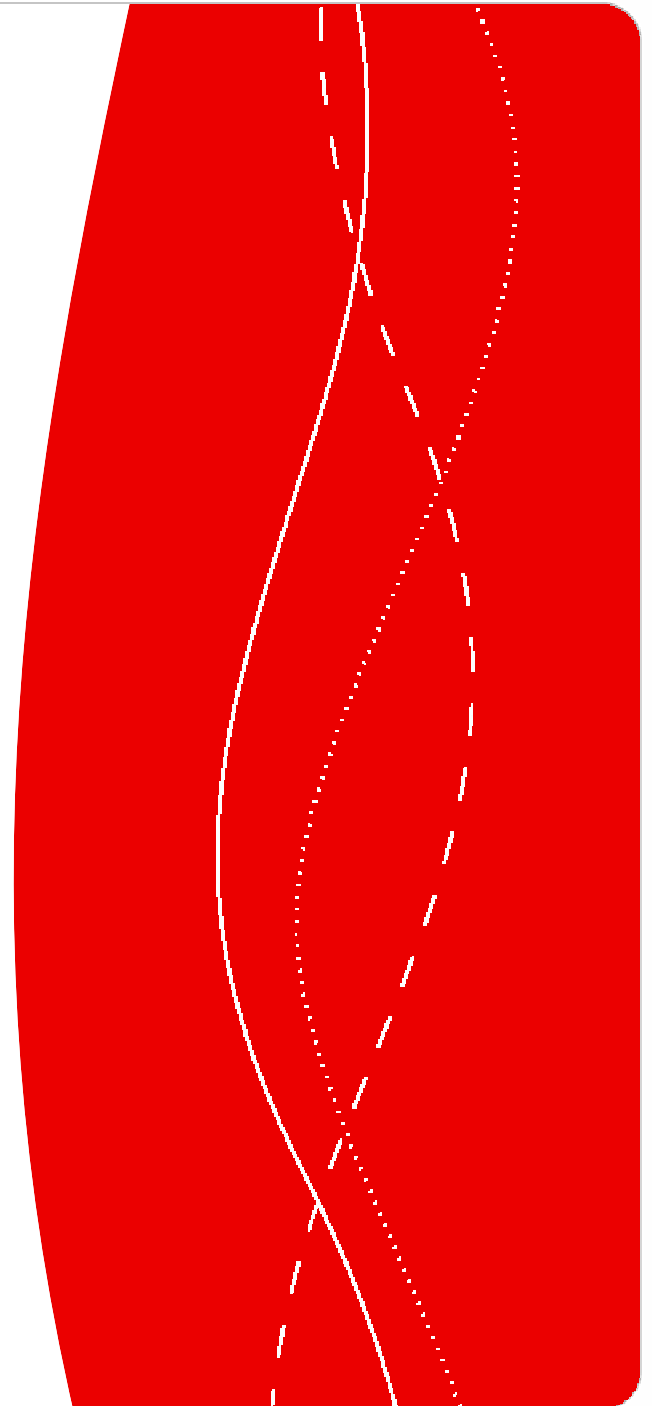




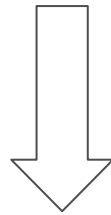
FINDING A BETTER WAY

Test of mobile reflectometers

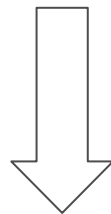
Belgium – September 2010



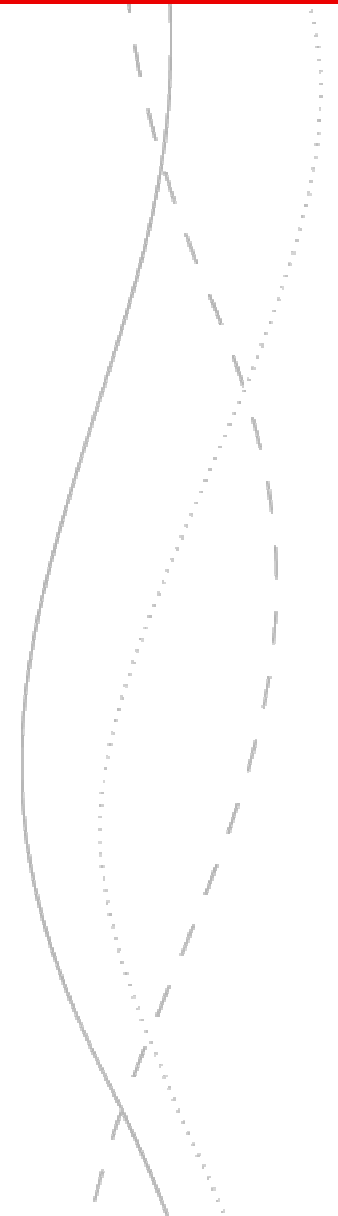
Sven-Olof Lundkvist



S-O Lundkvist



Esso



Field study carried out by

Belgian Road Research Centre (BRRRC)

**Swedish National Road and Transport
Research Institute (VTI)**



Project leaders at the road authorities:

Denmark Kenneth Kjemtrup

Finland Tuomas Österman

Norway Bjørn Skaar

Sweden Hans G Holmén

Aim of the measurements:

**To be the basis for a new EN-standard
for mobile reflectometers,
comparable to EN-1436**

Four instruments participated:

