Renesas Synergy™ S124

Cloud Sensor Demo Kit Quick Start Guide

Introduction

This quick start guide describes the Renesas Sensor Panel Demo Kit with Cloud utility set up. Highlighted components in this solution includes a Sensor Panel board, which is using Renesas Synergy™ S124 Microcontroller Group and Renesas RL78/G1D Bluetooth Low Energy, and Renesas Synergy™ SK-S7G2 starter kit. Using this Demo Kit, developers can easily start to evaluate on Renesas platform with its third-party Medium One's Cloud solution for Building Automation application like Renesas Smart Home Portal. Contact your nearest Renesas sale offices to request a live demonstration or kit for development.

Target Device

R7FS124773A01CFM

Related documents

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

Document Name	Document No.
User's Manual Application Example for Wi-Fi Connectivity (AE-Wi-Fi1)	R12UM0017EU0100
Quick Start Guide Sensor Demo Kit	R12QS0024EU0100
User Guide Sensor Panel Board	R12AN0074EU0100

Contents

1.   Kit Contents

The following components are included in the kit:

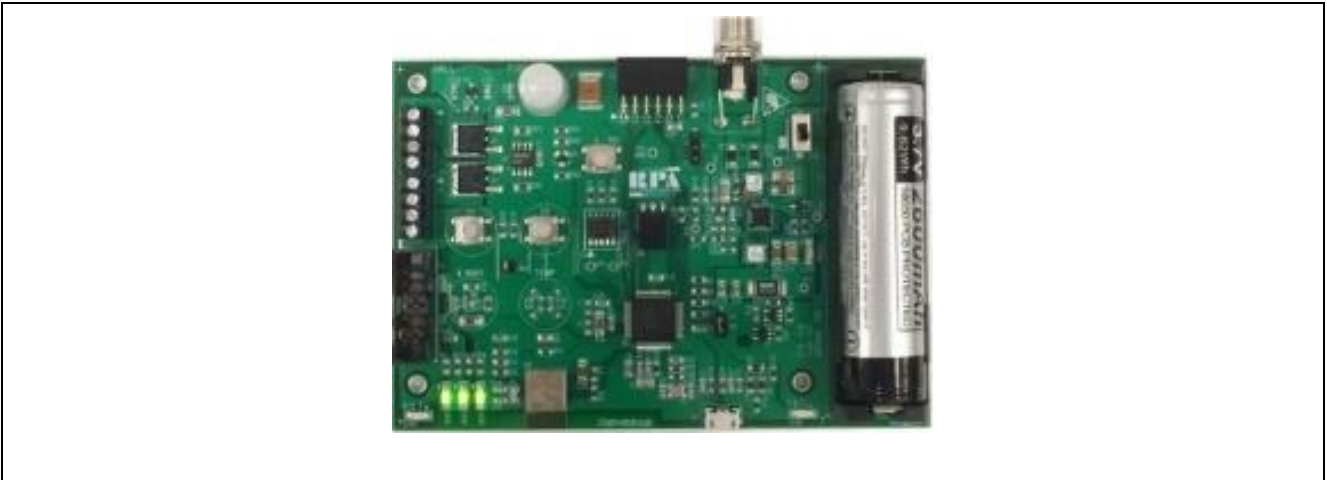1.   One preprogrammed Sensor Panel board

Figure 1 Sensor Panel Board

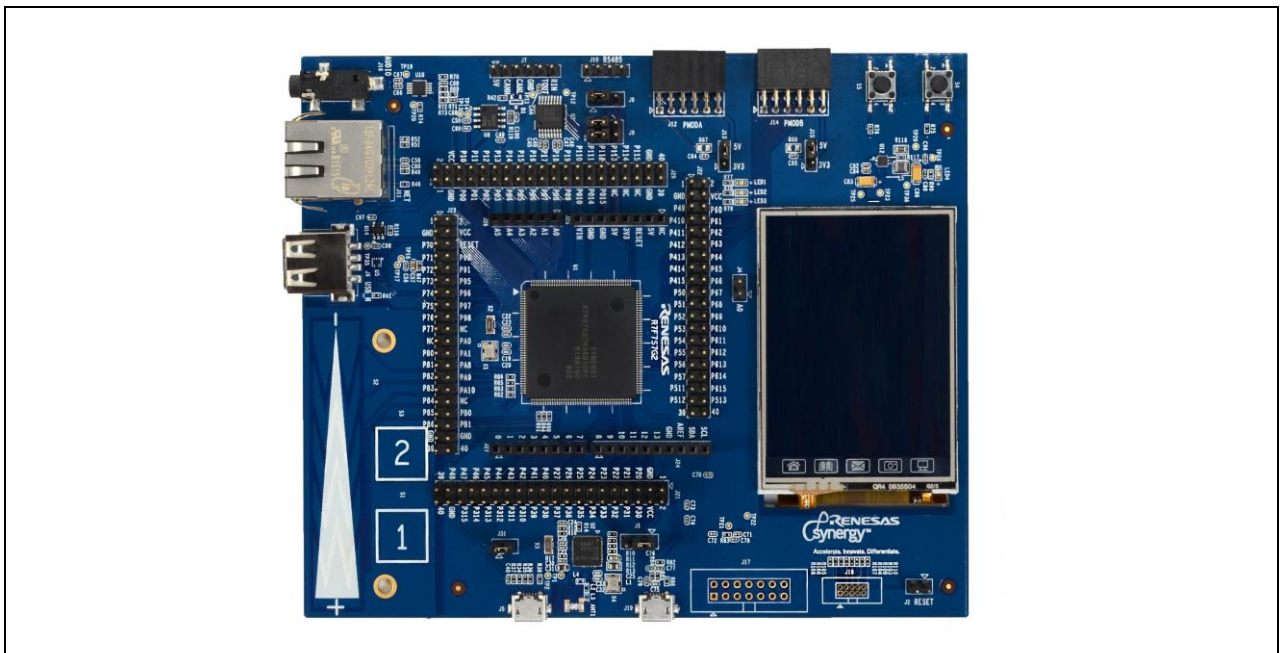2.   One preprogrammed SK-S7G2 Starter Kit board

Figure 2   Renesas Synergy™ SK-S7G2 Starter Kit

3.   One rechargeable Li-ion battery or one USB Wall Charger 5Vdc (1A) power supply for Sensor Panel power supply

4.   One USB Wall Charger 5Vdc, 1A for SK-S7G2 Starter Kit power supply

5.   Two micro B USB cable for Sensor Panel board and SK-S7G2 Starker Kit

6.   One PMOD Wi-Fi module (AE-Wi-Fi1)

2. Features

This is a verticalized demo to demonstrate and end to end application for the hotel and hospital segment. This demo shows how the Renesas Sensor panel can enable monitoring of hotel room such as temperature, window open/close, occupancy detection in the room, air conditioning on/off, room service request and do not disturb. For developer, there is Renesas IoT Sandbox webpage to build workflows with Python programming. The Renesas Smart Hotel system diagram is shown in Figure 3.

The portal is designed to be used by hotel personnel to monitor the rooms and detected the following scenarios:

1) Air-condition (A/C) is running while room is unoccupied (inefficient power)
2) A/C is running while window is open
3) Room service requested
4) Do not disturb enabled
5) View analytics such as historic data and trends
6) House cleaning can create logs per room
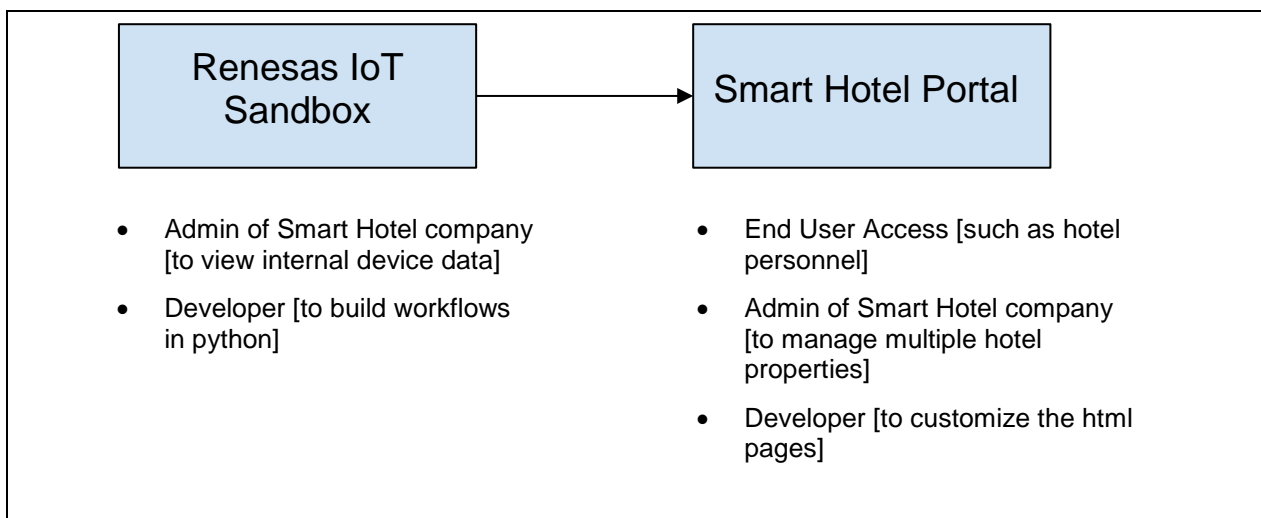7) House cleaning can mark rooms as cleaned

Figure 3   Renesas Smart Hotel System Diagram

Note: Each SK-S7G2 gateway will represent one room. Match the device ID on the SKS7-G2 Starter Kit to the device ID (the first 4 digit) on the portal to know which device you have.

