# IOT8700 Series Wireless Test Solution

Build confidence in IoT, 4x faster


## What Are We Seeing in Today's IoT World?

Driven by the need for convenience and portability in Internet of Things (IoT) devices, device manufacturers now face new challenges in testing the increasingly smaller devices when wired connections are not possible. IoT technologies are widely used in many mission-critical applications such the smart city, industrial automation, and digital health. IoT devices cannot afford to fail, so over-the-air measurements are critical to thoroughly test IoT devices at every stage of the design cycle.

## Quickly Deploy Cost-Effective OTA Signaling Test

Your customers need confidence in their high-value or mission critical IoT devices. Delivering greater peace of mind depends on the right balance of test time versus test coverage.

For WLAN and *Bluetooth*® Low Energy (BLE) devices, Keysight's IOT8700 Series is a complete solution for wireless test: hardware, software, and RF shielded enclosure. In your production process, our solutions simplify over-the-air (OTA) signaling test of devices running their final firmware. Get true parallel testing from Keysight and build confidence up to four times faster.

To optimize your investment, this cost-effective solution includes essential measurement functionality, signaling test, and enhanced capabilities such as deep radio control and UUID read/write. And to simplify and accelerate the test-development process, consider using Keysight PathWave-based automation software as the foundation of your solution.

KEYSIGHT

## Ensure reliable performance

IoT technologies are becoming more widely used in high value or mission critical applications such as digital health, industrial automation smart cities, and high value consumer electronics devices. To ensure dependable operation in real-world conditions, OTA signaling measurements help you assess, validate, and prove device performance at every stage of the product cycle.

# Cover Manufacturing Tests and More

The IOT8700 Series is purpose-built for manufacturing test of IoT devices. These time-saving solutions help test-development teams stay on track with new-product introduction schedules, and the unique combination of size, speed, and functionality will help test-development managers reduce the overall cost of tests.

For R&D validation tests, the IOT8700 Series makes it easy to get fast insights into device performance and establishes crucial test parameters and margins.

For final assembly test, the deep radio control and signaling test capability makes the IOT8700 Series an excellent companion device.

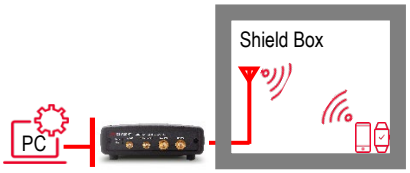
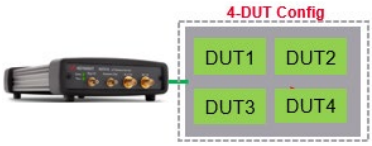
| Design Validation | Manufacturing | Final Assembly Test |
|---|---|---|
|  |  |  |
| Perform over-the-air signaling test of end-device, including the antenna.<br>Characterize device performance under various actual operation modes.<br>Save time and simplify test development with optional XA8722A IoT Soft Front Panel Pro or XA8723A IoT Signaling Measurement Suite. | Perform parallel testing of up to four DUTs to reduce cost of test.<br>Maximize throughput and accelerate time-to-market.<br>Assure end device quality and reduce the risk of manufacturing defects or field failures.<br>Increase efficiency and reduce test development time with XA8723A IoT Signaling Measurement Suite. | Ideal companion device for final assembly test.<br>Cover the commonly used radio formats at an affordable cost.<br>Get accurate and traceable measurement results.<br>Easy integration to existing test system through SCPI. |

**Figure 1.** Use of the IOT8700 Series in different applications


**Figure 2.** Various test configurations of the IOT8700 Series

Whether you are characterizing your IoT device over many different scenarios during the design process, filtering manufacturing defects, or testing your IoT device for final assembly test, the Keysight IOT8700 Series IoT wireless test solution gives you the confidence and reliability you need to ensure that your IoT products can withstand the mission critical rigors of the real world.

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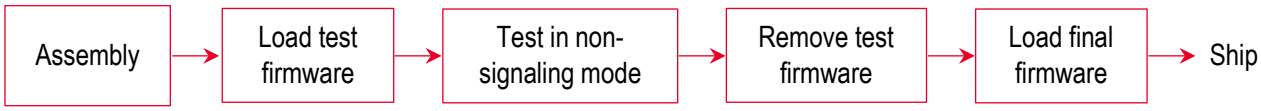
# Features to Optimize Your Manufacturing Test

## Signaling test capability to streamline manufacturing test

The IOT8700 Series enables you to perform signaling tests without the need to develop a chipset specific driver to control or program the device in test mode. Manufacturers can easily execute the transmitter and receiver tests by flashing the current firmware onto the device under test. This helps manufacturers eliminate the process of switching the device under test into test mode for testing and to reflash it with the final firmware once testing is passed. With a streamlined test flow, manufacturers save time and effort on testing as they perform measurements under actual operation mode to ensure device quality.

**Existing Test Flow**




**Streamlined Test Flow with IOT8720A and IOT8740A**

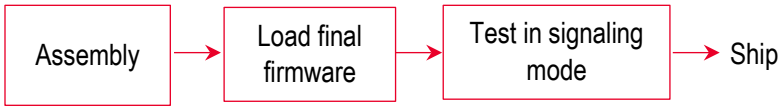



**Figure 3.** Streamlined test flow by testing in signaling mode with IOT8720 and IOT8740A

## Channel-based transmitter power and receiver PER

| | Transmitter Power | Receiver PER |
|---|---|---|
| Channel 37 | -8.98 dBm | 10.37% |
| Channel 38 | -9.10 dBm | 11.29% |
| Channel 39 | -9.45 dBm | 8.71% |

Active Scan mode is optimized for fast manufacturing tests whereby it is possible to complete the transmitter and receiver tests over all three advertising channels within 10 seconds. The Active Scan mode provides measurements for the advertising channels at low, mid, and high frequency channels, ensuring device performance over the entire Bluetooth frequency bands.

For BLE data channel measurements, you can configure the IOT8700 Series to Connected Mode to enable transmitter and receiver measurements for any of the data channels. This is normally used for device characterization or troubleshooting as it takes a longer time to complete the test.

Note:

Channel-based measurements require all three primary channels to be advertising.

Secondary advertising channels are not supported.

# True multidevice parallel test configuration for *Bluetooth*® Low Energy devices

The IOT8740A IoT wireless multidevice test solution is the industry's first solution to enable true parallel testing for both transmitter and receiver tests in signaling mode. It is possible to test up to four devices in parallel with all of them transmitting and receiving concurrently and being placed in the same shielding box. With tight timing alignment between the radio subsystem and RF power detection subsystem in the tester, it is possible to monitor all incoming RF packets using the RF detection subsystem, and correlate each of the packets with the DUT MAC address decoded from the radio subsystem to provide TX and RX measurements for all DUT in parallel. Through this innovative measurement algorithm, manufacturers can now save close to four times the test time.

