

- Decimal degrees added to the coordinate system choice
- Save and load range and colour presentation
- Aircom Asset's Signia format supported
- Add GPS-based distance to time-triggered runs (accurate to within 10%)

8010 Hindsight RF
Propagation Software

Version 2.2

boosting wireless efficiency

Colour Presentation (saving and loading map legends)

Originally Hindsite would automatically set the ranges and colours for all map views. Some of the Criteria contractors are given is to present their information in the company format. For example their client is only interested when the signal falls below -110 dBm and would like this to be shown in red while everything above should be in green. Another client may want the best frequency map to show his Servers displayed with certain colours.

The customer had the option of changing the defaults but would have to do it for each and every map and then for every run or new configuration they opened.

Colour presentation allows the customer to only have to input this data once and then whenever they open up a new map view, then they can select their colour presentation.

Example 1 Creating a colour presentation

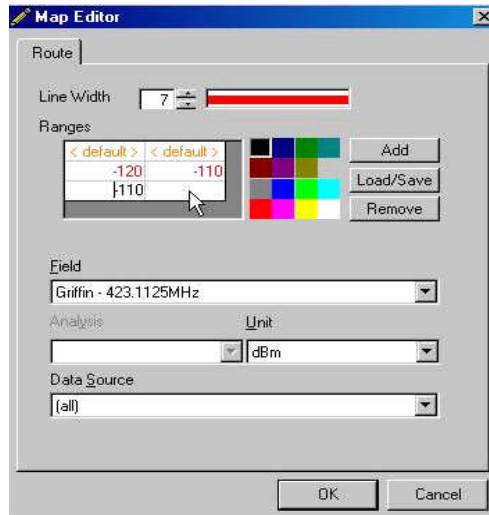
We remove a row by highlighting a cell in the ranges box. Move the mouse onto a cell and left-click. A flashing cursor will indicate that this is done. Now click on **Remove**. The row will disappear. Repeat this until only the default is left.

Now we can add our own ranges. Click on the **Add** button. An empty row will appear. Enter the new ranges here.

Ranges are entered using the keyboard. Highlight the cell using the mouse and left-click. Using the first client's information to enter the range in the first column as -120 and the range in the second column as -110.

The value in the first column is arbitrary and could be -130.

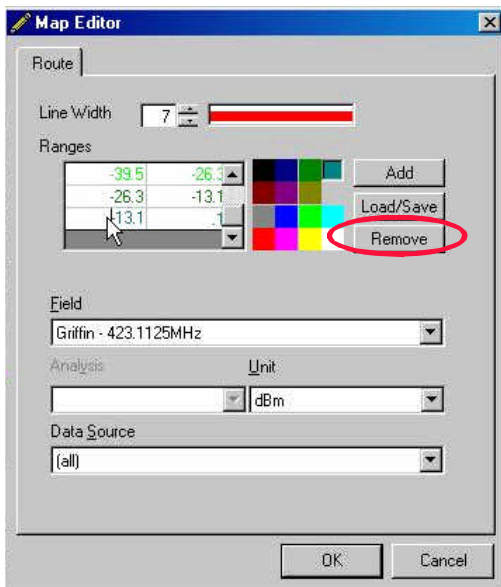
Now use the mouse to click on the red colour. We now press the add button again which will place a new row. We now enter the information -110 in the first column and -45 in the second and click on the green colour. The value for the second column is arbitrary. We could have made -45 to -10 if we knew the signal strength could possibly go up to this.



Example 2 Saving a colour presentation

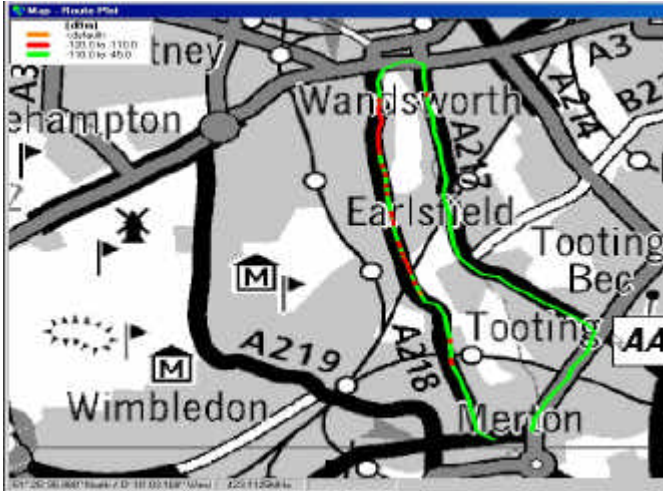
To save our presentation we click on **Load/Save**. This opens the following dialogue box. This dialogue is used for both saving and loading colour presentations.

