iQunet.®

INSTRUCTION MANUAL

iQunet Wireless Sensor Monitoring System

Commissioning of multiple iQunet servers

Subject to reasonable modifications due to technical advances

iQunet.®

0. Abbreviations used

BS: iQunet Base Station

RPT: iQunet Repeater

1. Scope

This manual applies for iQunet monitoring systems that are using more than one iQunet Server in same environment and were the wireless system is designed to overlap in order to cover a larger area. (e.g. a tunnel; see Fig.1).

This Instruction does not cover the installation of the Server in an Ethernet network, or WiFi network. Please refer to the iQunet Manual with software version 1.4.x for more information how to install the iQunet Server in a Wide Area Network (WAN) or a Local Area Network (LAN).
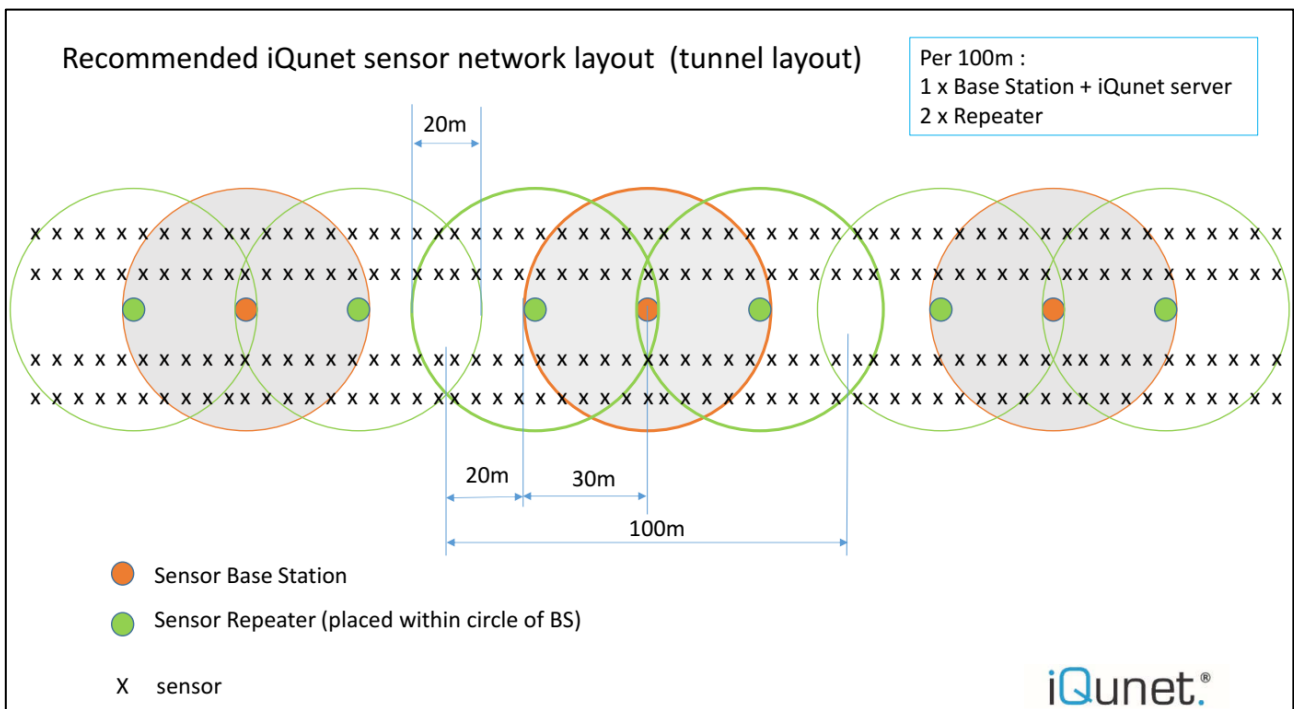

Figure 1: Recommended sensor network layout for best coverage

2. Instructions
2.1. Installation of the Sensors, Base Station and Repeater

Install the iQunet equipment according the product instructions and user manuals from the individual products. Depending on the area attributes like radio signal reflections, radio signal absorptions, etc. the sensor range can differ. It is always necessary to test the reach of sensors in live circumstances before finally fixing the equipment in position.

