

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

Wireless Connectivity Test Set MT8862A

The ETSI EN 301 489-17 European EMC standard was updated in September 2020 to add Packet Error Rate (PER) measurement to immunity testing. The MT8862A can measure RF TRx characteristics during communications with commercial wireless LAN (WLAN) devices. It has the PER measurement function required by the immunity test and supports fixed or changing Rx power levels.

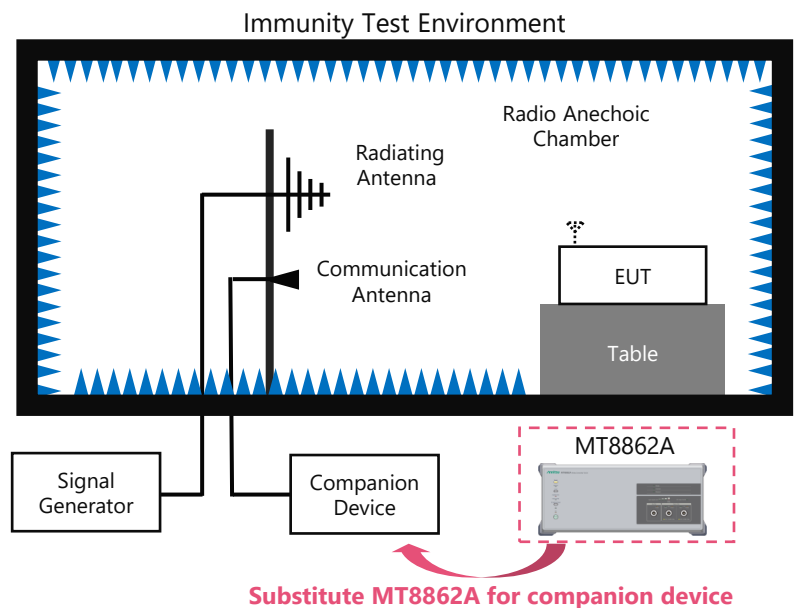


New Minimum Performance Level Reference Established by PER

The immunity test is performed by radiating electromagnetic waves during communications with a WLAN device to check the items listed below. This update defines the minimum PER measurement reference value to evaluate pass/fail performance.

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

The immunity test is performed in a radio anechoic chamber as shown in the opposite figure. In a previous revision of the standard, operation was checked while the companion device and Equipment Under Test (EUT) were communicating with each other. The recently updated standard added PER measurement, which most companion devices do not support. **Therefore, instead of the companion device, test equipment supporting PER measurement is needed.**



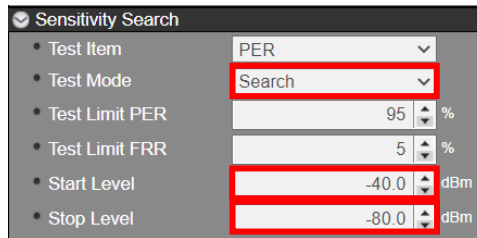
During PER measurement, communications between the EUT and measuring instrument must comply with the following conditions, which are supported by the MT8862A.
 *Extract from 4.2.3 Arrangements for test signals at the input of receivers.
 "For radiated immunity, the level of the wanted signal at the input 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 and MT8862A Configuration

Search the receiver sensitivity performance.

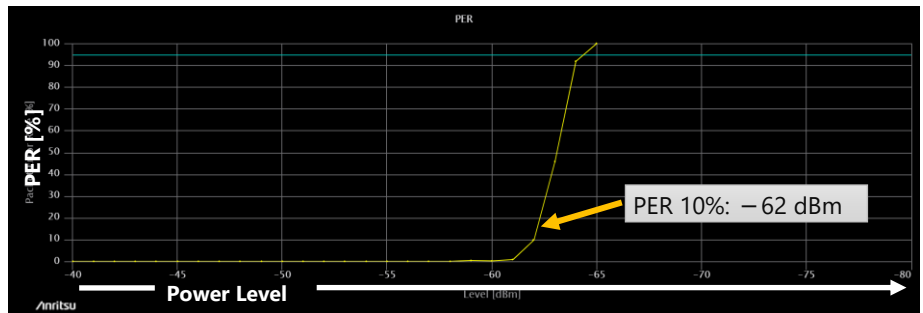
Step 1.

Set Test Mode to Search, and Start Level and Stop Level according to the search sensitivity. Power sweeping is performed starting from the highest power level to the lowest. Confirm the power level when PER is 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

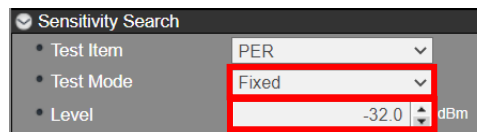


Measurement Result Example

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

Step 2.

