2020/2021 TECHNICAL ASSURANCE OF METERING (TAM) AUDIT SCOPE

MEETING NAME	Performance Assurance Board (PAB)
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Purpose of paper	Decision
Classification	Public
Summary	The Performance Assurance Board is invited to approve the Technical Assurance of Metering (TAM) audit scope in Performance Assurance Operating Period (PAOP) 2020/2021.

1. Introduction

1.1 ELEXON continues to be aware of significant impacts to Settlement caused by Metering errors. Metering errors are typically introduced through Business as Usual (BAU) activities (new connections and Metering Equipment exchanges) and routine operation of Metering Systems (blown fuses), so there is an on-going opportunity for them to manifest.

1.2 The Technical Assurance of Metering (TAM) technique aims to ensure the accuracy of Half Hourly (HH) metered data through the use of onsite Inspection Visits and Desktop Audits. It is the only Performance Assurance Technique (PAT) within the Performance Assurance Framework (PAF) that looks at physical Metering Systems. TAM is also used to assess the overall health of the HH Metering System population. TAM requirements are outlined in BSCP27 – Technical Assurance of Half Hourly Metering Systems for Settlement Purposes.

1.3 Table 1 shows the Settlement Risks that the TAM technique assesses compliance against and the estimated annual Settlement impact in the 2019/2020 Risk Evaluation Register (RER).

Id No.	Risk Sub-Category	Market	Lower Impact	Forecast Impact	Upper Impact	Target Risk Impact
003	Metering Equipment installation and Commissioning	SVA	£14.7m	£43.0m	£84.3m	£40.0m
020	Metering Equipment installation and Commissioning	CVA	£618.0k	£14.0m	£21.2m	£11.5m
006	Meter Technical Details transfer and processing	SVA	£3.5m	£8.0m	£17.0m	£6.0m
004	Notification of change to Metering Equipment	SVA	£2.9m	£7.7m	£19.4m	£6.7m
012	Metering Equipment technical detail quality	SVA	£2.1m	£6.2m	£17.1m	£5.0m
022	Notification of change to Metering Equipment	CVA	£5.2m	£5.2m	£16.0m	£5.0m
024	Metering Equipment technical detail quality	CVA	£1.1m	£1.1m	£4.0m	£1.0m
026	Aggregation Rules	CVA	£0.0	£0.1m	£39.8m	£0.1m

Table 1: Technical Assurance of Metering associated Risks (Risk Evaluation Register 2019/2020)

1.4 The 2020/2021 RER is currently under review. However, ELEXON does not anticipate significant changes to the impact scorings of Risks that the TAM technique assesses.

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2. Performance Assurance Framework (PAF) Review Recommendations

2.1 The PAF review included two recommendations associated with the TAM audit scope:

- Greater flexibility is provided for when setting the TAM audit scope (for all sample types) with consideration given to targeting market segments deemed to be of higher risk; and
- An annual exercise is undertaken to assess the sample size required to deliver the scope which follows good statistical practice.

2.2 ELEXON aims to provide greater flexibility in TAM by using Desktop Audits to supplement Specific Sample Inspection Visits. The introduction of Desktop Audits will increase the number of total audits that can be undertaken during a PAOP. An increase in sample size could allow for more than one market segment, or area of Risk to be investigated.

3. Statistical Sampling

3.1 A Statistical sampling methodology will be used where appropriate to improve the understanding of the assurance offered by the sample size. Where a statistical sampling methodology has been used it will include reference to a confidence level and a confidence interval, which is defined as:

- **Confidence level** expresses the certainty as a percentage. If the confidence level is 95%, you can be 95% certain that the results from the sample are representative of the population; and
- **Confidence Interval** is the margin of error on the certainty of outcomes from your sample. For example, if you use a confidence interval of 2 and 20% of your sample has a particular outcome, you can infer that between 18-22% of the population would have the same outcome.

3.2 The calculation of a sample size will also include a failure rate. The failure rates used in this assessment are the expected percentage of Settlement impacting (Category 1) non-compliances present in the population.

3.3 ELEXON has used a combination of in-house data modelling exercises and standard statistical sampling formula to arrive at the values presented in this paper. A summary has been provided in Appendix 1 and 2.

3.4 A statistical sampling methodology will not be appropriate for all of the sample types covered in the TAM technique. Market areas, or Meter types that have a small population require a much higher percentage of the population included in the sample in order to determine statistical significance.

4. Main Sample

4.1 The main samples for Supplier Volume Allocation (SVA) and Central Volume Allocation (CVA) look to provide a view of overall health of the market. Historically, the SVA main samples size has been approximately 1% of Measurement Class C Meters, whilst CVA has been approximately 5-10% of the total CVA sites.

