財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

(Certificate No：L3431-240911)

This is to certify that

Alltestek Co.,LTD

Calibration Laboratory

No.145, Sec.1, Sanmin Rd., Zhongli Dist., Taoyuan City, Taiwan

is accredited in respect of laboratory

Accreditation Criteria	：	ISO/IEC 17025:2017；CNS 17025:2018
Accreditation Number	：	3431
Originally Accredited	：	December 01, 2017
Effective Period	：	December 01, 2023 to November 30, 2026
Accredited Scope	：	Calibration Field, see described in the Appendix

Scan to verify

Yi-Ling Chen

Yi-Ling Chen
President, Taiwan Accreditation Foundation
September 11, 2024

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix

Accreditation Number ：3431
Laboratory Head ：LIAO, Chun-Pin

Electricity

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KF1001 DC Voltage Source DC Voltage Meter	Agilent/3458A FLUKE/5700A	In-house method: DC Voltage Calibration Procedure (Report No.: ECL-SCP-01)	100	mV	100	mV	DC Voltage Source	16	μV/V
			1	V	1	V	DC Voltage Source	10	μV/V
			10	V	10	V	DC Voltage Source	10	μV/V
			100	V	100	V	DC Voltage Source	12	μV/V
			1000	V	1000	V	DC Voltage Source	14	μV/V
			100	mV	100	mV	DC Voltage Meter	18	μV/V
			1	V	1	V	DC Voltage Meter	10	μV/V
			10	V	10	V	DC Voltage Meter	9	μV/V
			100	V	100	V	DC Voltage Meter	11	μV/V
			1000	V	1000	V	DC Voltage Meter	13	μV/V
Approval Signatory: LIN, Shun-Hui; LIANG, Sung-Chun									
KF1002 DC Current Source DC Current Meter	Agilent/3458A FLUKE/5700A	In-house method: DC Current Calibration Procedure (Report No.: ECL-SCP-02)	100	μA	100	μA	DC Current Source	46	μA/A
			1	mA	1	mA	DC Current Source	43	μA/A
			10	mA	10	mA	DC Current Source	43	μA/A
			100	mA	100	mA	DC Current Source	58	μA/A
			1	A	1	A	DC Current Source	0.15	mA/A
			100	μA	100	μA	DC Current Meter	0.16	mA/A
			1	mA	1	mA	DC Current Meter	72	μA/A
			10	mA	10	mA	DC Current Meter	72	μA/A
			100	mA	100	mA	DC Current Meter	83	μA/A
			1	A	1	A	DC Current Meter	0.13	mA/A
Approval Signatory: LIN, Shun-Hui; LIANG, Sung-Chun									

