EBU
OPERATING EUROVISION AND EURORADIO
TECHNOLOGY & INNOVATION
Get an edge
EBU VIDEO SYSTEMS AND WORKFLOWS
SIMON THOMPSON
SENIOR R&D ENGINEER, BBC
31.1.24

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TECHNOLOGY & INNOVATION

Get an edge

WHAT HAS EBU VS BEEN UP TO?

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R 153

PARAMETERS FOR LIVE CONTRIBUTION OF UHD/HDR PROGRAMMES

Version 2.0

SOURCE: EBU Video Systems Group

Geneva
June 2023

UPDATES

Live and Non-Live

Better understanding of Metadata Guided Audio (MGA)

Better understanding of HDR to SDR conversion

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TR 078

DYNAMIC HDR CONVERTER TESTING RESULTS

Version 1.0

Geneva
September 2023

DYNAMIC HDR TO SDR CONVERSION

Tested a range of vendors' products

Allows video to utilise more of the available dynamic range than static conversion

Presented anonymised results at IBC

Cautious approval for small, unilateral events

Work needed for camera matching, graphics inserts etc. for large multilateral events

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Tech 3376

BASELINE HDR CAMERA PAINTING CONTROLS

Version 1.0

Geneva
September 2023

CAMERA LOOK

Based on BBC work for Coronation

Multiple cameras

Multiple vendors

Completely different controls

Can we achieve a baseline set of controls, that work under a wide range of lighting conditions and give a traditional look in terms of saturation and shadow/midtone details?

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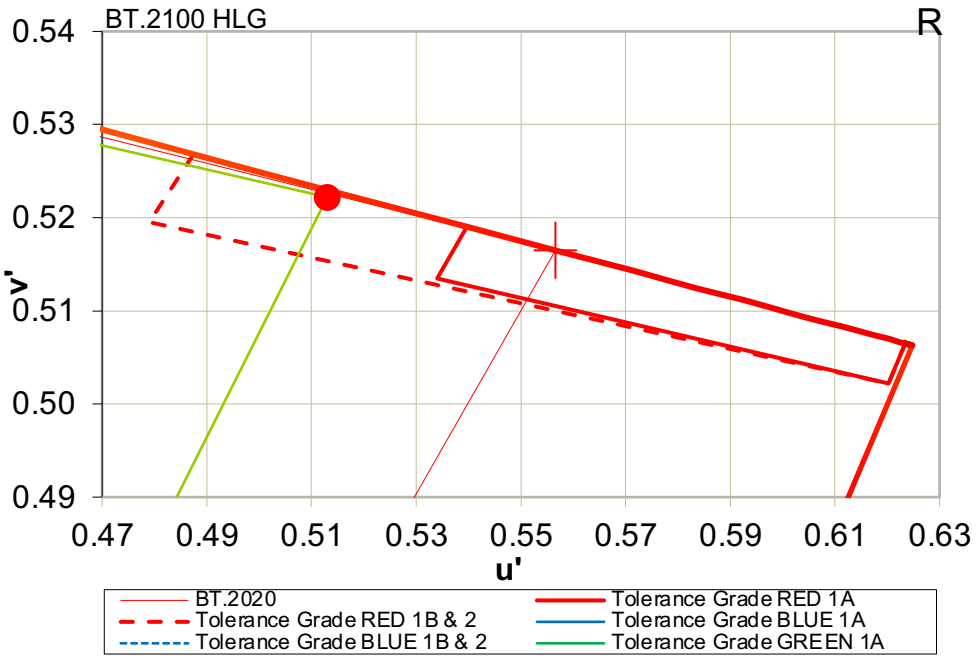
WHAT HAVE WE GOT COMING UP?

MONITORS



Definition of Monitors and Cameras for different production roles finalised during lock down

How to test against the definition? (Curtailed due to Covid backlog)

How to semi-automate the testing?

International alignment

SUMMER PLANS

- Working with Members on 2 major sporting events
- Qatar WC had a number of EBU members trialing OTT
- Expect public facing OTT this summer

FRANCE TV

UHD HDR + NGA Webinar

Feb 14th – 1600 CET

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TECHNOLOGY & INNOVATION

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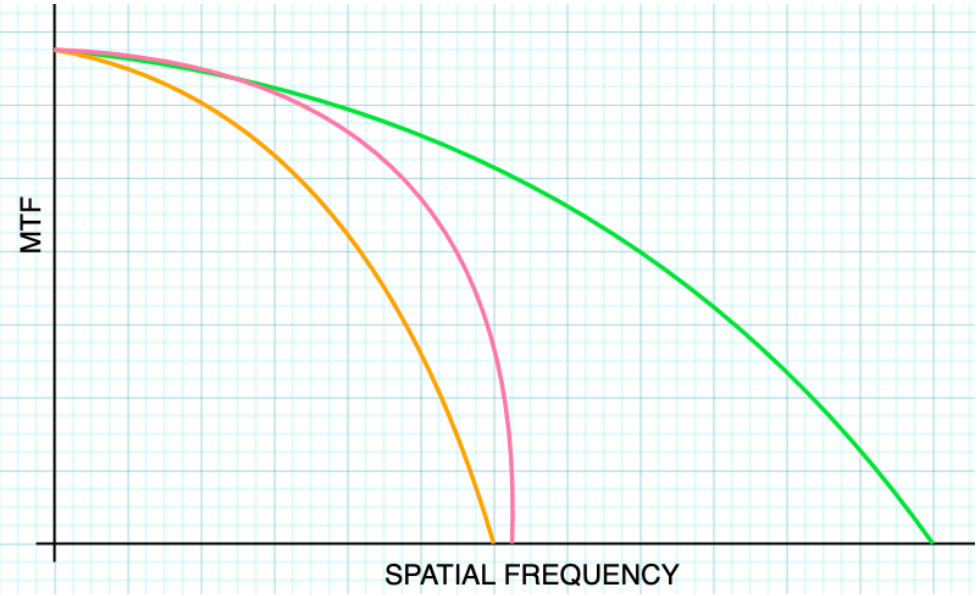
WORK STILL NEEDED

INTERLACING



A down-converted UHD signal has more high frequency “detail” than the output of an HD camera.

- Green = UHD camera
- Orange = HD Camera
- Pink = Down-converted UHD

§ *11.3.2.6 cICP Coding-independent code points for video signal type identification*

The four-byte chunk type field contains the hexadecimal values

```
63 49 43 50
```

If present, the cICP chunk specifies the color space (primaries), transfer function, matrix coefficients and scaling factor of the image using the code points specified in [ITU-T-H.273]. The video format signaling *SHOULD* be used when processing the image, including by a decoder or when rendering the image.

STILL IMAGE
FORMATS – W3C PNG

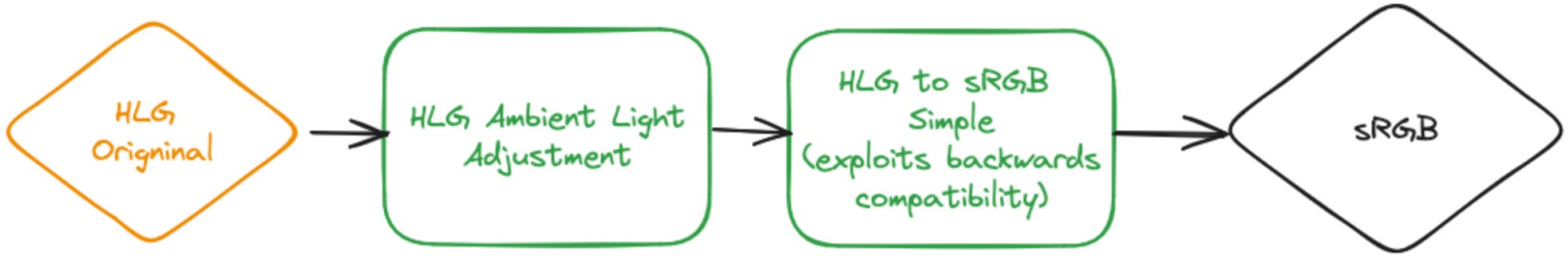
The cICP chunk consists of 4 bytes, each a signed integers to identify the characteristics described above.

The following specifies the syntax of the cICP chunk:

Table 17 cICP chunk components

Name	Size
Color Primaries	1 byte
Transfer Function	1 byte
Matrix Coefficients	1 byte
Video Full Range Flag	1 byte

W3C canvas tonemapping method with ambient light correction (HLG)



```
10  LUT_3D_SIZE 33
11
12  TITLE "DownMapping->COLOURSPACE"
13
14  0.019551 0.019551 0.019551
15  0.062561 0.062561 0.062561
16  0.098533 0.055886 0.061128
17  0.119185 0.049550 0.059543
18  0.153492 0.037111 0.055677
19  0.187238 0.024487 0.050783
20  0.223286 0.019551 0.068100
21  0.262913 0.019552 0.091167
```

LOOK UP TABLES

Work in SMPTE

Current Look up tables (LUTs) have very little machine-readable data

Hardware configuration is not automatic

CAMERAS

Work in SMPTE and ARIB

Measurement of Cameras

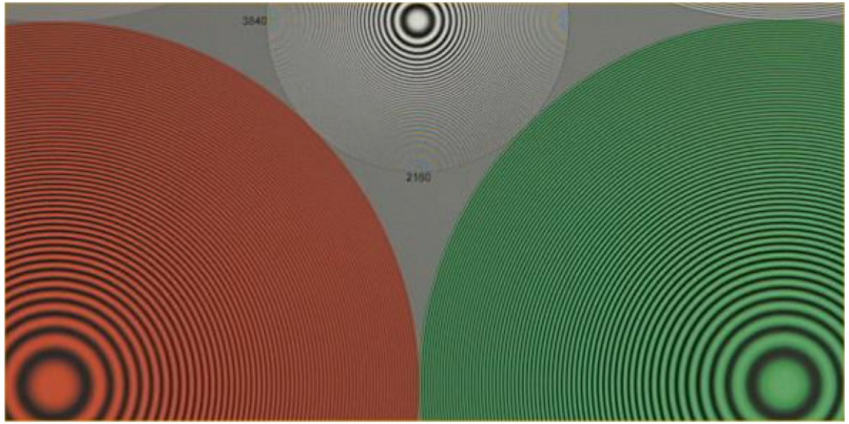


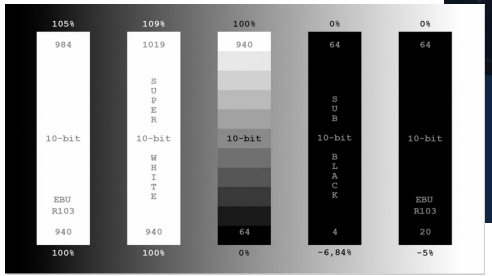
Figure 2 Resolution, 1080p, factory detail settings, red and green

