OUR

OFFICE OF UTILITIES REGULATION

METER TESTING ADMINISTRATIVE AND OPERATIONAL PROTOCOL FOR THE ELECTRICITY AND WATER SECTORS IN JAMAICA

2017 October 3

Document No. 2016/GEN/004/RUL.001

DOCUMENT TITLE AND APPROVAL PAGE

DOCUMENT NUMBER: 2016/GEN/004/RUL.001

DOCUMENT TITLE:

Meter Testing Administrative and Operational Protocol for the Electricity and Water Sectors in Jamaica

PURPOSE OF DOCUMENT:

To prescribe the administrative and testing procedures for metering devices used by electric and water utilities in Jamaica to measure consumption for revenue determination.

ANTECEDENT DOCUMENTS:

Document Number	*Document Title*	*Date*
Ele2005/07	Electricity Meter Testing in Jamaica – Protocol on Administrative and Testing Procedures	2005 December 13

REVISIONS:

Section(s) Affected	*Comments*	*Date*

APPROVAL:

This document is approved by the Office of Utilities Regulation and the provisions therein become effective on 2017 October 17.

On behalf of the Office:

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Joseph M. Matalon
Chairman

2017 October 3

Preface

This document is an update and expansion of the provisions of the document titled: ***"Electricity Meter Testing in Jamaica – Protocol on Administrative and Testing Procedures"*** (Document No. ELE2005/07) which became effective 2005 December 19 ("Electricity Meter Testing Protocol, 2005"). As was done with the Electricity Meter Testing Protocol, 2005, this document – ***"The Meter Testing Administrative and Operational Protocol for the Electricity and Water Sectors in Jamaica"*** ("Meter Testing Protocol, 2017" or "the Protocol") was developed by the Office of Utilities Regulation (OUR) in collaboration with the Bureau of Standards Jamaica (BSJ) and involves consultations with the relevant stakeholders. Initially, the scope of the review of the Electricity Meter Testing Protocol, 2005 was limited to electricity revenue meters. However, during the process, a decision was made to incorporate provisions for the administration and testing of water meters.

Pursuant to its functions under section 4 of the Office of Utilities Regulation Act ("OUR Act"), the OUR is mandated to regulate the provision of prescribed utility services or specified organizations. Further, the OUR is empowered to, among other things, take necessary measures to protect the interest of consumers in relation to the supply of a prescribed utility service. To satisfy this crucial requirement, section 4(5) paragraphs (a) to (d) of the OUR Act empowers the OUR to, *inter alia*, prescribe the measurement parameters, prescribe minimum standards of quality and accuracy, and provide for the inspection and testing of any equipment used in connection with the prescribed utility services in Jamaica.

In that regard, the Meter Testing Protocol, 2017 is established to provide an appropriate framework, based on international best practices and prudent utility practice, for the verification and testing of existing and future utility revenue meters used in the Jamaican electricity and water sectors. Essentially, it provides guidance to the relevant service providers in meeting their responsibilities regarding the inspection and testing, as well as the quality and accuracy, of any equipment or measuring device used in connection with the prescribed utility services.

The OUR decided to undertake a complete review of the Electricity Meter Testing Protocol, 2005 based on the following considerations:

- Increased utilization of advanced metering technology/infrastructure by electricity and water service providers, which were not sufficiently addressed in the existing Protocol;
- Decentralization of supply with significant concentration at the distribution level, creating need for specialized metering systems;
- Proposed changes in the arrangements for meter testing and verification activities;
- The obsolescence of certain standards, regulations and specifications governing meter testing and verification associated with the Electricity Meter Testing Protocol, 2005;
- The need to establish minimum standards and guidelines for the testing and accuracy verification of water meter systems;
- Increased customer complaints and requests for independent testing of utility meters installed at their premises; and

- Notification from the BSJ signalling the restructuring of the organization, which had implications for the meter testing process, including cost requirements.

The Meter Testing Protocol, 2017 was developed on a fair and transparent basis and incorporated a comprehensive consultation process which took into consideration comments provided by the relevant stakeholders. It seeks to:

a) address current and future metering developments and activities in the electricity and water sectors; and

b) provide guidelines and procedures for the inspection, testing and accuracy verification of existing revenue meters and those to be deployed in the electricity and water sectors.

The following considerations, which were not a part of the Electricity Meter Testing Protocol, 2005 have been factored into the Meter Testing Protocol, 2017.

- Provisions for the inspection, testing and accuracy verification of revenue meters used in the water sector have been included.
- Provisions for the inspection, testing and accuracy verification of instrument transformers, Bi-Directional Electricity Meters and Advanced Electricity Meters have been included.
- The procedures for the initiation and execution of the different meter testing activities have been amended.
- The sampling procedures and rejection criteria used for Acceptance and Compliance Testing have been substantially altered.
- The fee structure and payment responsibilities for the different meter testing and verification activities have been altered in some instances. These alterations were also incorporated as part of the provisions for the testing and verification of water meters.
- The document references have been updated to include the most current versions of licences, codes, legislation, international standards, specifications etc.

Abbreviations and Acronyms

ANSI	-	American National Standards Institute
AQL	-	Acceptable Quality Level
BIPM	-	Bureau International de Poids et Mesures
BSJ	-	Bureau of Standards Jamaica
IEC	-	International Electrotechnical Commission
IEEE	-	Institute of Electrical and Electronics Engineers
ISO	-	International Organization for Standardization
JPS	-	Jamaica Public Service Company Limited
kPa	-	Kilo Pascals
kVARh	-	Kilo Volt Amperes Reactive Hours
kWh	-	Kilo watt hours
LQL	-	Limiting Quality Level
MPa	-	Mega Pascals
MPE	-	Maximum Permissible Error
NWC	-	National Water Commission
OUR	-	Office of Utilities Regulation
SI	-	Systeme Internationale
WSP	-	Water Service Providers

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PART 1: INTRODUCTION AND GENERAL CONDITIONS

1 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

Revenue metering devices or systems that measure a particular commodity or usage of utility service and convey specific metering data to utility service providers for billing purposes, are required to meet certain reliability and accuracy requirements. This is to ensure accurate measurement and accounting of electricity and water quantities consumed by utility customers and to limit under-recovery of operating revenues to the relevant utility companies. Given this imperative, it is critical that there are appropriate administrative and testing procedures in place to facilitate the ongoing inspection, testing and verification of these revenue metering devices or systems.

In some jurisdictions, the measurements of quantity, quality or other conditions relating to a prescribed utility service for revenue purposes, is mandated as a legal requirement. In many cases, these requirements entail some form of independent accuracy verification and testing of the associated revenue metering devices or systems subject to the relevant industry codes, standards, regulations and prudent utility practice.

In Jamaica, the Office of Utilities Regulation ("OUR" or "Office") has the responsibility to ensure that these requirements are satisfied in a reasonable and prudent manner consistent with good regulatory practice.

Section 4 (5) (c) of the Office of Utilities Regulation Act ("OUR Act") empowers the OUR to provide for the inspection and testing of any prescribed utility services or of any equipment or measuring device used in connection therewith. Section 4 (5) provides as follows:

"(5) The Office may, by order published in the Gazette—

(a) prescribe the unit of measurement and the type of measuring device to be used by a licensee or specified organization in relation to prescribed utility services;

(b) prescribe standards for the measurements of quantity, quality or other conditions relating to prescribed utility services;

(c) provide for the inspection and testing of any prescribed utility services or of any equipment or measuring device used in connection therewith;

(d) prescribe minimum standards of quality and accuracy in relation to any equipment used or any commodity supplied by a licensee or specified organization in connection with the relevant prescribed utility service;

(e) prescribe the system of accounts to be kept by a licensee or specified organization as respects prescribed utility services;

(f) make such provisions as the Office considers necessary to ensure the safety of the public as respects prescribed utility services; and

(g) *impose fees (to be known as regulatory service fees) to be paid by licensees or specified organizations at the rates specified in the order."* (Emphasis added)

These provisions of the OUR Act specifically permits the OUR to prescribe standards and requirements regarding the type, inspection and testing of measuring devices and equipment used for prescribed utility services in Jamaica. In this regard, the OUR issued the Electricity Meter Testing Protocol, 2005, which accorded with the terms of the All-Island Electric Licence, 2001. The Electricity Meter Testing Protocol, 2005 became effective on 2005 December 19 and was promulgated to govern the testing and verification of electricity revenue meters for billing purposes in connection with electricity services as provided in Jamaica. Subsequent to the promulgation of the Electricity Meter Testing Protocol, 2005, there was the establishment of the Jamaica National Agency for Accreditation (JANAAC), which began offering accreditation services in 2008. These services ultimately included accreditation of testing and calibration laboratories and, as a result, JPS was able to obtain accreditation of its Meter Testing & Calibration Centre, ensuring conformity with international standards.

Based on: (i) technological advancements in utility revenue metering devices and systems, (ii) changes in the law, (iii) decentralized supply transaction at the electricity distribution network level, (iv) proposed changes to the existing arrangements for meter testing and verification, (v) the obsolescence of certain standards, regulations and specifications associated with the Electricity Meter Testing Protocol, 2005, (vi) the need to establish minimum standards and guidelines for the testing and accuracy verification of water metering systems, (vii) increased customer complaints and requests for independent testing of utility meters installed at their premises, and (vii) notification from the BSJ signalling the restructuring of the organization, which had implications for the meter testing process, including cost requirements, the OUR has decided that it is timely to undertake a complete review of the Electricity Meter Testing Protocol, 2005.

The "Meter Testing Protocol, 2017" or the "Protocol" was developed on a fair and transparent basis and incorporated a comprehensive consultation process which took into consideration comments provided by the relevant stakeholders.

1.2 SCOPE

The broad scope and objectives of the Protocol are outlined as follows.

a) The Protocol seeks to address current and future metering developments and activities in the electricity and water sectors;

b) The Protocol aims to establish a framework for ensuring that equipment and devices used for the measurement of electricity and water consumption for revenue purposes meet the stipulated technical specification and performance requirements on an ongoing basis, thus fostering and developing confidence in the measurement process;

c) The Protocol sets out the guiding principles, procedures and the regulatory requirements applicable to the approval of new patterns of measurement equipment and devices to be used for

revenue purposes in the electricity and water sectors, and the testing and subsequent acceptance of such equipment and devices are set out herein;

d) The Protocol sets out the requirements for electricity and water providers to, on an ongoing basis, to conduct Compliance Testing which involves testing of meters installed in the field so as to ensure that functionality within acceptable tolerance levels is maintained; and

e) The Protocol provides individual electricity and water customers the opportunity to be able to directly request meter accuracy checks on their electricity and/or water meters installed at their premises.

1.3 STRUCTURE OF DOCUMENT

The "Protocol" is divided into five (5) main parts comprising of sixteen (16) sections and five (5) schedules.

Part 1: Introduction and General Conditions

Part 1 provides background information and general conditions of the Protocol. It includes sections 1 and 2.

- Section 1 – **Introduction:** Provides background information on the development of the Protocol and its intended purpose.
- Section 2 – **General Conditions:** Outlines the general conditions, including interpretations, and the demarcation of organizational responsibilities.

Part 2: Electricity Meter Testing

Part 2 covers the specific requirements for the testing and verification of electricity meters and related metering devices in Jamaica. Part 2 of the Protocol accords with the OUR Act and the Electricity Licence, 2016, issued 2016 January 27 (previously, the Amended and Restated All-Island Electric Licence, 2011). These requirements are detailed in sections 3 to 7.

- Section 3 - **Pattern Testing and Approval of New Electricity Meter Models and Related Metering Devices:** Sets out the requirements for Pattern Testing of all electricity meters and related metering devices intended to be introduced for the measurement of electricity and billing.
- Section 4 - **Acceptance Testing and Approval of Batches of New & Repaired Electricity Meters and Related Metering Devices:** Sets out the requirements for Acceptance Testing and Approval of all new and repaired batches of electricity meters and related metering devices to be used for electricity measurement and billing.

- Section 5 - **Compliance Testing of Field Installed Electricity Meters and Related Metering Devices:** Sets out the requirement for compliance testing of field installed electricity meters.
- Section 6 - **Customer Request for Electricity Meter Accuracy Verification Check:** Sets out the procedures pertaining to customer requests for Electricity Meter Accuracy Checks.
- Section 7 - **Accreditation of JPS Meter Testing, Calibration & Repair Facilities and Services:** Sets out the requirements for accreditation of JPS' Meter Testing, Calibration & Repair Facilities and Services.

Part 3: Water Meter Testing

Part 3 covers the specific requirements for the testing and verification of water meters in Jamaica. These requirements are detailed in sections 8 to 12.

- Section 8 - **Pattern Testing and Approval of New Water Meter Models:** Sets out the requirements for Pattern Testing of all water meters intended to be introduced for the measurement of water consumption and billing.
- Section 9 - **Acceptance Testing and Approval of Batches of New & Repaired Water Meter Models :** Sets out the requirements Acceptance Testing of all new and repaired batches of water meters to be used for the measurement of water consumption and billing.
- Section 10 - **Compliance Testing of Field Installed Water Meters:** Sets out the requirement for compliance testing of field installed water meters.
- Section 11 - **Customer Request for Water Meter Accuracy Verification Check:** Sets out the procedures pertaining to customer requests for Water Meter Accuracy Checks.
- Section 12 - **Accreditation of Water Service Providers' Meter Testing, Calibration & Repair Facilities and Services:** Sets out the requirements for accreditation of Water Service Providers' Meter Testing, Calibration & Repair Facilities and Services where applicable.

Part 4: General Requirements

Part 4 contains general provisions applicable to both the electricity and water sectors. It includes sections 13 to 16.

- Section 13 – **Monitoring and Review of the Protocol:** Outlines the procedures for the review of the Protocol.
- Section 14 – **Resolution of Disputes:** Outlines the process for how disputes between parties to the Protocol shall be handled.

- Section 15 – **Notices:** Sets out the requirements for notification or communication with the relevant stakeholders with responsibilities and obligations under the Protocol.
- Section 16 – **Derogation:** Outlines how requests for derogation from conditions of the Protocol shall be handled.

Part 5: Schedules

Part 5 is comprised of five (5) attached schedules which provide supporting information to various aspects of the Protocol.

- **Schedule 1: Definitions, Symbols and Acronyms**
- **Schedule 2: Test Procedures for Electricity Meters and Related Metering**
- **Schedule 3: Test Procedures for Water Meters**
- **Schedule 4: Testing Fees**
- **Schedule 5: Contact Information for Notices**

2 GENERAL CONDITIONS

2.1 INTERPRETATION

2.1.1 In this Protocol:

a) Expressions as defined in **Schedule 1** shall bear the respective meanings set out therein;

b) The table of contents, preface and headings contained in this Protocol are for convenience only and are not integral in construing this Protocol;

c) Unless the context otherwise requires, the singular shall include the plural and vice versa, references to any gender shall include all other genders and references to persons shall include any individual and any other entity, in each case whether or not having separate legal personality;

d) References to the words “include” or “including” are to be construed without limitation to the generality of the preceding words;

e) In this Protocol, all references to meters shall be construed to mean revenue meters.

f) Terms not defined herein, or in referenced standards, depending on the context, shall have the meaning ascribed thereto in the Oxford English Dictionary or such meaning as normally ascribed and accepted within the regulated industries;

g) Unless the context otherwise requires, all references to a particular section, sub-section, paragraph, sub-paragraph and Schedule(s) shall be references to that section, sub-section, paragraph, sub-paragraph or Schedule(s) to this Protocol;

h) In the event of any conflict between the main body and provisions of this Protocol and any of the Schedules hereto, the relevant provisions shall be construed as complementary rather than conflicting wherever possible, but, if a complementary construction is not possible, then the terms and provisions of the body of this Protocol shall take precedence over the relevant conflicting Schedules; and

i) Nothing in this Protocol is intended to or shall derogate from JPS’ or the Water Service Providers’ (WSP’s) statutory or licence obligations.

2.2 SPECIFIC FUNCTIONS AND RESPONSIBLE ORGANIZATIONS

2.2.1 Upon implementation of this Protocol, there will be specific functions that will be the responsibility of specific organizations. These functions and responsible organizations are shown in Table 2.1 below.

Table 2.1: Functions and Responsible Organizations

Functions	Responsible Organization
Pattern Testing of all new models of electricity and water meters and related metering devices.	BSJ
Acceptance Testing of new and repaired Pattern Approved electricity and water meters and related metering devices.	BSJ
Pre-field calibration of all new electricity meters for use on commercial and industrial customers' accounts.	JPS
Compliance Testing of field installed electricity meters.	JPS
Customer requests for Electricity Meter Accuracy Checks.	JPS/BSJ
Compliance Testing of field installed water meters.	WSP
Customer requests for Water Meter Accuracy Checks.	WSP/BSJ

2.3 TREATMENT OF EXISTING APPROVALS

2.3.1 All relevant meter related approvals, covered in this Protocol, granted prior to its promulgation to JPS, NWC or relevant WSPs, who are integral to this Protocol, shall be submitted to the OUR for review within thirty (30) days of the effective date of the Protocol.

PART 2: ELECTRICITY METER TESTING

3 PATTERN TESTING AND APPROVAL OF NEW ELECTRICITY METER MODELS AND RELATED METERING DEVICES

3.1 OBJECTIVES OF PATTERN TESTING AND APPROVAL

3.1.1 JPS shall cause any new model, design or pattern of electricity meter and related metering devices that is intended to be deployed in Jamaica for the measurement of electrical quantities such as power and energy, and to be used for the purpose of revenue determination, to be subjected to Pattern Approval before the introduction of such meters into the field.

3.2 STANDARDS GOVERNING PATTERN TESTING

3.2.1 Pattern Testing of electricity meters and related metering devices shall be in accordance with the following standards or any later version of the said standards, or any other applicable standards prescribed by the OUR.

a) ANSI C12.1 – 2014: American National Standard for Electric Meters – Code for Electricity Metering

b) IEEE C57.13 – 2008: IEEE Standard Requirements for Instrument Transformers

3.3 MEASUREMENT TRACEABILITY FOR PATTERN TESTING

3.3.1 The BSJ shall maintain references for the kWh and kVARh for Jamaica, in relation to Pattern Testing, through its National Power and Energy Standards that must be directly traceable to the Systeme Internationale (SI) either through direct or indirect calibration or measurement comparison programmes.

3.3.2 The BSJ shall ensure that all Reference Measurement Instruments being used for laboratory services are traceable to the SI by calibration to the National Power and Energy Standards.

3.3.3 The BSJ shall document the Traceability that applies to each Pattern Test which shall be included in the Pattern Test Report.

3.4 METER TOLERANCE AND MEASUREMENT ACCURACY

3.4.1 Electricity meters submitted for Pattern Approval by JPS shall be able to measure electrical power/energy to within $\pm$1% accuracy and the manufacturer shall furnish information on the capability of the meter to maintain such accuracy over time.

3.4.2 The BSJ shall ensure that the Reference Measurement Instruments being used in conducting Pattern Approval tests have percentage errors which are no greater than those indicated in sections 3.9.2.2.2 and 3.9.2.2.3 of ANSI C12.1 – 2014.

3.5 REQUIREMENTS FOR PATTERN APPROVAL APPLICATION

3.5.1 ORGANIZATION AUTHORIZED TO REQUEST PATTERN APPROVAL

3.5.1.1 Applications for Pattern Approval of electricity meters and related metering devices shall be submitted by JPS to the BSJ in accordance with sub-section 3.5.2 of this Protocol.

3.5.1.2 Pattern Approvals as described in sub-section 3.9 of this Protocol, shall be issued to JPS by the OUR.

3.5.2 PROCESSING OF APPLICATION FOR PATTERN APPROVAL

3.5.2.1 In order to introduce any new pattern of electricity meter or related metering devices into Jamaica, for the measurement of electrical power or energy or other relevant electrical quantities, JPS shall complete and submit a Pattern Approval application form along with the relevant supporting documentation for review and processing by the BSJ. This form can be obtained from the OUR's website or at the OUR's office.

3.5.2.2 The BSJ upon receipt of such application from JPS, shall provide: (i) a notification to JPS of its acknowledgment of the Pattern Approval application within two (2) working days, and (ii) a copy of the said notification and a copy of the submitted application to the OUR.

3.5.2.3 The BSJ shall review the Pattern Approval application, including the supporting documentation within five (5) working days of receipt of the application to determine if it is able to proceed with the required processing. If the BSJ determines that the information provided to facilitate processing is inadequate, then the BSJ shall notify JPS of the additional information requirements necessary to proceed with the required processing.

3.5.2.4 When the BSJ has determined that the information is satisfactory to proceed with testing it shall notify JPS of the number of sample devices that are required pursuant to sub-section 3.6 and the associated fees that need to be covered by JPS, to facilitate the required testing, pursuant to sub-section 3.11.

3.5.2.5 JPS shall then submit the required number of sample devices along with any additional documentation, if applicable, to the BSJ and pay the required fee pursuant to sub-section 3.11.

3.5.2.6 Upon receipt of the JPS sample devices by BSJ, the BSJ shall provide notification to JPS acknowledging receipt of the samples. Such notification shall include verification of the number of sample devices received and the condition of such devices.

3.5.2.7 If the BSJ determines that the samples are satisfactory, the BSJ shall proceed with testing in accordance with the testing procedures and applicable time schedule as outlined in sub-sections 3.7 and 3.10.

3.5.2.8 Upon completion of testing, the BSJ shall submit a Pattern Test Report to the OUR, and copied to JPS. At the same time, the BSJ shall return all samples and relevant documentation to JPS. Following this, any further action regarding this matter shall be directed by the OUR in accordance with Section 3.9 of this Protocol.

3.5.2.9 JPS shall be responsible for notifying all of its prospective meter suppliers or manufacturers of the requirements for Pattern Approval.

3.5.3 OUR'S RIGHT TO ACCEPT PATTERN APPROVALS ISSUED BY OTHER PARTIES

3.5.3.1 Subject to its regulatory functions, the OUR may consider it necessary to have all new electricity meter patterns tested by the BSJ prior to granting Pattern Approval, or to grant Pattern Approval based on testing of meters and Pattern Approval granted by other reputable meter testing entities ("Other Meter Testing Entities") with accreditation qualifications pursuant to sub-section 7.2 for the new electricity meter patterns, subject to a verification process conducted by the BSJ.

