

For ETSI EN 301 489-17 Immunity Test PER Measurement for Wireless LAN Devices

Wireless Connectivity Test Set MT8862A

ETSI updated their EN 301 489-17 European EMC standard in September 2020, adding Packet Error Rate (PER) measurement to immunity testing.

The Wireless Connectivity Test Set MT8862A can evaluate the PER as well as the RF TRx characteristics during communications with commercial wireless LAN (WLAN) devices. It supports both fixed or varying Rx power levels.



New Minimum Performance Level Reference Established by PER

In the immunity test, to check the items listed below, a device is radiated with electromagnetic waves while it is communicating with a WLAN device. The standard defines a minimum PER measurement reference value for evaluating pass/fail performance.

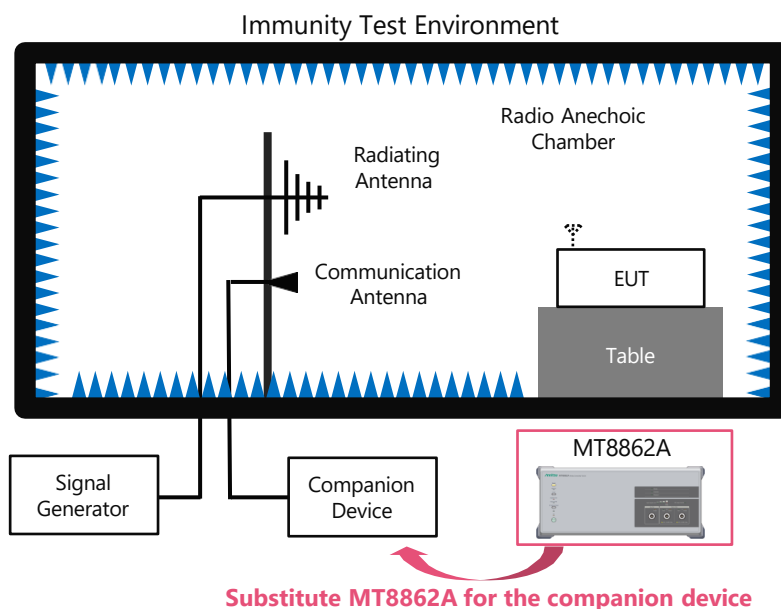
[Check items]

- Shall operate as intended.
- Shall exhibit no loss of function.
- Shall be no unintentional transmissions.
- **Shall have PER not greater than 10%.**

The immunity test is to be conducted in a radio anechoic chamber as shown in the right-hand figure.

The previous version of the standard required a test environment in which the companion device and Equipment Under Test (EUT) communicate with each other. The updated standard adds PER measurement, which most companion devices do not support.

Therefore, test equipment supporting PER measurement is to be used, rather than a companion device.



During PER measurement, communications between the EUT and test equipment must comply with the following conditions. The MT8862A fully supports these requirements.

*Extract from 4.2.3 Arrangements for test signals at the input of receivers.

"For radiated immunity, the level of the wanted signal at the input of the receiver or the enclosure port of the EUT shall be 30 dB (± 6 dB) above the Pmin for the EUT." (Pmin: minimum power required to establish communication link)

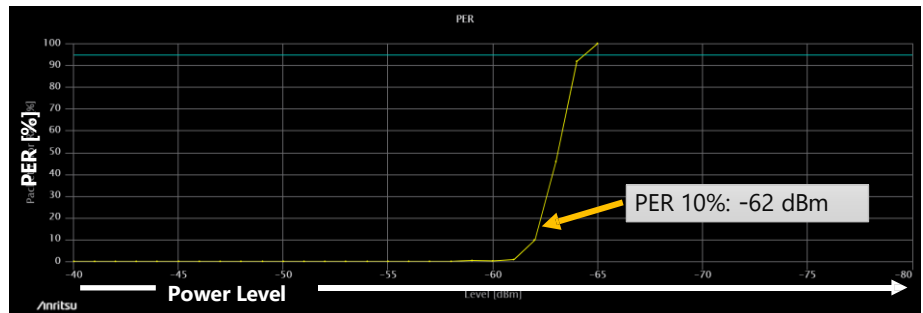
Overview of Immunity Test Procedure Using MT8862A

Determining the receiver sensitivity performance.

Step 1.

