R&S®AdVISE VISUAL INSPECTION SOFTWARE

Now with
image tracking and
audio monitoring

A new way to eliminate human inattention

Product Brochure
Version 05.00

ROHDE&SCHWARZ
Make ideas real

AT A GLANCE

R&S®AdVISE visual inspection software automates the process of visually monitoring equipment under test (EUT) during a test sequence. This eliminates human inattention, ensures reproducible results and simplifies the test documentation. A typical application is EMS testing with R&S®EMC32 and R&S®ELEKTRA test software.

Visually monitoring an EUT during a complex test sequence is time-consuming and requires utmost concentration. Errors can be overlooked in a momentary lapse of attention. Furthermore, many events cannot be reliably monitored with the naked eye, such as slight changes in color or brightness or deviation from a predefined flashing frequency. This is where R&S®AdVISE software provides support.

R&S®AdVISE uses object based algorithms to analyze the incoming video signal of an HDTV camera attached to a PC. With the aid of parameters defined by the user, the software detects any deviations from the target status of the EUT and documents these deviations in a video protocol and status report. R&S®AdVISE can be connected to system software such as R&S®EMC32 and R&S®ELEKTRA via a remote control interface. The system software controls the test sequence and creates its own report containing the results.

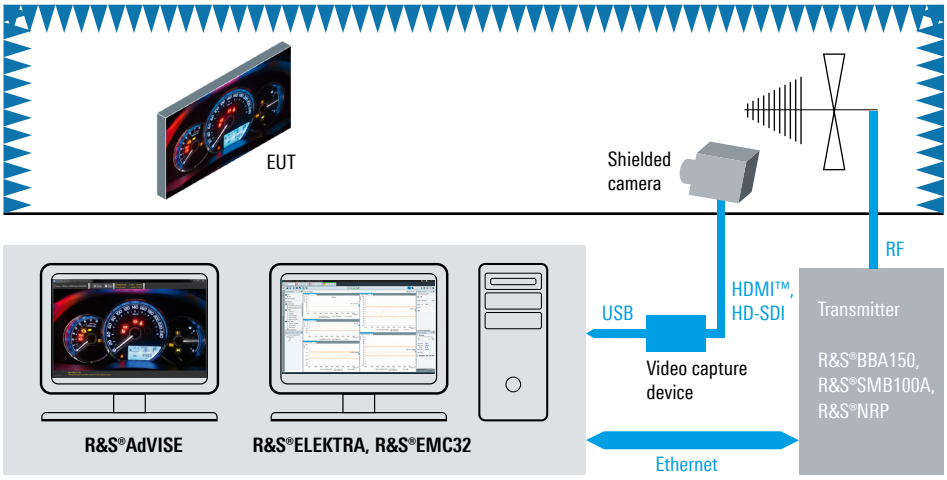
The analysis focuses on regions of interest (ROI). ROIs, drawn by the user, are used to denote the areas of the picture that are to be analyzed and specify which analysis method is to be used. The R&S®AdVISE system analyzes up to 30 video frames per second and can see transitory events that a human may miss.

The intuitive and clearly structured user interface makes it possible to configure measurements in only a few minutes. The operator can intervene at any point during the test sequence to deactivate or adjust individual regions.

Key facts

- Automatic error recognition for EUTs based on camera signal evaluation
- Continuous monitoring of up to 32 regions at 30 frames per second
- High-performance image processing thanks to object based evaluation with optimized test methods
- Optional image tracking to compensate for EUT and camera vibrations
- Creation of event-controlled video protocols and test reports
- Runs independently and under the control of system software

R&S®AdVISE in a networked system with EMC control software



BENEFITS AND KEY FEATURES

System concept

R&S®AdVISE runs on any controller that fulfills the minimum requirements listed in the specifications. It leaves sufficient processing power to also run control software such as R&S®EMC32 and R&S®ELEKTRA on the same controller.

