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**Prepared By**  
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Connecting the ORB-X1 to a UDP Server Over WiFi

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# CONNECTING THE ORB-X1 TO A UDP SERVER OVER WIFI

## Introduction

This application note discusses the connection of a Senquip ORB to a UDP client server over Wi-Fi. It will describe connecting the ORB to a Wi-Fi network and the configuration of the ORB and the UDP Client Server.

After reading this application note, you should be able to connect an ORB to a UDP client server and receive data transmitted by the ORB on that Server.

## Hardware Interconnect

The Senquip ORB can measure data from almost any industrial sensor and transmit that data to the Senquip Portal or a company server or SCADA system. The ORB-X1-G can transmit data over GSM and Wi-Fi and the ORB-X1-W over Wi-Fi only. An ORB-X1 only requires power to operate a UDP link. The Wi-Fi antenna is internal to the ORB.

Pins 1 and 2 of the ORB should be connected to power and ground. Power can be any voltage from 9V to 75V and can be permanent power or can be provided by a solar panel or AA batteries. It is recommended that a 1A fuse be inserted between the power source and power connection of the ORB. The fuse protects the power source if the ORB fails or the positive wire comes loose and touches ground.

## ORB Configuration

If you are configuring the ORB for the first time, use a phone, tablet or laptop to access the ORB's integrated webserver. To activate the webserver, press the setup key on the ORB for 1 second and then connect to the ORB's Wi-Fi on your phone, tablet or laptop. Passwords for the ORB's Wi-Fi and webserver can be found on a tear-off sticker under the lid of the ORB. For further details on how to access the webserver, please see the "ORB-X1 User Guide". If the ORB is already available on the Senquip Portal, simply login to the Portal and make the required changes remotely.

In this application, we will use a UDP client server called "Udp Client Server" by NSauditor. The client server has determined that it has an IP address of 192.168.1.49. We have specified the port

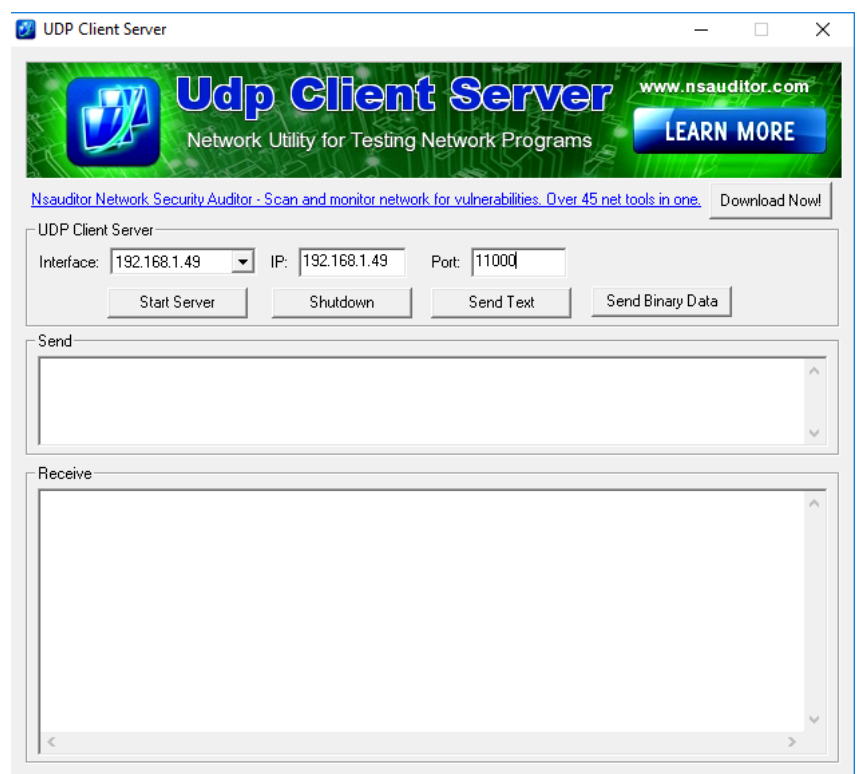


Figure 1 - Typical UDP Client Server

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as 11000. The IP address field should be used if you want to send packets to the ORB. It will not be used in this application.

Once you have entered your port number, press “Start Server” to begin.

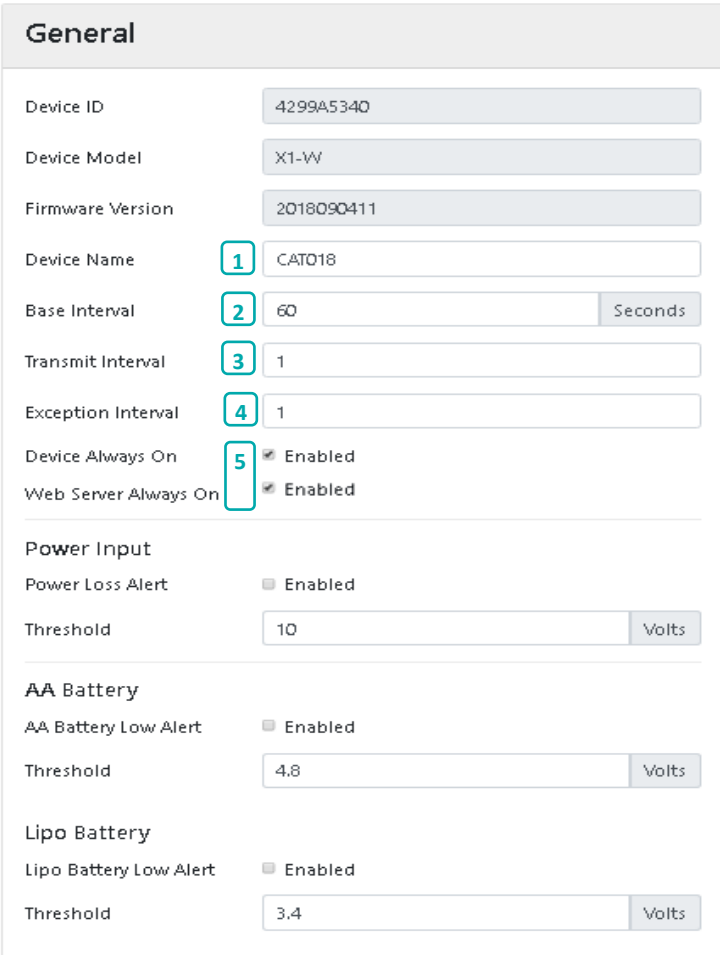
Note that only settings used in connection of a Senquip ORB-X1 to a UDP server over Wi-Fi are discussed in this application note. For information on connecting sensors to an ORB, please see the “ORB-X1 User Guide”.

## General Setup

For general setup, use the **General** tab on the ORB webserver. Remember to save when complete.

1. Give the ORB a name that is meaningful to the user, in this case, the vehicle registration, “CAT018.”
2. In this application, we will forward data to the UDP server once every minute. There is no reason to wake up more regularly than this and so the base interval is set at 60 seconds.
3. Set the Transmit Interval to 1 so that a UDP packet will be sent each time the ORB wakes to take measurements.
4. There are no warnings or alarms used in this application that require faster updates be sent and so the Exception Interval is set to be the same as the transit interval.
5. By turning on Device Always On and Web Server Always On, the ORB will remain awake and the webserver will be accessible on the local WiFi network at all times.

Remember to save your settings. When you press save, the ORB will reset and will load the new settings on re-start.



General	
Device ID	4299A5340
Device Model	X1-W
Firmware Version	2018090411
Device Name	1 CAT018
Base Interval	2 60 Seconds
Transmit Interval	3 1
Exception Interval	4 1
Device Always On	5 <input checked="" type="checkbox"/> Enabled
Web Server Always On	<input checked="" type="checkbox"/> Enabled
Power Input	
Power Loss Alert	<input type="checkbox"/> Enabled
Threshold	10 Volts
AA Battery	
AA Battery Low Alert	<input type="checkbox"/> Enabled
Threshold	4.8 Volts
Lipo Battery	
Lipo Battery Low Alert	<input type="checkbox"/> Enabled
Threshold	3.4 Volts

