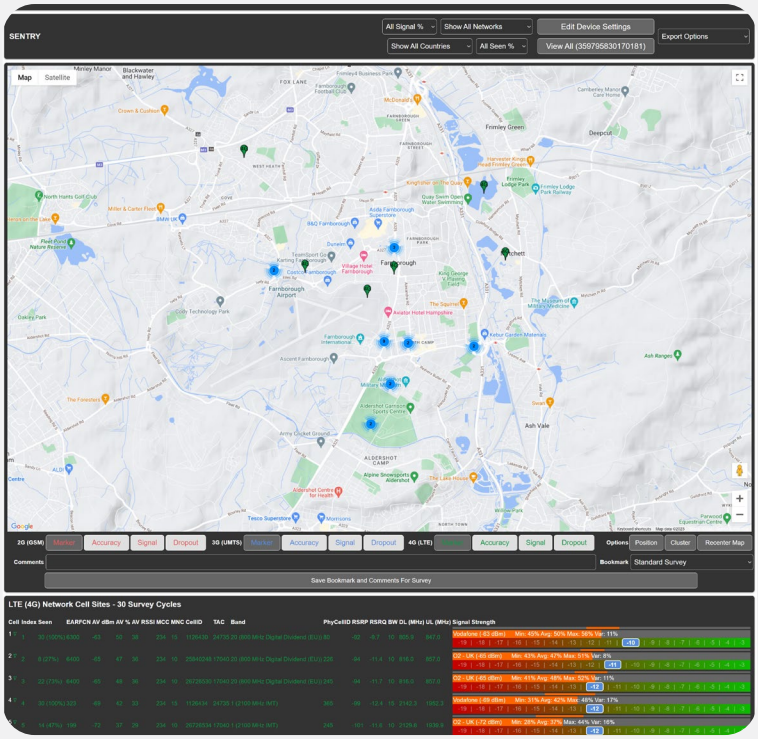
Siretta

Enabling Industrial IoT



CloudSURVEY

Applicable models:

SNYPER-LTE GRAPHYTE (all models)

SNYPER-LTE+ (all models)

SNYPER-LTEM (GL)

SNYPER-5G Graphyte (GL)

SNYPER-IoT Graphyte (GL)

SENTRY (all models)

User Manual

Rev 2.7

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Siretta
Enabling Industrial IoT

CloudSURVEY
User Manual

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Introduction

CloudSURVEY is a cloud-based management portal that is designed for use with Siretta's SNYPER and SENTRY cellular network analyser products. SENTRY surveying is controlled from the CloudSURVEY portal (as it has no local interface) and SENTRY automatically uploads any surveys that it conducts to CloudSURVEY. Whereas, users can choose to upload their SNYPER surveys to CloudSURVEY while viewing the survey file on a PC.

Utilising CloudSURVEY with a SNYPER provides certain benefits. Firstly, users can gain more detailed information about the conducted surveys. This includes but is not limited to, insights into network dominance, survey mapping and keyword searching. Network dominance ranks networks based not only on the number of cells discovered, but their signal strength. Survey mapping shows the location of discovered cells by marking them on an interactive map. This allows users to visualise the cellular environment and apply visual overlays. Lastly, keyword searching. With all surveys safely stored in CloudSURVEY, surveys can be searched for key words such as the location and compared with other saved surveys. For instance, if a site has been surveyed in the past it could be compared with a recent survey to see how the cellular networks discovered may have evolved over time.

The SENTRY utilises a SIM card to connect to the cellular network. This enables them to post surveys to CloudSURVEY seamlessly and access the same benefits available to SNYPERs. SENTRYs configure survey requirements and initiate or terminate surveys through CloudSURVEY. Surveys are automatically uploaded to CloudSURVEY as they are conducted.

An account holder of either a SENTRY or SNYPER may enable the sharing feature.Once sharing is enabled, the shared accounts can view all surveys stored on the sharer account, allowing for easy collaboration within a team or organization.

Creating and uploading surveys to CloudSURVEY is free of charge. However, placing cell site markers on maps requires CloudSURVEY processing and hosted mapping resources. Users can purchase tokens via the CloudSURVEY portal, which are consumed when map data is generated and updated.

Common Features

- Displays the location of discovered cells on a map (see note).
- Stores cellular network surveys into secure Cloud storage.
- Supports up to 100 SNYPERs and SENTRYs on one account.
- Add comments and bookmarks to surveys.
- Filter view to show specific networks.
- Limit view to a specific country and/or cell technology.
- Show heat density of cellular coverage.
- Powerful search tool that allows for searching of keywords in the location and comments across all surveys from all devices on the CloudSURVEY account.
- Compare surveys.
- Share surveys between CloudSURVEY accounts.

SNYPER Key Features

- Improved visualisation of network survey results.
- Interprets uploaded results to show network dominance.

SNYPER Compatible models

- SNYPER-LTE Graphyte (EU)
- SNYPER-LTE Graphyte (USA)
- SNYPER-LTE Graphyte (EU) V2
- SNYPER-LTE Graphyte (USA) V2
- SNYPER-LTE Graphyte (AP) V2
- SNYPER-LTE+ (EU)
- SNYPER-LTE+ (EU) V2
- SNYPER-LTE+ (USA)
- SNYPER-LTE+ (USA) V2
- SNYPER-LTE+ Spectrum (EU)
- SNYPER-LTE+ Spectrum (EU) V2
- SNYPER-LTE+ Spectrum (AP) V2
- SNYPER-LTEM (GL)
- SNYPER-5G Graphyte (GL)
- SNYPER-IoT Graphyte (GL)

SENTRY Key Features

- Setup survey parameters – type, duration, etc.
- View survey results.
- Mobile App for SENTRY setup and control.

SENTRY Compatible models

- SENTRY-G-LTE4 (EU)
- SENTRY-G-LTE4 (USA)

Note: Cell mapping uses a Google API. Google collects information from Google maps users about where they are and what cell that they are connected to. This in turn is used to estimate the position of the cell used and stored in a database. The Google API uses this database to map discovered cells.

The advantages of this are that new cells deployed are quickly discovered added to Googles database, and that the mapping system will work worldwide. The disadvantage is that the database can only map cells that a phone has registered to. For GSM, UMTS, LTE and 5G NR cells this is not a problem.

For NB-IoT and LTE-M, cell mapping is best effort and comes with no guarantees as a phone would not normally connect to these types of cell. However, often LTE-M cells are shared with LTE cells and can be indirectly found because of the sharing, But this is highly dependant on how the cell has been configured by the operator. In practice, CloudSURVEY is able to map many LTE-M cells but this capability will vary between networks and countries. Expectations that an NB-IoT cell will be mapped are very low.

Getting Started

Overview

The CloudSURVEY website can be found at https://www.cloud-survey.co.uk/.

Siretta uses a unified login procedure to access some areas of Siretta's websites:

https://portal.siretta.com/

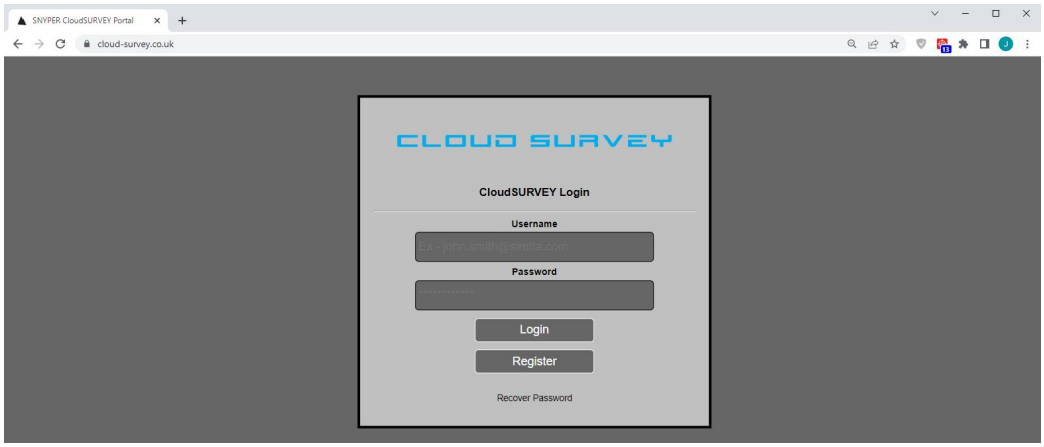
https://www.siretta-link.com/

https://www.cloud-survey.co.uk/

An account created for one of these websites will also work on the other websites. Account logins are a combination of the user's email address as a username, and a password. If using a password manager, it is suggested that Siretta's websites be set as equivalent domains for best management of login details.

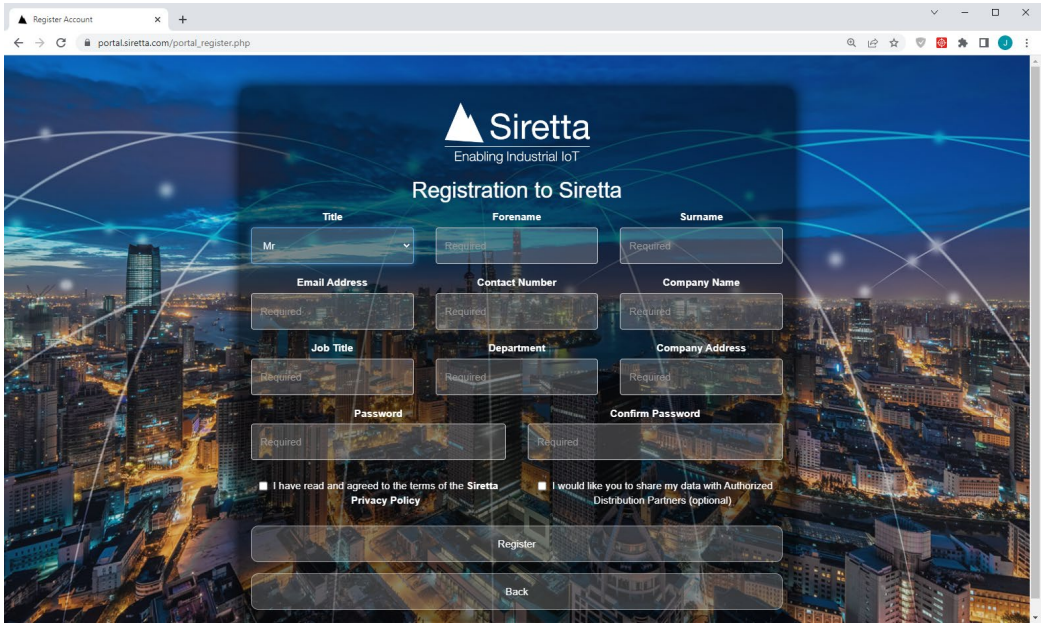
Use a web browser to open the URL of the CloudSURVEY web site, https://www.cloud-survey.co.uk/ The screenshots in this user Manual were created with Google Chrome Version 113 and 114. With other versions of Chrome, or other web browsers, the rendered pages may display slightly differently. The user will be requested to log in:

Figure 1: CloudSURVEY login page



If the user already has an account, they should enter their Username and Password and click 'Login'. Otherwise click 'Register' to create an account to use with CloudSURVEY (and the other Siretta websites). This will take the user to https://portal.siretta.com/ where the account registration form will be presented:

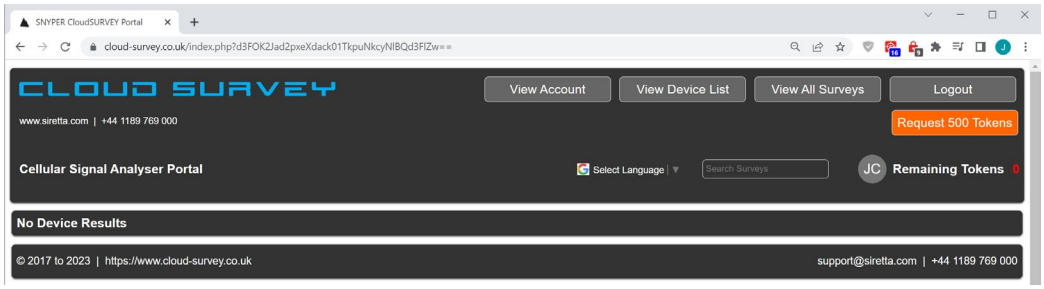
Figure 2: Siretta account registration page



The user should complete the required fields, read and agree to the privacy policy, and then click 'Register' to create the account. On registering, an email will be sent to the registered email address from portal@siretta.com requesting that a link be clicked to confirm that the email address is correct. Watch for this email and be sure to click the link to complete the registration process. This email should be received within a few minutes of completing the registration form. If not received, please check spam. It is suggested that portal@siretta.com be added to the user's safe senders list as any further emails generated by the portal will come from this email address.

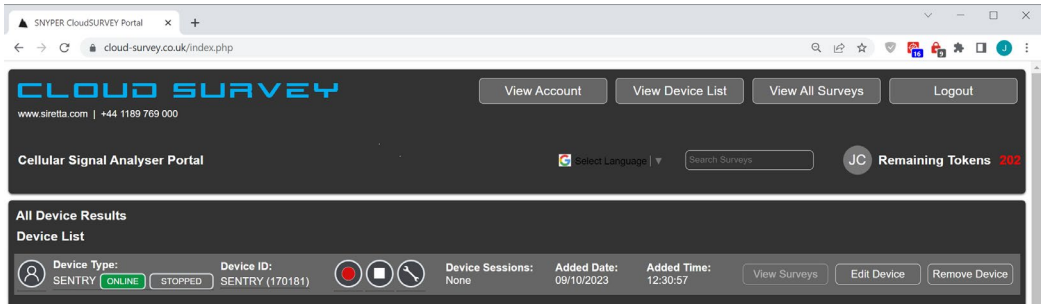
On first successful login to the CloudSURVEY portal, the system will send a welcome email to the user containing a brief overview of CloudSURVEY. The screenshot below shows the initial view upon first login with no devices added to the CloudSURVEY account.

Figure 3: CloudSURVEY first login page with no devices added



Configuring a SENTRY for the first time with SirettaSPARK will automatically link it to the portal, providing an initial view similar to this:

Figure 4: CloudSURVEY with a SENTRY added to the account

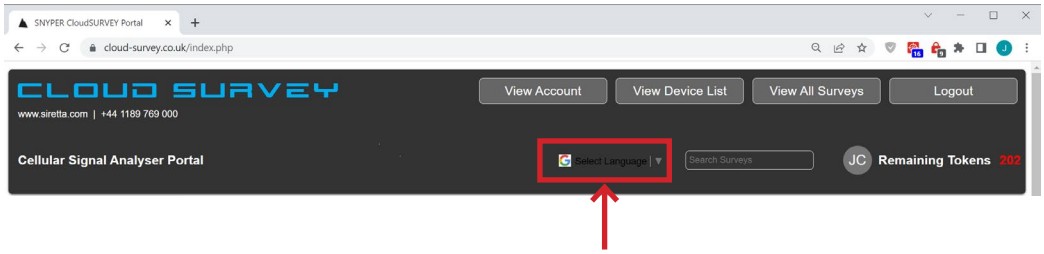


It may take up to 5 minutes for the SENTRY to appear online because it only communicates with the server once every 5 minutes while waiting instruction.

Setting the Interface Language

Set the preferred interface language using the drop-down menu shown:

Figure 5: How to select language



Language support is provided by Google Translate and offers over 130 languages to choose from.

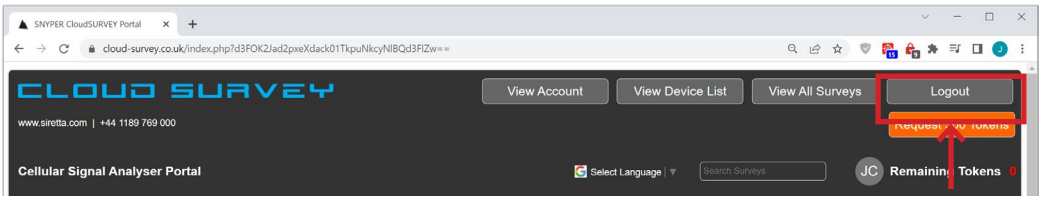
Tokens

Tokens are a form of credit in CloudSURVEY. They are used with cell mapping and are consumed when a map is initially created or its view is refreshed to redraw the positions of found cells. One token is used to draw the map, and an additional token is used for each cell plotted on the map.

SENTRY surveys are real-time events; thus, tokens are used as cells are discovered, unlike SNYPER surveys which are uploaded after the event. Viewing a previously created map without refreshing the cell locations also consumes one token.

The first 500 Tokens are granted to the user free of charge. From the landing page click the 'Request 500 Tokens' button.

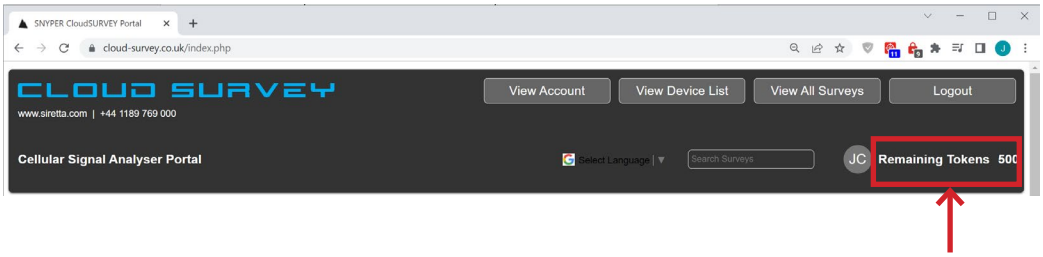
Figure 6: How to request tokens



This sends a request to sales@siretta.com to add 500 tokens to the user's account. Normally this request will be actioned within 1 working day, UK weekends and holidays excepted. A confirmation email from portal@siretta.com will confirm the addition of the tokens. Note that the granting of tokens is a manual process and subject to abuse of service checks. Once requested the button will disappear.

Once granted, a token count can be seen to the right of the user icon.

Figure 7: CloudSURVEY after adding 500 tokens to a new account



Once the initial 500 tokens provided with the account have been used, additional tokens can be purchased. Click on the user icon next to the remaining token count to access the token store.

Note: Tokens are only required to use the mapping functionality of CloudSURVEY. CloudSURVEY will always allow surveys to be stored and viewed, even when there are no remaining tokens on the account. Tokens are not required to be able to control and use SENTRY.

Using SENTRY with CloudSURVEY

SENTRY is a cellular surveying tool that integrates with CloudSURVEY in two ways:

1. CloudSURVEY is used for setup and control of surveying. This can be either with a web browser, or Android App (from Google Play Store) or iOS App (from Apple App store). As surveys are completed, the results are uploaded directly to CloudSURVEY via the cellular network.

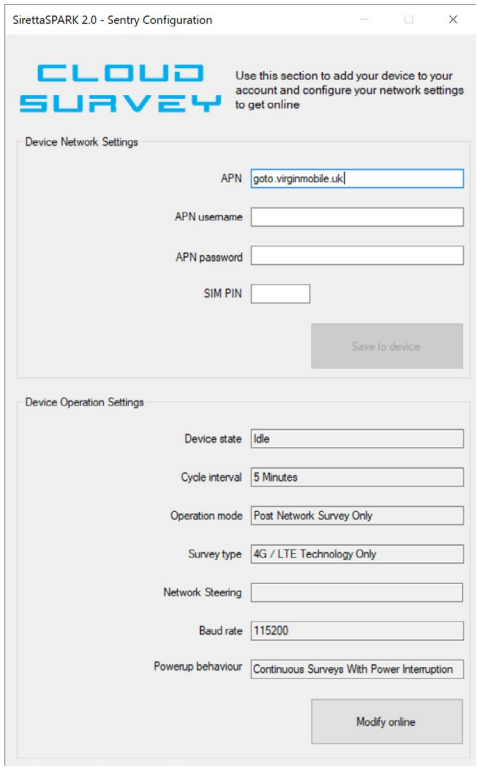
2. CloudSURVEY is used for viewing the surveys uploaded by SENTRY.

