Video Conference Quality Testing

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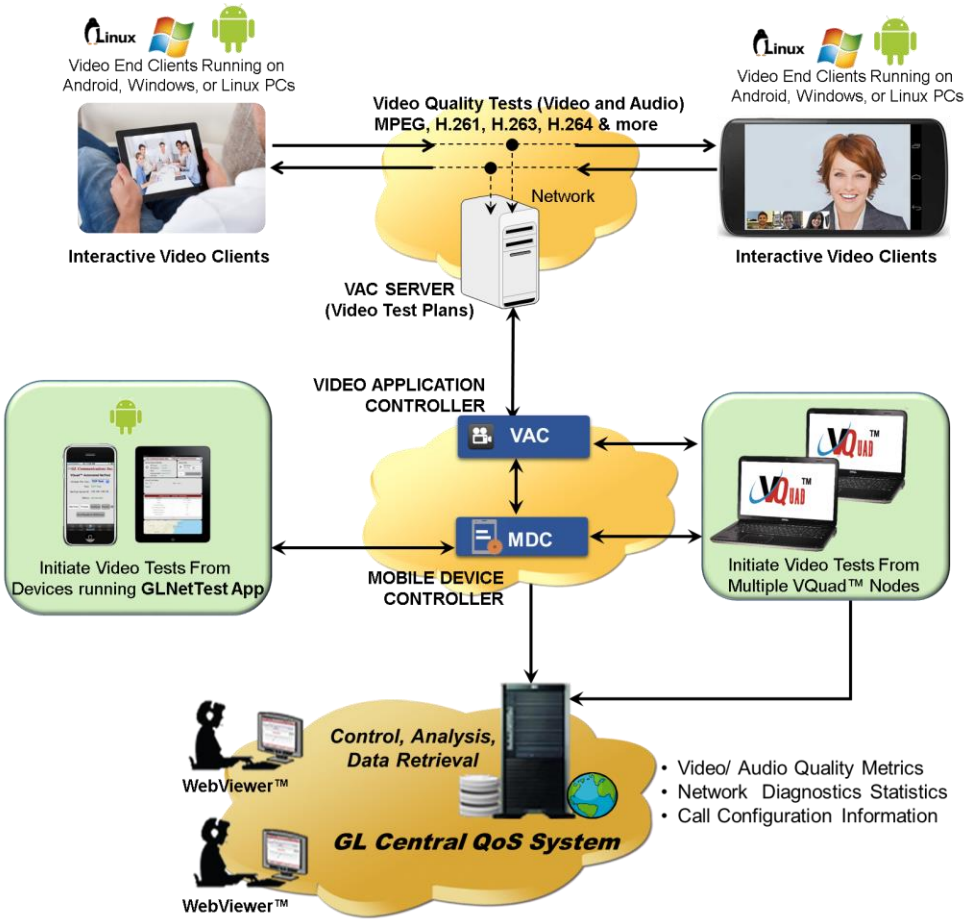
Video Conference Network

- Supports Android, Windows, and Linux video end client devices
- Supports both manual and automated (scripted) video testing within VQuad™
- Monitor Audio/Video Quality in Real-time
- Monitor service level compliance with SLAs
- Perform pre-deployment service testing
- Unlimited test plans configurations with Codec, Frame Rate, Bandwidth, Latency, GoP (Group of Pictures) Structure and Video Resolution
- Test results include Video Quality (Relative MOS-V), Audio Quality (Relative MOS-A), Audio Video Quality (Relative MOS-AV), IP Network condition parameters, Signaling Performance, and Call Config Info
- Initiate multiple (consecutive and/or concurrent) IP video calls between licensed agents
- Customized, consolidated, and interactive charts showing quality and diagnostic metrics
- Supported on Linux/CentOS, Windows operating systems



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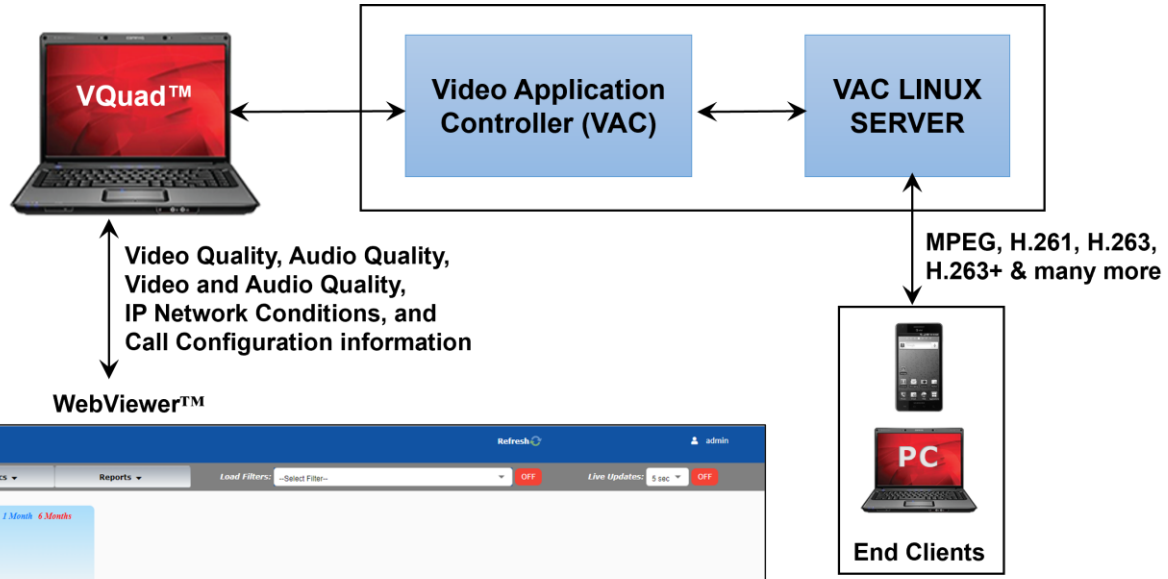
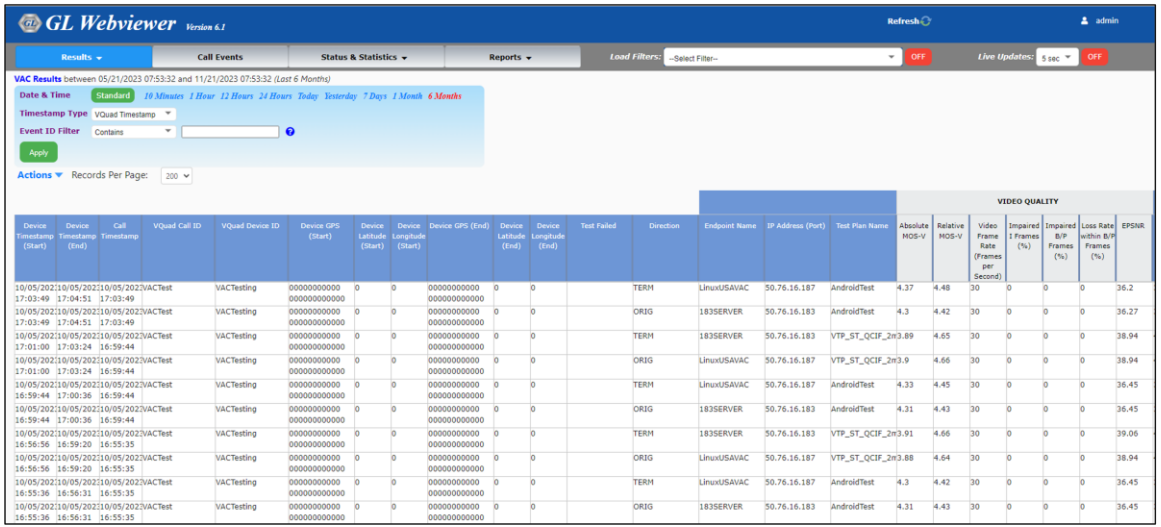
Automated Video Testing





