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Calibration Division
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E-mail: calibration@nec-cal.com URL: http://www.nec-cal.com

Certificate of Calibration

Customer :

Description of Equipment : Digital Multimeter
Model Number : 3458A
Manufacturer : Hewlett Packard
Serial Number :
Control Number :
Receipt Date :
Calibration Date :
Work Order Number :
Certificate No. :
Page Number : 1 of 12

We certify that the above mentioned measuring instrument was calibrated in accordance with our quality control system as the ISO/IEC 17025 : 2005 and all the standard equipments used for calibration were traceable to the International of System Unit (SI Unit)

Issued Date :
Calibrated by :
Checked by :

Approved by : ☐ Mr. Yanyong Pithong / Laboratory Manager
☐ Mr. Satoshi Fujiwara / Head of Laboratory

Approved Signatory

The uncertainties are for a confidence probability of approximately 95%

Environment Conditions

The calibration was carried out in an ambient of temperature (23 ± 3)°C and relative humidity (55 ± 15)%RH and accomplished in an ambient environment controlled in the laboratory.

Standard Equipment Used

Equip. No.	Equipment Name	Maker & Model	Serial No.	Cert. No.	Due Date
SE-00009	Multi-Function Calibrator	Fluke & 5720A	6960202	EL-0056/08	25-Mar-09
SE-99010	Amplifier	Fluke & 5725A	6485901	EL-0057/08	25-Mar-09
SE-04179	AC Measurement System	Fluke & 5790A+WB	5510033	EL-0003/08	14-Feb-10
SE-01020	Digital Multimeter	Agilent & 3458A-002	2823A27401	EL-0193/08	10-Sep-09
SE-99049	Standard Resistor : 1Ω	Fluke & 742A-1	6330024	EL-0087/08	31-Mar-09
SE-07252	Standard Resistance	IET Labs, Inc. & SRX-10	H1-0646479	108-3030	23-Feb-09
SE-07253	Standard Resistance	IET Labs, Inc. & SRX-100	H1-0646480	108-3031	23-Feb-09
SE-07254	Standard Resistance	IET Labs, Inc. & SRX-1K	H1-0646481	108-3032	26-Feb-09
SE-07257	Standard Resistance	IET Labs, Inc. & SRX-100K	H1-0710500	108-3033	28-Feb-09
SE-07251	Standard Resistance	IET Labs, Inc. & SRX-1M	H1-0705312	108-3034	04-Mar-09
SE-07255	Standard Resistance	IET Labs, Inc. & SRX-10M	H1-0710498	108-3035	03-Mar-09
SE-99025	DC/AC Shunt	Guildline & 7320	63834	EL-0216/06	09-Feb-09
SE-99095	Synthesized Func/Sweep Gen.	HP & 3325B	2847A09782	E3080092	02-May-09

Traceability

This certificate is traceable to the International System of Unit (SI Unit) maintained at;

- National Institute of Metrology (NIMT), Thailand for dc voltage standards (0 to 1100V).
- National Institute of Metrology (NIMT), Thailand for ac voltage standards (0.22mV to 1100V, 10Hz to 10MHz).
- National Institute of Metrology (NIMT), Thailand for dc current standards (0 to 200A).
- National Institute of Metrology (NIMT), Thailand for ac current standards (9μA to 20.5A, 10Hz to 100kHz).
- National Institute of Metrology (NIMT), Thailand for resistance standards (0 to 1TΩ).
- National Institute of Metrology (NIMT), Thailand for time and frequency standards.

Uncertainty of Measurement

The uncertainty of measurement evaluation has been carried out by using the methodology in the "Expression of Uncertainty and Confidence in Measurement" (M3003). These uncertainties are based on a standard uncertainty multiplied by a coverage factor k = 2

Calibration Method

The Agilent/HP 3458A Multimeter (Unit Under Calibration : UUC) has been calibrated in accordance with the in-house method of the laboratory and the calibration procedures described in the Agilent Technologies 3458A Multimeter Calibration Manual P/N 03458-
The identification of the laboratory's calibration procedures employed are E-DCV-M-0004-GT, E-ACV-M-0004-GT, E-DCA-M-0004-GT, E-ACA-M-0001-GT, E-ACA-M-0004-GT and E-DCR-M-0001-GT.

Calibration Results

The following results were the measurement results ***without any adjustment*** and were applied on the calibrated item and found accurate as shown on the date and place of calibration only.

