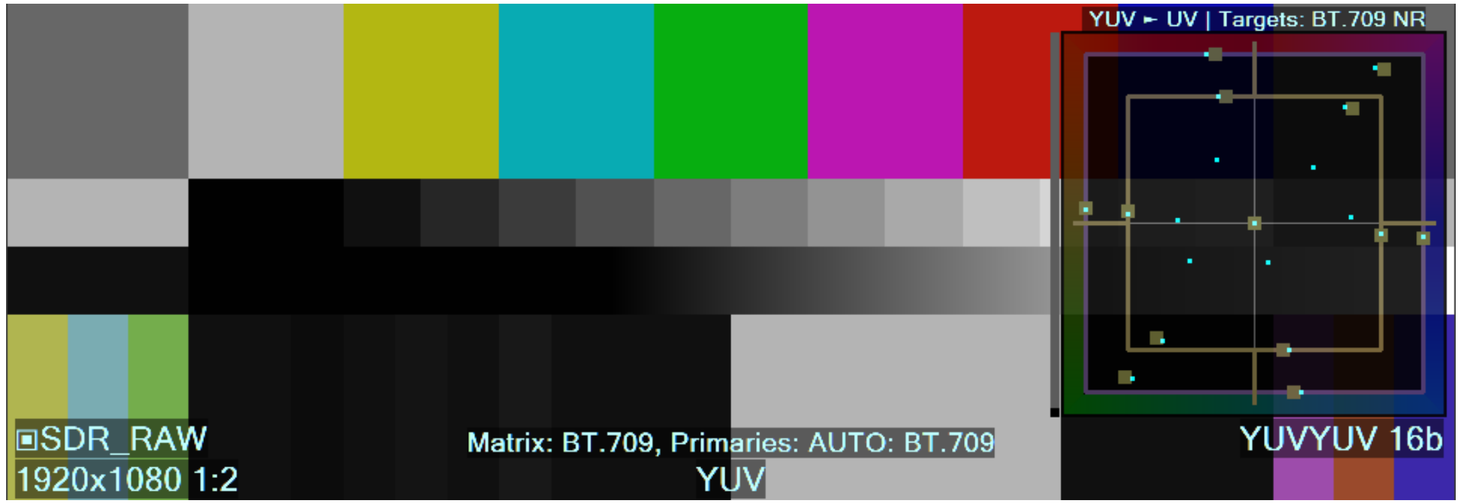
A1.1 VectorScope – Checking Color Matrix

Press **Ctrl + V**
to toggle On/Off
VectorScope Overlay

HD file metadata correctly designate Color Matrix as BT.2020 (*probably, down-converted from UHD source*)

HD file metadata are wrong; Color Matrix incorrectly reported as BT.709 (*default for HD frame size*)



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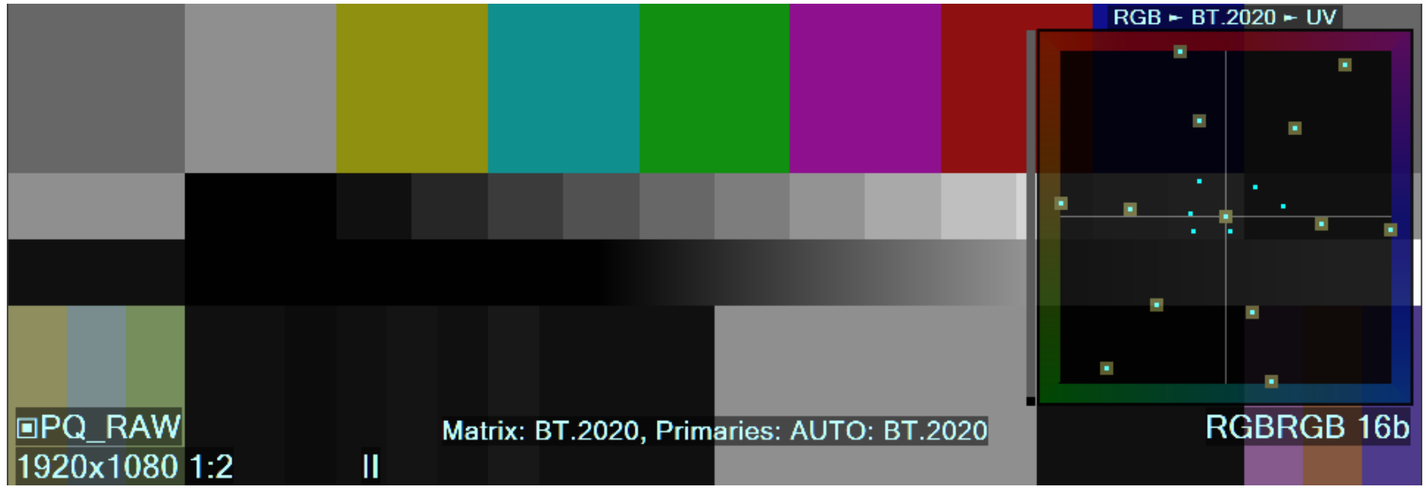
A1.2 VectorScope – Checking RGB vs. Metadata

Press **Ctrl + V**
to toggle On/Off
VectorScope Overlay

Media file metadata correctly designate HDR-PQ RGB Narrow Range format.
Both 100% Bars and 58% Bars hit the centers of target boxes.



Media file metadata correctly designate HDR-PQ RGB Full Range format.
Both 100% Bars and 58% Bars hit the centers of target boxes.

VQCB HDR-PQ Test
NR & FR RGB versions

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A1.3 ChromaScope Presentation Modes

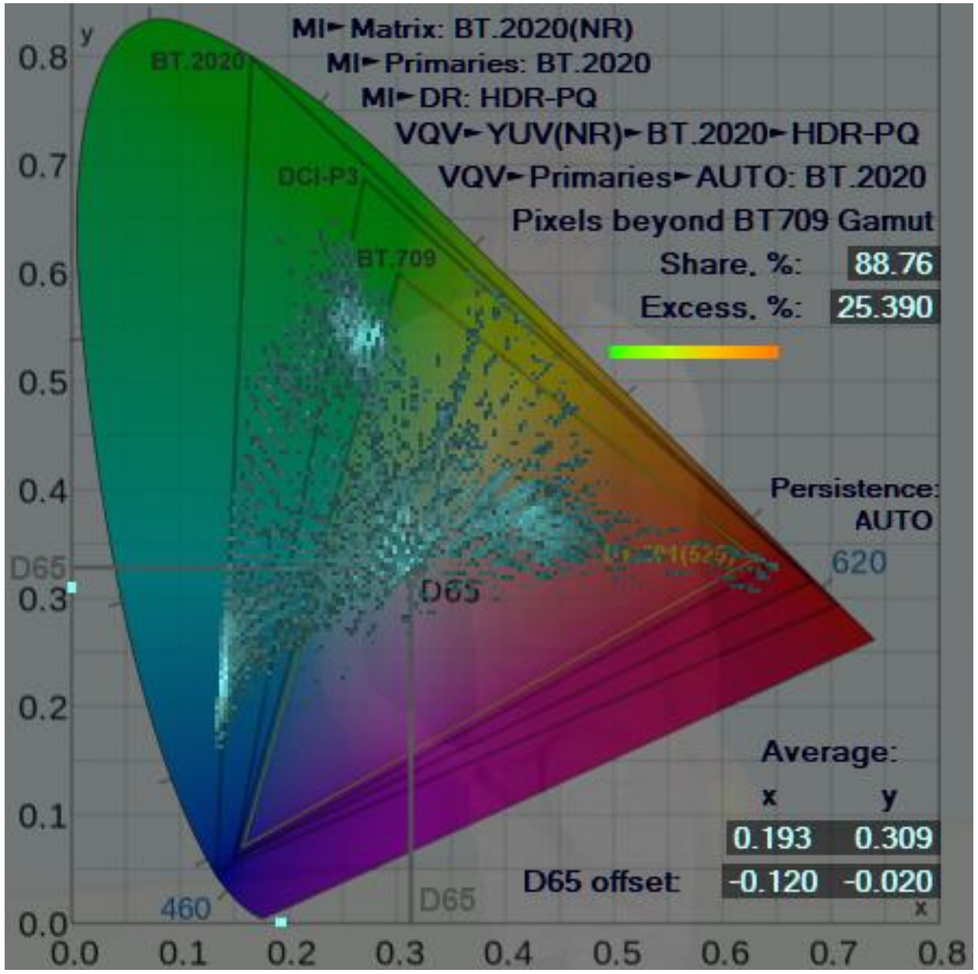
ChromaScope Presentation Mode 1 (*default)*
shows media file metadata, the status of VQV color processing/analysis controls and the most important **Content Statistics** analysis results.

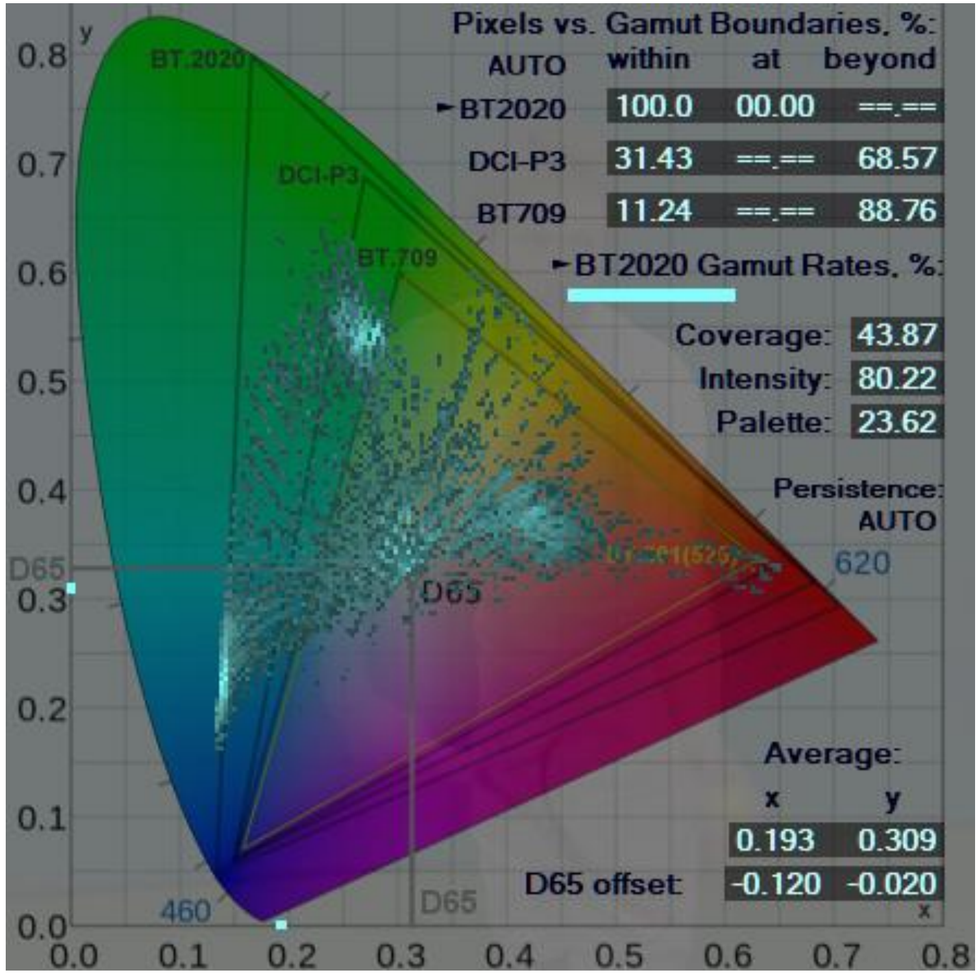
Press **M**

to toggle between

the **ChromaScope Presentation Modes**

ChromaScope Presentation Mode 2
shows **Content Statistics Table** and **Gamut Rates** of the analyzed content as well as cyan-colored **Gamut Coverage Bar**.





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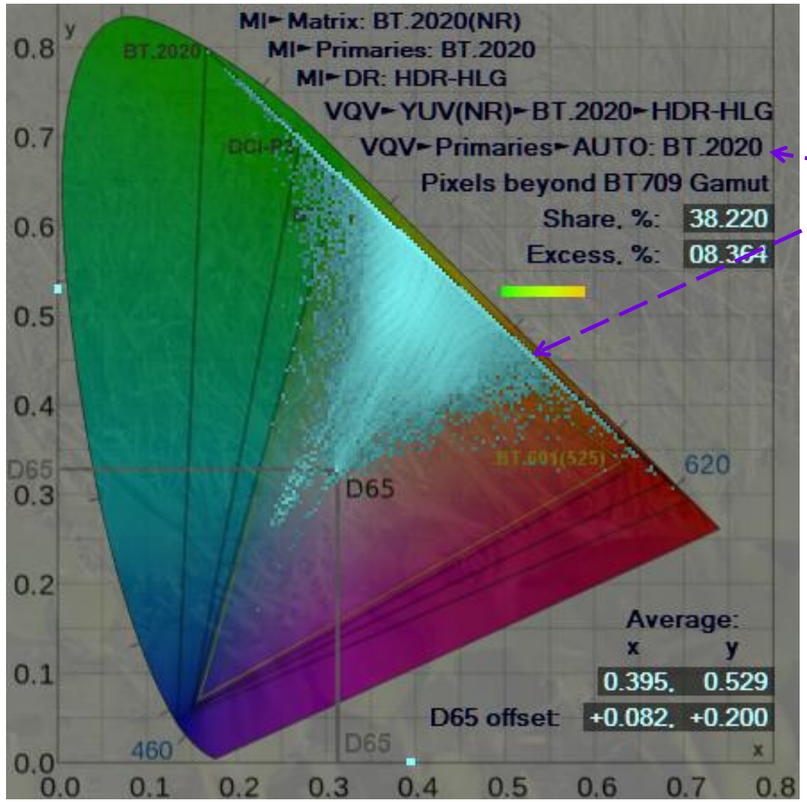
A1.4 Selecting ChromaScope Primaries

By default ChromaScope uses **AUTO** color space selection, typically defined by media file metadata. In this example **BT.2020** Primaries are used.



Press **Shift + P**

to cycle thru

the **ChromaScope Primaries**

from auto-configurable list

Use **Color Space>Select Primaries** menu for manual selection:

- **BT.2020**
- **DCI-P3**
- **BT.709 / BT.601 (625)**
- **BT.601 (525**)

Switching **Primaries** provides for quick visual estimation of chromaticities distributions within **Gamut Triangles**.

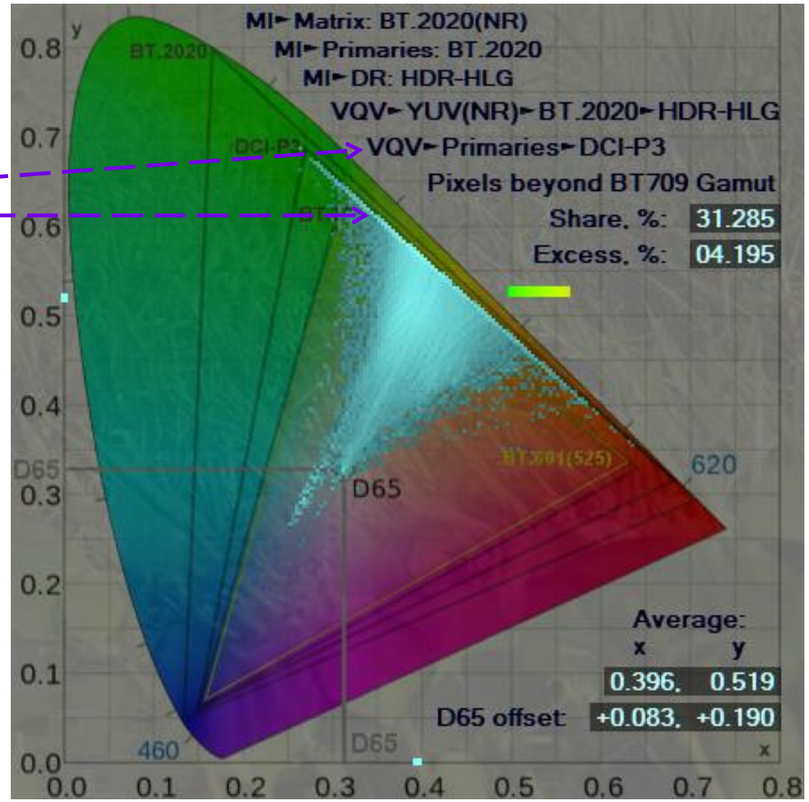
Double Click on ChromaScope pop-up window to cycle thru the most used **Primaries** (BT.2020/DCI-P3/BT.709) and two ChromaScope **Presentation Modes**.

Press **A**

to **AUTO** select

the **ChromaScope Primaries**

In this example ChromaScope use **DCI-P3** color primaries (medium size triangle) selected **by the user** instead of AUTO selected (default) BT.2020 color primaries



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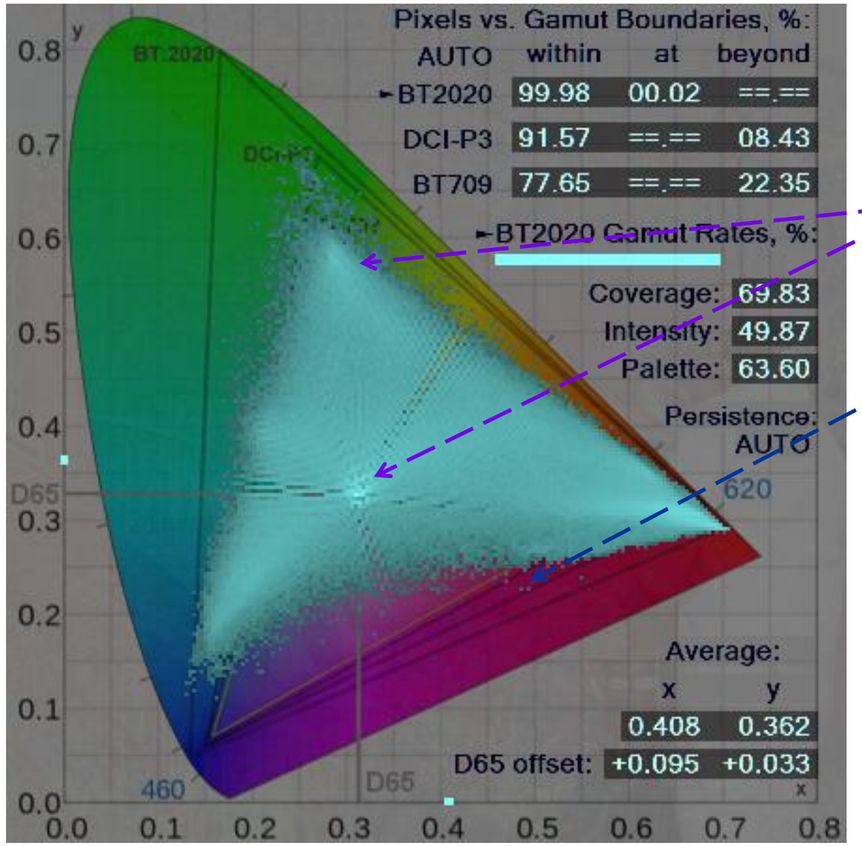
A1.5 ChromaScope Display Persistence Modes

In the default **AUTO Persistence Mode**
the Cyan overlay color intensity is proportional to the logarithm of the probability (events frequency).
Total range is 100 dB (5 decimal orders).

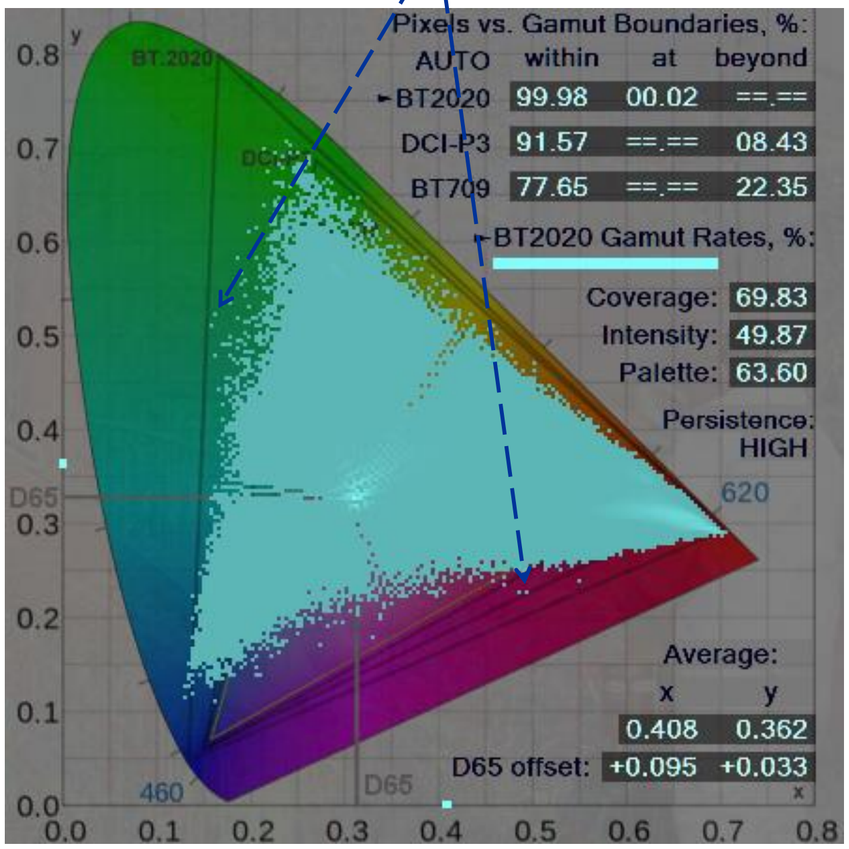
Press **P**
to change
the **ChromaScope Persistence**

In **High Persistence Mode**
the overlay minimum brightness is lifted up; even very low probability events are clearly visible.



High probability events look brighter, thus allowing to see 2D distribution profile,

but extremely low probability events could be difficult to see.



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A1.6 ChromaScope Plotting Modes

The traditional **CIE1931 xy** color space is still widely used.
For example, the display Primaries and D65 White Point are typically specified as x & y values.
By default VQV ChromaScope starts in this mode.

