Why the TAS7500 Series Delivers Superior Performance

Best-in-Class Throughout
Advantest’s proprietary sampling technology—sensitively controlled sweep method—delivers higher throughput than any previous system.

Highly Stable Terahertz Wave Measurement
Advantest’s independently developed optical fiber laser technology enables spectral power stability to within ±1%.

Specialized Systems for Specific Bandwidth Needs
- TAS7500SL
- TAS7500SP
- TAS7500SU

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- TAS7500SL
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Key Specifications

<table>
<thead>
<tr>
<th>TAS7500SL</th>
<th>TAS7500SP</th>
<th>TAS7500SU</th>
</tr>
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<tbody>
<tr>
<td>Resolution</td>
<td>0.03 to 2 THz</td>
<td>0.1 to 4 THz</td>
</tr>
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<td>Frequency resolution</td>
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</tr>
<tr>
<td>Throughput (32 x 32 points, integrate 32 times)</td>
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</tr>
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<td>Temperature range</td>
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</tr>
<tr>
<td>Relative humidity</td>
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</tr>
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Thermal Control Accessory Specification

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Chemicals, Communication Materials, etc.
The TAS7500 series of high-speed, multifunctional analysis systems that perform spectroscopy and imaging by utilizing terahertz (THz) waves. Featuring easy operation and high-speed analysis, the systems analyze non-destructive analysis of chemical samples, industrial products, materials for advanced communications and other substances, without complicated operation, as required by older terahertz analysis equipment. Utilizing Advantest's high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment. Utilizing Advantest's high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, but also for use in R&D projects thus extending the practical use of terahertz technology.

The systems in the TAS7500 series cover a diverse range of applications. The TAS7500 series of high-speed, multifunctional analysis systems that perform spectroscopy and imaging by utilizing terahertz (THz) waves. Featuring easy operation and high-speed analysis, the systems analyze non-destructive analysis of chemical samples, industrial products, materials for advanced communications and other substances, without complicated operation, as required by older terahertz analysis equipment. Utilizing Advantest's high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, but also for use in R&D projects thus extending the practical use of terahertz technology.

The systems in the TAS7500 series cover a diverse range of applications.

TAS7500 Series

- **Compact, High-Speed Terahertz Spectroscopic/ Imaging Analysis Systems**

- **TAS7500IM**
  - 2D/3D imaging of layer thickness distributions and cross-sections, etc.
  - Analysis of thickness/density of layers
  - Non-destructive analysis of sample internal interfaces
  - Autosampler enables measurement of up to 10 samples
  - Terahertz time-of-flight tomography
  - Reflectance of THz pulses from samples allows non-destructive analysis of layer thicknesses and density via detection of delay times and amplitudes.

- **TAS7500SU**
  - Supports spectroscopic analysis at frequencies up to 7 THz, greatly improving high-frequency performance
  - Industry-best scan time of 8 milliseconds
  - Excellent spectral flatness enables highly reliable terahertz spectroscopy

- **TAS7500SP**
  - Four easily interchangeable measurement accessories facilitate spectroscopic analysis of a wide range of materials.
  - Spectroscopic analysis methodology related to liquids, powders, and solids
  - Industry-best scan time of 6 milliseconds

- **TAS7500SL**
  - Specialized for the sub-terahertz band, optimized for R&D in the area of materials for advanced communications and other substances, without complicated operation, as required by older terahertz analysis equipment. Utilizing Advantest's high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, but also for use in R&D projects thus extending the practical use of terahertz technology.
  - Supports spectroscopic analysis at frequencies up to 7 THz, greatly improving high-frequency performance
  - Industry-best scan time of 8 milliseconds
  - Excellent spectral flatness enables highly reliable terahertz spectroscopy

- **TAS7500NL**
  - Two easily interchangeable accessories (transmission and reflectance) enable diverse spectroscopic analysis applications
  - 0.03 – 2 THz bandwidth coverage is optimal for millimeter/sub-millimeter spectroscopic analysis
  - Excellent spectral flatness means highly reliable terahertz spectroscopy

- **TAS7500**
  - 2D/3D imaging of layer thickness distributions and cross-sections, etc.
  - Analysis of thickness/density of layers
  - Non-destructive analysis of sample internal interfaces
  - Autosampler enables measurement of up to 10 samples
  - Terahertz time-of-flight tomography
  - Reflectance of THz pulses from samples allows non-destructive analysis of layer thicknesses and density via detection of delay times and amplitudes.

