

# ECHO System User Guide

Release 2.0, April 2023



EchoCare Technologies Ltd. Confidential and Proprietary Information

# Contents

|          |                                                   |           |
|----------|---------------------------------------------------|-----------|
| <b>1</b> | <b>System Overview .....</b>                      | <b>3</b>  |
| 1.1      | Introduction                                      | 3         |
| 1.2      | Main Features and Functions                       | 4         |
| 1.2.1    | The ECHO System Capabilities                      | 4         |
| 1.2.2    | System Use Cases                                  | 5         |
| 1.2.3    | Display Example - Caregiver Dashboard             | 5         |
| 1.3      | System Architecture                               | 6         |
| <b>2</b> | <b>Offered Services.....</b>                      | <b>7</b>  |
| 2.1      | Monitoring Services                               | 8         |
| <b>3</b> | <b>User Guide</b>                                 | <b>10</b> |
| 3.1      | Installation Guide                                | 10        |
| 3.1.1    | Safety and Precaution Guidelines                  | 10        |
| 3.1.2    | Product Package Contents                          | 11        |
| 3.2      | System Setup                                      | 12        |
| 3.2.1    | Connecting PC to the ECHO Device                  | 12        |
| 3.2.2    | Initial Configuration                             | 12        |
| 3.3      | EchoCloud Dashboard                               | 19        |
| 3.3.1    | Introduction                                      | 19        |
| 3.3.2    | Caregivers Dashboard                              | 21        |
| 3.3.3    | Displayed Indications and Alerts                  | 22        |
| 3.3.4    | Respiration Monitoring (Optional Service)         | 27        |
| 3.3.5    | Daily Living Activity Report (Optional Service)   | 29        |
| 3.4      | Mobile Application                                | 33        |
| <b>4</b> | <b>Appendix – Acronyms and Abbreviations.....</b> | <b>34</b> |
| <b>5</b> | <b>Statements</b>                                 | <b>35</b> |
| 5.1      | FCC Statements                                    | 35        |
| 5.2      | IC Statements                                     | 35        |

# 1 System Overview

## 1.1 Introduction

The ECHO system by EchoCare Technologies is capable of monitoring persons living in their homes or in nursing care facilities. Decisions on emergency alerts, various indications and reports, are made in real time, and are sent to pre-defined clients – site admins, caregivers, etc. Therefore, the ECHO system helps increasing the safety of the persons being monitored, and helps tracking their physical condition for identifying possible degradations that may happen over time.

The purpose of this document is to provide information about:

- System architecture
- Main features and functions of the ECHO system
- Review of product variants
- Guidance for system assembly and installation
- Guidance for system setup (initialization, calibration and mapping)
- System usage with its cloud capabilities
- Types of, alerts, indications and reports
- Product specifications
- Applicable standards and certificates

Figure 1 : Assembled ECHO System Mounted on Ceiling



## 1.2 Main Features and Functions

The EchoCare monitoring system, with its “ECHO” device, has unique and innovative capabilities of identifying various situations that could involve a physical or health risk for the monitored person. In combination with the system cloud – “EchoCloud”, web dashboards and a mobile application, the system can immediately alert on such detected situations. It also gives relevant indications about the person’s status and about any identified abnormalities. Yet, the system does not apply any video means, so that the privacy and intimacy of the monitored person is fully respected.

The EchoCare monitoring technology applies very low power RF signals, about 1000 times lower than mobile handset RF power, yet can “see” through walls under certain conditions.

The EchoCare monitoring technology further uses Edge processing (that is, performed within the end device, not remotely). This means that data analysis is done by the monitoring ECHO device, so that decisions on emergency events and other situations are reached immediately, and are independent of latency caused by the communication link to a cloud server. Moreover, all the necessary data and decisions for real time events are stored within the ECHO device, not relying on a remote storage facility.

### 1.2.1 The ECHO System Capabilities

The ECHO system tracks four indicators of the monitored person – location, posture, motion and respiration, based on which it is able to:

- Detect and provide various indications in real time
  - Person's location within the apartment and the presence of visitors
  - Out of Home / Out of Room indication
- Detect and provide emergency alerts in real time
  - Moderate fall, Acute fall, Fall from bed
  - Hyperventilation
  - Drowning in bathtub
- Detect and provide abnormal status alerts
  - Sedentary condition or Lying on the floor for 3 minutes by default (can be adjusted per customer request at 0.5 minute steps)
  - Risk of drowning
- Perform respiration measurements
  - Measuring respiration parameters and recording respiration patterns
- Provide Daily Living Activity reports
  - Location distribution
  - Gait measurements
  - Per-hour activity statistics

## 1.2.2 System Use Cases

The system is intended for the following use cases:

- Aging in Place – monitoring persons in the apartment where they live, or monitoring only part of the apartment, using either a single ECHO device or multiple devices for appropriate coverage of the entire space; special cases may be monitoring the bedroom or bathroom area only.
- Assisted Living / Skilled Nursing Facilities – using a single device per resident room
- Remote Patient Monitoring – using a single device installed above the patient's bed

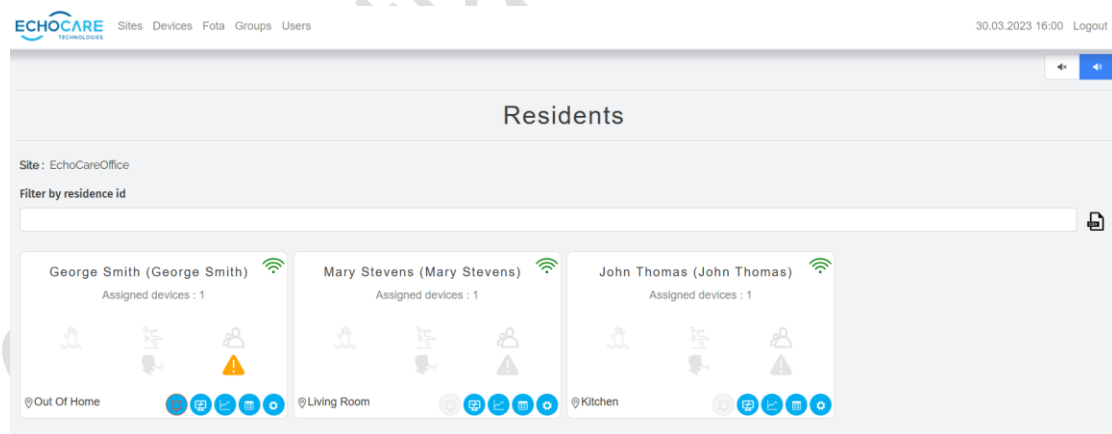
## 1.2.3 Display Example - Caregiver Dashboard

The Caregiver Dashboard (normally used by the person's caregiver or by his/her family) displays each resident's information on a dedicated tile showing his/her instantaneous location and emergency events if applicable, as shown in Figure 1.

The example figure shows the following cases:

- a resident who has had an acute fall in the kitchen
- a resident who is currently out of home
- a resident who is in bed and has a visitor
- a resident with a hyperventilation alert

Figure 1: Example of Residents' Tiles



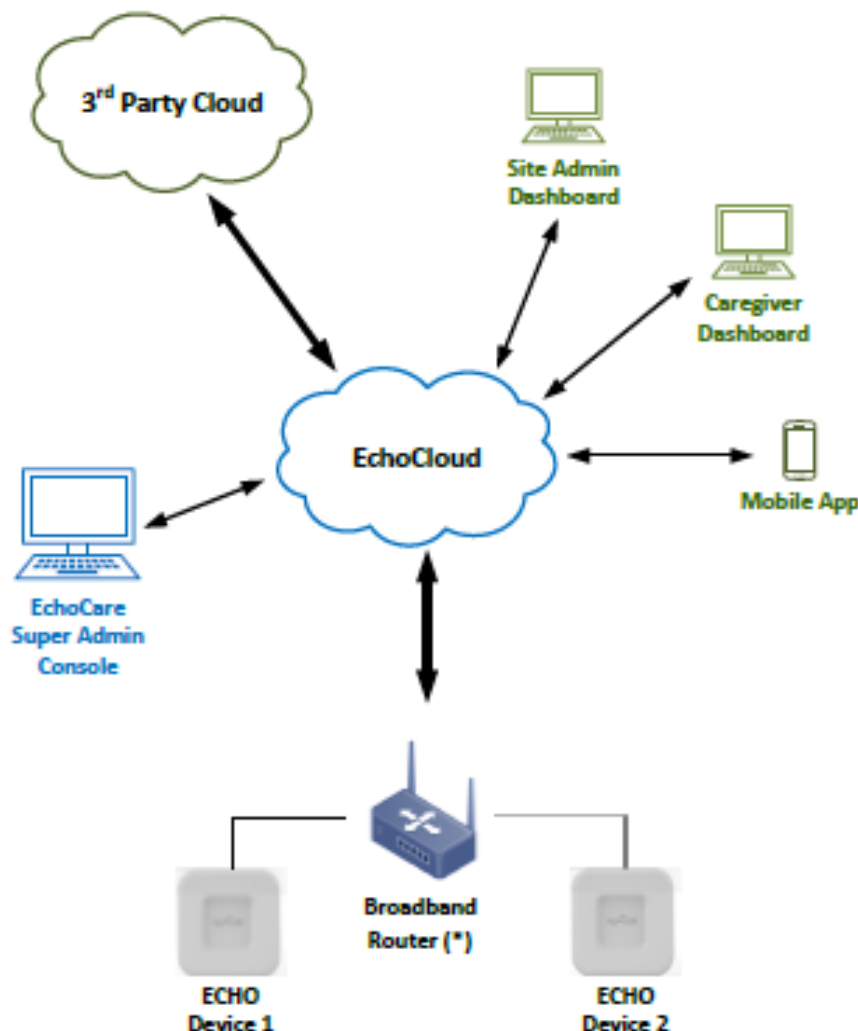
A detailed description of the dashboard screens for various cases is provided in Section [Error! Reference source not found.3.3, EchoCloud Dashboard](#).