A special video interface to feed the uncompressed camera signal is not necessary. This is performed by an off-the-shelf portable frame grabber connected to the R&S®AdVISE PC via USB 3.0. All cameras with a conventional DVI, HDMI™ or HD-SDI interface can be connected.

R&S®AdVISE is an efficient solution for monitoring an EUT from different angles. Thanks to the precise configurability of the ROIs, R&S®AdVISE can analyze up to four cameras simultaneously when their output signals are combined by an upstream multiviewer into a single video signal.

Image tracking

With the image tracking option, R&S®AdVISE automatically adjusts the position of all defined measuring fields to the actual position of the image elements to be evaluated. As a result, R&S®AdVISE visual inspection software can be used even if running motors, shaky turntables or unstable camera suspensions cause the image to vibrate. The option also supports camera repositioning. The measurement configuration can be resumed at the push of a button.

Virtual camera

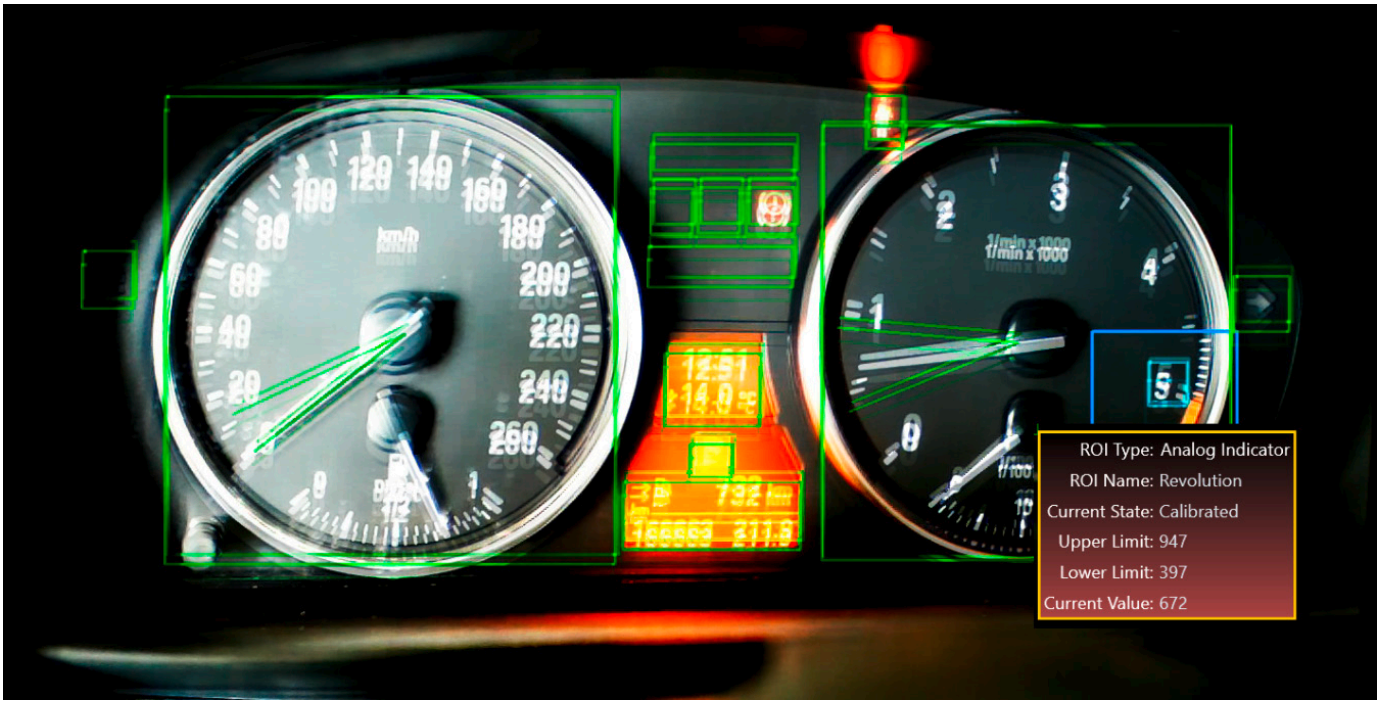
R&S®AdVISE can also analyze video recordings of completed tests with the R&S®ADV-K1050 virtual camera option. Measurements can be configured in the same way as during real-time operation, except that the software analyzes the content of a video file instead of a camera signal.

Video protocol and test report

R&S®AdVISE creates a video protocol with an event list. What sets the R&S®AdVISE system apart in usability is the indexing feature of the integrated video player. This feature allows the user to go to any event in the video by clicking on the event information. The player enables the user to collect a single frame as a JPEG image or collect a clip of the video to be used for reports or archiving.

The event list can also be saved as a PDF test report.

Image tracking allows EUT monitoring even if vibrations disturb the image recording



Remote control

R&S®AdVISE has a generic and an extended remote interface to control test sequences.

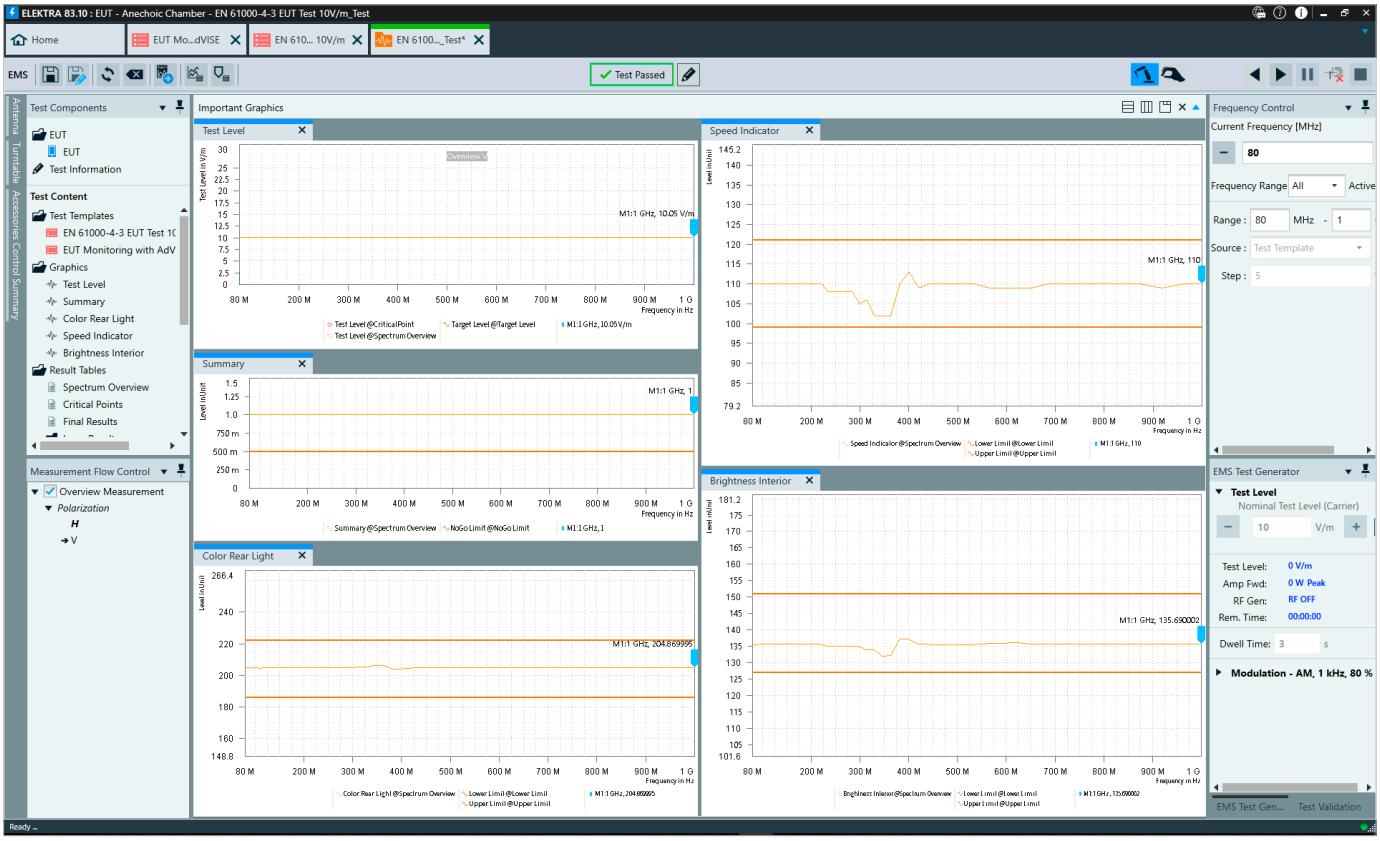
The generic interface is open to all users who wish to control R&S®AdVISE via their own remote control program. R&S®AdVISE will pass back to the remote system a Go/NoGo value indicating whether or not an event condition has been detected. The test software can transmit test information to R&S®AdVISE during the test sequence.

