Sigfox Requirements For Radiated Performance Test Report

Internal use / External Use

1. Scope

This document explains the minimum requirements of a Sigfox Radiated performance test report. It is addressed to *Sigfox Accredited test house.*

2. Definitions and Acronyms

Device:
A manufactured end-product that is intended for use by end-user customers on the Sigfox network.

Device Under Test:
Candidate device for certification and used as reference product during the test.

Effective radiated power (ERP):
The power radiated in the direction of maximum field strength under specified conditions of measurements.

$$ERP_{dBm} = Conducted\_RF\_Power_{dBm} + Antenna\_Gain_{dB}$$

Effective Isotropic Radiated Power (EIRP):
EIRP refers to an isotropic antenna whereas ERP refers to a perfect dipole antenna. The relation between ERP and EIRP is:

$$EIRP_{dBm} = ERP_{dBm} + 2.15_{dB}$$

Partner:
The person/company developing a Sigfox product which can be either a Modular Design, Device, or Development Solution, intended to go through the Sigfox certification process.

Radiation pattern:
The variation of the power radiated by an antenna as a function of the direction away from the antenna. This power variation, as a function of the arrival angle, is observed in the antenna's far field.

Radiated receiver sensitivity:
The minimum level of signal at the receiver input, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal modulation.

Sigfox Accredited test house:
is a test house accredited by Sigfox to execute Sigfox RF & protocol tests and/or Sigfox radiated performance tests.

Sigfox ReadyTM certification:
is the certification required for each Device that is intended to operate on the Sigfox network.

Table 1: Acronyms

Acronyms	Definitions
2D	Two dimensions
CW	Continuous wave
DUT	Device Under Test
EIRP	Effective Isotropic Radiated Power
EIRS	Effective Isotropic Radiated Sensitivity
ERP	Effective Radiated Power
FW	Firmware
HW	Hardware
SCA	Sigfox Certification Authority
RC	Radio Configuration
RF	Radio Frequency
RX	Receive
TX	Transmit

3. Test specification

Sigfox accredited test houses shall follow Sigfox Radiated performance test specifications to perform Sigfox radiated performance tests.

his document is stored in *build.sigfox.com*

4. Deliverables

The mandatory information to be included in each test report is listed below:

General information

- Test House name and address.

Device maker name and contact (applicant and manufacturer)

- Date of test.
- Date of report.
- Operator and supervisor name and signature.

DUT description

- Model name.
- HW revision.
- FW revision.
- Sigfox radio configuration (RC).
- Operating frequencies.
- Kind of device, product description, use case.
- Internal battery or external power supply.
- Voltage (nominal).
- Internal or external antenna.
- Antenna type.
- Antenna gain.
- Photo of the DUT.
- Photo of DUT into the anechoic chamber.
- Ancillary / auxiliary equipment provided with DUT.

TEST CONDITIONS

- Test equipment list (category, brand, reference, date of calibration, next calibration date) and software.
- Test standards
    - ETSI EN300-220
    - FCC Part 15-247
- Measurement distance.
- Environment (temperature, humidity and pressure)
- Measurement uncertainty.

EIRP

- Test setup description (used materials, method)
- DUT configuration (position, mode…)
- The maximum EIRP, or ERP, clearly defined and highlighted.

NOTE The value corresponds to peak measured in one DUT orientation, one polarization.

- If the value is superior than Sigfox limit, indicate the following mention:

Warning:

As ERP/EIRP measurement value is higher than the Sigfox recommended limit, manufacturer must verify that his product complies with its local regulation limits and with any target country where the device is to be deployed.

Radiation pattern

- Test setup description (used materials, method)
- DUT configuration (position, mode…)
- Indicate the DUT reference position.
- 2D or 3D representations.
- For each representation, indicate:
    - the plan considered.
    - the polarization.
    - the value in dBm or referenced from the peak.
- The values must be provided in a table

Warning:

If the DUT is declared with single and fixed position, only one measurement can be considered. If the DUT is declared as a multi-position, the radiation pattern for each orientation or a 3D representation must be provided.

CONDUCTED POWER (OPTIONAL)

- Test setup description (used materials, method)
- DUT configuration (position, mode…)
- Conducted power in dBm.

NOTE Not required by Sigfox but may be requested by partner. To be indicated if available.

RX TESTS (OPTIONAL)

Report shall integrate the following test information for RX tests:

- Describe the test setup and method.
- Schematic or picture of anechoic chamber.
- Provided the EIRS value only for the best DUT position (where peak EIRP has been measured).

Changes description

Version	Description	Author	Date
0.1	Initial spec	B.Ray	August 15th, 2017
0.2	Removed laboratory accreditation number	B.Ray	December 11th, 2017
1.0	Change of template, review of all paragraph for update.	V.GAMONAL	February 15th, 2019