

Agilent Wireless Keyboard and Mouse Testing Made Easy

Using the Agilent N9320B RF Spectrum Analyzer

Application Note



Agilent N9320B RF spectrum analyzer. Maximize your productivity.
Minimize your cost.

Overview

Most of the wireless mice and keyboards work in the ISM 2.4 GHz band, and most of them employ either *Bluetooth*[®] technology or the FSK modulation format for signal transmission. These wireless computer peripherals must transmit signals with enough power for the receiver to easily capture the signals. The wireless mice and keyboards must also avoid creating electromagnetic interference and disrupting other radio communications using the same frequency.

As this brief illustrates, a variety of equipment is used to create a test system capable of ensuring that wireless computer devices meet the defined standards. One of the key components in such a configuration is a spectrum analyzer such as the Agilent Technologies N9320B RF spectrum analyzer.



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Typical Testing Configuration

Many countries adopted the United State’s Federal Communications Commission (FCC) regulations to regulate the radio frequencies in the ISM bands. During production, wireless mice and keyboards are typically tested to ensure they meet the FCC requirements and work properly.

A common automatic test system configuration used in production lines to test wireless mice and keyboards is shown in Figure 1.

Table 1 summarizes the equipment’s role in the automated system and suggests suitable Agilent products.

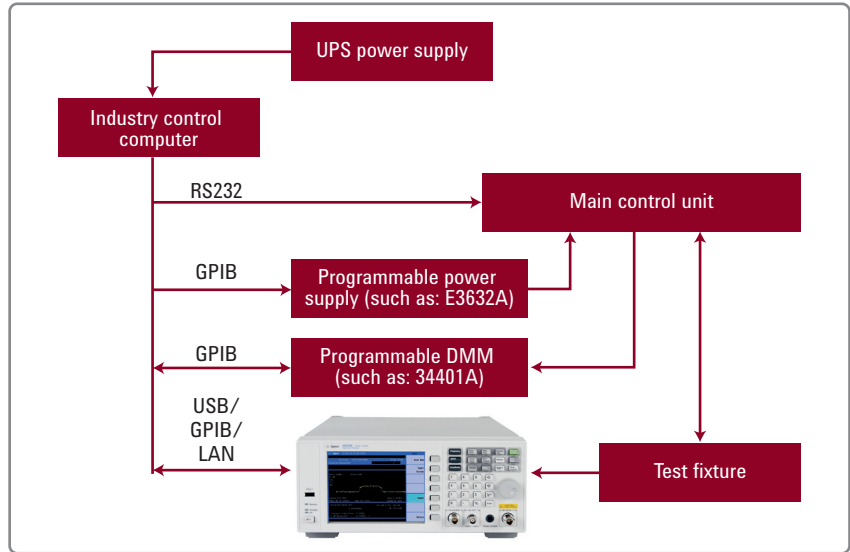


Figure 1. A common wireless mice and keyboard system testing block diagram

Table 1. Equipment solutions for wireless mice and keyboard automated test system

| Device | Purpose | Agilent solution |
|---|---|--|
| RF spectrum analyzer with: • GPIB interface • Rack-mount unit | Measures the DUT’s RF specification | N9320B with: • Option N9320B-G01 • Option N9320B-1CM |
| Digital multi-meter (DMM) | Performs current and voltage measurements | 34401A |
| Power supply | Supplies power | E3632A |
| RF switches | Switches signal pathway | L7100/L7200 Series |



N9320B Performance Advantages

In any test configuration, the spectrum analyzer plays a pivotal role in maximizing throughput and is used to verify the following specifications for the wireless device's high, medium, and low channels adhere to regulatory requirements (Figures 2 to 4):

- Center frequency and power
- Occupied bandwidth (OBW)
- Channel power (CHP)

Ideally, the spectrum analyzer provides fast measurement speed, robust measurements, and flexible programmability. In this respect the N9320B is well suited to the test configuration due to the following specification and measurement capabilities:

- 9 kHz to 3 GHz spectrum analyzer
- Typical ± 0.5 dB measurement accuracy
- Fast measurement speed: 10 ms (non zero span sweep time)
- Robust measurement features including:
 - One-button power suite: CHP, OBW, spectrum emission mask (SEM), third-order intermodulation (TOI)
 - ASK/FSK modulation analysis (requires Option DMA)

The N9320B also provides a multitude of interface options for connecting to the computer and the test fixture.

- LAN and USB: Standard configured
- GPIB: Requires Option G01
- SCPI command compatible for Agilent ESA Series (ensures backwards compatibility)

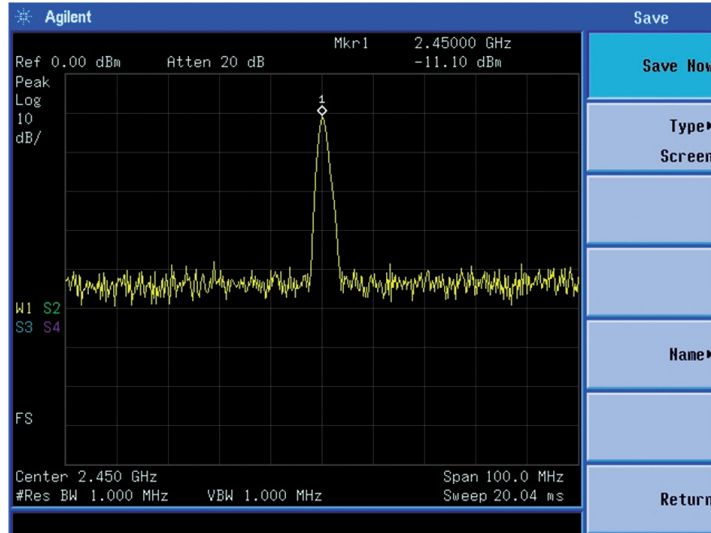


Figure 2. Center frequency and power as shown on N9320B



Figure 3. OBW available as a convenient one-button measurement on the N9320B

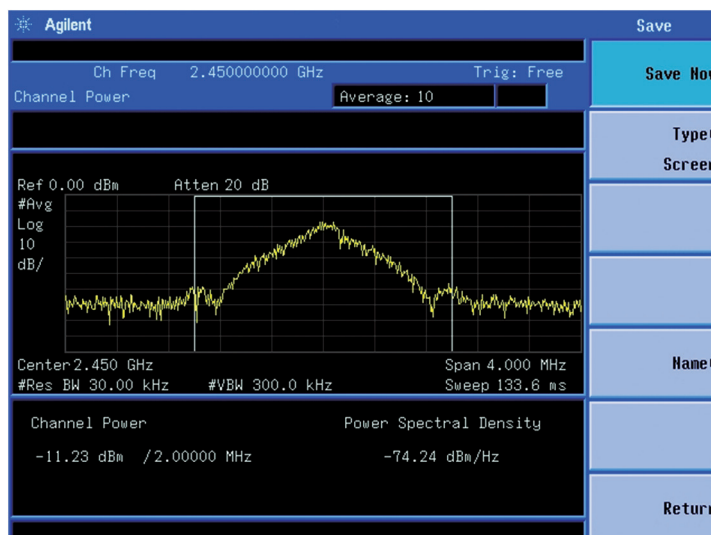


Figure 4. Channel power available quick as one-button measurement on the N9320B

Conclusion

A test configuration for wireless mice and keyboards using the Agilent N9320B RF spectrum analyzer, as well as other Agilent products, provides the measurement capabilities necessary to ensure the conformance of wireless computer devices to industry standards. The affordably-priced, easy-to-use test equipment provides accurate, repeatable results with the speed and performance required in your automated test environment.

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