



# 3D video Subjective Test

Performed by experts

# Subjective study outline

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## › 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)

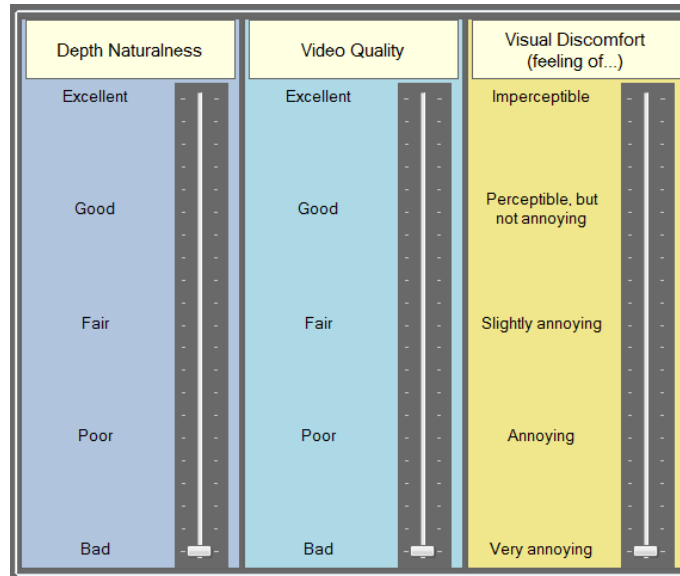
# Viewing conditions and play out

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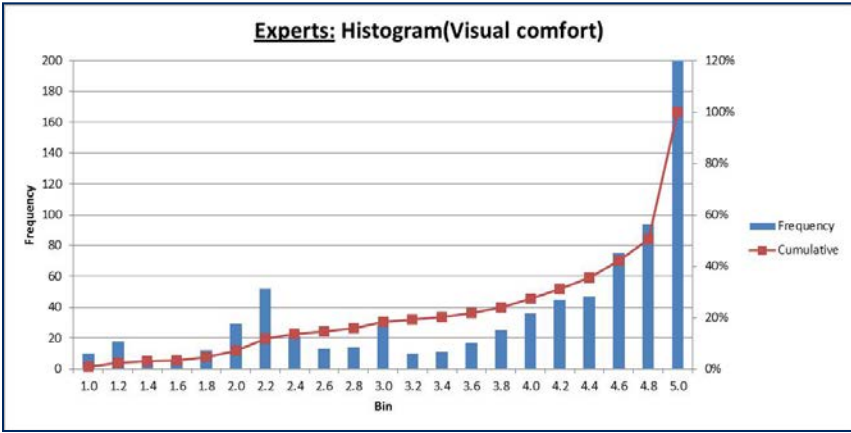
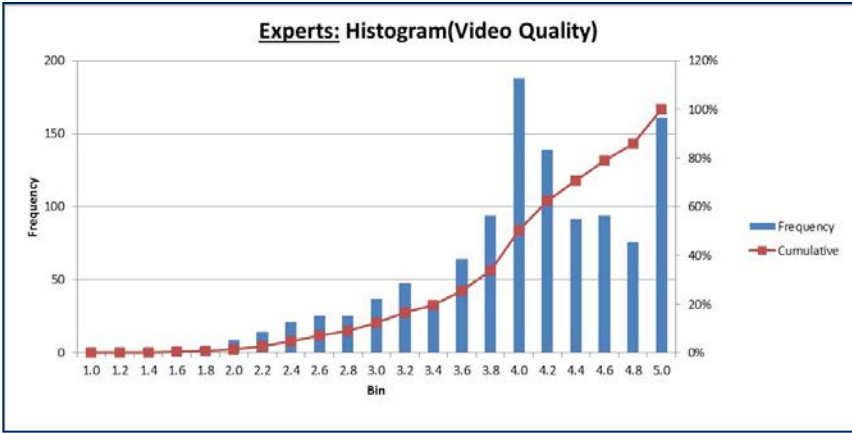
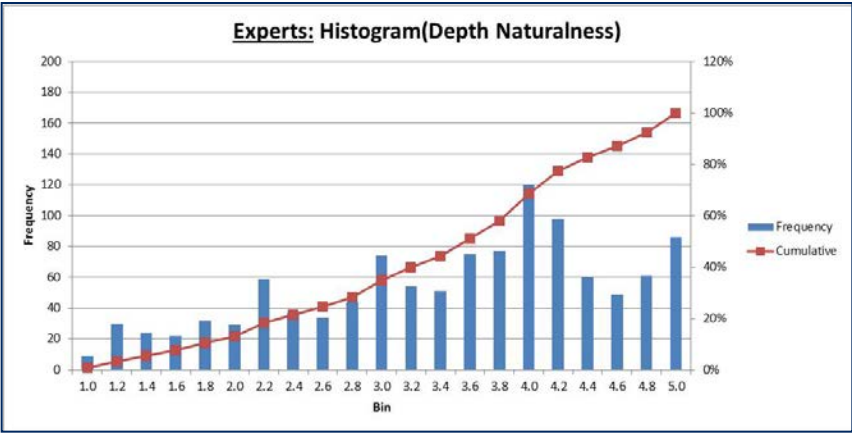
- › Viewing distance – 4H
- › Room lighting – switched off
- › Two subjects at a time performed the test
- › Display – Hyundai S465D
  - Brightness 90%
  - Contrast 80%
  - Color 50%
- › Row interleaving of the 3D test videos was performed offline
- › 3D glasses:
  - EX3D and MasterImage

# Voting scales

- › Depth Naturalness
- › Video Quality
- › Visual Discomfort

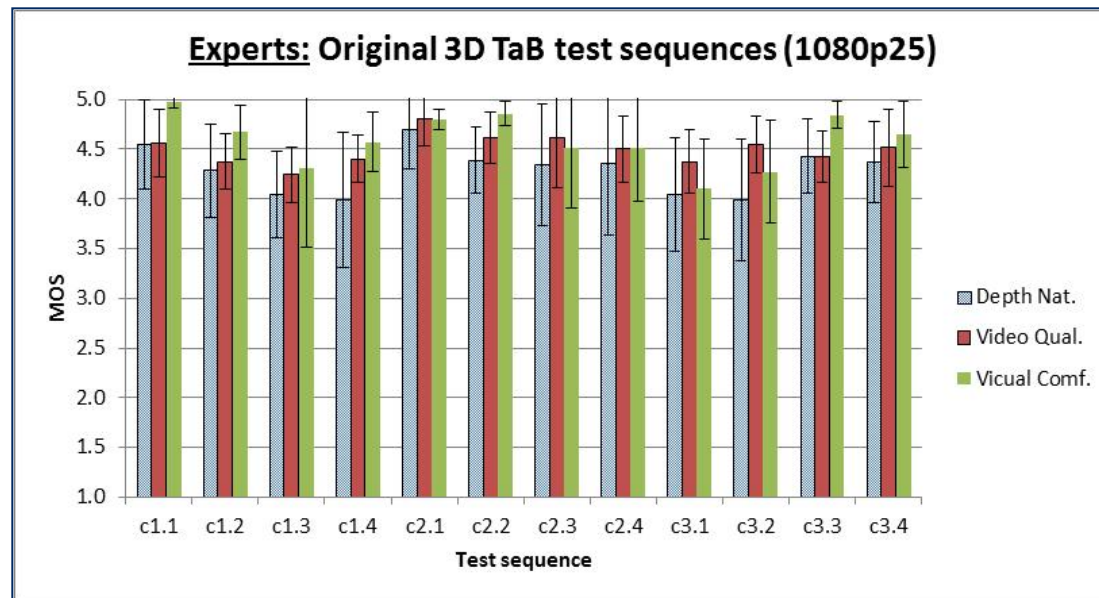


# Subjective scores distribution



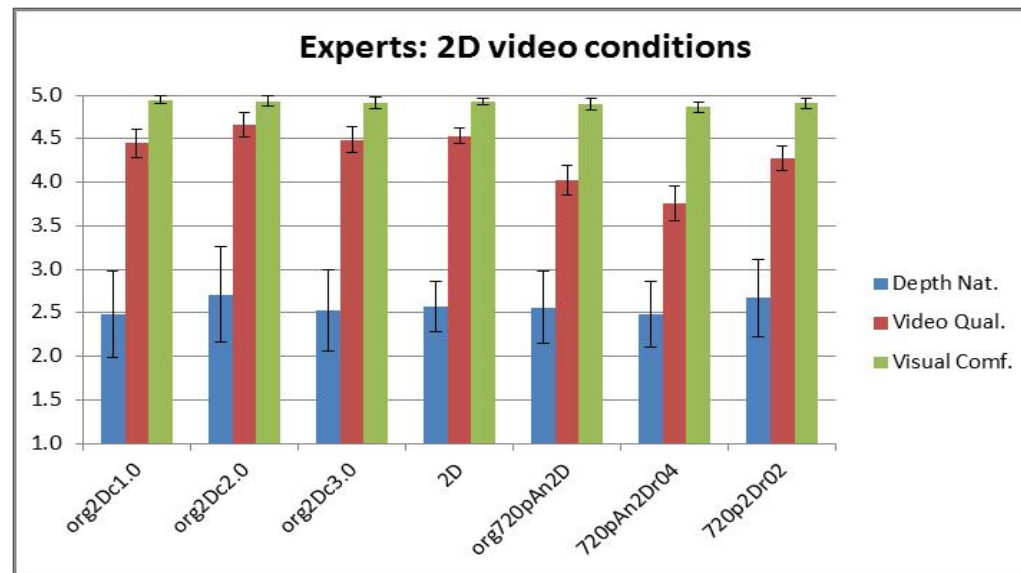
# Source 3D sequences

- › 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



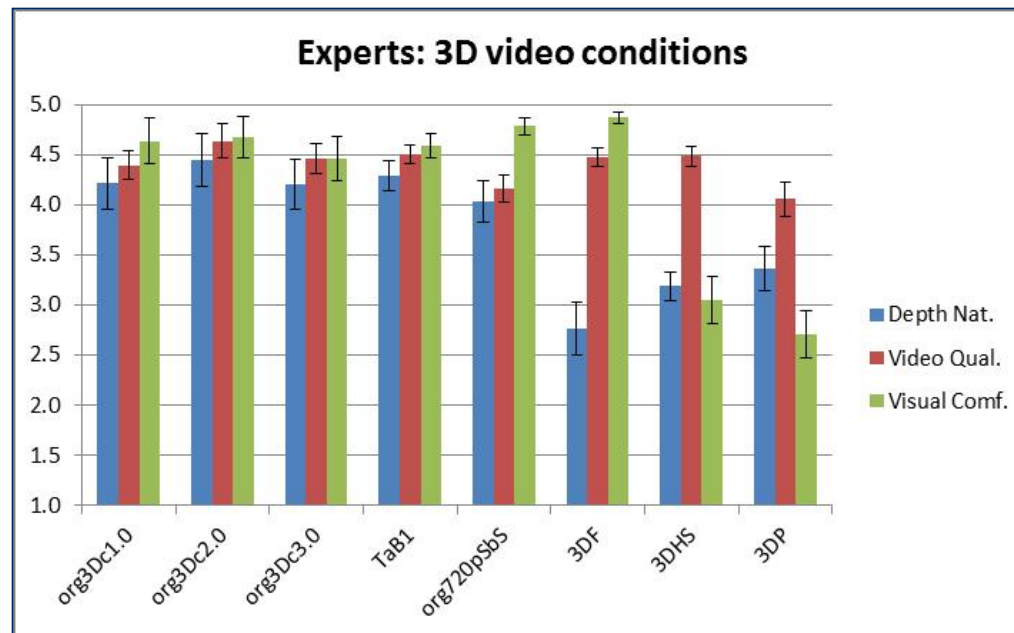
# 2D video test conditions

- › 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

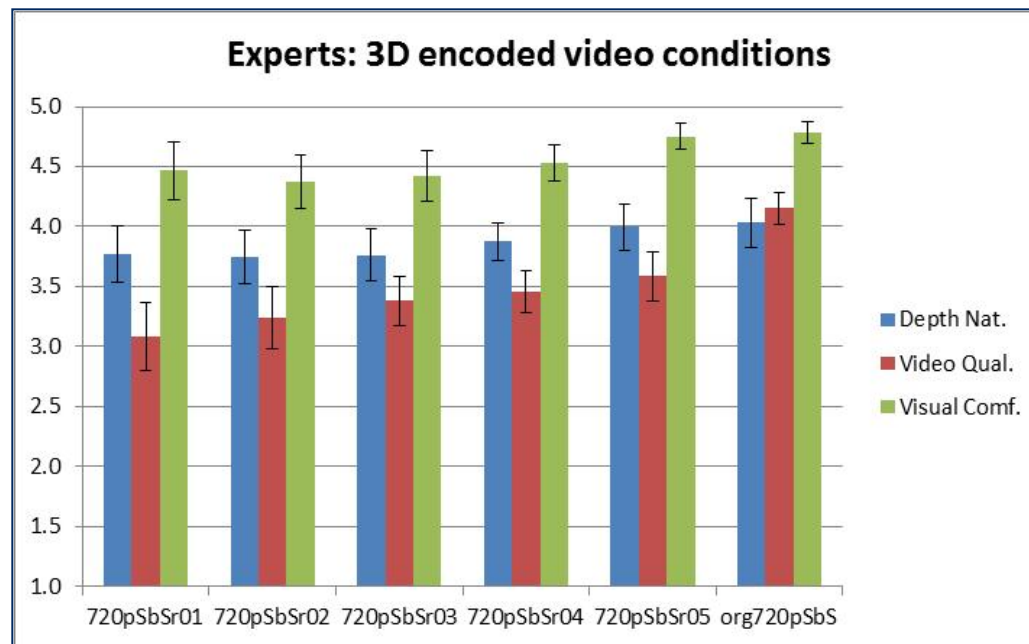
- › Depth Naturalness – reflected simulated 3D in “3DF” and depth distortions in “3DHS” and “3DP” conditions
- › Video Quality – reflected lower resolution for 720p SbS and temporal mismatch simulation “3DP”
- › Visual Comfort – low for simulated 3D and depth distortions



