

## APPLICATION NOTE



## SCA11H BED SENSOR INSTALLATION GUIDE

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**1 SCA11H product content**



**Figure 1.** SCA11H-C01

- BCG sensor node
- Power adapter
  - 9V/500mA switching power supply with 2.1/5.5 mm plug.
  - Four different power plugs are supported according to the table below.

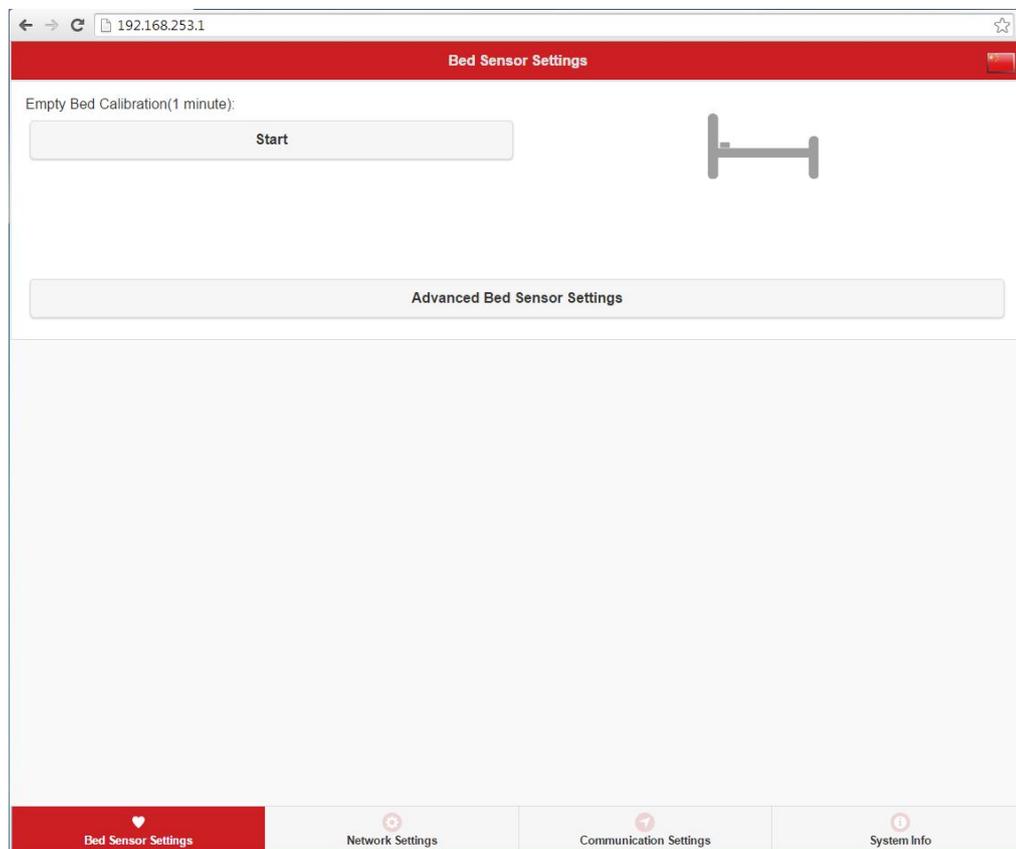
<b>Product type</b>	<b>Note <a href="http://www.iec.ch/worldplugs">www.iec.ch/worldplugs</a></b>	
SCA11H-A01	AC-adapter type A US, Canada, Mexico and Japan...	
SCA11H-P01	AC-adapter type A China	
SCA11H-C01	AC-adapter type C Europe, South America and Asia...	
SCA11H-G01	AC-adapter type G UK, Ireland, Malta, Malaysia, Singapore...	

## 2 SCA11H operation modes

### 2.1 Configuration mode

In configuration mode SCA11H creates its own network.  
Following configurations and settings can be made using configuration WEB page.

1. Communication – local vs cloud
2. BCG measurement related settings
3. Network settings
4. BCG-calibration



**Figure 2.** Configuration WEB page

### 2.2 Local communication mode

In local communication mode SCA11H connects to pre-defined WiFi network.

