EM4XXX Datalogger V2 – Getting Started Guide – February 2019

Overview

The EM4xxx datalogger system is fully IP68 rated. It consists of 3 main elements.

1. Loop antennas. These are available currently in 3 diameters (45mm, 65mm and 80mm). All antennas come with 1.5m of cable. Antennas can be single or double, depending upon the RFID unit ordered being single or double.
2. RFID Unit. This unit can be a single antenna or double antenna version. It is IP68 rated and comes with two connectors. One to the antenna(s) and one to the datalogger/battery unit. The unit contains a small amount of memory where 100 detections are stored. Once more than 100 detections occur, the data is transferred to the datalogger/battery unit where it is stored as a CSV file.
3. The datalogger/battery unit. This contains the storage memory for the tag detections and a rechargeable lithium ion battery pack. This is charged by a 5V power supply (USB) and is connected by a mini USB connector. On the current pre-production trial units, the system is a fixed polling rate of 7 scans per second. Any tag detected will not be stored in memory again for a second to prevent too many "same event" storages. On future releases, polling time will be user configurable, as will the "same event" delay time for ignoring events within a user selectable time of one another.

The system comes with a standard 2m interconnect cable between the datalogger/battery unit and the RFID unit. Longer cables (5m or 10m) can be ordered at extra cost. Armoured conduit can also be ordered for this cable and is charged by the metre.

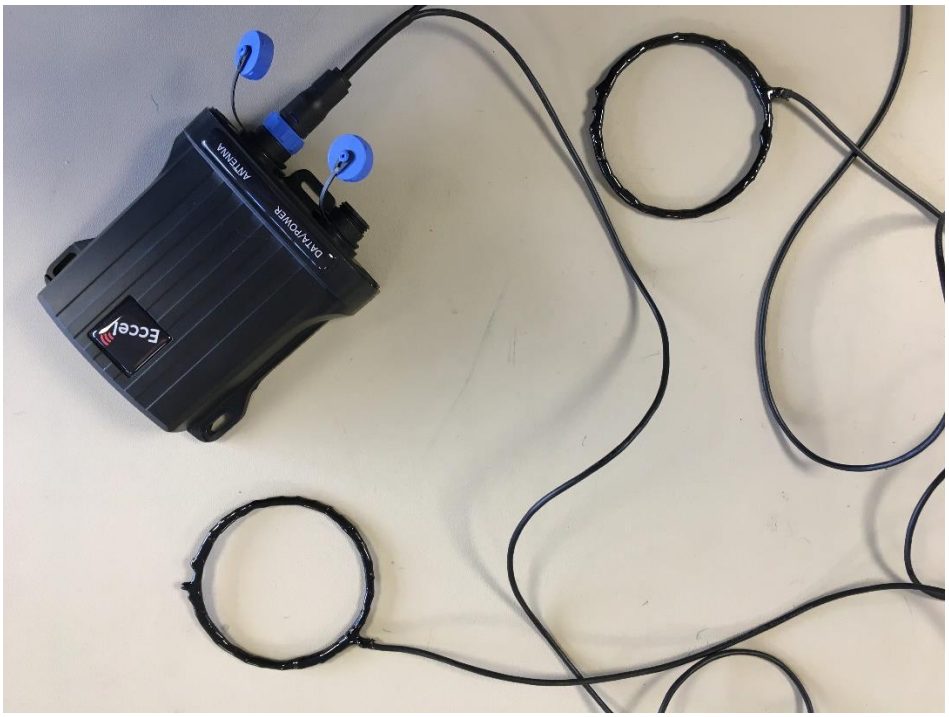
Getting Started

Charging the Battery/ Datalogger Unit

The units are shipped fully charged, with the date and time set by Eccel. However, you may wish to connect before installation and insure that the units are fully charged and that the date/time is accurate. The units can be charged by connecting a suitable USB power supply (we recommend 3A capacity for quickest charging times).

