

Vayyar Care™

Product Specification

Release 38 / Rev.10



REVISION HISTORY

Revision	Date	Author	Description
1	April 2020	Noga Barpal	Preliminary issue
2	June 2020	Igal Kronshtein	More information added
3	October 2020	Noga Barpal	Japan spec added
4	November 2020	Noga Barpal	More information added
5	January 2021	Noga Barpal	More information added. Final Release
6	April 2021	Tomer Granit	Minor edits
7	May 2021	Hen Shidlansik	LED and buzzer spec, minor edits
8	August 2022	Tal Katz	Product updates
9	November 2022	Tal Katz	Minor edits
10	February 2023	Sefi Sasson	Major edits and adjustments to v38

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1. INTRODUCTION

This document summarizes the product specifications of Vayyar Care, a contact-free sensing system that continuously provides real-time fall detection and presence events (activity tracking), primarily for residents of senior living facilities.

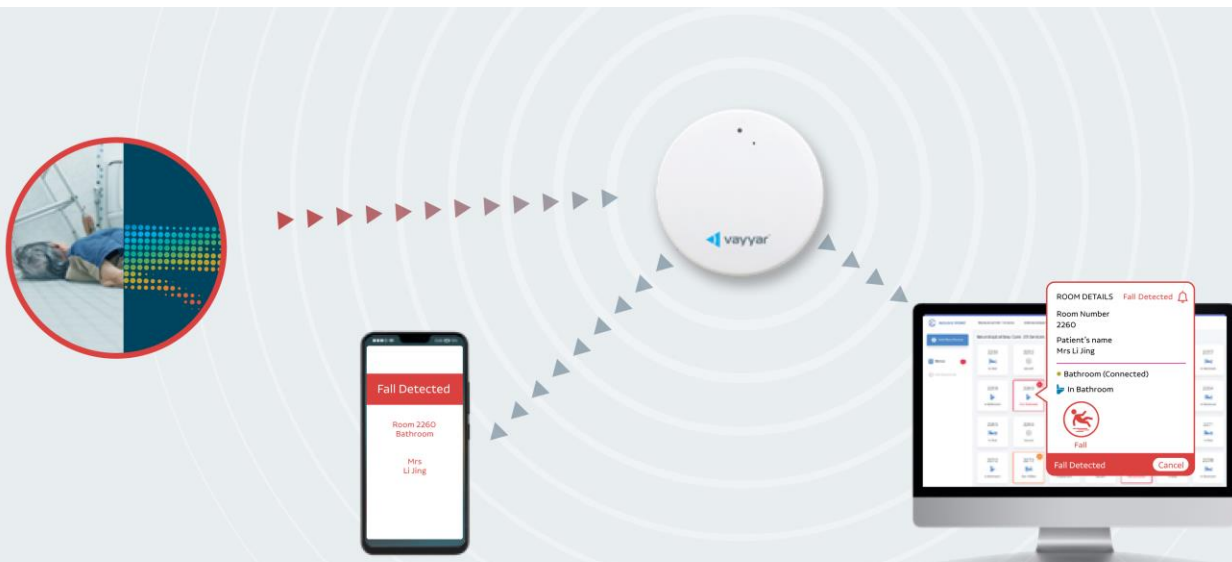
The sensor data can be utilized to relay real-time fall emergency alerts and to develop presence-based activity trend analytics, to be integrated into fall management solutions. The system is comprised of the Vayyar Care sensors that cover a single-room environment, and a cloud solution consisting of either Vayyar's cloud or a partner's cloud. The system is intended to be installed according to the Vayyar Care installation guidelines.

INTENDED AUDIENCE

- ▶ Platform providers with their own dashboard or app
- ▶ Nurse call system providers
- ▶ System integrators, distributors, and installers

SOLUTION ADVANTAGES

- ▶ Privacy – the device is RF-based (no optics), and therefore user privacy is maintained at all times.
- ▶ Contact-free – the device provides passive detection, so there is no need to wear a pendant or bracelet.
- ▶ Multiple mounting options – the device can be mounted on either a wall or a ceiling.
- ▶ Lighting – the device works in all lighting conditions.
- ▶ Humidity – the device works in conditions of steam and high humidity.
- ▶ Multiple integration options – Vayyar Care supports dry contact, Vayyar cloud-based, partner cloud-based, and an option for a customer's on-prem server developed by the partner.



