

# Easy RF Evaluation of WLAN Products

Wireless Connectivity Test Set MT8862A

WLAN functions are being adopted rapidly not just in personal computers and smartphones, but - due to the spread of IoT - also in household goods, such as printers, TVs, and digital cameras, as well as in automotive, industrial, and sensor applications. Additionally, it is extended to many kinds of usage such as transmission of images and video.

The Wireless Connectivity Test Set MT8862A is designed to evaluate the receiver and transmitter characteristics of WLAN products meeting the IEEE802.11a/b/g/n/ac (2.4 and 5-GHz bands) specifications.

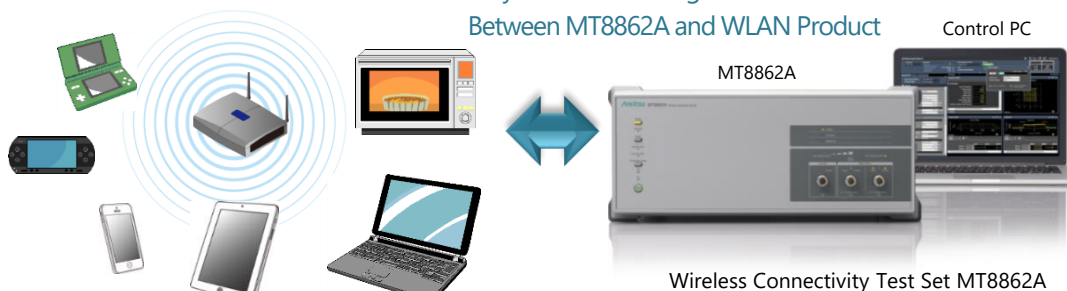
Measurement Target: WLAN Products

- ❑ Supports IEEE802.11b/g/n\*1 (2.4-GHz band) and IEEE802.11a/n\*1/ac\*2 (5-GHz band)
- ❑ All-in-one measurement of key Tx/Rx performance
- ❑ Logging to troubleshoot connection issues

\*1: Supports SISO/2x2 MIMO, 20/40 MHz

\*2: Supports SISO/2x2 MIMO, 20/40/80-MHz bandwidth

Easy connection using Network Mode  
Between MT8862A and WLAN Product



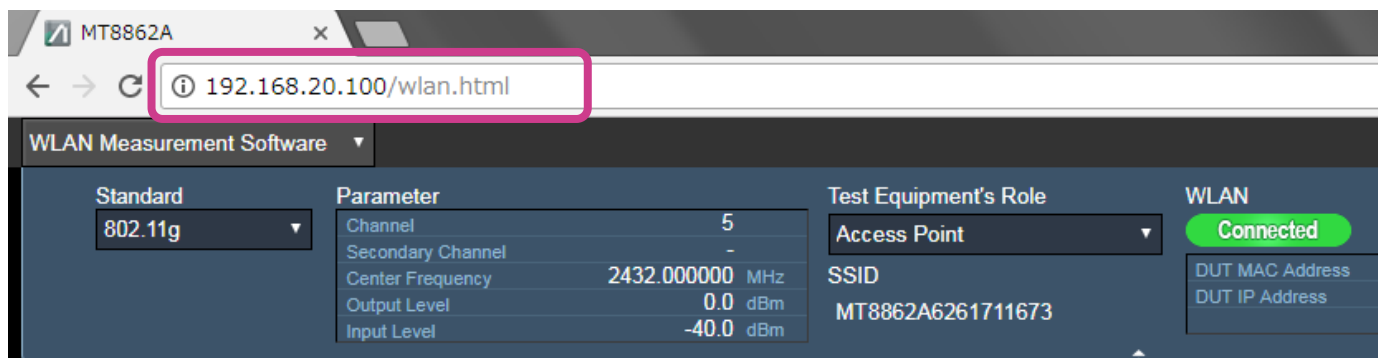
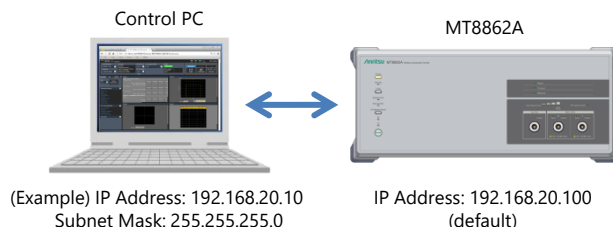
The MT8862A simulates **Access Points (AP)** or **Stations (STA)** to realize the common WLAN connection procedure.