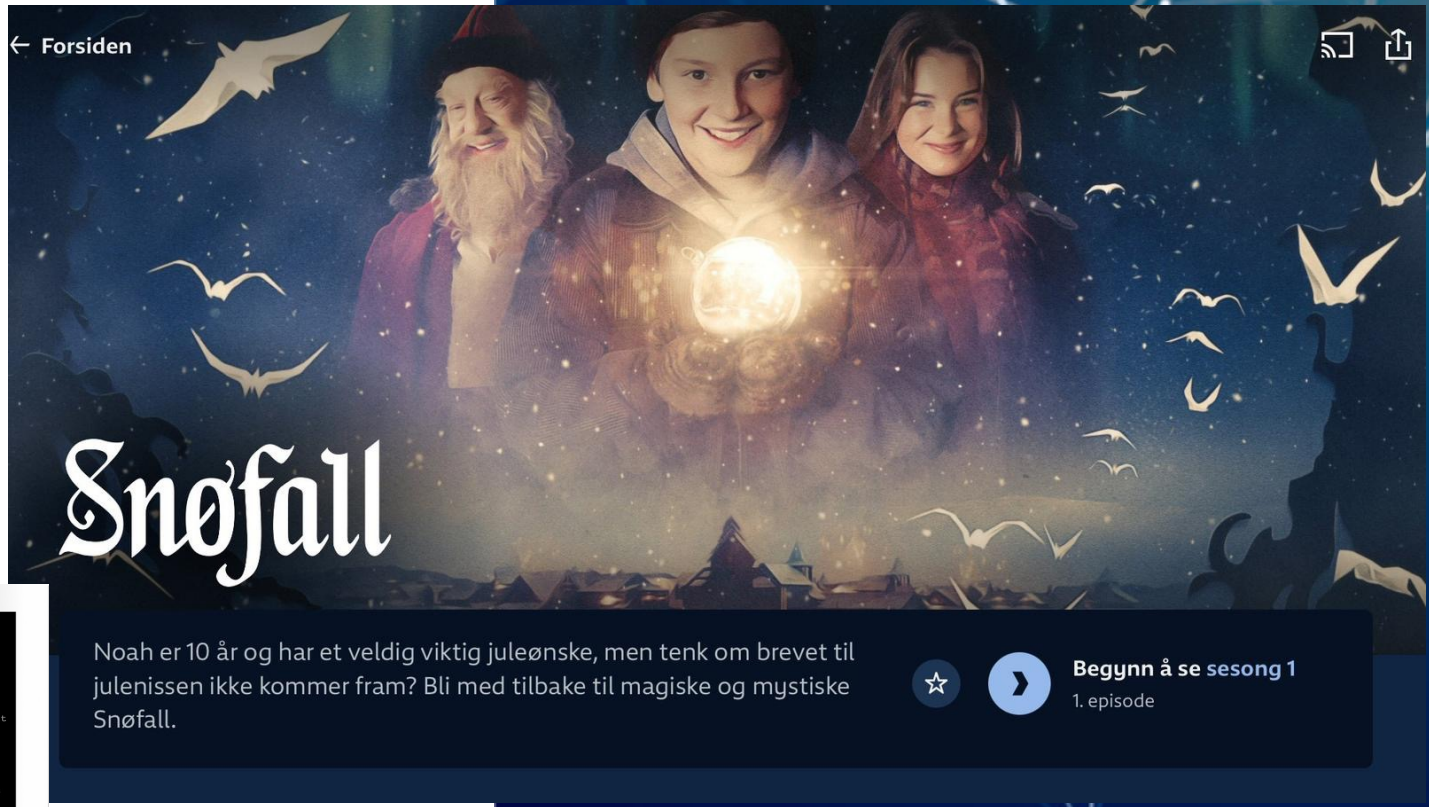
MEMBER HIGHLIGHTS

NRK Christmas Dramas

HLG

Produced for a number of platforms

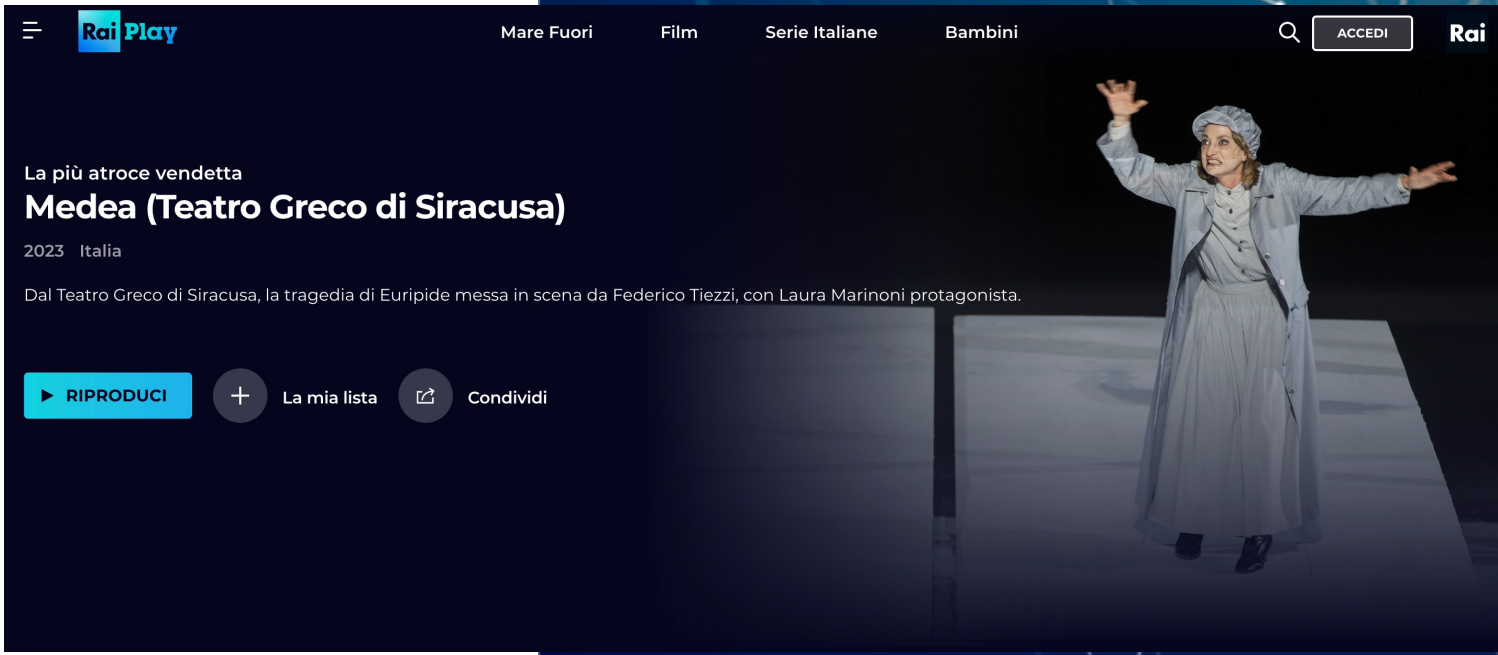


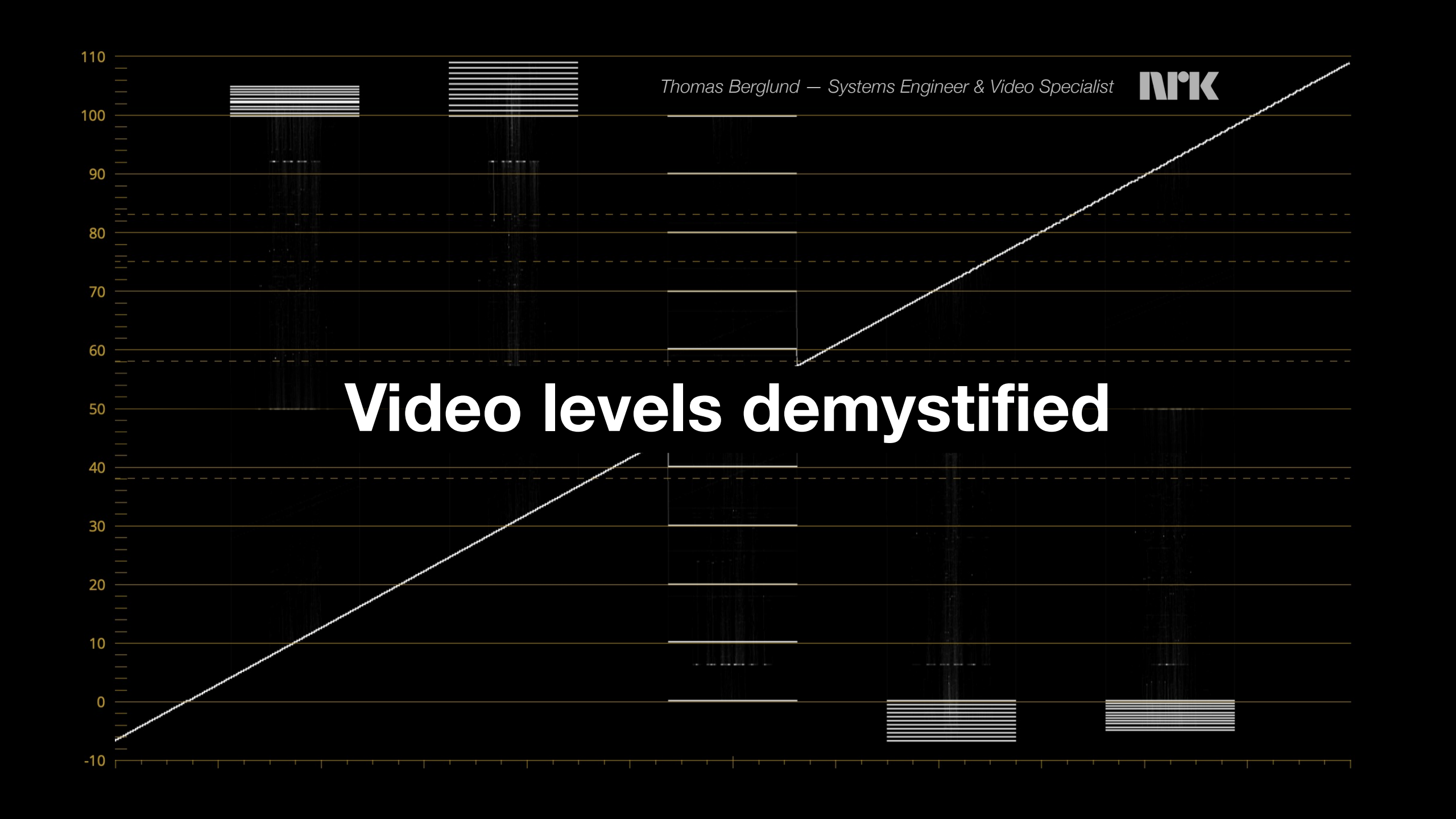


MEMBER HIGHLIGHTS

RAI Opera

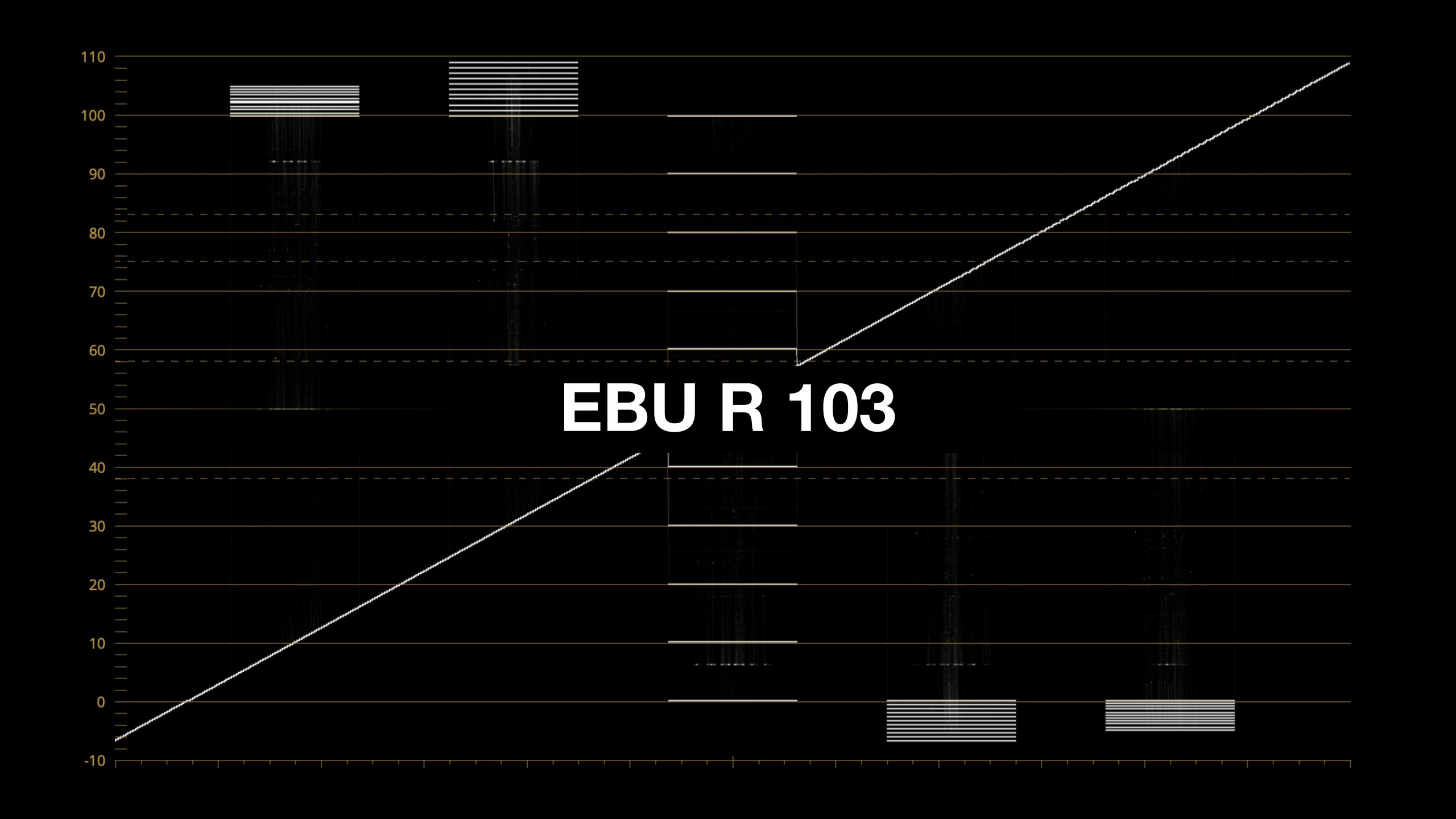
HLG





Thomas Berglund — Systems Engineer & Video Specialist

Video levels demystified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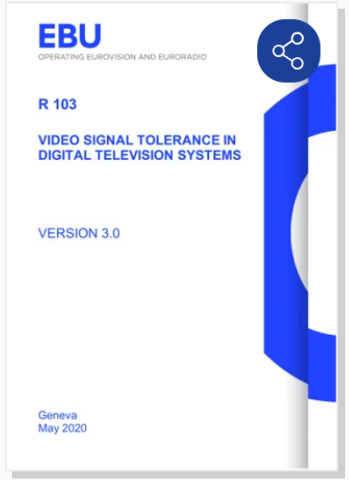
EBU R 103

https://tech.ebu.ch/publications/r103

VIDEO SIGNAL TOLERANCE IN DIGITAL TELEVISION SYSTEMS

EBU R 103

RECOMMENDATIONS 23 May 2020