An iQunet wireless sensor shall always be installed in the range of a Base Station or a Repeater.

Fig 1. Shows a typical layout of the spacing between the components, whereas the circles represent the theoretical average range of the components. The range circles of the Base Station and Repeater shall overlap in this way that the Repeater needs to be in the range of the Base Station. (Fig.1: green Repeater must be positioned in the range circle of the orange Base Station). With 1 Base Station and 2 Repeaters, it is possible to cover an area with a length of about 100m. More Repeaters in the Base Station circle can extend the coverage also in other directions. It is although not possible to link Repeaters to each other. A specific sensor can only reach the Base Station directly, or via 1 Repeater. Installing 2 or more Repeaters in a row is not possible.

Special attention shall be made for the installation of the Base Station and the Repeater. For best installation, the use of the iQunet installation boxes in Fig.2 and Fig.3 is recommended. These boxes are designed to generate best radio coverage while the internal Base Station and Repeater are positioned away from the interferences from the back wall.

Figure 3: Base Station mount in a iQunet pre-assembled box

Figure 3: Repeater mount in a iQunet pre-assembled box

Installation of the sensors shall be made according to Fig.4, keeping the area around the internal antenna free from any metal obstruction or metal part. This way, the antenna gain is maximized.
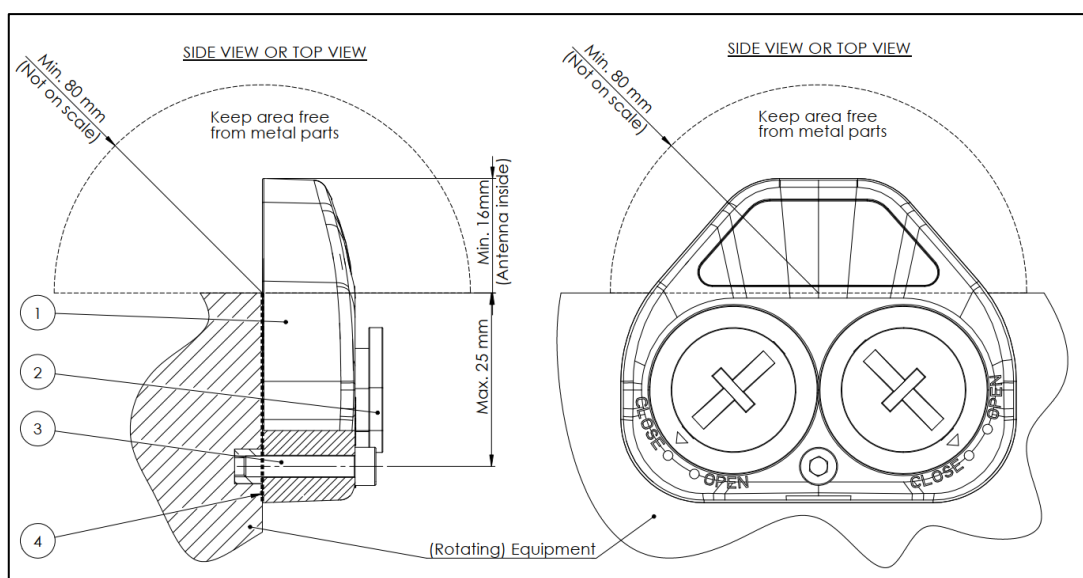

Figure 4: Sensor mounting instruction (extract)

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2.2. Commissioning of the Sub-GHz sensor network

Once the Base Station (and connected Server) and the Repeater(s) are mechanical installed, the system needs to be commissioned using the following steps:

2.2.1. Unpower all sensor network parts

To start configuring the servers, all sensor network parts and sensors need to be unpowered first:

a. Unpower the BS from the server by disconnecting the USB-A cable from the server
b. Unpower the RPT from the power source by disconnecting the micro USB connector. In case the RPT has been powered before, the fail-over batteries has been activated. In that case, the RPT batteries need to be removed as well
c. Unpower **all** sensors: remove the batteries when already inserted, remove the power cable of the 24V sensor.