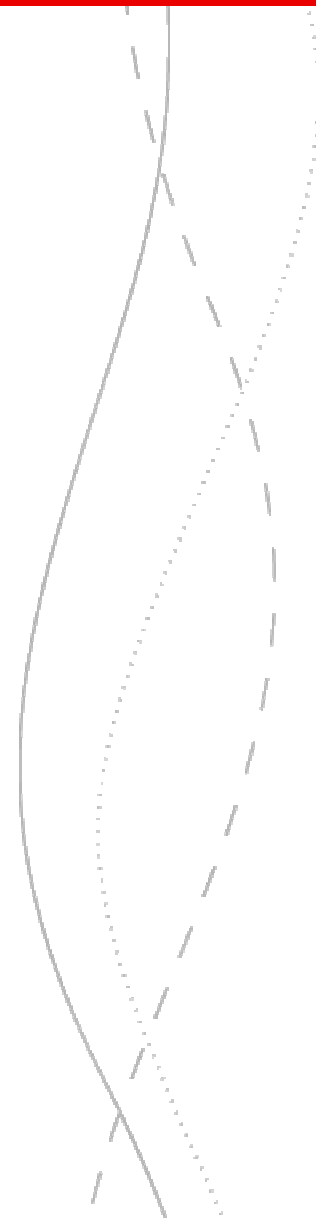
Ecodyn 30 Ennis Prismo, UK

Ecodyn 30 Euroconsult, Spain

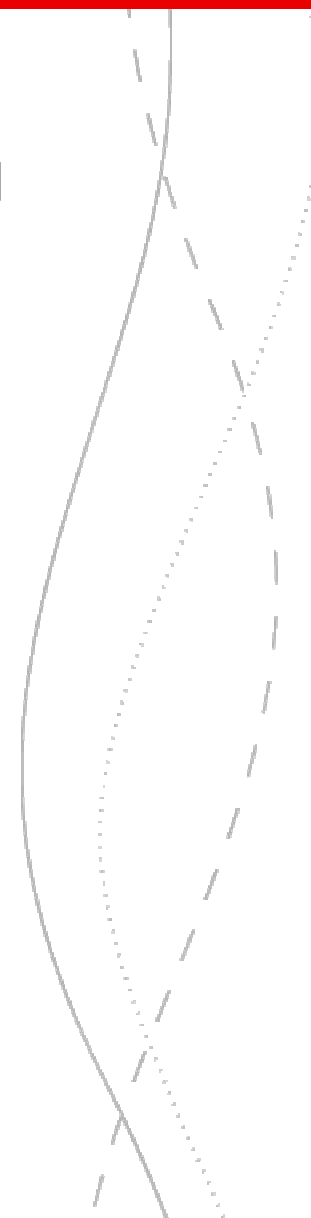
LTL-MDELTA, Denmark

Zehntner ZDR 6020

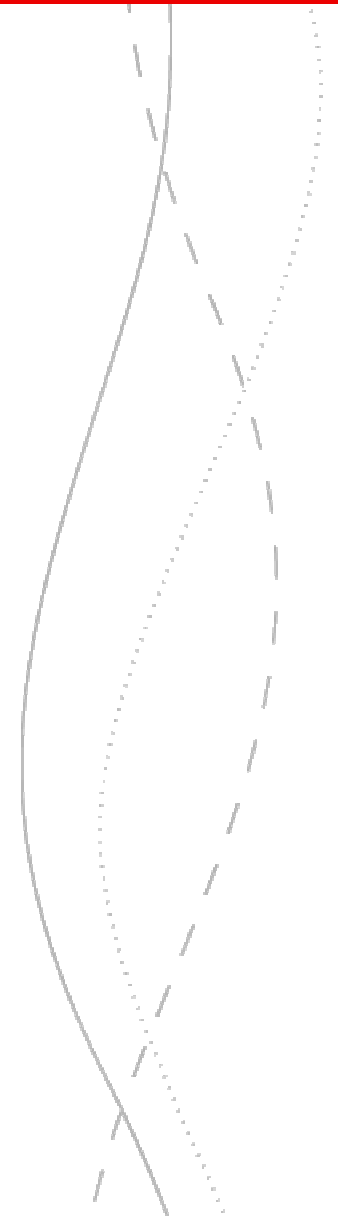
Zehntner, Switzerland



испытательными станциями в России

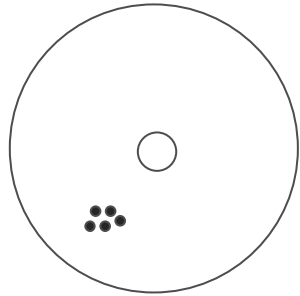


**21 test sites, each of length 200 m
were used for the evaluation**

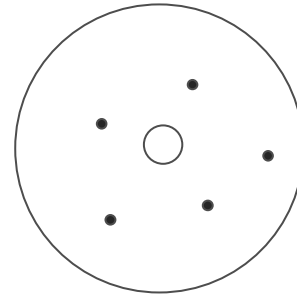


We wanted to investigate

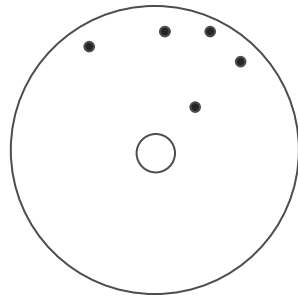
- The accuracy**
- The precision**
- The uncertainty**
- The repeatability**



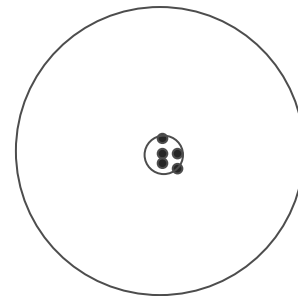
Good precision
Poor accuracy



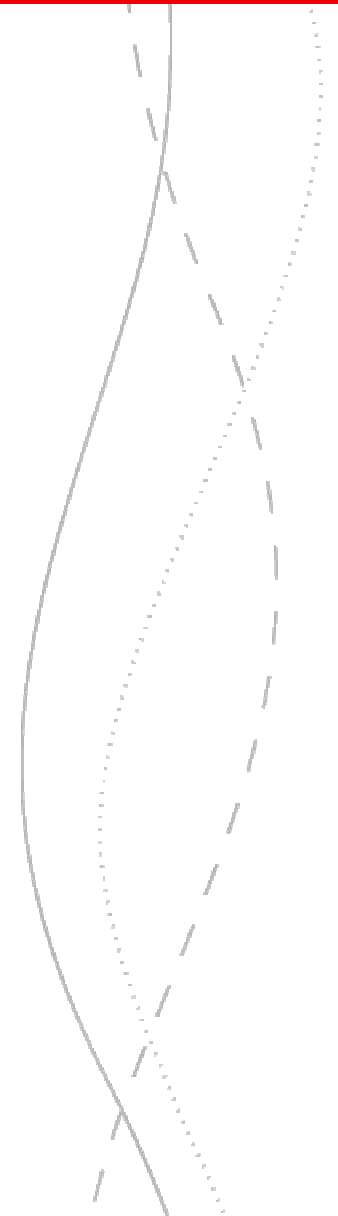
Poor precision
Good accuracy



Poor precision
Poor accuracy



Good precision
Good accuracy



In the study the instruments were not identified by name.

Instead they were numbered randomly 1 – 4.

