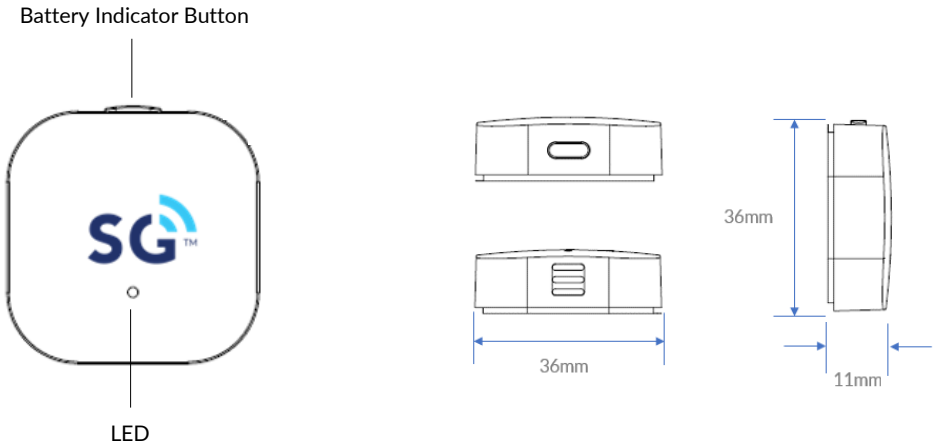
DTSB4.04 SGW8130 BLE Tag Datasheet

October 2021 V2.0

Introduction

The SGW8130 BLE Tag is a multi-purpose BLE device with both sensor and beacon capabilities, designed for indoor applications with its integrated antenna. It reports ambience data (temperature, humidity and light intensity), or simply transmits BLE signals for further analysis and interpretation, depending on your requirements.

Use as a complete solution with our SG Wireless Gateways, or have it customized as an easy, long-lasting integration into your own system.



Order Part Number	Description
SGW8130A	3-in-1 BLE Sensor (Temperature, Humidity and Light Intensity) with LED Indicator *Used with SGW6008A BLE-WiFi Gateway*
SGW8130B	2-in-1 BLE Sensor (Temperature and Humidity) with LED Indicator *Used with SGW6008B BLE-WiFi Gateway*
SGW8130C	Low-maintenance BLE Beacon Transmitter *Used with SGW6008C BLE-WiFi Gateway*

**All variants come with removable 3M stickers. Battery not included.*

Features

Chipset	Powered by Nordic's nR52840 Bluetooth® 5/BLE SoC
Description	Complete BLE RF solution with integrated antenna
Technology	BLE 5 ready with Beacon advertising data packet format
Power Input	CR2032 battery, CR2032W battery
Bluetooth	Bluetooth 5.0
Sensor	Temperature & humidity sensor and light sensor
LED	Tri-color LED indicator in red, green and blue
Dimension	37mm x 36.4mm x 11.5mm

Electrical Specifications

	SGW8130 BLE Tag
Absolute Maximum Rating	
Power Supply	CR2032 battery
Operating Temperature	-20°C to 80°C (-40°C to 125°C with CR2032W battery)
Electrical Specification	
Core Module	SGW BLE Module
Current Consumption	Part number-dependent
BLE RF Performance	
Radio Operating Frequencies	2402MHz ~ 2480MHz
Radio On-air Data Rate	1Mbps
Transmit Power	0dBm powered by nRF52840
Antenna	Onboard PCB antenna
Range	Up to 100 meters (open space at 0dBm)
Sensors	
Temperature Range & Precision *For SGW8130A and SGW8130B*	0°C – 60°C, ±0.3°C; -40°C – 125°C, ±2°C
Humidity Range & Precision *For SGW8130A and SGW8130B*	0 – 100% RH, ±3%
Light *For SGW8130A only*	0 – 4,096 Lux

Current Consumption

Typical Value	SGW8130A	SGW8130B	SGW8130C
Operating Mode	2.8mA	30uA	20uA
Sleep Mode	11.5uA	4.7uA	2.7uA

Data Packet

Data transmitted from SGW8130 is formatted according to the Bluetooth® Core Specification with the below details.

