



蔚華科技
SPIROX

Spirox Group

Professional Semiconductor Equipment Provider

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Agenda

- | | |
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| 01 | Spirox Overview and Market Trend |
| 02 | Core Technology: SpiroxLTS® and Applications |
| 03 | Patent and Certificate |
| 04 | Financial Review |
| 05 | Q&A |

Agenda

01 Spirox Overview and Market Trend

02 Core Technology: SpiroxLTS® and Applications

03 Patent and Certificate

04 Financial Review

05 Q&A

Overview



Hsinchu, Taiwan | HQ



- Own Products
- Semiconductor Equipment Distribution
- Optical Technology R&D Center
- Power Semiconductor Dynamic Reliability Verification Lab
- Board Repair Service

Subsidiary

Jetek Technology Corp.

- System Integration Services
- Customized Test Solutions

Spirox Technology Shanghai

- Semiconductor Equipment Distribution
- Board Repair Service

Southport Corporation

- Advanced Optics Technologies
- Compound Semiconductor Inspection System
- Confocal Measurement Development Platform

Spirox Group

- Established in 1987
- TWSE: 3055, Listed in 2002
- Capital: 38.5M USD
- Market Cap: 586 M USD (as of 2026/7/13)
- Employees: 130 (as of 2026/07)
- Business Coverage: Semiconductor Test / Package / Inspection Equipment

Spirox Products

- **SP8000G** Non-Destructive TGV Laser Modification Inspection
- **SP8000S** Non-Destructive TSV Inspection System
- **SP8000A** Laser Scanning Confocal Measurement Development Platform
- **MA6503D** Micro Inspection System

Distribution Products



Key Process Flow of Through-Glass Via (TGV) Fabrication

1

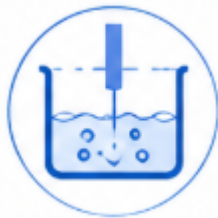
Laser Modification



Ultra-fast laser pulses induce localized structural modification inside the glass, defining the via locations.

2

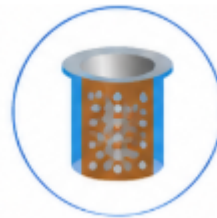
Etching



Selective chemical etching removes the laser-modified regions to form high-aspect-ratio vias.

3

Metallization



Copper electroplating fills the vias or deposits a seed layer to establish vertical electrical interconnections.

4

Build-Up



Integration of ABF build-up layers and redistribution layers (RDL) completes the glass substrate fabrication.

Key Challenges in Glass Core / TGV Manufacturing

Key Process Challenges

Glass is inherently transparent and brittle, making defects prone to occur during **laser modification, etching, metallization, and build-up** processes, including:

- Cracks / Micro-Cracks
- Voids
- Gaps

These defects may lead to reliability failures and reduced manufacturing yield.

Limitations of Conventional Inspection Tools

- **Conventional AOI :**
Relies on reflected light imaging and is affected by light scattering in transparent materials, resulting in limited inspection capability.
- **X-ray Inspection :**
Limited by relatively low throughput and insufficient resolution for inspecting fine internal structures within glass.

Internal defects in glass remain difficult to inspect using conventional technologies.

