

Audit Nonconformity (ANC) Number XNC-SGYMMNN	INC-SG200702	Assignee, Company (Supplier designated point of contact or WPPL Auditee)	Luo Hua Zhen, WPPL (Test Engineering Operations)
SECTION 1: INTRODUCTION (To be completed by Waters Supplier Quality / Quality Engineer)			
Category	☐ CNC ☐ MNC ☒ NC	Failure Type	Facility & Equipment Controls
Statement	There are multiple inaccuracies observed in the calibration records provided by Micro Precision Calibration.		
Requirement Standard, regulation or document that is not met	ISO9001:2015 Cl. 8.4 Control of externally provided processes, products and services. 8.4.1 The organization shall ensure that externally provided processes, products and services conform to requirements.		
Objective Evidence	Evidence 1: It was observed the calibration cert no. 551220083592482 dated 02 May 2020 contains multiples inaccuracies in the Notes section. Evidence 2: It was observed on calibration cert no. 551220083320957 dated 11 Nov 2019 for equipment ID# WPPL0018 S/N# 122994G, the calibration date is 11 Nov 2019 and calibration due date is 11 Nov 2020. However, on the physical calibration sticker pasted on equipment by the service provider, the calibration date is 05 Nov 2019 and calibration due date is 05 Nov 2020		
INITIATED BY (Waters Supplier Quality / Quality Engineer)	Name/ Title	Sign	Date
	Bayu Darmawan/ ISO Consultant	Refer to issued copy	Refer to issued copy
Issuance Date	Due Date for Sections 2 and 3 (Should be within 90 days from issuance.)	Due Date for Section 2 (Should be within 21 days from issuance for internal NC and MNC; 3 days for Internal CNC.)	Remarks (if any): Refer to issued copy
See attach	See issued copy	☐ N/A, Supplier Audit Nonconformity	
SECTION 2: ROOT CAUSE ANALYSIS AND INTERIM CONTAINMENT ACTIONS			
SECTION 2A: FORM A TEAM List Team Members' Names/ Function (minimum 2 personnel)	Luo HuaZhen (Senior Test Engineer); Desmond Ann (Manufacturing Team Lead), Eugene Lim (Manufacturing Engineer), Siddharth Udayshankar (Product Assurance Engineer)		
SECTION 2B: IMPLEMENTED INTERIM CONTAINMENT ACTIONS (Temporary fixes to protect customer, including Correction Actions. Where applicable, Part Number(s), Part Description(s), Quantities, Action Owner should be included. If containment is documented via Waters NCR, Waters NCR number should be included).			Completion Date (DD.MM.YY)
1. Review of calibration records from Jan 2019 to Jul 2020. Result of review: inaccuracies found in calibration reports (certificate numbers: 551220083507606, 551220083694795, 551220083694803, 551220083477955). Refer to Attachment INC-SG200702-01. For full list of calibration reports (Flex Singapore; Venture Singapore; CEI Singapore; Flex Senai, CEI Batam, WPPL). Refer to Attachment INC-SG200702-02 for MasterList.			17.07.20
2. Review of calibration sticker against calibration report for equipment in WPPL. Result of review: All calibration required equipment has been reviewed. No issue was highlighted. Refert to Attachment INC-SG200702-03 for review checklist.			28.07.20
SECTION 2C: ROOT CAUSE ANALYSIS (RCA) AND RISK ASSESSMENT (Objective evidence should be attached and referenced with running number e.g. Refer to Attachment 1).			
1. Calibration Service Provider's error in generation of calibration report. Refer to SCAR-SG200701. 2. Review of calibration report by Contract Manufacturer did not effectively detect inaccuracies. 3. Calibration Service Provider's error in QC check of calibration sticker against calibration certificate. Refer to SCAR-SG200701.			
RCA Category	Facility & Equipment Controls	Sub-Category	Select from Dropdown
RCA Category 2 (if any)	Select from Dropdown	Sub-Category 2 (if any)	Select from Dropdown
SECTION 2D: PLAN OF PERMANENT CORRECTIVE ACTION(S) (Each root cause in section 2 shall be addressed. Documentation shall be updated as appropriate. Where applicable, Part Number(s), Part Description(s), Quantities, Action Owner should be included).			Plan Date (DD.MM.YY)

Title: Audit Nonconformity Report

Document No: 730005840

Version No: 03

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1. Refer to SCAR-SG200701.				1. 14.07.20	
2. Reemphasize to Flextronics to ensure calibration reports are reviewed for conformity to requirements.				2. 23.07.20	
3. Reemphasize to Operations' Calibration Coordinators/ Designee to ensure that review of calibration report includes review of label against calibration certificate per WPPL-WI-05 Section 8.3.4.				3. 23.07.20	
SECTION 2E: PLAN ACTION(S) TO PREVENT RECURRENCE (Shall prevent problems on similar products, processes, locations or families. Documentation shall be updated as appropriate. Where applicable, Part Number(s), Part Description(s), Quantities, Action Owner should be included).				Plan Date (DD.MM.YY)	
1. Reemphasize to wider Global Operations team and other Contract Manufacturers (Venture; CEI Singapore) to ensure calibration reports are reviewed for conformity to requirements.				1. 23.07.20	
2. Standardize the notes template for Calibration Service Provider.				2. 23.07.20	
3. Create separate account for Calibration Service Provider for individual Contract Manufacturer to eliminate need to customize calibration location.				3. 31.08.20	
SUBMISSION BY (by Audit Nonconformity Assignee)		Req?	Name/ Title	Sign	Date
		X	Luo HuaZhen		05 Aug 2020
RCA APPROVAL	Quality Manager/ Quality Supervisor (of Assignee)	X			
	Waters Supplier Quality / Quality Engineer	X			
	Other	☐			
Remarks (if any): Certain calibration reports states calibration location as "calibration performed at customer's facility" with remarks such as "calibrated at Flextronics" or "calibrated at Venture". This was deemed acceptable by team as contract manufacturers were deemed indirect customer of MPC.					

SECTION 3A: IMPLEMENTATION OF PERMANENT CORRECTIVE ACTION(S) (Attach evidence)				Completion Date (DD.MM.YY)
SECTION 3B: ACTION(S) TO PREVENT RECURRENCE (Attach evidence)				Completion Date (DD.MM.YY)
SUBMISSION BY (by Assignee)		Name/ Title	Sign	Date

SECTION 4: VERIFICATION AND VALIDATION (Shall confirm that actions do not adversely affect the finished device. Examples: Refer to: ECO Number, Validation Protocol Number, Risk Management File. Where not applicable, document rationale).				Completion Date (DD.MM.YY)	
Verification of Effectiveness: (Evidence reviewed to confirm effectiveness of actions; such as number of records monitored).		Acceptance Criteria: (Results that needs to be observed for actions to be deemed effective).		Result (Pass/ Fail)	
				Choose an item	
Remarks (if any): ☐ Attached extension request WPPL-FM-25.					
SUBMISSION BY (by Assignee)		Req?	Name/ Title	Sign	Date
		X			

APPROVAL	Quality Manager/ Quality Supervisor <i>(of Assignee)</i>	X			
	Management Rep/ QMS In-Charge <i>(of Assignee)</i>	X			
CAPA DETERMINATION <i>(by Waters SQE/ QE below. Ineffective actions with no CAPA issued should be justified)</i>		☐ No CAPA needed, Actions Effective. ☐ No CAPA needed, justification in remarks. ☐ CAPA number: CAPA- _____.			
APPROVAL	Waters Supplier Quality / Quality Engineer	Req?	Name/ Title	Sign	Date
		X			
APPROVAL	Other	☐			
FINAL APPROVAL	Waters Quality Manager / Designee)	X			
Remarks (if any): ☐ Isolated occurrence of effectiveness fail. ANC shall be revised and submitted before due date.					



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: Jul 13, 2020

Cert No. 551220083507606

Customer:

WATERS PACIFIC PTE LTD

1 SCIENCE PARK ROAD, #02-08 THE CAPRICORN
SINGAPORE SCIENCE PARK II
SINGAPORE 117528

Work Order #: SG-11013648

MPC Control #: 14354681

Serial Number: 14354681

Asset ID: 2095

Department: N/A

Gage Type: LOAD BOX

Performed By: SENGTHYE CHEW

Manufacturer: CHROMA

Received Condition: OPERATIONAL

Model Number: S14-03

Returned Condition: REPORT OF VALUE

Size: N/A

Cal. Date: March 06, 2020

Temp/RH: 22.0°C / 52.0%

Cal. Interval: 12 MONTHS

Location: Calibration performed at MPC facility

Cal. Due Date: March 06, 2021

Calibration Notes:

The user shall determine the suitability of the equipment for its intended use. The calibration status is defined as Report of Value. See attached data. (1 page)

Calibration performed for Flextronics Pte Ltd.

This supersedes Certificate Number 551220083573991

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CA8094	MULTIMETER	3458A	2823A25888	HEWLETT PACKARD	Jan 10, 2021	1-12015829011-1

Procedures Used in this Event

Procedure Name	Description
CHROMA 190XX PRODUCT	Using a Load Box to Verify Hipot Tester

Calibrating Technician:


SENGTHYE CHEW

QC Approval:


JUN CALIMAG

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCCL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.

PASS²- Term used when compliance statement is given, and the measurement result is conditional passed or PASS².

FAIL- Term used when compliance statement is given, and the measurement result is FAIL.

FAIL²- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL².

REPORT OF VALUE- Term used when reported measurement is not requiring compliance statement in report.

ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.

LIMITED- When an instrument fails calibration but is still functional in a limited manner.

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. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCCL Z540.3. 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. 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. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.



Calibration Report of Chroma S14-03 Load Box

MPC Control #:	14354681	Serial Number:	14354681
Asset ID:	NA	Calibration Date:	March 06, 2020

Resistance Check

Function Tested	Nominal	Measured Value	Correction	Uncertainty ($\pm$)
PASS	50 m Ω	50.66 m Ω	-0.66 m Ω	0.00070 m Ω
PASS	450 k Ω	448.02 k Ω	1.98 k Ω	0.0081 k Ω
FAIL	150 m Ω	149.97 m Ω	0.03 m Ω	0.0021 m Ω
FAIL	400 k Ω	399.40 k Ω	0.60 k Ω	0.0072 k Ω

The user shall determine the suitability of the equipment for its intended use. The calibration status is defined as **Report of Value**.