Before we press Save we must first give our presentation a name. Type the name directly into the combo box and then press Save. In this example let's use 'Pass or Fail'. Your presentation will be saved to the windows registry. This dialogue will be closed down and return you to the Map Editor.

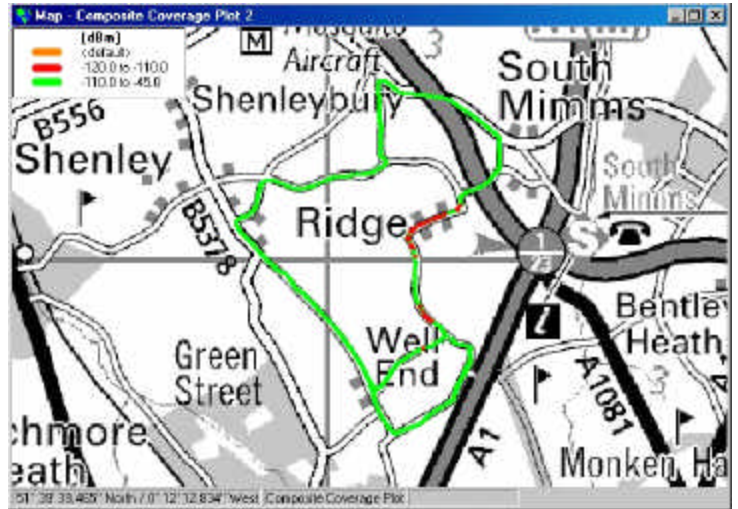


Press **OK** on the Map Editor and the map view will be updated.

The red area shows clearly where there will be no coverage or at least poor quality.

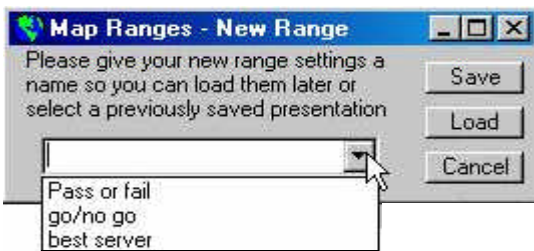


I have opened a Composite Coverage Map and I will load my "Pass or fail" colour presentation by selecting the name from the combo box and clicking **Load**. In this screen shot, coverage is within specification with an isolated problem area indicated in red.



Example 3 Loading a colour presentation

Loading is similar to saving a colour presentation. From the Map Editor press **Load/Save**. This again opens the map ranges dialogue box. From the dropdown box select the file with the mouse or type the name in and it will auto-complete. Then click **Load**. The new dialogue box will close and the ranges and colours will be loaded into the Map Editor.




Composite Coverage Table View

A Composite Coverage Table **Table** lists the highest measured signal level and also gives the corresponding frequency or server. It is only available in runs with multiple frequencies. Here is an example:

In effect this gives the same information as a best server map but in table form so it can be exported more easily. The catch-all system does a similar thing.