3. Kit Components

List of components in the demo kit.

Components	Pictures
Renesas Synergy™ SK-S7G2 Starter Kit	
Sensor Panel board with Li-ion rechargeable Battery (3.7V, 18650 cell) Note: Battery will not be included	
5V1A USB Wall Charger	
USB micro A male to B male cable	
PMOD Wi-Fi module (AE-Wi-Fi1)	

4.   Setting up Sensor Panel Cloud Demo

The Sensor Panel board has several functions for interacting with surrounding environment like sensing Temperature, Light intensity, room occupancy, Hall Effect switch for door closing and opening, and tilt switch for Air-condition on or off. For user interface, the board includes 5 LED indicators, three pushbutton switches and two open drain outputs. It has an option for using Li-ion rechargeable battery as power source to the board for portable usage as self-contained unit with no power supply wiring required. Alternately, powered via USB port (J2). It also has onboard Renesas Bluetooth® module for wireless connectivity, yet it can demonstrate Renesas Bluetooth Beacon stack functionality.
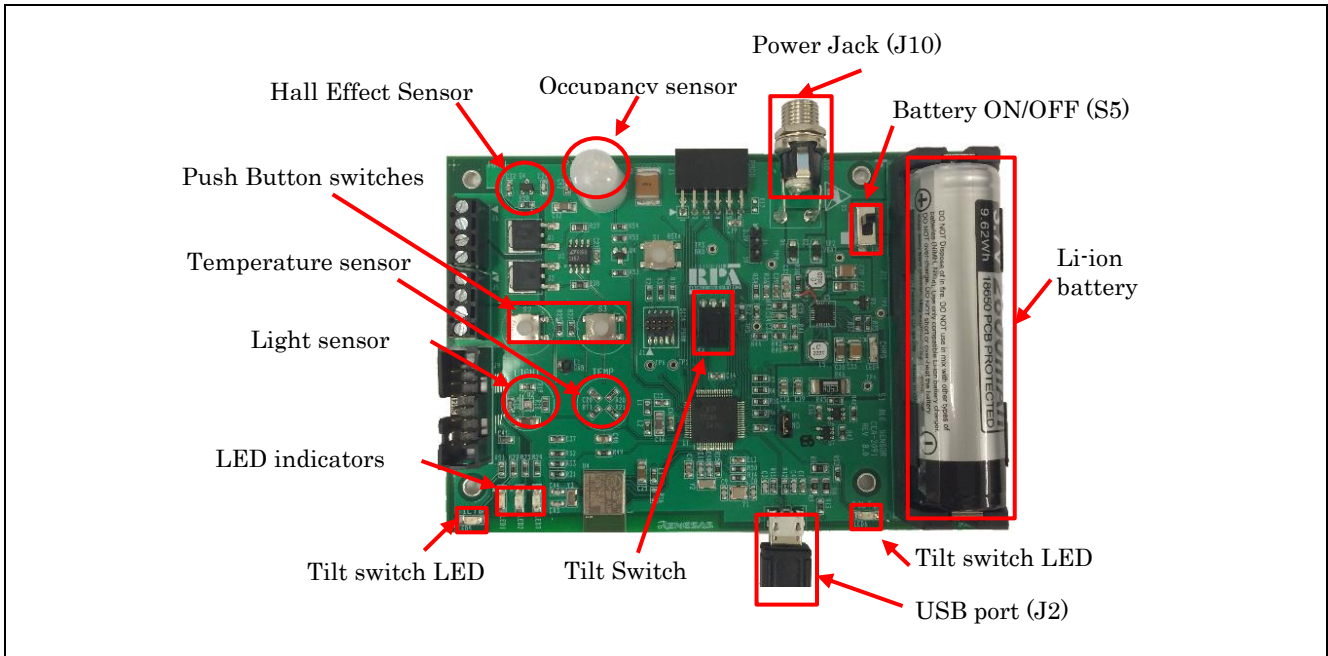
Figure 4   Sensor Panel board setup

For receiving Beacon data, Renesas Synergy SK-S7G2 Starter Kit acts as Bluetooth® scanner and receives sensor data from Sensor Panel board. This IoT Kit has onboard touch screen display that shows all receiving sensor data yet regularly update whenever changes on Sensor Panel board conditions. For development, refer to Sensor Panel User Guide for detail.
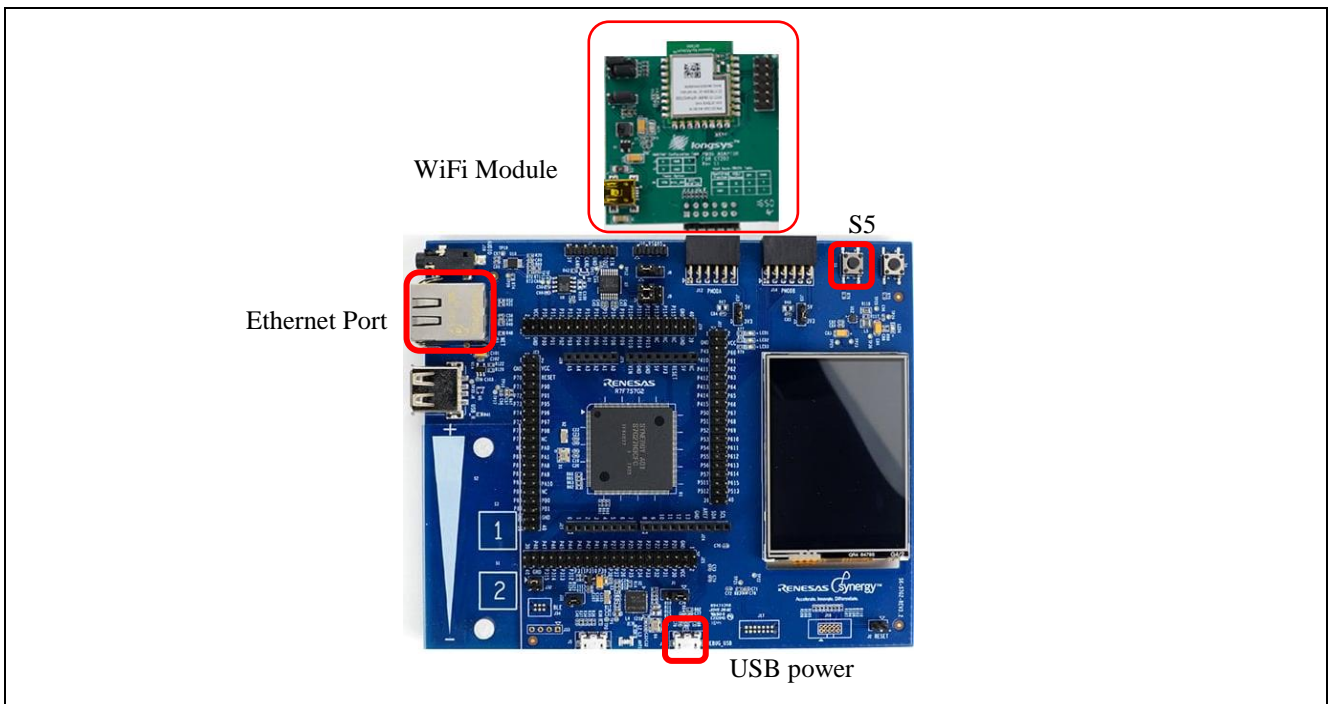

Figure 5   SK-S7G2 board with WiFi Module

4.1 Internet Gateway Setup for Sensor Panel

This section will explain about gateway setup for Sensor Panel demo. Before demonstration, this demo needs internet access to connect to Renesas Sand Box web pages or Renesas Smart Home Portal web page.

