

# Electricity Industry Participation Code Audit Report

For



Class A and B  
Approved Test House

Prepared by Steve Woods – Veritek Limited

Date of Audit: 02/11/17

Date Audit Report Complete: 24/11/17

Date Audit Report Due: 30/11/17

## Executive Summary

Broadspectrum is a Class A and B Approved Test House and this audit was performed at their request, to encompass the Electricity Industry Participation Code (Code) requirement for an audit, in accordance with clause 2 of schedule 10.3.

The Authority had stipulated that the next audit was due by 30 November 2017, in accordance with clause 1(4)(c) of schedule 10.3.

Eight non-compliances are recorded in relation to the following four main points:

- Calibration reports are not always produced for meters calibrated in Broadspectrum's laboratory.
- The maximum interrogation cycle is not always populated.
- Design reports are not prepared for some installations.
- Temperature variations are not considered in uncertainty calculations and there is no direct link between stated uncertainty and the working standard calibration report.

Three issues are recorded for the Authority to consider. Working standard calibration intervals are set to 12 months in the Code. ATHs used to have five years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.

Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

The issues of meter class accuracy and consideration of *"the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months"* are also applied inconsistently across the industry and I recommend clarification is provided.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. The table below provides some guidance on this matter and recommends a next audit frequency of 12 months.

The matters raised are shown in the tables below.

## Table of Non-Compliance

Subject	Section	Clause	Non compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Calibration reports	3.6	11(1) of Schedule 10.4	Calibration reports not always produced.	Moderate	Low	2	Cleared
Record keeping	3.7	12 of Schedule 10.4	Calibration reports not always produced, therefore records do not detail the test carried out.	Moderate	Low	2	Cleared
Meter certification	3.11	26(4) of Schedule 10.7	Maximum interrogation cycle not always populated.	Moderate	Low	2	Identified
Max interrogation cycle	3.14	36(4) of Schedule 10.7	Maximum interrogation cycle not always populated.	Moderate	Low	2	Identified
Design reports	5.3	2(4) Of Schedule 10.7	Design reports not prepared for some metering installations.	Moderate	Low	2	Identified
Design reports	5.4	3 Of Schedule 10.7	Design reports not prepared for some metering installations.	Moderate	Low	2	Identified
Error calculation	5.30	22 Of Schedule 10.7	Temperature variations not considered in uncertainty calculations and there is no direct link between stated uncertainty and the working standard calibration report.	Moderate	Low	2	Identified
Meter certification	5.63	1 of Schedule 10.8	Some metering components do not have calibration reports.	Moderate	Low	2	Cleared
<b>Future Risk Rating</b>						<b>16</b>	
<b>Indicative Audit Frequency</b>						<b>12 months</b>	

Future risk rating	1-3	4-6	7-8	9-17	18-26	27+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

## Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Quality management systems	2.6	4(1) of schedule 10.3	Include reference to the Approved Test House in the ISO 9001:2015 scope.	Not planned
Organisation and management	2.7	15 of Schedule 10.4	Update the quality manual to specifically identify the quality and technical manager roles.	Identified
Type test reports	4.12	5 of Schedule 10.8	Obtain and file EDM I type test reports.	Identified
Low burden	5.67	2(1)(C) Of Schedule 10.8	Develop a process for the management of low burden for LV installations.	Identified

Issue	Description
<b>Regarding:</b> Clause 3 (table 1) of schedule 10.4	<p><u>Calibration of working standards</u></p> <p>Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV.</p> <p>I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.</p>
<b>Regarding:</b> Clause 3 of schedule 10.4	<p>Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.</p>
<b>Regarding:</b> Clause 4(1)(a) of schedule 10.7	<p><u>Use of meter class accuracy when determining errors</u></p> <p>Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class <u>accuracy</u> is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures.</p> <p><u>Taking into account "the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months"</u></p> <p>It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.</p>

## Persons Involved in This Audit

Auditor:

Steve Woods

**Veritek Limited**

**Electricity Authority Approved Auditor**

Broadspectrum personnel assisting in this audit were:

Name	Title
Malcolm Hoare	National Metering Technical Manager

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## 1. ADMINISTRATIVE

### 1.1 Exemptions from Obligations to Comply With Code (Section 11 of Electricity Industry Act 2010)

#### Code related audit information

*Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.*

#### Audit observation

I checked the Authority's website for any relevant exemptions.

#### Audit commentary

There are no exemptions in place.

### 1.2 Scope of Audit

Broadspectrum is a Class A and B ATH and this audit was performed at their request, to encompass the Electricity Industry Participation Code requirement for an audit, in accordance with clause 2 of schedule 10.3.

The Authority has stipulated that the next audit was due by 30 November 2017, in accordance with clause 1(4)(c) of schedule 10.3.

The audit was conducted in accordance with the ATH Audit Guidelines V1.3 produced by the Electricity Authority.

Broadspectrum has a Class A laboratory which provides services to their own metering equipment ownership function, and to other metering equipment owners.

Broadspectrum provides field ATH services to metering equipment owners and participants and is approved for all categories of metering. This work is conducted by a combination of staff, subcontractors and on rare occasions, other ATHs. Broadspectrum provides training and monitors the ongoing compliance and competence of these staff and subcontractors by internal audit.

Most audit requirements of the Class A ATH are covered in their external ISO 17025 Audit, conducted annually by IANZ.

Broadspectrum has three distinct processes in place, one for Transpower metering, one for Meridian generation metering and another for customer metering, mostly where Broadspectrum is the MEP. The processes have little scope for variation so I considered a sample of one of each of the processes to be sufficient. Larger samples were checked during MEP audits, which confirmed there was no variation in processes.

Broadspectrum wishes its ATH approval to include the following functions of Clauses 3(2) 4(2) of Schedule 10.3:

Class A Approval:

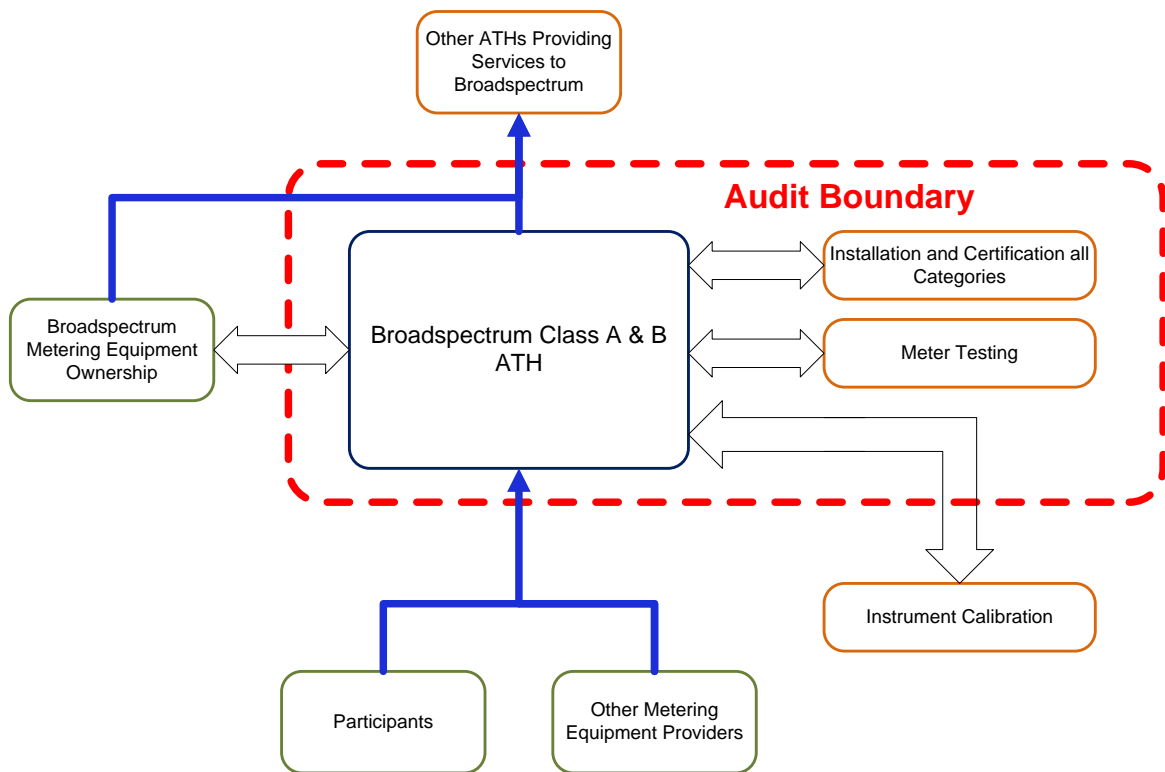
- (a) calibration of—
  - (i) working standards:
  - (ii) metering components (other than a calibration referred to in paragraph (c)):
  - (iii) metering installations:
- (b) issuing calibration reports:
- (c) calibration of metering components on site:
- (d) installation and modification of metering installations:
- (e) installation and modification of metering components:
- (f) certification of all categories of metering installations under this Code, and issuing of certification reports:
- (g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:
- (h) inspection of metering installations.

#### Class B Approval

- (b) installation and modification of metering installations:
- (c) installation and modification of metering components:
- (d) calibration of metering components on site:
- (e) certification, using the selected component certification method, of:
  - (i) category 1 metering installations:
  - (ii) category 2 metering installations:
  - (iii) category 3 metering installations with a primary voltage of less than 1kV:
- (g) certification, using the comparative recertification method, of category 2 metering installations:
- (h) issuing of certification reports in respect of certifications of metering installations under paragraphs (e) to (g):
- (i) inspection of:
  - (i) category 1 metering installations:
  - (ii) category 2 metering installations:
  - (iii) category 3 metering installations with a primary voltage of less than 1kV.

Broadspectrum also requires approval to certify metering components. I note that neither the Class B or Class A functions listed in Clauses 3(2) and 4(2) of Schedule 10.3 include certification of metering components.

The boundaries of this audit are shown below for greater clarity.



### 1.3 Previous Audit Results

The last audit was conducted in November 2015 by Steve Woods of Veritek. This audit found one non-compliance and two recommendations were made. One of the recommendations is now resolved. The non-compliance is still existing. There are two issues for the Authority to resolve which are still outstanding.

The matters raised are shown in the tables below:

#### Table of Non-Compliance

Subject	Section	Clause	Non compliance	Status
Calibration methods	3.12	22 of schedule 10.7 & clause 9 of schedule 10.8	Comparative uncertainty calculations do not consider site-specific conditions or working standard uncertainty.	Still existing

#### Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Quality management systems	3.6	4(1) of schedule 10.3	Ensure the next ISO 9001 audit includes the ATH.	Cleared
Documentation	3.12	7(6) of schedule 10.4	Update all documentation to include the latest Code references. Ensure the comparative testing instruction includes consideration of uncertainty.	Still existing

Issue	Description
Regarding: 3 (table 1) of schedule 10.4	<u>Calibration of working standards</u> Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.
Regarding: Clause 4(1)(a) of schedule 10.7	<u>Use of meter class accuracy when determining errors</u> Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class <u>accuracy</u> is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. <u>Taking into account "the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months"</u> It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.

## 2. ATH REQUIREMENTS

### 2.1 Use of Contractors (Clause 10.3 of Part 10)

#### Code related audit information

*A participant may perform its obligations and exercise its rights under this Part by using a contractor. A participant who uses a contractor to perform the participant's obligation under this Part remains responsible and liable for, and is not released from, the obligation, or any other obligation under this Part.*

#### Audit observation

I checked Broadspectrum understands this requirement by conducting a walk-through of contractor management processes. I checked the audit regime in place to ensure contractors are competent and are following Broadspectrum's instructions.

#### Audit commentary

Broadspectrum predominantly uses staff and not subcontractors. The staff used for installing, commissioning and certifying meter installations are managed by the ATH. Broadspectrum, as an MEP, uses Accucal on rare occasions. Accucal is a Class A ATH and has its own compliance and audit responsibilities.

#### Audit outcome

Compliant

### 2.2 Provision of Accurate Information (Clause 10.6 of Part 10)

#### Code related audit information

*A participant must take all practicable steps to ensure that information that it provides under this Part is:*

- *complete and accurate*
- *not misleading or deceptive*
- *not likely to mislead or deceive.*

*If a participant, having provided information under this Part, becomes aware that the participant has not complied with these requirements, the participant must, except if clause 10.43 applies, as soon as practicable provide such further information, or corrected information, as is necessary to ensure that the participant complies.*

### Audit observation

I checked compliance with this clause at the end of the audit to determine whether compliance had been achieved.

### Audit commentary

I did not find any information that was not complete and accurate, or likely to mislead or deceive.

### Audit outcome

Compliant

## 2.3 Dispute Resolution (Clause 10.50(1) to (3) of Part 10)

### Code related audit information

*Participants must in good faith use best endeavours to resolve any disputes related to Part 10 of the Code. Disputes that are unable to be resolved may be referred to the Authority for determination. Complaints that are not resolved by the parties or the Authority may be referred to the Rulings Panel by the Authority or participant.*

### Audit observation

I checked whether any disputes had been dealt with by Broadspectrum during the audit period.

### Audit commentary

Broadspectrum has not needed to resolve any disputes in accordance with these clauses.

### Audit outcome

Compliant

## 2.4 ATH Approval (Clause 10.40 of Part 10)

### Code related audit information

*A person wishing to be approved as an ATH, or an ATH wishing to renew its approval, must apply to the Authority:*

- at least two months before the intended effective date of the approval or renewal*
- in writing*
- in the prescribed form*
- in accordance with Schedule 10.3.*

*A person making an application must satisfy the Authority (providing, where appropriate, suitable evidence) that the person:*

- has the facilities and procedures to reliably meet, for the requested term of the approval, the minimum requirements of this Code for the class or classes of ATH for which it is seeking approval*
- has had an audit under Schedule 10.3*
- is a fit and proper person for approval.*

### Audit observation

I checked the most recent application for re-certification.



## Audit commentary

Broadspectrum has appropriate approval and appropriate facilities and procedures to meet the minimum requirements of the Code.

## Audit outcome

Compliant

## 2.5 ATH Requirements (Clause 10.41 of Part 10)

### Code related audit information

*An ATH must, when carrying out activities under this Part:*

- *only carry out activities for which it has been approved by the Authority*
- *exercise a degree of skill, diligence, prudence, foresight, and economic management, taking into account the technological complexity of the metering components and metering installations being tested:*
  - *determined by reference to good industry practice*
  - *that would reasonably be expected from a skilled and experienced ATH engaged in the management and operation of an approved ATH*
- *comply with all applicable safety, employment, environmental, and other enactments*
- *exercise any discretion given to it under this Part by:*
  - *taking into account the relevant circumstances of the particular instance*
  - *acting professionally*
- *recording the manner in which it carried out its activities and its reasons for carrying the activities out in that manner.*

### Audit observation

I checked policy and process documentation to confirm compliance with these clauses.

## Audit commentary

Broadspectrum has only conducted activities that fall within the scope of their approval. I have concluded from this audit that Broadspectrum has met the requirements of this clause. I checked compliance with other enactments, specifically the electricity regulations with regard to safety practices and I confirm the following critical points are managed in a robust manner:

- access to basic insulation
- livening practices, specifically polarity testing
- general safety practices and the appropriate use and testing of personal protective equipment.

