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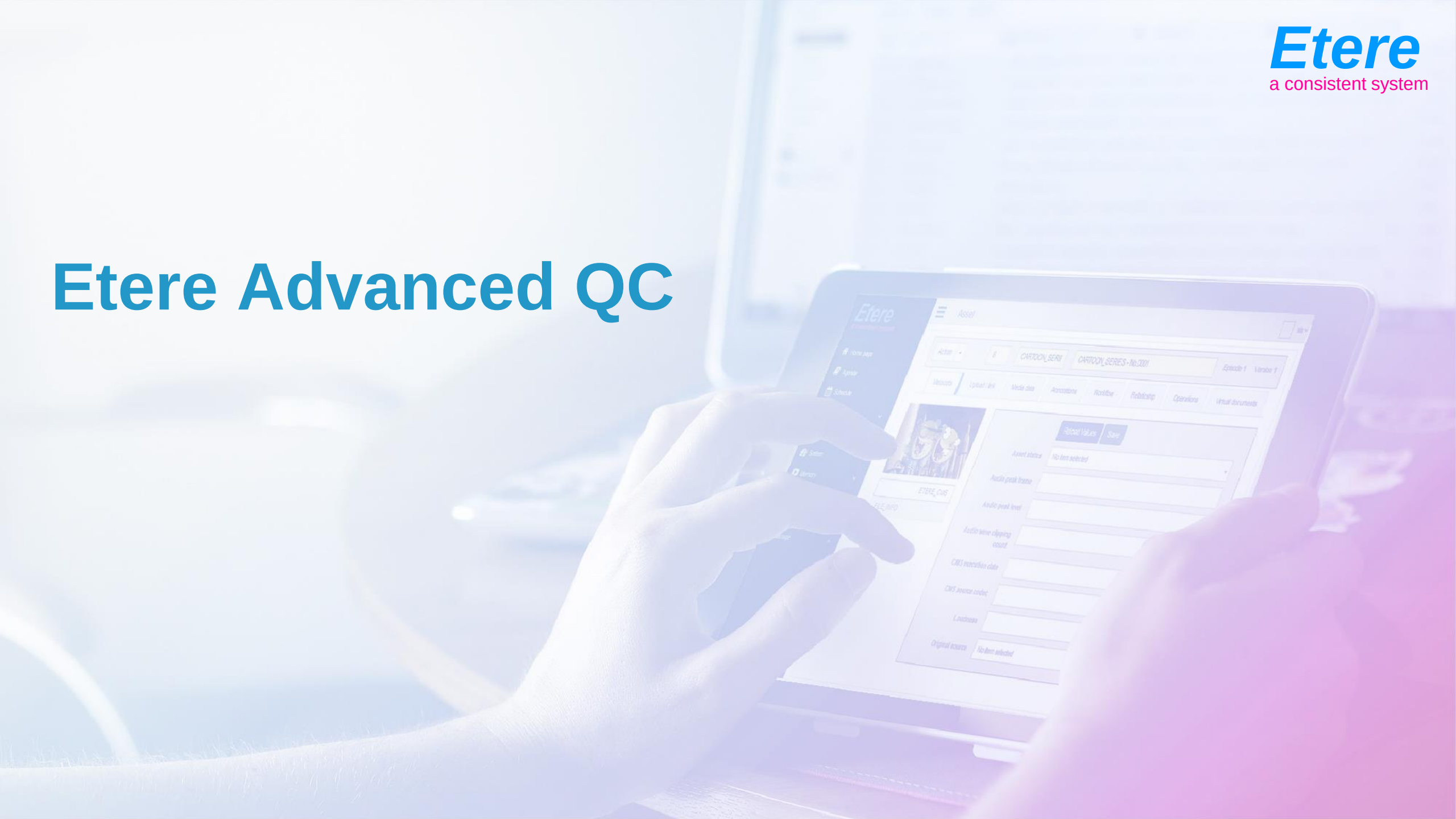
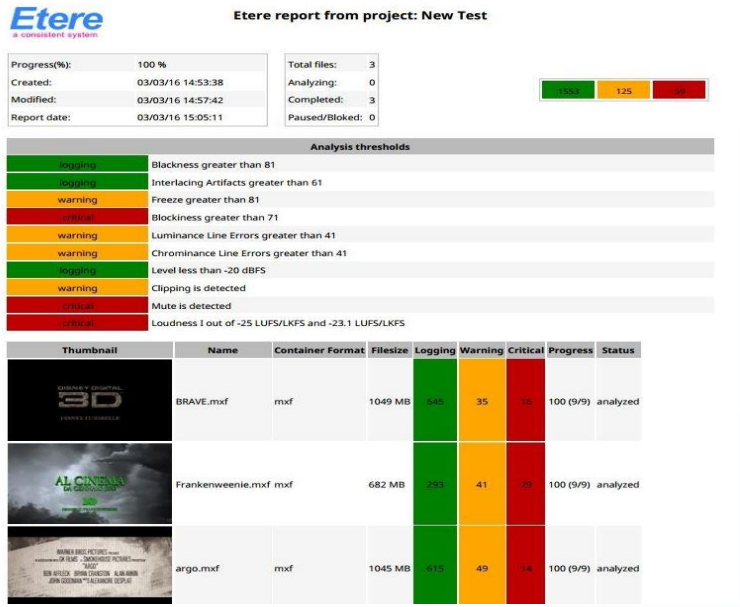
Etere Advanced QC



What is Etere Advanced QC

- A cloud-ready and cost-effective solution that is able to provide significant time saving in QC tasks



