

Supplementary information for EU Devices in the LoRaWAN® Showcase catalogue. Version 1.0

Version of Questionnaire form from the Customer/ Device Manufacturer

Version	Date	Author	Update
1.0			Initial release from manufacture

Supplementary Information on certified device

1 Supplementary information	
1.1 Manufacturer or Brand name	Lobaro GmbH
1.2 Website	https://www.lobaro.com/
1.3 Sales / Marketing contact person, email:	sales@lobaro.de
1.4 Technical contact person, email:	support@lobaro.de
1.5 Commercial Product name	LOB-GW-WMBUS-LW-2 wireless M-Bus Bridge (LoRaWAN)
1.6 Product code used when ordering / article number	8000095
1.7 Product Version : Hardware version: Firmware version:	2 1.2 2.5.8
1.8 In what countries is the product available	Germany
1.9 What date was / is the market introduction for this device / product?	11/2017
1.10 Is the device already working on a public LoRaWAN network. If yes specify at which public operator, country and number of deployed devices on that network:	<input checked="" type="checkbox"/> Yes: <input type="checkbox"/> No Ca. 500 Devices on various German networks including TTN, Stromnetz Hamburg, Private networks
1.11 What functionality does the device provide and which sensor(s) does it contain?	Use case: Collecting wMbus telegrams from utility meters and uploading the data via LoRaWAN®. Short behavior description: The Lobaro wireless M-Bus Bridge V2 is a cost-effective & energy efficient bridge / range extender, that receives, caches and transparently forwards wireless M-Bus (C1, T1, S1 modes) metering data from utility meters via any LoRaWAN® network onto the Internet. The metering data will not be decrypted by the device instead an unchanged 1:1 forwarding takes place via one or more LoRaWAN® packets (depending on the wMBUS telegram byte size). Thus the end-to-end encryption of sensitive wireless M-BUS consumption data is preserved.
1.12 Accuracy & resolution for every sensor or	

measurement made by the device	
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	Temperature 0.5°C 0.1°C °C -20°C - 55°C
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	
1.13 Uplinks are: Periodic: Period: Explanation: Keep alive message period: Event triggered how:	<input checked="" type="checkbox"/> Configurable Usual upload periods are daily or monthly. <input type="checkbox"/> Configurable Configurable via CRON expressions
1.14 Parameter configuration of device (e.g. transmission or measurement interval, threshold levels, etc.)	<input checked="" type="checkbox"/> Remotely: <input checked="" type="checkbox"/> Over-the-air with LoRaWAN data downlinks <input type="checkbox"/> Specify if other: <input checked="" type="checkbox"/> Locally: <input checked="" type="checkbox"/> Via CLI: specify type of connector: Lobaro Configuration Adapter (UART) <input type="checkbox"/> Via NFC: <input type="checkbox"/> Specify if other:
1.15 Does the application server send downlinks to the devices?	<input checked="" type="checkbox"/> Yes: (why/how often/typical size) Optional for configuration and triggering uploads <input type="checkbox"/> No
1.16 Operating temperature of device - x °C to + x °C	Minimum -20°C °C Maximum 55°C °C
1.17 Is the payload structure available for decoding?	<input checked="" type="checkbox"/> Yes: <input type="checkbox"/> No Please attach the payload structure (+example of decoded payload) See: https://docs.lobaro.com/lorawan-

	sensors/wmbus-lorawan/index.html#example-parser
1.18 Is there a decode-API available	<input checked="" type="checkbox"/> Yes: <input type="checkbox"/> No Please attach the API documentation https://platform.lobaro.com/#/wmbus/parser
1.19 Is the firmware upgradeable and how?	<input checked="" type="checkbox"/> Yes: (how) via Lobar Config Adapter & Tooling
1.20 How can the device be reset to factory default settings?	via Lobar Config Adapter & Tooling
1.21 How can the device be forced to re-initiate the join procedure?	Reset via button on the hardware
1.22 Product certifications (IP rating, ATEX, ...)	1. IP rating: IP67 2. ATEX compliance: NO Other:
1.23 Which regulatory certifications are available (RED, CE, EMC)?	<input checked="" type="checkbox"/> RED <input checked="" type="checkbox"/> CE <input checked="" type="checkbox"/> EMC Attach proof of certification to the mail in which this document is sent to a public operator
1.24 Power Supply	<input type="checkbox"/> External power supply: connection: voltage: amperage: <input checked="" type="checkbox"/> Internal battery: battery type: ER34615 3.6V battery chemical composition: Lithium Battery self-discharge (%/year): Battery shelf life: capacity: weight: rechargeable: <input type="checkbox"/> Yes: <input checked="" type="checkbox"/> No
1.25 Powering device on and off How is the device turned ON ? How is the device turned OFF ?	Connect battery Disconnect battery
1.26 Dimensions of device (Length x width x height)	12,2 x 8,2 x 5,5cm
1.27 Weight of full device	300g
1.28 Mounting of device 1. How to mount? 2. How to mount for best antenna propagation	Mounting with screws on the wall

