

IN BUSINESS THERE'S CERTAIN

ABSOLUTELY POSITIVE

I STAKE MY LIFE ON IT

INTRODUCTION TO SGS TAIWAN -- RELIABILITY SERVICES

April 2nd, 2019

Reliability Laboratory

WHEN YOU NEED TO BE SURE



SGS

SGS GROUP

Established in 1878. Registered in Geneva as Société Générale de Surveillance in 1919



N°1
WORLD
LEADER

95 000
EMPLOYEES

2 400
OFFICES AND
LABORATORI
ES

INSPECTION
VERIFICATION
TESTING



11
GLOBAL
INDUSTRIES

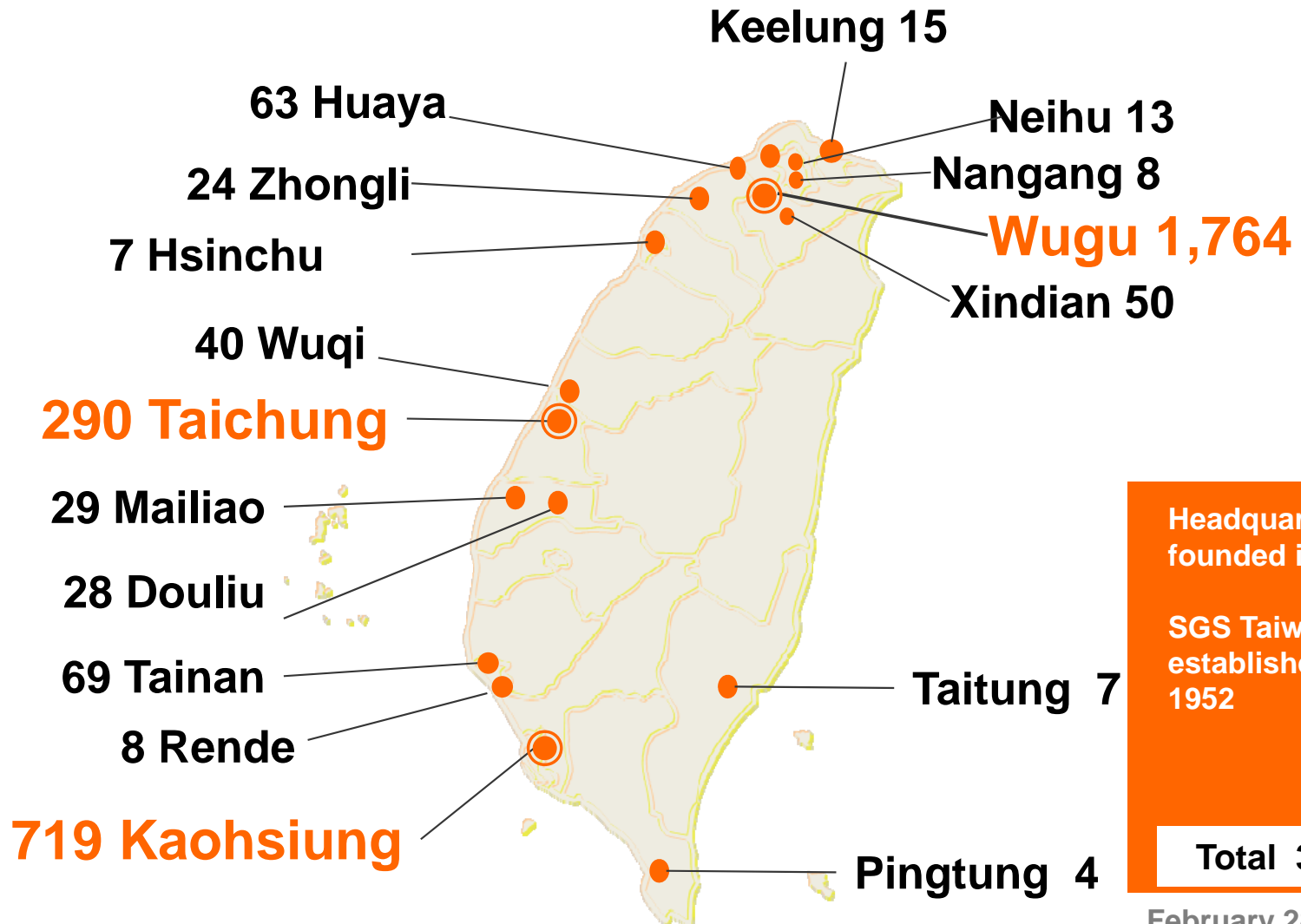
GLOBAL
SERVICE
LOCAL
EXPERTISE

CERTIFICATION
CONSULTANCY
OUTSOURCING
TRAINING

Characteristics

- ◇ Independent
- ◇ Professional
- ◇ Reliable

SGS TAIWAN H/C DISTRIBUTION



Headquarter
founded in 1878

SGS Taiwan
established in
1952

Total 3,138

February 28, 2019

WUKU LOCATIONS (13 BUILDINGS)