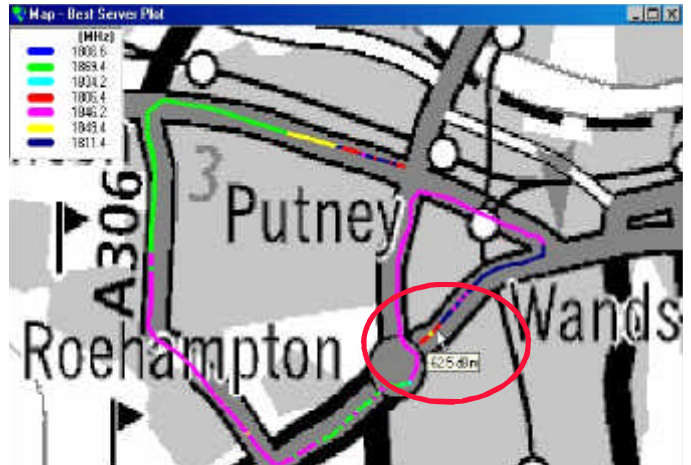
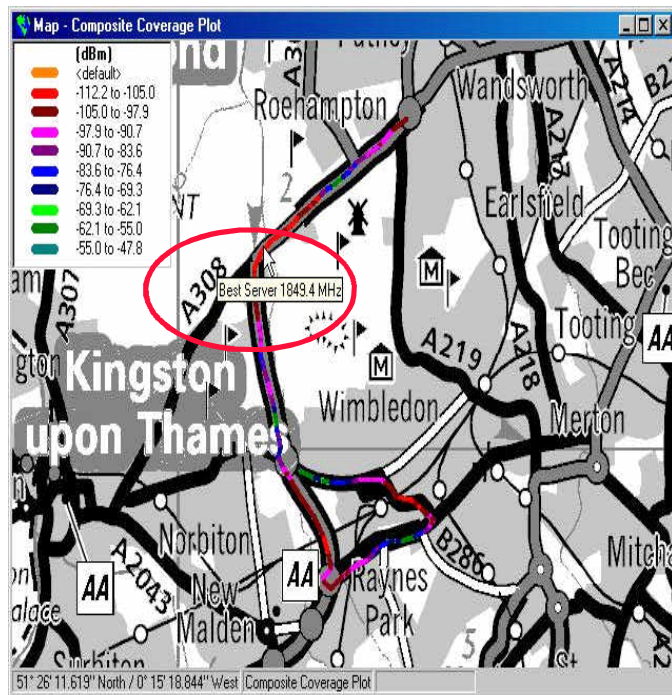
Time	Latitude (°)	Longitude (°)	Best Signal (dBm)	Best Frequency (MHz)
11:46:04				
11:46:05	51° 24' 58.167" N	0° 10' 46.077" W	-81.5	955.2
11:46:06	51° 24' 58.283" N	0° 10' 46.017" W	-76.5	955.2
11:46:06	51° 24' 58.398" N	0° 10' 45.958" W	-82.2	950.4
11:46:07	51° 24' 58.514" N	0° 10' 45.898" W	-82.1	950.4
11:46:08	51° 24' 58.630" N	0° 10' 45.838" W	-83.4	950.4
11:46:09	51° 24' 58.746" N	0° 10' 45.778" W	-81.6	950.4
11:46:09	51° 24' 58.862" N	0° 10' 45.718" W	-82.3	950.4
11:46:10	51° 24' 58.977" N	0° 10' 45.658" W	-78.8	955.2
11:46:11	51° 24' 59.093" N	0° 10' 45.598" W	-80.6	955.2
11:46:12	51° 24' 59.209" N	0° 10' 45.538" W	-80.6	950.4
11:46:12	51° 24' 59.325" N	0° 10' 45.478" W	-79.5	950.4
11:46:13	51° 24' 59.441" N	0° 10' 45.418" W	-68.8	955.2
11:46:14	51° 24' 59.556" N	0° 10' 45.358" W	-79.3	950.4
11:46:15	51° 24' 59.672" N	0° 10' 45.298" W	-68.6	955.2
11:46:15	51° 24' 59.788" N	0° 10' 45.238" W	-71.6	955.2
11:46:16	51° 24' 59.904" N	0° 10' 45.178" W	-70.2	955.2
11:46:17	51° 25' 00.019" N	0° 10' 45.118" W	-70.1	955.2
11:46:18	51° 25' 00.135" N	0° 10' 45.058" W	-70.5	955.2
11:46:18	51° 25' 00.251" N	0° 10' 44.998" W	-60.7	955.2
11:46:19	51° 25' 00.367" N	0° 10' 44.938" W	-62.7	955.2
11:46:20	51° 25' 00.483" N	0° 10' 44.878" W	-70.3	955.2
11:46:21	51° 25' 00.598" N	0° 10' 44.818" W	-63.8	955.2
11:46:21	51° 25' 00.714" N	0° 10' 44.758" W	-64.1	955.2
11:46:22	51° 25' 00.830" N	0° 10' 44.700" W	-69.8	955.2

Composite Coverage Map View

The Composite Coverage Map  plots the highest signal level from the frequencies being measured. It is only available if you have measured multiple frequencies. In the map editor you can remove frequencies and change the level units.