3.5.3.2 If JPS chooses to obtain Pattern Approval from Other Meter Testing Entities for any new electricity meter pattern or related metering device it plans to introduce in Jamaica, it shall submit an application for Pattern Approval processing to the BSJ. In such instances, however, a full set of Pattern Approval tests may not be required. In lieu of this condition, JPS shall attach to their application, copies of the document received from Other Meter Testing Entities that granted Pattern Approval along with the test report that served the basis for the granting of such Pattern Approval. The BSJ shall then conduct a review and evaluation of such documentation to ascertain whether the basis under which such Pattern Approval was granted accords with the requirements of this Protocol.

a) If the BSJ's review and evaluation indicate that that the requirements under which such Pattern Approval was granted is in conformance with the requirements of this Protocol, the BSJ shall submit a report of its findings to the OUR. Subject to the OUR's review, the OUR may grant its own Pattern Approval for the relevant electricity meter or related metering device.

b) If the BSJ's review and evaluation indicate that the Pattern Approval granted to JPS by Other Meter Testing Entities is not based on requirements which are consistent with the requirements of this Protocol, the BSJ shall submit a report of its findings to the OUR. Subject to the OUR's review, the OUR may indicate to JPS that in order to achieve the required Pattern Approval it may choose to (i) utilize the Pattern Approval process set out under sub-section 3.5.2 of this Protocol in order to obtain Pattern Approval for the new electricity meter or related metering devices under consideration, or (ii) obtain Pattern Approval from Other Meter Testing Entities based on requirements which are consistent with the requirements of this Protocol, provided that such Pattern Approval shall be subject to the provisions of paragraph 3.5.3.2 (a).

3.6 PATTERN APPROVAL SAMPLE SIZE

3.6.1 Pursuant to paragraph 3.5.2.5, the meters or related metering devices to be tested shall be representative of the basic type. A minimum of three (3) samples shall be subjected to each test. When the devices representing a given basic type include several versions, the following sampling requirements shall apply:

i. For different current ratings – at least one (1) sample of each of the representative current rating is required.

ii. For different voltage rating – at least one (1) sample of each of the representative voltage type is required. However, if the meter has auto-ranging for voltages, then multiple samples are not required.

iii. For different number of elements – at least one (1) sample for each element type is required.

iv. For four-wire wye and four-wire delta configured meters of the two-element type – there shall be at least one (1) device for each configuration.

3.7 TESTS REQUIRED FOR PATTERN APPROVAL

3.7.1 Testing of all new patterns of electricity meters and related metering devices shall be conducted in accordance with S201 of Schedule 2 of this Protocol.

3.8 CRITERIA FOR PATTERN APPROVAL

3.8.1 The criteria for granting Pattern Approval of submitted meter models and related metering devices shall be:

a) No observed Nonconformities from the visual inspection made before testing is conducted.

b) Performance of all the functions specified in the various tests safely, accurately and reliably without any failure.

c) No sign of physical damage on the meter samples as a result of the various tests conducted.

d) The number of failures versus the number of metering devices tested falls within the "PASS" zone in Table 3.1 below.

Table 3.1: Table of Failures Based on the Number of Metering Device Tested

# METERING DEVICES TESTED	FAILURES IN DIFFERENT TESTS INDIVIDUALLY			
	0	1	2	3 or more
3	PASS		FAIL	
4				
5				
6				
7				
8				
9 or more				

Source: ANSI C12.1-2014

3.9 GRANTING OF PATTERN APPROVAL

3.9.1 ELECTRICITY METER MODELS OR RELATED METERING DEVICES APPARATUS FOUND ACCEPTABLE

3.9.1.1 Subject to the Pattern Test Report, when an electricity meter model or related metering device successfully meets the requirements for Pattern Approval, the OUR shall grant Pattern Approval to JPS, which will enable the JPS, and its Agents, to freely procure, or arrange for the manufacture of the specific electricity meter or related metering device.

3.9.2 CONDITIONS OF GRANT OF PATTERN APPROVAL

3.9.2.1 The OUR, in granting Pattern Approval to JPS, may elect to apply certain conditions to such Pattern Approval which may include, among other things, the following:

a) A requirement that the specific meter model undergo pre-field calibration if the device is an electricity meter intended to be used for measurement of electricity to commercial or industrial customers.

b) A date by which the issued approval is to be reviewed, usually ten (10) years from the date of approval.

c) Any additional conditions, as deemed necessary by the OUR.

3.9.3 ELECTRICITY METER MODELS AND RELATED METERING DEVICES FOUND UNACCEPTABLE

3.9.3.1 When an electricity meter model or related metering device fails to meet the requirements for Pattern Approval, the OUR shall:

a) Notify JPS that the specific meter model, or variation, submitted for Pattern Approval, has failed to meet the requirements of this Protocol.

b) Indicate to JPS any corrective measures that may be available to them.

3.9.4 VARIATIONS TO PATTERN APPROVAL

3.9.4.1 A variation to a Pattern Approval previously granted by the OUR, may be required in instances where JPS holds an existing Pattern Approval and wishes to make a change to such Pattern Approval. Such a change may be occasioned by, among other things, subsequent modifications or upgrades to the approved meter pattern, such as significant software updates, which in the view of JPS, may alter the performance or operation of that particular meter pattern.

3.9.4.2 For the effect of the changes to be deemed a variation to the existing meter pattern, and not a separate meter pattern, the arrangement of the components of the meter, or related metering device, must be substantially of the same design as that of the approved meter pattern. Variations that may be considered shall be consistent with the conditions of section 4.2.2 of ANSI C12.1 – 2014. Significant

deviations from the arrangements of the approved meter pattern shall require that a new set of Pattern Approval tests be conducted.

3.9.4.3 Where the OUR grants approval for a variation to an existing approved meter pattern, the OUR shall issue an addendum to the existing Pattern Approval, setting out the changes applicable to the meter pattern and any subsequent effect on the operating conditions of such pattern. In instances where it is unclear to JPS whether a variation to an existing Pattern Approval is required JPS shall consult with the OUR.

3.9.4.4 For the avoidance of doubt, the OUR will not approve any request or application for variation of a cancelled, expired or withdrawn Pattern Approval.

3.9.5 CHANGES TO PATTERN APPROVAL

3.9.5.1 The OUR shall make provisions for minor changes to issued Pattern Approval documents such as changes of address, corrections, changes to periods of validity and other administrative changes.

3.9.5.2 Depending on the extent of any such change, the OUR may consider it necessary to issue an addendum to the existing Pattern Approval documents or completely replace such documents.

3.9.6 CANCELLATION OF PATTERN APPROVAL

3.9.6.1 Where a Pattern Approval was issued to JPS, the OUR may deem it necessary to cancel such Pattern Approval for, inter-alia, the following reasons:

a) the previously approved pattern no longer complies with the requirements of this Protocol; or

b) any other conditions the OUR deems appropriate under the circumstances.

3.9.6.2 Electricity meters and related metering devices which were in use, or for which a batch was ordered by JPS, prior to the cancellation of the applicable Pattern Approval, may be considered by the OUR as being of an approved pattern but subject to the other relevant requirements of this Protocol.

3.9.7 OUR'S RIGHT TO WITHDRAW PATTERN APPROVAL

3.9.7.1 If sufficient reason exists, the OUR may withdraw a Pattern Approval granted to JPS, in circumstances where cancellation is not considered to be appropriate.

3.9.7.2 In the event that a Pattern Approval is withdrawn by the OUR, all devices already installed in the field and conforming to the approved pattern shall be removed from service by JPS.

3.9.7.3 In its Pattern Approval withdrawal notification to JPS, the OUR may give directions as to the regulatory treatment of the assets removed from service.

3.10 TIMEFRAME FOR CONDUCTING PATTERN TESTING AND APPROVAL

3.10.1 The required number of samples of electricity meters and related metering devices shall be submitted by JPS to the BSJ for testing within reasonable time ahead of JPS' planned procurement date of the identified batch of electricity meters or related metering devices, in order to satisfy the requirements under paragraphs 3.10.2 to 3.10.3.

3.10.2 Where three (3) sample devices are submitted by JPS to the BSJ for testing, the BSJ shall use best efforts and endeavour to complete the Pattern Test within six (6) weeks of the date of receipt of the samples.

3.10.3 In instances where more than three (3) sample devices are submitted for testing, the BSJ may require more than six (6) weeks to complete testing. In such instances, the BSJ in its notification to JPS, pertaining to the receipt of the samples, shall indicate the timeframe that will be reasonably required to complete such testing, such timeframe shall be mutually agreed between the BSJ and JPS. Notwithstanding, the BSJ shall use best efforts and endeavour to complete the Pattern Testing within such agreed timeframe.

3.10.4 If the Pattern Test Report from BSJ indicates that an electricity meter model or related metering device has successfully met the requirements for Pattern Approval, the OUR may within five (5) working days issue Pattern Approval to JPS for the specific electricity meter model or related metering device.

3.10.5 If the Pattern Test Report from BSJ indicates that the electricity meter or related metering device has not met the requirements for Pattern Approval, the OUR may notify JPS within five (5) working days.

3.10.6 In the event that the BSJ fails to complete the required Pattern Testing within the timeframes specified in this Section 3.10, the OUR shall issue such instructions as it deems appropriate to enable JPS to achieve the requisite Pattern Approval.

3.11 COST FOR CONDUCTING PATTERN APPROVAL

3.11.1 The cost for conducting the relevant Pattern Approval inspections and tests including administrative costs shall be the responsibility of JPS, and shall be as specified in Schedule 4 of this Protocol.

4 ACCEPTANCE TESTING AND APPROVAL OF BATCHES OF NEW & REPAIRED ELECTRICITY METERS AND RELATED METERING DEVICES

4.1 OBJECTIVES OF ACCEPTANCE TESTING

4.1.1 Acceptance Testing shall be conducted for all new and repaired electricity meters and related metering devices before they can be declared eligible for field installation. Acceptance Testing will determine whether the electricity meters purchased or repaired are representative of the previously approved pattern.

4.1.2 All batches of new electricity meters and related metering devices shall be subjected to Acceptance Testing to determine whether they conform to the standards under which their Pattern Approval was granted.

4.1.3 Acceptance Testing shall be conducted on all batches of repaired meters and related metering devices, or on all repaired meters and related metering devices that cannot be grouped into a batch to determine if their tolerance falls within the limits prescribed by this Protocol.

4.1.4 Acceptance Testing of all new electricity meters and related metering devices that were granted Pattern Approval shall be conducted by the BSJ.

4.1.5 Acceptance Testing of all repaired JPS electricity meters that were granted Pattern Approval shall be conducted by JPS or the BSJ, as the case may be.

4.2 STANDARDS GOVERNING ACCEPTANCE TESTING

4.2.1 Acceptance Testing of all new and repaired electricity meters and related metering devices conducted under this Protocol shall be in accordance with the following standards or any later version of the said standards or any other applicable standards prescribed by the OUR.

a) ANSI C12.1 – 2014: American National Standard for Electric Meters – Code for Electricity Metering

b) IEEE C57.13 – 2008: IEEE Standard Requirements for Instrument Transformers

c) ISO 2859/2 – 1985: Sampling Procedures for Inspection by Attributes – Part 2: Sampling Plans Indexed by Limiting Quality (LQ) for Isolated Lot Inspection

4.3 MEASUREMENT TRACEABILITY FOR ACCEPTANCE TESTING

4.3.1 The BSJ shall maintain the kWh and kVARh measurements for Jamaica, in relation to Acceptance Testing, through its National Power and Energy Standards that must be traceable to the SI through direct or indirect calibration or measurement comparison programmes.

4.3.2 The BSJ and JPS shall ensure that all Reference Measurement Instruments being used for laboratory services are traceable to the SI by calibration to the National Power and Energy Standards.

4.3.3 The BSJ and JPS shall document the Traceability that applies to the measurement equipment used in the Acceptance Testing process which shall be included in the Acceptance Test Report.

4.4 METER TOLERANCE AND MEASUREMENT ACCURACY

4.4.1 The BSJ shall subject all new Lots of electricity meters to Acceptance Testing to ensure that their tolerance on electrical power/energy measurements fall within ±1% as required by ANSI C12.1 – 2014.

4.4.2 JPS shall ensure that all batches of repaired meters and related metering devices, or all repaired meters and related metering devices that cannot be grouped into a batch are subject to Acceptance Testing to ensure that their tolerance on electrical power/energy measurements fall within ±1% as required by ANSI C12.1 - 2014.

4.4.3 The BSJ and JPS shall ensure that the Reference Measurement Instruments being used in conducting the relevant Acceptance Testing have percentage errors which are no greater than those indicated in sections 3.9.2.2.2 and 3.9.2.2.3 of ANSI C12.1 – 2014.

4.5 ACCEPTANCE TESTING

4.5.1 JPS or its Agent shall notify the OUR of all Lots of new and repaired electricity meters, related metering devices and accessories which are intended to be introduced into service. Such notification shall include a full listing of all devices in the Lot and shall be in a form that allows the OUR to select a representative sample of each device from every Lot for Acceptance Testing.

4.5.2 The sample selection process shall be done in accordance with sub-section 4.6 of this Protocol.

4.5.3 For new electricity meters and related metering devices, the OUR shall notify JPS or its Agent, as appropriate, of the specific devices which comprise the sample to be tested and direct JPS or its Agent, as appropriate, to deliver these devices to the BSJ for testing within five (5) working days of such notification, unless agreed otherwise by JPS and the OUR.

4.5.4 The OUR, at the time of notifying JPS or its Agent regarding the device for Acceptance Testing, , shall also provide notification to the BSJ of such Acceptance Testing and identify therein the specific devices which comprise the sample to be tested.

4.5.5 For repaired JPS electricity meters and related metering devices, the OUR shall notify JPS of the specific devices which comprise the sample to be tested.

4.5.6 The BSJ, upon receipt of sample devices from JPS, where applicable, shall notify JPS or its Agent, as appropriate, acknowledging receipt of the samples and indicating the condition in which they were received. BSJ shall also submit a copy of such notification to the OUR.

4.5.7 Electricity meters rated above 12kVA shall satisfy all the requirements of Acceptance Testing before they are permitted to undergo calibration by JPS prior to field installation.

4.5.8 The BSJ shall execute Acceptance Testing of electricity meters and related metering devices in accordance with the timelines specified in sub-section 4.11 of this Protocol.

4.5.9 JPS shall ensure that Acceptance Testing of all repaired JPS electricity meters and related metering devices is executed in a timeframe to ensure that adequate metering devices are available to meet its obligations under its licence.

4.5.10 The BSJ, upon completion of the required Acceptance Testing of electricity meters and related metering devices, shall submit its Acceptance Test Report to the OUR, copied to JPS. At the same time the BSJ shall return all test samples to JPS, or its Agent with the BSJ's protection seal applied to each device prior to its return. Noncompliance with these requirements may result in an investigation by the OUR.

4.5.11 Where Acceptance Testing of repaired JPS electricity meters or related metering device is conducted by JPS, upon completion of the required testing JPS shall submit its Acceptance Test Report to the OUR.

4.5.12 All devices to be tested shall be appropriately handled and transported, in suitable packaging by the relevant parties to prevent damage.

4.6 ACCEPTANCE TESTING SAMPLE SELECTION PROCESS AND SAMPLE SIZE

4.6.1 The selection of a sample of devices to undergo Acceptance Testing shall be based on the provisions herein.

4.6.2 The Sampling Plan to be used in determining the number of devices to be tested, as per the requirements for Acceptance Testing shall normally be guided by section 3.3, procedure A, of ISO 2859/2, using a limiting quality (LQ) index of 8.0%. In instances, however, where the OUR deems the devices being tested to be of sufficiently low risk of being rejected, the OUR may instead choose to use a Sampling Plan based on a LQ index of 12.5%.

4.6.3 All Lots of devices to be subjected to Acceptance Testing shall consist of devices of the same make and model, with the same metrological parameters; manufactured or repaired under uniform conditions; and for newly imported devices, they shall be part of the same shipment.

4.6.4 All devices within a Lot shall be individually identified on a list.

4.6.5 The sample for testing shall be chosen by the OUR at random without replacement from the Lot, using an appropriate random sampling method.

4.6.6 The sample size for Acceptance Testing shall be determined using Table 4.1.

Table 4.1: Acceptance Sample Size (n) and Acceptance Number (Ac) Guided by Procedure A of ISO 2859/2

Lot Size	LQ = 8.0%		LQ=12.5%		Remarks
	n	Ac	n	Ac	
Up to 25*	17**	0	13	0	* - Lot size modified from "16 to 25" to "Up to 25" ** - *When n exceeds the Lot size, use 100% inspection with an Acceptance Number of zero*
26 to 50	22	0	15	0	
51 to 90	24	0	16	0	
91 to 150	26	0	18	0	
151 to 280	28	0	20	0	
281 to 500	32	0	32	1	
501 to 1,200	50	1	32	1	
1,201 to 3,200	80	3	50	3	
3,201 to 10,000	125	5	80	5	
10,001 to 35,000	200	10	125	10	
35,001 to 150,000	315	18	200	18	
150,001 to 500,000	315	18	200	18	
> 500,000	315	18	200	18	

4.7 TESTS REQUIRED FOR ACCEPTANCE

4.7.1 All new and repaired JPS electricity meters and related metering devices undergoing Acceptance Testing shall be tested in accordance with S202 of Schedule 2 of this Protocol.

4.8 ACCEPTANCE CRITERIA

4.8.1 The Acceptance Criteria to be used in Acceptance Testing of new and repaired JPS electricity meters and related metering devices shall be based on the Acceptance Criteria contained in ISO 2859/2. A Lot of electricity meters or related metering devices shall be considered acceptable if the number of Nonconforming Units found in the sample is equal to, or less than, the Acceptance Number (Ac) specified in Table 4.1 above.

4.8.2 If the number of Nonconforming Units found in the sample is greater than the Acceptance Number (Ac), the Lot is unacceptable. An unacceptable Lot may not be resubmitted for Acceptance Testing unless:

a) The OUR agrees; and

b) All Nonconforming Units have been removed or replaced by appropriate units or the relevant nonconformities have been corrected.

4.8.3 If a Nonconformity discovered during Acceptance Testing is due to non-compliance with the device's Pattern Approval, or the Nonconformity or defect compromises, or may compromise the accuracy, integrity, or appropriate usage of the device and it is determined that the cause of the Nonconformity or defect may potentially impact additional devices of the same make, type or model then the Lot in question shall be rejected and Acceptance Testing shall be suspended pending identification and correction of the cause(s) associated with such Nonconformity. Under such circumstances, the BSJ or JPS, as appropriate, shall promptly notify the OUR of such occurrences, and the OUR shall give directions to the BSJ and/or JPS as to how to proceed.

4.8.4 Devices which are deemed unacceptable and cannot be repaired by JPS shall be scrapped.

4.9 ACCEPTANCE OR REJECTION OF DEVICE LOT

4.9.1 When a Lot of devices has been determined to be acceptable based on the Acceptance Test Report submitted by BSJ or JPS as applicable, the OUR shall notify JPS of its acceptance of the device lot under consideration, which shall authorize JPS to install such devices or to undertake pre-field calibration as specified in section 4.10. The OUR's Acceptance shall include a Re-verification Period which shall not exceed ten (10) years.

4.9.2 Where based on the Acceptance Test Report submitted by the BSJ or JPS as applicable, it is determined by the OUR that a device Lot has not satisfied the Acceptance Criteria, the OUR shall notify JPS accordingly and in the notification indicate the areas of deficiency or Nonconformity and may suggest corrective measures that JPS may consider for acceptance to be granted for such devices.

4.10 PRE-FIELD CALIBRATION OF ELECTRICITY METERS

4.10.1 JPS shall adjust the tolerance on each electricity meter from an accepted Lot of meters rated above 12kVA , where necessary, to ensure that it measures as close to zero tolerance as possible before it is dispatched for field installation.

4.10.2 JPS may immediately dispatch, for field installation, each electricity meter rated at 12kVA and below; and any other metering device that have satisfied all the Acceptance Criteria without the need for JPS to adjust them to as close as possible to zero tolerance.

4.11 TIME FRAME FOR CONDUCTING ACCEPTANCE TESTING

4.11.1 The BSJ shall ensure that the time frame for conducting Acceptance Testing for all new electricity meters and related metering devices, including advanced electricity meters is in accordance with Table 4.2 below.

Table 4.2: Time Frame for Conducting Acceptance Testing

Acceptance Sample Size (n)	Maximum Number of Working Days for Acceptance Testing According to Device Classification	
	Electricity Meters	**Instrument Transformers**
1 to 80	7	15
125	10	19
200	17	28
315	28	37

4.11.2 In the event that the BSJ encounters problems beyond its immediate control during the Acceptance Testing process, it shall promptly notify the OUR of such problems and such notification shall be copied to JPS.

4.11.3 After notification by the BSJ, the OUR shall give directions on how to proceed.

4.11.4 In the event that the BSJ is unable to meet the stipulated timelines for Acceptance Testing the OUR shall be notified by the BSJ, and the OUR after consultations with JPS and the BSJ, shall issue a determination regarding securing Acceptance Testing for a Lot of devices.

4.12 COST FOR CONDUCTING ACCEPTANCE TESTING

4.12.1 The cost for conducting the relevant Acceptance Tests shall be the responsibility of the organization requesting the Acceptance Testing and shall be in accordance with the provisions of Schedule 4 of this Protocol.

5 COMPLIANCE TESTING OF FIELD INSTALLED ELECTRICITY METERS AND RELATED METERING DEVICES

5.1 OBJECTIVES OF COMPLIANCE TESTING

5.1.1 To ensure that the full complement of JPS field-installed electricity meters' electrical power/energy measurements are in compliance with a $\pm$2% tolerance as required by ANSI C12.1 – 2014.

5.1.2 To ensure that all the relevant related metering devices are operating in conformance with the applicable standard.

