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VERITEK

# **Electricity Industry Participation Code Audit Report**

**For**

**Intellihub Limited**  
NZBN:9429047189027

**Class A and B**  
**Approved Test House**

**Prepared by Brett Piskulic – Veritek Limited**

**Date of Audit:** 7/09/22

**Date Audit Report Complete:** 27/09/22

**Date Audit Report Due:** 02/10/22

## Executive Summary

**IntelliHUB Limited (IntelliHUB)** 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 to be completed by 2 October 2022 in accordance with clause 16A.19(b).

Non-compliance is recorded in 11 sections of this audit. Six of the non-compliances relate to new Code requirements that were introduced in February 2021 which require additional details to be recorded in metering installation certification records. At the time of the audit IntelliHUB had updated its processes to ensure that these requirements are now being met.

During the audit period IntelliHUB has increased the number of approved metering contractors used to provide nationwide coverage for the deployment of meters. Reporting provided by IntelliHUB shows that the ATH has not been able to provide records to the MEP within five business days for 44% of metering installations certified due to processing delays.

I have raised two issues for the Authority to consider in relation to non-compliances recorded in this audit as follows:

- Table 3 of Schedule 10.1 states that for Category 1 metering installations, where recertification occurs without meter replacement, a prevailing load test must be conducted using a working standard, and
- Clause 31 of Schedule 10.7 requires burden to be added regardless of the impact on the accuracy of the measuring transformers unless the transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.

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. After considering IntelliHUBs responses and recognizing that seven of the non-compliances have been cleared I recommend an audit period of 24 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
Provision of Accurate Information	2.2	10.6 of Part 10	Each services access interface not recorded correctly in five of a sample of 63 metering installation certification reports. Metering installation type recorded incorrectly in five of a sample of 63 metering installation certification reports. Burden range not recorded in CT certification reports for six a sample of 14 metering installations.	Strong	Low	1	Cleared
Metering Installation Type	3.2	8(2) of Schedule 10.7	Metering installation type recorded incorrectly for five of a sample of 63 metering installations. Each services access interface not recorded correctly for five of 63 metering installations.	Strong	Low	1	Cleared
Services Access Interface	3.5	10 of Schedule 10.4	Each services access interface not recorded correctly for five of a sample of 63 metering installations.	Strong	Low	1	Cleared
Provision of certification records	3.9	14 Of Schedule 10.4	Certification records provided to the MEP late for 44% of metering installations certified.	Weak	Low	3	Investigating
Maximum interrogation cycle	3.14	36(3) & (4) of Schedule 10.7	Maximum interrogation cycle incorrectly recorded for each services access interface in one metering installation.	Strong	Low	1	Cleared
Metering Component Stickers	4.13	8(1) and 8(4) of Schedule 10.8	Metering component certification stickers not applied to CTs certified in the field by IntelliHUB.	Strong	Low	1	Cleared

Subject	Section	Clause	Non-compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Certification Tests	5.12	9(1)(ii)(B) of Schedule 10.7	Four cases where minimum load requirement was not met for Category 1 raw meter data tests.  Four cases where the ATH did not record test results when conducting Category 1 raw meter data tests.	Strong	Low	1	Identified
Measuring Transformers used in a Certified Metering Installation	5.37	28(4) Of Schedule 10.7	Two metering installations certified with CTs burden lower than the lowest burden test point specified in the standard without confirmation from the CT manufacturer.	Strong	Low	1	Disputed
Measuring Transformers used in a Certified Metering Installation	5.40	31 of Schedule 10.7	Two metering installations certified with CTs burden lower than the lowest burden test point specified in the standard without confirmation from the CT manufacturer.	Strong	Low	1	Disputed
Measuring Transformer Certification	5.67	3 of Schedule 10.8	Burden range not recorded in CT certification reports for six a sample of 14 metering installations.	Strong	Low	1	Cleared
Measuring Transformers in service burden range	5.68	2(1)(E) Of Schedule 10.8	Burden range not recorded in CT certification reports for six a sample of 14 metering installations.	Strong	Low	1	Cleared
<b>Future Risk Rating</b>						<b>13</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
Metering Component Stickers	4.14	8(2) of Schedule 10.8	Add a "Calibrated by field to the combined metering installation and component certification sticker.	Identified

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Certification Tests	5.12	89(1) of Schedule 10.7.	IntelliHUB update its processes and communicate this to technicians to ensure that the load applied meets the minimum load requirements.	Identified

## Table of Issues

Issue	Description	Remedial action
Category 1 prevailing load tests	<p>Table 3 of Schedule 10.1 states that for Category 1 metering installations, where recertification occurs without meter replacement, a prevailing load test must be conducted using a working standard.</p> <p>The industry does not have a Category 1 prevailing load test capability and to establish one would cost approx. \$12,500,000 just for the working standards, then each job would take longer, which would also add to costs.</p>	<p>I recommend the Authority changes the Code to remove the requirement to conduct a prevailing load test when recertifying Category 1 metering installations.</p> <p><u>IntelliHUB comments</u> - Intellihub has been in communication with Authority on this point and is awaiting a decision.</p>
Measuring transformer in-service burden	<p>Clause 31 of Schedule 10.7 requires burden to be added regardless of the impact on the accuracy of the measuring transformers unless the transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.</p>	<p>I recommend the Authority reviews the Code to allow the ATH to determine through testing whether burden should be added in situations where confirmation cannot be obtained from the manufacturer that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.</p> <p><u>IntelliHUB comments</u> - Intellihub agrees and intends to enter into discussion with the Authority on this matter.</p>

# Persons Involved in This Audit

Auditor:

Brett Piskulic  
**Veritek Limited**  
**Electricity Authority Approved Auditor**

IntelliHUB personnel assisting in this audit were:

<b>Name</b>	<b>Title</b>
Chris Chambers	Compliance Specialist
George Diederer	Technical Specialist
Rod Jones	Quality and HSE Manager
Emily Cole	Data Support Analyst
Shane Broome	Logistics and Asset Manager
Bryan Gravatt	Technical Support Engineer
Andrew Doel	Senior Field Technician
Paul Wilson	Contractor Manager
Swati Nanda	Technical Coordinator
Robert Sharp	Asset Support Technician

# Contents

Executive Summary	2
Table of Non-Compliance	3
Table of Recommendations	4
Table of Issues	5
Persons Involved in This Audit	6
Contents	7
<b>1. Administrative</b>	<b>12</b>
1.1 Exemptions from Obligations to Comply with Code (Section 11 of Electricity Industry Act 2010)	12
1.2 Scope of Audit	12
1.3 Previous Audit Results	14
Table of Non-Compliance	14
Table of Recommendations	14
<b>2. ATH Requirements</b>	<b>15</b>
2.1 Use of Contractors (Clause 10.3 of Part 10)	15
2.2 Provision of Accurate Information (Clause 10.6 of Part 10)	16
2.3 Dispute Resolution (Clause 10.50(1) to (3) of Part 10)	17
2.4 ATH Approval (Clause 10.40 of Part 10)	17
2.5 ATH Requirements (Clause 10.41 of Part 10)	18
2.6 Quality Management Systems (Clauses 3(1) & 4(1) of Schedule 10.3)	19
2.7 Organisation and Management (Clause 15 of Schedule 10.4)	21
2.8 Document Processes and Procedures (Clause 16 Of Schedule 10.4)	22
2.9 Quality Standard Required for Field Work (Clause 17 Of Schedule 10.4)	23
2.10 Material Change Requirements (Clause 16A.11)	23
2.11 Audit Required for ATH Approval (Clause 16A.12 and 16A.13)	23
2.12 Accommodation & Environment (Clause 1 of Schedule 10.4)	24
2.13 Compensation Factors (Clause 8 of Schedule 10.4)	24
2.14 Metering Component Stickers (Clause 8(3) of Schedule 10.8)	24
2.15 Interference with Metering Installations (Clause 10.12)	25
<b>3. Metering records and reports</b>	<b>26</b>
3.1 Physical Location of Metering Installations (Clause 10.35 of Part 10)	26
3.2 Metering Installation Type (Clause 8(2) of Schedule 10.7)	26
3.3 Record Metering Installation Category (Clause 8(4) Of Schedule 10.7)	27
3.4 Calibration Test Points (Clause 7(7) Of Schedule 10.4)	27
3.5 Services Access Interface (Clause 10 of Schedule 10.4)	28
3.6 Certification & Calibration Reports (Clause 11(1) of Schedule 10.4)	29
3.7 ATH Record Keeping Requirements (Clause 12 of Schedule 10.4)	30
3.8 Retention of Records (Clause 13 of Schedule 10.4)	30

3.9	Advise MEP of Records, Certificates or Reports for A Metering Installation (Clause 14 Of Schedule 10.4)	30
3.10	Certification at a Lower Category (Clause 6(4) Of Schedule 10.7)	31
3.11	Meter Requirements (Clause 26(3) & (4) of Schedule 10.7)	32
3.12	Meter Certification Expiry Date (Clause 27(5) of Schedule 10.7)	32
3.13	Measuring Transformer Requirements (Clause 28(3) of Schedule 10.7)	33
3.14	Determine Maximum Interrogation Cycle (Clause 36(3) & (4) Of Schedule 10.7)	33
<b>4.</b>	<b>Calibration and certification of metering components</b>	<b>35</b>
4.1	Accommodation and Environment (Clause 1(D)-(E) Of Schedule 10.4)	35
4.2	Use of Measurement Standards (Clause 1(F) Of Schedule 10.4)	35
4.3	Test Equipment (Clause 2 of Schedule 10.4)	35
4.4	Calibration of Reference & Working Standards (Clause 3(1)(a), (b)(i) and (6) of Schedule 10.4)	36
4.5	Calibration Interval (Clause 3(2) of Schedule 10.4)	37
4.6	Calibration of Reference Standards (Clause 3(1)(B)(ii), (2), (3)(C), (4) And (5) Of Schedule 10.4)	37
4.7	33kv Or Above Calibrated by an Approved Calibration Laboratory (Clause 3(3)(B) Of Schedule 10.4)	38
4.8	Metering Component Testing System (Clause 4 of Schedule 10.4)	38
4.9	Calibration Errors (Clause 5 of Schedule 10.4)	39
4.10	Measurement Traceability (Clause 6 of Schedule 10.4)	39
4.11	Calibration Methods (Clause 7(6) of Schedule 10.4)	39
4.12	Data Storage Device Certification (Clause 5 of Schedule 10.8)	40
4.13	Metering Component Stickers (Clause 8(1) and 8(4) of Schedule 10.8)	41
4.14	Metering Component Stickers (Clause 8(2) of Schedule 10.8)	42
4.15	Sealing and Monitoring of Seals (Clause 9 of Schedule 10.4 & Clause 47(7) of Schedule 10.7)	43
<b>5.</b>	<b>Calibration and certification of Metering Installations</b>	<b>44</b>
5.1	ATH Must Not Certify Metering Installations under Certain Circumstances (Clause 8(1) Of Schedule 10.7)	44
5.2	Determination of Metering Categories (Clause 5 of Schedule 10.7 & Clause 10.11)	44
5.3	Requirement for Metering Installation Design Report (Clause 2(4) Of Schedule 10.7)	44
5.4	ATH Design Report Obligations (Clause 3 of Schedule 10.7)	45
5.5	Certification as a Lower Category (Clause 6(1) of Schedule 10.7)	45
5.6	Use of Current Transformer Rating Lower Than Supply Capacity (Clause 6(2)(a) of Schedule 10.7)	46
5.7	Determining Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(2)(b) & (d) of Schedule 10.7)	46
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)	47
5.9	Use of Metering Installation Certification Methods (Clause 7(1) Of Schedule 10.7)	47
5.10	Certification of a Metering Installation Using Statistical Sampling or Comparative Recertification (Clause 7(2) Of Schedule 10.7)	48
5.11	Metering Installation Certification Requirements (Clause 8(3) Of Schedule 10.7)	48