Recommendation concerning permissible tolerances of video signals in digital television systems. Since version 3 includes details on the popular video ranges in use.

OPEN FILE (PDF, 0.5 MB)

EMAIL ME A LINK

FEEDBACK

The EBU encourages users and industry to provide feedback via **tech@ebu.ch**.

Details of changes between versions are available **here**.

TEST CHART

Thomas Berglund (NRK) has kindly provided this **DCTL and a Quicktime rendering** created with it, as well as a **tutorial video**.

https://tech.ebu.ch/publications/r103

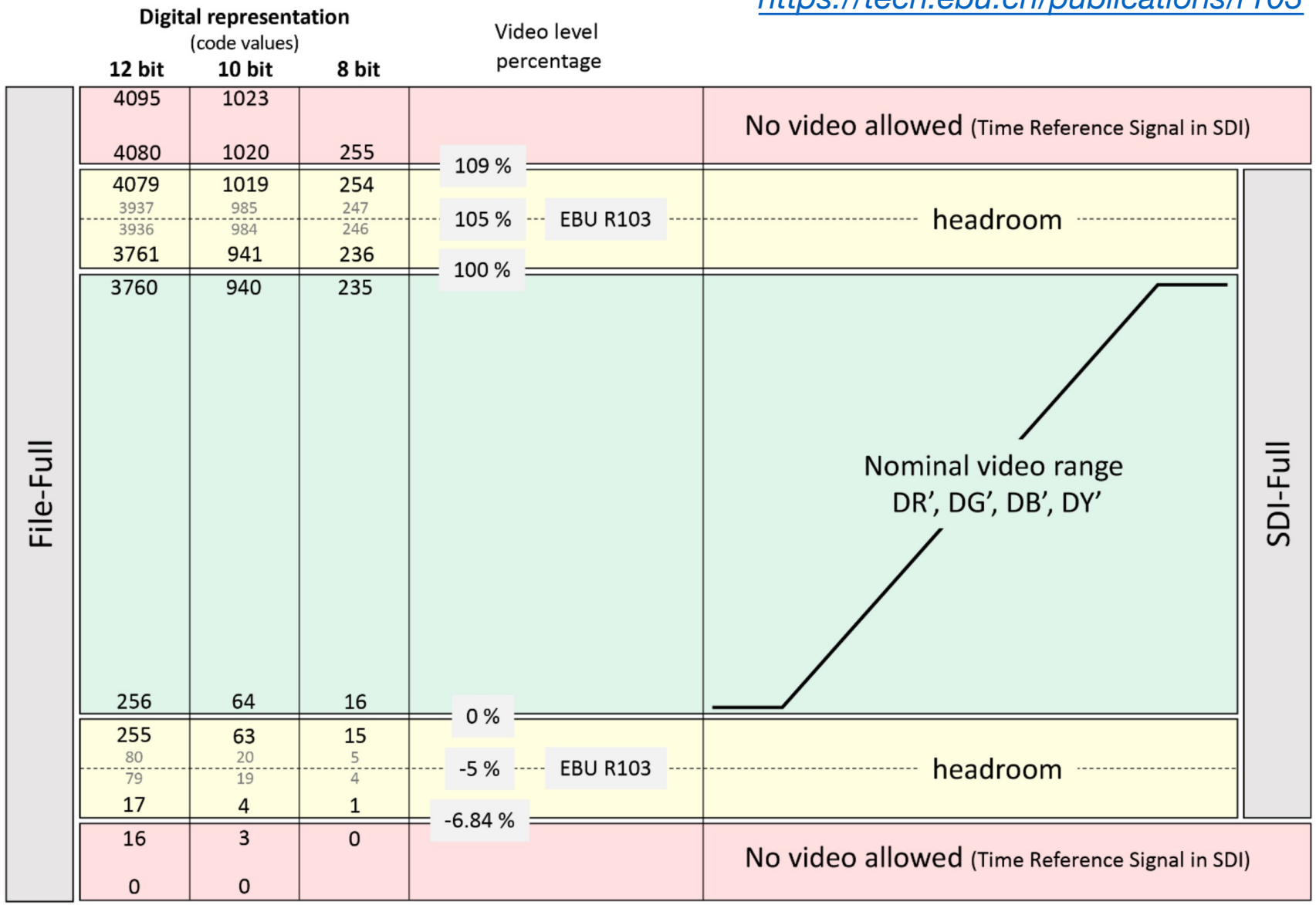
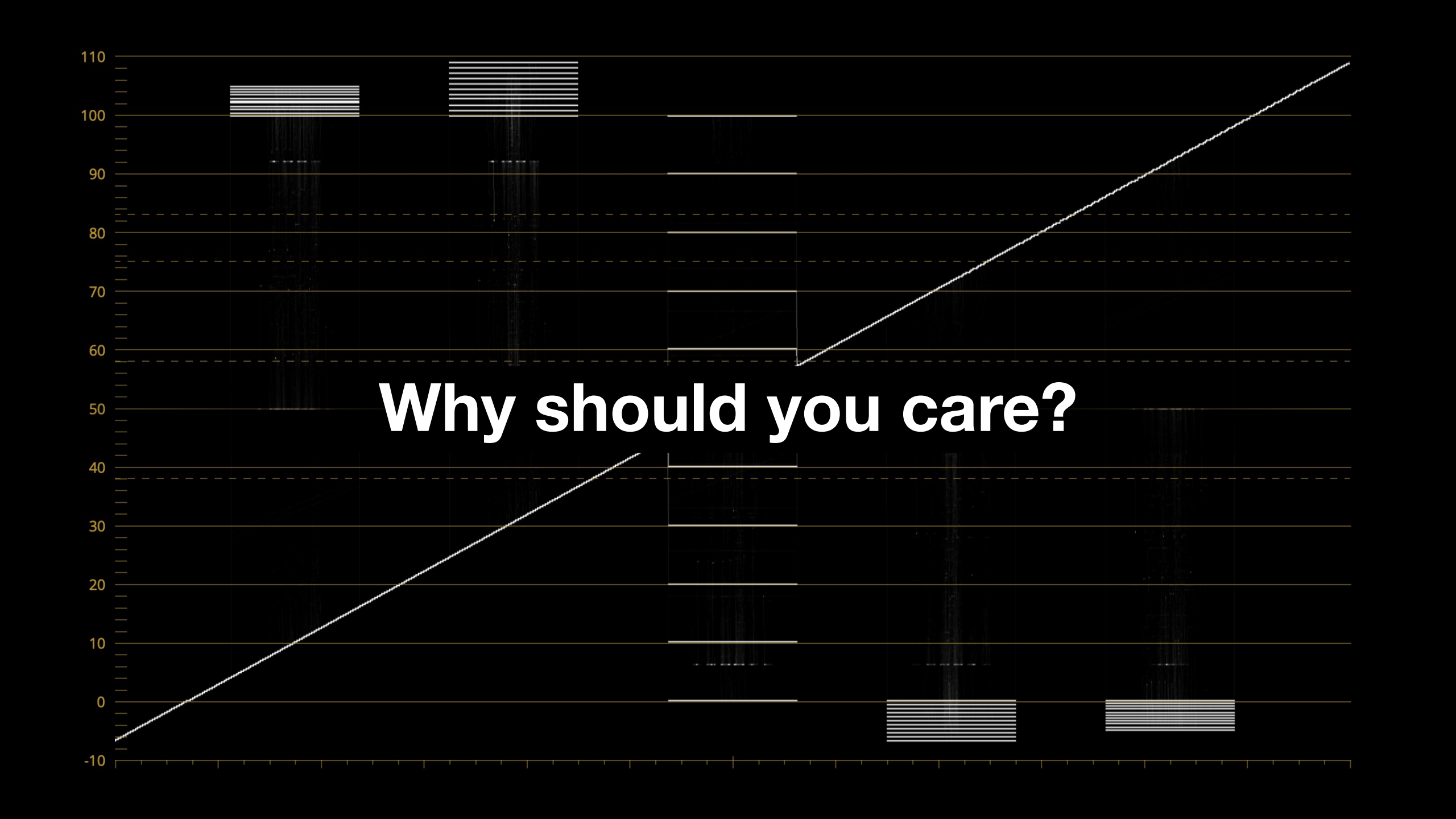