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KF1011 AC Voltage Source AC Voltage Meter	Agilent/3458A FLUKE/5700A	In-house method: AC Voltage Calibration Procedure (Report No.: ECL-SCP-03)	100	mV	100	mV	AC Voltage Source @freq.: 60 Hz	0.18	mV/V
			1	V	1	V	AC Voltage Source @freq.: 60 Hz	0.17	mV/V
			10	V	10	V	AC Voltage Source @freq.: 60 Hz	0.17	mV/V
			100	V	100	V	AC Voltage Source @freq.: 60 Hz	0.29	mV/V
			100	mV	100	mV	AC Voltage Source @freq.: 1 kHz	0.23	mV/V
			1	V	1	V	AC Voltage Source @freq.: 1 kHz	0.23	mV/V
			10	V	10	V	AC Voltage Source @freq.: 1 kHz	0.23	mV/V
			100	V	100	V	AC Voltage Source @freq.: 1 kHz	0.29	mV/V
			100	mV	100	mV	AC Voltage Meter @freq.: 60 Hz	0.22	mV/V
			1	V	1	V	AC Voltage Meter @freq.: 60 Hz	97	μV/V
			10	V	10	V	AC Voltage Meter @freq.: 60 Hz	98	μV/V
			100	V	100	V	AC Voltage Meter @freq.: 60 Hz	0.12	mV/V
			100	mV	100	mV	AC Voltage Meter @freq.: 1 kHz	0.22	mV/V
			1	V	1	V	AC Voltage Meter @freq.: 1 kHz	97	μV/V
			10	V	10	V	AC Voltage Meter @freq.: 1 kHz	98	μV/V
			100	V	100	V	AC Voltage Meter @freq.: 1 kHz	0.12	mV/V
Approval Signatory: LIN, Shun-Hui; LIANG, Sung-Chun									
KF1012 AC Current Source AC Current Meter	Agilent/3458A FLUKE/5700A	In-house method: AC Current Calibration Procedure (Report No.: ECL-SCP-05)	100	μA	100	μA	AC Current Source @freq.: 60 Hz	1.1	mA/A
			1	mA	1	mA	AC Current Source @freq.: 60 Hz	0.94	mA/A
			10	mA	10	mA	AC Current Source @freq.: 60 Hz	0.94	mA/A
			100	mA	100	mA	AC Current Source @freq.: 60 Hz	0.94	mA/A
			1	A	1	A	AC Current Source @freq.: 60 Hz	1.2	mA/A
			100	μA	100	μA	AC Current Source @freq.: 1 kHz	1.1	mA/A
			1	mA	1	mA	AC Current Source @freq.: 1 kHz	0.60	mA/A
			10	mA	10	mA	AC Current Source @freq.: 1 kHz	0.60	mA/A
			100	mA	100	mA	AC Current Source @freq.: 1 kHz	0.60	mA/A
			1	A	1	A	AC Current Source @freq.: 1 kHz	1.4	mA/A
			100	μA	100	μA	AC Current Meter @freq.: 60 Hz	0.37	mA/A
			1	mA	1	mA	AC Current Meter @freq.: 60 Hz	0.22	mA/A

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KF1012 AC Current Source AC Current Meter	Agilent/3458A FLUKE/5700A	In-house method: AC Current Calibration Procedure (Report No.: ECL-SCP-05)	10	mA	10	mA	AC Current Meter @freq.: 60 Hz	0.22	mA/A
			100	mA	100	mA	AC Current Meter @freq.: 60 Hz	0.22	mA/A
			1	A	1	A	AC Current Meter @freq.: 60 Hz	0.80	mA/A
			100	μA	100	μA	AC Current Meter @freq.: 1 kHz	0.37	mA/A
			1	mA	1	mA	AC Current Meter @freq.: 1 kHz	0.22	mA/A
			10	mA	10	mA	AC Current Meter @freq.: 1 kHz	0.22	mA/A
			100	mA	100	mA	AC Current Meter @freq.: 1 kHz	0.22	mA/A
			1	A	1	A	AC Current Meter @freq.: 1 kHz	0.80	mA/A
Approval Signatory: LIN, Shun-Hui; LIANG, Sung-Chun									
KF3001 DC Resistance Source DC Resistance Meter	Agilent/3458A FLUKE/5700A	In-house method: DC Resistance Calibration Procedure (Report No.: ECL-SCP-04)	1	Ω	1	Ω	DC Resistance Source	80	μΩ/Ω
			10	Ω	10	Ω	DC Resistance Source	28	μΩ/Ω
			100	Ω	100	Ω	DC Resistance Source	24	μΩ/Ω
			1	kΩ	1	kΩ	DC Resistance Source	17	μΩ/Ω
			10	kΩ	10	kΩ	DC Resistance Source	16	μΩ/Ω
			100	kΩ	100	kΩ	DC Resistance Source	17	μΩ/Ω
			1	MΩ	1	MΩ	DC Resistance Source	25	μΩ/Ω
			10	MΩ	10	MΩ	DC Resistance Source	75	μΩ/Ω
			1	Ω	1	Ω	DC Resistance Meter	0.12	mΩ/Ω
			10	Ω	10	Ω	DC Resistance Meter	33	μΩ/Ω
			100	Ω	100	Ω	DC Resistance Meter	20	μΩ/Ω
			1	kΩ	1	kΩ	DC Resistance Meter	16	μΩ/Ω
			10	kΩ	10	kΩ	DC Resistance Meter	14	μΩ/Ω
			100	kΩ	100	kΩ	DC Resistance Meter	17	μΩ/Ω
			1	MΩ	1	MΩ	DC Resistance Meter	25	μΩ/Ω
			10	MΩ	10	MΩ	DC Resistance Meter	49	μΩ/Ω
Approval Signatory: LIN, Shun-Hui; LIANG, Sung-Chun									