## 1.3 System Architecture

The ECHO system consists of one or more monitoring ECHO devices that are linked to a broadband router either by Wi-Fi or by Ethernet cable. The broadband router connects to the EchoCare cloud ("EchoCloud") via an Internet network. System users – site admins and caregivers – can access the EchoCloud using either a website (with dashboard) or a dedicated mobile application (under development). Alternatively, organizations or facilities having 3<sup>rd</sup> party cloud service, can rely on a cloud-to-cloud API for accessing the EchoCloud, and use their own designed dashboards interacting with the 3<sup>rd</sup> party cloud.

Figure 2 illustrates the system architecture.

**Figure 2: System Architecture**



(\*) The broadband router can be either :

- Fixed Line Router with internet subscription & Ethernet I/F to ECHO device
- Fixed Line Router with internet subscription & Wi-Fi connectivity to ECHO device
- Mobile Wi-Fi Router with cellular subscription

## 2 Offered Services

The monitoring services consist of various reports, indications and alerts, which can be presented in several ways. The ECHO system enables monitoring either the entire apartment area (by a single or multiple devices, depending on the apartment size) or monitoring a selected area / primary zone with a single device, for example bedroom or bathroom.

Certain monitoring services are not available while monitoring a selected area only. Specific services are available only with the Bathroom variant, to be described later on.

The services offered by the system are as follows:

- EchoCloud web Dashboard, graphically presenting the various indications and alerts for each registered resident; it is most useful for site admins, nursing stations, caregiver control stations and caregivers
- Mobile application with similar features to those provided by the web dashboard, but optimized for a smartphone display; it is most useful for caregivers or employees of nursing sites
- Dissemination of information from the EchoCloud to a 3<sup>rd</sup>-party cloud using a cloud-to-cloud API. Cloud to cloud API can serve, for example, a call center or a nursing site.
- Easy and convenient upgrade capability via FOTA (Firmware Over The Air) for firmware upgrades and for introduction of improved or new services. FOTA can only be performed through the web dashboard.

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## 2.1 Monitoring Services

Table 1 presents the monitoring services offered by the ECHO system. Distinction is made among the following cases:

- Full coverage support – for the entire apartment area
- Selected area – covering, for example, the bedroom only or the bed only
- Bathroom - covering the bathroom with a dedicated device variant

Depending on the detected event, the system immediately issues relevant indications and alerts.

**Table 1: Monitoring Services for Full Coverage or Selected Area or Bathroom**

| Category                 | Feature                                                 | Full Coverage                                                                                                                                                                                                                                                       | Selected Area                    | Bathroom                     |
|--------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------|
| Location Indication      | Instantaneous resident location                         | Shows the instantaneous location of the resident                                                                                                                                                                                                                    | Ditto, for the covered area only | Ditto                        |
|                          | Out of home / room                                      | Indicates that the resident is out of home / out of room                                                                                                                                                                                                            | Ditto, for the covered area only | Out of bathroom              |
| Visitor Indication       | Identifying visitors in the resident's room / apartment | Indicates entry of visitors to the resident's room or their exit. During visitor's presence, emergency events and locations are not reported. The latest location that was identified prior to visitor detection is frozen until the visitor exits the covered area | Ditto, for the covered area only | Under development            |
| Alert on Emergency Event | Acute fall detection – Collapse fall                    | Emergency alert, indicating a collapse – a severe fall down on the floor, of which the resident could not get up                                                                                                                                                    | Ditto, for the covered area only | Ditto, in bathroom           |
|                          | Acute fall detection – Falling from bed                 | Emergency alert, indicating that the resident has fallen from the bed and remains lying on the floor                                                                                                                                                                | Ditto, for the covered area only | N/A                          |
|                          | Moderate fall detection                                 | Indicates a moderate (possibly non-severe) fall, of which the resident got up and possibly recovered                                                                                                                                                                | Ditto, for the covered area only | Ditto, in the bathroom       |
|                          | Drowning in bathtub                                     | N/A                                                                                                                                                                                                                                                                 | N/A                              | Alert on drowning in bathtub |

| Category                                  | Feature                                                         | Full Coverage                                                                                                                 | Selected Area                    | Bathroom                                                           |
|-------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------|
|                                           | Respiration distress (optional service *)                       | Emergency alert when a person's breathing exceeds a predefined RPM threshold that indicates hyperventilation distress         | Ditto, for the covered area only | Ditto, in bathroom                                                 |
| Alert on Abnormal Event                   | Lying on the floor for too long                                 | Alert on a person lying on the floor for more than a preset amount of time (default: 3 minutes)                               | Ditto, for the covered area only | Ditto, in bathroom                                                 |
|                                           | Being in a sedentary state for too long                         | Alert on a person lying or sitting without movement for more than a pre-defined amount of time                                | Ditto                            | Alert on a person not moving in the bathtub for more than a minute |
|                                           | Drowning Risk                                                   | N/A                                                                                                                           | N/A                              | Alert on a person not moving in the bathtub for more than a minute |
|                                           | Leaving a pre-defined area on which an alert is requested       | Alert on a person sitting up in bed (**) / leaving bed / leaving room or home or bathroom, if so requested                    | Ditto, for the covered area only | Ditto, for bathroom area only                                      |
| Respiration report (optional *)           | When enabled, respiration measurement is on-demand or automatic | A caregiver can request a respiration measurement of the resident; automatic measurements are taken following each acute fall | Ditto, for the covered area only | Ditto, in bathroom                                                 |
| Daily Living Activity report (optional *) | When enabled, Activity of Daily Living                          | Reports the daily location distribution, daily activity profile and daily Gait measurements                                   | N/A                              | N/A                                                                |

(\*) Optional services are not included in the basic set of services – to be ordered and licensed from EchoCare Technologies

(\*\*) Detection of the **sitting up in bed** event is only possible while the ECHO device is installed above the bed.

## 3 User Guide

### 3.1 Installation Guide

#### 3.1.1 Safety and Precaution Guidelines

##### 3.1.1.1 General

Read the installation instructions prior to installing the system and prior to connecting it to AC power source.

Only trained and qualified personnel are allowed to install, replace or service this equipment.

Prior to performing any maintenance procedure with the installed device, ensure that it is removed from the AC outlet.

The ECHO system is intended and designed for indoor use only.

##### 3.1.1.2 During Device Installation to Ceiling or Wall

During installation works in a certain room, persons who are not specifically assigned to those works must not stay in that room.

Protect your eyes and hands.

Handle the device parts with care and avoid dropping them on the floor, as this may cause irreversible damage to fragile parts within the device.

!

**Warning:**

Make sure that the device sub-units are very well attached to the ceiling or to the wall, and to one another, to avoid accidental detaching and injury to a person passing nearby.

##### 3.1.1.3 During Electrical Installation of the Device

The device is fed from a high voltage AC supply. Follow all precautionary measures necessary while dealing with high voltage wires. In addition, follow all relevant regulations that apply to your country.

##### 3.1.1.4 Treatment of Waste and Dismantled Parts

Waste and dismantled parts must be disposed off in accordance with local regulations that apply to your country.

### 3.1.2 Product Package Contents

The product package contains the following parts (as shown in Figure 3 and Error! Reference source not found.):

- Main unit (1 piece)
- Docking plate, including AC to 5V DC voltage regulator (1 piece)
- Safety pin (1 piece)
- AC power cable (1 piece)
- DC power cable (1 piece)

**Figure 3: ECHO Device in its Enclosure**



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## 3.2 System Setup

### 3.2.1 Connecting PC to the ECHO Device

The initial configuration of the ECHO system is done on a control PC. Therefore, before starting the configuration itself, make sure you have the following:

- Control PC connected to Internet
- ECHO device connected to Internet either through an Ethernet cable or through Wi-Fi. For Wi-Fi initial connectivity, one should temporarily set the parameters given below in a local router or in the smartphone being operated as a hotspot:

SSID : ECTwifi

Password : ECTwifi1234

Proceed now to performing the initial configuration as detailed in the next section.