5.12	Certification Tests (Clause 9(1) of Schedule 10.7)	48
5.13	Raw Meter Data Test for all Metering Installations (Clause 9(1A) Of Schedule 10.7)	52
5.14	Alternate Raw Meter Data Test for Category 1 and 2 Metering Installations (Clause 9(1)(C) Of Schedule 10.7)	53
5.15	Raw Meter Data Output Test (Clause 9(2) And 9(3) Of Schedule 10.7)	53
5.16	Test Results (Clause 10(1) & (2) of Schedule 10.7)	53
5.17	Selected Component Certification (Clause 11(2) of Schedule 10.7)	54
5.18	Selected Component - Circumstances Where Method May Be Used (Clause 11(3) Of Schedule 10.7)	54
5.19	Comparative Recertification – Circumstances Where Method May be Used (Clause 12(2) of Schedule 10.7)	54
5.20	Comparative Recertification Tests (Clause 12(3) And 12(5)(A) Of Schedule 10.7)	55
5.21	Fully Calibrated – Circumstances Where Method May be Used (Clause 13(3) of Schedule 10.7)	55
5.22	Fully Calibrated - Certify Each Metering Component (Clause 13(4) Of Schedule 10.7)	56
5.23	Fully Calibrated - Additional Metering Installation Certification Report Requirements (Clause 13(5) & (6) Of Schedule 10.7)	56
5.24	Fully Calibrated – Use Meter Class Accuracy (Clause 13(7) Of Schedule 10.7)	57
5.25	Insufficient Load (Clause 14 of Schedule 10.7)	57
5.26	Statistical Sampling (Clause 16 of Schedule 10.7)	58
5.27	Statistical Sampling - Certification Method (Clause 7(3) Of Schedule 10.7)	58
5.28	Certification Validity Periods (Clause 17 of Schedule 10.7)	59
5.29	Metering Installation Accuracy (Clause 21 of Schedule 10.7)	59
5.30	Error Calculation (Clause 22 of Schedule 10.7)	59
5.31	Compensation Factors (Clause 24(1)(b) of Schedule 10.7)	60
5.32	Record Metering Installation Compensation Factor (Clause 24(2) Of Schedule 10.7)	61
5.33	Installation of Metering Components (Clause 25 of Schedule 10.7)	61
5.34	Determine Metering Installation Certification Expiry Date (Clause 27(1) & (2) Of Schedule 10.7)	62
5.35	Meter Certification Shelf Life (Clause 27(4) Of Schedule 10.7)	62
5.36	Measuring Transformers must be Certified (Clause 28(2) Of Schedule 10.7)	62
5.37	Measuring Transformers used in a Certified Metering Installation (Clause 28(4) Of Schedule 10.7)	63
5.38	Measuring Transformer Certification Expiry Date (Clause 29 of Schedule 10.7)	65
5.39	Other Equipment Connected to Measuring Transformers (Clause 30 of Schedule 10.7)	65
5.40	Burden & Compensation (Clause 31 of Schedule 10.7)	66
5.41	Alternative Certification (Clause 32(1) of Schedule 10.7)	68
5.42	Installations Incorporating Control Devices (Clause 33(2) of Schedule 10.7)	69
5.43	Control Device Reliability (Clause 34(1) & (3) to (5) of Schedule 10.7)	69
5.44	Data Storage Devices (Clauses 36(2) of Schedule 10.7)	70
5.45	Data storage device requirements (Clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8)	70
5.46	Location of Metering Installation Certification Stickers (Clause 41(1) and 41(9) of Schedule 10.7)	71

5.47	Alternate Location of Metering Installation Certification Sticker (Clause 41(4) Of Schedule 10.7)	71
5.48	Contents of Metering Installation Certification Sticker (Clause 41(2) Of Schedule 10.7)	72
5.49	Combining certification stickers (Clause 41(5) – Clause 41(8) of Schedule 10.7)	72
5.50	Enclosures (Clause 42 of Schedule 10.7)	72
5.51	Metering Component Certification (Clause 43(1) of Schedule 10.7)	73
5.52	Sealing Requirements (Clause 47(2) (3) (4) and (5) Of Schedule 10.7)	73
5.53	Seals for Metering Component Enclosures (Clause 47(6) Of Schedule 10.7)	74
5.54	Requirements for Sealing System (Clause 47(7) Of Schedule 10.7)	74
5.55	Removal or Breakage of Seals (Clause 48(6) of Schedule 10.7)	75
5.56	Wiring (Clause 6 of Schedule 10.8)	75
5.57	Fuses and Circuit Breakers (Clause 7 of Schedule 10.8)	76
5.58	Calibration of Metering Components Where Relevant (Clause 7(1) Of Schedule 10.4)	76
5.59	Requirement for Calibration of Metering Components (Clause 7(2) Of Schedule 10.4)	76
5.60	Metering Component Calibration Method (Clause 7(3) Of Schedule 10.4)	77
5.61	Metering Component Calibration Test Points (Clause 7(4) Of Schedule 10.4)	77
5.62	Determine Metering Component Error and Record (Clause 7(5) Of Schedule 10.4)	78
5.63	Class B ATH Calibrating Metering Components (Clause 2(3) Of Schedule 10.3)	78
5.64	Meter Certification (Clause 1 of Schedule 10.8)	78
5.65	Meter Requirements When Meter Is Relocated (Clause 26(2) Of Schedule 10.7 and Clause 43(2) Of Schedule 10.7)	79
5.66	Measuring Transformer Error Testing (Clause 2(1)(A) & (B) Of Schedule 10.8)	79
5.67	Measuring Transformer Certification (Clause 3 of Schedule 10.8)	80
5.68	Measuring Transformers in service burden range (Clause 2(1)(E) Of Schedule 10.8)	81
5.69	Measuring Transformer - Epoxy Insulated (Clause 2(2) Of Schedule 10.8)	82
5.70	Control Device Certification (Clause 4 of Schedule 10.8)	83
5.71	Data Storage Devices (Clause 36(2) Of Schedule 10.7)	83
5.72	On-site Calibration and Certification (Clause 9(1) of Schedule 10.8)	83
5.73	On Site Metering Component Calibration (Clause 9(2) Of Schedule 10.8)	84
5.74	On site metering component calibration records (Clause 9(3) of Schedule 10.8)	84
5.75	Data Storage Device Certification Expiry Date (Clause 37 of Schedule 10.7)	85
5.76	All Functions and Activities Must Be Completed (Clause 10.42(2))	85
<b>6.</b>	<b>Inspection of metering installations</b>	<b>86</b>
6.1	General Inspection Requirements (Clause 44 (1) (a) to (e) of Schedule 10.7)	86
6.2	Raw Meter Data Test (Clause 44(1)(F) Of Schedule 10.7)	86
6.3	Prepare Inspection Report (Clause 44(2) Of Schedule 10.7)	87
6.4	Provide Inspection Report to MEP (Clause 44(3) Of Schedule 10.7)	87
6.5	Inspections for Category 2 & Above Installations (Clause 46(2) of Schedule 10.7)	87
<b>7.</b>	<b>Process for handling faulty metering installations</b>	<b>89</b>
7.1	Investigation of Faulty Metering Installations (Clause 10.43(3) of Part 10)	89

7.2	Testing of Faulty Metering Installations (Clause 10.44 of Part 10)	89
7.3	Statement of Situation (Clause 10.46(1) of Part 10)	90
7.4	ATH to keep records of modifications to correct defects (Clause 10.47 of Part 10)	91
<b>8.</b>	<b>Conclusions</b>	<b>92</b>
<b>9.</b>	<b>IntelliHUB Response</b>	<b>93</b>

## 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

**Exemption 310** allowing the recertification of metering installations with certification cancelled due to failed sum-checks. The exemption came into force on 16<sup>th</sup> June 2021 and expired on 31<sup>st</sup> December 2021.

Intellihub Limited ("Intellihub") is exempted from complying with the obligation in clauses 8(2)(a), 9, 10, 11(3)(a), 11(4)(a), 11(4)(c), 11(4)(d), 11(5) and 41(1) in Schedule 10.7 of the Electricity Industry Participation Code 2010 ("Code") to conduct certification testing, issue a certification report and affix a certification sticker to the metering installation. This exemption applies only to Honeywell meters with certification that was cancelled due to clause 20(1)(j)(iii) in Schedule 10.7 of the Code between 1 February 2021 and 5 May 2021.

Recertification of 220,521 ICPs took place under this exemption in October 2021. The registry was updated with the certification details by the Intellihub MEP with the ATH was recorded as Intellihub.

### 1.2 Scope of Audit

IntelliHUB 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 2 October 2022, 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.

IntelliHUB provides laboratory testing services to other MEPs. IntelliHUB can provide services in relation to calibration of working standards owned by other parties. All Class A installation work is subcontracted to other Class A ATHs.

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

IntelliHUB 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:

IntelliHUB also requires approval to certify metering components. I note that the Class A functions listed in Clause 3(2) of Schedule 10.3 do not include certification of metering components.

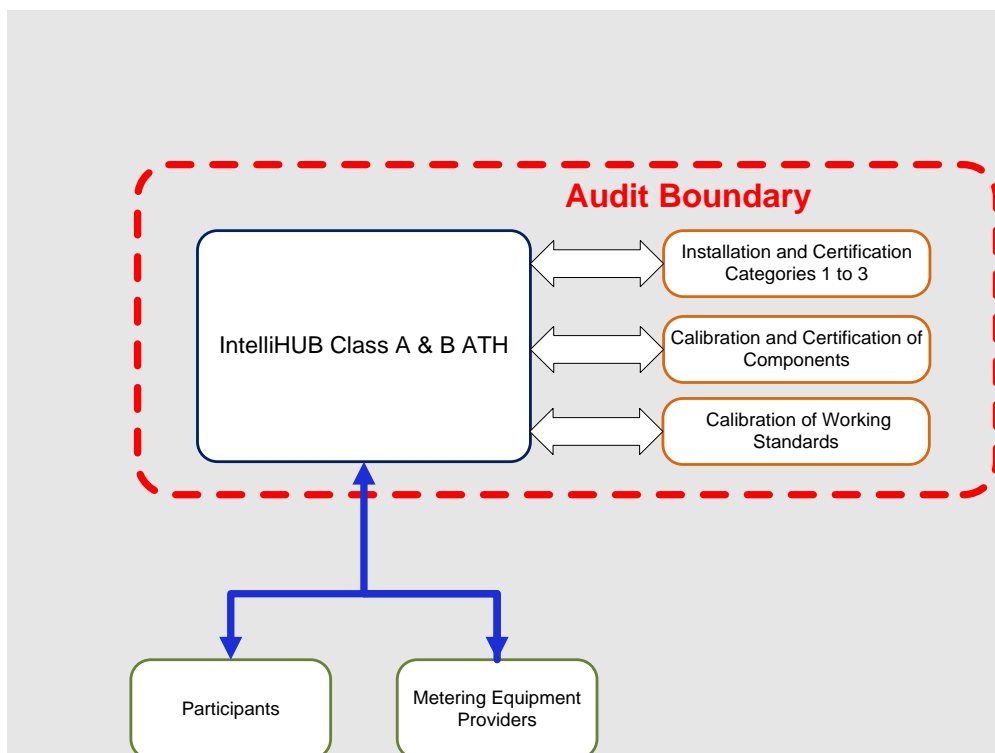
Class B Approval

- (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.