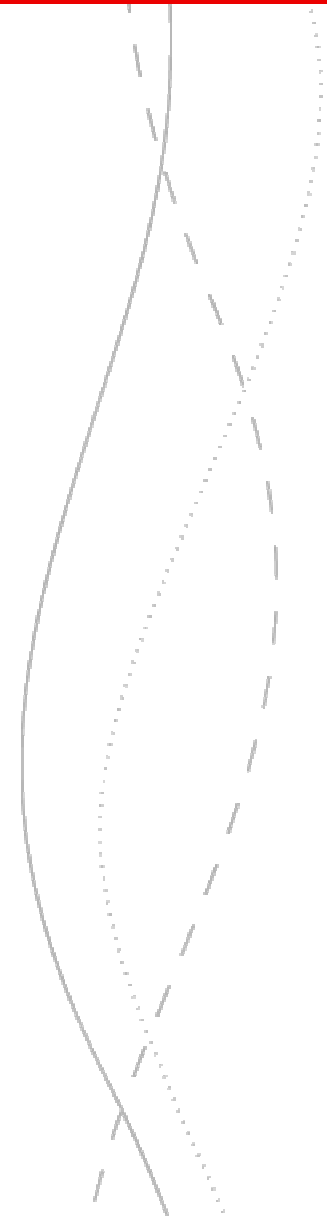
Problem: The measurement area of the instruments differed.

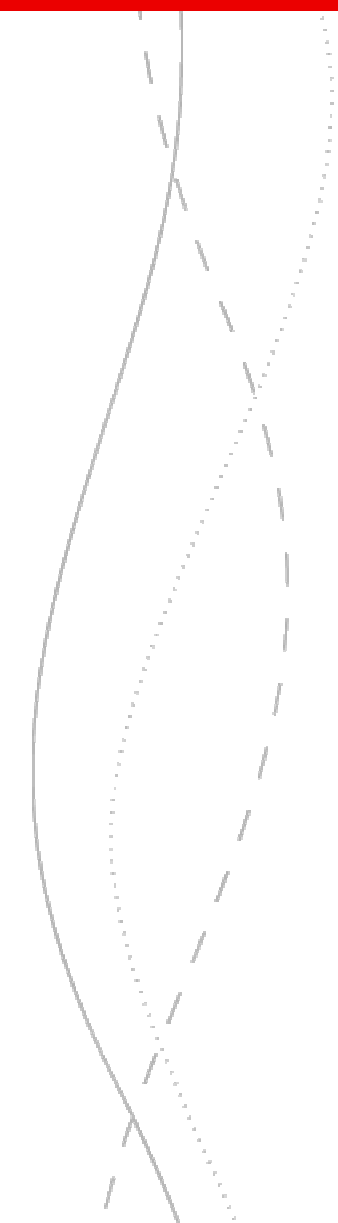
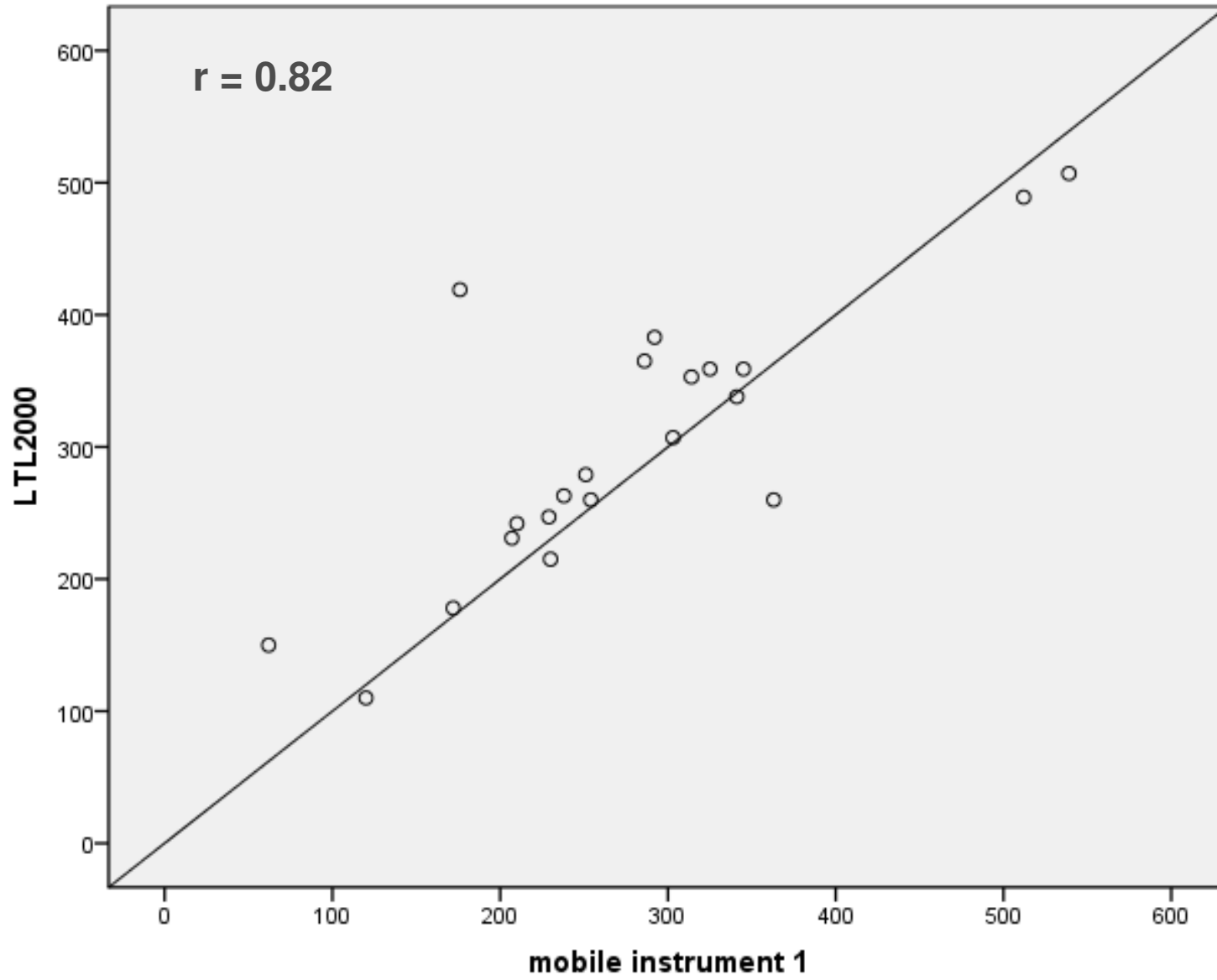
Instrument 1 The whole road marking area
focused optical system

