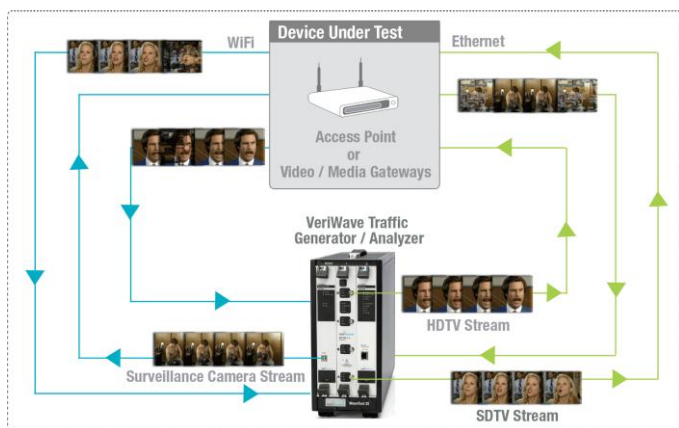
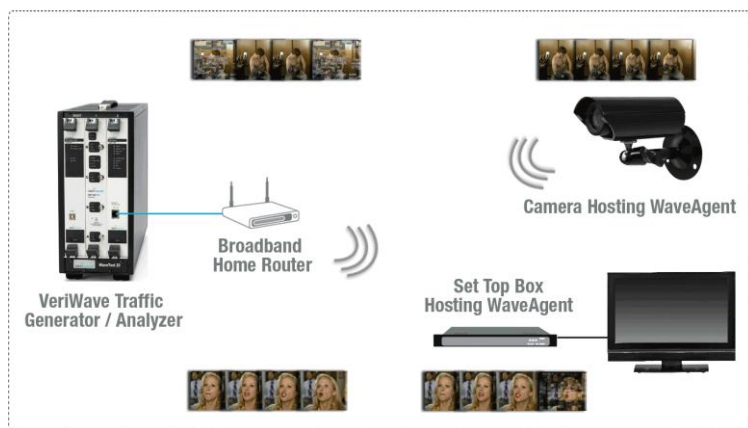


## WaveVideo™ – SDTV/HDTV Video over Ethernet / WLAN Test

**WaveVideo** - offers developers, QA engineers, installers and IT staff the capability to accurately determine how well WLAN network devices are handling video streaming. The only WLAN test system to allow users to create hundreds of independent video flows, measure their individual quality and view the actual effects of the network on real video clips.



Test Access Points & video media gateways



Test set top boxes & cameras

## Benefits

- Create hundreds of independent video over WLAN streams and measure individual and combined performance
- View and compare an original video clip to the resulting video clip after it passes through the WLAN
- Enables video to be mixed with other types of traffic such as voice and data to observe cross-impacts
- The only video test designed for Video over WLAN; provides precise measurements of video Quality of Experience (QoE) on WLAN's, including 802.11n
- Choose from a wide variety of clips encoded with different video parameters to play and view
- Test video handling of Access Points, WLAN Multimedia and Video Gateways, WLAN Video Adapters, and complete WLAN
- See the effects of the network on individual video clips with your own subjective view in addition to industry standards metrics
- Measure QoE for SDTV and HDTV

## Test Description

WaveVideo accurately measures video quality of hundreds of video flows being transported over virtually any network. The user picks from a library of available video clips, assigns them to LAN or WLAN clients, and chooses whether the video will be played upstream or downstream. An expected Service Level Requirement (SLR) can be assigned to each video stream.

The user may choose from a library of pre-defined traffic profiles representing various vertical environments including corporate offices, healthcare, residential and education. These profiles mix representative video types with data, voice and machine-to-machine traffic as applicable for each environment.

For each video clip, industry standard media descriptors, such as the coding type, frame rate, and aspect ratio, as well as I, P, and B frame distribution over time, are monitored.

At the conclusion of the test, each video flow is scored for quality using the Media Delivery Index (MDI) as well as individual average latency and jitter measurements. The quality is compared to user-set SLR. To aid in pinpointing transient effects and to map the raw packet loss on the network over time to perceivable effects on the video quality, the percentage of I, P, and B frames corrupted over time is reported.