## Audit outcome

Compliant

## 2.6 Quality Management Systems (Clauses 3(1) & 4(1) of Schedule 10.3)

### Code related audit information

*An ATH must establish, document, implement, maintain, and comply with a quality management system which records its processes and procedures to ensure compliance with this Part.*

*An applicant applying for approval or renewal of approval, as a class A ATH must, as part of its application, confirm that it holds and complies with AS/NZS ISO 17025 accreditation, for at least the requested term of the approval.*

*An applicant applying for approval, or renewal of approval, as a class B ATH must, as part of its application to the Authority, confirm that it holds and complies with AS/NZS ISO 9001:2008 or AS/NZS ISO 9001:2016 certification for at least the requested term of the approval.*

#### **Audit observation**

I obtained and reviewed the most recent ISO reports to confirm the scopes were appropriate and that certification was in place.

#### **Audit commentary**

Broadspectrum provided a copy of their most recent ISO 9001:2015 audit report, dated September 2017, which was conducted by Bureau Veritas Certification. The Site Scope is recorded as:

*Scope: Provision of Asset Management Services, including Consulting, Engineering, Construction, Operations, Maintenance, Outages and Upgrades to the following sectors and industries:*

- *Resources: Minerals Processing, Mining*
- *Energy: Hydrocarbons, Power Generation*
- *Industrial: Chemicals, Manufacturing*
- *Infrastructure: Maritime, Public Transport, Telecommunications, Transmission & Distribution, Rail, Roads, Water*
- *Property: Commercial, Education, Health, Housing*
- *Defence: Sustainment, Support, Operations & Exercises.*

*Covers operation in the following regions: Australia & New Zealand, Americas and Middle East & Asia.*

The scope does not have any reference to the Approved Test House Function, although the "site name" is recorded as "BROADSPECTRUM: NZ- METERING & CALIBRATION SERVICES (MCS)".

I recommend the scope is changed to include the Approved Test House Function.

<b>Recommendation</b>	<b>Description</b>	<b>Audited party comment</b>	<b>Remedial action</b>
Regarding: 3(1) & 4(1) of Schedule 10.3	Include reference to the Approved Test House in the ISO 9001:2015 scope	This is unlikely to happen as The Test House is part of Power NZ and is considered by BVQ to be covered already. We are now included in the list of sites to be audited and BVQ randomly chooses site to be audited each year.	Not planned

The September 2017 report raised the following issues:

Issue	Description	Status
Observation	It was noted that a significant proportion of Metering & Calibration Services operational systems and documented information are currently retained and/or accessible through the Lotus Notes software framework. While this is currently operating effectively, the support of Lotus Notes is unlikely to continue indefinitely and the eventual transition is likely to be a significant project which is likely to require operational software implementation and/or development. Given that the current situation represents a potential risk to business continuity, consideration should be given to the development of a transition strategy that has clearly defined timeframe(s) and determination of the associated resource needs	In progress. Another system is being sourced
Observation	It was noted that recent Job Records from field activities, (including completed SWMS and JA records) were not available for review at the time of the audit as they are completed and then held in service vehicles.	Not relevant to ATH
Opportunity for improvement	That, in consideration of OBS 1, processes are established which ensure full and prompt retrieval of these records and submission back to the MCS Office for archival should be established, with consideration given to scanning and electronic storage of these records	Not relevant to ATH

Broadspectrum also provided a copy of their most recent ISO 17025: 2005 audit report, dated November 2016, which was conducted by IANZ.

The scope of their ISO 17025 certification is appropriate and is notes as:

*Field of operations:*      *Metrology and Calibration Laboratory*  
*Subfields*                :      *Energy meters, current and voltage transformers, electrical calibrations*

The audit report contained six corrective action requests and seven recommendations.

The matters raised are shown in the table below.

Issue	Description	Status
<p>Corrective Action</p> <p><b>Reporting the results</b></p>	<p>The laboratory is required to report results clearly and unambiguously and not to make claim to being accredited for work not covered by the scope of accreditation.</p> <p>This issue, or similar, has been raised in CARs in 2008, 2009, 2011, 2013 and 2014. There continued to be reports issued with unclear statements of compliance, endorsed measurements which were not covered by the scope of accreditation or results without associated measurement uncertainties.</p> <ul style="list-style-type: none"> <li>• Report C108239 (10 October 2016) for a multi-function tester included a measurement of time, for which the laboratory is not accredited.</li> <li>• Report C108271 (8 November 2016) for a digital multi-meter had two conflicting compliance statements (<i>Work order results: Fail and This instrument complies with...</i>), no uncertainty for the measurement of temperature (simulated), measurements of conductance which are not in the scope of accreditation (and no associated uncertainty either for conductance).</li> </ul> <p>a) The laboratory is requested to withdraw and reissue the above two certificates with corrections to the content and endorsement statement, and to ensure the certificate C108279, dated 22 November 2016, is not released as it also contained errors. Please ensure that the requirements of ISO 17025 for reissue of calibration certificates are met (see clause 5.10.9). <i>Please forward to IANZ evidence of the reissue of these certificates along with any associated correspondence to the client(s).</i></p> <p>b) The laboratory is required to put in place a system to minimise the errors being included in reports. CAR clearances from previous years suggested this type of system should have already been in place (for example, the use of a report checklist prior to the authorisation of the report). Please review, update, and implement a plan and system to minimise errors. <i>Please forward to IANZ your response to part b.</i></p>	<p>Cleared</p>
<p>Corrective Action</p> <p><b>Reporting the results: compliance with the Electricity Industry Participation Code (EIPC)</b></p>	<p>On Broadpectrum's IANZ scope of accreditation, permission is granted to certify metering installations in accordance with EIPC 2010 Part 10 Metering.</p> <p>Clause 22 of Schedule 10.7 in the above document states that the calculation for the error in the metering installation must be recorded in the metering installation certification report (22.3), with reference to the components of the error in 22.1a, and include the uncertainty in measurement (22.1b, c).</p> <p>Broadpectrum was not reporting the site error and uncertainty in its installation certificate as required by the Code. The laboratory is requested to put in place a system for recording the overall error and uncertainty in accordance with the clauses of the Code above.</p> <p>Please forward to IANZ a copy of a template and an issued certificate showing the required information.</p>	<p>Cleared</p>

Corrective Action  <b>Personnel: records of training and authorisation</b>	<p>The laboratory is required to maintain records of relevant authorisations, competence and training (amongst other things) for all technical personnel.</p> <p>The laboratory had employed a new technician, Matt Cross, who was performing work in the electrical calibration laboratory under the scope of accreditation. However, on the day of the assessment, neither relevant training records nor records of competence or authorisation to do work could be accessed or located. There appeared to be a problem with access to a list of competencies for Matt in the database as he was still listed as reporting to a manager who had left the organisation, and the only information available seemed to show that he was last assessed in either April 2009 or November 2010 (and this was probably for activities not related to the calibration laboratory).</p> <p>The laboratory is requested to either locate records or create them to support its decision to authorise Matt to do work in the calibration laboratory. <i>Please forward to IANZ a copy of the records.</i></p> <p>Similar CARs were raised in 2009, 2010 and 2011</p>	Cleared
Corrective Action  <b>Personnel: policy</b>	<p>The laboratory did not appear to have an appropriate policy or policies fully covering the requirements of clause 5.2. A brief review of the part of the quality manual which seemed most relevant suggested there was some information about initial training but nothing regarding authorisations, competency assessment or record-keeping.</p> <p>Please review current policy and update if required to include requirements under 5.2, <i>and forward to IANZ a copy of the updated policy/policies.</i></p>	Cleared
Corrective Action  <b>Equipment, Measurement traceability</b>	<p>The laboratory is required to maintain records of calibrations for its significant reference equipment. It is also required to carry out intermediate checks and internal calibrations according to a defined procedure.</p> <p>The Eltel comparator <i>a</i> (serial number 20072014) had been compared with the Eltel comparator <i>b</i> (serial number 20072013) after Broadspectrum received the calibration report for comparator <i>b</i> from MSL (Electrical/2016/S21980). Records of this comparison had not been finalised and were not reviewed during the assessment. The last fully endorsed calibration of comparator <i>a</i> was in March 2012 (Electrical/2012/S21825).</p> <p>Part of the reason given for the delay in writing the formal results was that the laboratory wanted to make sure the process was correct and documented for consistency next time around.</p> <p>The laboratory is requested to:</p> <ul style="list-style-type: none"> <li>a) Finalise the report in a suitable format;</li> <li>b) Write a procedure, including a template, for the inter-comparison between the two comparators so that it can be done consistently and completed more quickly next time.</li> </ul>	Cleared

Corrective Action  <b>Proficiency testing</b>	<p>Broadspectrum as an accredited laboratory is required to demonstrate technical competence by satisfactory participation in proficiency testing covering all areas of the scope of accreditation (a rough benchmark being each major area of the scope at least once in a three-year cycle), in accordance with IANZ Technical Policy 2. The laboratory is also required to have a plan for proficiency testing activities in place, and to analyse, review and address results as appropriate.</p> <p>For Broadspectrum it is conceivable that most areas of the scope could be covered by some kind of inter-operator comparison but allowance for self-initiated inter-laboratory comparisons or programmes initiated externally should be made.</p> <p>Please write (or update) a policy including requirements from the above clauses of accreditation criteria, and <i>forward to IANZ for review</i>.</p> <p>Policy should include a plan (or reference to one) and acceptance criteria.</p>	Cleared
Recommendation  <b>Quality management</b>	It is recommended that an improvement system (a way of raising, tracking and monitoring improvement suggestions from various sources) is implemented and then described in policy. This could be a newly created spreadsheet or database or it could be the existing Better Ways/Innovation Database belonging to the wider organisation.	In progress
Recommendation  <b>Quality management</b>	The laboratory is recommended to implement a system for solicitation of client feedback and document it in policy. Online systems seem to work well (for example Survey Monkey or Google analytics), or a simple one-page form to fill in by hand or electronically. The laboratory will need to devise a few key criteria to quiz clients on	Investigating
Recommendation  <b>Quality management</b>	On the internal audit template/checklist, it is recommended that the clauses relating specifically to testing laboratories are removed, as Broadspectrum is a calibration laboratory only	Resolved
Recommendation  <b>Technical and reporting the results</b>	It is <b>strongly recommended</b> that the laboratory reviews its calculation of metering installation error to ensure it accounts for an estimated quantity of electricity over a 12 month period, as required in the EIPC Code 10 Schedule 10.7 (clause 22.1a; <i>Specific Criteria 5 clause 10.5</i> ).	Currently estimating percentage of the load (generation) at each load point and calculating based on that. Not using a load profile. Transpower errors are programmed in.
Recommendation  <b>Technical and reporting the results</b>	A <b>strong recommendation</b> is made to complete a proficiency test of some type in the area of electrical calibration (probably either an inter-operator or a self-initiated inter-laboratory comparison). All technicians and signatories related to the electrical calibration area should take part ( <i>Specific Criteria clause 14</i> ).	In progress

Recommendation  <b>Technical and reporting the results</b>	A <b>strong recommendation</b> is made to reconsider the inclusion of the statement <i>“By issuing a certificate, we believe the instrument will continue to perform correctly for some time beyond the date of this calibration”</i> . Such a statement is considered in ISO 17025 to be an opinion and should be clearly marked as such, or preferably removed from the report. If the laboratory is going to state an opinion on a report it is required to document the basis upon which that opinion has been formed (5.10.5).	Not applicable to ATH
Recommendation  <b>Technical and reporting the results</b>	Regarding endorsed electrical calibration reports, the laboratory is recommended to: <ul style="list-style-type: none"> <li>a) Add consideration of risk/consequences to the clause ‘warning’ the client to properly consider what is meant by a calibration due date;</li> <li>b) Correct or remove the statement that the instrument calibrated meets the requirements of ISO 17025;</li> <li>c) Consider how to more clearly mark non-endorsed results i.e. on the results pages themselves rather than only in small text on the front page;</li> <li>d) Use scientific symbols correctly (for example ms versus mS for milliseconds) and generally improve the spelling and presentation on the report templates;</li> <li>e) Include units of measurement on the ambient temperature and humidity;</li> <li>f) Review the title ‘calculated generic measurement uncertainties’ and/or state what is meant by that title;</li> <li>g) Give corrections/deviations to the same number of decimal places as the resolution of the unit under calibration</li> </ul>	Not applicable to ATH

### Audit outcome

Compliant

## 2.7 Organisation and Management (Clause 15 of Schedule 10.4)

### Code related audit information

*An ATH must ensure that it has managerial staff who, unless otherwise permitted in the relevant approval, all have the authority and resources needed to discharge their duties; and the responsibilities, authority, and functional relationships of all its personnel are fully and accurately specified and recorded in the ATH’s records.*

*An ATH must appoint a technical manager (however named) with overall responsibility for technical operations, who must have appropriate engineering qualifications and experience in the operation of an approved ATH; and a quality manager (however named), with responsibility for the quality management certification and the implementation of the quality management system.*

### Audit observation

I checked records in the quality manual to confirm compliance.

### Audit commentary

Malcolm Hoare is appointed as Technical Manager and as Quality Manager. Malcolm has appropriate qualifications and experience. I recommend the quality manual is updated to specifically identify that Malcolm holds these positions.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 15 of Schedule 10.4	Update the quality manual to specifically identify the quality and technical manager roles.	The quality manual already indicates who the Technical Manager is  The Quality manual will be updated to identify the Quality Manager	Identified

An ATH must ensure that all staff who perform or supervise work or activities regulated under this Part are technically competent, experienced, qualified, and trained for the functions they perform. I checked the training and competency assessment processes and I confirm compliance with this clause.

#### Audit outcome

Compliant

### 2.8 Document Processes and Procedures (Clause 16 Of Schedule 10.4)

#### Code related audit information

*An ATH must establish, document, implement, maintain, and comply with a quality management system which records its processes and procedures.*

#### Audit observation

I checked the Class A and Class B quality documentation and I reviewed the relevant ISO reports.

#### Audit commentary

The quality management system meets the requirements of the Code.

#### Audit outcome

Compliant

### 2.9 Quality Standard Required For Field Work (Clause 17 Of Schedule 10.4)

#### Code related audit information

*If a class A ATH arranges for another person to carry out field work, it must ensure that person is certified to the relevant AS/NZS ISO9001:2008 or AS/NZS ISO9001:2016 standard at all times while the person carries out the work.*

#### Audit observation

Broadspectrum has not required other parties to carry out field work.

#### Audit commentary

Broadspectrum has not required other parties to carry out field work.



## Audit outcome

Not applicable

### 2.10 Material Change Requirements (Clause 16A.11)

#### Code related audit information

*If the ATH intends to make a material change to any of its facilities, processes, procedures, or the scope of the ATH's ISO accreditation is reduced, the ATH must arrange for an additional audit at least 5 business days before the change or reduction in scope take place.*

#### Audit observation

Broadspectrum has not conducted any material changes.

#### Audit commentary

Broadspectrum has not conducted any material changes.

## Audit outcome

Not applicable

### 2.11 Audit Required For ATH Approval (Clause 16A.12 and 16A.13)

#### Code related audit information

*The ATH must provide an audit report to the Authority by the due date. If there are areas where compliance is not achieved, the ATH must also submit a compliance plan which specifies the actions that the ATH intends to address, any issues identified in the audit report and the time frames to complete those actions.*

#### Audit observation

Broadspectrum is currently undergoing an audit and the report will be provided with a compliance plan.

#### Audit commentary

Broadspectrum is currently undergoing an audit and the report will be provided with a compliance plan.