Range checking the RFID units/antennas with some of your tags

1. Connect the antenna(s) to the RFID unit and tighten the nut to hold the antenna securely in place.
2. Lay the antenna(s) out flat on a work area. Separate the antennas by 10cm or so if it is a 2-antenna system.



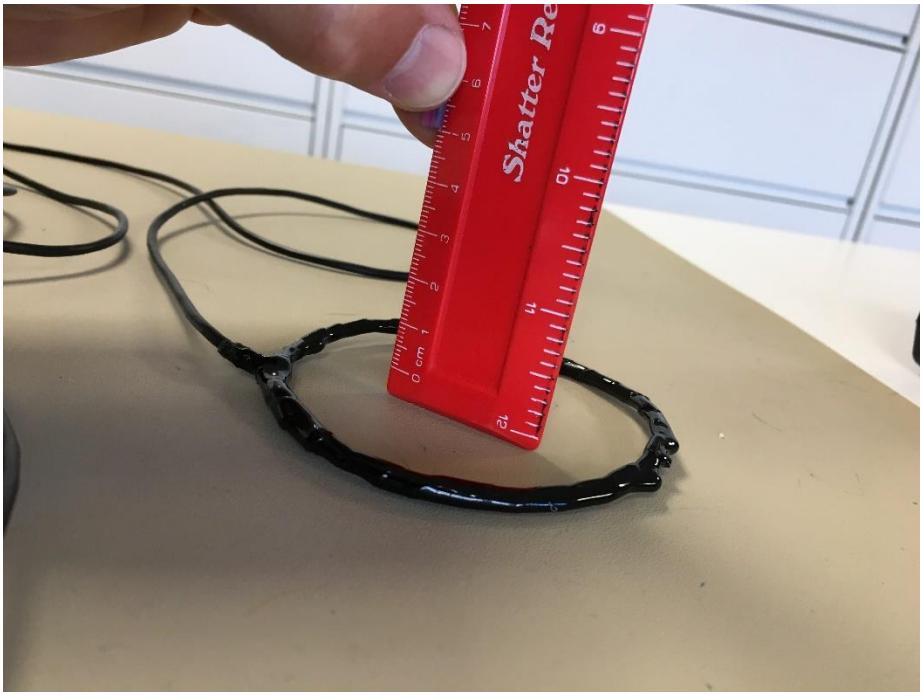
3. Connect the lead for the datalogger/battery unit to the RFID unit:

4. Now connect the other end of the data/power cable to the datalogger/battery unit. Once this connection is made, the system will be running and looking for tags (currently at the

fixed polling rate of 7 scans per second).