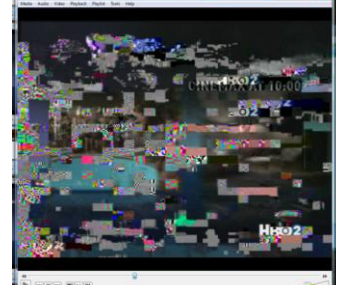
Test recording makes it simple for the user to identify degraded video and view the resulting clip/clips for visual inspection.

## Test Results & Metrics

- Real-time as well as final test results and metrics are provided. All numeric results can be exported in a comma separated value (.CSV) file format or HTML to facilitate results analysis and reporting.
- Automatically generated PDF test reports provide executive summaries, including comprehensive graphs, a description of the test, the significance of the results, and detailed results for drill-down analysis
- View input & output video clips; output video provides subjective view of the Network Under Test induced impairments applied to the input video clip
- Video results include:
  - Per video flow MDI score, average latency, average jitter, SLR pass/fail
  - Per video flow, over time, I, P, and B frame corruption ratio
- Other traffic results include:
  - VoIP MOS scores, HTTP/FTP Goodput levels, FTP file transfer times, etc.
  - Over time results displayed in real-time
  - Total intended load, offered load and achieved load
  - Percentage of traffic flows of traffic types that satisfied the SLA
  - Percentage of clients of each client type that satisfied the SLA



Original video clip



Resulting video clip

### CLIENT CONTROL

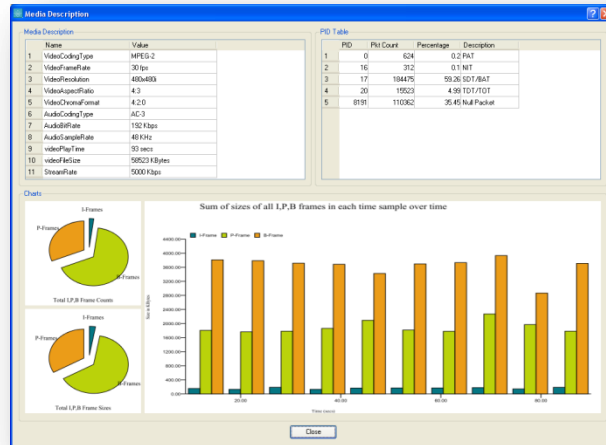
- 802.3 link speed / 802.11 PHY data rate
- VLAN tag / WMM QoS
- Security schemes
- MAC address (auto/manual)
- IP address (DHCP/static)
- For wireless clients
  - Transmit power level and frame error ratio
  - WMM admission control

### OTHER TRAFFIC OPTIONS

- Distinct SLA threshold per traffic type
- Source server
- Traffic direction
- User priority per 802.11e/802.1D
- Multicast video/voice
- HTTP (1.0, 1.1): GET, POST
- SIP signaling (enable/disable)
- VoIP codec types – G.711, G.729, G.723
- FTP: USERNAME, PASSWORD, GET, PUT, file size
- TCP, UDP

### VIDEO TRAFFIC OPTIONS

- Video clips, such as HTDV 1080i at 19.2 Mbps, HDTV 1080i at 10.9 Mbps, SDTV 480i at 5 Mbps
- VeriWave generated video over RTP, such as HDTV at 20 Mbps, SDTV at 3 Mbps, 600 Kbps
- MPEG2 transport stream: Unicast or Multicast
- Video over TCP/HTTP such as YouTube video



## Minimum Requirements

<b>VeriWave Test System</b>	<ul style="list-style-type: none"> <li>• 1x VeriWave WaveTest 90 or WaveTest 20 system</li> <li>• 1 x VeriWave Gig-E port (WBE1101)</li> <li>• 1 x VeriWave WLAN port (WBW1101 or WBW2000)</li> </ul>
<b>VeriWave Software</b>	VeriWave L4-L7 Stateful Client Generation Package
<b>Host Computer</b>	<ul style="list-style-type: none"> <li>• X86-based PC with 1GHz processor and 256MB RAM</li> <li>• Windows XP SP2, or Linux (2.6 or higher kernel level)</li> </ul>