



EC Type Examination Certificate Number: **0120/SGS0083**

## **EM-Lite Limited**

10 Reynolds Business Park  
Stevern Way  
Peterborough  
Cambridgeshire  
PE1 5EL

Instrument Identification:

**ECA1.\* & EM\*1.\***

**Single Phase, Credit, Active Import/ Export, Modular, Electricity Meter**

Instrument Traceable Number

**0120/ SGS0083**

has been assessed and certified as meeting the requirements of

## **EC Directive 2004/22/EC**

**on Measuring Instruments Annex B**

It is certified that the manufacturer's technical design and specimen for the above instrument has been examined and, based on the evidence submitted, it is considered that the instrument conforms to the requirements of MI-003 of EC Directive 2004/22/EC

This certificate must be used in conjunction with a certificate covering the product verification as required in Annex D or Annex F.

This certificate is valid until 23rd May 2021  
Issue 8

Certification is based on report number(s)

EMA146218 dated 24th May 2011

EMA149885 dated 12th August 2011

EMA155457 dated 17<sup>th</sup> January 2012


EMA190713 dated 23<sup>rd</sup> January 2015

Authorised Signature

SGS United Kingdom Limited, Notified Body 0120  
Unit 202B Worle Parkway, Weston-super-Mare, BS22 6WA UK  
t +44 (0)1934 522917 f +44 (0)1934 522137 [www.sgs.com](http://www.sgs.com)


Contact Address

SGS United Kingdom Ltd, Unit 10, South Industrial Estate, Bowburn, Durham, DH6 5AD UK  
t +44 (0)191 377 2000 f +44 (0)191 377 2020 [www.sgs.com](http://www.sgs.com)

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	Issue Number: 8	Dated: 26 <sup>th</sup> January 2015

## 1. Technical Data

<b>Manufacturer</b>	EM-Lite Ltd
<b>Meter Type(s)</b>	ECA1.* & EM*1.*
<b>Voltage Rating (<math>U_n</math>)</b>	220-240V
<b>Current Rating (<math>I_{min}</math> – <math>I_{ref}</math> (<math>I_{max}</math>))</b>	0,25-5(100)A 0,5-10(100)A 0,75-15(100)A 1-20(100)A
<b>Frequency (<math>F_n</math>)</b>	50Hz
<b>Active Accuracy Class (<math>kWh</math>)</b>	A or B ( $kWh$ )
<b>Type of circuit</b>	1p2w
<b>Temperature Range</b>	-40°C to +70°C
<b>Software/ Firmware Version No(s)</b>	See list overleaf
<b>Identification Location</b>	LCD
<b>Bill Of Materials Number(s)</b>	See list overleaf
<b>IP Rating</b>	IP52
<b>Insulation Protective Class</b>	Class II
<b>LED Pulse Constant</b>	1000 imp/ kWh
<b>Impulse Voltage Rating</b>	8kV
<b>AC Voltage Rating</b>	4kV
<b>Main Cover Sealing Type</b>	Wire & Crimp x 1
<b>Integrity of meter</b>	Inaccessible without breaking seals
<b>Intended Location of the Meter</b>	Indoor
<b>Type of Register</b>	LCD

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**Bill of Materials**

<b>Meter Variant</b>	<b>BOM Number</b>
ECA1. z	ECA1-4002-01
ECA1. y	ECA1-4001-03
EMA1.z	EMA1-4002-01
EMA1.az	EMA1-4003-05
EMA1.y	EMA1-4001-05
EMA1.ay	EMA1-4004-01
EMA1.x	EMA1-4002-01
EMA1.w	EMA1-4001-05
EMB1.z	EMB1-4002-01
EMB1.y	EMB1-4001-05
EMB1.ay	EMB1-4003-02
EMB1.x	EMB1-4002-01
EMB1.w	EMB1-4001-05
EMC1.z	EMC1-4002-01
EMC1.az	EMC1-4003-01
EMC1.y	EMC1-4001-04
EMC1.x	EMC1-4002-01
EMC1.w	EMC1-4001-04