## Easy Graphical User Interface (GUI) Measurement Environment

The MT8862A built-in Web server can be accessed for control from a Web browser (Google Chrome recommended) running on the Control PC.

This helps reduce the measurement setup burden as follows:

- No control software → Control by Web browser
- Version match between main unit firmware and software is unnecessary



## Measuring Tx Characteristics (Tx Test)

- The MT8862A performs Tx tests (table on right) of WLAN products at the Data or ACK frames. Using the Data Frame, MT8862A sends an ICMP Echo Request and measures the ICMP Echo Reply signal from the WLAN product. Using the ACK Frame, MT8862A sends a unique UDP packet (Test Packet) and measures the ACK Frame signal sent from the WLAN product.
- MT8862A analyzes the header of the packet received from the WLAN product and performs RF measurements, such as power, modulation accuracy, and spectrum, before displaying the results.
- MT8862A can also measure packets sent by an ethernet port for IP data on the back panel.

### Measurement Screens

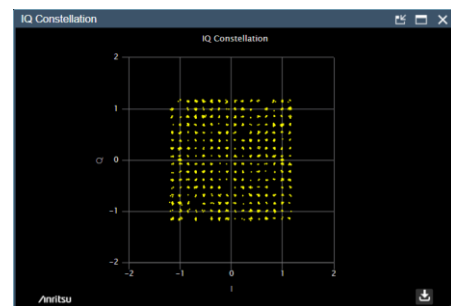
The Tx test collects results as shown on the following screens.

### Tx Measurement Items

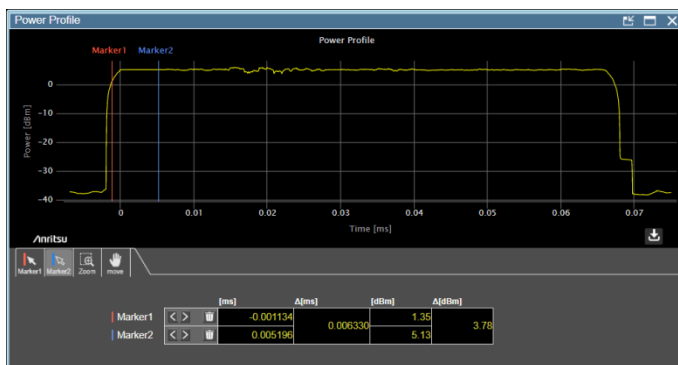
No.	Items	WLAN Standard		11b		11a, g, n, ac		11ax HE SU		11ax HE TB	
		Data	Ack	Data	Ack	Data	Ack	Data	Ack	Data	Ack
<b>Numeric Result</b>											
1	Transmit power	○	○	○	○	○	○	○	○	○	○
2	Power pre-correction accuracy										○
3	Crest factor	○	○	○	○	○	○	○	○	○	○
4	Power ramp	○	○	○	○	○	○	○	○	○	○
5	EVM (Transmit modulation accuracy)	○	×	○	×	○	×	○	×	○	×
6	Unused tone error										○
7	Center frequency leakage			○	×	○	×	○	×	○	×
8	Center frequency tolerance	○	×	○	×	○	×	○	×	○	×
9	Center frequency offset										○
10	Symbol clock frequency tolerance			○	×	○	×	○	×	○	×
11	IQ offset	○	×								
<b>Phase &amp; Magnitude error</b>											
	Phase error	○	×								
	Magnitude error	○	×								
<b>IQ imbalance</b>											
	Amplitude imbalance	○	×	○	×	○	×	○	×	○	×
	Phase imbalance	○	×	○	×	○	×	○	×	○	×
	Phase error			○	×	○	×	○	×	○	×
14	Chip clock frequency tolerance	○	×								
15	Carrier suppression from IQ offset	○	×								
16	Spectrum flatness			○	×	○	×	○	×	○	×
17	Spectrum mask	○	○	○	×	○	×	○	×	○	×
<b>Graph Result</b>											
18	IQ constellation	○	×	○	×	○	×	○	×	○	×
19	Spectrum flatness			○	×	○	×	○	×	○	×
20	Power profile	○	○	○	○	○	○	○	○	○	○
21	Spectrum mask	○	○	○	×	○	×	○	×	○	×
22	Unused tone error										○
23	Carrier Frequency Offset										○



