RWC5020x-64

All in One Tester for LoRa®/LoRaWAN®



GENERAL DESCRIPTION

The RWC5020x-64 Tester for LoRa®/LoRaWAN® is a compact, all-in-one tester that provides an ideal solution for testing and measuring LoRa® and LoRaWAN® technology. It is well-suited for R&D, quality control, and manufacturing across 16, 64, and 96 channels based on regional parameters. It provides various test functions that can be performed in signaling mode, including activation procedures, as well as in non-signaling mode. Automated PC software helps users test and debug their devices by performing pre-certification tests as specified by the LoRWAN®.

LoRaWAN® COMPLIANCE

Confirming that the end device meets the functional requirements of the LoRaWAN® protocol specification

RWC5020B pre-certification test is recommended for the purpose of pre-qualification. Since RWC5020B supports 8/16/64/96 channels, it can measure all the functions and performance of the DUT without channel limitations depending on the region.

Supported LoRaWAN® Protocol

- Compatible with LoRaWAN® version of V1.0.2, 1.0.3, 1.0.4 and V1.1.0 & Class A/B/C
- Optionally up to 64(125kHz)+8(500kHz) channels for US/CA/AU915, 96(125kHz) channels for CN470, 16(125kHz) channels for EU868/EU433/KR920/AS923/IN865/RU864.



RWC5020x supports 16,64, and 96 channels

Supported LoRaWAN® Region

EU 868 // EU 433 // US 915 // AU 915 // CN 470 // KR 920 // AS 923 // IN 865 // RU 864

Supported Pre-certification Test Option

LoRaWAN® Specification 1.0.2:

- LoRaWAN® European EU 863-870MHz Region End Device Certification Requirements
- LoRaWAN® US + Canada 902-928MHz Region End Device Certification Requirements
- LoRaWAN® Asia AS 923MHz Region End Device Certification Requirements
- LoRaWAN® South Korea 920-923MHz Region End Device Certification Requirements
- LoRaWAN® India IN865-867MHz Region End Device Certification Requirements

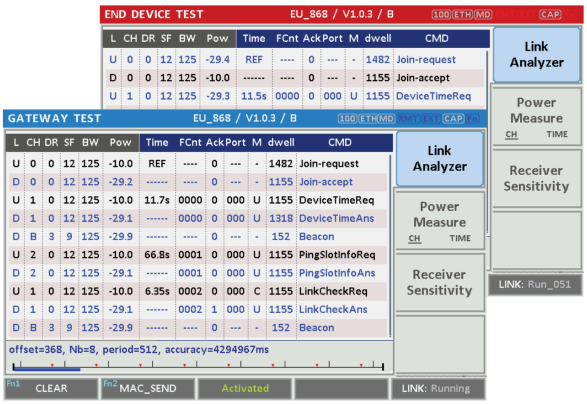
LoRaWAN® Specification 1.0.4:

- LoRaWAN® Certification Requirement for All Regions
- LoRaWAN® Class B/C Certification Requirement for All Regions
- Supported Regions: EU868, US/CA915, AS923-1/2/3/4, KR920, IN865, AU915, RU865, and EU433

LINK ANALYZER

Analyzing frames for MAC/PHY analysis

RWC5020B provides a function of Link Analyzer for EDT and GWT. Link Analyzer in EDT (or GWT) helps to create a link between RWC5020B and an End Device (or Gateway/Server) Under Test and to analyze the protocol messages.