UUC Temperature Check

The 3458A's displayed temperature last adjust (CAL 0) was	38.00 °C
The 3458A's displayed temperature last adjust (CAL 10V) was	38.00 °C
The 3458A's displayed temperature last adjust (CAL 10kΩ) was	38.00 °C

Calibration Results (Cont.)

DC Voltage Performance Tests

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: DCV

Ranges: Manual selection

NPLC 100 (Integration time 100 power line cycles)

NDIG 8 (Resolution 8 digits)

The 3458A's front input terminals were used.

The Guard switch was in "Open" position.

The 3458A's "Guard" and "Lo" terminals were at Earth potential.

The 3458A was allowed to settle for 30 minute after "AUTOCAL" was performed.

DC Voltage Function Offset Test (MATH OFF, Shorting time > 5 min.)

UUC Range	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 mV	(Short) 0 mV	0.00000 mV	0.00040 mV	0.00000 mV	0.00106 mV
1 V	(Short) 0 V	0.00000000 V	0.00040 mV	0.00000 mV	0.00106 mV
10 V	(Short) 0 V	0.0000000 V	0.00040 mV	0.0000 mV	0.0023 mV
100 V	(Short) 0 V	0.000000 V	0.0010 mV	0.000 mV	0.036 mV
1000 V	(Short) 0 V	0.00000 V	0.010 mV	0.00 mV	0.10 mV

DC Voltage Function Gain Test

(Performed "MATH NULL" with the input terminals shorted, prior to starting calibration on each range)

UUC Range	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 mV	100.000097 mV	100.00010 mV	11 $\cdot 10^{-6}$	0.00000 mV	0.00188 mV
100 mV	-99.999708 mV	-99.99971 mV	10 $\cdot 10^{-6}$	0.00000 mV	0.00188 mV
1 V	0.99999979 V	0.99999979 V	5.0 $\cdot 10^{-6}$	0.00000 mV	0.00740 mV
1 V	-0.99999958 V	-0.99999958 V	5.0 $\cdot 10^{-6}$	0.00000 mV	0.00740 mV
10 V	9.9999996 V	9.9999996 V	5.0 $\cdot 10^{-6}$	0.0000 mV	0.0624 mV
10 V	-10.0000089 V	-10.0000089 V	5.1 $\cdot 10^{-6}$	0.0000 mV	0.0624 mV
100 V	99.999888 V	99.999888 V	5.0 $\cdot 10^{-6}$	0.000 mV	0.853 mV
100 V	-99.999989 V	-99.999989 V	5.0 $\cdot 10^{-6}$	0.000 mV	0.853 mV
1000 V	1.00000053 kV	1.00000053 kV	6.1 $\cdot 10^{-6}$	0.00 mV	19.34 mV
1000 V	-1.00000116 kV	-1.00000116 kV	6.1 $\cdot 10^{-6}$	0.00 mV	19.34 mV

Calibration Results (Cont.)

Analog AC Voltage Performance Tests (Mode ANA)

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: ACV

Ranges: Manual selection

SETACV ANA (Analog Mode)

ACBAND 10, 2E6 (10Hz~2MHz)

LFILTER ON (Low-pass filter ON)

NPLC 100 (Integration time 100 power line cycles)

The 3458A's front input terminals were used.

The Guard switch was in "Open" position.

The 3458A's "Guard" and "Lo" terminals were at Earth potential.

The 3458A was performed "AUTOCAL" prior to starting the measurements.

UUC Range	Applied Value	Freq.	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
10 mV	9.998310 mV	1 kHz	9.99831 mV	400 •10^{-6}	0.000000 mV	0.027020 mV
100 mV	100.00218 mV	1 kHz	100.0022 mV	160 •10^{-6}	0.000020 mV	0.030200 mV
1 V	1.0000212 V	1 kHz	1.000021 V	160 •10^{-6}	0.000000 V	0.000302 V
10 V	1.0000212 V	1 kHz	1.00002 V	160 •10^{-6}	-0.000001 V	0.001202 V
10 V	1.0000298 V	50 kHz	1.00003 V	160 •10^{-6}	0.000000 V	0.005502 V
10 V	1.0011024 V	1 MHz	1.00110 V	1598 •10^{-6}	-0.000002 V	0.250057 V
10 V	10.000469 V	10 Hz	10.00047 V	81 •10^{-6}	0.000001 V	0.042022 V
10 V	10.000192 V	20 Hz	10.00019 V	81 •10^{-6}	-0.000002 V	0.042021 V
10 V	10.000145 V	40 Hz	10.00015 V	81 •10^{-6}	0.000005 V	0.017020 V
10 V	10.000121 V	100 Hz	10.00012 V	81 •10^{-6}	-0.000001 V	0.007020 V
10 V	10.000114 V	1 kHz	10.00011 V	81 •10^{-6}	-0.000004 V	0.003020 V
10 V	10.000121 V	20 kHz	10.00012 V	81 •10^{-6}	-0.000001 V	0.003020 V
10 V	10.000123 V	50 kHz	10.00012 V	81 •10^{-6}	-0.000003 V	0.019020 V
10 V	10.000109 V	100 kHz	10.00011 V	81 •10^{-6}	0.000001 V	0.068021 V
10 V	10.000696 V	300 kHz	10.00070 V	610 •10^{-6}	0.000004 V	0.360041 V
10 V	10.001960 V	500 kHz	10.00196 V	710 •10^{-6}	0.000000 V	0.360079 V
10 V	10.006970 V	1 MHz	10.00697 V	2598 •10^{-6}	0.000000 V	0.700369 V
100 V	99.99995 V	1 kHz	100.0000 V	80 •10^{-6}	0.000050 V	0.040200 V
1000 V	600.0046 V	1 kHz	600.005 V	82 •10^{-6}	0.000400 V	0.561203 V

Calibration Results (Cont.)

Synchronously Sub-sampled AC Voltage Performance Tests (Mode SYNC)

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: ACV

Ranges: Manual selection

SETACV SYNC (Synchronously Sub-sampled Mode)

ACBAND 10, 2E6 (10Hz~2MHz)

LFILTER ON (Low-pass filter ON)

NPLC 100 (Integration time 100 power line cycles)

RES .002 (AC reading resolution 6 digits)

The 3458A's front input terminals were used.

The Guard switch was in "Open" position.

The 3458A's "Guard" and "Lo" terminals were at Earth potential.

The 3458A was performed "AUTOCAL" prior to starting the measurements.

UUC Range	Applied Value	Freq.	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
10 mV	9.998810 mV	10 Hz	9.99881 mV	400 •10^{-6}	0.00000 mV	0.00602 mV
10 mV	9.998610 mV	20 Hz	9.99861 mV	400 •10^{-6}	0.00000 mV	0.00602 mV
10 mV	9.998490 mV	40 Hz	9.99849 mV	400 •10^{-6}	0.00000 mV	0.00602 mV
10 mV	9.998400 mV	100 Hz	9.99840 mV	400 •10^{-6}	0.00000 mV	0.00312 mV
10 mV	9.998310 mV	1 kHz	9.99831 mV	400 •10^{-6}	0.00000 mV	0.00312 mV
10 mV	9.999530 mV	10 kHz	9.99953 mV	400 •10^{-6}	0.00000 mV	0.00412 mV
10 mV	9.999760 mV	20 kHz	9.99976 mV	400 •10^{-6}	0.00000 mV	0.00412 mV
10 mV	9.999860 mV	50 kHz	9.99986 mV	400 •10^{-6}	0.00000 mV	0.01112 mV
10 mV	9.996499 mV	100 kHz	9.99650 mV	400 •10^{-6}	0.00000 mV	0.05110 mV
10 mV	9.995949 mV	300 kHz	9.99595 mV	800 •10^{-6}	0.00000 mV	0.40186 mV
10 mV	9.994212 mV	500 kHz	9.99421 mV	800 •10^{-6}	0.00000 mV	n/a
10 mV	9.982696 mV	** 1 MHz	9.98270 mV	2003 •10^{-6}	0.00000 mV	0.12481 mV

*Note: (**) ACBAND 1E6, 10E6 (1MHz~10MHz), LFILTER OFF (Low-pass filter OFF)*

Calibration Results (Cont.)