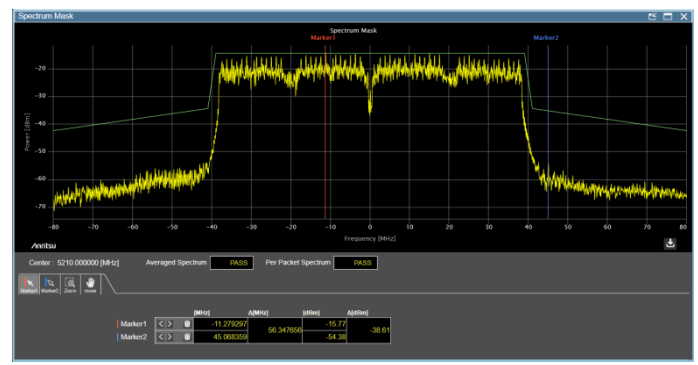
Numeric Results



Constellation



Power Profile



Spectrum

### Tx Test

The MT8862A supports the following transmit test items specified by IEEE802.11.

Test Item	802.11a	802.11b	802.11g	802.11n	802.11ac <sup>*3</sup>	802.11ax <sup>*4</sup>
Transmit power levels	17.3.9.2	16.3.7.2	18.4.7.2	19.3.18.3	--	--
Transmit spectral mask <sup>*5</sup>	17.3.9.3	16.3.7.4	18.4.7.3	19.3.18.1	21.3.17.1	27.3.19.1
Transmit center frequency tolerance	17.3.9.5	16.3.7.5	18.4.7.4	19.3.18.4	21.3.17.3	27.3.19.3
Chip/Symbol clock frequency tolerance	17.3.9.6	16.3.7.6	18.4.7.5	19.3.18.6	21.3.17.3	27.3.19.3
Transmit power-on and power-down ramp	--	16.3.7.7	--	--	--	--
Transmitter center frequency leakage	17.3.9.7.2	--	17.3.9.7.2	19.3.18.7.2	21.3.17.4.2	27.3.19.4.2
Transmitter spectral flatness	17.3.9.7.3	--	17.3.9.7.3	19.3.18.2	21.3.17.2	27.3.19.2
Transmitter constellation error	17.3.9.7.4	--	17.3.9.7.4	19.3.18.7.3	21.3.17.4.3	27.3.19.4.3
Transmitter modulation accuracy test	17.3.9.8	16.3.7.9	17.3.9.8	19.3.18.7.4	21.3.17.4.4	27.3.19.4.4

\*3: 802.11ac Tx test measurements require MX886200A-001

\*4: 802.11ax Tx test measurements require MX886200A-002

\*5: Supports 802.11ac Frequency Span of  $\leq \pm 80$  MHz

"--" Means not specified in standards

## Measuring Receiver Characteristics (Rx Test)

- The MT8862A sends a unique UDP packet (Test Packet) to the WLAN product and uses the count of the ACK frames sent from the WLAN product to measure the Packet Error Rate (PER)/Frame Reception Rate (FRR).
- The Network Mode provides an easy way to configure measurement environment in comparison to configuring it in the Direct Mode.  
Moreover, the receiver performance of finished WLAN products can be evaluated in a close-to-live environment using Network mode.
- The ETSI EN 300 328 V2.1.1 Standard promulgated on January 13, 2017 added the PER specification to the Receiver Blocking Test for wideband wireless products operating in the 2.4-GHz ISM Band, which includes WLAN. The MT8862A PER measurement function supports this test using a signal generator (sold separately) for the interference waveform.

Receiver Test Measurement Items

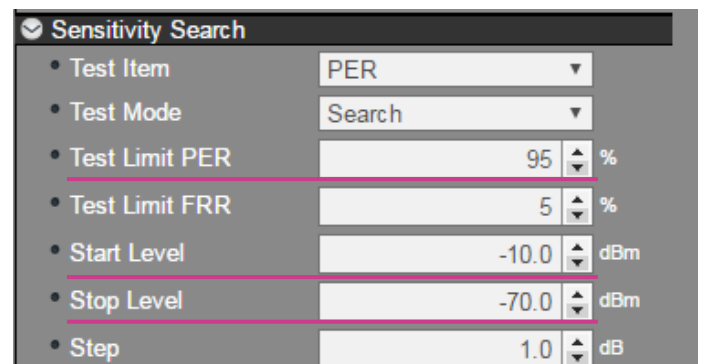
No.	Items
<b>Numeric Result</b>	
1	Packet Error Rate List (PER List)
2	Frame Reception Rate List (FRR List)
<b>Graph Result</b>	
1	Packet Error Rate (PER)
2	Frame Reception Rate (FRR)

### Sensitivity Level Auto-Search

Capturing the receiver sensitivity level of WLAN devices is extremely important for quantitative evaluation of device receiver performance.

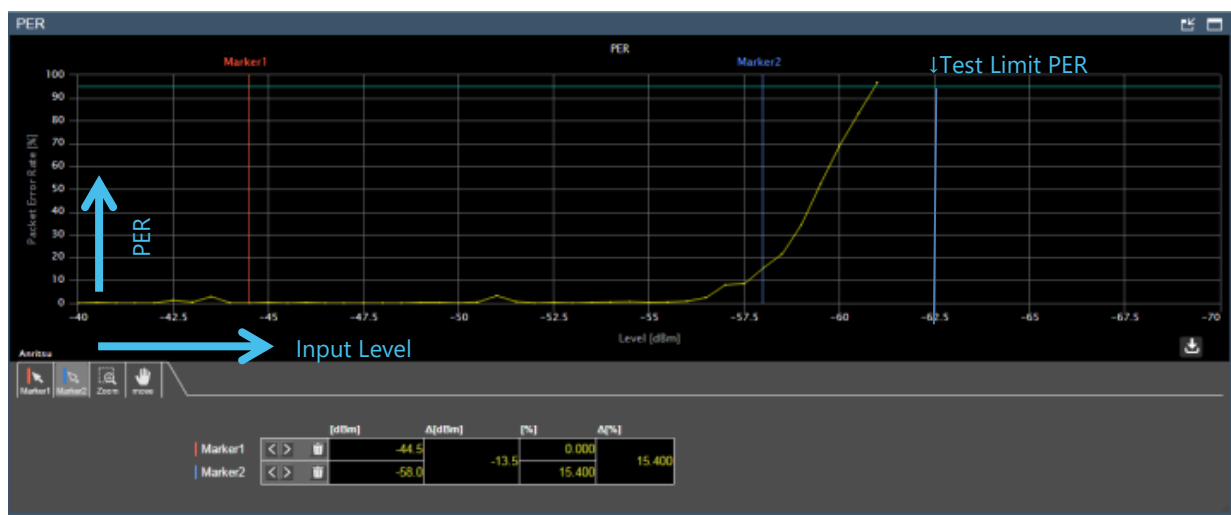
Generally, the receiver sensitivity level is obtained by measuring PER while changing the output level of the measuring instrument either manually or automatically (by creating an automation program). When performed manually, measurement takes a long time because the level is changed repeatedly at each PER measurement. On the other hand, configuration of an automatic measurement system with programming for instrument control places a heavy burden on the engineer.

As shown in the figure on the right, the MT8862A has a function for automatically capturing the bathtub curve (figure below) by inputting test limit values, such as MT8862A signal output start and stop levels, and step size. Additionally, captured results can be saved as a file for post-measurement analysis.



Receiver Test Parameter Setting Screen

PER measurement results are captured while automatically changing the level up to the Test Limit PER value.



Bathtub Curve

### Receiver Test

The MT8862A supports the following receiver test items specified by IEEE802.11.

Test Items	802.11a	802.11b	802.11g	802.11n	802.11ac <sup>*6</sup>	802.11ax
Receiver minimum input level sensitivity	17.3.10.2	16.3.8.2	18.4.8.2	19.3.19.1	21.3.18.1	27.3.20.2
Adjacent channel rejection <sup>*7</sup>	17.3.10.3	16.3.8.4	18.4.8.3	19.3.19.2	21.3.18.2	27.3.20.3
Nonadjacent channel rejection <sup>*7</sup>	17.3.10.4	--	17.3.10.4	19.3.19.3	21.3.18.3	27.3.20.4
Receiver maximum input level	17.3.10.5	16.3.8.3	18.4.8.4	19.3.19.4	21.3.18.4	27.3.20.5

\*6: 802.11ac Rx test measurements require MX886200A-001

\*7: Requires signal generator (sold separately) for interference waveform

"--" Means not specified in standards

## Easy Finished Product Check (Network Mode)

### ■ Confirm Operation at Close-to-Live Operation Conditions (Network Mode)

The MT8862A has a built-in Network Mode for evaluating the wireless quality of finished WLAN products under close-to-live operation conditions. It evaluates transmitter and receiver performance using simple connections realizing general WLAN communications procedures.

### ■ Easy Setup (Preparing Measurement Environment)

Connect the MT8862A and Control PC by LAN cable.

Connect the MT8862A and WLAN product either by cable or antenna (OTA) to complete setup.

### ■ Easy Measurement

Start measurement in three easy steps.

Step 1: Power-on the MT8862A, Control PC, and WLAN product.

Step 2: Use a Web browser at the Control PC to access the MT8862A GUI and select the MT8862A SSID on the WLAN product.

Step 3: Measurement starts as soon as the link is established.

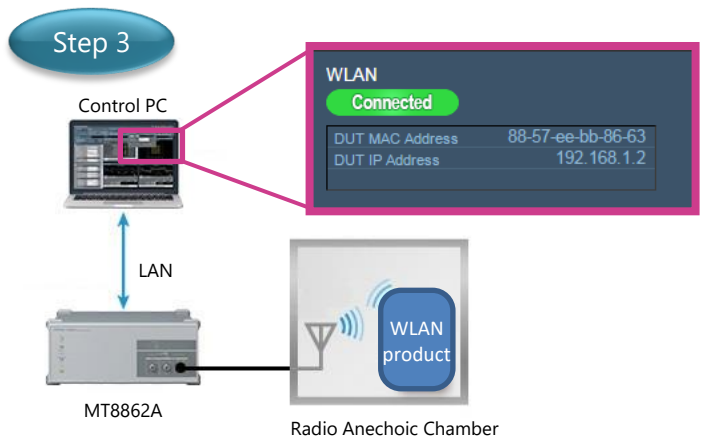
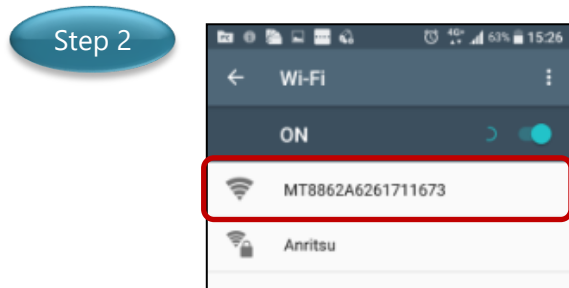
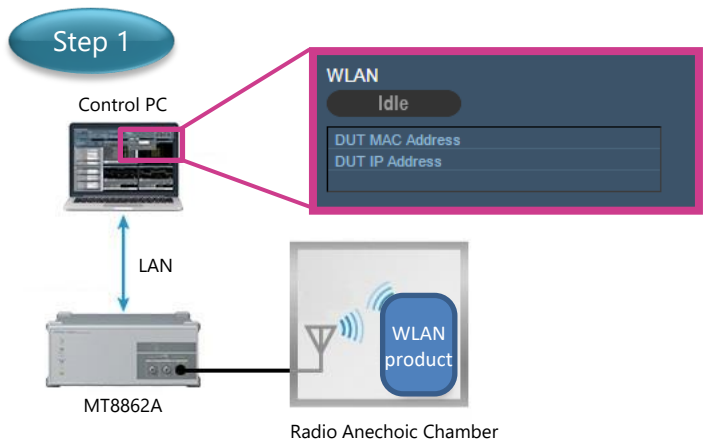
### ■ Security Enabled Measurements <MX886200-020 WLAN Security Function>

The MT8862A can connect and perform measurements without disabling the WLAN product security settings.

- It supports WLAN IEEE802.11a/b/g/n/ac (2.4/5-GHz bands) [Access Points/Stations]
- It supports WEP, WPA-Personal, WPA2-Personal

The measured **transmit power**, **modulation accuracy**, and **receiver sensitivity** results can be evaluated.

Be sure to evaluate WLAN product connectivity and performance using Anritsu's MT8862A to help improve product reliability for customers.



WLAN Equipment Over the Air (OTA) Setup

## Ordering Information

Model	Name	Remarks
MT8862A	Wireless Connectivity Test Set	Main Unit
MT8862A-001	RF Frequency 2.4 GHz, 5 GHz <sup>*8</sup>	Required: Option
MX886200A	WLAN Measurement Software <sup>*9</sup>	Required: Software for IEEE 802.11b/g/a/n TRx evaluation
MX886200A-001	WLAN 802.11ac Option <sup>*10</sup>	Expansion: Software for IEEE 802.11ac TRx evaluation
MX886200A-020	WLAN Security Function <sup>*10</sup>	Expansion: Software for WEP, WPA-Personal, WPA2-Personal support

<sup>\*8</sup> Requires MT8862A; <sup>\*9</sup> Requires MT8862A-001; <sup>\*10</sup> Requires MX886200A