Renesas Sand Box web page: https://renesas-na-sandbox.mediumone.com/login

Renesas Smart Home Portal web page: https://portal-smarthotel.mediumone.com

There are two methods: using ethernet port and using WiFi PMOD module at J12. For using ethernet port, insert the Ethernet CAT5 cable to J11 and power up through USB port J19 as shown in Figure 5. When successfully connect to internet, it will turn on the green LED. For using WiFi module, insert the Wifi module (AE-Wi-Fi1) to J12 and follow the below procedure for setting up the internet connection. The SK-S7G2 Starter Kit will always try the ethernet connection first. If not detect the ethernet connection, WiFi connection will try later. Below are the SK-S7G2 Starter Kit on board network status indicators.

 LED1 (Green LED)   : Internet connection ready
 LED2 (Red LED)   : No internet connection
 LED3 (Orange LED)   : Connecting internet connection

You can setup the internet gateway using WiFi module as below.

Step 1. Plug in Wifi module (AE-Wi-Fi1) to J12, SK-S7G2 board and set J13 to 3v3 position.

Step 2. Press and hold push button switch (S5) while power up with micro USB at J19 to SK-S7G2 board. Wait for green LED (LED1) is turn on.

Step 3. Open Manage Wireless Networks Windows in the PC as shown in Figure 6. Then, select sensor_panel_ap and double click on sensor_panel_ap to popup Wireless Network Properties Windows, which shown in Figure 7.
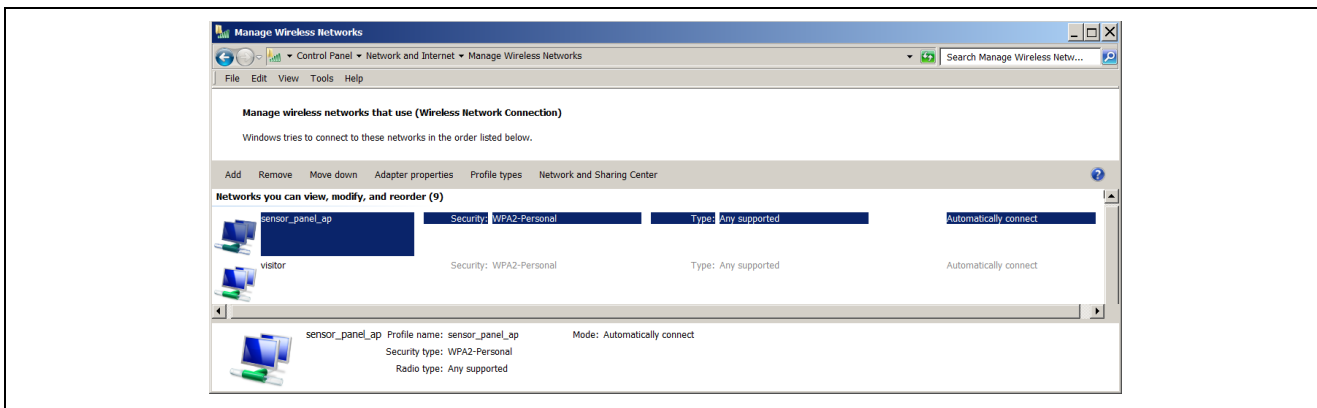

Figure 6   Setup Wireless Network

Step 4. Uncheck "connect automatically when this network is in range" and Select Security tap. Select "WPA2-Personal" and "AES" then type "renesas123" in network security key. Then click "OK" button.
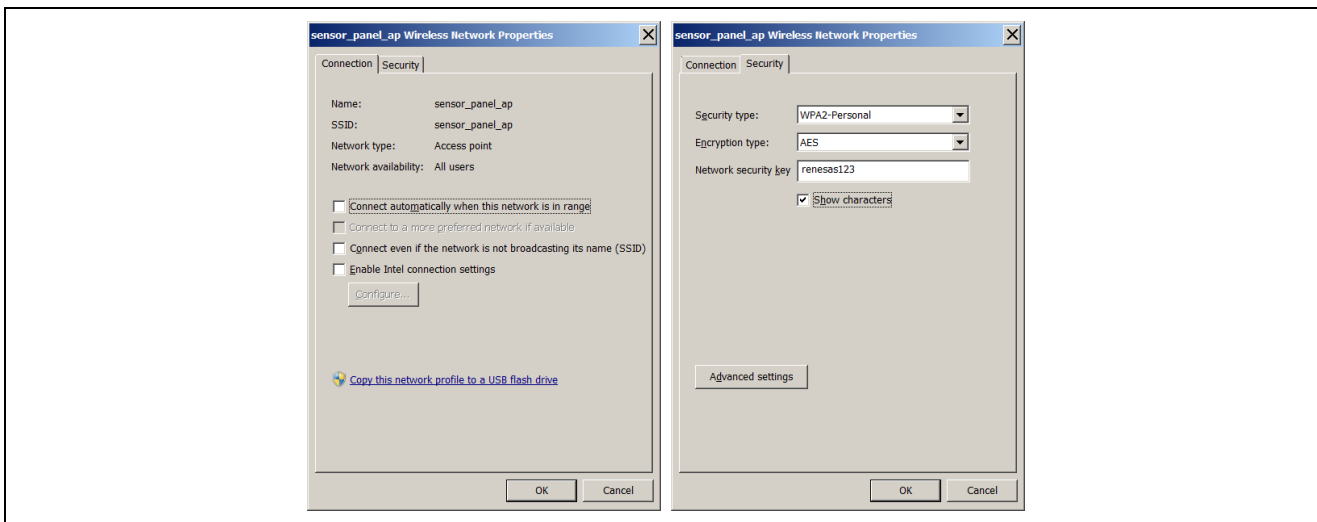

Figure 7   Setup Wireless Properties

Step 5. Click "connect to network". Select currently connected network and then disconnect the currently connected network. Figure 8 shows the "connect to network" icon for network selection.

click Connect to a network

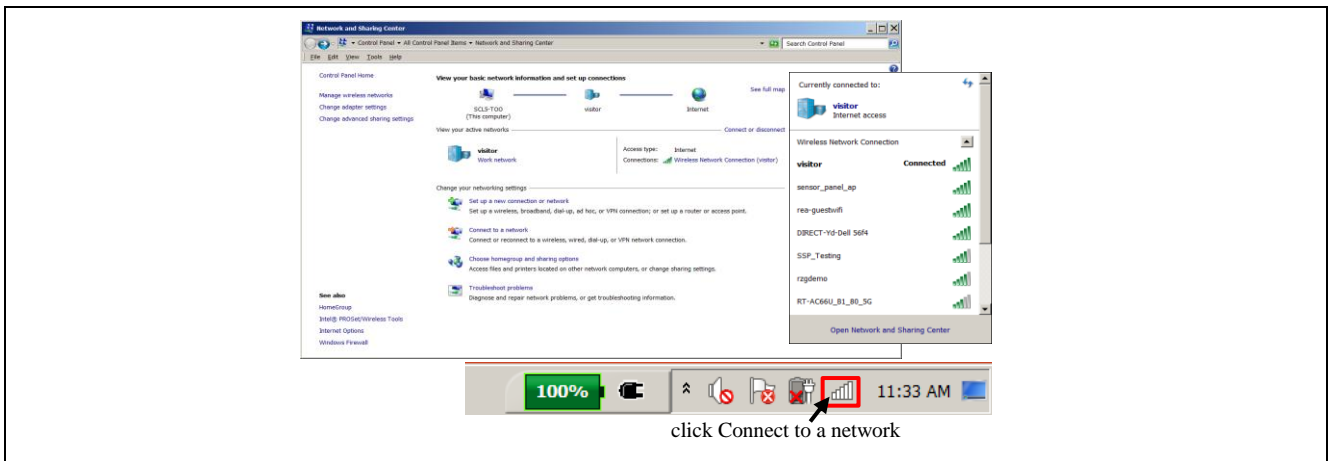**Figure 8   Connect Wireless to Sensor Panel Application**