Etere

Etere report from project: New Test

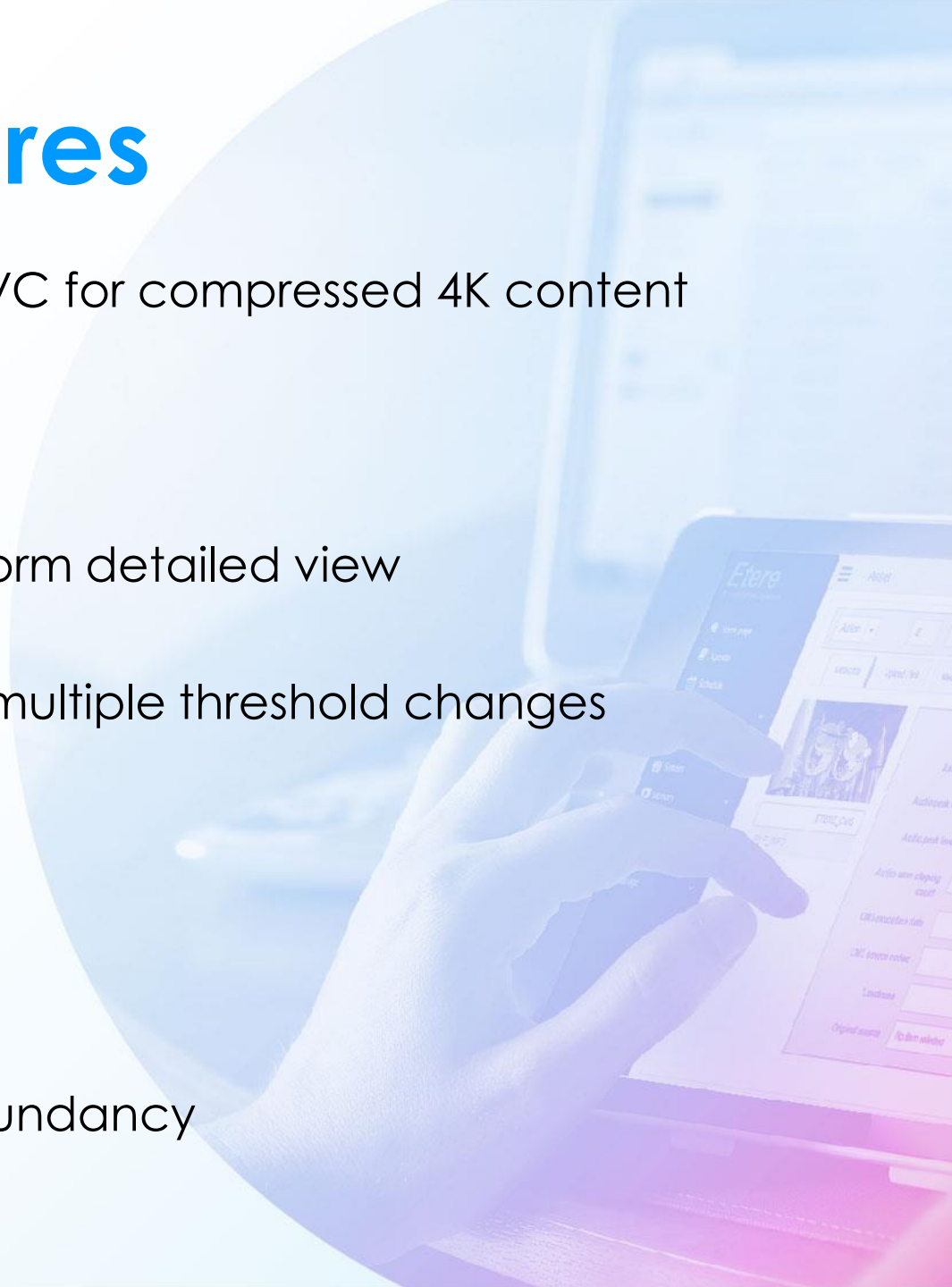
Progress(%):	100 %	Total files:	3
Created:	03/03/16 14:53:38	Analyzing:	0
Modified:	03/03/16 14:57:42	Completed:	3
Report date:	03/03/16 15:05:11	Paused/Bloked:	0

Analysis thresholds	
logging	Blackness greater than 81
logging	Interlacing Artifacts greater than 61
warning	Freeze greater than 81
critical	Blockiness greater than 71
warning	Luminance Line Errors greater than 41
warning	Chrominance Line Errors greater than 41
logging	Level less than -20 dBFS
warning	Clipping is detected
critical	Mute is detected
critical	Loudness 1 out of -25 LUFS/LKFS and -23.1 LUFS/LKFS

Thumbnail	Name	Container Format	Filesize	Logging	Warning	Critical	Progress	Status
	BRAVE.mxf	mxf	1049 MB	545	35	16	100 (9/9)	analyzed
	Frankenweenie.mxf	mxf	682 MB	293	41	29	100 (9/9)	analyzed
	argo.mxf	mxf	1045 MB	615	49	14	100 (9/9)	analyzed

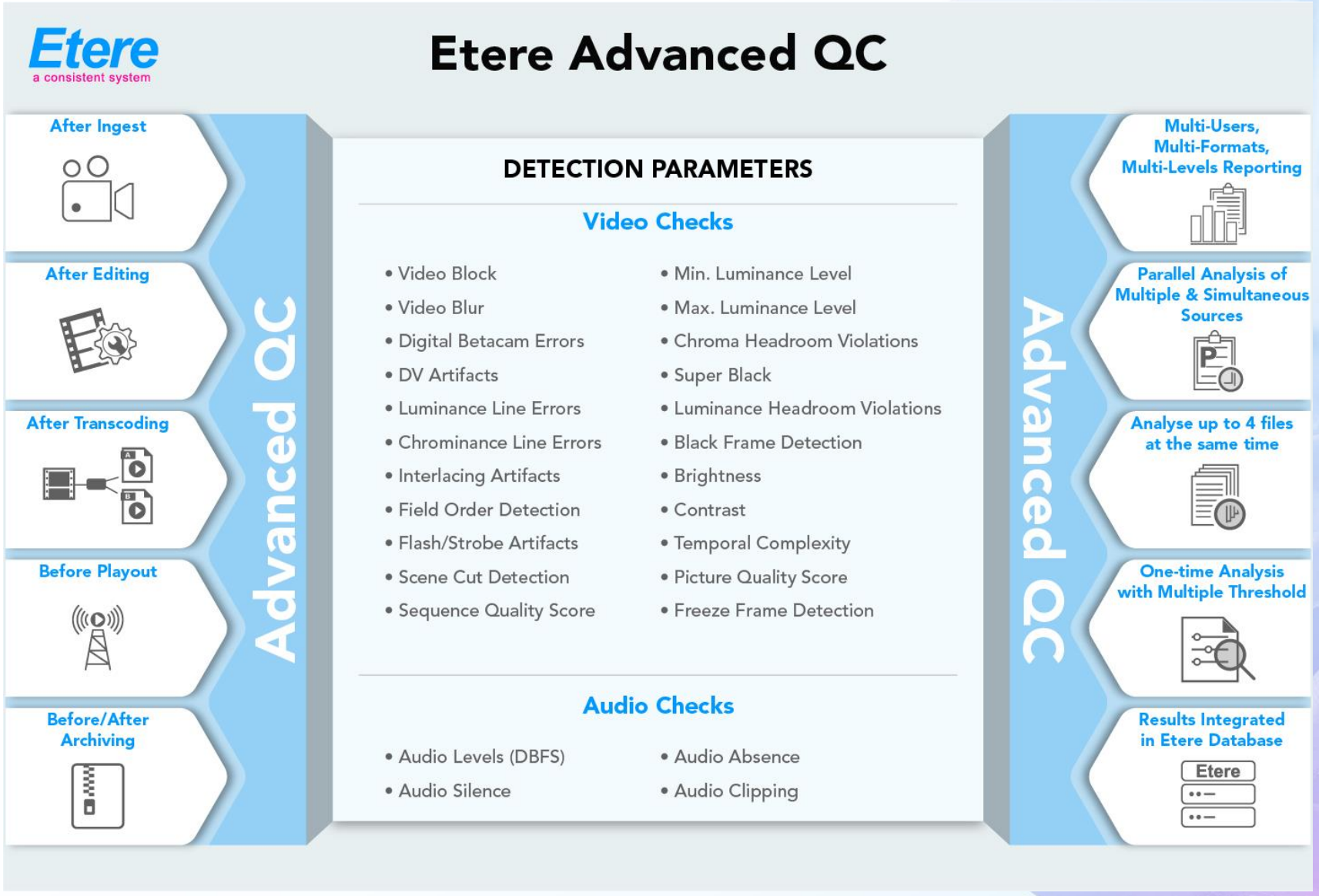
Key Features

- Support for most standard formats including HEVC for compressed 4K content
- Audio loudness analysis including EBU R128
- Syntax error detection
- Access to networked content repositories
- In-depth analysis of contents with frame/waveform detailed view
- Reporting of time codes and frame references
- One-time analysis that can be configured with multiple threshold changes
- Fault tolerant & fault resilient
- Analyse up to 4 files at the same time
- Fully workflow driven
- QC results integrated in Etere database
- Etere load balancing
- Etere Distributed architecture provides high redundancy