## Audit outcome

Compliant

### 2.12 Accommodation & Environment (Clause 1 of Schedule 10.4)

#### Code related audit information

An ATH must maintain a list of personnel who are authorised to access and use its laboratory and storage facilities and restrict access to its laboratory and storage facilities to:

- (i) the personnel specified*
- (ii) the Authority*
- (iii) an auditor conducting an audit*
- (iv) any other person who is, at all times, directly supervised by a member of personnel specified.*

### Audit observation

I checked records in the quality manual to confirm compliance.

### Audit commentary

Broadspectrum's laboratory is only accessible from the rear of the metering office; this serves as restriction of access to authorised personnel. Broadspectrum has a list of approved personnel, which is posted on the door of the laboratory, along with a notice that other personnel must be accompanied.

Broadspectrum controls their laboratory environment to  $22^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Temperature is logged with a temperature logger and the results are checked by IANZ during the annual audits.

### Audit outcome

Compliant

## 2.13 Compensation Factors (Clause 8 of Schedule 10.4)

### Code related audit information

*If an ATH is approved to certify metering installations, the ATH must have a documented process for the determination of compensation factors.*

### Audit observation

I checked the documentation in relation to compensation factors.

### Audit commentary

The documentation achieves compliance with the Code.

### Audit outcome

Compliant

## 2.14 Metering Component Stickers (Clause 8(3) of Schedule 10.8)

### Code related audit information

*An ATH must ensure that a certification sticker is:*

- made of weather-proof material*
- permanently attached*
- filled out using permanent markings.*

### Audit observation

I checked Broadspectrum's component stickers to confirm compliance.

### Audit commentary

All component stickers are compliant with this clause.

### Audit outcome

Compliant

## 2.15 Interference with Metering Installations (Clause 10.12)

### Code related audit information

*An ATH may not directly or indirectly interfere with a metering installation unless it is also the MEP or has been instructed to do so by the existing or gaining MEP for the installation.*

### Audit observation

I audited this clause by exception.

### Audit commentary

I did not identify any interference by Broadspectrum during the audit.

### Audit outcome

Compliant

## 3. METERING RECORDS AND REPORTS

### 3.1 Physical Location of Metering Installations (Clause 10.35 of Part 10)

#### Code related audit information

*If it is not practical in the circumstances to locate the metering installation at the point of connection, the reconciliation participant must calculate the quantity of electricity conveyed through the point of connection using a loss compensation process approved by the certifying ATH.*

*If this occurs the ATH must record the calculation, measurements, and assumptions in the installation certification report.*

#### Audit observation

I checked whether Broadspectrum had certified any installations with loss compensation.

#### Audit commentary

Broadspectrum deals with metering installations that are not located at the point of connection. The losses are calculated by the ION meters based on certain inputs, such as cable and transformer details. The inputs are determined by Beca for Meridian and by Broadspectrum for Transpower. The details are recorded in the design reports, which become part of the metering installation certification reports.

#### Audit outcome

Compliant

### 3.2 Metering Installation Type (Clause 8(2) of Schedule 10.7)

#### Code related audit information

*The metering installation certification report must specify whether the installation is half hour or non-half hour metering. It must also record where the services access interface is.*

#### Audit observation

I checked three certification reports to confirm compliance.

### Audit commentary

All reports have a populated field for NHH/HHR and the location of the services access interface.

### Audit outcome

Compliant

## 3.3 Record Metering Installation Category (Clause 8(4) Of Schedule 10.7)

### Code related audit information

*An ATH must record the category of the metering installation in the metering installation certification report.*

### Audit observation

I checked three certification reports to confirm compliance.

### Audit commentary

All reports correctly recorded the metering category.

### Audit outcome

Compliant

## 3.4 Calibration Test Points (Clause 7(7) Of Schedule 10.4)

### Code related audit information

*An ATH may select a test point other than those specified in the relevant standard listed in Table 5 of Schedule 10.1, or at a lower burden than specified in the standard, but must, if it does this, document its reasons for the selection of these test points in the calibration report.*

### Audit observation

I checked with Broadspectrum whether any different test points had been used.

### Audit commentary

There were no different test points used other than those specified in the standards.

### Audit outcome

Compliant

## 3.5 Services Access Interface (Clause 10 of Schedule 10.4)

### Code related audit information

*An ATH must, when preparing a metering installation certification report, determine, and record in the certification report, the location of the services access interface. The services access interface means the point, at which access may be gained to the services available from a metering installation, that is:*

- recorded in the certification report by the certifying ATH for the metering installation*
- where information received from the metering installation can be made available to another person*
- where signals for services such as remote control of load (but not ripple control) can be injected.*

### Audit observation

I checked the design reports and a sample of three certification records to confirm compliance.

#### Audit commentary

The location of the Services Access Interface is recorded in the certification report as required by this clause.

#### Audit outcome

Compliant

### 3.6 Certification & Calibration Reports (Clause 11(1) of Schedule 10.4)

#### Code related audit information

*An ATH must, for each metering installation that it certifies, produce a certification report in accordance with Schedule 10.7. An ATH must, for each metering component:*

- that it calibrates, produce a calibration report in accordance with Schedule 10.8*
- that it certifies, produce a certification report in accordance with Schedule 10.8.*

#### Audit observation

I requested a sample of three certification records to confirm compliance.

#### Audit commentary

Certification reports are produced for all installations; a process is in place to produce certification and calibration reports for all components but the meter at ICP 0000021956WEA44 did not have a calibration report produced. The calibration was conducted, but a record still needs to be prepared in order to comply with this clause.

#### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.6 With: Clause 11(1) of Schedule 10.4  From: 22-May-17 To: 02-Nov-17	Calibration reports not always produced.  Potential impact: Low  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because calibration reports are produced for all Meridian and Transpower meters.  The impact on other participants could be minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
The calibration report for the meter at this installation (CMR14277) has been completed and attached to the database.		3/11/2017	Cleared

Preventative actions taken to ensure no further issues will occur	Completion date	
The cause of this was a resourcing issue which has been addressed with the employment of a part time laboratory technician to complete the meter calibrations This problem had been identified prior to the audit and was in the process of being corrected.	13/11/2017	

### 3.7 ATH Record Keeping Requirements (Clause 12 of Schedule 10.4)

#### Code related audit information

*The ATH must document and maintain its record keeping system for certificates, reports, and any other records. The records can be stored in any media, such as hard copy or electronically. The records should be stored in a manner that prevents deterioration or damage and that retrieval of a record cannot result in change or damage to the record. Electronic storage should be backed up.*

*The ATH must securely store all records, certificates, and reports and ensure that each metering installation is:*

- *uniquely identified*
- *sufficiently detailed to verify the tests carried out including test conditions, the test equipment used and the personnel carrying out the tests.*

#### Audit observation

I checked the certification records for three metering installations along with the storage practices.

#### Audit commentary

All records are stored securely and are kept indefinitely. As mentioned in Section 3.6, one of the installations checked did not have a calibration report prepared, therefore compliance is not achieved with the requirement to ensure records are “*sufficiently detailed to verify the tests carried out including test conditions, the test equipment used and the personnel carrying out the tests*”

## Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.7 With: Clause 12 of Schedule 10.4  From: 22-May-17 To: 02-Nov-17	Calibration reports not always produced, therefore records do not detail the test carried out.  Potential impact: Low  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because calibration reports are produced for all Meridian and Transpower meters.  The impact on other participants could be minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
All the outstanding calibration meter reports for our own lease metering have now been completed. Further checking will be made to ensure all outstanding reports are captured		3/11/2017	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
The cause of this was a resourcing issue which has been addressed with the employment of a part time laboratory technician to complete the meter calibrations. Even though the calibration reports were not completed the testing file was retained and attached to the database so that all the testing results, records, and tests completed were available, these have now been converted to calibration reports.		13/11/2017	

### 3.8 Retention of Records (Clause 13 of Schedule 10.4)

#### Code related audit information

*The ATH must keep all records, certificates, and calibration reports for all components and installations certified for at least 48 months after the date of decommissioning.*

#### Audit observation

I checked the certification records for three metering installations along with the storage practices.

#### Audit commentary

Records are stored indefinitely.

## Audit outcome

Compliant

### 3.9 Advise MEP of Records, Certificates Or Reports For A Metering Installation (Clause 14 Of Schedule 10.4)

#### Code related audit information

*The ATH must provide the MEP responsible for the metering installation with the record, certificate, or report for the metering installation within five business days of certification. The ATH must ensure the MEP receives the record. This can be either as an electronic copy or any other agreed format.*

#### Audit observation

I checked the communication trail for three metering records.

#### Audit commentary

Broadspectrum acts as an agent to MEPs for the Broadspectrum and Transpower installations, but not for Meridian. I checked the records for the Waitaki station, which was certified on 06/10/17 but the records were not provided to Meridian until 19/10/17, which is outside the five day window from certification. This was originally believed to be non-compliance; however the Code actually requires the ATH to send records within five business days of creation of the record, not from the certification date. I have therefore concluded that compliance is achieved with this requirement because the record has not been “created” until all of the information is complete, which was 19/10/17.

#### Audit outcome

Compliant

### 3.10 Certification at a Lower Category (Clause 6(4) Of Schedule 10.7)

#### Code related audit information

*If the ATH makes a determination to certify a metering installation at a lower category under clause 6 of Schedule 10.7, the certification report must include all information required to demonstrate compliance.*

#### Audit observation

I checked whether certification had occurred under this clause in the audit period.

#### Audit commentary

Certification had not occurred under this clause in the audit period.

#### Audit outcome

Not applicable

### 3.11 Meter Requirements (Clause 26(3) & (4) of Schedule 10.7)

#### Code related audit information

*The ATH needs to document the following in the metering records:*

- the meter manufacturer's required recommendations for regular maintenance
- any maintenance that has been carried out on the meter, such as battery monitoring and replacement.

*An ATH must record in the metering installation certification report, the maximum interrogation cycle for the metering installation before it certifies a metering installation incorporating a meter.*



## Audit observation

I checked process documentation, conducted a walk-through of the process and checked three certification records.

## Audit commentary

Broadspectrum as a Class A ATH has not certified any installations where the meter requires maintenance and they have not conducted any maintenance on any components. As a Class B ATH, Broadspectrum is unlikely to deal with any meters where maintenance is required. All AMI devices installed have battery monitoring conducted as part of the data collection function.

The maximum interrogation cycle is recorded correctly for Transpower and Meridian installations. Where Broadspectrum is the MEP, the field in the records is labelled "days of data storage", but it was not filled out for the example checked.

Days of data storage	
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## Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.11 With: Clause 26(4) of Schedule 10.7  From: 08-May-17 To: 02-Nov-17	Maximum interrogation cycle not always populated.  Potential impact: Low  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because there is room for improvement.  The impact on other participants could be minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
While the days of data storage is not always populated on the installation checksheet/Design report, for the lower category installations, where BRS is the MEP all installations have a storage capacity at least 4 or 5 times the normal interrogation cycle.		20/11/2017	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Additional checking will be implemented to ensure that all the required fields are populated.		20/11/2017	

### 3.12 Meter Certification Expiry Date (Clause 27(5) of Schedule 10.7)

#### Code related audit information

*The ATH must record the certification expiry date for each meter in a metering installation in the metering installation certification report and the meter certification report.*

#### Audit observation

I checked three certification records to confirm compliance.

#### Audit commentary

Certification expiry dates are correctly calculated and recorded.

#### Audit outcome

Compliant

### 3.13 Measuring Transformer Requirements (Clause 28(3) of Schedule 10.7)

#### Code related audit information

*The ATH needs to document the following in the metering records:*

- the manufacturer's recommendations for any regular maintenance required for the measuring transformer*
- any maintenance that has been carried out on the measuring transformer.*

#### Audit observation

I checked whether any measuring transformers required maintenance.

#### Audit commentary

Broadspectrum has not installed any measuring transformers where maintenance is required. Certification reports confirm this fact.

#### Audit outcome

Not applicable

### 3.14 Determine Maximum Interrogation Cycle (Clause 36(3) & (4) Of Schedule 10.7)

#### Code related audit information

*An ATH must record the maximum interrogation cycle for the metering installation. The maximum interrogation cycle for a metering installation is the shortest of the following periods:*

- the period of inherent data loss protection for the metering installation*
- the period of memory availability given the data storage device configuration*
- the period in which the accumulated drift of a data storage device clock is expected to exceed the maximum time error set out in Table 1 of clause 2 of Schedule 15.2 for the category of the metering installation.*

#### Audit observation

I checked processes and the records for three metering installations to confirm compliance.

#### Audit commentary

The maximum interrogation cycle is recorded correctly for Transpower and Meridian installations. Where Broadspectrum is the MEP, the field in the records is labelled “days of data storage”, but it was not filled out for the example checked.

Days of data storage	
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#### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.14 With: Clause 36(4) of Schedule 10.7 From: 08-May-17 To: 02-Nov-17	Maximum interrogation cycle not always populated. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are recorded as moderate because there is room for improvement. The impact on other participants could be minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
While the days of data storage is not always populated on the installation checksheet/Design report, for the lower category installations, where BRS is the MEP all installations have a storage capacity at least 4 or 5 times the normal interrogation cycle,		20/11/2017	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Additional checking will be implemented to ensure that the required fields are populated.		20/11/2017	

## 4. CALIBRATION AND CERTIFICATION OF METERING COMPONENTS

### 4.1 Accommodation and Environment (Clause 1(D)-(E) Of Schedule 10.4)

#### Code related audit information

*The ATH must ensure that the environment in which its activities are undertaken is monitored, appropriate for the tests being carried out and unlikely to affect the required accuracy.*

#### Audit observation

I checked the IANZ report which confirmed the test laboratory environment was appropriate.

#### Audit commentary

I checked the IANZ report which confirmed the test laboratory environment was appropriate.

#### **Audit outcome**

Compliant

### **4.2 Use of Measurement Standards (Clause 1(F) Of Schedule 10.4)**

#### **Code related audit information**

*The ATH must comply with the specific requirements of the applicable standard listed in Table 5 of Schedule 10.1.*

#### **Audit observation**

I checked the standards being used and some test points to confirm compliance.

#### **Audit commentary**

Broadspectrum uses the correct standards.

#### **Audit outcome**

Compliant

### **4.3 Test Equipment (Clause 2 of Schedule 10.4)**

#### **Code related audit information**

*An ATH must, at all times, ensure that it has access to all items of equipment required for the performance of the calibrations and tests it is approved to undertake under this Part; and each item of equipment it uses is maintained in accordance with the manufacturer's recommendations and this Code. A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables.*

#### **Audit observation**

I checked records in the instrument register to confirm compliance.

#### **Audit commentary**

Broadspectrum maintains a register of equipment, including test equipment, in Lotus Notes and this includes a section for repairs and maintenance. I checked whether this was up to date and it was current.

A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables. The relevant operating procedure was demonstrated during the audit. The relevant consumables are seals, and stickers.

#### **Audit outcome**

Compliant

#### 4.4 Calibration of Reference & Working Standards (Clause 3(1)(a), (b)(i) and (6) of Schedule 10.4)

##### Code related audit information

*An ATH must ensure that any reference standard is calibrated by an approved calibration laboratory and that any working standard is calibrated by an approved calibration laboratory or class A ATH. The calibration reports for the calibrated standards must be held by the ATH and indicate that the standard is within the manufacturer's accuracy specifications.*

##### Audit observation

I checked all of Broadspectrum's reference and working standards to confirm they had current calibration certificates.