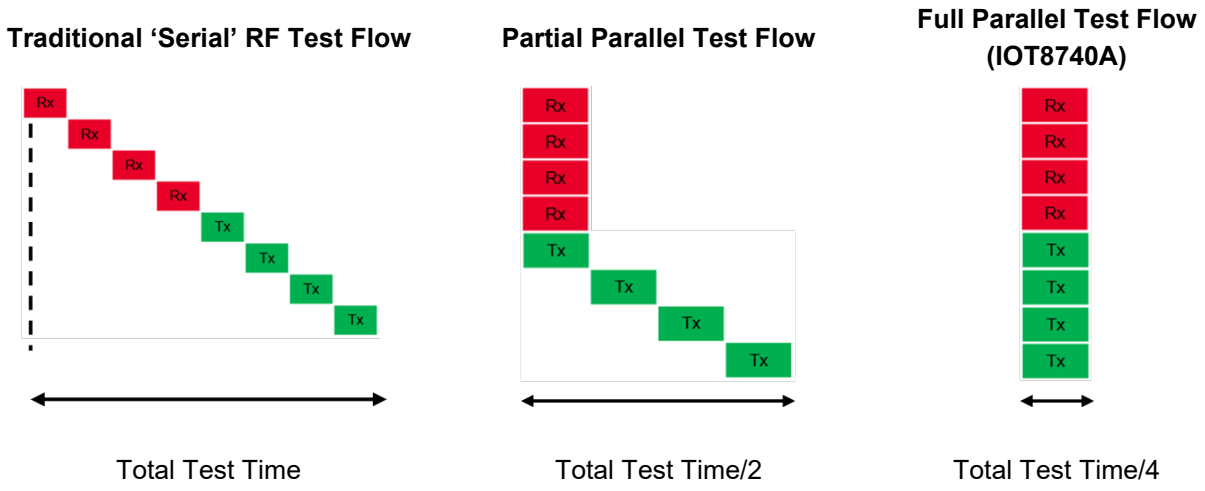



**Figure 4.** Significant improvement in test time is achievable using full parallel test flow

# Built-in pass-fail limit check and result log for manufacturing test

The built-in pass-fail limit check enables faster test time with the ability to catch up with the transmission rate of the DUT. The theoretical tester speed can be estimated as the number of packets multiplied with the advertising interval plus some overhead time to process the data. You can now optimize production throughput and manufacturing test time through parallel testing and faster test speed. Sample test plans are provided in the XA8723A IoT signaling measurement suite for single and multidevice configurations, along with pass-fail limit check and results logging capability. Manufacturing engineers can save test development and testing time by leveraging and modifying the test plans and test sequence provided.

# Features for Design Validation Tests

## Advertising interval and throughput measurements

Some BLE devices may have variable advertising intervals. The IOT8700 Series allows you to measure the advertising interval during the advertising events (active or passive scanning) and monitor the trend in graph view to get a better understanding of the advertising events. It is also possible to perform a data throughput measurement of the advertising data or the scan response data.

For WLAN devices, the IOT8700 Series performs throughput measurements using iPerf methodology. You can set various WLAN settings and measure the actual achievable throughput, which is the number of bits of real data transmitted per unit of total transmission time, typically expressed in kilobits per second (kbps), from the connections.

## Deep radio control capability

With deep radio control capability, it is possible to utilize the IOT8700 Series as a companion device to control the DUT to transmit and receive in various operation modes, and perform a comprehensive transmitter, receiver, and throughput analysis. This is especially useful for designers or test engineers to fully characterize the device performance under various modulations, bandwidth, and channel settings. Test engineers can use the IOT8700 Series as a signaling unit to perform PER tests at various power levels. Significant savings in setup and testing time is possible since there is no need to develop an individual chipset specific driver.

## Transmitter RF power envelope display capability

The turn-on behaviors of IoT devices may vary. Some IoT devices will not advertise immediately upon turning on while others will advertise at high power levels for a short duration before reducing the transmit power to the minimum to save battery life. There are also devices with variable advertising intervals. The transmitter RF power envelope display capability comes in handy here as it can provide you with a better understanding of the device transmitting behavior that you can use to improve measurement accuracy or repeatability and troubleshoot any connection issues with the instrument.

# Connection, and pairing and bonding check

Bonding is the exchange of long-term keys after pairing occurs and storing those keys for later use. It is the creation of permanent security between devices. Pairing is the mechanism that allows bonding to occur. Bonding will enable the devices to reconnect with each other in subsequent connections without repeating the pairing process.

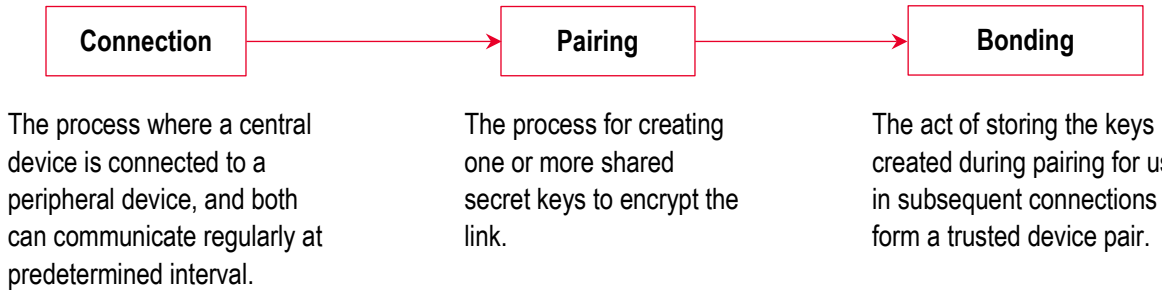



**Figure 5.** BLE connection, pairing and bonding

The IOT8700 Series enables designers to verify the ability of the device to connect, pair and bond, and ensure that these security features are being implemented properly in the device.

# Service discovery and UUID read-write

The UUID (Universally Unique Identifier) identifies a service provided by a Bluetooth device. The IOT8700 Series can perform UUID service discovery to identify all supported UUIDs, handle values, and permissions. If the permission is set as write-able, you can overwrite a specific UUID and its values. This feature is very useful for manufacturers to retrieve certain data from the device (example: battery level) or program specific data to the device (example: manufacturing data, serial number) over-the-air without hardwire connection. This feature only works on BLE devices supporting Connected Mode.

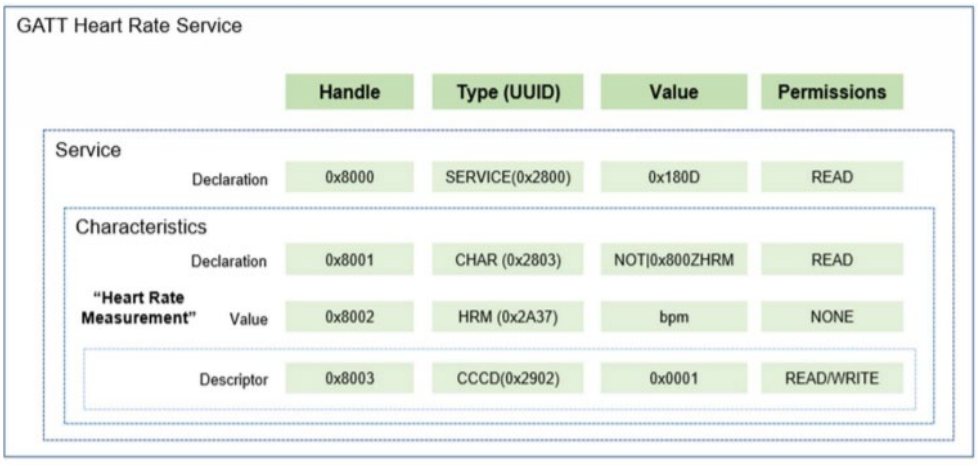



**Figure 6.** GATT profile example of a heart rate service

## Simplify receiver blocking or PER tests

The IOT8700 Series' deep radio control capability allows the tester to remotely control the DUT to transmit and receive in different normal operation modes, such as by frequency channel, modulation bandwidth, or data rate. Instead of painstakingly writing your own DUT control driver or having to return to your customer for it – which they may not have – you can remotely control the tester and the DUT with the PathWave-based software or through SCPI commands. This test automation saves you days or even weeks of driver development work and allows you to perform receiver blocking tests or PER tests through a signaling connection with the DUT.

## Cover commonly used radio formats at affordable cost

The IOT8700 Series offers multi-format signaling test capability so you can perform tests for Bluetooth Low Energy 4.2, 5.0, 5.1, 5.2, and WLAN 802.11 a/b/g/n/ac with just one solution.

## Traceable and accurate measurement results

The IOT8700 Series' output signals and input power measurements are fully calibrated in the factory and referenced to a RF power meter with low measurement uncertainty, with measurements traceable to national metrology institutes.

