



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-04
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: February 21, 2019

Cert No. 551220082826578

Customer:

GES SINGAPORE PTE LTD
28 MARSILING LANE
SINGAPORE 739152

Work Order #: SG-11010042

MPC Control #: B020696
Asset ID: NA
Gage Type: FOUR CHANNEL DIGITIZING OSCILLOSCOPE
Manufacturer: TEKTRONIX
Model Number: TDS 3054C
Size: N/A
Temp/RH: 24.2°C / 42 %
Location: Calibration performed at Customer's facility

Serial Number: B020696
Department: N/A
Performed By: SENGTHYE CHEW
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: February 21, 2019
Cal. Interval: 12 MONTHS
Cal. Due Date: February 21, 2020

Calibration Notes:

Please refer to the attached calibration data. (3 pages).

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
DC9931	OSCILLOSCOPE CALIBRATOR	9500B/9530	932654038 / 895650875	FLUKE	Nov 2, 2019	551220081654572
CT2147	SIGNAL GENERATOR	SMA 100A-B103-B22	103536	ROHDE & SCHWARZ	Mar 8, 2019	512200813289520

Procedures Used in this Event

Procedure Name	Description
TEKTRONIX TDS3000B	Series Digital Phosphor Oscilloscopes Service Manual, 071-0972-05

Calibrating Technician:


SENGTHYE CHEW

QC Approval:


JULES PHILIPPE AGPANGAN

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO/IEC 17025:2017, ANSI/NCCL Z540-1-1994, ANSI/NCCL Z540.3-2006, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.



Calibration Report of Tektronix TDS3054B Four Channel Digitizing Oscilloscope

MPC Control #: B020696
Asset ID: NA

Serial Number: B020696
Calibration Date: February 21, 2019

DC Voltage Measurement Accuracy

Channel 1

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
1 mV/div	100.000 mV	99.25 mV	99.89 mV	99.89 mV	0.110 %	100.8 mV	PASS	0.0015 mV
2 mV/div	-7.000 mV	-7.540 mV	-7.004 mV	-7.004 mV	0.057 %	-6.460 mV	PASS	0.00057 mV
5 mV/div	-100.000 mV	-101.8 mV	-100.56 mV	-100.56 mV	0.560 %	-98.24 mV	PASS	0.0015 mV
50 mV/div	1.000 V	0.982 V	0.994 V	0.994 V	0.600 %	1.018 V	PASS	0.000068 V
50 mV/div	650.000 mV	632.4 mV	648.5 mV	648.5 mV	0.231 %	667.6 mV	PASS	0.0047 mV
50 mV/div delta	350.000 mV	340.5 mV	348.7 mV	348.7 mV	0.380 %	359.5 mV	PASS	0.0029 mV
90 mV/div	-315.000 mV	-339.3 mV	-314.7 mV	-314.7 mV	0.105 %	-290.7 mV	PASS	0.0027 mV
200 mV/div	10.00 V	9.900 V	9.99 V	9.99 V	0.100 %	10.10 V	PASS	0.000043 V
1 V/div	-10.00 V	-10.30 V	-10.010 V	-10.010 V	0.100 %	-9.698 V	PASS	0.000043 V

Channel 2

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
1 mV/div	100.000 mV	99.25 mV	100.10 mV	100.10 mV	0.100 %	100.8 mV	PASS	0.0015 mV
2 mV/div	-7.000 mV	-7.540 mV	-6.998 mV	-6.998 mV	0.029 %	-6.460 mV	PASS	0.00057 mV
5 mV/div	-100.000 mV	-101.8 mV	-99.87 mV	-99.87 mV	0.130 %	-98.24 mV	PASS	0.0015 mV
50 mV/div	1.000 V	0.982 V	0.994 V	0.994 V	0.600 %	1.018 V	PASS	0.000068 V
50 mV/div	650.000 mV	632.4 mV	650.2 mV	650.2 mV	0.031 %	667.6 mV	PASS	0.0047 mV
50 mV/div delta	350.000 mV	340.5 mV	350.2 mV	350.2 mV	0.066 %	359.5 mV	PASS	0.0029 mV
90 mV/div	-315.000 mV	-339.3 mV	-314.9 mV	-314.9 mV	0.035 %	-290.7 mV	PASS	0.0027 mV
200 mV/div	10.00 V	9.900 V	10.02 V	10.02 V	0.200 %	10.10 V	PASS	0.000043 V
1 V/div	-10.00 V	-10.30 V	-9.970 V	-9.970 V	0.300 %	-9.698 V	PASS	0.000043 V