Figure 2 - General Settings

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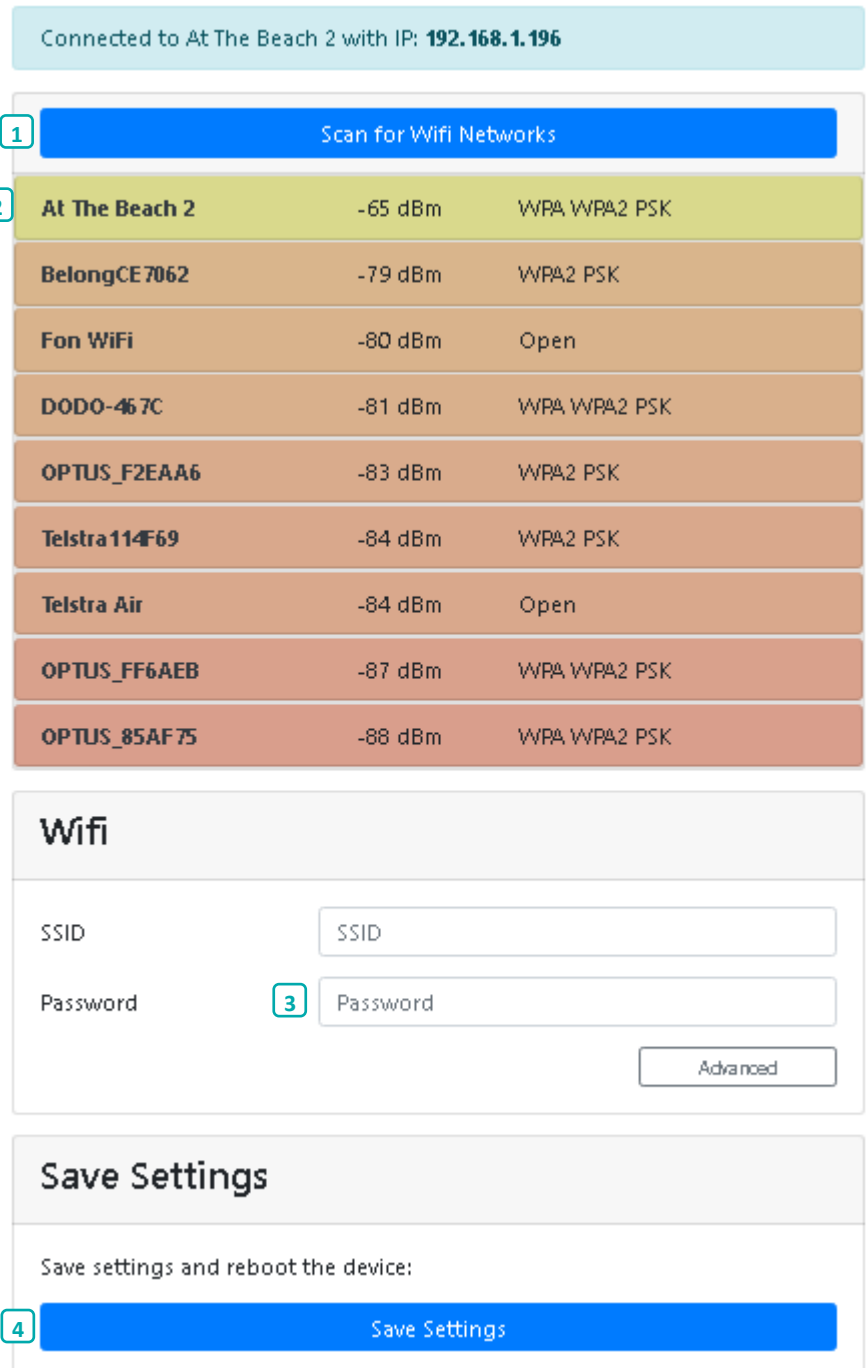
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## Network Setup

The ORB is to be connected to a Wi-Fi network. To configure and connect the ORB to the WiFi network, use the **Network** tab on the ORB webpage.

1. Press the **Scan for Wi-Fi Networks** tab to search for your network.
2. When found, press the network name to auto-populate the SSID field. If the SSID is hidden, enter it directly.
3. Enter the WiFi password.
4. Save and re-boot the ORB. If the SSID and password are correct, the ORB will attach to the WiFi network.
5. To check if the ORB has successfully connected, re-enter setup mode and select the Network tab. At the top of the page, the connection status and IP address on the Wi-Fi network are given. This IP address can be used to access the ORB webserver from this point on.

Remember to save your settings. Once the ORB re-starts, the orange LED should go solid as the ORB finds the network. If the orange light continues to flash, the ORB cannot connect to the network and the network settings should be checked. Senquip does not allow UDP connections over GSM as this is not a secure method of data transfer.



Connected to At The Beach 2 with IP: **192.168.1.196**

Scan for Wifi Networks		
<b>At The Beach 2</b>	-65 dBm	WPA WPA2 PSK
BelongCE7062	-79 dBm	WPA2 PSK
Fon WiFi	-80 dBm	Open
DODO-467C	-81 dBm	WPA WPA2 PSK
OPTUS_F2EAA6	-83 dBm	WPA2 PSK
Telstra114F69	-84 dBm	WPA2 PSK
Telstra Air	-84 dBm	Open
OPTUS_FF6AEB	-87 dBm	WPA WPA2 PSK
OPTUS_85AF75	-88 dBm	WPA WPA2 PSK

**Wifi**

SSID:

Password:

**Save Settings**

Save settings and reboot the device:

Figure 3 - Network Settings

## Endpoint Setup

To setup the server to which the data is to be sent, in this case a UDP server with address 192.168.49 and port 11000, use the **Endpoint** tab on the ORB webpage.

1. If data is to be sent to the Senquip Portal, enable this option.
2. In this application, data is to be sent to a UDP server, so UDP needs to be enabled.
3. Enter the IP address of the UDP server followed by a colon and the port. In this case, the IP address is the IP address of the UDP client server. The port must match the port number that has been specified in the UDP client server earlier.
4. If you would like a readable timestamp on each message, tick this box.
5. If you would like to report network information like your IP address on the local port, select this box.

### Data Endpoints

Senquip Portal	<span style="border: 1px solid #00a651; border-radius: 50%; padding: 2px 5px;">1</span>	<input checked="" type="checkbox"/> Enabled
Offline Buffer		<input type="checkbox"/> Enabled
UDP	<span style="border: 1px solid #00a651; border-radius: 50%; padding: 2px 5px;">2</span>	<input checked="" type="checkbox"/> Enabled
UDP Address	<span style="border: 1px solid #00a651; border-radius: 50%; padding: 2px 5px;">3</span>	<input type="text" value="192.168.1.49:11000"/>
HTTP POST		<input type="checkbox"/> Enabled
HTTP Address		<input type="text" value="example.com/api:80"/>
Add Formatted Time	<span style="border: 1px solid #00a651; border-radius: 50%; padding: 2px 5px;">4</span>	<input type="checkbox"/> Enabled
Report Network Info	<span style="border: 1px solid #00a651; border-radius: 50%; padding: 2px 5px;">5</span>	<input checked="" type="checkbox"/> Enabled

Remember to save your settings.

**Figure 4 - Endpoint Setup**

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## Viewing the Data

Each time the ORB wakes from sleep and measures data, that data will now be sent to the UDP client server as shown in Figure 5. Note that the format of the data is JSON; further detail on the format of the transmitted data can be found in the “ORB-X1 User Guide”.