# Single and Multidevice Configurations

The IOT8700 Series is available in two configurations:

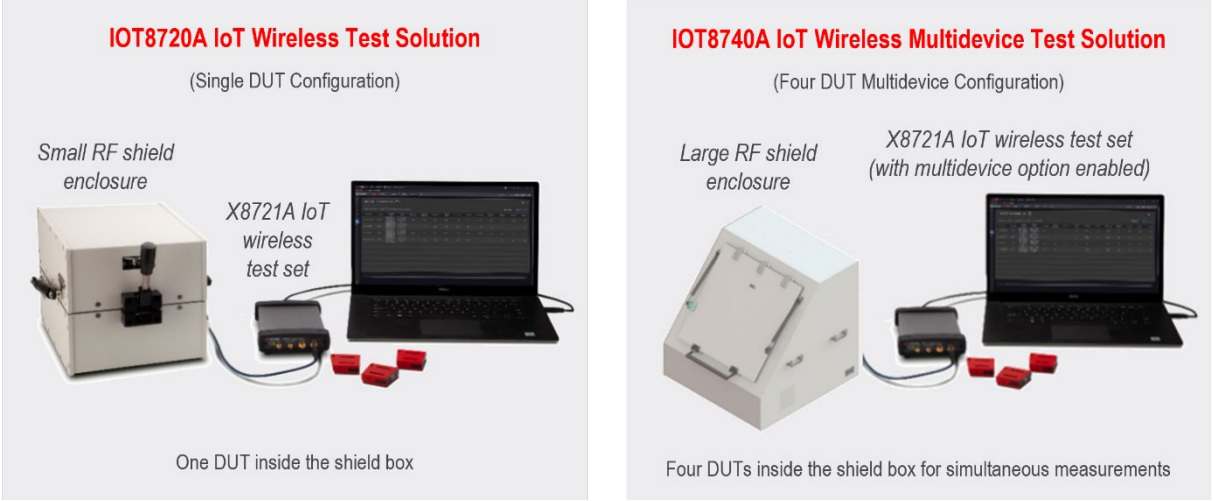



**Figure 7.** Diagrams showing the single vs multidevice configuration

The IOT8720A is suitable for both design validation and production test whereas the IOT8740A is ideal for high volume manufacturing applications.

The IOT8740A is the Industry's first solution to offer interleaved multidevice feature where it concurrently tests multidevice inside a single shield box. Testing is interleaved to maximize the utilization of the tester, thus reducing the overall test time.

# Double Your Production Throughput

**Figure 8.** Multiple configuration setup using two X8721A IoT Wireless Test Set

You can now double your production throughput with an additional Wireless IOT Tester. Compact in size, the testers can be stacked to utilize minimal space. It only requires one PC and a TAP license to run both testers in parallel and is the ideal setup for those looking to obtain a high-volume production rate.

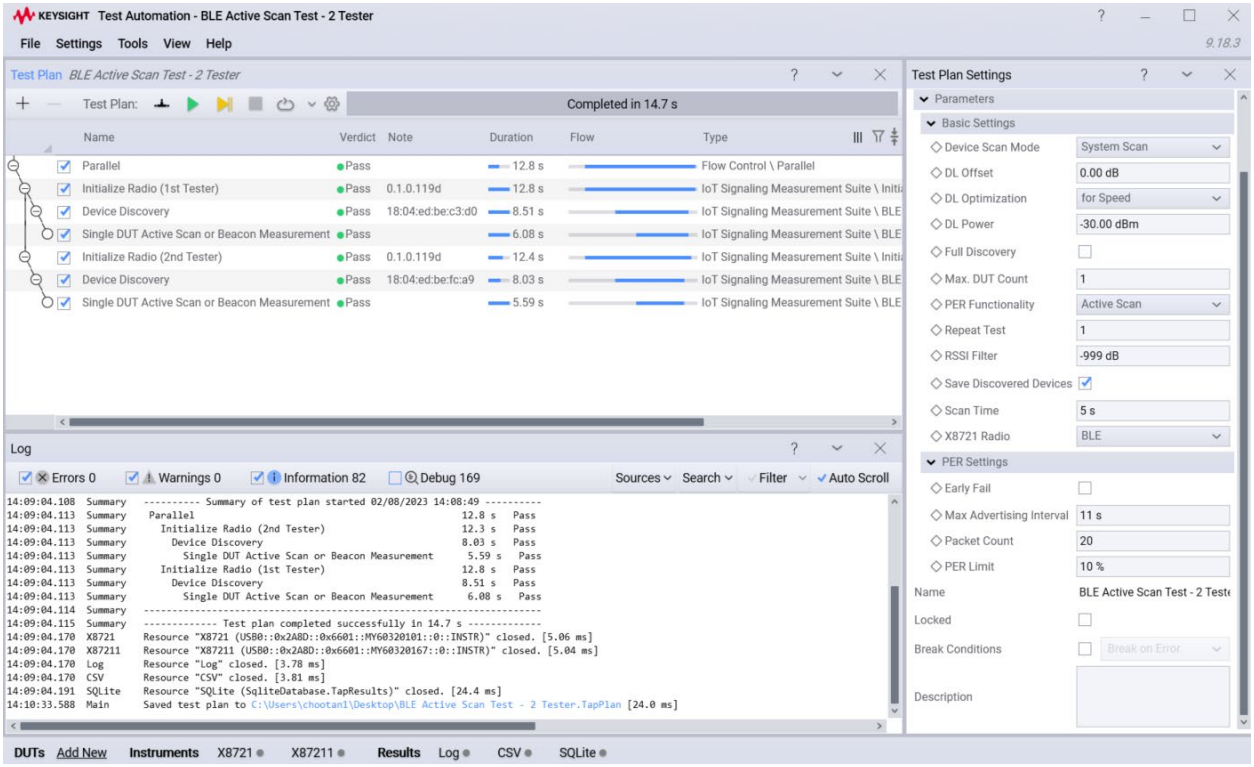



**Figure 9.** Sample TAP test plan for multiple configurations with universal settings

Figure 9 shows BLE active scan measurements using two Keysight wireless IOT tester running in parallel controlled by Keysight Test Automation software. The Keysight Test Automation software is a flexible and customizable platform. You can modify the test plan yourself or request for customization services from Keysight (additional charges required).

# X8721A Hardware Performance

## *Bluetooth* Low Energy

The specifications below are based on full range operating temperature and room temperature, with relative humidity less than 80%, and are referenced to the RFIO port. The specifications on this table are applicable for both the IOT8720A single DUT and IOT8740A Multi-DUT models.

| Radio format[1] | *Bluetooth* Low Energy 4.2, 5.0, 5.1, and 5.2 | |
|---|---|---|
| Frequency range | 2.4 to 2.48 GHz | |
| Frequency accuracy | 50 ppm (nominal) | |
| Operating temperature | 10 °C to 40 °C | 23 °C ± 5 °C |
| Input power measurement (DUT transmit power) | Range: +17 to -50 dBm<br>For IOT8720A:<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec)<br>For IOT8740A:<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec) | Range: +17 to -50 dBm<br>For IOT8720A:<br>Accuracy: ± 0.7 dB (typical)<br>± 1.0 dB (spec)<br>For IOT8740A:<br>Accuracy: ± 1.2 dB (typical)<br>± 1.5 dB (spec) |
| Output power range/downlink power adjustment (receiver sensitivity) | Range: -28 to -100 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec) | Range: -25 to -100 dBm<br>Accuracy: ± 0.7 dB (typical)<br>± 1.0 dB (spec) |
| Frequency accuracy | 50 ppm (nominal) | |
| Output power resolution | 0.25 dB | |
| Maximum input level at RF I/O or Aux I/O | ≤ +27 dBm | |
| Input VSWR at RF I/O or Aux I/O | ≤ 2:1 (nominal) | |
| RF I/O to Aux I/O coupling loss | < 10 dB at 2.48 GHz | |
| Isolation/shielding effectiveness[2] | > 100 dB | |
| Residual packet error rate[3,4] | For IOT8720A: < 1%<br>For IOT8740A: < 6% | |

1. Tester can only support physical layer RF test parameters.
2. Isolation at the Radio with RF I/O and Aux I/O terminated.
3. Tester will not call good packets bad or bad packets good above this level.
4. For IOT8740A Multi-DUT measurements, residual packet error rate will be less than 6% with the following conditions:
   Two DUTs for advertising intervals <40ms or Four DUTs for advertising intervals >40ms.