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KF4008 Spectrum Analyzer (On-site calibration included)	rubidium Freq. standard /Fluke /910R Counter /Agilent/53132A signal Generator /Keysight/E8247C power meter/sensor /Agilent/E4418B /Keysight /N8487A/ E9304A /H18 spectrum analyzer /Agilent E4446A	In-house method: spectrum analyzer calibration procedure (Document No.: SPA-SCP-01)	10	MHz	10	MHz	spectrum base freq. accuracy	1.2×10^{-8}	
			250	kHz	500	kHz	central freq. reading value (bandwidth 1 MHz)	9.4×10^{-9}	
			500	kHz	1	MHz	central freq. reading value (bandwidth 1 MHz)	7.9×10^{-9}	
			1	MHz	10	MHz	central freq. reading value (bandwidth 1 MHz)	6.1×10^{-9}	
			10	MHz	40	GHz	central freq. reading value (bandwidth 1 MHz)	5.3×10^{-9}	
			-30	dBm	10	dBm	voltage level (freq. response @0.25~500 MHz)	0.15	dB
			-30	dBm	10	dBm	voltage level (freq. response @0.5~40 GHz)	0.20	dB
Approval Signatory: HSU, Ming-Lu									

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KF4012 Arbitrary function generator (on-site calibration included)	Digital multimeter /HP/Agilent 3458A Counter/HP /Agilent 53132A Power meter /sensor/Agilent E4418B/E9304A Digital oscilloscope /Tektronix DPO7254C Spectrum analyzer /Agilent E4446A	In-house method: arbitrary function generator calibration procedure (document no.: AFG-SCP-01)	0.02	V	0.2	V	Voltage (amplitude)/1 kHz	0.09	%
			0.2	V	2.5	V	Voltage (amplitude)/1 kHz	0.07	%
			2.5	V	10	V	Voltage (amplitude)/1 kHz	0.08	%
			1	mV	100	mV	Voltage (DC Bias)	0.12	%
			0.1	V	1	V	Voltage (DC Bias)	0.08	%
			1	V	10	V	Voltage (DC Bias)	0.08	%
			1	kHz	240	MHz	Frequency	2.5×10^{-8}	
			-20	dBm	10	dBm	Sine wave flatness/(0.1~240) MHz, Reference 100 kHz	0.19	dB
			10	dBm	18	dBm	Sine wave flatness/(0.1~240) MHz, Reference 100 kHz	0.19	dB
			10	dBm	18	dBm	Sine wave flatness/(100~240) MHz, Reference 100 kHz	0.38	dB
			1	MHz	240	MHz	Spurious signal level	0.90	dB
			1	kHz	20	kHz	Total Harmonic Distortion	0.07	%
			2.5	ns	2.5	ns	Rise Time (SQ10MHz)	0.11	ns
			5	ns	5	ns	Rise Time (SQ10MHz)	0.28	ns
			13	ns	13	ns	Rise Time (SQ10MHz)	0.53	ns
Approval Signatory: HSU, Ming-Lu									