### 3.2.2 Initial Configuration

#### 3.2.2.1 Creating New Resident

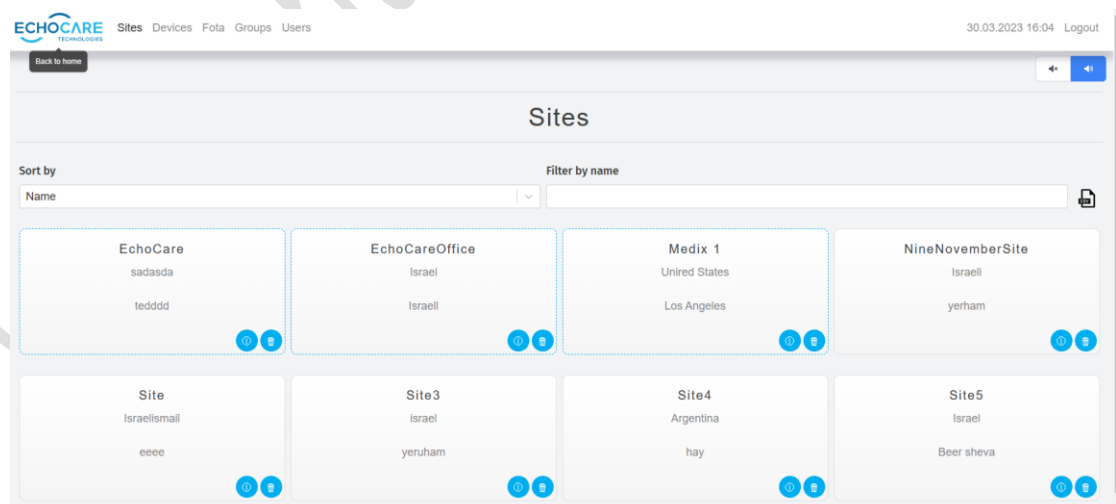
The initial configuration of an installed ECHO device is performed by the following steps:

1. On the control PC, login to your account through the address <https://dashboard.echocare-ncs.com/>

The first page that appears shows all the relevant sites.

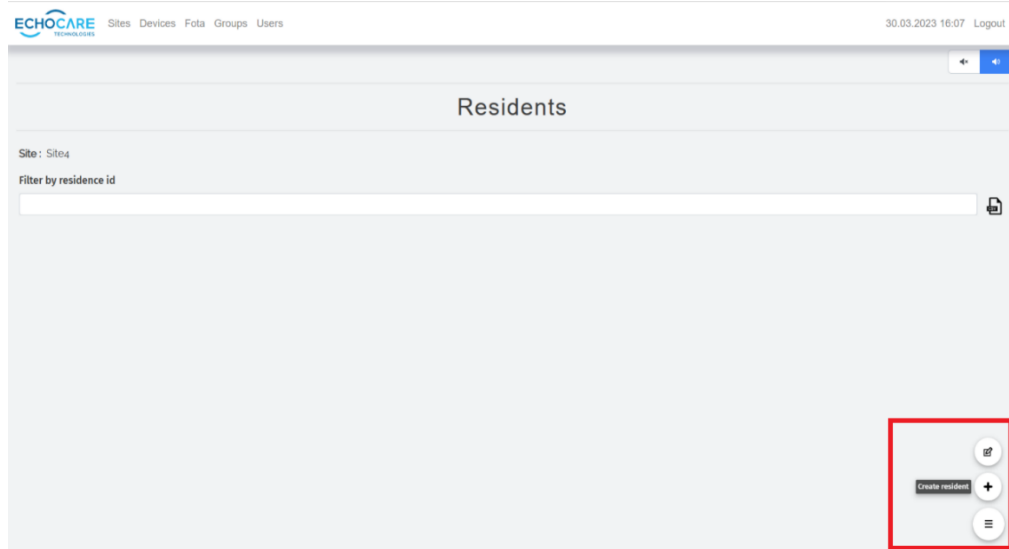
A page with Site tiles appears, showing all the sites under the responsibility of the same site admin.

**Figure 4 – Sites tiles screen**



2. To create a new resident, first click the correct site. Initially, the resident page opens, without defined residents yet. Then click **Create Resident** as marked in red in Figure 5. After filling in the resident details, a new resident is added in the Resident page.

**Figure 5: Create New Resident**



At The bottom right corner there are three buttons:

- Upper – Edit Site
- Middle – Create Resident
- Bottom – Menu

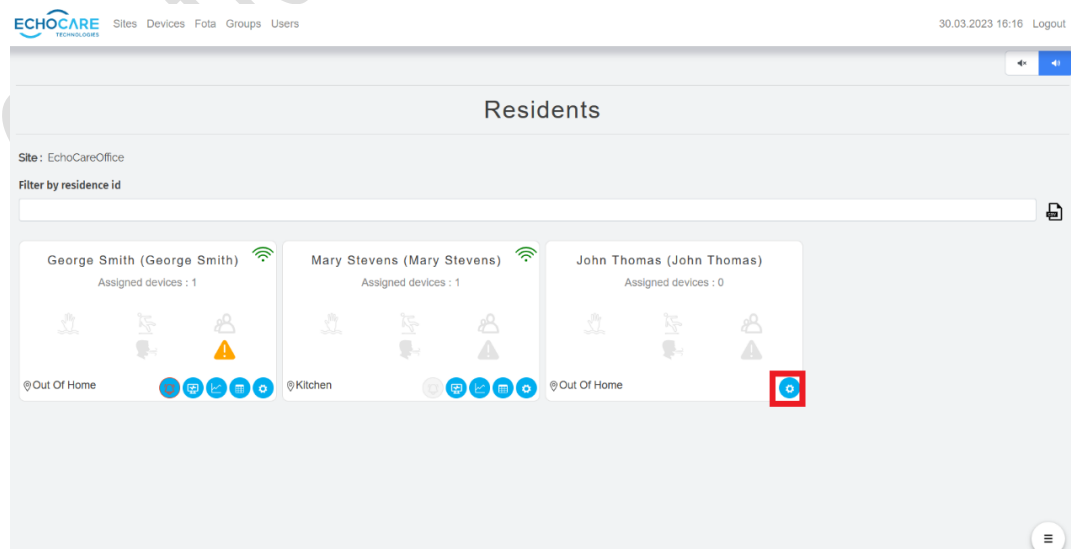
### 3.2.2.2 Assigning a Device to a Resident

The devices are pre-defined by the EchoCare admin, each with its unique MAC address. After a resident has been created, his/her tile appears on the dashboard. However, as is seen in Figure 6, no device has been assigned to it yet.

To assign a device to the new resident, perform the following steps:

1. Click the **Settings** button in the bottom right corner of the resident tile, see Figure 6.

**Figure 6: Settings Button**



2. Go to the **Residence Configuration** tab on the **Settings & Configurations** screen

**Figure 7: Residence Configuration**

Settings & Configurations

Optional Alerts Setup **Residence Configuration**

Residence id name  
John Thomas

Phone  
32154231212

Site  
EchoCareOffice

Resident first name  
John

Resident last name  
Thomas

Birth date  
04/02/2023

Resident gender  
Male

Save changes Cancel Assign device Delete

3. Click **Assign device** button at the bottom of the screen

**Figure 8: Assigning a Device**

Settings & Configurations

Optional Alerts Setup **Residence Configuration**

Residence id name  
John Thomas

Phone  
32154231212

Site  
EchoCareOffice

Resident first name  
John

Resident last name  
Thomas

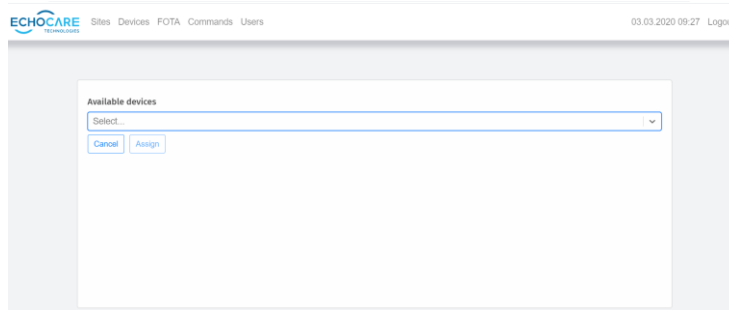
Birth date  
04/02/2023

Resident gender  
Male

Save changes Cancel Assign device Delete

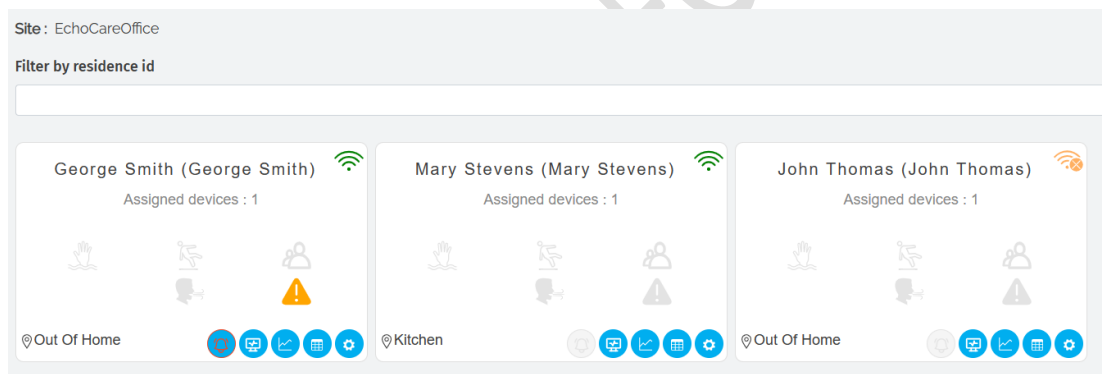
4. Select a device from the dropdown list as shown in Figure 9 and press Assign.

