

ELEXON

# Test Specification for an Equivalent Meter

Version 1.0



**Contact:**

Kevin Spencer

Market Analyst

Telephone: 0207 380 4115

## Introduction

### 1. Scope

This Test Specification covers the MA System tests that are required to be performed by an applicant, wishing to gain approval for use as an Equivalent Meter, and the test evidence that should be provided to the accredited test agent, currently BSCCo, to demonstrate compliance with the requirements and responsibilities as per BSCP520. Where EM software is developed by a Software Developer not associated with an existing MA the testing will solely focus on the software requirement within this document.

### 2. Approval Process

All new EMs are required by BSCP520 to be approved by the Panel or its delegated authority, the Supplier Volume Allocation Group (SVG). As part of this process, the initial stages of which are managed by the Unmetered Supply User Group (UMSUG), EMs are tested against the requirements of an EM specification in BSCP520 to ensure they are fit for purpose. The UMSUG then makes a recommendation to the SVG as to whether the EM should be approved for use.

The testing and approval process has been introduced for EMs. The Test Specification for EMs comprising a CMS is covered in the following document which specifies the CMS Testing requirements: [CMS Test Specification](#)

The approach requires an applicant to commission an accredited test agent, currently BSCCo, who would evaluate the software against the EM requirements specified in BSCP520.

This Test Specification aims to provide guidance to applicants by summarising the EM requirements as specified in BSCP520 in the Requirements Test Checklist ([Section 9](#)), along with the associated testing that is necessary in order to demonstrate compliance.

Approval would be demonstrated by the provision of test evidence gained in the process of running the specified tests to the UMSUG and SVG. Once approved, the details of the new EM would be added to an Approved Equivalent Meters List maintained by BSCCo, published on the website.

### 3. Equivalent Meter Functionality

Equivalent meters are of two types:-

- (a) Passive meters which allocate the Unmetered consumption across the half hourly periods by a mathematical relationship of annual burning hours to the daily time of sunrise and sunset; and
- (b) Dynamic meters which allocate the Unmetered consumption across the half hourly periods by reference to the operation of a number of actual PECUs, or by making use of actual switching times reported by a Central Management System. In either case the equivalent meter defaults to a passive mode using calculated times of switch operation in the event of the actual switching times not being available.

The applicant will define the type of EM to be tested. The certified test agent will only test against the test requirement appropriate to the type of EM.

## 4. Assumptions

The following assumptions have been made:

- New MAs are required to undergo Qualification in accordance with BSCP537 'Qualification Process for SVA Parties, SVA Party Agents and CVA MOAs, before operating in the market and before undergoing Central Management System EM approval; and
- If an existing MA chooses to make use of a new EM, the changes required to the participant's systems and processes may trigger a requirement for re-qualification. The MA will determine whether they need to re-qualify in this circumstance. BSCCo can provide guidance on this matter where required.

## 5. Test Approach

The MA system functional requirements and responsibilities (as per BSCP520) have been mapped to System Requirement Test Checklists. These Checklists will be used by the accredited test agent, currently BSCCo, to ensure that the applicant has demonstrated compliance with all MA system requirements listed in BSCP520.

Each test requirement has been given a test reference number, which can be traced back where applicable, to the relevant requirement in BSCP520. Test References have been grouped into Test Groups with a summary of the tests and evidence required for each Test Group given in the Test Group Summary ([Section 18](#)).

The Test Group Summary ([Section 18](#)) has been provided as a guideline only. It is the applicant's responsibility to ensure that the tests run show compliance with each requirement listed in the System Requirements Test Checklists ([Section 9](#)), and that the test evidence has been collected in a clear and precise manner ([Recording Test Results](#)).

It is expected that the accredited test agent will witness the execution of the tests run by the applicant at the applicant's premises.