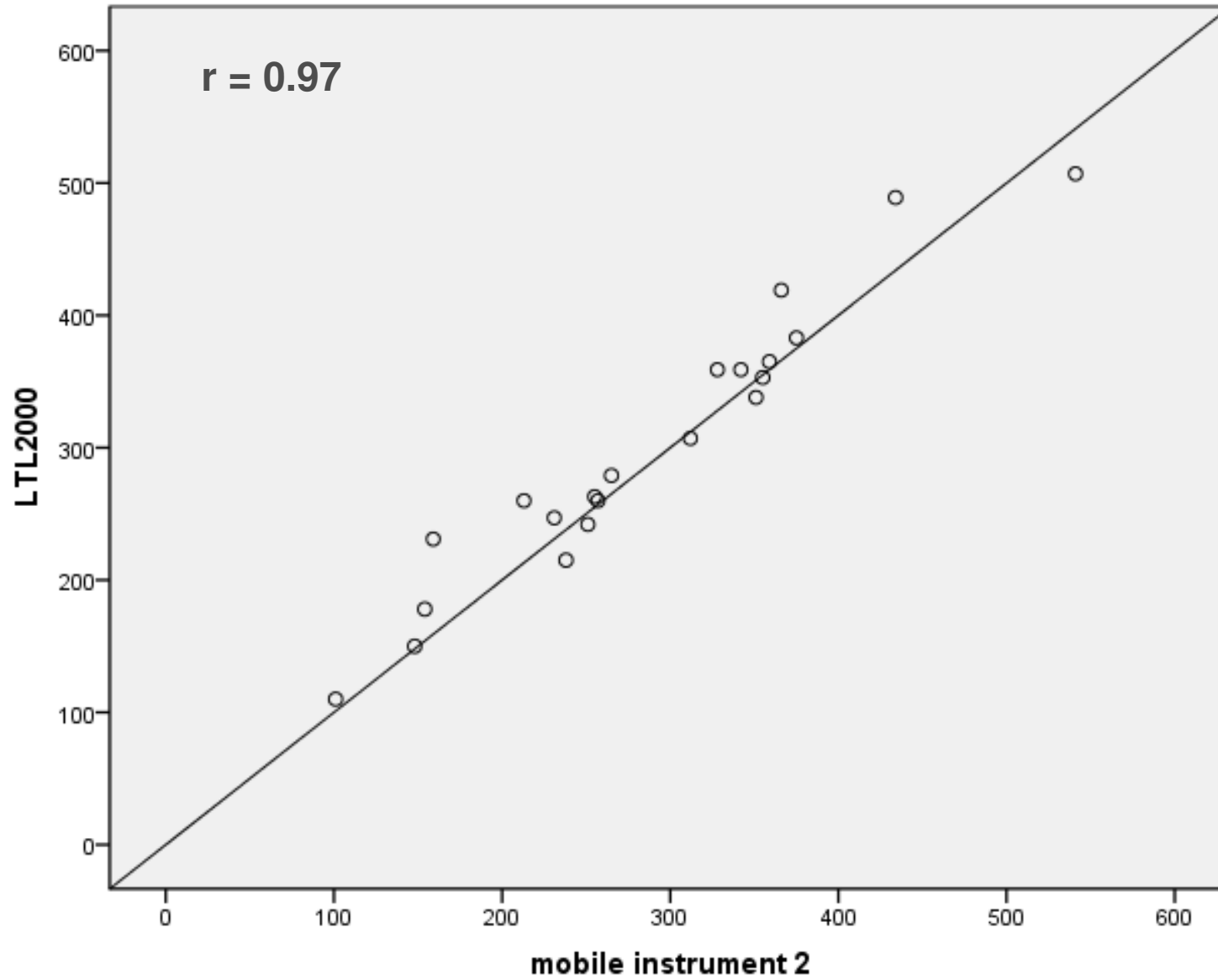
Instrument 2 5 cm in the centre of the road marking *or*
the whole road marking area
defocused optical system

