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	seeed studio
1.2 Website	solution.seeedstudio.com
1.3 Sales / Marketing contact person, email:	kevin.yang@seeed.cc
1.4 Technical contact person, email:	yunzhu.tang@seeed.cc
1.5 Commercial Product name	SenseCAP LoRaWAN Light Intensity Sensor
1.6 Product code used when ordering / article number	114992868
1.7 Product Version : Hardware version: Firmware version:	 1.2 2.0
1.8 In what countries is the product available	US, EU
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:	☒ Yes: ☐ No Europe/3000
1.11 What functionality does the device provide and which sensor(s) does it contain?	Use case: light sensor Short behavior description: SenseCAP LoRaWAN S2102 light intensity sensor satisfies industrial wireless long-distance data acquisition with a wide measuring range from 0 to 160000 Lux, with an accuracy of ±5% and a resolution of 1 Lux.
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	SenseCAP S2101 ±0.2 °C 0.01 °C Temperature -40 to +85 °C
Name:	SenseCAP S2102

sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	±5% Lux 1 Lux Light 0 to 160000 Lux
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	SenseCAP S2103 400 to 5000 ppm: ±(30+3%MV) 1 ppm CO2 400 to 10000 ppm
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	SenseCAP S2104 -40 to 0, 50 to 80°C: ±1 °C/50 to 100%: ±5% 0.1 °C/0 to 50%: 0.1%,50 to 100%: 0.5% Soil Temperature/Soil Moisture -40 to +80 °C/0 to 100% (air-water)
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	SenseCAP S2105 0 to 50%: ±3%/50 to 100%: ±5% 0 to 50%: 0.1%/50 to 100%: 0.5% Soil Temperature/Soil Moisture 0 to 100% (air-water)
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	SenseCAP S2100
1.13 Uplinks are: Periodic: Period: Explanation: Keep alive message period: Event triggered how:	☒ 60 minutes Configurable by APP: 5~1440 mins 60 mins By internal timer
1.14 Parameter configuration of device (e.g. transmission or measurement interval, threshold levels, etc.)	☐ Remotely: ☐ Over-the-air with LoRaWAN data downlinks ☐ Specify if other: ☐ Locally: ☐ Via CLI: specify type of connector: ☐ Via NFC: ☒ Specify if other: Bluetooth
1.15 Does the application server send downlinks to the devices?	☒ Yes: (why/how often/typical size) ☐ No
1.16 Operating temperature of device - x °C to + x °C	Minimum -40 °C Maximum 85 °C
1.17 Is the payload structure available for decoding?	☒ Yes: ☐ No Please attach the payload structure (+example of decoded payload)
1.18 Is there a decode-API available	☐ Yes: ☒ No Please attach the API documentation

1.19 Is the firmware upgradeable and how?	☒ Yes: (how) OTA
1.20 How can the device be reset to factory default settings?	APP
1.21 How can the device be forced to re-initiate the join procedure?	Press the button
1.22 Product certifications (IP rating, ATEX, ...)	1. IP rating: IP66 2. ATEX compliance: Other: FCC/CE
1.23 Which regulatory certifications are available (RED, CE, EMC)?	☒ RED ☒ CE ☒ EMC Attach proof of certification to the mail in which this document is sent to a public operator
1.24 Power Supply	☐ External power supply: connection: voltage: amperage: ☒ Internal battery: battery type: LiSOCI2 Battery chemical composition: Battery self-discharge (%/year): Battery shelf life: capacity: weight: rechargeable: ☐ Yes: ☐ No
1.25 Powering device on and off How is the device turned ON ? How is the device turned OFF ?	 Press the button until the LED on Press the button until the led blink
1.26 Dimensions of device (Length x width x height)	19*5.5*7cm
1.27 Weight of full device	280gg
1.28 Mounting of device 1. How to mount? 2. How to mount for best antenna propagation	