##### Audit commentary

Broadspectrum has an MTE K2006 reference standard, which was calibrated on 31/01/17. This standard is used to calibrate working standards.

The VT standard was calibrated on 24/11/15.

The Omicron working standard was calibrated on 03/02/17.

Broadspectrum has some Hioki working standards for calibration of Category 2 metering installations. These are calibrated every 12 months.

The two Eltel field comparators are technically working standards and according to Table 1 in clause 3 of schedule 10.4, these should be calibrated every 12 months. IANZ has approved a two yearly interval as long as the interval is staggered and that each standard is checked against the newly calibrated standard immediately after calibration. This approach achieves compliance.

Broadspectrum certifies grid metering and for 110kV VT calibrations, they use a Transpower field standard, which was calibrated in 2013 in Australia by ANMI. Broadspectrum has a 66kV standard, which was calibrated on 09/08/13, also by ANMI. As mentioned above, Table 1 in clause 3 of schedule 10.4 requires that all working standards should be calibrated every 12 months. Broadspectrum's current schedule is 5 years. I have raised this as an issue for the Authority to consider, because annual calibration will incur a significant cost and will result in the standards being out of service or 3 to 4 months out of each year, meaning ATHs will need to have two sets of working standards.

Issue	Description
<b>Regarding:</b> Clause 3 (table 1) of schedule 10.4	<p>Working standard calibration interval is set to 12 months in the Code. ATHs used to have five years under the old Code if the standards were used on HV metering above 33kV.</p> <p>I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It's possible they are only "periodically" used in the field.</p>

The working standard identification and calibration expiry is recorded in certification records to ensure only standards with current calibration are used.

Broadspectrum also has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower,

Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

Issue	Description
<b>Regarding:</b> Clause 3 of schedule 10.4	Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

Broadspectrum has an Omicron CT analyser, which is used to produce results and which also does not have a calibration report. Compliance is achieved for this standard because the results are compared to a standard which does have a calibration report.

#### Audit outcome

Compliant

### 4.5 Calibration Interval (Clause 3(2) of Schedule 10.4)

#### Code related audit information

*Each reference standard or working standard must be calibrated within the applicable calibration interval set out in Table 1 of Schedule 10.4.*

#### Audit observation

I checked all of Broadspectrum's reference and working standards to confirm they had current calibration certificates.

#### Audit commentary

I have recorded an issue in the section above regarding the calibration interval for working standards. I've recorded compliance whilst the matter is with the Authority for consideration.

#### Audit outcome

Compliant

### 4.6 Calibration of Reference Standards (Clause 3(1)(B)(li), (2), (3)(C), (4) And (5) Of Schedule 10.4)

#### Code related audit information

*Class A ATHs must ensure that in calibration of reference standards, any uncertainties are sufficiently small so that the overall uncertainty in the measurements used to test a metering installation does not exceed one third of the maximum permitted error set out in Table 1 of Schedule 10.1 for the category of metering installation that the reference standard will be used to calibrate.*

*If a reference standard is used in conditions that deviate from those in the calibration report, the class A ATH must calculate and apply adjustments using its own processes and procedures so that the reference standard achieves the reference conditions.*

*If a reference standard is used in conditions that deviate from those in the calibration report, the class A ATH must calculate and apply adjustments using its own processes and procedures so that the reference standard achieves the reference conditions.*

#### **Audit observation**

I checked all of Broadspectrum's reference standards to confirm they had current calibration certificates.

#### **Audit commentary**

There were no situations where calibration occurred or standards were used in non-reference situations.

#### **Audit outcome**

Compliant

### **4.7 33kv Or Above Calibrated By An Approved Calibration Laboratory (Clause 3(3)(B) Of Schedule 10.4)**

#### **Code related audit information**

*Class A ATHs must ensure that a working standard on a system operating at a voltage of 33kV or above has been calibrated by an approved calibration laboratory.*

#### **Audit observation**

I checked all of Broadspectrum's reference and working standards to confirm they had current calibration certificates.

#### **Audit commentary**

I have recorded an issue in Section 4.4 above regarding the calibration interval for working standards. I've recorded compliance whilst the matter is with the Authority for consideration.

Broadspectrum also has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend in Section 4.4 that the Authority provides clarification to the industry regarding the use of this device.

#### **Audit outcome**

Compliant

### **4.8 Metering Component Testing System (Clause 4 of Schedule 10.4)**

#### **Code related audit information**

*An ATH may use a complete calibrated metering component testing system (a test bench) as an alternative to a separately calibrated working standard only if the ATH:*

- calibrates the test bench as if it was a working standard*
- carries out a testing system accuracy test, using approved reference standards before completing the calibration report.*

#### **Audit observation**

Broadspectrum does not have a test bench.

#### **Audit commentary**

Broadspectrum does not have a test bench.

#### **Audit outcome**

Not applicable

### **4.9 Calibration Errors (Clause 5 of Schedule 10.4)**

#### **Code related audit information**

*A Standard cannot be used if the ATH believes it has a calibration error. If an error is found then all ATH's that have used the standard must be notified. All metering installations certified using the standard must be treated as defective in accordance with Clause 10.43.*

#### **Audit observation**

I checked Broadspectrum's understanding of this requirement through interview. I checked whether this situation had occurred.

#### **Audit commentary**

Broadspectrum understands the requirements of this clause. There are no examples of standards with calibration errors.

#### **Audit outcome**

Compliant

### **4.10 Measurement Traceability (Clause 6 of Schedule 10.4)**

#### **Code related audit information**

An ATH must document, maintain, and comply with a system that ensures, whenever it undertakes a calibration test or measurement, the ATH can replicate the test or measurement in every respect and the results of the measurements are traceable.

#### **Audit observation**

I checked this by reviewing the IANZ audit report.

#### **Audit commentary**

The IANZ report confirms compliance.

#### **Audit outcome**

Compliant

### **4.11 Calibration Methods (Clause 7(6) of Schedule 10.4)**

#### **Code related audit information**

*An ATH must only use components that have been certified by an ATH or calibration laboratory.*

*A Class B ATH must follow 17025 calibration methods for components.*



*The test points must be those listed in the relevant IEC standard.*

*An ATH must ensure that uncertainty of measurement does not exceed one third of the error listed in the relevant IEC standard listed in Table 5.*

*If a CT is to be used in a Metering Installation is certified using the selected component method then it must be tested for errors at 5% to 120% of rated current.*

*An ATH must have documented instructions for calibration that match the IEC standard.*

#### **Audit observation**

I checked a sample of calibration and certification reports to confirm compliance with this clause.

#### **Audit commentary**

All components are calibrated and certified. Calibration is conducted by the Class A ATH not the Class B ATH. Uncertainty of measurement does not exceed one third of the error listed in the standard. CT test points are compliant.

#### **Audit outcome**

Compliant

### **4.12 Data Storage Device Certification (Clause 5 of Schedule 10.8)**

#### **Code related audit information**

*All data storage devices must be certified before they can be used in a metering installation. The ATH must ensure that the data storage devices in a metering installation have been type tested by an approved test laboratory, that the results for data storage devices are appropriate for that model and version, and have a calibration report.*

#### **Audit observation**

I checked the certification records for three metering installations to confirm compliance.

#### **Audit commentary**

Broadspectrum certifies data storage devices in accordance with these clauses. The certification report is combined with the metering installation certification report and contains the required details. Broadspectrum has a directory of type test reports for relevant devices; however the EDM I report could not be located. I recommend this is obtained and filed in the directory.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 5 of Schedule 10.8	Obtain and file EDM I type test reports.	Data logger type tests were available for the MK6, MK6E and MK10 EDM I meters which are the meter types that we generally use.  Data logger type test report for the other types of EDM I meters have been requested from EDM I.	Identified

#### **Audit outcome**

Compliant

#### 4.13 Metering Component Stickers (Clause 8(1) of Schedule 10.8)

##### Code related audit information

*An ATH must confirm certification by attaching a metering component certification sticker to the metering component or, if not practicable, provide the sticker with the metering component.*

##### Audit observation

I checked Broadspectrum's component stickers to confirm compliance.

##### Audit commentary

All component stickers are compliant with this clause.

##### Audit outcome

Compliant

#### 4.14 Metering Component Stickers (Clause 8(2) of Schedule 10.8)

##### Code related audit information

*A metering component certification sticker must show:*

- the name of the metering component owner (if available)
- if the metering component is a meter or a measuring transformer:
  - a) the name of the ATH or the approved calibration laboratory who calibrated the metering component
  - b) the name of the ATH who certified the metering component
  - c) the date on which the metering component was certified
  - d) the initials or other unique identifier of the person who carried out the certification of the metering component.

##### Audit observation

I checked Broadspectrum's component stickers to confirm compliance.

##### Audit commentary

All component stickers are compliant with this clause.

##### Audit outcome

Compliant

#### 4.15 Sealing and Monitoring of Seals (Clause 9 of Schedule 10.4 & Clause 47(7) of Schedule 10.7)

##### Code related audit information

*An ATH is required to have a documented system for applying seals to a metering installation to ensure that each metering component in the metering installation that could be expected to affect the accuracy or reliability of the metering installation is sealed. The system of sealing will ensure monitoring of the integrity of the metering installation and that unauthorised access to the metering installation will be identifiable so that the MEP can be notified.*

*The sealing system will identify:*

- the ATH who affixed the seal
- the person (or the sealing tool) who applied the seal
- when the seal was applied.

##### Audit observation

I checked the quality documentation and a sample of three certification records to confirm compliance.

#### **Audit commentary**

Broadspectrum's processes achieve compliance with all of the requirements above. I checked the photos for the metering installations and I confirm that all components and enclosures were appropriately sealed. Main switches are sealed where this is possible. Broadspectrum has an appropriate warning label sticker. I checked the sealing records which showed they were up to date and accurate.

#### **Audit outcome**

Compliant

## **5. CALIBRATION AND CERTIFICATION OF METERING INSTALLATIONS**

### **5.1 ATH Must Not Certify Metering Installations under Certain Circumstances (Clause 8(1) Of Schedule 10.7)**

#### **Code related audit information**

*The ATH must not certify a metering installation if the installation does not comply with Part 10*

#### **Audit observation**

I checked a sample of three certification records to confirm compliance.

#### **Audit commentary**

There were no metering installations certified that did not comply with Part 10.

#### **Audit outcome**

Compliant

### **5.2 Determination of Metering Categories (Clause 5 of Schedule 10.7 & Clause 10.11)**

#### **Code related audit information**

*An ATH is required to determine the category of the metering installation in accordance with Table 1 of Schedule 10.1 before it certifies a metering installation.*

#### **Audit observation**

I checked certification records for three metering installations to confirm compliance.

#### **Audit commentary**

All three certification reports had the metering category recorded correctly.

#### **Audit outcome**

Compliant

### **5.3 Requirement for Metering Installation Design Report (Clause 2(4) Of Schedule 10.7)**

#### **Code related audit information**

*The ATH must receive a design report from the MEP before installing or modifying a metering installation or a component in a metering installation.*

## Audit observation

I checked the current suite of design reports and the certification records for three metering installations.

## Audit commentary

Transpower design reports are prepared by Broadspectrum and these have a “checked by” section, which I consider achieves the requirement to “approve” the design report.

Meridian installations have appropriate design reports.

Design reports have not been prepared for installations where Broadspectrum is the MEP. The certification report has a design report tick box, but does not have a field for recording the design reference.

## Audit outcome

### Non-compliant

Non-compliance	Description		
Audit Ref: 5.3 With: Clause 2(4) Of Schedule 10.7  From: 01-Oct-15 To: 31-Oct-17	Design reports not prepared for some metering installations. Potential impact: Medium Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because design reports are in place for most metering installations.  There is a potential minor impact due to the lack of design reports, therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
The installation documentation is designed to cover many documents including being a design report, which is included in the document title. This document when fully completed covers all the requirements of a design report.  This was discussed and changes made after the last audit so that all the requirements of the design report were covered.		20/11/2017	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Additional checking will be implemented to ensure that all the required fields are populated.		20/11/2017	

## 5.4 ATH Design Report Obligations (Clause 3 of Schedule 10.7)

## Code related audit information

*Before certifying a metering installation the ATH must check the design report to confirm the metering installation will function as designed and that the metering installation will comply with Part 10.*

*The certifying ATH must update the design report with any changes and provide it to the MEP responsible for the installation within 10 days of installation certification.*

### Audit observation

I checked the current suite of design reports and the certification records for three metering installations.

### Audit commentary

Transpower design reports are prepared by Broadspectrum and these have a “checked by” section, which I consider achieves the requirement to “approve” the design report.

Meridian installations have appropriate design reports.

Design reports have not been prepared for installations where Broadspectrum is the MEP. The certification report has a design report tick box, but does not have a field for recording the design reference.

### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 5.4 With: 3 Of Schedule 10.7 From: 01-Oct-15 To: 31-Oct-17	Design reports not prepared for some metering installations. Potential impact: Medium Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are recorded as moderate because design reports are in place for most metering installations. There is a potential minor impact due to the lack of design reports, therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
The installation documentation is designed to cover many documents including being a design report, which is included in the document title. This document when fully completed covers all the requirements of a design report. This was discussed and changes made after the last audit so that all the requirements of the design report were covered.		20/11/2017	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Additional checking will be implemented to ensure that all the required fields are populated.		20/11/2017	

## 5.5 Certification as a Lower Category (Clause 6(1) of Schedule 10.7)

### Code related audit information

*An ATH may determine that the metering category of a current transformer installation is lower than would otherwise be the case and certify the installation at that lower category only if:*

- a protection device, like a fuse or a circuit breaker, is installed so that it limits the maximum current; or*
- the MEP provides evidence from historical data that the maximum current will be lower than the current setting of the protection device for the category that metering installation is currently certified at; or*
- the components in the metering installation will use less than 0.5 GWh in any 12 month period; or*
- the MEP provides evidence from historical data that the installation will use less than 0.5 GWh in any 12 month period.*

### Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

### Audit commentary

No metering installations were certified as a lower category during the audit period.

### Audit outcome

Compliant

## 5.6 Use of Current Transformer Rating Lower Than Supply Capacity (Clause 6(2)(a) of Schedule 10.7)

### Code related audit information

*If the ATH determines the category of a current transformer metering installation is lower than would otherwise be the case and a current limiting device is used, the ATH must:*

- *confirm the suitability and operational condition of the protection device*
- *record the rating and setting of the protection device in the metering records*
- *seal the protection device*
- *apply, if practicable, a warning tag or label to the seal.*

### Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

### Audit commentary

No metering installations were certified as a lower category during the audit period.

### Audit outcome

Compliant

## 5.7 Determining Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(2)(b) & (d) of Schedule 10.7)

### Code related audit information

*The ATH may determine the metering installation category according to the metering installation's expected maximum current, if:*

- *there has been a request to do so from the MEP;*
- *the MEP provides evidence from historical data that the maximum current will be lower than the current setting of the protection device for the category that metering installation is currently certified; and*
- *the ATH considers it is appropriate to do so in the circumstances.*

*The MEP must obtain the maximum current that flows through the installation each month from the participant interrogating the installation. From this data the ATH can calculate the maximum current from the raw meter data by either calculation from the kVA by trading period if available or from a maximum current indicator if fitted. If the MEP does not receive the monthly report from the participant interrogating the installation or if the current exceeds the maximum calculated rating of the installation, the certification of the installation is automatically cancelled.*

### Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

### Audit commentary

No metering installations were certified as a lower category during the audit period.