**Software Version Number(s)**

**EMA1, EMB1, ECA1**


V3.00-1  
V3.02-0  
V3.03-2  
V3.04-0 Checksum 44051

**EMA1.y or .z, EMB1.y or .z**

V3.10-0 Checksum 39352  
V3.11-1 Checksum 16259


**EMC1.\***

V0.00-3  
V1.00-0  
V1.01-3  
V1.02-0 Checksum 10305  
V2.00.1 Checksum 49889  
V3.00.0 Checksum 18714

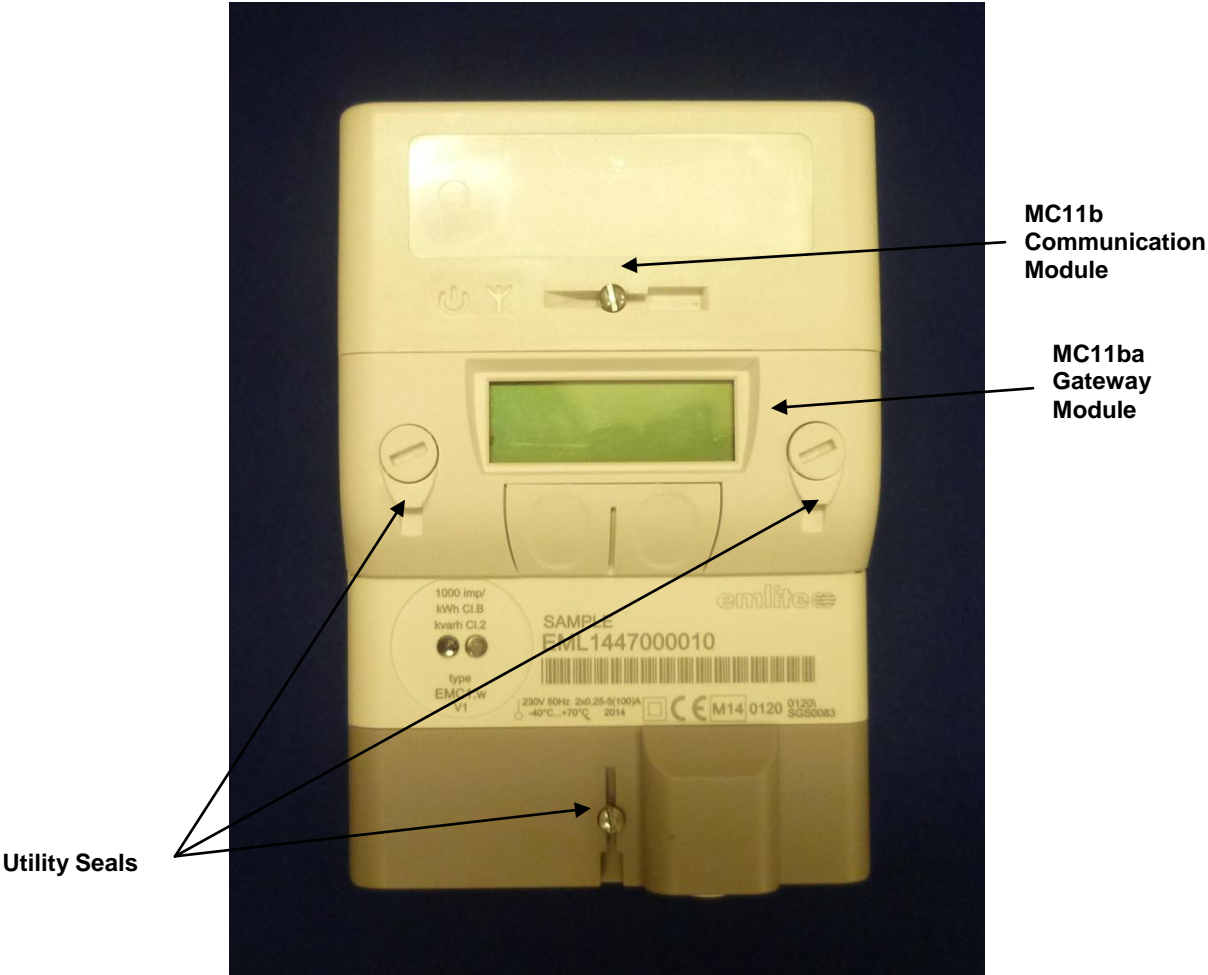
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**2. Photograph of Meter EMB1 and Sealing Plan**