IntelliHUB also requires approval to certify metering components. I note that the Class B functions listed in Clause 4(2) of Schedule 10.3 do not include certification of metering components.

As a Class B ATH IntelliHUB performs certification work using a combination of its own technicians and approved metering contractors used to provide nationwide coverage for the deployment of meters.

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



### 1.3 Previous Audit Results

The last audit was conducted in October 2020 by Steve Woods of Veritek. The findings are shown in the table below.

#### Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Meter Certification Expiry Date	3.12	27(5) of Schedule 10.7	Metering installation certification reports do not contain the meter certification expiry date.	Cleared

#### Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Type test reports	4.12	5 of Schedule 10.8.	Add fields into the type test report schedule showing the date the reports were checked and who checked them.	Cleared
Error and uncertainty calculations	5.30	22 of Schedule 10.7	Evaluate the test results and possibly re-test the metering installation at ICP0125199341LCD4D to ensure the error result is correct.	Cleared

## 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 IntelliHUB 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 the IntelliHUB instructions.

#### Audit commentary

IntelliHUB uses a combination of employees and subcontractors to conduct certification activities. At the time of the audit there were 77 active approved technicians, 12 of these are IntelliHUB staff. New contractors are assessed through an examination after a training session. Training includes a classroom session followed by on-job training specific to the type of work to be conducted. Training is tailored to the individual, and accreditation is only granted when the individual is considered competent. Each contractor has a training record, acknowledged by them through a signature, showing the content of the training, the trainer, and the date. There is also an overall summary of this information.

There is an ongoing audit regime in place for fieldwork, including the following steps:

- field audits include a combination of live and post completion checks,
- the field audit program takes into consideration the quantity of work conducted and the competence of the technician; those with higher competence may be audited less frequently and those conducting a high proportion of work may have a higher audit total, and
- photo checking is conducted of all certifications completed; the checks include health and safety and compliance issues.

#### 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

Three issues were identified during the audit where incomplete or inaccurate information was recorded in metering installation certification reports. The issues are as follows:

- each services access interface not recorded correctly in five of a sample of 63 metering installation certification reports (**sections 3.2 and 3.5**),
- metering installation type recorded incorrectly in five of a sample of 63 metering installation certification reports (**section 3.2**), and
- burden range not recorded in CT certification reports for six of a sample of 14 metering installations (**section 5.67 and 5.68**).

### Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 10.6 of Part 10  From: 01-Feb-21 To: 07-Sep-22	Each services access interface not recorded correctly in five of a sample of 63 metering installation certification reports.  Metering installation type recorded incorrectly in five of a sample of 63 metering installation certification reports.  Burden range not recorded in CT certification reports for six a sample of 14 metering installations.  Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1



Audit risk rating	Rationale for audit risk rating		
Low	<p>I have recorded the controls as strong as the processes have been updated to correctly record each services access interface, installation type and burden range.</p> <p>There is no impact on other participants or accuracy of metering installations; therefore, the audit risk rating is low.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
The current versions of Metering Installation Certification Reports now correctly record these fields.		20/9/2022	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
No further action required as these fields are now correctly recorded.		20/9/2022	

### 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 IntelliHUB during the audit period.

#### Audit commentary

IntelliHUB 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**

IntelliHUB 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 along with the ISO reports to confirm compliance with these clauses.

#### **Audit commentary**

IntelliHUB has only conducted activities that fall within the scope of their approval. I have concluded from this audit that IntelliHUB 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:

- *liveness practices, specifically polarity testing; this is a required step in the process and is included in training materials and live audits include this requirement,*

- safety practices with regard to the management of asbestos switchboards; asbestos management practices are sound, and these jobs are only conducted by a small number of technicians, and
- general safety practices and the appropriate use and testing of personal protective equipment; PPE management and use are prescribed, and this area is included in field audits.

### 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

IntelliHUB provided a copy of the report for the most recent ISO 9001:2015 audit, conducted in November 2021 by Telarc SAI Limited. The scope of the ISO 9001: 2016 registration is appropriate and includes: *To perform the Test House Functions permitted in the scope of the Intellihub Test House Electricity Authority Approvals.* No non-compliance was found and three opportunities for improvement were identified, details of these and their current status are listed below.

Opportunities for improvement	Status
OI 1 - It may be beneficial to reinforce the protocols with the returning of asbestos contaminated equipment to the warehouse. It would be good to review how contaminated equipment is stored and protocols for its disposal to minimise the risk to warehouse staff i.e., sighted an asbestos contaminated meter in a single bag rather than double bag, which are then placed in what appeared to be an open cardboard box.	Cleared
OI 2 - It would be good to ensure review the risk management framework against the current ISO 31000:2018 version of the standard to identify if there are any gaps. Reference was made in the framework to the old ISO31000:2009 version of the standard.	Cleared
OI 3 - As part of company induction and awareness, it may be beneficial to have a 'Quality Statement' with vision, values and commitment to quality, signed by the CEO to clearly demonstrate the company's commitment; and as an endorsement to ISO9001.	In-progress

IntelliHUB also provided a copy of the report for the most recent ISO 17025: 2017 audit, conducted in November 2021 by IANZ.

The scope of their ISO 17025: 2017 certification is appropriate and is noted as:

*Programme: Metrology and Calibration Laboratory*  
*Sub Fields: Energy Meters, Current Transformers*

The executive summary contained the following statement:

*With the exception of the Corrective Action Request (CAR) listed below, the assessment found the laboratory was in compliance with the requirements of accreditation.*

*· CAR 1 – Evaluation of measurement uncertainty*

*The laboratory maintained a high quality output and was operated by highly knowledgeable and competent staff. Evidence of continuous improvement was observed with the laboratory being well supported by senior management.*

Corrective Action	Status
<p>Evaluation of measurement uncertainty</p> <p>The laboratory had identified contributions to and evaluated the calibration measurement uncertainty in Lab BMC &amp; Uncertainty Budget (20201123) Working.xlsx. However, two areas were found that the laboratory is requested to correct:</p> <ol style="list-style-type: none"> <li>1. The contribution to the current transformer measurement uncertainty from the working standard transformer calibration had been determined using the highest ratio error from the TELECO calibration report (tab "Uncert Current Tx Zera", row 9). A full uncertainty calculation for the working standard transformer calibration needs to be performed as it is the second highest contribution to the uncertainty.</li> <li>2. The "Summary" tab includes a column for the expanded uncertainty at a confidence level of 95 % with a coverage factor of <math>k = 2</math> (column E, incorrectly labelled as standard uncertainty). The uncertainty is calculated by correcting the actual expanded uncertainty based on a ratio of the actual coverage factor to <math>k = 2</math>. However, this calculation is incorrect and does not take into account the impact of changing the coverage factor. The necessity for the calculation needs to be reviewed and corrected if necessary.</li> </ol> <p>Please advise what actions were undertaken and provide supporting evidence including the updated calculation spreadsheet.</p> <p>Agreed clearance date: 17 February 2022</p>	Cleared
Recommendations	Status
<p>When laboratory equipment is returned from external calibration the laboratory analyses the results in order to verify that the equipment can returned to service. However, there have been instances in the past where the equipment had been returned but there was a delay in receiving the final calibration report. In this circumstance the laboratory could request an interim result from the external calibration provider to verify that equipment can be used (taking into account the risk of utilising interim results). [6.4.4]</p>	Cleared
<p>Calculations for the meter and transformer CMC uncertainties were recorded in BMC &amp; Uncertainty Budget (20201123) Working.xlsx. However, the numbers recorded did not match the current CMC uncertainties reported in the Scope of Accreditation, so it is strongly</p>	Cleared

recommended that the values are reviewed, and the scope updated, if necessary. [IANZ AS LAB C5, 11.1]	
The uncertainty reported on calibration certificates were recorded in BMC & Uncertainty Budget (20201123) Working.xlsx but it was unclear how this value was determined. It is strongly recommended that the reported uncertainty is reviewed to determine, and document where necessary, how the number was obtained. The reported uncertainties were observed to be very conservative, and the laboratory may report the actual uncertainty calculated. [7.6, 7.8.4.1 a)]	Cleared
Improvements were identified for BMC & Uncertainty Budget (20201123) Working.xlsx: [7.6] a. The source of the repeatability uncertainty component for different classes of meter should be reviewed and recorded. b. The comments should be updated whenever calculations/calibrations are updated. c. The energy meter CMC should include an uncertainty component due to the correction not being applied for all power factors. d. The contribution due to the largest recorded uncorrected error should be updated regularly. e. The actual calibration date rather than report date should be used when reporting trends. f. Changes to the uncertainty calculations and comments could be managed via version history of the spreadsheet.	In-progress
The intra-laboratory comparisons were analysed by calculating the normalised error (En) and comparing against a criteria of $En < 1$ . Areas for improvement were identified for the analysis. [7.7.3] a. The formula for the pass criteria should be updated based on an absolute value of En value such that $ En  < 1$ . b. The laboratory is reminded that when the En number is a significant part of their uncertainty that it should be investigated even if it is less than 1.	Cleared
The intra-laboratory comparison using a 1 Phase static meter was analysed using Inter operator comparison 1 PHASE STATIC December 2020.xlsx. The values recorded in the spreadsheet did not match the corresponding technician calibration results, so it is strongly recommended that the results are entered correctly and reviewed. [7.7.3]	Cleared
Issue 666 had been created in order to track the progress of the update of the calibration bench software to run on Windows 10. The issue record should be updated to include a description of the final verification that was performed and the result. [7.11.2]	Cleared
The Internal Audit Schedule.xlsx was updated each year to plan the internal audits of the laboratory processes. There were instances of processes that had not been audited since 2012, or in the case of the internal audit process, not at all. It is strongly recommended that the frequency of process audits are reviewed and an audit of the internal audit process is undertaken. [8.8.2 a)]	Cleared

## 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 to confirm compliance.

#### **Audit commentary**

Roles and responsibilities are documented in the relevant position descriptions and the authority and resources are available to ensure the ATH functions as intended.