Figure 1: Typical signal levels for SDI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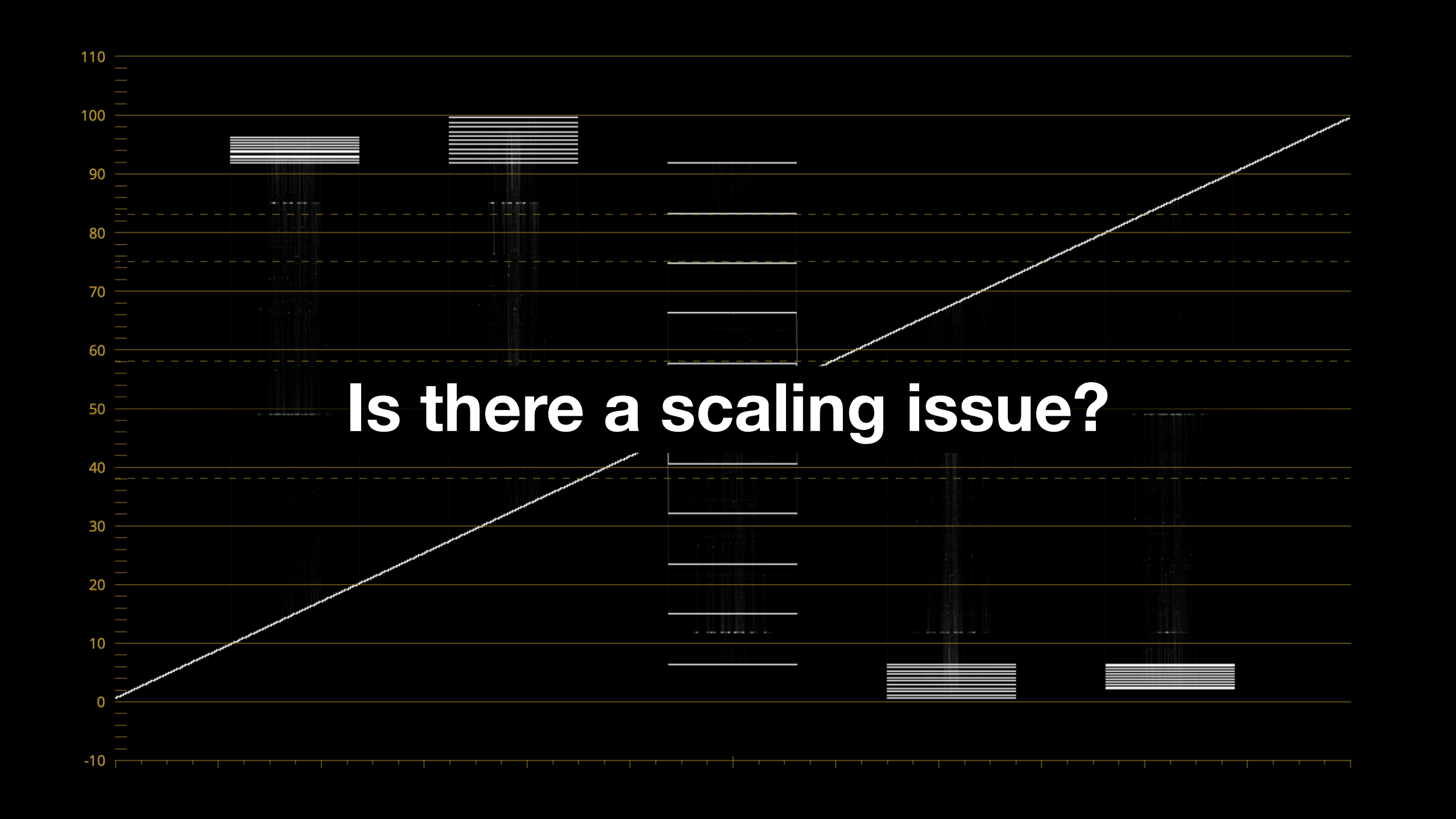
Why should you care?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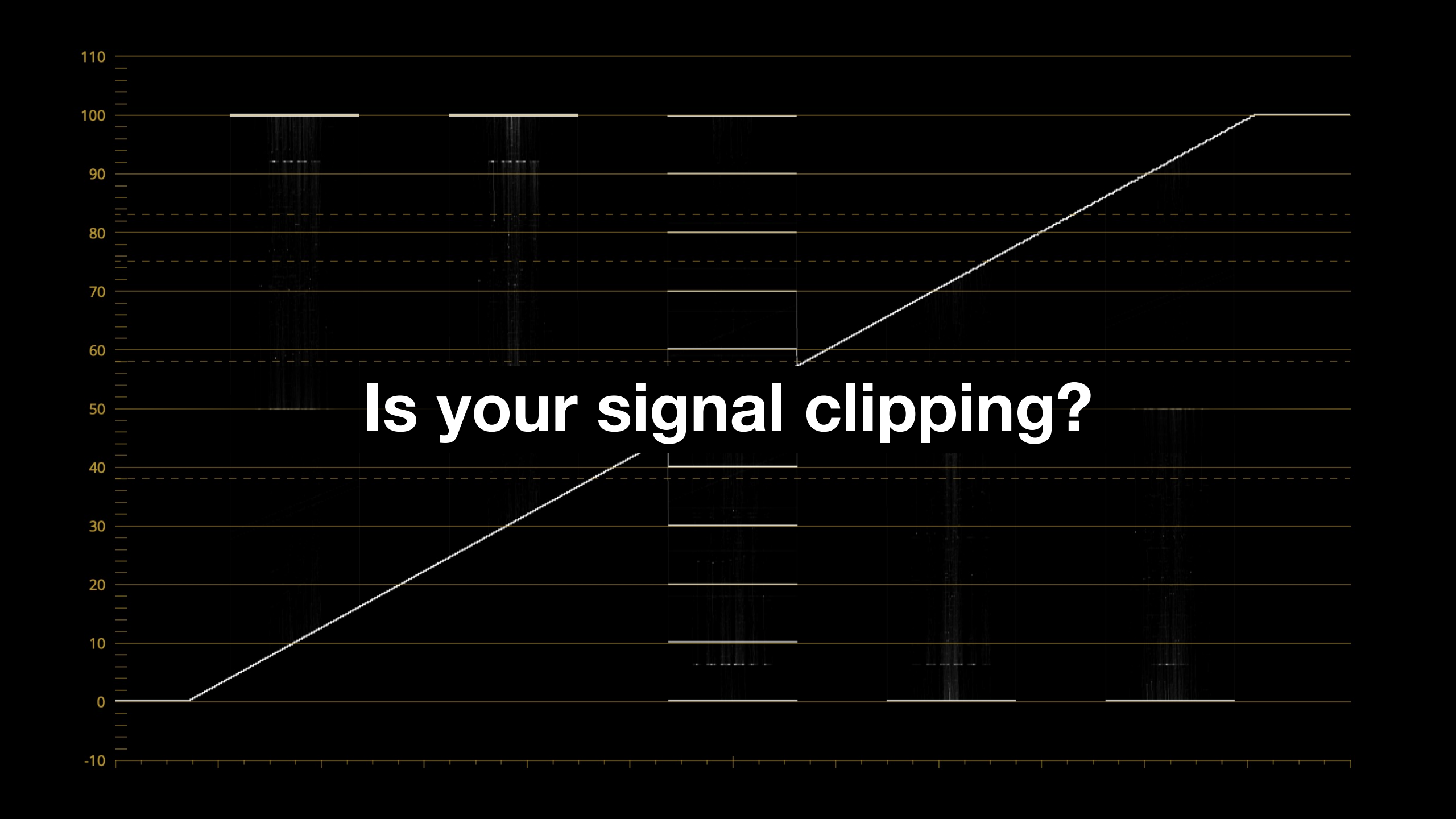
Is there a scaling issue?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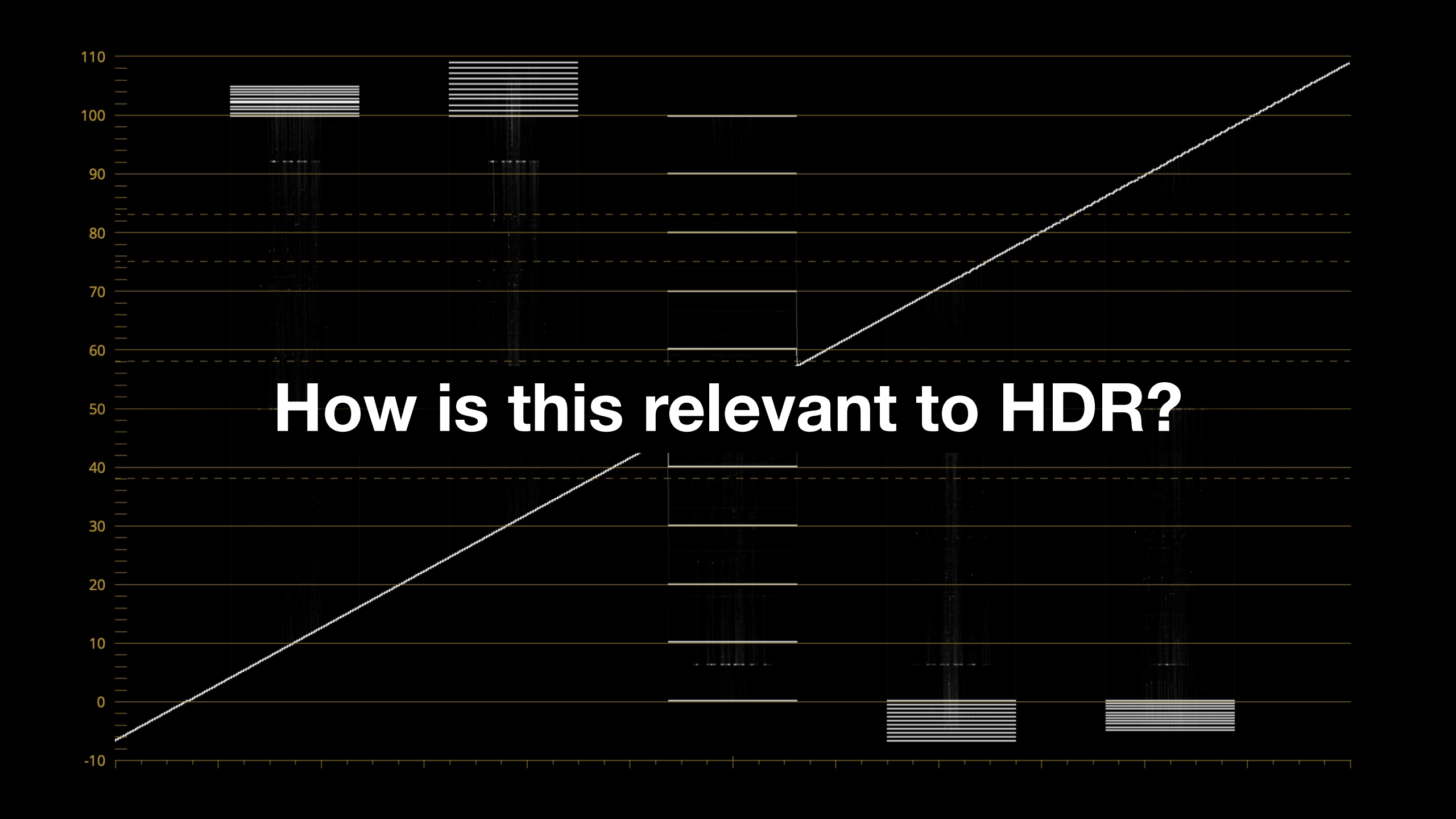
Is your signal clipping?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How is this relevant to HDR?

