

**ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT**



VERITEK

For

VODAFONE AND MERCURY NZ LTD

Prepared by: Steve Woods

Date audit commenced: 10 May 2021

Date audit report completed: 10 August 2021

Audit report due date: 14-Sep-17

TABLE OF CONTENTS

Executive summary	3
Audit summary	4
Non-compliances	4
Recommendations	4
Issues 4	
1. Administrative	5
1.1. Exemptions from Obligations to Comply with Code	5
1.2. Structure of Organisation	6
1.3. Persons involved in this audit.....	7
1.4. Hardware and Software	7
1.5. Breaches or Breach Allegations.....	7
1.6. ICP Data	7
1.7. Authorisation Received	8
1.8. Scope of Audit	8
1.9. Summary of previous audit	8
1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)	8
2. DUML database requirements.....	10
2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)	10
2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)	12
2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)	12
2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)	13
2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)	13
2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)	13
2.7. Audit trail (Clause 11(4) of Schedule 15.3).....	14
3. Accuracy of DUML database	15
3.1. Database accuracy (Clause 15.2 and 15.37B(b))	15
3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))	16
Conclusion	19
Participant response	20

EXECUTIVE SUMMARY

This audit covers the **Vodafone** DUML database and processes and was conducted at the request of **Mercury NZ Limited (Mercury)** in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

This database is for items of load supplying Vodafone's telecommunications network. Each item of load contains a transformer and the secondary side of the transformer supplies voltage to part of the Vodafone network. The wattage figures in the database were derived from measurements taken at the secondary side of the transformers, which means transformer losses are not considered. The voltage and current measurements should have been taken on the primary side of the transformers, which is a recommendation in this report. Incorrect wattage calculations have led to under submission by approx. 400,000 kWh per annum.

All other details in the database were confirmed as accurate.

The future risk rating indicates that the next audit be completed in three months. The timeframe for completing the voltage and current measurements for all 545 items of load could take longer than three months, therefore I recommend an audit period of six months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Distributed unmetered load audits	1.10	16A.26 and 17.295F	Audit not conducted within the required timeframe.	Moderate	Medium	4	Cleared
Deriving submission information	2.1	11(1) of Schedule 15.3	Under submission of 400,000 kWh per annum due to incorrect wattage figures in the database.	Moderate	High	6	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Under submission of 400,000 kWh per annum due to incorrect wattage figures in the database.	Moderate	High	6	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	Under submission of 400,000 kWh per annum due to incorrect wattage figures in the database.	Moderate	High	6	Identified
Future Risk Rating						22	
Future risk rating	0	1-4	5-8	9-15	16-18	19+	
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months	

RECOMMENDATIONS

Subject	Section	Recommendation
Deriving submission information	2.1	Conduct voltage and current measurements at the primary side and update all wattage figures.

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

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

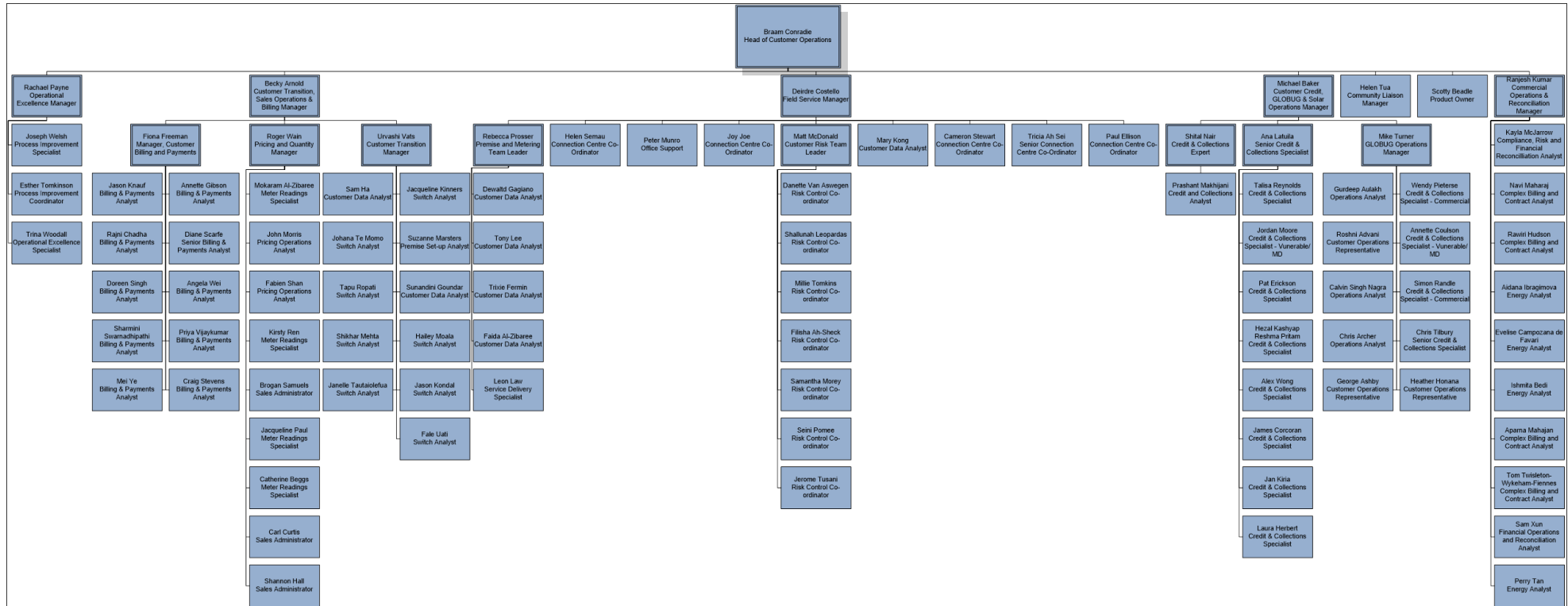
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

