

TECH OFFER

Spectral Sensing Using Terahertz Radiation Method



KEY INFORMATION

TECHNOLOGY CATEGORY:

Electronics - Radio Frequency

Electronics - Sensors & Instrumentation

TECHNOLOGY READINESS LEVEL (TRL): **TRL5**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174850**

OVERVIEW

Terahertz (THz) radiation is a form of electromagnetic radiation that lies in the frequency spectrum ranging between microwaves and infrared light. In the field of Non-Destructive Testing (NDT), THz radiation is utilised to inspect materials for imperfections or anomalies. THz radiation can penetrate numerous non-metallic materials and can reveal internal structures that are not visible in natural light or x-ray imaging. THz-based NDT finds applications in a variety of applications, including aerospace, electronics, and medical imaging. Each material possesses a unique fingerprint that enables its identification, differentiation, condition, quantification, and quality of materials through spectroscopy.

This technology offer is a spectral sensing technique that utilises accessible terahertz technology. It includes a portable device equipped with industrial-grade sensors and cloud-based data analytics.

The technology owner is keen to engage in R&D collaboration with industrial partners in various industries, including pharmaceuticals, food packaging quality inspection and public safety inspection.

TECHNOLOGY FEATURES & SPECIFICATIONS

The technology offer is a reliable solution for non-disruptive inspection and measurement of materials:

- It boasts high accuracy and multi-layer penetration capabilities.
- The accuracy rate of 95% in laboratory conditions provides users with confidence in the results produced.
- The wide measurement range of 30µm to 100µm and beyond with an accuracy of approximately $\pm 4\mu\text{m}$ makes it suitable for various applications.
- The multi-layer penetration capability of up to four layers of material allows for the inspection of layered materials or detection of defects within multiple layers.
- Designed to increase productivity and efficiency, the technology provides accurate measurements and multi-layer penetration capabilities for faster decision-making and efficient use of resources.
- The technology offer is versatile, suitable for quality control and inspection in the manufacturing, electronics, medical, and aerospace industries.

POTENTIAL APPLICATIONS

This technology offer can be expanded and deployed in various industry such as:

- Package inspection
- Security and screening
- Spectroscopy, medical imaging
- Material science, chemical analysis
- Food quality control

UNIQUE VALUE PROPOSITION

Terahertz (THz) technology offers numerous advantages over other radiation-based technologies. One key benefit is its ability to penetrate non-conductive materials, making it useful for imaging and inspecting plastic, paper, wood, cloth, ceramics, and other materials. THz technology is also safe and non-radioactive, making it a preferred choice for imaging and analysis.

THz technology is non-contact and non-destructive, making it an ideal tool for Non-Destructive Testing (NDT) applications. It can detect defects and flaws within materials without requiring physical contact and provides high-resolution images with sub-millimeter accuracy. THz technology is valuable for composition identification by analyzing the spectral fingerprints of materials, allowing for non-invasive identification and characterization of materials. This feature is useful for security, pharmaceuticals, and food analysis applications.

The technology owner is keen to engage in R&D collaboration with industrial partners in various industries, including pharmaceuticals, food packaging quality inspection and public safety inspection.