

# R&S®VEGA Suite

## Detailed media file analysis

Broadcasting

Product Brochure | 02.00

Now supporting  
HEVC/H.265



# R&S®VEGA Suite

## At a glance

The R&S®VEGA Suite contains software tools for in-depth offline analysis of media files on a PC. Manufacturers of video processing components and devices use the R&S®VEGA Suite to check that their products are standard compliant, for quality assurance testing and to improve performance. Broadcast operators and service providers can use this software to find deep-lying signal errors and optimize content. The software is ideal for analyzing compressed audio and video signals, MPEG-2 transport streams and MXF files.

The R&S®VEGA Suite consists of four products:

- R&S®VEGA-HEVC is for detailed analysis of HEVC/H.265 encoded video streams
- R&S®VEGA-H264 supports detailed analysis of AVC/H.264 video streams and can optionally be extended to support several additional video and audio codecs
- R&S®VEGA-TSA is for analyzing MPEG-2 transport streams and MXF files
- R&S®VEGA-SYNC is for checking audio-video synchronization

The R&S®VEGA Suite supports the latest standards and technologies, making it especially useful for developers of DTV components and devices such as encoders, multiplexers and transcoders. Many video formats can be analyzed, including HEVC/H.265, AVC/H.264, H.264 SVC, H.264 MVC and VC-1. Supported audio formats include MPEG and a number of Dolby<sup>1)</sup> standards. Data streams such as teletext, DVB subtitling, closed captioning and EPG can also be analyzed.

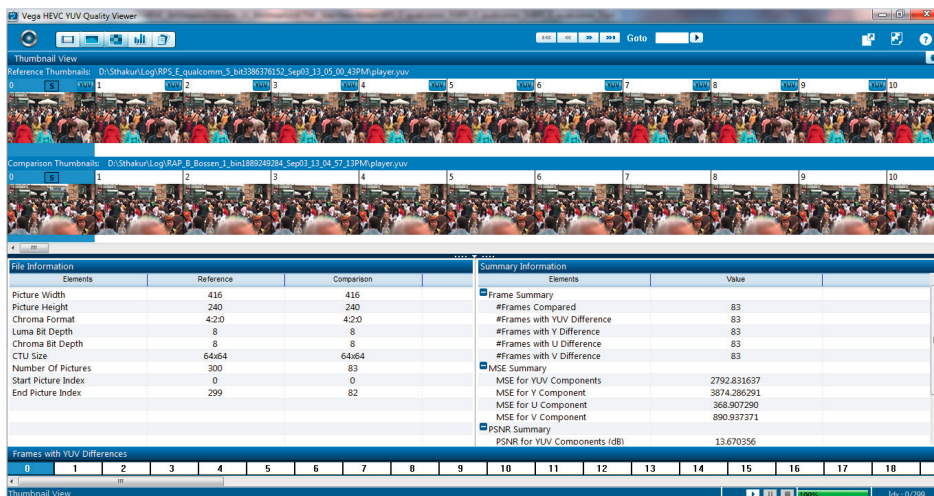
The R&S®VEGA Suite software was developed by Interra Systems. This software is the perfect complement for the Rohde&Schwarz video and MPEG analyzers.

### Key facts

- Support of the latest standards and technologies
- Detailed analysis capabilities
- Comprehensive visualization functions
- Batch mode for checking multiple files (R&S®VEGA-K11 option)

<sup>1)</sup> Dolby® is a registered trademark of Dolby Laboratories.

R&S®VEGA-HEVC: YUV quality analysis.