Configure SENTRY using the SirettaSPARK tool

Once logged onto the Siretta portal, navigate to Resources > SirettaSPARK tool or navigate there directly using this link: https://portal.siretta.com/portal_siretta_spark.php.

Download and run the SirettaSPARK application. Users are required to register SirettaSPARK to the account they created. Please refer to the SirettaSPARK User's manual for details of how to use SirettaSPARK. In the SPARK tool, navigate to the SENTRY configuration settings and enter the APN and any username/password/PIN required by the SIM card provider and save them to the SENTRY.

Figure 8: SENTRY configuration panel of SirettaSPARK



When the SENTRY is configured, the SirettaSPARK application associates the serial number of the configured SENTRY to the users CloudSURVEY account so that it automatically appears on the users CloudSURVEY account.

Important: The account to which a SENTRY is initially paired is considered the owner of the SENTRY on CloudSURVEY.

With network settings now configured in the SENTRY, turn off/remove the power and unplug the USB cable.

Then re-apply power. The SENTRY will then connect to the cellular network. On first boot after the SIM settings have been applied, this will take several minutes. When the green and blue LEDs are continuously lit, and the red LED is blinking slowly, the SENTRY is online and ready for use.

Using SNYPER with CloudSURVEY

To use a SNYPER with CloudSURVEY, it must be configured to produce an HTML report for each survey, which is the default factory configuration.

Note: This is not applicable to both 5G-Graphyte and IoT-Graphyte SNYPER models.

This setting can be found from the Main Menu of the SNYPER by navigating to Setup > Documents and checking that HTML is set to ON.

Ownership Overview

Every device (ie SNYPER or SENTRY) used with CloudSURVEY is judged to be owned by a single user. The owner of a device has full rights to the device and may grant permissions to other CloudSURVEY users to view surveys, and in the case of SENTRY to conduct new network surveys. Rights granted by the owner to other users may be removed at any time by either party. Ownership may also be transferred from one owner to another.

A device owner may always see which of their devices are shared, and with who. Similarly, a user who has been granted permissions can always see which devices that they have been granted permissions to view, and who the owners are.

Surveying

Overview

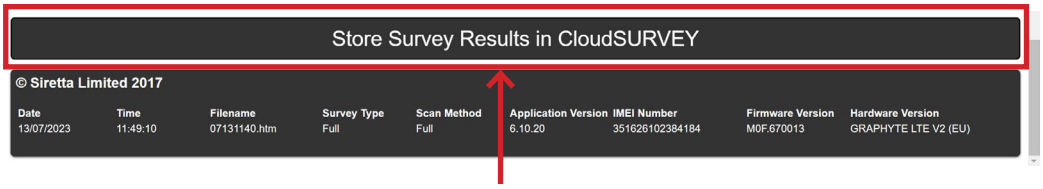
CloudSURVEY is used to control the start, duration, and survey conditions of SENTRY cellular network surveys. CloudSURVEY is essential for the operation of a SENTRY and viewing the surveys it produces. In contrast, SNYPERs operate as a stand-alone product, conducting surveys independently of CloudSURVEY. CloudSURVEY enhances the SNYPER by offering additional features such as cloud storage, management, and mapping tools.

Surveying with SNYPER

For SNYPER models: LTE, LTE+, LTE Graphyte, LTEM, ensure the HTML document setting is turned on (default). Connect the SNYPER to an Internet enabled PC then open and view the html survey file in a web browser. Please refer to the SNYPER user manual corresponding to your specific model for details of how to create a survey and view the resultant html file on a PC (click here for Siretta's document library)

Scroll to the end of the survey page. Find and click on 'Store Survey Results in CloudSURVEY'.

Figure 9: Store Survey panel from SNYPER-LTE Graphyte html survey output



The user will be redirected to the CloudSURVEY portal login. Once signed in, the survey will be visible. The survey will be automatically stored. If this is the first time accessing a survey on the SNYPER in CloudSURVEY, the signed-in account will become the owner of the device.

Important: Clicking the link at the bottom of the html survey file will always show the survey in CloudSURVEY. However, it will only be saved to the account if the viewer of the survey is either the owner of the SNYPER or has permission to view surveys from that SNYPER added to the portal be the SNYPER's owner.

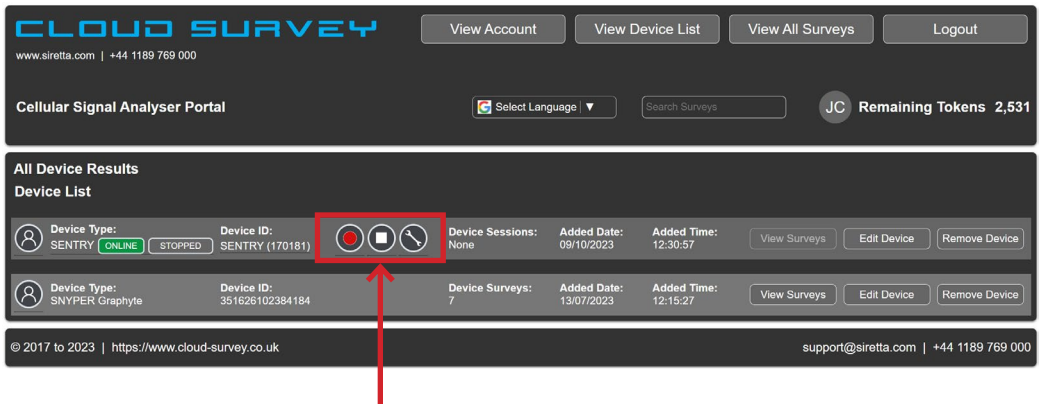
Surveying with SENTRY

Cellular network surveys using SENTRY are set up and initiated either from the CloudSURVEY portal or by using the CloudSURVEY app, available on both Android and iOS.

Use The CloudSURVEY portal to initiate surveys

Log into the CloudSURVEY portal. All online SENTRYs will be visible in the device list. Each SENTRY added may be identified by the six-digit number displayed in the device ID which is the last 6 digits of the serial number printed on the product label. Note that it can take up to 5 minutes for the SENTRY to appear in the device list after the LEDs indicate it is online. The controls for surveying with the SENTRY are highlighted below.

Figure 10: SENTRY surveying control buttons



If an account has more than one SENTRY assigned, each unit will have its own independent controls.

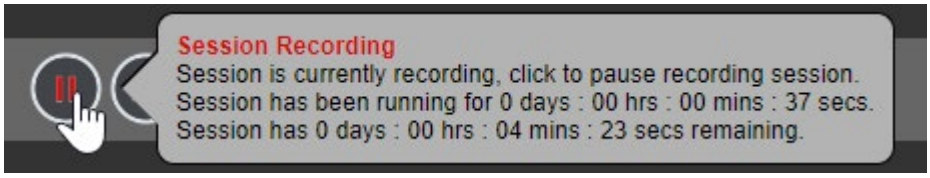
Figure 11: SENTRY surveying control buttons of a SENTRY that has conducted surveys

Buttons for operating SENTRY surveys.

Session start button	Click to start a survey with the current configuration. CloudSURVEY synchronises with the SENTRY.
Wait for SENTRY synchronisation	Synchronisation information message, moves to surveying when complete.
Session pause button	Surveying in progress, click to pause surveying.
Session stop button	Click to stop an ongoing survey.
Configuration button	Click to edit and save the SENTRY survey configuration settings. See *SENTRY Configuration*.
Survey history button	Click to see a list of all conducted surveys. (Accessible only after an initial survey has been completed.) See *SENTRY Survey history*.

Hovering the cursor over any of the buttons will display a pop-up window with additional information. This is particularly useful when the SENTRY is surveying if the session start/ resume button is hovered over as it shows the running and remaining time:

Figure 12: Pop-up when hovering over SENTRY control buttons



Survey Procedure

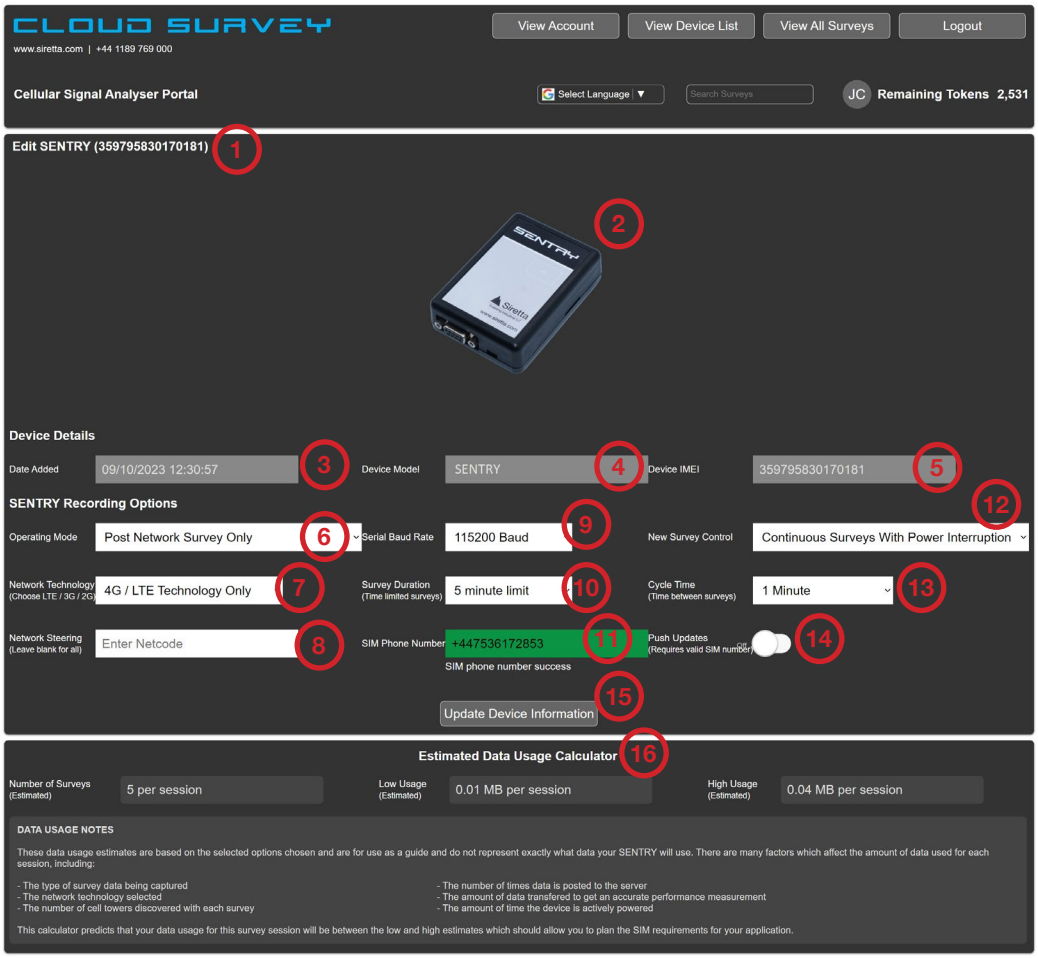
1. Click **configuration button** and set the survey parameters (See *SENTRY Configuration*).
2. Click **session start button** to start surveying.
3. Click **pause/resume buttons** if and as necessary.
4. Click **session stop button** if necessary.
5. Surveying concludes when either the configured end conditions are met or the stop button is pressed, whichever occurs first.
6. View the survey (see *Viewing all Survey Results*).

SENTRY Configuration button

The SENTRY should be configured before first use. This ensures it is set up for the correct survey type and duration as required by the user. The configuration page and meaning of the fields is explained below.

Important: The configuration settings may not be updated while a survey is in progress. Any changes made during an active survey will terminate it and initiate a new one with the updated configurations.

Figure 13: Configuration page



1. Siretta product name and serial number (Field not editable)
2. Product image.
3. Date added to the account (not editable).
4. Device model (field not editable).

5. Device IMEI number (not editable).
6. Operating Mode:
    a. Post Network Survey Only – This identifies all the cells around the SENTRY, their received signal strength and other cell characteristics such as network operator, band, Cell ID, etc.
    b. Post Network Survey & Performance – In addition to identifying all nearby cells, the SENTRY will execute a performance survey on the network to which it is registered to. This measures the upload/download speed, registration speed and latency of the connected cell. Set network steering to force the survey to test a specific network (see 8).
    c. Local Network Survey only (RS232 Serial) – This performs a Network Survey; however, instead of posting the results to CloudSURVEY, they are saved in a.csv file and sent to the RS232 port on the SENTRY.
7. Survey technology:
    a. 2G/GSM Technology Only
    b. 3G/UMTS Technology Only
    c. 4G/LTE Technology Only
8. Network Steering: An optional setting used exclusively for performance surveys. Enter the PLMN (a combination of the MCC and MNC) of the network to test. The SENTRY will attempt to register to the specified network to performance test the cell that it connects to. This should only be used with a roaming SIM. If a network is specified that the SENTRY is unable to register to, then the performance part of the survey will be skipped.
9. Serial Baud Rate: specifies the baud rate to be used on the serial port. Data is always 8-bit, 1 stop bit, no parity.
    a. 9600 Baud
    b. 115200 Baud
10. Survey Duration: determines the total duration of the survey. The survey duration counter starts when the first network scan is posted to CloudSURVEY. So if the SENTRY is not powered, the timer doesn't start until the SENTRY has powered up and sent the first scan data back to CloudSURVEY. Any scans in progress when the timer expires will be completed, resulting in the survey duration reported by CloudSURVEY being slightly longer than the requested time. Selectable survey durations:
    a. No time limit
    b. 5 minute limit

c. 30 minute limit

d. 1 hour limit

e. 2 hour limit

f. 3 hour limit

g. 4 hour limit

h. 6 hour limit

i. 12 hour limit

j. 24 hour limit

k. 2 day limit

l. 3 day limit

m. 4 day limit

n. 5 day limit

o. 1 week limit

p. 2 week limit

11. SIM Phone number: Enter the phone number of the SIM card used in international calling format (i.e. with a leading '+' and country dialling code). This may be used to improve the responsiveness of the SENTRY surveying by allowing CloudSURVEY to send text messages to the SENTRY with instructions rather than waiting for the SENTRY to contact CloudSURVEY.

12. New Survey Control: Controls how surveying behaves in the event of a power interruption.

    a. Continuous Surveys With Power Interruption – Upon recovery from a power failure, new cellular scans are added to the ongoing survey. The survey duration is not extended to account for the loss of scans during the power outage.

    b. Start New Survey With Each Powerup – CCloudSURVEY detects a SENTRY power-up event, marks the survey that was in progress as complete, and initiates a new survey. Beginning a new survey in this way does not restart the survey duration counter. E.G. If power fails 15 minutes into a one-hour survey and is returned 50 minutes into the survey CloudSURVEY will have one survey of 15 minutes and one survey of 10 minutes data recorded.

13. Cycle Time: This is the time interval between the cellular network scans taken by the SENTRY. All network scans performed are collated into a single survey report. The survey report may be examined while surveying is in progress and will show the results of the scans already completed. Selectable cycle times:

    a. 1 Minute

    b. 5 Minutes

    c. 10 Minutes

    d. 15 Minutes

    e. 30 Minutes

    f. 45 Minutes

    g. 1 Hour

    h. 2 Hours

    i. 3 Hours

    j. 6 Hours

    k. 12 Hours

    l. 24 Hours

14. Push Updates: Enabling push updates allows CloudSURVEY to send SMS to the SENTRY thereby improving the response time of the SENTRY to commands issued by CloudSURVEY. For this to work correctly, the SIM card must be enabled to receive such SMS messages.

    Important: SIMs with International Network country code (+882 and +883) numbers can behave differently with respect to text messaging compared to normal SIMs and may not work with this setting, dependant on SIM provider.

15. Update Device Information. Clicking this button saves any configuration changes made to the unit. Updating the configuration while a survey is in progress will terminate the executing survey while retaining all survey data already gathered during the survey.

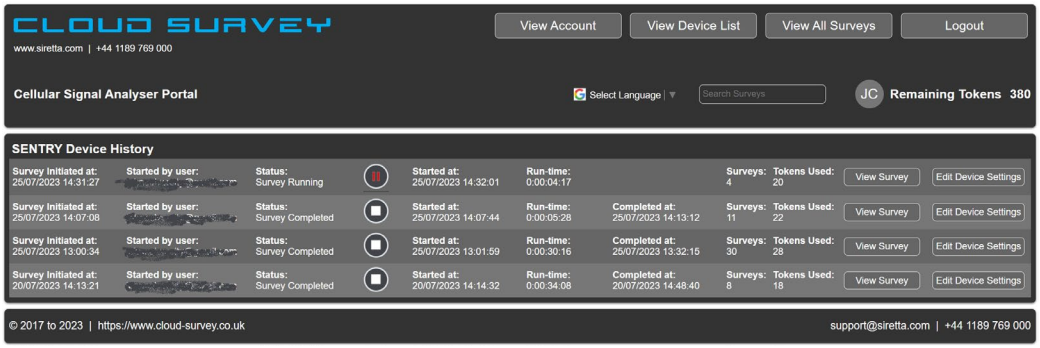
16. Estimated Data Usage Calculator: Displays the estimated data usage of the SENTRY with the settings shown for a survey with an average amount of discovered cells. Actual data usage could be higher or lower than the estimate depending on how many cells are discovered.

SENTRY Survey history button

Clicking this button will display a list of all surveys initiated on this SENTRY. This includes any surveys that are currently in progress.

This differs from the 'View All Surveys' list because it provides the start and end times along with details on the user that initiated the survey.

