LoRaWAN® EU Supplementary Device Info Questionnaire

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
1.2 Website	solution.seeedstudio.com
1.3 Sales / Marketing contact person, email:	kevin.yang@seeed.cc
1.4 Technical contact person, email:	kevin.yang@seeed.cc
1.5 Commercial Product name	SenseCAP LoRaWAN Sensor Data Logger
1.6 Product code used when ordering / article number	114991726
1.7 Product Version : Hardware version: Firmware version:	v2.0 v2.0 v3.5
1.8 In what countries is the product available	Europe, China
1.9 What date was / is the market introduction for this device / product?	2020/07/03
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
1.11 What functionality does the device provide and which sensor(s) does it contain?	Use case: It gets sensor data and transmite it to network. The sensor includes air temperature and humidity, barometric pressure, light intensity, soil temperature & moisture & EC, wind speed, wind direction, pH and etc. Short behavior description: The SenseCAP LoRaWAN Data Logger connects the sensor, collects the data and uploads it to the LoRaWAN gateway. It has a custom battery and an IP66 enclosure, optimized for outdoor use cases that need reliable data collection over year.
1.12 Accuracy & resolution for every sensor or measurement made by the device	
Name:	SenseCAP Wireless Air Temperature and Humidity Sensor

sensor accuracy (incl. unit): +/-	±0.3 ℃; ±2 %RH
resolution (incl. unit):	0.1 ℃; 1 %RH
measurement parameter:	Air Temperature; Air Humidity
measurement range	-40 ℃ to +85 ℃; 0 to 100 %RH
Name:	SenseCAP Wireless Light Intensity Sensor
sensor accuracy (incl. unit): +/-	0 to 188000 Lux
resolution (incl. unit):	±5%
measurement parameter:	Light Intensity
measurement range	0 to 188000 Lux
Name:	SenseCAP Wireless CO2 Sensor
sensor accuracy (incl. unit): +/-	±(30 ppm + 3 %MV)
resolution (incl. unit):	1 ppm
measurement parameter:	CO2
measurement range	0 to 40000 ppm
Name:	SenseCAP Wireless Barometric Pressure Sensor
sensor accuracy (incl. unit): +/-	±1.0 hPa
resolution (incl. unit):	1 Pa
measurement parameter:	Barometric Pressure
measurement range	300~1100 hPa
Name:	SenseCAP Wireless Wind Speed Sensor
sensor accuracy (incl. unit): +/-	±0.3 m/s
resolution (incl. unit):	0.1 m/s
measurement parameter:	Wind Speed
measurement range	0 to 60 m/s
Name:	SenseCAP Wireless Wind Direction Sensor
sensor accuracy (incl. unit): +/-	±3°
resolution (incl. unit):	1°
measurement parameter:	Wind Direction
measurement range	0° to 360°
Name:	SenseCAP Wireless Soil Moisture and Temperature Sensor
sensor accuracy (incl. unit): +/-	±0.2 ℃; ±2%
resolution (incl. unit):	0.01 ℃; 0.01 %
measurement parameter:	Soil Temperature; Soil Moisture
measurement range	-30 ℃ to +70 ℃; from 0% to 100% of saturation
Name:	SenseCAP Wireless Soil Temperature, VWC & EC Sensor
sensor accuracy (incl. unit): +/-	±1 ℃; ±3 %(m3/m3); ±10% (0~7dS/m)
resolution (incl. unit):	0.1 ℃; 0.08 %(m3/m3); 0.01 dS/m (0~7dS/m)
measurement parameter:	Soil Temperature; Soil VWC; Soil EC
measurement range	-40 ℃ to +60 ℃; from 0% to 100% of saturation; 0 to 23 dS/m (bulk)
Name:	SenseCAP Wireless pH Sensor
sensor accuracy (incl. unit): +/-	±0.1 pH
resolution (incl. unit):	0.1 pH
measurement parameter:	pH
measurement range	0~14 pH
Name:	SenseCAP Wireless PAR Sensor
sensor accuracy (incl. unit): +/-	0.2 mV/μmol m-2 s-1
resolution (incl. unit):	1 μmol m-2 s-1
measurement parameter:	Photosynthetically Active Radiation

measurement range	0 to 2000 µmol m-2 s-1
Name: sensor accuracy (incl. unit): +/- resolution (incl. unit): measurement parameter: measurement range	SenseCAP Wireless Rain Gauge ⩽ ±2% 0.5 mm/hour Rainfall Volume 0~240 mm/hour
1.13 Uplinks are: Periodic: Period: Explanation: Keep alive message period: Event triggered how:	☒ 5 ~ 60 minutes When node join the network, node cycles upload data 5 ~ 60 minutes Internal Clock
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: Use a Serial Tool ☐ Via NFC: ☐ Specify if other:
1.15 Does the application server send downlinks to the devices?	☒ Yes: (why/how often/typical size) Modify the measurement interval ☐ 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) Use a Serial Tool via the Serial Port
1.20 How can the device be reset to factory default settings?	Update the firmware
1.21 How can the device be forced to re-initiate the join procedure?	Use the RESET button or switch
1.22 Product certifications (IP rating, ATEX, ...)	1. IP rating: IP66 2. ATEX compliance: Other:
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: Lithium thionyl chloride battery chemical composition: Lithium thionyl chloride Battery self-discharge (%/year): ⩽1%/year Battery shelf life: 3 year capacity: 19Ah weight: 107g rechargeable: ☐ Yes: ☒ No
1.25 Powering device on and off How is the device turned ON ? How is the device turned OFF ?	 By using the device internal switch By using the device internal switch
1.26 Dimensions of device (Length x width x height)	56*56*164 cm
1.27 Weight of full device	240g
1.28 Mounting of device 1. How to mount? 2. How to mount for best antenna propagation	 With the original bracket, can be installed on the wall or pole Point the logo on the device at the gateway

2 LoRaWAN Device Information

2.1 DevEUI Range (IEEE Compliance)	From :2CF7F10000000000 To : 2CF7F1FFFFFFFFFF
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: sensecap-docs.seeed.cc
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 : 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: 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:	64recommended value: 64 32recommended 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): ☒No. Why? How to trigger a rejoin? Use the RESET button
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. 1% duty cycle
2.19 On what SF and power setting is the first uplink (after join procedure) done?	SF: 12 TXPower: 0
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: 0 Max: 7
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)	v1.0.2
2.33 LoRa Radio Hardware (optional)	☒Proprietary: SX chip used: SX1276 ☐LoRaWAN Modem/Module: Manufacturer: Part Number: 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)
3.2 Antenna gain [dBi or dBd]	-2dBi or dBd
3.3 Did you measure and take into account the loss between the modem and the antenna?	☐Yes, dB loss ☒No, why: The antenna is only designed to our device, we have match the impedance between the modem and the antenna
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 txpower 0 (14dBm)
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, -2 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: 100mA RX current: 20 mA Idle time current: 0.02mA
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.	Battery life in years Transmission Periodicity (transmissions/day) 144 SF7 SF10 SF12 1.4 96 2 48 4 24 8 12 16 4 48 1 100
- LoRaWAN specification used for battery life calculation:	☐LW1.0.1 ☐LW1.0.2 revA ☒LW1.0.2 revB ☐Other :
- TX power setting (txpower) used for battery life calculation:	☐LW1.0.1 ☐LW1.0.2 revA ☒LW1.0.2 revB ☐Other :
- Payload size used for battery life calculation (should be average payload size of production device):	16 bytes
- Additional assumptions or comments on battery life (Typical usage	One battery pack per 10 packets, 23 bytes per packet

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- dBdBm)
4.4 Is this the same TX power setting (TXPower) used by default in production devices (before network ADR)?	☒Yes, TXPower0 ☐No, why:
4.5 Maximum ERP measured: (ERP = EIRP - 2.15 dB; LoRaWAN allows 14 dBm ERP)	14 dBm
4.6 TRP measured: (TRP is based on EIRP) This gives an idea about the directivity of the antenna.	14 dBm
3.10 TIS measured on RX1:	For RX1-SF12BW125 on 868.3MHz -137 dBm
3.11 TIS measured on RX2	For RX2-SF12BW125 on 869.525 MHz: -136 dBm