Step 6. Select "sensor_panel_ap" and click "Connect" button to connect "sensor_panel_ap".
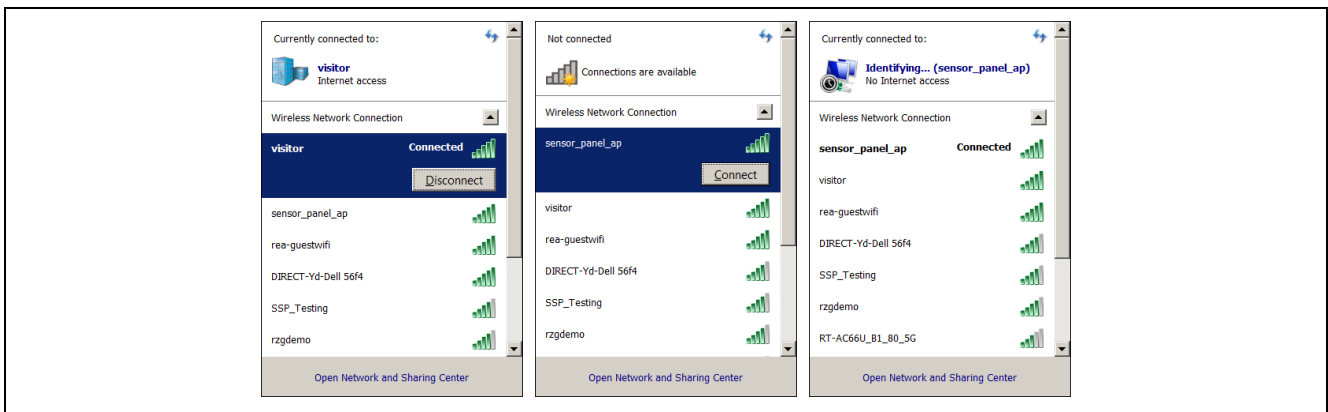

Figure 9   Connect Wireless to Sensor Panel Application

Step 7. Open internet browser and type "http://192.168.3.1" in address line as shown in Figure 10. Then, press "Enter" key.
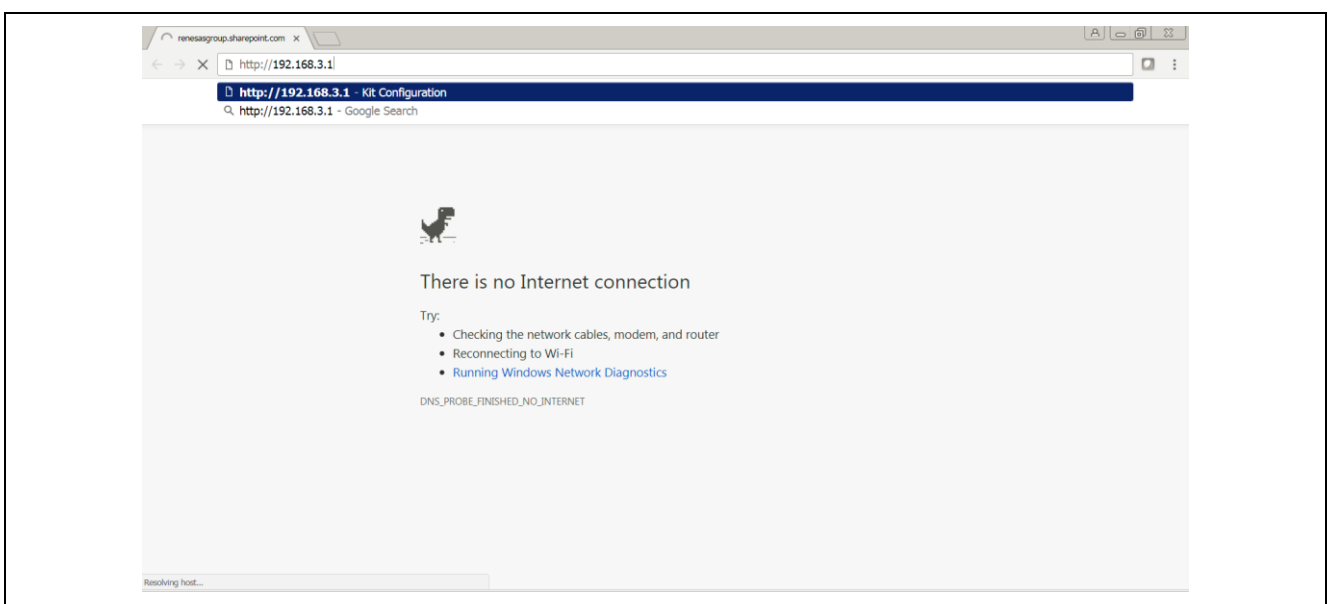

Figure 10   Enter Sensor Panel Wireless Cardinal

Step 8.   Key in "Network SSID" and "WiFi Password" for desire internet connection.

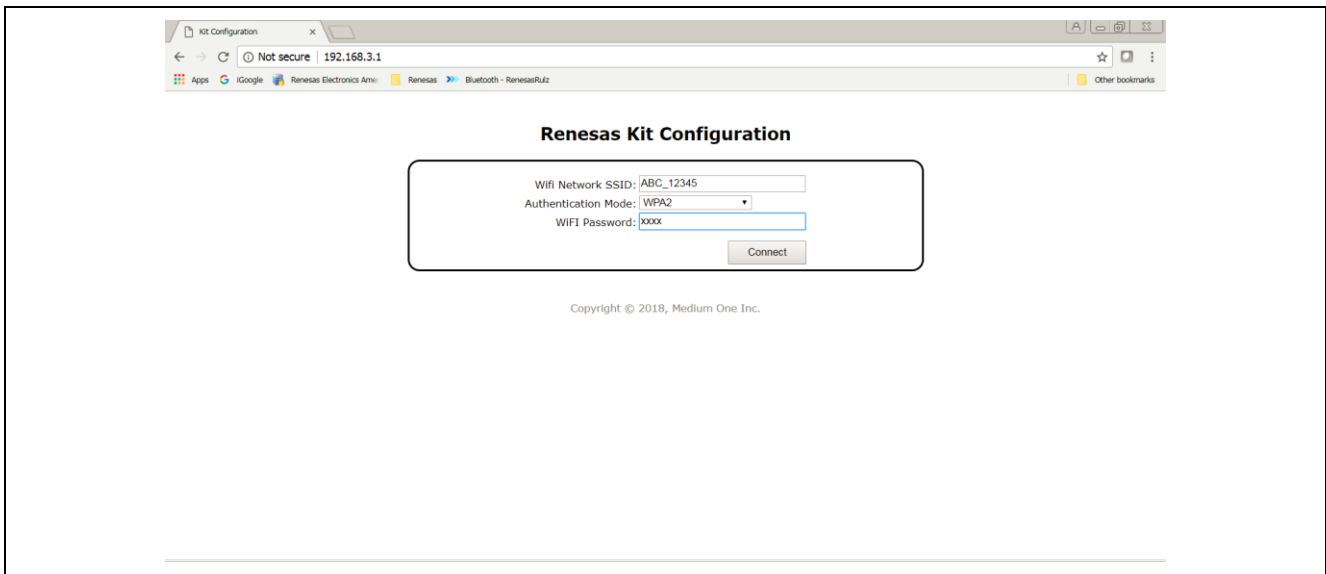***Step 9.***   Select WPA2 and click "Connect" button.

Figure 11 Enter Sensor Panel Wireless Cardinal

Step 10.   Get message on completion of WiFi module configuration as shown in Figure 12.
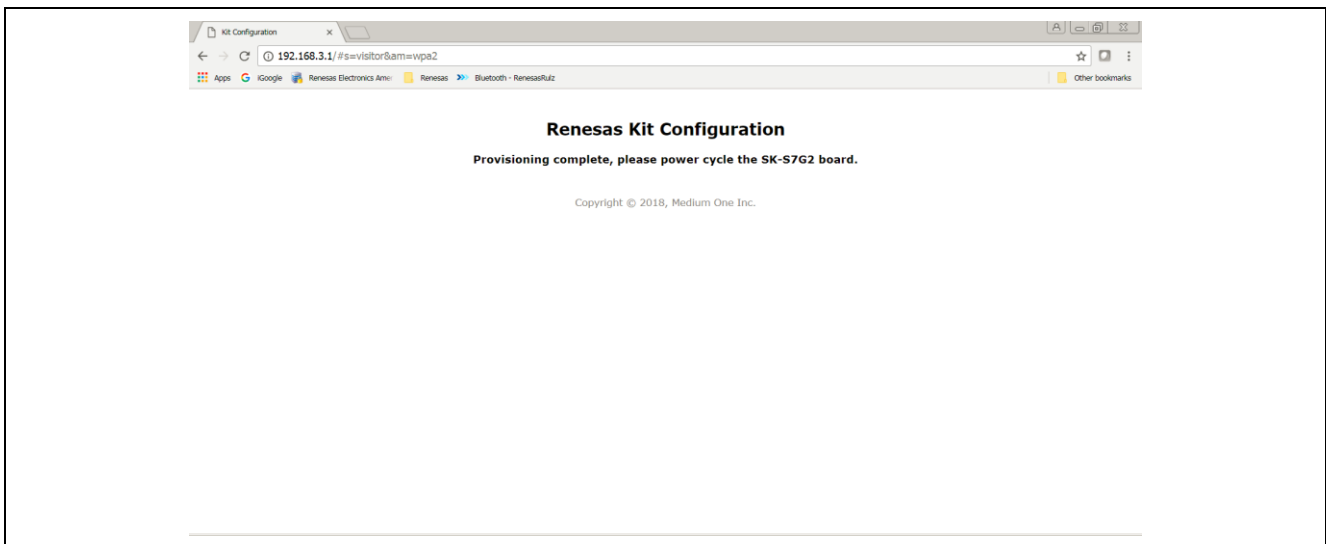
Figure 12 Completion of Wɪʀ module configuration