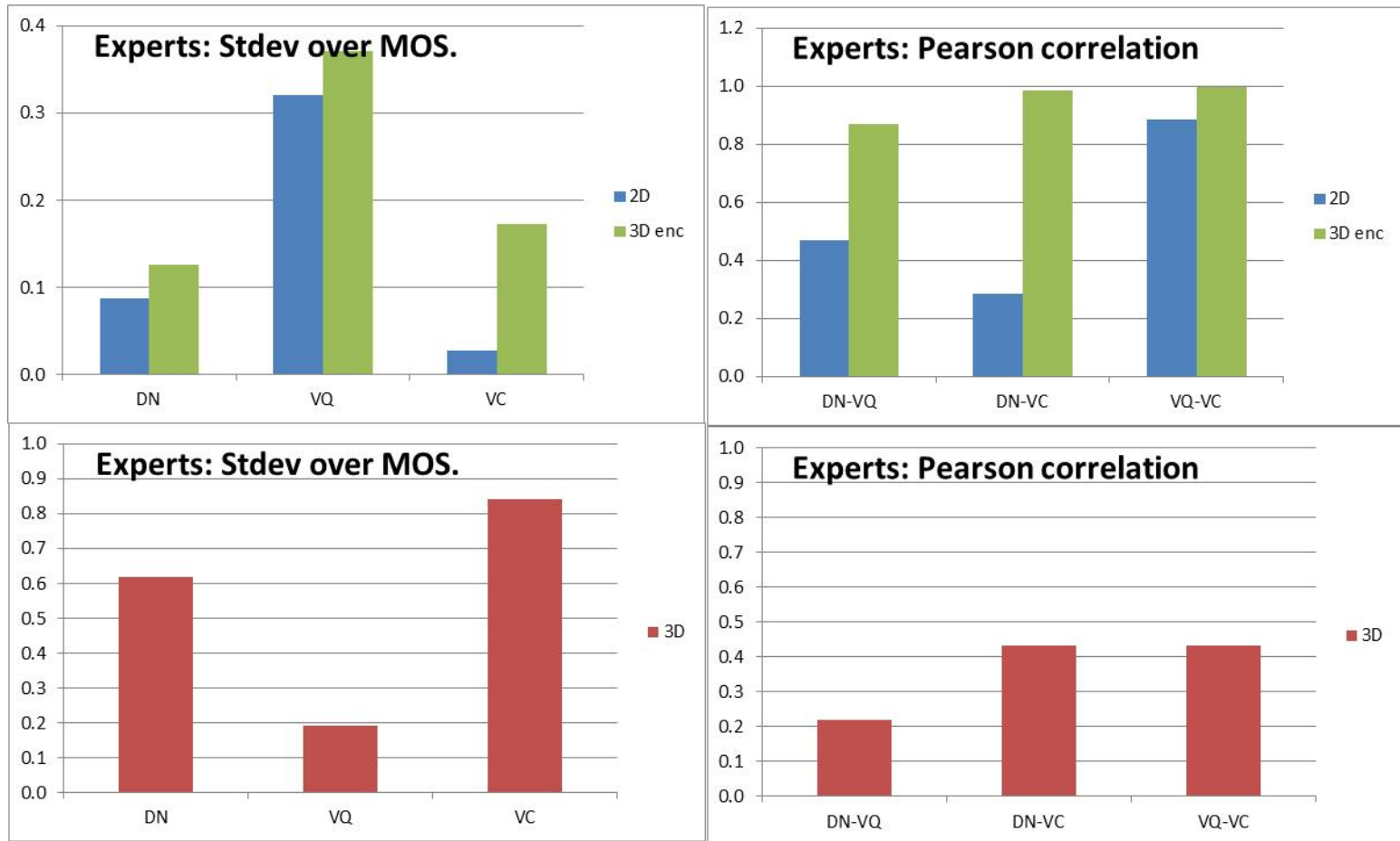


# Encoded 720p25 SbS test conditions

- › 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

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- › 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



**ERICSSON**