



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



Certificate of Calibration

Date: November 17, 2017

Cert No. 512200813124723

Customer:

GES SINGAPORE PTE LTD
28 MARSILING LANE
SINGAPORE 739152

Work Order #: SG-11006714

MPC Control #: 1210
Asset ID: N/A
Gage Type: UNIVERSAL COUNTER
Manufacturer: RACAL INSTRUMENTS
Model Number: 2461
Size: N/A
Temp/RH: 23°C / 44 %
Location: Calibration performed at Customer's facility

Serial Number: 1210
Department: N/A
Performed By: SENGTHYE CHEW
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: November 17, 2017
Cal. Interval: 12 MONTHS
Cal. Due Date: November 17, 2018

Calibration Notes:

Please refer to the attached calibration data. (2 pages).

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CC6761	SIGNAL GENERATOR	8657B	3210U03016	HEWLETT PACKARD	Sep 12, 2018	512200813018595
AP4205	MULTIMETER	3458A	2823A17096	HEWLETT PACKARD	Aug 10, 2018	512200812551609
DA4645	WAVEFORM GENERATOR	33250A	MY4004395	AGILENT	Jun 12, 2018	512200812886361

Procedures Used in this Event

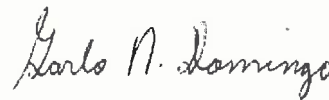
Procedure Name
RACAL INST 2461-C

Description
200MHz Universal Counter Timer, 980833-002

Calibrating Technician:


SENGTHYE CHEW

QC Approval:


GARLO DOMINGO

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 17025:2005, ANSI/NCSL Z540-1-1994, ANSI/NCSL 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.



Racal Instruments 2461 Universal Counter Timer

Procedure Ref: RACAL INST 2461-C
 ID Number: 1210
 Asset Number: NA

Order Number: SG-11006714
 Serial Number: 1210
 Calibration Date: November 17, 2017

Input 1 Sensitivity Low Frequency Test

UUT Signal Level / Resolution	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
25 mV/SENS: RES 8	10.00000000 Hz	9.00000000 Hz	10.00000056 Hz	10.00000056 Hz	11.00000000 Hz	PASS	0.0000085 Hz
25 mV/SENS: RES 8	5.00000000 kHz	4.90000000 kHz	5.00000076 kHz	5.00000076 kHz	5.10000000 kHz	PASS	0.0000085 kHz
25 mV/SENS: RES 8	10.00000000 kHz	9.90000000 kHz	10.00000109 kHz	10.00000109 kHz	10.10000000 kHz	PASS	0.0000085 kHz

Input 1 Sensitivity High Frequency Test

UUT Signal Level / Resolution	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
50 mV/SENS: RES 9	200.00000000 MHz	199.00000000 MHz	200.00000132 MHz	200.00000132 MHz	201.00000000 MHz	PASS	0.0000016 MHz
50 mV/SENS: RES 9	160.00000000 MHz	159.00000000 MHz	160.00000209 MHz	160.00000209 MHz	161.00000000 MHz	PASS	0.0000016 MHz
50 mV/SENS: RES 9	100.00000000 kHz	99.00000000 kHz	100.00000100 kHz	100.00000100 kHz	101.00000000 kHz	PASS	0.0000085 kHz
25 mV/SENS: RES 8	10.00000000 MHz	9.00000000 MHz	10.00000090 MHz	10.00000090 MHz	11.00000000 MHz	PASS	0.0000057 MHz
25 mV/SENS: RES 8	100.00000000 kHz	99.90000000 kHz	100.00000050 kHz	100.00000050 kHz	100.10000000 kHz	PASS	0.0000085 kHz

Input 2 Sensitivity Low Frequency Test

UUT Signal Level / Resolution	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
25 mV/SENS: RES 8	10.00000000 Hz	9.00000000 Hz	10.00000127 Hz	10.00000127 Hz	11.00000000 Hz	PASS	0.0000085 Hz
25 mV/SENS: RES 8	5.00000000 kHz	4.90000000 kHz	5.00000195 kHz	5.00000195 kHz	5.10000000 kHz	PASS	0.0000085 kHz
25 mV/SENS: RES 8	10.00000000 kHz	9.90000000 kHz	10.00000113 kHz	10.00000113 kHz	10.10000000 kHz	PASS	0.0000085 kHz

Input 2 Sensitivity High Frequency Test

UUT Signal Level / Resolution	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
50 mV/SENS: RES 9	100.00000000 MHz	99.00000000 MHz	100.00000189 MHz	100.00000189 MHz	101.00000000 MHz	PASS	0.0000016 MHz
50 mV/SENS: RES 9	100.00000000 kHz	99.00000000 kHz	100.00000129 kHz	100.00000129 kHz	101.00000000 kHz	PASS	0.0000085 kHz
25 mV/SENS: RES 8	10.00000000 MHz	9.00000000 MHz	10.00000124 MHz	10.00000124 MHz	11.00000000 MHz	PASS	0.0000016 MHz
25 mV/SENS: RES 8	100.00000000 kHz	99.90000000 kHz	100.00000133 kHz	100.00000133 kHz	100.10000000 kHz	PASS	0.0000085 kHz

Time Interval 1-2

Input 1 Slope Command Syntax	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
INP1:COMP:SLOP POS	0.0 ns	-2.0 ns	0.7 ns	0.7 ns	2.0 ns	PASS	0.16 ns
INP1:COMP:SLOP NEG	50.0 ns	48.0 ns	50.9 ns	50.9 ns	52.0 ns	PASS	0.16 ns
INP1:COMP:SLOP NEG	0.0 ns	-2.0 ns	0.8 ns	0.8 ns	2.0 ns	PASS	0.16 ns
INP1:COMP:SLOP POS	50.0 ns	48.0 ns	51.4 ns	51.4 ns	52.0 ns	PASS	0.16 ns

Jeff 04-Dec-17
 JASON KAGAYANI

Totalize 1 by 2

Reference Applied Value	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
10 MHz, 0 dBm	5000	4999	5000	5000	5001	PASS	N/A

Ratio 1:2

Reference Applied Value	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
50 MHz, 100 mVrms	50000	49999	50000	50000	50001	PASS	N/A

Channel 1 Trigger Level

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
4 V	4.000 V	3.710 V	4.029 V	4.029 V	4.290 V	PASS	0.00057 V
-4 V	-4.000 V	-4.290 V	-4.019 V	-4.019 V	-3.710 V	PASS	0.00057 V
8 V	8.000 V	6.700 V	8.075 V	8.075 V	9.300 V	PASS	0.00057 V
-8 V	-8.000 V	-9.300 V	-8.029 V	-8.029 V	-6.700 V	PASS	0.00057 V

Channel 2 Trigger Level

Range	Nominal Value	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
4 V	4.000 V	3.710 V	4.025 V	4.025 V	4.290 V	PASS	0.00057 V
-4 V	-4.000 V	-4.290 V	-4.028 V	-4.028 V	-3.710 V	PASS	0.00057 V
8 V	8.000 V	6.700 V	8.069 V	8.069 V	9.300 V	PASS	0.00057 V
-8 V	-8.000 V	-9.300 V	-8.051 V	-8.051 V	-6.700 V	PASS	0.00057 V

Jan 24-DEC-17
JASON AGRAYANI