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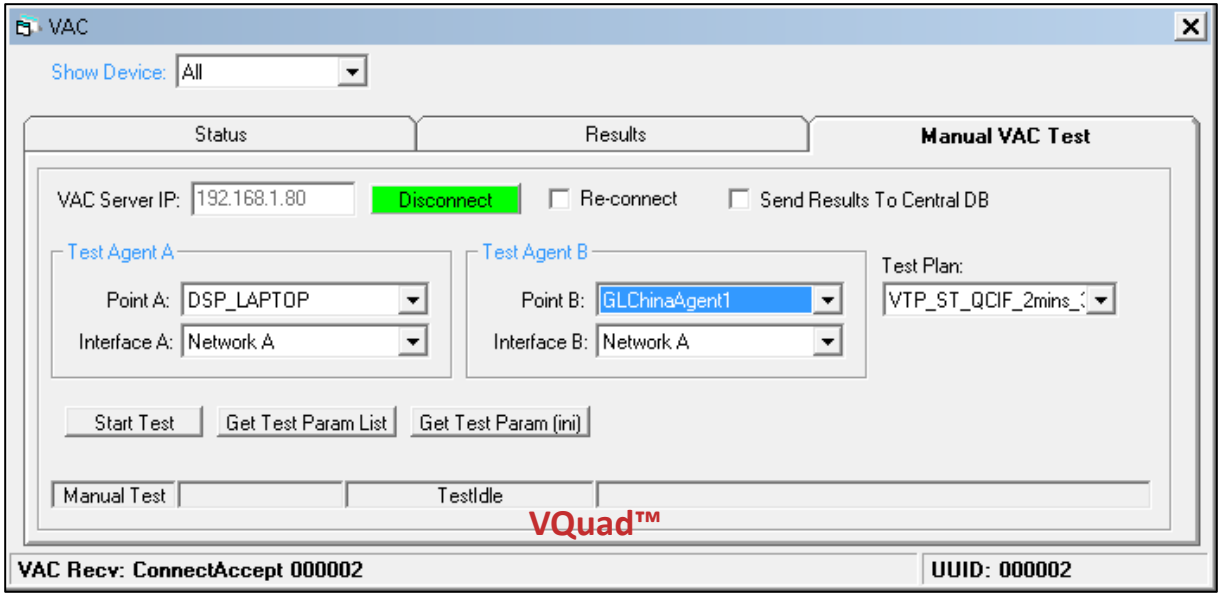
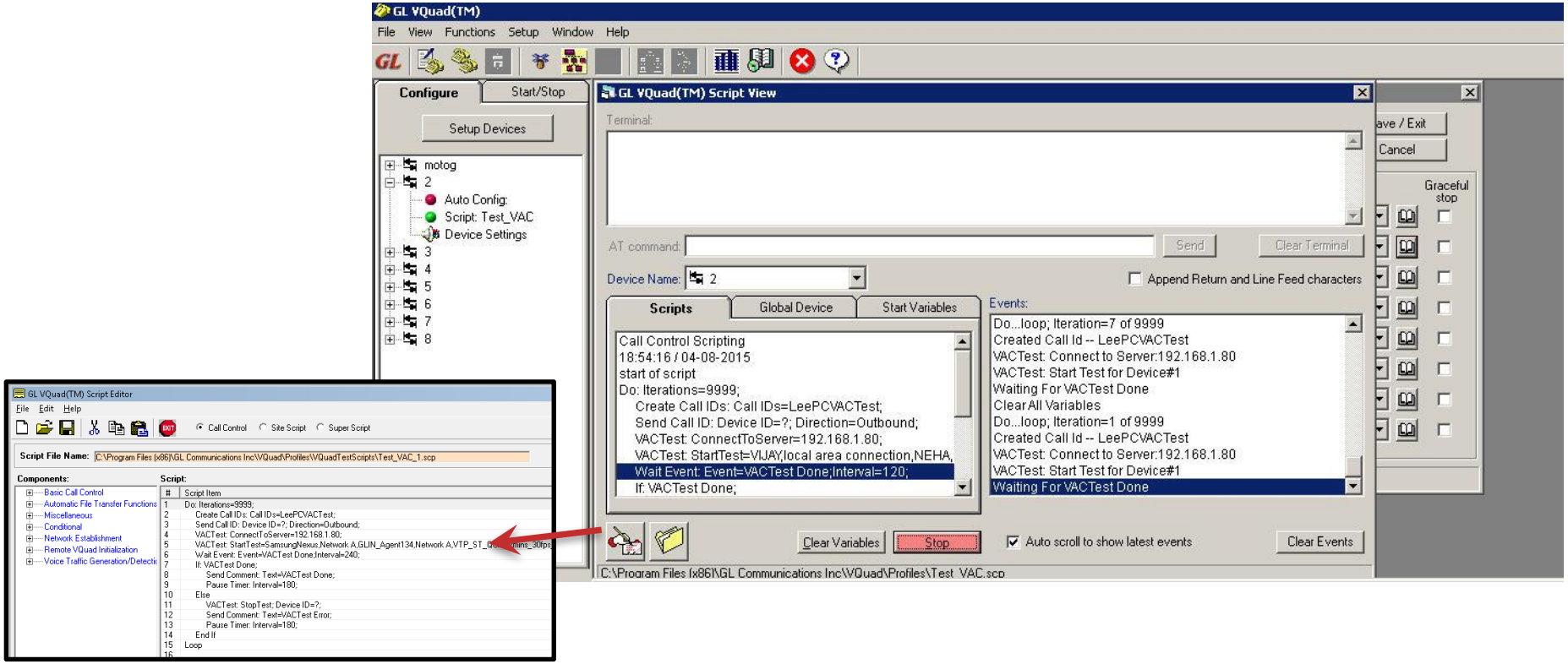
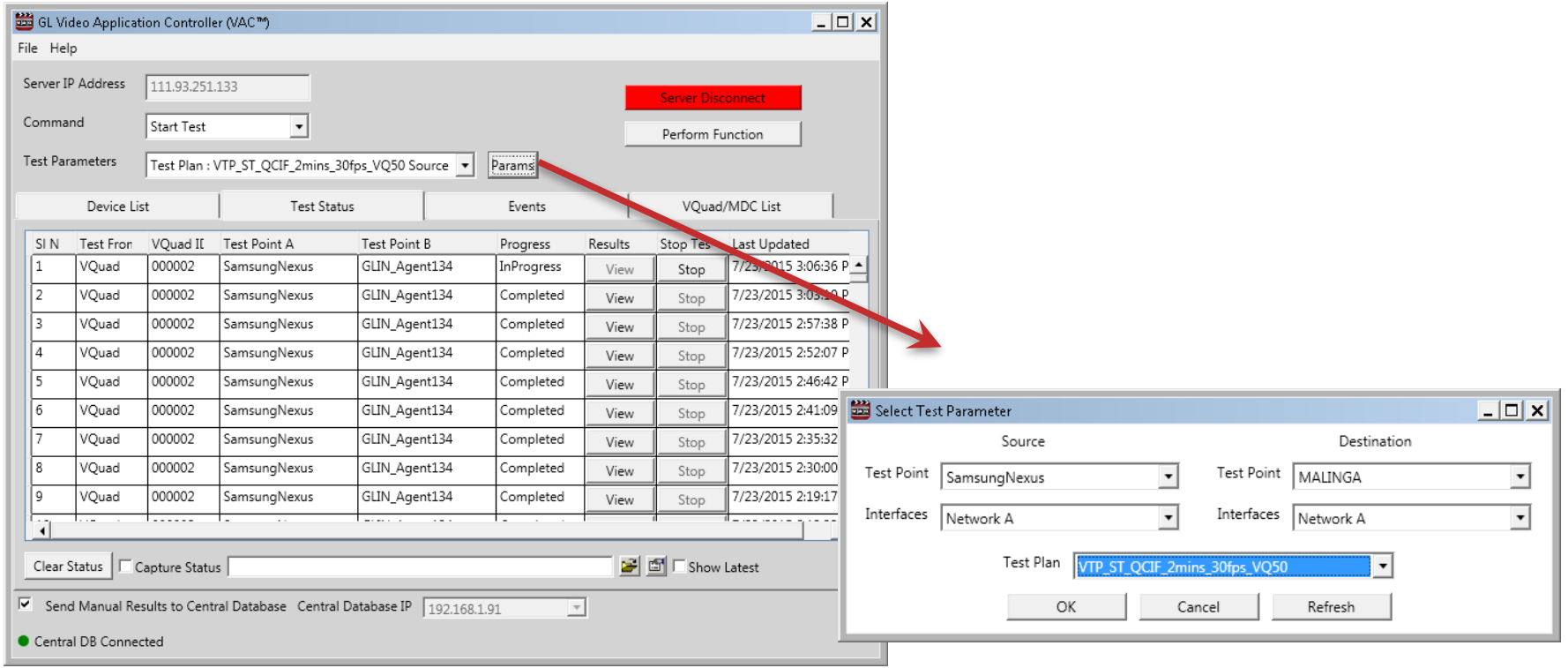
Manual Video Testing using VQuad™