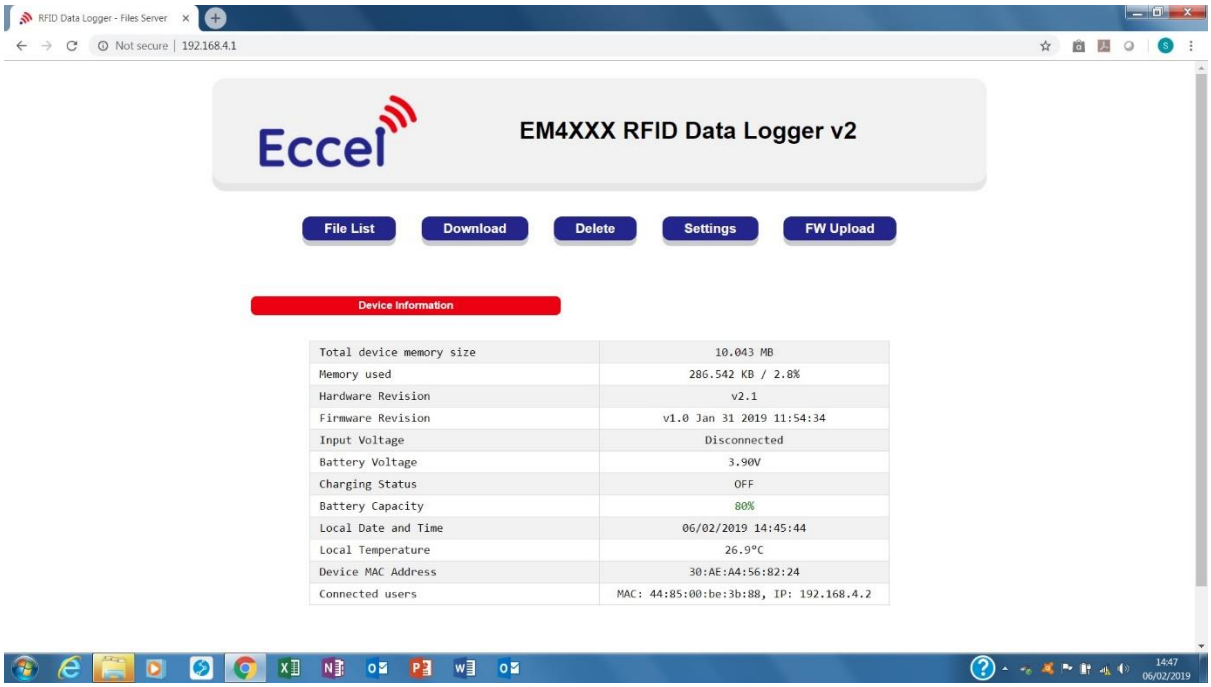
5. The range test can now be performed by connecting over Wi-Fi to the RFID unit from a PC or tablet by firstly powering up the Wi-Fi of both the RFID unit and the datalogger/battery unit by pressing and holding the button on the datalogger/battery unit for at least 3 seconds. The red LED in the button will illuminate when the Wi-Fi is enabled.
6. Now in the list of available networks on the PC/tablet etc, connect to the “RFID…” wireless network. The network password key is “EccelTechnology”. The network will come up as “limited access “or “No Internet Access” with an exclamation mark on the icon. This is normal and you can ignore it.
7. Using your chosen browser, navigate to the IP address shown on the label on the bottom of the product (192.168.4.1). You should see the following screenshot (different MAC address etc):

8. Now if you use a ruler and a test tag as shown below, you can lower the tag slowly a few mm at a time until you see the tag ID appear in one of the antenna tag ID lines on the screen. You can then see the range by reading the ruler and do the same for the other antenna if it is a 2-antenna system.

