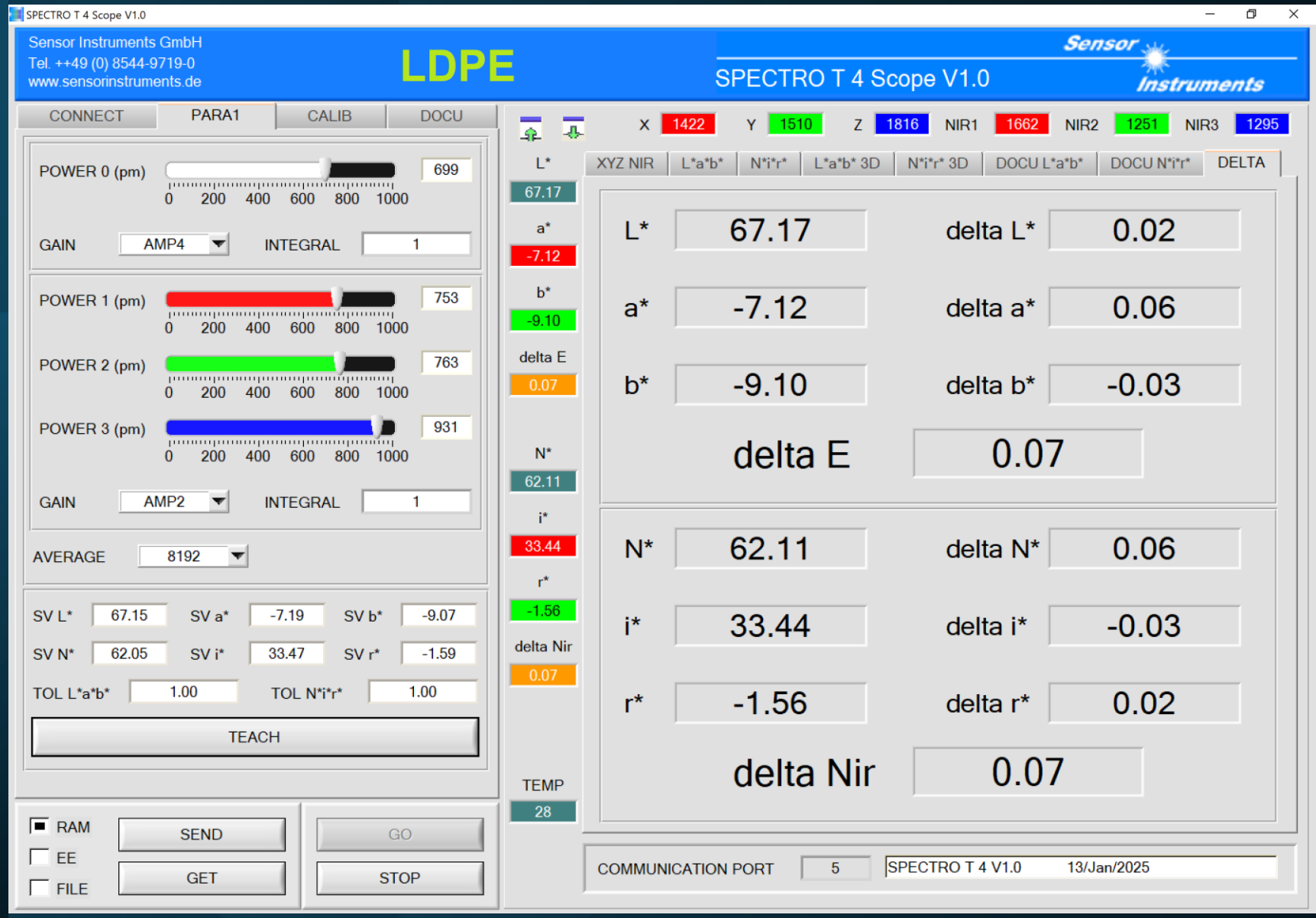
How can pure recyclate be distinguished from a recyclate mixture?