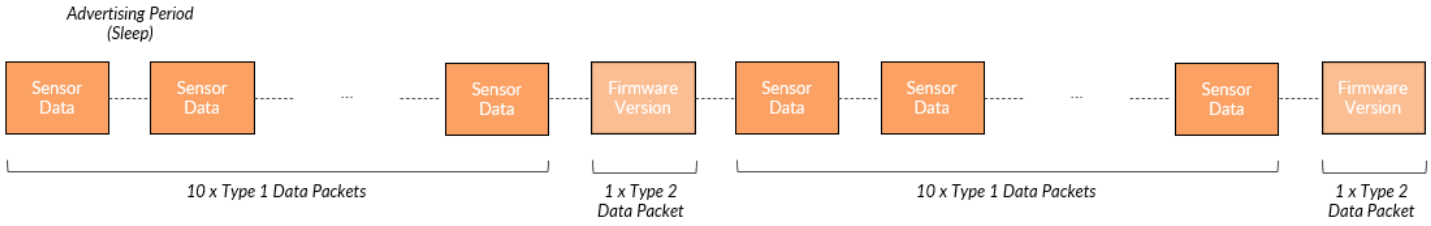
Field	Length	Description
Preamble	1 byte	Used for synchronization and timing estimation at the receiver. Broadcast packets are always 0xAA.
Access Address	4 bytes	Fixed broadcast packets with value = 0x8E89BED6
CRC	3 bytes	Cyclic Redundancy Check (CRC) is an error-detecting code used to validate the packets for unwanted alterations.
Header	2 bytes	Packet types information
Broadcast Address	6 bytes	BLE Tag MAC address
Manufacturer ID	2 Bytes	Manufacturer ID = 0x0059
Temperature Data	2 Bytes	Temperature in 0.01°C, byte in little endian, HEX format
Humidity Data	2 Bytes	Humidity in 0.01%, byte in little endian, HEX format
Light Sensor Data	2 Bytes	Light sensor max 4,096 lux under sunlight, HEX format
Battery Level	1 Byte	Battery level 0 – 100%, HEX format

Both the data packet transmission interval and data packet structure vary with the variant as well as the operation mode (for SGW8130A and SGW8130B).

In Advertising Mode,

- SGW8130 achieves the lowest possible power consumption by simply waking up, transmitting data and going back to sleep.
- SGW8130A and SGW8130B transmission periods are fixed at 1 second, while SGW8130C transmission period is fixed at 4 seconds.
- SGW8130A and SGW8130B transmit two types of data packets:
  - Type 1: Sensor Data
  - Type 2: Firmware Version