# *Bluetooth* Low Energy features

The IOT8700 Series can support BLE testing in Active Scan or Connect Mode. The table below shows the supported BLE device roles and test parameters.

| | | | Active Scan<br>Supports Single and 4-DUT Configuration | | | Connected Mode<br>Only Available for Single DUT Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Tester Role** | **Device Role** | **Device Description** | **TX Power** | **Active Scan PER** | **Throughput** | **TX Power** | **Connected Mode PER** | **UUID** | **Throughput** |
| Central | Peripheral | Slave device that can send/receive info | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Central | Beacon | Transmit only device | Yes | Yes | Yes | No | No | No | No |
| None | Observer | Receive only device | No | No | No | No | No | No | No |

## Radio control for *Bluetooth* Low Energy

In Connected Mode, IOT8700 Series is configurable for the following settings:

- PHY: LE 1M, LE 2M, Coded S2, Coded S8
- Channel: Configurable in pairs, from Channel 00-01 to Channel 35-36

# Wireless LAN specifications

The specifications below are based on full range operating temperature and room temperature, with relative humidity less than 80%, and are referenced to the RFIO port. These specifications are applicable to IOT8720A. Note that the IOT8740A does not support WLAN multi-DUT measurements.

| **Radio format**[1] | **802.11 a/b/g/n/ac** | | | |
|---|---|---|---|---|
| Operating temperature | 10 °C to 40 °C | | 23 °C ± 5 °C | |
| Frequency range | 2.4 to 2.48 GHz | 4.8 to 6.0 GHz | 2.4 to 2.48 GHz | 4.8 to 6.0 GHz |
| Frequency accuracy | 50 ppm (nominal) | | | |
| Input power measurement (DUT transmit power) | Range: +17 to -50 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec) | Range: +17 to ≥ -35 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec)<br>Range: -35 to -39 dBm<br>Accuracy: ± 2.0 dB (typical)<br>± 3.0 dB (spec) | Range: +17 to -50 dBm<br>Accuracy: ± 0.7 dB (typical)<br>± 1.0 dB (spec) | Range: +17 to -39 dBm<br>Accuracy: ± 0.7 dB (typical):<br>± 1.0 dB (spec) |

| Radio format[1] | 802.11 a/b/g/n/ac | | | |
|---|---|---|---|---|
| Output power range/Downlink power adjustment (receiver sensitivity) | Range: -28 to ≥ -30 dBm<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec)<br><br>Range: -30 to -60 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec)<br><br>Range: ≤ -60 to ≥ -80 dBm<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec)<br><br>Range: -80 to -90 dBm<br>Accuracy: ± 2.0 dB (typical)<br>± 2.5 dB (spec) | Range: -28 to -60 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec)<br><br>Range: ≤ -60 to ≥ -70 dBm<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec)<br><br>Range: -70 to -90 dBm<br>Accuracy: ± 2.0 dB (typical)<br>± 3.0 dB (spec) | Range: -28 to ≥ -30 dBm<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec)<br><br>Range: -30 to -60 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec)<br><br>Range: ≤ -60 to ≥ -80 dBm<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec)<br><br>Range: -80 to -90 dBm<br>Accuracy: ± 2.0 dB (typical)<br>± 2.5 dB (spec) | Range: -28 to -60 dBm<br>Accuracy: ± 1.0 dB (typical)<br>± 1.5 dB (spec)<br><br>Range: ≤ -60 to ≥ -70 dBm<br>Accuracy: ± 1.5 dB (typical)<br>± 2.0 dB (spec)<br><br>Range: -70 to -90 dBm<br>Accuracy: ± 2.0 dB (typical)<br>± 3.0 dB (spec) |
| Output power resolution | 0.25 dB | | | |
| Maximum input level at RF I/O or Aux I/O | ≤ +27 dBm | | | |
| Input VSWR at RF I/O or Aux I/O | ≤ 2:1 (nominal) | | | |
| RF I/O to Aux I/O coupling loss | < 10 dB at 2.48 GHz<br>< 12 dB at 6 GHz | | | |
| Isolation/ Shielding effectiveness[2] | > 100 dB | | | |
| Residual packet error rate[3] | < 1% | | | |

1. Tester can only support physical layer RF test parameters.
2. Isolation at the Radio with RF I/O and Aux I/O terminated.
3. Tester will not generate any false good or false bad packets above this level. False good packet counts a good packet as a bad packet. False bad packet counts a bad packet as a good packet.

# WLAN features

The IOT8700 Series supports wireless 802.11a/b/g/n/ac specifications. The table shows all supported roles and test parameters.

| Tester Role | Device Role | Single DUT | | |
|---|---|---|---|---|
| | | Device Description | TX Power | PER |
| Access Point | Station | User Equipment | Yes | Yes |
| Station | Access Point | Network Equipment | Yes | Yes |

**Note**:

1. TX power: Measures the power in the transmit burst of the DUT.
2. PER: Measures the packet-error-rate (PER) of the DUT by sending a known request to the device and listening for a response.
3. Throughput: Throughput is measured through iPerf methodology. The DUT must be able to support iPerf2 for this feature to work. The tester will always act as the client to initiate the loopback test with the DUT (as server) receiving and returning the data traffic. The tester will obtain all the required information to calculate the throughput. Throughput testing is supported whether the DUT is AP or Station.

## Radio control for WLAN

- Standard: 802.11 a/b/g/n/ac
- Channel: 2.4 GHz (Ch 1-13) & 5 GHz (Ch 34-64 and 100-165)
- BW: 20, 40, and 80 MHz supported (coupled to corresponding WLAN channel mapping)
- Data Rate: Max data rate up to 292.5 Mbits/s
- Modulation: support up to 64 QAM
- Number of spatial streams: single stream (1x1)
- Security Types: Open, WPA-TKIP, WPA2

# General Characteristics

| | |
|---|---|
| Remote interfaces | USB 2.0, LAN |
| Detector output | DC output of 0 – 4 V, proportional to RF input |
| Trigger I/O | Input: Rising and falling edge with 1 ms pulse duration<br>Output: Transmit Indicator (3.3 V TTL compliant/5 V tolerant) |
| Remote programming language | SCPI compliance |
| Physical dimensions | 25 mm (H) x 175 mm (L) x 105 mm (W) |
| Weight | 0.7 kg |
| Power requirement | 100/120 V, 50/60 Hz<br>220/240 V, 50/60 Hz |

## Front and rear panels

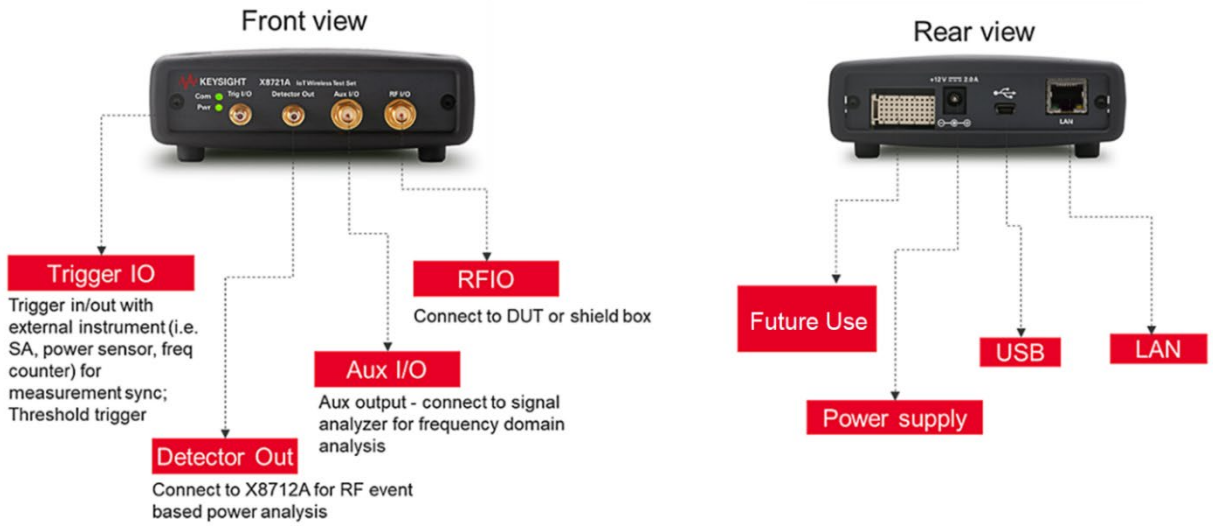



**Figure 10.** Front and rear panels of the X8721A IoT wireless test set

# Software Applications

The IOT8700 Series wireless test solution offers two optional software packages to help you easily configure the test setup and save time through test automation, without needing to write your own programming codes.