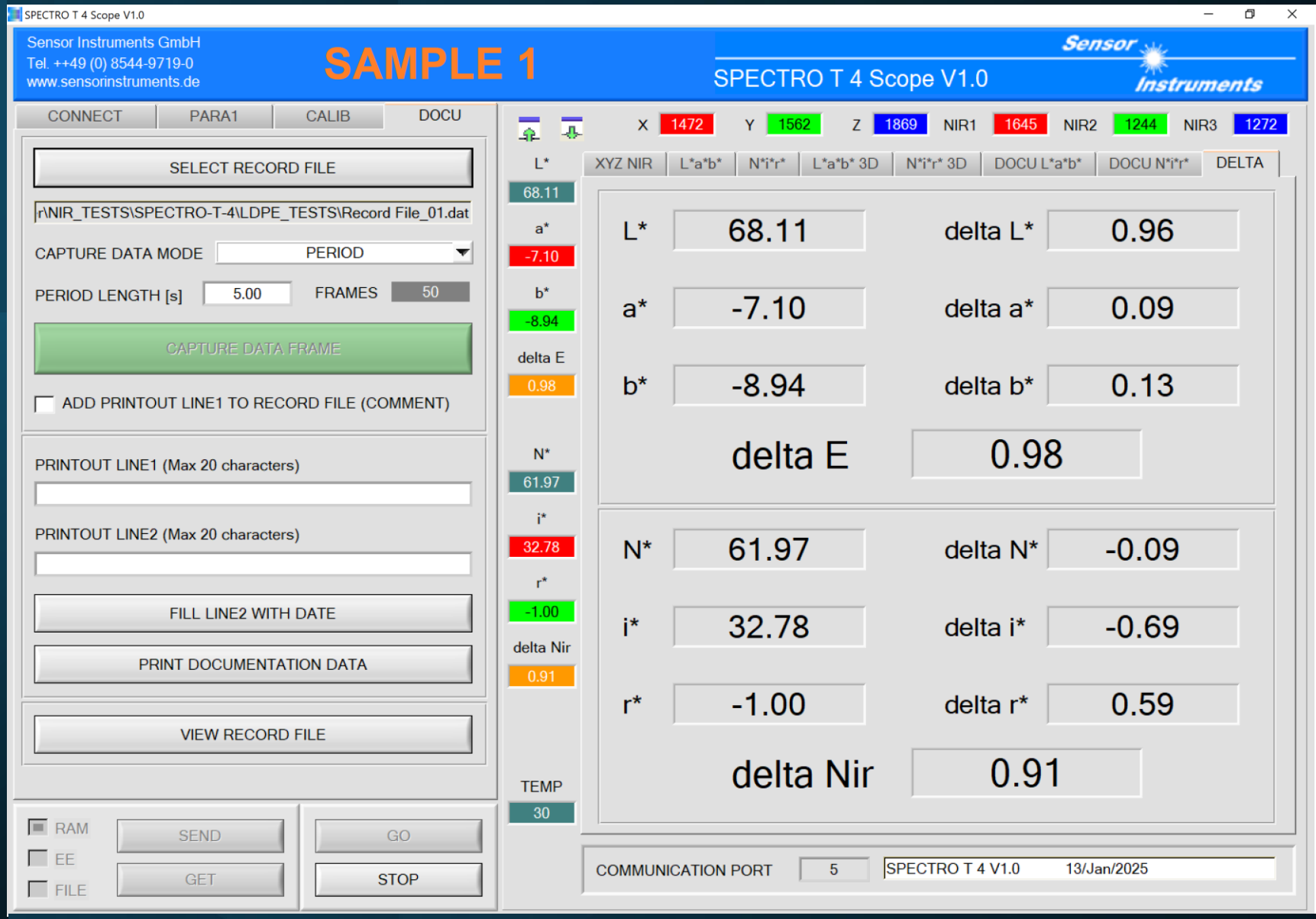
Two recyclate samples provided by a customer were to be analyzed. Both samples should consist of LDPE. Measurements were taken in both the visible and NIR range.

First, an LDPE virgin material sample was measured as a refererence. The SPECTRO-T-4-VISNIR-MOBILE measuring system was used in conjunction with the TABUN-13“ PC/voltage supply unit.