Step 11.   Power cycle to SK-S7G2 starter kit for internet connection. When green LED is turn on, the internet gateway is connected and ready to use internet with the SK-S7G2 board.

Note 1: There is an error for no SSID or Password in WiFi module if all lights on (green LED, red LED, yellow LED).

Note 2: For using WiFi to connect internet, there may not be connecting to the internet gateway after setting up the WiFi cardinal because of firewall and/or very weak WiFi signal strength. In this case, use Ethernet cable for internet access.

4.2   Sensor Panel Demo Setup

To demonstrate this Sensor Panel, you need to power up to both Sensor Panel board and SK-S7G2 Starter Kit.

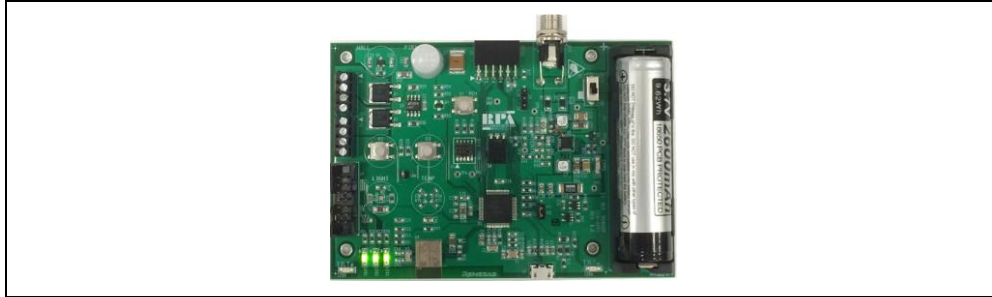*Step 1.*   The out-of-box Sensor Panel board is preprogrammed. For using on board battery power, turn on the slide switch (S5) to ON position or provide external 5V power via USB port (J2).

*Step 2.*   Once Sensor Panel board is ON, the program is running and LED1, LED2, and LED3 are ON.

Step 3.   The out-of-box SK-S7G2 Starter Kit is preprogrammed for Sensor Panel Demo firmware. You can provide external 5V power via USB port (J19).

Step 4.   After powering up the SK-S7G2, wait for internet connection. After connected to internet, the green LED (LED1) will turn on. If fail to connect internet, the red LED (LED2) will turn on. Make sure connecting to internet successfully before starting this demo.

           Error: If all lights on (LED1, LED2, LED3) and PMOD is connect with AE-Wi-Fi1, there is no SSID or Password in WiFi module.

Step 5.   The Starter Kit shows Login Screen on LCD display after power up.
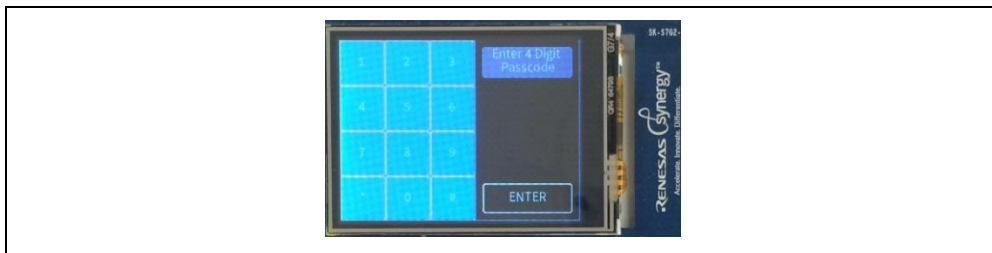
Step 6.   The Login Screen has numeric key pad for entering password. After connected to internet, type 1234 using keypad and press ENTER button.
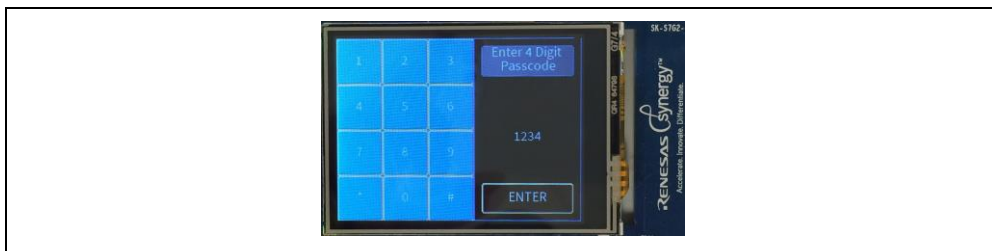
Step 7.   Show next Data Screen. On the screen, you can read Temperature, Current, and Light Liniment value as well as showing the status of Tilt Switch, Push Button 1 and 2, Hall Switch, and PIR.
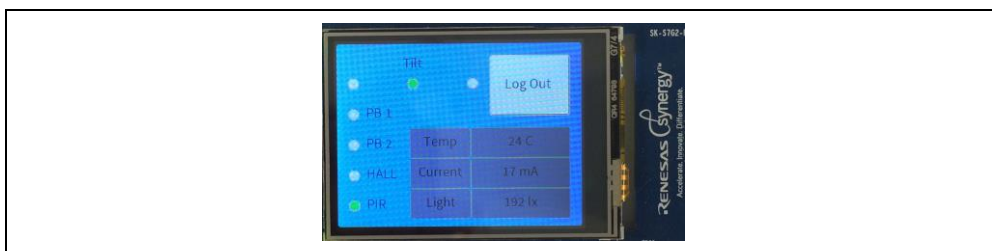
Step 8.   The status changes on Sensor Panel board will be updated on SK-S7G2 Starter Kit in real-time.

Step 9.   Pressing Logout Button will exit from Data Screen and back to Login Screen.

5.   Renesas IoT Sandbox

This section will explain about Medium One webpage for Renesas IoT Sandbox demo. Open the webpage from below link for login.

Login Page: https://renesas-na-sandbox.mediumone.com/login

Step 1.   Login to Renesas IoT Sandbox in https://renesas-na-sandbox.mediumone.com/login webpage.
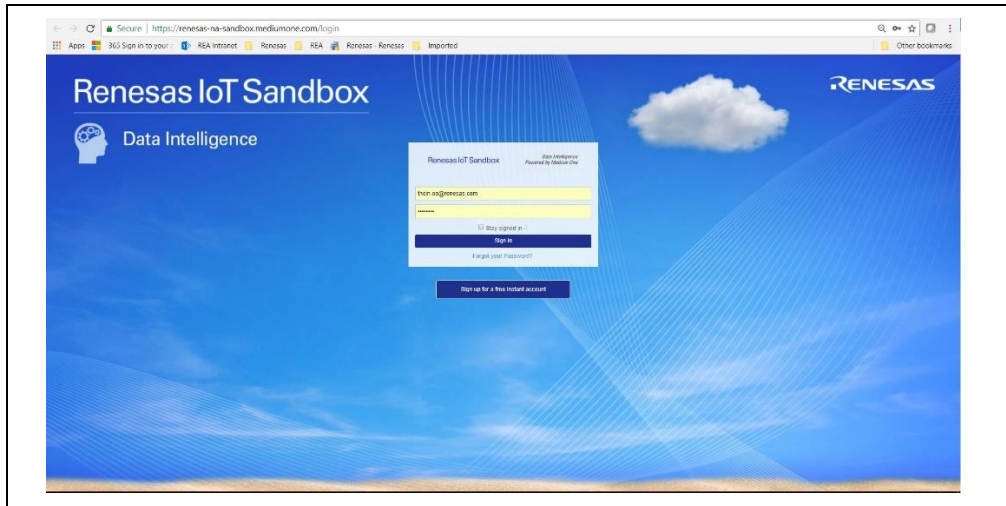
Figure 13 Wireless Network Login Page

