
8 CALCULATIONS: SPECTRUM VIEWER

8.1 INTRODUCTION

The Spectrum Viewer provides a visual overview of the spectrum occupancy at any location. Considering propagation in a geographical region, the field strength or signal power as a function of frequency and distance is presented. It is an excellent aid in the selection of frequencies for new assignments or tracking down an interfering signal. The Spectrum Viewer handles different services and can be used to display the azimuths to the received stations for selected stations shown on the map.

A quick overview of the number of assignments per frequency can be displayed by selecting the “Count stations” mode.

The test receiver is located at the cursor position and depending on the settings, either the field strength or the received power is presented. When moving the cursor, the diagram is updated interactively. This includes recalculation of all power budgets for all contributing stations, i.e. all stations in the current project. The combined signal levels from contributing stations are then displayed in the diagram.

The main features of the Spectrum Viewer are:

- Three different target calculations: Power, field strength or the number of stations using each frequency within a definable frequency range and distance from the receiving point.
- User selectable mobile, when applicable. The antenna height and gain can be entered.
- Full power budgets are calculated for each transmitting station, i.e. EIRP, transmitter antenna diagram and transmission loss. For received power calculations the receiving antenna diagram is also taken into account. The power spectrum of the transmitter is aggregated to the assigned frequency in the display.
- Full range of propagation models available.
- Display of azimuths (lines) to the received signals for a selected frequency.
 - Updating of diagrams in real time when moving cursor over the 2D map.

Typical Stations are only considered in the “Count Stations” mode.

Figure 8.1 shows a display example of the Spectrum Viewer. The window can be scaled in size as desired using the mouse (the diagram automatically adjusts itself).

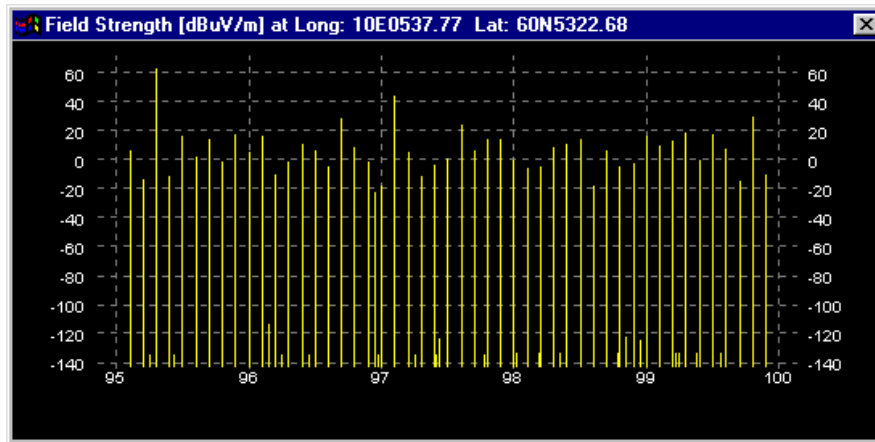


Figure 8.1: Spectrum Viewer set for BC services using Field Strength.

A settings window is associated with the Spectrum Viewer, refer to **Figure 8.2**. It is accessed through right-click menu (option Settings...) in the Spectrum Viewer window.

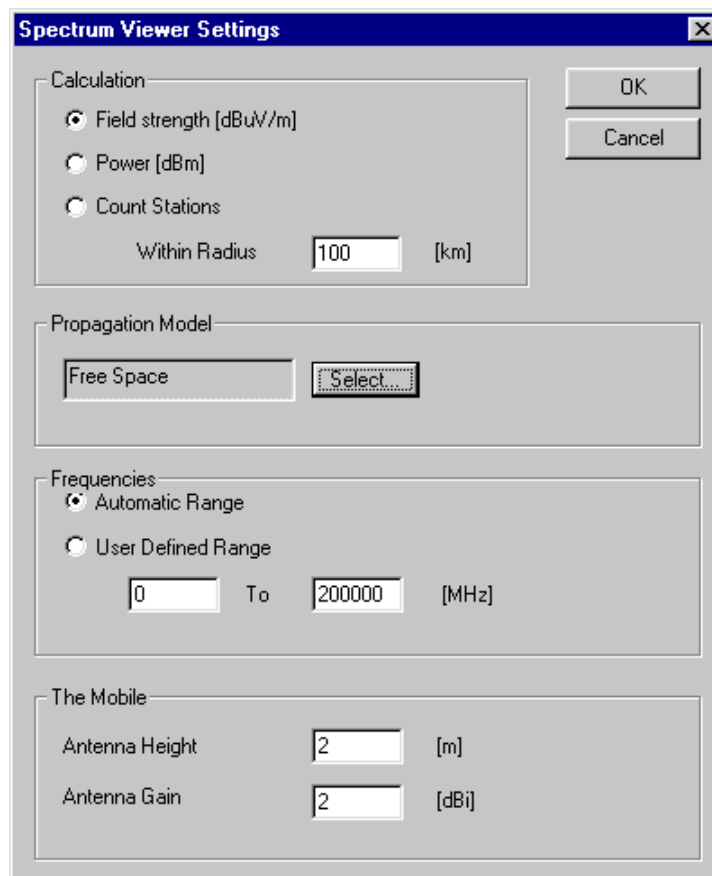



Figure 8.2: Settings for the Spectrum Viewer (default state).

8.1.1 Examples

Perform the following to learn about most of the commands described above:

- Open the project file ***Spectrum.WPR***.
- Mark all stations and display them on the map.
- Select <Tools><Spectrum View> or press the  button.
- Left-click anywhere on the map. A number of bars will appear in the display.
- Move the cursor with the left mouse button pressed in the 2-D map and watch the Spectrum Viewer diagram become updated in real time - this is only recommended when using non-terrain dependent propagation models though. Between diagram updates, and depending on the number of stations within range (radius) and the propagation model currently selected, the computing progress is indicated for some time by a percentage figure (NN %). During this time Settings can not be changed unless the calculation is aborted first.

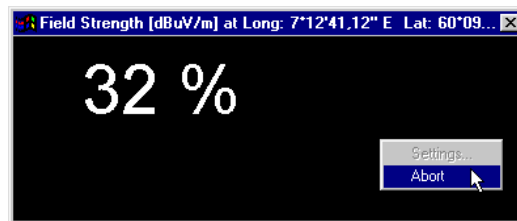


Figure 8.3: Diagram update in progress (right-click menu option to abort).

- Use the right mouse button in the Spectrum Viewer to display and alter any of the settings, e.g. change to **Power** or **Count Stations** calculation.

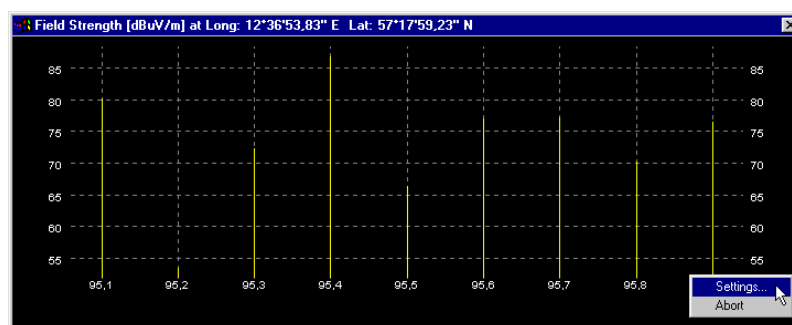


Figure 8.4: Right-clicking within the Spectrum Viewer window brings up the Settings.../Abort menu.

- Now, call up the Settings window by right-clicking in the spectrum display window and select Power [dBm] calculation. Leave all other settings to their default states.
- Select a test position on the map, e.g. south of Halmstad. Left-click on a frequency bar in the spectrum window and observe the map display of frequency azimuth line bearings with dBm values. Try clicking on different frequency bars using different map scales, etc.

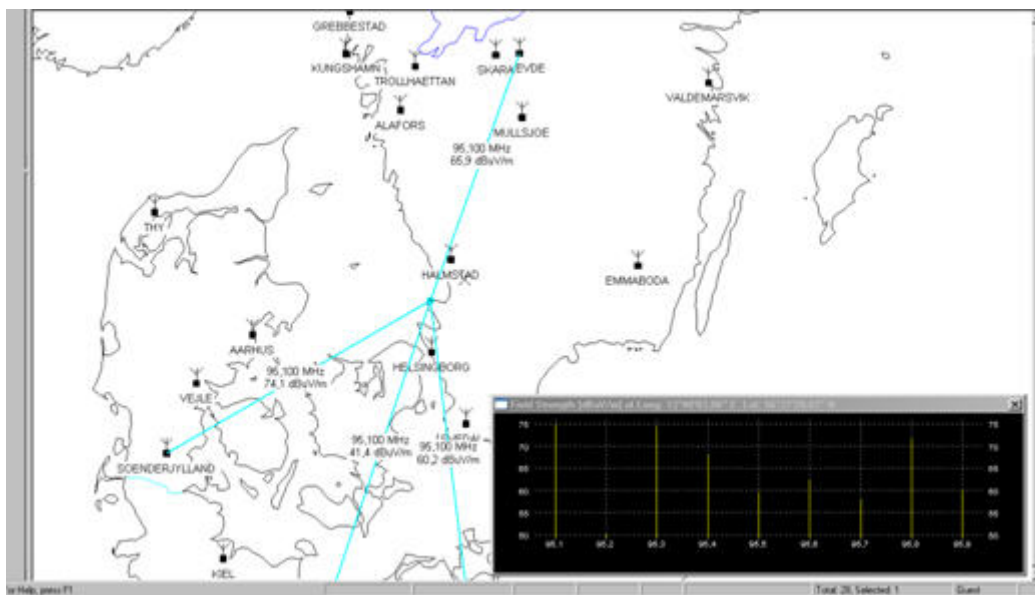


Figure 8.5: Spectrum Viewer, showing Received Power [dBm] with Free-Space propagation for a test position south of Halmstad. Azimuth lines with dBm values shown on map for this position. [Spectrum.WPR].

Note 1: Left-clicking in the spectrum window will resolve and display results on the map for the **nearest** frequency bar to the cursor position in the spectrum window. Test point values are displayed on the map with each azimuth line bearing for Field strength [$\text{dB}\mu\text{V}/\text{m}$] and Power [dBm] calculations.

Note 2: The first calculation in projects with a large number of stations may take some time, even with a fast propagation model. This is due to the fact that the ground height above sea level is retrieved from the geographical database for each station. If this is experienced you should save the project file after the calculation is ready. The next calculation will be much faster, since the calculation will not read the terrain data for the station height above sea level again.



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