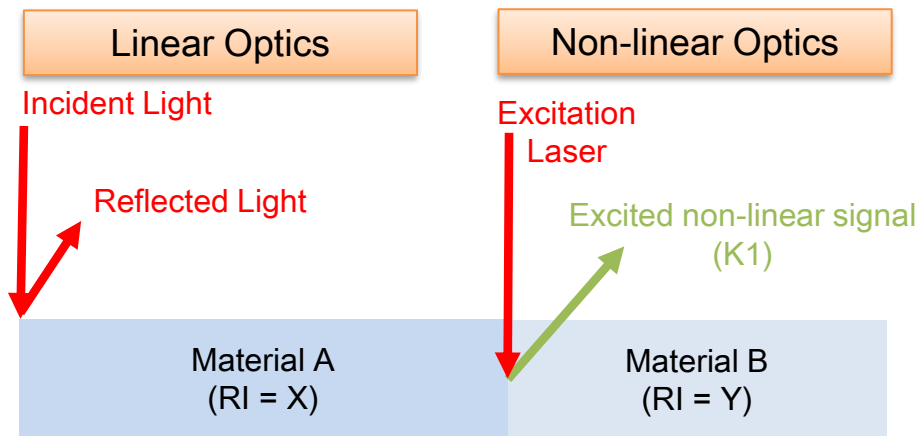
Solution

Spirox Laser Tomography Scan
SPIROX LTS®

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SpiroxLTS uses non-linear optics technology to non-destructively visualize refractive index discontinuities at internal material interfaces.



**Refractive Index Discontinuities
at the interface between Material A and B**



Tomography Scan

TGV Manufacturing Process Optimization: Key Role in Process Parameter Optimization