5.1.3 To use random sampling together with a statistical Sampling Plan to achieve the above objectives set out in paragraphs 5.1.1 and 5.1.2.

5.1.4 To ensure that Compliance Testing is being conducted by JPS on an ongoing basis.

5.2 STANDARDS GOVERNING COMPLIANCE TESTING

5.2.1 Compliance Testing of JPS' field-installed electricity meters and related metering devices, shall be carried out by JPS in accordance with the following standards or any later version of the said standards or any other applicable standards prescribed by the OUR.

a) ANSI C12.1 – 2014: American National Standard for Electric Meters – Code for Electricity Metering

b) IEEE C57.13 – 2008: IEEE Standard Requirements for Instrument Transformers

c) ISO 2859/2 – 1985: Sampling Procedures for Inspection by Attributes – Part 2: Sampling Plans Indexed by Limiting Quality (LQ) for Isolated Lot Inspection

5.3 MEASUREMENT TRACEABILITY FOR COMPLIANCE TESTING

5.3.1 Measurement Traceability shall be the mechanism under this Protocol which ensures that the energy measured in kWh and billed to a particular JPS customer is the same as that measured at the BSJ or at the institution that defines the kWh globally, the BIPM.

5.3.2 Compliance Testing of electricity meters and related metering devices may require the use of fixed and travelling watt-hour working standards; portable meter test kit; multi-meter controlled test bench; standardized test voltages, current, phase angle, main frequency and waveform distortion as well as laboratory ambient temperature control. Verifying Traceability to the SI of all these test equipment, service supplies and space conditioning instruments shall be a part of the terms of Accreditation obtained by JPS for its Meter Testing, Calibration & Repair Facilities and Services.

5.3.3 The BSJ shall maintain the kWh and kVARh measurement for Jamaica, in relation to Compliance Testing, through its National Power and Energy Standards that must be directly traceable to the SI through direct or indirect calibration or measurement comparison programmes.

5.4 METER TOLERANCE AND MEASUREMENT ACCURACY

5.4.1 JPS shall subject all their field-installed electricity meters to Compliance Testing to ensure that their tolerance on electrical measurements remain within ±2%.

5.4.2 JPS shall subject all the relevant related metering devices to Compliance Testing to ensure that they are operating in conformance with the applicable standard.

5.4.3 JPS shall ensure that the Reference Measurement Instruments being used in conducting Compliance Testing have percentage errors which are no greater than those indicated in sub-sections 3.9.2.2.2 and 3.9.2.2.3 of ANSI C12.1 – 2014.

5.5 COMPLIANCE TESTING REQUIREMENTS

5.5.1 JPS shall conduct Compliance Testing on its field installed electricity meters and related metering devices to ensure compliance with the requirements of this Protocol and to satisfy its requirements under its electricity licence.

5.5.2 The OUR shall ensure that JPS fulfils the requirements for Compliance Testing and that the procedures used in satisfying these requirements are in accordance with the standards referenced in this Protocol. Further, the OUR may give direction to JPS to take specific actions premised on the results of Compliance Testing.

5.5.3 Compliance Testing for a Lot of electricity meters and related metering devices shall be carried out sufficiently in advance of the expiry of the Re-verification Period of the electricity meters or related metering devices so that in the case of Noncompliance with the requirements for measurement accuracy, all electricity meters or related metering devices that comprise a Lot can be removed from service prior to the expiry of the Re-verification Period.

5.5.4 Prior to the commencement of Compliance Testing, JPS shall review the entire set of its installed electricity meters and related metering devices and shall define device Lots on a set of criteria that as far as practicable meets the requirements for developing a National Electricity Meter Sampling Map (NEMSM). JPS shall submit its proposal for defining such device Lots for Compliance Testing to the OUR for review and approval.

5.5.5 In executing the review process, the OUR may constitute and chair a committee which comprise representatives of the JPS and the BSJ to ensure that the NEMSM arranges the entire set of field installed electricity meters and related metering devices across the island into the best possible homogeneous Lots for the purposes of sampling to facilitate Compliance Testing.

5.5.6 JPS shall within six (6) months of agreement on a NEMSM prepare a report on the general status of metering within each sample area. Such reports shall contain, among other things, a listing of the devices within that sampling area and shall include the following information:

a) The serial number for each electricity meter

b) The meter manufacturer's name

c) The meter model designation

d) Age of the electricity meters

e) The current range of the meter

f) The exact location (address) for the electricity meters

g) The total number of electricity meters in the Lot

h) The meter Lot identification number

i) The recommended years for seal extension of the electricity meters in the Lot

j) All the relevant information applicable to the related metering devices

5.5.7 The listing of the devices, provided by JPS, shall explicitly define the Lot for Compliance Testing, and should be such that a device can be withdrawn from the list but no additions to the listing can be made.

5.5.8 Prior to conducting Compliance Testing of any selected Lot of devices, JPS shall submit the listing of devices in the Lot to the OUR, and the OUR shall, within five (5) days use random sampling methodology to select the devices from the Lot to be tested.

5.5.9 The Sampling Plan to be used by the OUR for Compliance Testing shall be based on section 3.3, procedure A, of ISO 2859/2.

5.6 COMPLIANCE TESTING SAMPLE SELECTION PROCESS AND SAMPLE SIZE

5.6.1 The samples of devices to undergo Compliance Testing shall be selected pursuant to sub-section 5.5, paragraph 5.5.8 of this Protocol.

5.6.2 As far as practicable, Lots of devices identified to undergo Compliance Testing, shall consist of homogenous groups of devices of the same pattern, tolerance, rating and shipment.

5.6.3 JPS shall ensure that all devices within a Lot can be individually identified on a list.

5.6.4 The size of the sample selected shall be determined using Table 5.1 below. The sample size representing a specific Lot shall correspond to a value between n_{min} and n_{max} for that Lot as identified in Table 5.1.

Table 5.1: Sampling Plans for Compliance Testing of Electricity Meters

	TARGET SEAL EXTENSION LEVEL (Limiting Quality)															
	Level 1 (3.15)				**Level 2** (5.0)				**Level 3** (8.0)				**Level 4** (12.5)			
LOT SIZE	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}
Up to 60*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30	37	0	0
Up to 500**	44	55	0	0	44	55	1	0	44	55	2	0	44	55	4	0
501 to 1,200	125	156	1	1	80	100	1	0	65	81	1	0	42	52	4	0
1,201 to 3,200	125	156	1	1	125	156	3	1	80	100	3	0	65	81	8	0
3,201 to 10,000	200	250	3	3	200	250	5	3	125	156	5	1	80	100	10	1
10,000 to 35,000	315	394	5	5	315	394	10	5	200	250	10	3	125	156	18	3
over 35,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	315	394	18	5	200	250	32	5
** -* *Limiting Quality for Level 4 Seal Extension is 5.0.*																
*** -* *Limiting Quality for Level 1 Seal Extension is 5.0, Level 2 – 8.0, Level 3 – 12.5 and Level 4 - 20*																

5.6.5 The factors that shall be used in determining a minimum sample size (n_{min}) as represented in Table 5.1 above are the Lot size and the maximum seal extension level being targeted. The target seal extension level gives a basis for choosing the number of years of seal extension that can be applied to the devices which comprise the Lot being subjected to Compliance Testing as indicated in sub-section 5.9.

5.6.6 Devices which are slated to undergo Compliance Testing for the first time shall, as a maximum, have a Level 1 seal extension target; devices identified to undergo Compliance Testing for the second time shall, as a maximum, have a Level 2 seal extension target; those identified to undergo Compliance Testing for the third time shall, as a maximum, have a Level 3 seal extension target; and those identified to undergo Compliance Testing for the fourth time or greater shall, as a maximum, have a Level 4 seal extension target.

5.6.7 The Acceptance Numbers Ac_{type1} and Ac_{type2} indicate the maximum number of marginal conforming electricity meters and Nonconforming electricity meters, respectively, which are allowable under each Sampling Plan. Pursuant to the requirements of this Protocol and the supporting standards, a marginally conforming electricity meter shall be one whose performance error exceeds $\pm$1.5% but is not greater than $\pm$2% in any of the Compliance Tests performed, while a Nonconforming electricity meter shall be one whose performance error exceeds $\pm$2%.

5.6.8 Electricity meters and devices which form a part of the Sampling Plan to be used in Compliance Testing shall be chosen at random without replacement, by the OUR, using an appropriate random sampling method.

5.6.9 JPS shall be responsible for ensuring that the electricity meters and devices which are included in the sample meet the following criteria:

a) The identified electricity meters and devices are all currently installed and in service; and

b) The identified electricity meters and devices' metrological parameters have not been adjusted post installation.

5.6.10 Each electricity meter or device in the sample which is determined to be defective based on inspection procedures being carried out in accordance with S203 of Schedule 2 of this Protocol shall be excluded from testing. Such defective electricity meters or devices shall be the subject of an investigation by JPS

to determine the causes of the identified defects. Upon completion of such investigation, JPS shall prepare a report of its investigation and findings which shall be appended to the Compliance Test Report to be submitted to the OUR, and such report shall include the following information:

a) Details of the electricity meter's or device's make, model, Pattern Approval information, Re-verification Period and identification numbers;

b) A description of the identified defects and the associated causes;

c) A description of the methodology used to investigate the cause of the defect, including identification of the personnel both performing the investigation and the activities performed;

d) An evaluation of the extent of the defect, including possible impacts if discernible and any potential effects on the operation of the electricity meter or device type in question; and

e) Details of the corrective and preventive action proposed or performed by JPS to address the cause and symptoms of the identified defect.

5.6.11 Where an electricity meter or device in the selected sample does not qualify based on the criteria in paragraphs 5.6.9 and 5.6.10 hereof, JPS shall not consider this electricity meter or device as part of the sample for Compliance Testing, and shall replace it with the sequentially subsequent meter on the preselected unsorted list, meeting the applicable criteria.

5.6.12 In cases where a defective electricity meter or device is identified by JPS during inspection of the sample, the investigation referred to in paragraph 5.6.10 hereof, shall apply and the report required following such investigation by JPS shall be submitted as part of the Compliance Test Report to the OUR for review prior to its determination on the acceptability of the affected Lot. The OUR's decisions regarding the acceptability of the affected Lot and the possible need for further investigation or corrective action shall not be made until the OUR has reviewed the report required in paragraph 5.6.10 hereof and the data from the sample of electricity meters or devices involved in the final calculations.

5.6.13 All electricity meters or devices that were originally included in the sample but have been excluded based on the criteria in paragraphs 5.6.9 and 5.6.10 hereof, shall be accounted for and the reasons for exclusion shall be reported. Evidence of deliberate exclusion may result in the OUR disqualifying the results of Compliance Testing on the sample.

5.6.14 Lots for which the minimum sample size, n_{min}, cannot be achieved, as a result of the total number of exclusions, are not considered to be homogenous and shall not be considered acceptable for Compliance Testing. In such instances JPS, in consultation with the OUR, may employ one of the following actions, taking into account technical and economic considerations:

a) Re-form the Lot on the basis of the homogeneity criteria;

b) Use requirements from a lower seal extension level which would lead to a shorter seal extension period; or

c) Remove the Lot from service.

5.7 TESTS CONDUCTED DURING COMPLIANCE TESTING

5.7.1 Testing of all electricity meters and devices slated to undergo Compliance Testing shall be done in accordance with S203 of Schedule 2 of this Protocol.

5.8 COMPLIANCE CRITERIA

5.8.1 To achieve Compliance, JPS shall implement the Sampling Plan requirements set out under sub-section 5.6 of this Protocol.

5.8.2 The acceptability of a Lot for the purposes of extending its Re-verification Period, shall be established on the basis of the results of the Compliance Testing.

5.8.3 If the numbers of marginally conforming and Nonconforming electricity meters or devices exceed the acceptance numbers in the relevant Sampling Plan, the specific Lot of electricity meters or devices undergoing Compliance Testing shall be deemed non-compliant.

5.8.4 Individual electricity meters or device which are found to be Nonconforming shall be withdrawn from service and repaired or destroyed. Where a Nonconforming electricity meter or device is withdrawn from service or destroyed, the OUR may give direction as to the regulatory treatment of such assets.

5.9 COMPLIANCE TESTING DECISION RULES AND ACTIONS

5.9.1 JPS after completion of its Compliance Testing shall submit a Compliance Test Report to the OUR providing details of the results, test statistics and other findings which shall clearly identify:

a) Lots that are acceptable and the recommended seal year extension having regard to the maximum seal year extensions set out in Table 5.2 below. A Lot shall be considered acceptable if it satisfies the compliance criteria set out under sub-section 5.8 of this Protocol.

b) Lots for which the sample failed to satisfy the Compliance Criteria set out under sub-section 5.8 of this Protocol.

5.9.2 When a Lot of electricity meters or devices satisfies the Compliance Criteria, the maximum seal extension period available to such Lot shall be determined from Table 5.2 below, based on the initial Re-verification Period which was given to the electricity meters or devices when they were initially accepted, and the maximum seal extension level determined for application to the Lot.

Table 5.2: Maximum Seal Period Extension (years)

INITIAL RE-VERIFICATION PERIOD (YEARS)	MAXIMUM SEAL PERIOD EXTENSION (YEARS)			
	Level 1	Level 2	Level 3	Level 4
10	8	6	4	2
9	7	5	3	2
8	6	4	3	2
7	5	4	2	1
6	4	3	2	1
5	no Level 1 extension	3	2	1

5.9.3 The OUR, after its review of JPS' Compliance Test Report and recommendation for seal year extension, may:

a) Approve a seal year extension for the Lot of electricity meters or devices if the results indicate that the relevant Compliance Criteria set out under sub-section 5.8 of this Protocol were met.

b) Reject any Lot of electricity meters or devices recommended as acceptable by JPS but for which the OUR identifies errors or deficiencies in the test procedures and/or results as presented in the Compliance Test Report including any appended report. In such cases the OUR shall notify JPS of its decision, setting out clearly the basis of such decision.

5.9.4 In the notification to JPS referred to under paragraph 5.9.3 (b), the OUR may either direct JPS to (i) withdraw the entire Lot of electricity meters from service; (ii) sample to a lower seal extension level with a resultant lower seal extension period if the lower threshold is met; or (iii) test 100% of the electricity meters in the Lot and subsequently remove the electricity meters which are found to be Nonconforming.

5.9.5 When seal year extensions have been approved by the OUR, the electricity meters in the Lot, less any Nonconforming meters shall be considered due for Re-verification on or before December 31 of the calendar year derived from the addition of the approved seal period extension in years to the year in which Compliance Testing began for the Lot and the extension period approved.

5.10 TIME FRAME FOR CONDUCTING COMPLIANCE TESTING

5.10.1 The JPS shall commence and complete the required Compliance Testing and submit its reports to the OUR in accordance with the schedule agreed between JPS and the OUR prior to Compliance Testing.

5.11 COST FOR CONDUCTING COMPLIANCE TESTING

5.11.1 The cost for conducting the required Compliance Testing of electricity meters and devices shall be the responsibility of JPS.

6 CUSTOMER REQUEST FOR ELECTRICITY METER ACCURACY VERIFICATION CHECK

6.1 OBJECTIVES OF METER ACCURACY VERIFICATION CHECK BASED ON CUSTOMER REQUEST

6.1.1 To give assurance to JPS customers of their right to have their meter checked for measurement accuracy upon request.

6.1.2 To make meter accuracy verification checks affordable to every JPS customer by allowing one free meter accuracy verification check per twelve (12) month period.

6.1.3 To ensure that meter accuracy verification checks on individual meters shall be in accordance with ANSI C12.1 – 2014 and the test criteria shall be ±2% for registration accuracy. The meter accuracy verification checks must also ensure that the meters conform to all other specified requirements, as indicated in S204 of Schedule 2 of this Protocol, and be free from defects and Nonconformities.

6.2 AUTHORIZATION FOR METER ACCURACY VERIFICATION CHECK

6.2.1 The OUR may, in accordance with section 4 (5) of the OUR Act and clause 3 of Directive [Ele 2005/06] titled: ***"(Issues pursuant to Section 4(2) of the Office of Utilities Regulation Act) In the matter of Prescribing a Protocol for the testing of meters used by Jamaica Public Service Company Limited to measure consumption of Electric Energy by its customers"***, which became effective 2005 December 6, require that a consumer's meter be independently tested for registration accuracy by the BSJ or any approved Meter Testing Entity.

6.2.2 Individual customers of JPS may request a meter accuracy verification check which shall be done in accordance to the procedures set out in sub-section 6.3 of this Protocol.

6.3 REQUESTS FOR METER ACCURACY VERIFICATION CHECK

6.3.1 JPS shall notify its customers that requests for meter accuracy verification checks shall first be directed to JPS and that they are entitled to one free meter accuracy verification check per twelve (12) month period which shall be conducted by JPS as stated in JPS' Terms and Conditions of Service. JPS shall ensure that the information pertaining to the free meter accuracy verification check is published on its website, in its brochures and any other publication it considers appropriate.

6.3.2 Without prejudice to the provisions set out in paragraph 6.3.1, a JPS customer is entitled to request a meter accuracy verification check other than the allowed one free check, under circumstances where: (i) the customer becomes aware that JPS inspected or tested its meter during the course of its operation and the results are not satisfactory to the customer, (ii) there is reasonable indication to the customer that the meter is malfunctioning, or (iii) where an Appeal or investigation related to the settlement of an electricity service/billing matter is being addressed by the OUR. Such customer requested meter accuracy verification check may be conducted by JPS or the BSJ or any approved Meter Testing Entity, as the case may be.

6.3.3 All requests for a meter accuracy verification check shall be submitted to JPS in writing or through any other medium of communication appropriate to JPS.

6.3.4 If a customer is dissatisfied with the results of a meter accuracy verification check conducted by JPS, the customer may contest such results and request a subsequent meter accuracy verification check which may be conducted by the BSJ or any approved Meter Testing Entity.

6.3.5 The timeline for JPS to conduct a meter accuracy verification check related to an Appeal or investigation shall be thirty (30) working days in accordance with Electricity Guaranteed Standard EGS 5(b) – Investigations, of the Electricity Licence, 2016. If JPS fails to comply with the stated timeline, the customer shall be compensated in accordance with the compensation mechanism specified in the Guaranteed Standards published by the OUR from time to time.

6.3.6 The timeline for JPS to conduct a customer requested meter accuracy verification check not related to an Appeal or investigation shall be thirty-five (35) working days.

6.3.7 Upon completion of a meter accuracy verification check, JPS shall notify the customer of the results within five (5) working days and copied to the OUR.

6.3.8 In the event that the OUR receives a request for a meter accuracy verification check from a JPS customer, the OUR shall act in accordance with the following:

a) The OUR shall contact JPS to determine if a request for a meter accuracy verification check was first made to JPS.

b) If it is found that the customer did not submit a request to JPS regarding a meter accuracy verification check, the OUR shall direct the customer to submit the request to.

c) If JPS fails to complete the customer requested meter accuracy verification check within the timeline specified in this sub-section 6.3, it shall notify the customer and the OUR accordingly and outline the reasons for delay. If the OUR is not satisfied that JPS is able to remedy the cause of the delay in a timely manner then, to the extent the customer agrees, the OUR may transfer the request for meter accuracy verification check to the BSJ or any approved Meter Testing Entity in accordance with the following provisions:

i. The OUR shall, after notification of the request to the BSJ or any approved Meter Testing Entity, agree on a date for testing. The OUR shall subsequently inform JPS of the agreed date.

ii. The BSJ, or approved Meter Testing Entity, may choose to conduct the meter accuracy verification check at the customer's premises, using portable meter testing equipment, or at their meter testing lab.

iii. Should the BSJ, or approved Meter Testing Entity, choose to conduct the meter accuracy verification check at the customer's premises, JPS shall use reasonable effort to cooperate and facilitate this activity by being present at the site to break the seal of the meter in the presence of a representative of the BSJ or approved Meter Testing Entity. Upon completion of the test, the on-site JPS Representative shall re-seal the meter in question.

iv. Should the BSJ, or approved Meter Testing Entity, choose to conduct the meter accuracy verification check at their meter testing lab, JPS shall use reasonable effort to cooperate and facilitate this activity and ensure that the meter is removed and placed in a tamper proof bag and handed over to a representative of the BSJ or Meter Testing Entity that was contracted by the OUR. On removal of the existing electricity meter, the JPS shall, at the same time, install an alternative meter at the location to ensure continued measurement of electricity supply to the customer.

v. The timeline for conducting this accuracy verification check shall be within thirty (30) working days.

vi. If the BSJ or a contracted Meter Testing Entity is unable to check the accuracy of the meter within this timeline, the BSJ or the Meter Testing Entity shall provide an explanation to the OUR and a new timeline shall be agreed between the OUR and the BSJ or the Meter Testing Entity in accordance with the terms of the arrangements between the OUR and the BSJ or the Meter Testing Entity.

vii. After the BSJ or the Meter Testing Entity has completed the requisite checks on the meter, the results shall be submitted to the OUR within five (5) working days.

viii. The OUR shall communicate the test results to the customer and to JPS within five (5) working days of receipt of such results.

d) If it is discovered that the customer previously made contact with JPS regarding a meter accuracy verification check, but either did not receive notification from JPS on the test results within the specified timeline or is dissatisfied with the results of JPS' meter accuracy verification check, then the customer may indicate to JPS that it intends to request a subsequent meter accuracy verification check to be conducted by the BSJ or other Meter Testing Entity.

6.3.9 In the event that the BSJ or any approved Meter Testing Entity receives a request for a meter accuracy verification check from a JPS customer, the BSJ or the Meter Testing Entity shall direct the customer to submit the request to JPS pursuant to the provisions of paragraphs 6.3.1 to 6.3.3 of this sub-section 6.3.

6.3.10 In the event that JPS receives a request from one of its customers for a meter accuracy verification check with that customer specifying that such meter accuracy verification check should be carried out by the BSJ or any approved Meter Testing Entity, JPS shall:

a) Acknowledge the customer's request within five (5) working days.

b) Inform the customer of a date and time at which a JPS Representative will be present at the location to facilitate testing activities being conducted by the BSJ or any other contracted Meter Testing Entity's representative present at the location. This shall be done within fifteen (15) working days after issuing its acknowledgement. If testing activities being conducted by the BSJ, or approved Meter Testing Entity, requires removal of the existing electricity meter, JPS shall, at the same time, install an alternative meter at the location to ensure normal supply to the customer.