2 LoRaWAN Device Information

2.1 DevEUI Range (IEEE Compliance)	From : To :
2.2 LoRaWAN Class	<input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B <input type="checkbox"/> Class C
2.3 For Class C Device: Device Under Test restores previous RF settings at boot?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.4 In what LoRaWAN region/frequency ranges is the product available	<input checked="" type="checkbox"/> EU863-870 <input type="checkbox"/> US902-928 <input type="checkbox"/> AS923 <input type="checkbox"/> IN865-867 <input type="checkbox"/> KR920-923 <input type="checkbox"/> Other
2.5 Is the LoRaWAN test mode supported?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, why not
2.6 Tested and certified against which LoRaWAN Specification(s)	<input type="checkbox"/> V1.0 <input type="checkbox"/> V1.0.1 <input checked="" type="checkbox"/> V1.0.2 revB <input type="checkbox"/> V1.0.3 <input type="checkbox"/> V1.1.x <input type="checkbox"/> Other :
2.7 Link to document on the LoRa Alliance website	Link:
<p>2.8 Which TX power is used in production devices by default?</p> <p>- if LW 1.0.2 rev A or older is used:</p> <p>- if LW 1.0.2 rev B or newer is used</p>	<p> <input type="checkbox"/> TXPower 0 (20dBm) <input type="checkbox"/> TXPower 1 (14dBm) <input type="checkbox"/> TXPower 2 (11dBm) <input type="checkbox"/> TXPower 3 (8dBm) <input type="checkbox"/> TXPower 4 (5dBm) <input type="checkbox"/> TXPower 5 (2dBm) <input type="checkbox"/> other TXPower (dBm) </p> <p> <input type="checkbox"/> TXPower 0 (MaxEIRP) <input checked="" type="checkbox"/> TXPower 1 (MaxEIRP-2dB) <input type="checkbox"/> TXPower 2 (MaxEIRP-4dB) <input type="checkbox"/> TXPower 3 (MaxEIRP-6dB) <input type="checkbox"/> TXPower 4 (MaxEIRP-8dB) <input type="checkbox"/> TXPower 5 (MaxEIRP-10dB) <input type="checkbox"/> TXPower 6 (MaxEIRP-12dB) <input type="checkbox"/> TXPower 7 (MaxEIRP-14dB) </p> <p> <input type="checkbox"/> other TXPower (Max EIRP : 16 dB) </p>
2.9 Which TX powers are supported by the	