Set "Test Mode" to "Search", and "Start Level" and "Stop Level" according to the search sensitivity of the EUT. The MT8862A varies the power, sweeping from the highest power level to the lowest. Confirm the power level when the PER reaches 10%.

Sensitivity Search	
• Test Item	PER
• Test Mode	Search
• Test Limit PER	95 %
• Test Limit FRR	5 %
• Start Level	-40.0 dBm
• Stop Level	-80.0 dBm



Example based on the above results

Checking the change in error rate at the fixed power level.

Step 2.

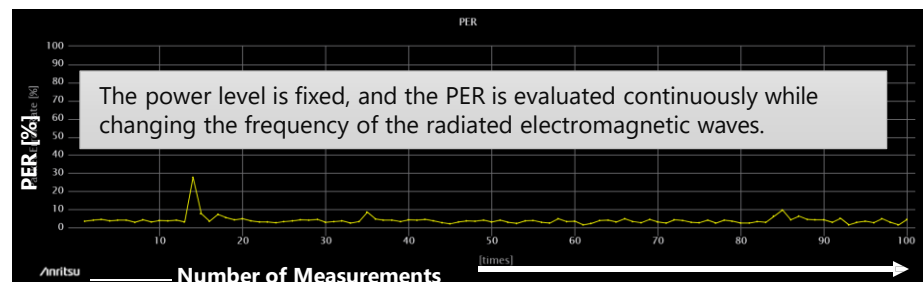
Set "Level" to 30 dB higher than the power level determined in Step 1 when PER reached 10%.

Sensitivity Search	
• Test Item	PER
• Test Mode	Fixed
• Level	-32.0 dBm

*Example based on the above results
-32 dBm = -62 dBm + 30 dB

Step 3.

Apply electromagnetic waves as an interference signal from the signal generator of MT8862A. Evaluate the PER while varying the frequency of the applied electromagnetic waves from 80 MHz to 6 GHz. Confirm that the PER does not exceed 10%.

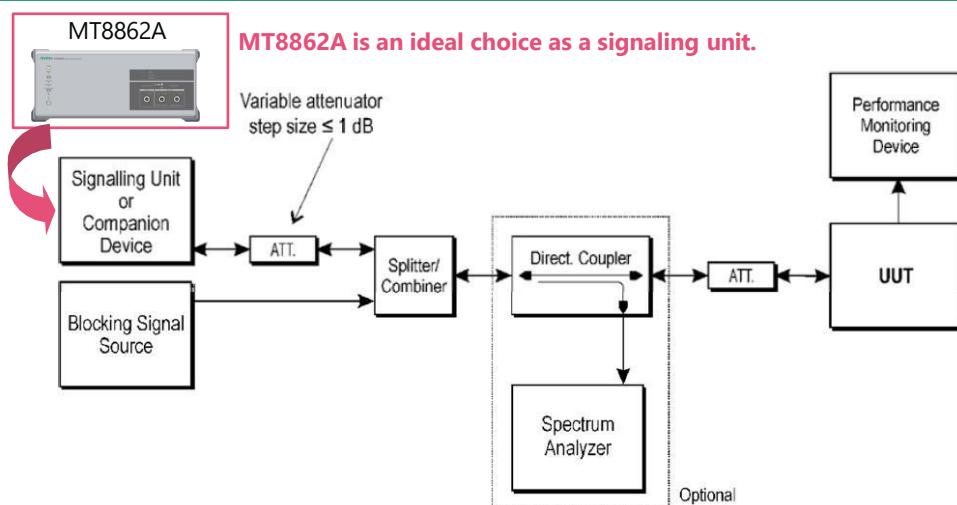


Example based on the above results

Other PER Measurement Requirement for CE marking.

In addition to the EMC, the Radio Equipment Directive (RED) 2014/53/EU also defines the use of radio frequencies and each frequency band used for a WLAN.

Most of the test items in the use of radio frequencies relate to the transmitter characteristics. In addition, however, a "Receiver blocking test" was added after 2016, while the validation of the PER measurement results became mandatory.



Test set-up for receiver blocking
(source: EN 300 328 V2.2.2)

The related standards are listed below.

2.4 GHz : EN 300 328 V2.2.2 "Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz band; Harmonised Standard for access to radio spectrum"

5 GHz : EN 301 893 V2.1.1 "5 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum"

6 GHz : EN 303 687 V1.1.1 "6 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum"