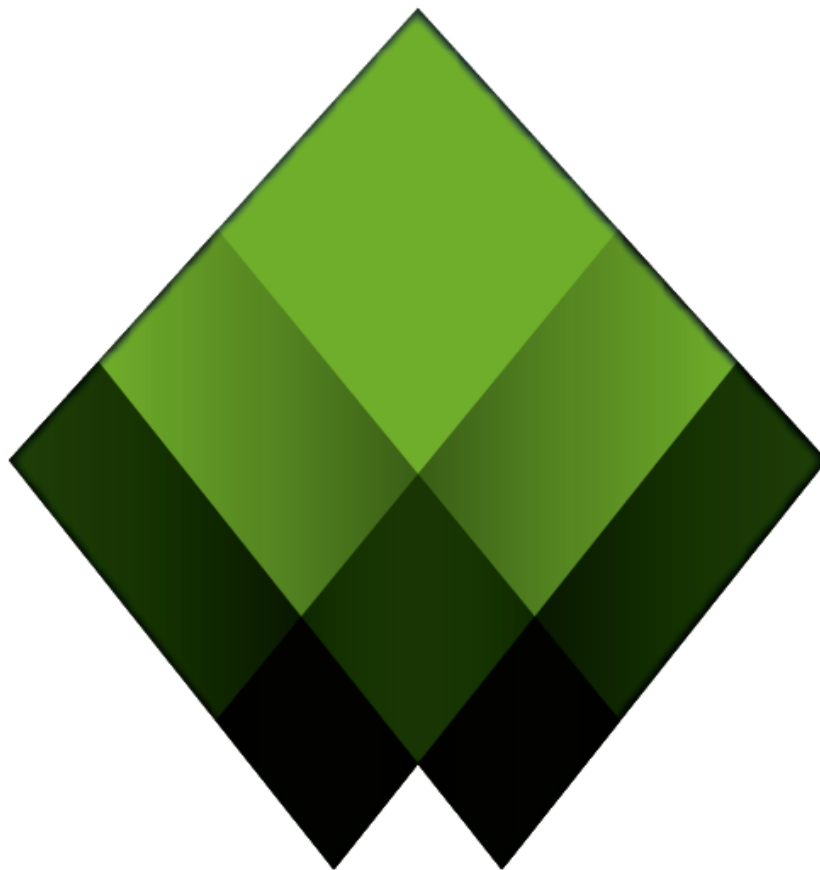


# Acrylic WiFi Heatmaps

Help

30/09/2016  
support@acrylicWiFi.com  
www.acrylicwifi.com



HEAT MAPS  
**ACRYLIC**  
WiFi



## Contenido

Project .....	5
Create a new project .....	5
Project details.....	5
Project structure .....	5
How to edit a project .....	7
Edit a project.....	8
Project details.....	8
Modify Project structure .....	8
Calibrate a blueprint .....	11
Assisted calibration .....	11
Manual calibration .....	12
Inventory .....	13
Right button mouse .....	13
Add or modify elements to the inventory .....	14
Survey .....	15
Access Points.....	15
Survey Mode .....	18
Additional Actions During a Site Survey.....	20
Passive Survey .....	21
Active Survey.....	23
How to perform an Active Survey .....	23
Configuration options .....	23
Plots .....	25
WiFi Quality.....	26
WiFi Quality Assessment .....	26
How to Evaluate Wi-Fi Quality Controls .....	26
Wi-Fi Quality Sections.....	26
Assesments Control list .....	28
Profiles.....	29
RSSI coverage .....	30

Simultaneous RSSI coverage ..... 31

Channel Overlap ..... 32

Co-Channel interference ..... 34

Latency ..... 35

Bandwidth ..... 37

Packet lost ..... 38

AccessPoint roaming ..... 39

Reports ..... 40

    Project Report Generation ..... 40

        How to Create a Report in 4 Simple Steps..... 40

        Report Type ..... 40

DocX..... 43

KMZ..... 47

RAW ..... 50

## Project

### Create a new project

Acrylic Wi-Fi Heatmaps saves all the collected data to a **project**.

To start a site survey, you need to create a new project or open an existing one.

### Project details

To create a new project, you need to enter some project identification information:

Project details

Name:	My new Project	
Description:	Description	
Client name:	Client	
Client Logo:	R:\floor.jpg	Remove

Field	Description
<b>Name</b>	Name under which the project will be saved. The name should be unique, meaning that two different projects cannot be saved under the same name.
<b>Description</b>	Project description as additional information.
<b>Client Name</b>	Name of the client or company for whom the work is performed. It will appear on the reports generated with the project. This information can be later edited from the project Edit section.
<b>Client Logo</b>	Logo or corporate image of the client to whom the work is performed. This image will be used on the front page of the reports generated on Acrylic Wi-Fi Heatmaps. It can be later changed from the project Edit section.

### Project structure

An Acrylic Wi-Fi Heatmaps site survey project has two main elements: **locations** and **scans**.

The scans result from site surveys and they are associated with a location.

Below are two simple examples of how to use and define locations

Example 1:

```

 Site Survey Project - XYZ Ltd. - Site survey at main offices
  Ground floor - Main floor
  Floor 1 - Office - Where the people works
  Floor 2 - Wharehouse - Where the company stuff is
  
```

A site survey is performed in a 3-story building.

For each floor, a single location is defined in the project.

The site surveys are performed on each floor within the corresponding locations.

So, we have 3 floors with one or more site surveys on each one. Therefore, the survey results and the generated reports are shown in a more consistent and structured manner

**Example 2:**

```

 USC Site survey - USC - USC University Campus
   North Campus
    Veterinary
    Medicine
   South Campus
    Computer Engineering
    Offices
  
```

A site survey is performed in a college campus, where both Northern and Southern campuses have two buildings each.

In this case, two main locations are generated, one for the Northern campus, and another one for the Southern campus.

Within each campus location, more locations are added to each building.

Depending on the surveyed building characteristics, it is possible to follow the approach described in the previous example and add a new location at each floor for every building, along with additional locations such as parking lots, parks, etc.

**Project structure**

Location

---

Name:

Description:

Blueprint:

- My New Project - Client - Description
  - Building A - Management Building
    - First Floor - Sales
    - Second Floor - Human Resources
  - Building B - Factory Building
    - Area A - Machinery
    - Area B - Locker rooms

Field	Description
<b>Name</b>	Name assigned to the location.
<b>Description</b>	Brief description of the location.
<b>Blueprint</b>	<p>Blueprint or plan of the location floor.</p> <p>This is optional, since you can work on satellite maps that are integrated in Acrylic Wi-Fi Heatmaps.</p> <p>If provided, you will be able to work on that blueprint during the whole site survey process.</p> <p>If a blueprint is added, it should be calibrated.</p> <p>Learn more on blueprint calibration using the help available for this process.</p>

## How to edit a project

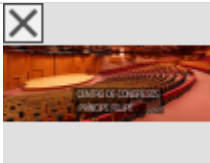
- 🔗 **Add:** To add a location within an existing one, select the main window and then add the new location. This location will be added as a child location of the selected location.
- 🔗 **Delete:** To delete a location, select it and while right clicking on it, press **Delete**
- 🔗 **Edit:** You will be able to edit a project and add new locations at any given time from the project window

## Edit a project

A project can be edited with the purpose of adding, modifying, and deleting the elements it contains.

**NOTE:** Changes to the project cannot be reverted. Please, make a back-up copy of the project if you are unsure of the changes.

## Project details

Field	Description
<b>File Name</b>	Name of the .prj extension file that contains the project.
<b>Project Name</b>	Name under which the project will be saved. The name should be unique, meaning that two different projects cannot be saved under the same name.
<b>Client Name</b>	Name of the client or company for whom the work is performed. It will appear on the reports generated with the project. This information can be later edited from the project Edit section.
<b>Creation Date</b>	Date in which the project was created.
<b>Description</b>	Project description as additional information.
	Logo or corporate image of the client to whom the work is performed. This image will be used on the front page of the reports generated on Acrylic Wi-Fi Heatmaps. It can be later changed from the project Edit section.

## Modify Project structure

You can add, modify, and delete locations, as well as delete scans from the project.

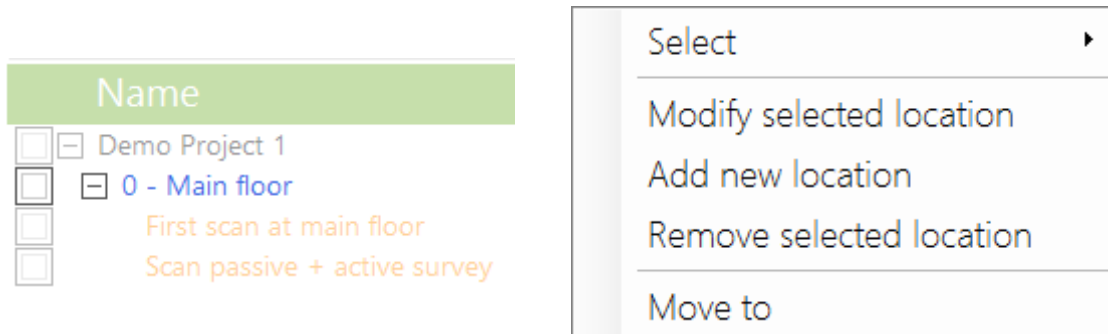
## Project



From the contextual menu, you can add new locations and modify project information.



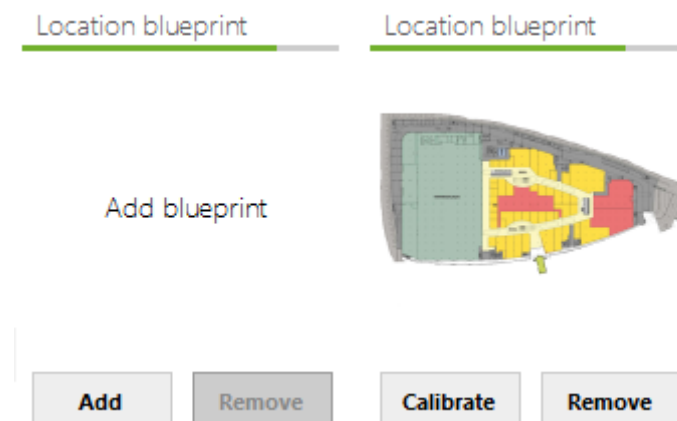
## Locations



From the Location contextual menu, you can modify the location parameters, add a new daughter location, delete it from the project, or move it as a daughter location to another location.

**NOTE:** If a location is deleted, all dependent locations and scans will also be deleted.

### Adding a Plan to a Location



After selecting the location to which the plan (*blueprint*) will be added, select the **Add** option.

Once a plan is added, it should be calibrated. Plan calibration is required in order for the plan to be used in site surveys.

If the plan is deleted, and if the location has site surveys on the plan, Acrylic Wi-Fi Heatmaps will not allow to delete the plan until the scans are deleted first.

## Scans



You can modify, delete or move a scan to a different location.

**NOTE:** Moving a scan to a different location can lead to inconsistencies if the measurements were performed on the original plan and this new location already has a different plan.

### Access points

Once a scan is selected, you will see at the bottom the access points detected during the site surveys.

From this view, you will be able to delete and inventory project elements.

**NOTE:** Once the elements are deleted, they can no longer be recovered.

## Calibrate a blueprint

Once a plan (*blueprint*) is selected and associated with a certain location, for it to be used over a map in a site survey, it is necessary to have it previously calibrated (in other words, to assign the image some physical properties to determine its actual size).

Acrylic Wi-Fi Heatmaps offers two different plan calibration methods: one consisting of measuring the distance between two selected points in the plan, and the other one consisting of overlaying the plan on a satellite map at the right position.

## Assisted calibration

To calibrate a plan using this method, you first need to know the actual spatial location of the building or structure represented in the plan.

It is recommended to use transparent background images (*PNG, etc.*) that hide irrelevant areas to make calibration easier and get more professional-looking results.

**IMPORTANT:** If the plan is calibrated using this method, you will be able to visualize both **Blueprint** and **Satellite** views, and the measurements on the plan will be georeferenced with latitude and longitude coordinates, which allows you to create a final report in KML format (*for more information about this report, please refer to the **Reports** section help*)

Use this method whenever possible

a) Assisted calibration



### Steps:

1. Locate the buildings and structures on the map.  
Navigate the map, using the zoom slider as required.  
If you need help in finding your location, you can use the search box in the upper part of the left hand panel.
2. Move the plan to the desired location, rotate and scale to adjust to the satellite map, and using the opacity slider (*transparency*), make sure the plan is in the right position.

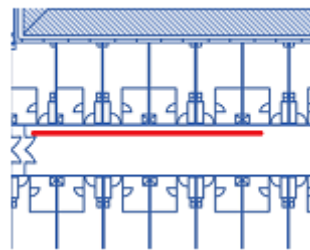
## Manual calibration

Manual calibration establishes the plan dimensions without providing spacial positioning. In other words, plan measurements are provided, but not its latitude and longitude coordinates.

This calibration method is recommended when latitude and longitude coordinates for the plan elements are unknown, or when determining the plan spacial position would be too complicated.

**IMPORTANT:** If the plan is calibrated using this method, you will be able to visualize only the **Blueprint** view, the use of **GPS** will not be supported, and KML format reports will not be available (for more information about this report, please refer to the **Reports** section help).

b) Manual calibration.



### Steps:

1. Identify in the plan an area where the distance between two points is known.
2. Select the first point.
3. Select the second point.
4. Indicate the distance and the length unit.
5. For plans calibrated using this method, site surveys are performed on **Blueprint** view, and do not support the use of **GPS** to establish the measuring points.
6. *Example case:* To perform the site surveys in the buildings, the best option is performing the surveys on the blueprint, and the manual calibration allows us to establish the actual scale of the blueprint.

## Inventory

In this section all devices which had been inventoried are listed.

When a device is inventoried, a friendly name is assigned to his MAC Address, so each time you use Acrylic Wi-Fi, this device appears identified with the assigned name instead of the MAC Address.

Inventory (4)

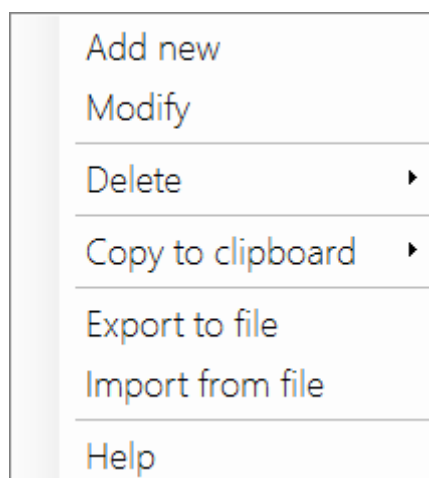
MAC Address	Name	Vendor	Description	Ssid
08:EA:44:27:9B:14	AP_GroundFloor	Aerohive Networks. Inc.	AP from ground floor of th	
08:EA:44:27:A0:94	AP_FirstFloor	Aerohive Networks. Inc.	AP of the First Floor: Office	
08:EA:44:27:A6:D4	AP_SecondFloor	Aerohive Networks. Inc.	AP of second floor	
08:EA:44:27:A9:D4	AP_Lobby	Aerohive Networks. Inc.	Access point Lobby	

?

OK

Column	What information gives?
Mac Address	Unique identifier assigned to network interfaces used as a network address (Media Access Control Address)
Name	Friendly name given to this device. This name will be displayed in Acrylic Wi-Fi instead of the MAC Address.
Vendor	Name of the manufacturer of the device. Non editable, is obtained automatically based on the MAC Address
Description	Description of the access point
SSID	Network name in case it can not be retrieved.

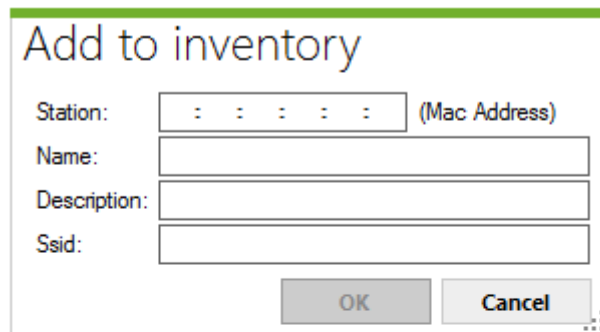
## Right button mouse



Contextual menu only available when pressing the right button on the inventory window

Contextual menu item	Function
Add new	Adds a new entry in the inventory
Modify	Allows to modify the information of an inventoried element
Delete	Removes an inventoried element
Copy to clipboard	Allows to copy inventoried elements information on the clipboard
Export to file	Allows to export inventory content to .csv file
Import from file	Allows to import inventory content from .csv file

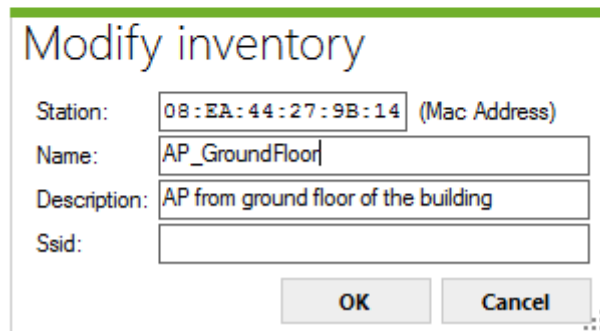
### Add or modify elements to the inventory



The 'Add to inventory' dialog box contains the following fields:

- Station:  (Mac Address)
- Name:
- Description:
- Ssid:

Buttons: OK, Cancel



The 'Modify inventory' dialog box contains the following fields:

- Station:  (Mac Address)
- Name:
- Description:
- Ssid:

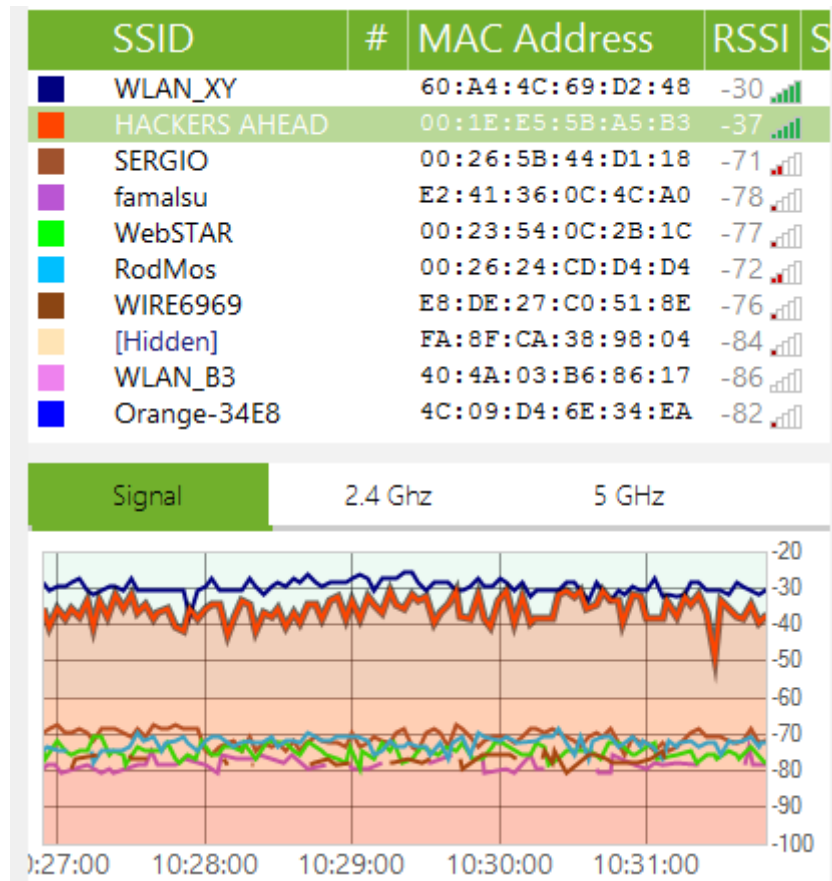
Buttons: OK, Cancel

The window to add or modify inventory items allows entering device data. In case of modifying, these fields will be filled with the current information to be edited.

## Survey

### Access Points

This section is displayed when a monitoring is being performed. It shows a general view of detected Wi-Fi devices.



Each device is represented by a row in the table, including information about it on each column, such as signal strength, signal-to-noise ratio, MAC, security options, etc. This view is very helpful if you want to get information about the state of Wi-Fi devices at a glance.

You can click on the colored checkbox to change the selected APs, which will change the view of the below tabs.

Column	What information gives?
SSID	Stands for: 'Service Set Identifier'. In other words: the network's name.  A network can hide its name, which will lead the software to show this

Column	What information gives?
	<p>field with the text '[Hidden]' on it. This text is configurable through the 'Configure' option menu.</p> <p>However, even when a network is not broadcasting its name, in monitor mode and in some cases it can be retrieved by inspecting and analyzing Wi-Fi traffic of connecting devices to that network. In case this is possible, Acrylic will show the name in red color, stating that it's a hidden network and that the name has been inferred by the software.</p>
#	<p>This is the number of devices that are connected to the network. If empty, no device has been detected as connected to the network. When performing a scan on 'Normal mode', this field will be automatically hidden. This is because on that mode Acrylic Wi-Fi can gather information only about access points, so no client device will be detected.</p>
Mac Address	<p>(Media Access Control Address) Unique identifier assigned to network interfaces used as a network address.</p> <p>This field can show a name instead of the address bytes in case the MAC Address has been previously inventoried.</p>
RSSI	<p>(Received Signal Strength Indication) Value measured in dBm indicating the strength of the received Wi-Fi signal, usually in the range of 0 to -100. The higher value the better signal strength.</p>
SNR	<p>(Signal-to-Noise Ratio) Ratio measured in dB used to compare the received signal and the background noise. The higher value the better. This field will be automatically hidden when performing a scan on 'Monitor mode'. This is because this information cannot be retrieved when capturing Wi-Fi traffic on this mode (unless using an Airpcap device).</p>
Chan	<p>Center frequency channel on which the network is operating. It can be shown as an addition of two numbers (such as: '1+5'), indicating that the network is operating on both channels (primary and secondary).</p>
Width	<p>This is the channel width measured in Mhz. Possible values are 20, 40, 80 and 160.</p>
802.11	<p>These are the communication standards that are supported by the access point on that network. Possible values are a combination of a,b,g,n,ac.</p>
Max rate	<p>The maximum transfer rate that is supported by the access point on that network, measured in Mb/s.</p>
Retries	<p>Percentage of packets that had to be retransmitted due to transmission errors. Between brackets are shown the total number of packets retransmitted.</p>
WEP	<p>Type of WEP security of the access point. If empty, the network doesn't support WEP. Possible values are 'SharedKey' and 'Open'</p>
WPA	<p>Type of WPA security of the access point. If empty, the network doesn't support WPA. Possible values are 'PSK' and 'MGT'.</p>
WPA2	<p>Type of WPA2 security of the access point. If empty, the network doesn't support WPA2. Possible values are 'PSK' and 'MGT'.</p>





Column	What information gives?
<b>WPS</b>	The supported WPS version of the access point. If empty, WPS is not supported. If WPS authentication is enabled appears in Green, in red otherwise.
<b>Vendor</b>	The name of the network interface manufacturer been used by the device.
<b>Data</b>	Amount of data packets sent by the device.
<b>Mgt</b>	Amount of management packets sent by the device.
<b>First</b>	Time when the device was detected for the first time.
<b>Last</b>	Time when the device was detected for the last time.
<b>Type</b>	Network type. Possible values are 'Infrastructure' and 'Adhoc'. This field only applies on access points.
<b>Latitude</b>	When running GPS, latitude is updated to the position where the device was detected for the last time.
<b>Longitude</b>	When running GPS, longitude is updated to the position where the device was detected for the last time.


### Additional options

By right-clicking over the "Access Points" module, contextual menu allows actions on selected APs or devices.



## Survey Mode

Acrylic Wi-Fi HeatMaps offers three different **site survey** modes.

Survey Mode	Description
 <p><b>Static Mode</b></p>	<p>This is the default measurement type, and it is recommended for specific or small area measurements.</p> <p>On this mode, the specific physical position can be selected on the satellite map or blueprint.</p> <p>Acrylic Wi-Fi HeatMaps performs a measurement and associates this data to the selected location.</p> <p>The application will identify each measurement point with sequential numbering. These points are joint by arrow lines so that the site survey path can be easily visualized.</p>
 <p><b>Continuous Mode</b></p>	<p>This type of site surveying is recommended for large outdoor and indoor areas when a GPS device is not available or GPS precision is not sufficiently accurate.</p> <p>On the plan (blueprint) or satellite map, select the location scan starting point and start walking straight at a constant pace until you have to change direction or you have reached your destination. From then on, you will have to start this procedure all over with a new location. Acrylic Wi-Fi Heatmaps will save all the measurements performed during the site survey.</p> <p>Interim measurement points scanned during the process will be identified with a different icon (●).</p> <p>Acrylic Wi-Fi HeatMaps will perform the measurements along the path, optimizing time and effort when it comes to covering large site surveying areas.</p> <p>Let's take a look at the following example: performing a site survey in a squared room.</p> <p>Position yourself at the room's entrance door, select your position on the blueprint and start walking straight at a steady pace until you reach one of the corners.</p> <p>Once you reach the corner, select the new point in the blueprint. Then start walking straight at a steady pace until you reach to the next corner, but this time you won't have to stop when you get there: when it is time to change direction, simply select the new point on the blueprint without stopping.</p>

Survey Mode	Description
	<p>Repeat the procedure until you reach the room's door.</p> <p>This way, we can quickly perform site surveys on large areas, and in this case, cover the perimeter of a squared room with just 4 clicks, no matter how big the room is.</p>
 <p><b>GPS Mode</b></p>	<p>This type of measuring is recommended to cover large outdoor areas. A GPS device should be previously configured and connected.</p> <p>During a site survey performed on GPS mode activated, measurement points will be automatically generated over the captured GPS coordinates.</p> <p>This is an automatic mode, and once a site survey is started, Acrylic Wi-Fi HeatMaps monitoring will capture the GPS positions and it will georeference the networks' measurements.</p> <p>If your GPS device is not yet configured, a pop-up window will prompt you to configure it and start it.</p> <p>Acrylic Wi-Fi HeatMaps supports GPS NMEA, and communicates with these devices via serial port.</p> <p>USB GPS devices create a serial port by which GPS data can be read. Please, review the serial port configuration parameters in the GPS device user's manual.</p> <p>Another way of providing Acrylic Wi-Fi HeatMaps with GPS coordinates is via bluetooth, also connecting to a serial port.</p> <p>Smartphones with GPS can share GPS positioning through a bluetooth connection. Check the app store in your device to find a suitable application for this use.</p>









## Additional Actions During a Site Survey




Button	Description
 Undo	<p>By clicking on the undo button, you can delete your most recently saved survey point.</p> <p>This button will be disabled if there are no survey points with measurements. In case you are performing a continuous site survey, the most recently saved point, along with all interim points between this point and the previously saved one, will be deleted.</p> <p>After deleting the point, the site survey mode will switch to Static Mode.</p>
 Pause	<p>By clicking the Pause button, monitoring can be temporarily paused. Data collected on pause will not be saved.</p> <p>This action is particularly helpful when you are performing a site survey on <b>Continuous Mode</b>.</p> <p><b>IMPORTANT:</b> If you pause monitoring while on Continuous Mode, you will be required to re-select the Continuous Mode to resume the process at a new measurement point.</p>

At the bottom of the screen, you will see charts indicating the values collected in real-time.

## Passive Survey

These plots allow you to visualize different passive measurements (no intervention with the wireless mean) collected during a site survey.

Plot type	Description
 <p>RSSI</p>	<p>Heatmap representing RSSI or 'Received Signal Strength Indication' in the site survey area.</p> <p>RSSI values range from 0dBm (better) to -100dBm (worst). Usual values range from -40 to -70.</p>
 <p>AP Coverage</p>	<p>This plot shows the best coverage AP for each area.</p>
 <p>Channel Coverage</p>	<p>This plot represents the channel received with the strongest signal for each point.</p>
 <p>Data Rates</p>	<p>This plot represents the transmission rate supported by the AP's with the better coverage for each point.</p>
 <p>Cell Density</p>	<p>This plot represents device density for the selected AP's.</p> <p><b>NOTE:</b> Only available if the site survey is performed on <b>Monitor Mode</b> or using an <b>Airpcap</b> device.</p>
 <p>Number of AP's</p>	<p>This plot represents the number of AP's that can be detected at one single point. This plot is independent from channel overlapping, so a high density may be beneficial as long as the overlapping is low.</p>
 <p>Retry rate</p>	<p>This plot represents the retry rate detected during the traffic analysis performed on passive mode.</p> <p>It is a percentage, ranging from 0 to 100. Values over 10% are considered to have a negative impact on network performance.</p> <p><b>NOTE:</b> Only available if the site survey is performed on <b>Monitor Mode</b> or using an <b>Airpcap</b> device.</p>
 <p>Channel Overlapping</p>	<p>It indicates the overlapping level at each point for the selected AP's. Overlapping is detected whenever a different AP is operating on an adjacent channel, <i>causing transmission frequencies to overlap</i>, and the signal strength differential is lower than 20dBm.</p> <p>The higher the number of interfering devices, the lower the network performance.</p> <p>Ideally, there should be no overlapping.</p>

Plot type	Description
 <b>Detailed Grid</b>	<p>This plot displays gross data grouped by cell. This way, actual data can be visualized by segmenting the area. The user can select the data to be displayed from the pull-down 'Plot Options' panel.</p>
 <b>SNR</b>	<p>This plot displays SNR (Signal-to-Noise Ratio) values.</p> <p>SNR is a good parameter to measure communication quality, since it considers signal strength and noise in the wireless medium.</p> <p>Its value ranges from 0 (worst) to 100 (best).</p> <p>Acceptable values are 60 or higher.</p> <p><b>NOTE:</b> This option is only available for site surveys performed with an <b>Airpcap</b> device.</p>
 <b>RF Spectrum</b>	<p>Displays the 2.4 and 5GHz band radio emissions used in Wi-Fi communications</p> <p>Represents the information collected from radioelectrical medium for the 2.4 and 5Ghz frequency bands.</p> <p>Wireless transmissions operate on one of these bands, according to the 802.11 communication standard being implemented.</p> <p>For each band, an access point operates in a frequency subset.</p> <p>Depending on the access point configuration, and the 802.11 standard revision, networks can operate in frequency bandwidths of 20, 40, 80, or even 160 Mhz.</p> <p>RF values range from 0dBm to -100dBm.</p> <p><b>NOTE:</b> This option is only available for site surveys which have been performed using a compatible spectrum analyzer.</p>

## Active Survey

### How to perform an Active Survey

During an **Active Survey**, besides performing measurements of the wireless medium without interacting with it, (*Passive Survey*), you can also perform active measurements by connecting to the network that is being analyzed.

Data packets are sent and received to obtain actual measurements of bandwidth, packet loss rate, and roaming.

#### Requirements to perform an Active Survey

- **Two** wireless network cards. One of them will be used for the **Passive Survey**, while the other one will be used for the **Active Survey**.
- The wireless card selected on the menu will be used for the **Passive Survey**, so it should not be connected to any network. It will only be used to perform measurements without interacting with the wireless medium.
- The second wireless card will should be connected to the network to be analyzed.
- The **Active Survey** parameters should be configured, and the option in the menu should be activated.

### Configuration options

Option	Description
Bandwidth	<p>This option is configured if bandwidth measurements will be performed. In case this option is activated, the user will have to choose the preferred measuring method. There are two options to choose from:</p> <ul style="list-style-type: none"> <li>• <b>Iperf:</b> <i>This is the recommended option.</i> Iperf is a free software that only performs bandwidth and latency measurements. This software can be found in the Acrylic Wi-Fi Heatmaps installation software.</li> </ul> <p>To use this method, the software should run in a server in the local corporate network, which should be accessible via Wi-Fi connection.</p> <p>The software can be run on server mode using the <code>'iperf -s -p'</code> command. Then, the server IP address should be included in the Active Survey configuration (in the <i>Server</i> textbox), along with the selected port.</p> <p>Once the site survey is initiated, Acrylic Wi-Fi Heatmaps will connect to this service and will perform the bandwidth measurements.</p>





Option	Description
	<p>It is important to have the server connected to a network with no delays and fluctuations that could negatively impact the measurements.</p> <ul style="list-style-type: none"> <li> <b>File Download:</b> With this procedure, a file is downloaded through a standard protocol like HTTP or FTP. <i>This method is not recommended, since it would produce less accurate results than the first one.</i> </li> </ul> <p>Acrylic Wi-Fi Heatmaps will use these downloads to perform measurements.</p> <p>Once the downloads are finished, the software will restart automatically. It is recommended to use a large size file (&gt;500MB).</p> <p>To configure this option, a valid URL should be specified, such as,  <a href="http://www.software.com/big_file.dat">http://www.software.com/big_file.dat</a> or  <a href="ftp://ftp.software.com/pub/file">ftp://ftp.software.com/pub/file</a></p>
<p><b>Latency</b></p>	<p>If latency measurement is enabled, the user will have to configure a host to respond to PING requests.</p> <p>Normally, the Wi-Fi connection gateway IP address (<i>to which the second wireless card used in the Active Survey will be connected</i>) is used.</p>
<p><b>Scale Bounds</b></p>	<p>This options are exclusively used for representing the <b>Active Survey</b> results in the <b>Survey</b> section and the site survey reports.</p> <p>Since bandwidth and latency data can have wide data ranges, these parameters can be easily adjusted to the data obtained from the site survey.</p>



## Plots

**Active Survey** graphics or *plots* represent the information collected during a site survey on **Active Survey** mode, interacting with a remote server in order to obtain actual, real-world wireless network performance parameters and measurements.

**NOTE:** These graphics (*plots*) are only available if the surveyed location scans have been performed with the **Active Survey** mode enabled.

Plot Type	Description
 <b>Bandwidth</b>	<p>Represents bandwidth in Kbps at each on of the points of the area covered by the site survey.</p> <p>The larger the bandwidth, the better.</p>
 <b>Latency</b>	<p>Represents packet latency in ms.</p> <p>Latency is the time it takes for a packet to travel to its destination and back.</p> <p>The shorter the time interval, the better the latency. Values over 10ms might indicate network problems.</p>
 <b>Packet Loss</b>	<p>Represents packet loss rate. It is the percentage of packets that are lost (<i>that do not arrive to their destination</i>) at the time of establishing a communication and that are <i>normally</i> re-transmitted.</p> <p>The lower the packet loss rate, the better the communication. Normally, healthy networks experience packet loss rates of less than 10%.</p>
 <b>AP Roaming</b>	<p>When moving along the coverage area, devices are expected to maintain communication by connecting to different access points within the network, keeping a high quality communication while preventing performance degradation. This service is called '<b>Roaming</b>'.</p> <p>Roaming helps extend connectivity throughout the entire coverage area to prevent blind stops.</p>

## WiFi Quality

### WiFi Quality Assessment

A Wi-Fi Quality Assessment allows the user to visualize actual wireless infrastructure status, providing an overview of the network status based on quality parameters. The **Wi-Fi Quality Assessments** controls can generate two-color graphics, displaying those areas where minimum requirements are met in green, while non compliant areas in shown in red. Configuration parameters for each control are stored in **Profiles**, and these can be reviewed, configured or created from the **Preferences** main menu, under the **Wi-Fi Quality** section.

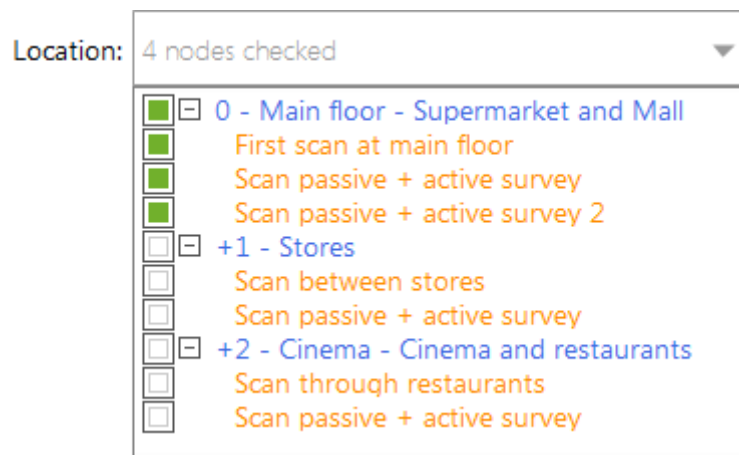
### How to Evaluate Wi-Fi Quality Controls

#### Steps:

1. Select the scans over which the access points will be listed.
2. Select the access points on which the controls will be applied.
3. Click on the control you want to visualize on the satellite map or blueprint.

### Wi-Fi Quality Sections

#### Location



This is a pull-down panel that displays the list of locations and scans. Here you can select the locations and the scans over which the Wi-Fi Quality controls will be applied. Note that the controls are applied to a single location. Therefore, you can only select scans from the same location.

### Access Points

SSID	#	Mac Address
<input type="checkbox"/> + Lois	1	
<input type="checkbox"/> + Pans&Company	1	
<input type="checkbox"/> + AsCancelas	25	
<input type="checkbox"/> + Carrefour-Conecta	10	
<input type="checkbox"/> + O CODICE	1	
<input type="checkbox"/> + SMOOY WIFI	1	
<input type="checkbox"/> + IMAGINARIUM	1	
<input type="checkbox"/> + Internacional	1	
<input type="checkbox"/> + Tenda R	1	
<input type="checkbox"/> + Lois 2	1	
<input type="checkbox"/> + Brasaylena	1	

List of Access Points recognized in the different selected scans. Wi-Fi Quality controls will be applied over those selected ones.

### Assesment controls

Assessment controls	%	Quality	
RSSI coverage	87%	Poor	?
Simultaneous RSSI coverage	59%	Bad	?
Channel Overlap	94%	Good	?
Co-Channel interference	96%	VeryGood	?
Latency	100%	Excellent	?
Bandwidth	0%	Bad	?
Packet lost	100%	Excellent	?
AccessPoint roaming	100%	Excellent	?

List of quality controls that will be applied on the access points. By selecting each one of them, you will be able to visualize those areas that have (or have not) passed the controls.

Assesment Controls	Control Name
%	<p>It indicates, as a percentage, the area covered by the site survey that meets the predefined requirements for each control. Control parameters can be configured by editing the control's <b>Profile</b>.</p> <p><i>Example:</i> If a control has a RSSI minimum threshold of -75, the area with a RSSI equal or higher than -75 will be displayed in green, and the area with a RSSI lower than -75 will be displayed in red.</p>
Quality	<p>It displays the quality resulting from applying the control requirements to the selected wireless network, as a percentage of the complying area.</p>

Assesment Controls	Control Name	
	Values	Description
	<b>Excellent</b>	100% of the area covered by the site survey meets the control requirements.
	<b>Very Good</b>	95-99% of the area covered by the site survey meets the control requirements.
	<b>Good</b>	90-94% of the area covered by the site survey meets the control requirements.
	<b>Poor</b>	75-89% of the area covered by the site survey meets the control requirements.
	<b>Bad</b>	0-74% of the area covered by the site survey meets the control requirements.
	<b>N/A</b>	The control cannot be applied over the selected access points.

### Assesments Control list

Summary of all available controls. For more details, refer to the Help entry available for each one of them by clicking on the question mark ('?') button.

Assesment Controls	Description	Required Site survey
<b>RSSI coverage</b>	It verifies that the RSSI thresholds are met within the site survey coverage area.	<b>Passive</b>
<b>Simultaneous RSSI coverage</b>	It verifies that the RSSI thresholds are met within the site survey coverage area. Additionally, it verifies there are enough access points to ensure a reliable communication as defined in the control's <b>profile</b> .	<b>Passive</b>
<b>Channel Overlapping</b>	It verifies that there are no interference caused by an adjacent channel within the site survey area.	<b>Passive</b>
<b>Co-Channel Interference</b>	It verifies that there are no co-channel interference within the site survey area.	<b>Passive</b>
<b>Latency</b>	It indicates if the latency of the connection established during the active sit survey is within the predetermined thresholds in the control's configuration.	<b>Active</b>
<b>Bandwidth</b>	It verifies that the bandwidth in the site survey area meets the requirements specified in the selected profile.	<b>Active</b>
<b>Packet Loss</b>	It verifies that the packet loss rate is not higher than the threshold established in the configuration.	<b>Active</b>

Assesment Controls	Description	Required Site survey
Access Point Roaming	It indicates if the roaming service has worked correctly during the active site survey.	Active

## Profiles

Profile:  ▼

- Default
- VoIP

By default, Acrylic Wi-Fi Heatmaps provides two threshold configurations and parameters for each one of the Wi-Fi Quality controls. These parameter groups are shown within the control **Profiles**

### Default Profiles

Profile	Description
Default	Standard configuration that the wireless network should keep to ensure service to all wireless client devices.
VoIP	This is the most important network configuration to guarantee the necessary service quality required for voice communication through the wireless network.

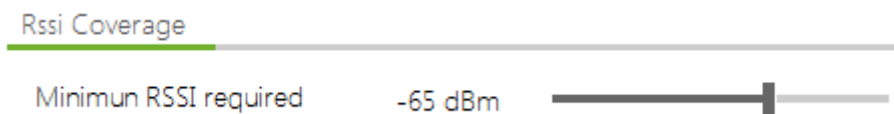
## RSSI coverage

The **Rssi Coverage** control displays those areas where the signal strength received from any of the selected access points falls below the selected threshold value.

Signal strength has a significant impact on the quality of communications. Signal strength is measured in dBm, and ranges from 0 dBm (stronger) to -100 dBm (weaker).

Acceptable values range from 0 -75 dBm. Proper communication cannot be guaranteed with lower signal strength values.

This control displays those areas where **Rssi Coverage** requirements are met in green, and those non compliant areas in red.



Minimum required values depend on the selected profile.

Normally, at least a -65dBm signal strength is required.

These values can be configured in the **Configure** menu under the **Wi-Fi Quality** section.

## Simultaneous RSSI coverage

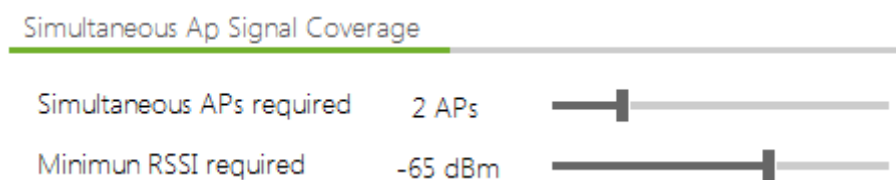
The **Simultaneous AP Coverage** control displays those areas where signal strength received by any of the network access points is equal or lower than the predetermined threshold value.

To ensure dependable wireless communications, it is necessary, under certain circumstances, that all the points in the coverage area can access a certain number of access points within the network infrastructure, preventing channel overlapping, with at least a minimum signal strength.

These two parameters depend on the type of infrastructure being analyzed and they can be configured in the profile.

For example, VoFi (Voice over Wi-Fi) service would typically require communication with two access points with at least -65dBm signal strength.

Those areas within the surveyed site meeting these requirements are displayed in green. Those non-compliant areas are shown in red.



Minimum required values depend on the selected profile.

Normally, having 2 access points capable of providing access simultaneously with at least a -65dBm signal strength is required.

These values can be configured in the **Configure** menu under the **Wi-Fi Quality** section.

## Channel Overlap

The **Channel Overlapping** control shows those areas where adjacent interference requirements are met.

An AP is considered to have an adjacent interference when some of its transmitted frequencies overlap with another AP transmitting on a different channel over the same band.

In other words, if our access point is operating on channel 1 over the 2.4Ghz band, and we have another access point transmitting on channel 2 over the same 2.4Ghz band, this one could be interfering and degrading the communication quality of our wireless network.

These interferences not only depend on the selected channel, but also channel bandwidth.

Communications can be transmitted over the 2.4Ghz frequency band (802.11 b/g/n) with a channel bandwidth ranging from 20 to 40Mhz.

Over the 5Ghz band (802.11 a/n/ac/ad), 20, 40, 80, and 160Mhz channel bandwidth can be used.

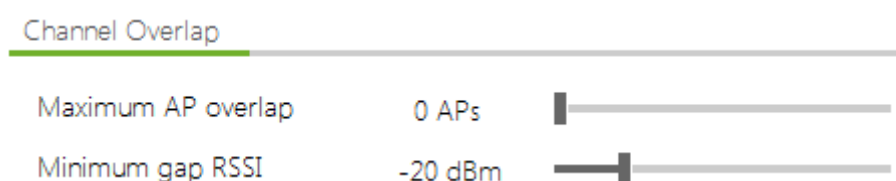
Besides frequency and bandwidth, these interferences also depend on the overlapping level existing between two signals (*that is to say, the signal strength from the interfering AP*).

If there is enough intensity differential (*in case the signal transmitted by our access point is received with higher intensity*), then the communications will not be impacted by an adjacent interference.

A difference of at least 20dBmin in signal intensity is enough to prevent network performance degradation.

For example, if we have a wireless network operating on channel 1 and it is received with a signal strength of -65dBm at a certain area, and there is another access point operating on channel 2 that is received with a signal strength of -50dBm at the same location, network performance will actually be degraded by overlapping, since there is 15dBm differential.

This control displays in green those areas where **Channel Overlapping** requirements are met, and in red those non-compliant areas.





The required values for this control will depend on the selected profile.

A surveyed AP is usually required to exceed all other potentially overlapping transmissions by at least 20dBm.

Ideally, the number of interfering AP transmissions should be 0.

These values can be configured from the **Configure** menu option under the **Wi-Fi Quality** section.

## Co-Channel interference

The **Co Channel** control displays those areas where the co-channel interference requirements are met.

An AP is considered to have a co-channel interference when there is another AP transmitting on the same channel.

The IEEE802.11 standard takes this situation into consideration.

This type of interference results from two or more AP's sharing the same radioelectric spectrum and taking turns while only one of them is able to transmit at a time.

These interferences downgrade communications quality when it comes to consider wireless medium availability before transmitting. While an AP is transmitting, the other AP's on the same channel have to wait for their turn. This causes transmission delays among the access points operating on the same frequency.

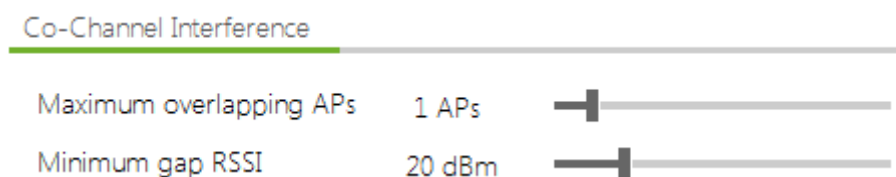
For example, if an office has 3 access points transmitting on channel 1 over the 2.4Ghz frequency, and it also has 3 clients, one for each access point, then the transmission time for each access point will triple, at best. In other words, communications performance will be severely downgraded.

Besides same-channel operation, these interferences are also affected by the overlapping signal strength.

In case of high signal strength differential (*in other words, the AP signal is significantly stronger than the interference*), then the communication will not be negatively affected by a co-channel interference.

A 20dBm signal strength differential is high enough to prevent network communications downgrade due to interference.

This control displays in green those areas where **Co Channel** requirements are met, and in red those non-compliant areas.



The required values for this control will depend on the selected profile.

Usually, surveyed AP's are required to exceed overlapping same-channel transmissions by at least 20dBm. Normally, the number of allowed co-channel interferences is limited to 1.

These values can be configured on the **Configure** menu option under the **Wi-Fi Quality** section.

## Latency

The **Latency** control displays those areas where minimum latency requirements are met.

Latency is the time it takes for a packet to travel to its destination and back. In this case, it is the sum of the times it takes a data packet to be sent and received through the wireless medium.

Let's take a look at the following example. Imagine that we want to communicate with someone in another continent. Data packets will then have to go through a series of devices, and they would even be re-transmitted through wireless networks, causing a transmission delay known as latency.

Latency must not be mistaken by bandwidth, since you can have long latency times while having good bandwidth, which is the amount of data sent and received per unit of time.

For example, in rural areas where no cable Internet is available, satellite Internet services are used. These *satellite Internet* services usually offer good transfer rates (bandwidth), but they have a certain delay in establishing data communication (*when we query a web page using a web browser, packet transfer or the request to establish connection with the server where the web page is hosted on, usually experiences a delay, because the data is transmitted to the satellite in the stratosphere and then it is sent back to the satellite service client on the surface of the Earth, plus the normal delay of the Internet*), but once established, data packet transfer rate (*bandwidth*) can reach high values, as in cable Internet connections. For these types of communications, normal values range from 500ms or over.

Acceptable latency values range from 1 to 10ms.

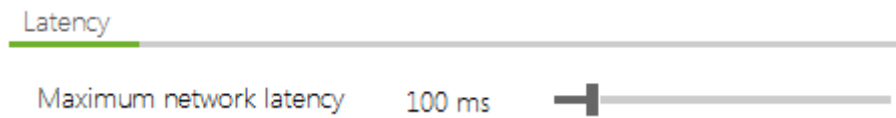
For VoFi (*Voice over Wi-Fi*) communications, keeping latency values low is important. During a voice communication, data is transmitted in a large amount of small-sized packets, each containing a small portion of the audio being transmitted. The reason behind this is that when a packet does not reach its destination, the amount of audio lost is minimum and the communication can still be fluid. As we previously mentioned, if a data packet takes too long in reaching its destination, (*high latency values*), these small audio portions will, therefore, take too long to be delivered, and if we also consider that data packets will be transmitted through a wireless medium where data packet loss is inherently high, this will result in a deficient voice communication. As in our satellite Internet example, we would experience a delay in data packet transmission, which would probably prevent a fluid voice communication.

In order to visualize latency, a site survey should be performed with the **Active Survey** option activated.

When the **Active Survey** option is enabled, bandwidth and latency measurements are taken during a passive site survey.

This information is processed to display those areas where the control requirements set up in the selected profile are met.

This control displays in green those areas where **Latency** requirements are met, and in red those non-compliant areas.



The required values for this control will depend on the selected profile.

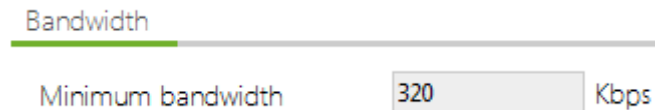
This value can be configured from the **Configure** menu in the **Wi-Fi Quality** section.

## Bandwidth

The **Bandwidth** control ensures that minimum bandwidth quality requirements for the connection established by the active survey are met throughout the coverage area.

This control displays in green those areas where **bandwidth** quality minimum requirements are met, and in red those non-compliant areas.

This control is only available when the **Active Survey** option is enabled during a site survey.



The minimum bandwidth quality value is determined by the selected profile.

This value can be configured from the **Configure** menu in the **Wi-Fi Quality** section.

## Packet lost

The **Packet Loss** control displays those areas where minimum packet loss requirements are met.

The packet loss rate is the percentage of packets that are lost, in other words, *that do not reach their destination* at the time of establishing communication, and that are *usually* retransmitted.

Packet loss has a negative impact on network performance. When a packet does not reach its destination, packet retransmission is usually requested by the recipient to keep communication flowing normally.

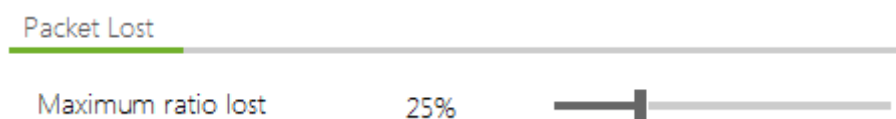
Here is a simple example: we have an image file that is broken in 4 data packets to be sequentially transmitted; first the packet #1, then the packet #2, then the packet #3 and finally the packet #4. Once all the packets have arrived to their destinations, the original image file can be recomposed. If during the transmission process packets #1, #2, and #4 successfully arrive to their destination, but packet #2 is missing due to *communication problems such as noise or interference*, the recipient will request that missing packet to be sent once again. Consequently, this interruption in the normal communication flow has multiplied the time required to send packet #2 by 4. Continuous packet loss has a negative impact on network performance.

Packet loss rates of under 10% are acceptable and will have a negligible impact on network performance in most cases.

To visualize packet loss percentage, the site survey should be performed with the **Active Survey** option activated.

Using this information, it is possible to calculate packet loss rate at each location.

This control displays in green those areas where **Latency** requirements are met, and in red those non-compliant areas.



The required values for this control will depend on the selected profile.

This value can be configured from the **Configure** menu in the **Wi-Fi Quality** section.

## AccessPoint roaming

The **Roaming** control shows those areas where **Roaming** is required by extending network coverage through many different access points.

In a wireless infrastructure, multiple access points are deployed to provide coverage throughout the desired area.

Roaming allows moving devices to maintain wireless communication by connecting to new access points within the same network to maintain the quality of communication and prevent degradation of signal strength. This service is called '**Roaming**'.

An example of Roaming can be seen at a hotel, where a device, after connecting to the building wireless network, would normally maintain uninterrupted communication while navigating over different floors.

To visualize **Roaming** performance, the **Active Survey** option should be enabled during a site survey.

This option displays those areas where Roaming was successfully maintained by keeping devices connected to the wireless network.

### Access Point Roaming

---

No configuration available

This control requires no parameter configuration.

In case of Roaming, connectivity is either maintained or lost.

## Reports

### Project Report Generation

Acrylic Wi-Fi Heatmaps can generate reports in three different editable formats, so they can be adapted or modified according to the user's needs.

### How to Create a Report in 4 Simple Steps

1. Select one of the three available report formats:
  - Executive
  - Standard
  - Complete
2. Select the locations and scans that will be included in the report.
3. Select the access points that will be included in the report.
4. Select the language, the output folder, if necessary, and then click on **Generate**.

**NOTE:** If you get a message saying that the generated report file size is too large (*this is due to documents having a large number of pages and large image files which are less practical to handle*), the report can still be generated, but the following alternatives are recommended:

- Select less locations and generate one report per location.
- Select less access points and generate one report per network.

Report generation options are detailed as follows:

### Report Type

Report Type

Standard	▼
Executive	
Standard	
Complete	

Reports based on detail level according to intended use are categorized under three different types:

Report sections and contained information are configured when selecting one of the three report types from the pull-down menu.

These are default configurations. You can modify the report content by manually editing these default options.



## Report Detail Levels

Report Type	Description
<p><b>Executive</b></p>	<p>Report that includes <i>site survey</i> project results.</p> <p>It explains in a simple, straightforward way how the survey has been performed, which <i>Access Points</i> have been analyzed, and what were the results after applying <i>Wi-Fi Quality</i> controls that indicate whether the network meets the predefined requirements.</p> <p>This is a non technical type of report that only shows the project's results through charts and tables, with no technical details. By default, an editable text report is generated.</p>
<p><b>Standard</b></p>	<p>A more comprehensive report including the information contained in the <b>Executive</b> report, along with all the plots available for the performed site surveys.</p> <p>Since this is a more thorough and technical report, it is the right option when you need the site survey results beyond just the details on the work performed, and when you need further information to support the results.</p> <p>Besides the explanation of the project results, you will get a report full of heatmaps and plots to provide more detailed technical results.</p> <p>By selecting this option, you will get an editable text report, along with a KML/KMZ format report (Keyhole Markup Language) that is used to represent geographical information, and can be opened using a GIS (Geographic Information System) tool.</p>
<p><b>Complete</b></p>	<p>A complete report combines the information included in <b>Executive</b> and <b>Standard</b> reports, and it also contains detailed graphics for every access point on each one of the plot types.</p> <p>This report is highly technical and offers a great number of graphics for each wireless network. This is also an extensive report that can be useful to evaluate or justify the performed work, and to analyze each access point individually.</p> <p>Along with the global graphic, detailed graphics included in this type of reports allow you to visualize parameters and graphics individually for a detailed <i>Access Point</i> based analysis.</p> <p>An editable text report is provided, as well as a KML format report with all the extended information.</p>

## Different Report Formats

Report Type.	Description
Document	<p>This report creates a .docx file (Office Open XML, also known as OOXML, or OpenXML), a standard open source file format. These files can be easily opened and edited using several commercial and free office suites.</p> <p>For more details on these types of documents, refer to the help available by clicking on the question mark ('?') icon in the report selector.</p>
KMZ	<p><b>KML/KMZ (Keyhole Markup Language)</b> format is used to represent geographical information.</p> <p>For more details on these types of documents, refer to the help available by clicking on the question mark ('?') icon in the report selector.</p>
RAW	<p>A RAW format report is made up of gross measurement data, and it is saved as a <i>Comma-Separated Values (CSV)</i> text file that is arranged in rows and columns.</p> <p>For more details on these types of documents, refer to the help available by clicking on the question mark ('?') icon in the report selector.</p>

## Location, Scans, and Access Points Selector

Form this list, you will be able to select the locations and scans that are to be included in the report.

Once the scans have been selected, at the bottom you will see the access points that were detected during those **site surveys**.

It has 3 tabs with the access points, which are categorized as follows:

- **By SSID:** The access points are sorted by name.
- **By Access Point:** The networks are grouped by physical access points.
- **All:** Access points are not grouped under any particular criteria and all of them are shown individually.

## Additional Configurations

- **Output Folder:** Reports are saved to this folder.
- **Report Language:** Language in which the report is generated.

## DocX

This report creates a **DocX** file (*Office Open XML, also known as OOXML, or OpenXML*), a standard open source file format. These files can be easily opened and edited using several commercial and free office suites.

This type of report contains a large amount of information that is sorted by sections, which can be configured from the Acrylic Wi-Fi Heatmaps document manager.

The file has the following sections:

Section	Description
Site Survey Summary	<p>This section is an overview of the performed site survey: In the first place, you can see project and client information, along with other general details, as well as the total number of locations and scans included in the report. Next, you are presented an overview of the networks detected during the site survey, which contains the following information:</p> <ul style="list-style-type: none"> <li>• Column chart showing the number of networks, access points and MAC addresses per location.</li> <li>• Pie chart showing the percentage of networks per location (<i>shown only in case the report includes more than one location.</i>)</li> <li>• Pie chart showing the percentage of access points per location (<i>shown only on reports including more than one location.</i>)</li> <li>• Pie chart showing the percentage of MAC addresses per location (<i>shown only on reports including more than one location.</i>)</li> <li>• Column chart showing the number of MAC addresses grouped by channel in the 2.4GHz frequency bandwidth.</li> <li>• Column chart showing the number of MAC addresses grouped by channel in the 5GHz frequency bandwidth.</li> <li>• Bar chart showing the number of MAC addresses grouped by maximum data transfer rate.</li> </ul>
Access Point Inventory	<p>This section shows a table listing all the inventoried devices selected for the report. Once inventoried, devices are sorted by their inventoried name, allowing access to each device's characteristics, such as MAC address, SSID, or manufacturer. <b>NOTE:</b> In case there were no devices inventoried in this section for the selected access points, this section will not be included in the report.</p>
Networks	<p>This section displays a table with all the information of the selected networks. For each network, their publishing MAC addresses, channel, frequency, signal strength, and security type are shown.</p>
Access Points	<p>This section provides information on the physical access points detected during the site survey and selected to be included in the report.</p>

Section	Description
	<p>For each physical access point (<i>one single access point can publish several networks</i>) a table showing MAC address, publishing SSID, channel and frequency is included.</p> <p>If any of these physical access points is detected on <i>Monitor Mode</i>, the number of clients connected to that access point is also shown.</p>
<b>Location Details</b>	<p>This section is included in the report for each one of the selected locations.</p> <p>The section provides information such as location name, location description, number of scans included, and associated plan or blueprint, if applicable.</p> <p>Additionally, it shows the site survey path for this location, both general and per individual scan.</p> <p>Finally, the positions of all the detected access points for each location are also shown over the map or blueprint, together with a table displaying their characteristics.</p>
<b>RF Spectrum</b>	<p>Wi-Fi devices can transmit on two different frequency bands, 2.4 GHz and 5GHz, depending on the 802.11 communication standard they use.</p> <p>Within these bands, Access Points transmit on a certain subset of frequencies. Depending on its configuration and the revision of the 802.11 standard they use, APs can operate with 20, 40, 80 and 160 MHz channels.</p> <p>This section shows any transmission on the 2.4GHz and 5GHz bands, either produced by a Wi-Fi device or not.</p> <p><b>NOTE:</b> This information is only available when the site survey is performed using a compatible spectrum analyzer.</p>
<b>Network Details</b>	<p>This section is included for each one of the locations where all selected networks have been detected.</p> <p>In the first place, the information is shown as a table, based on the access points publishing the network at the location.</p> <p>Next, the information is presented as a table, based on the channel(s) through which the network is being published at the location.</p> <p>Finally, the positions of all the access points publishing the network that were detected at that location are shown over the map or blueprint, together with a table displaying their characteristics.</p>
<b>Wi-Fi Quality</b>	<p>The <b>Wi-Fi Quality Assessment</b> allows you to visualize actual wireless infrastructure status, providing an overview of the network status based on communication quality parameters.</p> <p>This section includes a chart for each one of the quality parameters: You can configure as many <b>Wi-Fi Quality</b> profiles as you want to include in the report by clicking on the gear icon next to the desired section.</p> <p><b>Default</b> quality profile includes:</p>

Section	Description
	<ul style="list-style-type: none"> <li>• RSSI coverage</li> <li>• Simultaneous RSSI coverage</li> <li>• Channel Overlapping</li> <li>• Co-Channel Interference</li> <li>• Latency</li> <li>• Bandwidth</li> <li>• Packet Loss</li> <li>• Access Point Roaming</li> </ul> <p>For more details on these quality parameters, refer to their corresponding help entries by clicking on the question mark icon ('?') in the <b>Wi-Fi quality Assessment</b> section.</p>
<b>Passive Survey</b>	<p>During a site monitoring session, data is obtained without any interaction with the wireless medium. This type of monitoring is known as <b>Passive Survey</b>.</p> <p>This section includes the following graphs resulting from processing the collected data without interacting with the wireless medium: You can configure graphic parameters such as colors and ranges by clicking on the gear icon next to each section.</p> <ul style="list-style-type: none"> <li>• RSSI</li> <li>• Access Point Coverage</li> <li>• Channel Coverage</li> <li>• Data Rate</li> <li>• Cell Density</li> <li>• Number of Access Points</li> <li>• Retry Rate</li> <li>• Channel Overlapping</li> <li>• Signal-to-Noise Ratio (SNR)</li> <li>• Detailed Grid</li> </ul> <p>For more details on these graphics or <i>plots</i>, refer to their corresponding help entries by clicking on the question mark icon ('?') in the <b>Survey</b> section on the pull-down plot selector.</p>
<b>Active Survey</b>	<p>During an <b>Active Survey</b>, apart from obtaining the wireless medium measurements without interaction with the wireless medium, (<b>Passive Survey</b>), active measurements are performed by connecting to the surveyed wireless network.</p> <p>Data packets are sent and received to obtain actual latency, bandwidth, packet loss rate, and roaming measurements.</p> <p>This section includes the following graphs resulting from processing the collected measurement values while actively interacting with the wireless medium:</p>

Section	Description
	<p>You can configure graphic parameters such as colors and ranges by clicking on the gear icon next to each section.</p> <ul style="list-style-type: none"><li>• Bandwidth</li><li>• Latency</li><li>• Packet Loss</li><li>• Access Point Roaming</li></ul> <p>For more details on these graphics or <i>plots</i>, refer to their corresponding help entries available by clicking on the question mark icon ('?') in the <b>Survey</b> section on the pull-down plot selector.</p>

## KMZ

The **KML/KMZ** (*Keyhole Markup Language*) format is used to represent geographical data.

