



Telit Charlie Evaluation Kit Application Example

Application Note

80xxxNT1yyyyA Rev. 0 – 2021-07-26



APPLICABILITY TABLE

PRODUCTS
TELIT CHARLIE EVALUATION KIT

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1. INTRODUCTION

1.1. Scope

This document describes an application's example for the Telit Charlie board, which is used to detect a freefall. All the features and solutions described in this document are applicable to Telit Charlie Evaluation Kit.

1.2. Audience

This document is intended for Telit customers, especially system integrators, about to implement their applications using the Telit Charlie Evaluation kit.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report of documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com
- TS-ONEEDGE@telit.com

Alternatively, use:

<https://www.telit.com/contact-us/>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<https://www.telit.com>

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates the user feedback on our information.

1.4. Symbol Conventions



Danger: This information **MUST** be followed or catastrophic equipment failure or personal injury may occur.



Warning: Alerts the user on important steps about the module integration.



Note/Tip: Provides advice and suggestions that may be useful when integrating the module.



Electro-static Discharge: Notifies the user to take proper grounding precautions before handling the product.

Table 1: Symbol Conventions

All dates are in ISO 8601 format, that is YYYY-MM-DD.

1.5. Related Documents

- ME310G1/ME910G1/ML865G1 AT commands Reference Guide, 80617ST10991A Rev.9
- Charlie EVK HW User Guide, 1VV0301670 Rev. 5
- LwM2M AT Commands Reference Guide, 80529ST10974A Rev. 4
- How to generate freefall interrupt using BMA400, Bosch Sensortec

2. PREREQUISITES

2.1. Hardware

You need a Telit Charlie board, a cellular antenna and a micro-USB cable. The Telit Charlie Evaluation kit can be found at <https://www.telit.com/developer-zone/charlie/>.



The Charlie Board Evaluation Kit comes with the Hardware User Guide.

Please read carefully the Charlie's HW User Guide first.

2.2. Software

The software used are Arduino IDE version 1.8.15 and a serial terminal tool (i.e. Tera Term). Telit AT Controller (TATC) is recommended, please download it from

<https://telit.com/developer-zone/charlie/>

You also need a browser to connect the board with OneEdge.

3. SETUP SOFTWARE

Download the Arduino IDE and the Arduino library for Telit module ME310G1 at

<https://github.com/telit/arduino-me310-library>.

Download the Grove_3Axis_Digital_Accelerometer_BMA400 library from

https://github.com/Seeed-Studio/Grove_3Axis_Digital_Accelerometer_BMA400.

To add the Charlie Board on Arduino IDE, click on *File->Preference*. Enter the release link into *Additional Board Manager URLs* field:

https://raw.githubusercontent.com/telit/arduino-charlie/main/Arduino/package_Telit-board_index.json.

Click on *Tools->Boards...->Boards manager* and install Charlie platform. Select your Charlie board from *Tools->Board* after installation.

To add the library for the accelerometer, go on *Sketch->Include library->Add .ZIP Library* and select the folder or ZIP file which would you import.

4. SETUP IOT PORTAL ONEEDGE

To manage the module through the IoT portal it is necessary to have an account on OneEdge IoT platform.

4.1. Register your account

Go to <https://portal-dev.telit.com/app/login>.

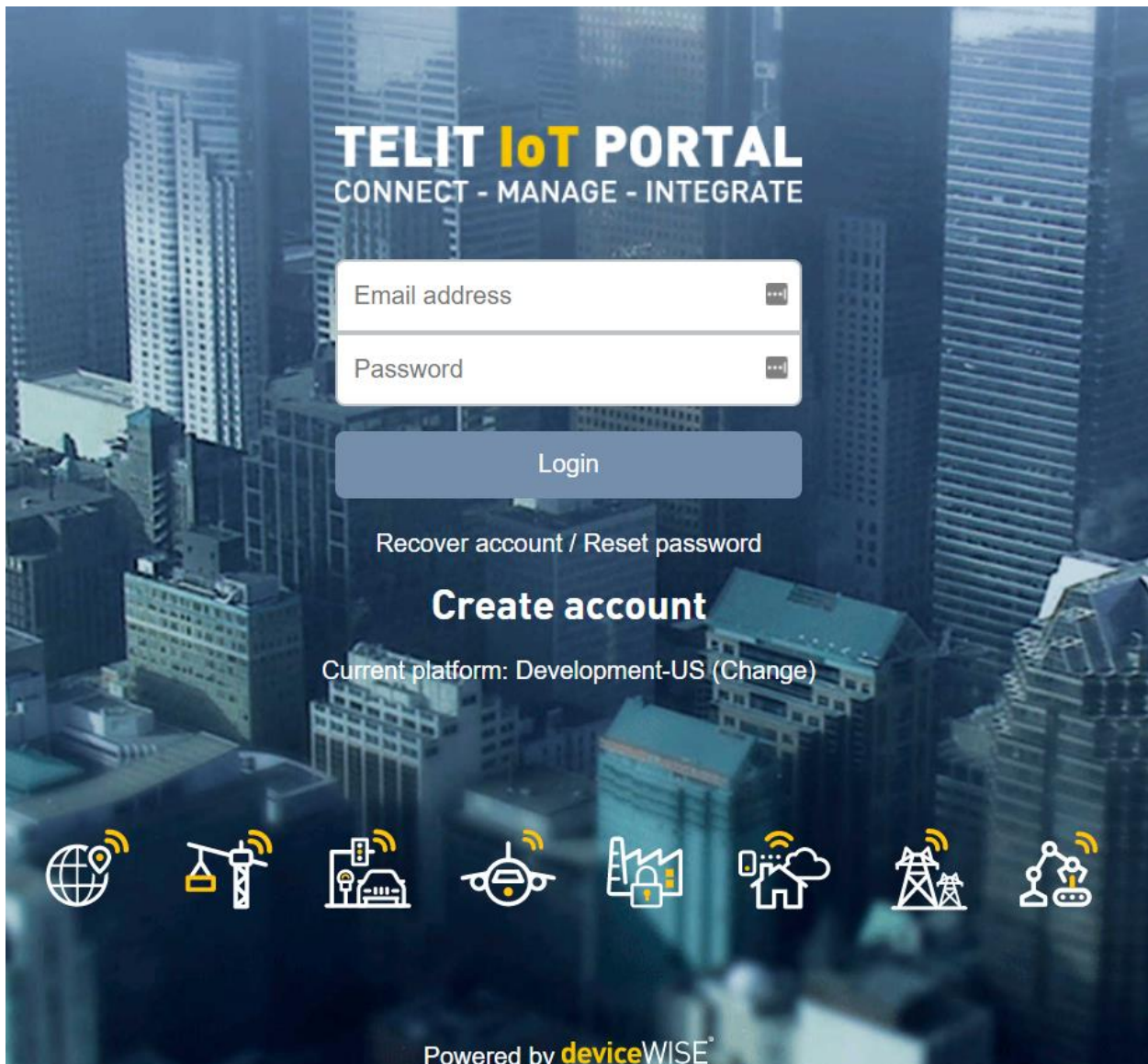


Figure 1: Log in page

If you have an account, skip this and continue to read from *4.2 Setup the thing definition and device profile*.

Click on “Create account”, enter your email and then look for an activation link in your email folder.

Complete your Telit IoT Portal account registration



deviceWISE IoT Platform <noreply@devicewise.com>

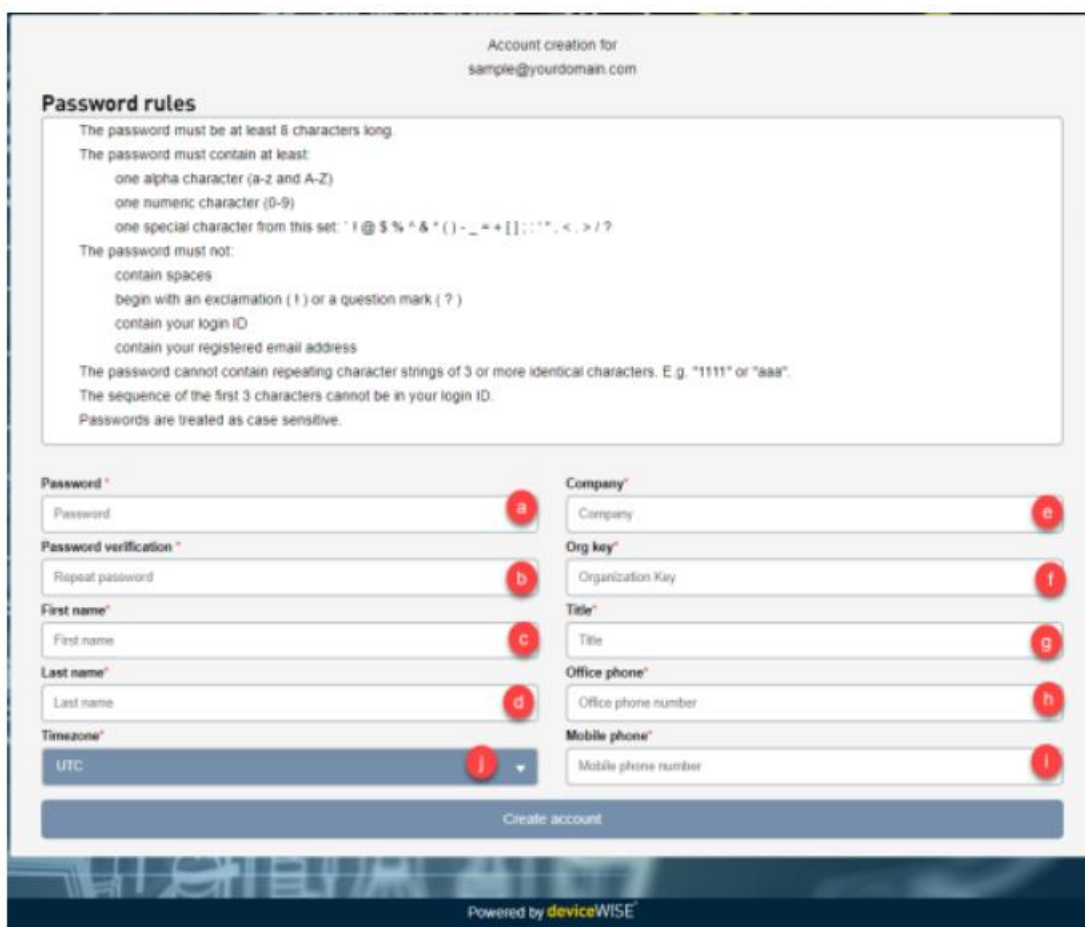
Thank you for requesting a new Telit IoT Portal user account.

To complete the registration process, please click on [this link](#) or copy and paste this URL <https://oneedge.devicewise.net/app/signup/> into your browser.

Upon submitting the completed registration form, you will receive a welcome email and be ready to start creating your own solutions for m2m and the Internet of Things.

Figure 2: Activation link

Click on link or copy and paste the link to your browser. The following form will appear



Account creation for
sample@yourdomain.com

Password rules

- The password must be at least 8 characters long.
- The password must contain at least:
 - one alpha character (a-z and A-Z)
 - one numeric character (0-9)
 - one special character from this set: ' ! @ \$ % ^ & * () - _ = + [] ; : ' " , < . > / ?
- The password must not:
 - contain spaces
 - begin with an exclamation (!) or a question mark (?)
 - contain your login ID
 - contain your registered email address
- The password cannot contain repeating character strings of 3 or more identical characters. E.g. "1111" or "aaa".
- The sequence of the first 3 characters cannot be in your login ID.
- Passwords are treated as case sensitive.

Form fields:

Password *	Company *
<input type="text"/>	<input type="text"/>
Password verification *	Org key *
<input type="text"/>	<input type="text"/>
First name *	Title *
<input type="text"/>	<input type="text"/>
Last name *	Office phone *
<input type="text"/>	<input type="text"/>
Timezone *	Mobile phone *
<input type="text"/>	<input type="text"/>

Create account

Powered by deviceWISE

Figure 3: Account creation

The fields marked with * are mandatory. Please make sure all fields are correctly filled.



Organization names may be duplicated.

Organization keys are unique, please choose a different key value

Then accept privacy policy and Terms and Conditions.

4.2. Setup the thing definition and device profile

Thing definition and device profiles define which capabilities are provided by the device.

Specifically, the device profile provides all the information to bind the LwM2M object to the real properties, events and commands- the device data model.

4.2.1. Import the Thing definition

Click on tab Developer.



Figure 4: Menu tabs IoT portal

Click on Thing definition on the left menu.

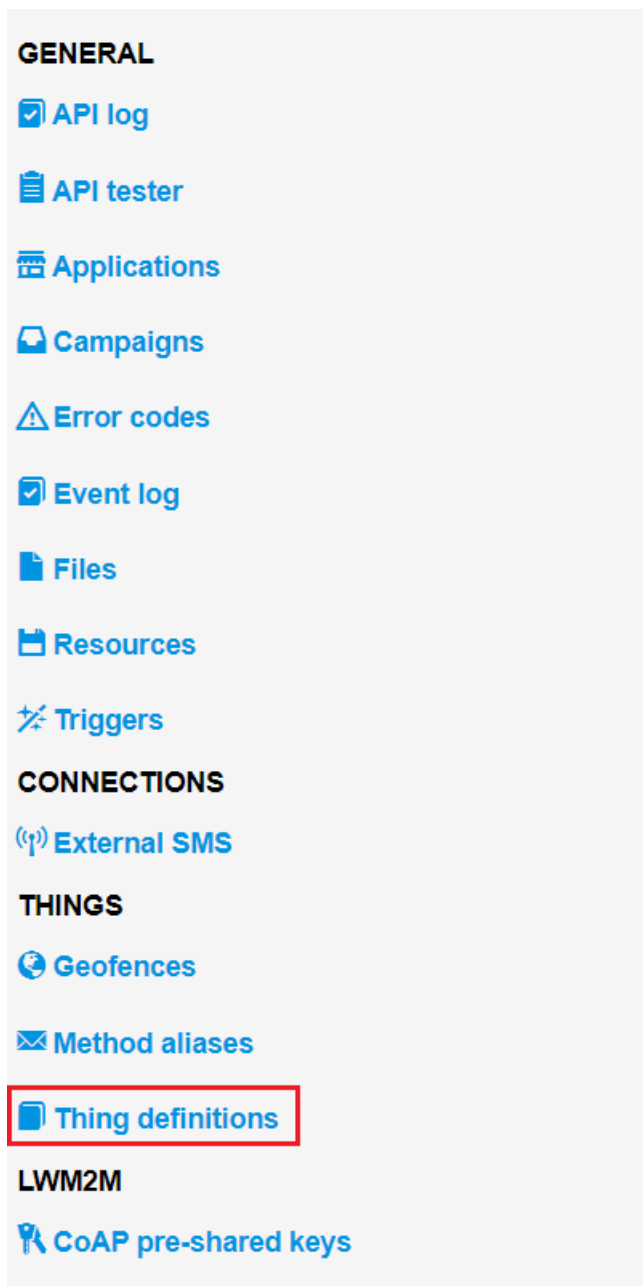


Figure 5: Left menu Thing definition

Click on tab Import.

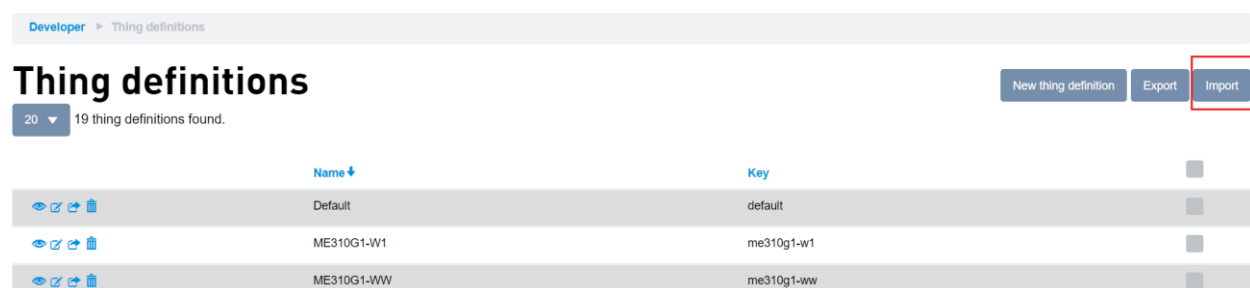


Figure 6: Import Thing definition

In the next page, click on Attach file and select the file *thing_defs.json*. Then click on Import button.

Developer ▶ Thing definitions ▶ Thing definitions import

Thing definitions import

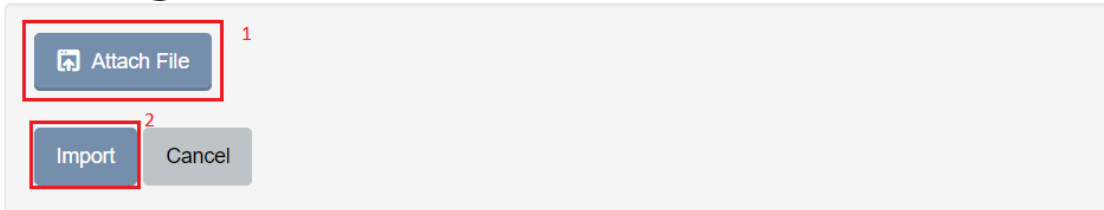


Figure 7: Attach file and Import buttons



Note- Please make sure that the JSON file imported on the thing definition is reporting “thing definition” and not “device profile” in the name.

4.2.2. Import Device profiles

Go back on Developer section and select Device profiles from the left menu. In the next page click on Import.

Developer ▶ Device profiles

Device profiles

New device profile Export Import

Figure 8: Import Device profile

Like in the step about Thing definition, click on Attach files and select the file *LwM2M_profiles.json*. Then click on Import button.

Now in the list of Device profiles will appear the Charlie_profile. Click on Edit button (marked in green in Figure 9) and check that the device profile objects are properly registered.

	5f8eaaad1c5bd740fe7c417f	Charlie_profile	xxxxxx.xxxxxx@xxxx.xxx	2020-10-20 09:15:25 +0000	xxxxxx.xxxxxx@xxxx.xxx	2021-07-13 08:48:51 +0000	
---	--------------------------	-----------------	------------------------	---------------------------------	------------------------	---------------------------------	---

Figure 9: Device profile imported

4.2.3. Import Trigger

On Developer page, click on Trigger from left menu. From this page, click on Actions and from the drop down menu choose Import. Click on Attach files button, upload the file *triggers.json* and after that, click on Import.

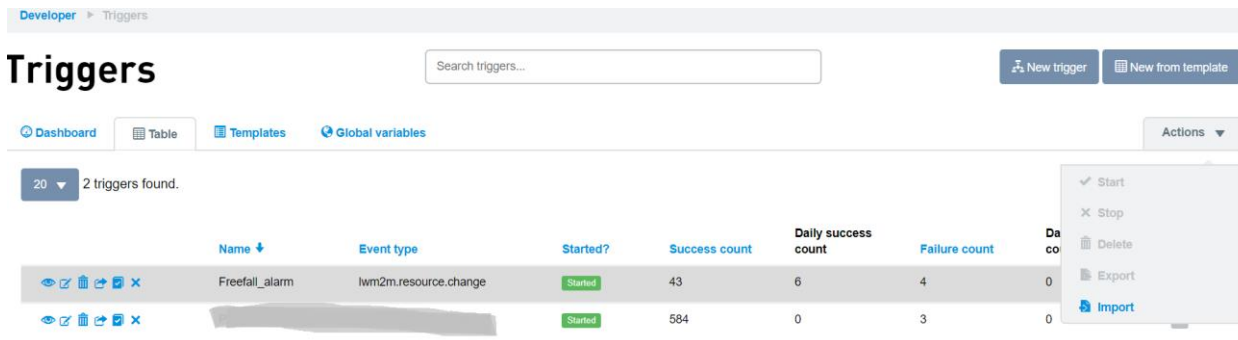


Figure 10: Trigger import

In the Triggers Table, the new Trigger is not running: click on the last symbol (tick symbol) to make it run. The tick symbol will be replaced by the cross symbol.

4.2.4. Create a new Thing

Before operating with the IoT portal, it is necessary to create a new Thing on the portal. The procedure is available at:

https://docs.devicewise.com/Content/Products/Management_Portal/Things/Creating-a-thing-for-a-Telit-module.htm

In point 4 of the guide reported in the link above, in field Thing definitions choose ME310G1-WW, which has the alarm interruptStatus.

In point 8 select the Device profile Charlie_profile.

5. CONNECT CHARLIE BOARD TO IOT PORTAL

5.1. Disable WWAN connection in Windows



Windows 10 users: by default, the OS is detecting and taking control of ME310 cellular connection. Please ensure this option is disabled as described in the following paragraph.

Whenever the Charlie Board is set up with a valid APN, Windows 10 network manager is able to detect this valid configuration and can automatically start a Dial-up connection as soon as the module is connected to the PC.

In this scenario the context is already enabled by Windows, the agents inside the module will get an error when trying to perform any connection using the same PDP context.

To avoid this scenario, it's necessary to disable the network adapter at runtime or change the default setting in the Windows registry.

5.1.1. Disable network adapter at runtime

- Open the Device Manager windows tool
- Open "Network adapters" section
- Search for "Telit USB WWAN Adapter" element
- Right-click and disable the device

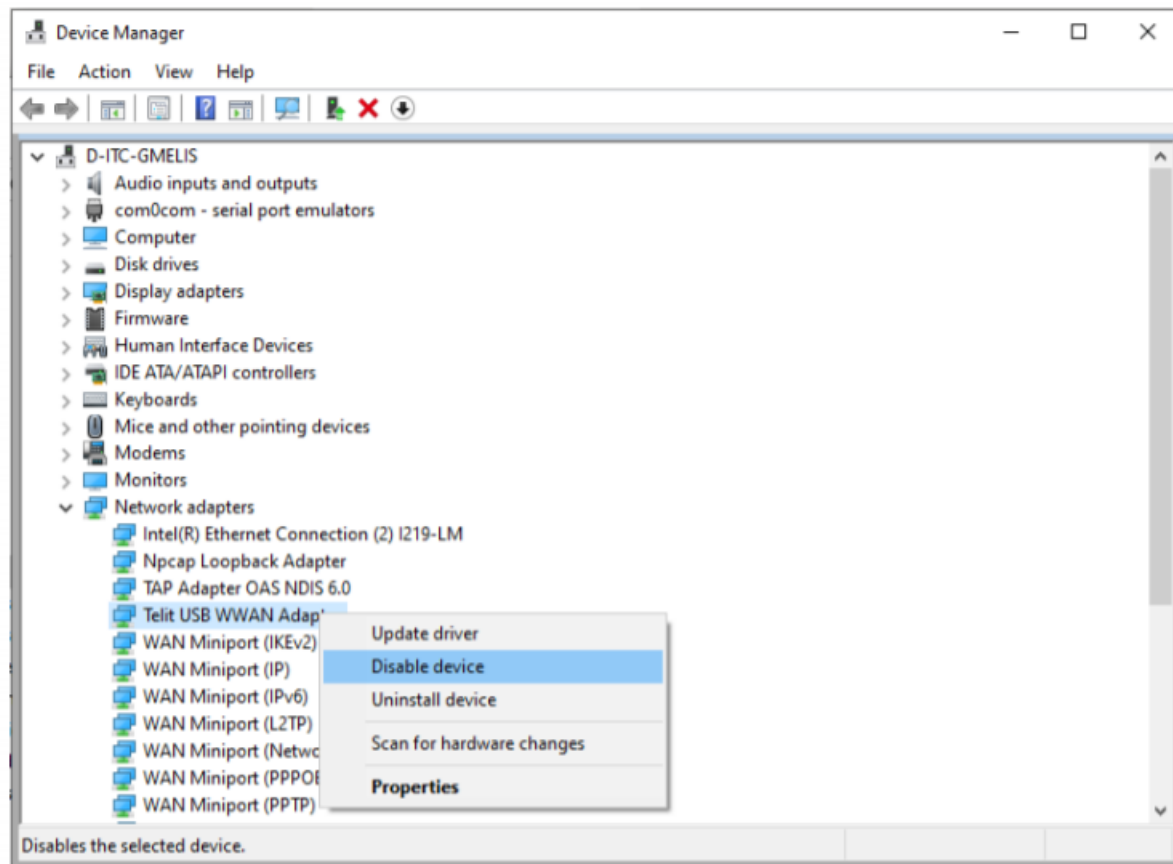


Figure 11: Network adapter disable

This setting is applied only to the device currently connected to the computer, so the user should repeat this procedure for all new devices connected to the computer.

5.2. Telit AT Controller

After the installation, double click on **Telit AT Controller** icon to open the application.

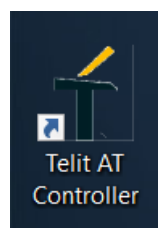


Figure 12: Telit AT controller icon

Click on the icon marked in red.



Figure 13: Setting icon

In the next window, set the parameters like in Figure 14. Then click on OK button

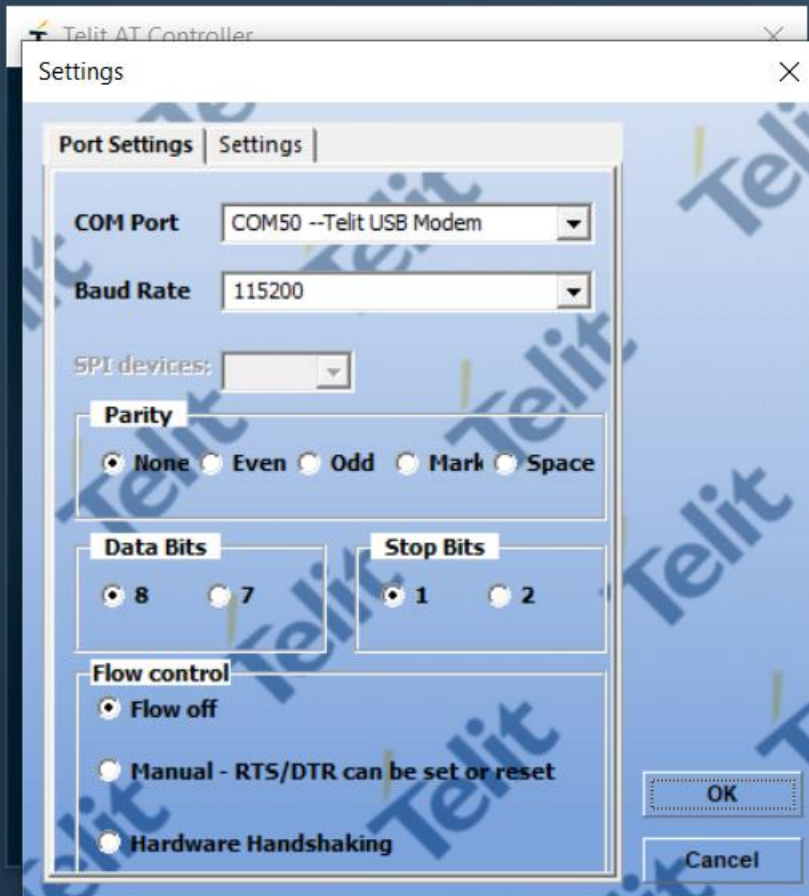
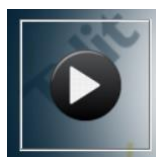


Figure 14: Setting window

Upon configuration, click on Connect button



Module information such as IMEI, Manufacturer name, Model name and FW release will be displayed



Figure 15: Setup completed

Then click on AT Terminal button



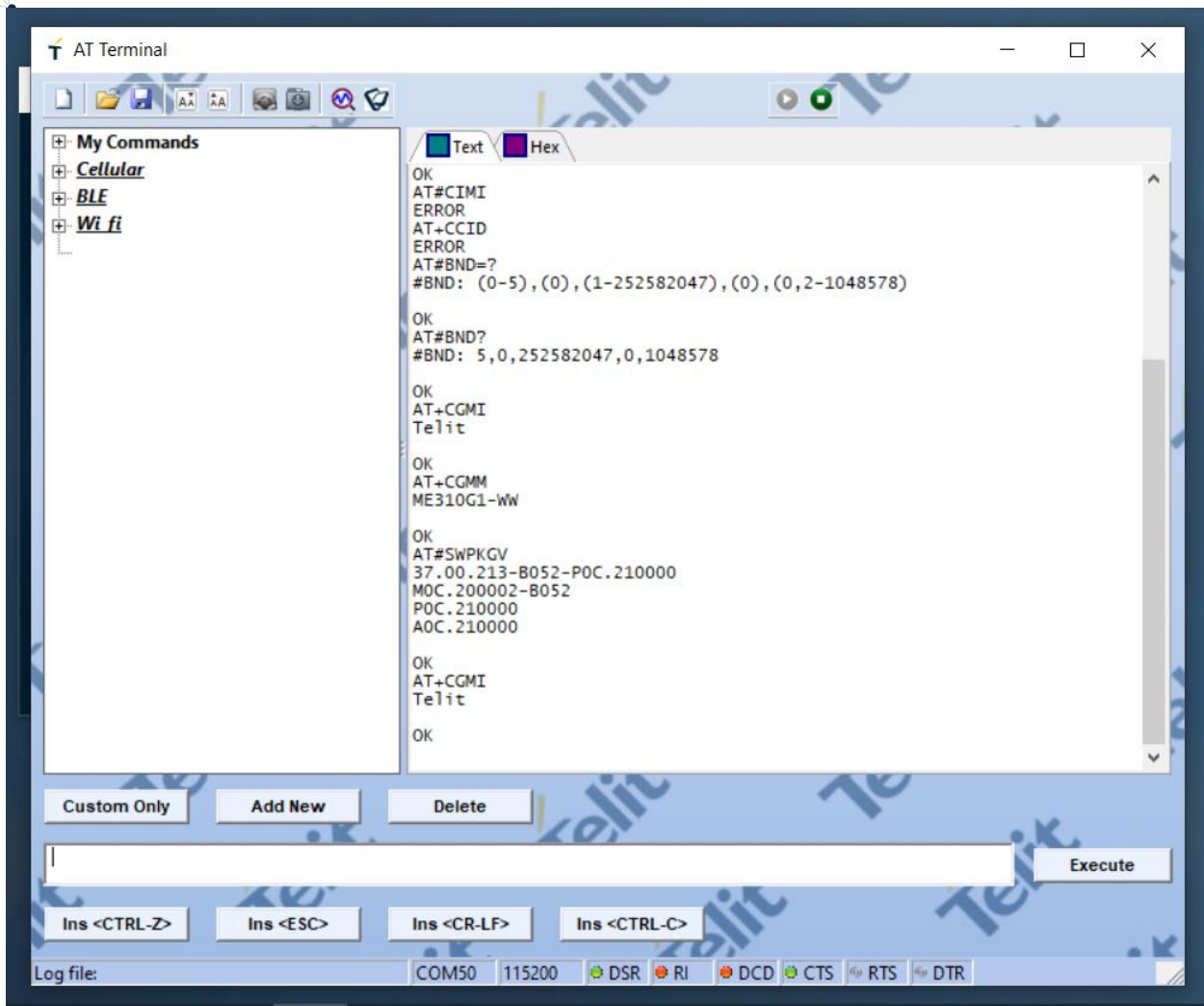


Figure 16: AT Terminal console

5.3. Connection to the IoT portal

The Lwm2m client requires an active connection in order to be able to start the Lwm2m handshake with the server and perform following interactions.

In case the Lwm2m client is enabled before having an active connection, it will stay on hold until data connection is active.

From a serial terminal, send the following AT commands:

- AT+CGDCONT=1,"IP","YOUR_APN", to set the PDP context to be used by the LWM2M client
- AT#SGACT=1,0, to let the LWM2M client handle the connection and the PDP context startup
- AT#LWM2MENA=1 (refer to AT#LWM2MENA=<en> on the AT commands reference guide.)

The Lwm2m client will perform the Bootstrap (only the first time or when forced) and the terminal will receive the following URC:

```
LWM2M-TLT: "BOOTSTRAPPING",SSID=0,"coaps://bs.telit.io"
```

```
LWM2M-TLT: "BOOTSTRAPPED",SSID=0,"coaps://bs.telit.io"
```

After the Bootstrap, the Lwm2m client will perform the registration on the DM server, and if the service is enabling through AT#LWM2MW=0,33211,0,0,1,1 command, the following URC are received:

```
LWM2M-TLT:"REGISTERING",SSID=99,"coaps://api-dev.devicewise.com"
```

```
LWM2M-TLT:"REGISTERED",SSID=99,"coaps://api-dev.devicewise.com"
```

5.4. Add the object 3200

Next step is to add the object 3200 to the client. It corresponds to a digital pin which was used to detect the interrupt generated by the freefall and for schedule the procedure to send the email. In the folder you will find the file *object_3200.xml*.

On module ME310G1 add the object 3200 with the followings AT commands:

1. AT#M2MWRITE="/XML/object_3200.xml", size

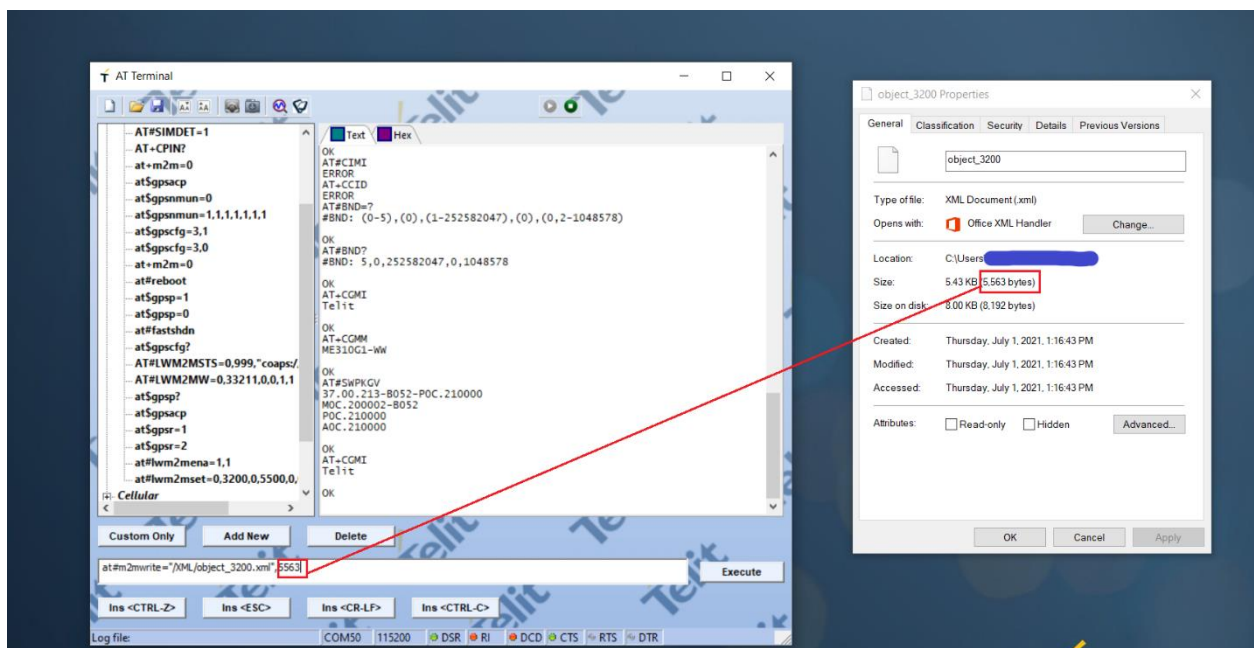


Figure 17: Parameters for AT#M2MWRITE

- After the command AT#M2MWRITE, there will be the symbol >>>. It indicates that the module is waiting for the upload of the file .xml. Click on the button marked in red in Figure 15 and select the file object_3200.xml

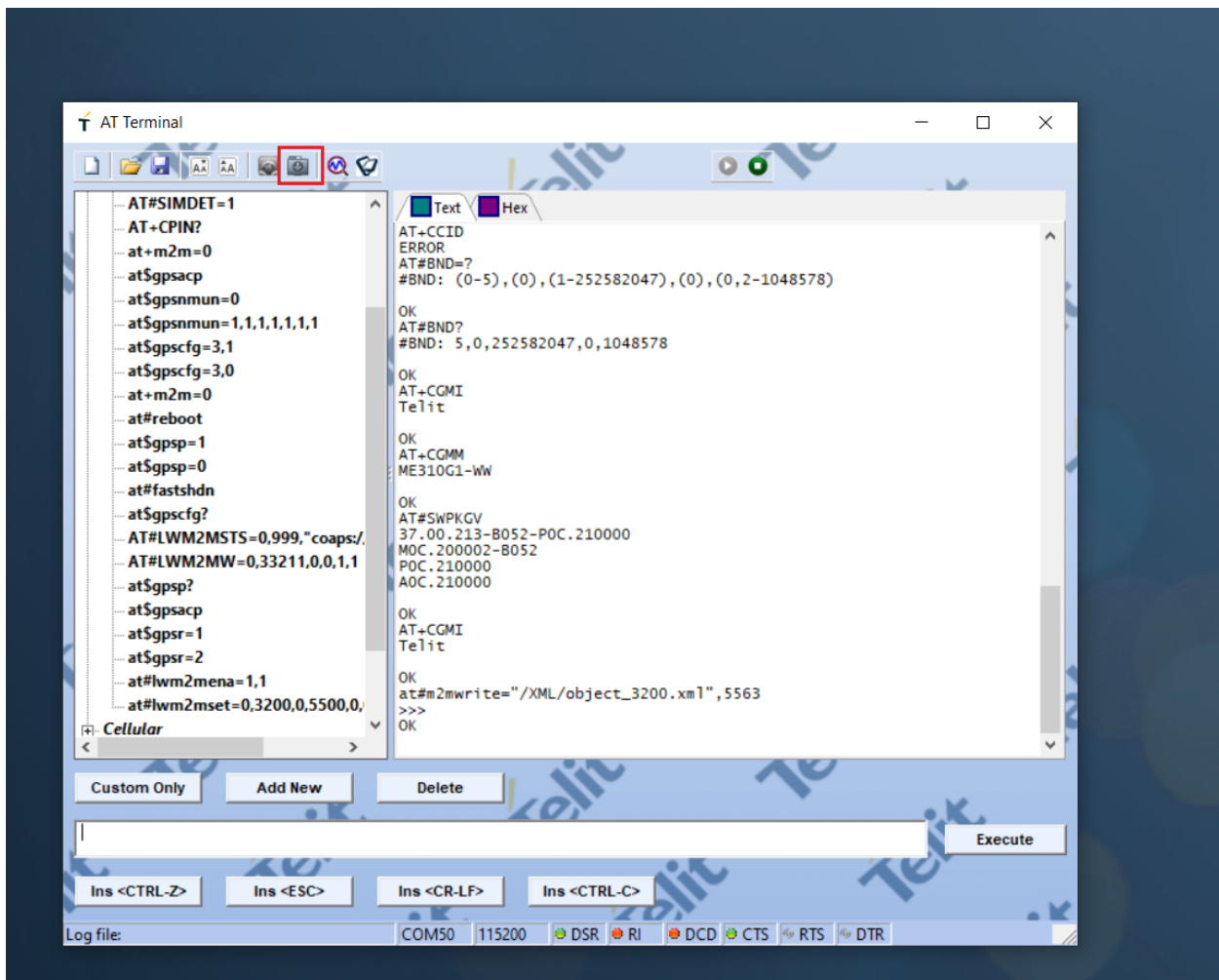


Figure 18: Uploading the file object_3200.xml

- AT#REBOOT
- AT#M2MLIST=/XML/ to verify if the file is uploaded

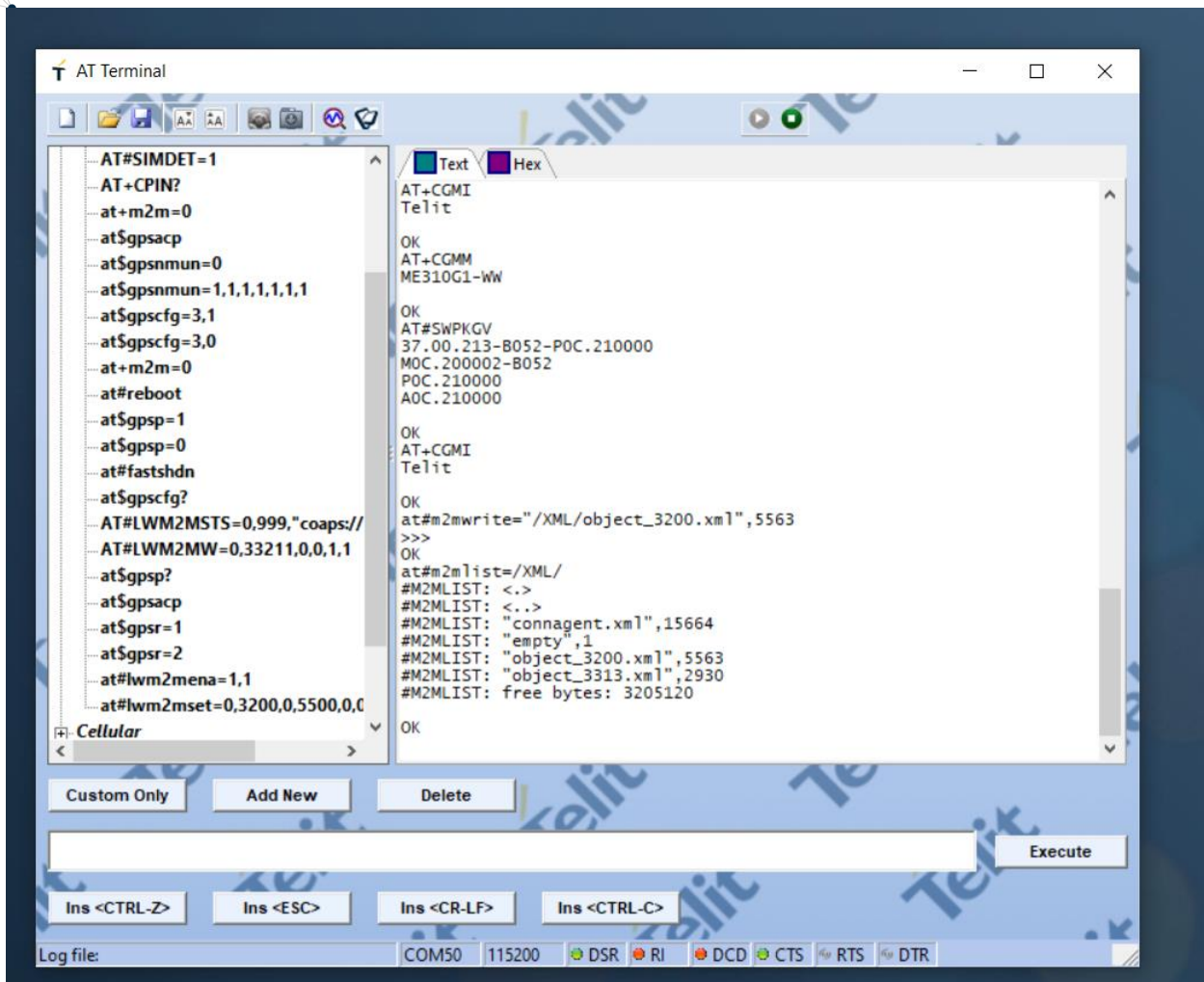


Figure 19: List of the files in the directory XML

5. `AT#LWM2MENA=1`
6. On the portal there will be the object 3200
7. Create an object instance through `AT#LWM2MNEWINST=0,3200,0`
8. Reload the object browser page (click on tab LWM2M from main page and then on Object browser)

Digital Input /3200				
Instance 0 /3200/0				
Create new instance				
	Observe	Read	Write	Attributes
Delete				
Digital Input State	/3200/0/5500	Observe	Read	Attributes
false				
Digital Input Counter	/3200/0/5501	Observe	Read	Attributes
Digital Input Polarity	/3200/0/5502	Observe	Read	Write
Digital Input Debounce	/3200/0/5503	Observe	Read	Write
Digital Input Edge Selection	/3200/0/5504	Observe	Read	Write
Digital Input Counter Reset	/3200/0/5505	Exec		
Application Type	/3200/0/5750	Observe	Read	Write
Sensor Type	/3200/0/5751	Observe	Read	Attributes
Timestamp	/3200/0/5518	Observe	Read	Attributes
Fractional Timestamp	/3200/0/6050	Observe	Read	Attributes

Figure 20: Object 3200 on the IoT portal

Then you have to change the value of the Lifetime parameter from 60 to 120. To do that, from module main page, click on tab LWM2M and then on Object browser.

Things > 359205100305400

359205100305400

Overview Details LWM2M LWM2M Device Management Attributes Remote AT Events Files API usage Actions

Identity	Ti0zI0nmDd95tury	Created on	2021-06-21 08:07:07 +0000
Device profile	Charlie_profile	Updated on	2021-06-21 08:07:07 +0000
Remote address	151.99.1.17:6002	Reported on	2021-07-21 14:04:56 +0000
Protocol	LWM2M-CoAP (DTLSv12)	Registered on	2021-07-21 13:55:26 +0000
Binding	UQ	Deregistered on	2021-07-21 14:04:56 +0000
Lifetime	60	Bootstrapped on	2021-07-21 13:38:15 +0000

Object browser Set profile Queue history Wakeup

Alarms

Name	State	Message	Timestamp
Interruptstatus	False	Nessus Interrupt	2021-07-21 13:11:02 +0000

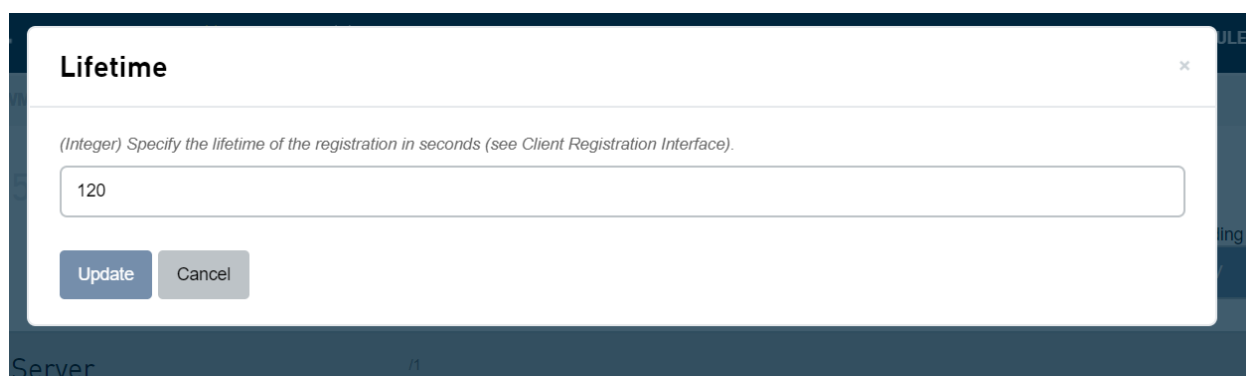
Figure 21: LWM2M page

On Object browser page, click on LwM2M Server and then on Write button in field Lifetime.



LwM2M Server		Encoding: TLV			
Instance 0		Create new instance			
Short Server ID	/1/0	Observe	Read	Write	Attributes
Lifetime	/1/0/1	Observe	Read	Write	Attributes
Default Minimum Period	/1/0/2	Observe	Read	Write	Attributes
Default Maximum Period	/1/0/3	Observe	Read	Write	Attributes
Disable	/1/0/4	Exec			
Disable Timeout	/1/0/5	Observe	Read	Write	Attributes
Notification Storing When Disabled or Offline	/1/0/6	Observe	Read	Write	Attributes
Binding	/1/0/7	Observe	Read	Write	Attributes
Registration Update Trigger	/1/0/8	Exec			
Bootstrap-Request Trigger	/1/0/9	Exec			
APN Link	/1/0/10	Observe	Read	Write	Attributes
TLS-DTLS Alert Code	/1/0/11	Observe	Read	Attributes	
Last Bootstrapped	/1/0/12	Observe	Read	Attributes	

Figure 22: LwM2M Server object



Lifetime

(Integer) Specify the lifetime of the registration in seconds (see Client Registration Interface).

Update
Cancel

Figure 23: Lifetime field

Click on Update button to update the value.

6. DETECTING A FREEFALL WITH CHARLIE BOARD

For the example described in this chapter, there are two variants: one for product 2G and one for product 4G.



It is necessary to select the wireless technology that will be used.

Please read the AT commands reference guide regarding the command AT+WS46.

6.1. Select the wireless technology

To select the wireless technology, from a serial terminal send to the module the following command

- AT+WS46= 12 if you want to use 2G technology
- AT+WS46= 28 if you want to use 4G technology

After you send the command, the module needs a reboot to store in the memory the select wireless technology. To do that, send the AT command AT#REBOOT.

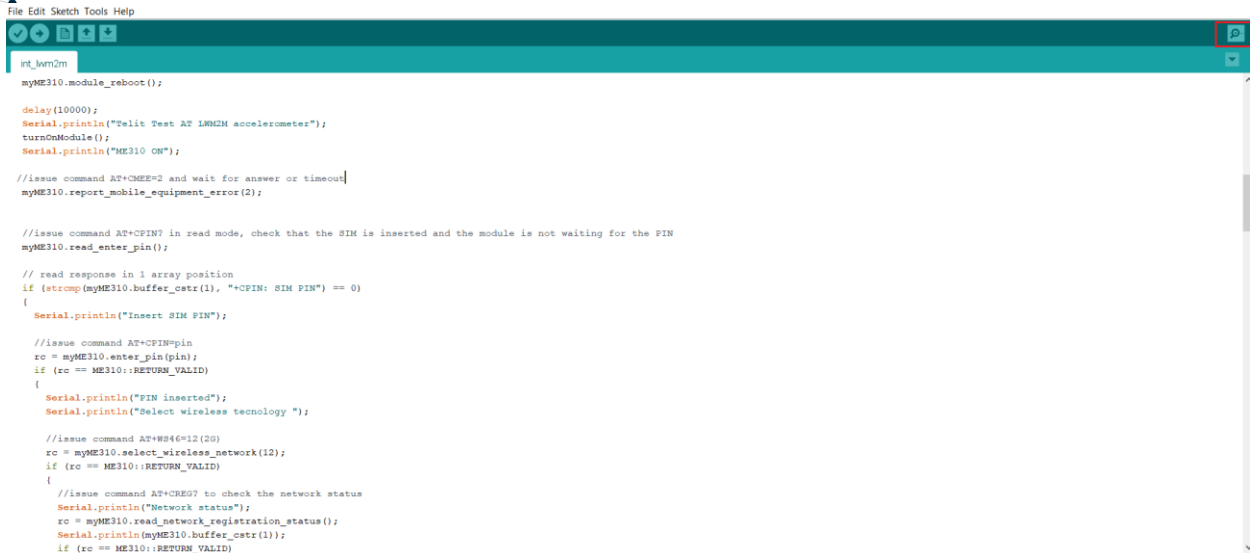
6.2. Detecting freefall with Charlie Board

On Arduino IDE, go to *File->Examples->ME310G1* and select which sketch would you use.



Warning: if your SIM needs the PIN code, you need to change the *char pin[]* variable value XXXX with your PIN code in both Arduino sketches.

Upload the sketch on Telit Charlie. After done uploading, open the serial monitor to trace the application's flow.



```
File Edit Sketch Tools Help
int_lm2m
myME310.module_reboot();

delay(10000);
Serial.println("Telit Test AT LM2M accelerometer");
turnOnModule();
Serial.println("ME310 ON");

//issue command AT+CHME=2 and wait for answer or timeout
myME310.report_mobile_equipment_error(2);

//issue command AT+CPIN? in read mode, check that the SIM is inserted and the module is not waiting for the PIN
myME310.read_enter_pin();

// read response in 1 array position
if (strcmp(myME310.buffer_cstr(1), "+CPIN: SIM PIN") == 0)
{
    Serial.println("Insert SIM PIN");

    //issue command AT+CPIN=pin
    rc = myME310.enter_pin(pin);
    if (rc == ME310::RETURN_VALID)
    {
        Serial.println("PIN inserted");
        Serial.println("Select wireless technology ");

        //issue command AT+WS46=12(20)
        rc = myME310.select_wireless_network(12);
        if (rc == ME310::RETURN_VALID)
        {
            //issue command AT+CREG? to check the network status
            Serial.println("Network status");
            rc = myME310.read_network_registration_status();
            Serial.println(myME310.buffer_cstr(1));
            if (rc == ME310::RETURN_VALID)
```

