LoRaWAN Certification
Pre-Test Service start-up guide

1. Package content

The package contains:

- IMST Lite Gateway
- Dipole antenna (suitable for EU 868 MHz ISM band)
- Power adapter
- USB-cable
- Ethernet cable

Figure 1 Pre-Testing HW-Package Contents

2. Gateway startup

Connect the dipole antenna to the RF ANT port (SMA-connector) and connect the gateway to a network with the Ethernet cable. Power it up with the power supply (use 2.5A output).

Figure 2 Connection at LoRa Lite GW (Top View)

Figure 3 Connection Ethernet cable

Figure 4 Connection RF antenna and power supply

3. User interface

Type loratesting.com to your browser (Chrome preferred) and you should see the following screen. Log in using credentials provided in a separate email and press the button "Sign in". Use only one active session to loratesting.com at the same time.

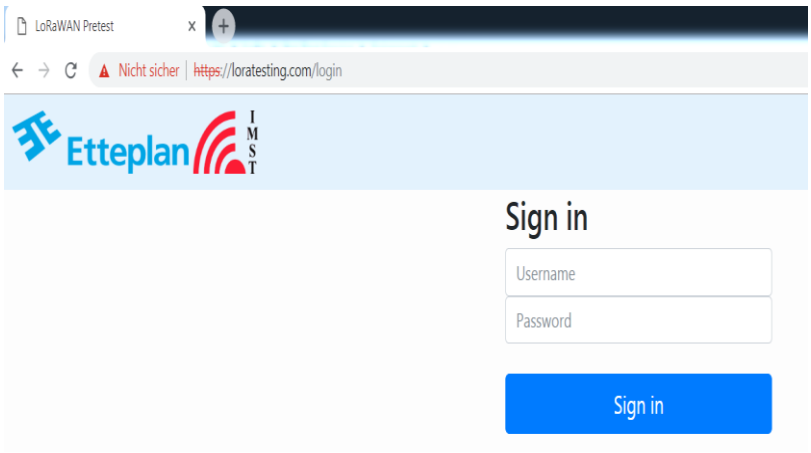


Figure 5 Login Screen

After successful login, you get the following screen.

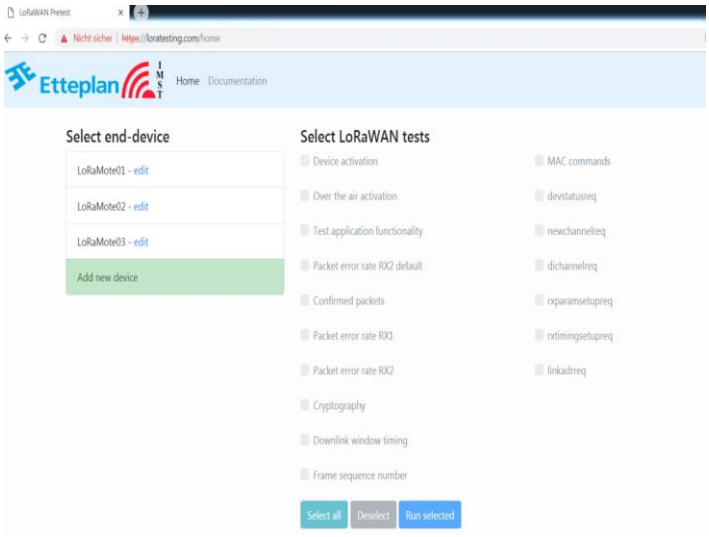


Figure 6 Successful Login

4. LoRaWAN specification version and optional feature support

Here you can select end-device and setting up test parameters. Here you can also Add new device.

After clicking the button “Add new device” you get the following screen. Here you can fill in the parameters and features of your device. You can finish the changes with the button “CreateUpdate”

The next step is to choose which version of the LoRaWAN specification the end-device will be tested against. The activation of the end-device can be chosen to be either over the air (OTAA) or activation by personalization (ABP). If the end-device supports trigger join request –feature in LoRaWAN specification version 1.0.1 and 1.0.2, both activation methods can be selected and tested on the same run. The adaptive data rate (ADR) and (data rates) SF7BW250 and FSK50 (DR6&DR7) are optional features and can be selected depending on the end-device support.

You can finish the changes with the button “CreateUpdate”

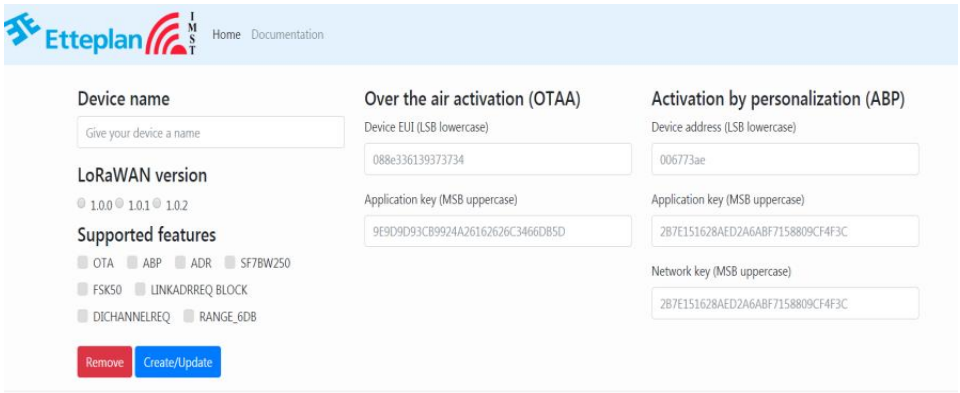


Figure 7 Test Parameter Set

5. End-device parameters

The end-device parameters needed for activation and encryption should be set by using hexadecimal letters. All fields are mandatory for testing, in case only one activation method is used, replace the keys for the other one with zeros for example.

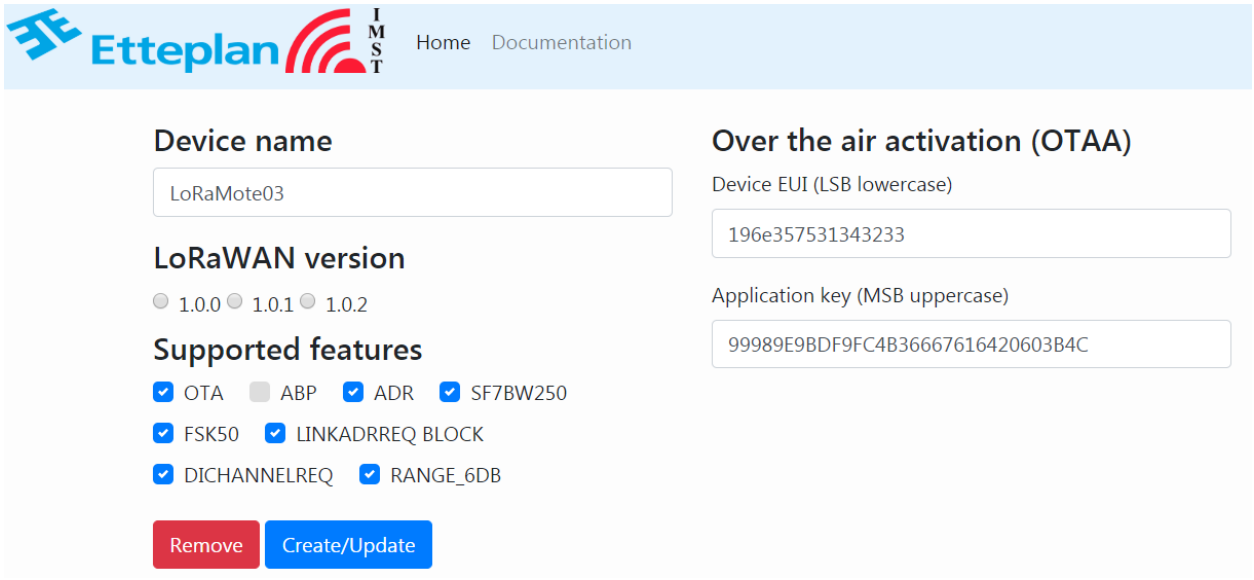


Figure 8 Device Parameter

6. Test selection

The next phase is to select which test cases will be performed for the end-device. The test case for device_activation must always be selected due to the certification test mode is activated there. The full certification test can be done by choosing and end –device (in this case LoRaMote03) ticking all boxes and by clicking "Run selected" button.

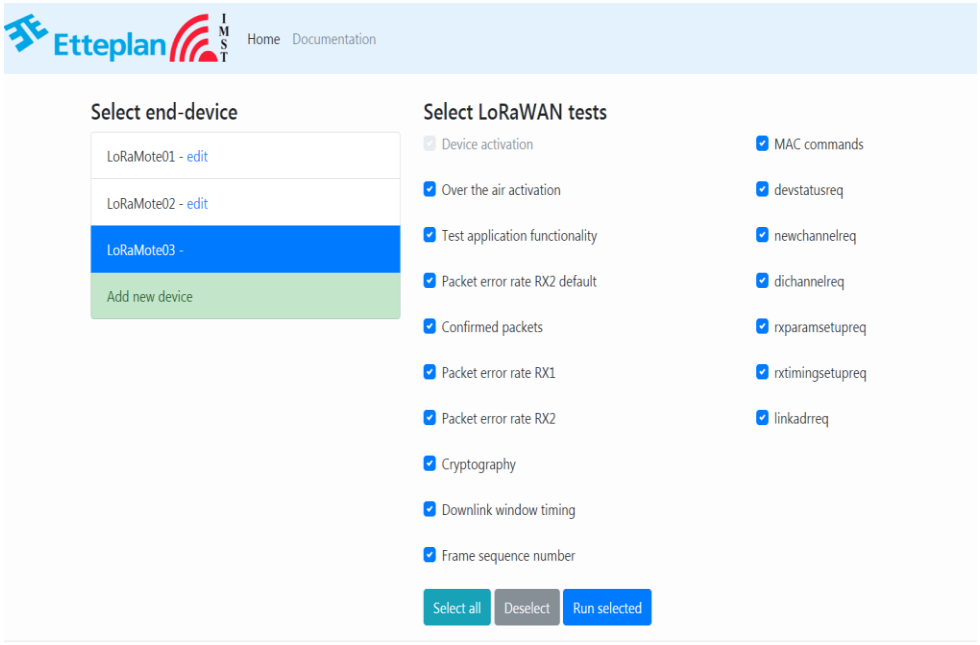


Figure 9 Test Case Selection

7. Test execution

At the beginning the screen is empty. Please click the button “Start test” for beginning with testing.

Figure 10 Test execution

The output of the test system is now showing on the screen and the test execution can be monitored in real time. At first the test server waits the gateway communication, which usually takes less than 30 seconds. Depending on the type of activation, either “Trying to activate node with personalization” or “Trying to activate node by over the air” is showing -> power up the device. The test can be stopped at any time by pressing stop tests.

```
Run LoRaWAN protocol certifications tests
================================================================
Device Activation & Test Application Functionality & Over The Air Activatio...
================================================================
Device Activation & Test Application Functionality & Over The Air Activatio...
================================================================

 -> Connecting to gateway
Enter test mode
 -> Trying to activate node by over the air

 -> Received uplink: port=2, payload=00277f0c47009d00000000000000ffff, fopts=

 -> Node over-the-air activated, addr=aabbccdd

 -> Unconfirmed downlink has been sent: port=224, payload=01010101, fopts=

 -> Received uplink: port=224, payload=0000, fopts=
| PASS |
```

Figure 11 Test Execution

8. Test results

After the test has finished a zip-archive containing the log files (html) can be downloaded by pressing Download results.

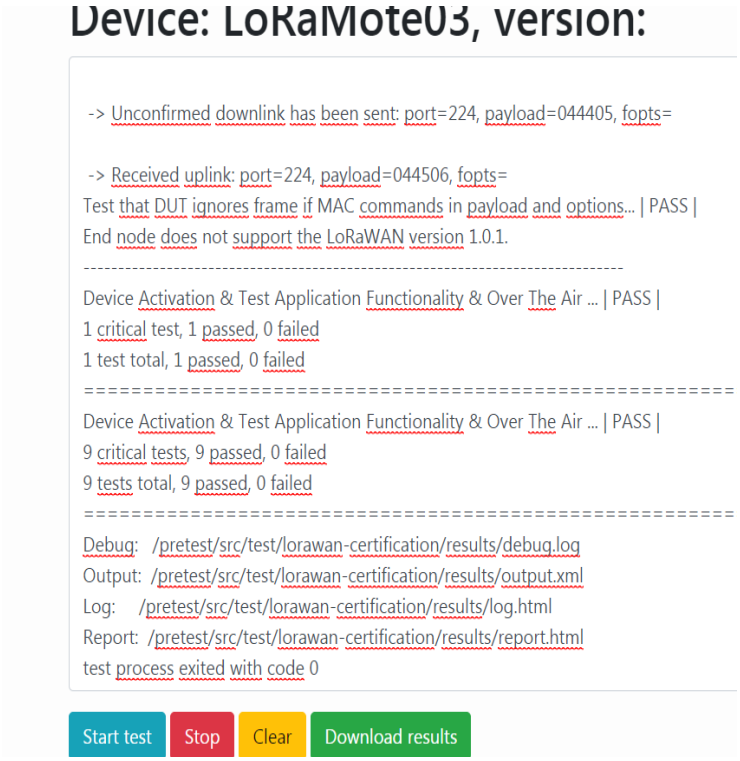


Figure 12 Test Results

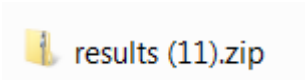
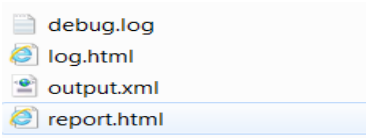
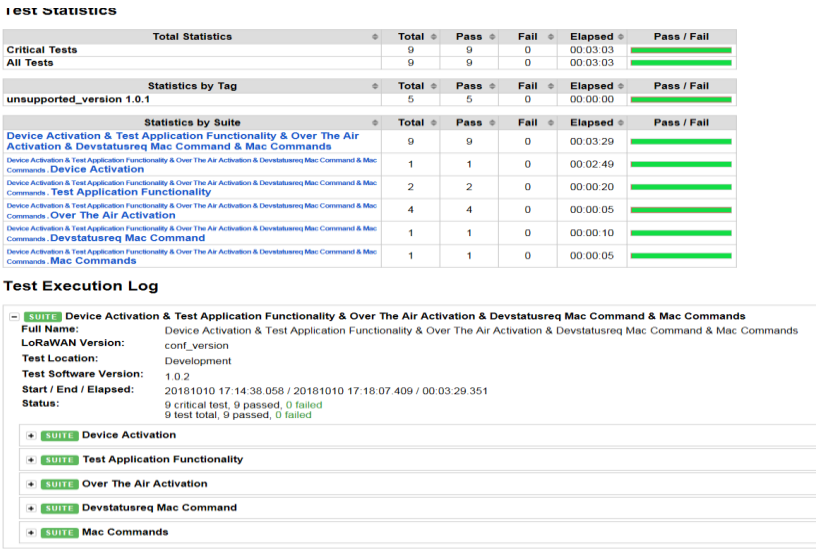


Figure 4 Test Results zip.file

After extraction there are following files:



The log.html contains all necessary information of the test execution and individual test cases can be monitored packet by packet.



Test Statistics

Total Statistics	Total	Pass	Fail	Elapsed	Pass / Fail
Critical Tests	9	9	0	00:03:03	
All Tests	9	9	0	00:03:03	

Statistics by Tag	Total	Pass	Fail	Elapsed	Pass / Fail
unsupported_version 1.0.1	5	5	0	00:00:00	

Statistics by Suite	Total	Pass	Fail	Elapsed	Pass / Fail
Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands	9	9	0	00:03:29	
Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands . Device Activation	1	1	0	00:02:49	
Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands . Test Application Functionality	2	2	0	00:00:20	
Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands . Over The Air Activation	4	4	0	00:00:05	
Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands . Devstatusreq Mac Command	1	1	0	00:00:10	
Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands . Mac Commands	1	1	0	00:00:05	

Test Execution Log

SUITE Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands

Full Name:	Device Activation & Test Application Functionality & Over The Air Activation & Devstatusreq Mac Command & Mac Commands
LoRaWAN Version:	conf_version
Test Location:	Development
Test Software Version:	1.0.2
Start / End / Elapsed:	20181010 17:14:38.058 / 20181010 17:18:07.409 / 00:03:29.351
Status:	9 critical test, 9 passed, 0 failed 9 test total, 9 passed, 0 failed

SUITE Device Activation

SUITE Test Application Functionality

SUITE Over The Air Activation

SUITE Devstatusreq Mac Command

SUITE Mac Commands

Figure 13 HTML Log-File

9. Troubleshooting

IP address is not showing on the screen of the gateway

- Check the power supply and the Ethernet connection
- If the screen is totally blank, the SD-card might be corrupted -> contact IMST, see mail address below.

The output of the test system is not showing on the screen after starting the tests

- Press stop tests, restart your browser and try to log in again

Error "Address already in use" or "Test is already running"

- The test is running on another browser or window -> close all browsers, wait 1-5 minutes and restart the test.

Error "No pull data received from the gateway"

- The gateway does not communicate with the test server -> make sure that the firewall allows outbound traffic on port 22 (SSH)

OTA-activation of the end-device fails

- Check the logs for "Join request from DevEUI: 1122334455667788" -> check that 1122334455667788 matches the DevEUI in the end-device parameters (might be reversed depending on the implementation)
- Check the AppKey

ABP-activation of the end-device fails

- Check the logs for "Uplink packet from an unknown node:11223344" -> check that 11223344 matches the ABP node address in the end-device parameters
- Check the ABP Application/Network Keys

Do not hesitate to contact contact@loratest.de for more specific instructions or troubleshooting.