Main Sample – SVA

4.2 The SVA Main Sample will continue to focus on Measurement Class C Meters, as it remains the most significant Risk to the SVA market. This is due to energy volumes at a Metering System level (100kW) and the proportion of total volume in the SVA market (estimated at 55%).

4.3 Table 2 details a conservative and lean sample size options for the SVA main sample.

	Option 1	Option 2
Confidence Level	95%	95%
Confidence Interval	0.5%	0.55%
Population	158,637	158,637
Failure Rate	1%	1%
Number of Inspection Visits	1507	1248
Percentage of population	0.95%	0.77%

Table 2: Supplier Volume Allocation Main Sample options

4.4 The two SVA Main Sample options provide the following assurance:

- **Option 1** offers 95% certainty that a Category 1 non-compliance occurring at a rate of 1% in Measurement Class C population will be detected to an accuracy 0.5-1.5%; and
- **Option 2** offers 95% certainty that a Category 1 non-compliance occurring at a rate of 1% in Measurement Class C population will be detected to an accuracy of 0.45-1.55%.

4.5 ELEXON recommends Option 2. The additional assurance offered by the inclusion of an additional 259 Inspection Visits is not deemed to add significant value. Furthermore, a data modelling exercise undertaken by ELEXON demonstrates that the error detection rate offered by a sample size of 1450 compared to 1250 does offer similar levels of detection rates.

4.6 An additional benefit of taking a lean approach to the SVA Main Sample is that it allows for Inspection Visits to be used in a flexible way to address specific markets, or Risk areas in the Specific Sample.

CVA Main Sample

4.7 The CVA main sample does not lend itself to statistical sampling methodology, due to the small CVA population (919 Meter System Identifiers (MSIDs)) and an expected Category 1 non-compliance occurrence of 0.25%. In order to achieve a statistical significance the sample would have to be approximately 70-80% of the population. The cost is deemed to outweigh the benefits of undertaking such a statistically significant CVA sample, especially as CVA sites have a number of controls and monitoring that would highlight high materiality errors.

4.8 The sampling method used in previous audit years has been to select between 5-10% of the population each audit year. Since audit year 2010/2011 to date a total of 685 (74% of total CVA sites) sites have been covered within the CVA Main Sample audits.

4.9 ELEXON recommends continuing with the previous methodology and proposes the same number of CVA Inspections Visits as with previous years for the 2020/2021 audit scope. This would result in a CVA Main Sample of 50 Inspection Visits, which would result in a total of 735 (79% of total CVA sites) covered in a 10 year period.

5. Specific Sample

5.1 The 2020/2021 audit year will see the introduction of Desktop Audits to the TAM technique. In order to better understand the strengths and weaknesses of Desktop Audits, ELEXON recommends having Desktop Audits supplementing Inspection Visits in the Specific Sample.

5.2 The Technical Assurance of Metering Expert Group (TAMEG) and internal stakeholders at ELEXON have recommended two market areas which could be covered in a Specific Sample for the 2020/2021 audit year; Measurement Class E Meters and Complex SVA sites.

5.3 Please note, the Complex SVA Specific Sample is only available if SVA Main Sample Option 2 is selected.

Measurement Class E Meters

5.4 Measurement Class E sites are defined as follows: Half Hourly Metering Equipment at below 100kW Premises with Current Transformers (CT).

5.5 TAM has not yet included Measurement Class E Meters in its scope, subsequently no assurance activities have been undertaken on the physical health of these types of Metering Systems. Table 3 presents the proposed sample.

	Measurement Class E – Specific Sample
Confidence Level	95%
Confidence Interval	1.25%
Population	82,439
Failure Rate	2%
Number of Inspection Visits	130
Number of Desktop Audits	350
Total Number of Audits	480
Percentage of population	0.58%

Table 3: Measurement Class E Specific Sample

5.6 The Measurement Class E Specific Sample offers 95% certainty that a Category 1 non-compliance that has been estimated to occur at a rate of 2%, will be detected to an accuracy of 0.75-3.25%. A failure rate of 2% has been estimated because it is anticipated that there is a greater failure rate than Measurement Class C due to errors that occurred during P272 – 'Mandatory Half Hourly Settlement for Profile Classes 5-8'.

5.7 An additional benefit of trialling Desktop Audits on Measurement Class E is that the records should be straightforward. This will allow ELEXON and the TAA to refine the process before using Desktop Audits on more complicated market areas, such as Complex SVA sites.