## 6. Test Environment and Data Requirements

It is the applicant's responsibility to provide the necessary test environments and data required to demonstrate compliance as per BSCP520, and to meet the requirements of all the key test scenarios given below ([MA Test Groups](#)) and those in the Test Group Summary ([Section 18](#)).

Where the MA System is being tested is CMS capable then it will be the applicant's responsibility to secure or create the operational event logs or operational event log data that meet the appropriate requirements.

## 7. Key Test Scenarios



# Test Specification

This section contains a high level summary of the key test scenarios included in the Test Group Summary ([Section 18](#)). This section does not contain an exhaustive list of all scenarios tested. The applicant is advised to analyse the testing requirements based on all scenarios listed in the Test Group Summary.

The key MA System test scenarios shall include, but will not be limited to, the following:

- MA qualification under BSCP537;
- Data security measures;
- Synchronisation to UTC;
- The EM can perform the Functions of a Passive Meter;
- The EM can perform the Functions of a Dynamic Meter;
- The EM can perform the Functions of a CMS Capable Meter;
- The generating and sending of file to the HHDC;
- The generating and sending of CMS Unit Exception Reports; and
- The ad-hoc generating and sending of Operational data.

## 8. Requirements Test Checklist

This section provides a checklist of MA System requirements. The applicant is expected to comply with these system requirements for approval as an Equivalent Meter.

Where applicable each requirement has been allocated the appropriate BSCP520 reference.

Test references have been grouped into Test Groups with a summary of the tests and evidence required for each Test Group given in the Test Group Summary ([Section 18](#)). It should be noted that the Test Group Summary provides a guideline only. It is the applicant's responsibility to perform the appropriate tests in order to demonstrate compliance with all relevant system requirements.

The certified test agent, currently BSCCo, will use the Test Checklist to monitor compliance of each requirement.



## Meter Administrator System Test Groups

### 9. System Requirements

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
<b>Test Group 1</b>	<b><u>MA Certification</u></b>			
Test 1.1	MA System must be operated by a MA qualified under BSCP537	Section 11		
<b>Test Group 2</b>	<b><u>Configuration Control</u></b>			
Test 2.1	MA software version	Non-functional		
Test 2.2	MA operating platform and version	Non-functional		
<b>Test Group 3</b>	<b><u>System Security</u></b>			
Test 3.1	Third Party Access			
<b>Test Group 4</b>	<b><u>Synchronisation to UTC</u></b>	4.6.3.2 (I)		
<b>4.1</b>	<b><u>Synchronisation to UTC</u></b>	4.6.3.2 (I)		



# Test Specification

## 10. Functions of a Passive Meter

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
<b>Test Group 5</b>	The Meter Administrator shall be able to add, delete and modify all information required to define each MSID and to relate it to the Customer, LDSO, Supplier and Data Collector.	<b>4.6.3.1</b>		
Test 5.1	Add, delete, modify manually:	4.6.3.1 (a)		
Test 5.1.1	MSID	4.6.3.1 (a)		
Test 5.1.2	Effective From Date	4.6.3.1 (a)		
Test 5.1.3	Inventory title and/or reference	4.6.3.1 (b)		
Test 5.1.4	Charge Code	4.6.3.1 (b)		
Test 5.1.5	Switch Regime	4.6.3.1 (b)		
Test 5.1.6	Total number of units of each Charge Code/Switch Regime combination	4.6.3.1 (b)		
Test 5.2	The Meter Administrator shall be able to add, delete and modify Charge Code and their associated circuit watts and circuit Volt Amperes reactive (VARs) for both full load circuit loading and dimmed load ratings as appropriate	4.6.3.1 (c)		
Test	The Meter Administrator shall be able to add, delete and modify Switch	4.6.3.1 (d)		