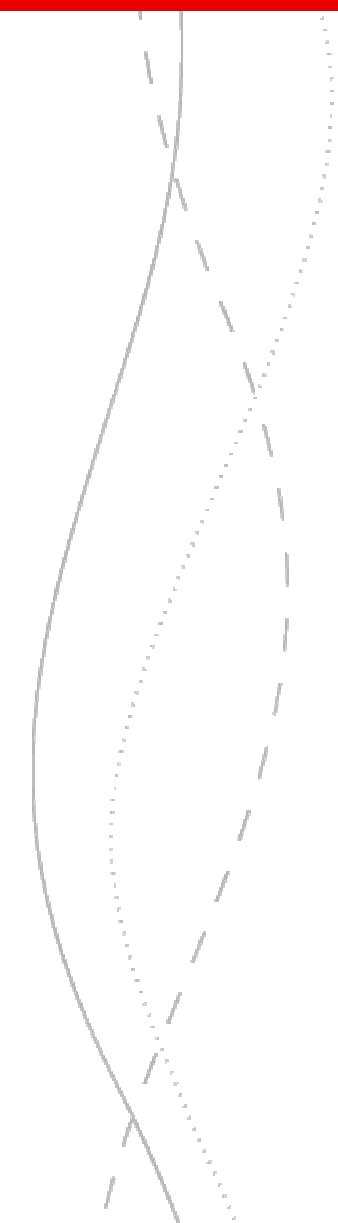
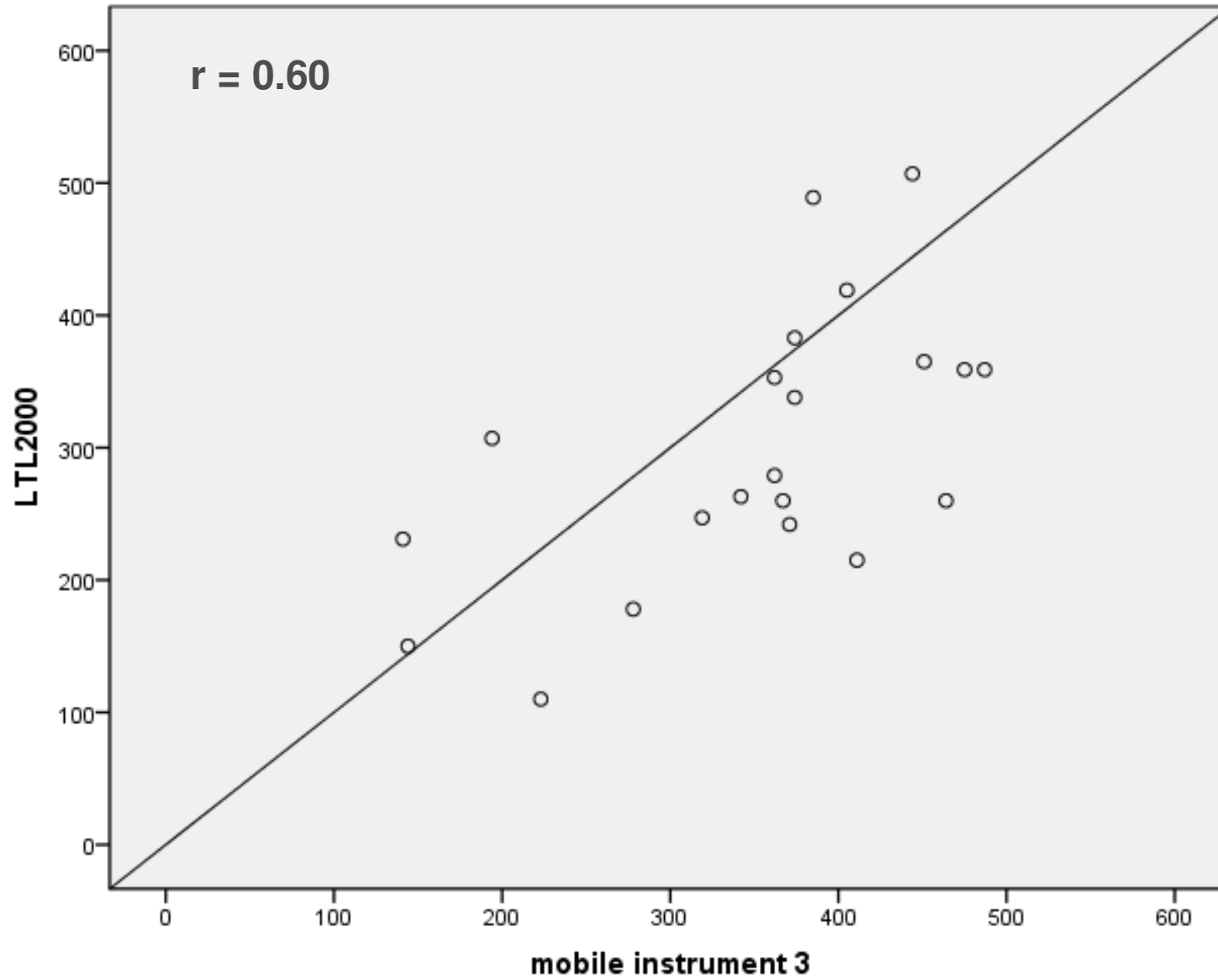
Instrument 3 & 4 8 cm where the highest readings
were found
focused optical system

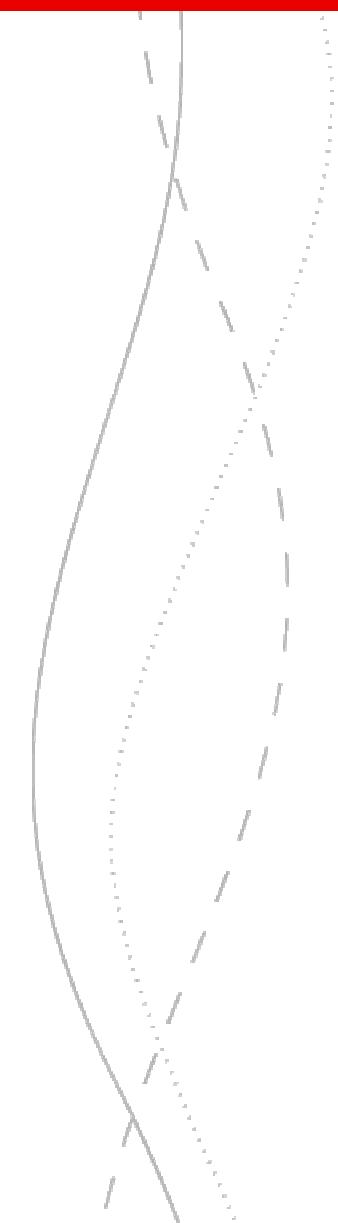
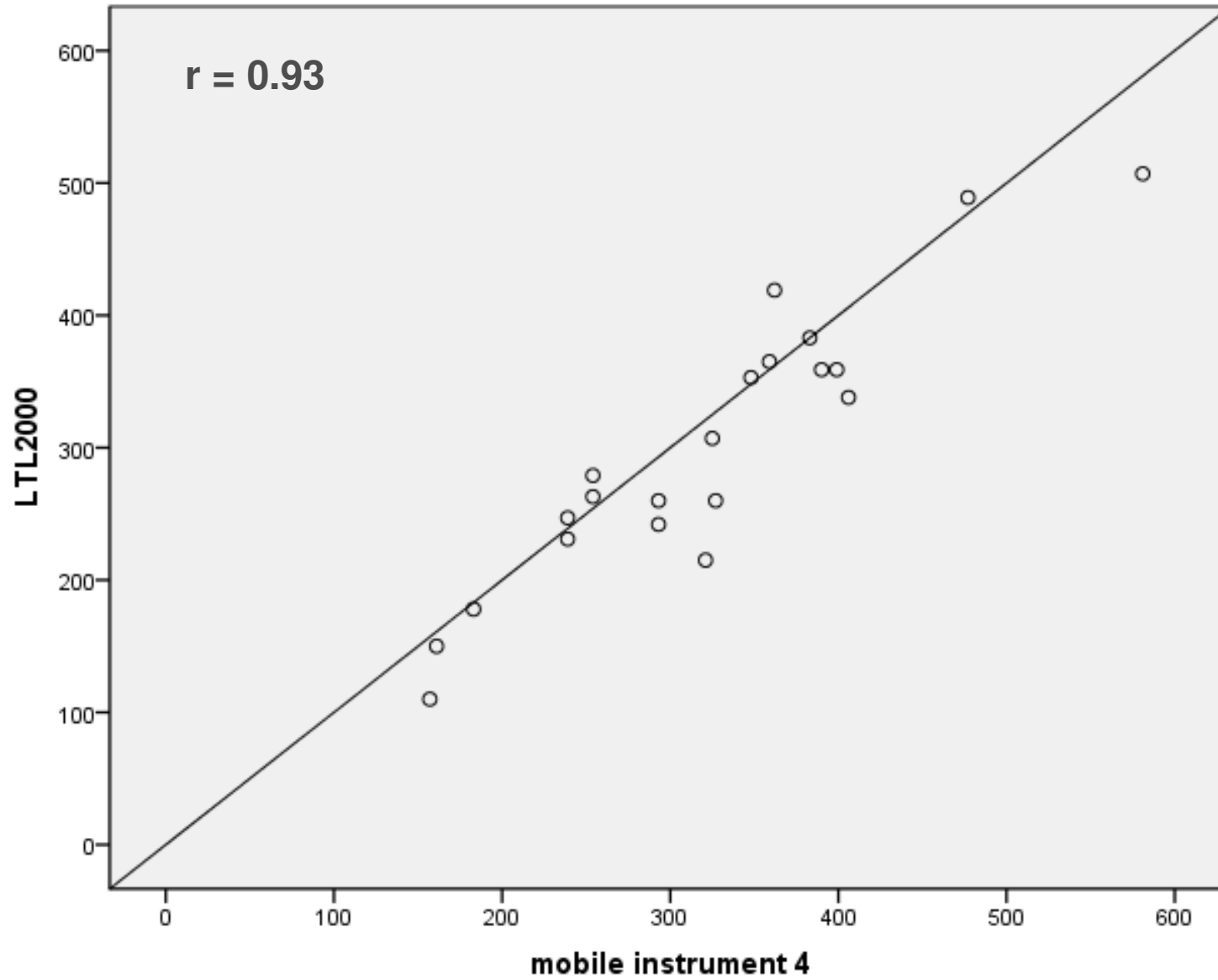
Reference instrument 4 cm in the centre of the road marking
(LTL-2000) *defocused optical system*







