

IoT, Medical & Healthcare Device Wireless Communication Quality Improvement

Wireless LAN Tester

Bluetooth® Tester

Spectrum Analyzer

Wireless communication is set to be widely used for Internet connectivity in the IoT market of the future. An increasing number of IoT products that support LTE FDD/TDD, NB-IoT, Cat-M, Wireless LAN (WLAN), and *Bluetooth*® have been appearing on the market in recent years.

Wireless communication is used in a variety of applications and is a great convenience in our daily lives. However, unintended radiated emissions such as broadband noise and unwanted radio waves may be generated, which could impede the operation of wireless systems.



■ Issues of communication quality:

Disconnection, interruptions, limited range, etc.

Internal factors

- Mounting or parts failure, antenna, cable, wireless module, etc.
- Noise from the device's own power supply circuits, CPU boards, LCD panels, etc.

External factors

- Interference from other devices, such as WLAN devices or microwave ovens
- Reflected radio signals originating from the device itself (multipath)

Challenges

- Build test environments to evaluate the transmission and reception performance of wireless devices under actual usage conditions
- Identify the causes of issues (internal or external)

Challenges

- Detect interference signals
- Identify the source of interference signals

Wireless LAN, Bluetooth Issues: Internal factors

Wireless LAN Tester: Wireless Connectivity Test Set MT8862A

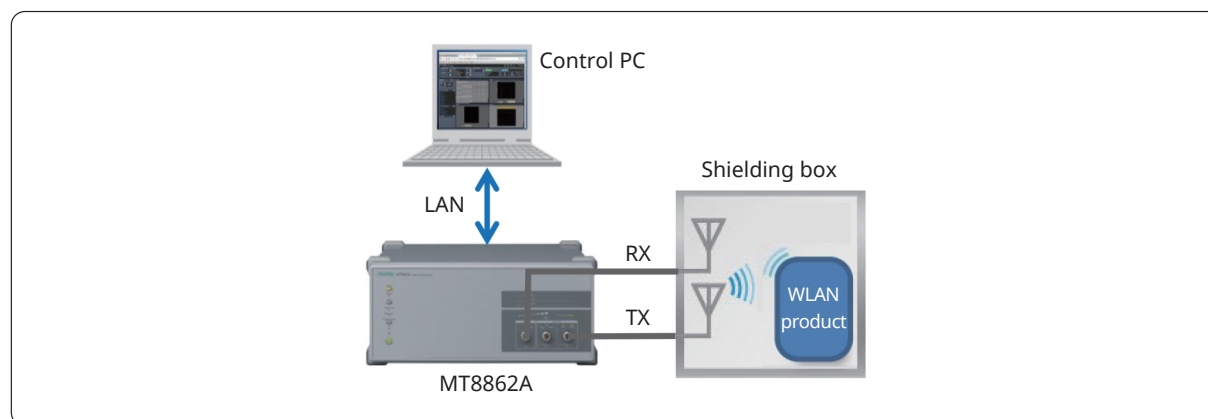
Final product evaluation under operating conditions

Even if the wireless LAN modules operate as intended, there remains the risk of communication performance degradation in the final product form.

The MT8862A supports "network mode" that allows connection in the same way as general wireless LAN devices, making it easy to evaluate wireless LAN devices in their final product form and actual operation. It can be used to determine normal/abnormal status if communication issues occur.

Features

Test item	IEEE 802.11 Tx/Rx characteristics
Standards	IEEE 802.11 a/b/g/n/ac/ax/be
Bands	2.4/5/6 GHz band
Bandwidth	20/40/80/160/320 MHz
Security	WEP, WPA/WPA2-Personal/WPA3-Personal



Example of wireless connection (OTA: Over The Air)

Use Case

Analysis of causes of communication issues in medical/healthcare devices:

The causes of communication issues can be divided into two types: external factors (surrounding environment/interference) and internal factors (device failure/deterioration).

To determine the cause of any communication issues, it is first necessary to check whether the problem is caused by external or internal factors.

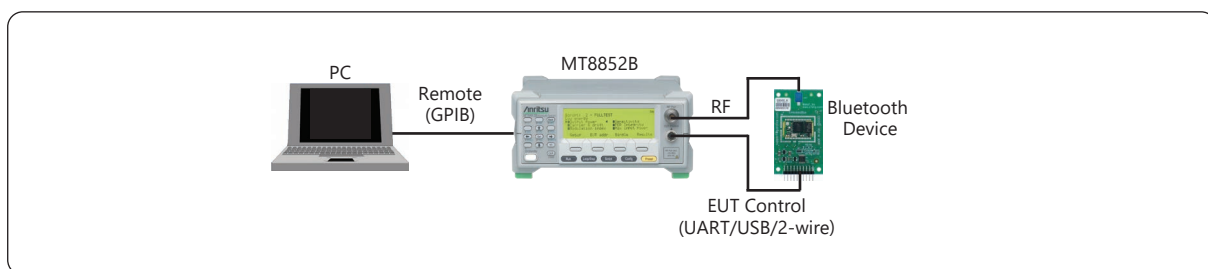
The MT8862A can be used to evaluate the normal/abnormal communication performance of wireless LAN devices, which are "internal factors" of failure.