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 -



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: Jul 13, 2020

Cert No. 551220083694795

Customer:

WATERS PACIFIC PTE LTD

1 SCIENCE PARK ROAD, #02-08 THE CAPRICORN
SINGAPORE SCIENCE PARK II
SINGAPORE 117528

Work Order #: SG-11014146

MPC Control #: 14354691

Serial Number: 14354691

Asset ID: 2096

Department: N/A

Gage Type: LOAD BOX

Performed By: SENGTHYE CHEW

Manufacturer: CHROMA

Received Condition: OPERATIONAL

Model Number: S14-03

Returned Condition: REPORT OF VALUE

Size: N/A

Cal. Date: May 02, 2020

Temp/RH: 22.0°C / 52.0%

Cal. Interval: 12 MONTHS

Location: Calibration performed at MPC facility

Cal. Due Date: May 02, 2021

Calibration Notes:

The user shall determine the suitability of the equipment for its intended use. The calibration status is defined as Report of Value. See attached data. (1 page)

Calibration performed for Flextronics Pte Ltd.

This supersedes Certificate Number 551220083592482

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CA8094	MULTIMETER	3458A	2823A25888	HEWLETT PACKARD	Jan 10, 2021	1-12015829011-1

Procedures Used in this Event

Procedure Name	Description
CHROMA 190XX PRODUCT	Using a Load Box to Verify Hipot Tester, Chroma 190XX Product, Jun-16-2016

Calibrating Technician:

SENGTHYE CHEW

QC Approval:

JUN CALIMAG

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCCL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.

PASS? Term used when compliance statement is given, and the measurement result is conditional passed or PASS?

FAIL- Term used when compliance statement is given, and the measurement result is FAIL.

FAIL? Term used when compliance statement is given, and the measurement result is conditional failed or FAIL?

REPORT OF VALUE- Term used when reported measurement is not requiring compliance statement in report.

ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.

LIMITED- When an instrument fails calibration but is still functional in a limited manner.

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. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCCL Z540.3. 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. 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. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.



Calibration Report of Chroma S14-03 Load Box

MPC Control #:	14354691	Serial Number:	14354691
Asset ID:	2096	Calibration Date:	May 02, 2020

Resistance Check

Function Tested	Nominal	As Found	As Left	Uncertainty ($\pm$)
PASS	50 m Ω	50.00 m Ω	50.00 m Ω	0.00070 m Ω
PASS	450 k Ω	448.34 k Ω	448.34 k Ω	0.0081 k Ω
FAIL	150 m Ω	150.00 m Ω	150.00 m Ω	0.0021 m Ω
FAIL	400 k Ω	399.29 k Ω	399.29 k Ω	0.0072 k Ω

The user shall determine the suitability of the equipment for its intended use. The calibration status is defined as **Report of Value**.
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 -



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: Jul 13, 2020

Cert No. 551220083694803

Customer:

WATERS PACIFIC PTE LTD

1 SCIENCE PARK ROAD, #02-08 THE CAPRICORN
SINGAPORE SCIENCE PARK II
SINGAPORE 117528

Work Order #: SG-11014146

MPC Control #: 7322788

Serial Number: 7322788

Asset ID: 2097

Department: N/A

Gage Type: LOAD BOX

Performed By: SENGTHYE CHEW

Manufacturer: CHROMA

Received Condition: OPERATIONAL

Model Number: S14-03

Returned Condition: REPORT OF VALUE

Size: N/A

Cal. Date: May 02, 2020

Temp/RH: 22.0°C / 52.0%

Cal. Interval: 12 MONTHS

Location: Calibration performed at MPC facility

Cal. Due Date: May 02, 2021

Calibration Notes:

The user shall determine the suitability of the equipment for its intended use. The calibration status is defined as Report of Value.

See attached data. (1 page)

Calibration performed for Flextronics Pte Ltd.

This supersedes Certificate Number 551220083592483

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CA8094	MULTIMETER	3458A	2823A25888	HEWLETT PACKARD	Jan 10, 2021	1-12015829011-1

Procedures Used in this Event

Procedure Name	Description
CHROMA 190XX PRODUCT	Using a Load Box to Verify Hipot Tester, Chroma 190XX Product, Jun-16-2016

Calibrating Technician:

SENGTHYE CHEW

QC Approval:

JUN CALIMAG

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCCL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.

PASS? Term used when compliance statement is given, and the measurement result is conditional passed or PASS?

FAIL- Term used when compliance statement is given, and the measurement result is FAIL.

FAIL? Term used when compliance statement is given, and the measurement result is conditional failed or FAIL?

REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.

ADJUSTED - When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.

LIMITED - When an instrument fails calibration but is still functional in a limited manner.

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. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCCL Z540.3. 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. 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. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.

Document No.: INC-S620702-01

Attachment: 3 Page: 1 of 2



Calibration Report of Chroma S14-03 Load Box

MPC Control #:	7322788	Serial Number:	7322788
Asset ID:	2097	Calibration Date:	May 02, 2020

Resistance Check

Function Tested	Nominal	As Found	As Left	Uncertainty (±)
PASS	50 mΩ	51.00 mΩ	51.00 mΩ	0.00070 mΩ
PASS	450 kΩ	448.26 kΩ	448.26 kΩ	0.0081 kΩ
FAIL	150 mΩ	149.00 mΩ	149.00 mΩ	0.0021 mΩ
FAIL	400 kΩ	399.61 kΩ	399.61 kΩ	0.0072 kΩ

The user shall determine the suitability of the equipment for its intended use. The calibration status is defined as **Report of Value**.
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 -



MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-02/03
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: February 18, 2020

Cert No. 551220083477955

Customer:

WATERS PACIFIC PTE LTD

1 SCIENCE PARK ROAD, #02-08 THE CAPRICORN
SINGAPORE SCIENCE PARK II
SINGAPORE 117528

Work Order #: SG-11013266

MPC Control #: MY53002751/95155

Asset ID: N/A

Gage Type: 6 1/2 DIGIT MULTIMETER

Manufacturer: AGILENT

Model Number: 34411A

Size: REFER DATA

Temp/RH: 22.4°C / 49 %

Location: Calibration performed at Customer's facility

Serial Number: MY53002751/95155

Department: N/A

Performed By: YIOK TEE CHUA

Received Condition: IN TOLERANCE

Returned Condition: IN TOLERANCE

Cal. Date: February 18, 2020

Cal. Interval: 12 MONTHS

Cal. Due Date: February 18, 2021

Calibration Notes:

Performance Tests Passed. See attached data (4 Pages).
Calibration performed at GES SINGAPORE PTE LTD.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
FA0003	CALIBRATOR	5500A	6940015	FLUKE	May 28, 2020	551220083035835
DH3876	MULTI-FUNCTION CALIBRATOR	5700A/NAF	6020913	FLUKE	Apr 9, 2020	551220082911745

Procedures Used in this Event

Procedure Name	Description
AGILENT 34410A/11A Rev. FIFTH EDITION	Digital Multimeter, Agilent 34410A/11A, Fifth Edition, Mar-01-2012

Calibrating Technician:

YIOK TEE CHUA

QC Approval:

JUN CALIMAG

Statements of Pass or Fail Conformance: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8 03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540-3-2006.

The status of compliance with the acceptance criteria is reported as:

PASS - Compliant with specification.

FAIL - Not compliant with specification.

FAIL² - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

PASS² - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

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. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540-3 Method 6-Guard Bands based on Test Uncertainty Ratio. 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. 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. The information on this report pertains only to the instrument identified; this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.



Measurement Report Agilent 34411A Digital Multimeter
1 year specifications

Procedure: 34411A AGILENT

Order Number: SG-11013266

ID Number: MY53002751/95155

Calibration Date: 18-02-20

Section 1 - Zero Offset Verification

Front panel input terminals

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
DCV / 100 mV	0.0000 mV	-0.0035 mV	0.0004 mV	0.0004 mV	0.0035 mV	PASS	0.000058 mV
DCV / 1 V	0.000000 V	-0.000007 V	0.000001 V	0.000001 V	0.000007 V	PASS	0.00000058 V
DCV / 10 V	0.00000 V	-0.00005 V	0.00000 V	0.00000 V	0.00005 V	PASS	0.0000058 V
DCV / 100 V	0.0000 V	-0.0006 V	0.0000 V	0.0000 V	0.0006 V	PASS	0.000058 V
DCV / 1000 V	0.000 V	-0.006 V	-0.001 V	-0.001 V	0.006 V	PASS	0.00058 V
DCI / 100 µA	0.0000 µA	-0.0250 µA	0.0000 µA	0.0000 µA	0.0250 µA	PASS	0.000058 µA
DCI / 1 mA	0.000000 mA	-0.060000 mA	0.000002 mA	0.000002 mA	0.060000 mA	PASS	0.00000058 mA
DCI / 10 mA	0.00000 mA	-0.00200 mA	0.00000 mA	0.00000 mA	0.00200 mA	PASS	0.0000058 mA
DCI / 100 mA	0.0000 mA	-0.0050 mA	0.0000 mA	0.0000 mA	0.0050 mA	PASS	0.000058 mA
DCI / 1 A	0.000000 A	-0.000100 A	0.000000 A	0.000000 A	0.000100 A	PASS	0.00000058 A
DCI / 3 A	0.00000 A	-0.00060 A	0.00000 A	0.00000 A	0.00060 A	PASS	0.0000058 A
4-Wire / 100 Ω	0.0000 Ω	-0.0040 Ω	0.0006 Ω	0.0006 Ω	0.0040 Ω	PASS	0.000058 Ω
4-Wire / 1 kΩ	0.000000 kΩ	-0.000010 kΩ	0.000001 kΩ	0.000001 kΩ	0.000010 kΩ	PASS	0.00000058 kΩ
4-Wire / 10 kΩ	0.00000 kΩ	-0.00010 kΩ	0.00000 kΩ	0.00000 kΩ	0.00010 kΩ	PASS	0.0000058 kΩ
4-Wire / 100 kΩ	0.0000 kΩ	-0.0010 kΩ	0.0000 kΩ	0.0000 kΩ	0.0010 kΩ	PASS	0.000058 kΩ
4-Wire / 1 MΩ	0.000000 MΩ	-0.000010 MΩ	0.000000 MΩ	0.000000 MΩ	0.000010 MΩ	PASS	0.00000058 MΩ
4-Wire / 10 MΩ	0.00000 MΩ	-0.00010 MΩ	0.00000 MΩ	0.00000 MΩ	0.00010 MΩ	PASS	0.0000058 MΩ
4-Wire / 100 MΩ	0.0000 MΩ	-0.0010 MΩ	0.0000 MΩ	0.0000 MΩ	0.0010 MΩ	PASS	0.000058 MΩ
2-Wire / 100 Ω	0.0000 Ω	-0.0040 Ω	0.0000 Ω	0.0000 Ω	0.0040 Ω	PASS	0.000058 Ω
2-Wire / 1 kΩ	0.000000 kΩ	-0.000010 kΩ	0.000000 kΩ	0.000000 kΩ	0.000010 kΩ	PASS	0.00000058 kΩ
2-Wire / 10 kΩ	0.00000 kΩ	-0.00010 kΩ	0.00000 kΩ	0.00000 kΩ	0.00010 kΩ	PASS	0.0000058 kΩ
2-Wire / 100 kΩ	0.0000 kΩ	-0.0010 kΩ	0.0000 kΩ	0.0000 kΩ	0.0010 kΩ	PASS	0.000058 kΩ
2-Wire / 1 MΩ	0.000000 MΩ	-0.000010 MΩ	0.000000 MΩ	0.000000 MΩ	0.000010 MΩ	PASS	0.00000058 MΩ
2-Wire / 10 MΩ	0.00000 MΩ	-0.00010 MΩ	0.00000 MΩ	0.00000 MΩ	0.00010 MΩ	PASS	0.0000058 MΩ
2-Wire / 100 MΩ	0.0000 MΩ	-0.0010 MΩ	0.0000 MΩ	0.0000 MΩ	0.0010 MΩ	PASS	0.000058 MΩ

Section 1 - Zero Offset Verification (continued)

Rear panel input terminals

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
DCV / 100 mV	0.0000 mV	-0.0035 mV	0.0002 mV	0.0002 mV	0.0035 mV	PASS	0.000058 mV
DCV / 1 V	0.000000 V	-0.000007 V	0.000001 V	0.000001 V	0.000007 V	PASS	0.00000058 V
DCV / 10 V	0.00000 V	-0.00005 V	0.00000 V	0.00000 V	0.00005 V	PASS	0.0000058 V
DCV / 100 V	0.0000 V	-0.0006 V	0.0000 V	0.0000 V	0.0006 V	PASS	0.000058 V
DCV / 1000 V	0.000 V	-0.006 V	0.000 V	0.000 V	0.006 V	PASS	0.00058 V
DCI / 100 µA	0.0000 µA	-0.0250 µA	0.0006 µA	0.0006 µA	0.0250 µA	PASS	0.000058 µA
DCI / 1 mA	0.000000 mA	-0.060000 mA	0.000002 mA	0.000000 mA	0.060000 mA	PASS	0.00000058 mA
DCI / 10 mA	0.00000 mA	-0.00200 mA	0.00002 mA	0.00000 mA	0.00200 mA	PASS	0.0000058 mA
DCI / 100 mA	0.0000 mA	-0.0050 mA	-0.0001 mA	-0.0001 mA	0.0050 mA	PASS	0.000058 mA
DCI / 1 A	0.000000 A	-0.000100 A	0.000000 A	0.000000 A	0.000100 A	PASS	0.00000058 A
DCI / 3 A	0.00000 A	-0.00060 A	0.00000 A	0.00000 A	0.00060 A	PASS	0.0000058 A
4-Wire / 100 Ω	0.0000 Ω	-0.0040 Ω	0.0005 Ω	0.0005 Ω	0.0040 Ω	PASS	0.000058 Ω
4-Wire / 1 kΩ	0.000000 kΩ	-0.000010 kΩ	0.000000 kΩ	0.000000 kΩ	0.000010 kΩ	PASS	0.00000058 kΩ
4-Wire / 10 kΩ	0.00000 kΩ	-0.00010 kΩ	0.00000 kΩ	0.00000 kΩ	0.00010 kΩ	PASS	0.0000058 kΩ
4-Wire / 100 kΩ	0.0000 kΩ	-0.0010 kΩ	0.0000 kΩ	0.0000 kΩ	0.0010 kΩ	PASS	0.000058 kΩ
4-Wire / 1 MΩ	0.000000 MΩ	-0.000010 MΩ	0.000000 MΩ	0.000000 MΩ	0.000010 MΩ	PASS	0.00000058 MΩ
4-Wire / 10 MΩ	0.00000 MΩ	-0.00010 MΩ	0.00000 MΩ	0.00000 MΩ	0.00010 MΩ	PASS	0.0000058 MΩ
4-Wire / 100 MΩ	0.0000 MΩ	-0.0010 MΩ	0.0000 MΩ	0.0000 MΩ	0.0010 MΩ	PASS	0.000058 MΩ
2-Wire / 100 Ω	0.0000 Ω	-0.0040 Ω	0.0000 Ω	0.0000 Ω	0.0040 Ω	PASS	0.000058 Ω
2-Wire / 1 kΩ	0.000000 kΩ	-0.000010 kΩ	0.000000 kΩ	0.000000 kΩ	0.000010 kΩ	PASS	0.00000058 kΩ
2-Wire / 10 kΩ	0.00000 kΩ	-0.00010 kΩ	0.00000 kΩ	0.00000 kΩ	0.00010 kΩ	PASS	0.0000058 kΩ
2-Wire / 100 kΩ	0.0000 kΩ	-0.0010 kΩ	0.0000 kΩ	0.0000 kΩ	0.0010 kΩ	PASS	0.000058 kΩ
2-Wire / 1 MΩ	0.000000 MΩ	-0.000010 MΩ	0.000000 MΩ	0.000000 MΩ	0.000010 MΩ	PASS	0.00000058 MΩ
2-Wire / 10 MΩ	0.00000 MΩ	-0.00010 MΩ	0.00000 MΩ	0.00000 MΩ	0.00010 MΩ	PASS	0.0000058 MΩ
2-Wire / 100 MΩ	0.0000 MΩ	-0.0010 MΩ	0.0000 MΩ	0.0000 MΩ	0.0010 MΩ	PASS	0.000058 MΩ

Section 2 - DC Voltage Gain Verification Test

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
100 mV	100.0000 mV	99.9915 mV	99.9990 mV	99.9990 mV	100.0085 mV	PASS	0.0017 mV
100 mV	-100.0000 mV	-100.0085 mV	-99.9990 mV	-99.9990 mV	-99.9915 mV	PASS	0.0017 mV
1 V	1.000000 V	0.999958 V	0.999980 V	0.999980 V	1.000042 V	PASS	0.000098 V
10 V	10.00000 V	9.99965 V	9.99986 V	9.99986 V	10.00035 V	PASS	0.000043 V
10 V	-10.00000 V	-10.00035 V	-9.99989 V	-9.99989 V	-9.99965 V	PASS	0.000043 V
100 V	100.0000 V	99.9954 V	99.9973 V	99.9973 V	100.0046 V	PASS	0.00065 V
1000 V	1000.000 V	999.954 V	999.980 V	999.980 V	1000.046 V	PASS	0.0061 V

Section 3 - DC Current Gain Verification Test

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
100 µA	100.0000 µA	99.9250 µA	100.0000 µA	100.0000 µA	100.0750 µA	PASS	0.010 µA
1 mA	1.000000 mA	0.999440 mA	0.999900 mA	0.999900 mA	1.000560 mA	PASS	0.000043 mA
10 mA	10.00000 mA	9.99300 mA	10.00000 mA	10.00000 mA	10.00700 mA	PASS	0.00041 mA
100 mA	100.0000 mA	99.9450 mA	100.0001 mA	100.0001 mA	100.0550 mA	PASS	0.0053 mA
1 A	1.000000 A	0.998900 A	0.999900 A	0.999900 A	1.001100 A	PASS	0.000094 A
3 A	2.00000 A	1.99640 A	1.99980 A	1.99980 A	2.00360 A	PASS	0.00018 A

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Section 4 - AC Voltage Gain Verification Test

Range Frequency	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
100 mV / 1 kHz	100.0000 mV	99.9100 mV	99.9750 mV	99.9750 mV	100.0900 mV	PASS	0.015 mV
100 mV / 50 kHz	100.0000 mV	99.8500 mV	99.9994 mV	99.9994 mV	100.1500 mV	PASS	0.027 mV
100 mV / 300 kHz	100.0000 mV	98.3000 mV	99.9955 mV	99.9955 mV	101.7000 mV	PASS	0.11 mV
1 V / 1 kHz	1.000000 V	0.999100 V	0.999801 V	0.999801 V	1.000900 V	PASS	0.000053 V
1 V / 50 kHz	1.000000 V	0.998500 V	1.000433 V	1.000433 V	1.001500 V	PASS	0.000085 V
1 V / 300 kHz	1.000000 V	0.983000 V	0.994578 V	0.994578 V	1.017000 V	PASS	0.00050 V
10 V / 10 Hz	10.00000 V	9.99097 V	9.99712 V	9.99712 V	10.00903 V	PASS	0.0028 V
10 V / 1 kHz	10.00000 V	9.99100 V	10.00326 V	10.00326 V	10.00900 V	PASS	0.00050 V
10 V / 50 kHz	10.00000 V	9.98500 V	9.99384 V	9.99384 V	10.01500 V	PASS	0.00085 V
10 V / 300 kHz	10.00000 V	9.83000 V	10.00344 V	10.00344 V	10.17000 V	PASS	0.0034 V
100 V / 1 kHz	100.0000 V	99.9100 V	100.0120 V	100.0120 V	100.0900 V	PASS	0.0046 V
100 V / 50 kHz	100.0000 V	99.8500 V	100.0211 V	100.0211 V	100.1500 V	PASS	0.0076 V
100 V / 300 kHz	50.0000 V	48.9000 V	49.9805 V	49.9805 V	51.1000 V	PASS	0.015 V
750 V / 1 kHz	750.000 V	749.010 V	750.371 V	750.371 V	750.990 V	PASS	0.056 V
750 V / 50 kHz	210.000 V	209.415 V	210.122 V	210.122 V	210.585 V	PASS	0.016 V
750 V / 300 kHz	70.000 V	65.410 V	71.365 V	71.365 V	74.590 V	PASS	0.020 V

Section 5 - AC Current Gain Verification Test

Range Frequency	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
100 µA / 1 kHz	100.0000 µA	99.8600 µA	100.0064 µA	100.0064 µA	100.1400 µA	PASS	0.020 µA
100 µA / 5 kHz	100.0000 µA	99.8600 µA	100.0620 µA	100.0620 µA	100.1400 µA	PASS	0.040 µA
1 mA / 1 kHz	1.000000 mA	0.998600 mA	1.000810 mA	1.000810 mA	1.001400 mA	PASS	0.00016 mA
1 mA / 5 kHz	1.000000 mA	0.998600 mA	1.000766 mA	1.000766 mA	1.001400 mA	PASS	0.00033 mA
10 mA / 1 kHz	10.00000 mA	9.98600 mA	10.00811 mA	10.00811 mA	10.01400 mA	PASS	0.0016 mA
10 mA / 5 kHz	10.00000 mA	9.97600 mA	9.99730 mA	9.99730 mA	10.02400 mA	PASS	0.0028 mA
100 mA / 1 kHz	100.0000 mA	99.8600 mA	100.0759 mA	100.0759 mA	100.1400 mA	PASS	0.015 mA
100 mA / 5 kHz	100.0000 mA	99.7600 mA	99.9280 mA	99.9280 mA	100.2400 mA	PASS	0.032 mA
1 A / 1 kHz	1.000000 A	0.998600 A	0.999962 A	0.999962 A	1.001400 A	PASS	0.00030 A
1 A / 5 kHz	1.000000 A	0.998600 A	1.000270 A	1.000270 A	1.001400 A	PASS	0.00052 A
3 A / 1 kHz	2.00000 A	1.99520 A	2.00000 A	2.00000 A	2.00480 A	PASS	0.00056 A
3 A / 5 kHz	2.00000 A	1.99520 A	1.99921 A	1.99921 A	2.00480 A	PASS	0.00096 A

Section 6 - Frequency Gain Verification Test

Input Voltage	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
10 mV	40.00000 Hz	39.97200 Hz	39.99922 Hz	39.99922 Hz	40.02800 Hz	PASS	0.0000058 Hz
10 V	10.00000 kHz	9.99930 kHz	9.99991 kHz	9.99991 kHz	10.00070 kHz	PASS	0.0000058 kHz

Section 7 - Ohms Gain Verification Test

4-Wire Ohms, @ 100Mohms Verify only. 2-Wire Ohms.

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
100 Ω	100.0000 Ω	99.9860 Ω	100.0000 Ω	100.0000 Ω	100.0140 Ω	PASS	0.0011 Ω
1 kΩ	1.000000 kΩ	0.999890 kΩ	1.000002 kΩ	1.000002 kΩ	1.000110 kΩ	PASS	0.0000090 kΩ
10 kΩ	10.00000 kΩ	9.99890 kΩ	9.99997 kΩ	9.99997 kΩ	10.00110 kΩ	PASS	0.000090 kΩ
100 kΩ	100.0000 kΩ	99.9890 kΩ	100.0000 kΩ	100.0000 kΩ	100.0110 kΩ	PASS	0.0014 kΩ
1 MΩ	1.000000 MΩ	0.999870 MΩ	0.999952 MΩ	0.999952 MΩ	1.000130 MΩ	PASS	0.000024 MΩ
10 MΩ	10.00000 MΩ	9.99590 MΩ	9.99947 MΩ	9.99947 MΩ	10.00410 MΩ	PASS	0.00043 MΩ
100 MΩ	100.00000 MΩ	99.99199 MΩ	99.999820 MΩ	99.999820 MΩ	100.000801 MΩ	PASS	0.00084 MΩ

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Section 8 - Capacitance Measurement

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	Uncertainty (±)
1.0000 μ F	1.0000 μ F	0.9950 μ F	1.0010 μ F	1.0010 μ F	1.0050 μ F	PASS	0.0040 μ F
10.000 μ F	1.000 μ F	0.986 μ F	1.001 μ F	1.001 μ F	1.014 μ F	PASS	0.0040 μ F

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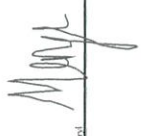
S/N	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment-Owner	Customized Equip.	Customer ID	Customer	Location	Active
1	93260	Electrical Safety Analyzer (Chroma)	Chroma	19032	19032G400225	12 Months	04-Mar-20	04-Mar-21	Micro Precision		N	NA	Waters	Waters - Production	Y
2	TE82869	Shutter Tester	Waters	TE82869-2	-	12 Months	02-Apr-20	02-Apr-21	Internal Calibration CEI		Y	NA	Waters	Waters - Production	Y
3	86082	Load Box (Chroma)	Waters	S14-03	14354696	12 Months	04-Mar-20	04-Mar-21	Micro Precision		Y	NA	Waters	Waters - Production	Y

Reviewed by : Lai Mui Khin

Date : 01 Apr 2020

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15	9024WP72	Tektronics 4-Channel Digital Oscilloscope	Tektronics	TDS460A	R071897	12 months	15 Aug 19	15 Aug 20	Tech system Service & Integration	N/A	380	N/A	Waters	Waters Production	Y
16	9024WP72	Electronic Load	HP	69552B	U537243391	12 months	15 Aug 19	15 Aug 20	Tech system Service & Integration	N/A	380	N/A	Waters	Waters Production	Y
17	9024WP72	Electronic Load	HP	69552B	U537244144	12 months	15 Aug 19	15 Aug 20	Tech system Service & Integration	N/A	380	N/A	Waters	Waters Production	Y
18	9024WP72	Electronic Load	HP	69552A	3011A-01246	12 months	15 Aug 19	15 Aug 20	Tech system Service & Integration	N/A	380	N/A	Waters	Waters Production	Y
19	9024WP72	Keithley Source Measurement Unit #2	Keithley	236	0763389	12 months	22 Aug 19	22 Aug 20	Tektronics Southern Asia Pte. Ltd	N/A	380	N/A	Waters	Waters Production	Y
20	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-25	09M1019A	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
21	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-25	09M1019A	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
22	9024WP72	601 DIGITAL MULTIMETER	Agilent Tech	34411A	MY4060358	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
23	9024WP72	4 CH SOURCE OSCILLOSCOPE	TEKTRONIX	TDS9054C	C011055	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
24	9024WP72	NI M series 1 MILLIFUNCTION DAQ Device	National Instruments	PXI-4229	145DF14	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
25	9024WP72	NI M series 1 MILLIFUNCTION DAQ Device	National Instruments	PXI-4229	145DF14	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
26	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5	09M1019A	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
27	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5	09M1019A	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
28	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5	09M1019A	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
29	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5	09M1019A	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
30	9024WP72	NI Programmable DC Power supply	National Instruments	PXI-4130	1450264	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
31	9024WP72	20MHz FUNCTION ARBITRARY WAVEFORM GENERATOR	Agilent Tech	33220A	MY4104658	12 months	21 Aug 20	21 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
32	9024WP72	DC ELECTRONIC LOAD MODULE 1.60 A, 80 V, 50 W	CHROMA	63103	631030017022	12 months	22 Aug 20	22 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
33	9024WP72	DC ELECTRONIC LOAD MODULE 1.60 A, 80 V, 50 W	CHROMA	63103	631030017022	12 months	22 Aug 20	22 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
34	9024WP72	DC ELECTRONIC LOAD MODULE 1.60 A, 80 V, 50 W	CHROMA	63103	631030017042	12 months	22 Aug 20	22 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
35	9024WP72	DC ELECTRONIC LOAD MODULE 1.60 A, 80 V, 50 W	CHROMA	63103	631030017030	12 months	22 Aug 20	22 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
36	9024WP72	NI M series 1 MILLIFUNCTION DAQ Device	National Instruments	PXI-4229	1701258	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
37	9024WP72	20MHz Function Arbitrary Waveform Generator	Agilent Tech	33220A	MY4104658	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
38	9024WP72	NI Programmable DC Power supply Power SMU	National Instruments	PXI-4130	16010707	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
39	9024WP72	DC Electronic Load 0.50A/50V/50W	Chroma	63103A	63103A05460	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
40	9024WP72	DC Electronic Load 0.50A/50V/50W	Chroma	63103A	63103A05457	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
41	9024WP72	DC Electronic Load 0.50A/50V/50W	Chroma	63103A	63103A05448	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
42	9024WP72	DC Electronic Load 0.50A/50V/50W	Chroma	63103A	63103A05472	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
43	9024WP72	Agilent 6172 Digi Multimeter	Agilent	34411A	MY4060358	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
44	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5/4 ANA1	09M1019A	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
45	9024WP72	NI M series 1 MILLIFUNCTION DAQ Device	National Instruments	PXI-4229	1701259	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
46	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-25	12M4062Z	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
47	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-25	12M4063Z	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
48	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5	12M4062Z	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
49	9024WP72	Programmable DC Power supply	TDK Lambda	GEN160-12.5	12M4062Z	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
50	9024WP72	4 CH SOURCE OSCILLOSCOPE	TEKTRONIX	TDS9054C	C011055	12 months	28 Aug 20	28 Aug 21	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
51	9024WP72	PXI PROGRAMMABLE RESISTOR MODULE	GEOSTEST	GX1164-01	002861J01EAXA00	24 months	21 Aug 20	21 Aug 22	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
52	9024WP72	PXI PROGRAMMABLE RESISTOR MODULE	GEOSTEST	GX1164-01	002861J01EAXA00	24 months	21 Aug 20	21 Aug 22	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y
53	1140241	PXI PROGRAMMABLE RESISTOR MODULE	GEOSTEST	GX1164-01	002861J01EAXA00	24 months	21 Aug 20	21 Aug 22	Micro Precision Calibration PTE LTD	N/A	380	N/A	Waters	Waters Production	Y



 Maya

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SN	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Intcal	Calibration Date	Due Date	Vendor	Equipment Owner	Contracted	Customer ID	Customer	Location	Active
1	90231	Kalibay Source Measurement Unit	Kalibay	236	0702275	12 months	15 Aug 19	31 Jan 20	ES&CO Calibration Laboratory	N/A	NO	N/A	Waters	Modified	not for service
2	90239	61-1 Dual VXI Multimeter D9022319 1200 V019	Head Inc	4152A	1S3010180	12 months	20 Mar 19	20 Mar 20	Tec-Cal LLC	N/A	NO	N/A	Waters	Modified	not for service
3	90235	3151 VXI Waveform Generator D909205 V019 CFI	Head Inc	3151A+	0305800	12 months	20 Mar 19	20 Mar 20	Tec-Cal LLC	N/A	NO	N/A	Waters	Modified	not for service
4	90241 1200 V019	VXI Counter Card	Head Inc	2461 CTD	1100	12 months	20 Mar 19	20 Mar 20	Tec-Cal LLC	N/A	NO	N/A	Waters	Modified	not for service
5		HP66103A DC Power Module 35V4 5A	Agilent Technologies	66103A	US34212664	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
6		HP66103A DC Power Module 35V4 5A	Agilent Technologies	66103A	US34212667	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
7		HP66103A DC Power Module 35V4 5A	Agilent Technologies	66103A	US34212669	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
8		HP66103A DC Power Module 35V4 5A	Agilent Technologies	66103A	US34212672	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
9		HP66101A DC Power Module 8V16A	Agilent Technologies	66101A	US34442070	12 months	16 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
10		HP66101A DC Power Module 8V16A	Agilent Technologies	66101A	MY4000535	12 months	16 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
11		HP66103A DC Power Module 35V4 5A	Agilent Technologies	66103A	US34212670	12 months	16 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
12	90231 1200 WP72	Electronic Load	HP	60502B	US37244128	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
13	90231 1200 WP72	Electronic Load	HP	60502B	US37244138	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y
14	90231 1200 WP72	Electronic Load	HP	60502B	US37244141	12 months	15 Aug 19	15 Aug 20	Tech systems Services & Integration	N/A	NO	N/A	Waters	Waters Production	Y

S/N	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment Owner	Customized Equip.	Customer ID	Customer	Location	Active
1	0196	Digital Thermometer with Probe (K type)	Fiske	51 II	89280141	12 Months	30-Jul-19	30-Jul-20	TSIA	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
2	0206	Electronic Weigh Balance	AND	HB200	12305157	06 Months	09-Jul-20	09-Jan-21	Micro Precision	Joel Manalilio Delayo	N	90891	Waters	Waters - Production	Y
3	0207	Column Heater	Waters	WA1091727	M03CHM01SR	12 Months	03-Apr-20	03-Apr-21	Internal	Joel Manalilio Delayo	Y	81008	Waters	Waters - Production	Y
4	0208	Column Heater	Waters	WA1091727	B01CHM203R	12 Months	03-Apr-20	03-Apr-21	Internal	Joel Manalilio Delayo	Y	81009	Waters	Waters - Production	Y
5	0209	Column Heater	Waters	WA1091727	D01CHM128R	12 Months	23-Jun-20	23-Jun-21	Internal	Joel Manalilio Delayo	Y	81010	Waters	Waters - Production	Y
6	0210	Column Heater	Waters	WA1091727	K03CHM093R	12 Months	23-Jun-20	23-Jun-21	Internal	Joel Manalilio Delayo	Y	81011	Waters	Waters - Production	Y
7	0211	Column Heater	Waters	WA1091727	F01CHM651R	12 Months	24-Jun-20	24-Jun-21	Internal	Joel Manalilio Delayo	Y	81012	Waters	Waters - Production	Y
8	0212	Column Heater	Waters	WA1091727	F00CHM523R	12 Months	24-Jun-20	24-Jun-21	Internal	Joel Manalilio Delayo	Y	81013	Waters	Waters - Production	Y
9	0213	Column Heater	Waters	WA1091727	F00CHM531R	12 Months	29-Jun-20	29-Jun-21	Internal	Joel Manalilio Delayo	Y	81014	Waters	Waters - Production	Y
10	0216	Electronic Weigh Balance	AND	HB200	12200404	06 Months	09-Jul-20	09-Jan-21	Micro Precision	Joel Manalilio Delayo	N	90838	Waters	Waters - Production	Y
11	0217	Electronic Weigh Balance	AND	HB200	12303279	06 Months	09-Jul-20	09-Jan-21	Micro Precision	Joel Manalilio Delayo	N	90818	Waters	Waters - Production	Y
12	0221	1500 Series Pump Final Test Station	Waters	Pump	TER2705-2	06 Months	21-May-20	21-Nov-20	Internal	Joel Manalilio Delayo	Y	TER2705-2	Waters	Waters - Production	Y
13	0222	515 Final Test Station	Waters	Pump	TER2534	06 Months	21-May-20	21-Nov-20	Internal	Joel Manalilio Delayo	Y	TER2534	Waters	Waters - Production	Y
14	0223	IPNAV Tester	Waters	NA	TER2625-1	06 Months	16-Jul-20	16-Jan-21	Internal	Joel Manalilio Delayo	Y	TER2625-1	Waters	Waters - Production	Y
15	0224	2090 Pump Head Tester	Waters	NA	TER2519	06 Months	22-May-20	22-Nov-20	Internal	Joel Manalilio Delayo	Y	TER2519	Waters	Waters - Production	Y
16	0225	Injector Seal Peak Tester	Waters	NA	TER2503-4	06 Months	16-Jul-20	16-Jan-21	Internal	Joel Manalilio Delayo	Y	TER2503-4	Waters	Waters - Production	Y
17	0226	Electronic Weigh Balance	AND	HB200	12315717	06 Months	09-Jul-20	09-Jan-21	Micro Precision	Joel Manalilio Delayo	N	90913	Waters	Waters - Production	Y
18	0233	Column Heater	Waters	WA1038040	H01CHM435M	12 Months	29-Jun-20	29-Jan-21	Internal	Joel Manalilio Delayo	Y	81020	Waters	Waters - Production	Y
19	0234	Column Heater	Waters	WA1038040	M00CHM010M	12 Months	29-Jun-20	29-Jan-21	Internal	Joel Manalilio Delayo	Y	81021	Waters	Waters - Production	Y
20	0235	Column Heater	Waters	WA1038040	H01CHM435M	12 Months	29-Jun-20	29-Jan-21	Internal	Joel Manalilio Delayo	Y	81022	Waters	Waters - Production	Y
21	0236	Column Heater	Waters	WA1038040	MX6DM7863M	12 Months	30-Jan-20	30-Jan-21	Internal	Joel Manalilio Delayo	Y	81018	Waters	Waters - Production	Y
22	0237	Column Heater	Waters	WA1038040	L97CHM711M	12 Months	02-Apr-20	02-Apr-21	Internal	Joel Manalilio Delayo	Y	81017	Waters	Waters - Production	Y
23	0238	Column Heater	Waters	WA1038040	MX6DM444M	12 Months	30-Jan-20	30-Jan-21	Internal	Joel Manalilio Delayo	Y	81023	Waters	Waters - Production	Y
24	0239	Column Heater	Waters	WA1038040	MX5DM6993M	12 Months	30-Jan-20	30-Jan-21	Internal	Joel Manalilio Delayo	Y	81016	Waters	Waters - Production	Y
25	0244	Column Heater	Waters	WA1038040	MX6DM7867M	12 Months	30-Jan-20	30-Jan-21	Internal	Joel Manalilio Delayo	Y	96263	Waters	Waters - Production	Y
26	0245	Digital Multimeter	Fiske	110	85730619	12 Months	16-Dec-19	16-Feb-20	TSIA	Joel Manalilio Delayo	N	91368	Waters	Waters - Production	Y
27	0246	Digital Multimeter	Fiske	179	90240092	12 Months	13-Feb-20	13-Feb-21	TSIA	Joel Manalilio Delayo	N	95037	Waters	Waters - Production	Y
28	0249	Electrical Safety Analyzer	Qualtech	Guardian 6900	5077655	12 Months	08-Jan-20	08-Jan-21	Micro Precision	Joel Manalilio Delayo	N	WT-TE-0331	Waters	Waters - Production	Y
29	0256	Pressure Calibrator	Ametek	ATC100CIN00G	9993205	12 Months	22-Nov-19	21-Nov-20	Scientific Instruments	Joel Manalilio Delayo	N	TER2503-05	Waters	Waters - Production	Y
30	0259	Injector Seal Peak Tester	Waters	TER2503-5	TER2503-5	06 Months	27-Feb-20	27-Aug-20	Internal	Joel Manalilio Delayo	Y	95206	Waters	Waters - Production	Y
31	0278	Electronic Weigh Balance	AND	HB200	12316922	06 Months	09-Jul-20	09-Jan-21	Micro Precision	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
32	0279	High Voltage Probe	Fiske	80K-6	89200011	12 Months	24-Sep-19	24-Sep-20	SGS	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
33	0280	Clamp Meter	Kyotoku	2033	66386	12 Months	Call in progress	Call in progress	TSIA	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
34	0360	Electrical Safety Analyzer	Qualtech	Guardian 6900	609766	12 Months	28-Nov-19	28-Nov-20	Micro Precision	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
35	0431	Picoammeter	Kellibey	485	435110	12 Months	18-Feb-20	18-Feb-21	Keylight Technologies	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
36	0432	Electrical Safety Analyzer	Qualtech	Guardian 6000 Plus	0820865	12 Months	03-Oct-19	03-Oct-20	Micro Precision	Joel Manalilio Delayo	N	NA	Waters	Waters - Production	Y
37	0438	Auto Pressure (Flowcell Tester)	Waters	NA	TE-32475-2	12 Months	09-Apr-20	09-Apr-21	Internal	Joel Manalilio Delayo	Y	NA	Waters	Waters - Production	Y
38	0497	Electronic Weigh Balance	AND	HB200	12326186	06 Months	09-Jul-20	09-Jan-21	Micro Precision	Joel Manalilio Delayo	N	90610	Waters	Waters - Production	Y

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Prepared by: Chai Jon Lai Wj 04 Aug 2020 (Name/Signature/Date)Approved by: Michelle Koh Sui Noi (Name/Signature/Date)

04 Aug 2020

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SN ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Internal	Calibration Date	Due Date	Vendor	Equipment Owner	Customized Equip.	Customer ID	Customer	Location	Active
39	0409 Electronic Weigh Balance	AND	HBC200	1326733	06 Months	01-Jun-20	01-Dec-20	Micro Precision	Joel Mantelero Delayo	N	90605	Waters	Waters - Production	Y
40	0500 Electronic Weigh Balance	AND	HBC200	1326734	06 Months	15-Apr-20	15-Oct-20	Micro Precision	Joel Mantelero Delayo	N	90608	Waters	Waters - Production	Y
41	0501 Electronic Weigh Balance	AND	HBC200	1326737	06 Months	03-Jun-20	03-Dec-20	Micro Precision	Joel Mantelero Delayo	N	90604	Waters	Waters - Production	Y
42	0502 Electronic Weigh Balance	AND	HBC200	1326738	06 Months	03-Jun-20	03-Dec-20	Micro Precision	Joel Mantelero Delayo	N	90603	Waters	Waters - Production	Y
43	0503 Electronic Weigh Balance	AND	HBC200	1326739	06 Months	03-Jun-20	03-Dec-20	Micro Precision	Joel Mantelero Delayo	N	90600	Waters	Waters - Production	Y
44	0504 Electronic Weigh Balance	AND	HBC200	1326740	06 Months	03-Jun-20	03-Dec-20	Micro Precision	Joel Mantelero Delayo	N	90607	Waters	Waters - Production	Y
45	0592 Torque Wrench	Shimpo	CD200	100032663	06 Months	04-Mar-20	04-Sep-20	Ming Deng	Paul	N	NA	Waters	Waters - Production	Y
46	0594 Dial Depth Gauge	Shimpo	2504S / 7217S	100317 / 000943	06 Months	06-Mar-20	06-Sep-20	Ming Deng	Paul	N	NA	Waters	Waters - Production	Y
47	0595 Dial Indicator	Mitutoyo	2514S	JY576	06 Months	06-Mar-20	06-Sep-20	Ming Deng	Paul	N	NA	Waters	Waters - Production	Y
48	0597 Mass Flow Meter	ALHONG	GRM17	170609.1	12 Months	08-Jul-20	08-Jul-21	Chick	Joel Mantelero Delayo	N	NA	Waters	Waters - Production	Y
49	0877 Torque Wrench	Shimpo	QD1820	040302147	06 Months	04-Mar-20	04-Sep-20	Ming Deng	Gary Lai Yim Iac	N	NA	Waters	Waters - Production	Y
50	1109 Dual Wavelength Detector	Waters	TCV Detector	K050PT419M	12 Months	31-Jan-20	31-Jan-21	Internal	Joel Mantelero Delayo	Y	91897	Waters	Waters - Production	Y
51	1394 2489 UV / Visible Detector	Waters	186248900	H1397E726A	12 Months	12-Jun-20	12-Jun-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
52	1395 2489 UV / Visible Detector	Waters	186248900	H1397E727A	12 Months	09-Jul-20	09-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
53	1396 2489 UV / Visible Detector	Waters	186248900	H1397E728A	12 Months	24-Jun-20	24-Jun-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
54	1397 2489 UV / Visible Detector	Waters	186248900	H1397E729A	12 Months	20-Jul-20	20-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
55	1398 2489 UV / Visible Detector	Waters	186248900	H1397E730A	12 Months	09-Jul-20	09-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
56	1399 2489 UV / Visible Detector	Waters	186248900	H1397E731A	12 Months	04-Jun-20	04-Jun-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
57	1400 2489 UV / Visible Detector	Waters	186248900	H1397E732A	12 Months	12-Jun-20	12-Jun-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
58	1401 2489 UV / Visible Detector	Waters	186248900	H1397E733A	12 Months	12-Jun-20	12-Jun-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
59	1402 2489 UV / Visible Detector	Waters	186248900	H1397E734A	12 Months	08-Jul-20	08-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
60	1403 2489 UV / Visible Detector	Waters	186248900	H1397E735A	12 Months	19-Jun-20	19-Jun-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
61	1404 2489 UV / Visible Detector	Waters	186248900	H1397E736A	12 Months	09-Jul-20	09-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
62	1405 2489 UV / Visible Detector	Waters	186248900	H1397E737A	12 Months	09-Jul-20	09-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
63	1428 2489 UV / Visible Detector	Waters	186248900	H1397E710A	12 Months	09-Jul-20	09-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
64	1429 2489 UV / Visible Detector	Waters	186248900	D1397E759A	12 Months	09-Apr-20	09-Apr-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
65	1430 2489 UV / Visible Detector	Waters	186248900	D1397E76A	12 Months	09-Apr-20	09-Apr-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
66	1431 2489 UV / Visible Detector	Waters	186248900	D1397E76A	12 Months	09-Apr-20	09-Apr-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
67	1432 2489 UV / Visible Detector	Waters	186248900	D1397E76A	12 Months	09-Apr-20	09-Apr-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
68	1433 2489 UV / Visible Detector	Waters	186248900	C1397E133M	12 Months	08-Apr-20	08-Apr-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
69	***1492 Electrical Safety Analyzer	Chroma	19032	19032000182	12 Months	26-Oct-19	26-Oct-20	Micro Precision	Joel Mantelero Delayo	N	NA	Waters	Waters - Production	Y
70	1515 2489 UV / Visible Detector	WATERS	186248900	H1587E607A	12 Months	26-Dec-19	26-Dec-20	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
71	1516 2489 UV / Visible Detector	WATERS	186248900	H1587E608A	12 Months	27-Dec-19	27-Dec-20	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
72	1519 2489 UV / Visible Detector	WATERS	186248900	H1587E609A	12 Months	27-Dec-19	27-Dec-20	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
73	1520 2489 UV / Visible Detector	WATERS	186248900	H1587E610A	12 Months	26-Dec-19	26-Dec-20	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
74	1571 Michelson Lighting	X-Rite	Julie 11	C6109261217	12 Months	04-Sep-19	04-Sep-20	Xite	Lloyd Blum Iac	N	NA	Waters	Chang South - IQA	Y
75	1787 Column Heater	WATERS	WAT001727	C13C18M795R	12 Months	17-Jul-20	17-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y
76	1782 Column Heater	WATERS	WAT001727	D13C18M259R	12 Months	17-Jul-20	17-Jul-21	Internal	Joel Mantelero Delayo	Y	NA	Waters	Waters - Production	Y

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Prepared by: Chai Soon Loi 10/04/2020 (Name/Signature/Date)

Approved by: Nichelle Koh Sai Noi 04 Aug 2020 (Name/Signature/Date)

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SN	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment Owner	Customized Equip.	Customer ID	Customer	Location	Active
77	1783	Column Heater	WATERS	WAT91727	K14C1M398R	12 Months	17-Jul-20	17-Jul-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
78	1784	Column Heater	WATERS	WAT91727	L14C1M438R	12 Months	17-Jul-20	17-Jul-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
79	1787	Column Heater	WATERS	WAT91727	D15C1M641R	12 Months	17-Jul-20	17-Jul-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
80	2035	Electronic Weigh Balance	AND	HR200	12316741	06 Months	15-Apr-20	15-Oct-20	Micro Precision	Joel Mamashten Delayo	N	92207	Waters	Waters - Production	Y
81	2092	Electronic Weigh Balance	AND	HR200	12377042	06 Months	15-Apr-20	15-Oct-20	Micro Precision	Joel Mamashten Delayo	N	86080	Waters	Waters - Production	Y
82	2094	Load Box	Chroma	S14-03	14354695	12 Months	12-Dec-19	12-Dec-20	TSSA	Joel Mamashten Delayo	N	86081	Waters	Waters - Production	Y
83	2095	Load Box	Chroma	S14-03	14354681	12 Months	06-Mar-20	06-Mar-21	Micro Precision	Joel Mamashten Delayo	N	86079	Waters	Waters - Production	Y
84	2096	Load Box	Chroma	S14-03	14354691	12 Months	02-May-20	02-May-21	Micro Precision	Joel Mamashten Delayo	N	86085	Waters	Waters - Production	Y
85	2097	Load Box	Chroma	S14-03	7322788	12 Months	03-May-20	03-May-21	Micro Precision	Joel Mamashten Delayo	N	95515	Waters	Waters - Production	Y
86	2217	Bandpass Measuring Machine	Quality Vision International	StarLine 150	BSL10012609	12 Months	30-Mar-20	30-Mar-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
87	2348	2489 UV / Visible Detector	Waters	186248900	C1887E101A	12 Months	20-Mar-20	20-Mar-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
88	2349	2489 UV / Visible Detector	Waters	186248900	C1887E103A	12 Months	20-Mar-20	20-Mar-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
89	2350	2489 UV / Visible Detector	Waters	186248900	C1887E106A	12 Months	13-Mar-20	13-Mar-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
90	2351	2489 UV / Visible Detector	Waters	186248900	D1887E275A	12 Months	08-Apr-20	08-Apr-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
91	2352	Column Heater Module	Waters	WAT038040	M17C1M434M	12 Months	12-Jun-20	12-Jun-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
92	2353	Column Heater Module	Waters	WAT038040	M17C1M435M	12 Months	12-Jun-20	12-Jun-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y
93	2354	Column Heater Module	Waters	WAT038040	M17C1M439M	12 Months	12-Jun-20	12-Jun-21	Internal	Joel Mamashten Delayo	Y	NA	Waters	Waters - Production	Y

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 Approved by: Michelle Koh Sai Noi 04 Aug 2020 (Name/Signature/Date)

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S/N	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment-Owner	Customized Equip.	Customer ID	Customer	LOCATION	Active
1	PWAT-16GC0002	DC Electronic Load module	HEWLETT PACKARD	60502B	3211A01907	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
2	PWAT-16GC0003	DC Electronic Load module	HEWLETT PACKARD	60502B	3211A01876	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
3	PWAT-16GC0004	DC Electronic Load module	HEWLETT PACKARD	60502B	3211A01587	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
4	PWAT-16GC0005	DC Electronic Load module	HEWLETT PACKARD	60502B	3211A02210	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
5	PWAT-16GC0006	DC Electronic Load module	HEWLETT PACKARD	60502B	3211A01795	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
6	PWAT-16GC0007	DC Electronic Load module	HEWLETT PACKARD	60502B	3211A00920	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
7	PWAT-16GC0008	DC Power Supply	TDK-Lambda	GENH30-25	95166	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
8	PWAT-16GC0009	DC Power Supply	TDK-LAMBDA	GENH60-12.5	95170	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
9	PWAT-16GC0010	DC Power Supply	TDK-Lambda	GENH60-12.5	95165	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
10	PWAT-16GC0011	DC Power Supply	TDK-Lambda	GENH30-25	95167	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
11	PWAT-16GC0012	DC Power Supply	TDK-Lambda	GENH60-12.5	95164	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
12	PWAT-16GC0013	DC Power Supply	TDK-Lambda	GENH60-12.5	95171	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
13	PWAT-16GC0014	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66103A	US34213251	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
14	PWAT-16GC0015	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66103A	US34213252	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
15	PWAT-16GC0016	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66103A	US34213090	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
16	PWAT-16GC0017	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66103A	US34213209	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
17	PWAT-16GC0018	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66101A	3444A02477	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
18	PWAT-16GC0019	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66103A	US34213216	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
19	PWAT-16GC0020	DC POWER SUPPLY MODULE	HEWLETT PACKARD	66101A	3444A02507	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
20	PWAT-16GC0021	Digital Phosphor Oscilloscope	Tektronix	TDS3054C	C011477	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
21	PWAT-16GC0022	Electronic Load Plug-In Module / Control Mainframe with 4 DC Electronic Load 6A/60A/80V 300W	Chroma	63103/6314	63145125/95148 (S/N : ID#95184, ID#95185, ID#95186, ID#95187)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
22	PWAT-16GC0023	Function/Arbitrary Waveform Generator	Agilent	33220A	MY44044085/95154	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
23	PWAT-16GC0030	M Series Multifunction DAQ	National Instruments	PXI6229	145DEFE	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
24	PWAT-16GC0031	M Series Multifunction DAQ	National Instruments	PXI6229	145DE3A	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
25	PWAT-16GC0033	Multimeter	Agilent	34411A	MY53002751/95155	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
26	PWAT-16GC0034	Oscilloscope	Textronix	TDS460A	B060926	12 Months	10/07/2019	10/07/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Out of service
27	PWAT-16GC0035	PCI 6025E	National Instruments	6025E	C57A10	12 Months	06/11/2019	06/11/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (UNIVERSAL TESTER)	Y

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S/N	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment Owner	Customized Equip.	Customer ID	Customer	LOCATION	Active
28	PWAT-16GC0036	POWER SMU	NATIONAL INSTRUMENTS	PXM130	145025B	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
29	PWAT-16GC0037	Prog. Resistance Card	Geotest	GX1164-01	11640209 (95750)	24 Months	16/04/2019	16/04/2021	Micro Precision	Ricky Celis Cortez	N	95750	Waters	WATERS (GTS TESTER)	Y
30	PWAT-16GC0038	VXI 6 1/2 Digit Multimeter	Racal-Dana Instruments, Inc.	4152A	US38010437	12 Months	10/10/2019	10/10/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
31	PWAT-16GC0039	VXI 6 1/2 Digit Multimeter	Racal-Dana Instruments, Inc.	4152A	US38010248	12 Months	30/04/2020	30/04/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
32	PWAT-16GC0040	VXI Universal Counter 200 MHz	Racal-Dana Instruments, Inc.	2461-CD	03070017	12 Months	26/03/2019	26/03/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Out of service
33	PWAT-16GC0041	VXI Universal Counter 200 MHz	Racal-Dana Instruments, Inc.	2461-CD	1210	12 Months	10/10/2019	10/10/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
34	PWAT-16GC0042	VXI Waveform Generator	Racal-Dana Instruments, Inc.	3151A+	9809972	12 Months	30/07/2018	30/07/2019	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Out of service
35	PWAT-16GC0043	VXI Waveform Generator	Racal-Dana Instruments, Inc.	3151A+	0101813	12 Months	10/10/2019	10/10/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (RACAL TESTER)	Y
36	PWAT-18GC0046	6 1/2 DIGITAL MULTIMETER	AGILENT	34411A	MY48003234	12 Months	10/10/2019	10/10/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (JUNIOR GTS FOR ODA)	Y
37	PWAT-18GC0047	20 MHz FUNCTION/ARBITRARY WAVEFORM GENERATOR	AGILENT	33220A	MY44015802	12 Months	03/07/2020	03/07/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (JUNIOR GTS FOR ODA)	Y
38	PWAT-18GC0048	DIGITAL PHOSFOR OSCILLOSCOPE	TEKTRONIX	TDS3054C	C020604	12 Months	10/10/2019	10/10/2020	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (JUNIOR GTS FOR ODA)	Y
39	PWAT-18GC0049	DC POWER SUPPLY	TDK-Lambda	GENH30-25	97019	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
40	PWAT-18GC0050	DC POWER SUPPLY	TDK-Lambda	GENH30-25	97020	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
41	PWAT-18GC0051	DC POWER SUPPLY	TDK-Lambda	GENH60-12.5	97015	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
42	PWAT-18GC0052	DC POWER SUPPLY	TDK-Lambda	GENH60-12.5	97016	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
43	PWAT-18GC0053	DC POWER SUPPLY	TDK-Lambda	GENH60-12.5	97017	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
44	PWAT-18GC0054	DC POWER SUPPLY	TDK-Lambda	GENH60-12.5	97018	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
45	PWAT-18GC0055	DC ELECTRONIC LOAD	CHROMA	63103A	97010	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
46	PWAT-18GC0056	DC ELECTRONIC LOAD	CHROMA	63103A	97011	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
47	PWAT-18GC0057	DC ELECTRONIC LOAD	CHROMA	63103A	97012	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
48	PWAT-18GC0058	DC ELECTRONIC LOAD	CHROMA	63103A	97013	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
49	PWAT-18GC0059	6 1/2 DIGITAL MULTIMETER	AGILENT	34411A	MY46000178 (ID#97025)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
50	PWAT-18GC0060	20 MHz FUNCTION/ARBITRARY WAVEFORM GENERATOR	AGILENT	33220A	MY44028120 (ID#97026)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
51	PWAT-18GC0061	DIGITAL PHOSFOR OSCILLOSCOPE	TEKTRONIX	TDS 3054C	B020696 (ID#97024)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
52	PWAT-18GC0063	Multifunction DAQ	National Instrument	NI PXI-6229	1CA64F1 (ID#97021)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
53	PWAT-18GC0064	Multifunction DAQ	National Instrument	NI PXI-6229	1CA64E1 (ID#97022)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y

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S/N	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment-Owner	Customized Equip.	Customer ID	Customer	LOCATION	Active
54	PWAT-18GC0065	Power SMU	National Instrument	NI PXI-4130	1CD658C (ID#97023)	12 Months	18/02/2020	18/02/2021	Micro Precision	Ricky Celis Cortez	N	ID#97023	Waters	WATERS (GTS TESTER)	Y
55	PWAT-18GC0062	Prog Resistor	Marvin Test Solution	GX1164	97014	24 Months	05/03/2019	05/03/2021	Micro Precision	Ricky Celis Cortez	N	NA	Waters	WATERS (GTS TESTER)	Y
56	W1-16GC0016	Multimeter / Data Acquisition System	Keithley	Keithley 2700	1227711	12 Months	03/03/2020	03/03/2021	Micro Precision	Ei Lwin Htay	N	NA	Waters	WATERS (LC Model)	Y
57	W1-16GC0020	Electrical Safety Analyzer	Chroma	19032	19032G400264 (ID#93467)	12 Months	03/07/2020	03/07/2021	Micro Precision	Chua Chong Keong	N	ID#93467	Waters	WATERS (LC Model)	Y
58	W1-16GC0021	Electrical Safety Analyzer	QuadTech	Guardian 6000	7312754 (ID#91356)	12 Months	06/11/2019	06/11/2020	Micro Precision	Chua Chong Keong	N	ID#91356	Waters	WATERS (LC Model)	Y
59	W1-16GC0022	Electrical Safety Analyzer	QuadTech	Guardian 6000	5278621 (ID#91693)	12 Months	15/01/2020	15/01/2021	Micro Precision	Chua Chong Keong	N	ID#91693	Waters	WATERS (LC Model)	Y
60	W1-16GC0023	Electrical Safety Analyzer	QuadTech	6000 Plus	11173729 (ID#91890)	12 Months	03/03/2020	03/03/2021	Micro Precision	Chua Chong Keong	N	ID#91890	Waters	WATERS (LC Model)	Y
61	W1-17GC0122	Pat and Flash Tester	Seaward Electronic	CLARE HAL 104	344-0747	12 Months	13/8/2019	13/8/2020	Micro Precision	Alan Oh	N	NA	Waters	WATERS (MS(QDA))	Y
62	W1-18GC0150	Insulation Tester	Megger	MIT400	0703071132	12 Months	06/11/2019	06/11/2020	Micro Precision	Alan Oh	N	NA	Waters	WATERS (MS(QDA))	Y
63	W1-19GC0152	Pat and Flash Tester	Seaward Electronic	CLARE HAL 104	44K-0204	12 Months	06/11/2019	06/11/2020	Micro Precision	Alan Oh	N	NA	Waters	WATERS (MS(QDA))	Y
64	W1-16GC0088	Load Box	CHROMA	S14-03	7322786	12 Months	03/03/2020	03/03/2021	Micro Precision	Chua Chong Keong	N	NA	Waters	WATERS (LC Model)	Y
65	W1-16GC0089	Load Box	CHROMA	S14-03	14354687	12 Months	03/03/2020	03/03/2021	Micro Precision	Chua Chong Keong	N	NA	Waters	WATERS (LC Model)	Y
66	W1-16GC0090	Load Box	CHROMA	S14-03	14354682	12 Months	03/03/2020	03/03/2021	Micro Precision	Chua Chong Keong	N	NA	Waters	WATERS (LC Model)	Y
67	W1-16GC0091	Load Box	CHROMA	S14-03	14354698	12 Months	03/03/2020	03/03/2021	Micro Precision	Chua Chong Keong	N	NA	Waters	WATERS (LC Model)	Y
68	W1-16GC0002	Digital Gram Balance - WP07 (Weighing Scale)	AND (HR-200)	HR-200	12335004 (93371)	6 Months	17/04/2020	17/10/2020	Micro Precision	Myae Soe Chan	N	93371	Waters	WATERS (LC Model)	Y
69	W1-16GC0005	Digital Gram Balance - WP07 (Weighing Scale)	AND (HR-200)	HR-200	12333739 (93373)	6 Months	17/04/2020	17/10/2020	Micro Precision	Myae Soe Chan	N	93373	Waters	WATERS (LC Model)	Y
70	W1-16GC0008	Digital Gram Balance - WP07 (Weighing Scale)	AND (HR-200)	HR-200	12333783 (93372)	6 Months	17/04/2020	17/10/2020	Micro Precision	Myae Soe Chan	N	93372	Waters	WATERS (LC Model)	Y
71	W1-16GC0011	Digital Gram Balance - WP07 (Weighing Scale)	AND (HR-200)	HR-200	12333730 (93370)	6 Months	17/04/2020	17/10/2020	Micro Precision	Myae Soe Chan	N	93370	Waters	WATERS (LC Model)	Y
72	W1-16GC0014	Digital Gram Balance - WP07 (Weighing Scale)	AND (HR-200)	HR-200	12316088 (90966)	6 Months	02/07/2020	02/01/2021	Micro Precision	Myae Soe Chan	N	90966	Waters	WATERS (LC Model)	Y
73	W1-16GC0068	Digital Gram Balance - WP07 (Weighing Scale)	AND (HR-200)	HR-200	12336767(94322)	6 Months	02/07/2020	02/01/2021	Micro Precision	Myae Soe Chan	N	94322	Waters	WATERS (LC Model)	Y
74	W1-16GC0017	Digital Process Indicators	Omega	DP81R-SER-DC2	TES3013-1 (09030136)	12 Months	03/01/2020	03/01/2021	SGS	Ei Lwin Htay	N	TES3013-1	Waters	WATERS (LC Model)	Y
75	W1-16GC0018	Digital Process Indicator C/W Probe	Omega	DP 80	TES3013-2 (10060165)	12 Months	10/06/2020	10/06/2021	Micro Precision	Ei Lwin Htay	N	TES3013-2	Waters	WATERS (LC Model)	Y
76	IQC-16GC0010	Light Box	X-Rite	JUDGE II	C61093251217	12 Months	04/09/2019	04/09/2020	RVC International Pte Ltd	Suresh Thirumavalavan	N	NA	Waters	IQC (WATERS)	Y
77	PWAT-16GC0024	Keithley 236 Source Measure unit	Keithley	236	0683301 (ID#90744)	12 Months	17/03/2020	17/03/2021	Keysight	Ricky Celis Cortez	N	ID#90744	Waters	WATERS (RACAL TESTER)	Y
78	PWAT-16GC0025	Keithley 236 Source Measure unit	Keithley	236	0648831 (ID#90316)	12 Months	07/08/2019	07/08/2020	Keithley	Ricky Celis Cortez	N	ID#90316	Waters	WATERS (RACAL TESTER)	Y

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S/N	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment-Owner	Customized Equip.	Customer ID	Customer	LOCATION	Active
79	PWAT-16GC0026	Keithley 236 Source Measure unit	Keithley	236	497638	12 Months	17/03/2020	17/03/2021	Keysight	Ricky Celis Cortez	N	NA	Waters	WATERS (UNIVERSAL TESTER)	Y
80	PWAT-16GC0027	Keithley 236 Source Measure unit	Keithley	236	0549819 (ID#95105)	12 Months	20/04/2020	20/04/2021	Keysight	Ricky Celis Cortez	N	ID#95105	Waters	WATERS (PCBA)	Y
81	PWAT-16GC0028	Keithley 236 Source Measure unit	Keithley	236	0796740 (ID#90275)	12 Months	08/06/2020	08/06/2021	Keysight	Ricky Celis Cortez	N	ID#90275	Waters	WATERS (PCBA)	Y
82	PWAT-16GC0029	Keithley 236 Source Measure unit	Keithley	236	0648819 (ID#90317)	12 Months	06/05/2018	06/05/2019	Keysight	Ricky Celis Cortez	N	ID#90317	Waters	WATERS (UNIVERSAL TESTER)	Out of service
83	W1-17GC0095	Leak Detector	Leibold	PhoenixL 300i	90001301209	12 Months	19/02/2020	19/02/2021	Leibold	Alan Oh	N	NA	Waters	WATERS (CLEAN ROOM)	Y
84	W1-19GC0151	Leak Detector (Inficon)	Inficon	TL7	90001370779	15 Months	09/03/2020	09/03/2021	Inficon	Alan Oh	N	NA	Waters	Waters (QDw/Beacon)	Y

Reviewed by : Lee Kwang Quek

Date : 17-July-2020

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Attachment:

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PREPARED BY:

Rasmanwati Binti Ahmad / *[Signature]* / 06/07/2020

NAME / SIGNATURE / DATE

APPROVED BY:

Leela Devi Periathambiy / *[Signature]* / 06/07/2020

NAME / SIGNATURE / DATE

SN	Equipment ID	Equipment Description	Manufacturer	Model	Equipment Serial Number	Interval	Calibration Date	Due Date	Vendor	Equipment Owner	Customized Equip.	Customer ID	Customer	Location	Active
1	S0163	Source Measure Units	Keithley	236	0704826	12 months	02-09-2019	02-09-2020	Keysight	Bernard	N	96030	Waters	Waters Cell	Y
2	S0169	Source Measure Units	Keithley	236	0786741	12 months	14-05-2020	14-05-2021	Keysight	Bernard	N	96274	Waters	Waters Cell	Y
3	S0170	Multifunction IQ	National Instrument	PCI-5029E	1347EFD	12 months	11-03-2020	11-03-2021	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y
4	S0171	PIC Charge Amp Tester	National Instrument	TE82861	130A201	12 months	02-03-2020	02-03-2021	Inernal	Bernard	Y	NA	Waters	Waters Cell	Y
5	S0189	Power SMU	National Instrument	PXI-130	1489564	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y
6	S0200	M Series Multifunction DAQ	National Instrument	PXI-6229	145DF2F	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y
7	S0201	M Series Multifunction DAQ	National Instrument	PXI-6229	145DF16	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y
8	S0202	Digital Phosphor Oscilloscope	Tektronix	TDS3054C	Q010785	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95150	Waters	Waters Cell	Y
9	S0203	Function / Arbitrary Waveform Generator	Agilent	33220A	MY4404394	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y
10	S0204	Digital Multimeter	Agilent	34411A	MY46002718	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95157	Waters	Waters Cell	Y
11	S0205	Multifunction / Electronic Load Module	Chroma	6314 / 63103 / 63103A	631400009104 / 631030017035 / 631030017265 / 631030017021 / 63103A000083	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y
12	S0206	DC Power Supply	TDK Lambda	GENH60-12.5	95162	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95162	Waters	Waters Cell	Y
13	S0207	DC Power Supply	TDK Lambda	GENH60-12.5	95163	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95163	Waters	Waters Cell	Y
14	S0208	DC Power Supply	TDK Lambda	GENH60-12.5	95179	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95179	Waters	Waters Cell	Y
15	S0209	DC Power Supply	TDK Lambda	GENH60-12.5	95141	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95141	Waters	Waters Cell	Y
16	S0210	DC Power Supply	TDK Lambda	GENH30-25	95178	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95178	Waters	Waters Cell	Y
17	S0211	DC Power Supply	TDK Lambda	GENH30-25	95142	12 months	15-07-2019	15-07-2020	Micro Precision	Bernard	N	95142	Waters	Waters Cell	Y
18	S0545	Source Measure Units	Keithley	236	0810603	12 months	05-06-2020	05-06-2021	Keithley	Bernard	N	NA	Waters	Waters Functional Tester	Y
19	S0748	Programmable Resistor PXI Board	Geotest	GXI164	93228	24 months	15-07-2019	15-07-2021	Micro Precision	Bernard	N	NA	Waters	Waters Cell	Y

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WPPL Review List

EQUIPMENT ID	EQUIPMENT DESCRIPTION	MANUFACTURER / DISTRIBUTOR	MODEL	SN	EQUIPMENT LOCATION	OWNER	*Validation/ Verification Resulted?	CAL Interval	(CAL) Calibration Required	(CAL) Last Calibration	(CAL) Next Calibration	Intended Of Use	Log In Date	Checked by
WPPL0001	Pipette	Eppendorf / VWR	P1000	G42127G	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - Micro Precision	28 May 20	28 May 21	Chemical solution preparation	13 Nov 17	Cygnus Lim 21 Jul 2020
WPPL0002	Pipette	Eppendorf / VWR	P1000	G42285G	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - Micro Precision	13 May 20	13 May 21	Chemical solution preparation	16 Nov 17	Cygnus Lim 21 Jul 2020
WPPL0003	Weighing balance	Sartorius	MSA 125P-100-D	35701494	WPPL IFWRC Lab	PAE - Siddharth	Y	1 Year	External - Sartorius	27 Sep 19	26 Sep 20	Chemical solution preparation	07 Aug 17	Cygnus Lim 21 Jul 2020
WPPL0006	Multimeter	FLUKE / Region Suppliers (PTE) LTD	FL77-4	35700255	WPPL R&D Lab	PAE - Siddharth	N/A	1 Year	External - Ming Deng	20 Jan 20	20 Jan 21	Troubleshoot	06 Jan 17	Cygnus Lim 21 Jul 2020
WPPL0008	Traceable Stopwatch/ Timer Big Digit 4 Channel	VWR	62344-641	17045616	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 year	External - Micro Precision	28 May 20	28 May 21	for 515 pump setup	28 Mar 18	Cygnus Lim 21 Jul 2020
WPPL0009	Weight-1g	Sartorius	YCW313-00	34729085	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - Micro Precision	19 Aug 19	19 Aug 20	for weighing scale check	07 Aug 17	Cygnus Lim 21 Jul 2020
WPPL0018	Pipette	Eppendorf / VWR	200uL	122994G	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - Micro Precision	11 Nov 19	11 Nov 20	Chemical solution preparation	16 Nov 17	Cygnus Lim 21 Jul 2020
WPPL0019	Pipette	Eppendorf / VWR	200uL	122911G	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - VWR	29 Jan 20	29 Jan 21	Chemical solution preparation	16 Nov 17	Cygnus Lim 21 Jul 2020
WPPL0031	Temperature Recorder	Log Tag	TRIX-8	1000848287	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	29 Apr 20	28 Apr 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0032	Temperature Recorder	Log Tag	TRIX-8	1000848286	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	03 Mar 20	02 Mar 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0033	Temperature Recorder	Log Tag	TRIX-8	1000848284	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	03 Mar 20	02 Mar 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0034	Temperature Recorder	Log Tag	TRIX-8	1000848289	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	03 Mar 20	02 Mar 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0035	Temperature Recorder	Log Tag	TRIX-8	1000848283	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	03 Mar 20	02 Mar 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0036	Temperature Recorder	Log Tag	TRIX-8	1000848288	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	29 Apr 20	28 Apr 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0037	Temperature Recorder	Log Tag	TRIX-8	1000848290	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	29 Apr 20	28 Apr 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0038	Temperature Recorder	Log Tag	TRIX-8	1000848285	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - UniCal	29 Apr 20	28 Apr 21	To monitor Freezer/Fridge temperature	04 Jun 18	Cygnus Lim 21 Jul 2020
WPPL0043	Weight-1g	Sartorius	YCW313-00	37029387	WPPL IFWRC Lab	PAE - Siddharth	N/A	1 Year	External - Micro Precision	06 Nov 19	06 Nov 20	for weighing scale check	01 Nov 19	Cygnus Lim 21 Jul 2020

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