Press releases

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Keio Research Institute at SFC
DENSO WAVE INCORPORATED
RAMXEED LIMITED
Panasonic Holdings Corporation

New UHF band RFID Standard "ISO/IEC 18000-65" for Wireless Sensing Using Battery-free Sensor Tags Has Been Approved and Published

A new international standard proposed by Japan was led primarily by Keio University and DENSO WAVE INCORPORATED, RAMXEED LIMITED, Panasonic Holdings, — "Wireless communication parameters enabling sensor data streaming based on ISO/IEC 18000-63"—has been approved by ISO/IEC and published in February 2026 as *ISO/IEC 18000-65*. Corporation (hereafter, "the four parties").

The four parties are pursuing technical development under a competitive research funding scheme of Ministry of Internal Affairs and Communications *"R&D on Efficient Frequency Utilization Technologies for Advanced Ambient IoT Systems."* In parallel, they will plan and conduct various proof-of-concept demonstrations aimed at industrial deployment of the systems based on this standard, in collaboration with member companies of *Ambient IoT Communication Research Consortium* in Keio Research Institute at SFC.

Background and Development

Battery-free wireless sensor systems—including actuation such as contact control—have been attracting significant interests in industrial machinery and infrastructure inspection and maintenance. Traditionally, inspection of infrastructure in high or steep locations depended on visual checks, requiring costly scaffolding or special equipment. Using objective data from sensors is an effective way to address the shortage of maintenance technicians. Moreover, because failures of infrastructure or machinery directly cause downtime, expectations for predictive maintenance are increasing.

RFID systems and wireless power transfer in the 920 MHz band have been used to implement battery-free wireless sensor systems, but it has not been possible to continuously and simultaneously acquire time- series data such as vibration, strain, or temperature. This new international standard leverages ISO/IEC 18000-63, widely used in 920 MHz RFID, and defines

frequency-channel assignment to each of the tags, procedures for starting and stopping continuous data acquisition, and a frame data structure in addition to existing one-shot sensor data acquisition. Through innovations in the wireless communication protocol, a wide variety of commercial off-the-shelf (COTS) sensors and ADCs can now be integrated into battery-free wireless communication systems.

By using this international standard, devices and sensor terminals from different manufacturers become interoperable, facilitating development of diverse battery-free wireless sensor systems, avoiding vendor lock-in and reducing system procurement costs.

This standardization effort was proposed in May 2023 to ISO/IEC SC31 WG4 as a New Work Item originating from Japan. In February 2024, Prof. Jin Mitsugi of Keio University (Faculty of Environment and Information Studies) was approved as the project leader. After the Final Draft International Standard (FDIS) vote beginning in October 2025, the standard was finally approved in February 2026.

This work includes the results of the research and development for expanding radio resources (JPJ000254) of the Ministry of Internal Affairs and Communications.

Technical Overview

In conventional RFID, multiple wireless tags transmit their data to the reader using time-division access. In this new standard, each wireless terminal is assigned its own frequency channel, enabling simultaneous and continuous data transmission. RFID uses backscatter communication—reflecting radio waves—to achieve extremely low-power wireless communication (approximately 10 μW, about 1/1000 that of BLE). However, until now, no international standard for backscatter communication existed that assigns individual frequency channels to each terminal and enables configuration and control of various sensors.

【Related resources】

- Press Release, Keio Research Institute at SFC
  https://www.kri.sfc.keio.ac.jp/ja/news/sfc_20250626/
- Press Release, RAMXEED Corporation
  https://www.ramxeed.com/jp/news-and-updates/4537/
- Ambient IoT communication research consortium, Keio Research Institute at SFC
  https://amiot.sfc.keio.ac.jp/

※This press release has been sent to the social affairs desks of newspapers.

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