

# CONTINUOUS WAVE TERAHERTZ EMITTER AND DETECTOR MODULES



## AT A GLANCE

Photomixers for 1.5  $\mu\text{m}$  optical wavelength, emitted THz power confirmed by PTB (Physikalisch Technische Bundesanstalt)

### Features

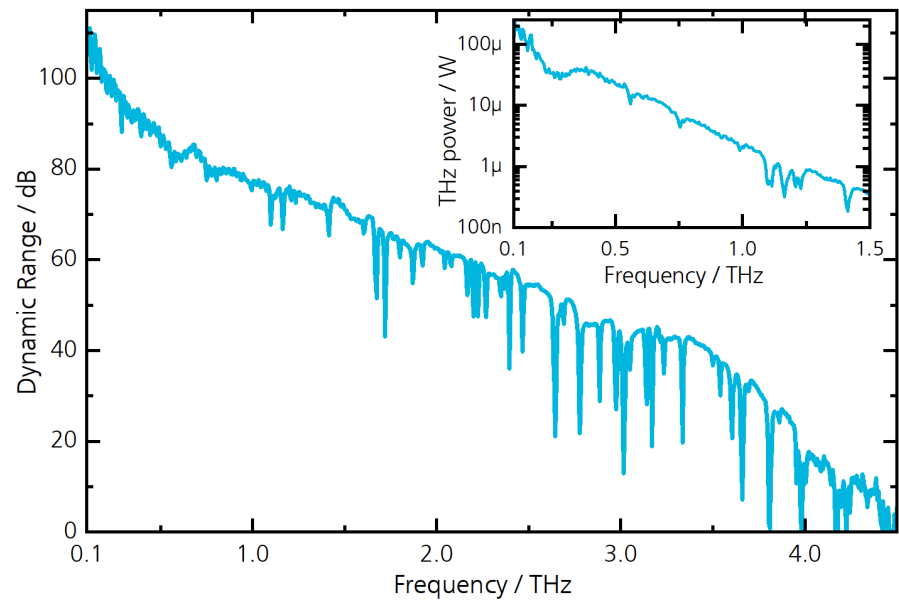
- Up to 200  $\mu\text{W}$  THz power
- Photodiode based emitter
- Photoconductive receiver
- Robust housing and fiber coupling

### Applications

- High-bandwidth terahertz spectroscopy
- Industrial process control
- Non-contact coating film thickness measurement
- High-speed measurements

### Technical background

Photomixers allow the generation of continuous wave (cw) terahertz radiation by converting the optical beat note of two lasers into an electrical THz signal. The frequency resolution of cw THz systems is only limited by the linewidth of the lasers. Preferred applications for continuous wave THz radiation are high resolution spectroscopy and imaging as well as non-contact thickness measurements. HHI's THz modules utilize mature telecom technology and are thus ready for industrial applications.



Performance of HHI's cw THz modules for operation conditions as given in the specifications.  
 The inset shows the emitted THz power of a THz emitter module as measured with a PTB-calibrated THz power detector.

### Specifications

- Optical wavelength 1.5  $\mu\text{m}$
- Optical power 30 mW
- Bias voltage -1.5 V
- Spectral range 0.1 - 4.5 THz
- Dynamic range
  - > 90 dB @ 100 GHz (typ. 100 dB)
  - > 60 dB @ 1 THz (typ. 65 dB)
  - > 40 dB @ 2 THz (typ. 45 dB)
- Diameter of module 25 mm

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*M. Deumer, et al. "Continuous wave terahertz receivers with 4.5 THz bandwidth and 112 dB dynamic range," Opt. Express 29, 41819-41826 (2021)*