Product Features	Etere a consistent system	Interra Baton	Vidcheck	Tektronix Aurora	Venera Pulsar
Support for most popular formats	Yes	No (1)	No (1)	No (1)	No (1)
Support for 4K content	Yes	Yes	Yes	Yes	Yes
Format checks	Yes	Yes	Yes	Yes	Yes
Data base storage to avoid re-analysis	Yes	No	No	No	No
PSE analysis	Yes	Yes	Yes	Yes	No (2)
Syntax error detection	Yes	No	No	No	No
Analysis from live sources (SDI, ASI, IP)	Yes	No (2)	No	No (2)	No
Playback through live output devices	Yes	No (2)	No	No (2)	No
In depth analysis with frame view	Yes	No	Yes	No (2)	No
Waveform view for video levels	Yes	No	No	No	No
One click access to event time-stamps	Yes	No (2)	Yes	No (2)	No
File type filter-in/out	Yes	Yes	Yes	Yes	Yes
File move/copy dependant on analysis results	Yes	Yes	Yes	Yes	Yes
DCP support	Yes	No	No	Yes	Yes
HEVC support	Yes	Yes	Yes	Yes	Yes
XAVC support	Yes	Yes	Yes	Yes	Yes
Template creation	Yes	Yes	Yes	Yes	Yes
Template combination	Yes	No	No	No	No
Full UNICODE support	Yes	Yes	Yes	Yes	Yes
Scalable and modular	Yes	Yes	Yes	Yes	Yes
Comprehensive environment	Yes	No	Yes	No	No
Operation in standard PC hardware	Yes	Yes	Yes	No	No (3)
Available API	Yes	Yes	Yes	Yes	Yes
Online demo system	Yes	No	No	No	No
Support multiple files analysis	Yes (4)	No (2)	No (2)	No (2)	No (2)
Load balancing	Yes	No (2)	No (2)	No (2)	No
Real time load balancing with different hardware and codecs	Yes	No	No	No	No
24/7 worldwide support	Yes	No	No	No	No
(1) Some specific codecs may require additional charges					
(2) Available as an additional option					
(3) The amount of cores to be used are limited by the version of the system					
(4) Up to 4 at the same time					

Detection Parameters



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Check details

Black Frame Detection

- Average Pixel Brightness is calculated by dividing the square sum of every pixel level in a frame by the pixel count
- A lookup table classifies the average brightness per pixel into a black level from 0 to 100
- This method allows detection of a frame as black frame even if there are some white (or non-black) pixels in the frame (which is often the case in a noisy black frame)
- A black level of 100 is only set when all pixels have a pixel value of 0

Parameter	Blackness
Range	0...100
Usage	Detection of Black Frames

Blocking Detection

- The Blocking artefacts are detected by analysing the 8 x 8 block pattern in the picture
- Several methods are used to detect if a block border is showing blocking artefacts
- The number of blocks with detected blocking artefacts are counted inside a frame
- A lookup table is used to provide a best possible blocking level (from 0 to 100) for the corresponding number of distorted blocks
- That means, there is no formula used to score the blocking level. The lookup table helps to ensure the user experience is as good as possible

Parameter	Blockiness
Range	0...100
Usage	Detection of Blocking Artefacts

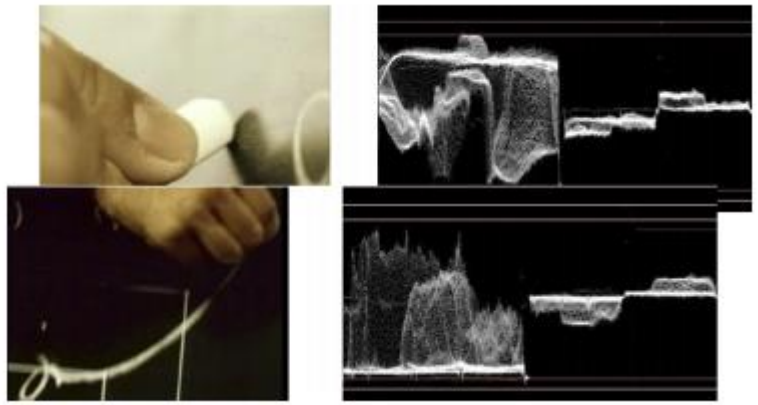
Blurring Detection

- The blurring artefacts are detected by analysing the 8x8 block pattern in the picture
- Several methods are used to detect if a block border is showing blurring artefacts coming from the AVC / H.264 filtering process
- The number of blocks with detected blurring artefacts are counted
- A lookup table is used to provide a blurring level (0...100) for the corresponding number of distorted blocks, that means, there is no formula used to score the blurring level. The lookup table helps to ensure the user experience is as good as possible
- Limit[illegible] algorithm can give some false alarms in case of frames that are i[illegible]rred

Parameter	Blurriness
Range	0...100
Usage	Detection of Blurring Artefacts

Brightness

- Average video level within a frame
- A value of 0 means that the average video level in a frame is ≤ 0% (average Pixel Level ≤16 in a 8 Bit System)
- A value of 100 means that the average video level in a frame is ≥ 100% (average Pixel Level ≥235 in a 8 Bit system)



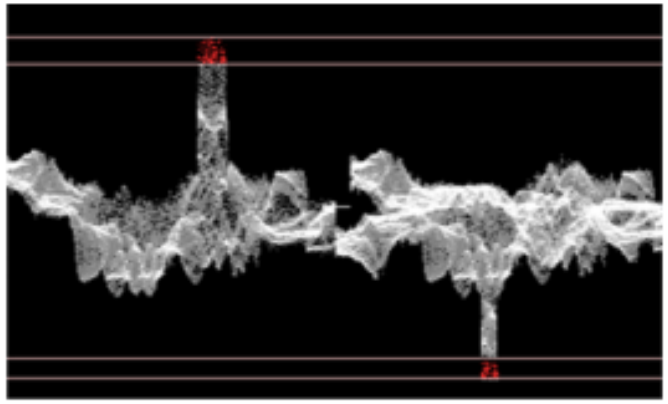
Parameter	Brightness
Range	0...100 if avg level < 0% → 0 if avg level < 100% → 100
Usage	Analysis of average Brightness of the video frame

Frame Size

Parameter	Bytes Per Frame
Range	0... bytes
Usage	Detection of Frame size

Chrominance Headroom Violation

- This parameter is counting how many percent of the pixels are violating the chrominance headroom
- The chrominance level of every pixel is analysed and used to calculate this value
- A value of 10 means that 10% of the pixels do have a Chrominance level > 100%



Parameter	Chrominance Headroom Violation
Range	0...100 0 : no Headroom Violation 100: max Headroom Violation
Usage	Detection of pixels violating the Chroma Headroom