Synchronously Sub-sampled AC Voltage Performance Tests (Mode SYNC) *Cont.*

UUC Range	Applied Value	Freq.	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 mV	100.00594 mV	10 Hz	100.0059 mV	160 •10^{-6}	0.0000 mV	0.0112 mV
100 mV	100.00302 mV	20 Hz	100.0030 mV	160 •10^{-6}	0.0000 mV	0.0112 mV
100 mV	100.00230 mV	40 Hz	100.0023 mV	160 •10^{-6}	0.0000 mV	0.0112 mV
100 mV	100.00221 mV	100 Hz	100.0022 mV	160 •10^{-6}	0.0000 mV	0.0092 mV
100 mV	100.00218 mV	1 kHz	100.0022 mV	160 •10^{-6}	0.0000 mV	0.0092 mV
100 mV	100.00264 mV	10 kHz	100.0026 mV	160 •10^{-6}	0.0000 mV	0.0162 mV
100 mV	100.00196 mV	20 kHz	100.0020 mV	160 •10^{-6}	0.0000 mV	0.0162 mV
100 mV	99.99988 mV	50 kHz	99.9999 mV	150 •10^{-6}	0.0000 mV	0.0322 mV
100 mV	99.99200 mV	100 kHz	99.9920 mV	150 •10^{-6}	0.0000 mV	0.0822 mV
100 mV	99.96077 mV	300 kHz	99.9608 mV	600 •10^{-6}	0.0000 mV	0.3101 mV
100 mV	99.86944 mV	500 kHz	99.8694 mV	701 •10^{-6}	0.0000 mV	1.0089 mV
100 mV	99.49188 mV	1 MHz	99.4919 mV	2513 •10^{-6}	0.0000 mV	1.0051 mV
1 V	1.0000577 V	10 Hz	1.000058 V	160 •10^{-6}	0.000000 V	0.000112 V
1 V	1.0000281 V	20 Hz	1.000028 V	160 •10^{-6}	0.000000 V	0.000112 V
1 V	1.0000225 V	40 Hz	1.000023 V	160 •10^{-6}	0.000001 V	0.000112 V
1 V	1.0000214 V	100 Hz	1.000021 V	160 •10^{-6}	0.000000 V	0.000092 V
1 V	1.0000212 V	1 kHz	1.000021 V	160 •10^{-6}	0.000000 V	0.000092 V
1 V	1.0000214 V	10 kHz	1.000021 V	160 •10^{-6}	0.000000 V	0.000162 V
1 V	1.0000250 V	20 kHz	1.000025 V	160 •10^{-6}	0.000000 V	0.000162 V
1 V	1.0000298 V	50 kHz	1.000030 V	160 •10^{-6}	0.000000 V	0.000322 V
1 V	1.0000347 V	100 kHz	1.000035 V	260 •10^{-6}	0.000000 V	0.000822 V
1 V	1.0018950 V	300 kHz	1.001895 V	759 •10^{-6}	0.000000 V	0.003108 V
1 V	1.0004184 V	500 kHz	1.000418 V	760 •10^{-6}	0.000000 V	0.010106 V
1 V	1.0011024 V	1 MHz	1.001102 V	1598 •10^{-6}	0.000000 V	0.010113 V
10 V	10.000469 V	10 Hz	10.00047 V	81 •10^{-6}	0.00000 V	0.00112 V
10 V	10.000192 V	20 Hz	10.00019 V	81 •10^{-6}	0.00000 V	0.00112 V
10 V	10.000145 V	40 Hz	10.00015 V	81 •10^{-6}	0.00000 V	0.00112 V
10 V	10.000121 V	100 Hz	10.00012 V	81 •10^{-6}	0.00000 V	0.00092 V
10 V	10.000114 V	1 kHz	10.00011 V	81 •10^{-6}	0.00000 V	0.00092 V
10 V	10.000118 V	10 kHz	10.00012 V	81 •10^{-6}	0.00000 V	0.00162 V
10 V	10.000121 V	20 kHz	10.00012 V	81 •10^{-6}	0.00000 V	0.00162 V
10 V	10.000123 V	50 kHz	10.00012 V	81 •10^{-6}	0.00000 V	0.00322 V
10 V	10.000109 V	100 kHz	10.00011 V	81 •10^{-6}	0.00000 V	0.00822 V
10 V	10.000696 V	300 kHz	10.00070 V	610 •10^{-6}	0.00000 V	0.03102 V
10 V	10.001960 V	500 kHz	10.00196 V	710 •10^{-6}	0.00000 V	0.10104 V
10 V	10.006970 V	1 MHz	10.00697 V	2598 •10^{-6}	0.00000 V	0.10109 V

Calibration Results (Cont.)