2. PRODUCT INFO

Vayyar Care Device SKU Options

Vayyar Care Type A	VC1BBUS02
Vayyar Care Type C (Dry Contact support)	1. Sensor - VC3BBGL03 2. Dry Contact Accessory - VHBADC01 or VHCADC01 (high resistance)

Radio Sensor

Vayyar RFIC	VYYR7201 SOC
Technology	mmWave MIMO (46 antennas) RF Sensor
Frequency Bands	WW- 61.01 - 61.49 GHz, Japan- 60.01 - 60.49 GHz
Field of view	140° Azimuth, 70° Elevation

Connectivity

Communications Technology	Wi-Fi 2.4 GHz, 802.11 b/g/n
Pairing Technology	BLE 2.4 GHz
Cloud Infrastructure	Vayyar Production Cloud or partner's cloud

Power supply

Input Voltage	<u>Vayyar Care Type A</u> : 5V fed from AC/DC transformer (power supply provided with the device)
	<u>Vayyar Care Type C</u> : 12V/2A or 24V/1A fed from an external power supply through the accessory board (external power supply not provided by Vayyar)

Power Cable length

Vayyar Care Type A	Strain relief USB A cable 1.5m / 5 ft
Vayyar Care Type C	Strain relief USB C cable 35 cm / 13.77 inches The cable connects to the dry contact accessory board that consists of a terminal block, for power and dry contact inputs, and supports 18-20 AWG wire types.

Device Peripherals

LED	LED Colors: Red – 40, Blue – 20, Green – 110 Illuminance [Lux] TYP. See also the LED & Buzzer Functionality section below.
Buzzer	90 SPL [dB] TYP at 10 cm See also the LED & Buzzer functionality section below.
Button	1. Reset the device via factory reset 2. Pair the device and Vayyar app 3. Run dry contact simulation

Device Material, Dimensions, and Weight

Material	ABS+PC
Diameter	9 cm / 3.54 inches

Mounting brackets diameter	14.4 cm / 5.67 inches
Depth/Thickness	1.5 cm / 0.59 inches
Weight	110 g / 0.24 pound

Mounting Options

Sensor mounting options and coverage	• Wall mount: center of the wall at a height of exactly 1.5m / 5 ft • Coverage: up to 4 x 4 m / 13 x 13 ft • Sensor orientation: cable at 90 deg relative to X-Axis • Ceiling mount: center of the ceiling, at supported height of 2.3 - 3m / 7.5 - 9.8 ft • Coverage: up to 4 x 5 m / 13 x 16.4 ft • Sensor orientation*: cable at 45 deg relative to Y-Axis
Mount options tolerance**	Wall mount: up to 1 m / 3.28 ft to the left from the installer's point of view or positive direction on the X-Axis Ceiling mount: up to 0.5 m / 1.64 ft in either positive or negative direction with respect to Y-Axis

Configuration and Services

Product Features***	1. Fall detection alerts 2. Target on-the-ground alerts 3. Presence events and status
Over The Air (OTA) Firmware Updates	The device checks for OTA FW version updates once a day. If a new version is available, the device will automatically update to the latest version.
Tethered Firmware update, Provisioning, and debug using UART (Debug port)	<u>Kit for type A devices, SKU: VEU2UTO2:</u> UART board and 2 USB cables <u>Kit for type C devices, SKU VHRAUSB02:</u> Vayyar Care Dry Contact Debug Board and 2 USB Cables

Reliability

Room temperature range	0°C-40°C / 32°F-104°F
Maximum Humidity	95%

Certifications

Certifications	USA - FCC, Canada - IC, Europe - CE, RED 2014/53/EU, ETSI, China - SRRC, Australia / New Zealand - CISPR, Japan - MIC, Korea - KC, Taiwan - NCC (type A only). Environmental certificates: RoHS, WEEE, REACH
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* Ceiling mount installation with straight sensor orientation is supported for legacy customers only and covers up to 4 x 4 m / 13 x 13 ft room area.

** Sensor should be placed in the center of the wall/ceiling. The tolerance is relative to the center.

*** General info about Vayyar Care device features:

- The person should be within the sensor's field of view and line of sight.
- Detection is optimized for a single person within the room.
- Presence events and fall detection alert accuracy is over 90% in a lab environment (empty room).
- Presence events in resting zones (e.g., in bed), require an additional Vayyar Care device to maintain accuracy.

3. PRODUCT FEATURES

Fall Detection

- ▶ The algorithm searches for falls suffered by human targets and is optimized for a single person in the room. Fall events may still be detected when there is more than one person in the room.
- ▶ The fall detection algorithm flow consists of the following stages (end to end ≥ 90 seconds):
 - Initial Fall Detection ("Fall_Detected")
 - Fall Confirmation ("Fall_Confirmed")
 - Fall Notification ("Calling") - Fall Detection alert
 - Event Ended ("Finished")
- ▶ The fall event is canceled automatically ("Fall_Exit") at any stage if the person gets up before the "Fall Notification" stage, another person enters the room, or due to another algorithm decision.
- ▶ The partner may use the fall detection stages information to alert or report on fall events or to build customized features.
- ▶ Fall Detection requires a two-week learning period after installation, allowing the Vayyar Care device to learn the room environment in order to reduce false positives (false alarms). During Learning Mode, fall alerts are not reported to customers.
- ▶ For further information about feature implementation, refer to the API documentation.