Channel 3

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
1 mV/div	100.000 mV	99.25 mV	100.02 mV	100.02 mV	0.020 %	100.8 mV	PASS	0.0015 mV
2 mV/div	-7.000 mV	-7.540 mV	-6.995 mV	-6.995 mV	0.071 %	-6.460 mV	PASS	0.00057 mV
5 mV/div	-100.000 mV	-101.8 mV	-100.28 mV	-100.28 mV	0.280 %	-98.24 mV	PASS	0.0015 mV
50 mV/div	1.000 V	0.982 V	1.004 V	1.004 V	0.400 %	1.018 V	PASS	0.000068 V
50 mV/div	650.000 mV	632.4 mV	648.6 mV	648.6 mV	0.215 %	667.6 mV	PASS	0.0047 mV
50 mV/div delta	350.000 mV	340.5 mV	349.8 mV	349.8 mV	0.069 %	359.5 mV	PASS	0.0029 mV
90 mV/div	-315.000 mV	-339.3 mV	-315.2 mV	-315.2 mV	0.067 %	-290.7 mV	PASS	0.0027 mV
200 mV/div	10.00 V	9.900 V	9.99 V	9.99 V	0.070 %	10.10 V	PASS	0.000043 V
1 V/div	-10.00 V	-10.30 V	-10.020 V	-10.020 V	0.200 %	-9.698 V	PASS	0.000043 V

Jaf 12-MAR-19
JASON AGOSTYANI



Calibration Report of Tektronix TDS3054B Four Channel Digitizing Oscilloscope

MPC Control #: B020696
Asset ID: NA

Serial Number: B020696
Calibration Date: February 21, 2019

Channel 4

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
1 mV/div	100.000 mV	99.25 mV	100.10 mV	100.10 mV	0.100 %	100.8 mV	PASS	0.0015 mV
2 mV/div	-7.000 mV	-7.540 mV	-7.005 mV	-7.005 mV	0.071 %	-6.460 mV	PASS	0.00057 mV
5 mV/div	-100.000 mV	-101.8 mV	-99.89 mV	-99.89 mV	0.110 %	-98.24 mV	PASS	0.0015 mV
50 mV/div	1.000 V	0.982 V	1.001 V	1.001 V	0.100 %	1.018 V	PASS	0.000068 V
50 mV/div	650.000 mV	632.4 mV	649.5 mV	649.5 mV	0.077 %	667.6 mV	PASS	0.0047 mV
50 mV/div delta	350.000 mV	340.5 mV	348.9 mV	348.9 mV	0.317 %	359.5 mV	PASS	0.0029 mV
90 mV/div	-315.000 mV	-339.3 mV	-315.2 mV	-315.2 mV	0.063 %	-290.7 mV	PASS	0.0027 mV
200 mV/div	10.00 V	9.900 V	9.98 V	9.98 V	0.200 %	10.10 V	PASS	0.000043 V
1 V/div	-10.00 V	-10.30 V	-10.010 V	-10.010 V	0.100 %	-9.698 V	PASS	0.000043 V

Check Bandwidth (500 MHz)

Channel	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
Channel 1	> 425.000 mV	425.000 mV	513.000 mV	513.000 mV	20.706 %	N/A	PASS	0.090 mV
Channel 2	> 425.000 mV	425.000 mV	515.000 mV	515.000 mV	21.176 %	N/A	PASS	0.090 mV
Channel 3	> 425.000 mV	425.000 mV	512.000 mV	512.000 mV	20.471 %	N/A	PASS	0.090 mV
Channel 4	> 425.000 mV	425.000 mV	526.000 mV	526.000 mV	23.765 %	N/A	PASS	0.090 mV

Channel Edge-Trigger Sensitivity (500 MHz)

Parameter	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
Channel 1 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 1 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 2 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 2 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 3 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 3 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 4 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 4 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A

Channel Edge-Trigger Sensitivity (50 MHz)

Parameter	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
Channel 1 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 1 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 2 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 2 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 3 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 3 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 4 / Rising Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A
Channel 4 / Falling Slope	Stable Trigger	N/A	PASS	PASS	N/A	N/A	PASS	N/A

Jaf 12-MAR-19
JAFUN AGRAWANI



Calibration Report of Tektronix TDS3054B Four Channel Digitizing Oscilloscope

MPC Control #:	B020696	Serial Number:	B020696
Asset ID:	NA	Calibration Date:	February 21, 2019

Sample Rate and Delay Time Accuracy

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty ($\pm$)
100 ms / 1 Vpk-pk	0.00 div	-2.00 div	1.00 div	1.00 div	1.000 %	2.00 div	PASS	0.013 div

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated.

- End of Calibration Report -

Jeff 12-MAR-19
JASON TEKTRONIX