Manual Instruction
DMS Data Mobile Solution

Rev. 2 – 05/2019

Index

Quick Start Guide

We send devices pre-configured in most cases. If yours were pre-configured by us, please go through this page to get started with your DMS system in a matter of minutes.

1. Download and install on your Android the app DMS Data Mobile Solution from Google Play
2. Power on Gateway and turn on its inbuilt WiFi network.
3. Connect your Android phone to the DMS Gateway WiFi network.
4. Connect the Android cable to the phone first using the OTG adapter.
5. Open the DMS Offline Android app.
6. Load the project and tap on it to go to the home screen of the app.
7. Then connect the Android cable's other end to the Node and click on Setup Device and follow the wizard.
8. Repeat step 7 for all your Nodes.
9. Then press the Cloud Sync on the app to sync back all the Node settings to the gateway.
10. That's it. Now the Nodes will send the sensor data at the configured time intervals.

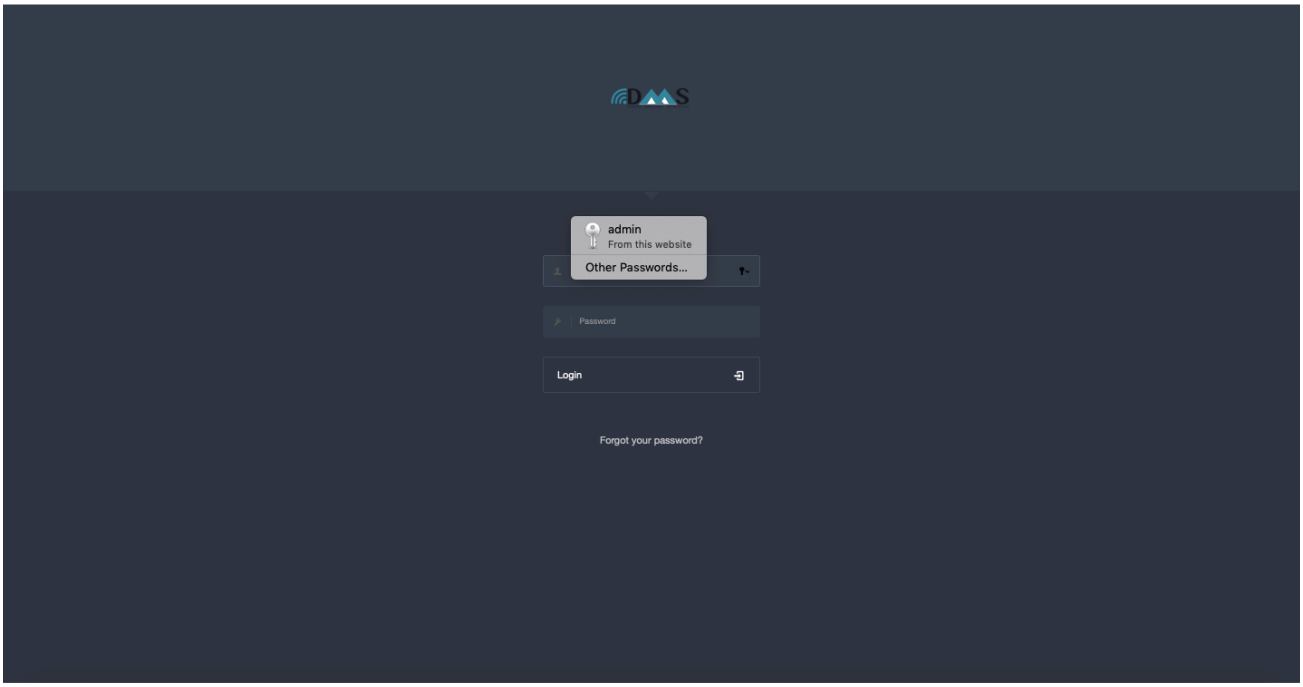
You can export the data and set Engineering conversions using the Gateway software.

Setting up the Gateway

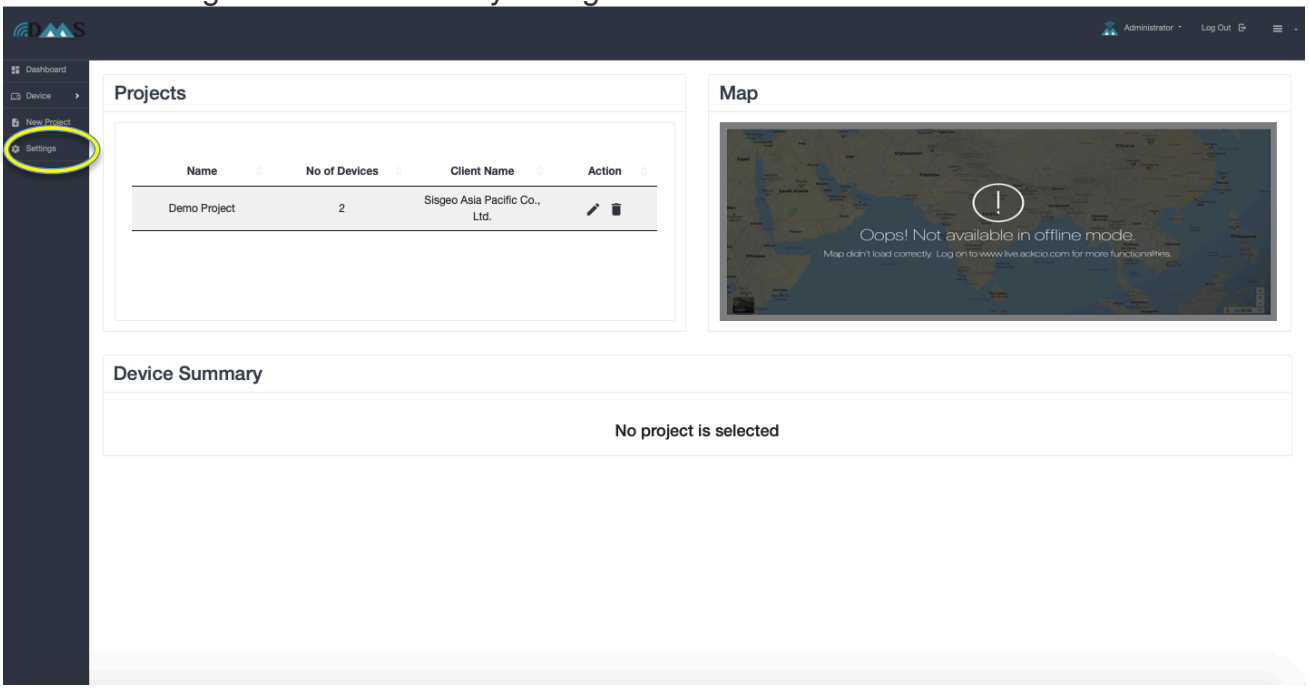
This page explains the process of setting up the DMS gateway in the offline mode.

1 Connect a 12V DC power supply to the gateway. Ensure the polarities are affixed correctly while connecting the power supply. The power supply can be a 12V DC power adapter or a 12V solar panel power setup.
2 Switch on the gateway by putting the power switch to ON position
3 Once the gateway turns on, you will see RF LED (Radio Signal) starts blinking. RPI LED will follow to blink 1~2 minutes later. Wait for another 2~3 minutes for RPI LED to blink slowly every 5 sec.
4 You can now turn on WIFI by pressing and holding the SYS TEST button for 6 to 7 seconds. The RPI LED will then stop blinking and remain lit up. This indicates that the on-board WiFi network was successfully switched on. If the RPI LED continues to blink after pressing and holding the button as mentioned above, please repeat until you see the RPI LED remain lit up.
5 On your computer, search for WiFi networks and connect to the DMS_Gateway WiFi network. The password is adminadmin

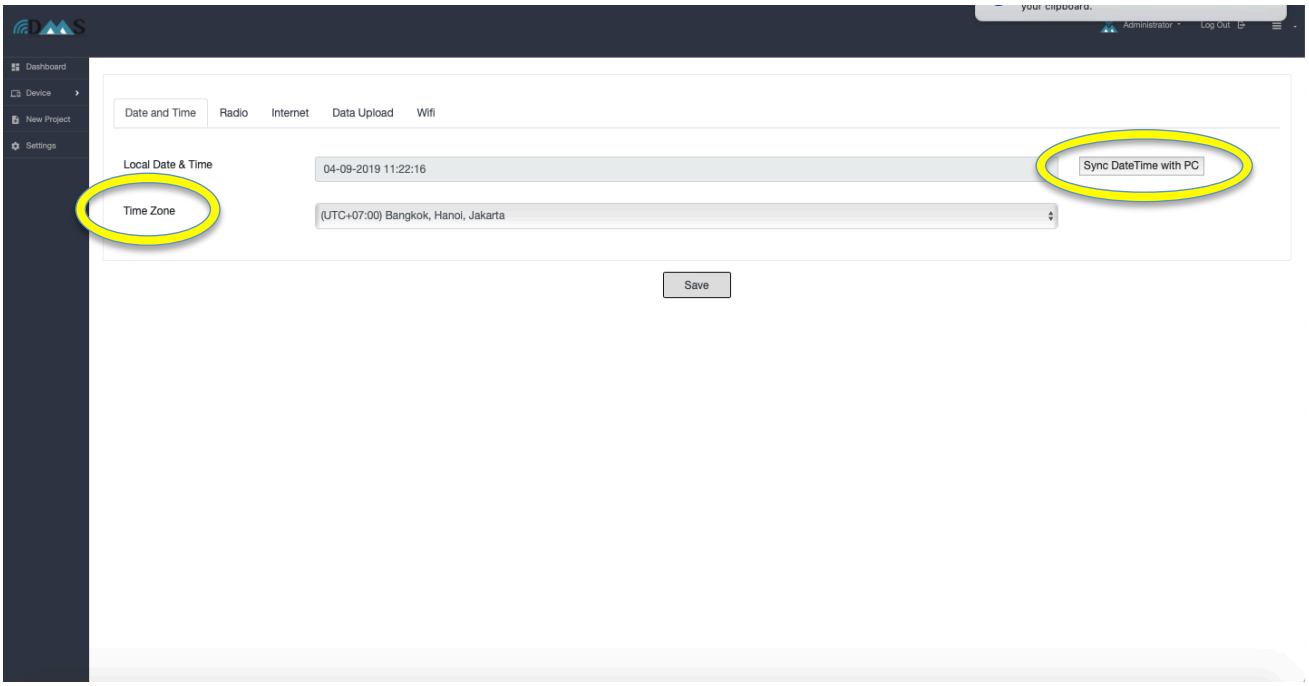
6. Open your favorite browser, and visit http://192.168.0.10
U/N: admin
PW: admin123



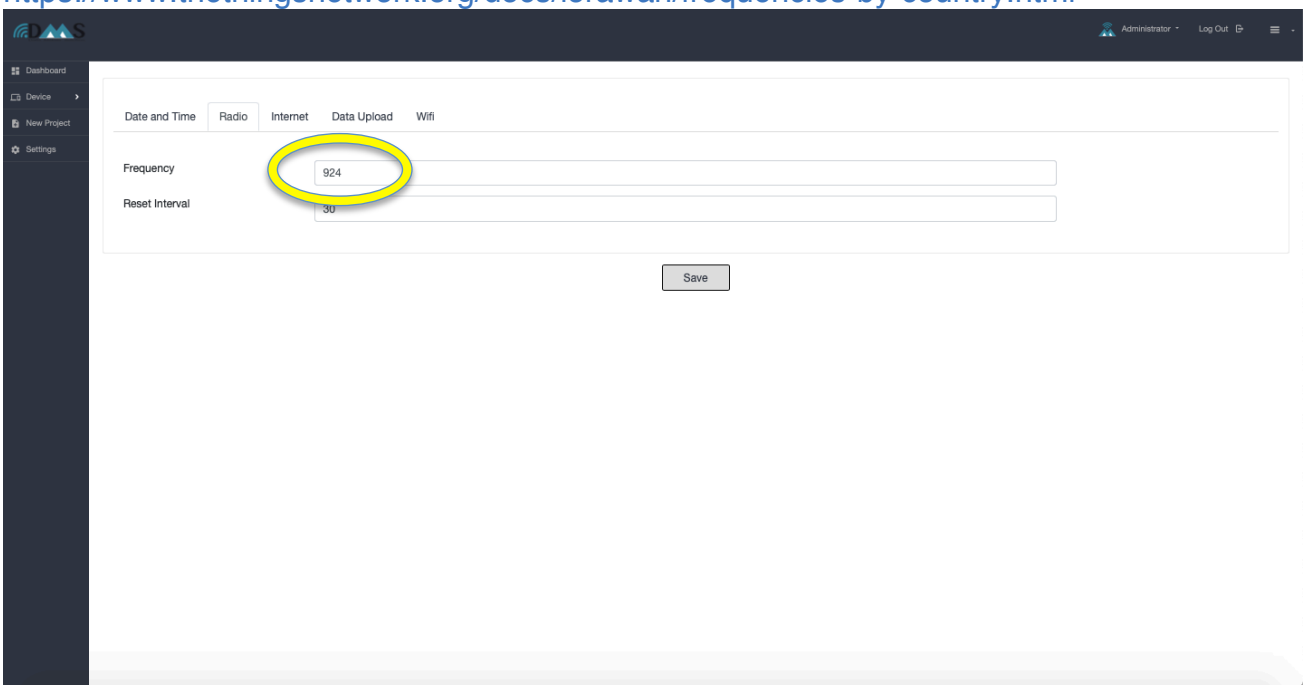
7. Go to settings menu for Gateway configuration.