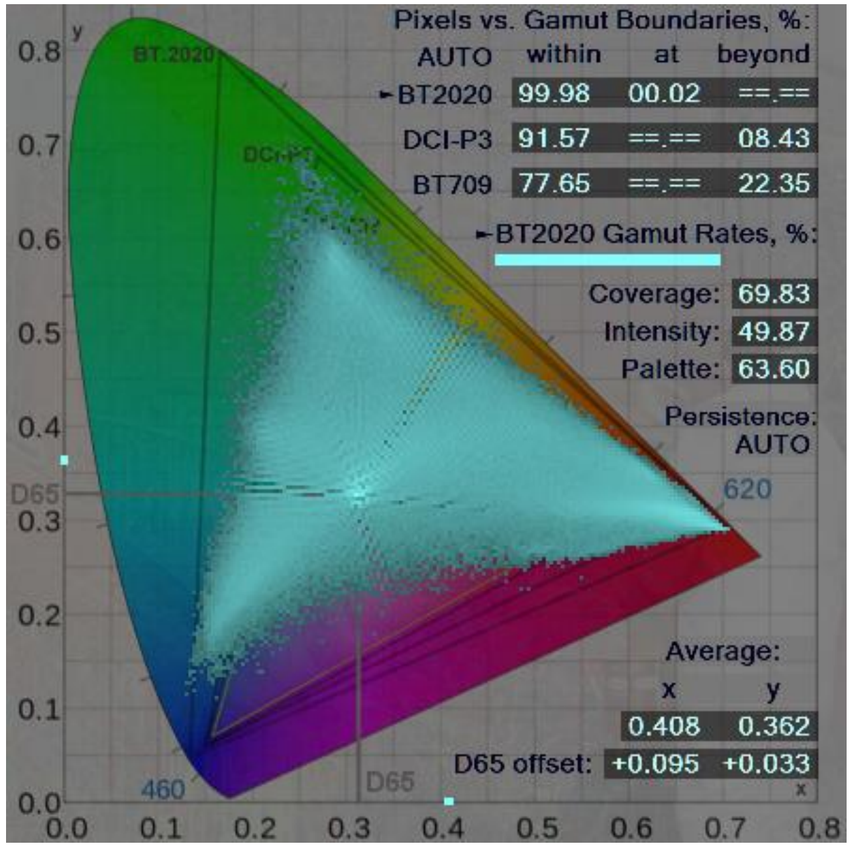
Press **U**

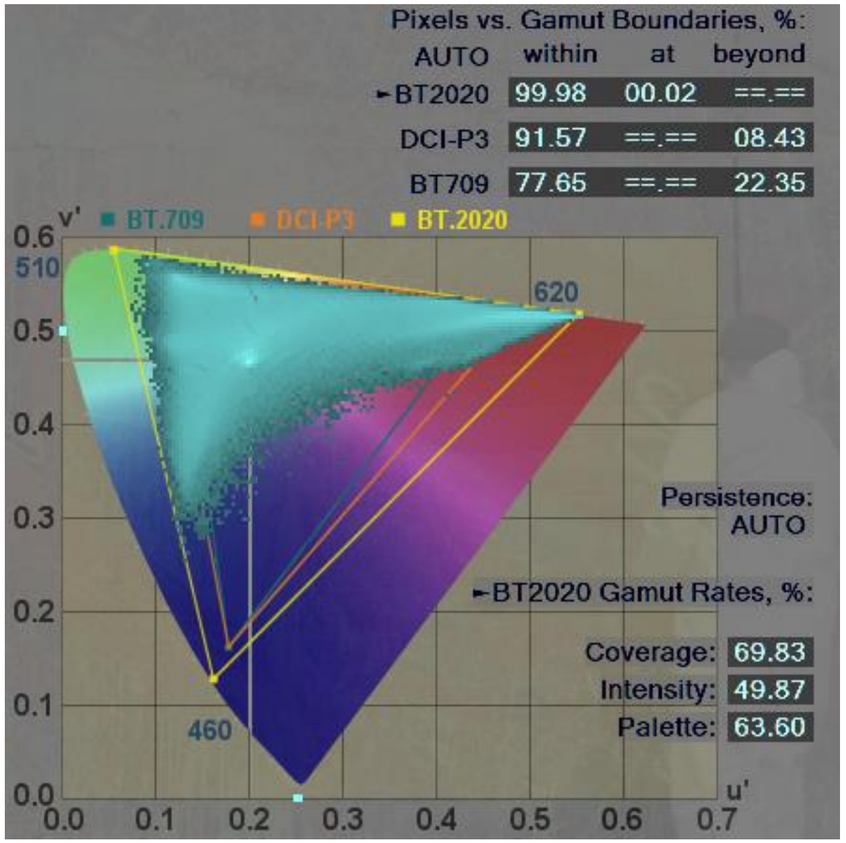
to change

the **ChromaScope Plotting Mode:**

CIE1931 xy / CIE1976 u'v'

The main advantage of **CIE1976 u'v'** color space, commonly known by its abbreviation CIELUV, is the uniform chromaticity scale (UCS).
The disadvantage is the reduced resolution in subjectively important tints of green area, due to the increased resolution within the less critical Blue-Magenta-Red area.





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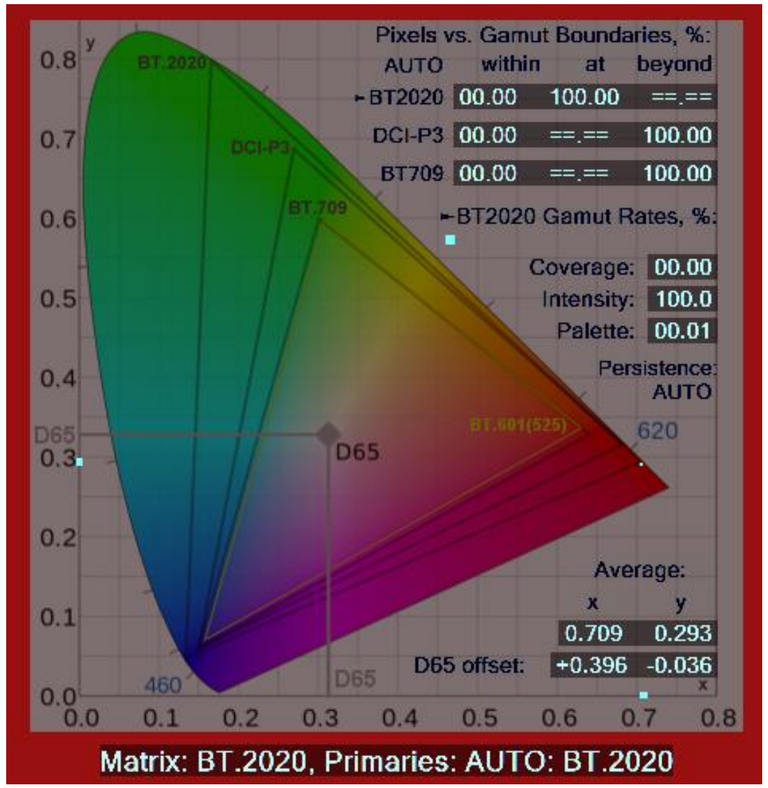
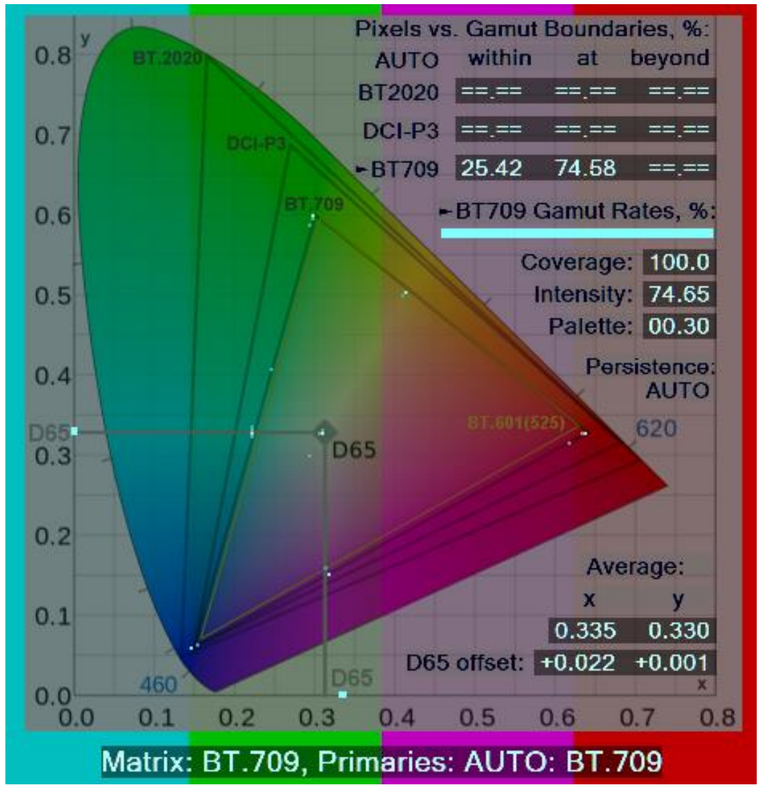
A1.7 ChromaScope Gamut Statistics Analyzer

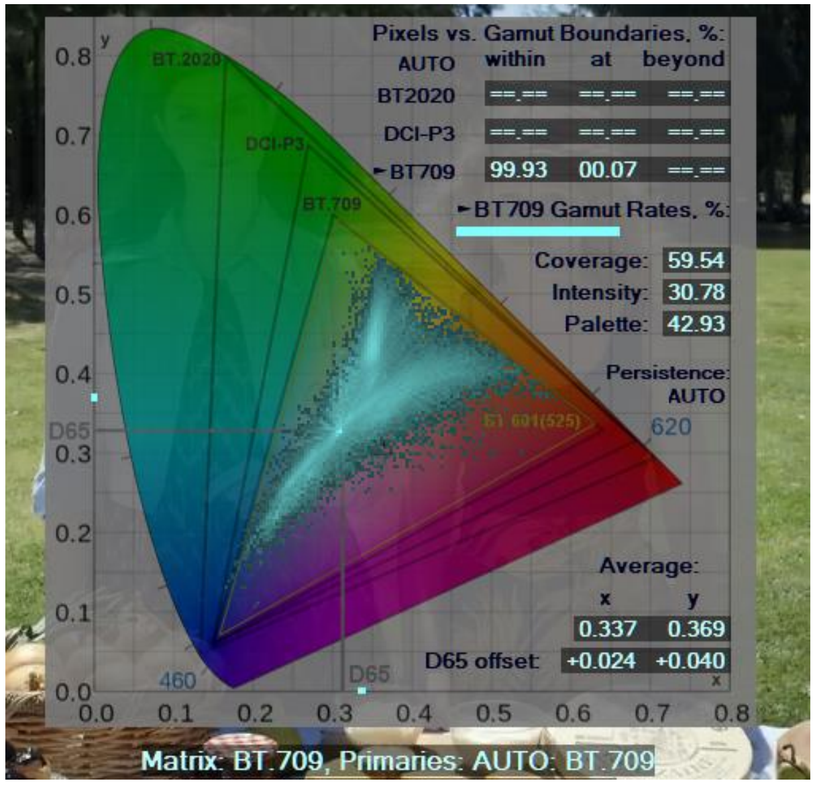
Example #1 – Solid Red UHD HDR-PQ Image.
Coverage Rate = 0% and Palette Rate is 0.01% because there is only one color present (Red).
Intensity Rate = 100% because this color is just Red, i.e. its Green and Blue components = 0.
Note 0% of pixels ***within*** the Gamut Boundaries, there are no other colors except Red,
i.e. 100% of pixels are ***at*** the Boundary.



Example #2 – Color Bars HD SDR Image.
Coverage Rate = 100%, i.e. the **Content Gamut** extent is equal to the **Primaries Gamut** extent.
Intensity Rate = 75% because only 6 of 8 Bars are colored (White & Black Bars Chromaticity = D65).
Thus, only 75% of pixels (6 of 8 Bars) are ***at*** the selected **Primaries Gamut Boundaries**; note the bright dot at the D65 Reference White point.



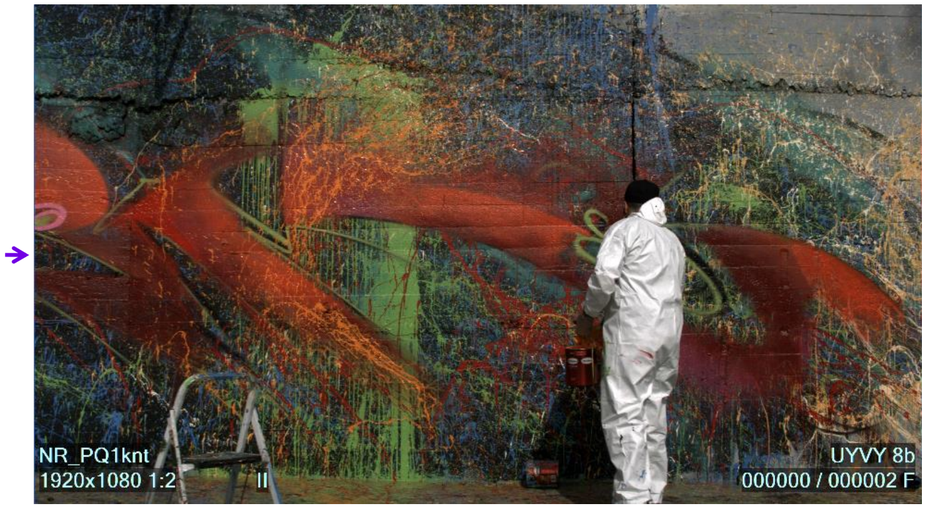
Example #3 – Typical HD SDR Video Image.
Coverage Rate is about 60% because the extent of the **Content Gamut** is noticeably smaller than the selected **Primaries Gamut**.
Intensity Rate is about 30% because the dominant colors (brighter cyan areas) are of low and medium saturation.
Palette Rate 43% indicates the relative value of measured **Content Gamut Area**.



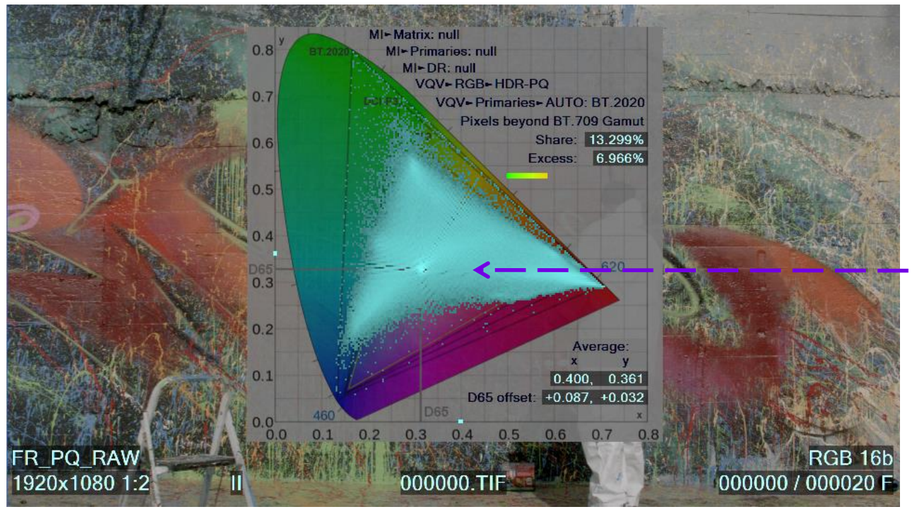
A1.8 ChromaScope HDR Content Analysis Example

RGB 16 bit, TIF, HDR-PQ Original

RGB 16 bit ⇒ YUV 8 bit ⇒ RGB 8 bit

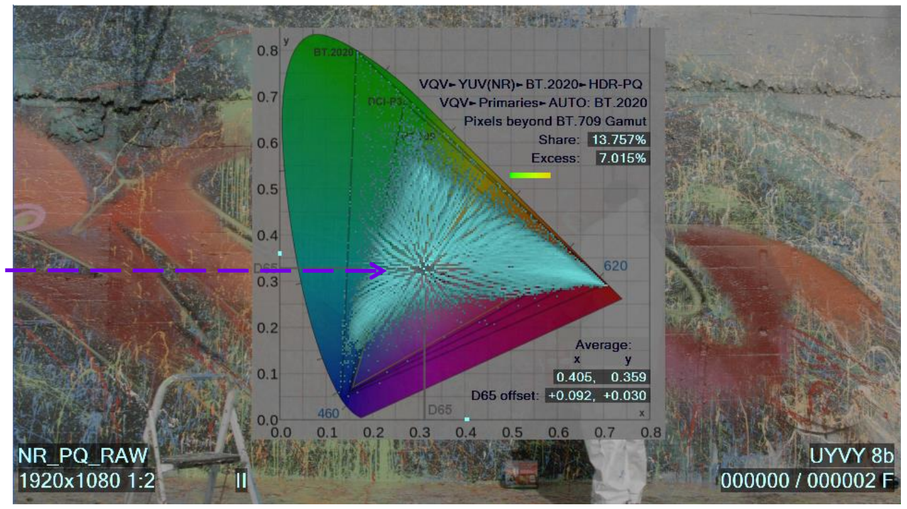


Original Image
and
Reconstructed Image
look very similar.



Magic bit!

VQV ChromaScope
reveals **coarse**
quantization artifacts:



Smooth Distribution
on the left
vs.
“Herringbone Pattern”
on the right

HDR sample video – courtesy of Sony

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A1.9 FrameScope Waveform Filtering Options

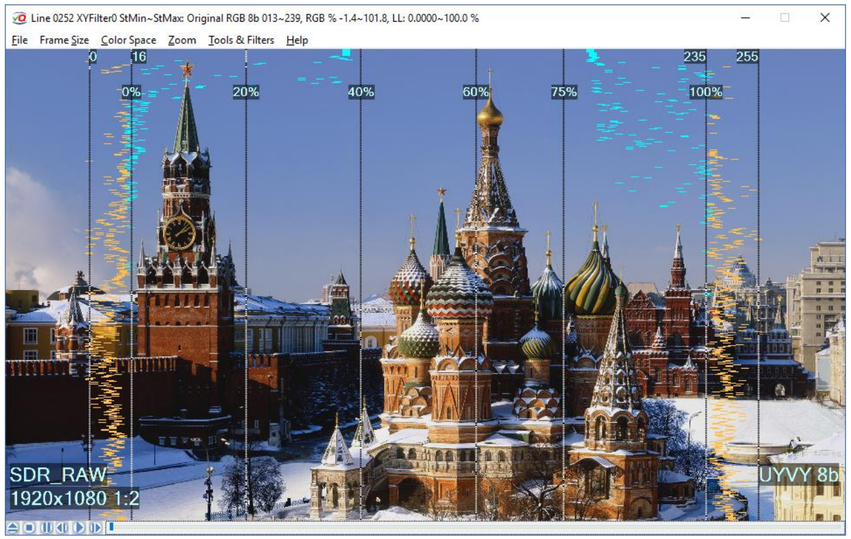
Press **F** key

to cycle through the

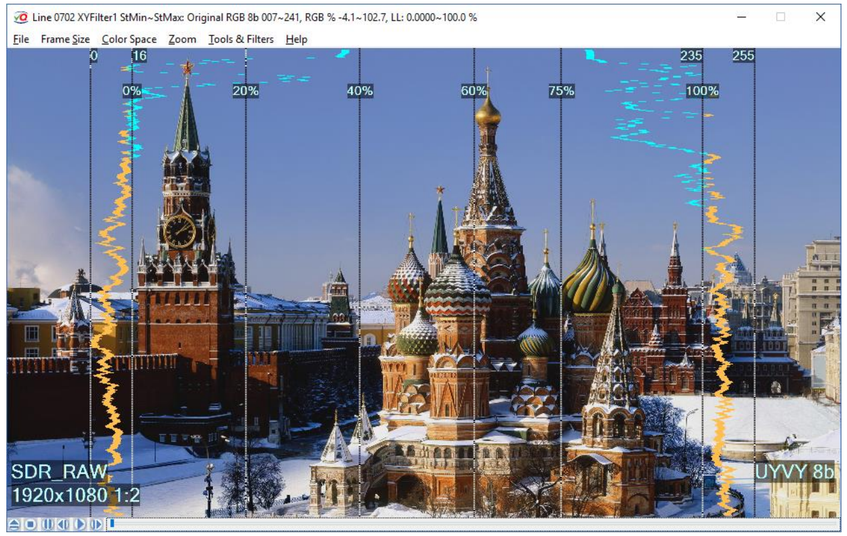
Frame Profile

Filtering Options

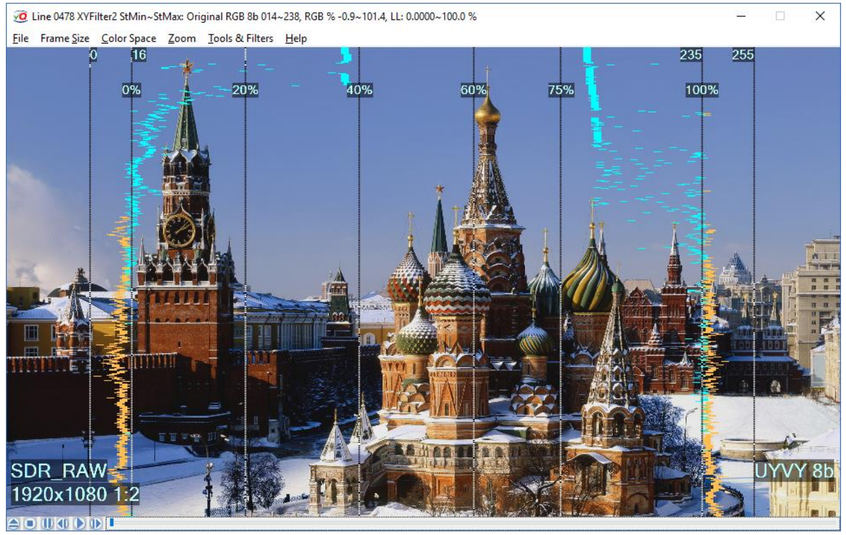
XYFilter0 – Filtering **Off**



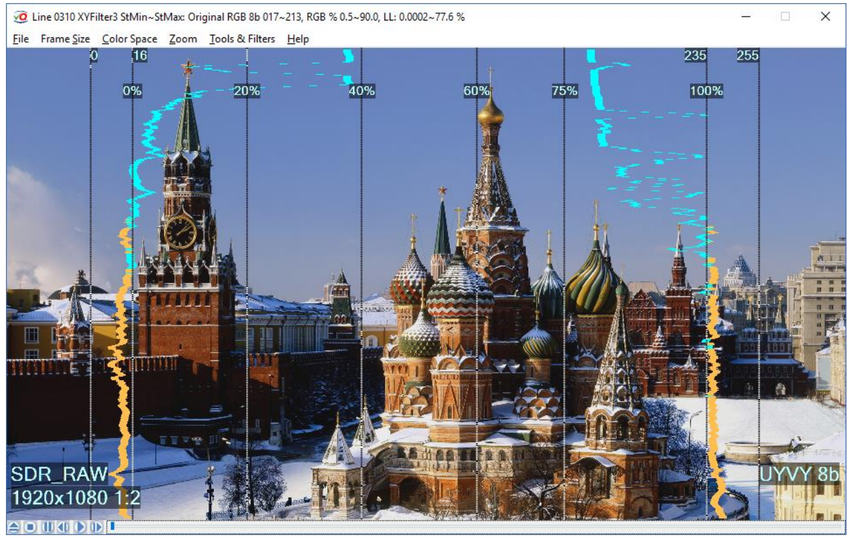
XYFilter1 – Vertical (Y) Filter, Running Sum of adjacent lines



