

ADVANTEST[®]

Terahertz Spectroscopy Systems

TAS7400 Series

Low-Cost Spectroscopic Analysis Systems For Diverse Applications



ADVANTEST

TAS7400 Series

Terahertz Spectroscopic Analysis at the Push of a Button. Low-Cost, General-Purpose Terahertz Spectroscopic Systems from Advantest

The TAS7400 Series of low-cost, general-purpose spectroscopy systems offers terahertz spectroscopic measurement for diverse applications. These systems can be easily operated by general users without specialized environmental controls. The TAS7400 Series enables non-destructive spectroscopic analysis of samples for users in a range of fields: chemical and industrial materials, and also the life sciences, electronics, and others. It is an ideal tool for industrial applications and basic research.



Key Features

- Superior spectroscopic performance at a low price
- Compact desktop form factor
- Supports terahertz spectroscopy in the 0.03 ~ 7THz band
- Multiple spectroscopic analysis modes: transmission, reflectance, ATR (Attenuated Total Reflection), and transmission polarization
- External dry air unit eliminates water vapor absorption interference
- Sample holders and cells for liquids, powders, and other types of samples included

TAS7400 System Configurations

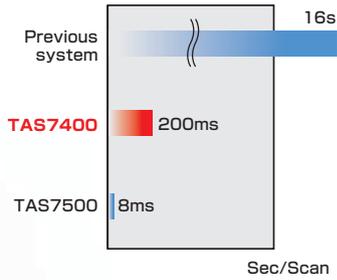
Application	Sub-terahertz material R&D	General spectroscopic analysis	Spectroscopic analysis at frequencies up to 7THz
Partial List of Supported Materials*	Dielectric materials, biological materials, paint, plastics, wall materials	Polymers, polymorphic crystals, biological materials, controlled substance, metamaterials, foods, construction materials, farm produce	Liquid solutions, oxide materials, biological materials, graphene, resins
Measurement Modes Supported	Transmission, reflectance	Transmission, reflectance, ATR, transmission polarization analysis	Transmission, reflectance, ATR
Frequency Range	0.03 ~ 2 THz	0.1 ~ 4 THz	0.5 ~ 7 THz
System	TAS7400SL Low-Frequency Configuration	TAS7400SP Standard Configuration	TAS7400SU Broadband Configuration

* This is a partial list of supported materials given for illustrative purposes. Some materials listed may also be analyzed at frequencies other than those given.

Superior Performance

High Throughput

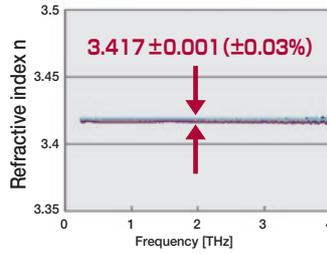
Advantest's patented sampling technique—an electronically controlled sweep method—delivers higher throughput than previous systems.



Excellent Reproducibility

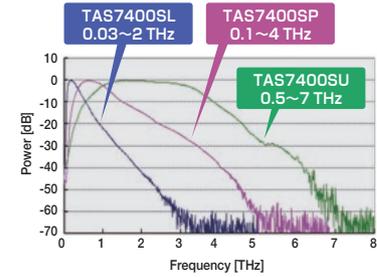
A proprietary low-jitter fiber laser and independently developed analog signal analysis technology enable measurement reproducibility with accuracy of $< \pm 0.03\%$ (typ).

Refractive index phase reproducibility



Broad Frequency Coverage

Three separate system configurations with different bandwidth coverage serve a broad array of applications.



Four Measurement Accessories Support Diverse Spectroscopy Needs

Transmission Accessory

For low-absorbance samples



Can be used with: **SL SP SU**

Reflectance Accessory

For dense or multi-layered samples



Can be used with: **SL SP SU**

ATR Accessory

For high-absorbance samples



Can be used with: **SP SU**

Transmission Polarization Analysis Accessory

For analysis of polarization characteristics



Can be used with: **SP**

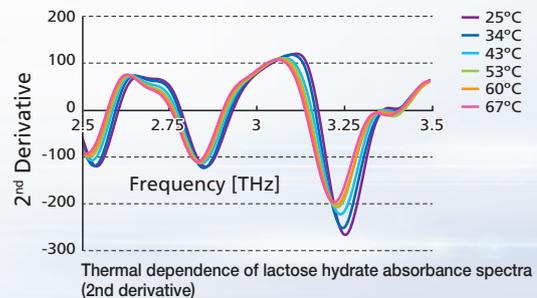
Thermal Control Accessory (Option for Transmission Accessory)

- By adding this accessory to the transmission accessory, the thermal dependence of a specimen's absorbance spectra can easily be measured.
- This accessory is available in two temperature-control ranges for differing measurement needs: $-10 \sim +80^{\circ}\text{C}$ (TAS1020) and room temperature $\sim +300^{\circ}\text{C}$ (TAS1030)
- Dry air purge function prevents condensation at low temperatures.
- Superior time-response feature enables highly responsive thermal load measurement.