Single Chrominance Line Error

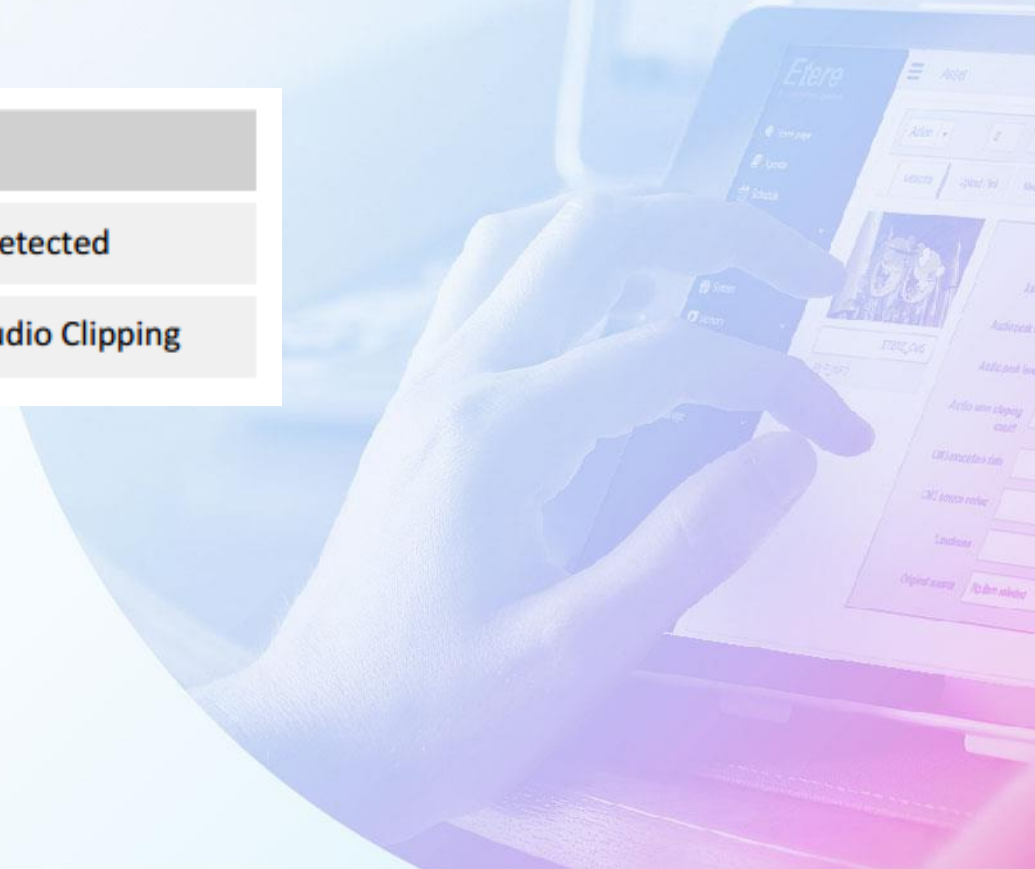
- This parameter detects single line errors in the chrominance channel of a frame
- The picture is analysed line by line in order to find this kind of artefacts
- The value will depend on the line length

Parameter	Chrominance Line Errors
Range	0...100 0 : no Line Errors 100: long Line Error
Usage	Detection of single Chrominance Line Errors

Clipping

- This parameter signals clipping within an audio frame
- Clipping is signalled when the audio level is larger than -1 dBFS

Parameter	Clipping
Range	detected/not detected
Usage	Detection of Audio Clipping



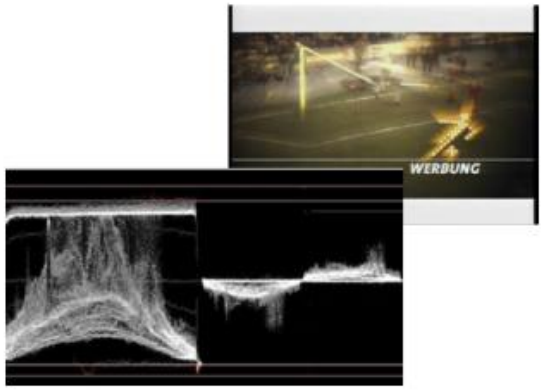
Constant Colour Frame

- This parameter will detect the percentage of the pixels in an image that presents constant colour
- A completely green frame will for example, cause a score of 100, smaller green portions in the frame will cause lower values
- The relation between constant colour parts and resulting s a best p

Parameter	Constant Color Frame Detection
Range	0...100 Percentage of constant color pixels
Usage	Detection of constant color frames

Contrast

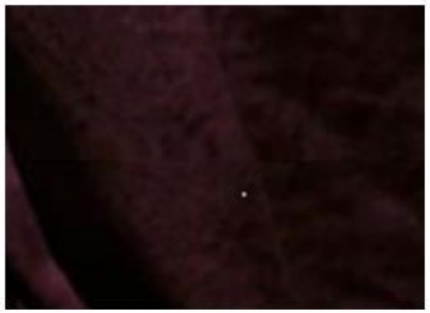
- This parameter gives the max. pixel contrast within a frame
- The highest and lowest pixel value is used to calculate this parameter
- Limitation: The algorithm does not detect any errors, it is more for statistical information. In order to detect “out of range” video levels, the max/min video level parameter should be used
- 0 means that highest and lowest pixel have the SAME value
- 100 means that highest and lowest pixel have the max. difference (255/1024 in 8-bit/10-bit video)



Parameter	Contrast
Range	0: lowest possible contrast 100: highest possible contrast
Usage	Analysis of max. pixel contrast within a frame

Dead Pixel Detection

- This parameter detects a "dead" pixel within a picture. A dead pixel is coming from a CCD Chip Camera that has a "broken" pixel element. This Pixel element will not receive any picture information
- The parameter value depends on the intensity of the "dead" pixel compared to the neighbouring pixels. A single white pixel within a black frame would cause a higher value than a single grey pixel within a black frame
- Limitation: This measurement can lead to some false positives, depending on the picture content. Furthermore, the accuracy of Dead Pixel detection is limited by the codec used to compress the picture. A high compression is "smearing" the dead pixel around neighbouring pixels… which makes it more difficult to be detecte



Parameter	Dead Pixel Detection
Range	0...100 0 : No Dead Pixel 100: Dead Pixel
Usage	Detection of Dead Pixels

Digital Betacam Error

- This parameter detects artefacts coming from Sony Digital Betacam tape machines
- These artefacts are also known as "Channel Condition Errors" or "Tape Hit Errors" or "Head Clog Errors“
- The picture is analysed pixel by pixel in order to find the typical artefacts caused by this kind of error
- The visibility of a single dropout detected in a frame will influence the dropout score. That means, the score of a single dropout depends on the "intensity/visibility" the algorithm is detecting. For example: there can be single dropout scored with 5 as
  well as single dropouts scored with 15. This would depend on the "intensity" of the detected dropout
- The number of dropouts (blocks) detected in a frame is influencing the total score. The
  more blocks detected, the higher the value will be
- The exact calculation of the dropouts is not linear. A lookup table is used to provide the best possible values for a given dropout pattern per frame

Digital Betacam Error

Parameter	DigiBeta Error
Range	0...100
Usage	Detection of Channel Condition Error from Sony Tape Machine (Digital Betacam)