XYFilter2 – Horizontal (X) Filter, Relevant Statistics Pixels



XYFilter3 – Both X & Y Filters On ***(default)***

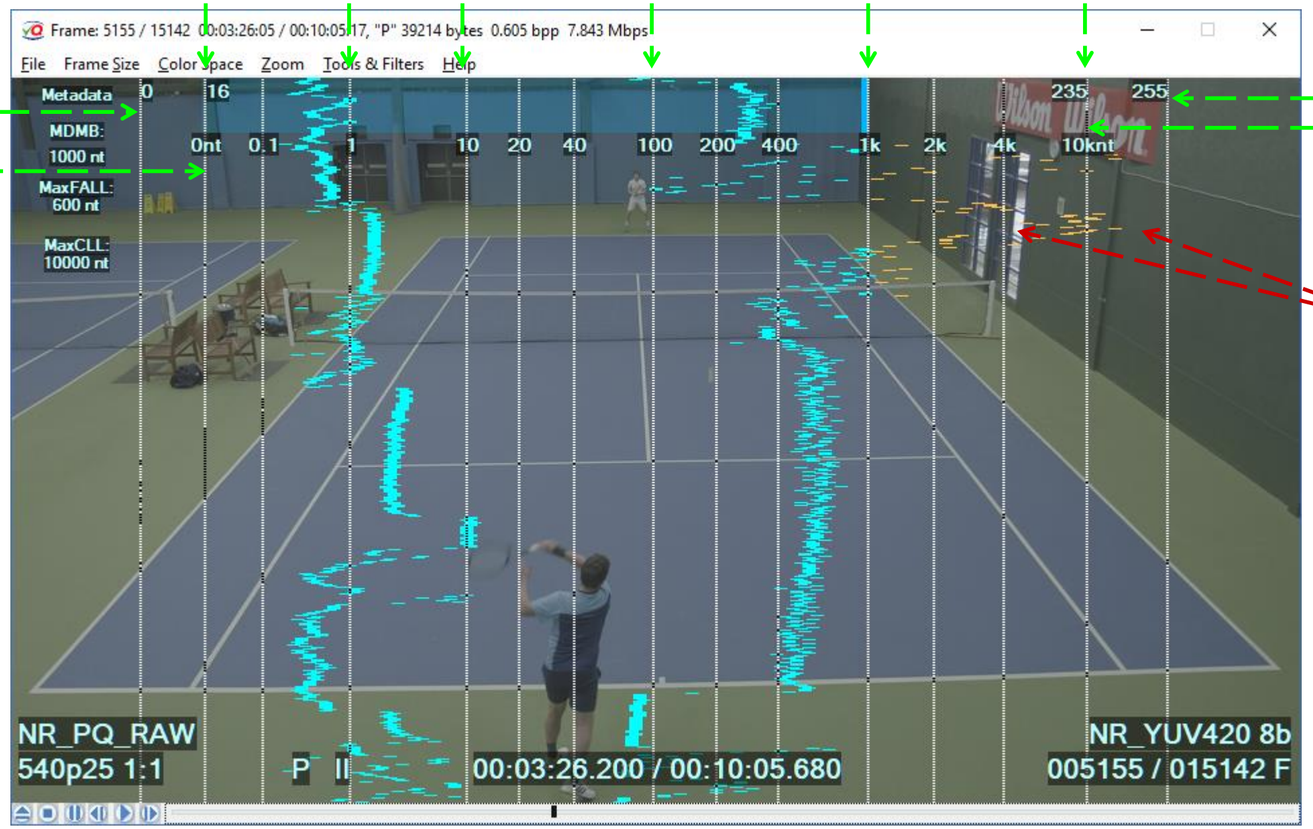


A1.10 FrameScope – HDR-PQ Light Levels Profile

Press **1**
to enable the
PQ-RAW Mode

Press **W**
to toggle On the
FrameScope™
(Frame Lines Profile)
Waveform Overlay

Light Levels Reference Markers (dotted lines) overlay



Data range min 8 bit limit = 0

Nominal Black = 16

Data range max 8 bit limit = 255

Narrow Range Limit = 235

More than 10,000 nit limit!
Very strong overexposure,
due to the bright object
(swimming pool glass door)

Checking HDR10 content. HDR10 metadata specify Narrow YUV Range and MDMB/TDMB = 1000 nit

Analysis conclusion: Though, this is a valid **HDR-PQ** clip, formatted into **Narrow Range YUV**, and on average **matching** the declared **1,000 nit TDMB** limit, but in this particular frame the lightest pixels are not only above **1,000 nit**, but above the **10,000 nit** limit of the **Narrow Range YUV format**.

HDR sample video – courtesy of newsbyte.co.uk

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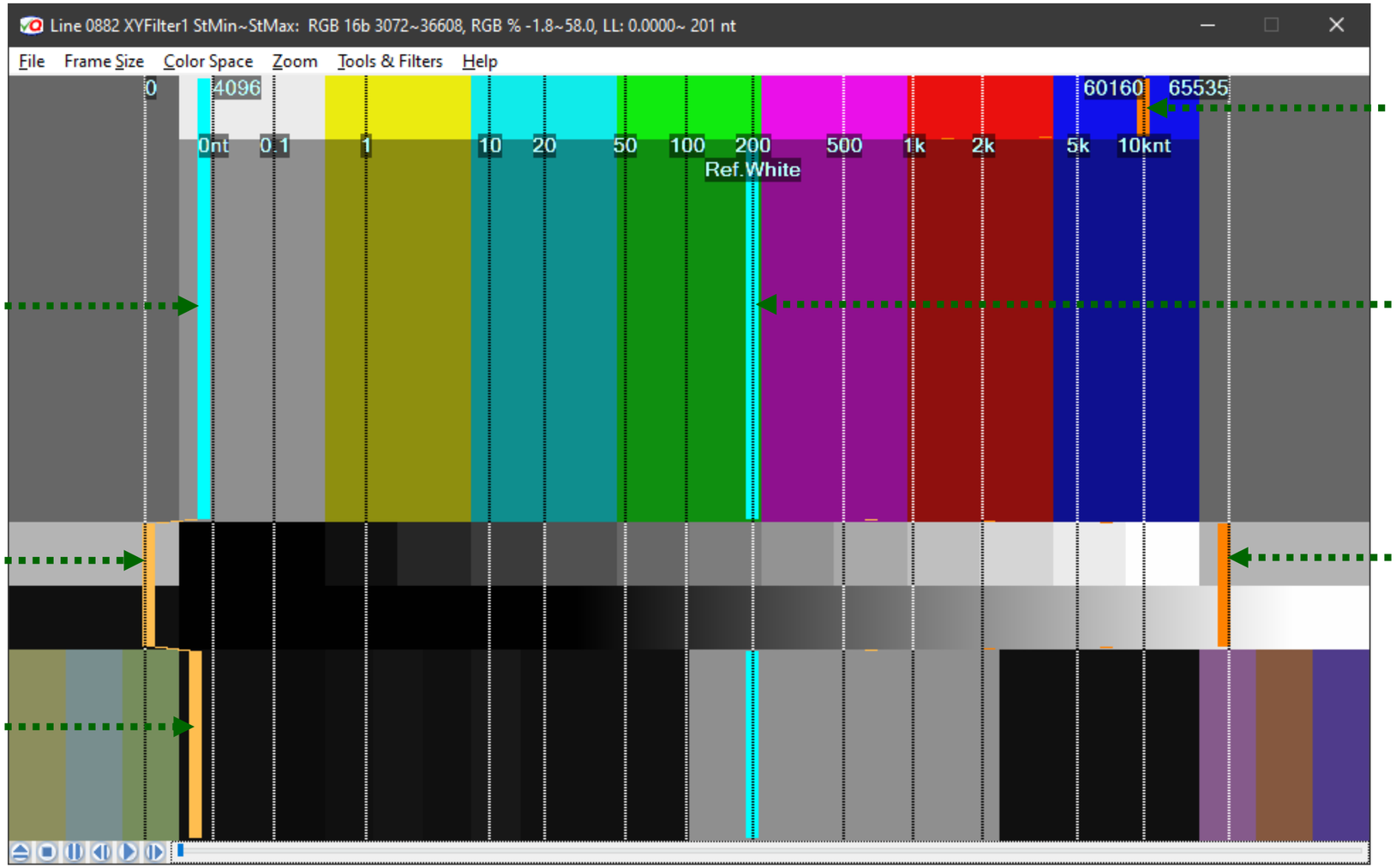
A1.11 FrameScope – Checking YUV Data Levels

YUV 16b data are correct: FrameScope shows correct NR HDR-PQ levels

Press **W**

to toggle On the **FrameScope™** (Frame Lines Profile) Waveform Overlay

HDR-PQ Mode: Graticule Units auto-switched to nits, top row shows actual 16b values



100% Bars
Max Level: 16b 60160
100% ⇔ LL 10,000nt
Peak White

100% Bars & 58% Bars
Min Level: 16b 4096
0% ⇔ LL 0nt

58% Bars
Max Level: 16b 36608
58% ⇔ LL 200nt
Reference White

Grayscale & Ramp
Min Level: 16b 252
-6.8% ⇔ LL 0nt

Grayscale & Ramp
Max Level: 16b 65024
109% ⇔ LL 10,000nt

PLUGE
Min Level: 16b 3072
-1.8% ⇔ LL 0nt

HDR sample video – courtesy of newsbyte.co.uk

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A1.12 Waveform Monitor – HDR-PQ Example

Press **Ctrl + W**
to toggle On the
Line Parade Waveform

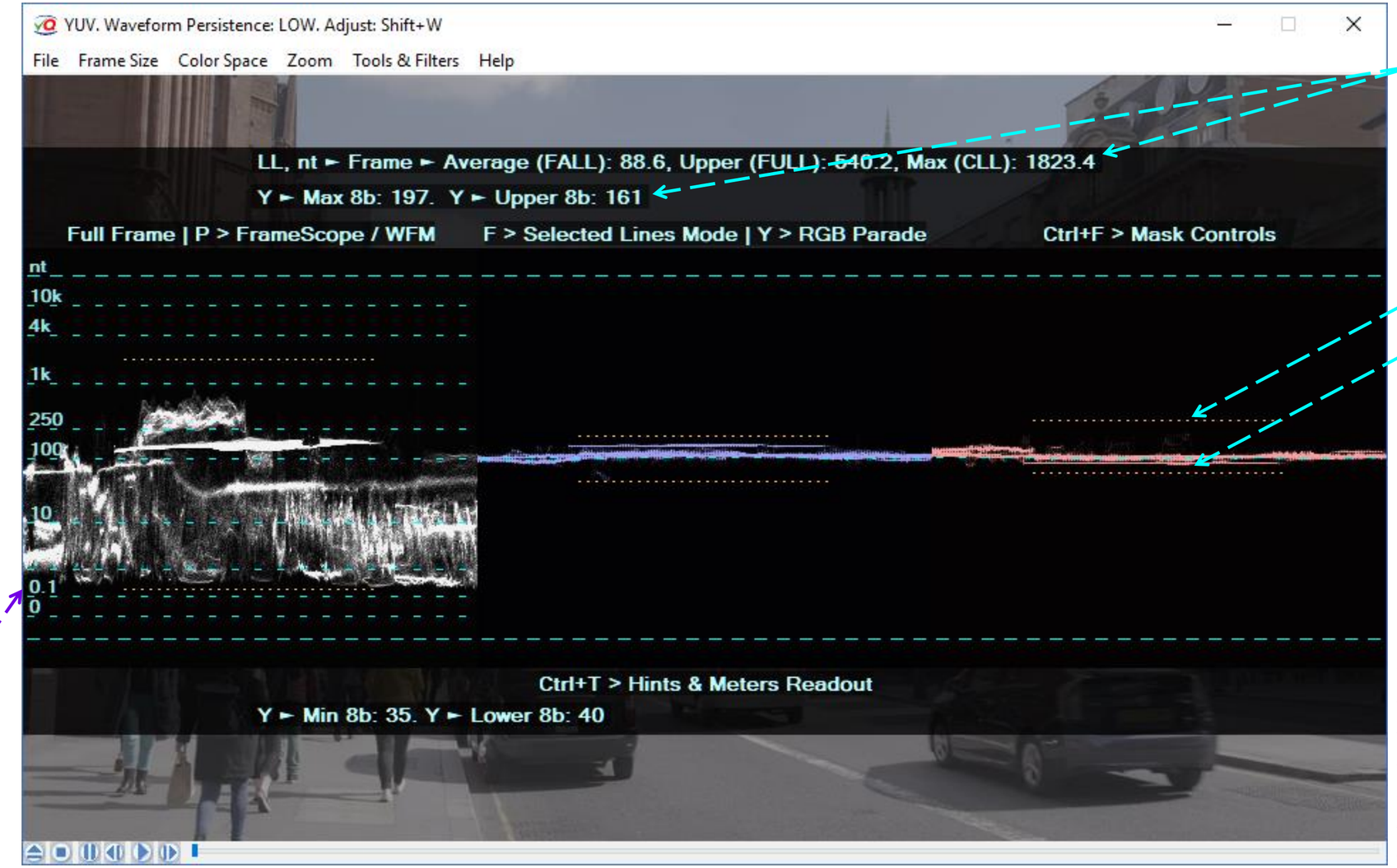
Press **1**
to enable
HDR-PQ RAW Mode

Press **Y**
to select **YUV**

Press **9**
to select
Narrow YUV Range

Press **Ctrl + T**
Cycle to
Full Info Text Mode

Y signal levels **Graticule** automatically switched to **PQ nits**



Measured LL and Y levels readout

Dotted line markers show measured signal range updated frame-by-frame

.

Seldom happening narrow signal peaks could be difficult to see even in high persistence mode.
Brown dotted line markers and numerical readouts reveal actual YUV/RGB/LL ranges

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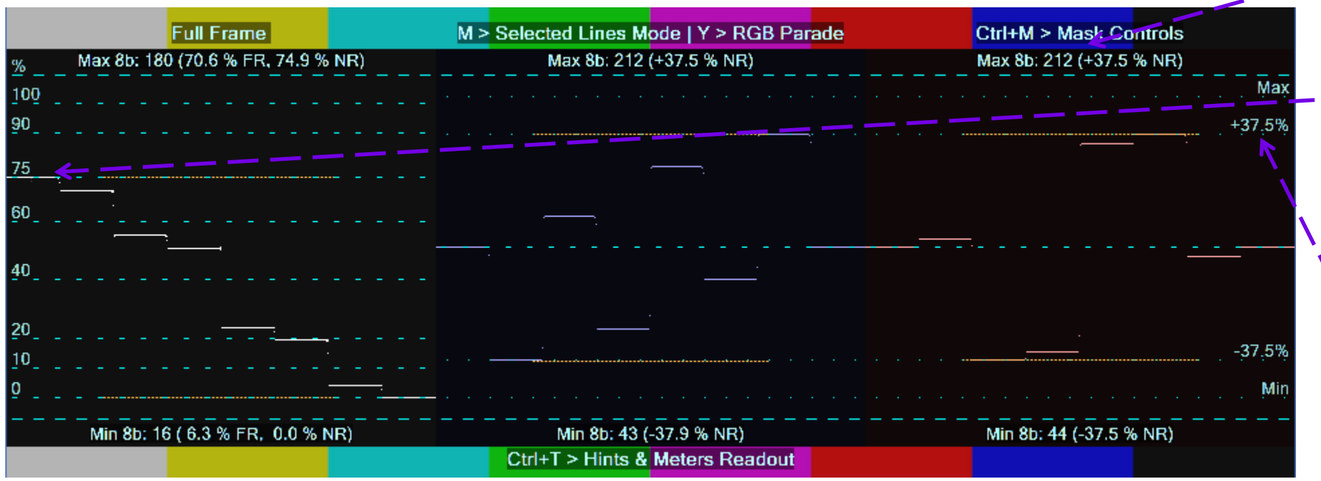
A1.13 Waveform Monitor Options

Press **Y**
In Line Parade Mode
to toggle
RGB / **YUV**

9 key
toggles
Full / **Narrow**
YUV Range Mode

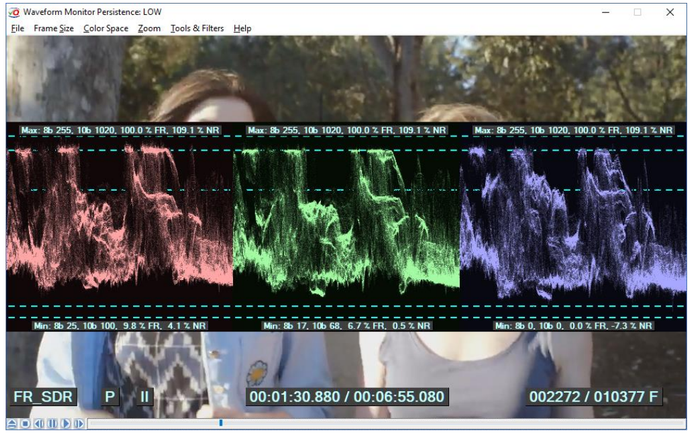
YUV Narrow Range Line Parade, 75% UHD Color Bars



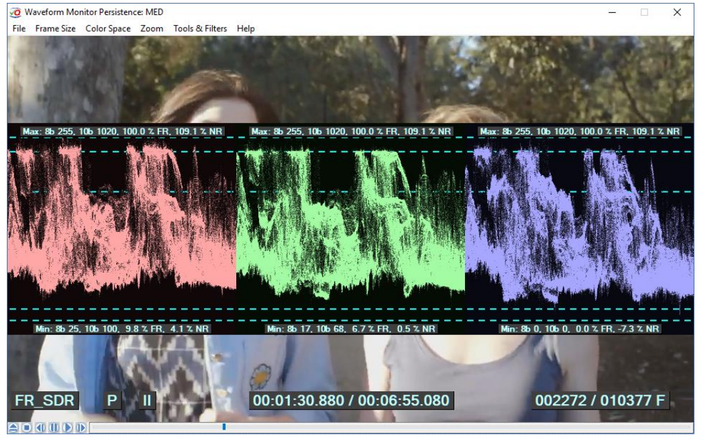
Waveform Monitor displays the **numerical readouts** of:
Min & Max values for **R**, **G**, **B**, **Y**, **U** and **V** channels in
8 bit digital values and **percents**.

Critical Reference Levels Markers (cyan dotted lines):
- **Full Range Limits: 8b 0** and **8b 255**,
- **Narrow Range Limits:**
  Y: 8b 16 (*10b 64, 0%)* and **8b 235** (*10b 940, 100%),*
  UV: 8b 16 (*10b 64, -50%)* and **8b 240** (*10b 960, +50%),*
- **75% Sub-range Limits** *(for HLG Reference White and Color Bars)*:
  Y: 8b 180 (*10b 720, 75%),*
  UV: 8b 44 (*10b 176, -37.5%) and* **8b 212** (*10b 848, +37.5%)*

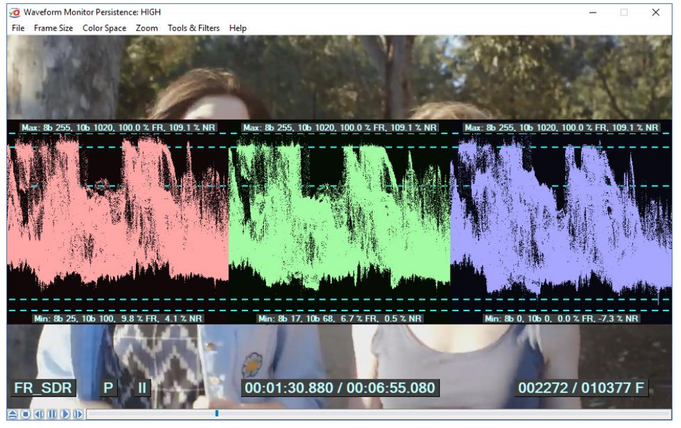
P
controls the
Persistence
strength:
from **Low** to **High**



Low Persistence (default mode) is useful
for the **general assessment**,
e.g. for the "white crush" check



Medium Persistence reveals pixel values of a
lower occurrence rate (smaller objects)



High Persistence reveals pixel values of the
lowest occurrence rate (the smallest objects)

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A1.14 Waveform Monitor Line Select Mode

Press **Ctrl + W**
to toggle On the
Line Parade Waveform

Press **M**
to toggle
Full Frame / **Line Select** Modes

Ctrl + M
enables
Mask Controls:

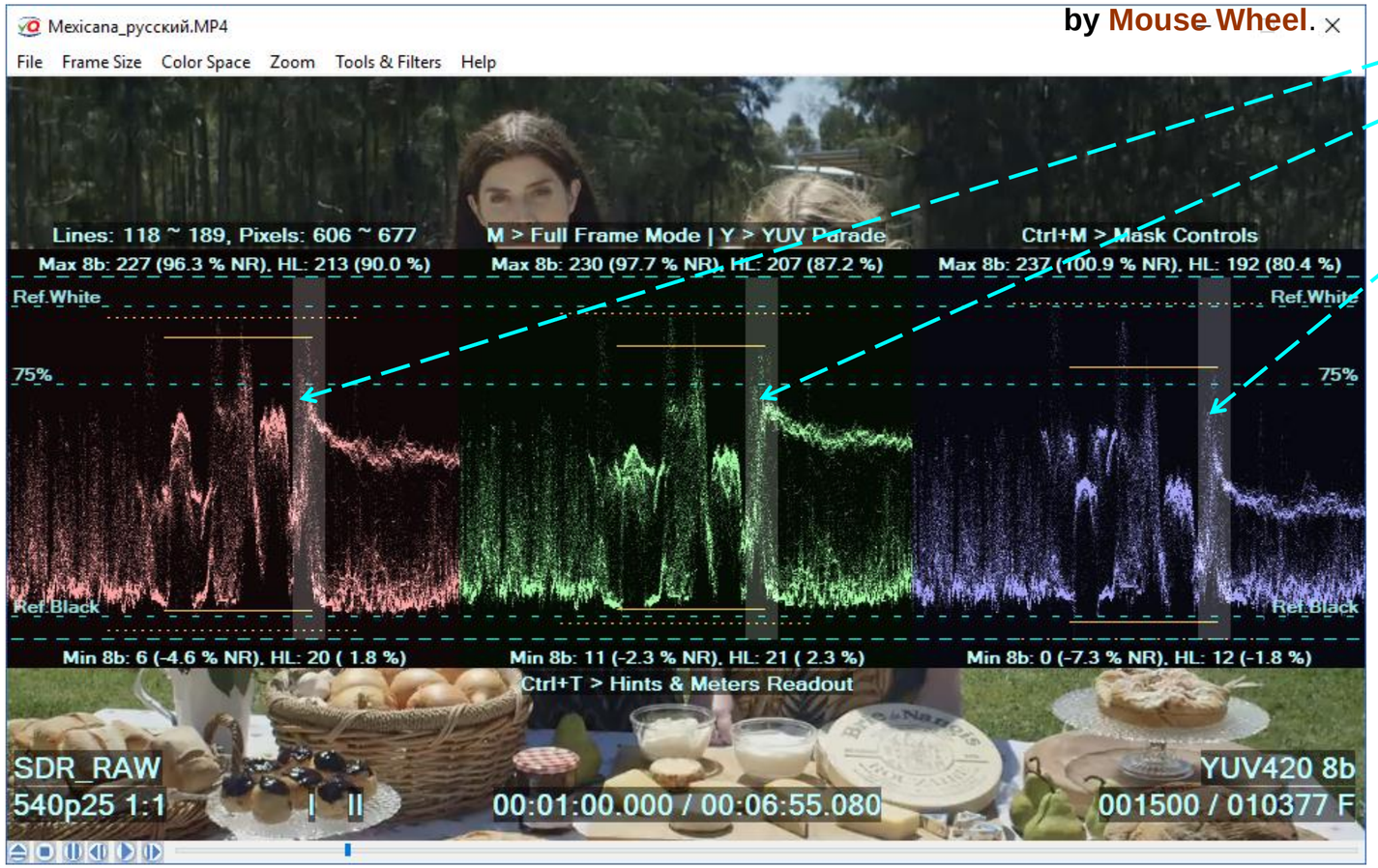
Step 1

Adjust **Line Range Mask**
Vertical Position**:**
by Mouse Cursor
and **Mask Size:**
by Mouse Wheel.