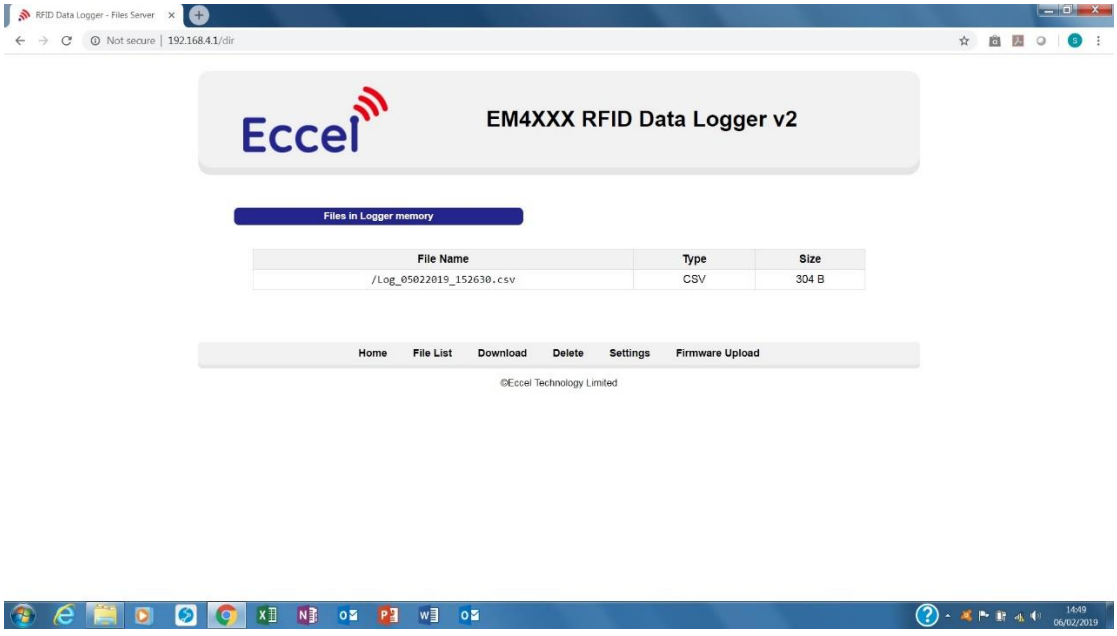


Setting Up the Datalogger System

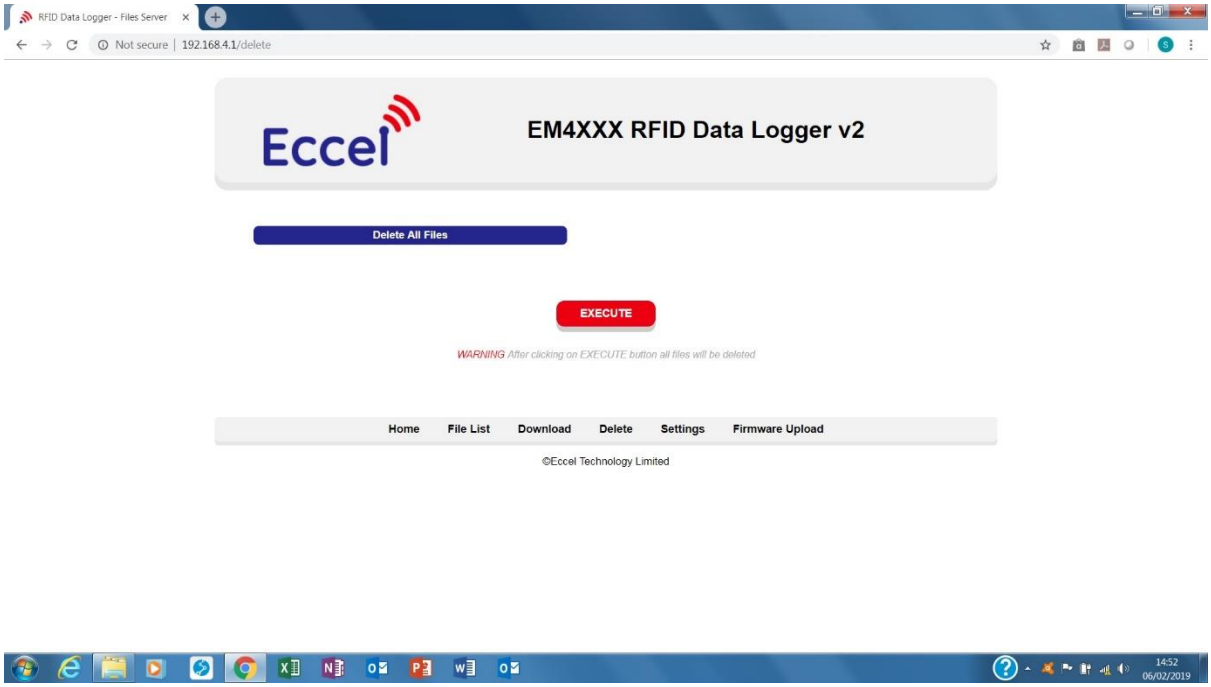
You now need to connect to the “Logger…..” wireless network in your list of available networks. The network passkey is again “EccelTechnology” and the IP address in your browser is the same (192.168.4.1). You should see the home page screen for the datalogger like this:



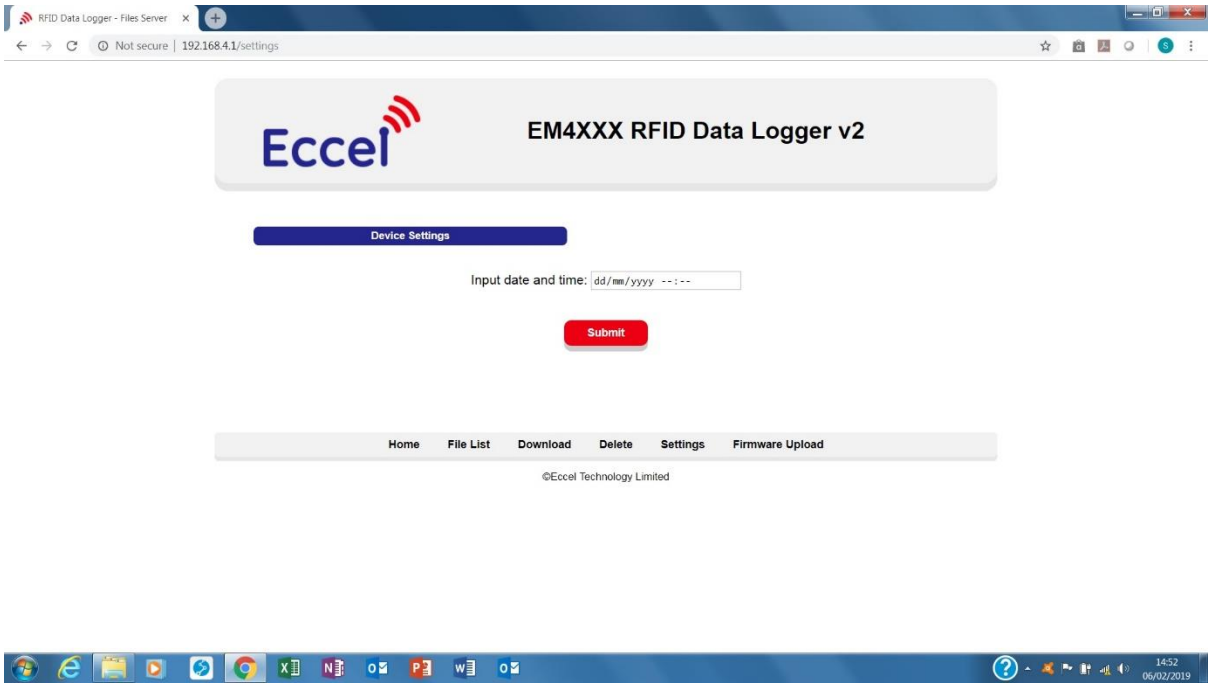
Here you can see temperature of the unit, battery status, whether it’s charging etc. You can also select one of the sub menus to download tag detection data files using either the “files list” or “download” options. On this first pre-production release firmware, the system creates every file with the same name as the last file. So, when you download files, rename them to something meaningful. We will fix this on later releases.



You can also delete the files on the unit when finished with downloading and storing them to free up memory.



Next you can change system settings (currently on this pre-production firmware, this is limited to setting the unit date and time).



Once you have finished setting up the system and downloading files etc, the Wi-Fi can be turned off to conserve battery life.

