Keysight Technologies

Testing Next Generation AC Controller with BLE Radio Technology

Application Brief

KEYSIGHT TECHNOLOGIES

Testing Next Generation AC Controller with BLE Radio Technology - Success Story

The Company

A large, multi-national manufacturing company, which we will call XYZ, makes several appliances and industrial products. In this case study, XYZ had the goal of designing an improved electronic air conditioner (AC) controller for use in their AC units that are typically installed in hotels and motels.

The Problem

Previous and current models of XYZ's AC controllers supported near-field communications (NFC). Although the NFC solution worked well, XYZ received clear feedback from maintenance engineers and technicians that the NFC solution required them to touch their smart phones to the controller on the AC unit every time they entered a room to test or configure an AC unit. In a large hotel, this wastes a lot of time, and it often required maintenance personnel to walk across hotel rooms, where floor paths may be blocked by luggage, rollaway beds, room service trays, small children, and so on.

Depending on the room layout, the maintenance person may also have to walk by bathrooms, changing areas, or beds, possibly leading to embarrassment for themselves, the hotel guests, or both. If the hotel's cleaning staff happened to be in the room, the AC technician and cleaning staff would sometimes get in each other's way. Such inconveniences to both guests and employees did not reflect well on XYZ's otherwise well-regarded products, leading to undesired complaints from customers.

The Desired Fix

To allow the maintenance personnel to test and configure the AC unit from the much more convenient hotel room doorway, XYZ decided to develop their next generation AC controller with *Bluetooth*® Low Energy (BLE) radio technology. The BLE technology would have much greater RF range than the previous NFC technology, while still having long battery life.

The Challenges

While BLE is a proven technology, existing BLE test solutions for over the air testing (OTA) proved to be too expensive and too difficult for XYZ to implement in manufacturing lines. Furthermore, the existing BLE test solution required a Host Controller Interface (HCI) to physically connect the AC controller to the tester via an SPI or UART connection. A chipset specific driver was also required to put the device into a known test mode for non-signaling tests. This increased text complexity and test time, and it introduced unnecessarily variability and unpredictable errors and delays into the production environment. Considering the product volumes that XYZ was producing, such costly variations and delays were unacceptable. Therefore, XYZ made it a goal to test their nearly final product without HCI.

The Solution

The customer ordered and implemented a BLE solution from Keysight Technologies that both reduced their capital equipment costs and eliminated much of the HCI that the previous solution required. Because this solution automatically detects and connects with BLE devices, the tests are both less expensive and much more automated than they had been.

According to XYZ engineers, the key factors that made this solution successful were:

- The simplicity of the complete solution, and its ease of use
- The cost-effectiveness of a single test solution that covered all essential tests for product quality verification
- The solution's upgradeability to test new wireless formats in the future

The Results

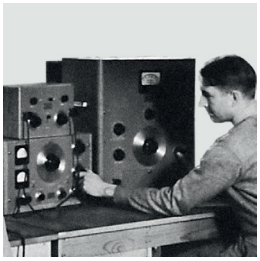
According to XYZ, the solution went beyond their expectation, so its use is also well beyond the original plan. Among the key results:

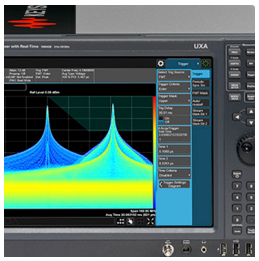
- The solution is currently working very well for product design and verification tests, including measuring transmitter power, and performing receiver packet error rate (PER) and receiver sensitivity test.
- One of XYZ's overseas subsidiaries is considering using the BLE solution to test their designs.
- Another group within XYZ is considering an IEEE 802.11 version of the solution. They will use it for both 802.11 transmitter test and 802.11 receiver test.

For more information, go to www.keysight.com/find/x8711a.

Evolving Since 1939

Our unique combination of hardware, software, services, and people can help you reach your next breakthrough. We are unlocking the future of technology.
From Hewlett-Packard to Agilent to Keysight.





myKeysight

myKeysight
www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

http://www.keysight.com/find/emt_product_registration
Register your products to get up-to-date product information and find warranty information.

KEYSIGHT SERVICES
Accelerate Technology Adoption.
Lower costs.

Keysight Services
www.keysight.com/find/service
Keysight Services can help from acquisition to renewal across your instrument's lifecycle. Our comprehensive service offerings—one-stop calibration, repair, asset management, technology refresh, consulting, training and more—helps you improve product quality and lower costs.

Keysight Channel Partners
www.keysight.com/find/channelpartners
Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/x8711a

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 11 2626
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353 Opt. 1 (DE) Opt. 2 (FR) Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:
www.keysight.com/find/contactus
(BP-9-7-17)

DEKRA Certified
ISO9001 Quality Management System

www.keysight.com/go/quality
Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2015
Quality Management System

KEYSIGHT TECHNOLOGIES

Published in USA, April 11, 2018
5992-2903EN
www.keysight.com