# R&S®VEGA Suite

## Benefits and key features

### **In-depth HEVC/H.265 video analysis – R&S®VEGA-HEVC**

- Comprehensive, easy-to-navigate visuals for efficient analysis
- Analytical graphs to provide bird eye view of the complete stream
- Summary information for all levels at a mouseclick
- In-depth analysis features and powerful reporting functions
- Comparison of HEVC and H.264 encoding (R&S®VEGA-K31, R&S®VEGA-K32)
- Powerful features for continued assurance of compliance and interoperability
- Efficient high-performance analysis

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### **In-depth audio and video analysis – R&S®VEGA-H264**

- Support of broad range of DTV standards
- Extensive video analysis functions
- Extensive audio analysis functions
- Support of several data applications
- Automated analysis of multiple files – batch mode (R&S®VEGA-K11)
- Comparison of two video signals – video comparator (R&S®VEGA-K13)

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### **Comprehensive MPEG-2 transport stream analysis – R&S®VEGA-TSA**

- Extensive analysis functions (MPEG-2 transport streams)
- Support of characteristics specific to various digital TV standards
- Special analysis features for data services
- Comprehensive analysis of MXF streams
- Smooth integration with R&S®VEGA-H264
- Support of PCAP files

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### **Precise audio-video synchronization analysis – R&S®VEGA-SYNC**

- Support of numerous standards
- Extensive analysis functions

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# In-depth HEVC/H.265 video analysis – R&S®VEGA-HEVC

Analytical graphs to provide bird eye view of the complete stream

- Frame distribution
- NAL distribution
- Compression ratio
- DPB occupancy
- Ratio of coding unit data
- Prediction data

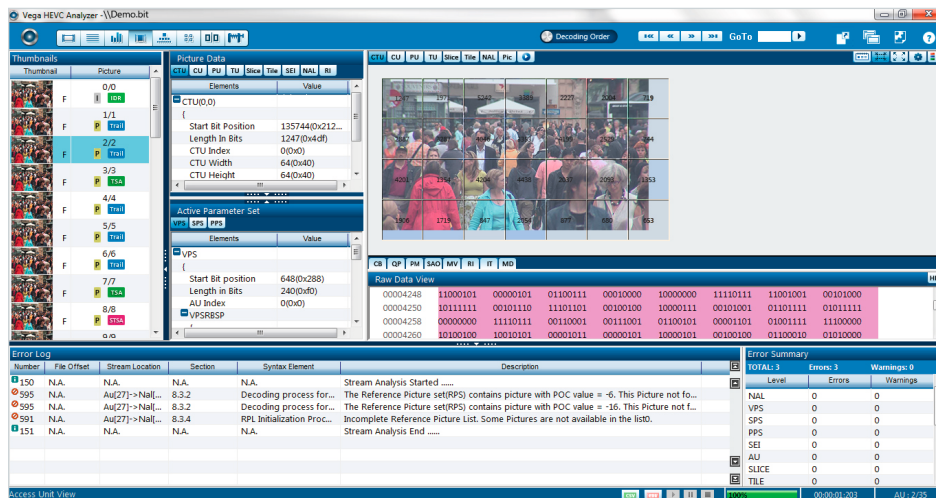
Summary information for all levels at a mouseclick

- Stream summary
- Sequence summary
- NAL summary
- Picture summary

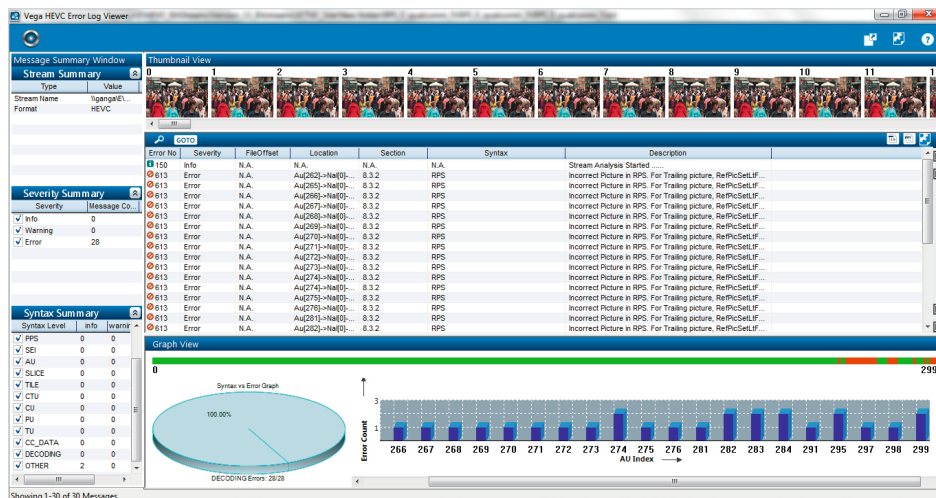
Comprehensive, easy-to-navigate visuals for efficient analysis