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. Chris Chambers is the Quality Manager and George Diederer is the Technical Manager. Chris and George have appropriate qualifications.

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. The Class A ATH has a detailed schedule of training and competence. The Class B ATH has an overall schedule including qualifications, training and competence. Both post job and live audits of field technicians work are conducted to ensure competence is maintained.

#### **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

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

### Audit commentary

IntelliHUB 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 five business days before the change or reduction in scope take place.*

### Audit observation

I checked whether IntelliHUB had made any material changes during the audit period.

### Audit commentary

IntelliHUB has not made any material changes during the audit period.

### 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

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

### Audit commentary

IntelliHUB is currently undergoing an audit and the report will be provided along 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 to confirm compliance.

#### **Audit commentary**

Access to the laboratory and storage area is restricted. There is a list of authorised personnel on the laboratory door.

#### **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. Ratio compensation factors are programmed into the majority of IntelliHUB owned meters and the compensation factor is recorded as "1" in the certification records. When certifying metering installations with meters where the compensation factor is not programmed in the IntelliHUB process ensures that the ratio compensation factor is confirmed by testing and recorded in the certification records.

#### **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 the IntelliHUB component stickers and photos of installations 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 IntelliHUB 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 IntelliHUB had certified any installations with loss compensation.

#### Audit commentary

IntelliHUB has not been required to conduct any loss compensation calculations.

#### Audit outcome

Not applicable

### 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, non-half hour or half hour and non-half hour metering.*

*The metering installation certification report must also record each services access interface and the conditions under which each services access interface may be used.*

#### Audit observation

I checked 63 certification reports to confirm compliance.

#### Audit commentary

My checks of the 63 records found that the installation type was recorded incorrectly for five metering installations and each services access interface was not recorded correctly for five metering installations.

There were three Category 3 metering installations which had the installation type incorrectly recorded as both HHR and NHH and local and remote services access interface recorded for each type. All Category 3 and above installations can be HHR only. There were two Category 2 metering installations which had the installation type incorrectly recorded as HHR with remote services access interface only. These should also have the NHH type and local services access interface recorded.

IntelliHUB has implemented changes to its metering installation certification report templates to include each services access interface and whether the installation is half hour, non-half hour or both half hour and non-half hour metering. The examples above were completed using previous templates which had not yet incorporated the changes.

#### Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 3.2 With: Clause 8(2) of Schedule 10.7 From: 01-Feb-21 To: 22-Jul-22	Metering installation type recorded incorrectly for five of a sample of 63 metering installations. Each services access interface not recorded correctly for five of a sample of 63 metering installations. Potential impact: Low Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1	
Audit risk rating	Rationale for audit risk rating	
Low	I have recorded the controls as strong as the processes have been updated to correctly record each services access interface and installation type. There is no impact because the MEP normally determines the location of the services access interface and metering installation type; therefore, the audit risk rating is low.	
Actions taken to resolve the issue	Completion date	Remedial action status
The current versions of Metering Installation Certification Reports now correctly record these fields.	20/9/2022	Cleared
Preventative actions taken to ensure no further issues will occur	Completion date	
No further action required as these fields are now correctly recorded.	20/9/2022	

### 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 63 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 IntelliHUB 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 services access interfaces and the conditions under which each services access interface may be used. 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 63 certification records to confirm compliance.

#### Audit commentary

My checks of the 63 records found that each services access interface was not recorded correctly for five metering installations.

There were three Category 3 metering installations which had the installation type incorrectly recorded as both HHR and NHH and local and remote services access interface recorded for each type. There were two Category 2 metering installations which had the installation type incorrectly recorded as HHR with remote services access interface only. These should also have the NHH type and local services access interface recorded.

IntelliHUB has implemented changes to its metering installation certification report templates to include each services access interface and whether the installation is half hour, non-half hour or both half hour and non-half hour metering. The examples above were completed using previous templates which had not yet incorporated the changes.

#### Audit outcome

Non-compliant

Non-compliance	Description
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Audit Ref: 3.5 With: Clause 10 of Schedule 10.4 From: 01-Feb-21 To: 22-Jul-22	Each services access interface not recorded correctly for five of a sample of 63 metering installations. Potential impact: Low Actual impact: None Audit history: Once Controls: Strong Breach risk rating: 1	
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>	
<b>Low</b>	I have recorded the controls as strong as the processes have been updated to correctly record each services access interface.  There is no impact because the MEP normally determines the location of the services access interface; therefore, the audit risk rating is low.	
<b>Actions taken to resolve the issue</b>	<b>Completion date</b>	<b>Remedial action status</b>
The current versions of Metering Installation Certification Reports now correctly record these fields.	20/9/2022	Cleared
<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>	
No further action required as these fields are now correctly recorded.	20/9/2022	

### 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 63 certification records to confirm compliance.

#### Audit commentary

Metering installation certification reports were provided for all 63 installations. The metering installation and metering component certification reports are combined and include all the required information. IntelliHUB calibrates meters and CTs and produces a calibration report that meets the requirements of this clause. This is also confirmed by the ISO 17025 audit report.

#### Audit outcome

Compliant

### 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 63 metering installations along with the storage practices.

#### Audit commentary

All records are stored securely and are kept indefinitely.

#### Audit outcome

Compliant

### 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 63 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 reporting IntelliHUB has in place for the timeliness of sending records to the MEP.

### Audit commentary

IntelliHUB provided the reporting for the period from August 2021 to August 2022. The reporting showed that the certification reports were provided to the MEP within five business days for 5,807 (56%) of the 10,316 certifications. Field paperwork is received by the MEP then forwarded to the ATH for validation and creation of metering installation certification reports. Delays in return from the field and from the MEP often cause the ATH to exceed the five-business day requirement. The reporting showed that 2,230 (22%) of the late reports were received later than five business days after the certification was completed.

### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.9 With: Clause 14 Of Schedule 10.4  From: 01-Aug-21 To: 31-Aug-22	Certification records provided to the MEP late for 44% of metering installations certified.  Potential impact: Low  Actual impact: Low  Audit history: None  Controls: Weak  Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are recorded as weak as they do not ensure records are provided within five business days for a high number of certifications completed.  The impact on MEPs is minor; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
IntelliHub is actively working towards resolving this issue by reviewing resourcing levels. There is also an increased focus on the implementation of a field app.		Unknown at this stage	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
IntelliHub is actively working on resolving this issue. A new field app is in development; the exact implementation date however is yet to be confirmed.		Unknown at this stage	

## 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 asked IntelliHUB to provide records for all installations certified as a lower category.

#### **Audit commentary**

IntelliHUB provided records for seven metering installations certified under these clauses during the audit period. Six of the records included a statement advising the MEP of the requirement to monitor the maximum demand monthly. One record included details of a 400A current limiting device which will ensure the load does not exceed the Category 2 limit.

#### **Audit outcome**

Compliant

### **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 63 certification records.

#### **Audit commentary**

IntelliHUB 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, IntelliHUB 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 for all 63 reports checked.

#### **Audit outcome**

Compliant

### **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 63 certification records to confirm compliance.

#### **Audit commentary**

IntelliHUB's certification reports contain the meter certification expiry date field which was populated in all 63 records checked. Non-compliance was recorded in the last audit. IntelliHUB updated its process and templates to ensure the meter certification expiry date is 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**

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

#### **Audit outcome**

Compliant

### **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 each services access interface 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 63 metering installations to confirm compliance.

#### **Audit commentary**

The maximum interrogation cycle is recorded correctly for each services access interface for 62 metering installations. There was one Category 3 metering installation at ICP 0000101515EN18C which had the maximum interrogation cycle correctly recorded as 150 days for the HHR meter type but also had the maximum interrogation cycle of 365 days incorrectly recorded for the NHH meter type.

## Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.14 With: Clause 36(3) & (4) of Schedule 10.7  From: 01-Feb-21 To: 12-Aug-21	Maximum interrogation cycle incorrectly recorded for each services access interface in one metering installation.  Potential impact: None  Actual impact: None  Audit history: None  Controls: Strong  Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	I have recorded the controls as strong as the processes have been updated to correctly record the maximum interrogation cycle correctly for each services access interface.  There is no impact on MEPs because they are the source of this information anyway; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
The current versions of Metering Installation Certification Reports now correctly record these fields.		20/9/2022	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
No further action is required, as these fields are now correctly recorded.		20/9/2022	

## 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. I also checked the monitoring system in the laboratory.

#### 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 the test points to confirm compliance.

#### Audit commentary

IntelliHUB 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 to confirm compliance.

### Audit commentary

IntelliHUB has all relevant records relating to the maintenance, repairs and calibration dates. They also have a whiteboard in the laboratory with the dates, so they are visible to all personnel.

A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables. The relevant documentation was observed during the audit. The relevant consumables are seals, and stickers. Compliance is confirmed.

### 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 the IntelliHUB reference and working standards to confirm they had current calibration certificates.

### Audit commentary

IntelliHUB provided calibration records confirming the following standards are currently in service and have current calibration.

Reference standards		
Standard	Calibration period	Calibrated by
Radian RM-11	2 years	MSL
Atco Multi CT	5 years	MSL
Laboratory working standards		
Standard	Calibration period	Calibrated by
Zera EPZ303 (meter test bench)	6 months	IntelliHUB
TWS 5:1 CT	5 years	MSL
WM303 Comparator	5 years	Babcock NZ Ltd
Teleco CT	1 year	IntelliHUB
Field working standards		

Standard	Calibration period	Calibrated by
4 x Zera MT310	6 months	IntelliHUB
3 x EDM1 Mk6E Test kit	1 year	IntelliHUB
4 x Hioki 3169	1 year	Owned and calibrated by contractors
2 x MTE PWS 2.3	1 year	IntelliHUB

IntelliHUB has all relevant records relating to the maintenance, repairs and calibration dates. I checked the maintenance schedule and there were clear notes regarding actions taken.

They also have a whiteboard in the laboratory with the dates, so they are visible to all personnel.

#### 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 the IntelliHUB reference and working standards to confirm they had current calibration certificates.

##### Audit commentary

Compliance is recorded in **section 4.4**.

##### 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 the IntelliHUB 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**

IntelliHUB does not conduct testing of systems of 33kV or above.

#### **Audit commentary**

IntelliHUB does not conduct testing of systems of 33kV or above.

#### **Audit outcome**

Not applicable

### **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**

Compliance is recorded in **section 4.4**.

#### **Audit commentary**

Compliance is recorded in **section 4.4**.

## Audit outcome

Compliant

### 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 the understanding of this requirement through interview with IntelliHUB. I checked whether this situation had occurred.

#### Audit commentary

IntelliHUB 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 63 metering installations to confirm compliance.

#### **Audit commentary**

IntelliHUB 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. IntelliHUB has a directory of type test reports for relevant devices, and they also have a schedule detailing that type test reports have been checked and that they confirm compliance. It was recommended in the last audit that fields were added to the type test report schedule to record the date the type test report was checked and who checked it. I checked the schedule and confirmed that these had been added shortly after the last audit.