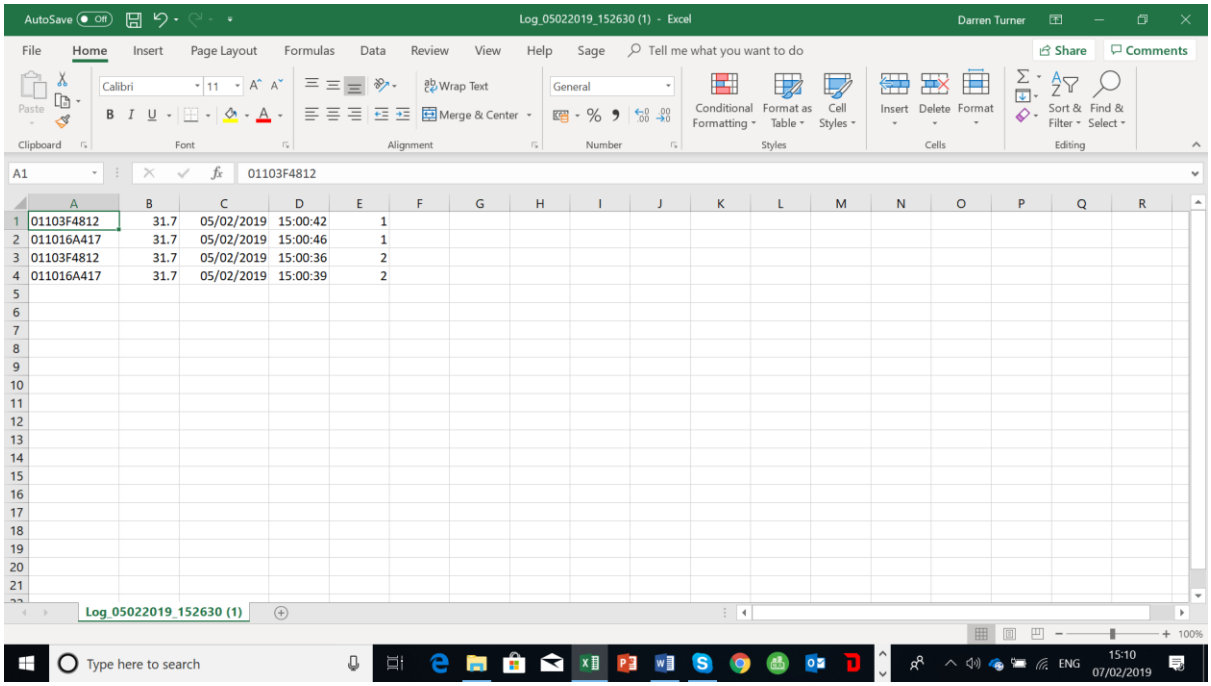
This can be done by pressing and holding the button on the datalogger unit for at least 3 seconds. The LED will go out to show that the Wi-Fi is off. Alternatively, if there is no activity on the Wi-Fi for 10 minutes, it will switch itself off. So, holding the button on the datalogger for approximately 3 seconds, toggles the Wi-Fi on the units on/off.

In operation, the datalogger unit itself can be updated and downloaded without taking with it the RFID unit. This enables "hot swap" of units in the field meaning no downtime on detecting activity.

