

# Child Presence Detection Support Device

幼児置き去り防止支援装置

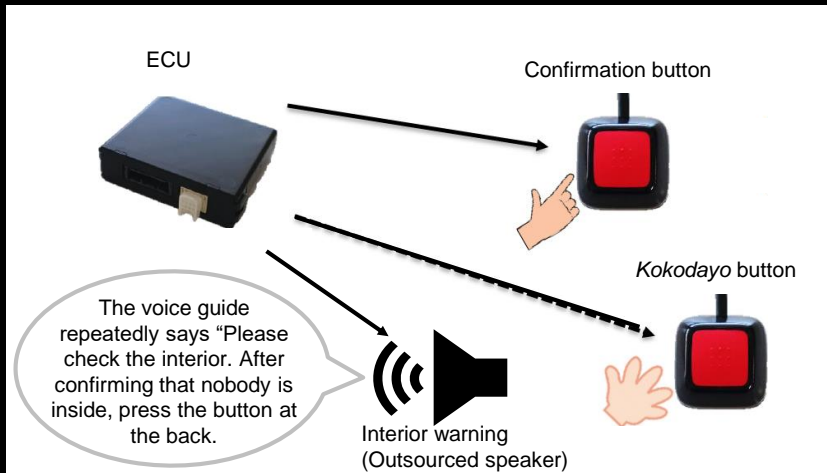
**Background**

Children left in cars or courtesy buses have become a social problem.

Response to an accident of a child left in a courtesy bus in last September

- Obligation to install a safety device in a courtesy bus
- MLIT's guidelines for safety device

European new vehicle safety test program Child Presence Detection (CPD) test required by Euro NCAP started in 2023.



① Development of a safety device that helps the detection of child presence in a courtesy bus



② Development of a CPD mmWave sensor

# ① CPD Support Safety Device for Courtesy Buses (Compliant With MLIT Guidelines: Getting Off Confirmation Type)

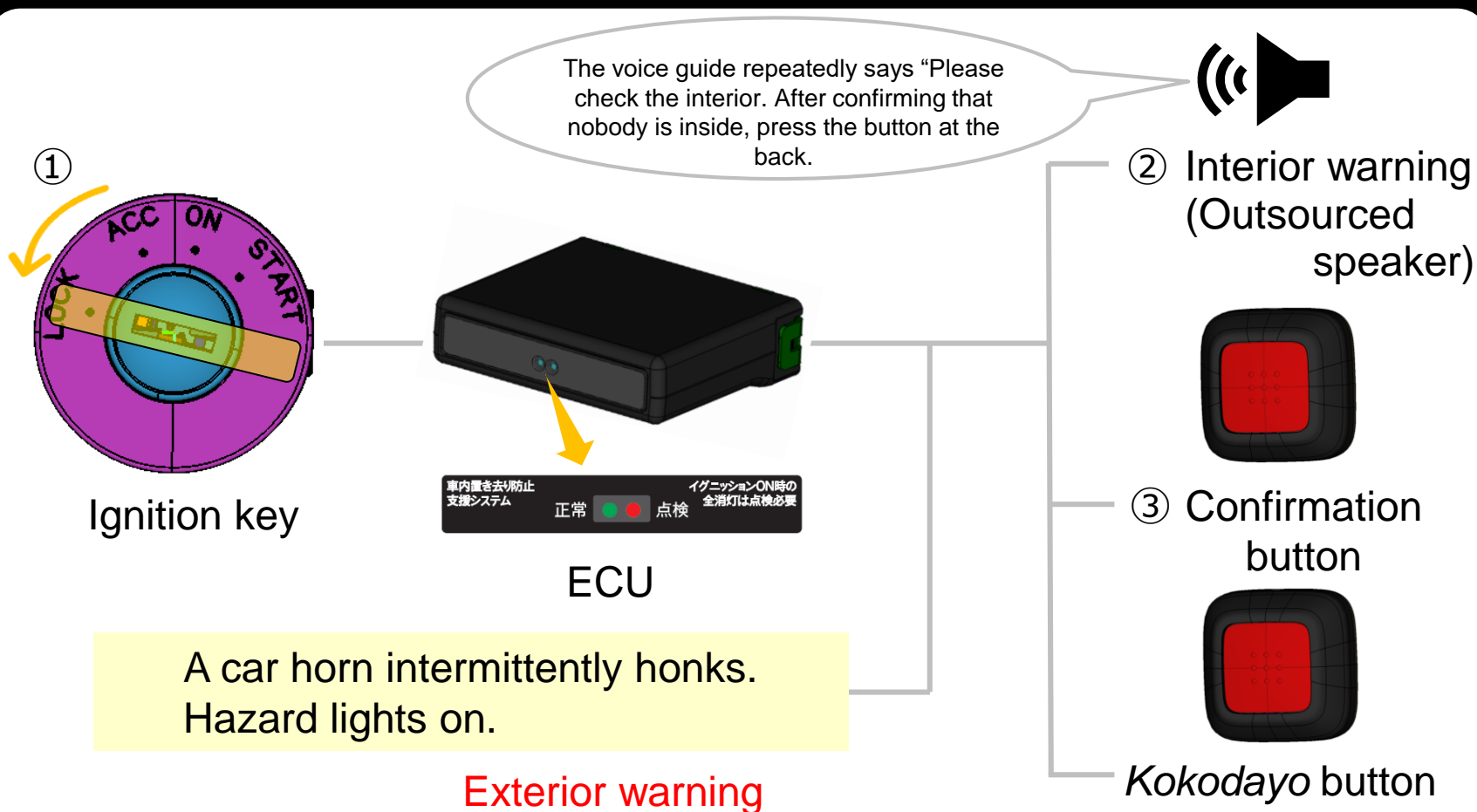
送迎用バスの置き去り防止を支援する安全装置  
(国交省ガイドライン準拠/降車時確認式)

