

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	06.01.2021	SERDAR ARSLAN	Initial release from manufacture

### Supplementary Information on certified device

1 Supplementary information	
1.1 Manufacturer or Brand name	LUNA ELEKTRİK ELEKTRONİK SAN. VE TİC. AS.
1.2 Website	www.lunatr.com
1.3 Sales / Marketing contact person, email:	Murat ORTAÇ murat.ortac@lunatr.com
1.4 Technical contact person, email:	Serdar ARSLAN serdar.arслан@lunatr.com
1.5 Commercial Product name	New STAR Remote Reading And Prepaid Water Meter
1.6 Product code used when ordering / article number	New STAR
1.7 Product Version : Hardware version: Firmware version:	v5.325 LSSWM200-200-00 3.7
1.8 In what countries is the product available	Countries which use EU863-870 Frequency Band
1.9 What date was / is the market introduction for this device / product?	03.02.2019
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 More than 50k pieces around the World.
1.11 What functionality does the device provide and which sensor(s) does it contain?	Use case: Water Flow Measurements  Short behavior description: Device measures the water consumption. It uses hall effect sensors for this purpose.
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	Water Flow Measurement %2 0.001 m3 Water 0.1 to 4 m3
Name:	

sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	
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1.13 Uplinks are: Periodic:  Period: Explanation: Keep alive message period: Event triggered how:	<input checked="" type="checkbox"/> , 1 hour  1 day Periodically or by pressing manually button on device
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 type="checkbox"/> Via CLI: specify type of connector:  <input type="checkbox"/> Via NFC:  <input checked="" type="checkbox"/> Specify if other: Via RFID Smart Card
1.15 Does the application server send downlinks to the devices?	<input checked="" type="checkbox"/> Yes: (why/how often/typical size) 4 times a month <input type="checkbox"/> No
1.16 Operating temperature of device - x °C to + x °C	Minimum +5 °C Maximum +55 °C
1.17 Is the payload structure available for decoding?	<input type="checkbox"/> Yes: <input checked="" type="checkbox"/> No Please attach the payload structure (+example of decoded payload)
1.18 Is there a decode-API available	<input type="checkbox"/> Yes: <input checked="" type="checkbox"/> No Please attach the API documentation
1.19 Is the firmware upgradeable and how?	<input checked="" type="checkbox"/> Yes: (how) Via RF Communication

1.20 How can the device be reset to factory default settings?	By using RFID Card
1.21 How can the device be forced to re-initiate the join procedure?	By using RFID Card
1.22 Product certifications (IP rating, ATEX, ...)	1. IP rating: IP68 2. ATEX compliance: Other:
1.23 Which regulatory certifications are available (RED, CE, EMC)?	<input type="checkbox"/> RED <input type="checkbox"/> CE <input 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: C Size chemical composition: Li/SOCl <sub>2</sub> Battery self-discharge (%/year): less than %1 Battery shelf life: 10 years capacity: 8500mAh weight: 52 g 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 ?	Continuously ON
1.26 Dimensions of device (Length x width x height)	20.5 cm x 11.5 cm x 10.7 cm
1.27 Weight of full device	1760g
1.28 Mounting of device 1. How to mount? 2. How to mount for best antenna propagation	Horizontal Horizontal

**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:
2.8 Which TX power is used in production devices by default?  - if LW 1.0.2 rev A or older is used:  - if LW 1.0.2 rev B or newer is used	<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)  <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)  <input type="checkbox"/> other TXPower (Max EIRP :        dB)

<p>2.9 Which TX powers are supported by the 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>	<ul style="list-style-type: none"> <li><input type="checkbox"/> TXPower 0 (20dBm)</li> <li><input type="checkbox"/> TXPower 1 (14dBm)</li> <li><input type="checkbox"/> TXPower 2 (11dBm)</li> <li><input type="checkbox"/> TXPower 3 (8dBm)</li> <li><input type="checkbox"/> TXPower 4 (5dBm)</li> <li><input type="checkbox"/> TXPower 5 (2dBm)</li> </ul> <p><input type="checkbox"/>other TXPower (      dBm)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> TXPower 0 (MaxEIRP)</li> <li><input checked="" type="checkbox"/> TXPower 1 (MaxEIRP-2dB)</li> <li><input type="checkbox"/> TXPower 2 (MaxEIRP-4dB)</li> <li><input type="checkbox"/> TXPower 3 (MaxEIRP-6dB)</li> <li><input type="checkbox"/> TXPower 4 (MaxEIRP-8dB)</li> <li><input type="checkbox"/> TXPower 5 (MaxEIRP-10dB)</li> <li><input type="checkbox"/> TXPower 6 (MaxEIRP-12dB)</li> <li><input type="checkbox"/> TXPower 7 (MaxEIRP-14dB)</li> </ul> <p>(Max EIRP :      dB)</p>
<p>2.9 Which LoRaWAN Specification is currently supported on the production devices?</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> V1.0</li> <li><input type="checkbox"/> V1.0.1</li> <li><input type="checkbox"/> V1.0.2 revA</li> <li><input checked="" type="checkbox"/> V1.0.2 revB</li> <li><input type="checkbox"/> V1.0.4</li> <li><input type="checkbox"/> V1.1.x</li> <li><input type="checkbox"/> Other:</li> </ul>
<p>2.10 Will you re-certify your device when a new major LoRaWAN specification version is released</p>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Yes.</li> <li><input type="checkbox"/> No, why :</li> </ul>
<p>2.11 Has Interoperability prequalification testing been done?</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Yes.</li> <li><input checked="" type="checkbox"/> No, why :</li> </ul> <p>Which Network Servers</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Activity</li> <li><input type="checkbox"/> Loriot</li> <li><input type="checkbox"/> TTI</li> <li><input type="checkbox"/> Other: Specify:</li> </ul> <p>Please attach all the test reports.</p>
<p>2.12 Is Activation Type OTAA the default</p>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Yes.</li> <li><input type="checkbox"/> No, why :</li> </ul>
<p>2.13 For OTAA, is AppKey unique for each device?</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Yes.</li> <li><input checked="" type="checkbox"/> No.</li> </ul>

<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>	<p><input checked="" type="checkbox"/> Activated  <input type="checkbox"/> Deactivated, why :   <input type="checkbox"/> Configurable by user (recommendation: Activated by default)  <input type="checkbox"/> Mixed, explain:</p>
<p>2.15 What values did you implement for: - ADR_ACK_LIMIT: - ADR_ACK_DELAY:</p>	<p>64      recommended value: 64 32      recommended 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>	<p><input checked="" type="checkbox"/> unconfirmed  <input type="checkbox"/> confirmed, when and why:  <input type="checkbox"/> Both, which is used when and why:                  Data rate, timing and power back-off algorithm                  (only if you use confirmed uplinks):    <input type="checkbox"/> Yes.  <input type="checkbox"/> No, why :</p>
<p>2.17 Is the device doing a periodical rejoin? (only for OTAA)</p>	<p><input checked="" type="checkbox"/> Yes (frequency):    once a day  <input type="checkbox"/> No. Why? How to trigger a rejoin?</p>
<p>2.18 Is the first join request sent on SF12?</p>	<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.</p>
<p>2.19 On what SF and power setting is the first uplink (after join procedure) done?</p>	<p>SF:    12 TXPower: +14 dbm</p>
<p>2.20 Are you doing periodically reset of Uplink frame counter?</p>	<p><input type="checkbox"/> Yes (frequency/why):  <input checked="" type="checkbox"/> No.</p>
<p>2.21 If LoRaWAN 1.0.x, DevNonce behaviour :</p>	<p><input type="checkbox"/> Based on a random value  <input type="checkbox"/> Monotonically increasing never-wrapping counter</p>
<p>2.22 Uplink DataRate (0-7 supported)</p>	<p>Min:    0 Max:    7</p>
<p>2.23 RX1 Data Rate Offset</p>	<p><input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band  <input type="checkbox"/> Other:</p>
<p>2.24 RX1 Delay</p>	<p><input checked="" type="checkbox"/> Default LoRaWAN in regards of ISM band  <input type="checkbox"/> Other:</p>

2.25 RX2 Data Rate	<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 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"/> LinkADRReq / 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 type="checkbox"/> Proprietary- Other, name it:
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**

<p>3.1 Type of Antenna</p>	<p><input type="checkbox"/> Wire  <input type="checkbox"/> PCB  <input type="checkbox"/> External  <input checked="" type="checkbox"/> Other: (which type) Helical</p>
<p>3.2 Antenna gain [dBi or dBd]</p>	<p>+1.5dBi or dBd</p>
<p>3.3 Did you measure and take into account the loss between the modem and the antenna?</p>	<p><input type="checkbox"/> Yes, dB loss  <input type="checkbox"/> No, why:</p>
<p>3.4 For LW 1.0.2 rev A or older devices: which TXPower setting should be used on the network for your device*:</p>	<p><input type="checkbox"/> TXPower 0 (20dBm)  <input checked="" 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>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)*.</p>	<p><input type="checkbox"/> Yes, dB loss  <input type="checkbox"/> No, why:</p>



**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:           mA                  RX current:           mA                  Idle time current:       mA</p>																															
<p>4.2 Estimated battery life in years based on the number of transmissions (including sensor readings) at SF7, SF10 &amp; SF12 with your battery self-discharge and aging over time taken into account.</p> <p><b>Assumptions:</b></p> <ul style="list-style-type: none"> <li>- Product shelf life before use: Maximum 1 year.</li> <li>- At an environment temperature of 20°C.</li> <li>- LoRaWAN specification used for battery life calculation:</li> <li>- TX power setting (txpower) used for battery life calculation:</li> <li>- Payload size used for battery life calculation (should be average payload size of production device):</li> <li>- Additional assumptions or comments on battery life (Typical usage</li> </ul>	<table border="1"> <thead> <tr> <th colspan="4">Battery life in years</th> </tr> <tr> <th></th> <th>SF7</th> <th>SF10</th> <th>SF12</th> </tr> </thead> <tbody> <tr> <td rowspan="6" style="writing-mode: vertical-rl; transform: rotate(180deg);">Transmission Periodicity (transmissions/day)</td> <td>144</td> <td></td> <td></td> </tr> <tr> <td>96</td> <td></td> <td></td> </tr> <tr> <td>48</td> <td></td> <td></td> </tr> <tr> <td>24</td> <td></td> <td></td> </tr> <tr> <td>12</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p> <input type="checkbox"/> LW1.0.1  <input type="checkbox"/> LW1.0.2 revA  <input 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 type="checkbox"/> LW1.0.2 revB  <input type="checkbox"/> Other :                 </p> <p>bytes</p>	Battery life in years					SF7	SF10	SF12	Transmission Periodicity (transmissions/day)	144			96			48			24			12			4			1			
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1																																

<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 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-      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 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>        dBm</p>
<p>4.6 TRP measured: (TRP is based on EIRP) This gives an idea about the directivity of the antenna.</p>	<p>        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>