Step 2.   After login, Medium One IoT Sandbox page will be popped up for Renesas Sensor Panel demo.
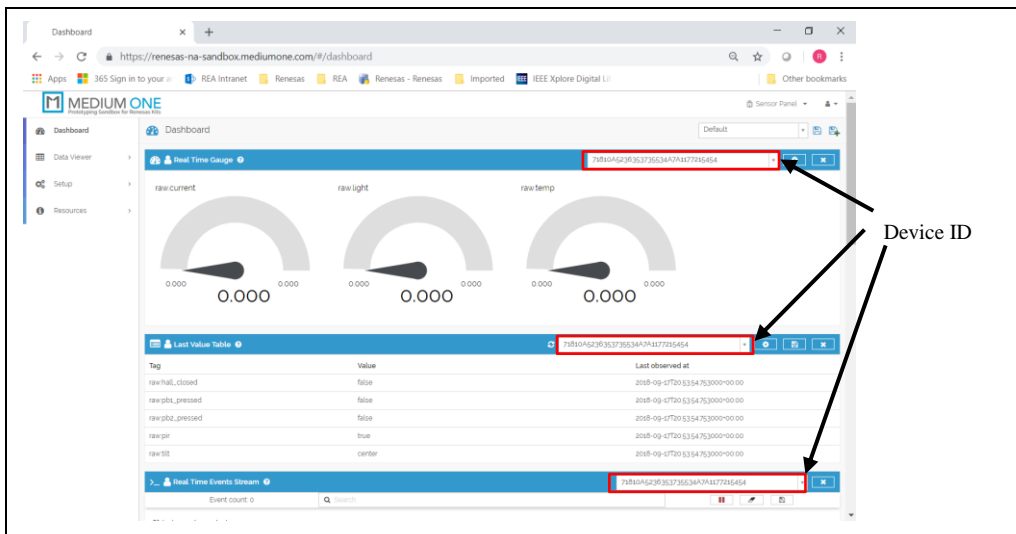
Figure 14 IoT Sandbox Page

Note: In this page, you can add and delete to customize this sandbox using Widget shown in Figure 15 form the bottom of the webpage. There are four categories: Real Time Gauge, Last Value Table, Real Time Event Stream, and Table for monitoring the Sensor Panel board activities.

Figure 15 IoT Sandbox Widget

Figure 16 SK-S7G2 Device ID Page

Step 3.   After login, select appropriate Device ID form each category for monitoring the respective SK-S7G2 board activities.

Figure 17 IoT Sandbox Page after selecting the Device ID

Step 4.   After selecting Device ID of active SK-S7G2 Starter Kit, the Sensor Panel board's activities and data are monitoring from the IoT Sandbox page.

6.   Renesas Smart Hotel Portal

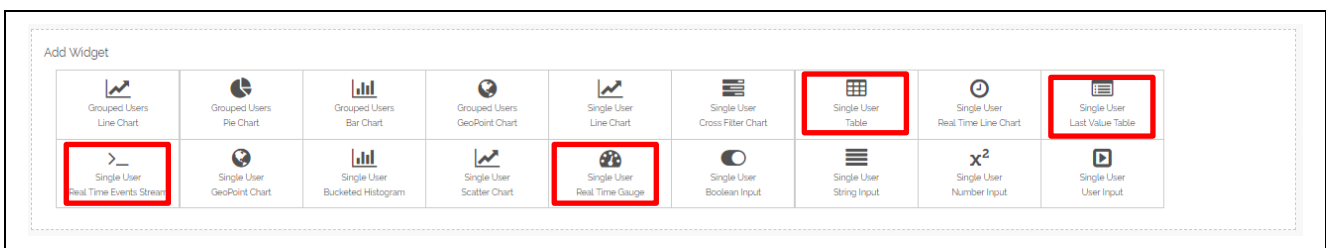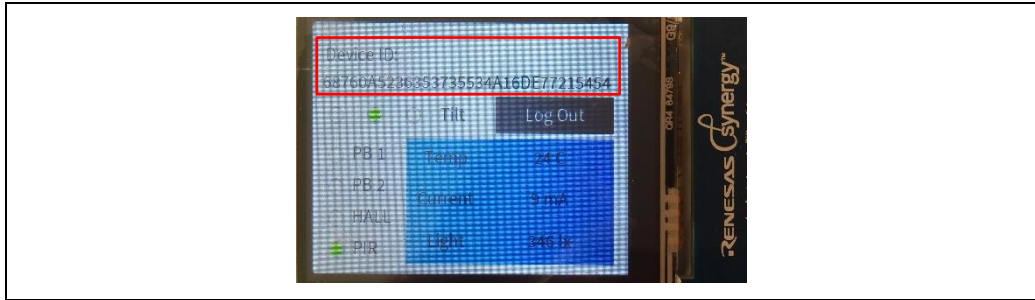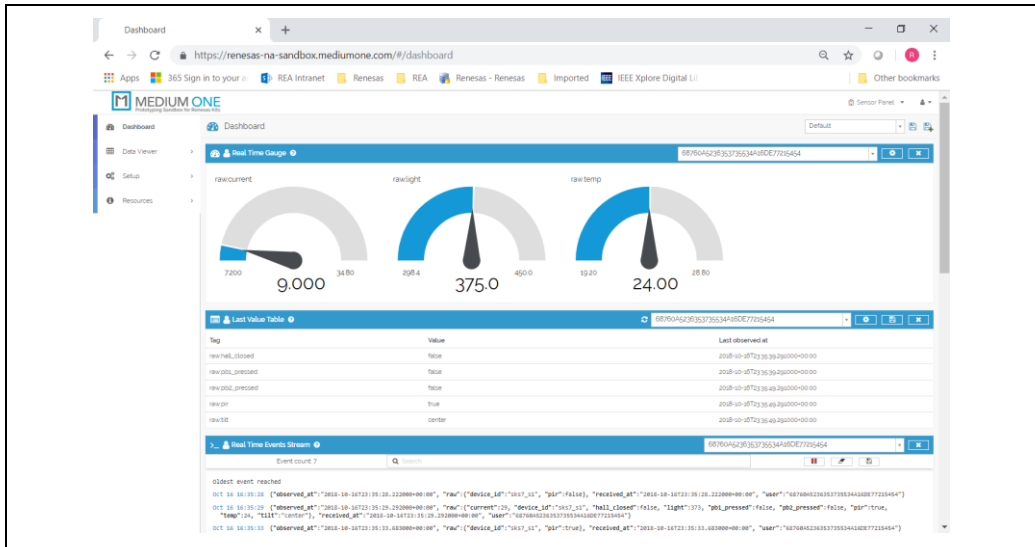This section will explain Renesas Smart Hotel Portal assessment and operation. Thus, the portal experience is design to walk through the hotel personnel. Firstly, go to the web link https://portal-smarthotel.mediumone.com for accessing the Portal page that needed to request a personal account as a common account through Medium One. You will receive a username and password via email after processing the approval from Renesas.