R&S®AdVISE then superimposes this information clearly into the incoming video. This informs the operator of the test's progress while it is running, and makes it easier to assign the event to the corresponding test conditions in the recorded video report.

The extended interface is designed to be used with R&S®EMC32 and R&S®ELEKTRA. This interface also provides the measurement results for individual ROIs for graphical processing in R&S®EMC32 and R&S®ELEKTRA.

Measurement view with superimposed information of the EMS test conditions

Displaying R&S®AdVISE test results in R&S®ELEKTRA measurement software



OPTIMAL ANALYSIS EFFICIENCY

Regions of interest (ROI) are the mechanism by which the user defines how to use the R&S®AdVISE system. ROIs are small sections of the video surface that the operator specifies by drawing a rectangular box around the area. The analyzers then focus on the video frame areas defined by the ROIs. This increases the speed at which events are captured and helps ensure real-time processing. The R&S®AdVISE system supports parallel monitoring of up to 32 ROIs (R&S®ADV-K1032 option).

Each ROI that is created is assigned to a specific type of event that the ROI is watching for. These types are described in more detail below.

Light (on/off)

Light on/off indicates extreme changes in brightness. In other words, a lamp is either on or off. The analyzer will declare an event if a defined area changes from off to on or from on to off. Examples:

- Headlights
- Dashboard indicator lights (ABS, engine oil, temperature, warning, etc.)
- Tail lights
- Cockpit warning indicators
- Interior or exterior lighting

Color change

Color change monitors the color of the observed area. The analyzer will declare an event if the average color of the defined ROI is outside the specified hue range. Example:

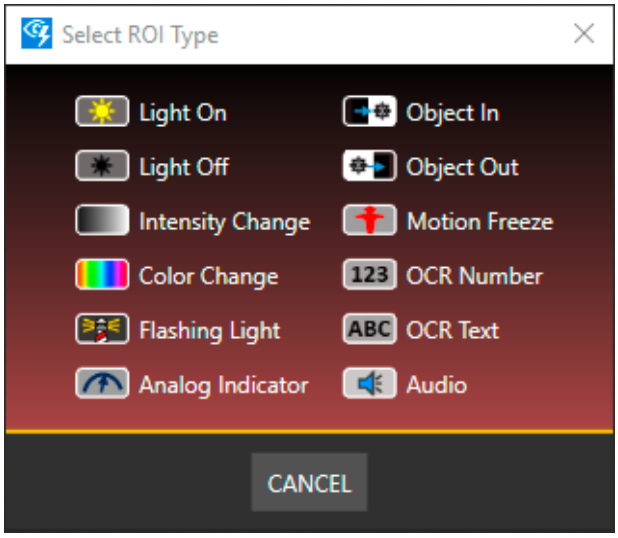
- Indicator that is normally green but turns to amber or red