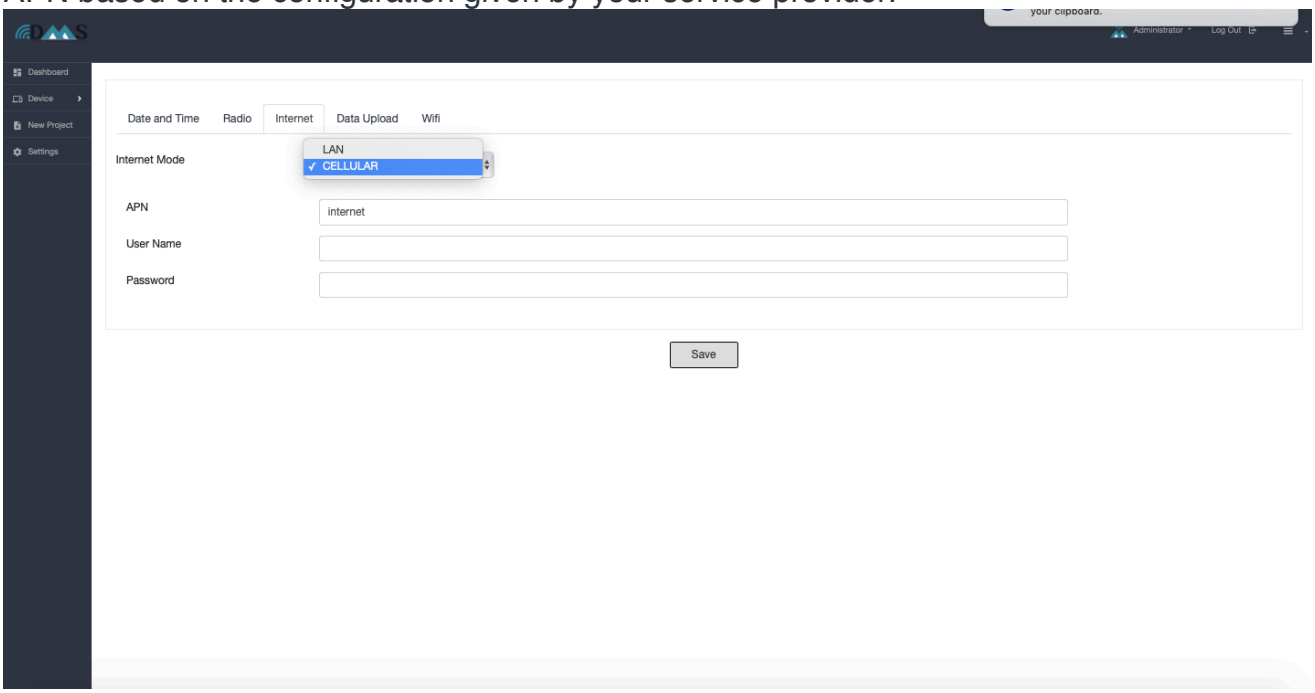
(i) **Date and Time tab:** Click on “Sync Date Time with PC” and choose your country time zone.

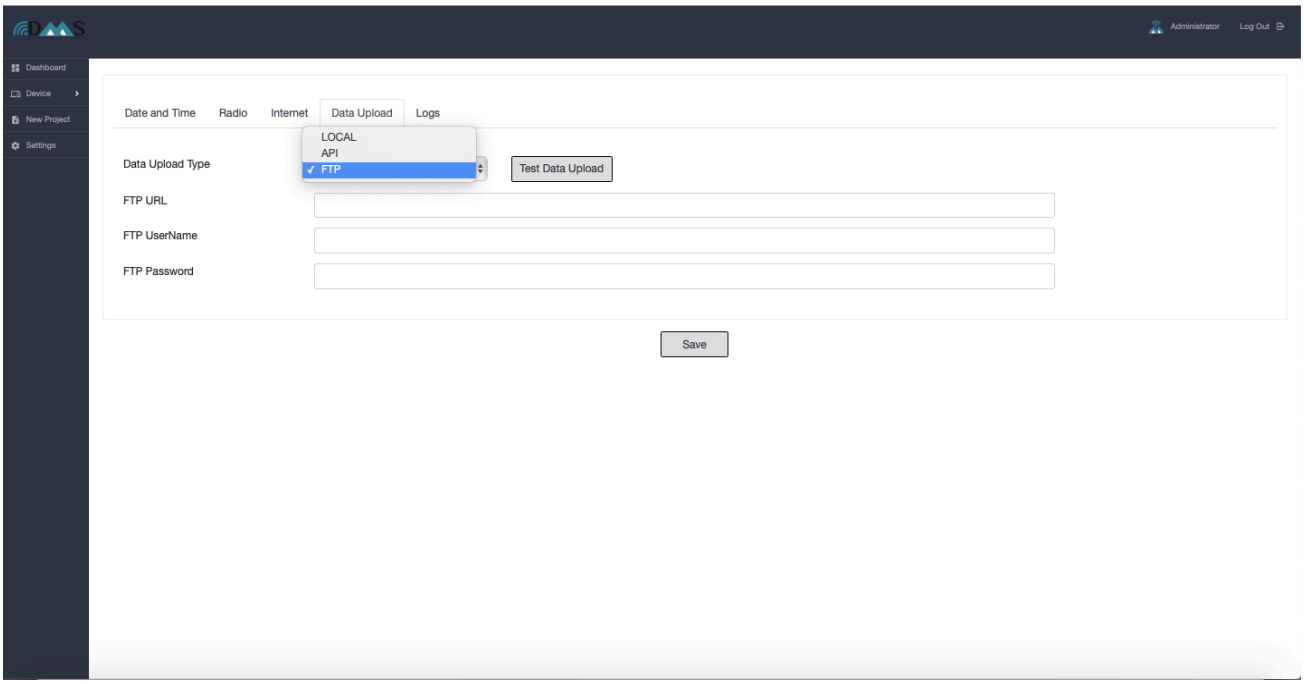


(ii) **Radio tab**: Type the “Frequency”. Refer to the following link to get your country frequency. Reset Interval can be default value, 30.
https://www.thethingsnetwork.org/docs/lorawan/frequencies-by-country.html



(iii) **Internet tab**: Choose either LAN or CELLULAR. If CELLULAR is chosen, set the APN based on the configuration given by your service provider.

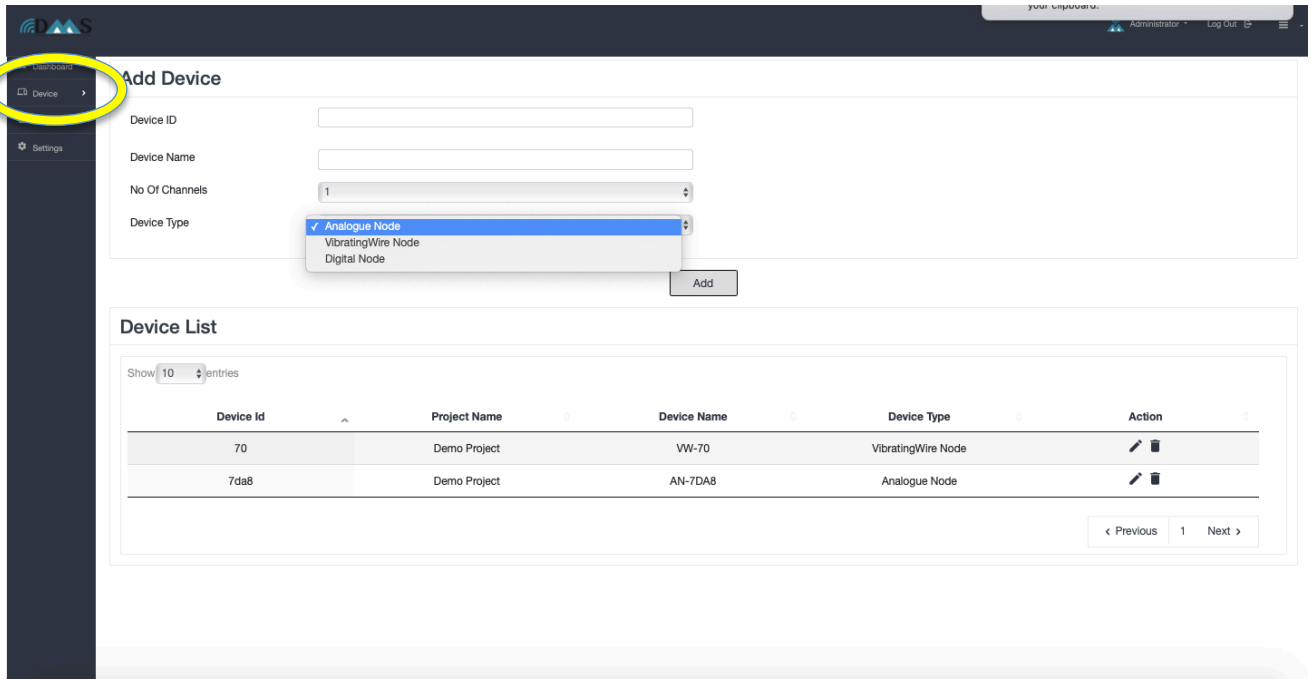




(iv) **Data Upload tab**: Four options. LOCAL, API, FTP. In LOCAL mode, the gateway stores data locally in the gateway itself for manual retrieval.
For uploading to API: Type the respective API URL.
For uploading to FTP: Type type the respective FTP information.

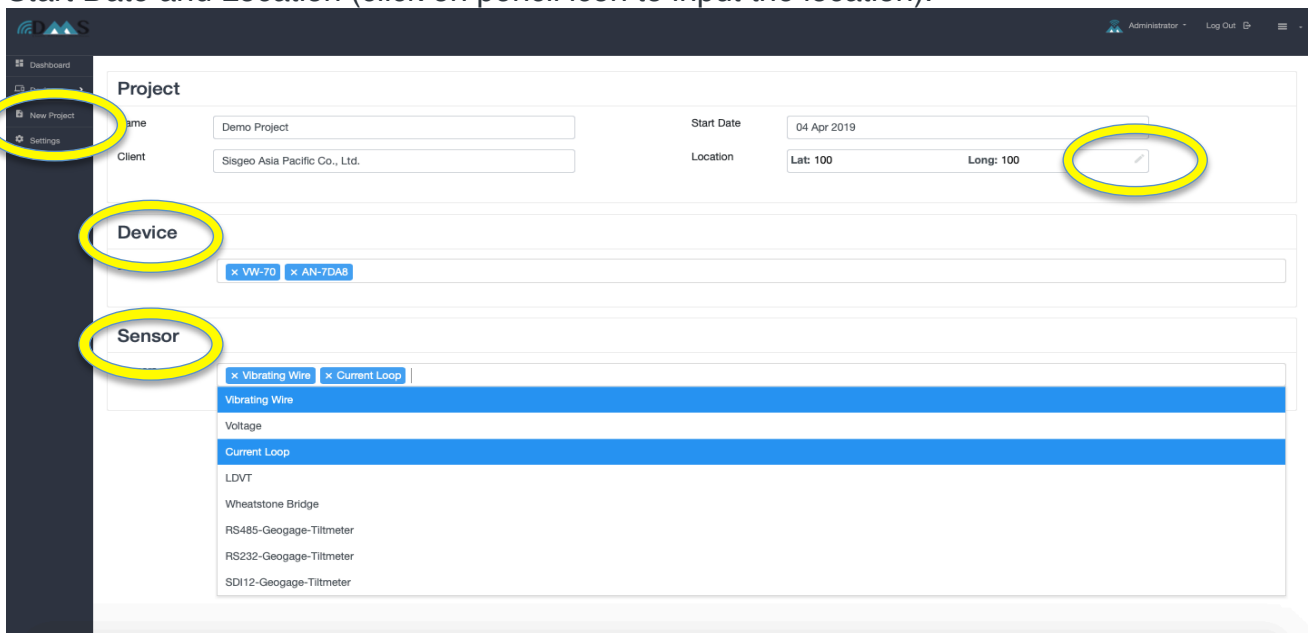
(v) **Logs tab**: You can export the Log file of the Gateway.
(vi) Once you have configured Gateway setting, click on Save button. You will see the prompt in green color on top of the page.
8. You can now add the device (node).
(i) First, you need to add all the devices (Nodes) before creating Project.