SP8000G Non-Destructive Laser
Modification Inspection
System

SP8002G Dual-Head
Non-Destructive TGV
Inspection System

SP8004G Qual-Head
Non-Destructive TGV
Inspection System

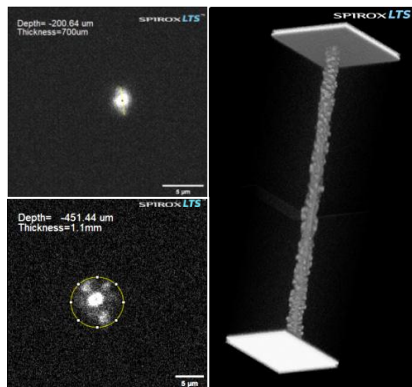


Spirox Laser Tomography Scan

SPIROX LTS

Laser Modification

Modified Beam Profile and Uniformity Inspection



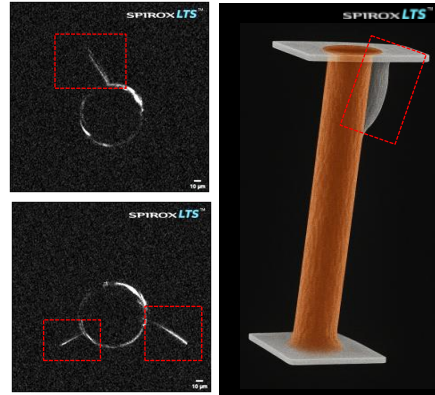
TGV Etching

Morphology and Dimensional Inspection



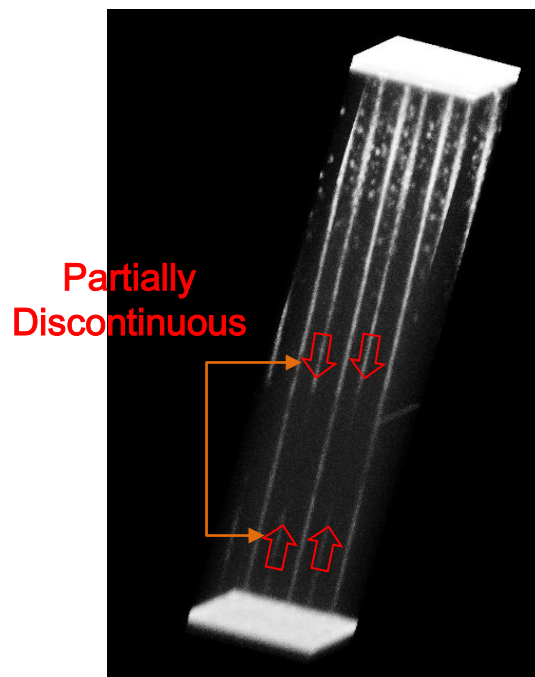
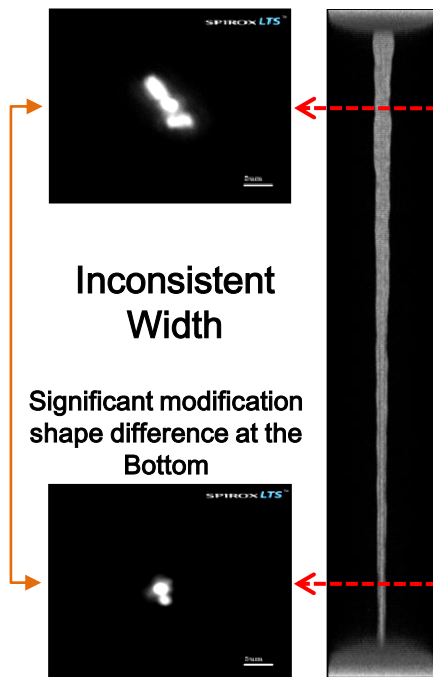
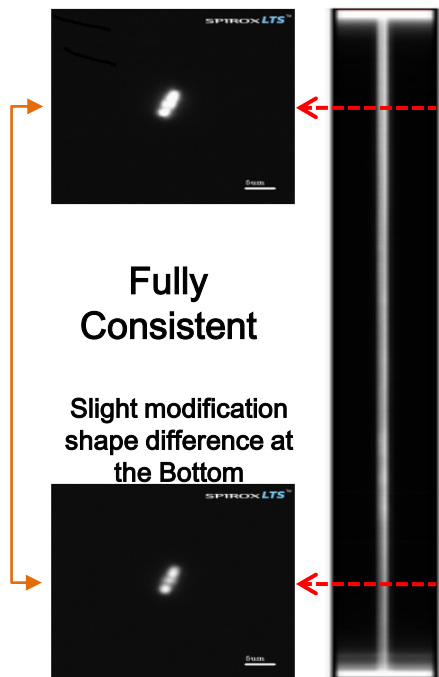
Metallization