## Purpose

Bring a MLIT guideline-compliant safety device to market to contribute to CPD.  
(Development of an ECU, a confirmation button, and a *Kokodayo* button)

## Outline

Mass-produced products are used for short-term development and for the quality of the on-board device.  
The device can be retrofitted to vehicles already used without any change in the on-board ECU.  
User-friendly even for the first-time drivers.



## Process

- ① Ignition key ACC ⇒ LOCK
- ② Voice-guided interior warning
- ③ A driver checks the interior according to voice guide and press the confirmation button at the back to stop the warning.

If the confirmation button is not pressed,  
⇒ Exterior warning  
(4 minutes later)

If a child left inside presses the *Kokodayo* button,  
⇒ External warning

## ② CPD Millimeter Wave Sensor

幼児置き去り検知ミリ波センサー

## Purpose

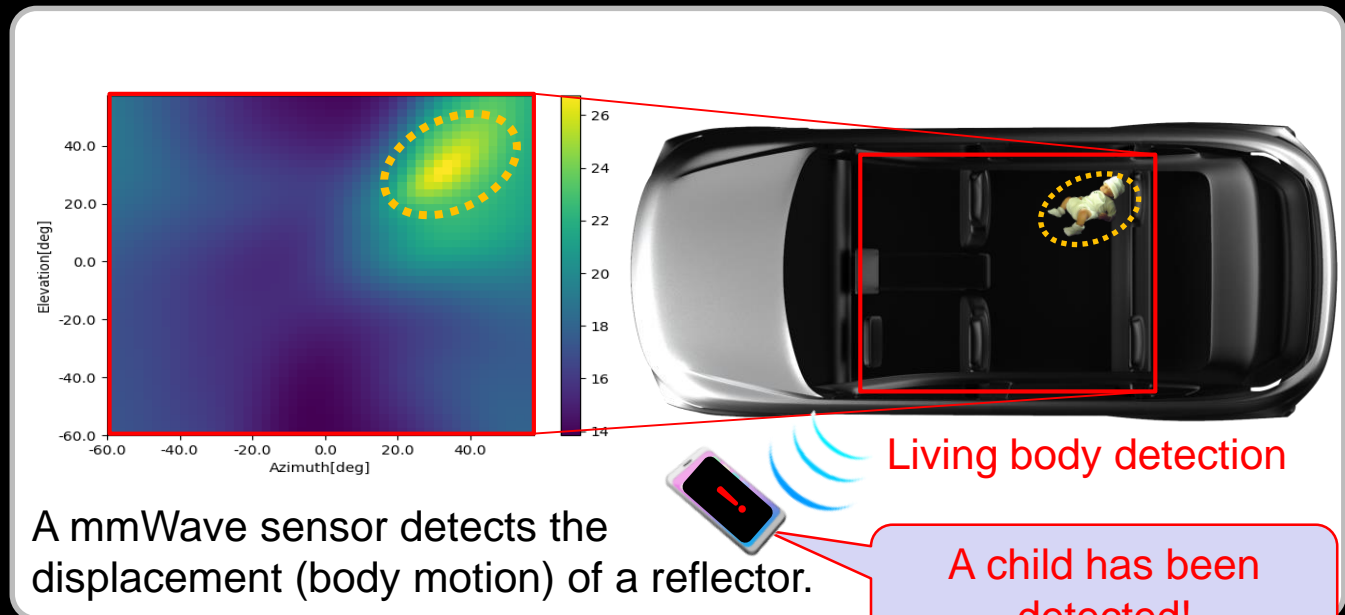
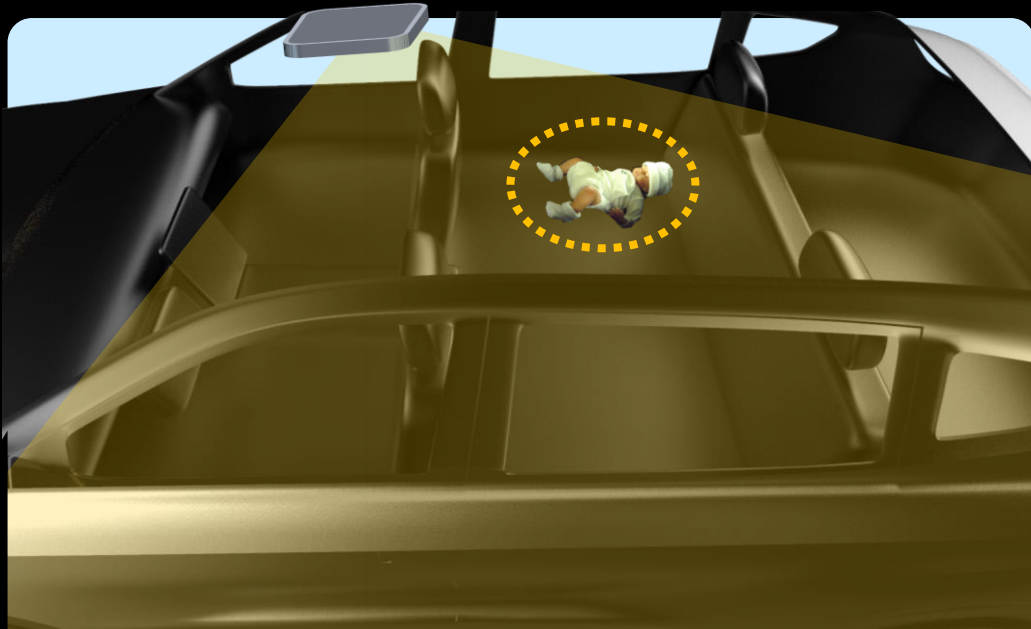
Contribute to CPD in anticipation of the Euro-NCAP evaluation criteria to be reviewed in 2025

## Outline

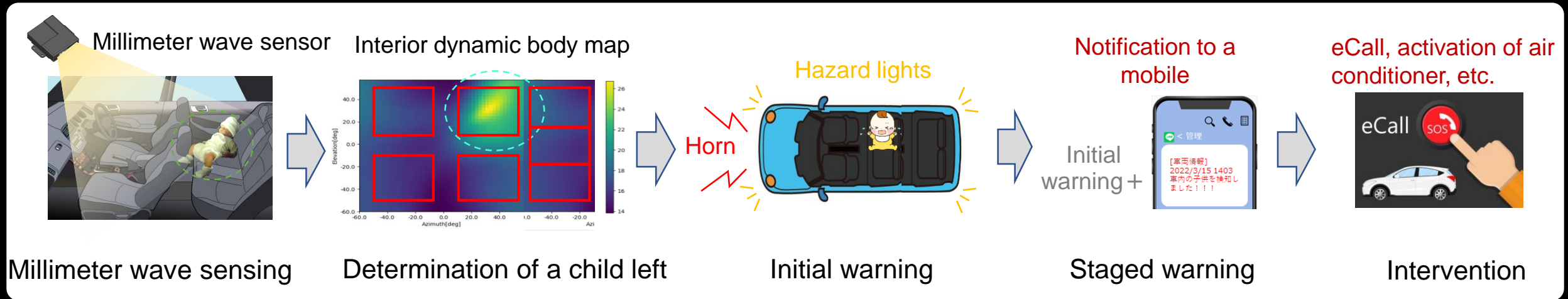
- A mmWave sensor installed overhead detects a living body in the car.
- The device responds to the Euro NCAP CPD requirements:
  - ① Children up to 6 years old including infants in a rearward-facing CRS
  - ② Entire interior space including the floor
  - ③ Children under blanket or sunshade
- A single sensor is available for a two-row seat car. The interior and exterior spaces are effectively segmented to prevent false detection.