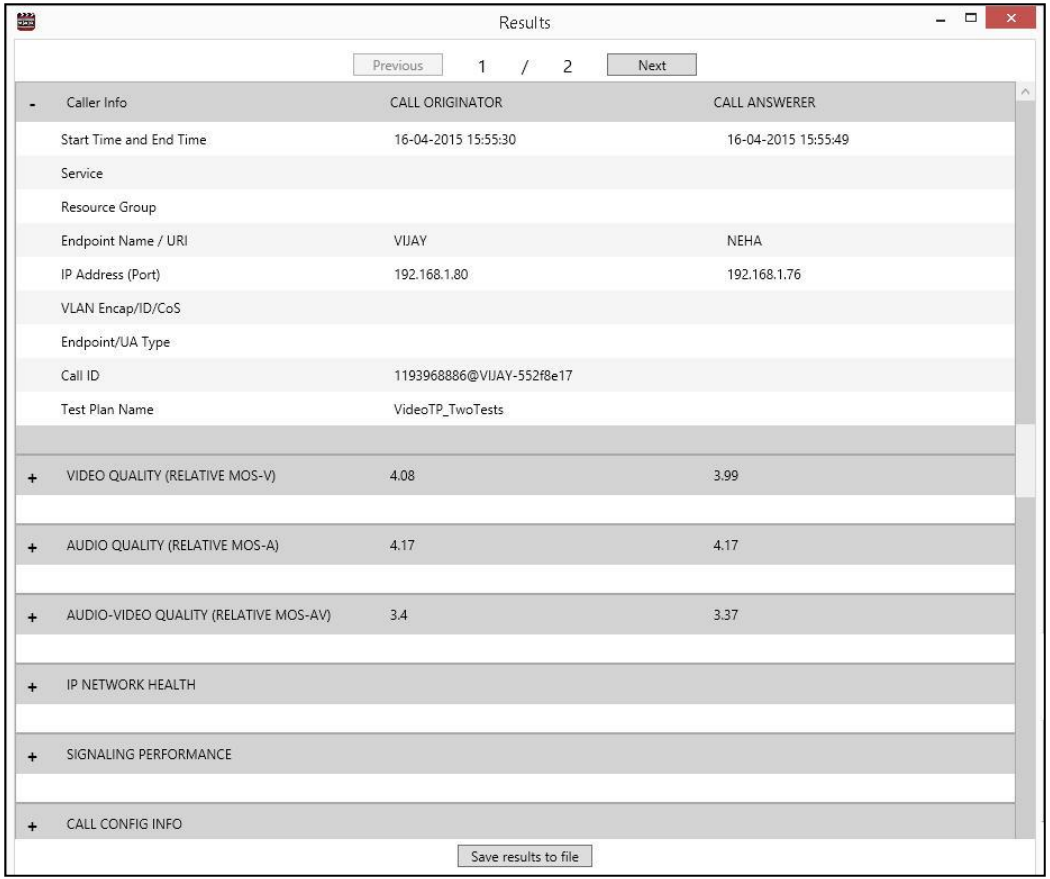
Automated Video Testing (VQuad™ Scripting)



Manual Video Testing using Video Application Controller (VAC)



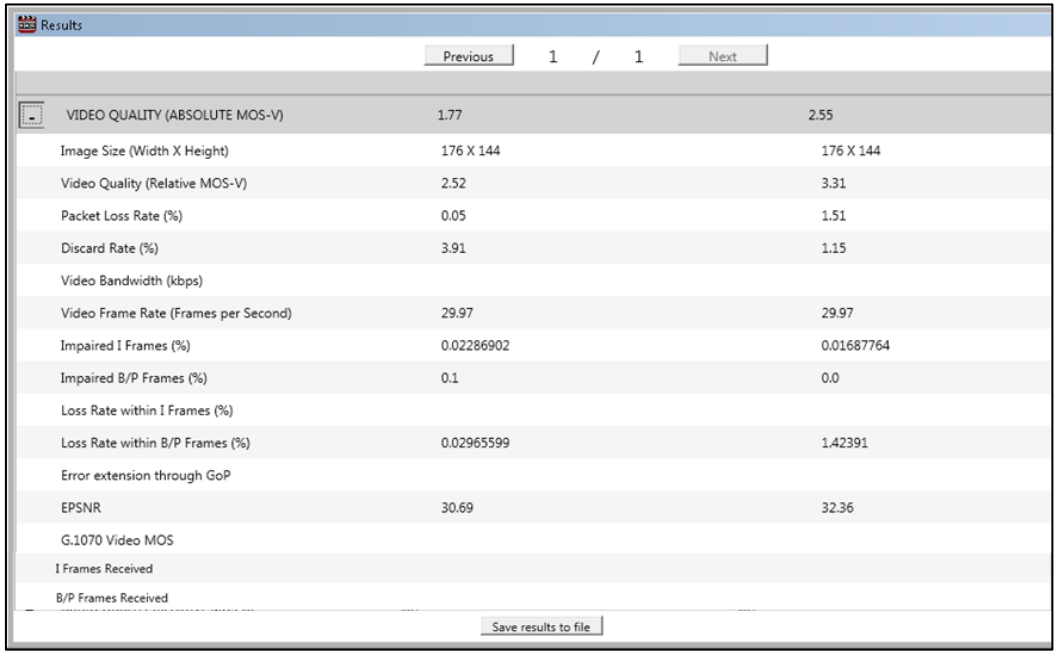
Detailed Results as seen from VAC



Video Quality Metrics

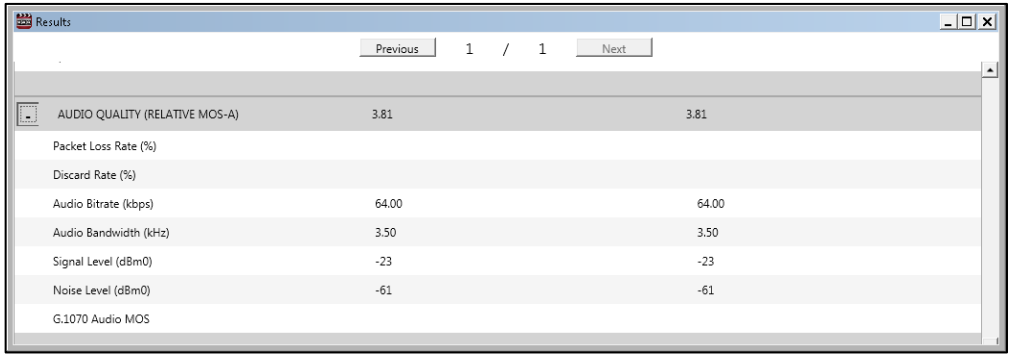
Video Mean Opinion Score (1-5 scale) that measures the impact of the video codec, frame rate, packet loss, GoP structure, content, and frame loss concealment on viewing quality.