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TECHNOLOGY & INNOVATION

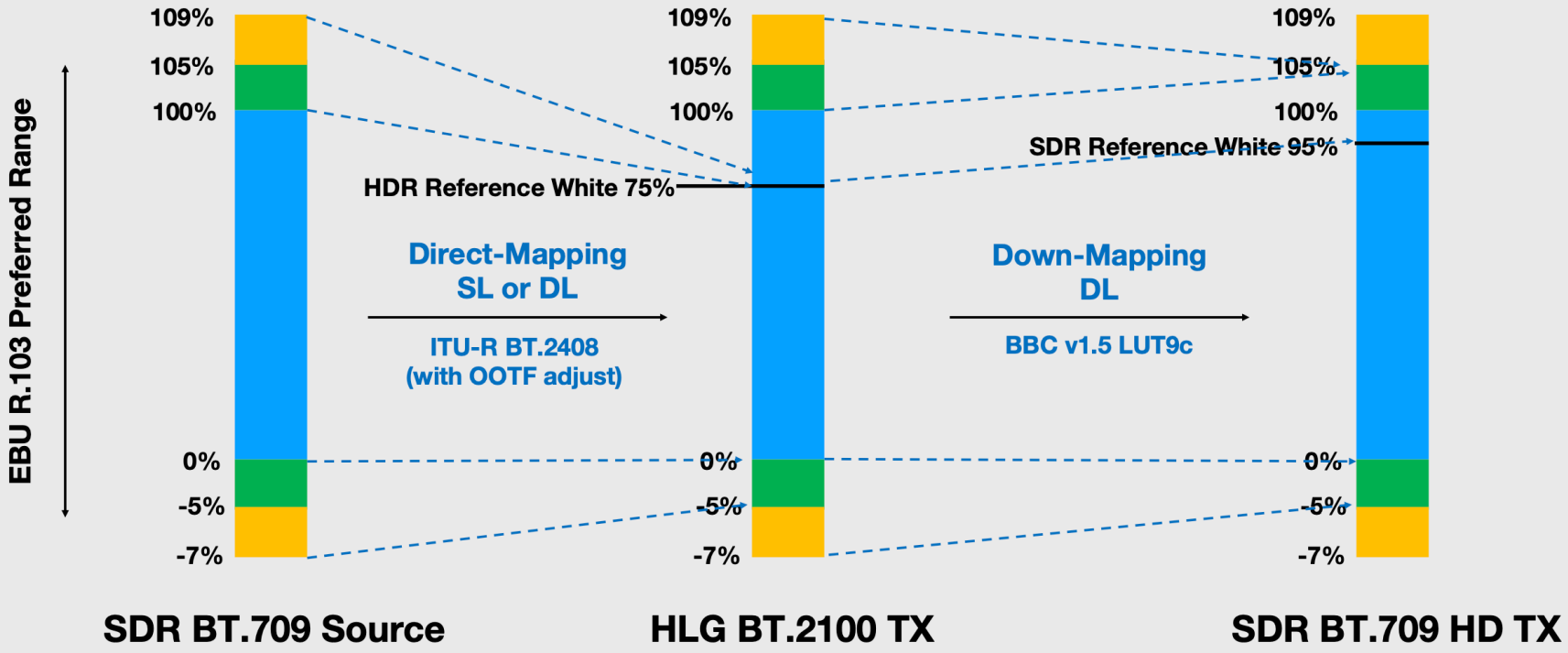
EBU HDR WORKSHOP

16 - 20 May 2022

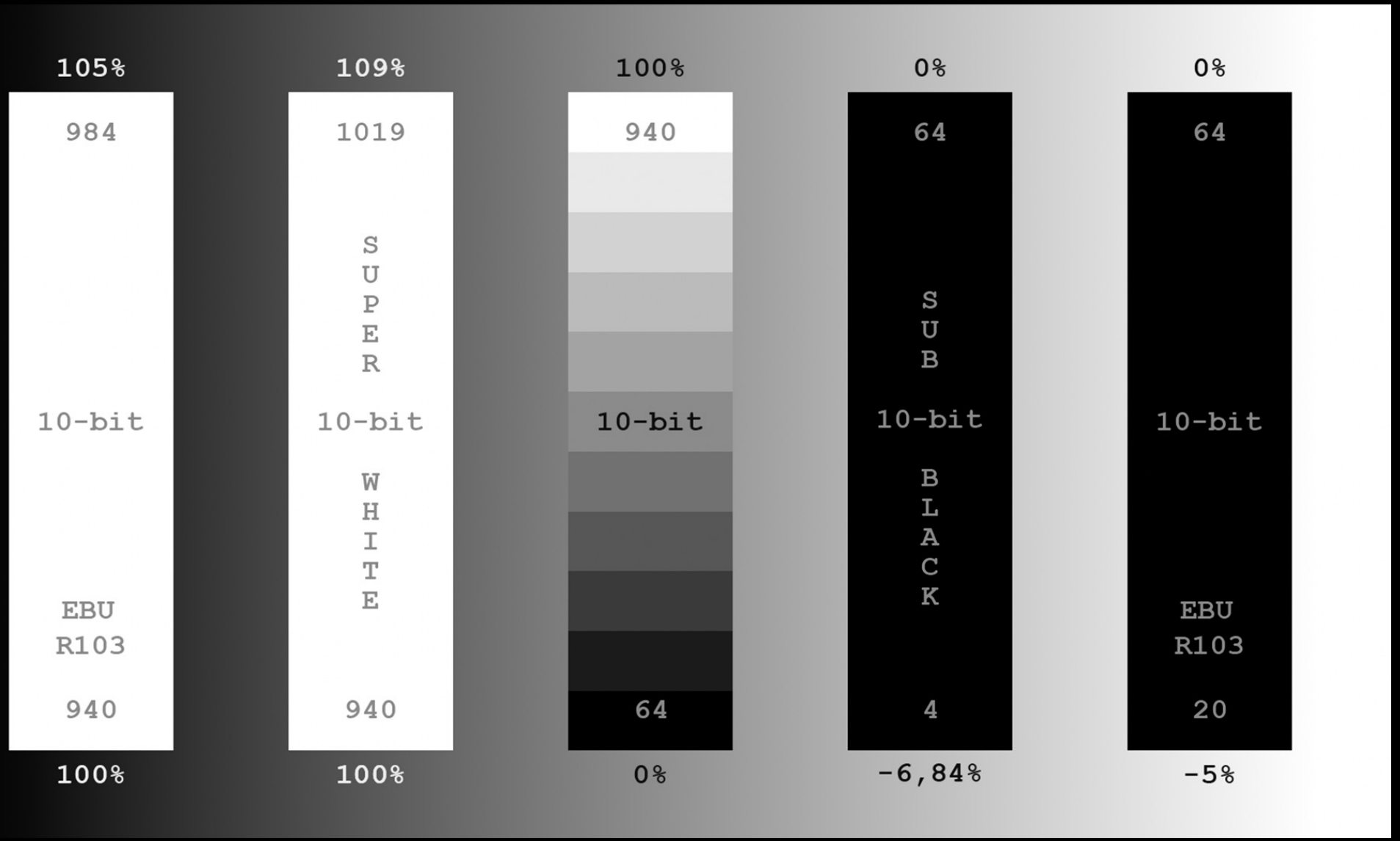
SWR

From EBU HDR Workshop 2022, presented by Andrew Cotton, Principal Technologist, BBC R&D

EBU R.103 allows SDR viewers to benefit from HDR production and reduce “round-trip” losses



- LUT9c down-mapping ensures R.103 “preferred” signal range
  - SDR “super-whites”
    - add detail in highlights
    - Reduce round-trip losses
      - Avoids need for up-mapping in SDR>HDR
      - HDR Ref White > 95% SDR
- Sub-blacks
  - Increase colour gamut