- Intuitive information display
- High-level picture information down to thumbnail structure

R&S®VEGA-HEVC: access unit analysis.



R&S®VEGA-HEVC: error log.





## In-depth analysis features and powerful reporting functions

- Overlay of picture with CU, TU and PU partitions
- CTB view that displays splitting of CU, PU and TU blocks
- Error messages at all levels to enable accurate examination of standard violations (NAL, SPS, PPS, APS, CU, TU and PU levels)
- Powerful reporting feature to save and distribute reports

## Comparison of HEVC and H.264 encoding (R&S®VEGA-K31, R&S®VEGA-K32)

- Bit rate
- QP data
- Buffer occupancy
- Motion vectors

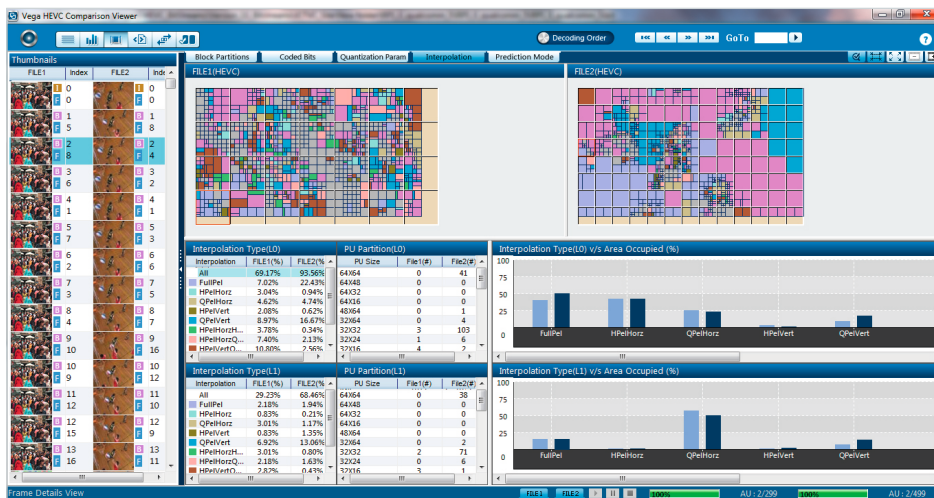
## Powerful features for continued assurance of compliance and interoperability

- Buffer analysis
- Trace viewer
- YUV viewer

## Efficient high-performance analysis

- Multicore support
- Support of Windows 7, 64-bit (32 bit version supports resolutions up to 1920 × 1080 pixel; 64 bit version supports higher resolutions)

R&S®VEGA-HEVC: video comparator.



R&S®VEGA-HEVC: thumbnails with picture details.

Vega HEVC Analyzer - Demo.bit														
Thumbnail View														
Thumbnail	Picture	TimeCode	POC	TemporalID	Errors/Warnings	File Offset (Bytes)	Frame Size (Bits)	Nal Count	Slice Count	CTU Count	Tile Count	Filter Type	AUX	
0/0	F	00:00:00:000	0	0	0/0	0	77880	8	1	28	1	SAO: L[ONL][C][OFF] DeBlock: ON	SPS	PPS
1/1	F	00:00:00:033	10	0	0/0	9735	57800	2	1	28	1	SAO: L[OFF][C][OFF] DeBlock: ON	SEI	
2/2	F	00:00:00:066	20	0	0/0	16960	66840	2	1	28	1	SAO: L[OFF][C][OFF] DeBlock: ON	SEI	
3/3	F	00:00:00:100	30	1	0/0	25315	64416	2	1	28	1	SAO: L[ONL][C][OFF] DeBlock: ON	SEI	
4/4	F	00:00:00:133	40	1	0/0	33367	68896	2	1	28	1	SAO: L[OFF][C][OFF] DeBlock: ON	SEI	
5/5	F	00:00:00:167	50	1	0/0	41979	66272	2	1	28	1	SAO: L[OFF][C][OFF] DeBlock: ON	SEI	
6/6	F	00:00:00:200	60	1	0/0	50263	71264	2	1	28	1	SAO: L[ONL][C][OFF] DeBlock: ON	SEI	
7/7	F	00:00:00:234	70	2	0/0	59171	67672	2	1	28	1	SAO: L[OFF][C][OFF] DeBlock: ON	SEI	
8/8	F	00:00:00:267	80	1	0/0	67630	80376	2	1	28	1	SAO: L[OFF][C][OFF] DeBlock: ON	SEI	
9/9	F											SAO: L[ONL][C][OFF] DeBlock: ON		
Error Log														
Number	File Offset	Stream Location	Section	Syntax Element	Description	Error Summary								
150	N.A.	N.A.	N.A.	N.A.	Stream Analysis Started	TOTAL: 3 Errors: 3 Warnings: 0								
595	N.A.	Au[27]->Nal[...]	8.3.2	Decoding process for...	The Reference Picture set(RPS) contains picture with POC value = -6. This Picture not fo...	Level	Errors	Warnings						
595	N.A.	Au[27]->Nal[...]	8.3.2	Decoding process for...	The Reference Picture set(RPS) contains picture with POC value = -16. This Picture not f...	NAL	0	0						
591	N.A.	Au[27]->Nal[...]	8.3.4	RPL Initialization Proc...	Incomplete Reference Picture List. Some Pictures are not available in the list.	VPS	0	0						
151	N.A.	N.A.	N.A.	N.A.	Stream Analysis End	SPS	0	0						
						PPS	0	0						
						SEI	0	0						
						AU	0	0						
						SLICE	0	0						
						TILE	0	0						

# In-depth audio and video analysis – R&S®VEGA-H264

## Support of broad range of DTV standards

- **Video:** H.264, H.263, H.263+, MPEG-4, MPEG-1, H.264 SVC (R&S®VEGA-K4), H.264 MVC (R&S®VEGA-K5), MPEG-2 (R&S®VEGA-K2), VC-1 (R&S®VEGA-K6), AVS (R&S®VEGA-K3)
- **Audio:** AAC, AMR, MP3, PCM, LPCM, MPEG-1/ MPEG-2 Audio, WMA, Dolby AC-3/Dolby Digital Plus (R&S®VEGA-K7), Dolby E (R&S®VEGA-K8)
- **Data:** XDS, JPEG, JPEG2000, closed captioning (R&S®VEGA-K9)
- **Container:** MPEG-2 transport stream (DVB, ATSC, ISDB), MPEG-2 program stream/DVD VOB, MPEG-1 systems, MP4, 3GPP/3GPP2, AVC, AVI

## Extensive video analysis functions

- Support of all profiles and levels
- Display of sequence, VOL, picture, VOP, macroblock, slice, NAL unit and binary data for each picture
- Display of frame statistics to analyze interpolation, prediction mode, coded bits and frame size
- Generation of encoder performance and quality metrics graphs
- Buffer analysis: CPB, VBV, VMV, VCV
- Display of hierarchy for SVC layers
- Display of multiple views for H.264 MVC

R&S®VEGA-H264: macroblock analysis.

The screenshot displays the Vega H264 Analyzer software interface. The top menu bar includes File, View, Navigate, Settings, Window, and Help. Below the menu is a toolbar with various icons. The main window is divided into several panels:

- Top Panel:** Shows a sequence of frames (0-10) with their respective POC (Picture Order Count) values. Frame 8 is highlighted.
- Left Panel:** Displays field parameters for the selected frame, including Profile (Main), Level (2.1), Chroma Format (4:2:0), MBAFF Mode (FALSE), Resolution (352 x 288), Max DFB Size (12), Coding Type (CAVLC), BitDepth Luma (8), BitDepth C (8), Frame Rate (30), and AUs in Seq# (150).
- Center Panel:** Shows a macroblock grid with a color-coded legend (I, P, B, Skip, PCM, FW, MV, BW, MV). A detailed macroblock summary is shown for the selected macroblock, including Name, Address, Type, Frame, Field, CP, Delta, CP, Delta, Transform Size, and Bitstream Address.
- Right Panel:** Displays sequence parameters for the selected frame, including profile\_idc, constraint\_set0\_flag, constraint\_set1\_flag, constraint\_set2\_flag, constraint\_set3\_flag, level\_idc, seq\_parameter\_set\_id, and various flags for direct\_8x8\_inference, frame\_cropping, and vui\_parameters.
- Bottom Panel:** Shows a hex dump of the binary data for the selected macroblock, with a description of the data (e.g., Stream Parsing Started, Date for 17 macroblocks out of 0).

## Extensive audio analysis functions

- Support of various audio object types and profiles
- Display of separate data for different channels, e.g. L, R, C, SCE, CPE, LFE, CCE
- Display of top-level header, e.g. ADIF, ADTS, synchronization information, BSI, WAV
- Display of spectrum and output data for all raw data blocks (RDBs), audio blocks, core frames, etc.
- Playback of decoded audio channels

## Support of several data applications

- Closed captioning
- XDS
- JPEG/JPEG2000

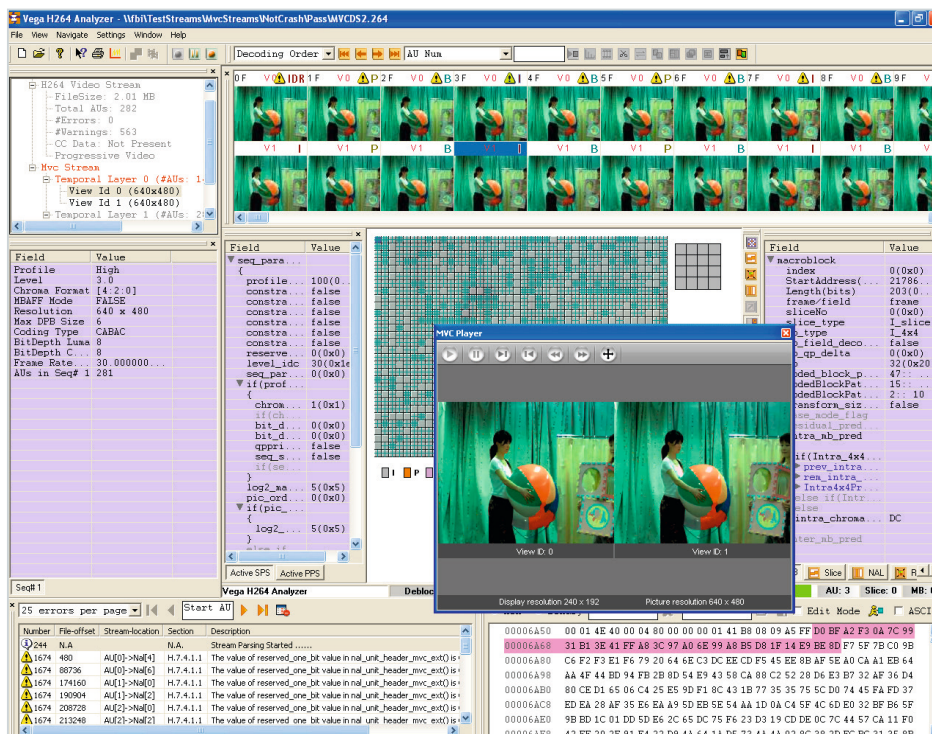
## Automated analysis of multiple files – batch mode (R&S® VEGA-K11)

- Command interface for batch analysis of multiple streams
- Automated storage of analysis results to project folder
- Use of R&S®VEGA-H264 GUI to browse and examine coding details of streams and to navigate to error locations

## Comparison of two video signals – video comparator (R&S® VEGA-K13)

- | Analysis of statistical details of an H.264 stream by displaying the differences between two video streams
- | Thumbnails of pictures in the stream
- | Summary information at format-specific level and sequence level
- | Display of parameters and properties for both streams
- | Summary information on differences including location, type and value
- | Statistical details of the video stream in text and graph mode at picture level, sequence level and stream level

R&S®VEGA-H264: multistream analysis.



# Comprehensive MPEG-2 transport stream analysis – R&S®VEGA-TSA

## Extensive analysis functions (MPEG-2 transport streams)

- ▮ Profile, level, resolution, bit rate and more
- ▮ Stream occupancy and packet distribution statistics
- ▮ Bandwidth statistics for all programs
- ▮ Display of packet header, PES header, SI, PSI, PSIP and more
- ▮ PCR/PTS inaccuracy and intervals, PCR jitter and drift rate, PCR frequency offset, PTS/DTS analysis
- ▮ TR 101 290 priority and CableLabs checks
- ▮ T-STD buffer analysis

## Support of characteristics specific to various digital TV standards

- ▮ DVB
- ▮ ATSC
- ▮ ISDB

## Special analysis features for data services

- ▮ DVB subtitles
- ▮ Teletext
- ▮ EPG
- ▮ DSM-CC
- ▮ CableLabs VoD

## Comprehensive analysis of MXF streams

- ▮ Partitions and their top-level contents
- ▮ MXF structures and descriptors
- ▮ Source package tracking

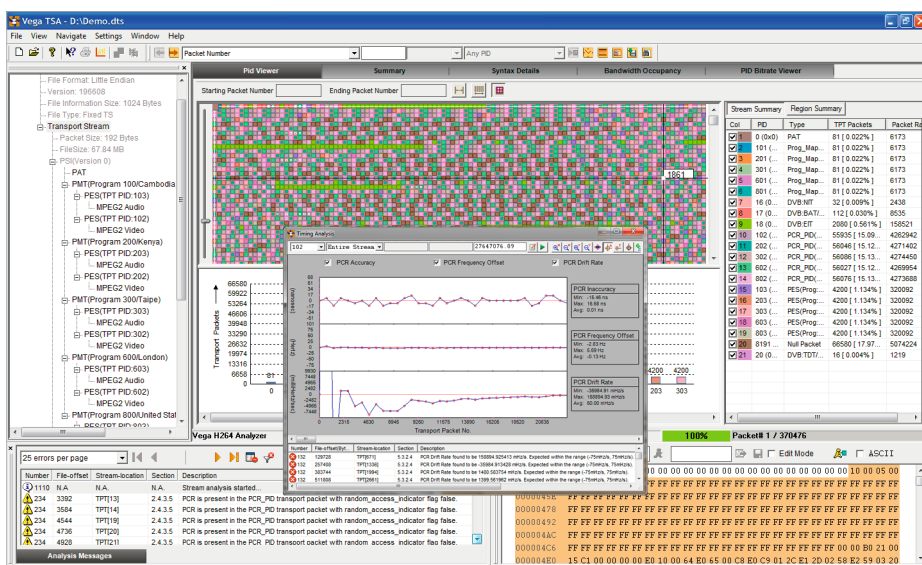
## Smooth integration with R&S®VEGA-H264

- ▮ Selection of audio or video elementary streams for in-depth analysis using R&S®VEGA-H264 via the R&S®VEGA-TSA GUI

## Support of PCAP files

- ▮ RTSP, SIP, H.264, H.263, SDP and RTP

### R&S®VEGA-TSA.



# Precise audio-video synchronization analysis – R&S®VEGA-SYNC

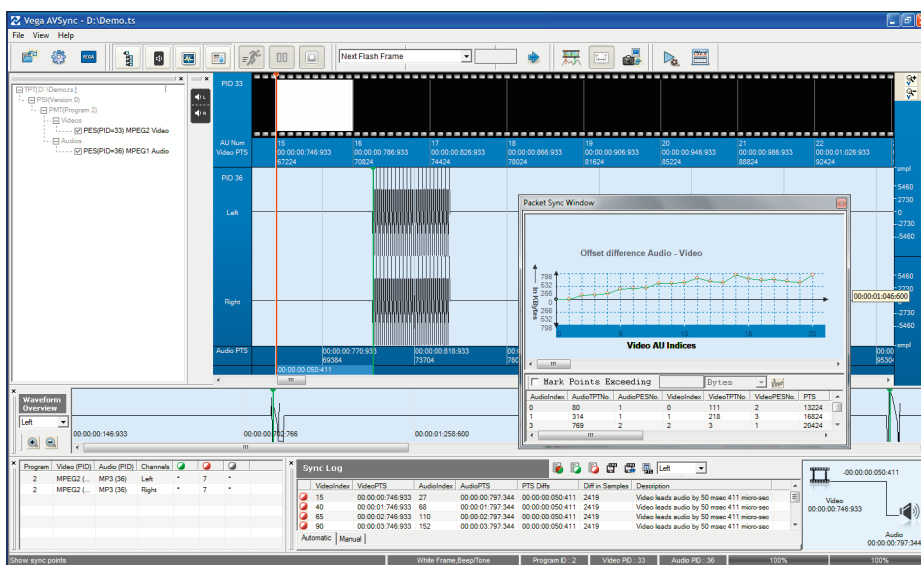
## Support of numerous standards

- **Video:** H.264, MPEG-4, MPEG-2
- **Audio:** AAC, Dolby AC-3, Dolby Digital Plus, Dolby E, MP3, AES3/LPCM, MPEG-1/MPEG-2 Audio
- **Container:** MPEG-2 transport stream (DVB, ATSC, ISDB), MPEG-2 program stream/DVD VOB, MP4

## Extensive analysis functions

- Detailed insight into sync points: packet number, frame number, PTS value and more
- Manual/automatic detection of sync points
- Channel-wise summary information: audio/video index, sync points, out-of-sync points, PTS, and PTS differences
- Quick forward and backward navigation across PTS timeline
- Support of comprehensive set of audio-video synchronization test patterns
- Coarse sync measurements using packet sync feature
- Customization options for tolerance levels and more

## R&S®VEGA-SYNC.





# Ordering information

Designation	Type	Order No.
<b>R&amp;S®VEGA Suite</b>		
<b>TS Analyzer</b>	R&S®VEGA-TSA	2116.8000.02
including USB dongle, printed installation instructions and CD with software and license file		
<b>AVSync Analyzer</b>	R&S®VEGA-SYNC	2116.8100.02
including USB dongle, printed installation instructions and CD with software and license file		
<b>HEVC Analyzer</b>	R&S®VEGA-HEVC	2116.8700.02
including USB dongle, printed installation instructions and CD with software and license file		
<b>HEVC Analyzer options</b>		
HEVC Video Comparator	R&S®VEGA-K31	2116.8339.02
H.264 license (for R&S®VEGA-K31 only)	R&S®VEGA-K32	2116.8345.02
<b>H264 Analyzer</b>	R&S®VEGA-H264	2116.8200.02
including USB dongle, printed installation instructions and CD with software and license file		
<b>H264 Analyzer options</b>		
MPEG-2 Video	R&S®VEGA-K2	2116.8216.02
AVS Video	R&S®VEGA-K3	2116.8222.02
SVC (Scalable Video Codec)	R&S®VEGA-K4	2116.8239.02
MVC (Multiview Video Codec)	R&S®VEGA-K5	2116.8245.02
VC-1 Video	R&S®VEGA-K6	2116.8251.02
Dolby Digital Plus/AC-3 Audio	R&S®VEGA-K7	2116.8268.02
Dolby E Audio	R&S®VEGA-K8	2116.8274.02
CC 708 (Closed Captioning)	R&S®VEGA-K9	2116.8280.02
Batch Mode and Command Line	R&S®VEGA-K11	2116.8300.02
DVB-H	R&S®VEGA-K12	2116.8316.02
Video Comparator	R&S®VEGA-K13	2116.8322.02
<b>Maintenance options</b>		
Maintenance for R&S®VEGA-H264, R&S®VEGA-TSA or R&S®VEGA-SYNC	R&S®VEGA-K20	2116.8400.02
Maintenance for R&S®VEGA-HEVC	R&S®VEGA-K21	2116.8397.02

## Software licensing

Use of the software requires a dongle with a matching license file. The dongle and the license file are included with R&S®VEGA-HEVC, R&S®VEGA-H264, R&S®VEGA-TSA and R&S®VEGA-SYNC. The license file enables all purchased options and supports new software versions released during the maintenance period. Remote operation of the PC running the R&S®VEGA Suite software using tools like Remote Desktop or VNC is not supported.

## Maintenance

The maintenance options are required for product support and allow the use of new software versions. Six months of maintenance are included with the purchase of the software. Additional maintenance time can be purchased in one-year increments. New software versions will not run if the maintenance period has expired.

System requirements				
	Operating system	Processor	RAM	Display
<b>R&amp;S®VEGA-H264</b>	Windows XP, Windows 7	quad-core processor (i3 or i5) (min. Core 2 Duo 1.8 GHz)	4 Gbyte (min. 1 Gbyte)	min. 1024 × 768 pixel
<b>R&amp;S®VEGA-TSA</b>	Windows XP, Windows 7	quad-core processor (i3 or i5) (min. Core 2 Duo 1.8 GHz)	4 Gbyte (min. 1 Gbyte)	min. 1024 × 768 pixel
<b>R&amp;S®VEGA-SYNC</b>	Windows XP, Windows 7	quad-core processor (i3 or i5) (min. Core 2 Duo 1.8 GHz)	4 Gbyte (min. 2 Gbyte)	min. 1024 × 768 pixel
<b>R&amp;S®VEGA-HEVC</b>	Windows 7 (32 bit) Windows 7 (64 bit <sup>1)</sup> ) (recommended)	quad-core processor	4 Gbyte	min. 1024 × 768 pixel

<sup>1)</sup> 64 bit version offers better performance and supports resolutions higher than 1920 × 1080 pixel.

**Note:**

Depending on the analysis settings and the size of the analyzed file, several 10 Gbytes of hard disk space may be required.

Your local Rohde&Schwarz representative will help you determine the optimum solution for your requirements.

To find your nearest Rohde&Schwarz representative, visit

[www.sales.rohde-schwarz.com](http://www.sales.rohde-schwarz.com)

## Service that adds value

- ▮ Worldwide
- ▮ Local and personalized
- ▮ Customized and flexible
- ▮ Uncompromising quality
- ▮ Long-term dependability

## About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

## Environmental commitment

- ▮ Energy-efficient products
- ▮ Continuous improvement in environmental sustainability
- ▮ ISO 14001-certified environmental management system

Certified Quality System  
**ISO 9001**

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R&S®VEGA Suite

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