- Image Size (Width X Height)
- Video Quality (Relative MOS-V)
- Packet Loss Rate (%)
- Discard Rate (%)
- Video Bandwidth (kbps)
- Video Frame Rate (Frames per Second)
- Impaired I Frames %
- Impaired B/P Frames %
- Loss Rate within I Frames (%)
- Loss Rate within B/P Frames (%)
- Error Extension through GoP
- EPSNR in dBm0 (Estimated Peak Signal-to-Noise Ratio)
- G.1070 Video MOS
- I Frames Received
- B/P Frames Received



Audio Quality Metrics

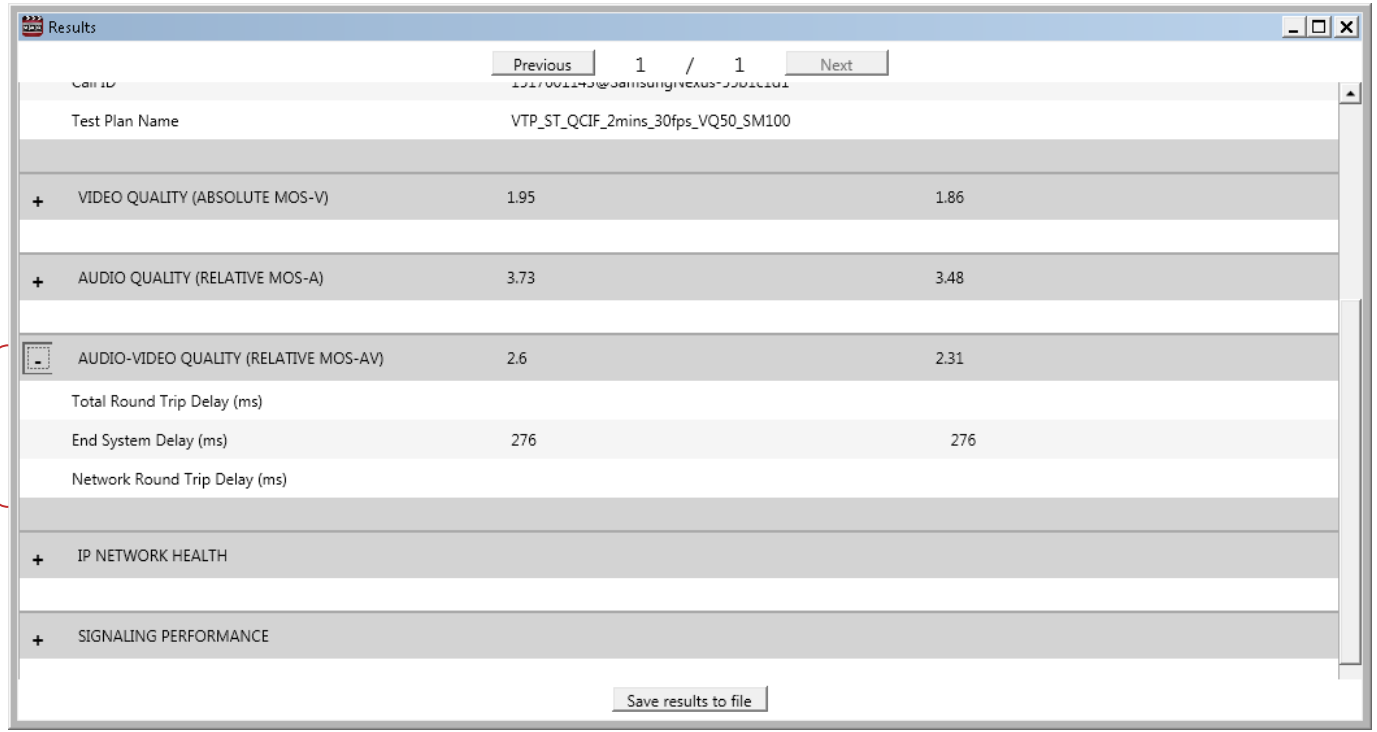
- **Packet Loss Rate (%)** - Percentage of packets identified as lost
- **Discard Rate (%)** - Percentage of packets identified as discarded by the jitter buffer due to late arrival
- **Audio Bitrate (kbps)** - Audio bitrate in kbps
- **Audio Bandwidth (kHz)** - Audio bandwidth in kHz.
- **Signal Level (dBm0)** - Audio signal level in dBm0
- **Noise Level (dBm0)** - Audio noise level in dBm0
- **G.1070 Audio MOS** - An estimated audio quality score of 1-5 (higher is better) calculated using the ITU-T G.1070 quality assessment model
- **Audio Mean Opinion Score** (1-5 scale) that measures the impact of the audio codec, bit rate, sample rate, and packet loss on audio quality