  10 Type 1 data packets are followed by 1 Type 2 data packet in every transmission cycle, as below.

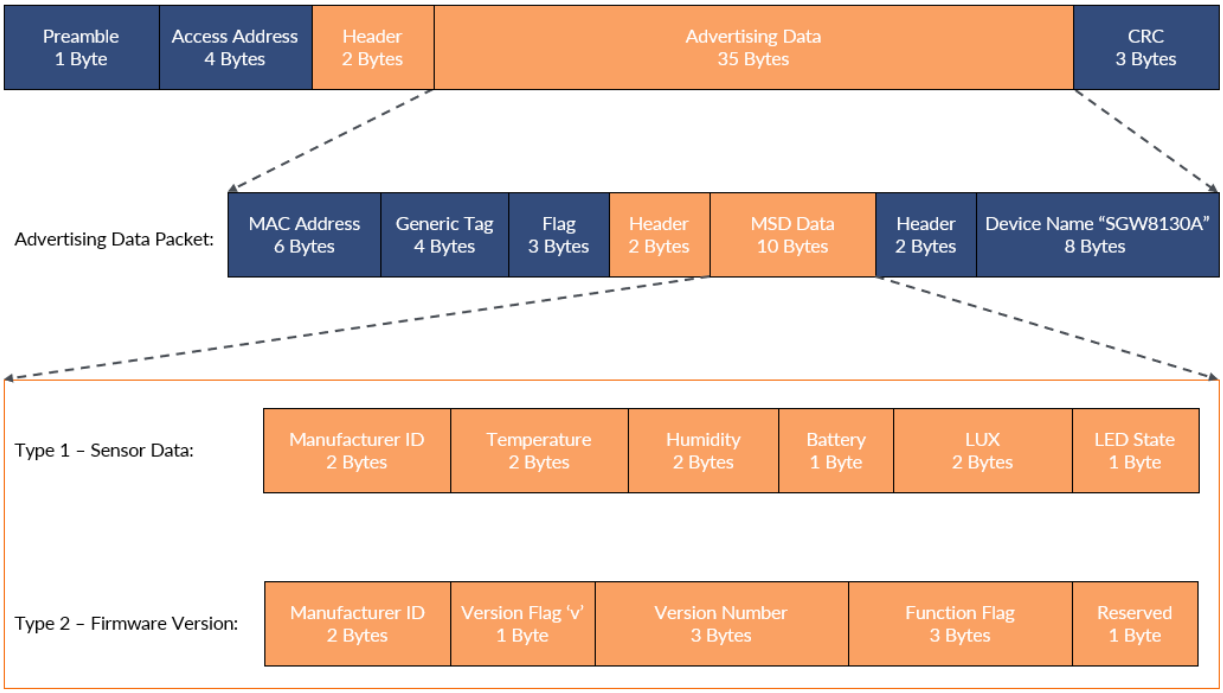


In Connected Mode,

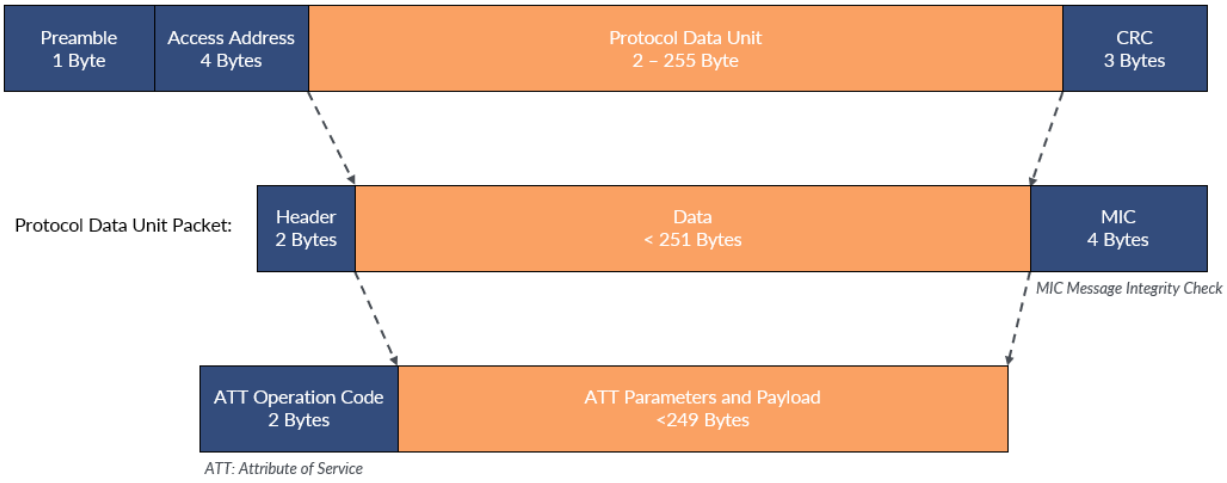
- SGW8130A and SGW8130B reporting periods are configurable.

Data packet structure for each variant in each operation mode (for SGW8130A and SGW8130B) is detailed below.