Bluetooth Tester: Bluetooth Test Set MT8852B

Compliant with Bluetooth SIG test specifications

MT8852B supports evaluation in accordance with the Bluetooth SIG test specifications.

You can quickly and easily measure the BR (Basic Rate), EDR (Enhanced Data Rate), BLE (Bluetooth low energy) power, frequency, modulation, receiver sensitivity, etc. demanded by the Bluetooth RF test specifications for modules and devices.



Example of connection for Bluetooth testing

■ Features

Increased test reliability	Support the latest Standard Bluetooth v5.4 Measurements performed as defined in the Bluetooth RF test specification Compliant with Bluetooth Core Specification v5.4
Built-in EUT control program	Self control by using HCI (Host Control Interface)/2-Wire Single-button control of BR, EDR, and BLE tests using preset scripts
Main test items	Audio testing, AFH* ¹ functionality verification, 2 Mbps Low Energy PHY (2LE) Bluetooth Long Range (BLR) testing, AoA* ² /AoD* ³

*1: Adaptive Frequency Hopping
*2: Angle of Arrival
*3: Angle of Departure

■ Use Case

Analysis of causes of communication issues in medical/healthcare devices:

The causes of communication issues can be divided into two types: external factors (surrounding environment/interference) and internal factors (device failure/deterioration).

To determine the cause of any communication issues, it is first necessary to check whether the problem is caused by external or internal factors.

The MT8852B can be used to evaluate the normal/abnormal communication performance of Bluetooth devices, which are "internal factors" of failure.

Wireless LAN, Bluetooth Issues: External factors

Handheld Spectrum Analyzer series

■ Compact/Lightweight/Battery-powered - Investigate the radio wave environment while on the move

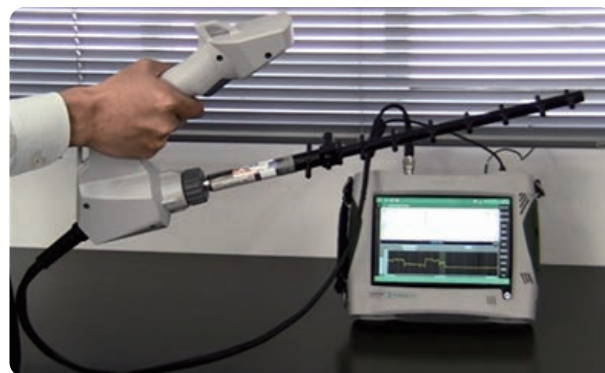
Wireless LAN and Bluetooth are supported by a variety of devices such that using the same frequency band may lead to communication failures. There are other factors such as motors, power supplies, displays and LEDs that can cause interference (noise). The handheld spectrum analyzer's portability makes it suitable for investigating the radio wave environment at sites where medical devices are used.

■ Use Case

Analysis of causes of communication issues in medical/healthcare devices:

The causes of communication issues can be divided into two types: external factors (surrounding environment/waveform interference) and internal factors (device failure/deterioration).

The handheld spectrum analyzer can be used for failure diagnosis when the problem is caused by internal factors.



InterferenceHunter™
MA2700A

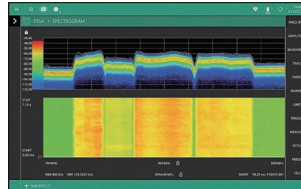
Field Master Pro™
MS2090A



Field Master Pro™ MS2090A Spectrogram screen (real time analysis)

■ Features

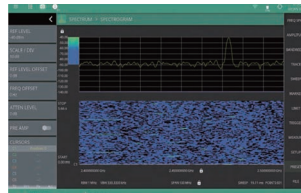
Frequency	9 kHz to 9/14/20/26.5/32/43.5/54 GHz
Bandwidth	22/55/110 MHz * real time analysis
Size	314 (W) × 235 (H) × 95 (D) mm
Weight	5.4 kg
Battery time	More than 2 H * depends on test modes



Field Master™ MS2080A Spectrogram screen (real time analysis)

■ Features

Frequency	9 kHz to 4/6 GHz
Bandwidth	20/40 MHz * real time analysis
Size	290 (W) × 212 (H) × 96 (D) mm
Weight	3.8 kg
Battery time	More than 3 H * depends on test modes



Field Master™ MS2070A Spectrogram screen (real time analysis)

■ Features

Frequency	9 kHz to 3 GHz
Size	290 (W) × 212 (H) × 96 (D) mm
Weight	3.8 kg
Battery time	More than 3 H * depends on test modes

60 GHz mmWave Sensor/Video Transfer Device Evaluation Compact Handheld Spectrum Analyzer



Spectrum Master™ MS2760A

■ Features

Frequency	9 kHz to 32/44/50/70/110/145/170 GHz
Size	84 (W) × 155 (H) × 27 (D) mm
Weight	0.255 kg

■ Use Case

Evaluation of image transmission/mmWave sensor using 60-GHz range

The 60-GHz band is expected to be used not only for image transmission, but also for high-precision sensors that detect heartbeat, breathing, minute vibrations, etc. without contact. On the other hand, since radio waves travel in a straight line and have a large amount of spatial attenuation, it is important to determine the range of those radio waves.

Spectrum Master can be used for both “transmission characteristics” and “radio coverage”.