## XA8722A IoT Soft Front Panel

The X8722A IoT Soft Front Panel provides a simple interface that allows you to quickly conduct tests without needing to spend a lot of time writing the test software. It provides simple operation with powerful visualization, allowing you to easily evaluate and control your hardware, as well as to automate and speed up testing.

There are two versions of the XA8722A software:

| Description | XA8722A IoT Soft Front Panel Utility | XA8722A IoT Soft Front Panel Pro |
|---|---|---|
| Version | Free version<br>Available for download from:<br>www.keysight.com/find/XA8722A | Licensed version<br>Download trial version from:<br>www.keysight.com/find/XA8722A |
| Feature | Provides basic view<br>• Basic composite TX power, RX PER, throughput, and advertising interval readings<br>• Basic TX power envelope display<br><br>Provides basic functionalities<br>• License enablement<br>• Firmware upgrade<br>• Run self-test<br>• Display SCPI logs | Provides various views<br>• Basic view<br>• TX power envelope display<br>• PER trend chart<br>• Advertising interval trend chart<br>• Throughput trend chart<br>• TX power trend chart<br>• UUID Read/Write<br>• DUT info<br>• Multidevice view<br>• Utility<br><br>Provides advance measurement capabilities<br>• Display channel-based TX power and RX PER measurements<br>• Provide min/max and average readings for all measurement parameters<br>• Ability to configure upper and lower limits and perform limit check with pass-fail indicators<br>• Export test results to csv format<br>• Display SCPI logs |
| PC Requirements | Tested with Microsoft Windows 10 Enterprise 64-bit, 16 GB RAM | |