### Audit outcome

Compliant

## 5.8 Suitability Of Determination Of a Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(3) Of Schedule 10.7)

### Code related audit information

*Before the ATH determines a metering installation to be a lower category, the ATH must first visit the site of the metering installation to ensure it is suitable for the metering installation to be determined to be a lower category.*

### Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

### Audit commentary

No metering installations were certified as a lower category during the audit period.

### Audit outcome

Compliant

## 5.9 Use of Metering Installation Certification Methods (Clause 7(1) Of Schedule 10.7)

### Code related audit information

*When certifying a metering installation the ATH must use either of the following methods:*  
*a) the selected component certification method if the metering installation is category 1, 2, or 3; or*  
*b) the fully calibrated certification method.*

### Audit observation

I checked certification records for three metering installations to confirm compliance.

### Audit commentary

Broadspectrum correctly applied and recorded the certification methods.

### Audit outcome

Compliant



## 5.10 Certification of a Metering Installation Using Statistical Sampling or Comparative Recertification (Clause 7(2) Of Schedule 10.7)

### Code related audit information

*In addition to the selected component and fully calibrated methods, the ATH may also recertify an installation using:*

- a) an approved statistical sampling process for category 1 metering installations; or*
- b) the approved comparative recertification method for a category 2 metering installation*

### Audit observation

Broadspectrum has not been requested to recertify any groups of metering installations using the statistical sampling method. They have used the comparative method.

### Audit commentary

Broadspectrum has not been requested to recertify any groups of metering installations using the statistical sampling method. They have used the comparative method.

### Audit outcome

Compliant

## 5.11 Metering Installation Certification Requirements (Clause 8(3) Of Schedule 10.7)

### Code related audit information

*An ATH may only certify a metering installation as category 3 or higher if the metering installation incorporates a half hour meter.*

### Audit observation

I checked certification records for three metering installations to confirm compliance.

### Audit commentary

All installations had HHR meters.

### Audit outcome

Compliant

## 5.12 Certification Tests (Clause 9(1) of Schedule 10.7)

### Code related audit information

*An ATH, when required to carry out tests specified in Tables 3 or 4 of Schedule 10.1, must comply with the provisions of clause 9(1) of Schedule 10.7 for the following tests:*

- a prevailing load test*
- an installation or component configuration test*
- a raw meter data output test.*

*A prevailing load test is defined in the Code as a test that is carried out by comparing the output of the metering installation against a working standard connected to the metering installation. For a category 2 or higher metering installation, the prevailing load check must be done against a calibrated instrument (working standard). For a category 1 metering installation industry, best practice has defined a prevailing load test as a measurement of disk revolutions or pulses compared with time and current measurements. The revolutions or pulses are compared against a table or chart to validate the*

*accuracy of the measurement. The prevailing load check is more than simply confirming that the meter operates but is only intended to identify a “gross error” like a phase missing or reversed or a significant metering error.*

*If the ATH carries out an installation or component configuration test on a metering installation or a metering component, it must ensure that the test equipment configuration is the same as the metering installation or component configuration recorded in the design report.*

*A raw meter data output test is carried out for a category 1 metering installation or category 2 metering installation by comparing a known load change against the increment of the sum of the meter registers.*

#### **Audit observation**

I checked process documentation and three certification reports to confirm compliance.

#### **Audit commentary**

- Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. Broadspectrum has conducted prevailing load tests in accordance with this clause using a working standard.
- Installation or component configuration tests must ensure that the actual configuration scheme is the same as the scheme for the metering installation or metering component recorded in the design report. This check is now recorded in the metering installation certification report.
- Raw meter data output tests for a category 1 metering installations or category 2 metering installations, must be conducted by applying a measured increase in load and measuring the increment of the sum of the meter registers, or the accumulation of pulses resulting from the increase in load. Load tests are conducted for a full trading period for Category 1 and 2 installations, which achieves compliance with this requirement.
- Raw meter data output tests for a HHR metering installation which are category 1 or category 2 must be conducted by either:
  - Comparing the output from a working standard to the raw meter data from the metering installation for a minimum of one trading period; or
  - Confirming that the metering equipment provider's back office processes include a comparison of the difference in the increment of the meter registers to the half-hour metering raw meter data, if the raw meter data is to be used for the purposes of Part 15. Broadspectrum conducts full HHR load tests for Category 1 and Category 2 HHR installations.
- Raw meter data output tests for category 3 or higher HHR metering installations must compare the output of a working standard to the raw meter data from the metering installation for a minimum of one trading period. This requirement is met and a sample of records was checked to confirm compliance.
- Raw meter data output tests for NHH Category 2 metering installations must compare the output of a working standard to the increment of the sum of the meter registers. Broadspectrum has conducted raw meter data output tests in accordance with this clause using a working standard.

If an ATH performs a raw meter data output test, for a metering installation that will be certified for remote meter reading, the ATH must obtain the raw meter data from the back office system where the raw meter data is held or ensure that the metering equipment provider responsible for the metering installation has a process to validate a meter reading taken at the time of the metering installation certification with a meter reading from the metering equipment provider's back office system. This process was checked and compliance is confirmed.

If an ATH performs a test that requires a comparison between two quantities, the ATH can only certify the metering installation if the test results demonstrate that the difference between the two quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1. Compliance is confirmed with this clause.

#### **Audit outcome**

Compliant

### **5.13 Raw Meter Data Test For All Metering Installations (Clause 9(1A) Of Schedule 10.7)**

#### **Code related audit information**

*If the ATH performs a raw meter data output test under sub-clause (1)(c) or sub-clause (1)(d), for a metering installation that will be certified for remote meter reading, the ATH must:*

- a) obtain the raw meter data from the back office system where the raw meter data is held; or*
- b) ensure that the metering equipment provider responsible for the metering installation has a process to validate a meter reading taken at the time of the metering installation certification with a meter reading from the metering equipment provider's back office system.*

#### **Audit observation**

I checked process documentation and three certification reports to confirm compliance.

#### **Audit commentary**

All installations have a full HHR load test conducted.

#### **Audit outcome**

Compliant

### **5.14 Alternate Raw Meter Data Test For Category 1 And 2 Metering Installations (Clause 9(1)(C) Of Schedule 10.7)**

#### **Code related audit information**

*A raw meter data output test is carried out for a category 1 metering installation or category 2 metering installation by comparing a known load change against the increment of the sum of the meter registers.*

#### **Audit observation**

I checked process documentation to confirm whether Broadspectrum conducts this test.

#### **Audit commentary**

Broadspectrum's process is compliant with this clause.

#### **Audit outcome**

Compliant

#### 5.15 Raw Meter Data Output Test (Clause 9(2) And 9(3) Of Schedule 10.7)

##### Code related audit information

*If the ATH performs a raw meter data output test that requires a comparison between two quantities, the ATH must not certify the metering installation unless the test demonstrates that the difference between the 2 quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1.*

##### Audit observation

I checked process documentation and records for three metering installations to confirm compliance.

##### Audit commentary

Broadspectrum's records confirmed compliance.

##### Audit outcome

Compliant

#### 5.16 Test Results (Clause 10(1) & (2) of Schedule 10.7)

##### Code related audit information

*An ATH must not certify a metering installation if the results of tests on the metering installation or any of its metering components find that:*

- a metering component did not pass all the tests*
- the metering installation did not meet the requirements for certification.*

*Within five business days of reviewing the tests, the ATH must advise the relevant MEP why it did not certify the metering installation.*

##### Audit observation

I checked process documentation and records for three metering installations to confirm compliance.

##### Audit commentary

Broadspectrum reviews the test results for any of the components prior to certification. Compliance is confirmed.

##### Audit outcome

Compliant

#### 5.17 Selected Component Certification (Clause 11(2) of Schedule 10.7)

##### Code related audit information

*An ATH may only use the selected component certification method to certify a metering installation which complies with the categories and component specifications set out in Table 1 of Schedule 10.1.*

##### Audit observation

I checked process documentation, and records for three metering installations to confirm compliance.

##### Audit commentary

I checked several examples of metering installation certification reports which confirmed the points above were recorded.

## Audit outcome

Compliant

### 5.18 Selected Component - Circumstances Where Method May Be Used (Clause 11(3) Of Schedule 10.7)

#### Code related audit information

*An ATH must only use the selected component certification method to certify the metering installation if:*

- the required tests in Table 3 of Schedule 10.1 are carried out*
- each data storage device, meter, and measuring transformer has been calibrated and certified*
- each data storage device is certified in accordance with clause 5 of Schedule 10.8*
- the ATH provides a certification report for the metering installation.*

#### Audit observation

I checked process documentation and records for three metering installations to confirm compliance.

#### Audit commentary

The process documentation is clear, and all selected component certification reports were compliant.

## Audit outcome

Compliant

### 5.19 Comparative Recertification – Circumstances Where Method May be Used (Clause 12(2) of Schedule 10.7)

#### Code related audit information

*An ATH may only use the comparative recertification method to recertify a category 2 metering installation if:*

- the certification of the current transformers in the metering installation expire before the meter certification expiry date*
- each data storage device and/or meter has been calibrated and certified.*

#### Audit observation

I checked process documentation and records for three metering installations to confirm compliance.

#### Audit commentary

The process documentation is clear, and all comparative certification reports contained confirmation that the meter was replaced by another certified meter.

## Audit outcome

Compliant

## 5.20 Comparative Recertification Tests (Clause 12(3) And 12(5)(A) Of Schedule 10.7)

### Code related audit information

*An ATH must, when recertifying the category 2 metering installation using the comparative recertification metering installation certification method, ensure that:*

- the metering installation has passed the tests set out in Table 3 of Schedule 10.1 using a working standard*
- the accuracy of the current measurement sensor (current transformer or high accuracy Rogowski coil) enables the metering installation to meet the specified accuracy requirements of Table 1 of Schedule 10.1*
- the overall metering installation accuracy meets the requirements of Table 1 of Schedule 10.1 and*
- the ATH provides a certification report for the metering installation.*

### Audit observation

I checked process documentation and records for three metering installations to confirm compliance.

### Audit commentary

Broadspectrum conducts comparative recertification tests using a working standard as required by this clause, but the total uncertainty is not calculated in accordance with this clause as recorded in Section 5.30.

Broadspectrum conducts the checks above and records the results on the metering installation certification report, along with confirmation that the components are fit for purpose.

### Audit outcome

Compliant

## 5.21 Fully Calibrated – Circumstances Where Method May be Used (Clause 13(3) of Schedule 10.7)

### Code related audit information

*An ATH must use the fully calibrated certification method to certify the metering installation:*

- by carrying out the tests set out in Table 4 of Schedule 10.1*
- if each of the components (the data storage device, meter, and measuring transformer) has been calibrated and certified.*

### Audit observation

I checked process documentation, and records for three metering installation to confirm compliance.

### Audit commentary

The records confirm the appropriate tests are performed and components are calibrated and certified.

### Audit outcome

Compliant

## 5.22 Fully Calibrated - Certify Each Metering Component (Clause 13(4) Of Schedule 10.7)

### Code related audit information

*Each individual metering component in the metering installation must have a current certification report that confirms that the metering component complies with the requirements of its accuracy class; and includes the certification date of the metering component.*

### Audit observation

I checked process documentation, and records for three metering installation to confirm compliance.

### Audit commentary

The certification report confirmed that appropriate testing was conducted, and that all components were certified and that certification reports were prepared.

### Audit outcome

Compliant

## 5.23 Fully Calibrated - Additional Metering Installation Certification Report Requirements (Clause 13(5) & (6) Of Schedule 10.7)

### Code related audit information

*The ATH must provide a certification report for the metering installation. The certification report must include confirmation that:*

- the ATH has checked the design report of the metering installation to confirm the metering installation functions in accordance with the report*
- the overall metering installation accuracy meets the requirements of Table 1 of Schedule 10.1*
- the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation*
- each metering component in the metering installation is used only in a permitted combination as set out in table 1 of Schedule 10.1.*

### Audit observation

I checked process documentation, and records for three metering installations to confirm compliance.

### Audit commentary

The certification reports confirmed that appropriate testing was conducted, and that all components were certified and that certification reports were prepared. The certification report recorded all of the points listed above.

### Audit outcome

Compliant

## 5.24 Fully Calibrated – Use Meter Class Accuracy (Clause 13(7) Of Schedule 10.7)

### Code related audit information

*An ATH must, before it certifies a metering installation, ensure that the ATH uses the meter class accuracy, and not the actual accuracy, to calculate whether the actual error is within the maximum permitted error.*

### Audit observation

I checked process documentation, and records for three metering installations to confirm compliance.

### Audit commentary

The meter class accuracy is now used, not measured accuracy.

### Audit outcome

Compliant

## 5.25 Insufficient Load (Clause 14 of Schedule 10.7)

### Code related audit information

*Every metering installation requires a test to ensure that the installation is correctly recording the energy used at the installation. The tests required are defined in Tables 3 and 4 of Schedule 10.1. The checks range from a minimum check that the meter registers increments through to a full raw meter data output check against a working standard and a check against the back office data for a half hour installation.*

*If the ATH decides to certify half hour metering installation that has insufficient load to complete a prevailing load check, the ATH must ensure that:*

- it performs an additional integrity check of the metering installation wiring, and records the results of this check in the certification report*
- it records in the certification report that the metering installation is certified under clause 14 of Schedule 10.7.*

*Once load is present and following a request from the MEP, the ATH must carry out prevailing load tests. If the tests demonstrate that the metering installation performs within the maximum permitted error, the certifying ATH must:*

- update the metering installation certification report, within five business days of completing the tests, to include the results of the tests carried out*
- leave the original metering installation certification expiry date unchanged.*

### Audit observation

There were no examples to examine in relation to this clause, but Broadspectrum's process is compliant.

### Audit commentary

There were no examples to examine in relation to this clause, but Broadspectrum's process is compliant.

### Audit outcome

Compliant



## 5.26 Statistical Sampling (Clause 16 of Schedule 10.7)

### Code related audit information

*A group of meters can be sampled by the ATH and the results of the sample group can be extended to a larger group of the same meters. This is a process of certification by statistical sampling. The ATH must select a sample using a statistical sampling process that is:*

- detailed in AS/NZS1284 (or approved and published by the Authority)*
- recertify the group by recertifying each metering installation in the sample using the fully calibrated certification method*
- advise the MEP as soon as reasonably practicable whether the sample passes or fails the recertification requirements.*

*If the ATH carries out a statistical sampling process when recertifying a group of category 1 metering installations on behalf of an MEP, it must document and record:*

- the process it follows for selecting samples*
- any assumptions about those samples*
- the metering installations in the sample*
- the metering installations in the recertified group.*

*An ATH that recertifies a group of metering installations using a statistical sampling process does not need to apply a certification sticker to the remainder of the metering installations in the family or group that was sample tested.*

### Audit observation

Broadspectrum has not been requested to recertify any groups of metering installations using the statistical sampling method.

### Audit commentary

Broadspectrum has not been requested to recertify any groups of metering installations using the statistical sampling method.

### Audit outcome

Not applicable

## 5.27 Statistical Sampling - Certification Method (Clause 7(3) Of Schedule 10.7)

### Code related audit information

*If the ATH uses statistical sampling, it must use either the selected component method or the fully calibrated method, as applicable, to certify each metering installation in the sample.*

### Audit observation

Broadspectrum has not been requested to recertify any groups of metering installations using the statistical sampling method.