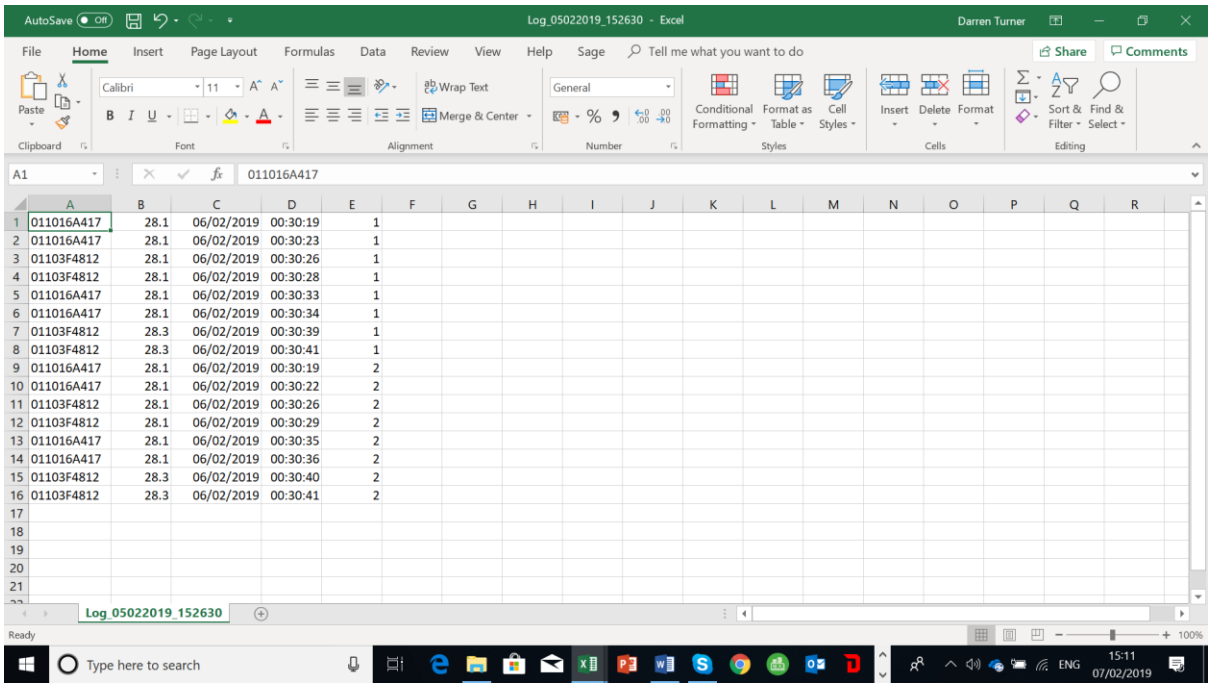
In order to make sure that all detections are transferred to the datalogger unit from the small amount of temporary memory in the RFID unit, the user should power up the Wi-Fi by pressing the button on the datalogger unit for 3 seconds BEFORE disconnecting the datalogger unit from the RFID unit. Once the LED illuminates, any data on the RFID unit will have been transferred to the datalogger unit. The user can then download the data in situ if he is not removing the datalogger unit for recharging (plenty of battery life left). The user should then power down the Wi-Fi by pressing the button for approximately 3 seconds and seeing the LED switch off. Then the datalogger unit can be disconnected and swapped out or left to run as required. If taken away, the datalogger can then be downloaded by pressing the button for approximately 3 seconds to power up the Wi-Fi.

As soon as the RFID unit is connected to a powered datalogger unit, the system begins to look for tag presence and record it when it has any EM4XXX tag present in range.

Here are a couple of screenshots of test CSV files viewed with Excel:



	A	B	C	D	E
1	01103F4812	31.7	05/02/2019	15:00:42	1
2	011016A417	31.7	05/02/2019	15:00:46	1
3	01103F4812	31.7	05/02/2019	15:00:36	2
4	011016A417	31.7	05/02/2019	15:00:39	2



	A	B	C	D	E
1	011016A417	28.1	06/02/2019	00:30:19	1
2	011016A417	28.1	06/02/2019	00:30:23	1
3	01103F4812	28.1	06/02/2019	00:30:26	1
4	01103F4812	28.1	06/02/2019	00:30:28	1
5	011016A417	28.1	06/02/2019	00:30:33	1
6	011016A417	28.1	06/02/2019	00:30:34	1
7	01103F4812	28.3	06/02/2019	00:30:39	1
8	01103F4812	28.3	06/02/2019	00:30:41	1
9	011016A417	28.1	06/02/2019	00:30:19	2
10	011016A417	28.1	06/02/2019	00:30:22	2
11	01103F4812	28.1	06/02/2019	00:30:26	2
12	01103F4812	28.1	06/02/2019	00:30:29	2
13	011016A417	28.1	06/02/2019	00:30:35	2
14	011016A417	28.1	06/02/2019	00:30:36	2
15	01103F4812	28.3	06/02/2019	00:30:40	2
16	01103F4812	28.3	06/02/2019	00:30:41	2

Column A is the tag ID. Column B is the temperature in the RFID unit (In the pre-production units, there is some heating by the electronics, so the temperature is higher than ambient. However, in the production release units, we will have fixed this anomaly). Column C is the date. (dd/mm/yyyy). Column D is the time (hh:mm:ss). Column E is the antenna number.

On the current pre-production firmware, the data is stored firstly by antenna number and secondly by ascending date/time order. We will change this to sorting first by ascending date/time order on production release firmware.