You can open these files using GIS (Geographic Information System) visualization tools such as *Google Earth*.

A KMZ file is structured in the selected locations.

The following information will be shown for each location:

Section	Description
<b>Blueprint</b>	<p>The associated plan or blueprint will be included in the location information.</p> <p>Including a plan or blueprint adds contexts and site situation when visualizing the other graphics and information included in the KMZ file.</p>
<b>Survey Path</b>	<p>Location information includes the paths followed for each selected scan during the site survey performed at that location.</p>
<b>Access Point Position</b>	<p>Location information includes the position of the access points detected in that location.</p> <p>When clicking on each one of the access points, you will be able to visualize AP information including MAC address, latitude or longitude.</p>
<b>RF Spectrum</b>	<p>Wi-Fi devices can transmit on two different frequency bands, 2.4 GHz and 5GHz, depending on the 802.11 communication standard they use.</p> <p>Within these bands, Access Points transmit on a certain subset of frequencies. Depending on its configuration and the revision of the 802.11 standard they use, APs can operate with 20, 40, 80 and 160 MHz channels.</p> <p>This section shows any transmission on the 2.4GHz and 5GHz bands, either produced by a Wi-Fi device or not.</p> <p><b>NOTE:</b> This information is only available when the site survey is performed using a compatible spectrum analyzer.</p>
<b>Wi-Fi Quality</b>	<p>The Wi-Fi Quality Assessment allows you to visualize actual wireless infrastructure status, providing an overview of the network status based on communication quality parameters.</p> <p>This section includes a chart for each one of the quality parameters: You can configure as many <b>Wi-Fi Quality</b> profiles as you want to include in the report by clicking on the gear icon next to the desired section. <b>Default</b> quality profile includes:</p> <ul style="list-style-type: none"> <li>• RSSI Coverage</li> <li>• Simultaneous RSSI Coverage</li> <li>• Channel Overlapping</li> <li>• Co-Channel Interference</li> </ul>

Section	Description
	<ul style="list-style-type: none"> <li>• Latency</li> <li>• Bandwidth</li> <li>• Packet Loss</li> <li>• Access Point Roaming</li> </ul> <p>For more details on these graphics or <i>plots</i>, refer to their corresponding help entries by clicking on the question mark icon ('?') in the <b>Survey</b> section on the pull-down plot selector.</p>
<p><b>Passive Survey</b></p>	<p>During a site monitoring session, data is obtained without any interaction with the wireless medium. This type of monitoring is known as <b>Passive Survey</b>.</p> <p>This section includes the following graphs resulting from processing the collected data without interacting with the wireless medium: You can configure graphic parameters such as colors and ranges by clicking on the gear icon next to each section.</p> <ul style="list-style-type: none"> <li>• RSSI</li> <li>• Access Point Coverage</li> <li>• Channel Coverage</li> <li>• Data Rate</li> <li>• Cell Density</li> <li>• Number of Access Points</li> <li>• Retry Rate</li> <li>• Channel Overlapping</li> <li>• Signal-to-Noise Ratio (SNR)</li> <li>• Detailed Grid</li> </ul> <p>For more details on these graphics or <i>plots</i>, refer to their corresponding help entries available by clicking on the question mark icon ('?') in the <b>Survey</b> section on the pull-down plot selector.</p>
<p><b>Active Survey</b></p>	<p>During an <b>Active Survey</b>, apart from obtaining the wireless medium measurements without interaction with the wireless medium, (<i>Passive Survey</i>), active measurements are performed by connecting to the surveyed wireless network. To perform active measurements by connecting to the network that is being analyzed.</p> <p>Data packets are sent and received to obtain actual latency, bandwidth, packet loss rate, and roaming measurements.</p> <p>This section includes the following graphs resulting from processing the collected measurement values while actively interacting with the wireless medium:</p>



Section	Description
	<p>You can configure graphic parameters such as colors and ranges by clicking on the gear icon next to each section.</p> <ul style="list-style-type: none"><li>• Bandwidth</li><li>• Latency</li><li>• Packet Loss</li><li>• Access Point Roaming</li></ul>

## RAW

A RAW format report is made up of gross measurement data, and it is saved as a Comma-Separated Values (CSV) text file that is arranged in rows and columns.

This type of report allows you to export the data for later use on third-party applications.

The file comprises the following columns:

Column	Description
Point#	Number that identifies the measurement number where the data were collected.
Latitude	Latitude of the point where the measurement was performed. <b>NOTE:</b> You will only have the coordinates in case the measurements are geositioned.
Longitude	Longitude of the point where the measurement was performed. <b>NOTE:</b> You will only have the coordinates in case the measurements are geositioned.
Altitude	Altitude of the point where the measurement was performed. <b>NOTE:</b> You will only have the coordinates in case the measurements are geositioned.
Accuracy	GPS precision of the point where the measurement was performed. <i>Normal</i> GPS accuracy values will rarely fall below 6 meters. <b>NOTE:</b> You will only have precision in case the measurements are geositioned.
Source	The type of point where the measurement was performed. Possible values are: <ul style="list-style-type: none"> <li>• <b>Blueprint:</b> The point was measured on a calibrated blueprint.</li> <li>• <b>Satellite Map:</b> The point was measured on a <b>Satellite</b> map, so it is geositioned.</li> <li>• <b>GPS:</b> The point was measured using a GPS device.</li> <li>• <b>Calculated:</b> The point was measured during a site survey on Continuous Mode, and Acrylic Wi-Fi Heatmaps calculated its position.</li> </ul>
X	X position en pixels per point. <b>NOTE:</b> In case of using a calibrated blueprint, only the position on the X axis will be obtained.
Y	Y position in pixels per point. <b>NOTE:</b> In case of using a calibrated blueprint, only the position on the Y axis will be obtained.
LocationId	Unique number that identifies the location where the measurement was performed.
LocationName	Name of the location where the measurement was performed.

Column	Description
ScanId	Unique number that identifies the scan where the measurement was performed.
ScanName	Name of the scan where the measurement was performed.
MacAddress	MAC address of the detected access point.
InventoryName	Name of the inventoried device. <b>NOTE:</b> Only applicable when the inventory has been previously added to the device.
SSID	Name of the detected AP within the network.
Vendor	Device manufacturer. This information is extracted from the MAC address.
RSSI	Surveyed network signal strength.
SNR	Signal-to-Noise Ratio. Relation between signal strength and noise. <b>NOTE:</b> This value is only obtained when the capture has been performed using an Aircap card.
Chan	Channel on which the access point is transmitting.
Frequency	Frequency on which the access point is transmitting.
ChanWidth	Width of the channel on which the access point is transmitting.
802.11	Communication standard used by the AP. Possible values are: <ul style="list-style-type: none"> <li>• 802.11a</li> <li>• 802.11b</li> <li>• 802.11g</li> <li>• 802.11n</li> <li>• 802.11ac</li> <li>• Unknown</li> </ul>
Rates	Transfer rates supported by the access point.
WEP	WEP Encryption Type: Open or Shared.
WPA	WPA encryption type.
WPA2	WPA2 encryption type.
WPS	Determines whether the AP supports WPS.
Type	Informs the type of connection supported by the AP. Possible values are: Infrastructure or Ad-hoc. <ul style="list-style-type: none"> <li>• Infrastructure</li> <li>• Ad-hoc</li> </ul>
PacketsCount	Information only available for <b>Active surveys</b> . It indicates the number of PING requests to a server for measuring latency in a specific location (defined by the field '# Point').
PacketsFail	Information only available for <b>Active surveys</b> .

Column	Description
	It indicates the total number of PING requests that have failed and have not received back in specific location (defined by the field '# Point')
<b>LatencyMs</b>	Information only available for <b>Active surveys</b> . Indicates average latency measured in a specific location.
<b>BitsPerSec</b>	Information only available for <b>Active Surveys</b> . Indicates the available bandwidth in this measurement.
<b>ConnectedAP</b>	Information only available for <b>Active surveys</b> . MAC address of the access point to which connection will be established.
<b>SSIDConnectedTo</b>	Information only available for <b>Active surveys</b> . Name ( <i>SSID</i> ) of the access point to which connection will be establish.
<b>Spectrum Frequencies</b>	This information is only available when the site survey is performed using a compatible spectrum analyzer. Each column represents a frequency and the values obtained at that point.