#### **Audit outcome**

Compliant



#### 4.13 Metering Component Stickers (Clause 8(1) and 8(4) 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.*

*If an ATH certifies the metering component on the same day it certifies the metering installation that the metering component is installed in, the ATH may combine the certification stickers and attach it to the metering installation in accordance with clause 41 of Schedule 10.7.*

##### Audit observation

I checked the IntelliHUB component stickers to confirm compliance.

##### Audit commentary

IntelliHUB attaches metering component stickers in accordance with these clauses for meters and control devices. IntelliHUB has introduced a combined installation and component sticker for this purpose.

During the audit period IntelliHUB changed its process to certify all new CTs at the time of metering installation certification. Previously IntelliHUB had relied on the certification provided with the new CTs by TWS. IntelliHUB did not update its field process to require metering component stickers to be attached. Non-compliance is recorded as metering component certification stickers have not been applied as required by this clause.

##### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 4.13 With: Clause 8(1) and 8(4) of Schedule 10.8 From: 01-Feb-21 To: 07-Sep-22	Metering component certification stickers not applied to CTs certified in the field by IntelliHUB. Potential impact: None Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	I have recorded the controls as strong the majority of metering components have had certification stickers applied. There is no impact on other participants; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
A new label current transformer certification sticker has been designed and is being printed. Please refer to the example shown below.		16/10/2022	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	



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 63 certification records to confirm compliance.

##### Audit commentary

There is an appropriate policy and procedures contained in the quality manual in relation to the management of sealing. Intellihub uses a wire and ferrule system, technicians are issued with individually numbered sealing pliers which are recorded in the technician approval records. I confirmed that sealing details were recorded in all 63 records checked and that the sealing plier records were up to date.

When a seal is discovered to be broken or missing there is a procedure that ensures the MEP is notified.

##### 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 63 certification records to confirm compliance.

#### Audit commentary

I considered the situation recorded in **sections 5.37** and **5.40** where two metering installations certified with CTs burden lower than the lowest burden test point specified in the standard without confirmation from the CT manufacturer in relation to this clause. As the ATH has chosen to take a sensible approach to this situation which meets the requirements of clause 10.41, I have recorded compliance in this section but have raised this as an issue for consideration by the Authority in **section 5.37**.

There were no other examples of 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 63 metering installations to confirm compliance.

#### Audit commentary

All 63 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 discussed the current suite of design reports and checked the certification records for 63 metering installations.

#### **Audit commentary**

The IntelliHUB MEP implemented a new design report pack in April 2021. This was received by the IntelliHUB ATH, and all 63 records checked included a design report reference confirming the correct design report was used.

#### **Audit outcome**

Compliant

### **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 discussed the current suite of design reports and checked the certification records for 63 metering installations.

#### **Audit commentary**

The IntelliHUB MEP implemented a new design report pack in April 2021. This was received by the IntelliHUB ATH, and all 63 records checked included a design report reference confirming the correct design report was used. Any variations to standard design reports are recorded in the certification report.

#### **Audit outcome**

Compliant

### **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**

There were seven examples of certification as a lower category where nominally Category 3 metering installations were certified at Category 2. I checked the records for these seven metering installations.

### Audit commentary

In six of the examples checked the ATH included advice in the certification report for the MEP of the requirement to monitor the maximum demand monthly. In one example the details of a 400-amp protective device limiting the maximum current were recorded in the certification report.

### 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

There was one example of certification of a nominally Category 3 metering installation at Category 2 under this clause.

### Audit commentary

My check of the certification report confirmed that the details of a 400-amp protective device limiting the maximum current were recorded as required by this clause.

### 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**

There were seven examples of certification as a lower category where nominally Category 3 metering installations were certified at Category 2. I checked the records for these seven metering installations.

#### **Audit commentary**

In six of the examples checked the ATH included advice in the certification report for the MEP of the requirement to monitor the maximum demand monthly. In one example the details of a 400-amp protective device limiting the maximum current were recorded in the certification report. The MEP had requested certification at a lower category in all seven examples and the certification report confirms that the ATH considered this was appropriate.

#### **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**

There were seven examples of certification as a lower category where nominally Category 3 metering installations were certified at Category 2. I checked the records for these seven metering installations.

#### **Audit commentary**

The IntelliHUB process meets this requirement as the site is visited at the time of certification. This was confirmed by checking the certification reports for all seven metering installations.

#### **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 63 metering installations to confirm compliance. The selected certification records included all relevant metering categories and all relevant certification methods.

### Audit commentary

IntelliHUB correctly applied, and recorded in the certification reports, that the selected component method was used in 34 of the Category 1, 2 and 3 certification records checked.

### 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

I checked certification records for 63 metering installations to confirm compliance. The selected certification records included all relevant metering categories and all relevant certification methods.

### Audit commentary

IntelliHUB correctly applied, and recorded in the certification reports, that the comparative recertification method was used in 29 of the Category 2 certification records checked.

Statistical sampling was not conducted during the audit period, but a recertification project is currently being planned.

### 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 four examples of Category 3 metering installations certified by IntelliHUB.

### Audit commentary

My checks of the certification records for four Category 3 metering installations confirmed that HHR meters were installed.

### 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.

To carry out a raw meter data output test for a category 1 metering installation or category 2 metering installation, the ATH must apply a load on each phase that is:

- greater than 5% of the meter's maximum rated current for category 1 installations,
- 10 amps on each phase for category 2 metering installations.

In addition, the ATH must use either the working standard referred to in subclause (1)(a) or an ammeter in good working order with an accuracy range of +/-5% to measure the load applied to the metering installation and recording the resulting increment of the meter register value over a measured period of time or recording the resulting accumulation of pulses from the load over a measured period of time.

The ATH must also ensure that the change in the meter register that occurs under subclause (ii)(A) or (ii)(B) is at least "1" in the least significant digit, or one mark if the least significant digit does not have numerical markings.

If the meter is a Ferraris disc meter, the ATH must undertake two raw meter data output tests in which the second test must have a load applied to the meter that is at least double the load applied in the first test.

To carry out a raw meter data output test for a half-hour installation, the ATH must either compare the output from a working standard to the raw meter data from the metering installation for a minimum of one trading period, or if the raw meter data is to be used for the purposes of Part 15, confirm that the MEP's back-office processes include a comparison of:

- the increment of the accumulating meter registers, and
- the sum of the half-hour metering raw meter data for the same period.

## Audit observation

I checked process documentation and 63 certification reports to confirm compliance.

## Audit commentary

This clause was changed from 1st February 2021 introducing minimum load requirements for ATHs when conducting raw meter data tests on Category 1 and 2 metering installations. The minimum load required on each phase is:

- greater than 5% of the meter’s maximum rated current for Category 1 installations, and
- 10 amps for Category 2 metering installations.

When conducting a raw meter data test on Category 1 and 2 metering installations the code requires the ATH to record either:

- the resulting increment of the meter register value over a measured period of time, or
- the resulting accumulation of pulses from the load over a measured period of time.

My certification report checks included 20 Category 1 and 39 Category 2 metering installations. The IntelliHUB Category 1 testing process requires the technician to apply an external load to conduct the raw meter data test but does not specify a minimum load required to meet the code requirement of 5% of the meter’s maximum rated current. Technicians typically use heat guns for this purpose which are commonly rated at 1,800 or 2,000 watts, which would meet the 5% requirement for all Category 1 meter types. The technician applies the load and counts the number of pulse and measures the time taken. The details of the load applied, number of pulses and time taken are recorded by the technician. I have recorded non-compliance as in four of the Category 1 records checked the load applied by the technician did not meet the minimum load requirement. I also recommend that IntelliHUB update its processes and communicate this to technicians to ensure that the load applied meets the minimum load requirements. There were four examples where the technician had not recorded the load applied so I was unable to determine if the minimum load requirements were met. Non-compliance is recorded for these four examples as test results were not recorded as required by these clauses.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 89(1) of Schedule 10.7.	IntelliHUB update its processes and communicate this to technicians to ensure that the load applied meets the minimum load requirements.	Intellihub agrees to review and update its processes as appropriate, and also to provide a reminder communication regarding this requirement to all field staff.	Identified

The ATH must also ensure that the change in the meter register that occurs when conducting a raw meter data test is at least “1” in the least significant digit, or one mark if the least significant digit does not have numerical markings. A memo to the industry from the Authority on 29 October 2021 confirming that if the LCD and the pulse output are both programmatically integrated, then the pulse can be used to confirm the register will advance. IntelliHUB uses this method to meet the requirement for the register to advance when conducting raw meter data tests on installations containing Elster/Honeywell gRex meters owned by the IntelliHUB MEP.

The IntelliHUB Category 2 process ensures that the minimum load requirement of 10 amps on each phase is met. IntelliHUB records the current at the time of testing in the certification report. My checks of 39 Category 2 certification reports confirmed that the minimum requirement of 10 amps was met in all 39 examples.

Raw meter data output tests for an 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.

IntelliHUB has received confirmation from the MEP that the comparison occurs.

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 test is conducted by IntelliHUB for all Category 3 metering installations.

Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. IntelliHUB has conducted prevailing load tests in accordance with this clause using a working standard for installations at Category 2 and 3.

The IntelliHUB processes do not include prevailing load tests when certifying Category 1 installations. My checks of 20 Category 1 certification records identified three examples where recertification took place without a meter being replaced. Table 3 of Schedule 10.1 requires a prevailing load test to be conducted when Category 1 metering installations are recertified with no meters replaced. If an installation has two or more meters and one is replaced the Code does not require a prevailing load test. The industry does not have a Category 1 prevailing load test capability and to establish one would cost approx. \$12,500,000 just for the working standards, then each job would take longer, which would also add to costs. I’ve raised this as an issue for the Authority to consider.

Issue	Description	Remedial action
Category 1 prevailing load tests	<p>Table 3 of Schedule 10.1 states that for Category 1 metering installations, where recertification occurs without meter replacement, a prevailing load test must be conducted using a working standard.</p> <p>The industry does not have a Category 1 prevailing load test capability and to establish one would cost approx. \$12,500,000 just for the working standards, then each job would take longer, which would also add to costs.</p>	<p>I recommend the Authority changes the Code to remove the requirement to conduct a prevailing load test when recertifying Category 1 metering installations.</p> <p><u>IntelliHUB comments</u> - Intellihub has been in communication with Authority on this point and is awaiting a decision.</p>

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. The configuration scheme is recorded on the design report and confirmed in the metering installation certification report.