<p>device in production</p> <p>- if LW 1.0.2 rev A or older is used:</p> <p>- if LW 1.0.2 rev B or newer is used</p>	<p><input type="checkbox"/> TXPower 0 (20dBm)</p> <p><input type="checkbox"/> TXPower 1 (14dBm)</p> <p><input type="checkbox"/> TXPower 2 (11dBm)</p> <p><input type="checkbox"/> TXPower 3 (8dBm)</p> <p><input type="checkbox"/> TXPower 4 (5dBm)</p> <p><input type="checkbox"/> TXPower 5 (2dBm)</p> <p><input type="checkbox"/> other TXPower (dBm)</p> <p><input type="checkbox"/> TXPower 0 (MaxEIRP)</p> <p><input checked="" type="checkbox"/> TXPower 1 (MaxEIRP-2dB)</p> <p><input checked="" type="checkbox"/> TXPower 2 (MaxEIRP-4dB)</p> <p><input checked="" type="checkbox"/> TXPower 3 (MaxEIRP-6dB)</p> <p><input checked="" type="checkbox"/> TXPower 4 (MaxEIRP-8dB)</p> <p><input checked="" type="checkbox"/> TXPower 5 (MaxEIRP-10dB)</p> <p><input checked="" type="checkbox"/> TXPower 6 (MaxEIRP-12dB)</p> <p><input checked="" type="checkbox"/> TXPower 7 (MaxEIRP-14dB)</p> <p>(Max EIRP : 16 dB)</p>
<p>2.9 Which LoRaWAN Specification is currently supported on the production devices?</p>	<p><input type="checkbox"/> V1.0</p> <p><input type="checkbox"/> V1.0.1</p> <p><input type="checkbox"/> V1.0.2 revA</p> <p><input checked="" type="checkbox"/> V1.0.2 revB</p> <p><input type="checkbox"/> V1.0.4</p> <p><input checked="" type="checkbox"/> V1.1.x</p> <p><input type="checkbox"/> Other:</p>
<p>2.10 Will you re-certify your device when a new major LoRaWAN specification version is released</p>	<p><input type="checkbox"/> Yes.</p> <p><input checked="" type="checkbox"/> No, why : We are not sure yet</p>
<p>2.11 Has Interoperability prequalification testing been done?</p>	<p><input checked="" type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No, why :</p> <p>Which Network Servers</p> <p><input checked="" type="checkbox"/> Actility</p> <p><input checked="" type="checkbox"/> Loriot</p> <p><input checked="" type="checkbox"/> TTI</p> <p><input checked="" type="checkbox"/> Other: Specify: TTN, Element-IoT, Chirpstack, Firefly</p> <p>Please attach all the test reports.</p> <p>Manual tests without reports.</p>
<p>2.12 Is Activation Type OTAA the default</p>	<p><input checked="" type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No, why :</p>
<p>2.13 For OTAA, is AppKey unique for each device?</p>	<p><input checked="" type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No.</p>

<p>2.14 Is ADR implemented? Recommendation: ADR should always be activated. Exceptions can be made for moving devices but will need to be explained.</p>	<input checked="" type="checkbox"/> Activated <input type="checkbox"/> Deactivated, why : <input checked="" type="checkbox"/> Configurable by user (recommendation: Activated by default) <input type="checkbox"/> Mixed, explain:
<p>2.15 What values did you implement for: - ADR_ACK_LIMIT: - ADR_ACK_DELAY:</p>	<p>8recommended value: 64 4recommended value: 32</p>
<p>2.16 Do you use unconfirmed and/or confirmed uplinks and what is the data rate, timing and power back off algorithm? Upon reception of a confirmed downlink message, is the next uplink sent immediately after the downlink ?Answers (radio buttons)</p>	<input type="checkbox"/> unconfirmed <input type="checkbox"/> confirmed, when and why: <input checked="" type="checkbox"/> Both, which is used when and why: Data rate, timing and power back-off algorithm (only if you use confirmed uplinks): regain connectivity <input checked="" type="checkbox"/> Yes. <input type="checkbox"/> No, why :
<p>2.17 Is the device doing a periodical rejoin? (only for OTAA)</p>	<input checked="" type="checkbox"/> Yes (frequency): 1 min - 8 hours (exp. Backoff) <input type="checkbox"/> No. Why? How to trigger a rejoin?
<p>2.18 Is the first join request sent on SF12?</p>	<input checked="" type="checkbox"/> Yes. <input type="checkbox"/> No, why: Explain the JoinRequest sequence if no JoinAccept is received - data rate, timing and power back-off algorithm. preiodic rejoin, see above.
<p>2.19 On what SF and power setting is the first uplink (after join procedure) done?</p>	<p>SF: 12 TXPower: 14dBm</p>
<p>2.20 Are you doing periodically reset of Uplink frame counter?</p>	<input type="checkbox"/> Yes (frequency/why): <input checked="" type="checkbox"/> No.
<p>2.21 If LoRaWAN 1.0.x, DevNonce behaviour :</p>	<input type="checkbox"/> Based on a random value <input checked="" type="checkbox"/> Monotonically increasing never-wrapping counter
<p>2.22 Uplink DataRate (0-7 supported)</p>	<p>Min: 0 Max: 6</p>
<p>2.23 RX1 Data Rate Offset</p>	<input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band <input type="checkbox"/> Other:
<p>2.24 RX1 Delay</p>	<input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band <input type="checkbox"/> Other:
<p>2.25 RX2 Data Rate</p>	<input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band <input type="checkbox"/> Other:

2.26 RX2 Frequency	<input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band <input type="checkbox"/> Other:
2.27 RX1 Delay on JoinRequest (OTAA devices only)	<input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band <input type="checkbox"/> Other:
2.28 Mobility Profile (how your device moves)	<input checked="" type="checkbox"/> Near static <input type="checkbox"/> Walking speed <input type="checkbox"/> Vehicle speed <input type="checkbox"/> Random
2.29 Frame Counters Up To 32-bits	<input checked="" type="checkbox"/> Frame counter-up <input checked="" type="checkbox"/> Frame counter-down
2.30 Which MAC commands does the device support	<input checked="" type="checkbox"/> LinkCheckReq / LinkCheckAns <input checked="" type="checkbox"/> TXParamSetupReq / TXParamSetupAns <input checked="" type="checkbox"/> LinkADRRReq / LinkADRAns <input checked="" type="checkbox"/> DutyCycleReq / DutyCycleAns <input checked="" type="checkbox"/> RXParamSetupReq /RXParamSetupAns <input checked="" type="checkbox"/> DevStatusReq / DevStatusAns <input checked="" type="checkbox"/> NewChannelReq / NewChannelAns <input checked="" type="checkbox"/> TXTimingSetupReq / TXTimingSetupAns
2.31 LoRaWAN Stack Type (optional)	<input type="checkbox"/> Semtech/Stackforce <input type="checkbox"/> Semtech/Stackforce with modifications <input type="checkbox"/> IBM <input type="checkbox"/> IBM with modifications <input checked="" type="checkbox"/> Proprietary- Other, name it: Lobaro LoRaWAN Stack
2.32 LoRaWAN Stack Version (optional)	
2.33 LoRa Radio Hardware (optional)	<input type="checkbox"/> Proprietary: SX chip used: <input type="checkbox"/> LoRaWAN Modem/Module: Manufacturer: Part Number: Firmware revision:
2.34 Multicast support (optional)	<input type="checkbox"/> Yes: Multicast DevAddr: Multicast AppSKey: Multicast NwkSKey: Payload: Port: <input type="checkbox"/> No.

3 Radio Frequency Information

3.1 Type of Antenna	<input type="checkbox"/> Wire <input checked="" type="checkbox"/> PCB <input type="checkbox"/> External <input type="checkbox"/> Other: (which type)
3.2 Antenna gain [dBi or dBd]	dBi or < 1dBd
3.3 Did you measure and take into account the loss between the modem and the antenna?	<input type="checkbox"/> Yes, dB loss <input checked="" type="checkbox"/> No, why:
3.4 For LW 1.0.2 rev A or older devices: which TXPower setting should be used on the network for your device*:	<input type="checkbox"/> TXPower 0 (20dBm) <input type="checkbox"/> TXPower 1 (14dBm) <input type="checkbox"/> TXPower 2 (11dBm) <input type="checkbox"/> TXPower 3 (8dBm) <input type="checkbox"/> TXPower 4 (5dBm) <input type="checkbox"/> TXPower 5 (2dBm) <input type="checkbox"/> other txpower (dBm)
3.5 Did you calibrate your device with the antenna gain and measured loss in between the chipset and antenna? This so that your device emits with maximal power when using TXPower 1 for LW 1.0.2 rev A or older devices (= 14dBm) and TXPower 0 for LW 1.0.2 rev B or newer devices (= MaxEIRP or 16.15dBm EIRP)*.	<input type="checkbox"/> Yes, dB loss <input checked="" type="checkbox"/> No, why: max output TX power is 14dBm

4 Battery and TX Power Information

Please indicate if you do not want Section 4 displayed on the LoRa Alliance Website Yes
 If yes please supply contact details for the operators to request the information for Section 4

<p>4.1 Battery consumption of the device (including modem, sensors and all other electronics)</p>	<p>TX current: 74mA RX current: 18 mA Idle time current: 4mA</p>																																							
<p>4.2 Estimated battery life in years based on the number of transmissions (including sensor readings) at SF7, SF10 & SF12 with your battery self-discharge and aging over time taken into account.</p> <p>Assumptions:</p> <ul style="list-style-type: none"> - Product shelf life before use: Maximum 1 year. - At an environment temperature of 20°C. - LoRaWAN specification used for battery life calculation: - TX power setting (txpower) used for battery life calculation: - Payload size used for battery life calculation (should be average payload size of production device): - Additional assumptions or comments on battery life (Typical usage) 	<table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="3">Battery life in years</th> </tr> <tr> <th colspan="2"></th> <th>SF7</th> <th>SF10</th> <th>SF12</th> </tr> </thead> <tbody> <tr> <th rowspan="7">Transmission Periodicity (transmissions/day)</th> <td>144</td> <td>0,6</td> <td>0,6</td> <td>0,5</td> </tr> <tr> <td>96</td> <td>0,9</td> <td>0,9</td> <td>0,8</td> </tr> <tr> <td>48</td> <td>1,8</td> <td>1,7</td> <td>1,5</td> </tr> <tr> <td>24</td> <td>3,6</td> <td>3,4</td> <td>2,9</td> </tr> <tr> <td>12</td> <td>6,8</td> <td>6,5</td> <td>5,7</td> </tr> <tr> <td>4</td> <td>17,4</td> <td>16,7</td> <td>14,8</td> </tr> <tr> <td>1</td> <td>41,5</td> <td>40,5</td> <td>37,6</td> </tr> </tbody> </table> <p> <input type="checkbox"/> LW1.0.1 <input type="checkbox"/> LW1.0.2 revA <input checked="" type="checkbox"/> LW1.0.2 revB <input type="checkbox"/> Other : </p> <p> <input type="checkbox"/> LW1.0.1 <input type="checkbox"/> LW1.0.2 revA <input checked="" type="checkbox"/> LW1.0.2 revB <input type="checkbox"/> Other : </p> <p>50 bytes</p> <p>With daily or monthly reading 5-10 years can be reached in typical use-cases</p>			Battery life in years					SF7	SF10	SF12	Transmission Periodicity (transmissions/day)	144	0,6	0,6	0,5	96	0,9	0,9	0,8	48	1,8	1,7	1,5	24	3,6	3,4	2,9	12	6,8	6,5	5,7	4	17,4	16,7	14,8	1	41,5	40,5	37,6
		Battery life in years																																						
		SF7	SF10	SF12																																				
Transmission Periodicity (transmissions/day)	144	0,6	0,6	0,5																																				
	96	0,9	0,9	0,8																																				
	48	1,8	1,7	1,5																																				
	24	3,6	3,4	2,9																																				
	12	6,8	6,5	5,7																																				
	4	17,4	16,7	14,8																																				
	1	41,5	40,5	37,6																																				

<p>4.3 Which TX power setting (TXPower) was used in the RF test?</p> <p>- If LW 1.0.2 rev A or older device:</p> <p>- If LW 1.0.2 rev B or newer device:</p>	<p><input type="checkbox"/> TXPower 0 (20dBm)</p> <p><input type="checkbox"/> TXPower 1 (14dBm)</p> <p><input type="checkbox"/> TXPower 2 (11dBm)</p> <p><input type="checkbox"/> TXPower 3 (8dBm)</p> <p><input type="checkbox"/> TXPower 4 (5dBm)</p> <p><input type="checkbox"/> TXPower 5 (2dBm)</p> <p><input type="checkbox"/> other TXPower (dBm)</p> <p><input type="checkbox"/> TXPower 0 (MaxEIRP)</p> <p><input checked="" type="checkbox"/> TXPower 1 (MaxEIRP-2dB)</p> <p><input type="checkbox"/> TXPower 2 (MaxEIRP-4dB)</p> <p><input type="checkbox"/> TXPower 3 (MaxEIRP-6dB)</p> <p><input type="checkbox"/> TXPower 4 (MaxEIRP-8dB)</p> <p><input type="checkbox"/> TXPower 5 (MaxEIRP-10dB)</p> <p><input type="checkbox"/> TXPower 6 (MaxEIRP-12dB)</p> <p><input type="checkbox"/> TXPower 7 (MaxEIRP-14dB)</p> <p><input type="checkbox"/> other TXPower (MaxEIRP-16 dBdBm)</p>
<p>4.4 Is this the same TX power setting (TXPower) used by default in production devices (before network ADR)?</p>	<p><input checked="" type="checkbox"/> Yes,</p> <p><input type="checkbox"/> No, why:</p>
<p>4.5 Maximum ERP measured: (ERP = EIRP - 2.15 dB; LoRaWAN allows 14 dBm ERP)</p>	<p>13,7 dBm</p>
<p>4.6 TRP measured: (TRP is based on EIRP) This gives an idea about the directivity of the antenna.</p>	<p>9,9 dBm</p>
<p>3.10 TIS measured on RX1:</p>	<p>For RX1-SF12BW125 on 868.3MHz dBm</p>
<p>3.11 TIS measured on RX2</p>	<p>For RX2-SF12BW125 on 869.525 MHz: dBm</p>