# Test Specification

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
5.3	Regimes and their associated operating times. The system shall be populated using the offsets and fixed times defined in Market Domain Data (MDD) (OID associated spreadsheets for each Switch Regime.)			
Test 5.4	The system shall use the average latitude and longitude information and a sunrise/sunset algorithm to calculate the time of sunrise and sunset for each day within two minutes of the sunrise and sunset times as derived from the Astronomical Almanac.	4.6.3.1 (e)		
Test 5.5	The system shall calculate, as defined in 4.5.1, the import kWh and import kVArh in each half hour period in UTC for each MSID.	4.6.3.1 (f)		
Test 5.6	The system shall provide an output file in the format shown in 4.5.4 of BSCP520 for provision to the appointed HHDC.	4.6.3.1 (g)		
Test 5.7	Audit Trail	4.6.3.1 (h)		

## 11. Functions of a Dynamic Meter

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
<b>Test Group 6</b>	In addition to the functions of a passive meter listed above, the following are required for a dynamic meter using PECU data.	<b><u>4.6.3.2</u></b>		



# Test Specification

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
Test 6.1	Add, delete, modify manually:	4.6.3.2		
Test 6.1	The system shall be able to use any one PECU array for the calculations of more than one MSID.	4.6.3.2 (a)		
Test 6.2	The system shall be able to use more than one PECU array for the calculations of one MSID using appropriate Sub-Meter ids.	4.6.3.2 (b)		
Test 6.3	In the event that a PECU in a PECU array fails to operate, the system shall compensate in its calculations by dividing that portion of load allocated to the faulty cell between the functioning cells of the same type as the failed cell.	4.6.3.2 (c)		
Test 6.4	If PECU array data is not available for any day then a data from an alternative specified PECU array shall be used for the calculations. If that data is not available then default PECU Switch Regime shall be used. The appropriate default Switch Regimes are defined in the OID associated spreadsheets.	4.6.3.2 (d)		
Test 6.5	The MA shall maintain details in an auditable manner for each PECU in a PECU array relating to location, type, manufacturer, date of manufacture and model number.	4.6.3.2 (e)		
Test 6.6	The system shall be able to download data from the PECU array.	4.6.3.2 (f)		
Test	The system shall monitor PECUs on	4.6.3.2 (g)		





# Test Specification

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
6.7	the PECU array and advise the MA of any failed units.			
Test 6.8	The system shall monitor the PECU array second counter for time keeping and advise the MA when the deviation exceeds the warning level.	4.6.3.2 (h)		
Test 6.8	The MA shall be able to produce switching times from a decoded PECU array file.  i.e. the system should be able to calculate and report switching times for individual PECUs with in an array	4.6.3.2 (i)		
Test 6.10	The system may provide a facility to apply time switch operations in accordance with a normal distribution about the nominal switching times. The standard deviation of the normal distribution shall be set by the MA.	4.6.3.2 (j)		
Test 6.11	The system shall provide facilities to retrospectively recalculate data for re-submission to Data Collectors.	4.6.3.2 (k)		
Test 6.12	Audit Trail	4.5.2.3 (b)		

## 12. Functions of a CMS Capable EM

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
<b>Test Group Z</b>	In addition to the functions of a passive meter listed above, the following requirements apply. Each requirement may relate to the CMS, the MA system or both. Where the two	<b><u>4.6.3.3</u></b>		



# Test Specification

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
	systems are combined into a single application, all requirements shall apply unless otherwise stated.			
Test 7.1	The MA system shall allow the Meter Administrator to add, delete and modify control information for each MSID electronically. The control file shall be provided to the Meter Administrator by the UMSO in the format defined in Appendix A of this Specification.	4.6.3.3 (a)		
Test 7.2	The MA system shall calculate, by an approved method, the import kWh and import kVArh consumption in each half hour period in UTC for each MSID using the switching times and power level information reported in the operational event log.	4.6.3.3 (d)		
Test 7.3	The MA system shall generate an exception list detailing any CMS Unit References reported in the control file but which are not contained in the operational event log. The exception list shall be produced for each day of the report for which any CMS Unit References are missing, and shall be provided to the UMSO and Customer on a monthly basis as a matter of routine, and additionally upon request from the UMSO or Customer.	4.6.3.3 (e)		
Test 7.4	In the event that all or part of the operational event log is not available for any reason, the MA system shall apply data representative of the Switch Regime indicated in the control file provided by the UMSO (i.e. 999 or 998). This regime shall be applied for	4.6.3.3 (f)		



# Test Specification

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
	each of the affected Settlement Days affected.			
Test 7.5	The MA system shall recalculate the half hourly consumption once data from previous days becomes available and shall submit this revised data to the HHDC. Furthermore, where any data has been found to be in error, revised data should also be submitted to the HHDC once it becomes available.	4.6.3.3 (g)		
Test 7.6	The Meter Administrator shall provide ad-hoc extracts of the CMS operational event data received from such system to the UMSO on request.	4.6.3.3 (j)		
Test 7.7	Audit Trail	4.6.3.3 (h)		

## 13. Data Output Requirements

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
<b>Test Group 8</b>	<b><u>Meter Output Report</u></b>			
Test 8.1	Submit to correct HHDC	4.6.3.1 (g)	3.3.7 of OD, Page 36 of Od	
Test 8.2	Submit Revision to correct HHDC	4.6.3.2 (k) 4.6.3.3 (g)	Page 57 of Test Report	
Test 8.3	Format as in Section 14	4.6.4	See file formats in Test report and 14 of test spec.	



# Test Specification

Test Ref	Requirement / Details	Requirement Reference	Comment	Complies
<b>Test Group 9</b>	<b><u>CMS Unit Exception List</u></b>		Just show us the exception report.	
Test 9.1	CMS Unit References	4.6.3.3 (e)		
Test 9.2	Reported on the day	4.6.3.3 (e)		
Test 9.3	Monthly distribution - UMSO	4.6.3.3 (e)		
Test 9.4	Monthly distribution - Customer	4.6.3.3 (e)		
Test 9.5	Upon request - UMSO	4.6.3.3 (e)		
Test 9.6	Upon request Customer	4.6.3.3 (e)		
<b>Test Group 10</b>	<b><u>Ad-hoc extracts - Operational event data</u></b>			
15.1	On request - LDSO	4.6.3.3 (j)		

## 14. Equivalent Meter Output File Format

The EM output shall be in the following format (given here for guidance during the testing process):

<u>Description</u>	<u>PICTURE</u>	<u>Comment</u>
HEADER RECORD:		
Record Type	X(1)	(H)header
In-Station Id.	X(2)	From System Id
Reading Date	9(8)	YYYYMMDD
Time Periods in Day	9(2)	48
Filler	X(1499)	Spaces
CR/LF		



# Test Specification

DETAIL RECORD:		
Record Type	X(1)	(D)etail
MSID	X(13)	13 digits from supply number
Register Value	9(10)	Spaces Occurs 20 times, one for each register
Register Sort Key	X(2)	Spaces
Impulse reading data group		Occurs 48 times
kWh	X(8)	Format nnnnnn.n. Space means no reading
kWh edit flag	X(1)	"A" if reading supplied else blank
Kvarh-lag	X(8)	Format nnnnnn.n. Space means no reading
Kvarh-lag edit flag	X(1)	"A" if reading supplied else blank
Kvarh-lead	X(8)	Format nnnnnn.n. Space means no reading
Kvarh-lead edit flag	X(1)	"A" if reading supplied else blank
CR/LF		
TRAILER RECORD:		
Record Type	X(1)	(T)railer
Record Count	9(8)	Includes Header & Trailer
Hash Total	9(12)	Sum of (kWh + kvarh-lag + kvarh-lead)
Filler	X(1491)	Spaces
CR/LF		



# Test Specification

## 15. CMS Control File Format

This control file shall be provided to the Meter Administrator by the UMSO in the following format:

Filename: controlmmmmmmmyyyymmdd.log  
where:  
mmmmmm = Sub-Meter ID (alphanumeric)  
yyymmdd = date of inventory  
log = file extension  
with all characters in lower case

File header: HMMMMMMYYYYMMDDVV  
where:  
H = header identifier, H  
MMMMMM = Sub-Meter ID (alphanumeric)  
YYYYMMDD = effective from date  
VV = version number

File body: UUUUUUUUUUUUNNNNNRRRCCCCCCCCCCCC  
where:  
UUUUUUUUUUUU = CMS Unit Reference (alphanumeric)  
NNNNNN = Number of items  
RRR = Switch Regime (999 or 998)  
CCCCCCCCCCCC = Charge Code

File trailer: TNNNNNN  
where:  
T = trailer identifier, T  
NNNNNN = total number of lines including header and trailer

The CMS Unit Reference shall be a 12-digit alphanumeric field that acts as a unique identifier of the unit under CMS control and to which the Charge Code and Switch Regime pertains. The structure of the CMS Unit Reference is to be agreed between the Customer and the UMSO, and may make use of existing information provided in the Detailed Inventory (e.g. National Street Gazetteer road codes) in combination with other data in order to ensure its uniqueness. The first digit of the CMS Unit Reference shall not be the letters 'H' or 'T', to ensure that the MA system cannot confuse the CMS Unit Reference with the file header or trailer.

## 16. CMS Event Log Format

Where the CMS and MA system are operated as separate applications, the switching time and load information shall be provided to the Meter Administrator in the following standard format text file. Where the CMS and MA system are integrated, the application must be able to produce the file on request for testing and audit purposes, however other methods may be used for transferring data between the two applications on a routine basis:



# Test Specification

Filename:	mmmmmmmyyyyymmddvzv.log where: mmmmmmm = Sub-Meter ID (alphanumeric) yyyymmdd = date to which the events pertain vzv = version number log = file extension with all characters in lower case
File header:	HMMMMMMYYYYMMDDVVV where: H = header identifier, H MMMMMM = Sub-Meter ID (alphanumeric) YYYYMMDD = date to which the events pertain VVV = version number
File body:	UUUUUUUUUUHHMSSPPP.PPI where: UUUUUUUUUUUU = CMS Unit Reference (alphanumeric) HHMSS = time in hours, minutes and seconds, in UTC throughout the year PPP.PP = percentage of base power i.e. undimmed power level applied to the lamp, to 2 decimal places I = information flag (alphanumeric)
File trailer:	TNNNNNNN where: T = trailer identifier, T NNNNNNN = total number of lines including header and trailer

All lines must be terminated with a carriage return, including all tail lines.

The information flag 'I' in the file body may be used to provide any further information relating to the data contained within the operational event log, e.g. if there are omissions, errors, etc. The values used for this information flag and how it is used by the CMS or the MA are currently not prescribed under the BSC, so the CMS manufacturer can specify its use/structure (and agree any such functionality with the relevant MA).

## 17. Recording Test Results

It is the applicants' responsibility for recording tests result in the format specified below. Evidence should be secured for each Test Reference listed in the Requirement Test Checklist. Evidence guidelines are given for each Test Group in the Test Group Summary. The applicant should capture evidence in accordance with these guidelines.

The following convention should used for labelling evidence where possible:



# Test Specification

<System>\_<Test Group>\_<Run Date>\_<Run Number>\_<Test Reference>

For example, the reference EM\_Test Group2\_250413\_1\_Test 2.2 should be recorded on the top of each piece of evidence associated with the following test:

Test System:       Equivalent Meter  
 Test Group:        2  
 Run Date:           25-04-2013  
 Run Number:        1  
 Test Ref: 2.2

Test to check the MA operating platform and version.

## 18. Test Group Summary

The following list summarises the TEST Groups and the testing requirements:

Test Ref	Requirement / Details	Test Requirement Overview	Test Evidence Overview
<b><u>Test Group 1</u></b>	<b><u>MA Certification</u></b> <b><u>Where EM is to be used by an existing or New MA. Does not apply to software developed for retail by software developer not associated with an MA.</u></b>	<b><u>MA Certification BSCP537 - Key requirements</u></b>  The MA System must be operated by a Meter Administrator qualified under BSCP537.	Where being developed for use by applicant:  Evidence that: <ul style="list-style-type: none"> <li>The party has previously qualified as a Meter Administrator.</li> </ul>
<b><u>Test Group 2</u></b>	<b><u>Configuration Control</u></b>	<b><u>Configuration control</u></b>  The operator of the MA system should demonstrate the software versioning and operating platforms that will be subject to approval.	Evidence that: <ul style="list-style-type: none"> <li>The software is subject to version control;</li> <li>The software version and platform subject to approval have been noted.</li> </ul>
<b><u>Test Group 3</u></b>	<b><u>System Security</u></b>	<b><u>Security</u></b> <ul style="list-style-type: none"> <li>The operator of the MA System should demonstrate the procedures which provide secure access to data.</li> </ul>	<ul style="list-style-type: none"> <li>Evidence that data is secure and that only relevant data can be accessed by the</li> </ul>





# Test Specification

Test Ref	Requirement / Details	Test Requirement Overview	Test Evidence Overview
			appropriate participant.
<b>Test Group 4</b>	<b><u>Synchronisation to UTC</u></b>	<b><u>Synchronisation to UTC</u></b>  The operator of the MA System should demonstrate that the MA System is synchronised to UTC, either by connection to internet time servers or a radio clock, and are accurate to within $\pm 20$ seconds per month.	<ul style="list-style-type: none"> <li>Evidence that the MA System is synchronised to UTC within <math>\pm 20</math> seconds per month.</li> </ul>
<b>Test Group 5</b>	<b><u>Functions of a Passive Meter</u></b>	The system can: <ul style="list-style-type: none"> <li>Fulfil the functions of a passive meter, e.g. defaulting data.</li> <li>Add, delete and modify summary inventory.</li> <li>The MA should be able to add summary inventory information, new charge Codes and Switch Regimes and other standing data.</li> <li>That any changes to standing data are auditable.</li> </ul>	<ul style="list-style-type: none"> <li>Evidence that the system can load Summary inventory data and update and amend standing data.</li> </ul>
<b>Test Group 6</b>	<b><u>Functions of a Dynamic Meter</u></b>	The system can: <ul style="list-style-type: none"> <li>Fulfil the functions of a Dynamic Meter, e.g. Use data from PECU arrays</li> </ul>	<ul style="list-style-type: none"> <li>Evidence that the System can obtain, load and process data from PECU arrays.</li> </ul>
<b>Test Group 7</b>	<b><u>Functions of a CMS Capable Meter</u></b>	The system can: <ul style="list-style-type: none"> <li>Fulfil the functions of a CMS Capable Meter, e.g. Use data from CMS systems and load control files.</li> </ul>	<ul style="list-style-type: none"> <li>Evidence that the System can obtain, load and process CMS Control files and CMS</li> </ul>



# Test Specification

Test Ref	Requirement / Details	Test Requirement Overview	Test Evidence Overview
			events
<b><u>Test Group 8</u></b>	<b><u>Meter Output Report</u></b>	The system can provide output data.	<ul style="list-style-type: none"><li>• Output in the format defined in <a href="#">Section 14</a></li></ul>
<b><u>Test Group 9</u></b>	<b><u>CMS Unit Exception List</u></b>	The system can provide CMS exception reports to appropriate Parties.	<ul style="list-style-type: none"><li>• Output containing defined data items</li></ul>
<b><u>Test Group 10</u></b>	<b><u>Ad-hoc extracts</u></b>	The system can provide ad-hoc extracts on request,	<ul style="list-style-type: none"><li>• E.G. CMS event data</li></ul>