



**RSA Map**  
**Printable Help**



**077-0758-02**





**RSA Map**

**Printable Help**

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## Welcome

This help provides in-depth information on how to use the RSA Map and RSA software. The RSA Map software enables you to record measurement results taken by a Tektronix spectrum analyzer on a map. If a GNSS receiver is connected to the Host Instrument, the measurements can be placed on a map automatically and include GNSS coordinates as part of the measurement data.





## RSA Map overview

RSA Map and Tektronix Real-Time Spectrum Analyzers provide an integrated solution for field interference and coverage problems. RSA Map lets you use an on-screen map to record the location and value of Host Instrument measurements. With RSA Map you can do the following:

- Select a measurement and touch the displayed map where you want the measurement to be placed
- Use a GNSS receiver (customer supplied) to automatically position measurements at your current location (on maps with geophysical reference information)
- Collect and export measurement data (and position data when using a GNSS receiver) to common formats to help analyze measurements (position, value, and direction) and prepare reports to resolve interference problems.

### Map files

RSA Map supports the following vector and image map file formats.

Map file format	Description
.bmp	Window Bitmap .bmp files can be either geo-referenced (using world map file format to specify geographic location) or non geo-referenced (which does not have geographic location information).
.mif	MapInfo Interchange Format
.jpg, .jpeg	JPEG File Interchange Format
.gif	Graphics Interchange Format
.tiff	Tagged Image File Format
.png	Portable Network Graphics
.osm	Open Street Map
.shp	ArcView Shape
.dlg, .opt	Digital Line Graphs

### TekVISA






Tektronix Virtual Instrument Software Architecture (TekVISA) is a Tektronix VISA solution. It is a collection of software and documentation that allows for remote control of instruments regardless of instrument brand and physical connection. TekVISA includes a VISA driver, VISA libraries,

documentation, USB Device Driver, VXI-11 server, and connection management/debug software. It is required for RSA Map to function properly.











## Elements of the display



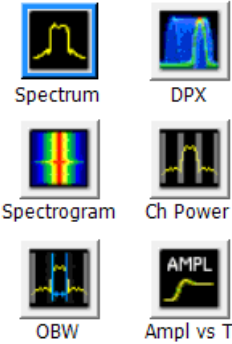
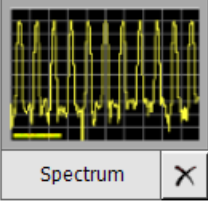
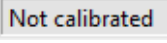
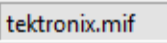
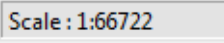
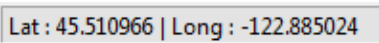
### Elements of the RSA Map display

Item	Button	Description
1		The Settings button allows you to set repeat measurement parameters and advanced map parameters.
2		The gray GNSS button indicates that GNSS is not enabled. Click it to toggle GNSS on/off.
		The yellow GNSS unlocked button indicates that GNSS is enabled, but the receiver is not locked to a signal. Click it to toggle GNSS on/off.
		The red GNSS button indicates that GNSS is enabled, but the GNSS data is invalid. Click it to toggle GNSS on/off.
		The green GNSS locked button indicates that the GNSS is enabled and is locked to a signal. Click it to toggle GNSS on/off.

Elements of the RSA Map display (cont.)

Item	Button	Description
3		The Home button resets the position of the map to the Home location and resets the magnification to its default value.
4		The User Center button resets the current GNSS location to the center of the display.
5		The Zoom button is used to magnify and shrink the map image.
6		The Pan tool is used to move the map within the window.
7		The Select button is used to select a measurement on the map display for editing.
8		The Move Result button is used to move a measurement on the map to a different position.
9		The Change Azimuth button is used to place an azimuth arrow on a measurement to indicate the direction in which a measurement was taken.
10		The Single Measurement button is used to start single measurement mode.
11		The Repeat Measurements button is used to start repeat measurements mode.
12		The Stopped icon indicates that the Host Instrument is not taking measurements.
		The Running icon indicates that the Host Instrument is running and taking measurements.

Elements of the RSA Map display (cont.)

Item	Button	Description
13	 <p>Spectrum DPX Spectrogram Ch Power OBW Ampl vs T</p>	The Measurements Select area is used to select the measurement to be taken.
14	 <p>Spectrum X</p>	The Thumbnail Preview shows a version of the Host Instrument display.
15	 <p>Not calibrated</p>	The instrument status readout displays the status of the Host Instrument.
16	 <p>tektronix.mif</p>	The Map name readout displays the name of the currently loaded map.
17	 <p>Scale : 1:66722</p>	The Scale readout at the bottom of the window indicates the scale of the map at the current magnification. For example, if the Scale reading is 1:100 that means that 1 cm on the map represents 100 cm on the ground.
18	 <p>Lat : 45.510966   Long : -122.885024</p>	The Latitude and Longitude readouts indicate the location of the cursor on a geo-referenced map.

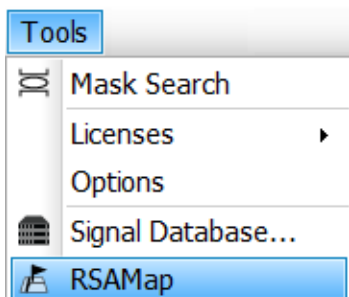
RSA Map menus

Menu	Description
<a href="#">File</a>	Load maps, save and recall results, print documents, and clear measurements.
<a href="#">View</a>	Display measurements, display the "You are here" icon, and set the azimuth line style.
<a href="#">Tools</a>	Preset software to default settings and switch to Host Instrument (analyzer).
<a href="#">Help</a>	Display online help.

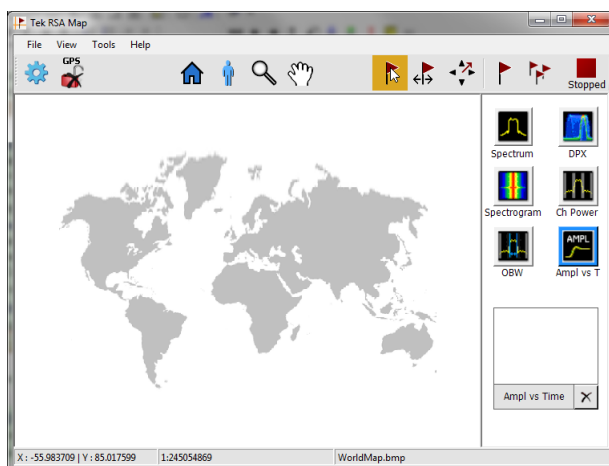
## Launching RSA Map

To launch RSA Map:

1. In the Host Instrument application, select **Tools > RSA Map** from the menu bar.



RSA Map will launch in a separate window.



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**NOTE.** When RSA Map is running, selecting RSA Map switches the display from the Host Instrument display to the RSA Map display.

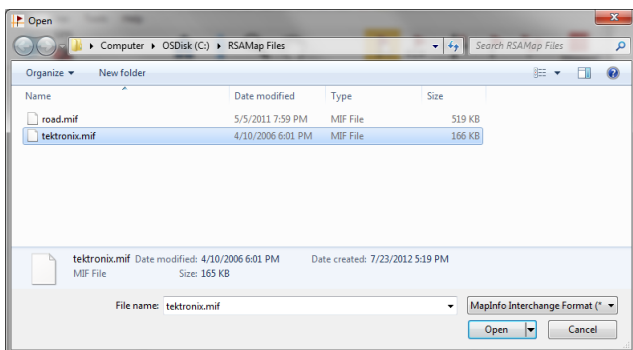
---

## Loading a map

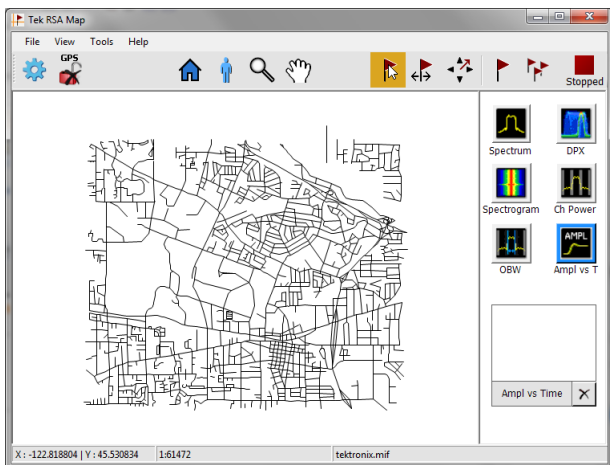
Before you can use the RSA Map tool to record measurements you must load a map. If you loaded a map in a previous session, that map will remain loaded until it is replaced by a new map. You can create a map using a program like [OpenStreetMap](https://www.openstreetmap.org/), which is a collaborative project to create a free editable map of the world. It can capture a map anywhere in the world and can export it in its native format, which RSAMap can import.

**NOTE.** *If GNSS is enabled and you load a map with coordinates that are far from the current GNSS location, the map display may appear blank because RSA Map is trying to display both the GNSS location and the map location. If the map display is blank after loading a map, check that the map coordinates are close to the actual GNSS location. If the map coordinates are not close to the actual GNSS location, try loading a map with coordinates closer to the actual GNSS location.*

1. Select **File > Load Map**.
2. Navigate to the location of the map file to be loaded, and select the map file to load (you may need to specify the file type of the map).



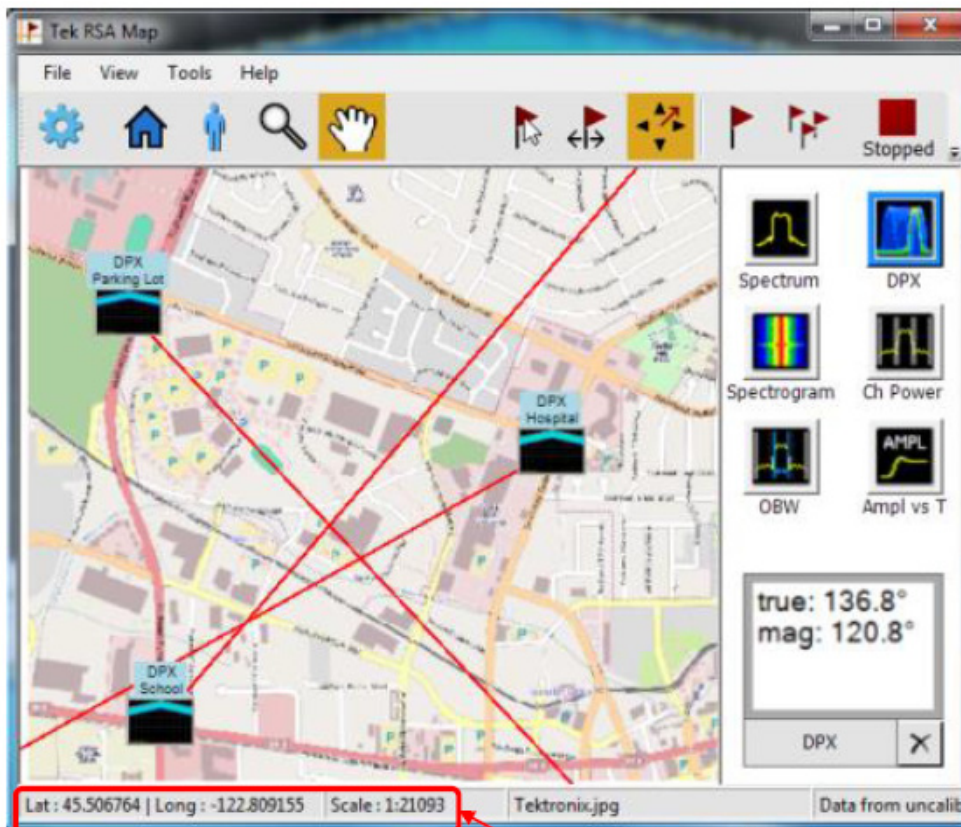
3. Click **Open**. The RSA Map application will load the selected map file.



**NOTE.** *Loading a map causes all previously stored measurements to be deleted, even if the same map is reloaded.*

## Converting a scanned map into a geo-referenced map

You can create a geo-referenced map to import into the RSA Map application from a scanned map. To do this, create a bitmap file of the map and then a World file (a geo-reference information file) using a World file creation software available online. The following image shows the location of the geophysical reference information in the RSA Map application.



Geophysical reference information

## Setting up a GNSS receiver


To include GNSS-derived coordinates with measurements when they are placed on a map, you must first enable GNSS in the Host Instrument.

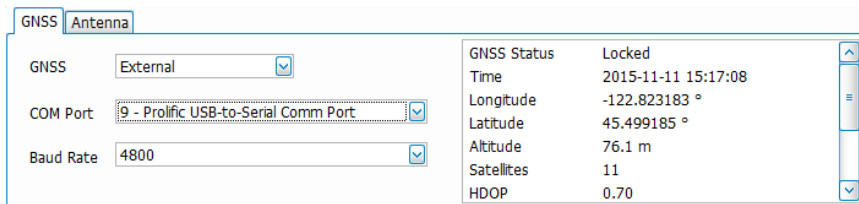
### GNSS receiver requirements

To place measurements on a map with the GNSS coordinates of where the measurement was taken, you need to connect an external GNSS receiver to the Host Instrument. The GNSS receiver must output NMEA 0183 serial data. Install any necessary software for the GNSS receiver before connecting.

### GNSS receiver setup

The GNSS receiver is set up through the Host Instrument software. Perform the following steps in the Host Instrument interface:

1. Click the  icon on the Favorites toolbar or select **Setup > GNSS/Antenna** from the main menu to open the GNSS/Antenna control panel.



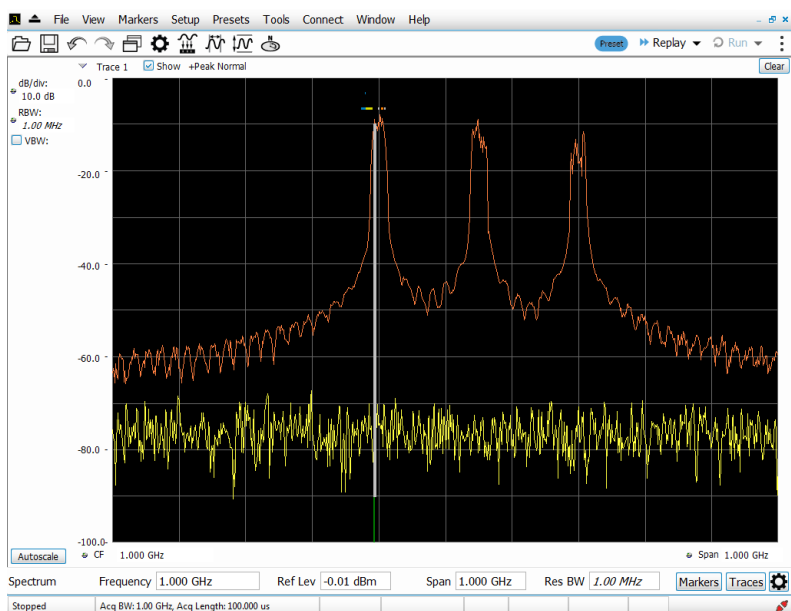
2. Open the Host Instrument Help file (User Manual).
3. In the Contents tab, expand the *GNSS, Antenna, and Map It Features* section and click on the *How to set up GNSS* topic for setup instructions.



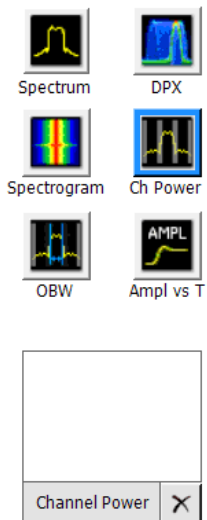
## Mapping a measurement

Use the following procedure to map measurement results. Before you use the following procedure, do the following:

- Load a map. See [Loading a Map \(see page 7\)](#).
- Select **Tools > Host Instrument** to switch to the Host Instrument and set up the measurement you wish to map. If you want to map Signal Strength, set up the **Chan Power/STR and ACPR** display on the Host Instrument as required for the signal you will be measuring.



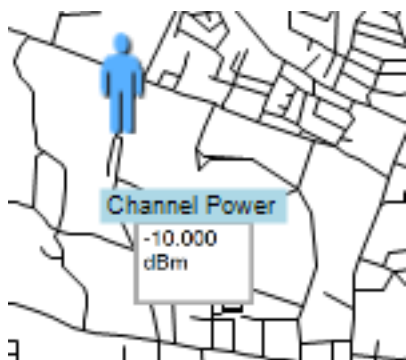
1. In the RSA Map application, select one of the measurement buttons. The selected measurement is surrounded with a blue highlight and the name of the measurement appears below the Thumbnail area.



2. Click the Single Measurement button. The selected measurement begins running on the Host Instrument and the result is displayed in the Thumbnail area.



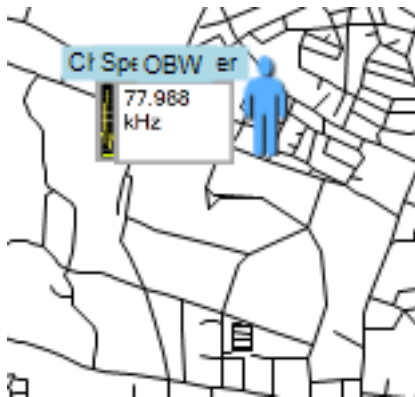
3. Click or tap on the map.



If a GNSS receiver is active, and you are using a geo-referenced map, a single measurement is placed at the current GNSS coordinates.

If a GNSS receiver is not active, or if you are using an image map, a single measurement is placed where you tapped the map.

4. You can select a different measurement button, and then tap the map to add a new measurement to the map. Multiple measurement icons at the same location stack on top of each other.



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**NOTE.** The number of measurements that can be placed on a map is limited to 200. When the limit is reached, RSA Map shows a message stating that the limit has been reached, and discards any following measurements. Select File > Save As to save the map and measurements to a file, or select File > Clear All Measurements to clear the map and resume adding measurements to the map.

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**NOTE.** To add measurements at a new location on a geo-referenced map with an active GNSS receiver, you must physically move to the new location. If you want to add a measurement at a point other than the current GNSS location, disable GNSS before placing the measurement.

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## Repeat measurements

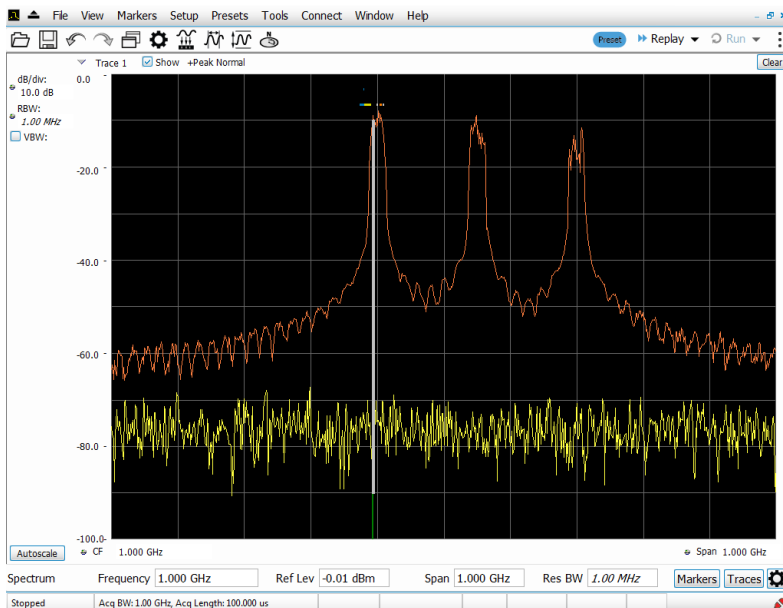
Repeat measurements lets you automatically map a single measurement at a set time interval or change in GNSS position. To perform repeat measurements, GNSS must be enabled and locked. The map used must be a geo-referenced map.

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**NOTE.** The RSA Map program maps only completed measurement results. If the specified time interval is less than that required to take a measurement, RSA Map ignores the specified time interval and maps results as soon as the measurement acquisition is done. For example, if the instrument requires 20 seconds to take a measurement, but the time interval is set to 10 seconds, then the instrument maps results every 20 seconds.

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1. Set up the measurement parameters (frequency, bandwidth, and so on) in the Host Instrument application.



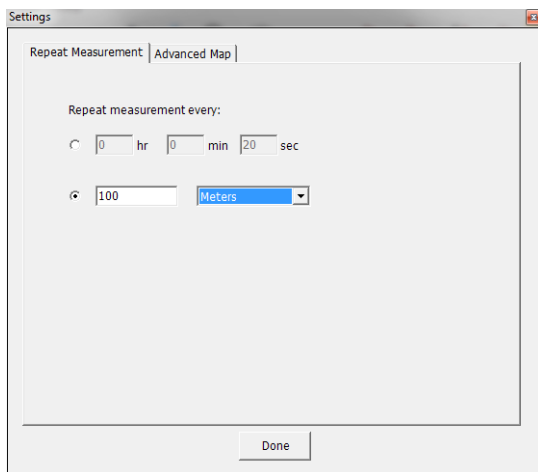
2. Select **Tools** > **RSA Map** to return to the RSA Map application.
3. Enable GNSS as previously described.
4. Click the Repeat Measurements button.




5. Click the Settings button display the Settings window.

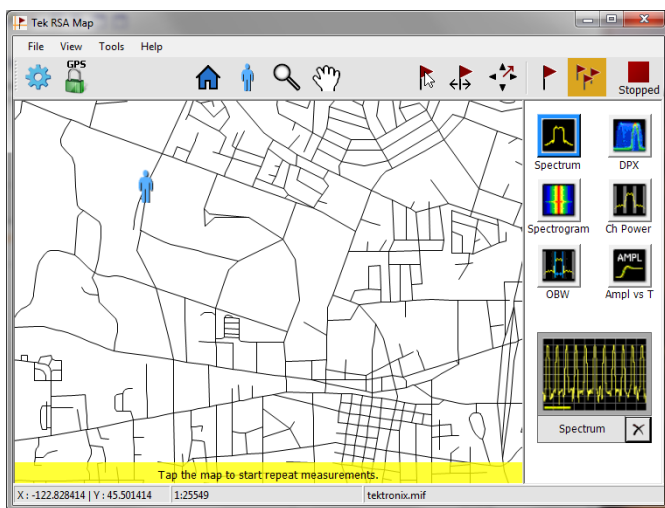


6. Set the type of measurement interval (time or distance between measurement positions) as needed.
7. Click **Done**.

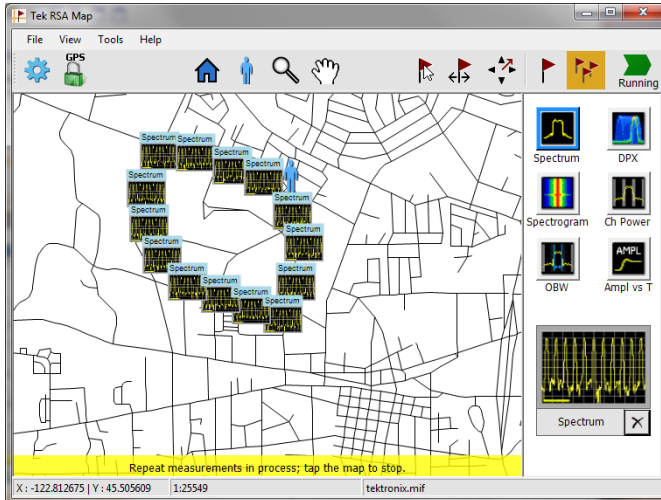




- 8. Click the map at any point to start repeat measurements. The instrument adds a measurement to the map at the current GNSS position.

The instrument will repeat measurements based on time or distance as specified on the  (Settings) > Repeat Measurement tab.



- 9. Click the map to stop measurements:



10. Click the Single Measurement button  or the Select button  to exit the RSA Map repeat measurements mode.

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**NOTE.** The number of measurements that can be placed on a map is limited to 200. For repeat measurements, when the instrument reaches the measurement limit, the measurements and map are automatically saved to the current Save Results directory, the map is cleared, and then RSA Map continues adding measurements to the map.

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## Modifying measurement icons and results

The RSA Map application uses icons on the map to represent a measurement taken at that location. You can perform various actions on measurement icons, including viewing the measurement results of an icon, moving the icon, deleting an icon, and attaching a measurement direction arrow to an icon.

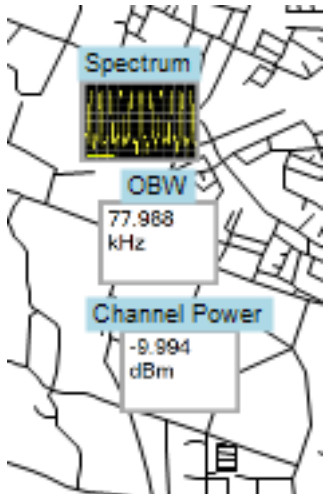
### Moving measurement icons

To move a measurement icon (for example, if two or more results are stacked):

1. Click the Move Result button.



2. Click and drag the measurement result to a new position. If the icon is moved to a new stack of measurements, then the icon is placed in the stack in time-of-measurement order.



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**NOTE.** Moving a measurement icon results in the geographic location data for the moved measurement icon being changed to that of the map location the measurement icon is moved to.

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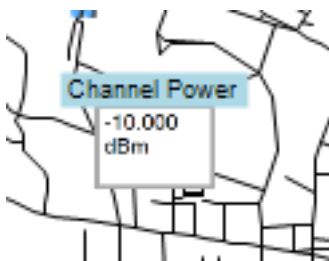
### Viewing and deleting measurement icons

To view or delete the measurement results associated with an RSA Map measurement icon:

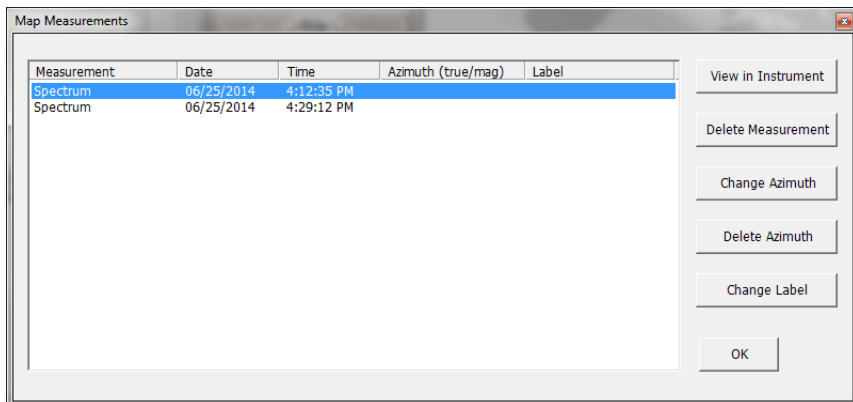
1. Click the RSA Map Select button.



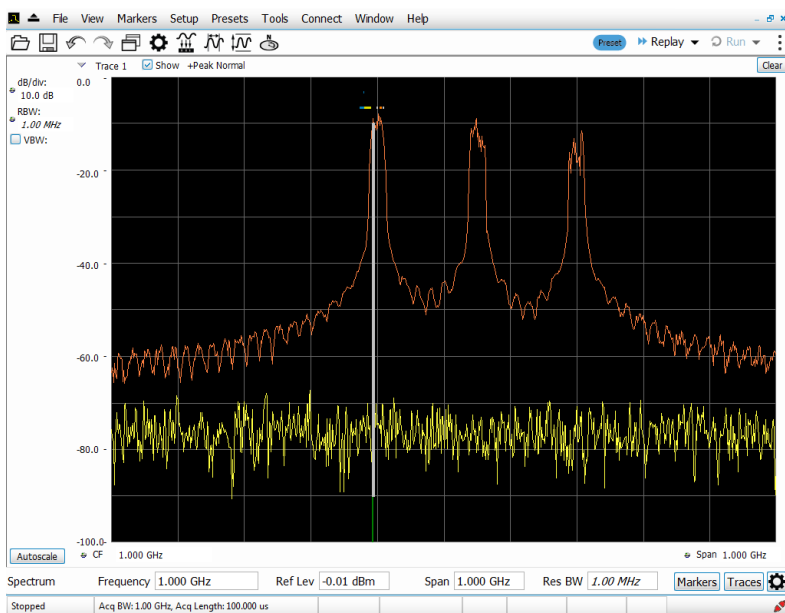
2. Click a measurement icon to open the **Map Measurements** dialog box.



3. Click the measurement of interest in the list.

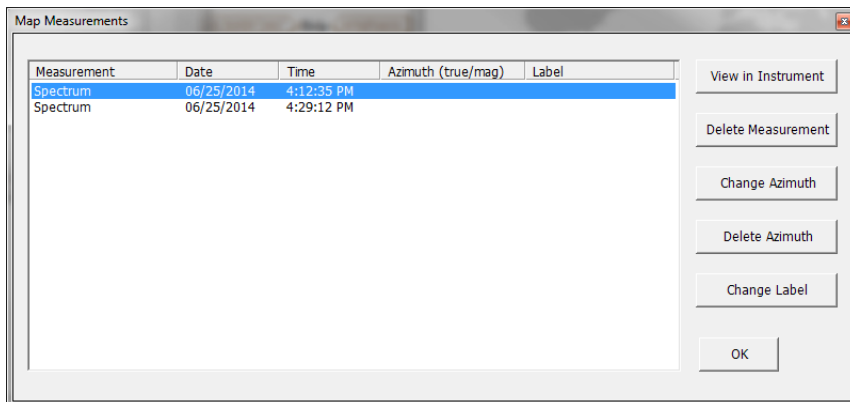


- Click **View in Instrument** to show the measurement screen for the selected measurement on the Host Instrument. Select **Tools > RSA Map** on the Host Instrument to return to the RSA Map screen.



- Click the **Delete Measurement** button to delete the selected measurement. If there are multiple measurements to delete, repeatedly select and tap **Delete Measurement**.
- Click **OK** to close the dialog box.





**NOTE.** To delete all the measurement icons from a map, select **File > Clear All Measurements**.

### Draw a measurements azimuth (direction) arrow

The RSA Map azimuth direction arrow function lets you draw an arrow on a mapped measurement to indicate the direction your antenna was pointing when you took a measurement.

1. Click the Change Azimuth button.



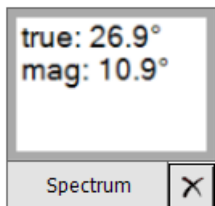
2. Click and drag from the center of a measurement icon in the direction the antenna was pointing when the measurement was made. RSA Map draws an arrow from the measurement icon.



The RSA Map measurement thumbnail display shows the direction of the arrow as you draw it. This display shows the True Azimuth and Magnetic Azimuth. As you change the direction of the arrow, the angles shown in the thumbnail display are updated to help you set the direction accurately. The information shown depends on the map type (geo-referenced or image). The example shown is for a geo-referenced map.

3. To change the arrow direction, draw a new line. RSA Map replaces the existing arrow with the new direction arrow.

You can also change the direction of the arrow by tapping the measurement, selecting Change Azimuth from the Map Measurements window and entering a Magnetic Azimuth value for the result.



4. To change the style of the azimuth line, select **View > Azimuth line style – Line** or **Azimuth line style – Arrow**.

### Changing the azimuth of a measurement

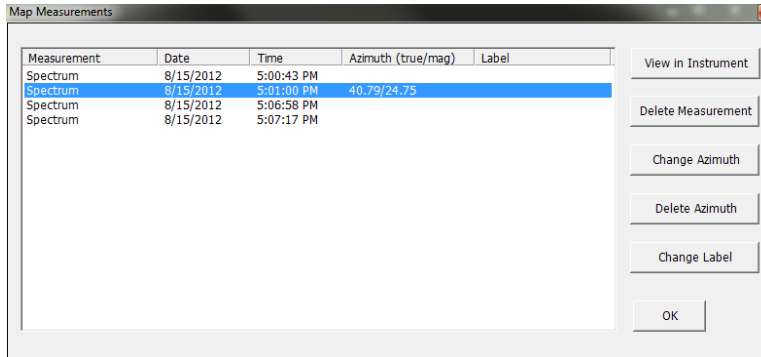
1. Click the RSA Map Select button.



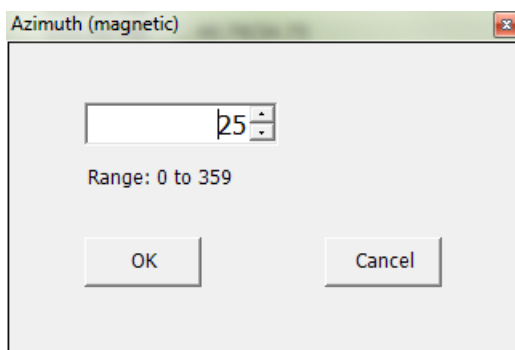
2. Click the measurement icon with the azimuth arrow whose value you want to change.



3. Click the measurement name that has the azimuth arrow you wish to change.
4. Click the **Change Azimuth** button.



5. Enter a new value for the azimuth. You can enter values precise to 1/100 of a degree.



6. Click **OK**. RSA Map closes the dialog box and updates the azimuth value.

### Delete an azimuth measurement direction arrow

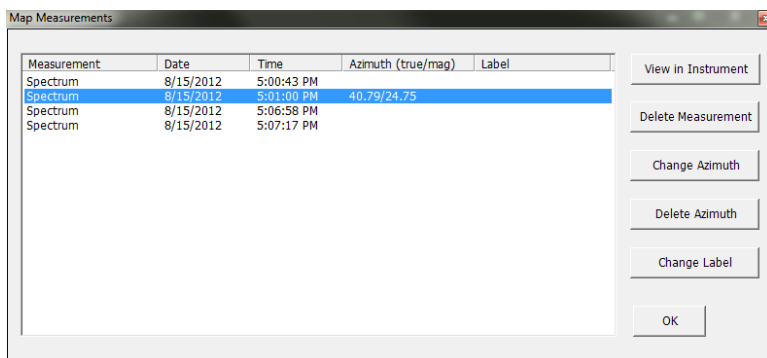
1. Click the RSA Map Select button.



2. Click the measurement icon with the direction arrow to delete. RSA Map opens the **Map Measurements** dialog box.



3. Click the measurement name that has the direction arrow to delete.



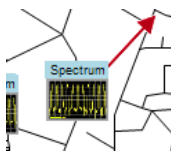
4. Click the **Delete Azimuth** button.
5. Click **OK**. RSA Map closes the dialog box and deletes the direction arrow.

### Adding and deleting measurement icon labels

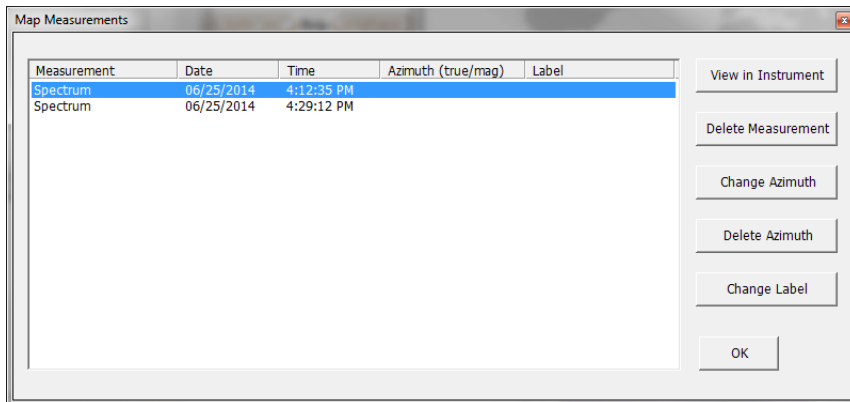
1. Click the RSA Map Select button.



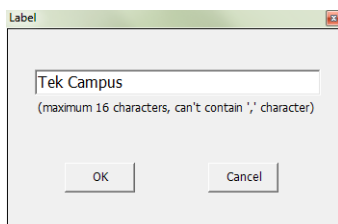
2. If Measurements are not displayed (flags are displayed instead of measurement thumbnails), select **View > Display Measurements** so that measurements are visible.
3. Click the measurement icon that you want to add a label to or that you want to change.



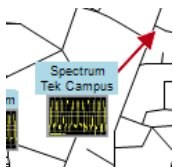
4. Click the measurement name that you want to add a label to.



5. Click the **Change Label** button.
6. Enter text for the label. You can enter up to 16 characters.



7. Click **OK** to close the Label dialog box.
8. Click **OK** to close the Map Measurements dialog box.



The measurement icon displays the new label below the measurement name.



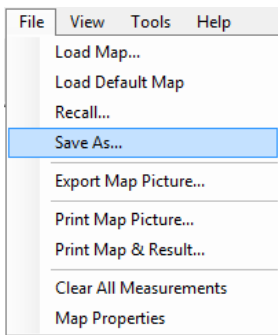
## Saving measurement results

RSA Map allows you to save measurement results to a file for documentation. Saved results can also be recalled to review results. RSA Map saves results in a compressed .zip format. The saved results contain several types of files:

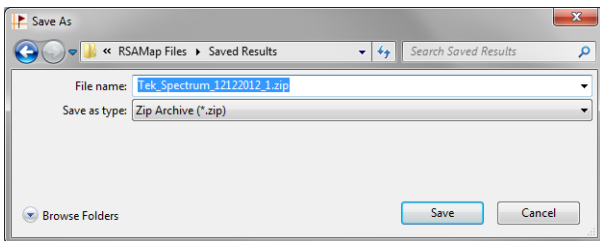
- Measurement data files (exported results)
- Map file used for the measurements
- Google Earth KMZ file
- Recallable results files (trace and setup files)
- MapInfo-compatible MIF/MID files

To save measurement results:

1. Select **File > Save As**.



2. Navigate to the location where you want to save the results and type a name for the file.



3. Select **Save** to save the results.

### Results archive format

The RSA Map results are saved in a Zip format compressed file. The structure of the Zip archive is shown in the following table.

**Table 1: Results archive contents**

Folder / Filename	Filename	Description
Readme.txt		A text document that describes the archive folder structure and file contents.
Data		Contains all exported csv-format trace data and png-format image captures. Also contains a measurement summary file.
	Measurements.csv	Summary file of all measurements in the Data folder.
	<Timestamp>_Result.csv	Full measurement results for each measurement taken.
	<Timestamp>_Picture.png	A screen capture of the measurement for each measurement taken.
KMZ		Map data for use with Google Earth.
	<ArchiveFilename>.kmz	Contains the exported .kmz data.
Map		Contains files for use by RSA Map.
	<mapfilename>	A copy of the map file in use when the measurements were taken.
Mifmid		Contains exported .mif and .mid files. These files can be imported into MapInfo for custom plotting.
	<ArchiveFilename>.mif	File containing MIF data.
	<ArchiveFilename>.mid	File containing MID data.
RSA		Contains setup and trace files for all measurement in the archive.
Tek		Contains files used by RSA Map.

### Contents of the measurements.csv file

The elements of the measurements.csv file saved in the archive is described in the following table.

#### Data and measurement csv file contents

Row	Column	Description
All	A	Longitude in decimal degrees, +/- (East/West), Example: 29.69462.
	B	Latitude in decimal degrees, +/- (North/South), Example: -2.851485.
	C	Azimuth, True North in degrees (blank if azimuth was not set for the measurement), Example: 122.
	D	Azimuth, Magnetic North in degrees (blank if azimuth was not set for the measurement), Example: 100.
	E	Result Export filename (.csv format), Example: 2e552f.csv.
	F	Result Date/Time, Example: 2012-04-28T07:41:46.
	G	Center Frequency, Hz, Example: 869200000.
	H	User Label, Example: PDX Airport
	I	Measurement Result, Example: -104.644527.
	J	Measurement Result Unit, Example: Hz..



**Measurement result.** The Measurement Result value is a single number retrieved from the measurement, and is only available for Channel Power and Occupied Channel Bandwidth.

### Google Earth output files

The RSA Map application generates a file named <ArchiveFilename>.kmz in the KMZ folder of the results archive file. <ArchiveFilename>.kmz is the same filename used by the archive .zip file. The .kmz file has a standard format that can be read by Google Earth to add RSA Map measurement icons to the Google Earth map display. To use the .kmz file in Google Earth, extract it from the .zip archive file and import it into Google Earth.

**KMZ file content.** The KMZ file contains the following files, all at the root level of the KMZ folder. There are no subfolders within the KMZ folder.

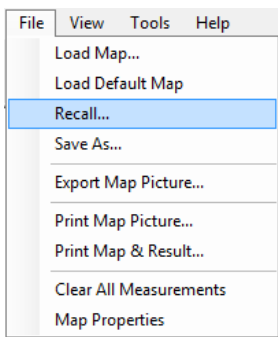
#### KMZ file contents

Filename	Description
doc.kml	KML language format file specifying point locations and icons.
<Timestamp>_ResultThumbnail.png	Measurement icon thumbnail graphic file; one for each result to be displayed on the Google Earth map.
<Timestamp>_AzimuthThumbnail.png	Azimuth arrow thumbnail graphic file; one for each result with azimuth to be displayed on the Google Earth map.

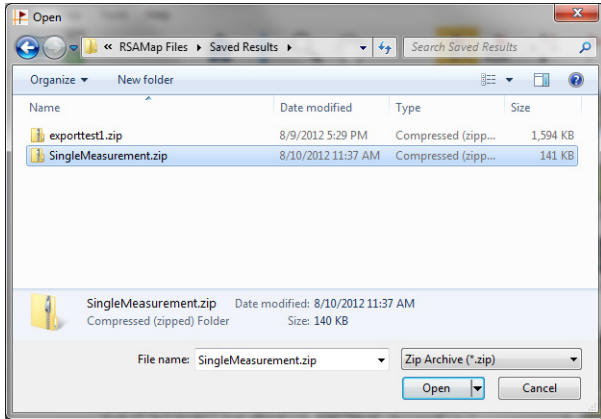
## Recalling measurement results

The Map It feature in the Host Instrument (analyzer) allows you to capture and export .zip files that can be imported into RSA Map using this recall functionality. To recall saved measurement results:

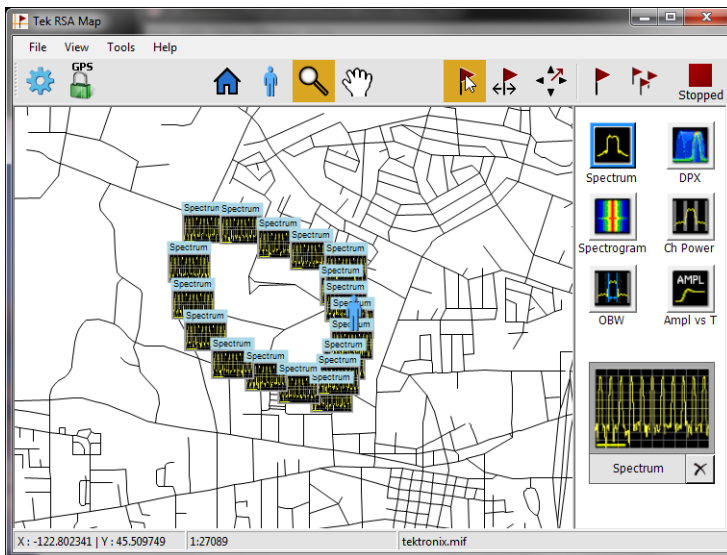
1. Select **File > Recall**.



2. Navigate to the location where you want to save the results and type a name for the file.
3. Select **Save** to save the results.



RSA Map loads the contents of the recalled measurement archive.



## RSA Map menus

**Table 2: File menu**

Menu	Description
Load Map	Loads maps.
Load Default Map	Loads the default WorldMap map.
Recall	Recall previously saved measurement results for analysis.
Save As	Save measurement results to an archive file.
Export Map Picture	Save the map display, with measurement icons, to a PNG format file for documentation.
Print Map Picture	Prints the map with measurement icons.
Print Map & Result	Prints the map with measurement icons and the measurement results. Measurement results include the following data: <ul style="list-style-type: none"> <li>■ Latitude – Latitude where the measurement was taken.</li> <li>■ Longitude – Longitude where the measurement was taken.</li> <li>■ Date \ time – Date and time the measurement was taken.</li> <li>■ Magnetic Azimuth – Present when an azimuth arrow has been added to a measurement icon.</li> <li>■ True azimuth – Present when an azimuth arrow has been added to a measurement icon.</li> <li>■ Center frequency – Center frequency of the spectrum analyzer.</li> <li>■ Result – Measured result for the selected measurement.</li> <li>■ Filename – Name of file where the measurement was saved.</li> </ul>
Clear All Measurements	Removes measurements displayed on the map.
Map Properties	Displays map characteristics. Properties displayed include map name, dimensions, latitude and longitude coordinates of the map edges, and whether the map is earth-referenced.

**Table 3: View menu**

Menu	Description
Display "You Are Here"	Displays or hides the "You Are Here" icon.
Display Measurements	Displays or hides the measurement icons. If measurements are hidden, the measurement location is indicated by a flag icon.
Azimuth line style – Line	Sets the azimuth line to just a line.
Azimuth line style – Arrow	Sets the azimuth line to a line with an arrow at the end of the line.

Table 4: Tools menu

Menu	Description
Preset	Resets the RSA Map parameters to the factory defaults.
Host Instrument	Changes the active application from RSA Map to the Host Instrument. This does not change the GNSS settings.

Table 5: Help menu

Menu	Description
Help	Displays the online help.
User Manual	Displays a PDF version of the online help.
About RSA Map	Displays information about the RSA Map version.

## Working with the map display

You can magnify and shrink the map display using the Zoom button.

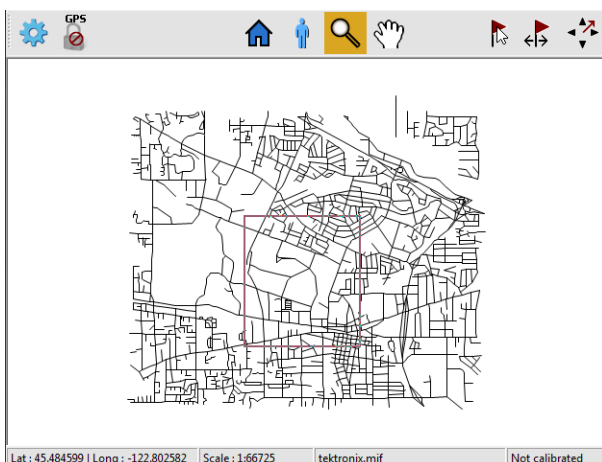
To zoom in (magnify):