5.8 A contingency of Inspection Visits has been reserved for occasions where a Desktop Audit indicates that there may be an onsite error that is currently affecting Settlement. It will be at the discretion of the Technical Assurance Agent (TAA) auditor and ELEXON whether an Inspection Visit is triggered.

Complex SVA Sites

5.9 Complex SVA sites are where the Half Hourly Meter Technical Details (MTDs) data flow (D0268[1]) is insufficient to accurately describe to the Half Hourly Data Collector (HHDC) how to allocate the various channels of data that should be utilised in Settlement. Therefore, the D0268 must be supplemented with the BSCP514/8.4.8a - 'Complex Site Supplementary Information Form'.

5.10 A Complex SVA site does not lend itself to a statistical sampling methodology due to the small number of complex SVA MSIDs (approximately 367 exist). ELEXON has noted an increase in the number of Trading Disputes associated with Complex SVA sites, which rose from zero in 2016-2017 to four in 2018-2019.

[1] D0268: Half Hourly Meter Technical Details are transferred when there is a change in equipment, configuration or upon change of Agent

5.11 A Specific Sample on Complex SVA sites was undertaken in the 2009/2010 audit year, 49 Inspection Visits were completed, with 79% of the audit registering Category 1 non-compliances. The Category 1 non-compliances were all related to issues with the Complex Site form, mainly sites being incorrectly registered as Complex.

5.12 ELEXON have processed a number of Changes to mitigate the Risk posed by Complex Sites, which includes CP1338[2], CP1378[3] and CP1472[4]. However, Complex Sites remain a topic of interest with a BSC Issue group currently in the pipeline to discuss Complex Site Single Line Diagrams (SLD), netted volumes and aggregation rules.

5.13 ELEXON proposes a sample size of 120 MSIDs for Inspection Visit, with the potential to add Desktop Audits further in the audit year. Please note that it is likely sites will contain multiple MSIDs, therefore will require less Inspection Visits.

5.14 Desktop Audits will not be included in the Complex Site sample, until ELEXON are satisfied that any teething issues that may occur at the start of the audit year are resolved in the Measurement Class E sample.

5.15 Complex Sites are deemed to represent a significant Risk to Settlement due to the high energy volumes and potential for errors associated with the added complexity. Furthermore, the Specific Sample will also inform the upcoming issue group and validate if the Meters are still being incorrectly registered as Complex, as observed in 2009/2010.

6. CVA Targeted Inspections - Offshore Wind

6.1 The last two audit years have included six (three per year) inspections of offshore wind sites. A total of six inspections have been completed of the total population of 21 sites. The audits so far have highlighted one Category 1 non-compliance.

6.2 ELEXON recommends continuing the offshore wind inspections and proposes to undertake three audits of this type in the 2020/2021 audit year.

7. Recommendations

7.1 We invite you to:

a) **COMMENT** on the TAM Audit Scope;

b) **AGREE** the SVA Main Sample;

c) **AGREE** the CVA Main Sample;

d) **AGREE** the Measurement Class E Specific Sample;

e) **AGREE** the Complex SVA Specific Sample; and

f) **AGREE** the CVA Targeted Inspection (Offshore Wind).

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[2] CP1338 – 'Guidance for Complex Sites - Network Flows affecting Settlement Meter Readings'
[3] CP1378 – 'Clarifying rules on Third Party Access on Licence Exempt Distribution Network'
[4] CP1472 – 'Removal of SVA proving tests for Meters with a pulse multiplier of one'

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APPENDIX 1

Statistical Sampling Formula

This calculator uses the following formula for the sample size n:

$$n = N*X / (X + N - 1),$$

where,

$$X = Z_{\alpha/2}^2 *p*(1-p) / MOE^2$$

$\mathbf{Z_{\alpha/2}}$ is the critical value of the Normal distribution at α/2 (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96);

MOE is the margin of error (or confidence interval);

p is the sample proportion

N is the population size

Daniel WW (1999). Biostatistics: A Foundation for Analysis in the Health Sciences. 7th edition. New York: John Wiley & Sons.

APPENDIX 2

ELEXON Sample Size Simulation

ELEXON ran sample size simulations to determine the frequency that a particular failure rate was observed in a population when using different sample sizes. This method assumes a completely random occurrence of failure events.

The total population of Measurement Class C Meters (150,000) was mapped, with a percentage (failure rate) of the population assigning a theoretical material error. A random sample of size 'n' was selected from the population 10,000 times and the failure rates of each sample presented on a standard distribution graph. Distribution curves were compared to determine the impact of effectiveness of different sample sizes.