**Audit outcome**

Non-compliant

Non-compliance	Description
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<p>Audit Ref: 5.12</p> <p>With: Clause 9(1)(ii)(B) of Schedule 10.7</p> <p>From: 01-Feb-21</p> <p>To: 07-Sep-22</p>	<p>Four cases where minimum load requirement was not met for Category 1 raw meter data tests.</p> <p>Four cases where the ATH did not record test results when conducting Category 1 raw meter data tests.</p> <p>Potential impact: Low</p> <p>Actual impact: None</p> <p>Audit history: None</p> <p>Controls: Strong</p> <p>Breach risk rating: 1</p>		
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>		
<b>Low</b>	<p>I have recorded the controls as strong because they mitigate risk to an acceptable level.</p> <p>The impact is negligible for the ICPs certified with less than 5% load. There is no impact from not doing a prevailing load test, because other tests confirm compliance of the installations.</p>		
<b>Actions taken to resolve the issue</b>	<b>Completion date</b>	<b>Remedial action status</b>	
IntelliHub technicians have been informed of these requirements.	20/9/2022	Identified	
<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>		
<p>IntelliHub agrees to review and update its processes as appropriate, and also to provide a reminder communication regarding the minimum load requirement to all field staff.</p> <p>IntelliHub will ensure that technicians record test results and provide these to the ATH. To verify the effectiveness a check will be made of commissioning reports to ensure that test results are included.</p>	1/2/2023		

### 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 63 certification reports to confirm compliance.

#### Audit commentary

IntelliHUB has written confirmation from relevant MEPs that this comparison occurs.

### 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 IntelliHUB conducts this test.

##### Audit commentary

IntelliHUB conducts this test using pulses not meter registers.

### 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 two 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 63 metering installations to confirm compliance.

##### Audit commentary

The records checked confirmed that the test results were within the accuracy tolerances set out in Table 1 of Schedule 10.1.

### 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 63 metering installations to confirm compliance.

### **Audit commentary**

There were no examples where installations failed tests or did not meet the requirements for certification. The IntelliHUB process ensures that certification will not occur if there is a failed test.

### **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 34 metering installations to confirm compliance.

### **Audit commentary**

All 34 metering installations complied with the component specifications of Table 1 of Schedule 10.1.

### **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 34 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 expires 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 29 metering installations to confirm compliance.

### Audit commentary

The process documentation is clear, and all comparative certification reports contained confirmation that the meter had been replaced by a certified meter and the certification of the current transformers had expired before the meter expiry date.

### 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 29 metering installations to confirm compliance.

### Audit commentary

The certification reports confirmed that appropriate testing was conducted and that the total accuracy was within the requirements of table 1. The results of the tests conducted, and details of the test instruments used, were recorded in the metering installation certification reports for each metering installation checked.

### 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**

IntelliHUB does not certify any installations using the fully calibrated method.

#### **Audit commentary**

IntelliHUB does not certify any installations using the fully calibrated method.

#### **Audit outcome**

Not applicable

### 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**

IntelliHUB does not certify any installations using the fully calibrated method.

#### **Audit commentary**

IntelliHUB does not certify any installations using the fully calibrated method.

#### **Audit outcome**

Not applicable

### 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**

IntelliHUB does not certify any installations using the fully calibrated method.

#### **Audit commentary**

IntelliHUB does not certify any installations using the fully calibrated method.

#### **Audit outcome**



Not applicable

#### 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

IntelliHUB does not certify any installations using the fully calibrated method.

##### Audit commentary

IntelliHUB does not certify any installations using the fully calibrated method.

##### Audit outcome

Not applicable

#### 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 increment 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

I checked the IntelliHUB process and if there were any insufficient load certifications completed during the audit period.

##### Audit commentary

There were no insufficient load certifications completed during the audit period. The IntelliHUB process requires technicians to add additional load when required. If insufficient load certification is conducted the technician completes a check-sheet containing additional checks that need to be conducted prior to certification.

## 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

I checked if any statistical sampling certification was conducted during the audit period.

#### Audit commentary

Statistical sampling was not conducted during the audit period, but a recertification project is currently being planned.

## Audit outcome

Compliant

### 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

There was no statistical sampling conducted during the current audit period.

#### Audit commentary

IntelliHUB understands the requirements of this clause and the selected component method will be used to certify installations in the future samples.

## Audit outcome

Compliant

### 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 63 metering installation certification records to confirm compliance.

#### Audit commentary

The commissioning date, validity period and expiry date are 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 63 metering installation certification records to confirm compliance.

#### Audit commentary

The process documentation stipulates the maximum permitted errors for certification. My checks of 63 certification records confirmed this had been applied correctly and the maximum error did not exceed the maximum permitted error.

## 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 29 metering installation certification records and discussed the process for error calculation.

#### **Audit commentary**

IntelliHUB conducts comparative recertification tests using a working standard as required by this clause. IntelliHUB has developed an uncertainty calculator, which includes working standard error and temperature based on the temperature coefficient of the working standards.

In the previous audit, it was recommended that IntelliHUB evaluate the test results and possibly re-test the metering installation at ICP0125199341LCD4D to ensure the error result is correct. IntelliHUB returned to site and recertified the metering installation confirming that the error was within the acceptable limits.

#### **Audit outcome**

Compliant

### **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 63 metering installation certification records, and process documentation.

#### **Audit commentary**

IntelliHUB has a documented process for the management of compensation factors (multipliers). The testing procedures provide confirmation of the multiplier and CT ratio, the multiplier is recorded on the metering installation certification report. IntelliHUB only deals with multipliers, not loss or error compensation factors.

#### **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 63 metering installation certification records, and process documentation.

#### **Audit commentary**

IntelliHUB has a documented process for the management of compensation factors (multipliers). The testing procedures provide confirmation of the multiplier and CT ratio, the multiplier is recorded on the metering installation certification report. IntelliHUB only deals with multipliers, not loss or error compensation factors.

#### **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. IntelliHUB's testing process includes wiring checks which ensure compliance with this clause.

#### **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 63 certification records to confirm compliance.

##### Audit commentary

All meter and metering installation certification expiry dates were correct.

##### Audit outcome

Compliant

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

##### Code related audit information

*If a 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

I checked 63 certification records to confirm compliance.

##### Audit commentary

IntelliHUB understands the requirements of this clause and ensures that all meters are certified at the time of installation.

##### 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 43 Category 2 and 3 certification records to confirm compliance.

##### Audit commentary

All of the metering installations had measuring transformers that had been certified.

## 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 maximum permitted error is calculated in accordance with clause 22 for the fully calibrated certification method or the comparative recertification method
- 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 in-service burden (magnitude and phase angle, where appropriate), complies with clause 31.

#### Audit observation

I checked 43 Category 2 and 3 certification records, and process documentation to confirm compliance.

#### Audit commentary

The certification reports confirmed compliance with regard to all of the above points with the exception of the total in-service burden requirements. Clause 31 (7) of schedule 10.7 was changed from 1st February 2021 to require the ATH to ensure that the in-service burden is within the burden range of the measuring transformers.

Clause 31 of Schedule 10.7 is specific and gives two methods of compliance for low voltage CT metered installations and states the following. *The ATH must, before it certifies a metering installation incorporating a measuring transformer, ensure that the in-service burden on the measuring transformer is within the range specified in the certification report for the measuring transformer by installing burdening resistors to increase the in-service burden if necessary; or confirm that the measuring transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.*

IntelliHUB has implemented a process to add burden resistors to CTs when the in-service burden is found to not be within the burden range of the CTs and the accuracy of the CTs at low burden has not been confirmed by the manufacturer. TWS has provided the industry with confirmation that all TWS CTs with uncompensated windings remain accurate at low burden. IntelliHUB does not add burden to TWS CTs with uncompensated windings. When conducting recertification of older metering installations IntelliHUB encounters CTs from manufacturers from which it is not possible to obtain confirmation of the accuracy of the CTs at low burden. In these cases, burden is added if IntelliHUB is confident that the CTs have compensated windings, resulting in an improvement of the accuracy of the CTs. In cases where the CTs are known to be uncompensated IntelliHUB does not add burden as

doing so would cause a decrease in the accuracy of the CTs. It is known that as burden is reduced on CTs with uncompensated windings the error gets closer to zero.

My checks of 43 certification records confirmed that 41 metering installations met the requirements of clause 31 of schedule 10.7. There were two metering installations where burden was not added to older CTs as follows.

ICP	CT manufacturer	CT ratio	Rated burden VA	Calculated CT burden at rated burden VA	Installation error %
0000523418NR214	Turnbull & Jones	800/5	5	0.545, 0.561, 0.79	-0.37
0318070022LC2F9	Teleco	600/5	10	0.79, 0.85, 0.73	-0.42

I have recorded non-compliance for these two metering installations as the ATH has not met the requirement to obtain confirmation from the manufacturer that the CTs remain accurate at low burden. I believe that the approach IntelliHUB has taken is a sensible approach to this situation which meets the requirements of clause 10.41 requiring the ATH to exercise a level of skill and diligence by ensuring accuracy is improved by not added burden in these two cases. I have raised this as an issue for the Authority to consider.

Issue	Description	Remedial action
Measuring transformer in-service burden	Clause 31 of Schedule 10.7 requires burden to be added regardless of the impact on the accuracy of the measuring transformers unless the transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.	I recommend the Authority reviews the Code to allow the ATH to determine through testing whether burden should be added in situations where confirmation cannot be obtained from the manufacturer that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard. <u>IntelliHUB comments</u> - Intellihub agrees and intends to enter into discussion with the Authority on this matter.

### Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.37 With: Clause 28(4) Of Schedule 10.7  From: 01-Feb-21 To: 08-Aug-22	Two metering installations certified with CTs burden lower than the lowest burden test point specified in the standard without confirmation from the CT manufacturer.  Potential impact: Low Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>



<b>Low</b>	I have recorded the controls as strong because the IntelliHUB process ensures improved accuracy of the metering installations.	
	There is no impact as the accuracy of the metering installations is improved by this non-compliance.	
Actions taken to resolve the issue	Completion date	Remedial action status
Intellihub disagrees with the Code requirement, and therefore accepts this non-compliance.  Intellihub does not wish to increase the overall metering installation error by adding burden to the CT circuits.  Intellihub agrees with the auditor's recommendation, that the Authority reviews the Code to allow the ATH to determine through testing whether burden should be added.	20/9/2022	Disputed
Preventative actions taken to ensure no further issues will occur	Completion date	
Intellihub intends to continue with its current practice.  Intellihub plans to enter into further discussion with the Authority on this matter.	1/12/2022	

### 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 14 certification records to confirm compliance.

#### Audit commentary

The metering installation certification report contains a field for CT expiry date and a check of 14 selected component certification 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

There were no examples to examine where other equipment was connected to measuring transformers. However, the measurement of burden during commissioning will address this matter.

#### 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 metering installation incorporating a measuring transformer:*

- *ensure that the in-service burden does not exceed the upper limit of the range specified for the measuring transformer, if specified in the design report for the metering installation.*
- *ensure that the in-service burden on the measuring transformer is within the range specified in the certification report by installing burdening resistors, if necessary,*
- *confirm that a class A ATH has confirmed by calibration that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard, if the primary voltage of the measuring transformer is greater than 1kV,*
- *confirm that the measuring transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.*

#### Audit observation

I checked 43 Category 2 and 3 certification records, and process documentation to confirm compliance.