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**Photographs of Meter EMC1w with MC11ba and MC11b Modules Fitted and Sealing Plan**



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### 3. Calculation of the composite error/ MPE

In addition to the accuracy requirements the composite error  $e_c$  of the meter is shown below

The composite error at a certain load is calculated from the following formula:

$$e_c = \sqrt{e^2(l.\cos\theta) + e^2(T.l.\cos\theta) + e^2(U.l.\cos\theta) + e^2(f.l.\cos\theta)}$$

where

- $e^2(l.\cos\theta)$  = Intrinsic error of meter at a certain load
- $e^2(T.l.\cos\theta)$  = Additional error due to variation of the temperature at the same load
- $e^2(U.l.\cos\theta)$  = Additional error due to variation of the voltage at the same load
- $e^2(f.l.\cos\theta)$  = Additional error due to variation of the frequency at the same load

Ambient Temperature Range 5 to 30 Degrees C						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.1	-0.02	0.07	<b>0.12</b>
Itr	1.0	0.12	0.15	0.01	0.04	<b>0.20</b>
10Itr	1.0	0.01	0.22	-0.03	0.04	<b>0.23</b>
Imax	1.0	0.06	0.26	0.02	0.09	<b>0.28</b>
Itr	0.5ind	-0.06	-0.08	-0.07	0.03	<b>0.13</b>
10Itr	0.5ind	-0.02	0.2	-0.03	0.07	<b>0.21</b>
Imax	0.5ind	0.22	0.34	0.14	0.19	<b>0.47</b>
Itr	0.8cap	0.17	0.12	-0.02	0.05	<b>0.21</b>
10Itr	0.8cap	0.08	0.21	-0.04	0.03	<b>0.23</b>
Imax	0.8cap	0.16	0.41	0.18	0.24	<b>0.53</b>

Ambient Temperature Range -10 to 40 Degrees C						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.23	-0.02	0.07	<b>0.24</b>
Itr	1.0	0.12	0.27	0.01	0.04	<b>0.30</b>
10Itr	1.0	0.01	0.38	-0.03	0.04	<b>0.38</b>
Imax	1.0	0.06	0.44	0.02	0.09	<b>0.45</b>
Itr	0.5ind	-0.06	-0.12	-0.07	0.03	<b>0.15</b>
10Itr	0.5ind	-0.02	0.37	-0.03	0.07	<b>0.38</b>
Imax	0.5ind	0.22	0.52	0.14	0.19	<b>0.61</b>
Itr	0.8cap	0.17	0.23	-0.02	0.05	<b>0.29</b>
10Itr	0.8cap	0.08	0.38	-0.04	0.03	<b>0.39</b>
Imax	0.8cap	0.16	0.58	0.18	0.24	<b>0.67</b>



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Ambient Temperature Range -25 to 55 Degrees C						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.36	-0.02	0.07	<b>0.37</b>
Itr	1.0	0.12	0.4	0.01	0.04	<b>0.42</b>
10ltr	1.0	0.01	-0.62	-0.03	0.04	<b>0.62</b>
Imax	1.0	0.06	-0.64	0.02	0.09	<b>0.65</b>
Itr	0.5ind	-0.06	0.16	-0.07	0.03	<b>0.19</b>
10ltr	0.5ind	-0.02	-0.54	-0.03	0.07	<b>0.55</b>
Imax	0.5ind	0.22	0.68	0.14	0.19	<b>0.75</b>
Itr	0.8cap	0.17	-0.37	-0.02	0.05	<b>0.41</b>
10ltr	0.8cap	0.08	-0.66	-0.04	0.03	<b>0.67</b>
Imax	0.8cap	0.16	0.74	0.18	0.24	<b>0.81</b>