The route is coloured according to the highest signal level and is annotated with the frequency of the best server.

In this example the point indicated with the mouse shows the best server is 1849.4 MHz and the route is red so the signal strength is between -112.2 to -105.



Removing Frequencies

This is only available for multiple frequency runs and only with the best Server and Composite Coverage Map.

This new feature gives the ability to remove frequencies (servers) from the presentation and create "what if..." scenarios. The customer may remove sites from the map view to create a powerful analysis of combinations of different sites.

The removal of frequencies can be found in the Map Editor for Best Server and Composite Coverage.

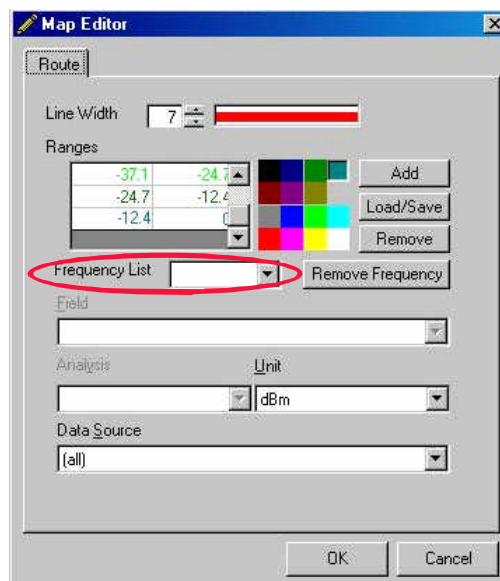
The frequency list

This dropdown box will contain the list of frequencies that were used during the run. To remove one of the frequencies from your plot, select the frequency from the combo box and then click **Remove Frequency**. Repeat this process if necessary.

When done click **OK**. The map will now be updated.

Best Server Map View

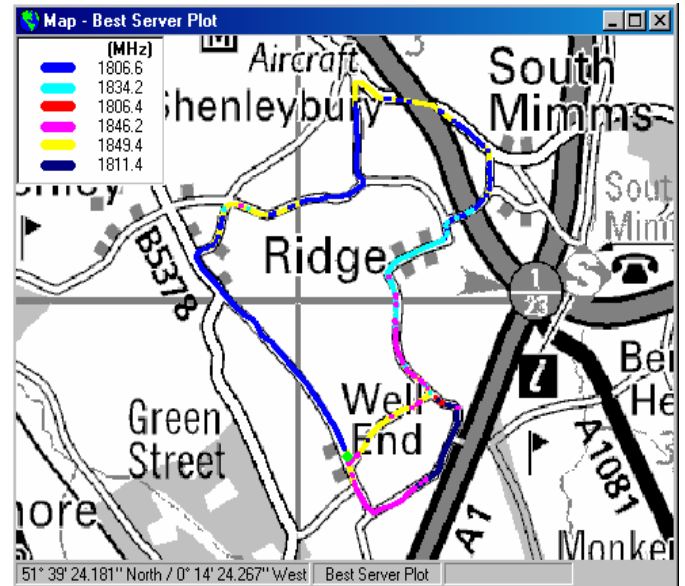
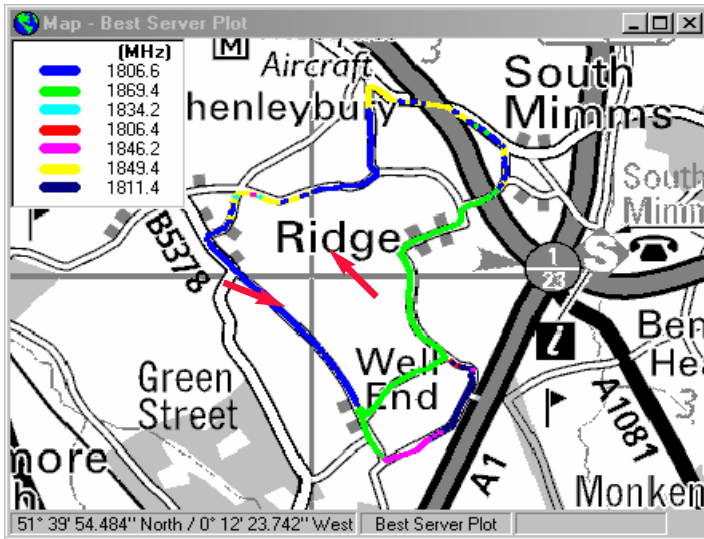
The Best Server Map view has also had a slight change. The route is still coloured according to the best server frequency but the map is annotated with the measured level. In the map editor, you can remove frequencies and change the level units. In the case below the frequency 1806.4 MHz (red) is -62dBm where the mouse pointer is indicating.