Example of usage

Users can monitor the changes caused by heating in peak frequency and phase changes in crystalline structure. (TAS1020 used in this example)



Key Specifications

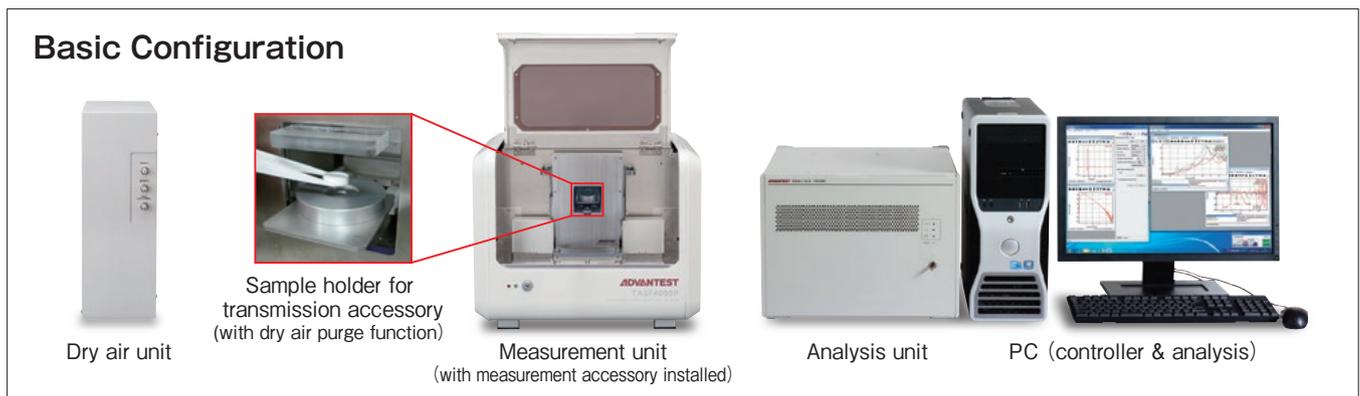
		Terahertz Spectroscopic System		
		TAS7400SL (low-frequency system)	TAS7400SP (standard system)	TAS7400SU (broadband system)
Primary measurement applications		Spectroscopic analysis (transmission, reflectance)*1	Spectroscopic analysis (transmission, reflectance, ATR, transmission polarization analysis)*1	Spectroscopic analysis (transmission, reflectance, ATR)*1
Analytical object		Dielectric / chemical materials, others	Chemical / industrial / biological materials, pharmaceuticals, others	
Specimen dimensions	Transmission / reflectance modes	φ20 mm ~ 30 mm, < 10 mm thick	φ5 mm ~ 30 mm, < 10 mm thick	
	ATR mode	—	< φ5 mm (powders, liquids), φ5 mm ~20 mm, < 10 mm thick (solids)	
	Transmission / polarization analysis mode	—	φ5 mm ~ 30 mm, < 10 mm thick	
Performance	Frequency range*2	0.03 ~ 2 THz	0.1 ~ 4 THz	0.5 ~ 7THz (transmission / reflectance modes) 0.5 ~ 6.5THz (ATR mode)
	Frequency accuracy*2	< ±10GHz at 0.56THz	< ±10GHz at 1.4THz	< ±10GHz at 1.4THz
	Frequency resolution	1.9GHz / 7.6GHz	1.9GHz / 7.6GHz	1.9GHz / 7.6GHz
	Dynamic range*2-5 (at peak frequency)	> 50dB	> 60dB	> 57dB (transmission / reflectance modes) > 55dB (ATR mode)
Throughput		200msec / scan		
Measurement accessories		Transmission mode / transmission polarization analysis mode (SP only): solid sample holder, liquid / powder cells*3, dry air purge kit*3, revolving holder*3 Reflectance mode: reflectance mirror, revolving holder*3 ATR mode (SP/SU only): powder holder		
Display		Spectral display (transmittance, reflectance, ATR*, phase difference, absorbance, absorption coefficient, complex refractive index, complex permittivity *ATR supports only SP/SU Time response display (electric field strength)		
Software*3		Transmission polarization analysis application, automatic control, FDA21CFR Part11 support, offline analysis		
Dry air purge		External dry air unit (external air supply necessary)		
External accessory*4		Thermal control accessory (2 models available: -10 ~ +80°C and room temperature ~ +300°C)		
Controller		Standard OS: Windows7 Pro. 64bit		
Data file formats		Binary format, JCAMP-DX, SPC, CSV		
General specifications		Operating temperature range: +10°C ~ +30°C, relative humidity: <80% (with no condensation) Storage temperature range: -10°C ~ +50°C, relative humidity: <80% (with no condensation) Analysis unit power source: AC100V(100-120) / 200V(220-240)±10%, 50/60Hz, 180VA Measurement unit power source: AC100V(100-120) / 200V(220-240)±10%, 50/60Hz, 150VA (excluding PC) Analysis unit dimensions: 430(W) × 540(D) × 330(H) mm, weight: <30kg Measurement unit dimensions: 500(W) × 490(D) × 410(H) mm, weight: <40kg		

*1:When purchasing a terahertz spectroscopic system, users must select at least one measurement accessory. *2: At temperatures of 23°C±5°C *3: Option *4: Option for transmission accessory only

*5:The peak level frequency varies in each system, and the dynamic range on each frequency varies in each system. Frequency resolution: 7.6 GHz. Number of integration: 16384

Thermal Control Accessory Specification

	TAS1020	TAS1030	Notes
Temperature range	-10.0~+80.0°C	Room temperature ~ +300°C	—
Resolution	0.1°C	1.0°C	—
Control interface	USB		Can be controlled independently of system
Accessories supported	Transmission accessory		—



ADVANTEST®

<https://www.advantest.com/>

ADVANTEST CORPORATION

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