

Sigfox Sens'it

Uplink frames format

Payload decoding guide

About

This doc describes how the frames sent by the Sensit v2 are formatted.

Bytes are read from left to right, the *first byte* being the most significant one

Bits are numbered the other way, from the LSB to the MSB. *Bit 0* being the LSB & *bit 7* the MSB of the said byte.

Example : received frame is *A9670d19* .

First byte is *0xA9* or *0b10101001* .

Or {bit 7}{bit 6}{bit 5}{bit 4}{bit 3}{bit 2}{bit 1}{bit 0}

Overall

First byte

Mode	Timeframe	Type	Battery MSB
b0-b2	b3-b4	b5-b6	b7
3 bits	2 bits	2 bits	1 bit

Second byte

T° MSB	Battery LSB
b0-b3	b4-b7
4 bits	4 bits

Following bytes

Data bytes, between 2 and 10 bytes depending on the active mode

Mode : int

Value	Mode
0	Button
1	T° + humidity
2	Light
3	Door
4	Move
5	Reed switch

Timeframe

Value	Timeframe
0	10 mins
1	1 hour
2	6 jours
3	24 hours

Type

Value	Type
0	Regular, no alert
1	Button call
2	Alert
3	New mode

Battery

Combine MSB & LSB, and use the following formula to get the value in V (between 2.7 & 4.25V) $\{\text{value}\} * 0.05 * 2.7$

Temperature (MSB)

Sent along each frame (not only in temp mode)

Value in °C : $(\{\text{value}\} * 6.4) - 20$

Value in °F : $((\{\text{value}\} * 6.4) - 20) * 1.8 - 30$

Data

Third byte

Classic mode (excludes Light & Door regular frames)

T° LSB	Reed Switch state	Unused
b0 - b5	b6	b7

Temperature in °C = $(\{\text{value}\} - 200) / 8$

Light mode

Value	Multiplier
b0 - b5	b6 - b7

Multiplier value	Final multiplier
0	1
1	8
2	64
3	2014

Light (lux) = $\{\text{final multiplier}\} * \{\text{value}\} * 0.01$

Door mode

Byte 3 is unused there, as it's reserved for configuration values

Fourth byte

Button frames

Byte 4 contains the software version

Minor version	Major version
b0-b3	b4-b7

Temperature mode

Byte 4 contains the humidity value Humidity (%) = $\text{value} * 0.5$

Other modes

This byte contains the number of alerts, as in movement detection mode for ex.

Examples

Ex 1 : E9671854

Binary representation

Byte number	Hex value	Binary
0	0x E9	0b 11101001
1	0x 67	0b 01100111
2	0x 18	0b 00011000
3	0x 54	0b 01010100

Sensit mode

3 LSB from first byte : 11101 001 1 means *temperature & humidity* mode

Frame type

Bits 5 & 6 from first byte : 1 11 01001 4 means *new mode*

Data

Humidity

Humidity % is byte 4 * 0.5

4th byte is 0x54 or 84, meaning humidity is 42%

Temperature

MSB

The most significant bits are the last (or most significant) 4 bits of the second byte.

Here, the second byte is 0x67 or 0b01100111

This means the temperature MSB are 0110

LSB

The least significant bits are the first 6 bits of the third byte.

Here, the third byte is 0x18 or 0b00011000.

This means the temperature LSB are 011000

Temperature value

We need to combine MSB & LSB. So our temperature value is 0110 011000, or

0b0110011000 or 408.

The formula to get the value in Celsius degrees is $(\{value\} - 200) / 8$.

This means our temperature is $(408 - 200) / 8$ or 26°C

Ex 2: C2646418

Binary representation

Byte number	Hex value	Binary
0	0x C2	0b 11000010
1	0x 64	0b 01100100
2	0x 64	0b 01100100
3	0x 18	0b 00011000

Sensit mode

3 LSB from first byte : 11000 010 2 means *Light sensor mode*

Frame type

Bits 5 & 6 from first byte : 1 10 00010 2 means *alert*

Data

Raw Value

Bits 0 to 5 from third byte : 01 100100 Meaning the raw value is 0b100100 or 36

Multiplier

Bits 6 & 7 (2 most significant bits) from third byte : 01 100100

1 means we'll have to multiply by 8

Light level value

Formula is Light (lux) = {final multiplier} * {value} * 0.01

Here, Light (lux) = 8 * 36 * 0.01 or 288 * 0.01 or 2.88 lux