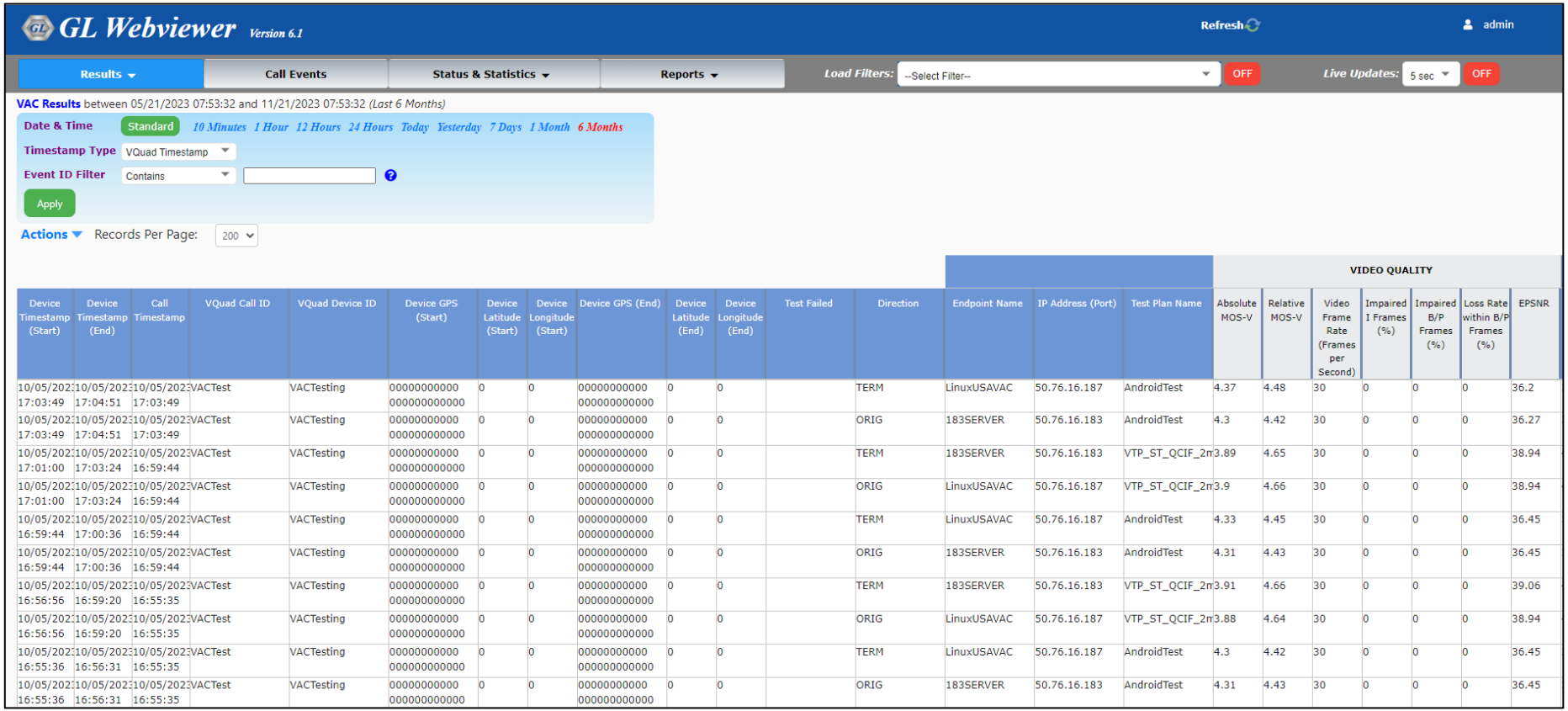
Audio Video Quality Metrics

- Audio-Video Mean Opinion Score (1-5 scale) that measures the impact of picture and audio quality, audio-video synchronization, and the effects of delay on the overall user experience.

Audio Video Quality (MOS-AV)



VAC Test Results in WebViewer™



GL Webviewer Version 6.1 — Refresh — admin

Results | Call Events | Status & Statistics | Reports — Load Filters: --Select Filter-- OFF — Live Updates: 5 sec OFF

VAC Results between 05/21/2023 07:53:32 and 11/21/2023 07:53:32 *(Last 6 Months)*

Date & Time: Standard | 10 Minutes | 1 Hour | 12 Hours | 24 Hours | Today | Yesterday | 7 Days | 1 Month | 6 Months

Timestamp Type: VQuad Timestamp

Event ID Filter: Contains

Apply

Actions — Records Per Page: 200

															VIDEO QUALITY						
Device Timestamp (Start)	Device Timestamp (End)	Call Timestamp	VQuad Call ID	VQuad Device ID	Device GPS (Start)	Device Latitude (Start)	Device Longitude (Start)	Device GPS (End)	Device Latitude (End)	Device Longitude (End)	Test Failed	Direction	Endpoint Name	IP Address (Port)	Test Plan Name	Absolute MOS-V	Relative MOS-V	Video Frame Rate (Frames per Second)	Impaired I Frames (%)	Impaired B/P Frames (%)	Loss Rate within B/P Frames (%)	EPSNR
10/05/2023 17:03:49	10/05/2023 17:04:51	10/05/2023 17:03:49	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		TERM	LinuxUSAVAC	50.76.16.187	AndroidTest	4.37	4.48	30	0	0	0	36.2
10/05/2023 17:03:49	10/05/2023 17:04:51	10/05/2023 17:03:49	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		ORIG	183SERVER	50.76.16.183	AndroidTest	4.3	4.42	30	0	0	0	36.27
10/05/2023 17:01:00	10/05/2023 17:03:24	10/05/2023 16:59:44	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		TERM	183SERVER	50.76.16.183	VTP_ST_QCIF_2m	3.89	4.65	30	0	0	0	38.94
10/05/2023 17:01:00	10/05/2023 17:03:24	10/05/2023 16:59:44	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		ORIG	LinuxUSAVAC	50.76.16.187	VTP_ST_QCIF_2m	3.9	4.66	30	0	0	0	38.94
10/05/2023 16:59:44	10/05/2023 17:00:36	10/05/2023 16:59:44	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		TERM	LinuxUSAVAC	50.76.16.187	AndroidTest	4.33	4.45	30	0	0	0	36.45
10/05/2023 16:59:44	10/05/2023 17:00:36	10/05/2023 16:59:44	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		ORIG	183SERVER	50.76.16.183	AndroidTest	4.31	4.43	30	0	0	0	36.45
10/05/2023 16:56:56	10/05/2023 16:59:20	10/05/2023 16:55:35	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		TERM	183SERVER	50.76.16.183	VTP_ST_QCIF_2m	3.91	4.66	30	0	0	0	39.06
10/05/2023 16:56:56	10/05/2023 16:59:20	10/05/2023 16:55:35	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		ORIG	LinuxUSAVAC	50.76.16.187	VTP_ST_QCIF_2m	3.88	4.64	30	0	0	0	38.94
10/05/2023 16:55:36	10/05/2023 16:56:31	10/05/2023 16:55:35	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		TERM	LinuxUSAVAC	50.76.16.187	AndroidTest	4.3	4.42	30	0	0	0	36.45
10/05/2023 16:55:36	10/05/2023 16:56:31	10/05/2023 16:55:35	VACTest	VACTesting	00000000000 000000000000	0	0	00000000000 000000000000	0	0		ORIG	183SERVER	50.76.16.183	AndroidTest	4.31	4.43	30	0	0	0	36.45

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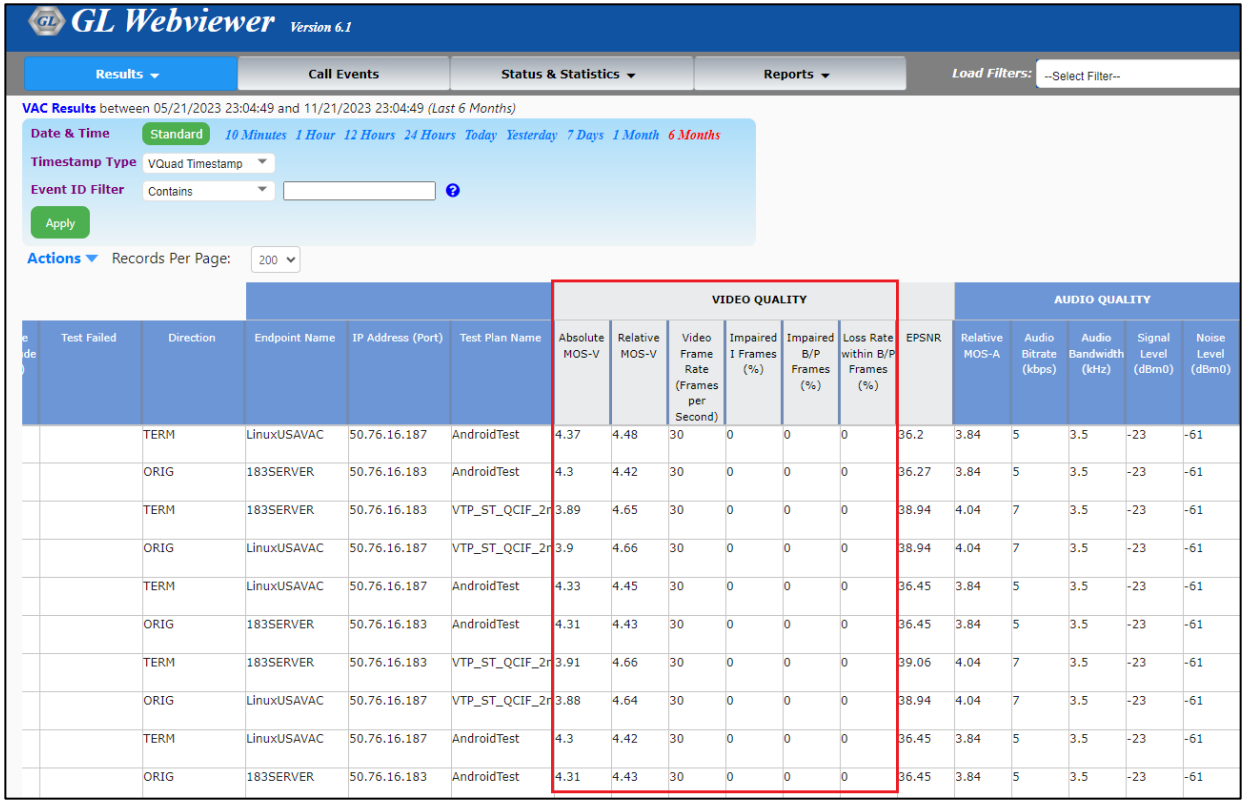
Video Quality Metrics