**Figure 9: Assigning a New Device**



5. Upon returning to the site screen, the new device will appear assigned. The device should be online but in the Idle state, with the  symbol as shown in Figure 10. If the device appears offline, with the  symbol, then connect the device to the internet through one of the methods in section 3.2.1.

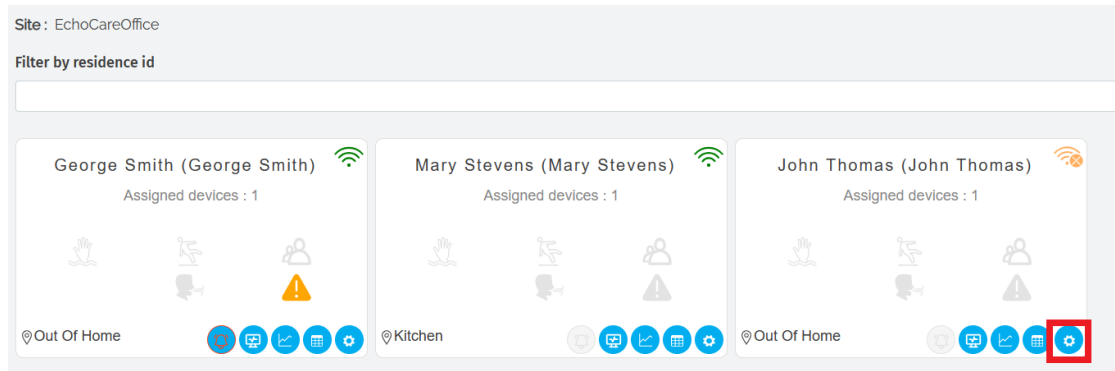
**Figure 10: Assigned Device**



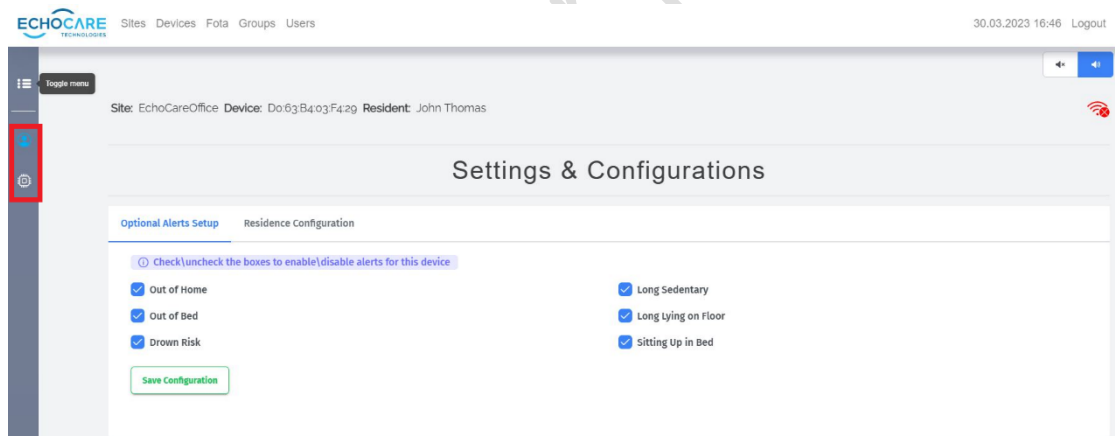
### 3.2.2.3 Connecting Device to Network

1. Click the Settings button as shown in Figure 11. The Settings & Configurations page is shown as in Figure 12. It consists of two sections: Device settings and User settings. The sections can be toggled by clicking the tabs on the leftmost side of the page which are outlined in red in Figure 12.

**Figure 11: Settings Button**



**Figure 12: Settings and Configurations**



2. Choose the **Device Settings** tab. The **Device Settings** page will appear. Then choose **Wifi & System Configuration** which is outlined in red in Figure 13.

**Figure 13: Device Settings Page**

Settings & Configurations

Device Settings **WIFI & System Configuration**

Device ID: D0:63:B4:03:F4:29

Version: 01.01.41

IP Address: 192.168.1.217

Site: EchoCareOffice

Group: Select...

Buttons: [Play] [Pause] [Stop] [Refresh] [Download certificate] [Download Calibration & Mapping Files] [Delete Device] [Unassign Device] [Save changes]

3. The **Wifi & System Configuration** page appears with values obtained from the installed device. If this is the first time the device was connected, the fields will appear with default values as shown in Figure 14.

**Figure 14: WiFi & System Configuration**

Settings & Configurations

Device Settings **WIFI & System Configuration**

WiFi Network ssid: Select...

WiFi Setting

SSID: RonenA

WifiPasswd: 12345678A

[Set Wifi]

System Setting

sensorHeight: 170

AutoOperationFlag: 0

Buttons: [Set Parameters] [New Parameter] [Get Parameters]

4. In this screen, fill in the suitable information for your device and site:
  - a) If the device should connect to the internet through Ethernet cable and not through W-Fi skip this step and the next step. Otherwise, for Wi-Fi connectivity, choose the SSID from the **WiFi Network ssid** dropdown, and enter the password of the Wi-Fi router in the **WifiPasswd** field.
  - b) Click the **Set WiFi** button. A pop-up will appear indicating that the Wi-Fi has been set. After a few moments, the device should connect to the Wi-Fi network that was just set. Verify this by removing the temporary Wi-Fi connection (Ethernet or ECTwifi SSID) and ensuring that the device is online.
  - c) In the Sensor Height field, enter the height of the ECHO device above the room floor in centimeters. For this purpose, measure the distance from the bottom enclosure of the device to the floor.

- d) To have the system automatically start in Monitoring state instead of Idle state, set the AutoOperation flag to **1**.
- e) After filling in all the settings, click **Set Parameters**.

A pop-up will appear indicating that the parameters have been set. The device will restart automatically. After restart, if the device is set for Wi-Fi connectivity, and if the Wi-Fi router is available, the ECHO device should connect to the router with the SSID and password supplied in step 1. If the device was initially connected with an Ethernet cable, the cable can now be disconnected. If the AutoOperation flag is set to 1, the system will automatically go into Monitoring state upon device power-up. If the flag is set to 0, the system will go into Idle state and will remain there until the site admin clicks the Go to Monitoring button. Refer to Section **Error! Reference source not found., Error! Reference source not found.**, for more details.

The site admin can configure the device parameters for:

- the specific apartment (sensor height)
- the specific resident-defined services, e.g., which abnormal situations should be indicated (Visitors, Out of Bed, Out of Room, etc.)

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## 3.3 EchoCloud Dashboard

### 3.3.1 Introduction

All the devices on a given site are connected to the cloud. Site admins can monitor all the residents in their respective sites only. The EchoCare admin can provide technical support remotely to all customer's sites.

The dashboard has two main displays:

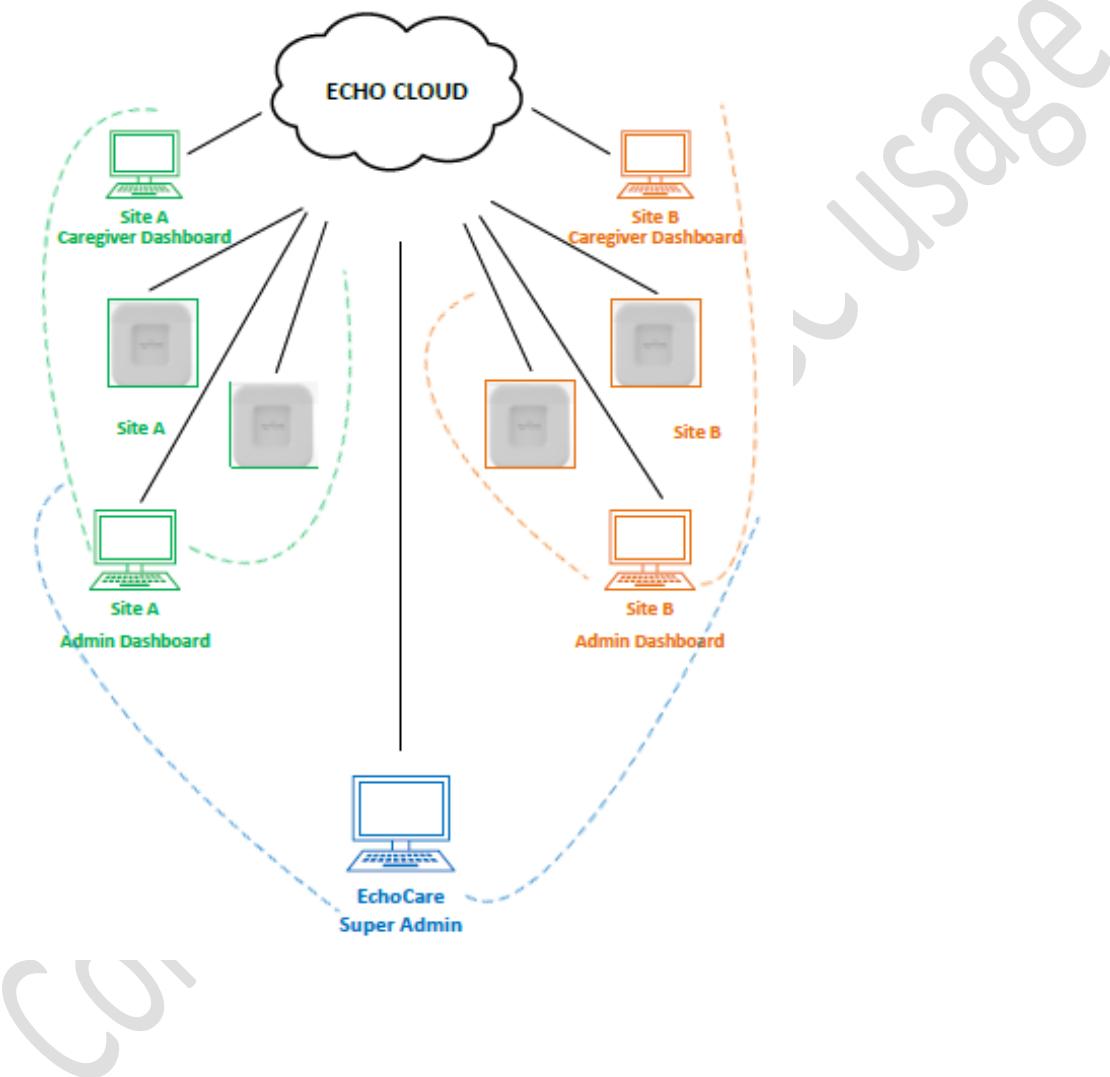
- Site Admin dashboard, described in Section [Error! Reference source not found.](#), [Error! Reference source not found.](#)
- Caregivers dashboard, described in Section [3.3.2, Caregivers Dashboard](#)

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The icons representing various alerts and indications are explained in Section 3.3.3, Displayed Indications and Alerts.

Figure 15 illustrates the overall system connectivity for an example of two sites, each with its own site admin, with each having one caregiver and two ECHO devices for two corresponding rooms or apartments. Site A admin can access only the caregiver and the two devices within its site. The same holds for site B admin. The EchoCare super admin has access to all users in both, site A and site B.

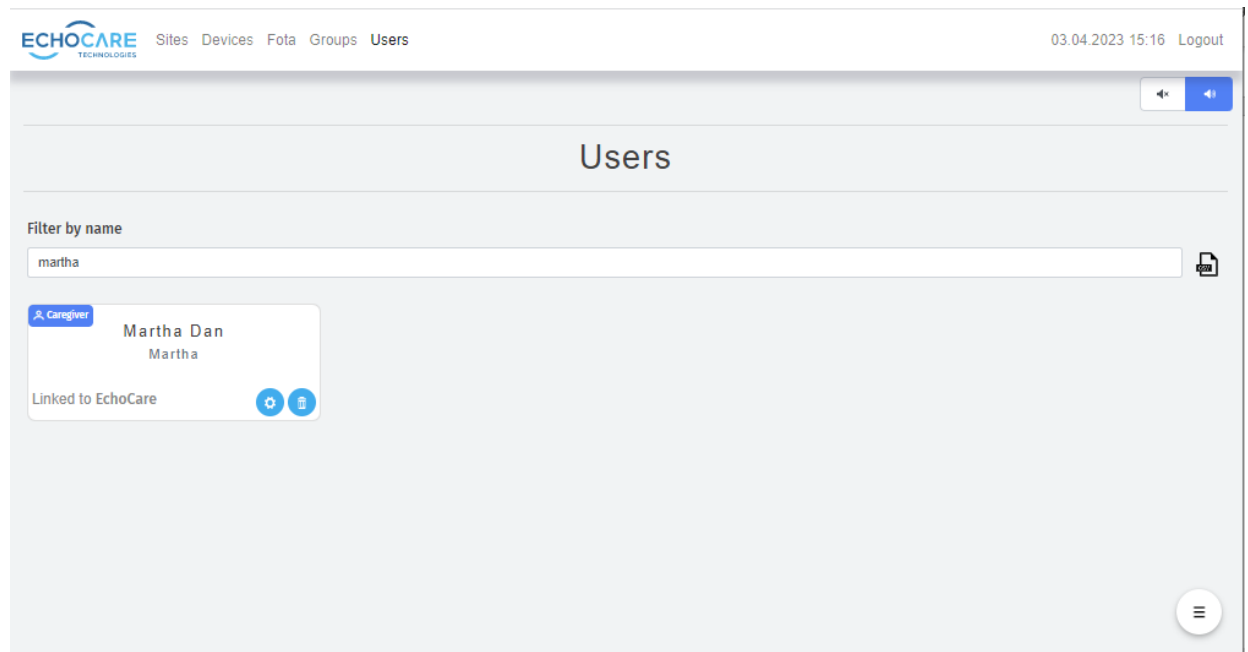
**Figure 15: System Connectivity – Multiple Sites, Multiple Devices**



### 3.3.2 Caregivers Dashboard

The Caregivers dashboard shows the information for all the site residents., as shown in Figure 16.

**Figure 16: Caregivers Page**



Caregivers can observe various screens, but cannot edit settings and definitions. Setting screens are not accessible to caregivers.

Caregiver can ask for respiration measurement, refer to Section 3.3.4, Respiration Monitoring (Optional Service).

#### 3.3.2.1 Filtering Residents

Residents can be filtered by name. To view a specific resident, type the name in the text bar. Refer also to Section **Error! Reference source not found.**, **Error! Reference source not found.**

#### 3.3.2.2 Export to CSV

To export the resident details into a CSV file, click the Export button in the top right corner of the Users screen. Refer to **Error! Reference source not found.** and **Error! Reference source not found.** in Section **Error! Reference source not found.**, **Error! Reference source not found.**

### 3.3.3 Displayed Indications and Alerts

#### 3.3.3.1 Connectivity Status

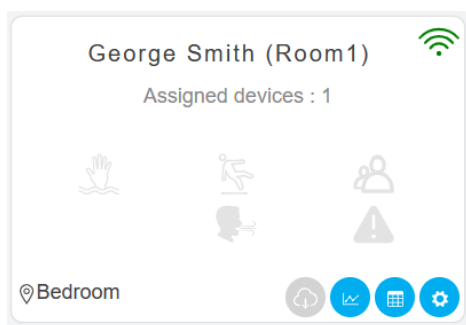
–The Connectivity Status icon can appear in 3 colors, indicating the following statuses:

- Red  – the device is disconnected from the EchoCloud.
- Orange  – the device is connected to the EchoCloud, but is not in Monitoring state.  
Switching the device to Monitoring state is described in Section [Error! Reference source not found., Error! Reference source not found..](#)
- Green  – the device is connected to the EchoCloud and is in Monitoring state.  
This can be considered a “Keep Alive” indication.

#### 3.3.3.2 Location Indication

The current location of the monitored person is normally presented – refer to the figure below. If the system loses track of the person, the indicated location is changed to Out of Home until the system acquires the person again.

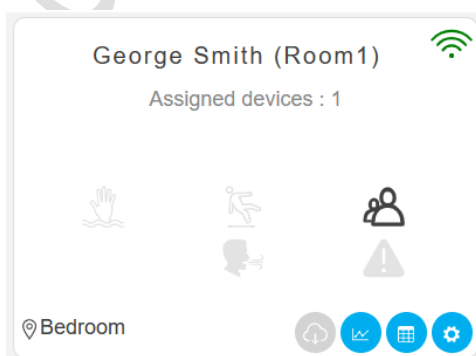
**Figure 17: Resident Tile Showing Resident's location**



#### 3.3.3.3 Visitor Indication

Whenever more than one person is detected in the monitored area, a visitor indication  is shown as in Figure 18. In this case, the system suspends the monitoring of emergency events until identifying that the visitor has left the monitored area. As soon as the visitor is not detected anymore in the monitored area, the visitor indication icon is turned off.

**Figure 18: Visitor Indication**



### 3.3.3.4 Moderate Fall Alert

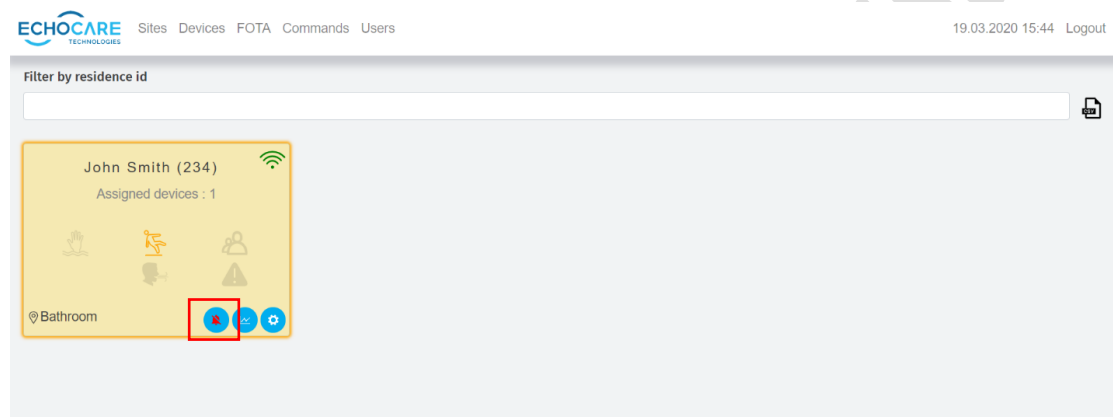
If the monitored person falls down, but gets up again within up to 20 Seconds, a Moderate Fall alert turns yellow, and the background color of the resident tile turns light yellow. This alert can be cleared by clicking the **Clear Alert** button as shown in Figure 19.