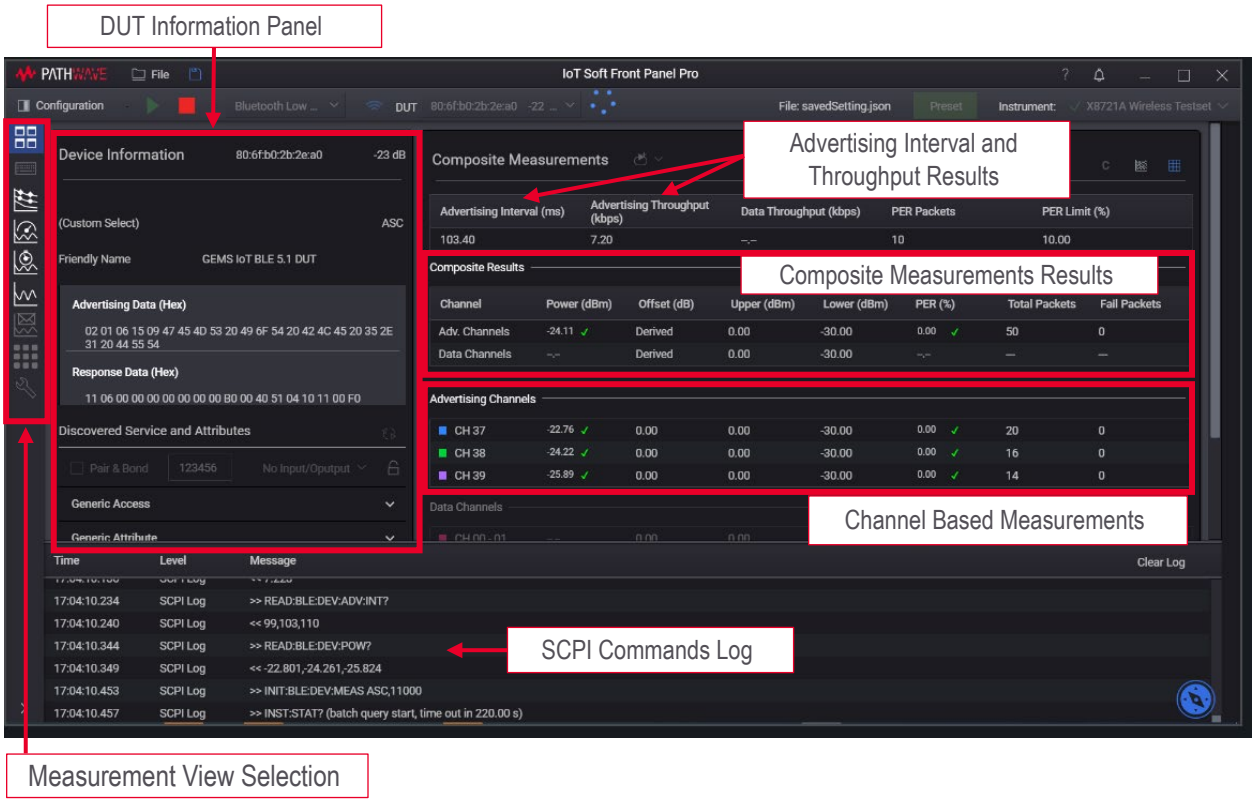



**Figure 11.** XA8722A soft front panel PRO (license required: XA8722A-1TL)

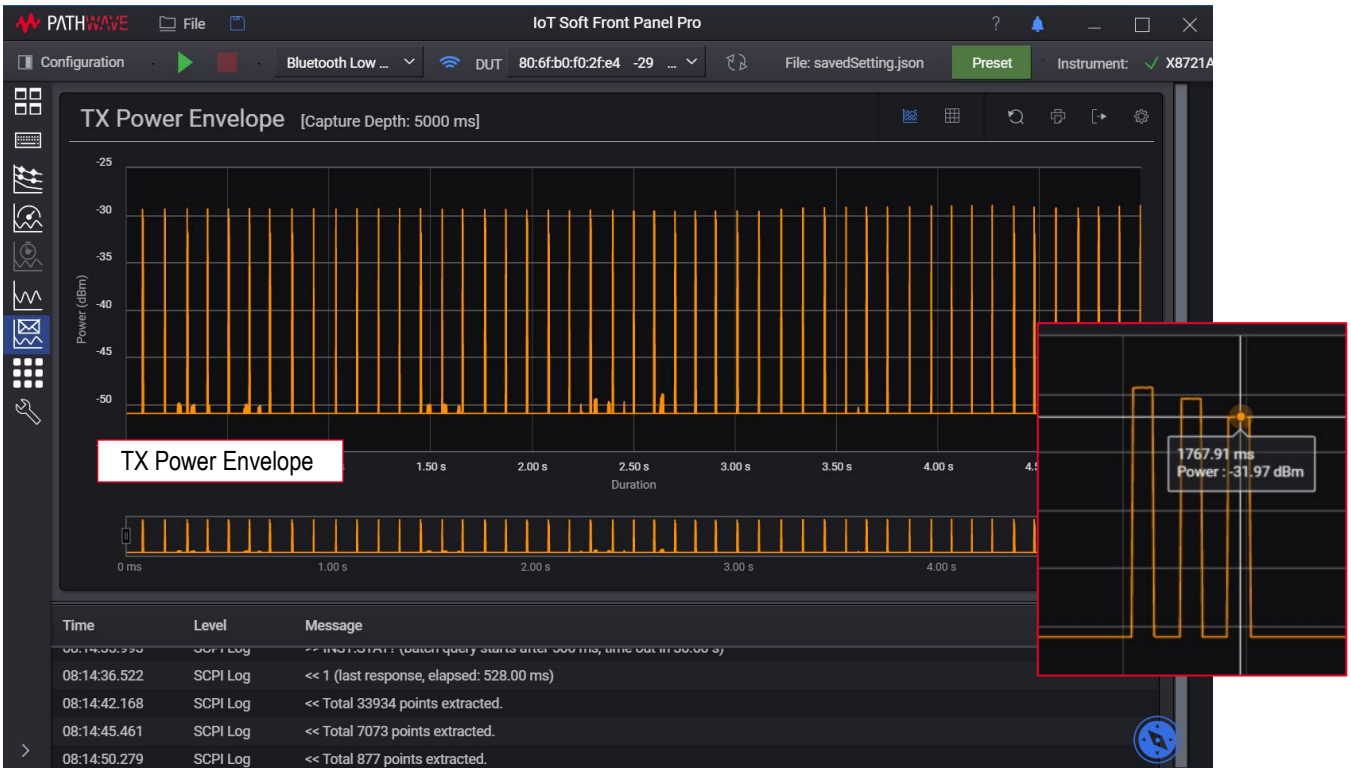



**Figure 12.** X8722A RF power envelope display with zoom in capability

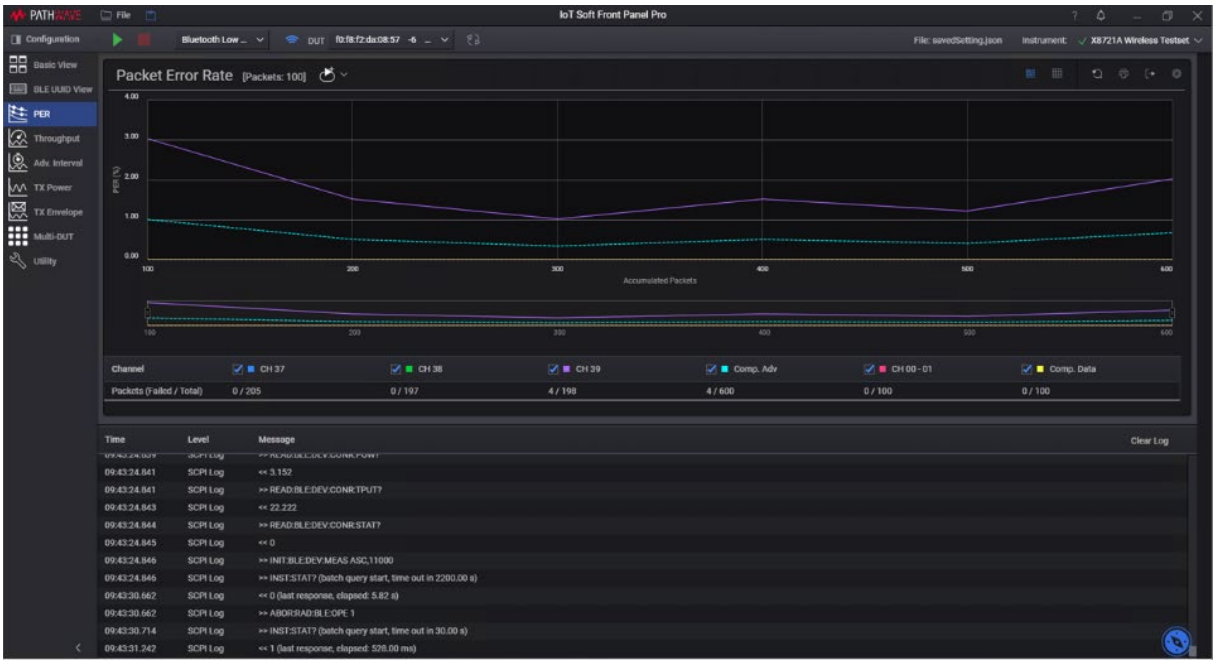



**Figure 13.** PER view – PER results by individual channels, provided in graph and numerical format, including average, maximum and minimum readings, and total packet received

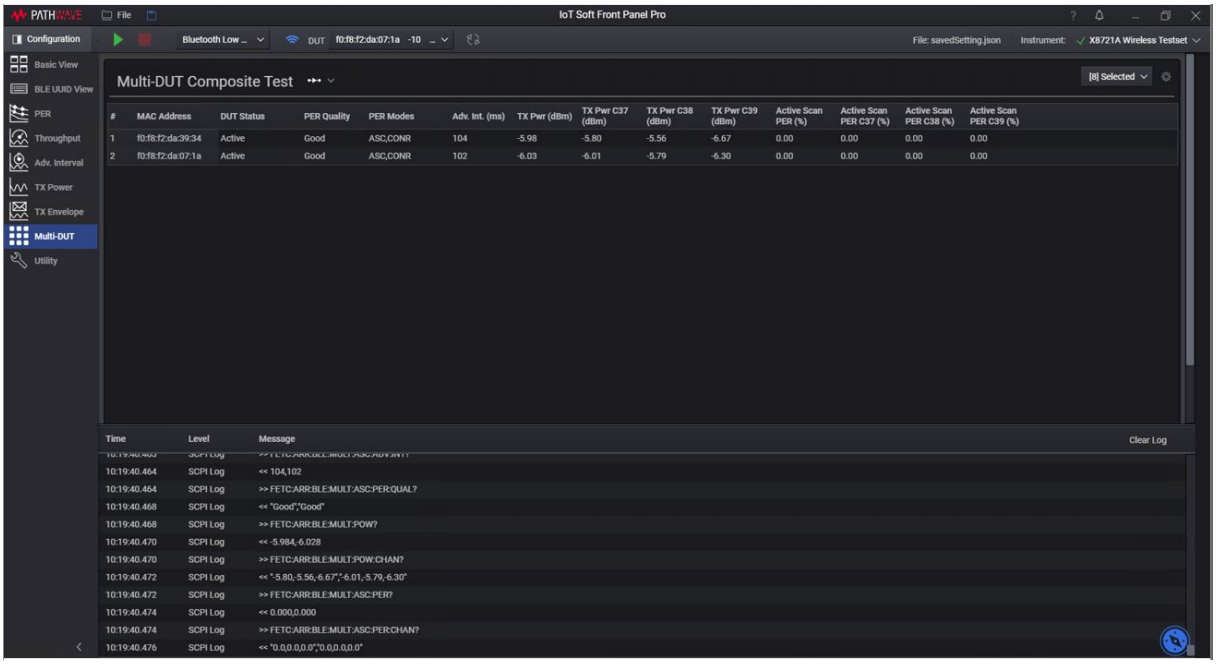



**Figure 14.** Multidevice view – All DUT results displayed in tabular format, with the ability to configure the displayed parameters; supports up to four DUTs (required Multidevice option)

# XA8723A IoT Signaling Measurement Suite

The XA8723A IoT Signaling Measurement Suite is a plugin that runs under the Keysight KS8400A/KS8400B Test Automation Platform (TAP). It contains test steps that enable BLE signaling connection, TX power measurements, RX packet-error-rate, sensitivity, and many other measurements, for both single device and multidevice parallel testing configurations.

The software provides powerful, flexible, and extensible test sequence and test plan creation with additional capabilities that optimize your test software development and overall performance. TAP provides a graphical user interface (GUI) so that both beginning and experienced programmers can quickly construct test plans consisting of multiple test steps. Flow operations are also supported, along with parallel testing.

The XA8723A software trial license is available for download at www.keysight.com/find/XA8723A.

PC requirements: Tested with Microsoft Windows 10 Enterprise 64-bit, 16 GB RAM

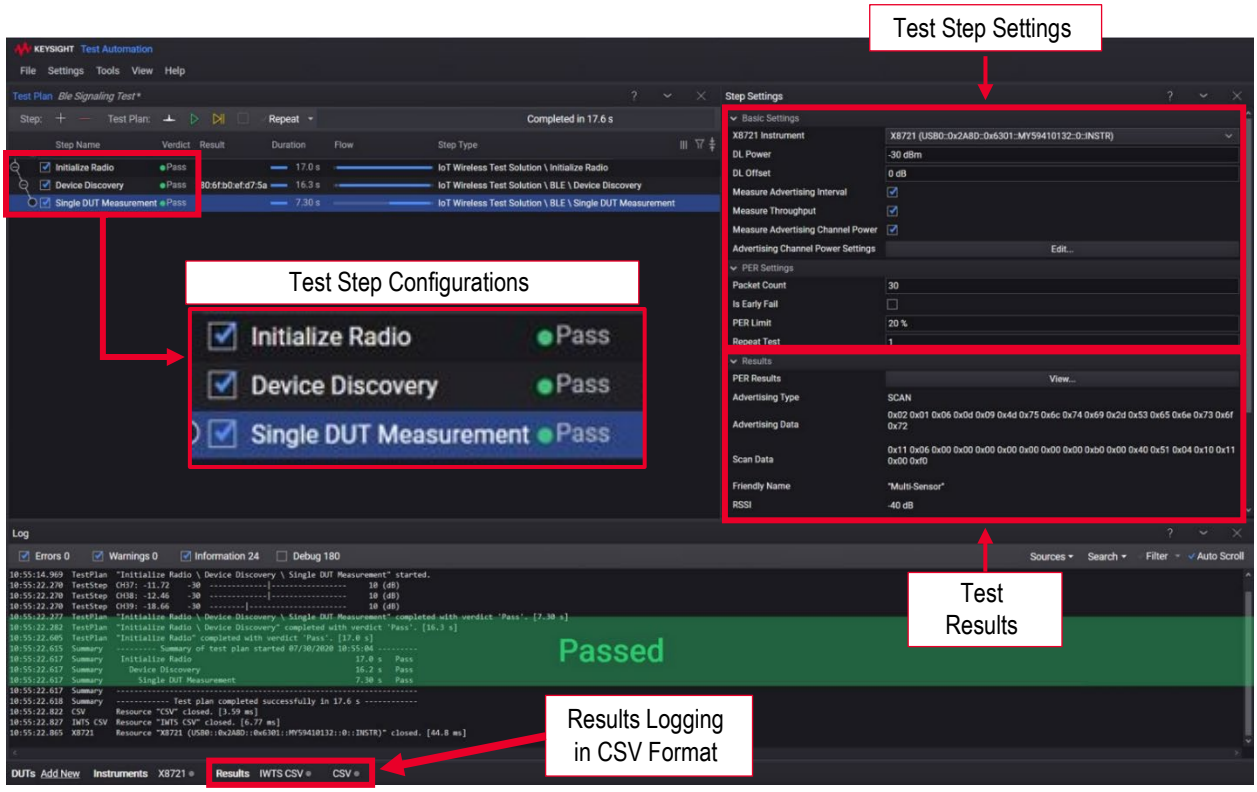



**Figure 15.** Sample BLE signaling test plan

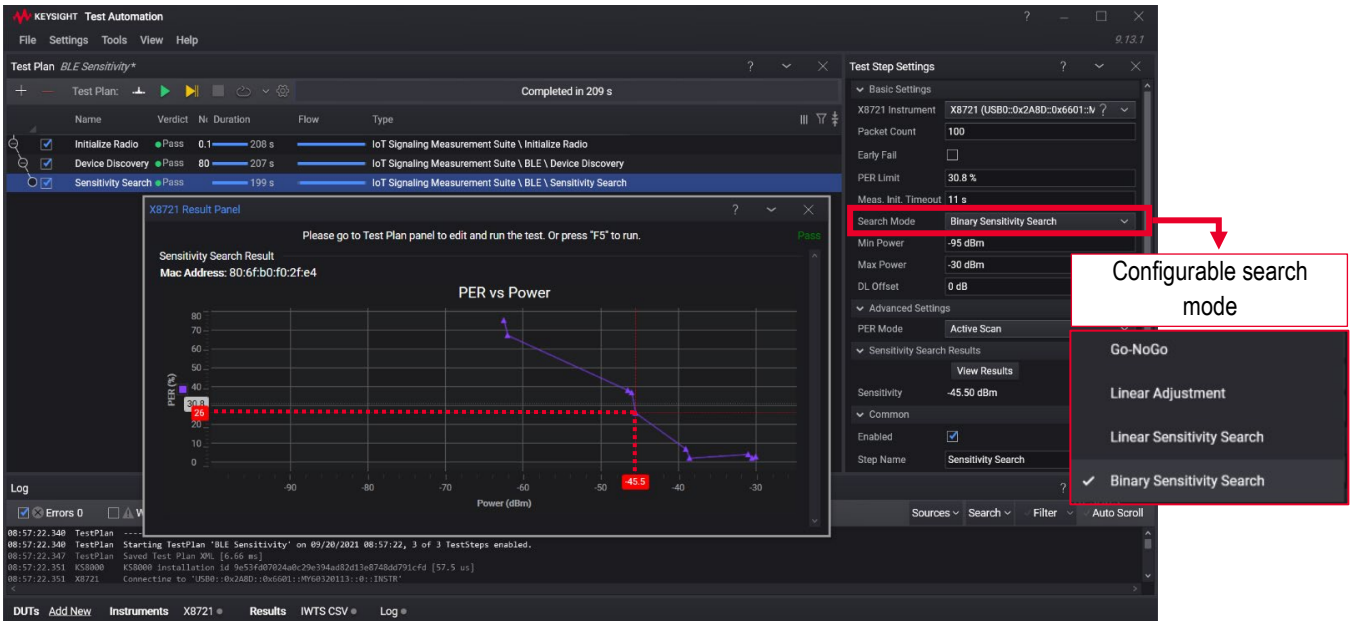



**Figure 16.** BLE receiver sensitivity test plan with configurable search mode

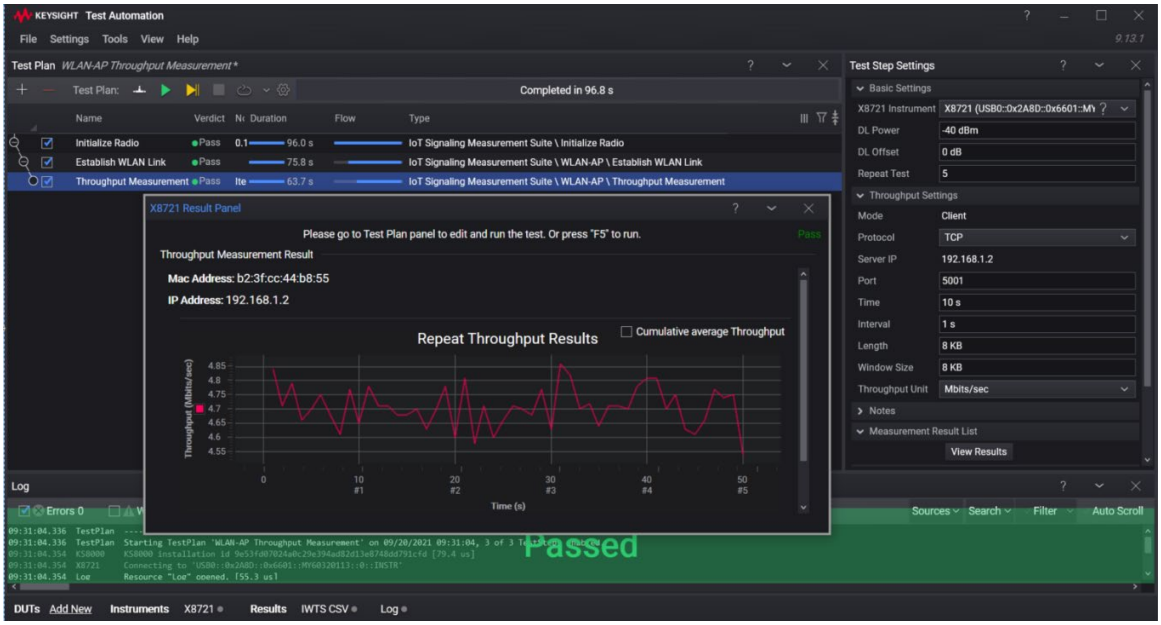



**Figure 17.** WLAN throughput measurements using iPerf methodology with tester as the client device to generate data traffic

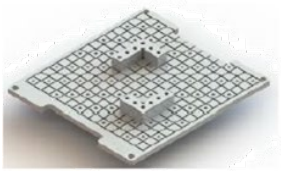
# Optional Accessories

## RF shielded enclosures and antenna couplers

There are three different sizes of RF shied enclosures available for purchase together with the IOT8700 Series. These enclosures are RoHS compliant and are globally shippable to most countries. To complement the IOT8720A and IOT8740A solutions, Keysight offers the ordering convenience of adding an RF shielded enclosure manufactured by BIP Roottek, and includes a 1-year warranty by the company.