Square **Highlighted Mask**
defines **Pixel Number Range.**
Adjust the Horizontal Position
by moving the **Mouse Cursor**

Press **M**
again to show
RGB/YUV Waveforms
in **Line Select** Mode

Step 2



Mouse Double Click
is a handy shortcut to
cycle thru 4 modes**:**

1. Full Frame WF
2. Mask adjustment
3. Line Select WF
4. Full Frame WF

In Line Select Mode
the **R**, **G**, and **B** (or Y, U, V)
Min and **Max** values
are calculated separately:

- for the **Full Frame Area**

- for the **Square Mask Area:**
  i.e. for the highlighted Pixels
  within the highlighted Line Range

.

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

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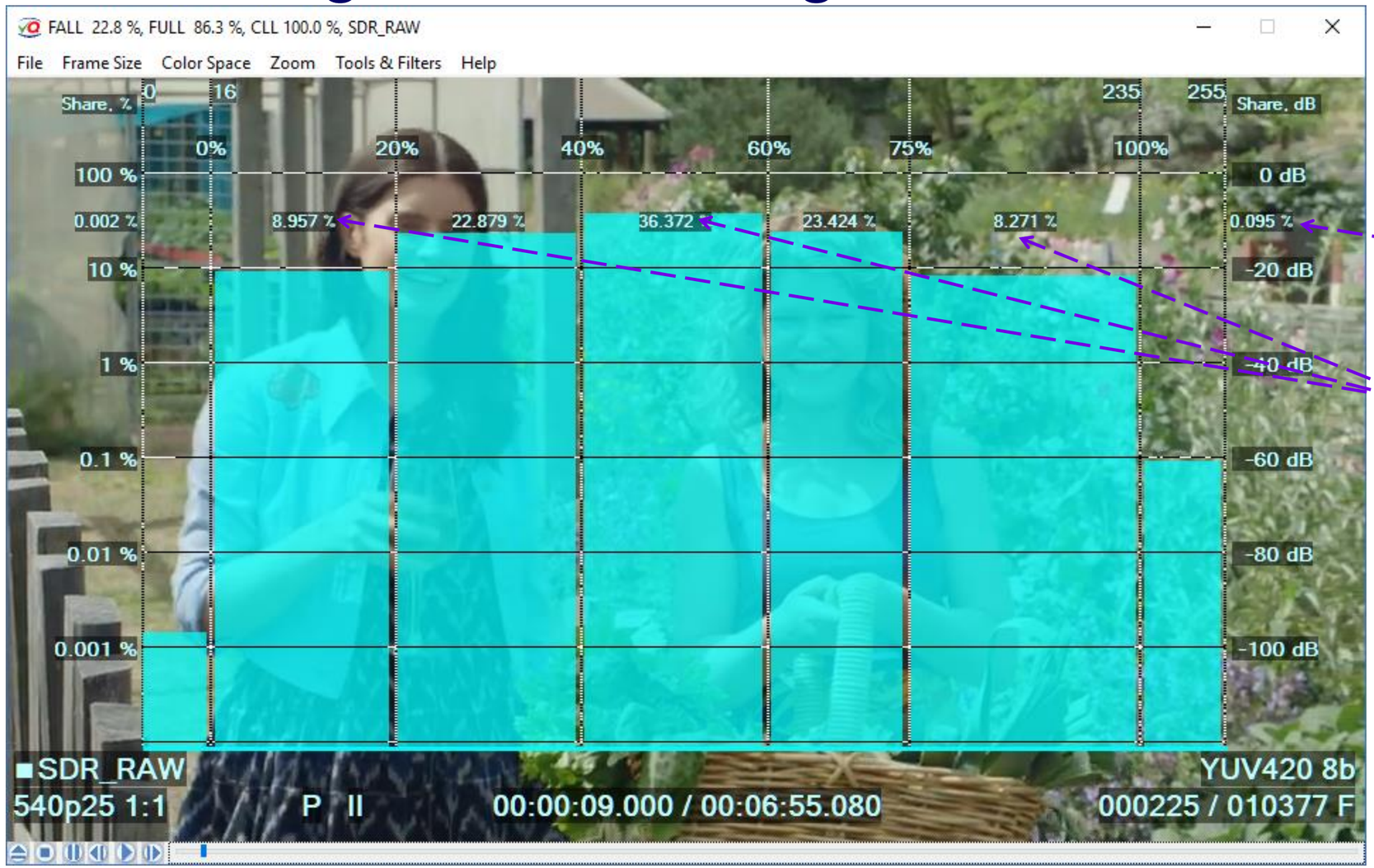
A1.15 Histogram – Sub-ranges Statistics Mode

Press **H**
to toggle On the
Frame Histogram Overlay

Press **Ctrl + H**
to toggle On the
Alternative Sub-ranges Histogram

Press **U**
to toggle the
RGB / Light Levels
Units & Graticules



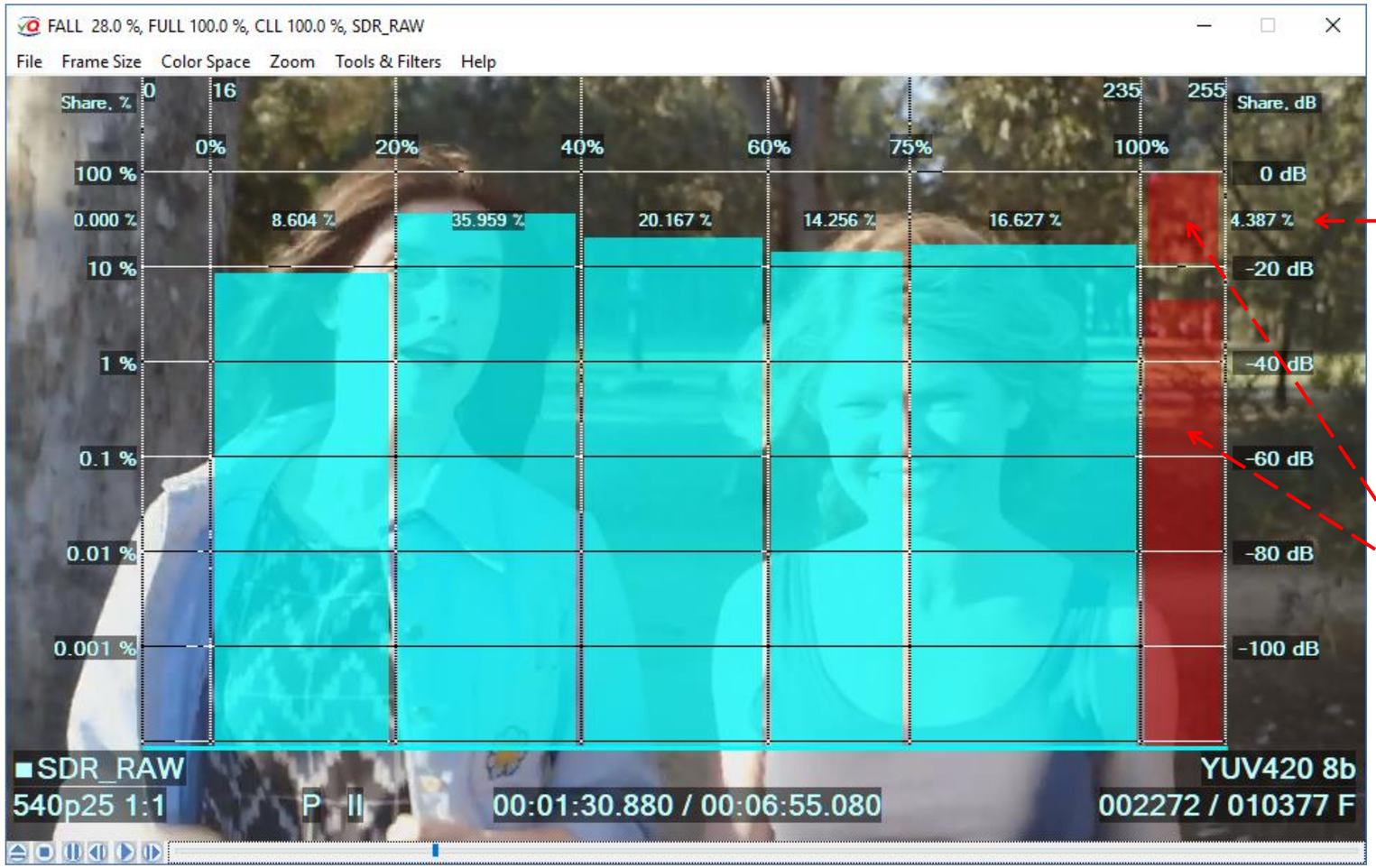
Some **white clipping** takes place, but **0.095 %** of the total screen area is an **acceptable** value

All sub-ranges are more or less **evenly populated**.

It means **good** SDR image

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

A1.16 Histogram – Sub-ranges Alarms



Strong white clipping
(“White Crush”)
takes place.

4.4 % of the screen area
is above the **4 %**
Red Alarm Threshold

Red Alarm Highlighter
indicates
the affected sub-range
above 100% White

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

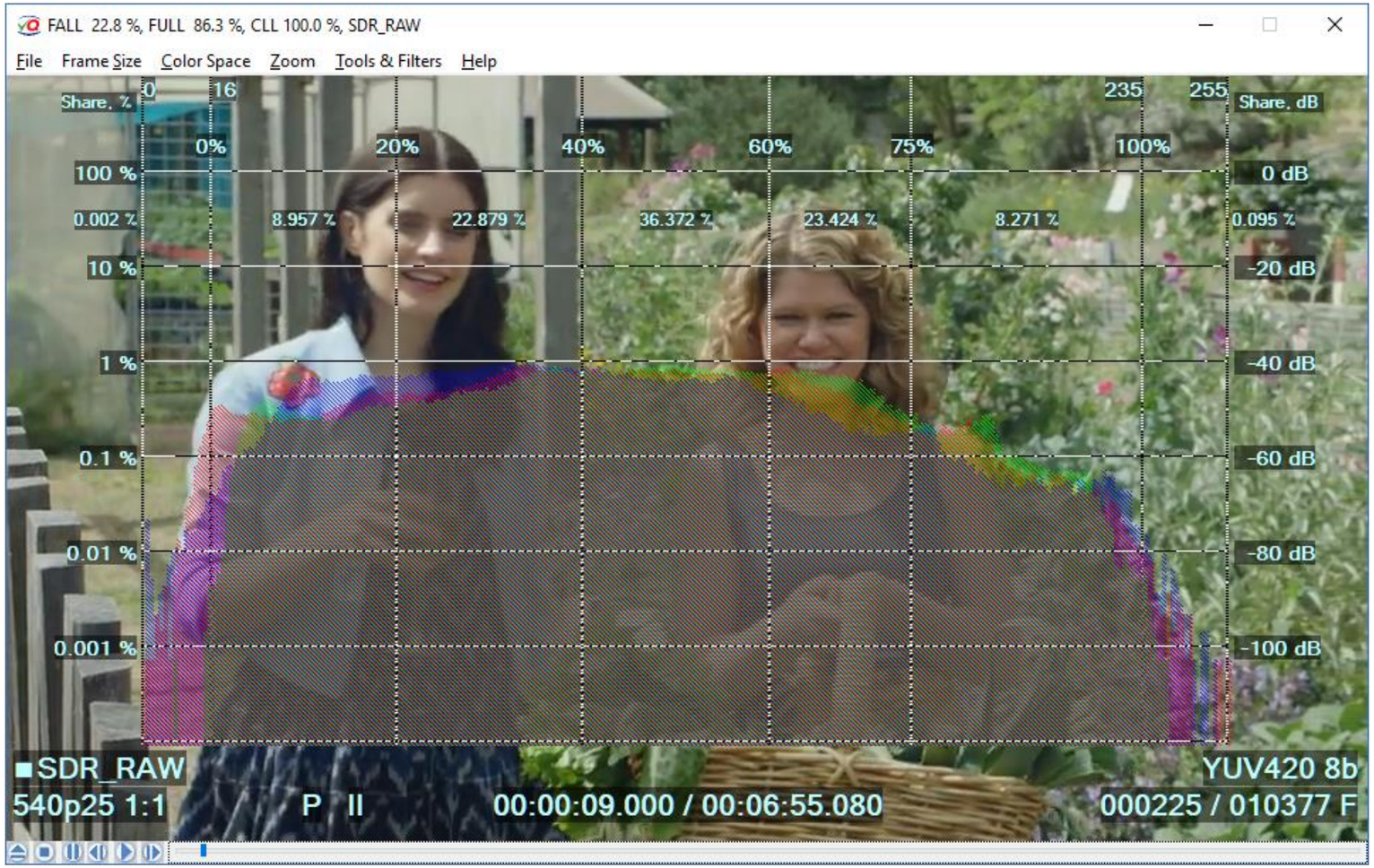
A1.17 RGB Logarithmic Histogram

Press **H**
to toggle On the
Histogram Overlay

Press **Shift + H**
to toggle On the
RGB Logarithmic Histogram

*Press **Shift + H***
again to restore
LL Histogram

Shift + H toggles LL / RGB



Patterned Gray central area designate the case where all 3 **R**, **G** and **B** histogram **channels overlap**.

Colored areas shows the **dominant color channel(s)**, e.g. transparent **green** color means that for **this level** the **G** channel has **more hits** than two other channels, i.e. **R** and **B**.

Yellow area color means that **both R** and **G** have **more hits** than **B**. Magenta color means that for these levels G channel has less hits than R and B, etc.

Big advantage of this mode is the **logarithmic vertical scale**, so the events of **very low occurrence rate** (few pixels per frame) are still visible.

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

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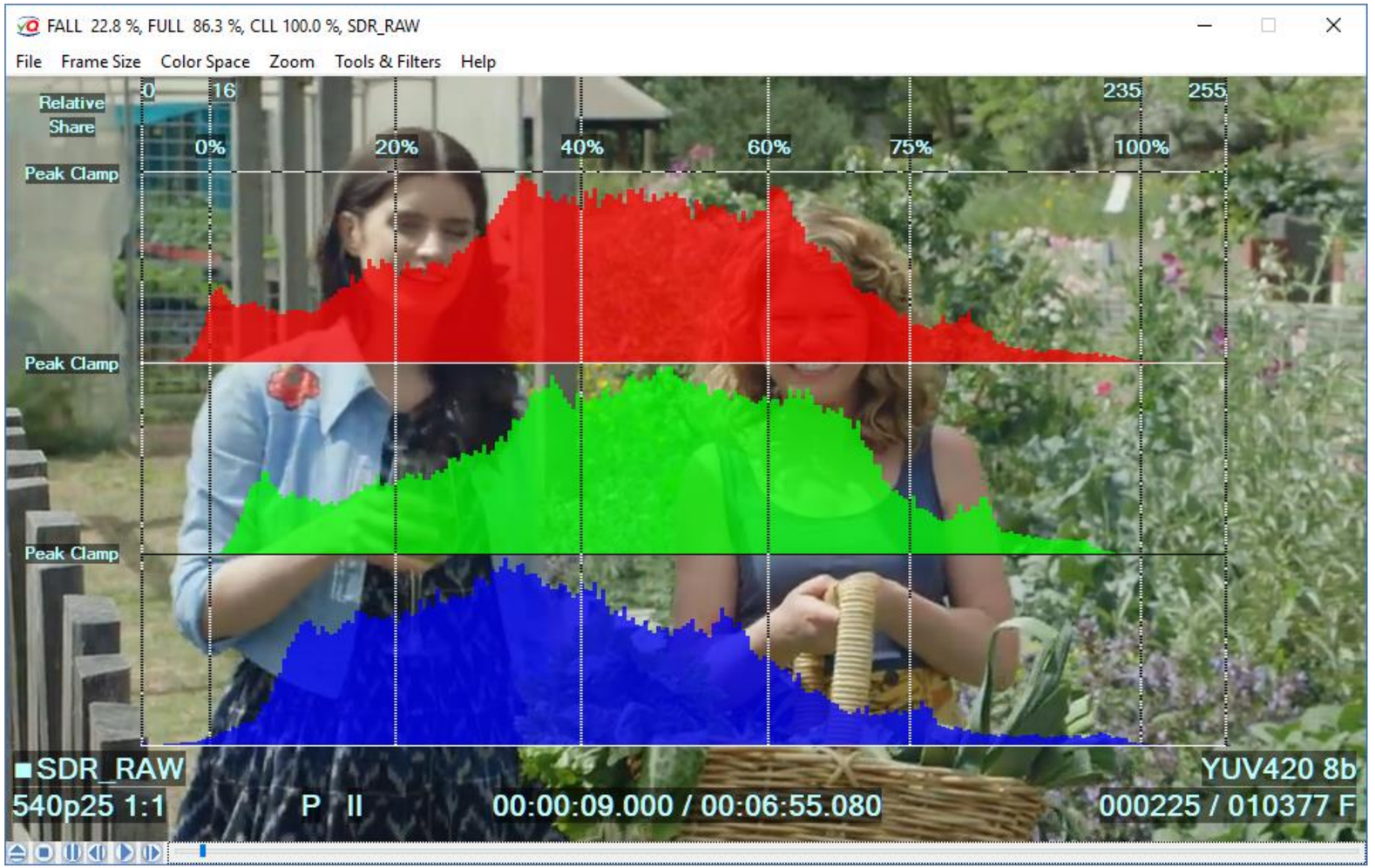
A1.18 RGB Linear Histograms

Press **H**
to toggle On the
Histogram Overlay

Press **Ctrl + H**
to enable the
Alternative Histogram Mode

Press **Shift + H**
to enable
3 separate R, G, B Linear Histograms



This mode serves mainly for **general assessment** of R, G and B levels distribution **shape**, **horizontal position** and **horizontal extent**.

All 3 (R, G and B) histograms are separately **normalized** to the corresponding **peak values**.

R, G and B levels are presented in a **relative linear scale**.

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

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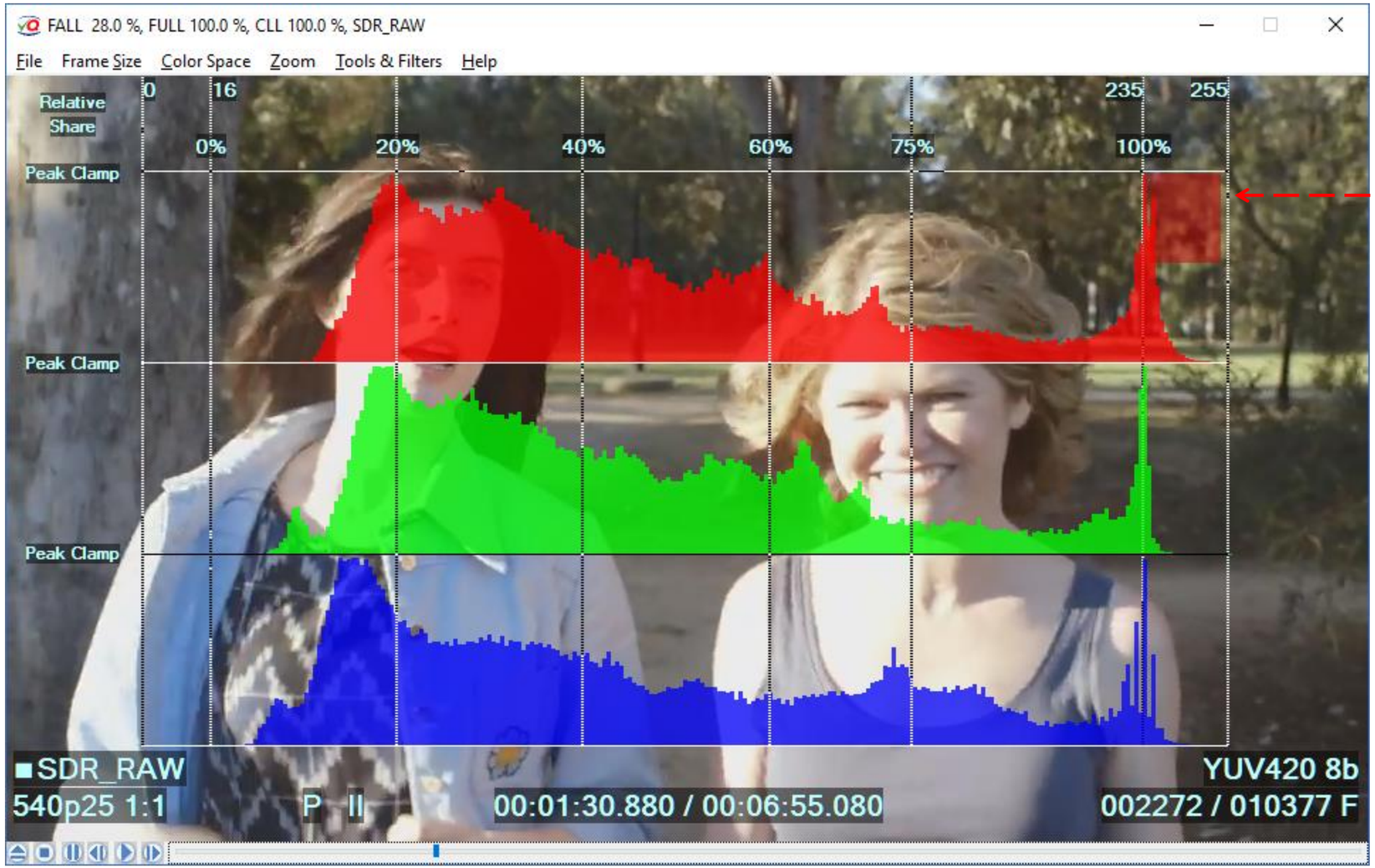
A1.19 RGB Linear Histograms Alarms

Note the **high probabilities** of **Red** & **Green** histograms near the 100% limit on the right side
(*not so strong for **Blue***).

It means massive clipping of white and yellow tones

.



Strong white clipping
(“White Crush”)
takes place,
Red Alarm Flag
is raised

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

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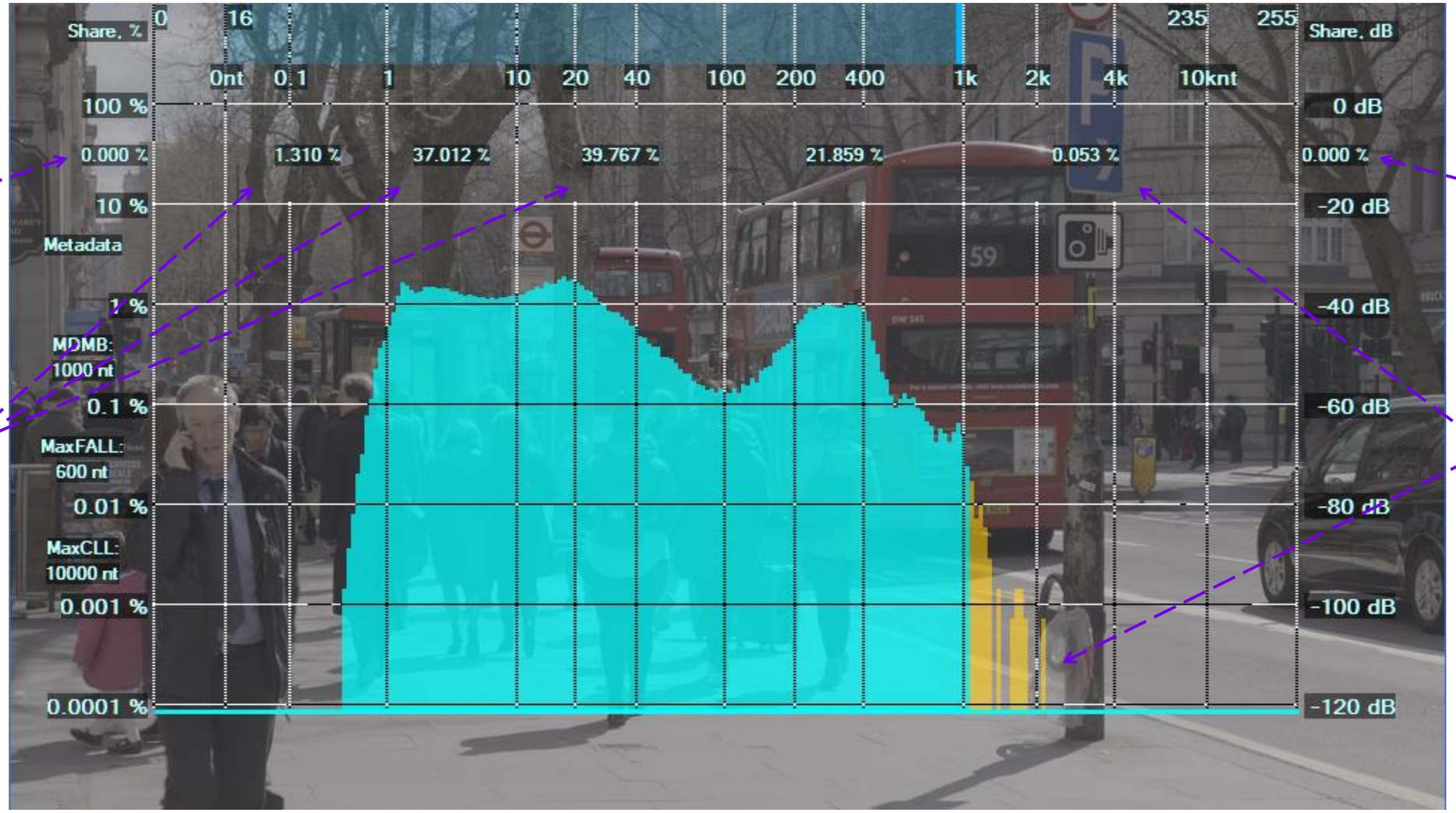
A1.20 HDR10 Light Levels Histogram Example

Press **1**
to enable:
PQ-RAW
Mode

The **sub-range** ***below Narrow range black limit*** is measured *to check for "Black Crush"*

VQV calculates shares of **screen area** for several **sub-ranges** of a Histogram



The **sub-range** ***above Narrow Range* limit** is measured to check for "White Crush", **0 %** means no crush

0.053 % value means that there are not so many pixels **above 1000 nt** limit

Logarithmic scale of histogram bins counts (vertical co-ordinate) covers very large range of values
from 100 % of screen area (in case of solid flat color the bin count may be in millions) down to 0.0001 % (even single pixel events are visible)

HDR sample video – courtesy of newsbyte.co.uk

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A1.21 HDR10+ Light Levels Distribution Analyzer

Press

Ctrl + Shift + H

to enable

HDR10+

Levels Statistics Analyzer

This also enables
L-Bar & **PQ_RAW** Mode

Cyan Bars show **maxRGB** (aka **Linear Light Levels**) **Distribution Values, nit** *(Frame Percentiles)* for each one of 7 specified percentage threshold values.

Green Bars show similar **Distribution Values, nit** *(Scene Percentiles),* of the selected **Segment**.

Numerical readout of the **Distribution Values** for the current **Frame (F)** and the analyzed **Segment (S)**

Analysis Progress Bar:
From the selected start frame to the current frame

L-Bar provides for **fast and reliable** RGB and LL parameters **assessment.**

Text info under the L-Bar provides brief summary of LL statistics analysis of the current frame and the selected segment.

HDR sample video – courtesy of newsbyte.co.uk

A1.22 Tools Combinations

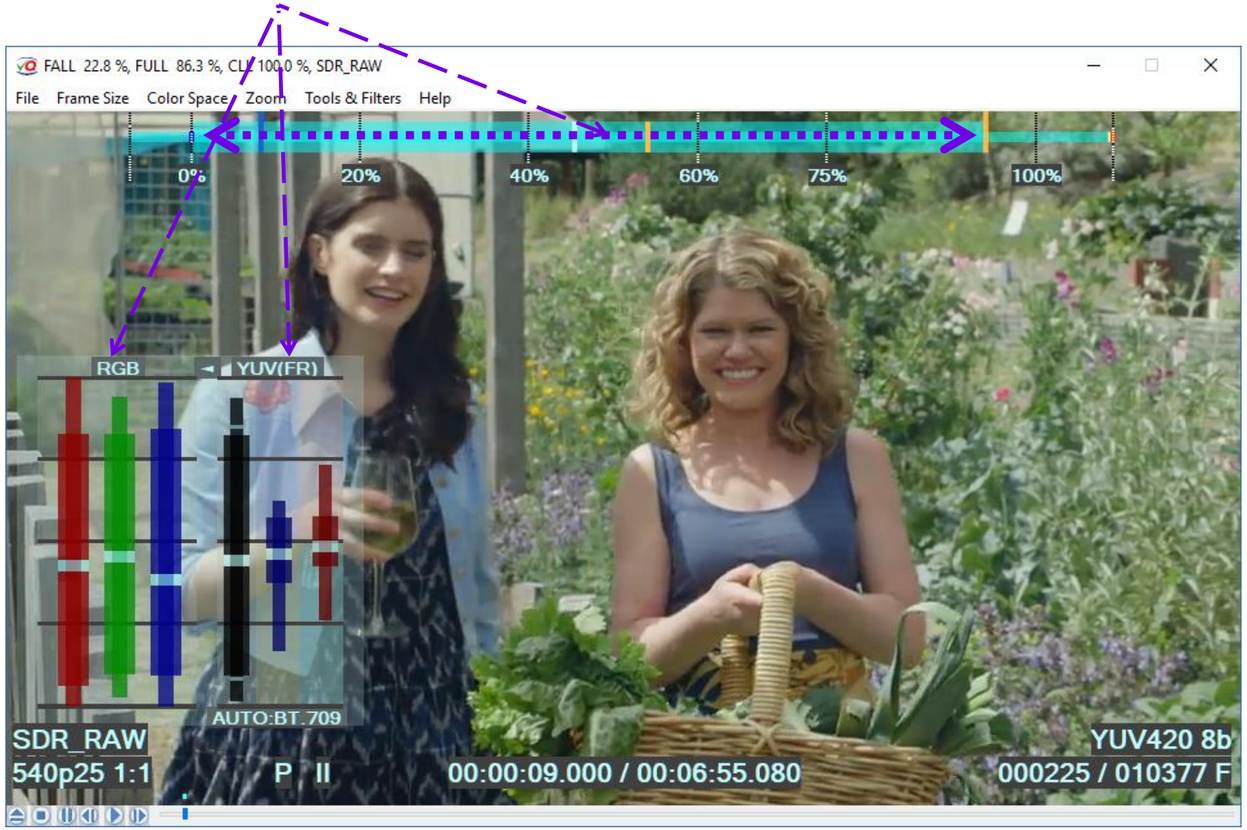
Press **V** then **L**
to enable two overlays:
VV-Bars & **L-Bar**

Press **9**
to switch between two
YUV to RGB Range Mapping Modes:
Full Range (FR) vs. **Narrow Range (NR)**

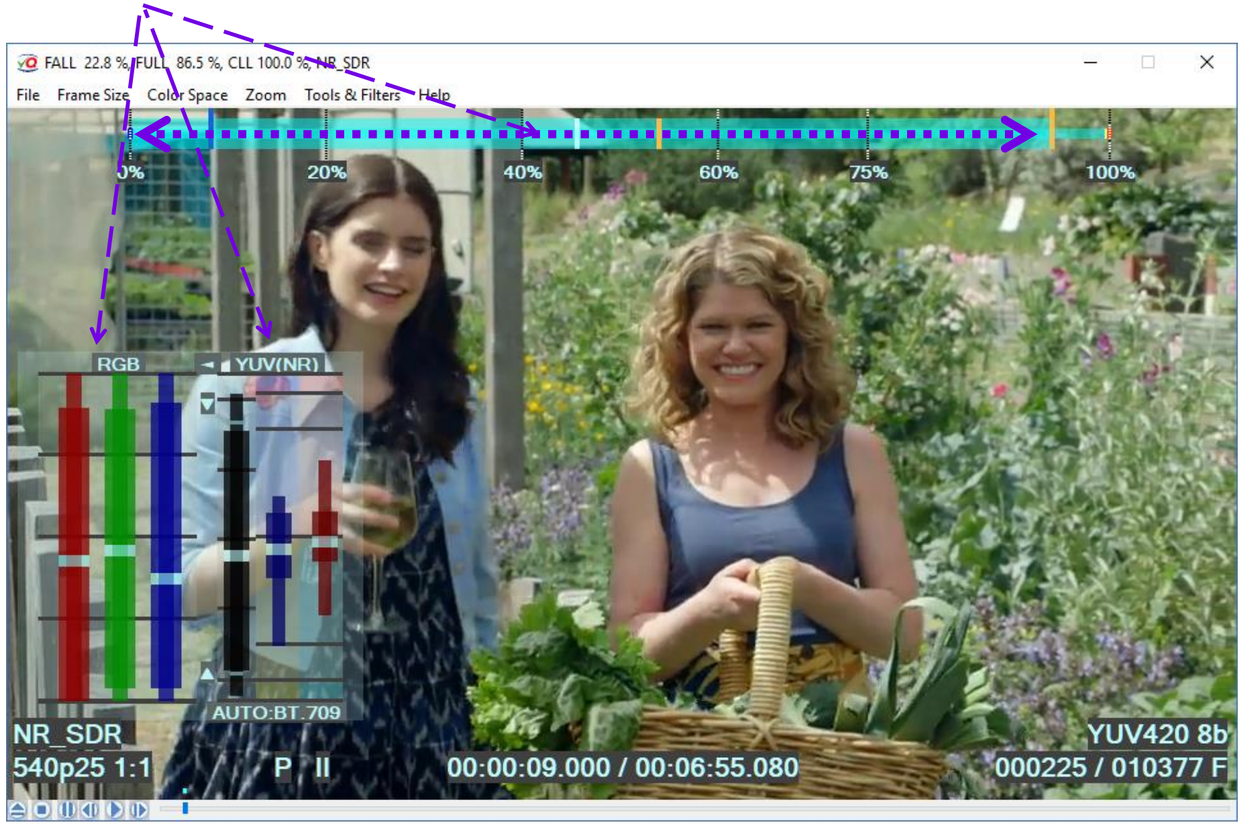
C-Bar, L-Bar, ***VV-Bars*** *and* ***VectorScope*** *can be used together in any combination, but not in combination with the* ***Waveform Monitor****.*

The ***Histogram*** *overlay can be used together with* ***L-Bar****, but not with the* ***C-Bar, VV-Bars****,* ***VectorScope*** *or* ***Waveform.***

Full YUV Range Mode means
reduced contrast of **rendered RGB** image



Narrow YUV Range Mode means
higher (normal) **contrast** of **rendered RGB** image

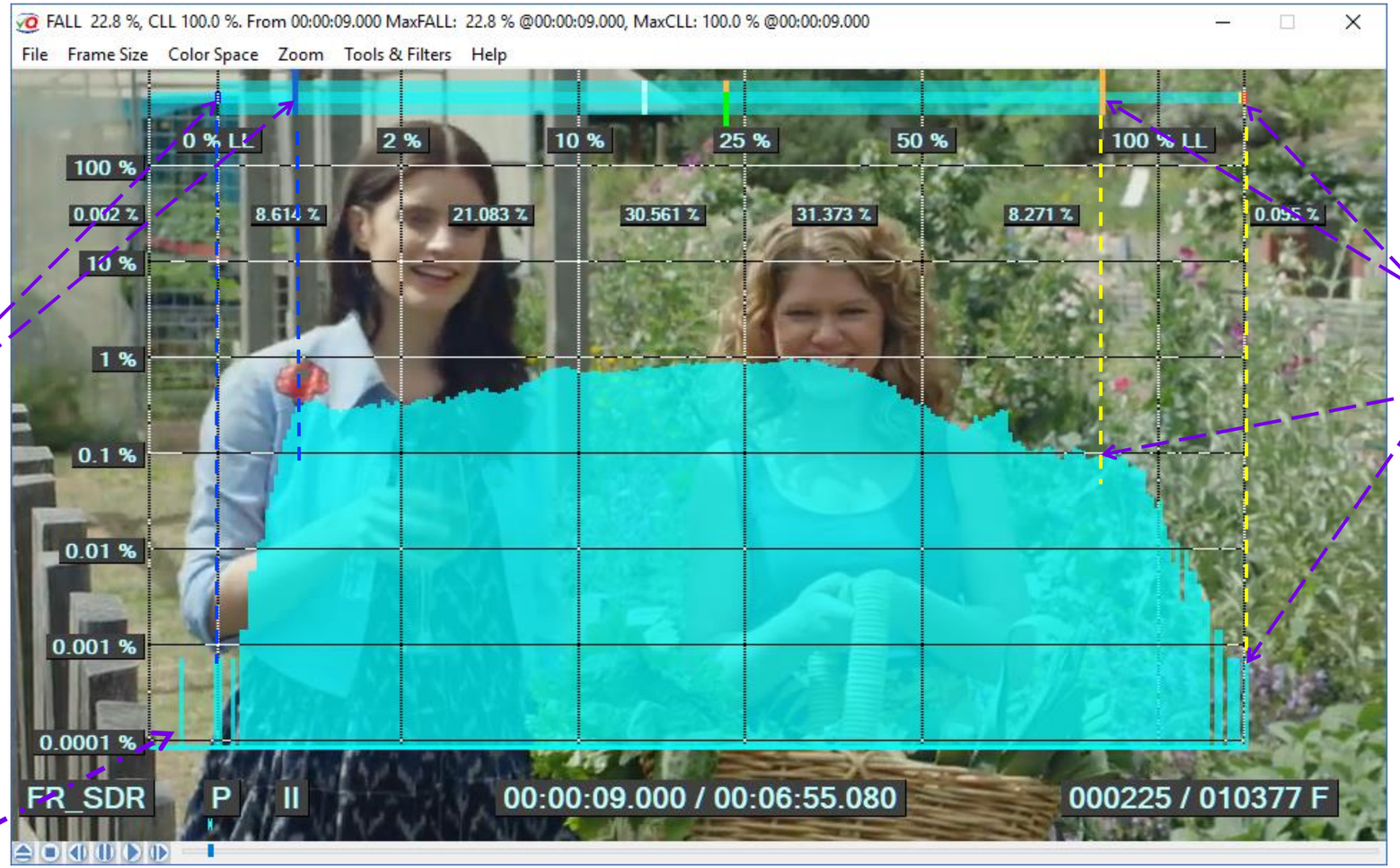


SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

A1.22 L-Bar and Light Levels Histogram

Press **H** then **U**
(and optionally **Ctrl + H, Shift + H**)
to select the desired
Histogram Mode, e.g.
Light Levels Histogram
in percents of LL range

Then press **L**
to enable.
L-Bar



Absolute LL Min and
Relevant LL Min
Blue Markers
always correlate
with the left edge of
LL Histogram profile.

But min (R, G, B) value,
i.e. **Narrow Bar left edge**,
may go lower than
the **LL Histogram left edge**,
e.g. on **colored shadows**

Frame Light Level
Relevant Max
and
Absolute Max (aka CLL)
Yellow Markers
always correlate
with the right edge of
LL Histogram profile

L-Bar provides for **fast and reliable** RGB and LL parameters **assessment** even when the actual histogram is **hidden**

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

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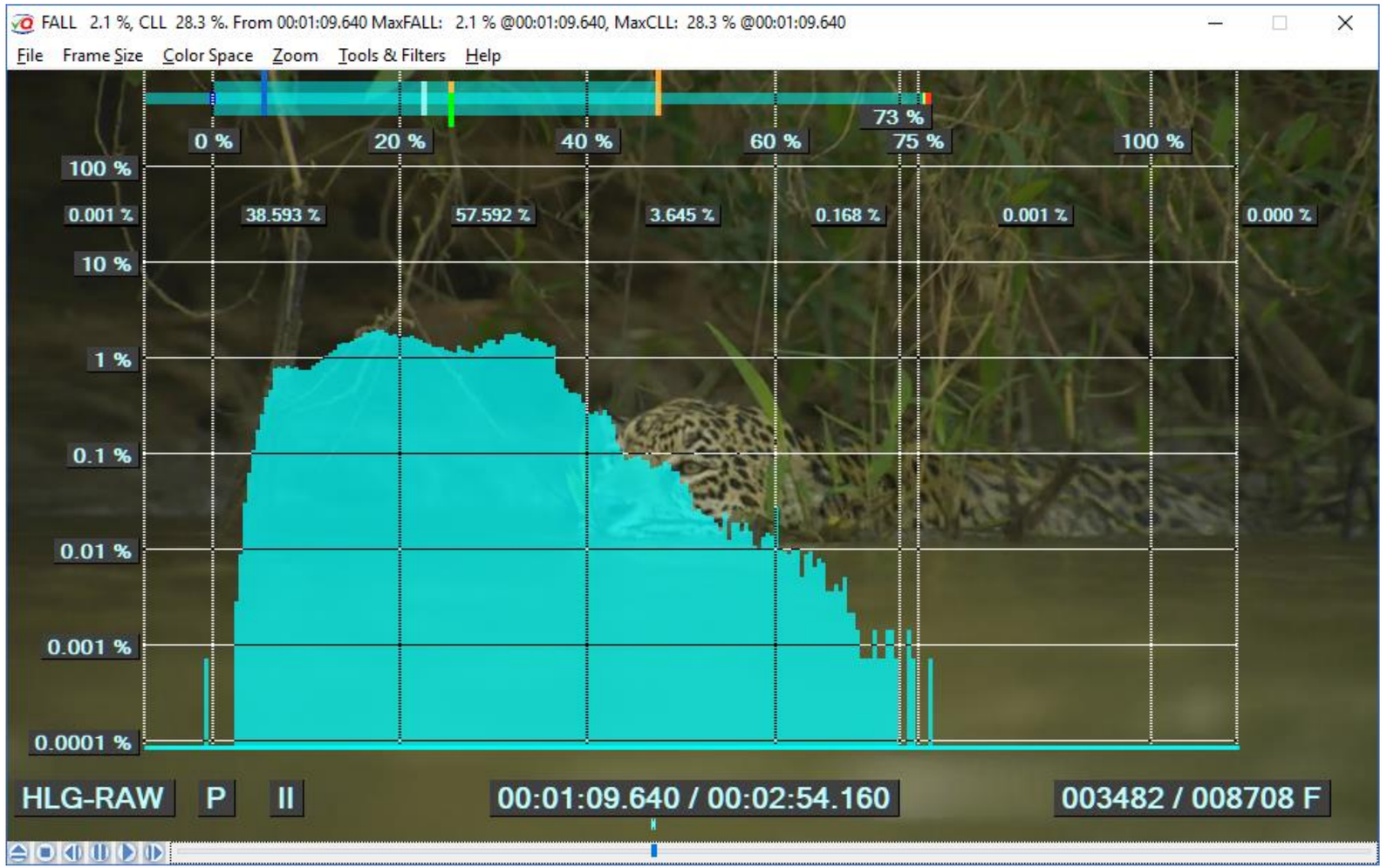
A1.23 L-Bar and Histogram of HLG Video

Press **3**
to enable the
HLG-RAW mode

Press **L** and **H**
to enable the
L-Bar + Histogram
combination

Press **U**
to select the
desired Graticule Units
e.g. **RGB Range %**



VQV calculates screen area in percents for several **sub-ranges**. The **most populated** RGB signal **sub-range** is **20% to 40%,** it occupies 57.6 % of screen area.

Such histogram distribution means that on “compatible” SDR display a viewer will see rather **dark image**.

Note that there are practically **no pixels** related to two bands **above Reference White** Level (75% signal, 26 % LL) – histogram counts are 0.001% and 0 %.