Link Analyzer in EDT/GWT

MAC command Test

- Multiple MAC commands in a single frame
- All MAC commands defined in LoRaWAN with user-configurable parameters
- Field selection: frame payload or frame options
- Message type selection: confirmed or unconfirmed
- User defined message: editable payload data and port field

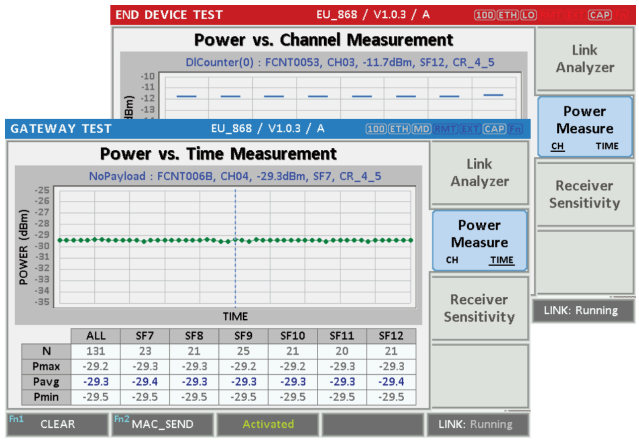
POWER MEASUREMENT VS. CH/TIME

Continuously monitoring TX power of DUT with respect to channels and data rates(SF)

RWC5020B provides a function of Power vs. Channel/Time

measurement for EDT and GWT. It helps to create a link between RWC5020B and an End Device (or Gateway/Server) Under Test and to measure the received power with RF channels or respect to data rates.

- ○ Continuous monitoring of DUT's TX Power w.r.t. Channel
- ○ Calculating the maximum/average/minimum values



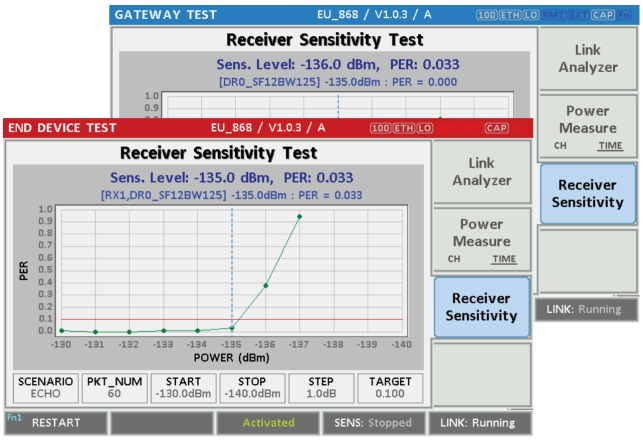
Power Measure CH/TIME in EDT/GWT

RECEIVER SENSITIVITY

Finding the minimum power level at which DUT can receive frames from the Tester

Receiver Sensitivity is a function of testing the receiver performance of DUT. RWC5020B sweeps its power level from the start value to the stop value with the step value and checks whether DUT functions properly, and stops immediately after DUT does not function properly to find the minimum sensitivity level.

- ○ Determine power range and step for testing
- ○ The result value is the minimum power level at which DUT can receive the Tester's frame



Receiver Sensitivity Test for ED/GW

SIGNAL GENERATOR

Transmitting LoRa test frames/CW

Signal Generator is a function of transmitting the defined test waveform to DUT repeatedly. Three different modes are provided; LoRa, FSK and CW. Especially in case of LoRa and FSK modes, various parameters are configurable to compose a LoRa test frame.

DUT's RX Performance Test

- ○ Set the DUT to always listen the pre-defined packet
- ○ Tester transmits pre-defined number of packets
- ○ DUT needs to calculate PER by itself

SIGNAL ANALYZER

Receiving LoRa frames and measuring the power

Signal Analyzer is a function of analyzing LoRa frames received from DUT repeatedly. Various parameters are configurable to receive a specific LoRa or FSK frame. Additionally TX power and frequency of DUT is measured in LoRa or CW mode.