Crack Inspection after Metallization and CMP



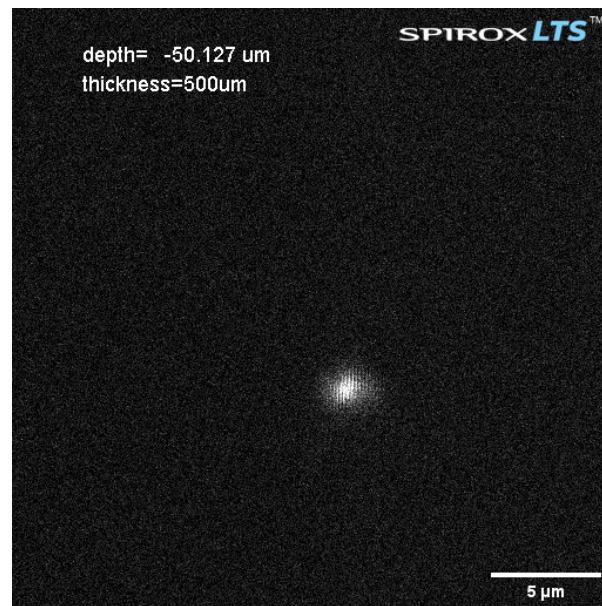
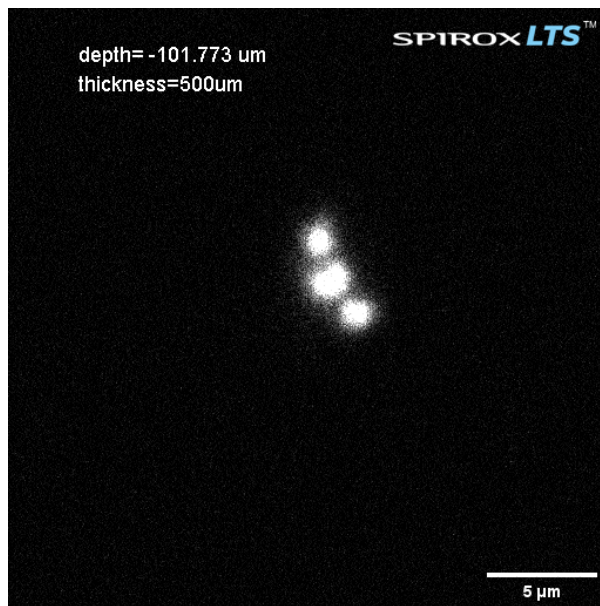
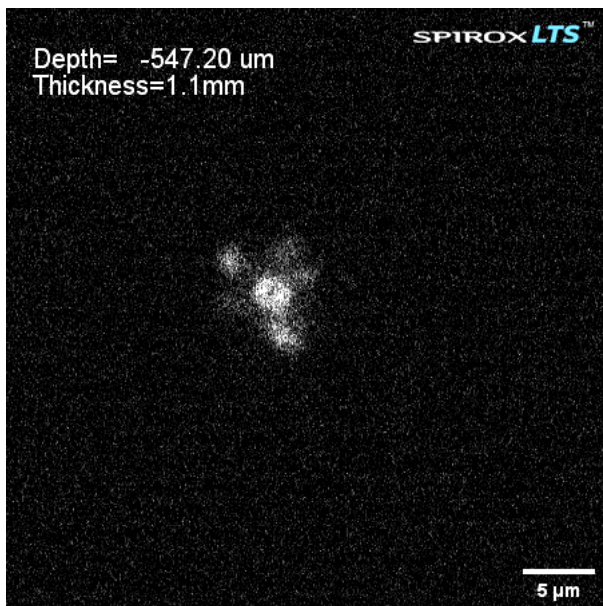
- **Multi-Mode Automatic Inspection with Flexibility**
 - ROI (Region of Interest) Inspection modes
 - Script scanning workflow
 - Coordinate-based inspection mode
 - Random inspection mode
- **Intuitive User Interface**
- **Manual Loading and Unloading**
 - Standard Supported Substrate Size: 310 × 310 mm
 - Maximum Supported Substrate Size: 510 × 515 mm
- **Dynamic Tomogram of Laser Modification (DTLM)**

TGV Applications: 3D Laser Modification Tomography for Uniformity and Continuity Inspection



TGV Application: Dynamic Tomogram of Laser Modification

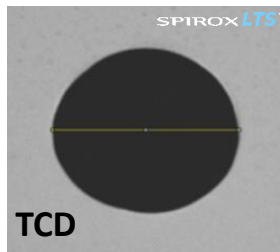
It's able to observe Laser modification variations along the vertical depth changes.