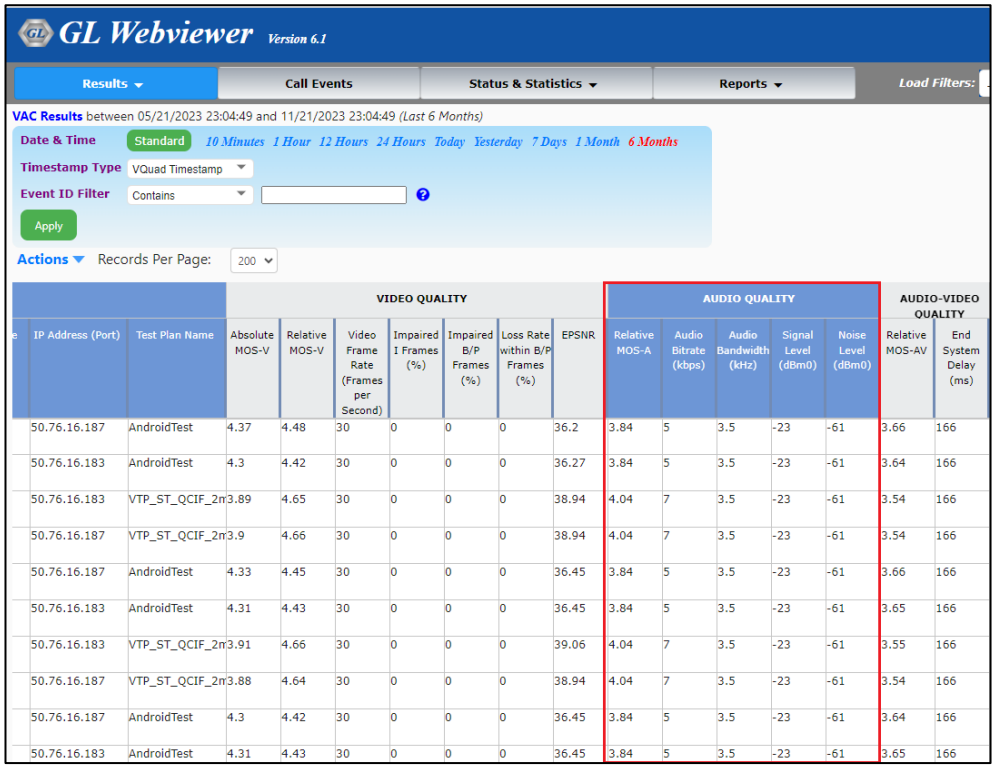


						VIDEO QUALITY							AUDIO QUALITY				
	Test Failed	Direction	Endpoint Name	IP Address (Port)	Test Plan Name	Absolute MOS-V	Relative MOS-V	Video Frame Rate (Frames per Second)	Impaired I Frames (%)	Impaired B/P Frames (%)	Loss Rate within B/P Frames (%)	EPSNR	Relative MOS-A	Audio Bitrate (kbps)	Audio Bandwidth (kHz)	Signal Level (dBm0)	Noise Level (dBm0)
		TERM	LinuxUSAVAC	50.76.16.187	AndroidTest	4.37	4.48	30	0	0	0	36.2	3.84	5	3.5	-23	-61
		ORIG	183SERVER	50.76.16.183	AndroidTest	4.3	4.42	30	0	0	0	36.27	3.84	5	3.5	-23	-61
		TERM	183SERVER	50.76.16.183	VTP_ST_QCIF_2r	3.89	4.65	30	0	0	0	38.94	4.04	7	3.5	-23	-61
		ORIG	LinuxUSAVAC	50.76.16.187	VTP_ST_QCIF_2r	3.9	4.66	30	0	0	0	38.94	4.04	7	3.5	-23	-61
		TERM	LinuxUSAVAC	50.76.16.187	AndroidTest	4.33	4.45	30	0	0	0	36.45	3.84	5	3.5	-23	-61
		ORIG	183SERVER	50.76.16.183	AndroidTest	4.31	4.43	30	0	0	0	36.45	3.84	5	3.5	-23	-61
		TERM	183SERVER	50.76.16.183	VTP_ST_QCIF_2r	3.91	4.66	30	0	0	0	39.06	4.04	7	3.5	-23	-61
		ORIG	LinuxUSAVAC	50.76.16.187	VTP_ST_QCIF_2r	3.88	4.64	30	0	0	0	38.94	4.04	7	3.5	-23	-61
		TERM	LinuxUSAVAC	50.76.16.187	AndroidTest	4.3	4.42	30	0	0	0	36.45	3.84	5	3.5	-23	-61
		ORIG	183SERVER	50.76.16.183	AndroidTest	4.31	4.43	30	0	0	0	36.45	3.84	5	3.5	-23	-61

- MOS-V, Video Frame Rate/sec, Impaired I Frames (%), Impaired B/P Frames (%), Loss Rate within B/P Frames (%), EPSNR (Estimated Peak Signal-to-Noise Ratio in dBm0)

Audio Quality Metrics

- MOS-A, Audio Bit Rate (kbps), Audio Bandwidth (kHz), Signal Level (dBm0), Noise Level (dBm0)



GL Webviewer Version 6.1

Results | Call Events | Status & Statistics | Reports | Load Filters:

VAC Results between 05/21/2023 23:04:49 and 11/21/2023 23:04:49 (Last 6 Months)

Date & Time: Standard | 10 Minutes | 1 Hour | 12 Hours | 24 Hours | Today | Yesterday | 7 Days | 1 Month | 6 Months