- SCA11H sensor node works as TCP/IP-server and writes output data in ASCII-format in the defined IP-address port 8080
- Simple Service Discovery Protocol SSDP is used for device discovery.
- Sensor node can be calibrated and maintained using the HTTP API according to *Product Specification 1424 SCA11H Hostless WLAN HTTP API Specification*.

## 2.3 Cloud communication mode

In cloud communication mode SCA11H connects to the pre-defined WiFi network and sends data to pre-defined server.

- Communication parameters can be set through the configuration mode.
- SCA11H sensor node sends data to the server as HTTP POST message. HTTP POST body contains XML-formatted BCG data according to *Product Specification 1325 SCA11H cloud server interface specification*.
- Simple Service Discovery Protocol SSDP is used for device discovery.
- Sensor node can be calibrated and maintained using the HTTP API according to *Product Specification 1424 SCA11H Hostless WLAN HTTP API Specification*.

## 3 SCA11H user interface

After initialization with the attachment plate LEDs on the top indicate the following functions:

1. Power (green)
  - Blinking: connecting to network
  - Static on: connected to network
2. Network (orange)
  - Flash: network traffic (transmission or reception)
3. Status (green)
  - Flash: BCG data transmission

After initialization without the attachment plate (approx. 10s) LEDs indicate the following functions:

1. Power (green)
  - Blinking: configuration mode
2. Network (orange)
  - Flash: network traffic (transmission or reception)
3. Status (green)
  - Off



**Figure 3.** SCA11H User Interface

## 4 SCA11H installation

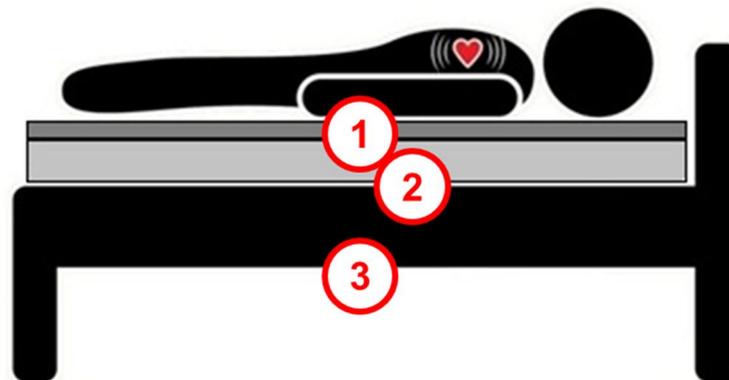
### 4.1 Positioning SCA11H into the bed

Positioning of SCA11H is very important. Please note two main items:

1. Orientation of the SCA11H needs to be the same as printed on top of the node (head to toes)
2. SCA11H measures the bed vibration caused by blood circulation and therefore it needs to be positioned in a place most optimal to measure this vibration.

Figure 4 depicts possible positioning options for SCA11H.

1. Under the mattress pad. Do not place under a person but rather on the side or edge of the mattress. The recommended distance to the person to be measured is min 20 cm.
2. On the bed frame or
3. On the side of the bed



**Figure 4.** Position options for SCA11H

In addition the socket-outlet shall be installed near the equipment and shall be easily accessible.

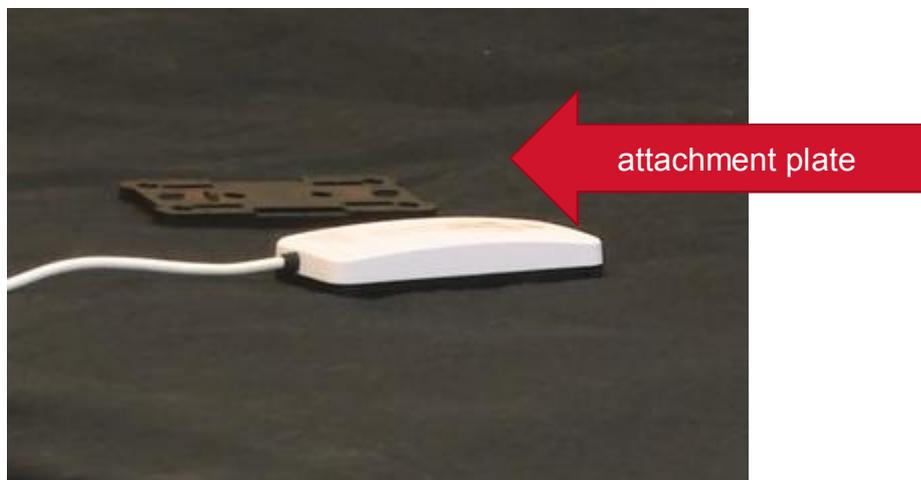
More examples for good positioning of SCA11H are shown in Figure 5.