Figure 14: Device survey history page



Use the mobile app to initiate surveys

Siretta has developed the CloudSURVEY mobile application as an alternative method to controlling a SENTRY. Available for both Android and iOS on the Play Store and App Store, respectively

Figure 15: Android Play Store

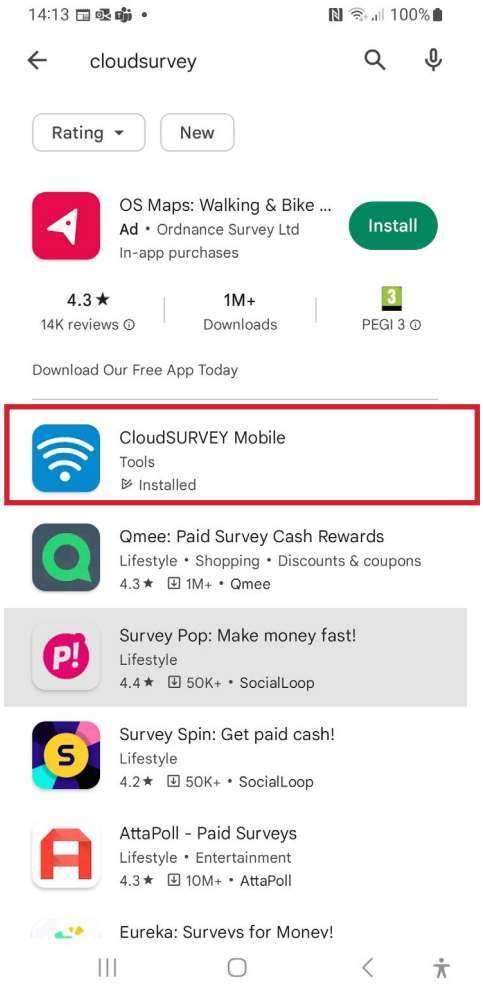


Figure 16: iPhone App Store

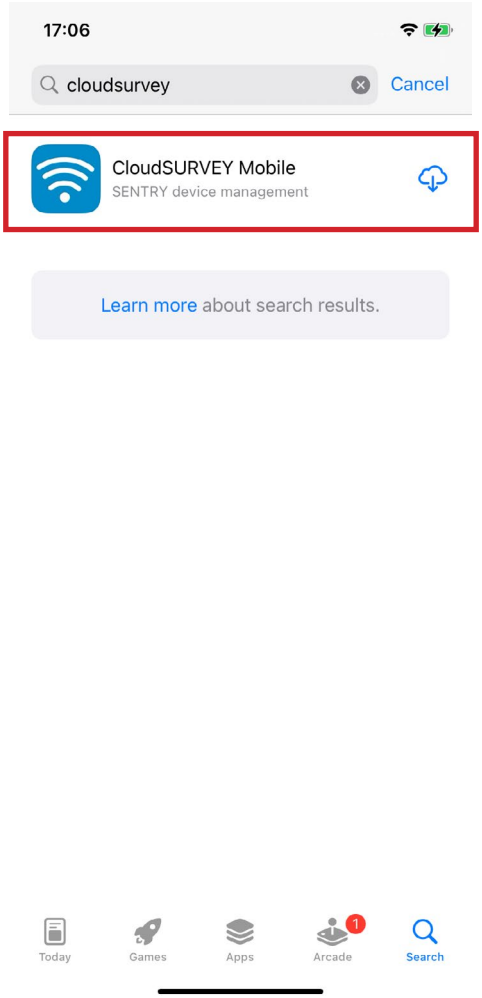


Figure 17: Android Play Store

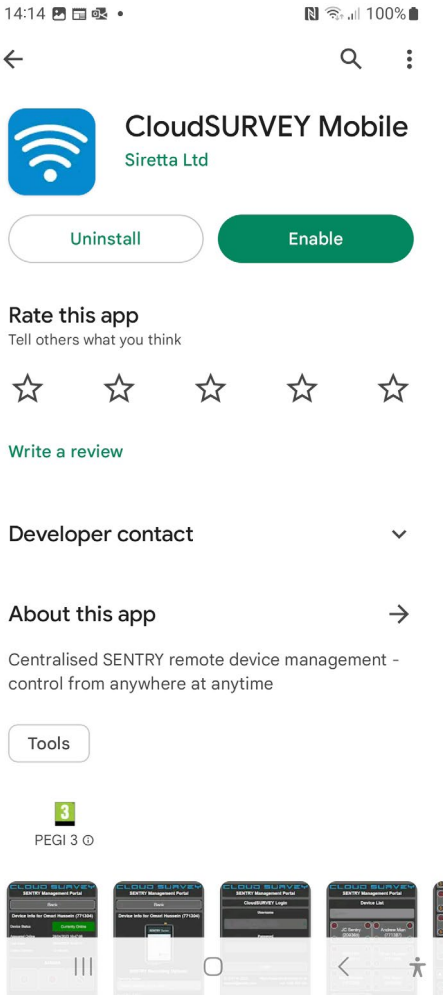
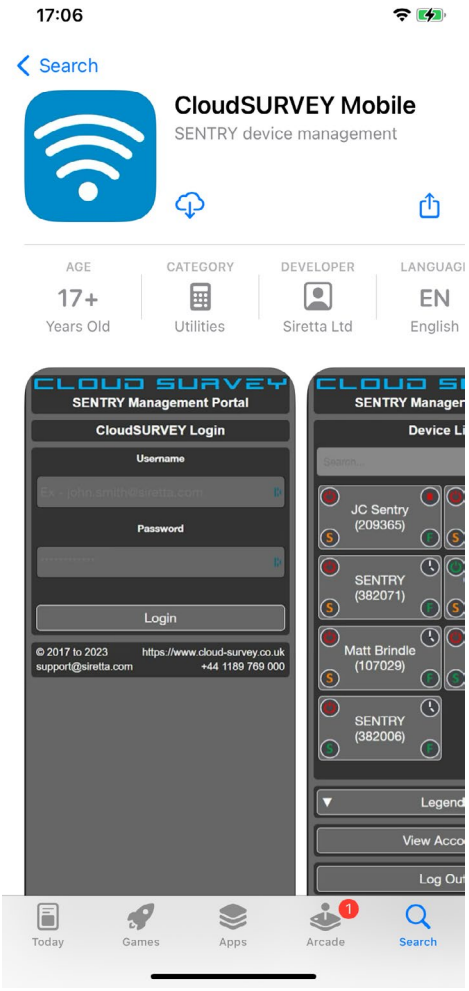


Figure 18: iPhone App Store

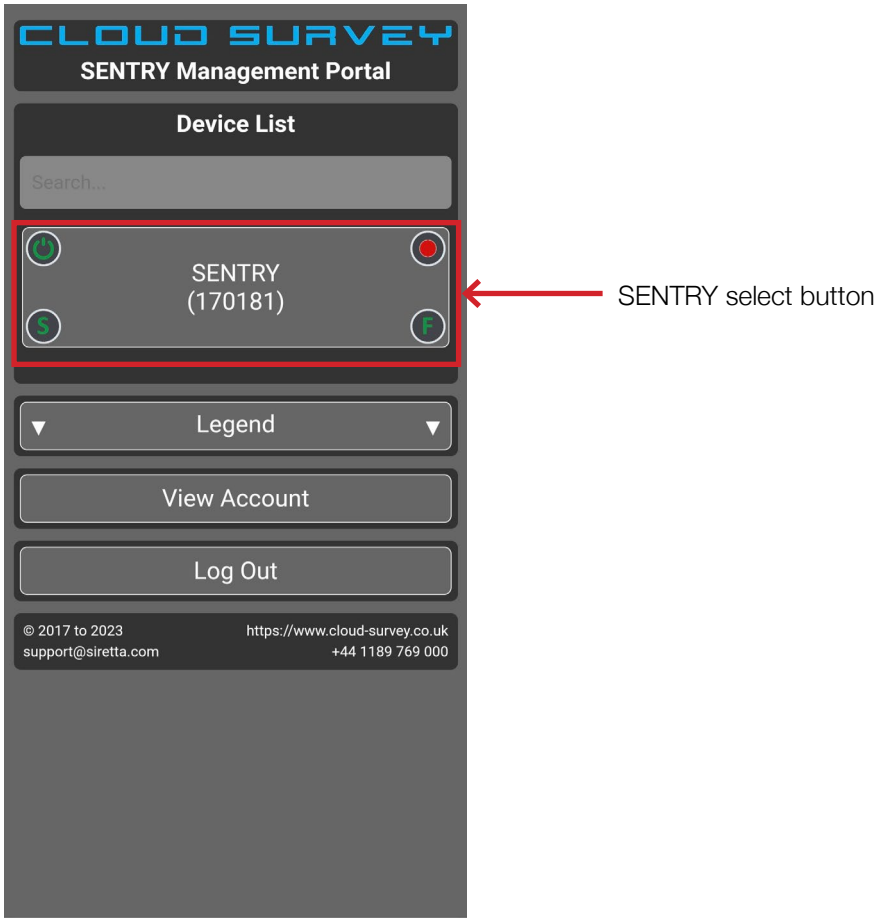


The app connects to the CloudSURVEY portal using a mobile view making it easier to use on devices with smaller displays. When first used, the user will be asked to login.

Figure 19: Login portal

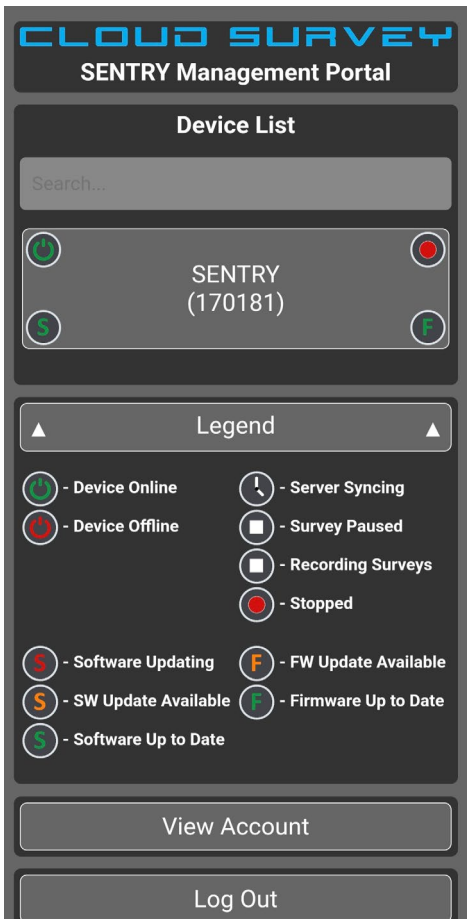
Once signed in, a list of all available devices will be displayed, along with options to view and edit personal account information.

Figure 20: Device list



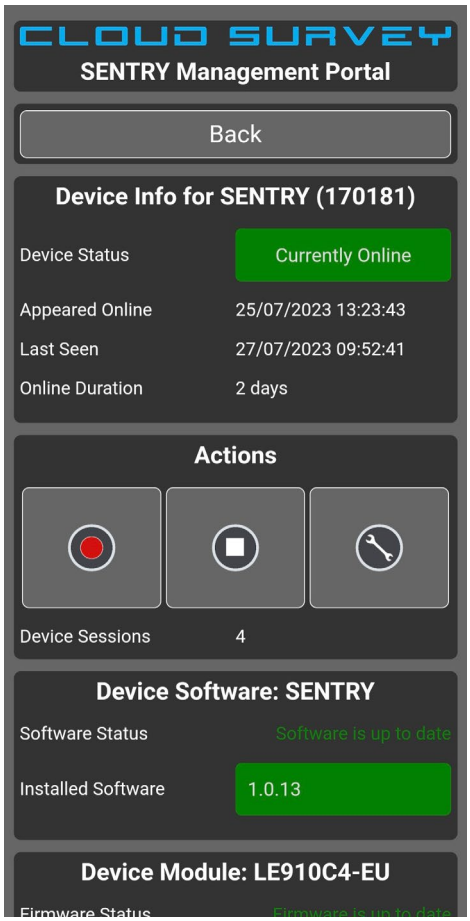
Tap ‘Legend’ to reveal what each of the different icons mean.

Figure 21: Application legends



Tap the SENTRY select button to open the controls for the SENTRY.

Figure 22: SENTRY controls

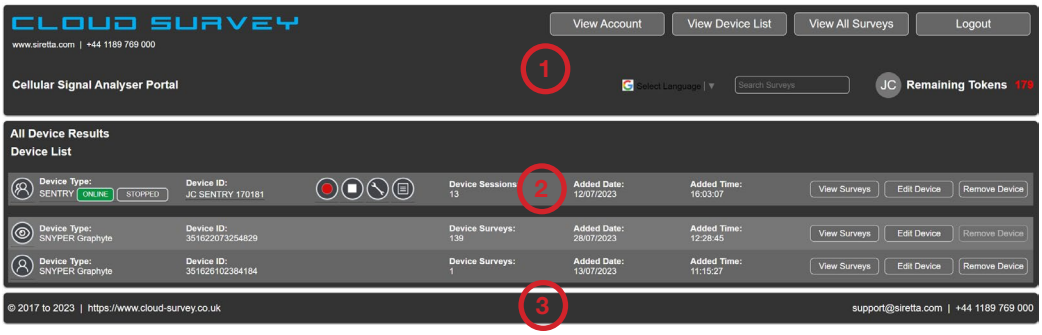


The controls on this page work in the same way as the web browser version of CloudSURVEY. Refer to the section '*Use the CloudSURVEY portal to initiate surveys*'.

CloudSURVEY Navigation

After logging into CloudSURVEY, the Device List page is displayed. This lists all the devices that are associated with the account – owned devices and devices to which the account user has viewing rights. This is the home page from which all the functions of CloudSURVEY are accessed.

Figure 23: SENTRY device list

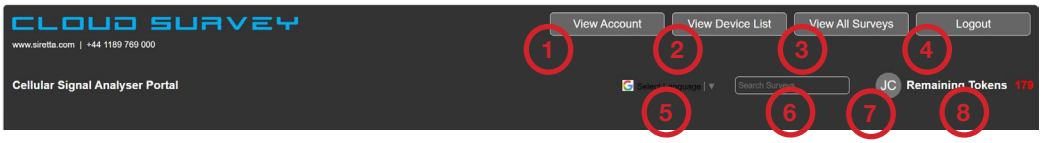


The portal view is divided into three sections.

1. Top header - Primary navigation buttons.
2. Context section(s) - Contains the core page content.
3. Footer - Copyright information and contact details.

Top Header

The top header contains the four main navigation buttons and some additional info:



1. View Account: This navigates to the Account Management page where website preferences and usage information is stored. The Token shop can also be found here. See ***CloudSURVEY Account Management*** for further detail.
2. View Device List: Lists all the devices associated with the CloudSURVEY account.
3. View All Surveys: Lists all the surveys associated with the CloudSURVEY account.
4. Logout: Sign out of the CloudSURVEY Portal.

5. Display Language: This translation service is provided by Google.
6. Survey Search Bar: Enter a term and press enter to search all surveys for that term.

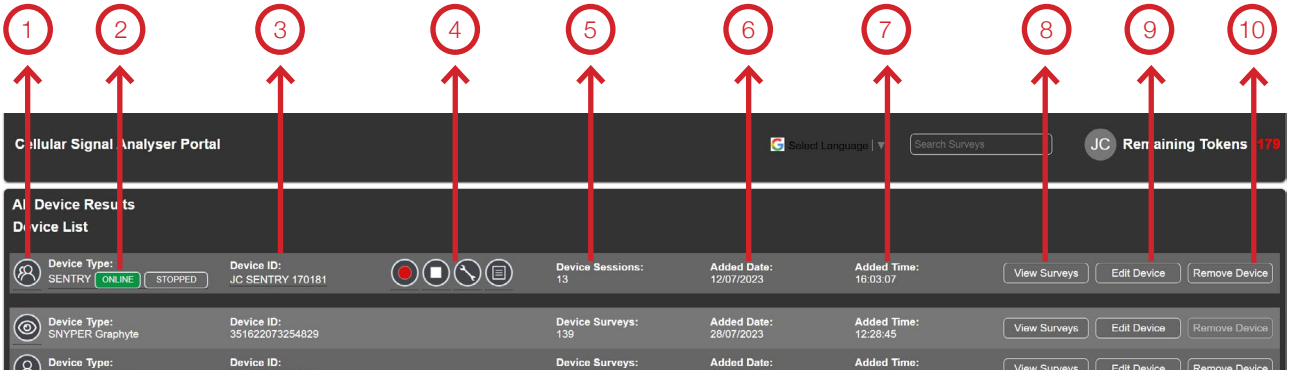
   Searchable fields include:
   IMEI number
   Application version
   Filename
   Firmware version
   Hardware model
   Location
   Date
   Comments
7. Account Icon: The initials of the account owner. ('First Name' and 'Surname' fields in Account Management.)
8. Remaining Tokens: Shows the available tokens in the account.

View Account

See *CloudSURVEY Account Management*.

View Device List

This lists all owned devices and those to which viewing permissions have been granted.



1. Ownership: The icon indicates the ownership status of the device. Click to edit access permissions.

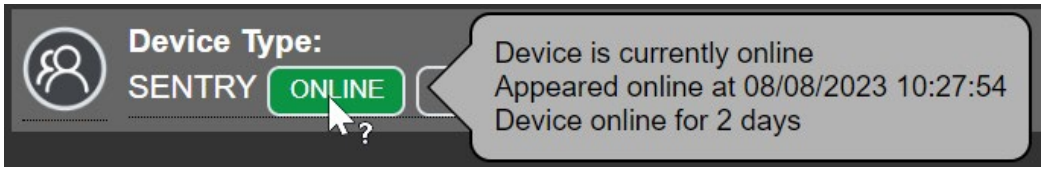
   Device owner. Ownership is not shared with any other user.

   Device owner. Ownership is shared with one or more other users.

   Un-owned device to which viewing rights have been granted.

2. Device type: Displays the type of device associated with the account. The icons below indicate the device status.

Figure 24: SENTRY device status



3. Device ID: For SNYPERs, it's the device serial number; for SENTRYs, it's "SENTRY" followed by the last 6 digits of the serial number. This is the device serial number for SNYPERs and 'SENTRY' followed by the last 6 digits of the serial number for SENTRYs.
4. Surveying controls (SENTRY only): See ***Surveying with SENTRY***.
5. Device Sessions: This indicates the number of surveys recorded on CloudSURVEY from each device. For a SNYPER, this count represents surveys uploaded to CloudSURVEY (which may differ from the total conducted).
6. Added Date: The date the device was added to the account—either when first registered by the account holder or when access permissions were granted by the owner.
7. Added Time: The time the device was added to the account, based on the same criteria as the date.
8. View Surveys: Lists all surveys conducted on the selected device.

9. Edit device: This allows the user to view and edit certain details about the device.
    a. Device Nickname: The name entered in this field will be used as the Device ID rather than the system default name.
    b. Location: Provided for the user's management needs.
    c. Owner: Provided for the user's management needs.
    d. Press 'Update Device Information' to save changes.

Figure 25: Edit device panel

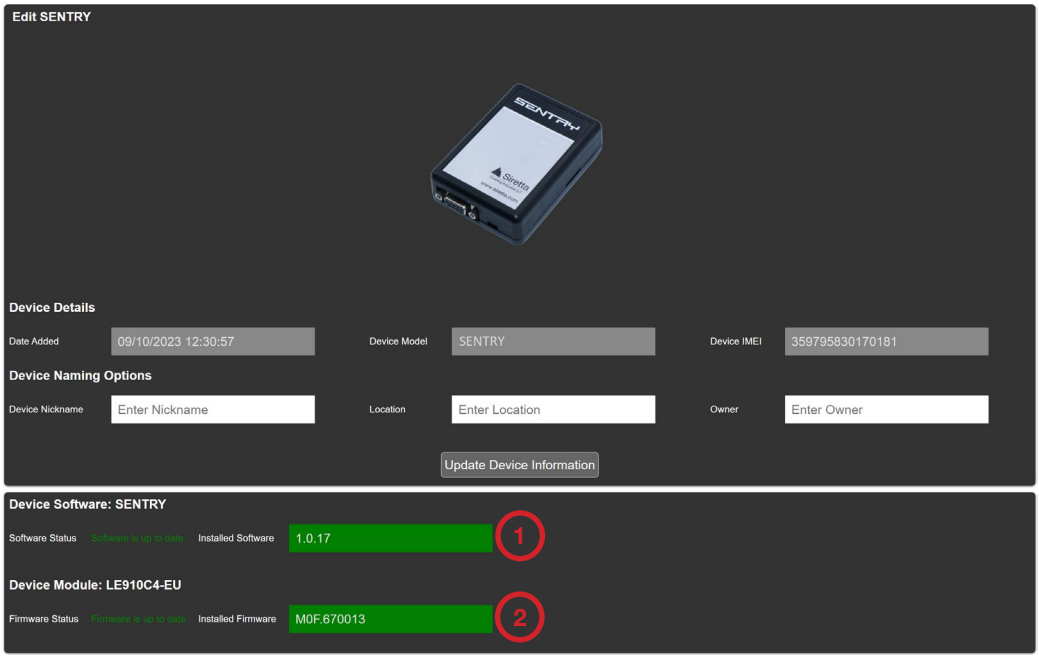


Figure 26: Out-of-date software and firmware panel

e. If the unit is running on the latest software, it will be displayed against a green background; otherwise, it will be displayed against a yellow background.

f. Recommended software: The latest available software version.

g. Software update: Click to automatically update the software in the unit to the latest version. This should not be attempted whilst a survey is ongoing.

h. Firmware Version: If the unit is running on the latest firmware, it will be displayed against a green background; otherwise, it will be displayed against a yellow background.

i. Recommended firmware: The latest available firmware version.

j. Firmware update: This must be performed locally using the SirettaSPARK tool. Clicking the button navigates to the download page.

10. Remove Device: Deletes the device and all its surveys from CloudSURVEY. Removing a device allows another user to take possession of it.

View all Survey Results

Selecting 'View All Surveys' from the top menu shows all surveys saved to the CloudSURVEY account. This is a comprehensive list of surveys from all devices on the account. The list, can be refined with filters or search terms and is organised by survey type (GSM/UMTS/LTE), then by date and time.

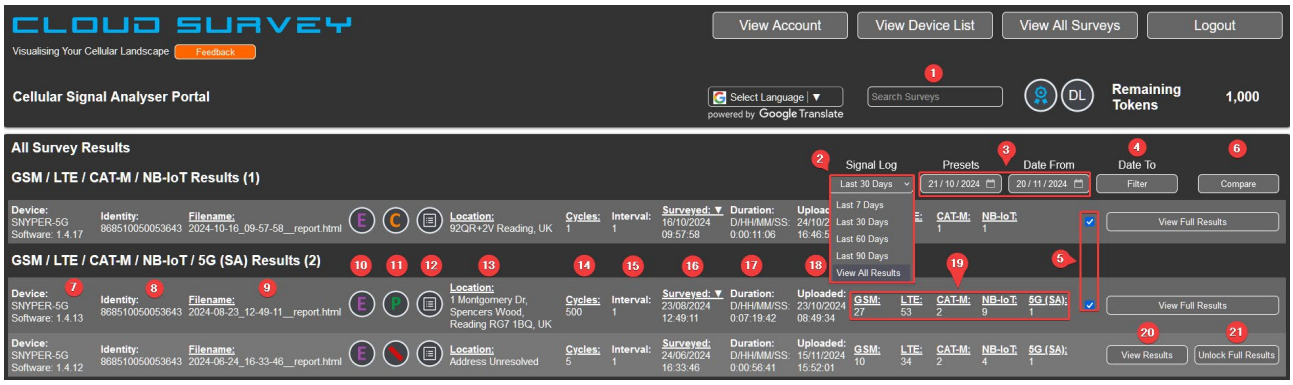


Figure 27: All survey results

1. Search bar: Use the search bar to filter results based on search terms. Examples of search terms include - addresses, postcodes, survey comments, IMEI numbers. Device nicknames cannot be searched for.
2. Signal Log: View survey results from the past 7, 30, 60, 90 days, or all completed surveys.
3. Date Filter: Select specific dates to filter the survey results.
4. Filter button: Press this button to apply the custom date filter.
5. Selection Box: Select one, multiple, or all surveys.
6. Compare: Select up to four surveys to merge into a single report with all identified cells overlaid on one map.
7. Device: Displays the survey device and its software version.
8. Identity: Device ID or nickname if this has been changed.
9. Filename: For SENTRYs, system-generated. For SNYPERs, user defined.

10. Survey type: Icons representing the type of survey conducted.


Standard


Advanced


Engineer


Performance Monitoring

11. Position estimated based on the cells discovered during the survey.


Position estimated from the position of cells discovered during the survey


Position determined by the user or GNSS (SENTRY)


Verified travelling GNSS position


In very rare cases, a cell's position may be indeterminable. If this happens clicking on a survey with this icon will attempt to resolve the issue; if unsuccessful, it will remain unresolved.

12. Survey bookmark. Icon representing the bookmark that the user has assigned the survey (all surveys default to 'Standard Survey' unless changed by the user).


Standard bookmark


Interest bookmark


Featured bookmark

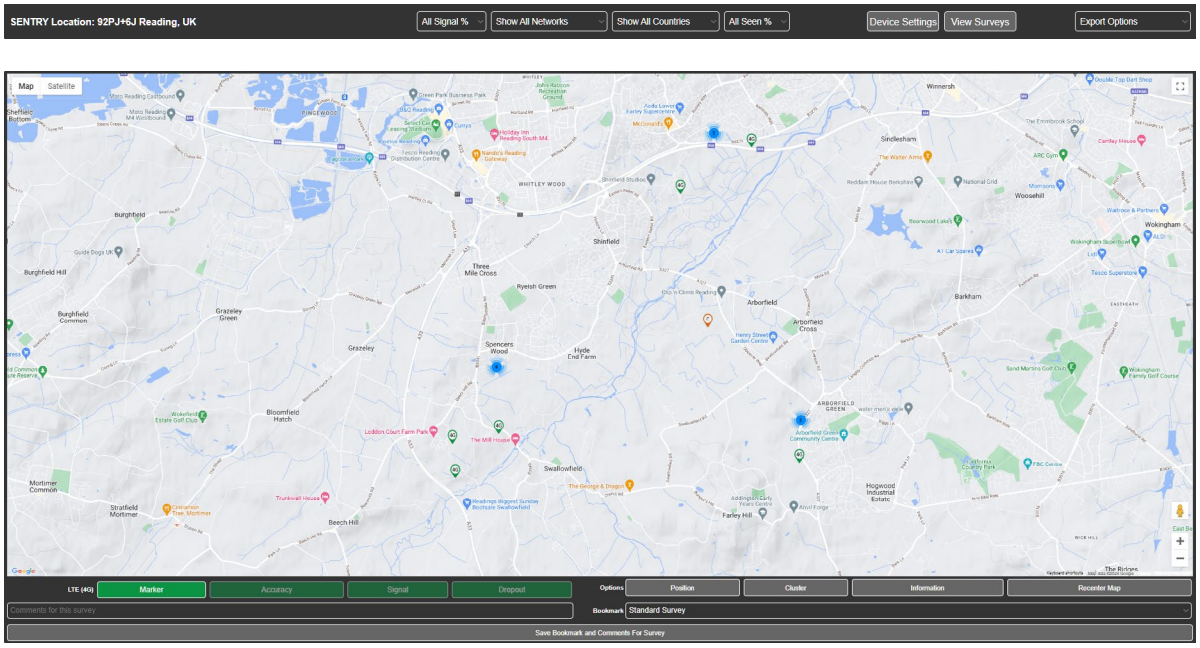

Problem bookmark

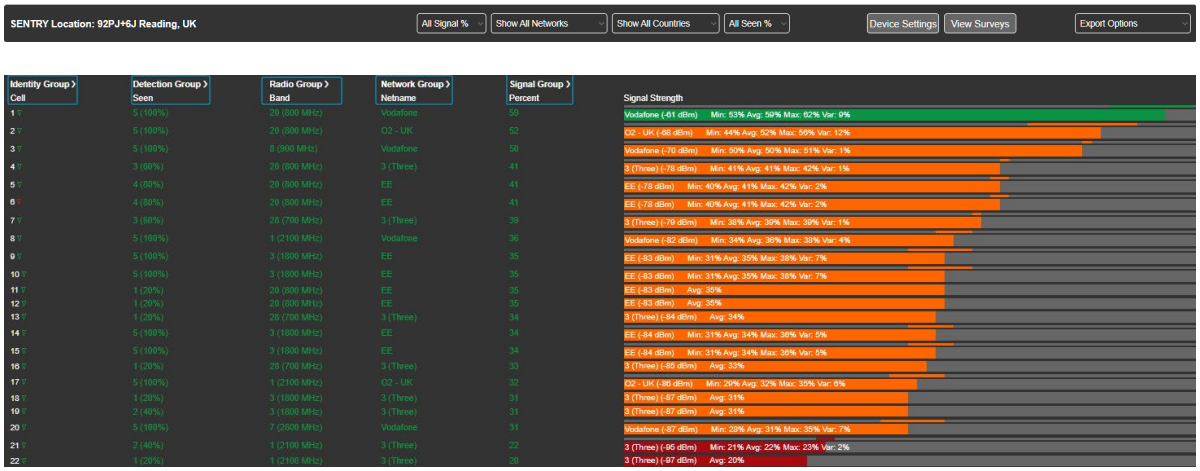

Archive bookmark

13. Location: Where the survey was conducted as reported by Google Maps.
14. Cycles: The number of survey measurement cycles in the survey.
15. Interval: The time between the survey cycles (in seconds).
16. Surveyed: Date and time at which the survey was started. For a SNYPER, the field is populated using the time set on the device. For a SENTRY, it reflects the server time.
17. Duration: Duration of the survey, measured as the time between the start of the first survey and the end of the last survey. SENTRY, start and end times are measured from the receipt of the individual survey cycles on the server which due to network processing times may be a little out of phase with real time.
18. Uploaded: Date and time that the survey was uploaded to CloudSURVEY. This is always the server time.
19. Network Technology: Displays the number of cells detected for each network technology during the survey.
20. View Results: Click to view survey.
21. Unlock Full Results: Show full survey results with detailed network parameters.

Viewing a Survey

All surveys, whether taken on a SNYPER or SENTRY, will follow a similar layout with only a few model-specific differences.





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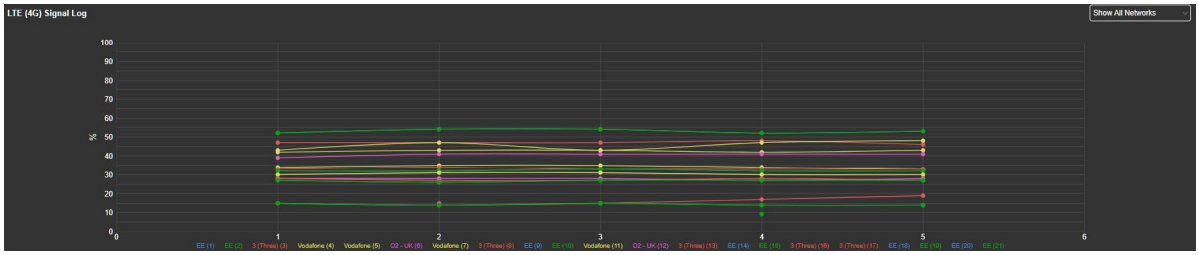
CloudSURVEY

User Manual



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Comprehending a Completed Survey

An outline of key survey components.

Survey Filter Header

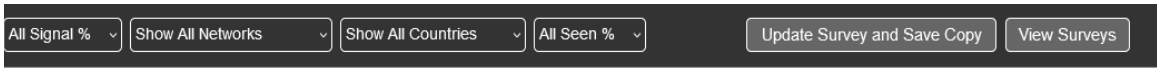


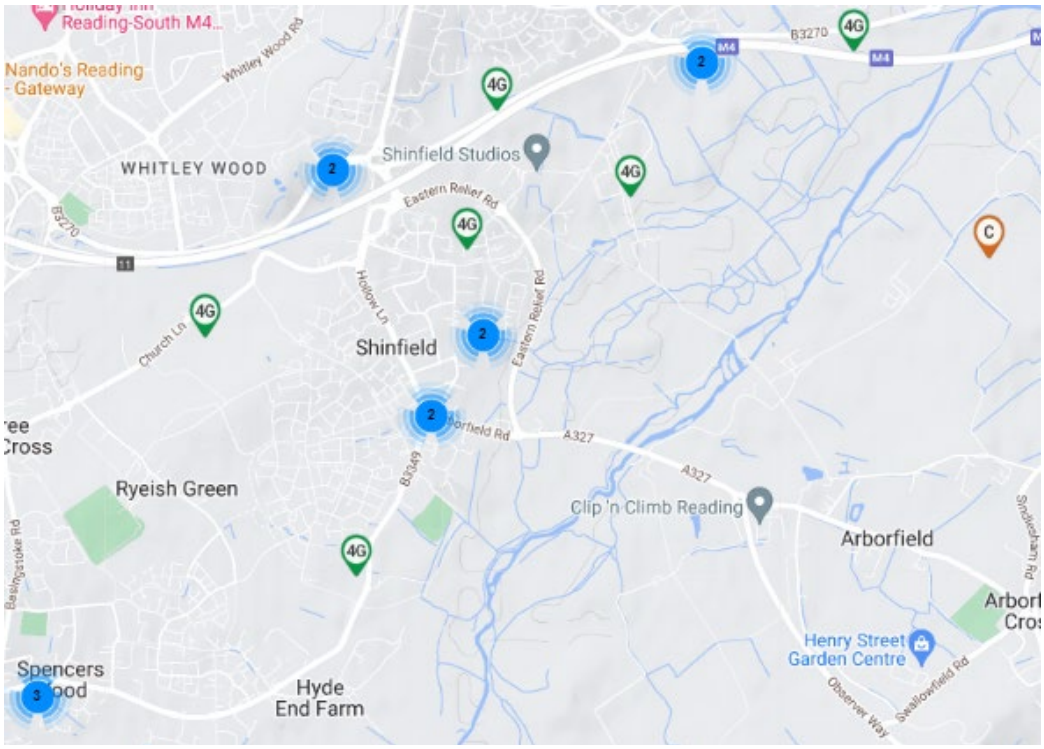
Figure 29: Survey configuration options

The filter header allows users to apply 4 individual filters that apply to both the map and cell listing. Choose to filter from:

1. **Signal %:** The signal percentage represents the measured signal strength as a percentage of the maximum possible signal strength.
2. **Networks:** Allows the user to select just a single named network discovered during the network scan.
3. **Countries:** Allows the user to select just the cells from a specific country discovered during the network scan.
4. **Seen %:** In a multi-cycle survey, this allows the user to filter by the frequency at which a cell appeared during the survey cycles.
5. **Update Survey and Save Copy (SNYPER only):** Updates the location position and position of the cells to the latest database. Each update will consume a token for every cell on the map. This feature can be useful for identifying cells that were not initially registered in the database. It is not recommended to do this often as the underlying database does not update frequently.
6. **Device settings (SENTRY only):** Navigates to the sentry configuration page.
7. **View Surveys:** Navigates back to the survey list page, filtered to display only the results from that specific device.
7. **Export Options:** Exports the survey into one of the following formats:
    - CSV report: Exports the cell data as a comma delimited.csv file.
    - HTML report: Exports the view as a single.html file. Note: Exporting the map is not possible.
    - Direct Print/Print to PDF: Formats the report for printing or saving as a PDF file.

Map

Figure 30: Map view of survey results



The survey map shows the identified positions of all cells around the survey location.

Navigate the map by holding down the left mouse button and dragging. To zoom in and out, hold the Ctrl key while using the scroll wheel or alternatively, use the plus '+' and minus '-' buttons on the right of the map.

Position Marker

Position markers indicate the location where the survey was conducted, utilising three types of pins based on the location determination method:

- Orange pin: An approximation based on the position of discovered cells.
- Blue pin: GNSS measured position.
- Green pin: User defined position.

By default, an orange pin is used. SENTRY surveys conducted using the GNSS antenna will display a blue pin. Although unlikely, an orange pin might also appear on a SENTRY survey map if the GNSS receiver fails to determine the position.

To reposition an orange marker on the map, left-click and hold the pin, then drag it to the desired location. When you release it, the marker becomes a user-defined position pin (turning green). Click on the pin to view the location details.

Cell Markers

Cell markers indicate the physical location of a cell on the map. They can be represented by a single icon or a cluster icon depending on cell density and the map's zoom percentage. Zooming in on a cluster reveals the individual cells within.

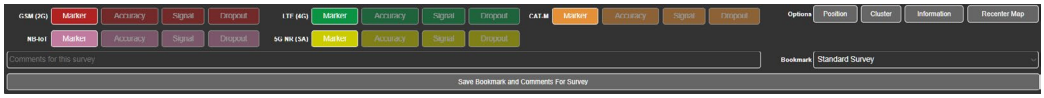
Icon	Name	Description
	Cluster icon	Represents multiple cells in close proximity. Clusters of 2 - 9 are blue, 10 - 99 are yellow and 100+ are red.
	Yellow 5G NR/SA pin	Represents the location of a 5G cell.
	Green 4G pin	Represents the location of a 4G cell.
	Blue 3G pin	Represents the location of a 3G cell.
	Red 2G pin	Represents the location of a 2G cell.
	Orange LTE-M pin	Represents the location of an LTE-M cell.
	Pink NB-IoT pin	Represents the location of an NB-IoT cell.

Clicking on a cell pin reveals additional information about the cell:

Cell placement information is generated using third-party mapping and location data services through the Google Maps API. CloudSURVEY uses these services to provide worldwide coverage and to support ongoing refinement of estimated cell locations. Cell tower positions are continuously updated as new data becomes available, and new cells are regularly added to the database. As a result, a missing cell marker may still appear in the future.

Map Display Buttons and Options

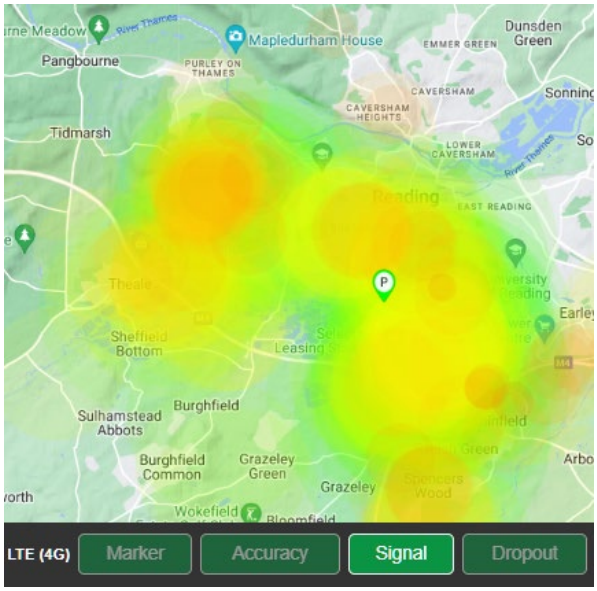
These options provide the user the ability to refine and restrict the information on the map to certain criteria. For example, it can be used isolate and only display only cell types of a particular network technology. Buttons will appear bright when selected and dim when deselected.



Marker: Used to show/hide cells on the map of the corresponding network technology.

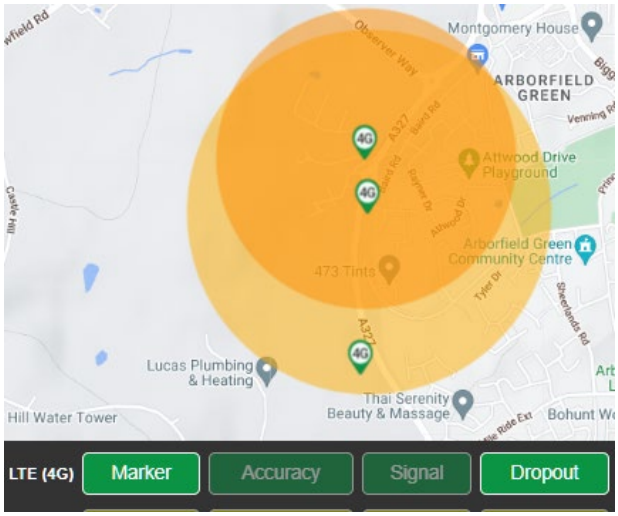
Accuracy: Plots a circular region around each cell to visually represent the potential radius within which the cell's location could fall.

Signal: The signal heatmap is a visual representation of the strength and distribution of a signal across a specific geographic area. The heatmap uses colour gradients to indicate varying signal strengths, with different colours representing different levels of intensity. The colours used correspond to a hue range of 0 to 120 degrees on the HSL colour wheel (red - green). Can be toggled on/off.



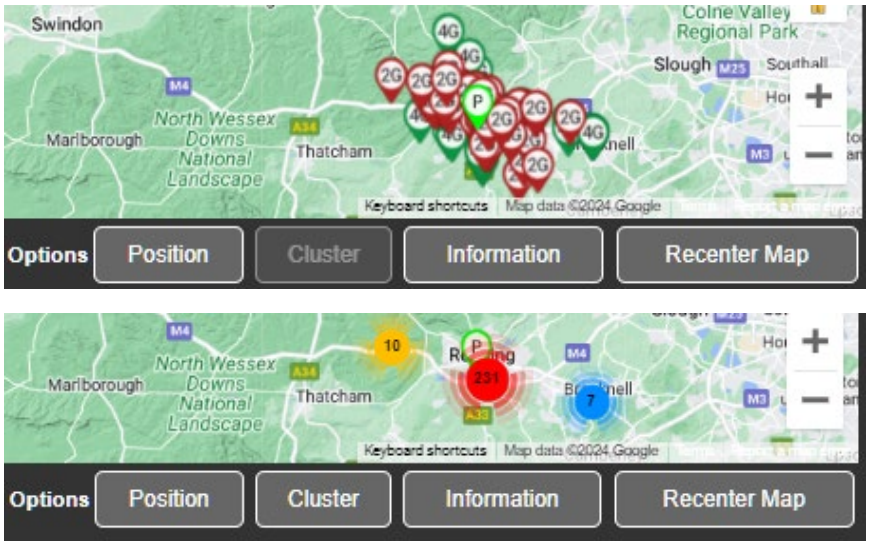
Dropout: Cells exhibiting a signal strength of 20% or less are flagged for poor signal quality. To highlight the impacted area, a circular region will be drawn around each of these identified cells.

The colour of the area changes according to signal strength, aligning with a hue range of 0 to 120 degrees on the HSL colour wheel (red – green).



Signal: Show or hide any position markers on the map.

Cluster: Enable/Disable cluster icons on the map regardless of zoom level.

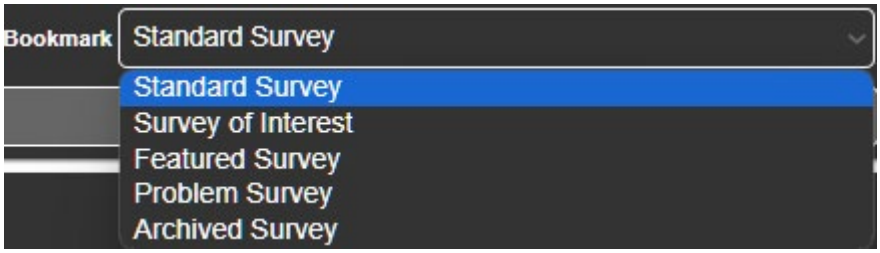


Information: Enable/Disable additional information when clicking on a cell.

Recentre Map: Reposition the map to a central position in relation to located cells.

Bookmark: Change the bookmark displayed on the survey:

- Standard (default)
- Survey of interest
- Featured survey
- Problem survey
- Archived survey

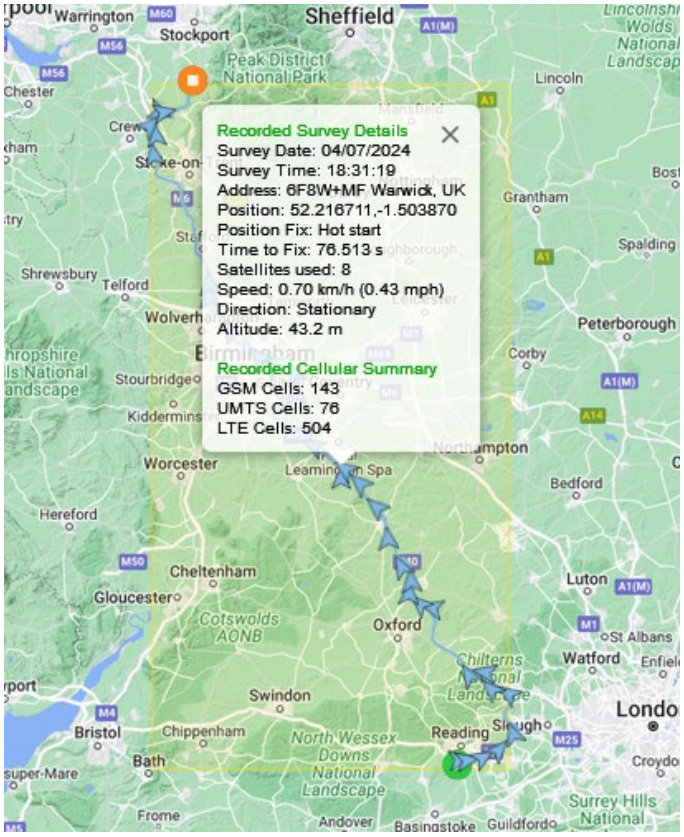


Save Bookmark and comments: Save any changes made to bookmark or comments.

Travelling Survey (SENTRY Exclusive)

Sentry devices can perform a travelling survey using a GNSS antenna. This survey method tracks the device from its starting point to its destination, recording the route taken and all cells encountered along the journey. Recorded metrics include:

- Date/Survey start time
- Starting co-ordinates (Lat/Long)
- Starting address
- Direction (in degrees)
- Altitude (m)
- Travel speed
- Number of cells of each network technology



Travelling Markers

Icon	Name	Description
	Direction arrow	A marker indicating the recorded position and direction of the device at a given time. These markers are placed along the route taken. Clicking on one reveals further details. [Figure 12]
	Start location	Represents the starting location of survey.
	End location	Represents the ending location of the survey.

Table of Discovered Cells

All cells discovered during the survey are listed within this section. By design, a SENTRY surveys only one network technology at a time, whereas a SNYPER, depending on its configuration, can produce a survey covering all network technologies. Which will be grouped and presented in order. The reported information can differ depending on the network technology surveyed. These differences occur because of the differences in the technologies.

Network Survey UI

The header displays the number of survey cycles each survey represents, showing both the requested cycles and the completed cycles. This format accounts for the possibility of a network scan being terminated before it reaches completion.

By default, there are five expandable columns used to categorise ‘like-data’ from the network scan. Clicking on a column to expand it will reveal further information. (This setting can be toggled off within account settings)

1. Identity group
2. Detection group
3. Radio group
4. Network group
5. Signal group

Cells are listed in descending order of signal strength, with the strongest at the top and weakest at the bottom.

Hover over the green upside-down triangle icon to reveal the latitude/longitude of the cell, clicking it will bring up its exact location on the cell map. Although uncommon, a red triangle indicates that the cell position could not be located on the map. This is more likely with a very low signal strength cell, an NB-IoT cell, or where some information may have been corrupted.

Identity Group		
Term	**Technology**	**Description**
LAC	GSM, UMTS	Location Area Code. This is assigned by the network operator to a group of cells in an area. Often given to the cells on a cell tower. Defined by 3GPP 23.003.
PCI	LTE, LTE-M, NB-IoT, NR	Physical layer Cell Id. In conjunction with the EARFCN, this will uniquely identify a broadcast channel. Defined by 3GPP TS 36.211
TAC	LTE, LTE-M, NB-IoT, NR	Tracking Area Code. This is assigned by the network operator to a group of cells in an area. Often given to the cells on a cell tower. Defined by 3GPP TS 23.003
Detection Group		
Seen	All technologies	Number of times the cell is discovered over the network scan cycles.
Index	All technologies	Position in the database.
Radio Group		
ARFCN	GSM	Absolute Radio Frequency Channel Number. This defines which frequency channel within a band that the cell uses. Used to calculate the upload and download frequencies. Defined by 3GPP TS 45.005
BW	LTE	Bandwidth of the cell (in MHz).
EARFCN	LTE, LTE-M, NB-IoT	E-UTRA Absolute Radio Frequency Channel Number. This defines which frequency channel within a band that the cell uses. Used to calculate the upload and download frequencies. Defined by 3GPP TS36.101
UARFCN	UMTS	UTRA Absolute Radio Frequency Channel Number. This defines which frequency channel within a band that the cell uses. Used to calculate the upload and download frequencies. Defined by 3GPP TS 25.213

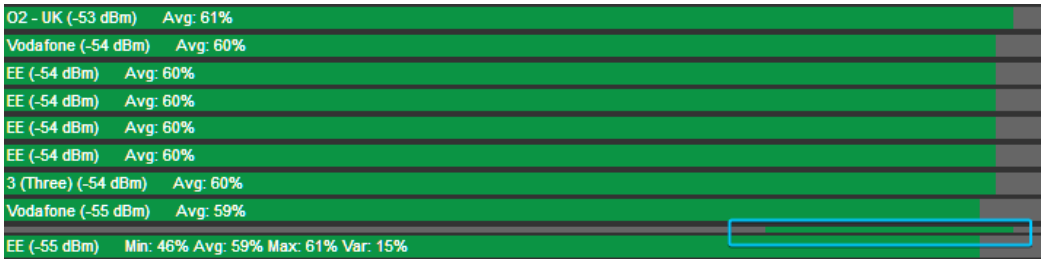
NR-ARFCN	NR	New Absolute Radio Frequency Channel Number is a unique identifier for radio frequency channels in the 5G New Radio (NR) standard. Used to calculate the upload and download frequencies. Defined by 3GPP TS 38.104
Cell ID	All technologies	Cell Identifier: This is an ID assigned to a cell. It is not unique on its own and can be repeated in larger countries. However, when combined with the LAC/TAC, it becomes unique.
DL (Mhz)	All technologies	The download frequency, calculated from ARFCN / UARFCN or EARFCN.
UL (Mhz)	All technologies	The upload frequency, calculated from ARFCN / UARFCN or EARFCN.
Network Group		
MCC	All technologies	Mobile Country Code. A unique code that normally specifies the country that a cell is located in. Some larger countries may have two or more MCC assigned to them. There are also non-geographic codes for applications such as maritime. Defined by ITU-T E.212
MNC	All technologies	Mobile Network Code. A unique code that identifies the network operator of the cell. Some network operators may have two or more MNC assigned to them. Defined by ITU-T E.212
Latitude	All technologies	A geographic coordinate that specifies the north-south position.
Longitude	All technologies	A geographic coordinate that specifies the east-west position.
Signal Group		
dBm	All technologies	
RSSI	UMTS, LTE, LTE-M, NB-IoT, NR	Received Signal Strength Indication. This is derived from the dBm measurement.
RSRP	LTE, LTE-M, NB-IoT, NR	Received Signals Received Power. This is the power received in the bandwidth of operation. Defined by 3GPP TS 36.214.

RSRQ	LTE, LTE-M, NB-IoT, NR	Reference Signals Received Quality. Received power divided by the RSSI. This is the measure of signal interference, as measured at the antenna connector. Defined by 3GPP TS 36.214.
SCR	UMTS	Scrambling code. In conjunction with the UARFCN, this will uniquely identify a broadcast channel. Defined by 3GPP TS
RSCP	UMTS	Received Signal Code Power. The received power taking no account of noise. Defined by 3GPP TS 25.215.
ECIO	UMTS	EC/IO is the signal to noise level of the received signal, measured in dB. Defined by 3GPP TS 25.133
BSIC	GSM	Base Station Identity Code. In conjunction with the ARFCN, this will uniquely identify a broadcast channel. Defined by 3GPP TS 03.03.

Signal Strength Bar Chart

Adjacent to the columns is a bar chart of all the discovered cells, organised in descending order. Each bar represents the signal strength of the respective cell as a percentage. Statistical metrics are overlaid onto each bar.

Some entries will have a thin bar above the main bar, this only appears if there is a variation in the recorded signal strength. It signifies the difference between the recorded minimum and maximum values .



Network Summary

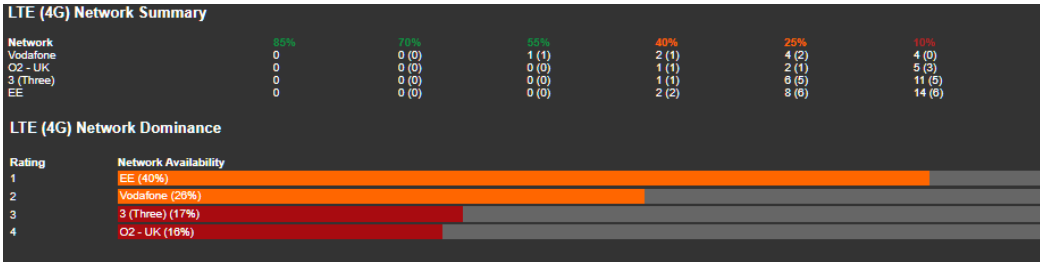
Network summary lists in tabular form; the number of cells found for each network against the signal strength . This interpretation summarizes the network based on the number of cells found and their signal strengths. The relative percentages provided may not always add up to 100% due to rounding errors.

GSM (2G) Network Summary

Network	85%	70%	55%	40%	25%	10%
EE	10	15 (5)	19 (4)	36 (17)	40 (4)	40 (0)
Vodafone	21	25 (4)	28 (3)	33 (5)	36 (3)	36 (0)
O2 - UK	17	28 (11)	31 (3)	44 (13)	46 (2)	46 (0)

Network Dominance Summary

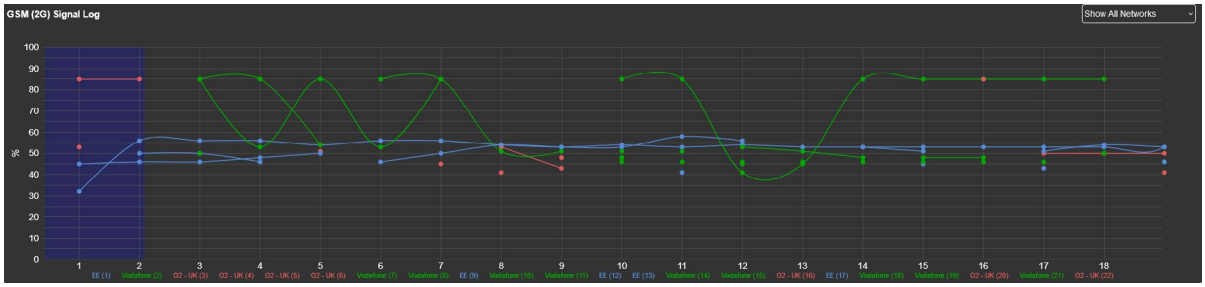
Network dominance visualizes the relative prevalence of different networks discovered in the survey location .



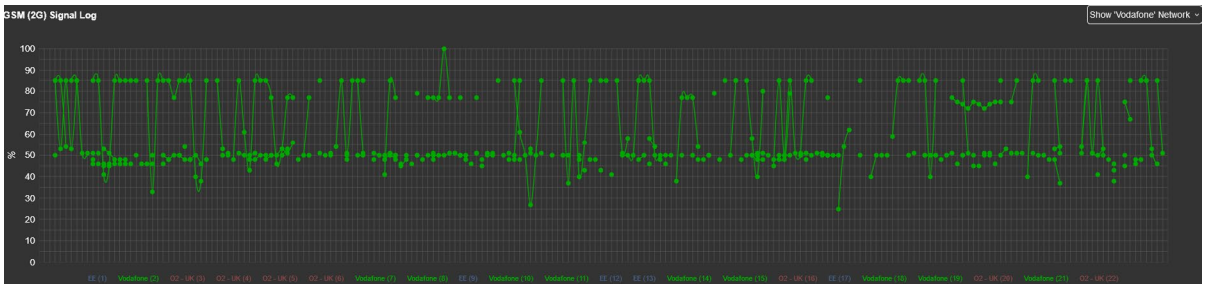
Signal Log (SNYPER Exclusive)

This line chart presents the same information as the bar chart, but displayed in a different format. The Y-axis denotes signal strength as a percentage, while the X-axis denotes the number of cycles performed. This format can be particularly useful for visualising changes over time .

Click and drag over the desired area to zoom in on the graph.



Users can use the filter (pictured in the image x) to select which datapoints are displayed on the chart. The filter allows for selection by network provider .



Along the X-axis are all the cells discovered across the completed cycles, listed in the order they were found .

Selecting one of these icons will bring up a different chart specific to that cell, displaying all the cycles in which it appeared, the time of appearance, and the recorded signal strength. All recorded parameters for the selected cell can be seen in the area directly above the graph, reflecting the same information found within the full cell table .

Additionally, this action will highlight the cell on the cell map and within the full cell table
To return to the original chart view, click on the same icon again .

Network Performance Monitoring (SENTRY Exclusive)

Network Performance is a survey feature unique to the SENTRY. A network performance survey tests and reports registration times, upload/download speeds, ping time and signal strength of the registered network. Using a roaming SIM without PLMN configured will additionally provide a performance survey for each network the device roams onto.

Signal strength is a given metric in the measurements, allowing users to observe any correlation between the measured performance and the received signal strength .

Important: Network performance monitors the cell that the SENTRY connects to. No attempt is made to force the SENTRY to connect to the same cell with each survey, so there is the possibility that the SENTRY could test different cells on upon subsequent surveys. To prevent the SENTRY wandering between networks, use the network steering configuration option before starting the survey.

Registration and Connection Time

The measured signal strength (yellow), cellular registration time (blue), TCP/IP registration time (orange), and socket connection time (green) are plotted over time to illustrate their variations.

Explanation of measured parameters:

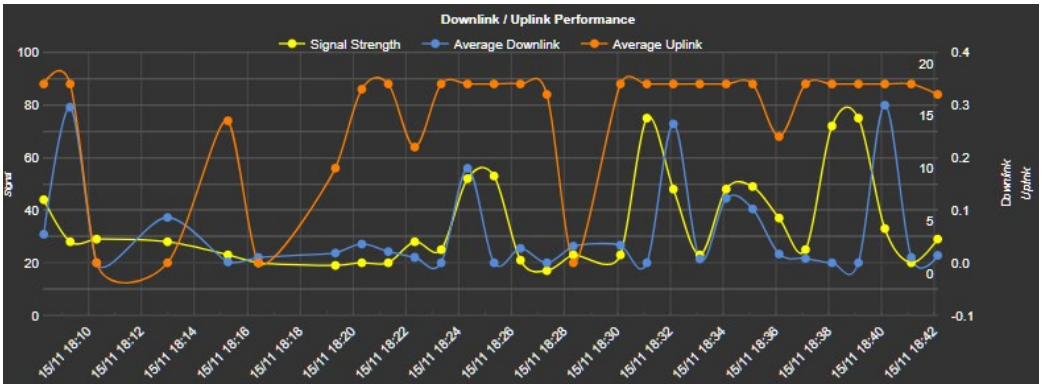
Signal strength (Yellow)	The received signal strength as a percentage of the maximum possible signal allowed by the cellular specifications. Note that receiving 100% signal strength is likely unobtainable as this will assume that the connected cell is transmitting at full strength which is unlikely. In practice, a signal strength of 25% is likely to be as good as a signal strength of 100%.
Cellular Registration Time (Blue)	This metric represents the time it takes to register to the cellular network where voice and text services are enabled. This measurement assumes that the cellular device has already booted and selected the cell to connect to.
TCP/IP Registration Time (Orange)	After registering to the cellular network, this metric represents the time it takes to receive an IP address from the network, which is necessary for obtaining Internet access.
Socket Connection Time (Green)	This metric represents the time taken to connect to an IP address (measured on cloud-survey.co.uk).

Upload/Download Performance

This measures the upload and download speeds when connecting to cloud-survey.co.uk. The SENTRY uses an LTE Cat 4 Modem, so the maximum theoretical speeds that can be achieved are:

Technology	Download Speed	Upload Speed
LTE	150 Mbps	50 Mbps
UMTS	42 Mbps (DH-HSDPA)	5.76 Mbps (HSUPA)
GSM/GPRS/EDGE	296 kbps (EDGE)	236.8 kbps

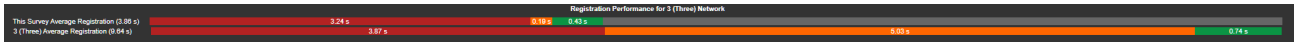
Note: While these are the maximum speeds that the SENTRY can support, the connected cell may not achieve these speeds due to design limitations, network congestion, or other environmental factors. The performance test aims to identify these network shortcomings .



Registration Performance

This metric averages the results of the Cellular Registration Time, TCP/IP Registration Time, and Socket Connection Time graphs .

The first bar represents the results observed from the survey. The Cellular Registration Time (in red), the TCP/IP registration time (in orange) and the Socket Connection time (in green). This overall connection time reflects the time taken from starting the network registration process through to full Internet connectivity. It does not consider any power up time or cell selection time. For a static device, there should be no cell reselection time after the initial connection, as the system will reconnect to the last used cell upon power-up.



The second bar compares the measurement to the average of all performance surveys uploaded by all users to the CloudSURVEY portal. This is provided to give a feel for how good the measurements obtained might be.

Average Signal Strength and Ping Time

Two gauges are used: one to display average signal strength and the other to show ping time.

Average Signal Strength: This metric represents the average signal strength measured by the SENTRY during the survey. It is a percentage of the maximum possible cellular signal as explained previously.

Average Ping Time: This metric represents latency, specifically the average round trip time for packets between the SENTRY and the cloud survey server. The SENTRY measures ping time by sending seal data packets and recording the response time. This method is preferred over ICMP ping as it better represents real internet traffic, accounting for any traffic shaping based on packet type .

Ownership

Every device used with CloudSURVEY is associated with an owner. The owner of a device also has ownership of the surveys conducted by that device on CloudSURVEY. The owner can grant permissions to other CloudSURVEY users to view surveys from their device. SENTRY owners can also authorise other users to set up and conduct surveys.

SENTRY Ownership Determination

Ownership of an un-allocated SENTRY is assigned to a user using the SirettaSPARK tool. Upon connecting the device and opening the software, the user will be prompted to allocate the device to their account.

An owner may choose to relinquish ownership over a device in one of two ways:

- Deleting it from CloudSURVEY. This deletes both the device and all surveys conducted by that device from CloudSURVEY. The device will return to the un-allocated state.
- By transferring ownership to another CloudSURVEY user. This transfers ownership of not only the device but also all data associated with the device on CloudSURVEY.

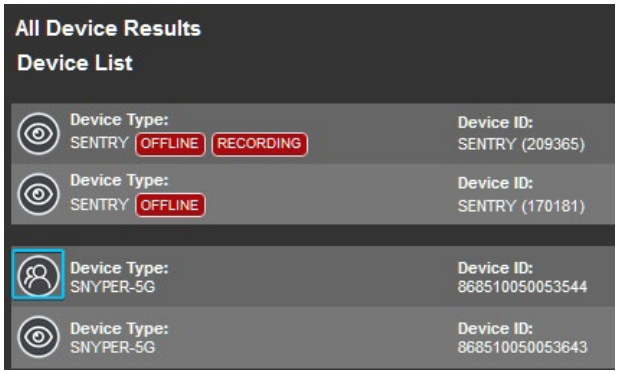
SNYPER Ownership Determination

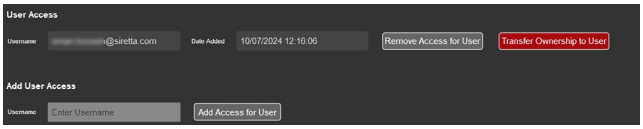
Ownership of a SNYPER on CloudSURVEY is established by the first user to access a survey conducted by the device. Possessing the physical device does not confer ownership from CloudSURVEY's perspective.

Changing Ownership Permissions

Ownership Permissions can be managed by clicking on the ownership icon to the left of the device in the device list.

This action will display a page listing all users who have access to the device, providing options to add new users, remove existing users, or transfer ownership .





CloudSURVEY Account Management

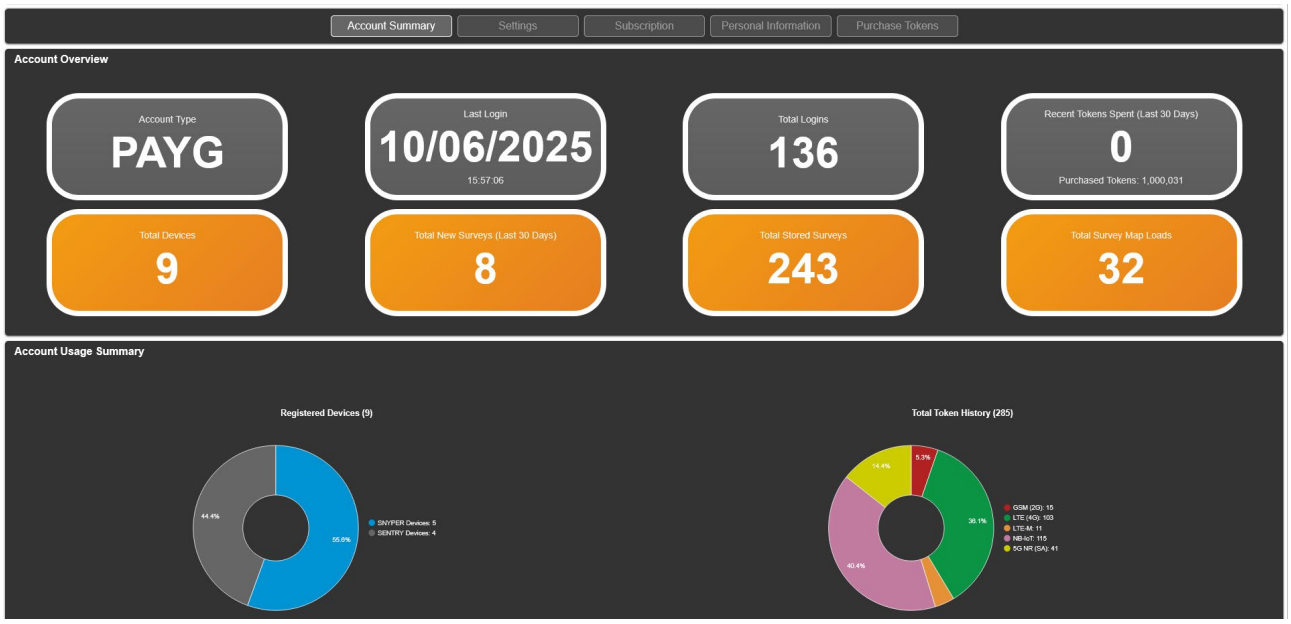
Click 'View Account' in the page header to access account settings. From here you may customise display options, change account settings, track token usage, and manage other preferences.

The page is divided into separate tabs:

- Account Summary
- Settings
- Subscription
- Personal Information
- Purchase Tokens

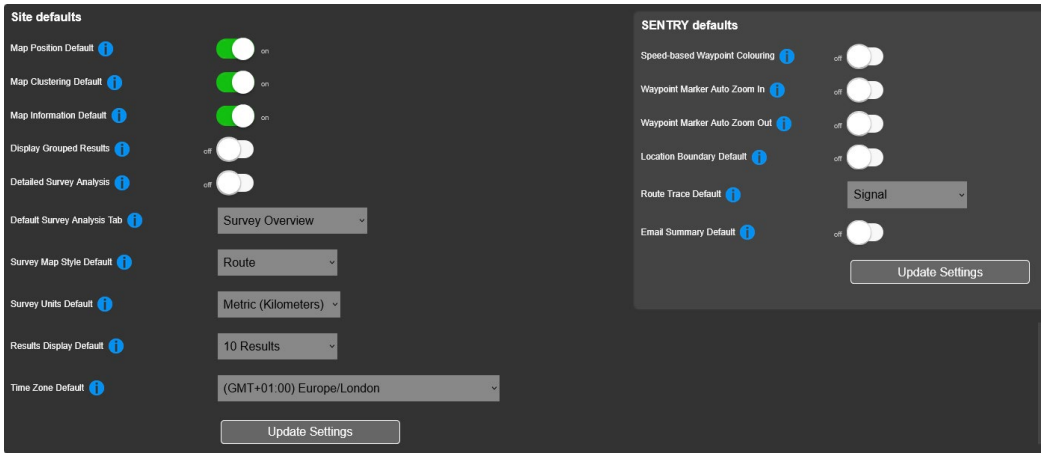
Account Summary

Get a clear overview of your account at a glance. View the total number registered devices, stored surveys, token usage and more. All presented in a simple, visual format.



Settings

The settings tab lets you customise how survey data is both displayed and interacted with in the CloudSURVEY Portal. You can toggle features on or off.



Site Default Settings

Setting	Description
Map Position Default	Show or hide the initial position marker on survey maps by default
Map Clustering Default	Choose whether or not to group nearby cell tower markers by default
Map Information Default	Show or hide cellular marker information by default
Display Grouped Results	Group survey results in collapsible sections
Detailed Survey Analysis	View survey results in a categorised and graphical form
Default Survey Analysis Tab	When 'Detailed Survey Analysis' is enabled set the default tab that loads opening a survey
Survey Map Style Default	Choose the default map style when opening a survey
Survey Units Default	Set the default unit of measurement (Metric / Imperial)
Results Display Default	Set the number of individual survey results displayed on the page in the survey list
Time Zone Default	Set the time zone used in the portal

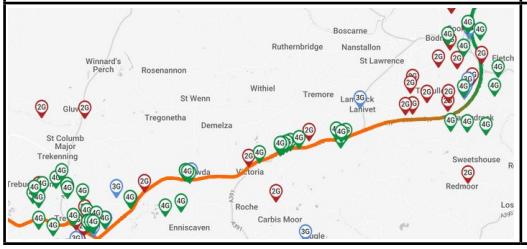
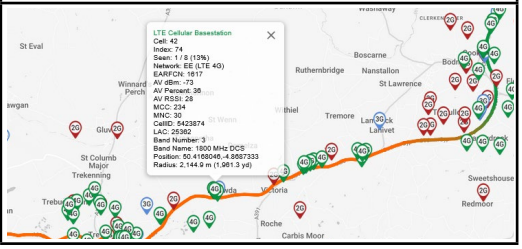
Map Position Default

Off	On
	

Map Clustering

Off	On
	

Map Information

Off	On
	

Survey Map Style

Route	Satellite	Map
		

Grouped Survey Results Columns

Off

Cell	Index	Seen	ARFCN	AV dBm	AV %	AV RSSI	Netname	MCC	MNC	CellID	LAC	Band
1	148	1 (13%)	2	-49	100	31	Vodafone	234	15	48444	269	8 (E-GSM-900)
2	128	1 (13%)	654	-61	83	26	EE	234	30	51924	2537	3 (DCS-1800)
3	149	1 (13%)	657	-63	80	25	EE	234	30	421	2537	3 (DCS-1800)
4	25	1 (13%)	114	-68	72	23	O2 - UK	234	10	30002	21430	8 (E-GSM-900)
5	24	2 (25%)	11	-71	68	21	Vodafone	234	15	59221	269	8 (E-GSM-900)
6	129	1 (13%)	669	-71	67	21	EE	234	30	51925	2537	3 (DCS-1800)
7	150	1 (13%)	663	-71	67	21	EE	234	30	420	2537	3 (DCS-1800)
8	151	1 (13%)	11	-74	62	19	Vodafone	234	15	48445	269	8 (E-GSM-900)

On

GSM (2G) Network Cell Sites - 8 Survey Cycles

Identity Group ❮		Detection Group ❮		Radio Group ❮				
Cell	LAC	Seen	Index	Band	ARFCN	CellID	DL (MHz)	UL (MHz)
1	269	1 (13%)	148	8 (E-GSM-900)	2	48444	935.4	890.4
2	2537	1 (13%)	128	3 (DCS-1800)	654	51924	1833.5	1738.5
3	2537	1 (13%)	149	3 (DCS-1800)	657	421	1834.1	1739.1
4	21430	1 (13%)	25	8 (E-GSM-900)	114	30002	957.7	912.7
5	269	2 (25%)	24	8 (E-GSM-900)	11	59221	937.2	892.2
6	2537	1 (13%)	129	3 (DCS-1800)	669	51925	1836.5	1741.5

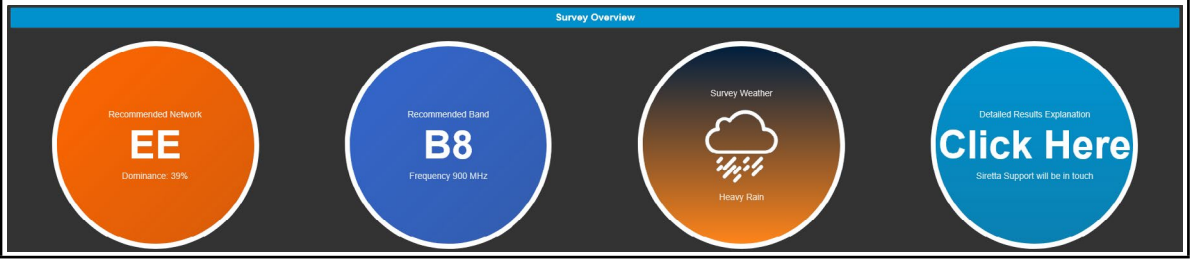
Enabled Detailed Survey Analysis

Off

GSM (2G) Network Cell Sites - 8 Survey Cycles — Jump To: UMTS (3G) LTE (4G)

Identity Group ❯	Detection Group ❯	Radio Group ❯	Network Group ❯	Signal Group ❯	
Cell	Seen	Band	Netname	Percent	Signal Strength
1	1 (13%)	8 (E-GSM-900)	Vodafone	100	
2	1 (13%)	3 (DCS-1800)	EE	83	
3	1 (13%)	3 (DCS-1800)	EE	80	
4	1 (13%)	8 (E-GSM-900)	O2 - UK	72	
5	2 (25%)	8 (E-GSM-900)	Vodafone	68	
6	1 (13%)	3 (DCS-1800)	EE	67	
7	1 (13%)	3 (DCS-1800)	EE	67	
8	1 (13%)	8 (E-GSM-900)	Vodafone	62	
9	1 (13%)	8 (E-GSM-900)	O2 - UK	61	
10	1 (13%)	3 (DCS-1800)	EE	59	

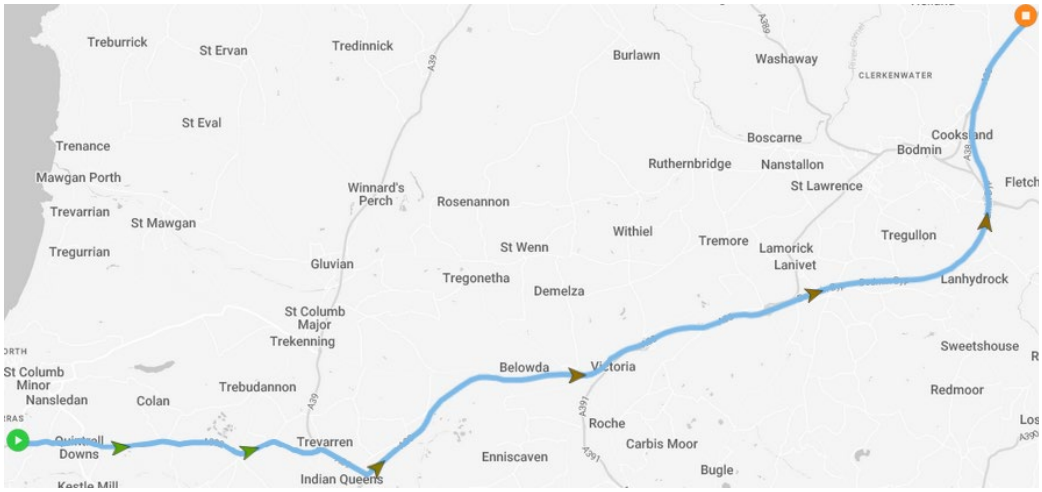
On



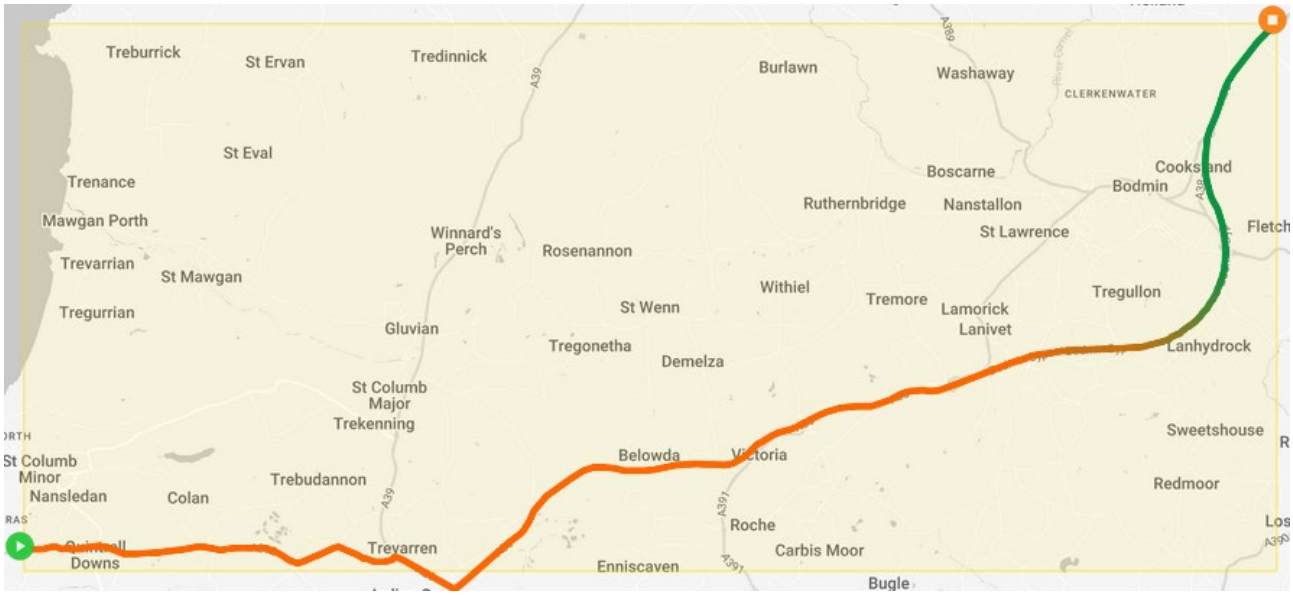
SENTRY Default Setting

Setting	Description
Speed-based Waypoint Colouring	Waypoints are color-coded based on travel speed, using a green-red gradient
Waypoint Marker Auto Zoom In	Automatically zoom in on selected markers
Waypoint Marker Auto Zoom Out	Automatically zoom out from selected markers
Location Boundary Default	Show the location boundary by default when opening a survey
Route Trace Default	Choose the colour of the survey route according to the selected metric (Standard / Signal strength / Velocity)
Email Summary Default	Send a summary email whenever a survey is completed

Speed-based Waypoint Colouring

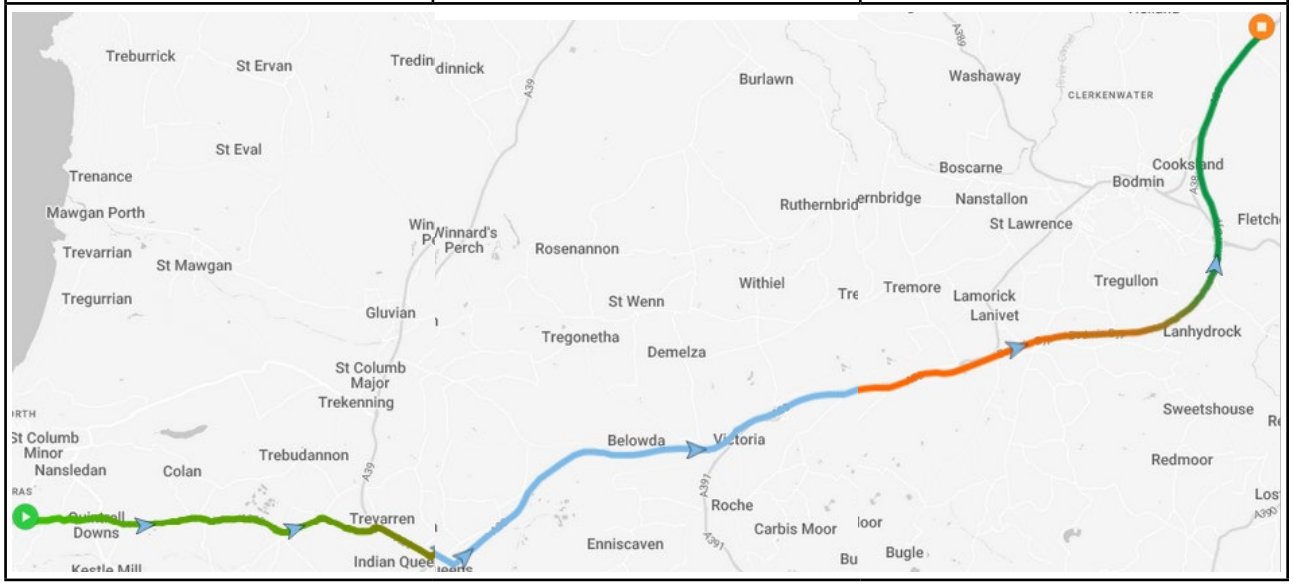


Location Boundary Default



Route Trace Default Colouring

Velocity	Standard	Signal



Detailed Survey Analysis

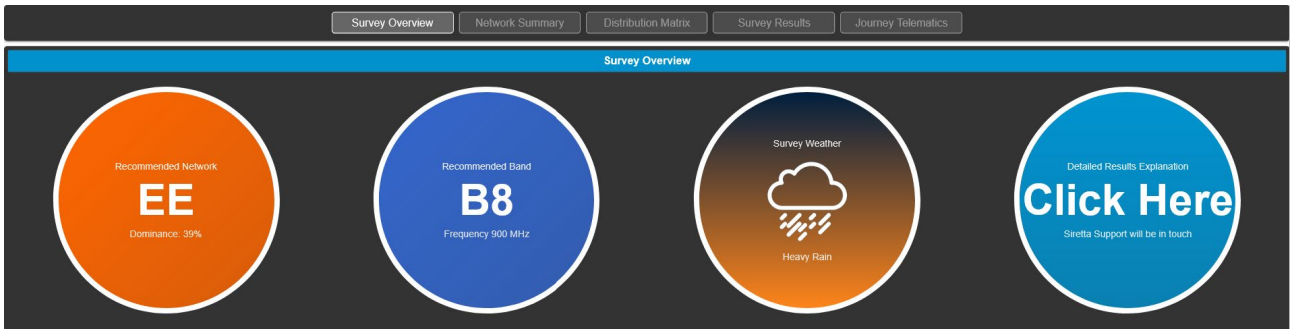
The detailed survey analysis transforms how survey data is presented, turning it into a clear and categorised visual format. Insights are organised across five tabs: Survey Overview, Network Summary, Distribution Matrix, Survey Results, and Journey Telematics, allowing for faster interpretation and more informed decision-making.

Survey Overview

At a glance, the survey overview provides a clear snapshot of key survey info.

Instantly see the recommended network (with dominance percentage), the optimal frequency band, and the weather conditions at the time of the survey. The recommended network is determined by identifying the network with the highest dominance, which is calculated based on how frequently it appears throughout the survey. Similarly, the recommended band is selected as the frequency band most commonly observed across all detected networks.

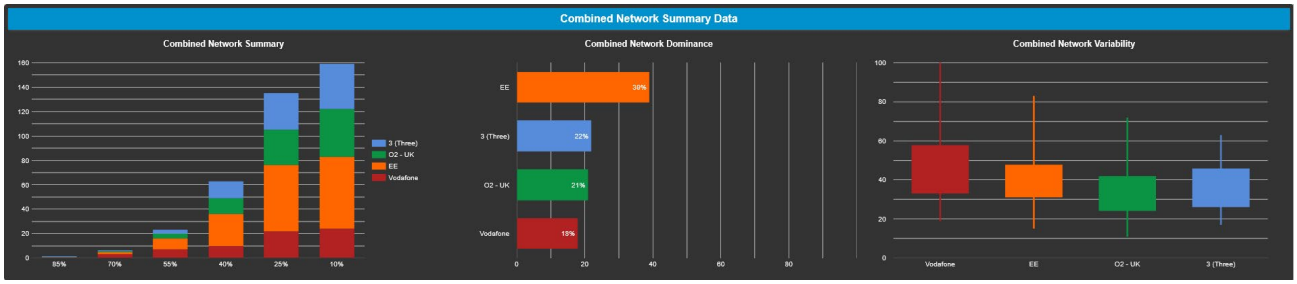
Additionally, if you'd like help in understanding your results, simply click the large blue button, and a member of the Siretta support team will get in touch to guide you through the findings.



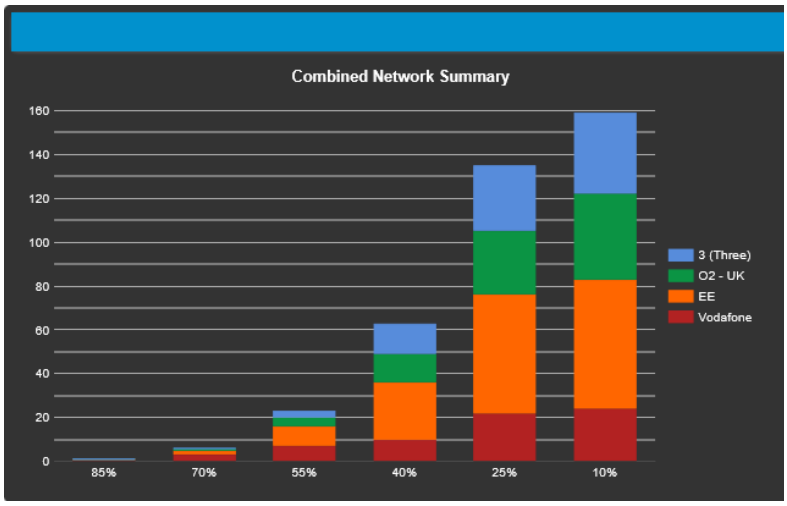
Network Summary

The Network Summary tab provides a tabulated breakdown of all detected cellular networks.

Each cellular technology is displayed within its own collapsible section, making it easy to navigate between them. For each technology, the key metrics are illustrated using bar charts, showing the number of detected cells, network dominance percentages, and signal variability. Hovering over any bar will bring up a tooltip with some additional context. A dedicated Combined Network Summary section consolidates data from all recorded technologies into unified charts, allowing for easier comparison of overall network dominance and signal stability across all major providers.

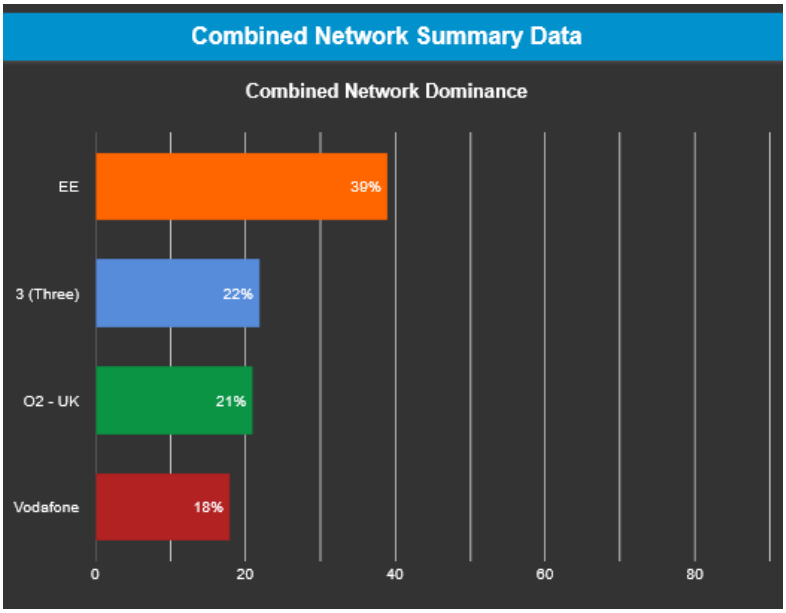


Network Summary



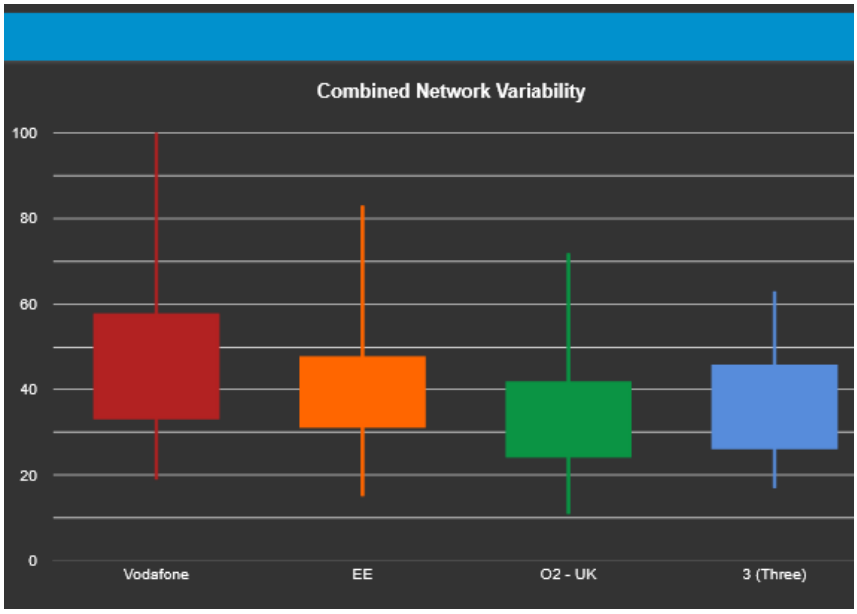
Network summary is a rolling tally of the cells within each signal band.

Network Dominance



Network dominance is determined by how often an operator appears, along with the strength of its recorded signals.

Network Variability



Network Variability provides insight into signal stability for each network operator.

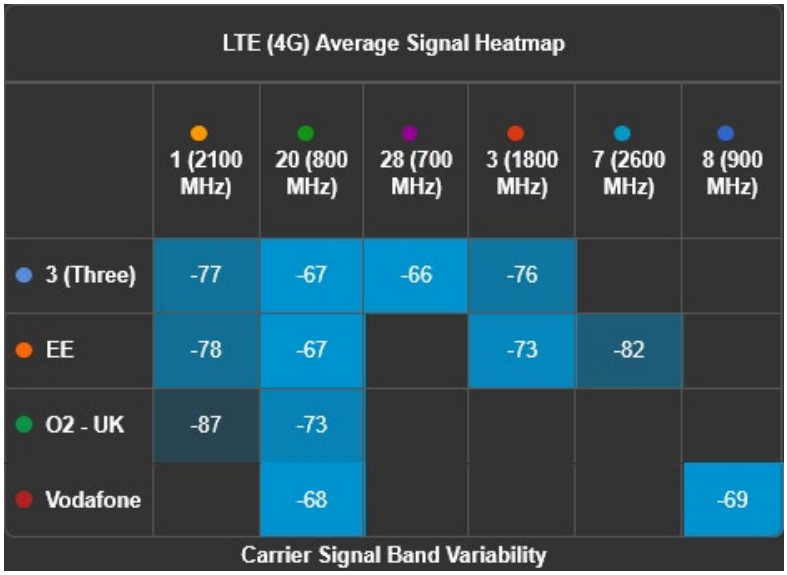
Each box plot displays the range and distribution of signal strength values.

The vertical lines (whiskers) represent the minimum and maximum values recorded, while the central block (box) shows the interquartile range, where the middle 50% of the data lies. A narrower box indicates more consistent signal strength, while a wider box suggests greater variability.

Distribution Matrix

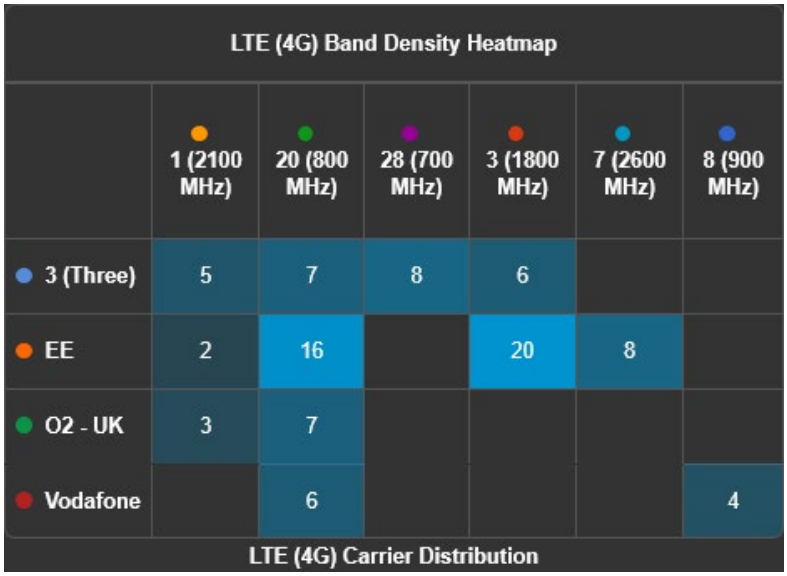
The Distribution Matrix offers a comprehensive breakdown of network performance using heatmaps and pie charts. Each technology is analysed using four key data visualisations that map the relationships between network providers (NetNames) and frequency bands. In addition to the standard heatmaps and distribution charts, there are also technology-specific metrics such as RSRP/RSRQ for LTE and ECIO/RSCP for UMTS.

Average Signal Heatmap



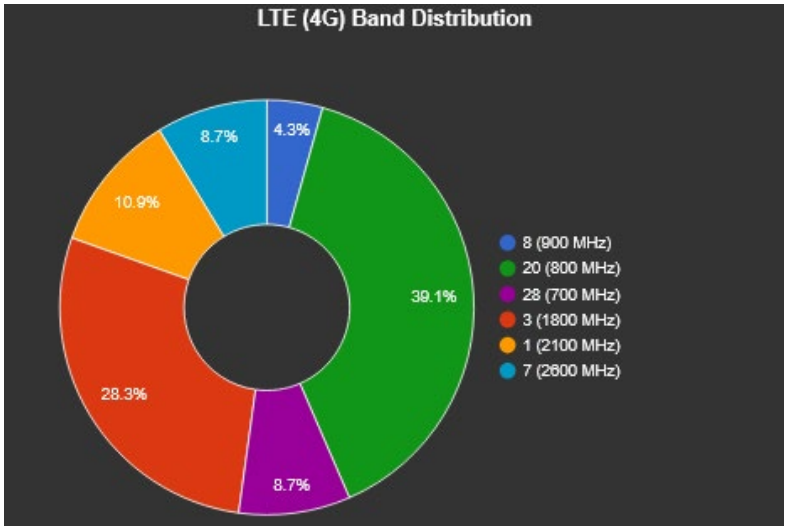
This heatmap displays the average signal strength (in dB) for each NetName (e.g., Vodafone, EE) across specific frequency bands. It provides insight into how well each carrier performs on each band in terms of signal quality.

Band Density Heatmap



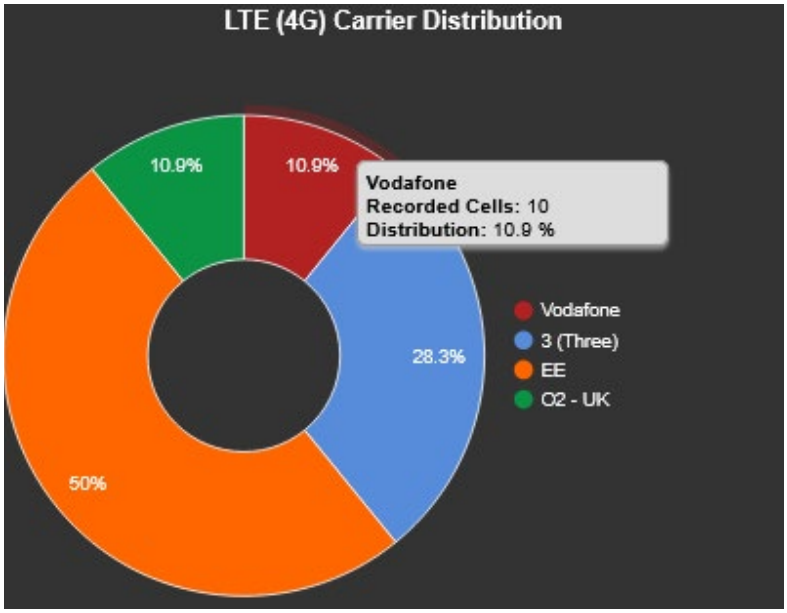
This heatmap shows the number of cells observed for each carrier-band combination. It reflects how frequently each band is used by the respective network operator, helping assess network deployment strategy.

Distribution Pie Chart



This chart provides a percentage-based breakdown of how often each frequency band appears across all observed networks. It's essentially a tally of the columns from the band density heatmap, highlighting which bands are most frequently utilised.

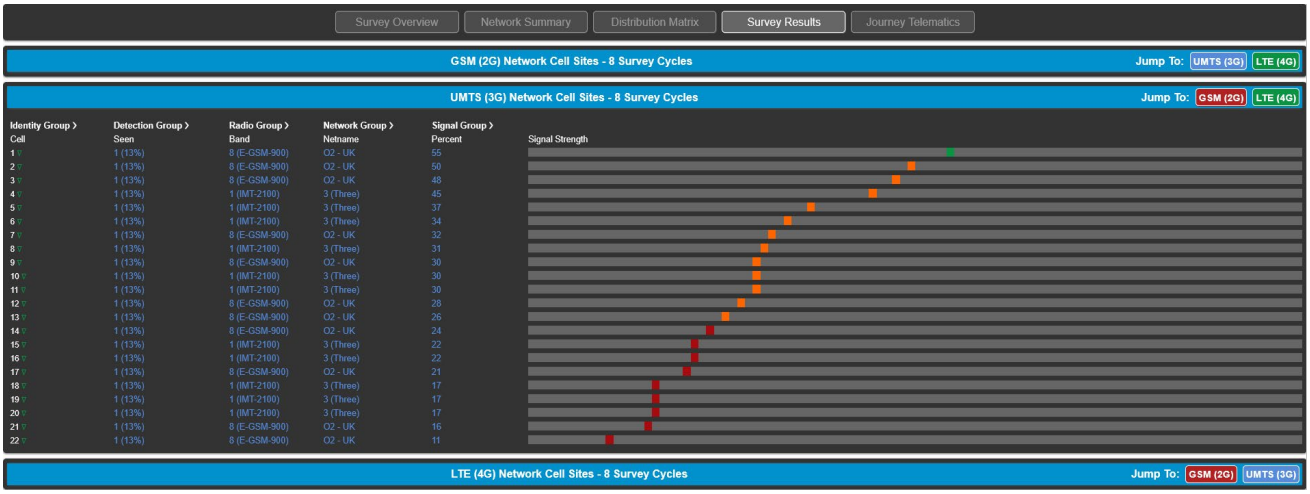
Carrier Distribution Pie Chart



This chart shows the percentage of observed cells for each carrier, effectively a tally of the rows in the band density heatmap. It reflects how much coverage or activity each network operator has in the dataset.