Timestamp Type: VQuad Timestamp

Event ID Filter: Contains

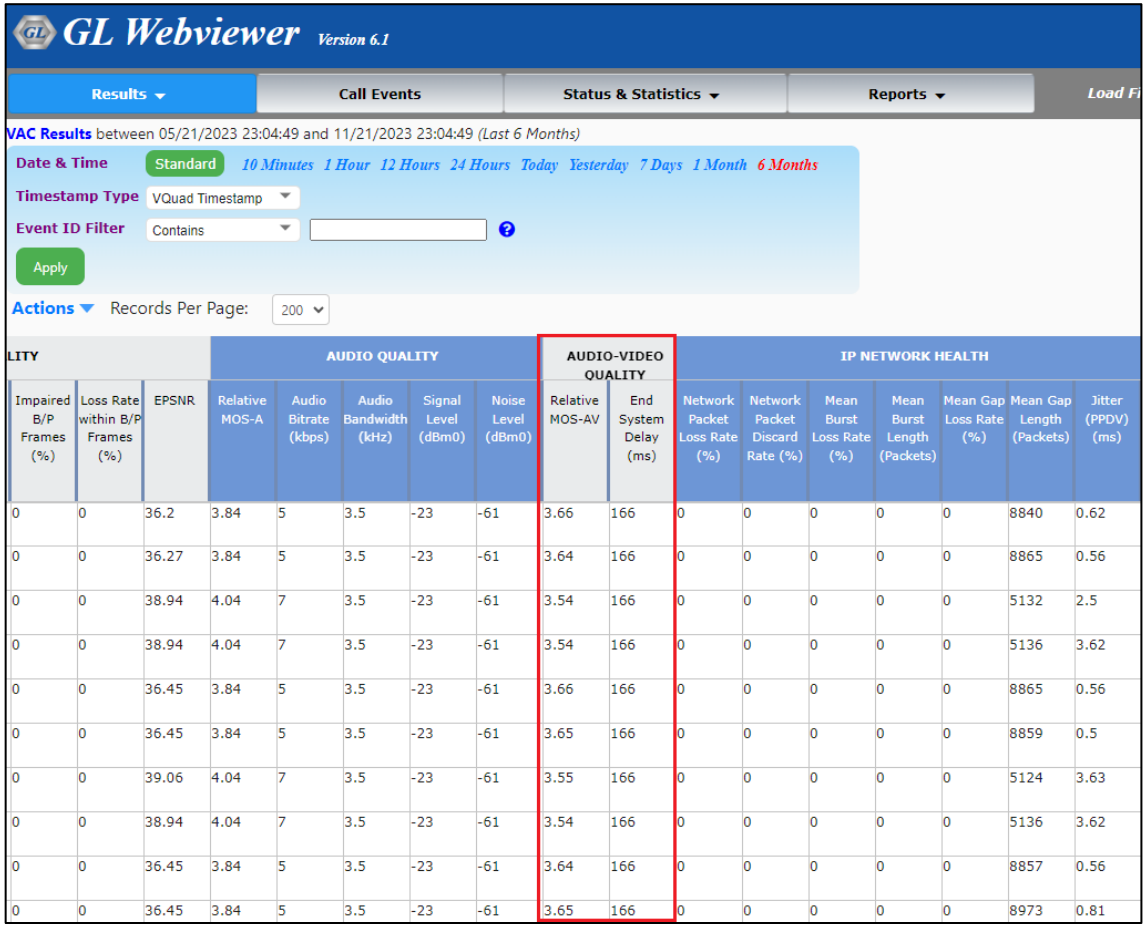
Apply

Actions | Records Per Page: 200

			VIDEO QUALITY							AUDIO QUALITY					AUDIO-VIDEO QUALITY	
	IP Address (Port)	Test Plan Name	Absolute MOS-V	Relative MOS-V	Video Frame Rate (Frames per Second)	Impaired I Frames (%)	Impaired B/P Frames (%)	Loss Rate within B/P Frames (%)	EPSNR	Relative MOS-A	Audio Bitrate (kbps)	Audio Bandwidth (kHz)	Signal Level (dBm0)	Noise Level (dBm0)	Relative MOS-AV	End System Delay (ms)
	50.76.16.187	AndroidTest	4.37	4.48	30	0	0	0	36.2	3.84	5	3.5	-23	-61	3.66	166
	50.76.16.183	AndroidTest	4.3	4.42	30	0	0	0	36.27	3.84	5	3.5	-23	-61	3.64	166
	50.76.16.183	VTP_ST_QCIF_2n	3.89	4.65	30	0	0	0	38.94	4.04	7	3.5	-23	-61	3.54	166
	50.76.16.187	VTP_ST_QCIF_2n	3.9	4.66	30	0	0	0	38.94	4.04	7	3.5	-23	-61	3.54	166
	50.76.16.187	AndroidTest	4.33	4.45	30	0	0	0	36.45	3.84	5	3.5	-23	-61	3.66	166
	50.76.16.183	AndroidTest	4.31	4.43	30	0	0	0	36.45	3.84	5	3.5	-23	-61	3.65	166
	50.76.16.183	VTP_ST_QCIF_2n	3.91	4.66	30	0	0	0	39.06	4.04	7	3.5	-23	-61	3.55	166
	50.76.16.187	VTP_ST_QCIF_2n	3.88	4.64	30	0	0	0	38.94	4.04	7	3.5	-23	-61	3.54	166
	50.76.16.187	AndroidTest	4.3	4.42	30	0	0	0	36.45	3.84	5	3.5	-23	-61	3.64	166
	50.76.16.183	AndroidTest	4.31	4.43	30	0	0	0	36.45	3.84	5	3.5	-23	-61	3.65	166

Audio and Video Quality Metrics

- MOS-AV, and End System Delay (ms)



GL Webviewer Version 6.1

Results | Call Events | Status & Statistics | Reports | Load Fi

VAC Results between 05/21/2023 23:04:49 and 11/21/2023 23:04:49 (Last 6 Months)

Date & Time: Standard | 10 Minutes | 1 Hour | 12 Hours | 24 Hours | Today | Yesterday | 7 Days | 1 Month | 6 Months

Timestamp Type: VQuad Timestamp

Event ID Filter: Contains

Apply

Actions | Records Per Page: 200

LITY			AUDIO QUALITY					AUDIO-VIDEO QUALITY		IP NETWORK HEALTH						
Impaired B/P Frames (%)	Loss Rate within B/P Frames (%)	EPSNR	Relative MOS-A	Audio Bitrate (kbps)	Audio Bandwidth (kHz)	Signal Level (dBm0)	Noise Level (dBm0)	Relative MOS-AV	End System Delay (ms)	Network Packet Loss Rate (%)	Network Packet Discard Rate (%)	Mean Burst Loss Rate (%)	Mean Burst Length (Packets)	Mean Gap Loss Rate (%)	Mean Gap Length (Packets)	Jitter (PPDV) (ms)
0	0	36.2	3.84	5	3.5	-23	-61	3.66	166	0	0	0	0	0	8840	0.62
0	0	36.27	3.84	5	3.5	-23	-61	3.64	166	0	0	0	0	0	8865	0.56
0	0	38.94	4.04	7	3.5	-23	-61	3.54	166	0	0	0	0	0	5132	2.5
0	0	38.94	4.04	7	3.5	-23	-61	3.54	166	0	0	0	0	0	5136	3.62
0	0	36.45	3.84	5	3.5	-23	-61	3.66	166	0	0	0	0	0	8865	0.56
0	0	36.45	3.84	5	3.5	-23	-61	3.65	166	0	0	0	0	0	8859	0.5
0	0	39.06	4.04	7	3.5	-23	-61	3.55	166	0	0	0	0	0	5124	3.63
0	0	38.94	4.04	7	3.5	-23	-61	3.54	166	0	0	0	0	0	5136	3.62
0	0	36.45	3.84	5	3.5	-23	-61	3.64	166	0	0	0	0	0	8857	0.56
0	0	36.45	3.84	5	3.5	-23	-61	3.65	166	0	0	0	0	0	8973	0.81

