

Methodology for IOT LoRaWAN end-device testing

1 Required information

1. Testing sample
2. Complete set of documentation (Datasheet, instalation manual, UL/DL payload structure)
3. Activation parameters and test sample identification:
 - DevEUI, DevAddr
 - Device type
 - Producer/distributor + suport contact
 - AES128 keys (NwkSkey, AppSkey)
4. Test report of consumption measurement (if the producer cannot deliver the report, CRA can do the measurement itself. In this case test sample should be sent to CRA)

2 Test procedure to verify recommended settings for use in CRA IoT network

1. Device registration into IoT portal (internally by CRA into account registered to CRA)
2. ABP/OTAA device activation
3. Verification of basic communication features
4. Comparative RF & antenna test – using Adeunis FTD demonstrator
5. One month stability and performance testing (interval 1 msg/5min). From the event. log it will be observed and analysed:
 - Frequencies used for device communication
 - Response to MAC commands sent by Network Server
 - ADR support
 - UL and DL Message seqno
 - Message format
 - Battery status derived from DevStatusAns MAC command
 - Usage of RX1 and RX2 window
6. Test report will be elaborated

Values not subject of testing – primary sensor functionality (temperature, pressure,...)

3 Mandatory criteria to pass the testing procedure

- Device activation (ABP or OTAA method)
- When the ABP method applied – communication over all 8 available channels (868.1, 868.3, 868.5, 867.1, 867.3, 867.5, 867.7, 867.9 MHz)
- Confirmation of the messages and MAC commands when sent and required by Network server
- Battery status level = 0 for the devices with the external power supply, 1-254 for the battery powered devices.
- When the OTAA method applied – CRA requires implementing re-join feature. If the device doesn't support this feature, the device still can pass the certification process. In that case, the re-join feature will be marked as an optional feature.

4 Test Description

Comparative RF & antenna test – during the tests Adeunis FTD demonstrator will be used. The tested sensor will be placed in the CRA LAB next to the Adeunis FTD. All datagrams will be received at the local gateway in the LAB. The received values of RSSI and SNR from both devices will be compared in the CRA metadata engine (MDE). The final result will be stored, categorized and used for calculations using a mathematical coverage model.

5 List of certification test

CRA LoRaWAN Certification tests - results
Overall test result
Evaluation date
Tester (responsible person)
Sequence number of the test
Producer
Device type/measured values
LORAWAN module vendor
LoRaWAN stack module version
FW version of LoRaWAN module
Sensor hardware version
Sensor FW version
Certification requirements - version of the document
DevEUI
LoRaWAN class device (A, B, C)
Testing frequency band
Technical contact to vendor/manufacture
Mandatory tests/Information
Complete documentation according to test requirements

<p>Test report or certificate for measured value</p> <p>ABP or OTAA activation</p> <p>Seqno increments</p> <p>Battery status in LoRaWAN protocol (not in payload)</p> <p>Support of all 8 channels</p> <p>ADR support</p> <p>Ability to change the transmitting period</p> <p>Correct acceptance of MAC downlink commands from NS</p> <p>RX1/RX2 window</p> <p>Comparative test (RF & antenna)</p> <p>Battery status at the beginning of the tests</p> <p>Battery status at the end of the tests</p> <p>Stability of the sensor (one month functional test)</p> <p>Optional tests</p> <p>OTAA ReJoin</p> <p>Confirmed messages support</p> <p>Notes</p>