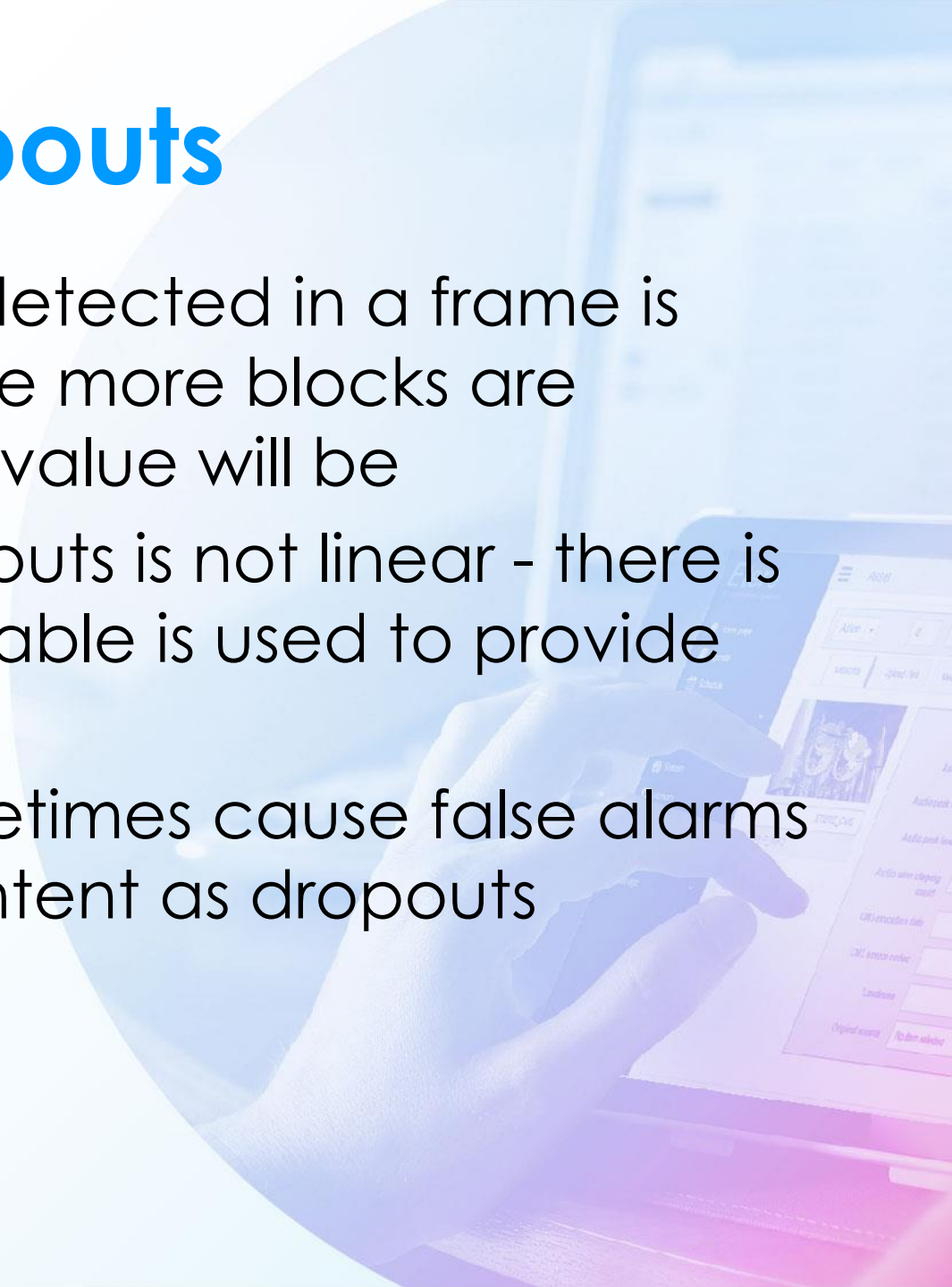
Digital Dropouts

- This Parameter detects Dropouts in the decoded picture. One possible source are channel condition Errors coming from Panasonic DVC PRO Tape Machines.
- Furthermore there are multiple other Errors that can cause this kind of Dropouts:
- bit errors in Files, encoding errors,..)
- The Picture is analyzed Pixel by Pixel in order to find these typical Artefacts
- To find a single dropout, the algorithm is checking for different Indicators. The more indicators the algorithm detects, the higher the score for the Dropout is
- For example: detecting a single Indicator could cause a value of 5, detecting a second one could raise the value to 10, etc.

Parameter	Digital Dropouts
Range	0...100
Usage	Detection of Dropouts

Digital Dropouts

- The number of dropouts (blocks) detected in a frame is also influencing the total score. The more blocks are detected, the higher the dropout value will be
- The exact calculation of the dropouts is not linear - there is no single formula used. A lookup table is used to provide the final parameter values.
- Limitation: The algorithm can sometimes cause false alarms by detecting "normal“ picture content as dropouts