Ambient Temperature Range -40 to 70 Degrees C (OUTDOOR ONLY)						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.42	-0.02	0.07	<b>0.43</b>
Itr	1.0	0.12	-0.65	0.01	0.04	<b>0.66</b>
10ltr	1.0	0.01	-1.03	-0.03	0.04	<b>1.03</b>
Imax	1.0	0.06	-1.3	0.02	0.09	<b>1.30</b>
Itr	0.5ind	-0.06	0.3	-0.07	0.03	<b>0.32</b>
10ltr	0.5ind	-0.02	-1	-0.03	0.07	<b>1.00</b>
Imax	0.5ind	0.22	-1.1	0.14	0.19	<b>1.15</b>
Itr	0.8cap	0.17	-0.64	-0.02	0.05	<b>0.66</b>
10ltr	0.8cap	0.08	-1.13	-0.04	0.03	<b>1.13</b>
Imax	0.8cap	0.16	-1.06	0.18	0.24	<b>1.11</b>

**Results taken from:-**

Report: EMA155457-1

Dated: 17<sup>th</sup> January 2012

Sample: SGS1000-01

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#### 4. Annex of Variants

Product Variant Identification Details:

Type Designation	Description of meter
ECA1.z	4 terminal basic variant, no auxiliary connections, no modular comms, no breaker
ECA1.y	4 terminal with auxiliary relay, no modular comms, no breaker
EMA1.z	4 terminal basic variant, no auxiliary connections
EMA1.az	4 terminal basic variant, no auxiliary connections, no breaker
EMA1.y	4 terminal with auxiliary relay
EMA1.ay	4 terminal with auxiliary relay, no breaker
EMA1.x	4 terminal with external hub connections
EMA1.w	4 terminal with auxiliary relay and external hub connections
EMB1.z	5 terminal (100A Heating Control) basic variant, no auxiliary connections
EMB1.y	5 terminal with auxiliary relay
EMB1.ay	5 terminal (100A Heating Control) with auxiliary relay, no breaker
EMB1.x	5 terminal with external hub connections
EMB1.w	5 terminal with auxiliary relay and external hub connections
EMC1.z	twin element basic variant, no auxiliary connections
EMC1.az	twin element basic variant, no auxiliary connections, no breakers
EMC1.y	twin element with auxiliary relay
EMC1.x	twin element with external hub connections
EMC1.w	twin element with auxiliary relay and external hub connections
EMC1.w	twin element with auxiliary relay and external hub connections,
MC11b + MC11a	smart module and gateway for use with all variants

Modifications to the meter(s) described according to approval No. **0120/ SGS0083** must be notified to the issuing body to confirm the meter(s) continuing compliance to the relevant pattern approval standard(s).

#### 5. Document Revision History

Issue	Date	Comments
1	24/05/2011	Initial Issue
2	12/08/2011	Addition approval of EMC1.* and ECA1.* variants
3	17/01/2012	Major Firmware update to EMC1 variants. Minor Firmware updates to ECA1, EMA1 and EMB1 variants
4	30/10/2012	New EMB1.ay variant added. Also, minor firmware updates to 3.10.0 on EMA1.* & EMB1.* variants for use with coin mech.
5	11/10/2013	Minor Firmware updates to ECA1, EMA1, EMB1 to V3.04.0 with Checksum 44051, EMA1.z, EMA1.y, EMB1.z, EMB1.y to V3.11.1 with Checksum 16259
6	18/09/2014	Minor software updates for EMC1.* variants V2.00.1 & V3.00.0 with checksums
7	26/11/2014	Updated BOM list & additional variant EMC1.az added
8	26/01/2015	Option for smart module and gateway modules for all variants