

# 'Authentication Outlet': Electricity use can be managed, consumed on a per-user and per-device basis

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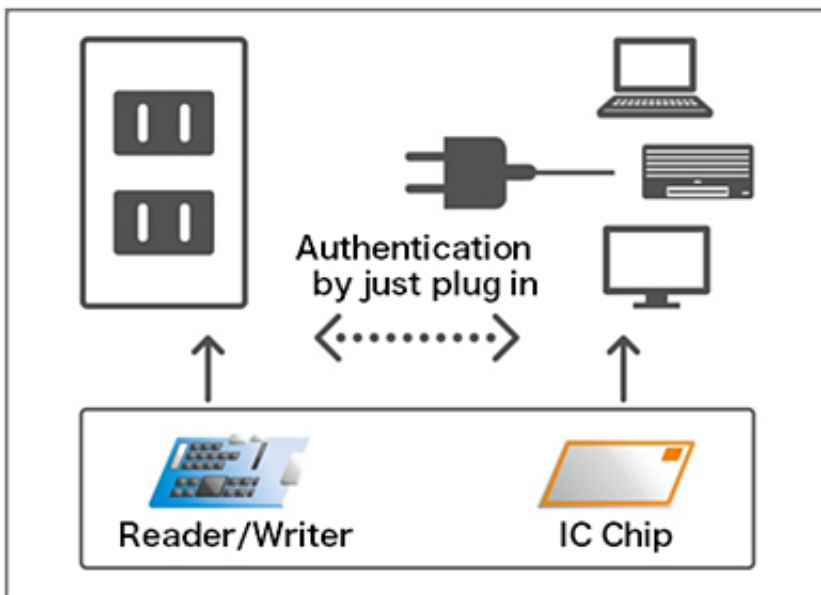


Image of “Authentication Outlet”

In recent years, the situation surrounding the supply of electricity and energy has changed significantly, and this has raised social concern over the impact of such supply on the global environment and our lives.

On the other hand, discussions on the implementation of HEMS (Home Energy Management System)/BEMS (Building and Energy Management System) in the majority of the currently proposed smart grid initiatives

have been based on the perspective of electricity suppliers and operators. From the perspective of users, the core functions of these management systems include the ability to check electricity consumption and monitor the operating conditions of electrical devices. These functions have been developed with the intent to further direct users' attention to energy conservation.

Given these developments, Sony has developed an “Authentication Outlet” that enables users to actively manage and control their power consumption. This new technology focuses on “electrical outlets” as the infrastructure through which electricity is inevitably consumed. More specifically, two types of outlets have been developed: the “Authentication Outlet: FeliCa Type” which uses the contactless IC card technology “NFC/FeliCa” to authenticate electrical devices and the “Authentication Outlet: RFID Over Power Line type” that adopts Sony's new “RFID Over Power Line” technology to authenticate electrical devices via a power supply cable.

Based on this technological development, Sony is working to implement its technology in the necessary equipment and systems to provide users with the ability to consume electricity in a way that best suits their individual lifestyles.

Additionally, Sony plans to create new services that provide value beyond energy conservation by partnering with other manufacturers that share its vision to facilitate the trial and verification of its various services, and formulate technology and service specifications regarding these products and services.

Once these “Authentication Outlets” are widely implemented, users will be able to authenticate the owners of electrical devices (e.g. home electric appliances, electrical vehicles), manage and consume electricity on a per-device basis in addition to authorizing their use, keep records of

past electricity usage, and finally have the ability to be charged and then process payments for their electricity consumption by combining the aforementioned features with electronic money payments.

Sony will continue to further develop this technology, thereby helping to create new relationships between people and their electricity usage and devices. By commercializing and promoting the adoption of this technology, Sony hopes to contribute to society by enabling enhanced energy conservation and the company will continue its mission to create new value through the development of its electrical devices that support a more intelligent and efficient way of life.

## **About the “Authentication Outlet”**

Sony has developed two types of “Authentication Outlets” by combining an “electrical outlet” unit that works as an interface for electricity consumption with an “authentication feature” based on the proven contactless IC card technology commonly used as a train fare card or an electronic money platform.

The “Authentication Outlet” is equipped with a contactless IC chip in the plug of the electrical device, while the electrical outlet is embedded with a contactless IC card reader/writer, controller or communication interface. When an electrical device is plugged into an outlet, the “Authentication Outlet” identifies a specific user or electrical device for authentication and matches it with each instance of electricity consumption. The adoption of the cryptographic communication technology used in FeliCa enables the outlet to quickly and correctly authenticate a device, while also preventing identity theft.

This technology also makes possible the building of a new type of power control system where users are provided with the ability to manage the electricity consumption of individual devices including the ability to

keep track of the electricity usage of individual users (amount consumed and consumption history).

The collection of such usage data may also enable the offering of new types of services in the future.