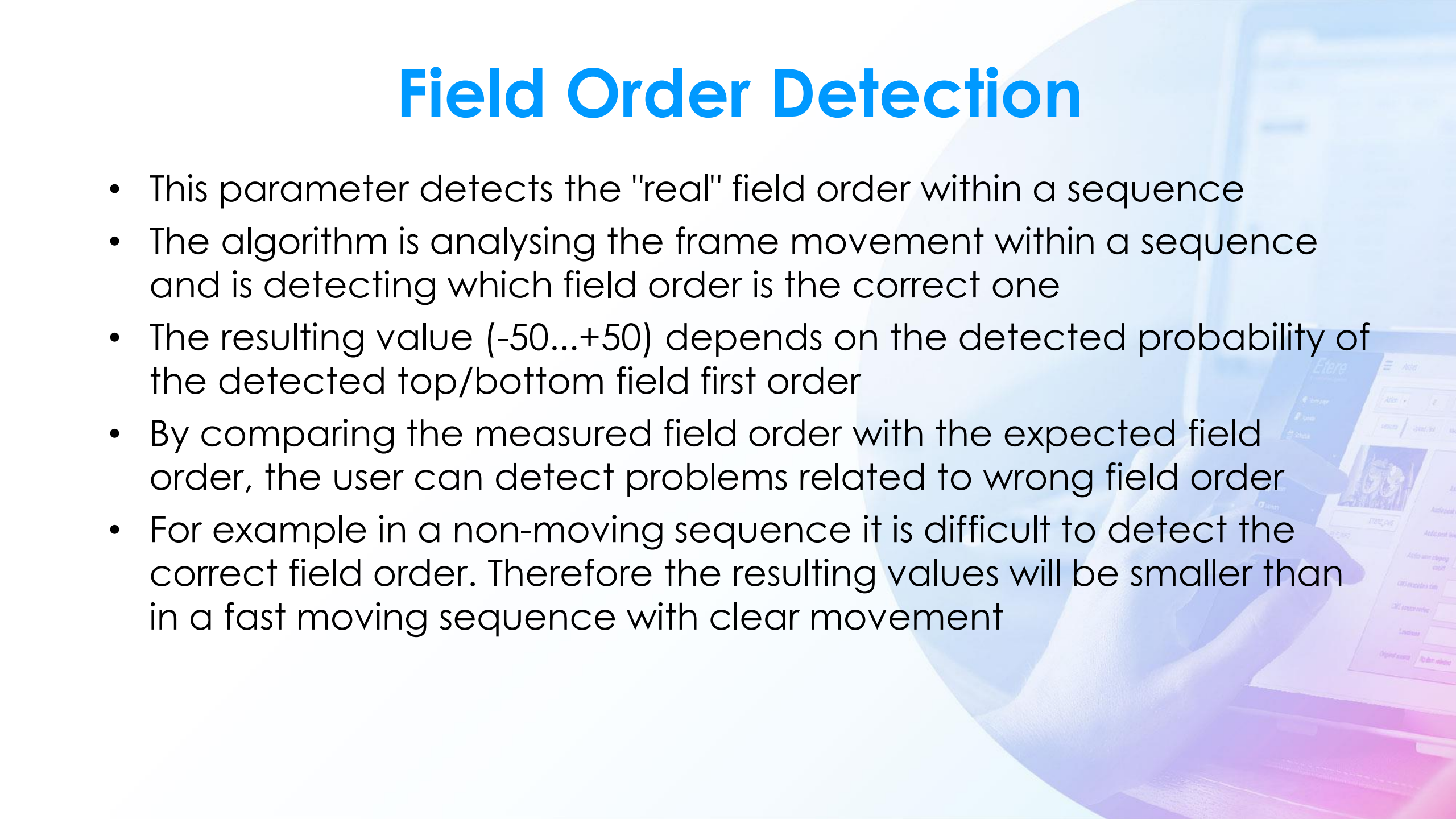
Field Dominance Errors

- Field dominance refers to the choice of which field of an interlaced video signal is chosen as the point where the video edit occur
- In a sequence of top and bottom fields T B T B T B T B, there are two possible choices:
- Wrong Field dominance results in “Scene Cut Errors” as shown in the screenshot above
  - T B T B | edit point | T B T B
  - B T B T | edit point | B T B T

Parameter	Field Dominance Errors
Range	0...100 0 : no error 100: error
Usage	Detection of wrong field dominance

Field Order Detection

- This parameter detects the "real" field order within a sequence
- The algorithm is analysing the frame movement within a sequence and is detecting which field order is the correct one
- The resulting value (-50...+50) depends on the detected probability of the detected top/bottom field first order
- By comparing the measured field order with the expected field order, the user can detect problems related to wrong field order
- For example in a non-moving sequence it is difficult to detect the correct field order. Therefore the resulting values will be smaller than in a fast moving sequence with clear movement



Field Order Detection

- Limitation: This measurement can lead to some false positives, depending on the picture content. The result should be handled with care, since it is only giving the user a hint of which field order the sequence most probably has

Parameter	Field Order
Range	-50: Bottom Field first 0 : Progressive Sequence 50: Top Field First
Usage	Detection of Field Order

Flash/Strobe Artefacts

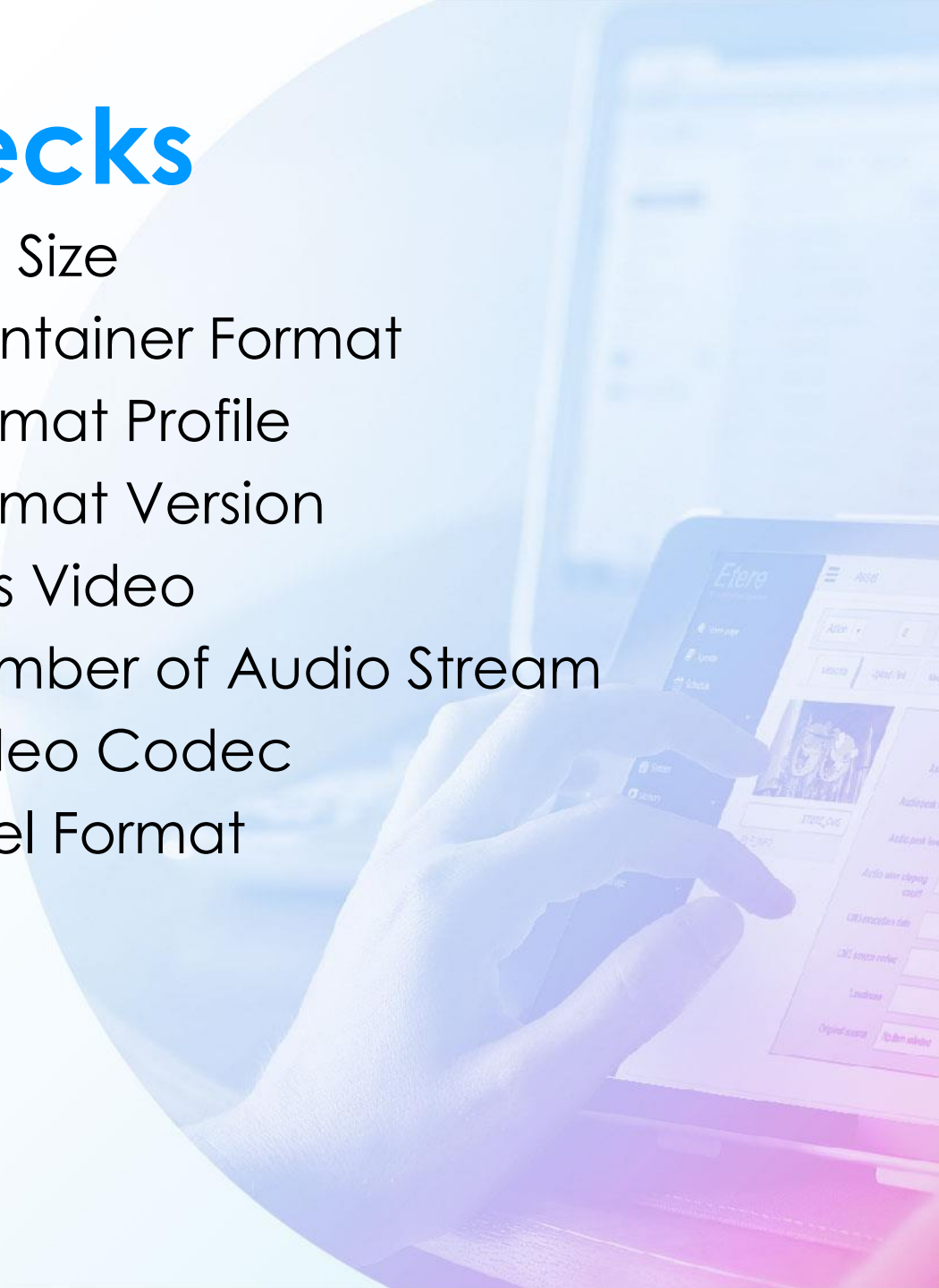
- This parameter detects flash lights and strobe errors
- The video is analysed frame by frame in order to find this kind of artefacts
- The resulting value (0..100) depends on the intensity of the luminance change from frame to frame

Parameter	Flash / Strobe / PSE
Range	0...100 0 : no Flash / Strobe / PSE 100: high Flash / Strobe / PSE
Usage	Detection of Flash / Strobe Artifacts

Format Checks

- Video Bit Rate
- Duration
- Resolution
- Frame Rate
- Coded Aspect Ratio
- Display Aspect Ratio
- Audio Codec
- Number of Channels
- Sample Rate
- Audio Bit Rate

- File Size
- Container Format
- Format Profile
- Format Version
- Has Video
- Number of Audio Stream
- Video Codec
- Pixel Format