**Note:**

The red Bell icon appears on the resident tile for each type of alert. Clicking it implies that the user has received the alert, and it clears the alert.

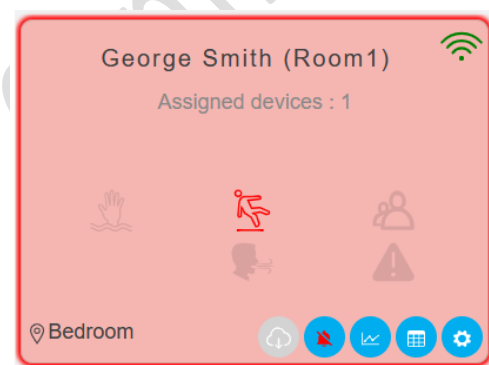
**Figure 19: Moderate Fall Alert**



### 3.3.3.5 Acute Fall Alert

If the monitored person falls down and remains lying on the floor for more than 30 seconds, an Acute Fall alert is given , and the alert icon turns red, and the background color of the entire tile turns light red. A fall from the bed is also shown as an Acute Fall .

**Figure 20: Acute Fall Alert**



### 3.3.3.6 Drowning in Bathtub Alert

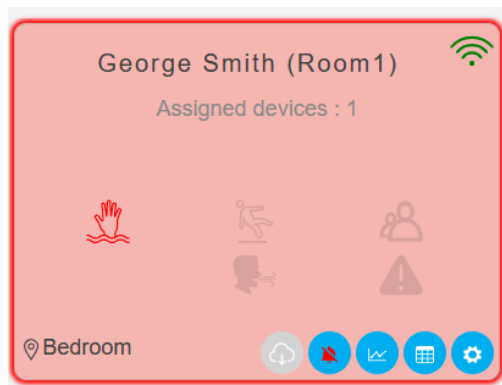


**Note:**

This alert feature is currently provided only by the Bathroom product variant for Japan.

If a person is suspected to be drowning in the bathtub a special Drowning Alert icon turns red 🛑, and the background color of the entire tile turns light red.

**Figure 21: Drowning in Bath Alert**



### 3.3.3.7 Alert on Abnormal Situation

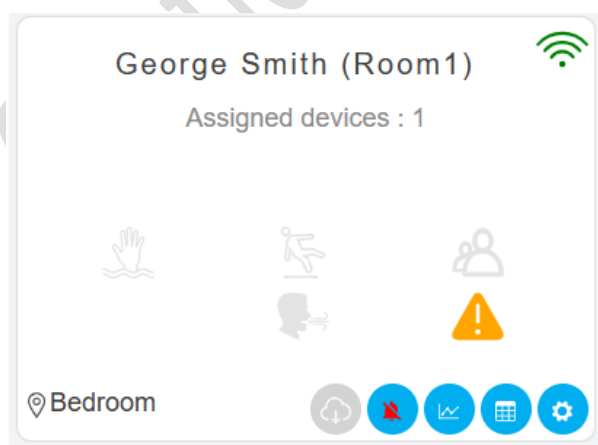
If any of the abnormal situations (listed in Table 1) is detected, an Abnormal alert is given by this icon ⚠️.

The abnormal alert icon refers to all types of abnormal situations that can be displayed – Out of Bed, Out of Home, Drowning Risk, etc.

The site admin can select which abnormal alerts will be displayed for each resident.

Hovering over the Abnormal icon will show the type of abnormal alert. For more details about the specific alert, click the “Alert History” button.

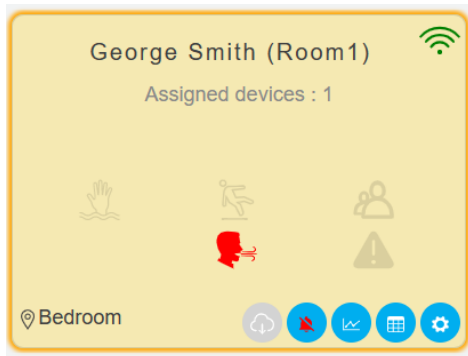
**Figure 22: Abnormal Alert**



### 3.3.3.8 Hyperventilation Alert (Optional Service)

A respiration rate higher than 24 RPM turns on a Hyperventilation alert icon  as shown in Figure 23, and the background color of the entire tile turns light yellow.

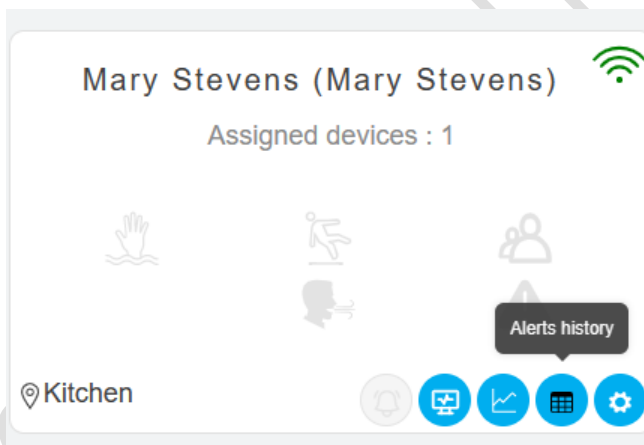
**Figure 23: Hyperventilation Alert**



### 3.3.3.9 Alert History

For each alert appearing on the screen, it is possible to obtain more details by clicking the “Alert History” button. From the site screen, click the **Alert History** icon on the appropriate resident’s tile as shown in Figure 24.

**Figure 24: Alert History button**



The Alert History presents the alerts that occurred within a given day, with their location, description, date and time and details of who confirmed the alert.

**Figure 25: Resident Alert History**


[Sites](#)
[Users](#)
26.02.2023 15:02 Logout

Resident: Demo room Site: EchoCare
Alarm Sound is ON

### Resident Alert History

| Emergency Alerts | Location    | Description                        | Date & Time          | Confirmed | Confirmed By | Confirmed At         |
|------------------|-------------|------------------------------------|----------------------|-----------|--------------|----------------------|
| Out Of Home      | OUT OF HOME |                                    | 2/26/2023 3:00:00 PM | ✗         | -            | -                    |
| Abnormal         | Entry       | Lying on the floor for a long time | 2/26/2023 2:59:20 PM | ✗         | -            | -                    |
| Abnormal         | Bedroom     | Person has left the bed            | 2/26/2023 2:23:34 PM | ✓         | admin        | 2/26/2023 2:52:40 PM |
| Abnormal         | Bedroom     | Person has left the bed            | 2/26/2023 2:23:05 PM | ✓         | admin        | 2/26/2023 2:52:40 PM |
| Out Of Home      | OUT OF HOME |                                    | 2/26/2023 1:23:57 PM | ✓         | admin        | 2/26/2023 2:52:40 PM |
| Abnormal         | Entry       | Lying on the floor for a long time | 2/26/2023 1:23:17 PM | ✓         | admin        | 2/26/2023 1:23:26 PM |
| Abnormal         | Entry       | Lying on the floor for a long time | 2/26/2023 1:22:21 PM | ✓         | admin        | 2/26/2023 1:22:26 PM |

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### 3.3.4 Respiration Monitoring (Optional Service)

#### 3.3.4.1 Respiration Monitoring

If a customer is subscribed to the respiration monitoring service, the following functions and operations are available:

- Clicking the **Get Respiration** button on the resident tile (by site admin or by caregiver) to initiate respiration measurement.
- In case of detecting an acute fall and remaining on the floor for at least 40 seconds, the system will automatically take a respiration measurement.