### Audit commentary

Broadspectrum has not been requested to recertify any groups of metering installations using the statistical sampling method.

### Audit outcome

Not applicable

## 5.28 Certification Validity Periods (Clause 17 of Schedule 10.7)

### Code related audit information

*A metering installation certification expiry date is the earliest of:*

- a) the date of commissioning plus the maximum certification validity period for the relevant category of metering installation, as set out in Table 1 of Schedule 10.1; or*
- b) the earliest metering component certification expiry date; or*
- c) a date determined by the ATH if the ATH believes that the circumstances and condition of the components in a metering installation warrant deviation from Table 1 of Schedule 10.1.*

*The expiry date for a metering installation in a group recertified using a statistical sampling process, is the earliest expiry date of the metering installations in the sample*

### Audit observation

I checked three metering installation certification records to confirm compliance.

### Audit commentary

The commissioning date and expiry date is recorded correctly in the metering installation certification reports.

### Audit outcome

Compliant

## 5.29 Metering Installation Accuracy (Clause 21 of Schedule 10.7)

### Code related audit information

*An ATH must, before it certifies a metering installation, ensure that the metering installation does not exceed the relevant maximum permitted error after the application of any external compensation factors.*

### Audit observation

I checked three metering installation certification records to confirm compliance.

### Audit commentary

The process documentation stipulates the maximum permitted errors for certification. I checked a sample of certification records that confirmed this was being applied correctly.

### Audit outcome

Compliant

## 5.30 Error Calculation (Clause 22 of Schedule 10.7)

### Code related audit information

*If a metering installation is certified using the comparative recertification or fully calibrated methods, the ATH must calculate and record the percentage of overall error of the metering installation. The ATH must calculate this using appropriate mathematical methods that include:*

- all sources of measurement error including test instrument errors, reference standard variations when used in conditions that deviate from those in the calibration report, variations in repeated observations, the instrument resolution or discrimination threshold and any assumptions incorporated in the measurement method and procedure*

- the error calculation must include the uncertainty in the measurement at a 95% level of confidence using JCGM 100:2008

- the error and its calculation must be recorded in the certification report.

The ATH must not certify the metering installation if the uncertainty is greater than the maximum permitted site uncertainty or the combined error that includes the measured error and the uncertainty, is greater than the maximum permitted installation error.

#### Audit observation

I checked three metering installation certification records and discussed the process for error calculation.

#### Audit commentary

During the previous audit, I recorded that Broadspectrum did not fully comply with this requirement. The points I raised were as follows:

1. Generation metering certification for Meridian. Uncertainties are calculated on a “per site” basis but the overall error calculation does not include estimated consumption and does not consider meter class accuracy.
2. Other metering certification (mainly where Broadspectrum is the MEP). Uncertainties are pre-calculated for each working standard and do not consider site specific conditions such as temperature.

This matter has been discussed at length since Broadspectrum's last audit. The issue is that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. I have therefore concluded that Broadspectrum is compliant with clause 4(1) of schedule 10.7, but I have raised this matter as an “issue” for the Authority to resolve. An additional matter is the requirement to consider “*the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months*”. It is not clear exactly what steps the Authority requires ATHs to take to achieve compliance with this clause. I have raised this as part of the issue noted in the table below.

Broadspectrum does now use meter class accuracy in their calculations and they consider the total quantity of electricity by estimating the proportion of load or generation that will occur at each load point. I have recorded compliance but this matter still needs some further evaluation and I have left the issue in the report.

Issue	Description
<b>Regarding:</b> Clause 4(1)(a) of schedule 10.7	<p><u>Use of meter class accuracy when determining errors</u></p> <p>Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures.</p> <p><u>Taking into account “the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months”</u></p> <p>It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.</p>

For grid metering certification for Transpower, all measuring transformer errors are compensated for in the meter at real time, so this covers point (a)(ii) above.

Error and uncertainty calculations for comparative recertification do not consider the points above. Broadspectrum uses 0.57%, which is a conservative estimate. There is no direct link to the calibration report of the Hioki working standard and temperature is not taken into account.

Consideration of temperature is relevant for Hioki standards due to their temperature coefficient being quite high. The “Conditions of Guaranteed Accuracy” are shown below and indicate a guaranteed accuracy within the range 18° to 28°.

### Conditions of Guaranteed Accuracy

Conditions of guaranteed accuracy	After 30 min warm-up, when measuring AC voltage; sine-wave input, PF=1, synchronized PLL
Temperature and humidity for guaranteed accuracy	23 ±5°C (73±9°F), 80% RH or less (applies to all specifications unless otherwise noted)

Further to this, the temperature characteristic indicates the 3196 working standard is within ± 0.03% per degree Celsius. When using this figure, it appears the combination of the working standard and clamp uncertainties may result in uncertainties greater than 0.6% at temperatures under approx. 10 degrees Celsius.

### Other Characteristics

Frequency characteristic	69Hz to 1kHz: ±3% f.s. 1kHz to 3kHz: ±10% f.s. (RMS voltage and current), ±15% f.s. (active power)
Temperature characteristic	AC: Within ±0.03% f.s./°C at 50 or 60 Hz measurement, Within ±0.05% f.s./°C at 400 Hz measurement (from 0 to 18°C and from 28 to 40°C) DC: Within ±0.1% f.s./°C (from 0 to 18°C and from 28 to 40°C)

This matter was checked with the Authority and it appears Broadspectrum's approach to uncertainty calculations for comparative certification does not meet the requirements of the Code

## Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 5.30 With: Clause 22 Of Schedule 10.7  From: 01-Aug-15 To: 31-Jul-17	Temperature variations not considered in uncertainty calculations and there is no direct link between stated uncertainty and the working standard calibration report. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2	
Audit risk rating	Rationale for audit risk rating	
<b>Low</b>	I have rated the controls as moderate because Broadspectrum has stated an uncertainty, but it is likely to be incorrect. The impact on settlement is likely to be minor because very few installations have overall errors close to the threshold.	
Actions taken to resolve the issue		Completion date
While the way the uncertainties were presented there was no indication of the temperature coefficient shown but the other uncertainties were larger than required and the indication of 0.57% uncertainties was fairly close. Using the following uncertainties and combining them using RSS gives an uncertainty of 0.57% . Hioki calibration 0.26% current clamp calibration 0.13%, current clamp position 0.39% and a 10 degree temperature variation $(0.03 \times 10) = 0.3\%$ .		22/11/2017
Preventative actions taken to ensure no further issues will occur		Completion date
The comparative recertification load run sheet has been modified to include the ability to include temperature variation in the uncertainty calculation.		22/11/2017
		Identified

### 5.31 Compensation Factors (Clause 24(1)(b) of Schedule 10.7)

#### Code related audit information

*Before it certifies a metering installation that requires a compensation factor to adjust raw meter data, the ATH must:*

- *advise the MEP of the compensation factor*
- *ensure that the compensation factor that will be applied to raw meter data external to the metering installation is applied as follows:*
  - a) *for ratio compensation, on a category 1 metering installation or higher category of metering installation; or*
  - b) *for error compensation, on a metering installation that quantifies electricity conveyed through a point of connection to the grid; or*

c) for loss compensation, only on a category 3 or higher metering installation.

#### **Audit observation**

I checked three metering installation certification records, and process documentation.

#### **Audit commentary**

Broadspectrum has a comprehensive documented process for the management of compensation factors. In most cases, compensation factors are programmed into the meters and the commissioning processes confirm and record accuracy.

#### **Audit outcome**

Compliant

### **5.32 Record Metering Installation Compensation Factor (Clause 24(2) Of Schedule 10.7)**

#### **Code related audit information**

*If a compensation factor is applied to a metering installation, the ATH must record in the certification report, the methodology, assumptions, measurements, calculation and details of each compensation factor that is included within the internal configuration of the metering installation and each compensation factor that must be applied to the raw meter data.*

#### **Audit observation**

I checked three metering installation certification records, and process documentation.

#### **Audit commentary**

Broadspectrum has a comprehensive documented process for the management of compensation factors. In most cases, compensation factors are programmed into the meters and the commissioning processes confirm and record accuracy.

#### **Audit outcome**

Compliant

### **5.33 Installation of Metering Components (Clause 25 of Schedule 10.7)**

#### **Code related audit information**

*Before it certifies a metering installation, the ATH must ensure that the installation of the metering components was carried out by an ATH. However, a suitably qualified person such as a switchboard manufacturer may install the measuring transformers and any required associated burden, the test facilities, potential fuses and switchboard wiring.*

*Before it certifies a metering installation, the ATH must ensure that each metering component is installed in accordance with the installation design report.*

#### **Audit observation**

I checked process documentation, and conducted a walk-through of the process.

#### **Audit commentary**

This clause is designed to allow switchboard manufacturers to install measuring transformers in switchboards at the time of manufacture. This clause does not allow the installation of meters or data

loggers. Broadspectrum has a documented process to ensure compliance with this clause. Only CTs and test blocks are supplied, not meters.

#### **Audit outcome**

Compliant

### **5.34 Determine Metering Installation Certification Expiry Date (Clause 27(1) & (2) Of Schedule 10.7)**

#### **Code related audit information**

*The ATH needs to determine the meter certification expiry date for each meter in a metering installation. The meter certification expiry date must be the earliest end date of the following periods, calculated from the date of commissioning of the metering installation:*

- a) the maximum metering installation certification validity period for the relevant category of metering installation; or*
- b) the maximum meter certification validity period set out in Table 2 of Schedule 10.1 for the relevant class of meter for the metering installation; or*
- c) the certification period specified in the meter certification report.*

#### **Audit observation**

I checked three certification records to confirm compliance.

#### **Audit commentary**

All meter and metering installation certification expiry dates were correct.

#### **Audit outcome**

Compliant

### **5.35 Electromechanical Meter Certification Shelf Life (Clause 27(4) Of Schedule 10.7)**

#### **Code related audit information**

*If an electromechanical meter is not installed in a metering installation within 24 months of the date of the meter's certification report, the meter must be recertified before it is installed.*

#### **Audit observation**

None of the installations had electromechanical meters. Broadspectrum understands the requirements of this clause. Electromechanical meters are seldom installed.

#### **Audit commentary**

None of the installations had electromechanical meters. Broadspectrum understands the requirements of this clause. Electromechanical meters are seldom installed.

#### **Audit outcome**

Compliant

## 5.36 Measuring Transformers Must Be Certified (Clause 28(2) Of Schedule 10.7)

### Code related audit information

*All measuring transformers must be certified before they can be used in a metering installation. If a measuring transformer has previously been used in another metering installation, the ATH must ensure that the measuring transformer has been recalibrated since it was removed from the previous metering installation. This must be undertaken either by an approved calibration laboratory or an ATH.*

### Audit observation

I checked three certification records to confirm compliance.

### Audit commentary

All of the installations had certified measuring transformers. Broadspectrum has a clear understanding of this requirement.

### Audit outcome

Compliant

## 5.37 Measuring Transformers Used In A Certified Metering Installation (Clause 28(4) Of Schedule 10.7)

### Code related audit information

*To certify any metering installation incorporating measuring transformers, the ATH must ensure that:*

- the installation has certified measuring transformers*
- the installation has a test facility which has provision for isolation, installed as physically close to the meter as practical in the circumstances*
- the test facility is fitted with a transparent cover*
- the installation has securely mounted measuring transformers which are, if practicable, in a sealed enclosure*
- the ATH uses the measuring transformer's actual accuracy (rather than class accuracy) when calculating the maximum permitted error for the relevant metering installation category*
- any voltage supplies from a voltage transformer to a meter or that other equipment in the metering installation is protected by appropriately rated fuses or circuit breakers dedicated to the supply. All fuses and circuit breakers must be suitably sealed or located in sealed enclosures*
- the measuring transformer's secondary circuit is earthed and that it is earthed at no more than one point*
- the total burden (magnitude and phase angle, where appropriate), including burden resistors if used, on the measuring transformer does not exceed its name plate rating or an alternative rating lower than the name plate rating, if specified in the metering installation design report.*

### Audit observation

I checked three certification records, and process documentation to confirm compliance.

### Audit commentary

Broadspectrum has process documentation to ensure compliance with all of the points above. I checked the records for several Category 2 metering installations and found that CT installation and sealing practices were all compliant.

### Audit outcome



Compliant

#### 5.38 Measuring Transformer Certification Expiry Date (Clause 29 of Schedule 10.7)

##### Code related audit information

*The ATH needs to determine the measuring transformer certification expiry date for each measuring transformer in a metering installation. The measuring transformer certification expiry must be within the validity period specified in the measuring transformer certification report.*

##### Audit observation

I checked three certification records to confirm compliance.

##### Audit commentary

The metering installation certification report contains a field for CT expiry date and a check of some records confirmed this was being calculated and used correctly.

##### Audit outcome

Compliant

#### 5.39 Other Equipment Connected to Measuring Transformers (Clause 30 of Schedule 10.7)

##### Code related audit information

*If the ATH certifies a metering installation incorporating a measuring transformer used by another metering installation, it must ensure that where voltage transformers are connected to more than one meter:*

- *the meters are included in the metering installation being certified*
- *appropriate fuses or circuit breakers are provided to protect the metering circuit from short circuits or overloads affecting the other meter.*

*While it is desirable that only metering equipment is connected to measuring transformers in a metering installation if, in some circumstances, the MEP connects other equipment to measuring transformers, the ATH must ensure that:*

- *the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation category*
- *the metering installation certification report confirms that the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation*
- *any wiring between the equipment and any part of the metering installation is continuous*
- *the equipment is labelled appropriately, including with any de-energisation restrictions*
- *the connection details of the other equipment are recorded in the metering installation design report*
- *there are appropriate fuses or circuit breakers provided to protect the voltage transformer and metering circuit from short circuits or overloads affecting the other equipment.*

##### Audit observation

I checked whether the situation arises where other equipment is connected to measuring transformers.

##### Audit commentary

Some installations certified by Broadspectrum have other equipment connected to the same VT. The design report and certification records include all relevant details and calculations in relation to non-metering equipment connected. The additional equipment normally has its own set of fuses.

#### **Audit outcome**

Compliant

### **5.40 Burden & Compensation (Clause 31 of Schedule 10.7)**

#### **Code related audit information**

*An ATH may certify a metering installation for a POC to the grid that includes error compensation factors as an alternative to the use of burden resistors only if the ATH is satisfied the error compensation factors will provide a more accurate result than the use of burden resistors.*

*An ATH may change the burden on a voltage transformer, without obtaining the approval of the MEP, if the ATH confirms in the certification report that the difference between the new burden and the burden at the time of the most recent metering installation certification is:*

*a) less than or equal to 1/30th of the VA rating of the voltage transformer, if the voltage transformer is rated at less than 30 VA; or*

*b) no greater than 1 VA, if the voltage transformer is rated at equal to or greater than 30 VA.*

*Before it certifies a measuring transformer where the in-service burden is less than the lowest burden test point specified in a standard set out in Table 5 of Schedule 10.1, the ATH must install burdening resistors to increase the in-service burden to be equal to or greater than the lowest test point of the measuring transformer certification test or confirm from the manufacturer of the instrument transformer that the accuracy will not be adversely affected by the low in service burden.*

#### **Audit observation**

I checked processes and the records for three metering installations to confirm compliance.