Example 4 Removing a frequency from a best server map

Open a Best Server view. If there is one already open then close it down and open a new one. We can see from the plot that the server 1869.4 MHz has the highest signal strength in the green section of the road and is serving that section of the road.

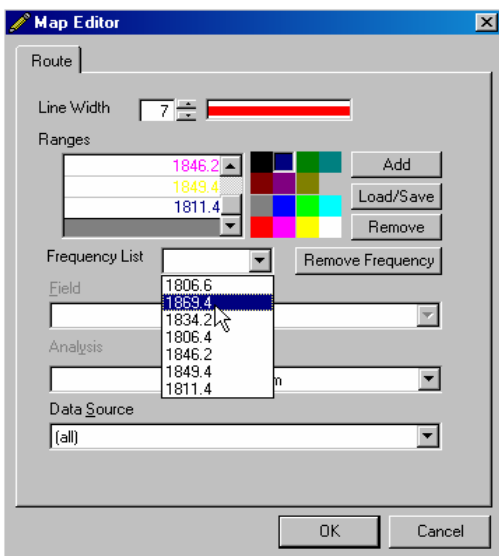
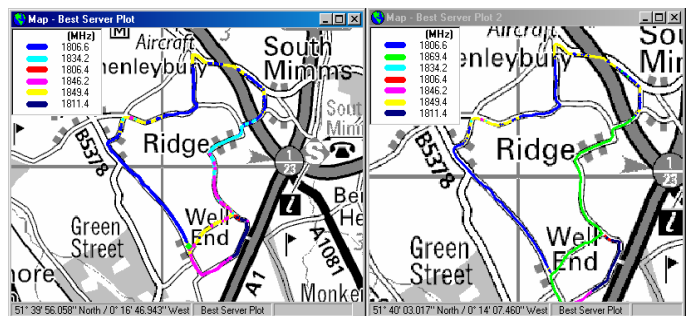
If we now open another Best Server Map we can directly compare the two views. The map on the right contains all the frequencies. The map below shows the after then before the frequency is removed. We could even open another view and remove different combinations of frequencies and see the effect.




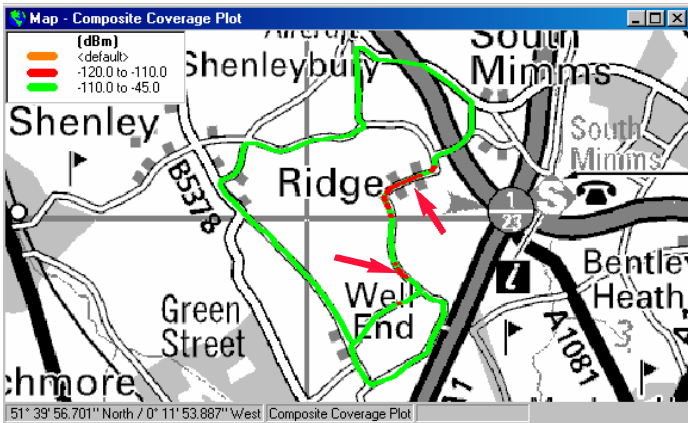
What if we wanted to see the route plot with that server removed. First we would bring up the Map Editor and select the frequency we want to remove from the dropdown box and click **Remove Frequency**.

The frequency combo box will go blank as a sign that the frequency has been removed.

Now click **OK** and the map will be updated.



We could now go a step further. Some network planners are interested in whether they have coverage or not. At this stage we could open a composite coverage map, remove the same frequency and using our previously saved colour presentation, find out if the coverage is a pass or fail. To do this we would first open a Composite Coverage Map  and then right-click and select properties to go into the Map Editor. Now follow example 3 on how to load a colour presentation and example 4 on how to remove a frequency. The result should be the map below.




In the analysis, it is clear by losing that server the coverage will fall below the requirement. This also gives an indication of coverage during heavy traffic periods. Like with the Best Server we can open multiple views and remove which frequencies we like for on-screen comparisons as well as being able to print off maps or add them to reports.

Adding Distance based on GPS coordinates

Another new feature requested by customers is adding distance to a time-triggered run. This is only to be used for new run files. It is not compatible with run files made with previous releases of Hindsight. Distance is derived from two GPS coordinates. This is available to runs that are time-triggered. It is available as a selectable field in all table views.

Example 5 Adding Distance to a Confidence Table

In this example I am using run file GPR-TIME-942.2 MHz-Routetrace.hsr. When the GPR is in multiple sample mode, it takes 200 samples a second. The percentage and confidence values are calculated by the GPR and then sent to Hindsight. First open the run file.

From the icon toolbar select . This will open the Confidence Table. From the highlighted section, taking the 20 dBµV column, we can say with 90% confidence that the signal strength will equal or exceed this level.

Time	Latitude	Longitude	10dBµV (%)	20dBµV (%)	30dBµV (%)
16:23:25	51° 22' 26.868" N	0° 17' 12.993" W	100	100	100
16:23:26	51° 22' 26.610" N	0° 17' 13.880" W	100	96	58
16:23:27	51° 22' 26.345" N	0° 17' 14.779" W	100	100	85
16:23:28	51° 22' 26.074" N	0° 17' 15.695" W	100	98	63
16:23:29	51° 22' 25.801" N	0° 17' 16.620" W	100	100	100
16:23:30	51° 22' 25.529" N	0° 17' 17.545" W	100	100	95
16:23:31	51° 22' 25.258" N	0° 17' 18.473" W	100	90	38
16:23:32	51° 22' 24.986" N	0° 17' 19.406" W	100	90	38
16:23:33	51° 22' 24.734" N	0° 17' 20.340" W	100	98	69
16:23:35	51° 22' 24.435" N	0° 17' 21.409" W	95	68	9
16:23:35	51° 22' 24.211" N	0° 17' 22.208" W	100	100	40
16:23:36	51° 22' 23.949" N	0° 17' 23.141" W	100	100	71
16:23:38	51° 22' 23.685" N	0° 17' 24.084" W	98	77	1
16:23:39	51° 22' 23.423" N	0° 17' 25.017" W	100	92	10
16:23:40	51° 22' 23.158" N	0° 17' 25.960" W	100	89	7
16:23:41	51° 22' 22.894" N	0° 17' 26.902" W	100	65	0
16:23:42	51° 22' 22.630" N	0° 17' 27.846" W	100	83	4

We now want to add GPS distance. First we right-click and select properties to bring up the Table Editor. The next thing we need to do is add a column.

It looks better to place the distance column between the time and latitude. This is done by selecting column 2 using the scroll controls and clicking **Insert**.

From the field combo box we scroll down and select 'GPR-GPS Distance'. This would say Griffin if this run file was done by a Griffin. Do not choose 'GPR-Distance' as this contains information used for route tracing and will give no valid results. By default the units are set to miles but you may change the units to your requirements in the unit combo box. Click **OK** on the Table Editor to update the view.


Time	Distance GPS (km)	Latitude (°)	Longitude (°)	10dBμV (%)	20dBμV (%)	30dBμV (%)
16:23:28	1.870955	51° 22' 26.074" N	0° 17' 15.695" W	100	98	63
16:23:29	1.894207	51° 22' 25.801" N	0° 17' 16.620" W	100	100	100
16:23:30	1.91771	51° 22' 25.529" N	0° 17' 17.545" W	100	100	95
16:23:31	1.94119	51° 22' 25.258" N	0° 17' 18.473" W	100	90	38
16:23:32	1.964706	51° 22' 24.996" N	0° 17' 19.406" W	100	90	38
16:23:33	1.988247	51° 22' 24.734" N	0° 17' 20.340" W	100	98	69
16:23:35	2.011811	51° 22' 24.435" N	0° 17' 21.409" W	95	68	9
16:23:35	2.038778	51° 22' 24.211" N	0° 17' 22.208" W	100	100	40
16:23:36	2.058917	51° 22' 23.949" N	0° 17' 23.141" W	100	100	71
16:23:38	2.082458	51° 22' 23.685" N	0° 17' 24.084" W	98	77	1
16:23:39	2.10625	51° 22' 23.423" N	0° 17' 25.017" W	100	92	10
16:23:40	2.129792	51° 22' 23.158" N	0° 17' 25.960" W	100	89	7
16:23:41	2.153584	51° 22' 22.894" N	0° 17' 26.902" W	100	65	0
16:23:42	2.177354	51° 22' 22.630" N	0° 17' 27.846" W	100	83	4

Please refer to the 8010 Hindsite RF Propagation Software data sheet for more details.

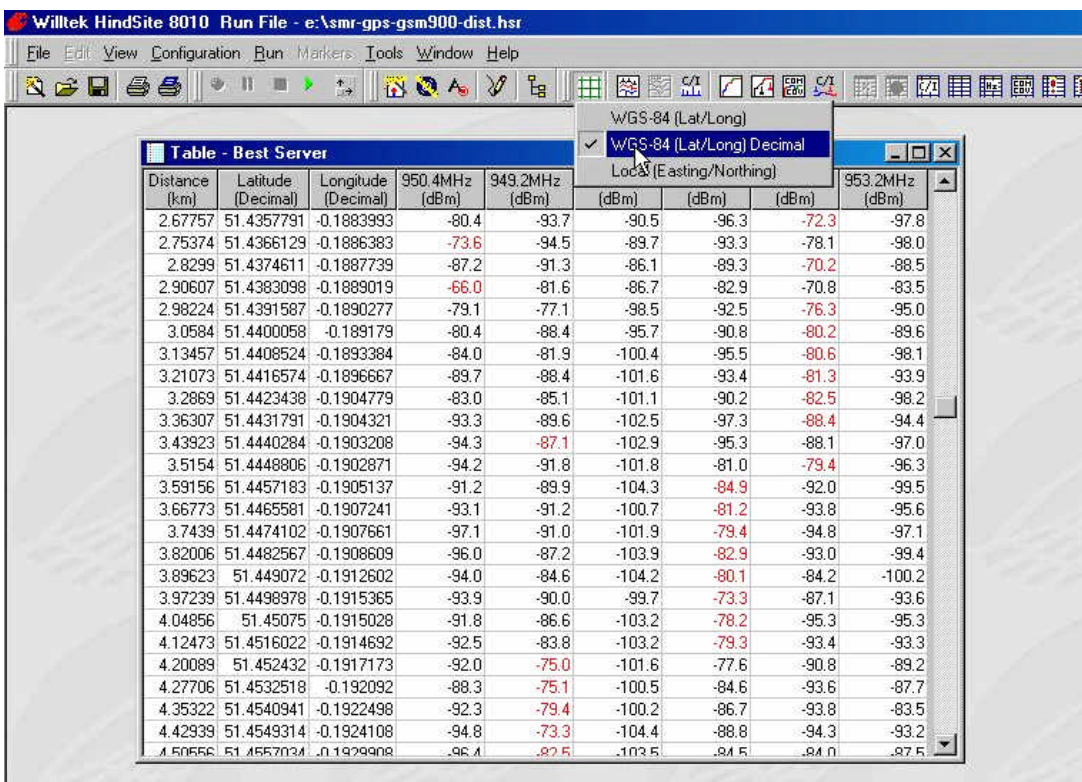
In the screen shot above I also changed the unit field to convert the distance to kilometers.

