

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

Version of Questionnaire form the Customer/ Device Manufacturer

Version	Date	Author	Update
1.0	14/01/2022	Oleg Sobolyev	Initial release from manufacture

Supplementary Information on certified device

1 Supplementary information	
1.1 Manufacturer or Brand name	Reacom GMBH
1.2 Website	reacom.eu
1.3 Sales / Marketing contact person, email:	ov@reacom.eu
1.4 Technical contact person, email:	oleg.sobolyev@ukraine.reacom.eu
1.5 Commercial Product name	Soil sensor RSMT6L
1.6 Product code used when ordering / article number	
1.7 Product Version : Hardware version: Firmware version:	1.0 1.1 1
1.8 In what countries is the product available	
1.9 What date was / is the market introduction for this device / product?	
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 type="checkbox"/> Yes: <input checked="" type="checkbox"/> No
1.11 What functionality does the device provide and which sensor(s) does it contain?	Use case: Sensor measure temperature and moisture parameters on 6 level deep (5cm, 15 cm, 25 cm, 35 cm, 45 cm, 55 cm), in soil, the temperature on the ground and temperature inside the sensor. Short behavior description: Measure and send all parameters every 15 minutes via LoRaWAN network automatically. Also sends keep-alive messages with battery voltage and internal chip temperature in every LoRaWAN packet.
1.12 Accuracy & resolution for every sensor or measurement made by the device	
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter:	Temperature 0.5°C 0.01°C Ti, T0, T5, T15, T25, T35, T45, T55

measurement range	-55°C +125°C
Name:	Moisture (counting)
sensor accuracy (incl. unit): +/-	30
resolution (incl. unit):	1
measurement parameter:	H5, H15, H25, H35, H45, H55
measurement range	~11000(water) – ~42000(air)
Name:	Battery voltage
sensor accuracy (incl. unit): +/-	10mV
resolution (incl. unit):	1mV
measurement parameter:	BattLoad
measurement range	0V - 4V
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: <input checked="" type="checkbox"/> Period: 15 min Explanation: By internal timer Keep alive message period: Event triggered how:
1.14 Parameter configuration of device (e.g. transmission or measurement interval, threshold levels, etc.)	<input type="checkbox"/> Remotely: <input 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: Reprograming firmware
1.15 Does the application server send downlinks to the devices?	<input type="checkbox"/> Yes: (why/how often/typical size) <input checked="" type="checkbox"/> No
1.16 Operating temperature of device - x °C to + x °C	Minimum -20 °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 type="checkbox"/> Yes: (how)

1.20 How can the device be reset to factory default settings?	Turn off battery. Wait 3-5 min. Place magnet near reed switch. Turn on battery. Wait 3-5sec (red LED should flash) and take off magnet from reed switch.
1.21 How can the device be forced to re-initiate the join procedure?	Turn off battery. Wait 3-5 min. Turn on battery. Or send command DutResetReq , or send command DutJoinReq to the port 224 (if port 224 is activated)
1.22 Product certifications (IP rating, ATEX, ...)	1. IP rating: IP65 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: ER34615-LD, 3.6V chemical composition: Li, SOCI2 Battery self-discharge (%/year): Battery shelf life: capacity: 19 Ah weight: 100g 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 ?	Plug battery connector Unplug battery connector
1.26 Dimensions of device (Length x width x height)	13.2 x 12.2 x 80 cm
1.27 Weight of full device	1365g
1.28 Mounting of device 1. How to mount? 2. How to mount for best antenna propagation	Insert into drilled hole in the soil. Internal SMD antenna or external antenna is using

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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No, why not Because of LoRaWAN 1.0.4 (not 1.0.2). Port 224 is ON by default until end of certification process
2.6 Tested and certified against which LoRaWAN Specification(s)	<input type="checkbox"/> V1.0 <input type="checkbox"/> V1.0.1 <input type="checkbox"/> V1.0.2 revB <input type="checkbox"/> V1.0.3 <input type="checkbox"/> V1.1.x <input checked="" type="checkbox"/> Other V1.0.4
2.7 Link to document on the LoRa Alliance website	Link: https://lora-alliance.org/resource_hub/lorawan-104-specification-package/
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 checked="" type="checkbox"/> TXPower 2 (MaxEIRP-4dB) <input checked="" type="checkbox"/> TXPower 3 (MaxEIRP-6dB) <input checked="" type="checkbox"/> TXPower 4 (MaxEIRP-8dB) <input checked="" type="checkbox"/> TXPower 5 (MaxEIRP-10dB) <input checked="" type="checkbox"/> TXPower 6 (MaxEIRP-12dB) <input checked="" type="checkbox"/> TXPower 7 (MaxEIRP-14dB) <input type="checkbox"/> other TXPower (Max EIRP : dB)
2.9 Which TX powers are supported by the	

<p>activated. Exceptions can be made for moving devices but will need to be explained.</p>	<p><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 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?</p> <p>Upon reception of a confirmed downlink message, is the next uplink sent immediately after the downlink ?Answers (radio buttons)</p>	<p><input type="checkbox"/> unconfirmed <input checked="" type="checkbox"/> confirmed, when and why: in application mode <input checked="" type="checkbox"/> Both, which is used when and why: always confirmed or specified by command TxFramesCtrlReq to the port 224 (if port 224 is activated) Data rate, timing and power back-off algorithm (only if you use confirmed uplinks):</p> <p><input type="checkbox"/> Yes. <input checked="" type="checkbox"/> No, why : period 15 min or specified by command TxPeriodicityChangeReq to the port 224 (if port 224 is activated)</p>
<p>2.17 Is the device doing a periodical rejoin? (only for OTAA)</p>	<p><input type="checkbox"/> Yes (frequency): <input checked="" type="checkbox"/> No. Why? How to trigger a rejoin? Turn off battery. Wait 3-5 min. Turn on battery. Or send command DutResetReq, or send command DutJoinReq to the port 224 (if port 224 is activated)</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: 14dBm</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 checked="" type="checkbox"/> Monotonically increasing never-wrapping counter</p>
<p>2.22 Uplink DataRate (0-7 supported)</p>	<p>Min: 0 Max: 5</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 checked="" type="checkbox"/> Proprietary- Other, name it: Microchip
2.32 LoRaWAN Stack Version (optional)	LoRAWAN MLS_SDK_1_0_P_5
2.33 LoRa Radio Hardware (optional)	<input checked="" type="checkbox"/> Proprietary: Semtech SX chip used: SX1276 <input checked="" type="checkbox"/> LoRaWAN Modem/Module: Manufacturer: Microchip SX1276 based Part Number: ATSAMR34J18B-I/7JX Firmware revision: ASF 3.49.1
2.34 Multicast support (optional)	<input type="checkbox"/> Yes: Multicast DevAddr: Multicast AppSKey: Multicast NwkSKey: Payload: Port: <input checked="" 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]	1.4 dBi
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: a lot of objective difficulties to do it
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:

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: 39mA RX current: 14 mA Idle time current: 0.003mA</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> <td rowspan="7" style="writing-mode: vertical-rl; transform: rotate(180deg);">Transmission Periodicity (transmissions/day)</td> <td>144</td> <td></td> <td></td> <td></td> </tr> <tr> <td>96</td> <td>2</td> <td></td> <td></td> </tr> <tr> <td>48</td> <td></td> <td></td> <td></td> </tr> <tr> <td>24</td> <td></td> <td></td> <td></td> </tr> <tr> <td>12</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></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 : Current measurement </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	2			48				24				12				4				1			
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