### Audit commentary

Clause 31 of Schedule 10.7 is specific and gives two methods of compliance for low voltage CT metered installations and states the following. *The ATH must, before it certifies a metering installation incorporating a measuring transformer, ensure that the in-service burden on the measuring transformer is within the range specified in the certification report for the measuring transformer by installing burdening resistors to increase the in-service burden if necessary; or confirm that the measuring transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.*

IntelliHUB has implemented a process to add burden resistors to CTs when the in-service burden is found to not be within the burden range of the CTs and the accuracy of the CTs at low burden has not been confirmed by the manufacturer. TWS has provided the industry with confirmation that all TWS CTs with uncompensated windings remain accurate at low burden. IntelliHUB does not add burden to TWS CTs with uncompensated windings. When conducting recertification of older metering installations IntelliHUB encounters CTs from manufacturers from which it is not possible to obtain confirmation of the accuracy of the CTs at low burden. In these cases, burden is added if IntelliHUB is confident that the CTs have compensated windings, resulting in an improvement of the accuracy of the CTs. In cases where the CTs are known to be uncompensated IntelliHUB does not add burden as doing so would cause a decrease in the accuracy of the CTs. It is known that as burden is reduced on CTs with uncompensated windings the error gets closer to zero.

My checks of 43 certification records confirmed that 41 metering installations met the requirements of clause 31 of schedule 10.7. There were two metering installations where burden was not added to older CTs as follows:

ICP	CT manufacturer	CT ratio	Rated burden VA	Calculated CT burden at rated burden VA	Installation error %
0000523418NR214	Turnbull & Jones	800/5	5	0.545, 0.561, 0.79	-0.37
0318070022LC2F9	Teleco	600/5	10	0.79, 0.85, 0.73	-0.42

I have recorded non-compliance with for these two metering installations as the ATH has not met the requirement to obtain confirmation from the manufacturer that the CTs remain accurate at low burden. I believe that the approach IntelliHUB has taken is a sensible approach to this situation which meets the requirements of clause 10.41 requiring the ATH to exercise a level of skill and diligence by ensuring accuracy is improved by not added burden in these two cases. I have raised this as an issue for the Authority to consider in **section 5.37**.

### Audit outcome

Non-compliant

Non-compliance	Description
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<p>Audit Ref: 5.40</p> <p>With: Clause 31 of Schedule 10.7</p> <p>From: 01-Feb-21</p> <p>To: 08-Aug-22</p>	<p>Two metering installations certified with CTs burden lower than the lowest burden test point specified in the standard without confirmation from the CT manufacturer.</p> <p>Potential impact: Low</p> <p>Actual impact: None</p> <p>Audit history: None</p> <p>Controls: Strong</p> <p>Breach risk rating: 1</p>		
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>		
<b>Low</b>	<p>I have recorded the controls as strong because the IntelliHUB process ensures improved accuracy of the metering installations.</p> <p>There is no impact as the accuracy of the metering installations is improved by this non-compliance.</p>		
<b>Actions taken to resolve the issue</b>		<b>Completion date</b>	<b>Remedial action status</b>
<p>IntelliHub disagrees with the Code requirement, and therefore accepts this non-compliance.</p> <p>IntelliHub does not wish to increase the overall metering installation error by adding burden to the CT circuits.</p> <p>IntelliHub agrees with the auditor's recommendation, that the Authority reviews the Code to allow the ATH to determine through testing whether burden should be added.</p>		20/9/2022	Disputed
<b>Preventative actions taken to ensure no further issues will occur</b>		<b>Completion date</b>	
<p>IntelliHub intends to continue with its current practice.</p> <p>IntelliHub plans to enter into further discussion with the Authority on this matter.</p>		1/12/2022	

#### 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 whether any installations had been certified under this clause.

##### Audit commentary

No examples were identified, but the process is understood by IntelliHUB.

### 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

IntelliHUB is certifying control devices and recording the appropriate information in certification records.

### Audit commentary

IntelliHUB is certifying control devices and recording the appropriate information in certification records. IntelliHUB has requested signal propagation information from distributors and has been notified of some areas on Vector's network where the pilot system is not operating.

### 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

I asked whether IntelliHUB had any knowledge of any areas with signal propagation issues.

### Audit commentary

IntelliHUB has corresponded with distributors to determine if there were any areas with signal propagation issues. Vector responded that there was a problem with the pilot system in the northern region but there were no other issues identified. Compliance is achieved.

### 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 60 metering installations to confirm compliance.

### Audit commentary

All data storage devices are recertified prior to being 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

The points above are documented in the type test report, which is checked as part of the certification process for the data storage device. IntelliHUB is ensuring data storage devices are certified and the maximum interrogation cycle is recorded.

### Audit outcome

Compliant

## 5.46 Location of Metering Installation Certification Stickers (Clause 41(1) and 41(9) 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.*

*When attaching a metering installation certification sticker, the ATH must remove or obscure any invalid or expired certification stickers.*

### Audit observation

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

### Audit commentary

In all cases, the certification stickers contained the appropriate detail and were correctly applied. Old certification stickers are either removed or obscured.

### 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 IntelliHUB whether this scenario had arisen.

### Audit commentary

This scenario has not arisen and is unlikely to arise.

### Audit outcome

Compliant

## 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 relevant stickers to confirm compliance.

### Audit commentary

The certification stickers contained the appropriate details.

### Audit outcome

Compliant

## 5.49 Combining certification stickers (Clause 41(5) – Clause 41(8) of Schedule 10.7)

### Code related audit information

*If an ATH certifies a metering component on the same day that the ATH certifies the metering installation, the ATH may combine the metering installation certification sticker with the metering component certification sticker.*

*If the certification sticker is combined, the ATH must:*

- *ensure that the combined sticker shows all the information required by subclause (2) and clause 8(2) of Schedule 10.8,*
- *meet the requirements of subclauses (1), (3) and (4), as if the combined sticker were a metering installation certification sticker.*

*The combined sticker is immediately invalid if:*

- *the metering installation certification expiry date changes; or*
- *a metering component to which the combined certification sticker relates is removed from the metering installation.*

### Audit observation

I checked the IntelliHUB combined metering installation and component sticker.

### Audit commentary

IntelliHUB has introduced a combined installation and component sticker. The IntelliHUB sticker does not contain the name of the calibration laboratory who calibrated the metering component, but the IntelliHUB process requires the technician to confirm that there is a calibration sticker on the component. I have accepted that this meets the requirement of this clause but have recommended in **section 4.14** that IntelliHUB add a “Calibrated by” field to the combined sticker.

### Audit outcome

Compliant

## 5.50 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 and photos of five metering installations.

### 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, a warning is included in the metering installation certification sticker and a separate sticker is applied to CT enclosures.

### Audit outcome

Compliant

## 5.51 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 63 metering installations to confirm compliance.

### Audit commentary

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

### Audit outcome

Compliant

## 5.52 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 five metering installations to confirm compliance.

#### **Audit commentary**

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

#### **Audit outcome**

Compliant

### 5.53 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 five metering installations to confirm compliance.

#### **Audit commentary**

Compliance is confirmed. A warning is included in the metering installation certification sticker and a separate sticker is applied to CT enclosures. The stickers are applied in a prominent position.

#### **Audit outcome**

Compliant

### 5.54 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 63 installations.

#### **Audit commentary**

IntelliHub uses a wire and ferrule system, technicians are issued with individually numbered sealing pliers which are recorded in the technician approval records. I confirmed that sealing details were recorded in all 63 records checked and that the sealing plier records were up to date.

#### **Audit outcome**

Compliant

## 5.55 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

IntelliHUB has appropriate instructions, including a flowchart, 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 available to check.

### Audit outcome

Compliant

## 5.56 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 one 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 and the photos for five metering installations to confirm compliance.

### Audit commentary

The process documentation and design reports are compliant. The photos for five metering installations showed that the secondary wiring was identified.

#### **Audit outcome**

Compliant

### 5.57 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

### 5.58 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 63 certification reports to confirm compliance.

#### **Audit commentary**

The IntelliHUB process requires the technician to confirm the calibration details of metering components on-site and certification does not occur if the component does not have a calibration sticker. The calibration details are recorded in the certification report. This was confirmed by my checks of 63 certification reports.

#### **Audit outcome**

Compliant

### 5.59 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 63 certification reports to confirm compliance.

### Audit commentary

The IntelliHUB process requires the technician to confirm the calibration details of metering components on-site and certification does not occur if the component does not have a calibration sticker. The calibration details are recorded in the certification report this was confirmed by my checks of 63 metering installation certification reports. IntelliHUB provided calibration reports for all components certified.

### Audit outcome

Compliant

## 5.60 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

The Class B IntelliHUB ATH does not calibrate components. Calibration is conducted by the Class A ATH.

### Audit commentary

The Class B IntelliHUB ATH does not calibrate components. Calibration is conducted by the Class A ATH.

### Audit outcome

Not applicable

## 5.61 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 IntelliHUB.

### Audit commentary

IntelliHUB uses the test points stipulated in the relevant standards.

### Audit outcome

Compliant

## 5.62 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 the IntelliHUB IANZ report to confirm compliance.

### Audit commentary

The IANZ report confirms compliance with these points.

### Audit outcome

Compliant

## 5.63 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

The Class B IntelliHUB ATH does not calibrate components. Calibration is conducted by the Class A ATH.

### Audit commentary

The Class B IntelliHUB ATH does not calibrate components. Calibration is conducted by the Class A ATH.

### Audit outcome

Not applicable

## 5.64 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 63 metering installations to confirm compliance.

#### **Audit commentary**

All meters are certified, and IntelliHUB has a directory of type test reports along with a summary table showing each report. IntelliHUB provided calibration reports for all meters certified.

#### **Audit outcome**

Compliant

### **5.65 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**

IntelliHUB ensures that all meters are calibrated by a class A ATH prior to being reinstalled.

#### **Audit outcome**

Compliant

### **5.66 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**

CTs certified by IntelliHUB are done so in accordance with these clauses. Compliance is confirmed.

#### **Audit commentary**

CTs certified by IntelliHUB are done so in accordance with these clauses. Compliance is confirmed.

## Audit outcome

Compliant

### 5.67 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 range that the in-service burden must be within*

*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 14 metering installations to confirm compliance.

#### Audit commentary

When conducting certification of category 2 and above metering installations under the selected component method the IntelliHUB certifies the CTs based on calibration reports provided by Class A ATHs, which covers most of the points raised above. IntelliHUB has added burden range field to its certification reports which meets the requirement to record the burden range of CTs. This field was correctly populated in all but six certification records. Non-compliance is recorded for these six records. The six records with no burden range recorded were completed prior to changes were made to the report template and process to include burden range. There is no impact on the accuracy of the six metering installations as the in-service burden was within the burden range in all six examples.

## Audit outcome

Non-compliant

Non-compliance	Description
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Audit Ref: 5.67 With: Clause 3 of Schedule 10.8  From: 01-Feb-21 To: 30-May-22	Burden range not recorded in CT certification reports for six of a sample of 14 metering installations.  Potential impact: Low Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1	
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>	
<b>Low</b>	I have recorded the controls as strong as the processes have been updated to correctly record burden range.  There is no impact because the in-service burden was within the burden range in all six examples; therefore, the audit risk rating is low.	
<b>Actions taken to resolve the issue</b>	<b>Completion date</b>	<b>Remedial action status</b>
The current versions of Metering Installation Certification Reports now correctly record these fields.	20/9/2022	Cleared
<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>	
No further action required as these fields are now correctly recorded.	20/9/2022	

## 5.68 Measuring Transformers in service burden range (Clause 2(1)(E) Of Schedule 10.8)

### Code related audit information

Before certifying a measuring transformer, the ATH must determine the range that the in-service burden must be within to ensure the measuring transformer remains accurate, by using one or more of the following:

- the measuring transformer's nameplate rating
- the calibration report for the measuring transformer
- the manufacturer's documentation for the measuring transformer
- the standard set out in Table 5 of Schedule 10.1 the measuring transformer was manufactured to.