The respiration monitoring lasts about 20 seconds, and if successfully completed, it will generate a respiration pattern chart, and will display:

“Respiration detected”

In a line below it will show the following measured parameters:

- Respiration Rate
- Inhale Time
- Exhale Time
- Stop Time
- Cycle Time

If respiration is identified but cannot be well measured, the following two lines will be displayed:

“Respiration detected”

“Parameters not extracted”

If respiration is not detected and no movement is identified by the monitored person the following line will be displayed:

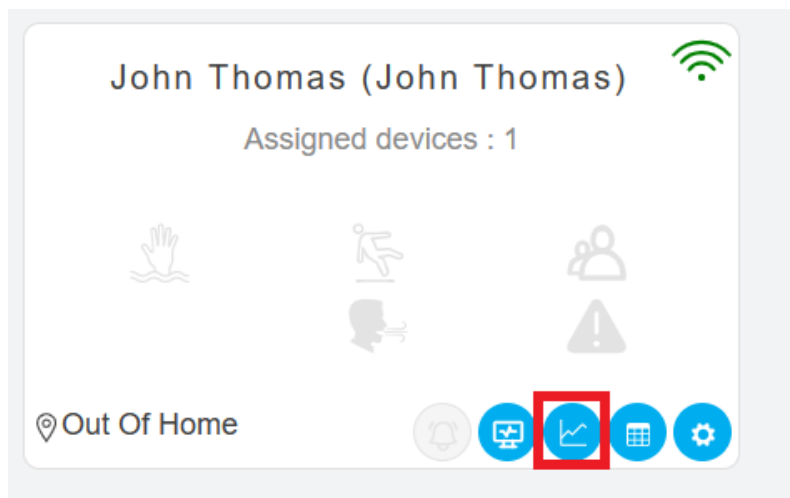
“Respiration not detected”

Hyperventilation alert is given if the respiration rate is found equal to or above 24 RPM.

Hypoventilation alert is given if the respiration rate is found equal to or below 8 RPM.

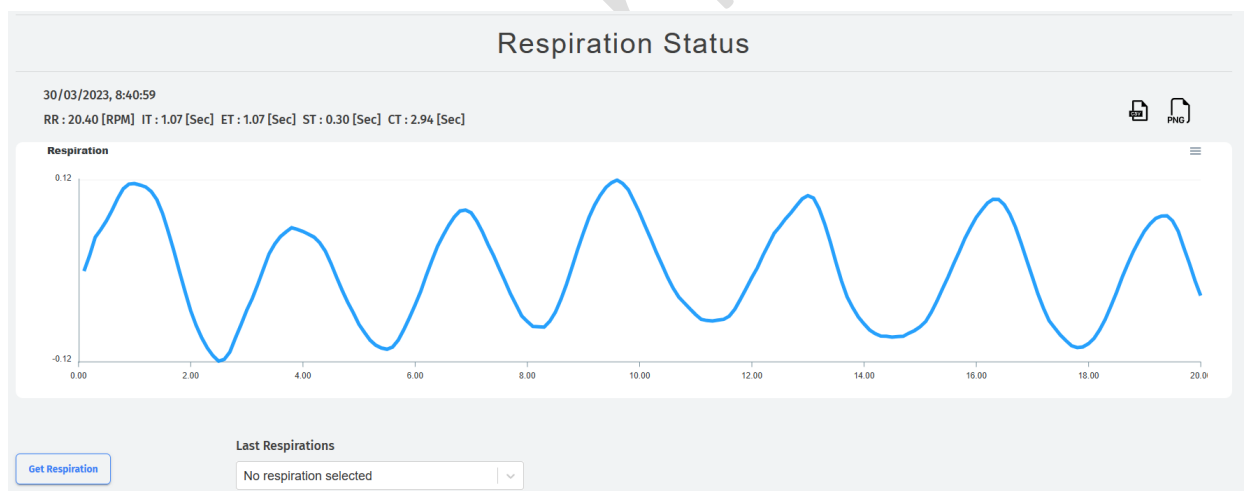
To view the latest recorded respiration pattern, click the Respiration icon  on the Resident Tile as shown in Figure 26, and a “Respiration Status” screen appears as in Figure 27.

**Figure 26: Respiration Page Button**



To measure respiration on demand, click the [Get Respiration](#) button in the Respiration Status screen.

**Figure 27: Respiration Chart**



On the lower bar there is a drop-down menu under **Last Respirations**, listing up to 10 recent respiration measurements, the details of which can be chosen for display.

To download the graph of the respiration pattern to CSV file, click the  button. A file named **Respiration[Date&Hour].csv** will be downloaded.

### 3.3.4.2 Sleep Monitoring [TBD]

### 3.3.4.3 Wakeup Check-in Procedure [TBD]

## 3.3.5 Daily Living Activity Report (Optional Service)

### 3.3.5.1 Overview

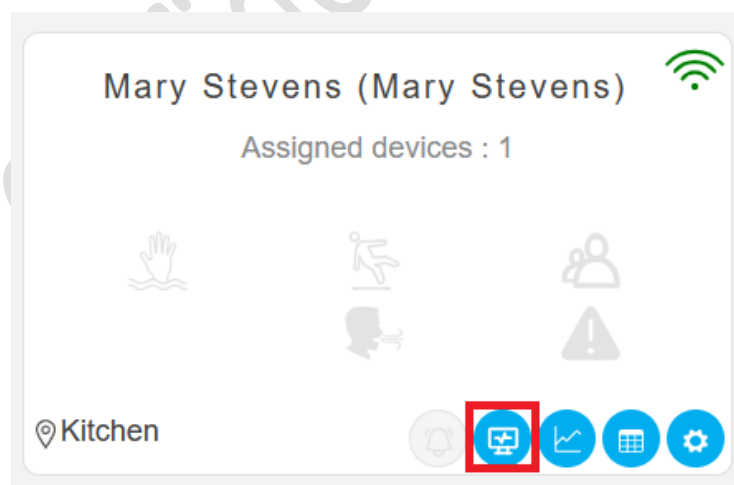
The Daily Living Activity contains statistical data of the monitored person. The data is collected every day, with the daily records stored for the previous 30 days. Physicians, family members or caregivers can review the Daily Living Activity report to identify potential health deterioration.

The Daily Living Activity report provides the following information:

- Physical Activity
- Daily Location Distribution
- Average Daily Gait Measurements
- Respiration

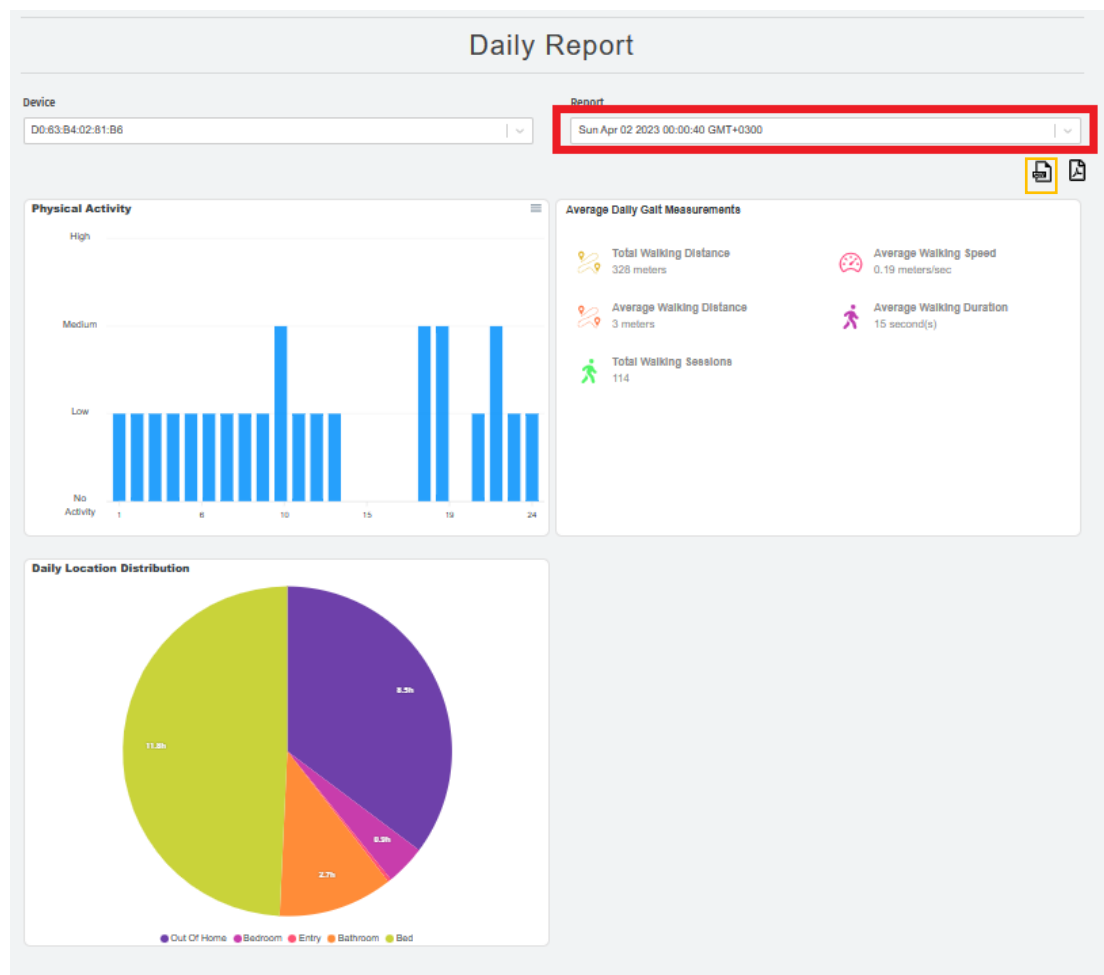
To display the Daily Living Activity page, click the Daily Report button as shown in Figure 28.

**Figure 28: Daily Living Activity Button**



The Daily Activity Report appears as shown in Figure 29.