**Figure 5.** Examples of good SCA11H attachment positions

## 4.2 Setting SCA11H into configuration mode

1. Ensure power is disconnected
2. Remove SCA11H from the attachment plate (attachment plate is the black plate attached with magnet to actual SCA11H sensor node, please see the figure below)
3. Plug in the power
4. Wait about 10 s until the green power led starts to blink with 1s interval
5. Attach SCA11H sensor node to the black attachment plate
6. After steps 1-5 SCA11H is ready for positioning and configuration.



**Figure 6.** SCA11H node without attachment plate

Flow chart for setting SCA11H into configuration mode is presented in Appendix 1.

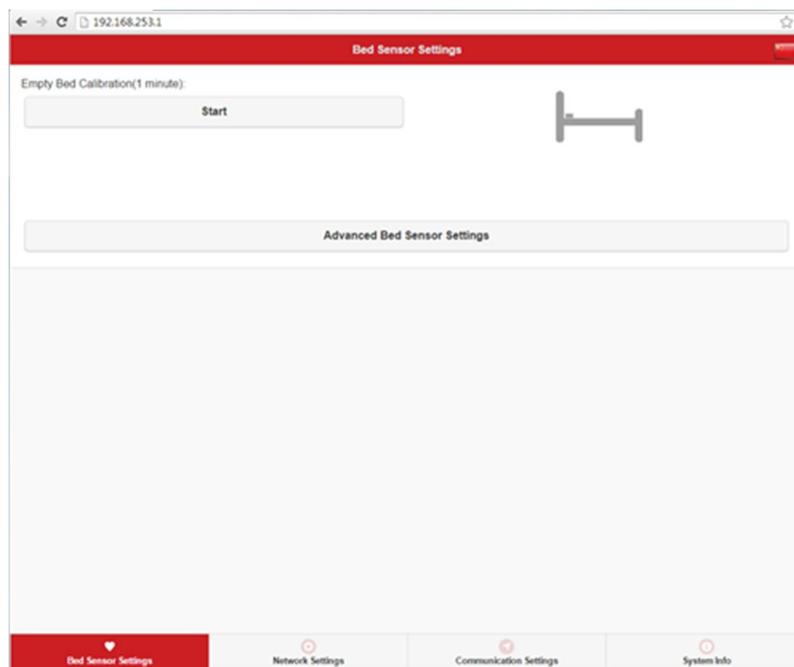
## 4.3 Configuration

1. Connect the used configuration device (for example laptop) to SCA11H's configuration network: muRata\_CFG\_XXXXXX using password: 24681012.



**Figure 7.** Example SCA11H's configuration network.

2. Open the browser at page <http://192.168.253.1>



**Figure 8.** Start-up page

3. Select Advanced Bed Sensor Settings

192.168.253.1/#page1\_1

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**BCG Running Mode:**

BCG Mode

**BCG Measurement Direction:**

Inverted

**BCG Calibration Parameters:**

Restore Default Parameters

Signal High: 7000      Signal Low: 270

Min Amplitude: 5000      Typ Amplitude: 1500

Scale: 7

Cancel      Apply

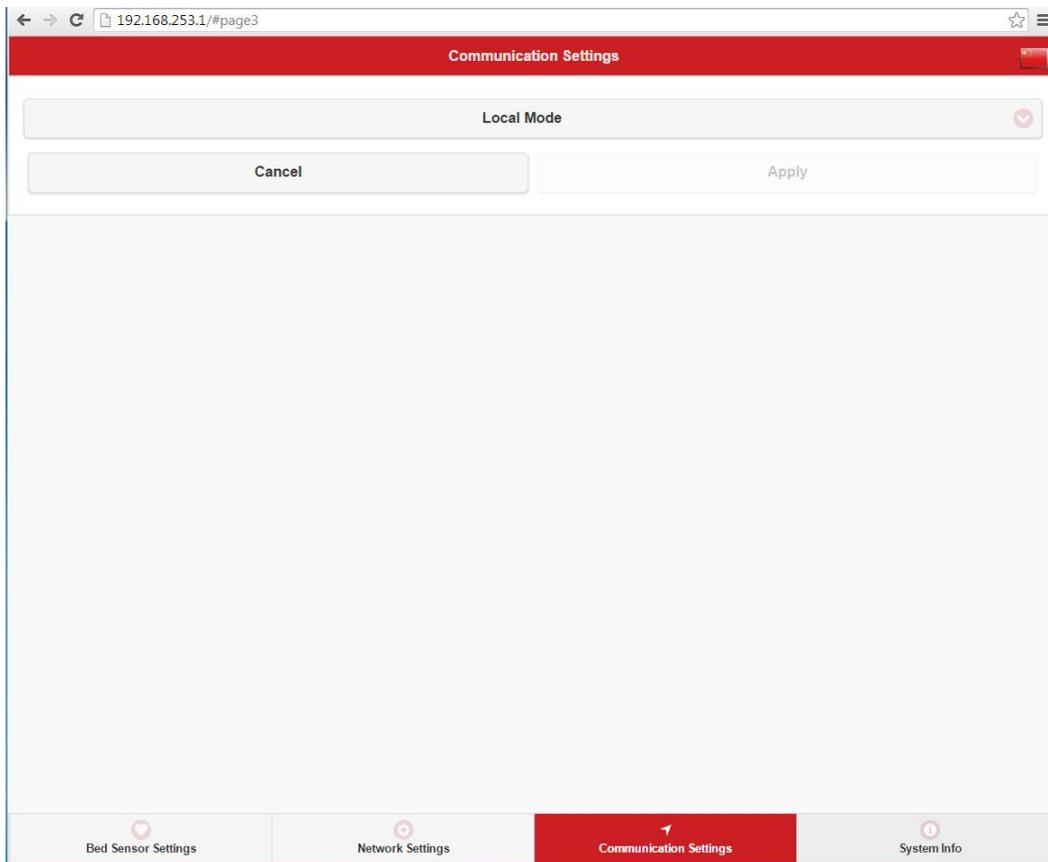
Bed Sensor Settings      Network Settings      Communication Settings      System Info

**Figure 9.** Advanced Bed Sensor Settings

4. Select “BCG Mode” for algorithm data output or “Data Logger Mode” for raw data output.
5. Select “Normal” as measurement direction.
6. Click “Apply” if changes were made.

Remark: Do not modify calibration parameters manually without in-depth understanding!

