TECH OFFER

Precision Contactless Heart Rate and Respiratory Rate Monitoring System

KEY INFORMATION

TECHNOLOGY CATEGORY:
Infocomm - Healthcare ICT
Infocomm - Artificial Intelligence
Infocomm - Wireless Technology

TECHNOLOGY READINESS LEVEL (TRL): **TRL8**
COUNTRY: **JAPAN**
ID NUMBER: **TO175200**

OVERVIEW

Radar sensor technology, particularly at the millimeter-wave (mmWave) range, offers innovative ways to monitor human health by leveraging electromagnetic waves to gather vital signs non-invasively. This non-contact approach is highly effective for measuring heart rate and respiratory rate, enhancing comfort for users by eliminating the need for physical sensors. This mmWave radar detects small body movements, such as chest expansion and contractions due to breathing, as well as micro-movements from heartbeats.

One of the key advantages of this technology is its ability to penetrate clothing and bedding, making it ideal for continuous monitoring in sleep studies, elderly care, and other medical applications. It also functions reliably regardless of lighting conditions or ambient noise, unlike optical or acoustic sensors.

This radar technology allows for immediate data collection, enabling quick responses in emergencies and optimizing overall

performance.

TECHNOLOGY FEATURES & SPECIFICATIONS

Millimeter-Wave Radar (24GHz): This technology utilizes 24GHz millimeter-wave radar for continuous monitoring of heart rate (HR) and respiratory rate (RR), providing real-time and historical data through Cloud-based storage for easy access and analysis.

Measurement Distance: The device operates effectively at a measurement distance of 1.7 ± 0.2 meters between the radar's surface and the human body.

Heart Rate (HR) & Respiratory Rate (RR) Range: HR measurement range: 40 to 120 beats per minute (bpm) and RR measurement range: 5 to 50 breaths per minute (bpm)

Modulation Techniques: DSSS (Direct Sequence Spread Spectrum): Compliant with IEEE802.11b standards, used to reduce interference and improve signal reliability in wireless communications. OFDM (Orthogonal Frequency Division Multiplexing): Compliant with IEEE802.11g standards to ensures high-speed data transmission with the Wi-Fi systems.

Compliance: The system meets Singapore's IMDA compliance standards.

Connectivity & Accessibility: The system is Wi-Fi enabled, allowing data to be accessed through an app installed on mobile devices and tablets. The app provides real-time readings, along with pop-up notifications and alerts for any abnormal conditions. Data can also be viewed and analysed on PCs or laptops.

Dimensions & Power Supply: The radar device is compact, measuring 130mm × 90mm × 39mm (H × W × D), and is designed for low power consumption. It is powered by a USB-C adapter.

POTENTIAL APPLICATIONS

Monitoring Heart Rate and Respiratory Rate:

- Stress and fatigue measurement
- Provide insights into sleep quality
- Health monitoring of soldiers at field medical posts to assess their readiness and overall wellness.
- Implementation in office environments to monitor employee health and wellness, fostering a healthier and more productive workplace.
- Sports Performance Optimization

The technology owner is seeking collaboration with companies that have the expertise to leverage HR and RR data collected by the monitoring system for advanced assessments in the areas mentioned above. Additionally, they are open to exploring other innovative applications where HR and RR monitoring can provide significant value, extending beyond the outlined use cases to unlock new possibilities in health, wellness, and performance optimization.

UNIQUE VALUE PROPOSITION

- Contactless heart rate and respiratory rate monitoring, without the need for physical sensors or wearable devices,

enhances comfort and improves overall quality of life.

- Ability to penetrate clothing and blanket.
- Provides real-time monitoring with immediate alerts, ensuring timely responses to critical conditions.
- Readings are easily accessible on mobile devices and tablets.
- Seamless integration with cloud platforms enables effortless data access, real-time remote analysis, and secure data sharing.
- The system enhances productivity of medical professionals/ caregivers, by reducing the patrol frequency of non-critical patients/ residents monitoring rounds.