(ii) Click on **Device>Add** at the side menu.
Device ID (Mac ID): the first 4 digits found on the sticker of the device
Device Name: Name it according to your device location or sensor as per your preference.
No of Channels: Select either **1,4 or 8** based on the device channels (port).
Device Type: Select either **Analogue Node, Vibrating Wire Node or Digital Node** based on the device.
After filling up the device information, click “Add” button.

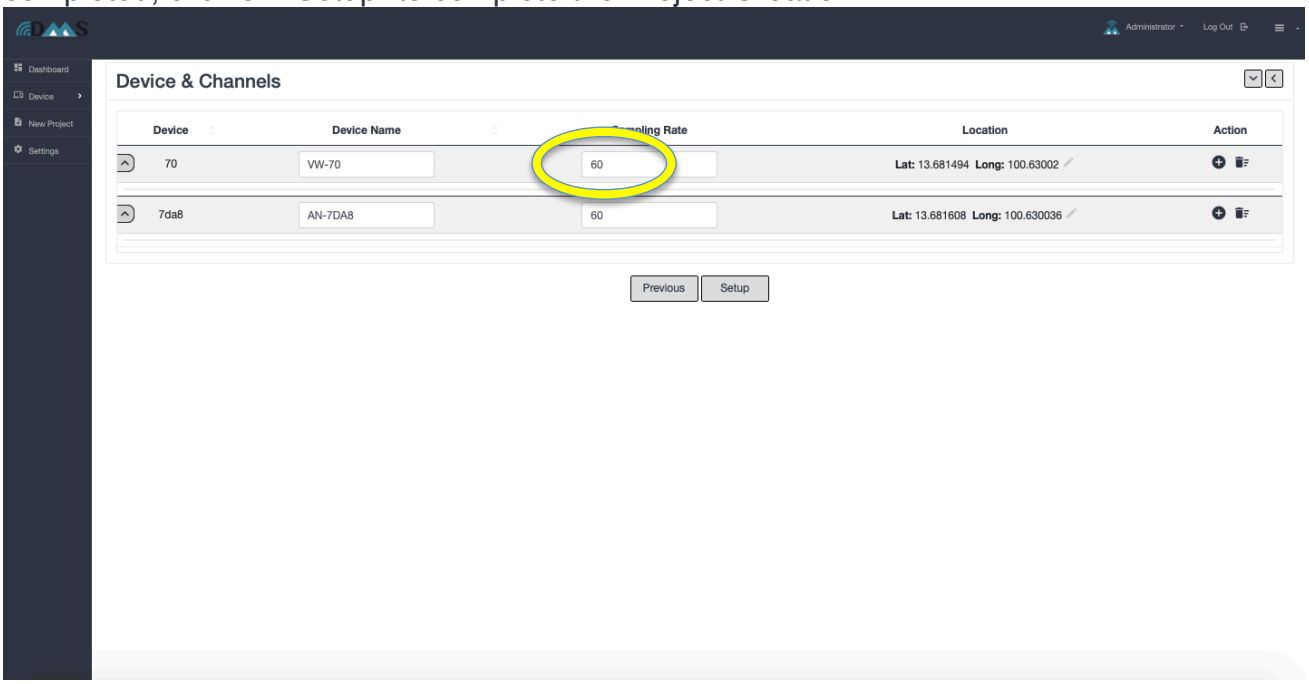


(iii) You will see the green color prompt and added device information under “Device list” section.
(iv) Repeat this step to add additional devices.

9. You can now create project. Click on “New Project” at side menu. Input Name, Client, Start Date and Location (click on pencil icon to input the location).

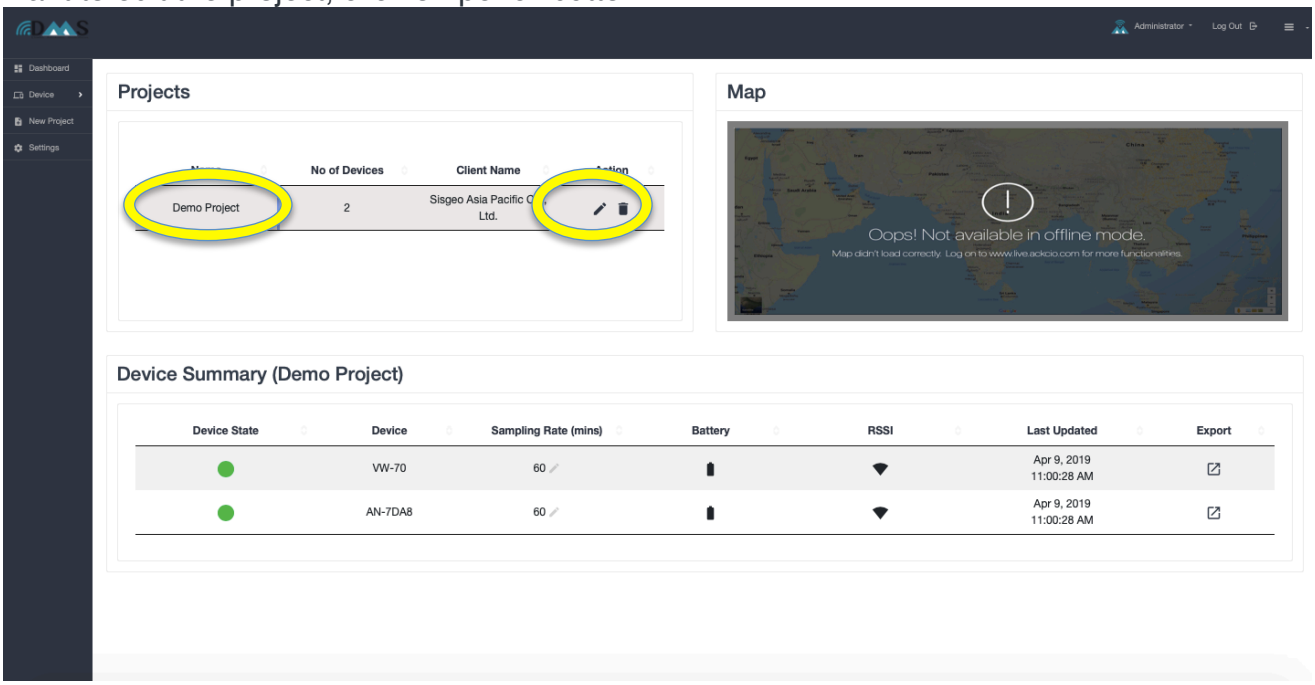


(i) On device section, click with cursor in the text box, you will see the device which you have already added previously. Please select your devices. (You can select multiple devices.)
(ii) On Sensor section, please select the respective sensor types. (You can select multiple sensor types.)
(iii) Click on Next.
(iv) You can set the desired “Sampling Rate” at this page for all the nodes. Once completed, click on “Setup” to complete the Project Creation.

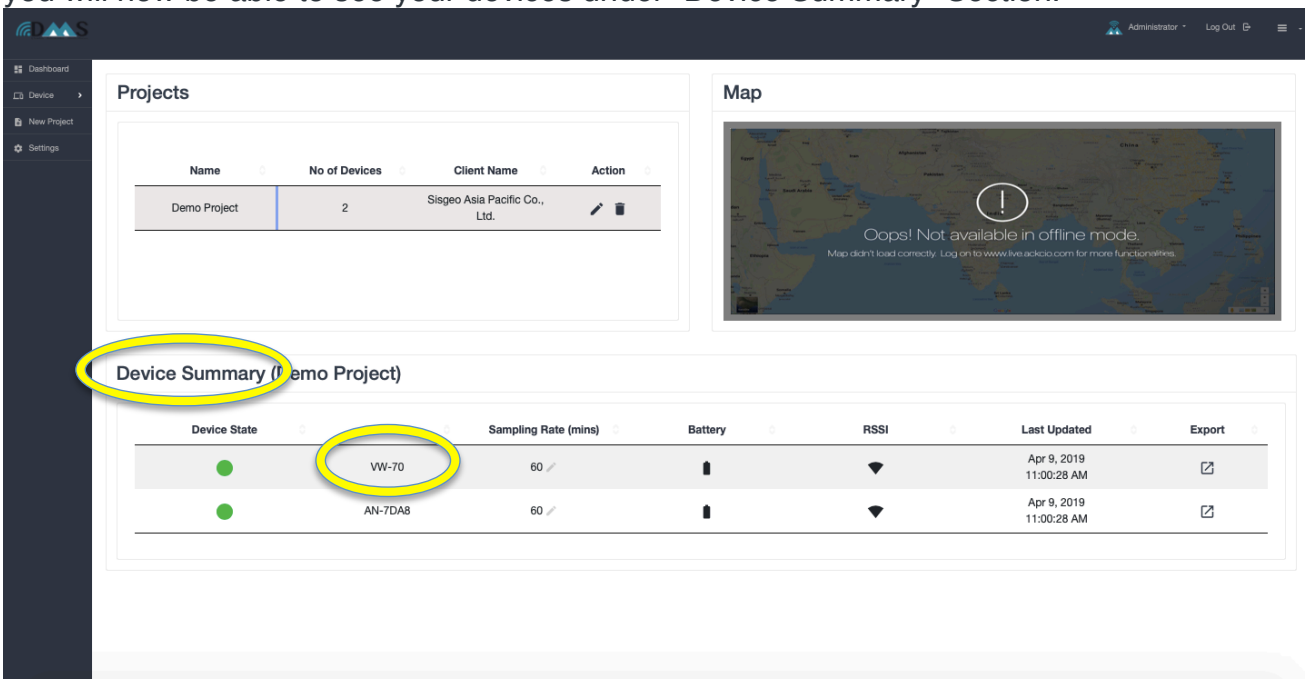


(v) You will see the green color prompt. Gateway wifi will be automatically turn off at this stage. You will need to turn on it again by pressing and holding the SYS TEST button for 6 to 7 seconds on device physical PCB board.

(vi) Click on Dashboard at the side menu, you can now see newly created project. If you want to edit the project, click on pencil button.



(vii) Next step, please refer to Node Manual (Analogue or Vibrating Wire) to setup and commission the nodes.
(viii) After you have commissioned all the nodes, go to Dashboard, click on your project, you will now be able to see your devices under “Device Summary” Section.



10. After you are done interacting with the gateway software, please turn off the WiFi network to conserve power. To do this, as in Step 4, press and hold the SYS TEST button for 6 to 7 seconds.

Normal Operating Status of the Gateway

1 You should see all three LEDs of the gateway should remain off most of the time.
2 The RPI LED will blink every 5sec. If WIFI is on, RPI LED will blink every 5 sec too.
3 The NET LED will blink if the Internet mode has been to CELLULAR and when there is Internet activity (e.g., real-time data uploading to a server via FTP or API). Afterwards, the LED will turn off. In the LOCAL mode, the NET will be permanently off since the gateway does not use Internet connectivity.
4 The RF LED will blink when there is RF activity (radio transmissions or receptions).

Turning off the Gateway

1 Press and hold the SYS TEST button for more than 10 seconds. You will see that the RPI LED will stop blinking and remain turned off.
2 RF LED may continue to blink every 5s which is normal.

Put the power switch to off position.

Setting up Analogue Nodes

This page provides information on setting up a Analogue Node to work with the offline DMS gateway.

Installation Analogue Nodes

1.Connect the node antenna to the antenna bulkhead.
2. Connect the sensor wires to the node while ensuring that the wires are plugged in correctly.