6.3.11 The timeline for conducting the meter accuracy check required under paragraph 6.3.10 shall be within thirty (30) working days. Upon completion of the meter accuracy verification check by the BSJ or any other approved Meter Testing Entity, the results shall be submitted to JPS, which shall notify the customer, and submit a copy of the results to the OUR within three (3) working days.

6.3.12 In the event that JPS is dissatisfied with the results of the meter accuracy verification check required under paragraph 6.3.10, JPS may choose to resolve the issue pursuant to section 14 of this Protocol.

6.4 TESTS REQUIRED FOR ELECTRICITY METER ACCURACY VERIFICATION CHECK

6.4.1 The requisite testing to be performed in response to a customer request for a meter accuracy verification check shall be done in accordance with S204 of Schedule 2 of this Protocol.

6.5 PAYMENT FOR METER ACCURACY VERIFICATION CHECK

6.5.1 PAYMENT FOR METER ACCURACY VERIFICATION CHECK PERFORMED BY JPS

6.5.1.1 To restrict a multitude of unreasonable requests for meter accuracy verification checks to JPS which has cost implications, the customers shall be solely responsible for the applicable costs associated with any more than one meter accuracy verification check per twelve (12) month period, unless the meter accuracy verification check results indicate that the meter accuracy is outside of the ±2% tolerance allowed.

6.5.1.2 If the results of the meter accuracy verification check carried out by JPS validates that the meter is working within the prescribed tolerance (±2%), the customer shall not pay for the cost of testing if a previous meter accuracy verification check was performed more than twelve (12) months prior.

6.5.1.3 The customer shall pay the cost of a meter accuracy verification check if the meter is tested and found to be working within the prescribed tolerance (±2%) if a customer's most recent meter accuracy verification check was performed less than twelve (12) months prior.

6.5.1.4 If the results of JPS' meter accuracy verification check shows that the meter is operating outside the required tolerance (±2%), the customer shall not pay the cost of testing, regardless of the time elapsed between the most recent request for a meter accuracy verification check and the previous request.

6.5.1.5 In instances where a meter accuracy verification check shows that the meter is operating outside the required tolerance (±2%) and there is sufficient evidence showing that the cause of such deviation is due to meter tampering related to electricity theft, the customer shall pay the cost of the meter accuracy verification check.

6.5.2 PAYMENT FOR METER ACCURACY VERIFICATION CHECK PERFORMED BY BSJ OR ANY APPROVED METER TESTING ENTITY

6.5.2.1 If the OUR requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check because of failure by JPS to respond to a customer's request for a meter accuracy verification check in the stipulated time, JPS shall bear the cost of the meter accuracy verification check.

6.5.2.2 If the OUR requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check as part of an Appeal or investigation and the results show that the meter is working outside of the required tolerance (±2%) then JPS shall be responsible for all the costs associated with conducting the requisite meter accuracy verification checks.

6.5.2.3 If the OUR requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check as part of an Appeal or investigation and the results show that the meter is working within the required tolerance (±2%) then the OUR shall be responsible for the applicable costs associated with conducting the requisite meter accuracy verification checks.

6.5.2.4 If a customer requests that the BSJ or any approved Meter Testing Entity performs a meter accuracy verification check and the results show that the meter is working outside of the required tolerance (±2%) then the JPS shall be responsible for all the costs associated with conducting the requisite meter accuracy verification checks.

6.5.2.5 If a customer requests that the BSJ or any approved Meter Testing Entity performs a meter accuracy verification check and the results show that the meter is working within the prescribed tolerance (±2%), the customer shall be responsible for the applicable costs associated with conducting the requisite meter accuracy verification checks.

6.5.2.6 The cost of meter testing undertaken by the BSJ shall be in accordance with provisions of Schedule 4 of this Protocol.

7 ACCREDITATION OF JPS METER TESTING, CALIBRATION & REPAIR FACILITIES AND SERVICES

7.1 OBJECTIVES OF ACCREDITATION

7.1.1 Accreditation of JPS Meter Testing, Calibration & Repair Facilities and Services is necessary to engender public confidence in the delivery of electricity service in Jamaica and to give credibility to JPS' meter testing processes and importantly, the measurement of customers' electricity usage. To fulfil this objective:

a) JPS shall ensure that its Meter Testing, Calibration & Repair Facilities and Services are accredited by established Accreditation bodies, based on internationally accepted standards and Prudent Utility Practice.

b) JPS shall maintain such Accreditation as long as its Meter Testing, Calibration & Repair Facilities and Services remain active.

c) JPS shall provide the OUR with a copy of the relevant documentation pertaining to all Accreditation obtained within twenty (20) working days after the effective date of this Protocol and shall notify the OUR in each instance when such Accreditation is extended, expired or revoked.

7.2 STANDARDS GOVERNING ACCREDITATION

7.2.1 The Accreditation of the referenced facilities and services shall be done in accordance with internationally accepted standards and criteria based on ISO/IEC 17020, 17025, 17065, and Prudent Utility Practice.

7.3 METER TOLERANCE AND MEASUREMENT ACCURACY

7.3.1 Electricity meters calibrated by JPS shall be able to measure electrical power/energy to an accuracy of $\pm$1%.

7.3.2 JPS shall ensure that the reference standards being used in its Meter Testing, Calibration & Repair Facilities and Services have percentage errors which are no greater than those indicated in sub-sections 3.9.2.2.2 and 3.9.2.2.3 of ANSI C12.1 – 2014.

7.4 FACILITIES AND SERVICES THAT REQUIRE ACCREDITATION

7.4.1 The electricity Meter Testing, Calibration & Repair Facilities and Services for which JPS shall seek the requisite Accreditation shall include:

a) The JPS Meter Repair Facilities.

b) The JPS Meter Testing and Calibration Facilities. Meter testing and calibration activities will be dependent on the following activities:

   i. Pre-field calibration of meters rated above 12 kVA that have fully satisfied Acceptance Testing approval criteria.

   ii. Calibration or Field Testing of installed meters to determine tolerance level.

   iii. Customer requested meter accuracy verification checks.

c) Field installed meter testing service.

PART 3: WATER METER TESTING

8 PATTERN TESTING AND APPROVAL OF NEW WATER METER MODELS

8.1 OBJECTIVES OF PATTERN TESTING AND APPROVAL

8.1.1 Water Service Providers (WSPs) shall cause any new model, design or pattern of water meter that is intended to be deployed in Jamaica for the measurement of water consumption, and to be used for the purpose of revenue determination, to be subjected to Pattern Approval before the introduction of such meters into the field.

8.2 STANDARDS GOVERNING PATTERN APPROVAL

8.2.1 Pattern Approval of all water meters shall be in accordance with the following standards or any later version of the said standards, or any other applicable standards agreed by the OUR and the BSJ:

a) ISO 4064 – 1 2014: Water Meters for Cold Potable Water and Hot Water Part 1: Metrological and Technical Requirements

b) ISO 4064 – 2 2014: Water Meters for Cold Potable Water and Hot Water Part 2: Test Methods

c) ISO 4064 – 3 2014: Water Meters for Cold Potable Water and Hot Water Part 3: Test Report Format

8.3 MEASUREMENT TRACEABILITY FOR PATTERN APPROVAL

8.3.1 The BSJ shall maintain the reference units of flow and volume for Jamaica, in relation to Pattern Testing, through its Flow and Volume Standard that must be traceable to the SI either through direct or indirect calibration or measurement comparison programmes.

8.3.2 The BSJ shall ensure that all Reference Measurement Instruments being used for laboratory services are traceable to the SI by calibration to its Flow and Volume Standard.

8.3.3 The BSJ shall document the Traceability that applies to each Pattern Test which shall be included in the Pattern Test Report.

8.4 METER TOLERANCE AND MEASUREMENT ACCURACY

8.4.1 Water meters submitted for Pattern Approval by WSPs shall be able to measure water flow to within the accuracies specified in section 4.2.2 and 4.2.3 of ISO 4064-1 (refer to S301 of Schedule 3 of this Protocol). The manufacturer shall furnish the relevant information on the capability of the water meter to ascertain that such accuracy can be maintained over time.

8.4.2 To ensure confidence in the results obtained, testing equipment shall be so designed, constructed and used so that the performance of the testing equipment itself shall not contribute significantly to the

test error. To this end, the test equipment shall be maintained to a sufficient standard to prevent unwanted vibration of the meter, the test equipment and its accessories. Furthermore, the environment in which the test equipment is located shall be such that the reference conditions given in S301 of Schedule 3 of this Protocol are met.

8.5 REQUIREMENTS FOR PATTERN APPROVAL APPLICATION

8.5.1 ORGANIZATION AUTHORIZED TO REQUEST PATTERN APPROVAL

8.5.1.1 Applications for Pattern Approval of water meters shall be submitted by the WSP to the BSJ in accordance with sub-section 8.5.2.

8.5.1.2 Pattern Approvals, as described in sub-section 8.9, shall be issued to the WSP by the OUR.

8.5.2 PROCESSING OF APPLICATION FOR PATTERN APPROVAL

8.5.2.1 In order to introduce any new pattern of water meter into Jamaica, for the measurement of water consumption, a WSP shall be complete and submit a Pattern Approval application form along with the relevant supporting documentation for review and processing by the BSJ. This form can be obtained from the OUR's website or at the OUR's office.

8.5.2.2 The BSJ upon receipt of such application from the WSP, shall provide: (i) a notification to the WSP of its acknowledgment of the Pattern Approval application within two (2) working days, and (ii) a copy of the said notification and a copy of the submitted application to the OUR.

8.5.2.3 The BSJ shall review the Pattern Approval application, including the supporting documentation within five (5) working days of receipt of the application to determine if it is able to proceed with the required processing. If the BSJ determines that the information provided to facilitate processing is inadequate, then the BSJ shall notify the WSP of the additional information requirements necessary to proceed with the required processing.

8.5.2.4 When the BSJ has determined that the information is satisfactory to proceed with testing it shall notify the WSP of the number of sample devices that are required pursuant to sub-section 8.6 and the associated fees that need to be covered by the WSP, to facilitate the required testing, pursuant to sub-section 8.11.

8.5.2.5 The WSP shall then submit the required number of sample water meters along with any additional documentation, if applicable, to the BSJ and pay the required fee pursuant to sub-section 8.11.

8.5.2.6 Upon receipt of the WSP's sample devices by the BSJ, the BSJ shall provide notification to the WSP acknowledging receipt of the samples. Such notification shall include verification of the number of sample devices received and the condition of such devices.

8.5.2.7 If the BSJ determines that the samples are satisfactory, the BSJ shall proceed with testing in accordance with the testing procedures and applicable time schedule as outlined in sub-sections 8.7 and 8.10.

8.5.2.8 Upon completion of testing, the BSJ shall submit a Pattern Test Report to the OUR, and copied to the WSP. At the same time, the BSJ shall return all samples and relevant documentation to the WSP. Following this, any further action regarding this matter shall be directed by the OUR in accordance with Section 8.9 of this Protocol.

8.5.2.9 The WSP shall be responsible for notifying all of its prospective meter suppliers or manufacturers of the requirements for Pattern Approval.

8.5.3 OUR'S RIGHT TO ACCEPT THE PATTERN APPROVALS ISSUED BY OTHER PARTIES

8.5.3.1 Subject to its regulatory functions, the OUR may consider it necessary to have all new water meter patterns tested by the BSJ prior to granting Pattern Approval, or to grant Pattern Approval based on testing of meters and Pattern Approval granted by other reputable meter testing entities ("Other Meter Testing Entities") with accreditation qualifications pursuant to sub-section 12.2 for the new water meter patterns, subject to a verification process conducted by the BSJ.

8.5.3.2 If the WSP chooses to obtain Pattern Approval from Other Meter Testing Entities for any new water meter pattern it plans to introduce in Jamaica, it shall submit an application for Pattern Approval processing to the BSJ. In such instances, however, a full set of Pattern Approval tests may not be required. In lieu of this condition, the WSP shall attach to their application, copies of the document received from Other Meter Testing Entities that granted Pattern Approval along with the test report that served the basis for the granting of such Pattern Approval. The BSJ shall then conduct a review and evaluation of such documentation to ascertain whether the basis under which such Pattern Approval was granted accords with the requirements of this Protocol.

a) If the BSJ's review and evaluation indicate that the requirements under which such Pattern Approval was granted is in conformance with the requirements of this Protocol, the BSJ shall submit a report of its findings to the OUR. Subject to the OUR's review, the OUR may grant its own Pattern Approval for the relevant water meter.

b) If the BSJ's review and evaluation indicate that the Pattern Approval granted to the WSP by Other Meter Testing Entities is not based on requirements which are consistent with the requirements of this Protocol, the BSJ shall submit a report of its findings to the OUR. Subject to the OUR's review, the OUR may indicate to the WSP that in order to achieve the required Pattern Approval it may choose to (i) to utilize the Pattern Approval process set out under sub-section 8.5.2 of this Protocol in order to obtain Pattern Approval for the new water meter under consideration, or (ii) obtain Pattern Approval from Other Meter Testing Entities based on requirements which are consistent with the requirements of this Protocol, provided that such Pattern Approval shall be subject to the provisions of paragraph 8.5.3.2 (a).

8.6 PATTERN APPROVAL SAMPLE SIZE

8.6.1 The WSP shall submit a minimum of five (5) samples of the water meter and accessories, together with any relevant documentation, to the BSJ to facilitate Pattern Testing.

8.7 TESTS REQUIRED FOR PATTERN APPROVAL

8.7.1 Testing of all new patterns of water meters shall be conducted in accordance with S301 of Schedule 3 of this Protocol.

8.8 CRITERIA FOR PATTERN APPROVAL

8.8.1 A water meter pattern submitted for Pattern Testing shall be approved only in instances where such pattern meets the acceptable performance requirements for all tests required under sub-section 8.7 of this Protocol.

8.9 GRANTING OF PATTERN APPROVAL

8.9.1 WATER METER MODELS FOUND ACCEPTABLE

8.9.1.1 Subject to the Pattern Test Report, when a water meter model successfully meets the requirements for Pattern Approval, the OUR shall grant Pattern Approval to the WSP, which will enable the WSP, and its Agents, to freely procure, or arrange for the manufacture of the specific water meter model.

8.9.2 CONDITIONS OF GRANT OF PATTERN APPROVAL

8.9.2.1 The OUR, in granting Pattern Approval to the WSP, may elect to apply certain conditions to such Pattern Approval which may include, among other things, the following:

a) A date by which the issued approval is to be reviewed, usually ten (10) years from the date of approval.

b) Any additional conditions, as deemed necessary by the OUR.

8.9.3 WATER METER MODELS FOUND UNACCEPTABLE

8.9.3.1 When a water meter model fails to meet the requirements for Pattern Approval, the OUR shall:

a) Notify the WSP that the specific meter model, or variation, submitted for Pattern Approval, has failed to meet the requirements of this Protocol.

b) Indicate to the WSP any corrective measures that may be available to them.

8.9.4 VARIATIONS TO PATTERN APPROVAL

8.9.4.1 A variation to a Pattern Approval, as previously granted by the OUR, may be required in instances where the WSP holds an existing Pattern Approval and wishes to make a change to such Pattern Approval.

Such a change may be occasioned by, among other things, subsequent modifications or upgrades to the approved meter pattern, such as significant software updates, which in the view of the WSP, may alter the performance or operation of that particular meter pattern.

8.9.4.2 For the effect of the changes to be deemed a variation to the existing meter pattern, and not a separate meter pattern, the arrangement of the components of the meter must be substantially of the same design as that of the approved meter pattern. Significant deviations from the arrangements of the approved meter pattern shall require that new Pattern Approval tests be conducted.

8.9.4.3 Where the OUR grants approval for a variation to an existing approved meter pattern, the OUR shall issue an addendum to the existing Pattern Approval, setting out the changes applicable to the meter pattern and any subsequent effect on the operating conditions of such pattern. In instances where it is unclear to the WSP whether a variation to an existing Pattern Approval is required, the WSP shall consult with the OUR.

8.9.4.4 For the avoidance of doubt, the OUR will not approve any request or application for variation of a cancelled, expired or withdrawn Pattern Approval.

8.9.5 CHANGES TO PATTERN APPROVAL

8.9.5.1 The OUR shall make provisions for minor changes to issued Pattern Approval documents such as changes of address, corrections, change to periods of validity and other administrative.

8.9.5.2 Depending on the extent of any such change, the OUR may consider it necessary to issue an addendum to the existing Pattern Approval documents or completely replace such documents.

8.9.6 CANCELLATION OF PATTERN APPROVAL

8.9.6.1 Where a Pattern Approval was Issued to a WSP, the OUR may deem it necessary to cancel such Pattern Approval for, inter-alia, the following reasons:

a) the previously approved pattern no longer complies with the requirements of this Protocol; or

b) any other reason the OUR deems appropriate under the circumstances.

8.9.6.2 Water meters which were in use, or for which a batch was ordered by the WSP, prior to the cancellation of the applicable Pattern Approval, may be considered by the OUR as being of an approved pattern but subject to the other requirements of this Protocol.

8.9.7 OUR'S RIGHT TO WITHDRAW PATTERN APPROVAL

8.9.7.1 If sufficient reason exists, the OUR may withdraw a Pattern Approval granted to a WSP, in circumstances where cancellation is not considered to be appropriate.

8.9.7.2 In the event that a Pattern Approval is withdrawn by the OUR, all devices already installed in the field and conforming to the approved pattern shall be removed from service by the WSP.

8.9.7.3 In its Pattern Approval withdrawal notification to the WSP, the OUR may give directions as to the regulatory treatment of the assets removed from service.

8.10 TIMEFRAME FOR CONDUCTING PATTERN TESTING AND APPROVAL

8.10.1 The required number of samples of water meters shall be submitted by the WSP to the BSJ for testing within reasonable time ahead of the WSP's planned procurement date of the identified batch of water meters, in order to satisfy the requirements under paragraph 8.10.2.

8.10.2 The BSJ shall use reasonable efforts and endeavour to complete the Pattern Test within six (6) weeks of the date of receipt of the samples.

8.10.3 If the Pattern Test Report from BSJ indicates that a water meter model has successfully met the requirements for Pattern Approval, the OUR may within five (5) working days, issue Pattern Approval to the WSP for the specific water meter model.

8.10.4 If the Pattern Test Report from BSJ indicates that the water meter model has not met the requirements for Pattern Approval, the OUR may notify the WSP within five (5) working days.

8.10.5 In the event that the BSJ fails to complete the required Pattern Testing within the timeframe specified in this Section 8.10, the OUR shall issue such instructions as it deems appropriate to enable the WSP to achieve the requisite Pattern Approval.

8.11 COST FOR CONDUCTING PATTERN APPROVAL

8.11.1 The cost for conducting the relevant Pattern Approval inspections and tests including administrative costs shall be the responsibility of the WSP, and shall be as specified in Schedule 4 of this Protocol.

9 ACCEPTANCE TESTING AND APPROVAL OF BATCHES OF NEW & REPAIRED WATER METER MODELS

9.1 OBJECTIVES OF ACCEPTANCE TESTING

9.1.1 Acceptance Testing shall be conducted by the BSJ for all new and repaired water meters before they can be declared eligible for field installation. Acceptance Testing will determine whether the water meters purchased or repaired are representative of the previously approved mater pattern.

9.1.2 All batches of new water meters shall be subjected to Acceptance Testing to determine whether they conform to the standards under which their Pattern Approval was granted.

9.1.3 Acceptance Testing shall be conducted on all batches of repaired water meters, or on all repaired water meters that cannot be grouped into a batch to determine if their tolerance falls within the limits prescribed by this Protocol.

9.1.4 Acceptance Testing of all new and repaired water meters that were granted Pattern Approval shall be conducted by the BSJ.

9.2 STANDARDS GOVERNING ACCEPTANCE TESTING

9.2.1 Acceptance Testing of all new and repaired water meters conducted under this Protocol shall be in accordance with the following standards or any later version of the said standards or any other applicable standards agreed by the OUR and the BSJ.

a) ISO 4064 – 1 2014: Water Meters for Cold Potable Water and Hot Water Part 1: Metrological and Technical Requirements

b) ISO 4064 – 2 2014: Water Meters for Cold Potable Water and Hot Water Part 2: Test Methods

c) ISO 4064 – 3 2014: Water Meters for Cold Potable Water and Hot Water Part 3: Test Report Format

d) ISO 2859/2 – 1985: Sampling Procedures for Inspection by Attributes – Part 2: Sampling Plans Indexed by Limiting Quality (LQ) for Isolated Lot Inspection

9.3 MEASUREMENT TRACEABILITY FOR ACCEPTANCE TESTING

9.3.1 The BSJ shall maintain the units for flow and volume measurements for Jamaica, in relation to Acceptance Testing, through its National Flow and Volume Standard that must be traceable to the SI either through direct or indirect calibration or measurement comparison programmes.

9.3.2 The BSJ shall ensure that all Reference Measurement Instruments being used for laboratory services are traceable to the SI by calibration to its Flow and Volume Standards.

9.3.3 The BSJ shall document the Traceability that applies to the measurement equipment used in the Acceptance Testing process which shall be included in the Acceptance Test Report.

9.4 METER TOLERANCE AND MEASUREMENT ACCURACY

9.4.1 The BSJ shall subject all new Lots of water meters and repaired WSP water meters to Acceptance Testing to ensure that their tolerance on water flow measurements fall within the accuracies specified in section 4.2.2 and 4.2.3 of ISO 4064-1 (refer to Schedule S302 of this Protocol).

9.4.2 To ensure confidence in the results obtained, testing equipment shall be so designed, constructed and used so that the performance of the testing equipment itself shall not contribute significantly to the test error. To this end, the test equipment shall be maintained to a sufficient standard to prevent unwanted vibration of the meter, the test equipment and its accessories. Furthermore, the environment in which the test equipment is located shall be such that the reference conditions given in S302 of Schedule 3 of this Protocol are met.