105%
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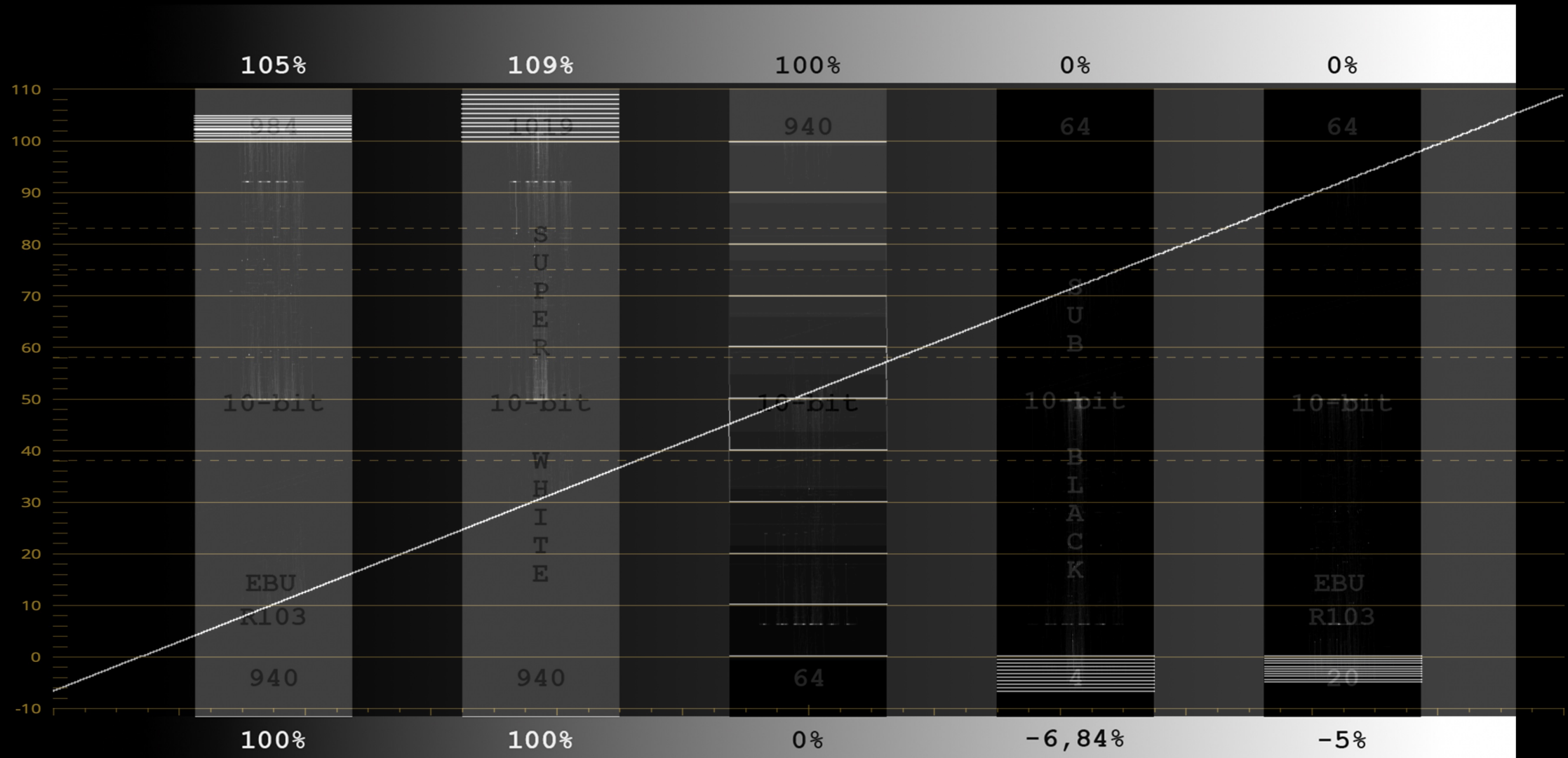
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SUPER WHITE
SUB BLACK
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EBU R103
EBU R103
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https://tech.ebu.ch/publications/r103

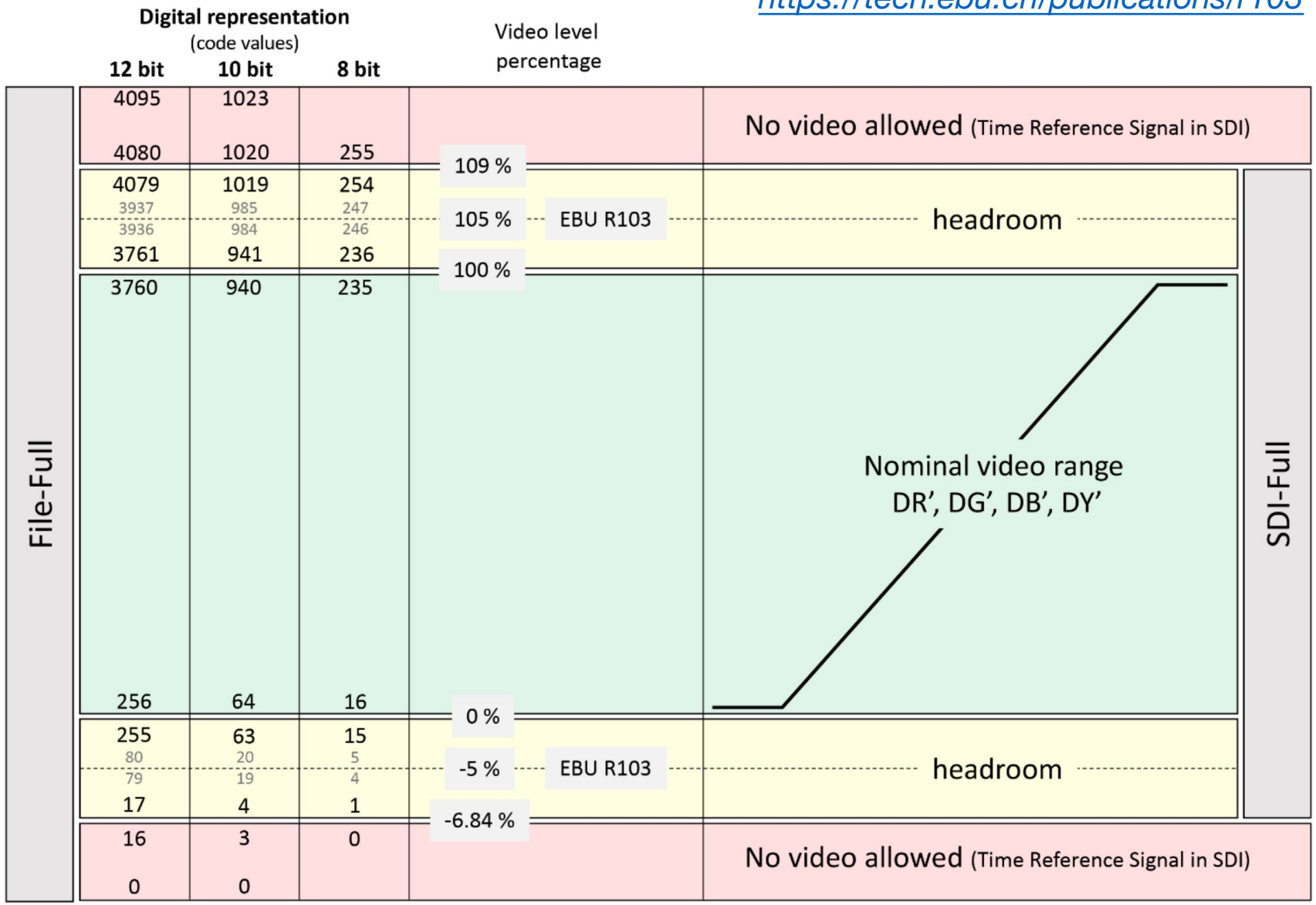
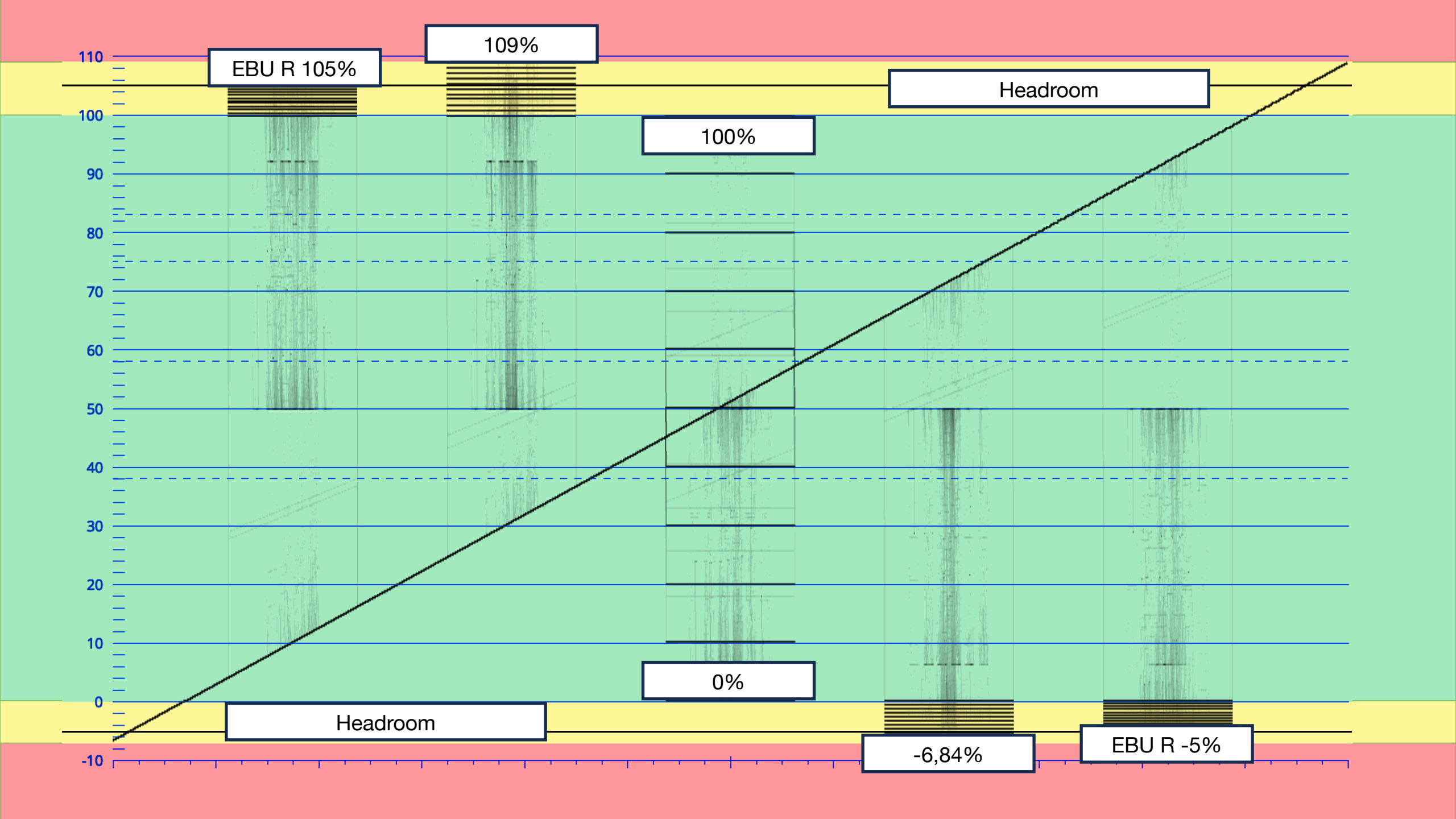