Contact to support@medium.one, for accessing the user portal as a common account or a developer who wants to view and edit the html code, which is not provided to avoid confusion and accidental tampering to the source code.
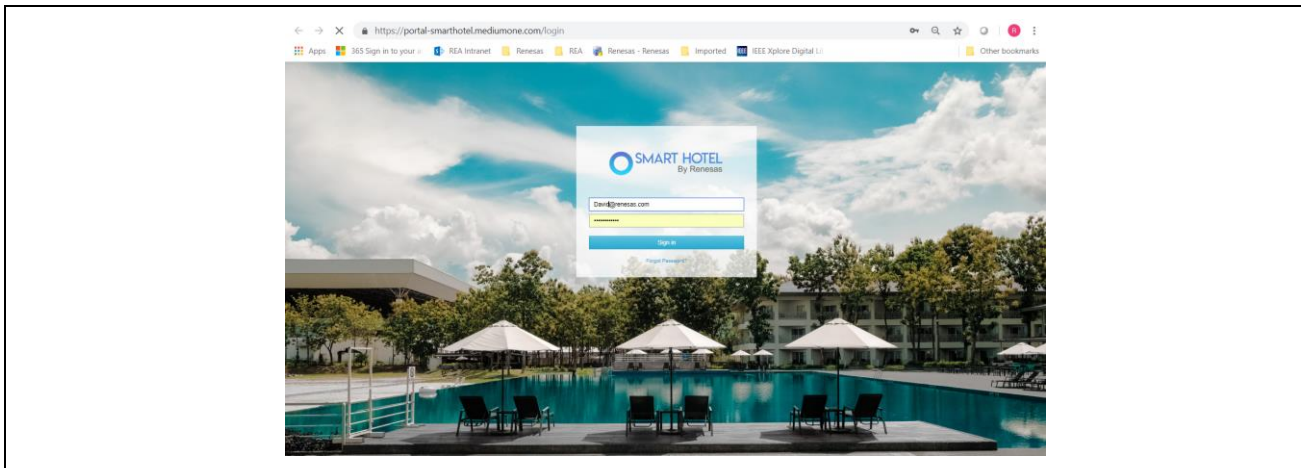
Figure 18 Smart Hotel Login page

Alternatively, the user can invite a new user for accessing the Smart Hotel Portal in Manage Users page as shown in Figure 19.
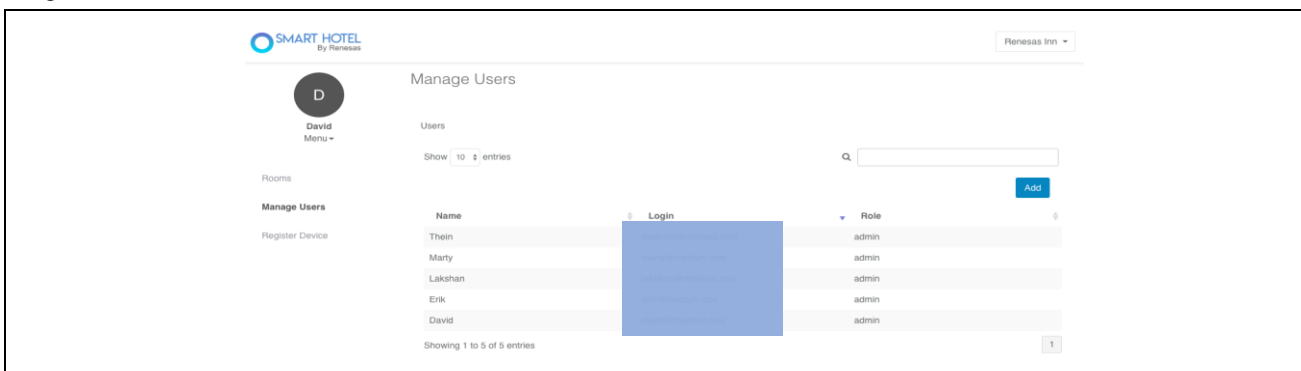
Figure 19 Setup Smart Hotel personal account manage page

When click on "Rooms" on the navigation bar, Smart Hotel Dashboard page will pop up and it shows summary of room activities such as room number, Last detected motion, status of Air-condition (AC) unit, ambient temperature, Window Status, and Device ID, which is SK-S7G2 Starter Kit unique identification for each Sensor Panel demo.

Figure 20 Smart Hotel Dashboard page

Click on any row to access more data for that room. This will open Room Current Status as shown in Figure 21.
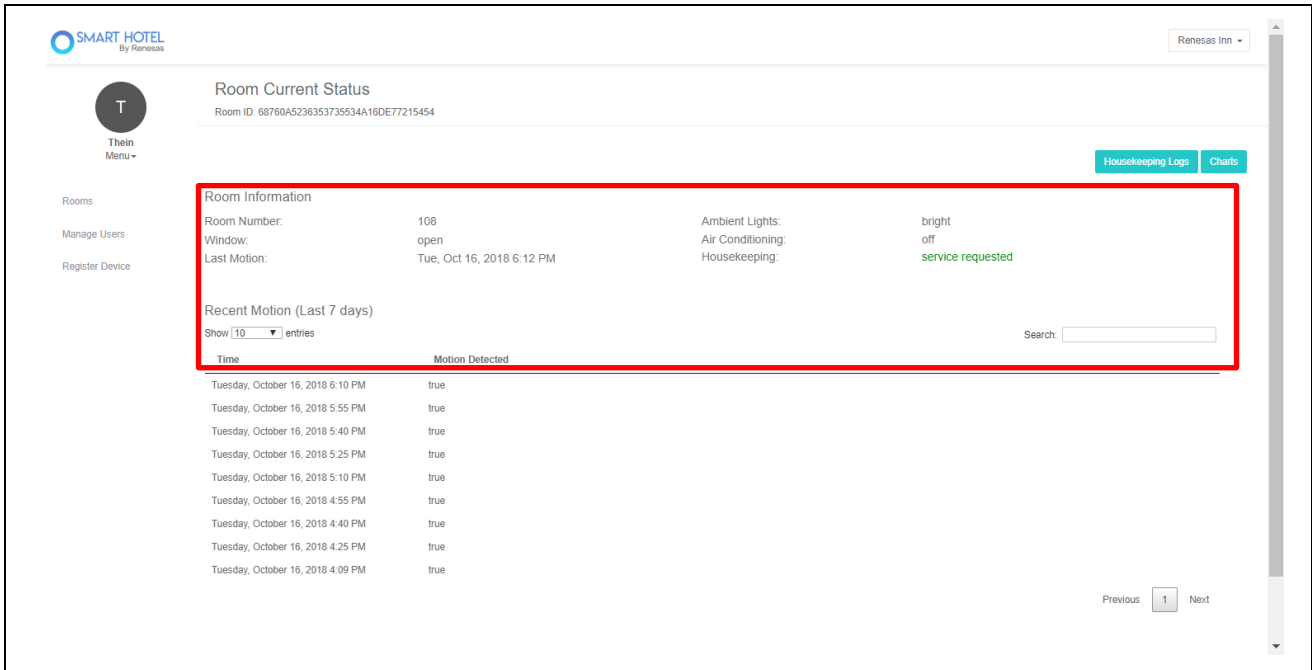
Figure 21 Smart Hotel Dashboard page, Room current Status

In this page, you can monitor more detail any activities from Sensor Panel board by sending through the SK-S7G2 Starter Kit to this Smart Home portal page. Here is the list of activities from Sensor Panel board.
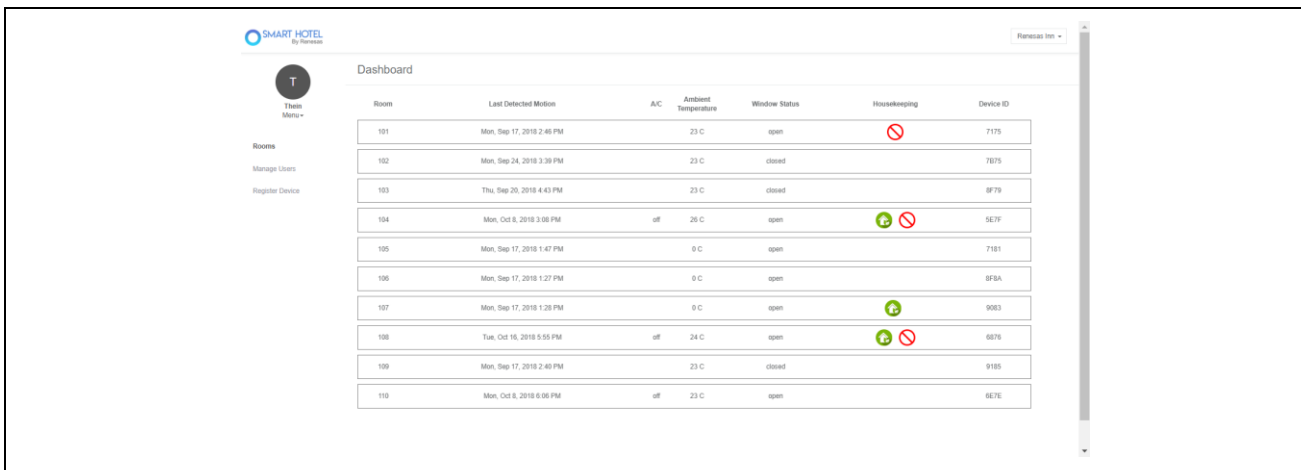
- To turn on A/C, tilt the sensor board to the right.
- To turn off A/C, tilt the sensor board to the left.
  Note: center tilt does not have any effect
- To open window, remove magnet from hall sensor
- To close window, place magnet over hall sensor
- To request house cleaning, press SW2
- To set do not disturb, press SW3
- Last Motion is detected based on the PIR sensor

Note: Ambient light will be set to bright, dark or mild depending on the light level detected.