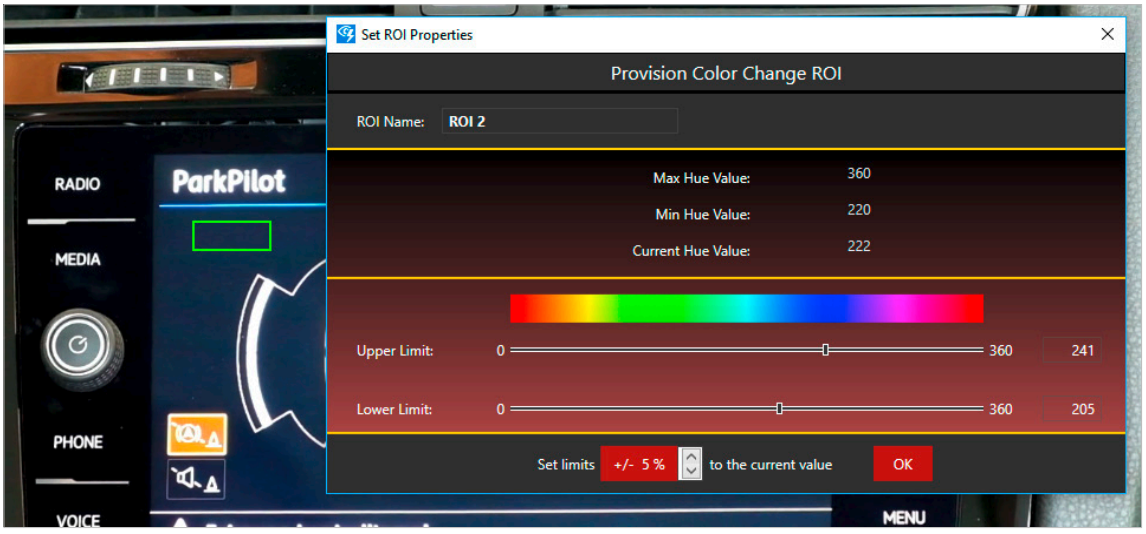
Intensity change

Intensity change monitors the brightness of the observed area. The analyzer will declare an event if the average brightness within the defined ROI is out of the specified luminance range. Examples:

- Lamps
- Background illumination

Selecting an ROI type





Checking the background color with "Color Change ROI"

Motion freeze

Motion freeze monitors whether an element is still moving. The analyzer will declare an event if the element that is monitored with this ROI stops moving for a definable time. Examples:

- Activity indicators
- Mechanical relays
- Running counters
- Running engines

OCR text (R&S®ADV-K1060 option)

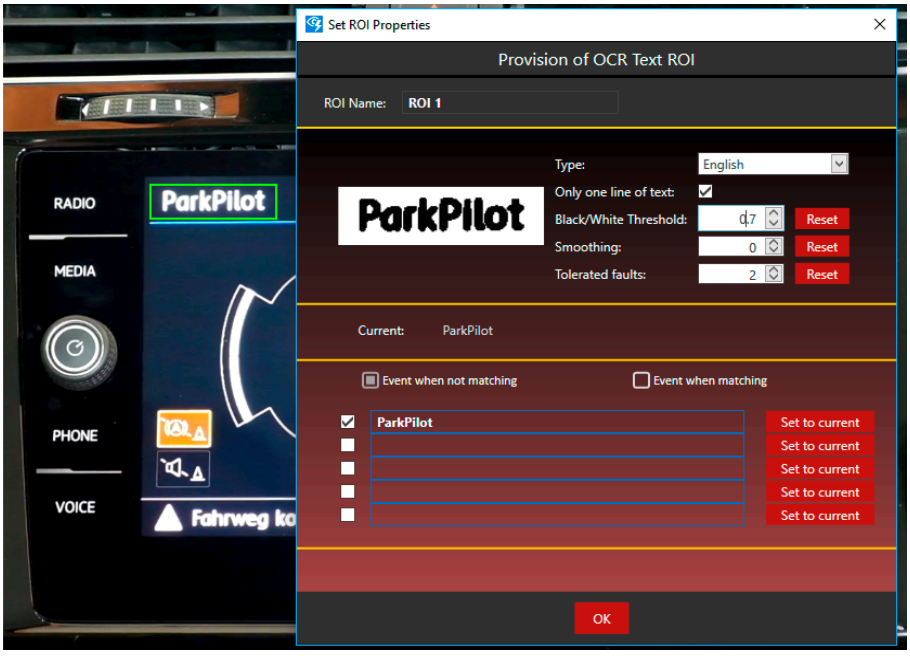
OCR text monitors status information. The user can define up to five status messages and choose whether he receives an alarm if none or alternatively if at least one of these messages appears. Examples:

- Status messages
- Warning or alarm information
- Instrument settings

OCR number (R&S®ADV-K1060 option)

OCR number monitors numeric outputs. The user can choose to receive an alarm if the test result is within or outside a definable range. Examples:

- Test results
- Temperature
- Filling level



Checking a text information with "OCR Text ROI"

Checking a numerical test result with "OCR Number"

Object in, object out

Object in and object out indicate any changes within a defined area. This can, for example, be an element that moves into or out of this area. The software also detects changes to the objects themselves. Examples:

- Symbols and icons
- Numbers and font displays
- Indicator positions

Analog indicator

Analog indicator monitors the position of a pointer or bar indicator. It supports circular and linear gauges. The operator can configure the analyzer to declare an event if the observed indicator is inside or outside of the specified limits. The value of the indicator position is available and can be processed via the remote interface. Examples:

- Circular gauge
- Linear gauge
- Bargraph indicator
- Speedometer
- Revolution counter
- Level indicator

Flashing lights

Flashing lights monitor the frequency, pulse width and duty cycle of flashing elements, either individually or together. The analyzer will declare an event if at least one of the measured values exceeds the defined limit values. Examples:

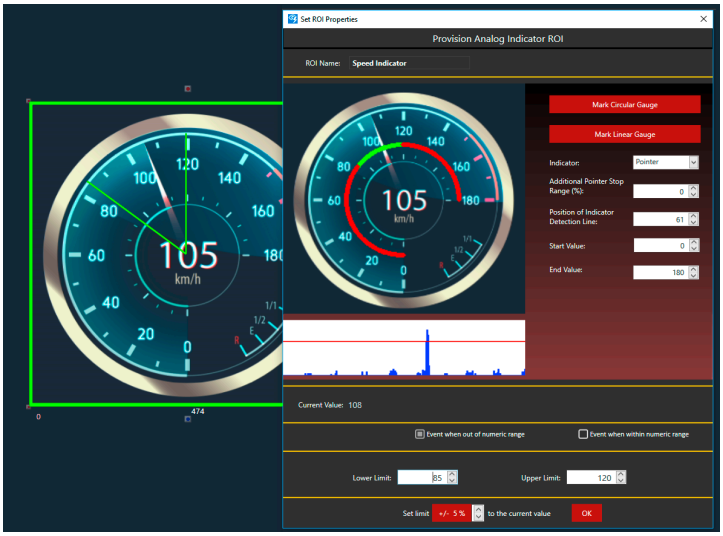
- Turn indicator
- Alarms
- Running lights

Audio monitoring (R&S®ADV-K1062 option)

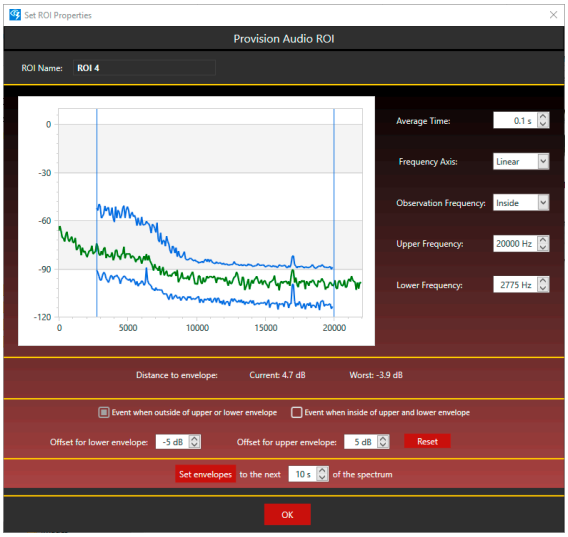
This option permits frequency-selective monitoring of wanted and unwanted noise. The analyzer generates an error message if the signal spectrum in the selected frequency range violates a pre-trained envelope. Audio signals can be recorded via the connected camera or PC audio input. Examples:

- Motor noise
- Fan noise
- Test tone distortions

Checking a mechanical circular gauge with "Analog Indicator ROI"



Checking the audio spectrum for wanted or unwanted noise with "Audio ROI"



SPECIFICATIONS IN BRIEF

Specifications in brief	
Base software	
ROI types	light on, light off; object in, object out; color change; intensity change; analog indicator; flashing frequency (0.2 Hz to 10 Hz), flashing duty cycle, flashing pulse width (0.1 s to 4.9 s); motion freeze (0.03 s to 3.3 s), optional OCR text, OCR number and audio monitoring
Max. number of parallel monitored ROIs	16 (optional 32)
Video report	1080p30, H.264 coded, file size typically 3 Gbyte/h, max. file size 60 Gbyte, EMS data fields for watermarking: frequency, modulation, immunity level, power level, turntable position
Operation modes	local, remote generic, remote extended (compatible with R&S®EMC32 version 10.50.00 or higher and R&S®ELEKTRA version 3.20 or higher)
Video interface for live camera	USB video class (UVC), USB 3.0; supporting HDMI™ and HD-SDI via video capture device
Supported camera formats	1080p30; RGB, 4:2:2, 4:4:4; 8 bit, 10 bit
Depth of analysis	8 bit
Options	
R&S®ADV-K1032 extension to 32 ROI	
Max. number of parallel monitored ROIs	32
R&S®ADV-K1050 virtual camera input option	
File container	*.mov, *.mp4, *.avi
Coding	H.264, MPEG-2; MPEG-4
Formats	1080p30, 1080p60; other resolutions are possible, but are converted in real time to 1080p
R&S®ADV-K1060 ROI OCR text and number	
OCR text	monitoring a status information
OCR number	monitoring a numeric output
R&S®ADV-K1062 audio monitoring	
Frequency range	50 Hz to 22 kHz (depending on microphone specification)
Level range	0 to –120 dBFS (depending on microphone specification)
Audio interface	live audio sources: embedded audio in USB video class (UVC), PC sounds (loopback); virtual camera audio source: MP2, MP3, AAC coding
Number of channels	1 (left)
R&S®ADV-K1070 image tracking	
Number of trackers	up to 3
Tracking range	300 × 300 pixel

Hardware recommendations	
Video capture devices	AV.io HD (DVI, HDMI™), AV.io SDI (HD-SDI), https://www.epiphan.com/products/
Supported and verified shielded cameras for EMC application	► mk-messtechnik GmbH: dAV-Cr-HD ► Audivo GmbH: HDCam6E, HDCam7
Minimum controller requirements	
CPU	6th generation Intel® Core i7 processor or 4 core Intel® Xeon processor with NVIDIA P2000
RAM	16 Gbyte
Mass storage	250 Gbyte hard disk, solid-state disk (SSD) recommended
USB, LAN	USB 3.0, 100 Mbit LAN interface, 1 Gbit LAN recommended
Minimum monitor resolution	1920 × 1080 pixel
Operating system	Windows 7/10, 64 bit

ORDERING INFORMATION

Designation	Type	Order No.
Visual inspection software	R&S®AdVISE-SW	1434.6518.02
License dongle	R&S®AdVISE-PC	1434.6660.02
Extension to 32 ROI	R&S®ADV-K1032	1434.6524.02
Virtual camera	R&S®ADV-K1050	1434.6530.02
ROI optical character recognition for text and numbers	R&S®ADV-K1060	1434.6601.02
Audio monitoring	R&S®ADV-K1062	1434.6618.02
Image tracking	R&S®ADV-K1070	1434.6560.02

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