**Figure 29: Daily Activity Report**



To display data of previous days, click the arrow next to the Report list and select the date of interest – as marked in red in Figure 29.

### 3.3.5.2 Physical Activity Report

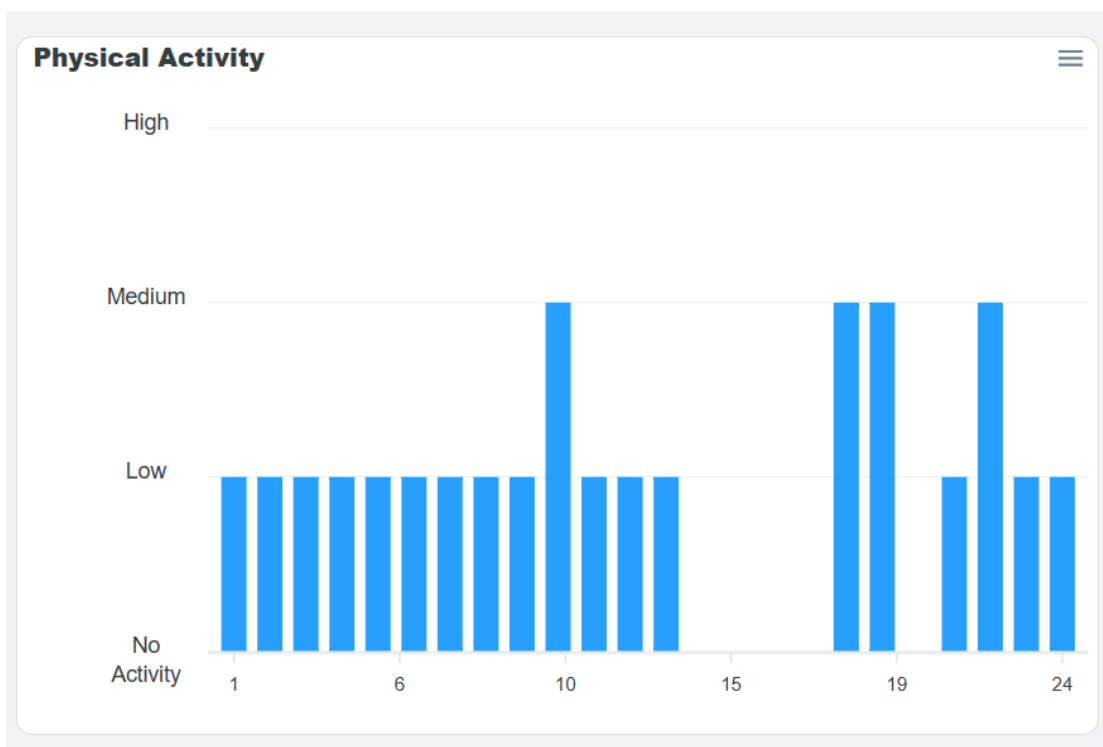
The physical activity report presents the activity level of the monitored person at each hour over the past 24 hours.

The level of hourly activity is determined by a statistical analysis of the posture and movement of the monitored person. For example, a person who walked a lot will get a high activity score compared to a person who mostly lies in bed who will get a low activity score.

If the person is not in the apartment for most of a given hour, the activity level for that hour will be set to **No Activity**.

Similarly, if the person is out of home, or having visitors, for more than half an hour, the activity level for that hour will be set to **No Activity**.

**Figure 30: Physical Activity Report**



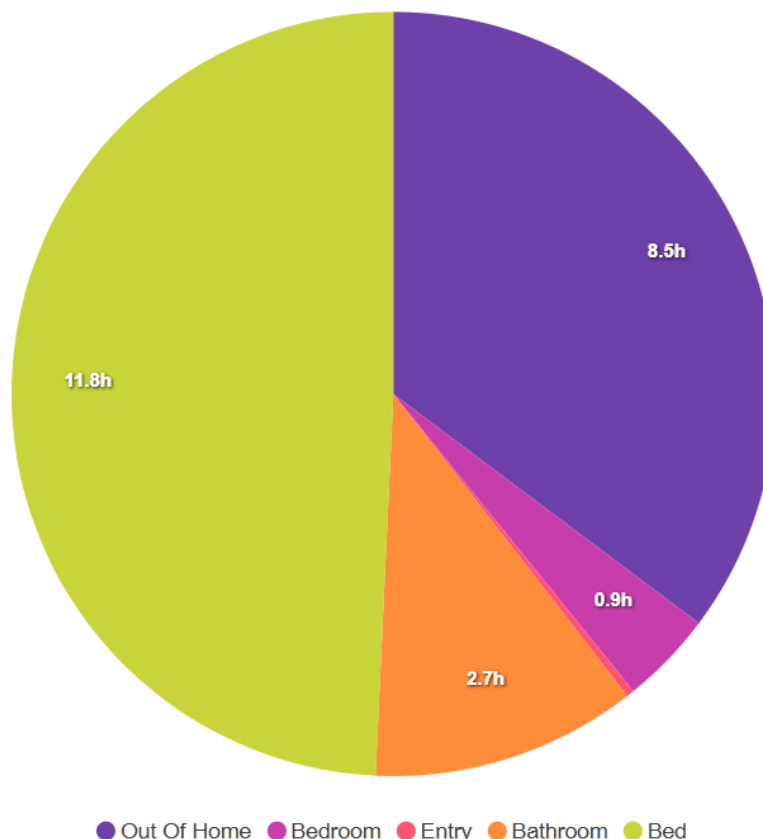
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### 3.3.5.3 Daily Locations Distribution

The Daily Locations Distribution chart presents the resident's location distribution for the last day. If the resident did not visit a certain location at all, this location will not appear in the legend.

**Figure 31: Daily Location Distribution**

#### **Daily Location Distribution**



### 3.3.5.4 Average Daily Gait Measurements

This section of Gait Measurements on the screen presents the resident's gait statistics for the last 24 hours and contains the following:

- Total walking distance: Cumulative distance of all walking sessions within a given day
- Number of walking sessions: The total number of walking sessions within a day. To prevent false counts, a track is considered a walking session if the person moved more than 1 meter after being static for at least 4 seconds.
- Average walking duration: Calculated by summing up the durations of all walking sessions within a given day and dividing by the number of those sessions.
- Average walking distance: Calculated by summing up the walking distance of all the walking sessions within a given day and dividing by the number of those sessions.
- Average walking speed: Calculated by summing up the measured speeds of all walking sessions within a given day and dividing by the number of those sessions.

**Figure 32: Average Daily Gait Measurements**

**Average Daily Gait Measurements**



**Total Walking Distance**  
328 meters



**Average Walking Speed**  
0.19 meters/sec



**Average Walking Distance**  
3 meters



**Average Walking Duration**  
15 second(s)



**Total Walking Sessions**  
114

### 3.3.5.5 Export to CSV

To download data of a specific day, click the **CSV** button - marked in orange in Figure 29. The data is packed into a zip file named **DailyStatistics [Date&Hour].zip**. The date and hour in the file name refer to the time when the Daily Living Activity report is sent from the device to the cloud.

The zip file contains the following CSV files:

- ActivityProfile[Date&Hour].csv
- EmergencyAlerts[Date&Hour].csv
- GaitMeasurments[Date&Hour].csv
- LocationDistribution[Date&Hour].csv

## 3.4 Mobile Application

TBD – Under development

## 4 Appendix – Acronyms and Abbreviations

| Acronym  | Description                                                                                                                                                      |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADL      | Activity of Daily Living                                                                                                                                         |
| API      | Application Programming Interface                                                                                                                                |
| AWS      | Amazon Web Services                                                                                                                                              |
| CA       | Certificate Authority                                                                                                                                            |
| CSV file | Comma-Separated Values file;<br>A text file in which information is separated by commas                                                                          |
| EHR      | Electronic Health Records                                                                                                                                        |
| EMC      | Electro Magnetic Conductance                                                                                                                                     |
| EMF      | Electro Magnetic Field                                                                                                                                           |
| FOTA     | Firmware Over The Air                                                                                                                                            |
| HB       | High-Band<br>Referring to an ECHO device operating at the higher frequency licensed ultra-wide band, which is in use in Japan, South Korea, Australia and the US |
| MB       | Mid-Band<br>Referring to an ECHO device operating at the mid frequency licensed ultra-wide band, which is in use in Europe, China and Israel                     |
| NCS      | Nursing Call System                                                                                                                                              |
| RPM      | Respirations per Minute                                                                                                                                          |
| RPM      | Remote Patient Monitoring                                                                                                                                        |
| RoHS     | Restriction on Hazardous Substances                                                                                                                              |
| UI       | User Interface                                                                                                                                                   |
| UX       | User Experience                                                                                                                                                  |

## 5 Statements

### 5.1 FCC Statements

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority 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.

WARNING – RF EXPOSURE COMPLIANCE: This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body.

-This Class B digital apparatus complies with Canadian ICES-003.

-Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

### 5.2 IC Statements

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux

appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

AVERTISSEMENT – CONFORMITÉ AUX NORMES D'EXPOSITION AUX RF : Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps.