



## TESS WIRELESS SENSOR TAG DEMO V1.1

Standard 2.4GHz Wireless Communication Tag

Humidity: 0 - 100% RH

Temperature: -20°C to +85°C

Pressure: 300 to 1,200mBar

iOS, Android™ and Windows® PC Compatible

### Applications

- ◆ Smart building
- ◆ Smart home
- ◆ HVAC controller
- ◆ Maintenance
- Smartphones and tablets accessories

The sensor tag demo V1.1 reports humidity, temperature and barometric pressure through a standard low power 2.4GHz wireless communication protocol.

It is based on the MEAS low power digital component sensors HTU21D(F) for RH/T (datasheet HPC199) and MEAS ultra-compact micro-altimeter MS5637 (datasheet DA5637-02BA03).

The mobile application is available for free download using the Google Play™ Store for Android™ or the App Store for iOS. It will turn your smart phone or tablet into a display and datalog terminal. Refer to the WPC001 and WPC005 for installation guidelines and user manual

An optional USB dongle is available to connect the sensor tag to your personal laptop. Refer to the WPC002 for Windows® application installation.

The tag has been designed for an expected life time of 1 year on a standard CR2032 cell battery at one acquisition per second.

BLE Services

HTU21D SERVICE

|      |                                      |
|------|--------------------------------------|
| UUID | F000AA20-0451-4000-B000-000000000000 |
|------|--------------------------------------|

AVAILABLE CHARACTERISTICS

| Name   | UUID                                 | Bytes | Read / Write | Notified |
|--------|--------------------------------------|-------|--------------|----------|
| Data   | F000AA21-0451-4000-B000-000000000000 | 6     | Read         | YES      |
| Status | F000AA2F-0451-4000-B000-000000000000 | 1     | Read         | NO       |

DATA CHARACTERISTIC BYTES FIELDS

| Byte 0               | Byte 1               | Byte 2          | Byte 3            | Byte 4            | Byte 5       |
|----------------------|----------------------|-----------------|-------------------|-------------------|--------------|
| Temperature Word MSB | Temperature Word LSB | Temperature CRC | Humidity Word MSB | Humidity Word LSB | Humidity CRC |

CONVERSION

Temperature (°C) =  $-46.85 + 175.72 \times \text{Temperature Word} / 2^{16}$

Humidity (%RH) =  $-6 + 125 \times \text{Humidity Word} / 2^{16}$

CRC

|                      |                       |
|----------------------|-----------------------|
| Generator polynomial | $X^8 + X^5 + X^4 + 1$ |
| Initialization value | 0x00                  |
| Final operation      | None                  |

Please refer to HTU21D (F) Sensor Datasheet for more information.

STATUS

|      |              |
|------|--------------|
| 0x00 | OK           |
| 0x01 | Sensor error |

## MS5637 SERVICE

|      |                                      |
|------|--------------------------------------|
| UUID | F000AA40-0451-4000-B000-000000000000 |
|------|--------------------------------------|

## AVAILABLE CHARACTERISTICS

| Name        | UUID                                 | Bytes | Read / Write | Notified |
|-------------|--------------------------------------|-------|--------------|----------|
| Data        | F000AA41-0451-4000-B000-000000000000 | 6     | Read         | YES      |
| Calibration | F000AA43-0451-4000-B000-000000000000 | 12    | Read         | NO       |
| Status      | F000AA4F-0451-4000-B000-000000000000 | 1     | Read         | NO       |

## DATA CHARACTERISTIC BYTES FIELDS

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 |
|--------|--------|--------|--------|--------|--------|
| D1 MSB | D1     | D1 LSB | D2 MSB | D2     | D2 LSB |

D1 and D2 are both 24 bits words.

## CALIBRATION CHARACTERISTIC BYTES FIELDS

|        |        |
|--------|--------|
| Byte 0 | C1 MSB |
| Byte 1 | C1 LSB |
| Byte 2 | C2 MSB |
| Byte 3 | C2 LSB |
| Byte 4 | C3 MSB |
| Byte 5 | C3 LSB |

|         |        |
|---------|--------|
| Byte 6  | C4 MSB |
| Byte 7  | C4 LSB |
| Byte 8  | C5 MSB |
| Byte 9  | C5 LSB |
| Byte 10 | C6 MSB |
| Byte 11 | C6 LSB |

## CONVERSION

$$dT = D2 - C5 \times 2^8$$

$$TEMP = 2000 + dT \times C6 / 2^{23}$$

$$OFF = C2 \times 2^{17} + (C4 \times dT) / 2^6$$

$$SENS = C1 \times 2^{16} + (C3 \times dT) / 2^7$$

$$P = (D1 \times SENS / 2^{21} - OFF) / 2^{15}$$

$$\text{Temperature (}^\circ\text{C)} = TEMP / 100$$

$$\text{Pressure (hPa)} = P / 100$$

Please refer to MS5637 Sensor Datasheet for more information.

## STATUS

|      |              |
|------|--------------|
| 0x00 | OK           |
| 0x01 | Sensor error |

## Battery Service

|      |                                      |
|------|--------------------------------------|
| UUID | F000180F-0451-4000-B000-000000000000 |
|------|--------------------------------------|

## AVAILABLE CHARACTERISTICS

| Name | UUID                                 | Bytes | Read / Write | Notified |
|------|--------------------------------------|-------|--------------|----------|
| Data | F0002A19-0451-4000-B000-000000000000 | 2     | Read         | YES      |

## DATA CHARACTERISTIC BYTES FIELDS

| Byte 0            | Byte 1 |
|-------------------|--------|
| Battery Level (%) | Status |

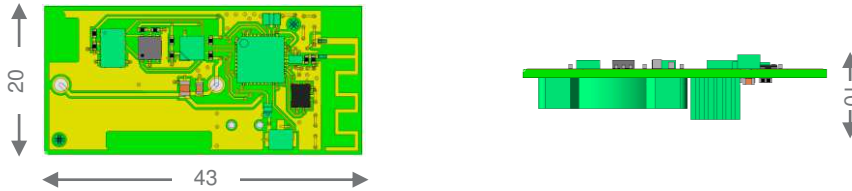
## CONVERSION

0% to 100% represents a supply voltage from 2.0V to 3.0V with 1%/bit resolution.



## STATUS

|      |             |
|------|-------------|
| 0x00 | Discharging |
| 0x01 | Charging    |

## Dimensions (mm)



## Ordering Information

| Description                                                       | Part Number                                                                                    |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BLE Sensor Tag Demo for use with free Android or iOS application. | WPP100B001  |
| BLE Sensor Tag Demo for use with USB dongle Key for Windows PC.   | WPP109B001  |

## Reference Material

- ◆ WPC001:  
Android™ Application installation guidelines
- ◆ WPC002:  
Windows® PC Software installation guidelines
- ◆ WPC005:  
iOS Application installation guidelines

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