LIDARIS
LIDT Service

# LOW OPTICAL ABSORPTION MEASUREMENT REPORT

## SAMPLE: BBO1

| Request from | | Testing institute | |
|---|---|---|---|
| Address | Optoman<br>Ukmergės pl. 427<br>LT-14183 Vilnius<br>Lithuania | Address | UAB Lidaris<br>Saulėtekio al. 10<br>LT-10223 Vilnius<br>Lithuania |
| Contact person | Vaida Grašytė | Tester | Edvinas Zacharovas |
| Inquiry date | 2026-04-20 | Sale order | SO06974 |
| Purchase order | PO15360 | Test ID | EN58BV |
| | | Test date | 2026-04-29 |

### Specimen

| | |
|---|---|
| Name | BBO1 |
| Front surface (S1) | AR Coating (AR@343) |
| Rear surface (S2) | Uncoated |
| Dimensions | 10.0 x 10.0 x 1.7 mm |
| Packaging | Plastic box |
| Storage before test | Normal laboratory conditions |
| Dust blow-off | None |
| Cleaning | None |

### Measurement

| | |
|---|---|
| Method | Photothermal common-path interferometry (PCI) |
| Regime | Transmission |
| Protocols | Longitudinal scan (L-scan), Time scan, Transverse scan (T-scan). |

# SUMMARY OF MEASUREMENT RESULTS

| Wavelength | AOI | Polarization | Location | Sample absorption * |
|---|---|---|---|---|
| 355.0 nm | (2.0 ± 1.0) Deg | Linear P | Front surface (S1) | $163^{+44}_{-43}$ ppm |

* Sample absorption is evaluated from Transverse scan protocol.

# TEST EQUIPMENT

## Definitions and test description

Photothermal common-path interferometry (PCI) for low absorption measurements is based on spatially resolved pump-probe techinque: low power probe beam senses the heating effect of an absorbed pump beam [1]. Several different scanning protocols are performed to measure the absorption of the sample.

| Irradiation sources | Pump laser | Probe laser |
|---|---|---|
| Manufacturer | Ekspla | Lumentum |
| Model | Atlantic 80 | 1122P |
| Type | Mode-locked Nd:YVO4 | Continuous wave HeNe |
| Central wavelength | 355 nm | 632.8 nm |
| Angle of incidence | (2.0 ± 1.0) Deg | (9.0 ± 1.0) Deg |
| Polarization state | Linear P | Linear P |
| Spatial beam profile in target plane | TEM00 | TEM00 |
| Beam diameter in target plane (1/e2) | (60 ± 5) µm | (210 ± 5) µm |
| Average power | (49.85 ± 0.42) mW | (2.00 ± 0.05) mW |

| Measurement setup calibration | Surface |
|---|---|
| Calibration sample | BBO Reference<br>Surface Sample |
| Absorption | 39.0 % |
| Correction factor | 1.0 |
| Responsivity | $10.76^{+0.81}_{-0.80}$ 1/W |

| Power meter | |
|---|---|
| Manufacturer | Ophir |
| Model | 12A-V1 |
| Calibration due date | 2027-09-19 |

| Test environment | |
|---|---|
| Environment | Air |
| Cleanroom class (ISO 14644-1) | ISO7 |
| Pressure | 1 bar |
| Temperature | 23 C |
| Humidity | 25 % |

[1] A. Alexandrovski, M. Fejer, A. Markosian, and Roger Route "Photothermal common-path interferometry (PCI): new developments", Proc. SPIE 7193, Solid State Lasers XVIII: Technology and Devices, 71930D (28 February 2009)

# LONGITUDINAL SCAN (L-SCAN) RESULTS

## FRONT SURFACE (S1)

### Scan parameters

| | |
|---|---|
| Scanning axis | Longitudinal (from S1 to S2) |
| Scanning distance | 3.0 mm |
| Scanning step | 20 µm |
| Pump laser power | (50.54 ± 0.38) mW |
| Number of scans | 1 |