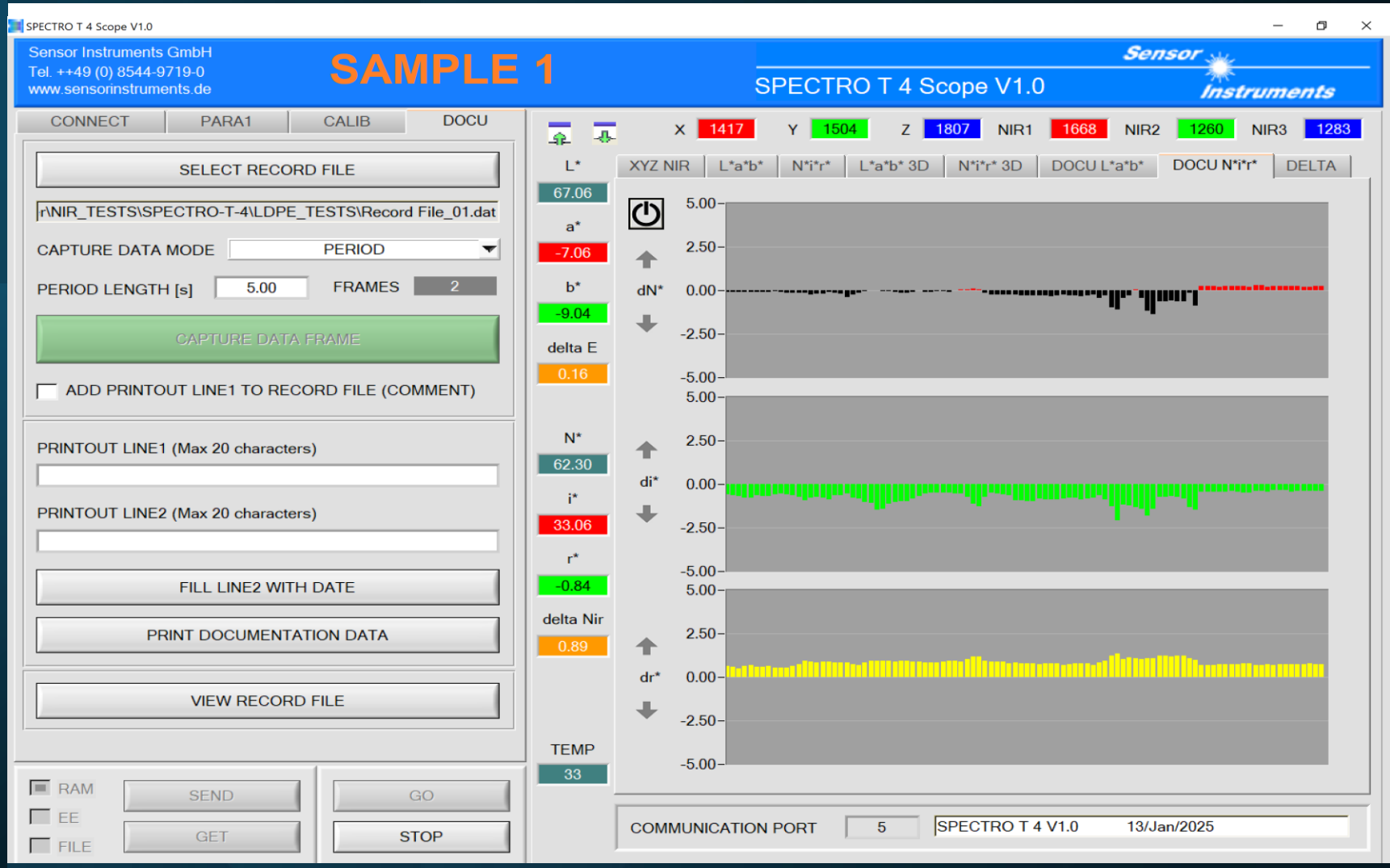


In the next step, the two recyclate samples were then measured and compared with the reference. Both the L*a*b* values, for the visible wavelength range, and the N*i*r* values, for the near infrared range, were recorded. Sample 1 shows similar L*a*b* and N*i*r* values to the reference sample.

Sample 1
Both the dE and the dNir value (respective spatial distance to the reference) are below 1.