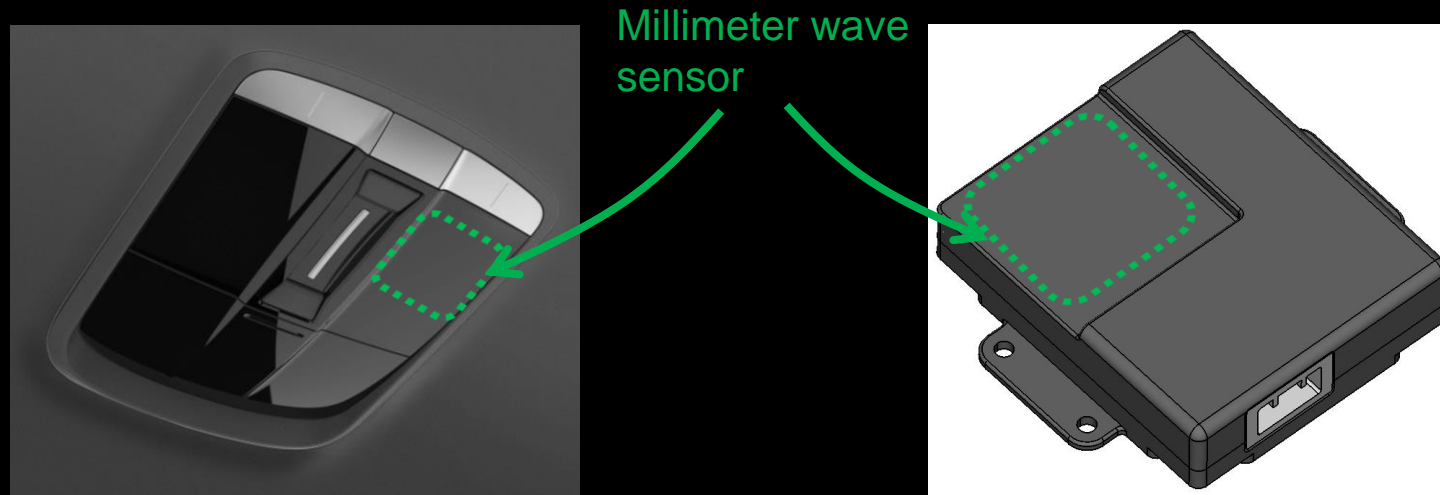
## Millimeter wave sensor



# Outline



## Example of system operation



Product example: Front overhead

Product example: Stand-alone module



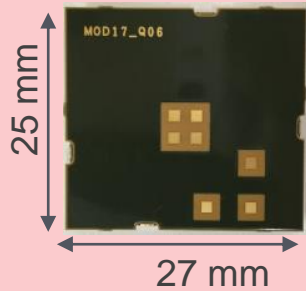
# Technology

- The wide-angle and high-angle resolution antenna module distinguishes between the interior and exterior of a two-row seat car with a single sensor.
- The lightweight algorithm accurately locates a living body.