Figure 1: Typical signal levels for SDI


EBU R 105%
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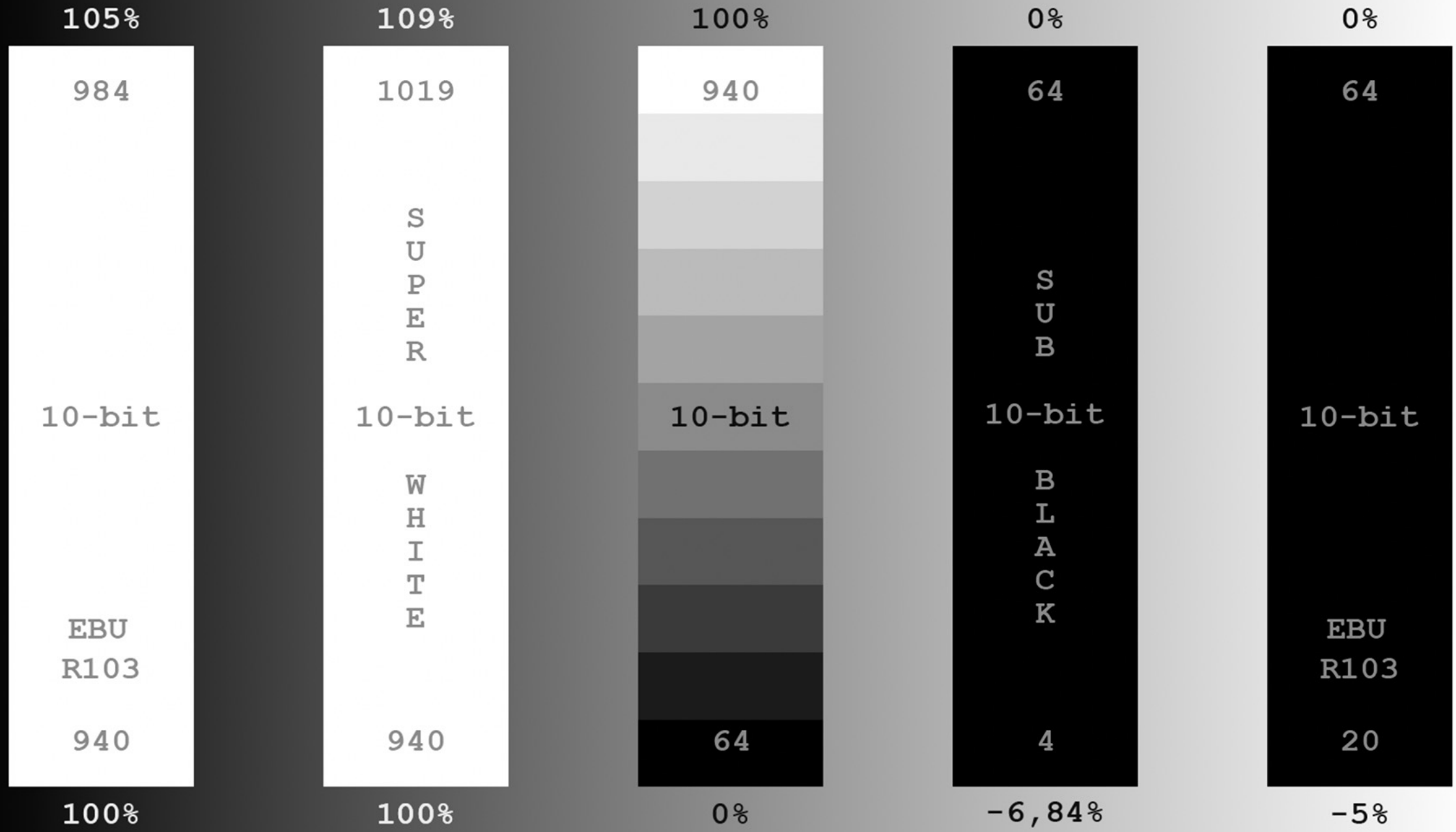
Headroom
-6,84%
EBU R -5%


105%
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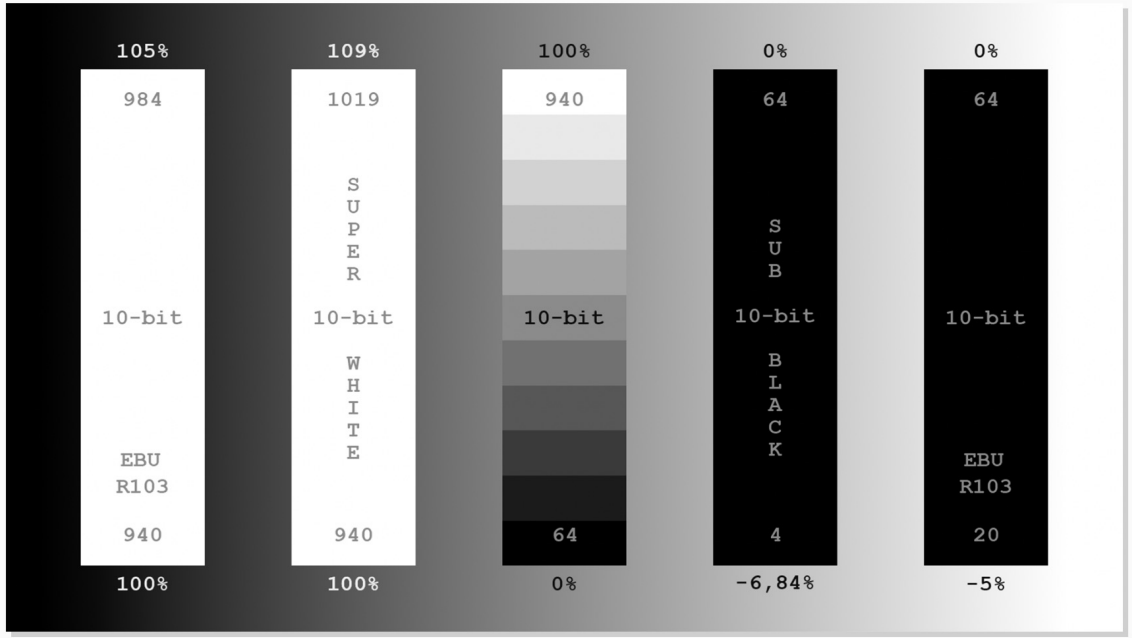
EBU R 103 TEST CHART - DCTL AND QUICKTIME

EBU R 103 TC 1

TEST MATERIAL 12 Sep 2023



OPEN EXTERNAL FILE EMAIL ME A LINK

EBU R 103 Test Chart and DCTL code to create it, provided by Thomas Berglund (NRK).

The Quicktime file linked from here is a 10-bit Uncompressed YUV ('v210') Test Chart that conforms to **EBU R 103**.

RELATED GROUPS

Production (SP)

Video Systems

CONTACT US

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Senior Project Manager
dejong@ebu.ch
+41 22 717 2722

RECOMMENDED

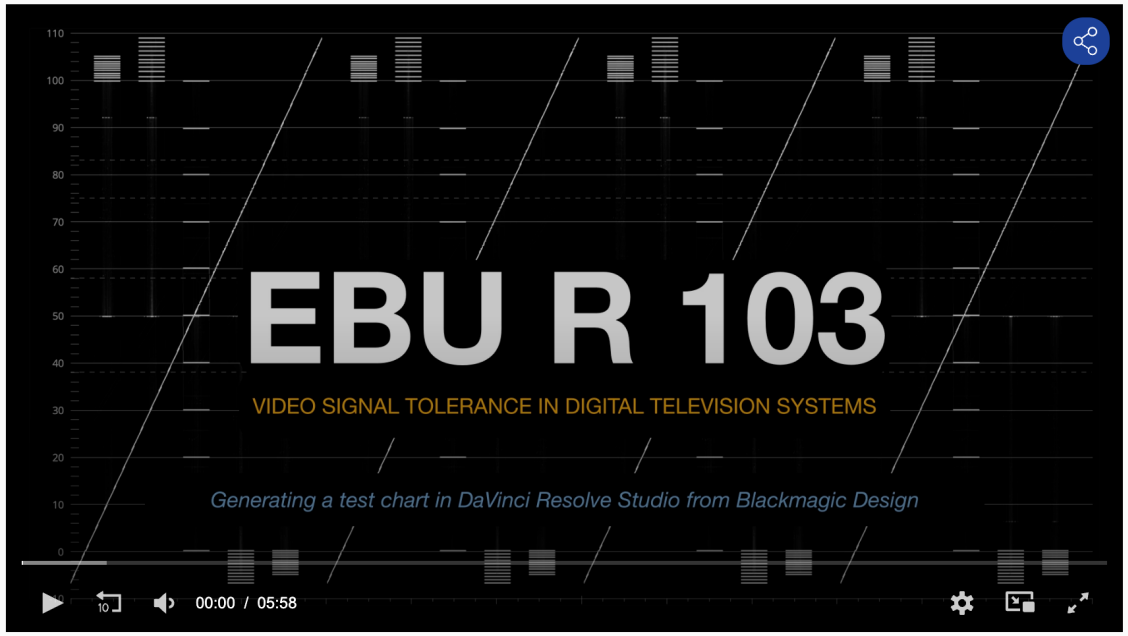
PUBLICATIONS

EBU R 103 Chart Tutorial

EBU Tech 3325 TP 6 Monitor Test Pattern 6

EBU R 103 TEST CHART CREATION IN DAVINCI RESOLVE - TUTORIAL

PRESENTATIONS 12 Sep 2023



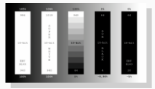
This video explains how to create an EBU R 103 Test Chart with Blackmagic Davinci Resolve.

Presenter(s): Thomas Berglund (NRK)

Thomas Berglund (NRK) has kindly contributed this video, as well as **the DCTL code** which you can use to create your own **EBU R 103** Test Chart.

RECOMMENDED

PUBLICATIONS


EBU R 103 TC 1 EBU R 103 Test Chart

Tech Review 307 B/MCAT ed3e29fb-1b9c-c4be-e040-007f01000739

NEWS

New test chart to help SDR viewers benefit from HDR production

EVENTS

Live Subtitling Workshop

Loudness Webinar - part 2

Summary

- Video signal levels can be very confusing.
- You can unfortunately not yet rely on metadata in either live or post production.
- DO NOT change signal input/output level unless you understand why you are doing it.
- Always verify your signal chain using test charts and scopes.
- Always verify before and after any image/signal processing.
- Imperative to feed signal processors with the correct/expected signal level.
- Using super-white and sub-blacks is mainly relevant for a live production context.
- For pre-produced and colour graded material, it is expected that the nominal video limits described in EBU R 103 are closely followed.
- Video formats and codecs in post can be interpreted differently by different software.
- When in doubt use default settings, but do not make assumptions.