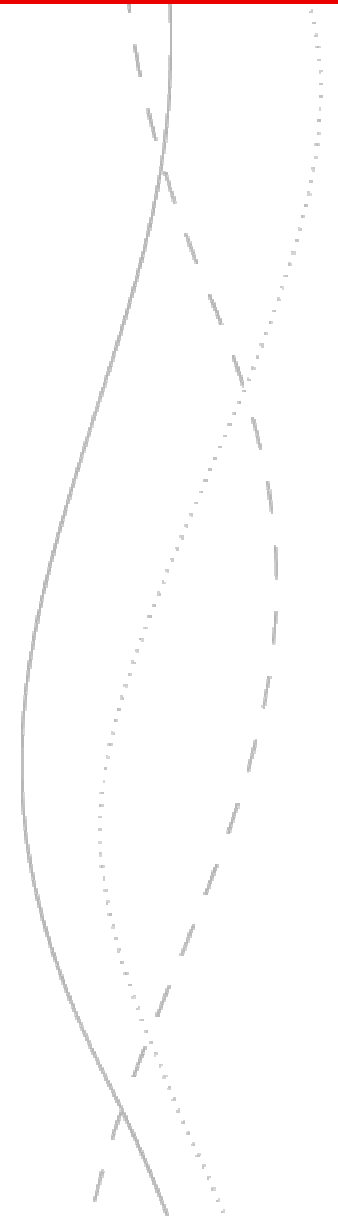




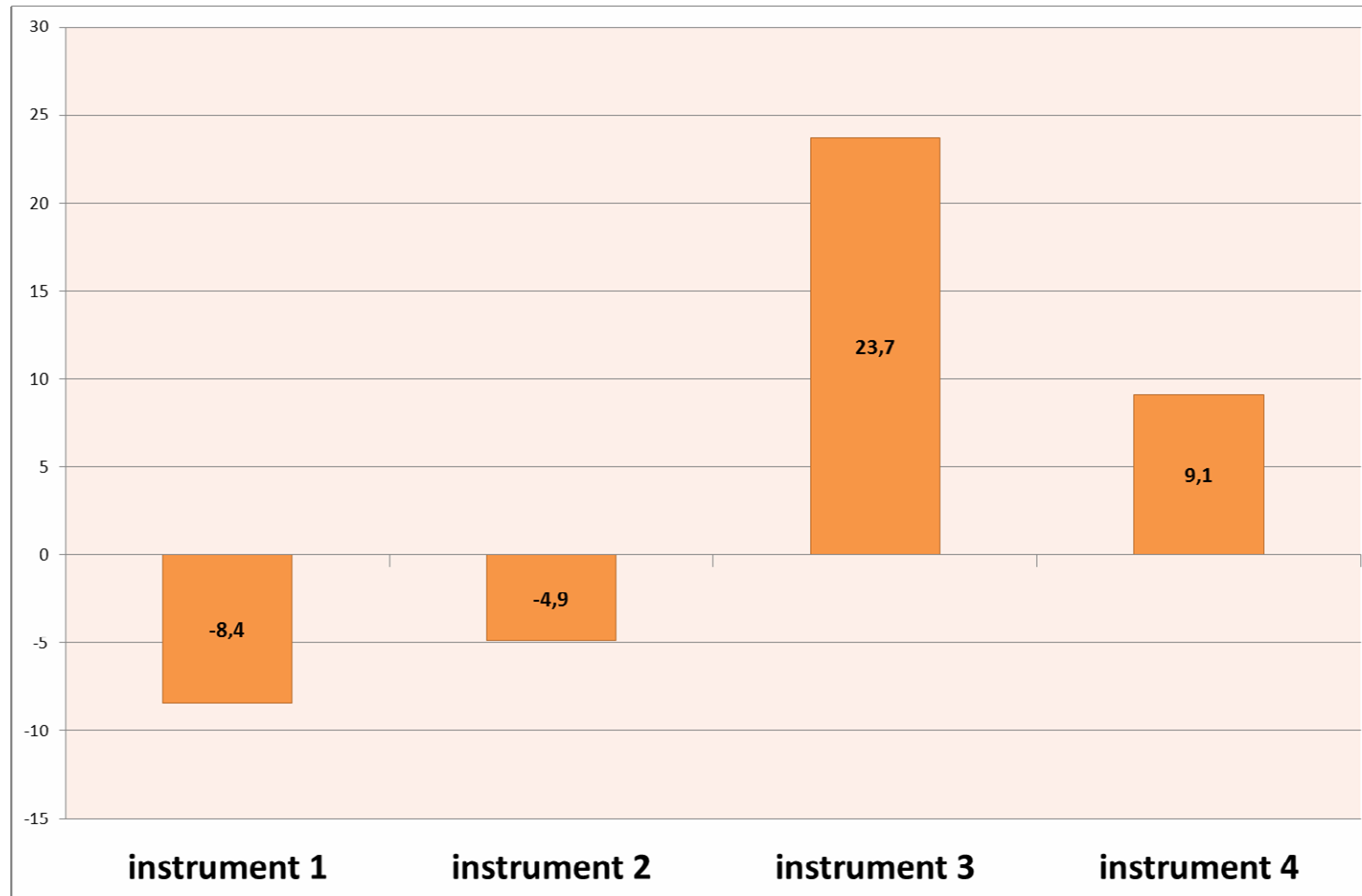
Important to remember:

**The deviations in the figures
are overestimations:**

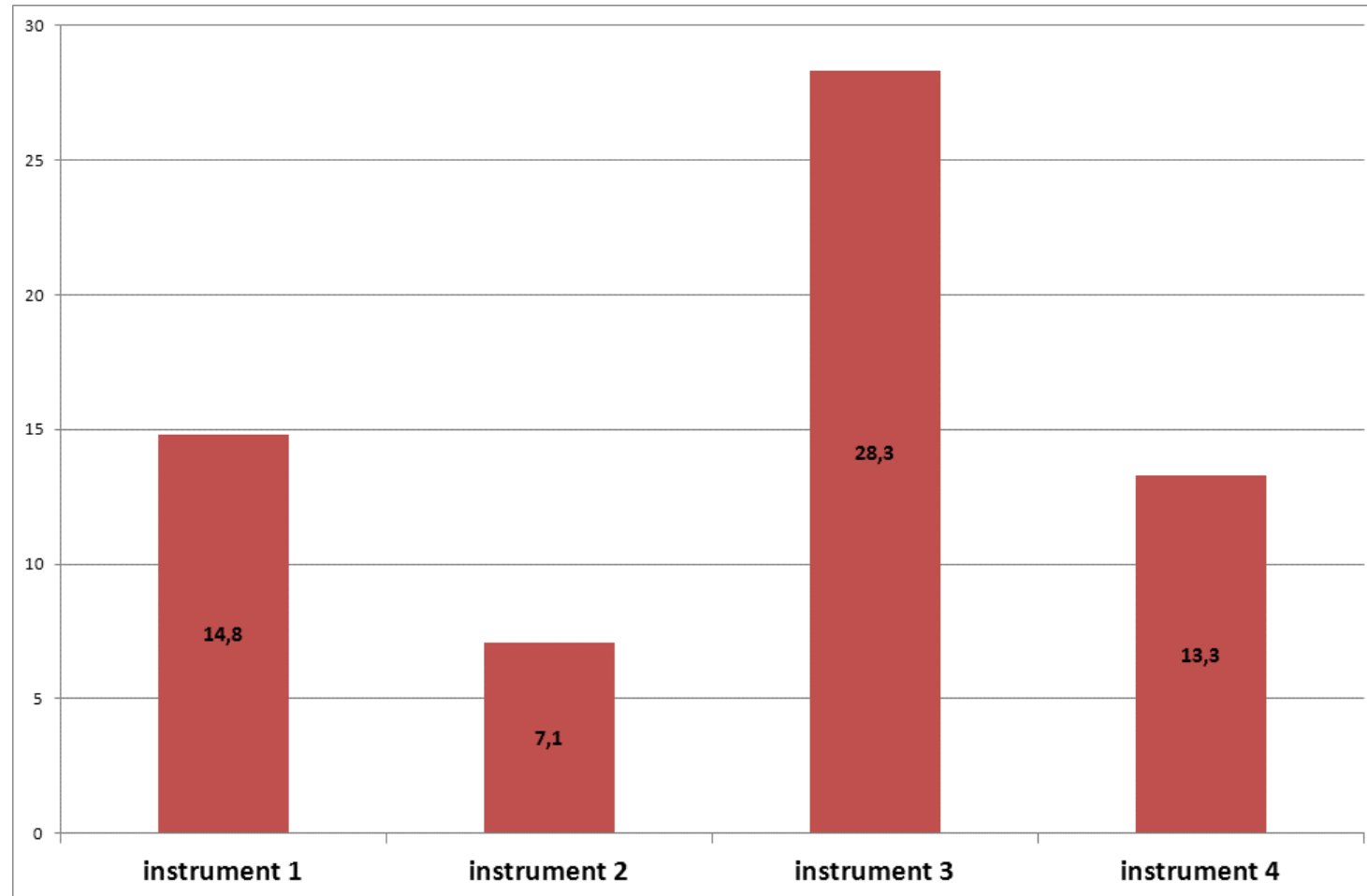
- **different measurement areas**
- **uncertainty in the reference readings**
- **operational mistakes**