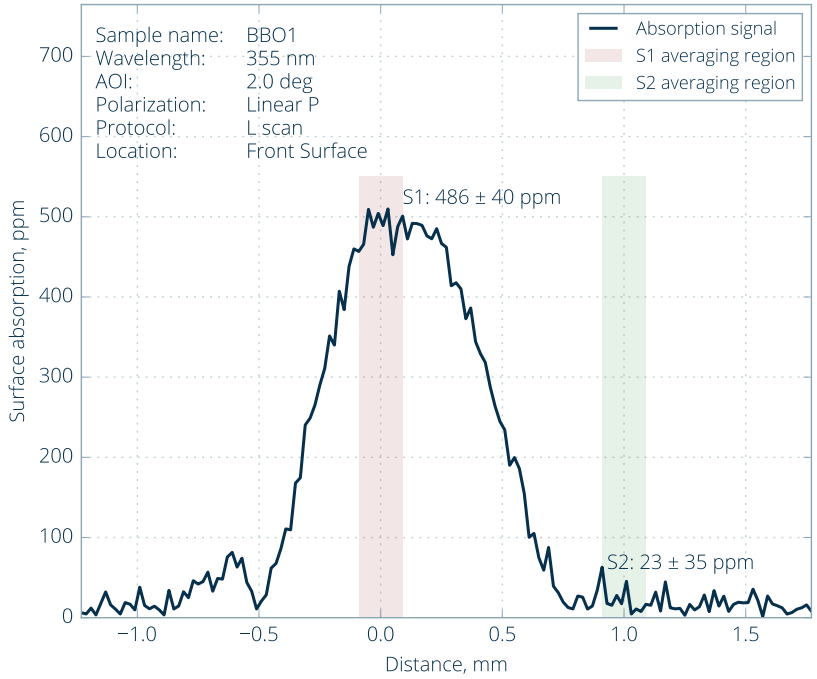



Figure 1. Longitudinal scan.

The central peaks, found at S1 and/or S2 positions, indicate the points where the pump and probe beams traverse the entrance (S1) and exit (S2) surfaces. The peak value of the signal corresponds to the surface absorptance, however, the secondary peaks (sidelobes) surrounding central peak should be regarded as part of the surface response function and lack any physical significance.

It's important to emphasize that the recorded scan distance between S1 and S2 is affected by refraction index of optical medium and therefore deviating from the actual physical thickness of the sample. The reported values are calibrated using a surface etalon sample. In cases where optical elements exhibit substantial bulk absorption, the longitudinal scan signal includes a central baseline that should be subtracted when estimating surface absorptance. The bulk absorptance portion of the signal necessitates a separate calibration process and should be interpreted separately.

Absorption values in L-scan figure are displayed only for comparison purpose, because absorption might change during the L-scan procedure. Temporal absorption changes can be seen in Time-scan results.

# TIME SCAN RESULTS

## FRONT SURFACE (S1)

### Scan parameters

| | |
|---|---|
| Scanning axis | Time |
| Scanning duration | 689 s |
| Scanning step | 1 s |
| Pump laser power | (49.66 ± 0.46) mW |
| Number of scans | 1 |

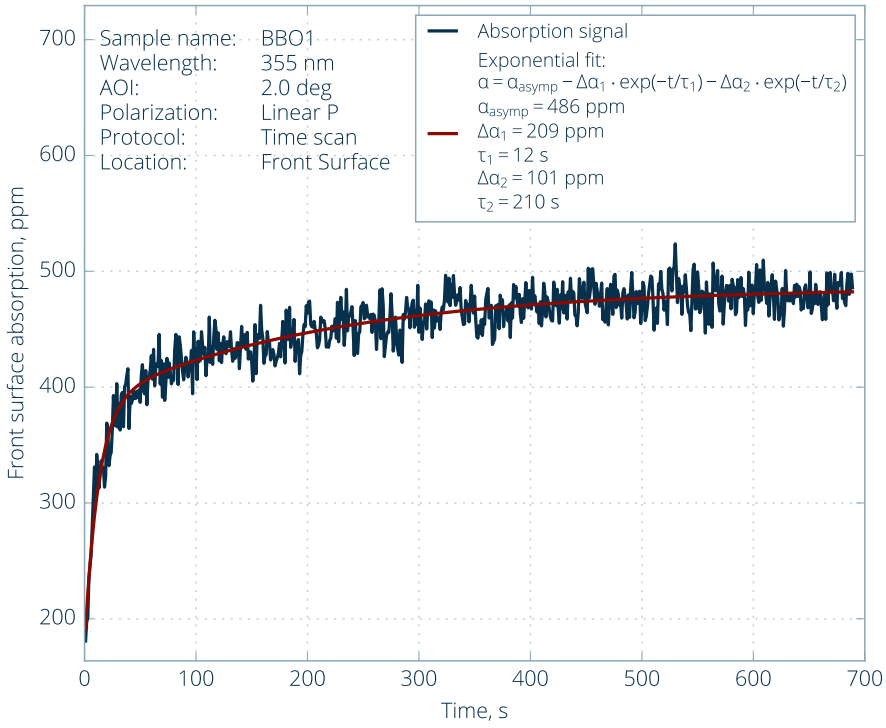



Figure 2. Time scan on front surface (S1) .

# TRANSVERSE SCAN (T-SCAN) RESULTS

## FRONT SURFACE (S1)

### Definitions and protocol description

Sample absorption is defined as median absorption value of T-scan measurement. Uncertainty is evaluated as minimum and maximum absorption values of T-scan measurement without outliers, i.e. within range [Q1 - 1.5 · IQR, Q3 + 1.5 · IQR], where Q1 - first quartile, Q3 - third quartile, IQR - interquartile range.

