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| **Title Comment on quantification of Nokia Chess content depth for MIV CTC** |
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# Context

Nokia Chess content has been proposed at last Geneva Meeting [1], and included in the CTC[2], and provided as optional for the Core Experiments.

It comes out that TMIV3.0 and Interdigital CE results are not good subjectively with a lot of artefacts (and probably the other CEs as well).

# Looking at Nokia Chess depth

## Point cloud

The point cloud expressed on 16 bits on Meshlab is very good, as shown below:

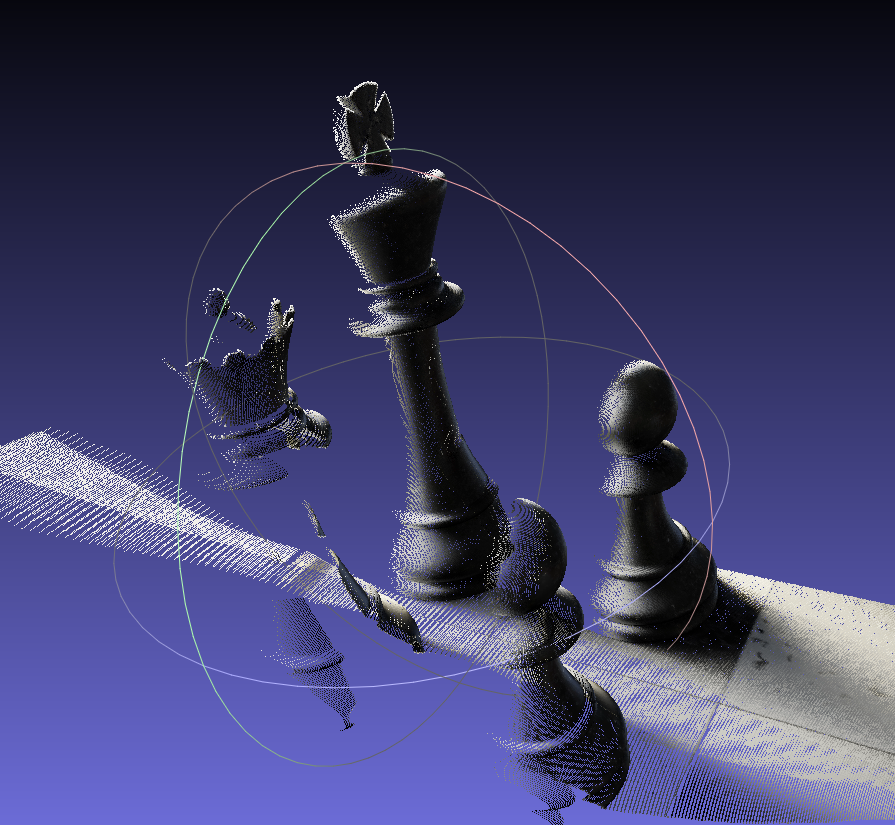


Figure 1: 16 bits point cloud (detail)

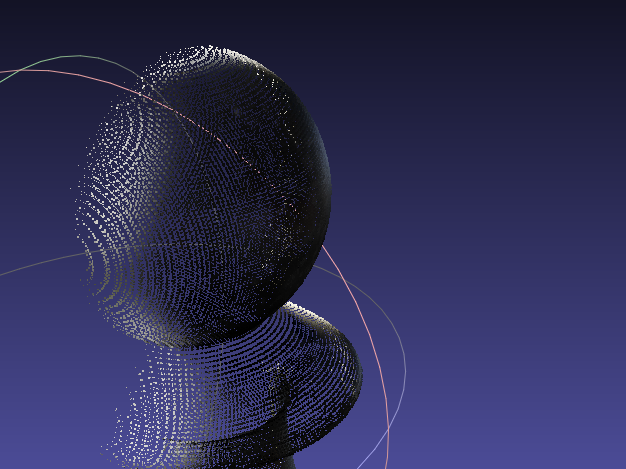


Figure 2: small detail showing high contour quality on 16 bits contours

## Depth Quantification law

The parameters of the depth quantification is given in the NokiaChess.json file for all cameras:

"Depth\_range": [0.1 meter, 500 meter],

It comes out that the scene is empty between 0.1 and 0.48 meters minimum (for v3) while it costs 3/4 of the dynamic. It is even worse for the other views, as shown in the quantization curve below:

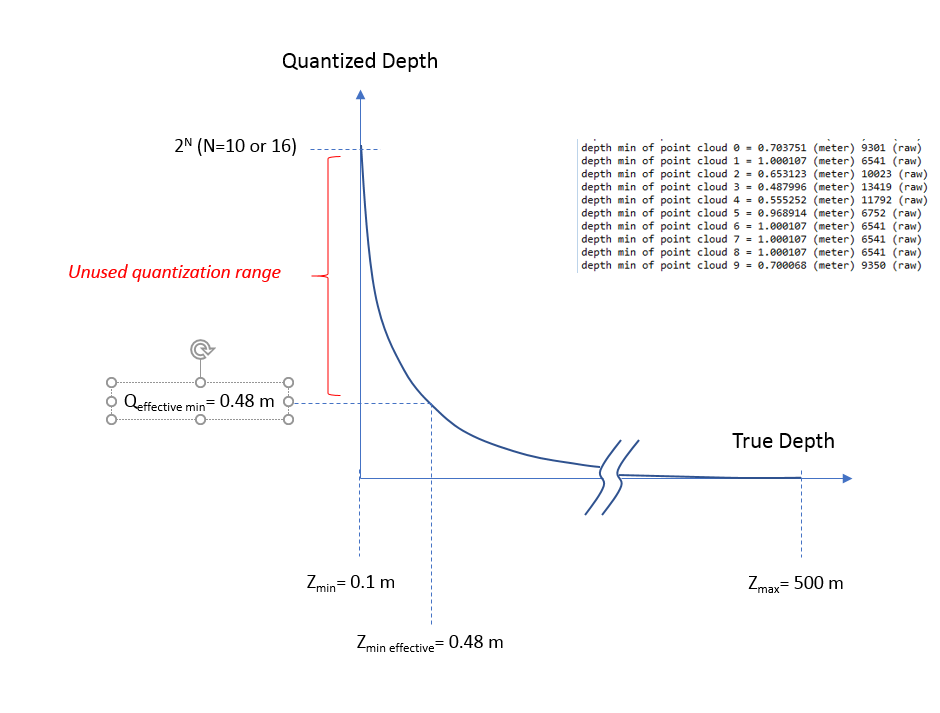


Figure 3: effective quantization law (for v3 best case)

As a result, the quantification steps are already significative for the close objects. We believe that the compression error even at QP1 induces very visible artefacts at the contour, as shown below. It may be not the only reason, but at least this one is easy to fix by readjusting the zmin value.



Figure 4: horse with contour artefact @ QP1 in TMIV3.0 Anchors

# Conclusion

Having new interesting content is absolutely important, and this content has characteristics which is different from the others like specular component. But we recommend to not keep the NokiaChess content as it is in the CTC and to improve its depth expression, because we believe that this is the reason of the degradation of the results of TMIV.

It could consist for the content provider in modifying the zmin used for the depth quantification law, even starting from the 16 bits inputs (and not necessarily by reshooting this CG scene).

We are reluctant that the MIV group adds a piece of code just for that in the TMIV, as it would too much specialize the TMIV code to a specific content.

Instead, the content provider should use the expression range of the depth as much as he can, as it is implicitly suggested in the Call for Test Material [3], if he wants his content to be properly handled by MIV technology.

# References

1. Lauri Ilola, Vinod Kumar Malamal Vadakital, Kimmo Roimela, Jaakko Keränen , “New test content for Immersive Video – Nokia Chess” ISO/IEC JTC1/SC29/WG11 MPEG/m50787
2. J. Jung, B. Kroon, J. Boyce, Common Test Conditions for Immersive Video, ISO/IEC JTC1/SC29/WG11 MPEG/N18789, October. 2019, Geneva, Switzerland.
3. Call for MPEG-I Visual Test Materials, ISO/IEC JTC1/SC29/WG11 MPEG/N18562, October. 2019, Goetebor, Sweden