Set Level to 30 dB higher than the power level found in step 1 when PER was 10%.



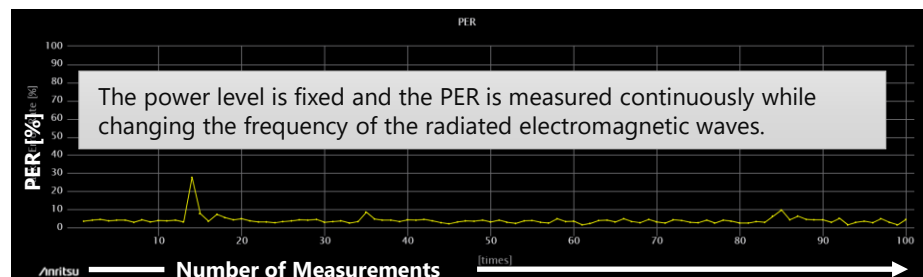
Sensitivity Search

- Test Item: PER
- Test Mode: Fixed
- Level: -32.0 dBm

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

Step 3.

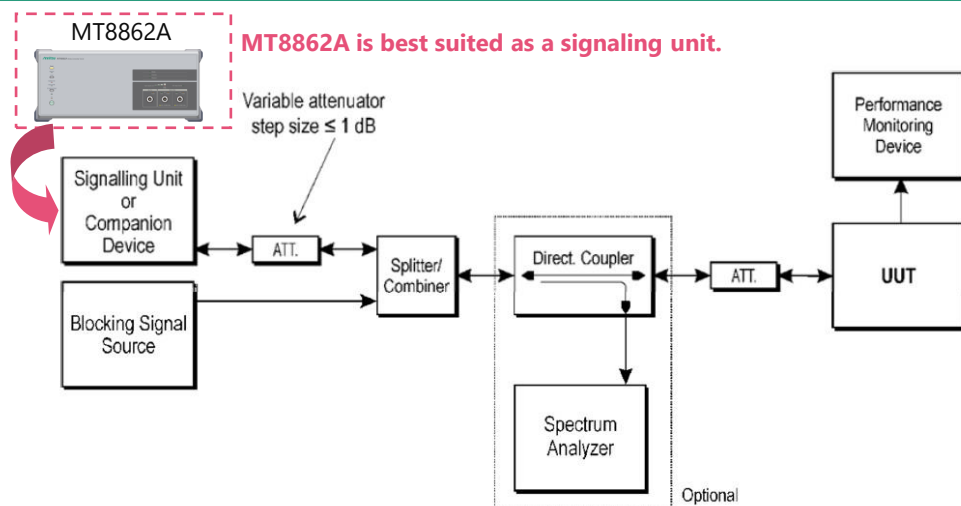
Radiate electromagnetic waves from the signal generator. Measure PER while changing the frequency of the radiated electromagnetic waves from 80 MHz to 6 GHz and confirm that PER does not exceed 10%.



Measurement Result Example

Other PER measurement requirement for CE marking.

In addition to EMC, Radio Equipment Directive 2014/53/EU also defines the use of radio frequencies, and for WLAN, two EN standards are defined for each frequency band. Most of the test items in the use of radio frequencies are related to transmitter characteristics, but a "Receiver blocking test" was added after 2016, and judgments based on PER measurement results are has been established.



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

- 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 RLAN; Harmonised Standard for access to radio spectrum"**

As of October 2021, there are two standards, one for the 2.4 GHz band and one for the 5 GHz band, both of which have the "Receiver blocking test". Since EU has just decided to open up the spectrum in June 2021, standards for the 6 GHz band are still being developed. The PER measurement may become mandatory in this developing standard.

- 6 GHz : EN 303 687 "6 GHz RLAN Harmonised Standard for access to radio spectrum"**
(In development, Publication is scheduled for November 22, 2022.)

Typical MT8862A Product Configuration

Model	Name	Remarks
MT8862A	Wireless Connectivity Test Set	Main Unit
MT8862A-001	RF Frequency 2.4 GHz, 5 GHz	Required option
MT8862A-002	RF Frequency 6 GHz	Option supporting 6-GHz band
MT8862A-010	Extended RF Hardware	Option supporting 6-GHz band
MX886200A	WLAN Measurement Software	Required option for IEEE 802.11b/g/a/n TRx evaluation
MX886200A-001	WLAN 802.11ac Option	Optional software for IEEE 802.11ac TRx evaluation
MX886200A-002	WLAN 802.11ax Option	Optional software for IEEE 802.11ax TRx evaluation
MX886200A-020	WLAN Security Function	Supports WEP, WPA/WPA2/WPA3-Personal encryption
MX886200A-030	160 MHz Bandwidth	Supports 160-MHz bandwidth

*Functional details of each option and dependencies between options are described in the product brochure.