青殿
Indigo House

五
工
六
路

黃居
Yellow House



程智科技
10M實驗室



紅樓
Red House



五 權 七 路

橙閣
Orange House



五
工
路

藍堡
Blue House



金棧
Gold House



銀座
Silver House



黑鑽
Black House



白宮
White House



綠屋
Green House



五 權 路

程智科技
總部



紫軒
Violet House



SGS

RELIABILITY LAB IN TAIWAN



SGS

SERVICE SCOPE



■ Reliability Tests & Consulting (**REL**)

- Environmental Simulation Test
- Mechanical/ Electrical Measurement
- MTBF/ RDT/ FMEA/ ALT/ HALT/...
- Component Safety – FI / ENEC mark

■ Battery Tests and Certification (**BATT**)

- Safety/ Reliability/ Performance Tests & Audit

■ Material Analysis & Failure Analysis (**MA**)

- Qualification Tests for PCBA
- AECQ 200 Qualification Test for AUTO components
- Root Cause Analysis

■ Functional Safety & Software Reliability(**FS**)

- Automotive & Industrial Electronics & IC/ IP
- Medical Devices & Household Products

SGS

LABORATORY ACCREDITATION

- TAF ISO 17025 accredited Lab (#1511)
- CATL (CTIA Authorized Testing Lab) for IEEE 1625/1725 (Lab Code 20071205-00)
- CBTL of IECEE for BATT (IEC 62133/ IEC62619)
- BSMI accredited Lab (SL2-A2-T-0138)
- US NRTL SGS US mark for BATT (UL2054/ UL1642/ UL62133)
- Dell Certified Shock and Vibration Lab (#80)
- CATL for CTIA Hardware Reliability Test
- ISTA (International Safe Transit Association) certified lab (ST-2061)
- Nike Approved Packaging Performance Testing Lab



OUR SERVICES



WHEN YOU NEED TO BE SURE





- Environmental Simulation Test
 - Thermal Stress Simulation
 - Outdoor Condition Simulation
 - Mechanical Stress Simulation
 - Chemical/ Biochemical Resistance
- Mechanical Property Measurement
 - Tension/ Compression/ Bending/ Torsion/ Durability
 - Dimension Measurement (E.g. SAG measurement,...)
 - Strain Gauge Measurement (Shock strain, ...)
 - Scratch resistance (touch screen/ cover)
- Electrical Property Measurement
 - Hi-pot/ Insulation Resistance
 - Inductance/ Capacitance/ Resistance Measurement
 - IV Curve
- Functional/ Performance Tests
 - Per customized test specification



■ HALT (Highly Accelerated Life Test)

- Pre-Test Planning
- HALT Execution
 - Cold Thermal Step Stress
 - Hot Thermal Step Stress
 - Fast Thermal Transitions
 - Vibration Step Stress
 - Combined Environment
- Post Testing Service

■ HASS (Highly Accelerated Stress Screen)

■ Reliability Consulting Services

- MTBF
- Reliability Demonstration Tests (RDT)
- Reliability Models and Predictions
- Failure Modes and Effects Analysis (FMEA)
- Accelerated Life Testing (ALT)
- Education for Reliability Engineering

■ Acoustic/ Noise Testing Service

- Sound Power Level Measurement in accordance with ISO3744/ ISO7779
- Sound Pressure Level Measurement in accordance with ISO11201/ ISO7779