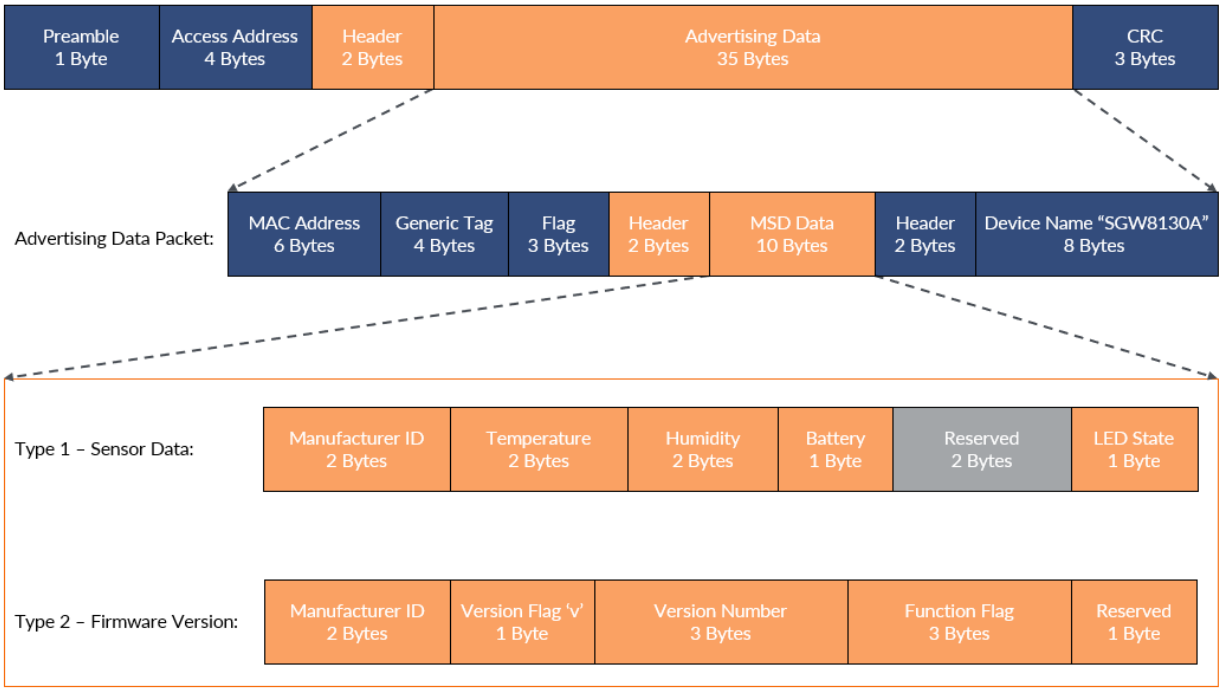
- **SGW8130A BLE Tag**
  - Advertising Data Packet with Advertising Period = 1 second



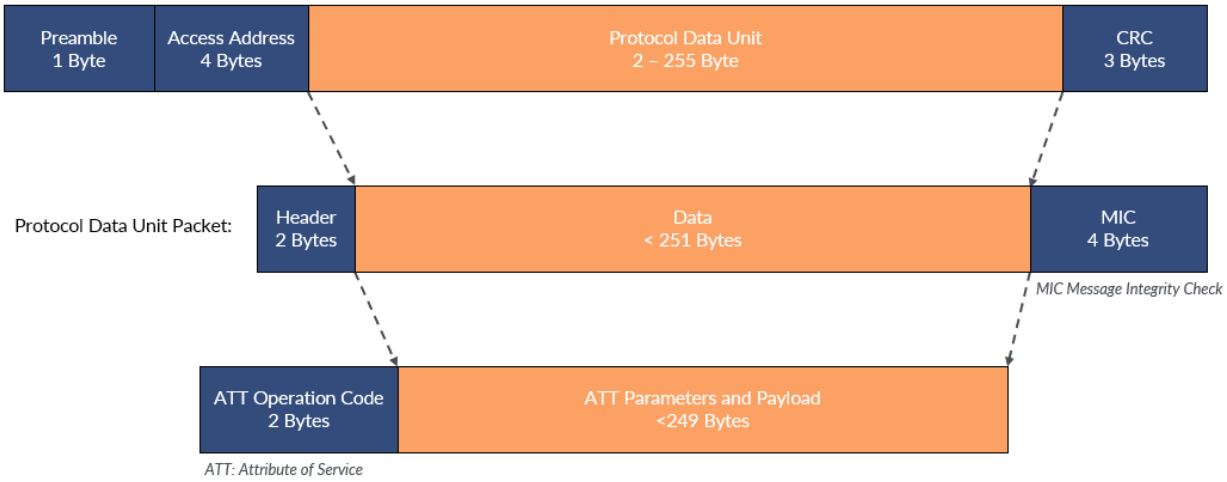
  - Connected Data Packet with Reporting Period = Configurable