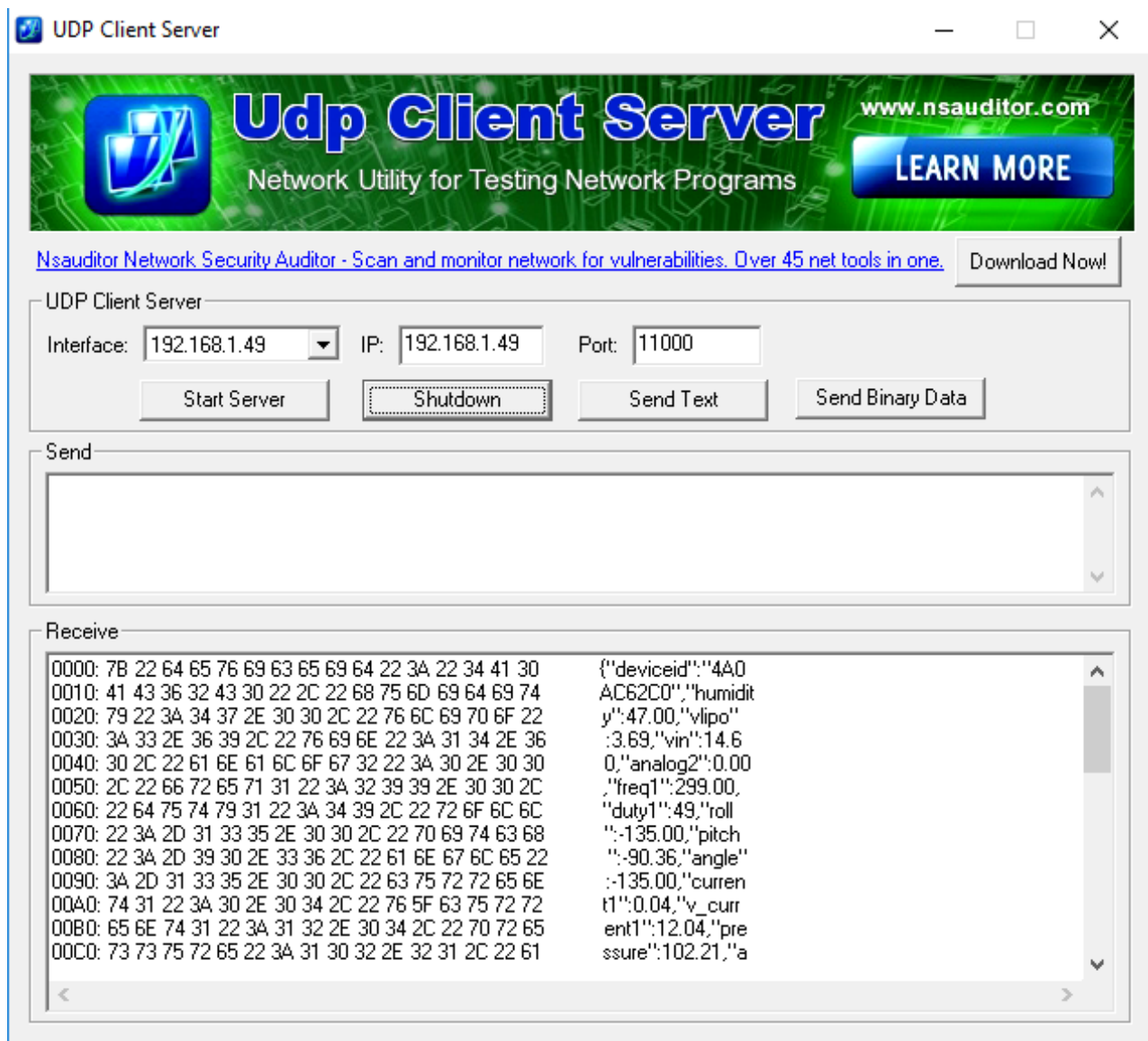
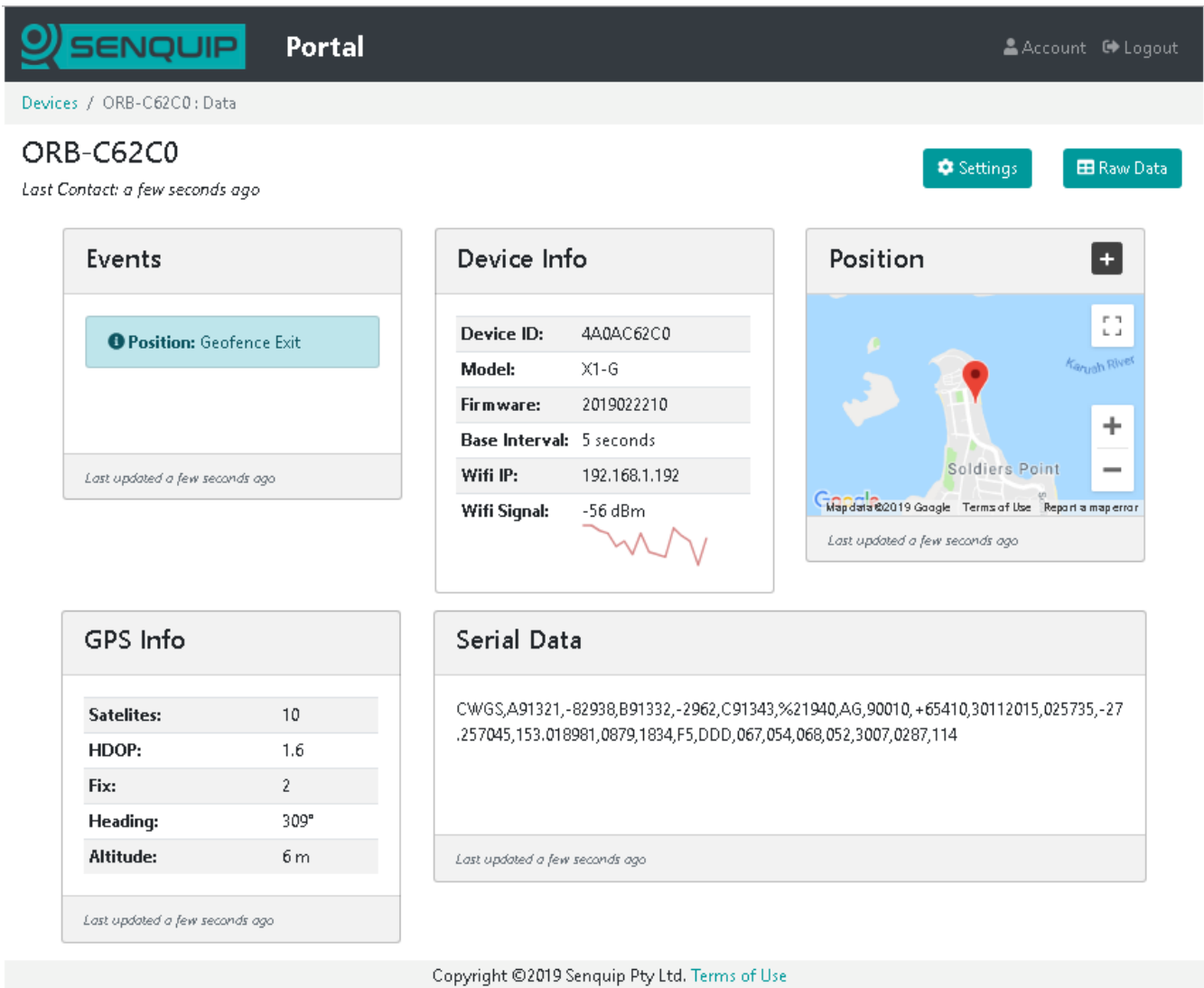


Figure 5 - Data Received at UDP Endpoint

In this application, the Senquip Portal was also selected as an endpoint and so the data will be available online on the Portal.

To view the data on the Senquip portal, go to: <https://portal.senquip.com> and create an account. Add the ORB to your account using the id and password under the lid. You can now view your data anywhere in the world, real-time.



**SENQUIP Portal**    Account    Logout

Devices / ORB-C62C0 : Data

**ORB-C62C0**    Settings    Raw Data

Last Contact: a few seconds ago

**Events**

- Position: Geofence Exit


Last updated a few seconds ago

**Device Info**

- Device ID: 4A0AC62C0
- Model: X1-G
- Firmware: 2019022210
- Base Interval: 5 seconds
- Wifi IP: 192.168.1.192
- Wifi Signal: -56 dBm

Last updated a few seconds ago

**Position**



Last updated a few seconds ago

**GPS Info**

- Satellites: 10
- HDOP: 1.6
- Fix: 2
- Heading: 309°
- Altitude: 6 m

Last updated a few seconds ago

**Serial Data**

```
CWGS,A91321,-82938,B91332,-2962,C91343,%21940,AG,90010,+65410,30112015,025735,-27.257045,153.018981,0879,1834,F5,DDD,067,054,068,052,3007,0287,114
```

Last updated a few seconds ago

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Figure 6 - Viewing Data on the Senquip Portal

## Conclusion

Connecting an ORB to a Wi-Fi network is quick and easy. When using the ORB, you can forward your data to any server or SCADA system using UDP, HTTP, HTTPS or MQTT. Use of the Senquip Portal is optional but is recommended in order to be able to do remote settings changes and firmware updates.