## 60 GHz Radar module

Appearance

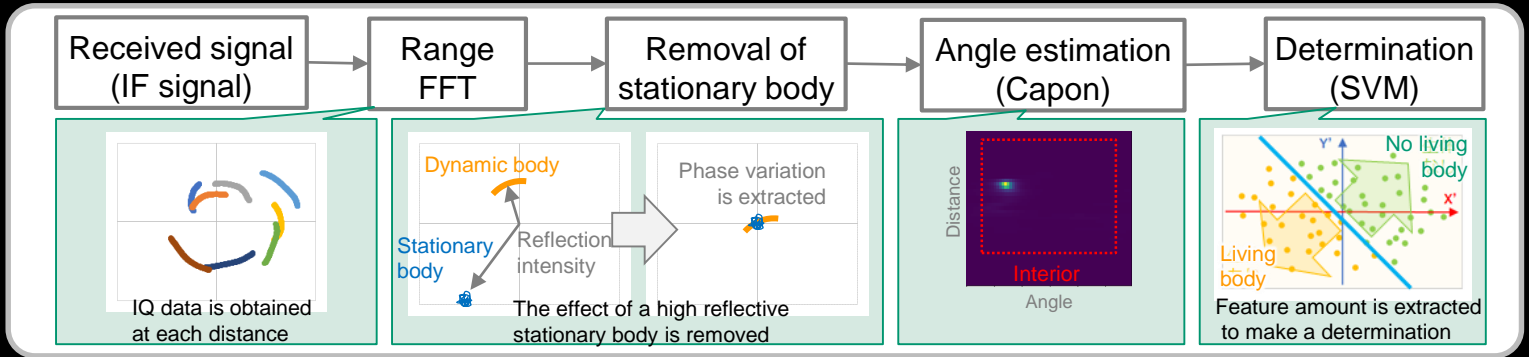


Antennas: 3Tx × 4Rx

Features

- Method: FMCW
- Communication: UART/CAN interface
- Operating temperature: -40 °C to +85 °C
- Consumption current: 350 mA (Avg.)  
1.0 A (Peak)
- Detection angle (of a male adult)  
: ±70 deg.

Antenna, CPU and DSP built-in module



### High precision lightweight algorithm

**A child under the first row seat**  
Dynamic body map  
A child inside

**A child under the second row seat**  
Dynamic body map  
An adult outside  
A child inside

**A child in a rearward-facing CRS in a second row seat**  
Dynamic body map  
A child inside

Millimeter wave sensor

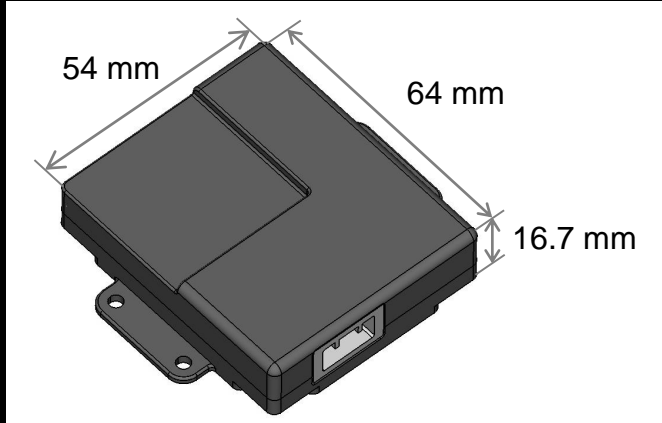
Child's breathing can be detected in and under any of the seats.

### Results of child detection in a two-row seat car

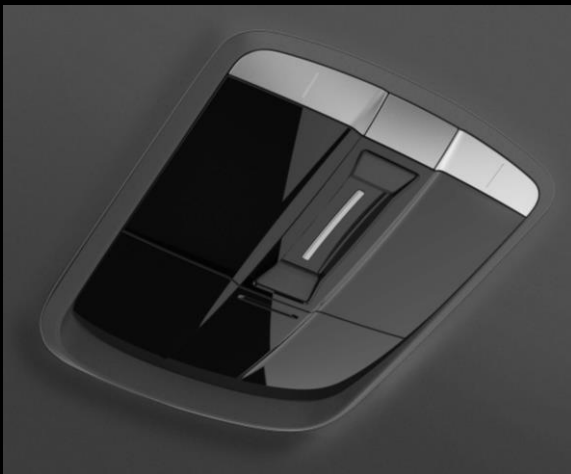


## Specifications

- Stand-alone module



- Built in front overhead



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Power supply voltage

12 V

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Operating temperature range

-40 to +85 °C

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Consumption current

Avg. 350 mA, Peak 1.0 A

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Interface

CAN FD (consultation available)

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Applicable vehicle types

Small to large (two-row seat cars)

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## Future use

- Privacy-conscious watch-over systems ⇒ Detection of falling or other problems with a person watched over



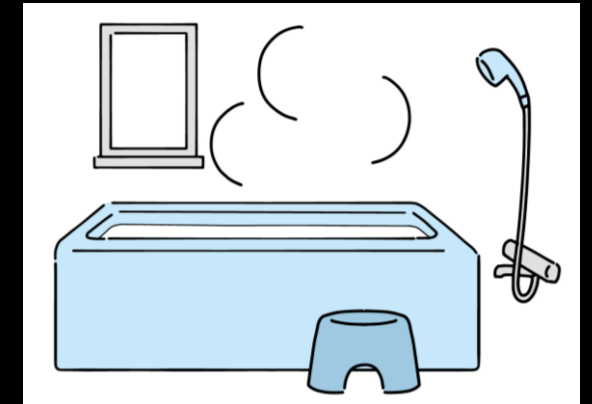
Nursing homes



Hospitals



Living rooms



Bathrooms

- Contactless vital signs monitoring ⇒ Healthcare and detection of sleep apnea and other health problems