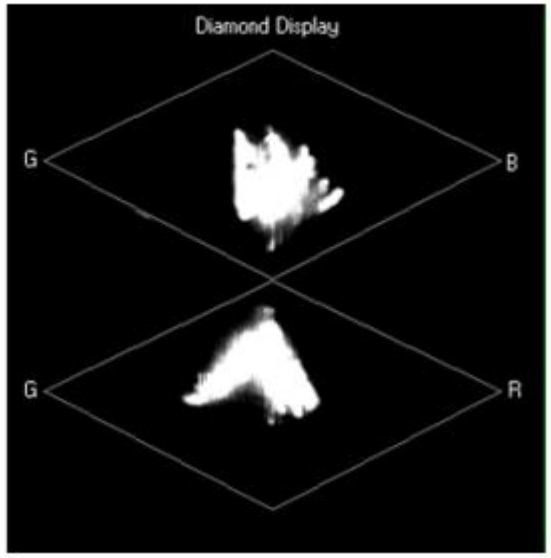
Freeze Frame Detection

- Estimates a freeze level between two successive frames
- The calculation of the freeze level is based on per pixel variations of those frames
- A freeze level of 100 means that EVERY Pixel is frozen (identical to the one of the previous Frame)
- An algorithm based on lookup tables is used to provide best possible Freeze Levels for the appropriate variations between two frames
- This method allows to detect a frame as freeze frame even if there are some "moving" pixels in the frame (which is often the case in a noisy freeze frame)

Parameter	Freeze
Range	0...100
Usage	Detection of Freeze Frames

Gamut Errors

- This feature is analysing the picture in order to detect if any YUV combination is producing illegal colours when converted to RGB domain
- By EBU recommendation R103-2000, a signal the RGB components need to be inside the range of -5...105%, and the Luminance signal need to be inside -1…103%
- The software will analyse/report on the percentage of "illegal" pixels appearing in a picture



Parameter	Gamut Errors
Range	0...100 0 : no Gamut Errors 100: max Gamut Errors
Usage	Detection of pixels with Gamut Error

Interlacing Artefacts

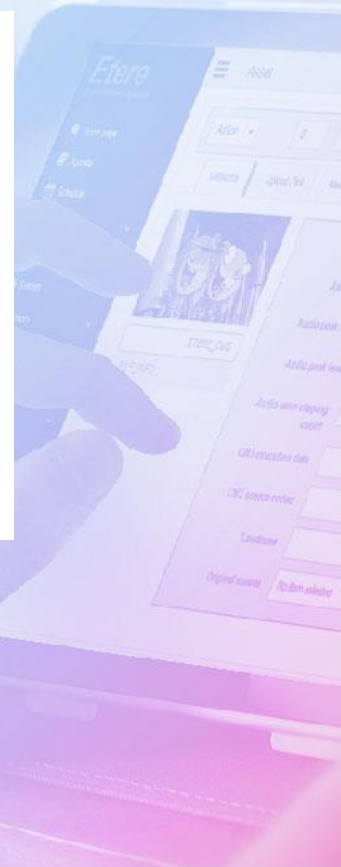
- This parameter detects Interlacing (combing) artefacts
- The picture is analysed line by line in order to find this kind of artefacts
- The parameter value depends on the "intensity" of the interlacing artefacts as well as on the number of interlacing regions found
- For example, in a non-moving sequence the visible interlacing is much lower than in a fast moving sequence
- The relation between number and "intensity" of visible interlacing is not linear. A lookup table is used to provide a best possible value

Parameter	Interlacing Artifacts
Range	0...100 0 : no interlacing 100: maximum interlacing
Usage	Detection of interlacing / combing artifacts

IS Keyframe

- Analyses videos and detects any key frames (I Frames)

Parameter	Is Keyframe
Range	detected/not detected
Usage	Detection of Key Frames



Audio Peak Level

- This Parameter gives the audio levels in dB full scale
- Formula: vu = cur_vu_level / MAX_LEVEL audio_level = 20 * log10 (vu)
- The audio frame size can be set by the user (Audio Integration Time)

Parameter	Level
Range	+3...-100dbFS
Usage	Detection of audio levels

Audio Loudness

- Analysis of loudness according to ITU BS.1770-2 and BS.1770-3
- Compliant with EBU R128 and ARIB TR-B32 recommendations

Parameter	Loudness M Loudness I Loudness S	Loudness LRA
Range	-125...0 LUFS/LKFS	0...125 LUFS
Usage	Loudness Analysis	

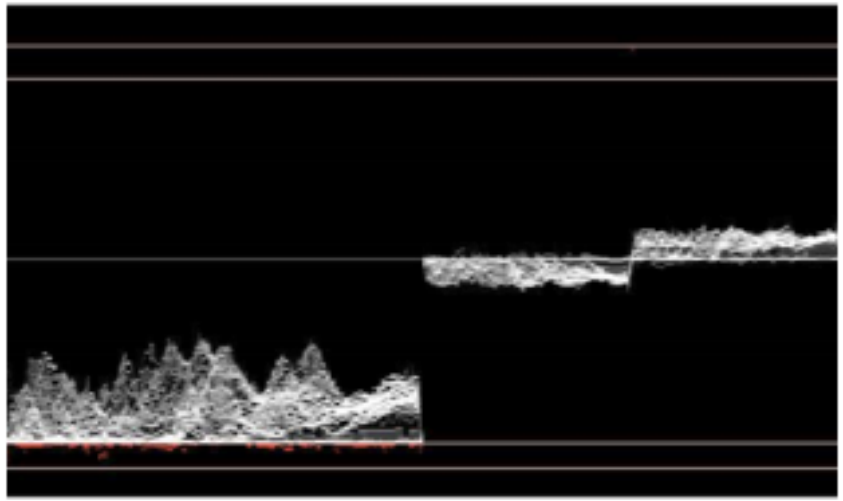
Luma Footroom Violations

- Analysis of loudness according to ITU BS.1770-2 and BS.1770-3
- Compliant with EBU R128 and ARIB TR-B32 recommendations

Parameter	Loudness M Loudness I Loudness S	Loudness LRA
Range	-125...0 LUFS/LKFS	0...125 LUFS
Usage	Loudness Analysis	

Luma Footroom Violations

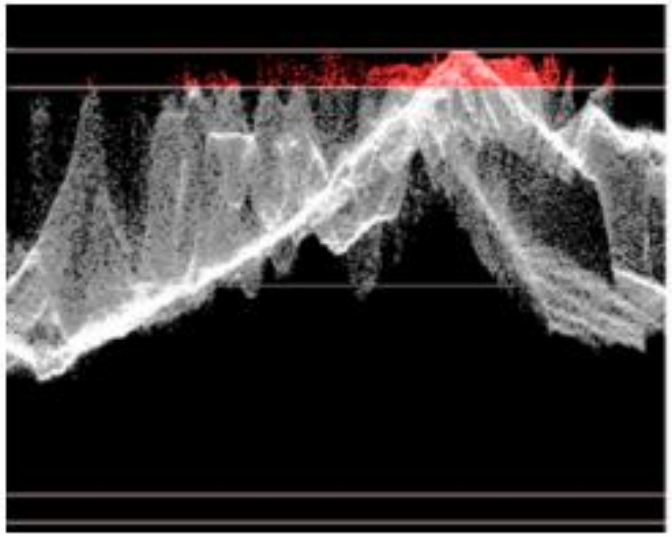
- This parameter is calculating the percentage of the Pixels that have a video level below 0%
- The video level of every pixel is analysed and used to calculate the this value
- A value of 10% means that 10% of the pixels do have a video level < 0%



Parameter	Luma Footroom Violations
Range	0...100 0 : no Luma Footroom Violations 100: max Luma Footroom Violations
Usage	Detection of pixels below 0% video level

Luminance Headroom Violation

- This parameter is counting how many percent of the pixels do have a video level above 100%
- The video level of every pixel is analysed and used to calculate the this value A value of 10 means that 10% of the pixels do have a video level > 100%



Parameter	Luma Headroom Violation
Range	0...100 0 : no Headroom Violation 100: max Headroom Violation
Usage	Detection of pixels above 100% video level

Single Luminance Line Error

- This parameter detects single line errors in a frame
- The picture is analysed line by line in order to pinpoint this kind of artefacts
- The resulting value for this parameter depends on the length of an continuous single line
- Note: The relation between length of a line and the value is not linear. A lookup table is used to scale the parameter to the range from 0...100 and to express a best possible relation between visible distortion and resulting value

Parameter	Luminance Line Errors
Range	0...100 0 : no Line Errors 100: long Line Error
Usage	Detection of single Luminance Line Errors

Mute

- Analyses whether an audio channel has mute levels
- Mute is signalled when audio level is smaller or equal to -54 dbFS

Parameter	Mute
Range	detected/not detected
Usage	Detection of Audio Mute

No Audio

- Analyses whether an audio channel contains data
- This Parameter detects if there is NO AUDIO data encoded in an audio frame
- Detected : There are NO Audio Samples encoded in the Audio Frame
- Not detected: There are Audio Samples encoded in the Audio Frame

Parameter	Mute
Range	detected/not detected
Usage	Detection of Audio Mute

Picture Coding Type

Parameter	Picture Coding Type
Range	I/P/B/S/SI/SP/BI
Usage	Detection of types of coding frames

Picture Quality Score

- This parameter detects the encoded picture quality
- It is a single ended (non-reference) based method, which means there are no PSNR measurements or comparisons done
- The proprietary algorithm is based on detecting Encoding Artefacts such as Blocking, Blurring, Picture Coding Types, Bitrate
- In order to have a good match with viewer, a set of files with different quality levels will also be scored by different viewers
- Using this method, the calculated Quality Score is scaled based on human reference

Parameter	Picture Quality Score
Range	0...100 0: bad encoding 50: fair encoding 100: excellent encoding
Usage	Detection of video quality

Picture Quality Score

- Note: the main goal of the Picture Quality score is to detect bad encoded files rather than distinguish a good from a perfect encoded file. That is, it could be that a score of 70 may not look any worse than a score of 80. The Goal is to detect the bad encoded sequences with bad/poor Encoding Quality.
- Limitation: This measurement is a proprietary algorithm. It can lead to some false positives, depending on the picture content and used codec. The Quality index was developed for H.264 + MPEG encoder and therefore could give less valid results for any other codecs

Photosensitive Epilepsy (PSE)

- System checks for segments that contain potentially harmful flashes for viewers with Photosensitive Epilepsy

Parameter	Photosensitive Epilepsy (PSE).
Range	detected/not detected
Usage	Detection of Video segments that contain potentially harmful flashes for viewers with Photosensitive Epilepsy(PSE)

Sample Clipping

- Analyses if a single audio sample is clipped
- Whereas “normal” clipping is based on the whole Audio frame, the Sample clipping refers to clipping of a single sample within a audio frame

Parameter	Sample Clipping
Range	detected/not detected
Usage	Detection of single Sample Clipping

Stream Syntax Errors

- This parameter detects an error in an encoded stream which results in decoding problems
- A bit error or packet loss could cause this kind of Errors which often results in visible distortion of the video/audio content
- If no syntax errors appear, the stream is confirmed to be standardised and could be decoded without any problems
- Limitation: Depending on the kind of error, it could be that the error is not visible at all

Parameter	Sample Clipping
Range	detected/not detected
Usage	Detection of single Sample Clipping

Temporal Complexity

- This Parameter is measuring the level of change between two successive frames
- High complexity means that there are high changes from the previous frame to the current one (e.g. change form black to white – or from white to black – would result in high complexity)
- Low complexity means that there were low changes from the previous frame to the current one (e.g. a Freeze frame will have a temporal complexity of 0)
- This parameter can help to detect scene cuts (each scene cut normally results in a high temporal complexity)

Parameter	Temporal Complexity
Range	0...100 0 : No Temporal Complexity 100: High Temporal Complexity
Usage	Detection of sequence changes

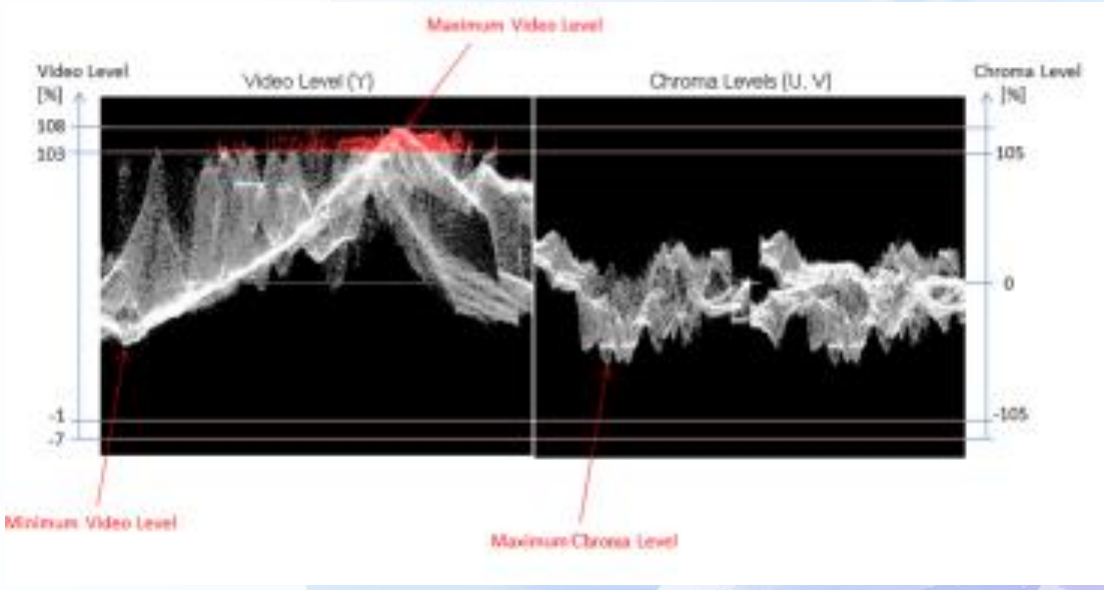
Test Pattern

- This parameter detects standard colour bars at 75% and 100% video level

Parameter	Test Pattern Detection
Range	0...100 0: no test pattern 75: 75% video level test pattern 100: 100% video level test pattern
Usage	Detection of test pattern

Video Baseband Analysis

Parameter	Highest Luminance Level Lowest Luminance Level	Highest Chroma Level
Range	-7...110% -50...750mV 0...255 8-bit scale 0...1023 10-bit scale	0...115% 0...400mV 0...128 8-bit scale 0...512 10-bit scale
Usage	Detection of highest/lowest Luminance levels	Detection of highest Chrominance levels



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Thank You