

Signalsphere Explorer enables users to explore their radio environment, and develop a clear view of radio coverage and performance across their chosen geography.

MAC Ltd's CatchAll receivers are the benchmark RSSI measurement receivers for networks deployed worldwide. Signalsphere Explorer takes the data captured using CatchAll and Signalsphere Recorder and provides tools to enable you to turn data into information.

Signalsphere Explorer :

- protects your **data's integrity** and
- **geographically visualizes** the radio environment and
- using the **information discovery** tools enables a rapid understanding of your radio environment

These features allow you to make information driven decisions to enhance your network and deliver a high-quality service to your customers.

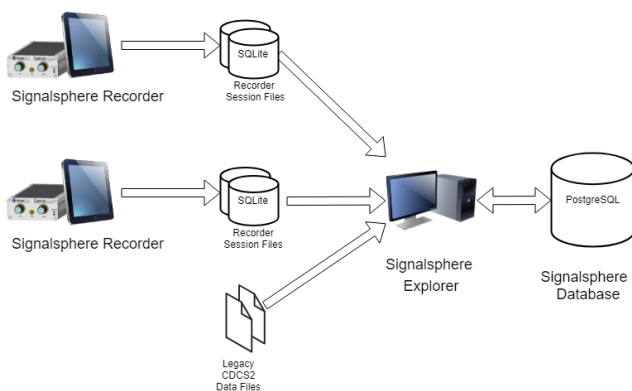
Data Integrity

Signalsphere Explorer uses MAC Ltd's radio experience to consolidate the multitude of captured data into reliable information stored in a single shared database. Users can then discuss and review data, knowing that they are using the same data with the same settings and conditions.

Data can be consolidated using:

- Distance / Speed weighting
- Filtering out overloaded measurements and results affected by adjacent channel leakage
- Multiple scales to manage the effects of fast and slow fading

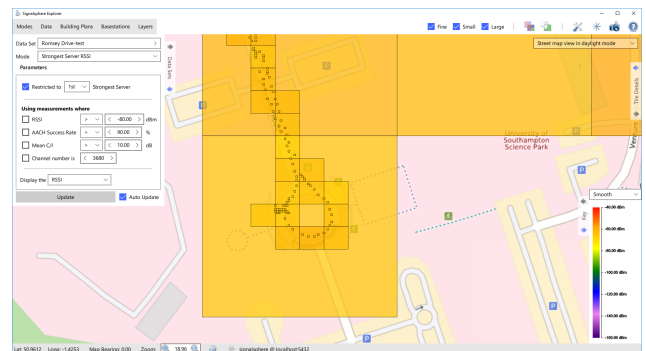
The shared database also stores building plans ensuring that the same orientation and scaling of a building plan is used by all members of a team. Building plans can then be exported for use in Signalsphere Recorder, so that the resultant measurements are consistently geo-located.



Signalsphere Explorer consolidates recordings from MAC Ltd's Signalsphere Recorder and legacy CDCS2 software

Geographic Visualization

Signalsphere Explorer is designed to geographically visualise the captured radio environment. Signalsphere Explorer supports commercial and non-commercial **on-line mapping** providers, including OpenStreetMap, ESRI, and MapBox. These allow users to view their data on up-to-date maintained maps, with a number of different styles. Signalsphere Explorer also provides an **off-line mapping** mode, including a series of black and white maps. Users can also add their own building plans and easily geolocate them on the map.