UHD HLG sample video – courtesy of BBC

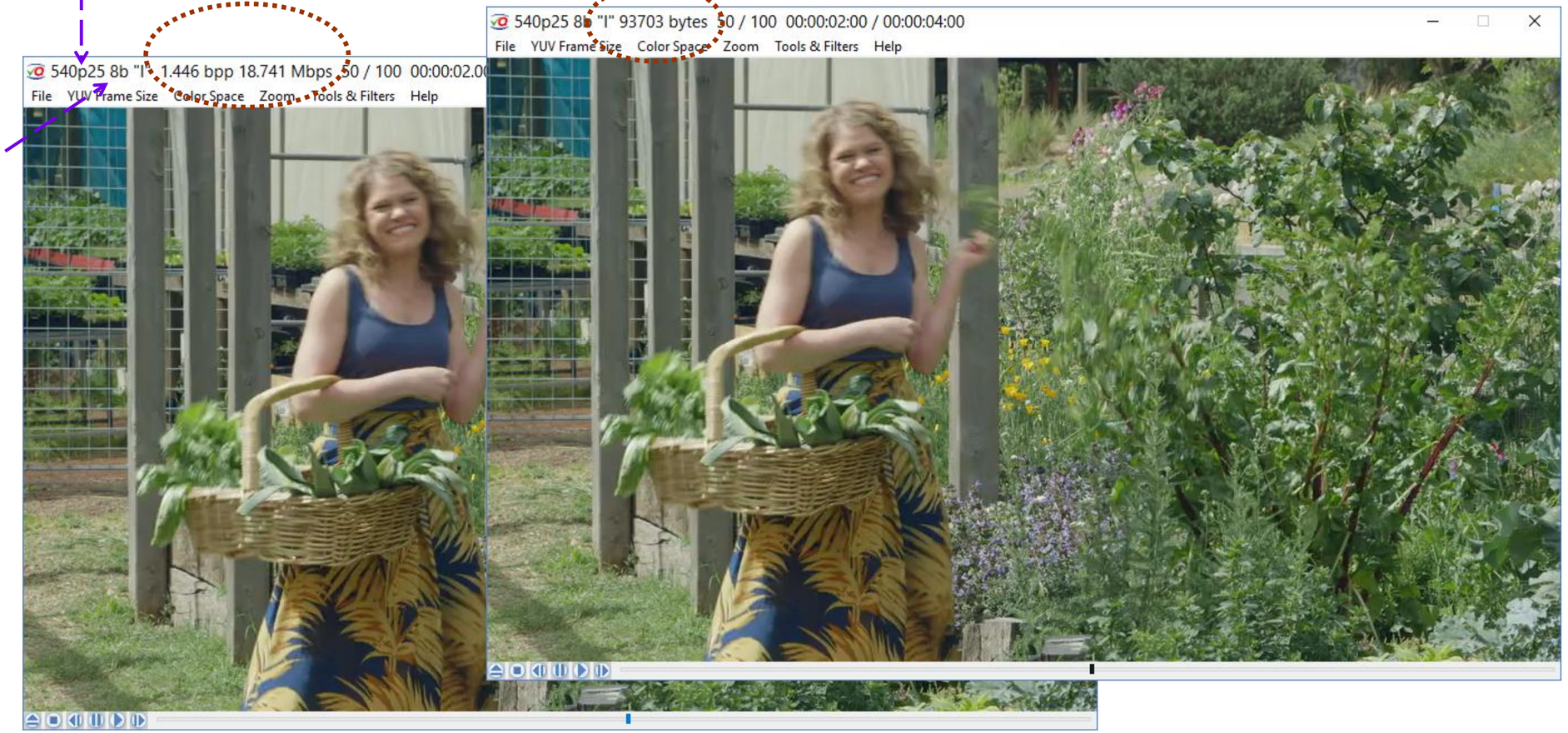
A1.24 Hidden C-Bar Title Bar Messages

Frame Size,
Frame Rate,
Interlace symbol

Frame Type,
Bits Per Pixel,
current Bitrate, Mbps

Message Display option (press **S**):
Compressed frame size, bytes

Bits Per
Component
(Bit Depth)

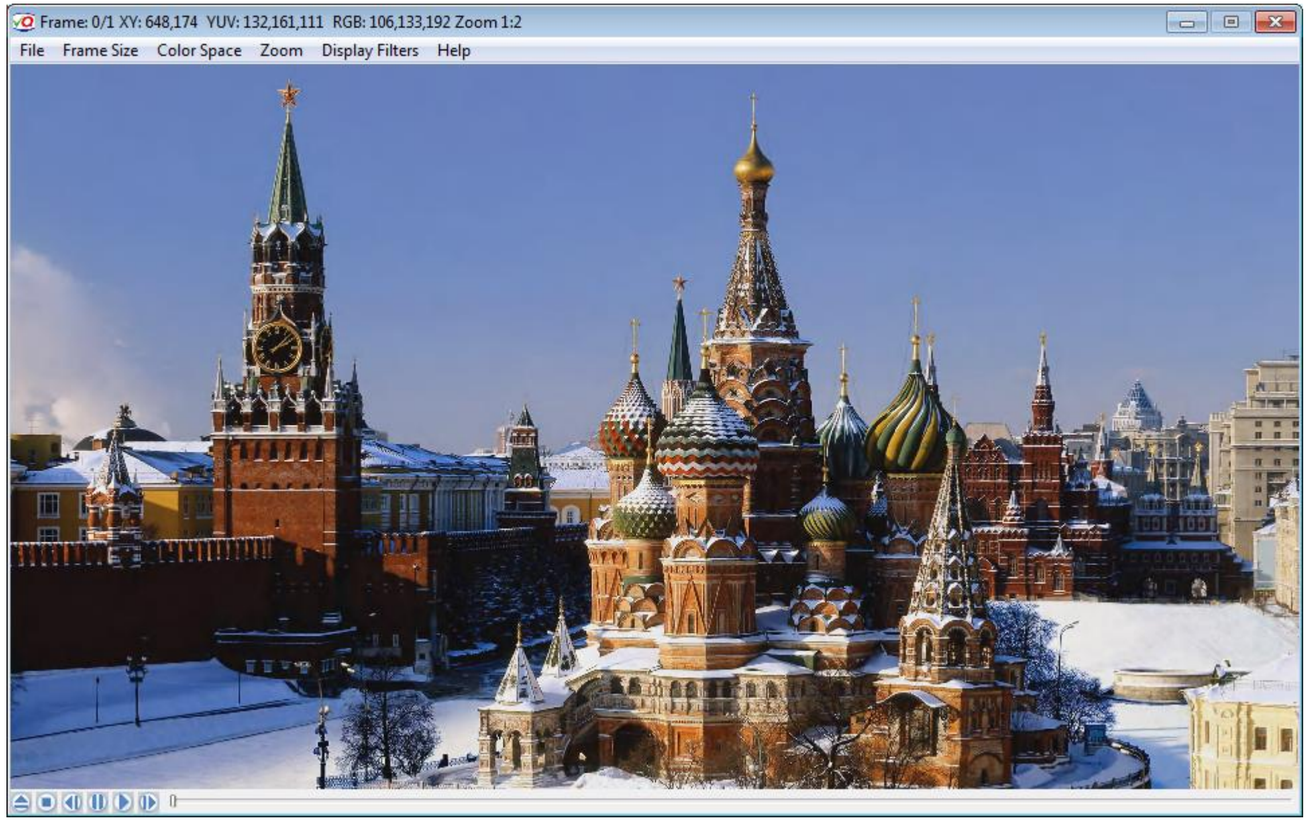


SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

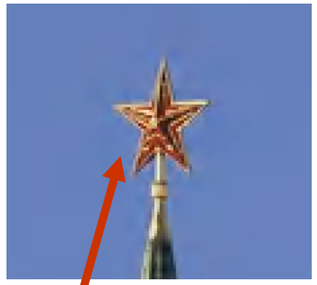
A1.25 Combined Color, Gain and Mask Filters

1. Press **Shift + Y** to select Y color component,
2. Adjust mask size (**M** + **Mouse Wheel**) and position (**Mouse Left Button + Mouse Move**),
3. Adjust zoom ratio (cursor centered): **Z** + **Mouse Wheel**,
4. Adjust the gain: **Shift** + **Mouse Wheel**

1920x1080 image, decoded lossy JP2K, Zoom 1:2

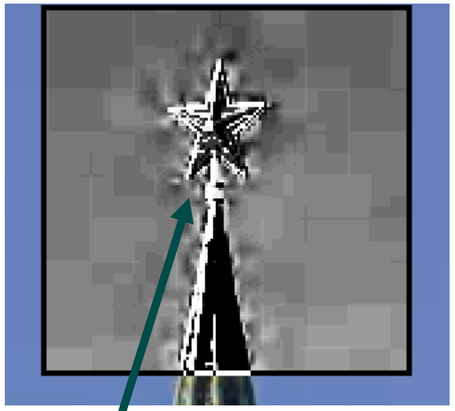


Zoom 2:1



Just noticeable compression artefacts

Zoom 2:1, Y, Gain x16

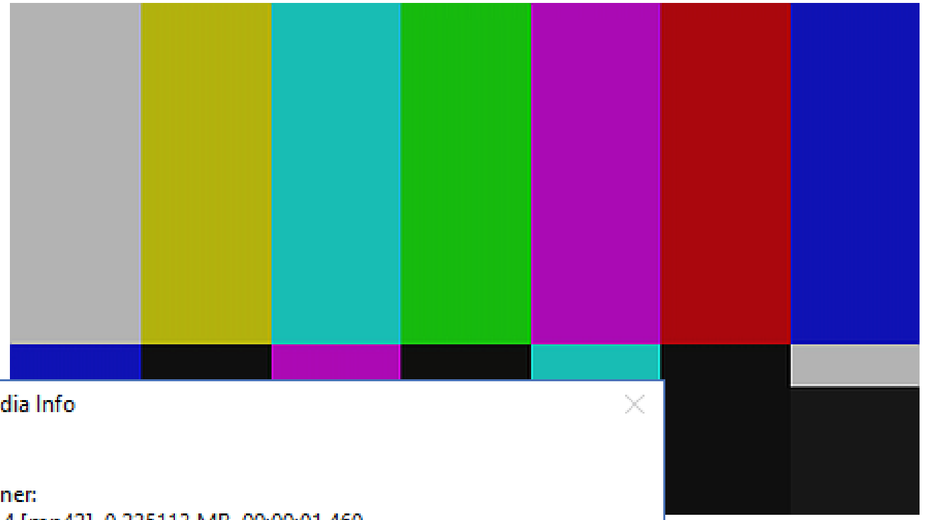


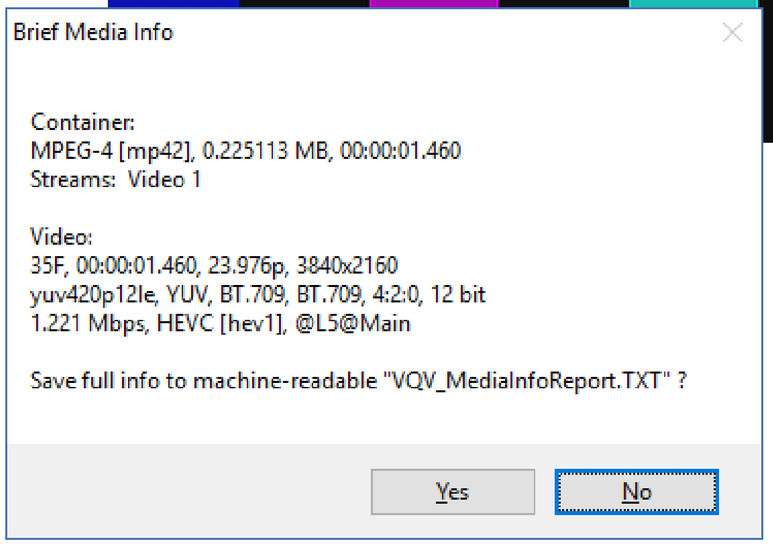
Clearly visible compression artefacts

A1.26 MSB/LSB Filter Application

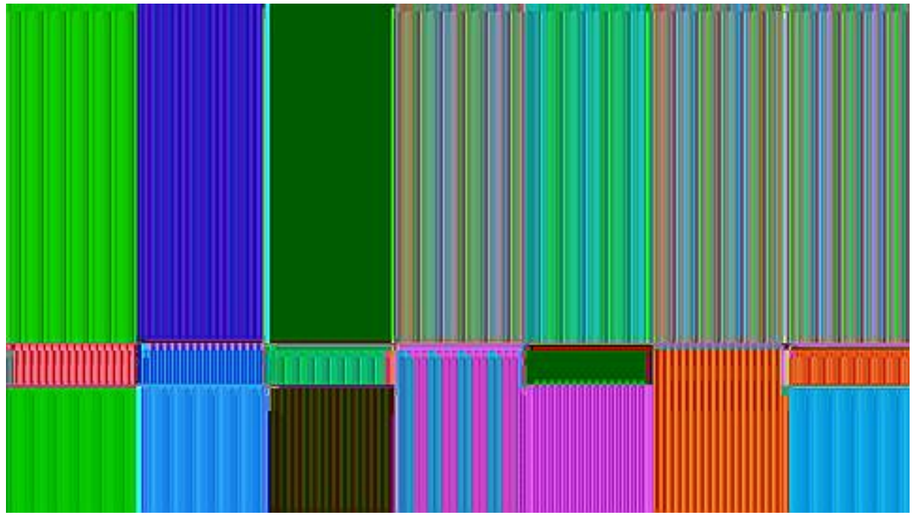
8 toggles between MSB and LSB images (*only if the input bit depth is greater than 8b*)

MSB: 8b RGB image derived from 12b UHD media file



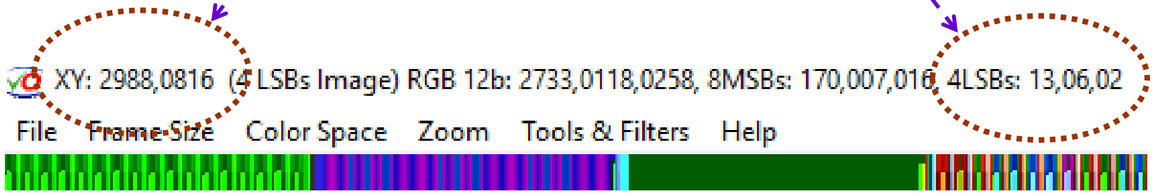


LSB: 8b RGB image derived from 12b UHD media file



Pixel position XY: **2988, 0816**

4 LSBs: **13, 06, 02**



This example shows that used encoder (UHD HEVC) is far from being 12 bit accurate:
even on relatively easy flat color objects 4 LSB values are in fact random – pixel-by-pixel readout displays various numbers from 0 to 15.

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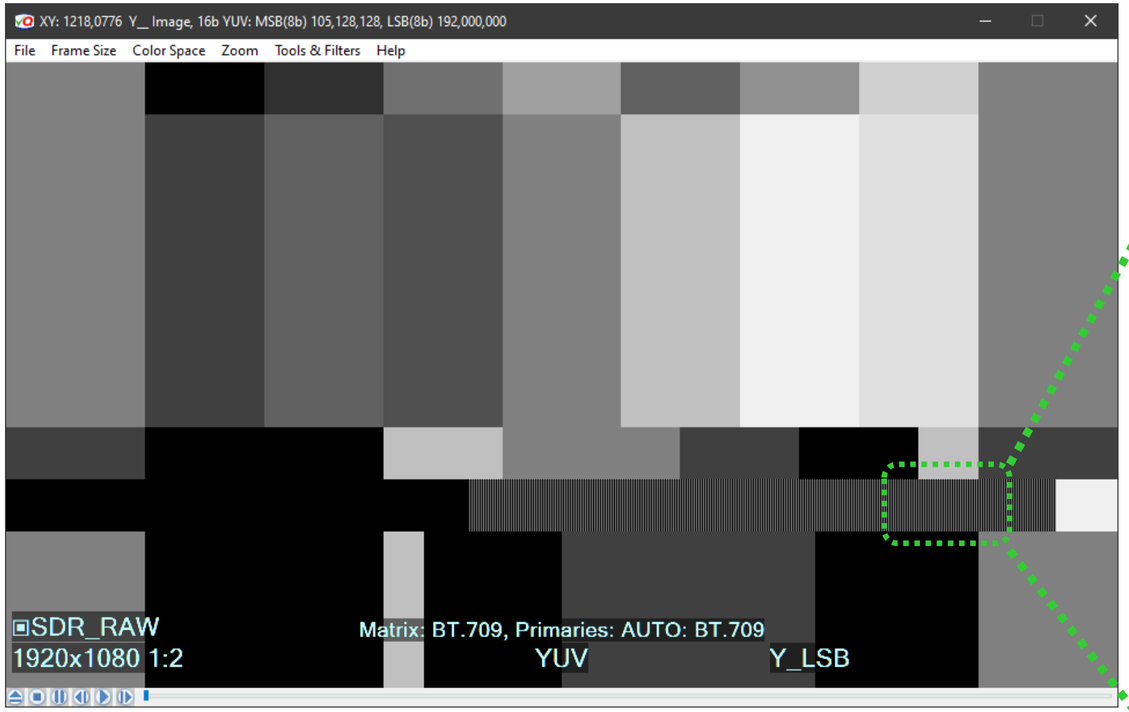
A1.27 Checking VQCB Test HD Version Ramp Bit Depth

8 toggles between MSB and LSB images (*only if the input bit depth is greater than 8b*)

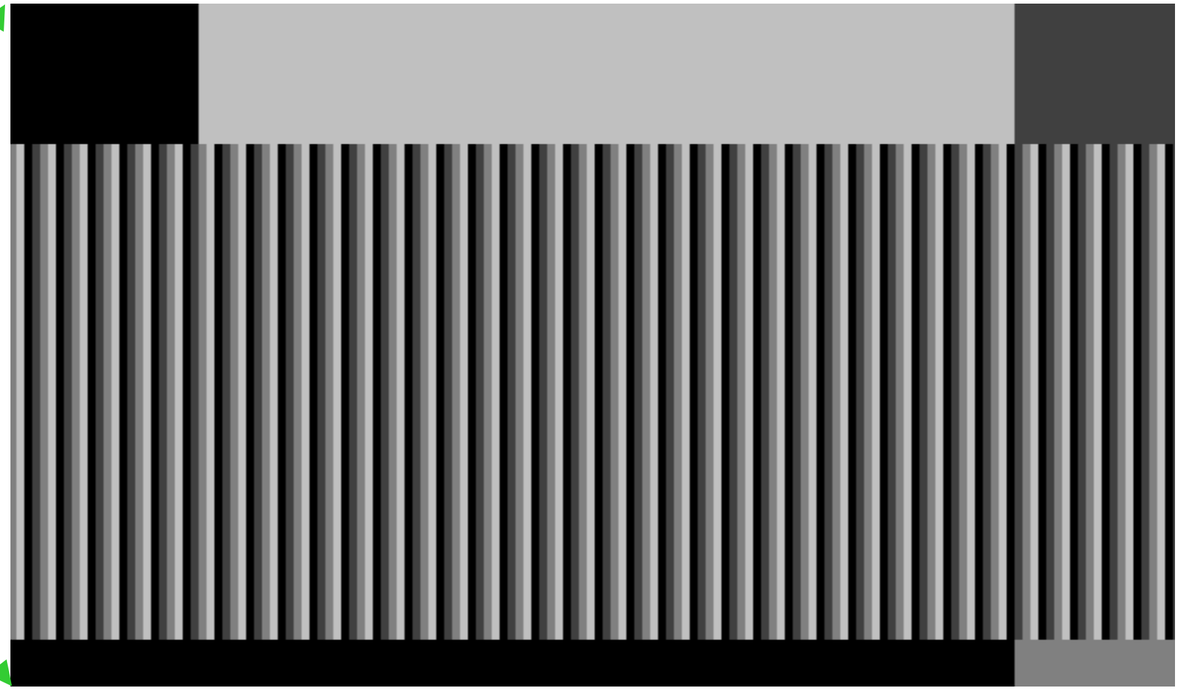
16b YUV source, Y channel 8b LSBs Image



Within the Ramp area

8b LSBs image shows **4 gradations**, i.e. only **2 LSBs** are active.

It means that actual bit depth of the Ramp is: 8 MSBs + 2 LSBs = **10 bit**



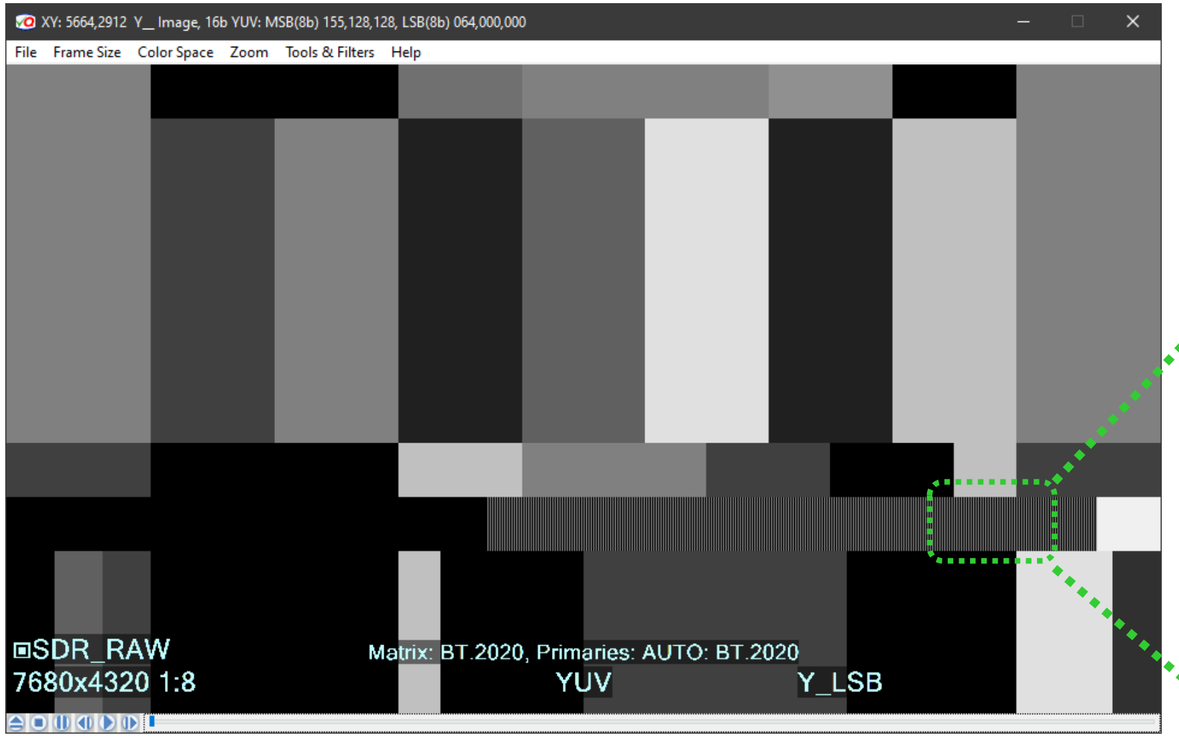
Max 4:1 Zoom centered on the Ramp Area

LSB image gradations pattern is uniform, it means that original data range have been not scaled: – preserving one 10b increment per pixel

A1.28 Checking VQCB Test 8K Version Ramp Bit Depth

8 toggles between MSB and LSB images (*only if the input bit depth is greater than 8b*)

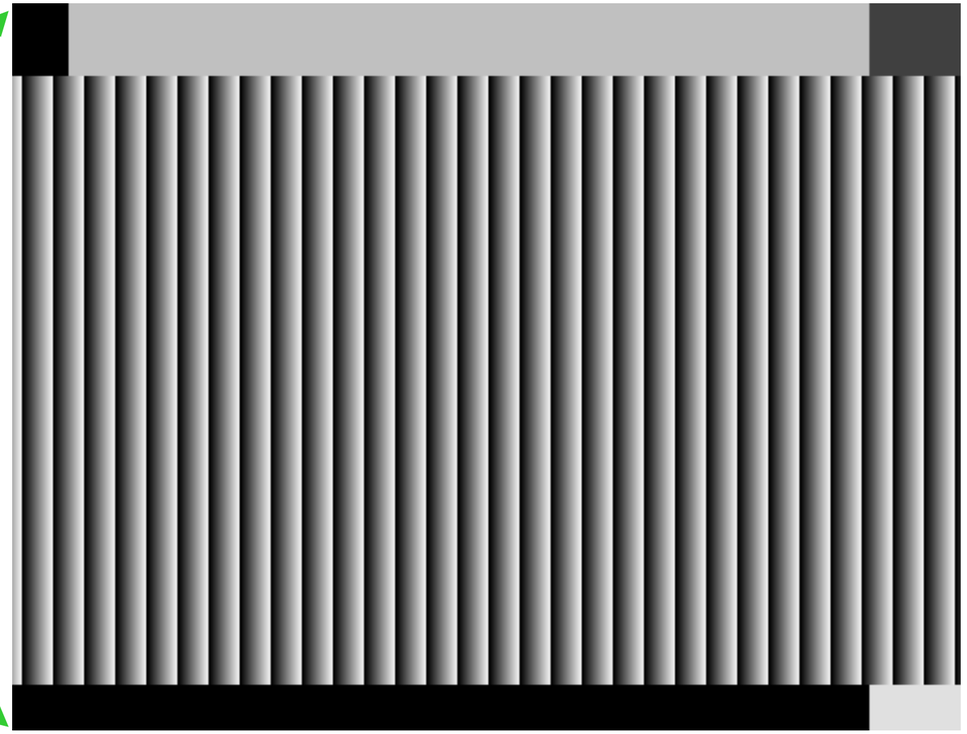
16b YUV source, Y channel 8b LSBs Image



Within the Ramp area

8b LSBs image shows **16 gradations**, i.e. **4 LSBs** are active.

