

# Video Quality Challenges

## So Many Different Types of Video

Video calling & chat	
Streaming video	
360° video	
Social live streaming	
Live events & broadcast (multicast)	
Mobile video conferencing	
Gaming & augmented reality	
Real-time first person view	

*Each type of video has its own unique characteristics and challenges*

- Start-up time
- Re-buffering and stalls
- Quality changes and bandwidth adaptation
- Scaling and aliasing
- Device compatibility and quality
- Smooth playback
- Bandwidth utilization and efficiency
- Sensitivity to latency and packet loss

## So Many Factors Can Affect Video Quality

Content	Encoding	Transmission	Decoding	Screen
Security	Encoder	Transcoding	Decoder	Size of Screen
Recording	Compression	Packet Loss	De-compression	Refresh Rate
Media Hosting	Resolution	RF Impairments	Resizing	Brightness
Ad Insertion	Frame Rate	Latency	Error Correction	Ambient Light
	Forward Error Correction	Mobility	Quality Negotiation	Aspect Ratio
	Quality Negotiation	QoS		



Many opportunities for problems to crop up along the way

Some at the origin, some along the path, some at the end

## Multiple Ways to Test

### Validate the Delivery *Gross Error Detection (GED)*



Things to test after the device attaches and the 'digital pipe' is connected

- Are all the packets of the video data getting to the device?
- Are the packets arriving in the right order?
- Is there jitter beyond the minimal buffers the real-time viewer allows?
- Are the audio and visual contents being aligned properly to achieve lip-synch?
- Is the device processing them correctly all the way to the screen and the earpiece?
- Do all these things also work for the video content being generated by the device (uplink)?



Make sure content arrives at the device in a timely, orderly, reliable manner

### Validate the Accurate Delivery *Full Reference VMOS*



Was the information interpreted correctly by the device?

- Did any of the bit errors or packet drops impact the video content?
- Did any of the bit errors or packet drops impact the audio content?
- Was the audio and video alignment maintained?
- Did the device accurately convert the information to MHL?
- If camera capture, did the device render it accurately on the screen?
- Did all of the above also work for content being generated by the device (uplink)?



Ensure the content arrives not only on time, but undamaged

### Validate What It Actually Looked Like *Non-Reference VMOS*



Was the video pleasing to the viewer?

- Did the contrast match what I expected?
- Did the focus look clear?
- Was the motion smooth from frame to frame?
- Was there any blockiness in the image I did not expect'?
- Were the luminance gradations in larger areas smooth and 'natural'?
- Did all of the above also work for content being generated by the device (uplink)?



Make sure the content is visually clear, crisp, pleasing to the eye