TGV Applications: Post-Etching Via Profile Measurement

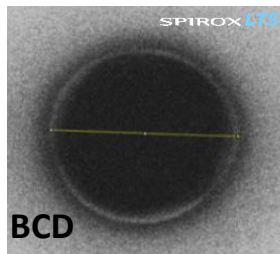


3D Imaging to TGV Profile

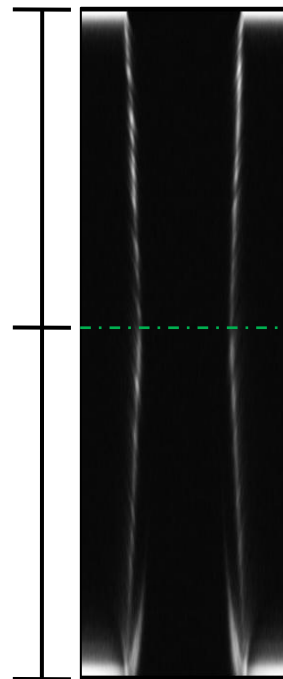


TCD

Vertical Depth of Aperture
Changes and Waist Depth
Positioning



BCD

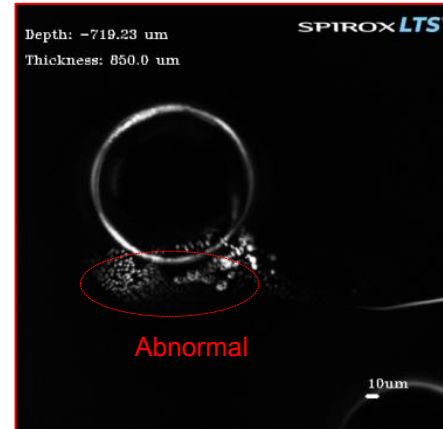
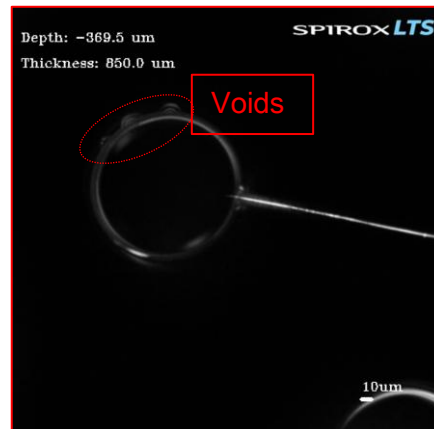
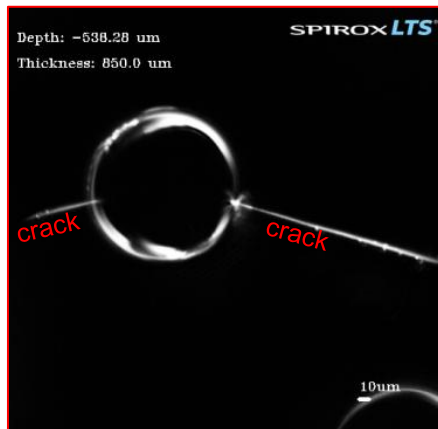
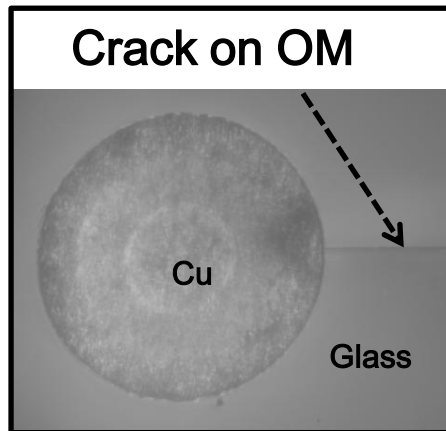


Vertical cross-section imaging
without sample destruction



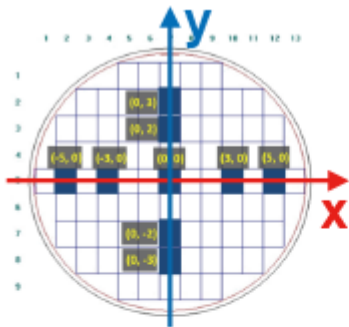
Waist CD

TGV Applications: Crack Inspection after Metallization & CMP



TSV Applications:

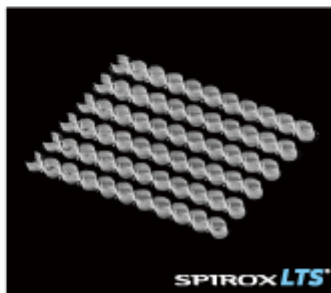
Via Depth Measurement & Bottom Residue Inspection