2.2.2. Configuring the BS connected to each Servers

Once all sensor parts are disconnected, power the iQunet Server and make a LAN or WAN network connection to each of the Servers (see manual 1.4.x for instructions how to reach the dashboard) and put the BS linked to that server in a separate PAN subnet by using the following steps:

a. Open the Server dashboard (see Fig. 5)
b. Connect the USB cable to the related BS in the server
c. Once connected, PING the BS to verify its activity
d. Select the BS in the "Connected Devices" list
e. Select "Setup" in the Network Interface pane, a new window opens (see Fig.6)
f. Assign a PAN subnet mask that is different for each BS. (E.g. change 192.168.0.0 to 192.172.0.0) Safe the changes
g. Click "Reboot" of the BS in the "System information" pane
h. The BS will restart and after it restarted, "Ping" the BS a few times to check the activity
i. The PAN subnet will show the new entered values
j. Repeat the actions from *b* to *j* for each available iQunet Server in the (plant) area and assign a different PAN subnet to each BS

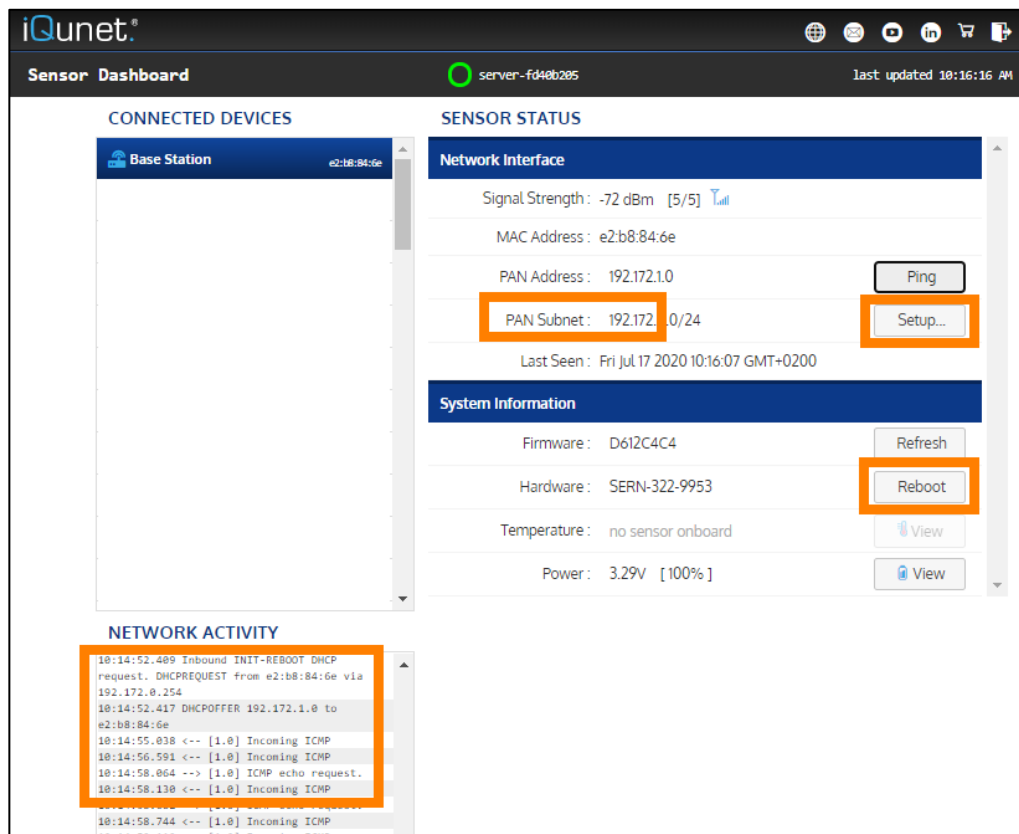The orange-grey circles from Fig.1 are now configured.