It means that actual bit depth of the Ramp is: 8 MSBs + 4 LSBs = **12 bit**



Max 1:1 Zoom centered on the Ramp Area

LSB image gradations pattern is uniform, it means that original data range have been not scaled: – preserving one 12b increment per pixel

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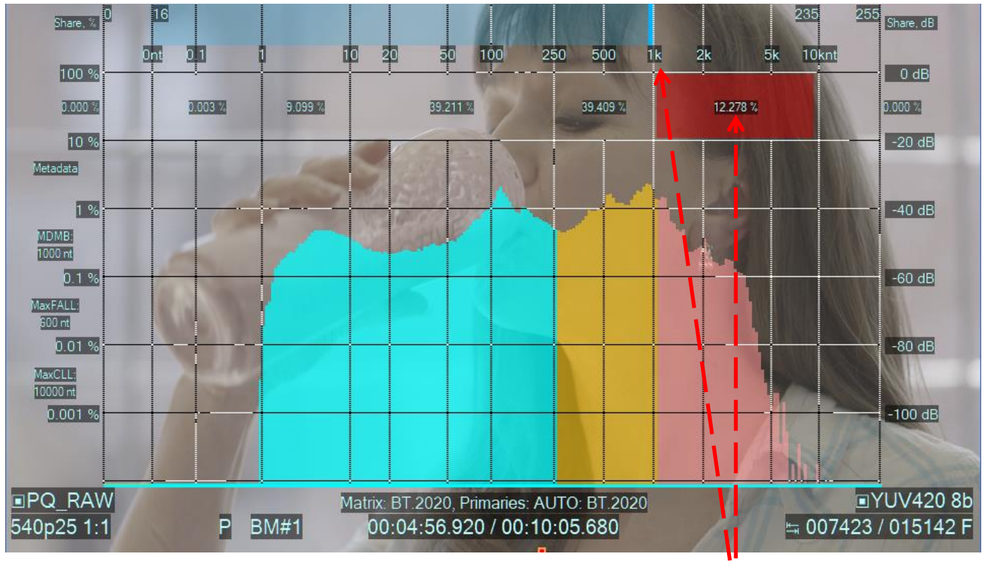
A1.29 Light Levels (LL) Image Filter

Overexposed HDR-PQ Image

Press **1**
to enable the
PQ-Raw Mode

Press **H**
to toggle On the
Frame Histogram Overlay

Light Levels Histogram



More than 12%
of pixels are above
1knt threshold

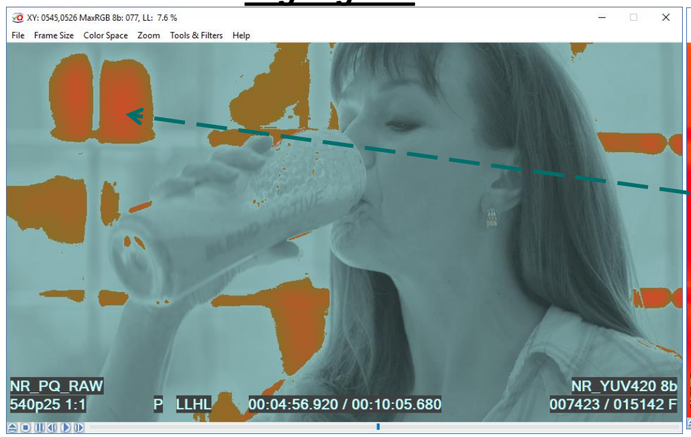
Press **Shift + L**
to enable the **Light Levels** (MaxRGB) Image Filter

Press **S**
to cycle thru 3 modes:

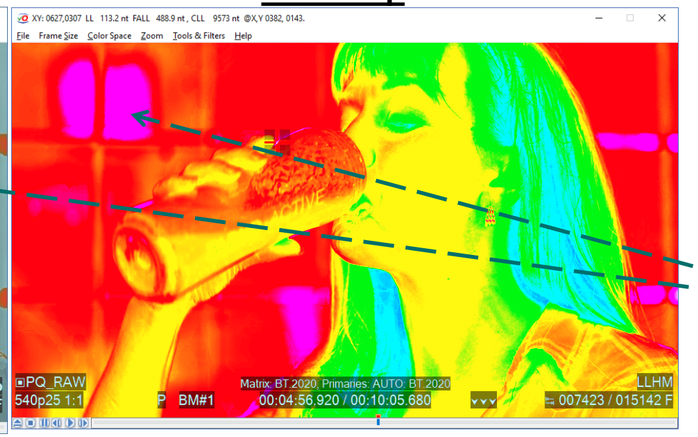
1. **LL** = Light Levels Image
2. **LLHL** = LL + Highlighter
3. **LLHM** = LL + 'Heat-map'

Light Levels (MaxRGB) Image Options:

Highlighter



Heat Map



Overexposed areas
are clearly visible

HDR sample video – courtesy of newsbyte.co.uk

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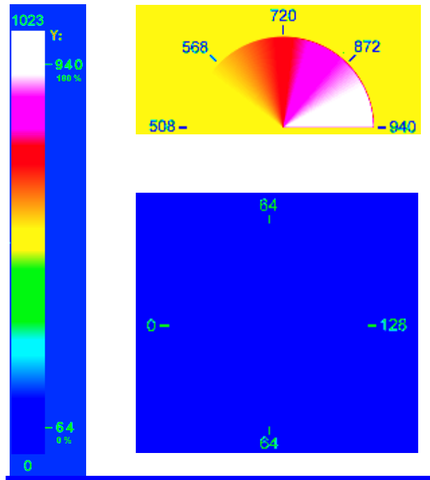
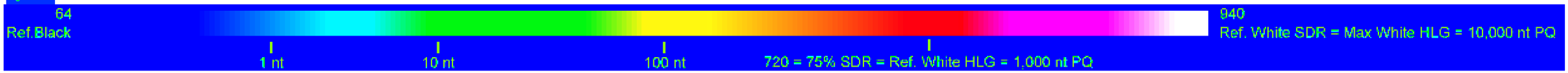
A1.30 Two Variants of Heat Map Overlay

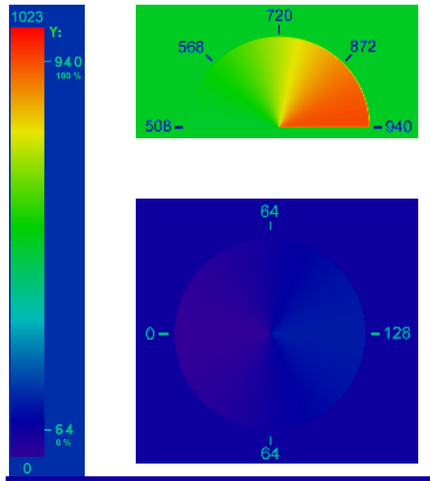


1. HDR Heat Map

auto-selected in RAW HDR-PQ & HDR-HLG Modes

Covers very large range of light levels and provides for easy detection of over-exposed areas.
However, low and medium gradations rendition is rather coarse.

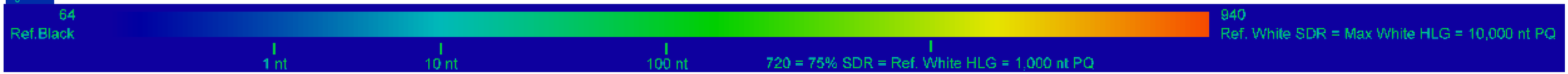




2. SDR & LOG Heat Map

auto-selected in SDR & RAW LOG Modes

Provides for easy detection of over-exposed (above Reference White) and under-exposed (below Reference Black) areas.
Better rendition of low and medium gradations.



HDR sample video – courtesy of newsbyte.co.uk

A1.31 Light Levels Highlighter

All six 100% Bars have the same 100% Light Level

All six 75% Bars have the same 50% Light Level

Press **Shift + L**

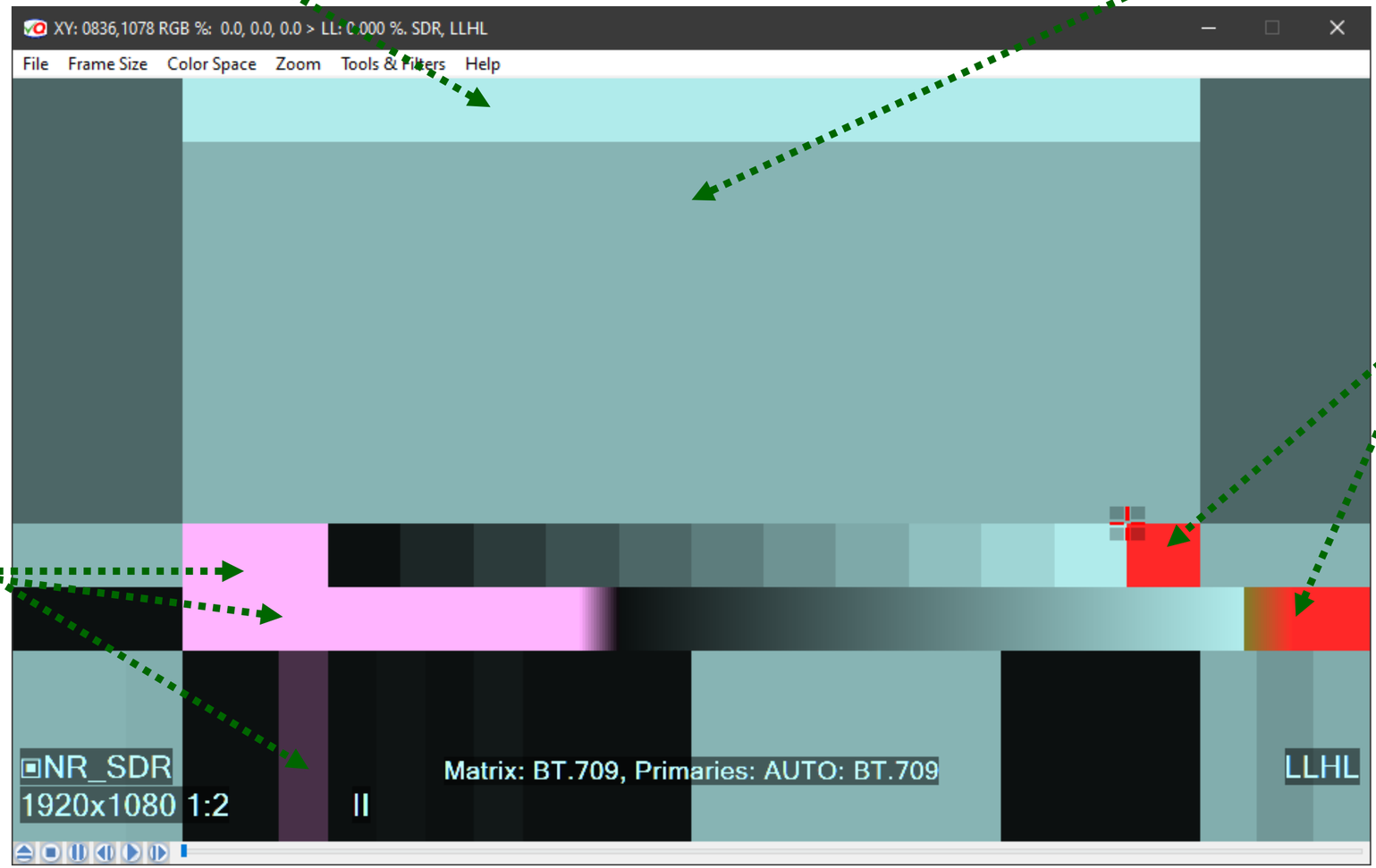
to enable the **Light Levels** (MaxRGB) Image Filter

Press **S**

to cycle thru 3 modes:

1. **LL** = Light Levels Image
2. **LLHL** = LL + Highlighter
3. **LLHM** = LL + ‘Heat-map’

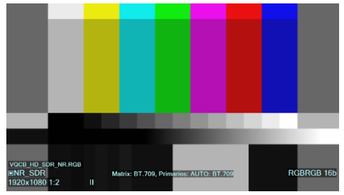
Light Levels **below** Reference Black



Light Levels **above** Reference White

VQCB Test

Narrow Range RGB



HDR sample video – courtesy of newsbyte.co.uk

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A1.32 L-Bar combined with VV-Bars

SDR RAW – Full Range (QC) Mode

Press **9**
to switch between two
RGB ⇔ YUV Level Mapping Modes:
Full vs. **Narrow**

SDR – Narrow Range (Regular Viewing) Mode

R channel **Upper Level** is
at the Full Range Max Limit Level,
i.e. above the White Crush threshold

B channel **Lower Level** is
slightly below the Narrow Range Min Limit Level
Black Crush is possible

White Crush Markers are On in all 3 channels,
R is the most affected one (brightest indicator)

B channel:
Medium strength **Black Crush Marker**

SDR sample video – courtesy of Kate McCartney & Kate McLennan, Australia

TOC2 ⟸ Click on **TOC2** for **Section A2 TOC**

A2. Reports and Log Files

A2.1 Reports and Log Files Features

VQV can display specific reports as pop-up windows:

- **Media Info Report** (**Ctrl + M**), optionally saved in **InFilePath.vqvmi.TXT**
- **Bookmarks Info Report** saved via File menu dialog, default name is **InFilePath.vqvbm.TXT**
- **Metadata Validator Report** (**Ctrl + Shift + M**), optionally saved in **VQV_MetaDataValidator.TXT**
- **Color Workflow Info Report** (**K**), optionally saved in **VQV_ColorWorkflowInfoReport.TXT**
- **Frame Info Report** (**Ctrl + F**), optionally saved in **VQV_FrameInfoReport.TXT**

Some report file names (listed above) are fixed and can not be changed. In such case the existing report will be overwritten/appended, then opened in minimized Notepad window, unless the user deliberately closed Notepad window related to the file.

VQV user can also create/append **VQV.Log** text file:

Press **Ctrl + P** to store in VQV.Log any textual information currently displayed in the Title Bar Message or as an Overlay.

Each time VQV.Log will be immediately opened in minimized Notepad window.

If necessary, user can edit/save/rename/copy/move these text files and copy/paste text data using standard Windows tools.

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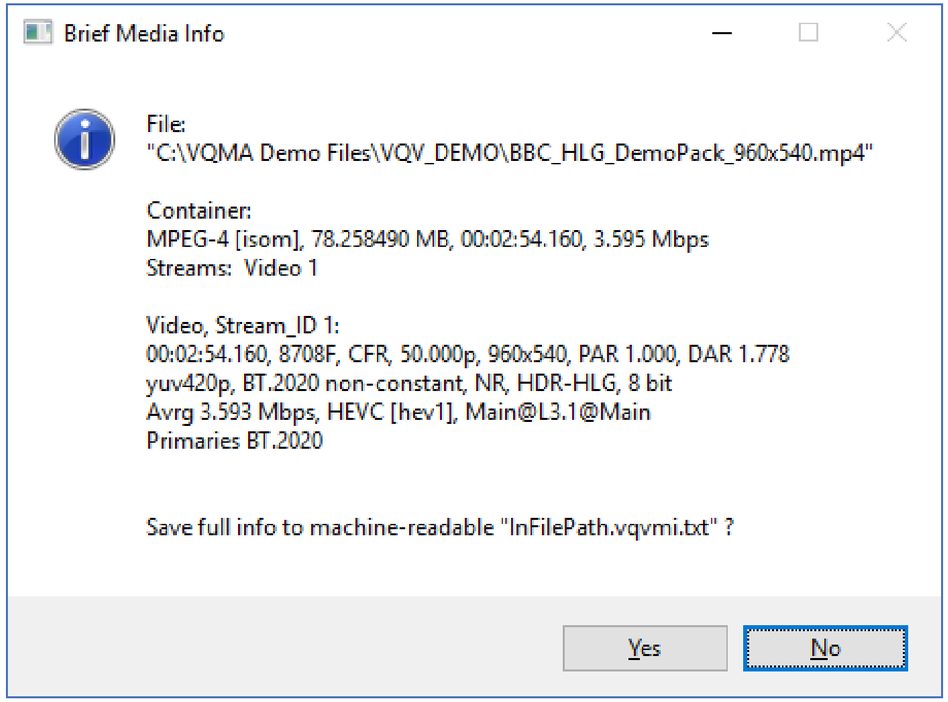
A2.2 Media Info Report

Press **Ctrl + M**

to get **Brief Media Info Report** in pop-up window,

More text data can be optionally saved as **InFilePath.vqvmi.txt** and opened in minimized Notepad window.



VideoQ VQV v 2.2.1 copyright (c) 2012-2016.
Media File Info Report
MediaInfoLib - v0.7.92.1
Media Info Report Time = ,2017-03-08T18:49:24
File = ,"C:\Users\VS\Desktop\Mexicana.mp4"
FileExtension = ,MP4

General File Info:

EncodedDate_UTC = ,NULL
TaggedDate_UTC = ,NULL
LastModificationDate_UTC = ,2016-05-04T07:13:20.716Z
LastModificationDate_LOCAL = ,2016-05-03T23:13:20.716
WrittenTime_UTC = ,2016-05-04T07:13:15.137Z
WrittenTime_LOCAL = ,2016-05-03T23:13:15.137
ContainerFormat = ,MPEG-4
ContainerCodecID = ,isom
FileSize_byte = ,41856374
OverallBitRateMode = ,VBR
Duration_ms = ,415123
Duration_TC1000 = ,19:18:00.000
CountOfVideoStreams = ,1
CountOfAudioStreams = ,1
CountOfImages = ,0
CountOfTexts = ,0

Video:

EncodedDate_UTC = ,NULL
TaggedDate_UTC = ,NULL
Duration_ms = ,415080
FramesCount = ,10377
ScanType = ,Progressive
TopFieldFirst = ,NULL
FrameRateMode = ,NULL
FrameRate = ,25.000
FrameWidth = ,960
FrameHeight = ,540
ColorSpace = ,YUV
ColorPixFormat =,yuv420p
ColorMatrix = ,NULL
ColorPrimaries = ,NULL
ColorRange = ,NULL
TransferCharacterstics = ,NULL
ChromaSubsampling = ,4:2:0
BitsPerComponent = ,8
StreamSize_byte = ,34978735
AverageBitRate_bps = ,674159
EncodingFormat = ,AVC
CodecID = ,avc1
EncodingProfile = ,Main@L3
EncodingCABAC = ,Yes
GOPSize = ,M=1, N=50
NumberOfReferenceFrames = ,4

Audio:

EncodedDate_UTC = ,NULL
TaggedDate_UTC = ,NULL
Language = ,en
Duration_ms = ,415123
StreamSize_byte = ,6642006
ChannelsNumber = ,2
ChannelPositions = ,Front: L R
SamplingRate = ,48000
SamplesCount = ,19925904
FrameCount = ,19459
BitRateMode = ,CBR
BitsPerComponent = ,NULL
BitRate_bps = ,128000
EncodingFormat = ,AAC
EncodingProfile = ,LC

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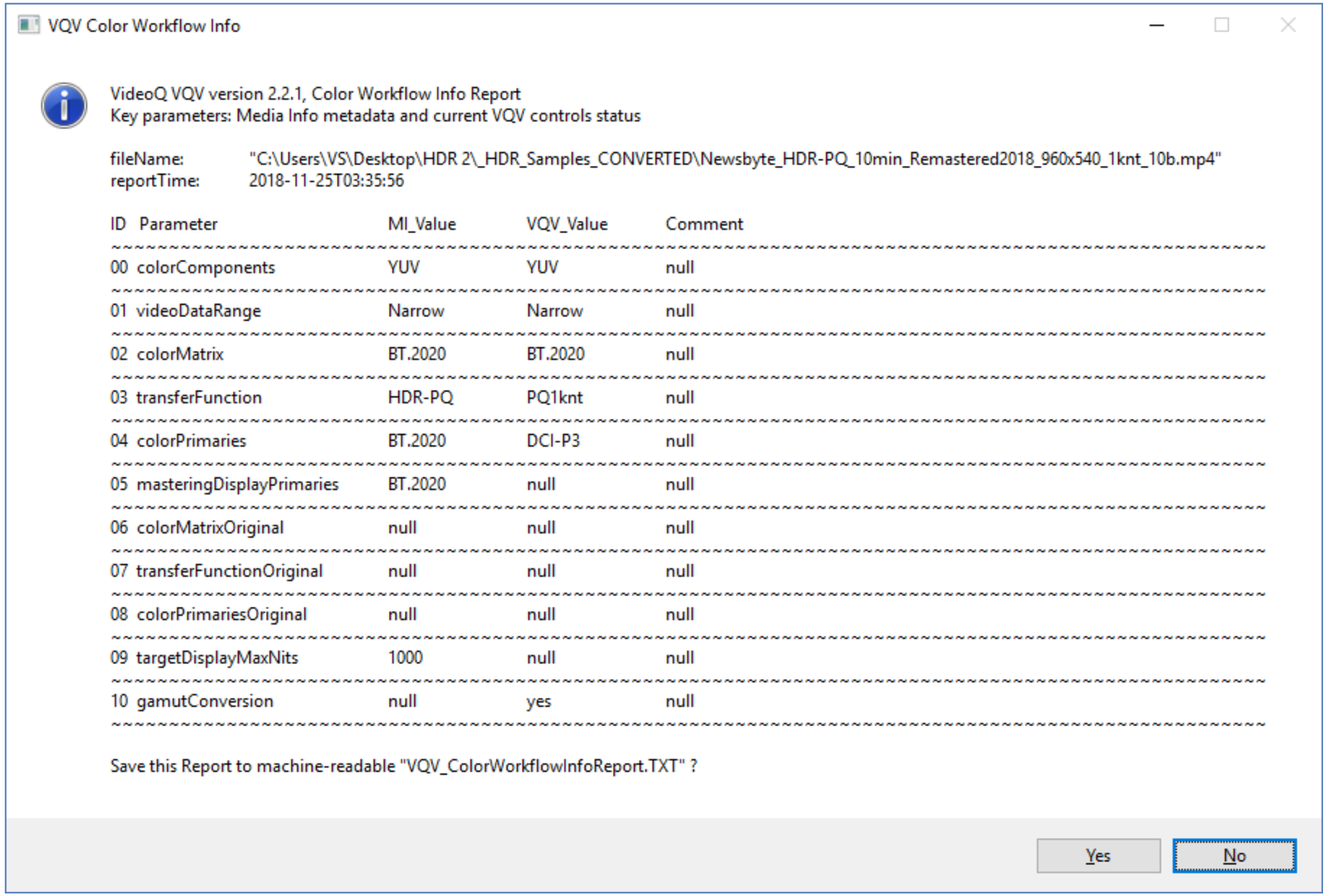
A2.3 VQV Color Workflow Info Report

Press **K**

to get **Color Workflow Report** in pop-up window, especially important for HDR WCG analysis.