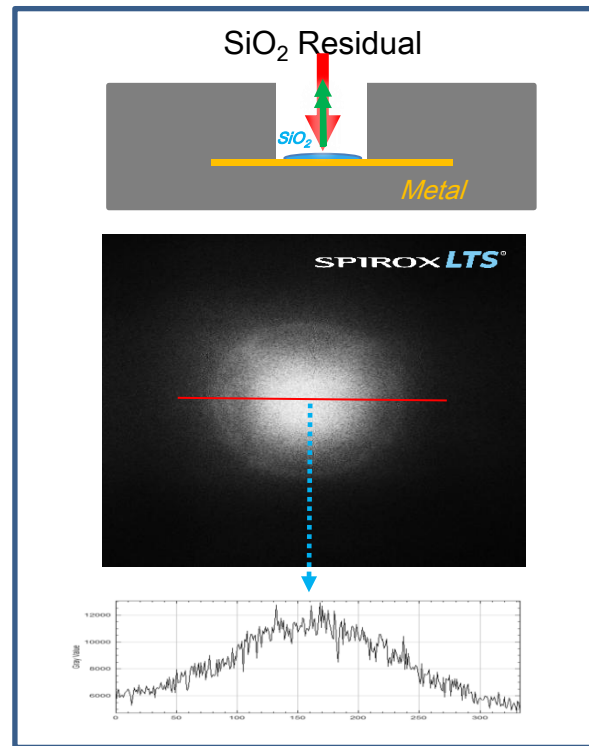
Total Statistics	
Avg.	12.77 μm
StDev.	0.61 μm
CV	4.81%
Max	14.63 μm
Min.	11.25 μm
Max - Min.	3.38 μm



Single-Via 3D Stacking

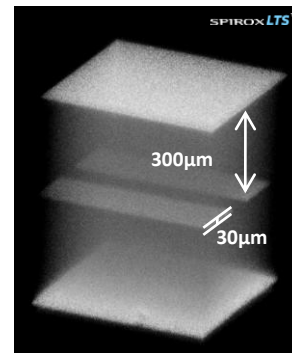
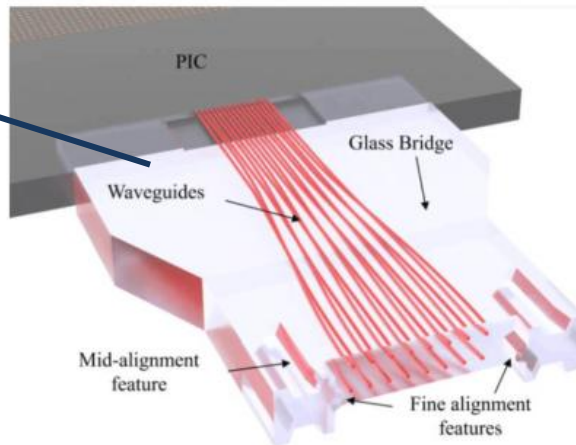
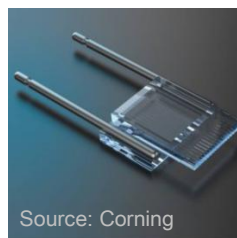
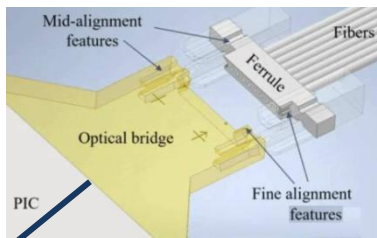
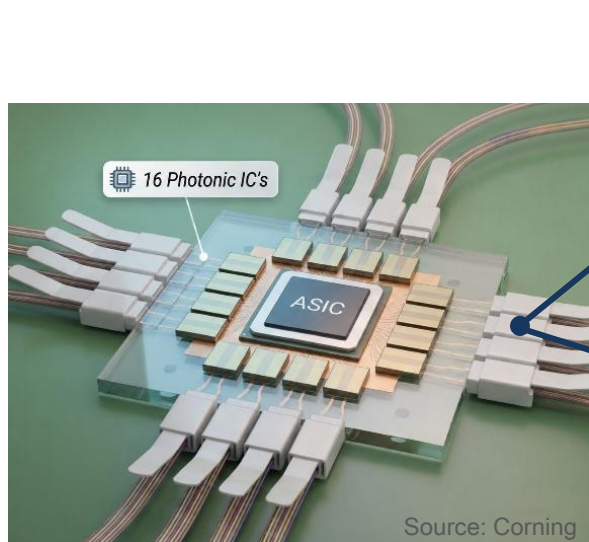


Multi-Via 3D Imaging

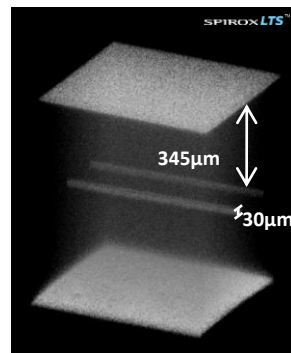


Glass Coupler / Glass Bridge Measurement

Glass-based optical connectors with embedded optical waveguides for chip-to-fiber coupling, enabling Co-Packaged Optics (CPO).