For viewing any activities trend and analysis, click on Charts. Select a metric to plot on the chart as shown in Figure 22.
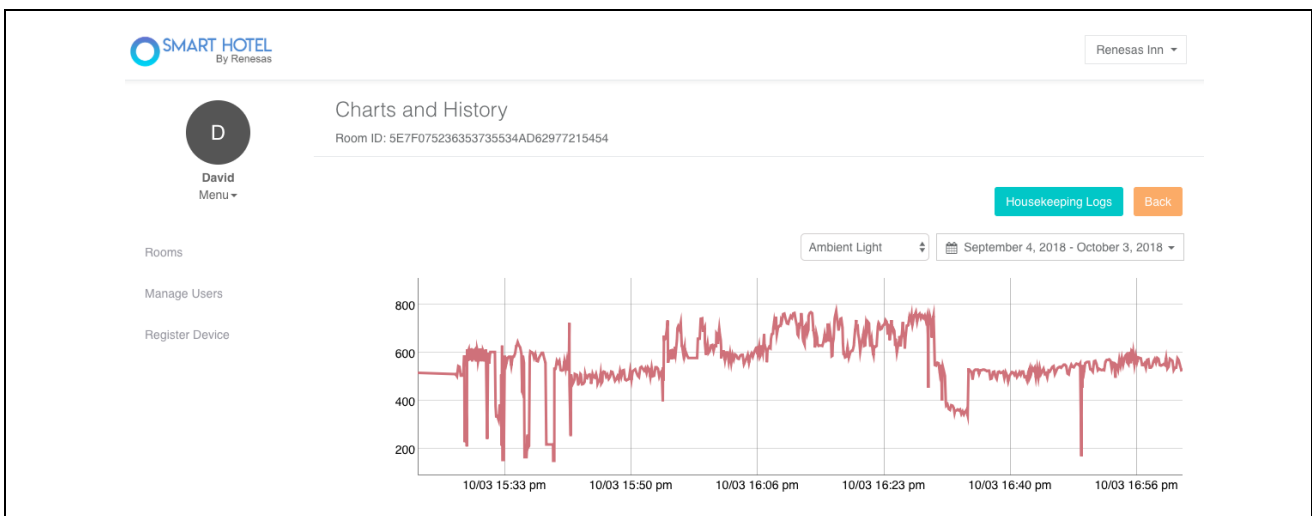
Figure 22 Smart Hotel, Chart and History page

For record, you can also select a metric to print on the table below the chart as shown in Figure 23.
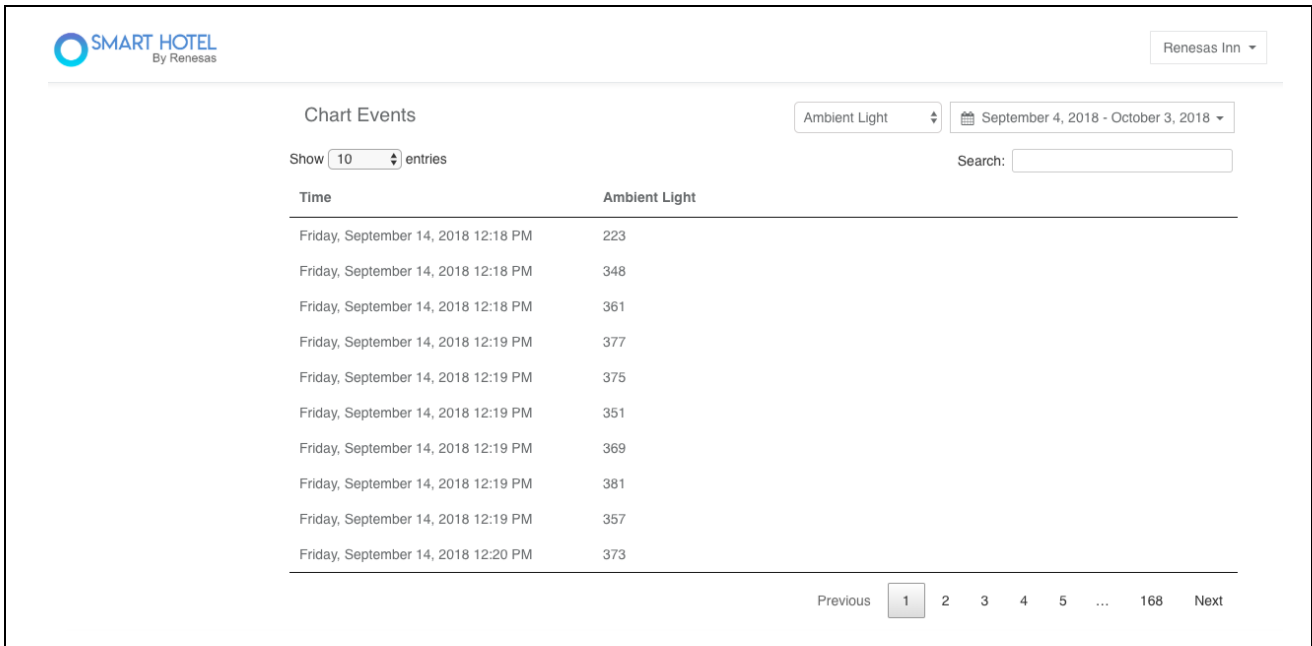
Figure 23 Smart Hotel, Chart Event Table

For Housekeeping tasks, the staff can turn off the service request or do not disturb status using the switches as show in Figure 24. Also, the staff can create, edit and delete logs. In this section, it is allowed to upload a photo or file as well.
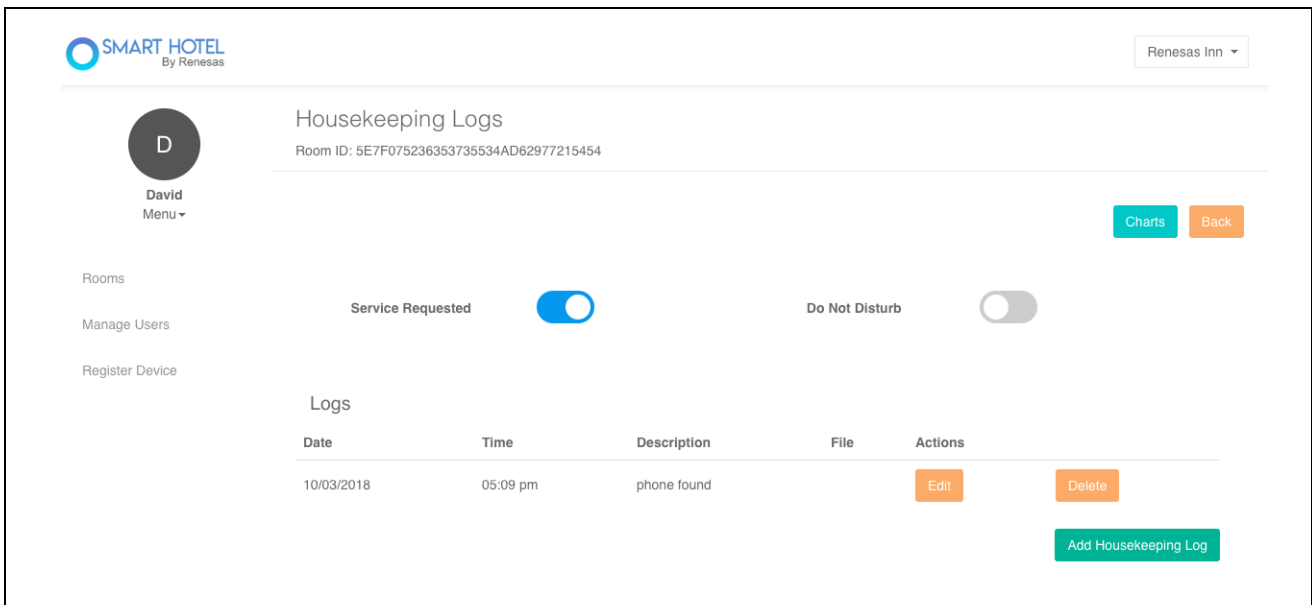
Figure 24 Smart Hotel, Housekeeping Log

Finally, clicking back button will bring up to previous page or clicking "Room" link from left will back immediately to Smart Hotel Dashboard page.

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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Nov 15, 2018	–	Initial Release

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

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   — The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

   The state of the product is undefined at the moment when power is supplied.

   — The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.
   In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.
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(Rev.4.0-1 November 2017)

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