9.5 ACCEPTANCE TESTING

9.5.1 The WSP or its Agent shall notify the OUR of all Lots of new and repaired water meters which are intended to be introduced into service. Such notification shall include a full listing of all meters in the Lot and shall be in a form that allows the OUR to select a representative sample of meters from every Lot for Acceptance Testing.

9.5.2 The sample selection shall be done in accordance with sub-section 9.6 of this Protocol.

9.5.3 The OUR shall notify the WSP or its Agent, as appropriate, of the specific water meters which comprise the sample to be tested and direct the WSP or its Agent, as appropriate, to deliver these devices to the BSJ for testing within five (5) working days of the notification, unless agreed otherwise by the WSP and the OUR.

9.5.4 The OUR, at the time of notifying the WSP or its Agent regarding the devices for Acceptance Testing shall also provide notification to the BSJ of such Acceptance Testing and identify therein the specific devices which comprise the sample to be tested.

9.5.5 The BSJ, upon receipt of sample meters from the WSP, shall notify the WSP or its Agent, as appropriate, acknowledging receipt of the samples and indicating the condition in which they were received. BSJ shall also submit a copy of such notification to the OUR.

9.5.6 The BSJ shall execute all Acceptance Testing of water meters in accordance with the timelines specified in sub-section 9.10 of this Protocol.

9.5.7 The BSJ, upon completion of the required Acceptance Testing of water meters, shall submit its Acceptance Test Report to the OUR, copied to the WSP. At the same time the BSJ shall return all test samples to the WSP, or its Agent. Noncompliance with these requirements may result in an investigation by the OUR.

9.5.8 All water meters to be tested shall be appropriately handled and transported, in suitable packaging by the relevant parties to prevent damage.

9.6 ACCEPTANCE TESTING SAMPLE SELECTION PROCESS AND SAMPLE SIZE

9.6.1 The selection of a sample of devices to undergo Acceptance Testing shall be based the provisions herein.

9.6.2 The Sampling Plan to be used in determining the number of water meters to be tested, as per the requirements for Acceptance Testing shall be guided by section 3.3, procedure A, of ISO 2859/2, using a limiting quality (LQ) index of 8.0%. In instances, however, where the OUR deems the devices being tested to be of sufficiently low risk of being rejected, the OUR may instead choose to use a Sampling Plan based on a LQ index of 12.5%.

9.6.3 All water meter Lots being subjected to Acceptance Testing shall consist of water meters of the same make and model, with the same metrological parameters; manufactured or repaired under uniform conditions; and for newly imported devices, they shall be part of the same shipment.

9.6.4 All water meters within a Lot shall be individually identified on a list.

9.6.5 The sample for testing shall be chosen by the OUR at random without replacement from the Lot, using an appropriate random sampling method.

9.6.6 The sample size for Acceptance Testing shall be determined using Table 9.1.

Table 9.1: Acceptance Sample Size (n) and Acceptance Number (Ac) Guided by Procedure A of ISO 2859/2

Lot Size	LQ = 8.0%		LQ=12.5%		Remarks
	n	Ac	n	Ac	
Up to 25*	17**	0	13	0	* - Lot size modified from "16 to 25" to "Up to 25" ** - *When n exceeds the Lot size, use 100% inspection with an Acceptance Number of zero*
26 to 50	22	0	15	0	
51 to 90	24	0	16	0	
91 to 150	26	0	18	0	
151 to 280	28	0	20	0	
281 to 500	32	0	32	1	
501 to 1,200	50	1	32	1	
1,201 to 3,200	80	3	50	3	
3,201 to 10,000	125	5	80	5	
10,001 to 35,000	200	10	125	10	
35,001 to 150,000	315	18	200	18	
150,001 to 500,000	315	18	200	18	
> 500,000	315	18	200	18	

9.7 TESTS REQUIRED FOR ACCEPTANCE

9.7.1 All new and repaired WSP water meters undergoing Acceptance Testing shall be tested in accordance with S302 of Schedule 3 of this Protocol.

9.8 ACCEPTANCE CRITERIA

9.8.1 The Acceptance Criteria to be used in Acceptance Testing of new and repaired water meters shall be based on the Acceptance Criteria contained in ISO 2859/2. A water meter Lot shall be considered acceptable if the number of Nonconforming Units found in the sample is equal to, or less than, the Acceptance Number (Ac) specified in Table 9.1 above.

9.8.2 If the number of Nonconforming Units found in the sample is greater than the Acceptance Number (Ac), the Lot of water meters is unacceptable. An unacceptable Lot may not be resubmitted for Acceptance Testing unless:

a) The OUR agrees; and

b) All Nonconforming Units have been removed or replaced by appropriate units or the relevant nonconformities have been corrected.

9.8.3 If a Nonconformity discovered during Acceptance Testing is due to non-compliance with the water meter's Pattern Approval, or the Nonconformity or defect compromises, or may compromise the accuracy, integrity, or appropriate usage of the device and it is determined that the cause of the Nonconformity or defect may potentially impact additional devices of the same make, type or model then the Lot of water meters in question shall be rejected and Acceptance Testing shall be suspended pending identification and correction of the cause(s) associated with such Nonconformity. Under such circumstances, the BSJ shall promptly notify the OUR of such occurrences, and the OUR shall give direction to the BSJ and the WSP as to how to proceed.

9.8.4 Water meters which are deemed unacceptable and cannot be repaired by the WSP shall be scrapped.

9.9 ACCEPTANCE OR REJECTION OF DEVICE LOT

9.9.1 When a Lot of water meters has been determined to be acceptable based on the Acceptance Test Report submitted by BSJ, the OUR shall notify the WSP of its Acceptance of the Lot of water meters under consideration, which shall authorize the WSP to install such water meters from the accepted Lots. The OUR's Acceptance shall include a Re-verification Period which shall not exceed ten (10) years.

9.9.2 Where, based on the Acceptance Test Report submitted by BSJ, it is determined by the OUR that a Lot of water meters has not satisfied the Acceptance Criteria, in its notification to the WSP the OUR shall indicate the areas of deficiency or Nonconformity and may suggest corrective measures that the WSP may consider for Acceptance to be granted for such meters.

9.10 TIME FRAME FOR CONDUCTING ACCEPTANCE TESTING

9.10.1 The BSJ shall ensure that the time frame for conducting Acceptance Testing for all new and repaired water meters is in accordance with Table 9.2 below.

Table 9.2: Time Frame for Conducting Acceptance Testing of Water Meters

Acceptance Testing Sample Size (n)	Maximum Number of Days for Acceptance Testing
1 to 80	7
125	10
200	17
315	28

9.10.2 In the event that the BSJ encounters problems beyond its immediate control during the Acceptance Testing process, it shall promptly notify the OUR of such problems and such notification shall be copied to the WSP.

9.10.3 After notification by the BSJ, the OUR shall give directions on how to proceed.

9.10.4 In the event that the BSJ is unable to meet the stipulated timelines for Acceptance Testing, the OUR shall be notified by the BSJ, and the OUR after consultations with the WSP and the BSJ, shall issue a determination regarding securing Acceptance Testing for a Lot of meters.

9.11 COST FOR CONDUCTING ACCEPTANCE TESTING

9.11.1 The cost for conducting the relevant Acceptance Tests shall be the responsibility of the organization requesting the Acceptance Testing and shall be in accordance with the provisions of Schedule 4 of this Protocol.

10 COMPLIANCE TESTING OF FIELD INSTALLED WATER METERS

10.1 OBJECTIVES OF COMPLIANCE TESTING

10.1.1 To ensure that the full complement of WSP field-installed water meters' flow and volume measurements are in compliance with a ±5% tolerance.

10.1.2 To use random sampling together with a statistical Sampling Plan to achieve the objective set out in paragraph 10.1.1 above.

10.1.3 To ensure that Compliance Testing is being conducted by all WSPs on an ongoing basis.

10.2 STANDARDS GOVERNING COMPLIANCE TESTING

10.2.1 Compliance Testing of WSP field-installed water meters, shall be carried out by the WSP in accordance with the following standards or any later version of the said standards or any other applicable standards agreed by the OUR and the BSJ.

a) ISO 4064 – 1 2014: Water Meters for Cold Potable Water and Hot Water Part 1: Metrological and Technical Requirements

b) ISO 4064 – 2 2014: Water Meters for Cold Potable Water and Hot Water Part 2: Test Methods

c) ISO 4064 – 3 2014: Water Meters for Cold Potable Water and Hot Water Part 3: Test Report Format

d) ISO 2859/2 – 1985: Sampling Procedures for Inspection by Attributes – Part 2: Sampling Plans Indexed by Limiting Quality (LQ) for Isolated Lot Inspection

10.3 MEASUREMENT TRACEABILITY FOR COMPLIANCE TESTING

10.3.1 Measurement Traceability shall be the mechanism under this Protocol which shall ensure that the volume measurements billed in litre to a particular customer of the WSPs is the same as that measured at the BSJ or at the institution that defines the litre globally, the BIPM.

10.3.2 Compliance Testing of water meters may require the use of fixed and portable testing equipment. Verifying Traceability to the SI of all these test equipment, service supplies and space conditioning instruments shall be a part of the terms of Accreditation for the lab performing Compliance Testing services for the respective WSPs

10.3.3 The BSJ shall maintain the unit of volume - litre for Jamaica, in relation to Compliance Testing through its Flow and Volume Standards that must be directly traceable to the SI through direct or indirect calibration or measurement comparison programmes.

10.4 METER TOLERANCE AND MEASUREMENT ACCURACY

10.4.1 WSPs shall subject all their field-installed water meters to Compliance Testing to ensure that their tolerance on flow and volume measurements remain within ±5%.

10.4.2 To ensure confidence in the results obtained, testing equipment shall be so designed, constructed and used that the performance of the testing equipment itself shall not contribute significantly to the test error. To this end, the test equipment shall be maintained to a sufficient standard to prevent unwanted vibration of the meter, the test equipment and its accessories. Furthermore, the environment in which test equipment is located shall be such that the reference conditions given in S303 of Schedule 3 of this Protocol are met.

10.5 COMPLIANCE TESTING REQUIREMENTS

10.5.1 WSPs shall conduct Compliance Testing on its field installed water meters to ensure compliance with the requirements of this Protocol and shall observe the following:

a) In instances where a WSP has its own Accredited Water Meter Testing and Repair Facilities, it may use its own facilities to fulfil the requirements for Compliance Testing.

b) In instances where the WSP does not have its own Accredited Water Meter Testing and Repair Facilities, such WSP may employ the services of a contractor with Accredited Water Meter Testing and Repair Facilities to fulfil the requirements for Compliance Testing.

10.5.2 The OUR shall ensure that all WSPs fulfil the requirements for Compliance Testing and that the procedures used in satisfying these requirements are in accordance with the standards referenced in this Protocol. Further, the OUR may give direction to the WSPs to take specific actions premised on the results of Compliance Testing.

10.5.3 Compliance Testing for a Lot of water meters shall be carried out sufficiently in advance of the expiry of the Re-verification Period of the water meters so that in the case of Noncompliance with the requirements for measurement accuracy, all water meters that comprise a Lot can be removed from service prior to the expiry of the Re-verification Period.

10.5.4 Prior to the commencement of the Compliance Testing, the WSP shall review the entire set of its installed water meters and shall define water meter Lots on a set of criteria that as far as practicable meets the requirements for developing a Water Meter Sampling Map (WMSP). Each WSP shall submit its proposal for defining such water meter Lots for Compliance Testing to the OUR for review and approval.

10.5.5 Included in the WSP's proposal shall be a listing of all the WSP's water meters grouped into homogeneous Lots pursuant to sub-section 10.6. The listing shall include the following information:

a) The serial number for each water meter

b) The meter manufacturer's name

c) The meter model designation

d) Age of the water meters

e) The accuracy class

f) The exact service location (address) for the water meter

g) The total number of water meters in the Lot

h) The Lot identification number

i) The recommended years for seal extension of the water meters in the Lot

10.5.6 For large WSPs who have significant numbers of customers spread over a large number of communities across the island, the OUR may constitute and chair a committee which comprise representatives of the WSP and the BSJ to ensure the specific WSP's WMSP arranges the WSP's entire set of field installed water meters into the best possible homogeneous Lots for the purposes of sampling to facilitate Compliance Testing.

10.5.7 The listing of the water meters, provided by the WSP, explicitly defines the Lot for Compliance Testing, and should be such that a water meter can be withdrawn from the list but no additions to the listing can be made.

10.5.8 Prior to conducting Compliance Testing of any selected Lot of water meters, the WSP shall submit the listing of meters in the Lot to the OUR, and the OUR shall, within five (5) days use random sampling methodology to select the water meters from the Lot to be tested.

10.5.9 The Sampling Plan to be used by the OUR for Compliance Testing shall be based on section 3.3, procedure A, of ISO 2859/2.

10.6 COMPLIANCE TESTING SAMPLE SELECTION PROCESS AND SAMPLE SIZE

10.6.1 The samples of water meters to undergo Compliance Testing shall be selected pursuant to sub-section 10.5, paragraph 10.5.7 of this Protocol.

10.6.2 As far as practicable, Lots of water meters identified to undergo Compliance Testing, shall consist of homogeneous groups of water meters of the same pattern, tolerance, rating and shipment.

10.6.3 The WSP shall ensure that all water meters within a Lot can be individually identified on a list.

10.6.4 The size of the sample selected shall be determined using Table 10.1 below. The sample size representing a specific Lot shall correspond to a value between n_{min} and n_{max} for the Lot as identified in Table 10.1 below.

Table 10.1: Sampling Plans for Compliance Testing of Water Meters

	TARGET SEAL EXTENSION LEVEL (Limiting Quality)															
	Level 1 (3.15)				**Level 2** (5.0)				**Level 3** (8.0)				**Level 4** (12.5)			
LOT SIZE	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}	n_{min}	n_{max}	Ac_{type1}	Ac_{type2}
Up to 60*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30	37	0	0
Up to 500**	44	55	0	0	44	55	1	0	44	55	2	0	44	55	4	0
501 to 1,200	125	156	1	1	80	100	1	0	65	81	1	0	42	52	4	0
1,201 to 3,200	125	156	1	1	125	156	3	1	80	100	3	0	65	81	8	0
3,201 to 10,000	200	250	3	3	200	250	5	3	125	156	5	1	80	100	10	1
10,000 to 35,000	315	394	5	5	315	394	10	5	200	250	10	3	125	156	18	3
over 35,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	315	394	18	5	200	250	32	5

** - Limiting Quality for Level 4 Seal Extension is 5.0.*
*** - Limiting Quality for Level 1 Seal Extension is 5.0, Level 2 – 8.0, Level 3 – 12.5 and Level 4 - 20*

10.6.5 The factors that shall be used in determining a minimum sample size (n_{min}) as represented in Table 10.1 above are the Lot size and the maximum seal extension level being targeted. The target seal extension level gives a basis for choosing the number of years of seal extension that can be applied to the water meters which comprise the Lot being subjected to Compliance Testing as indicated in sub-section 10.9.

10.6.6 Water meters which are slated to undergo Compliance Testing for the first time shall, as a maximum, have a Level 1 seal extension target; meters identified to undergo Compliance Testing for the second time shall, as a maximum, have a Level 2 seal extension target; those identified to undergo Compliance Testing for the third time shall, as a maximum, have a Level 3 seal extension target; and those identified to undergo Compliance Testing for the fourth time or greater shall, as a maximum, have a Level 4 seal extension target.

10.6.7 The Acceptance Numbers Ac_{type1} and Ac_{type2} indicate the maximum number of marginal conforming water meters and Nonconforming water meters, respectively, which are allowable under each Sampling Plan. Pursuant to the requirements of this Protocol and the supporting standards, a marginally conforming water meter shall be one whose performance error exceeds $\pm$3.5% but is not greater than $\pm$5% in any of the Compliance Tests performed, while a Nonconforming water meter shall be one whose performance error exceeds $\pm$5%.

10.6.8 Water meters which form a part of the Sampling Plan to be used in Compliance Testing shall be chosen at random without replacement, by the OUR, using an appropriate random sampling method.

10.6.9 The WSP shall be responsible for ensuring that the water meters which are included in the sample meet the following criteria:

a) The identified water meters are all currently installed in service; and

b) The identified water meters' metrological parameters have not been adjusted post installation.

10.6.10 Each water meter in the sample which is determined to be defective based on inspection procedures being carried out in accordance with S303 of Schedule 3 of this Protocol shall be excluded from testing. Such defective water meters shall be the subject of an investigation by the WSP to determine the causes of the identified defects. Upon completion of such investigation, the WSP shall prepare a report of its

investigation and findings which shall be appended to the Compliance Test Report to be submitted to the OUR, and such report shall include the following information:

a) Details of the water meter's make, model, Pattern Approval information, Re-verification Period and identification numbers;

b) A description of the identified defects and the associated causes;

c) A description of the methodology used to investigate the cause of the defect, including identification of the personnel both performing the investigation and the activities performed;

d) An evaluation of the extent of the defect, including possible impacts if discernible and any potential effects on the operation of the water meter type in question; and

e) Details of the corrective and preventive action proposed or performed by the WSP to address the cause and symptoms of the identified defect.

10.6.11 Where a water meter in the selected sample does not qualify based on the criteria in paragraphs 10.6.9 and 10.6.10 hereof, the WSP shall not consider this water meter as part of the sample for Compliance Testing, and shall replace it with the sequentially subsequent meter on the preselected unsorted list meeting the applicable criteria.

10.6.12 In cases where a defective water meter is identified by the WSP during inspection of the sample, the investigation referred to in paragraph 10.6.10 hereof, shall apply and the report required following such investigation by the WSP shall be submitted as part of the Compliance Test Report to the OUR for review prior to its determination on the acceptability of the affected Lot. The OUR's decisions regarding the acceptability of the affected Lot and the possible need for further investigation or corrective action shall not be made until the OUR has reviewed the report required in paragraph 10.6.10 and the data from the sample of water meters involved in the final calculations.

10.6.13 All water meters that were originally included in the sample but have been excluded based on the criteria in paragraphs 10.6.9 and 10.6.10 hereof, shall be accounted for and the reasons for exclusion shall be reported. Evidence of deliberate exclusion may result in the OUR disqualifying the results of Compliance Testing on the sample.

10.6.14 Lots for which the minimum sample size, n_{min}, cannot be achieved, as a result of the total number of exclusions, are not considered to be homogenous and shall not be considered acceptable for Compliance Testing. In such instances the WSP, in consultation with the OUR, may employ one of the following actions, taking into account technical and economic considerations:

a) Re-form the Lot on the basis of the homogeneity criteria;

b) Use requirements from a lower seal extension level which would lead to a shorter seal extension period; or

c) Remove the Lot from service.

10.7 TESTS CONDUCTED DURING COMPLIANCE TESTING

10.7.1 Testing of all water meters slated to undergo Compliance Testing shall be done in accordance with S303 of Schedule 3 of this Protocol.

10.8 COMPLIANCE CRITERIA

10.8.1 To achieve Compliance, the WSP shall implement the Sampling Plan requirements set out under sub-section 10.6 of this Protocol.

10.8.2 The acceptability of a Lot for the purposes of extending its Re-verification Period, shall be established on the basis of the results of Compliance Testing.

10.8.3 If the numbers of marginally conforming and Nonconforming water meters exceed the acceptance numbers in the relevant Sampling Plan, the specific Lot of water meters undergoing Compliance Testing shall be deemed non-compliant.

10.8.4 Individual water meters which are found to be Nonconforming shall be withdrawn from service and repaired or destroyed. Where a Nonconforming water meter is withdrawn from service or destroyed, the OUR may give direction as to the regulatory treatment of such assets.

10.9 COMPLIANCE TESTING DECISION RULES AND ACTIONS

10.9.1 WSPs after completion of its Compliance Testing shall submit a Compliance Test Report to the OUR providing details of the results, test statistics and other findings which shall clearly identify:

a) Lots that are acceptable and the recommended seal year extension having regard to the maximum seal year extensions set out in Table 10.2 below. A Lot shall be considered acceptable if it satisfies the compliance criteria set out under sub-section 10.8 of this Protocol.

b) Lots for which the sample failed to satisfy the Compliance Criteria set out under sub-section 10.8 of this Protocol.

10.9.2 When a Lot of water meters satisfies the Compliance Criteria, the maximum seal extension period available to such Lot shall be determined from Table 10.2 below, based on the initial Re-verification Period which was given to the water meters when they were initially accepted, and the maximum seal extension level determined for application to the Lot.

Table 10.2: Maximum Seal Period Extension (years)

INITIAL RE-VERIFICATION PERIOD (YEARS)	MAXIMUM SEAL PERIOD EXTENSION (YEARS)			
	Level 1	Level 2	Level 3	Level 4
10	8	6	4	2
9	7	5	3	2
8	6	4	3	2
7	5	4	2	1
6	4	3	2	1
5	no Level 1 extension	3	2	1

10.9.3 The OUR, after its review of the WSP's Compliance Test Report and recommendation for seal year extension, may:

a) Approve a seal year extension for the Lot of water meters if the results indicate that the relevant Compliance Criteria set out under sub-section 10.8 of this Protocol were met.

b) Reject any Lot of water meters recommended as acceptable by the WSP but for which the OUR identifies errors or deficiencies in the test procedures and/or results as presented in the Compliance Test Report including any appended report. In such cases the OUR shall notify the WSP of its decision, setting out clearly the basis of such decision.

10.9.4 In the notification to the WSP referred to under paragraph 10.9.3 (b), the OUR may either direct the WSP to (i) withdraw the entire Lot of water meters from service; (ii) sample to a lower seal extension level with a resultant lower seal extension period if the lower threshold is met; or (iii) test 100% of the water meters in the Lot and subsequently remove the water meters which are found to be Nonconforming.

10.9.5 When seal year extensions have been approved by the OUR, the water meters in the Lot, less any Nonconforming meters shall be considered due for Re-verification on or before December 31 of the calendar year derived from the addition of the approved seal period extension in years to the year in which Compliance Testing began for the Lot and the extension period approved.