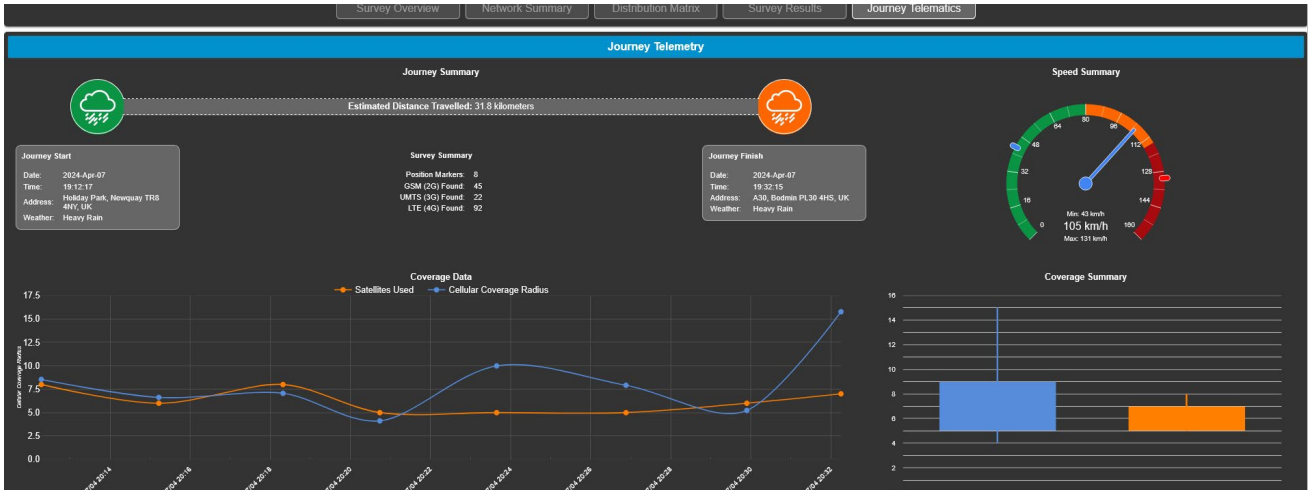
Survey Results

The survey results maintain their original list format, with data organised by technology into collapsible sections for improved readability. Quick navigation buttons allow users to jump between sections with a single click.



Journey Telematics

Journey telemetry is only applicable to travelling surveys, it provides an overview of a recorded journey, combining cellular coverage data, GPS telemetry, and speed metrics.



Journey Summary

Displays an overview of the entire journey recorded during the survey:

- Estimated Distance Travelled: The total length of the route calculated based on GPS position markers.
- Journey Start / Finish:
  - Date & Time: Marks the exact time the journey began and ended.
  - Address: Indicates the GPS-based location at both the start and end of the journey.
  - Weather: Describes the weather conditions during the trip (e.g., “Heavy Rain”), which can affect signal quality and GPS accuracy.
  - Position Markers: The number of GPS points where data was logged.
  - Networks Found: A count of each cell found of a particular network technology. This helps show which technologies were available along the route.

Speed Summary

The speedometer-style gauge visualises the speed profile of the journey:

- Minimum Speed: The slowest recorded speed during the trip.
- Maximum Speed: The fastest speed reached.
- Average Speed: Displayed in the centre, showing the mean speed throughout the journey.

Coverage Data

A time-series line chart showing how coverage and GPS visibility varies over the course of the journey:

- X-Axis (Time): Timeline showing when data points were recorded
- Y-Axis:
  - Blue Line (Cellular Coverage Radius): Indicates the cell coverage area based on signal strength and quality. Fluctuations show areas with stronger or weaker mobile coverage.
  - Orange Line (Satellites Used): Represents the number of GPS satellites visible at each point in time. A higher number generally results in better location accuracy.

Coverage Summary

Box plots summarising the variation in two key datasets:

- Coverage Distance: Shows the variability in cellular coverage radius over the journey. A wider spread indicates inconsistent signal strength or frequent changes in coverage quality.
- Satellites Used: Represents the distribution of satellite counts during the journey. It helps in assessing the reliability of GPS tracking across different areas (e.g., fewer satellites might indicate signal blockage due to terrain or weather).

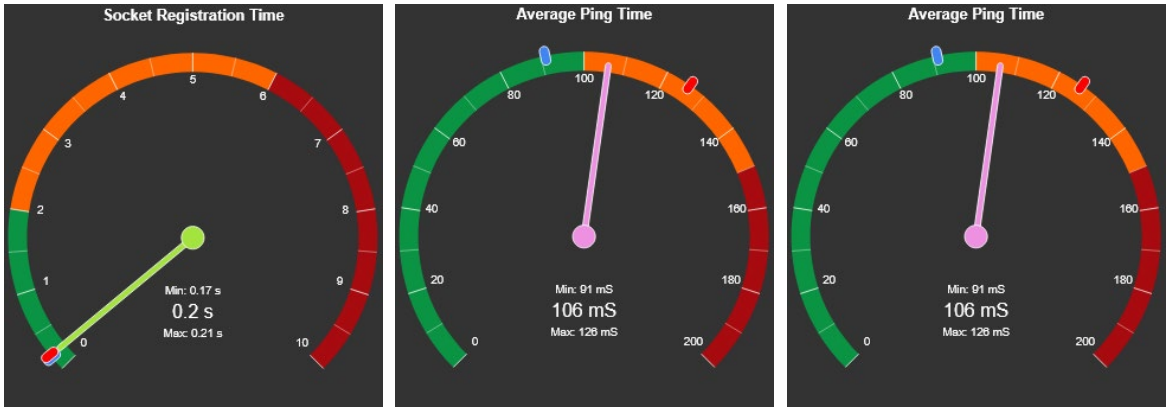
Performance Monitoring (SENTRY Exclusive)

Network Performance Monitoring is a survey feature exclusive to the SENTRY. It evaluates key metrics related to network connectivity, including:

- Signal Strength
- Registration Time (Cellular, TCP/IP, Socket)
- Ping Time
- Upload and Download Throughput

Each monitored metric is visually represented using dedicated gauge clusters, providing a clear and immediate view of network performance.

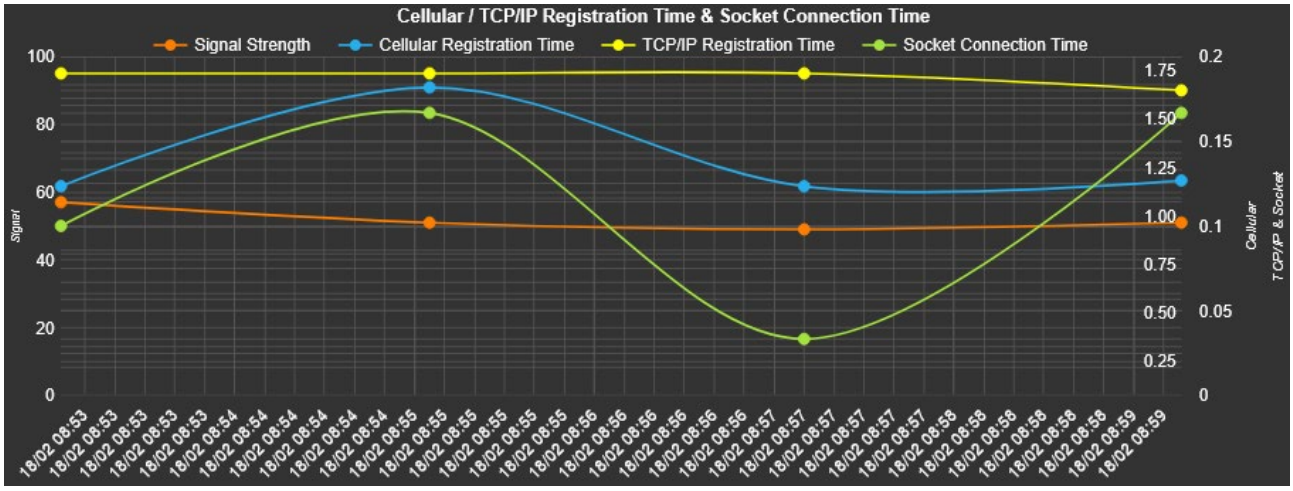
Note: The SENTRY measures network performance using the cell it is connected to at the time of each survey. It does not try to maintain or force connection to the same cell in subsequent surveys.



Registration and Connection Time

Four primary parameters are graphed over time for comprehensive analysis:

- Signal Strength (Yellow): Measured as a percentage of the maximum possible cellular signal. In practice, values above 25% are generally sufficient for reliable service. 100% is rarely observed under normal conditions.
- Cellular Registration Time (Blue): The time it takes the SENTRY to register to the network, enabling voice and SMS services.
- TCP/IP Registration Time (Orange): The time required to obtain an IP address from the network post-registration.
- Socket Connection Time (Green): The time to establish a connection to a remote IP address.

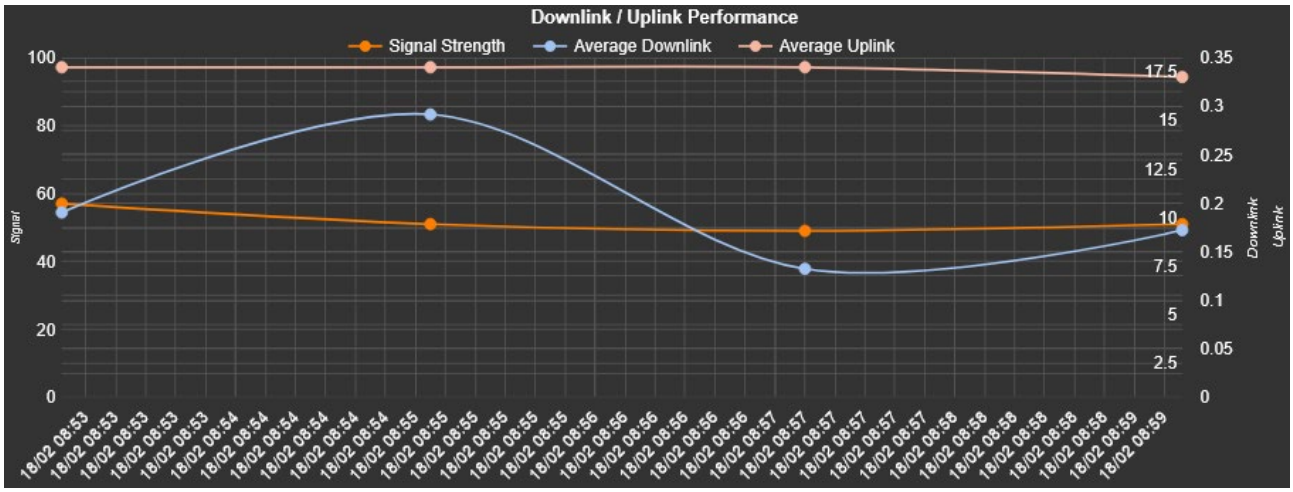


Upload/Download Performance

This evaluates the throughput capabilities of the network. The SENTRY connects to cloud-survey.co.uk to determine average upload and download speed. The SENTRY uses a LTE Cat 4 Modem, so the maximum theoretical speeds that can be achieved are:

Technology	Max Download	Max Upload
LTE	150 Mbps	50 Mbps
UMTS (HSPA+)	42 Mbps	5.76 Mbps
EDGE / GPRS	296 kbps	236.8 kbps

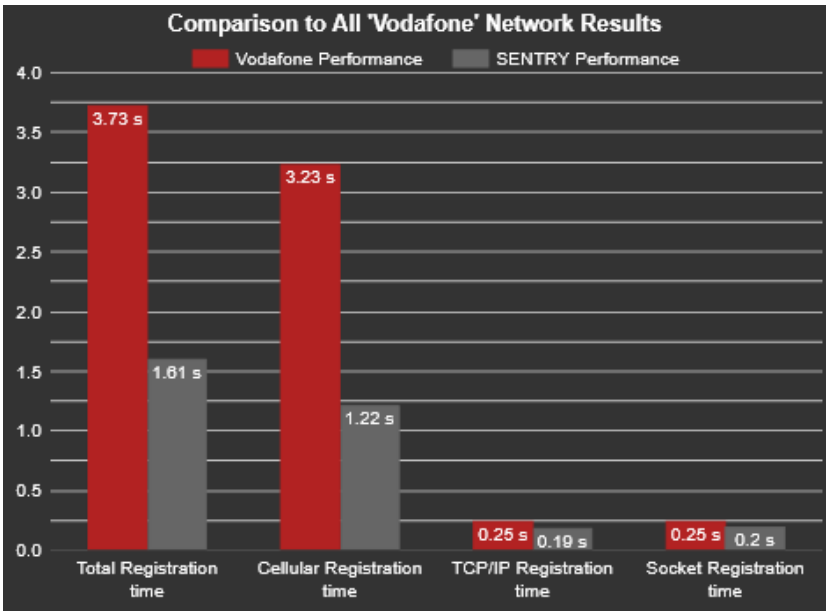
Note: Real-world values often fall below these theoretical maximums due to factors like network congestion, cell tower limitations, and signal interference.



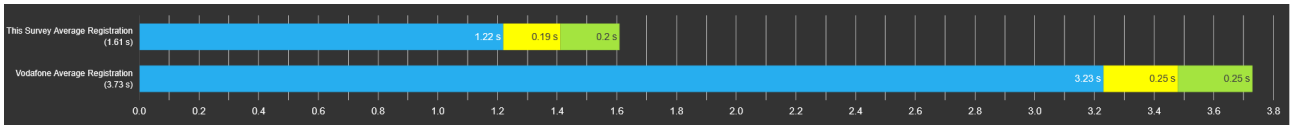
Comparative Network Performance

These charts provide a side-by-side comparison of performance metrics between the monitored network provider (Vodafone) and the SENTRY's survey results.

Comparative Network Performance



This visual comparison helps to assess how the current survey's performance aligns with or deviates from the provider's overall network averages. It highlights whether the current location experiences delays in any particular phase of the network registration process compared to typical Vodafone performance across other surveys.



Personal Information

The personal information stored in CloudSURVEY for the account owner is shown here. For new accounts, many fields may appear with a red background, indicating incomplete information. Any fields that are already populated were collected during the portal account registration process.

Please complete the Personal Information section if you wish to enable token purchases.

Token and Map Services

CloudSURVEY is free to use for core survey creation and upload. However, some features require tokens. Tokens contribute to the cost of providing the CloudSURVEY service, including hosted processing, secure cloud storage of survey data, database resources, and ongoing updates to mapping and cell placement information. Tokens can be obtained in two ways:

- Subscription – Premium and Premium Plus plans include a monthly allocation of tokens.
- Pay-as-you-go (PAYG) – Tokens can be purchased as needed via the CloudSURVEY portal.

Subscription

CloudSURVEY is free to use with core features available to all users. For those who require enhanced capabilities, we offer an optional subscription-based service with tiered plans to suit different levels of usage. Our subscription plans: Premium and Premium Plus, provide access to advanced features and a monthly supply of tokens. These plans are ideal for users who need more in-depth insights.

On subscription, premium tokens are automatically added to the account and will subsequently be added every month on the date of the initial purchase. For example, if you subscribed on the 13th of January, the tokens will refresh on the 13th of February and continue on the 13th of each following month. Any unused tokens will not roll over at the end of the month; instead, a new allocation will be made to the account.

Note: Users may still purchase additional tokens separately while using the subscription service. Non-premium tokens purchased this way behave as normal and will remain in the account beyond the end of the month.

Basic Subscription – Free

Get started at no cost with core platform access and essential features.

- Unlimited portal access
- Unlimited survey data storage
- CloudSURVEY mobile app device control
- Integrated map view
- Address geocoding
- Network carrier summary
- Survey dominance processing

Advanced features such as cell tower lookups are available on a token basis.

Premium Plan - £49.99 / Month (Billed Annually)

Includes everything in the basic plan, plus:

- Cell tower location relationship
- Accumulated cell towers
- Transmitting cell towers
- Location marker velocity colouring
- Survey email summary
- Cell tower location markers
- 150,000 cell tower lookups/month

Premium Plus Plan - £99.99 / Month (Billed Annually)

Includes everything in the premium plan, plus:

- 500,000 cell tower lookups/month

Premium Feature	Description
Cell tower location relationship	An accurate breakdown of all cell towers observed at specific position markers for surveyed data
Accumulated cell towers	At each position marker on a journey, you can see a breakdown of the accumulated cells for each cellular technology
Transmitting cell towers	Identify the specific cell used to transmit survey result data at each position marker
Location marker velocity colouring	Display coloured position markers to indicate your average journey velocity at a glance across your entire surveyed route
Survey email summary	Receive an email summary of your recently completed survey with automated reports send directly to your preferred email address
Cell tower location markers	Plot approximate cell tower locations directly onto your survey map and view signal heatmaps and dropout zones

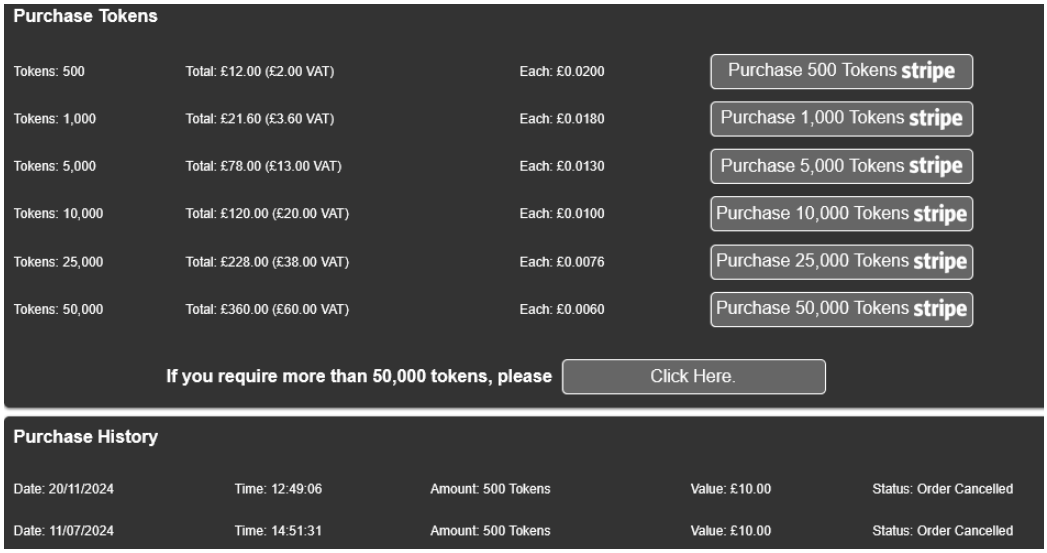
Purchasing Tokens

Tokens can be purchased to access pay-per-use features, which are included by default in Premium and Premium Plus subscription plans.

Important: You must complete and save your personal details in your account settings before purchasing tokens.

Select the quantity of tokens you wish to purchase. You will be redirected away from CloudSURVEY towards a payment page (not controlled by Siretta Ltd). The payment page accepts major credit and debit cards. Tokens will be added to the account, following a successful transaction.

Token purchases (whether completed or abandoned) are chronologically listed under purchase history.



About Siretta

Siretta is a wireless communications company located in Reading, United Kingdom manufacturing & supplying industrial IoT products since 1998.

Siretta's product portfolio is made up of:

» Antennas, plus their associated Cable Assemblies & Adapters,

» Cellular Network Analysers

» Industrial Modems

» Industrial Routers

» Associated Cloud Management

Siretta supplies products directly and via a worldwide network of distributors, into numerous markets and applications across the globe.

Siretta's distribution partners range from industrial IoT specialists through to global catalogue organisations.

Whether "off the shelf" or custom solutions are required, Siretta has a wide portfolio of products to fit many types of application.

Siretta's extensive knowledge and experience in the wireless market allows support of a wide range of customer applications, focusing on frequencies between 400 MHz to 6 GHz. These encompass modems, routers and antennas for:

» Cellular technologies: GSM / UMTS / LTE (including Cat M & NB) / 5G NR and other cellular technologies as they emerge.

» Global positioning: GPS/GNSS

» WLAN/Wi-Fi

Whilst providing the above products for the industrial cellular market, Siretta also has a number of antennas to cover applications for:

» Bluetooth, Zigbee, ISM band, LoRa and Sigfox

With a heavy emphasis on design, Siretta has a team of dedicated Engineers and Product Managers, who specialise in wireless applications.

Siretta continually makes significant investment in R&D endeavouring to provide customers with market leading, future-proofed, wireless solutions. Siretta works closely with many technology partners to stay at the forefront of industrial IOT.

Siretta

Enabling Industrial IoT

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