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Figure 6: Assigning an unique PAN subnet to each BS

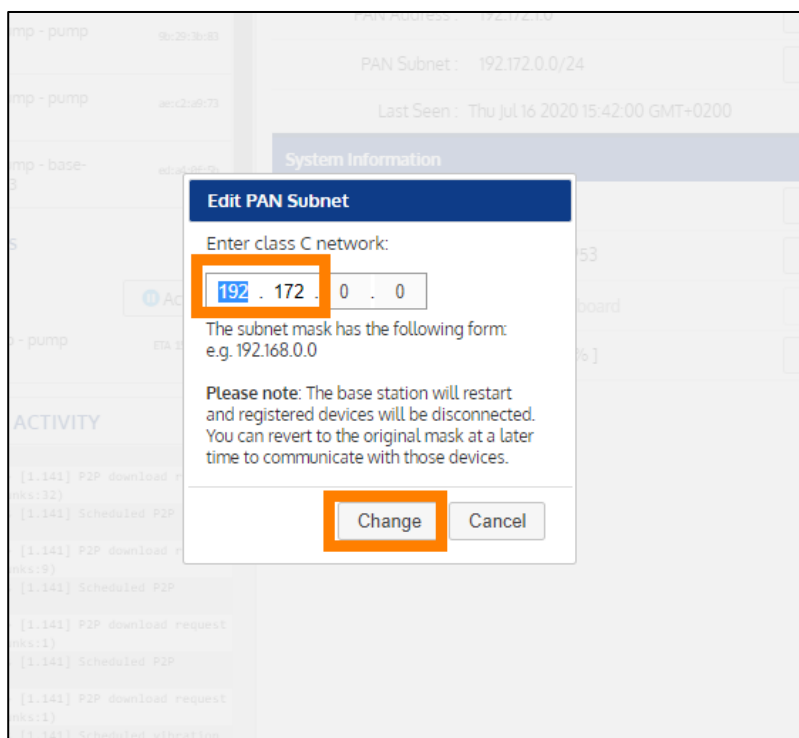*Figure 6: Editing the PAN Subnet*

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2.2.3. Configuring the Repeater to its related BS

Now the Repeaters need to be connected to the related BS. Perform the following actions:

a. Open the server dashboard (see Fig. 7)

b. Connect the micro USB connector to the Repeater to power the Repeater (5.1 VDC). The RPT will pop up as a Device in the list of connected devices with hardware name SERN-322-9964. In case the Repeater does not pop-up in the "Connected Devices" list, reposition the RPT or the Repeater Box until the RPT makes connection to the BS

c. "Ping" the device. The RPT must respond immediately – within the second - to each ping request. If the response is slow (seconds), the RPT is working on the fail over batteries. Remove the batteries and go back to "b". Make sure the Power shows >3.25V (100%)

d. If the RPT is responding quickly, rename the RPT to "RPT repeatername", and "reboot" the device with the reboot button, and "ping" the RPT a few times

e. The device will pop up with a new icon (Repeater icon). (see Fig. 8) Pan address will show xxx.xxx.2.0. The RPT will be active in the "Network Activity" pane as [2.0]. the RPT must respond immediate within a second to each ping. All sensors that will be under this repeater will receive a pan address like xxx.xxx.2.140 or higher number. (a sensor directly connected to the BS will receive xxx.xxx.1.140 or higher number)

f. Repeat this procedure *b* to *e* for each new Repeater that needs to be connected to the BS. Each new Repeater will receive a pan an incremental pan address like [3.0], [4.0], …

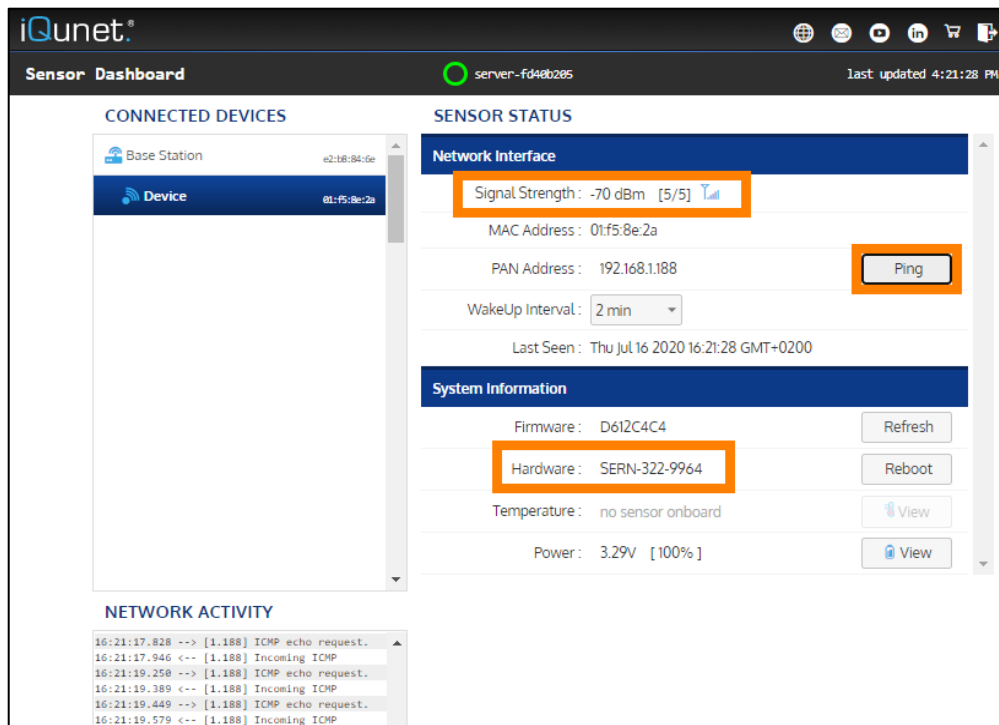g. Insert the fail over batteries in each RPT if not yet done
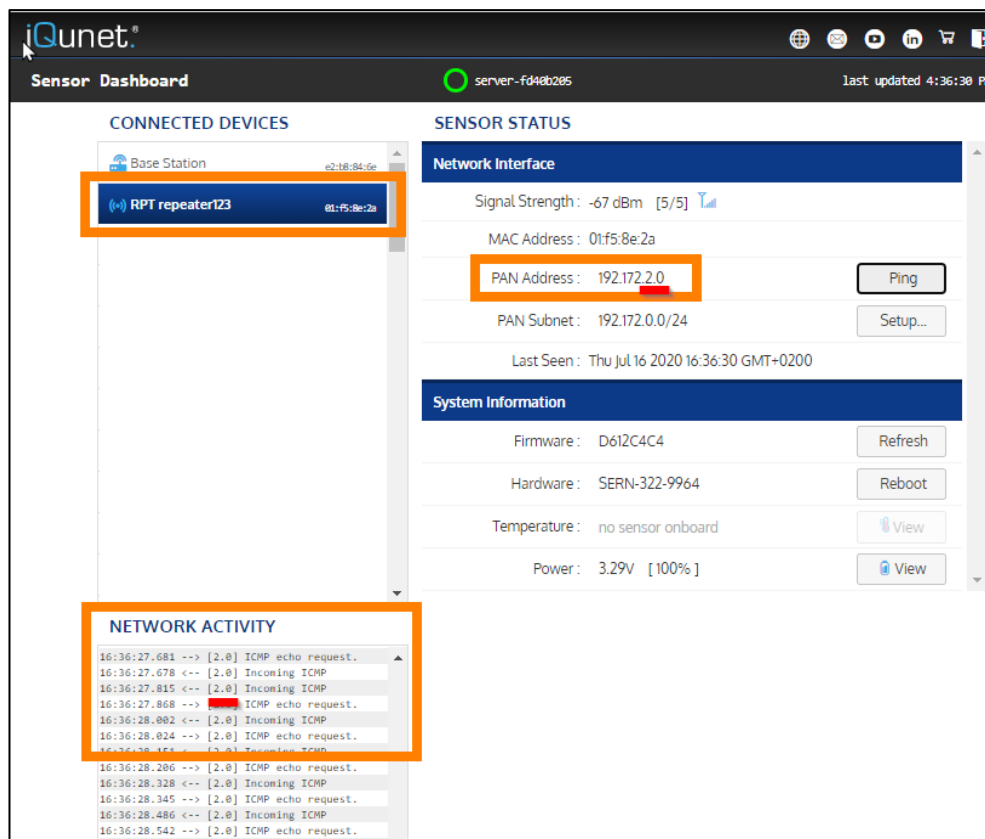

Figure 7: Adding a Repeater Device

Figure 8: Configuring a Repeater device as Repeater

Put all available Repeaters in each BS-networks to roll out the entire wireless Sub-GHz sensor network. All green-white circles from Fig.1 are now configured together with each BS network (orange-grey circles). The wireless sub-GHz network is now installed to connect to all sensors in reach.

2.2.4. Configuring the sensors to the wireless sensor network

Once the Sub-GHz network is in place, the sensors can be added. For best performance, it is recommended to leave the sensors automatically decide to enter under the BS or under the Repeater based on the best available wireless Signal Strength, or even to an adjacent sensor network.

To start connecting the sensors in the network, perform the following actions:

a. Insert the batteries in the sensor, or power the sensor with the power cable.
b. Open the dashboard from the nearest Server/Base Station. The sensor will pop-up under the BS (see Fig.9) or under the Repeater (see Fig.10) , depending of the best signal strength available.
c. Rename the sensor device as appropriate
d. If the sensor does not pop up in the connected devices list, check the nearest dashboard from the nearest Server/Base Station in the area. If the sensor pops up

there, the signal strength is best to this Base Station or Repeater nearby. Keep the sensor connected to this sensor network for best performance.

e. In case the sensor does not pop up in any of the Server dashboards, the sensor is out of range and cannot reach any Repeater or Base Station, perform the following troubleshooting:

   i. make sure the sensor antenna is not "hidden" by a metal object within 8 cm reach. Re-install the sensor with a free sensor antenna according to the installation instructions of the sensor (see Fig.4)

   ii. check if another sensor would make contact from the same position or check if the sensor is popping up in the network when moving the sensor temporarily closer to the Repeater or Base Station. Check if the "last seen" time is renewing within some minutes (click on the sensor name for performing an update – see green arrow in Fig 9 and 10)

   iii. reposition the sensor by turning or shifting in another direction. (e.g. change the antenna top direction pointing to the sky)

   iv. if possible, relocate the sensor 0.5 to 1m, taking in consideration the above points

   v. in case the above points do not work, consider to add another Repeater to the network installed on another height or with another angle to the sensor. (note that a Repeater cannot be repeated)

   vi. in case the above points do not work, consider to add a Server/Base Station combination closer to the sensors which is unable to make any contact

f. perform action *a* to *e* for each sensor

According to the needs, the sensor can now be renamed by clicking the sensor icon. All sensors can be configured for measurement according to the software manual 1.4.x .