Electromagnetics

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KG1001 Microwave power meter	HP 8478B Keysight 11683	In-house method: PMC-SAP-01	1	mW	1	mW	Power Reference: Frequency 50 MHz	1.2	%
			-25 (3.16)	dBm (μW)	20 (100)	dBm (mW)	Power Range	0.32	%
Approval Signatory: LIANG, Sung-Chun; HSU, Ming-Lu									
KG1001 Microwave power sensor	HP 8478B Keysight N432A Agilent 11667A	In-house method: PSC-SCP-01	0.8		1		Power 1 mW Frequency 10 MHz to 50 MHz	3.4	%
			0.8		1		Power 1 mW Frequency 50 MHz to 2 GHz	3.4	%
			0.8		1		Power 1 mW Frequency > 2 GHz to 12 GHz	3.6	%
			0.8		1		Power 1 mW Frequency > 12 GHz to 13 GHz	3.8	%
			0.8		1		Power 1 mW Frequency > 13 GHz to 14 GHz	4.0	%
			0.8		1		Power 1 mW Frequency > 14 GHz to 16 GHz	3.8	%
			0.8		1		Power 1 mW Frequency > 16 GHz to 17 GHz	3.6	%
			0.8		1		Power 1 mW Frequency > 17 GHz to 18 GHz	4.6	%
Approval Signatory: LIANG, Sung-Chun; HSU, Ming-Lu									

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KG1002 Short circuit, Opener, Terminator, Mismatcher, Attenuator, microwave components	Keysight /85055-60003 Keysight /85055-60004	In-house method: SPC-SCP-01	0.00		<0.10		Reflection coefficient Type N @10 MHz to 500 MHz	0.0064	
			0.10		<0.20		Reflection coefficient Type N @10 MHz to 500 MHz	0.0074	
			0.20		<0.30		Reflection coefficient Type N @10 MHz to 500 MHz	0.0083	
			0.30		<0.40		Reflection coefficient Type N @10 MHz to 500 MHz	0.0093	
			0.40		<0.50		Reflection coefficient Type N @10 MHz to 500 MHz	0.011	
			0.50		<0.60		Reflection coefficient Type N @10 MHz to 500 MHz	0.012	
			0.60		<0.70		Reflection coefficient Type N @10 MHz to 500 MHz	0.014	
			0.70		<0.80		Reflection coefficient Type N @10 MHz to 500 MHz	0.015	
			0.80		<0.90		Reflection coefficient Type N @10 MHz to 500 MHz	0.017	
			0.90		<1.00		Reflection coefficient Type N @10 MHz to 500 MHz	0.019	
			1.00		1.00		Reflection coefficient Type N @10 MHz to 500 MHz	0.020	
			0.00		<0.10		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.0064	
			0.10		<0.20		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.0074	
			0.20		<0.30		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.0083	
			0.30		<0.40		Reflection coefficient Type N @500 M Hz to 2 GHz	0.0093	

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KG1002 Short circuit, Opener, Terminator, Mismatcher, Attenuator, microwave components	Keysight /85055-60003 Keysight /85055-60004	In-house method: SPC-SCP-01	0.40		<0.50		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.011	
			0.50		<0.60		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.012	
			0.60		<0.70		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.014	
			0.70		<0.80		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.015	
			0.80		<0.90		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.017	
			0.90		<1.00		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.019	
			1.00		1.00		Reflection coefficient Type N @>500 M Hz to 2 GHz	0.020	
			0.00		<0.10		Reflection coefficient Type N @>2 GHz to 8 GHz	0.013	
			0.10		<0.20		Reflection coefficient Type N @>2 GHz to 8 GHz	0.014	
			0.20		<0.30		Reflection coefficient Type N @>2 GHz to 8 GHz	0.015	
			0.30		<0.40		Reflection coefficient Type N @>2 GHz to 8 GHz	0.017	
			0.40		<0.50		Reflection coefficient Type N @>2 GHz to 8 GHz	0.019	
			0.50		<0.60		Reflection coefficient Type N @>2 GHz to 8 GHz	0.021	
			0.60		<0.70		Reflection coefficient Type N @>2 GHz to 8 GHz	0.024	
			0.70		<0.80		Reflection coefficient Type N @>2 GHz to 8 GHz	0.028	