The report data can be optionally saved in **VQV_ColorWorkflowInfo Report.TXT** and opened in minimized Notepad window.



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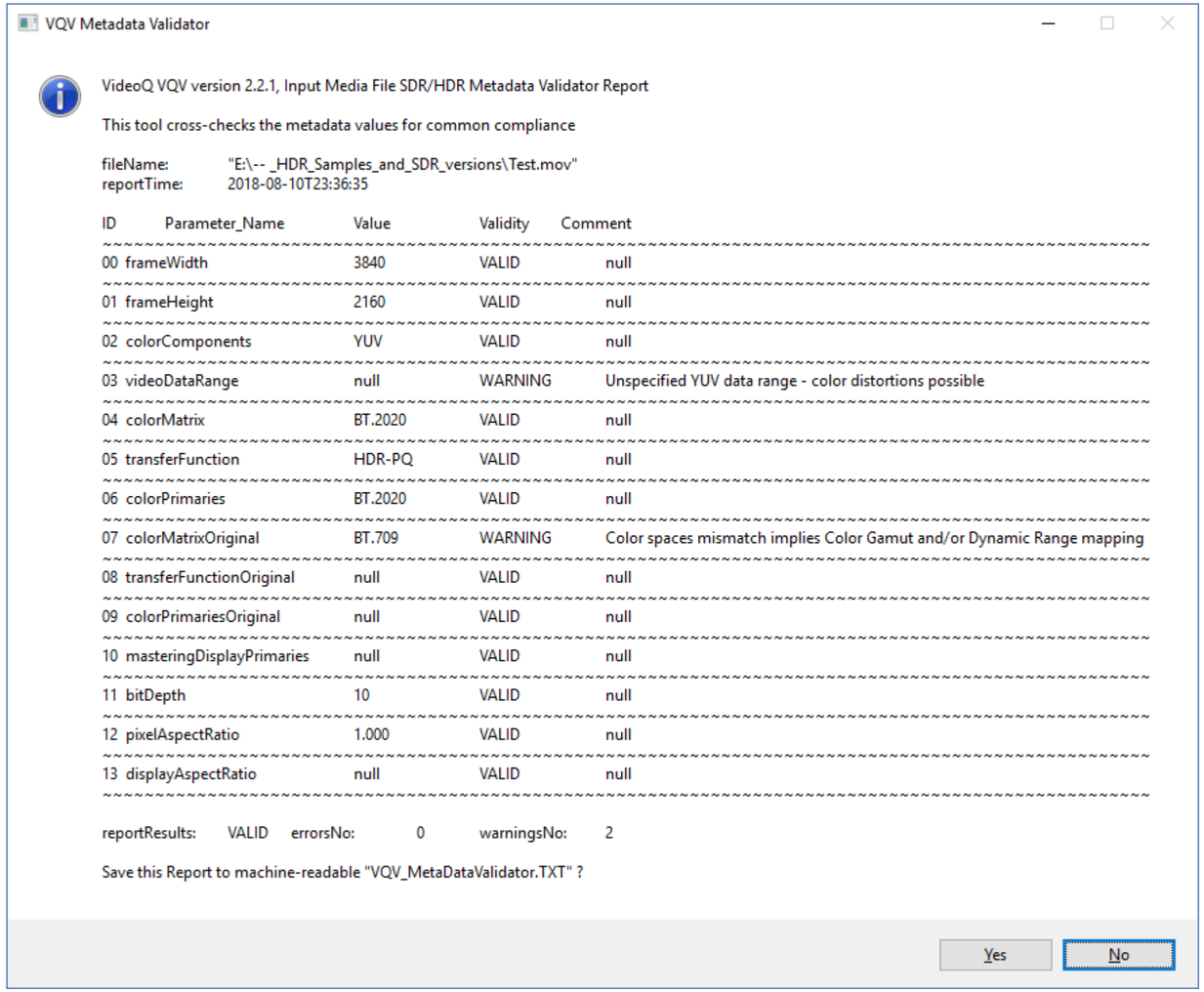
A2.4 Metadata Validator Report

Press **Ctrl + Shift + M**

to get **Metadata Validator Report** in pop-up window,

The report data can be optionally saved in **VQV_MetaDataValidator.TXT** and opened in minimized Notepad window.



This tool generate **Warnings** and **Errors** Messages in tabular format with appropriate explanatory comments

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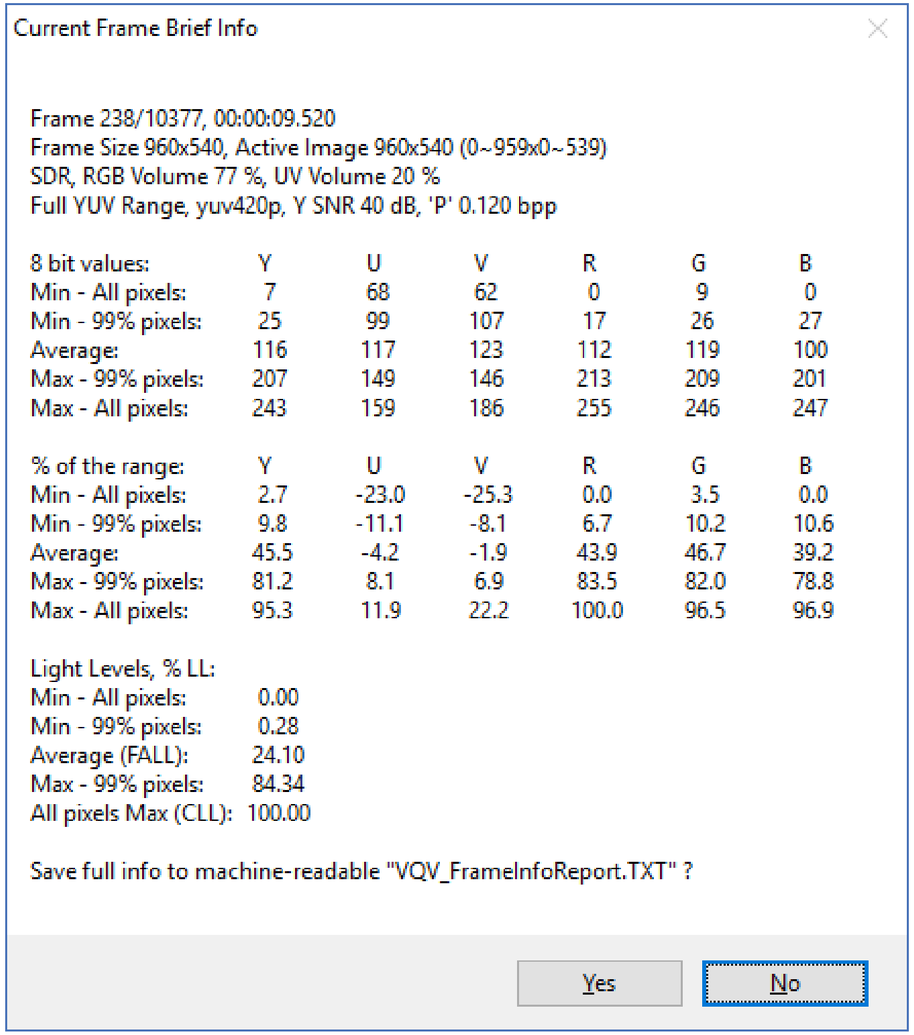
A2.5 Frame Info Report

Press **Ctrl + F**

to get **Brief Frame Info Report** in pop-up window,

More text data can be optionally saved in **VQV_FrameInfoReport.TXT** and opened in minimized Notepad window.



VQV v 2.2.1, Copyright (c) 2012-2016, VideoQ, Inc.
Frame Info Report Time: ,2017-03-09T00:51:23
File: ,"C:\Users\VS\Desktop\Mexicana.mp4"

Duration_ms ,415080000, Duration_TC1000 ,19:18:00.000
Frame 238/10377, 00:00:09.520 , TimePosition_ms ,9520, TimePosition_TC1000 ,00:00:09.520
Frame Size ,960, x ,540, Active Image ,960, x ,540, (0 ~ 959 x 0 ~ 539)
YUV 8b from file, RGB converted from YUV, Full Range to Full Range , BT.709
Selected RGB Rendering Mode: ,SDR

RGB_Volume_pct ,77, UV_Volume_pct ,20

Video Levels Statistics, 8b values
Channel: ,Y,U,V,R,G,B
Min - All pixels: ,7,68,62,0,9,0
Min - 99% pixels: ,25,99,107,17,26,27
Average: ,116,117,123,112,119,100
Max - 99% pixels: ,207,149,146,213,209,201
Max - All pixels: ,243,159,186,255,246,247

Video Levels Statistics, Percents of Nominal Range
Channel: ,Y,U,V,R,G,B
Min - All pixels: , 2.7, -23.0, -25.3, 0.0, 3.5, 0.0
Min - 99% pixels: , 9.8, -11.1, -8.1, 6.7, 10.2, 10.6
Average: , 45.5, -4.2, -1.9, 43.9, 46.7, 39.2
Max - 99% pixels: , 81.2, 8.1, 6.9, 83.5, 82.0, 78.8
Max - All pixels: , 95.3, 11.9, 22.2, 100.0, 96.5, 96.9

Special Pixels Counts, percents of Total Pixels Count
Channel: R,G,B
On Min of All Pixels Level: , 0.0008, 0.0008, 0.0139
On Max of All Pixels Level: , 0.0008, 0.0008, 0.0023
Below Nominal Black: , 0.0000, 0.0000, 0.0000
Above Nominal White: , 0.0000, 0.0000, 0.0000

Light Levels, :
Min - All pixels: , 0.00
Min - 99% pixels: , 0.28
Average (FALL): , 24.10
Max - 99% pixels: , 84.34
All pixels Max (CLL): ,100.00

SNR, dB:
R,G,B,Y,U,V, (YUV SNRs derived from RGB)
40,40,41,40,49,52

Inter-Frame Activities, dB:
R,G,B
-22,-22,-21

TOC2

A2.6 VQV.Log Report

Press **Ctrl + P**

to create/append **VQV.Log** and store in it any text currently displayed in the Title Bar Message or as an Overlay;

VQV.Log will be immediately opened in minimized Notepad window.

VQV v 2.2.1. Copyright (c) 2012-2017 VideoQ, Inc.
Selected Analysis Data Items Log Created: 2017-03-09T01:03:05

File Open Time: 2017-03-09T01:03:05
File: "C:\Users\VS\Desktop\Mexicana.mp4"
Item: 0, FrameNo: 325
 Full YUV Range, SDR, Video Volume 77%
 Frame 325 / 10377 Time Code 00:00:13.000 / 00:06:55.080
 Active Image Size Meter: OFF. Analyzed: Full Frame Area 960x540
 Frame Video Levels, 8b: Min 0, Lower 21, Median 114, Upper 217, Max 255
 Frame Video Levels, %: Min -7.31, Lower 2.28, Median 44.75, Upper 91.78, Max 109.13
 Frame Light Values, %: Min 0.000, Lower 0.217, Average (FALL) 23.2, Upper 84.3, Max (CLL) 100.0
 Light Levels Statistics Analysis Start: 238F @ 00:00:09.520
 Overall: Average FALL 26.5 %, Max FALL 28.1 % @ 261F 00:00:10.440
 Overall: Max FrameUpper LL 100.0 % @ 249F 00:00:09.960, MaxMax LL (MaxCLL) 100.0 % @ 238F 00:00:09.520
 Analyzed: 88 Frames from 238F @ 00:00:09.520 to 325F @ 00:00:13.000
Item: 1, FrameNo: 325
Line 0260 StMin~StMax: Original RGB 8b 009~246, RGB % 3.5~96.5, LL: 0.0327~91.7 % LL
Item: 2, FrameNo: 470
 MP4[AVC] 960x540 25p 8b, Media Info: Average 0.674 Mbps, 0.052 bpp
 Current Frame: 470 / 10377F, 00:00:18.800 / 00:06:55.080, 'P', 0.223 Mbps, 0.017 bpp
 Bit Rate Statistics Segment Start: 325F @00:00:13.000
 Current GOP: Start 450F @00:00:18.000, # (Chunk ID) 9, I Frame (Max) 8.859 Mbps
 Last GOP: Size 50F, Average 1.175 Mbps
 Min GOP Size 50F @00:00:12.000, Max GOP Size 50F @00:00:12.000
 Analyzed: 146 Frames from 325F @00:00:13.000 to 470F @00:00:18.800
 Overall: Average 1.197 Mbps, Max 12.501 Mbps @00:00:16.000, GOP Average Max 1.381 Mbps @00:00:16.000

File Open Time: 2017-03-09T01:15:02
File: "C:\Users\VS\Desktop\HDR_10minutes_test_960x540_1000nit_p3.MP4"
Item: 0, FrameNo: 0
 Narrow YUV Range, HDR-PQ Max 1000 nt to SDR, Video Volume 73%
 Frame 0 / 15142 Time Code 00:00:00.000 / 00:10:05.680
 Active Image Size Meter: OFF. Analyzed: Full Frame Area 960x540
 Frame Video Levels, 8b: Min 5, Lower 9, Median 65, Upper 195, Max 255
 Frame Video Levels, %: Min 1.96, Lower 3.53, Median 25.49, Upper 76.47, Max 100.00
 Frame Light Values, nt: Min 0.080, Lower 0.421, Average (FALL) 86.9, Upper 525.3, Max (CLL) 1000.0

7. Full List of VQV Shortcuts (p 1/3)

'Videola' – Jog & Shuttle Timeline Navigation Tool: **Ctrl** + **Mouse Left Button** + **Cursor Horizontal Position** within Image Area

Cursor position controls the speed selection; preset timeline step values: **+/- 0, 1, 2, 5, 10 F, 1, 2, 5, 10, 20 s, 1 m (60 s)**
In Jog Mode (i.e. starting from pause) – **Seek with variable speed**. On release of Mouse Left Button or Ctrl key – pause at last shown frame;
In Shuttle Mode (during playout) – **Play with variable speed**. On release of Mouse Left Button or Ctrl key – continue playout at last selected speed.
Select fractional playout speeds (slow motion) with **Mouse Wheel or Left/Right Arrows**: **+/- 0.1, 0.2 and 0.5** of media file frame rate

Key	Result	Shift + Key	Ctrl + Key	Ctrl + Shift + Key
Mouse Wheel	Jog Mode: **+/- 1 frame**, Shuttle Mode: **Speed** up/down,	Display **Gain**: up/down		Display Gain Filter Brightness **Offset**: up/down
Mouse Move	In Active Image: **Pixel Value** readout, In Mask Area: **Masked Filter** readout			
Mouse Middle Button	**Jog/Shuttle** toggle			
Mouse Left Button + Mouse Move	In Active Image: **Image Position** In Mask Area: **Mask Position**	Click in the image area: **Start/Stop playout**, speed: **+1F**	Hold and move the slider: **Timeline Scroll**	Click in the image area: **Continue playout**, reset speed: **+1F**
M + Mouse Wheel	**Mask Size** up/down			
Z + Mouse Wheel	**Zoom** up/down *(cursor centered)*			
Mouse Right Button	In Active Image: **Context Menu**			
Up/Down Arrows	**Zoom** up/down *(image centered)*	Display **Gain**: up/down	**VQV** to/from **VQMP** message	Display Gain **Slicing Level** up/down
Right/Left Arrows	Jog Mode: **+/- 1 frame**, Shuttle Mode: **Speed control**	Jog Mode: **+/- 10 frames**	In Jog Mode**:** **Seek, variable speed**	
PageDown/PageUp	Jog Mode: **+/- 1 s**	Jog Mode: **+/- 10 s**	Jog Mode: **+/- 1 m**	Jog Mode: **+/- 10 m**
0	**SDR RAW**	**Clear all Bookmarks**	**Segments Info** On/Off	
1	**HDR-PQ RAW**	**Record Bookmark #1**	**Go to Bookmark #1**	
2	**HDR-PQ ⇒ SDR**, Max **1000 nt**	**Record Bookmark #2**	**Go to Bookmark #2**	
3	**HDR-HLG RAW**	**Record Bookmark #3**	**Go to Bookmark #3**	
4	**HDR-HLG ⇒ SDR**, Max **100% LL**	**Record Bookmark #4**	**Go to Bookmark #4**	

Full List of VQV Shortcuts 2 (p 2/3)

Key	Result	Shift + Key	Ctrl + Key	Ctrl + Shift + Key
5	**HDR-LOG RAW**	**Record Bookmark #5**	**Go to Bookmark #5**	
6	**HDR-LOG ⇒ HLG Compatible SDR**	**Record Bookmark #6**	**Go to Bookmark #6**	
7	**HDR-LOG ⇒ SDR**	**Record Bookmark #7**	**Go to Bookmark #7**	
8	**MSB / LSB Image** toggle (if media file > 8 bit)	**Record Bookmark #8**	**Go to Bookmark #8**	
9	**Full / Narrow YUV Range** toggle (RGB <> YUV conversion mode)	**Record Bookmark #9**	**Go to Bookmark #9**	
Space Bar	**Jog / Shuttle** toggle *(same as Play Button)*	**Jog / Shuttle** toggle speed reset to default **+1F**		
A	**Auto-select Primaries** for: - Color Gamut Converter - ChromaScope	Active Image Size **Markers** Show / Hide toggle	**Active Image Size Meter** (Black Bars Detector): Detect once & store results; also enables Active Image Area Analysis Mode	**Analyzed Area** toggle: **Active Image / Full Frame** Applies to most meters; Active Image Size Meter results are not affected
B	**Bookmark** current **Timeline Position** and **copy** it to **Clipboard**	**B** component Image (**Blue**)	**Go to** the **last used Bookmark**	Create the **Bookmark** from **Clipboard** data
C	**C-Bar** (Compression Analyzer) toggle On/Off	**ChromaScope Primaries**	**ChromaScope** On/Off	
D	All **Filters Off, same result as ESC key:** *settings reset to defaults*	**- Fast Draw Mode (FDM)** **- Aspect Ratio Correction** (**ARC**)	**Duplicate** currently opened file in new VQV window	
E	**Enhanced Rendering Mode** On/Off, **Color Vector Correlation ™** (CVC) processing		**AV Sync Error** Meter (on *MPC Test Pattern)*	
F	Frame Profile Waveform **Filtering Modes**,	All **Filters** On/Off *(settings preserved)*	**Frame Info** Report pop-up, *or* **Line Range Selection Mask**	
G	**Gamut** Conversion On/Off	**G** component Image (**Green**)		
H	**Histogram** Overlay toggle On/Off	**RGB / Light Levels Histogram** toggle	**Histogram Mode** toggle	**HDR10+ Analyzer** On/Off, also enables **L-Bar**

Full List of VQV Shortcuts 3 (p 3/3)

Key	Result	Shift + Key	Ctrl + Key	Ctrl + Shift + Key
I	Cycle thru 3 **Deinterlacing Modes**			
L	**L-Bar** toggle On/Off	**Light Levels** (MaxRGB) Image, **S**: Highlighter / Heat-Map	**Transfer Function** Plot: On/Off	
M	WFM **Mask** toggle: Full Frame/Line Select, **Mask Size** control, ChromaScope **Modes**	Filters **Mask** On/Off	**Media Info** Report pop-up or WFM **Mask** Controls	
N	**Navigation** Control Panel pop-up (Go to Timeline Position & Bookmarks)	**Noise** Meter toggle On/Off	File Open in **New** Window	
O			File **Open** Dialog	
P	ChromaScope & WFM **Persistence**	Select **Primaries** for: **-** Color Gamut Converter - ChromaScope	**Print** analysis data to: *VQV.Log, VQV_Statistics.TXT, etc.*	
Q			**Quit** (Exit) VQV	
R		**R** component Image (**Red**)	**Release / Reopen** media file *same as 'Eject' button*	
S	**Switch / Start / Select** Text Messages / Display Modes		*Select **Video Stream** # if the number of video streams > 1*	
T	**Text Overlay Messages** On/Off	**T-Filte**r (Temporal High Pass)	**Text Overlay Auto-hide** On/Off	
U	Histogram, WFM, FrameScope and ChromaScope **Units** selection	**UV** components Image	Graticule Grid **Units** toggle: ***RGB** % vs. **Light Level** % or nits*	
V	**VV-Bars** toggle On/Off	Cycle thru 3 **VV Bars Modes**	**VectorScope** toggle On/Off	
W	**FrameScope** On/Off		**Waveform Monitor** On/Off	
X		**XY-Filter** (Spatial HPF/LPF)	**Exit** (Quit) VQV	
Y	Waveform Monitor: **RGB/YUV** toggle	**Y** components Image		
Z	**Zoom** with **Mouse Wheel** – *see above*			

8. 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