3. **Support**

Please contact the sales team from iQunet in case additional support is required.
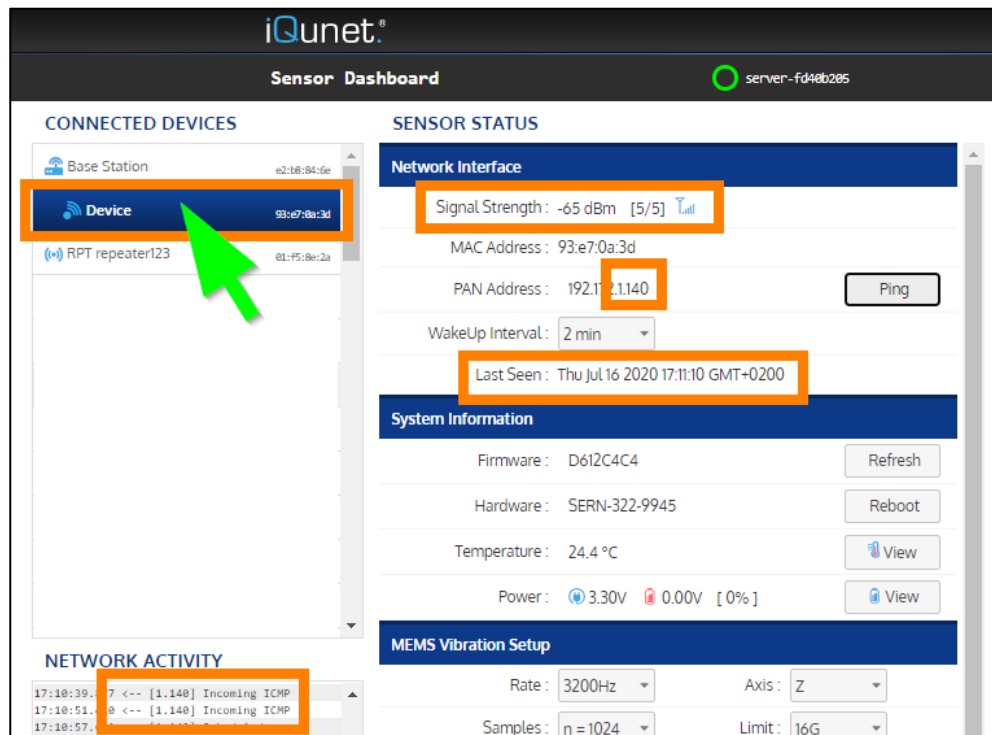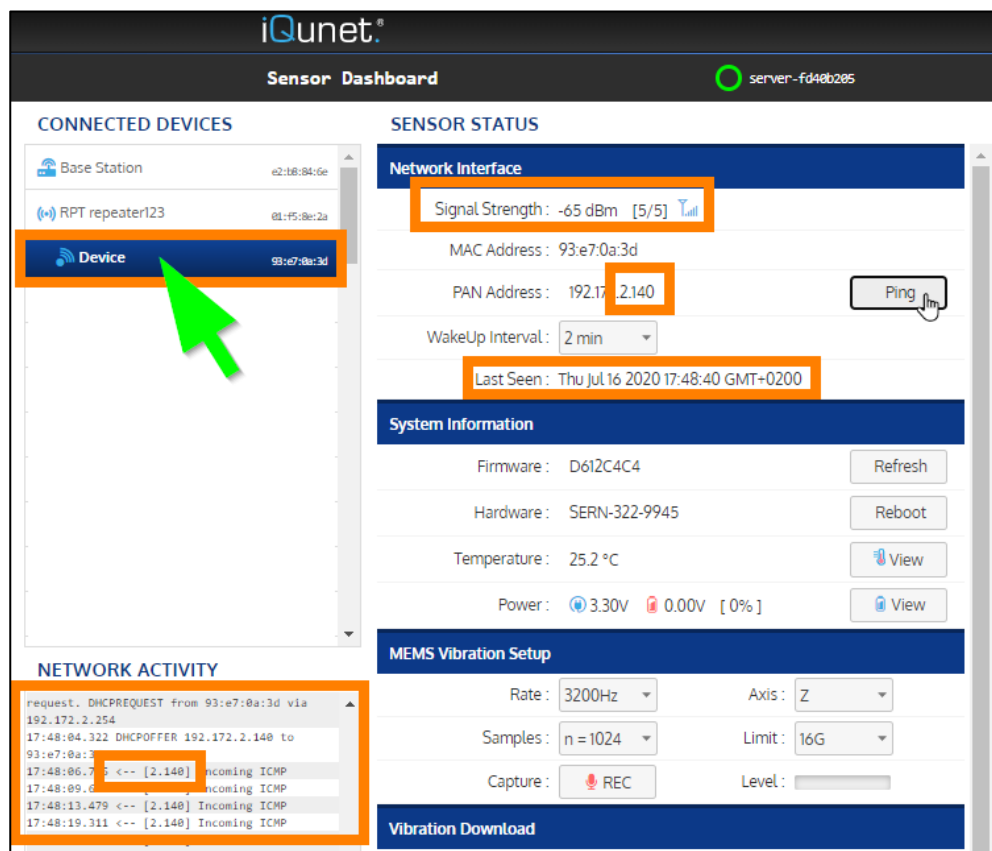
Figure 9: sensor auto-connects to BS, check of connectivity

Figure 9: sensor auto-connects to RPT, check of connectivity