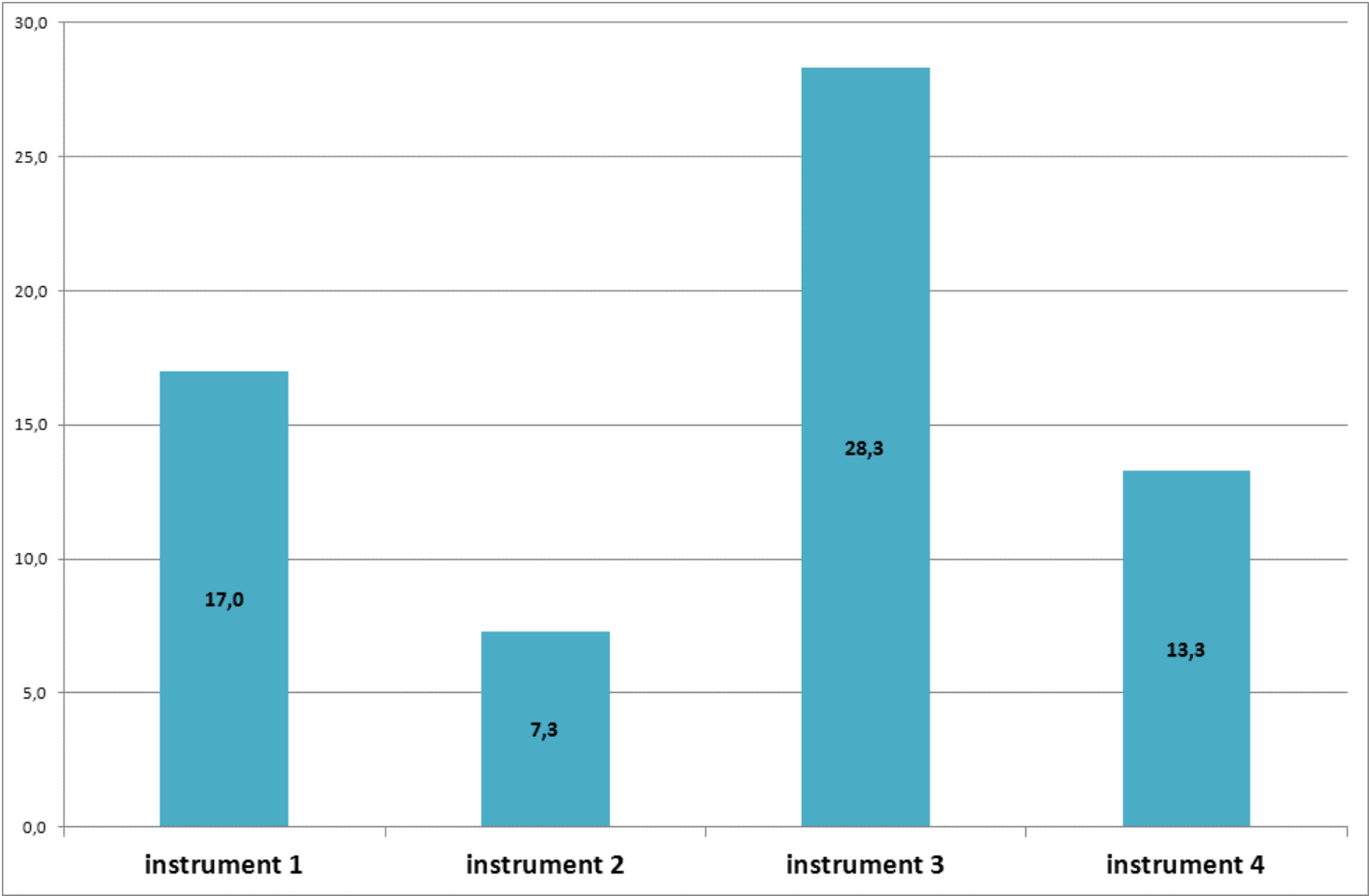
Accuracy – systematic deviation



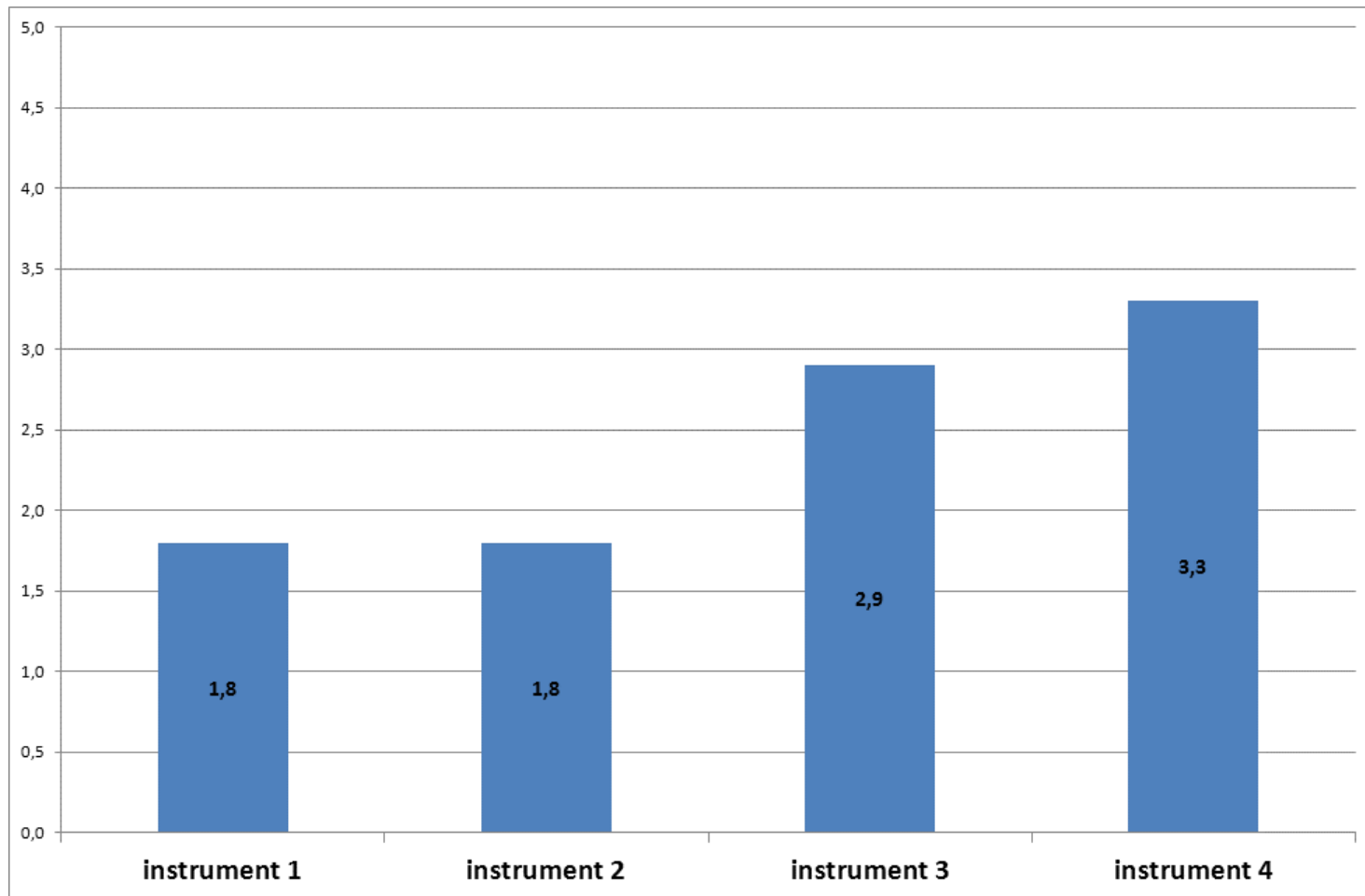
Precision – random deviation



Uncertainty – total deviation



Repeatability



Conclusion:

**It is up to the Expert Panel of
CEN/TC 226 WG2 to evaluate
the results in this study**