### Key Features

- High-speed measurement functionality
- Compact, desktop form-factor
- One-touch terahertz spectroscopic analysis
- Multiple spectroscopic analysis modes (transmission, reflectance, ATR (Attenuated Total Reflection), and polarimeter)
- Imaging and analysis of internal sample structures, thickness, and density
- External dry air purge unit eliminates atmospheric moisture interference

### Example of image

Three user-friendly features included in the transmitter control unit: 1) Display of frequency and phase changes in real-time; 2) Display of the sample's thermal properties; 3) Measurement of sample temperature.
Why the TAS7500 Series Delivers Superior Performance

- Advantest’s proprietary sampling technology delivers higher throughput than any previous system.
- TAS7500SP Spectroscopic Analysis
- TAS7500SL and TAS7500SU—expand the bandwidth coverage of the TAS7500 series to serve a broad array of applications.

Terahertz Spectroscopic System

- Data file format: Binary format, JCAMP-DX, SPC, CSV
- Controller: Standard (OS: Windows7 Pro. 64 bits)
- Spatial resolution: <15 min (32 x 32 points, integrate 32 times) 8ms / scan
- Frequency range (*4): 0.1 to 4 THz
- Frequency resolution: 30.4GHz
- Polarization extinction ratio: 60 dB or higher
- Spectral power stability: to within ±0.2%
- Time response display: (electric field, permittivity)
- Spectral display: (transmittance, reflectance, ATR, phase difference, absorbance, absorption coefficient)

Key Specifications

<table>
<thead>
<tr>
<th>TAS7500IM</th>
<th>TAS7500SU</th>
<th>TAS7500SL</th>
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<tbody>
<tr>
<td>Thermal Control Accessory</td>
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Non-Destructive Analysis of Pharmaceuticals, Chemicals, Communication Materials, etc.
Compact, High-Speed Terahertz Spectroscopic/ Imaging Analysis Systems

The TAS7500 series of high-speed, multifunctional analysis systems that perform spectroscopy and imaging by utilizing terahertz (THz) waves. Featuring easy operation and high-speed analysis, the systems enable non-destructive analysis of chemical samples, industrial products, materials for advanced communications and other substances, without complicated operation, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, but also for use in R&D projects thus extending the practical use of terahertz technology.

Terahertz Spectroscopic System

- Four easily interchangeable measurement accessories facilitate spectroscopic analysis of a wide range of materials.
- Spectroscopic analysis methodology tailored to liquids, powders, and solids.
- Industry-best scan time of 6 milliseconds.

Wide-Band Terahertz Analysis System

- Adapts Advantest’s newly developed Cherenkov terahertz source enables broadband terahertz spectroscopy at frequencies up to 7 THz.
- Supports spectroscopic analysis at frequencies up to 7 THz, greatly improving high-frequency performance.
- Industry-best scan time of 6 milliseconds.
- Excellent spectral flatness means highly reliable terahertz spectroscopy.

Low-Frequency Terahertz Analysis System

- Specialized for the sub-terahertz band, optimized for R&D in the area of materials for advanced communications, and for spectroscopic analysis at lower bandwidths.
- Supports spectroscopic analysis at frequencies from 0.03 – 2 THz bandwidth coverage is optimal for millimeter/sub-millimeter wave spectroscopy.
- Industry-best scan time of 6 milliseconds.
- Excellent spectral flatness means highly reliable terahertz spectroscopy.

Terahertz Imaging System

- 3D/4D imaging of layer thickness and cross-sections, enabling analysis of sample internal interfaces.
- Non-destructive analysis of sample internal interfaces.
- Autosampler enables measurement of up to 10 samples.

Thermal Control Accessory (Option for Transmission Accessory)

- By adding the accessory to the transmission accessory, the thermal dependence of a specimen’s absorbance spectra can easily be measured.
- The accessory is available in two temperature ranges for differing measurement needs: -10°C to +80°C (TAS1020) and room temperature to +30°C (TAS1030).
- Dry air purge function prevents condensation at low temperatures.
- Superior time-response feature enables highly responsive thermal load measurement.

Sample Analysis Results

- Non-destructive analysis of layer thicknesses and density, via detection of delay times and amplitudes.
- Reflections of THz pulses from samples allows non-destructive analysis of layer thicknesses and density.
The systems in the TAS7500 series cover a diverse range of applications. The TAS7500 series of high-speed, multifunctional analysis systems that perform spectroscopy and imaging by utilizing terahertz (THz) waves. Featuring easy operation and high-speed analysis, the systems enable non-destructive analysis of chemical samples, industrial products, materials for advanced communications and other substances, without complicated operation, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment. Utilizing Advantest’s high-performance sampling detection technology, the TAS7500 series is ideally suited not only for routine analysis, as required by older terahertz analysis equipment.