The “Authentication Outlet: FeliCa type” achieves the above functionalities by incorporating an antenna-connected IC chip into the plug of an electrical device and an antenna-connected reader/writer or controller into an electrical outlet.

On the other hand, the “Authentication Outlet: RFID Over Power Line type” aims to expand the functionality of the outlet's applications by combining Sony's newly developed “RFID Over Power Line” technology with its conventional contactless IC card technology.

## About the “RFID Over Power Line” technology

This technology enables mutual authentication between an electrical device and a power supply by sending authentication information down the power line.

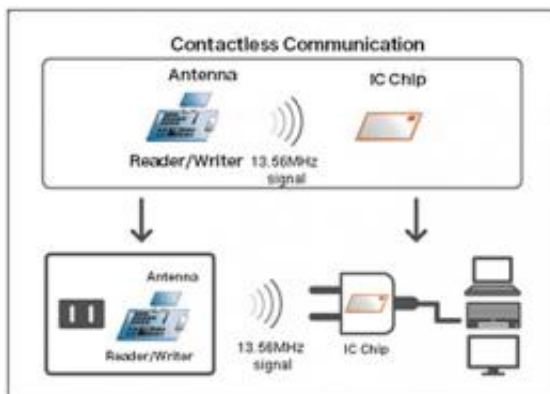


Figure 1: “Authentication Outlet: FeliCa type” Figure 2: “Authentication Outlet:

## RFID Over Power Line type”

On the other hand, the contactless IC card technology establishes wireless communication between an IC chip and a reader/writer via an antenna, while the new “RFID Over Power Line” technology does so via physical power line cables.

More specifically, when the input-output terminal of a reader/writer built into a power supply (e.g. an electrical outlet) is connected to a power line, the read signal is superimposed on the power line.

In this case, similar to conventional contactless IC card technology, an electrical device, which would be the counterpart to an IC card, establishes passive communication without requiring a power supply. Accordingly, unlike the conventional PLC (Power Line Communication), a plugged-in device can be identified and authenticated simply by being plugged into an electrical outlet, regardless of whether power is actually supplied to the device or not.

### **Major features:**

- Authentication can be performed even when power is not supplied to a IC chip-equipped device

This provides users with the ability to to either allow or disallow the supply of power prior to actual usage

- Data communication can be authenticated without the use of an antenna

Authentication can be performed even in an environment where a wireless system cannot be used as the externally leaked signal is weaker

than the conventional contactless IC card reader/writer.

- Data can be transmitted between a reader/writer and an IC chip through [power line](#) cables with lengths of up to dozens of meters

Communication can be established even when an extension cord is used to connect an electrical device to an electrical outlet.

## **Examples of “Authentication Outlet” Applications:**

### **1. Establishment of safety and security**

This electrical outlet ensures safety as it authenticates a device and supplies 100V of power only when the authenticated device is used, avoiding electrification even when an exogenous material is inserted.

Accordingly, this outlet is not only suitable for general residential houses, but also play areas for children residing in condominium units and day-care centers. It would be also beneficial in countries where high-voltage power supplies are used, such as 220V in China.

### **2. New electricity service 1**

This outlet not only enables users to visualize their power consumption, but also enables users to continuously monitor the usage status and degradation level of their devices through analysis of the electricity usage data accumulated and stored in data storage devices installed in a house or building, or stored online via a cloud-based service. Such capabilities could for example support a new service whereby a user's electricity usage behavior is analyzed in order to propose the most suitable electrical device and related usage methods based on the user's electricity usage data.

### **3. New electricity service 2**

In an instance where electricity demand becomes too strained in a tight electricity supply situation, this outlet can be used to manage the shutdown of non-critical devices while the supply of power to critical medical equipment and appliances such as refrigerators is maintained to avoid an electricity outage for an entire house or building.

### **4. New electricity service 3**

The demand for the availability of electrical outlets in public places had increased as smartphones and tablet devices have become more popular.

If a simple charging system that could identify and authenticate a user or device were established, electrical outlets that enable users to use electricity whenever, wherever and as much as they want, may become popular. In the future, the Authentication Outlet could be made available in cafes, restaurants, train station waiting rooms and airport lounges etc.

### **5. Other possible applications**

·“Electricity theft” could be avoided if electrical outlets located in the common area of an apartment building were replaced by the Authentication Outlet, as this outlet would only supply power to authenticated devices.

·Even in a factory where production lines are frequently rearranged, operators could keep track of the usage location and status of jigs and production facilities simply by plugging them into the Authentication Outlet.

·The Authentication Outlet would also allow providers of a battery rental

service or a distributed power supply service to identify and manage customers and the batteries they use in a simple and fast forward manner, in emerging countries where [electricity](#) infrastructure is still not firmly established.

A prototype of this “Authentication Outlet” system will be demonstrated at Sony's booth at “NFC&Smart WORLD 2012” which will be held at Tokyo Big Sight in Japan from March 6-9, 2012.

Source: Sony Corporation

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