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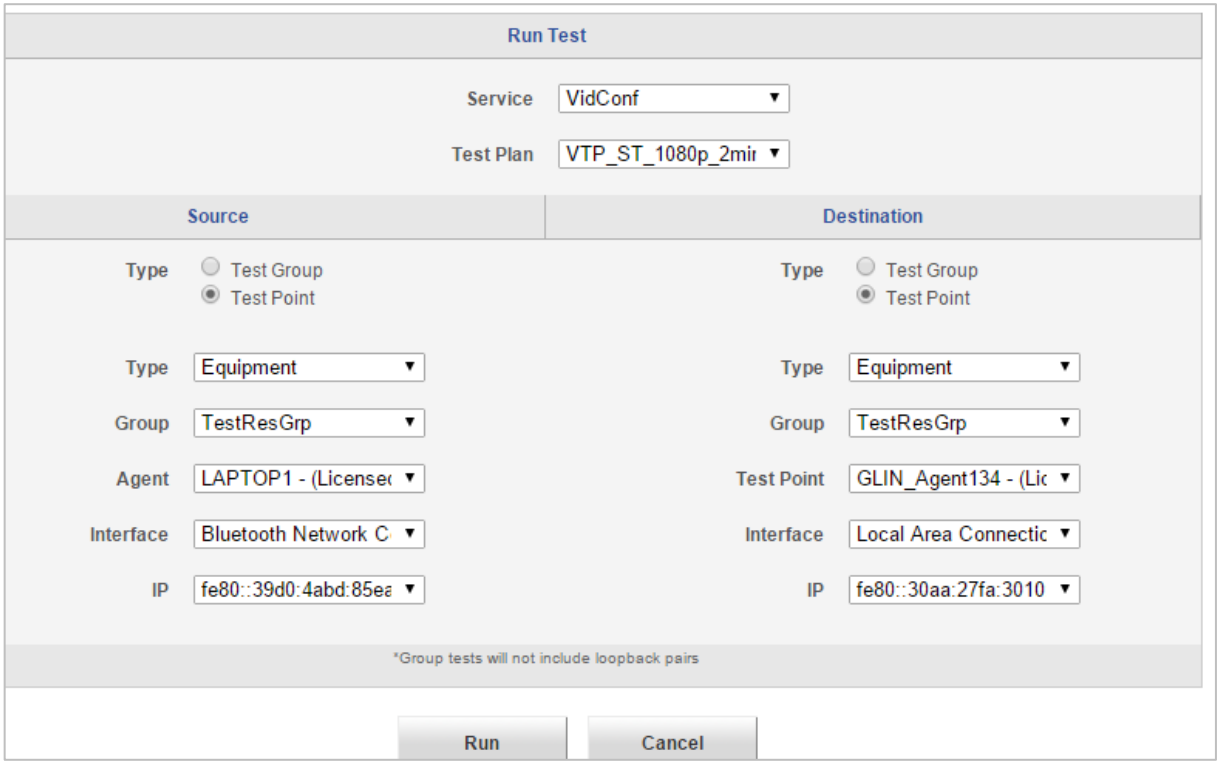
Manual Video Testing using VAC Server

Run tests from the VAC Test Manager:

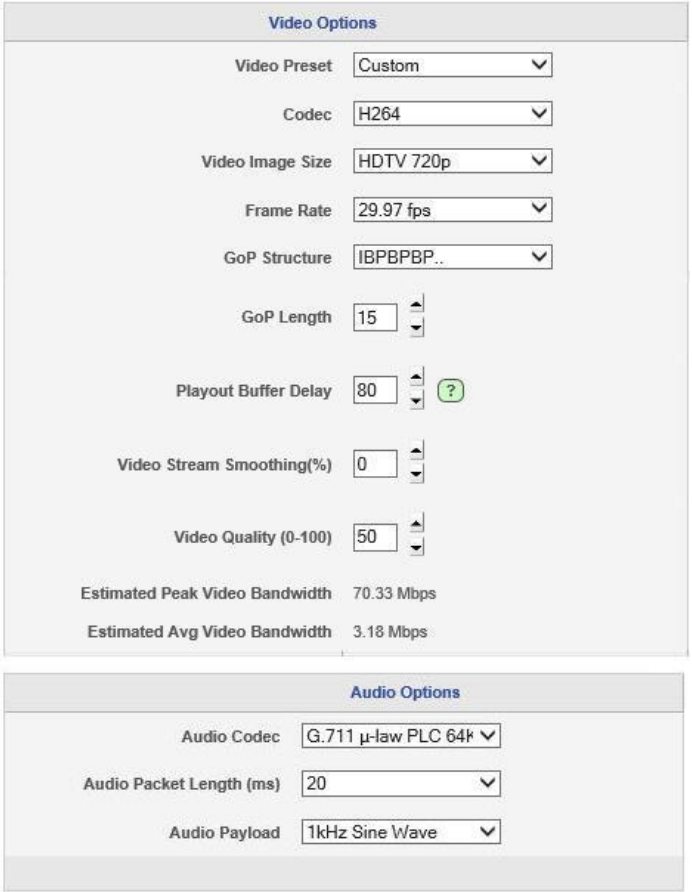
- Test Point-to-Test Point
- Test Point-to-Test Group
- Test Group-to-Test Group
- Test Group-to-Test Point



Video Test Characteristics

Typical characteristics of a video conferencing system controlled by VAC Server includes:

- Video Codecs supported are JPEG, H.261, H.263, H.263+, H.264, MPEG, MPEG-2, MPEG-4, VC1
- Audio Codecs supported are G.711, G.722, G.723, AMR-NB, AMR-WB, and iLBC
- Video Resolutions – HDTV (720p, 1080p, or 1080i), SDTV (480i), CIF, VGA
- Video Frame rate used for the test can range from 5 fps up to 60 fps
- Group of Pictures (GOP) structure



Video Quality Result View

VIDEO QUALITY (ABSOLUTE MOS-V)	2.55	1 – 5		2.5	1 – 5
Image Size (Width X Height)		176 X 144			176 X 144
Video Quality (Relative MOS-V)	3.31	1 – 5		3.26	1 – 5
Packet Loss Rate (%)	0.1	0 – 4		0.08	0 – 4
Corrected Packet Loss Rate (%)	NR	0 – 4		NR	0 – 4
Discard Rate (%)	0.1	0 – 4		0.54	0 – 4
Video Bandwidth (kbps)	93.1	0 – 1000		93	0 – 1000
Video Frame Rate (Frames per Second)	29.97	0 – 30		29.97	0 – 30
Impaired I Frames (%)	0.415	0 – 5		0.415	0 – 5
Impaired B/P Frames (%)	0.178	0 – 5		0.594	0 – 5
Loss Rate within I Frames (%)	0	0 – 5		0.414	0 – 5
Loss Rate within B/P Frames (%)	0.119	0 – 5		0.03	0 – 5
Error extension through GoP	0	1 – 100		0	1 – 100
EPSNR	32.36	0 – 50		32.04	0 – 50
G.1070 Video MOS	1.404	1 – 5		1.405	1 – 5
I Frames Received	241			241	
B/P Frames Received	3362			3366	

- acceptable metric value
- moderate problem
- severe problem

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Audio Quality Result View

AUDIO QUALITY (RELATIVE MOS-A)	4.17	1	5	4.17	1 5
Packet Loss Rate (%)	0	0	8	0	0 8
Corrected Packet Loss Rate (%)	NR	0	4	NR	0 4
Discard Rate (%)	0	0	8	0	0 8
Audio Bitrate (kbps)	64	0	32	64	0 32
Audio Bandwidth (kHz)	3.5	0	7	3.5	0 7
Signal Level (dBm0)	-23	< -32	> -12	-23	< -32 > -12
Noise Level (dBm0)	-61	< -65	> -40	-61	< -65 > -40
G.1070 Audio MOS	4.21	1	5	4.21	1 5

Audio Video Quality Result View

AUDIO-VIDEO QUALITY (RELATIVE MOS-AV)	3.37	1	5	3.37	1	5
Total Round Trip Delay (ms)	207 *	20	600	207 *	20	600
End System Delay (ms)	146	20	200	146	20	200
Network Round Trip Delay (ms)	1	20	200	1	20	200

* Asterisk indicates that value is estimated

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Thank you