#### **Audit commentary**

Broadspectrum confirmed that the CTs they use do not have compensation windings, therefore the CTs will record accurately even at low burden. The CT manufacturer has confirmed this in writing.

#### **Audit outcome**

Compliant

### **5.41 Alternative Certification (Clause 32(1) of Schedule 10.7)**

#### **Code related audit information**

*If the ATH cannot comply with the requirements for certifying a measuring transformer solely due to the inability to obtain physical access to test the measuring transformers, it can certify the metering installation for a period not exceeding 24 months only if:*

- the measuring transformer has not previously been certified due to failure to obtain access*
- the ATH is satisfied that the metering installation will comply with the applicable accuracy requirements*
- the ATH has advised the MEP that the metering installation has been certified by this method*
- the MEP has advised the registry of the certification.*

#### **Audit observation**

I checked and examined one example to confirm compliance of the process.

### Audit commentary

Broadspectrum applied alternative certification to one metering installation. The process and records are compliant.

### Audit outcome

Compliant

## 5.42 Installations Incorporating Control Devices (Clause 33(2) of Schedule 10.7)

### Code related audit information

*Before the ATH can certify a metering installation incorporating a control device that must be certified, it must ensure:*

- *that the certification expiry date for each control device is the same as the metering installation certification expiry date and record that date in the installation certification report*
- *that the control device complies with the applicable standards listed in Table 5 of Schedule 10.1*
- *the control device is fit for purpose*
- *if the metering installation contains a control device that has previously been used in another metering installation, that the control device is still fit for service.*
- *that the control device is:*
  - a) *likely to receive control signals*
  - b) *correctly connected*
  - c) *correctly programmed.*

### Audit observation

Broadspectrum has not certified any metering installations incorporating control devices.

### Audit commentary

Broadspectrum has not certified any metering installations incorporating control devices.

### Audit outcome

Compliant

## 5.43 Control Device Reliability (Clause 34(1) & (3) to (5) of Schedule 10.7)

### Code related audit information

*In order to ensure control device accuracy or the completeness of reconciliation information, the ATH must determine the likelihood of the control device not receiving control signals before it certifies a metering installation incorporating a control device.*

*If the ATH believes the likelihood of the control device not receiving control signals would affect the accuracy or completeness of the information for consumption reconciliation, the ATH may certify the remainder of the metering components and the installation, excluding the control device. The ATH must advise the MEP within three business days of its decision. The MEP is then responsible for advising both the reconciliation participant for the POC for the metering installation and the control signal provider of the ATH's determination.*

### Audit observation

Broadspectrum has not certified any metering installations incorporating control devices.

### Audit commentary

Broadspectrum has not certified any metering installations incorporating control devices.

#### **Audit outcome**

Compliant

### **5.44 Data Storage Devices (Clauses 36(2) of Schedule 10.7)**

#### **Code related audit information**

*If a data storage device has previously been used in another metering installation, the ATH must ensure that the data storage device has been recalibrated since it was removed from the previous metering installation by an approved calibration laboratory, an approved test laboratory, or an ATH.*

#### **Audit observation**

I checked processes and the records for three metering installations to confirm compliance.

#### **Audit commentary**

All data storage devices are recertified prior to be reinstalled.

#### **Audit outcome**

Compliant

### **5.45 Data storage device requirements (Clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8)**

#### **Code related audit information**

*An ATH must ensure that each data storage device in the metering installation:*

- is installed so that on site interrogation is possible without the need to interfere with seals*
- has a dedicated power supply unless the data storage device is integrated with another metering component*
- is compatible with each other metering component of the metering installation*
- is suitable for the electrical and environmental site conditions in which it is installed*
- has all of its outputs and inputs appropriately electrically isolated and rated for purpose*
- has no outputs that will interfere with the operation of the metering installation*
- records periods of data identifiable or deducible by both date and time on interrogation*
- has memory capacity and functionality that is suitable for the proposed functions of the data storage device specified in the design report for the metering installation*
- has availability of memory for a period that is suitable for the proposed functions as set out in the design report for the metering installation, and at least for a minimum continuous period of 15 days.*

*The data storage device must have an event log which records the following:*

- a) loss of power supply*
- b) critical internal alarms*
- c) meter phase failure if integral to the meter*
- d) software configuration changes*
- e) a record of time changes.*

#### **Audit observation**

I checked the availability of type test reports, and processes for determining environmental suitability.

#### **Audit commentary**

All of the points above apart from the point regarding environmental suitability are covered by the type test reports. Broadspectrum has appropriate instructions for the identification and recording of unsuitable environments.

#### **Audit outcome**

Compliant

### **5.46 Location of Metering Installation Certification Stickers (Clause 41(1) of Schedule 10.7)**

#### **Code related audit information**

An ATH must confirm the metering installation certification by attaching a metering installation certification sticker as close as possible to the meter, while maintaining reasonable visibility of the certification sticker and the meter.

#### **Audit observation**

I checked the photos for three metering installations to confirm compliance.

#### **Audit commentary**

In all cases, the certification stickers contained the appropriate detail and were correctly applied.

#### **Audit outcome**

Compliant

### **5.47 Alternate Location of Metering Installation Certification Sticker (Clause 41(4) Of Schedule 10.7)**

#### **Code related audit information**

*If attaching a certification sticker is not practicable, the ATH must devise and use an alternative means of documenting the information and keep any metering component certification sticker with the documented information.*

#### **Audit observation**

I checked with Broadspectrum whether this scenario had arisen.

#### **Audit commentary**

This scenario has not arisen and is unlikely to arise.

#### **Audit outcome**

Not applicable

### **5.48 Contents of Metering Installation Certification Sticker (Clause 41(2) Of Schedule 10.7)**

#### **Code related audit information**

*The metering installation certification sticker must show:*

- *the name of the ATH who certified the metering installation*
- *the certification date of the installation*
- *the metering installation category*
- *the ICP*
- *the certification number for the metering installation.*

#### **Audit observation**

I checked the photos for three metering installations to confirm compliance.

#### **Audit commentary**

In all cases, the certification stickers contained the appropriate detail and were correctly applied.

#### **Audit outcome**

Compliant

### **5.49 Enclosures (Clause 42 of Schedule 10.7)**

#### **Code related audit information**

*An ATH must, before it certifies a metering installation, ensure that, if a metering component in the metering installation is housed in a separate enclosure from the meter enclosure, the enclosure is appropriate to the environment in which it is located and has a warning label attached stating that the enclosure houses a metering component.*

#### **Audit observation**

I checked the process documentation in relation to this clause.

#### **Audit commentary**

Although this clause only refers to enclosures other than the metering enclosure, I have considered this clause to apply to metering enclosures as well.

The stickers used are compliant with this clause.

#### **Audit outcome**

Compliant

### **5.50 Metering Component Certification (Clause 43(1) of Schedule 10.7)**

#### **Code related audit information**

*Before certifying an installation, the ATH must ensure that each component has been certified by an ATH and has been stored appropriately since component certification.*

#### **Audit observation**

I checked the processes for storage of components, and the records for three metering installations to confirm compliance.

#### **Audit commentary**

Broadspectrum conducts calibration of components in their laboratory and they have appropriate arrangements for storage and transportation. Broadspectrum is ensuring components are certified as required by the Code.

#### **Audit outcome**

Compliant

## 5.51 Sealing Requirements (Clause 47(2) (3) (4) and (5) Of Schedule 10.7)

### Code related audit information

*Before an ATH certifies a metering installation or leaves it unattended, the ATH must ensure that each metering component that could reasonably be expected to affect the accuracy or reliability of the metering installation is sealed.*

*The metering components which must be sealed include:*

- *each part and connection of a data storage device in, or attached to, the metering installation except for a port for on-site reading that is not capable of carrying out any other function*
- *the main switch cover, if the main switch:*
  - a) *is on the supply side of the metering installation*
  - b) *has provision for sealing.*

### Audit observation

I checked process documentation, design reports and the photos for three metering installations to confirm compliance.

### Audit commentary

The process documentation, design reports and the photos for three metering installations confirm compliance.

### Audit outcome

Compliant

## 5.52 Seals for Metering Component Enclosures (Clause 47(6) Of Schedule 10.7)

### Code related audit information

*When applying a seal to a metering component in an enclosure, the ATH must attach a warning label in a prominent position inside the enclosure.*

### Audit observation

I checked process documentation and the photos for three metering installations to confirm compliance.

### Audit commentary

Compliance is confirmed. The warning label is installed in a prominent position.

### Audit outcome

Compliant

## 5.53 Requirements for Sealing System (Clause 47(7) Of Schedule 10.7)

### Code related audit information

*An ATH must use a sealing system that enables identification of:*

- *the ATH who affixed the seal*
- *the person (or the sealing tool) who applied the seal*
- *when the seal was applied.*

### Audit observation

I checked process documentation and records for three installations.

#### **Audit commentary**

The certification records contain the relevant details required by this clause.

#### **Audit outcome**

Compliant

### **5.54 Removal or Breakage of Seals (Clause 48(6) of Schedule 10.7)**

#### **Code related audit information**

*When the ATH investigates an unauthorised removal or breakage, it must assess the accuracy and continued integrity of the metering installation. If the ATH considers the accuracy and continued integrity is unaffected, it must replace the removed or broken seals.*

*If the accuracy and continued integrity is affected, the ATH must replace the removed or broken seal and advise the MEP that the metering installation is potentially inaccurate, defective, or not fit for purpose.*

#### **Audit observation**

I checked the process documentation to confirm compliance.

#### **Audit commentary**

Broadspectrum has appropriate instructions in relation to this requirement and there is the ability to record this information on the commissioning record for the installation. There were no recent examples.

#### **Audit outcome**

Compliant

### **5.55 Wiring (Clause 6 of Schedule 10.8)**

#### **Code related audit information**

*An ATH must, before it certifies a metering installation, ensure that all wiring in the metering installation is suitable for the environment in which the metering installation is located, fit for purpose, securely fastened, and compliant with all applicable requirements and enactments.*

*The ATH must ensure that the wiring between metering components in the metering installation:*

- is run as directly as practicable*
- is appropriately sized and protected*
- does not, to the extent practicable, include intermediate joints for any measuring transformer circuits*
- includes conductors that are clearly and permanently identified, by the use of any 1 or more of the following:*
  - a) colour coding*
  - b) marker ferrules*
  - c) conductor numbering.*

*If it is not practicable to exclude intermediate joints for any measuring transformer circuits, the ATH must ensure that the intermediate joints are sealed or in a sealed enclosure.*

#### **Audit observation**



I checked process documentation, design reports and the photos for three metering installations to confirm compliance.

#### **Audit commentary**

The process documentation, design reports and the photos for three metering installations confirm compliance.

#### **Audit outcome**

Compliant

### **5.56 Fuses and Circuit Breakers (Clause 7 of Schedule 10.8)**

#### **Code related audit information**

*An ATH must, before it certifies a metering installation, ensure that all fuses and circuit breakers that are part of the metering installation are appropriately rated for the electrical duty and discrimination required, clearly labelled and sealed or located in sealed enclosures.*

#### **Audit observation**

I checked process documentation to confirm compliance.

#### **Audit commentary**

The documentation demonstrated compliance with this requirement.

#### **Audit outcome**

Compliant

### **5.57 Calibration of Metering Components Where Relevant (Clause 7(1) Of Schedule 10.4)**

#### **Code related audit information**

*Before the ATH certifies a metering installation or metering component, it must ensure that the metering components have been calibrated by an approved calibration laboratory or an ATH with appropriate approval under Schedule 10.3.*

#### **Audit observation**

I checked process documentation and three certification reports to confirm compliance.

#### **Audit commentary**

All certified components have been calibrated appropriately.

#### **Audit outcome**

Compliant

### **5.58 Requirement for Calibration of Metering Components (Clause 7(2) Of Schedule 10.4)**

#### **Code related audit information**

*Before the ATH certifies a metering component it must ensure that the component is calibrated or adjusted under the physical and electrical conditions specified in Table 5 of schedule 10.1 and the conditions permit the calculation of uncertainties at the reference conditions.*

#### **Audit observation**

I checked process documentation and three certification reports to confirm compliance.

#### **Audit commentary**

All certified components have been calibrated appropriately.

#### **Audit outcome**

Compliant

### **5.59 Metering Component Calibration Method (Clause 7(3) Of Schedule 10.4)**

#### **Code related audit information**

*A class B ATH must follow the relevant requirements of ISO17025 for calibration of components and only use methodologies that have been verified in their most recent audit.*

#### **Audit observation**

Broadspectrum's Class B ATH does not calibrate components.

#### **Audit commentary**

Broadspectrum's Class B ATH does not calibrate components.

#### **Audit outcome**

Not applicable

### **5.60 Metering Component Calibration Test Points (Clause 7(4) Of Schedule 10.4)**

#### **Code related audit information**

*If the ATH calibrates a component it must ensure that the test points that it uses are either:*  
- *no less than the test points in Table 5 of Schedule 10.1 or*  
- *sufficient to calculate the metering installation error as defined in clause 22 of Schedule 10.7.*

#### **Audit observation**

I checked the test points used by Broadspectrum.

#### **Audit commentary**

Broadspectrum's uses the test points stipulated in the relevant standards.

#### **Audit outcome**

Compliant

### **5.61 Determine Metering Component Error and Record (Clause 7(5) Of Schedule 10.4)**

#### **Code related audit information**

*An ATH must, when calibrating a metering component:*  
- *if necessary, adjust and document the error compensation*  
- *ensure that any adjustment carried out is appropriate to achieve an error as close as practicable to zero*  
- *ensure that the uncertainty of measurement during the calibration of the metering component does not exceed one third of the maximum permitted error in the relevant standard listed in Table 5 of Schedule 10.1.*  
*If the metering component is intended for a metering installation which will be certified using the selected component certification method, the ATH must ensure that the ATH records the errors of a current transformer from 5 % to 120 % of rated primary current.*

#### **Audit observation**

I checked Broadspectrum's IANZ report to confirm compliance.

#### **Audit commentary**

The IANZ report confirms compliance with these points.

#### **Audit outcome**

Compliant

### **5.62 Class B ATH Calibrating Metering Components (Clause 2(3) Of Schedule 10.3)**

#### **Code related audit information**

*If a class B ATH wishes to calibrate components (such as class 0.5 meters, class 1 meters, class 2 meters, class 0.5 current transformers, and class 1.0 current transformers) this must be carried out under the relevant provisions and methodologies of ISO 17025. The final audit report must include a list of all relevant requirements of ISO 17025 for calibrating these metering components and all relevant methodologies audited.*

#### **Audit observation**

Broadspectrum's Class B ATH does not calibrate components.

#### **Audit commentary**

Broadspectrum's Class B ATH does not calibrate components.

#### **Audit outcome**

Not applicable

### **5.63 Meter Certification (Clause 1 of Schedule 10.8)**

#### **Code related audit information**

*All meters must be certified before they can be used in a metering installation. The ATH must ensure that the meters in a metering installation have been type tested by an approved test laboratory, that the results for the meter are appropriate for that meter model and version, and have a calibration report.*

#### **Audit observation**

I checked the certification records for three metering installations and Broadspectrum's directory of type test reports to confirm compliance.

#### **Audit commentary**

All meters are certified and Broadspectrum has a directory of type test reports. I have recommended in Section 4.12 that the EDM I type test report is added.

As recorded in Sections 3.6 and 3.7, not all metering components have calibration reports prepared, which does not achieve compliance with this clause.