### Audit observation

I checked the certification records for 14 metering installations to confirm compliance.

### Audit commentary

When conducting certification of category 2 and above metering installations under the selected component method the IntelliHUB certifies the CTs based on calibration reports provided by Class A ATHs. IntelliHUB has added burden range field to its certification reports which meets the requirement to record the burden range of CTs. This field was correctly populated in all but six certification records. Non-compliance is recorded for these six records. The six records with no burden range recorded were completed prior to changes were made to the report template and process to include burden range.

There is no impact on the accuracy of the six metering installations as the in-service burden was within the burden range in all six examples.

**Audit outcome**

Non-compliant

Non-compliance	Description		
Audit Ref: 5.68 With: Clause 2(1)(E) Of Schedule 10.8  From: 01-Feb-21 To: 30-May-22	Burden range not recorded in CT certification reports for six of a sample of 14 metering installations.  Potential impact: Low Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	I have recorded the controls as strong as the processes have been updated to correctly record burden range.  There is no impact because the in-service burden was within the burden range in all six examples; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
The current versions of Metering Installation Certification Reports now correctly record these fields.		20/9/2022	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
No further action required as these fields are now correctly recorded.		20/9/2022	

**5.69 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

#### 5.70 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

IntelliHUB certifies control devices in accordance with these clauses. The certification report is combined with the metering installation certification report.

##### Audit commentary

IntelliHUB certifies control devices in accordance with these clauses. The certification report is combined with the metering installation certification report.

##### Audit outcome

Compliant

#### 5.71 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 60 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

#### 5.72 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

IntelliHUB does not conduct onsite calibration of metering components.

### Audit commentary

IntelliHUB does not conduct onsite calibration of metering components.

### Audit outcome

Not applicable

## 5.73 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

IntelliHUB does not conduct onsite calibration of metering components.

### Audit commentary

IntelliHUB does not conduct onsite calibration of metering components.

### Audit outcome

Not applicable

## 5.74 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

IntelliHUB does not conduct onsite calibration of metering components.

#### **Audit commentary**

IntelliHUB does not conduct onsite calibration of metering components.

#### **Audit outcome**

Not applicable

### **5.75 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 60 metering installations to confirm compliance.

#### **Audit commentary**

All data storage devices are integrated with the meters and in all cases the data storage devices expiry date is the same as the meter and is recorded in the certification report.

#### **Audit outcome**

Compliant

### **5.76 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 63 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 IntelliHUB process and a sample of five completed inspection reports to confirm compliance.

#### Audit commentary

When conducting inspections of AMI metered Category 1 installations, which contain data storage devices. The following information is obtained from the MEP prior to the inspection being conducted:

- confirmation that there are no events recorded which could affect the operation of the data storage device,
- date of the last sum-check and confirmation that it passed, and
- confirmation that there are no battery alarms present.

#### 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

IntelliHUB conducted inspections of AMI metered Category 1 installations, which contain data storage devices.

IntelliHUB confirmed that the sum-check process was in place for the relevant data storage devices and that no failures were recorded.

## 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 IntelliHUB process and a sample of five completed inspection reports to confirm compliance.

#### Audit commentary

IntelliHUB inspection reports contain all 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

IntelliHUB was the MEP in all cases, therefore the inspection reports were provided to the MEP at the time of completion.

## 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**

IntelliHUB inspection reports contain all the relevant information above. No inspections were conducted of higher category installations during the audit period.

#### **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 the IntelliHUB process and three examples to confirm compliance.

#### Audit commentary

In two of the examples IntelliHUB went to site to replace meters and recertify installations due to a change of MEP. The existing meters were found to be faulty as they had stopped recording. The ATH replaced the faulty meters and recertified the metering installations. Details of the faulty meters was provided to the previous MEP meeting the requirement to notify the MEP and the provision of a statement of situation.

In the third example IntelliHUB became aware that a Category 2 metering installation at ICP 0005511122TU819 had been installed with an incorrect CT ratio programmed into the meter. IntelliHUB went to site and conducted testing which confirmed that the recorded consumption was 50% of the actual consumption. The meter was reprogrammed to the correct CT ratio and the metering installation was recertified. Details of the situation were provided to the MEP meeting the requirement to notify the MEP and the provision of a statement of situation.

#### 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 the IntelliHUB process and three examples to confirm compliance.

#### Audit commentary

In two of the examples IntelliHUB went to site to replace meters and recertify installations due to a change of MEP. The existing meters were found to be faulty as they had stopped recording. The ATH replaced the faulty meters and recertified the metering installations. Details of the faulty meters was provided to the previous MEP meeting the requirement to notify the MEP and the provision of a statement of situation. In these two cases the MEP was not aware of the faulty installations until notified by IntelliHUB.

In the third example IntelliHUB became aware that a Category 2 metering installation at ICP 0005511122TU819 had been installed with an incorrect CT ratio programmed into the meter. IntelliHUB went to site and conducted testing which confirmed that the recorded consumption was 50% of the actual consumption. The meter was reprogrammed to the correct CT ratio and the metering installation was recertified. Details of the situation were provided to the MEP meeting the requirement to notify the MEP and the provision of a statement of situation.

#### **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 the IntelliHUB process and three examples to confirm compliance.

#### **Audit commentary**

In two of the examples IntelliHUB went to site to replace meters and recertify installations due to a change of MEP. The existing meters were found to be faulty as they had stopped recording. The ATH replaced the faulty meters and recertified the metering installations. Details of the faulty meters was provided to the previous MEP meeting the requirement to notify the MEP and the provision of a statement of situation. In these two cases the MEP was not aware of the faulty installations until notified by IntelliHUB.

In the third example IntelliHUB became aware that a Category 2 metering installation at ICP 0005511122TU819 had been installed with an incorrect CT ratio programmed into the meter. IntelliHUB went to site and conducted testing which confirmed that the recorded consumption was 50% of the actual consumption. The meter was reprogrammed to the correct CT ratio and the metering installation was recertified. Details of the situation were provided to the MEP meeting the requirement to notify the MEP and the provision of a statement of situation.

#### **Audit outcome**

Compliant

## 7.4 ATH to keep records of modifications to correct 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 the IntelliHUB process and three examples to confirm compliance.

### Audit commentary

In all three examples the metering records included details of the faults found and actions taken to remedy these. The IntelliHUB process ensures that all records are kept indefinitely.

### Audit outcome

Compliant

## 8. Conclusions

Non-compliance is recorded in 11 sections of this audit. Six of the non-compliances relate to new Code requirements that were introduced in February 2021 which require additional details to be recorded in metering installation certification records. At the time of the audit IntelliHUB had updated its processes to ensure that these requirements are now being met.

During the audit period IntelliHUB has increased the number of approved metering contractors used to provide nationwide coverage for the deployment of meters. Reporting provided by IntelliHUB shows that the ATH has not been able to provide records to the MEP within five business days for 44% of metering installations certified due to processing delays.

I have raised two issues for the Authority to consider in relation to non-compliances recorded in this audit as follows:

- Table 3 of Schedule 10.1 states that for Category 1 metering installations, where recertification occurs without meter replacement, a prevailing load test must be conducted using a working standard, and
- Clause 31 of Schedule 10.7 requires burden to be added regardless of the impact on the accuracy of the measuring transformers unless the transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.

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. After considering IntelliHUBs responses and recognizing that seven of the non-compliances have been cleared I recommend an audit period of 24 months.

## 9. Intellihub Response

Please see individual comments against each section of the report.

This is the first audit of the Intellihub Class A and Class B ATH since September 2020.

Intellihub is pleased with the outcome of the report, taking into consideration the number of significant events that have taken place during the past 24 months.

Covid-19 presented considerable challenges for both the Intellihub Class A and Class B ATH during this period. The Laboratory has had restricted access at times. During periods of high alert levels, many staff were required to work remotely. There have been restrictions on travel outside Auckland boundaries. There have been restrictions on access to premises to complete metering compliance activities, especially where meters are located indoors. In addition, there has been restricted access to and between individual technicians, contractors and members of the public for auditing purposes.

In October 2020, the Intellihub Class A Laboratory successfully transitioned from the ISO 17025:2005 standard, to the ISO 17025:2017 standard.

28 Changes to Part 10 of the Code were announced by the Electricity Authority on 15th December 2020, with an expected implementation date of 1st February 2021. These changes introduced significant impacts on Intellihub and our customers. In the past the Authority has provided advance warning, where code changes impact participants significantly. In this instance code changes were announced with only 27 working days' notice (excluding the Christmas-New Year period). In effect this left insufficient time for the Intellihub ATH to achieve full compliance prior to code changes taking effect. Intellihub responded by taking a pragmatic approach, assigning specific resources and working systematically through the Code changes with the objective of complying in full with all of the new clauses. As can be seen in this report, due to the timing of implementation the various Code changes, a number of the non-compliances identified have been cleared as our current processes now comply.

Intellihub acquired the NOVA (BOPE) Class B ATH on 01/06/2021. A successful project to integrate NOVA operations into the Intellihub business model was initiated during the following months. We are pleased with the level of compliance following the onboarding of BOPE staff, equipment and processes.

In October 2021, the Intellihub Class A Laboratory successfully implemented Key Technical Personnel (KTP) Policies.

In October / November 2021 the Intellihub Calibration Laboratory appointed two new Key Technical Personnel.

In November 2021 the Intellihub Calibration Laboratory successfully completed its 4-yearly ISO 17025 Technical revalidation reassessment

In December 2021, Intellihub successfully completed its 4-yearly ISO 9001 Revalidation reassessment

Over the past 24 months, Intellihub has continued with its expansion plans and has increased its footprint into new Network areas.

There is one area of the February 2021 Code changes where Intellihub has concerns that the Code was not implemented in line with the “Decision Document” published in December 2020, as follows: Intellihub interpretation of Line 2 of Table 3 in Part 10 is that a Prevailing Load Test should not be required when a meter is not being changed, and the installation certification expiry date remains unchanged. Our understanding is that this view is also shared by the majority of MEP’s and ATH’s. Intellihub formally sought clarification from the Authority on this matter, soon after the Code changes came into effect on 01/02/2021. We are still currently awaiting a response to clarify this. In the interim, Intellihub is ensuring that all other metering installation commissioning tests and checks are completed including the raw meter data output test to confirm overall installation accuracy.

Over the past 12 months, Intellihub has instigated monthly Technical Compliance sessions with contracted Approved Test Houses Wells and Delta with the objectives of improving communication, alignment and ensuring we both meet Code Compliance. We have already seen good value out of these meetings, these will remain ongoing as avenues to discuss any Code or Technical issues as they arise.