Mercury has no exemptions in place in relation to the ICPs covered by this audit report.

1.2. Structure of Organisation

Mercury provided an organisational structure:



1.3. Persons involved in this audit

Auditors:

Name	Title
Steve Woods	Lead Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Kayla McJarrow	Compliance, Risk and Financial Reconciliation Analyst	Mercury NZ Ltd
Sarah Dark	Business Development Manager – Large Commercial	Mercury NZ Ltd
Christian White	Access DevOps Engineer, Platforms - Fixed Access Network	Vodafone

1.4. Hardware and Software

The streetlight data for Vodafone is held in an excel spreadsheet. This is backed up in accordance with standard industry procedures. Access to the spreadsheet is restricted by way of user log into the computer drive.

Systems used by the trader to calculate submissions are assessed as part of their reconciliation participant audits.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000161894CK3EF	VODAFONE DUML GXP CPK0331	CPK0331	RPS	107	43,427
0000161895CKFAA	VODAFONE DUML GXP GFD0331	GFD0331	RPS	60	23,085
0000161896CK36A	VODAFONE DUML GXP KWA0111	KWA0111	RPS	10	3,598
0000161897CKF2F	VODAFONE DUML GXP HAY0331	HAY0331	RPS	20	7,741
0000161898CK0F1	VODAFONE DUML GXP TKR0331	TKR0331	RPS	42	15,483
0000161899CKCB4	VODAFONE DUML GXP UHT0331	UHT0331	RPS	41	16,352
0000161900CK406	VODAFONE DUML GXP WIL0331	WIL0331	RPS	43	16,706
0000164960CKCD6	VODAFONE DUML GXP CPK0111	CPK0111	RPS	14	5,183
0000190118TR62B	VODAFONE DUML GXP MLG0331	MLG0331	UML	49	19,273
0001261460UN08E	VODAFONE BULK UNMETERED	WRD0331	UML	9	4,555

0001393839UN86B	VODAFONE DUML GXP HAY0111	HAY0111	UML	21	7,680
0001409085UN545	VODAFONE BULK UNMETERED	ALB0331	UML	11	5,452
0007106261RN1C3	Clear Mux Box	ISL0661	UML	1	368
0007145198RN5F3	Telstra Clear Cabinet	ISL0661	UML	1	312
0007146145RN50A	Telstra Clear Cabinet	ISL0661	UML	1	273
0015723581ELA43	TELSTRACLEAR LTD	PRM0331	RPS	94	39,345
1001146090UN1CE	VODAFONE DUML GXP MLG0111	MLG0111	UML	21	7,314
				545	216,146

1.7. Authorisation Received

All information was provided directly by Mercury.

1.8. Scope of Audit

This audit covers the Vodafone DUML database and processes and was conducted at the request of Mercury NZ Limited (Mercury) in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The spreadsheet is maintained by Vodafone and an updated version is expected to be sent to Mercury each month.