Voltage Output Sensors

PWR: +Voltage input to sensor (e.g. +12V)
GND: 0 Voltage input to sensor (e.g. 0V)
12VN: 12V Voltage input to sensor
1H: 1st channel output of sensor
1L: 1st channel output of sensor
2H: 2nd channel output of sensor
2L: 2nd channel output of sensor
+T: Thermistor
-T: Thermistor
SHLD: Shield wire of sensor

Current Loop Sensor

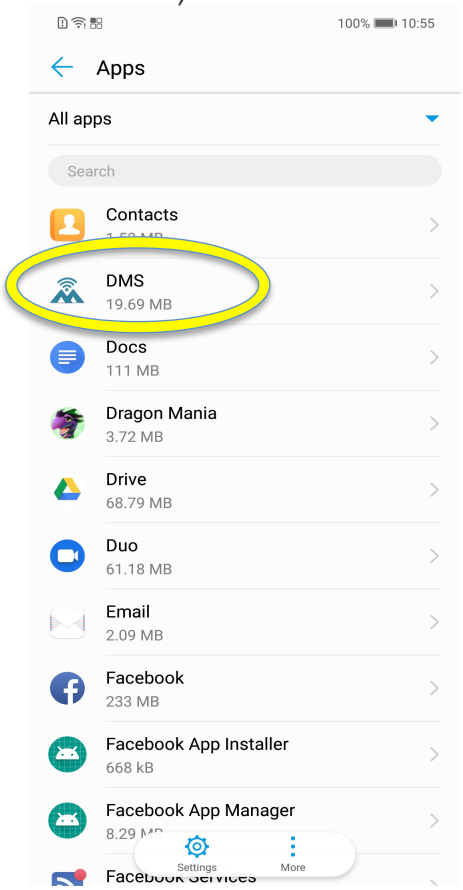
PWR: +Voltage input to sensor (e.g. +12V)
GND: Not used
12VN: Not used
1H: Not used
1L: 1st output channel of sensor (e.g. -Voltage wire)
2H: Not used
2L: 2nd output channel of sensor (e.g. -Voltage wire)
+T: Thermistor
-T: Thermistor
SHLD: Shield wire of sensor

3. Make sure that the Node is switched off.
4. Insert the battery while ensuring the polarity is followed correctly.

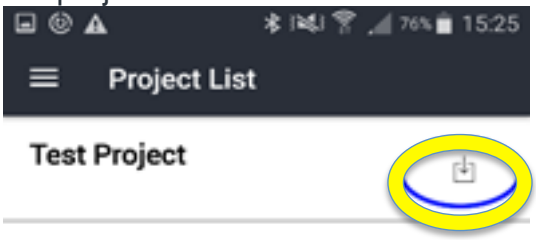
Configuring Analogue node via DMS App

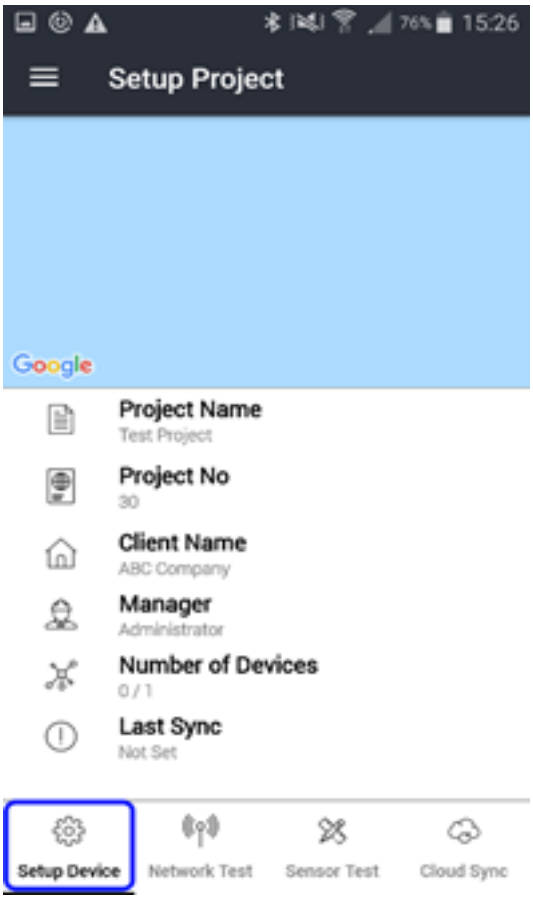
1.Obtain an Android phone and connect it to the DMS gateway WiFi network. (See the Gateway page to learn about switching on the DMS gateway WiFi network.)
2. Plug in the USB end of the debugger kit (the transparent box provided with our shipment) via an OTG adapter to your Android phone.
3. The green LED on the debugger should turn on. If not, please check your phone settings to enable OTG.
4. **Important!** Please make sure the Node switch is turned off before connecting to your phone.
5. Once the green LED on the debugger turns on, plugin the ribbon wire of the debugger to the black socket on the Node.

6. Switch on the Node.
7. Open the DMS app on the phone. (Please note that you need to add the device (node) and create the project first before you commission the note. Please refer to Gateway Setup for details.)

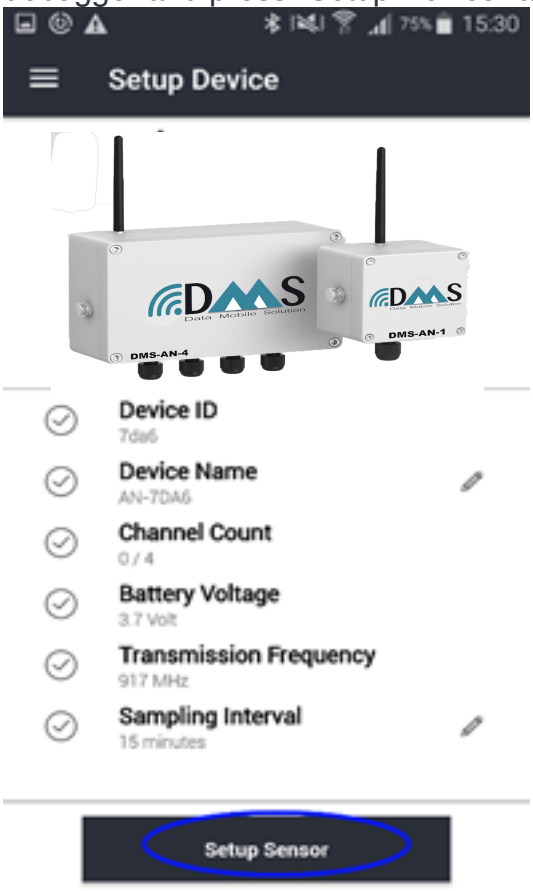


(i) You will see the project which you have already created once you open your DMS Offline app. Click the button to download the project and go in to the project, you will see the project details.



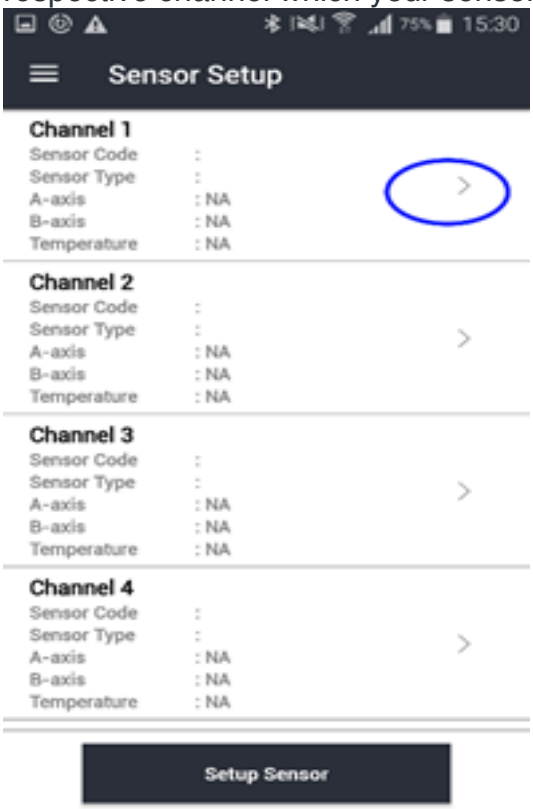


(ii) Click on “Setup Device” on the lower menu, the app will show connected node information. If the connection is unsuccessful, please press the small button on the debugger and press "Setup Device" again.

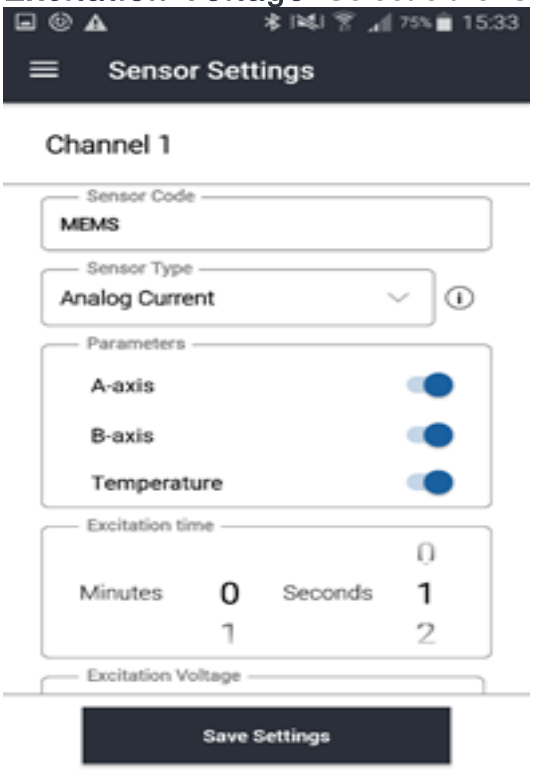


(iii) Click on “Setup Sensor”, you can now configure the sensor settings.

(iv) You will see this page with the available channels. Tap the “Arrow icon” on the respective channel which your sensor is connected to.



(v) **Sensor Code**: Your desired sensor name.
Sensor Type: Select respective sensor type.
Parameters: Turn on the parameters as connected to the Node.
Excitation: Set the warm up time required for the sensor.
Excitation Voltage: Select either 5 or 12 or 24, depending on the sensor.



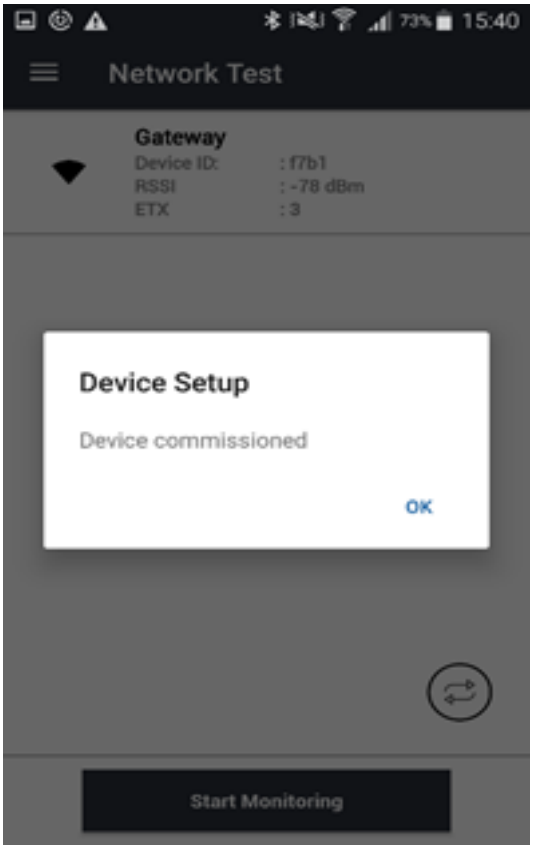
(vi) Click Save Settings. The Node will now read the configured sensor.
(vii) The next page, you will see the readings of the sensor.

(viii) To get another reading, click on arrow icon. If reading is ok, please turn on blue color icon to enable the sensor.