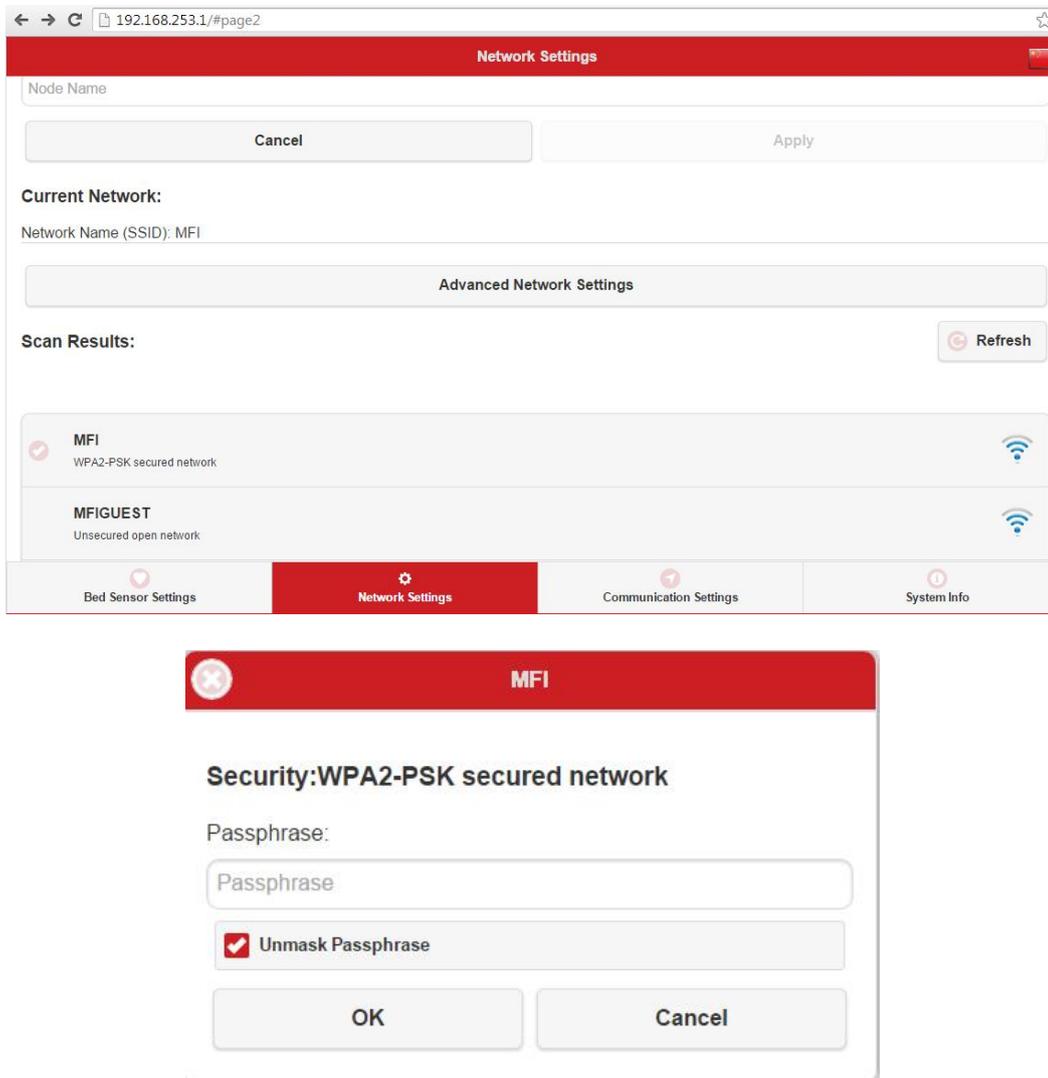
Select Communication Settings tab



**Figure 10.** Communication Settings

7. Select “Local Mode” if you are operating in local network or “Cloud Mode” if data is sent to a cloud server.
8. If cloud mode is selected, please follow the service provider instructions to configure the parameters.
9. Click “Apply” if changes were made.

Select Network Settings tab



**Figure 10.** Network Settings

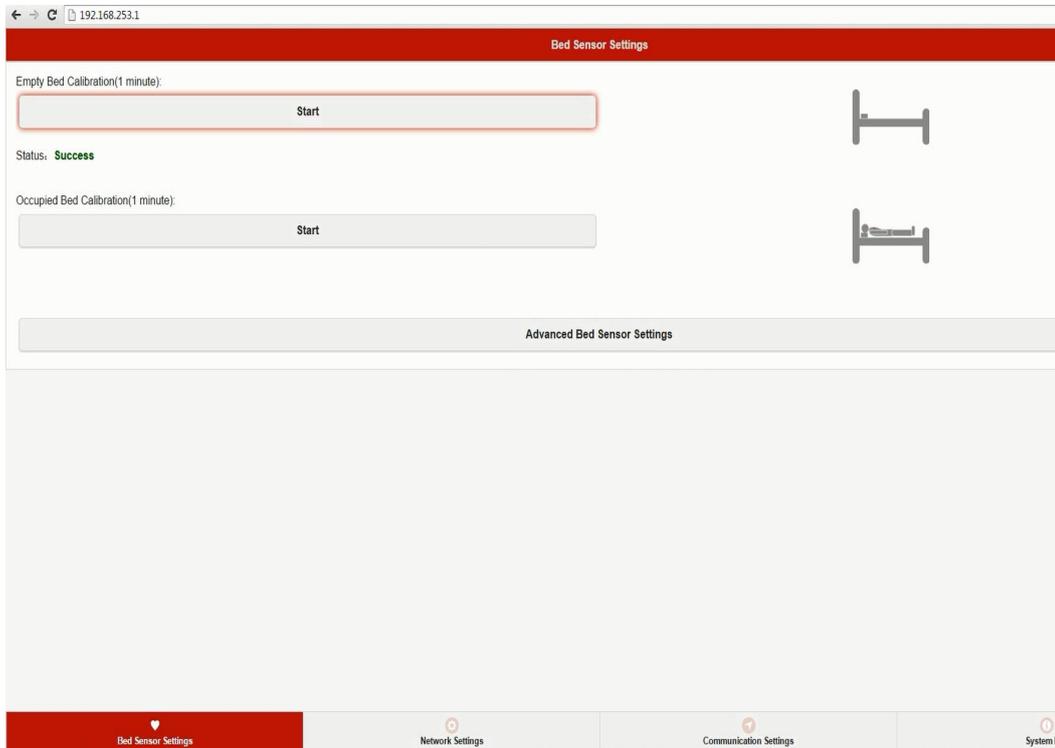
10. Select the local network where to connect SCA11H bed sensor node and enter the network password.