Synchronously Sub-sampled AC Voltage Performance Tests (Mode SYNC) *Cont.*

UUC Range	Applied Value	Freq.	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 V	100.00320 V	10 Hz	100.0032 V	81 •10^{-6}	0.0000 V	0.0242 V
100 V	100.00011 V	20 Hz	100.0001 V	81 •10^{-6}	0.0000 V	0.0242 V
100 V	99.99965 V	40 Hz	99.9997 V	80 •10^{-6}	0.0001 V	0.0242 V
100 V	99.99958 V	100 Hz	99.9996 V	80 •10^{-6}	0.0000 V	0.0222 V
100 V	99.99995 V	1 kHz	100.0000 V	80 •10^{-6}	0.0001 V	0.0222 V
100 V	100.00034 V	10 kHz	100.0003 V	81 •10^{-6}	0.0000 V	0.0222 V
100 V	100.00022 V	20 kHz	100.0002 V	81 •10^{-6}	0.0000 V	0.0222 V
100 V	99.99954 V	50 kHz	99.9995 V	150 •10^{-6}	0.0000 V	0.0372 V
100 V	99.99481 V	100 kHz	99.9948 V	250 •10^{-6}	0.0000 V	0.1222 V
1000 V	600.0008 V	40 Hz	600.001 V	82 •10^{-6}	0.000 V	0.281 V
1000 V	599.9993 V	100 Hz	599.999 V	80 •10^{-6}	0.000 V	0.261 V
1000 V	600.0046 V	1 kHz	600.005 V	82 •10^{-6}	0.000 V	0.261 V
1000 V	600.0095 V	10 kHz	600.010 V	82 •10^{-6}	0.000 V	0.381 V
1000 V	600.0117 V	20 kHz	600.012 V	82 •10^{-6}	0.000 V	0.381 V
1000 V	600.0282 V	50 kHz	600.028 V	152 •10^{-6}	0.000 V	0.741 V
1000 V	600.0835 V	100 kHz	600.084 V	417 •10^{-6}	0.000 V	1.821 V

Calibration Results (Cont.)

Ohms Performance Tests

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: OHMF (For 4 wire ohms), OHM (For 2 wire ohms)

Ranges: Manual selection

OCOMP ON (Offset compensation, 10Ω to 10kΩ ranges)

NPLC 100 (Integration time 100 power line cycles)

The 3458A's front input terminals were used.

The Guard switch was in "Open" position.

The 3458A's "Guard" and "Lo" terminals were at Earth potential.

The 3458A was performed "AUTOCAL" prior to starting the measurements.

Ohms Zeroes Offset Test (MATH OFF, Shorting time > 5 min.)

UUC Range	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
10 Ω (2-W)	(Short) 0 Ω	0.00000 Ω	0.000020 Ω	0.00000 Ω	0.25007 Ω
10 Ω (4-W)	(Short) 0 Ω	0.00000 Ω	0.000020 Ω	0.00000 Ω	0.00007 Ω

4-Wire Ohms Gain Test

(Performed "MATH NULL" with the input terminals shorted, prior to starting calibration on each range)

UUC Range	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
10 Ω	1.0001337 Ω	1.00013 Ω	30 $\cdot 10^{-6}$	0.00000 Ω	0.00007 Ω
10 Ω	9.999968 Ω	9.99997 Ω	26 $\cdot 10^{-6}$	0.00000 Ω	0.00028 Ω
100 Ω	100.00015 Ω	100.00015 Ω	12 $\cdot 10^{-6}$	0.00000 Ω	0.00231 Ω
1 kΩ	1.0000010 kΩ	1.0000010 kΩ	12 $\cdot 10^{-6}$	0.0000000 kΩ	0.0000142 kΩ
10 kΩ	10.0001946 kΩ	10.000195 kΩ	8.1 $\cdot 10^{-6}$	0.000000 kΩ	0.000142 kΩ
100 kΩ	100.00072 kΩ	100.00072 kΩ	12 $\cdot 10^{-6}$	0.00000 kΩ	0.00142 kΩ
1 MΩ	1.0000024 MΩ	1.0000024 MΩ	18 $\cdot 10^{-6}$	0.0000000 MΩ	0.0000209 MΩ
10 MΩ	9.999629 MΩ	9.999629 MΩ	47 $\cdot 10^{-6}$	0.000000 MΩ	0.000703 MΩ
100 MΩ	99.903428 MΩ	99.90343 MΩ	80 $\cdot 10^{-6}$	0.00000 MΩ	0.05125 MΩ

Calibration Results (Cont.)