Figure 24: Serial monitor Arduino IDE

COM53

```
Telit Test AT LWM2M accelerometer  
ME310 ON  
Network status  
+CEREG: 0,1  
BMA400 Raw Data  
BMA400 is connected
```

```
Device InitializationBuffer LEN=80  
0x0      0x90  
0x1      0xA9  
0x2      0x0  
0x3      0x94  
0x4      0x20  
0x5      0x0  
0x6      0x7D  
0x7      0xF  
0x8      0xFB  
0x9      0xD  
0xA      0x8  
0xB      0x53  
0xC      0x5D  
0xD      0x0  
0xE      0x0  
0xF      0x0  
0x10     0x0  
0x11     0x1F  
0x12     0x0  
0x13     0x0  
0x14     0x80  
0x15     0x0  
0x16     0x0  
0x17     0x0  
0x18     0x0  
0x19     0x2  
0x1A     0x49  
0x1B     0x0  
0x1C     0x0  
0x1D     0x0
```

Figure 25: Execution flow

COM53

```
0x3D 0x0
0x3E 0x0
0x3F 0xF0
0x40 0x1
0x41 0x3F
0x42 0x0
0x43 0xA
0x44 0x0
0x45 0x0
0x46 0x0
0x47 0x0
0x48 0x0
0x49 0x0
0x4A 0x0
0x4B 0x0
0x4C 0x0
0x4D 0x0
0x4E 0x0
0x4F 0x0
Freefall not occurred
Freefall not occurred
Freefall not occurred
Freefall not occurred

*****
Freefall Occurred
*****
Enabling and registering LWM2M client
Registered on server DM
Writing 1 in resource 33211/0/0/0
VALID
$GPSCFG: 1,1,1,1,1
Switching to GNSS priority
Switched to GNSS
```

Figure 26: Execution flow (2)



Verify on IoT portal that client is registered to the server. In Figure 27, this is visible in field Last Seen, in which the green clip indicates the registration. If the client is not registered to the server, the clip will be red.

Things ▶ 359205100305400



359205100305400

Overview Details LWM2M LWM2M Device Management Attributes Remote AT Events Files API usage Actions ▼

Id 60d048aa1c5bd76ffc652e72

Thing definition ME310G1-WW  


Key 359205100305400


Last seen  3 seconds ago 

Tags

Security Tags

Location [Raccordo Autostradale 13 Sistiana-Padriciano](#)

[Aurisina Santa Croce / Nabrežina Križ, Friuli-Venezia Giulia 34011 IT \(History\)](#) 

Identity  Unlocked

Alarms



	Name	State	Message	Timestamp
 	Interruptstatus	False	Nessun Interrupt	2021-07-15 09:08:05 +0000

Figure 27: Registration on IoT portal

Note that in Figure 27 the alarm status is set to false.

When the freefall occurred (like in Figure 26), the MCU will send the command AT#LWM2MENA=1,1 to enable the client registration. Then on IoT portal there will be the situation illustrated in Figure 27.

In GPS priority, the client perform a LwM2M read operation every 10 seconds on resource 6/0/3, corresponding to GPS accuracy, until the resource value is below 20.0000.

When the value is below 20.0000, the priority is switched to WWAN, like in Figure 28.

```
Switched to WWAN
```

Figure 28: Priority switched to WWAN

On portal side the situation is

359205100305400

Overview Details LWM2M LWM2M Device Management Attributes Remote AT Events Files API usage Actions

Identity	Gma1Zr15e758hHs0	Created on	2021-06-21 08:07:07 +0000
Device profile	Charlie_profile	Updated on	2021-06-21 08:07:07 +0000
Remote address	151.99.1.17:6002	Reported on	2021-07-15 09:11:37 +0000
Protocol	LWM2M-CoAP (DTLSv12)	Registered on	2021-07-15 09:10:06 +0000
Binding	UQ	Deregistered on	2021-07-15 09:08:07 +0000
Lifetime	120	Bootstrapped on	2021-06-22 12:58:46 +0000

Object browser Set profile Queue history Wakeup

Alarms

Name	State	Message	Timestamp
interruptstatus	True	Interrupt	2021-07-15 09:11:39 +0000

Figure 29: Alarm true

Firmware Update /5

Location /6

Instance 0	/6/0	Observe	Read	Attributes	Delete	Map view
Latitude	/6/0/0	Observe	Read	Attributes		45.71367438
Longitude	/6/0/1	Observe	Read	Attributes		13.73800109
Altitude	/6/0/2	Observe	Read	Attributes		242.68244934082
Radius	/6/0/3	Observe	Read	Attributes		13.335973739624
Velocity	/6/0/4	Observe	Read	Attributes		bearing=0, hSpeed=0
Timestamp	/6/0/5	Observe	Read	Attributes		2021-07-15T09:11:10Z
Speed	/6/0/6	Observe	Read	Attributes		0

Figure 30: GPS fix

Freefall

deviceWISE IoT Platform <noreply@devicewise.com>
To: [redacted]

Thu 15-Jul-21 11:12 AM

EmailTranslator V1.1

CAUTION: From external sender. Do not click unexpected links or attachments

Freefall occurred
Latitude: 45.71367438
Longitude: 13.73800109
Altitude: 242.6824493408203
Accuracy: 13.335973739624023
Timestamp: 2021-07-15T09:11:10Z

Figure 31: Email sent with the GPS coordinates



```
Switched to WWAN
Writing 0 in resource 33211/0/0/0
Disabling client
Client disabled
```

☒ Autoscroll ☐ Show timestamp

Figure 32: Execution flow (4)

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- it can interfere with other electronic devices, particularly in environments such as hospitals, airports, aircrafts, etc.
- there is a risk of explosion such as gasoline stations, oil refineries, etc. It is the responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conformed to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible for the functioning of the final product. Therefore, the external components of the module, as well as any project or installation issue, have to be handled with care. Any interference may cause the risk of disturbing the GSM network or external devices or having an impact on the security system. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed carefully in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The equipment is intended to be installed in a restricted area location.

The equipment must be supplied by an external specific limited power source in compliance with the standard EN 62368-1:2014.

The European Community provides some Directives for the electronic equipment introduced on the market. All of the relevant information is available on the European Community website:

https://ec.europa.eu/growth/sectors/electrical-engineering_en


8. GLOSSARY

APN	Access Point Name – It's the gateway name between a GSM, GPRS, 3G or 4G mobile network and another computer network (usually the internet)
IMEI	International Mobile Equipment Identity- It's a unique number that is associated with all 2G-5G devices
IMSI	International Mobile Subscriber Identity- It's a unique number that is associated with all SIM cards
I/O	Input Output
JSON	JavaScript Object Notation- It's a text-based data interchange format designed for transmitting and storing structured data, both human readable and machine readable
LWM2M	LightWeight Machine to Machine- IoT application protocol designed for bidirectional communication between devices and a central server
PDP	Packet Data Protocol- It's a protocol that defines a specific data structure that allows the device to communicate using the Internet Protocol
RTC	Real Time Clock
SIM	Subscriber Identification Module
USB	Universal Serial Bus
URC	Unsolicted Result Code- It's the message returned by the mobile equipment (the modem) that is not a direct result of an AT command. It could be a soft interrupt or the response of an AT asynchronous command
XML	eXtensible Markup File- It's a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable
WWAN	Wireless Wide Area Network, is a form of wireless network usually associated to mobile broadband connection.

9. DOCUMENT HISTORY


Revision	Date	Changes
5	2020-xx-xx	
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3	2020-xx-xx	
2	2020-10-06	
1	2015-10-08	Various edits This thing That other thing Another one
0	2021-07-20	First issue

From Mod.0809 rev.3



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