1. Select the Magnify button.

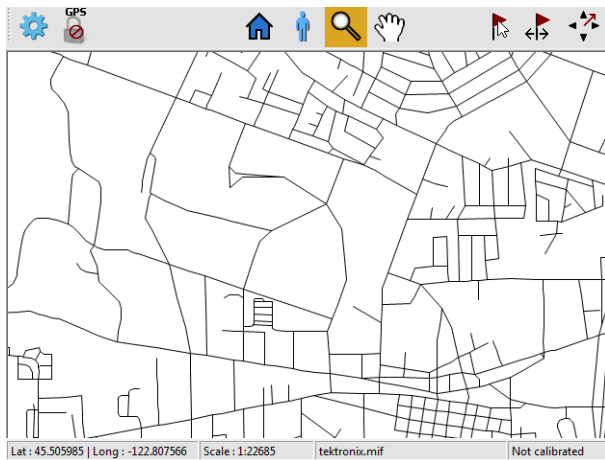


2. Locate the Magnify icon at the top-left corner of the area you wish to magnify and then click (or double-tap the touchscreen) and drag across the map down and to the right to the lower-right corner of the area you wish to magnify.

RSA Map will draw a square outline around the selected area.



3. When you have selected the area you wish to magnify, release the mouse button. RSA Map will magnify the selected area to fill the map display.



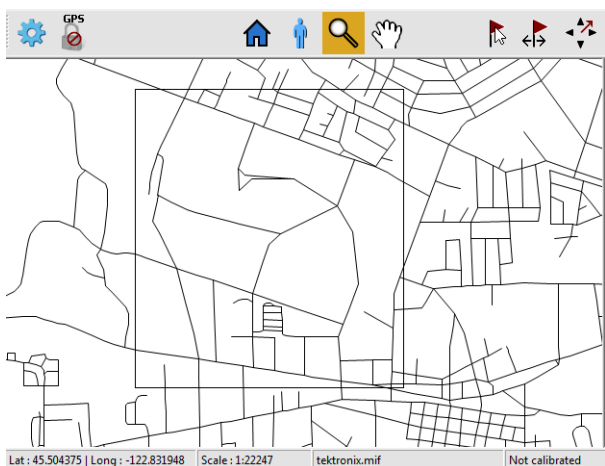
To zoom out (shrink):

1. Select the Zoom button.

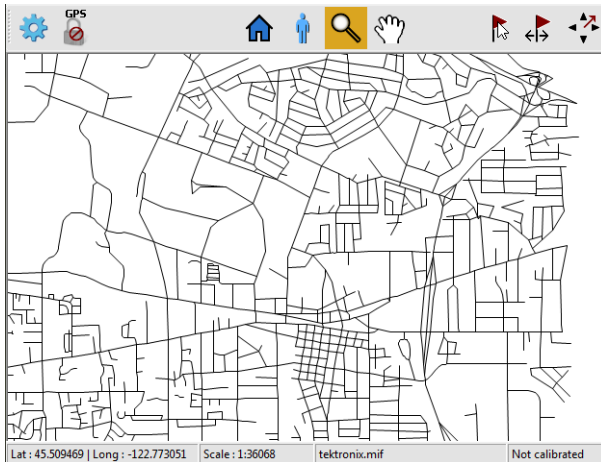


2. Locate the Zoom icon at the bottom-right corner of the area you wish to shrink and then click (or double-tap the touchscreen) and drag across the map up and to the left toward the upper-left corner of the area you wish to magnify.

RSA Map will draw a square outline around the selected area.



3. When you have selected the area you wish to zoom, release the mouse button (or lift your finger from the touchscreen). RSA Map will shrink the selected area.



### Panning the map

1. Select the Pan button.



2. Click on the map and drag the map to the desired position.

## Changing map settings

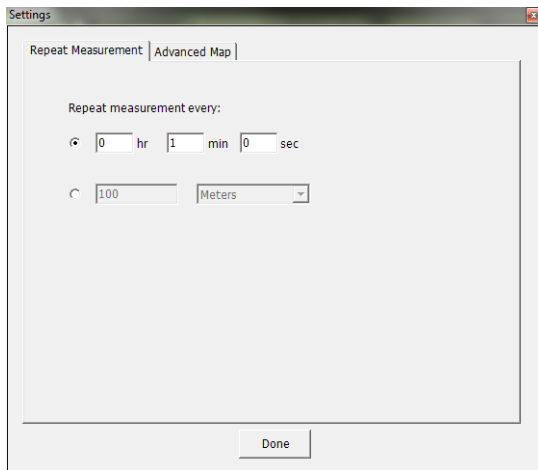
Use the Settings button to change advanced map settings.

To change advanced map settings:

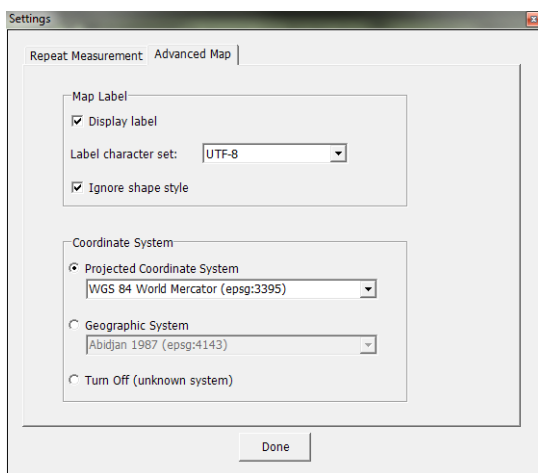


1. Click the  (Settings) button.

This displays the Settings window.



2. Click the **Advanced Map** tab.



3. Change the settings as required. See the table below.

4. Click **Done** when you have finished changing settings.

**Advanced map settings**

Group	Setting	Description
Map label	Display label	Display or hide map labels. Labels normally include street names.

**Advanced map settings (cont.)**

Group	Setting	Description
	Label character set	Set the character set for map labels. Labels on a map can be created with different character sets, for example, Chinese or English. You may need to set the character set to match the label. Available selections are: <ul style="list-style-type: none"> <li>■ System - The system character set.</li> <li>■ GBK, GB18030, Big5 – Chinese character sets.</li> <li>■ UTF-8 - A common character set encoding.</li> </ul>
	Ignore shape style	Causes RSA Map to ignore shape styles specified in a MapInfo map file.
<b>Coordinate System</b>		
	Projected Coordinate System	Sets the coordinate system. This value is set automatically when a map is loaded. For a geo-referenced map, it defaults to Projected Coordinate System (WGS 84 Word Mercator (epsg:3395)). For a non-geo-referenced map, it defaults to Geographic System (WGS 84 (epsg:4326)). You can select a different system from the drop-down list.
	Geographic System	Specifies the reference system used to represent locations. You can select a different system from the drop-down list.
	Turn Off (unknown system)	You can turn off the coordinate system if you do not know what system is being used in the loaded map.



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