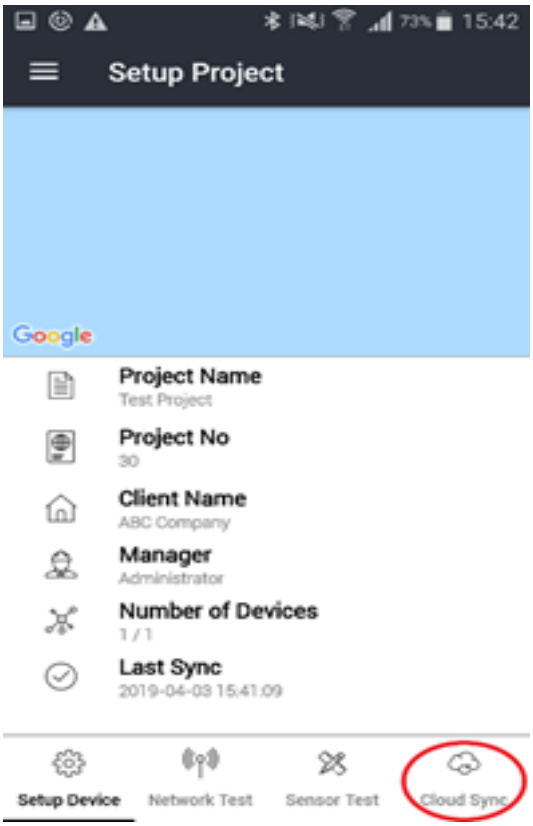
(ix) Repeat above steps to configure other channels of the Node.

(x) Once all sensors are configured, click on “Enable Sensor”, it will take you to next page “Scanning Network” which will scan the wireless signal strength (RSSI) between the Node and Gateway.
(xi) After you get the Network Test information, if you need to, you can refresh by pressing the button located at the lower right corner.

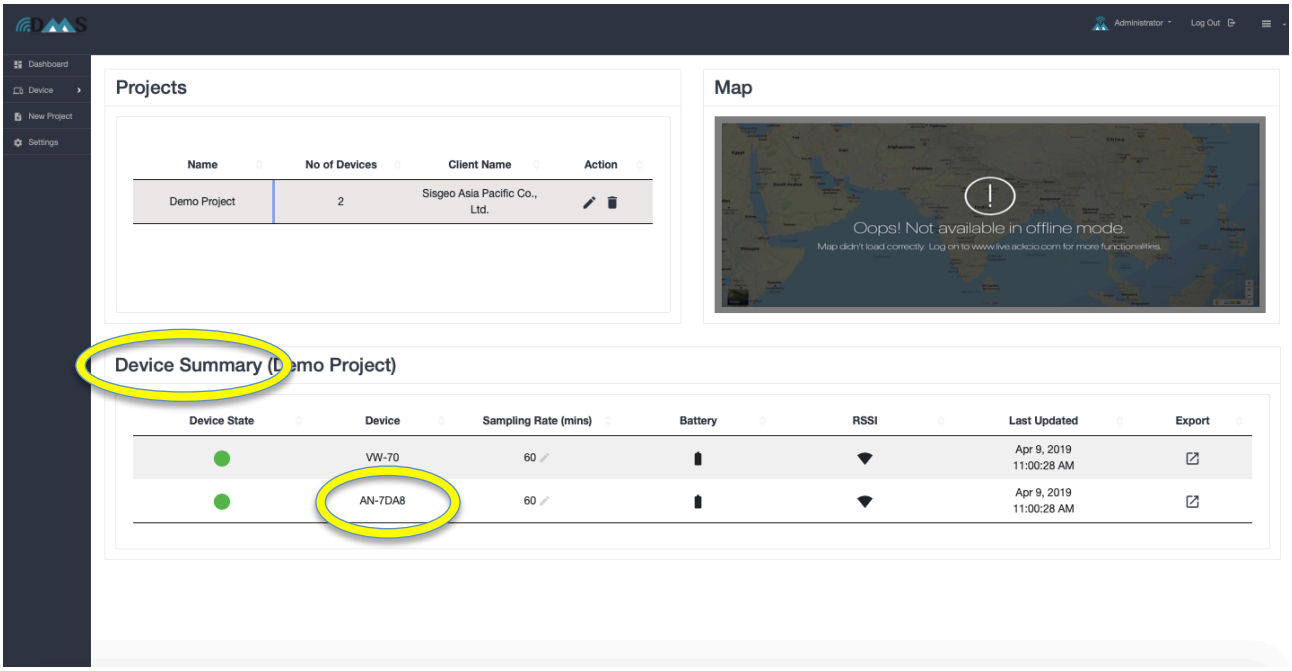
(xii) After that, click “Start Monitoring” button then the app will prompt “Device commissioned”. Click OK.



(xiii) **Important!** Next step, please press the Cloud Sync button at lower right area to send all the configuration information back to the gateway.



(xiv) If you would like the Node to immediately send a reading to the Gateway, please press the “SYS TEST” button on the device physical circuit board.
(xv) For additional node commissioning, repeat the steps above.
(xvi) You can now go to the Gateway software dashboard on your computer and click on your project. You will now be able to see your commissioned devices under “Device Summary” Section.
(xvii) In case the node at the moment of the configuration is far from the gateway, it’s not necessary to press over the Cloud Sync to send the configuration by Wifi. The node will send it after transfer the first reading (pressing the SYS TEST Button)



Setting up Vibrating Wire Nodes

This page provides information on setting up a Vibrating Wire Node to work with the offline DMS gateway.

Installation Vibrating Wire Nodes

1. Connect the node antenna to the antenna bulkhead.
2. Connect the sensor wires to the node while ensuring that the wires are plugged in correctly.

+S: Vibrating wire input of sensor
-S: Vibrating wire input of sensor
+T: Thermistor
-T: Thermistor
SHLD: Shield wire of sensor

3. Switch off the Node and insert the battery while ensuring the polarity is followed correctly.

Configuring VW Nodes via DMS App

1.Obtain an Android phone and connect it to the DMS_gateway WiFi network. (See the Gateway page to learn about switching on the DMS_gateway WiFi network.)

2. Plug in the USB end of the debugger kit (the transparent box provided with our shipment) via an OTG adapter to an Android phone.

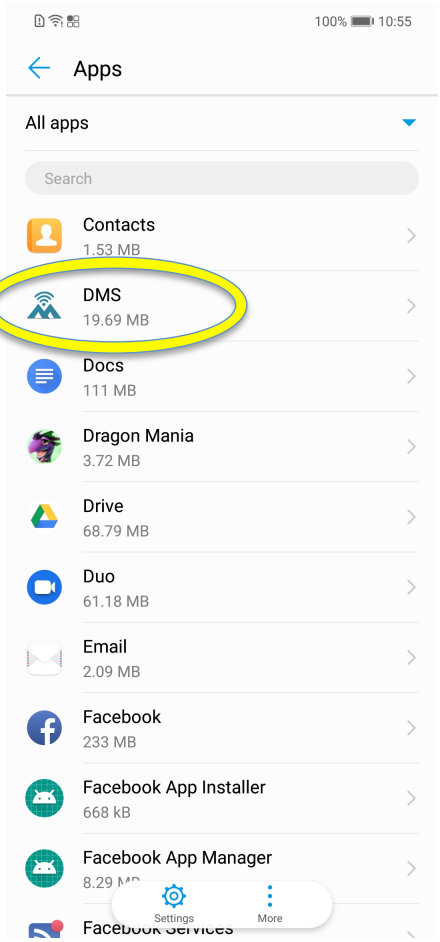
3. The green LED on the debugger should turn on. If not, please check your phone settings to enable OTG.

4. Important! Please make sure the Node is switch off before connecting to your Android phone.

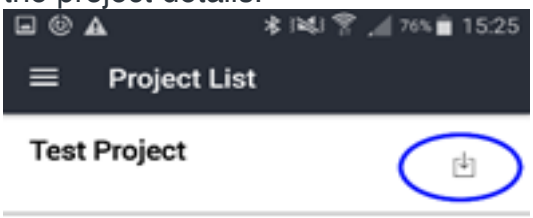
5. Once the green LED on the debugger turns on, plugin the ribbon wire of the debugger to the black socket on the Node.

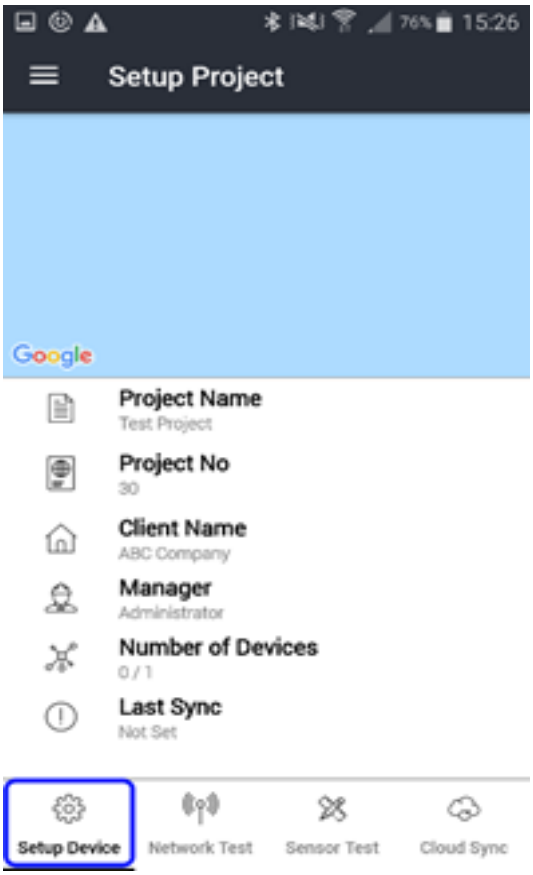
6. Switch on the Node.

7. Open the DMS Offline app on the phone. (Please note that you need to add the device (Node) and create the project first before you commission the Node. Please refer to Gateway Setup for details.)

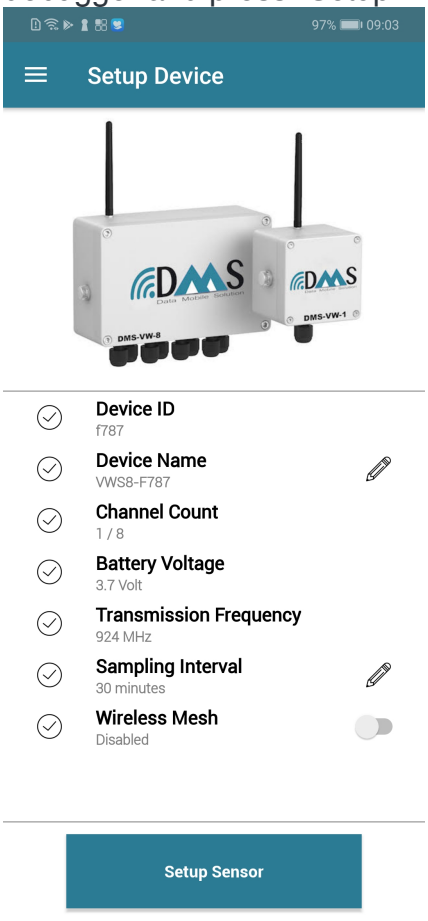


(i) You will see the project which you have already created once you open your DMS Offline app. Click the button to download the project and go in to the project, you will see the project details.

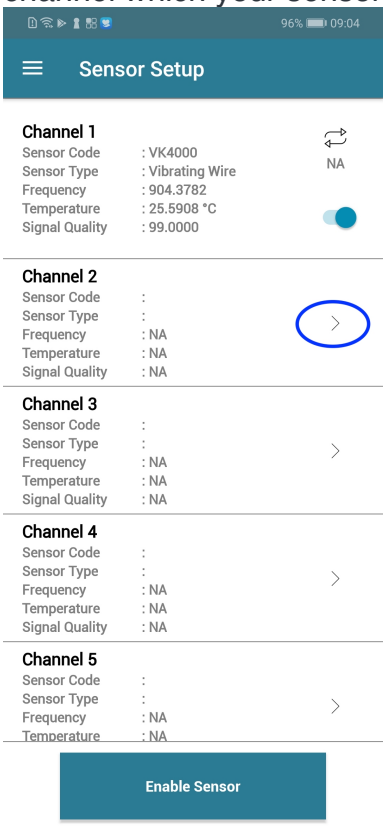




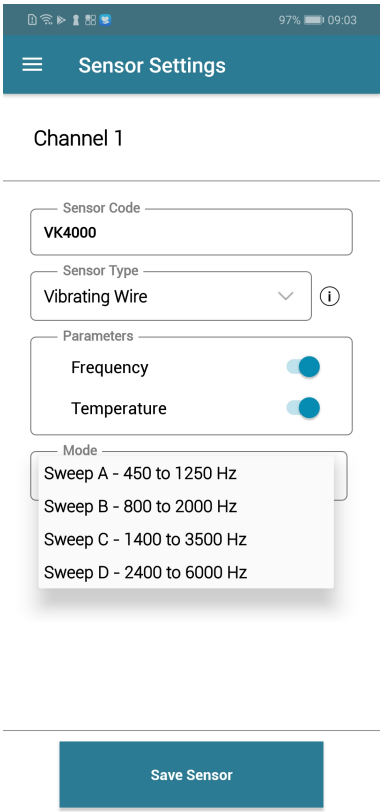
(ii) Click on “Setup Device” on the lower menu, the app will show connected node information. If the connection is unsuccessful, please press the small button on the debugger and press "Setup Device" again.



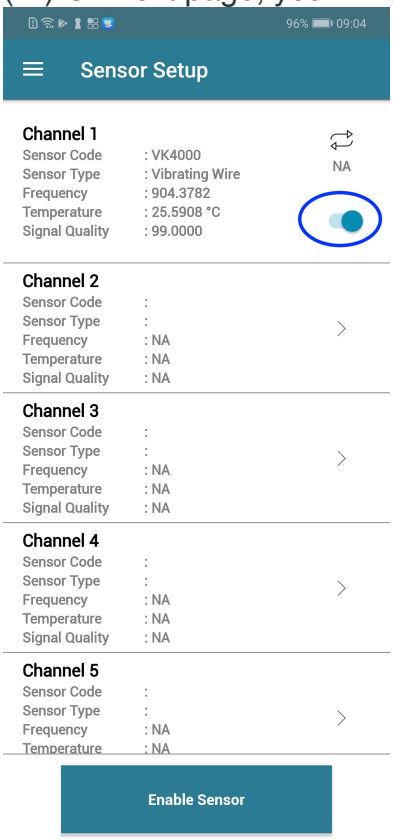
(iii) Click on “Setup Sensor”, you can now configure the sensor settings.
(iv) You will see this page with the available channels. Click “Arrow icon” on the respective channel which your sensor is connected to.



(v) **Sensor Code**: Your desired sensor name.
Sensor Type: Select respective sensor type.
Parameters: Turn on the parameters as connected to the Node.
Mode: Please select the respective Sweep Mode (A or B or C), depending on the sensor.

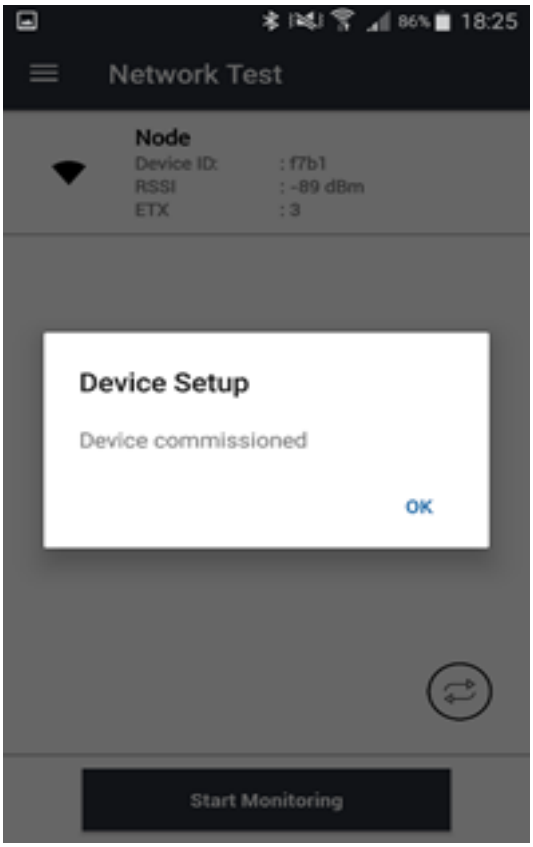


(vi) Click Save Settings. The Node will now read the sensor that was just configured.
(vii) On next page, you will see the first reading.

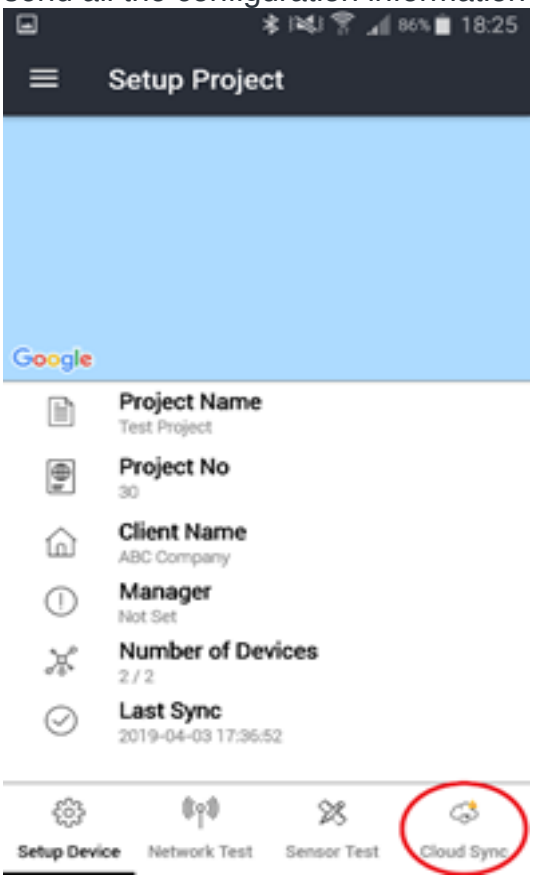


(viii) To get another reading, click on the arrow icon. If the reading is ok, please enable the sensor using the blue color icon.
(ix) Repeat above steps to configure other sensors that are connected to the Node.
(x) Once all sensors are configured, click on “Enable Sensor” button. It will then take you to next page “Scanning Network” which will scan the wireless signal strength (RSSI) between the Node and Gateway.
(xi) After you get the Network Test information, if you need to, you can perform another network test by pressing the button located at the lower right corner.

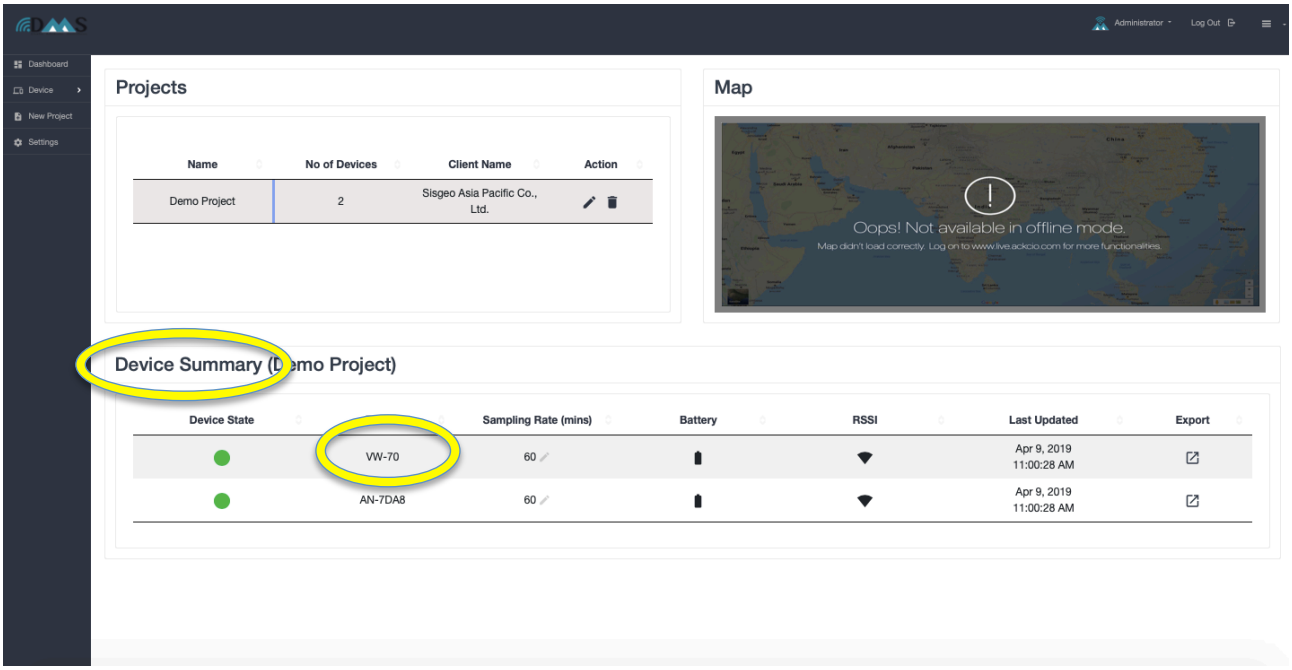
(xii) After that, click “Start Monitoring” button then the app will prompt “Device commissioned”. Click OK.



(xiii) **Important!** Next step, please press the Cloud Sync button at lower right area to send all the configuration information back to the gateway.



(xiv) If you would like to get the Node to immediately send a reading to the Gateway, please press the “SYS TEST” button on device physical circuit board.
(xv) For commissioning of additional Nodes, repeat the above steps.
(xvi) You can now go to the Gateway software dashboard on your computer and click on your project. You will now be able to see your commissioned devices under “Device Summary” Section.
(xvii) In case the node at the moment of the configuration is far from the gateway, it’s not necessary to press over the Cloud Sync to send the configuration by Wifi. The node will send it after transfer the first reading (pressing the SYS TEST Button)



Setting up Relay Ext Node

This page provides information on setting up a Relay Ext node in case your system need.

Configuring of Relay via DMS App

1.Obtain an Android phone and connect it to the DMS_gateway WiFi network. (See the Gateway page to learn about switching on the DMS_gateway WiFi network.)

2. Plug in the USB end of the debugger kit (the transparent box provided with our shipment) via an OTG adapter to an Android phone.

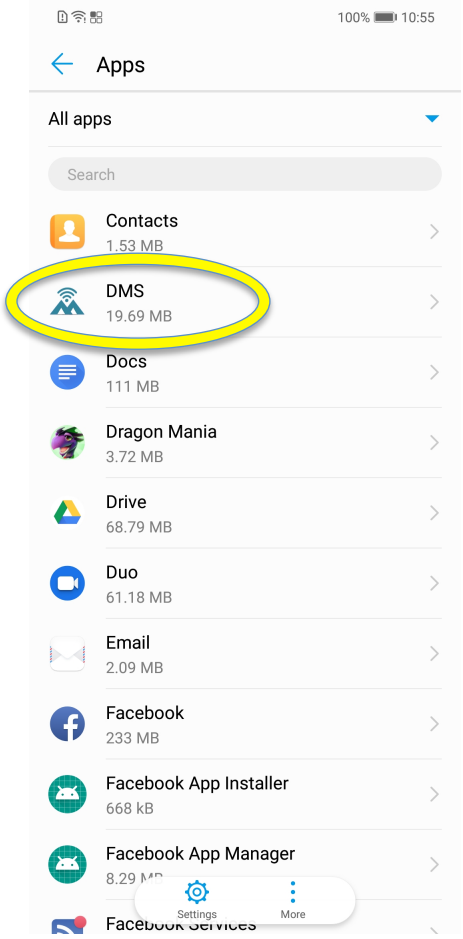
3. The green LED on the debugger should turn on. If not, please check your phone settings to enable OTG.

4. Important! Please make sure the Node is switch off before connecting to your Android phone.

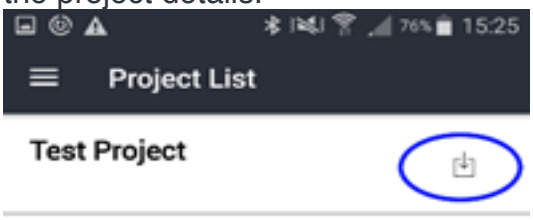
5. Once the green LED on the debugger turns on, plugin the ribbon wire of the debugger to the black socket on the Node.

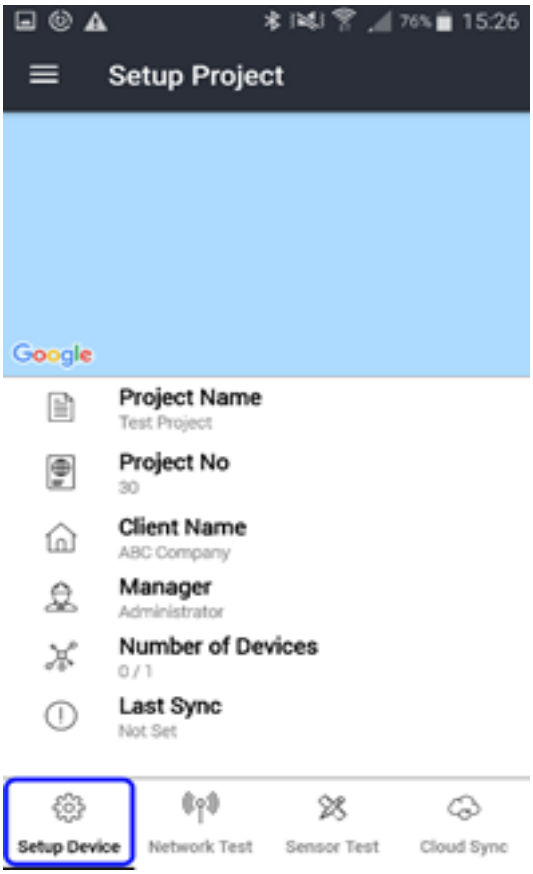
6. Switch on the Node.

