

# RF-PERFORMANCE MEASUREMENTS FAQ

---

## 1. What is RF-performance measurement?

The RF-performance measurement covers radio performance i.e. testing of radiated power (TRP), radiated sensitivity (TIS) etc. These are key parameters for good performance for smooth network integration and long range.

## 2. What is the benefit and aim of RF-performance measurement?

Every LoRa end-device needs to be ETSI EN 300 220-2 (regulatory approval) compliant before can be sold in the European Union. The declaration of conformity (DoC) is according to directive 2014/53/EU. For the 868 MHz ISM band, the main requirement is that the device should not radiate more than 14 dBm (or 25 mW) effective radiated power (ERP) for any orientation. RF-performance measurements ensure that the device actually radiates as much power as possible to maximize the robustness and usable data rate of the uplink, while not exceeding the 14 dBm.

## 3. Why do some network operator requiring these measurements?

The possibility of connecting an end-device to an operator's network depends on the quality of the radio implementation of the end-device. As such, operators should impose minimum end-device radio performance criteria to be able to ensure consistent service to all end-users. Since the LoRaWAN networks are symmetrical, bi-directional networks, the end-device receiver performance is of same importance as the transmitter performance.

## 4. What are the initial requirements to undergo the RF-performance measurements?

a) For official LoRaWAN RF-performance measurements, one needs to be a member in LoRa Alliance. If any assistance is needed by registering, you may contact the Alliance.

Contact details: [help@lora-alliance.org](mailto:help@lora-alliance.org)

b) Pre-Compliance measurements or measurements with different parameters may not require a LoRa Alliance membership.

c) Contact IMST for a quote. Fill in the [questionnaire](#) (sections 01 to 06) and send it to [contact@loratest.de](mailto:contact@loratest.de)

## 5. What is the RF-performance measurement procedure with IMST?

The LoRaWAN RF-performance measurement program with IMST is as follows:

- a) Prepare your product(s) for RF-performance measurement.
  - The end-device must fulfill the specification [LoRa Alliance End-Device Certification Radiated RF Performance for EU 868 MHz ISM Band Devices](#).
  - The end-device must fulfill the [LoRaWAN specification version 1.0.2](#) or newer, which specifies the test mode (TM) and continuous wave (CW) transmit mode.
  - The end-device must fulfill the LoRa Alliance [End Device Certification Requirements for EU version 1.3](#) or newer.
- b) The end-device comes with integrated antenna or external one. In case the device is equipped with a detachable antenna the manufacturer and model of the antenna shall be declared in the report. If the end-device is battery powered, the measurement should be done using its own battery supply, which is also stated in the report.
- c) Deliver your product to us. Either one or both activation methods should be ready: „Over The Air Activation (OAA)“ or/and „Activation By Personalization (ABP)“. If standard LoRaWAN certification is also required, two devices, one for certification testing and another one for spare shall be provided. A switching between both modes is also provided from IMST test system. Please provide us also a short instruction how to bring the device in operation to begin with the testing.
- d) We will perform the certification tests and provide you or the Alliance with the results, depending on request.
- e) In case the node fails performance requirements we can help with test diagnostics and guidelines for corrections. The device needs to be retested again.
- f) Alliance reviews the test result and saves the results, while not publishing them. Published will only be that RF-performance measurements are present for the respective device.

## 6. What is the price of the measurement?

The costs for the measurements are 2.5 k€ per test (LoRaWAN requirements for the test), includes test diagnostics and instructions for corrections in case the node fails performance criteria.

## 7. How long does it take to run the RF-Performance measurements?

The RF-performance measurements can be conducted in about half a day. The report is available about 1-2 days after the measurement.