DC Current Performance Tests

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: DCI

Ranges: Manual selection

NPLC 100 (Integration time 100 power line cycles)

The 3458A's front input terminals were used.

The Guard switch was in "Open" position.

The 3458A's "Guard" and "Lo" terminals were at Earth potential.

The 3458A was performed "AUTOCAL" prior to starting the measurements.

DC Current Zeroes Offset Test (MATH OFF)

UUC Range	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 µA	(Open) 0 µA	0.00000 µA	0.00010 µA	0.00000 µA	0.00095 µA
1 mA	(Open) 0 mA	0.0000000 mA	0.0010 µA	0.0000 µA	0.0065 µA
10 mA	(Open) 0 mA	0.000000 mA	0.010 µA	0.000 µA	0.065 µA
100 mA	(Open) 0 mA	0.00000 mA	0.10 µA	0.00 µA	0.65 µA
1 A	(Open) 0 A	0.0000000 A	1.0 µA	0.0 µA	11.5 µA

DC Current Gain Test

(Performed "MATH NULL" with the input terminals opened, prior to starting calibration on each range)

UUC Range	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 µA	100.00043 µA	100.00043 µA	$21 \cdot 10^{-6}$	0.00000 µA	0.00356 µA
100 µA	-100.00019 µA	-100.00019 µA	$21 \cdot 10^{-6}$	0.00000 µA	0.00356 µA
1 mA	1.0000011 mA	1.0000011 mA	$21 \cdot 10^{-6}$	0.0000000 mA	0.0000323 mA
1 mA	-0.9999994 mA	-0.9999994 mA	$20 \cdot 10^{-6}$	0.0000000 mA	0.0000323 mA
10 mA	10.000015 mA	10.000015 mA	$21 \cdot 10^{-6}$	0.000000 mA	0.000323 mA
10 mA	-10.000007 mA	-10.000007 mA	$21 \cdot 10^{-6}$	0.000000 mA	0.000323 mA
100 mA	100.00120 mA	100.00120 mA	$21 \cdot 10^{-6}$	0.00000 mA	0.00489 mA
100 mA	-100.00100 mA	-100.00100 mA	$21 \cdot 10^{-6}$	0.00000 mA	0.00489 mA
1 A	1.0000532 A	1.0000532 A	$36 \cdot 10^{-6}$	0.0000 mA	0.1349 mA
1 A	-1.0000445 A	-1.0000445 A	$36 \cdot 10^{-6}$	0.0000 mA	0.1349 mA

Calibration Results (Cont.)

AC Current Performance Test

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: ACI

Ranges: Manual selection

NPLC 100 (Integration time 100 power line cycles)

LFILTER ON (Low-pass filter ON)

The 3458A's front input terminals were used.

The Guard switch was in "Open" position.

The 3458A's "Guard" and "Lo" terminals were at Earth potential.

The 3458A was performed "AUTOCAL" prior to starting the measurements.

UUC Range	Applied Value	Frequency	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 µA	100.0042 µA	10 Hz	100.0042 µA	210 •10^{-6}	0.0000 µA	0.4305 µA
100 µA	100.0023 µA	20 Hz	100.0023 µA	210 •10^{-6}	0.0000 µA	0.4305 µA
100 µA	100.0007 µA	40 Hz	100.0007 µA	160 •10^{-6}	0.0000 µA	0.1805 µA
100 µA	99.9999 µA	100 Hz	99.9999 µA	150 •10^{-6}	0.0000 µA	0.0905 µA
100 µA	99.9973 µA	1 kHz	99.9973 µA	150 •10^{-6}	0.0000 µA	0.0905 µA
100 µA	100.0000 µA	5 kHz	100.0000 µA	350 •10^{-6}	0.0000 µA	n/a
1 mA	1.000048 mA	10 Hz	1.000048 mA	210 •10^{-6}	0.000000 mA	0.004205 mA
1 mA	1.000027 mA	20 Hz	1.000027 mA	210 •10^{-6}	0.000000 mA	0.004205 mA
1 mA	1.000004 mA	40 Hz	1.000004 mA	160 •10^{-6}	0.000000 mA	0.001705 mA
1 mA	1.000003 mA	100 Hz	1.000003 mA	160 •10^{-6}	0.000000 mA	0.000805 mA
1 mA	0.999997 mA	1 kHz	0.999997 mA	150 •10^{-6}	0.000000 mA	0.000505 mA
1 mA	1.000000 mA	5 kHz	1.000000 mA	250 •10^{-6}	0.000000 mA	0.000505 mA
1 mA	1.000000 mA	10 kHz	1.000000 mA	650 •10^{-6}	0.000000 mA	0.000805 mA
10 mA	10.00036 mA	10 Hz	10.00036 mA	160 •10^{-6}	0.00000 mA	0.04205 mA
10 mA	10.00010 mA	20 Hz	10.00010 mA	160 •10^{-6}	0.00000 mA	0.04205 mA
10 mA	10.00001 mA	40 Hz	10.00001 mA	160 •10^{-6}	0.00000 mA	0.01705 mA
10 mA	10.00002 mA	100 Hz	10.00002 mA	160 •10^{-6}	0.00000 mA	0.00805 mA
10 mA	9.99994 mA	1 kHz	9.99994 mA	150 •10^{-6}	0.00000 mA	0.00505 mA
10 mA	10.00000 mA	5 kHz	10.00000 mA	250 •10^{-6}	0.00000 mA	0.00505 mA
10 mA	10.00000 mA	10 kHz	10.00000 mA	640 •10^{-6}	0.00000 mA	0.00805 mA

Calibration Results (Cont.)

AC Current Performance Test *Cont.*

UUC Range	Applied Value	Frequency	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
100 mA	100.0042 mA	10 Hz	100.0042 mA	160 •10^{-6}	0.0000 mA	0.4205 mA
100 mA	100.0024 mA	20 Hz	100.0024 mA	160 •10^{-6}	0.0000 mA	0.4205 mA
100 mA	100.0018 mA	40 Hz	100.0018 mA	160 •10^{-6}	0.0000 mA	0.1705 mA
100 mA	100.0015 mA	100 Hz	100.0015 mA	160 •10^{-6}	0.0000 mA	0.0805 mA
100 mA	100.0009 mA	1 kHz	100.0009 mA	160 •10^{-6}	0.0000 mA	0.0505 mA
100 mA	100.0000 mA	5 kHz	100.0000 mA	250 •10^{-6}	0.0000 mA	0.0505 mA
100 mA	100.0000 mA	10 kHz	100.0000 mA	640 •10^{-6}	0.0000 mA	0.0805 mA
1 A	1.000089 A	10 Hz	1.000089 A	160 •10^{-6}	0.000000 A	0.004205 A
1 A	1.000072 A	20 Hz	1.000072 A	160 •10^{-6}	0.000000 A	0.004205 A
1 A	1.000070 A	40 Hz	1.000070 A	160 •10^{-6}	0.000000 A	0.001805 A
1 A	1.000070 A	100 Hz	1.000070 A	160 •10^{-6}	0.000000 A	0.001005 A
1 A	1.000064 A	1 kHz	1.000064 A	160 •10^{-6}	0.000000 A	0.001205 A
1 A	1.000000 A	5 kHz	1.000000 A	190 •10^{-6}	0.000000 A	0.001205 A
1 A	1.000000 A	10 kHz	1.000000 A	190 •10^{-6}	0.000000 A	0.003205 A

Frequency Performance Test

Test Conditions:

The 3458A was turned on at least 48-hours before calibration.

The 3458A's displayed internal temperature (TEMP?) was 38.0 °C

The 3458A was in the default/power-on state with the following exceptions:

Function: FREQ

Fsource ACDCV

Level 0, DC

LFILTER ON @ 1Hz, 10MHz OFF (Low-pass filter)

The 3458A's front input terminals were used.

The Guard switch was in "To Lo" position.

The 3458A was performed "AUTOCAL" prior to starting the measurements.

Test Voltage	Applied Value	UUC Reading	Uncertainty (±)	UUC Error	1Year Spec. (±)
1 Vp-p	1 Hz	1.000000 Hz	10 •10^{-6}	0.000000 Hz	0.000500 Hz
1 Vp-p	10 MHz	10.00000 MHz	6.0 •10^{-6}	0.00000 MHz	0.00100 MHz

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