A field audit of 140 items of load was carried out on May 10th, 2021.

1.9. Summary of previous audit

This is the first audit for this database.

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

1. *by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
2. *within three months of submission to the reconciliation manager (for new DUML)*
3. *within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

Audit observation

Mercury has requested Veritek to undertake this street lighting audit.

Audit commentary

This audit report was due within three months of these ICPs switching to Mercury. The switch in date was 18 October 2019 for some ICPs and 14 June 2017 for ICP 0015723581ELA43. Therefore, this audit report is late. The main reason is that there was no database in place and Mercury has had to work with Vodafone to develop one.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 1.10 With: Clause 16A.26 and 17.295F From: 14-Sep-17 To: 17-May-21	Audit not conducted within the required timeframe. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4		
Audit risk rating	Rationale for audit risk rating		
Medium	The controls are recorded as moderate because Mercury has had to develop a database from scratch and this process started as soon as the ICPs switched in. The impact on settlement and participants is moderate; therefore, the audit risk rating is medium.		
Actions taken to resolve the issue		Completion date	Remedial action status
When Mercury inherited these connections, there was no unmetered database in place despite having been connected for many years under other retailers. Mercury began working with Vodafone as soon as these ICPs were switched in, to establish a compliant DUML database to ensure for accurate submission and compliance with the code. This has been a lengthy process and has required coordination among different parties. A number of new ICPs have been created to comply with DUML database requirements and Vodafone have completed full field audits to ensure connections details are recorded correctly.		N/A	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
This is a complex one-off instance and we believe we have adequate process in place to comply in normal circumstances.		N/A	

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- DUML database is up to date,
- methodology for deriving submission information complies with Schedule 15.5.

Audit observation

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information. Mercury reconciles this DUML load using the RPS and UML profiles. I checked the accuracy of the submission information from the database with the submission for the month of April 2021 to confirm the volume was calculated correctly.

Submission is based on the registry for 16 of the 17 ICPs and for ICP 0015723581ELA43, there is one metered cabinet, where the consumption is multiplied by 101. The expected consumption for April 2021 for this ICP, based on the database wattages, is 28,323 kWh, but the actual submission was 25,564 kWh, which is under submission of 2,765 kWh.

The registry daily kWh figure is incorrect for five of the 16 ICPs where the figure is used. The table below shows the differences.

ICP	Database daily kWh	Registry daily kWh	kWh difference for April 2021
0001261460UN08E	109.33	64.8	1,336
0001409085UN545	130.84	79.2	1,549
0007106261RN1C3	8.83	84	-2,255
0007145198RN5F3	7.50	27.6	-603
0007146145RN50A	6.54	27.6	-632

The net difference of April 2021, including ICP 0015723581ELA43 is under submission of 2,164 kWh. This equates to annual under submission of 26,329 kWh.

Each item of load contains a transformer and the secondary side of the transformer supplies voltage to part of the Vodafone network. The wattage figures in the database were derived from measurements taken at the secondary side of the transformers, which means transformer losses are not considered. The voltage and current measurements should have been taken on the primary side of the transformers. I compared the calculated consumption for 20 metered items of load, where the measurements were taken at the secondary side of the transformers, against the actual metered consumption and found the metered consumption was 17.5% higher than the calculated consumption. There are 10 items of load where measurements were taken at both the primary and secondary sides of the transformer and these

results showed a difference of 21%. Even taking the lower figure of 17.5%, the total under submission is 400,000 kWh per annum. I recommend the voltage and current measurements are repeated at the primary side of each item of load to ensure the accurate calculation of kWh.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 11(1) of Schedule 15.3	Conduct voltage and current measurements at the primary side and update all wattage figures.	We will be working with Vodafone to conduct another full field audit to confirm correct wattage details using the correct measurement procedures.	Identified

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.1 With: 11(1) of Schedule 15.3 From: 14-Jun-17 To: 15-May-21	Under submission of 400,000 kWh per annum due to incorrect wattage figures in the database. Potential impact: High Actual impact: High Audit history: None Controls: Moderate Breach risk rating: 6		
Audit risk rating	Rationale for audit risk rating		
High	The controls in place are rated as moderate because there was a wattage calculation, but it was based on incorrect inputs. The impact is assessed to be high based on the under submission of 400,000 kWh per annum.		
Actions taken to resolve the issue		Completion date	Remedial action status