Flow chart for configuration and calibration using configuration WEB page is shown in Appendix 2.

#### 4.4 Calibration

Calibration is recommended to be carried out separately for each person in bed. If the person in bed changes, calibration should be repeated in order to obtain reliable results for each person.

## Select Bed Sensor Settings tab

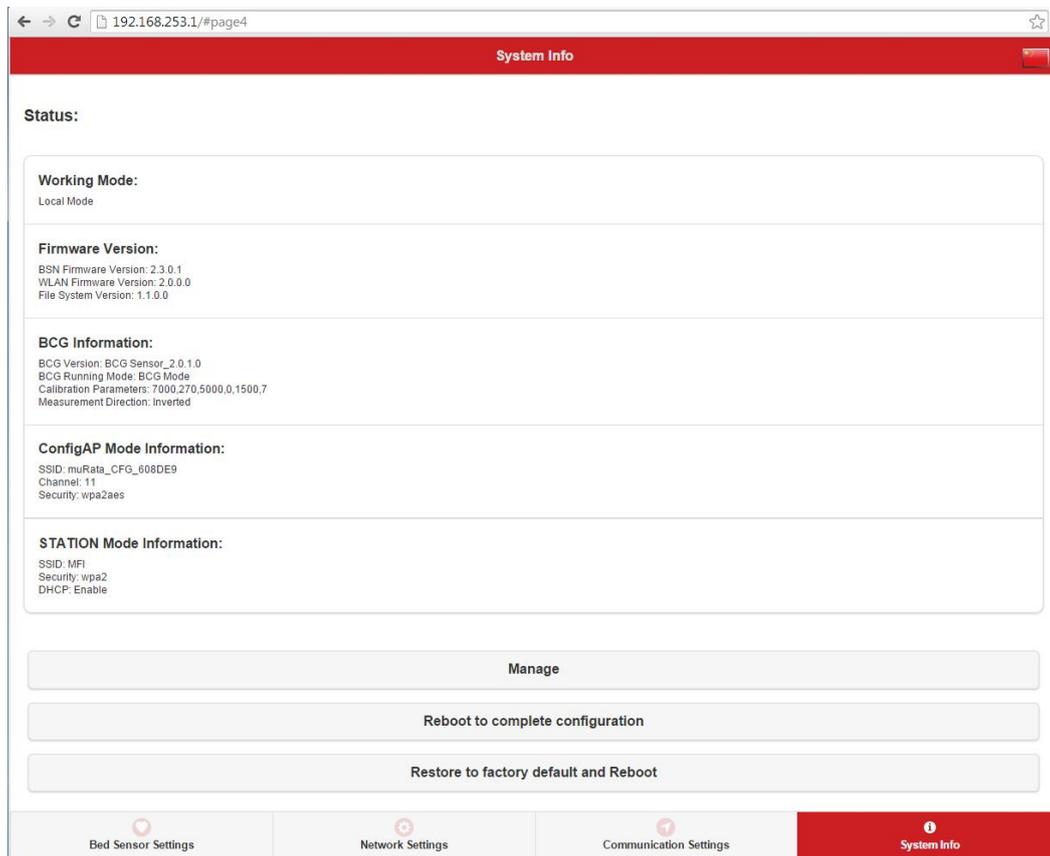


**Figure 11. Calibration**

1. Make sure that the SCA11H is positioned as instructed in chapter 4.2, bed is empty and it is not exposed to disturbances.
2. Start the empty bed calibration by clicking the “Start” button. This takes 1 minute. In case of disturbances the calibration can be started again. When succeeded, bed has been calibrated to the environment.
3. After empty bed calibration has been successfully performed SCA11H can be calibrated for the occupied bed. The monitored person should lie still on the bed and the occupied bed calibration can be started by clicking the “Start” button. This takes also 1 minute.

