

THz Tunable Precision Attenuator



To attenuate THz radiation, we offer a tunable precision attenuator.

The attenuator is a unit made of two identical polarizers. The polarizers are set in rotators that are affixed to the same base plate and allow them to rotate full circle. The polarizer that is encountered by the beam first is called an input polarizer (or simply polarizer), the second one is called an analyzer.

The advantage of the tunable precision attenuator is the ability to smoothly change and accurately adjust the required attenuation up to 30-40 dB. The design provides to tilt the polarizer planes out of parallel to suppress retroreflection and interference.

THz tunable precision attenuator is supplied with a calibration curve to determine the extinction at a given rotation angle of the analyzer relative to the input polarizer.

Depending on the operational wavelength range, following attenuator types are manufactured:

- a – for wavelengths of 600 μm and above – a microwave attenuator,
- b – 150 μm and above – a THz attenuator,
- c – 15 μm and above – an IR-THz attenuator.

Typical calibration curves of the attenuators are depicted in fig. 1 and 2. In addition, the kit includes a program for calculating attenuation.

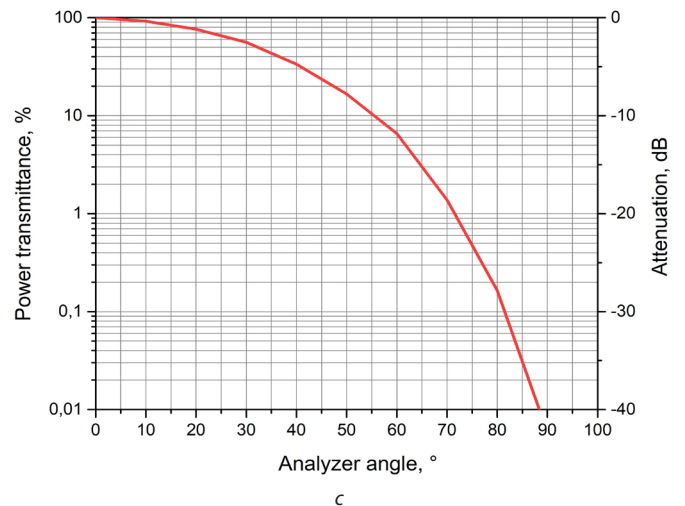
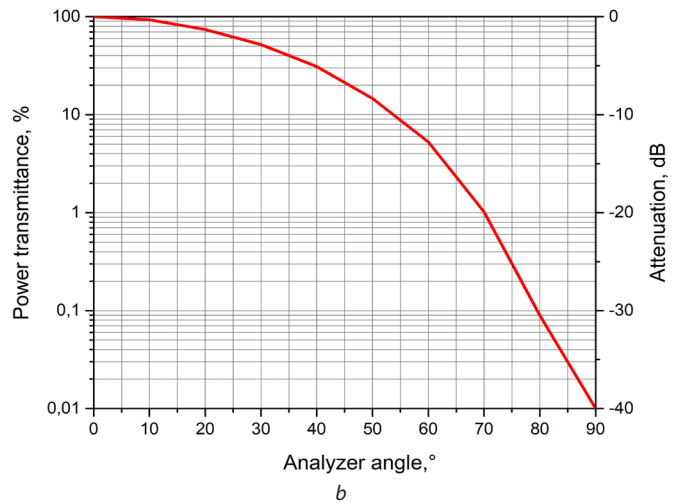
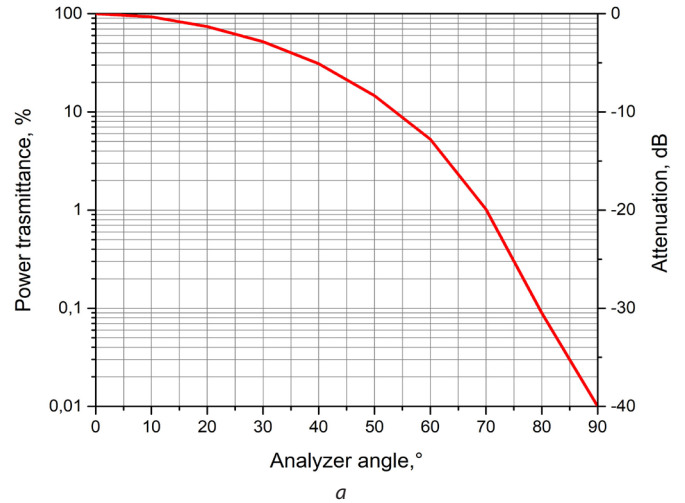


Fig. 1. Attenuator transmittance vs angle of rotation of the analyzer relative to the polarizer, measured using a continuous 140 GHz source (a – microwave, b – THz, c – IR-THz).

THz Tunable Precision Attenuator

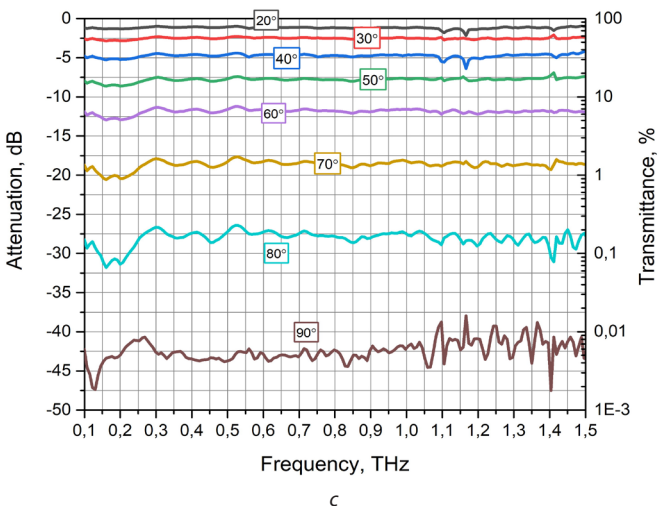
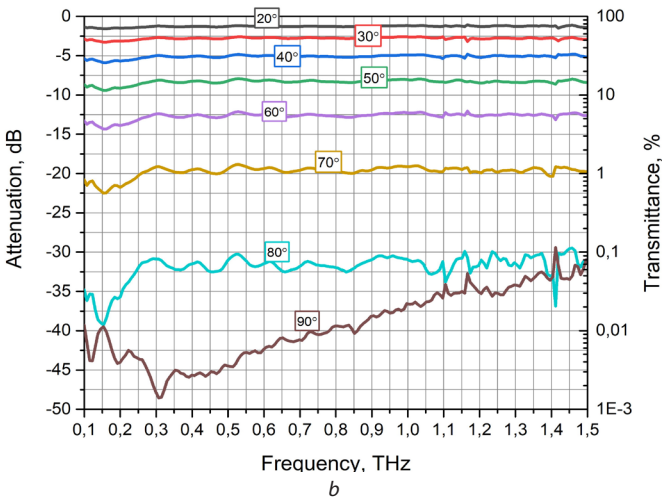
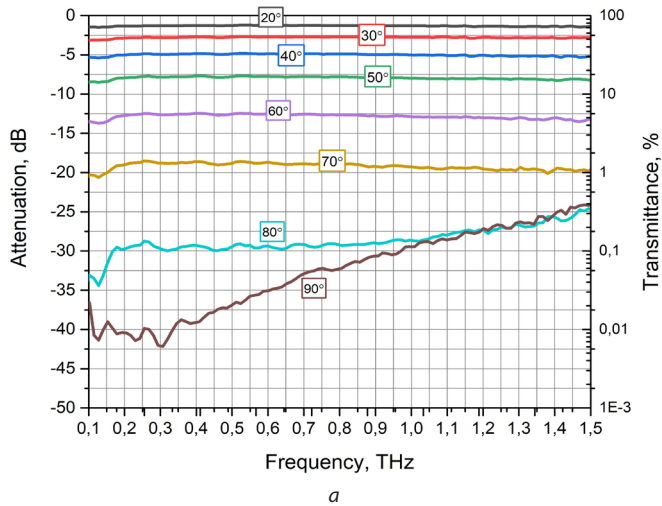


Fig. 2. Typical calibration curve of the attenuator depending on analyzer rotation angle. Measured with a Menlo Systems K-8 pulsed terahertz spectrometer. (a – microwave, b – THz, c – IR-THz).

General Specification:

Specifications	Microwave range	THz range	IR-THz range
Material	Wire grid polarizer		Film polarizer
Wire diameter / Structure period, μm	20 / 40	11 / 16	- / 0.8
Inner diameter, mm	36, 60, 85, 110		25, 30, 38, 45, 51, 77, 102
Outer diameter, mm	50, 76.2, 101.6, 127		40, 50, 60, 70, 76, 101, 124
Operating range, μm	> 600	> 150	> 15
Transmittance for parallel planes of polarization *	> 90 %	> 70 %	> 80 %
Damage threshold in pulse mode **, kW/cm^2	> 20	> 20	determined by the polypropylene film properties

* for a plane-polarized incident wave;

** spot diameter 0.5 mm, wavelength 130 μm , power density 36 MW/cm^2 in 100 ps pulses, pulse repetition rate 5.6 MHz No visual damage at the above conditions. Measurements performed by Budaker Institute of Nuclear Physics (BINP).

THz tunable precision attenuators are manufactured upon request.

To get a quote, please email us or fill the request form on our website.