7. Open the DMS Offline app on the phone. (Please note that you need to add the device (Node) and create the project first before you commission the Node. Please refer to Gateway Setup for details.)



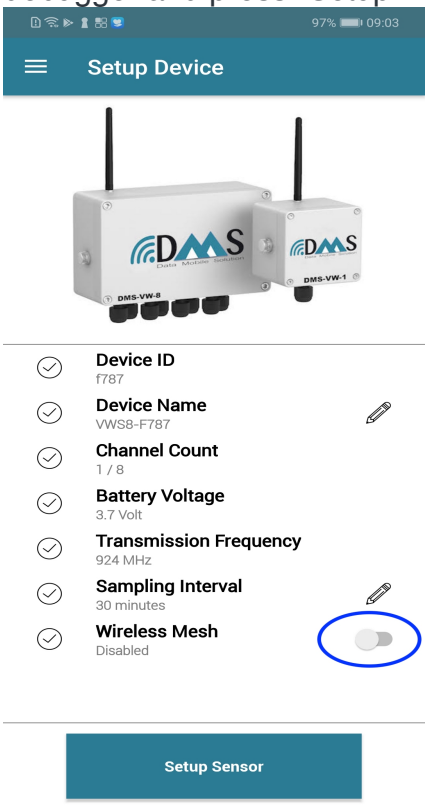
(i) You will see the project which you have already created once you open your DMS Offline app. Click the button to download the project and go in to the project, you will see the project details.



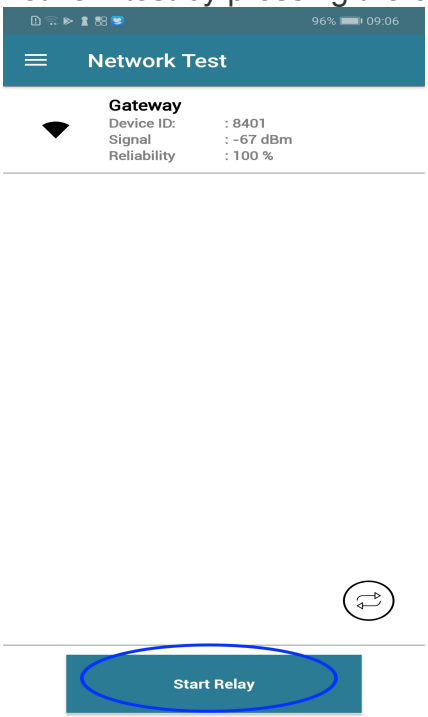


(ii) Click on “Setup Device” on the lower menu, the app will show connected node information. If the connection is unsuccessful, please press the small button on the

debugger and press "Setup Device" again.



(iii) Enable the Wireless Mesh. In this case the node will become a mesh point and can extend the signal between the others node and the Gateway.
(iv) Once all sensors are configured, click on “Enable Sensor” button. It will then take you to next page “Scanning Network” which will scan the wireless signal strength (RSSI) between the Node and Gateway.
(v) After you get the Network Test information, if you need to, you can perform another network test by pressing the button located at the lower right corner.

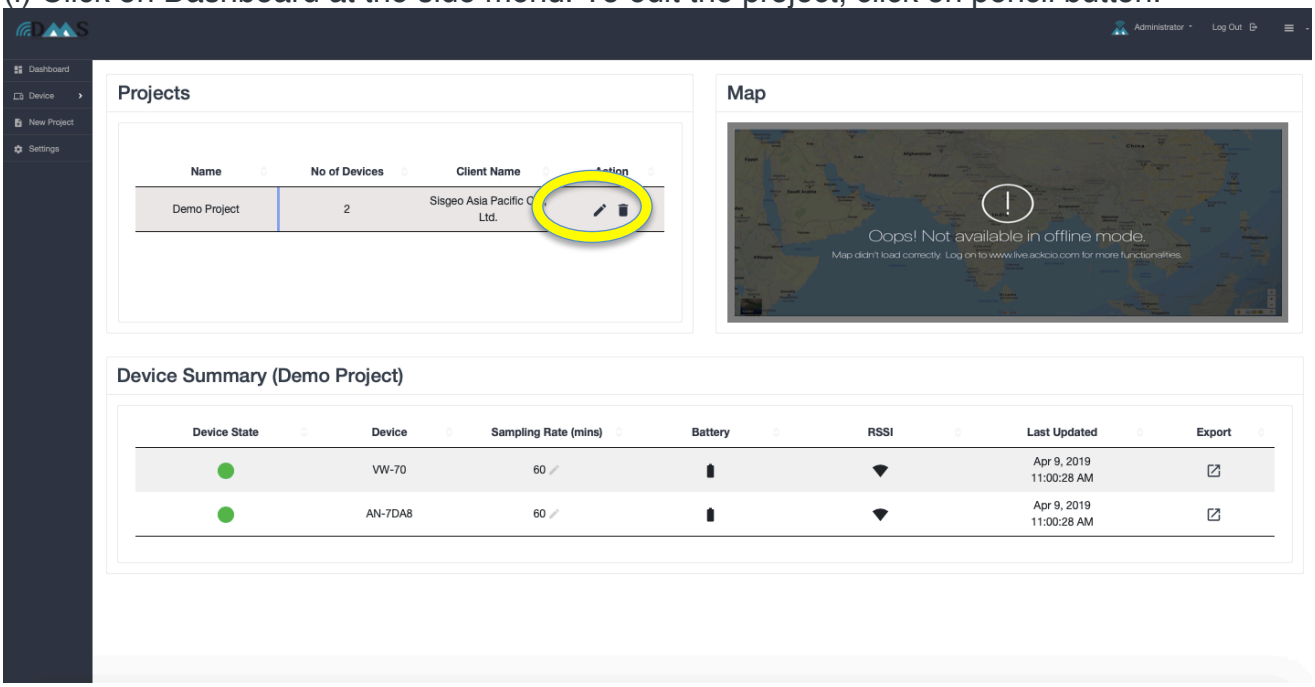


(vi) After that, click “Start Relay” button then the app will prompt “Device commissioned”. Click OK.

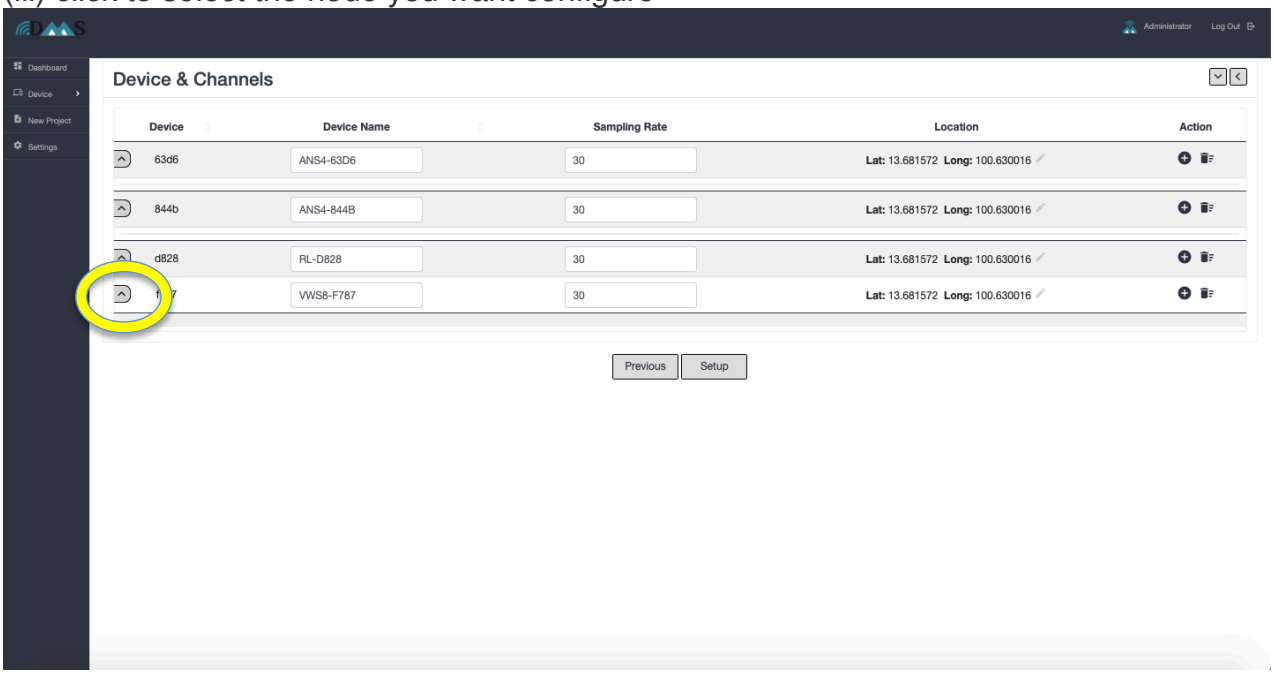
Setting up the conversion formula

This page provides information on setting up in the software the formula to convert the data from electric unit to engineering unit.

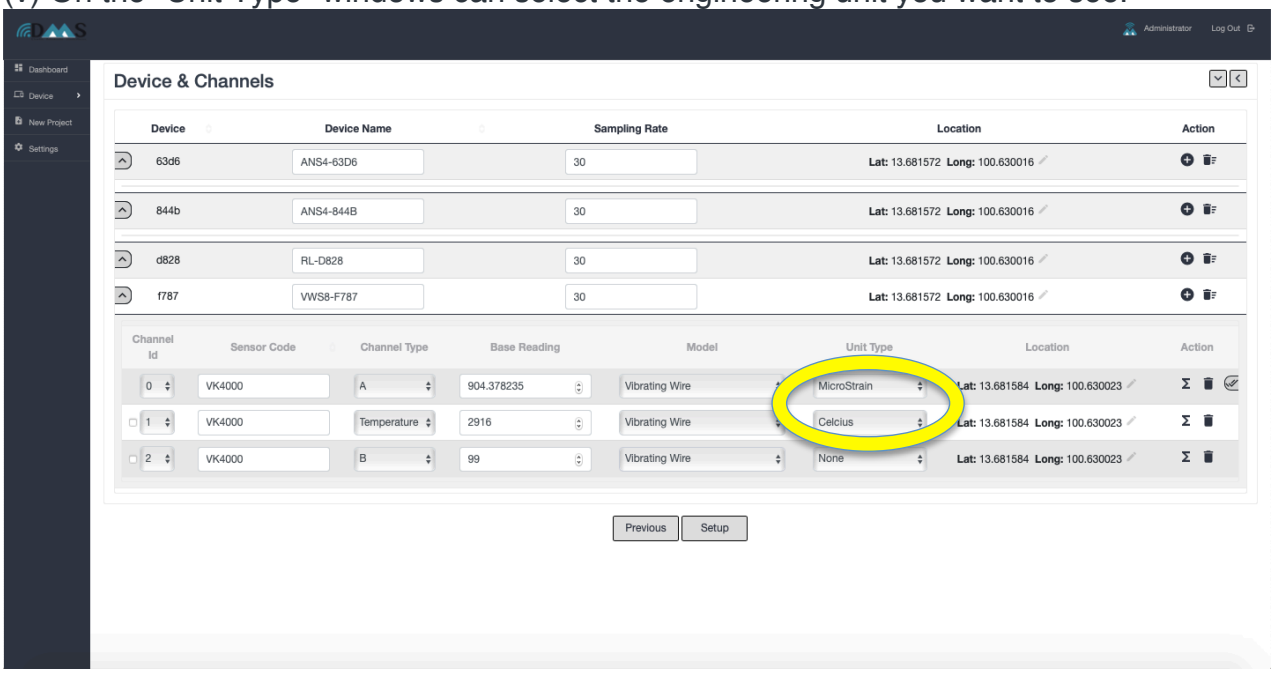
(i) Click on Dashboard at the side menu. To edit the project, click on pencil button.