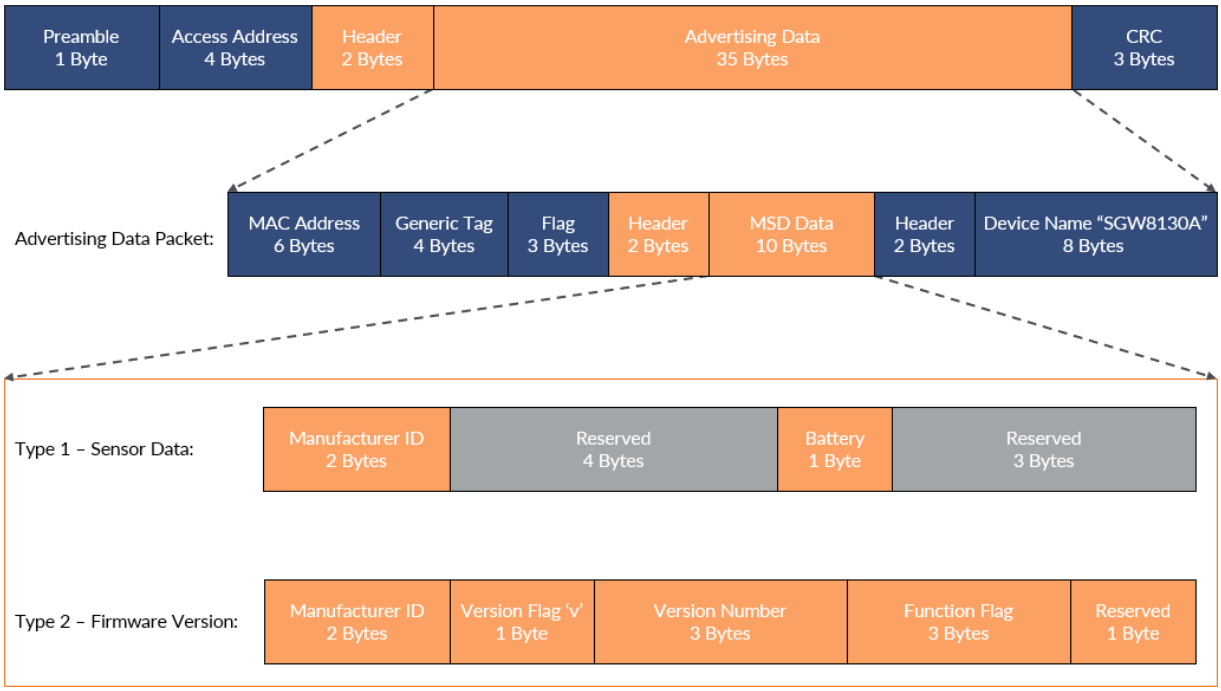
- **SGW8130B BLE Tag**
  - Advertising Data Packet with Advertising Period = 1 second



  - Connected Data Packet with Reporting Period = Configurable



- **SGW8130C BLE Tag**
  - Advertising Data Packet with Advertising Period = 4 seconds



GATT Service Tables

SGW8130 data packets are interpreted with the below tables.