### Scan parameters

| | |
|---|---|
| Scanning axis | Transverse (vertical) |
| Scanning distance | 3.0 mm |
| Scanning step | 35 µm |
| Pump laser power | (49.85 ± 0.42) mW |
| Number of scans | 1 |

### Scan results

| | |
|---|---|
| Sample absorption | $163^{+44}_{-43}$ ppm |

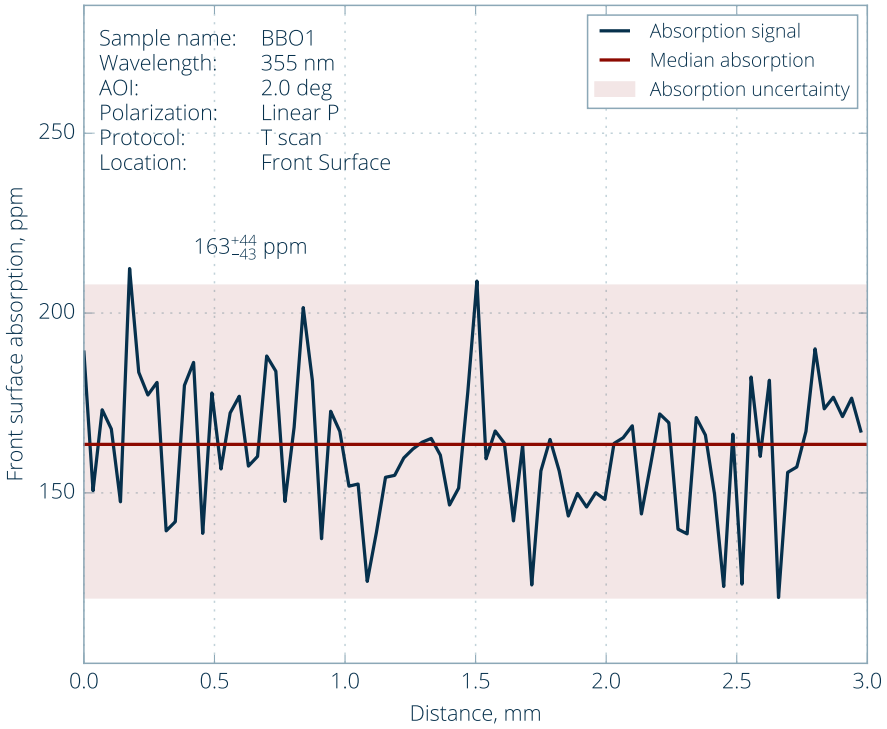



Figure 3. Transverse scan on front surface (S1) .

# TESTING LOCATION

## FRONT SURFACE (S1)

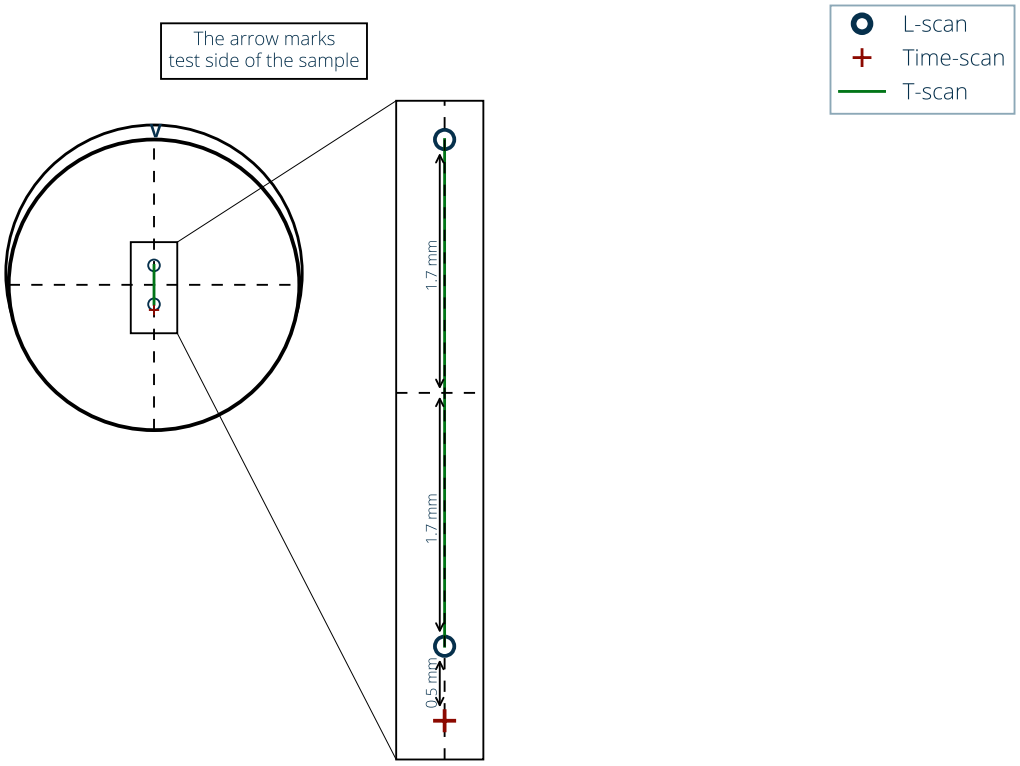



Figure 4. Measured sites on the sample.