#### **Audit outcome**

Non-compliant

Non-compliance	Description		
Audit Ref: 5.63 With: Clause 1 of Schedule 10.8 From: 01-Nov-16 To: 09-Nov-17	Some metering components do not have calibration reports. Potential impact: Medium Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because there is room for improvement. The impact on settlement and participants is minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
It has never been our intention not to produce calibration reports and they are all produced in due course the outstanding reports from our own lease meters have now all been produced. If there is a resource issue we will delay our own reports. Although the calibration report has not been produced we do have the test file which contains all the tests and results completed, and we know the state of the component prior to installing on site.		13/11/2017	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
The cause of this was a resourcing issue which has been addressed with the employment of a part time laboratory technician to complete the meter calibrations.		13/11/2017	

#### 5.64 Meter Requirements When Meter Is Relocated (Clause 26(2) Of Schedule 10.7 and Clause 43(2) Of Schedule 10.7)

##### Code related audit information

*If a meter has previously been used in another metering installation, the ATH must ensure that the meter has been recalibrated since it was removed from the previous metering installation by an approved calibration laboratory or an ATH unless it is less than 12 months since the meter was commissioned in the previous installation.*

##### Audit observation

I checked the process documentation in relation to this clause.

##### Audit commentary

This clause is designed to allow builder's temporary supplies to be portable without the need to calibrate the meter every time. Broadspectrum understands the requirements of this clause and has appropriate processes in place to correctly determine expiry dates.

##### Audit outcome

Compliant

#### 5.65 Measuring Transformer Error Testing (Clause 2(1)(A) & (B) Of Schedule 10.8)

##### Code related audit information

*Before certifying a measuring transformer, an ATH must test the measuring transformer's errors at a range of primary values at their rated burdens. If the measuring transformer is a multi-tap current transformer, an ATH must carry out the calibration tests and only certify the transformer for the ratios that have been calibrated.*

##### Audit observation

It is rare for Broadspectrum to certify multi tap CTs but the process documentation is compliant.

##### Audit commentary

It is rare for Broadspectrum to certify multi tap CTs but the process documentation is compliant.

##### Audit outcome

Compliant

#### 5.66 Measuring Transformer Certification (Clause 3 of Schedule 10.8)

##### Code related audit information

*Before it certifies a measuring transformer, the ATH must ensure that:*

- the measuring transformer has a current calibration report issued by an approved calibration laboratory or an ATH approved to carry out calibration*
- the measuring transformer calibration report:*
- confirms that the measuring transformer complies with the standards listed in Table 5 of Schedule 10.1*
- records any tests the ATH has performed to confirm compliance*
- confirms that the measuring transformer has passed the tests*
- records any recommendations made by the ATH on error compensation*
- includes any manufacturer's calibration test reports.*

*The ATH is required to produce a measuring transformer certification report that includes:*

- the date on which it certified the measuring transformer*
- the certification validity period for the measuring transformer, which must be no more than 120 months*
- whether the certification was based on batch test certificates*
- if the certification was based on batch test certificates, confirmation that the manufacturer's batch testing facility is, in the ATH's opinion, of an acceptable standard*

*The ATH must provide confirmation that the ATH has inspected the manufacturer's test certificates, and carried out any additional tests it considers necessary, to satisfy itself that the measuring transformer meets the accuracy requirements.*

##### Audit observation

I checked the certification records for three metering installations to confirm compliance.

##### Audit commentary

The process documentation and records are compliant.

## Audit outcome

Compliant

### 5.67 Measuring Transformers In Service Burden Lower Than Calibration Test Point Burden (Clause 2(1)(C) Of Schedule 10.8)

#### Code related audit information

*If the in-service burden of a measuring transformer is lower than a test point specified in a standard listed in Table 5 of Schedule 10.1, the ATH must confirm the accuracy of the measuring transformer at the in-service burden by:*

- a) obtaining confirmation of accuracies at the in-service burden from the measuring transformer's manufacturer; or*
- b) if the primary voltage of the measuring transformer is greater than 1 kV, a class A ATH calibrating the measuring transformer at the in-service burden.*

#### Audit observation

I checked process documentation and the certification records for three metering installations to confirm compliance.

#### Audit commentary

There were no examples of low burden in the records I examined, but I recommend a process is developed to cater for low burden for LV installations.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 2(1)(C) Of Schedule 10.8	Develop a process for the management of low burden for LV installations.	For new Installations we only use TWS CTs which we have confirmation that the errors are within class even with low burdens.	Identified

## Audit outcome

Compliant

### 5.68 Measuring Transformer - Epoxy Insulated (Clause 2(2) Of Schedule 10.8)

#### Code related audit information

*Before it certifies an epoxy insulated current transformer, the ATH must ensure that the certification tests allow for, and the metering installation certification report shows, the current transformer's age, temperature, and batch.*

#### Audit observation

I checked the policy regarding epoxy CTs.

#### Audit commentary

Epoxy insulated CTs are discarded upon discovery.

## Audit outcome

Compliant

#### 5.69 Control Device Certification (Clause 4 of Schedule 10.8)

##### Code related audit information

*Before it certifies a new control device, the ATH must produce a certification report that:*

- confirms that the control device complies with the applicable standards listed in Table 5 of Schedule 10.1*
- includes the details and results of any test that the ATH has carried out to confirm compliance under paragraph (a)*
- confirms that the control device has passed such tests.*

*Before it certifies an existing installed control device, the ATH must produce a certification report that confirms:*

- that the control device is fit for purpose*
- the control device certification validity period that the ATH considers appropriate, which must be no more than 180 months.*

##### Audit observation

Broadspectrum does not deal with any control devices.

##### Audit commentary

Broadspectrum does not deal with any control devices.

##### Audit outcome

Not applicable

#### 5.70 Data Storage Devices (Clause 36(2) Of Schedule 10.7)

##### Code related audit information

*If a data storage device has previously been used in another metering installation, the ATH must ensure that the data storage device has been recalibrated since it was removed from the previous metering installation by an approved calibration laboratory, an approved test laboratory, or an ATH.*

##### Audit observation

I checked the certification records for three metering installations and the process documentation to confirm compliance.

##### Audit commentary

The process documentation and certification records confirmed that data storage devices are certified prior to installation.

##### Audit outcome

Compliant

## 5.71 On-site Calibration and Certification (Clause 9(1) of Schedule 10.8)

### Code related audit information

*An ATH may only calibrate a metering component on site in the metering component's normal environment by measuring the influence of all on-site variables and including their estimated effects in the uncertainty calculation. An ATH must ensure that:*

- the effects of any departures from the reference conditions can accurately and reliably be calculated*
- the metering installation, in which the metering component is incorporated, is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1 after taking into account all known influences including temperature and temperature co-efficient measurements.*

### Audit observation

Meter and data storage device calibration occurs in the laboratory. I checked the IANZ report for any exceptions to this clause.

### Audit commentary

A CAR was raised in relation to this clause, which is now cleared.

### Audit outcome

Compliant

## 5.72 On Site Metering Component Calibration (Clause 9(2) Of Schedule 10.8)

### Code related audit information

*If the ATH calibrates a metering component on site using manual methods, computers, or automated equipment for the capture, processing, manipulation, recording, reporting, storage, or retrieval of calibration data, it must ensure that its computer software:*

- is documented in the ATH's procedures*
- can manipulate the variables that affect the performance of the metering component in a manner that will produce results that would correctly indicate the level of compliance of the metering component with this Code.*

### Audit observation

Meter and data storage device calibration occurs in the laboratory. I checked the IANZ report for any exceptions to this clause.

### Audit commentary

A CAR was raised in relation to this clause, which is now cleared.

### Audit outcome

Compliant

## 5.73 On site metering component calibration records (Clause 9(3) of Schedule 10.8)

### Code related audit information

*An ATH that certifies a metering component on site must include confirmation in the metering component certification report that:*



- it has calculated the uncertainty of measurement taking into account all environmental factors for both the metering component being calibrated and the working standards
- the calculation of the uncertainty comprises all uncertainties in the chain of calibration
- the ATH has used a calibration procedure to calibrate the metering component that was included in the ATH's most recent audit and is appropriate for on-site calibration.

#### **Audit observation**

Meter and data storage device calibration occurs in the laboratory. I checked the IANZ report for any exceptions to this clause.

#### **Audit commentary**

A CAR was raised in relation to this clause, which is now cleared.

#### **Audit outcome**

Compliant

### **5.74 Data Storage Device Certification Expiry Date (Clause 37 of Schedule 10.7)**

#### **Code related audit information**

*Before certifying a meter installation which incorporates a data storage device, the ATH must determine the expiry date of the data storage device. The ATH must record the expiry date in the certification report for the metering installation and the certification report for the data storage device.*

#### **Audit observation**

I checked the records for three metering installations to confirm compliance.

#### **Audit commentary**

Broadspectrum is correctly applying certification in accordance with this clause.

#### **Audit outcome**

Compliant

### **5.75 All Functions and Activities Must Be Completed (Clause 10.42(2))**

#### **Code related audit information**

*Where Part 10 requires the ATH to complete a function or activity before a metering installation is certified, the ATH must complete that function or activity as part of the process for certifying the metering installation.*

#### **Audit observation**

I checked the records for three metering installations to confirm compliance.

#### **Audit commentary**

There was no evidence of incomplete functions.

#### **Audit outcome**

Compliant

## 6. INSPECTION OF METERING INSTALLATIONS

### 6.1 General Inspection Requirements (Clause 44 (1) (a) to (e) of Schedule 10.7)

#### Code related audit information

*When carrying out an inspection of a metering installation, the ATH must:*

- check and confirm that the data storage device in the metering installation operates as required*
- check and confirm that the expected remaining lifetime of each battery in the metering installation will be reasonably likely to meet or exceed the metering installation certification expiry date*
- ensure that no modifications have been made to the metering installation without the change having been documented and certification requirements satisfied*
- visually inspect all seals, enclosures, metering components, and wiring of the metering installation for evidence of damage, deterioration, or tampering*
- ensure that the metering installation and its metering components carry appropriate certification stickers.*

#### Audit observation

I checked the content of the standard inspection reports to confirm compliance.

#### Audit commentary

Broadspectrum has appropriate process documentation for conducting inspections, and their records are compliant with these clauses.

#### Audit outcome

Compliant

### 6.2 Raw Meter Data Test (Clause 44(1)(F) Of Schedule 10.7)

#### Code related audit information

*When carrying out an inspection of a category 1 metering installation, the ATH must also check and confirm there is no difference between the volume of electricity recorded by the master accumulation register of a data storage device, and the sum of the meter registers.*

#### Audit observation

I checked the content of the standard inspection reports to confirm compliance.

#### Audit commentary

Broadspectrum conducts a full HHR load test to ensure compliance.

#### Audit outcome

Compliant

### 6.3 Prepare Inspection Report (Clause 44(2) Of Schedule 10.7)

#### Code related audit information

*An ATH must prepare an inspection report for each inspection of a metering installation that it carries out, which includes the following:*

- details of the checks carried out, the results, and the installation certification expiry date*
- the serial numbers of all components in the metering installation*
- any non-compliances and the action taken to remedy the non-compliance*
- the name of the inspector and the date on the inspection.*

### Audit observation

I checked the content of the standard inspection reports to confirm compliance.

### Audit commentary

Broadspectrum's inspection reports contain all of the relevant information above.

### Audit outcome

Compliant

## 6.4 Provide Inspection Report To MEP (Clause 44(3) Of Schedule 10.7)

### Code related audit information

*The ATH must, within 10 business days of carrying out the inspection, provide the inspection report to the MEP.*

### Audit observation

I checked the timeframes for sending inspection reports to MEPs.

### Audit commentary

Broadspectrum acts as an agent to Transpower and does not send them inspection reports. All other reports were sent within 10 business days.

### Audit outcome

Compliant

## 6.5 Inspections for Category 2 & Above Installations (Clause 46(2) of Schedule 10.7)

### Code related audit information

*When carrying out an inspection of a category 2 or higher metering installation, the ATH must also conduct the following additional checks:*

- a visual inspection of each metering component in the metering installation for damage, tampering, or defect*
- if the current transformer can be safely accessed, check the position of the current transformer tap to ensure it is still appropriate for the expected maximum current for the metering installation*
- check for the presence of appropriate voltages at the metering installation*
- check the voltage circuit alarms and fault indicators.*

### Audit observation

I checked the content of the standard inspection reports to confirm compliance.

### Audit commentary

Broadspectrum's inspection reports contain all of the relevant information above.

### Audit outcome

Compliant

## 7. PROCESS FOR HANDLING FAULTY METERING INSTALLATIONS

### 7.1 Investigation of Faulty Metering Installations (Clause 10.43(3) of Part 10)

#### Code related audit information

*As a participant, the ATH must inform the MEP if it believes a metering installation is faulty, inaccurate, defective, or not fit for purpose.*

#### Audit observation

I checked Broadspectrum's process documentation.

#### Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

#### Audit outcome

Compliant

### 7.2 Testing of Faulty Metering Installations (Clause 10.44 of Part 10)

#### Code related audit information

*When advised by an MEP that a metering installation is faulty, inaccurate, defective, or not fit for purpose, the ATH must test the metering installation as soon as practical and provide a statement of situation.*

#### Audit observation

I checked Broadspectrum's process documentation.

#### Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

#### Audit outcome

Compliant

### 7.3 Statement of Situation (Clause 10.46(1) of Part 10)

#### Code related audit information

*The ATH must include the following in the statement of situation:*

- the details and results of the tests carried out*
- a conclusion, with reasons, as to whether or not the metering installation is faulty*
- an assessment of the risk to the completeness and accuracy of the raw meter data*
- the remedial action proposed or undertaken*
- any correction factors to apply to raw meter data to ensure that the volume information is accurate*
- the period over which the correction factor must be applied to the raw meter data.*

#### Audit observation

I checked Broadspectrum's process documentation.

#### Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

## Audit outcome

Compliant

### 7.4 Correction of Defects (Clause 10.47 of Part 10)

#### Code related audit information

*When taking action to remedy an inaccuracy or defect within a metering installation, the ATH must ensure that records of any modifications that are carried out to the metering installation are kept for each metering component of the metering installation in the metering records and in a manner reasonable in the circumstances to ensure that further investigation can be carried out.*

#### Audit observation

I checked Broadspectrum's process documentation.

#### Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

## Audit outcome

Compliant

## 8. Conclusions

Eight non-compliances are recorded in relation to the following four main points:

- Calibration reports are not always produced for meters calibrated in Broadspectrum's laboratory.
- The maximum interrogation cycle is not always populated.
- Design reports are not prepared for some installations.
- Temperature variations are not considered in uncertainty calculations and there is no direct link between stated uncertainty and the working standard calibration report.

Three issues are recorded for the Authority to consider. Working standard calibration intervals are set to 12 months in the Code. ATHs used to have five years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.

Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

The issues of meter class accuracy and consideration of *"the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months"* are also applied inconsistently across the industry and I recommend clarification is provided.

## 9. Broadspectrum Response

I tend to look at audits as a learning exercise and to catch things that we might not be doing quite right, I do have trouble with the concept of effectively being hit twice for the same fault, error or omission in separate parts of the audit.

I know that we have had some issues over the past 12 months with resourcing etc. but these are being addressed with the employment of a part time technician for meter calibrations in Christchurch, and the advertising for a full time metering technician to carry out field metering work in the Wellington region.