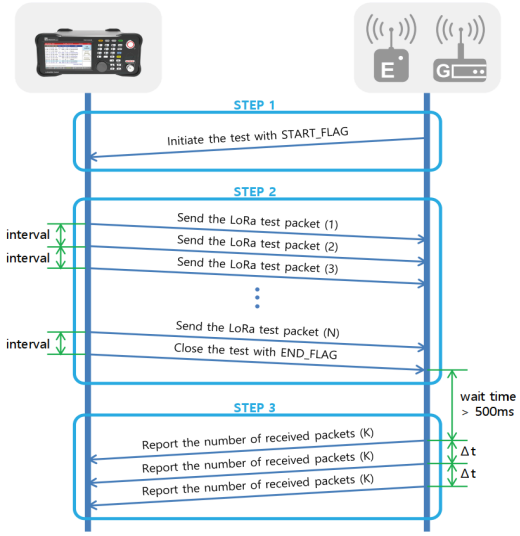
DUT's TX Performance Test

- ○ Set the DUT to always transmit the pre-defined packet
- ○ Tester measures TX power and CW frequency

MFG

Speeding up the test in production lines

MFG is a function of manufacturing tests to measure the TX and RX performances of DUT simultaneously; power measurement for TX and sensitivity measurement for RX respectively. Basically manufacturing tests of LoRa products should be performed in non-signaling mode because of two reasons; test time and a type of DUT.



MFG Test Procedure

PC APPLICATION PROGRAM

Automated test

This PC application provides a variety of special measurement functions such as LoRaWAN pre-certification test, RF performance measurement, link message logging and DUT control. The RWC5020B automatically measures specified characteristics such as the PER of the DUT, obtains data such as link messages or measurement data according to the LoRa Alliance standard, summarizes and creates the report.



PC Application Program connected to RWC5020x

Semtech's Non-regression Tests for Gateway

RWC5020x provides the Semtech's Non-regression tests for gateway performance. The application software will manage RWC5020A/B/M and RWC2020A, and will internally run a simple network server function which can communicate with a gateway under test via the JSON interface. It consists of TX output power measurement, sensitivity, PER, RSSI, SNR, frequency error tolerance, and CW interferer immunity.



Semtech's Non-regression test

SPECIFICATION

Frequency	Range: 400MHz ~ 510MHz, 862MHz ~ 960MHz Resolution: 100Hz Stability vs. +25℃: ±0.5ppm standard Stability vs. Aging: ±1ppm/1st year
Output Level	Range: 0dBm ~ -150dBm Resolution: 0.1dB Accuracy: ±1dB Impedance: 50Ω
Input Level	+30dBm ~ -80dBm for Power Measurement +30dBm ~ -50dBm for Frequency Measurement
Measurement Accuracy	±1dB for Power ±1KHz for Frequency (Single Tone)
VSWR	Better than 1:1.5
External Frequency Reference	Frequency: 10MHz Power Range: 0dBm ~ +20dBm
Remote Programming Ports	RJ45(Ethernet) RS-232C
Miscellaneous	Operating temperature: 5 ~ 40℃ Line Voltage: 100 to 240 VAC50/60Hz Dimension: 250(w)x110(h)x348(d)mm Weight: 5kg

ORDERING INFORMATION

Main Product

Order Code	Part Name
C5020B-00	EDT+GWT+NST
C5020B-01	EDT+GWT
C5020B-02	NST
C5020B-03	EDT
C5020B-04	GWT
C5020B-05	EDT+NST
C5020B-06	GWT+NST

Options

Order Code	Part Name
O5020B-01	LoRaWAN Pre-Cert EU868*
O5020B-03	LoRaWAN Pre-Cert US915*
O5020B-04	LoRaWAN Pre-Cert AS923*
O5020B-05	LoRaWAN Pre-Cert KR920*
O5020B-06	LoRaWAN Pre-Cert IN865*
O5020B-09	LoRaWAN Pre-Cert AU915*
O5020B-11	LoRaWAN Pre-Cert RU864*
O5020B-12	LoRaWAN Pre-Cert EU433*
O5020B-64	16/64/96 CH Channels
O5020B-98	Calibration
O5020B-99	SW/FW Maintenance

*Purchasing five Pre-Cert options will come with free licenses for all regions

CONTACT

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