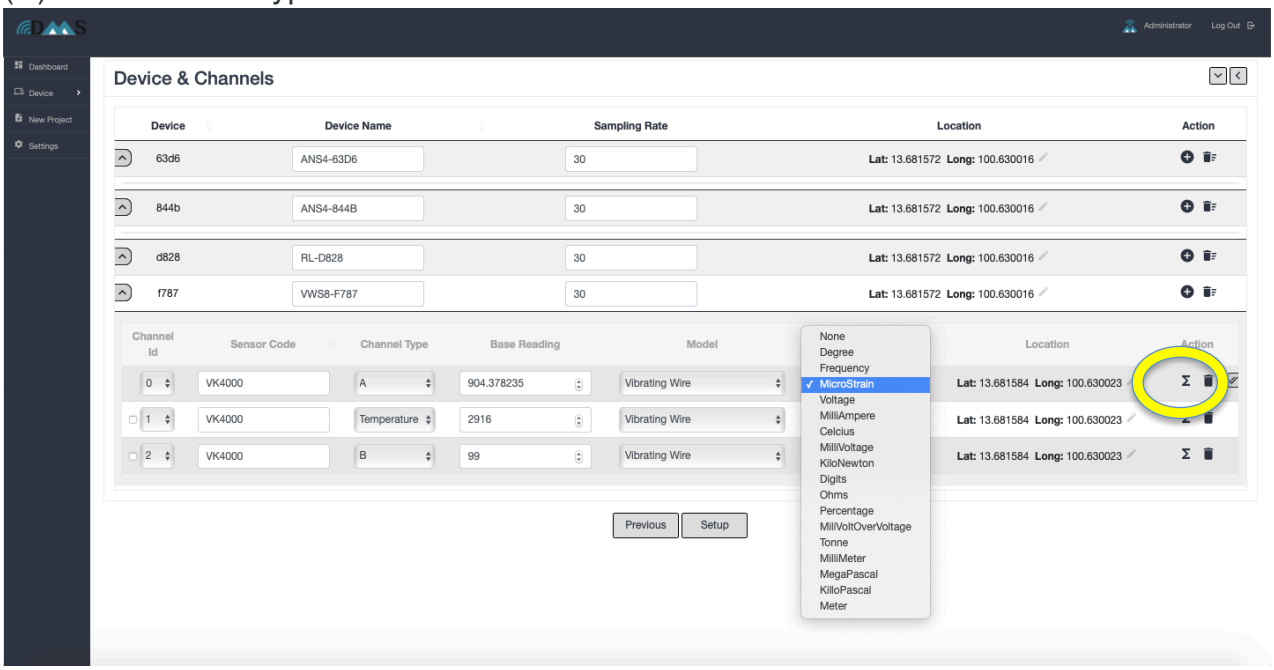
(ii) Click Next button till arrive at the “Device & Channel” page
(iii) click to select the node you want configure



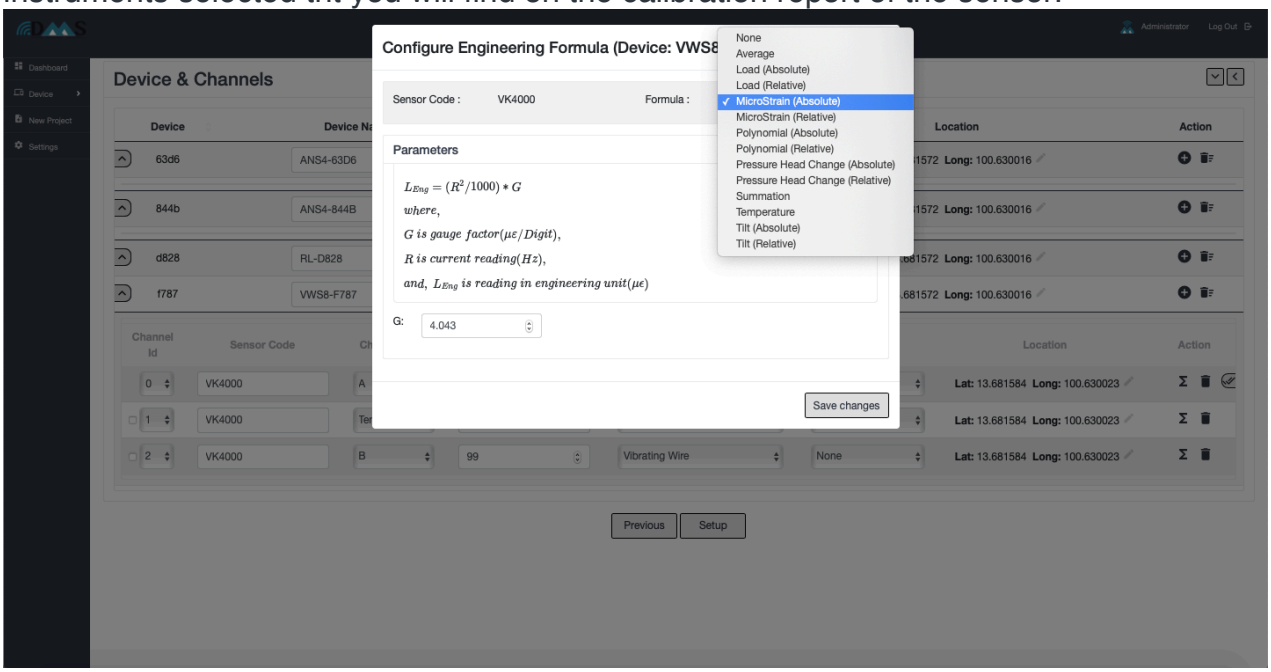
(iv) next page will show you the channel configured for selected node.
(v) On the “Unit Type” windows can select the engineering unit you want to see.



(vi) select the unit type and click on the Σ to set the conversion



(vii) in the new windows can select the Formula you need and input the coefficient of the instruments selected tht you will find on the calibration report of the sensor.

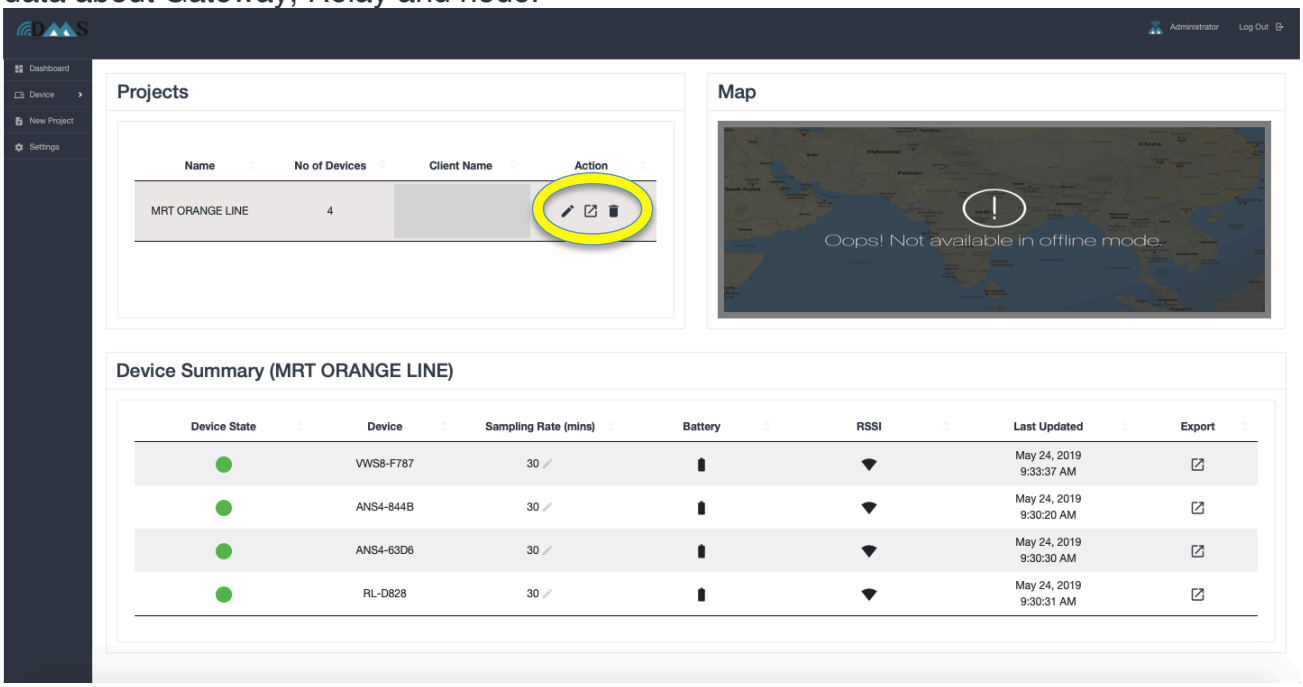


(viii) when you will export the data you will have on the .csv file the raw reading and the engineering converted reading.

	A	B	C	D	E	F	G	H	I	J
1	Date & Time	Temperatures (C)	Rssi (dBm)	Battery (V)	VK4000-Reading-A (mμ)	VK4000-RawReading-A	VK4000-Reading-Temperature (C)	VK4000-RawReading-Temperature	VK4000-Reading-B ()	VK4000-RawRe
2	15/05/19 09:25	26	-100	4.172	3304.3435	904.0464	25.88	2880	98	
3	15/05/19 09:55	26	-94	4.102	3305.152	904.157	25.73	2898	98	
4	15/05/19 10:00	26	-94	4.102	3305.152	904.157	25.59	2916	98	
5	15/05/19 10:15	22	-77	4.103	3304.3435	904.0464	25.18	2969	98	
6	15/05/19 10:30	22	-93	4.102	3302.3225	903.7699	25.21	2965	98	
7	15/05/19 10:45	22	-91	4.102	3302.3225	903.7699	25.21	2965	98	
8	15/05/19 11:00	22	-53	4.101	3302.3225	903.7699	25.18	2969	98	
9	15/05/19 11:15	22	-36	4.102	3302.3225	903.7699	25.21	2965	98	
10	15/05/19 11:30	22	-48	4.101	3302.3225	903.7699	25.11	2978	96	
11	15/05/19 12:00	22	-49	4.101	3305.152	904.157	25.04	2987	93	
12	15/05/19 12:15	22	-50	4.1	3305.9607	904.2676	25.07	2983	92	
13	15/05/19 12:30	22	-46	4.1	3302.3225	903.7699	24.9	3005	92	
14	15/05/19 12:45	22	-49	4.1	3302.3225	903.7699	24.77	3023	92	
15	15/05/19 13:00	22	-50	4.097	3301.5136	903.6592	24.73	3028	91	
16	15/05/19 13:15	22	-50	4.097	3302.3225	903.7699	24.8	3019	91	
17	15/05/19 13:30	22	-48	4.096	3305.152	904.157	24.9	3005	93	
18	15/05/19 13:45	22	-49	4.095	3303.1308	903.8805	24.97	2996	91	
19	15/05/19 14:00	22	-47	4.095	3301.5136	903.6592	25	2992	91	
20	15/05/19 14:15	22	-52	4.094	3302.3225	903.7699	24.8	3019	90	
21	15/05/19 14:30	22	-51	4.094	3300.7055	903.5486	24.84	3014	89	
22	15/05/19 14:45	22	-50	4.094	3302.3225	903.7699	24.8	3019	90	
23	15/05/19 15:00	22	-50	4.093	3300.3007	903.4932	24.8	3019	91	
24	15/05/19 15:15	22	-50	4.093	3302.3225	903.7699	24.84	3014	90	
25	15/05/19 15:30	22	-47	4.093	3301.5136	903.6592	24.77	3023	92	
26	15/05/19 15:45	22	-49	4.093	3302.3225	903.7699	24.84	3014	90	
27	15/05/19 16:00	22	-49	4.09	3301.5136	903.6592	24.8	3019	90	
28	15/05/19 16:15	22	-52	4.09	3301.5136	903.6592	24.8	3019	91	
29	15/05/19 16:30	22	-50	4.091	3302.3225	903.7699	24.8	3019	91	
30	15/05/19 16:45	22	-50	4.089	3301.5136	903.6592	24.77	3023	90	
31	15/05/19 17:00	22	-50	4.089	3300.7055	903.5486	24.73	3028	92	

Export data from DMS Software

(i) Click on Dashboard at the side menu.
(ii) Click the export's action symbol. In this case you will export for the selected project all data about Gateway, Relay and node.



(iii) In case you want to export only the data of a single node, click on the export's action button on the Device Summary table.