2 LoRaWAN Device Information

2.1 DevEUI Range (IEEE Compliance)	From :2CF7F120147002A1 To : 2CF7F120147102A1
2.2 LoRaWAN Class	☒ Class A ☐ Class B ☐ Class C
2.3 For Class C Device: Device Under Test restores previous RF settings at boot?	☐ Yes ☐ No
2.4 In what LoRaWAN region/frequency ranges is the product available	☒ EU863-870 ☒ US902-928 ☐ AS923 ☐ IN865-867 ☐ KR920-923 ☐ Other
2.5 Is the LoRaWAN test mode supported?	☒ Yes ☐ No, why not
2.6 Tested and certified against which LoRaWAN Specification(s)	☐ V1.0 ☐ V1.0.1 ☒ V1.0.2 revB ☐ V1.0.3 ☐ V1.1.x ☐ 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	 ☐ TXPower 0 (20dBm) ☐ TXPower 1 (14dBm) ☐ TXPower 2 (11dBm) ☐ TXPower 3 (8dBm) ☐ TXPower 4 (5dBm) ☐ TXPower 5 (2dBm) ☐ other TXPower (dBm) ☒ TXPower 0 (MaxEIRP) ☐ TXPower 1 (MaxEIRP-2dB) ☐ TXPower 2 (MaxEIRP-4dB) ☐ TXPower 3 (MaxEIRP-6dB) ☐ TXPower 4 (MaxEIRP-8dB) ☐ TXPower 5 (MaxEIRP-10dB) ☐ TXPower 6 (MaxEIRP-12dB) ☐ TXPower 7 (MaxEIRP-14dB) ☐ other TXPower (Max EIRP : dB)

2.9 Which TX powers are supported by the device in production - if LW 1.0.2 rev A or older is used: - if LW 1.0.2 rev B or newer is used	☐ TXPower 0 (20dBm) ☐ TXPower 1 (14dBm) ☐ TXPower 2 (11dBm) ☐ TXPower 3 (8dBm) ☐ TXPower 4 (5dBm) ☐ TXPower 5 (2dBm) ☐other TXPower (dBm) ☒ TXPower 0 (MaxEIRP) ☒ TXPower 1 (MaxEIRP-2dB) ☒ TXPower 2 (MaxEIRP-4dB) ☒ TXPower 3 (MaxEIRP-6dB) ☒ TXPower 4 (MaxEIRP-8dB) ☒ TXPower 5 (MaxEIRP-10dB) ☒ TXPower 6 (MaxEIRP-12dB) ☒ TXPower 7 (MaxEIRP-14dB) (Max EIRP : 16.0 dB)
2.9 Which LoRaWAN Specification is currently supported on the production devices?	☐V1.0 ☐V1.0.1 ☐V1.0.2 revA ☒V1.0.2 revB ☐V1.0.4 ☐V1.1.x ☐Other:
2.10 Will you re-certify your device when a new major LoRaWAN specification version is released	☒Yes. ☐No, why :
2.11 Has Interoperability prequalification testing been done?	☒Yes. ☐No, why : Which Network Servers ☐Actility ☐Loriot ☐TTI ☒Other: Specify: LCTT Please attach all the test reports.
2.12 Is Activation Type OTAA the default	☒Yes. ☐No, why :
2.13 For OTAA, is AppKey unique for each device?	☒Yes. ☐No.

2.14 Is ADR implemented? Recommendation: ADR should always be activated. Exceptions can be made for moving devices but will need to be explained.	☒Activated ☐Deactivated, why : ☐Configurable by user (recommendation: Activated by default) ☐Mixed, explain:
2.15 What values did you implement for: - ADR_ACK_LIMIT: - ADR_ACK_DELAY:	64 recommended value: 64 32 recommended value: 32
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)	☒unconfirmed ☐confirmed, when and why: ☐Both, which is used when and why: Data rate, timing and power back-off algorithm (only if you use confirmed uplinks): ☒Yes. ☐No, why :
2.17 Is the device doing a periodical rejoin? (only for OTAA)	☒Yes (frequency): Every 3minutes(10times) ☐No. Why? How to trigger a rejoin? Short press and release the button, the red breath light represents join.
2.18 Is the first join request sent on SF12?	☒Yes. ☐No, why: Explain the JoinRequest sequence if no JoinAccept is received - data rate, timing and power back-off algorithm.
2.19 On what SF and power setting is the first uplink (after join procedure) done?	SF: 12 TXPower: 16
2.20 Are you doing periodically reset of Uplink frame counter?	☐Yes (frequency/why): ☒No.
2.21 If LoRaWAN 1.0.x, DevNonce behaviour :	☒ Based on a random value ☐ Monotonically increasing never-wrapping counter
2.22 Uplink DataRate (0-7 supported)	Min: DR0 Max: DR7
2.23 RX1 Data Rate Offset	☒Default LoRaWAN in regards of ISM band ☐Other:
2.24 RX1 Delay	☒Default LoRaWAN in regards of ISM band ☐Other:
2.25 RX2 Data Rate	☒Default LoRaWAN in regards of ISM band ☐Other:

2.26 RX2 Frequency	☒Default LoRaWAN in regards of ISM band ☐Other:
2.27 RX1 Delay on JoinRequest (OTAA devices only)	☒Default LoRaWAN in regards of ISM band ☐Other:
2.28 Mobility Profile (how your device moves)	☒Near static ☐Walking speed ☐Vehicle speed ☐Random
2.29 Frame Counters Up To 32-bits	☒Frame counter-up ☐Frame counter-down
2.30 Which MAC commands does the device support	☒LinkCheckReq / LinkCheckAns ☒TXParamSetupReq / TXParamSetupAns ☒LinkADRReq / LinkADRAns ☒DutyCycleReq / DutyCycleAns ☒RXParamSetupReq /RXParamSetupAns ☒DevStatusReq / DevStatusAns ☒NewChannelReq / NewChannelAns ☒TXTimingSetupReq / TXTimingSetupAns
2.31 LoRaWAN Stack Type (optional)	☐Semtech/Stackforce ☒Semtech/Stackforce with modifications ☐IBM ☐IBM with modifications ☐Proprietary- Other, name it:
2.32 LoRaWAN Stack Version (optional)	1.0.3
2.33 LoRa Radio Hardware (optional)	☐Proprietary: SX chip used: ☒LoRaWAN Modem/Module: Manufacturer: ST Part Number: STM32WLE5JC Firmware revision:
2.34 Multicast support (optional)	☐Yes: Multicast DevAddr: Multicast AppSKey: Multicast NwkSKey: Payload: Port: ☒No.

3 Radio Frequency Information

3.1 Type of Antenna	☐Wire ☐PCB ☐External ☒Other: (which type) Shrapnel
3.2 Antenna gain [dBi or dBd]	1.74dBi or dBd
3.3 Did you measure and take into account the loss between the modem and the antenna?	☐Yes, dB loss ☐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*:	☐ TXPower 0 (20dBm) ☐ TXPower 1 (14dBm) ☐ TXPower 2 (11dBm) ☐ TXPower 3 (8dBm) ☐ TXPower 4 (5dBm) ☐ TXPower 5 (2dBm) ☐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)*.	☐Yes, dB loss ☐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

4.1 Battery consumption of the device (including modem, sensors and all other electronics	TX current: mA RX current: mA Idle time current: mA
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. **Assumptions:** - 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	Battery life in years Transmission Periodicity (transmissions/day) SF7 SF10 SF12 144 96 48 24 12 4 1 ☐LW1.0.1 ☐LW1.0.2 revA ☒LW1.0.2 revB ☐Other : ☐LW1.0.1 ☐LW1.0.2 revA ☒LW1.0.2 revB ☐Other : bytes

4.3 Which TX power setting (TXPower) was used in the RF test? - If LW 1.0.2 rev A or older device: - If LW 1.0.2 rev B or newer device:	☐ TXPower 0 (20dBm) ☐ TXPower 1 (14dBm) ☐ TXPower 2 (11dBm) ☐ TXPower 3 (8dBm) ☐ TXPower 4 (5dBm) ☐ TXPower 5 (2dBm) ☐other TXPower (dBm) ☒ TXPower 0 (MaxEIRP) ☒ TXPower 1 (MaxEIRP-2dB) ☒ TXPower 2 (MaxEIRP-4dB) ☒ TXPower 3 (MaxEIRP-6dB) ☒ TXPower 4 (MaxEIRP-8dB) ☒ TXPower 5 (MaxEIRP-10dB) ☒ TXPower 6 (MaxEIRP-12dB) ☒ TXPower 7 (MaxEIRP-14dB) ☐other TXPower (MaxEIRP- 16.0 dBdBm)
4.4 Is this the same TX power setting (TXPower) used by default in production devices (before network ADR)?	☒Yes, TXPower 0 ☐No, why:
4.5 Maximum ERP measured: (ERP = EIRP - 2.15 dB; LoRaWAN allows 14 dBm ERP)	10.72 dBm
4.6 TRP measured: (TRP is based on EIRP) This gives an idea about the directivity of the antenna.	dBm
3.10 TIS measured on RX1:	For RX1-SF12BW125 on 868.3MHz dBm
3.11 TIS measured on RX2	For RX2-SF12BW125 on 869.525 MHz: dBm