**TAS7500 Series Basic Configuration**

- **TAS7500SP**
  - Wide-Band Terahertz Analysis System
  - Supports spectroscopic analysis at frequencies up to 7 THz.
  - Industry-best scan time of 8 milliseconds
  - Excellent spectral flatness means highly reliable terahertz spectroscopy

- **TAS7500SU**
  - Low-Frequency Terahertz Analysis System
  - Supports spectroscopic analysis at frequencies up to 1 THz
  - Industry-best scan time of 8 milliseconds
  - Spectroscopic analysis methodology tailored to liquids, powders, and solids
  - Industry-best scan time of 8 milliseconds

- **TAS7500SL**
  - Specialized for the sub-terahertz band
  - Supports spectroscopic analysis at frequencies up to 1 THz
  - Industry-best scan time of 8 milliseconds
  - Spectroscopic analysis methodology tailored to liquids, powders, and solids
  - Industry-best scan time of 8 milliseconds

**TAS7500 Series Key Features**

- **One-touch terahertz spectroscopic analysis**
- **Compact, desktop form factor**
- **High-speed measurement functionality**

**Terahertz Spectroscopic System**

- Four easily interchangeable measurement accessories facilitate spectroscopic analysis of a wide range of materials.
- Spectroscopic analysis methodology tailored to liquids, powders, and solids
- Industry-best scan time of 8 milliseconds

**Wide-Band Terahertz Analysis System**

- Supports spectroscopic analysis at frequencies up to 7 THz, greatly improving high-frequency performance
- Excellent spectral flatness means highly reliable terahertz spectroscopy

**Low-Frequency Terahertz Analysis System**

- Supports spectroscopic analysis at frequencies up to 7 THz, greatly improving high-frequency performance
- Excellent spectral flatness means highly reliable terahertz spectroscopy

**Terahertz Imaging System**

- 2D/3D imaging of layer thickness and density, etc.
- Sample Analysis Results
- Thermal Control Accessory (Option for Transmission Accessory)
  - By adding the accessory to the transmission accessory, the thermal dependence of a specimen’s absorbance spectra can easily be measured.
  - The accessory is evaluated for separate control ranges for different measurement needs: -10 to +80°C for TAS1020 and room temperature to +330°C for TAS1030.
  - Dry air purge function prevents condensation at low temperatures.
  - Superior time-response feature enables highly responsive thermal load measurement.
**Specroscopic Analysis**

**TAS7500 Series**

**Why the TAS7500 Series Delivers Superior Performance**

- **Best-in-Class Throughout**
  - Advantest’s proprietary sampling/trapping/spectroscopic analysis method achieves higher throughput than any previous system.

- **Highly Stable Terahertz Wave Measurement**
  - Superior stability in its 0.1-THz bandwidth due to the adoption of an internally controlled terahertz wave detector.

- **Specialized Systems for Specific Bandwidth Needs**
  - Suitable for specific bandwidth applications (TAS7500IM, TAS7500SU).

**Key Specifications**

<table>
<thead>
<tr>
<th>Frequency Range</th>
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<tbody>
<tr>
<td>0.1-THz</td>
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</tr>
<tr>
<td>0.5-7 THz</td>
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<tr>
<td>0.03-2 THz</td>
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**Advantages**

- **Increased Sensitivity**
  - TAS7500 Series Accessory Lineup

- **Optical Fiber Laser Technology**
  - A high-performance terahertz wave source for highly sensitive measurements.

**Throughput**

- TAS7500 Series can achieve higher throughput than any previous system.

**Sensitivity**

- TAS7500 Series is sensitive to subtle changes, enabling highly accurate measurements.

**Applications**

- TAS7500 Series is applicable to a wide range of measurements, including pharmaceutical products (powder, liquid), transmission polarization analysis modes.

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**Terahertz Spectroscopic System**

- Dielectric materials, pharmaceuticals, electronics, and other reagents and chemical materials.

**Terahertz Imaging System**

- TAS7500IM
  - For imaging and analysis of pharmaceutical products (powder, liquid).

**Thermal Control Accessory Specification**

<table>
<thead>
<tr>
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<tr>
<td>Temperature range: +10 to +30°C, Relative humidity: 80% or less (no condensation)</td>
<td>Temperature range: -10 to +50 °C, Relative humidity: 80% or less (no condensation)</td>
</tr>
<tr>
<td>Dry air unit (external air supply required)</td>
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<td>&lt;15 min (32 x 32 points, integrate 32 times) 8ms / scan</td>
<td>Throughput less than 0.3 mm (2 THz)</td>
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**ADVANTEST Corporation**

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  - E-mail: info_t@advantest.com

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**Terahertz Spectroscopic/Imaging Analysis Systems**

- Non-Destructive Analysis of Pharmaceuticals, Chemicals, Communication Materials, etc.