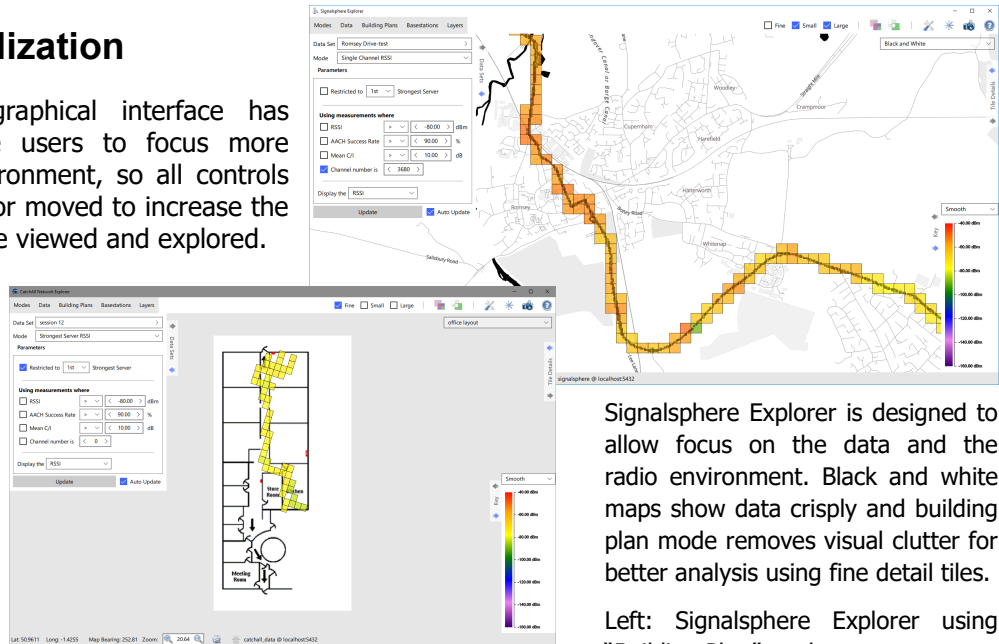
Large, small and fine tiles show your radio environment

Signalsphere Explorer uses **geographic averaging** to combine the data; small tiles are used to linearly average the measurement data to smooth out the effects of fast-fading, a first step in improving the reliability of the measurement data. Large tiles use a logarithmic average of the small tiles they cover, smoothing out the effects of slow-fading. The large tiles are useful for visualising the radio coverage of an area, whilst the smaller tiles provide useful supporting information. Signalsphere Explorer has fine detail tiles that can be used for when the measurements are very dense and the user wants to investigate the radio environment

Geographic Visualization

Signalsphere Explorer's graphical interface has been designed to enable users to focus more clearly on their radio environment, so all controls and panels can be hidden or moved to increase the area of the map that can be viewed and explored.

The colour keys used for presenting the radio information can be adjusted to preferred settings, so that information can be read more clearly from the map. Display tiles can also be switched on or off at the touch of a button.

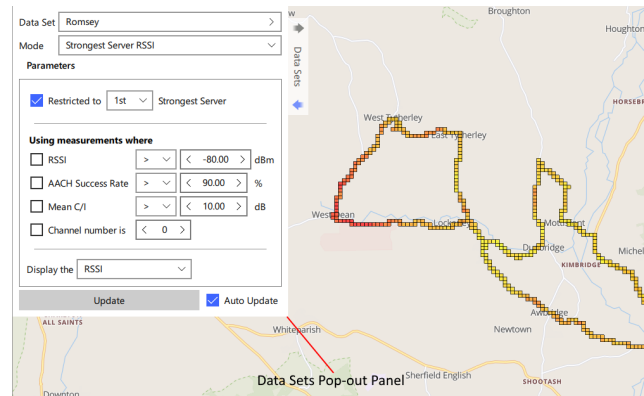


Signalsphere Explorer is designed to allow focus on the data and the radio environment. Black and white maps show data crisply and building plan mode removes visual clutter for better analysis using fine detail tiles.

Left: Signalsphere Explorer using "Building Plan" mode

Information Discovery

Signalsphere Explorer's foundation of data integrity, and geographic visualisation places the user in the position to explore their radio environment. This starts with a series of **predefined display modes** that for example present the N^{th} strongest server's RSSI or a count of channels above a threshold or technology specific values like the strongest server's decoded TETRA MCC, MNC and LAC codes. These modes can be **instantly customised** with thresholds and modes being combined as the user sees fit to enable their understanding of their radio environment.



User customisable data display modes with TETRA radio technology support

Radio Technology Support

Signalsphere Explorer provides support for displaying multi-channel radio measurements, and for exploring individual channels. Additionally fixed transmitters or basestation locations can be loaded into the Signalsphere Explorer database. These can be selected from the map to highlight associated tiles, further enhancing an understanding of your radio environment. Signalsphere Explorer is available with enhancements for technology specific information to be used and displayed. MAC Ltd's history of supporting the **TETRA** community has meant that the first technology that Signalsphere Explorer supports is TETRA. The Signalsphere Explorer TETRA support feature enables the use of estimated **C/I**, **AACH decode** success rate, decoded **MCC**, **MNC** and **LAC** codes. These new data types can be displayed on the map or used to control the information that is displayed. Explorer's TETRA feature also enables new predefined display modes, such as "*Strongest server C/I*" or "*Single channel MCC:MNC:LAC*" that provide good starting points for customisation and investigating your radio environment.



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