### 1. X8763A small RF shielded enclosure and antenna couplers

- High performance RF absorber
- High shielding effectiveness using double layer gasket structure
- Fixture mounting holes in the bottom plate
- Includes one RF N-Terminator plug straight
- Includes one 36 in RF cable with SMA-Male to N-Male to connect X8721A module to the enclosure

| Parameters | | Characteristics |
|---|---|---|
| Inner size | | 173 mm (W) x 248 mm (D) x 134 mm (H) |
| Weight | | Approx. 7.6 kg |
| Interface  | | 1x DB25<br>1x USB 2.0<br>2x N-SMA |
| Grid plate and antenna coupler   | | Small grid plate<br>- On-board screw holes<br>- 2x L-guide with screws<br>- 5 mm thickness<br><br>Small antenna coupler<br>- Wide band<br>- VSWR < 2.2 @ 0.8~6 GHz |
| Shielding effectiveness (measured when the blank I/O panel is attached) | 100–3000 MHz | > 70 dB |
| | 3000–6000 MHz | > 60 dB |

## 2. X8764A medium RF shielded enclosure and antenna couplers

- High performance RF absorber on the inside walls
- High shielding effectiveness using double layer gasket structure
- Includes three RF N-Terminator plug straight
- Includes one 36 in RF cable with SMA-Male to N-Male to connect X8721A module to the enclosure

| Parameters | | Characteristics |
|---|---|---|
| Inner size | | 457 mm (W) x 480 mm (D) x 358 mm (H) |
| Weight | | Approx. 38 kg |
| Interface  | | 1x DB25<br>1x USB 2.0<br>4x N-SMA |
| Grid plate and antenna coupler   | | Medium grid plate<br>- On-board screw holes<br>- 20x L-guide with screws<br>- 5 mm thickness<br><br>Small antenna coupler<br>- Wide band<br>- VSWR < 2.3 @ 0.5~6 GHz |
| Shielding effectiveness (measured when the blank I/O panel is attached) | 100–3000 MHz | > 70 dB |
| | 3000–6000 MHz | > 60 dB |

## 3. X8765A large RF shielded enclosure and antenna couplers

- High performance RF absorber on the inside walls
- High shielding effectiveness using double layer gasket structure
- Fixture mounting holes in the top, bottom, and side walls
- Includes one RF N-Terminator plug straight
- Includes one 36 in RF cable with SMA-Male to N-Male to connect X8721A module to the enclosure

| Parameters | | Characteristics |
|---|---|---|
| Inner size | | 842 mm (W) x 842 mm (D) x 842 mm (H) |
| Weight | | Approx. 100 kg |
| Interface  | | 1x DB25<br>1x USB 2.0<br>2x N-SMA |
| Grid plate and antenna coupler   | | Large Grid Plate<br>- On-board screw holes<br>- 20x L-guide with screws<br>- 5 mm thickness<br><br>Small Antenna Coupler<br>- Wide band<br>- VSWR < 2.3 @ 0.5~6 GHz |
| Shielding effectiveness (measured when the blank I/O panel is attached) | 100–3000 MHz | > 70 dB |
| | 3000–6000 MHz | > 60 dB |

# X8761A rackmount kit

This rackmount kit supports up to three units of X8721A on an EIA 19-inch test rack cabinet. Fillers are provided to cover the empty slots.

- Dimension: 483 mm (W) x 44 m (H) x 105 mm (D)

# Ordering Information

| | |
|---|---|
| **Step 1: Choose single or multidevice test configuration (select one)** | |
| IOT8720A | IoT wireless test solution |
| IOT8740A | IoT wireless test solution, multidevice |
| **Step 2: Choose radio option (select one or more)** | |
| X8721A- BT5 | Bluetooth Low Energy 4.2, 5.0, 5.1, and 5.2 |
| X8721A-WLN | Wireless LAN a/b/g/n/ac |
| **Step 3: Choose multidevice option (select one); skip this step for IOT8720A** | |
| X8721A-D04 | Multidevice, 4-DUT |
| **Step 4: Choose software option (optional)** | |
| XA8722A | IoT Soft Front Panel Pro |
| XA8723A | IoT Signaling Measurement Suite<br>(Required: KS8400A/KS8400B Keysight PathWave Test Automation) |
| **Step 5: Choose RF Shield Enclosure (optional)** | |
| X8763A | Small RF shielded enclosure and antenna coupler |
| X8764A | Medium RF shielded enclosure and antenna coupler |
| X8765A | Large RF shielded enclosure and antenna coupler |
| **Step 6: Choose other accessories (optional)** | |
| X8761A | Rackmount kit |

# Software – License Type and Terms

## For XA8722A IoT Soft Front Panel Pro and XA8723A IoT Signaling Measurement Suite

| Time-based license type and support subscription | |
|---|---|
| R-X4Y-001-L | 12-months, node-locked license, KeysightCare software support subscription |
| R-X4Y-002-L | 12-months, floating (single site) license, KeysightCare software support subscription |
| R-X4Y-004-L | 12-months, transportable license, KeysightCare software support subscription |
| R-X4Y-005-L | 12-months, USB portable license, KeysightCare software support subscription |

## For KS8400A/KS8400B Pathwave Test Automation Developer System

| Time-based license type and support subscription | |
|---|---|
| R-D4A-001-L | 12-months, node-locked license, KeysightCare software support subscription |
| R-D4A-002-L | 12-months, floating (single site) license, KeysightCare software support subscription |
| R-D4A-004-L | 12-months, transportable license, KeysightCare software support subscription |
| R-D5A-005-L | 12-months, USB portable license, KeysightCare software support subscription |

# Upgrading Your System

Upgrades are available for hardware and software after your first purchase. To upgrade the IOT8720A and/or IOT8740A, you can select IOT8700AU and order the corresponding item numbers from the tables below:

## IOT8700AU Upgrade Model for IOT8720A and IOT8740A

| Hardware Upgrade | |
|---|---|
| X8721AU-BT5 | Bluetooth Low Energy 5.0 Upgrade |
| X8721AU-WLN | WLAN a/b/g/n/ac Upgrade |
| X8721AU-D04 | Multi-Devices, up to 4 DUTs |

| Software Upgrade | |
|---|---|
| KS8400B | Test Automation Platform, Developer's System |
| XA8722A | IoT Wireless Test Solution Soft Front Panel |
| XA8723A | IoT Wireless Test Solution Measurement Suite |

# Standard Shipping Items

- X8721A IoT wireless test set
- USB Type-A male to Mini-USB 2.0 Type-B cable
- External power adapter 85-264VAC, 12VDC, 2.09A, 25W, and power cord
- Certificate of calibration
- IoT Soft Front Panel Utility Software
  (available for download at www.keysight.com/find/XA8722A)

# Related Information

KS8400B and KS8000A test automation platform: www.keysight.com/find/TAP