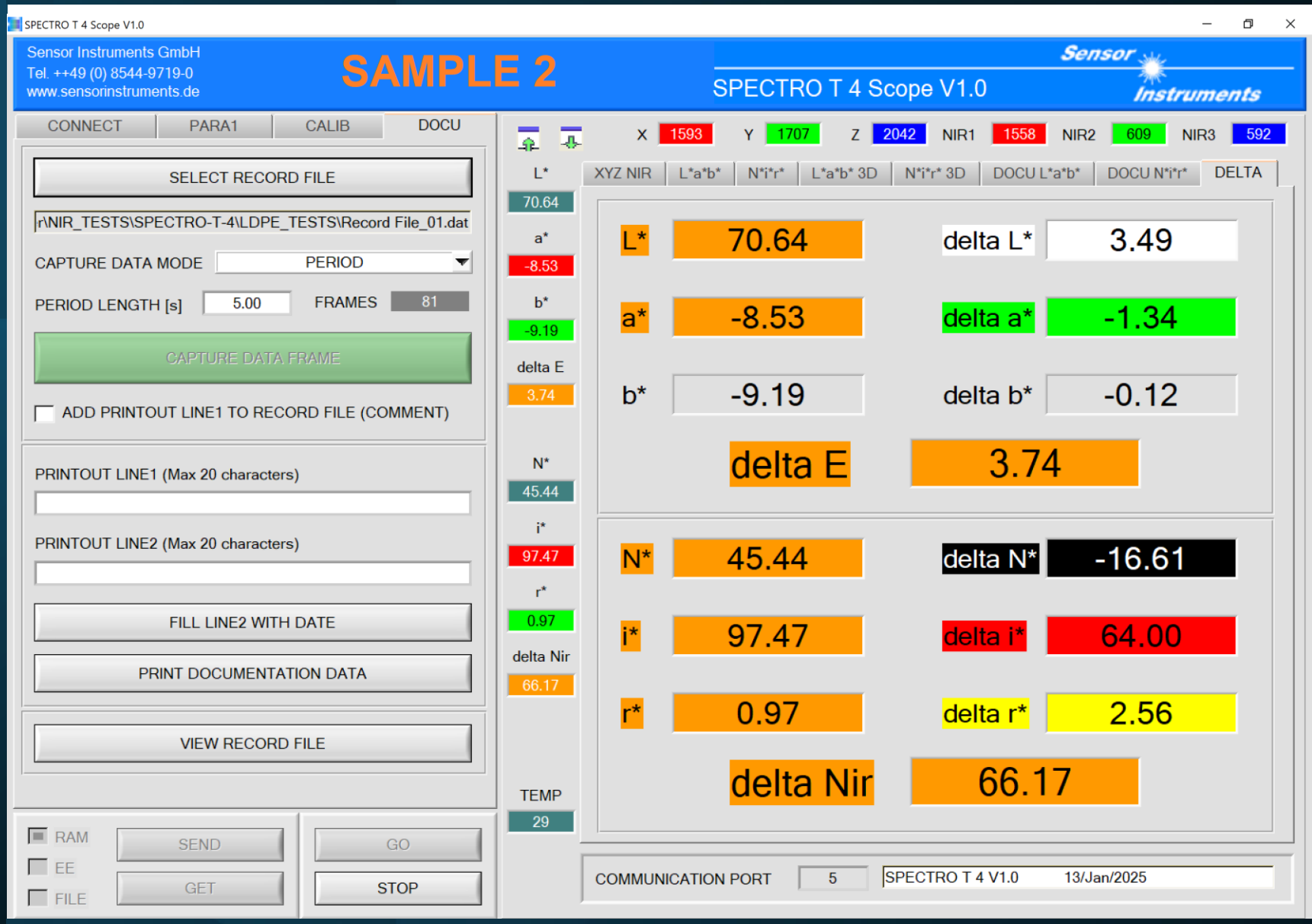


In the trend display, the SPECTRO-T-4-VISNIR-MOBILE sensor head was moved in a circular motion on the recyclate surface while the measured values are being recorded.