## 4.5 Completing configuration

Select System Info tab



**Figure 12.** System Info

Check the configured settings are correct. If yes, click "Reboot to complete configuration".

SCA11H Bed Sensor Node has now been configured.

## **5 Testing the output of SCA11H**

When using SCA11H the first time with the specific bed it is recommended to ensure proper sensor position. Please use e.g. separately provided BCGDemoGUI in Data logger mode to verify the measured raw data contains periodic signal due to pulse. If no periodic signal can be seen, sensor position should be improved.

## **6 Care instructions and safety utilization**

SCA11H is maintenance free. AC-adaptor must be disconnected from the power when cleaning the bed to avoid electric shock due to water or moisture.

SCA11H does not need to be reconfigured or recalibrated in case of power out.

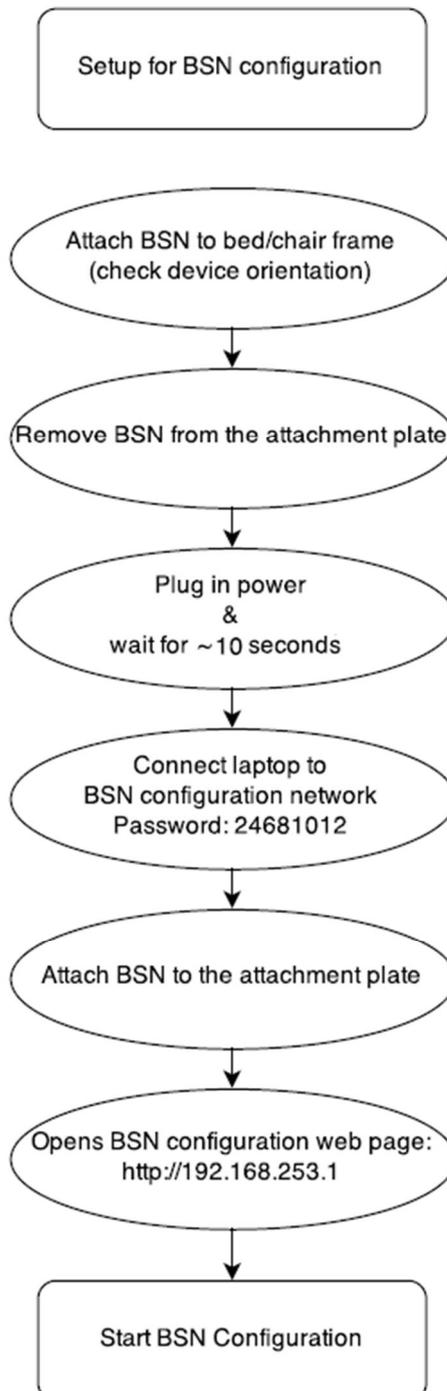
## **7 Declarations**

- SCA11H operating temperature range is 10 to 55 °C
- Non-authorized modification by user is prohibited.
- SCA11H sensor is not a medical device and has not been validated or approved as such. It should not be used to diagnose or treat medical conditions.

## 8 Appendixes

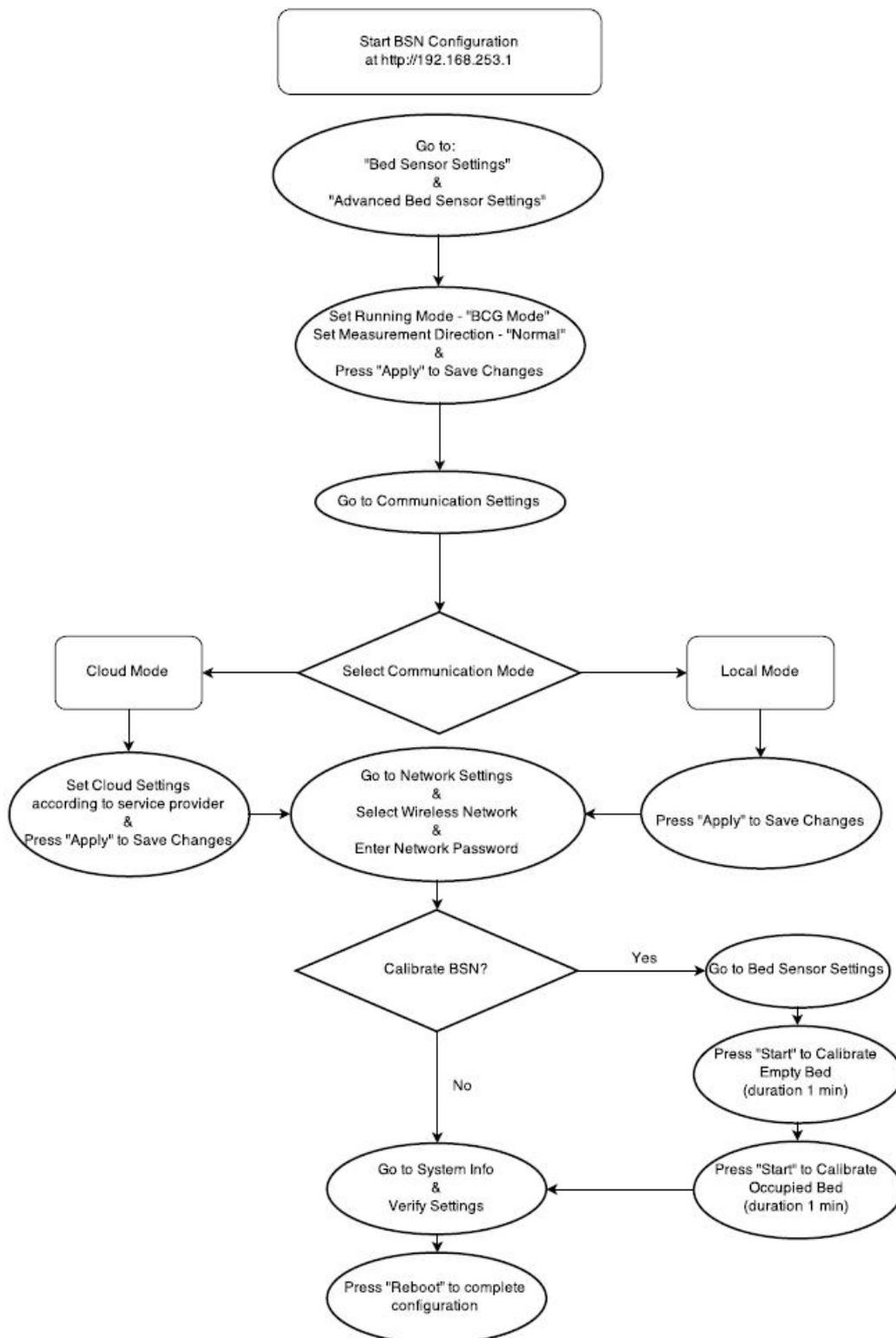
### Appendix 1

Setting up SCA11H to the configuration mode



## Appendix 2

### SCA11H Configuration and Calibration using configuration WEB page



## Appendix 3

### FCC regulations

**NOTICE:**

*This device complies with Part 15 of the FCC Rules.*

*Operation is subject to the following two conditions:*

- (1) this device may not cause harmful interference, and*
- (2) this device must accept any interference received, including interference that may cause undesired operation.*

**NOTICE:**

*Changes or modifications made to this equipment not expressly approved by Murata Manufacturing Co., Ltd. may void the FCC authorization to operate this equipment.*

**NOTE:**

*This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.*
- Increase the separation between the equipment and receiver.*
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- Consult the dealer or an experienced radio/TV technician for help.*

**Radiofrequency radiation exposure Information:**

*This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*

**9 Change Control**

<b>Rev.</b>	<b>Date</b>	<b>Change Description</b>
1	25-Sep-15	Document moved to new control system and template, updated document references. Appendix 1 updated.