Field Failure Rate Estimate from HALT Results

Input Matrix	Date Verify	Key
MTBF (in Hrs) = 200,000	OK	User input
Product Thermal (Hot in °C) = 98	OK	Calculated
Product Thermal (Cold in °C) = -20	OK	Calculated
Product Vibration (in Gms) = 1.5	OK	Selection
Prod Published Spec Level (See below) = 2	OK	Data Validity
Vibration Table Technology = 2	OK	
Number of HALT Samples = 3	OK	
HASS or HASA (yes = 1, no = 0) = 1	OK	
IF HASS or HASA, Daily Sample Size = 200	OK	
IF HASS or HASA, Detectable Shift in AFR (in %) = 6	OK	
Steady State AFR, % (HALT Only) = 1.33		
Steady State Field MTBF, Hrs (HALT Only) = 609,635		
Lower 90% HALT Confidence Limit = 369,200		
Upper 90% HALT Confidence Limit = 1,372,245		
Days to Detect Shift w/ HALT-HASS-HASA (Max) = 12.5		

Published Spec	Level #	Guard Band Limits
0 to +40	1	Consumer -30 to +60
0 to +50	2	Hi-end Consumer -30 to +100
-10 to +50	3	Hi Performance -40 to +110
-20 to +50	4	Critical Application -50 to +110
-25 to +55	5	Shielded -50 to +110
-40 to +65	6	All Outdoor -60 to +110

Vibration Technology	Factor
Rigid Tables	1
Single & LF	2
xLF	3



BATTERY SERVICES

One stop service

To get BSMI + CB + KC in lower cost and shorter time

- Regulatory Testing Service
- ITA Worldwide Services
- Handset/ Laptop Battery System Certification Service
- Client's In-house Specifications testing
- 2nd Party Cell Factory Audit - Quality Improvement Program based on IEEE 1725/ 1625





- Regulatory Testing Service for Lithium Battery
 - CB Certification
(IEC 62133/IEC 62619)
 - BSMI RPC for Portable Electronics & Electric Scooters
(CNS 15364/CNS 15387/CNS 15424)
 - PSE (Japan) for Lithium Batteries
 - SGS US mark
(UL 2054/ UL 1642/UL 62133)
 - UN 38.3



■ ITA Worldwide Services

- **KC (Korea)**
(via **SGS FI CB certificate**)
- **ICT (Vietnam)**
(via **SGS FI CB certificate**)
- **SIRIM (Malaysia) (via SGS FI CB certificate + Factory Audit)**
- **GOST R (Russia)**
(via **SGS FI CB certificate**)
- BIS (India)
- TISI (Thailand)
- CQC (China)
- ANATEL (Brizal) (mobile phone battery only)

BATTERY SERVICES

- Handset/ Laptop Battery System Certification Service
 - CTIA/ IEEE1725 & 1625 of Cell/ Pack/ Adapter/ Host
 - CTIA Cell Factory Audit
- 2nd Party Cell Factory Audit - Quality Improvement Program based on IEEE 1725/ 1625

- Test Service for other battery
 - Primary Battery (IEC60086-1,-2,-3,-4,-5)
 - Lead Acid Battery (IATA, IMDG, SASO)
 - Ni-Cd Battery (IEC 62259)

- Test Service for 3rd party requirement
 - Battery Standalone Reliability Test
 - Charger/Battery Pack Safety Qualification
 - Track Pad Specification Test
 - Cell Qualification Test
 - Government Battery Qualification project

- Equipment Capacity
 - Max Voltage/Current for battery :100V/400A
 - Max DC power load:1000A/10KW
- Special Test ability
 - Nail Test
 - Internal short circuit Test
 - Low resistance short circuit Test (10 mohm min.)
 - Salt water immersion Test

MATERIALS ANALYSIS & FAILURE ANALYSIS SERVICES

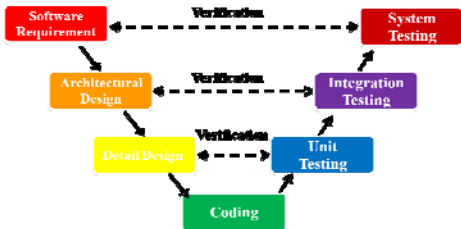


- X-ray Inspection (Solder Joints on PCBAs)
- C-SAM Inspection (Package Device)
- Cross-section Analysis (Solder Joints on PCBAs, PCB)
- Dye & Pry Test (BGA/ CSP Package)
- Solderability Test (Component, PCB)
- Moisture/ Reflow Sensitivity (MSL for SMD Component)
- Solder Heat Resistance (Component)
- Tin Whisker Observation (Component, PCBAs)
- Solder Joint Strength Tests (PCBAs)
- SIR/ Ion Migration Test/ CAF (PCB)
- Physical Properties of PCB, e.g. Tg/ Td/ T260/ T288, CTE, Flammability...(PCB)
- Qualification Tests & Plan for Lead-free/ Halogen-free Products
- **Physical, Chemical, Electrical tests, Metallography, SEM+EDS, Failure analysis**