- **Table 1: BLE Service UUID (for Connected Mode only)**

Standard Service:

	UUID	Data Size (Byte)	Function
Battery Service 0x180F			
Level	0x2A19	1	Battery level
Device Information Service 0x180A			
Manufacturer Name String	0x2A29	17	Manufacturer name
Model Number String	0x2A24	16	Model number
Firmware Revision String	0x2A26	18	Firmware revision
System ID	0x2A23	8	System ID

Manufacturer Specific Service:

	UUID	Data Size (Byte)	Function
Secure DFU Service 0xFE59			
Buttonless DFU Without Bonds	8ec90003-f315-4f60-9fb8-838830daea50	20	DFU
Temperature Service f000aa00-0451-4000-b000-000000000000			
Data	f000aa01-0451-4000-b000-000000000000	2	Real-time sensor data (See Table 3)
Config	f000aa02-0451-4000-b000-000000000000	1	Set/get sensor on/off state
Period	f000aa03-0451-4000-b000-000000000000	2	Set/get reporting period
Humidity Service f000aa20-0451-4000-b000-000000000000			
Data	f000aa21-0451-4000-b000-000000000000	2	Real-time sensor data (See Table 3)
Config	f000aa22-0451-4000-b000-000000000000	1	Set/get sensor on/off state
Period	f000aa23-0451-4000-b000-000000000000	2	Set/get reporting period
Light Service (for SGW8130A only) f000aa70-0451-4000-b000-000000000000			
Data	f000aa71-0451-4000-b000-000000000000	2	Real-time sensor data (See Table 3)
Config	f000aa72-0451-4000-b000-000000000000	1	Set/get sensor on/off state
Period	f000aa73-0451-4000-b000-000000000000	2	Set/get reporting period
IO Service f000aa64-0451-4000-b000-000000000000			
Data	f000aa65-0451-4000-b000-000000000000	16	Sensor configuration settings (See Table 2)

- **Table 2: Configuration Settings (for Connected Mode only)**

	Input	Description
Data	0	Turn on/start measurements
	1	Turn off/stop measurements
Period	Sensor data reporting period definition	Default at 1 second
		Configuration • 1 = 1 second • 2 = 1 minute • 3 = 1 hour • 4 = 1 day
IO	1 byte	LED on/off • 0 = Off • 1 = Red LED • 2 = Green LED • 3 = Blue LED
	2 bytes	First byte = Sensor type • 0 = Light Sensor • 1 = Temperature • 2 = Humidity
		Second byte = Sensor on/off • 0 = Off • 1 = On
	8 bytes	• Luxo_period • Temp_period • Humidity_period • Luxo_period_unit • Temp_period_unit • Humidity_period_unit
	Notification	Byte 1: LED_Status • Bit 0 = Red LED • Bit 1 = Green LED • Bit 2 = Blue LED
		Byte 2: Light Sensor on/off
		Byte 3: Temperature on/off
		Byte 4: Humidity on/off
		Byte 5: Reserved
		Byte 6 – 13: Sensor (period + unit)
		Byte 14: Auto wakeup on/off
		Byte 15: Auto wakeup period
		Byte 16: Auto wakeup period unit

- **Table 3: Raw Data Conversion**

Sensor	Data Length	Raw Data (HEX)	Conversion
Temperature	2 bytes	TempL : TempH	HexToDec (TempH : TempL) / 100 = Temperature in °C
Humidity	2 bytes	HumiL : HumiH	HexToDec (HumiH : HumiL) / 100 = Humidity in %
Light	2 bytes	LuxL : LuxH	HexToDec (LuxH : LuxL) = Light intensity value in lux

Revision History

Revised	Version	Description
22-Oct-2020	1.0	Initial document release
12-Jan-2021	1.1	Figure 2 update
5-Oct-2021	2.0	Document overhaul

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