<p>On further analysis, we believe our total unmetered kWh values prior to March 2021, will have been in line with the estimated consumption calculated from this audit.</p> <p>We will be working with Vodafone to conduct another full field audit to confirm correct wattage details using the correct measurement procedures. As this is unlikely to be a quick process, we have inflated our kWh values for each ICP by 17.5% (from March21) to more accurately reflect the correct volumes in our submissions. Once the correct wattages have been confirmed following Vodafone’s second field audit, the corrections will be processed in revision files.</p> <p>Vodafone has now completed an audit of ICP 0015723581ELA43 and all unmetered connections have been added to the DUMML database and our system. We are currently in the process of working with the relevant parties to update the registry accordingly. This ICP will also be included in Vodafone’s second field audit.</p>	March 2022	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As above.	As above.	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUMML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUMML,*
- *the items of load associated with the ICP identifier.*

Audit observation

The spreadsheet was checked to confirm the correct ICP was recorded correctly for the load.

Audit commentary

The spreadsheet contains correct ICP identifiers.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUMML database must contain the location of each DUMML item.

Audit observation

The spreadsheet was checked to confirm the location is recorded for all items of load.

Audit commentary

The spreadsheet contains the street address for each item of load, which is sufficient to locate them.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The spreadsheet was checked to confirm that it contained fields for load type and wattage.

Audit commentary

The spreadsheet contains fields for wattage and a description of the type of load.

Audit outcome

Compliant

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

A field audit was undertaken of 140 items of load.

Audit commentary

No discrepancies were identified.

Audit outcome

Compliant

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the spreadsheets was examined.

Audit commentary

The spreadsheet contains a separate sheet for recording changes. Vodafone advised that the voltage and current figures will be re-checked when any changes to the load are conducted.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The spreadsheet was checked for audit trails.

Audit commentary

The spreadsheet includes a change log for each ICP which records the date of any change, action taken, person making the change and the details.

Audit outcome

Compliant

3. ACCURACY OF DUMML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUMML database is complete and accurate.

Audit observation

A field audit of all 140 items of load was undertaken to confirm the accuracy of the spreadsheet. I checked the wattage calculations to ensure accuracy.

Audit commentary

Field Audit Findings

No discrepancies were identified.

Wattage accuracy

Each item of load contains a transformer and the secondary side of the transformer supplies voltage to part of the Vodafone network. The wattage figures in the database were derived from measurements taken at the secondary side of the transformers, which means transformer losses are not considered. The voltage and current measurements should have been taken on the primary side of the transformers. I compared the calculated consumption for 20 metered items of load, where the measurements were taken at the secondary side of the transformers, against the actual metered consumption and found the metered consumption was 17.5% higher than the calculated consumption. There are 10 items of load where measurements were taken at both the primary and secondary sides of the transformer and these results showed a difference of 21%. Even taking the lower figure of 17.5%, the total under submission is 400,000 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: 15.2 and 15.37B(b) From: 14-Jun-17 To: 15-May-21	Under submission of 400,000 kWh per annum due to incorrect wattage figures in the database. Potential impact: High Actual impact: High Audit history: None Controls: Moderate Breach risk rating: 6
Audit risk rating	Rationale for audit risk rating
High	The controls in place are rated as moderate because there was a wattage calculation, but it was based on incorrect inputs. The impact is assessed to be high based on the under submission of 400,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
<p>On further analysis, we believe our total unmetered kWh values prior to March 2021, will have been in line with the estimated consumption calculated from this audit.</p> <p>We will be working with Vodafone to conduct another full field audit to confirm correct wattage details using the correct measurement procedures. As this is unlikely to be a quick process, we have inflated our kWh values for each ICP by 17.5% (from March21) to more accurately reflect the correct volumes in our submissions. Once the correct wattages have been confirmed following Vodafone’s second field audit, the corrections will be processed in revision files.</p> <p>Vodafone has now completed an audit of ICP 0015723581ELA43 and all unmetered connections have been added to the DUML database and our system. We are currently in the process of working with the relevant parties to update the registry accordingly. This ICP will also be included in Vodafone’s second field audit.</p>	March 2022	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As above.	As above.	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- volume information for the DUML is being calculated accurately,
- profiles for DUML have been correctly applied.

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the expected kWh against the submitted figure to confirm accuracy.

Audit commentary

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information. Mercury reconciles this DUML load using the RPS and UML profiles. I checked the accuracy of the submission information from the database with the submission for the month of April 2021 to confirm the volume was calculated correctly.