FUNCTIONAL SAFETY & SOFTWARE RELIABILITY SERVICES

■ Functional Safety

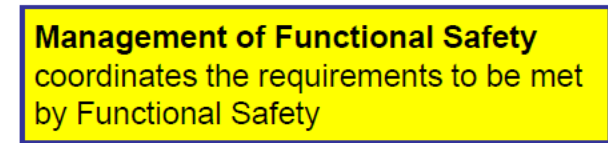
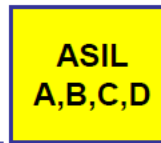
- Functional Safety for Road vehicles
 - ISO 26262 Road vehicles — Functional safety ASIL A to ASIL D
- Functional Safety for Automated Industry
 - IEC 61508 Automated Industry — Functional safety SIL A to SIL D
 - ISO 13849/ IEC62061 Safety-related control systems for machinery
 - IEC61511 Safety instrumented systems for the process industry sector SIL 1 to SIL 3



■ Software Validation

- Software validation for MED (Medical Devices)
 - IEC 60601-1 Clause 14 Programmable Electrical Medical Systems (PEMS)
 - IEC 62304 Medical device software –Software life cycle processes
- Software validation for Household
 - IEC 60335-1 Annex R
 - IEC 60730-1 Annex H
- Software Testing
 - Black Box Testing
 - White Box Testing

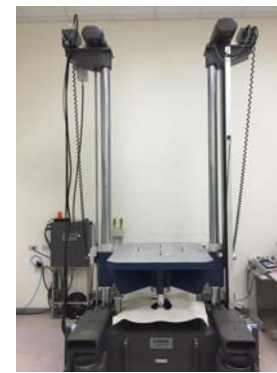
“ON TOP“



- X-ray Inspection System
- C-Mode Scanning Acoustic Microscope
- SEM/EDS
- Stereoscope
- Optical Microscope
- Measuring Optical Microscope
- Solderability Test System
- Solder Joint Tester
- Coordinate Measuring Machine
- Measuring Projector
- LCR Meter
- Milliohmmeter
- High Resistance Meter
- AC/DC Withstand Volt./ IR tester
- DC Electronic Load
- Moment Breaking Tester
- Data Acquisition System
- High Speed SIR System
- Strain Measuring System



- Vibration Tester
- Mechanical Shock Tester
- Drop Tester
- Walk-in Chamber (3m x 2m x 2.4m)
- Temp./ Humidity Chamber
- Temperature Cycling Chamber
- Thermal Shock Chamber
- Solar Chamber
- Flowing Gas Corrosion Test Cabinet
- Salt Spray Chamber
- Altitude Chamber
- HALT Chamber
- Oven / Vacuum Dry Oven
- Pressure Cooker Tester
- Air Reflow Oven
- Dust Tester
- Waterproof Tester (IPX1~IPX9K)
- Semi-anechoic Chamber (B&K)
- Material Testing System
- Mating/Unmating Test System
- Durability Tester
- Automatic Torque Tester
- Impact Test Device
- Multi-function Mechanical Endurance Tester



- Battery Test System (100V, 100A)
- Battery Test System (60V, 60A)
- Battery Test System (25V, 10A)
- Battery Test System (20V, 10A)
- Battery Test System (18V, 4A)
- Battery Test System (5V, 50A)
- Vacuum Glove Box
- DC Electronic Load
- DC Power Supply
- Milliohmmeter
- High Resistance Meter
- External Short Circuit Tester
- Internal Short Circuit Tester
- Anti-explosive Test Area
- AC/DC Withstand Volt./ IR tester
- Data Acquisition System
- Materials Test System
- Altitude Chambers
- Vibration Testers
- Mechanical Shock Testers
- Drop Testers
- Temp./ Humidity Chambers
- Thermal Shock Chambers
- Thermal Cycling Chambers



SGS Reliability Lab provides services for E&E Industries, including IT/ Telecom/ MED/ Auto/ Rugged Devices/ Components.

WHEN YOU NEED TO BE SURE



可靠度實驗室

Reliability Laboratory

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Thank You

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