Planar Waveguide



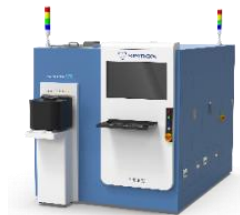
Channel Waveguide

Product

SP8000G



SP8000S



Target Process

TGV

TSV

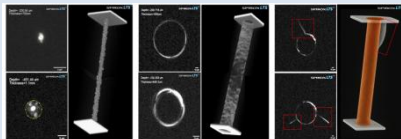
Applications

Glass Core
Glass Coupler/Glass Bridge

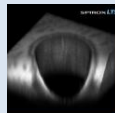
TSV, HBM, Memory

Inspection
Capability

- Laser Modification: Modified Beam Profile and Uniformity Inspection
- TGV Etching: Morphology and Dimensional Inspection
- Crack Inspection after Metallization and CMP



- TSV Profile and Inner Wall Inspection
- Fast Measurement of TSV Full-Wafer Depth Uniformity (AWU)
- Bottom Residue Inspection
- WoW Trimming Measurement



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Patents and Certifications

- Nearly 50 patent applications filed across the U.S., Europe, Japan, Korea, Taiwan, and China
- Registered SpiroxLTS® trademarks in Taiwan, the U.S., and Europe
- SP8000G certified with CE Mark and SEMI S2 certification



13 Patent Families | 6 Countries | 54 Applications

No.	Type	Granted	Pending	Applications Filed
1	Invention	Taiwan, Japan, China		3
2	Invention	Taiwan		1
3 & 4	Invention	Taiwan	Japan, U.S., China	8
5	Invention		Taiwan, Japan, U.S., China	4
6 & 8	Invention	Taiwan (#6)	Taiwan(#8), Japan, Korea, U.S., Germany, China	12
7 & 9	Invention		Taiwan, Japan, Korea, U.S., China	10
10	Invention		Taiwan, Japan, Korea	3
	Utility Model	Taiwan	Japan	2
11	Invention		Taiwan, Japan, Korea, U.S.	4
12	Utility Model		Taiwan, Japan	2
13	Invention		Taiwan, Japan, Korea, U.S.	4
	Utility Model		Taiwan	1

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Consolidated Financial Information Summary (YoY)

(In NT\$ Millions)

	2026 H1	2025 H1
Net Revenue	247	276
Gross Profit	31.77%	20.83%
Net Income (loss)	(7)	(188)
EPS (NT\$)	(0.03)	(1.57)
Debts ratio%	16%	23%
Current ratio%	519%	378%

- The Gross Profit Margin for the first half of 2026 was 31.77%, which was nearly 11 percentage points higher than the same period last year. This was mainly due to the fact that the revenue in April included the SP8000S non-destructive TSV inspection system, which is designed with the proprietary SpiroxLTS® Laser Tomography Scan Technology.
- The net non-operating income for the first half of 2026 was higher than that of the same period last year, mainly due to the gains of NT\$78 million on Financial Assets at Fair Value through Profit or Loss (an increase of NT\$61 million year-on-year), net gains from Foreign Exchange of NT\$11 million (an increase of NT\$58million year-on-year), and the provision for Expected Credit Losses of NT\$44 million in the same period last year.
- In the first half of 2026, the company's Liabilities Ratio was 16% and its Current Ratio was 519%, indicating that the company's financial structure was still relatively sound.

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Thank you.