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KG1002 Short circuit, Opener, Terminator, Mismatcher, Attenuator, microwave components	Keysight /85055-60003 Keysight /85055-60004	In-house method: SPC-SCP-01	0.80		<0.90		Reflection coefficient Type N @>2 GHz to 8 GHz	0.032	
			0.90		<1.00		Reflection coefficient Type N @>2 GHz to 8 GHz	0.036	
			1.00		1.00		Reflection coefficient Type N @>2 GHz to 8 GHz	0.037	
			0.00		<0.10		Reflection coefficient Type N @>8 GHz to 18 GHz	0.013	
			0.10		<0.20		Reflection coefficient Type N @>8 GHz to 18 GHz	0.015	
			0.20		<0.30		Reflection coefficient Type N @>8 GHz to 18 GHz	0.017	
			0.30		<0.40		Reflection coefficient Type N @>8 GHz to 18 GHz	0.019	
			0.40		<0.50		Reflection coefficient Type N @>8 GHz to 18 GHz	0.023	
			0.50		<0.60		Reflection coefficient Type N @>8 GHz to 18 GHz	0.027	
			0.60		<0.70		Reflection coefficient Type N @>8 GHz to 18 GHz	0.031	
			0.70		<0.80		Reflection coefficient Type N @>8 GHz to 18 GHz	0.037	
			0.80		<0.90		Reflection coefficient Type N @>8 GHz to 18 GHz	0.043	
			0.90		<1.00		Reflection coefficient Type N @>8 GHz to 18 GHz	0.050	
			1.00		1.00		Reflection coefficient Type N @>8 GHz to 18 GHz	0.052	
Approval Signatory: LIANG, Sung-Chun; HSU, Ming-Lu									

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KG1002 Short circuit, Opener, Terminator, Mismatcher, Attenuator, microwave components	Keysight /85055-60003 Keysight /85055-60004	In-house method: SPC-SCP-01	>-10	dB	0	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.063	dB
			>-20	dB	-10	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.071	dB
			>-30	dB	-20	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.086	dB
			>-40	dB	-30	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.10	dB
			>-50	dB	-40	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.12	dB
			>-60	dB	-50	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.14	dB
			-60	dB	-60	dB	Transmission coefficient Type N @10 MHz to 500 MHz	0.19	dB
			>-10	dB	0	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.062	dB
			>-20	dB	-10	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.070	dB
			>-30	dB	-20	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.086	dB
			>-40	dB	-30	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.10	dB
			>-50	dB	-40	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.11	dB
			>-60	dB	-50	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.14	dB
			-60	dB	-60	dB	Transmission coefficient Type N @>500 M Hz to 2 GHz	0.19	dB
			>-10	dB	0	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.13	dB

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KG1002 Short circuit, Opener, Terminator, Mismatcher, Attenuator, microwave components	Keysight /85055-60003 Keysight /85055-60004	In-house method: SPC-SCP-01	>-20	dB	-10	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.13	dB
			>-30	dB	-20	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.14	dB
			>-40	dB	-30	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.15	dB
			>-50	dB	-40	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.16	dB
			>-60	dB	-50	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.19	dB
			-60	dB	-60	dB	Transmission coefficient Type N @>2 GHz to 8 GHz	0.25	dB
			>-10	dB	0	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.23	dB
			>-20	dB	-10	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.23	dB
			>-30	dB	-20	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.24	dB
			>-40	dB	-30	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.26	dB
			>-50	dB	-40	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.27	dB
			>-60	dB	-50	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.29	dB
			-60	dB	-60	dB	Transmission coefficient Type N @>8 GHz to 18 GHz	0.36	dB
Approval Signatory: LIANG, Sung-Chun; HSU, Ming-Lu									

Time And Frequency

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KJ0200 1.Various types of signal generator 2.Various frequency counters	1.Controlled Ferquency Standards /FLUKE 910R 2.Universal Counter /Agilent 53132A	In-house method: Time and frequency calibration procedures (Document No.: TFC-SCP-01)	10	MHz	10	MHz		1.5×10^{-8}	
Approval Signatory: LIN, Shun-Hui; LIANG, Sung-Chun									

Note: Smallest uncertainty represents an expanded uncertainty using a coverage factor approximately 95 % level of confidence.
(Null Below)