SMPTE

Standards Current Project Progress

(Updated daily at 2:00 AM ET)

Common LUT Format | **Filter by Start Date:** 01/02/2010 - 12/31/2030 | Reset | Search

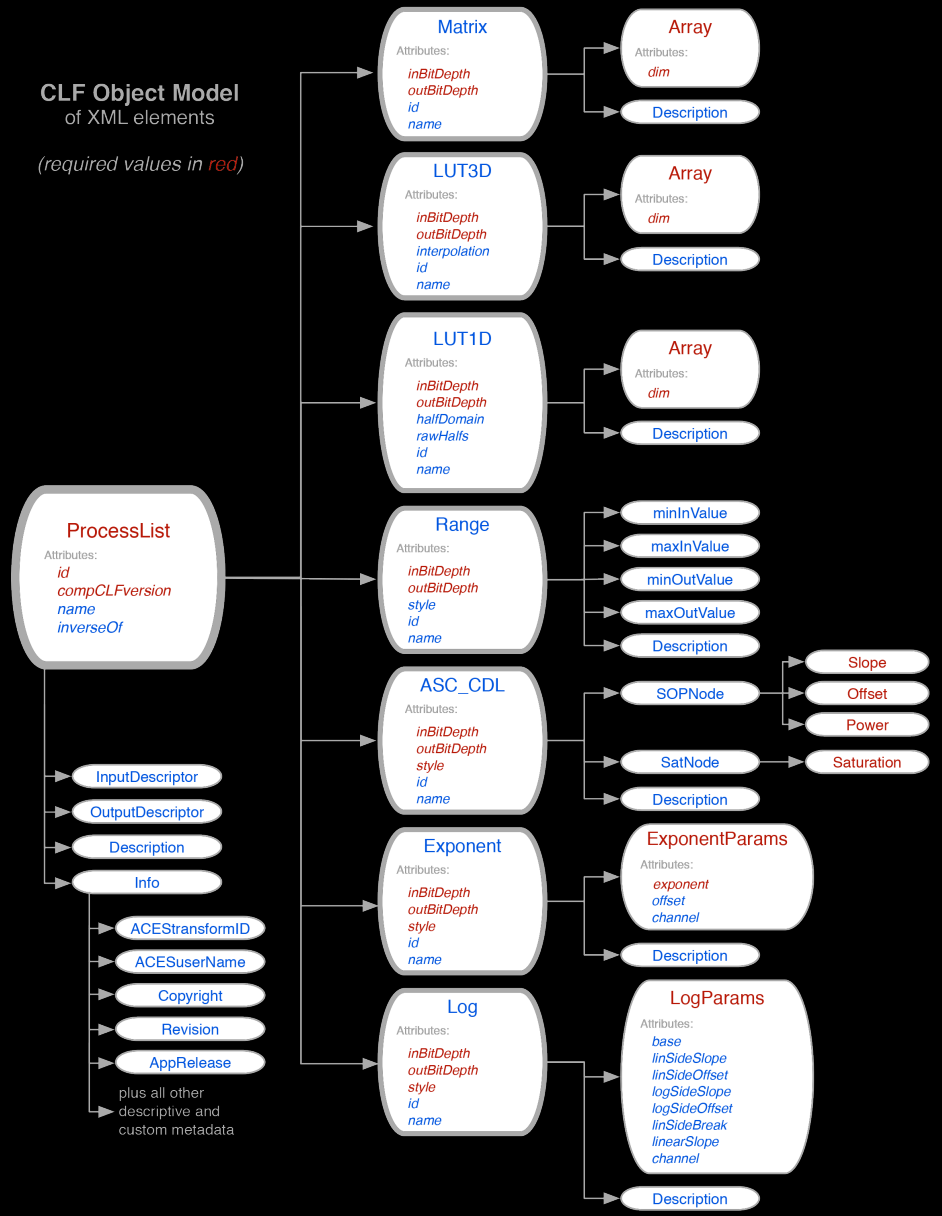
[10E] 10E ST Common LUT Format

WG or DG working on WD doc — **20%**

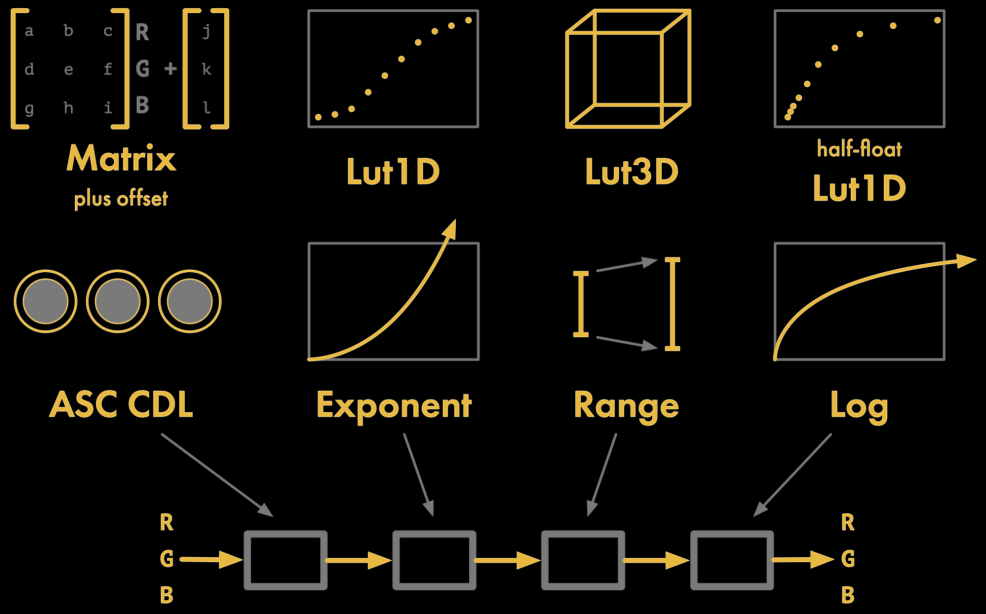
Start date: 03/01/2023

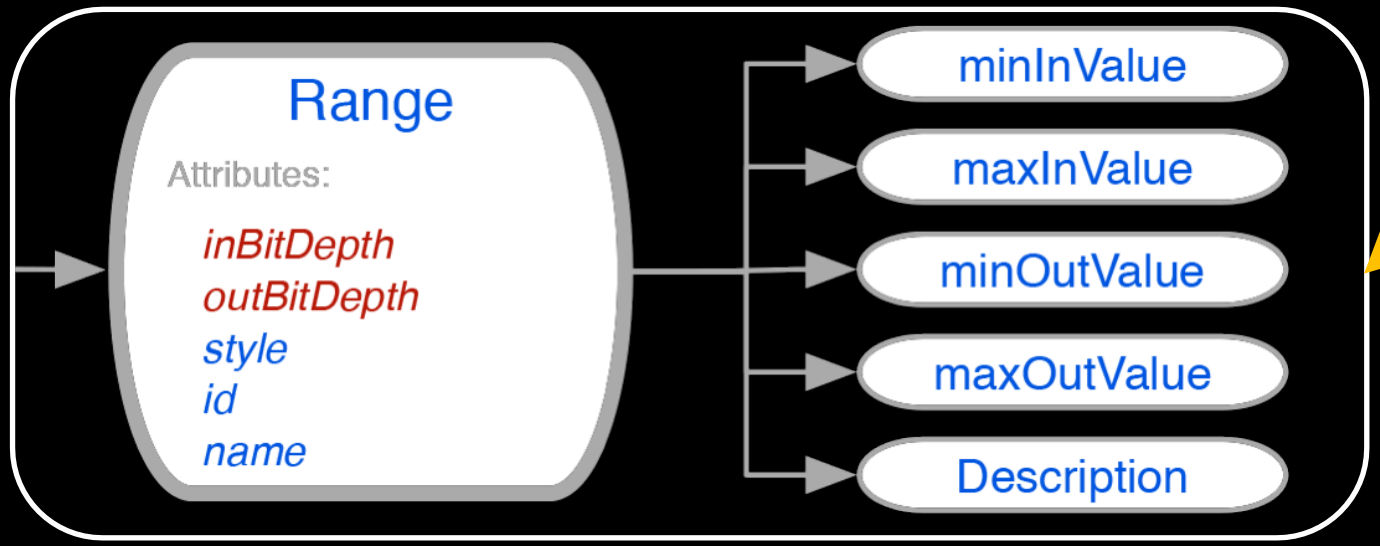
Scope:

The CLF is a human-readable text file format for the interchange of color transformations using an XML schema. The XML schema supports Look-Up Tables of several types: 1D LUTs, 3D LUTs, and 3×1D LUTs, as well as additional transformation needs such as matrices, range rescaling, and “shaper LUTs.”

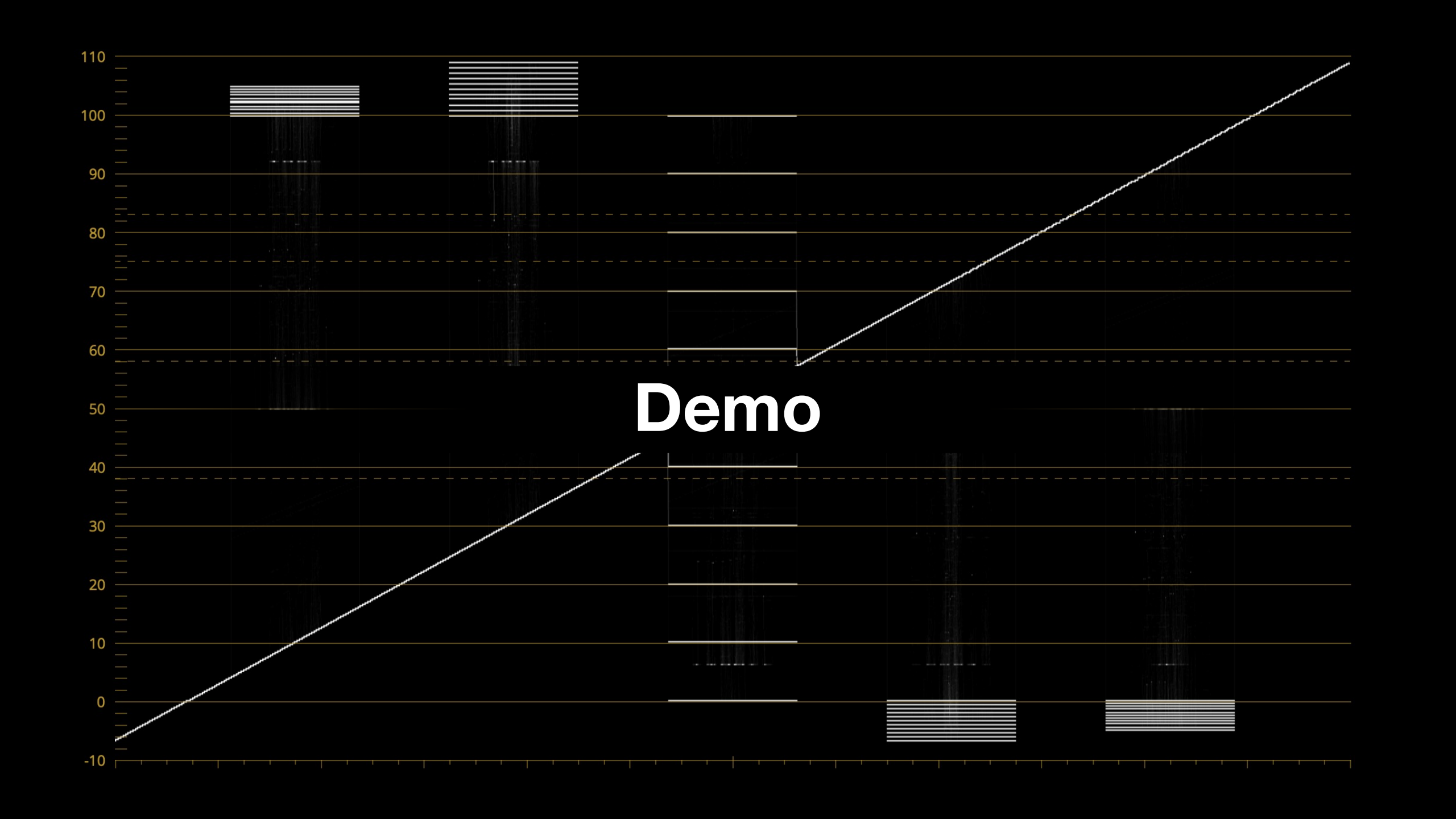


https://docs.acescentral.com/specifications/clf/





https://docs.acescentral.com/specifications/clf/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