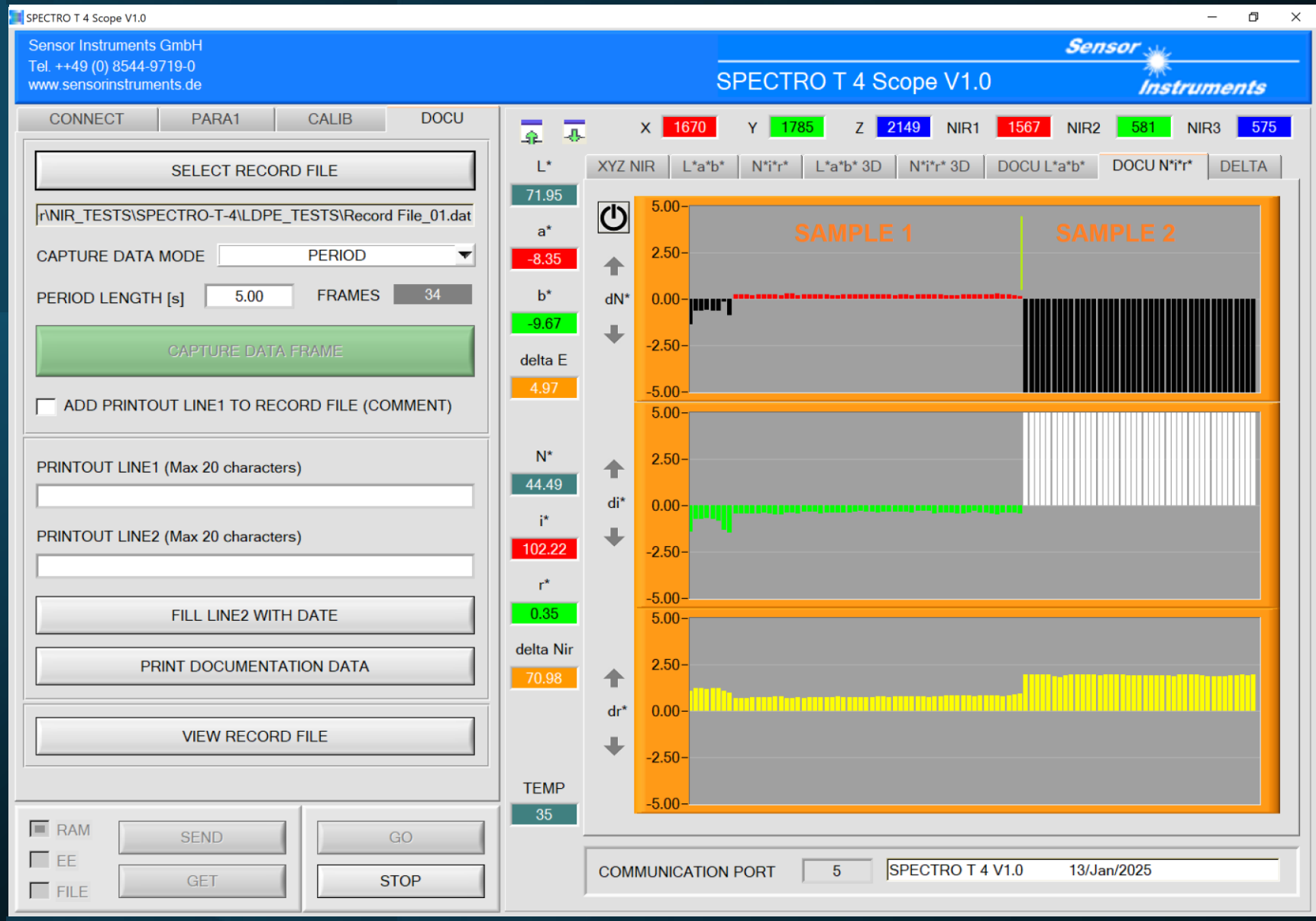


Sample 2 was then measured. The distance to the reference was considerable, especially in the N*i*r* range, which indicates a mixture of several recyclate types rather than a pure LDPE recyclate sample.

Almost all values were outside the specified tolerance of 1. In particular, the N*i*r* values and the resulting dNir value showed a very large deviation.



Now the VISNIR measuring head was also moved in a circular motion over the surface of the recyclate during the recording of the measured values for this recyclate sample.



Conclusion

Sample 1 is an LDPE sample, while Sample 2 is more of a mixture of LDPE with other types of plastic.