3D video Subjective Test

Performed by experts
Subjective study outline

Three groups of conditions

- Uncompressed and encoded 2D video in full resolution and anamorphic
- Uncompressed conditions with different levels of 3D quality
- Compressed conditions encoded in Side-by-Side format at different bitrates (constant bitrate encoding)
Viewing conditions and play out

› Viewing distance – 4H
› Room lighting – switched off
› Two subjects at a time performed the test
› Display – Hyundai S465D
  – Brightness 90%
  – Contrast 80%
  – Color 50%
› Row interleaving of the 3D test videos was performed offline
› 3D glasses:
  – EX3D and MasterImage
Voting scales

- Depth Naturalness
- Video Quality
- Visual Discomfort

![Voting Scales Diagram](image_url)
Subjective scores distribution

**Experts: Histogram (Depth Naturalness)**

**Experts: Histogram (Video Quality)**

**Experts: Histogram (Visual comfort)**
Source 3D sequences

- Content 1 (c1) – still camera and small amount of motion
- Content 2 (c2) – still camera and moderate amount of motion
- Content 3 (c3) – zoom, moving/handheld camera, contain from moderate to large amount of motion
2D video test conditions

› Depth Naturalness – almost constant through conditions
› Video Quality – varying due to resolution change and encoding
› Visual Comfort – constant through conditions
Uncompressed 3D video test conditions

- Depth Naturalness – reflected simulated 3D in “3DF” and depth distortions in “3DHS” and “3DP” conditions
- Video Quality – reflected lower resolution for 720p SbS and temporal mismatch simulation “3DP”
- Visual Comfort – low for simulated 3D and depth distortions
Encoded 720p25 SbS test conditions

› Video compression affected quality judgment on all three scales
  – Five different bit rates were included (r01 – r05)
› Video Quality MOS varied more than DN and VC
Voting scales

The Stdev and Pearson correlation are calculated over the respective MOS values for respective conditions ("2D", "3D enc", "3D").
Conclusions

› Different quality properties of the conditions were graded differently on different scales
  – The simulation of the depth distortions – reflected exclusively by “Depth Naturalness” and “Visual Comfort”
  – “Video Quality” alone is enough for 2D video quality assessment as expected
  – Three scales are needed for 3D video assessment to understand the multidimensional impact on the quality

› The use of 2D and simulated 3D can be considered as useful anchors between different tests