Submission is based on the registry for 16 of the 17 ICPs and for ICP 0015723581ELA43, there is one metered cabinet, where the consumption is multiplied by 101. The expected consumption for April 2021 for this ICP, based on the database wattages, is 28,323 kWh, but the actual submission was 25,564 kWh, which is under submission of 2,765 kWh.

The registry daily kWh figure is incorrect for five of the 16 ICPs where the figure is used. The table below shows the differences.

ICP	Database daily kWh	Registry daily kWh	kWh difference for April 2021
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0007145198RN5F3	7.50	27.6	-603
0007146145RN50A	6.54	27.6	-632

The net difference of April 2021, including ICP 0015723581ELA43 is under submission of 2,164 kWh. This equates to annual under submission of 26,329 kWh.

Each item of load contains a transformer and the secondary side of the transformer supplies voltage to part of the Vodafone network. The wattage figures in the database were derived from measurements taken at the secondary side of the transformers, which means transformer losses are not considered. The voltage and current measurements should have been taken on the primary side of the transformers. I compared the calculated consumption for 20 metered items of load, where the measurements were taken at the secondary side of the transformers, against the actual metered consumption and found the metered consumption was 17.5% higher than the calculated consumption. There are 10 items of load where measurements were taken at both the primary and secondary sides of the transformer and these results showed a difference of 21%. Even taking the lower figure of 17.5%, the total under submission is 400,000 kWh per annum. I recommend the voltage and current measurements are repeated at the primary side of each item of load to ensure the accurate calculation of kWh.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: 15.2 and 15.37B(c) From: 14-Jun-17 To: 15-May-21	Under submission of 400,000 kWh per annum due to incorrect wattage figures in the database. Potential impact: High Actual impact: High Audit history: None Controls: Moderate Breach risk rating: 6
Audit risk rating	Rationale for audit risk rating

High	<p>The controls in place are rated as moderate because there was a wattage calculation, but it was based on incorrect inputs.</p> <p>The impact is assessed to be high based on the under submission of 400,000 kWh per annum.</p>	
Actions taken to resolve the issue	Completion date	Remedial action status
<p>On further analysis, we believe our total unmetered kWh values prior to March 2021, will have been in line with the estimated consumption calculated from this audit.</p> <p>We will be working with Vodafone to conduct another full field audit to confirm correct wattage details using the correct measurement procedures. As this is unlikely to be a quick process, we have inflated our kWh values for each ICP by 17.5% (from March21) to more accurately reflect the correct volumes in our submissions. Once the correct wattages have been confirmed following Vodafone’s second field audit, the corrections will be processed in revision files.</p> <p>Vodafone has now completed an audit of ICP 0015723581ELA43 and all unmetered connections have been added to the DUML database and our system. We are currently in the process of working with the relevant parties to update the registry accordingly. This ICP will also be included in Vodafone’s second field audit.</p>	March 2022	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As above.	As above.	

CONCLUSION

This database is for items of load supplying Vodafone's telecommunications network. Each item of load contains a transformer and the secondary side of the transformer supplies voltage to part of the Vodafone network. The wattage figures in the database were derived from measurements taken at the secondary side of the transformers, which means transformer losses are not considered. The voltage and current measurements should have been taken on the primary side of the transformers, which is a recommendation in this report. Incorrect wattage calculations have led to under submission by approx. 400,000 kWh per annum.

All other details in the database were confirmed as accurate.

The future risk rating indicates that the next audit be completed in three months. The timeframe for completing the voltage and current measurements for all 545 items of load could take longer than three months, therefore I recommend an audit period of six months.

PARTICIPANT RESPONSE

Mercury would like to thank all parties who have contributed to the establishment of this DUML database. This has been a complex and lengthy process. Special thanks to The EA and Steve Woods for providing support and advice, and to Vodafone for their co-operation.

Following the findings from this audit, Mercury has taken the proactive steps of inflating our unmetered kWh values by 17.5% to more accurately reflect the estimated volumes of this database. We will be working with Vodafone again to conduct another field audit of all connections to record the correct wattage values. Corrections will be reflected in revision files as we expect to have this completed by Mar22.

We would like to note that all other database details have been confirmed as accurate which shows Vodafone & Mercury's commitment to establishing a compliant database and request that the EA consider an appropriate audit period to allow sufficient time for Vodafone to complete another full field audit which is not a quick and easy task.