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5G Advanced to Support Self-Powered Sensors

Passive IoT tech promises to improve coverage tenfold compared with RFID.

Huawei and China Mobile have conducted field tests of a passive Internet of Things (IoT) solution, which enables large numbers of sensors to transmit data without the need for batteries. Conducted in Chengdu, Sichuan province, China, the tests used a prototype 5G-Advanced network.

HUAWEI 中国移动 China Mobile

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CASE STUDY LEAD:
HUAWEI & CMCC (CHINA MOBILE COMMUNICATIONS GROUP CO., LTD.)

CHALLENGE

Traditional sensors require batteries, which are costly to maintain and replace, as well as being detrimental for the environment. Factories, mines, ports, and power plants want to connect large numbers of sensors to track the location and performance of their assets, but are looking for a solution that costs less than 10 U.S. cents and involves power consumption of just 100 uW per device, according to Huawei. While RFID tags are widely used to track inventory today, this wireless technology suffers from a small coverage area and strong self-interference. Huawei says employing RFID solutions is also time-consuming, labour-intensive and inefficient.

SOLUTION

In the second quarter of 2022, Huawei and China Mobile conducted a field test of a passive IoT technology, which obtains energy from the surrounding environment. That means sensors can transmit data without batteries. The technology is designed to be deployed with 5G- Advanced networks, equipped with inter-site resource coordination and joint scheduling optimisation. As well as providing continuous regional coverage, 5G-Advanced networks can employ a simplified air interface to serve ultra-low-cost battery-free terminals.

IMPACT & STATISTICS

Huawei say the passive IoT solution it tested improved coverage tenfold compared with RFID. The test, which involved the collection of temperature and humidity data, found that a passive IoT base station supports a maximum reading distance of 235 metres.

WIDER IMPLICATIONS

Passive IoT technologies could enable the cellular IoT to expand into new markets, potentially serving 100 billion connections, according to Huawei. By reducing costs and the need for labour, the solution could make sensor networks far more economically viable, while dramatically increasing the efficiency of warehouse stocktaking and other industrial processes. Such a solution could, for example, be used to count 100,000 stock items in a warehouse with an accuracy is 99.99%.

In the automobile industry, a passive IoT network could track materials across the whole manufacturing process from the workshop to the warehouse, the repacking and sorting area, and the production line. Such tracking could be conducted every hour automatically. Similarly, in the animal husbandry sector, the technology could be used for remote automatic stocktaking and real-time temperature and movement monitoring of livestock. It would allow for battery-free sensors to be small and light enough to be worn comfortably by animals.

STAKEHOLDERS

Huawei and CMCC (China Mobile Communications Group Co., Ltd.)

SOURCES & FURTHER INFORMATION

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