Decimal degrees

Most planning tools require GPS information to be in decimal degrees. Many customers had asked for this feature to be included. Decimal degrees are made up of degrees and minutes. A negative number tells the direction (south for latitude, west for longitude).

The option is accessed from the local coordinate system . A dropdown menu appears prompting you to make a selection. Clicking on WGS-84(Lat/Long), decimal will change all open views to decimal degrees. The coordinate system with the tick is the current system. Once the coordinates have been changed, the table can now be exported using the ASCII format.

If using one of the other export facilities, DO NOT change the coordinate system from the default WGS-84 (Lat/Long).



The screenshot shows the 'Willtek HindSite 8010 Run File' window. A dropdown menu is open, showing options for coordinate systems: 'WGS-84 (Lat/Long)', 'WGS-84 (Lat/Long) Decimal' (which is selected with a checkmark), and 'Local (Easting/Northing)'. Below the menu, a table titled 'Table - Best Server' displays signal strength data for various frequencies (950, 949, and 953 MHz) across multiple locations. The table columns include Distance (km), Latitude (Decimal), Longitude (Decimal), and signal strength in dBm for each frequency.

Distance (km)	Latitude (Decimal)	Longitude (Decimal)	950.4MHz (dBm)	949.2MHz (dBm)	953.2MHz (dBm)
2.67757	51.4357791	-0.1883993	-80.4	-93.7	-90.5
2.75374	51.4366129	-0.1886383	-73.6	-94.5	-89.7
2.8299	51.4374611	-0.1887739	-87.2	-91.3	-86.1
2.90607	51.4383098	-0.1889019	-66.0	-81.6	-86.7
2.98224	51.4391587	-0.1890277	-79.1	-77.1	-98.5
3.0584	51.4400058	-0.189179	-80.4	-88.4	-95.7
3.13457	51.4408524	-0.1893384	-84.0	-81.9	-100.4
3.21073	51.4416574	-0.1896667	-89.7	-88.4	-101.6
3.2869	51.4423438	-0.1904779	-83.0	-85.1	-101.1
3.36307	51.4431791	-0.1904321	-93.3	-89.6	-102.5
3.43823	51.4440284	-0.1903208	-94.3	-87.1	-102.9
3.5154	51.4448806	-0.1902871	-94.2	-91.8	-101.8
3.59156	51.4457183	-0.1905137	-91.2	-89.9	-104.3
3.66773	51.4465581	-0.1907241	-93.1	-91.2	-100.7
3.7439	51.4474102	-0.1907661	-97.1	-91.0	-101.9
3.82006	51.4482567	-0.1908609	-96.0	-87.2	-103.9
3.89623	51.449072	-0.1912602	-94.0	-84.6	-104.2
3.97239	51.4498978	-0.1915365	-93.9	-90.0	-99.7
4.04856	51.45075	-0.1915028	-91.8	-86.6	-103.2
4.12473	51.4516022	-0.1914692	-92.5	-83.8	-103.2
4.20089	51.452432	-0.1917173	-92.0	-75.0	-101.6
4.27706	51.4532518	-0.192092	-88.3	-75.1	-100.5
4.35322	51.4540941	-0.1922498	-92.3	-79.4	-100.2
4.42939	51.4549314	-0.1924108	-94.8	-73.3	-104.4
4.50556	51.4557034	-0.1929908	-96.4	-82.5	-103.5

Ordering information

8010 Hindsite™ RF Propagation Test Software	
MS Windows 95, 98, NT 4.0, 2000, XP	M 897 825
8301 Griffin Fast Measurement Receiver	M 100 501
US cellular, GSM 900	
8302 Griffin Fast Measurement Receiver	M 100 501
US PCS, GSM 1800	
8381 Griffin UMTS Down Converter for 8301 Griffin	M 248 650
8382 Griffin Up-Converter for 8301 Griffin	M 248 648
8103 GPR General Purpose Receiver 26 MHz to 1000 MHz	M 100 603



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