tabs

Healthy Home Sensor

Reference Manual

TBHV100-915
TBHV100-868

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1. Description

The Tabs Healthy Home sensor utilizes LoRaWAN connectivity to communicate the Temperature, Relatrive Humidity and Volatile Organic Compound levels of the surrounding environment. The intended use is to place the sensor within a room to determine if the air quality, temperature, and humidity are ideal.

The sensor is composed of two sensing elements. The main element is a temperature and relative humidity sensor. The second element is a Volatile Organic Compound sensor that requires temperature and relative humidity values to compensate for its operating conditions.

2. Specifications

2.1 Mechanical

2.1.1 Sensor

Length x Width x Height	50mm x 20mm x 50mm
Weight	30g without battery 40g with battery
Sensor	Temperature & Relative Humidity, Volatile Organic Compound

2.2 Environmental

Temperature	-20°C to +50°C
IP Rating	IP 40 equivalent

2.3 Radio

Frequency	Either 863–870MHz for Eu models and 902–928MHz for North America
Tx Power	+19dBm conducted
Rx Sensitivity (Conducted)	-140dBm
Antenna Gain	-2dBi Peak, -5dBi Avg

2.4 Certifications and Conformity

FCC ID: 2AMUGTBSP100
IC: 22980-TBSP100
CE
ROHS REACH

2.5 Power

Source	3.6V ½ AA Li-SOCl2 1200mAh battery
Maximum Voltage	3.6V
Minimum Voltage	3.1V
Current	135mA maximum/5uA minimum

2.6 User Interface

LEDs	One blue LED

2.7 Additional Features

PCB Temperature
Battery Monitoring

3. Operation

3.1 Power On Reset

Anytime the device power drops below 2.8V the device will enter a Power On Reset (POR) when greater than 2.8V is restored. After a POR the device will wait up to 30 seconds before entering default operation.

3.2 Transport Mode

They are shipped with a plastic battery isolation tab that must be removed to enable operation.

3.3 Installation Mode

There is no installation mode for the Healthy Home sensor.

3.4 Default Operation

During default operation the device will send a message to the network anytime there is a sufficient delta in the environmental conditions or after 60 minutes of inactivity. The precise trigger values can be found in 4.1.2.

4. Messages

LoRaWAN Packets for this device use port 103.

4.1 Status

4.1.1 Common Fields

Status[7:0]

{Fault3, Fault2, LED1, LED0, Fault1, Fault0, BTN1, BTN0}

- Nominally Fault0 indicates no network time available
- Nominally Fault1 indicates loss of primary sensor function
- Nominally Fault2 indicates loss of secondary sensor function
- Nominally Fault3 indicates loss of network connectivity

Battery[7:0]

LoRaWAN Decode

- 0 => Device is charging or line powered
- 1 to 254 => device level, 1 = minimum and 254 = fully charged
    - Futher encode
        - [7:4] = predicted battery life percentage, 15 = New, 0 = Replace
        - [3:0] = BatteryVoltage — 2.5V, in 0.1V steps, So 3.1V = 6
- 255 => Device could not measure battery — possible Fault

Temperature[6:0]

Unsigned Integer (0 to 127) Temperature = value - 32, measurement range -32 to 95°C

4.1.2 Triggers

Packet Triggers: 60 minute inactivity, 2C delta, 5% RH Delta, 50ppm eCO_2, 20ppb VOC

4.1.3 Payload

Port	103
Payload Length	8 bytes

Byte	0	1	2	3	4	5	6	7
Field	Status	Battery	Temp	RH	CO_2		VOC	

4.1.3 Payload (cont.)

Status	**Sensor status**	
	Bits [7:0]	RFU
Battery	**Battery level**	
	Bits [3:0]	unsigned value ν, range 1 – 14; battery voltage in V = (25 + ν) ÷ 10.
	Bits [7:4]	unsigned value κ, range 0 – 15; remaining battery capacity in % = 100 × (κ ÷ 15).
Temp	**Temperature as measured by digital sensor**	
	Bits [6:0]	unsigned value τ, range 0 – 127; temperature in °C = τ - 32.
	Bit [7]	RFU
RH	**Relative humidity as measured by digital sensor**	
	Bits [6:0]	unsigned value in %, range 0-100. The value 127 indicates measurement error.
	Bit [7]	RFU
CO_2	**Equivalent CO_2 level as measured by digital sensor**	
	Bits [15:0]	unsigned value in ppm, range 400 – 8192. The value 0 indicates no measurement available yet, a value of 0xffff indicates measurement error.
VOC	**Total Volatile Organic Compound Level as measured by digital sensor**	
	Bits [15:0]	unsigned value in ppb, range 0 – 1187. The value 0xffff indicates measurement error.

5. Commands

RESERVED.