Target on the ground

- ▶ This is a complementary algorithm to the fall detection algorithm that enables detection of a human target lying on the floor in cases where no fall was detected. The device sends "Fall_Suspected" updates every 50 seconds until it reaches the "Calling" stage - typically 5-12 minutes.
- ▶ The target on the ground process is canceled automatically ("Fall_Exit") at any stage if the person gets up before the "Fall Notification" stage, another person enters the room or due to another algorithm decision.
- ▶ The partner may use the information to alert or report on suspected falls in near real time to ensure that high-risk residents/patients are closely monitored. Activating this feature may result in additional false positives (false alarms). For more information, please consult your CSM.
- ▶ For further information about feature implementation refer to the API documentation.

Presence status in the room and in subregions within the room

- ▶ This feature enables tracking of a person's activity in order to reveal their behavioral trends over time. Optimized for a single person, it gathers data within any of the monitored rooms in the apartment/suite, by utilizing resident presence status reports for the room or for any of the defined subregions (zones) of interest in the room.
- ▶ To obtain accurate presence information, once a person enters or exits a room or a subregion, Vayyar recommends a minimum latency of 120 seconds.
- ▶ The partner may use the information to identify trends over time for offline reports, as specified in the below examples:
 - Present an increase or decrease in avg. bathroom visits, to indicate a potential medical issue.
 - Present an increase or decrease in avg. time spent in the apartment/suite, to indicate a change in social engagement which can reflect on wellbeing.
 - Present an increase or decrease in avg. time spent in bed and/or other resting zones during certain hours, to indicate changes in activity level or mobility.
 - Create a personalized fall risk score by combining fall history with "presence" trends.
- ▶ Presence in resting zones (e.g., in bed):
 - Requires an additional device for maximum accuracy.
 - The resting zone's minimum size should be no less than 1 x 1 m / 3.28 x 3.28 ft.
 - The minimum separation distance (borders between zones) should be no less than 0.5 m / 1.64 ft.
 - The feature supports up to 4 subregions (zones).

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4. SUPPORTED INTERFACES

Supported types of integration

- ▶ Webhooks API – Enables sending alerts and status from the Vayyar cloud to the partner's cloud/server and Vayyar cloud for Vayyar Care device management.
- ▶ MQTT API – Enables sending alerts and status from a Vayyar Care device to the partner's MQTT Broker and Vayyar cloud for Vayyar Care device management.
- ▶ API (Customized) – Full management of Vayyar Care devices from the partner's cloud. The partner is required to send Vayyar Care sensor data to the Vayyar cloud for automatic room analysis updates (reduction of false alarms) and Tier 2 support (aggregator API).

Fall Detection alert

Webhooks	MQTT	API	Module Support	Dry Contact	Vayyar App*	Vayyar Dashboard*	SMS*
V	V	V	V	V	V	V	V

Target on the Ground detection alert

Webhooks	MQTT	API	Module Support	Dry Contact	Vayyar App*	Vayyar Dashboard*	SMS*
V	V	V	V	V	X	X	X

Presence

Webhooks	MQTT	API	Module Support	Dry Contact	Vayyar App*	Vayyar Dashboard*	SMS*
V	V	V	V	X	V	V	X

*Available only during system evaluation or pilot

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5. LED AND BUZZER FUNCTIONALITY

Status	LED color	LED Mode	Buzzer	Notes
Device startup	White	Blinking	N/A	Appears when the device is first connected to the power or rebooted.
Pairing mode	Blue	Blinking	N/A	Stable blue turns to blinking as the button is pressed for 5 seconds and released to enable pairing mode. If factory version is 38, the device enters this mode immediately after startup.
Fall detected	Yellow	Blinking	OFF	Initial suspicion of a fall Duration = 50 seconds
Fall confirmed	Yellow	Fast Blinking	ON	Confirmation of fall Duration = 40 seconds
Fall alert ("Calling")	Yellow	Fast Blinking	ON	A fall alert is sent Duration = 30 seconds
Wi-Fi/Internet disconnection	Red	Blinking	N/A	Red LED appears when the device is plugged into the power but disconnected from Wi-Fi or in version 38 when disconnected from the internet.
Factory Reset	Blue + White	Blinking	N/A	To reset provisioning details (Wi-Fi and pairing) 1. Press and hold the button for 20 seconds while the blue light flashes. 2. Release the button when the blue light changes to solid white. 3. Wait about 30 seconds until light flashes white 4 times, indicating that the process is complete.

Notes:

1. Some of these behaviors are configurable and are subject to change.
2. For commercial deployment Vayyar recommends turning off the LED and the buzzer (configurable) to avoid end user/resident disturbance.
When the LED is turned off, only Wi-Fi / Internet disconnection error (red color) will be displayed in the event of an error.

6. VAYYAR CARE DEVICE TYPES

► **Vayyar Care Type A**



► USB TYPE A



► **Vayyar Care Type C**



► USB TYPE C



► Dry Contact Board



► Mounting accessory for Vayyar Care



Thanks!

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