10.10 TIME FRAME FOR CONDUCTING COMPLIANCE TESTING

10.10.1 WSPs shall commence and complete the required Compliance Testing and submit its reports to the OUR in accordance with the schedule agreed between the WSP and the OUR prior to Compliance Testing.

10.11 COST FOR CONDUCTING COMPLIANCE TESTING

10.11.1 The cost for conducting the required Compliance Testing of water meters shall be the responsibility of the respective WSPs.

11 CUSTOMER REQUEST FOR WATER METER ACCURACY VERIFICATION CHECK

11.1 OBJECTIVES OF CUSTOMER REQUESTED WATER METER ACCURACY VERIFICATION CHECK

11.1.1 To give assurance to WSP customers of their right to have their water meter checked for measurement accuracy upon request.

11.1.2 To make water meter accuracy verification checks accessible to every customer of NWC by allowing one free meter accuracy verification check per twelve (12) month period. This requirement shall become effective twelve (12) months after the implementation of this Protocol during which time the NWC Meter Testing and Repair Facilities shall become accredited in accordance with section 12 of this Protocol.

11.1.3 To make water meter accuracy verification checks accessible to every customer of WSPs (excluding NWC).

11.1.4 To ensure that accuracy verification checks on individual meters shall be in accordance with the standards set out in ISO 4064 – 1 2014, ISO 4064 – 2 2014 and ISO 4064 – 3 2014; and the test criteria shall be $\pm$5% for registration accuracy. The accuracy verification checks must also ensure that the meters conform to all other specified requirements of the before mentioned ISO standards and be free from defects and Nonconformities.

11.2 AUTHORIZATION FOR WATER METER ACCURACY VERIFICATION CHECK

11.2.1 The OUR may, in accordance with section 4 (5) of the OUR Act, require that a customer's meter be independently tested for registration accuracy by the BSJ or any approved Meter Testing Entity.

11.2.2 Individual customers of each WSP may request a meter accuracy verification check which shall be done in accordance to the procedures set out in sub-section 11.3 of this Protocol.

11.3 REQUESTS FOR WATER METER ACCURACY VERIFICATION CHECKS

11.3.1 Twelve (12) months after the effective date of this Protocol, NWC shall use reasonable efforts to notify all its customers that they are entitled to one free meter accuracy verification check per twelve (12) month period. This provision for one free meter accuracy verification check per twelve (12) month period shall be incorporated in the NWC's Terms and Conditions of Service and the NWC shall ensure that the information pertaining to the free meter accuracy verification check is published on its website, in its brochures, and any other publication it considers appropriate.

11.3.2 Without prejudice to the provisions set out under paragraph 11.3.1, customers of NWC are entitled to request a meter accuracy verification check other than the allowed one free check, under circumstances where: (i) the customer becomes aware that the NWC inspected or tested its meter during the course of its operation and the results were not satisfactory to the customer, (ii) there is reasonable indication to the customer that the meter is malfunctioning, or (iii) where an Appeal or investigation related to a

customer is submitted to or being conducted by the OUR. Such customer requested meter accuracy verification checks may be conducted by the BSJ or any approved Meter Testing Entity, as the case may be or the NWC, where it is required to be qualified under this Protocol to conduct such testing twelve (12) months after the effective date of this Protocol.

11.3.3 A WSP (excluding NWC) is required to accommodate requests for meter accuracy verification checks from its customers. Such meter checks may be required due to circumstances where: (i) the customer becomes aware that the WSP inspected or tested its meter during the course of its operation and the results were not satisfactory to the customer, (ii) there is reasonable indication to the customer that the meter is malfunctioning, or (iii) where an Appeal or investigation related to a customer is submitted to or being conducted by the OUR. Such customer requested meter accuracy verification checks may be conducted by the BSJ or any approved Meter Testing Entity, as the case may be or the NWC, where it is required to be qualified under this Protocol to conduct such testing no later than twelve (12) months after the effective date of this Protocol.

11.3.4 In the case of NWC, all customers' requests for a meter accuracy verification check shall be submitted in writing to NWC, or through any other medium of communication appropriate to NWC.

11.3.5 In the case of WSPs (excluding NWC), customers' requests for a meter accuracy verification check shall (i) normally be submitted in writing to the applicable WSP, or through any other medium of communication appropriate to the WSP, or (ii) directed to the OUR, where necessary.

11.3.6 If a customer is dissatisfied with the results of a meter accuracy verification check conducted by their respective WSP, the customer may contest such results and request a subsequent meter accuracy verification check which may be conducted by the BSJ or any approved Meter Testing Entity.

11.3.7 The timeline for the NWC or other relevant WSP, where applicable, to conduct a meter accuracy verification check related to an Appeal or investigation shall be thirty (30) working days, in keeping with the applicable Guaranteed Standard published by the OUR from time to time. If the NWC or other relevant WSP fails to comply with the stated timeline, the customer shall be compensated in accordance with the compensation mechanism specified in the Guaranteed Standards published by the OUR from time to time.

11.3.8 The timeline for NWC or a private WSP, where applicable, to conduct a customer requested meter accuracy verification check not related to an Appeal or investigation shall be thirty-five (35) working days.

11.3.9 Upon completion of a meter accuracy verification check, the NWC or the relevant WSP shall notify the customer of the results within five (5) working days and copied to the OUR.

11.3.10 In the event that the OUR receives a request for a meter accuracy verification check from a customer of a WSP, the OUR shall act in accordance with the following:

a) The OUR shall establish contact with the WSP to determine if a request for a meter accuracy verification check was first made to the WSP.

b) In the case of customers of NWC, if it is found that the customer did not submit a request to the NWC regarding a meter accuracy verification check, the OUR shall direct the customer to submit

the request to the NWC pursuant to the provisions of paragraphs 11.3.1, 11.3.2 and 11.3.4 of this sub-section 11.3.

c) In the case of customer of WSPs (excluding NWC), if it is found that the customer did not submit a request to the relevant WSP regarding a meter accuracy verification check, the OUR shall direct the customer to submit the request to the relevant WSP pursuant to the provisions of paragraph 11.3.3 of this sub-section 11.3.

d) Up to twelve (12) months after the effective date of this Protocol, subject to any established arrangements for testing, if the NWC is unable to have a requested meter accuracy verification check completed within the timeline specified in this sub-section 11.3, NWC shall notify the customer and the OUR of the situation outlining the reasons for the delay. If the OUR is not satisfied that NWC is able to remedy the situation in a timely manner then the OUR shall provide direction as to how to proceed.

e) Commencing twelve (12) months after the effective date of this Protocol, if the NWC is unable to have a requested meter accuracy verification check completed within the timeline specified in this sub-section 11.3, NWC shall notify the customer and the OUR of the situation outlining the reasons for the delay. If the OUR is not satisfied that NWC is able to remedy the situation in a timely manner then the OUR may transfer the request for meter accuracy verification check to the BSJ or any approved Meter Testing Entity.

    i. The OUR shall, after providing notification for the transfer of such testing to the BSJ or any approved Meter Testing Entity, agree on a date for testing. The OUR shall subsequently inform NWC of the agreed date.

    ii. The BSJ, or approved Meter Testing Entity, may choose to conduct the meter accuracy verification check at the customer's premises, using portable meter testing equipment, or at their meter testing lab.

    iii. Should the BSJ, or approved Meter Testing Entity, choose to conduct the meter accuracy verification check at the customer's premises, NWC shall use reasonable effort to cooperate and facilitate this activity by being present at the site when the BSJ, or approved Meter Testing Entity, undertakes their testing activities.

    iv. Should the BSJ, or approved Meter Testing Entity, choose to conduct the meter accuracy verification check at their meter testing lab, NWC shall use reasonable effort to cooperate and facilitate this activity and ensure that the meter is removed and placed in a tamper proof bag and handed over to a representative of the BSJ or Meter Testing Entity that was contracted by the OUR. On removal of the existing water meter, the NWC shall, at the same time, install an alternative meter at the location to ensure continued measurement of supply to the customer.

    v. The timeline for conducting this meter accuracy verification check shall be thirty (30) working days.

    vi. If the BSJ or a contracted Meter Testing Entity is unable to check the accuracy of the meter within this timeline, the Meter Testing Entity shall provide an explanation to the OUR and

a new timeline shall be agreed upon between the OUR and the BSJ or the Meter Testing Entity in accordance with the terms of the arrangements between the OUR and the BSJ or the Meter Testing Entity.

vii. After the BSJ or the Meter Testing Entity has completed the requisite checks on the meter, the results shall be submitted to the OUR within five (5) working days.

viii. The OUR shall communicate the test results to the customer and to NWC within five (5) working days of receipt of the results.

f) If it is discovered that a customer previously made contact with the NWC regarding a meter accuracy verification check, but either did not receive notification from the NWC on the test results within the specified timeline or is dissatisfied with the results of the NWC's meter accuracy verification check, then the customer may indicate to the NWC that they intend to request a subsequent meter accuracy verification check to be conducted by the BSJ or other Meter Testing Entity.

11.3.11 In the event that the BSJ or any approved Meter Testing Entity receives a request for a meter accuracy verification check from a customer of NWC, the BSJ or the Meter Testing Entity shall direct the customer to submit the request to the NWC pursuant to the provisions of paragraph 11.3.1, 11.3.2 and 11.3.4 of this sub-section 11.3.

11.3.12 Subject to the relevant provisions of this Protocol, in the event that it is ascertained that a WSP (excluding NWC) possesses the capacity to conduct testing or have in place an established arrangement for testing, and such WSP is unable to have a requested meter accuracy verification check completed within the timeline specified in this sub-section 11.3, the WSP shall notify the customer and the OUR of the situation outlining the reasons for the delay. If the OUR is not satisfied that the WSP is able to remedy the situation in a timely manner then the OUR shall provide direction as to how to proceed.

11.3.13 In the event that NWC or other relevant WSP receives a request from one of its customers for a meter accuracy verification check with that customer specifying that such meter accuracy verification check should be carried out by the BSJ or any approved Meter Testing Entity, the NWC or the other relevant WSP shall:

a) Acknowledge the customer's request within five (5) working days.

b) Inform the customer of a date and time at which a representative of the WSP will be present at the location to facilitate testing activities being conducted by BSJ or any other contracted Meter Testing Entity's representative present at the location. This shall be done within fifteen (15) working days after issuing its acknowledgment. If testing activities being conducted by the BSJ, or approved Meter Testing Entity, requires removal of the existing water meter, the WSP shall, at the same time, install an alternative meter at the location to ensure normal supply to the customer.

11.3.14 The timeline for conducting the meter accuracy verification check required under paragraph 11.3.13 shall be within thirty (30) working days. Upon completion of the meter accuracy verification check by the BSJ or any approved Meter Testing Entity, the results shall be submitted to the NWC or the relevant

WSP, which shall notify the customer, and submit a copy of the results to the OUR within three (3) working days.

11.3.15 In the event that the NWC or the relevant WSP is dissatisfied with the results of the meter accuracy verification check required under paragraph 11.3.13, the WSP may choose to resolve this issue pursuant to section 14 of this Protocol.

11.4 TESTS REQUIRED FOR WATER METER ACCURACY VERIFICATION CHECK

11.4.1 The requisite testing to be performed in response to a customer request for a meter accuracy verification check shall be done in accordance with S304 of Schedule 3 of this Protocol.

11.5 PAYMENT FOR METER ACCURACY VERIFICATION CHECK

11.5.1 PAYMENT FOR METER ACCURACY VERIFICATION CHECK PERFORMED BY WATER SERVICE PROVIDER

11.5.1.1 To restrict a multitude of unreasonable requests for meter accuracy verification checks to the NWC, which may have significant cost implications, the customers shall be solely responsible for the applicable costs associated with all requests for meter accuracy verification checks except for the one free meter accuracy verification check allowed per twelve (12) month period, subject to the conditions under paragraphs 11.1.2 and 11.3.1, unless the meter accuracy verification check results indicate that the meter accuracy is outside of the ±5% tolerance allowed.

11.5.1.2 The applicable costs associated with a customer requests for meter accuracy verification checks to the relevant WSPs, shall solely be the responsibility of the customer unless the meter accuracy verification check results indicate that the meter accuracy is outside of the ±5% tolerance allowed.

11.5.1.3 If the results of the meter accuracy verification check carried out by NWC validates that the meter is working within the prescribed tolerance (±5%), the customer shall not pay the cost of testing if a previous meter accuracy verification check was performed more than twelve (12) months.

11.5.1.4 The customer shall pay for the cost of a meter accuracy verification check if the meter is tested and found to be working within the prescribed tolerance (±5%) if a customer's most recent meter accuracy verification check was performed less than twelve (12) months prior.

11.5.1.5 If the results of a NWC or WSP meter accuracy verification check show that the meter is operating outside the required tolerance (±5%), the customer shall not pay the cost of testing, regardless of the time elapsed between the most recent request for a meter accuracy verification check and the previous request.

11.5.1.6 In instances where a meter accuracy verification check shows that the meter is operating outside the required tolerance (±5%) and there is sufficient evidence showing that such deviation is due to meter tampering related to theft, the customer shall pay the cost of the meter accuracy verification check.

11.5.2 PAYMENT FOR METER ACCURACY VERIFICATION CHECK PERFORMED BY BSJ OR ANY APPROVED METER TESTING ENTITY

11.5.2.1 If the OUR requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check because of failure by NWC or a WSP to respond to a customer's request for a meter accuracy verification check in the stipulated time, NWC or the WSP shall bear the cost of the meter accuracy verification check.

11.5.2.2 If the OUR requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check as part of an Appeal or investigation and the meter is found to be working outside of the required tolerance (±5%), the NWC or the WSP shall be responsible for all the costs associated with conducting the requisite meter accuracy verification checks.

11.5.2.3 If the OUR requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check as part of an Appeal or investigation and the results show that meter is working within the required tolerance (±5%), the OUR shall be responsible for the applicable costs associated with conducting the requisite meter accuracy verification checks.

11.5.2.4 If a customer requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check and the results show that the meter is working outside of the required tolerance (±5%), the NWC or the WSP shall be responsible for the applicable costs associated with conducting the requisite meter accuracy verification checks.

11.5.2.5 If a customer requests that the BSJ or any approved Meter Testing Entity perform a meter accuracy verification check and the results show that the meter is working within the prescribed tolerance (±5%), the customer shall be responsible for the applicable costs associated with conducting the requisite meter accuracy verification checks.

11.5.2.6 The cost of meter testing undertaken by the BSJ shall be in accordance with the provisions of Schedule 4 of this Protocol.

12 ACCREDITATION OF WATER SERVICE PROVIDERS' METER TESTING, CALIBRATION & REPAIR FACILITIES AND SERVICES

12.1 OBJECTIVES OF ACCREDITATION

12.1.1 Accreditation of WSPs Meter Testing, Calibration & Repair Facilities and Services is necessary to engender public confidence in the delivery of water supply services in Jamaica and to give credibility to the applicable WSP's meter testing processes and importantly, the measurement of customers' water usage. To fulfil this objective:

a) NWC shall ensure that within twelve (12) months after the effective date of this Protocol, it obtains accreditation for its Meter Testing, Calibration & Repair Facilities and Services from established Accreditation bodies in accordance with requirements hereunder and consistent with internationally accepted practices and Prudent Utility Practice.

b) The NWC after obtaining the required Accreditation shall maintain such Accreditation as long as their respective Meter Testing, Calibration & Repair Facilities and Services remain active.

c) Where it is economically feasible, WSPs (excluding NWC), shall seek to have their Meter Testing, Calibration & Repair Facilities and Services accredited by established Accreditation bodies in accordance with requirements under sub-section 12.2 of this Protocol and consistent with internationally accepted practices and Prudent Utility Practice.

d) WSPs (excluding NWC), who obtain Accreditation shall maintain such Accreditation as long as their respective Meter Testing, Calibration & Repair Facilities and Services remain active.

e) The NWC and the relevant WSPs shall provide the OUR with a copy of the relevant documentation pertaining to all Accreditation obtained within twenty (20) working days after achieving Accreditation, and shall notify the OUR in each instance when such Accreditation is extended, expires or is revoked.

12.2 STANDARDS GOVERNING ACCREDITATION

12.2.1 The Accreditation of the referenced facilities and services shall be done in accordance with internationally accepted standards and criteria based on ISO/IEC 17020, 17025, 17065, and Prudent Utility Practice.

12.3 METER TOLERANCE AND MEASUREMENT ACCURACY

12.3.1 Water meters repaired by the NWC or a relevant WSP at their Meter Testing, Calibration & Repair Facilities shall be able to measure water flow/volume to within $\pm$5%.

12.3.2 To ensure confidence in results obtained, testing equipment shall be so designed, constructed and used so that the performance of the testing equipment itself shall not contribute significantly to the test error. To this end, the test equipment shall be maintained to a sufficient standard to prevent unwanted vibration of the meter, the test equipment and its accessories. Furthermore, the environment in which the test equipment is located shall be such that the reference conditions given in the applicable testing procedures contained in Schedule 3 of this Protocol are met.

12.4 FACILITIES AND SERVICES THAT REQUIRE ACCREDITATION

12.4.1 The Water Meter Testing, Calibration & Repair Facilities and Services for which the relevant WSPs shall seek the requisite Accreditation shall include:

a) The WSP's Meter Repair Facilities.

b) The WSP's Meter Testing Facilities.

c) Field installed Meter Testing Service.

PART 4: GENERAL REQUIREMENTS

13 MONITORING AND REVIEW OF THE PROTOCOL

13.1 THE ROLE OF THE OUR

13.1.1 The role of the OUR with respect to this Protocol shall be to promulgate, apply and enforce its provisions. The rights and obligations under this Protocol and the application thereof shall not be changed, modified or otherwise altered without the prior written approval of the OUR.

13.1.2 Modifications of the Protocol shall be executed by the OUR through a Protocol Review Panel ("the Panel"). The Panel shall be established by the OUR within ninety (90) days of the effective date of this Protocol and shall be the designated body charged with the responsibility for reviewing and monitoring the operation of the Protocol. The Panel shall report to the OUR on its dealings and, as appropriate, recommend amendments to the Protocol for the OUR's approval.

13.2 THE PROTOCOL REVIEW PANEL

13.2.1 COMPOSITION OF THE PANEL

13.2.1.1 The Panel appointed by the OUR shall have the following composition:

a) At least one but not more than three representatives of the OUR.

b) Two representatives of the BSJ.

c) Two representatives of JPS.

d) Two representatives of NWC.

e) One representative of WSPs (excluding NWC).

13.2.1.2 The chairperson of the Panel shall be one of the OUR's representatives. The deputy chairperson shall be chosen by the members of the Panel.

13.2.1.3 The chairperson of the panel shall preside at the meetings of the Panel. In the absence or inability of the chairperson of the Panel to act, the deputy chairperson shall preside.

13.2.1.4 The Panel may establish electricity meter subcommittees and water meter subcommittees, from its members, and co-opt other persons and experts as the Panel considers appropriate to specifically address electricity meter and water meter related issues. The subcommittees shall present their proposals to the Panel for further consideration and recommendation to the OUR, as applicable.

13.2.2 DUTIES OF THE PANEL

13.2.2.1 As part of its mandate, the Panel shall examine the Protocol from a technical and administrative perspective. Its duties shall include:

a) Review of the Protocol to ensure that all administrative and operational provisions remain up to date.

b) Review and analysis of the contents of the Protocol to assess technical requirements, taking into consideration changes in metering technology, applications and deployment.

c) Review proposals for amendments to the Protocol which the OUR or other stakeholders may submit to the Panel for consideration.

d) Present recommendations to the OUR pertaining to amendments to the Protocol that the Panel considers warranted and the reason for such amendments.

13.2.3 OPERATIONS OF THE PANEL

13.2.3.1 The Panel may meet at such times as it considers necessary or expedient for the carrying out of the duties of the Panel.

13.2.3.2 The Panel may establish electricity meter subcommittees and water meter subcommittees, from its members, and co-opt other persons and experts as the Panel considers appropriate to specifically address electricity meter and water meter related issues. The subcommittees shall present their proposals to the Panel for further consideration and recommendation to the OUR, as applicable.

13.2.3.3 The Panel and subcommittees shall establish and comply at all times with its own rules and procedures governing the conduct of its business which the OUR shall approve.

13.2.3.4 The Panel shall make its decisions by means of consensus. If the Panel is unable to reach unanimous agreement or consensus, the matter shall be referred to the OUR for determination. Any such referral to the OUR shall set out the cause of disagreement and the views held by the respective members. A determination made by the OUR after any such referral shall be considered final.

13.2.3.5 The quorum for the meetings of the Panel shall be six (6) members.

13.3 REVISIONS OF THE PROTOCOL

13.3.1 Upon the occurrence of any of the events listed in paragraph 13.3.2, a full review of the Protocol by the Panel shall be initiated.

13.3.2 The events that may trigger a review of this Protocol include:

a) In the event that one or more of the standards, listed below, which provides the supporting framework for this Protocol, undergoes a version change which the OUR wishes to adopt.

i. ISO 2859/2 – 1985: Sampling Procedures for Inspection by Attributes – Part 2: Sampling Plans Indexed by Limiting Quality (LQ) for Isolated Lot Inspection

ii. ANSI C12.1 – 2014: American National Standard for Electric Meters – Code for Electricity Metering

iii. IEEE C57.13 – 2008: IEEE Standards Requirements for Instrument Transformers

iv. ISO 4064 – 1 2014: Water Meters for Cold Potable Water and Hot Water Part 1: Metrological and Technical Requirements

v. ISO 4064 – 2 2014: Water Meters for Cold Potable Water and Hot Water Part 2: Test Methods

vi. ISO 4064 – 3 2014: Water Meters for Cold Potable Water and Hot Water Part 3: Test Report Format

b) In the event that the OUR indicates that it wishes to make alterations to provisions of this Protocol which materially alters how this Protocol is interpreted and applied.

c) In the event that there are changes in legislation which has implications for how this Protocol is interpreted and applied.

d) In the event that there are changes to the OUR-BSJ meter testing arrangements.

13.3.1.1 After completing a review of the Protocol, the Panel shall prepare and recommend an amended version of the Protocol to the OUR for its consideration and approval. Thereafter, the OUR shall notify the Panel of the accepted amendments as well as those that still remain an issue. If the OUR rejects the Panel's proposed amendments and wishes to propose alternative language, this language should also be presented to the Panel for its consideration prior to finalizing the Protocol.

13.3.1.2 The OUR shall publish by order in the Gazette and on its website, as well as in any other manner that it considers appropriate, the approved version of the Protocol. JPS, BSJ, and WSPs, if the facilities exist, shall also publish the revised Protocol on their website.

14 RESOLUTION OF DISPUTES

14.1 Any disputes arising whatsoever from the promulgation of this Protocol, its terms and conditions, their application and or interpretation, shall be handled as follows:

a) Any dispute regarding and in relation to the terms and conditions of this Protocol and its application and arising therefrom shall be determined by the OUR upon application to it by an aggrieved party or parties that are subject to the terms of this Protocol.

b) Prior to determining any such dispute, the OUR shall give the parties aggrieved and affected an opportunity to make submissions to the OUR for its consideration.

c) Upon considering such submissions, the OUR shall settle all contentious issues in such manner as appears to the OUR to be fair and equitable after having duly considered the submissions of all parties aggrieved and affected.

d) In the event that any party aggrieved is dissatisfied by the decisions of the OUR on any matter under this Protocol, such party may avail themselves of the relevant appeals process provided for under statute and subsidiary enabling instruments.

15 NOTICES

15.1 All notices or other communications (together "notices") to be given or made hereunder shall be in writing, shall be addressed or directed to the persons indicated in Schedule 5 of this Protocol and shall either be delivered personally or sent by prepaid post or by fax or by other electronic means. All notices given by fax shall be confirmed in writing delivered or sent as aforesaid but the failure to so confirm shall not vitiate the original notice.

15.2 The addresses of the relevant parties to the Protocol and their respective contact information are set out in Schedule 5 of this Protocol.

16 DEROGATION

16.1 REQUEST FOR DEROGATION

16.1.1 A request for derogation from specific obligations of this Protocol may be sought by a Utility Service Provider in the following instances:

a) Where at the effective date of this Protocol, metering devices installed in the field by the Utility Service Provider do not comply with obligations of this Protocol that did not exist in a prior version and it is not economically reasonable or technically necessary to replace the metering device or upgrade it to meet the requirements of this Protocol; or

b) Where a Utility Service Provider is seeking Pattern Approval, Acceptance or Re-verification for a specific Lot of metering devices but due to specific technical characteristics, compliance with testing obligations of this Protocol is seen by the Utility Service Provider as being unreasonable.

16.1.2 A Utility Service Provider shall include the following information in the request for derogation:

a) The provision of this Protocol against which the present or predicted noncompliance is identified;

b) The reason for noncompliance with the provision;

c) Identification of the metering device for which a derogation from obligation is being sought;

d) Any potential adverse effects which may results from the derogation of obligation being sought; and

e) Whether the derogation from obligation being sought is permanent or temporarily for the purposes of achieving compliance.

16.2 BASIS FOR GRANTING OR REFUSING DEROGATION

16.2.1 On receipt of a request for derogation, the OUR shall consider whether such derogation can be granted without having a materially adverse effect on the accuracy of metering services being provided to utility customers. Once a decision has been made and approved by the OUR, the Utility Service Provider applying for derogation shall be promptly informed of the decision and, in the event that the request is refused, the reason(s) for such refusal shall be provided.

PART 5: SCHEDULES

SCHEDULE 1: DEFINITIONS, SYMBOLS AND ACRONYMS

DEFINITIONS

TERM	DEFINITION
Acceptance Criteria	Rules given under this Protocol used to determine if a batch of new or repaired meters or related metering devices can be considered suitable for installation in the field.
Acceptance Number	The maximum number of Nonconforming Units allowable for Acceptance of a Lot of meters or related metering devices undergoing Acceptance Testing or Re-verification of a Lot of meters or related metering devices undergoing Compliance Testing, according to the applicable Sampling Plan.
Acceptance Testing	The process of accepting or rejecting a Lot of meters by inspecting a sample in accordance with a predetermined Sampling Plan. The objective is to ensure that the Lots of acceptable quality have a high probability of acceptance.
Acceptance Test Report	The report prepared containing the results obtained from conducting Acceptance Testing.
Accreditation	Procedure by which an authoritative body gives formal recognition to a body or person that it is competent to perform specific tasks to ISO 17065 after the facilities of the said body or person has been evaluated by the Accreditor along established criteria and declared to be in full conformance and with measurements traceable to the national physical standards. Accreditation involves periodic audit visits to the body or person accredited to assess whether the quality of workmanship, equipment and environment remains within acceptable standards.
Accreditor	The authoritative body which performs the Accreditation process.
Accuracy	The extent to which a given measurement agrees with the defined value.
Advanced Electricity Meters	Electricity meters including meters based on automated metering infrastructure, meters used on an intelligent electricity network, smart meters, any future intelligent metering technologies, etc. which measures and registers the integral of an electrical quantity, such as active power (kW) and reactive power (kVar) with respect to time.
Agent	An entity contracted directly by a Utility Service Provider to act on its behalf.
Appeal	A request by a utility customer, made to the OUR to address a utility service complaint that was not addressed, to the customer's satisfaction, by the utility's complaints procedures.
ANSI	American National Standards Institute

TERM	DEFINITION
AQL	Acceptable Quality Level. The quality level that is the worst tolerable process average when a continuing series of Lots is submitted for Acceptance Sampling.
Batch	A distinctive group of meters arrived at through shipment or manufacturing and having the same manufacturer, model and type designation.
Bi-Directional Electricity Meters	Electricity meter which measures electrical quantities such as active power (kW) and reactive power (kVar) with respect to time in both directions.
BIPM	Bureau International de Poids at Mesures
BSJ	Bureau of Standards Jamaica. A statutory body established by The Standards Act of 1969 to promote and encourage standardization in relation to commodities, processes and practices. The BSJ operates as an agency under the portfolio Ministry and is governed by a fourteen-member Standards Council.
Calibration	Comparison of the indication of the instrument under test, or registration of the meter under test, with an appropriate standard.
Characteristic	Any distinct property or attribute of a meter that can be described and measured to determine conformance or non-conformance to a specified requirement.
Combination Meter Changeover Flow Rate	Flow rate at which the flow in the larger water meter stops with decreasing flow rate (Q_{x1}) or starts with increasing flow rate (Q_{x2})
Compliance Sampling	A specialized form of sampling having the object of ensuring that a batch of unacceptable quality has a high probability of rejection.
Compliance Testing	The process of verifying that field installed meters operate within the acceptable tolerance requirements of this Protocol.
Compliance Test Report	The report prepared by JPS containing the results obtained from conducting Compliance Testing.
Current Transformer	A device which has its primary winding connected in series with the conductor carrying the current to be measured or controlled and a secondary winding which provides a small fraction of the conductor current. This secondary current is used for the measurement or control.
Defect	A departure of a quality characteristic from its intended level or state that occurs with a severity sufficient to cause a meter not to satisfy normal usage requirements.
Defective Meter	A meter containing one or more defects.
Demand	The average power or a related quantity over a specified interval of time. Demand is expressed in kilowatts, kilovolt-amperes, kilovars or other suitable units.

TERM	DEFINITION
Devices	Where the context applies, devices shall include singly or collectively: Electricity Meters, Related Metering Devices and other accessories.
Electricity Meter	An electrical device that measures and registers the integral of an electrical quantity, such as active power (kW) and reactive power (kVar) with respect to time.
Electricity Metering System	The electricity meter(s) and related metering devices used to measure and register the integral of an electrical quantity, such as active power (kW) and reactive power (kVar) with respect to time.
Electricity Meter Testing Protocol	The document entitled: "Electricity Meter Testing Protocol – Protocol on Administrative and Testing Procedures" [Document No. ELE2005/07] which was issued on December 13, 2005. This document became effective on December 19, 2005 and was promulgated to govern the testing and verification of Electricity Meters to be used for revenue billing purposes in Jamaica.
Electrical Energy	The integral of active power with respect to time.
Field	The location where the meter is installed.
Field Sample	A sample taken from meters in field installation to decide on whether a particular batch should remain in installation, be withdrawn for repairs or be discarded.
Field Testing	This is testing done at the location of the installed meter.
Homogeneous Meter Group	A Lot or population of meters from which a random sample is selected that, as far as is practicable, consists of meters of the same basic type or model designation, having the same general construction, produced by the same manufacturer, and have the same relationship of parts.
IEEE	Institute of Electrical and Electronics Engineers
Influence Quantity	Quantity not essential for the performance of an item but affecting its performance.
Intelligent Network	An electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.
Jamaica Public Service Company Limited	A vertically integrated electric utility and the sole retailer of electric power in Jamaica operating under the Electricity Licence, 2016.
JPS	Jamaica Public Service Company Limited
kPa	Kilo Pascals
kVARh	Kilo volt amperes reactive hours
kWh	Kilo watt hours
Limiting Quality Level (LQL)	A quality level, in a Sampling Plan which corresponds to a specified and relatively low probability of acceptance.
Lot	A collection of homogeneous meters or related metering devices available for inspection at one time. The collection will pass or

TERM	DEFINITION
	fail as a whole based on the results of tests on a sample drawn from this collection.
Maximum Permissible Error	Extreme value of measurement error, with respect to a known reference quantity value, permitted by specifications or regulations for a given meter.
Meter Testing, Calibration & Repair Facilities and Services	A building or part thereof where meters and related metering devices are inspected, repaired, tested and adjusted.
Meter Testing Entity	An independent accredited facility where meters and related metering devices are inspected and tested.
Minimum Flow Rate	Lowest flow rate at which the meter is to operate within the maximum permissible errors
MPa	Mega Pascals
MPE	Maximum Permissible Error.
National Electricity Meter Sampling Map	A segmentation of the island's field installed electricity meter population into the best possible homogenous Lots for the purposes of sampling and testing in accordance with the requirements for Compliance Testing.
National Power and Energy Standards	Standard electrical quantities (in the form of equipment) that are maintained by the BSJ which are traceable to the Systeme Internationale (SI) at the Bureau Internationale des Pois et Measures (BIPM).
Nonconformity	A departure of a quality characteristic from its intended level or state that occurs with a severity sufficient to cause a meter not to meet a specification requirement.
Nonconforming Unit	A meter containing one or more nonconformities.
OUR	Office of Utilities Regulation. The regulatory authority for Jamaica's utility sector.
OUR – BSJ Testing Agreement	Legal agreement between the OUR and the BSJ which governs the activities of each party with regards to the Meter Testing Administrative and Operational Protocol.
Outlier	A meter containing one or more outlying observations with respect to accuracy. An outlying observation deviates markedly from the observations of the other meters in the sample.
Pattern	The design of the measuring device.
Pattern Approval	The result of a successful series of Pattern Tests on a measurement device.
Pattern Testing	The process by which the pattern (design) of a device is examined to ensure that it is fit for trade or other legal purposes, in such a way that it is expected to provide reliable measurement results within the required tolerance or Maximum Permissible Error.
Pattern Test Report	The report prepared by the BSJ or Other Meter Testing Entities containing the results obtained from conducting Pattern Testing.
Permanent Flow Rate	Highest flow rate within the rated operating conditions at which the meter is to operate within the maximum permissible errors
Power Factor	The ratio of active power to the apparent power.

TERM	DEFINITION
Prepaid Meters	Electrical meters which require customers to make advanced payments before electricity can be used within their premises. Activation occurs when credit is added to the meter and the supply of electrical energy is cut off when the credit is exhausted.
Protocol Review Panel or Panel	A panel established by the OUR to review the Protocol in accordance with section 13 of the Protocol.
Prudent Utility Practice	The practices generally followed by utilities with respect to the design, construction, operation and maintenance of its facilities, including, but not limited to, the engineering, operating, and safety practices generally followed by such utility industries.
Random Sampling	The process of selecting sample meters such that all meters under consideration have an equal and independent probability of being selected.
Recalibration	This is a repetition of the calibration process to determine the accuracy of a meter or measuring instrument which has spent some time in operation. Recalibration includes effecting any necessary repairs to restore the meter to acceptable level of accuracy.
Reference Measurement Instruments	The measurement apparatus/instrumentation used to facilitate the required testing as required by the Protocol.
Related Metering Device	Equipment, except electricity meters, used in revenue metering; such as instrument transformers.
Representative Sample	A sample size which when tested should mirror the characteristics of the entire batch or shipment from which it was drawn.
Re-verification	Confirmation of a meter's conformance to the requirements of this Protocol through Compliance Testing following initial verification of conformance to the requirements of this Protocol through Acceptance Testing.
Re-verification Period	The period within which a meter shall be subjected to Compliance Testing/Re-verification or alternatively removed from service.
Sample	A quantity of meters randomly selected from a larger collection of meters and providing information that can be used as a basis for making a decision concerning the larger collection of meters.
Sampling Plan	A specific plan that states the number of meters to be inspected and the associated decision.
SI	Systeme Internationale
Terms and Conditions of Service	Rules set out by a Utility Service Provider by which it operates with regards to providing utility services to its customers.
Traceability	A property of measurement whereby it can be related to appropriate measurement standards (generally international or national) through an unbroken chain of comparisons.
Transitional Flow Rate	Flow rate between the permanent flow rate and the minimum flow rate that divides the flow rate range into two zones, the

TERM	DEFINITION
	upper flow rate zone and the lower flow rate zone, each characterized by its own maximum permissible errors
Type Approval	See Pattern Approval.
Utility Service Provider	Providers of core utility services in Jamaica's electricity, water or sewage sectors.
Verification Checks	These are tests done to establish that every shipment of new meter imported or manufactured locally conforms to the Pattern Approval tests previously done.
Voltage Transformer	An instrument transformer intended to have its primary winding connected in shunt with a power circuit, the voltage of which is to be measured or controlled.
Water Meter	Instrument intended to measure continuously, memorize, and display the volume of water passing through the measurement transducer at metering conditions
Water Meter Sampling Map	A segmentation of the Water Service Provider's field installed water meter population into the best possible homogenous Lots for the purposes of sampling and testing in accordance with the requirements for Compliance Testing.
Water Service Provider	An entity licensed to provide water services in Jamaica or the NWC.
Watthour Meter	An electrical meter that measures active power integrating the product of the instantaneous voltage and instantaneous current over time. This device has both current and voltage coils and the unit in which the integral is usually measured is kilowatt-hour.
Working Day	The days between, and including, Monday to Friday, not including public holidays.

SYMBOLS

SYMBOL	DEFINITION
Ac	Acceptance Number
n	The number of meters in a sample
Q_x	Combination Meter Changeover Flow Rate
Q_1	Minimum Flow Rate
Q_2	Transitional Flow Rate
Q_3	Permanent Flow Rate
Q_4	Transitional Flow Rate
T30	The water meter temperature class with a minimum admissible temperature of 0.1°C and a maximum admissible temperature of 30°C.
T50	The water meter temperature class with a minimum admissible temperature of 0.1°C and a maximum admissible temperature of 50°C.

SYMBOL	DEFINITION
T70	The water meter temperature class with a minimum admissible temperature of 0.1°C and a maximum admissible temperature of 70°C.
T180	The water meter temperature class with a minimum admissible temperature of 0.1°C and a maximum admissible temperature of 180°C.
U_{bmax}	Maximum operating voltage
U_{bmin}	Minimum operating voltage

SCHEDULE 2: TEST PROCEDURES FOR ELECTRICITY METERS AND RELATED METERING DEVICES

S201: TESTS REQUIRED FOR PATTERN APPROVAL OF ELECTRICITY METERS AND RELATED METERING DEVICES

The testing procedures required for Pattern Approval of electricity meters and related metering devices covered under the Protocol shall be those outlined in this section – S201, of Schedule 2.

REFERENCE CONDITIONS

All the following Influence Quantities, except for the Influence Quantity being tested, shall be held at the following values during Acceptance Testing of electricity meters and related metering devices.

Voltage:	110 V
Current:	5.0 A
Frequency:	50 Hz
Power Factor:	Unity and 0.5 Lagging
Temperature:	23°C

CONDITIONS OF TEST

a) The test conditions for electricity meters shall be in accordance to section 4.5.1-4.5.4 and section 4.7.1 of ANSI C12.1-2014.

b) The test conditions for instrument transformers shall be in accordance with the criteria established in IEEE C57.13-2008, with the exception for frequency, where the design shall be rated for operation at 50 Hz.

INSPECTION OF SAMPLES

Prior to performing the tests required for Pattern Approval, the BSJ shall carry out the following:

a) A thorough inspection check to determine if damage exists to any part(s) of the sample meter(s) or its accessories. Additionally, this inspection check shall be done to determine compliance with section 4.3 of ANSI C12.1 – 2014.

b) A meter tolerance check at the high load unity power factor and Low Load unity power factor to establish that the meter operates within the $\pm$1% tolerance allowed.

c) Each instrument transformer being Pattern Tested shall be inspected by the BSJ to ensure compliance with section 4.8 of IEEE C57.13-2008.

GENERAL TEST PROCEDURES REQUIRED FOR PATTERN APPROVAL OF ELECTRICITY METERS

In carrying out Pattern Testing of all electricity meters, the BSJ shall perform the applicable tests as stipulated in ANSI C12.1 – 2014. The listing of all the tests from which Pattern Approval Tests for electricity meters shall be chosen is replicated in Table S2.1 below.

Table S2.1: Listing of All Tests from which Pattern Approval Tests for Electricity Meters Shall be Chosen

Tests (✓) Performed in Series	Description of Pattern Approval Tests	Test Numbers in ANSI C12.1
	No Load	Test #1
	Starting Load	Test #2
	Load Performance	Test #3
	Effect of Variation of Power Factor	Test #4
	Effect of Variation of Voltage	Test #5 or 5a
	Effect of Variation of Frequency	Test #6
	Equality of Current Circuits	Test #7
	Internal Meter Losses	Test #8
	Temperature Rise	Test #9
	Effect of Register Friction	Test #10
	Effect of Internal Heating	Test #11
	Effect of Tilt	Test #12
	Stability of Performance	Test #13
	Independence of Elements	Test #14
✓	Insulation	Test #15
✓	Voltage Interruptions	Test #16
✓	Effect of High Voltage Line Surges	Test #17
	Effect of Variation of Ambient Temperature	Test #18
	Effect of Temporary Overloads	Test #19 or 19a
	Effect of Current Surges in Ground Conductors	Test #20
	Effect of Superimposed Signals	Test #21
	Effect of Voltage Variation – secondary Time Base	Test #22
	Effect of Variation of Amb. Temp. – second. Time Base	Test #23
✓	Effect of electrical Fast Transient/Burst	Test #24
✓	Effect of electrical oscillatory SWC test	Test #25
	Effect of Radio Frequency Interference	Test #26
	Radio Frequency Conducted and Radiated Emission	Test #27
✓	Effect of Electrostatic Discharge (ESD)	Test #28
	Effect of Storage Temperature	Test #29
✓	Effect of Operating Temperature	Test #30
✓	Effect of Relative Humidity	Test #31

Tests (✓) Performed in Series	Description of Pattern Approval Tests	Test Numbers in ANSI C12.1
	Mechanical Shock	Test #32
	Transportation Drop	Test #33
	Mechanical Vibration	Test #34
	Transportation Vibration	Test #35
	Weather Simulation	Test #36
	Salt-spray	Test #37
	Rain Tightness	Test #38

REQUIREMENTS SPECIFIC TO BI-DIRECTIONAL ELECTRICITY METERS

For the testing of bi-directional electricity meters, the applicable aspects of the following tests (which are indicated in Table S2.1 above) shall be performed twice, once with energy flowing only in the forward or "delivered" directions, and once with energy flowing only in the reverse or received direction.

- Test #2
- Test #3
- Test #4

REQUIREMENTS SPECIFIC TO ADVANCED ELECTRICITY METERS

In addition to complying with the generally required test procedures for Pattern Approval of electricity meters, Advanced Electricity Meters used by JPS shall comply with the provisions of the following ANSI standards, as applicable:

- ANSI C12.19: American National Standard for Utility Industry End Device Data Tables
- ANSI C12.18: American National Standard for Protocol Specification for ANSI Type 2 Optical Port (if applicable to the specific device)
- ANSI C12.21: American National Standard for Protocol Specification for Telephone Modem Communication (if applicable to the specific device)
- ANSI C12.22: American National Standard for Protocol Specification for Interfacing to Data Communications Networks (if applicable to the specific device)

TESTING REQUIREMENTS REQUIRED FOR PATTERN APPROVAL OF INSTRUMENT TRANSFORMERS

Instrument transformers shall be tested in accordance with IEEE C57.13-2008 section 4.7.3, with the exception for frequency, where the rated frequency shall be 50 Hz.

S202: TESTS REQUIRED FOR ACCEPTANCE TESTING OF ELECTRICITY METERS AND RELATED METERING DEVICES

The testing procedures required for Acceptance Testing of electricity meters and related metering devices covered under this Protocol shall be those outlined in this section – S202, of Schedule 2.

REFERENCE CONDITIONS

All the following Influence Quantities, except for the Influence Quantity being tested, shall be held at the following values during Acceptance Testing of electricity meters and related metering devices.

Voltage:	110 V
Current:	5.0 A
Frequency:	50 Hz
Power Factor:	Unity and 0.5 Lagging
Temperature:	23°C

CONDITIONS OF TEST

a) The test conditions for electricity meters shall be in accordance to section 4.5.1-4.5.4 and section 4.7.1 of ANSI C12.1-2014.

b) The test conditions for instrument transformers shall be in accordance with the criteria established in IEEE C57.13-2008, with the exception for frequency, where the design shall be rated for operation at 50 Hz.

c) When meters with voltage ratings encompassing more than one of the rated voltages of 110, 120, 220, 240,270, and 480 are tested for acceptance, each test shall be performed at both 110 volts and at the highest rated voltage, unless otherwise specified.

INSPECTION OF SAMPLES

Each sample of an electricity meter or related metering device chosen to undergo Acceptance Testing based on the process outlined in section 4.6 of this Protocol, shall be inspected by the BSJ to ensure compliance with the relevant provisions listed below. This inspection process shall help to establish the identity of the devices and confirm whether they belong to previously Pattern Approved groups. The result of the inspection shall be recorded on the Acceptance Test Report.

a) Each electricity meter sample chosen shall be inspected by the BSJ to ensure compliance with section 4.3 of ANSI C12.1-2014.

b) Each instrument transformer sample chosen shall be inspected by the BSJ to ensure compliance with sub-section 4.8 of IEEE C57.13-2008.

TEST PROCEDURES REQUIRED FOR ACCEPTANCE TESTING OF ELECTRICITY METERS AND RELATED METERING DEVICES

Each applicable sample device undergoing Acceptance Testing will be tested as shown below. The results obtained shall be included as part of the Acceptance Test Report.

a) Electricity meter samples shall be load tested in accordance with ANSI C12.1-2014 section 5.1.1.1.

b) Instrument transformers shall be tested in accordance with ANSI C12.1-2014 section 5.2.1.

c) All other related metering devices shall be tested in accordance with the requisite provisions under ANSI C12.1-2014 section 5.0.

S203: TESTS REQUIRED FOR COMPLIANCE TESTING OF ELECTRICITY METERS AND RELATED METERING DEVICES

The testing procedures required when conducting Compliance Testing on a Lot of electricity meters or related metering devices as provided for in section 5 of this Protocol shall be those outlined in this section – S203, of Schedule 2.

REFERENCE CONDITIONS

Samples of electricity meter and related metering devices being subject to Compliance Testing shall be tested under identical conditions and within as short a time period as is practicable to achieve valid testing results. Reference conditions required for Compliance Testing of electricity meters and related metering devices shall be as those given under S201, of Schedule 2 of this Protocol.

INSPECTION OF SAMPLES

a) Each sample of an electricity meter or related metering device chosen from a Lot undergoing Compliance Testing shall be inspected by JPS to ensure compliance with the relevant provisions listed below. This inspection process shall help to establish the identity of the devices and confirm whether they belong to previously Pattern Approved groups. The results of the inspection shall be recorded and included in the Compliance Test Report.

    i. Each electricity meter sample chosen shall be inspected by the BSJ to ensure compliance with section 4.3 of ANSI C12.1-2014.

    ii. Each instrument transformer sample chosen shall be inspected by the BSJ to ensure compliance with sub-section 4.8 of IEEE C57.13-2008.

b) Each electricity meter or related metering device which is found to be defective based on inspection shall be excluded from testing and is to be replaced in accordance with the requirements of sub-section 5.6 of this Protocol.

TEST PROCEDURES REQUIRED FOR COMPLIANCE TESTING OF ELECTRICITY METERS AND RELATED METRING DEVICES

Each applicable sample device being tested in accordance with Compliance Testing requirements shall be tested as shown below. The results obtained shall be included as part of the Compliance Test Report.

a) Electricity meter samples shall be load tested in accordance with ANSI C12.1-2014 section 5.1.1.1.

b) Instrument transformers shall be tested in accordance with ANSI C12.1-2014 section 5.2.1.

c) All other related metering devices shall be tested in accordance with the requisite provisions under ANSI C12.1-2014 section 5.0.

S204: TESTS REQUIRED FOR ELECTRICITY METER ACCURACY VERIFICATION CHECK

The testing procedures required when conducting an electricity meter accuracy verification check as provided for in section 6 of this Protocol shall be those outlined in this section – S204, of Schedule 2.

REFERENCE CONDITIONS

Reference conditions required for an electricity meter accuracy verification check shall be the same as those given under S201, of Schedule 2 of this Protocol.

INSPECTION OF SAMPLES

Each electricity meter undergoing an accuracy verification check shall be inspected by JPS or the BSJ, as the case may be, to ensure compliance with the relevant provisions of sub-section 4.3 of ANSI C12.1 – 2014. This inspection process shall help to establish the identity of the electricity meter and confirm whether it belongs to a previously Pattern Approved group. The result of the inspection shall be recorded on the electricity meter accuracy verification check report.

TEST PROCEDURES REQUIRED FOR ELECTRICITY METER ACCURACY VERIFICATION CHECK

Each applicable sample device undergoing an accuracy check shall be load tested in accordance with sub-section 5.1.1.1 of ANSI C12.1 – 2014. The results obtained shall be included as part of the electricity meter accuracy verification check report.

SCHEDULE 3: TEST PROCEDURES FOR WATER METERS

S301: TESTS REQUIRED FOR PATTERN APPROVAL OF WATER METERS

The testing procedures required for Pattern Approval of water meters covered under this Protocol shall be those outlined in this section – S301, of Schedule 3.

REFERENCE CONDITIONS

All applicable Influence Quantities, except for the Influence Quantity being tested, shall be held at the following values during Pattern Testing of a water meter.

Flow rate:	$0.7 \times (Q_2 + Q_3) \pm 0.03 \times (Q_2 + Q_3)$
Water temperature:	T30, T50 is 20°C ± 5°C
	T70 to T180 is 20°C ± 5°C and 50°C ± 5°C
	T30/70 to T30/180 is 50°C ± 5°C
Water pressure:	Within 0.03 MPa (0.3 bar) to 1 MPa (10 bar)
Ambient temperature range:	15°C to 25°C
Ambient relative humidity range:	45% to 75%
Ambient atmospheric pressure range:	86 kPa to 106 kPa (0.86 bar to 1.06 bar)
Power supply voltage (mains AC):	Nominal ± 5%
Power supply frequency:	Nominal frequency ± 2%
Power supply voltage (battery):	A voltage V in the range $U_{bmin} \leq V \leq U_{bmax}$

During each test, the temperature and relative humidity shall not vary by more than 5°C or 10%, respectively, within the reference range. The reference conditions are permitted to deviate from the defined tolerance values during the performance tests if it can be shown that the water meter pattern under consideration is not affected by the deviation of the condition in question. The actual values of the deviating condition, however, shall be measured and documented as part of the test report.

INSPECTION OF WATER METER SAMPLES

Prior to performing the tests required for Pattern Approval, the BSJ shall inspect each pattern of water meter submitted to ensure compliance with the relevant provisions of section 6 of ISO 4064 – 1 2014.

TEST PROCEDURES FOR PATTERN APPROVAL OF WATER METERS

In carrying out Pattern Testing of all water meters, the BSJ shall perform the applicable tests as stipulated in ISO 4064 – 2 2014 subject to the reference conditions indicated above. The listing of all the tests from which Pattern Approval Tests for water meters shall be chosen is replicated in Table S3.1 below. Further details relating to how the tests listed in Table S3.1 below should be undertaken can be found under sub-clause 9.2 of ISO 4064 – 2 2014.

Table S3.1: Listing of All Tests from which Pattern Approval Tests for Water Meters Shall be Chosen

	Test	Sub-clause in ISO 4064 – 2 2014	Number of Water Meters from Sample to be Tested
Tests which may be carried out in any order			
1	Static pressure	7.3	All
2	Error (of indication)	7.4	All
3	Absence of flow [a]	8.17	≥1
4	Water temperature	7.5	≥1
5	Overload water temperature [b]	7.6	≥1
6	Water pressure	7.7	≥1
7	Reverse flow	7.8	≥1
8	Pressure loss	7.9	≥1
9	Flow disturbance	7.10	≥1
Tests to be carried out in the order given			
10	Discontinuous flow durability test at Q_3 [c] or at $Q \geq 2Q_{x2}$ [e]	7.11.2	≥1 ieao
11	Continuous flow durability test at Q_3 [d]	7.11.3	≥1 ieao
12	Continuous flow durability test at Q_4	7.11.3	≥1 ieao
13	Continuous flow durability test at $0.9Q_{x1}$ [f]	7.11.3	≥1 ieao
Test to be carried out before tests 10 - 13			
14	Magnetic field testing [g]	8.16	≥1

ieao: in each applicable orientation

[a] *This test is only required for electronic water meters or water meters with electronic devices*

[b] *This test only applies to meters with a MAT ≥ 50°C*

[c] *Only for meters with $Q_3 \leq 16\ m^3/h$*

[e] *Specific test for combination meters.*

[f] *For combination meters where the small meter has not been previously approved.*

[g] *For all meters with electronic components and mechanical meters equipped with a magnetic coupling in the drive to the readout or any other mechanism which may be affected by the external application of a magnetic field.*

Source: Table 6, ISO 4064 – 2 2014

S302: TESTS REQUIRED FOR ACCEPTANCE TESTING OF WATER METERS

The testing procedures required for Acceptance of water meters covered under this Protocol shall be those outlined in this section – S302, of Schedule 3.

REFERENCE CONDITIONS

Reference conditions required for Acceptance Testing of water meters shall be the same as those given under S301, of Schedule 3 of this Protocol.

INSPECTION OF WATER METER SAMPLES

Each water meter sample chosen based on the process outlined in sub-section 9.6 of this Protocol, shall be inspected by the BSJ to ensure compliance with the relevant provisions of section 6 of ISO 4064 – 1 2014. This inspection process shall help to establish the identity of the water meters and confirm whether they belong to previously Pattern Approved groups. The result of the inspection shall be recorded on the Acceptance Test Report.

TEST PROCEDURES REQUIRED FOR ACCEPTANCE TESTING OF WATER METERS

Each water meter sample shall be tested for accuracy at each of the following flow conditions to check compliance with the corresponding Maximum Permissible Error (MPE) or tolerance.

a) Minimum Flow Rate (Q_1) MPE: $\pm$5%

b) Transitional Flow Rate (Q_2) MPE: $\pm$2%

c) Permanent Flow Rate (Q_3) MPE: $\pm$2%

The above tests are to be conducted in accordance with sub-clauses 10.1.2 and 10.1.3 of ISO 4064 – 2 2014.

REQUIREMENTS FOR WATER METER CONFORMANCE

The requirements for Acceptance of a batch of new and repaired water meters shall be based on the procedure outlined in sub-section 9.8 of this Protocol. In line with the requirements given under sub-section 9.8, for each water meter sample to be considered a conforming unit, it shall satisfy the following:

a) The errors of the water meter shall not exceed the Maximum Permissible Errors indicated above.

b) If all the errors of the water meter have the same sign, at least one of these errors shall not exceed one-half the MPE.

S303: TESTS REQUIRED FOR COMPLIANCE TESTING OF WATER METERS

The testing procedures required when conducting Compliance Testing on a Lot of water meters as provided for in section 10 of this Protocol shall be those outlined in this section – S303, of Schedule 3.

REFERENCE CONDITIONS

Water meter samples being subject to Compliance Testing shall be tested under identical conditions and within as short a time period as is practicable to achieve valid testing results. Reference conditions required for Compliance Testing of water meters shall be as those given under S301, of Schedule 3 of this Protocol.

INSPECTION OF SAMPLES

a) Each sample water meter from a Lot undergoing Compliance Testing, in accordance with the provisions of section 10 of this Protocol, shall be inspected by the WSP to ensure compliance with the relevant provisions of section 6 of ISO 4064 – 1 2014. This inspection process shall help to establish the identity of the water meters and confirm whether they belong to previously Pattern Approved groups. The result of the inspection shall be recorded and included in the Compliance Test Report

b) Each water meter which is found to be defective based on inspection shall be excluded from testing and is to be replaced in accordance with the requirements of sub-section 10.6 of this Protocol.

TEST PROCEDURES REQUIRED FOR COMPLIANCE TESTING OF WATER METERS

Each water meter sample shall be tested for accuracy at each of the following flow conditions to check compliance with the corresponding Maximum Permissible Error (MPE) or tolerance.

a) Minimum Flow Rate (Q_1) MPE: $\pm$5%

b) Transitional Flow Rate (Q_2) MPE: $\pm$2%

c) Permanent Flow Rate (Q_3) MPE: $\pm$2%

The above tests are to be conducted in accordance with sub-clauses 10.1.2 and 10.1.3 of ISO 4064 – 2 2014.

REQUIREMENTS FOR WATER METER CONFORMANCE

For a water meter included as part of Compliance Testing to be considered a conforming unit, it shall satisfy the following:

a) The errors of the water meter shall not exceed the Maximum Permissible Errors indicated above.

b) If all the errors of the water meter have the same sign, at least one of these errors shall not exceed one-half the MPE.

S304: TESTS REQUIRED FOR WATER METER ACCURACY VERIFICATION CHECK

The testing procedures required when conducting a water meter accuracy verification check as provided for in section 11 of this Protocol shall be those outlined in this section – S304, of Schedule 3.

REFERENCE CONDITIONS

Reference conditions required for a water meter accuracy verification check shall be the same as those given under S301, of Schedule 3 of this Protocol.

INSPECTION OF WATER METER SAMPLES

Each water meter undergoing an accuracy verification check, shall be inspected by the BSJ to ensure compliance with the relevant provisions of section 6 of ISO 4064 – 1 2014. This inspection process shall help to establish the identity of the water meter and confirm whether it belongs to a previously Pattern Approved group. The result of the inspection shall be recorded on the water meter accuracy verification check report.

TEST PROCEDURES REQUIRED FOR WATER METER ACCURACY VERIFICATION CHECK

Each water meter sample shall be tested for accuracy at each of the following flow conditions to check compliance with the corresponding Maximum Permissible Error (MPE) or tolerance.

a) Minimum Flow Rate (Q_1) MPE: $\pm$5%

b) Transitional Flow Rate (Q_2) MPE: $\pm$2%

c) Permanent Flow Rate (Q_3) MPE: $\pm$2%

The above tests are to be conducted in accordance with sub-clauses 10.1.2 and 10.1.3 of ISO 4064 – 2 2014.

REQUIREMENTS FOR WATER METER CONFORMANCE

For a water meter undergoing an accuracy check to be considered a Conforming Unit, it shall satisfy the following:

a) The errors of the water meter shall not exceed the Maximum Permissible Errors indicated above.

b) If all the errors of the water meter have the same sign, at least one of these errors shall not exceed one-half the MPE.

SCHEDULE 4: TESTING FEES

S401: FEES FOR TESTING SERVICES RELATED TO ELECTRICITY METERS AND RELATED METERING DEVICES

The required fees for services related to electricity meters and related metering devices covered under the provisions of the Protocol, at the date the Protocol is published, are given in Table S4.1 below. However, the cost for services related to electricity meters and related metering devices performed by the BSJ may change from time to time. Therefore, a version of Table S4.1 can be obtained from the OUR's website with the most up to date information.

Table S4.1: Fees for Testing Services Related to Electricity Meters and Related Metering Devices

Category of Service: PATTERN APPROVAL				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
Full Pattern Approval Tests	Standard Watt-hour meters of all ratings	BSJ	JPS	$34,377
	Bidirectional Watt-hour meters of all ratings	BSJ	JPS	$34,377
	Advanced Electricity Meters of all ratings	BSJ	JPS	$34,377
	Instrument Transformers of all ratings	BSJ	JPS	$13,677
Verification of Pattern Approval Granted in Another Jurisdiction	Standard Watt-hour meters of all ratings	BSJ	JPS	$19,927
	Bidirectional Watt-hour meters of all ratings	BSJ	JPS	$19,927
	Advanced Electricity Meters of all ratings	BSJ	JPS	$19,927
	Instrument Transformers of all ratings	BSJ	JPS	$19,927
Variation of Existing Pattern Approval	Standard Watt-hour meters of all ratings	BSJ	JPS	$8,703
	Bidirectional Watt-hour meters of all ratings	BSJ	JPS	$8,703
	Advanced Electricity Meters of all ratings	BSJ	JPS	$8,703
	Instrument Transformers of all ratings	BSJ	JPS	$8,703
Extension of Validity of Pattern Approval	Standard Watt-hour meters of all ratings	BSJ	JPS	$34,377
	Bidirectional Watt-hour meters of all ratings	BSJ	JPS	$34,377
	Advanced Electricity Meters of all ratings	BSJ	JPS	$34,377
	Instrument Transformers of all ratings	BSJ	JPS	$13,677
Simple Corrections to Pattern Approval Documents	All devices	OUR	JPS	-
Category of Service: ACCEPTANCE TESTING				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
Acceptance Testing of New Electricity Meters	Standard Watt-hour meters of all ratings	BSJ	JPS or Agent	$12,670/meter
	Bidirectional Watt-hour meters of all ratings	BSJ	JPS or Agent	$12,670/meter
	Advanced Electricity Meters of all ratings	BSJ	JPS or Agent	$12,670/meter
	Instrument Transformers of all ratings	BSJ	JPS or Agent	$12,670/device
Acceptance Testing of Repaired Electricity Meters	Standard Watt-hour meters of all ratings	BSJ	JPS or Agent	$12,670/meter
	Bidirectional Watt-hour meters of all ratings	BSJ	JPS or Agent	$12,670/meter
	Advanced Electricity Meters of all ratings	BSJ	JPS or Agent	$12,670/meter
	Instrument Transformers of all ratings	BSJ	JPS or Agent	$12,670/device

Category of Service: COMPLIANCE TESTING				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
	Standard Watt-hour meters of all ratings	JPS	JPS	TBD
	Bidirectional Watt-hour meters of all ratings	JPS	JPS	TBD
	Advanced Electricity Meters of all ratings	JPS	JPS	TBD
Category of Service: CUSTOMER REQUEST FOR ELECTRICITY METER ACCURACY VERIFICATION CHECK				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
	Standard Watt-hour meters of all ratings	See NOTE 1 below		$12,670 (BSJ)
	Bidirectional Watt-hour meters of all ratings	See NOTE 1 below		$12,670 (BSJ)
	Advanced Electricity Meters of all ratings	See NOTE 1 below		$12,670 (BSJ)
Category of Service: ACCREDITATION OF METER TESTING, CALIBRATION & REPAIR FACILITIES AND SERVICE				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
	JPS Meter Testing, Calibration & Repair Facilities (including Field Testing Equipment)	Accreditor	JPS	Determined by Accreditor

NOTE 1: PAYMENT FOR METER ACCURACY VERIFICATION CHECK

Costs shown only represent cost of meter accuracy verification checks for electricity meters done by the BSJ. For the full terms and conditions which govern payment for customer requested meter accuracy verification checks see section 6.5 of the Protocol.

S402: FEES FOR TESTING SERVICES RELATED TO WATER METERS

The required fees for services related to water meters covered under the provisions of the Protocol are given in Table S4.2 below.

The required fees for services related to water meters covered under the provisions of the Protocol, at the date the Protocol is published, are given in Table S4.2 below. However, the cost for services related to water meters performed by the BSJ may change from time to time. Therefore, a version of Table S4.2 can be obtained from the OUR's website with the most up to date information.

Table S4.2: Fees for Testing Services Related to Water Meters

Category of Service: PATTERN APPROVAL				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
Full Pattern Approval Tests	Conventional Mechanical Water Meters	BSJ	Water Service Provider	$60,051
	Solid State Water Meters	BSJ	Water Service Provider	$60,051
Verification of Pattern Approval Granted in Another Jurisdiction	Conventional Mechanical Water Meters	BSJ	Water Service Provider	$7,300
	Solid State Water Meters	BSJ	Water Service Provider	$7,300
Variation of Existing Pattern Approval	Conventional Mechanical Water Meters	BSJ	Water Service Provider	$7,300
	Solid State Water Meters	BSJ	Water Service Provider	$7,300
Extension of Validity of Pattern Approval	Conventional Mechanical Water Meters	BSJ	Water Service Provider	$60,051
	Solid State Water Meters	BSJ	Water Service Provider	$60,051
Simple Corrections to Pattern Approval Documents	All devices	OUR	Water Service Provider	-
Category of Service: ACCEPTANCE TESTING				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
Acceptance Testing of New Water Meters	Conventional Mechanical Water Meters	BSJ	Water Service Provider or Agent	$16,483/meter
	Solid State Water Meters	BSJ	Water Service Provider or Agent	$16,483/meter
Acceptance Testing of Repaired Water Meters	Conventional Mechanical Water Meters	BSJ	Water Service Provider or Agent	$16,483/meter
	Solid State Water Meters	BSJ	Water Service Provider or Agent	$16,483/meter
Category of Service: COMPLIANCE TESTING				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
	Conventional Mechanical Water Meters	Applicable Water Service Provider		$16,483

	Solid State Water Meters	Applicable Water Service Provider		$16,483
Category of Service: CUSTOMER REQUEST FOR ELECTRICITY METER ACCURACY VERIFICATION CHECK				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
	Conventional Mechanical Water Meters	See NOTE 1 below		$16,483
	Solid State Water Meters	See NOTE 1 below		$16,483
Category of Service: ACCREDITATION OF METER TESTING & REPAIR SERVICES				
Subcategory of Service	**Applicable Devices**	**Organization Performing Service**	**Payment Responsibility**	**Cost for Service**
	Applicable Water Service Provider's Meter Testing and Repair Facilities (including Field Testing Equipment)	Accreditor	Applicable Water Service Provider	Determined by Accreditor

NOTE 1: PAYMENT FOR METER ACCURACY VERIFICATION CHECK

Costs shown only represent cost of meter accuracy verification checks for electricity meters done by the BSJ. For the full terms and conditions which govern payment for customer requested meter accuracy verification checks see section 6.5 of the Protocol.

SCHEDULE 5: CONTACT INFORMATION FOR NOTICES

Notices and communique relating to the Protocol should be directed to the following contacts in Table S5.1 below.

Table S5.1: Contact Details for Notices and Communique

Entity	Contact	Address	Phone	Email
OUR	Secretary to the Office	Office of Utilities Regulation, 3rd Floor, PCJ Resource Centre 36 Trafalgar Road, Kingston 10	876-968-6053	pblack@our.org.jm
BSJ	Director, Engineering	Bureau of Standards Jamaica 6 Winchester Road, Kingston 10	876-632-4275	rlawrence@bsj.org.jm
JPS	Head, Govt. & Regulatory Affairs	Jamaica Public Service Co. Ltd., 6 Knutsford Boulevard, Kingston 5	876-926-3190	sdavis@jpsco.com
NWC	VP Responsible for Regulatory Compliance	National Water Commission R. Danny Williams Building 28-48 Barbados Avenue Kingston 5		Vernon.barrett@nwc.com.jm
WSPs (excluding NWC)				