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User's Guide

TEMS Discovery Device 10.0

Contents

1 Getting Started

Welcome to TEMS Discovery!

TEMS Discovery is a measurement data analysis and network optimization tool. It introduces many unique and advanced features to enhance productivity. Consequently, you might not be able to easily familiarize yourself with TEMS Discovery without taking a demo session, or referring to the Help file. But we promise that you will quickly appreciate the powerful and user-friendly functions of TEMS Discovery. Should you have any questions, or would like to request a live demo over the Internet, please feel free to contact us.

1.1 Contact Information

Please refer any dimensioning or server hardware questions to your customer-specific Account Manager within the Ascom Sales organization, your Ascom Service Delivery contact person, or your Ascom Customer Support contact.

You may also contact the Ascom Global Help Desk for support. (Global Help Desk services are not available in China or Russia. If you are in one of those regions, please use the local numbers specified below.)

- Email: customercare.tems@ascom.com
- Telephone: +1.855.323.5755

Region-specific contact information is listed below.

AMERICAS

+1.800.522.9670 Hours of Operation: 8:00 AM - 7:00 PM

EUROPE, MIDDLE EAST, AND AFRICA

+46.10.492.5005 Hours of Operation: 8:30 AM - 5:00 PM

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+7.495.777.0085 Hours of Operation: 9:00 AM - 5:30 PM (Moscow Time)

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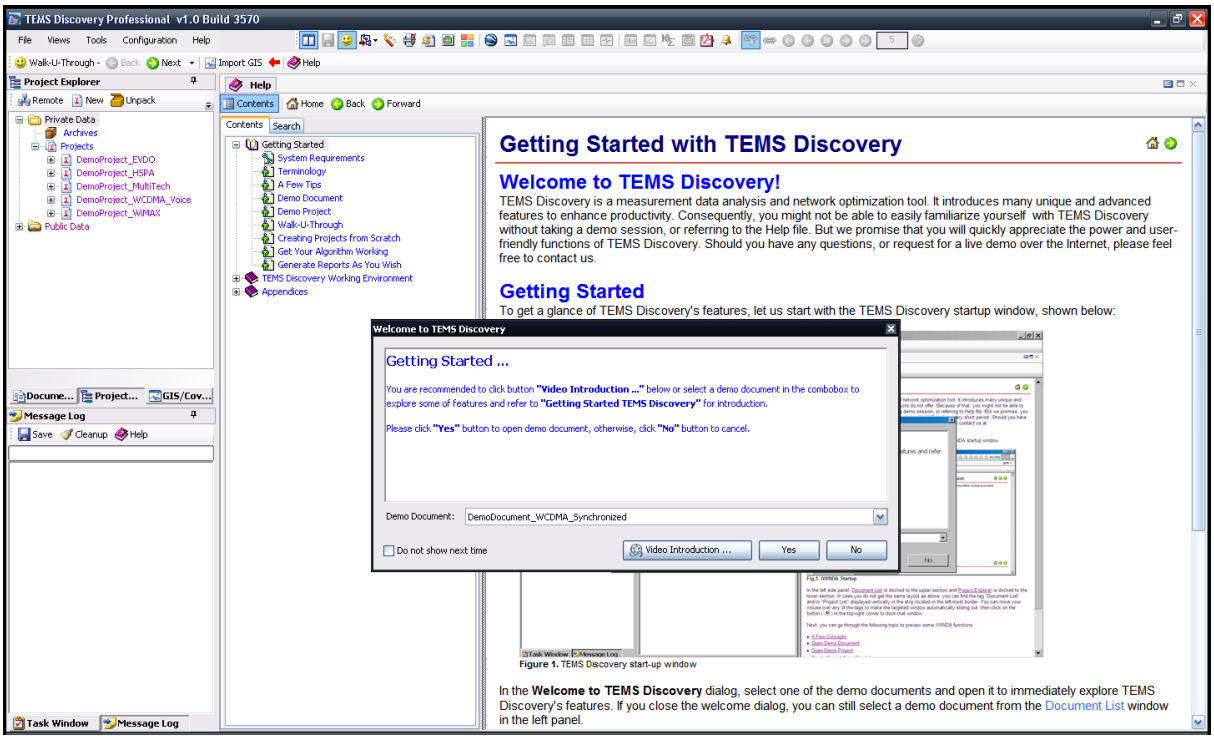
INDIA

+91.98.80500500 Hours of Operation: 9:30 AM - 6:30 PM

1.2 TEMS Discovery Startup Window

To get a glance at TEMS Discovery's features, let us start with the TEMS Discovery startup window, shown below:



In the **Welcome to TEMS Discovery** dialog, select one of the demo documents and open it to immediately explore TEMS Discovery's features. If you close the Welcome dialog, you can still select a demo document from the Document List window in the left panel.

The Document List is docked in the upper section of the left panel, and the Project List is docked in the lower section. If the layout you see is not similar to the one shown above, look at the strip at the far left border for the vertically-displayed tags **Document List** and/or **Project List**. You can hover your mouse over any of the tags, and the window will slide out. Then, click the **Pin** button at the top-right corner to dock that window.

Next, you can go through the following topics to preview some of TEMS Discovery's functions:

- System Requirements
- Terminology
- Open Demo Document
- Open Demo Project
- Create Projects from Scratch
- Get Your Algorithm Working
- Generate Reports As You Wish

1.3 System Requirements

1.3.1 Software Requirements

TEMS Discovery can run on Microsoft Windows operating systems that are compatible with Microsoft .Net framework version 4.0, either 32-bit or 64-bit. Windows XP is no longer supported.

The following components are also required:

- **Microsoft .Net framework version 4.0**

  http://www.microsoft.com/en-us/download/details.aspx?id=17851
- **Microsoft Office Excel (optional)**. Microsoft Office Excel will be used to open the output Excel file from TEMS Discovery Report Engine.
- **PDF viewer (optional)**. A PDF viewer such as Adobe PDF Reader will be used to open the output PDF file from the TEMS Discovery Report Engine.
- **Google Earth 3D Plug-in (optional)**. This component is needed for TEMS Discovery's integrated Google Earth Viewer. It can be downloaded from: http://earth.google.com/download-earth.html

  http://www.microsoft.com/downloads/details.aspx?FamilyId=333325FD-AE52-4E35-B531-508D977D32A6&displaylang=en

NOTE: In a 64-bit windows operating system, the error dialog *Google Update installation failed with error 0x80040714* may appear. Currently, there is no solution for this issue.

- **Bing Map 3D Plug-in (optional)**. This component is needed for TEMS Discovery's integrated Bing Map Viewer. It can be downloaded from: http://www.bing.com/maps/Help/VE3DInstall/Default.aspx?action=install&mkt=en-us
- **Java Runtime Environment (optional)**. Google Earth and Bing Map require the Java Runtime Environment (JRE). You can download the 32-bit installation package from:

  http://javadl.sun.com/webapps/download/AutoDL?BundleId=29226.

NOTE: Even for a 64-bit operating system, TEMS Discovery still requires a 32-bit Java Runtime Environment.

1.3.2 Hardware Requirements

1.3.2.1 Hardware Requirements – TEMS Discovery Professional

The minimum and recommended requirements for a typical single user environment within TEMS Discovery Professional are listed below.

Minimum requirement: 1.6GHz CPU, 2GB RAM, 250GB hard disk

Recommended requirement: Intel® i7 (2.4GHz) CPU, 8GB RAM, 500GB hard disk

For a multi-user environment, the following is a general guideline for the average configuration:

1. Six-core 2.66GHz Processor, plus one additional core of processor for each concurrent user
2. 32GB RAM plus an additional 1GB RAM for each concurrent user
3. Hard disk space should be at least double the size of the data to be processed
4. Sufficient internet bandwidth

1.3.2.2 Hardware Requirements – TEMS Discovery Enterprise

The hardware required by TEMS Discovery Enterprise varies, depending on the amount of data being processed and how the data is processed. Processing capacity and hardware requirements for various single server systems are provided in the following tables.

Configuration	4 data processing threads	8 data processing threads	24 data processing threads	48 data processing threads
Base Server	HP ProLiant ML370 G6 Small Form Factor Tower Server	HP ProLiant ML370 G6 Small Form Factor Tower Server	HP ProLiant DL580 G7 Server	HP ProLiant DL580 G7 Server
Processor	1 X Intel® Xeon® Processor E5649 (6 core, 2.53 GHz, 12MB L3, 80W)	2 X Intel® Xeon® Processors E5649 (6 core, 2.53 GHz, 12MB L3, 80W)	2 X 10-Core Intel® Xeon® Processors E7-4850 (2.00GHz, 24MB Cache, 130W)	4 X 8-Core Intel® Xeon® Processors E7-4830 (2.13GHz, 24MB Cache, 105W)
Storage Controller	P410i/512 BBWC	P410i/512 BBWC	P410i/512 BBWC	P410i/512 BBWC
Total Memory	HP 64GB PC3-8500R 4x16GB 4Rank Memory	HP 64GB PC3-8500R 4x16GB 4Rank Memory	HP 128GB PC3-10600R 16x8GB	HP 128GB PC3-10600R 16x8GB
Log file processing capacity (avg.)	650MB per hour	1GB per hour	2.8GB per hour	

Configuration	4 data processing threads	8 data processing threads	24 data processing threads	48 data processing threads
Database size	DB_SIZE (GB) = 1.625 X Total_Hours_Per_Day X Total_Days	DB_SIZE (GB) = 2.5 X Total_Hours_Per_Day X Total_Days	DB_SIZE (GB) = 7 X Total_Hours_Per_Day X Total_Days	

For Drives (use 64-KB NTFS block size):

Configuration	4 data processing threads	8 data processing threads	24 data processing threads	48 data processing threads
C: (OS) (RAID 1) (Software including SQL Server)	2 x HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug	2 x HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug	2 x HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug	2 x HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug
E: (TEMP) (RAID 0) TD temp files and SQL temp files	2 x HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug	2 x HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug	2 x HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug	4 x HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug
F: (SQL_Database) (RAID 5)	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug or HP 600GB 6G Hot Plug 2.5 SAS Dual Port 10K rpm Enterprise Hard Drive Total_Drive = 1 + (DB_SIZE / 300) or (DB_SIZE/ 600) Minimum of 3 Drives	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug or HP 600GB 6G Hot Plug 2.5 SAS Dual Port 10K rpm Enterprise Hard Drive Total_Drive = 1 + (DB_SIZE / 300) or (DB_SIZE/ 600) Minimum of 3 Drives	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug or HP 600GB 6G Hot Plug 2.5 SAS Dual Port 10K rpm Enterprise Hard Drive Total_Drive = 1 + (DB_SIZE / 300) or (DB_SIZE/ 600) Minimum of 4 Drives	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug or HP 600GB 6G Hot Plug 2.5 SAS Dual Port 10K rpm Enterprise Hard Drive Total_Drive = 1 + (DB_SIZE / 300) or (DB_SIZE/ 600) Minimum of 5 Drives

If there are more than 8 drives, then additional drive cages/enclosures and storage controllers are required.

Each drive cage will hold 8 drives.

Configuration	4 data processing threads	8 data processing threads	24 data processing threads	48 data processing threads
Drive Cage/ Enclosure	HP 8-Bay Small Form Factor Drive Cage		HP D2700 Disk Enclosure – It will hold 25 SFF SAS drives.	
Additional Controller	HP SAS Expander Card or HP Smart Array P812 controller		HP Smart Array P812 controller	

1.4 Terminology

To quickly familiarize yourself with TEMS Discovery, it is necessary to know and understand the following terminology:

Project. A project is a placeholder used to organize the processed data from a geographic region. Mixing data collected from two distant regions in a project will result in substantial distortion of the display on Map Views; however, multiple projects can be created for a given region. All the data in TEMS Discovery is structurally organized, and, unlike competing tools that require you to load raw log data in every new session, TEMS Discovery loads the data once and saves the processed data permanently until it is removed.

GIS Data and Geo Area. GIS data used in TEMS Discovery includes vector data, raster images, and terrain elevation data. Data from the same geographic region is grouped into a geo area that can be referred to by one or more projects. GIS data is optional, but can be very helpful for troubleshooting.

Dataset. A dataset is created by importing one or more raw drive test files. All of the processed data is organized according to certain attributes, including the original file names, device names, mobile IDs, labels, etc. Multiple datasets can be created under a project to organize the data collected from different time frames, optimization phases, vendors, sub-geo regions, or any other attributes. Newly collected data can be appended onto any existing dataset or project.

Composite Dataset. Processed data from one or more datasets of a project can be logically combined into composite datasets. A typical practice is to group the processed data by one of their attributes, such as mobile IDs or functional labels (long call, short call, PS call, etc.), and then generate one composite dataset for each of the groups.

Coverage Maps. Coverage maps are the prediction data from RF planning and design tools. Any prediction data in a format similar to raster images or terrain elevation data supported by TEMS Discovery can be imported. The imported data can then be used for both background display and to create prediction vs. measurement delta metrics.

View Layout. A view layout is a configuration setting that describes the organization of various data views. The user can open a project with one of the saved view layouts.

Analysis Set. An analysis set is a set of view layouts that includes precise configuration settings that describe the specific names of the metrics to be displayed in a given view. The user can send an entire set of metrics defined in an analysis set from a selected data source with a single click.

[TEMS Discovery] Document. A TEMS Discovery document defines the configuration settings of the specific data sources, displayed metrics, and view layouts. Opening a TEMS Discovery document will restore almost all aspects of any saved information, except for the zoom level.

1.5 Data Archive vs. Export vs. Sharing

Cleaning up the Datasets:
Archiving is a method for taking datasets out of the active working data , but keeping it available locally. It will move the datasets from the Explorer>DataSets branch to the Exploreer>Archives branch. The data is stored in compressed files on disk to save space. Archiving is available in the Properties menu at the file, device, and dataset levels.

Sharing the views, configurations, settings, and map sets:
Exporting is the method in TEMS Discovery of saving a view, a configuration set, settings, or maps sets for sharing and distribution to others. It is available in the Properties menu at the file, device, and dataset levels, and in the Configuration>Configuration Management menu at the project level.

Sharing imported datasets:
Packing for Sharing is the method in TEMS Discovery of saving imported datasets for sharing and distribution to others. It is available in the Properties menu at the dataset level, not the device or file levels.

1.6 A Few Tips

TEMS Discovery has several unique features that will allow you to easily customize TEMS Discovery's display to suit your needs and preferences. The settings can be easily saved for future use.

View Arrangement. One of TEMS Discovery's special features is its moveable window views. This feature allows you to arrange the layout of the views to best suit your presentation needs. Each view can be locked, hidden, or even dragged to another monitor as a floating window.

Any view can be enabled or disabled by clicking the related toolbar buttons, or by selecting a sub-menu under *Views*. By default, the newly enabled view overlaps an existing view. To rearrange a view, simply move the mouse to the view title, left-click, and drag the view to the target position on the screen. To overlap two views, simply drag one view to the title of the other view.

Creating Sub-Views. To further break down the primary view windows, TEMS Discovery enables users to create sub-views that help organize data by placing it into smaller groups.

To divide the Map View, Time Chart, Histogram, or Correlation View into several smaller views, click the **Table Size** button  on the view's toolbar.

Using Drag-and-Drop. To display any metric in any view, the user can drag-and-drop the metric from the Data Explorer into the target view.

Dealing with Right-Click Context Menus. Right-clicking an object or at any space in a given view will bring up a context menu that can be applied to the selected object or view.

Dual-mode Toolbar Buttons. Toolbar buttons containing both "+" and "-" signs are dual-mode buttons. Left-clicking performs the opposite function as right-clicking (e.g., left-clicking zooms in and right-clicking zooms out).

Samples of dual-mode toolbar buttons:  ,  , and 

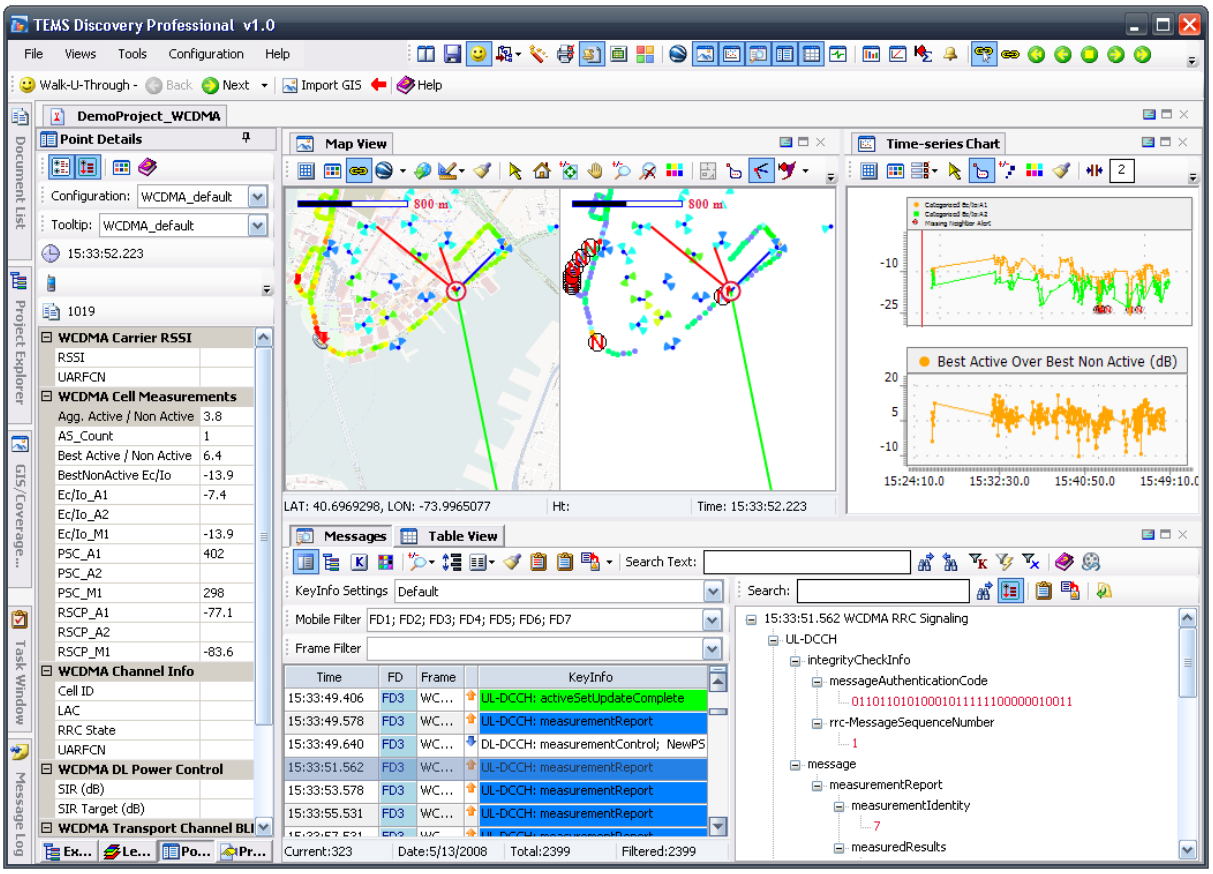
1.7 Demo Documents

The Document List in the DemoProject_WCDMA, contains several demo documents, including:

- **DemoDocument_EVDO**. A demonstration of a partial list of EVDO metrics supported by TEMS Discovery.
- **DemoDocument_Indoor**. A demonstration of TEMS Discovery's ability to handle indoor measurements. Indoor floor prints can easily be geo-referenced with TEMS Discovery and displayed along with outdoor GIS data. The user can switch between indoor and outdoor modes with a single click.

- **DemoDocument_WCDMA**. A demonstration of TEMS Discovery's rich data visualization and flexible view arrangement, and a demonstration of the synchronization of all views.

To open a demo document, double-click on any of the three documents, or, if right-clicking, select *Open* from the context menu. The following screen will appear if you open the demo document *DemoDocument_WCDMA*.



The opened document contains a project called *DemoProject_WCDMA,* as well as the configuration of data presentations. By opening this document, some project data will be automatically displayed in synchronizable views, including Map View, Time Chart, Messages View, and Table View. Other project data may be displayed in summary data views, such as the Histogram.

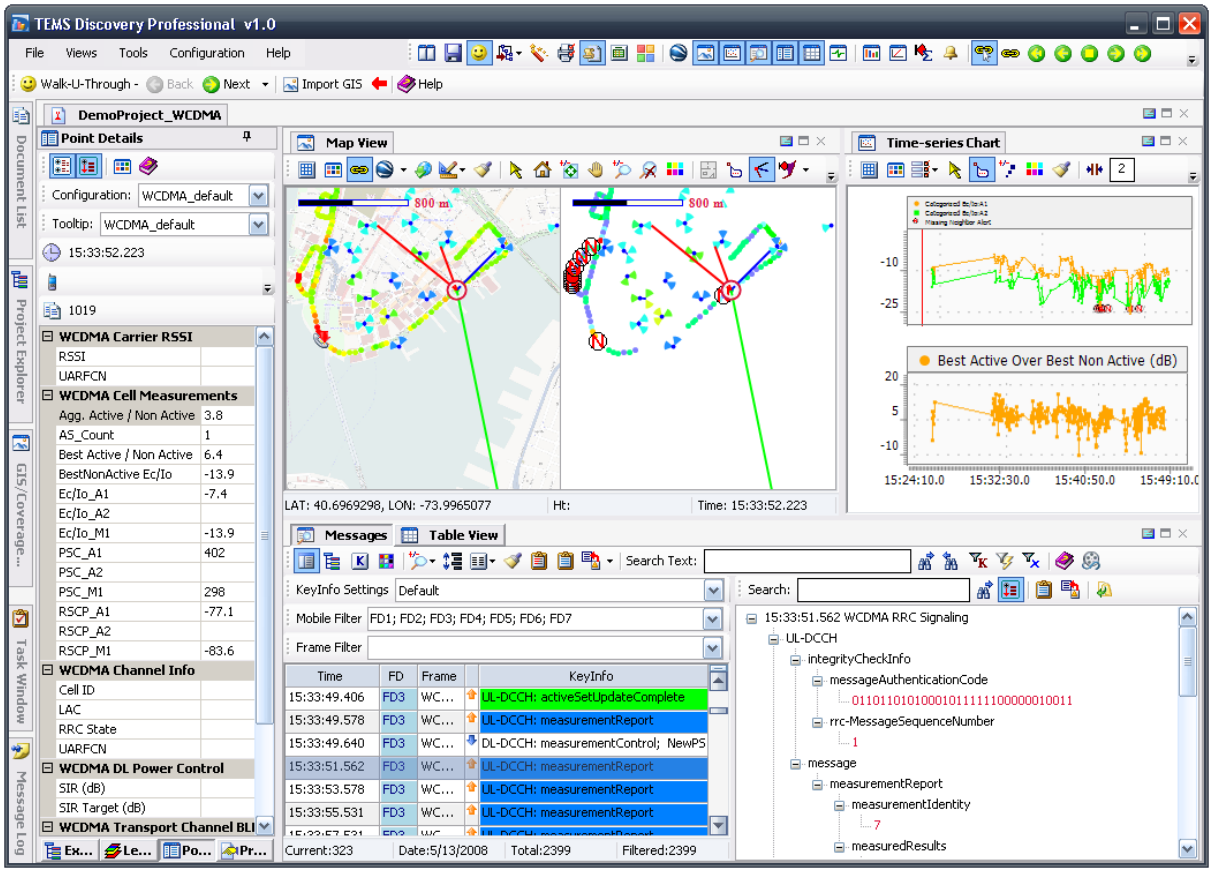
The level of the project data display in the Data Explorer window is controlled with the **Tree View** button . (If the Explorer is hidden, click the tab located at the bottom of the panel to make it visible.) The data objects are active and can be dragged-and-dropped to any of the synchronizable views or summary data views.

If you would like to give additional space to any of the windows, click the **Pin Down** button at the top-right corner of the window to use the auto-hide feature, or move the mouse over the border of a window, and click and hold to change the window size. You can also rearrange windows to a preferred layout by dragging-and-dropping each window by its tab into the desired location.

1.8 Demo Project

To open a demo project, double-click any of the demo projects in the Project List. Or, right-click on a project name and select **Open** from the context menu.

If you open DemoProject_WCDMA, you will see the following screen:



You can expand the tree view in the Data Explorer and view data from the top level, Dataset, to the lowest level, Metric. Right-clicking each level will bring up its corresponding context menu. The data objects in those levels can be also dragged-and-dropped to the windows located on the right side of the window.

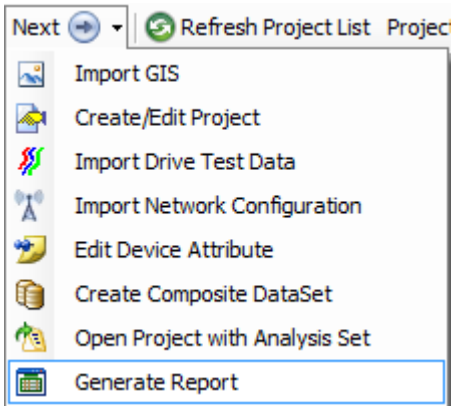
After you send data to the windows, select Save from the File menu, or click the **Save** button on the toolbar to save the current workspace as a TEMS Discovery document. The saved document will then be listed in the Document List. A document named *Last* is created by default to save the last workspace so the user can always restore the most recent environment.

1.9 Walk-U-Through

Walk-U-Through is a TEMS Discovery wizard that walks through some of the most common tasks.

You can navigate these tasks by clicking the **Back** button or the **Forward** button. Then, click the name of the task that you want to perform (next to the red arrow).

You can also access the Walk-U-Through tasks from the dropdown menu next to the **Next** button.



In general, you can follow the tasks one by one, from importing data through analyzing data and generating reports, or you can jump to any task by using a shortcut.

1. **Import GIS**

   See Import GIS Data for more information about importing GIS data (terrain elevation, raster images, vector files, etc.). You can also access the Import GIS Data task from the File menu or by clicking the **Data Import** button on the Main Window toolbar.

2. **Create/Edit Project**

   See Project List for more information about creating a new project or editing an existing project. You can also access the Create/Edit Project task from the Project List context menu.

3. **Import Drive Test Data**

   See Import Drive Test Data for more information. You can also access the Import Drive Test Data task from the File menu or by clicking the **Data Import** button on the Main Window toolbar.

4. **Import Network Configuration**

   See Import Network Configuration for more information. You can also access the Import Network Configuration task from the File menu or by clicking the **Data Import** button on the Main Window toolbar.

5. **Edit Device Attributes**

   See Device Attribute Assignment for more information.

6. **Create Composite Dataset**

   See Composite Dataset for more information about creating one or more composite datasets.

7. **Open Project with Analysis Set**

   See Save & Restore Working Environment for how to create or edit Analysis Sets. You can also open a project with an analysis set from the Data Explorer context menu.

8. **Generate Report**

   See Report Template Builder for how to generate reports for the selected project or device based on the selected report template. You can also generate reports from the Data Explorer context menu.

1.10 Creating Projects from Scratch

Once you have familiarized yourself with the functions and capabilities of TEMS Discovery, you can start to create a new project.

1. Prepare Data

Depending on your needs, you may import network cell configuration, antenna, and GIS data, in addition to the drive test data to be processed. TEMS Discovery can directly process compressed files with a *.zip extension.

The current release of TEMS Discovery supports the following data:

- Drive test data:
  - TEMS Investigation log files
  - TEMS Automatic log files
  - TEMS Pocket log files
  - QVoice Symphony log files
  - Nemo log files (.dt, .fs, .nmf files)
  - LGE LTE DM (LLDM) files
  - ZK Cell Test files
  - Flexible delimited text files.
- Cell configuration. See Import Network Configuration for more information.
- Antenna data. See Import Antenna Data for more information.
- GIS data. See Import GIS Data for more information.

2. Typical Steps to Follow:

You can follow these steps to create a project and load data:

1. Import GIS data and create a geo area (optional).
2. Create a project (placeholder) and designate a geo area if GIS data is to be used (optional).
3. Import network configuration data into the target project (optional).
4. Import the drive test data into the project.
5. Analyze the processed data, which can be browsed through the Data Explorer of the opened project.

It is possible to skip steps 1 through 3, and go directly to step 4 to import drive test data (and create a new project and dataset at the same time) and then modify the project properties, as described below.

3. Import Data

You can select Import from the File menu or click the **Import** button  on the toolbar to bring up Automatic Data Processing. From there, you can import drive test data, cell configuration, antenna, or GIS data.

While importing drive test data, you will be asked to select a target project, or to create a new project for the data to be associated with. If you choose to create a new project, the newly created project will be listed in the Project List after the import is done.

4. Edit Project Properties

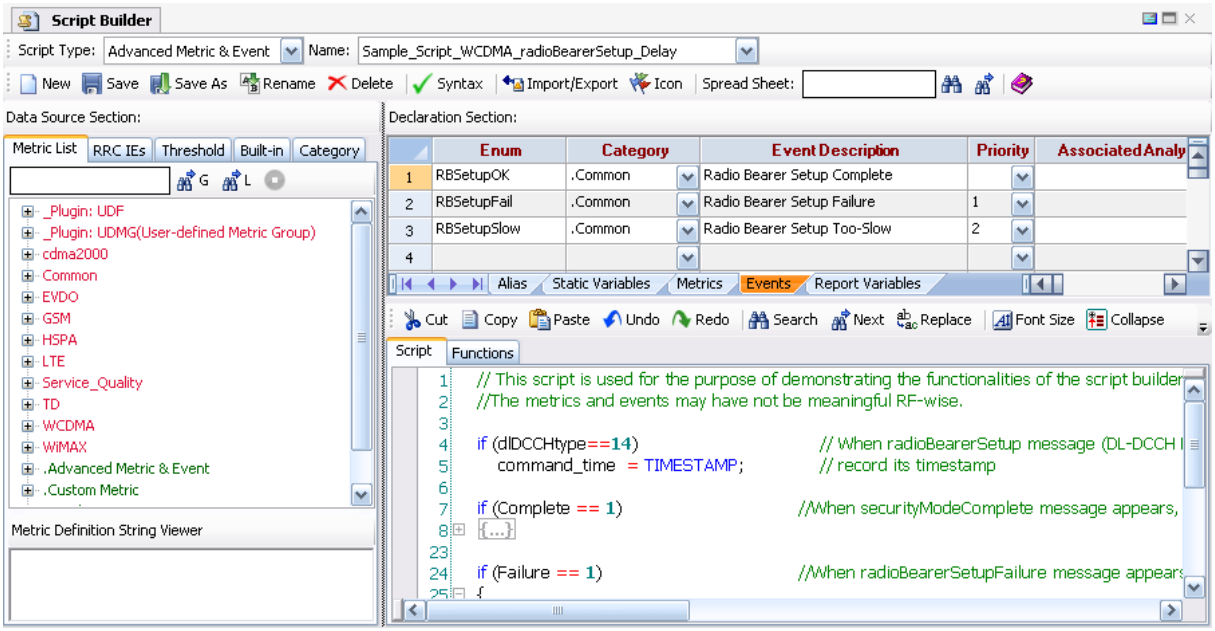
Right-clicking on a selected project and selecting **Edit/View Properties** will bring up the Project Properties dialog. In the Project Properties dialog, you can associate a geo area to the project so that all of the GIS data under that geo area will be listed in the Data Explorer–GIS List. The GIS data can then be displayed in the Map View.

5. Open Project

Refer to Demo Project for how to open a project.

1.11 Get Your Algorithm Working

The Script Builder is one of the unique and advanced features that TEMS Discovery offers. It enables you to easily create your own definitions of events/alerts or derive custom metrics (such as event counters, time delays, or composite metrics) based on any decoded information elements, including all Layer 3 information elements. The algorithms can then be shared with peers or standardized across an organization.

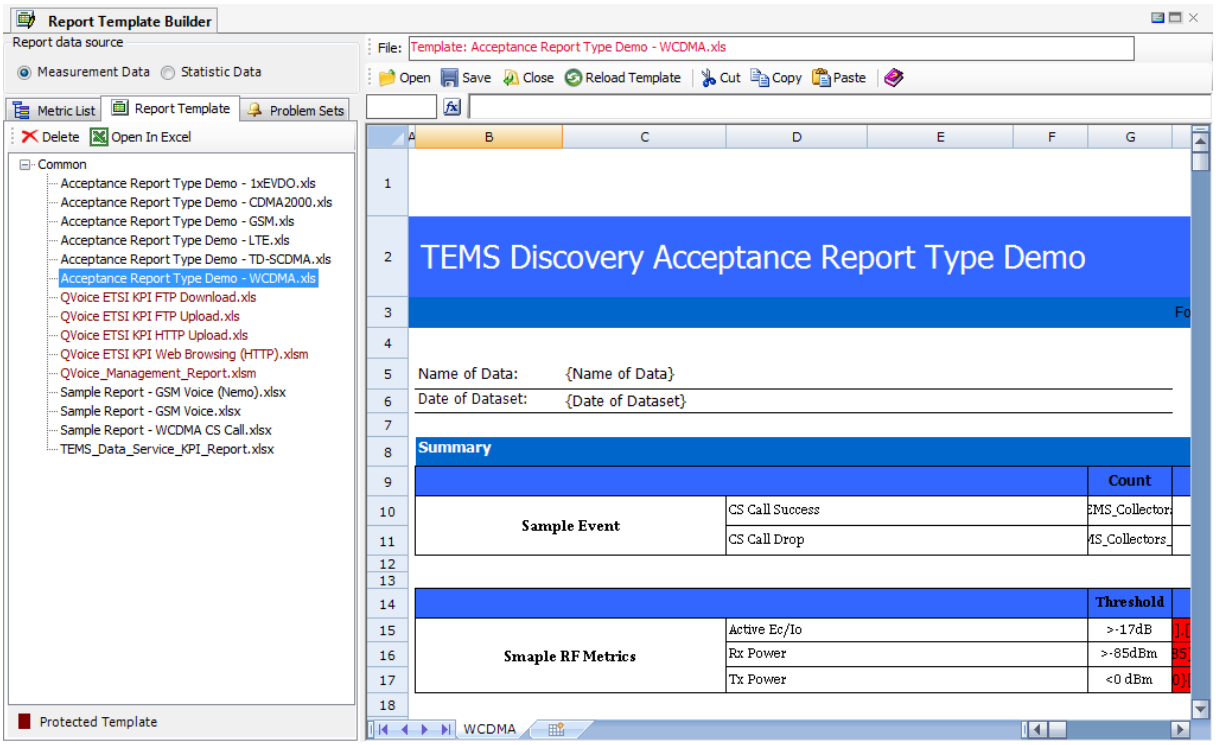


The Script Builder is designed for RF engineers who do not specialize in software development but who know basic C programming syntax, as well as software developers who can take advantage of C# programming language and Microsoft .Net library.

TEMS Discovery provides several sample scripts in the program; referring to them can help you learn how to create your own scripts.

1.12 Generate Reports As You Wish

The Report Template Builder is another unique and advanced feature that only TEMS Discovery offers. TEMS Discovery incorporates a powerful reporting mechanism that allows the user to customize and generate a variety of different Excel-based report templates.



You can create a report template in Excel; then open the spreadsheet in TEMS Discovery to fill in the metric attributes in any cell. From the Metric List tab, you can drag-and-drop any information elements to the spreadsheet and select one of the metric attributes (e.g., sample count, mean, maximum, minimum, standard deviation, multiple user-defined percentiles, elapsed time, distance, etc.). The modified spreadsheet can then be saved as a TEMS Discovery report template. With these templates, you can drag-and-drop a “mobile” or a “composite” dataset to the template; TEMS Discovery will then automatically fill in the specific metric data and generate a final report.

The remainder of this manual covers the TEMS Discovery working environment. The topics provided are:

- Overview
- Data List and Progress Log
- Main Project Windows
- Tools
- Configuration and Settings

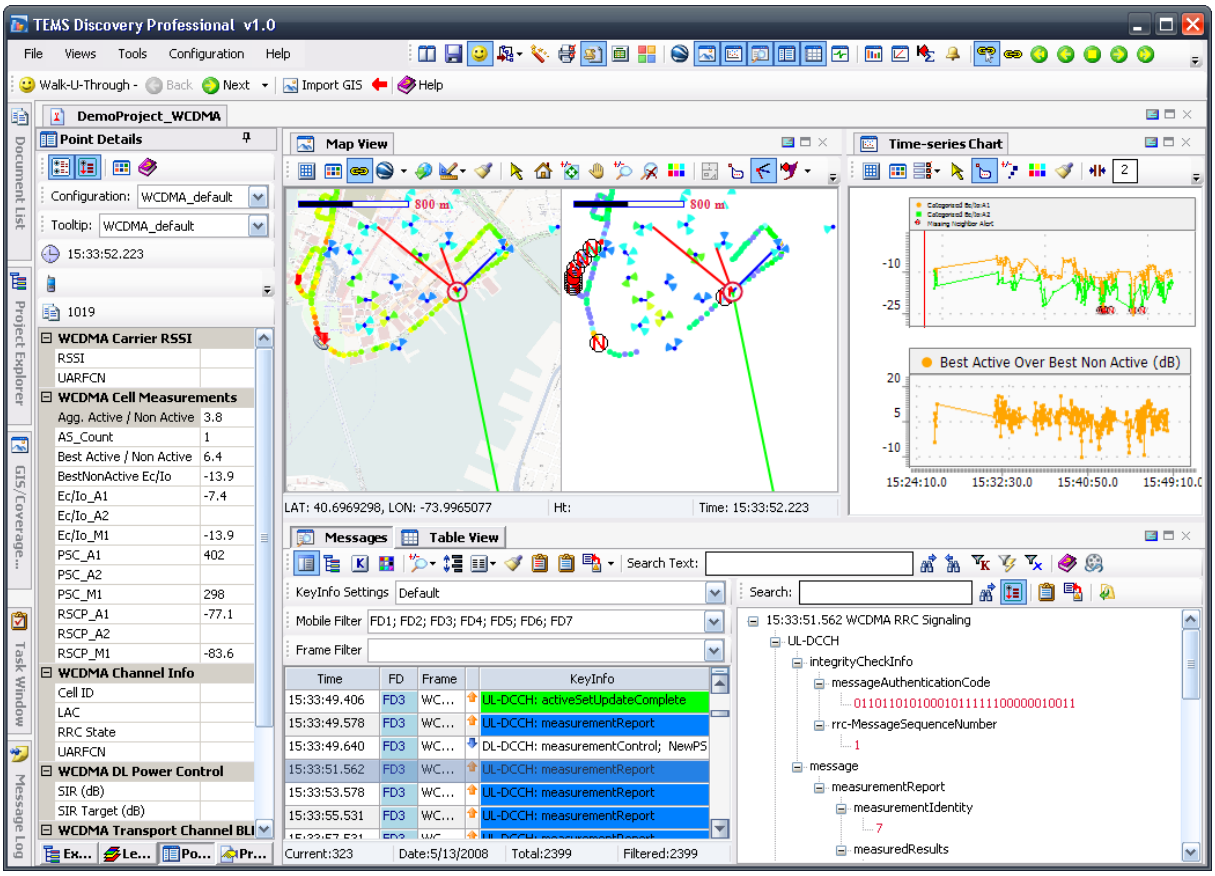
2 Overview

TEMS Discovery is built around a dockable workspace to achieve its clear and intuitive user interface. All windows, such as Map View, Messages View, Time Chart, and most of the configuration dialogs can function as either docked or overlapping tabs.

The Document List, Project List, GIS List, Task Manager, and Message Log each has an auto-hide feature that allows them to be hidden, while preserving valuable information on screen. Enable or disable the auto-hide feature by clicking the **Pin** buttons (or) at the top right corner of each window.

TEMS Discovery uses a drag-and-drop mechanism that allows you to perform many tasks through direct manipulation. For example, during run time, the windows can be rearranged to a preferred layout by simply dragging-and-dropping them. The layout can then be saved as an XML file so that the application can restore its screen layout whenever needed.

2.1 Main Window



The TEMS Discovery Main Window can be divided into multiple panels:

- The left panel contains the Data List and Progress Log.
- The right panel contains one or more project workspaces. Each project workspace can contain multiple views.

2.1.1 Data List and Progress Log Panel

The Data List and Progress Log panel is created when the application starts. It always docks to the left side of the workspace and each window in the panel has an auto-hide feature. The Data List and Progress Log include:

- Document List
- Project List
- GIS List
- Task Window
- Message Log

2.1.2 Data Explorer Panel

When a project is open, a workspace for the project will be created. The workspace contains two panels, one for the Data Explorer, and the other for synchronizable views and summary data views.

Like the Data List and Progress Log, the Data Explorer docks to the left side of the workspace and has an auto-hide feature. The Data Explorer includes the following data pertinent to the opened project:

- Dataset
- Cells
- GIS

2.1.3 Synchronizable and Summary View Panel

Various data presentations used for visual and efficient troubleshooting, called *views*, are presented in the second panel on the Main Window. Views can be categorized into **synchronizable views** and **summary views**.

Synchronizable views simultaneously display data that was collected at the same time. These views can be part of test drive data playback. Synchronizable views include:

- Messages View
- Map View
- Time Chart
- Metric Correlation
- Table View
- Point Detail View
- Instant Chart
- Google Earth
- Bing Map
- Wave View
- Legend View

Summary views present statistic data in various formats.

Summary views include:

- Histogram
- Batch PDF View
- Problem Summary View
- Sector Statistics View

2.2 Menu Bar

The Menu Bar on the Main Window includes the menus described below.

2.2.1 File Menu

Create/Update Demo Projects. All existing demo projects will be deleted and re-created.

Open Demo Document. Open one of the TEMS Discovery demo documents.

Save. Open the Save dialog, which has options to save the opened data (can be multi-project) as a TEMS Discovery document, to save the view layout, and to save the opened data as an analysis set. See Save & Restore Working Environment for more information.

Walk-U-Through. Access a TEMS Discovery wizard that walks through some of the most common usage tasks. See Walk-U-Through for more information.

Import. Open a data-specific Import dialog for importing external data to TEMS Discovery. See Import Data for more information.

General Page Setup. Access page setup for general printing and PDF file generation.

Batch Printing Page Setup. Access page setup for batch printing.

Exit. Close the application.

2.2.2 Views Menu

Google Earth. Turn on Google Earth. See Google Earth for more information.

Bing Map. Turn on Bing Map. See Bing Map for more information.

Maps. Display the Map View for the active project. See Map View for more information.

Time-series Chart. Display the Time-series Chart for the active project. See Time Chart for more information.

Metric Correlation. Display the Correlation View for the active project. See Metric Correlation for more information.

Messages. Display the Messages View for the active project. See the Messages View for more information.

Table View. Display the Table View for the active project. See Table View for more information.

Point Detail. Display the Point Details for the active project. See Point Detail View for more information.

Instant Chart. Display the Instant Chart for the active project. See Instant Chart for more information.

Wave View. Display the Wave View for the active project. See Wave View for more information.

Synchronize Views by Mouse Moving. Synchronize all views listed above by moving the mouse.

Synchronize Views by Mouse Clicking. Synchronize all views listed above by clicking the mouse.

Histogram. Display the Histogram for the active project. See Histogram for more information.

Multi-dimension Statistic View. Display the Multi-dimension Statistic View for the active project. See Multi-dimension Statistic View for more information.

Sector Statistic View. Display the Sector Statistics View for the active project. See Sector Statistics View for more information.

Problem Summary View. Display the Problem Summary View, based on Problem Sets created by the Report Template Builder.

2.2.3 Tools Menu


Script Builder. Open the Script Builder.


Report Template Builder/ Problem Set Builder. Open the Report Template Builder.


ADP Management. Access ADP (automatic data processing) tasks.


Neighbor List Analyzer. Open the Neighbor List Analyzer.


Batch Printing. Open the Batch Printing dialog.


Antenna Viewer. Open the Antenna Viewer.


Signaling Message Browser. Open the Signaling Message Browser.


Parameter Mapping. Open the Parameter Mapping dialog.


Log File Browser. Open the Log File Database Browser dialog.


Log File Cleanup


Measurement Data Cleanup. Open the Measurement Data Cleanup dialog.


Generate Measurement Database Description. Generate a text file description of the Measurement Database.

Generate Script Database Description. Generate a text file description of the Script Database.


Plug-in Browser. Open the Plug-in Manager.

2.2.4 Configuration Menu


Publish/Update via FTP Setting. Access the Publish/Update Configurations via FTP Setting feature.


Configuration Management. Access TEMS Discovery configuration management features such as Import, Export, Update, and Publish.

Document Management. Access TEMS Discovery document management features such as Import, Export, Update, and Publish.

Generic User-Defined Metric Groups. Define a metric group for importing a flexible data source. See Generic User-defined Metric Groups for more information.

Metric Frame Import Configuration. Define import options for each frame. See Metric Frame Import Configuration for more information.


Plot Band Definition. Open the Plot Band dialog for editing plot bands.

User Defined Parameters. Open the User Defined Parameters dialog for editing threshold settings. These thresholds can be used in conjunction with the Script Builder.


Dynamic Composite Dataset Settings. Open the Dynamic Composite Dataset Settings dialog to define rules for automatically creating a composite dataset.


Batch Configuration. Open the Batch Configurations dialog for generating summaries to PDF.

Event Set Filter Configuration. Open the Event Set Filter Configuration dialog for creating event set filters.


Message Coloring. Assign colors to signaling messages for display in the Messages View. See Message Coloring for more information.


Messages View KeyInfo Settings. Define a set of information to be displayed in the KeyInfo column in the Messages View. See Messages View KeyInfo Settings for more information.


Point Detail Settings. Define a set of information to be tracked for a particular data point. See Point Detail Settings for more information.


Instant Chart Component Content. Define component content for the Instant Chart. See Instant Chart Component Content for more information

UDR Project/Dataset Matching. Define UDR project/dataset matching for data import. See UDR Project Mapping for more information.

Device Attribute Assignment Template. Define a device attribute assignment template for data import. See Device Attribute Assignment for more information.

Wireless Operator Lookup Table. Lookup Operator based on MNC/MCC, SID ot OperatorID. In Script Builder, you can call built-in function GetOperatorByMncMcc(),GetOperatorBySid(), or GetOperatorByOperatorId() to fetch the operator name. . See Wireless Operator Lookup Table for more information.

Data Networking. Register the local TEMS Discovery to be a TEMS Discovery server. See Data Networking for more information.

Email Templates. Create and maintain email templates.
See Email Template for more information.

Options. Maintain system options.

2.2.5 Statistic Menu

Cube Management. Access the Cube Management feature for creating new cubes, deleting cubes, activating/deactivating cube processing.

Statistic Browser. Open the Statistic Browser, where cube data can be browsed.

Dashboard. Open the Statistic Dashboard.

Report Generation. Generate the Statistic Report, based on the Statistic Report Template.

Dashboard Builder. Open the Statistic Dashboard Builder, where a Dashboard template can be built.

Report Template Builder. Open the Report Template Builder, where a Statistic Report template can be built.

Cube Data Scope Configurations. Open the Cube Data Scope Configurations , where geo center, data scope (projects) to be associated with a cube, and scheduler are selected.

Statistic Data Cleanup. Clean up statistic data.

Default GIS Builder. Build the default GIS list for cube processing.

Default Network Configuration Builder. Build the default network configuration list for cube processing.

Database User Management. Manage database users.

Database User Access Permission. Grant database access permissions for user groups.

Measurement Data Server List. Display the Measurement Data Server List associated with the statistic database.

Enterprise License Information. Display TEMS Discovery Enterprise license information.

2.2.6 Help Menu

Help.

Multimedia Presentation. In addition to the built-in multimedia, you can set up a hyperlink to the multimedia presentation index file located in your own server accessible by TEMS Discovery, so that you can maintain your own multimedia and present them in TEMS Discovery video player.

License Status. Open the *License Status* information window.

About TEMS Discovery. Open the *About TEMS Discovery* information block.

2.3 Main Toolbar

 **Show/Hide Left Panel**.

 **Save Project Data**. See Save & Restore Working Environment for more information.

 **Walk-U-Through**. Walk through some of the most common usage tasks. See Walk-U-Through for more information.

 **Data Import**. See Import Data for more information.

 **Automatic Data Processing**. See ADP Management for more information.

 **Batch Printing**. See Batch Printing for more information.

 **Script Builder**. See Script Builder for more information.

 **Report Template/Problem Set Builder**. See Report Template Builder for more information.

 **Plot Band Editor**. See Plot Band Definition for more information.

 **Map View**. See Map View for more information.

 **Time-series Chart**. See Time Chart for more information.

 **Messages View**. See Messages View for more information.

 **Table View**. See Table View for more information.

 **Instant Chart**. See Instant Chart for more information.

 **Point Detail**. See Point Detail View for more information.

 **Wave View**. See Wave View for more information.

 **Histogram**. See Histogram for more information.

 **Correlation View**. See Metric Correlation for more information.

 **Sector Statistic View**. See Sector Statistics View for more information.

 **Problem Summary View**. See Problem Summary View for more information.

 **Multi-dimension Statistic View**. See Multi-dimension Statistic View for more information.

 **Synchronize By Mouse Clicking**. See Synchronizable Views for more information.

 **Synchronize Views By Mouse Moving**. See Synchronizable Views for more information.

 **Play Back From Ending** point of data displayed in the views.

 **Play Back** from current timestamp or location.

 **Play Stop**. Stop playback.

 **Play Forward** from the current timestamp or location.

 **Play Forward From Starting** point of data displayed in the views.

 **Apply Specified Play Speed** (in seconds per step).

3 Data List and Progress Log

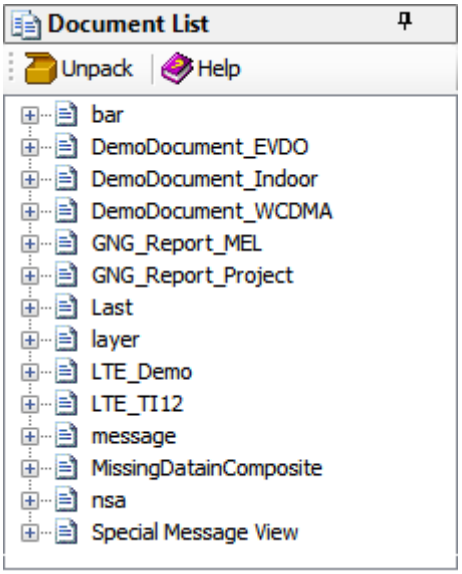
This section describes the display windows that are created when the application starts.

3.1 Document List

The Document List maintains a list of TEMS Discovery **documents**. A TEMS Discovery document contains the following types of information: workspace configuration, project data, and the presentation of the data.

You can open a document by double-clicking it. You can also export documents for sharing, or import documents from peers.

See Save & Restore Working Environment for information about saving a TEMS Discovery document.

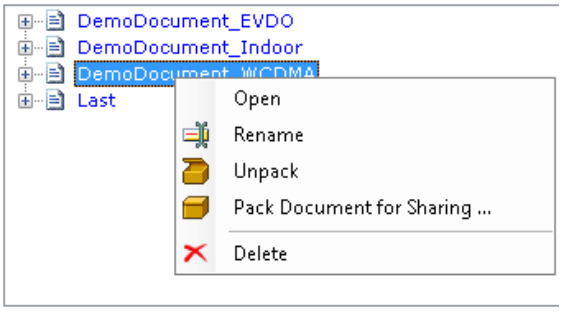


Document List Toolbar

Unpack. Unpack a TEMS Discovery packed document.

Help.

Document List Pop-up Menu



Open. Open the selected document.

Rename. Rename the selected document.

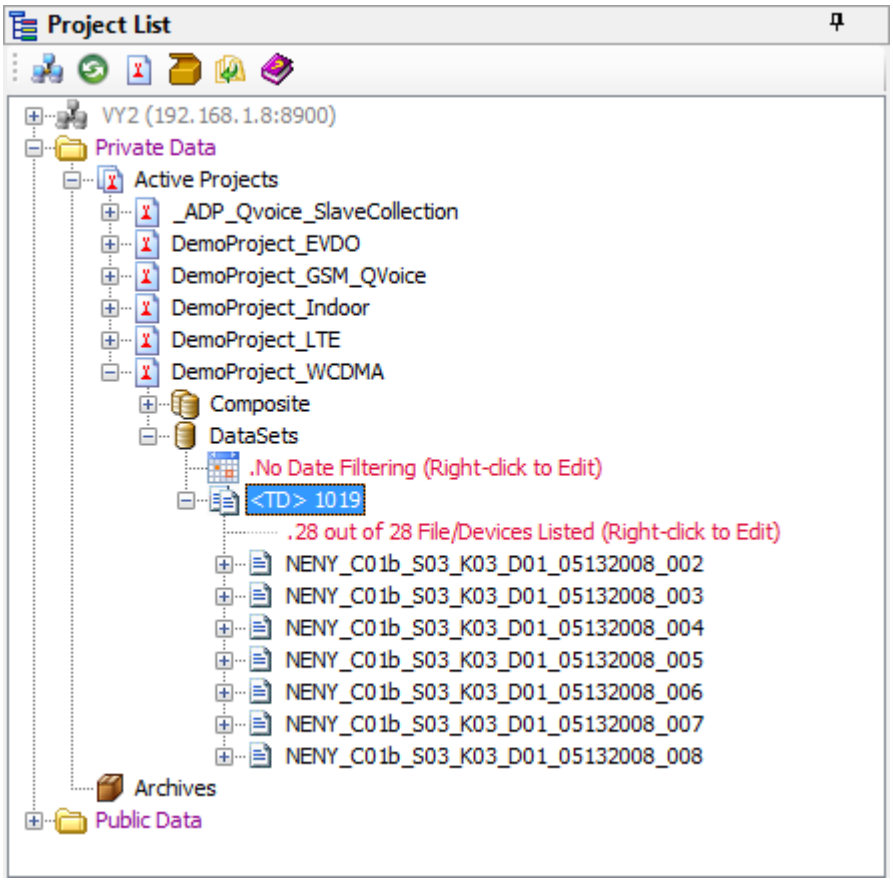
Unpack. Unpack a TEMS Discovery packed document.

Pack Document for Sharing. Pack the selected document to a .ZIP file.

Delete. Delete the selected document.

3.2 Project List

The **Project List** contains an overview of projects created in the **Private Data** folder of the local computer, collected for sharing in a **Public Data** folder, or even located in the **Private Data** folders of multiple remote TEMS Discovery peers.



TEMS Discovery provides a multi-user environment. Different users in the same computer can have their own private data folder, hidden from others. Projects created by a user will be visible only to their owner (these are listed under the **Private Data** tree node in the tree view). However, the computer administrator has the right to control who else has permission to access a particular user's private data folder.

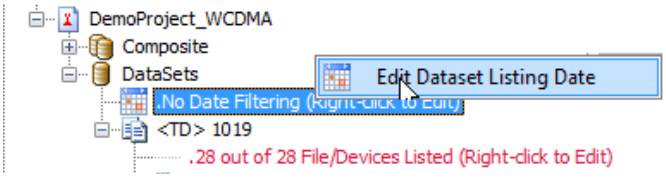
The **Public Data** folder is for sharing data among all users. Users can upload their private data to the public data folder, or download data to their private data folder for manipulation. This **Public Data** folder can be a network folder. Please see Measurement Data Storage Options for information about setting up a Public Data folder.

Additionally, TEMS Discovery can connect to remote computers that are also running TEMS Discovery and share data with those computers' active users. In the tree view, a remote computer will be indicated with its IP address and FTP port number. See Data Networking for more information.

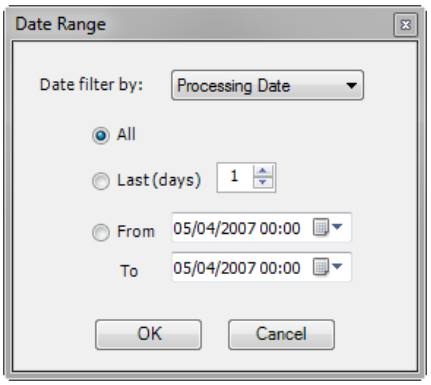
The Project List is the data portal. The listed projects can be opened to a workspace with certain pre-configured view layouts and/or with pre-defined analysis sets.

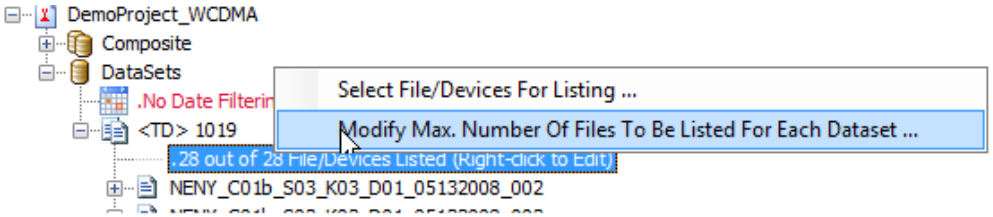
3.2.1 Project List – File/Device Listing Filter

TEMS Discovery provides funcitons to filter the file/device list by date or by user-selected.



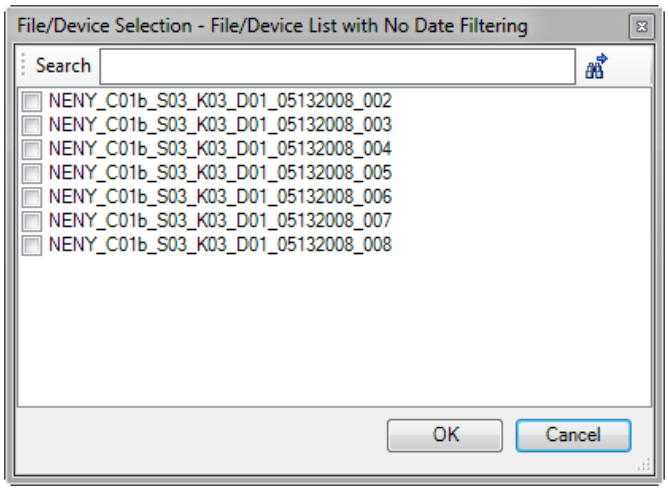
Right-clicking at the tree node shown above will bring up the following dialog for defining date range, so that only the file/devices which are processed or collected within that date range will be listed.





Other than the above date filtering, for each dataset, only up to a certain number of file/devices can be listed. You can select the context menu "*Modify Max. Number Of Files To Be Listed For Each Dataset*" to modify this maximum number.

To be more specific, you can manually select the file/device to be listed from the following dialog which can be brought by selecting contaxt menu "*Select File/Device For Listing*".



3.2.2 Project List Toolbar

Remote. Maintain the list of TEMS Discovery peers. See TEMS Discovery Peers and Data Networking for more information.

New. Create a new project.

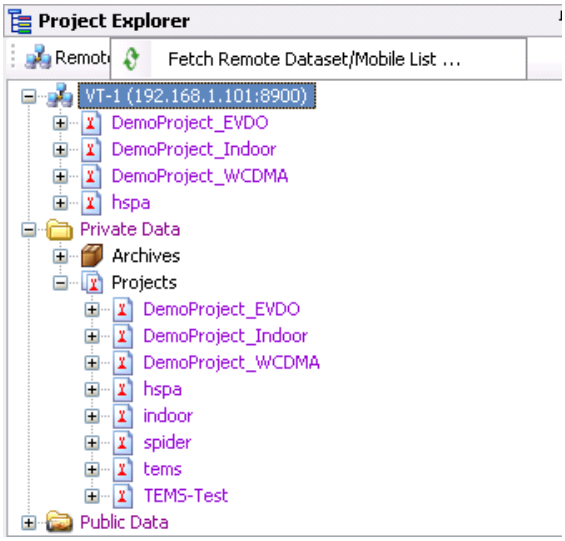
Unpack. Unpack a TEMS Discovery packed project.

Close All. Close all opened projects.

Help.

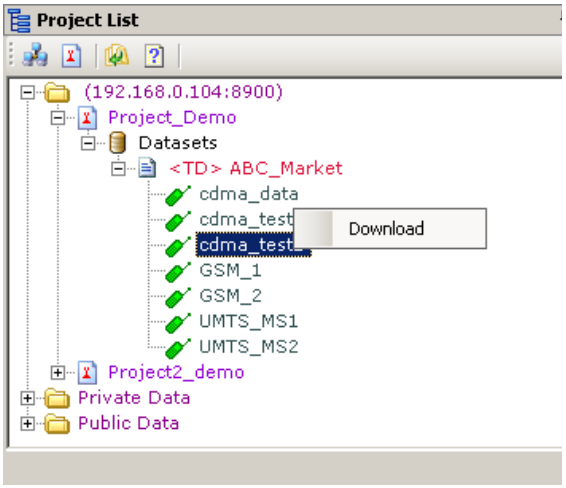
3.2.3 Project List Pop-up Menus

TEMS Discovery Peer



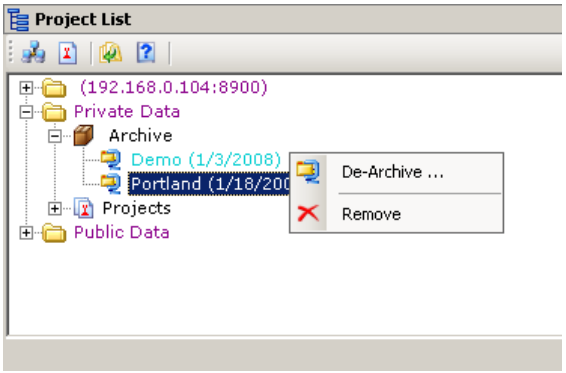
Fetch Remote Dataset/Mobile List. Fetch a dataset/mobile list that exists in the selected remote TEMS Discovery peer. Any changes to the remote TEMS Discovery peer can be manually refreshed by the user through this menu.

Project, Dataset, or Mobile of TEMS Discovery Peer



Download. Download selected data from a remote TEMS Discovery peer. The data can be a project, a dataset, or mobile data. TEMS Discovery will automatically compress the remote data, download it, and decompress the data locally. The downloaded data will be listed under the *Private Data* tree node.

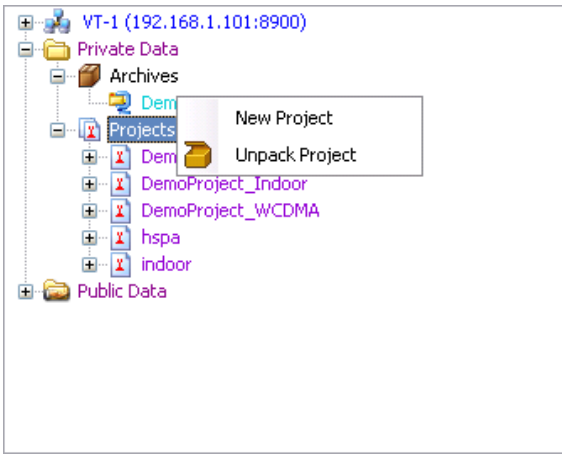
Archived Project



De-Archive. De-archive the selected project archive. The de-archived project will be listed under the *Private Data* tree node.

Remove. Permanently remove the selected project archive from the disk.

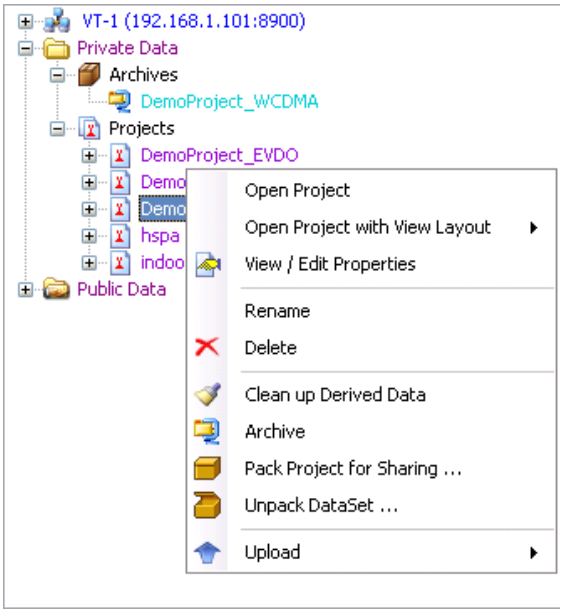
Project Root



New Project. Create a new project.

Unpack Project. Unpack a TEMS Discovery packed project.

Project



Open Project. Open the selected project to workspace and restore the last workspace layout.

Open With View Layout. Open the selected project to workspace and construct a pre-configured view layout. See Save & Restore Working Environment for more information.

View/Edit Properties. View and edit the properties of the selected project.

Rename. Rename the selected project.

Delete. Remove the selected project permanently from disk.

Clean Up Derived Data. TEMS Discovery will generate a lot of processed data from the imported data. Selecting this from the menu will clean up the processed data from disk.

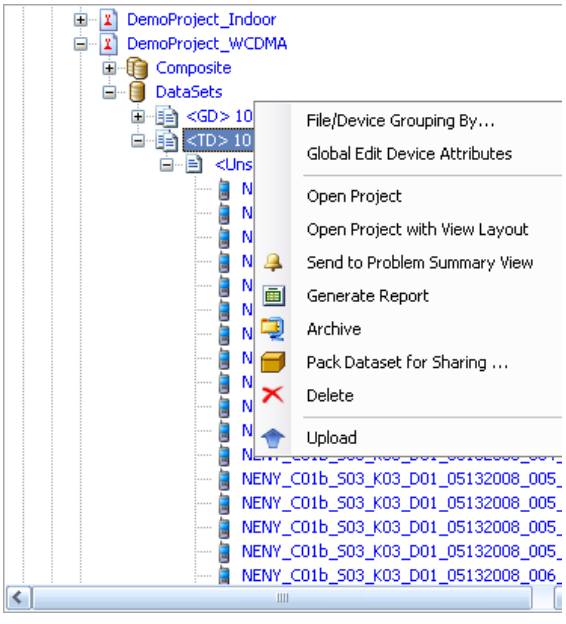
Archive. Archive the selected project. The archived project will then be listed in the *Archive* tree node.

Pack Project for Sharing. The entire project can be packed to a .ZIP file for archiving or sharing. This packed project can be unpacked through the context menu described above.

Unpack Dataset. Unpack a dataset that was packed from TEMS Discovery.

Upload. Upload the selected project to a TEMS Discovery peer or public data folder. If a project with the same name exists in the TEMS Discovery peer or public data folder, the project will be overwritten.

Dataset



File/Device Grouping By. Mobile data can be grouped by its File name, Device, ESN, IMEI, Label, and Mobile ID, or by any user-defined attributes. See Device Attribute Assignment for more information.

Global Edit Device Attributes. Globally edit the attributes of all the devices in the selected dataset. See Device Attribute Assignment for more information.

Open Project. Open the selected project to workspace and restore the last workspace layout.

Open With View Layout. Open the selected project to workspace and construct a pre-configured view layout. See Save & Restore Working Environment for more information.

Send to Problem Summary View. Bring up a dialog for selecting a problem set template (which can be defined in the Report Template Builder) to generate a report of the problem from the selected dataset, and then display the problem report in the Problem Summary View.

Generate Report. Generate a report from the selected dataset based on the pre-defined report template, and send the result to Report Excel Viewer. See Report Template Builder for more information.

Pilot Pollution Analyzer. Run Pilot Pollution analysis on the selected dataset.

GSM Interference Matrix. Generate a GSM Interference Matrix on the selected dataset.

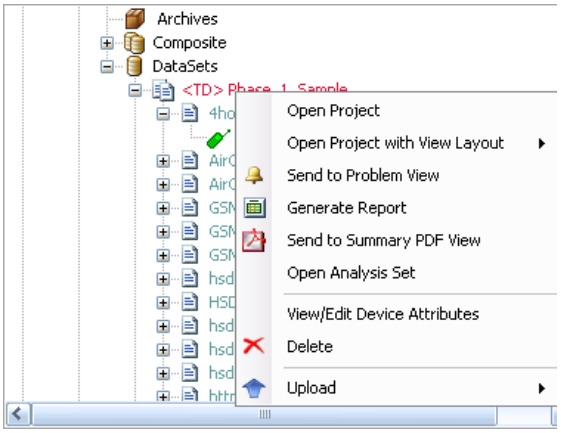
Archive. Archive the selected dataset. The archived dataset will then be listed in the *Archive* tree node.

Pack Dataset for Sharing. The select dataset can be packed to a .ZIP file for archiving or sharing.

Delete. Delete the selected dataset permanently from disk.

Upload. Upload the selected dataset to a TEMS Discovery peer or a public data folder. If the project exists in the remote TEMS Discovery peer or public data folder, this dataset will be added to that project; otherwise, a new project will be created as well.

Mobile



Open Project. Open the selected project to workspace and restore the last workspace layout.

Open Project With View Layout. Open the selected project to workspace and construct a pre-configured view layout. See Save & Restore Working Environment for more information.

Send to Problem Summary View. Bring up a dialog for selecting a problem set template (which can be defined in the Report Template Builder) to generate a report of problem from the selected device, and then display the problem report in the Problem Summary View.

Generate Report. Generate a report from the selected dataset based on the pre-defined report template, and send the results to the Report Excel Viewer.

Pilot Pollution Analyzer. Run Pilot Pollution analysis on the selected dataset.

GSM Interference Matrix. Generate a GSM Interference Matrix on the selected dataset.

Send to Summary PDF View. Bring up a dialog for selecting a summary view option to generate a summary PDF from the selected device, and then display the PDF in Batch PDF View.

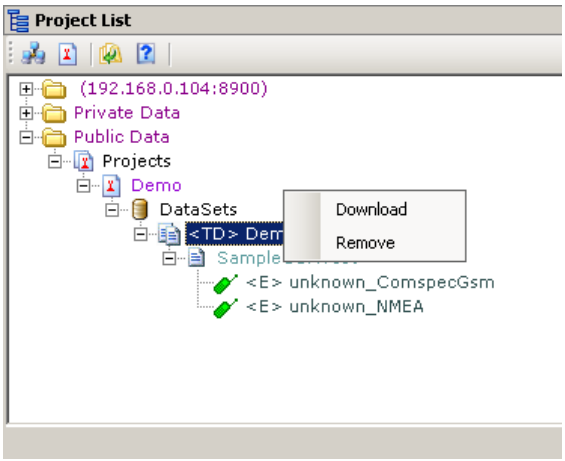
Open Analysis Set. Open the selected project to workspace and load the data pre-defined in analysis sets. See Save & Restore Working Environment for more information.

View/Edit Device Attributes. View and edit the selected mobile's device information. See Device Attribute Assignment for more information.

Delete. Permanently delete the selected mobile from the disk.

Upload. Upload the selected mobile to a TEMS Discovery peer or a public data folder. If the project exists in the remote TEMS Discovery peer or public data folder, this mobile data will be added to that project; otherwise, a new project will be created as well.

Public Data



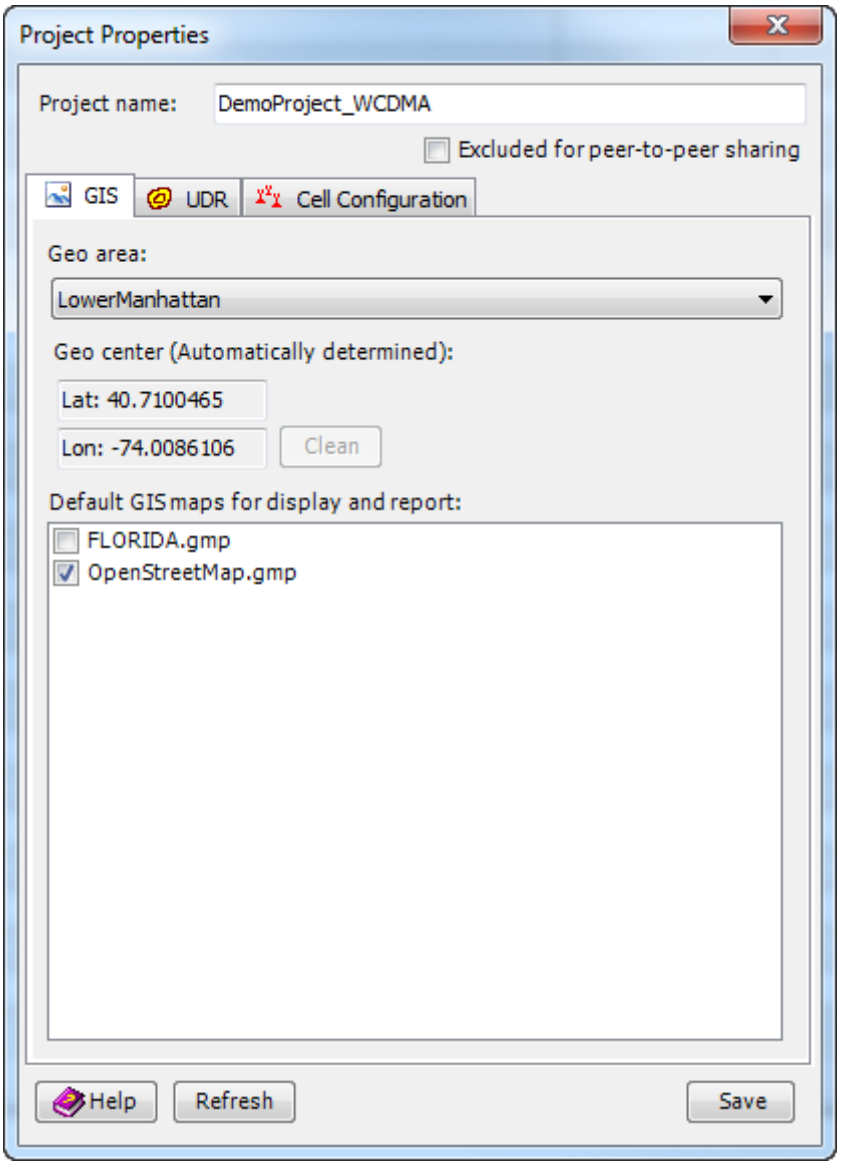
Download. Download the selected project/dataset/mobile to a private data folder.

Remove. Remove the selected project/dataset/mobile from the public data folder. This menu is only available to the administrator of the computer.

3.2.4 Project Properties

1. To display the Project Properties dialog, right-click on empty space or the project root, and select **View/Edit Properties** from the context menu.
2. Complete the Project Properties dialog as described below.
3. Click the **Excluded from peer-to-peer sharing** checkbox if you want to make the project invisible to peers (if Data Networking is enabled).
4. Click the **Save** button to save the changes or click the "X" in the top right corner to exit the dialog.

3.2.4.1 Project Properties – GIS Settings



Geo area. The *Geo area* combo box lists the available geo areas created by importing GIS data. Once a geo area is selected, all the maps under that geo area will be listed under *Default GIS* combo box.

A geo area can be associated to a project, so that all the maps under that geo area will be listed in the Data Explorer–GIS List and available for display in the Map View.

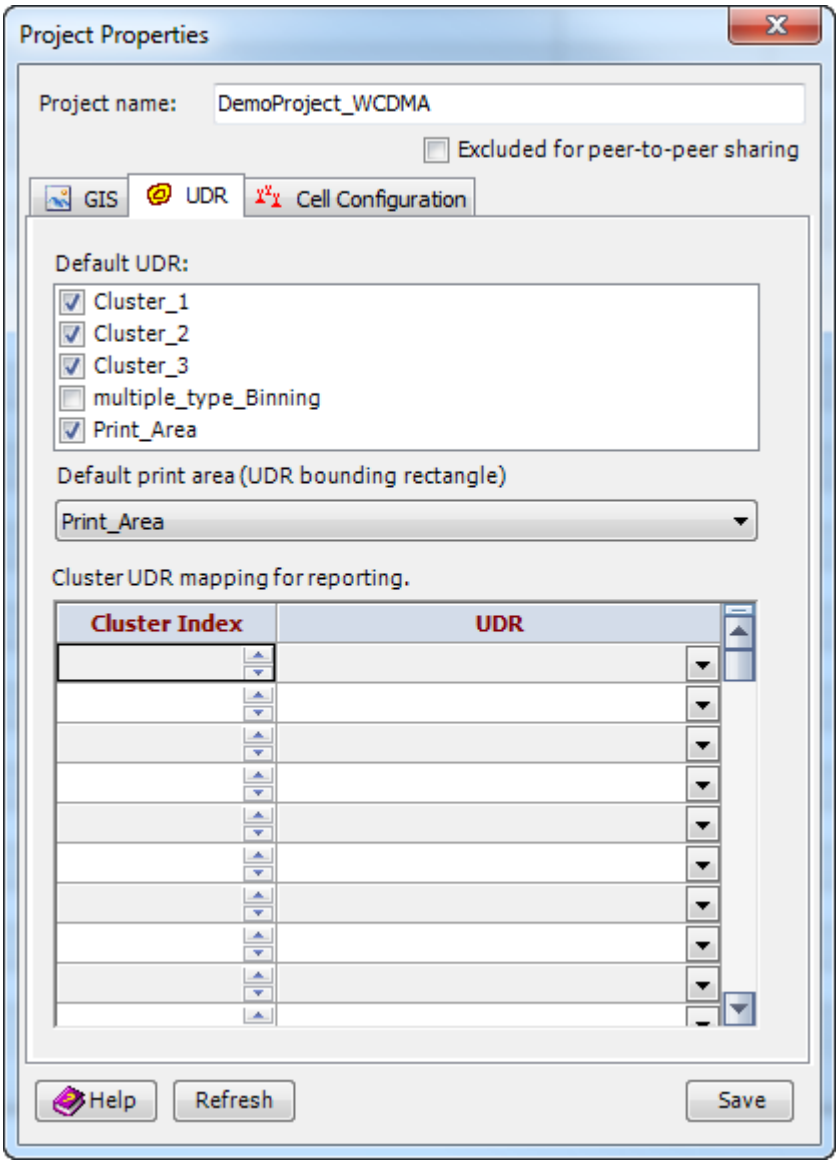
Geo center. Once a geo area is selected, the center of the selected geo area will be used as the geo center of the project.

Because Map View is based on Azimuth Equidistance projection, an appropriate geo center is crucial. If you select a geo area for the project, the geo center will be automatically determined from the selected geo area, otherwise, the geo center will be determined from the first data (drive test data, cell configuration, or maps, etc.) to be displayed in the Map View. You have the option to clean up the current geo center and

force TEMS Discovery to determine a new geo center. In some circumstances, this could solve some Map View distortion problems.

Default maps for display and report. You have the option to select multiple maps so that they will be always displayed in the Map View when it is opened or when it is part of output such as Excel, PDF, or paper printing.

3.2.4.2 Project Properties – UDR Configuration

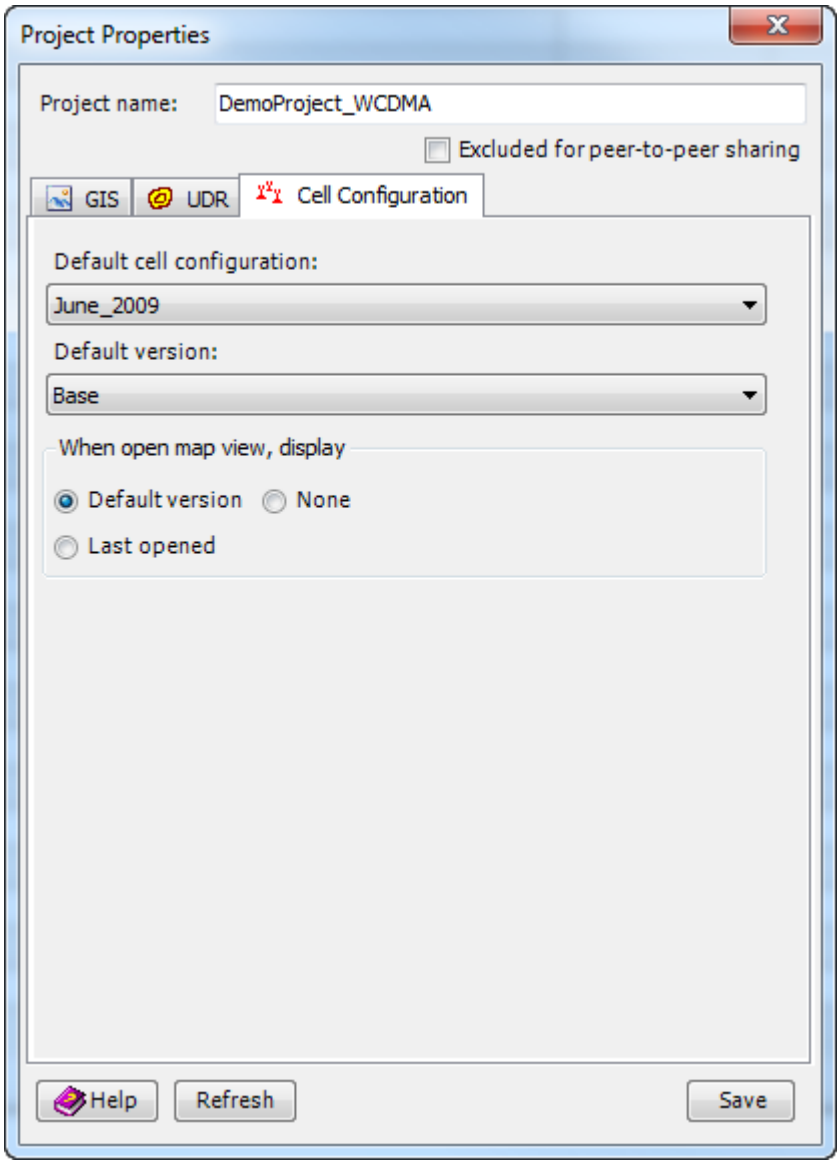


Default UDR. You have the option to select multiple UDRs so that they will be always displayed in the Map View when it is opened or when it is part of output such as Excel, PDF, or paper printing.

Default print area (UDR bounding rectangle). TEMS Discovery provides several features such as Reporting, Batch Printing, and Batch PDF View to output data in the Map View. Instead of leaving TEMS Discovery to automatically determine output area, you can create a UDR in the Map View and select that UDR as the output boundary.

Cluster UDR mapping for reporting. In this spreadsheet, you can create indexes for cluster UDRs. When you create the report template in the Report Template Builder, you can select an index in Report Options so that only the data collected in the corresponding UDR will be considered for reporting.

3.2.4.3 Project Properties – Cell Configuration

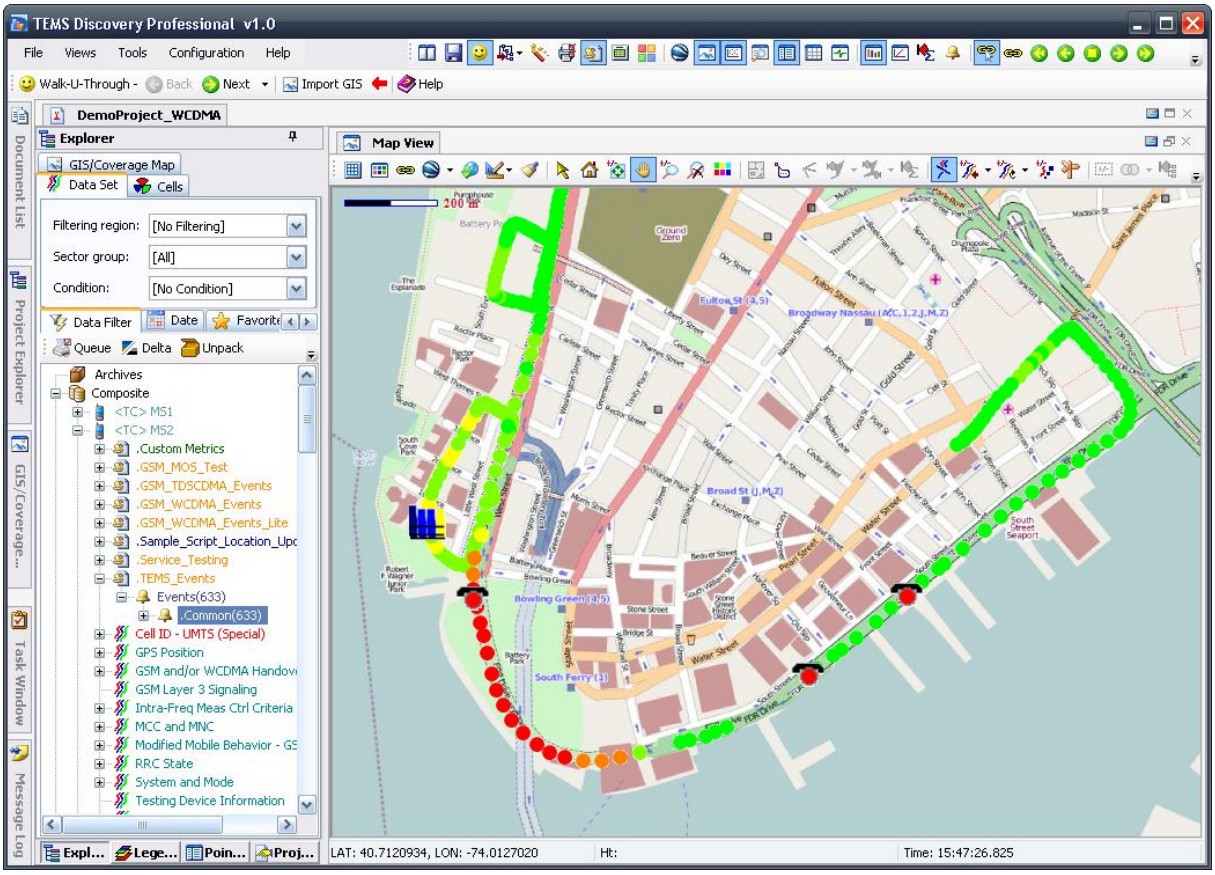


The default cell configuration defined here will be used for generating Cell ID frames and Map View reports (if prompted to include cell configuration in the report template), as well as other functions that require the presence of a cell configuration.

You have the option of selecting a default cell configuration so that it will be always displayed in the Map View when it is opened, or you can choose to just restore the last displayed cell configuration.

3.2.5 Open Project

From the Project List, you can double-click on a project, or right-click the project field and choose **Import Project** to open a project. Once a project is open, a workspace like the one shown below will be created. This workspace contains multiple views that can be turned on or off by their corresponding toolbar buttons or from the File menu.



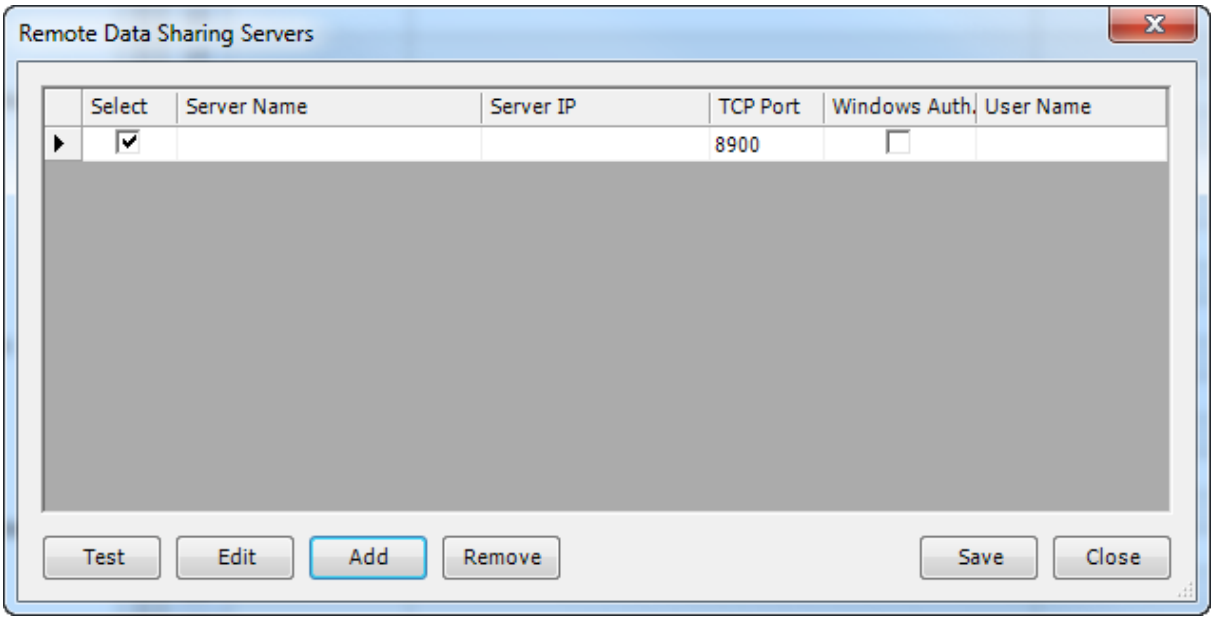
3.2.6 Delete Project

You can select a project in the Project List, then hit the **Delete** key on the keyboard or choose **Remove** from the pop-up menu to delete the project. All data belonging to that project will be permanently removed from the disk and cannot be recovered.

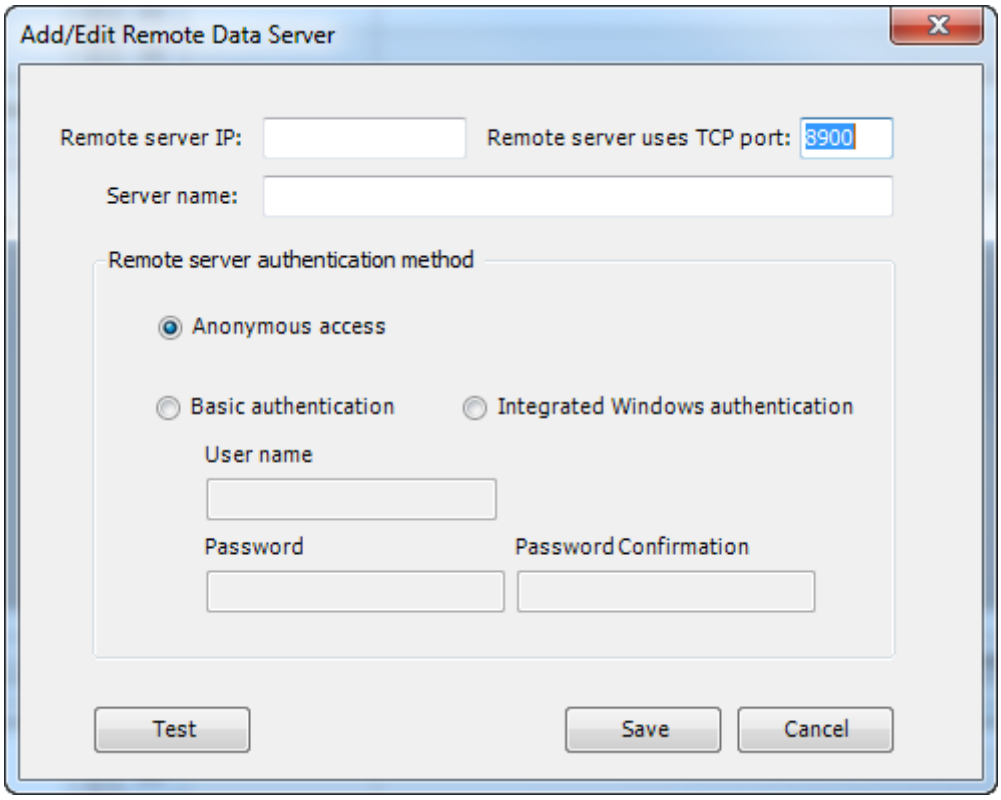
3.2.7 TEMS Discovery Peers

TEMS Discovery maintains a list of TEMS Discovery peers that can access and share data.

Click the **Network** button in the Project List toolbar to bring up the Remote Data Sharing Servers dialog. In this dialog, you can add, remove, or edit TEMS Discovery peers.



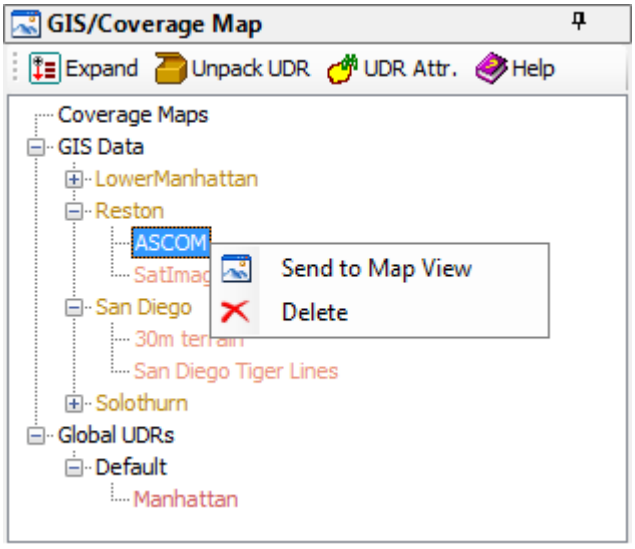
To add or edit a TEMS Discovery peer, click the **Add** or **Edit** button to bring up the Add/Edit Remote Data Server dialog.



The settings in this dialog must be consistent with what is defined in TEMS Discovery peer (defined in Data Networking). Clicking the **Test** button will test whether this specific remote TEMS Discovery peer is accessible.

3.3 GIS List

External GIS data must be imported into TEMS Discovery. The imported GIS data will be listed in the GIS List, providing an overview of the GIS data that TEMS Discovery can access. The GIS data in this view can be sent to the Map View for display.



When importing GIS data, you will be asked to define a geo area name for that data. In the GIS List, the GIS data will then be organized by its geo area. When you create a project, one of the geo areas listed in this window can be assigned to the *Geo Area* property of the project. See Project List for more information.

Global UDRs can be used to match drive test data against project/dataset when importing drive test data to decide where (project and dataset) to put the imported log file if the user has selected the Use global UDR specified project/dataset option.

GIS List Toolbar

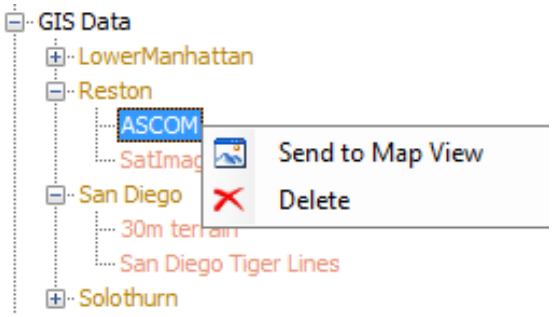
Expand. Expand or collapse all tree node data.

Unpack UDR.

UDR Attr. Display the UDR Attribute Editor.

Help.

GIS List Pop-up Menu

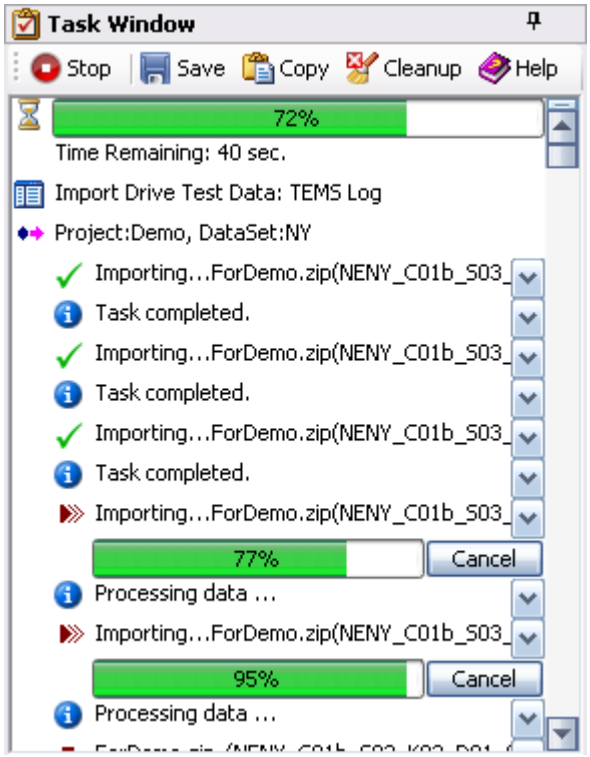


Send to Map View. Open the Map View and display the selected map on the view.

Delete. Delete the selected geo area or map from TEMS Discovery.

3.4 Task Window

The Task Window lists the status of background tasks that are created by importing data or configuring Automatic Data Processing.

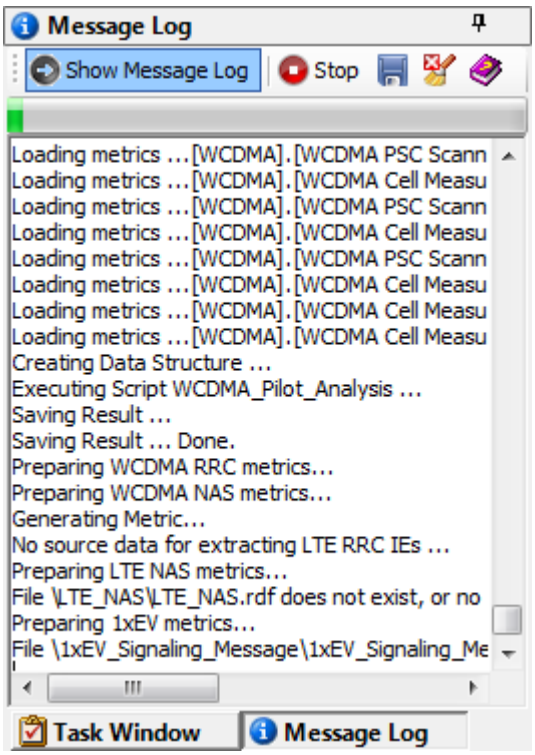


Task Window Toolbar

- **Stop**. Cancel all tasks, running or pending.
- **Save**. Save the task status history to an ASCII file.
- **Copy**. Copy the task status history to the Clipboard.
- **Cleanup**. Clean up the Task Window view.
- **Help**.

3.5 Message Log

The Message Log contains the message generated from the current operation, such as Report Generation, Script Execution, etc.



Message Log Toolbar

- **Show Message Log**.
- **Stop** the currently running operation.
- **Save** the message log to an ASCII file.
- **Erase** the message log.
- **Help**.

3.6 ADP Management Window

The ADP (Automatic Data Processing) Management window can be docked to the left panel. This window provides quick access to task editing and status monitoring for the Automatic Data Processing task.

4 Main Project Windows

This section describes the display windows in the project workspace in further detail.

- Data Explorer
- Synchronizable Views
- Summary Data Views
- Legend View

4.1 Data Explorer

The Data Explorer organizes project data into three categories: **Dataset**, **Cells**, and **GIS**. Each object in the Data Explorer can be dragged-and-dropped into multiple views.

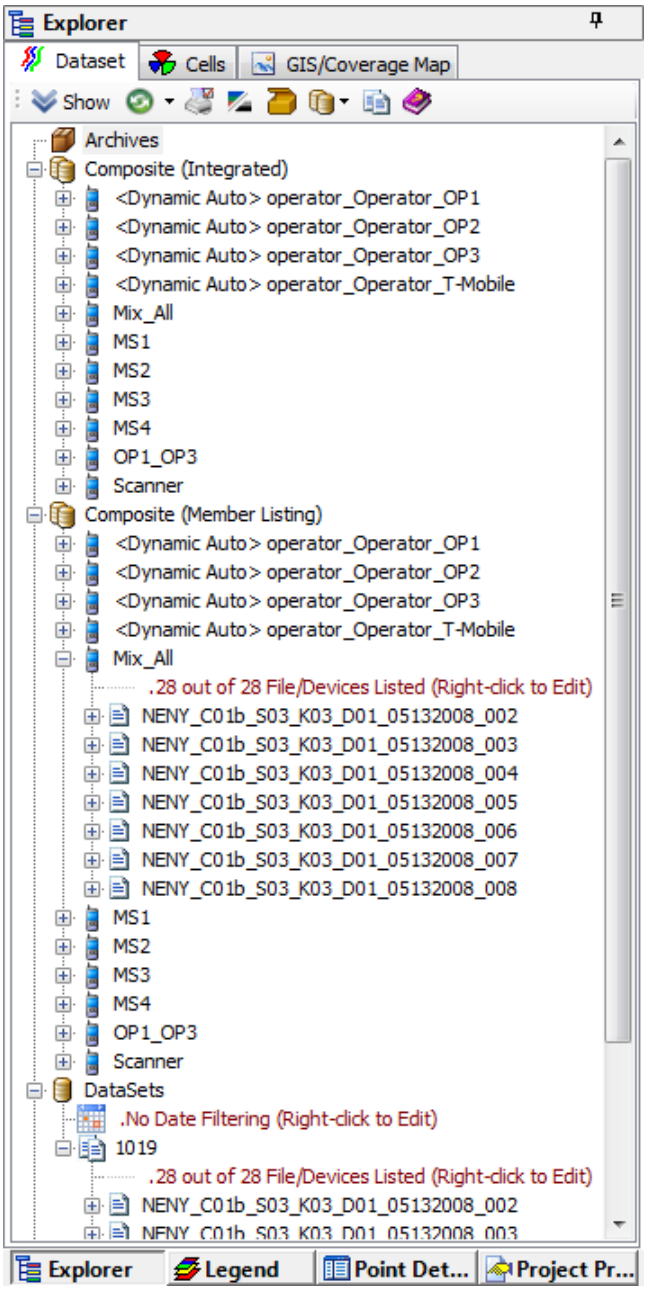
To open the Data Explorer, right-click on a project in the Project List and select **Open Project** or **Open Project with View Layout** from the context menu.

4.1.1 Dataset

The Dataset tab displays drive test data in three logical groups:

- **Archive**. Datasets that have been compressed and stored in the disk as .ZIP files to save space.
- **Composite**. Multiple datasets/mobiles that have been combined to construct logical datasets/mobiles.
- **Datasets**. Drive test data that has been processed (binned) from the source data. The hierarchy of the data is: Dataset > Mobile Group > Mobile > Frame > Metric.

Except for the archives, each group is in a tree view layout that can be drilled down to the metric level.



4.1.1.1 Dataset Toolbar

Show/Hide. Show (or hide) the data filtering options.

Refresh. Refresh tree view

- **Stop Automatically Refreshing Dataset Tree View**.

Queue. Open the print queue. See Print Queue for more information.

Delta. Generate Delta/special-type grid-binned metrics. See Delta/Special -type Grid-binned Metrics for more information.

Unpack. Unpack a TEMS Discovery packed dataset.

Composite options:

- **Create/Edit Static Composite Dataset**. See Static Composite Dataset for more information.
- **Modify Dynamic Composite Dataset Scope**. Modify restrictions for applying the rules defined in dynamic composite dataset to current project. See Modify Dynamic Composite Dataset Scope for more information.
- **Create/Edit Dynamic Composite Dataset**. See Dynamic Composite Dataset Settings for more information.

Group. Create dataset group.

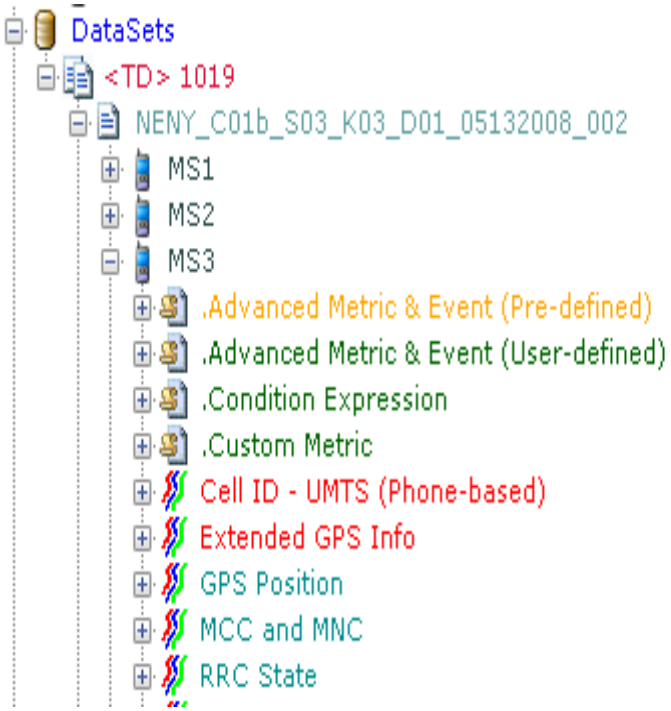
Help.

4.1.1.2 Color Scheme

The metric list tree nodes for a dataset are color-coded according to the nature and the level of data.

To illustrate, the following hard-coded color scheme is used:

- TEMS Discovery-predefined Scripts/Custom Metric/Condition Expression: Orange
- User-defined Scripts/Custom Metric/Condition Expression: Green
- Password protected Scripts/Custom Metric/Condition Expression: Maroon
- TEMS Discovery-Special Metric Group: Red

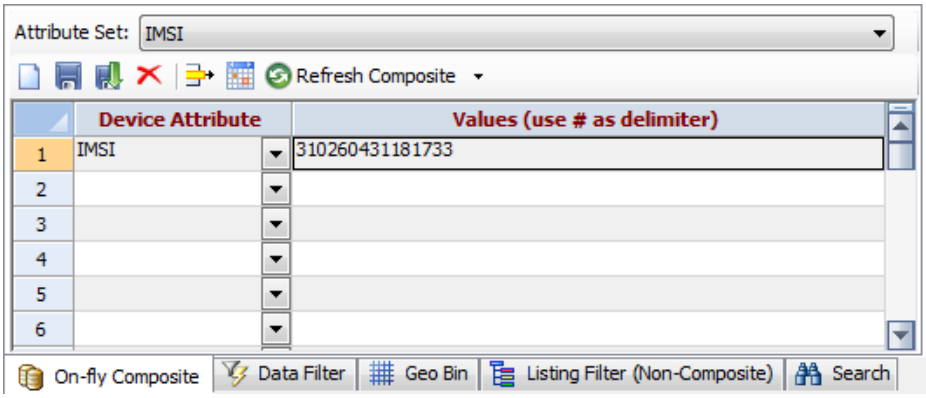


You can change the color scheme by selecting a new set of favorite colors for certain modifiable tree notes. See Color Scheme Options for more information.

4.1.1.3 Dataset Options

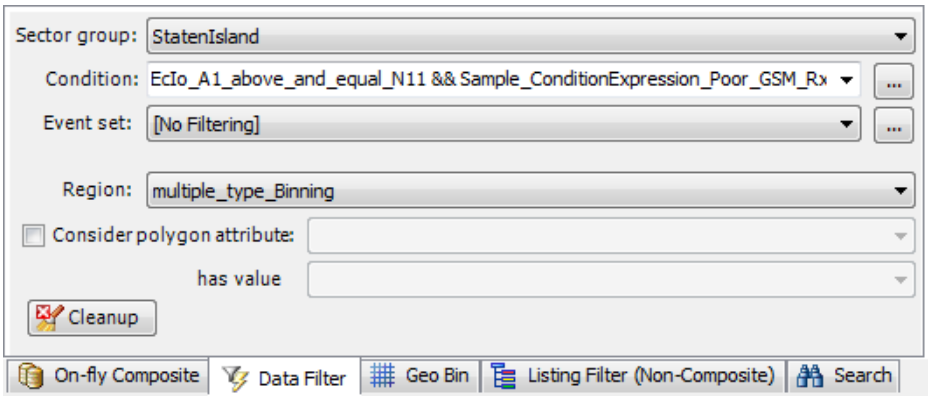
Datasets can be filtered by sector group, condition expression, event set, and/or user-defined region. Those filters will affect what data is to be considered for data presentation and statistics. In addition, TEMS Discovery can list only the files that meet the listing filters, problem set, favorite flag, or collection date/processing date. You can also search the dataset tree for any label that contains the search text.

4.1.1.3.1 On-fly Composite



The *On-fly Composite* option allows the user to create dynamical composite dataset based on multiple device attribute. This option is only available when database is selected for measurement data storage.

4.1.1.3.2 Data Filters

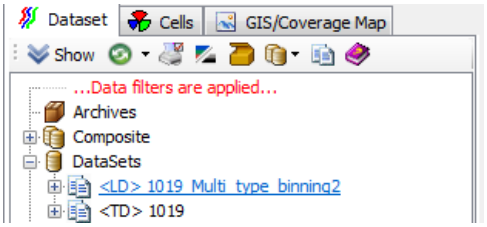


The *Data Filters* option is different from the Listing Filters (Non-Composite) option. The Data Filters option will not affect the dataset listing in the Data Explorer, but it will affect what data can be analyzed and displayed. In another words, if a metric is dragged-and-dropped to any view, only the data within the filtering region covered by the sector group and meeting the conditions will be displayed.

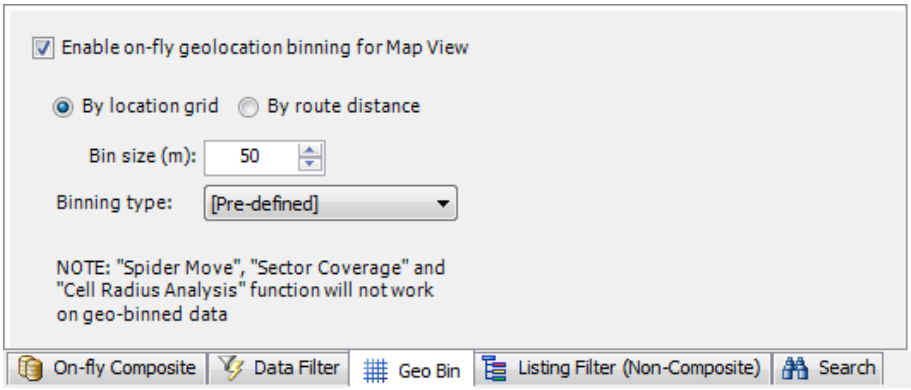
- **Sector group**. If a sector group is selected, only the data at the location that is covered by the sectors in the sector group will be considered. See Cells in Map View for information about defining a sector group.
- **Condition**. If one or multiple condition expressions are selected, the data to be considered must also meet the condition. Click the **Browse** button to open the Script Builder, where you can define or edit a condition expression. See the Script Builder section for more information.

- **Event set**. If an event set is selected, the data to be considered must also meet the condition defined in the event set. Click the **Browse** button to open the Event Set Configuration dialog, where you can define or edit an event set. See Event Set Filter for more information.
- **Region**. If a filter region is selected, only the data within the defined region will be considered. See GIS in Map View for information about creating a user-defined region (UDR) and assigning attributes to each polygon.
- **Consider polygon attribute**. If this option is selected, only the data that falls within the polygon with the specified attribute and value will be considered.

In case *Data Filters* option pane is hidden, an indicator in red color will be displayed as below.



4.1.1.3.3 Geo Bin



The *Geo Bin* option is to provice on-the-fly solution to aggregate the data in geolocation bin.

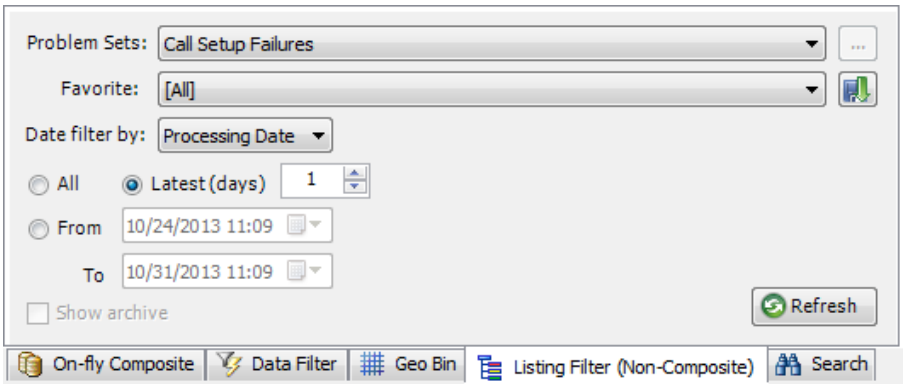
- **Binning Method**

  TEMS Discovery provides two algorithms, **by route distance** and **by location grid**, for geo-location binning. If you choose to use route distance binning, the data within the distance of the defined binning size will be binned, whereas if you choose to use location grid binning, the data within the square area of defined binning size will be binned.

- **Binning Type**

  The default binning type is by the nature of data. TEMS Discovery has pre-defined binning type for each metric by its nature, for example, use LAVG (linear average for Ec/Io, etc.). However, you can select user-defined option and select one of binning type for all the data to be geo-binned. The selectable binning types are: AVG, LAVG, MIN, MAX, COUNT, SUM, FIRST and LAST.

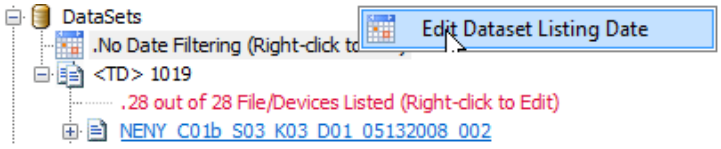
4.1.1.3.4 Listing Filters (Non-Composite)



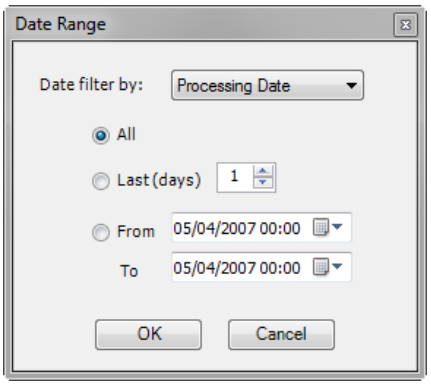
The *Listing Filters* option is different from the Data Filters option. The Listing Filters option will not directly affect the statistics of displayed data. However, it does directly affect whether a project, dataset, file/device, or metric will be displayed under the Data Explorer tree view. Please be advised that these options will not affect the listing of composite dataset.

- **Problem Sets**. You can select a problem set as a filter to list only the datasets or devices that have the problem defined in the problem set. Be sure to click the **Refresh** button to refresh the Dataset tree view after any change to the selection of problem sets. This option only affects the dataset listing in the Data Explorer.
- **Favorite**. The Frame or Metric can be added to or removed from the favorite group through its pop-up menu. The collection of these Frames and Metrics can be named and saved to a favorite group. The Favorite combo box lists all available favorite groups. Once a favorite group is selected from the combo box, only the Frames or Metrics that belong to the group will be listed in the tree view. This option only affects the dataset listing in the Data Explorer.
- **Date filter by**. You can search the dataset within a certain period based on its processing date or collection date. You will need to click the **Refresh** button to refresh the dataset tree view after any change to the date criteria. This option only affects the dataset listing in the Data Explorer.

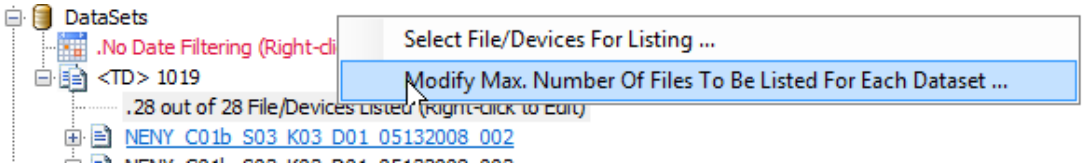
You can also select context menu shown below



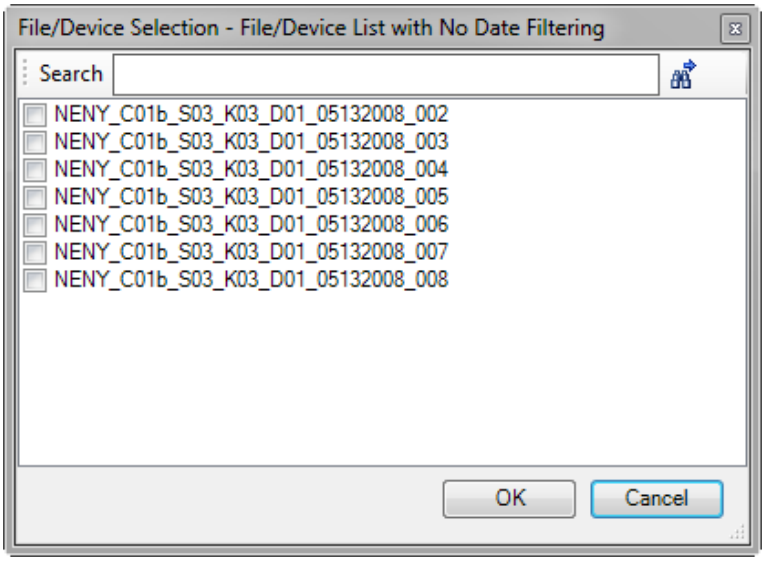
to bring up the following dialog for defining date range for listing, so that only the file/devices which are processed or collected within that date range will be listed.



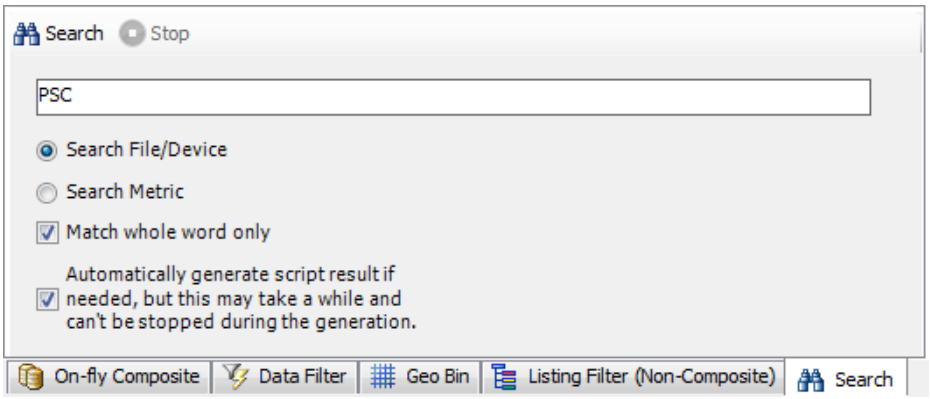
Other than the above date filtering, for each dataset, only up to a certain number of file/devices can be listed. You can select the context menu "*Modify Max. Number Of Files To Be Listed For Each Dataset*" to modify this maximum number.



To be more specific, you can also manually select the file/device to be listed from the following dialog which can be brought by selecting contaxt menu "*Select File/Device For Listing*".



4.1.1.3.5 Search Dataset Tree

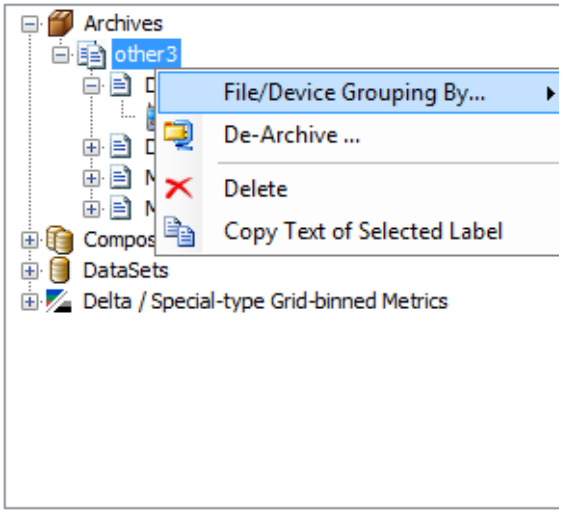


You can search the dataset tree for any label that contains the specified search text. You can search only for File/Device name, or if you also want to search the script results, check the option **Automatically generate script result if needed**.

NOTE: The process of searching the script results may take some time, and you will not be able to cancel the process once it starts.

4.1.1.4 Dataset Pop-up Menus

4.1.1.4.1 *Dataset - Archive Pop-up Menu*



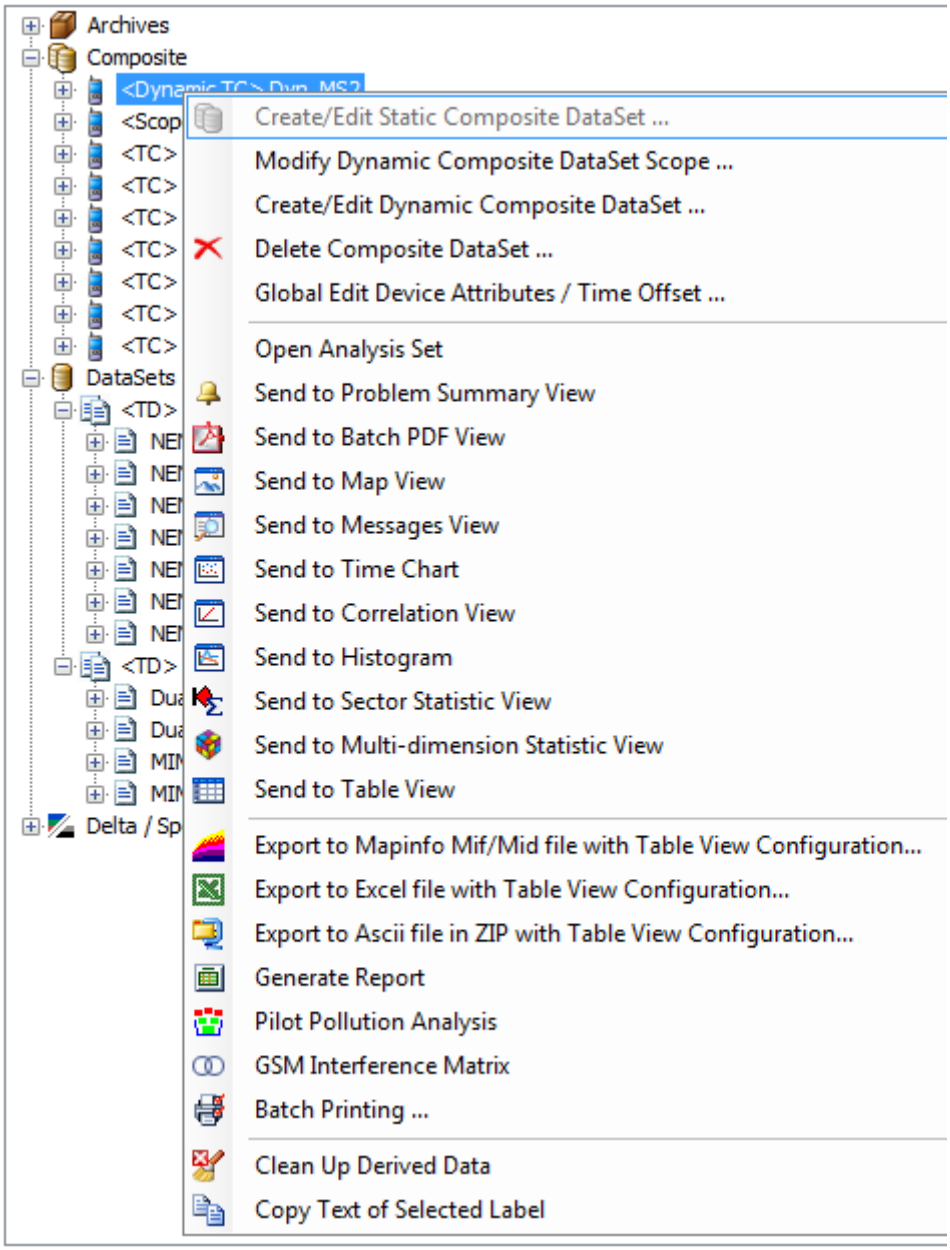
File/Device Grouping By. Group mobile data by its File Name, Device, ESN, IMEI, Label, or Mobile ID, or by any user-defined attributes. See Device Attribute Assignment.

De-Archive. De-archive the dataset so that it will be listed under the logical group Datasets.

Delete. Delete the archived dataset permanently from the disk.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.2 *Dataset - Composite Pop-up Menu*



Create/Edit Static Composite Dataset. Open the Create/Edit Static Composite Dataset dialog. See Static Composite Dataset.

Modify Dynamic Composite Dataset Scope. Open the Modify Dynamic Composite Dataset Scope dialog. See Modify Dynamic Composite Dataset Scope.

Create/Edit Dynamic Composite Dataset. Open the Create/Edit Dynamic Composite Dataset dialog. See Dynamic Composite Dataset Settings.

Delete Composite Dataset. Delete the selected composite dataset.

Global Edit Device Attributes/Time Offset. Globally edit the attributes of all the devices that are members of the selected composite dataset. See Device

Attribute Assignment.

Open Analysis Set. Construct a new view layout and load data from the selected composite dataset based on the pre-defined analysis sets.

Send to Problem Summary View. Select a problem set template (which can be defined in the Report Template Builder) to generate a report of the problem from the selected composite dataset, and then display the problem report in the Problem Summary View.

Send to Batch PDF View. Load data from the selected composite dataset and display a summary PDF based on the pre-defined configuration in Batch PDF View.

Send to Map View. Load data from the selected composite dataset based on the pre-defined configuration to the Map View.

Send to Messages View. Load data from the selected composite dataset based on the pre-defined configuration to the Messages View.

Send to Time Chart. Load data from the selected composite dataset based on the pre-defined configuration to the Time Chart.

Send to Correlation View. Load data from the selected composite dataset based on the pre-defined configuration to the Correlation View.

Send to Histogram. Load data from the selected composite dataset based on the pre-defined configuration to the Histogram.

Send to Sector Statistics View. Load data from the selected composite dataset based on the pre-defined configuration to the Sector Statistics View.

Send to Multi-dimension Statistic View. Load data from the selected composite dataset based on the pre-defined configuration to the Multi-dimension Statistic View.

Send to Table View. Load data from the selected composite dataset based on the pre-defined configuration to the Table View.

Export to MapInfo Mif/Mid file with Table View Configuration. Export data from the selected composite dataset based on the pre-defined Table View configuration to MapInfo Mif/Mid files.

Export to Excel with Table View Configuration. Export data from the selected composite dataset based on the pre-defined Table View configuration to an Excel file.

Export to ASCII file in ZIP with Table View Configuration. Export data from the selected composite dataset based on the pre-defined Table View configuration to ASCII files and compresses them to a ZIP file.

Generate Report. Generate a report from the selected composite dataset based on the pre-defined report template, and send the result to Excel.

Pilot Pollution Analysis. Run Pilot Pollution analysis on the selected composite dataset.

GSM Interference Matrix. Generate a GSM Interference Matrix on the selected composite dataset.

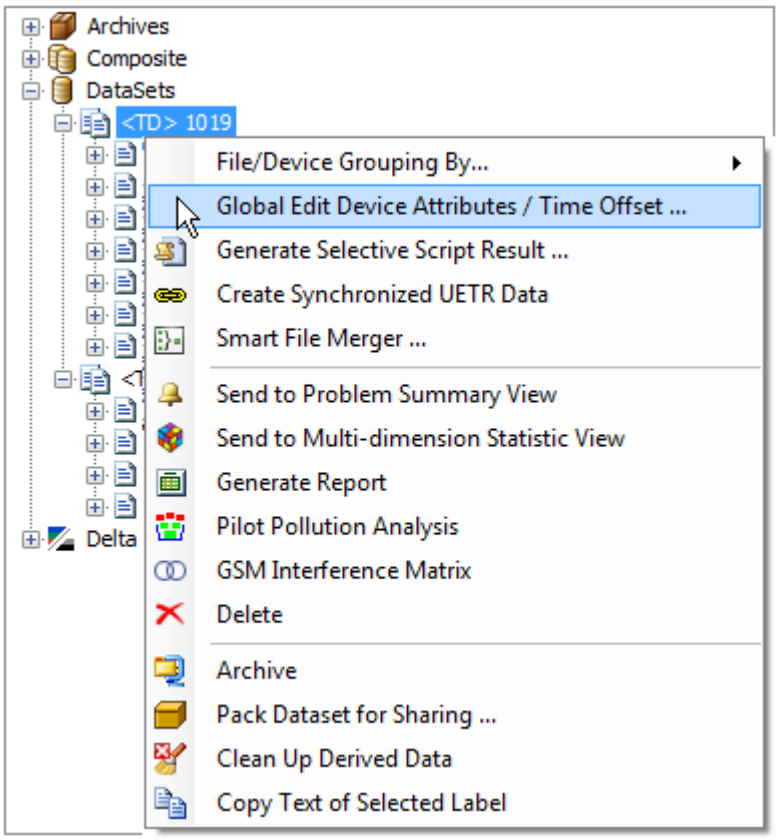
Batch Printing. Print data based on the pre-defined configuration to a printer or PDF. See Batch Printing.

Clean Up Derived Data. Clean up the data that is not generated from data importing, thus releasing disk

space.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.3 *Dataset - Datasets Pop-up Menu*



File/Device Grouping By. Group mobile data by its File Name, Device, ESN, IMEI, Label, or Mobile ID, or by any user-defined attributes. See Device Attribute Assignment.

Global Edit Device Attributes/Time Offset. Globally edit the attributes of all the devices that are members of the selected dataset. See Device Attribute Assignment.

Smart File Merger. Automatically merge all the files in the selected dataset, if the gap between any two files is less than or equal to the defined gap, and their IMSIs are the same if any of them has IMSI information. In case both of them do not have IMSI information, then check their IMEI, then ESN, and then device type.

Send to Problem Summary View. Bring up a dialog for selecting a problem set template (defined in the Report Template Builder) to generate a report of problems from the selected dataset, and then display the problem report in the Problem Summary View.

Send to Multi-dimension Statistic View. Load data from the selected dataset based on the pre-defined configuration to the Multi-dimension Statistic View.

Generate Report. Generate a report from the selected dataset based on the pre-defined report template, and send the result to Excel.

Pilot Pollution Analyzer. Run Pilot Pollution analysis on the selected dataset.

GSM Interference Matrix. Generate a GSM Interference Matrix on the selected dataset.

Delete. Delete the selected dataset.

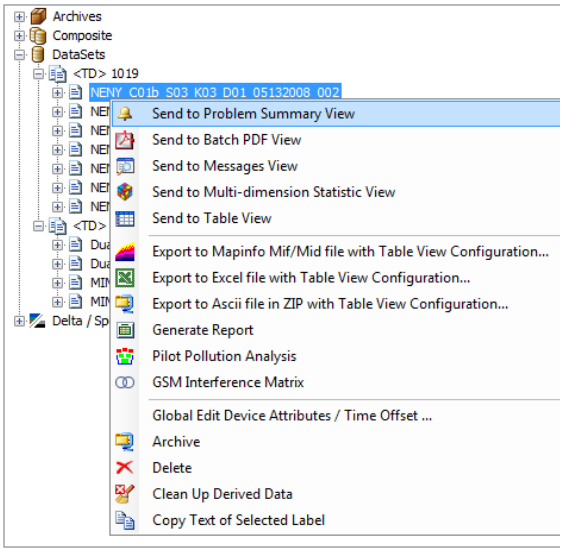
Archive. Archive the selected dataset. The archived dataset will then be listed under the *Archive* tree node.

Pack Dataset for Sharing. Export the selected dataset to a ZIP file for archiving or sharing.

Clean Up Derived Data. Clean up the data that is not generated from data importing, thus releasing disk space.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.4 *Dataset - Mobile Group Pop-up Menu*



Send to Problem Summary View. Select a problem set template (defined in the Report Template Builder) to generate a report of problems from the selected mobile group, and then display the problem report in Problem Summary View.

Send to Batch PDF View. Load data from the selected mobile group and display a summary PDF based on the pre-defined configuration in Batch PDF View.

Send to Messages View. Display the selected mobile groups to the Messages View.

Send to Multi-dimension Statistic View. Load data from the selected mobile group based on the pre-defined configuration to the Multi-dimension Statistic View.

Send to Table View. Load data from the selected mobile group based on the pre-defined configuration to the Table View.

Export to MapInfo Mif/Mid file with Table View Configuration. Export data from the selected mobile group based on the pre-defined Table View configuration to MapInfo Mif/Mid files.

Export to Excel file with Table View Configuration. Export data from the selected mobile group based on the pre-defined Table View configuration to Excel files.

Export to ASCII file in ZIP with Table View Configuration. Export data from the selected mobile group based on the pre-defined Table View configuration to ASCII files and compress them to a ZIP file.

Generate Report. Generate a report from the selected mobile group based on the pre-defined report template and send the result to Excel.

Pilot Pollution Analysis. Run Pilot Pollution analysis on the selected mobile group.

GSM Interference Matrix. Generate a GSM Interference Matrix on the selected mobile group.

Global Edit Device Attributes/Time Offset. Globally edit the attributes of all the devices that are members of the selected mobile group. See Device Attribute Assignment.

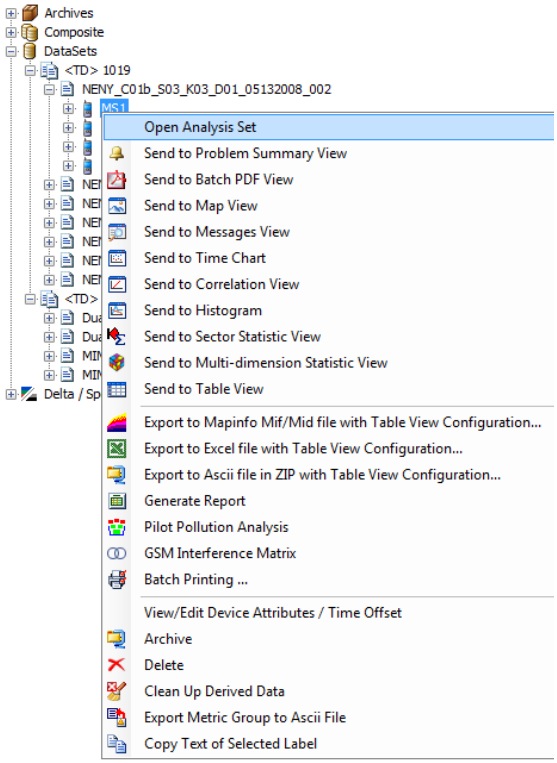
Archive. Archive the selected mobile group. The archived mobile can then be listed under the *Archive* tree node.

Delete. Delete the selected mobile group.

Clean Up Derived Data. Clean up the data that is not generated from data importing, thus releasing disk space.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.5 *Dataset – Mobile Pop-up Menu*



Open Analysis Set. Construct a new view layout and load data from the selected mobile data based on the pre-defined analysis sets.

Send to Problem Summary View. Bring up a dialog for selecting a problem set template (defined in the Report Template Builder) to generate a report of problems from the selected mobile, and then display the problem report in Problem Summary View.

Send to Batch PDF View. Bring up a dialog for selecting a summary view option to generate a summary PDF from the selected device, and then display the PDF in Batch PDF View.

Send to Map View. Load data from the selected mobile based on the pre-defined configuration to the Map View.

Send to Messages View. Display the selected mobile to the Messages View.

Send to Time Chart. Load data from the selected mobile based on the pre-defined configuration to the Time Chart.

Send to Correlation View. Load data from the selected mobile based on the pre-defined configuration to the Correlation View.

Send to Histogram. Load data from the selected mobile based on the pre-defined configuration to the Histogram.

Send to Sector Statistics View. Load data from the selected mobile based on the pre-defined configuration to the Sector Statistics View.

Send to Multi-dimension Statistic View. Load data from the selected mobile based on the pre-defined configuration to the Multi-dimension Statistic View.

Send to Table View. Load data from the selected mobile based on the pre-defined configuration to the Table View.

Export to MapInfo Mif/Mid file with Table View Configuration. Export data from the selected mobile based on the pre-defined Table View configuration to MapInfo Mif/Mid files.

Export to Excel file with Table View Configuration. Export data from the selected mobile based on the pre-defined Table View configuration to Excel files.

Export to ASCII file in ZIP with Table View Configuration. Export data from the selected mobile based on the pre-defined Table View configuration to ASCII files and compress them to a ZIP file.

Generate Report. Generate a report from the selected mobile based on the pre-defined report template and send the result to Excel.

Pilot Pollution Analysis. Run Pilot Pollution analysis on the selected mobile.

GSM Interference Matrix. Generate a GSM Interference Matrix on the selected mobile.

Batch Printing. Print data based on the pre-defined configuration to a printer or PDF. See Batch Printing.

View/Edit Device Attributes/Time Offset. View and edit the selected mobile's device information. See Device Attribute Assignment.

Archive. Archive the selected mobile. The archived mobile can then be listed under the *Archive* tree node.

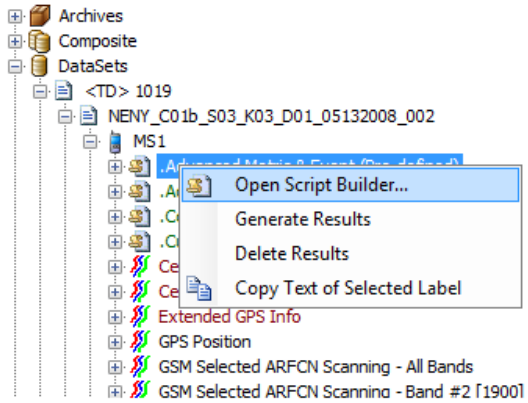
Delete. Delete the selected mobile data.

Clean Up Derived Data. Clean up the data that is not generated from data importing, thus releasing disk space.

Export Metric Group to ASCII File. Export the data of the selected metric group to an ASCII file.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.6 *Dataset - Script Root Pop-up Menu*



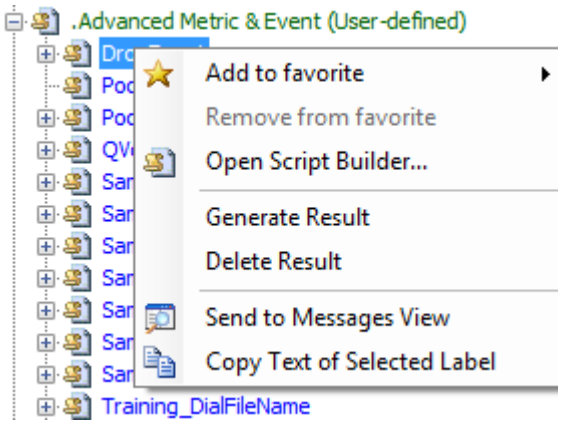
Open Script Builder. Open the Script Builder.

Generate Results. Run all the scripts under the selected script category, and generate results for each script.

Delete Results. Delete the result of all scripts under the selected script category.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.7 *Dataset – Script Pop-up Menu*



Add to favorite. Add the selected script to the pre-defined favorite group.

Remove from favorite. Remove the selected script from the current favorite group.

Open Script Builder. Open the Script Builder.

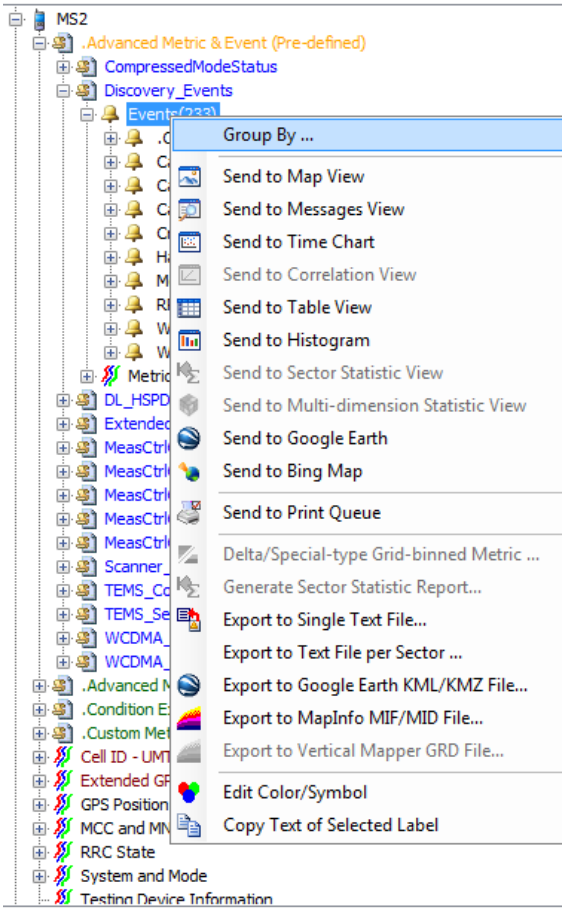
Generate Result. Generate results for the selected script.

Delete Result. Delete the results generated by the script.

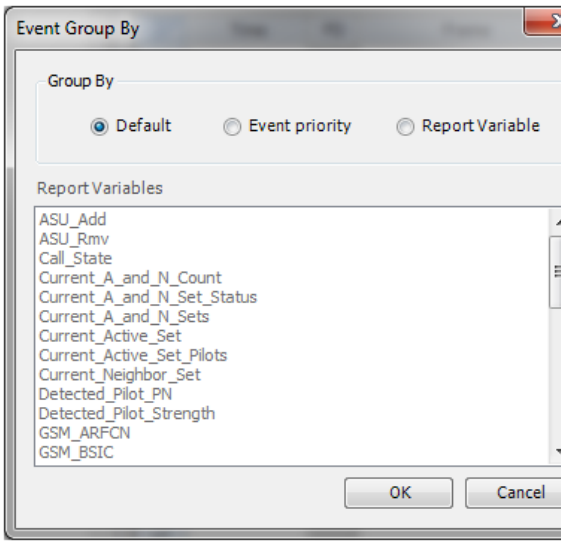
Send to Messages View. Execute the selected script and display the result in the Messages View.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.8 *Dataset - Script-Event Root Pop-up Menu*



Group By. Events can be grouped event category, which is the default, or by event priority, or by one of the report variables. Event priority and report variables are defined when you create a script.



Send to Map View. Execute the script and display all events in the Map View.

Send to Messages View. Execute the script and display all events in the Messages View.

Send to Time Chart. Execute the script and display all events in the Time Chart.

Send to Correlation View. Not applicable.

Send to Table View. Execute the script and display all events in the Table View.

Send to Histogram. Execute the script and display all events in the Histogram.

Send to Sector Statistic View. Not applicable.

Send to Multi-dimension Statistic View. Not applicable.

Send to Google Earth. Execute the script and display all events in Google Earth.

Send to Bing Map. Execute the script and display all events in Bing Map.

Send to Print Queue. Execute the script and send to Print Queue.

Delta/Special-type Grid-binned Metric. Not applicable.

Generate Sector Statistics Report. Execute the script and generate a statistic report per sector.

Export to Single Text File. Execute the script and export all events to a text file.

Export to Text File per Sector. Execute the script and export all events to a text file per sector.

Export to Google Earth KML/KMZ file. Export the selected metric to a KML/KMZ file that can be displayed in Google Earth or any other tools that support KML/KMZ files.

Export to MapInfo MIF/MID File. Execute the script and export all events to a MapInfo MIF/MID file.

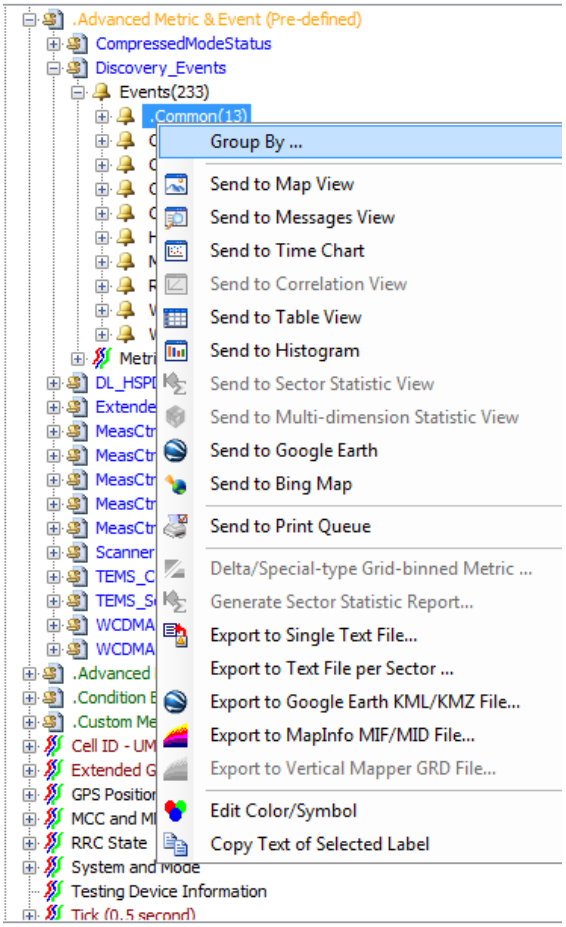
Export to Vertical Mapper GRD File. Not applicable.

Edit Color/Symbol. Open the Plot Band Definition dialog and edit the color/symbol for the selected event.

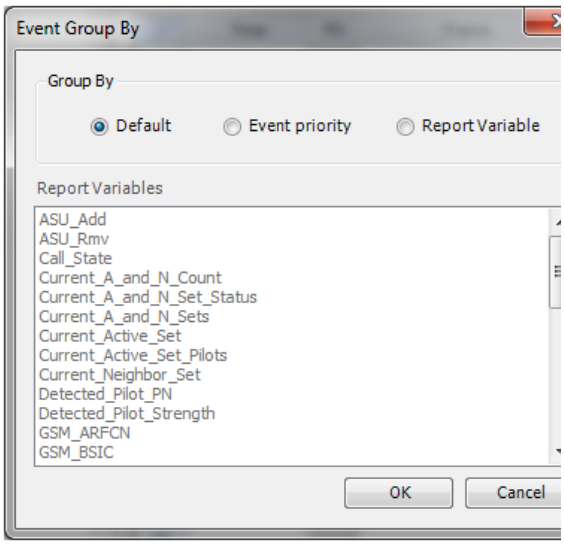
Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can

paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.9 *Dataset - Script-Event Category Pop-up Menu*



Group By. Events can be grouped event category, which is the default, or by event priority, or by one of the report variables. Event priority and report variables are defined when you create a script.



Send to Map View. Execute the script and display events of the selected category in the Map View.

Send to Messages View. Execute the script and display all events of the selected category in the Messages View.

Send to Time Chart. Execute the script and display events of the selected category in the Time Chart.

Send to Correlation View. Not applicable.

Send to Table View. Execute the script and display events of the selected category in the Table View.

Send to Histogram. Execute the script and display events of the selected category in the Histogram.

Send to Sector Statistic View. Not applicable.

Send to Multi-dimension Statistic View. Not applicable.

Send to Google Earth. Execute the script and display all events in Google Earth.

Send to Bing Map. Execute the script and display all events in Bing Map.

Send to Print Queue. Execute the script and send to Print Queue.

Delta/Special-type Grid-binned Metric. Not applicable.

Generate Sector Statistics Report. Not applicable.

Export to Single Text File. Execute the script and export events of the selected category to a text file.

Export to Text File per Sector. Execute the script and export events of the selected category to a text file per sector.

Export to Google Earth KML/KMZ File. Execute the script and export events of the selected category to a Google Earth KML or KMZ file.

Export to MapInfo MIF/MID File. Execute the script and export events of the selected category to a MapInfo MIF/MID file.

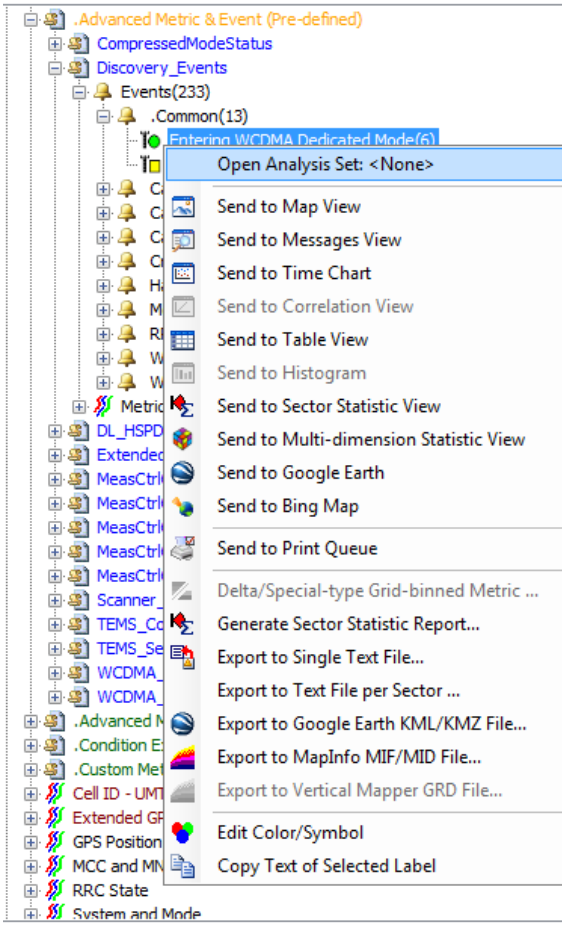
Export to Vertical Mapper GRD File. Not applicable.

Edit Color/Symbol. Open the Plot Band Definition dialog and edit the color/symbol for the selected event category.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can

paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.10 *Dataset - Script-Event Pop-up Menu*



Open Analysis Set. Execute the script and open the associated analysis set.

Send to Map View. Execute the script and display the selected event in the Map View.

Send to Messages View. Execute the script and display the selected event in the Messages View.

Send to Time Chart. Execute the script and display the selected event in the Time Chart.

Send to Correlation View. Not applicable.

Send to Table View. Execute the script and display the selected event in the Table View.

Send to Histogram. Not applicable.

Send to Sector Statistic View. Execute the script and display the selected event in Sector Statistic View.

Send to Multi-dimension Statistic View. Execute the script and display the selected event in Multi-dimension Statistic View.

Send to Google Earth. Execute the script and display all events in Google Earth.

Send to Bing Map. Execute the script and display all events in Bing Map.

Send to Print Queue. Execute the script and send to Print Queue.

Delta/Special-type Grid-binned Metric. Not applicable.

Generate Sector Statistics Report. Execute the script and generate a Sector Statistics Report for the selected event to a text file.

Export to Single Text File. Execute the script and export the selected event to a text file.

Export to Text File per Sector. Execute the script and export the selected event to a text file per sector.

Export to Google Earth KML/KMZ File. Execute the script and export events of the selected event to a Google Earth KML or KMZ file.

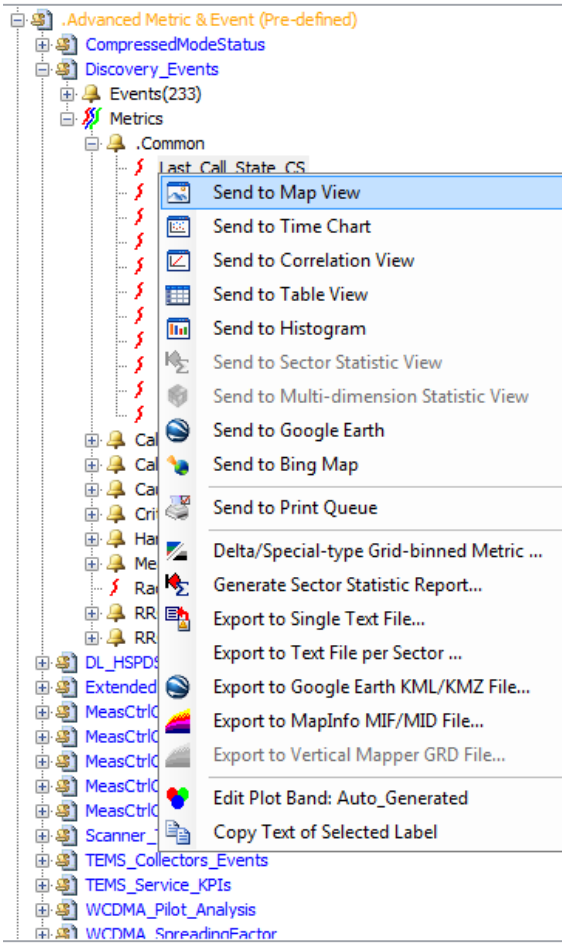
Export to MapInfo MIF/MID File. Execute the script and export events of the selected event to a MapInfo MIF/MID file.

Export to Vertical Mapper GRD File. Not applicable.

Edit Color/Symbol. Open the Plot Band Definition dialog and edit the color/symbol for the selected event.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.11 *Dataset - Script-Metric Pop-up Menu*



Send to Map View. Execute the script and display the selected metric in the Map View.

Send to Time Chart. Execute the script and display the selected metric in the Time Chart.

Send to Correlation View. Not applicable.

Send to Table View. Execute the script and display the selected metric in the Table View.

Send to Histogram. Execute the script and display the selected metric in the Histogram.

Send to Sector Statistic View. Execute the script and display the selected metric in the Sector Statistic View.

Send to Multi-dimension Statistic View. Execute the script and display the selected metric in the Multi-dimension Statistic View.

Send to Google Earth. Execute the script and display all events in Google Earth.

Send to Bing Map. Execute the script and display all events in Bing Map.

Send to Print Queue. Execute the script and send to Print Queue.

Delta/Special-type Grid-binned Metric. Generate Delta/Special-Type Grid-Binned Metric.

Generate Sector Statistics Report. Execute the script and generate a Sector Statistics Report for the selected metric to a text file.

Export to Single Text File. Execute the script and export the selected metric to a text file.

Export to Text File per Sector. Execute the script and export the selected metric to a text file per sector.

Export to Google Earth KML/KMZ File. Execute the script and export events of the selected metric to a Google Earth KML or KMZ file.

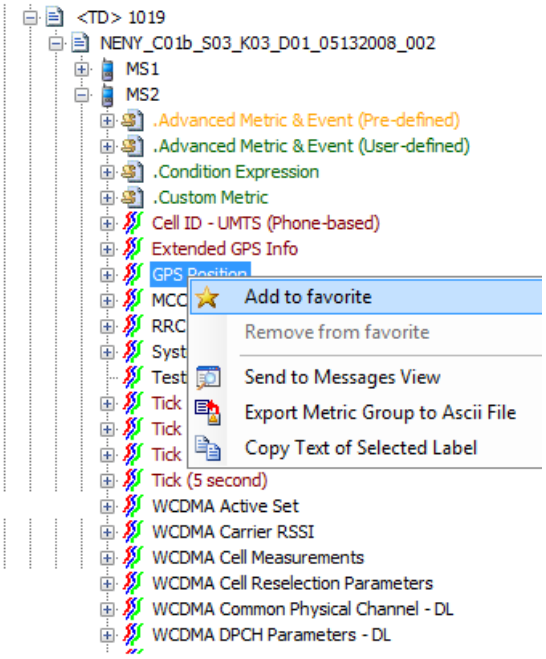
Export to MapInfo MIF/MID File. Execute the script and export events of the selected metric to a MapInfo MIF/MID file.

Export to Vertical Mapper GRD File. Not applicable.

Edit Plot Band. Open the Plot Band Definition dialog and edit the plot band for the selected metric.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.12 *Dataset – Metric Group Pop-up Menu*



Add to favorite. Add the selected frame to the pre-defined favorite group.

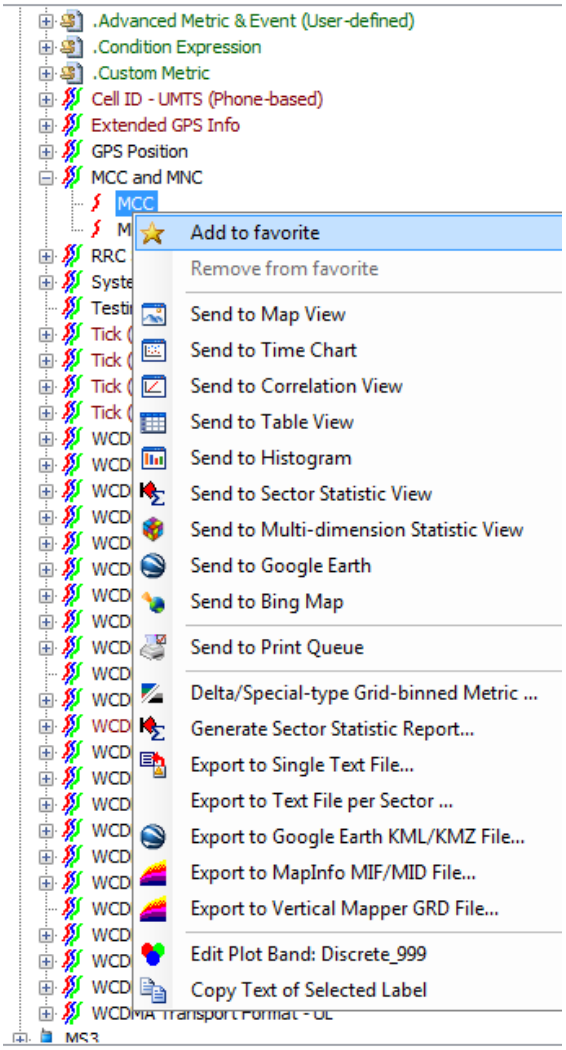
Remove from favorite. Remove the selected frame from the current favorite group.

Send to Messages View. Display the selected frame in the Messages View.

Export Metric Group to ASCII File. Export the selected frame to a text file.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.4.13 *Dataset – Metric Pop-up Menu*



Add to favorite. Add the selected metric to the pre-defined favorite group.

Remove from favorite. Remove the selected metric from the current favorite group.

Send to Map View. Display the selected metric in the Map View.

Send to Time Chart. Display the selected metric in the Time Chart.

Send to Correlation View. Load data from the selected dataset based on the pre-defined configuration to the Correlation View.

Send to Table View. Display the selected metric in the Table View.

Send to Histogram. Display the selected metric in the Histogram.

Send to Sector Statistic View. Display the selected metric in the Sector Statistic View.

Send to Multi-dimension Statistic View. Display the selected metric in the Multi-dimension Statistic View.

Send to Google Earth. Display the selected metric in Google Earth.

Send to Bing Map. Execute the script and display all events in Bing Map.

Send to Print Queue. See Print Queue for more information.

Delta/Special-type Grid-binned Metric. Generate Delta/Special -type Grid-binned Metrics.

Generate Sector Statistics Report. Generate a Sector Statistics Report for the selected metric to a text file.

Export to Single Text File. Export the selected metric to a text file.

Export to Text File per Sector. Export the selected metric to a text file per sector.

Export to Google Earth KML/KMZ file. Export the selected metric to a KML/KMZ file that can be displayed in Google Earth or any other tools that support KML/KMZ files.

Export to MapInfo MIF/MID File. Execute the selected metric to a MapInfo MIF/MID file.

Export to Vertical Mapper GRD File. Execute the selected metric to a Vertical Mapper GRD file.

Export to GPX (GPS Exchange Format) File. Execute the selected metric (Route in GPS Position) to a GPX (GPS exchange format) file. This file can be imported into any software applications that support common GPS data format to describe the drive test route.

Edit Plot Band. Open the Plot Band Definition dialog and edit the plot band for the selected metric.

Copy Text of Selected Label. Copy the text of the selected tree node to the Clipboard, so that you can paste the text to an external tool such as Notepad or Excel for any purpose.

4.1.1.5 Static Composite Dataset

Multiple datasets and/or mobile data can be combined to form a super dataset. This can be done by dragging-and-dropping one or more datasets or mobile data from the tree view on the left to the list view on the right. The combined dataset will be listed in the Data Explorer–Dataset List under **Composite**. The operation of this dataset is similar to a regular dataset.

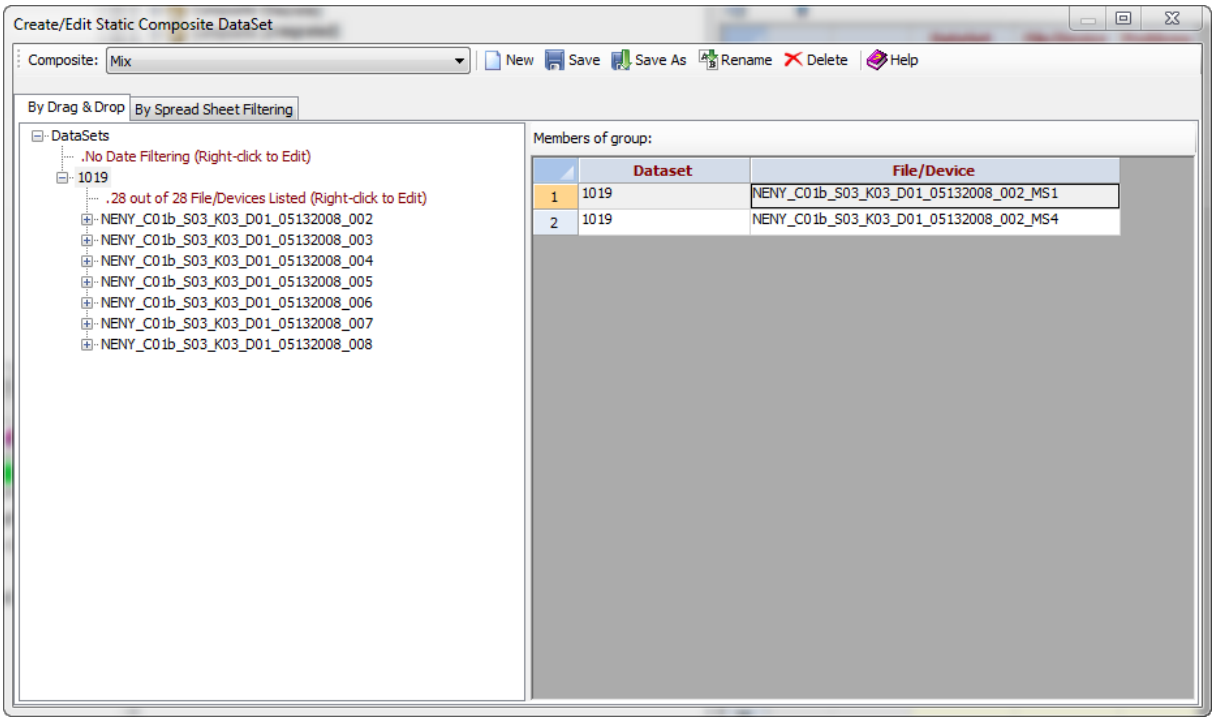
The Create/Edit Static Composite Dataset dialog can be accessed in the following ways:

- Selecting **Create/Edit Composite Dataset** from the Data Explorer–Dataset right-click menu.
- Clicking the **Edit Composite Dataset** button on the Data Explorer–Dataset toolbar.

A composite dataset can be created in two ways: by drag-and-drop, or by spreadsheet filtering.

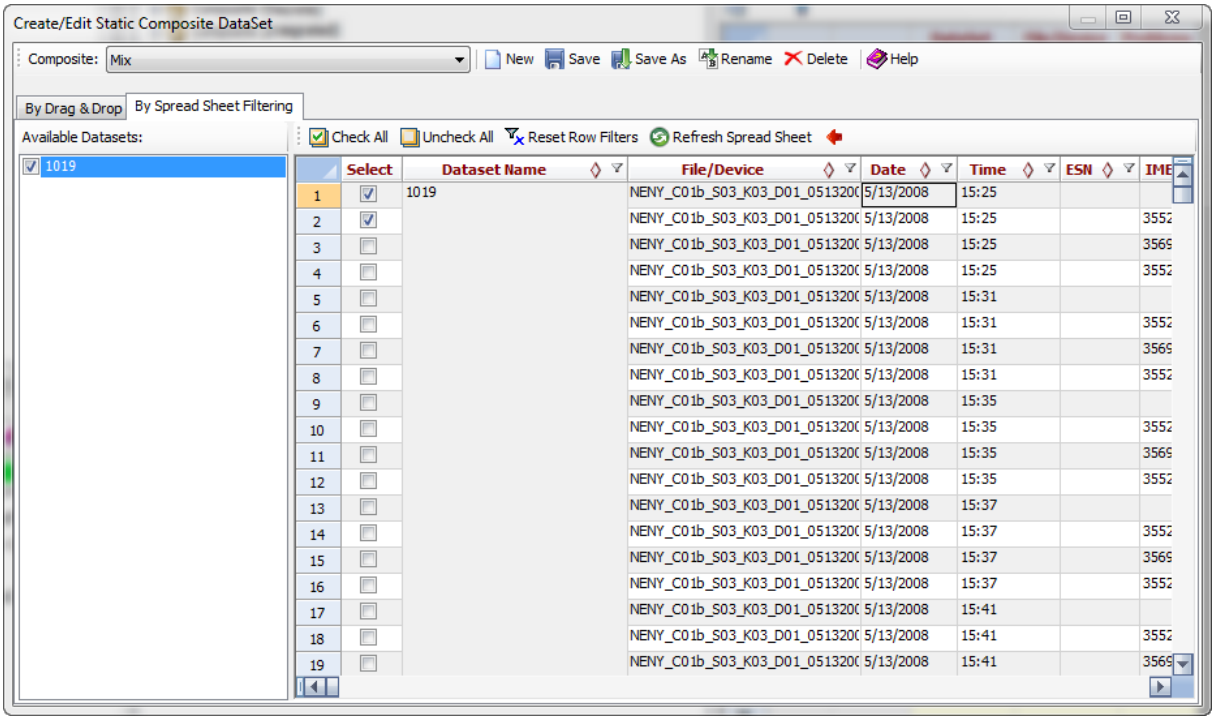
By Drag-and-Drop

To make the best use of the file/device grouping function, group data by a particular attribute, and then drag-and-drop a group of data from the tree view on the left to the list view on the right.



By Spreadsheet Filtering

To list all file/devices in the spreadsheet, define a composite dataset from the selected datasets on the *Available Datasets* list, and then press the **Refresh Spreadsheet** button in the toolbar. As with Microsoft Office Excel, you can use the row filtering function to filter out the unwanted data by a particular attribute, and then check the checkboxes to select the data.



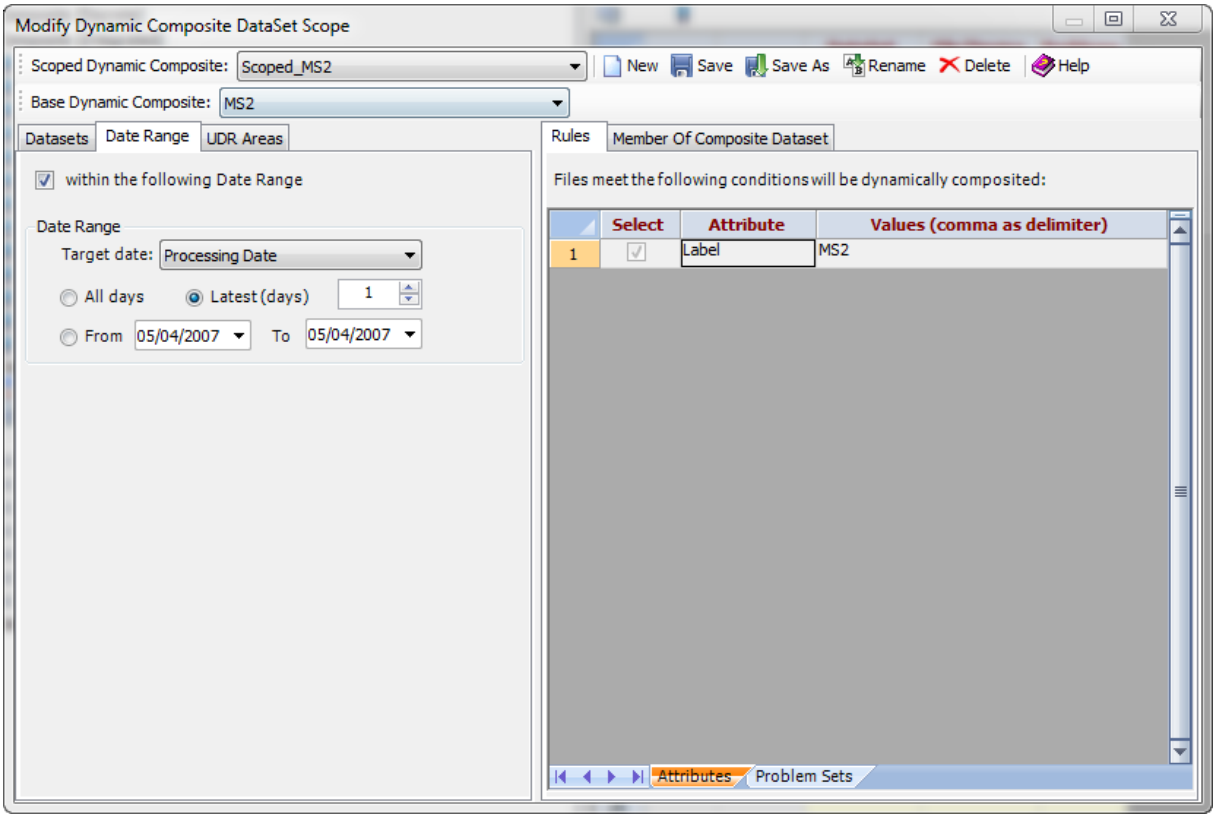
The toolbar includes individual buttons for the various actions you might need to perform: creating a new composite dataset, saving the dataset, saving the dataset under a different name, or renaming or deleting the dataset.

4.1.1.6 Modify Dynamic Composite Dataset Scope

The Modify Dynamic Composite Dataset feature defines a set of rules by determining which rules to apply automatically to a certain composite dataset. In some circumstances, we may want to restrict the rules so that a more desired composite dataset can be generated.

This feature can be accessed in the following ways:

- Selecting **Modify Dynamic Composite Dataset Scope** from the Data Explorer–Dataset right-click context menu.
- Clicking the **Edit Composite Dataset** button in the Data Explorer–Dataset toolbar.



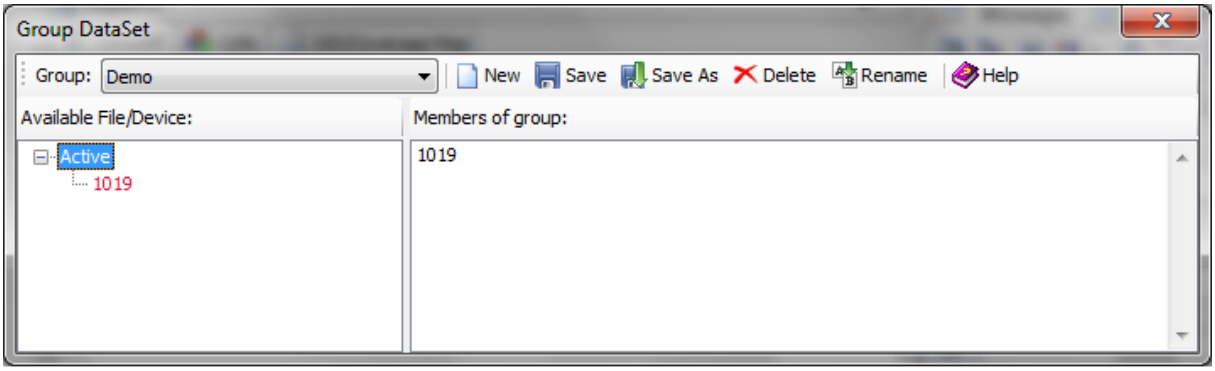
You can limit the rules of a dynamic composite dataset so that they apply to a limited number of datasets and/or a certain date range, and then save it as a named scoped dynamic composite dataset. You can create unlimited scoped dynamic composite datasets from a base dynamic composite dataset.

4.1.1.7 Dataset Group

Multiple datasets can be grouped to form a dataset group.

The Group Dataset dialog can be accessed in the following ways:

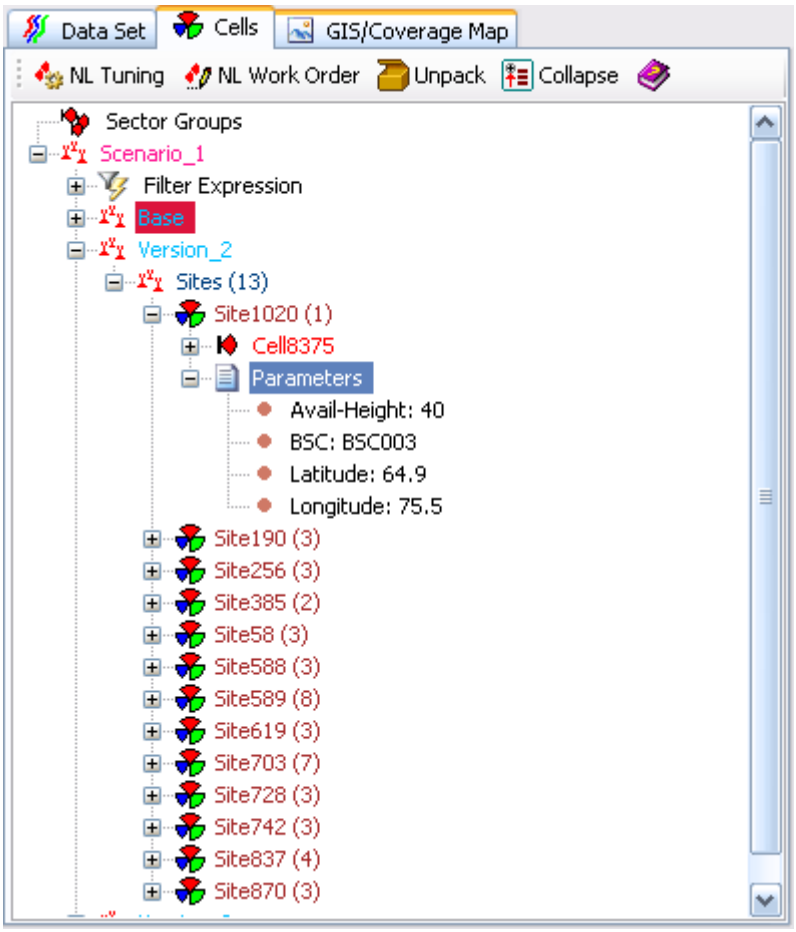
- Selecting **Edit Group Dataset** from the Data Explorer–Dataset right-click context menu.
- Clicking the **Group** button in the Data Explorer–Dataset toolbar.



To form a dataset group, drag-and-drop one or more datasets from the tree view on the left to the list view on the right. The grouped dataset will be listed in the Data Explorer–Dataset List with a prefix of <Group>. The operations for this dataset are similar to those for a regular dataset.

4.1.2 Cells

The **Cells** tab is the logical display of network configurations, sector groups, and sector filter expressions.



Network Configuration. Each project can contain multiple scenarios of network configurations. Each scenario can have multiple versions and will have a "Base" version of network configurations by default. You can modify the base version and save it to multiple derived versions.

From the tree view, you can drill down any scenario of network configurations from cell site to carrier parameters.

If any version of a cell configuration is displayed in the Map View, the background of the corresponding tree node will be colored.

Sector Group. You can select some particular sectors and form a sector group with a name. This sector group can be highlighted in the Map View for viewing, or used to filter drive test data for analyzing.

Sector Filter Expression. **T**he Sector Filter Expression is a logical expression that is constructed from the cell site, sector, and carrier parameters. It is used to search sectors that meet a user-defined condition. You can also save the searched sector as a

sector group for further manipulation. See Sector Filter Expression Builder for more information.

4.1.2.1 Cells Toolbar

NL Analyzer. See Neighbor List Analyzer.

NL Work Order. See Neighbor List Work Order.

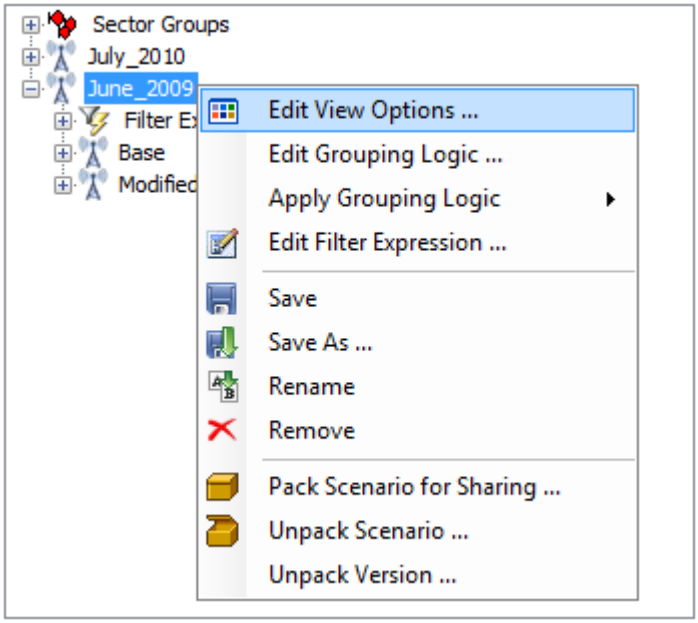
Unpack. Unpack a TEMS Discovery packed cell configuration.

Collapse. Collapse tree view.

Help.

4.1.2.2 Cells Pop-up Menus

4.1.2.2.1 Scenario



Edit View options. Open the Cell Configuration View Options dialog. The data structure used as the view options is based on the "Base" version of the selected cell configuration.

Edit Grouping Logic. Open the Cell Site Grouping Logic dialog. The data structure used as the group categories is based on the "Base" version of the selected cell configuration.

Apply Grouping Logic. Apply pre-defined group logic to the logical display of all versions of the selected cell configuration.

Edit Filter Expression. Open the Cell Site/Sector Filter Expression Builder. The data structure used as parameters is based on the "Base" version of the selected cell configuration.

Save. Save the selected scenario.

Save As. Save the selected scenario as a new scenario.

Rename. Rename the selected scenario.

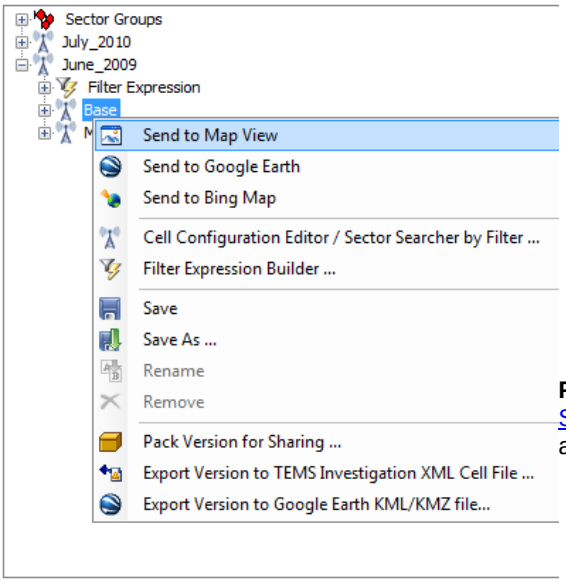
Remove. Remove the selected scenario.

Pack Scenario for Sharing. Pack the selected scenario to a ZIP file. This ZIP file can be shared with peers and unpacked to other projects.

Unpack Scenario. Import a TEMS Discovery exported scenario.

Unpack Version. Import a TEMS Discovery exported scenario version.

4.1.2.2.2 Scenario Version



Send to Map View. Display the selected scenario version in the Map View.

Send to Google Earth. Display the selected scenario version in Google Earth.

Send to Bing Map. Display the selected scenario version in Bing Map.

Cell Configuration Editor/Sector Searcher by Filter. Open the Cell Configuration Editor dialog.

Filter Expression Builder. Open the Cell Site/Sector Filter Expression Builder dialog to build a search criteria.

Save. Save the selected scenario version.

Save As. Save the selected scenario version as a new scenario version.

Rename. Rename the selected scenario version.

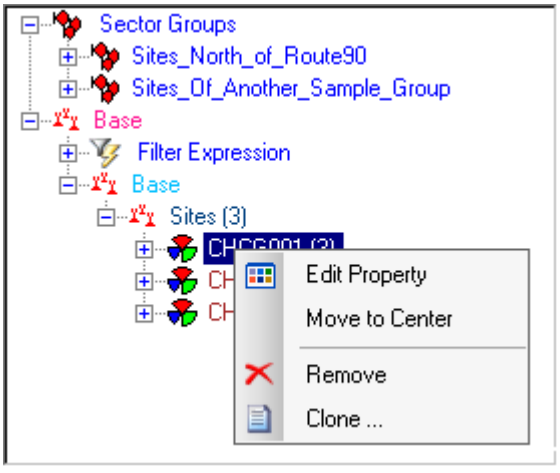
Remove. Remove the selected scenario version.

Pack Scenario for Sharing. Pack the selected scenario to a ZIP file. This ZIP file can be shared with peers and unpacked to other projects.

Export Version to TEMS Investigation XML Cell File. Export the selected scenario version to a TEMS Investigation XML cell file.

Export Version to Google Earth KML/KMZ File. Export the selected scenario version to a KML/KMZ file that can be displayed in Google Earth or any other tools that support KML/KMZ files.

4.1.2.2.3 Cell Site



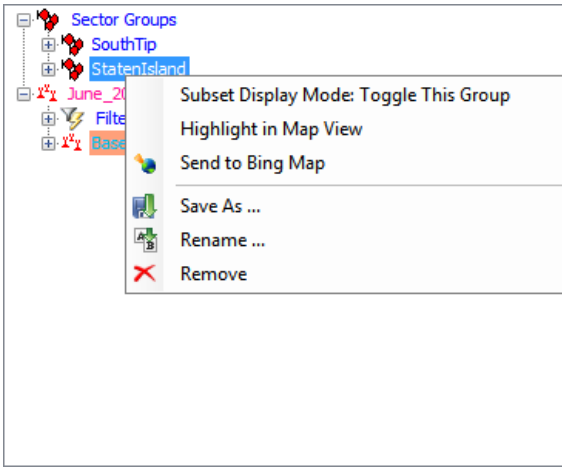
Edit Property. Open the Properties of Cell Site dialog.

Move to Center. Move the selected cell site to the center of the Map View.

Remove. Remove the selected cell site from the network configuration.

Clone. Clone the selected cell site and bring up the Cell Site Properties for editing.

4.1.2.2.4 Sector Group



Subset Display Mode: Toggle This Group. In subset display mode, only the selected number of sector groups will be displayed in the Map View. Select this option to toggle the display of the selected sector group in the Map View.

Highlight in Map View. Highlight the selected sector group in the Map View, if any of the network configurations are displayed in the Map View.

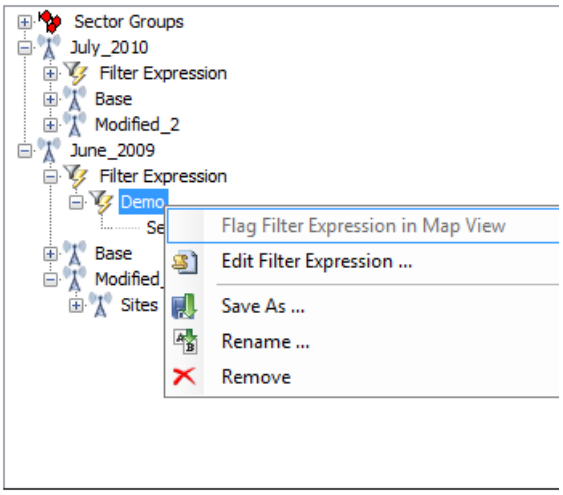
Send to Bing Map. Send the selected sector group to Bing Map for display.

Save As. Save the selected sector group as a new group.

Rename. Rename the selected sector group.

Remove. Remove the selected sector group.

4.1.2.2.5 Sector Filter Expression



Flag Filter Expression in Map View. Apply the selected sector filter expression and highlight the sectors that meet the filter in the Map View, if any of the network configurations are displayed in the Map View.

Edit Filter Expression. Open the Cell Site/Sector Filter Expression Builder dialog to edit the selected filter expression.

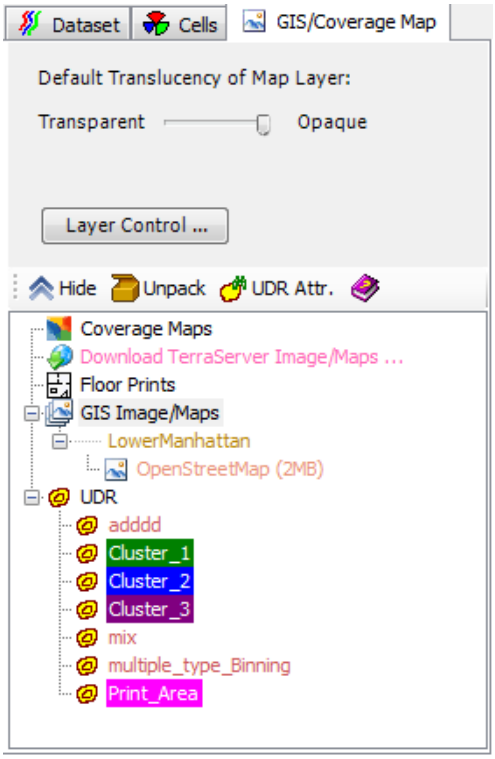
Save As. Save the selected sector filter expression as a new filter expression.

Rename. Rename the selected sector filter expression.

Remove. Remove the selected sector filter expression.

4.1.3 GIS/Coverage Map

The GIS/Coverage Map tab lists all GIS data associated with the current project. The GIS data can be displayed in the Map View by dragging-and-dropping, or by choosing it from its pop-up menu. Before dragging the GIS image/map to the Map View, you can define the translucency for the image/map for rendering.



4.1.3.1 GIS Categories

GIS data can be grouped into the following categories:

- Coverage Maps
- Download Terra Server Images/Maps
- Floor Prints
- Images/Maps
- User Defined Regions (UDRs)

4.1.3.1.1 Coverage Maps

TEMS Discovery can import a coverage map to a user-defined geo area. This user-defined geo area can be assigned to a geo area property of a project (see GIS List and Project Properties for more information). Coverage maps can consist of data in any GIS format exported from a third-party cell planning tool and can be used in TEMS Discovery as regular GIS maps.

4.1.3.1.2 Download TerraServer Images/Maps

TEMS Discovery offers direct access to multiple online sources of imagery, topographic maps, and gridded terrain data. This includes worldwide high-resolution color imagery from Digital Globe/GlobeXplorer/AirPhotoUSA (watermarked access for free), and access to the entire TerraServer-USA database of USGS satellite imagery and topographic maps, free of charge. TEMS Discovery can also access WMS data sources, including built-in access to elevation data and color imagery for the entire world.

To open the Select Online Data Source to Download dialog, right-click on the tree node and choose **Download**. The downloaded GIS data will be listed with its geo boundary as the title.

4.1.3.1.3 Floor Prints

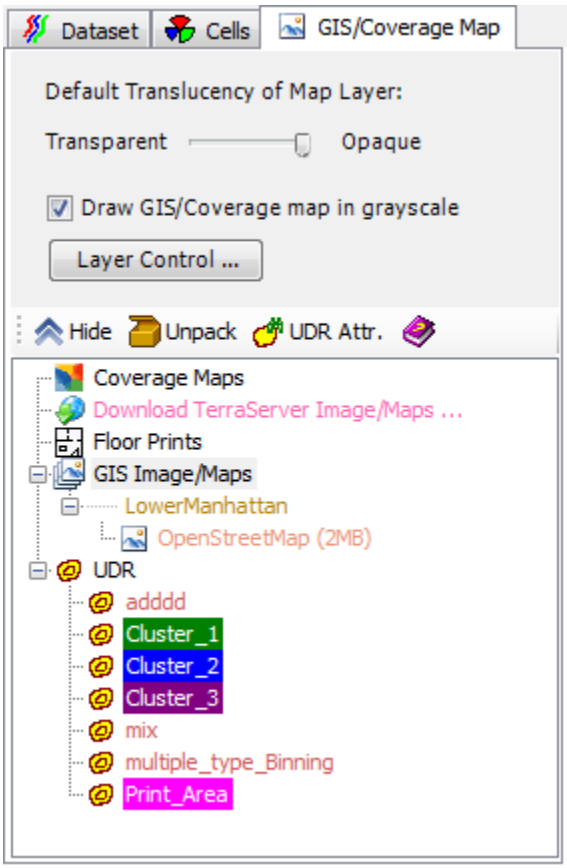
When TEMS Discovery imports indoor drive test data, it will also import any floor prints contained in the indoor data package if the indoor data package contains geo references for the floor prints in the following supported coordinate systems:

- Lat/Lon projection (1) with WGS84 datum (104)
- UTM projection (8) with WGS84 datum (104)

TEMS Discovery will save those geo references so that the user does not have to manually rectify the floor prints.

4.1.3.1.4 Images/Maps

TEMS Discovery can import GIS data to a user-defined geo area. This user-defined geo area can be assigned to a geo area property of a project (see GIS List and Project Properties for more information). As shown below, the geo area property of the current project is *Demo_Geo*, and three maps have been imported to this geo area.

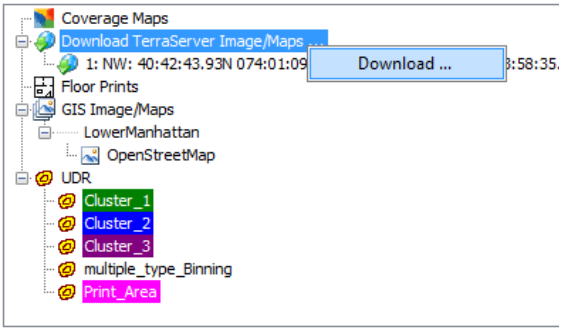


4.1.3.1.5 UDR

TEMS Discovery allows the user to draw user-defined regions (UDRs), or to choose area features from the terrain vector data (see Map View for more information). UDR is mainly used for data filtering

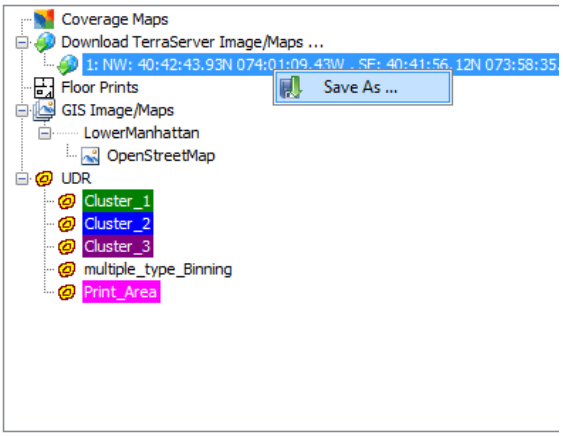
4.1.3.2 GIS Pop-up Menus

4.1.3.2.1 GIS - Download TerraServer Images/Maps Pop-Up Menu



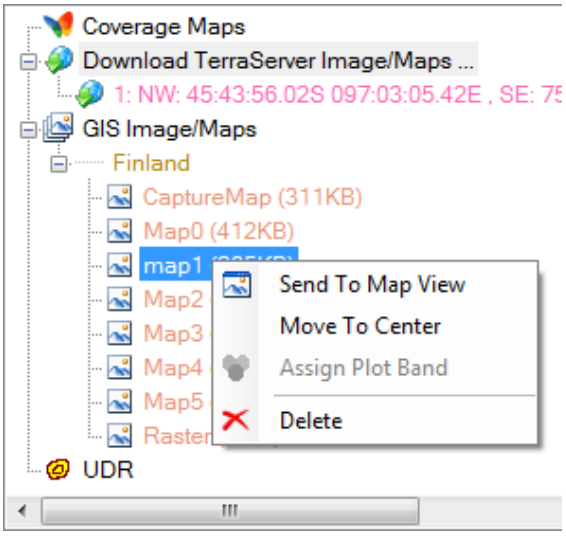
Download. Download an online GIS data source. See Download Online GIS Data Source.

4.1.3.2.2 GIS - Downloaded Map Pop-Up Menu



Save As. Once the online GIS data is downloaded, it can be saved as a map in the TEMS Discovery internal GIS format under the current project's geo area. That map will be listed under the Image/Maps category.

4.1.3.2.3 GIS - Image/Maps Pop-Up Menu



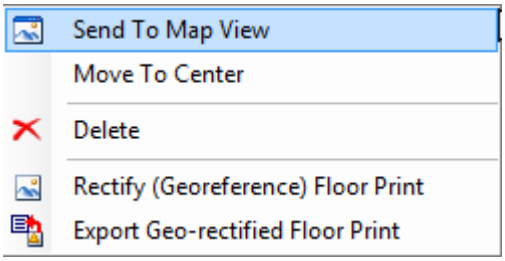
Send to Map View. Send the selected image/map to the Map View.

Move to Center. Move the selected image/map, if displayed, to the center of the Map View.

Assign Plot Band. Assign a plot band for the coverage map.
See Layer/View Options.

Delete. Delete the selected image/map.

4.1.3.2.4 GIS – Floor Prints Pop-Up Menus



Send to Map View. Send the selected floor print to the Map View.

Move to Center. Move the selected floor print, if displayed, to the center of the Map View.

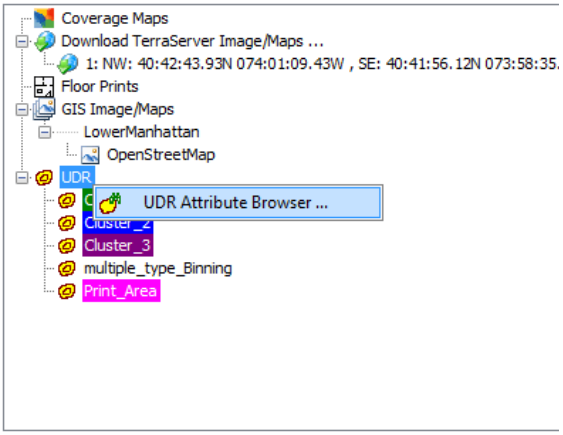
Delete. Delete the selected floor print.

Rectify (Georeference) Floor Print. Bring up the Floor Print Rectifier to rectify the selected floor print.

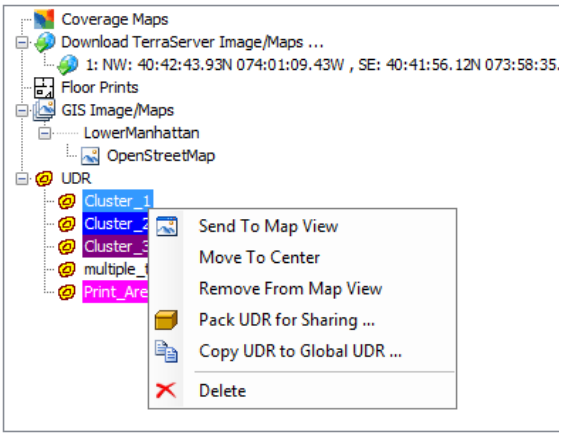
Export Geo-rectified Floor Print. Export the selected geo-rectified floor print to a user selected folder.

A MapInfo TAB file containing the geo reference information in lat/lon geographic projection will be exported to the selected folder.

4.1.3.2.5 GIS - UDR Pop-Up Menus



UDR Attribute Browser. Open the UDR Attribute Browser to browse the UDR attributes.



Send to Map View. Send the selected UDR to the Map View.

Move to Center. Move the selected UDR, if displayed, to the center of the Map View.

Remove From Map View. Remove the selected UDR from the Map View.

Pack UDR for Sharing. Save the selected UDR and its information as a .ZIP file.

Copy UDR to Global UDR. Copy the UDR to the global UDR list.

Delete. Delete the selected UDR.

4.1.3.3 Download Online GIS Data Source

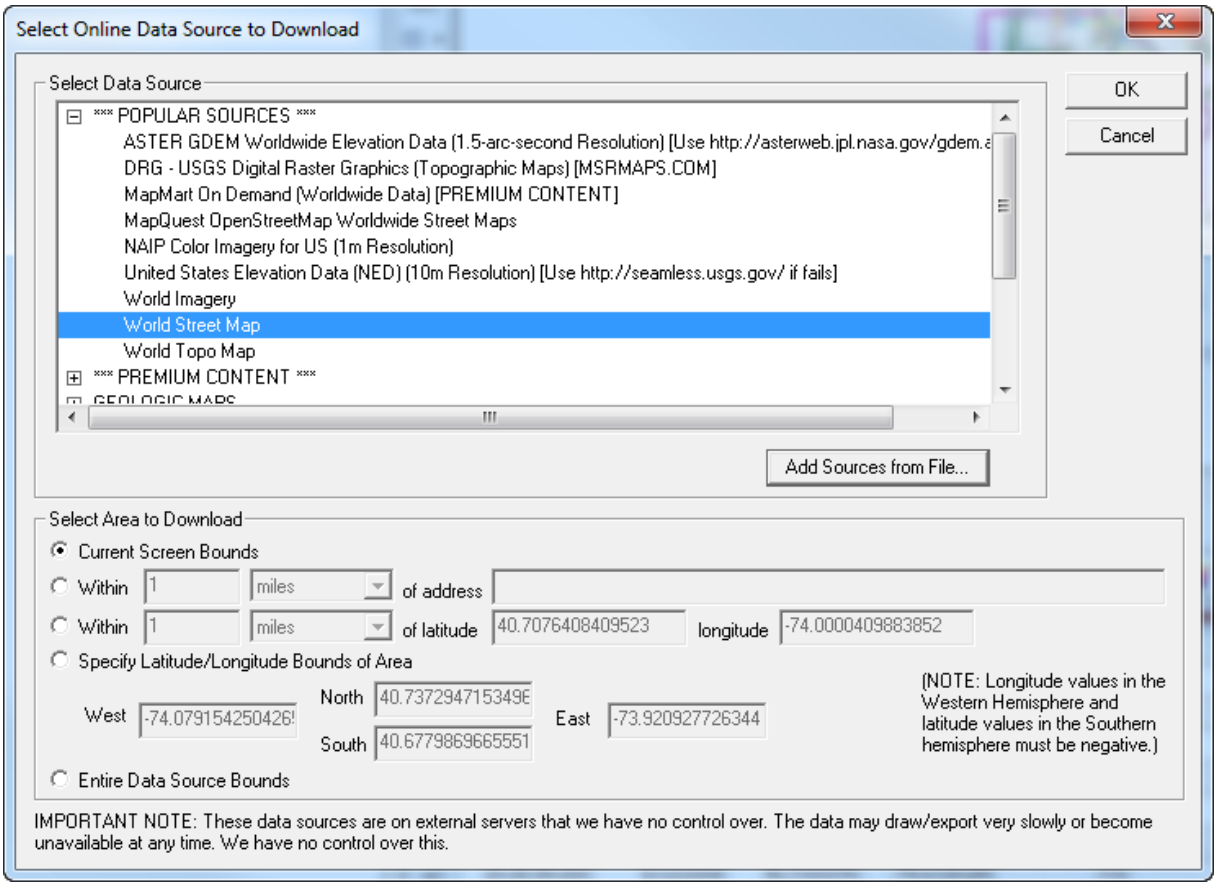
TEMS Discovery allows download of seamless USGS topographic maps and satellite imagery for all of the United States, as well as high-resolution color aerial imagery for select metropolitan areas from TerraServer-USA. Additionally, several built-in WMS (OpenGC Web Map Server) databases provide easy access to digital terrain data and color satellite imagery for the entire world.

This is an extremely powerful feature as it puts many terabytes of very expensive data right at our fingertips in TEMS Discovery for no additional cost. (Note that this feature requires Internet access.)

Open the Select Online Data Source to Download dialog in the following ways:

- Right-clicking **Download TerraServer Image Maps** from the Data Explorer–GIS List and selecting **Download** from the context menu.
- Clicking the **Download TerraServer Image Maps** button in the Map View or Google Earth toolbar.

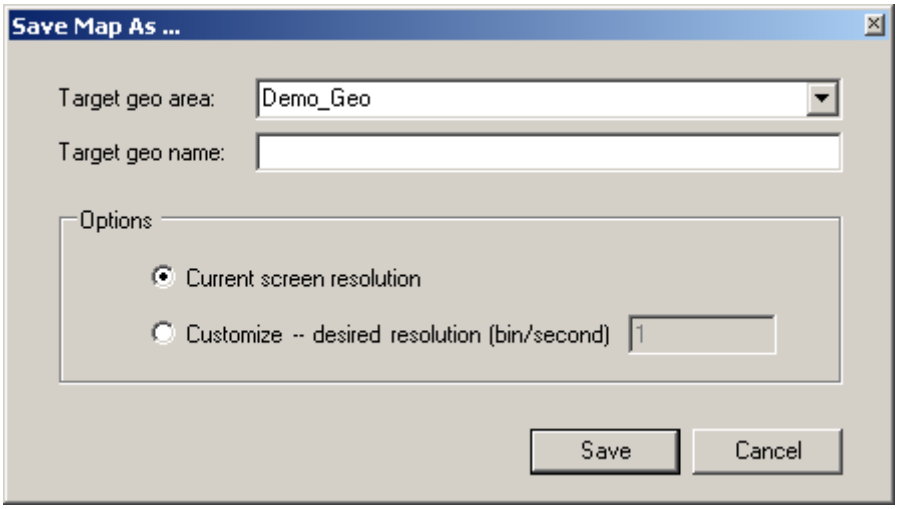
This dialog allows selection of the type, or theme, of the data to download, as well as the extent of the data to download. You can choose to download the current screen bounds, an area to download around an address, or a specific latitude/longitude bound; or you can choose to download the entire data source.



The **Add Sources From File** button allows you to add new WMS sources from an external text file generated by the **Global Mapper**, a third-party tool. This tool can be accessed from your Global Mapper Application Data.

Download In Map View or Google Earth

If you click the button on the Map View or Google Earth toolbars, the Save Map As dialog will appear prior to the Select Online Data Source for Download dialog.



After the selections are made, TEMS Discovery will automatically download the most appropriate layer and save it under the specified geo area with the specified name. This newly created geo area/geo map will be listed in the GIS List.

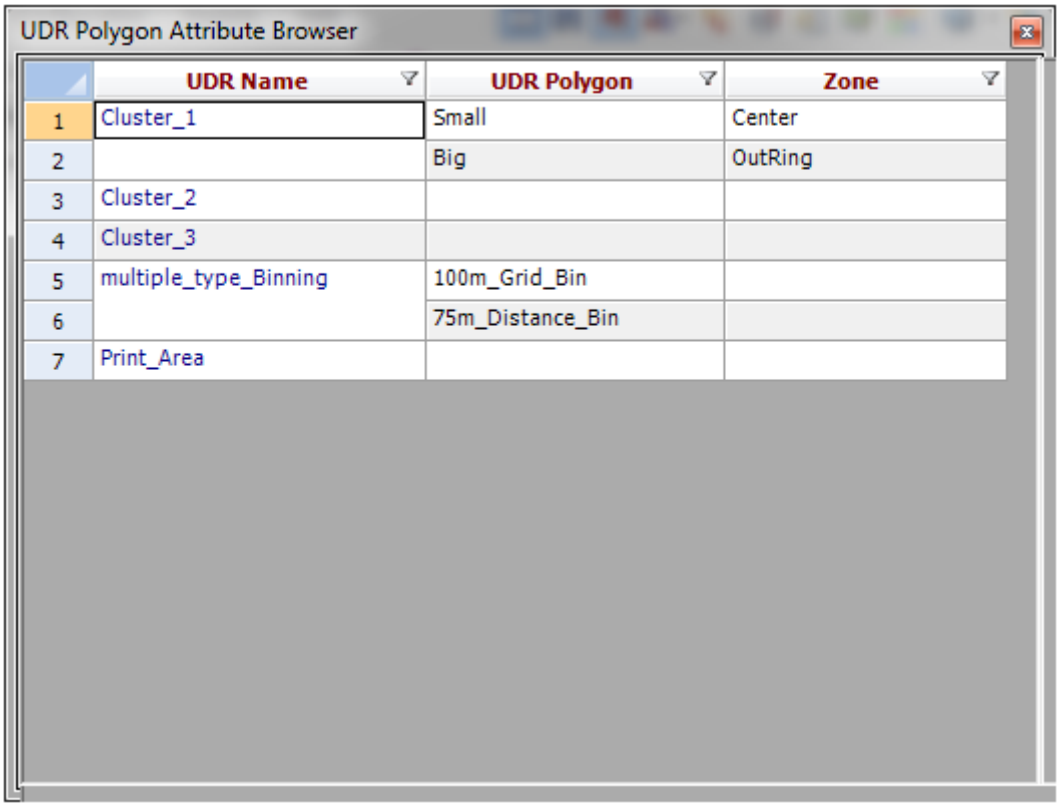
Download In Data Explorer

Once the data to download is defined, TEMS Discovery will automatically download the most appropriate layer for display while zooming in and out in the Map View window. This way, an overview of the data can be viewed while zoomed out, and more data details will become available as you zoom in. This data can be saved in full resolution to the TEMS Discovery internal format by choosing **Save As** from the Data Explorer–GIS List context menu.

4.1.3.4 UDR Attribute Browser

The UDR Polygon Attribute Browser is a quick way to browse UDR attributes. This browser can be accessed in the following ways:

- Clicking the **UDR Attribute** button on the GIS List toolbar.
- Selecting **UDR Attribute Browser** from the UDR right-click context menu.


UDR Polygon Attribute Browser
UDR Name
UDR Polygon
Zone
1
Cluster_1
Small
Center
2
Big
OutRing
3
Cluster_2
4
Cluster_3
5
multiple_type_Binning
100m_Grid_Bin
6
75m_Distance_Bin
7
Print_Area

4.2 Synchronizable Views

The project workspace can contain multiple views. These views provide various data presentations for visual analysis and troubleshooting. The views are categorized as synchronizable views and summary data views.

Synchronizable views simultaneously display data that was collected at the same moment. All of these views can be viewed while playing back drive test data. **Synchronizable views** include:

- Messages View
- Map View
- Google Earth
- Time Chart
- Metric Correlation
- Table View
- Point Detail View
- Instant Chart
- Wave View
- Legend View

Two synchronization modes are available:

 **Mouse Moving Mode**

 **Mouse Clicking Mode**

Once the data point in a view is identified, whether by mouse hovering or mouse clicking, the related information will be synchronized and highlighted in all other synchronizable views.

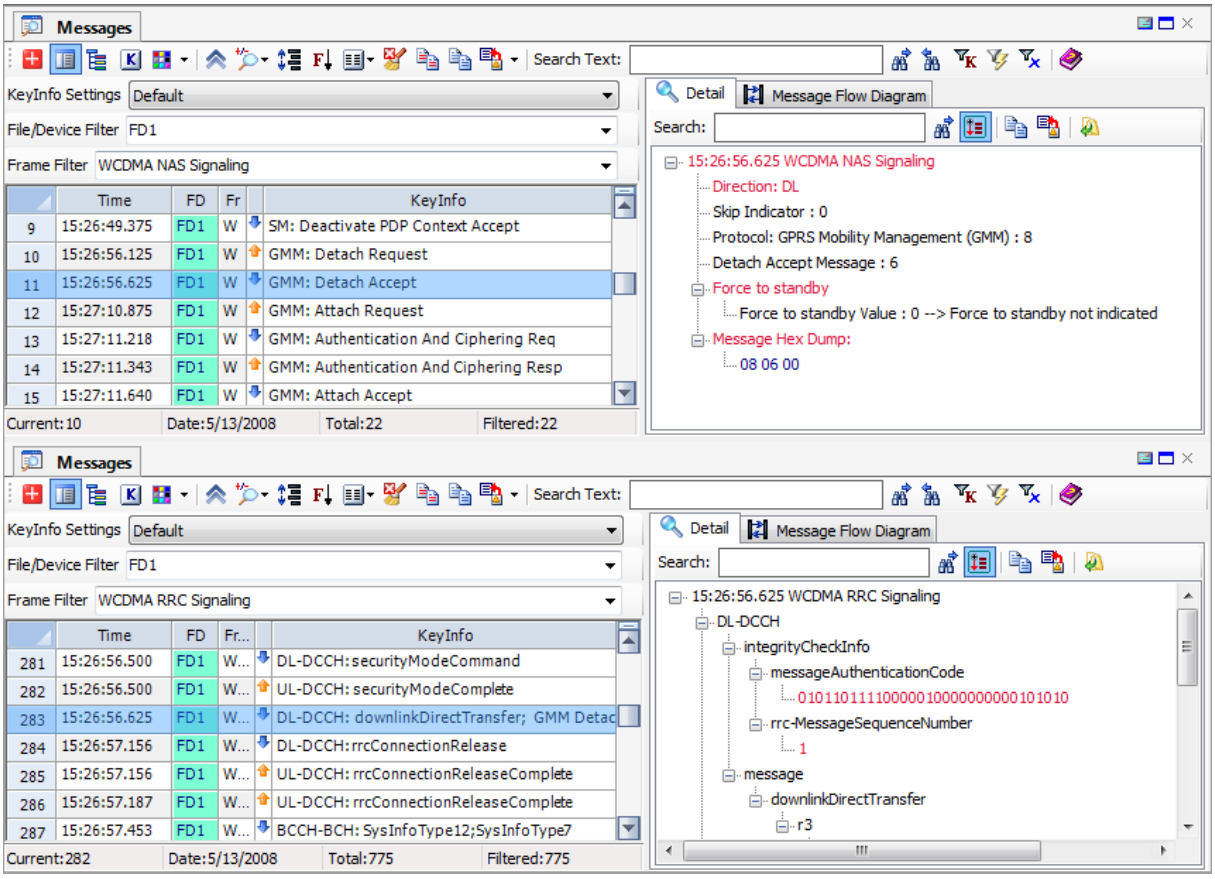
4.2.1 Messages View

The Messages View contains two panels.

The left panel is a spreadsheet that lists the message in time sequence. The information in the spreadsheet can include the timestamp, File/Device ID, frame name, direction, and configurable key information for the message (columns are selected with the **Message Header Column Selector** button on the Messages View toolbar).

The right panel holds the Detail View and the Message Flow Diagram. The Detail View can be a spreadsheet or a tree view, depending on what information is displayed. The Message Flow Diagram displays a user-defined message cycle in diagram form.

You can show or hide the Detail View/Message Flow Diagram by clicking the **Detail/Diagram View** button on the Messages View toolbar.



For information to be listed in the *KeyInfo* column, you can define many KeyInfo settings and select one of the settings from the *KeyInfo Settings* combo box.

Click the **KeyInfo Settings** button to access the Messages View KeyInfo Settings dialog.

To format a particular message with color, click the **Layer 3 Message Coloring** button to launch the Message Coloring settings dialog and choose a color for that message.

4.2.1.1 Messages View Toolbars

Summary View Toolbar

Create New Message View

Detail/Diagram View. Show or hide the right-side panel (**Detail View**).

Layer 3/RRC IE Browser. Open the Signaling Message Browser.

KeyInfo Settings. Open the Messages View KeyInfo Settings dialog.

Layer 3 Message Coloring. Open the Message Coloring dialog.

Show/Hide Extra Options. Show/hide the KeyInfo Settings, File/Device Filter, and Frame Filter settings.

Zoom Spreadsheet. Zoom in or out of the spreadsheet.

Enable/Disable Auto-Adjustment of Column Height.

Group Messages by File/Device.

Message Header Column Selector. Select the columns to be included in the message header. Options: Time, FD, Frame Name, Direction, and KeyInfo.

Clean Spreadsheet. Clean up the spreadsheet.

Copy Selected Summary. Copy the selected message in the spreadsheet to the Clipboard. The message can then be pasted to a text editor outside of TEMS Discovery. To select one or more messages, left-click the first message, and hold down the mouse to select other messages.

Copy All Summary. Copy all messages in the spreadsheet to the Clipboard, from which they can be pasted to a text editor outside of TEMS Discovery.

Export Summary to Text

- Export all messages displayed in the spreadsheet to a tab-delimited text file.
- Export all messages, including their decoded detail information, to a text file.

Search Forward. Find the next message containing the text phrase defined in the text box.

Search Backward. Find the previous message containing the text phrase defined in the text box.

Filter. Apply a filter and display only the messages whose KeyInfo contains the text phrase defined in the text box.

Filtering per Selected Layer 3 Message Type. Apply a filter and display only the messages selected by the user in the spreadsheet.

Remove Filter. Remove the filter and display all loaded messages.

Help.

Detail View Toolbar

Search Next. Find the next content containing the text phrase defined in the text box.

Expand/Collapse Tree View.

Copy All Detail. Copy all content in the spreadsheet or tree view to the Clipboard to paste them to a text editor outside of TEMS Discovery.

Export Detail to Text File. Export all content in the spreadsheet or tree view to a tab-delimited text file.

Close Detail/Diagram View.

4.2.1.2 Display Messages

Messages can be sent from the Data Explorer to the Messages View in two ways:

1. Select a data object and drag-and-drop it into the Messages View.
2. Right-click a data object and choose **Send to Messages View** from the context menu.

4.2.1.3 Navigate Messages

Each row in the spreadsheet on the left represents one message, detailing the information for a corresponding message that can be displayed in the Detail View on the right. To show or hide Detail View, click the **Detail/Diagram View** button on the toolbar. Or, as a shortcut, double-click any row in the spreadsheet to show the Detail View with detail information for the selected message.

The Page and Arrow buttons on your keyboard (*Page Up*, *Page Down*, *Arrow Up*, and *Arrow Down*) can be used to navigate messages in the spreadsheet.

4.2.1.4 Filter Messages

Messages displayed in the spreadsheet can be filtered in four ways.

- **By Key Info**

  If you input a text phrase in the *KeyInfo* text box and then click the **KeyInfo Filter** toolbar button, the spreadsheet will display only the messages whose KeyInfo contains the specified text phrase.

  If you click the **Remove Filter** button in the toolbar, the filter will be removed and all messages will be displayed.

  You can input multiple text phrases in the *KeyInfo* text box, with double quotation marks and connected with a plus sign (+). For example, with the text phrases "*key info 1*"+"*key info 2*", only messages whose KeyInfo contains either "*key info 1*" OR "*key info 2*" will be displayed.

- **By File/Device ID**

  If any data is displayed in the Messages View, TEMS Discovery will dynamically assign a sequence ID (FD-xx) to its associated file/device, and list that ID in the File/Device filter combo box at the top of the spreadsheet. You can make multiple selections in the dropdown list to display only the selected file/device.

- **By Frame Name**

  The combo box at the top of the spreadsheet lists all the names of the frames and scripts displayed in the spreadsheet. You can make multiple selections in the dropdown list to display only the selected frames/scripts.

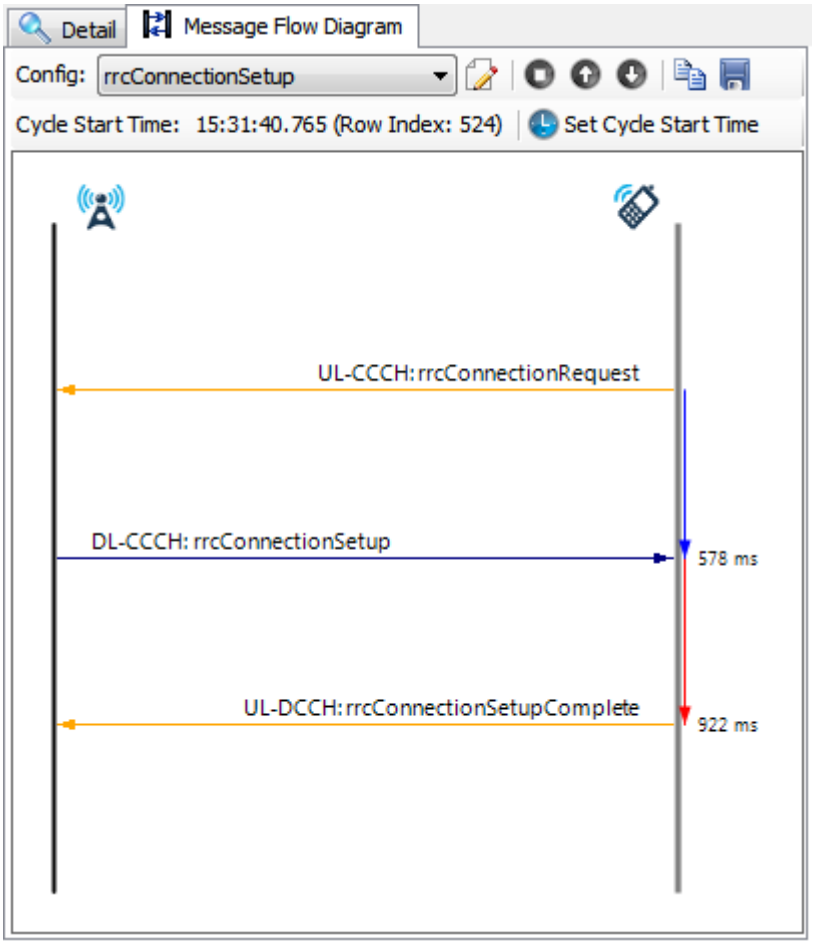
- **By Selected Message**

  If you select a message in the spreadsheet and then click the **Filter** toolbar button, the spreadsheet will display only the selected message.

  If you click the **Remove Filter** button in the toolbar, the filter will be removed and all messages will be displayed.

4.2.1.5 Message Flow Diagram

The Message Flow Diagram displays the user-defined message cycle in diagram form.



A message cycle can be built from (and only from) the Layer 3 signaling messages listed in the message summary view on the left panel, based on the user-defined message cycle configuration.

4.2.1.5.1 *Message Flow Diagram Toolbar*

Edit Message Cycle Configuration. Access the Message Cycle Configuration dialog.

Display Message Flow Containing the Selected Message. Display the message cycle that contains the message currently selected in the message summary spreadsheet.

or

Display Previous or Next Message Flow. Display the previous or next message cycle, starting from the cycle start time shown beneath the toolbar. This cycle start time will be automatically updated after a message cycle is built and displayed.

Copy Diagram. Copy the displayed diagram to the Clipboard for pasting to any external application.

Save as Image. Save the displayed diagram as an image file.

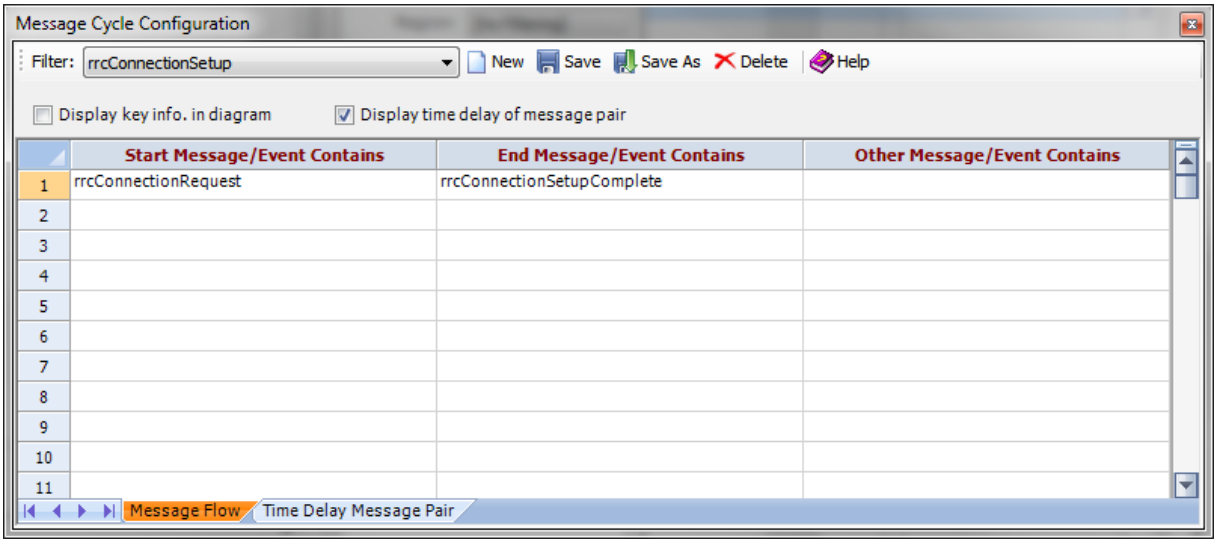
Set Cycle Start Time. Manually select a Layer 3 signaling message in the message summary spreadsheet and click this button to set a specific start time for building a new message cycle.

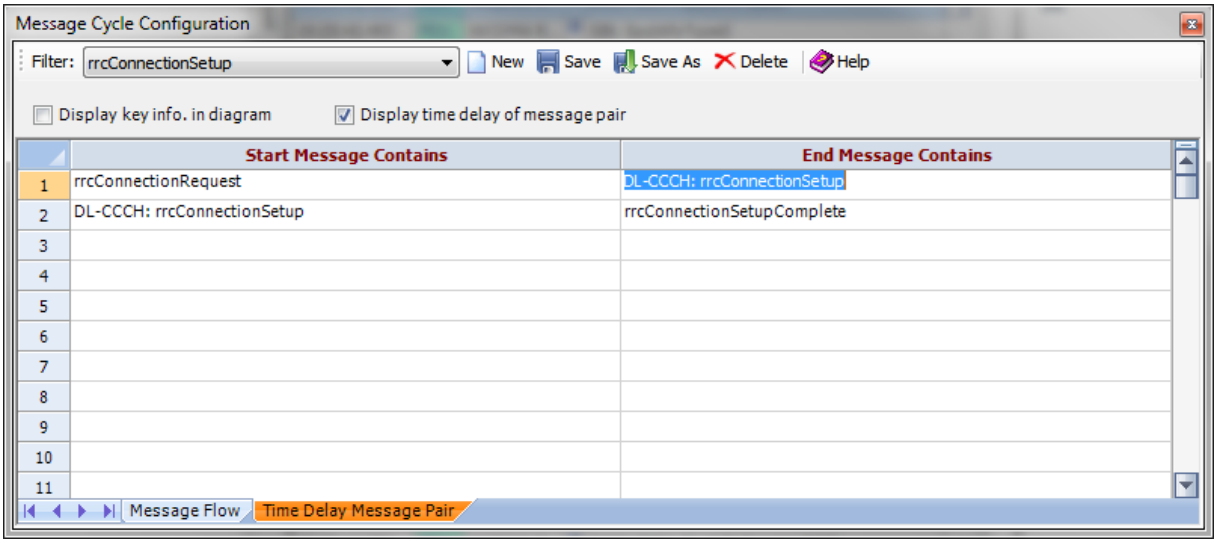
4.2.1.5.2 *Message Cycle Configuration*

The message cycle is defined in the Message Cycle Configuration dialog. This dialog is accessed by clicking the button in the Message Flow Diagram toolbar. Options are:

- The message cycle starts with a message/event that contains any of the text phrases listed in the column *Start Message/Event Contains*.
- The message cycle ends with a message/event that contains any of the text phrases listed in the column *End Message/Event Contains.*
- All the messages/events in between the start and end of the message cycle will contain any of the text phrases listed in the column *Other Message/Event Contains.*
- The message time delay will be calculated based on the message pair defined in the *Time Delay Message Pair* sheet. Each row represents one message pair.

You have the options to display all key information associated with the messages in diagram, and/or to display the time delay of the message pair.



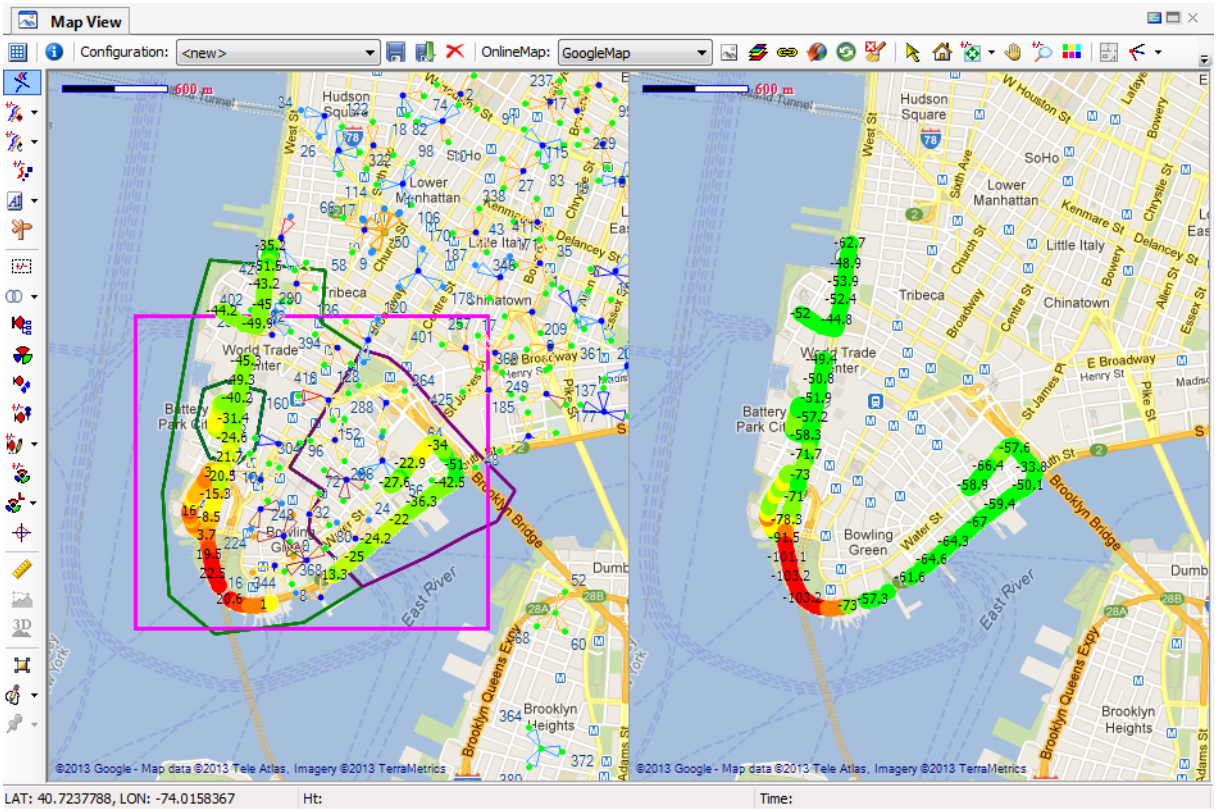


4.2.2 Map View

The Map View is a multi-layer display that can display multiple datasets, multiple cell configurations, and multiple GIS images or online Map in the same view. Data can be displayed in the Map View in the following ways:

- Drag-and-drop a data object from the Data Explorer into the Map View.
- Right-click a data object and choose **Send to Map View** from the context menu.

Click any data point on the Map View to display detail information in the tooltip.



4.2.2.1 Map View Toolbar

	Table Size. Display a table size selector for creating multiple Map Views. Multiple views can be synchronized by clicking the **Synchronization** button .
Combo box	List the available configurations. Each configuration defines the collection of metrics to be loaded and in which sub-view to load them. When sending/dragging a file/device to the Map View with a configuration selected, the currently defined data filtering options will be applied.
	Save Configuration. Save the currently displayed metric and its location as a configuration.
	Save Configuration As. Save the currently metric configuration as a new configuration.
	Delete Selected Configuration. Delete the selected configuration.
Combo box	**OnlineMap**. List the available online map data source that you have been licensed.
	Draw GIS in Grayscale. Display the GIS image in grayscale
	Layer/View Option. Open the Map View Options dialog. See Layer/View Options.
	Turn On/Off Subview Synchronization Mode. Synchronize all Map sub-views created by

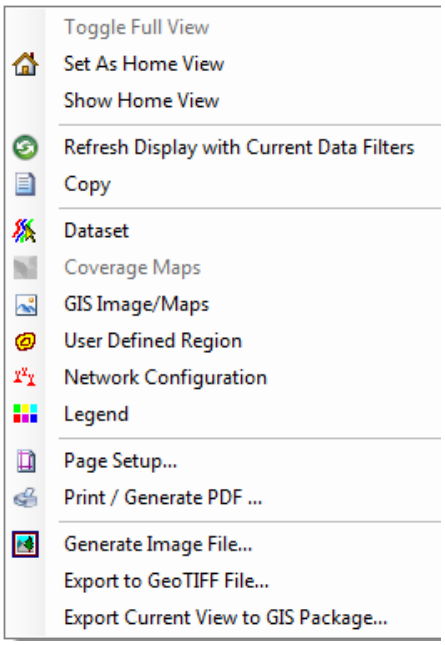
the **Table Size** button .

Download TerraServer Image/Maps. Download an online GIS data source. See Download Online GIS Data Source.

Refresh Display to Apply Current Data Filters. Apply the new data filtering options defined in the Data Explorer and refresh the display.

Cleanup All Layers. Clean up the display.

Pointer. Change the cursor to a pointer. Right-clicking the screen will bring up the pop-up menu shown below:



Toggle Full View. This menu will only be enabled when multiple Map Views are displayed. Choosing this menu maximizes the current Map View, or restores the Map View to its original state if the current view is maximized.

Set As Home View. Save the current view port as Home View.

Show Home View. Restore the view port to Home View.

Refresh Display with Current Data Filters. Apply the new data filtering and refresh the display.

Copy. Copy the current display to the Clipboard to paste it outside of TEMS Discovery.

Dataset. See Dataset in Map View.

Coverage Maps. Coverage maps exported from external planning tools.

GIS Image/Maps. See GIS in Map View.

User Defined Region. See GIS in Map View.

Network Configuration. See Cells in Map View.

Legend. Show or hide the legend display.

Page Setup. Page setup for print-out or PDF generation.

Print / Generate PDF. See Create Output.

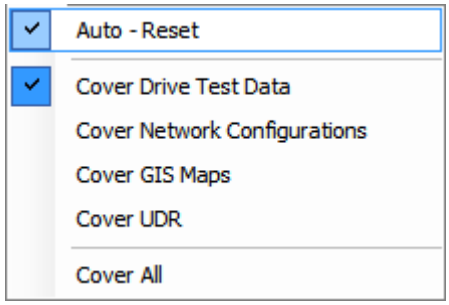
Generate Image File. See Create Output.

Export to GeoTIFF File. See Create Output.

Export Current View to GIS Package. See Create Output.

Home View. Reset the current view port to a pre-defined Home View. To define the Home View, right-click on the Map View and choose **Set as Home View** from the pop-up menu.

Reset.



Reset all Map Views to the view port that covers bounding rectangle of the user-selected loaded d in that view. If the Auto-Reset option is selected, view port will be automatically reset at each time drag-and-drop new data to that view.

Pan. Pan view to user-selected direction and distance.

Zoom In/Out.

1. To zoom in, left-click the desired location, which will be used as the center for the zoom

in.

2. To zoom out, right-click the location, which will be used as the center for the zoom out.
3. Left-clicking and holding will draw a rectangle that will zoom in the view port to the area within the rectangle.
4. Right-clicking and holding will draw a rectangle that will zoom out of the view port to that area within the rectangle.

Unzoom. Undo the last zoom action. Clicking the **Reset** button will clear the history of previous zoom actions.

Show/Hide Legends. Show or hide the legend in the Map View.

Indoor Mode.

Spider Move. Displays ray lines that link the data point to the appropriate sector for serving and neighbor sites, based on PSC (WCDMA), PN (cdma2000/EVDO) or BCCH/BSICH (GSM). The ray lines can be built based on phone data or scanner data.

1. Use Phone Data.
2. Use Scanner Data

Cell Radius Analysis. Click at a sector to perform cell radius analysis.
See Cell Radius Analysis.

Top 1 Sector Coverage IntelliSense. Click at a sector to view its coverage. The coverage can be indicated by any of the following options:

1. Show ray lines from sector to drive route
2. Color the drive route with the color of sector display

Top 1 Sector Coverage. Show or hide all sectors' coverage. There are two ways to visualize sector coverage, by ray lines and by color.

Utilities

Spotlight on UDR. Lower the light of the surrounding area to stand out the UDR area.

Data Route Offset. If more than two data routes are displayed, you can toggle this button to apply or not apply the screen offset for all data routes displayed.

Dataset Routes Distance. If more than two data routes are displayed:

1. Left-click to increase the screen offset of the data routes.
2. Right-click to decrease the screen offset of the data routes.

You can also select a **Coarse** or **Fine Tune** option for the screen offset adjustment.

Dataset Routes Position. If more than two data routes are displayed:

1. Left-click to rotate the data routes, whose screen offset are not zero, clockwise.
2. Right-click to rotate the data routes, whose screen offset are not zero, counterclockwise.

You can also select a **Coarse** or **Fine Tune** option for the dataset route position adjustment.

Data Point Icon Size:

1. Left-click to enlarge the icon size of a data point.
2. Right-click to reduce the icon size of a data point.

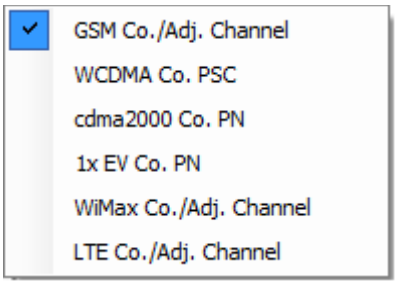
Data Label. Display value of data points on the view.

Dataset Route Direction. Show or hide the direction of the drive test.

Sector Selector/De-selector:

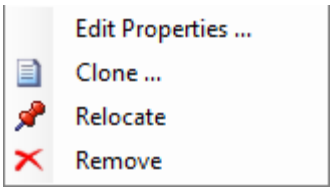
1. Left-clicking a sector will trigger an active flag.
2. Left-click and hold to draw a rectangle that selects all sectors within that rectangle. The selected sectors will be highlighted with a grid in the pie.
3. Right-click and hold to draw a rectangle that de-selects all sectors within that rectangle.
4. Right-clicking the screen will bring up a pop-up menu with the following options:
   - Save flagged sectors as group. Save the selected sectors to a sector group.
   - Remove all flags. Clear the sector highlighting.

Search for specific metrics, as specified by the dropdown menu:



Pin-point Sector Logical Display. Left-click a site/sector to ensure the visibility of its corresponding logical display in the tree view in the Data Explorer–Cells List.

Cell Site Property. Left-click a site or sector to bring up the dialog to view or edit site/sector properties. See Cell Site Properties for more information.
Right-click on a site/sector to bring up the following context menu:



Edit Properties. Edit properties of the clicked site.

Clone. Clone the clicked site.

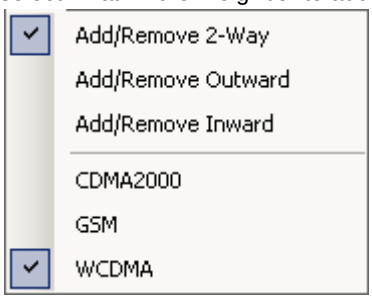
Relocate. Relocate the clicked site.

Remove. Remove the clicked site.

Neighbor List IntelliSense:
1. Moving the mouse over a sector will show ray lines that link to neighboring sectors.
2. Right-clicking the screen will bring up a pop-up menu. Choose Network configuration > Freeze the current NL display, Remove the selected NL display, or Remove all NL display to manipulate the display of ray lines.

NL Serving Sector Selector. Pick a sector as a serving sector of the neighbor list.

Edit Neighbor List. Edit the neighbor list for the serving sector picked by . You need to select what kind of neighbor to add or remove from the dropdown menu.



1. Left-click on a sector to pick.
2. Right-click on a sector to remove.

Cell Site Icon Size. Left-click to enlarge the cell site icon. Right-click to reduce the cell site icon.

Cell Site Label. Shortcut for site/label display options. See Cell Configuration View Options.

View Antenna Pattern. Click a sector to view its antenna pattern. See Antenna Pattern Viewer.

Measurement Tool:
1. With this tool activated, measure distance by pressing and holding the left mouse button to draw a path.
2. Click on a path to select it.
3. If a path is selected, press and holding one end of the path to modify it.
4. Delete a path by double-clicking it.
5. Right-clicking the screen will bring up a a pop-up menu with the following options:
   - **Clear This Path**. Remove the selected path.
   - **Clear All Paths**. Clear all paths.

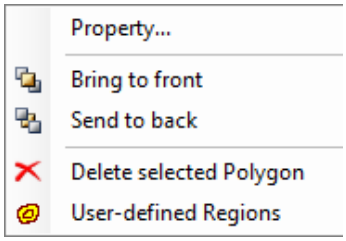
Terrain Path Profile:
1. Display the terrain path profile in the lower panel of Map View by left-clicking and holding to draw a path. See Terrain Profile.

2. Click on a path to select it and display the terrain path profile for that path.
3. If a path is selected, left-click and hold one end of the path to modify it.
4. Delete a path by double-clicking it.
5. Right-clicking the screen will bring up a a pop-up menu with the following options:
   - **Clear This Path**. Remove the selected path.
   - **Clear All Paths**. Clear all paths.

3D View. Open 3D window and display the current rendered terrain map in 3D. See 3D Map View.

UDR Selector:

1. Left-click a UDR to select it. Once the UDR is selected, a number of small black squares will appear around the UDR.
2. Once the UDR is selected, left-click and hold its point to modify the selected UDR.
3. Right-clicking the screen will bring up the following pop-up menu.



Property
Edit the properties of the selected UDR.

Bring to front
Bring the selected UDR to the front of other UDRs.

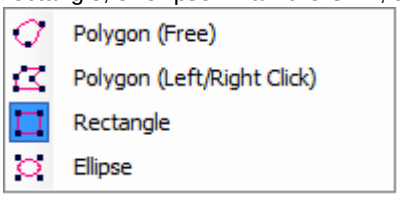
Send to back
Send the selected UDR to the back of other UDRs.

Delete selected Polygon
Delete the selected polygon.

User-defined Regions
The next level of the pop-up menu contains: New, Save, Save as, and Close. The drawn UDR can be saved to a named GIS area, or saved as a new GIS area. The displayed GIS area can be closed (removed from view).

UDR Drawing:

1. Select the shape from the dropdown menu: polygon (free), polygon (left/right click), rectangle, or ellipse. Draw the UDR, as desired.



2. Left-click a UDR to select it. Once the UDR is selected, a number of small black squares will appear around the UDR.
3. Once the UDR is selected, left-click and hold its point to modify the selected UDR.
4. Right-clicking the screen will bring up the same pop-up menu described above for the UDR Selector.

Vector Feature Selector:

1. To use this tool, the terrain vector data must be displayed in the Map View. By left-clicking a location on the map, a list of available area features will be listed in the pop-up menu. You can pick an area feature to highlight.
2. Right-clicking the screen will bring up a pop-up menu with the following options:
   - **Add the highlighted area to UDR**. Add the highlighted area feature to UDR. By switching the mouse mode to ( ), you can manipulate the newly added UDR as a user-drawn UDR, and save it to a GIS area.
   - **Clear the area highlighting**. Clear the area highlighting.

Help.

4.2.2.2 Dataset in Map View

Context Menu

Right-clicking the screen and selecting **Network Configuration** from the context menu will bring up a pop-up menu with the following options:

- **Remove Data Point to Sector Links**. When playing back drive test data, the ray lines linking the data points to their appropriate serving sectors can be kept permanently. Choose this menu to remove those lines.
- **Remove Curves**. Remove one or all curves from the Map View.

Display Metric

To display a dataset in the Map View, drag-and-drop the data object from the Data Explorer into the Map View, or right-click on the data object and choose **Send to Map View** from the pop-up menu.

Modify Appearance

Multiple metrics can be displayed side by side in the Map View with certain screen offsets. Use the tools provided in the toolbar ( ,  ,  , ) to adjust the appearance of the metrics in the Map View and to obtain the best visual effects. See Map View Toolbar for more information.

Click the **Dataset Route Direction** button  to display black arrows indicating the drive test direction.

You can also assign a plot band to the metric so that it is displayed in different colors. See Data Explorer for more information on how to assign a plot band to a metric.

Remove Metric from Display

To remove one or all metrics from the display, right-click the screen and select **Dataset > Remove Curves** from the context menu. From the list of existing curves displayed in the Map View, select **All** to remove all curves, or select a particular curve to remove it.

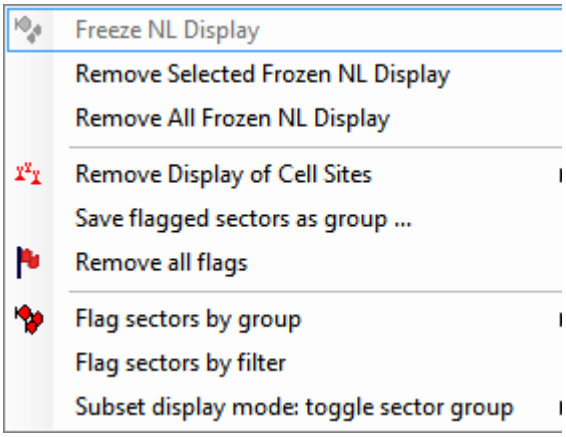
Links to Serving Sector

The toolbar button  activates the **Spider Movement Tool**. When the cursor is passed over a data point, colored ray lines will be appear if the version of cell sites is displayed. The ray lines link the data point to its appropriate serving sectors. From the *Sector vs. Data point* tab in the Map View Options dialog, you can define the color for links and the conditions for showing the links.

4.2.2.3 Cells in Map View

Context Menu

Right-clicking the screen and selecting **Network Configuration** from the context menu will bring up the following menu:



Freeze NL Display. Keep the current NL display (ray lines) permanent.

Remove Selected Frozen NL Display. Remove the frozen NL display (ray lines) from the selected serving sector (the sector that was right-clicked).

Remove All Frozen NL Display. Remove all frozen NL displays from the screen.

Remove All Cell Site Flags. Remove all cell site flags from the screen.

Remove Display of Cell Sites. Remove a version of cell sites from the screen.

Save highlighted sectors as group. To highlight sectors, click the **Sector Selector/De-Selector** button.

Flag sectors by group. Highlight the sectors with flags in the sector group.

Flag sectors by filter. Search sectors based on the filter defined and highlight the sectors found with flags.

Subset display mode: toggle sector group. In subset display mode, only the selected number of sector groups will be displayed in the Map View. Select this menu to toggle the display of the selected sector group in the Map View.

Display Version of Cell Sites

To display cell sites in the Map View, drag-and-drop a version of cell sites from the Data Explorer into the Map View, or right-click on the version and choose **Send to Map View** from the context menu.

Modify Appearance

Multiple versions of cell sites can be displayed side-by-side in the Map View.

The icon size can be enlarged or reduced by left-clicking or right-clicking the **Cell Site Icon Size** button on the toolbar.

Clicking the **Layer/View Option** button on the toolbar will bring up the Map View Options dialog. In the Cell Configuration tab, you can modify the options for displaying cell/sector labels.

The dropdown toolbar at the **Cell Site Label** button provides a shortcut for selecting label display options.

Additionally, the view options for the version of cell sites can be edited by right-clicking the version in the Data Explorer and choosing **Edit View Options** from the pop-up menu. In the Cell Configuration View Option dialog, you can modify the plot band for the cell site or sector icon, the labels to display, and the color of the labels. See Cell Configuration View Options for more information.

Remove Version of Cell Sites

To remove one or all versions of cell sites from the display, right-click the screen and select **Network Configuration > Remove Display of Cell Sites** from the context menu. From the list of existing versions of cell sites displayed in the Map View, select **All** to remove all versions, or select any particular version to remove it.

Edit Cell/Sector

To edit or view the properties of a cell site or sector, click the **Cell Site Property** button on the toolbar to activate the Edit Cell Site/Sector tool; then left-click on a cell site or sector in the Map View to display the Properties of Cell Site dialog. Edit the properties and save. See Edit Cell/Sector Parameters for more information.

Sector Antenna View

Click the **View Antenna Pattern** button on the toolbar to activate the Antenna Pattern Viewer tool, then left-click a sector to bring up the Antenna Pattern Viewer, where you can view that sector's antenna pattern.

Neighbor List

TEMS Discovery provides direct operations to graphically edit the neighbor list.

Click the **NL Serving Sector Selector** button on the toolbar to activate the Pick Serving Sector tool. Then, click on a sector to pick that sector as the serving sector for editing the neighbor list. If the serving sector has neighbors, ray lines will link the serving sector to its neighbors.

Before editing the neighbor list, click the **Edit Neighbor List** button on the toolbar to activate the Edit Neighbor List tool. Then, to add a neighbor sector for the serving sector, select the appropriate properties from the dropdown buttons and left-click the sector. To remove a sector from the neighbor list, right-click the sector.

Click the **Neighbor List IntelliSense** button on the toolbar to activate the Neighbor List IntelliSense Tool. When this tool is active and the cursor is passed over a sector with a neighbor list, ray lines that link the sector to its neighbors will appear. You can modify the color of the lines in the *Cell Configuration* tab in the Map View Options dialog. To freeze the ray lines for the current serving sector, right-click and choose **Network Configuration > Freeze NL Display** from the context menu. To remove a frozen neighbor list display, right-click the serving sector and choose **Network Configuration > Remove Selected NL Display**. Choosing **Remove All NL Display** will remove all neighbor list displays from screen.

Create Sector Group

Metric data can be filtered by its serving sectors. In the Filtering Options of the Data Explorer, the sector group is applied for such purposes.

To create a sector group, click the **Sector Selector/De-selector** button on the toolbar to activate the Sector Selector tool that allows direct operation on the cell sites displayed in the Map View. See Map View Toolbar for how to select sectors and save the selected sector as a sector group.

Another way to create a sector group is to search for sectors that meet a certain criteria of so-called filters. Filters can be created or edited as follows:

- From one of the Data Explorer–Cells List context menus, choose **Edit Filter Expression**.
- In the Cell Configuration Editor, click the toolbar button.

After the filter is created, right-click the screen and select **Network Configuration > Highlight sectors by filter**; after doing so, right-click again, and select **Network Configuration > Save highlighted sectors as group** to save it as a group. Another way to highlight the filtered sectors is from the Cell Configuration Editor dialog.

After the filter is applied and the sectors found are listed in the spreadsheet, click the button on the toolbar to highlight the found sectors on the Map View, then save the highlighted sectors as a group, or click **Save As** to save the filtered sectors as a sector group.

Display Sector Coverage

Click the button on the toolbar to activate the Sector Coverage tool. Then, click on a sector displayed in the Map View to display its coverage. To display the coverage of all sectors, click the button on the toolbar.

4.2.2.4 GIS in Map View

Context Menus

Right-clicking the screen and selecting **Maps** from the context menu will bring up a pop-up menu with the following options:

- **Remove GIS Image/Maps Layers**. Remove one or all GIS image/map layers from the display.
- **Remove GIS Image/Maps Packages**. Remove one or all GIS image/map packages from the display.

Right-clicking the screen and selecting **User Defined Region** from the context menu will bring up a pop-up menu with the following options:

- **New**. Create a new UDR.
- **Save**. Save the opened UDR.
- **Save As**. Save the opened UDR as a new UDR.
- **Close**. Close the opened UDR.

Display Metric

To display GIS data in the Map View, drag-and-drop the GIS data object from the Data Explorer–GIS List into the Map View, or right-click on the GIS data object and select **Send to Map View** from the pop-up menu.

Modify Appearance

Clicking the **Layer/View Option** button on the toolbar will bring up the Map View Options dialog. In the **Vertical Display** tab, you can modify the options for displaying terrain elevation. In the **Vector Display** tab, you can modify the options for displaying vector information. In the **Layer Control** tab, you can modify the Z-order of each layer and its opacity. However, vector layers will always be on the top of raster image layers.

Hide or Remove Map

When importing GIS data, multiple maps can be compressed into a .ZIP package and imported. The package can then be displayed in the Map View and each map in the package will be rendered as a separate layer. All of the layers will be blended and displayed. TEMS Discovery provides the function to hide or remove any single layer from the display by using the *Control Layer* tab in the Map View Options dialog. You can also remove a layer or a map package from the display by right-clicking and selecting **Remove Map Layers or Remove Map Packages** from the context menu.

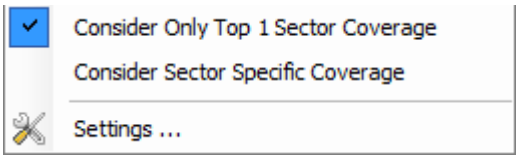
UDR

UDR can be applied to filter metric data. You can only create, edit, or delete UDR in the Map View by utilizing the tools provided in the toolbar (, , and), combined with the pop-up menu described above. See Map View Toolbar for how to use these toolbar buttons to draw UDRs, edit UDRs, and pick area features from a vector layer.

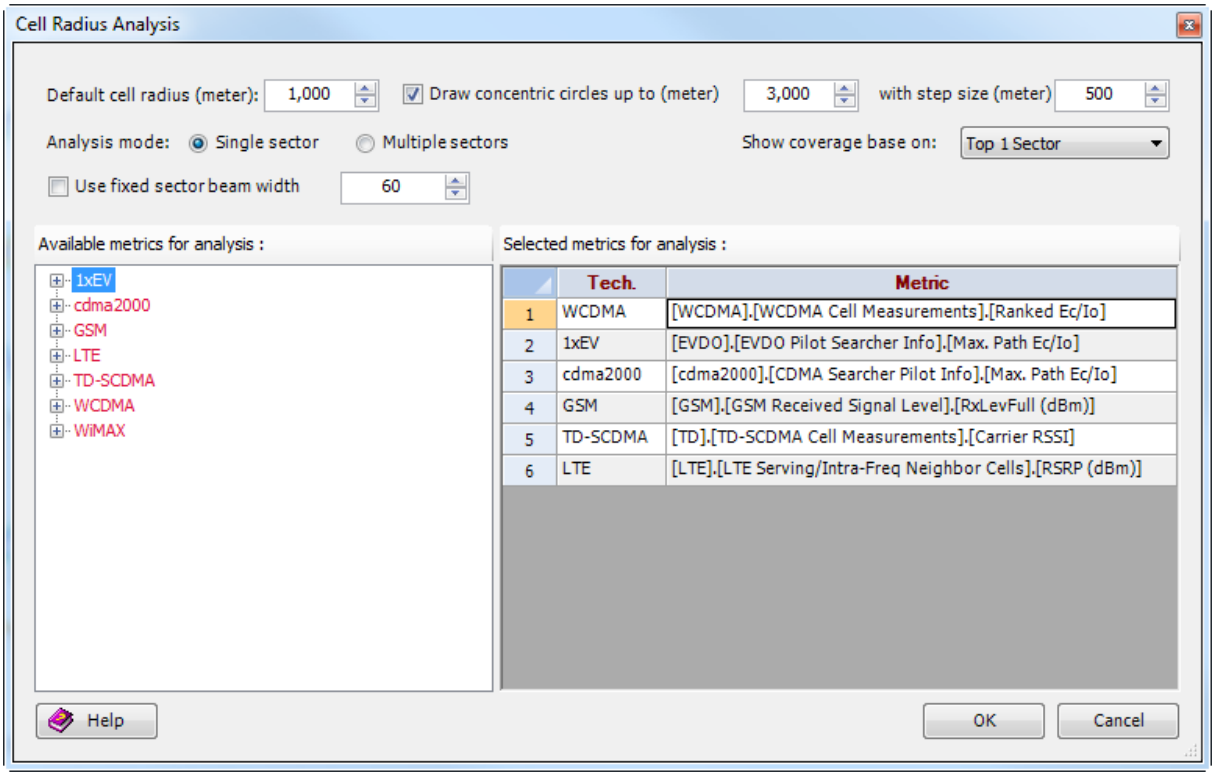
4.2.2.5 Cell Radius Analysis

To enter cell radius analysis mode, click the **Cell Radius Analysis** button on the toolbar.

From the dropdown context menu, you can choose to consider only the Top 1 sector coverage, or to consider coverage for a specific sector.



Select the **Settings** option to bring up the Cell Radius Analysis configuration dialog, where you can define what to analyze and how it is to be displayed.

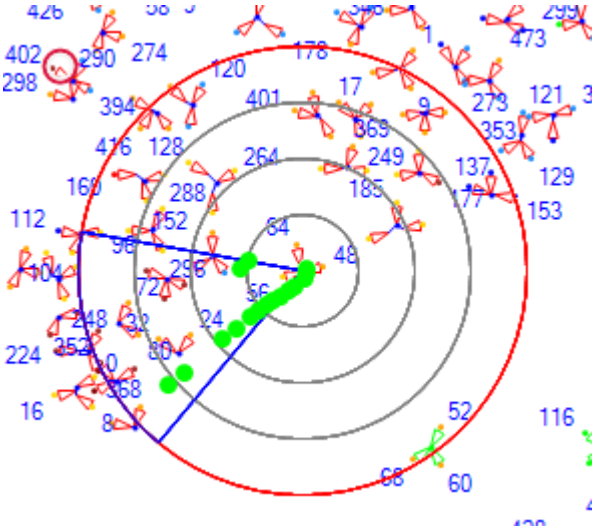


To define metrics for analysis for different technologies, you can drag-and-drop any available metric from the tree view on the left to the spreadsheet on the right. Those defined metrics will be displayed in the Map View if the corresponding sector with the same technology is selected.

Once you click a sector on the Map View, the following indicators will be displayed (the entire display can be turned on or off from Legend View).

- **A red circle**. If you have defined the cell radius for this sector (see the Cell Configuration Editor for how to add a new cell radius parameter and assign a value for each sector), that cell radius will be used. Otherwise, the default cell radius defined in the configuration dialog will be used to draw this circle.
- **Concentric circles**. Circles with the step size defined in the Cell Radius Analysis configuration dialog will be drawn as distance indicators.

- **A blue pie**. This pie will reach to the edge of the outermost red circle and indicate the azimuth and beamwidth of the sector.
- **Drive test data in the sector's coverage area**. If you elect to consider only Top 1 coverage, only drive test data in the area where that selected sector is the top 1 server will be displayed. On the other hand, if you elect to consider sector specific coverage, all drive test data in the area covered by that selected sector will be displayed.

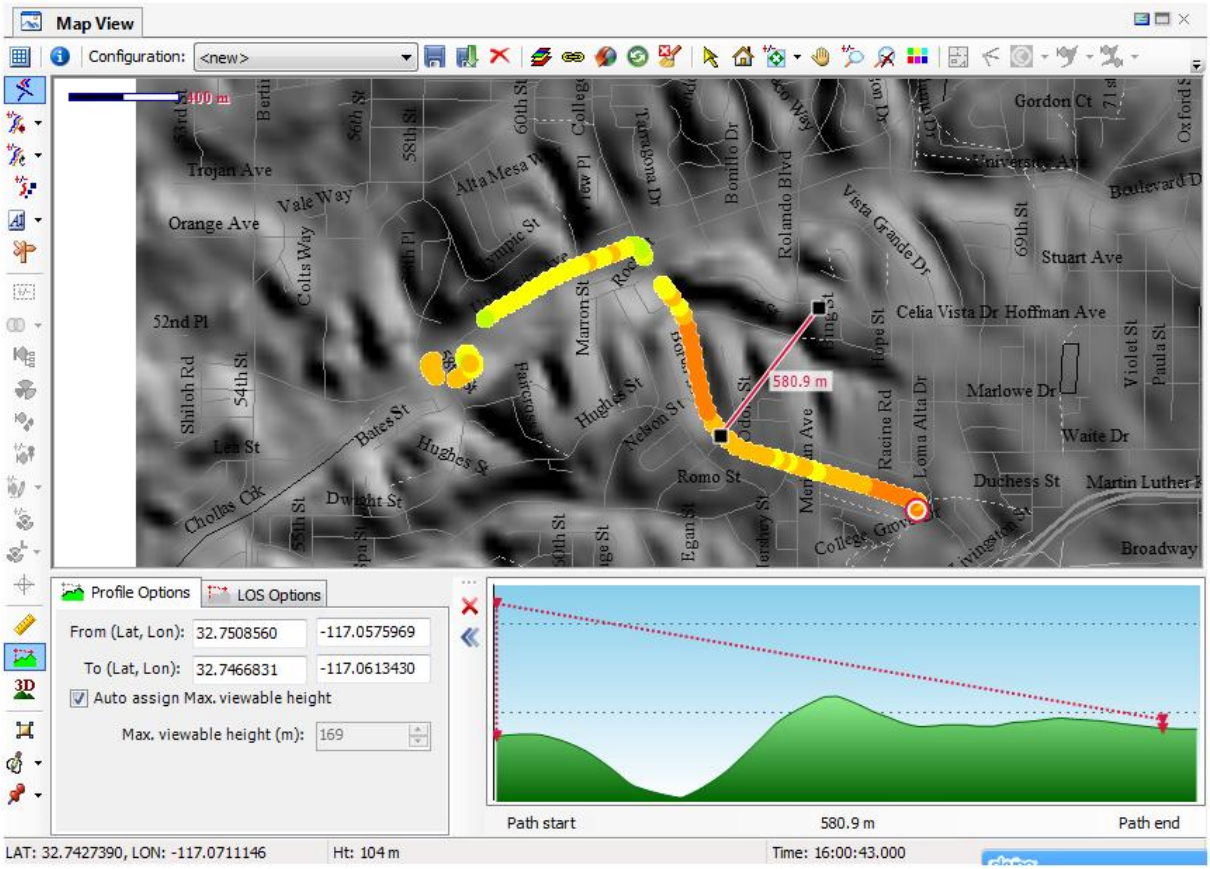


A reference drive test data source is required for performing cell radius analysis. If any dataset is displayed in the Map View, data from the same device will be used for analysis. Otherwise, you can simply drag-and-drop any metric from the desired device in the Data Explorer to the Map View to define the reference data source.

4.2.2.6 Terrain Profile

The Terrain Path Profile view can be shown or hidden by clicking the button on the toolbar. Using loaded elevation data and performing line-of-sight calculations along the defined path, you can also create a vertical profile along a user-specified path.

To define the path that the 3D path profile will be generated along, left-click and hold the position where you want to start the path, and move the cursor to the next position that you want to include in the path profile. The path profile for the defined path will be displayed as shown below. The red path indicates the line-of-sight. Any points along the path without elevation data underneath will be treated as a point with an elevation of zero.



The Terrain Path Profile view--creating a path for the 3D path profile.

The *Profile Options* tab allows you to change the start and end positions. The viewable height can also be adjusted by manually entering the desired height.

The *LOS Options* tab allows you to define the height of the starting position, which is represented by a vertical dotted line on the left side of the profile window. You also have the option of whether to consider the earth's curve and the atmospheric correction.

4.2.2.7 Reposition Waypoints

This feature is designed to reposition the indoor project's waypoints in case their positions are not accurately generated by a hand-held device.

Use the Reposition Waypoints feature as follows:

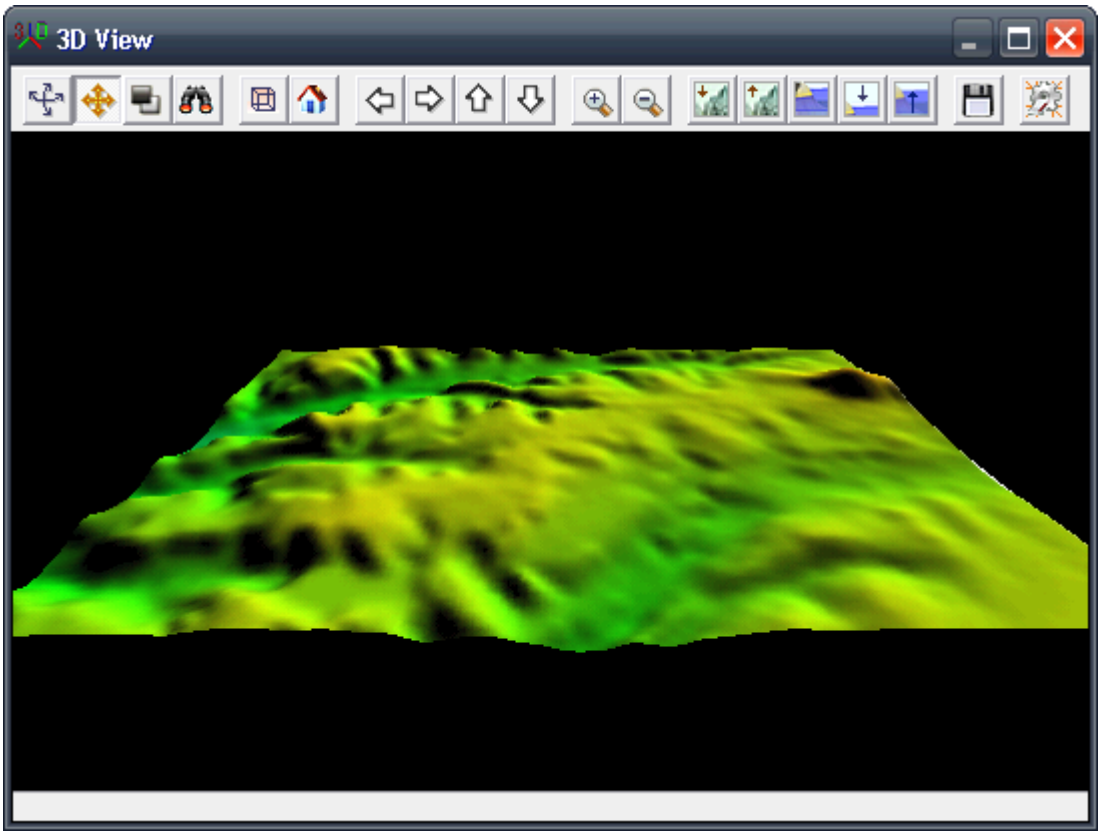
1. Open the indoor project for which you want to reposition waypoints.
2. Open the tree node of the GPS Position of the mobile you want to reposition.
3. Right-click on the Route metric under GPS Position and select **Reposition Waypoints** from the context menu. A window similar to the one below will be displayed.
4. Use the Reposition tool to drag the waypoint you want to reposition to the location you want.
5. Repeat step 4 for all the waypoints you want to reposition.
6. Save the results by either right-clicking on the floor print and selecting **Save** from the content menu, or closing the Map View and confirming the Save operation.

4.2.2.8 3D Map View

The 3D View allows you to view gridded elevation data and any overlying raster or vector data in a true perspective 3D manner.

Clicking the  button on the toolbar will bring up a floating window containing a 3D view of the data in the current 2D Map View. Any imagery or vector data drawn on top of the elevation grid(s) in 2D Map View will automatically be draped on top of the elevation data in the 3D View window.

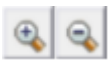
The buttons on the 3D View toolbar allow modification of the default view.



3D Map View Toolbar

Change the mouse mode so that you can use the mouse to rotate and pan the 3D view.

Pan the data visible in the 3D view in any direction.

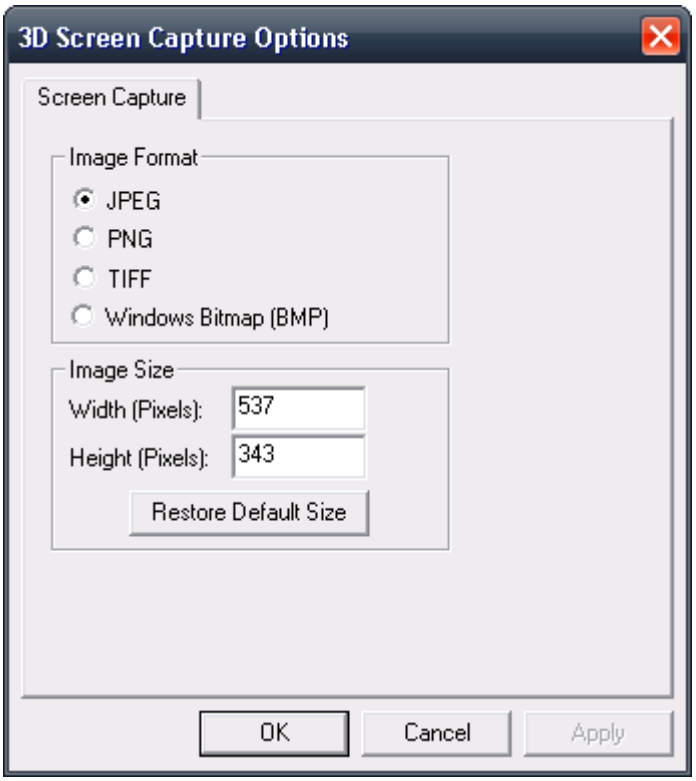


Zoom in or out of the 3D view at its center.

Decrease or increase the vertical exaggeration of the 3D display.

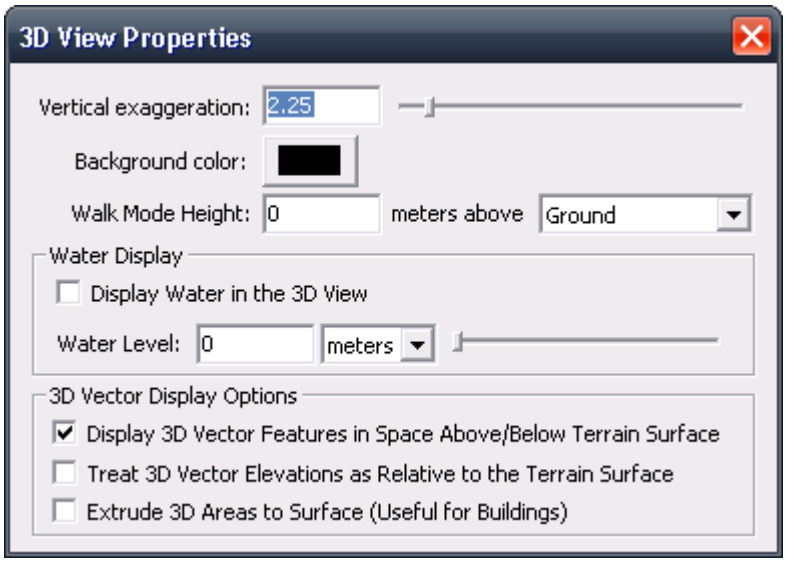
Select whether to display the water level in the 3D display, and change the water level down or up.

Display the 3D Screen Capture Options dialog, from which you can save the 3D view contents to a Windows BMP, TIFF, PNG, or JPG file.



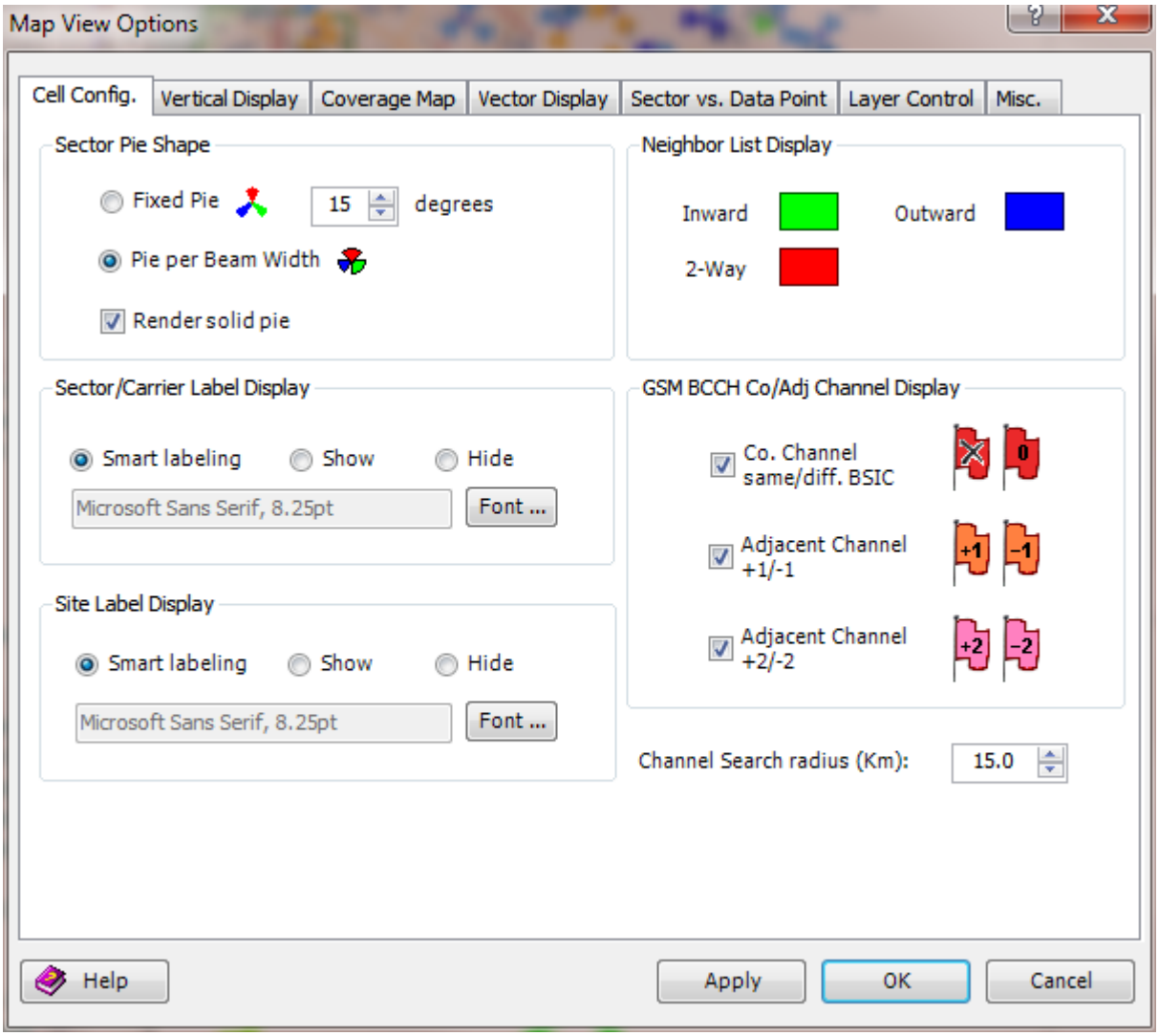
Display the 3D View Properties dialog, where you can configure the 3D view settings. These include vertical exaggeration, water display, background color, and 3D vector display.

The contents of the 3D View window always reflect what is visible in 2D Map View. This means that as you pan and zoom around the 2D Map View, the contents of the 3D View window will pan and zoom around as well.



4.2.2.9 Layer/View Options

Display the Map View Options dialog by clicking the **Layer/View Options** button on the Map toolbar.

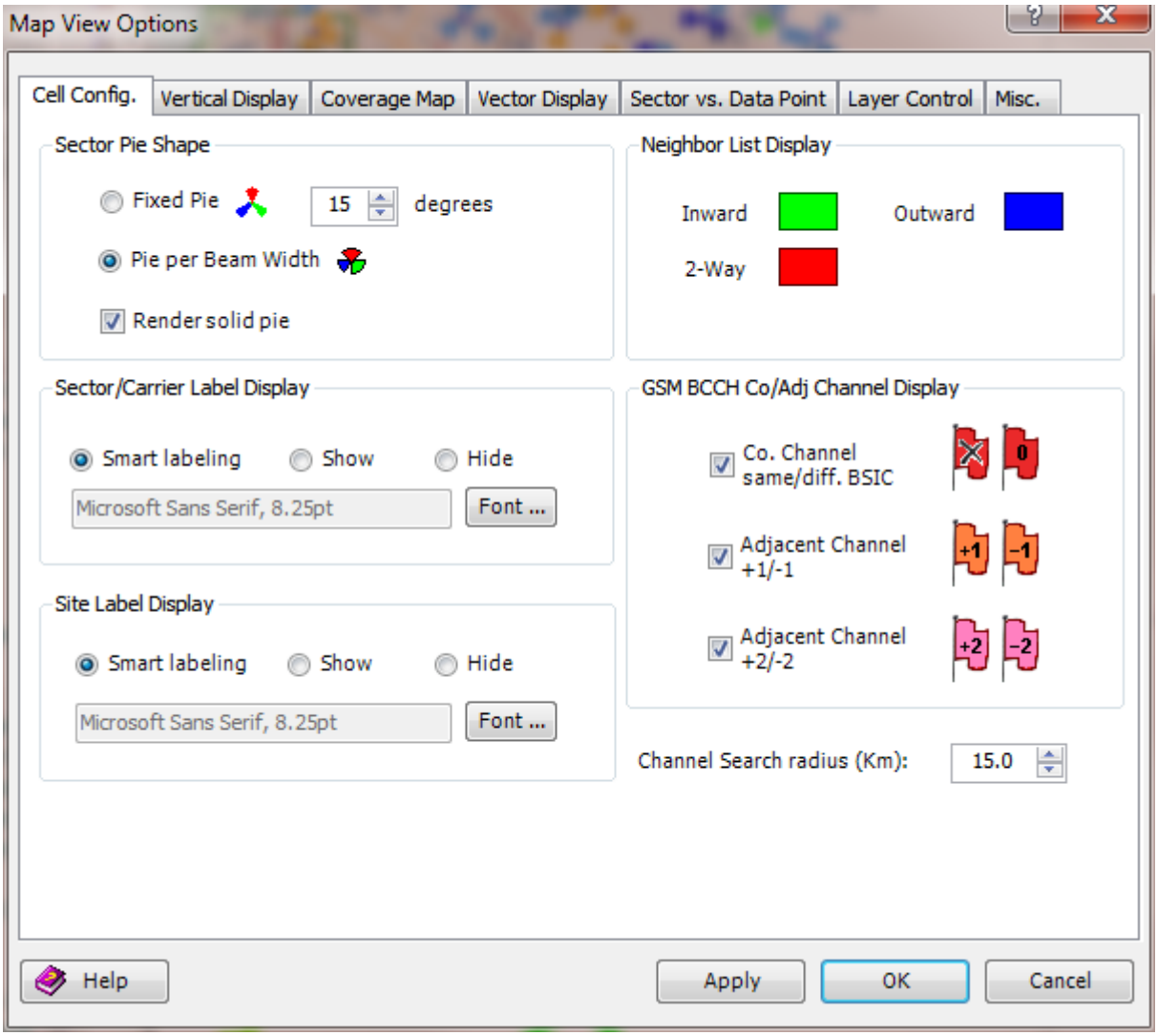


The view options are presented on separate tabs. They include:

- Cell Configuration display options
- Vertical Display options
- Vector Display options
- Coverage Map display options
- Sector vs. Data Point display options
- Layer Control display options
- Miscellaneous display options

4.2.2.9.1 Cell Configuration Display Options

The **Cell Configuration** tab, along with the Cell Configuration View Options dialog, allow you to modify the appearance of the cells displayed on the Map View.



Sector Pie Shape. There are two options for displaying a sector: **fixed pie** with user-defined width and **pie with width per antenna beamwidth**.

Sector/Carrier Label Display. The Sector/Carrier Label will always be visible if the *Show* option is selected. To hide the Site Label, select *Hide*. The *Smart labeling* option allows the application to display site labels only if the site label does not overlap any other labels within the defined bounding rectangle.

The font for the label can be modified by clicking *Font* and selecting it from the dialog.

Site Label Display. The Site Label will always be visible if the *Show* option is selected. To hide the Site Label, select *Hide*. The *Smart labeling* option allows the application to display site labels only if the site label does not overlap any other labels within the defined bounding rectangle.

The font for the label can be modified by clicking *Font* and selecting it from the dialog.

Neighbor List Display. If you select the **Neighbor List IntelliSense Tool** () or **Pick Serving Sector Tool** (), when the cursor is passed over sectors, the ray lines linking the serving sector to its neighbors will be displayed in different colors. The color of the lines, which can be modified here, indicates the relationship between the serving sector and its neighbor.

GSM BCCH Co/Adj Channel Display

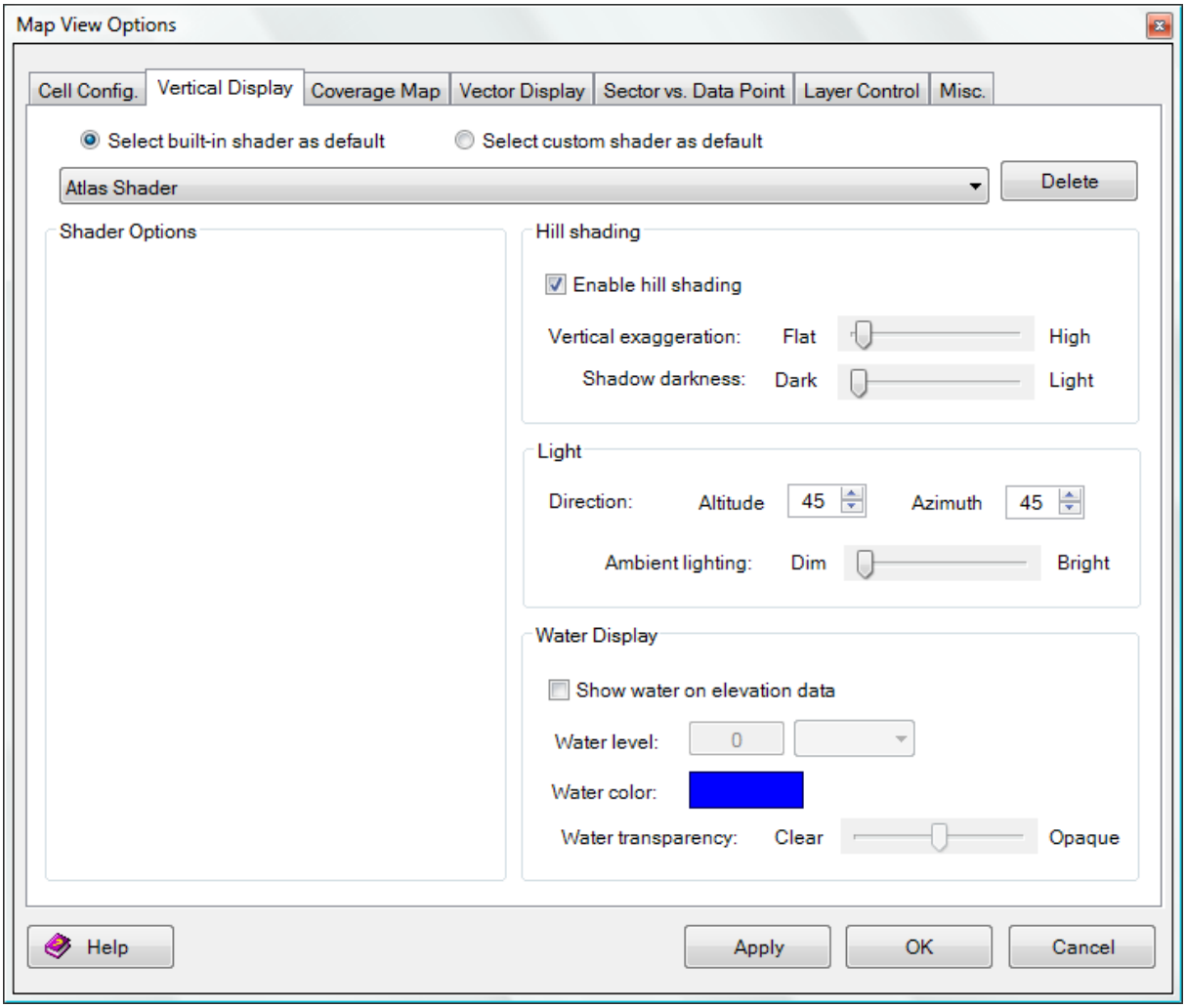
GSM Co/Adj channels can be indicated in the Map View with flags. You can choose to indicate only the sectors with same channel but different BSICs, +1/-1 adjacent channels, +2/-2 adjacent channels, or all of these channels.

Channel Search Radius (Km)

Use the spin control to define the channel search area for the selected sector.

4.2.2.9.2 Vertical Display Options

The Vertical Display options allow you to control how terrain elevation data is displayed. The configurations can be adjusted to suit your needs. If you want to change colors, simply click on the color swatch to change it.



Shader Options. To view terrain elevation data, you can choose several algorithms from the dropdown menu to color and shade the loaded elevation data. Selecting the **Select built-in shader as default** radio button will allow you to choose from the following algorithms:

- **Atlas Shader**. The Atlas Shader is the default shader, and generally provides good results for any loaded elevation data.
- **Color Ramp Shader**. The Color Ramp Shader displays ramps of color: blue for low elevations to red for the highest elevations.
- **Daylight Shader**. The Daylight Shader colors all elevations the same shade and is only useful while Hill Shading is enabled.

  When using this shader, you may customize the following options:

  – Surface Color: sets the calculated surface intensity color.

- **Global Shader**. The Global Shader shades elevation datasets that cover large areas of the Earth such as Terrain Base and GTOPO30, to provide stunning results for these datasets.
- **Gradient Shader**. The Gradient Shader moderates coloring with elevation between the low elevations and the high elevations.

  The actual colors ramped between can be selected in the Shader Options panel:

  - Low Color: Sets the lowest elevation value color.
  - High Color: Sets the lowest elevation range color.
- **HSV Shader**. The HSV Shader maps the elevations onto the HSV (hue saturation value) color space.

  Mapping can be configured in the Shader Options panel:

  - Low Color Start (Advanced): Sets where the lowest elevation will be on the HSV color range.
  - Value (Advanced): Modifies the HSV value parameter.
  - Saturation (Advanced): Modifies the HSV saturation parameter.
  - Range: Modifies how much of the full HSV range is to be used--increasing this value leads to color wraparound.
  - Reverse Colors: Reverses the orders of colors used for shading.
- **Slope Shader**. The **Slope Shader** colors loaded terrain data by the slope of the terrain rather than the absolute elevation. This shader allows you to identify the portions of the terrain that are relatively flat versus those that are relatively steep.

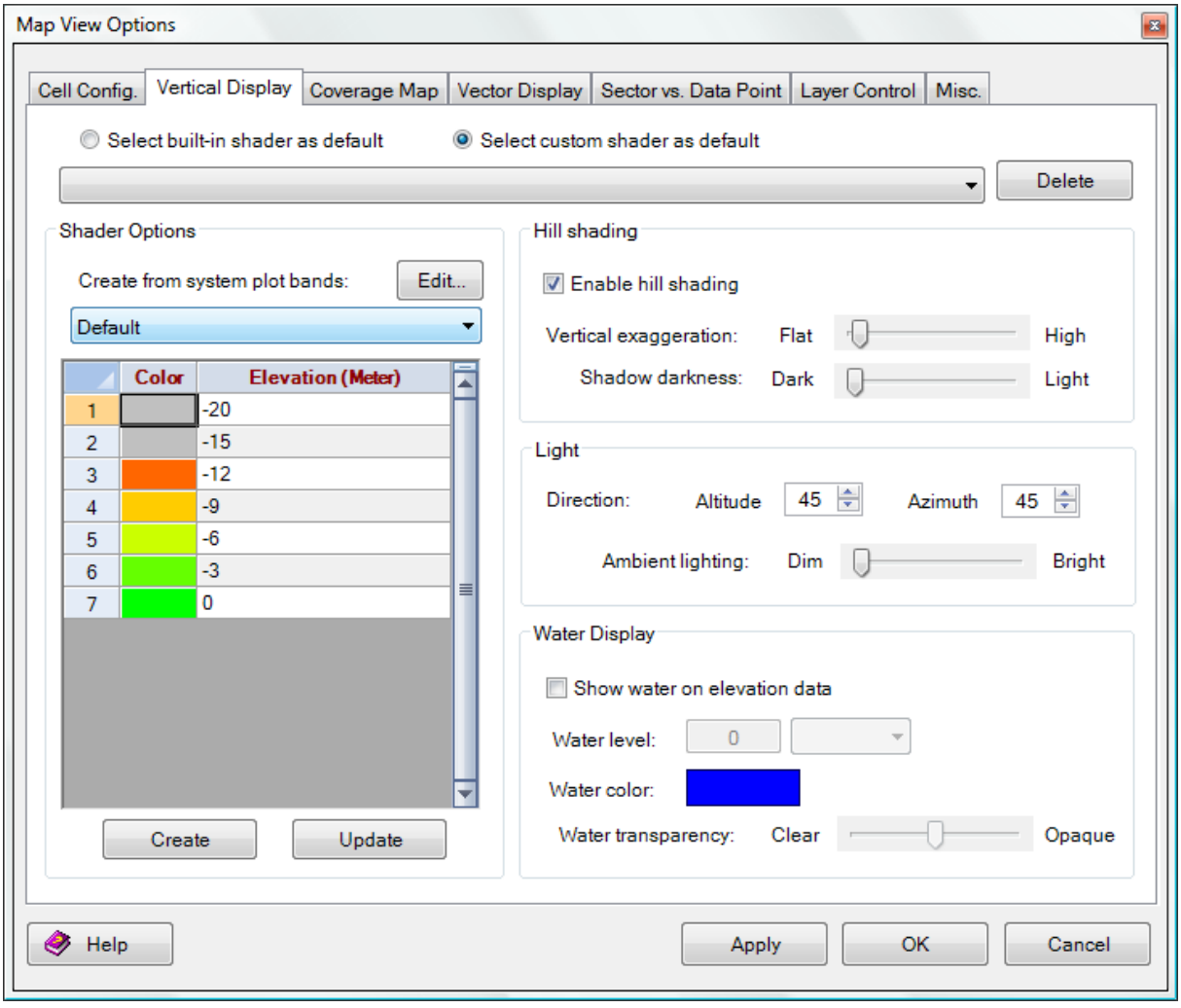
  The definitions of "flat" and "steep" are the configurations for the **Shader Options** panel:

  - Minimum Slope -> Slope Value: Allows you to set the slope at or below whichever Minimum Slope Color is used.
  - Minimum Slope -> Color: Specifies the color with which all parts of the terrain with a slope at or below the Minimum Slope Value will be shaded.
  - Maximum Slope -> Slope Value: Allows you to set the slope at or above whichever Maximum Slope Color is used.
  - Maximum Slope -> Color: Specifies the color with which all parts of the terrain with a slope at or above the Maximum Slope Value will be shaded.
  - Smooth Gradient: Specifies that all portions of the terrain with a slope between the Minimum Slope Value and the Maximum Slope Value will be colored with a smooth gradient of colors that vary with the slope from the Minimum Slope Color to the Maximum Slope Color.
  - Custom Color: Specifies that all portions of the terrain with a slope between the Minimum Slope Value and the Maximum Slope Value will be colored with a single color that can be modified with the **Select** button.

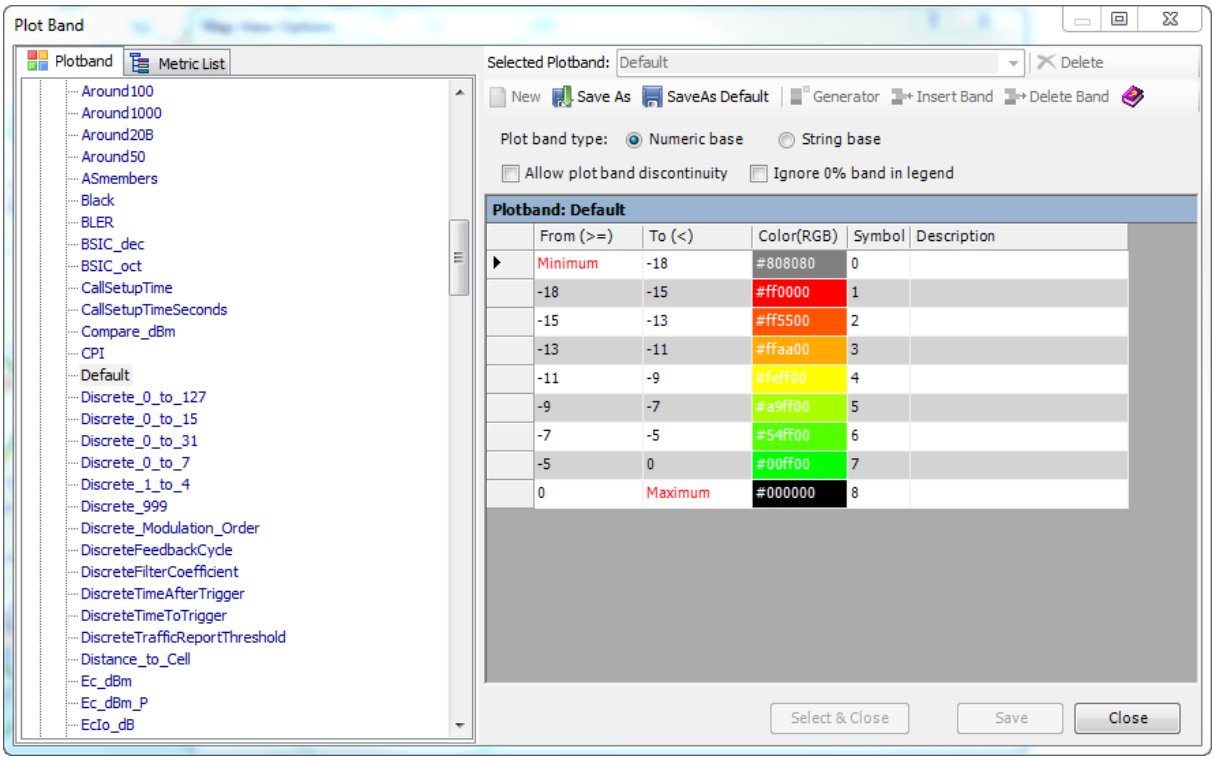
Alternatively, you can choose to use custom shading created from system plot bands.

Hill Shading. Select the **Enable Hill Shading** option to view elevation data as a shaded relief. With the option on, shadows will be generated using the loaded elevation data along with the remaining settings on this panel. The Vertical Exaggeration setting is used to control the exaggeration of relief features.

When this option is turned off, the map will appear flat, with elevations distinguished only by color. Selecting the **Select custom shader as default** radio button will open Shader Options similar to those shown in the dialog below:



When using this option, select a plot band from the dropdown menu, and the current configurations for that plot band will appear in the frame below. To change the configurations, click **Edit** and the following window will appear:



Light. The Lighting Direction option sets the position of the light source (the "sun") for hill shading. Note that cartographic azimuth and altitude are used. 0 azimuth means the sun is to the north, 90 azimuth means the sun is to the east, etc. An altitude of 90 means that the sun is directly overhead, while an altitude of 0 means the sun is on the horizon.

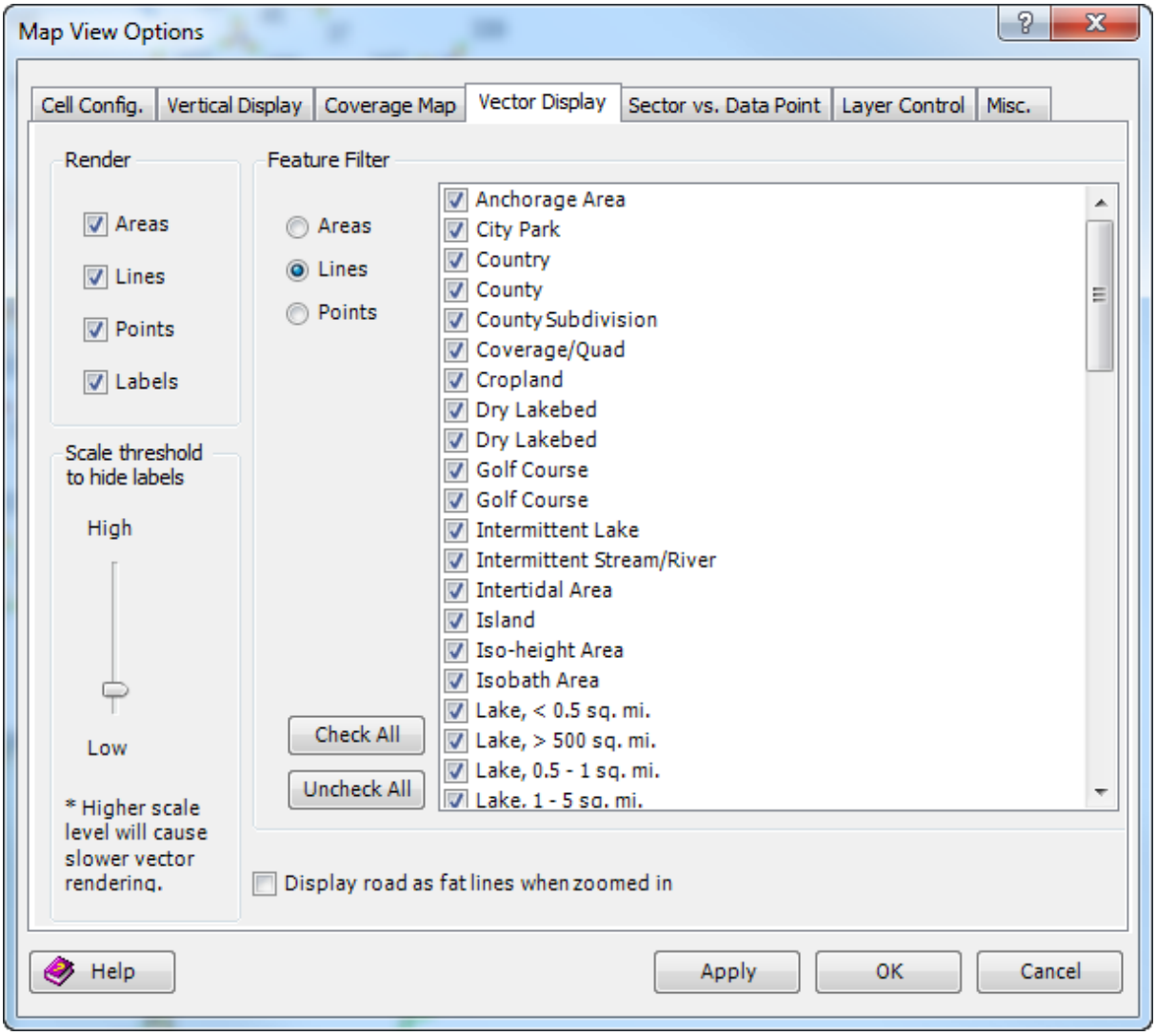
Use the Ambient Lighting option to brighten up dark datasets or to dim bright datasets.

Water Display. The Water Level setting controls the level at which water is displayed. The default is set at an elevation of 0 meters above sea level. Use this to simulate different flood and sea level change scenarios.

The Water Transparency setting controls the clarity of the water displayed if configured to show water. Clearer water allows more underlying reliefs to show through, while opaque water allows none.

4.2.2.9.3 Vector Display Options

The Vector Display options let you control the display of vector data (areas, lines, and points).



Render. This section contains the settings for which types of vector features (areas, lines, points, or labels) will be displayed when loaded. You can use these settings to turn off an entire class of features all at once. For a finer degree of control, see the **Feature Filter** section described below.

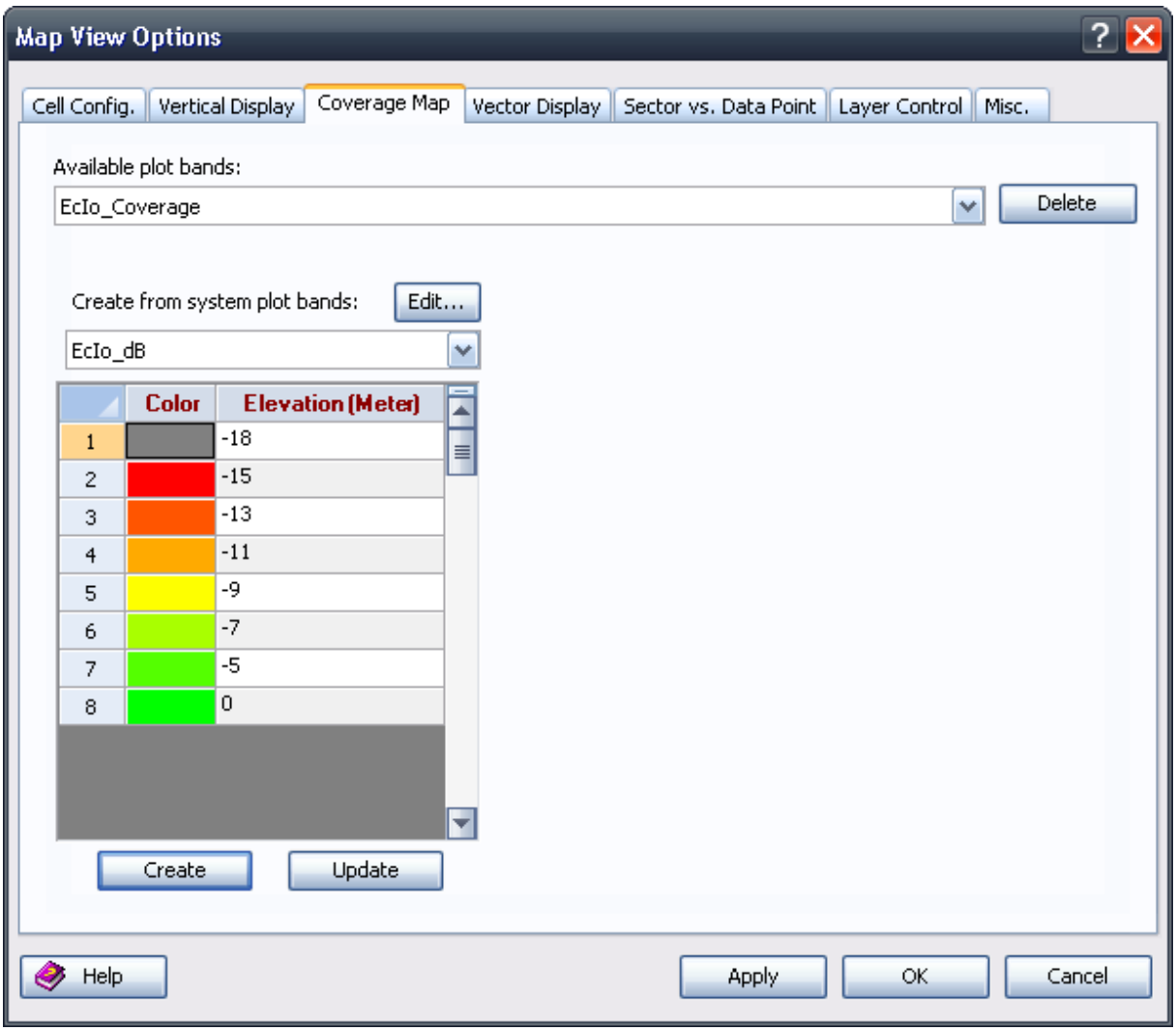
Scale threshold to hide labels. This setting controls how much de-cluttering of displayed vector data is done. This is useful when you have a large of amount of vector data loaded. For example, if you have all of the roads for an entire state loaded at once, you can slide the detail slider to hide minor roads until you have zoomed in sufficiently on the data. The default setting (*Low*) will display all vector data regardless of zoom scale. This setting does not affect the display of raster or elevation datasets.

Feature Filter. This section allows you to select which specific area, line, and point feature types to display. By default, all feature types are displayed.

Display road as fat lines when zoomed in. When zoomed into the display, the road defaults to a constant very thin line. Select this option to display the road in a heavy line to make it easier to see.

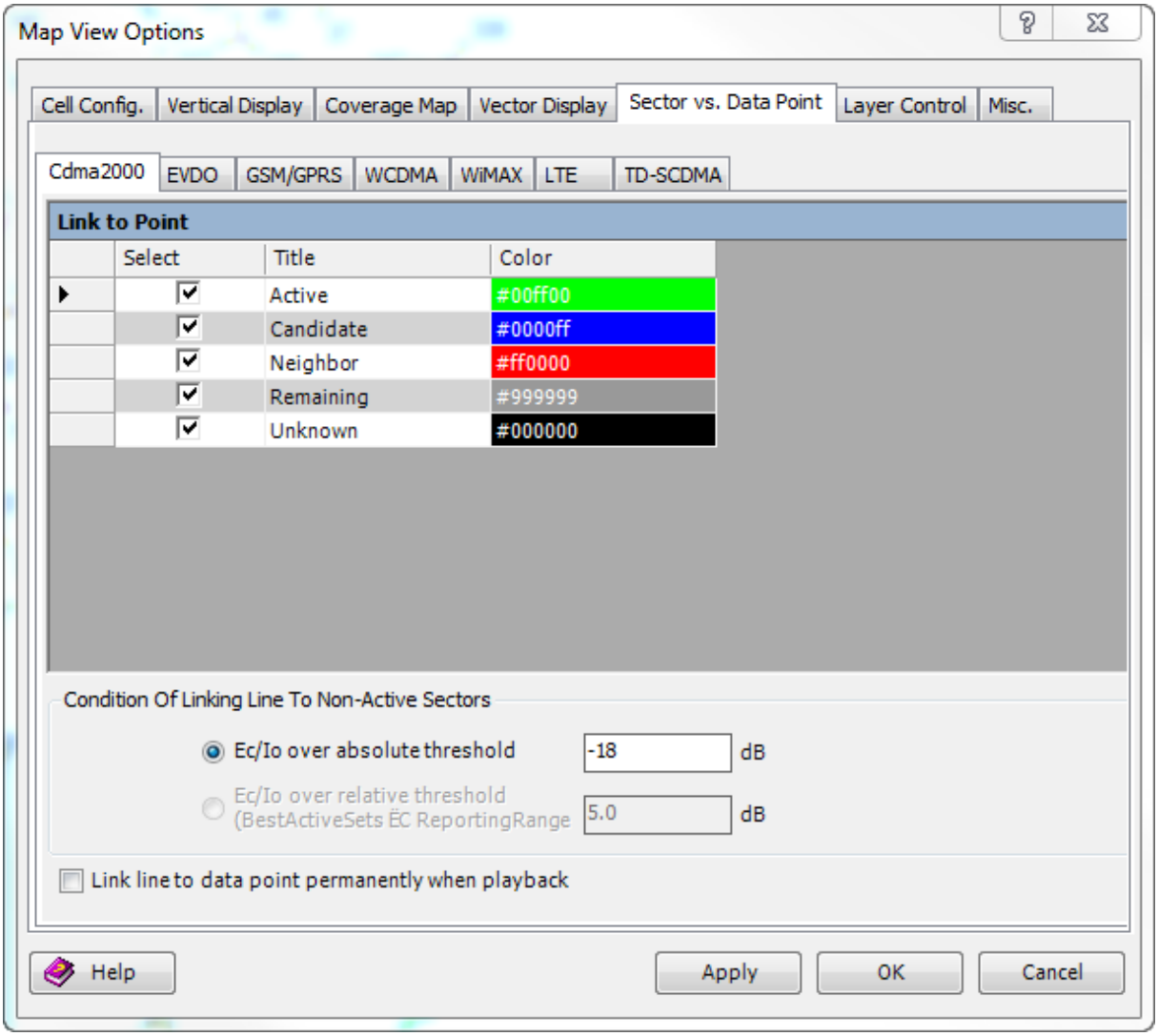
4.2.2.9.4 Coverage Map Display Options

The Coverage Map is displayed in the same way as terrain elevation data. The method to define a plot band for a coverage map is the same as defining a plot band for terrain elevation data. Please see Vertical Display Options for more information.



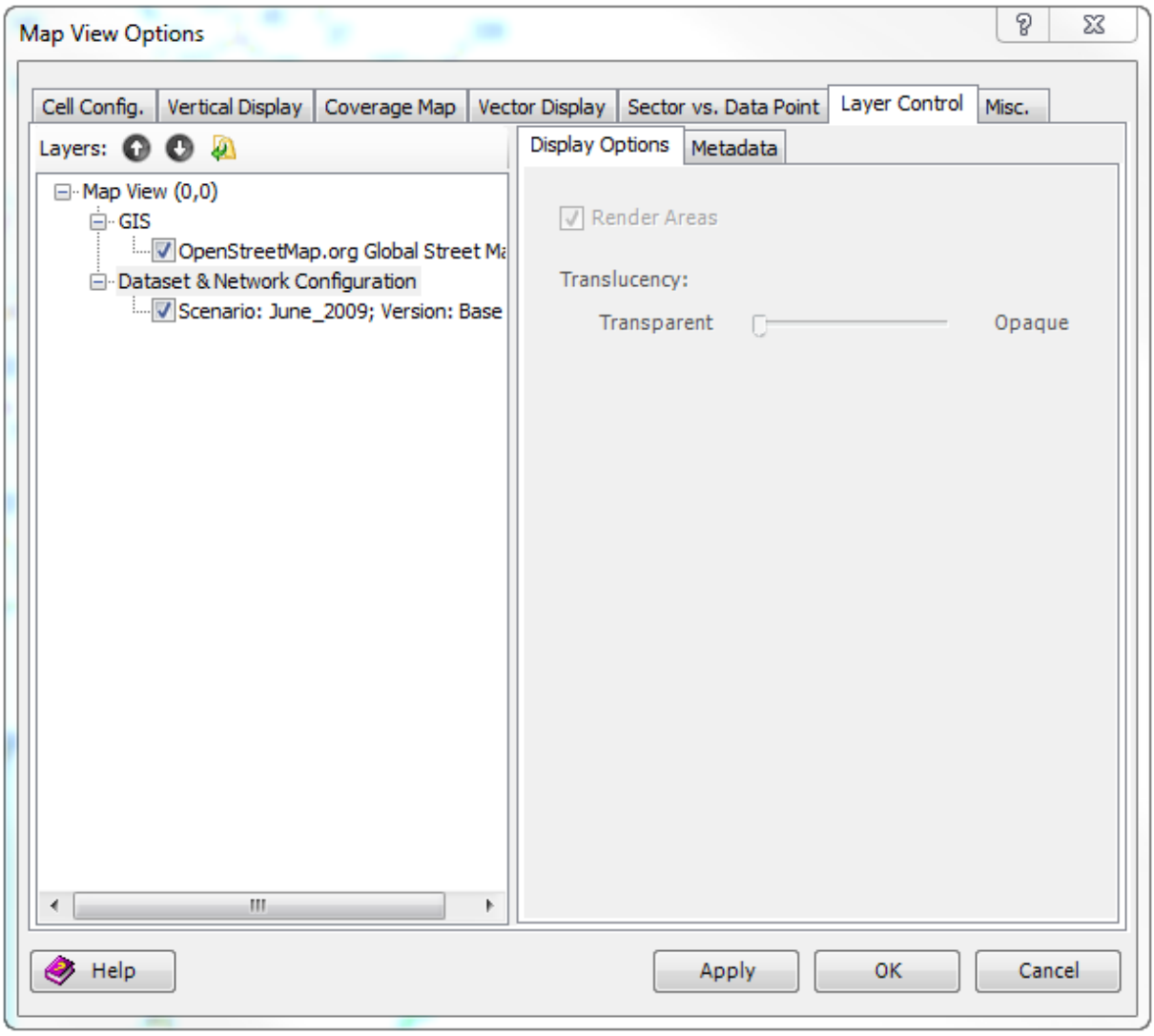
4.2.2.9.5 Sector vs. Data Point Display Options

If you select the **Spider Movement Tool** (), when the cursor is passed over a sector, ray lines linking the data point to its serving sector will be displayed in different colors. The color of the ray line indicates the role of the serving sector at this data point. The properties can be modified in the Sector vs. Data Point display options.



4.2.2.9.6 Layer Control Display Options

Multiple layers of data can be displayed in the Map View with certain composite modes. For GIS data, by default, all vector data is drawn after any other loaded raster or elevation data, regardless of the order of the vector layers in this dialog.



Layers Tree View. In the *Layers* tree view on the left, the higher level indicates the view index in multiple Map Views; the lower level lists all loaded GIS, dataset, and network configuration layers in that view. You can select a layer by clicking on its name. For the GIS layer, its current Display Options and Metadata are displayed in the tab controls on the right side.

To hide a layer, uncheck the layer by clearing the checkbox before its name in the tree view, or click the **Close Selected Layer** button on the toolbar to unload that layer from the Map View.

To change the drawing order of a selected layer, use the and buttons to move the layer up and down. The first layer in the tree view will be drawn on top of the other layers.

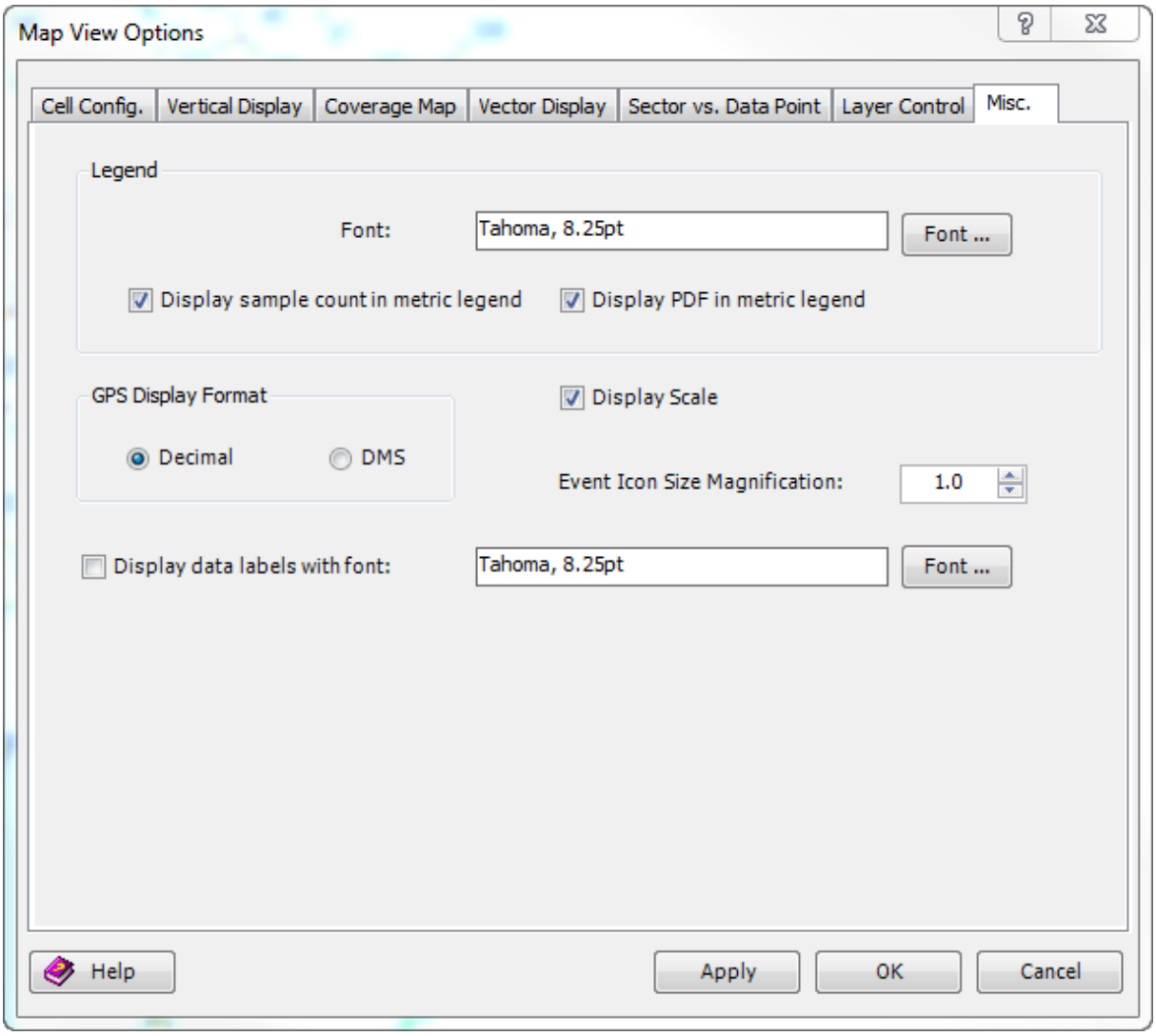
Display Options. The *Display Options* tab contains controls for the color intensity (brightness, darkness), color transparency, blending, anti-aliasing, and texture mapping of the selected layers. Note that the exact options displayed depend on the type of data.

- The **Color Intensity** setting controls whether the displayed pixels are lightened or darkened before being displayed. It may be useful to lighten or darken raster overlays to see overlaying vector data more clearly.
- The **Translucency** setting controls the degree that you can see through the layer underneath the selected layer. The default setting **Opaque** means that you cannot see through the overlay at all. Settings closer to **Transparent** let you see through the overlay and blend overlapping data.
- Selecting **Transparent** will make a particular color transparent, making it possible to see through a layer to the layers underneath. For example, when viewing a DRG on top of a DOQ, making the white in the DRG transparent makes it possible to see much of the DOQ underneath. Clicking **Set Transparent Color** allows you to select the color that will be transparent in the selected overlay(s) as well as save the palette for palette-based files to a color palette (.pal) file.
- **Interpolate** removes jagged edges by making a subtle transition between pixels. Turning off this option maintains the hard edges of the pixels as they are rasterized.
- Selecting **Texture Map** will drape a 2D raster overlay over loaded 3D elevation overlays. Turning on **Texture Map** will let the overlay use any available data from the underlying elevation layers to determine how to color the DRG or DOQ; the result is a shaded relief map.
- Selecting **Auto-Clip Collar** automatically removes the collar from loaded raster data. It is typically used to remove the white border around a DRG or the small black collar around a 3.75 minute DOQQ. This allows you to seamlessly view a collection of adjacent DRG or DOQ files.
- Selecting **Automatically adjust contrast** will automatically adjust the display contrast.

Metadata. The *Metadata* tab displays metadata for the selected layer.

4.2.2.9.7 Miscellaneous Display Options

The **Misc**. tab provides options for controlling the display of the legend and GIS elements .



Legend

- Modify the legend font.
- Control the legend contents:
  - Turn the sample count display on/off.
  - Turn the % distribution display on/off.

GPS Display Format

- Select the display format of GPS coordinates – decimal or DMS
- Toggle the display of the map scale on/off.

- Define the size of event icons.
- Display data labels, and select the font size for the labels.

4.2.2.10 Create Output

Right-clicking the screen will bring up a pop-up menu that offers the following options for output display.

- Copy
- Page Setup
- Print/Generate PDF
- Generate Image File
- Export to GeoTIFF File
- Export Current View to GIS Package

4.2.2.10.1 *Copy*

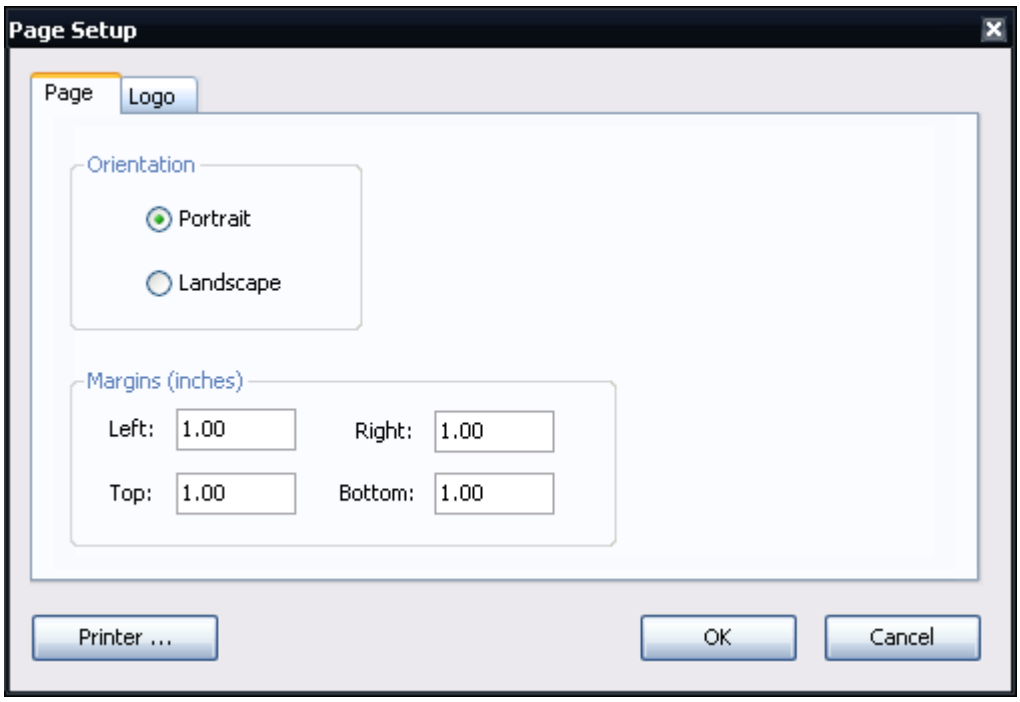
Copies the current display in screen resolution to the Clipboard; once it has been copied, it can be pasted outside of TEMS Discovery.

4.2.2.10.2 Page Setup

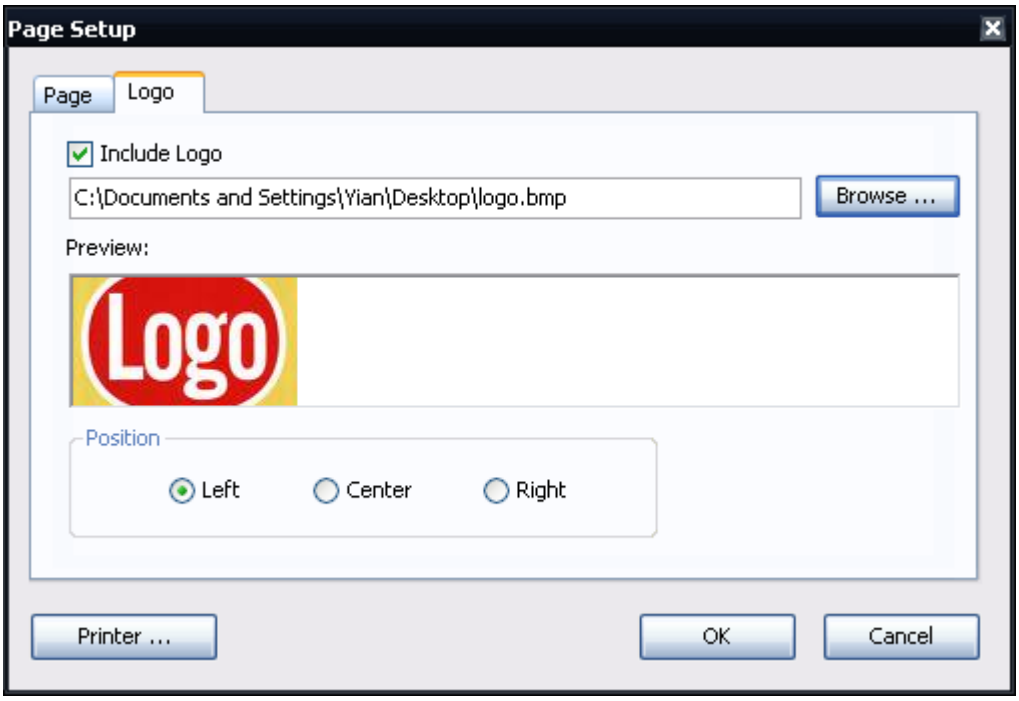
Page Setup is used to modify the page settings for printout or PDF generation. The **Printer** button brings up the standard printer setting dialog.

The Page Setup dialog contains two tabs: **Page** and **Logo**.

- **Page tab**. The options on the Page tab allow you to define the margins and orientation of the printed document. The orientation can be either portrait or landscape.



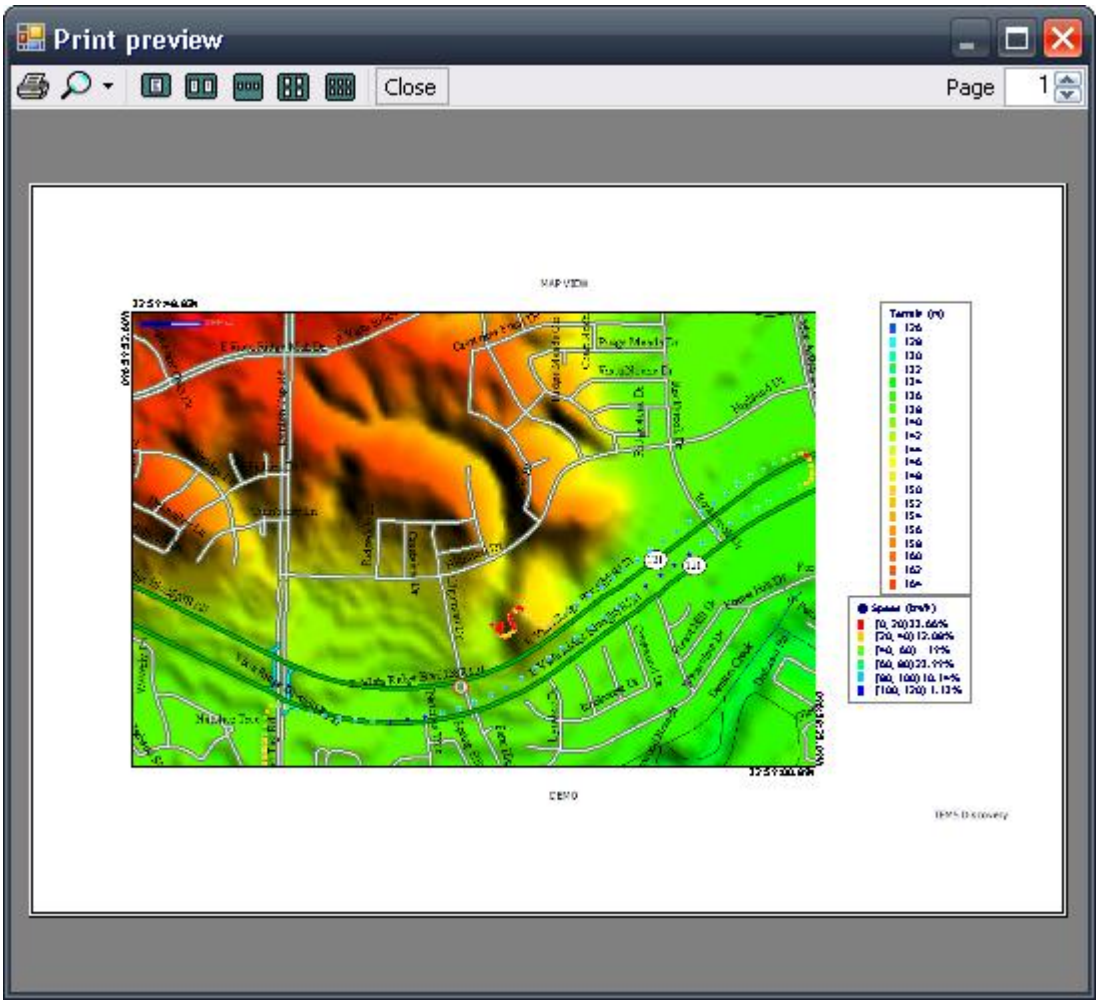
- **Logo tab**. The options on the Logo tab allow you to add a logo or other image to the output. The image will be placed at the top of the paper. The position of the image can be aligned at the left, center, or right.



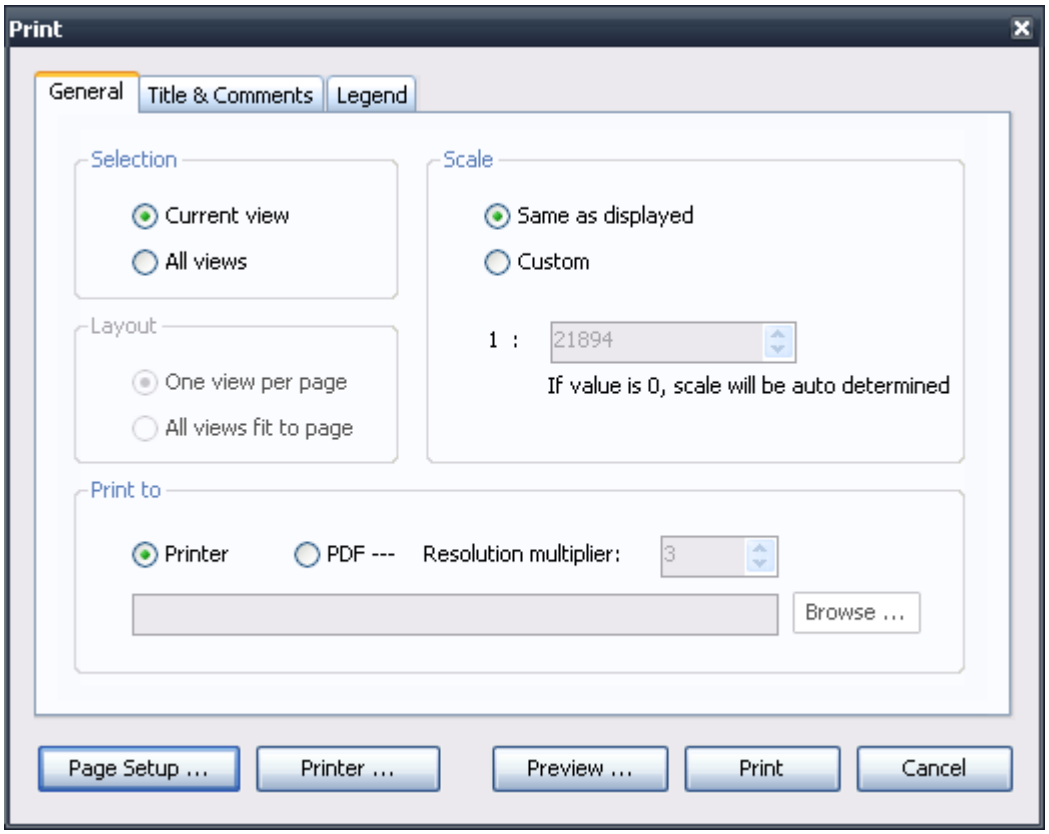
4.2.2.10.3 *Print / Generate PDF*

The Print dialog will appear when **Print** is selected from a right-click context menu. The Print dialog includes:

- Three tabs: **General**, **Title & Comments**, and **Legend**. These tabs are described below.
- Several action buttons:
  - **Help**. Accesses the on-line help for the Print function.
  - **Page Setup**. Accesses the page setup dialog. See Page Setup for more information.
  - **Printer**. Accesses your system's standard printer dialog.
  - **Print**. Sends the output to the default printer.
  - **Preview**. Accesses a Print Preview dialog that shows how the printout will look.
  - **Cancel**. Cancels the print command.


Print preview
Close
Page
1

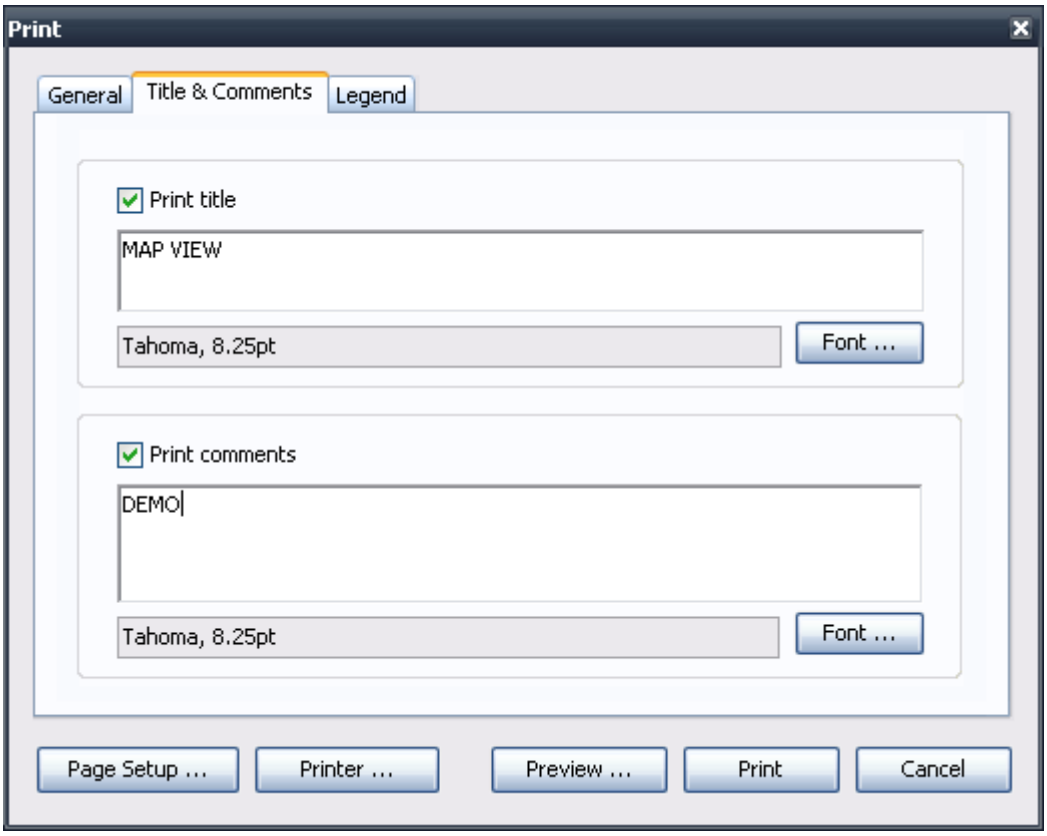
General tab



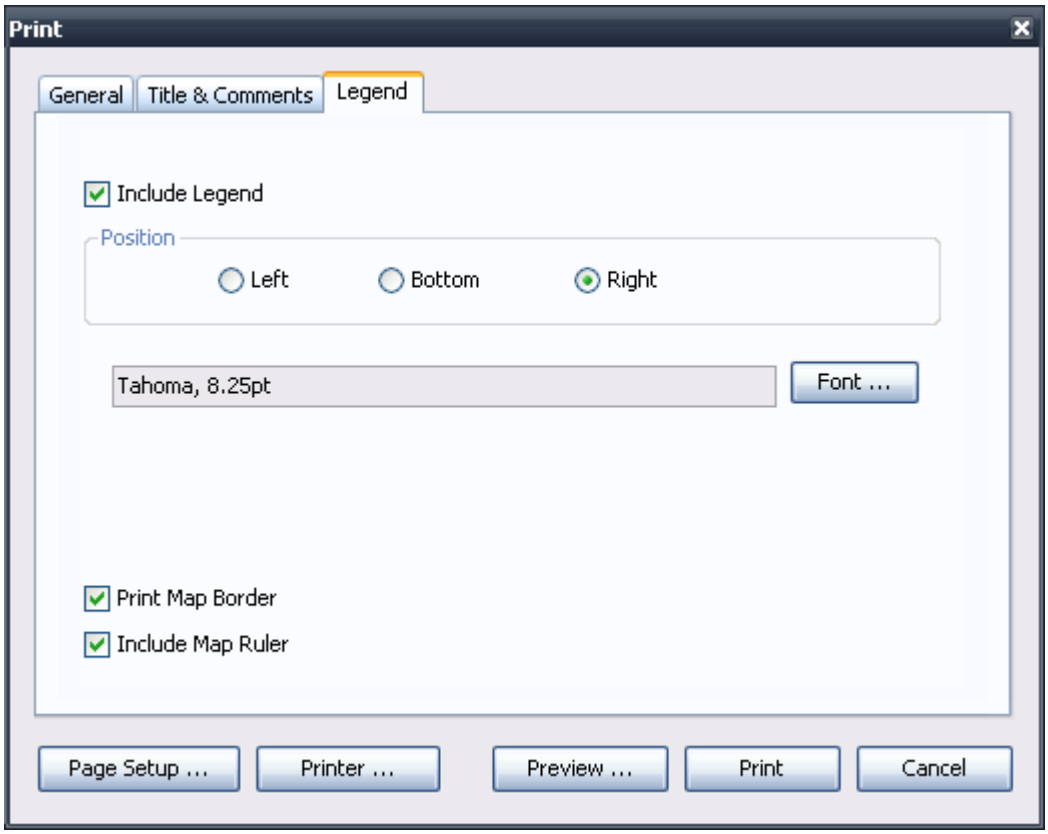
The **General** tab has the following panels:

- **Selection**. Select *Current View* to print the view that was right-clicked. Select *All Views* to print all the views that are displayed.
- **Layout**. If you choose *All Views* from the Selection panel, you can also choose how to print the views: *One view per page* or *All views fit to page*.
- **Scale**. You can define a scale or apply a scale for the printed views.
- **Print to**. The output can be sent to a printer or a PDF file. If selecting the PDF option, you can define the resolution multiplier (the resolution of the PDF file will be the screen resolution multiplied by the resolution multiplier) and the target file name.

Title & Comments tab. You can include a title at the top, or comments at the bottom of the output.



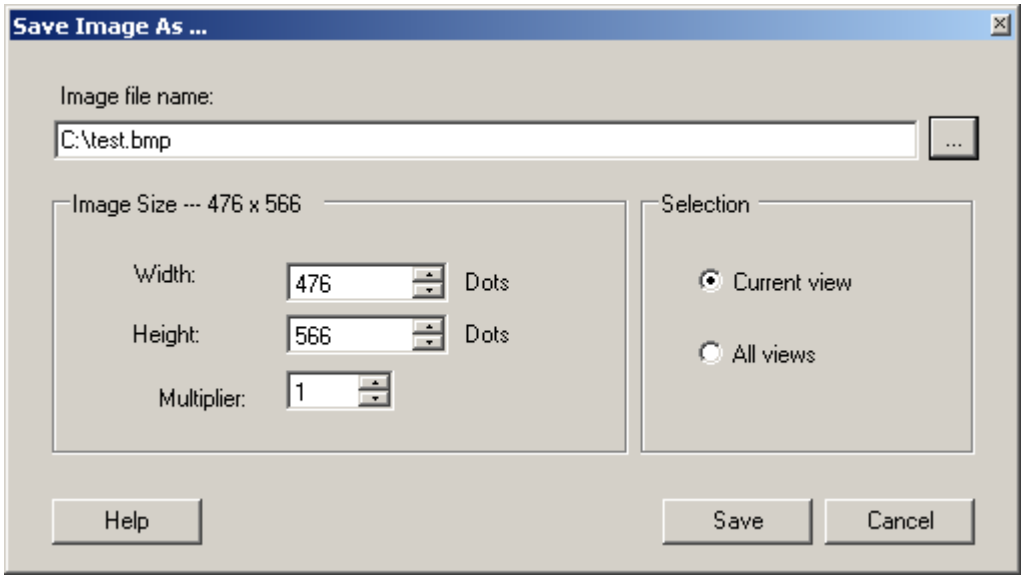
Legend tab. You can choose whether to include the Legend in the output. If selected, the Legend can be placed at the left, bottom, or right of the paper. You can also print a map border and include a map ruler.



4.2.2.10.4 Generate Image File

You can capture the Map View display as a JPEG, PNG, or Windows bitmap (BMP) file. The generated image can be generated at a higher resolution than the screen to provide greater fidelity.

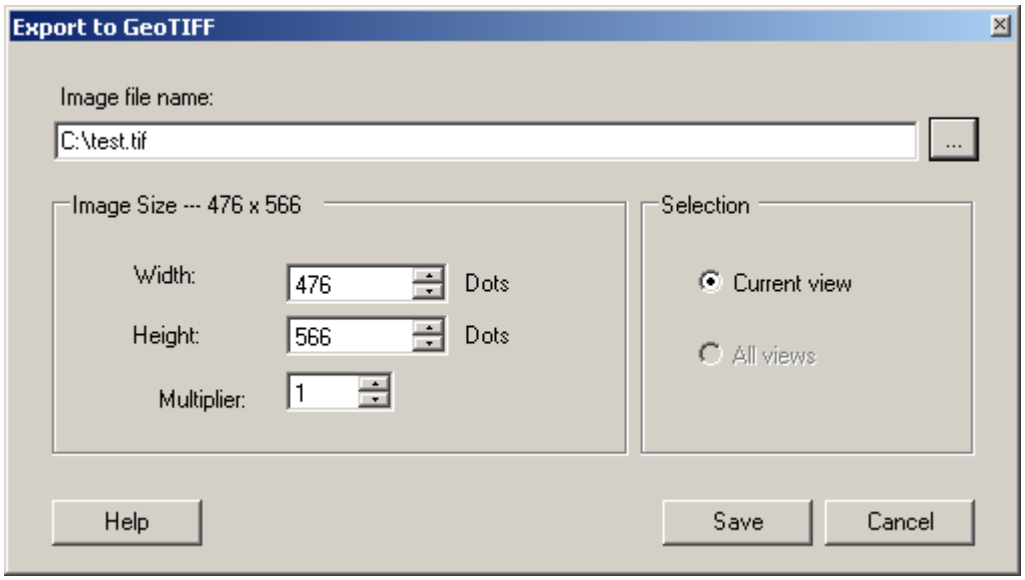
The width and height of the generated image in pixels are specified in the Image Size panel. By default, the Map View size is used. Using these values will generate an image that is an exact copy of what you see. You can change these values to generate a higher or lower resolution image with the obvious trade-off of size versus quality. You can also define the multiplier, which will be applied to the width/height defined in the panel.



4.2.2.10.5 Export to GeoTIFF File

GeoTIFF - TIFF is a lossless format that is supported by many GIS packages. Saving the screen as a TIFF generates a 24-bit uncompressed TIFF. Additionally, all geo-referencing data is stored in a GeoTIFF header attached to the TIFF, making the image completely self-explanatory.

Similar to Generate Image File, you can define the image size for the output.



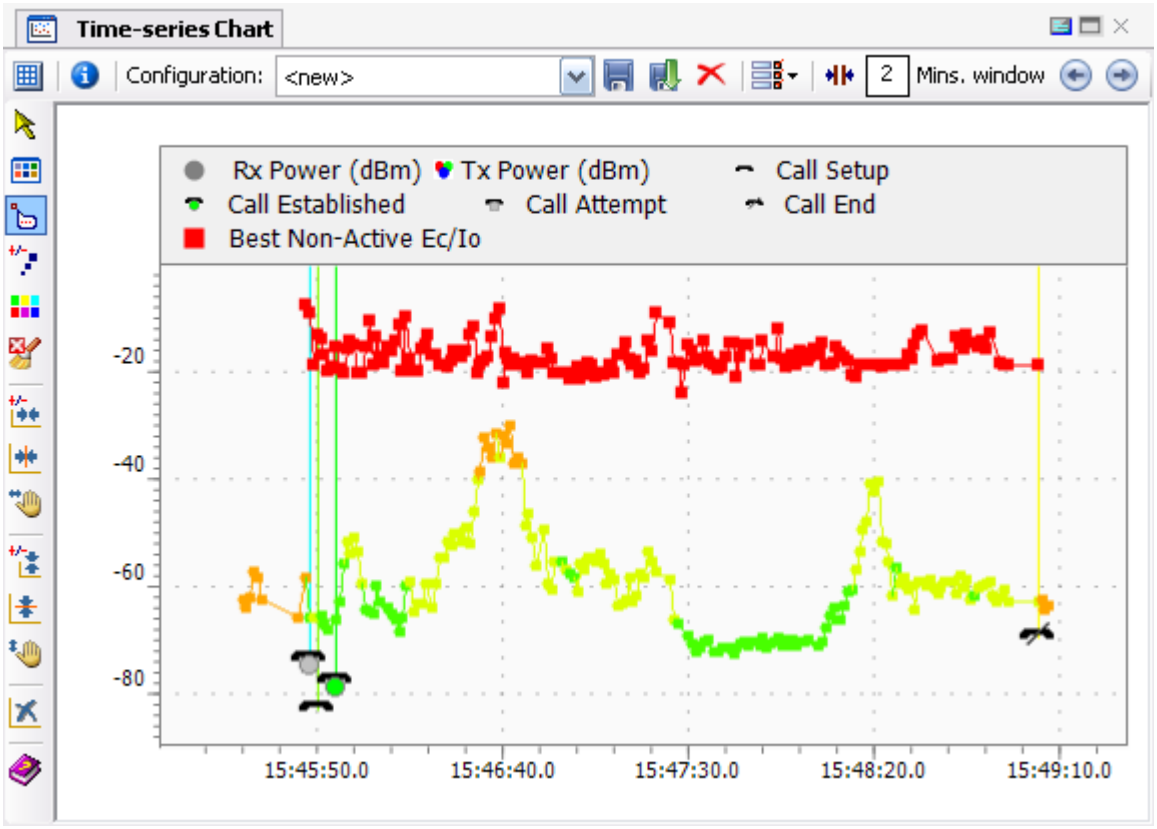
4.2.2.10.6 Export Current View to GIS Package

You can select this context menu to export the currently displayed GIS data in the Map View to a GIS package. All the information including vector, raster, and elevation data will be preserved and can be imported back to TEMS Discovery. The generated GIS package will use .gmp as the file extension. This function can be useful for cropping or merging GIS data for achieving or sharing.

4.2.3 Time Chart

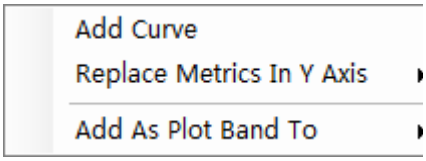
The Time Chart displays metric data in a time serial. To display data in the Time Chart, drag-and-drop the metric data object from the Data Explorer into the Time Chart, or right-click the metric data object and choose **Send to Time Chart** from the pop-up menu.

Click any data point to display the detail information in the tooltip.



4.2.3.1 Time Chart Pop-up Menu

The following pop-up menu will appear if metric data is dragged-and-dropped into the Time Chart:



Add Curve. Place the metric on the Time Chart, where it will coexist with existing data.

Replace Metric In Y Axis. Replace an existing metric in the Y-axis.

Add As Plot Band To. Associate the dragged metric data to a particular curve displayed. The color of the data point in that curve will be determined by the plot band of the metric data.

4.2.3.2 Time Chart Toolbar

	Table Size Display the Table Size selector for creating multiple Time Charts. The Time Charts are always in sync.
Combo	List the available configurations. Each configuration defines the collection of metrics to be

box loaded and in which chart to load them. When sending/dragging a file/device to the Time Chart with a configuration selected, the currently defined data filtering options will be applied.

Save Configuration. Save the currently displayed metric and its location as a configuration.

Save Configuration As. Save the current metric configuration as a new configuration.

Delete Selected Configuration.

Cleanup. Clean up the display.

View Option Shortcuts:

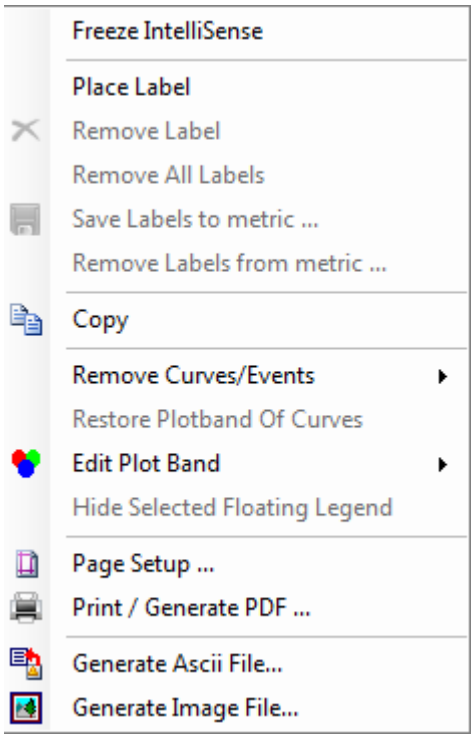
- Show top legend
- Show symbol
- Show connection line
- Always connect points
- Show event vertical lines

Zoom to Window Size. Define a time window for display. Click to adjust the current time window to the defined window.

Previous Time Window. Move the window to the previous time window.

Next Time Window. Move the window to the next time window.

Pointer. Change mouse cursor to a pointer. Right clicking the screen will bring up the pop-up menu shown below.



Freeze IntelliSense. Freeze the IntelliSense display - a vertical red line indicating the time and the value of the metric in the Legend View.

Place Label. Place text labels next to the Time Chart.

Remove Label. To remove a label, select the label and choose this option.

Remove All Labels. Remove all labels displayed in the Time Chart.

Save Labels to Metric. Save the labels in the Time Chart and associate them to a metric.

Remove Labels from metric. Detach labels from the metric.

Copy. Copy the current display to the Clipboard so it can be pasted it outside of TEMS Discovery.

Remove Curves/Events. Remove one or all curves/events from the display.

Restore Plot Band of Curves. Metric data can be associated to a curve as a plot band; in other words, the color of a data point in that curve will be determined by the plot band of the metric data. Restore Plot Band of Curves will remove this association.

Edit Plot Band. Edit the plot band of a curve.

Hide Selected Floating Legend. The plot band of a curve can be displayed graphically as a floating legend. Select this option to hide the display of the selected floating legend.

Page Setup. Page setup for printout or PDF generation.

Print / Generate PDF. See Create Output.

Generate ASCII File. Export the metric data to an ASCII file. Each metric will be exported as a column in the file.

Generate Image File. See Generate Image File for more information.

View Option. Open the Time Chart View Options dialog.

Data Point Icon Size:

1. Left-click to enlarge the icon size of a data point.
2. Right-click to reduce the icon size of a data point.

Show/Hide Legend. Show or hide the Legend. This button will be enabled if you have added a metric to the chart as a plot band to an existing metric.

X Axis Zoom:

1. Left-click and hold to draw a rectangle that will zoom in the X-axis to that area.
2. Right-click and hold to draw a rectangle that will zoom out the X-axis to that area.

Reset X Axis. Reset the X-axis to display all data.

X Axis Pan. Pan the Time Chart in the X-axis.

Y Axis Zoom:

1. Left-click and hold to draw a rectangle that will zoom in the Y-axis to that area.
2. Right-click and hold to draw a rectangle that will zoom out the Y-axis to that area.

Reset Y Axis. Reset the Y-axis to display all data.

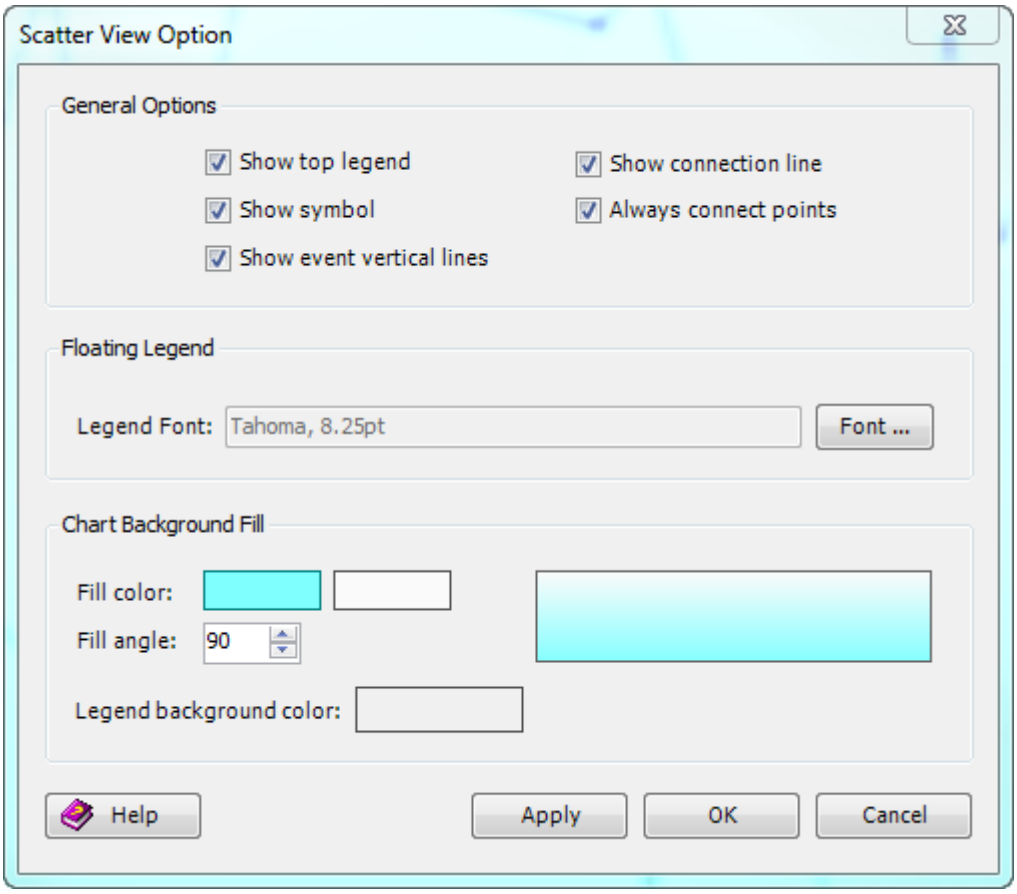
Y Axis Pan. Pan the Time Chart in the Y-axis.

Unzoom. Undo the last zoom action. To clear the history of previous zoom actions, click the **Reset** button.

Help.

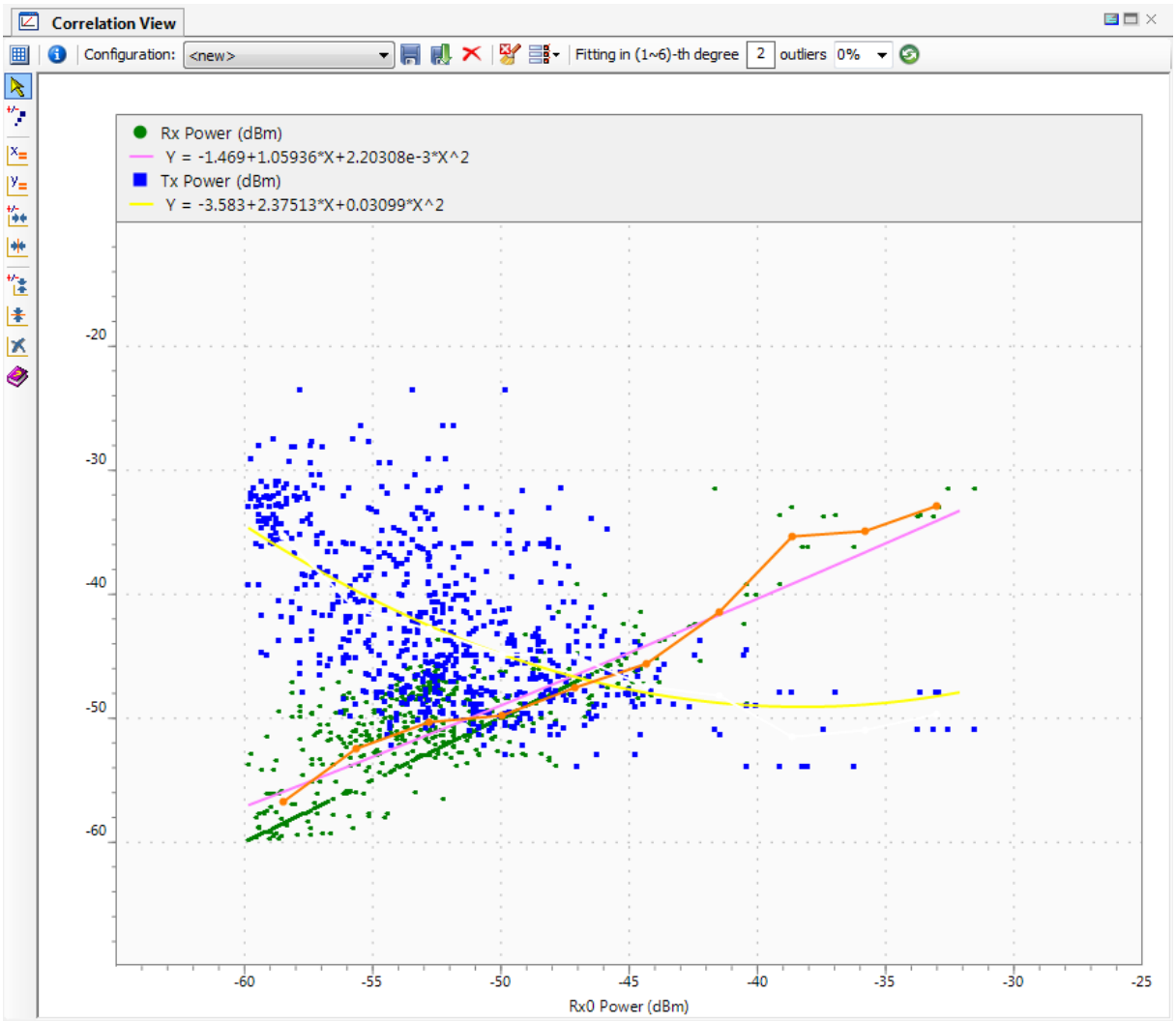
4.2.3.3 Time Chart View Options

Several options can affect the display of metrics in a Time Chart.

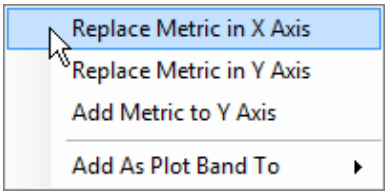


4.2.4 Metric Correlation

Metric Correlation enables the indication of the linear/non-linear relationship between two metrics. You can drag-and-drop a metric data object from the Data Explorer into the Correlation View, then drag-and-drop another metric data object from the Data Explorer into the Correlation View. Choose **Replace Metric in X Axis** to build the relationship between these two metrics. The Least Squares Fitting mathematical procedure is applied to build this correlation.



The following pop-up menu will appear if metric data is dragged-and-dropped into the Correlation View:



Replace Metric in X Axis. Replace the metric in the X-axis with the dragged metric.

Replace Metric In Y Axis. Replace the metric in the Y-axis with the dragged metric.

Add Metric to Y Axis. Add the dragged metric to the Y-axis. This will create a new fitting curve that indicates the relationship between this metric and the metric in the X-axis.

Add As Plot Band To. Associate the dragged metric data to a particular curve displayed. The color of the data point in that curve will be determined by the plot band of the metric data.

4.2.4.1 Correlation View Toolbar

Table Size. Display a Table Size selector for creating multiple Correlation Charts. The Correlation Charts are always in sync.

Combo box List the available configurations. Each configuration defines the collection of metrics to be loaded and in which metric correlation to load them.

Save Configuration. Save the current metric configuration

Save Configuration As. Save the current metric configuration as a new configuration.

Delete Selected Configuration. Delete the current metric configuration.

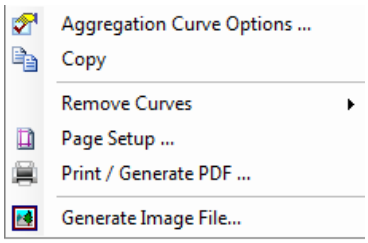
Cleanup. Clean up the display.

View Option Shortcuts:

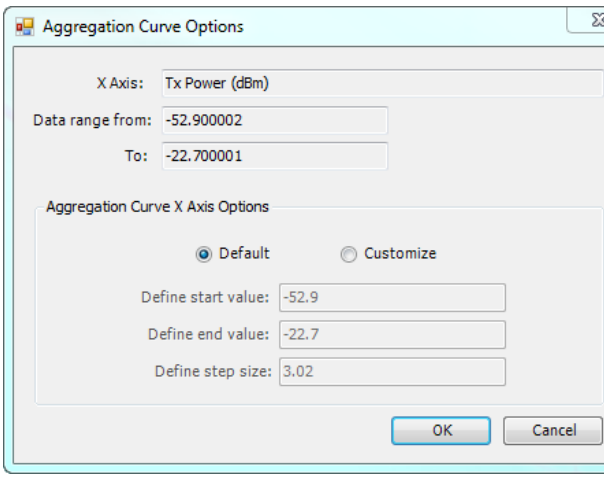
- Show scatter points
- Show fitting curve
- Show aggregation curve

Apply Fitting Order. You can define a degree from 1 to 6 for Least Squares Fitting. Click this button to apply the change.

Pointer. Change the cursor to a pointer. Right-clicking the screen will bring up the following pop-up menu:



Aggregation Curve Options. Open the Aggregation Curve Options dialog. This dialog allows the user to define how the aggregation curve is to be created. You can define the start value, end value, and step size.



Copy. Copy the current display to the Clipboard to paste it outside of TEMS Discovery.

Remove Curves. Remove one or all curves from the display.

Page Setup. Page setup for printout or PDF generation.

Print. See Create Output.

Generate Image File. See Generate Image File for more information.

Data Point Icon Size:

- Left-click to enlarge the icon size of a data point.
- Right-click to reduce the icon size of a data point.


Unify X Axis Scale of All Charts. Make all charts have the same X-axis scale.


Unify Y Axis Scale of All Charts. Make all charts have the same Y-axis scale.


X Axis Zoom:

- Left-click and hold to draw a rectangle that will zoom in the X-axis to that area.
- Right-click and hold to draw a rectangle that will zoom out the X-axis to that area.


Reset X Axis. Reset the X-axis to display all data.


Y Axis Zoom:

- Left-click and hold to draw a rectangle that will zoom in the Y-axis to that area.
- Right-click and hold to draw a rectangle that will zoom out the Y-axis to that area.

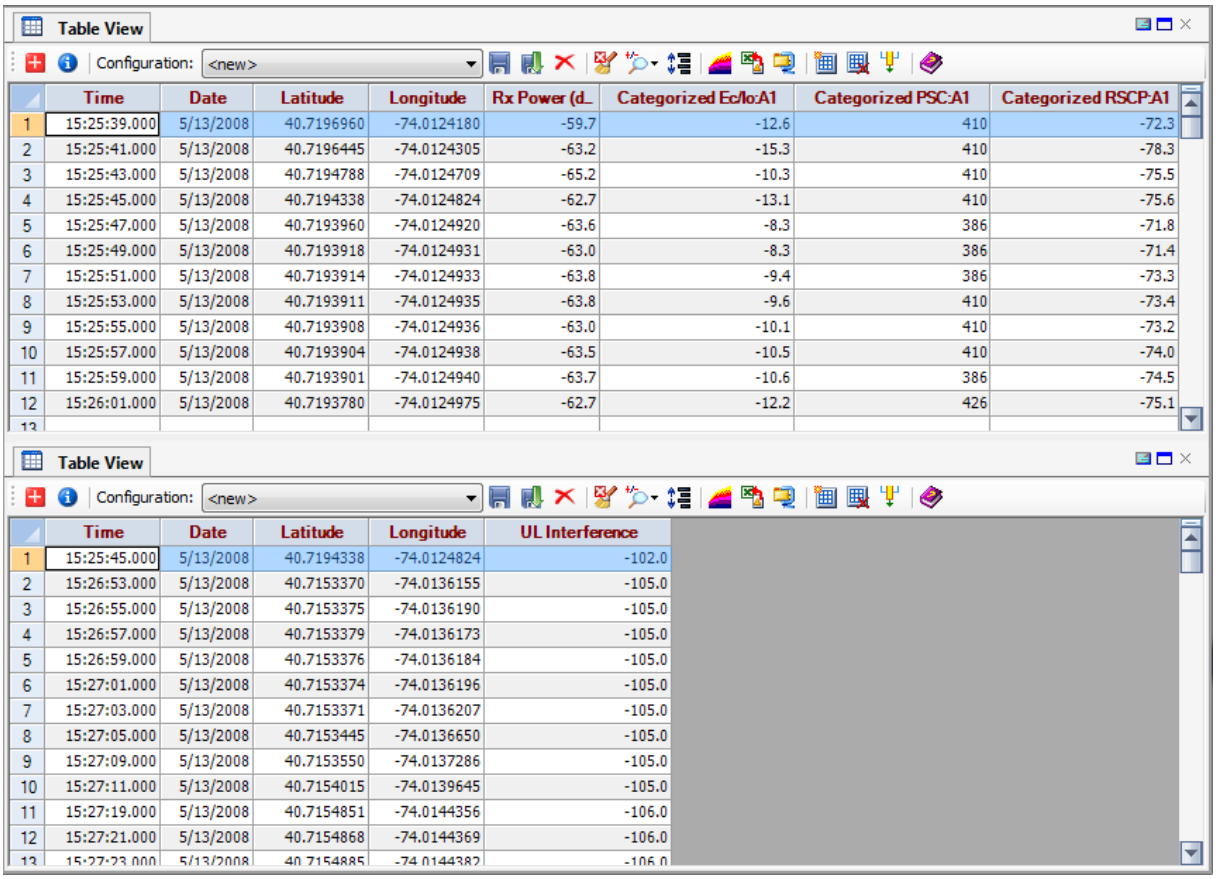

Reset Y Axis. Reset the Y-axis to display all data.


Unzoom. Undo the last zoom action. To clear the history of previous zoom actions, click the **Reset** button.


Help.

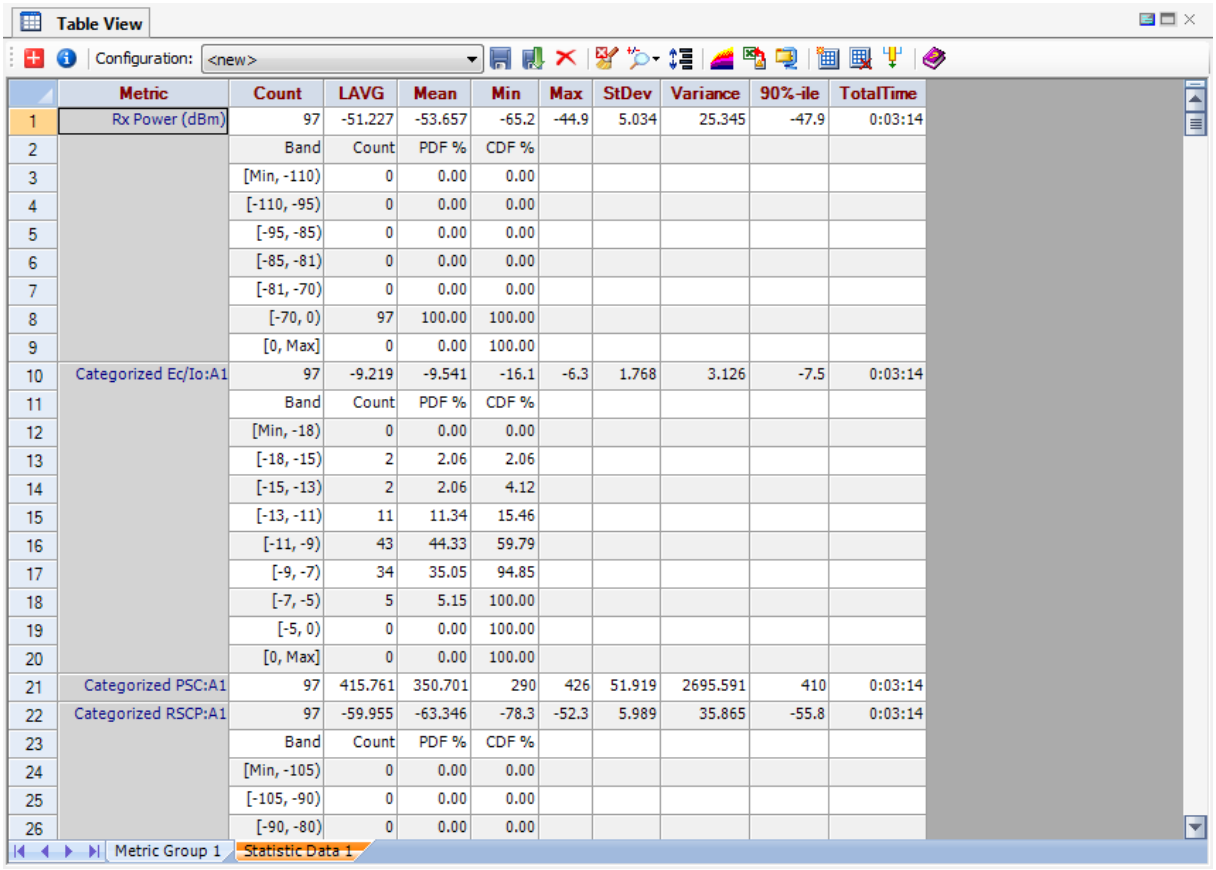
4.2.5 Table View

Table View provides a tabular display of multiple metrics. Multiple Table Views can be created.



In Table View, you can either click the scroll bar or press arrow keys to move the display up and down. If you click a cell to make it active and then use the arrow key to move the display up and down, TEMS Discovery will skip the blank cells and jump right to the previous/next valid cell.

If you set the option **Generate statistic data along with Table View** to true in Options, the statistic report of the metric will displayed in addition to measurement data.



	Metric	Count	LAVG	Mean	Min	Max	StDev	Variance	90%-ile	TotalTime
1	Rx Power (dBm)	97	-51.227	-53.657	-65.2	-44.9	5.034	25.345	-47.9	0:03:14
2		Band	Count	PDF %	CDF %					
3		[Min, -110)	0	0.00	0.00					
4		[-110, -95)	0	0.00	0.00					
5		[-95, -85)	0	0.00	0.00					
6		[-85, -81)	0	0.00	0.00					
7		[-81, -70)	0	0.00	0.00					
8		[-70, 0)	97	100.00	100.00					
9		[0, Max]	0	0.00	100.00					
10	Categorized Ec/Io:A1	97	-9.219	-9.541	-16.1	-6.3	1.768	3.126	-7.5	0:03:14
11		Band	Count	PDF %	CDF %					
12		[Min, -18)	0	0.00	0.00					
13		[-18, -15)	2	2.06	2.06					
14		[-15, -13)	2	2.06	4.12					
15		[-13, -11)	11	11.34	15.46					
16		[-11, -9)	43	44.33	59.79					
17		[-9, -7)	34	35.05	94.85					
18		[-7, -5)	5	5.15	100.00					
19		[-5, 0)	0	0.00	100.00					
20		[0, Max]	0	0.00	100.00					
21	Categorized PSC:A1	97	415.761	350.701	290	426	51.919	2695.591	410	0:03:14
22	Categorized RSCP:A1	97	-59.955	-63.346	-78.3	-52.3	5.989	35.865	-55.8	0:03:14
23		Band	Count	PDF %	CDF %					
24		[Min, -105)	0	0.00	0.00					
25		[-105, -90)	0	0.00	0.00					
26		[-90, -80)	0	0.00	0.00					

Table View Toolbar

Create New Table View

Combo box List the available configurations. Each configuration defines the collection of metrics to be loaded and in which spreadsheet to load them. When sending/dragging a file/device to Table View with a configuration selected, the currently defined data filtering options will be applied.

Save Configuration. Save the currently displayed metric and its location as a configuration.

Save Configuration As. Save the current metric configuration as a new configuration.

Delete Configuration. Delete the current configuration.

Cleanup Table View. Clean up the display.

Zoom Spreadsheet. Zoom in or out of the spreadsheet.

Enable/disable Auto Adjustment of Column Height.

Export to MapInfo MIF/MID. Export the displayed metric data to MapInfo Mif/Mid files.

Save to Excel. Export the displayed metric data to an Excel file.
Note: Only up to 65536 records can be written to the Excel file due to Excel's limitations.

Export to Text Delimited Files in ZIP Package. Export the displayed metric data to ASCII files and then compress all the files to a ZIP file.

Add Sheet. Add a new spreadsheet to the Table View.

Remove Current Sheet. Remove the current active spreadsheet and its partner (Metric and Statistic spreadsheets).

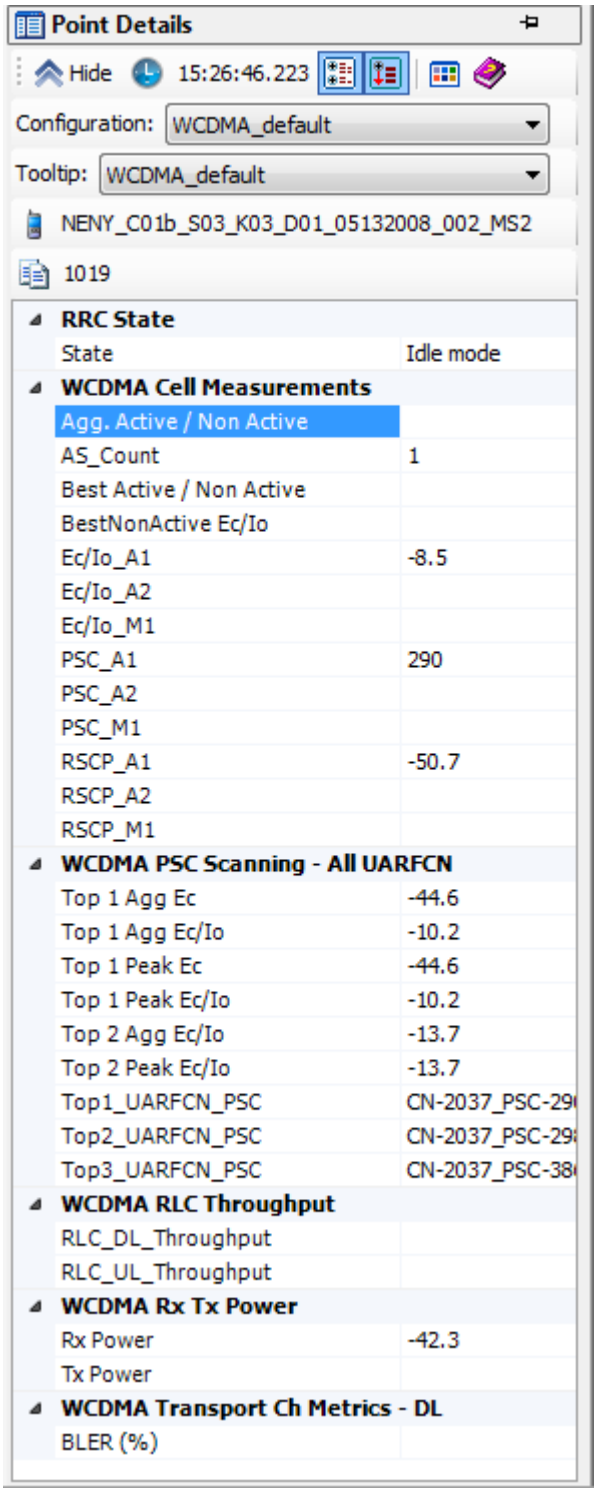
Remove Columns. Delete the selected column and its corresponding statistic data from the spreadsheet.

Help.

4.2.6 Point Detail View

 The Point Detail View provides a convenient way to overview detail information from a particular time or location. By moving the cursor into the Map View and Time Chart, or by changing the row selection in the spreadsheets of the Messages View or the Table View, the detail information will be displayed in the spreadsheet as shown below.

In this dialog, you can also select a tooltip configuration, so that the corresponding detail information can be displayed in the tooltip.



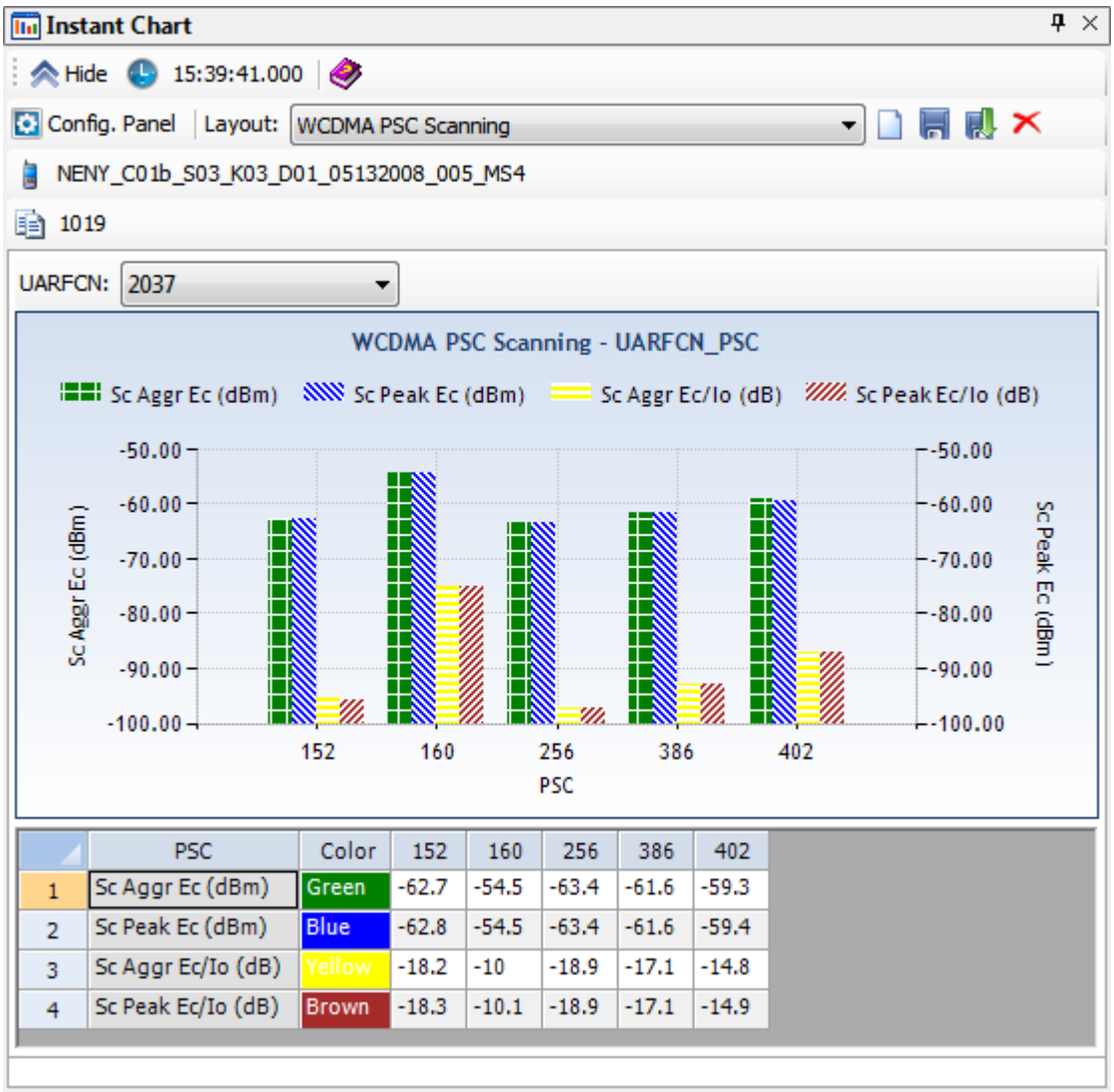
You can control what information to display in this view by selecting a different metric group from the combo box. Clicking the **Point Detail Configuration** button on the toolbar will bring up the Point Detail Settings dialog, where you can create or edit the metric group.

Clicking the **Sort** button on the toolbar will sort the metric group by category (otherwise, the metric group is sorted alphabetically).

If the metric group is sorted by category, clicking the **Grid Expand/Collapse** button  on the toolbar will expand or collapse all of the categories.

4.2.7 Instant Chart

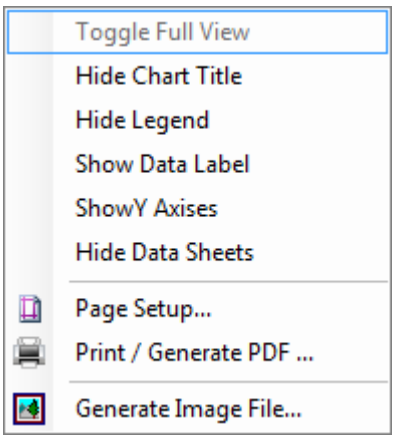
The Instant Chart View provides a convenient way to view the instant information of the selected metrics with respect to a group-by key metric (e.g., UARFCN-PSC) from a particular time or location. By moving the cursor into the Map View or Time Chart, or by changing the row selection in the spreadsheets of the Messages View or the Table View, the detailed metric information will be displayed as shown below, both in a chart and in a spreadsheet.



	PSC	Color	152	160	256	386	402
1	Sc Aggr Ec (dBm)	Green	-62.7	-54.5	-63.4	-61.6	-59.3
2	Sc Peak Ec (dBm)	Blue	-62.8	-54.5	-63.4	-61.6	-59.4
3	Sc Aggr Ec/Io (dB)	Yellow	-18.2	-10	-18.9	-17.1	-14.8
4	Sc Peak Ec/Io (dB)	Brown	-18.3	-10.1	-18.9	-17.1	-14.9

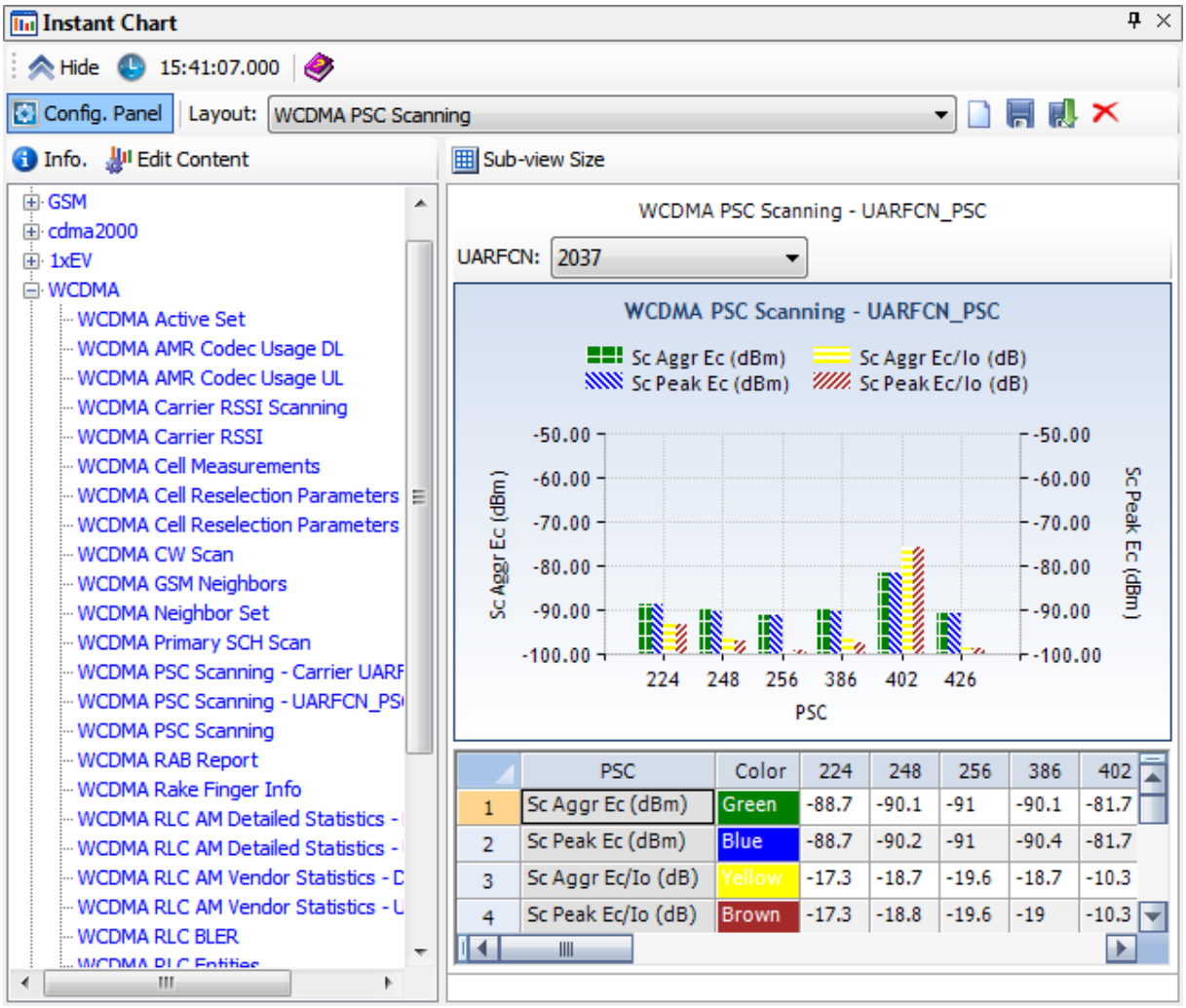
Right-clicking the chart area will bring up a context menu like the one shown here.

From this context menu, you can adjust how the Instant Chart will be displayed and output the display to printer, PDF or image file.



If you click the **Config Panel** button, you will change the window to the one shown below. Then, you can click the **Sub-view Size** button to create new layouts or edit existing layouts by dragging-and-dropping Instant Chart component content from the left panel to the right panel.

The **Edit Content** button is a shortcut that opens the Instant Chart Component Content dialog for editing the selected component content on the left panel.

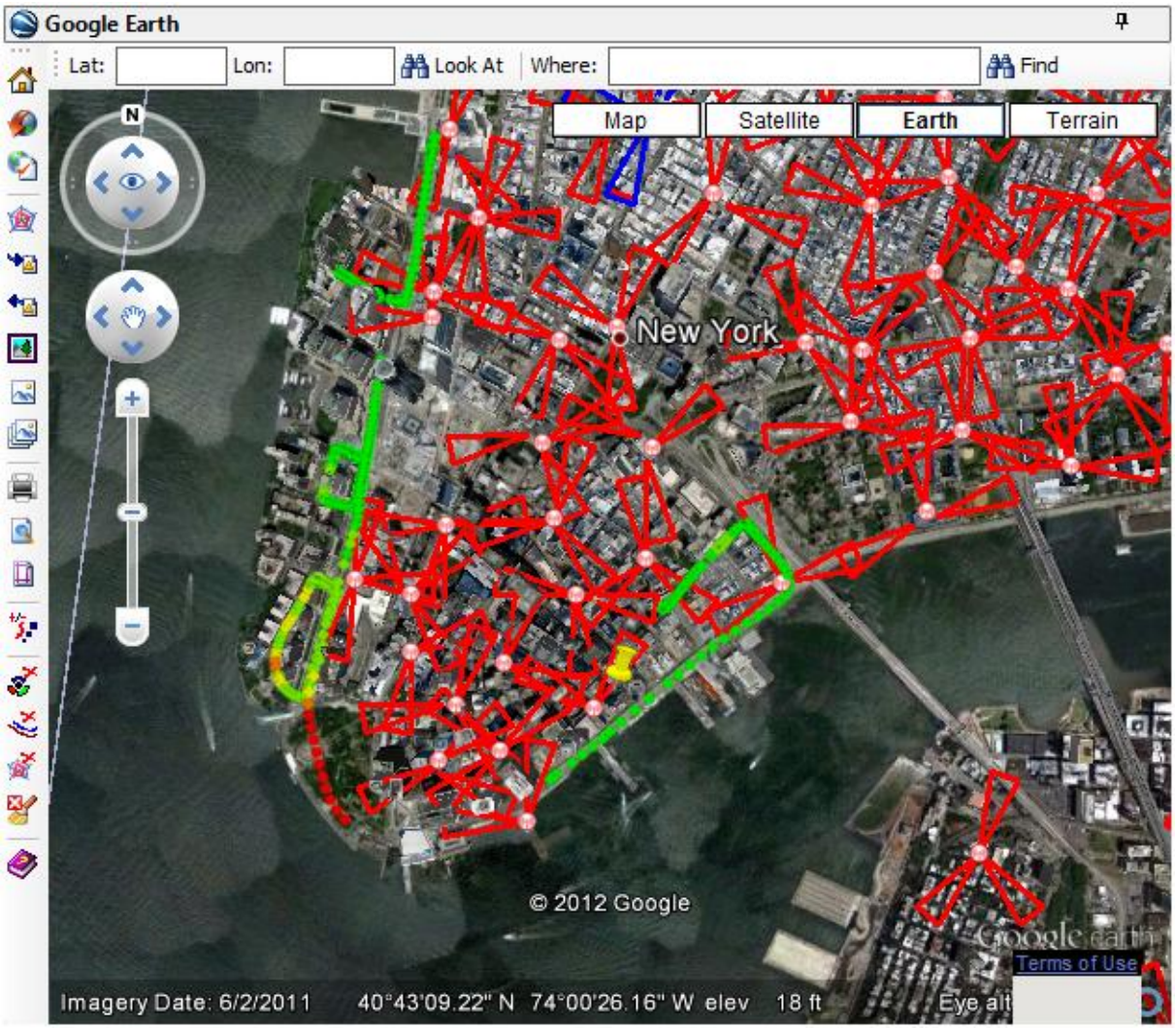


Instant Chart Toolbar

	**Config Pane**l. Configure which sub view of the layout is using which Chart Configuration.
Combo box	List the available Instant Chart layout configurations.
	**New**. Create new layout configuration.
	**Save Configuration**. Save the current layout configuration.
	**Save Configuration As**. Save As the current layout configuration with another name.
	**Delete Selected Configuration**. Delete the current layout configuration.
	**Help**.

4.2.8 Google Earth

Google Earth provides an interactive online mapping capability. It is built on the Google Earth platform, providing several view options: Map, Satellite, Earth, and Terrain. Google Earth also lets you search, discover, and explore specific locations by entering an address. You can also send cell configurations (displayed as a pie with color and different radius), events (displayed with various icons), or metric data (displayed as a colored circle) to be displayed on top of Google Earth as shown below.



To change the display color of metric data, you can edit the plot band of that metric. To change the cell site radius, you can change the icon size for each technology in Cell Configuration View Options.

In the current version of TEMS Discovery, the data object in the Data Explorer can be displayed in Google Earth only, not in Google Map/Satellite/Terrain options. However, you can export the display in Google Earth to a KML file and upload that exported KML file to a web server that can be accessed by public, then click the button on the toolbar to link that KML file. By doing this, the display will always exist in all Google map styles.

4.2.8.1 Google Earth Toolbar


Look At

Lat/Lon. Enter latitude and longitude coordinates, and then click the **Look At** icon to find the location on the map.


Find

Where. Enter a postal address, and then click the **Find** icon to find the address on the map.

Home. Reload Google Earth to its initial stage.

Download GIS Data. See Download Online GIS Data Source for more information.

Display Options. Open the Google Earth View Options dialog.

Link to KML/KMZ Network File. Link a network KML or KMZ file, and display it in Google Earth.

Load GoogleEarth KML/KMZ. Export the current display to a KML or KMZ file.

Export TEMS Discovery Data to KML/KMZ. Import an external or TEMS Discovery exported KML or KMZ file, and display it in Google Earth.

Save as Image. Save the current display as an image file.

Save as GeoTIFF. Save the current display as a GeoTiff file with geo-projection information.

Save as GIS Package. Save the current display as a TEMS Discovery GIS package file that will be listed in the Data Explorer–GIS List.

Print. Print the current display. See Create Output.

Preview. Look at the current display in Print preview mode.

Page Setup.

Change Icon Size:

1. Left-click to enlarge the icon size of a data point.
2. Right-click to reduce the icon size of a data point.

Remove Cell Sites Display. Remove the cell configuration display.

Remove Metric/Event Display. Remove the metric/event display.

Remove Network Links. Remove the network link of KML or KMZ file display.

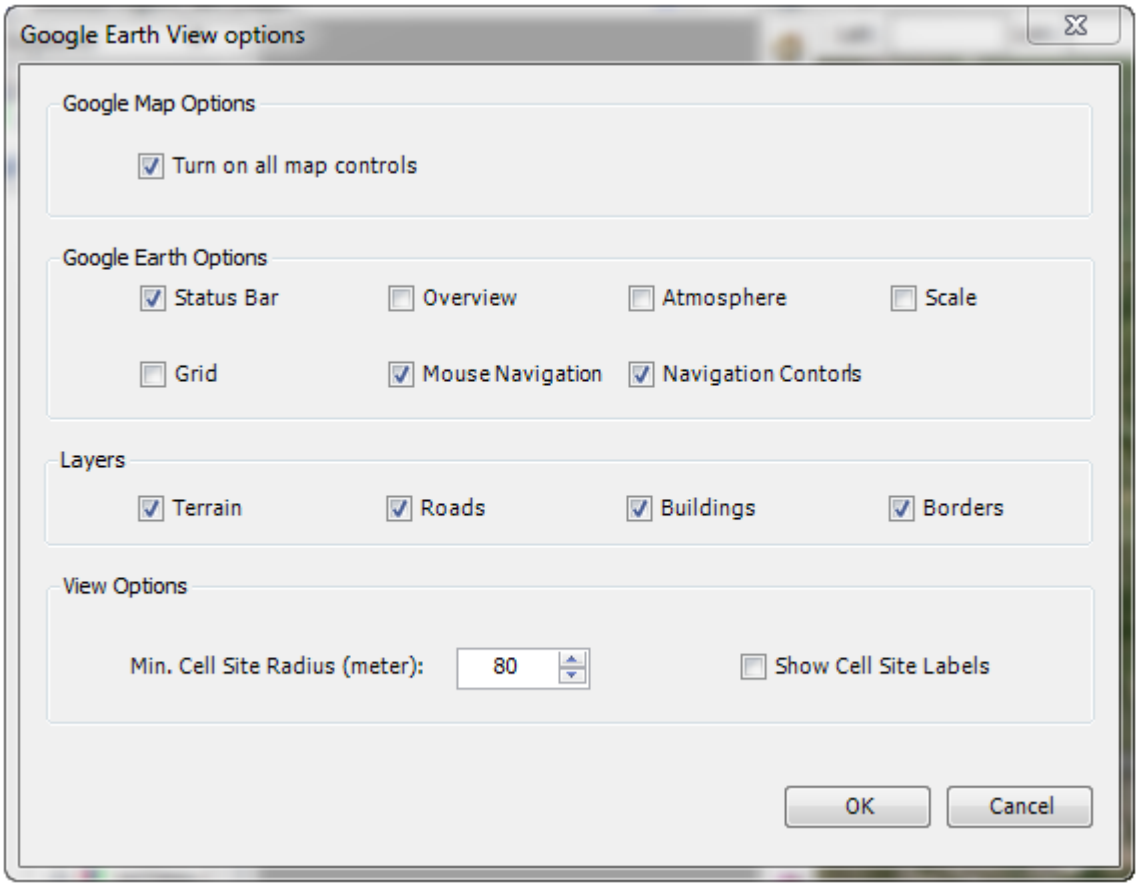
Cleanup Display. Remove all displays.

Help.

4.2.8.2 Google Earth View Options

A number of options are provided for the user to control the display on Google Earth.

To access the Google Earth View options dialog, click the **Display Options** button on the toolbar. Check the desired options.



4.2.8.3 Download GIS Data – Google Map

Several options are provided for the user to download online GIS data from a Google Map display, as listed below.

Map Controls should be turned off before saving the images to GeoTiff file or TEMS Discovery GIS packages.

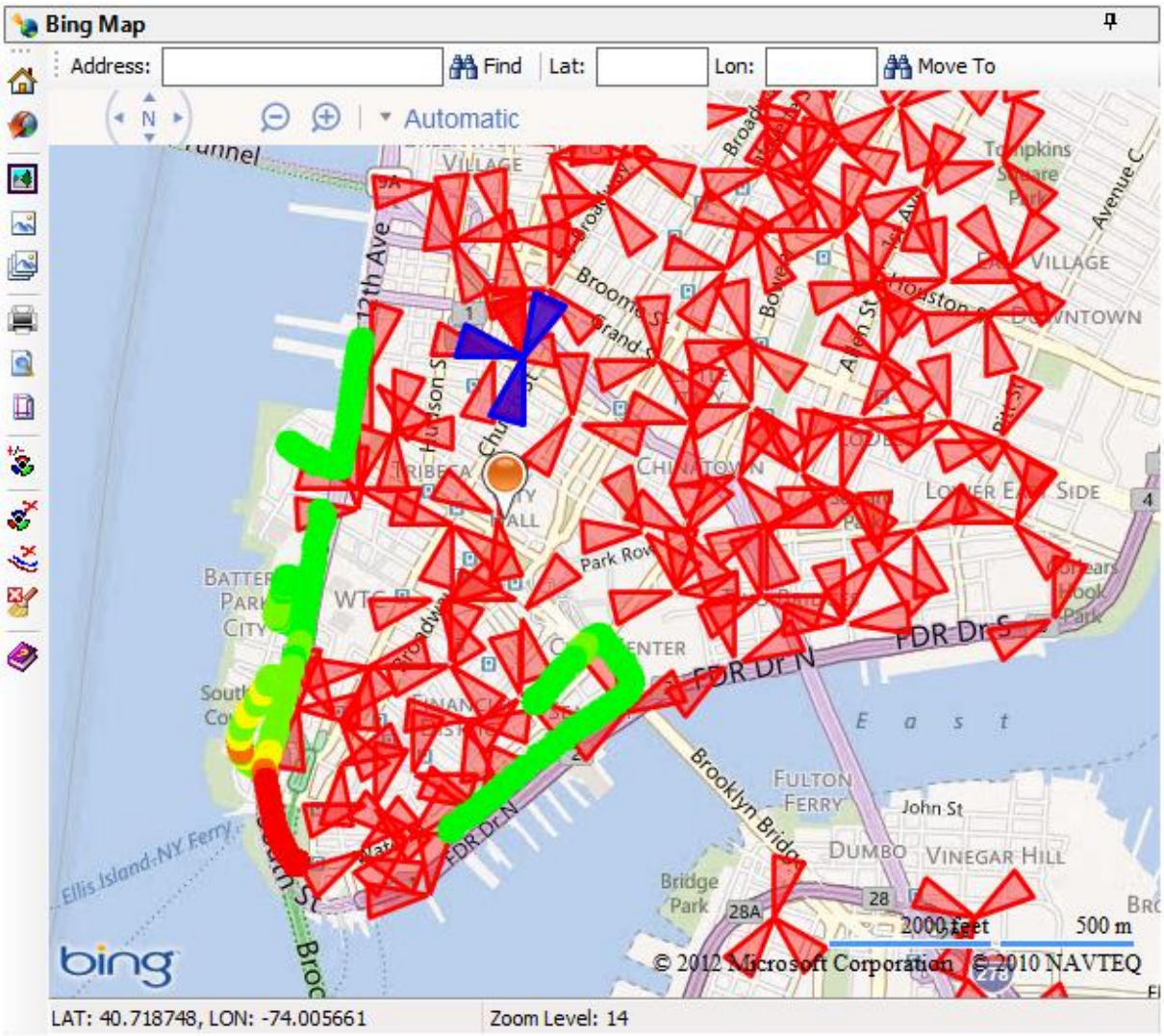
Download GIS Data. This option will open the Select Online Data Source for Download dialog and allow you to download free GIS data from several online data sources (not Google Earth). The boundary of the displayed region will be automatically populated.

Save as GeoTiff. This option allows you to save the displayed images (maps, satellite, terrain) as a geo-referenced GeoTiff file, which can be opened with another third party tool, or imported into TEMS Discovery and displayed on Map View.

 ***Save as GIS Package***. This option allows you to save the displayed images as a TEMS Discovery GIS Package file, which will be listed in the Data Explorer–GIS List and which can be displayed immediately on the Map View.

4.2.9 Bing Map

Bing Map provides an interactive online mapping capability. It is built on the Bing Map platform, providing several view options: road, aerial, bird's eye, and in 2D or 3D. Bing Map also lets you search, discover, and explore specific locations by entering an address. You can also send cell configurations (displayed as a pie with color and different radius), events (displayed with various icons), or metric data (displayed as a colored circle) to be displayed on top of Bing Map as shown below.



To change the display color of metric data, you can edit the plot band definition of that metric. To change the cell site radius, you can change the icon size for each technology in Cell Configuration View Options.

4.2.9.1 Bing Map Toolbar

 **Find**	**Find**. Enter a postal address, and then click the **Find** icon to find the address on the map.
 **Move To**	**Move To**. Enter latitude and longitude coordinates, and then click the **Move To** icon to find the location on the map.
	**Home**. Reload Google Earth to its initial stage.
	**Download GIS Data**. See Download Online GIS Data Source for more information.
	**Save As Image**. Save the current display as an image file.
	**Save As GeoTIFF**. Save the current display as a GeoTiff file with geo-projection information.
	**Save As GIS Package**. Save the current display as a TEMS Discovery GIS package file that will be listed in the Data Explorer–GIS List.
	**Print**. Print the current display. See Create Output.
	**Preview**. Look at the current display in Print preview mode.
	**Page Setup**.
	**Cell Site Radius**. Define the cell site radius (in meters) for display.
	**Remove Cell Sites Display**. Remove the cell configuration display.
	**Remove Metric/Event Display**. Remove the metric/event display.
	**Cleanup All Displays**. Remove all displays.
	**Help**.

4.2.9.2 Download GIS Data – Bing Map

Several options are provided for the user to download online GIS data from a Bing Map display, as listed below.

Map Controls should be turned off before saving the images to GeoTiff file or TEMS Discovery GIS packages.

 ***Download GIS Data***. This option will open the Select Online Data Source for Download dialog and allow you to download free GIS data from several online data sources (not Bing Map). The boundary of the displayed region will be automatically populated.

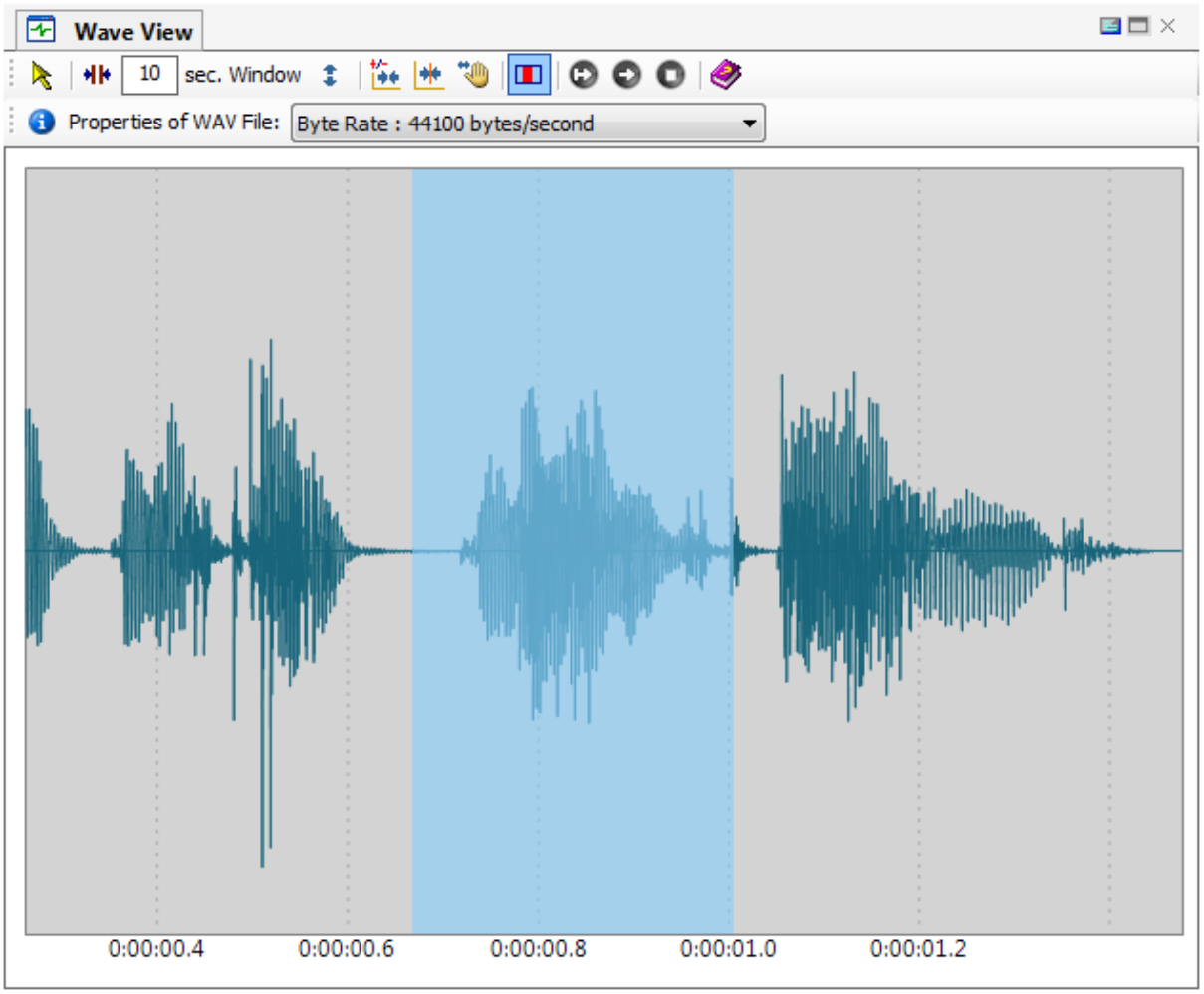
 ***Save as GeoTiff***. This option allows you to save the displayed images (maps, satellite, terrain) as a geo-referenced GeoTiff file, which can be opened with another third party tool, or imported into TEMS Discovery and displayed on the Map View.

 ***Save as GIS Package***. This option allows you to save the displayed images as a TEMS Discovery GIS Package file, which will be listed in the Data Explorer and which can be displayed immediately on the Map View.

4.2.10 Wave View

Wave View provides functions to visualize and analyze voice quality. You can import 8-bit or 16-bit wave files through the Import Drive Test Data feature and associate the wave file with any imported device with a certain time offset. Those wave files will be listed under the associated device with the frame name *WaveFiles* in the Data Explorer.

To use this function, right-click on a wave file and select **Send to Wave View** from the context menu, or directly drag-and-drop the wave file to Wave View. This view can also be synchronized with other synchronizable views.



Wave View Toolbar

Set Time Window. Clicking to adjust the current time window to the defined window.

Zoom In Y Direction. Click and hold to draw a rectangle that will zoom in the Y-axis to that area.

Zoom In/Out X Direction:
1. Left-click and hold to draw a rectangle that will zoom in the X-axis to that area.
2. Right-click and hold to draw a rectangle that will zoom out the X-axis to that area.

Reset X. Reset the X-axis to display all data.

Pan in X Direction. Pan the Wave View in the X-axis

 **Section Selector**.

 **Play Forward From Beginning**. Play from the start of the wave file.

 **Play Forward**. Play forward from the current timestamp or location.

 **Play Stop**. Stop play back.

 **Help**.

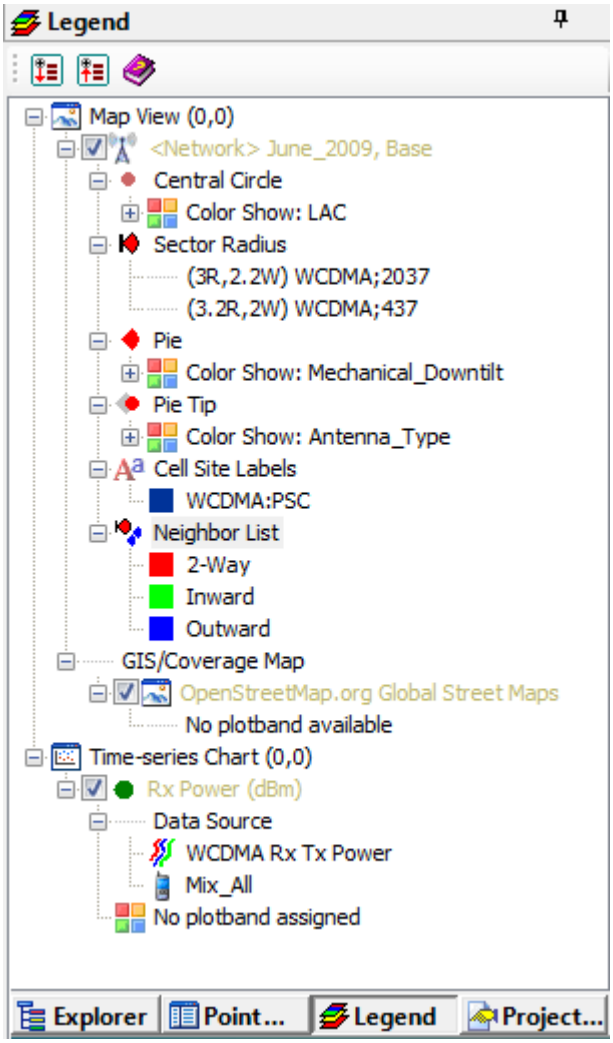
4.3 Legend View

The Legend View displays the plot band information of metrics that are drawn in the Map View and Time Chart. Here, you can show or hide a particular metric by selecting or de-selecting the corresponding metric title. For a metric displayed in the Map View, you can even show or hide the display of data points within a particular plot band by checking or unchecking that plot band.

By dragging a metric title and dropping it into the Map View or Time Chart, the plot band information of that metric will be displayed as a floating legend that can be moved around within the view.

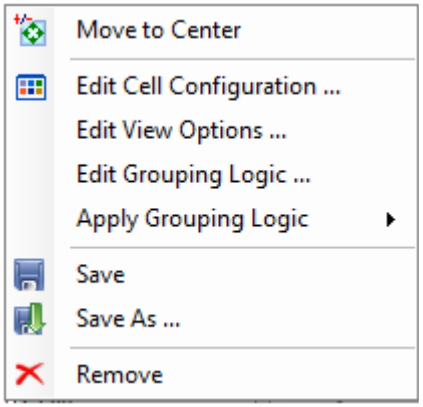
Clicking the **Expand** button will expand the entire tree view.

Clicking the **Collapse** button will collapse the tree view.



4.3.1.1.1 Legend View Pop-up Menus

Cell Configuration of Map View



Move to Center. Move the bounding rectangle of the displayed version of cell sites to the center of the Map View.

Edit Cell Configuration. Open the Cell Configuration Editor.

Edit View Options. Open the Cell Configuration View Options dialog.

Edit Grouping Logic. Open the Cell Site Grouping Logic dialog dialog.

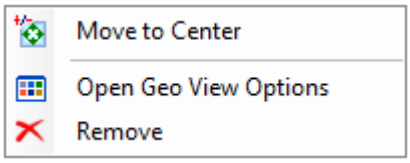
Apply Grouping Logic. Apply a certain grouping logic to refresh the logical display of the selected version of cell sites.

Save. Save the version of cell sites to a file.

Save As. Save the version of cell sites as a new cell site configuration.

Remove. Remove the corresponding cell configuration display from the Map View.

GIS of Map View

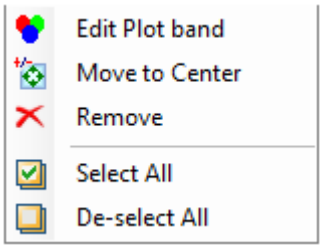


Move to Center. Move the bounding rectangle of the displayed GIS data to the center of the Map View.

Open Geo View Options. Open the Map View Options dialog.

Remove. Remove the corresponding GIS map display from the Map View.

Metric of Map View



Edit Plot Band. Edit the plot band of the metric.

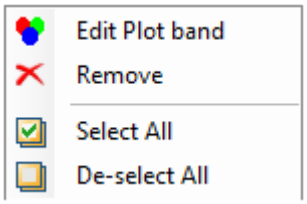
Move to Center. Move the bounding rectangle of the displayed metric to the center of Map View.

Remove. Remove the corresponding metric display from the Map View.

Select All. Select all plot bands so that all data will be displayed in the Map View.

De-select All. De-select all plot bands so that no data will be displayed in the Map View.

Metric of Time Chart



Edit Plot Band. Edit the plot band of the metric.

Remove. Remove the metric from the Time Chart.

Select All. Select all plot bands so that all data will be displayed in the Time Chart.

De-select All. De-select all plot bands so that no data will be displayed in the Time Chart.

4.4 Summary Data Views

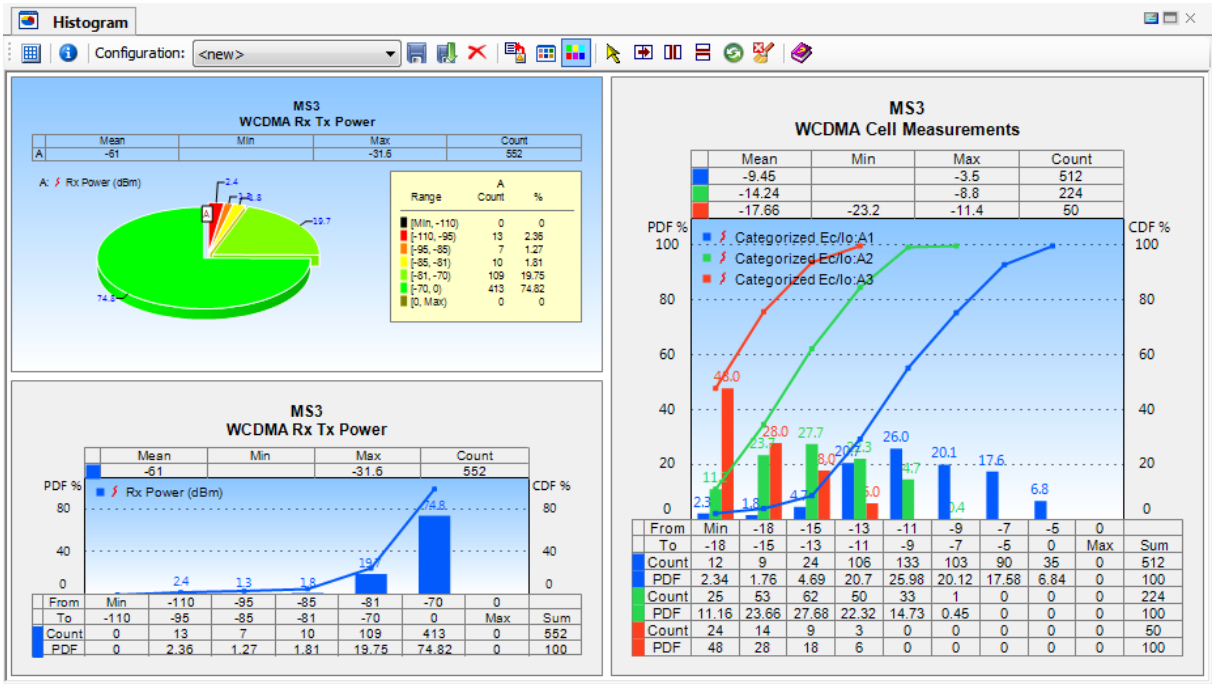
The project workspace contains multiple views. All of the views provide various data presentations for analyzing and troubleshooting visually and efficiently. The views are categorized as Synchronizable Views and Summary Data Views.

Summary views are the views that present statistic data in various formats. Summary views include:

- Histogram
- Batch PDF View
- Problem Summary View
- Sector Statistics View
- Multi-dimension Statistic View

4.4.1 Histogram

The Histogram View is for graphical display of metric data showing the proportion of data that falls into each specific plot band. To display data in the Histogram, drag-and-drop the metric data object from the Data Explorer into the Histogram View, or right-click the metric data object and choose **Send to Histogram** from the pop-up menu.



The graphical display of metric data can be shown as a bar graph, a 2D pie chart, or a 3D pie chart; all options can be freely converted from one to the other.

4.4.1.1 Histogram Toolbar

Table Size. Display a Table Size selector for creating multiple Histograms. The Histograms are always in sync.

Combo box List the available configurations. Each configuration defines the collection of metrics to be loaded and in which Histogram to load them.

Save Configuration. Save the current metric configuration.

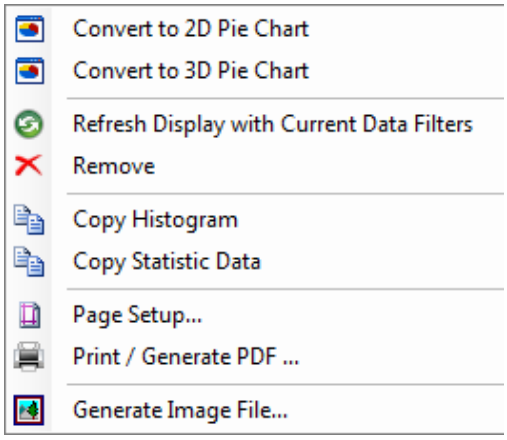
Save Configuration As. Save the current metric configuration as a new configuration.

Delete Selected Configuration.

Export Statistic Data to a Text File.

View Option. Open the **Histogram View Option** dialog. See Histogram View Options for more information.

Pointer. Change the cursor to a pointer. Right-clicking the screen will bring up the following pop-up menu:



Convert to 2D Pie Chart. Convert the current display to a 2D pie chart.

Convert to 3D Pie Chart. Convert the current display to a 3D pie chart.

Refresh Display with Current Data Filters. Apply the new data filtering and refresh the display.

Remove. Remove a particular chart from the display.

Copy Histogram. Copy the current display to the Clipboard to paste it outside of TEMS Discovery.

Copy Statistic Data. Copy the current display statistic data to the Clipboard to paste it outside of TEMS Discovery.

Page Setup. Page setup for printout or PDF generation.

Print / Generate PDF. See Create Output.

Generate Image File. See Generate Image File for more information.

Cell Merger Tool. Left-click, hold, and move the mouse to draw a rectangle to select the cells to be merged. Release the cursor to merge the cells into a single cell spanning multiple columns and rows.

Split Merged Cell in Horizontal Direction. Click the cell created with the Cell Merger tool to split it horizontally.

Split Merged Cell in Vertical Direction. Click the cell created with the Cell Merger tool to split it vertically.

Refresh Display to Apply Current Data Filters. Apply the new data filtering defined in the Data Explorer and refresh the display.

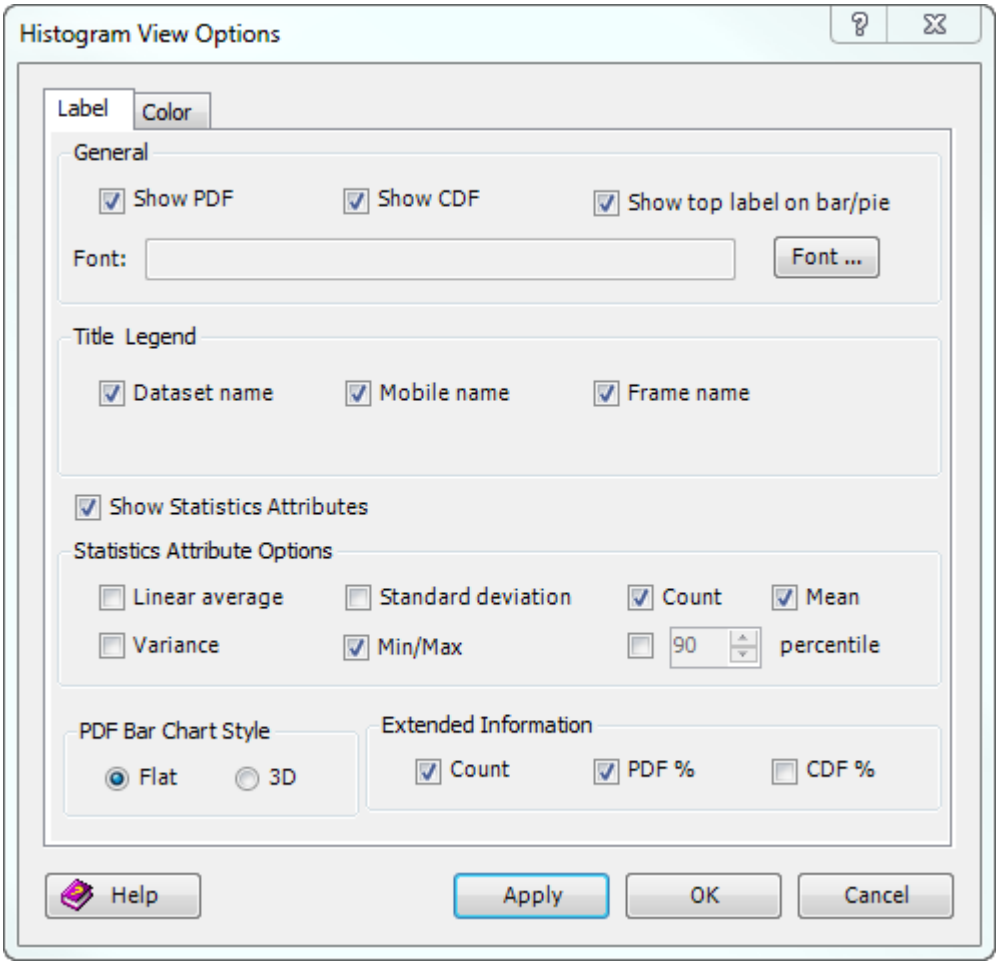
Cleanup. Clean up the display.

Help.

4.4.1.2 Histogram View Options

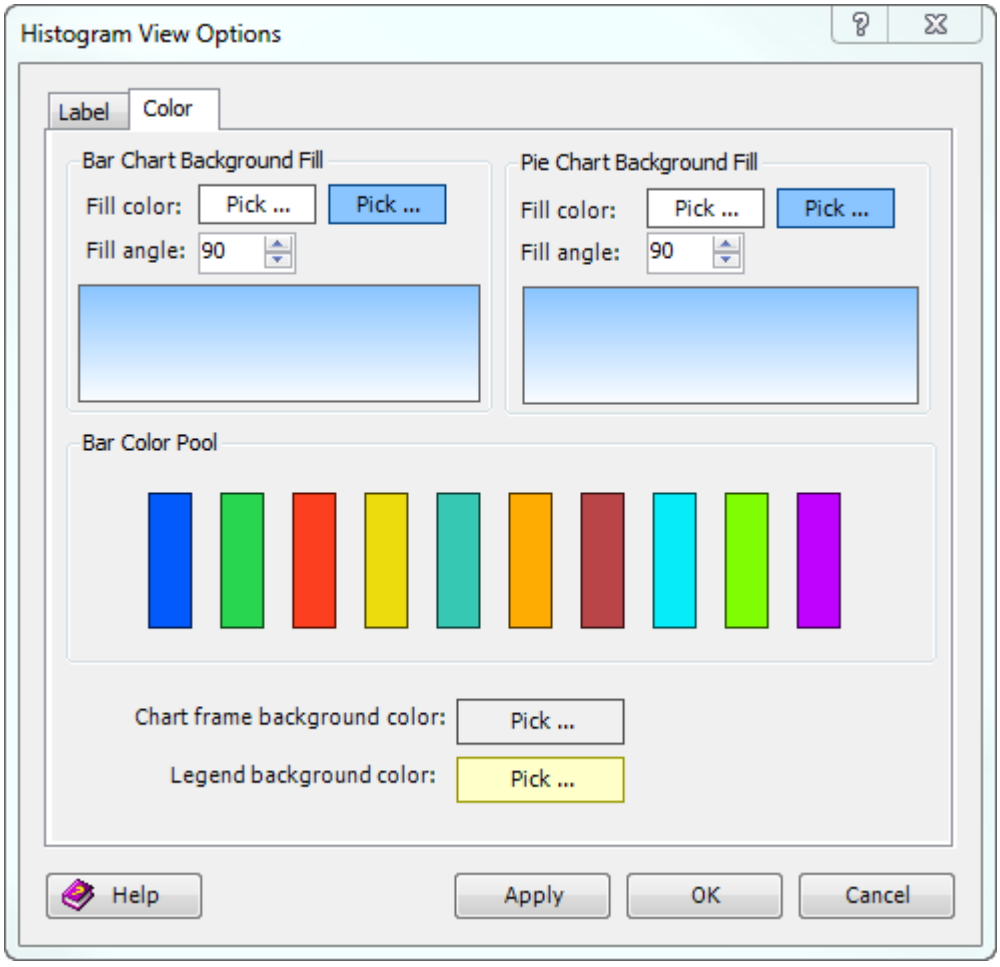
The Histogram view options dialog can be accessed by clicking the **View Options** button on the Histogram toolbar.

Label tab



- **General**. Select whether to display PDF, CDF, and/or top label on bar/pie. (The font for the label can be modified.)
- **Title Legend**. Select what to display in the title – dataset name, mobile name, and/or frame name.
- **Statistic Attribute Options**. Select the statistic attributes to be listed.
- **PDF Bar Chart Style**. Select a flat or 3D image.
- **Bar Chart Extended Label**. Select additional information to display – Count, PDF%, and/or CDF% (other than the plot band displayed at the bottom of the bar chart).

Color tab



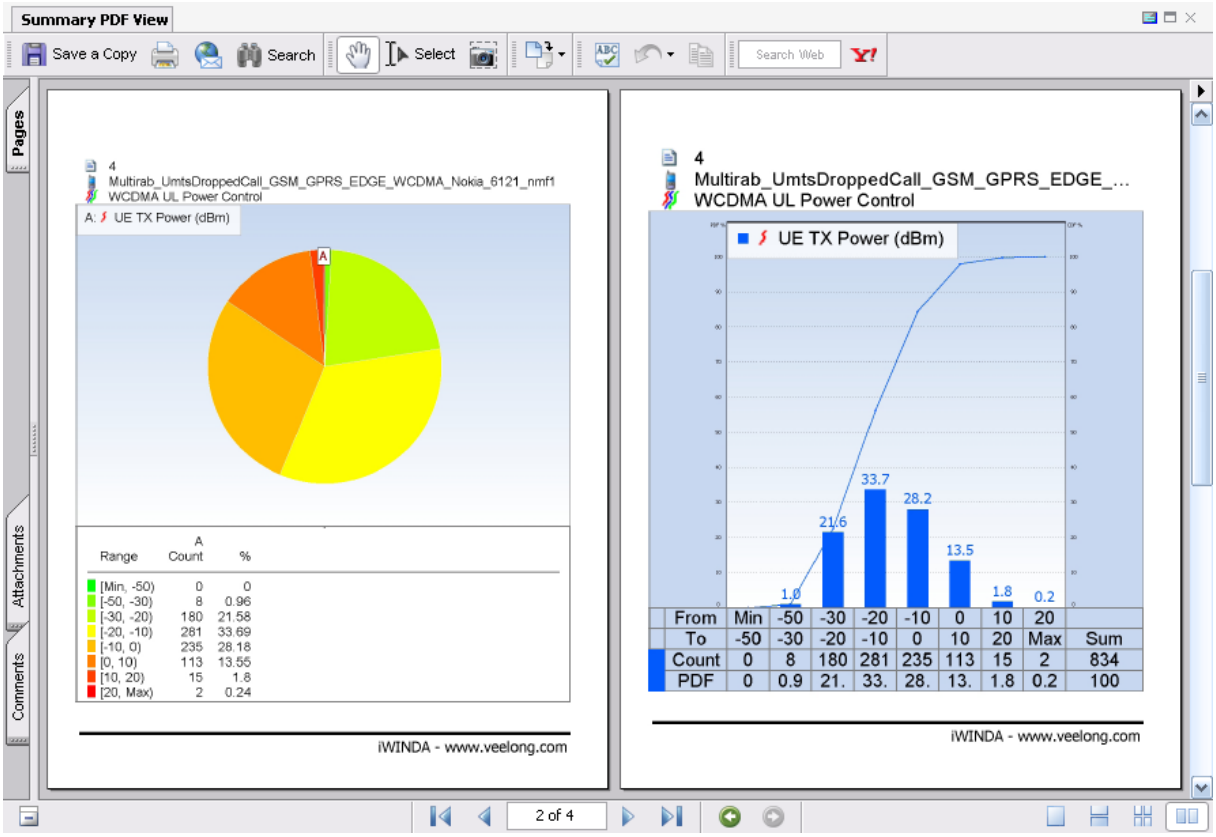
- **Bar Chart Background Fill**. The background of bar chart can be in filled as a gradient to visually enhance presentation. You can define the start and end colors, and the fill angle. Click the color bar to select a color.
- **Pie Chart Background Fill**. The background of the bar chart can be in-filled as a gradient to visually enhance presentation. You can define the start and end colors, and the fill angle. Click the color bar to select a color.
- **Bar Color Pool**. The color(s) of the bar chart can be picked from this color pool. Click the color bar to select a color.
- **Chart frame background color**. Select the background color for the chart frame.
  Click the color bar to select a color.
- **Legend background color**. Select the background color for the legend.
  Click the color bar to select a color.

4.4.2 Batch PDF View

TEMS Discovery can generate data summary in a PDF file for any particular device based on the Batch Configuration.

To display the PDF in this view, right-click a device in the Project List or Data Explorer and select **Send to Batch PDF View** from the context menu.

The Batch Configuration List will be displayed, in which you can choose the configuration you want to prepare. Page Setup options are available, where you can select page margins and select an image to be included as a logo. When satisfied with your settings, click Print, and the PDF file will be created.



4.4.3 Problem Summary View

The Problem Summary View lists the problem summary of devices based on pre-defined problem sets (see Report Template Builder for how to define problem sets). If a device has problems, its background color will be orange. Otherwise, the background color of the rows will be displayed in the normal alternating, shaded format.

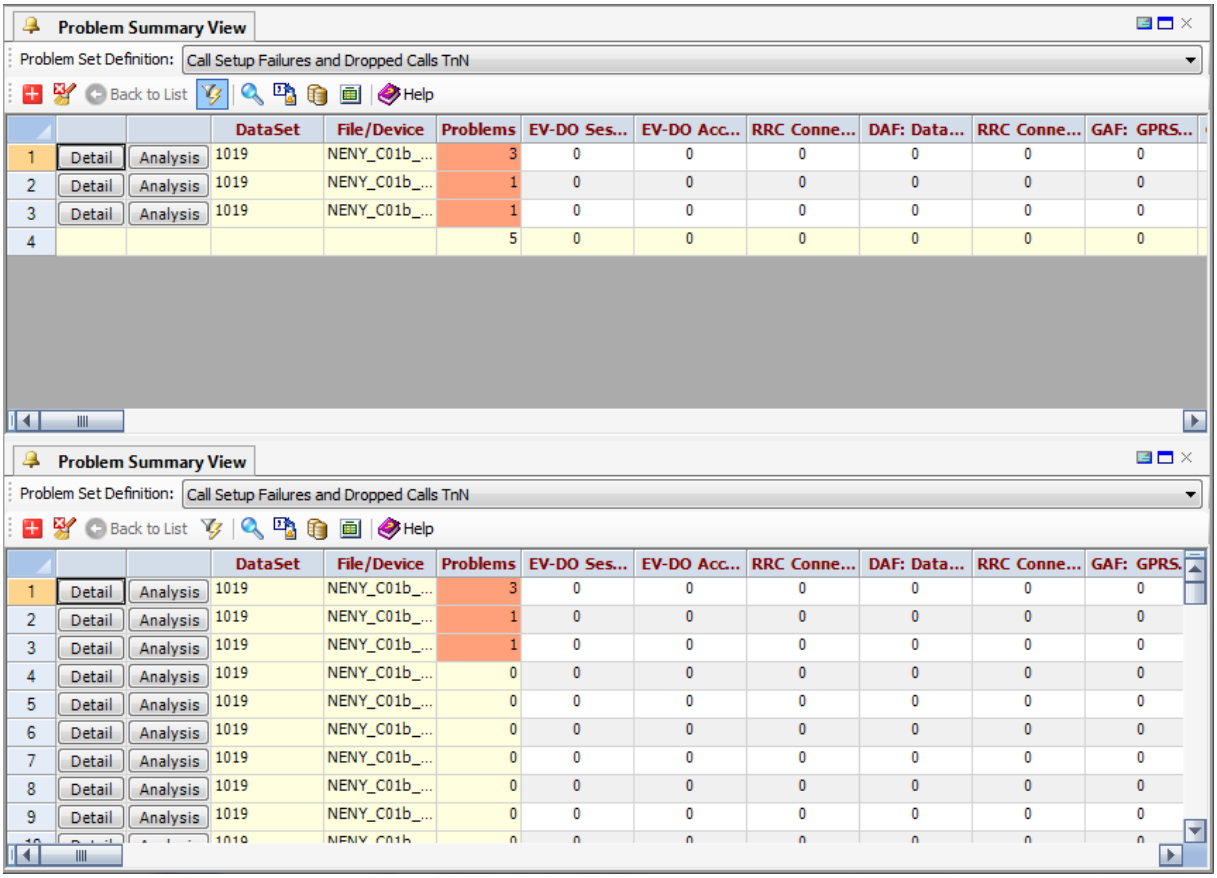
You can send a set of devices from the Project List or Data Explorer either by dragging-and-dropping them into Problem Summary View or by selecting them from the context menu. All of the devices will be listed with the number of the problems and their detail problem information in a tabular format.

Click the **Problem Only** filter button on the toolbar to list the devices with problems, or select a different problem set definition from the combo box to refine the list. You

can also click the **Detail** button to view the details of a problem of a particular device, or the **Analysis** button to analyze the device.

If any problem count displayed in a cell is actually the count of an event that is defined in a script, and this event has an analysis set associated with it (see Script Builder for detail), you can simply double-click that cell and TEMS Discovery will automatically open the analysis view based on the associated analysis set.

All problem information can be saved to an Excel file. You can also create a composite dataset from what is displayed in the spreadsheet, or simply generate a report from the data.



Problem Summary View Toolbar

Create New Problem Summary View

Cleanup. Clean up the spreadsheet.

Back to List. Go back to the list of devices.

Problem Only. List only the devices with problems.

Analyze. Analyze the selected problem (selected cell) if the problem has an associated Analysis Set defined in the Script Builder.

Save to File. Save the problem summary to a text file.

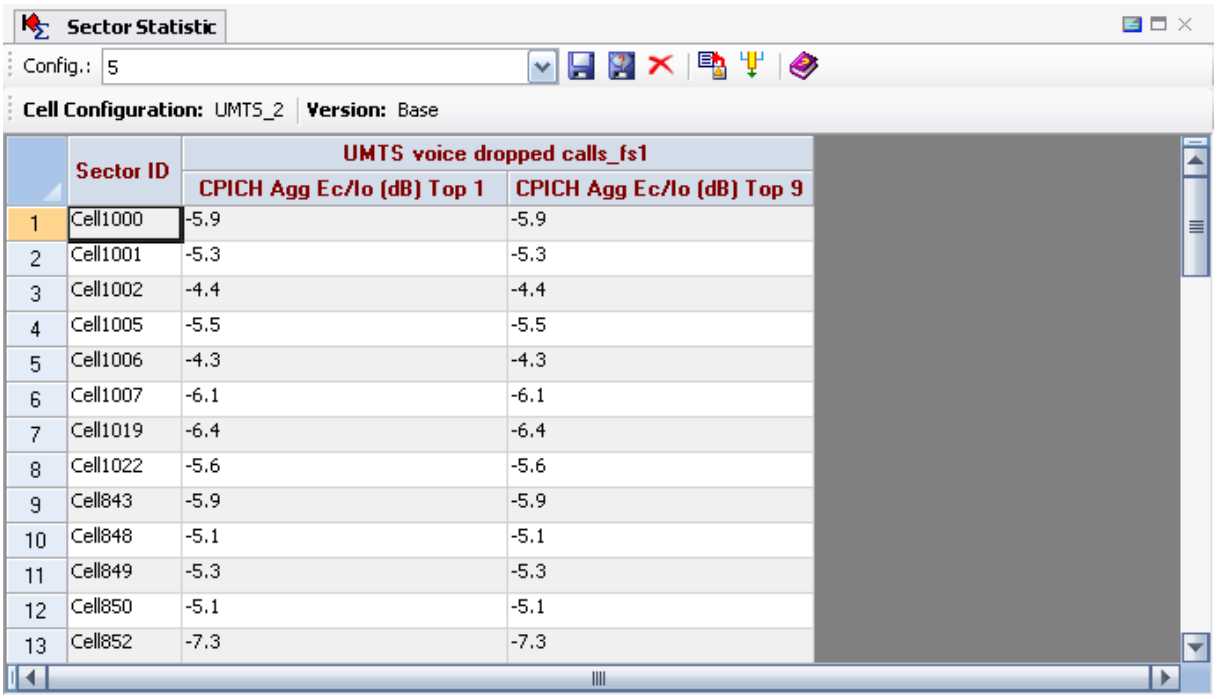
Create Composite Dataset. Create a composite dataset from the devices listed in the spreadsheet.

Generate Report. Generate a report from the devices listed in the spreadsheet.

 **Help**.

4.4.4 Sector Statistics View

The **Sector Statistics View** displays a metric per sector binning; its functions are similar to those of the Table View. To display data in the Sector Statistics View, drag-and-drop the metric data object from the Data Explorer into the Sector Statistics View, or right-click the metric data object and choose **Send to Sector Statistics View** from the pop-up menu.



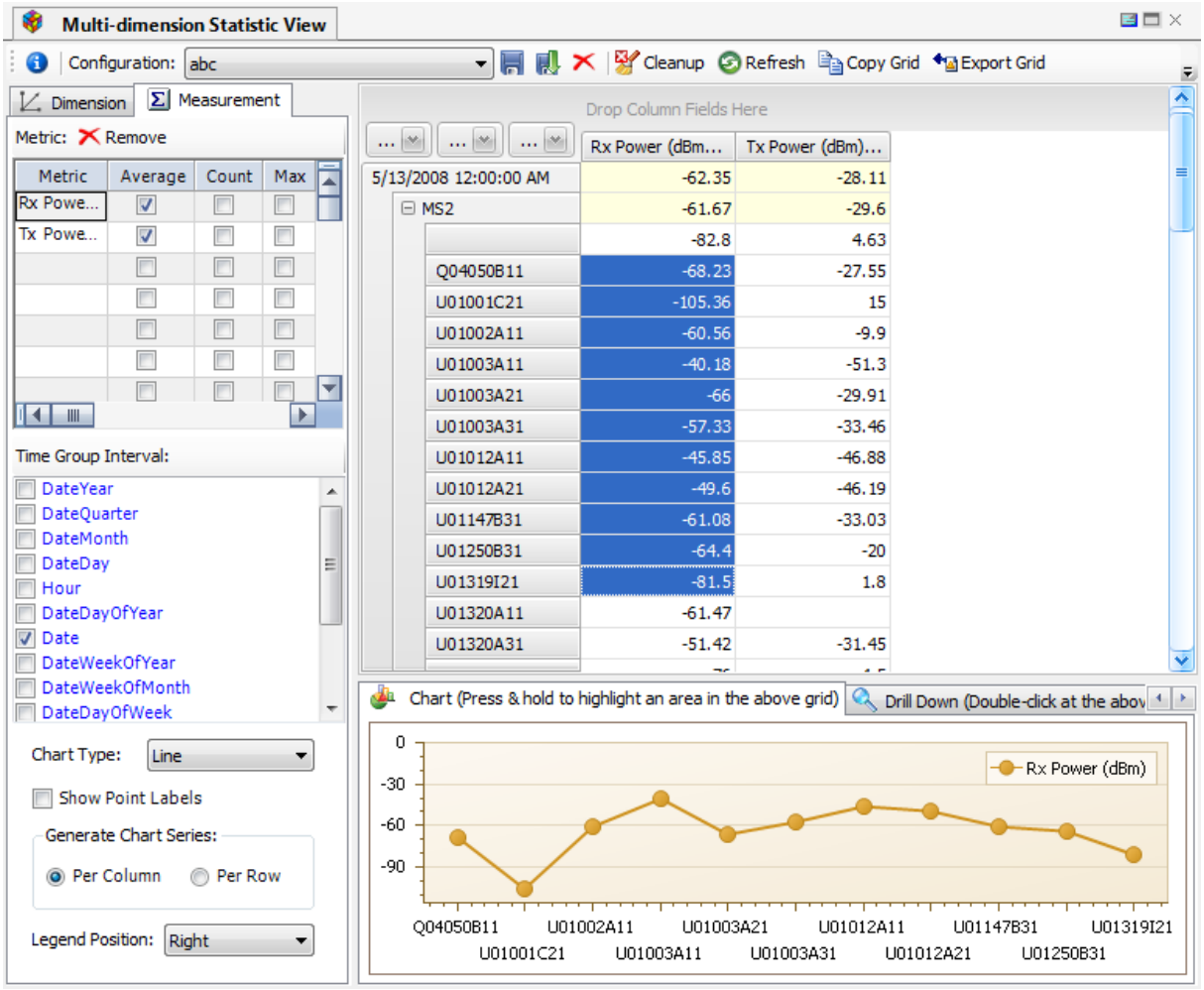
	Sector ID	UMTS voice dropped calls_fs1	
		CPICH Agg Ec/Io (dB) Top 1	CPICH Agg Ec/Io (dB) Top 9
1	Cell1000	-5.9	-5.9
2	Cell1001	-5.3	-5.3
3	Cell1002	-4.4	-4.4
4	Cell1005	-5.5	-5.5
5	Cell1006	-4.3	-4.3
6	Cell1007	-6.1	-6.1
7	Cell1019	-6.4	-6.4
8	Cell1022	-5.6	-5.6
9	Cell843	-5.9	-5.9
10	Cell848	-5.1	-5.1
11	Cell849	-5.3	-5.3
12	Cell850	-5.1	-5.1
13	Cell852	-7.3	-7.3

Sector Statistics View Toolbar

Combo box	Lists the available configurations. Each configuration defines the collection of metrics to be loaded.
	Save Configuration. Save the currently displayed metric and its location as a configuration.
	Save Configuration As. Save the current metric configuration as a new configuration.
	Delete Configuration. Delete the current configuration.
	Cleanup.
	Export to Text File. Export the displayed statistic data to a tab-delimited text file.
	Remove Columns. Delete the selected column and its corresponding statistic data from spreadsheet.
	Help.

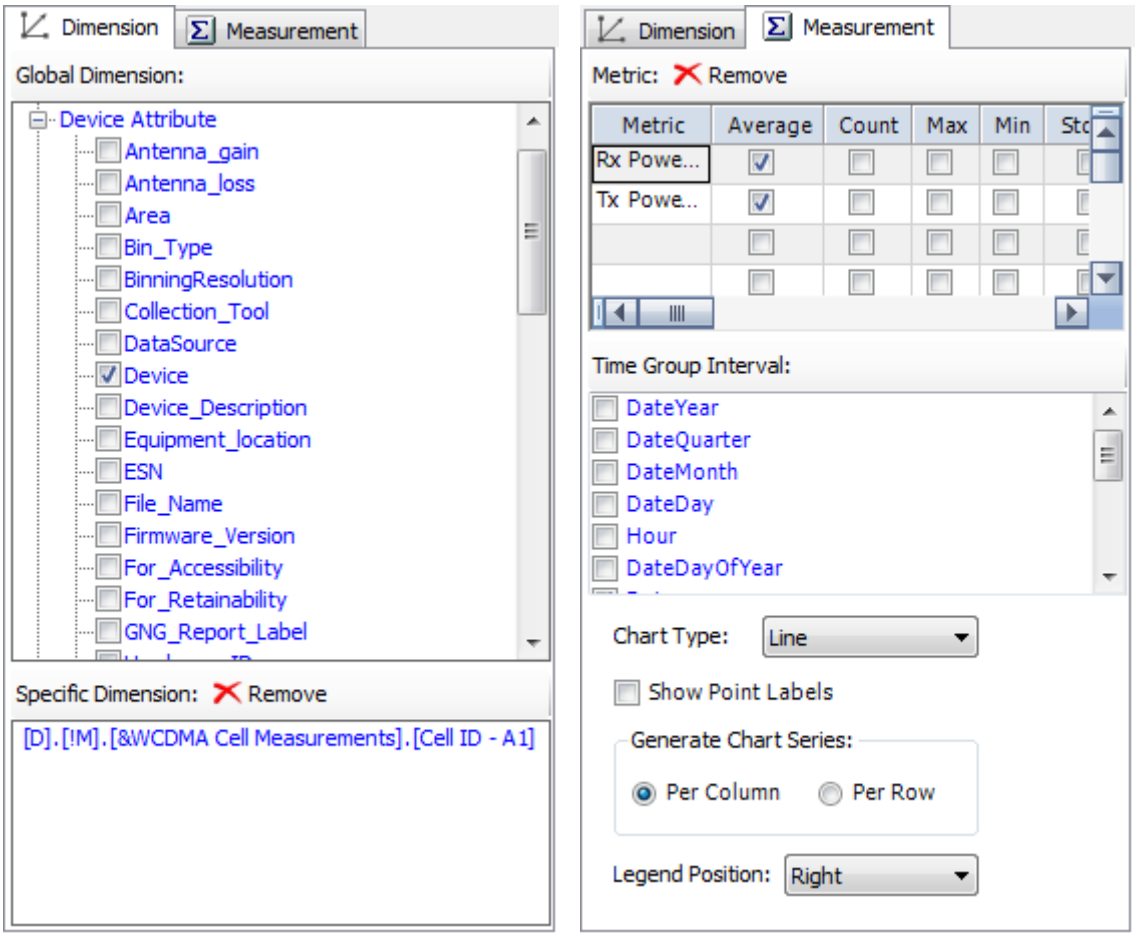
4.4.5 Multi-dimension Statistic View

The **Multi-dimension Statistic View** displays on-demand statistic data of multiple metrics in multiple user-selected dimensions.



To create an on-demand Multi-dimension Statistic View, you may:

1. Select any number of pre-defined global dimensions (device attributes, cell configuration, or UDR attributes) in the *Dimension* tab.
2. To define a specific dimension using other metric data, you may drag-and-drop one or many metrics from the Data Explorer into the specific dimension box. You can remove a specific dimension by pressing the **Delete** button on the toolbar.
3. Drag-and-drop one or many metrics from the Data Explorer into the grid or chart control in the right pane to display the view. You can remove a measurement by pressing the **Delete** button on the spreadsheet toolbar.
4. Select Aggregation Methods for each measurement; select Time Group Interval and other options in the *Measurement* tab.



If you modify any display options, be sure to press the **Refresh** button on the toolbar to refresh the display.

To visualize statistics data in a chart, you can select a desired data area on the grid by clicking and holding the left mouse button.

To drill down to the detail of what contributes to the statistics data, click a cell in the grid, and a list of files will be listed in the spreadsheet. You can save the list to a file, create a composite dataset from the list, or generate a report from the list. All of the data can be exported to an external file.

The display options can also be saved as a configuration and re-used.

As an alternative, you can right-click the metric data object in the Data Explorer and choose **Send to Multi-dimension Statistic View** from the pop-up menu. See Data Explorer for more information.

Multi-dimension Statistic View Toolbar

Combo box	Lists the available configurations.
	Save Configuration. Save the currently displayed metric and its location as a configuration.
	Save Configuration As. Save the current metric configuration as a new configuration.
	Delete Configuration. Delete the current configuration.
	Cleanup Grid.

 **Refresh**. Refresh the data.

 **Copy Grid**.

 **Export Grid**. Export the grid data or chart to an external file.

 **Help**.

5 Tools

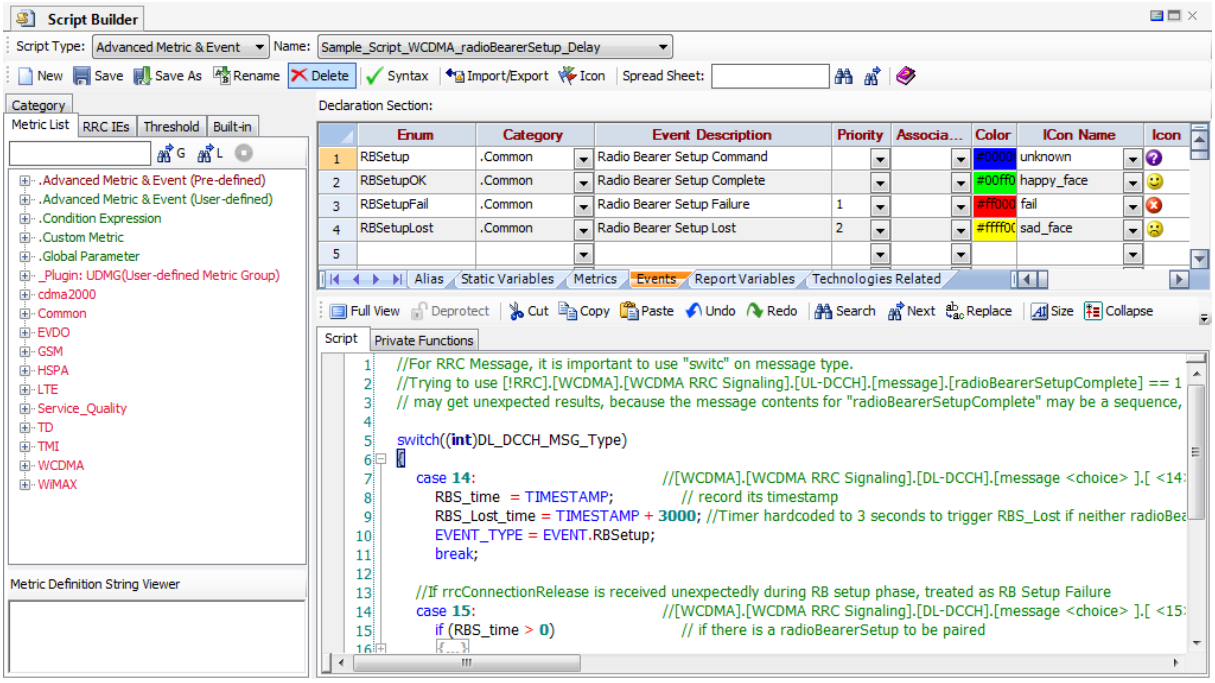
TEMS Discovery provides the tools described in the following sections.

5.1 Script Builder

The **Script Builder** provides an advanced function to extract data from messages and apply customized algorithms to generate new metrics and events. Scripts can be written in C# language.

The Script Builder can be accessed in the following ways:

- Selecting **Script Builder** from the **Tools** menu on the Main Window.
- Clicking the **Script Builder** button on the Main Window toolbar.

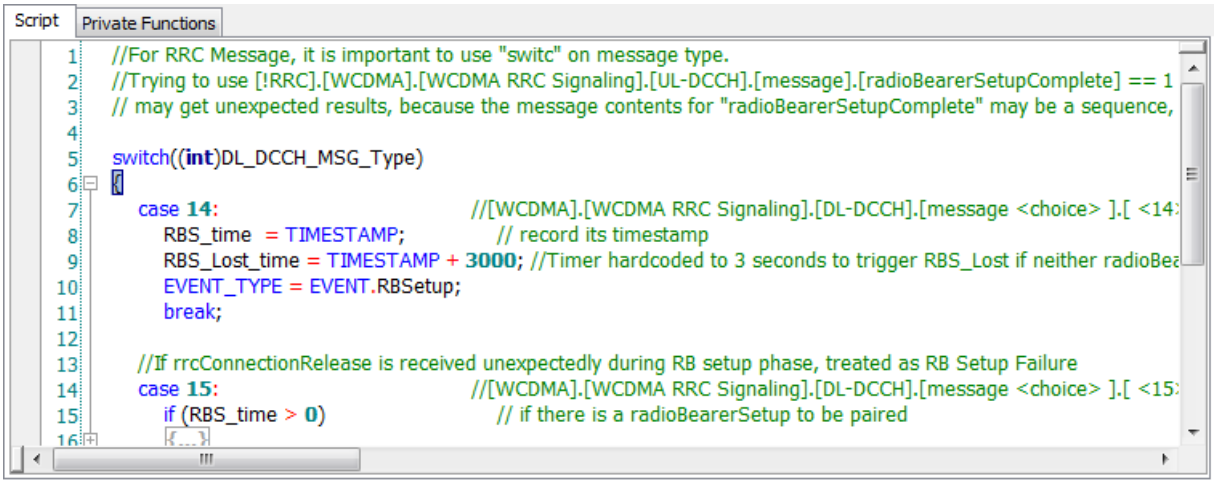


The **Script Builder** allows creation of the following script types:

- **Condition Expression**
- **Custom Metric**
- **Global Parameter**
- **Advanced Metric & Event**. This is the most flexible type, and also the most complicated. It allows you to generate multiple metrics, events, and report desired parameters or including troubleshooting information in the script.

5.1.1 Script Editor & Private Functions Editor

TEMS Discovery provides the **Script Editor** and the **Private Functions Editor**. The **Script Editor** is used to implement algorithms; the **Private Functions Editor** is used to create procedures that can be used only by the script.



Script/Private Functions Editor Toolbar

Cut.

Copy.

Paste.

Undo.

Redo.

Search.

Next. Search next.

Replace. Search and replace.

Size. Left-click or right-click mouse to enlarge or reduce font size.

Collapse. Collapse definitions.

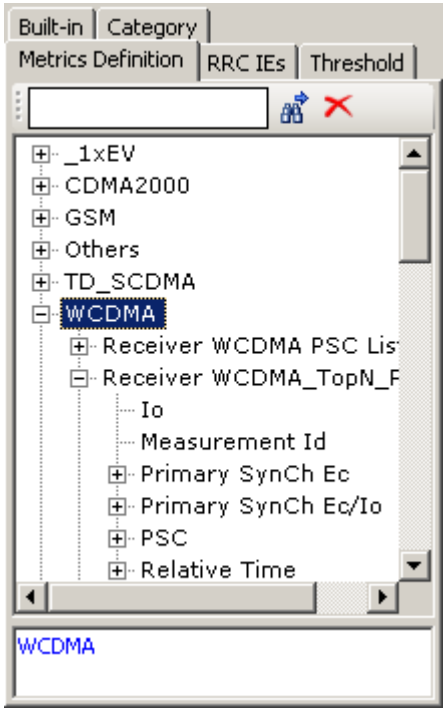
Expand. Expand all definitions.

Split V. Split the editor to 50-50 in the vertical direction, or remove the vertical splitter.

Split H. Split the editor to 50-50 in the horizontal direction, or remove the horizontal splitter.

5.1.2 Data Object: Metric List

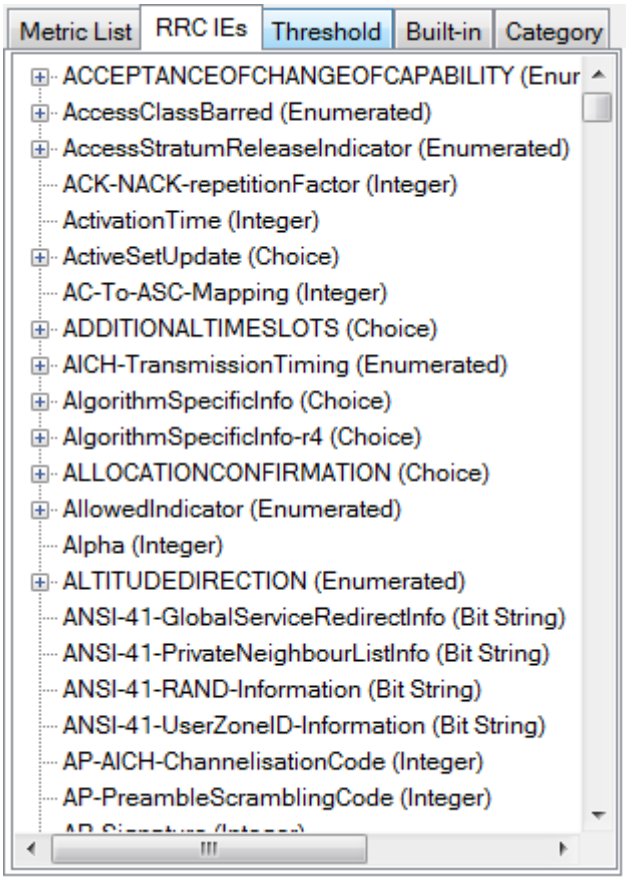
The **Metric Definition** tab lists all available information elements (IEs), including Layer 3 signaling IEs, that can be used as sources of data. These IEs can be dragged-and-dropped into the spreadsheet on the right to define an Alias, which will be used as a variable in the script.



5.1.3 Data Object: RRC IEs

The **RRC IEs** tab lists all available "terminal" WCDMA RRC information elements (IEs). These IEs can be dragged-and-dropped into the spreadsheet on the right to define an Alias, which will be used as a variable in the script.

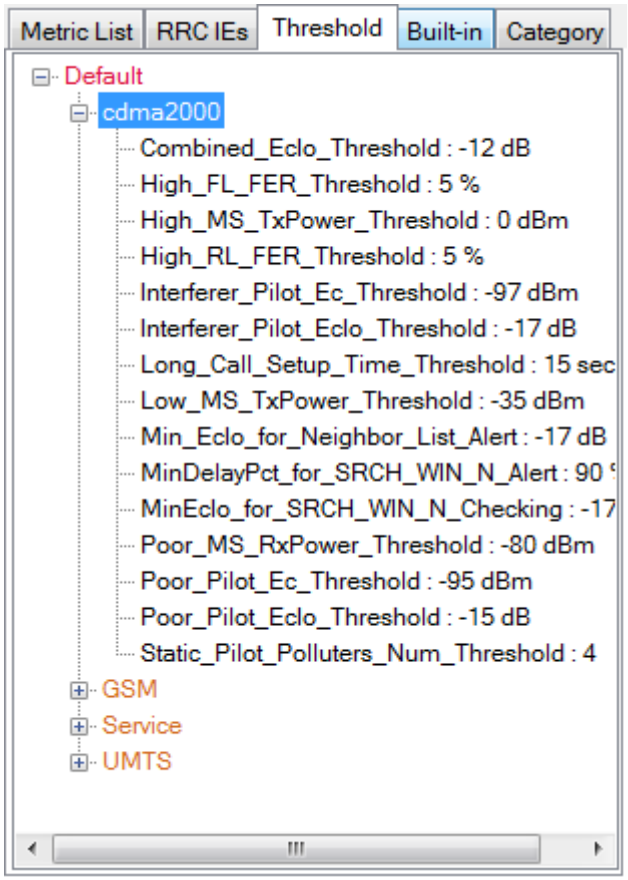
When a script is executed, TEMS Discovery will automatically search for the values from all RRC signaling messages containing the IEs defined.



5.1.4 Data Object: Threshold

The **Threshold** tab lists all of the available default and user-defined thresholds. These thresholds can be dragged-and-dropped into the spreadsheet on the right to define an Alias, which will be used as a variable in the script.

See User Defined Parameters for more information.



5.1.5 Built-in Flags

5.1.5.1 CONDITION_FLAG

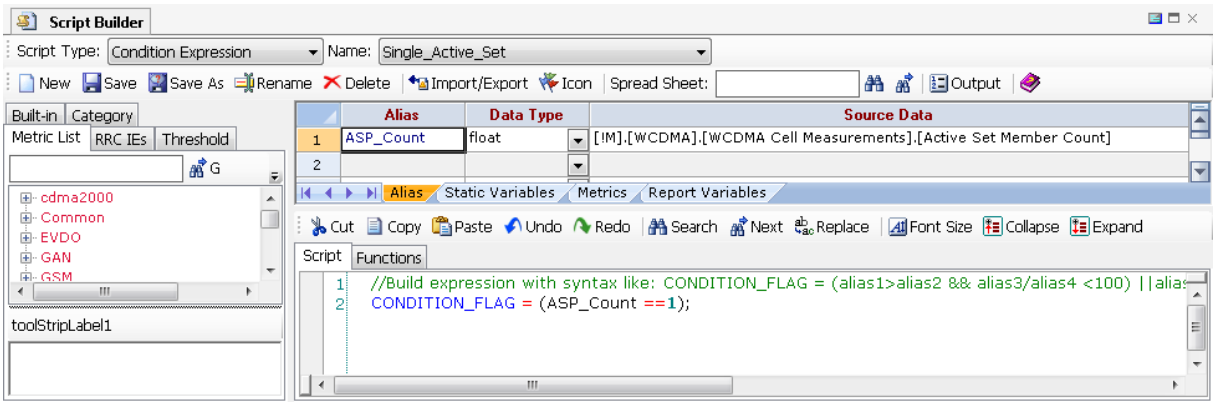
A pre-defined variable that is used to hold the result of a condition expression. This flag is valid only for the Condition Expression script type.

Example:

```
CONDITION_FLAG = EcIo>-10 && EcIo<-5;
```

Where:

EcIo is a user-defined alias in the spreadsheet



5.1.5.2 TARGET_VALUE:

A pre-defined variable that is used to hold the result of a global parameter. This flag is valid only for the Global Parameter script type.

Example:

```
TARGET_VALUE = EcIo+5;
```

Where:

EcIo is a user-defined alias in the spreadsheet

5.1.5.3 EVENT:

A qualifier that is used to describe an event type defined in the spreadsheet.

Example:

```
EVENT_TYPE = EVENT.Call_Drop;
```

Where:

Call_Drop is a user-defined event in the spreadsheet.

5.1.5.4 EVENT_TIMESTAMP:

A pre-defined Hash table that is used to store events and their corresponding timestamp (in milliseconds) of the current computing iteration.

Example:

```
EVENT_TIMESTAMP[EVENT.Call_Drop] = TIMESTAMP-3000;  //backward 3 second
```

Where:

Call_Drop is a user-defined event in the spreadsheet.

TIMESTAMP is a pre-defined variable in milliseconds.

Remarks:

By doing this, the timestamp of an event can be manually adjusted.

5.1.5.5 EVENT_TYPE:

A collection that is used to store one or many events in the current computing iteration.

Example:

```
EVENT_TYPE = EVENT.Call_Drop;
```

Where:

Call_Drop is a user-defined event in the spreadsheet

Remarks:

Each time you call 'EVENT_TYPE = EVENT.<specific event>;' the specified event type will be added to the collection.

Related Functions:

ClearAllEvents(), ClearEvent(), ReplaceEvent()

5.1.5.6 MESSAGE:

A pre-defined variable that represents an additional message of the current computing iteration.

Example:

```
MESSAGE += string.Format(""Current EcIo value: {0}"", EcIo);
```

Where:

EcIo is a user-defined alias in the spreadsheet.

5.1.5.7 MESSAGE_INDEX:

A pre-defined variable that represents the index of the currently computing iteration.

Example:

```
MESSAGE_INDEX = MESSAGE_INDEX-10;
```

Remarks:

You can modify this variable so that the next computing iteration can go to a particular index.

5.1.5.8 EOF:

A pre-defined variable (Boolean) that indicates whether the current iteration is the end of file.

Example:

```
if(EOF)
{
   //do something
}
```

5.1.5.9 TIMESTAMP:

A pre-defined variable that represents the time stamp (in millisecond) of current computing iteration.

Example:

```
TIMESTAMP= TIMESTAMP-3000;  //backward 3 second
```

Remarks:

By doing this, the timestamp of the result can be manually adjusted.

5.1.5.10 LOG_FILE_NAME:

A pre-defined variable that represents the log file name of the currently computing iteration.

Example:

```
MESSAGE += ""Drive test data log file: ""+ LOG_FILE_NAME;
```

5.1.5.11 IS_NEMO_DATA:

A pre-defined variable that indicates whether the current drive test data was collected by Nemo.

Example:

```
if(IS_NEMO_DATA)
{
//do something
}
```

5.1.5.12 IS_TEMS_DATA:

A pre-defined variable that indicates whether the current drive test data was collected by TEMS.

Example:

```
if(IS_TEMS_DATA)
{
//do something
}
```

5.1.5.13 IS_QVOICE_DATA:

A pre-defined variable that indicates whether the current drive test data was collected by QVoice.

Example:

```
if(IS_QVOICE_DATA)
{
//do something
}
```

5.1.5.14 IS_QVOICE_MASTER:

A pre-defined variable that indicates whether the current drive test data is QVoice master data.

Example:

```
if(IS_QVOICE_MASTER)
{
//do something
}
```

5.1.5.15 IS_QVOICE_SLAVE:

A pre-defined variable that indicates whether the current drive test data is QVoice slave data.

Example:

```
if(IS_QVOICE_SLAVE)
{
//do something
}
```

5.1.5.16 IS_JDSU_DATA:

A pre-defined variable that indicates whether the current drive test data was collected by JSDU.

Example:

```
if(IS_JDSU_DATA)
{
//do something
}
```

5.1.5.17 QVOICE_MASTER_END_TIMESTAMP:

A pre-defined variable that represents the end timestamp (in milliseconds) of QVoice master data.

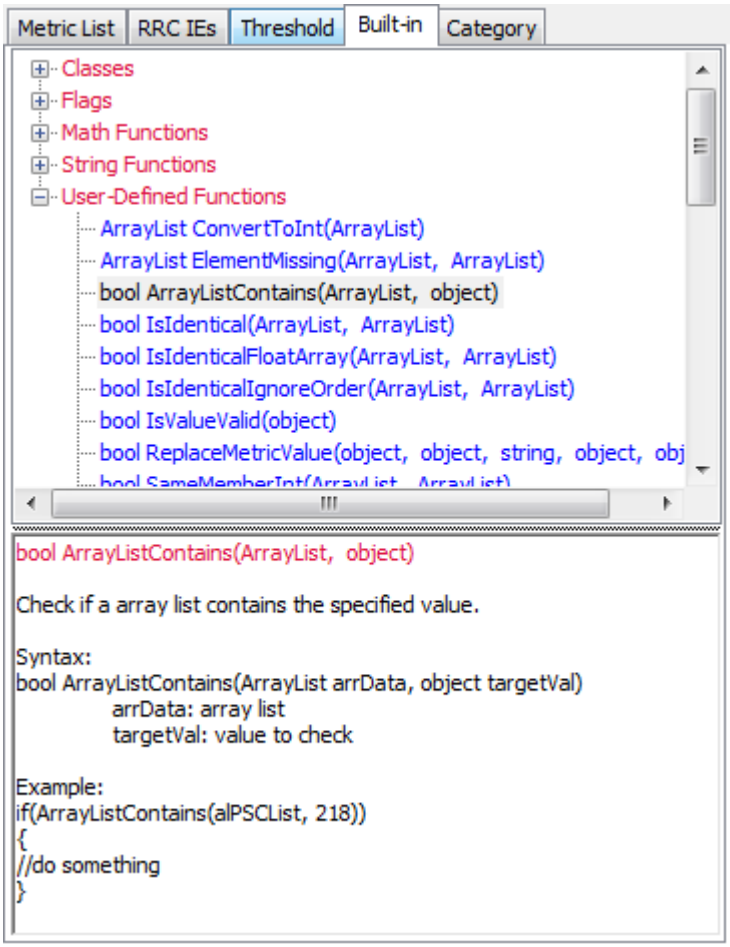
5.1.5.18 QVOICE_SLAVE_END_TIMESTAMP:

A pre-defined variable that represents the end timestamp (in milliseconds) of QVoice slave data.

5.1.5.19 TIMESTAMP_START_OF_FILE:

A pre-defined variable that represents the start timestamp (in milliseconds) of the log file.

5.1.6 Built-in User-defined Functions



5.1.6.1 ClearAllEvents:

Clear all events in the specified message index.

Syntax:

```
void ClearAllEvents(object oMessageIndex)
   oMessageIndex: message index
```

Example:

```
ClearAllEvents(MESSAGE_INDEX-2);
```

5.1.6.2 ClearEvent:

Remove a specific event in the specified message index.

Syntax:

```
void ClearEvent(object oMessageIndex, object oEventType)
   oMessageIndex: message index
   oEventType: event type to be removed
```

Example:

```
ClearEvent(MESSAGE_INDEX-2, EVENT.Drop_Call);
```

Where:

`Call_Drop` is a user-defined event in the spreadsheet.

5.1.6.3 ReplaceEvent:

Replace a specific event in the specified message index with another event.

Syntax:

```
void ReplaceEvent(object oMessageIndex, object oOrigEventType,
object oNewEventType)
   oMessageIndex: message index
   oOrigEventType: event type to be replaced
   oNewEventType: new event type
```

Example:

```
//replace EVENT.Drop_Call with EVENT.Call_Release
ReplaceEvent(MESSAGE_INDEX-2, EVENT.Drop_Call,
EVENT.Call_Release);
```

Where:

`Call_Drop and Call_Release are user-defined events in the spreadsheet.`

5.1.6.4 AddEvent:

Add a specific event in the specified message index.

Syntax:

```
void AddEvent(object oMessageIndex, object oEventType)
      oMessageIndex: message index
      oEventType: event type to add
```

Example:

```
//Add EVENT.Drop_Call
AddEvent(MESSAGE_INDEX-2, EVENT.Drop_Call);
```

Where:

```
Call_Drop is a user-defined event in the spreadsheet.
```

5.1.6.5 AssignMetricValue:

Assign a value to a specific metric in the specified message index.

Syntax:

```
void AssignMetricValue(object oMessageIndex, string
      szMetricName, object oValue)
   oMessageIndex: message index
   szMetricName: target metric name
   oValue: value to assign
```

Example:

```
AssignMetricValue(MESSAGE_INDEX-2, Metric_EcIo, -10);
```

Where:

Metric_EcIo is a user-defined metric in the spreadsheet.

5.1.6.6 ReplaceMetricValue:

Replace the value of a specific metric within a certain message range from one to another.

Syntax:

```
bool ReplaceMetricValue(object oStartIndex, object oEndIndex,
     string szMetricName, object oValueOrig, object oValueNew)
   oStartIndex: start index of the message range
   oEndIndex: start index of the message range
   szMetricName: target metric name
   oValueOrig: original metric value
   oValueNew: new metric value
return true if metric valus has been successfully replaced,
     otherwise, return false.
```

Example:

```
AssignMetricValue(MESSAGE_INDEX-2, Metric_EcIo, -10);
```

Where:

Metric_EcIo is a user-defined metric in the spreadsheet.

5.1.6.7 GetLatLon:

Get the geo position at the specfied timestamp.

Syntax:

```
void GetLatLon(object oTimestampInMs, out double dLat, out
double dLon)
   oTimestampInMs: timestamp
   dLat: latitude
   dLon: longitude
```

Example:

```
double dLat, dLon;
GetLatLon(TIMESTAMP, out dLat, out dLon);
```

5.1.6.8 IsValueValidStatic:

Check whether a value is valid.

Syntax:

```
bool IsValueValidStatic(object oVal)
   oVal: value to check
return true if the value is valid, otherwise, return false;
```

Example:

```
if( IsValueValidStatic(oValue))
{
//do somthing
}
```

5.1.6.9 IsValueValid:

Check whether a value is valid.

Syntax:

```
bool IsValueValid(object oVal)
   oVal: value to check
return true if the value is valid, otherwise, return false;
```

Example:

```
if( IsValueValid(oValue))
{
//do somthing
}
```

5.1.6.10 GetDeviceAttribute:

Get the value of a specified device attribute.

Syntax:

```
string GetDeviceAttribute(string szAttribute)
   szAttribute: name of device attribute
return value of the specified device attribute
```

Example:

```
string szIMEI = GetDeviceAttribute("IMEI");
```

5.1.6.11 SetDeviceAttribute:

Set the value of a specified device attribute.

Syntax:

```
void SetDeviceAttribute(string szAttribute, string szValue)
   szAttribute: name of device attribute
   szValue: value of the device attribute
```

Example:

```
SetDeviceAttribute("Operator", "TEMS");
```

5.1.6.12 GetWcdmaUarfcnIndex:

Get the index of a specified UARFCN.

Syntax:

```
int GetWcdmaUarfcnIndex(object oUARFCN)
   oUARFCN: UARFCN
return index of the specified UARFCN
```

Example:

```
int iIndex = GetWcdmaUarfcnIndex(4085);
```

Remarks:

Each WCDMA UARFCN will be assigned a unique integer automatically by TEMS Discovery during data import.

5.1.6.13 ElementNotContain:

Return elements in an array list that do not exist in another array list.

Syntax:

```
string ElementNotContain(ArrayList sourceList, ArrayList
targetList)
   sourceList: array list
   targetList: array list
return a comma delimited string that represents the elements of
array list sourceList which do not exist in array list
targetList.
```

Example:

```
string szMissing = ElementNotContain(sourceList, targetList);
```

5.1.6.14 ElementMissing:

Return elements in an array list that do not exist in another array list.

Syntax:

```
ArrayList ElementMissing(ArrayList sourceList, ArrayList
targetList)
   sourceList: array list
   targetList: array list
return array list that represents the elements of array list
sourceList which do not exist in array list targetList.
```

Example:

```
ArrayList alMissing = ElementMissing(sourceList, targetList);
```

5.1.6.15 FindPairValue:

Find index of a given value in a specified array list; then return the value of the element in the same index of another array list.

Syntax:

```
float FindPairValue(float key, ArrayList sourceList, ArrayList
targetList)
   float: the value of element in sourceList
   sourceList: array list
   targetList: array list
return the paired value of the element in another array list.
```

Example:

```
float fEcIo = FindPairValue(218, alPSCList, alEcIoList)
```

5.1.6.16 MaxOfArrayList:

Find the maximum value of the specified array list.

Syntax:

```
float MaxOfArrayList(ArrayList al)
   al: array list
return the maximum value of the specified array list
```

5.1.6.17 CountOfArrayList:

Find the count of the specified array list.

Syntax:

```
int CountOfArrayList(ArrayList al)
   al: array list
return the count of the specified array list
```

5.1.6.18 IsIdentical:

Check whether two array lists are exactly identical, including their sequences of elements.

Syntax:

```
bool IsIdentical(ArrayList al1, ArrayList al2)
   al1: array list
   al2: array list
return true if two array lists are identical, otherwise, return
false
```

5.1.6.19 IsIdenticalIgnoreOrder:

Check whether two array lists are identical, ignoring the sequence of elements.

Syntax:

```
bool IsIdenticalIgnoreOrder(ArrayList al1, ArrayList al2)
   al1: array list
   al2: array list
return true if two array lists are identical, otherwise, return
false
```

5.1.6.20 IsIdenticalFloatArray:

Check whether two float array lists are exactly indentical, including their sequence.

Syntax:

```
bool IsIdenticalFloatArray(ArrayList al1, ArrayList al2)
   al1: float array list
   al2: float array list
return true if two array lists are identical, otherwise, return
false
```

5.1.6.21 GetDisplayString:

Get a string representation of the specified array list. Elements of the specified array list will be concatenated and delimited with commas.

Syntax:

```
string GetDisplayString(ArrayList alValue)
   alValue: array list
```

5.1.6.22 ArrayListContains:

Check whether an array list contains the specified value.

Syntax:

```
bool ArrayListContains(ArrayList arrData, object targetVal)
   arrData: array list
   targetVal: value to check
```

Example:

```
if(ArrayListContains(alPSCList, 218))
{
//do something
}
```

5.1.6.23 ArrayListIndexOf:

Get the index of the specified value in an array list.

Syntax:

```
int ArrayListIndexOf(ArrayList arrData, object targetVal)
   arrData: array list
   targetVal: target value
```

Example:

```
int index = ArrayListIndexOf(alPSCList, 218);
```

5.1.6.24 SameMemberInt:

Check whether two integer array lists are indentical, ignoring their sequences.

Syntax:

```
bool SameMemberInt(ArrayList al1, ArrayList al2)
   al1: integer array list
   al2: integer array list
return true if two array lists are identical, otherwise, return
false
```

5.1.6.25 ConvertToInt:

Convert a float array list to an integer array list.

Syntax:

```
ArrayList ConvertToInt(ArrayList alFloat)
   alFloat: float array list
return integer array list.
```

5.1.6.26 ConvertToDateString:

Convert a timestamp (in milliseconds) to date string such as MM/dd/YYYY.

Syntax:

```
string ConvertToDateString(object oTimestampIsMs)
   oTimestampIsMs: time stamp in millisecond
return date string.
```

Example:

```
string szDate = ConvertToDateString(TIMESTAMP);
```

5.1.6.27 ConvertToTimeString:

Convert a timestamp (in milliseconds) to a time string such as HH:mm:ss.fff.

Syntax:

```
string ConvertToTimeString(object oTimestampIsMs)
   oTimestampIsMs: time stamp is millisecond
return time string.
```

Example:

```
string szTime = ConvertToTimeString(TIMESTAMP);
```

5.1.6.28 ConvertToDateTimeString:

Convert a timestamp (in milliseconds) to a date time string such as MM/dd/YYYY HH:mm:ss.fff.

Syntax:

```
string ConvertToDateTimeString(object oTimestampIsMs)
   oTimestampIsMs: time stamp is millisecond
return date time string.
```

Example:

```
string szDateTime = ConvertToDateTimeString(TIMESTAMP);
```

5.1.6.29 ExtractNumericValue:

Extract a numeric value from a string that contains numbers.

Syntax:

```
float ExtractNumericValue(string szString)
   szString: a string that contains numbers
return float value.
```

Example:

```
float fVal = ExtractNumericValue(""Call Duration: 300.5 ms"");
fVal will be 300.5.
```

5.1.6.30 GetSectorParameter:

Get a sector parameter value.

Syntax:

```
string GetSectorParameter(string szSiteId, string szSectorId,
string szTech, string szParmName)
   szSiteId: site ID
   szSectorId: sector ID
   szTech: technology flag (available flags: CDMA, EVDO, GSM,
WCDMA, TD, LTE)
   szParmName: sector parameter name
return the value of the specified sector parameter.
```

Syntax of overloading function:

```
string GetSectorParameter(string szSector_SiteId, string szTech,
     string szParmName)
   szSector_SiteId: contains sector and site id in the format of
     "<sectorID> [[<SiteID>]"
   szTech: technology flag (available flags: CDMA, EVDO, GSM,
     WCDMA, TD, LTE)
   szParmName: sector parameter name
return the value of the specified sector parameter.
```

Example:

```
string szAngle = GetSectorParameter(SiteID,SectorID,"",
"Azimuth");
string szLtePCI= GetSectorParameter(SiteID, SectorID, "LTE",
"PCI");
string szLtePCI= GetSectorParameter(Sector_SiteID, "LTE",
"PCI");
```

Where:

SiteID is alias of [!Mid].[Common].[Cell ID - LTE].[Site ID].[Sort By: Signal Strength].[Top #1] defined in Alias spreadsheet

SectorID is alias of [!Mid].[Common].[Cell ID - LTE].[Sector ID].[Sort By: Signal Strength].[Top #1] defined in Alias spreadsheet

Sector_SiteID is alias of [!Mid].[Common].[Cell ID - LTE].[Serving Sector] defined in Alias spreadsheet

5.1.6.31 GetSectorParameters:

Get sector parameter value by passing the sector keys and the geo location of sector detected.

Syntax:

```
string[] GetSectorParameters(string szKey1, string szKey2,
string szTech, double dLatitude, double dLongitude, string[]
arrParmName)
      szKey1: first key of the sector. It is PN for CDMA and
EVDO, BSIC for GSM, PSC for WCDMA, CPI for TD, and PCI for LTE.
      szKey2: second key of the sector. It is BCCH for
GSM,UARFCN for WCDMA and TD, and EARFCN for LTE. Pass ""null""
(DON'T include quotation marks) if this key is unknown.
      szTech: technology flag (available flags: CDMA, EVDO, GSM,
WCDMA, TD, LTE)
      dLatitude: latitude of the sector detected.
      dLongitude: longitude of the sector detected.
      arrParmName: list of sector parameter names
return the list of value corresponding to the specified list of
sector parameters.
```

Example:

```
if(IsValueValid(Psc)
{
      string szUarfcn=null;
      if(IsValueValid(Uarfcn))
            szUarfcn=Uarfcn.ToString();
      string[] arrResults = GetSectorParameters(Psc.ToString(),
szUarfcn, "WCDMA", dLat, dLon,
            new string[]{"Latitude", "Longitude", "Azimuth",
"Antenna_Type"});
      double dSectorLat, dSectorLon;
      int iSectorAzimuth;
      bool bSectorLocationOK = false;
      if(double.TryParse(arrResults[0], out dSectorLat) &&
double.TryParse(arrResults[1], out dSectorLon))
            bSectorLocationOK = true;
      int.TryParse(arrResults[2], out iSectorAzimuth);
      string szAntennaType = arrResults[3];
}
```

Where:

```
Psc is alias of [!M].[WCDMA].[WCDMA Cell
Measurements].[Categorized PSC:A1]
Uarfen is alias of [!M].[WCDMA].[WCDMA Cell
Measurements].[Categorized UARFCN_DL:A1]
dLat is the alias of [!M].[Common].[GPS Position].[Latitude]
dLon is the alias of [!M].[Common].[GPS Position].[Longitude]
```

5.1.6.32 GetOperatorByMncMcc:

Get operator name from the lookup table (accessible from menu Configuration->Wireless Operator Lookup Table) by MNC and MCC

Syntax:

```
string GetOperatorByMncMcc(object MNC, object MCC)
      MNC: MNC value
      MCC: MCC value
return operator name.
```

Example:

```
string szOperator = GetOperatorByMncMcc(123, 321);
```

5.1.6.33 GetOperatorBySid:

Get operator name from the lookup table (accessible from menu Configuration->Wireless Operator Lookup Table) by SID

Syntax:

```
string GetOperatorBySid(object SID)
      SID: SID value
return operator name.
```

Example:

```
string szOperator = GetOperatorBySid(123);
```

5.1.6.34 GetOperatorByOperatorId:

Get operator name from the lookup table (accessible from menu Configuration->Wireless Operator Lookup Table) by SID

Syntax:

```
string GetOperatorBySid(object SID)
      SID: SID value
return operator name.
```

Example:

```
string szOperator = GetOperatorBySid(123);
```

5.1.6.35 TimeDiff:

Return the time difference of two messages in second

Syntax:

```
double TimeDiff(double msg1, double msg2)
      msg1: the alias of first message
      msg2: the alias of second message
return time difference in second.
```

```
Syntax of overloading function :
double TimeDiff(double msg1, double msg2, int Option)
      msg1: the alias of first message
      msg2: the alias of second message
      Option: if set to 0, the output timestamp will be the
current timestamp which is timestamp of the second message; If
set to 1, change the output timestamp to timestamp of the first
message (May mess up output timestamps, be careful of using this
option)
return time difference in second.
.
```

Example:

```
double dDiff = TimeDiff(msg1, msg2);
double dDiff = TimeDiff(msg1, msg2, 1);
```

5.1.7 Built-in Math Function

http://msdn2.microsoft.com/en-us/library/system.math.aspx

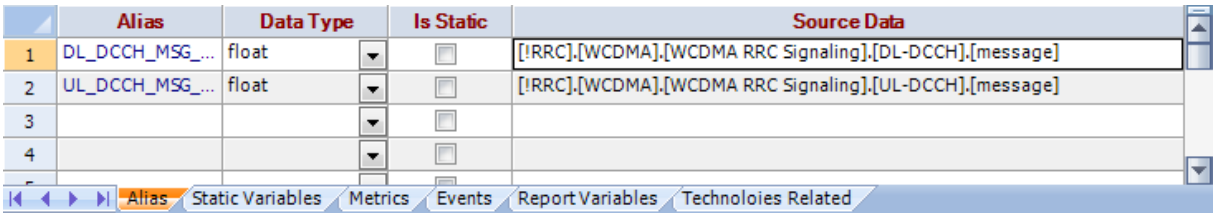
5.1.8 Built-in String Function

- **string.Format**
  http://msdn2.microsoft.com/en-us/library/system.string.format.aspx

5.1.9 Built-in Classes

- **ArrayList**
  http://msdn2.microsoft.com/en-us/library/system.collections.arraylist.aspx
- **Hashtable**
  http://msdn2.microsoft.com/en-us/library/system.collections.hashtable.aspx
- **SortedList**
  http://msdn2.microsoft.com/en-us/library/system.collections.sortedlist.aspx
- **Queue**
  http://msdn2.microsoft.com/en-us/library/system.collections.queue.aspx
- **Stack**
  http://msdn2.microsoft.com/en-us/library/system.collections.stack.aspx

5.1.10 Declaration



- **Alias**. An alias that can be referred as a metric when writing a script.
- **Static Variables**. Variables whose values will be kept valid while computing the next data point. It is not possible to assign null to a static variable. In order to remove the value of a static variable, it must be set to empty (for strings) or to the default minimum value (for other types).
  - `MyString = "";`
  - `MyFloat = float.MinValue;`
  - `MyTimestamp = double.MinValue;`
- **Event Enum**. Event enumeration.
- **Metrics**. Metric to be generated.
- **Report Variables**. The varaibles to report around the timestamp when an event occurs.
- **Technologies Related**. Define the technologies that the script can ba applied. This information will be used to determine if the script will be visible under a particular file/device in Data Explorer

All variable types may be tested for valid values using IsValidValue(MyVariable). It will return false for both null and empty values.

Strings may be tested with String.IsNullOrEmpty(MyString). It will return true for both null and empty values.

5.1.11 Programming in C# Language

The Script Builder uses a subset of C# programming language. For more detailed information about C#, refer to the online resource: http://msdn2.microsoft.com/en-us/library/default.aspx.

This section describes basic programming concepts that apply to script building and provides an example.

5.1.11.1 Statements

The sequence of a script's execution is controlled by statements, which are executed for their effect and do not have values. All C# statements end in a semicolon (**;**).

#region

#region lets you specify a block of code that you can expand or collapse when using the outlining feature of the Script Editor. A **#region** block must be terminated with a **#endregion** directive.

#region a loop statements

```
for(int i=0; i<50; i++)
{
statement 1;
statement 2;
}
```

#endregion

5.1.11.2 Declaring and Initializing Variables

The following build-in numeric data types are supported:

Build-in Numeric Data Type:	Ranges
bool	true, false
byte	0~255
short	-32768~32768
int	2147483648 ~ 2147483647
long	-9223372036854775808 ~ 9223372036854775807
double	5.0E-324 ~ 1.7E308, 15-digit precision

In the script, you can declare a variable by using its type and a given name:

```
int i;       // create an integer
```

To initialize the variable, you can give it a value or use the **new** operator:

```
int j=5;     // create an integer and set its value to 5
```

5.1.11.3 Casting Variables

To cast a data type to a different but compatible type, you may simply place (<*new data type*>) in front of the variable of interest. For example:

Delta_PSCH_RS = (float) RP_PSCH[(int)CellIndex] -(float) RSRP[(**int**)CellIndex]

5.1.11.4 Writing Comments

C# uses two forms of comments: a single-line comment starting with **//**, and a multi-line comment starting with **/*** and ending with ***/**.

The single-line comment does not have a terminator. It ends at the end of the current line.

```
int i;   //simple counter
i++;
```

Multi-line comments start with **/*** and end with ***/**.

```
/*this code block is commented out
int i=3;
i++;
end of comments */
```

5.1.11.5 Using Blocks { }

C# does not contain special keywords for the end of many control statements (**for**, **if**, **switch**, **foreach**, **do**, **while**, and others). Instead, C# uses the opening brace **{** to denote the beginning of the block and the closing brace **}** to denote the end of the block.

```
for(int i=0; i<50; i++)
{
   statement 1;
   statement 2;
}
```

5.1.11.6 Declaring Functions

A function declaration contains any optional modifiers, the return type, the name of the function, any parameters, and the body of the function. For example:

```
int foo()
{
   return 5;
}
```

To define a function that does not return a value, specify a return type of **void**.

```
void bar()
{
   //do work ...
}
```

5.1.11.7 Using the return statement

The return statement exits a function. It is necessary for any function that returns a value.

```
int foo()
{
   return 5;  //necessary to get the value out of the
function
}
```

5.1.11.8 Branching Statements

Branching statements are the programming equivalent of “do this, or do that, or do something else.” They provide the means to select which “branch” of code to take. C# contains two different syntax elements that control branching: **if/else** and the **switch/case/break** statement.

Using the *if/else* Statement

The **if/else** statement lets us pick one of two paths based on a Boolean expression. Examine the following code:

```
if ( val > 5 )
{
   //do work ...
}
else
{
   //do work ...
}
```

If this expression is true, then the next statement is executed. If the expression is false, then the next statement is skipped, and the statement after the optional **else** is executed.

Also, notice in this example that the **else** clause is optional. We can omit the **else** clause if no actions will be taken if the expression is false.

```
if ( val > 5 )
{
   //do work ...
}
//continue other works
```

However, the **else** clause can contain another **if** statement.

```
if ( val > 5 )
{
   //do work ...
}
else if ( val > 3 )
{
   //do work ...
}
else
{
   //do work ...
}
```

Using the *switch/case/break* Statement

The **switch/case** statement provides a multi-way branching statement. The **switch** statement defines the variable to use as the branching element. Each **case** statement defines the beginning of a block. That block is executed only when the value control variable has a value equal to the value in the **case** statement.

```
switch( day )
{
   case "Monday"
      //do work;
      break;
   case "Wednesday"
      //do work;
      break;
   default:
      //do work;
      break;
}
```

5.1.11.9 Iterations

Iteration statements provide the means to execute a block of code multiple times.

Using *while* and *do/while* Statement

C# contains statements that let you execute a series of statements multiple times. The **while** loop and the **do/while** loop are closely related:

```
int i=0;
while( i < 10 )
{
   //do work...
   i++;
}
```

The above example works for every value of i from 0 to 9. The do/while loop can work in almost the same way:

```
int i=0;
do{
   //do work ...
   i++;
} while ( i < 10 );
```

The only difference between the **while** loop and the **do/while** loop is that a **do/while** loop is always executed at least once. The **while** loop evaluates the Boolean expression before entering the block of code. The **do/while** loop evaluates the Boolean expression only after executing the block of code the first time.

Using *for* Loops

The code in the preceding section can be just as easily written using a **for** loop. A **for** statement contains three clauses: the first clause sets the initial value of the looping variable; the second clause defines the loop termination expression; and the third clause defines the expression that modifies the looping variable. The first and third clauses may contain multiple statements separated by commas. The second clause must evaluate to a single Boolean expression:

```
for( int i=0, j=0; ( i<10 ) & ( j<10 ); i++, j++)
{
   // do work ...
}
```

Using *foreach* Loops

The **foreach** statement provides a shortcut to loop through a collection, as shown in the following example:

```
foreach( int i in collectionOfi)
{
   //do work...
}
```

Using *break/continue* in Loops

We use the **break** and **continue** statement to modify the execution paths of loops. The **break** statement terminates the block being executed inside the loop and exits the loop. The **continue** statement terminates the block being executed inside the loop and starts the next iteration.

```
for( int i=50; i<100; i++)
{
   if( i > 80 )
      continue;   //terminate the block and start a new
iteration if    the expression is true
   if( i == 95)
      break;  //exit if the expression is true
   //do work
}
```

5.1.11.10 Expression

An expression defines some kind of computation. Expressions include variables or literal values, and some set of operators. They may be variable assignments, mathematical computations, or Boolean computations.

Arithmetic Operators

The standard mathematical operators in C# are:

+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulus
++	Increment
--	Decrement

Boolean Operators

C# supports the usual logical operators:

&&	Logical AND
||	Logical OR
!	Logical NOT

C# also supports bitwise Boolean operators:

&	Bitwise AND
|	Bitwise OR
^	Bitwise exclusive OR (XOR)
~	Bitwise NOT operator

Equality and Comparison Operators

C# contains operators that let you compare values:

<	Smaller than
<=	Smaller than or equal to
==	Equal to
!=	Not equal to
>=	Greater than or equal to
>	Greater than

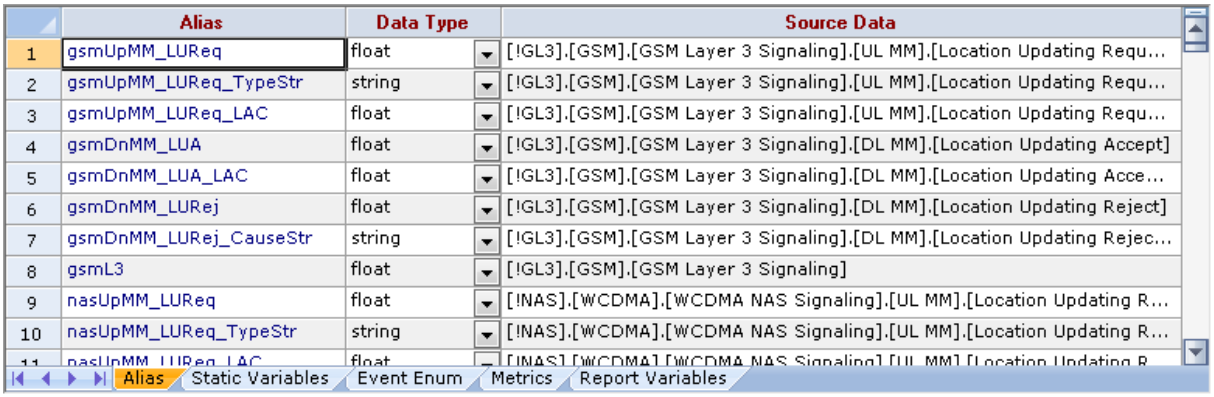
All of these work in the same way. They compare two values of the same type and return a Boolean value:

```
if( a == b )
   //do work ...
```

5.1.12 Example

1. Create Alias for Metric

Expand the tree in the Metric List. Drag-and-drop the target metric into the *Source Data* column. An Alias should be defined for this metric so that when writing script, the alias will represent the corresponding metric.

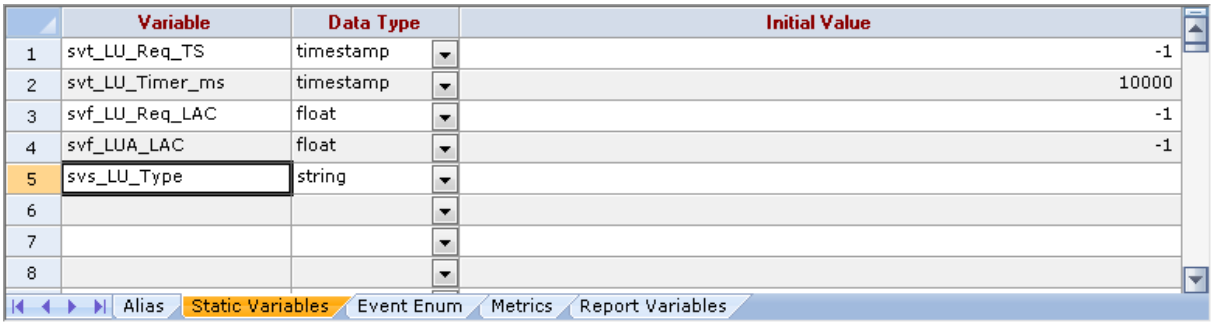


	Alias	Data Type	Source Data
1	gsmUpMM_LUReq	float	[!GL3].[GSM].[GSM Layer 3 Signaling].[UL MM].[Location Updating Requ...
2	gsmUpMM_LUReq_TypeStr	string	[!GL3].[GSM].[GSM Layer 3 Signaling].[UL MM].[Location Updating Requ...
3	gsmUpMM_LUReq_LAC	float	[!GL3].[GSM].[GSM Layer 3 Signaling].[UL MM].[Location Updating Requ...
4	gsmDnMM_LUA	float	[!GL3].[GSM].[GSM Layer 3 Signaling].[DL MM].[Location Updating Accept]
5	gsmDnMM_LUA_LAC	float	[!GL3].[GSM].[GSM Layer 3 Signaling].[DL MM].[Location Updating Acce...
6	gsmDnMM_LURej	float	[!GL3].[GSM].[GSM Layer 3 Signaling].[DL MM].[Location Updating Reject]
7	gsmDnMM_LURej_CauseStr	string	[!GL3].[GSM].[GSM Layer 3 Signaling].[DL MM].[Location Updating Rejec...
8	gsmL3	float	[!GL3].[GSM].[GSM Layer 3 Signaling]
9	nasUpMM_LUReq	float	[!NAS].[WCDMA].[WCDMA NAS Signaling].[UL MM].[Location Updating R...
10	nasUpMM_LUReq_TypeStr	string	[!NAS].[WCDMA].[WCDMA NAS Signaling].[UL MM].[Location Updating R...
11	nasUpMM_LUReq_LAC	float	[!NAS].[WCDMA].[WCDMA NAS Signaling].[UL MM].[Location Updating R...

Alias | Static Variables | Event Enum | Metrics | Report Variables

2. Create Static Variables

To retain the values of a variable from one message to another, one must define the variable as a static variable. The static variable allows you to keep track of the timestamp of a message or a status. By defining multiple static variables, you are effectively running multiple state machines.



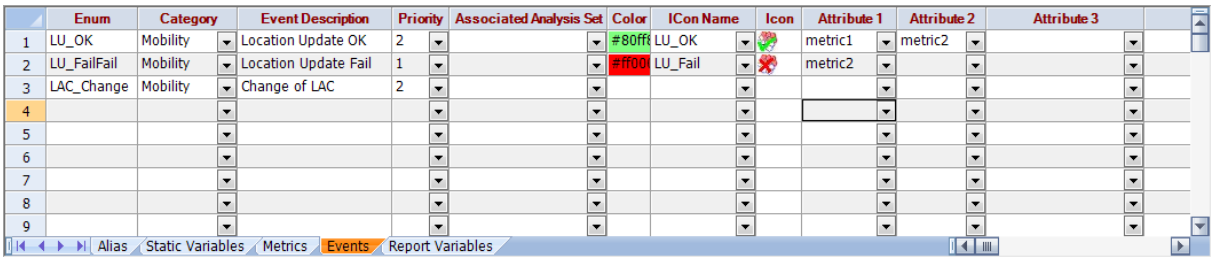
	Variable	Data Type	Initial Value
1	svt_LU_Req_TS	timestamp	-1
2	svt_LU_Timer_ms	timestamp	10000
3	svf_LU_Req_LAC	float	-1
4	svf_LUA_LAC	float	-1
5	svs_LU_Type	string	
6			
7			
8			

Alias | Static Variables | Event Enum | Metrics | Report Variables

3. Create Event Enum

The Event Enum tab allows you to assign an event enum to be used in the script and defines the following important information:

- Event category
- Event description: Event name to be displayed in the user interface.
- Priority
- Associated analysis set
- Color scheme
- Event icon selection
- Attributes (1-10) to be used in the tooltip when viewing an event in the Map View

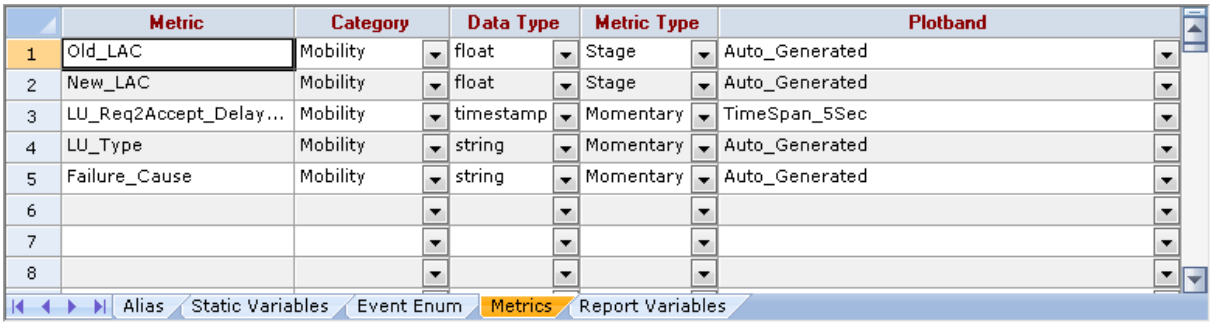


	Enum	Category	Event Description	Priority	Associated Analysis Set	Color	ICon Name	Icon	Attribute 1	Attribute 2	Attribute 3
1	LU_OK	Mobility	Location Update OK	2		#80ff	LU_OK		metric1	metric2	
2	LU_FailFail	Mobility	Location Update Fail	1		#ff00	LU_Fail		metric2		
3	LAC_Change	Mobility	Change of LAC	2							
4											
5											
6											
7											
8											
9											

Alias | Static Variables | Metrics | Events | Report Variables

4. Create Output Metric

The Metrics tab allows you to assign the names and properties of the metrics to be created in the script.

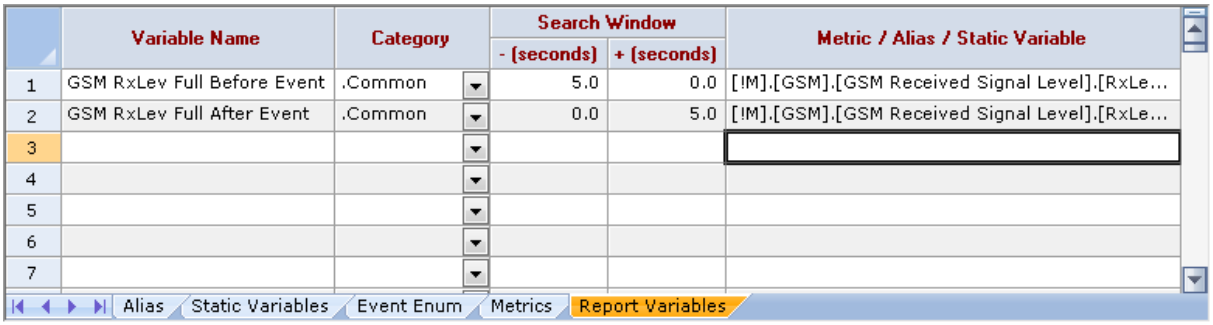


	Metric	Category	Data Type	Metric Type	Plotband
1	Old_LAC	Mobility	float	Stage	Auto_Generated
2	New_LAC	Mobility	float	Stage	Auto_Generated
3	LU_Req2Accept_Delay...	Mobility	timestamp	Momentary	TimeSpan_5Sec
4	LU_Type	Mobility	string	Momentary	Auto_Generated
5	Failure_Cause	Mobility	string	Momentary	Auto_Generated
6					
7					
8					

Alias | Static Variables | Event Enum | Metrics | Report Variables

5. Define Report Variable

The Report Variables tab allows you to define the parameters or variables to be reported, along with any generated events.



	Variable Name	Category	Search Window		Metric / Alias / Static Variable
			- (seconds)	+ (seconds)	
1	GSM RxLev Full Before Event	.Common	5.0	0.0	[!M].[GSM].[GSM Received Signal Level].[RxLe...
2	GSM RxLev Full After Event	.Common	0.0	5.0	[!M].[GSM].[GSM Received Signal Level].[RxLe...
3					
4					
5					
6					
7					

Alias | Static Variables | Event Enum | Metrics | Report Variables

6. Write Script

```
if( TxPw > -5 )
   TxPw_TooHigh = TxPw;
```

7. Save Script

Click the **Save** button to save the script. If the coding has an error, an output window will appear and list all errors. The errors must be corrected before the script can be saved.

8. Run Script

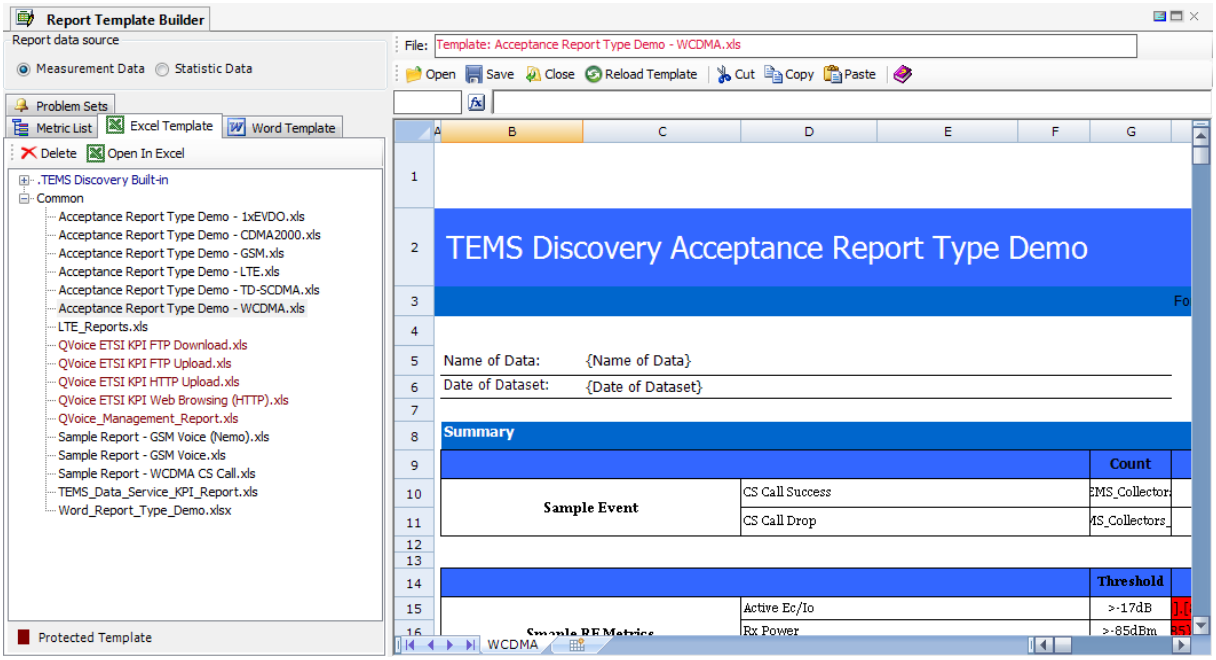
From the Data Explorer, drag-and-drop the script into any view to generate the output metric.

5.2 Report Template Builder – Measurement Data

The **Report Template Builder** provides great flexibility when generating reports from drive test data. Reports can be generated in several Excel formats.

The Report Template Builder eliminates the need to request customized report generation from another tool vendor, or to manually conduct data manipulation. Data objects need only to be dragged-and-dropped from the Specific Metrics tab to generate a final report.

For all of TEMS Discovery's supported metrics, prescriptives may be defined and the results presented in a chart with all Microsoft Office Excel supported types. With a single operation, it is possible to generate the final report from TEMS Discovery report templates.



The **Report Template Builder** has the following components:

- **Toolbar and Context Menu**
- **Excel Templates**. Lists all Excel type report templates defined by using the Report Template Builder. See Generating Microsoft Office Word Report for more information.
- **Word Templates**. Lists all Word type report templates defined by MS Word. See Problem Summary View for more information.
- **Problem Sets**. Lists all problem sets defined by using the Report Template Builder. Problem set definition is similar to report template definition, except that the B1 cell in the spreadsheet is a flag to note whether the final report indicates that the device has problem. If the value in B1 cell is 0, the device has no problems; otherwise, the device does have problems. See Problem Summary View for more information.

- **Report Template Editor**. For directly generating the final report or defining the report template. To edit the report format or color, it is recommended that you use Microsoft Office Excel.

5.2.1 Report Builder Toolbar and Pop-up Menu

Open. Open an Excel file.

Save. Save the information in the spreadsheet as the final report or report template.

Close. Close any open file and clear the spreadsheet.

Reload Template. Reload the report template.

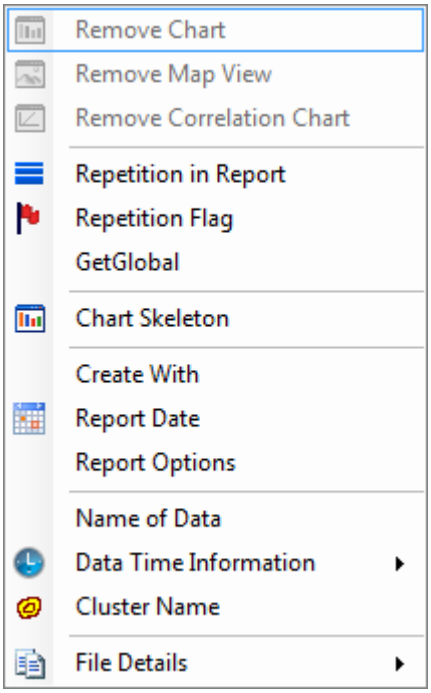
Cut. Cut the selected text in the spreadsheet.

Copy. Copy the selected text in the spreadsheet.

Paste. Paste text to the spreadsheet.

Help.

Report Template Builder Right-Click Menu



Remove Chart. Remove the chart definition and clean up the chart area.

Remove Map View. Remove the Map View definition and clean up the view area.

Remove Correlation Chart. Remove the Correlation Chart definition and clean up the view area

Repetition in Report. Define repetition options in the report template. See Options of Repetition in Report.

Repetition Flag. Define a repetition flag in the cell as a placeholder. This placeholder will be replaced with the value of the repetition key when the report is generated.

GetGlobal. Define GetGlobal flag in the cell as a placeholder. This placeholder will be replaced with the value that has been set by SetGlobal definition when the report is generated. As a rule, SetGlobal must be defined in the row after GetGlobal is defined.

Chart Skeleton. Define a Chart Skeleton.

Create With. Place a tag for reporting the version of TEMS Discovery.

Report Date. Place a tag for reporting the date when the report is generated.

Report Options. Place a tag for reporting the report options. See Report Options.

Name of Data. Place a tag for reporting the file name of data.

Date Of Dataset. Place a tag for reporting the date range of the dataset from which the report is generated.

Start Collection Time. Place a tag to report the start collection time of data.

End Collection Time. Place a tag to report the end collection time of data.

Collection Duration – hh:mm:ss. Place a tag to report the collection duration in the format of hours:minutes:seconds.

Collection Duration – minutes. Place a tag for reporting the collection duration in the format of minutes.

Cluster Name. Place a tag to report the name of the cluster.

File Detail (All). Place a series of tags to list file details of all data.

File Detail – Device. Place tags to list the device description of each file in the data.

File Detail – Name. Place tags to list the name of each file in the data.

File Detail – Duration. Place tags to list the duration of each file in the data.

File Detail – Gap. Place tags to list the time gap of each file in the data.

File Detail – Start Time. Place tags to list the start time of each file in the data.

File Detail – End Time. Place tags to list the end time of each file in the data.

File Detail – <Device Attribute>. Place tags to list specific device attributes of each file in the data.

5.2.2 File Formats and Limitations

The report template can be in any of the following Excel files types:

- Excel 97-2003 **xls**
- Excel 2007/2010 **xlsx**
- Excel 2007/2010 Macro-Enabled **xlsm**

Cross-referencing among different sheets is supported in each format, but VBA macros are supported only as follows:

- Excel 97-2003 xls report template. Can contain VBA macros, but the maximum worksheet size is 65536 rows by 256 columns.
- Excel 2007/2010 xlsx report template. Maximum worksheet size is 1048576 rows by 16384 columns. Cannot contain VBA macros.
- Excel 2007/2010 macro-enabled xlsm report template. Maximum worksheet size is 1048576 rows by 16384 columns. Can contain VBA macros.

  However, the Report Template Builder cannot edit an Excel 2007/2010 Macro-Enabled xlsm file. You will need to open a report template (xls or xlsx) in Excel, add macros as needed, and then save the file as an Excel macro-Enabled xlsm file.

Limitations of Report Builder and report output:

- Cell comments and form controls (such as buttons, checkboxes, list boxes, etc.) will not be read from or written to .xlsx or .xlsm files.
- Reading and writing shapes from and to Open XML files is limited. Many properties may be lost, and all complex shapes will be lost.
- When reading conditional formats, only Excel 2003 features are supported. Conditional formats that use Excel 2007-2010 features are ignored (deleted).

  Also, Report Builder does not support the new ability of Excel 2007-2010 to have different conditional formats that overlap. Therefore, when a conditional format is read that overlaps a previous conditional format, the cells in the previous conditional format will be removed from the newly read conditional format.
- Table references in formulas such as [Sales] are converted to #REF!

Report Builder does not support Excel tables. With no table to refer to, there is no way to preserve these formulas in their original state. Excel will generate a warning when reading the workbook.

Workaround to display image properly in report output:

- Open report template using Excel, remove the images from report template. You may see many images overlapping, which may be instroduced by third-party component TD uses.
- Create your image and save as BMP file, then select Excel menu “Insert->Picture” and insert your image to report template, then save.
- If you edit the report template and save the change in TD report builder, you will have to repeat the above steps.

5.2.3 Define Report Template

A TEMS Discovery report template is actually a Microsoft Office Excel file with TEMS Discovery formatted information. TEMS Discovery can read and write Excel files and replace TEMS Discovery formatted information with the final values.

To define a report template, you can:

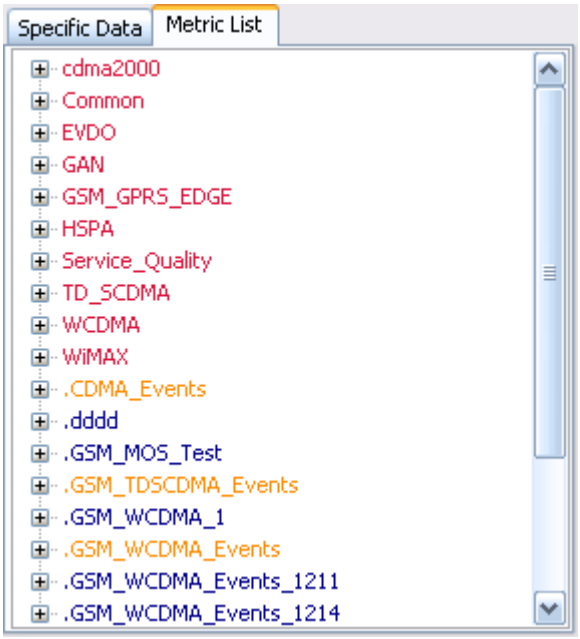
1. Open an external Excel file, open an existing internal report template, or work directly on the right-side spreadsheet called the Report Editor.
2. Drag-and-drop any IE from the Metric List tab into the Report Editor.
3. Pick the desired aggregate or charting function from the pop-up menu. As a result, a TEMS Discovery formatted string, along with additional information, will be placed into the target cell.
4. Save the report template through the toolbar functionality. The saved report template will be listed in the Report Templates list box.

It is recommended that you create an Excel file to define the reporting format, including font, color, and formula and so on. Click the **Open** button on the toolbar to open the file and define the TEMS Discovery report template. Additionally, you can right-click on any report template in the list box and select **Open In Excel** to further edit the report format.

More information about defining a report template:

- Drag data objects from the Metric List.
- Drop data objects into the editor and select the report option (see Report Options).
- To define a chart, see Define Single Chart.
- To define a chart with more than one series, see Define Multi-series Chart.
- To define a chart skeleton, see Define Chart Skeleton.
- To define generation of statistics data, see Define Statistic Data.
- To define a trend chart, see Define Trend Chart.

5.2.3.1 Metric List



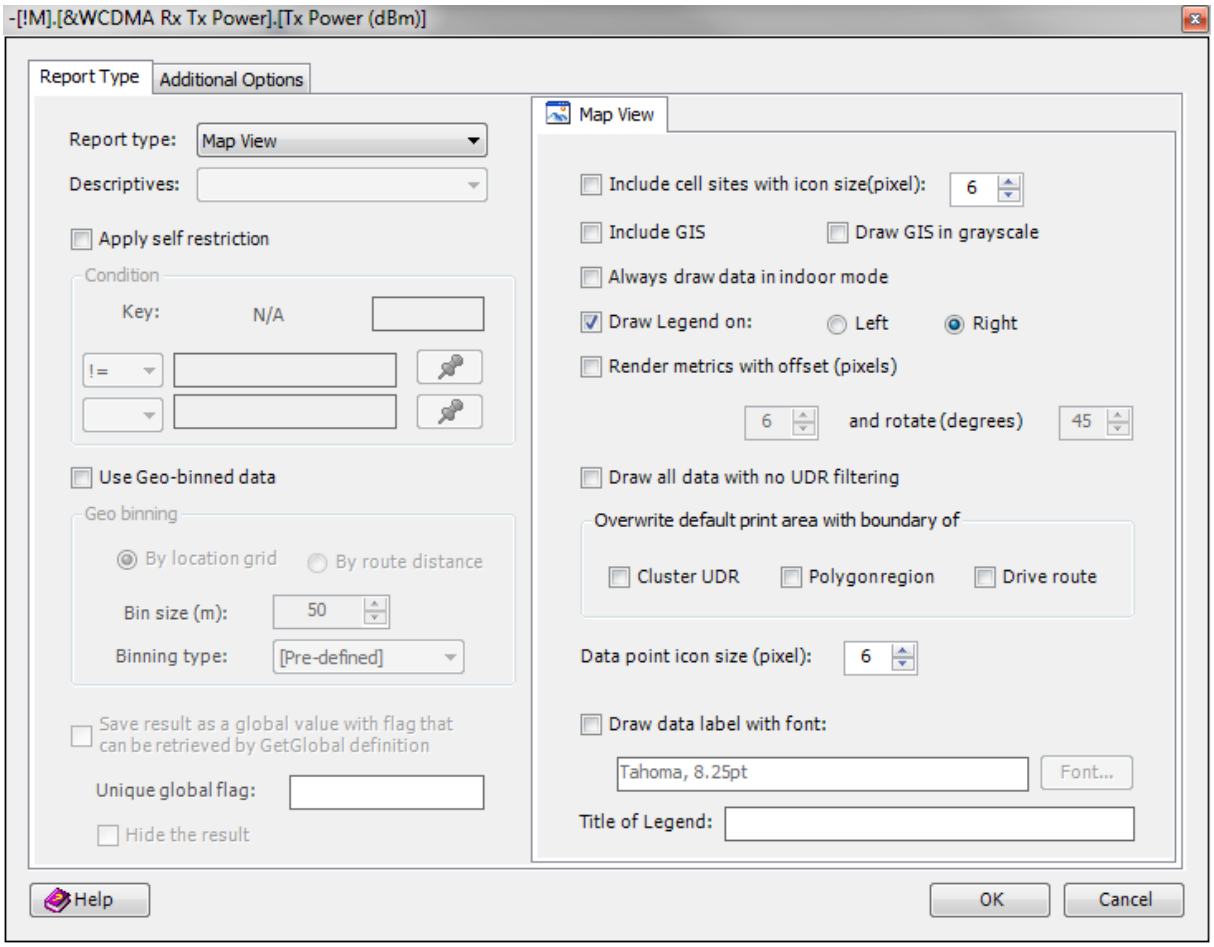
All TEMS Discovery supported metrics and user-defined events and metrics are listed in the Metric List tree view. You can drag-and-drop any of the metrics (except for Layer 3 message information elements) into the Report Editor.

NOTE: If you need to define a report from a Layer 3 message IE, define an advanced metric by using the Script Builder and define the report using that advanced metric. See the Script Builder for how to define an advanced metric.

When you drop an item into the Report Editor, the Report Options dialog will pop up.

5.2.3.2 Report Options

Once an information element is dropped into the Report Editor, the dialog shown below will pop up. You can select the desired report type and descriptive, and even apply a threshold or range to the data of target metric. Once you have selected the settings, a well-formatted string and additional information will be placed in the target cell.



Report Types

- **Chart**. Defines a specific TEMS Discovery chart. See Define Single Chart and Define Multi-series Chart.
- **Correlation Chart**. Defines a correlation chart between a pair of metrics. See Define Correlation Chart.
- **Correlation Key**. Defines a correlated metric to generate a chart or statistic data. See Define Single Chart and Define Multi-series Chart.
- **Map View**. Defines a Map View report.
- **Multi-dimension Statistic View**. Defines a Multi-dimension Statistics report.
- **Name**. Places the name of the dragged item into the target cell.
- **Single Value**. Differentiates between a Chart and a Statistic Data report. This type of report definition produces one final value.

- **SetGlobal**. Defines a global value (a single value or an array of value) generated from a metric's data. This global value can be retrieved by the GetGlobal flag. Be aware that SetGlobal must be defined after GetGlobalFlag in the report template. In other words, if the GetGlobal flag is defined in row number 10, the corresponding SetGlobal flag must be defined in a row number that is greater than 10.
- **Statistic Data**. Defines a Statistic Data report. See Define Statistic Data.
- **Tabular**. Defines a Tabular data report. See Define Tabular List.
- **Trend Chart**. Defines a Trend Chart report. See Define Trend Chart for details.

Descriptives

- **Count**. Count of the data points.
- **Duration**. The time span of the first data collected to the last data collected.
- **Linear Average**. Linear average of the data points.
- **Mean**. Mean of the data points.
- **Max**. Maximum value of the data points.
- **Min**. Minimum value of the data points.
- **Mode**. Mode of the data points.
- **Percentage**. Percentage of the data points that are within the range defined or over/below a defined threshold. A threshold or a range must be defined if this report type is selected.
- **Standard Deviation**. Standard deviation of the data points.
- **Sum**. Summation of the value of the data points.
- **Unique Count**. Count of unique values of the data points.
- **Variance**. Variance of the data points.
- **X-Percentile**. Value of the data point that is in the specified percentage – the percentage must be defined.

Define Plot Bands

If you choose to report data in Chart, you can also define plot bands by providing the start value, end value, and step value.

Apply Self Restriction

You can define a threshold or a range to filter data points, so that only the data points satisfying the threshold/range are computed for what is described. You can select a logical operator and a corresponding operand (numerical value or text) to form a logical expression. Up to two logical expressions are supported and these two logical expressions will be joined. The settings in this section apply to the selected metric itself.

Under the metric list, there are some special metric groups like *WCDMA PSC Scanning - UARFCN #=?* and *WCDMA PSC Scanning - UARFCN =?*. If you drag-and-drop a

metric under the group name ended with "**#=?**" to the Report Template Builder, you can then specify an index so that only data in the specified index will be reported. Also, if you drag-and-drop a metric under the group name ended with "**=?**" to the Report Template Builder, you can specific a key so that only the data of the specified key (e.g., UARFCN) will be reported.

Apply Condition Filter

You can also select one or multiple condition filters. Only the data points at the times or locations meeting the criteria defined in the condition filters will be included for reporting. To define a condition filter, see Report Template Builder.

You can choose to embed the condition filter definition into the template so that the report template will be self-contained and can be exported for sharing without exporting the associated condition definition.

Apply (Geographical) Cluster Region Filter

You can choose to enable or disable UDR data filtering for the data you select. If the *Enable UDR Filtering* option is selected, by enabling the *Consider data only in cluster region index #* checkbox and selecting an index, you can create a report template containing flags for a cluster region index. Before generating a report for a specific set of data, you can then associate a set of specific UDRs with the region index. See Generate Report From Report Template for detail. To be more flexible, you can even choose to filter the data based on the attributes of each polygon.

Apply Device Attribute

You can attach certain attributes to mobile data (see Device Attribute Assignment) so that mobile data can be identified by its attributes. For example, consider that you have data from two operators, Blue and Green. You can import this data into the same dataset, and set attributes to Blue and Green, respectively. In the report template, you can define the report with data of the Blue attribute, Green attribute, or both.

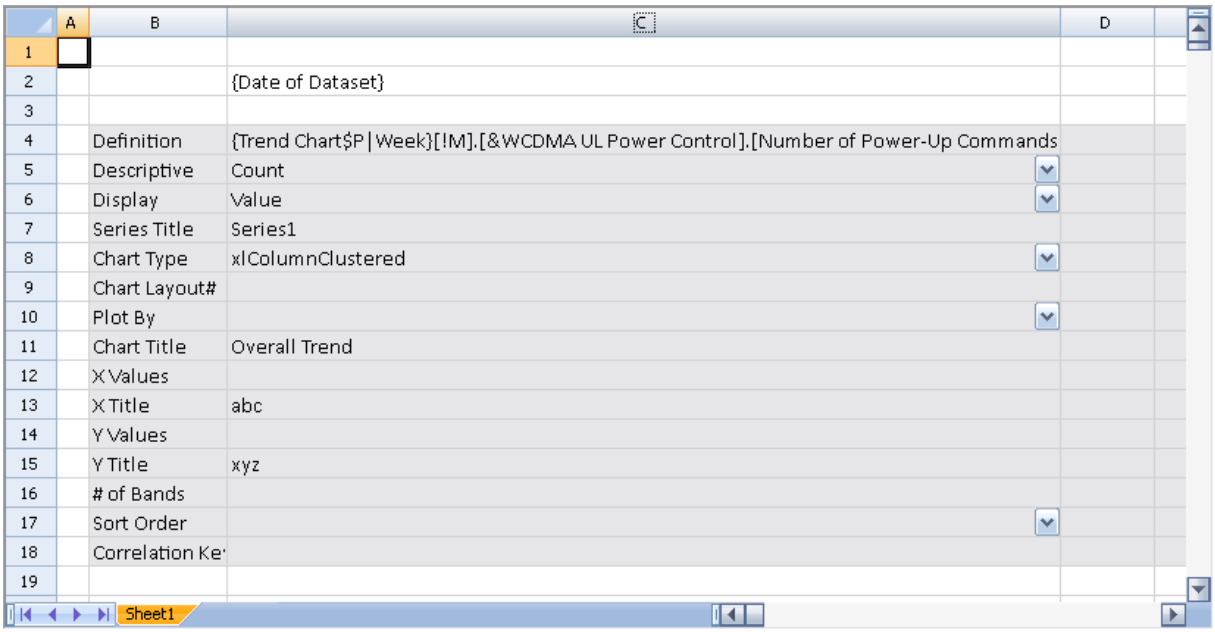
Check the checkbox in front of each attribute to include that attribute in the definition.

When generating the final report, the attributes will be used to identify what data is to be considered for reporting. See Generate Report From Report Template.

You can also check the *Enable delta between different device attributes* option to generate the delta between the data of two different attribute sets. A plot band must be defined so that the delta can be presented in a chart.

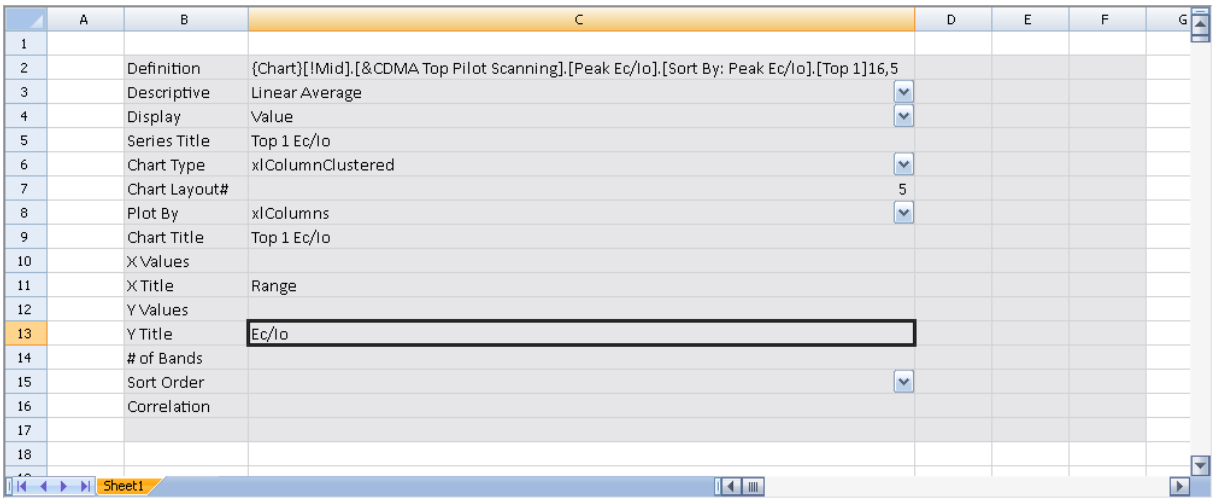
5.2.3.3 Define Trend Chart

Defining a trend chart is similar to defining a regular chart, except that you can select periodicity — Hourly, Daily, Weekly, and Monthly — for the trend report.



5.2.3.4 Define Single Chart

As an example, you can drag-and-drop the IE *cdma2000 > CDMA Top Pilot Scanning > Peak Ec/Io >Top 1* from the Metric List into the Report Editor, and select *Chart > Linear Average* from the pop-up menu. When moving the mouse, an area will be dynamically highlighted in light grey. This area defines the chart location and size. After you move the mouse to the bottom-right corner of the desired chart area, left-click and the definition will be generated in the Report Editor. Some of the definitions are automatically filled in, but you can manually edit some of the fields to adjust the display of chart to your preference.

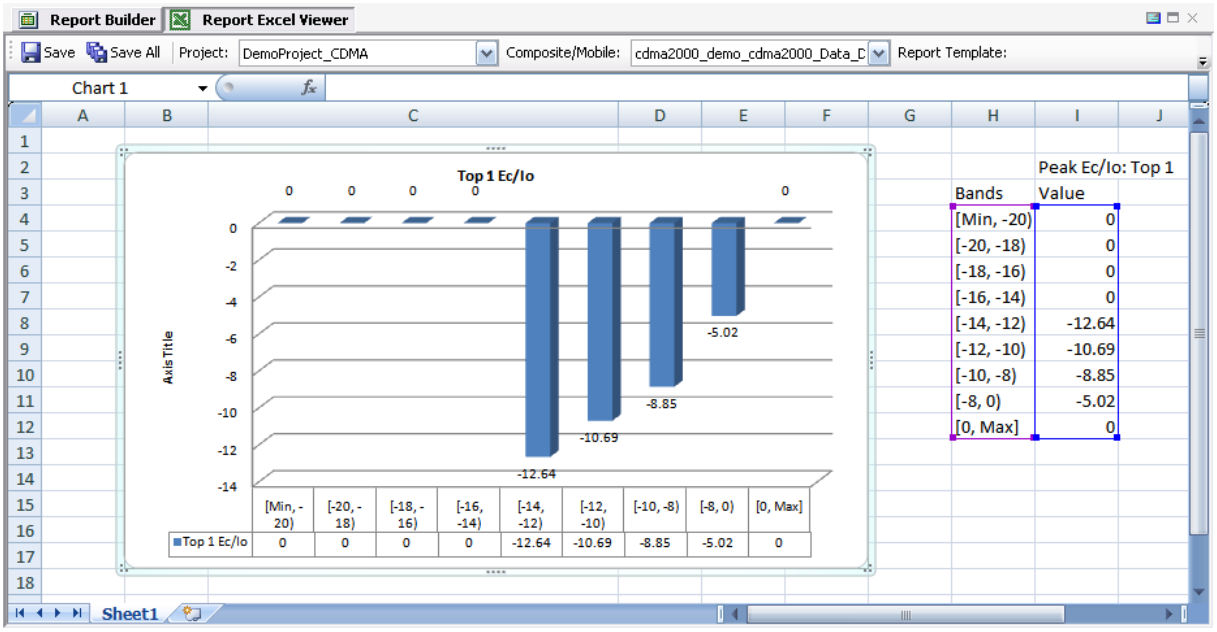


The first column in the highlighted area is the title of the definition, and the series definitions start from the second column. Each column represents one series of the chart.

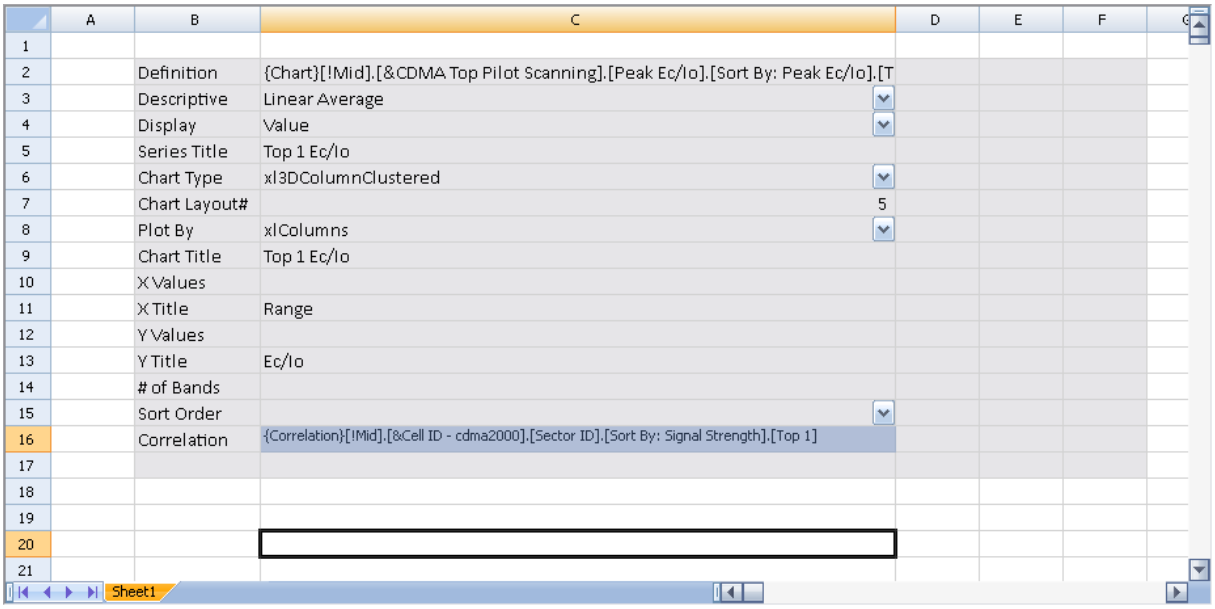
The following information is used to define a series:

Definition	Define the IE with a formatted string including the size of the chart area. (Do not edit this information!)
Descriptive	Select what to calculate for the IE. For each plot band, one value will be computed and those values will be defined as the Y values. The plot band of this IE, by default, will be defined as X values, unless a correlation metric is defined.
Display	Select what to display in the chart as the Y values. The options are Value, PDF, and CDF.
Series Title	Define a title for the series.
Chart Type	Select a chart type. These chart types are fully compatible with those in Microsoft Office Excel 2007. However, if an earlier version of Excel is installed, some of the chart types will not be viewable.
Chart Layout #	Excel provides a set of predefined layouts for each chart type. Each layout is indicated by an integer number. See Available Chart Types for an overview. You can refer to Excel for more detailed information.
Plot By	Indicates the way columns or rows are used as data series on the chart: xlColumns or xlRows.
Chart Title	Define a title for the chart. This title must be defined only in the second column; the other columns must be left blank.
X Values	The starting Cell label of the X-values. By default, the X-values of the chart will be the plot band of the metric, and the Y-values will be the values (computed by the selection of the "Descriptive") that are allocated in each band. If a correlated metric is defined for this metric, the X values will be the plot bands of the correlated metric. This value will be automatically filled when the final report is generated.
X Title	Title for the X-axis.
Y Values	The starting Cell label of the X-axis values. This value will be automatically filled when the final report is generated.
Y Title	Title for the Y-axis.
# of Bands	Define the number of bands to be considered for generating the chart.
Sort Order	Define the sort order for sorting the Y-axis values. The options are *Ascending*, *Descending*, and *None*.
Correlation	By default, the X-axis value is the plot band assigned to this IE. For some cases, you can correlate this IE with another IE and use the plot band of that IE for the X values.

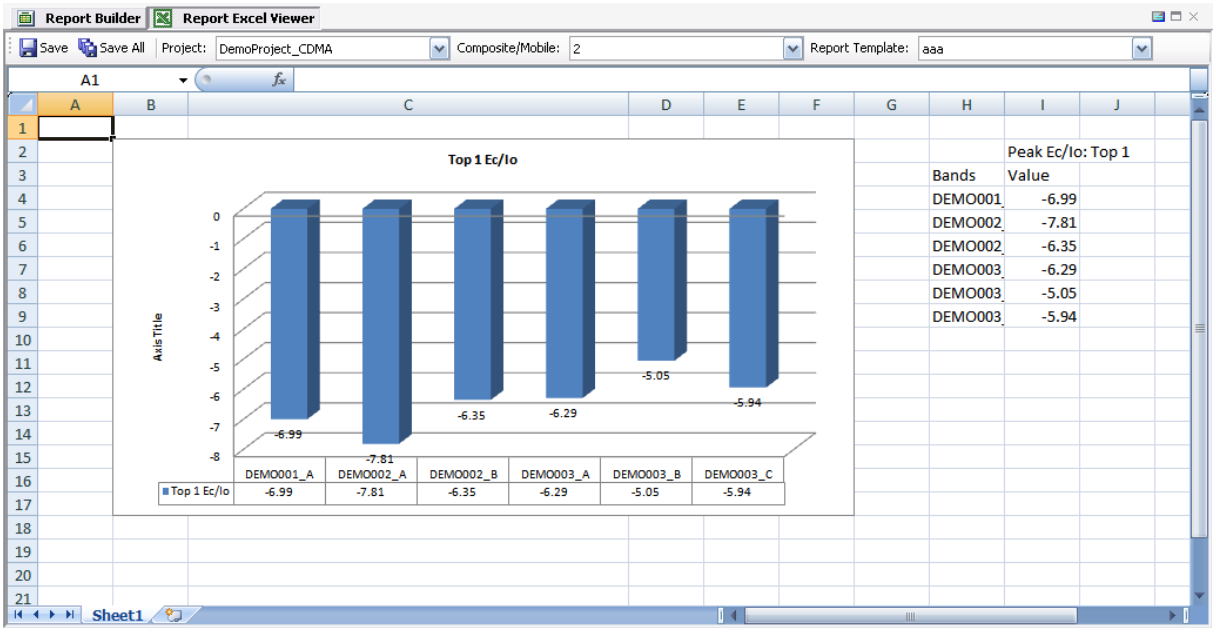
The report template shown above will result in a final report similar the one shown below. The H and I columns of the spreadsheet are generated by TEMS Discovery and are used by Microsoft Office Excel to generate the chart. Do not delete or hide this data.



For example, if you want to create a chart to visualize the linear average of the Peak Ec/Io of each serving sector, this metric can be correlated with *Common > Cell ID - cdma2000 > Sector ID > Sort By: Signal Strength > Top 1*. Drag-and-drop that metric from the Metric List into the **Correlation** cell, as shown below.



The final report will be similar to the following:



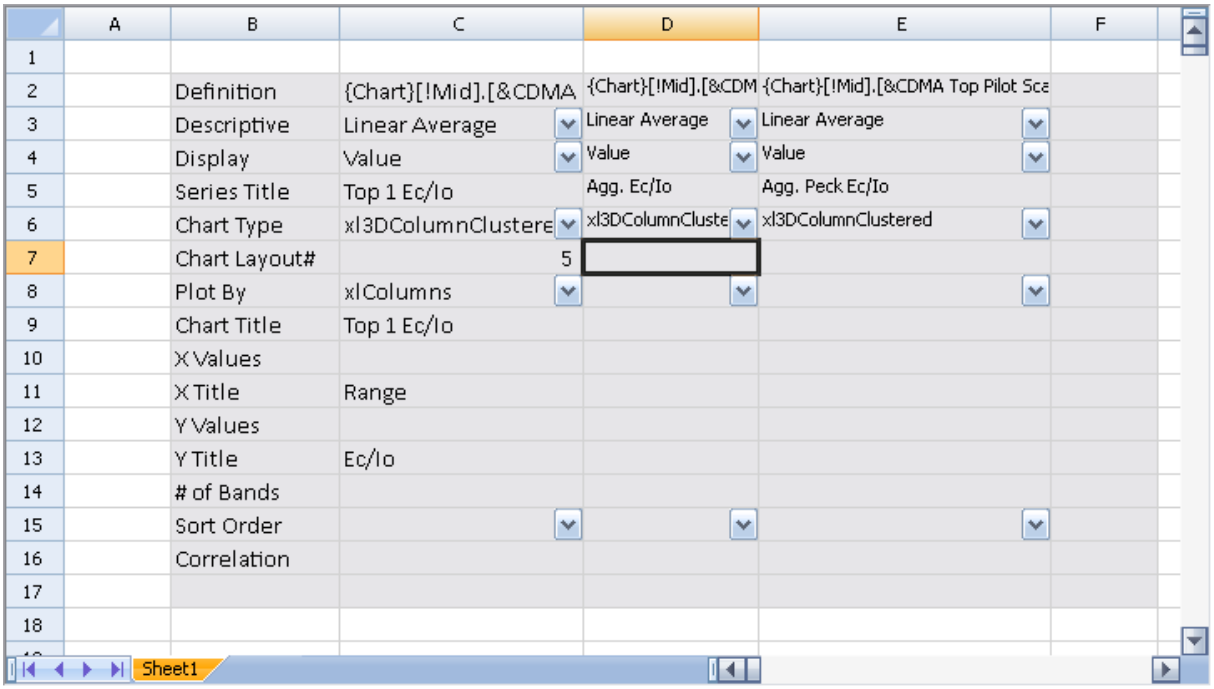
For the example shown above, you can even elect to sort the Peak Ec/Io in *Ascending* or *Descending* order so that the chart can be better visualized. If you further define a *# of Bands* (for example, 5), only the stronger or weaker 5 serving sectors will be shown in the chart.

Of course, you can elect to correlate with any other metrics, and, by combining those charting options, you can produce a rich report just by dragging-and-dropping data.

5.2.3.5 Define Multi-series Chart

You can define more than one series in a single chart by dragging-and-dropping another IE into the column immediately after the previous series. Other than defining the chart area (the highlighted area in light grey), all operations are the same as for defining the first series.

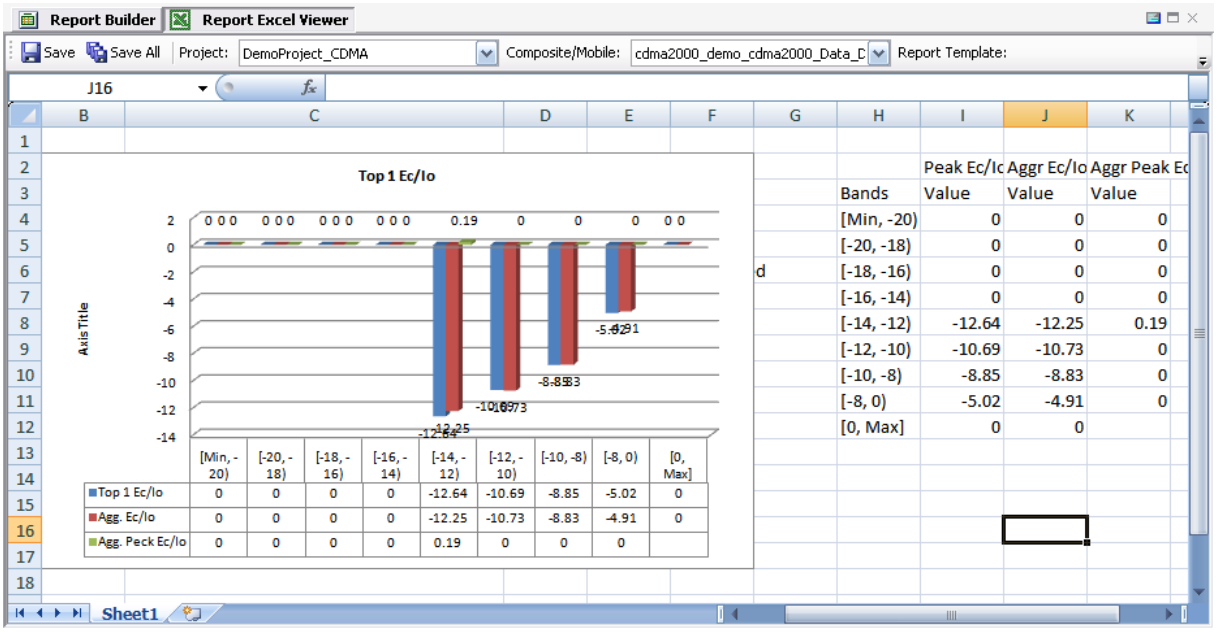
For example, refer to the following report template, which defines three series. For ***Chart Layout #***, ***Plot By***, ***Chart Title***, and ***Correlation***, only the first series requires definition. The other series will apply the same settings.



	A	B	C	D	E	F
1						
2		Definition	{Chart}[!Mid].[&CDMA	{Chart}[!Mid].[&CDM	{Chart}[!Mid].[&CDMA Top Pilot Sca	
3		Descriptive	Linear Average	Linear Average	Linear Average	
4		Display	Value	Value	Value	
5		Series Title	Top 1 Ec/Io	Agg. Ec/Io	Agg. Peck Ec/Io	
6		Chart Type	xl3DColumnClustere	xl3DColumnCluste	xl3DColumnClustered	
7		Chart Layout#	5			
8		Plot By	xlColumns			
9		Chart Title	Top 1 Ec/Io			
10		X Values				
11		X Title	Range			
12		Y Values				
13		Y Title	Ec/Io			
14		# of Bands				
15		Sort Order				
16		Correlation				
17						
18						

Sheet1

The report template shown above will result in a final report similar to the one shown here:

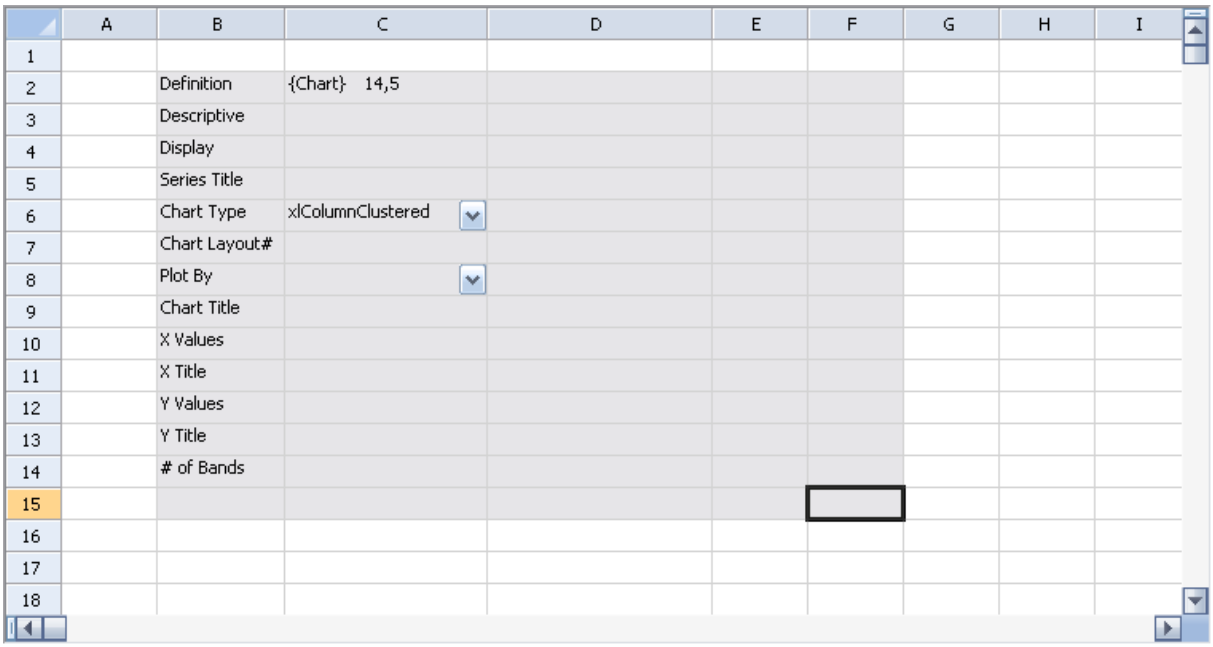


The chart type for different series can be set to different types. This way, one series can be plotted as the *xlColumn* type and the other can be plotted as the *xlLine* type. However, the mixed chart type can only be defined to a 2D chart type. If you define a mixed 3D chart type, or one to the 2D type and another to the 3-D type, all the series will be plotted to the chart type of the first series.

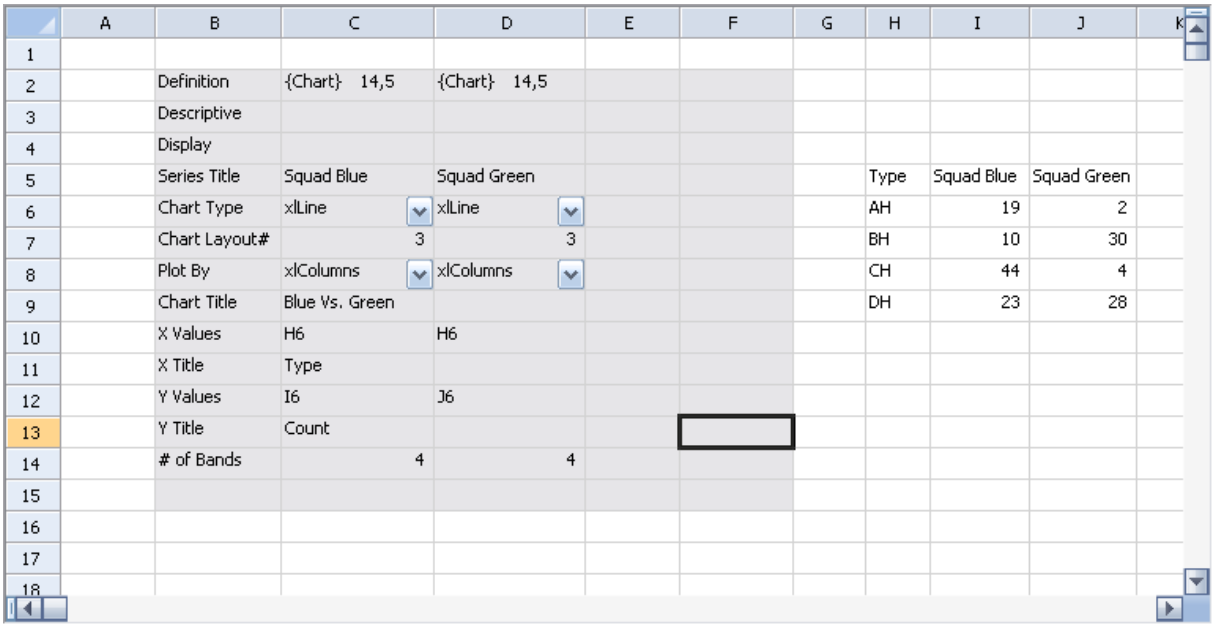
5.2.3.6 Define Chart Skeleton

In some circumstances, you may want to manually define a list of X-values and Y-values one by one. Each value could be computed by a Microsoft Office Excel formula, constant value, or cross-referred value; or computed by TEMS Discovery through a *Single Value* report type. TEMS Discovery provides a way to define a chart skeleton and, when generating the final report, TEMS Discovery will create the chart based on the definition.

To define a chart skeleton, right-click the Report Editor and select **Chart Skeleton** from the context menu. As when a chart is defined, an area will be dynamically highlighted in light grey while moving the mouse. At the right-bottom corner of the desired chart area, left-click, and the following definition will be generated in the Report Editor.

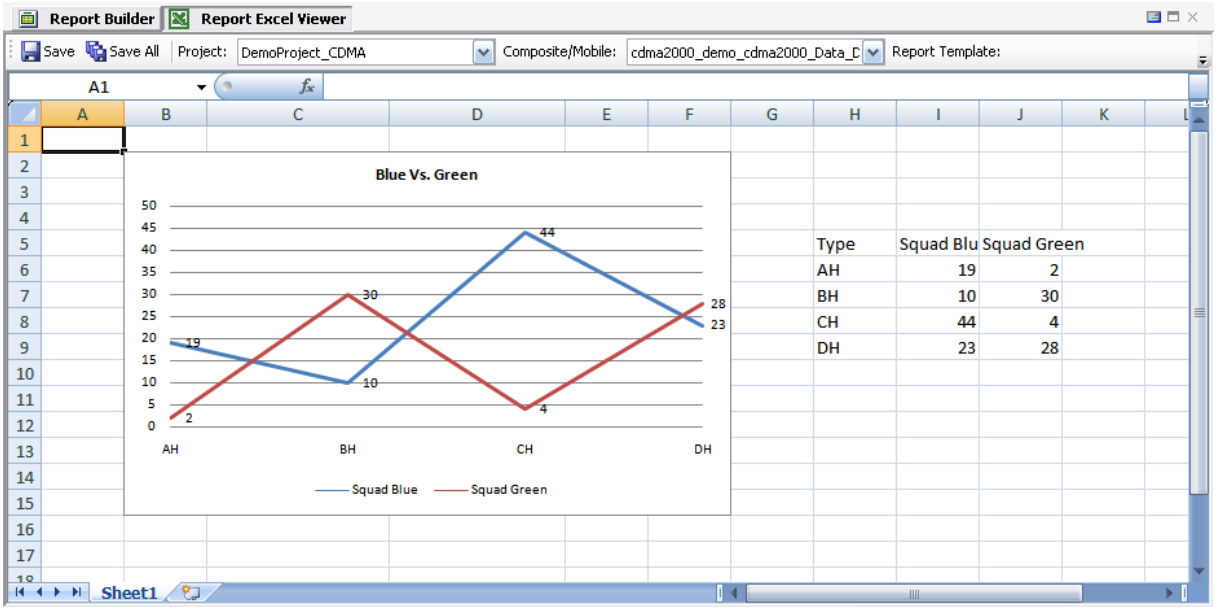


For this skeleton, you need to at least manually define the starting cell label of X values and Y values, along with the *# of Bands*. Cross referencing is allowed, but the format of the reference should be as such: 'Sheet Name'!M24. Be sure to place an exclamation mark (!) after the sheet name. The following is an example of a well-defined chart skeleton.



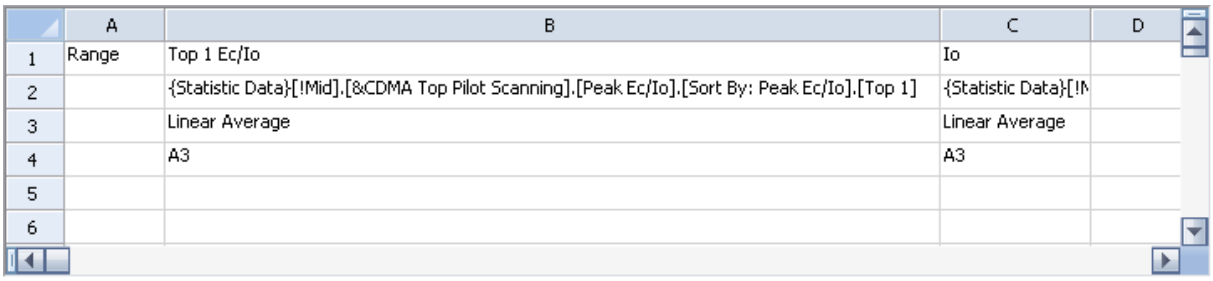
	A	B	C	D	E	F	G	H	I	J	K
1											
2		Definition	{Chart} 14,5	{Chart} 14,5							
3		Descriptive									
4		Display									
5		Series Title	Squad Blue	Squad Green				Type	Squad Blue	Squad Green	
6		Chart Type	xlLine	xlLine				AH	19	2	
7		Chart Layout#	3	3				BH	10	30	
8		Plot By	xlColumns	xlColumns				CH	44	4	
9		Chart Title	Blue Vs. Green					DH	23	28	
10		X Values	H6	H6							
11		X Title	Type								
12		Y Values	I6	J6							
13		Y Title	Count								
14		# of Bands	4	4							
15											
16											
17											
18											

The report template shown above will result in a final report similar to the one shown here:



5.2.3.7 Define Statistic Data

You may choose to describe a metric in a tabular format. Drag-and-drop a metric and select **Statistic Data** in the Report Options. The definition that will be generated is shown below.

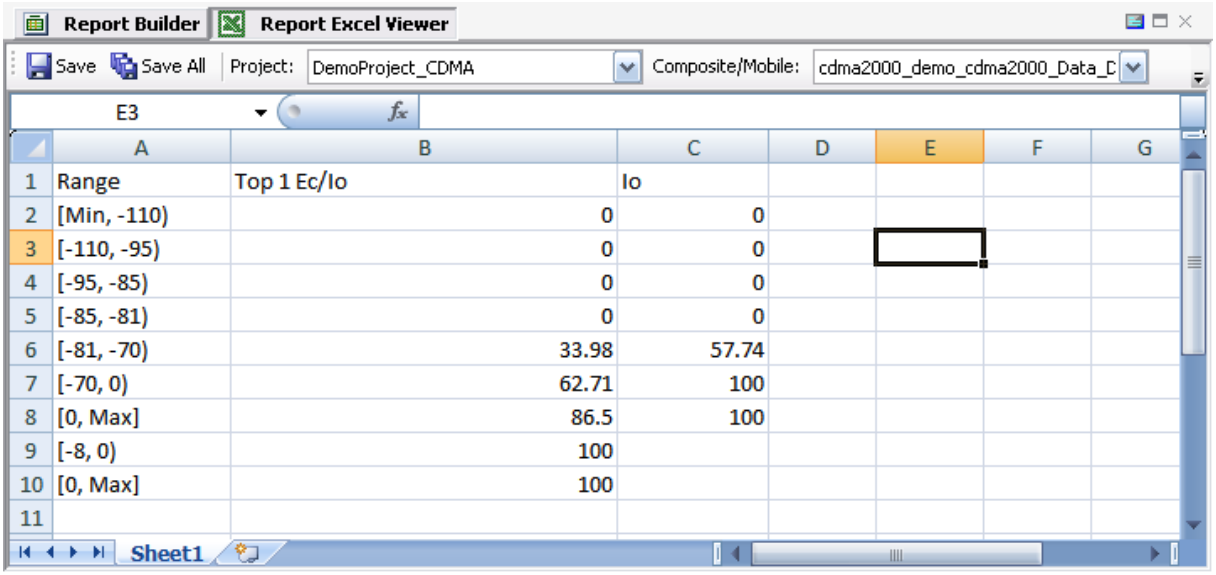


	A	B	C	D
1	Range	Top 1 Ec/Io	Io	
2		{Statistic Data}[!Mid].[&CDMA Top Pilot Scanning].[Peak Ec/Io].[Sort By: Peak Ec/Io].[Top 1]	{Statistic Data}[!	
3		Linear Average	Linear Average	
4		A3	A3	
5				
6				

Figure 1

Cell B2 (the cell that the metric is dropped into) defines the metric information, Cell B3 defines what to compute, and, by default, Cell B4 defines where the starting cell is to place the range. If you don't want the range to be listed, clear the cell. You can list other metrics side-by-side by defining another Statistic Data report in the C column; however, all of the metrics must have the same plot band definition.

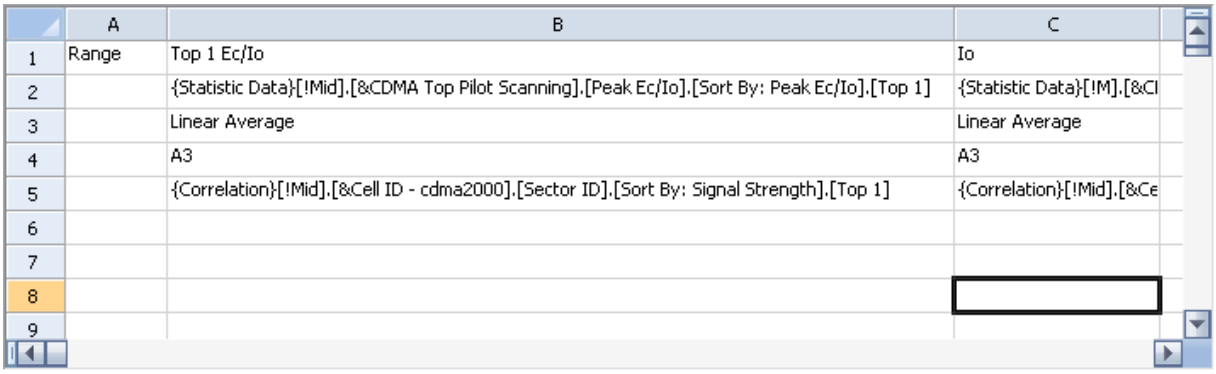
Following is the final report generated:



	A	B	C	D	E	F	G
1	Range	Top 1 Ec/Io	Io				
2	[Min, -110)	0	0				
3	[-110, -95)	0	0				
4	[-95, -85)	0	0				
5	[-85, -81)	0	0				
6	[-81, -70)	33.98	57.74				
7	[-70, 0)	62.71	100				
8	[0, Max]	86.5	100				
9	[-8, 0)	100					
10	[0, Max]	100					
11							

Figure 2

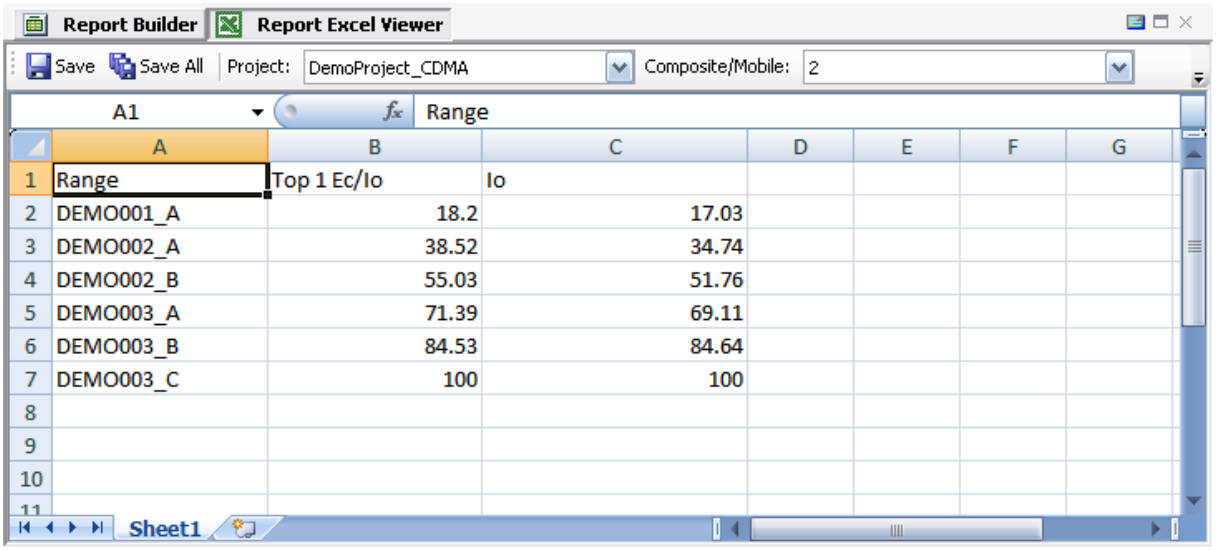
Simply generating statistic data per its own plot band is not enough. More desirable information is the correlation between two metrics. In Figure 1, you can drag-and-drop another metric to Cell B5 and define it as the correlation metric. For example, you can drag-and-drop *Common > Cell ID - cdma2000 > Sector ID > Sort By: Signal Strength > Top 1* into Cell B5, as shown below.



	A	B	C
1	Range	Top 1 Ec/Io	Io
2		{Statistic Data}[!Mid].[&CDMA Top Pilot Scanning].[Peak Ec/Io].[Sort By: Peak Ec/Io].[Top 1]	{Statistic Data}[!M].[&Cl
3		Linear Average	Linear Average
4		A3	A3
5		{Correlation}[!Mid].[&Cell ID - cdma2000].[Sector ID].[Sort By: Signal Strength].[Top 1]	{Correlation}[!Mid].[&Ce
6			
7			
8			
9			

Figure 3

Be aware that if you define other metrics side-by-side, all of these metrics must have the same correlation defined. In this example, Cell C5 must be the same as Cell B5. The final report generated from the above example is shown below:



	A	B	C	D	E	F	G
1	Range	Top 1 Ec/Io	Io				
2	DEMO001_A	18.2	17.03				
3	DEMO002_A	38.52	34.74				
4	DEMO002_B	55.03	51.76				
5	DEMO003_A	71.39	69.11				
6	DEMO003_B	84.53	84.64				
7	DEMO003_C	100	100				
8							
9							
10							
11							

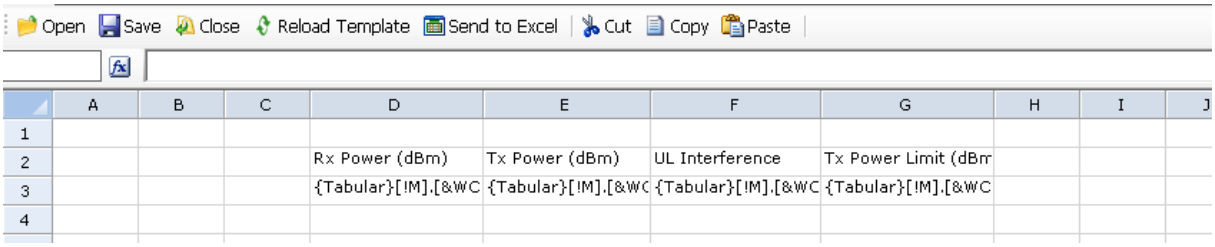
Sheet1

Figure 4

The above example lists the linear average of Ec/Io and Io of each sector's coverage. To correlate with *Cell ID - <technology>* under the *Common* tree node, scanner data and its corresponding cell configuration must all be imported to the same project.

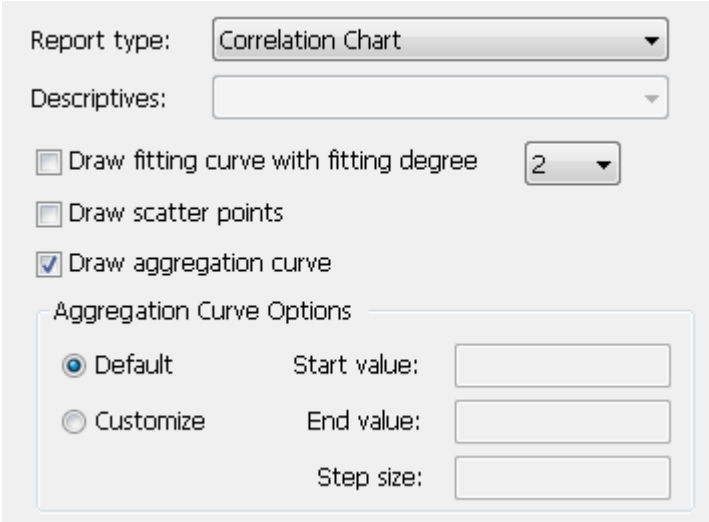
5.2.3.8 Define Tabular List

You may use the Tabular report type to create a tabular list of multiple metrics. You need to reserve at least three columns to the left for Time, Latitude, and Longitude.



5.2.3.9 Define Correlation Chart

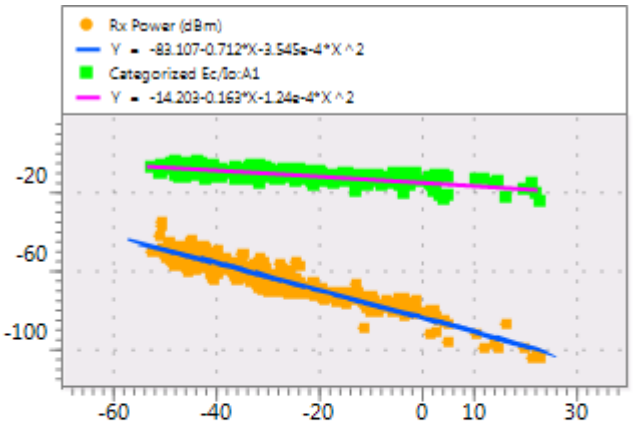
You may include one or more correlation charts in your report template.

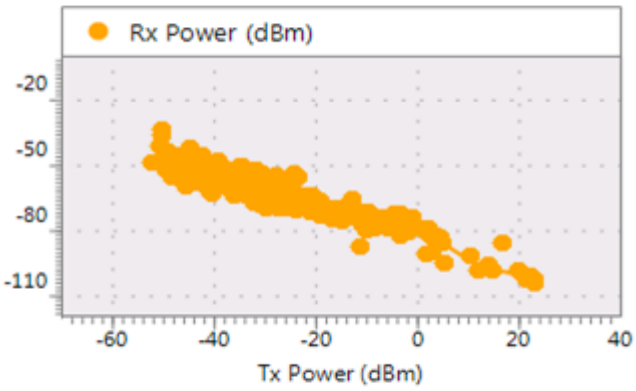


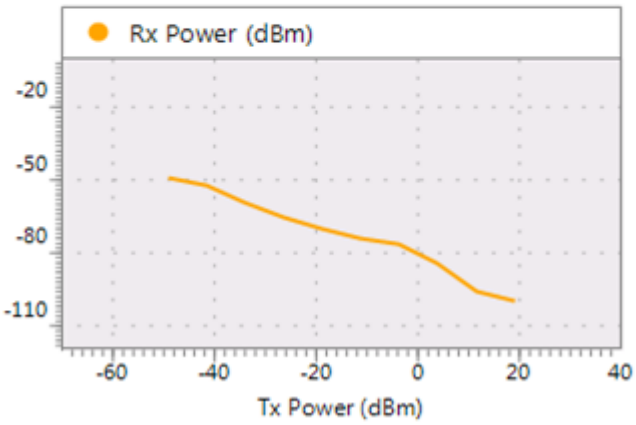
One or more of the following options can be included in a correlation chart:

- **Draw fitting curve with 1~4 fitting degree**
- **Draw scatter points**
- **Draw aggregation curve**. This option allows you to divide the X-axis metrics into multiple steps, and TEMS Discovery will calculate the corresponding aggregate values and Y-axis metrics for each of the steps and draw lines connecting adjacent data points.
  - With the *Default* option, TEMS Discovery will find the ranges from all available data points and automatically assign up to 10 steps.
  - For predictable X-axis steps, the *Customize* option is recommended. Define Start value, End value, and Step size according to the nature of the X-axis metric.

Following is the sample output expected for a final report:





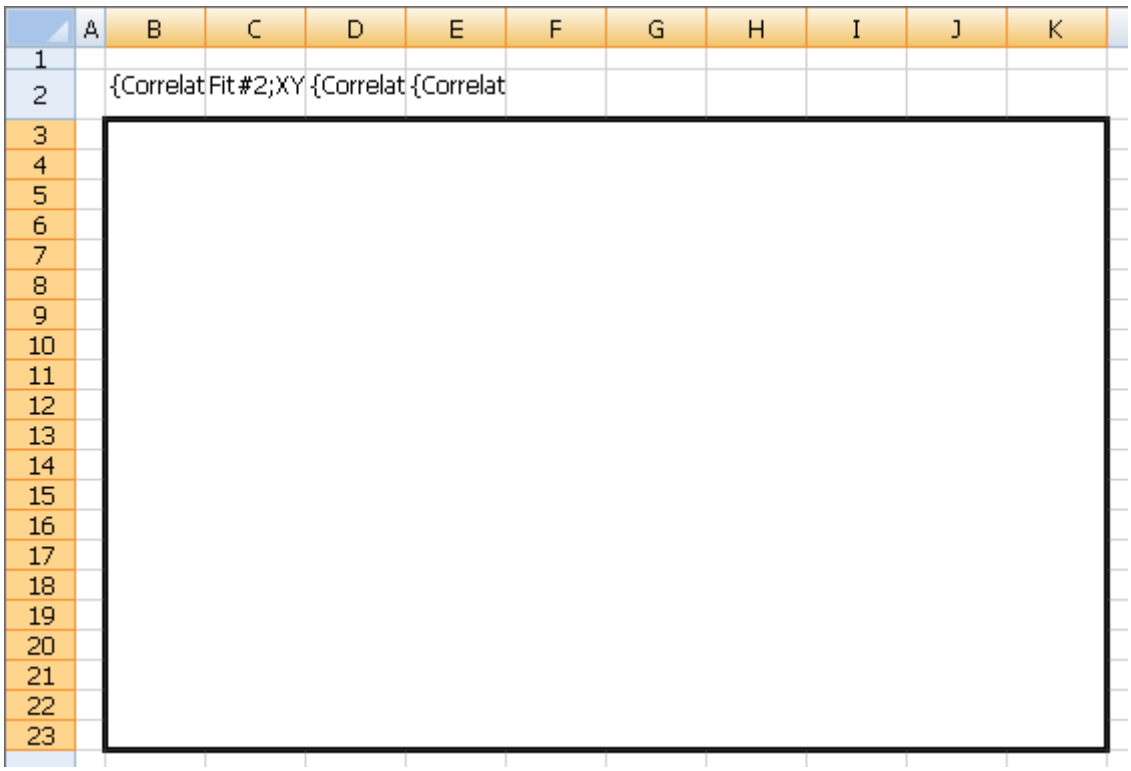


To create a report like this, do the following:

1. Drag-and-drop the X-axis metric from the Metric List into a cell in the report template.
2. Select Correlation Chart as the report type, and define other settings as necessary.
3. Click OK, and drag the mouse to define the chart space.
4. Left-click to finalize the chart space.
5. Drag-and-drop the Y-axis metric from the Metric List into the gray chart space.
6. Repeat step 5 for additional Y-axis metrics.

7. Resize cell height or cell width and format the cells in Excel.

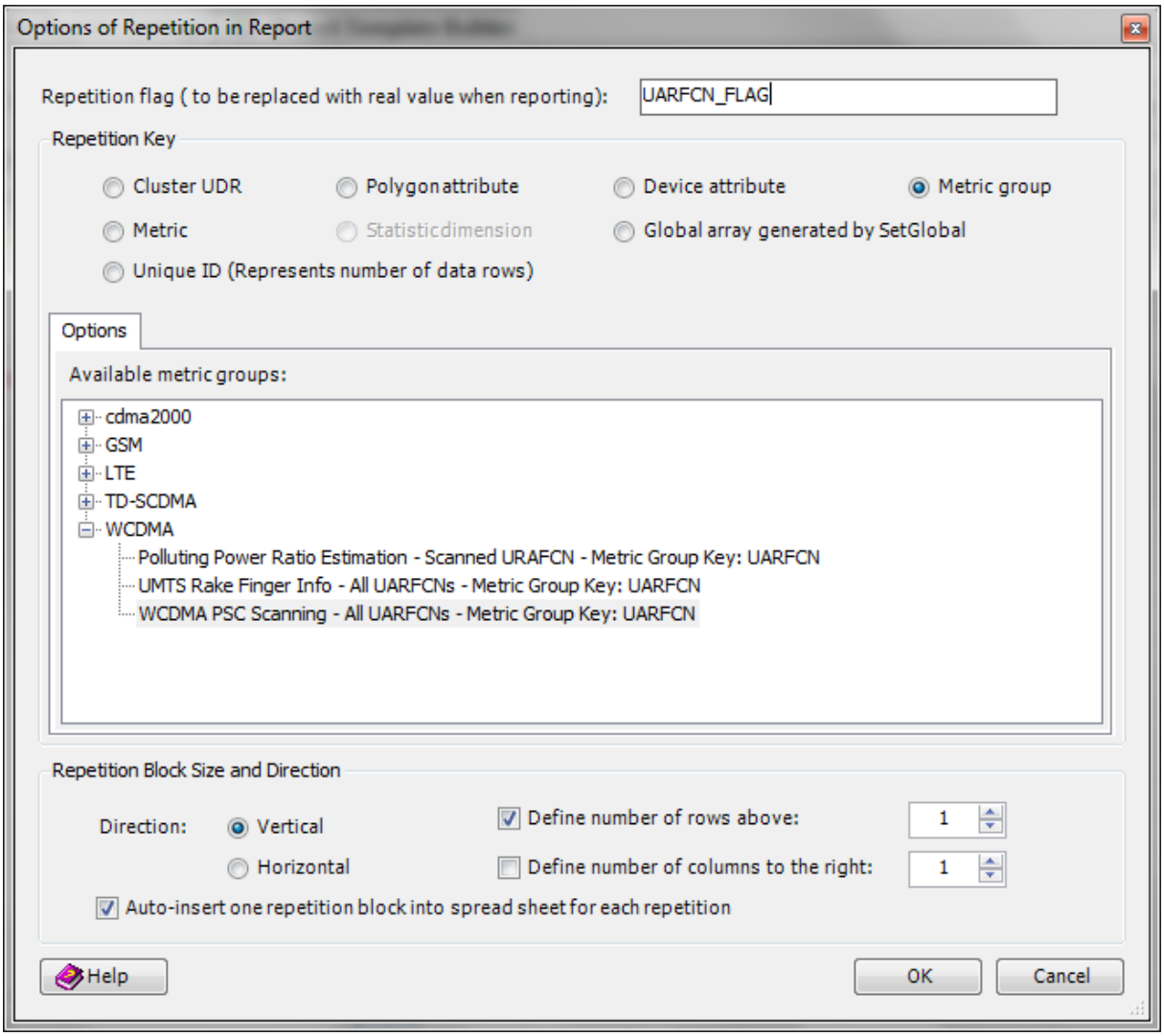
The final template may look something like this. The content above the chart space is automatically filled by TEMS Discovery and will not appear in the final report output. Experienced users may further edit the contents of those cells to alter the final output.



5.2.3.10 Options of Repetition in Report

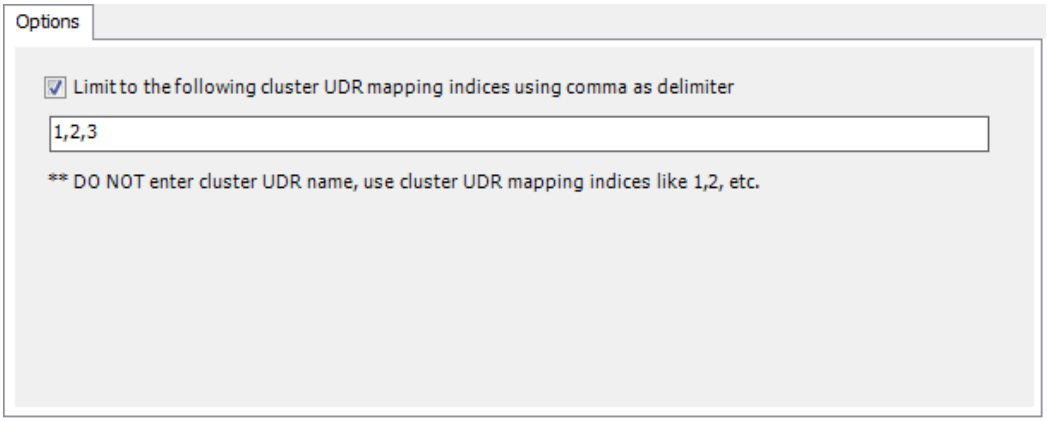
In cases where you need to generate a report with repetitive information (e.g., for each cluster UDR), you can define the report type and descriptive in a block of cells in the report template as usual, and then provide repetition options in the first cell immediately under the definition block. TEMS Discovery can then automatically repeat the report generation of the definition block for each available cluster UDR in the data source.

To access the following dialog, right-click at the first cell immediately under the definition block on which you intend to repeat, and select **Repetition in Report** from the context menu.



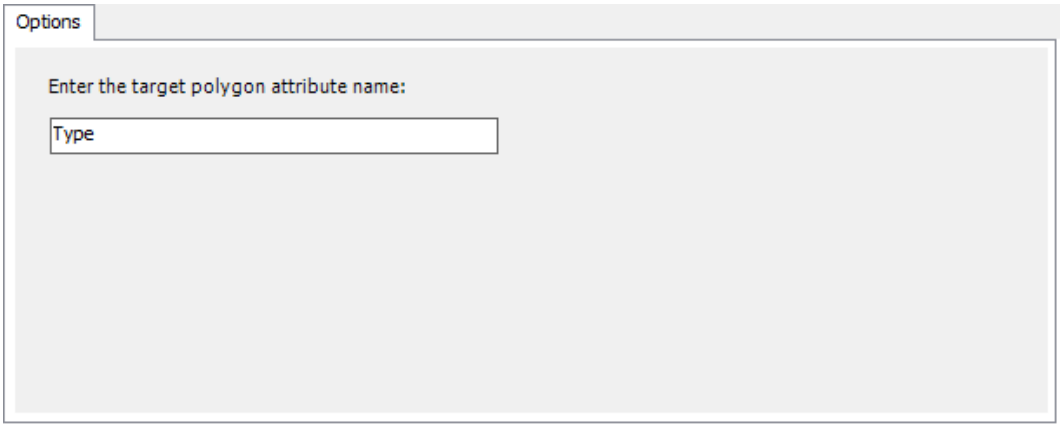
- **Repetition Flag**. Repetition flag is a user-defined flag that will be placed in any cell of the definition block as a placeholder. During report generation, this placeholder will be replaced with the value of the Repetition Key. Select Repetition Flag from the right-click context menu, and place the flag at the desired location. If the flag will be placed inside any text, including online script, embrace the flag with braces, like this: "{{RepeatFlag}ServingSector}"

- **Repetition Key**. You can select from several different repetition keys:
  - **Cluster UDR**. Select this option to make TEMS Discovery repeatedly report on each available cluster UDR in the data source. You can also enter a list of cluster UDR mapping indexes to limit the reporting scope, using commas as delimiters to separate the indices. For more information about cluster UDR mapping, see Project Properties.

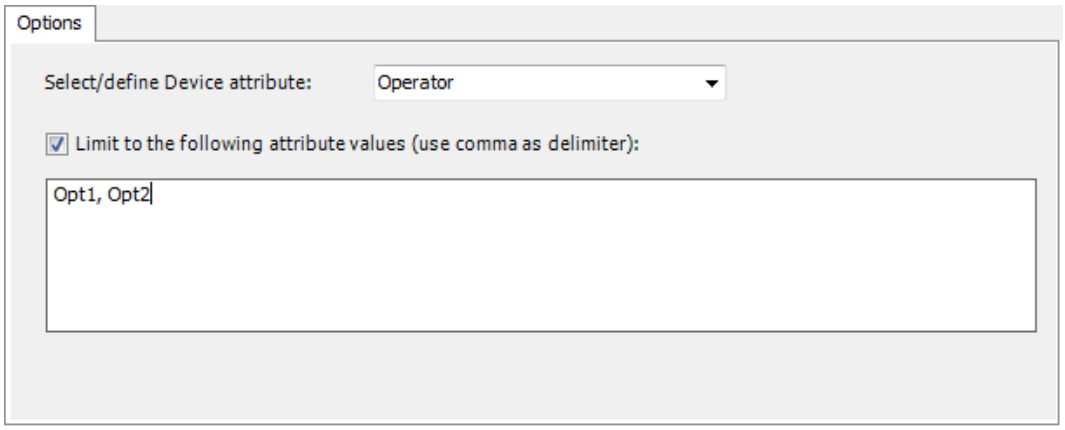


  - **Polygon attribute**. A cluster UDR can contain a number of polygons, and each polygon can be assigned to a number of attributes. Those attributes can be utilized as a repetition key for reporting. For more information about creating UDRs and assigning attributes to polygons, see GIS in Map View.

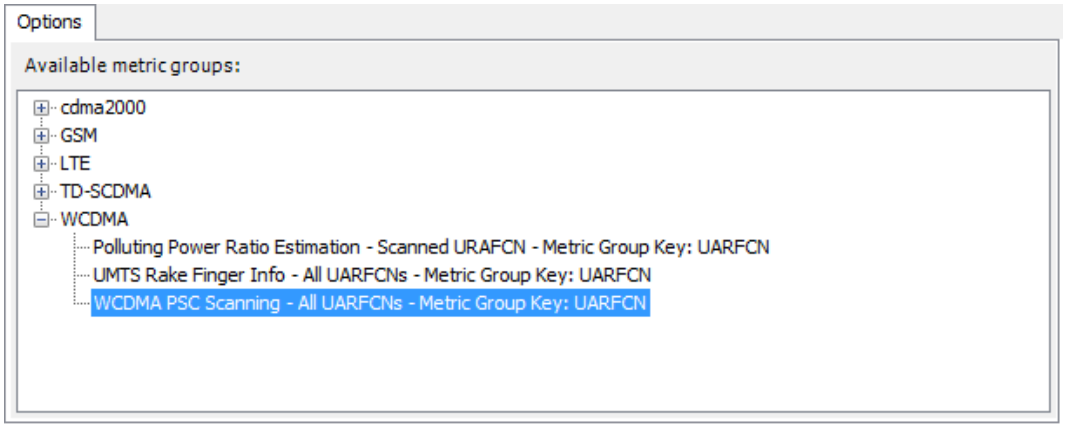
    For this repetition type, select a default geo region in the Report Generation dialog so that the definition block will be reported on polygon regions with each unique attribute defined in this default geo region.



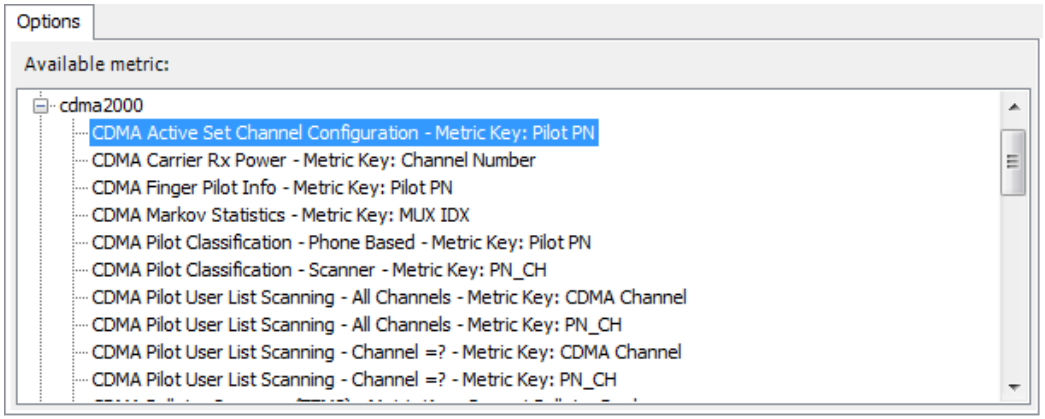
– **Device attribute**. Select this option to make TEMS Discovery repeatedly report on each available device attributes in the data source. You can also enter a list of attribute values to limit the reporting scope, using commas as delimiters to separate the values. Device attributes will normally be taken from drive test data. For information about creating new device attributes, see Device Attribute Assignment.



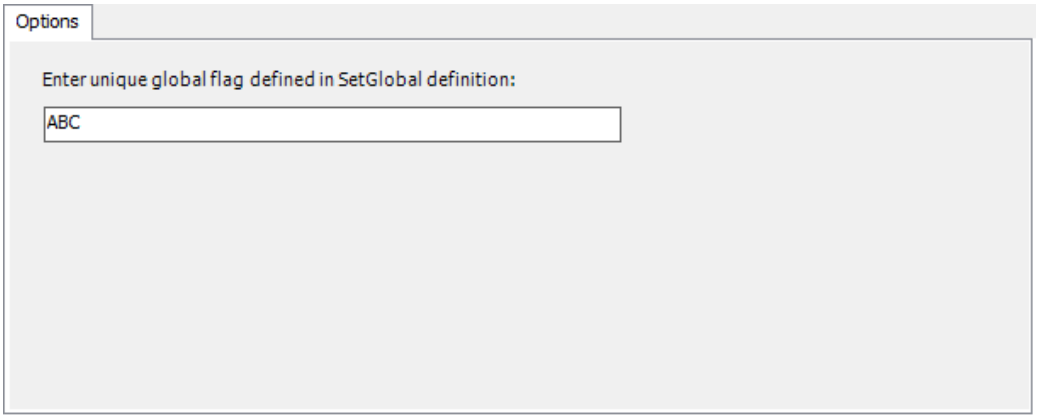
– **Metric Group**. Select this option to make TEMS Discovery repeatedly report on each specific metric group key in the data source.



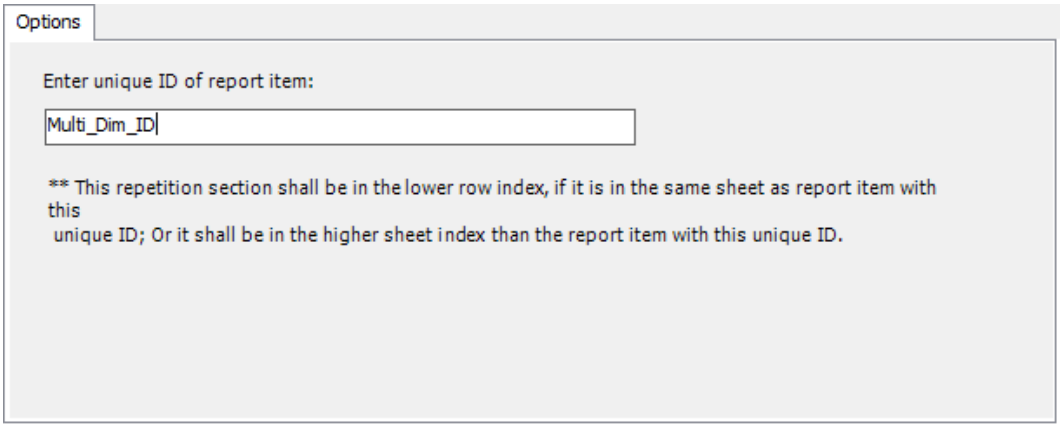
– **Metric**. Select this option to make TEMS Discovery repeatedly report on each distinct value of the specific metric key in the data source.



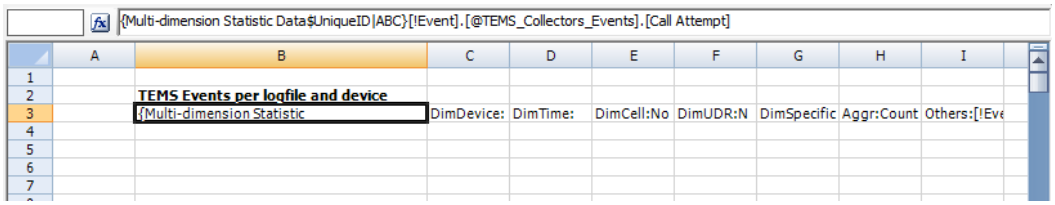
– **Global Array (From SetGlobal)**. Select this option to make TEMS Discovery repeatedly report on the array defined by SetGlobal in Report Options. This array contains distinct values of the selected metric.



– **Unique ID (represents number of data rows)**. The number of rows that will be occupied by the results of report types such as Statistic Data, Multi-dimension Statistic Data, and Tabular is dynamic and unknown in the design stage. However, you can assign a unique global ID (on the *Additional Options* tab in Report Options) for any of these report types, and refer to this unique ID in repetition definition. In this way, you can define the number of repetitions of a block to be the same as the number of data rows generated.

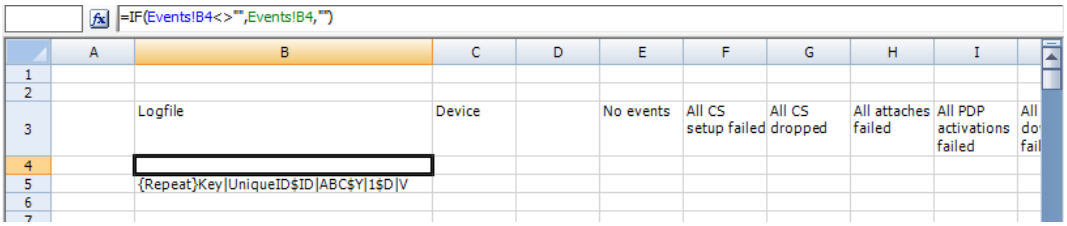


The most useful usage case is to define cross-references to the results of report types. For example, we defined Multi-dimension Statistic with unique ID "ABC" in sheet "Events", as shown below.



In another sheet which must be a sheet not in front of the above sheet, we created a formula "=IF(Events!B4<>"",Events!B4,"")" in Cell B4 (it doesn't have to be in Cell B4) that refers to Cell B4 in the above sheet, "Events."

Then, we defined repetition to repeat Row 4 for the number of times that is represented by the unique ID "ABC" in sheet "Events". As a result, Row 4 will be repeated by the same number of times as the number of data rows generated for the defined Multi-dimension Statistic, and each row will be calculated corresponding to each data row of the multi-dimension statistic data.



5.2.4 Generating Microsoft Office Word Report

TEMS Discovery word reporting currently supports tabular data, charts and images (map, correlation chart). Word report can also have static contents (contents that are not required to be replaced during report generation).

5.2.4.1 Requirement

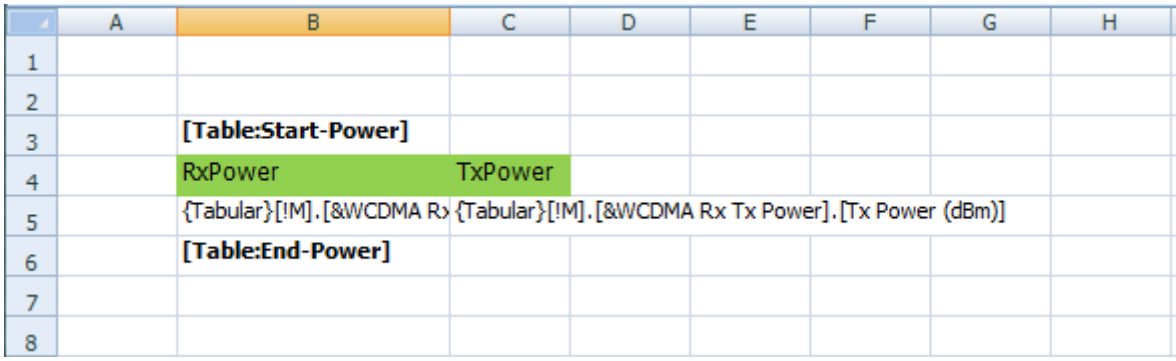
- Microsoft Office Word 2007 or current
- TEMS Discovery report template (Microsoft Office Excel file .XLSX format) for word report.
- MS-Word report template (.Docx) based to on the TEMS Discovery .XLSX format report template.

5.2.4.2 MS-Word reporting template

To generate MS-Word report from TEMS Discovery; provide a Microsoft Office Word file containing place holder for tabular data, chart or image. The MS-Word files name should be same name as the TEMS Discovery Excel (.XLSX) report template file name and should have .Docx extension.

5.2.4.2.1 Import tabular data from excel report template

To import tabular data (rows and columns) in MS-Word mark the rows in the TEMS Discovery excel report template with [Table:Start-TableName] and [Table:End-tag]. See the following example for tabular data with tag name 'Power'.



There are 2 ways to import ‘Power’ tabular data in Ms-Word report from the MS-Excel template.

- Just add a line in MS-Word report template with text ‘{table:power} ‘
- Or create a table with column header ‘RxPower’ and ‘TxPower’ and write {power} in the first cell of the table.

RxPower	TxPower
{power}	

5.2.4.2.2 Import Chart from Excel report template

Provide all the charts in TEMS Discovery excel report template a unique title to include them in the MS-Word report. The following picture shows a chart titled ‘Agg. Active Ec/Io (db)’.

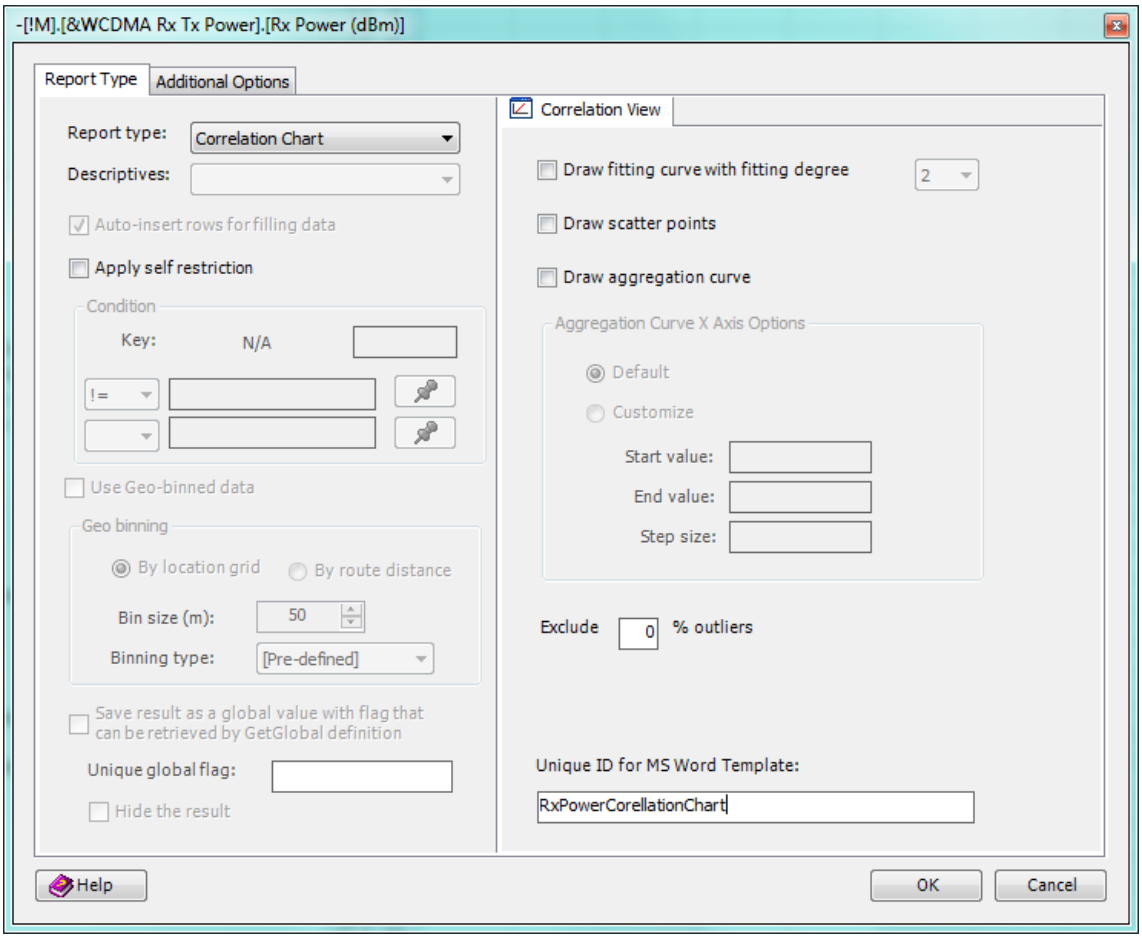
Chart

Definition	{Chart}[!M].[&WCDMA C	{Chart}[!M].[&WCDMA Cell Measurements].[Agg. Active Ec/Io (dB)]
Descriptive	Count	Count
Display	PDF	CDF
Series Title	Ec/Io PDF	Ec/Io CDF
Chart Type	xlColumnClustered	xlLine
Chart Layout#		
Plot By		
Chart Title	Agg. Active Ec/Io (dB)	
X Values		
X Title		
Y Values		
Y Title		
# of Bands		
Sort Order		
Correlation Key		

To include this chart in the MS-Word report, add a line with text ‘{chart: Agg. Active Ec/Io (db)} ‘.

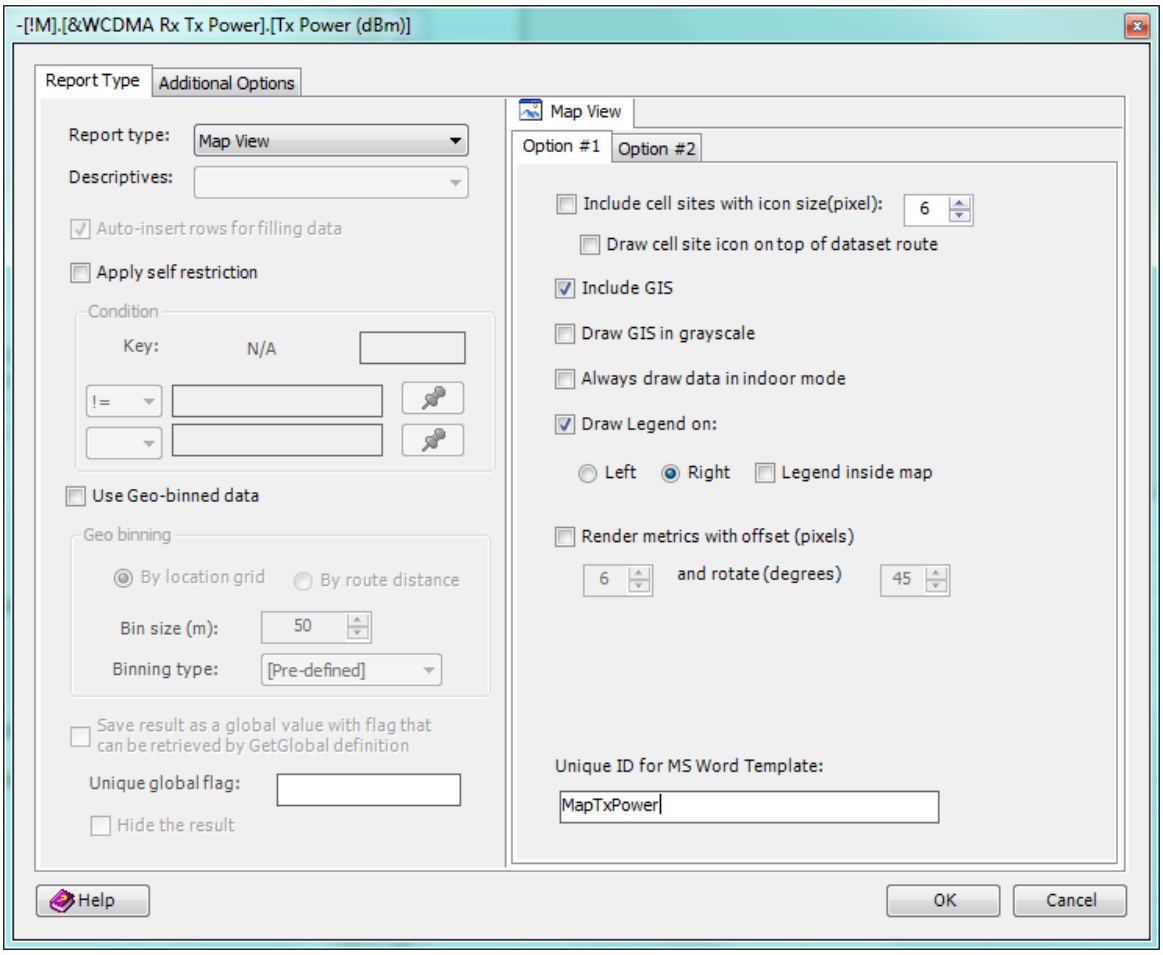
5.2.4.2.3 Import image from Excel report template

- **Correlation Chart** – provide a unique name to the correlation chat in TEMS Discovery excel report template. See the figure below.



Here the correlation chart ID is 'RxPowerCorrelationChart'. To include this chart to Ms-Word report, add line with text '{Image: RxPowerCorrelationChart.jpg}'.

- **Map View** – provide a unique ID to the map object in the TEMS Discovery excel report template. See the figure below.

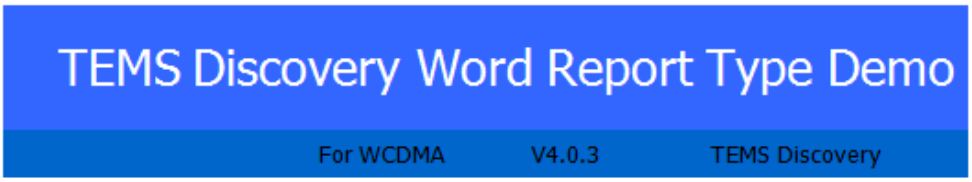


To include the ‘MapTxPower’ in MS-Word report add a line with text ‘{Image:MapTxPower.jpg}’ in the MS-Word report template.

General syntax for adding an image in the MS-Word report:

{Image:ImageName}

5.2.4.3 Sample Word Report Template



Tabular Data 1

{table:power}

Tabular Data 2

RX Power	TX Power
{power}	

Chart

{chart: Agg. Active Ec/Io (db)}

Correlation Chart

{Image: RxPowerCorrelationChart.jpg}

Map View

{Image:MapTxPower.jpg}

5.2.5 Generate Report From Report Template

A report can be generated from a report template in the following ways:

From Walk-U-Through

1. Go to the step *Generate Report*.
2. Select the target project from the combo box.
3. Select the target data.
4. Click the **Generate Report** button.
5. The report will be displayed in Microsoft Excel/MS-Word.

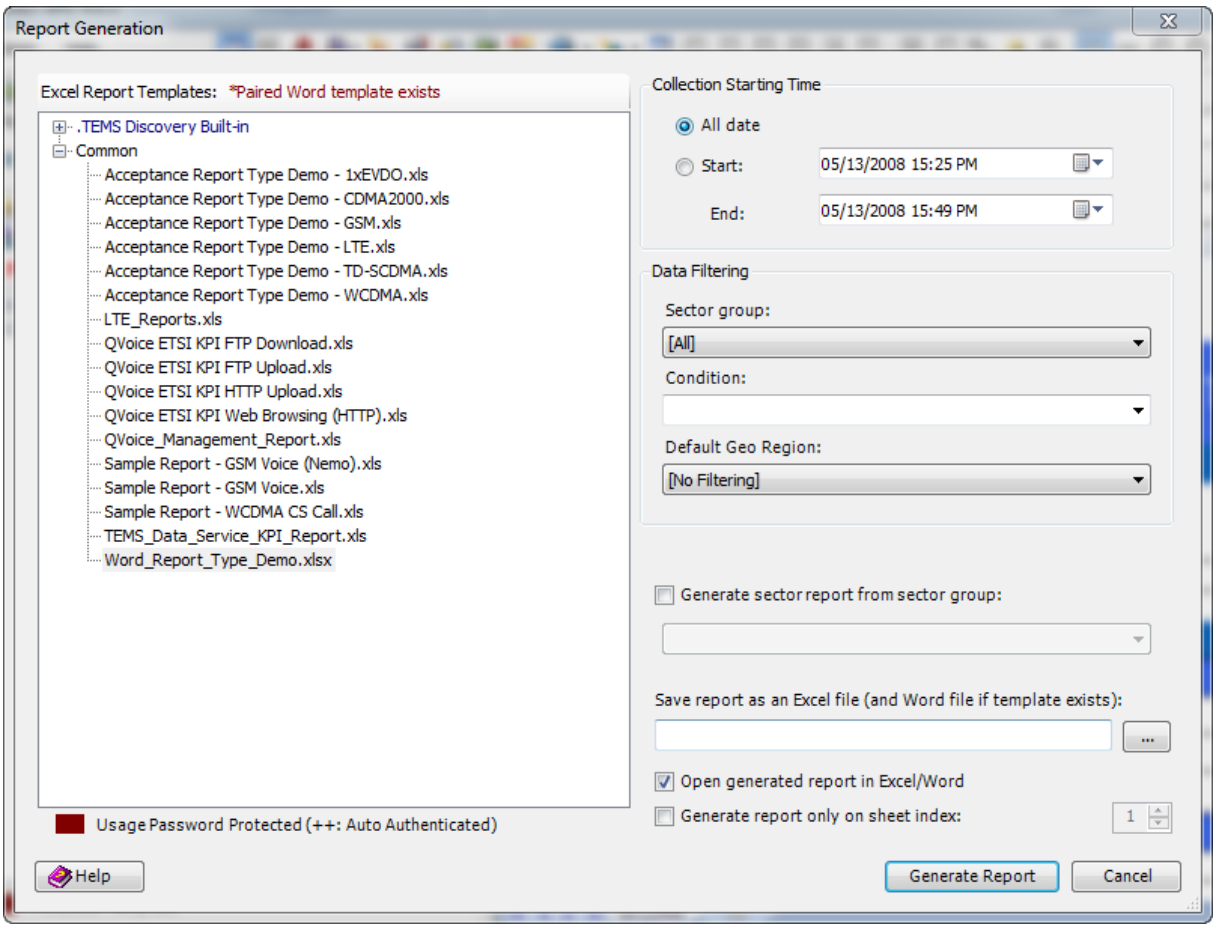
From Project List

1. Expand the tree view to the target mobile data or dataset; then right-click on that target.
2. Select **Generate Report**.
3. The report will be displayed in Microsoft Excel/MS-Word.

From Data Explorer

1. Expand the tree view to the target mobile data or dataset; then right-click on that target.
2. Select **Generate Report**.
3. The report will be displayed in Microsoft Excel/MS-Word.

Before the report can be generated from the template, the following Report Generation dialog will open:



- **Collection Date**. You can report all the data in the selected dataset/mobile, or you can report only on the data collected from a specified start date to a specified end date.
- **Data Filtering**

  - **Sector Group**. You can report data from all sector groups, or you can select a particular sector group.
  - **Condition**. You can select one or multiple condition expressions on which to filter data points, so that only the data points satisfying the condition expressions will be computed. See Script Builder for how to define a condition expression.
  - **Default Geo Region**. You can report only the data that falls within a selected geo region. In Project Properties, you can assign a cluster index for those UDRs created in the Map View. If you selected *Consider data only in cluster region index* and given an index (see Report Options) in the report template, the target data will be filtered by those indexed cluster UDRs. If you do not define cluster region filtering for some data, that data will be filtered by the default geo region selected in this dialog.

- **Generate sector report from sector group**. By identifying a sector group, you can force TEMS Discovery to generate a report on that sector group only.
- **Save report as an Excel file (and Word file if template exists)**. You can use the Windows browser to save the report to an Excel file in a target folder, and if the paired Word report template exists, the output Word file will be saved in the same folder.
- **Open generated report in Excel/Word**. This option will cause the report to be automatically opened when the generation process is finished.
- **Generate report only on sheet index**. By providing a sheet index, you can force TEMS Discovery to generate a report on that particular sheet only.

After all options have been selected, select a report template and click **Generate Report**. The final report can also be saved to a file.

If an Excel template has a paied Word template, in another word, has the Word template with the same file name, an indicator “*Paired Word template exists” will be display in the header of the tree view after Excel template selected.

The final report generated will be in the same Excel format as the report template. If you select a report template with the extension xls, the final report will have an extension of xls, and the same to extension xlsx. In addition, if the paired Word template exists, a final Word report will be generated in the same target folder.

5.2.6 Available Chart Types

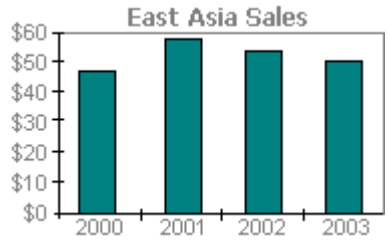
Microsoft Excel supports many kinds of charts to help you display data in ways that are meaningful to your audience. You can easily select the type you want from a list of standard or custom chart types.

Following is an overview of some standard chart types and their subtypes. For more detailed information, please refer to Microsoft's online resources.

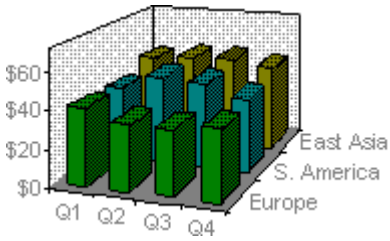
5.2.6.1 Column Charts

A column chart shows data changes over a period of time or illustrates comparisons among items. Column charts have the following chart sub-types:

- **Clustered Column**. This type of chart compares values across categories. It is also available with a 3-D visual effect. As shown in the following chart, categories are organized horizontally, and values vertically, to emphasize variation over time.



- **Stacked Column**. This type of chart shows the relationship of individual items to the whole, comparing the contribution of each value to a total across categories. It is also available with a 3-D visual effect.
- **100% Stacked Column**. This type of chart compares the percentage each value contributes to a total across categories. It is also available with a 3-D visual effect.
- **3-D Column**. This type of chart compares data points along two axes. For example, in the following 3-D chart, you can compare four quarters of sales performance in Europe with the performance of two other divisions.

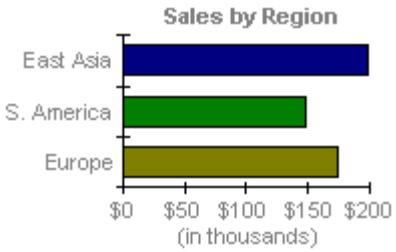


NOTE: Data points are individual values plotted in a chart and represented by bars, columns, lines, pie or doughnut slices, dots, and various other shapes called data markers. Data markers of the same color constitute a data series.

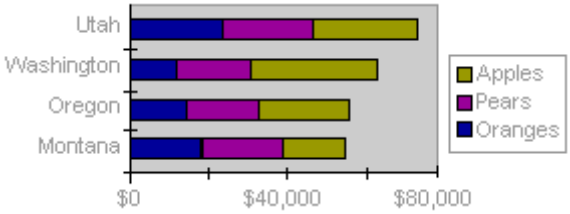
5.2.6.2 Bar Charts

A bar chart illustrates comparisons among individual items. Bar charts have the following chart sub-types:

- **Clustered Bar**. This type of chart compares values across categories. It is also available with a 3-D visual effect. In the following chart, categories are organized vertically, and values horizontally, to place focus on comparing the values.



- **Stacked Bar**. This type of chart show the relationship of individual items to the whole. It is also available with a 3-D visual effect.

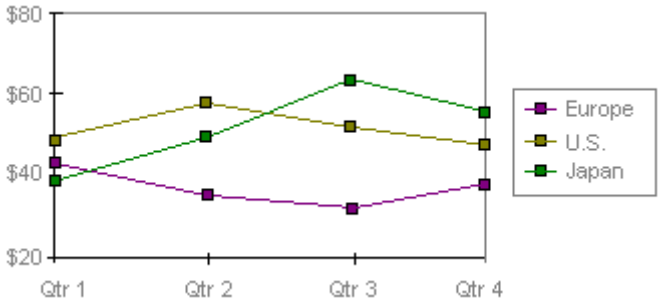


- **100 % Stacked Bar**. This type of chart compares the percentage each value contributes to a total across categories. It is also available with a 3-D visual effect.

5.2.6.3 Line Charts

A line chart shows trends in data at equal intervals. Line charts have the following chart sub-types:

- **Line**. This type of chart displays trends over time or categories. It is also available with markers displayed at each data value.



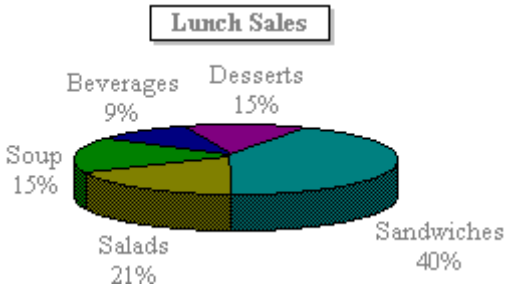
- **Stacked Line**. This type of chart displays the trend of the contribution of each value over time or categories. It is also available with markers displayed at each data value.

- **100% Stacked Line**. This type of chart displays the trend of the percentage each value contributes over time or categories. It is also available with markers displayed at each data value.
- **3-D Line**. This is a line chart with a 3-D visual effect.

5.2.6.4 Pie Charts

A pie chart shows the size of items that make up a data series (data series: Related data points that are plotted in a chart. Each data series in a chart has a unique color or pattern and is represented in the chart legend. You can plot one or more data series in a chart. Pie charts have only one data series.), proportional to the sum of the items. It always shows only one data series and is useful when you want to emphasize a significant element in the data. Pie charts have the following chart sub-types:

- **Pie**. This type of chart displays the contribution of each value to a total. It is also available with a 3-D visual effect, as shown in the following chart.

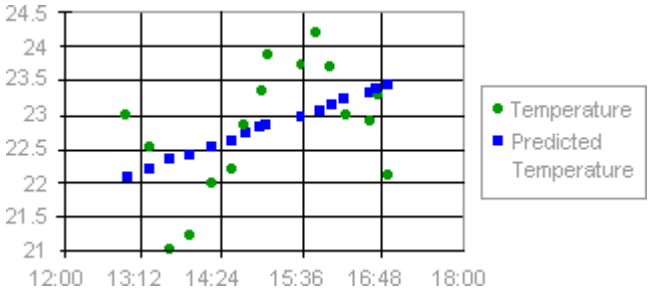


- **Exploded Pie**. This type of chart displays the contribution of each value to a total while emphasizing individual values. It is also available with a 3-D visual effect.
- **Pie of Pie**. This is a pie chart with user-defined values extracted and combined into a second pie. For example, to make small slices easier to see, you can group them together as one item in a pie chart and then break down that item in a smaller pie or bar chart next to the main chart.
- **Bar of Pie**. This is a pie chart with user-defined values extracted and combined into a stacked bar. More information

5.2.6.5 XY (Scatter) Charts

An xy (scatter) chart shows the relationships among the numeric values in several data series (data series: Related data points that are plotted in a chart. Each data series in a chart has a unique color or pattern and is represented in the chart legend. You can plot one or more data series in a chart. Pie charts have only one data series.), or plots two groups of numbers as one series of xy coordinates. Scatter charts are commonly used for scientific data and have the following chart sub-types:

- **Scatter**. This type of chart compares pairs of values. For example, the following scatter chart shows uneven intervals (or clusters) of two sets of data.



When you arrange your data for a scatter chart, place x values in one row or column, and then enter corresponding y values in the adjacent rows or columns.

Time	Temp.	Predicted Temp.
13:01	23.0	22.1
13:25	22.5	22.2
13:45	21.0	22.3

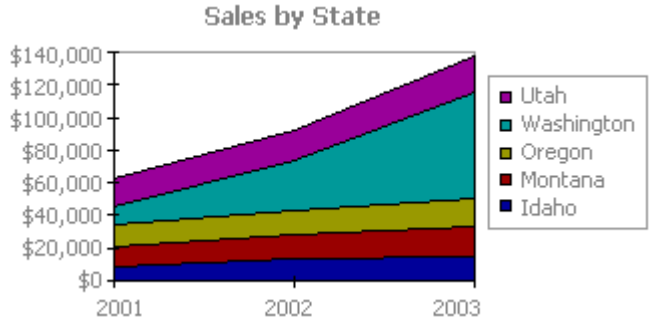
X values Y values

- **Scatter with Data Points Connected by Lines**. This type of chart can be displayed with or without straight or smoothed connecting lines between data points. These lines can be displayed with or without markers.

5.2.6.6 Area Charts

An area chart emphasizes the magnitude of change over time. Area charts have the following chart sub-types:

- **Area**. This type of chart displays the trend of values over time or categories. It is also available with a 3-D visual effect. By displaying the sum of the plotted values, an area chart also shows the relationship of parts to a whole. For example, the following area chart emphasizes increased sales in Washington and illustrates the contribution of each state to total sales.

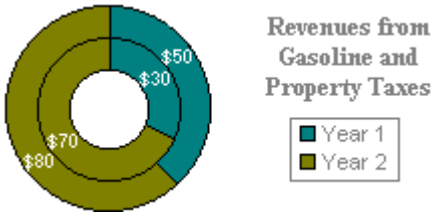


- **Stacked Area**. This type of chart displays the trend of the contribution of each value over time or categories. It is also available with a 3-D visual effect.
- **100% Stacked Area**. This chart type displays the trend of the percentage each value contributes over time or categories. It is also available with a 3-D visual effect.

5.2.6.7 Doughnut Charts

Like a pie chart, a doughnut chart shows the relationship of parts to a whole; however, it can contain more than one data series (data series: Related data points that are plotted in a chart. Each data series in a chart has a unique color or pattern and is represented in the chart legend. You can plot one or more data series in a chart. Pie charts have only one data series.). Doughnut charts have the following chart sub-types:

- **Doughnut**. This type of chart displays data in rings, where each ring represents a data series. For example, in the following chart, the inner ring represents gas tax revenues, and the outer ring represents property tax revenues.

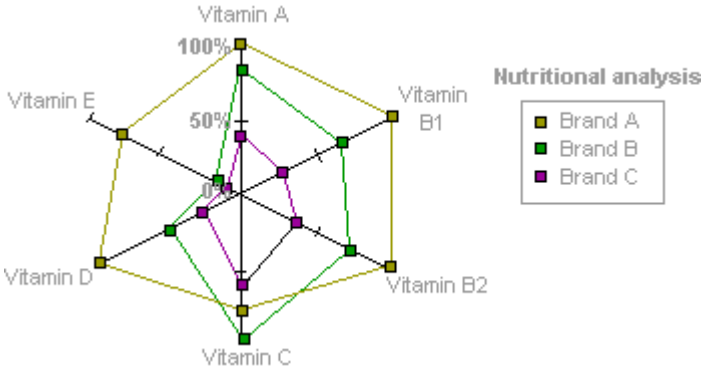


- **Exploded Doughnut**. This chart type is like an exploded pie chart, but it can contain more than one data series.

5.2.6.8 Radar Charts

A radar chart compares the aggregate values of a number of data series (data series: Related data points that are plotted in a chart. Each data series in a chart has a unique color or pattern and is represented in the chart legend. You can plot one or more data series in a chart. Pie charts have only one data series.). Radar charts have the following chart sub-types:

- **Radar**. This type of chart displays changes in values relative to a center point. It can be displayed with markers for each data point. For example, in the following radar chart, the data series that covers the most area, Brand A, represents the brand with the highest vitamin content.



- **Filled Radar**. In this type of chart, the area covered by a data series is filled with a color.

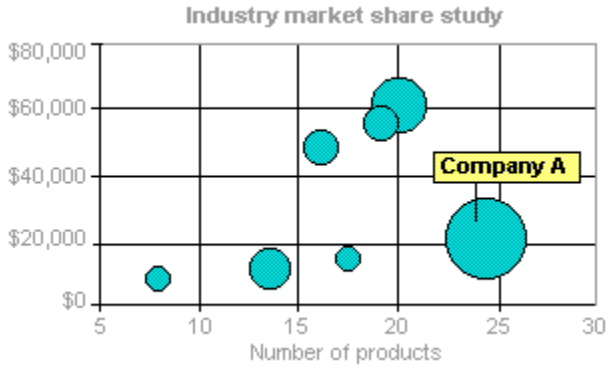
5.2.6.9 Bubble Charts

A bubble chart is a type of xy (scatter) chart. It compares sets of three values and can be displayed with a 3-D visual effect. The size of the bubble, or data marker (data marker: A bar, area, dot, slice, or other symbol in a chart that represents a single data point or value that originates from a worksheet cell. Related data markers in a chart constitute a data series.) indicates the value of a third variable. To arrange your data for a bubble chart, place the x values in one row or column, and enter corresponding y values and bubble sizes in the adjacent rows or columns. For example, you would organize your data as shown in the following picture.

No. of products	Sales	Market share %
14	$11,200	13
20	$60,000	23
18	$14,400	5

X values Y values Bubble sizes

The following bubble chart shows that Company A has the most products and the greatest market share, but not the highest sales.



5.2.6.10 Stock Charts

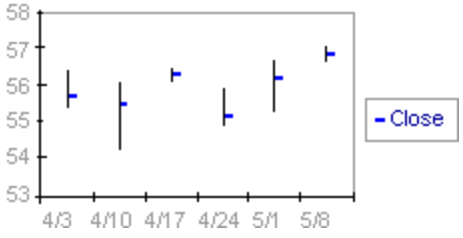
This chart type is most often used for stock price data, but can also be used for scientific data (for example, to indicate temperature changes). You must organize your data in the correct order to create stock charts. Stock charts have the following chart sub-types:

- **High-Low-Close**. The high-low-close chart is often used to illustrate stock prices and requires three series of values in the following order (high, low, and then close).

Arrange your data in this order...

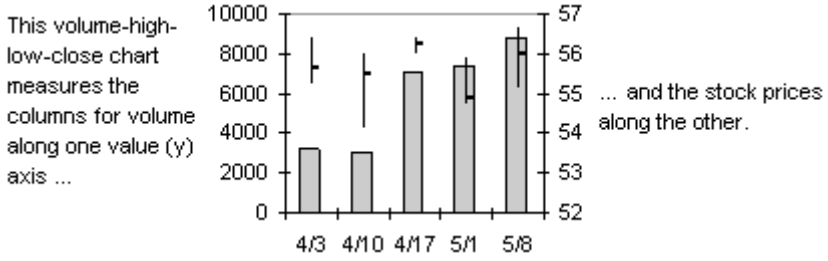
Date	High	Low	Close
4/3	56 3/8	55 1/4	55 5/8
4/10	56	54 1/8	55 1/2
4/17	56 3/8	56	56 1/4

... to create a high-low-close chart.



- **Open-High-Low-Close**. This type of chart requires four series of values in the correct order (open, high, low, and then close).

- **Volume-High-Low-Close**. This type of chart requires four series of values in the correct order (volume, high, low, and then close). The following stock chart measures volume using two value axes: one for the columns that measure volume, and the other for the stock prices.

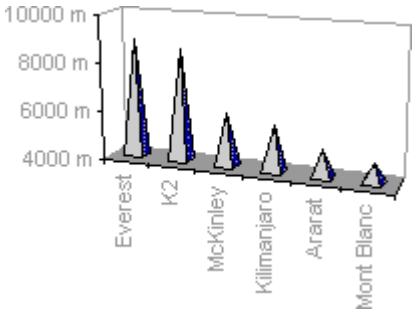


- **Volume-Open-High-Low-Close**. This type of chart requires five series of values in the correct order (volume, open, high, low, and then close). More information

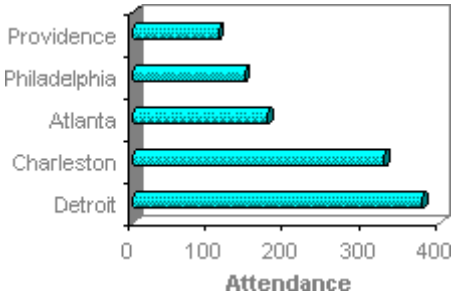
5.2.6.11 Cylinder, Cone, or Pyramid Charts

These chart types use cylinder, cone, or pyramid data markers to lend a dramatic effect to column, bar, and 3-D column charts. Much like column and bar charts, cylinder, cone, and pyramid charts have the following chart sub-types:

- **Column, Stacked Column, or 100% Stacked Column**. The columns in these types of chart are represented by cylindrical, conical, or pyramid shapes.



- **Bar, Stacked Bar, or 100% Stacked Bar**. The bars in these types of chart are represented by cylindrical, conical, or pyramid shapes.



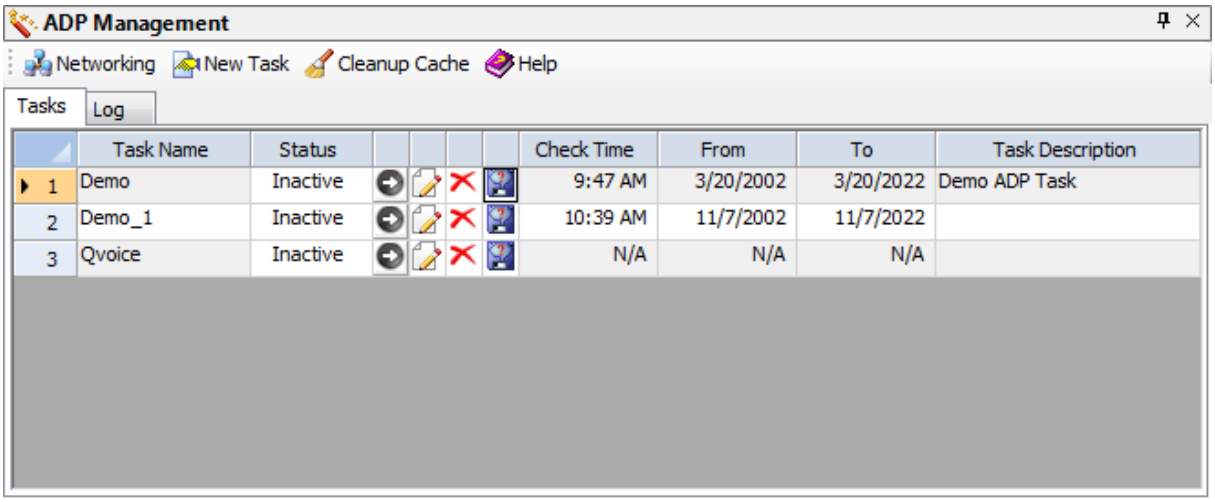
- **3-D Column**. The 3-D columns in this type of chart are represented by cylindrical, conical, or pyramid shapes.

5.3 ADP Management

Automatic Data Processing (ADP) is an advanced configurable function that monitors newly arrived drive test data, automatically imports the data, generates reports, deposits the reports to a specified location, and/or sends the reports via email. ADP allows multiple computers to use distributed data processing. See Data Networking Configuration for more information.

The ADP Management window can be accessed in the following ways:

- Selecting **ADP Management** from the **Tools** menu on the Main Window.
- Clicking the **Automatic Data Processing** button on the Main Window toolbar.



You can create a new ADP task by clicking the **New Task** button on the toolbar and following the wizard steps.

ADP tasks can be defined in the following ways:

- A purely file monitoring task that monitors file folders to import and processes the data files into TEMS Discovery.
- A purely output generating task that generates output (pdf and/or report) from project/datasets.
- A dual file monitoring and output task.

The *Tasks* tab on the ADP Management window lists the created ADP tasks in a table with the following columns and functions:

- **Task Name**. Shows the name of the task.
- **Status**. Shows the status of the task (e.g., Active or Inactive).
- **Start/Stop** button . Starts or stops a task.
- **Edit/View** button . Edits or views a task definition.
- **Delete** button . Deletes an inactive task.
- **Check Time**. Shows the check time of the output generation.
- **From** and **To**. Shows the date range of the output data.

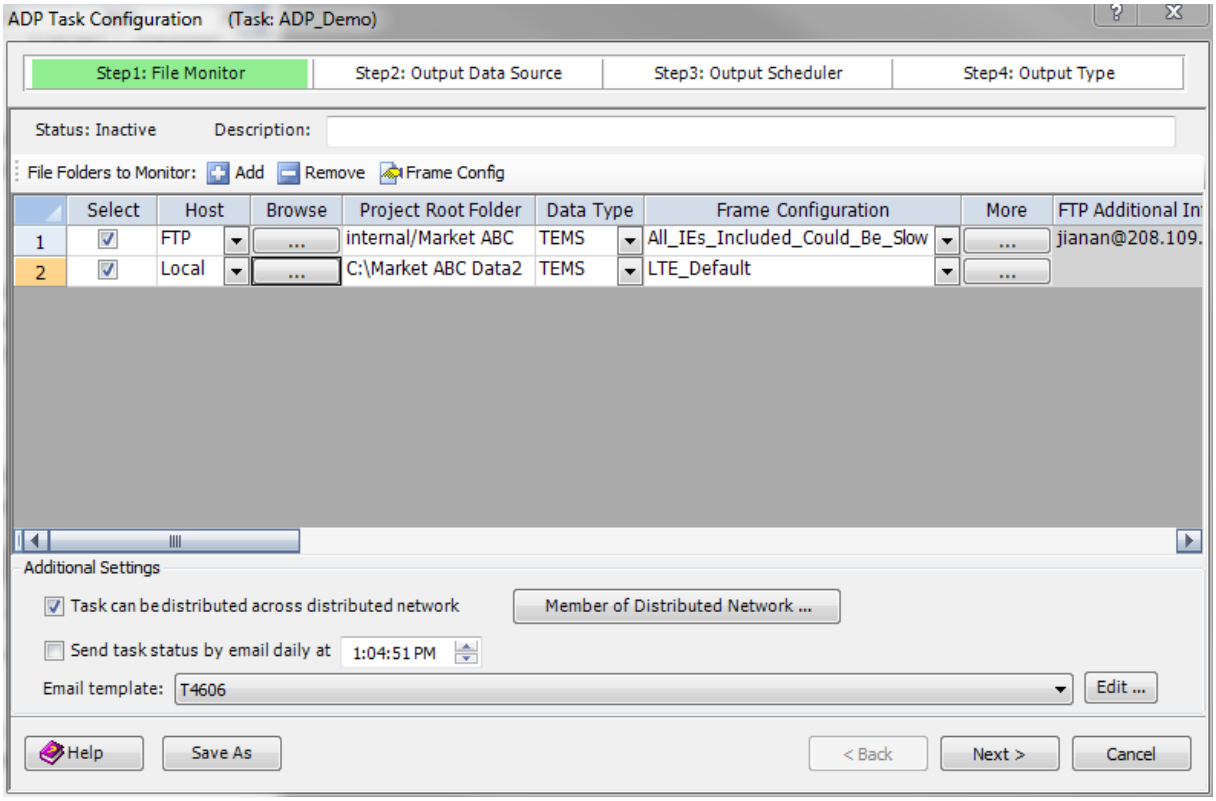
- **Task Description**. Shows a description of the task.

The *Log* tab shows the logging information for the ADP tasks.

To configure ADP to achieve distributed data processing, click the **Networking** button on the toolbar to access the Data Networking dialog. To distribute the created tasks by this computer, this computer will serve as the Dispatcher and maintain a list of computers that are available to process data. See Data Networking for more information.

5.3.1 ADP Step1: File Monitor

The step 1 window of configuring an ADP task is shown below:



If you are creating a new ADP task for purely output purposes, you can skip this step by clicking the **Next** button.

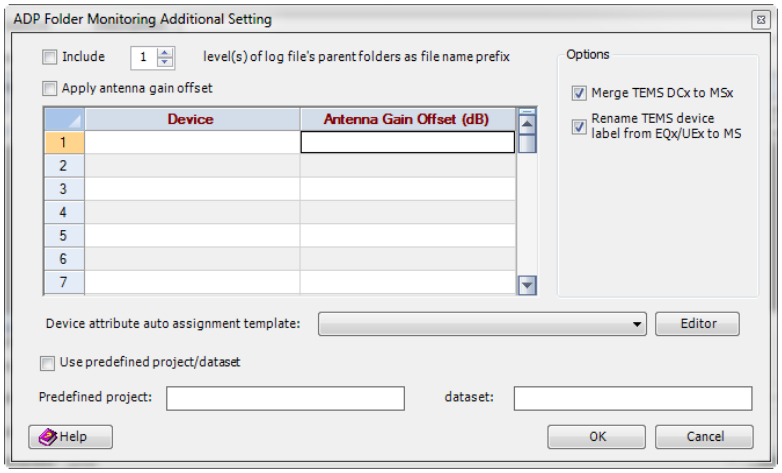
The table lists all the file folders to be monitored by this ADP task.

- To add a new file folder to be monitored by this ADP task, click the **Add** button on the toolbar.
- To remove a file folder from the table, select the row to be removed and then click the **Remove** button on the toolbar.

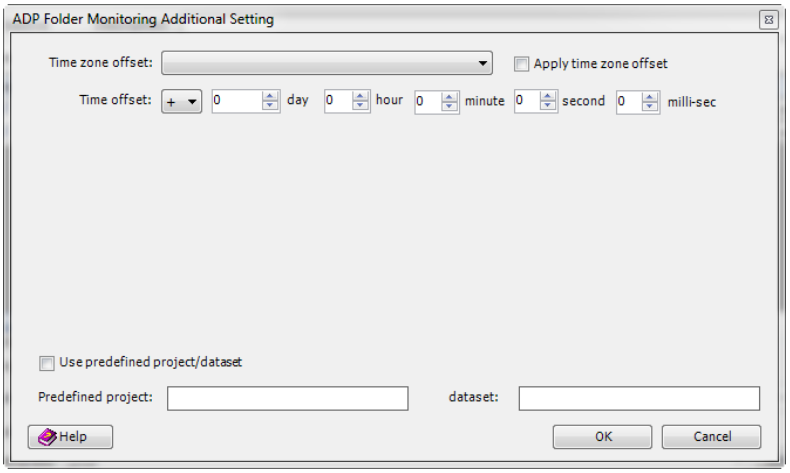
The table has the following columns and functions:

- **Select**. Used to select or unselect a folder to be actively monitored by the task.

- **Host**. Indicates the folder to be monitored is *Local* to this computer or from an *FTP* server.
- **Browse**. Used to browse the Local folder or the FTP server folder and related information. More detailed information about the FTP server information is in the next section.
- **Project Root Folder**. Shows the folder name of the root folder of the project data.
- **Data Type**. Indicates what kind of drive test data file is to be monitored in this folder.
- **Frame Configuration**. Indicates which frame information is to be imported from the files in the folder being monitored. Click the **Frame Config** button on the toolbar to access the ADP Task Configuration dialog, where you can create or modify a Frame Configuration.
- **More**. Used to set up more data import options for the folder being monitored. These options include the rules for automatically assigning device attributes based on the device attribute assignment template (see Device Attribute Assignment for more information), antenna gain offset, and smart file merge.



If UETR or PCAP is selected, the following more options will be shown below.



- **FTP Additional Info**. Used to display additional information for the FTP monitor folder.

Set up Monitored Folder (Project Root Folder) and Sub-folders

In order to monitor multiple projects and multiple datasets automatically, it is recommended that the monitored folder be set up according to the following structure:

```
<Monitored Folder>
      <Sub folder 1 for Project 1>
            <Sub-sub folder 1 for Dataset 1>
                  <Drive Test *.log files>
            .....
            <Sub-sub folder n for Dataset n>
      ...
      <Sub folder n for Project n>
```

If no project sub-folders are under the monitored folder, TEMS Discovery will create the following default project and default datasets:

```
_ADP_Created_Project_From_Folder_<Monitored Folder>
      _ADP_Created_DataSet
```

Also, TEMS Discovery will automatically create the following two sub-folders after execution of an ADP task:

- **Imported**. Log files that are successfully processed will be moved to this folder.
- **FailedToImported**. Log files that are not successfully processed will be moved to this folder.

You should never manually place any log files to be processed under the *Imported* or the *FailedToImported* folders.

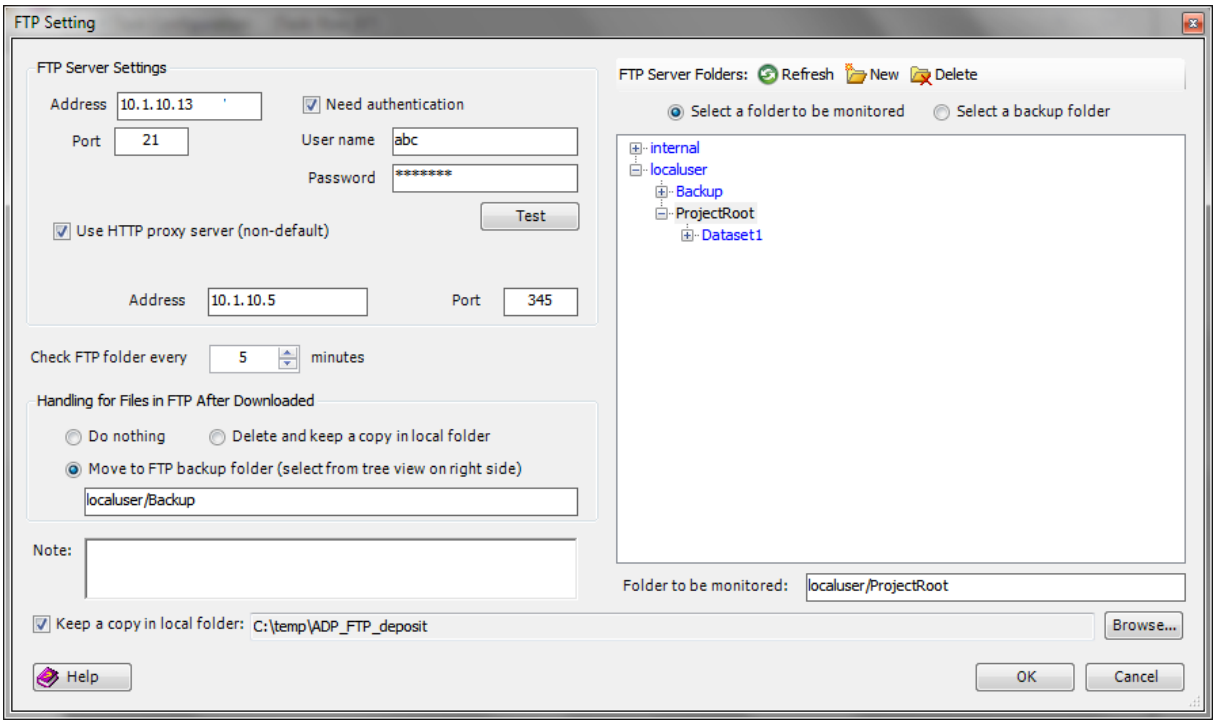
Additional Settings

Task can be distributed across distributed network. If you would like to utilize processing resources from other computers on the same network to help process new monitored data files when this computer is busy, turn this option on.

Member of Distributed Network. If you want to add or modify the distributed network information, click this button to access the necessary dialog.

Email template. If you want TEMS Discovery to send task status by email to the email recipients defined by the Email Template, turn this option on.

FTP Setting. If you have selected FTP as the Host type, clicking the button in the Browse column will bring you to the FTP Setting window.



FTP Setting Window parameters:

- **Address**. IP address of the FTP server to be monitored.
- **Port**. Port number of the FTP server to be connected to. If you don't know this value, contact the FTP server administrator.
- **Use HTTP proxy server (non-default)**. If you do not explicitly define the proxy server setting, the default proxy setting in your Windows Internet options will be applied when connecting to FTP.
- **Need authentication**. If the FTP folder to be monitored can be accessed anonymously, do not check this option, and TEMS Discovery will try to connect to the FTP server as an anonymous user. Otherwise, check this option and provide the user name and password to be used by TEMS Discovery when connecting.
- **Check FTP folder every x minutes**. TEMS Discovery does not monitor the FTP folder constantly; it checks for new files periodically. The default interval for checking files is 5 minutes. If a shorter interval is selected, the CPU usage and network traffic will increase, and vice versa.
- **Handling for Files in FTP after Download**. After downloading the data files from FTP, you can elect to keep a copy in the local folder and then remove them from the FTP server, or you can relocate the files to another FTP folder as a backup. It is OK to leave them in the monitored FTP folder without further action, but this option is not recommended.
- **Keep a copy in local folder**. Specify a local folder where TEMS Discovery can download the new data file from the FTP server and keep it as a copy.
- **Project root folder**. As when monitoring a local folder, you need to specify the Project root folder to be monitored on the FTP server. This folder must follow the same rules as for the locally monitored folder.

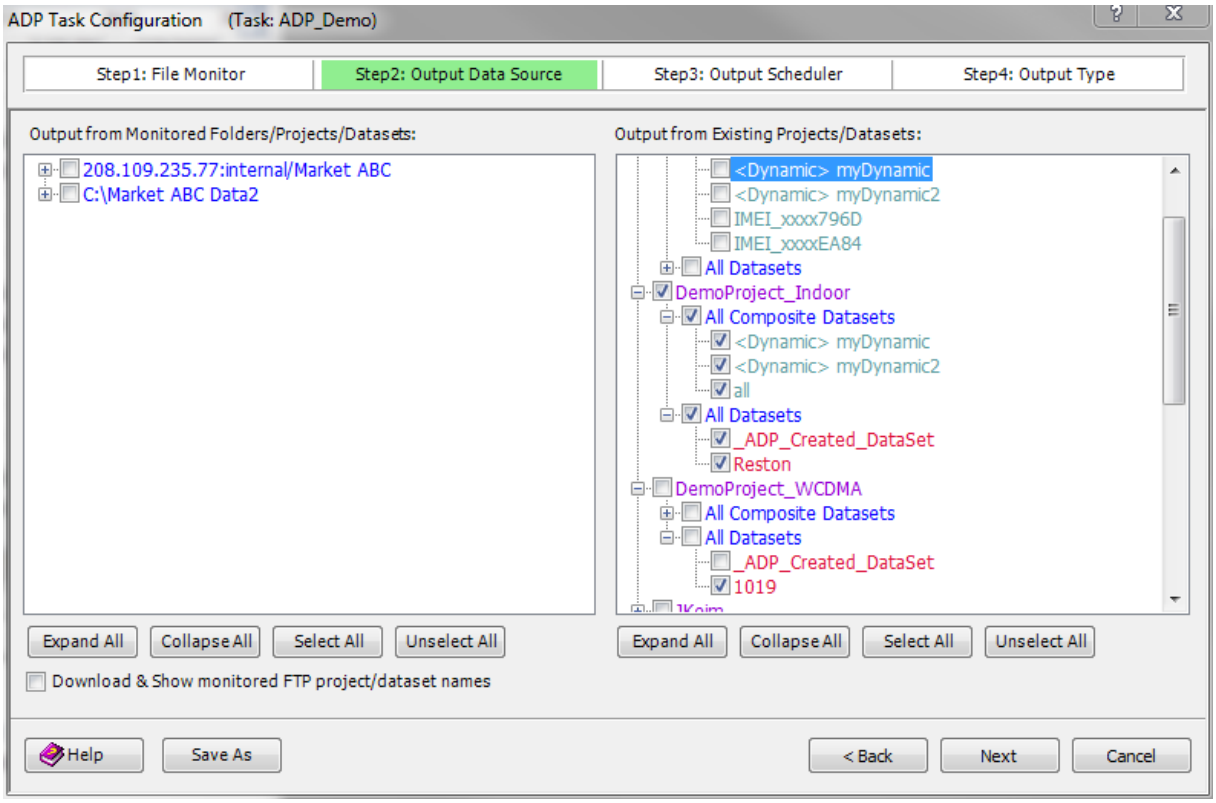
NOTE: You can put any text notes here for your own reference purpose.

Select the **Select a folder to be monitored** or the **Select a backup folder** radio button before selecting a folder to be monitored or selecting a backup folder from the folder browser by highlighting the folder.

When you click OK, TEMS Discovery will try to connect to the FTP server with the information you provided and check whether at least one set of project/dataset folders is available under the Project root folder being monitored.

5.3.2 ADP Step2: Output Data Source

The step 2 window of configuring an ADP task is shown below:



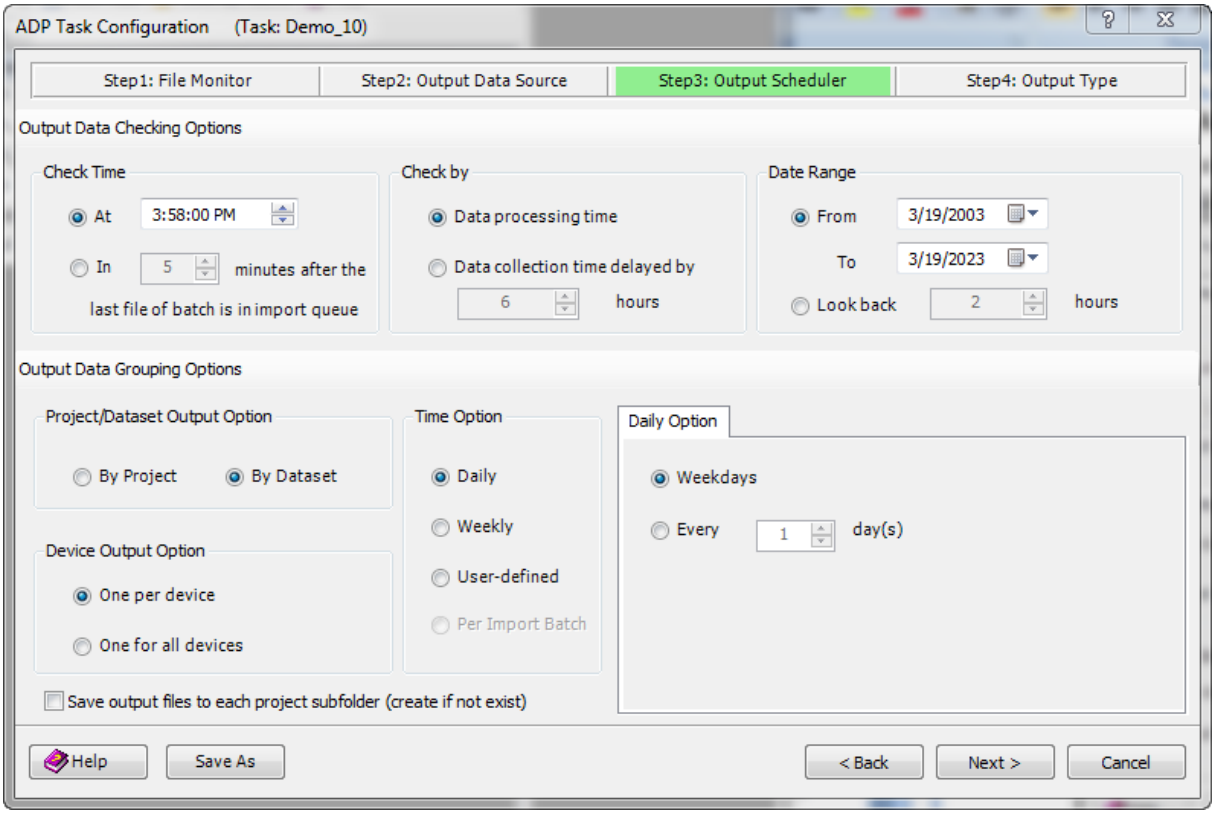
This window has two tree views showing projects and datasets that can be selected as the output data source.

The left side tree view shows the current project and dataset folders under the monitored Project Root Folder of this task. The right side tree view shows the output from the existing projects/datasets. When you select/unselect a tree node on one tree, TEMS Discovery will automatically select or unselect the corresponding node on the other tree if there is one on the other tree.

Download & Show monitored FTP project/dataset names. If you have an FTP folder to be monitored by this task, enable this checkbox (it is unchecked by default). If your computer is connected to the network and you want to make a specific tree node selection, checking this option will direct TEMS Discovery to connect to the FTP server and download the current project and dataset subfolder names from the monitored FTP folder. (If the network or the FTP server is slow and/or the folder has many subfolders, it could take a while for Discovery to download all the information.)

5.3.3 ADP Step3: Output Scheduler

The step 3 window of configuring an ADP task is shown below:



Output Data Checking Options

Check Time. These settings tell TEMS Discovery when to check the project/dataset for the defined time interval to generate the output. You can check at a certain time of day, or you can wait for a certain number of minutes after the last drive test data file of a batch is placed in the import queue. For example, if you define a check time of 30 minutes after the last file of a batch is placed in the import queue and then start an upload of 10 files, if the upload interval between the sixth file and the seventh file is more than 30 minutes, TEMS Discovery will automatically group these 10 files into two batches and generate a report for each batch 30 minutes after the last file of a batch is placed in the import queue, or at the time when all the files in the batch are imported.

Check by. These settings tell TEMS Discovery how to check the data, by *Data processing time* or by *Data collection time*.

At the check time, the active ADP task will check the project/dataset selected at Step 2 up to the beginning of the start time interval and generate the output as defined by the task.

If the *Check by* option is set to *Data collection time*, the *delayed by hours* value will be added. For example, if the delayed by hours value is 6, then the time range of a day's data will be 6 AM to 6 AM on the following day.

Date Range. These settings tell TEMS Discovery what date range should be considered when generating the output. For example, if you have data in the project/dataset as old as January 1, 2010, but you only want to generate output from March 1, 2010, you can set the starting date as March 1, 2010. Note that you can

define a more flexible date range by defining the number of hours to *look back* from the check time.

Once an ADP task with an output option set is activated and TEMS Discovery keeps running on the computer, TEMS Discovery will try to generate the output based on the settings every day at the Check time. TEMS Discovery will keep track of which days' data have been processed for output. If you stop and restart a task that has generated some output for some days, TEMS Discovery will ask whether you want to re-generate the output from the Start date.

Output Data Grouping Options

Time options:

- **Daily**. The output will be generated daily, and every day's data will appear in one output file (if set to *Weekdays*, output will only be generated Monday through Friday).
- **Weekly**. The output will be generated at weekly intervals (every week or every few weeks) according to the definition of the week's start day.
- **User-defined**. The output will be generated according to the date range defined by the user.
- **Per Import Batch**. The output will be generated according to the data which has been imported in the latest batch.

Device Output options:

- **One per device**. The output will be generated as one per device.
- **One for all devices**. The output will be generated as one for all the devices.

Project/Dataset Output options:

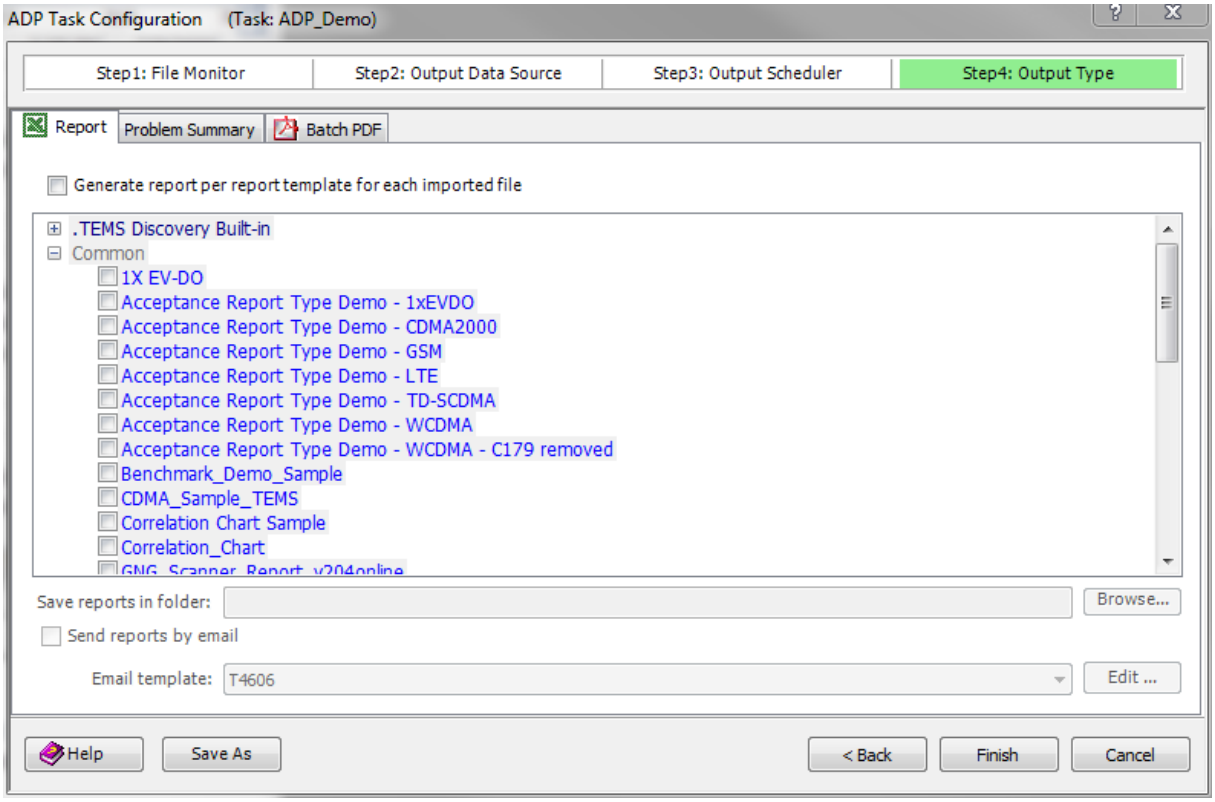
- **Project**. The output data will be grouped by project.
- **Dataset**. The output data will be grouped by dataset.

Save output files to each project subfolder (create if not exist)

Normally TD will output all files to used-defined output folder. The project name will be concatenated in the output file name. If you like to group output files by each project, you shall check this option. A subfolder will be created for each project and the output files will be saved in each subfolder respectively.

5.3.4 ADP Step4: Output Type

The step 4 window of configuring an ADP task is shown below:



In this window, you can specify whether you want the output data to be sent to Batch PDF files and/or Report files.

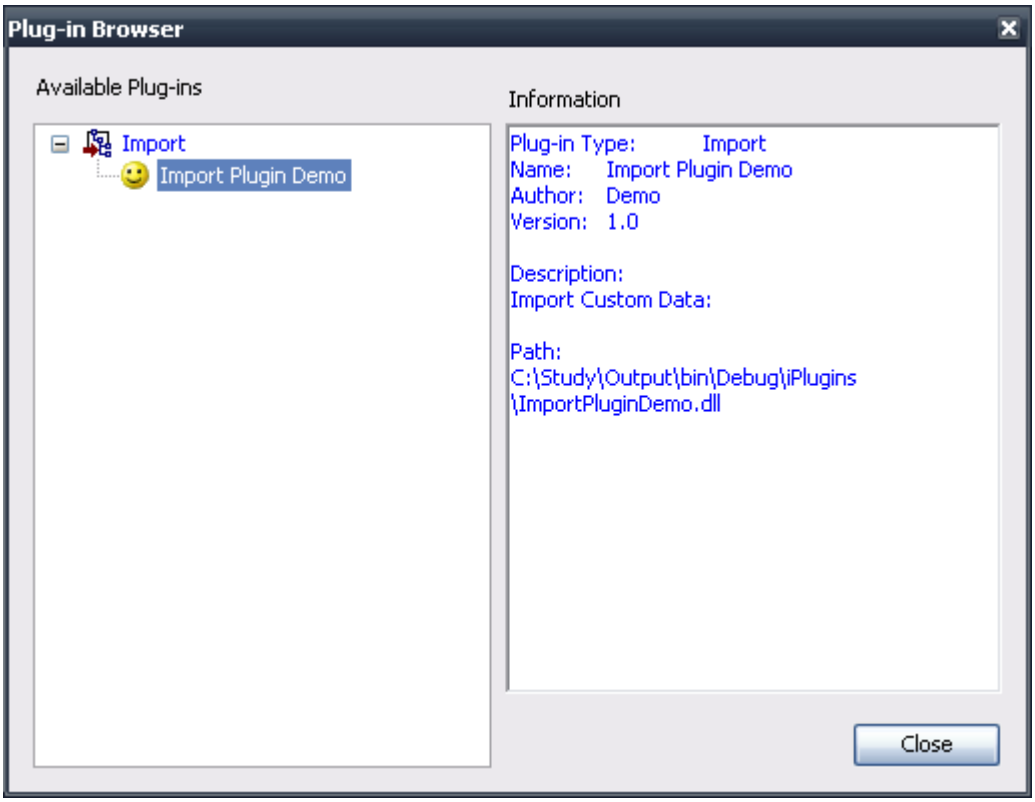
You can specify the output folder, and you also have the option to send the output file to the email recipients specified in the Email Template.

If you want to edit the batch configuration, click the **Edit** button, which will bring you to the Batch Configurations dialog. For more information, see Batch Configuration.

5.4 Plug-in Manager

This feature allows you to view more detailed information about plug-ins that TEMS Discovery recognizes.

The Plug-in Browser can be accessed from the **Tools** menu on the Main Window.

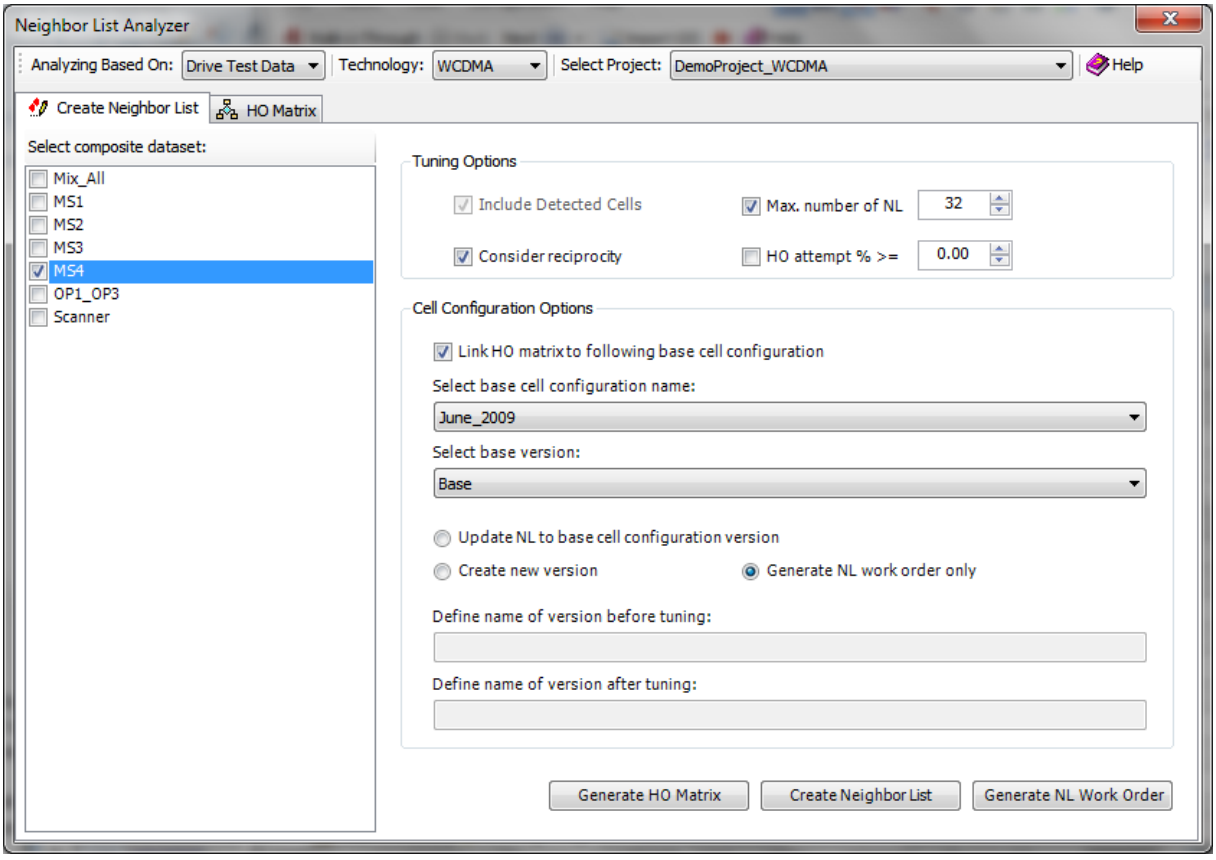


5.5 Neighbor List Analyzer

TEMS Discovery can generate an HO matrix from drive test data, and then, from the HO matrix, create a neighbor list. If you link the generated HO matrix to an existing network configuration, TEMS Discovery can even generate a neighbor list work order. For more information on direct import of an HO matrix for neighbor list analysis, see Import HO Matrix.

The Neighbor List Analyzer can be accessed in the following ways:

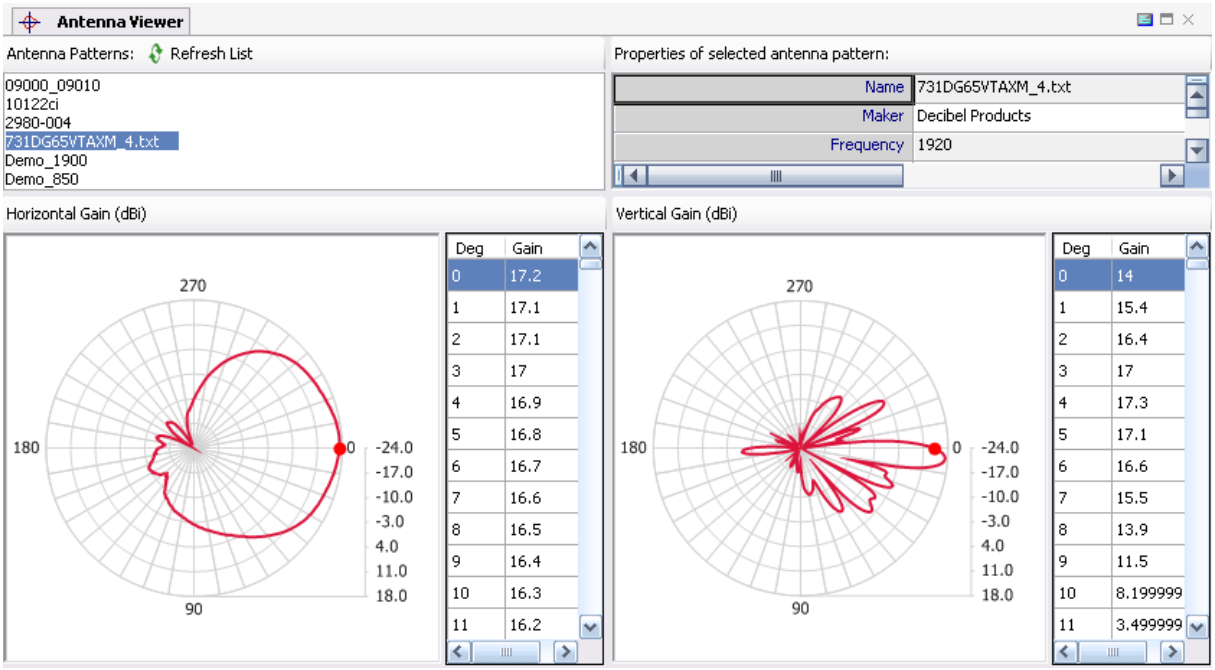
- Selecting **Neighbor List Analyzer** from the **Tools** menu on the Main Window.
- Clicking the **NL Analyzer button** on the Data Explorer–Cells List toolbar.



5.6 Antenna Pattern Viewer

This feature provides a view of the radiation pattern of the imported antenna files.

The Antenna Viewer window can be accessed from the **Tools** menu on the Main Window.

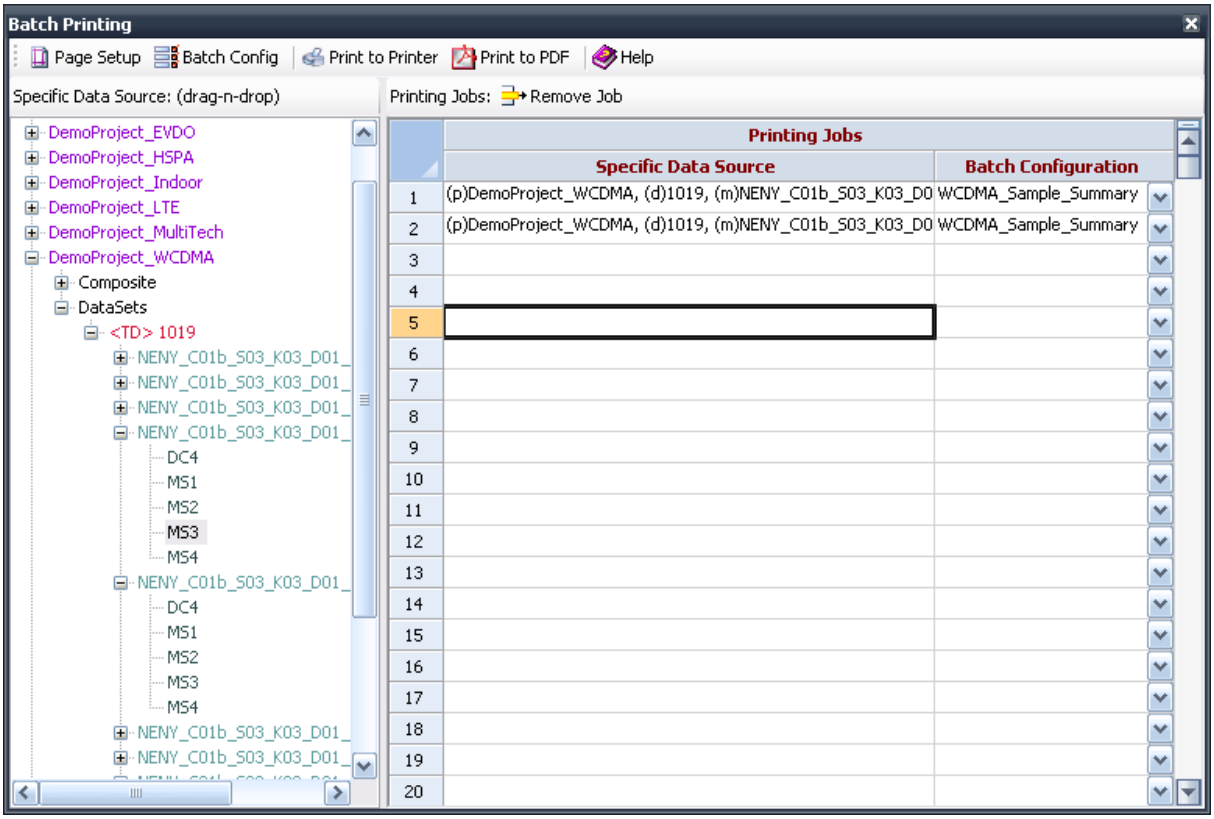


5.7 Batch Printing

TEMS Discovery provides a convenient means of batch printing. The user can select an unlimited number of data sources and print them per the Batch Configuration.

The Batch Printing dialog can be accessed in the following ways:

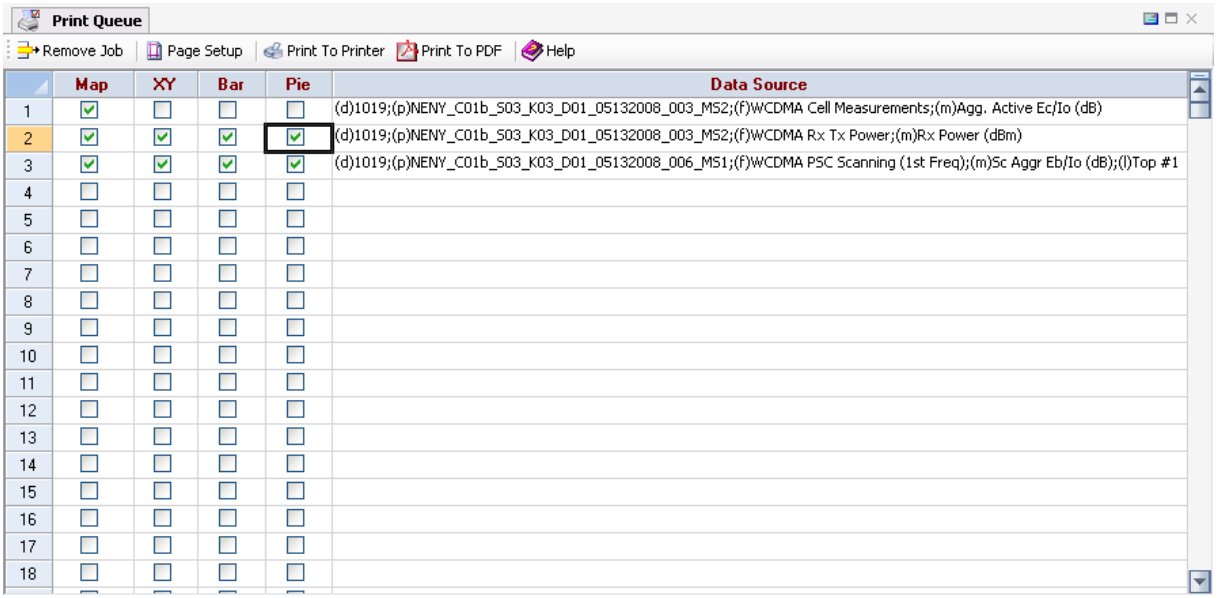
- Selecting **Batch Printing** from the **Tools** menu on the Main Window.
- Clicking the **Batch Printing** button in the Main Window toolbar.



5.8 Print Queue

In addition to Batch Printing, TEMS Discovery allows the user to define a print job by specifically picking a metric from the Data Explorer of an open project and selecting the visualization of data. This eliminates the process of defining the Batch Configuration, as is required by the Batch Printing task.

The Print Queue dialog can be accessed by clicking the **Print Queue** button on the Dataset toolbar or from the Dataset right-click context menus.



5.9 Signaling Message Browser

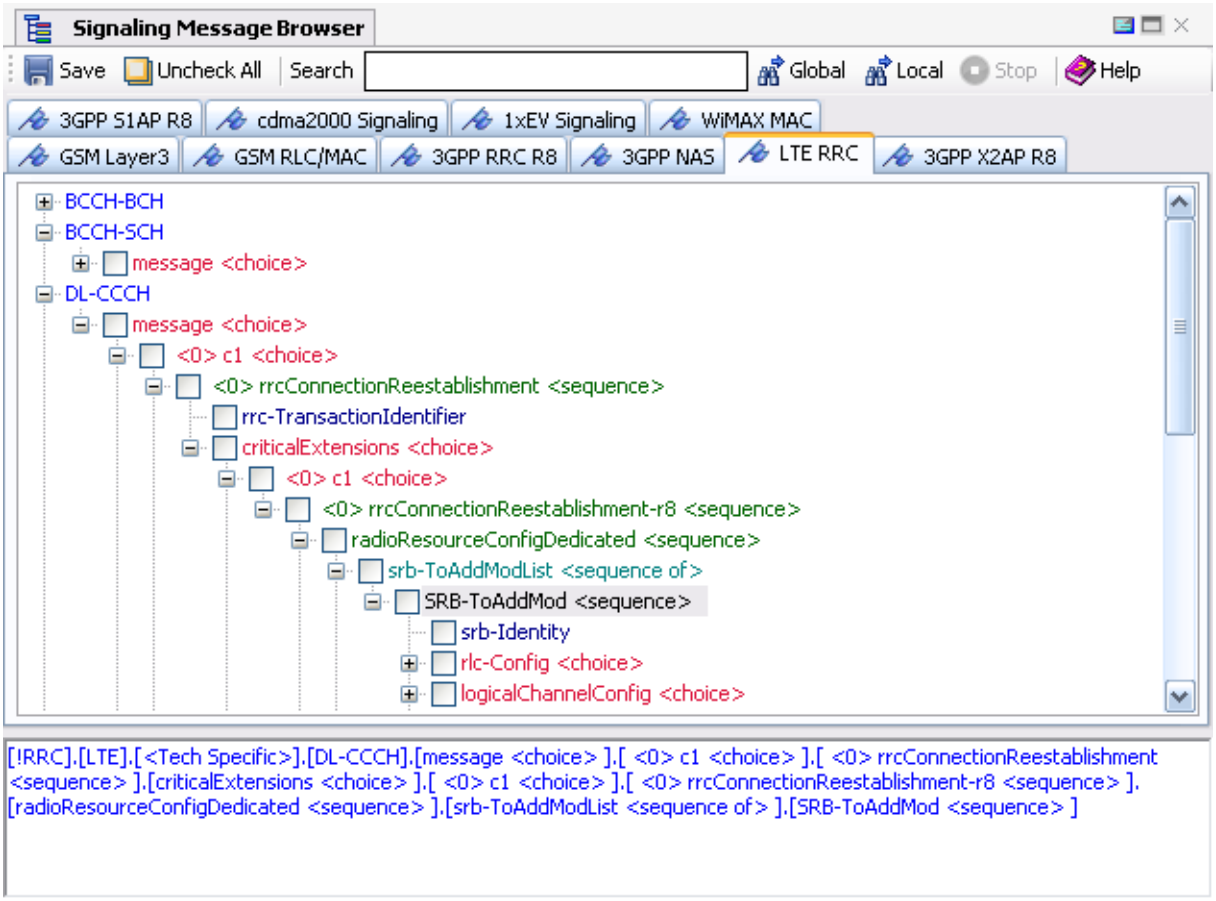
The Signaling Message Browser provides a highly organized view of the following signaling messages:

- 3GPP RRC, NAS, X2AP, and S1AP, covering WCDMA, TD-SCDMA and LTE
- GSM Layer 3, RLC/MAC
- cdma2000 Signaling Messages
- 1xEV Signaling Messages
- WiMAX MAC

You can also specify a keyword, and check the existence and the path leading to the information elements containing the items searched.

NOTE: If the label of an IE starts with "<*number*>" or "*[number]*", it indicates that the number specified is a possible numeric value of its upper level IE.

The Signaling Message Browser can be accessed from the **Tools** menu on the Main Window or by clicking the **Layer 3/RRC IE Browser** button on the Messages View.



Signaling Message Browser Toolbar

Save. Save the check status of each IE to file.

Uncheck All.

Global

Search Global. Search for an IE that contains the text phrase defined in the text box, starting from the current selected tree node to the end of the tree view.

Search Local. Search for an IE that contains the text phrase defined in the text box, only from the current selected tree node and its child nodes.

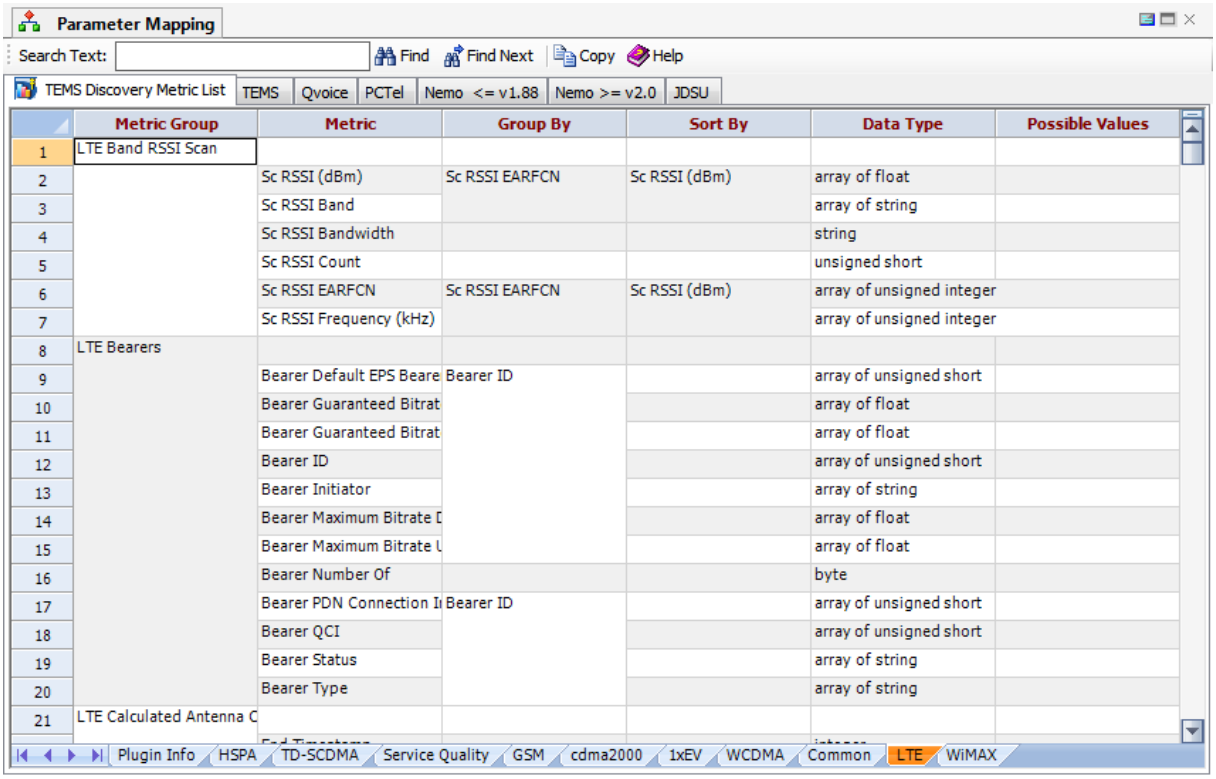
Stop. Cancel the search.

Help.

5.10 Parameter Mapping

On the **Parameter Mapping** dialog, all TEMS Discovery metrics and the mapping between the names of the metrics used in TEMS Discovery and those from different vendors are displayed. Use the **Search Text** function to find a target metric.

This feature is accessed from the **Tools** menu on the Main Window.

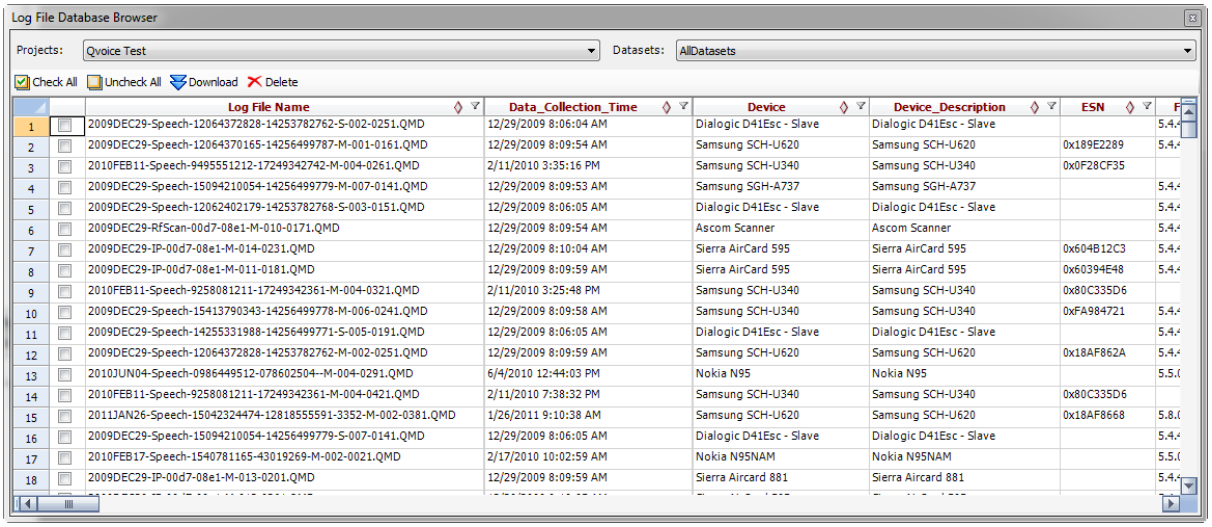


The possible values of a metric are listed in the *TEMS Discovery Metric List*. Each possible value contains two parts, a numeric value used internally and a text value for display.

In Script Builder, if you define the data type of this metric to be *float* in the Alias spreadsheet, the numeric value of this metric will be reported; otherwise, the text value will be reported.

5.11 Log File Database Browser

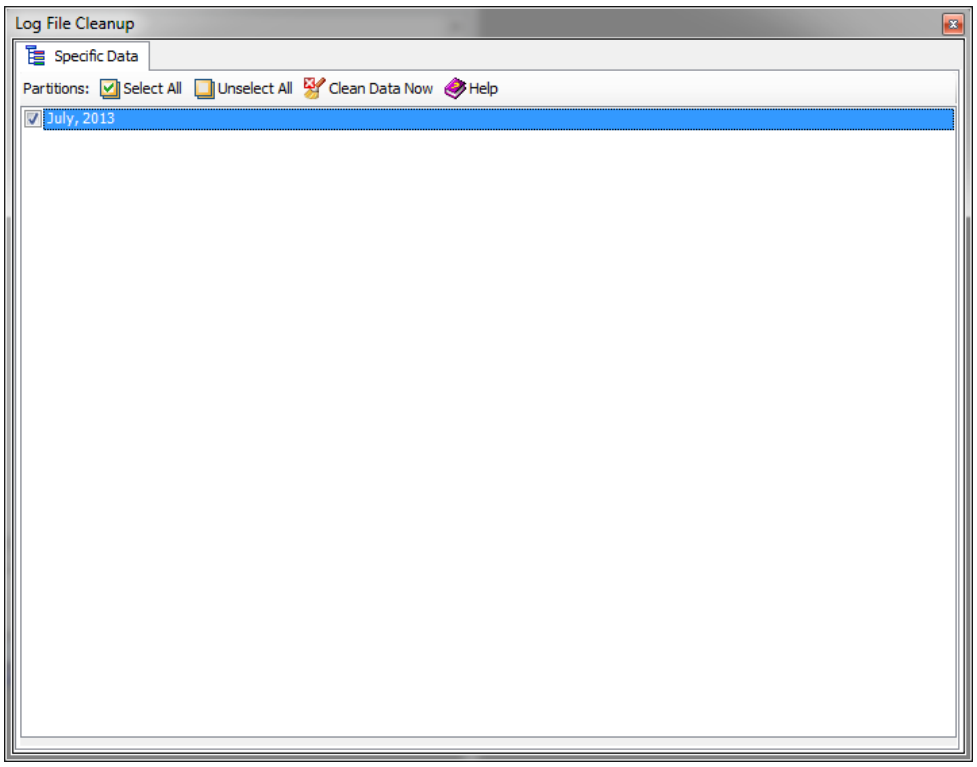
This feature provides the functionality to browse the log files and download selected log files from the database. An Excel-like spreadsheet is provided for easy filtering and sorting.



	Log File Name	Data_Collection_Time	Device	Device_Description	ESN	F
1	2009DEC29-Speech-12064372828-14253782762-S-002-0251.QMD	12/29/2009 8:06:04 AM	Dialogic D41Esc - Slave	Dialogic D41Esc - Slave		5.4.4
2	2009DEC29-Speech-12064370165-14256499787-M-001-0161.QMD	12/29/2009 8:09:54 AM	Samsung SCH-U620	Samsung SCH-U620	0x189E2289	5.4.4
3	2010FEB11-Speech-9495551212-17249342742-M-004-0261.QMD	2/11/2010 3:35:16 PM	Samsung SCH-U340	Samsung SCH-U340	0x0F28CF35	
4	2009DEC29-Speech-15094210054-14256499779-M-007-0141.QMD	12/29/2009 8:09:53 AM	Samsung SGH-A737	Samsung SGH-A737		5.4.4
5	2009DEC29-Speech-12062402179-14253782768-S-003-0151.QMD	12/29/2009 8:06:05 AM	Dialogic D41Esc - Slave	Dialogic D41Esc - Slave		5.4.4
6	2009DEC29-RfScan-00d7-08e1-M-010-0171.QMD	12/29/2009 8:09:54 AM	Ascom Scanner	Ascom Scanner		5.4.4
7	2009DEC29-IP-00d7-08e1-M-014-0231.QMD	12/29/2009 8:10:04 AM	Sierra AirCard 595	Sierra AirCard 595	0x604B12C3	5.4.4
8	2009DEC29-IP-00d7-08e1-M-011-0181.QMD	12/29/2009 8:09:59 AM	Sierra AirCard 595	Sierra AirCard 595	0x60394E48	5.4.4
9	2010FEB11-Speech-9258081211-17249342361-M-004-0321.QMD	2/11/2010 3:25:48 PM	Samsung SCH-U340	Samsung SCH-U340	0x80C335D6	
10	2009DEC29-Speech-15413790343-14256499778-M-006-0241.QMD	12/29/2009 8:09:58 AM	Samsung SCH-U340	Samsung SCH-U340	0xFA984721	5.4.4
11	2009DEC29-Speech-14255331988-14256499771-S-005-0191.QMD	12/29/2009 8:06:05 AM	Dialogic D41Esc - Slave	Dialogic D41Esc - Slave		5.4.4
12	2009DEC29-Speech-12064372828-14253782762-M-002-0251.QMD	12/29/2009 8:09:59 AM	Samsung SCH-U620	Samsung SCH-U620	0x18AF862A	5.4.4
13	2010JUN04-Speech-0986449512-078602504--M-004-0291.QMD	6/4/2010 12:44:03 PM	Nokia N95	Nokia N95		5.5.0
14	2010FEB11-Speech-9258081211-17249342361-M-004-0421.QMD	2/11/2010 7:38:32 PM	Samsung SCH-U340	Samsung SCH-U340	0x80C335D6	
15	2011JAN26-Speech-15042324474-12818555591-3352-M-002-0381.QMD	1/26/2011 9:10:38 AM	Samsung SCH-U620	Samsung SCH-U620	0x18AF8668	5.8.0
16	2009DEC29-Speech-15094210054-14256499779-S-007-0141.QMD	12/29/2009 8:06:05 AM	Dialogic D41Esc - Slave	Dialogic D41Esc - Slave		5.4.4
17	2010FEB17-Speech-1540781165-43019269-M-002-0021.QMD	2/17/2010 10:02:59 AM	Nokia N95NAM	Nokia N95NAM		5.5.0
18	2009DEC29-IP-00d7-08e1-M-013-0201.QMD	12/29/2009 8:09:59 AM	Sierra Aircard 881	Sierra Aircard 881		5.4.4

5.12 Log File Database Cleanup

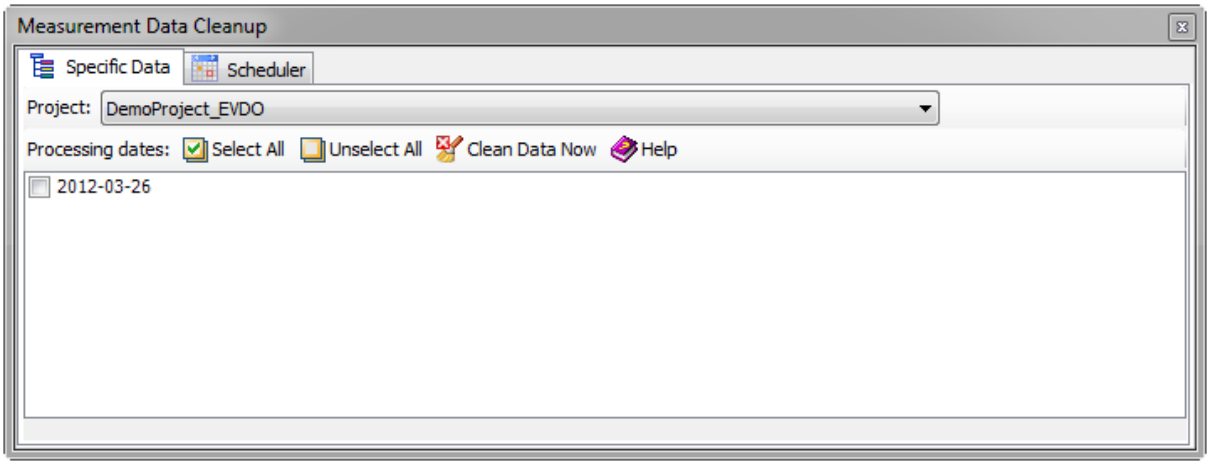
This feature provides the functionality to cleanup the log files that were processed in a particular date.



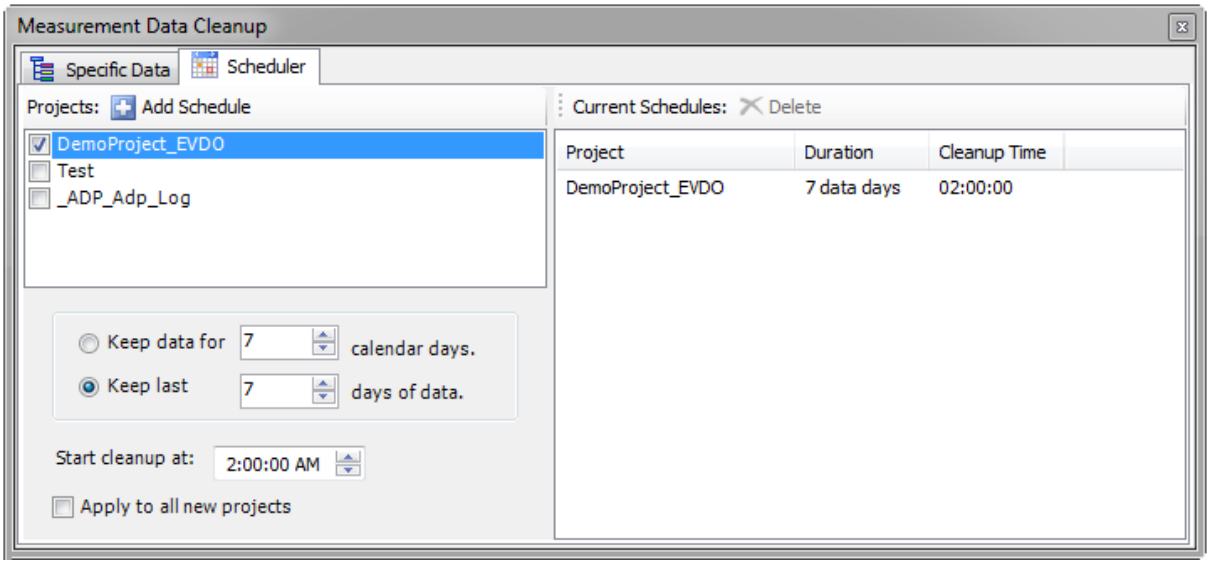
5.13 Measurement Data Cleanup

This feature provides the functionality needed to clean up the measurement database.

Use the *Specific Data* tab to select a specific project and delete the data for the specified dates.



Or, use the *Scheduler* tab to set up the scheduler to clean up data automatically.



6 Statistic

TEMS Discovery Enterprise provides a set of tools, as described in the following sections, for reporting statistic data.

- Cube Management, including the Cube Creator
- Statistic Browser
- Dashboard
- Report Generation
- Dashboard Builder
- Report Template Builder
- Cube Data Scope Configurations
- Statistic Data Cleanup
- Default GIS Builder
- Default Network Configuration Builder
- Database User Management
- Database User Access Permission
- Measurement Data Server List
- Enterprise License Information

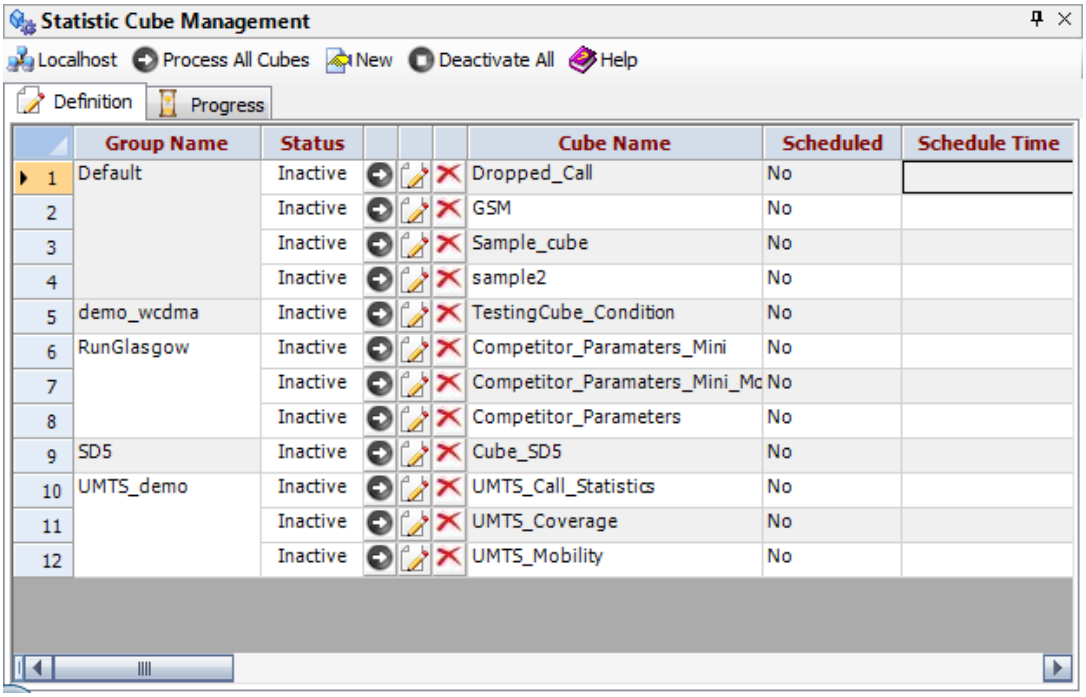
NOTE: The TEMS Discovery Statistic feature incorporates the concept of OLAP "cubes."

An OLAP cube is a set of data, organized in a way that facilitates non-predetermined queries for aggregated information, or, in other words, online analytical processing. OLAP is one of the computer-based techniques for analyzing business data that are collectively called "business intelligence." (http://en.wikipedia.org/wiki/OLAP_cube)

6.1 Cube Management

Cube Management is a configurable function that creates new cubes, edits or deletes existing cubes, and activates/de-activates cube processing. It also shows the cube filling progress.

The Cube Management function can be accessed by selecting **Cube Management** from the **Statistic** menu on the Main Window.



	Group Name	Status	Cube Name	Scheduled	Schedule Time
1	Default	Inactive	Dropped_Call	No	
2		Inactive	GSM	No	
3		Inactive	Sample_cube	No	
4		Inactive	sample2	No	
5	demo_wcdma	Inactive	TestingCube_Condition	No	
6	RunGlasgow	Inactive	Competitor_Paramaters_Mini	No	
7		Inactive	Competitor_Paramaters_Mini_Mc	No	
8		Inactive	Competitor_Parameters	No	
9	SD5	Inactive	Cube_SD5	No	
10	UMTS_demo	Inactive	UMTS_Call_Statistics	No	
11		Inactive	UMTS_Coverage	No	
12		Inactive	UMTS_Mobility	No	

You can create a new cube by clicking the **New** button on the toolbar to bring up the cube creator dialog. After the cube is created, its default status will be set to “Inactive”. You will need to click the **Process All Cubes** button to activate it, so that the imported drive test data can be extracted and stored in the statistic database according to the definition of the cube.

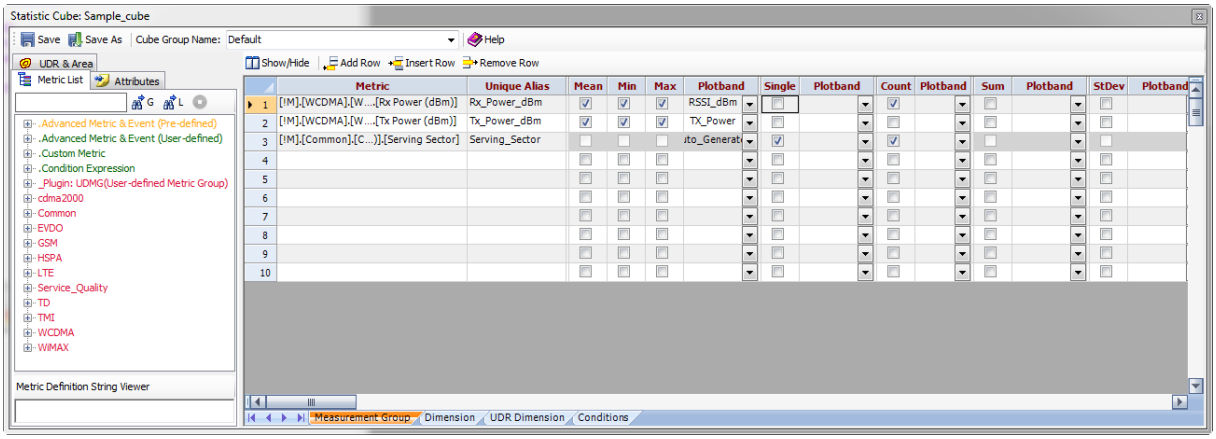
Cube Management Toolbar

- **Local Host**. Open the Data Networking dialog and set up local host options.
- **Process All Cubes**. Trigger the action to process all activated cubes.
- **New**. Open the Cube Creator dialog to create a new cube.
- **Deactivate All**. Deactivate all cubes.
- **Help**.

6.2 Cube Creator

The dialog illustrated below allows you to define how measurement data will be extracted and what data will be stored into the statistic database.

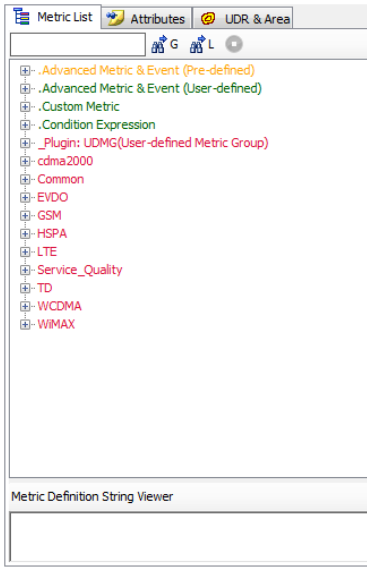
This dialog is accessed by clicking the **New** button on the Statistic Cube Management dialog.



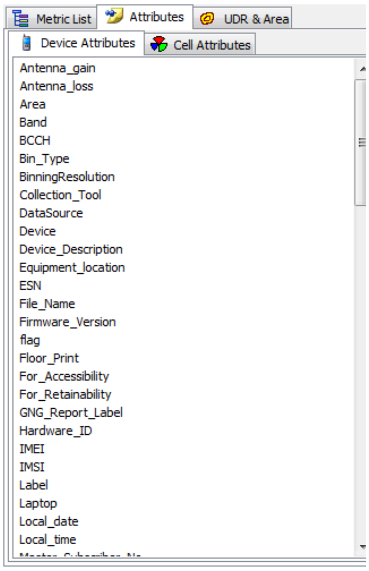
To build measurement group for a cube, you can drag-and-drop the desired metric from the Metric List on the left to the Measurement Group spreadsheet on the right.

To build the dimension of the cube, you can drag-and-drop the desired metric from the Metric List, or the desired device attribute from the Device Attributes tab, or the desired cell attribute from the Cell Attributes tab to the Dimension spreadsheet.

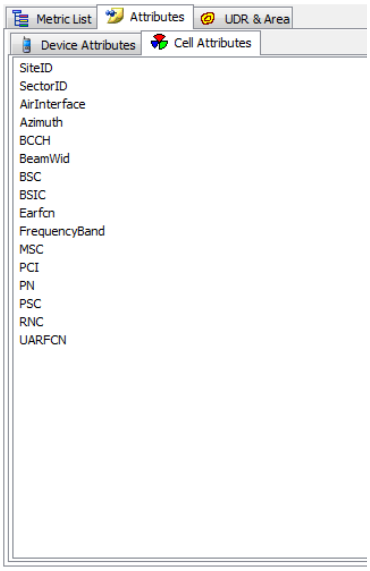
To apply condition filtering, you can select one or many condition expressions from “Condition” sheet. Only the data meeting all selected conditions will be sent to statistic database.



Metric List tab



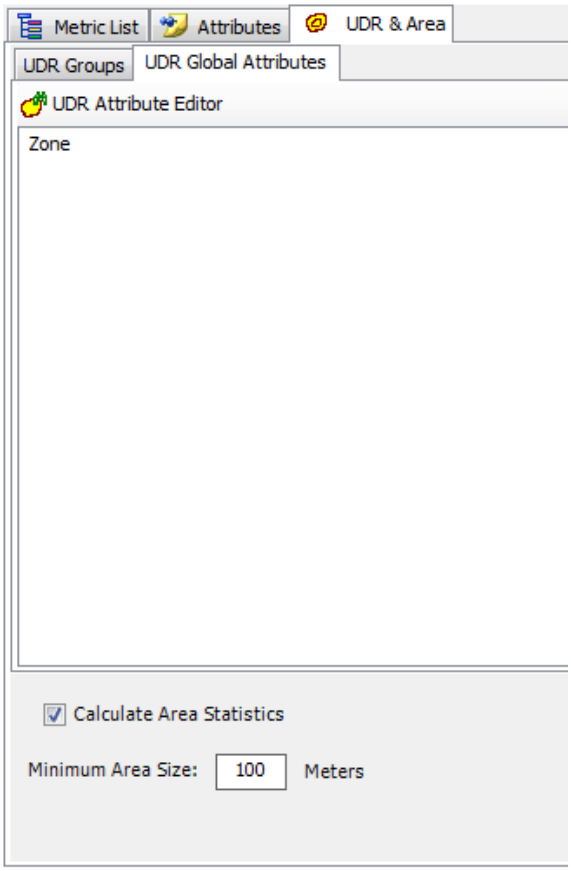
Device Attributes tab



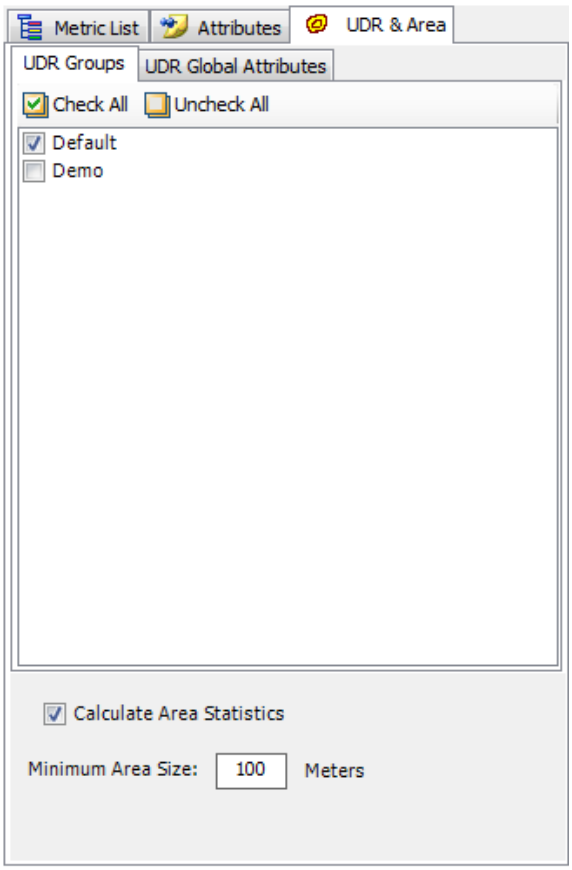
Cell Attributes tab

UDR attribute can be defined as a cube dimension. To do so, you can draw UDRs in Map View, assign attributes to each polygon, and then save. In the Data Explorer, right-click at the newly created UDR, select context menu to copy it to the global UDR list. The attributes of the polygon can be selected as global attributes for the statistic database in the UDR Attribute Editor. After definition is complete, they will be listed in the UDR & Area | UDR Global Attributes tab.

From the UDR Groups tab, select the UDR group for which statistic data is to be calculated, based on the UDR attributes.



UDR & Area | UDR Global Attributes tab



UDR & Area – UDR Groups tab

To enable calculation of area bin statistics, check the **Calculate Area Statistics** box and define a minimum area size, in meters. TEMS Discovery will automatically generate the statistic data for the area with bin sizes in multiples of the defined minimum area size. For example, if the minimum area size is 100, TEMS Discovery will calculate data for bin sizes of 200, 400, 800, 1600, and up to 12800 meters.

NOTE: Once the cube definition has been modified, all statistic data associated with this cube will be DELETED.

If data like UDR or network configuration refered by a cube has been modified, the data of the cube processed before will be kept intact. However, you can force TD to reprocess all data to reflect the change.

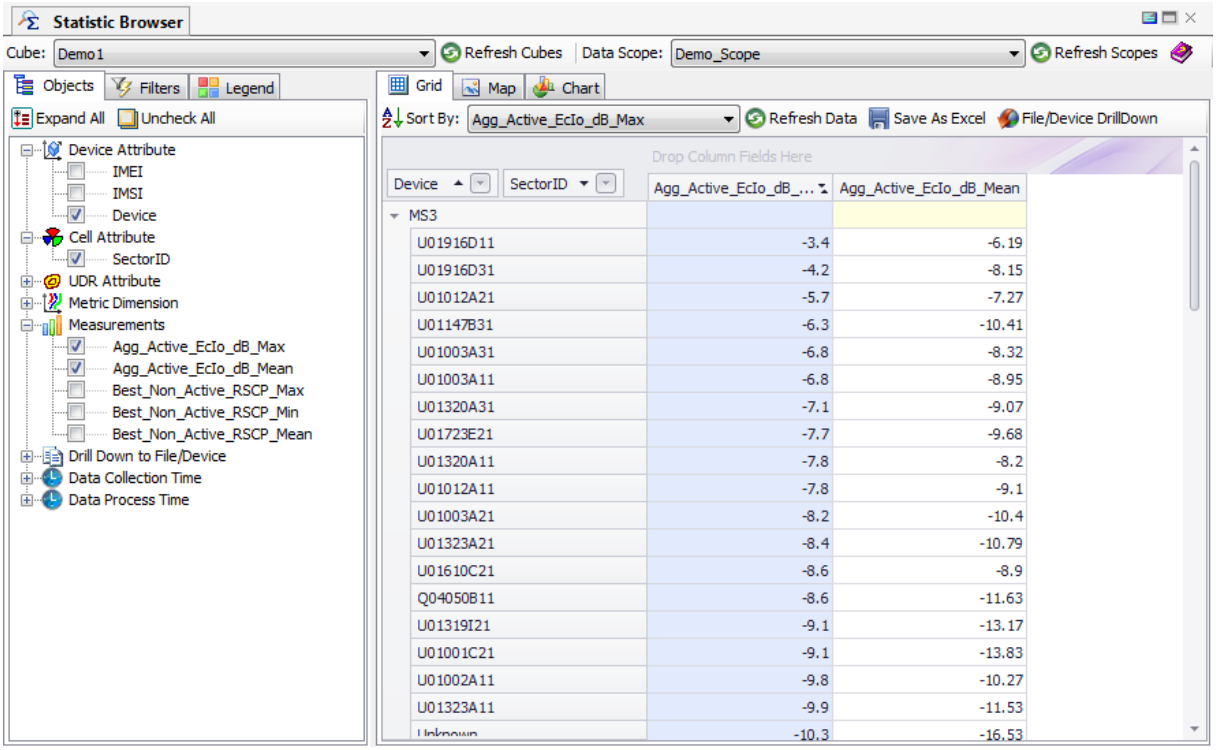
6.3 Statistic Browser

With the Cube Viewer, you can browse statistic data in various presentations.

The Statistic Data Cube View dialog is accessed by selecting **Statistic Browser** from the **Statistic** menu on the Main Window.

You can 1) select the desired presentation type tab – Grid, Chart, or Map; 2) select the desired cube objects by clicking the checkboxes on the Objects tab; 3) click the **Refresh** button to present the data in the selected view.

You can simply change the data scope to apply the same presentation to different data source.



Filtering

You can filter the displayed data.

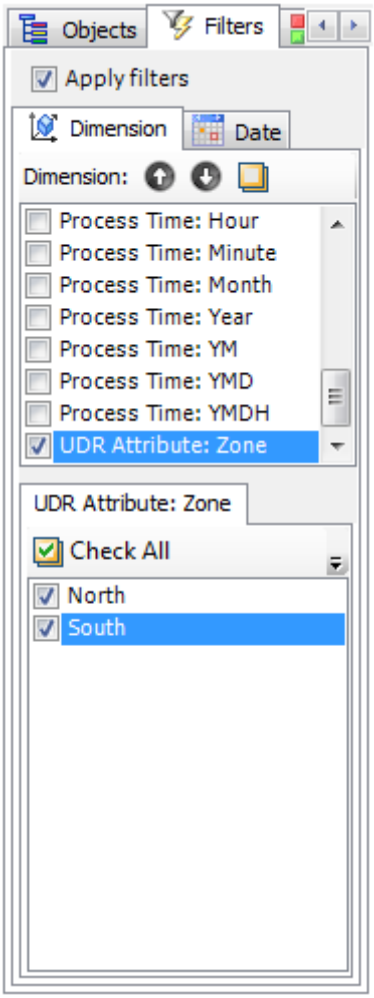
All available filtering dimensions for the selected cube are listed in the upper pane of the Filters | Dimension tab.

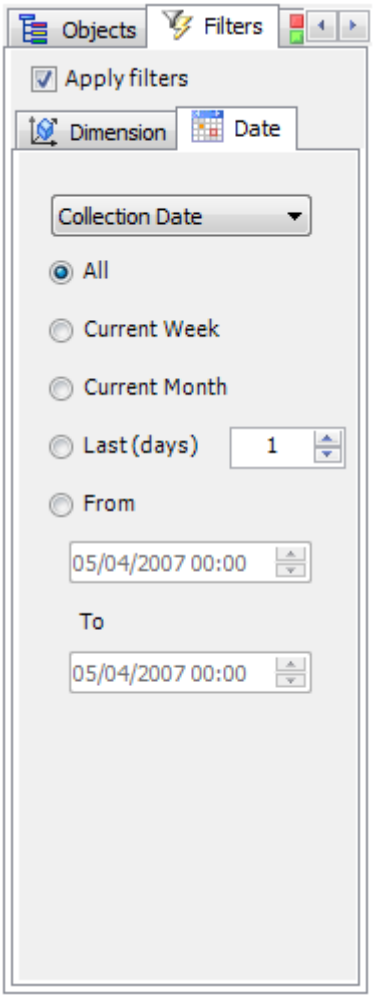
by Dimension:

Once a dimension is checked, the available values for that dimension will be listed in the lower pane. You can select any one of them as a filter.

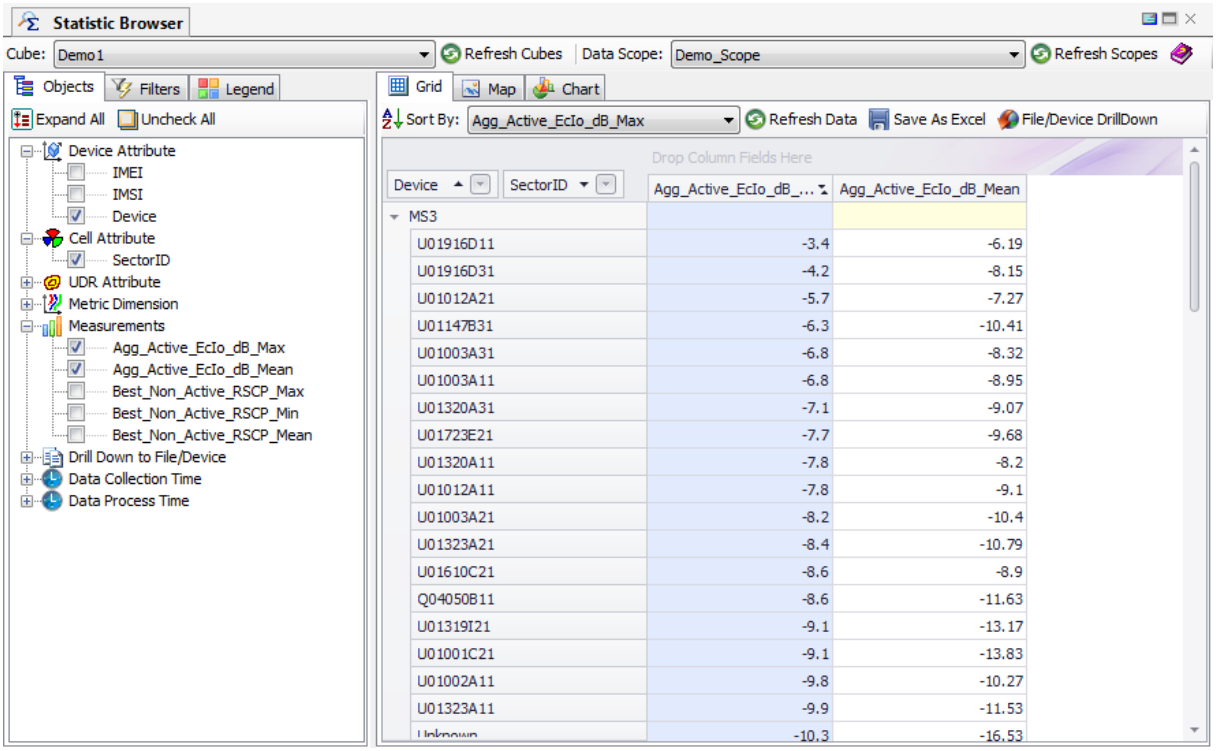
by Date:

You can also filter data based on the time range.





6.3.1.1 Statistic Data Cube View – Grid



Statistic Data Cube View – Grid Toolbar

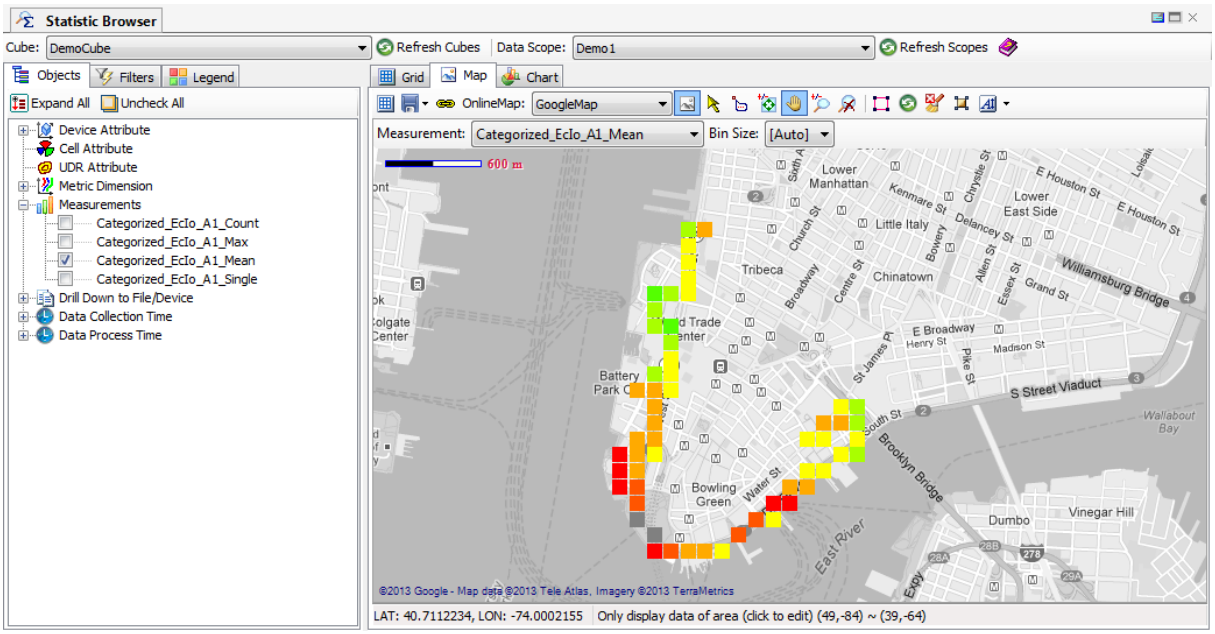
Refresh Data. Apply the new data selection and refresh the display.

Save As Excel. Save the current display as an Excel file.

File/Device Drilldown. Bring up the File/Device List. Then, double-click any of the cells in the grid to list the contributed file/device in the dialog. Each row in the spreadsheet lists the processed file/device and the location (data source) of that file/device. See File/Device Drilldown .

Help.

6.3.1.2 Statistic Data Cube View – Map



Statistic Data Cube View – Map Toolbar

Table Size Selector. Display the Table Size selector for creating multiple Map Views. Multiple views can be synchronized by clicking the **Synchronization** button .

Save. Save all the currently displayed views, or save an individual view as an image.

Turn On/Off Subview Synchronization Mode.
Synchronize all Map subviews created by the Table Size button .

Combo box — **OnlineMap**. List the available online map data source that you have been licensed.

Draw GIS in Grayscale. Display the GIS image in grayscale.

Pointer. Change the cursor to a pointer.

List of File/Device Contribute to Area Bin. Bring up the File/Device list. Click at any area bin in the Map View to list the contributed file/device to the dialog. Each row in the spreadsheet lists the processed file/device and the location (data source) of the file/device. See File/Device Drilldown .

Reset.

Pan. Pan view to user-selected direction and distance.

Zoom In/Out:

1. To zoom in, left-click the desired location, which will be used as the center for the zoom in.
2. To zoom out, right-click the location, which will be used as the center for the zoom out.
3. Left-clicking and holding will draw a rectangle that will zoom in the view port to the area within the rectangle.
4. Right-clicking and holding will draw a rectangle that will zoom out of the view port to that area within the rectangle.

Unzoom. Undo the last zoom action. Clicking the **Reset** button will clear the history of previous zoom actions.

Define Statistic Data Area. Only the statistic data in the defined area with Geo center defined in "*Cube Data Scope Configurations"* will be loaded and displayed in Map View. This area can also be defined in options

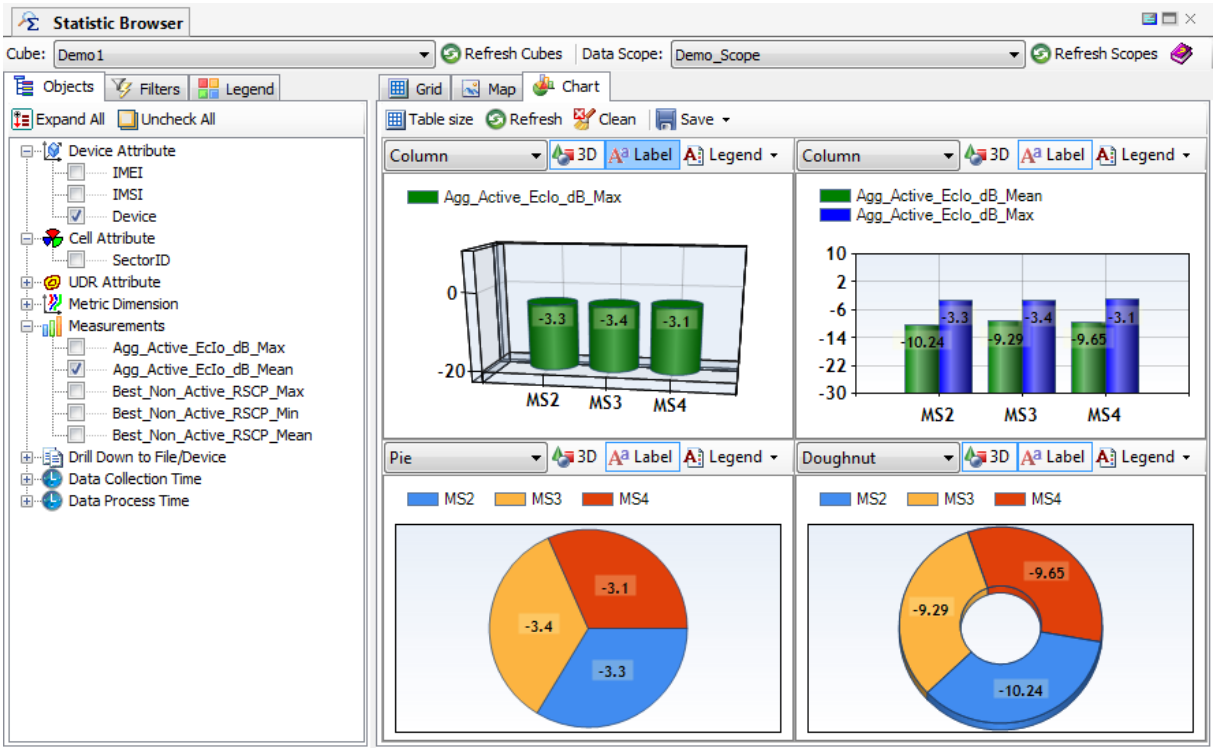
Refresh Data. Apply the new data selection and refresh the display.

Clean. Clean up the display.

UDR Polygon Selector.

Data Label. Display value of data points in the screen.

6.3.1.3 Statistic Data Cube View – Chart



Statistic Data Cube View – Chart Toolbar

Table Size. Display the Table Size selector for creating multiple Map Views. Multiple views can be synchronized by clicking the **Synchronization** button .

Refresh. Apply the new data selection and refresh the display.

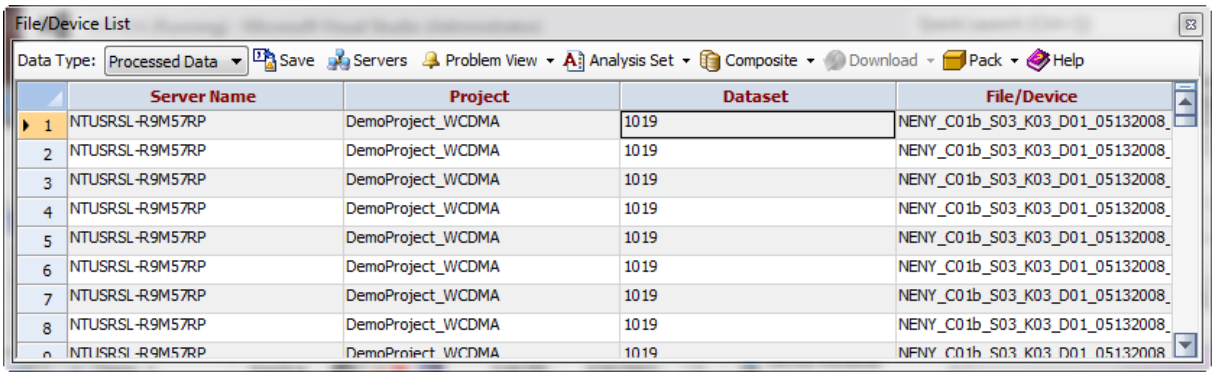
Clean. Clean up the display.

Save. Save all the currently displayed views, or save an individual view as an image.

6.3.1.4 File/Device Drilldown

Clicking at any area bin in the Map View, or double-clicking at any cell in Grid will list the contributed file/device to the dialog below. You can:

- Download the processed measurement, or the original log files if you have confiured Log file database,
- immediately send all files or multiple selected files to problem summary view
- Immediately open analysis set to analyze all files or multiple selected files



File/Device Drilldown Toolbar

Save. Save the list to an Excel file.

Remote Servers. The Remote Data Sharing Servers dialog lists all remote servers that can be accessed for peer-to-peer data sharing. If you want to download the listed file/device, make sure the according server (data source) is in your remote server list.

Problem Summary View. Send all files or multiple selected files to Problem Summary View

Analysis Set. Open analysis set to analyze all files or multiple selected files.

Composite. Create new composite dataset from all files or multiple selected files, or add all files or multiple selected files to an existing composite dataset.

Download. If TEMS Discovery detects that the data source is located in a remote server, it will download the selected file/device and list the data in the Project List with the same data structure as that in the remote server.

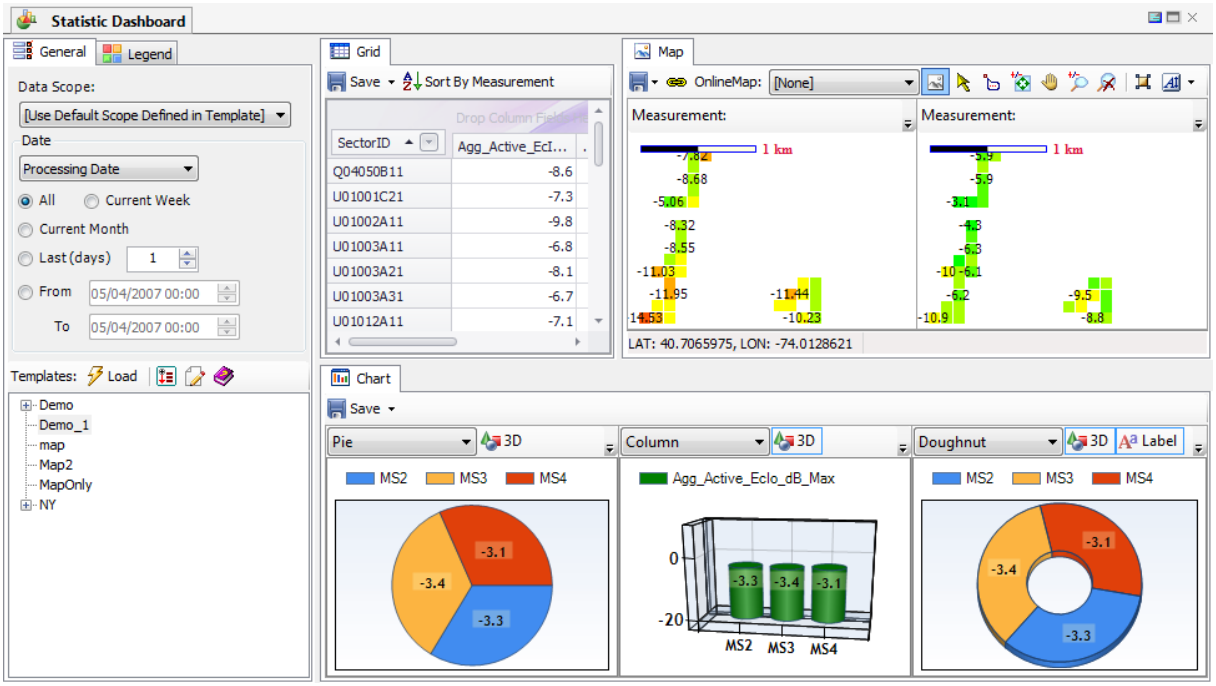
Pack. If TEMS Discovery detects that the data source is located in the local machine, rather than downloading measurement data from a remote server, it will pack the selected file/device to a zip file for sharing.

6.4 Statistic Dashboard

The Statistic Dashboard is the user interface that presents statistic data in the way predefined in the Dashboard Builder.

The Statistic Dashboard is accessed by selecting **Dashboard** from the **Statistic** menu on the Main Window.

You can simply change the data scope to apply the same dashboard template to different data source.



Statistic Dashboard Toolbar

Load. Load the statistic data based on the selected template.

Expand/Collapse Tree View. Expand/collapse the template tree view.

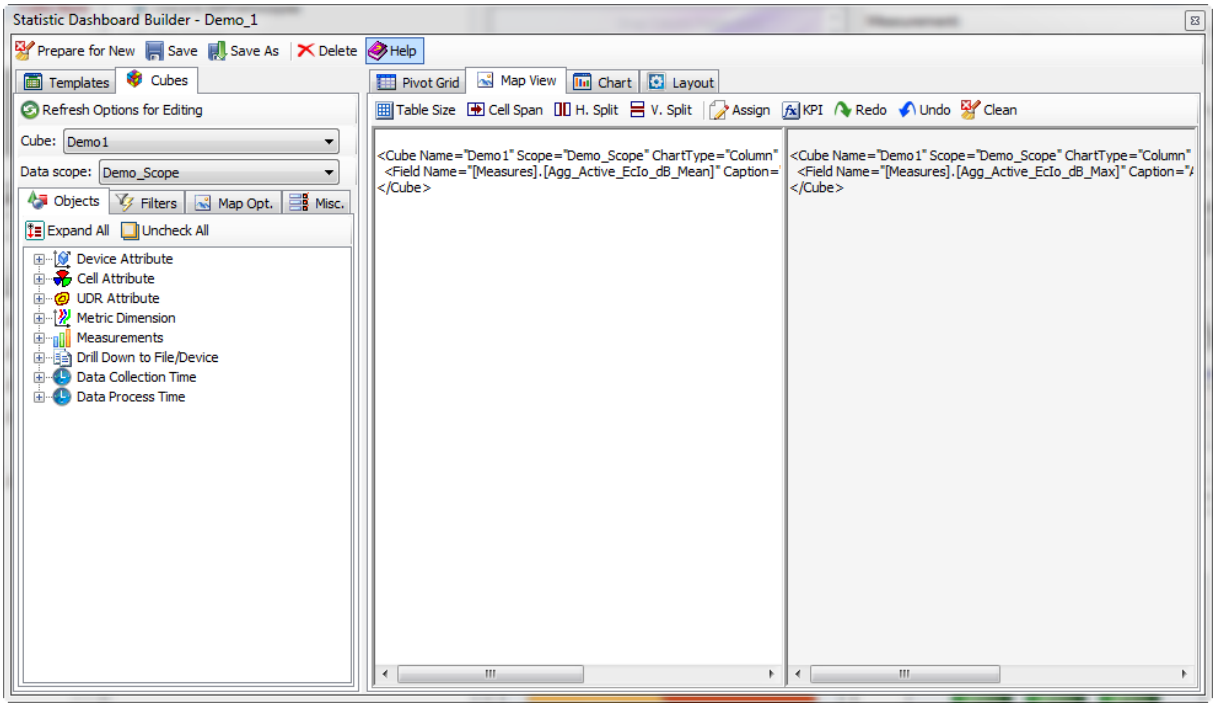
Dashboard Builder. Open the Statistic Dashboard Builder.

6.5 Statistic Dashboard Builder

The Statistic Dashboard Builder is a user interface that builds a template that contains information about the view layouts and the content to be presented in each view. The available views are Pivot Grid View, Map View, and Chart View.

The Dashboard Builder can be accessed in the following ways:

- Selecting **Dashboard Builder** from the **Statistic** menu on the Main Window.
- Clicking the **Dashboard Builder** button on the Dashboard toolbar.

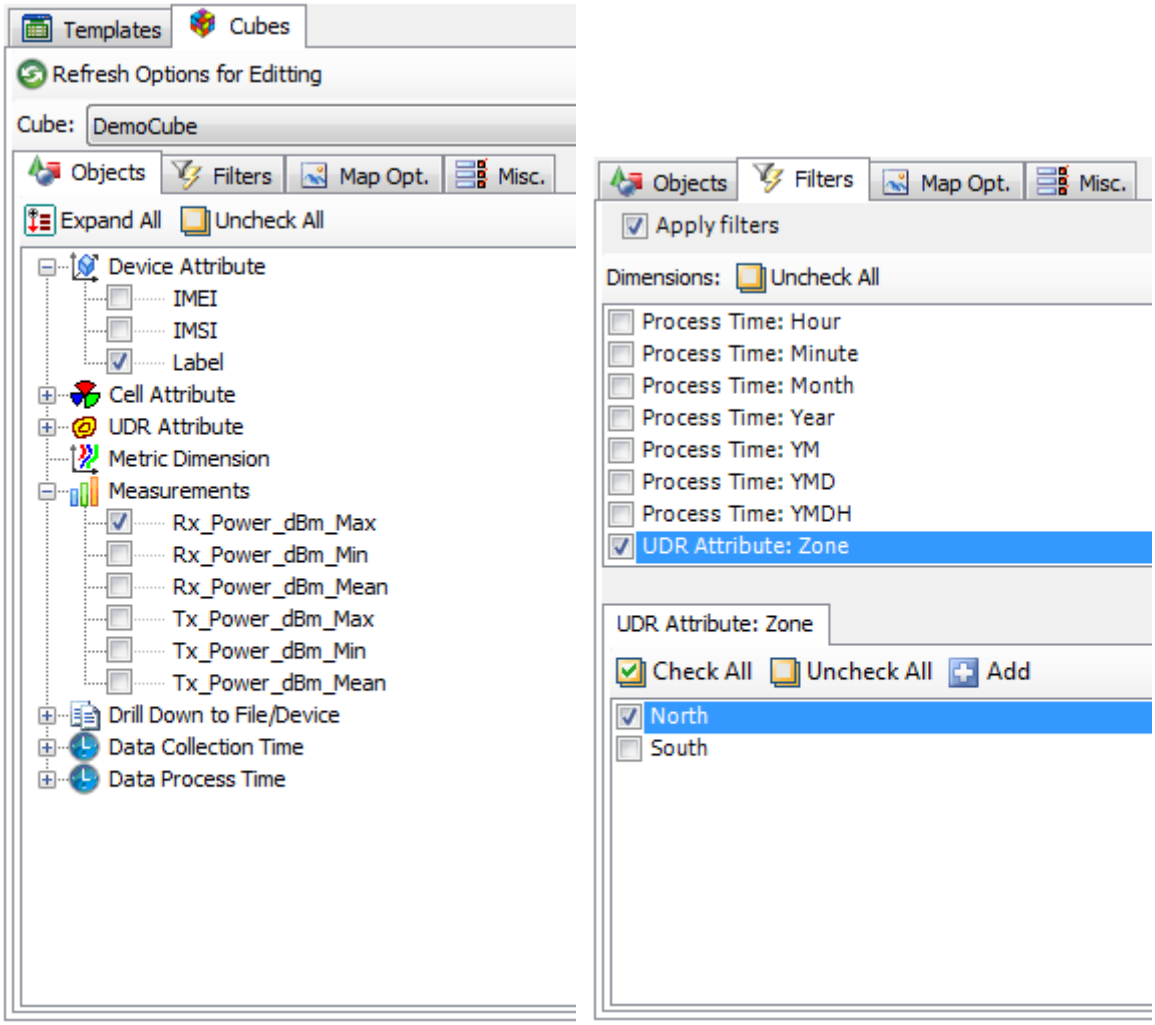


All available dashboard templates are listed in the Templates tab on the left pane. You can delete or edit those templates.

To start creating a new template, click the **Prepare for New** button, which will clean up all assignments in the views on the right pane. Switch to the Cubes tab, select a cube, and then make the desired selections.

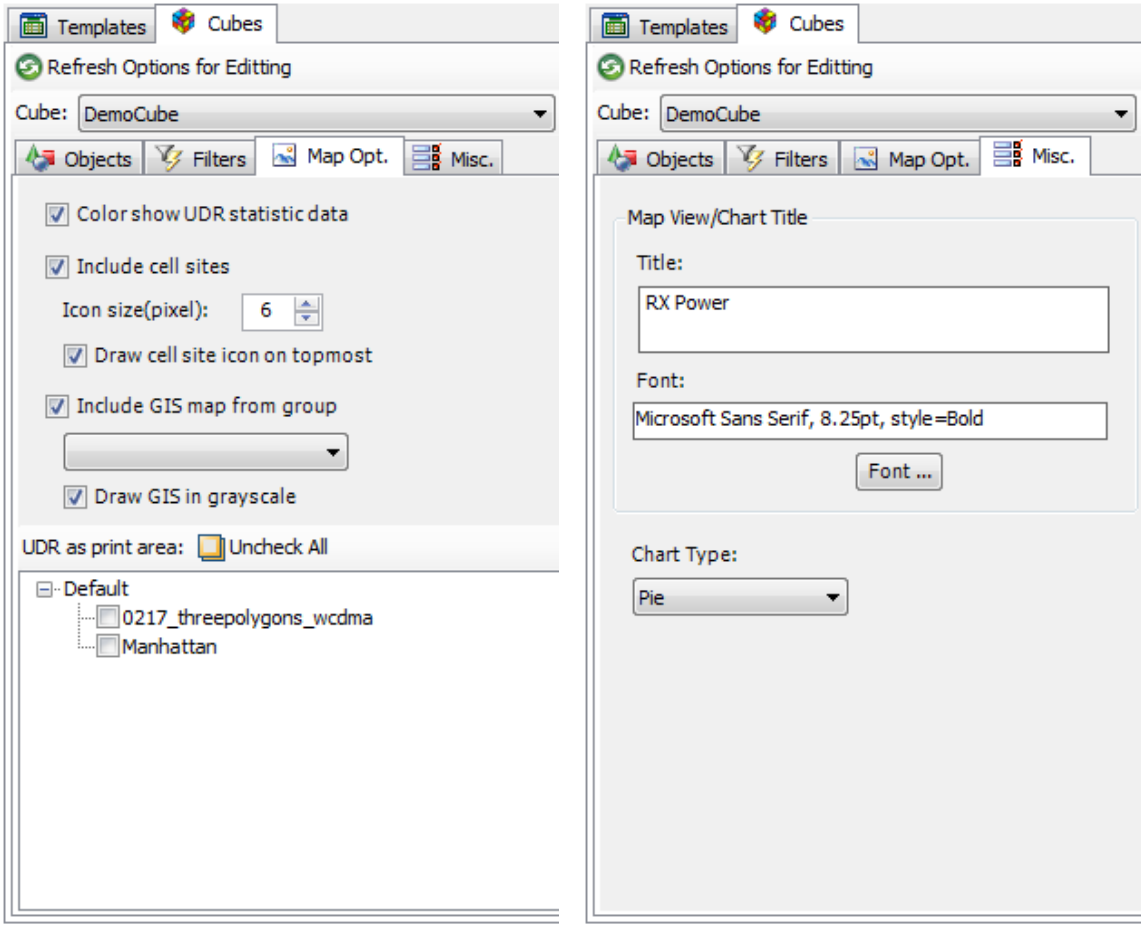
Pivot Grid View

For the Pivot Grid view display, you can select one or more measurements and dimensions in the Object tab, apply a filter in the Filters tab, and then click the **Assign** button on the Pivot Grid tab to assign the definition string to the target grid view.



Map View

The Map View display has more options: Map Options and Miscellaneous Options.



Map Options

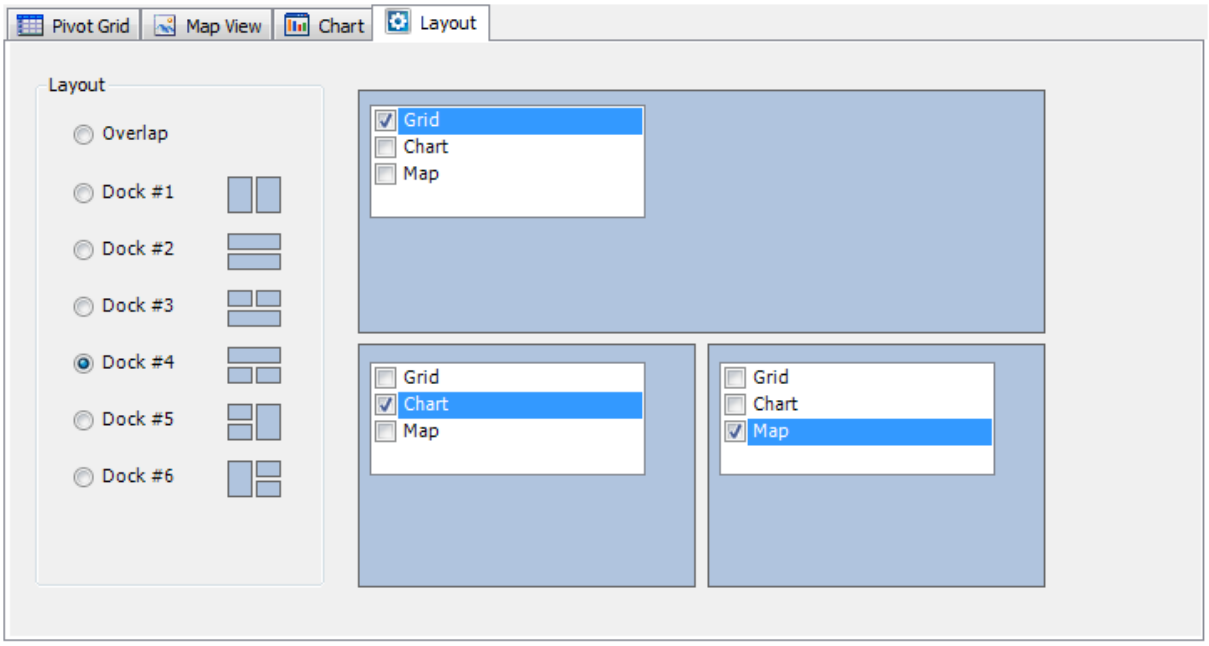
- **Color shows UDR statistic data**. To use this option, you must select one UDR attribute as a dimension in the Objects tab. This option directs TEMS Discovery to draw the UDR polygon with the selected attribute, calculate the statistic data of each polygon, and then fill the polygon with the color determined by the plot band definition.
- **Include Cell Sites**. Based on the boundaries of the statistic data, this option directs TEMS Discovery to search the default network configuration list, locate all the cell sites within the boundary, and draw those cell sites in the Map View.
- **Include GIS map from group**. Based on the boundaries of the statistic data, this option directs TEMS Discovery to search the selected default GIS group, locate all the GIS data within the boundary, and draw that GIS data in the Map View.
- **UDR as print area**. This option selects a list of UDRs as a fixed print area. TEMS Discovery will determine the bounding rectangle of the selected UDRs and adjust the view port of the Map View accordingly.

Miscellaneous Options

- **Map View/Chart Title**. Enter the text of your choice to define a title for the Map View or Chart.
- **Font**. Select the font for the text.
- **Chart type**. For Charts, select the chart type.

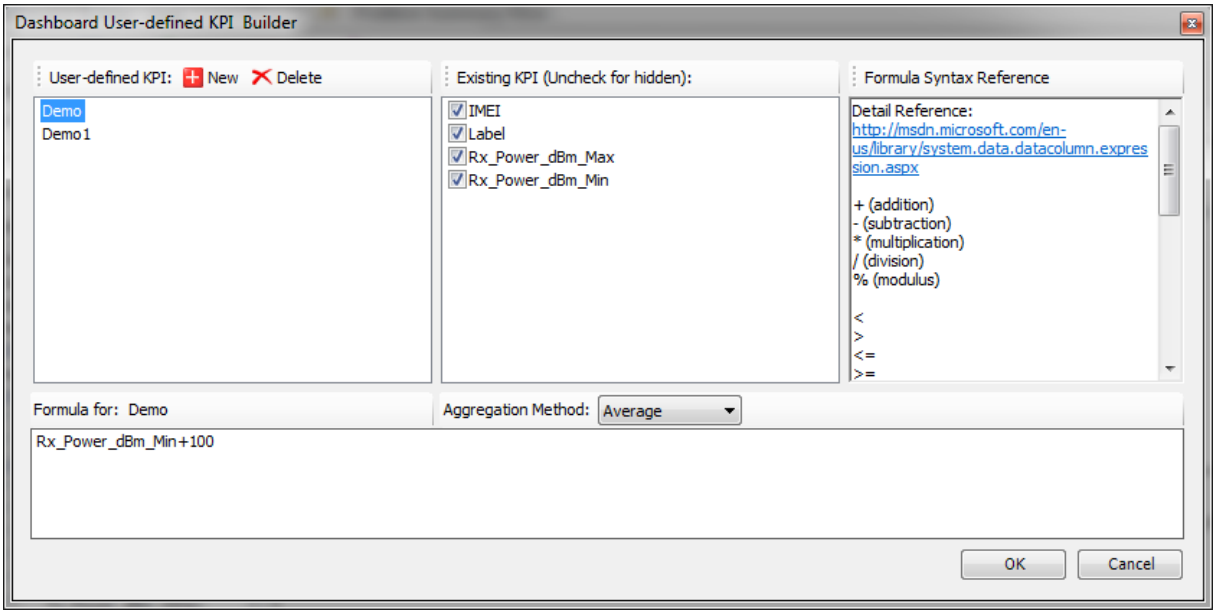
Layout

Use the options on the Layout tab to define the view layout.



User-defined KPI

The user can create customize KPI from the pre-defined KPI.



For syntax reference, please visit pages below

http://msdn.microsoft.com/en-us/library/system.data.datacolumn.expression.aspx

6.5.1.1 Dashboard Builder Toolbars


Prepare for New. Prepare for a new assignment. This cleans up all existing assignments and prepares for creation of a new template.


Save. Save the template.


Save As. Save the template as a new template.


Delete. Delete the selected template.


Help.

Dashboard Builder Toolbar – View tabs


Table Size. Define the number of subviews.


Move Field Down. In Grid view, you can move a measurement or dimension field up or down to change the order of the field in the grid.


Move Field Up. In Grid view, you can move a measurement or dimension field up or down to change the order of the field in the grid.


Cell Span.


Horizontal Split.


Vertical Split.


Assign. Assign the selected option as a definition for the view.


Create/Edit User-defined KPI.


Redo. Redo the previous modification.

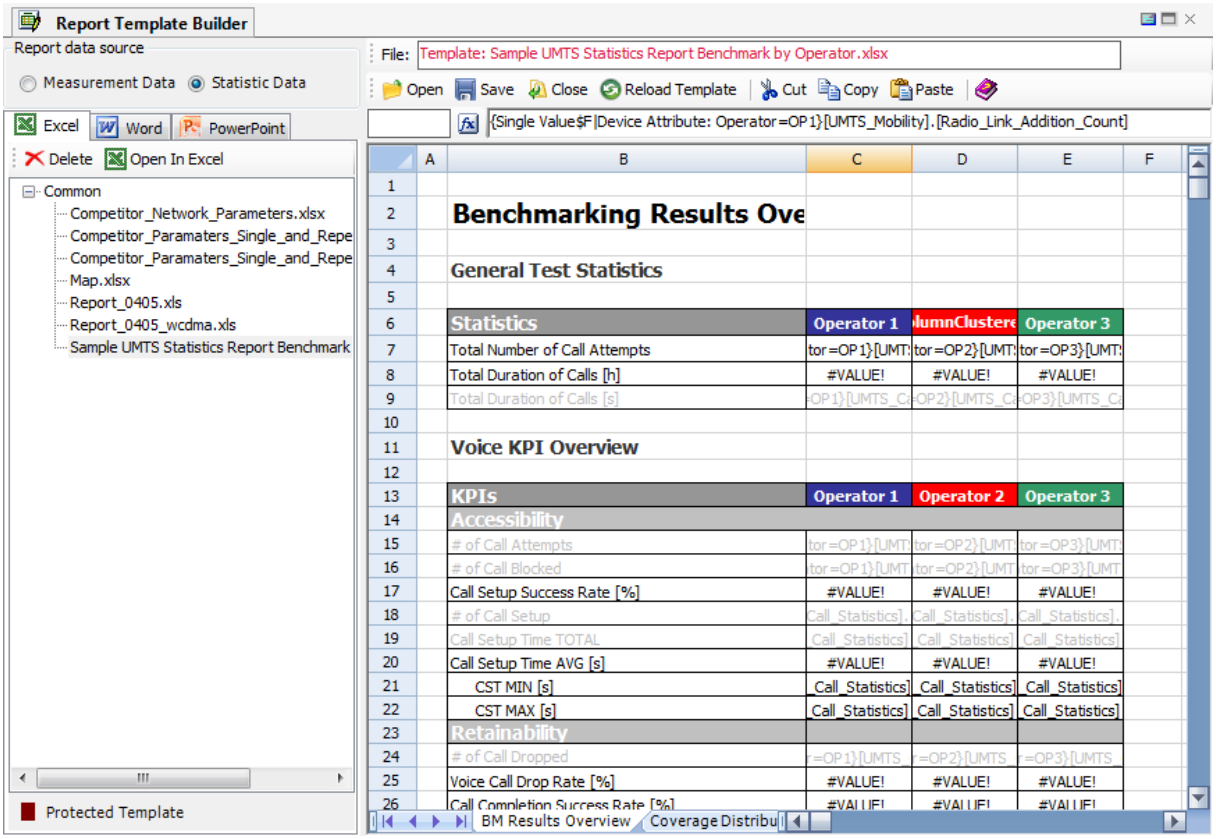

Undo. Undo the previous modification.


Clean. Clean up.

6.6 Report Template Builder – Statistic Data

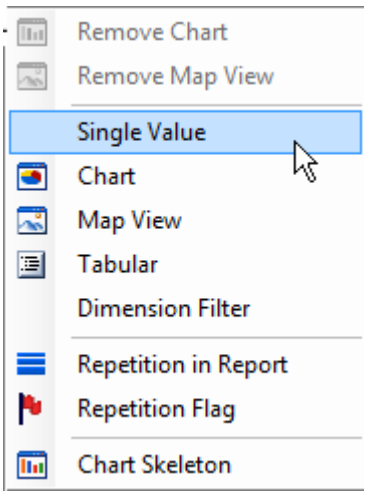
The **Report Template Builder** for statistic data is designed to provide great flexibility when generating reports (in Microsoft Office Excel XLS format) from statistic data. The basic operation is the same as described for the Report Template Builder used for measurement data.

The Report Template Builder for statistical data is accessed by selecting **Report Template Builder** from the **Statistic** menu on the Main Window.



Currently, TEMS Discovery provides four types of statistic reporting: **Chart**, **Map View**, **Single value** (the result is a single value), and **Tabular**.

A right-click at the spreadsheet will bring up the context menu described below.



Remove Chart. Remove the chart definition and clean up the chart area.

Remove Map View. Remove the Map View definition and clean up the view area.

Repetition in Report. Define repetition options in the report template. See Options of Repetition in Report.

Repetition Flag. Define a repetition flag in the cell as a placeholder. This placeholder will be replaced with the value of the repetition key when the report is generated.

Chart Skeleton. Define a Chart Skeleton.

Single Value. Generate a single value

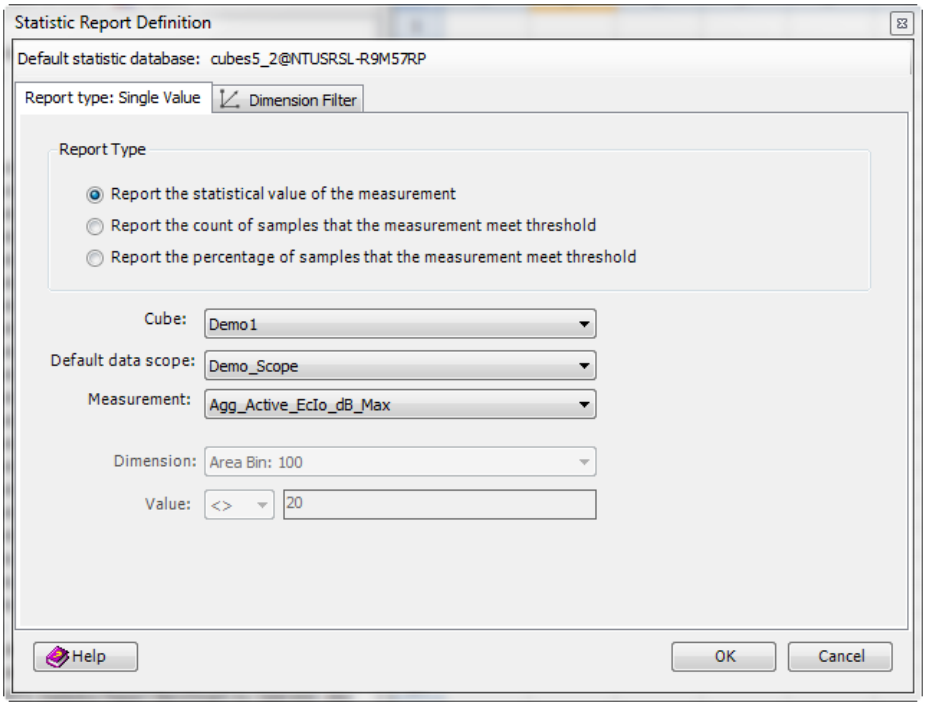
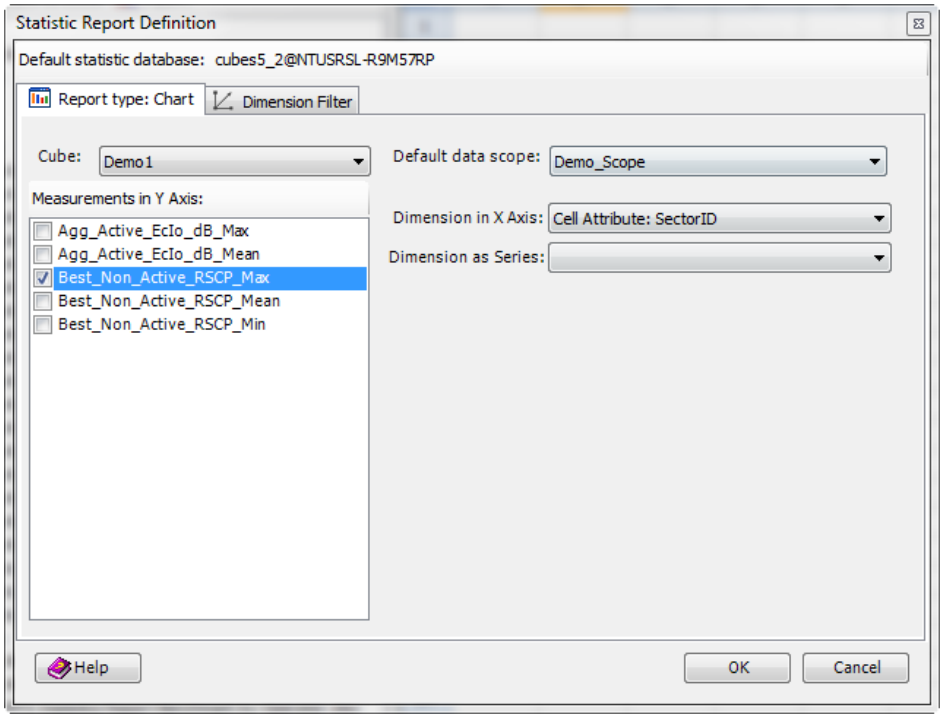
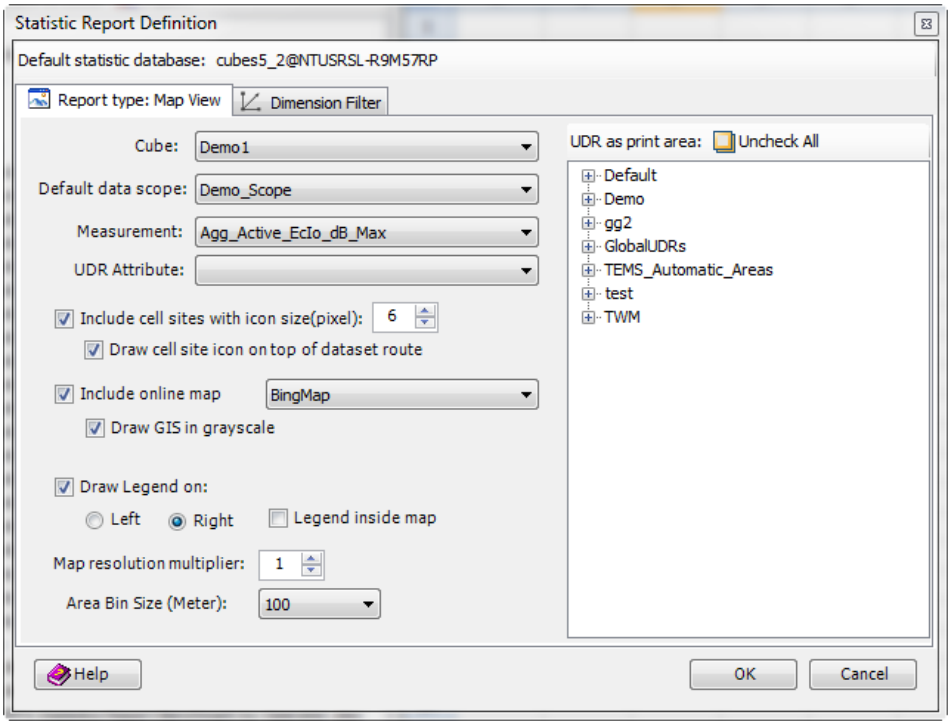


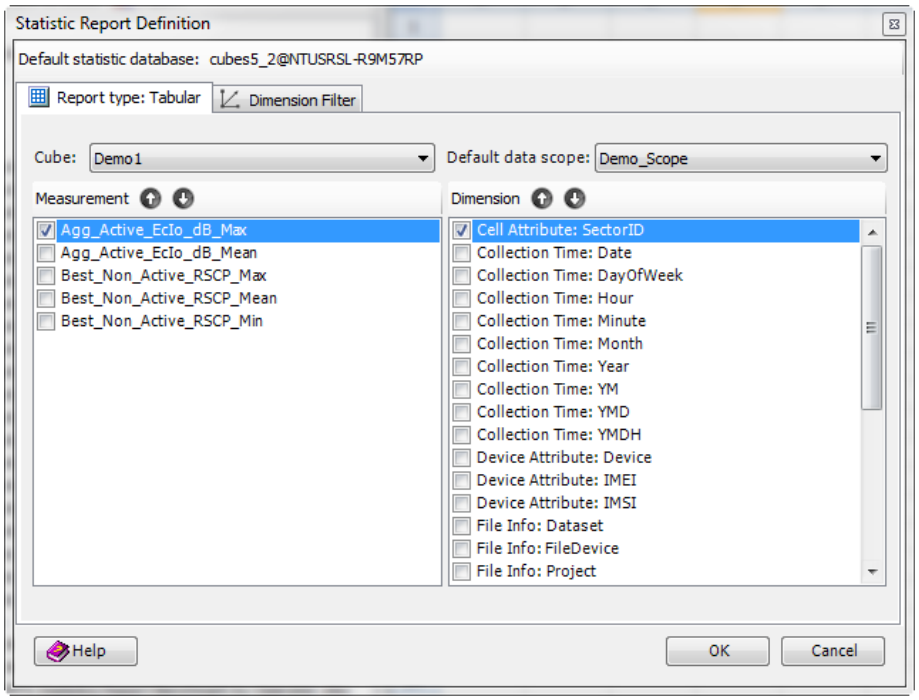
Chart: Generate a chart



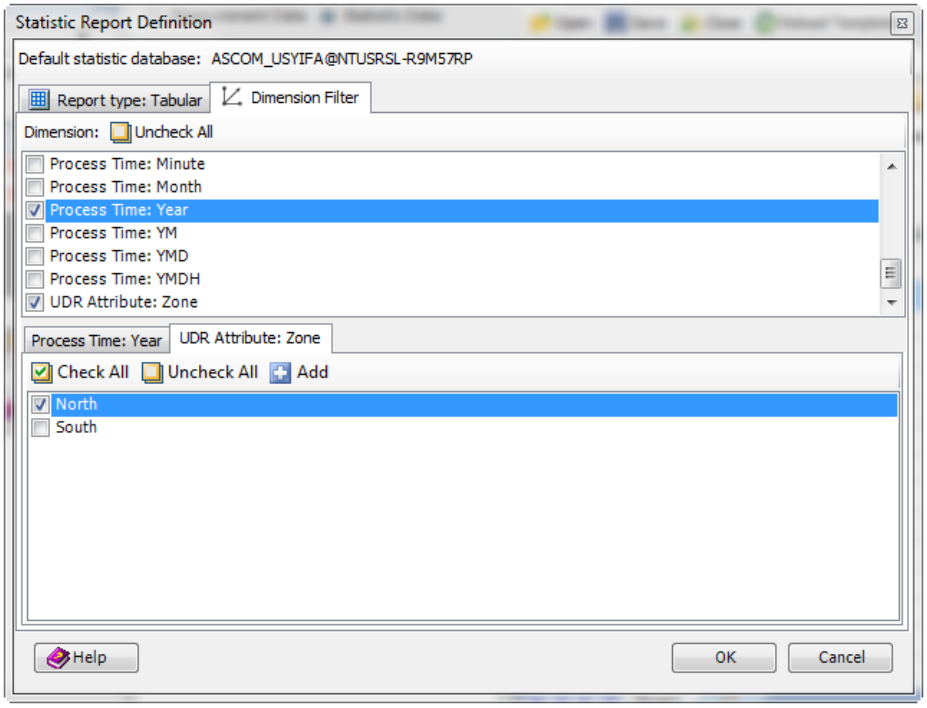
Map View: Generate a map view



Tabular: Generate a tabular

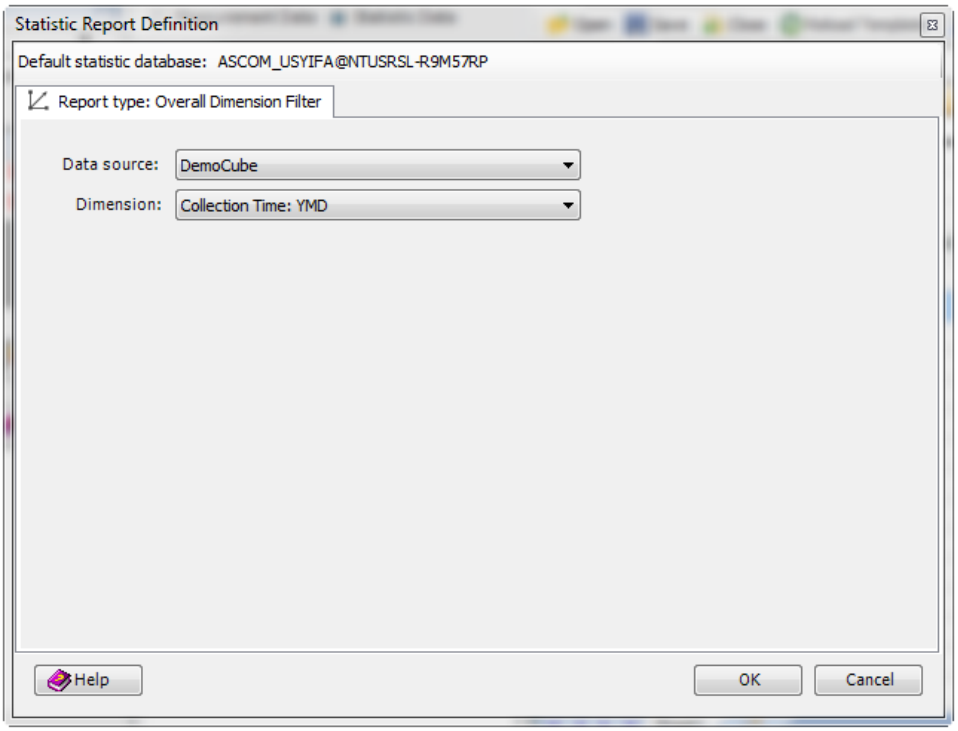


Certain **filters** can be applied to any of the report types.



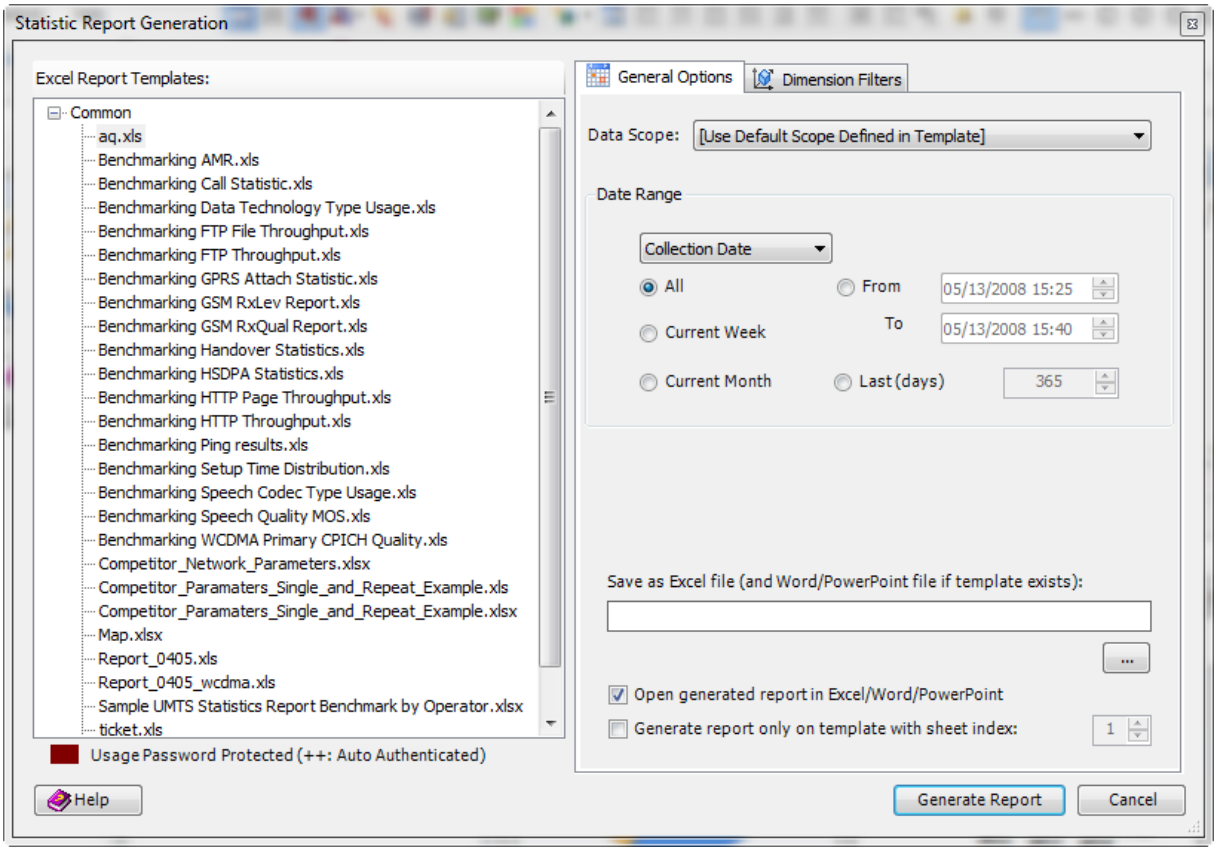
Dimension Filter: When you generate a report based on a report template, you may want to apply certain filters to all reports. (See Generate Statistic Report From Report Template for more information.)

The following dialog provides a way to list those filters in the final report.



6.6.1 Generate Statistic Report From Report Template

The Statistic Report Generation dialog is accessed by selecting **Report Generation** from the **Statistic** menu on the Main Window.



The process is similar to that described for generating a report from the Report Template Builder for Measurement Data. Time and dimension filters can be applied.

You can simply change the data scope to apply the same report template to different data source.

6.7 Cube Data Scope Configurations

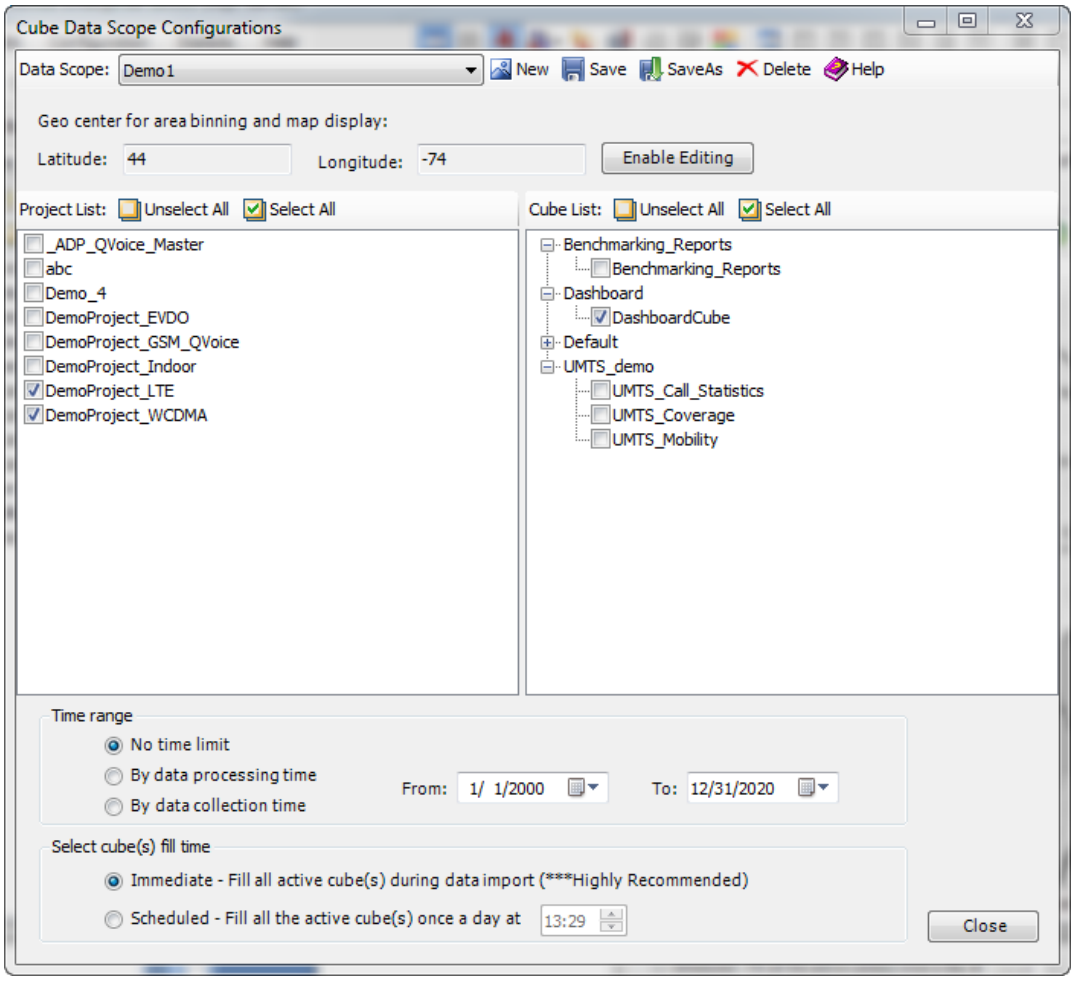
The Cube Data Scope Configurations allows you to define geo center for calculating geo area bins, select the data source for a cube, and define cube processing scheduler.

TEMS Discovery applies Azimuthal Equidistant projection for map display and geo area bin calculation, therefore, geo center is crucial. If you make change to geo center, all the effected statistical data shall be re-processed. You can always make change to the definition of a particular cube to force it to be re-processed.

TEMS Discovery will extract the data within the certain time range from the selected projects and fill the cubes associated in the statistic database.

In addition, you can schedule when to extract measurement data and fill statistic database for a cube group. But for better performance, it is highly recommended to select option "*Immediate – Fill all active cubes(s) during data import*".

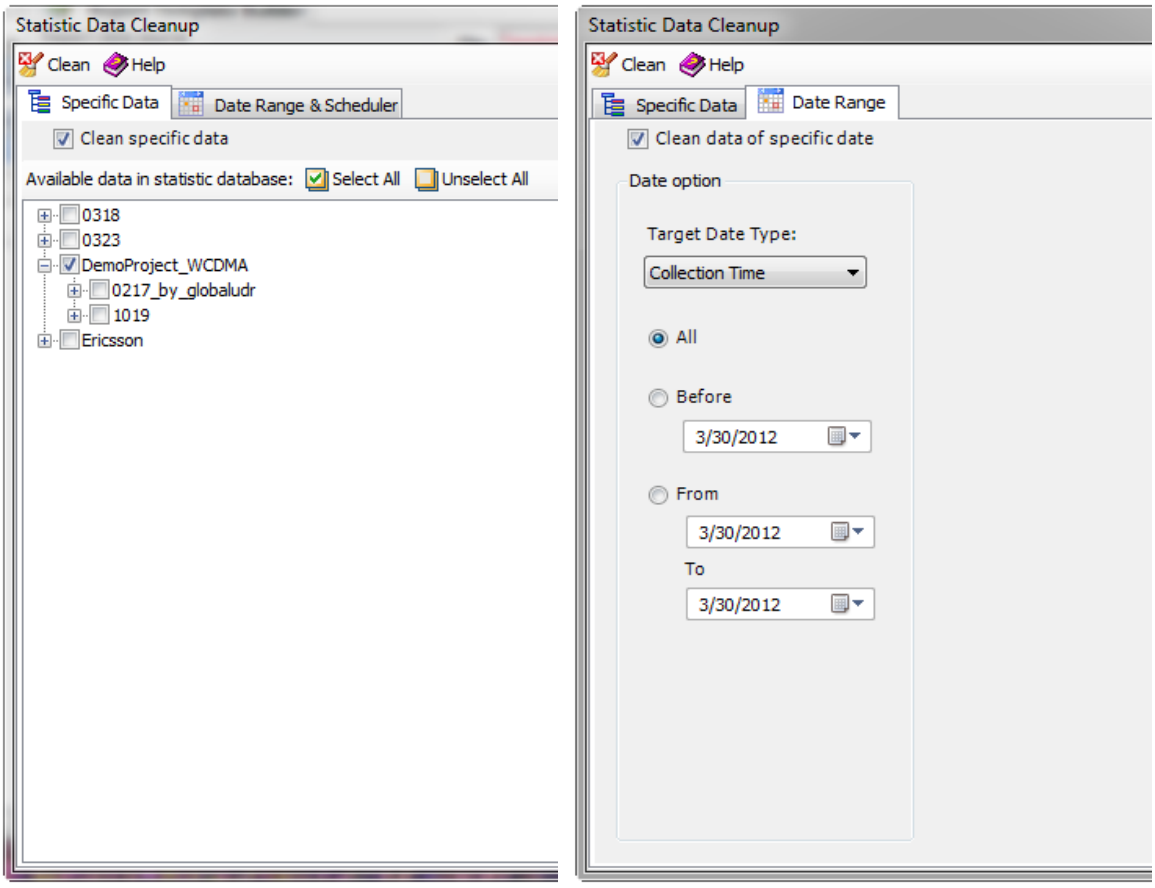
The Cube Data Scope Configuration dialog is accessed by selecting **Cube Data Scope Configuration** from the **Statistic** menu on the Main Window.



6.8 Statistic Data Cleanup

The Statistic Data Cleanup function cleans up the selected data from the statistic database.

The function is accessed by selecting **Statistic Data Cleanup** from the **Statistic** menu on the Main Window.



Specific Data

Use the Specific Data tab to select data to be purged from the database.

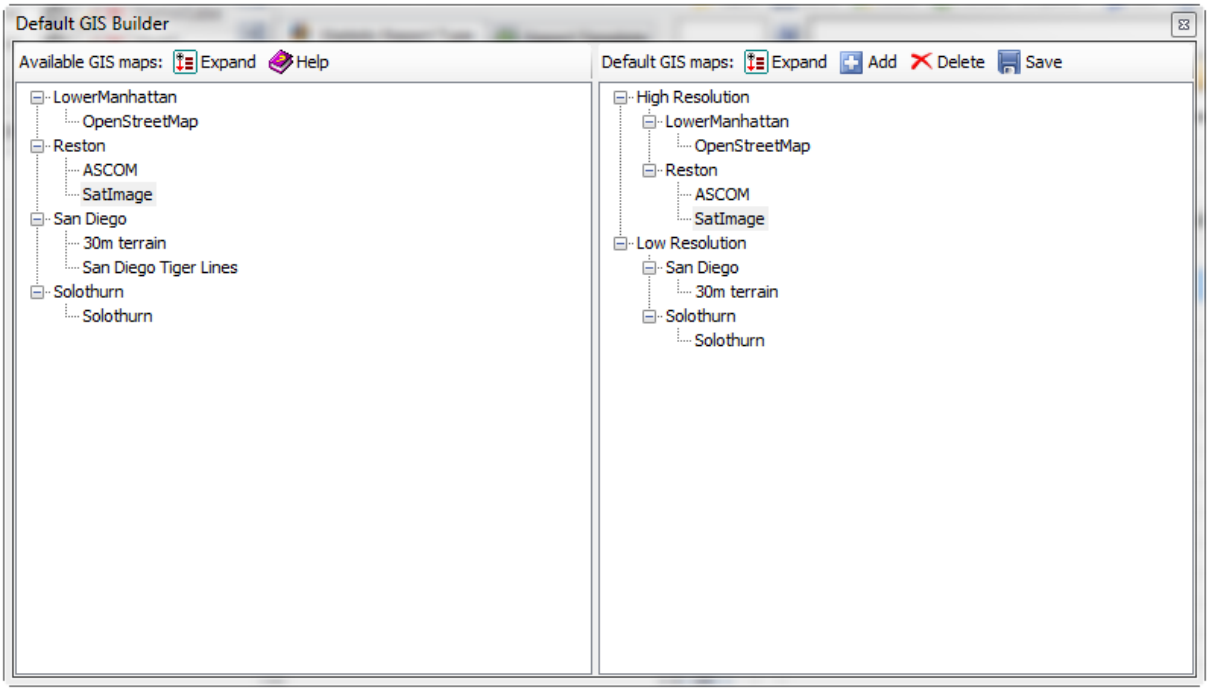
Date Range

Use the Date Range tab to identify data to be purged from the database by date.

6.9 Default GIS Builder

The Default GIS Builder function allows you to select GIS data from the existing GIS data list and build a default set of GIS data. In the Dashboard, Cube Viewer, and Report Generator, based on the bounding rectangle of the statistic data, TEMS Discovery will determine what GIS data is to be displayed in the view from this default GIS list.

This function is accessed by selecting **Default GIS Builder** from the **Statistic** menu on the Main Window.



Drag-and-drop the desired maps from the list of available GIS maps on the left pane into the list of default GIS maps on the right pane.

If no GIS map group exists, a dialog will pop up to ask whether a new one should be created. You can also click the **Add** button on the toolbar to create a new map group. More than one GIS map can be added to a group.

NOTE: See Import GIS data for more information.

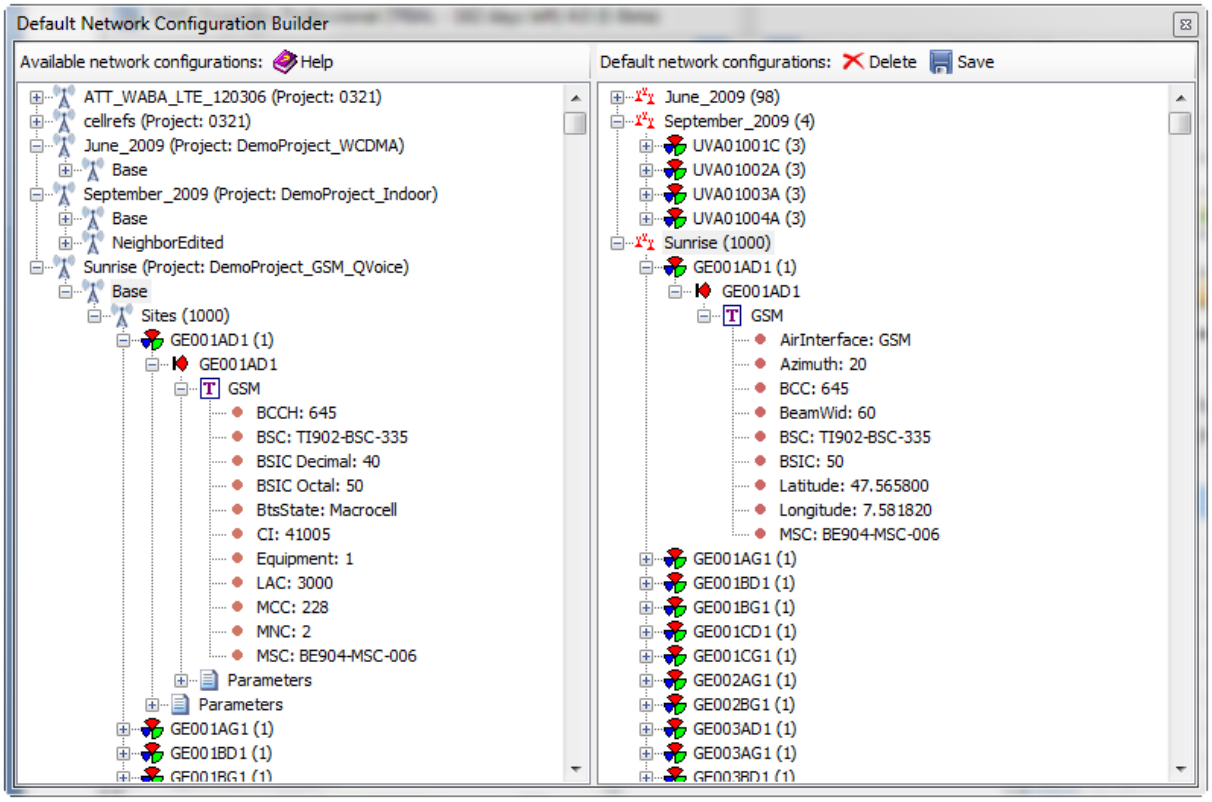
Default GIS Builder Toolbar

- **Expand**. Expand/collapse the tree view.
- **Help**.
- **Add**. Add a new GIS map group.
- **Delete**. Delete the selected map.
- **Save**. Save the current GIS configuration.

6.10 Default Network Configuration Builder

The Default Network Configuration Builder function allows you to select a network configuration from the existing list and build a default network configuration list. In the Dashboard, Cube Viewer, and Report Generator, based on the bounding rectangle of the statistic data, TEMS Discovery will determine what cell sites to be displayed in the view from this default network configuration list.

This function is accessed by selecting **Default Network Configuration Builder** from the **Statistic** menu on the Main Window.



Drag-and-drop the desired configuration from the list of available network configurations on the left pane into the list of default network configurations on the right pane.

NOTE: The existing networking configuration lists are collected from measurement data projects. See Import Network Configuration for more information.

Default Network Configuration Builder Toolbar

Help.

Delete. Delete the selected network configuration.

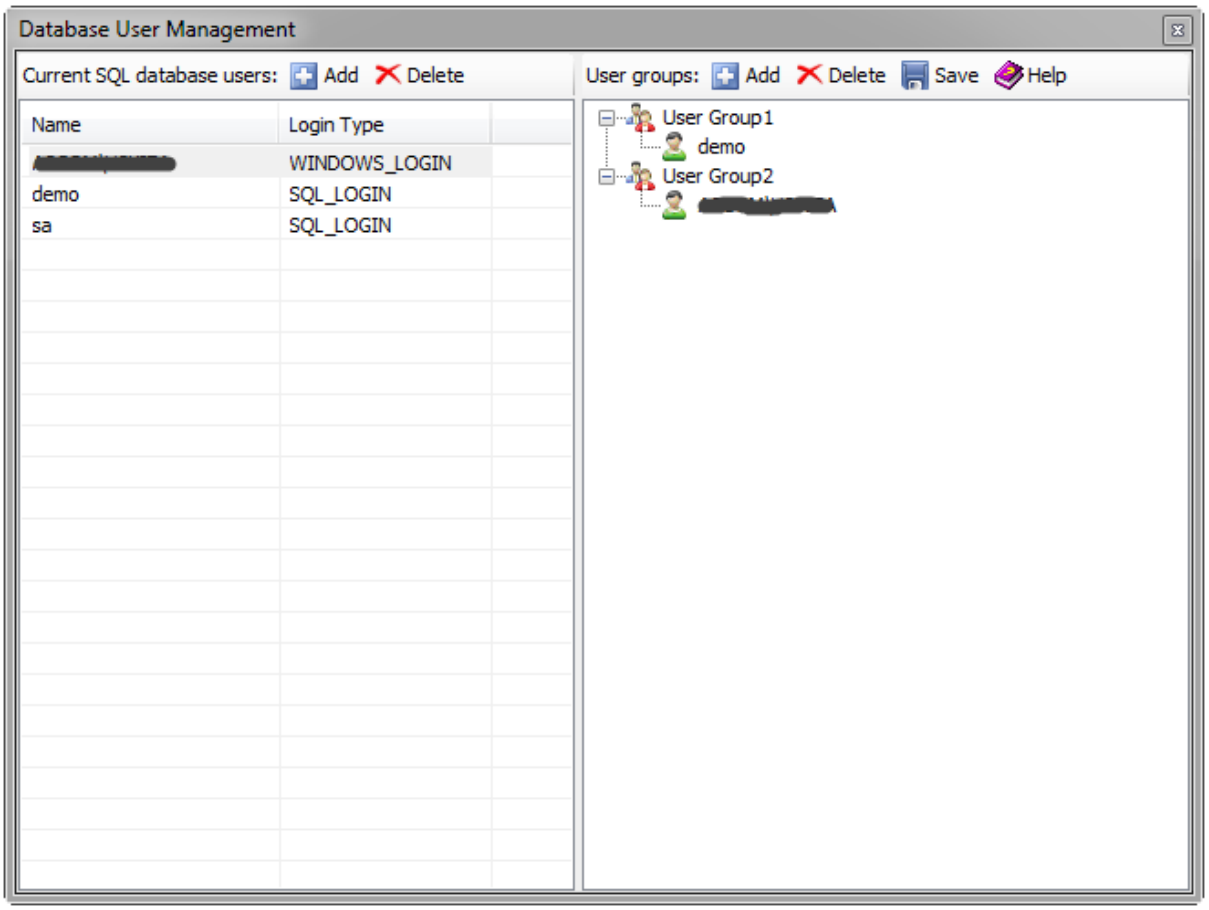
Save. Save the current network configuration.

6.11 Database User Management

The Database User Management feature is used to create database users and to assign them to user groups. Only TEMS Discovery users with administrator rights can create users who can access the statistic database.

User groups created in this dialog are used for assigning permissions for statistic database access.

This feature is accessed by selecting **Database User Management** from the **Statistic** menu on the Main Window.



NOTE: Prior to using this feature, the user will need to configure the default statistic database in the Statistic Database dialog, providing the correct user name and password.

The Statistic Database dialog is accessed by selecting **Configuration | Options | Statistic Database** from the Main Window.

Database User Management Toolbar

Add. Add a new user (or user group).

 **Delete**. Delete the selected user (or user group).

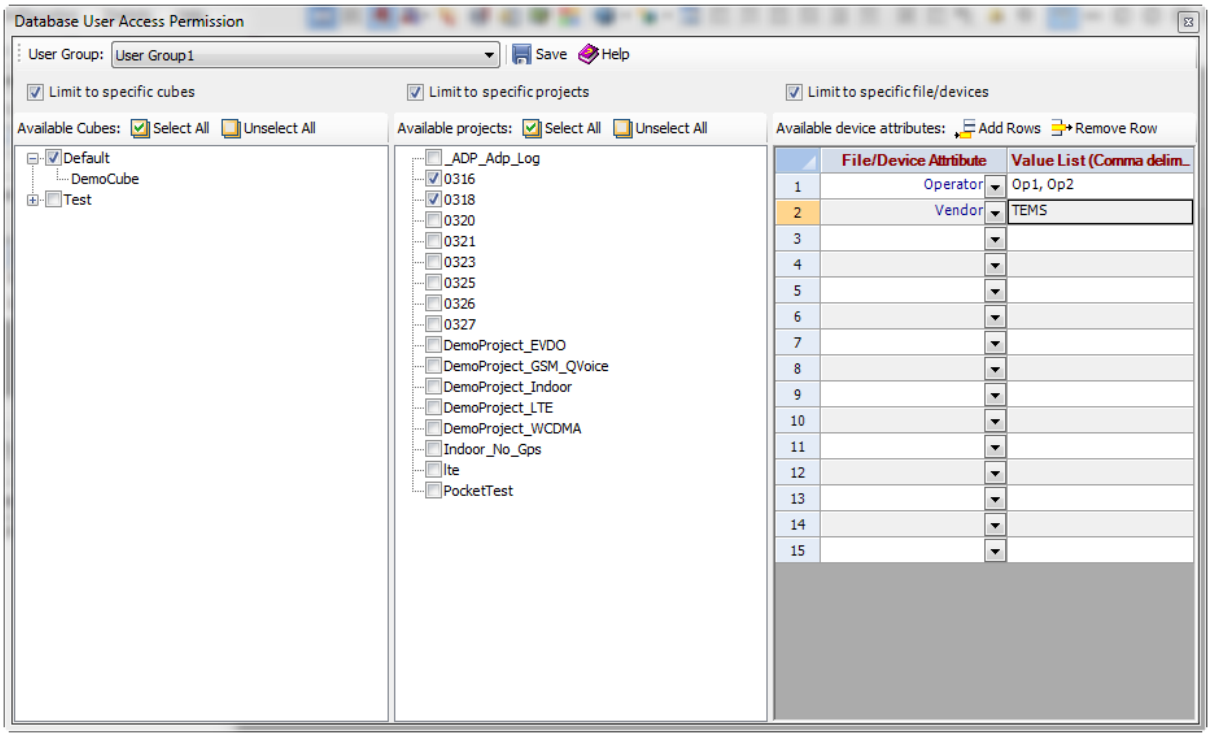
 **Save**. Save the user group.

 **Help**.

6.12 Database User Access Permission

The purpose of the Database User Access Permission feature is to control and limit user access to the statistic database.

This feature is accessed by selecting **Database User Access Permission** from the **Statistic** menu on the Main Window.



Use the checkboxes in the three panels on the Database User Access Permission window to limit user group access according to:

- Specific cubes
- The data in specific projects
- Device attributes in specific files/devices.

Database User Access Permission Toolbar

Save. Save the current user group.

Help.

Select All. Select All items in the panel.

Unselect All. Unselect All items in the panel.

Add Rows. Add rows for more device attributes.

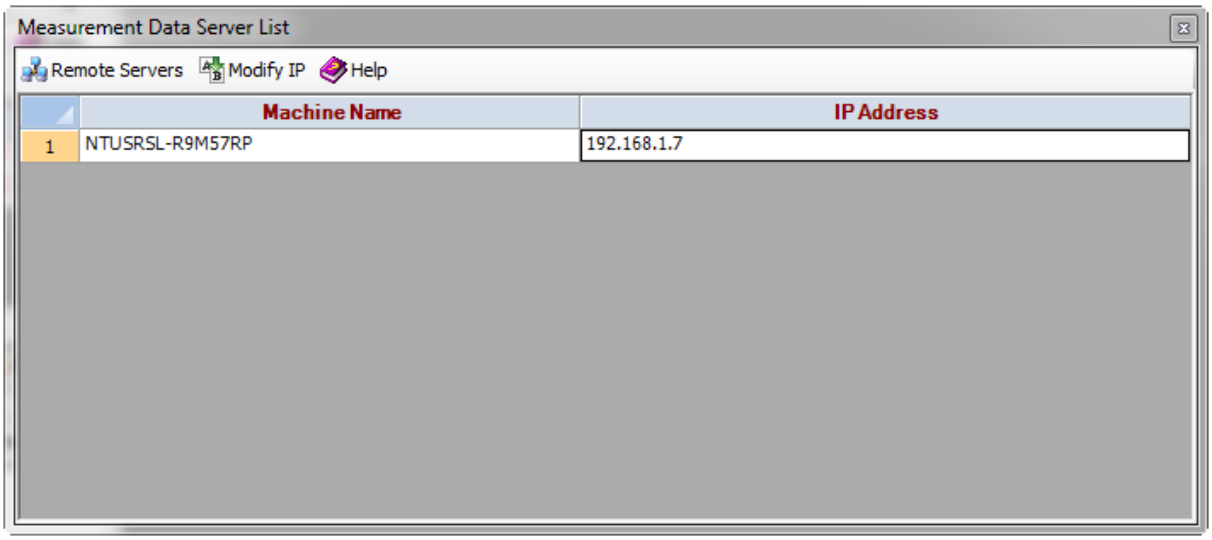
Remove Row. Remove device attribute rows.

6.13 Measurement Data Server List

The Measurement Data Server List is a list of servers that contain measurement data that contributes to the current statistic database.

If the IP address of a server that processes measurement data and provides statistic data has been modified, you will need to update the information in this dialog.

The Measurement Data Server List is accessed by selecting **Measurement Data Server List** from the **Statistic** menu on the Main Window.



Measurement Data Server Toolbar

Remote Servers. The Remote Data Sharing Servers dialog lists all remote servers that can be accessed for peer-to-peer data sharing. If you want to download the listed file/device, make sure the according server (data source) is in your remote server list.

Modify IP. When TEMS Discovery extracts measurement data and stores the data in the statistic database, it will also record the IP address of the measurement data server in the statistic database. This information will be used for tracing the cube data back to measurement data.

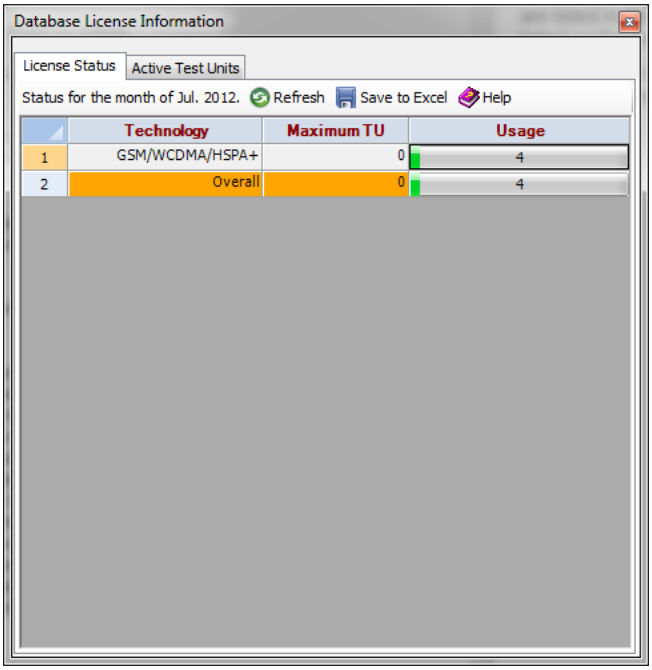
If the IP address of the measurement data server is changed, selecting this tool will modify the record in the statistic database accordingly.

Help.

6.14 Enterprise License Information

The Enterprise License Information feature is used to display the license status. All licensed technologies are listed in the spreadsheet on the License Status tab, and the corresponding maximum active test units are listed on the Active Test Units tab.

The Database License Information dialog is accessed by selecting **Enterprise License Information** from the **Statistic** menu on the Main Window.



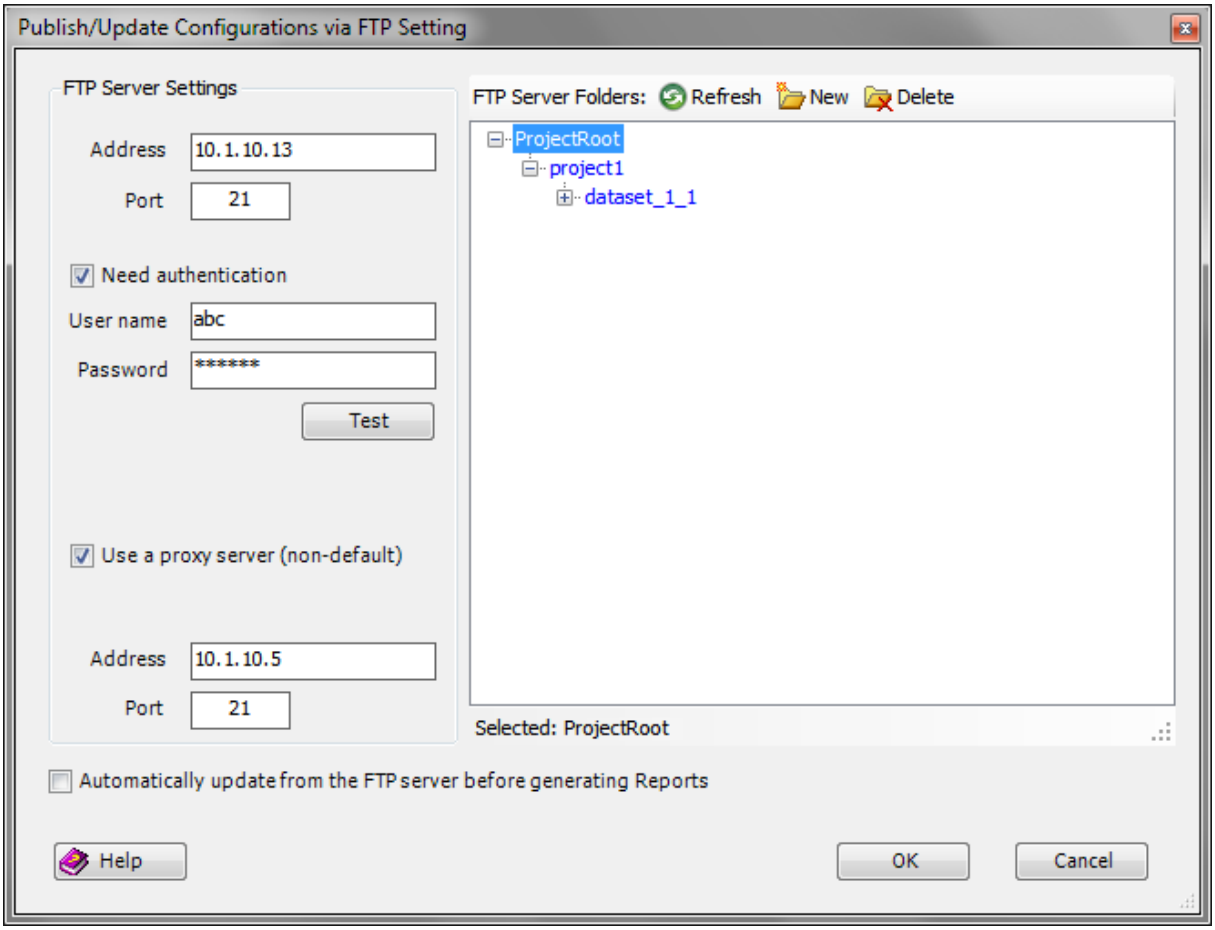
7 Configuration and Settings

The following sections describe the interface for TEMS Discovery configuration and settings.

7.1 Publish/Update via FTP Setting

Using the Publish/Update Configurations via FTP Setting feature, TEMS Discovery users can set up an automatic configuration publish/update process via an FTP server.

This feature is accessed from the **Configuration** menu on the Main Window.



If you turn on the **Automatically update from the FTP server before generating Reports** option, TEMS Discovery will automatically update your TEMS Discovery configurations based on the latest published configurations on the specified FTP server before generating reports or before generating output by the ADP tasks.

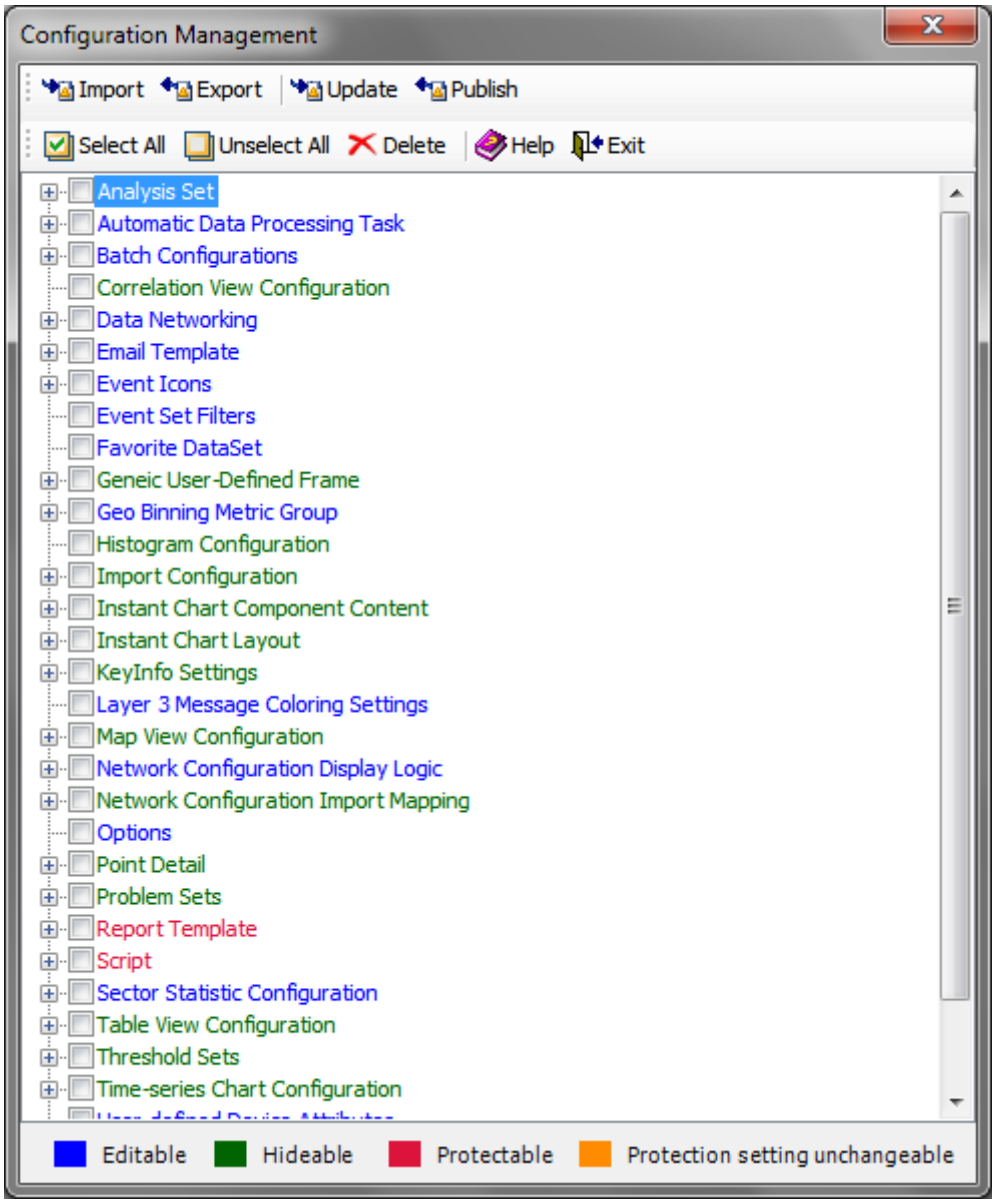
Once an FTP server is set up, you can use the action buttons on the Configuration Management toolbar to publish the selected configurations to the FTP server or to make updates if new published configuration files are available on the FTP server.

- To publish configurations to the FTP server, select the configuration tree nodes to be published, and then click the **Publish** button on the Configuration Management toolbar.
- To update configurations from the FTP server, simply click the **Update** button on the Configuration Management toolbar, and TEMS Discovery will automatically check the specified FTP server's folder, download any new configuration files, and import them into TEMS Discovery.

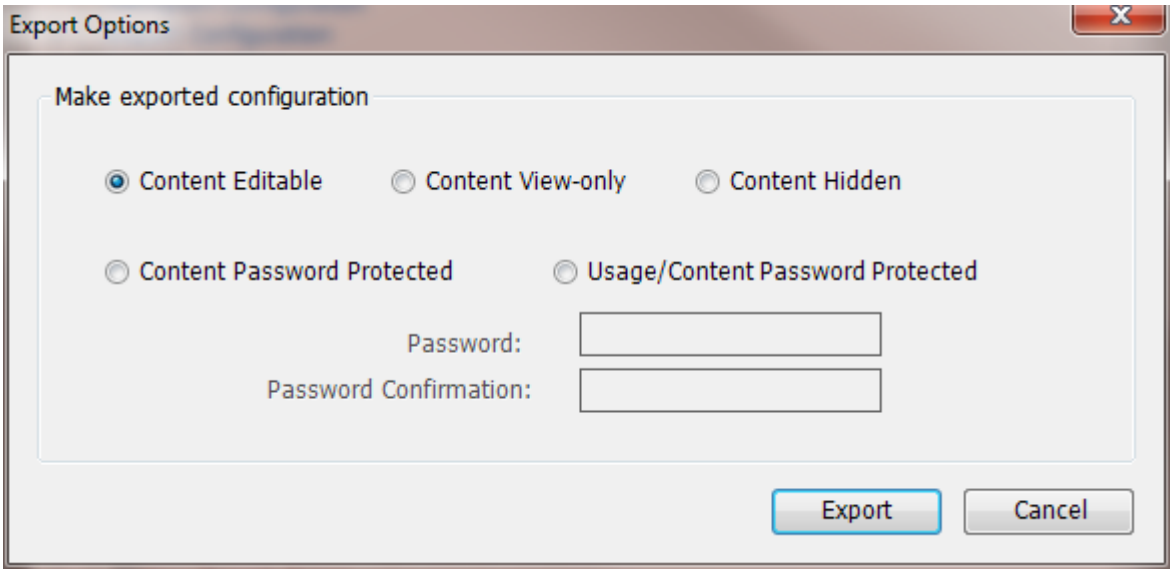
7.2 Configuration Management

Configuration Management provides a user interface to manage all TEMS Discovery configurations and settings that can be shared, saved, or deleted. You can select one or more configuration items and export them to a ZIP file. This ZIP file can be imported into another user's TEMS Discovery application, allowing a group to share the same TEMS Discovery configuration and settings.

This feature is accessed from the **Configuration** menu on the Main Window.



To protect intellectual property, TEMS Discovery provides options to export script and report templates with certain protection.



- **Content Editable**. The exported content will be totally open for modification.
- **Content View-only**. The exported content can be viewed only and cannot be modified.
- **Content Hidden**. The exported content cannot be viewed and will totally hidden from the GUI.
- **Content Password Protected**. The exported content will be protected from view and modification. However, by providing the correct password, the user can deprotect the content and both view the content and make modifications.
- **Usage/Content Password Protected**. The exported content cannot be viewed or modified. However, by providing the correct password, the user can use it but will not be able to deprotect the content.

Configuration Management Toolbar

Import. Import a TEMS Discovery configuration from a TEMS Discovery exported ZIP file.

Export. Export the selected configuration to a ZIP file.

Update. Update the TEMS Discovery configuration from the FTP server.

Publish. Publish the TEMS Discovery configuration to the FTP server.

Select All. Check all tree view checkboxes.

Unselect All. Uncheck all tree view checkboxes.

Delete. Delete the selected configuration.

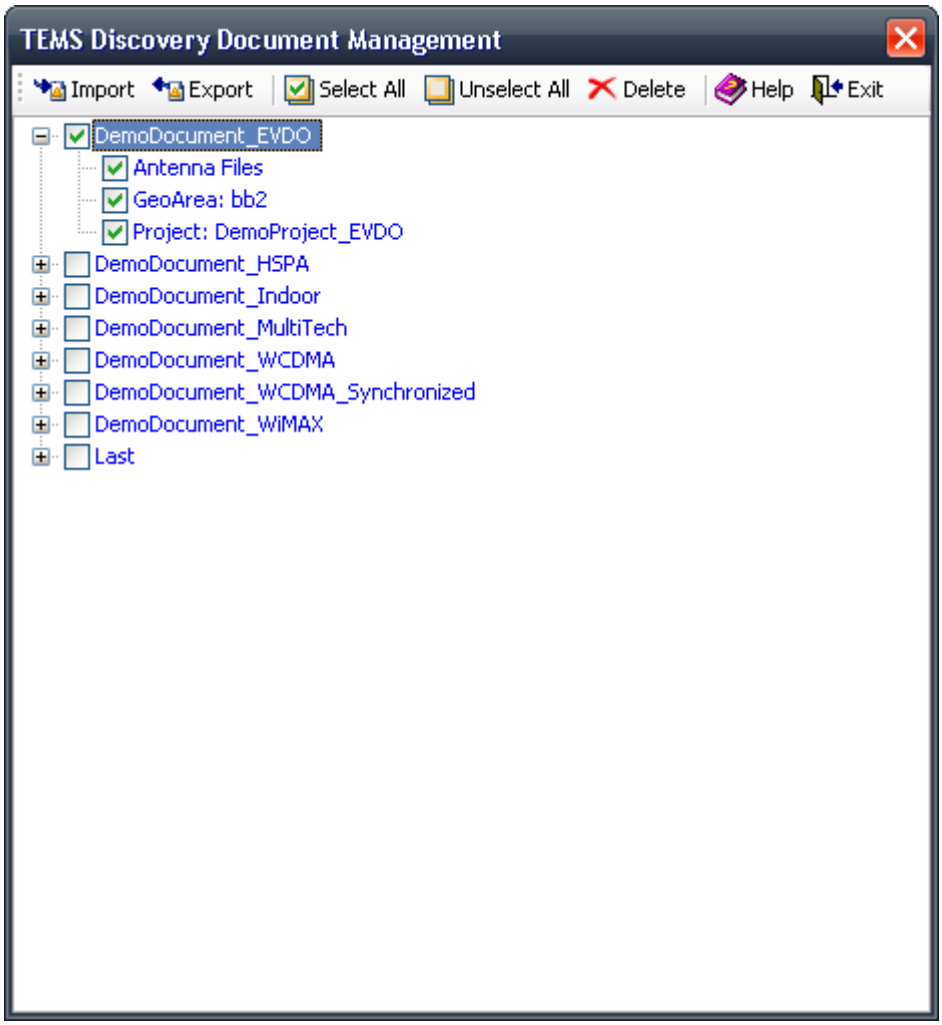
Help.

Exit.

7.3 Document Management

Document Management provides a user interface to manage all TEMS Discovery documents that can be shared, saved, or deleted. You can select one or more documents and export them to a ZIP file. This ZIP file can be imported to another user's TEMS Discovery application, allowing a group to share the same TEMS Discovery documents.

This feature is accessed from the **Configuration** menu on the Main Window.



Document Management Toolbar

Import. Import a TEMS Discovery document from a TEMS Discovery exported ZIP file.

Export. Export the selected document(s) to a ZIP file.

Update.

Publish.

Select All. Check all tree view checkboxes.

Unselect All. Uncheck all tree view checkboxes.

 **Delete**. Delete the selected document(s).

 **Help**.

 **Exit**.

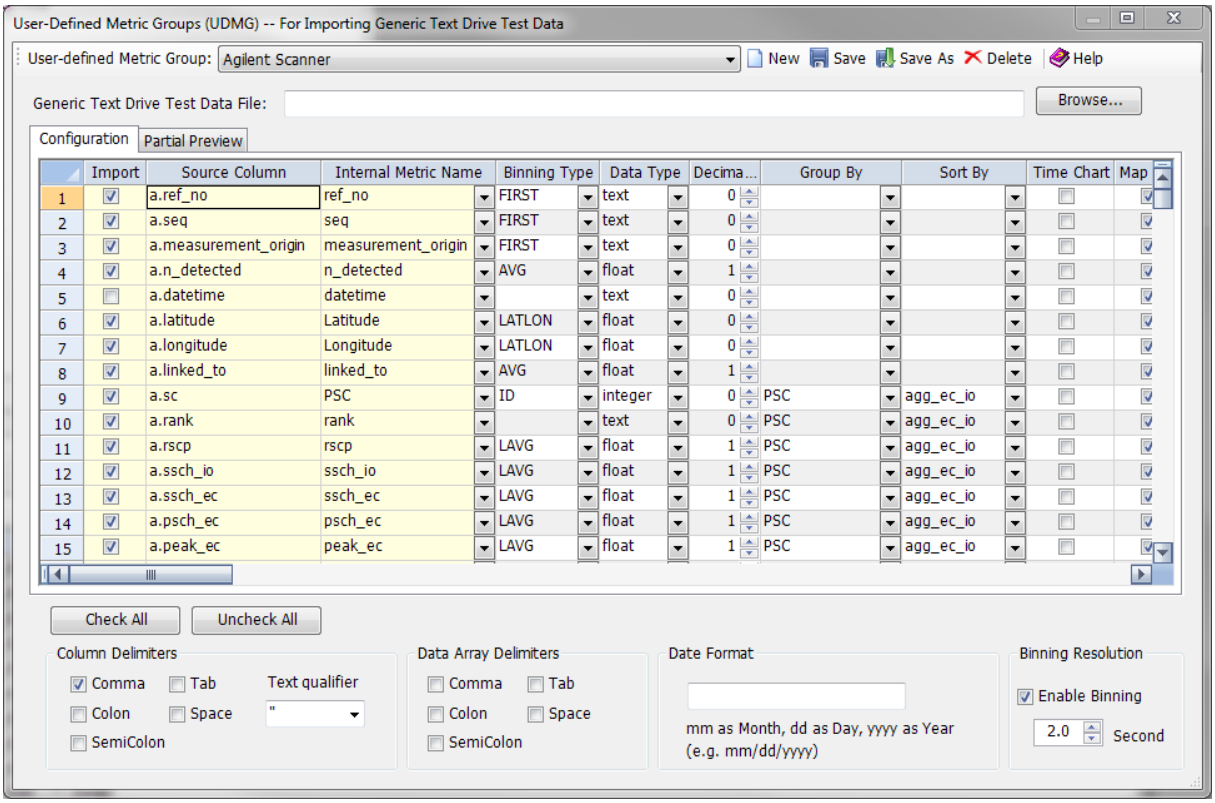
7.4 Generic User-Defined Metric Group

TEMS Discovery can import drive test data from a delimited text file, and then the imported data can be manipulated in a similar manner as drive test data from other formats. In other words, the imported data can be displayed in all views, and it can be used to generate reports through the Report Template Builder and produce new metrics or events through the Script Builder.

To enable TEMS Discovery to import a text file, you must define a user-defined metric group in the dialog shown below. This dialog can be accessed in the following ways:

- Selecting **Generic User-Defined Metric Group** from the **Configuration** menu on the Main Window.
- Clicking the **Edit** button in the Import Drive Test Data dialog.

Once the metric group is defined, you can reuse it to import any text file with a compatible format. This metric group will be listed in the Report Template Builder and the Script Builder under the tree node *_Plugin: UDMG (User-defined Metric Group)*.



To define a user-defined metric group from scratch, follow the steps below:

1. **Click the *Browse* button to locate the delimited text file you intend to import.**

   TEMS Discovery will display the first few lines of the selected file in the *Partial Preview* tab, and populate the *Source Column/TD Metric Name* in the *Configuration* tab. The names in *Source Column/TD Metric Name* are simply copied from the column headers of the selected text file. Since the *TD Metric*

Name strings will be displayed in the TEMS Discovery GUI, you can modify a *TD Metric Name* to one that better describes the nature of the data.

You can also specify the column delimiters and data array delimiters if a column contains a data array.

2. **For any user-defined metric group, source columns must be mapped to the TEMS Discovery metric name *Time* or *Latitude/Longitude/Position*.**

   You can select those pre-defined TEMS Discovery metric names, listed below, from the combo box in the *Internal Metric Name* column.

Date	If you have a source column that contains only date information such as *10/25/2010*, you can map it to this TEMS Discovery metric name. Further, you need to define the date format in the text box at the bottom so that TEMS Discovery can parse this date information correctly. The date can be in compact format without a leading 0 (*m/dd/yyyy*, if the data is like *3/20/2010* (March 20, 2010)). Otherwise, the date is in the format *mm-dd-yyyy*. (December 30, 2009 would be *30-12-2009*.)
DateTime	If you have a source column that contains both date and time information, such as *10/25/2010 10:23:59.232*, you can map it to this TEMS Discovery metric name. Further, you need to define the date format as described above.
Latitude	The source data must be a numerical value in degrees.
Longitude	The source data must be a numerical value in degrees.
Position	The source data can be in a standard format such as *34:22:22N 117:34:22W*
Time	If you have a source column that contains only time information, such as *21:05:59.333*, you can map it to this TEMS Discovery metric name. If you don't have source data providing date information, you can select a target date in the Import Drive Test Data dialog to provide the missing information.

3. **Define the binning type for each metric.**

   The following binning types can be selected from the combo box in the *Binning Type* column.

None	No binning
AVG	Take the average value of the bin
COUNT	Take the count of data in the bin
ID	Only take unique values of this metric in the bin (i.e., treat this metric as an ID)
FIRST	Take the first value in the bin
LAST	Take the last value in the bin
LATLON	The value is GIS data and shall be treated specially
LAVG	Take the linear average value of the bin
MAX	Take the maximum value of the bin
MIN	Take the minimum value of the bin
SUM	Take the sum value of the bin

4. **Assign the data type for each metric.**

   For different data types, the metric data will be displayed differently in the output. If you assign *text* to a metric, this metric will not be used to generate statistic data such as Mean, Average, etc. even though the nature of the data might be numeric.

float	Assign this data type if the source data is numeric. You can also define the number of digits after the decimal point to be kept. If the data source contains a special value that indicates an exception, you can put that value in the *Exception Val* column, or if you want to exclude a range of values, you can define that range in the *Exception >=" and "Exception* <= columns. TEMS Discovery will not import the exception value, but will set it to No Data.
integer	Similar to the data type *float*.
text	Assign this data type if the data source is text.

5. **Define the group by metric**

   You can use *Group By* to separate data belonging to different identifiers, such as WCDMA PSC or CDMA PN. By grouping the Ec/Io values or Ec values by PSC or PN, you may avoid incorrect aggregation of Ec/Io or Ec values.

6. **Define the sort by metric**

   By defining a metric as the *Sort By* entity, you can arrange a set of data according to the values of the metric. *Sort By* is used in conjunction with *Group By*. However, it is rare for one to use the same metric as the key for both *Group By* and *Sort By*. Using PSC or PN as a *Group By* key and Ec/Io or Ec as a *Sort By* key is a good example for typical usage.

7. **Select where the metric can be displayed.**

   Select Time Chart, Map View, or Histogram. The plot band for the metric can also be defined in this window.

User-Defined Metric Group Toolbar


New. Create a new metric group configuration.


Save. Save the current metric group configuration.


Save As. Save the current metric group configuration under a new name.


Delete. Delete the current metric group configuration.

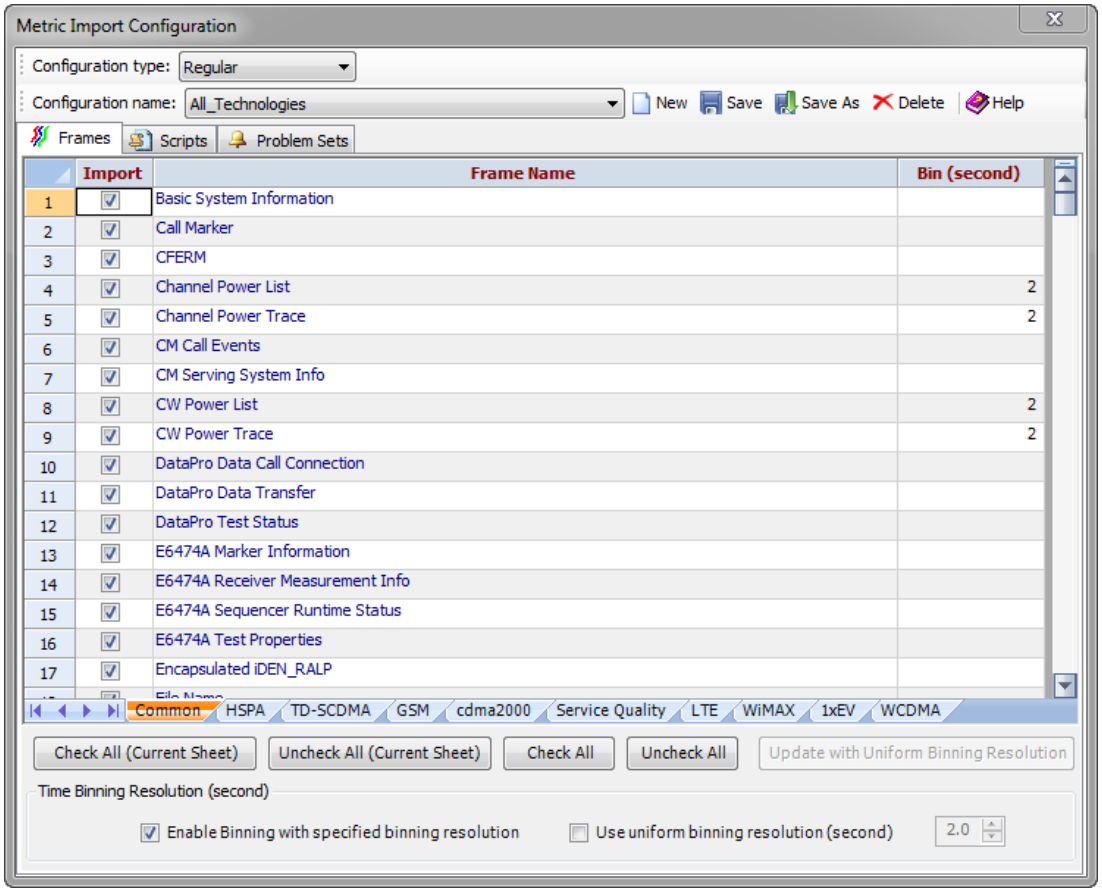

Help.

7.5 Metric Frame Import Configuration

When importing drive test data (Configuration type is “Regular”), TMI or UETR data, you have the option to import only selected frames and to define the binning resolution for each frame. You can also enable or disable the binning of data.

If binning is enabled, you can define different binning resolutions for each frame, or use a uniform binning resolution for all of the frames. Note that some frames, such as Layer 3 messages, do not have any defined binning resolution.

This feature is accessed from the **Configuration** menu on the Main Window.



Metric Import Configuration Toolbar

New. Create a new metric import configuration.

Save. Save the current metric import configuration.

Save As. Save the current metric import configuration under a new name.

Delete. Delete the current metric import configuration.

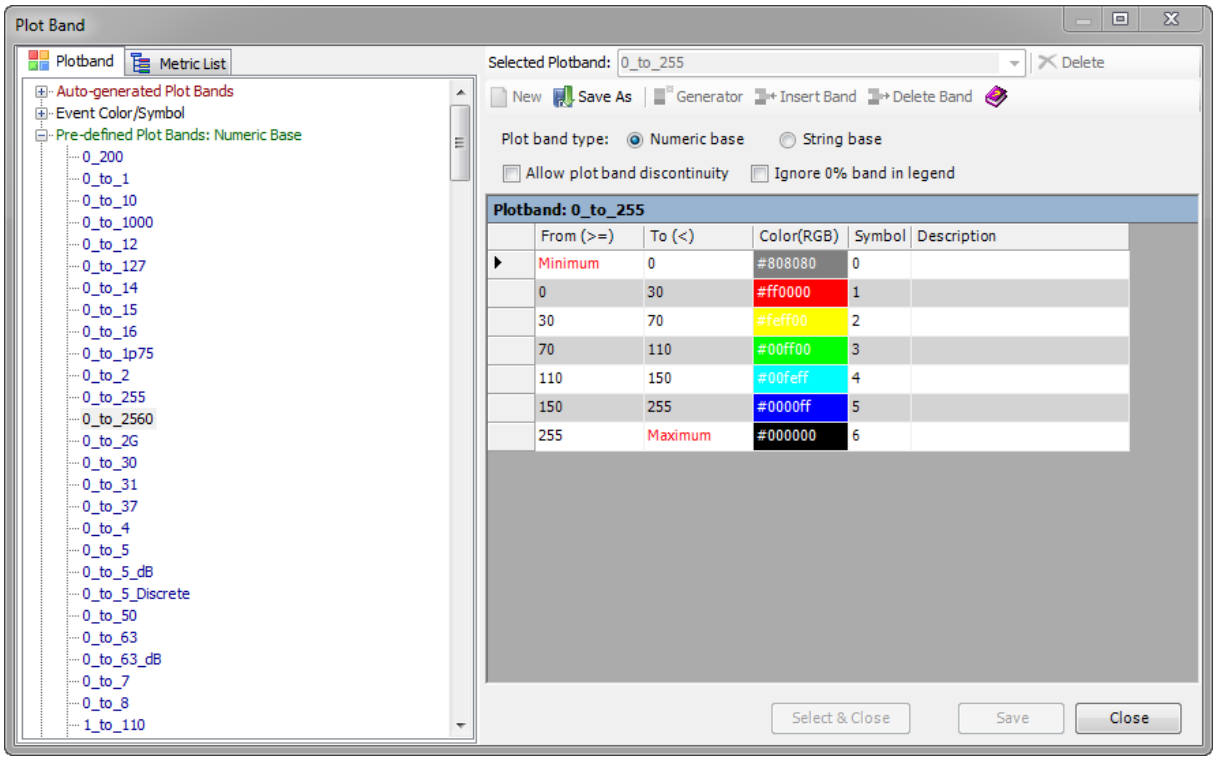
Help.

7.6 Plot Band Definition

TEMS Discovery provides a set of default plot bands. However, you can modify, create, or choose a plot band definition for a metric.

The Plot Band definition dialog can be accessed in the following ways:

- Clicking the **Plot Band** button in the toolbar on the Main Window.
- Right-clicking a metric in the Data Explorer–Dataset List and selecting **Edit Plot Band** from the context menu.



Plot Band Toolbar

Delete. Delete the selected plot band definition.

New. Create a new plot band.

Save As. Save the currently displayed plot band as a new plot band.

Generator. Generate a new plot band definition from scratch. This option will bring up the Plot Band Auto Generator.

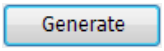
Insert Band. Insert a band to the spreadsheet.

Remove Band. Remove a band from the spreadsheet.

Help.

7.6.1 Plot Band Auto Generator

- **Settings**. The plot band definition will always include the first band that is from the minimum and the last band that is up to the maximum. You need to define the second band and the second-to-last band. For the middle bands, you can define the number of bands and the step.
- **Colors**. Define the color of the first and last bands, respectively, by clicking *Color of first band* and *Color of last band*. For the rest of the bands, after defining the start and end colors, the colors will be generated automatically.



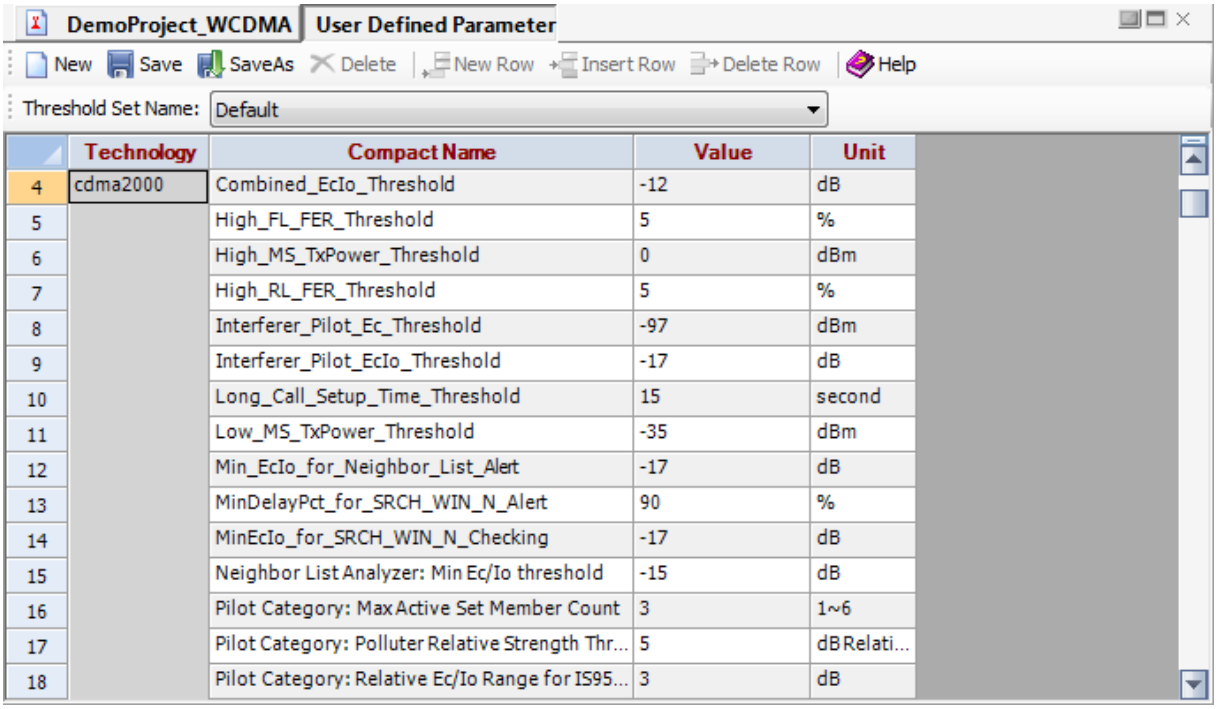
Click **Generate**, and the plot bands will be generated automatically and the spreadsheet will be populated.

To save the definition, click the **Save** button.

7.7 User-Defined Parameters

The User-Defined Parameters tab allows you to view and define certain parameter constant values that can be used in a script. Changing the parameter values may directly affect the results of scripts using the affected parameters.

This feature is accessed by selecting **User Defined Parameter** from the **Configuration** menu on the Main Window.



	Technology	Compact Name	Value	Unit
4	cdma2000	Combined_EcIo_Threshold	-12	dB
5		High_FL_FER_Threshold	5	%
6		High_MS_TxPower_Threshold	0	dBm
7		High_RL_FER_Threshold	5	%
8		Interferer_Pilot_Ec_Threshold	-97	dBm
9		Interferer_Pilot_EcIo_Threshold	-17	dB
10		Long_Call_Setup_Time_Threshold	15	second
11		Low_MS_TxPower_Threshold	-35	dBm
12		Min_EcIo_for_Neighbor_List_Alert	-17	dB
13		MinDelayPct_for_SRCH_WIN_N_Alert	90	%
14		MinEcIo_for_SRCH_WIN_N_Checking	-17	dB
15		Neighbor List Analyzer: Min Ec/Io threshold	-15	dB
16		Pilot Category: Max Active Set Member Count	3	1~6
17		Pilot Category: Polluter Relative Strength Thr...	5	dB Relati...
18		Pilot Category: Relative Ec/Io Range for IS95...	3	dB

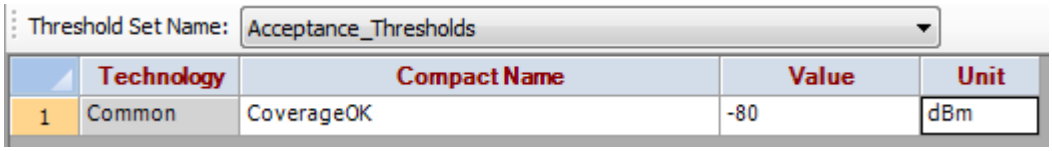
Two steps are required for creating and using a user-defined parameter:

- Create a threshold set.
- Create an alias in a script for the user-defined parameter.

These steps are described below.

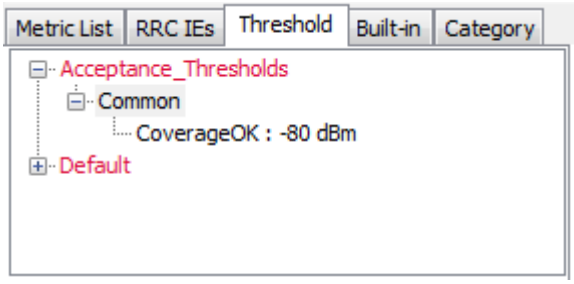
Create a Threshold Set with a UDP:

1. From the Main window, go to **Configuration | User Defined Parameter**.
2. Click the **New** button and enter a new Threshold Set Name.
3. In row 1, enter the Technology (e.g., Common, GSM, etc.). This will allow grouping of the UDPs within the Threshold Set.
4. Enter the Compact Name (e.g., CoverageOK).
5. Enter the threshold Value (e.g., -80). This value will be used by the script.
6. Enter the Unit, if applicable (e.g., dBm). The unit entry is optional information for the user.
7. Save the new Threshold Set.



Add an Alias for the UDP to Your Script:

1. In Script Builder, go to the Threshold tab.
2. Find your Threshold Set name in the tree and expand it.



3. Find the UDP name (the Compact Name defined when you created the threshold), drag it into the Alias list, and give it an alias.
4. Use the alias in your script.

User Defined Threshold Toolbar

 **New**. Create a new threshold setting.

 **Save**. Save the current threshold settings.

 **Save As**. Save the current threshold settings under a new name.

 **Deleted**. Delete the current threshold settings.

 **New Row**. Add a new threshold.

 **Insert Row**. Insert a new threshold above the selected threshold.

 **Delete Row**. Remove the selected threshold.

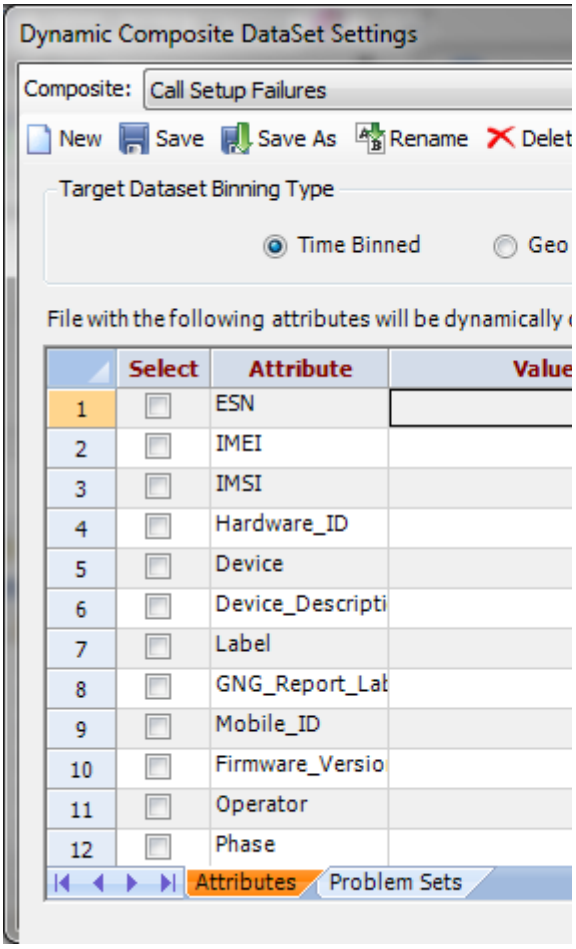
 **Help**.

7.8 Dynamic Composite Dataset

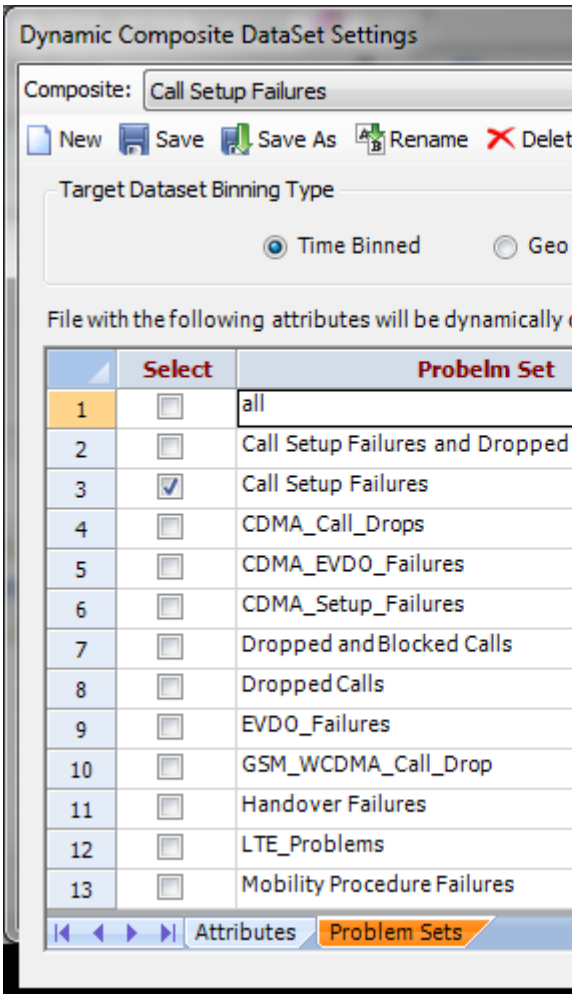
Dynamic Composite Dataset is different from Static Composite Dataset in terms of how the data is grouped. Dynamic Composite Dataset is a set of criteria that can be applied to any particular project; as such, you will obtain only the data that meets those criteria.

The Dynamic Composite Dataset Settings dialog can be accessed in the following ways:

- Selecting **Dynamic Composite Dataset Setting**s from the **Configuration** menu on the Main Window.
- Clicking the **Edit Composite Dataset** button in the Data Explorer–Dataset toolbar. The Dynamic Composite Dataset will be listed in the Data Explorer–Dataset list together with the Static Composite Dataset.



Each attribute listed on the *Attributes* tab can be selected to be used with comma separated values to construct the dynamic dataset.



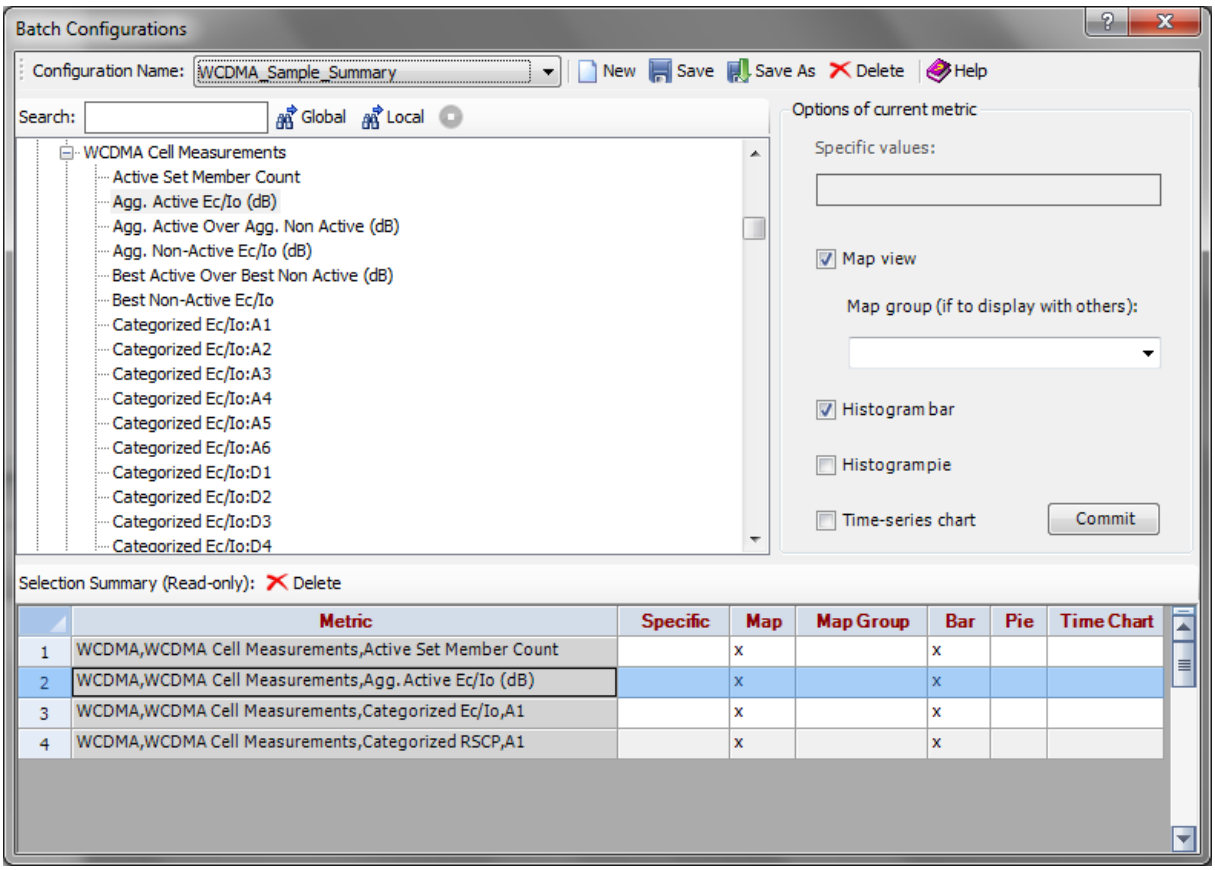
Each problem set listed on the *Problem Sets* tab can be checked with a minimum value to be used to construct the dynamic dataset.

7.9 Batch Configuration

A Batch Configuration can be used in the Batch PDF and ADP Management output tasks.

Many sets of options for generating the data summary of any particular device in PDF can be defined. The PDF file can then be displayed in the Batch PDF View. See Project List and Data Explorer for more information about how to select summary view options and generate batch PDF for a device.

This feature can be accessed from the **Configuration** menu on the Main Window.



If you enter specific key values for the metric under the **Options of current metric** section, separated by commas, TEMS Discovery will generate output only for the metrics that have the specified key values. Otherwise, the metric for each key value will be output.

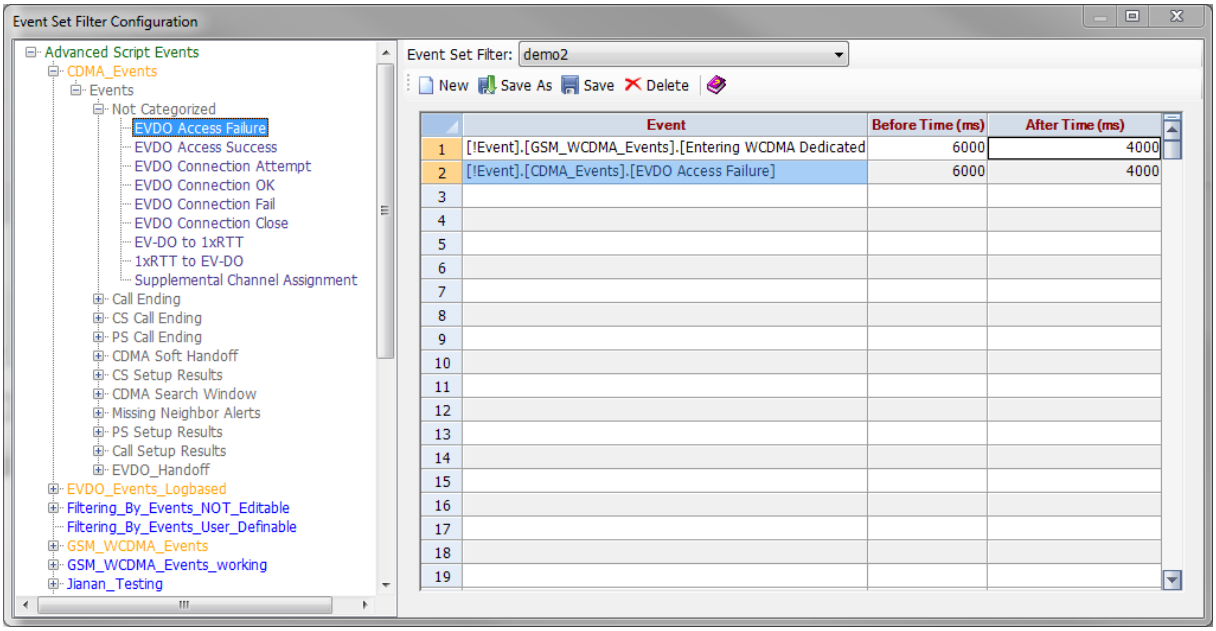
You can define or select a map group so that all the metrics with the same group name are displayed in the same Map View. Otherwise, each metric will be displayed in the Map View alone.

7.10 Event Set Filter

An Event Set Filter is a set of time ranges defined by each event. For example, if an event occurred at 8:00:00.000 AM, and the Before Time is defined as 6000 ms and the After Time as 4000 ms, then the time range from 7:59:54:000 AM to 8:00:04:000 AM is one of the time filtering ranges.

You can use an Event Set Filter to filter metric values along with the other filters (e.g., Sector Group, Condition, and Region).

Event Set Filters are created with the Event Set Filter Configuration dialog. To access this dialog, select **Event Set Filter Configuration** from the Configuration menu.



Drag-and-drop any Script Event from the tree view on the left into the spreadsheet on the right.

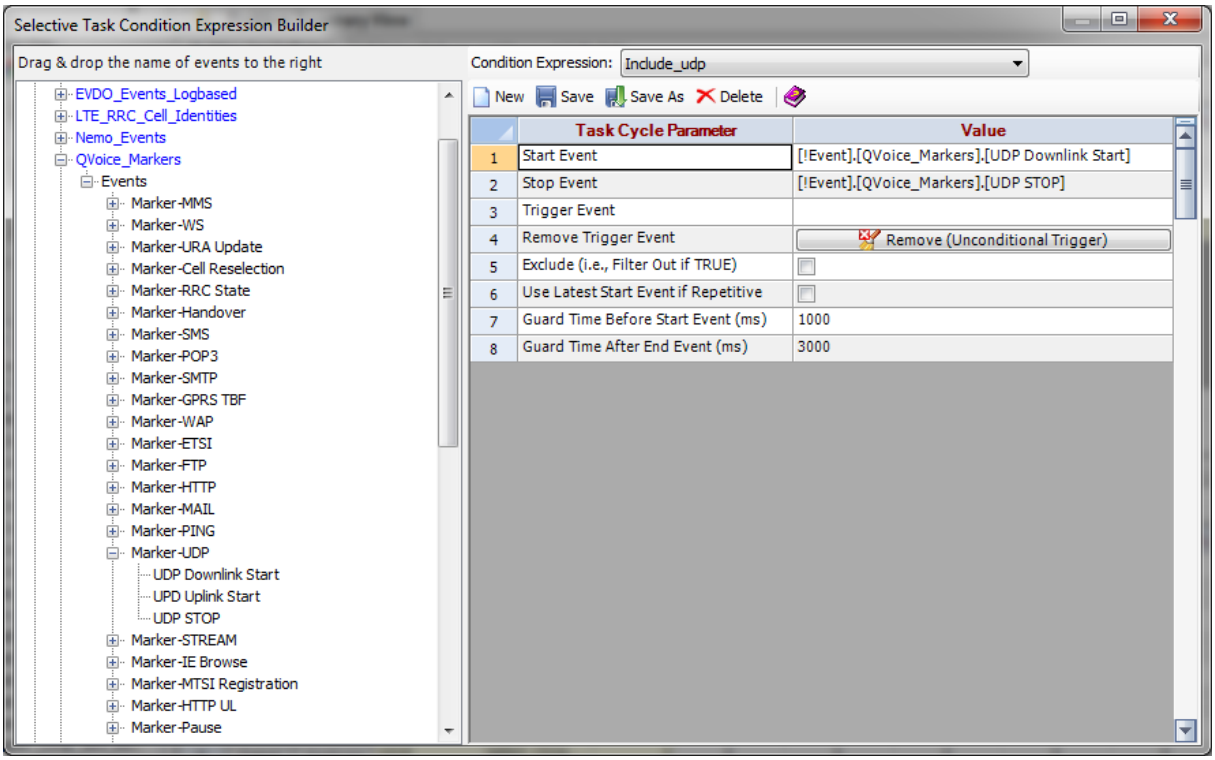
You can add as many events as you need, and you can modify the *Before Time* and *After Time* for each event.

Typing directly into the Event column in the spreadsheet is not recommended because if you make a syntax error, that event will not be used in the filter.

7.11 Selective Task Condition Expression Builder

Selective Task Condition Expression Builder is used to simplify the creation of condition expression that basically defines measurement task cycle, which can be applied to filter data for display or report.

Those condition expressions can be used the same as other condition expressions created by Script Builder

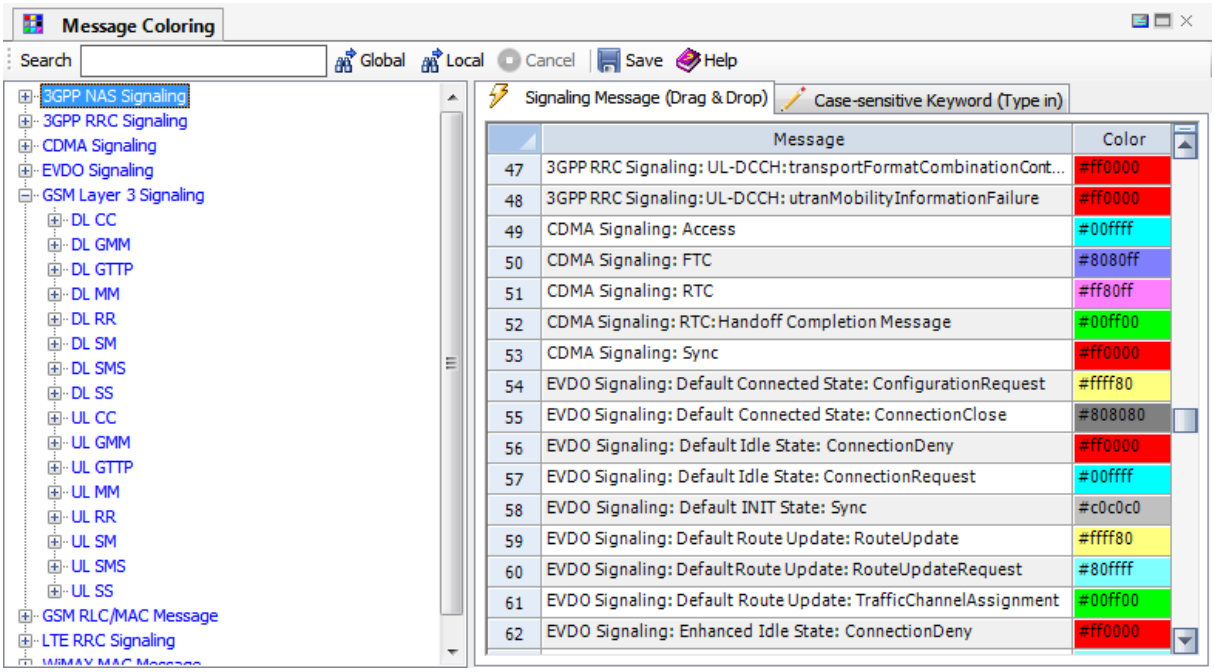


7.12 Message Coloring

The **Message Coloring** feature provides a way to distinguish messages listed in the Messages View with different colors.

The Message Coloring feature can be accessed in the following ways:

- Clicking the **Layer 3 Message Coloring** button in the Messages View toolbar.
- Selecting **Message Coloring** from the **Configuration** menu on the Main Window.



Drag-and-drop an element from the tree view into the spreadsheet on the *Signaling Message* tab in the right panel. Click the cell in the *Color* column to choose a color. You can associate a message or a channel with color. If color is associated to a channel, all messages in that channel will be displayed in the same color in the Messages View.

Or, you can manually type keywords into the spreadsheet on the *Case-sensitive Keyword* tab and associate a color. When building the Messages View, TEMS Discovery will check whether the key information of a message contains any defined keywords, one-by-one, from the first row to the last. If found, the background color of the row on the Messages View will be colored accordingly. The order of the keywords in the spreadsheet will affect the coloring.

Click the **Save** button to save the color settings after any modification.

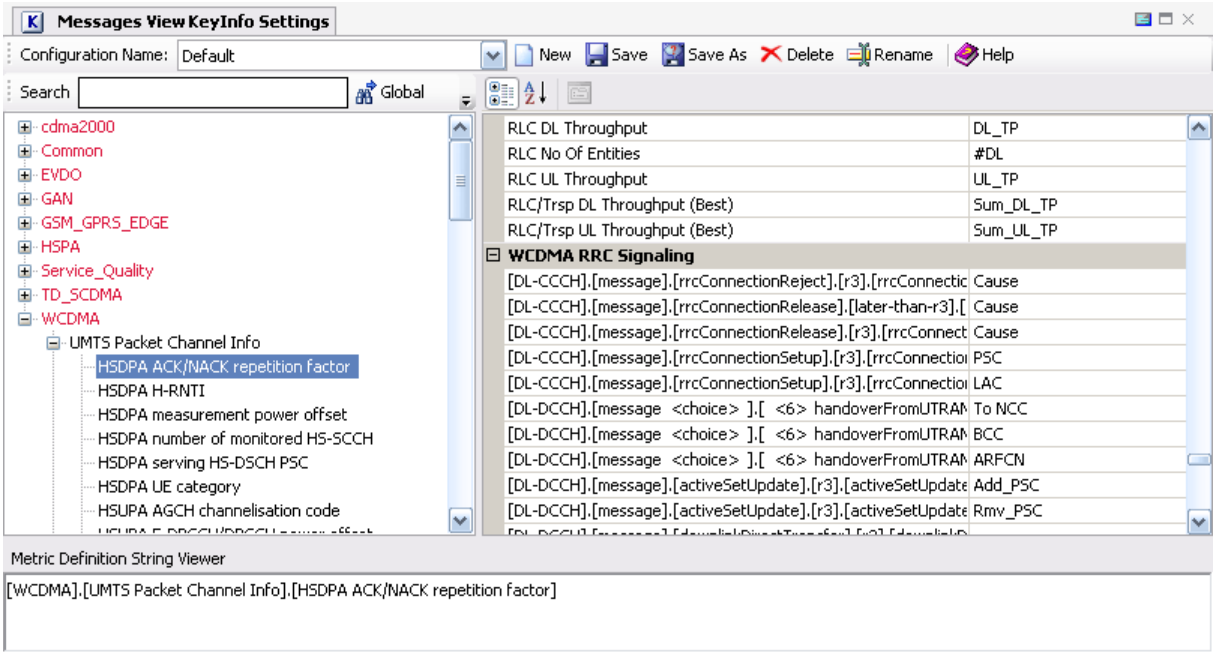
7.13 Messages View KeyInfo Settings

To directly view information in a message, you can configure the key information so that it is displayed in the *KeyInfo* column in the Messages View.

The Messages View KeyInfo Settings dialog can be accessed in the following ways:

- Select **Message View KeyInfo Settings** from the **Configuration** menu on the Main Window.
- Click the **KeyInfo Settings** button in the Messages View toolbar.

Drag-and-drop an IE into the spreadsheet on the right side, and define an alias for the IE. Save the settings and resend the mobile information to the Messages View; the information for the defined IEs will then be displayed in the *KeyInfo* column.



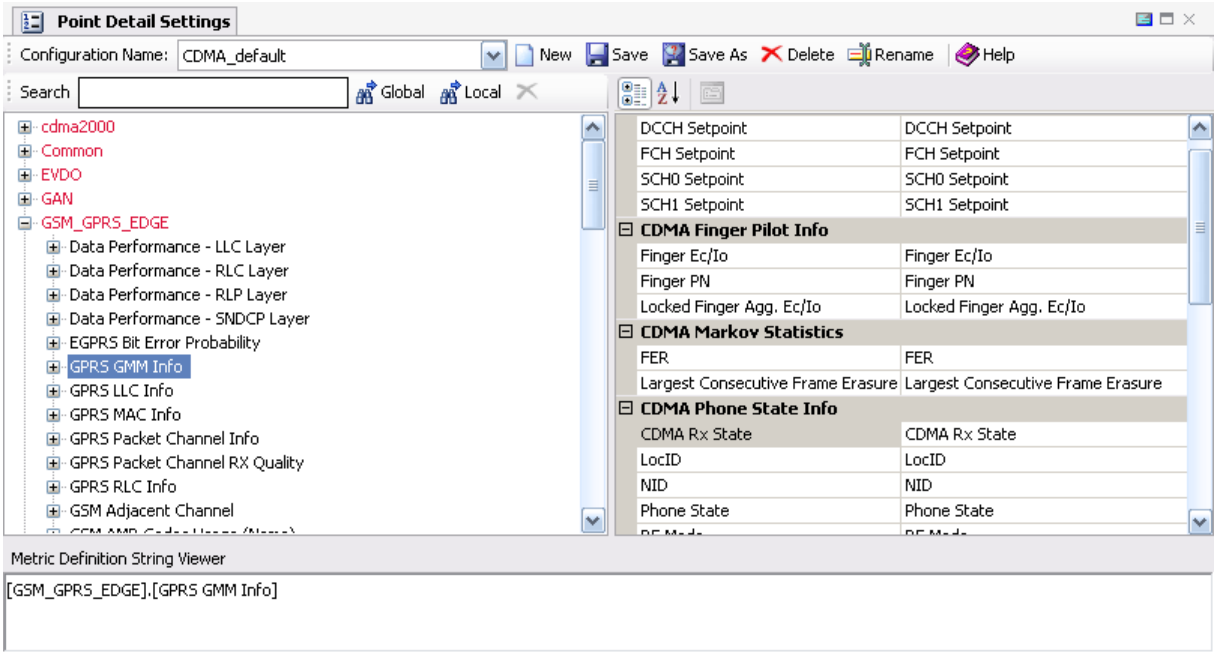
7.14 Point Detail Settings

TEMS Discovery can present detail information from a certain location and time (see Point Detail View for more information). The user interface for **Point Detail Settings** is similar to that of the Messages View KeyInfo Settings.

The operations are similar; however, you may define any named configuration, which will let you freely pick the configuration needed to get the detail information of any particular IE set at the moment.

The Point Detail Settings dialog can be accessed in the following ways:

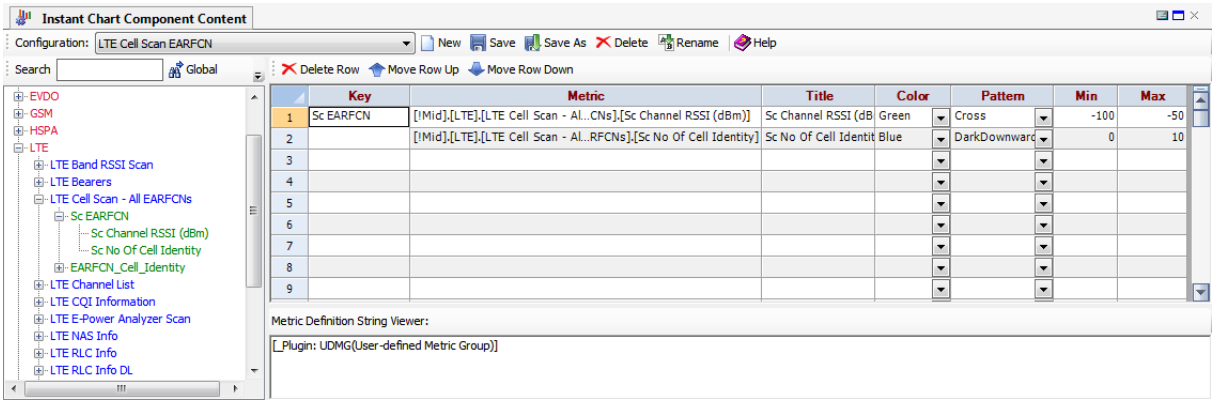
- Select **Point Detail Settings** from the **Configuration** menu on the Main Window.
- Clicking the **Point Detail Configuration** button on the Point Details toolbar.



7.15 Instant Chart Component Content

The Instant Chart Component Content window provides a way for the user to create and modify content of an Instant Chart. The tree view in the panel at the left lists all the frame/metric candidates that can be dragged-and-dropped into the spreadsheet at the right. You can give each metric selected in the configuration a fixed color, or you can use another metric's plot band color in the same frame to mark the metric in the chart when it is displayed.

The Instant Chart Component Content dialog can be accessed by selecting **Instant Chart Component Content** from the **Configuration** menu on the Main Window.



Instant Chart Component Content Toolbar

New. Create a new Instant Chart configuration.

Save. Save the current Instant Chart configuration.

Save As. Save the current Instant Chart configuration under another name.

Delete. Delete the current Instant Chart configuration.

Rename. Rename the current Instant Chart configuration.

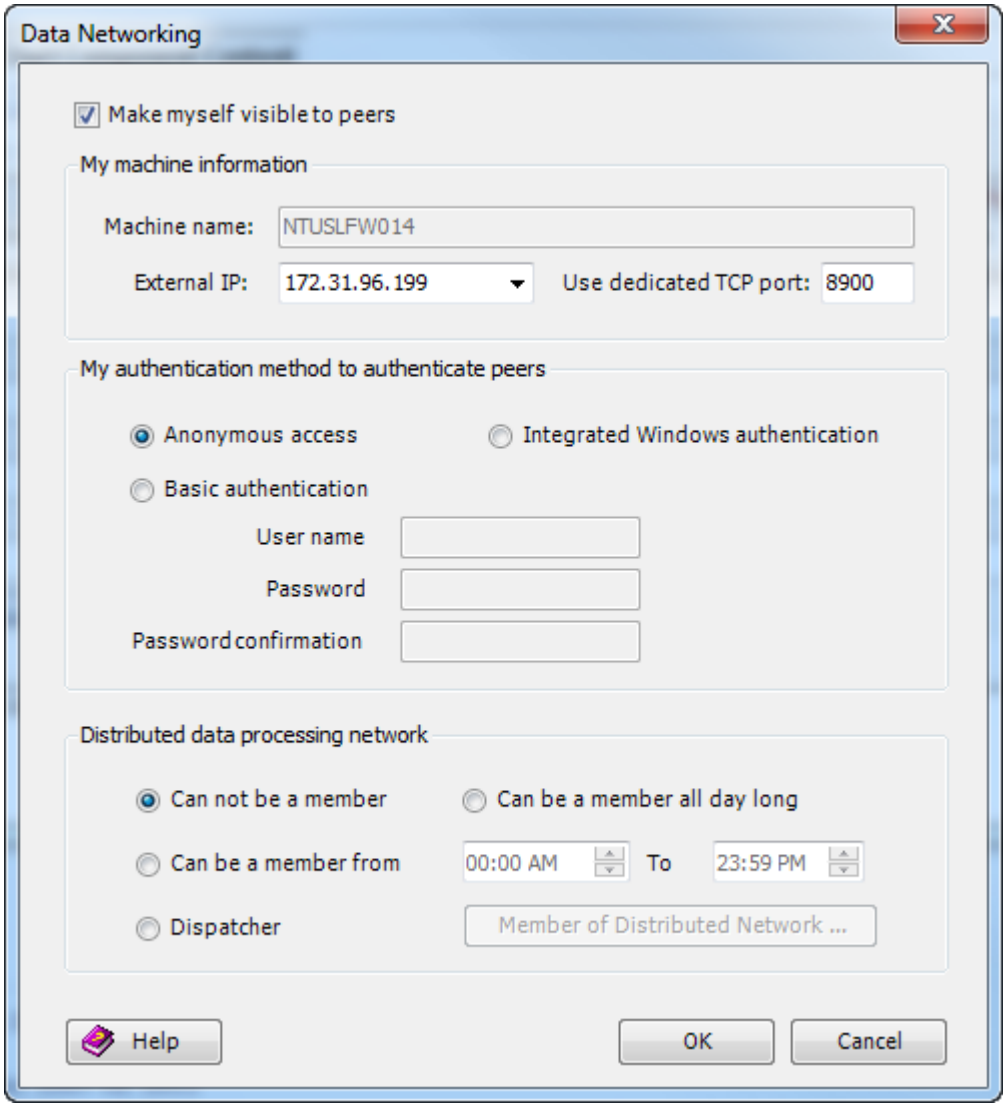
Help.

7.16 Data Networking

TEMS Discovery's architecture allows it to archive data networking; TEMS Discovery peers can share data and participate in distributed data processing.

The Data Networking configuration dialog can be accessed by selecting **Data Networking** from the **Configuration** menu on the Main Window.

After the settings on the Data Networking dialog have been made, the private data folder will be visible and can be shared by other TEMS Discovery peers. See Project List for more information.



NOTE: TEMS Discovery peers must run in the same local network. In other words, TEMS Discovery cannot connect to TEMS Discovery peers through a router.

Make myself visible to peers. Check this option and provide the requested authentication information to make TEMS Discovery visible to other TEMS Discovery peers running on remote computers.

***Machine Information**:*

- ***Machine IP**.* The IP address of the local computer running TEMS Discovery. This IP field will be filled automatically and is not editable.
- ***Use dedicated TCP port**.* The TCP port number used for TEMS Discovery communication can be a positive integer from 0 to 32768.

  Important: If Windows Firewall is running on the computer that hosts TEMS Discovery, TEMS Discovery needs to be added to Windows Firewall as an exception to open the specific TCP port. Please refer to Windows Help for more information.

***Authentication Methods**.* To verify the identity of users who attempt access, use the settings in this section to authenticate users and thus prevent unauthorized users from establishing a TEMS Discovery TCP connection.

- ***Anonymous access**.* Select this option to allow users to establish an anonymous connection. Your server logs on the user with an anonymous or guest account.
- ***Basic authentication**.* Select this option to enable the Basic authentication method for TEMS Discovery peers.

  Important: Basic authentication results in the transmission of passwords across the network in an unencrypted form. It is possible for a third party equipped with a network monitoring tool to intercept usernames and passwords.
- ***Integrated Windows authentication**.* Integrated Windows authentication uses a cryptographic exchange to confirm the identity of the user. TEMS Discovery, serving as a data sharing server, will require that the user be a Windows user of the computer that hosts this instance of TEMS Discovery. (Please see Windows operating system Help for more information on how to add a user to a computer.)

Distributed data processing network. TEMS Discovery can also be configured to be involved or uninvolved in distributed data processing. Select one of the following options:

- **Can not be a member**. Prevent this computer from being involved in distributed data processing.
- **Can be a member all day long**. Allow this computer to be involved in distributed data processing at any time.
- **Can be a member from x to y**. Allow this computer to be involved in distributed data processing for a particular period only.
- **Dispatcher**. This computer will be involved in distributed data processing. It also serves as the dispatcher responsible for monitoring newly arriving drive test data, and dispatching processing tasks to the members of the distributing network.

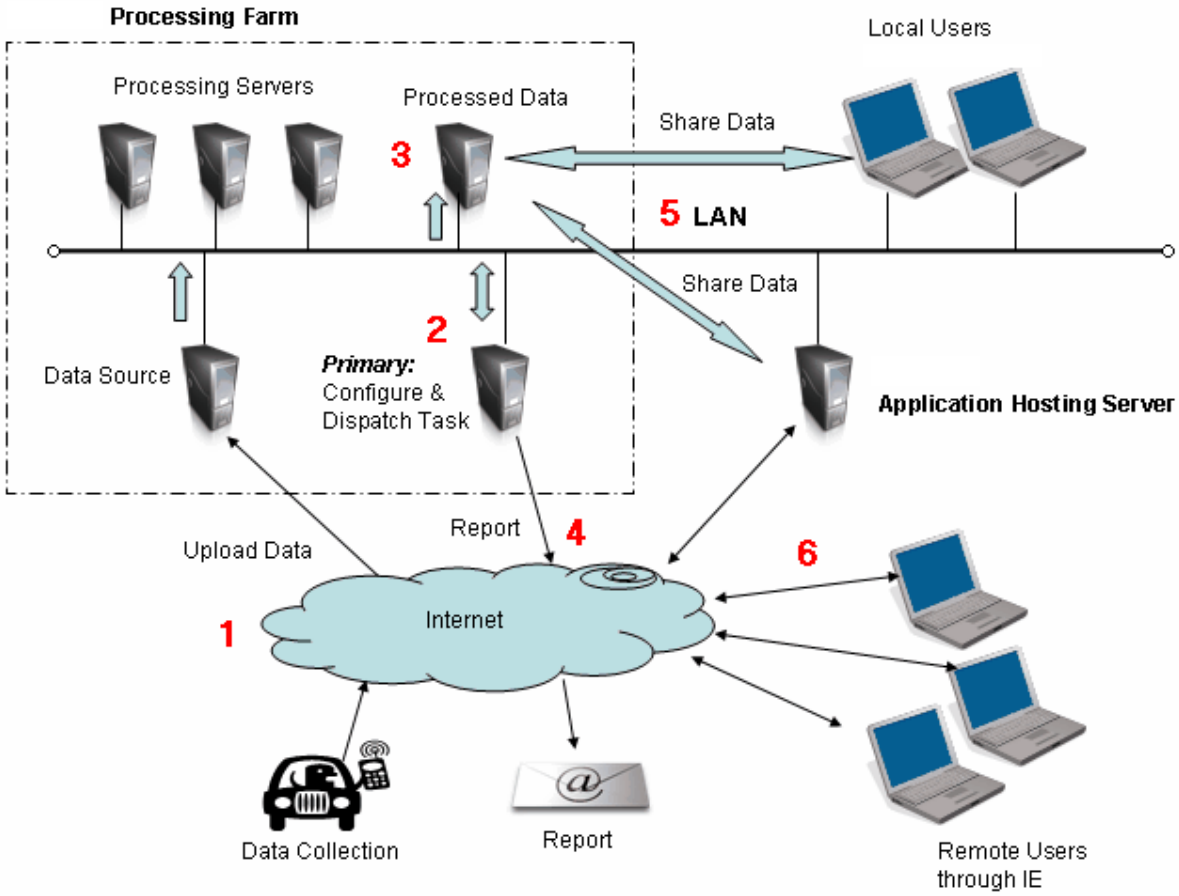
  Once a computer is assigned as Dispatcher, the members of the distributing network can be built by clicking *Members of Distributed Network*.

The distributed data processing task is configured in Automatic Data Processing.

7.16.1 Data Networking Configuration

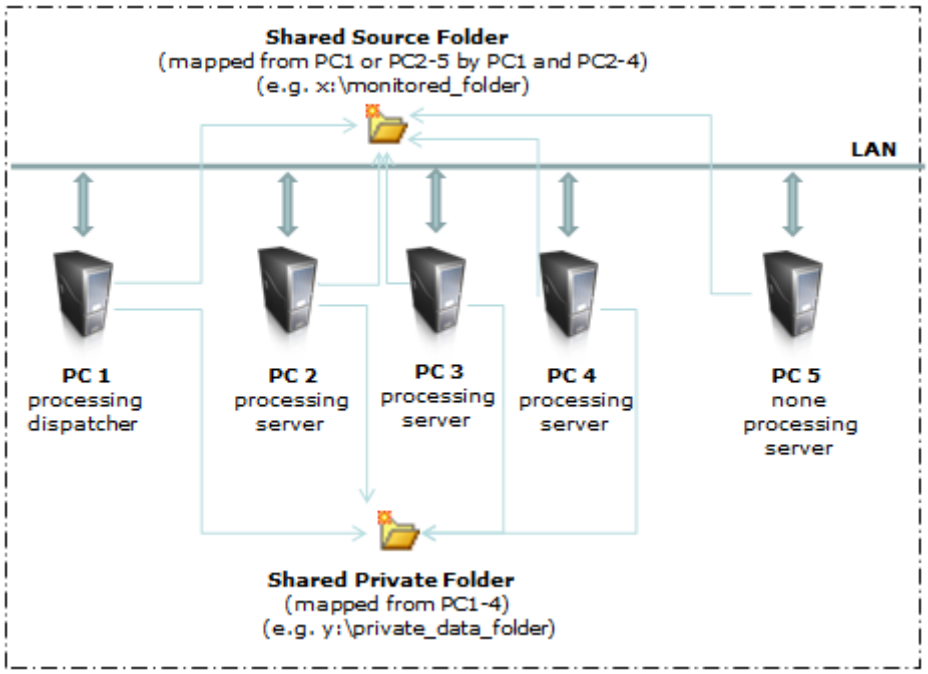
A typical data networking can be configured as described, and the typical data flow could be as follows:

1. The collected drive test data is uploaded to a data source server via internet.
2. A primary server, configured as the data processing dispatcher, continues to watch the data source. It will immediately dispatch the information to the available processing server, which processes the newly arrived data.
3. The processing server stores the data at a specific data storage location.
4. Reports can be sent by email, or deposited to a specific location via FTP.
5. The processed data can be shared by local TEMS Discovery users, or a TEMS Discovery application hosting the server through a LAN.
6. Remote users can log in to a TEMS Discovery application hosting server and access the processed data and report.



7.16.2 Distributed Processing System

In the following distributed processing system (DPS), PC1 is running TEMS Discovery designated as the dispatcher, PC2 through PC4 are running TEMS Discovery acting as remote processing servers, and PC5 can be a pure data storage server.



Once all servers are set up and PC1~PC4 are running TEMS Discovery Professional as described above, you can:

1. Create two mapped network folders.

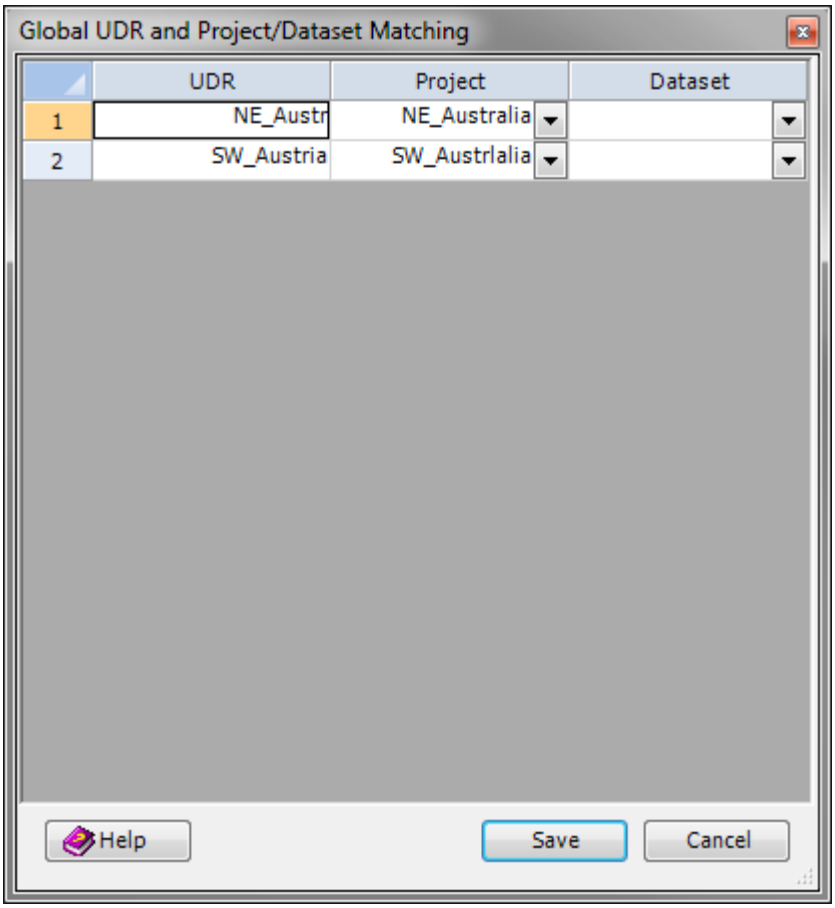
   These two mapped network folders will be accessible by all PCs with a common drive and folder name (e.g., x:\monitored_folder, y:\private_data_folder). These folders can be physically in one server or in separate servers.

   - **Shared Source Folder**. Drive test data to be processed is placed in this folder. When the ADP task is created in the dispatcher, this folder will be configured to be monitored.
   - **Shared Private Folder**. This folder will hold the processed data. For all PCs, set this folder as a Private Data folder in the Options dialog (Configuration | Options | Data Storage).
2. Set each of the Processing Servers (PC2~PC4) as *Can be a member* (Data Networking dialog).
3. Set PC1 as *Dispatcher* (Data Networking dialog).
4. Add Processing Servers (PC2~PC4) as members of a distributed network to Dispatcher PC1 (Data Networking dialog).
5. Create an ADP task in Dispatcher PC1 to monitor the Shared Source folder.
6. Start the ADP task from Dispatcher PC1.

This distributed processing system (DPS) will act once new log files arrive in the Shared Source Folder.

7.17 UDR Project Mapping

The user can select the target project and target dataset when importing drive test data. The user can also use the predefined global UDRs and UDR Project Mapping setting to decide which project and dataset will be the target. The following window shows how the UDR and Project mapping is defined.



Each available global UDR can be used to match against one project and dataset.

A predefined default project named *_No_UDR_Matched_Project* will be used as the target project and *_UDR_Match_Default_Dataset* will be used as the target dataset if:

- You selected the Use global UDR specified project/dataset option when the data was imported.
- No project and/or dataset name was specified for a global UDR and a drive test overlaps, or the drive test data doesn't overlap with any global UDRs.

7.18 Device Attribute Assignment Template

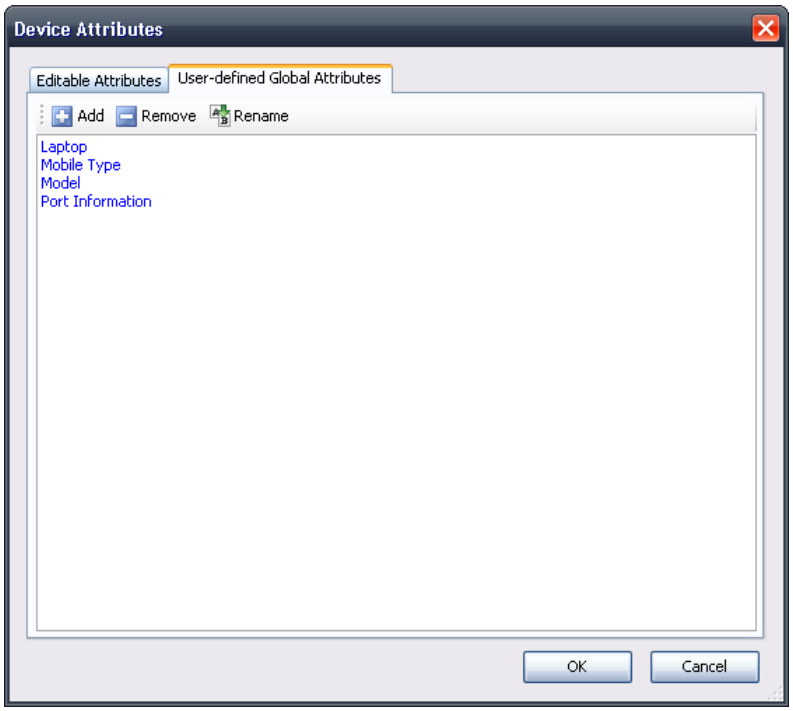
After drive test data is imported, some key pieces of information will be extracted and saved as attributes of the file/device. New attributes can also be created. Attributes can be used to categorize files/devices for the following purposes:

- **Organize mobile data in Data Explorer**. Mobile data can be categorized and logically displayed under the same attributes.
- **Create Composite Data**. Before creating a composite dataset, you can group the mobile data by its attributes and drag-and-drop the entire group to create composite data. See Composite Dataset for more information.
- **Generate Reports**. By assigning appropriate attributes to mobile data, you gain great flexibility to generate reports from specific data. These attributes can be part of the definition in the report template. See the Report Template Builder Metric List for information about applying these attributes. When generating final reports from large amounts of data, TEMS Discovery can internally categorize the data based on its attributes and produce reports of defined attributes from the data.

New attributes are defined and edited on the Device Attributes dialog, which can be accessed through the right-click context menus for data in the Data Explorer, the Composite Dataset dialog, or the Report Template Builder. The attributes can be globally applied to all data, conditionally or unconditionally.

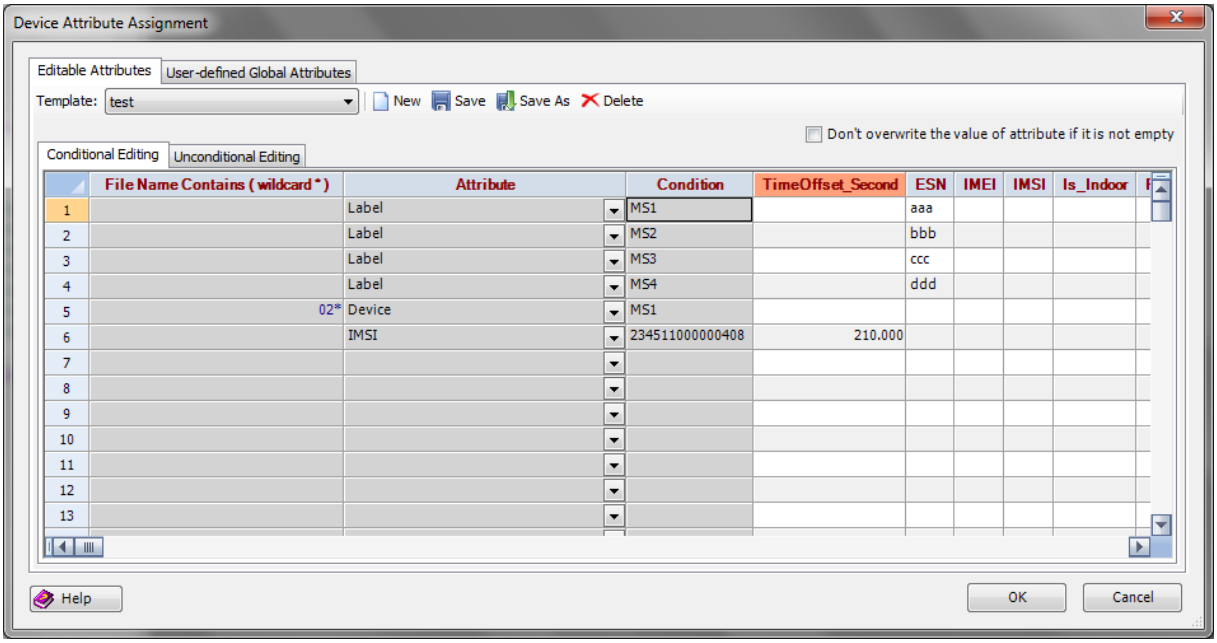
User-defined Attributes

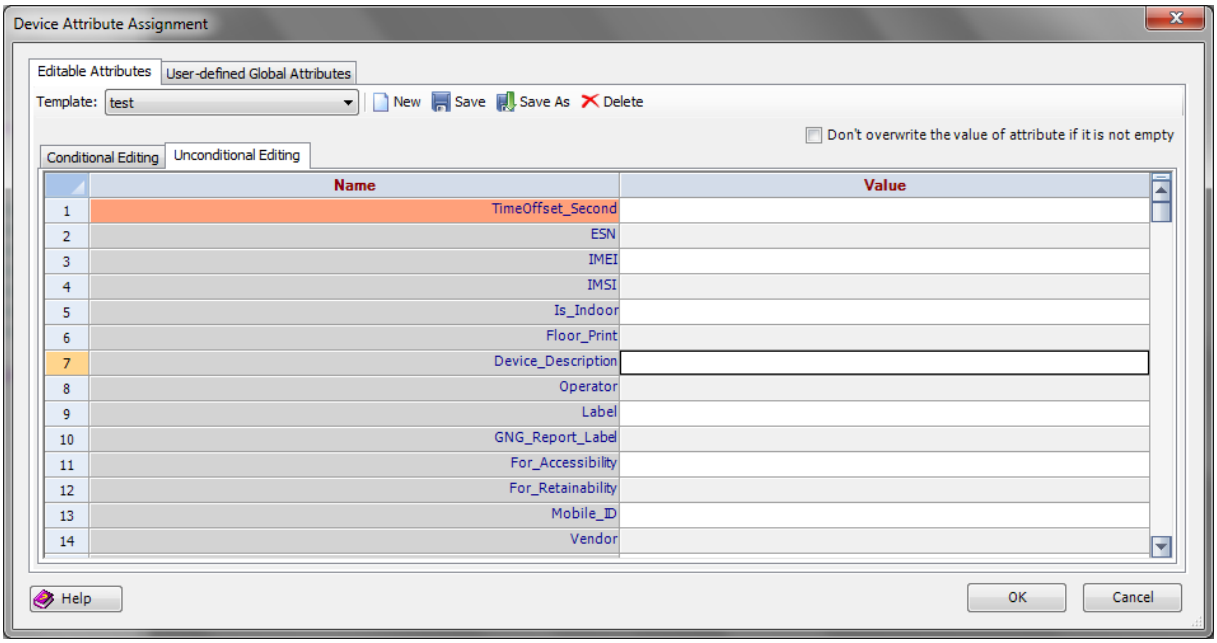
Users can define any number of attributes and assign values to them. These attributes can then be used to group data for display or to identify data for reporting.



Editable Attributes

The value of attributes can be assigned unconditionally, or changes to their value can be assigned conditionally by providing a list of conditions and the associated change. In the event you don't want to overwrite the value of an attribute that has been assigned a value, check the **Don't overwrite the value of attribute if it is not empty** option.





The device attributes assignment can be saved as a template, and it can be configured to automatically assign device attributes at the time drive test data is imported. (See Import Drive Test Data and ADP Management for more information.)

With conditional editing, you can define a condition that checks for certain text phrases in the file name. You can include the wildcard (*) in the text phrase to create more flexible condition checking.

Following are some examples of conditional editing:

Condition	
ABC*	Checks if file name starts with *ABC*
*ABC	Checks if file name ends with *ABC*
*ABC*DEF*	Checks if file name contains *ABC,* then *DEF*

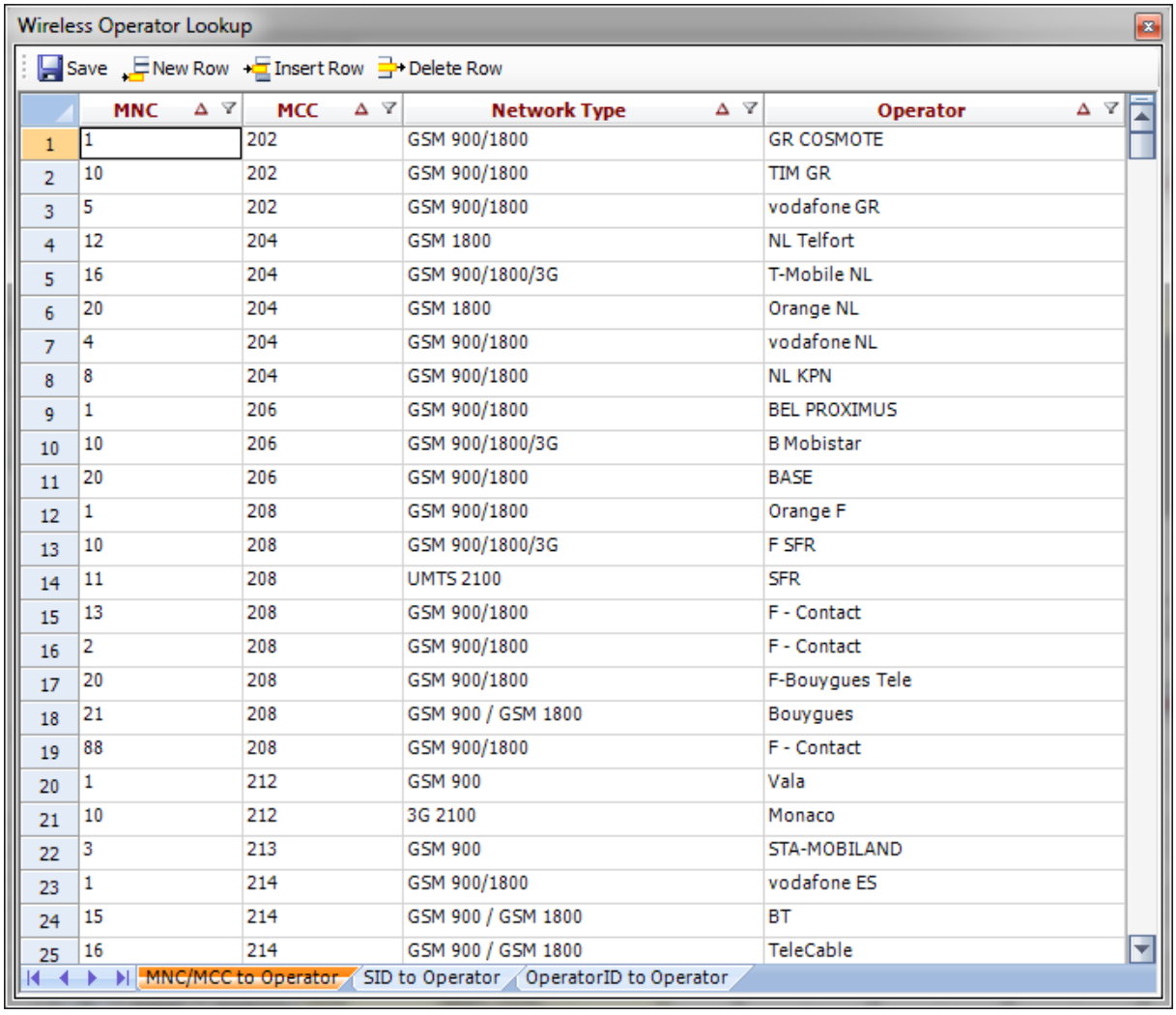
Time Offset

Time offset is a special device attribute that can be set to artificially offset the data collection time. This is extremely useful if you want to synchronize messages from different devices.

7.19 Wireless Operator Lookup Table

Wireless Operator can be looked up from MNC/MCC, SID or Operator ID. In Script Builder the following built-in functions are created for accessing this table.

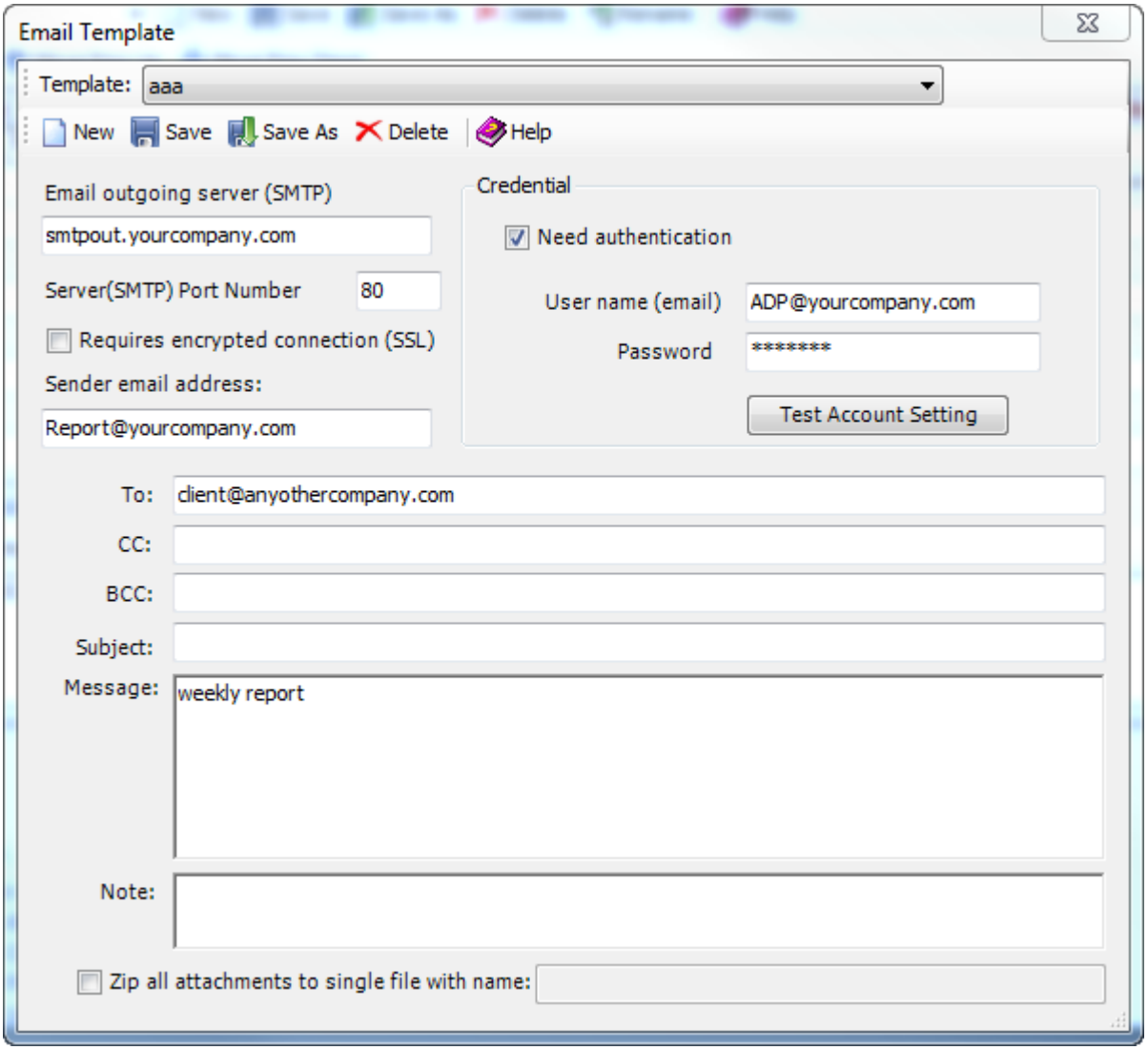
string GetOperatorByMncMcc(object MNC, object MCC)
string GetOperatorBySid(object SID)
string GetOperatorByOperatorId(object OperatorId)



	MNC	MCC	Network Type	Operator
1	1	202	GSM 900/1800	GR COSMOTE
2	10	202	GSM 900/1800	TIM GR
3	5	202	GSM 900/1800	vodafone GR
4	12	204	GSM 1800	NL Telfort
5	16	204	GSM 900/1800/3G	T-Mobile NL
6	20	204	GSM 1800	Orange NL
7	4	204	GSM 900/1800	vodafone NL
8	8	204	GSM 900/1800	NL KPN
9	1	206	GSM 900/1800	BEL PROXIMUS
10	10	206	GSM 900/1800/3G	B Mobistar
11	20	206	GSM 900/1800	BASE
12	1	208	GSM 900/1800	Orange F
13	10	208	GSM 900/1800/3G	F SFR
14	11	208	UMTS 2100	SFR
15	13	208	GSM 900/1800	F - Contact
16	2	208	GSM 900/1800	F - Contact
17	20	208	GSM 900/1800	F-Bouygues Tele
18	21	208	GSM 900 / GSM 1800	Bouygues
19	88	208	GSM 900/1800	F - Contact
20	1	212	GSM 900	Vala
21	10	212	3G 2100	Monaco
22	3	213	GSM 900	STA-MOBILAND
23	1	214	GSM 900/1800	vodafone ES
24	15	214	GSM 900 / GSM 1800	BT
25	16	214	GSM 900 / GSM 1800	TeleCable

7.20 Email Templates

During Automatic Data Processing, reports or status notifications can be sent by email to specified groups of recipients. The Email Template dialog allows definition of email templates that can be reused.

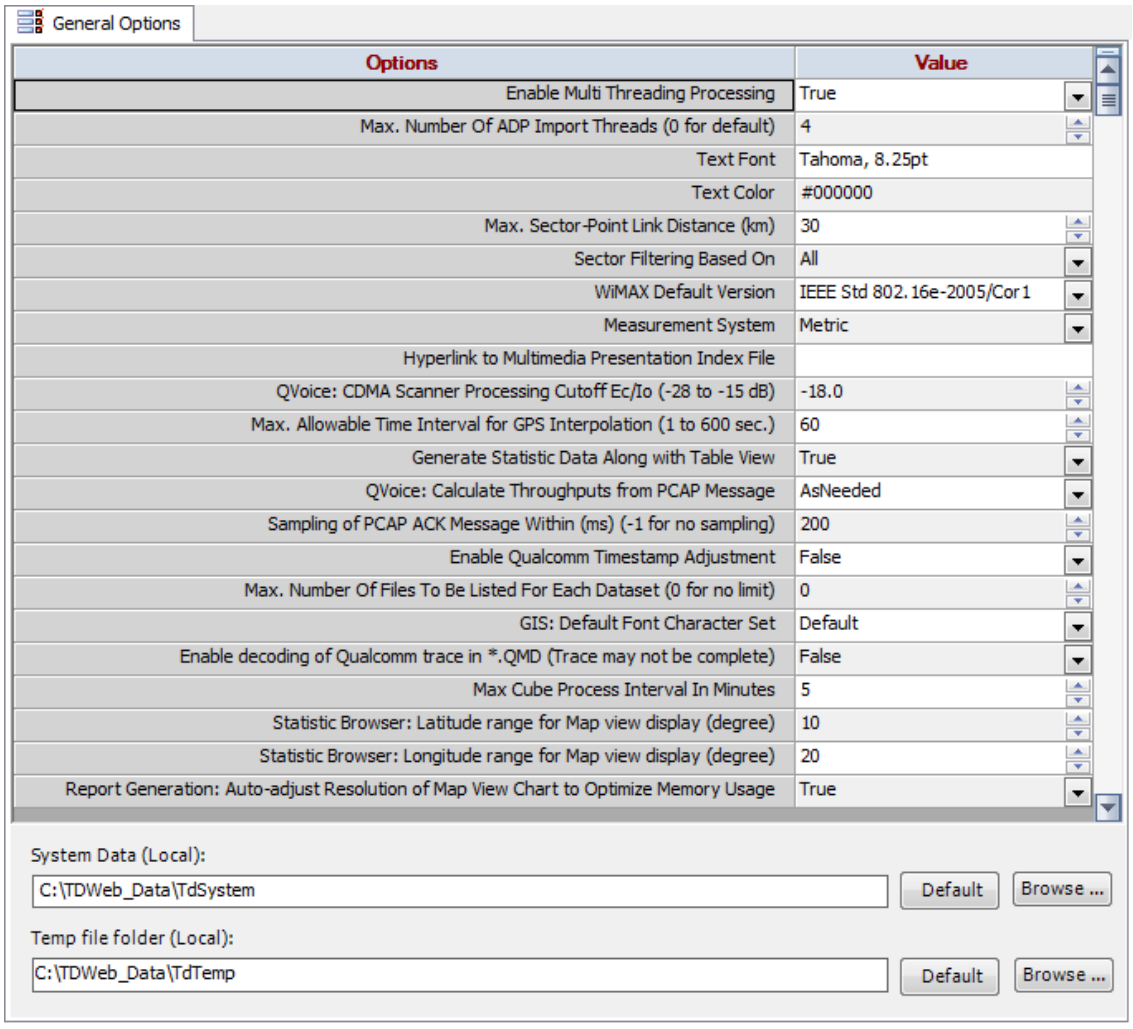


If **Zip all attachment to single file with name** is checked, all the attached data or reports will be compressed to a single ZIP file, under a user-defined name.

7.21 Options

The following categories of options are available: **General Options**, **Measurement Data Storage Options**, **Statistic Database Storage Options**, **Log Files Storage Options**, and **Color Scheme**. The Options feature can be accessed from the **Configuration** menu on the Main Window.

7.21.1 General Options



- **Enable Multi Threading Processing**. When importing multiple drive test data files, TEMS Discovery can create multiple threads with one thread for each imported file. The number of threads will equal the number of processors the computer has (dual-core computers have two processors, and quad-core computer have four). However, the more threads that are created by TEMS Discovery, the more memory will be consumed. The computer must have sufficient memory to support this function; otherwise, the multi-threading processing feature will only slow down processing.

  You can also use this option to turn off multi-threading processing.

- **Max. Number Of ADP Import Threads (0 for default)**. Within the license allowable number of ADP import threads, you have control of how many simuteniouse import threads for importing data. If 0 is selected, TD will figure out a proper number of ADP import thread base on machine configuration.

- **Text Font**. Define the font for the TEMS Discovery application. Clicking the *Text Font* cell in the *Value* column will bring up the dialog to define a font.

- **Text Color**. Define the color of the font by clicking the *Text Color* cell in the *Value* column, and then selecting a color.

- **Max. Sector-Point Link Distance (km)**. Define the maximum distance of sector coverage. This value will affect all the functions that associate the drive test data point and sector.

- **Sector Filtering Based On**. In the Data Explorer, a sector group can be selected to filter the data points. There are two options for filtering:
  - *All*: A data point will be picked if it is covered by any of the sector in this sector group.
  - *Top 1*: A data point will be picked only if the Top 1 serving sector at this geo location is in this sector group.

- **WiMAX Default Version**. Select the WiMAX default version for decoding.

- **Measurement System**. Select the measurement system for GUI display.

- **Hyperlink to Multimedia Presentation Index File**. In addition to the built-in multimedia, you can set up a hyperlink to the multimedia presentation index file located in your own server accessible by TEMS Discovery, so that you can maintain your own multimedia and present them in the TEMS Discovery video player.

  The index file will look something like this, where ### indicates a comment line and [x] represents a kind of definition:

```
### [W] the home page for the video. NOT REQUIRED
### [B] video file base. Shall only define one [B]. REQUIRED

### List all video files one by one, using the following format
### [C] Category of the video
### [D] Description of the video
### [H] Hyperlink to the video file

[W]
http://nqlweb.tems.net/TEMS_Discovery/DiscoveryGE/Video/VideoHom
e.htm
[B] http://www.ascom.com/en/index

[C] Introduction
[D] TEMS Discovery
[H] tems-flash-discovery.htm

[C] Introduction
```

```
[D] TEMS Discovery Indoor
[H] tems-flash-discovery-Indoor.htm
```

- **QVoice: CDMA Scanner Processing Cutoff Ec/Io (-28 to -15 dB)**. When importing QVoice CDMA scanner data, ignore the PNs with Ec/Io values weaker than the cutoff specified here.

- **Max. Allowable Time Interval for GPS Interpolation (1 to 600 sec.)**. If the time interval of two good GPS positions is longer than this maximum allowable time interval, no GPS interpolation will be performed for the messages captured in this time period. In other words, those messages will not be visualized in the Map View.

- **Generate Statistic Data Along with Table View**. If set to True, statistical data of the metric will be calculated and displayed in a separate sheet. If the statistical data is not needed, set to False for better user interface performance.

- **Qvoice: Calculate Throughputs from PCAP Message**. TD is able to calculate UL/DL throughputs from PCAP message. However, you have option to directly import the UL/DL throughputs from QVoice log file, or allow TD to conduct calculation only if QVoice log file does not contains that information.

- **Sampling of PCAP ACK Message Within (ms) (-1 for no sampling).** A log file could contain millions of PCAP ACK messages, which not only increase data processing time, but also consume huge memory. Those ACK messages can be safely skipped. TD can sample ACK message in user-defined time interval, or if -1 is set, will not perform sampling.

- **Enable Qualcomm Timestamp Adjustment**. When importing log files that contain qualcomm trace data, using timestamp in the original qualcomm message to adjust the message timestamp.

- **Max. Number of Files To Be Listed For Each Dataset (0 for no limit)**. Limit the number of file/device to be listed for each dataset for performance purpose. If set to 0, all file/devices will be listed.

- **GIS: Default Font Character Set**. If GIS vector data contains certain non-Unicode characters, the display may not proper. This option will allow the user to define the proper character set which will take effect after restarting TD.

- **Enable decoding of Qualcomm trace in *.QMD (Trace may not be complete):** Since the Qualcomm trace data may not be embedded completely in QMD file, enabling the decoding of it could generate wrong result. This is an option to disable or enable this decoding.

- **Max Cube Process Interval in Miutes**. The interval for processing cubes.

- **Statistic Browser: Latitude range for Map View display (degree).** Define the area for browser to load statistic data. The geo center of this area is defined in "*Cube Data Scope Configurations*".

- **Statistic Browser: Longitude range for Map View display (degree).** Define the area for browser to load statistic data. The geo center of this area is defined in "*Cube Data Scope Configurations*".

- **Report: Auto-adjust Resolution of Map View Chart to Optimize Memory Usage**. When reporting, the higher resolution of map view chart is set, the bigger contiguous memory block TEMS Discovery may request. To avoid problem, TEMS Discovery can automatically adjust the resolution to reduce the memory usage.

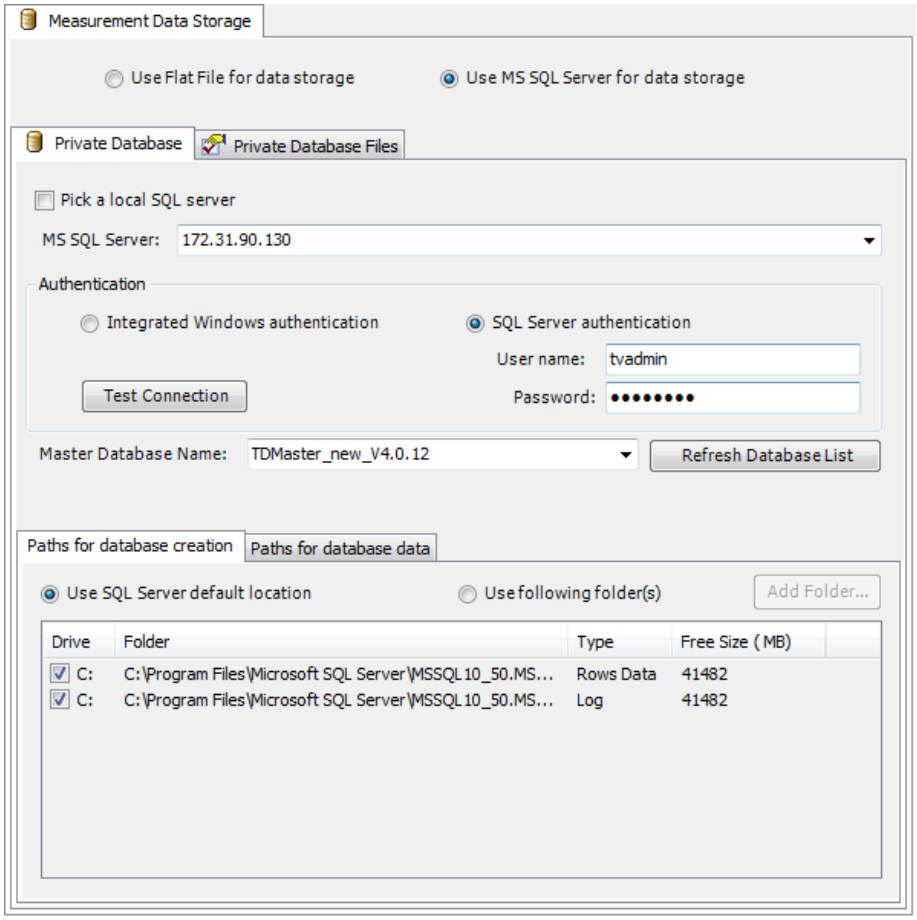
Folder Configuration

The user can specify a dedicate folder to storing system configuration files and temprary data as well.

As a general guideline, the *system data* folder shall be in local machine, and the *temp file* folder shall be located in a fast drive that has plenty of free space, and try to avoid C drive.

7.21.2 Measurement Data Storage Options

TEMS Discovery provides **Flat File** and **MS SQL Server** options for data storage. Both options have advantages and disadvantages; the decision is up to the user.

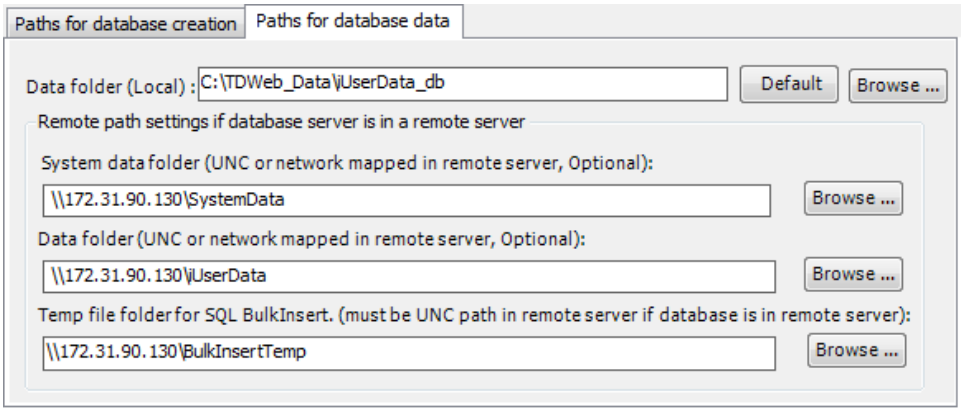


- **Use Flat File for data storage**. This option is the default. If desired, you can select one folder for Private data and another for Public data. For TEMS Discovery Enterprise, the default data storage is SQL server.

- **Use MS SQL Server for data storage**. With this option, you should install at least MS SQL Server Enterprise 2008 R2. After the SQL server installation is done, check the **Pick a local SQL Servers** to list available SQL servers in the local area network. You can select one of the SQL servers and the database for TEMS Discovery will be automatically created. You can also type in a remote SQL server and connect to an existing remote database.

  You can make the selection for Private Database and/or Public Database, then click **Save** and exit from the dialog. TEMS Discovery will be restarted to reflect the change.

  If the SQL server you have picked is in a remote server, you will need to configure the path for database data as below.



Data folder (Local). Even though the measurement data storage is a database, but some working data will still be saved as a file in the defined data folder.

System data folder (UNC or network mapped in remote server, Optional). When you run TEMS Discovery Professional and connect to the SQL server in a remote server, you are running TEMS Discovery Professional as a read-only client. In this scenario, If you like to apply the system settings like report template, scripts, etc in the remote server, you will need to provide the path to the system data folder in the remote server. Otherwise, you can leave it blank.

Data folder (UNC or network mapped in remote server, Optional). In the scenario that you run TEMS Discovery Professional as a read-only client and you like to utilize the intermediate result created by remote server, you will need to provide the path to the **Data Folder (Local)** setting in the remote server. Otherwise, you can leave it blank.

Temp file folder for SQL data transfer. (UNC path, Mandatory if SQL server is in remote machine). When you run TEMS Discovery Enterprise and connect to the SQL server in a remote server, you must provide the path to the temporary folder that will be used for TEMS Discovery to dump text files for the remote SQL server to perform data transfer.

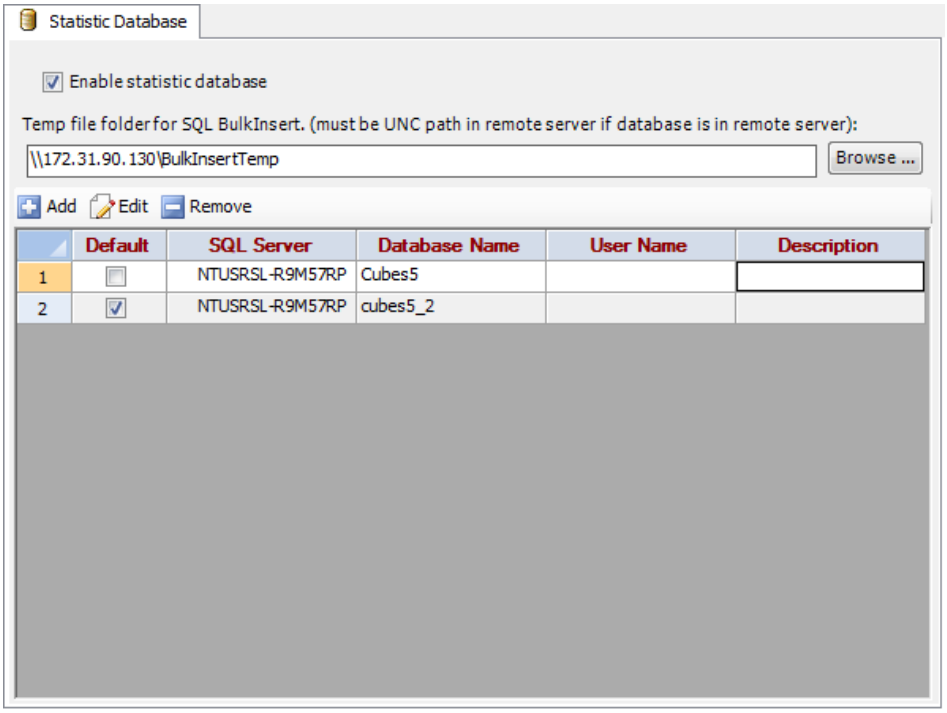
7.21.3 Statistic Data Storage Options

The Statistic Database dialog displays all the SQL servers that can be accessed by the user to store statistic database information.

One, and only one, statistic database can be selected as the default statistic database. The data extracted from the measurement data will be stored in this default database.

NOTE: Microsoft SQL Server 2008 R2 Enterprise version with Analysis Service must be accessible from the user's computer in order to use this dialog.

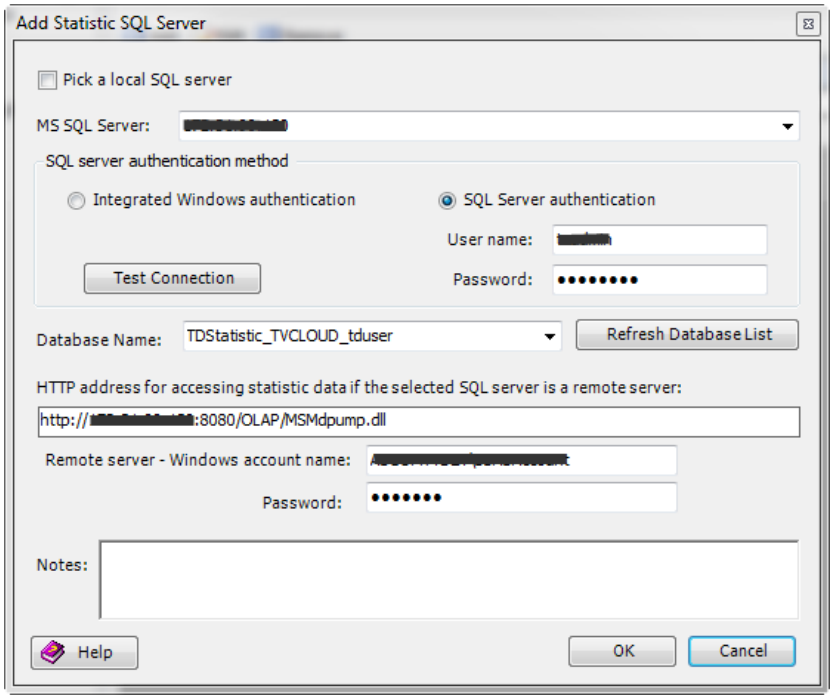
The Statistic Database dialog is reached by selecting **Configuration | Options | Statistic Database** from the Main Window.



Temp file folder for SQL BulkInsert. (must be UNC path in remote server if database in in remote server). When you run TEMS Discovery Enterprise and connect to the SQL server in a remote server, you must provide the path to the temporary folder that will be used for TEMS Discovery to dump text files for the remote SQL server to perform BulkInsert.

Statistic Database Toolbar

Add. Add a new statistic database. Brings up the Add SQL Server dialog, where information for the new statistic database can be entered. For accessing remote statistic database, please refer to “TEMS Discovery Enterprise system configuration”.



Edit. Edit the information for the selected database.

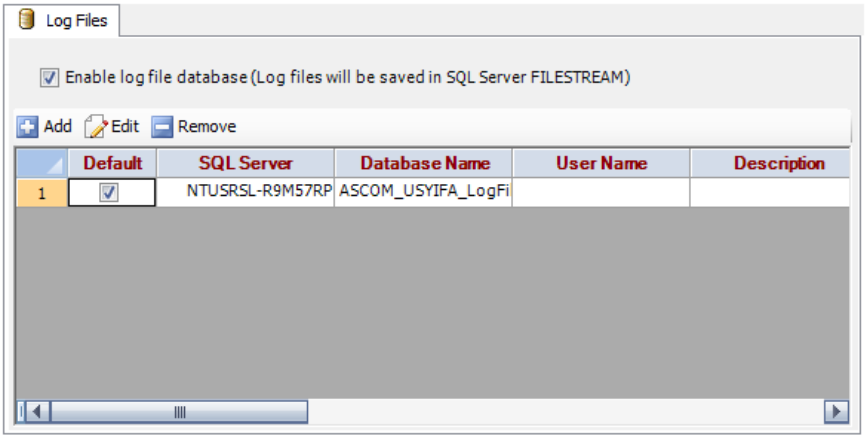
Remove. Remove the selected database.

7.21.4 Log File Storage Options

The Log Files dialog displays all the SQL servers that can be accessed by the user to store log file information. One, and only one, log file database can be selected as the default log file database. The log files imported by TEMS Discovery will be stored in this default database.

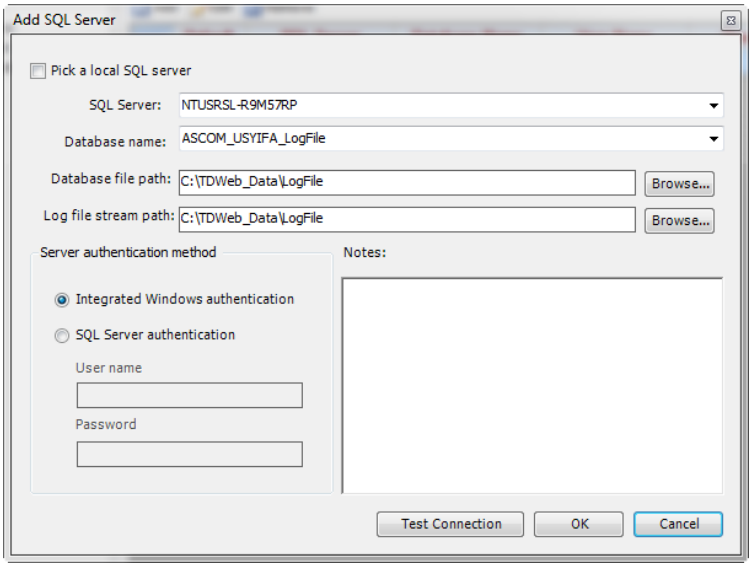
NOTE: Microsoft SQL Server 2008 R2 Enterprise version with FILESTREAM enabled must be accessible from the user's computer in order to use this dialog. Please see Enabling FILESTREAM in SQL Server 2008 R2 for more information.

The Log Files dialog is reached by selecting **Configuration | Options | Log Files** from the Main Window.



Log Files Toolbar

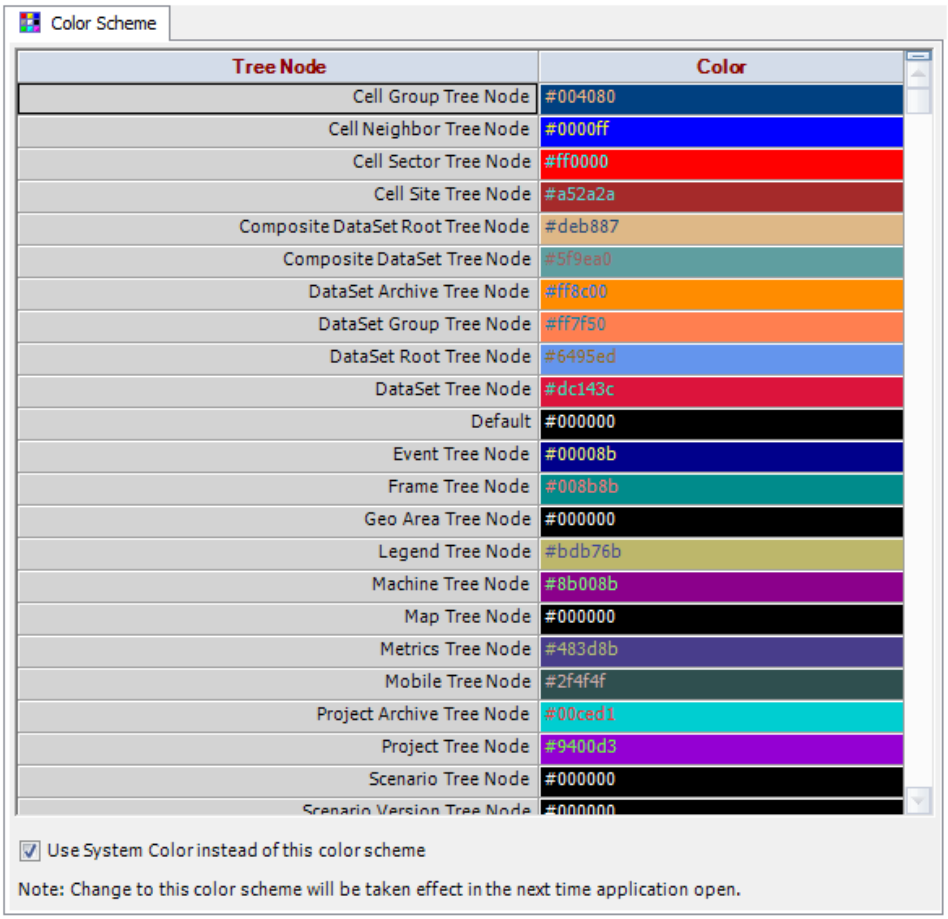
Add. Add a new log files database. Brings up the Add SQL Server dialog, where information for the new database can be entered.



Edit. Edit the information for the selected database.

Remove. Remove the selected database.

7.21.5 Color Scheme Options

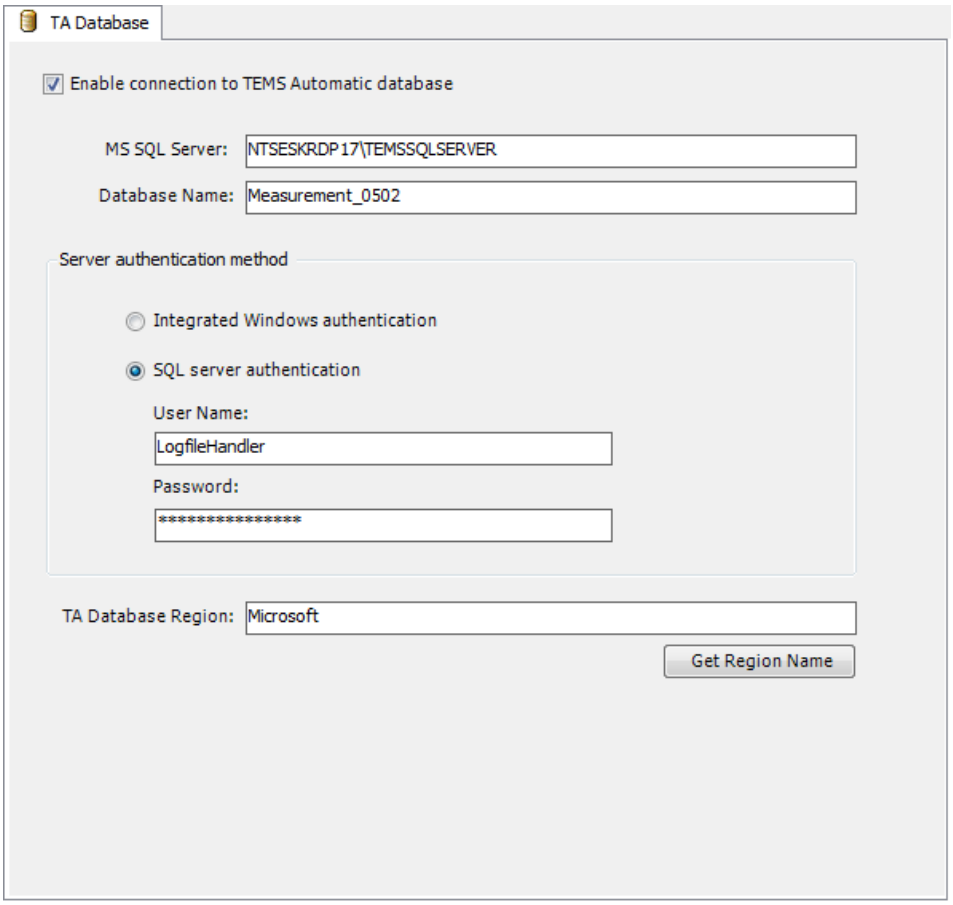


The **Color Scheme** options allow you to associate one color for each data type displayed in the tree view. Clicking on a cell in the *Color* column will bring up a dialog in which you can choose a color.

As an option, you can check **Use System Color instead of this color scheme** to apply one color for all data types.

7.21.6 TA Database Options

TEMS Discovery can directly access TEMA Automatic database to import uplink data created by call generator, and fetch other information like area information.



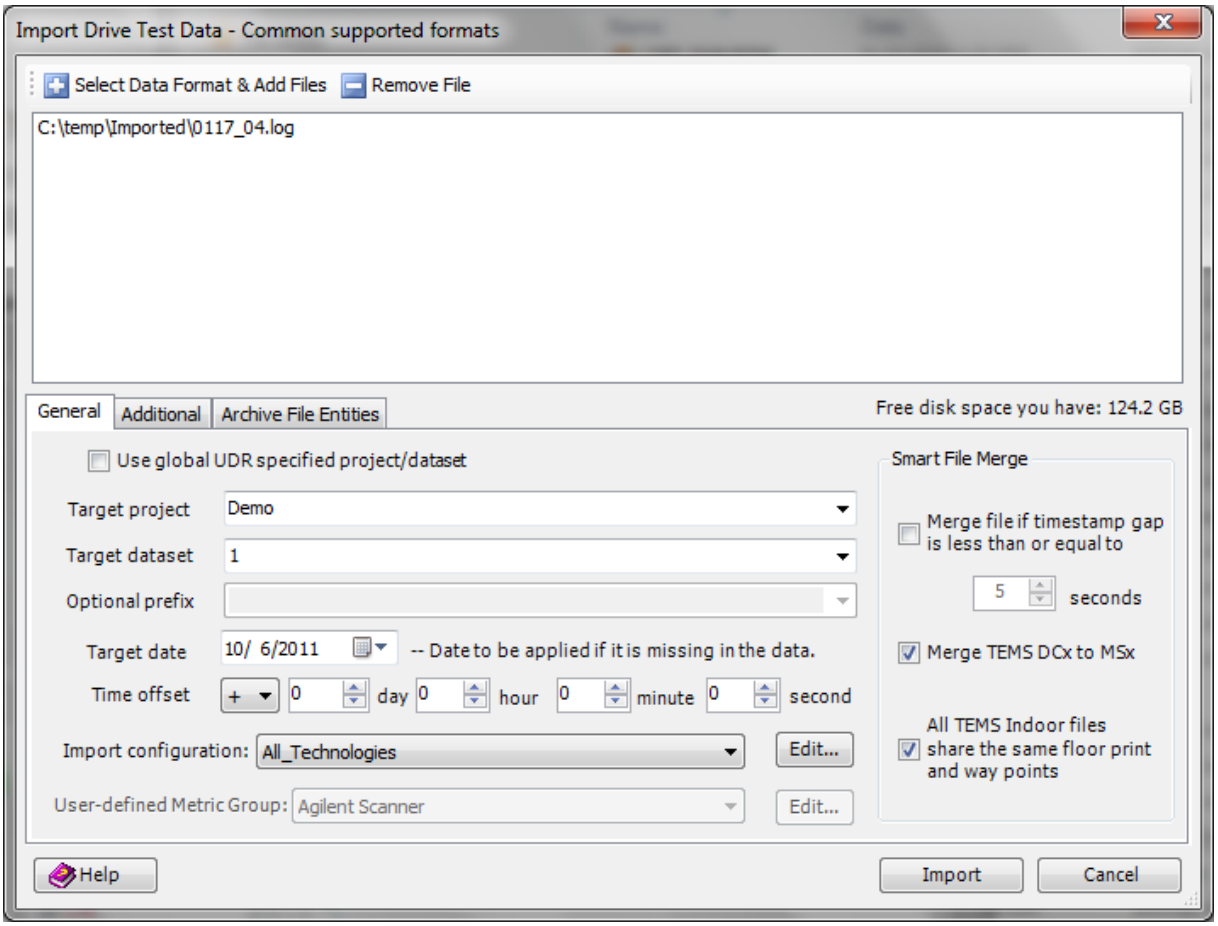
7.22 Import Data

Drive test data, cell configuration data, and GIS data can be imported into TEMS Discovery. The imported data will be well organized, can be presented in various formats, and can be shared.

7.22.1 Import Drive Test Data

The Import Drive Test Data dialog can be accessed in the following ways:

- Selecting **Import | Import Drive Test Data** from the **File** menu on the Main Window.
- Clicking the **Data Import** button in the Main Window toolbar.
- Clicking the **Import Drive Test Data** button in the Walk-U-Through wizard toolbar.



TEMS Discovery can import the following data formats:

- TEMS Log (TEMS Investigation, TEMS Pocket, TEMS Automatic)
- QVoice Symphony
- JDSU AOD/SD5

- Qualcomm
- Nemo Outdoor, Nemo Handy
- PCTel Scanner
- Wave File
- Generic Text File (Delimited)

Follow these steps to import data:

1. Click the Select Data Format & Add Files button to add one or more drive test data files to import. **Please be aware** that you must select the data format from the pop-up file open dialog.
2. If the file you have selected is a supported archive file, clicking the file will list all its entities in the Archive File Entities tab page. To select which entity or entities to import, check or uncheck as needed.
3. Select the *Use global UDR specified project/dataset* option if you have global UDRs and have specified the UDR Project Mapping and want to use the global UDRs to decide which project and dataset should be used as the target.
   - If you have selected this option and the imported drive test data does not overlap with any of the global UDRs that have a project specified in the mapping, then a default project named *_No_UDR_Match_Project* will be used as the target project and a default dataset named *_UDR_Match_Default_Dataset* will be used as the target dataset.
   - If a drive test data file does overlap with multiple global UDRs and each of the UDRs is mapped to a different project, then each of these projects will be used as the target project to take the drive test data. You can skip the next two steps if you have chosen this option.
4. Select or enter a new target project name in the *Target project* field.
5. Select or enter a new target dataset name in the *Target dataset* field.
6. When importing some drive test data formats, you may be asked to select or enter a new target mobile name in the *Target mobile* field.
7. If your source drive test data does not contain collection date information, or you want to change the collection date, define the desired data information in the *Target Date* field.
8. You can define the time offset for the data, or skip it.
9. In the *Smart File Merge* section, you have the following independent options:
   - **Merge file if timestamp gap is less than or equal to x seconds**. This option allows you to physically merge the selected files (different from creating a composite dataset, which is logically merged). If you want to merge all the files, not limited to the selected files to be imported, in a dataset, do so by selecting the context menu in Data Explorer–Dataset.
   - **Merge TEMS DCx to MSx**. This option is applicable only to TEMS files.
   - **All TEMS indoor files share the same floor print and way points**. This option is applicable only to TEMS indoor files. Please be advised that the selected files must be collected in the same floor and in the same time period.

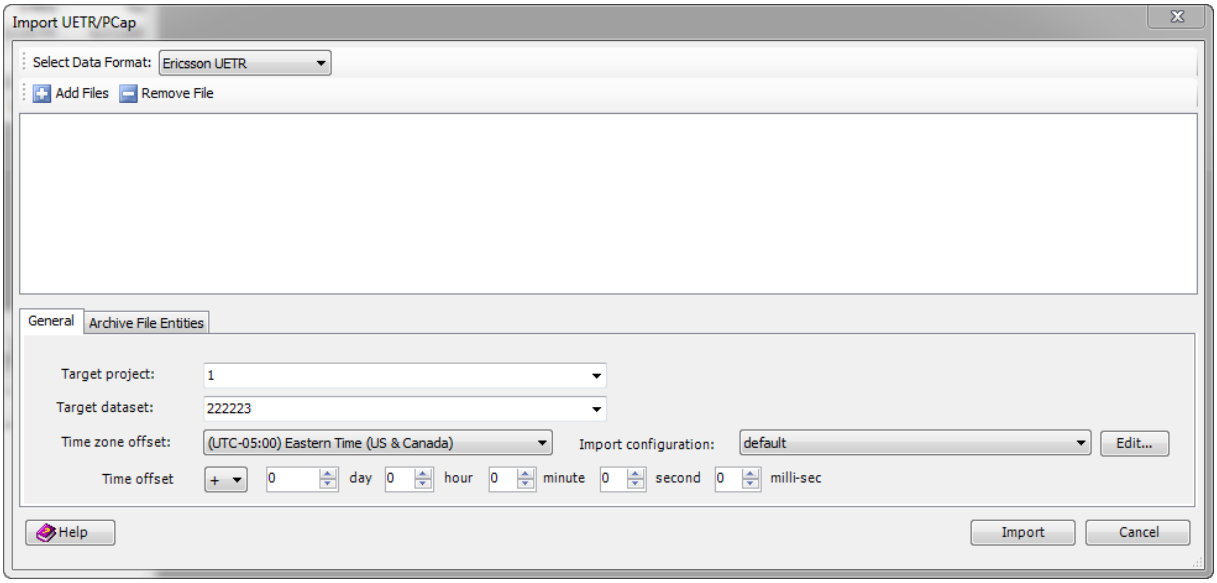
10. Select the frame import configuration from the *Frame Import Configuration* field, or create/edit the configuration by clicking *Edit/View.* See Metric Frame Import Configuration for more information.
11. If importing a generic text file, select an import configuration from the *Generic User-Defined Metric Group* field, or create/edit configuration by clicking *Edit/View.* See Generic User-defined Metric Groups for more information.
12. In the **Additional** tab page, you have the following additional options:
    - **Apply antenna gain offset to user-specified devices**.
    - **Include multiple levels of log file's parent folders as file name prefix**. This may avoid overwriting file names if you are importing the data from multiple data collection teams and every team is using the default *mmdd.log* naming convention for log file name.
    - **Define Default (Device) Attributes**. This option allows you to globally assign certain device attributes for the data to be imported. These attributes can then be utilized for data grouping or for report generation. See Device Attribute Assignment for more information. You should be very cautious when using this feature to avoid incorrect assignment of device attributes if you are dealing with simultaneous multi-device testing.
    - You can select a device attribute assignment template and TEMS Discovery will automatically assign device attributes for the imported device based on these rules. See Device Attribute Assignment for more information.

Once you click **Import**, the task will be placed into the task queue for scheduling, and its status will be indicated in the Task Window. After the data is imported, it will be listed in the Project List and the Data Explorer.

7.22.2 Import UETR

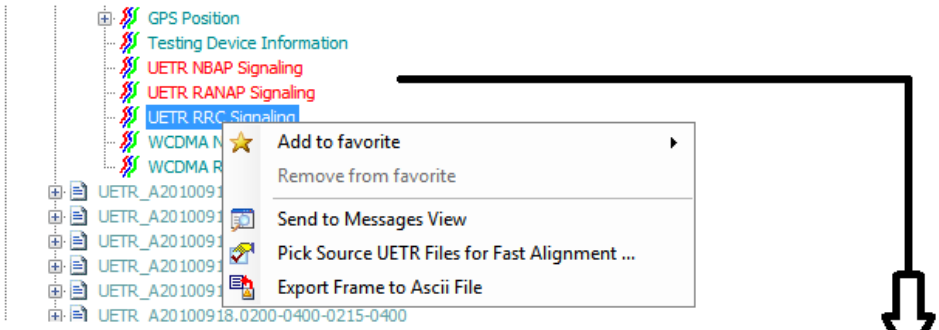
The Import UETR dialog can be accessed in the following ways:

- Selecting **Import | Import UETR** from the **File** menu on the Main Window.
- Clicking the **Import Data** button in the Main Window toolbar.



Currently, TEMS Discovery supports the import of Ericsson UETR files. You can select one or more UETR files and import those files into the selected project and dataset. You can adjust UETR messages by defining your time zone.

After a UETR file is imported, it will be listed under the selected dataset with its sub-network name as the file name and IMSI as the device name. If you want to view how the UETR message is aligned with the drive test data, you can drag-and-drop the corresponding UETR message frames (in red color) from the drive test data listing to the Messages View. Then, TEMS Discovery will only display the UETR messages within the time span of the drive test data.

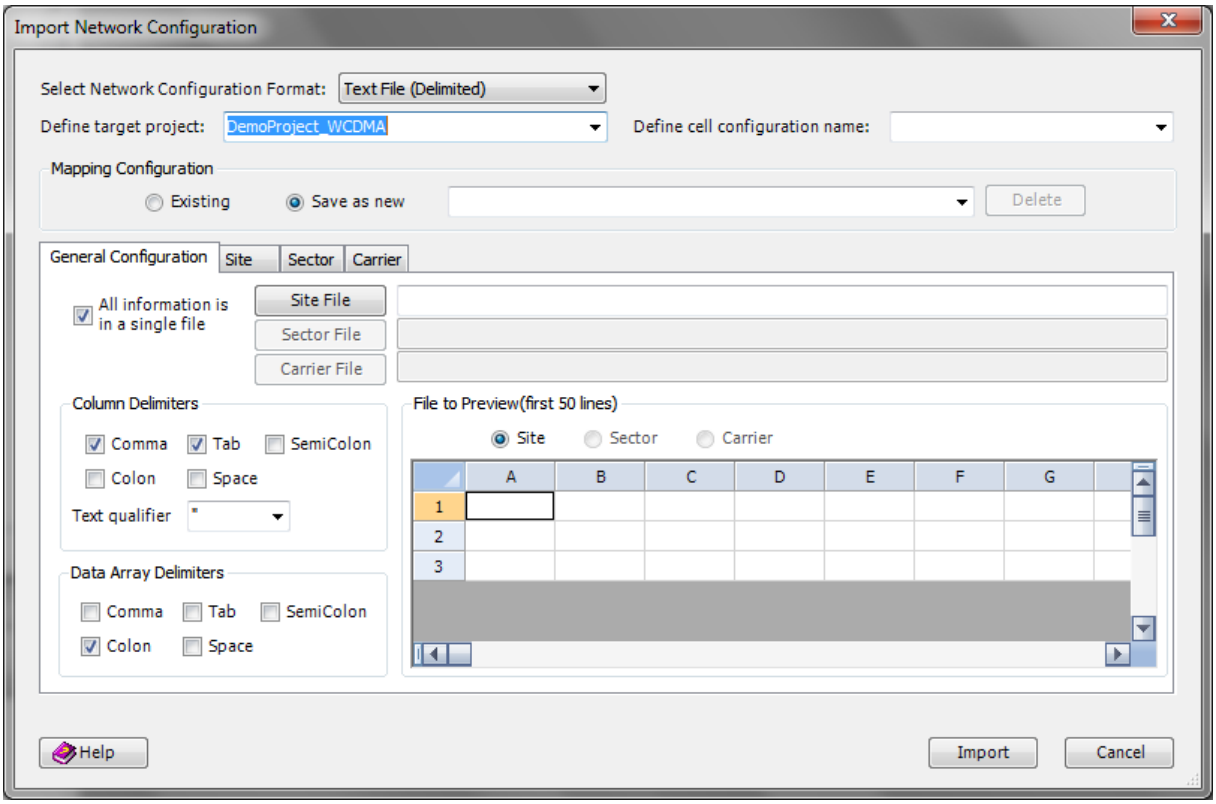


21:11:12.955	FD1	WCDMA RRC Signaling	UL-DCCH: measurementReport
21:11:13.038	FD1	UETR RRC Signaling	DL-DCCH: radioBearerSetup
21:11:13.088	FD1	WCDMA RRC Signaling	DL-DCCH: radioBearerSetup
21:11:13.115	FD1	UETR RRC Signaling	UL-DCCH: measurementReport
21:11:13.126	FD1	UETR RRC Signaling	UL-DCCH: measurementReport
21:11:13.431	FD1	WCDMA RRC Signaling	UL-DCCH: radioBearerSetupComplete
21:11:13.542	FD1	WCDMA RRC Signaling	UL-DCCH: measurementReport
21:11:13.633	FD1	UETR RRC Signaling	UL-DCCH: radioBearerSetupComplete
21:11:13.705	FD1	UETR RRC Signaling	UL-DCCH: measurementReport
21:11:13.809	FD1	UETR RRC Signaling	DL-DCCH: radioBearerReconfiguration
21:11:13.820	FD1	UETR RRC Signaling	DL-DCCH: downlinkDirectTransfer
21:11:13.912	FD1	WCDMA RRC Signaling	DL-DCCH: radioBearerReconfiguration
21:11:13.913	FD1	WCDMA RRC Signaling	UL-DCCH: radioBearerReconfigurationComplete

7.22.3 Import Network Configuration

The Import Network Configuration dialog can be accessed in the following ways:

- Selecting **Import | Network Configuration** from the **File** menu on the Main Window.
- Clicking the **Import Data** button in the Main Window toolbar.
- Clicking the **Import Cell Configuration** button in the Walk-U-Through wizard toolbar.



TEMS Discovery can import network configuration files of the following formats:

- **TEMS .cel or .xml files for GSM and WCDMA**. These files can be imported directly without requiring additional mapping by the user.
- **ACTIX™ cellref**. These files can be imported directly without requiring additional mapping by the user.
- **ASSET™ .xml files for GSM and WCDMA**. These files can be imported directly without requiring additional mapping by the user.
- **ATOLL™ .xml files**. These files can be imported directly without requiring additional mapping by the user.
- **Ericsson Bulk CM files**. These files can be imported directly without requiring additional mapping by the user.
- **Text delimited files**. Any text delimited file can be imported, although a first-time parameter mapping must be done by the user. Afterward, the mapping configuration can be saved and shared across multiple users for future import.

To import a text delimited network configuration file, the following procedures must be completed.

1. Prepare Network Configuration File
2. Set General Configuration
3. Create Mapping

After you have done the configuration and clicked **Import**, the task will be placed into the task queue for scheduling, and its status will be indicated in the Task Window. After the data is imported, the imported data will be listed in Data Explorer–Cells.

7.22.3.1 Prepare Network Configuration File

The network configuration will be a **text delimited file**.

The file **MUST** contain the following network information:

- Cell site ID
- Cell site location
- Sector ID
- Sector location, if it differs from the cell site location
- Sector azimuth

The file should **PREFERABLY** contain the following information, as well:

- Cell site cluster
- Cell site type
- Sector antenna type
- Sector horizontal beamwidth
- Sector vertical beamwidth
- Sector antenna height
- Sector mechanical down tilt
- Sector electronic down tilt
- Sector neighbor list

For **cdma2000**, the **PREFERRED** carrier parameters are:

- PN offset
- MCC
- SID
- NID

- BID
- Pilot channel power
- Synch channel power
- Paging channel power
- Maximum amplifier power(Watt)
- Pilot power fraction
- Non-pilot overhead power fraction
- Traffic power fraction

For **EVDO**, the **PREFERRED** carrier parameters are:

- PN offset

For **GSM**, the **PREFERRED** carrier parameters are:

- BCCH
- BSIC
- MCC
- MNC
- LAC
- CI
- Transmitter power

For **WCDMA**, the **PREFERRED** carrier parameters are:

- PSC
- MCC
- MNC
- LAI
- RAI
- CPICH power
- Primary synch power
- Secondary synch power
- Traffic channel power
- Maximum amplifier power (Watt)
- Pilot power fraction
- Pilot overhead power fraction
- Traffic power fraction

For **TD-SCDMA**, the **PREFERRED** carrier parameters are:

- UARFCN
- CPI
- Cell ID

Additional information, other than the information required/preferred above, can also be included in the file and imported into TEMS Discovery.

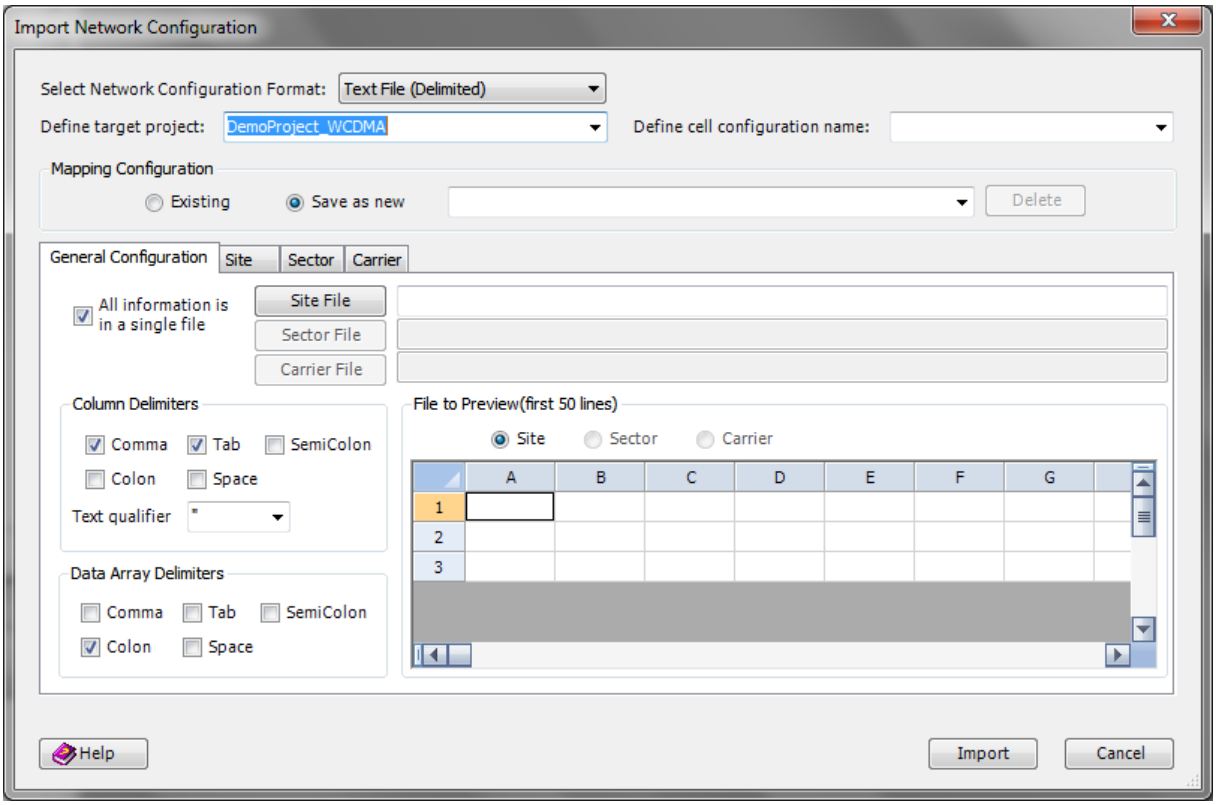
A sample of a network configuration file is shown below.

SiteNo	SectorID	Longitude	Latitude	Radius	Sector Width	Azimuth	Model	LAC	CI	Ant High	Terrain	Tilt	TYPE	BSIC	BCCH
Site1	Site1_O	120.9445	-40.88181	0.2	360	360	Repeater	16761	40422	62	0	0	0	60	85
Site12	Site12_O	120.9552	-40.8872	0.2	360	360	Repeater	16761	40422	62	0	0	0	60	85

The format of longitude and latitude can also be like E 120.9445, N 40.88181, using N, S, E, or W instead of the + or – signs.

7.22.3.2 General Configuration

After the network configuration file is well formatted, you can start to define the column delimiters and create mapping between your source file and TEMS Discovery's internal parameters.



Target project and Scenario Name. To associate a new name to the network configuration, select or enter a new project name in *Target Project*, then select or enter a new scenario name in *Scenario Name*.

Mapping Configuration. The mapping can be saved as a mapping configuration that can be reused to import network configurations of the same data format.

There are two options:

- **Existing**. Select and apply an existing mapping configuration from the dropdown menu in the **Mapping Configuration** panel; changes made to the mapping configuration will be saved.
- **Save as new**. Build a new mapping configuration and save.

To delete any mapping configurations, select a mapping configuration from the dropdown menu and click **Delete**.

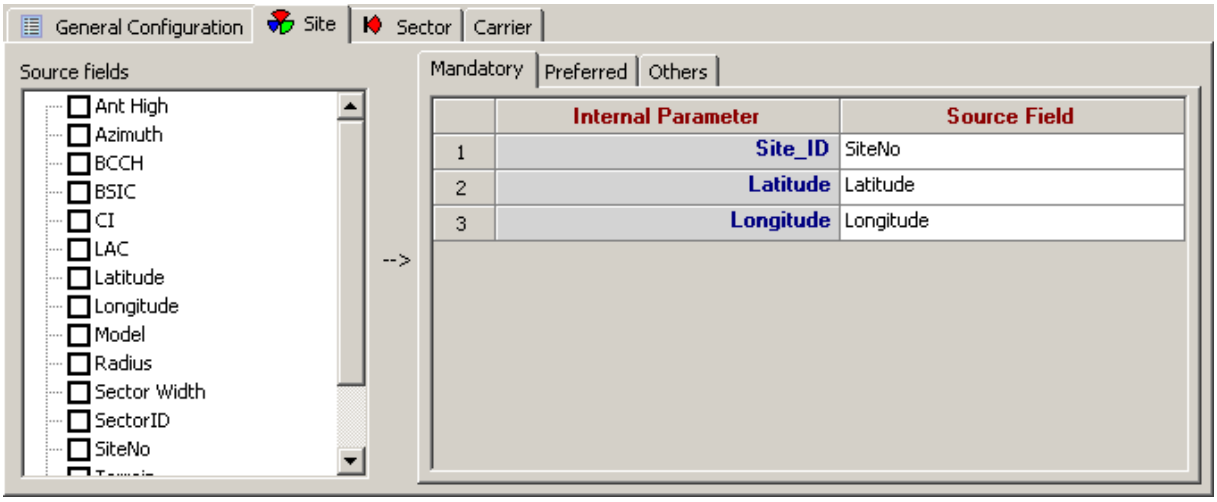
General Configuration. The network configurations can be contained in one file, or separated into several files. For example, one file can contain cell site information, another file can contain sector information, and a third file can contain carrier information. If multiple files are used for the network configuration, uncheck **All information is in a single file**, and click **Site File**, **Sector File**, and **Carrier File** to identify the corresponding file.

The preview spreadsheet displays the first 50 lines of the **Site** file. Select the correct column delimiter and data array delimited to preview the source file.

7.22.3.3 Create Mapping

Create mapping between source fields and TEMS Discovery's internal data structure by dragging-and-dropping a source field from the list into the spreadsheet on the right side.

When creating mapping, all of the parameters in the **Mandatory** spreadsheet must be mapped to the source field. Parameters in the **Preferred** spreadsheet are preferred, but not required; be aware that missing some preferred parameters could make certain TEMS Discovery functions unavailable. In **Others**, map any source field to a user-defined internal parameter; the user-defined parameters are primarily used for display purposes.

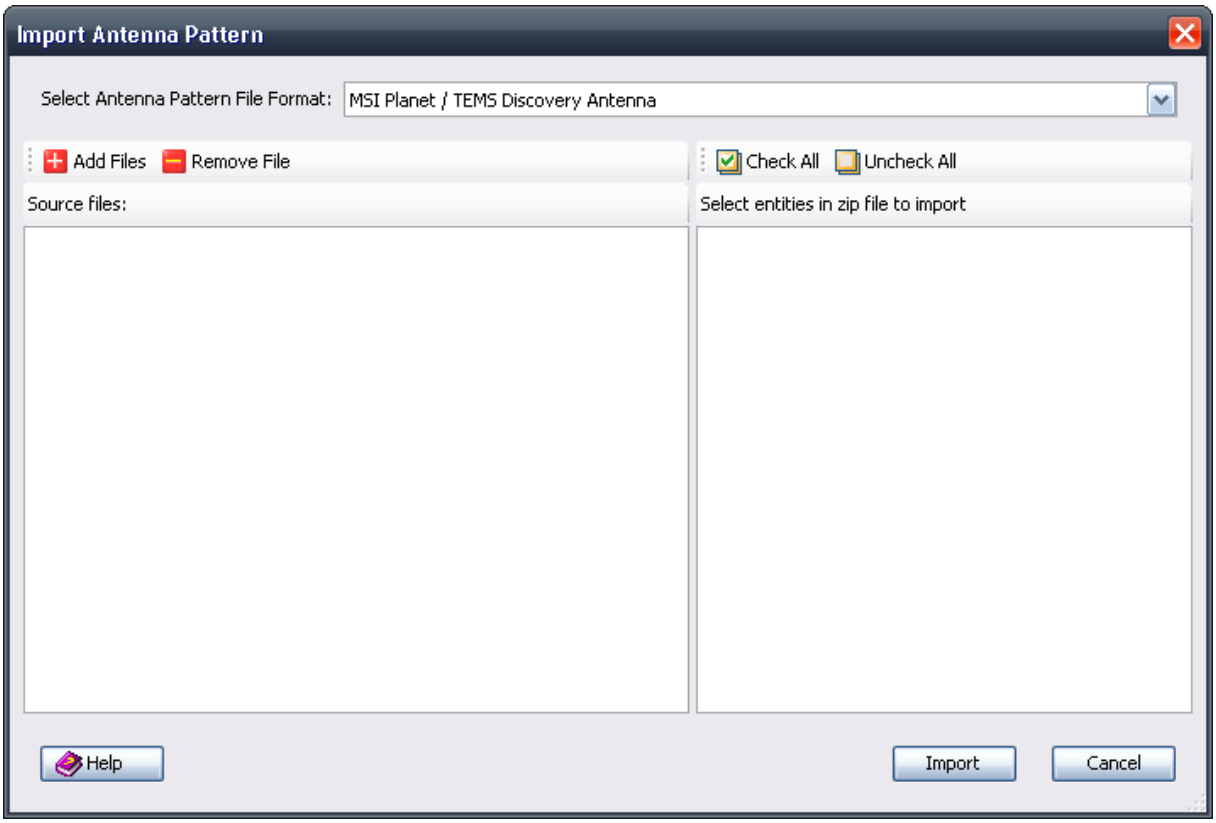


7.22.4 Import Antenna Data

If the Network Configuration contains *Antenna_Type* as a parameter of the Sector table, TEMS Discovery can provide a view for the antenna pattern of a sector.

The Import Antenna Pattern dialog can be accessed in the following ways:

- Selecting **Import | Import Antenna** from the **File** menu on the Main Window.
- Clicking the **Import Data** button in the Main Window toolbar.



After you have selected the files and clicked the Import button, the task will be placed into the task queue for scheduling and its status will be indicated in the Task Window. After the data is imported, the imported file will be displayed in the Antenna Pattern Viewer, and can be assigned to a sector parameter in the Cell Configuration Editor.

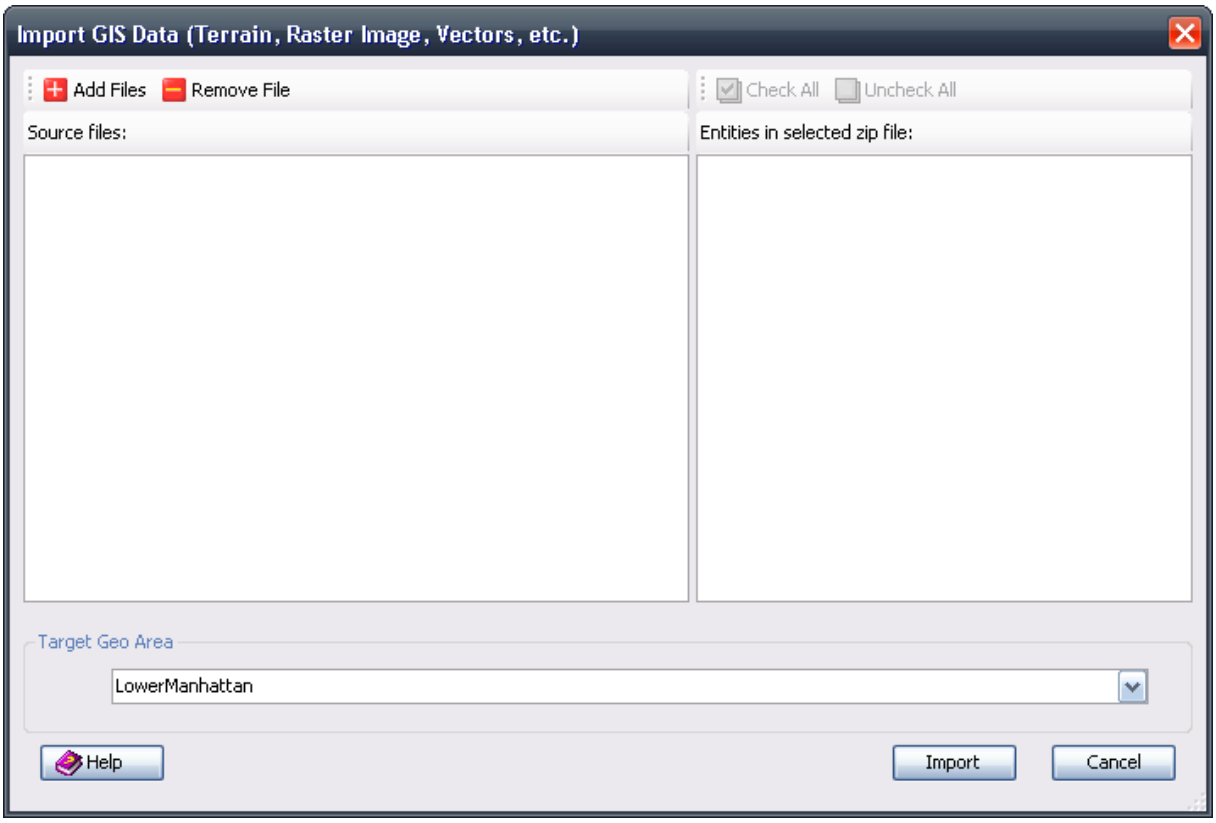
A sample MSI Planet/TEMS Discovery Antenna file is shown below.

```
NAME 420
FREQUENCY 455
H_WIDTH 360
V_WIDTH 7
FRONT_TO_BACK 0
TILT ELECTRICAL
gain 9.2 dBI
Polarization VERTICAL
Comment
HORIZONTAL 360
0 0.2
1 0.2
2 0.2
...
353 0.2
354 0.2
355 0.2
356 0.2
357 0.2
358 0.2
359 0.2
VERTICAL 360
0 0
1 0.5
2 1.4
3 2.6
....
354 8.2
355 5.1
356 2.9
357 1.4
358 0.5
359 0
```

7.22.5 Import GIS Data

The Import GIS Data dialog can be accessed in the following ways:

- Selecting **Import | Import GIS** from the **File** menu on the Main Window.
- Clicking the **Data Import** button in the Main Window toolbar.
- Clicking the **Import GIS** button in the Walk-U-Through wizard toolbar.



You can select multiple GIS data files in various formats, then select or enter a new geo folder in the field, and click **Import**. The import task will be placed into the task queue for scheduling, and its status will be indicated in the Task Window. After the data is imported, the imported data will be listed in the GIS List and the GIS/Coverage Map tab in the Data Explorer.

As a reference, the following is a partial list of spatial data products and formats that can be imported into TEMS Discovery. However, it is strongly recommended to attempt import of any GIS data, even if it is not known whether that format is supported.

- USGS Digital Line Graph, Optional Format (DLG-O)
- USGS Digital Line Graph, Spatial Data Transfer Standard Format (DLG/SDTS)
- USGS Digital Elevation Model (DEM)
- USGS Digital Elevation Model, Spatial Data Transfer Standard Format (DEM/SDTS)
- USGS Digital Elevation Model, GeoTIFF Format
- USGS Digital Raster Graphic (DRG)
- USGS Digital Orthophoto Quads (DOQ), Native USGS Format
- USGS Digital Orthophoto Quads (DOQ), GeoTIFF Format

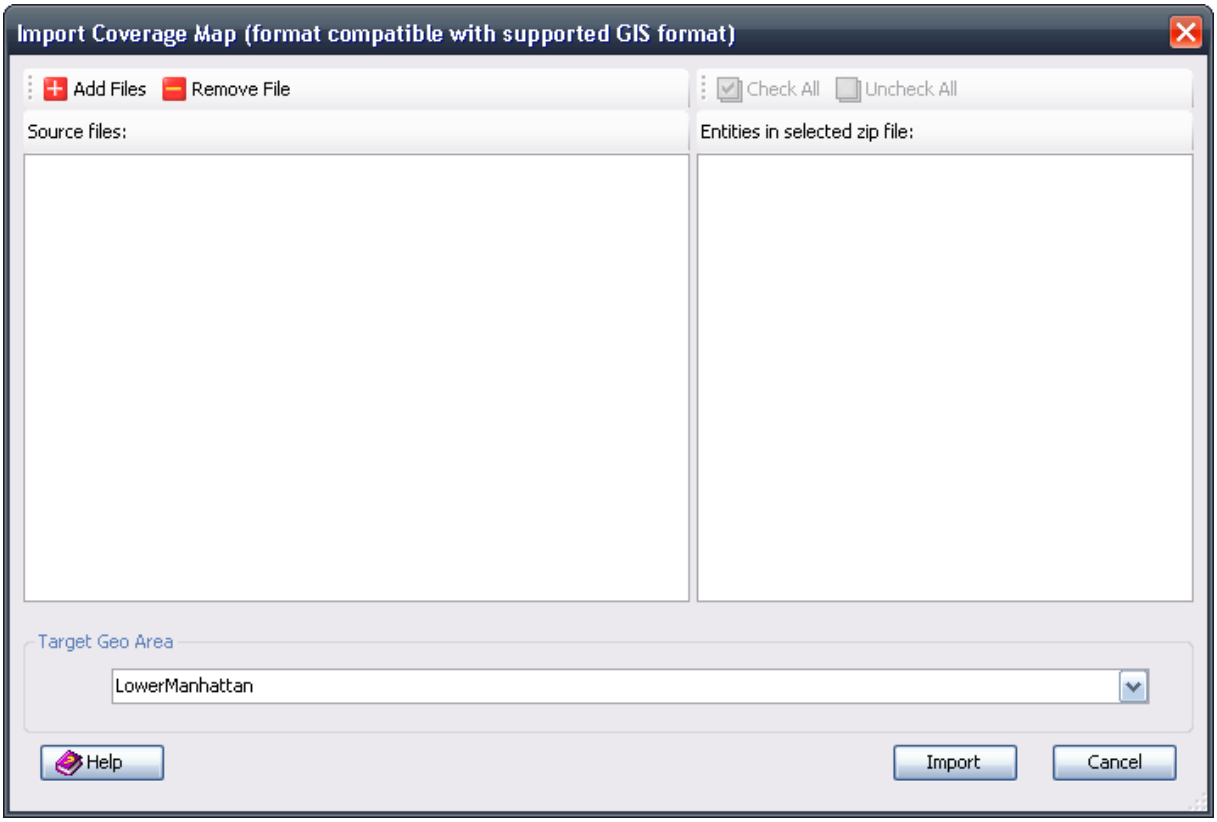
- USGS Digital Orthophoto Quads (DOQ), JPG w/ Native Header Format
- USGS Geographic Names Information System (GNIS)
- USGS Land Use and Land Cover Data (LULC)
- USGS National Elevation Dataset (NED) - ArcGrid, BIL, Grid Float Format
- Global 30-arc-second Digital Elevation Data (GTOPO30)
- NOAA DSDATA Geodetic Control, SDTS Format
- NOAA TerrainBase Elevation Data
- Canadian Digital Elevation Data (CDED)
- JPEG Image with World File
- PNG Image with World File
- AutoCAD DXF (Drawing Interchange File)
- ESRI Shapefiles
- Surfer Grid (ASCII and Binary) Format Files
- Canada 3D Files
- International Bathymetric Chart of the Arctic Ocean (IBCAO) Files
- Global 2' Elevation Data (ETOPO2)
- GLOBE (Global Land 1-km Base Elevation) Data
- Arc/Info ASCII Grid
- Arc/Info Binary Grid
- LizardTech MrSID Data
- Arc/Info Export Format (E00)
- ERMapper Compressed Wavelet (ECW) Format
- ERDAS Imagine Image Format
- DTED (Digital Terrain Elevation Data) Format
- MapInfo MIF/MID and TAB/MAP Formats
- NIMA GNS (GeoNet Names Server) Format
- Terragen Terrain Format
- MicroStation DGN Format
- SRTM (Shuttle Radar Topography Mission)
- BIL/BSQ/BIP/RAW Imagery
- ASTER DEM and L1A/L1B Imagery and MODIS imagery
- BSB Nautical Charts
- MapTech Topo Maps and Aerial Navigation Charts
- MapTech Nautical Charts (PCX Format)
- TIGER/Line Files
- ADRG Files
- ASRP (Arc Standard Raster Product) and USRP Files
- CADRG and CIB Files
- VPF (VMAP0, VMAP1, DNC) Files
- S-57 Digital Chart Files
- JPEG2000 Files
- Erdas GIS/LAN Files
- GIF Files
- NOS/Geo Chart Files
- Garmin PCX5 Format Waypoint (WPT), Route (RTE), and Track (TRK) Files
- OziExplorer Waypoint (WPT), Route (RTE), and Track (PLT) Files
- GPX (GPS eXchange Format) Files
- Zmap Plus Grid Files
- DBF (DBase III+) Files
- BT (Binary Terrain) Elevation Grid Files

- GXF (Geosoft ASCII Grid) Files
- Geosoft Binary Grid Files
- ASPRS LIDAR LAS Files
- Hypack Matrix Files
- Marplot MIE Files
- DHM - Swiss DEM Files
- Lowrance USR
- GPS TrackMaker
- Landsat 7A FAST Format
- NTF Grid/Contour Format
- TerraScan .bin/.ts Format
- Idrisi Format
- Japanese DEM (JDEM) Format
- SEGP1/UKOOA Seismic Shotpoint Format
- CompeGPS RTE, TRK, and WPT Formats
- KML/KMZ Formats
- Lowrance SonarViewer Format
- NITF - National Imagery Transmission Format
- Geodas Grid (GRD98) Format
- Intergraph COT Format
- CDF (GES Cartographic Data Format)
- Platte River ASCII Digitizer Format
- AutoCAD DWG (DraWinG) File
- WAsP .MAP Format
- PGM Grayscale Grid Format
- SMT KINGDOM Software Planimetric Polygon Format
- Polish MP (cGPSMapper) Format
- GML (Geography Markup Language) Format
- DMDF (Digital Map Data Format) Format
- EMF (Windows Enhanced Metafile) Format
- PCX Files
- RIK (Swedish Topo Map) Files
- MPR/MPH (German Topo Map) Files
- OCAD .OCD Files
- HF2/HFZ Files
- PLS-CADD XYZ Files
- OpenStreetMap (OSM) Files
- TomTom OV2 Files
- Vulcan3D Triangulation (.00t) Files
- Delft3D (LDB) Files

7.22.6 Import Coverage Map

Coverage maps exported from external planning tools can be imported into TEMS Discovery.

These coverage maps can be displayed in the Map View, and they can be used to generate delta metrics.

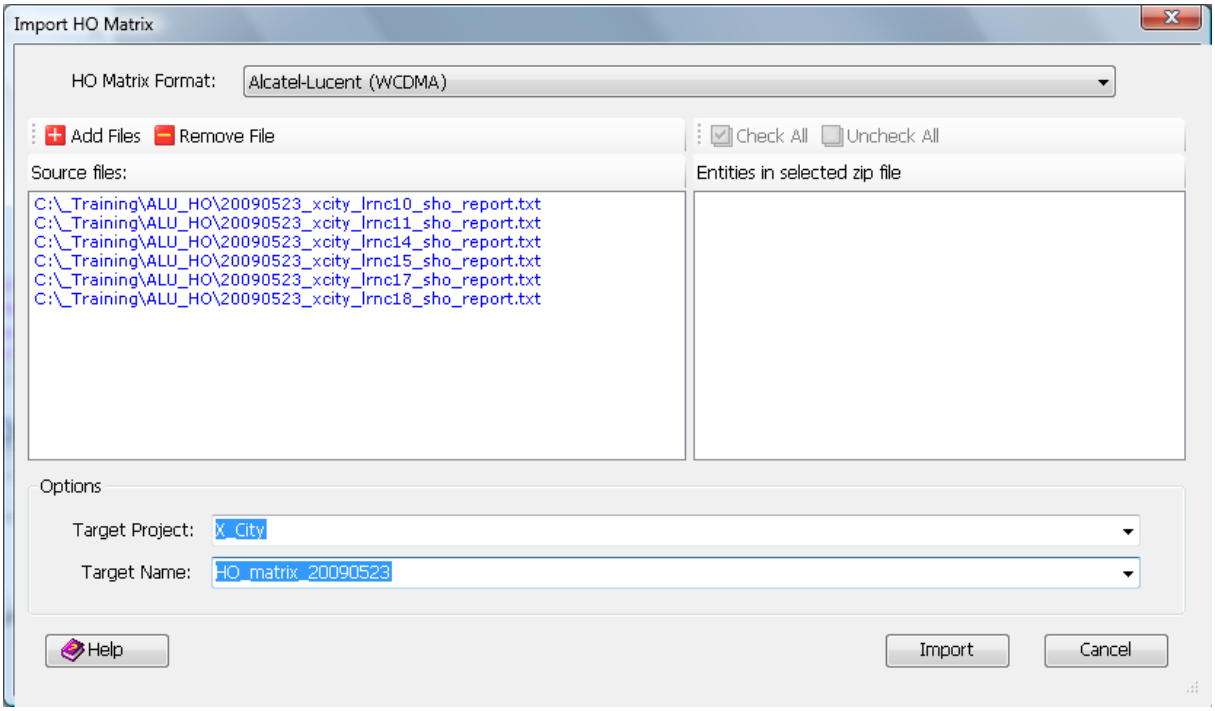


The procedure for importing a coverage map is similar to that of importing GIS data.

7.22.7 Import HO Matrix

TEMS Discovery can import Handover (HO) matrices. Based on the HO matrices, TEMS Discovery can use the Neighbor List Analyzer to perform neighbor list analysis and eventually export a Neighbor List Work Order.

The HO Matrix formats supported include those from Huawei and Alcatel-Lucent WCDMA networks. The support for other formats from other equipment vendors can be added upon request. Please contact our customer support or sales team if you have additional questions.



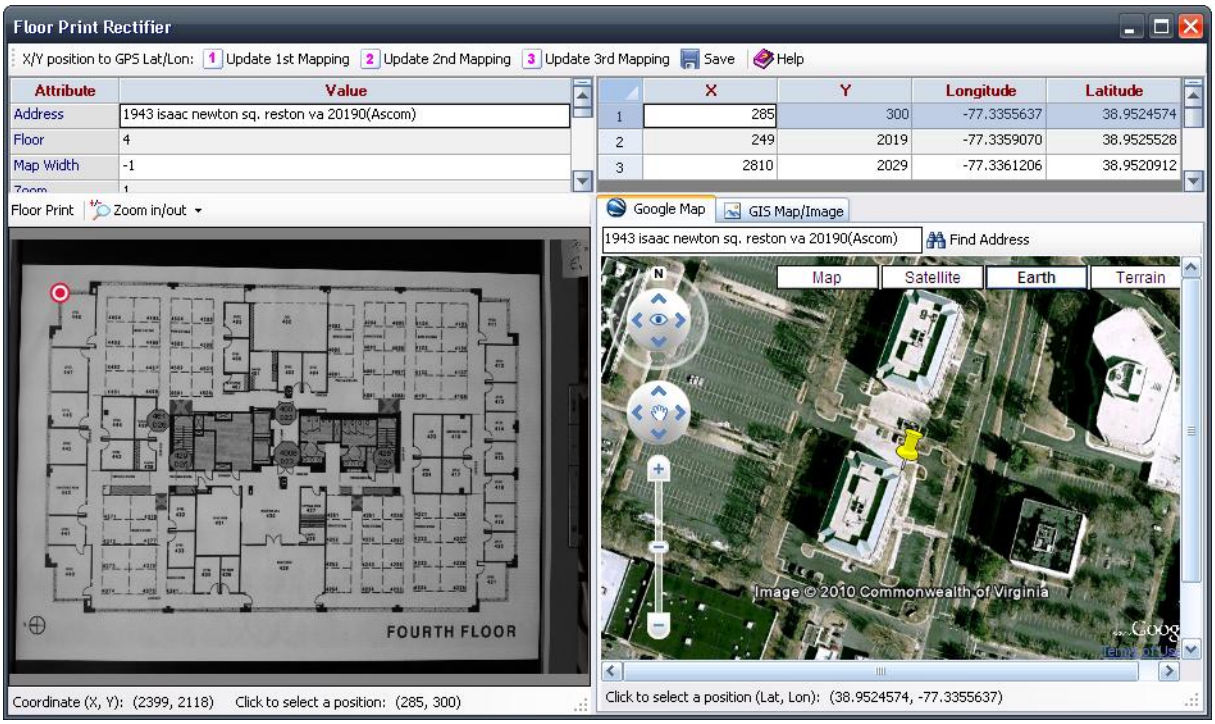
7.22.8 Plug-in for Custom Import

TEMS Discovery provides API for users to develop their own parser to import data into TEMS Discovery. Please see the *TEMS Discovery API* document for more information.

7.23 Specific Topics

7.23.1 Floor Print Rectifier

For indoor type projects, you can use the Floor Print Rectifier tool to rectify the floor print so it can be used with outdoor maps.



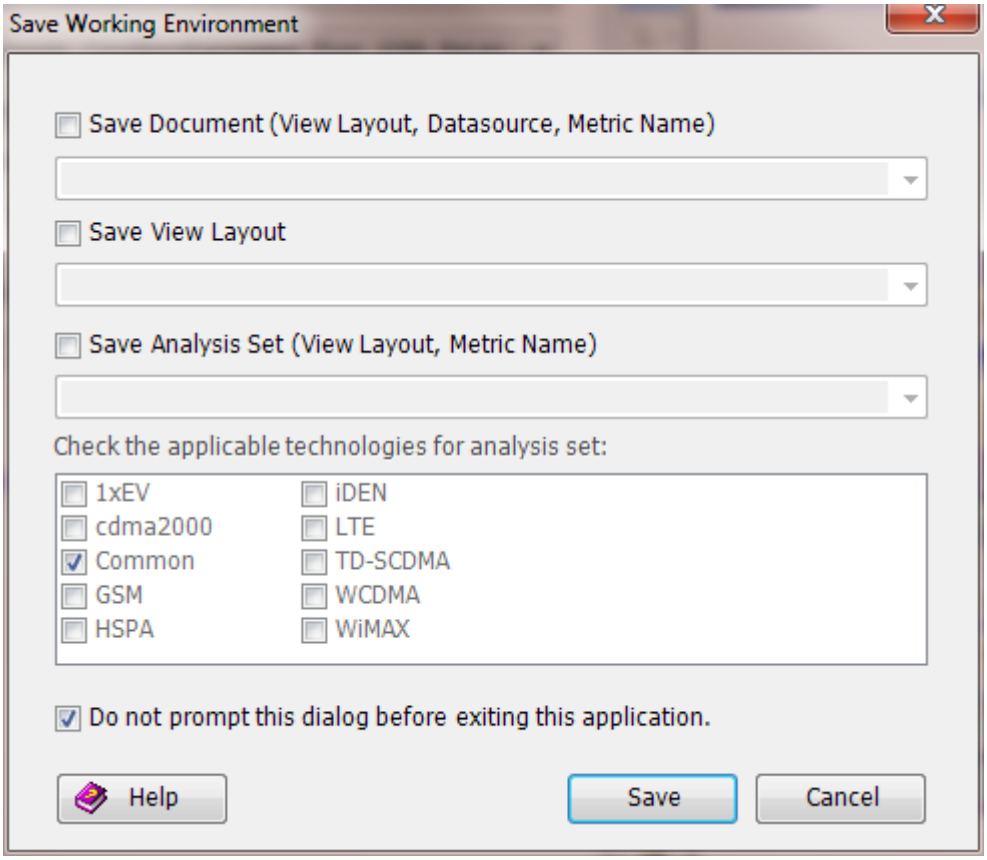
To rectify a floor print, perform the following steps:

1. Open the indoor project you want to rectify.
2. Go to the GIS/Coverage Map tab.
3. Right-click the floor print you want to rectify – it should be listed under the Floor Prints tree node.
4. Select **Rectify (Georeference) Floor Print** from the context menu.
5. Click a corner point on the floor print as the 1st mapping point.
6. Find the corresponding point on the GIS Map (Google Earth or Bing Map, depending on your TEMS Discovery license) display on the right-side window.
   - If you are using Google Map, select *Earth* mode from the top menu list.
   - If you are using Bing Map, select *2D mode* with only *Road* or *Aerial* map type.
7. Click the **Update 1st Mapping** button in the toolbar.
8. Repeat steps 6 and 7 for the next two corner points for the 2nd and 3rd mapping.
9. Save the result and close the window.

7.23.2 Save & Restore Working Environment

TEMS Discovery can easily restore the working environment. The Save Working Environment dialog can be accessed in the following ways:

- Clicking the **Save** button on the toolbar.
- Selecting **Save** from the **File** menu on the Main Window.



- **Save TEMS Discovery Document**. Multiple projects and display data can be opened and shown in multiple views, then saved as a TEMS Discovery document. All data, including the view layout, will be saved. To open a TEMS Discovery document, select from the list in Document List
- **Save View Layout.** The current view layout can be saved and restored for any project by right-clicking the target project in the Project List and selecting **Open View Layout** from the context menu.
- **Save Analysis Set**. Save the current view layout, along with the type of data currently displayed as an Analysis Set. This analysis set can then be applied to any mobile data by right-clicking a target mobile in the Project List or Data Explorer–Dataset and selecting **Open Analysis Set** from the context menu. It can also be selected when opening a project/device in the Walk-U-Through wizard.

7.23.3 Cell Configuration

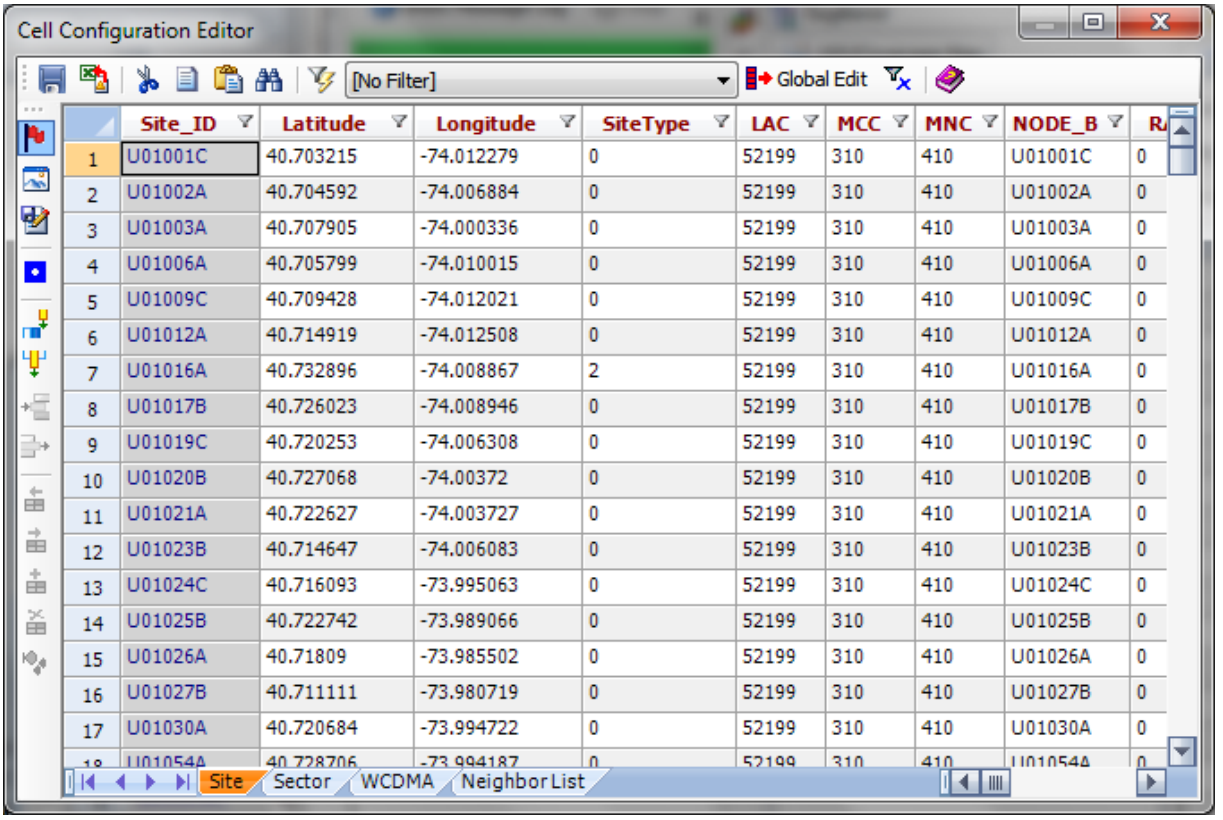
TEMS Discovery can import network configurations in a text delimited file format (see Import Network Configuration for more information). The imported configuration can then be displayed graphically in the Map View, and the information can be manipulated in various ways (see Data Explorer–Cells and Map View for more information).

NOTE: Since TEMS Discovery is not intended for network planning purposes, its editing capacity is limited. TEMS Discovery does not provide the functions to add or remove new cell sites or sectors, but does allow a user to modify parameter values or to add/remove parameters (see Edit Cell Configuration and Edit Cell/Sector Parameters for more information).

7.23.3.1 Edit Cell Configuration

Cell configurations can be imported with the Import Network Configuration feature via a customized text delimited file. The cell configuration can be displayed in the Map View for various operations. Once the cell configuration is imported, it can be manipulated directly in the Map View, or from the Cell Configuration Editor.

The Cell Configuration Editor can be accessed from the Data Explorer–Cells right-click menu.



	Site_ID	Latitude	Longitude	SiteType	LAC	MCC	MNC	NODE_B	R
1	U01001C	40.703215	-74.012279	0	52199	310	410	U01001C	0
2	U01002A	40.704592	-74.006884	0	52199	310	410	U01002A	0
3	U01003A	40.707905	-74.000336	0	52199	310	410	U01003A	0
4	U01006A	40.705799	-74.010015	0	52199	310	410	U01006A	0
5	U01009C	40.709428	-74.012021	0	52199	310	410	U01009C	0
6	U01012A	40.714919	-74.012508	0	52199	310	410	U01012A	0
7	U01016A	40.732896	-74.008867	2	52199	310	410	U01016A	0
8	U01017B	40.726023	-74.008946	0	52199	310	410	U01017B	0
9	U01019C	40.720253	-74.006308	0	52199	310	410	U01019C	0
10	U01020B	40.727068	-74.00372	0	52199	310	410	U01020B	0
11	U01021A	40.722627	-74.003727	0	52199	310	410	U01021A	0
12	U01023B	40.714647	-74.006083	0	52199	310	410	U01023B	0
13	U01024C	40.716093	-73.995063	0	52199	310	410	U01024C	0
14	U01025B	40.722742	-73.989066	0	52199	310	410	U01025B	0
15	U01026A	40.71809	-73.985502	0	52199	310	410	U01026A	0
16	U01027B	40.711111	-73.980719	0	52199	310	410	U01027B	0
17	U01030A	40.720684	-73.994722	0	52199	310	410	U01030A	0

The Cell Configuration Editor contains four spreadsheets of information for cell sites, sectors, technology, and the neighbor list. You cannot add or delete cell sites or sectors, but you can modify the values of the parameters and add new parameters. In

the Neighbor List spreadsheet, you can add a new neighbor list to a sector and modify the neighbor list. All changes can be permanently saved.

A dropdown menu in the toolbar lists the sector filter expressions that have previously been created. Select any of the filters to apply it to the cell configuration, and the filtered sectors will be listed in the spreadsheet. Click the **Filter Expression Builder** button  to bring up the Sector Filter Expression Builder, where filter expressions can be edited.

In each column header, you can click the small filter button  and select a string to filter the data in that column. Press the **Reset Row Filter** button  to reset the filters.

Cell Configuration Editor Toolbar

 **Save Network Configuration**. Save any changes to the cell configuration.

 **Save As Excel File**. Save the cell configuration to an Excel file.

 **Delete the Selection**. Cut the text in the selected cell.

 **Copy the Selection to Clipboard**. Copy the text in the selected cell to the Clipboard.

 **Paste to the Specified Cell**. Paste the text into the selected cell.

 **Search Text**. Bring up the Search dialog to search text in the spreadsheet.

 **Filter Expression Builder**. Open the Sector Filter Expression Builder.

 **Global Edit**. Global edit a parameter.

 **Reset Row Filter**.

 **Help**.

 **Highlight in Map View**. Put a red flag in the site that is selected in the spreadsheet.

 **Highlight the Site/Sectors Listed in the Spreadsheet in Map View**.

 **Save as Sector Group**. Save the sectors listed in the spreadsheet as a sector group with name.

 **Unify Location of Sectors and Sites**.

 **Add New Column**. Add a new parameter to the spreadsheet.

 **Remove Selected Column**. Remove the selected parameter from the spreadsheet.

 **Insert Rows**. Insert the neighbor list to a sector.

 **Remove Selected Rows**. **Remove the neighbor list from a sector.**

 **Shift the Selected Cells to Left**. Move the selected neighbor to the left.

 **Shift the Selected Cells to Right**. Move the selected neighbor to the right.

 **Insert a Cell**. Insert a neighbor in front of the selected neighbor.

 **Remove the Selected Cells**. Remove the selected neighbor from the list.

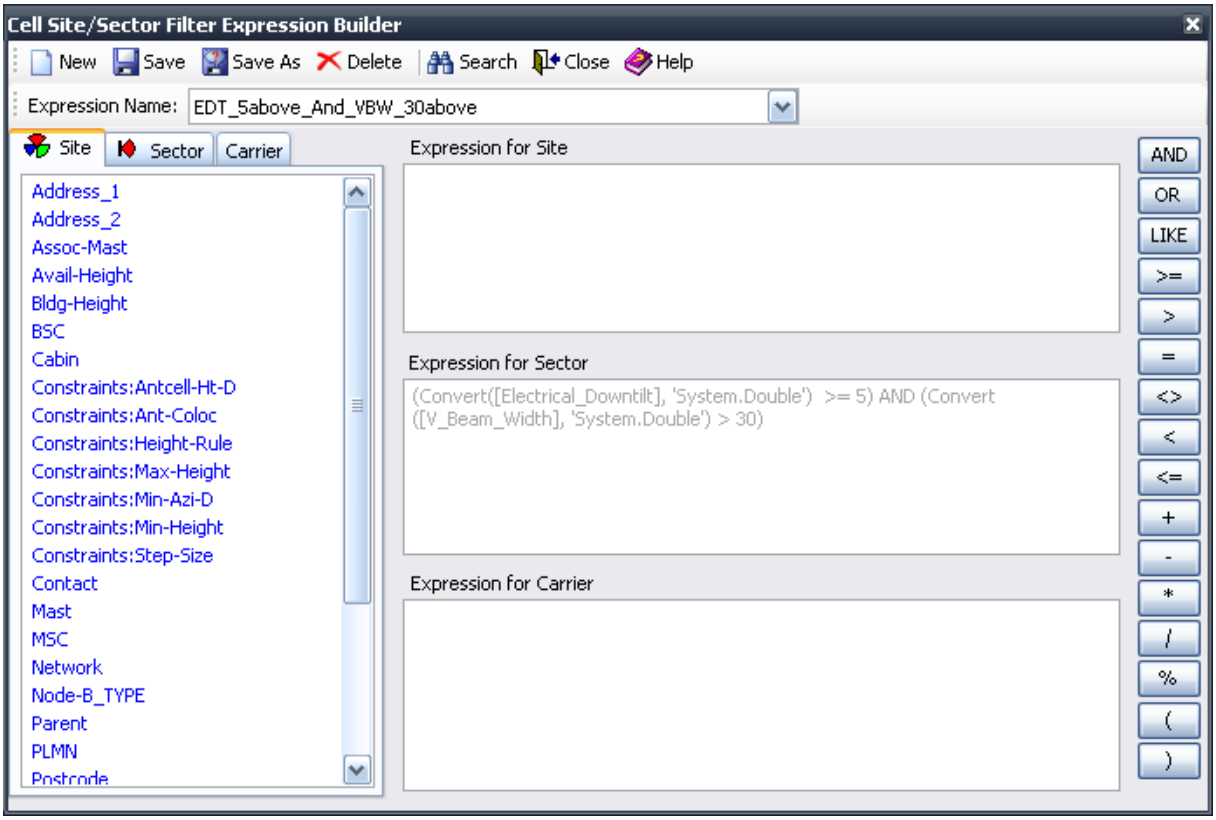
Filter Neighbor List.

7.23.3.2 Cell Site/Sector Filter Expression Builder

The Cell Site/Sector Filter Expression Builder can create comparison expressions that can be used in sector searches.

You can access the Cell Site/Sector Filter Expression Builder in the following ways:

- Selecting **Sector Filter Expression** from the Data Explorer–Cells context menu.
- Clicking the button in the Cell Configuration Editor toolbar.



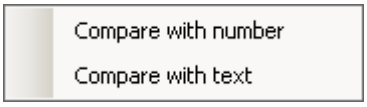
To search for a particular sector, create an expression containing the parameters of the **Cell Site**, **Sector**, or **Carrier**, in the respective “Expression for” window.

Drag-and-drop the parameter name from the list on the left side into the corresponding editor on the right side. The supported concatenation operators, logical operators, and arithmetic operators are listed on the far right. Click one of the buttons and the corresponding operator will be placed in the active editor.

The expressions can be saved with a name, after which the expression name will be listed in the Data Explorer–Cells tab under the target scenario in cell configuration. You can use this expression to search for sectors and highlight them in the Map View. The sectors can be saved into a sector group, which can then be used to filter drive test data.

Drag-and-Dropping Parameters

When dragging-and-dropping a parameter to the editor, a menu will pop up with two options, *Compare with number* and *Compare with text*.



If you choose to compare the parameter with a number, a string *Convert(<parameter_name>, 'System.Double')* will be dropped into the editor; otherwise, *<parameter_name>* will be dropped into the editor and the parameter will be compared with text.

Concatenation operators AND and OR

Concatenation is allowed for Boolean AND and OR operators. Use parentheses to group clauses and force precedence. The AND operator has precedence over other operators. For example:

(Antenna_Type = '731DG85V1EXM_850' **OR** Antenna_Type = '731DG85V1EXM_1900'**) AND** Convert(Height, 'System.Double') >= 80

Matching operator LIKE

The **LIKE** operator is used in character string comparisons with pattern matching. Both the * and % can be used interchangeably for wildcard characters in a **LIKE** comparison. If the string in a **LIKE** clause contains a * or %, those characters should be escaped in brackets ([]). If a bracket is in the clause, the bracket characters should be escaped in brackets (for example [[] or []]). A wildcard is allowed at the start and end of a pattern, or at the end of a pattern, or at the start of a pattern. For example:

Antenna_Type LIKE '*DG85V1EXM_*'

Antenna_Type LIKE '*DG85V1EXM_850'

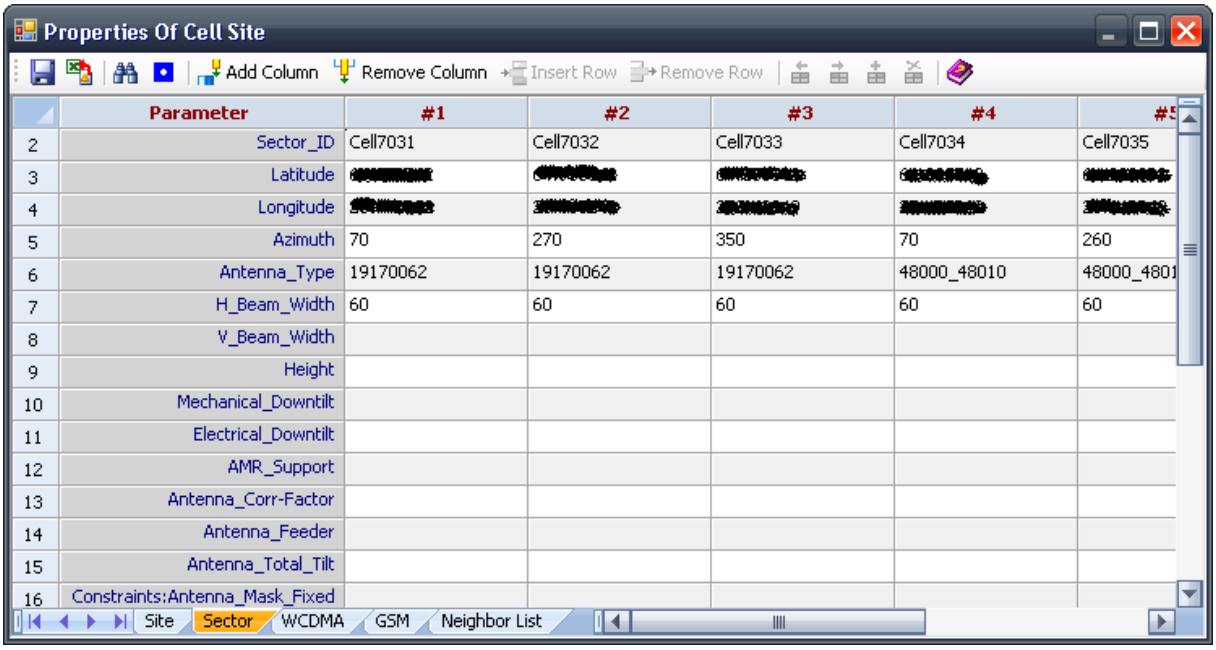
Antenna_Type LIKE '731DG85V1EXM_*'

Wildcard characters are not allowed in the middle of a string. For example, 'te*xt' is not allowed.

7.23.3.3 Edit Cell/Sector Parameters

The Properties of Cell Site dialog, where the properties of a cell site or sector can be edited, can be accessed in the following ways:

- Select one of the Data Explorer–Cells context menus.
- Click the **Cell Site Property** button in the Map View toolbar, and then click the cell site or sector.



	Parameter	#1	#2	#3	#4	#5
2	Sector_ID	Cell7031	Cell7032	Cell7033	Cell7034	Cell7035
3	Latitude	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
4	Longitude	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
5	Azimuth	70	270	350	70	260
6	Antenna_Type	19170062	19170062	19170062	48000_48010	48000_4801
7	H_Beam_Width	60	60	60	60	60
8	V_Beam_Width					
9	Height					
10	Mechanical_Downtilt					
11	Electrical_Downtilt					
12	AMR_Support					
13	Antenna_Corr-Factor					
14	Antenna_Feeder					
15	Antenna_Total_Tilt					
16	Constraints:Antenna_Mask_Fixed					

This dialog contains multiple sheets containing information on the **Site**, **Sector**, **Carrier** and **Neighbor List**. You can modify the value of the parameters and save them permanently. You can also export the information to an Excel file.

Using the **Add Column** or **Remove Column** buttons on the toolbar, you can also add or remove a sector of the cell site, or add or remove a carrier of the cell site.

7.23.3.4 Cell Configuration View Options

Other than displaying the icon of the cell site and sector in the Map View, the icon can be colored based on the value of a particular cell parameter or sector statistics data. Besides, the value of a cell parameter or sector statistics data can be printed on the screen as a label.

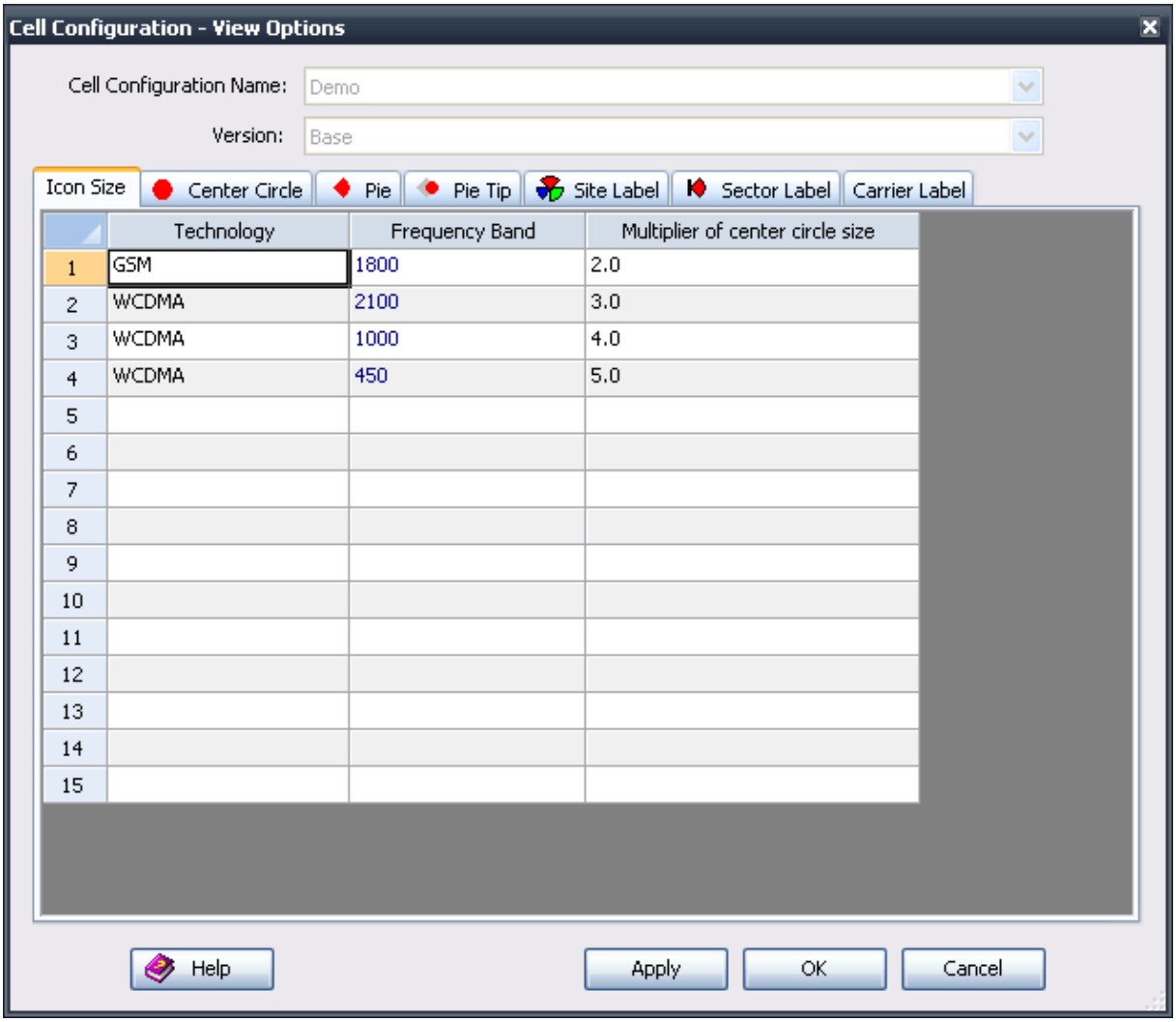
To edit the view options, right-click a scenario version in the Data Explorer–Cells List and select **Edit View Options** from the menu.

The available view options are:

- Icon size
- Central Circle
- Color of Pie and Pie Tip
- Labels

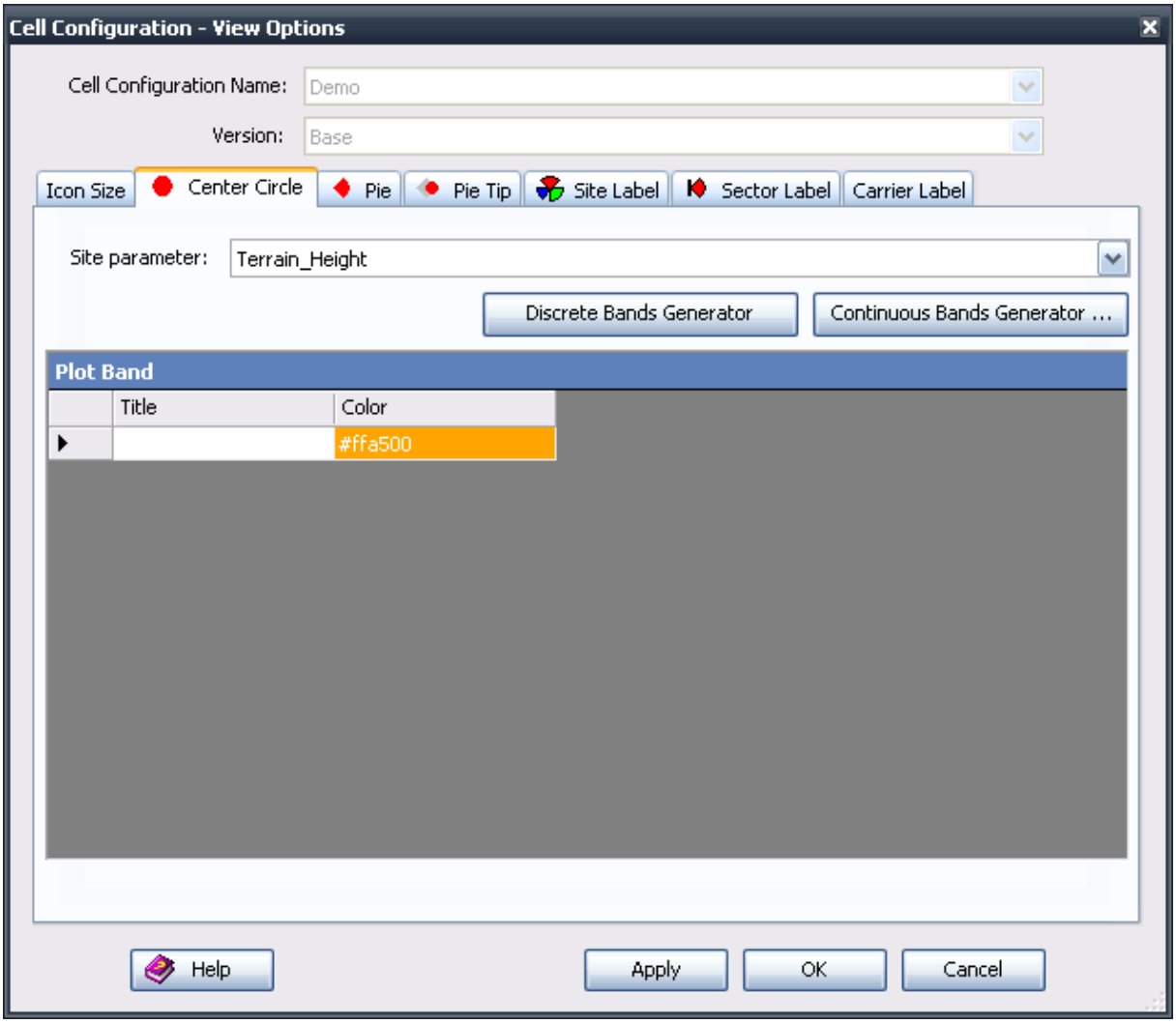
7.23.3.4.1 Icon Size

Cell sector can be displayed as a fixed pie or pie with width per antenna beamwidth. To better distinguish different technologies/bands in each sector, a specific radius of the pie for the technology/band can be defined.



7.23.3.4.2 Central Circle

The center circle of the cell site icon can be colored by the plot bands defined for a particular cell site parameter. Select a cell site parameter from the dropdown menu; then click **Discrete Bands Generator** to generate discrete plot bands or **Continuous Bands Generator** to generate continuous plot bands. When displayed in the Map View, the color of the center circle will be colored according to the plot band.



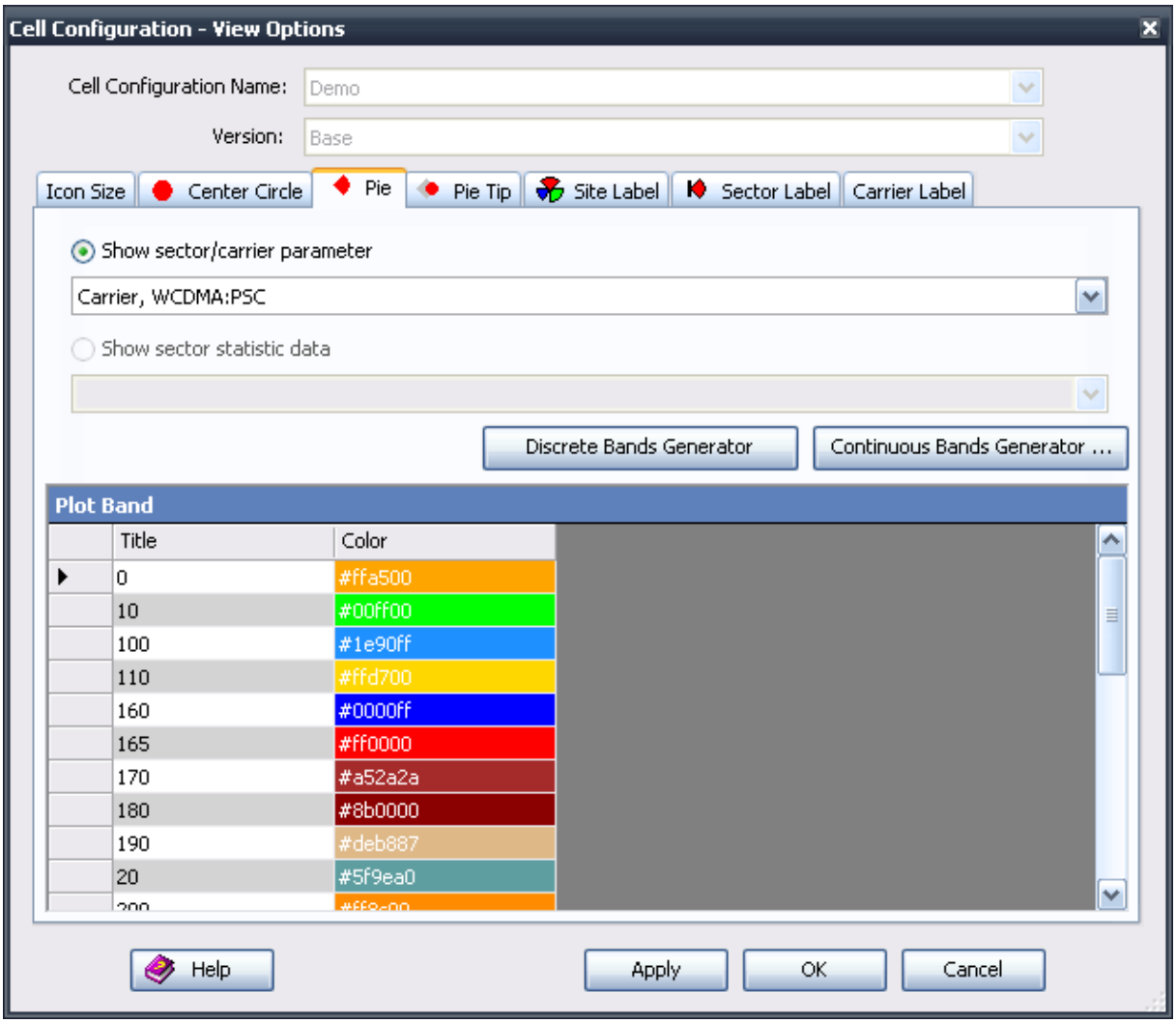
7.23.3.4.3 Color of Pie and Pie Tip

The color of pie can be used to indicate information from two categories:

- Sector/Carrier parameter
- Sector Statistics data

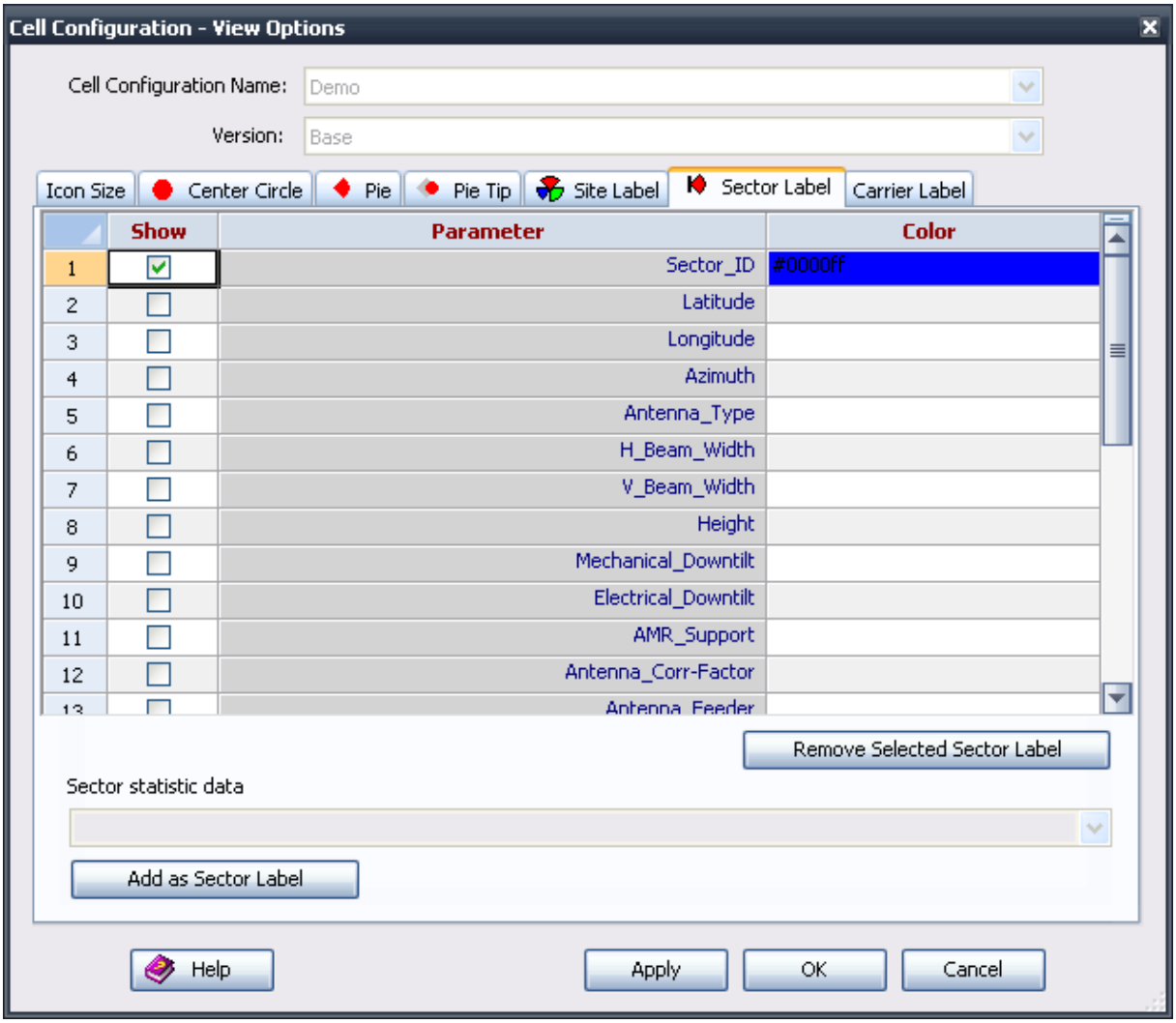
You can select any Sector or Carrier parameter and create the plot band following the same procedure as previously described for the **Center Circle**; or you can select a specific data from the tree view in the dropdown menu to generate sector statistics data, and the plot band for showing sector statistics data will be auto-generated based on the plot band definition of this specific data (see Data Explorer–Dataset for how to edit a plot band).

The *Cell Configuration Name* and *Version* fields define the cell configuration to which the statistic data will be generated. This cell configuration must be consistent with the default cell configuration of current project (see Project Properties for more information).



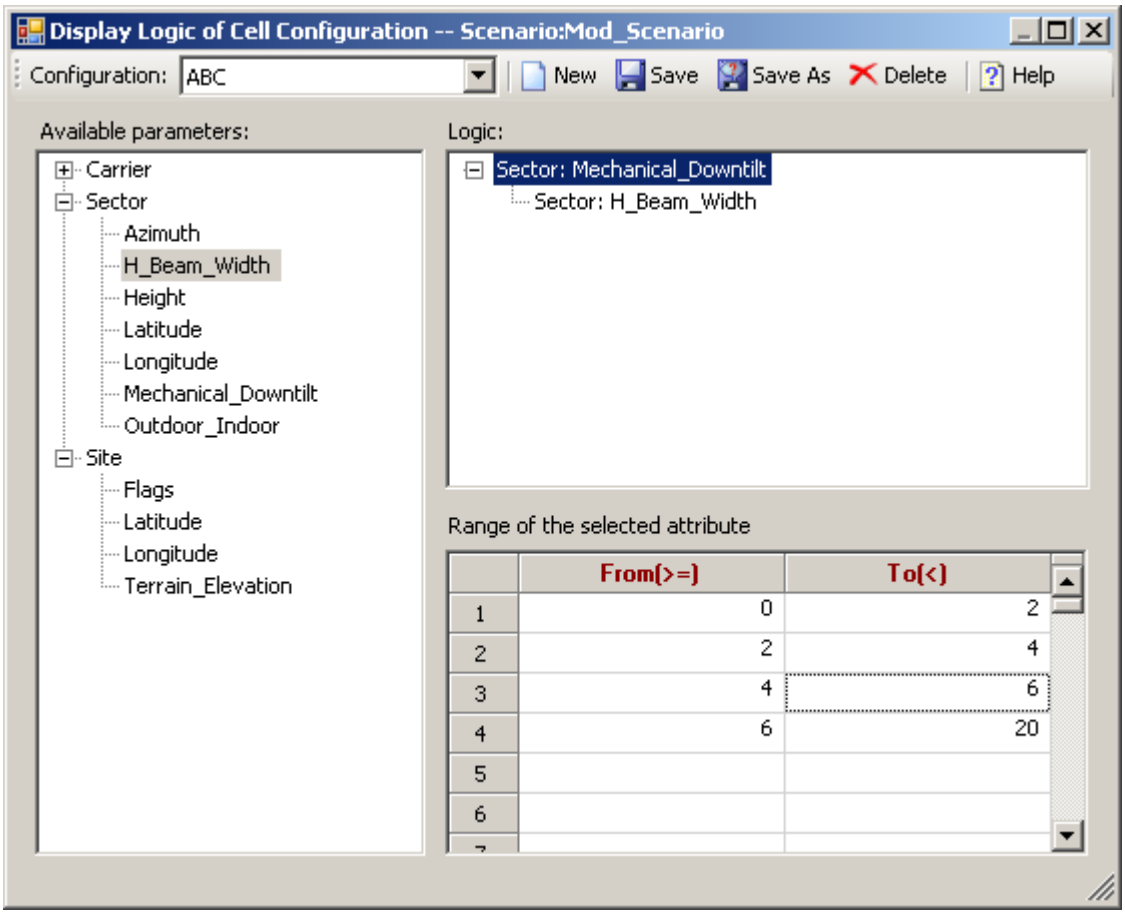
7.23.3.4.4 Labeling

The value of particular parameters can be printed as labels in the Map View; you can also choose the colors of the labels. Additionally, specific data can be chosen from the tree view in the dropdown menu and print the sector statistics data as labels.



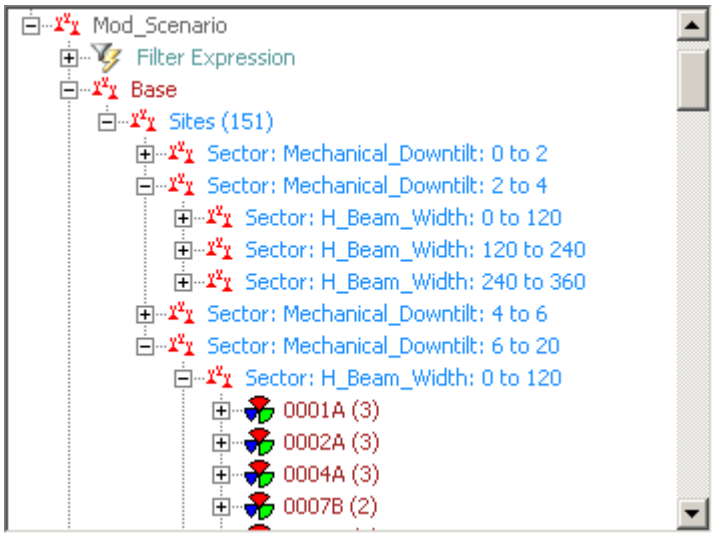
7.23.3.5 Cell Site Grouping Logic

The cell sites listed in Data Explorer–Cells can be grouped with user-defined grouping logic for better data organization. To do this, right click a scenario version in Data Explorer–Cells, and select **Edit Grouping Logic** from the menu.



Drag-and-drop a parameter from the tree view on the left side into the Logic pane on the right side. For each parameter, define its range in the spreadsheet. Multiple parameters can be dragged into Logic pane, and their levels can be modified by dragging-and-dropping them to the desired level. All configurations can be saved with a name.

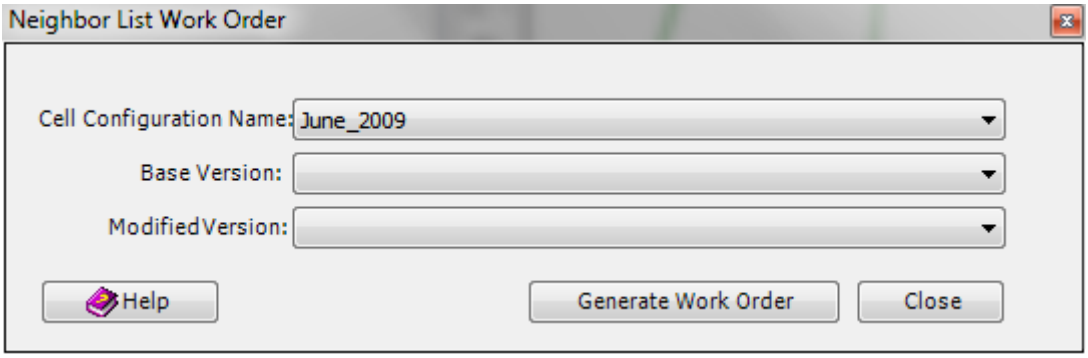
From Data Explorer–Cells, right-click a scenario version and select **Apply Grouping Logic** from the menu. The name of the configuration and the logical display of cell configuration will refresh and be grouped as defined, as shown below:


Mod_Scenario
Filter Expression
Base
Sites (151)
Sector: Mechanical_Downtilt: 0 to 2
Sector: Mechanical_Downtilt: 2 to 4
Sector: H_Beam_Width: 0 to 120
Sector: H_Beam_Width: 120 to 240
Sector: H_Beam_Width: 240 to 360
Sector: Mechanical_Downtilt: 4 to 6
Sector: Mechanical_Downtilt: 6 to 20
Sector: H_Beam_Width: 0 to 120
0001A (3)
0002A (3)
0004A (3)
0007B (2)

7.23.3.6 Neighbor List Work Order

After using the Neighbor List Editing tools in the Map View (see Cells in Map View for more information) to modify the neighbor list, you can generate a work order and save it to a file.

To access the Neighbor List Work Order dialog, click the **NL Word Order** button in the Data Explorer–Cells List toolbar.



You can select a cell configuration and generate a neighbor list work order based on two versions. After the work order is generated, click **Save to File** to save the result to an Excel file or a tab-delimited text file.

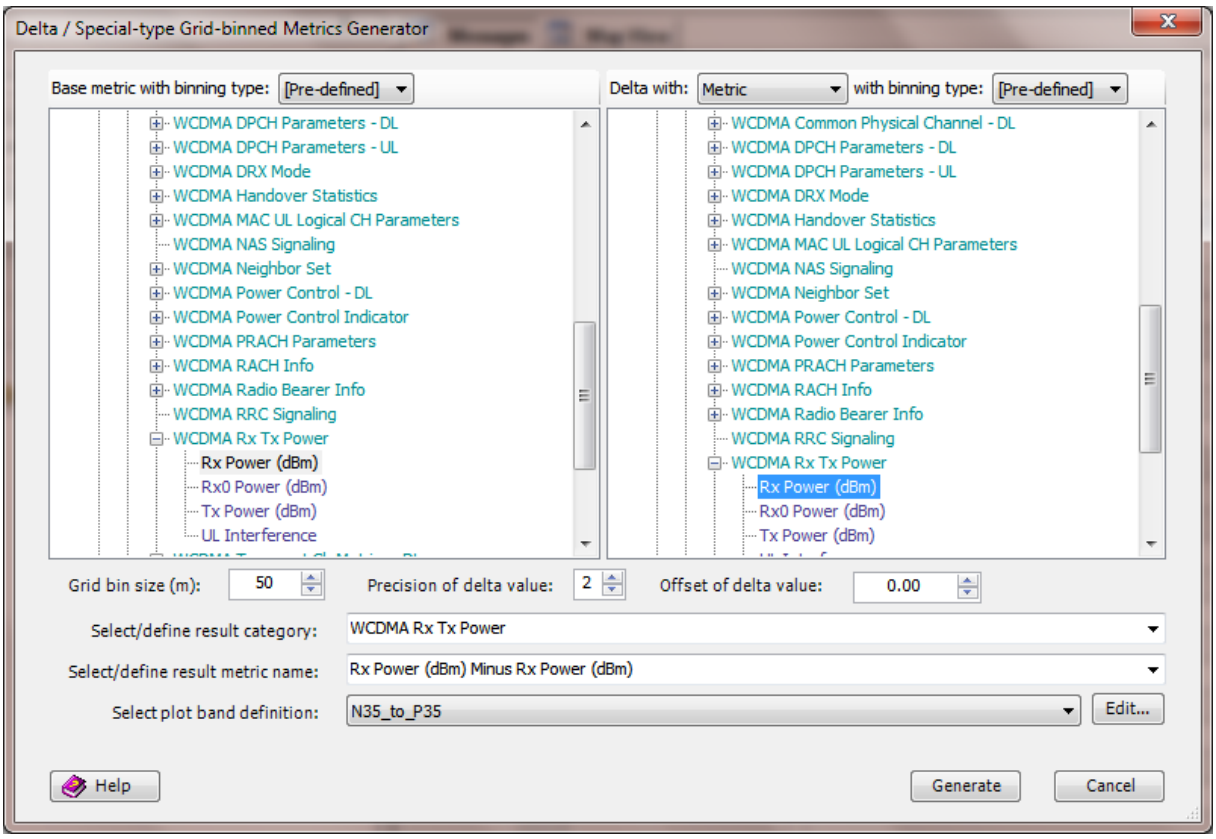
7.23.4 Delta/Special-type Grid-binned Metric

TEMS Discovery provides an easy approach to generating delta metrics between any given metric pair or metric-coverage map pair, or generating grid-binned metrics with a user-defined binning type.

The Delta/Special-type Grid-binned Metrics Generator can be accessed as follows:

- Clicking the **Delta/Special-type Grid-binned Metric** button in the Data Explorer–Dataset toolbar.
- Right-clicking any metric in the Data Explorer–Dataset List, and selecting the **Generate Delta/Special-type Grid-binned Metric** option.

After the delta metric is generated, it will be listed under the Delta/Special-type Grid-binned Metric tree node in the Data Explorer–Dataset. This delta/special metric can be displayed in the Map View, Table View, Report View, etc., as are other geo-binned metrics.



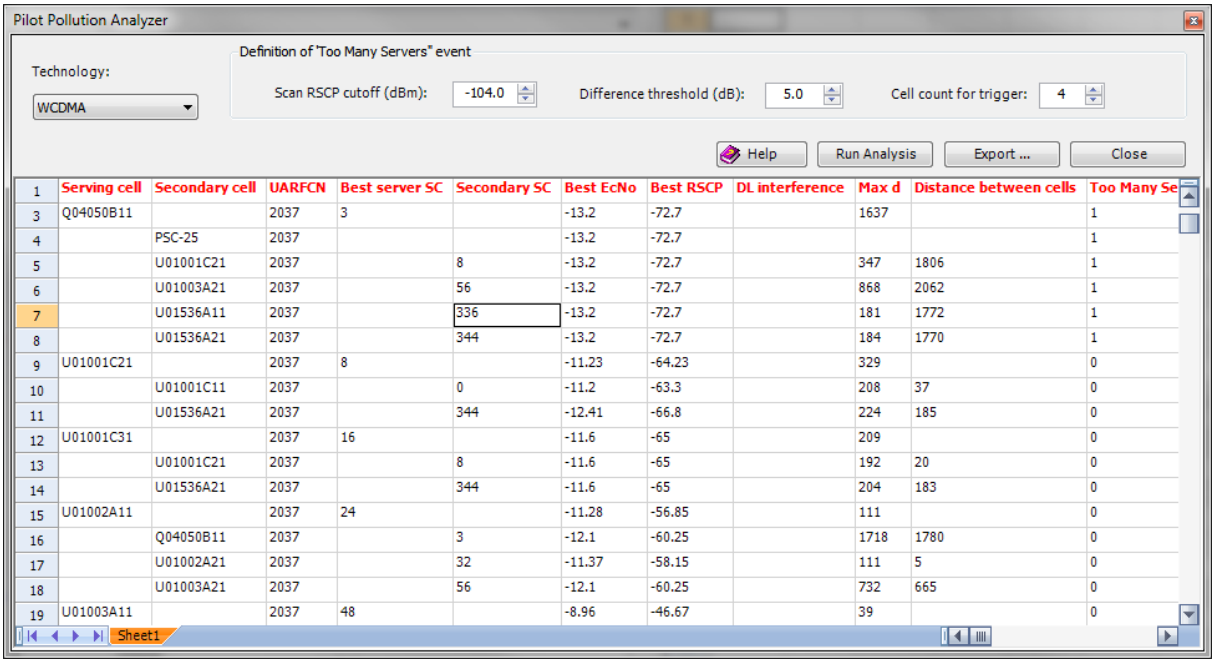
Normally, when generating delta metrics, you would select *[Pre-defined]* as the binning type, which is the aggregation method pre-defined in TEMS Discovery by the nature of the data. However, you have the option to overwrite this default aggregation method by selecting any other from the combo box. The available binning types are: AVG, LAVG, MIN, MAX, COUNT, SUM, FIRST, and LAST.

After you select a base metric in the right panel, go to the combo box labeled *Delta with:* and select the option to generate delta with another metric, with coverage map (see Import Coverage Map), or with *None*. If *None* is selected, TEMS Discovery will actually perform geo-location binning for the selected base metric with the selected binning type. You can also add an offset to the result of each bin so that you can create more meaningful metrics.

7.23.5 Pilot Pollution Analysis

Pilot pollution analysis can be run from selected scanner data, and the data can be listed according to serving cell and secondary cell combinations.

The Pilot Pollution Analyzer can be accessed from the context menus on the Project List or the Data Explorer–Dataset.



	Serving cell	Secondary cell	UARFCN	Best server SC	Secondary SC	Best EcNo	Best RSCP	DL interference	Max d	Distance between cells	Too Many Se
3	Q04050B11		2037	3		-13.2	-72.7		1637		1
4		PSC-25	2037			-13.2	-72.7				1
5		U01001C21	2037		8	-13.2	-72.7		347	1806	1
6		U01003A21	2037		56	-13.2	-72.7		868	2062	1
7		U01536A11	2037		336	-13.2	-72.7		181	1772	1
8		U01536A21	2037		344	-13.2	-72.7		184	1770	1
9	U01001C21		2037	8		-11.23	-64.23		329		0
10		U01001C11	2037		0	-11.2	-63.3		208	37	0
11		U01536A21	2037		344	-12.41	-66.8		224	185	0
12	U01001C31		2037	16		-11.6	-65		209		0
13		U01001C21	2037		8	-11.6	-65		192	20	0
14		U01536A21	2037		344	-11.6	-65		204	183	0
15	U01002A11		2037	24		-11.28	-56.85		111		0
16		Q04050B11	2037		3	-12.1	-60.25		1718	1780	0
17		U01002A21	2037		32	-11.37	-58.15		111	5	0
18		U01003A21	2037		56	-12.1	-60.25		732	665	0
19	U01003A11		2037	48		-8.96	-46.67		39		0

- **Best EcNo**. The strongest EcNo (dB) recorded for the serving cell across all bins in which the respective serving cell and secondary cell were seen together.
- **Best RSCP**. The strongest RSCP (dBm) recorded for the serving cell across all bins in which the respective serving cell and secondary cell were seen together.
- **DL interference**. The mean downlink interference reported by the scanner across all bins in which the respective serving cell and secondary cell were seen together.
- **Max d**. The maximum distance (meters) reported between the measured BIN and the secondary cell, across all bins in which the respective serving cell and secondary cell were seen together.
- **Distance between cells**. The distance (meters) between the serving cell and the respective secondary cell.
- **Too many servers event count**. The number of *Too many server* events was triggered across all bins in which the respective serving cell and secondary cell were seen together. The definition for *Too many server* can be configured as shown in user interface.
- **Distance samples**. The number of distance measurement samples were recorded in which the respective serving cell and secondary cell were seen together.

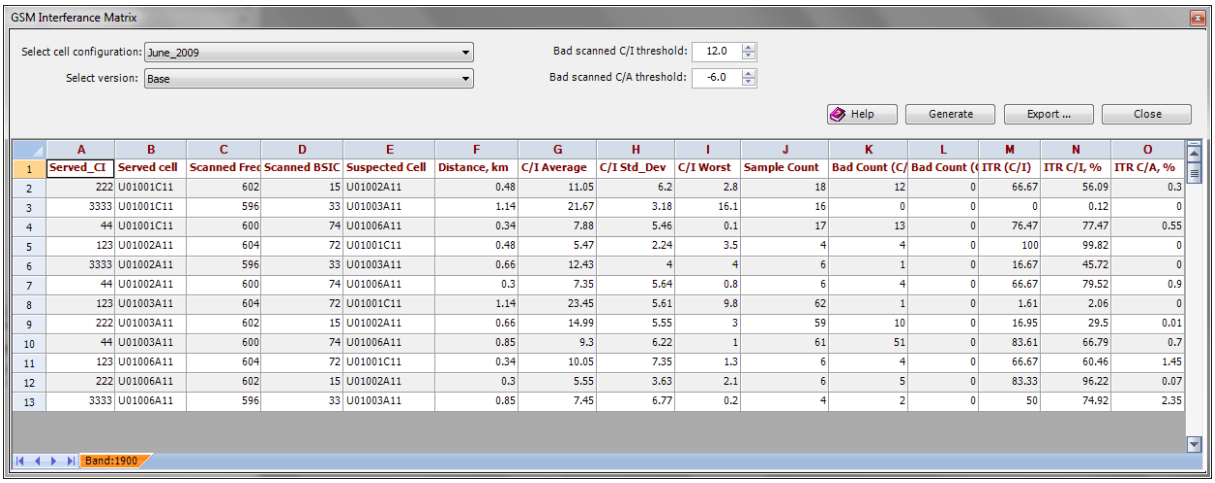
  d < 1000, 1000 < d < 5000, d > 5000

For each particular serving cell and secondary cell combination, this value shows what percentage of distance measurement samples fell within a particular range (meters) of the serving cell.

7.23.6 GSM Interference Matrix

A GSM interference matrix can be generated from selected scanner data while the serving sector is determined from phone data, and the data can be listed according to serving cell and suspected cell combinations.

The GSM Interference Matrix can be accessed from the context menus on the Project List or the Data Explorer–Dataset.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Served_CI	Served cell	Scanned Freq	Scanned BSIC	Suspected Cell	Distance, km	C/I Average	C/I Std_Dev	C/I Worst	Sample Count	Bad Count (C/	Bad Count ((	ITR (C/I)	ITR C/I, %	ITR C/A, %
2	222	U01001C11	602	15	U01002A11	0.48	11.05	6.2	2.8	18	12	0	66.67	56.09	0.3
3	3333	U01001C11	596	33	U01003A11	1.14	21.67	3.18	16.1	16	0	0	0	0.12	0
4	44	U01001C11	600	74	U01006A11	0.34	7.88	5.46	0.1	17	13	0	76.47	77.47	0.55
5	123	U01002A11	604	72	U01001C11	0.48	5.47	2.24	3.5	4	4	0	100	99.82	0
6	3333	U01002A11	596	33	U01003A11	0.66	12.43	4	4	6	1	0	16.67	45.72	0
7	44	U01002A11	600	74	U01006A11	0.3	7.35	5.64	0.8	6	4	0	66.67	79.52	0.9
8	123	U01003A11	604	72	U01001C11	1.14	23.45	5.61	9.8	62	1	0	1.61	2.06	0
9	222	U01003A11	602	15	U01002A11	0.66	14.99	5.55	3	59	10	0	16.95	29.5	0.01
10	44	U01003A11	600	74	U01006A11	0.85	9.3	6.22	1	61	51	0	83.61	66.79	0.7
11	123	U01006A11	604	72	U01001C11	0.34	10.05	7.35	1.3	6	4	0	66.67	60.46	1.45
12	222	U01006A11	602	15	U01002A11	0.3	5.55	3.63	2.1	6	5	0	83.33	96.22	0.07
13	3333	U01006A11	596	33	U01003A11	0.85	7.45	6.77	0.2	4	2	0	50	74.92	2.35

- **Distance, km**. The distance between the serving cell and the suspected cell
- **C/I Average**. The C/I average of all bins in which the respective serving cell and suspected cell were seen together.
- **C/I Std_Dev**. The C/I standard deviation of all bins in which the respective serving cell and suspected cell were seen together.
- **C/I Worst**. The worst C/I of all bins in which the respective serving cell and suspected cell were seen together.
- **Sample Count**. The count of all bins in which the respective serving cell and suspected cell were seen together.
- **Bad Count (C/I)**. The count of the bins in which the respective serving cell and suspected cell were seen together and C/I is less then threshold.
- **Bad Count (C/A)**. The count of the bins in which the respective serving cell and suspected cell were seen together and C/I is less then threshold.
- **ITR C/I**. Interference traffic rate
- **ITR C/I, %**. The lost traffic percentage for serving sector due to co-channel interference.
- **ITR C/A, %**. The lost traffic percentage for serving sector due to adjacent channel interference.

8 Appendix

This appendix contains two sections:

- Event List in Pre-defined Scripts
- Enabling FILESTREAM in SQL Server 2008 R2

8.1 Event List in Pre-defined Scripts

8.1.1 CDMA_Events

Event Category	Event Description
Call Ending	Call Drop MT Call Drop MO Call Drop Call Network Release MT Call Network Release MO Call Network Release Call Mobile Release MT Call Mobile Release MO Call Mobile Release On Incoming Call @ EOF On Outgoing Call @ EOF On Call @ EOF
Call Setup Results	On Incoming Call Setup @ EOF Call Setup OK Outgoing Call OK Call Fail Outgoing Call Fail Incoming Call Fail Incoming Call OK Outgoing Call Setup Failure Call Setup Failure On Incoming Call @ SOF
CDMA Search Window	SRCH_W_N too small
CDMA Soft Handoff	Consecutive Handoff Direction Soft Handoff Complete Soft Handoff 2-Way Soft Handoff 3-Way Soft Handoff 4-Way Soft Handoff 5-Way Soft Handoff 6-Way Soft Handoff Failed
EVDO_Handoff	EVDO Single Server EVDO 2-Way Softer EVDO 2-Way Soft EVDO 3-Way Softer-Softer EVDO 3-Way Soft-Softer EVDO 3-Way Soft EVDO 4-Way Soft EVDO 4-Way 2 Softer

Event Category	Event Description
	EVDO 4-Way 3 Softer EVDO 4-Way 4 Softer EVDO 5-Way EVDO 6-Way
Missing Neighbor Alerts	Missing Neighbor Alert

Not Categorized Events
EVDO Access Failure
EVDO Access Success
EVDO Connection Attempt
EVDO Connection OK
EVDO Connection Fail
EVDO Connection Close
CS Call Drop
PS Call Drop
MT CS Call Drop
MT PS Call Drop
MO CS Call Drop
MO PS Call Drop
CS Call Network Release
PS Call Network Release
MT CS Call Network Release
MT PS Call Network Release
MO CS Call Network Release
MO PS Call Network Release
CS Call Fail
Outgoing CS Call Fail
CS Call OK
Outgoing CS Call OK
Incoming CS Call Fail
Incoming CS Call OK
CS Call Mobile Release
PS Call Mobile Release
MT CS Call Mobile Release
MT PS Call Mobile Release
MO CS Call Mobile Release
MO PS Call Mobile Release
On Incoming CS Call @ EOF
On Incoming PS Call @ EOF
On Outgoing CS Call @ EOF
On Outgoing PS Call @ EOF
On CS Call @ EOF
On PS Call @ EOF
On Incoming CS Call Setup @ EOF

Not Categorized Events
On Incoming PS Call Setup @ EOF
On Outgoing CS Call Setup @ EOF
Outgoing PS Call Fail
PS Call Fail
Outgoing PS Call OK
PS Call OK
Incoming PS Call Fail
Incoming PS Call OK
Outgoing PS Call Setup Failure
CS Call Setup Failure
PS Call Setup Failure
EV-DO to 1xRTT
1xRTT to EV-DO
Supplemental Channel Assignment
Entering 1x Traffic Mode
Entering 1x Idle Mode
Dedicated_SOF
On Call at Start of File
On Incoming CS Call @ SOF
On Incoming PS Call @ SOF
On Outgoing CS Call @ SOF
Access Probe
Access Probe Retry
Origination Message
Page Response Message
Base Ack-to-Access Request
ECAM Received
BaseAckFTC
MSAckRTC
Call Blocked

8.1.2 EVDO_Events_Logbased

Event Category	Event Description
N/A	EVDO Access Failure EVDO Access Success EVDO Acquisition Failure EVDO Acquisition Success EVDO Connection Failure EVDO Connection Success EVDO Connection - Access HO EVDO Connection - User Abort EVDO AT Close EVDO AN Close EVDO Abnormal Release

Event Category	Event Description
	EVDO Release Others EVDO Reacquisition OK EVDO Reacquisition Fail

8.1.3 GSM_WCDMA_Events

Event Category	Event Description
.Common	Entering WCDMA Dedicated Mode Entering GSM Idle Mode Entering WCDMA Idle Mode Dedicated Mode at SOF Paging Answered
Attach and Detach	PS Attach Failure PS Attached PS Detach Failure Network-initiated PS Detach UE-initiated PS Detach
Channel Type Switching	R99-to-HS Switching Cell_FACH-to-Cell_DCH Cell_FACH-to-Cell_DCH Failed HSPA Mode Entered HS-to-R99 Switching R99 PS Mode Entered Entering Cell_DCH Failed to Enter Cell_DCH Transition to Cell_FACH Dedicated Channel Not Allocated Data Transfer Ready Data Transfer Request with Cell Update Data Transfer Request with E4a
Compressed Mode	Entering Compressed Mode Leaving Compressed Mode Dropped on Compressed Mode
Critical RF Conditions	Lack of Dominant Pilot Pilot Pollution Alert Poor Active Set Pilot Quality Strong DL Interference Alert Weak Pilot Alert
GMM Service	GMM Service Request MO GMM Request for PDP Deactivation MT GMM Request for PDP Deactivation
GPRS Packet Access	GPRS Packet DL Transfer Done GPRS Packet Access Failure GPRS Packet Access Success GPRS Packet Access Retry
GSM RR Setup	GSM Channel Request Failure GSM Channel Request Success GSM Channel Request Retry
Idle Procedures	Registration Failure Registration Success

Event Category	Event Description
IRAT	Entering GSM from WCDMA Entering WCDMA from GSM
Measurement Report Events	e1a - Above Reporting Range e1b - Below Reporting Range e1c - Nonactive Better than Active e1d - Change of Best Cell e1e - Above Abs Threshold e1f - Below Abs Threshold e2a - Change of Best Frequency e2b - (Q @ Own F<Thr1) & (Q @ Other F>Thr2) e2c - Q @ Other F > Threshold e2d - Q @ Own F < Threshold e2e - Q @ Other F < Threshold e2f - Q @ Own F > Threshold e3a - (Q @ Own F<Thr1) & (Q @ Other RAT>Thr2) e3b - Q @ Other RAT < Threshold e3c - Q @ Other RAT > Threshold e3d - Q @ Other RAT - Best Cell Change e4a - RLC Buffer Above Threshold e4b - RLC Buffer Below Threshold e5a - CRC Errors Above Threshold e6a - UE TX Power Above Threshold e6b - UE TX Power Below Threshold e6c - UE TX Power Hits Minimum e6d - UE TX Power Hits Maximum e6e - RSSI Hits Dynamic Receiver Range e6f - Rx-Tx Time Difference > Threshold e6g - Rx-Tx Time Difference < Threshold Consecutive e1a~c Requests
Missing Neighbor Alerts	Missing Neighbor Alert
Mobility	Location Update Failure Location Update Success Routing Area Update Failure Routing Area Update Success
PDP Activation	PDP Context Activation Failure PDP Context Activated PDP Context Activation Request
PDP Deactivation	PDP Abnormal Deactivation Request PDP Context Deactivation Failure PDP Regular Deactivation Request PDP Context Deactivated
RRC Release	RRC Connection Release
RRC Setup	RRC Connection Setup Fail RRC Connection Setup Rejected RRC Connection Request Retry RRC Connection Setup OK
RRC State Transition	Cell_PCH-to-Cell_FACH Cell_DCH-to-Cell_PCH Cell_DCH-to-Cell_FACH Cell_DCH-to-URA_PCH Cell_FACH-to-Cell_PCH

Event Category	Event Description
	Cell_FACH-to-URA_PCH Transition to Cell_PCH Transition to URA_PCH ura_PCH-to-Cell_FACH
SMS	SMS Send Attempt SMS Paging Received SMS Received SMS Reception Fail SMS Sending Fail SMS Sent
Supplementary Services	MO_CS_Call2_End MO_CS_Call2_Start Call Holding MO_GSM_Call2_End MO_GSM_Call2_Start GSM Call Holding MT_CS_Call2_End MT_CS_Call2_Start MT_GSM_Call2_End MT_GSM_Call2_Start
UE-Reported Failures	Active Set Update Failure Cell Change Order from UTRAN Failure Cell Update with Failure Cause Measurement Control Failure Physical Channel Reconfiguration Failure cellUpdate w/ radiolinkFailure Radio Bearer Reconfiguration Failure Radio Bearer Release Failure Radio Bearer Setup Failure cellUpdate w/ rlc-unrecoverableError Security Mode Failure Transport Channel Reconfiguration Failure Transport Format Combination Control Failure UTRAN Mobility Information Failure
WCDMA DCH Bearer Rate	PS DCH Rate Assigned PS DCH DL Rate Decrease PS DCH DL Rate Increase PS DCH UL Rate Decrease PS DCH UL Rate Increase

Not Categorized Events
CS Call Dropped
CS Call On-Call @ EOF
CS Call NW Release (Normal Cause)
CS Call MS Release (Normal Cause)
CS Call Abnormal Release
MO CS Call Dropped
MO CS Call On-Call @ EOF
MO CS Call NW Release (Normal Cause)
MO CS Call MS Release (Normal Cause)

Not Categorized Events
MO CS Call Abnormal Release
MT CS Call Dropped
MT CS Call On-Call @ EOF
MT CS Call NW Release (Normal Cause)
MT CS Call MS Release (Normal Cause)
MT CS Call Abnormal Release
Re-established CS Call Dropped
Re-established CS Call On-Call @ EOF
Re-established CS Call NW Release (Normal Cause)
Re-established CS Call MS Release (Normal Cause)
Re-established CS Call Abnormal Release
GSM CS Call Dropped
GSM On-Call @ EOF
GSM Call - Low Speech Quality
GSM Call MS Release (Normal Cause)
GSM Call NW Release (Normal Cause)
MO GSM Call Dropped
MO GSM On-Call @ EOF
MO GSM Call MS Release (Normal Cause)
MO GSM Call NW Release (Normal Cause)
MT GSM CS Call Dropped
MT GSM On-Call @ EOF
MT GSM Call MS Release (Normal Cause)
MT GSM Call NW Release (Normal Cause)
MO PS Call Dropped
MO PS Call On-Call @ EOF
MO PS Call NW Release (Normal Cause)
MO PS Call MS Release (Normal Cause)
MO PS Call Abnormal Release
MT PS Call Dropped
MT PS Call On-Call @ EOF
MT PS Call NW Release (Normal Cause)
MT PS Call MS Release (Normal Cause)
MT PS Call Abnormal Release
PS Call Dropped
PS Call On-Call @ EOF
PS Call NW Release (Normal Cause)
PS Call MS Release (Normal Cause)
PS Call Abnormal Release
Re-established PS Call Dropped
Re-established PS Call @ EOF
Re-established PS Call NW Release (Normal Cause)
Re-established PS Call UE Release (Normal Cause)
CS Call Re-establishment Retry

Not Categorized Events
PS Call Re-establishment Retry
CS Call Setup EOF
CS Call Setup Failure
CS Call Setup Success
MO CS Call Setup EOF
MO CS Call Setup Re-directed to GSM
MO CS Call Setup Failure
MO CS Call Setup Success
GSM MOC - Long Setup Time
MT CS Call Setup EOF
MT CS Call Setup Failure
MT CS Call Setup Success
On CS Call at Start of File
CS Call Re-establishment Attempt Blocked
CS Call Re-establishment @ EOF
CS Call Re-establishment Failure
CS Call Re-establishment Success
GSM Call Re-establishment Attempt Blocked
GSM Call Re-establishment @ EOF
GSM Call Setup Blocked
GSM Call Setup EOF
GSM MOC Fail - RACH Fail
GSM MOC Fail - SDCCH Access Fail
GSM MOC Fail - SDCCH Drop
GSM MOC Fail - TCH Access Fail
GSM MOC Fail - TCH Drop Before Alerting
GSM MOC Fail - Dialed Number Busy
GSM MTC Fail - RACH Fail
GSM MTC Fail - SDCCH Access Fail
GSM MTC Fail - SDCCH Drop
GSM MTC Fail - TCH Access Fail
GSM MTC Fail - TCH Drop Before Alerting
GSM MOC Fail - No Network
GSM Call Setup Success
MO GSM Call Setup Blocked
MO GSM Call Setup EOF
MO GSM Call Setup Success
MT GSM Call Setup Blocked
MT GSM Call Setup EOF
MT GSM Call Setup Success
GSM MTC - Long Setup Time
On GSM Call at Start of File
GSM Call Re-establishment Failure
GSM Call Re-establishment Success

Not Categorized Events
MO PS Call Setup EOF
MO PS Call Setup Failure
MO PS Call Setup Success
MT PS Call Setup EOF
MT PS Call Setup Failure
MT PS Call Setup Success
On PS Call at Start of File
PS Call Setup EOF
PS Call Setup Failure
PS Call Setup Success
PS Call Re-establishment @ EOF
PS Call Re-establishment Failure
PS Call Re-establishment Success
CS Call Setup Start
MO CS Call Setup Start
MT CS Call Setup Start
On CS Call Setup at Start of File
CS Call Re-establishment Attempt
GSM Call Setup Start
WCDMA-to-GSM Redirected Call Setup Start
MO GSM Call Setup Start
MT GSM Call Setup Start
On GSM Call Setup at Start of File
GSM Call Re-establishment Attempt
MO PS Call Setup Start
MT PS Call Setup Start
On PS Call Setup at Start of File
PS Call Setup Start
PS Call Re-establishment Attempt
GSM Intercell Handover Failure
GSM Intercell Handover
GSM Intracell Handover Failure
GSM Intracell Handover
UMTS IFHO Attempt
UMTS IFHO Fail
UMTS IFHO OK
Radio Link Addition Failure
Radio Link Addition
Radio Link Addition (partial)
Radio Link Removal Failure
Radio Link Removal
Radio Link Removal (partial)
Radio Link Replacement Failure
Radio Link Replacement

Not Categorized Events
Radio Link Replacement (partial)
UTRAN-to-GSM Handover Failure
UTRAN-to-GSM Handover Success
UTRAN-to-GSM Handover Start
GSM-to-UTRAN Handover Failure
GSM-to-UTRAN Handover Success
GSM-to-UTRAN Handover Start
GSM-to-UTRAN Cell Reselection Fail
GSM-to-UTRAN Cell Reselection OK
GSM-to-UTRAN Cell Reselection Start
UTRAN-to-GSM Cell Change Order Failure
UTRAN-to-GSM Cell Change Order Success
UTRAN-to-GSM Cell Change Order Start

8.1.4 LTE_Events

Event Category	Event Description
LTE Attach	LTE Attach Request LTE Attach OK LTE Attach Accepted LTE Attach Rejected LTE Attach Failed
LTE Detach	LTE UE-initiated Detach Accepted LTE UE-initiated Detach Completed
LTE EUTRA Reporting Events	LTE RRC A1 Event LTE RRC A2 Event LTE RRC A3 Event LTE RRC A4 Event LTE RRC A5 Event LTE Consecutive A3 Events
LTE Handover	LTE Intra-frequency Handover Failed LTE Intra-frequency Handover OK LTE Inter-frequency Handover Failed LTE Inter-frequency Handover OK
LTE InterRAT Reporting Events	LTE RRC B1 Event LTE RRC B2 Event
LTE Misc. Rejects and Failures	LTE Authentication reject LTE Service reject LTE Bearer resource allocation reject LTE Bearer resource modification reject LTE PDN connectivity reject LTE PDN disconnect reject LTE Authentication failure LTE Activate dedicated EPS bearer context reject LTE Activate default EPS bearer context reject LTE Modify EPS bearer context reject
LTE RRC Connection	LTE RRC Connection Request

Event Category	Event Description
	LTE RRC Connection Complete LTE RRC Connection Setup LTE RRC Connection Fail LTE RRC Connection Reject LTE RRC Connection Release
LTE RRC Reestablishment	LTE RRC Reestablishment Request LTE RRC Connection Reestablishment LTE RRC Reestablishment Reject
LTE Tracking Area Update	LTE Tracking area update complete LTE Tracking area update accept LTE Tracking area update reject LTE Tracking area update failed

8.1.5 Nemo_Events

Event Category	Event Description
External application launch	APP: External application launch
Call attempt	CAA: Call attempt
Call connect success	CAC: Call connect success
Call disconnect	CAD: Call disconnect
Call failed	CAF: Call failed
Incoming call	CAI: Incoming call
Cell reselection	CREL: Cell reselection
Data connection attempt	DAA: Data connection attempt
Data connection success	DAC: Data connection success
Data disconnect	DAD: Data disconnect
Data connection failed	DAF: Data connection failed
Data channel request	DCHR: Data channel request
Data transfer completed	DCOMP: Data transfer completed
Data transfer request	DREQ: Data transfer request
Data stream status	DSS: Data stream status
GPRS attach attempt	GAA: GPRS attach attempt
GPRS attach connected	GAC: GPRS attach connected
GPRS detach	GAD: GPRS detach
GPRS attach failed	GAF: GPRS attach failed
Handover/handoff attempt	HOA: Handover/handoff attempt
Handover/handoff fail	HOF: Handover/handoff fail
Handover/handoff success	HOS: Handover/handoff success
Lock info	LOCK: Lock info
Location update attempt	LUA: Location update attempt
Location update fail	LUF: Location update fail
Location update accepted	LUS: Location update accepted
Measurement event information	MEI: Measurement event information
Message sending/receiving attempt	MSGA: Message sending/receiving attempt
Message sending/receiving failed	MSGF: Message sending/receiving failed

Event Category	Event Description
Message sending/receiving success	MSGS: Message sending/receiving success
Packet session activation attempt	PAA: Packet session activation attempt
Packet session activated	PAC: Packet session activated
Packet session deactivated	PAD: Packet session deactivated
Packet session activation failed	PAF: Packet session activation failed
Pause	PAUSE: Pause
Ping session completed	PCOMP: Ping session completed
Ping	PING: Ping
Ping session request	PREQ: Ping session request
Push-to-talk session attempt	PTTA: Push-to-talk session attempt
Push-to-talk session connected	PTTC: Push-to-talk session connected
Push-to-talk session disconnected	PTTD: Push-to-talk session disconnected
Push-to-talk session failed	PTTF: Push-to-talk session failed
Quality of service profile negotiated	QSPN: Quality of service profile negotiated
Quality of service profile request	QSPR: Quality of service profile request
Roaming Status Changes	ROAM: Roaming Status Changes
Radio resource connection attempt	RRA: Radio resource connection attempt
Radio resource connection success	RRC: Radio resource connection success
Radio resource connection release	RRD: Radio resource connection release
Radio resource connection failure	RRF: Radio resource connection failure
Routing area update attempt	RUA: Routing area update attempt
Routing area update fail	RUF: Routing area update fail
Routing area update successful	RUS: Routing area update successful
Service Status Changes	SEI: Service Status Changes
Soft handover	SHO: Soft handover
Soft handover event information	SHOI: Soft handover event information
TBF uplink establishment	TBFULE: TBF uplink establishment

8.1.6 QVoice_Markers

Marker Category	Marker Description
Marker-Cell Reselection	Cell Reselection
Marker-ETSI	ETSI Marker ETSI Invalid ETSI ATD ETSI ROFPCC ETSI SOFPCC ETSI FSYN ETSI ROLPCC ETSI ROFALPCC ETSI ROAFSA ETSI SOFG ETSI ROPA250HELO ETSI ROPA250EOM ETSI POPRETR ETSI PCFS

Marker Category	Marker Description
	ETSI SOLPCC (customer creation) ETSI ROHALPCC (customer creation) ETSI TCPRTD ETSI conformity ETSI VT_CALL_ACCEPTED ETSI VT_AUDIO_CONNECTED ETSI VT_VIDEO_CONNCETED ETSI SPEECH_DELAY_SENT ETSI SPEECH_DELAY_RECEIVED ETSI VT_VIDEO_DELAY_SENT ETSI VT_VIDEO_DELAY_RECEIVED
Marker-FTP	FTP public 2 DL Start FTP public 2 UL Start FTP 2 DL Start FTP 2 UL Start FTP public DL Start FTP public UL Start FTP Downlink START FTP Uplink START FTP STOP FTP public STOP FTP CONNECT FTP DISCONNECT FTP public 3 DL Start FTP public 3 UL Start FTP 3 DL Start FTP 3 UL Start
Marker-GPRS Attachment	AttchRequest AttachAccept AttachComplete AttachReject DetachRequest DetachAccept
Marker-GPRS PDP Context	Activate PDP Context Request Activate PDP Context Accept Activate PDP Context Reject Deactivate PDP Context Request Deactivate PDP Context Accept Ras Connect Start Ras Connect Success Ras Disconnect Start Ras Disconnect Success Ras Disconnect Completed Ras Timeout Ras Connection Lost
Marker-GPRS RAU	RAUpdateRequest RAUpdateAccept RAUpdateComplete RAUpdateReject
Marker-GPRS TBF	Open Downlink Open Uplink Close Downlink

Marker Category	Marker Description
	Close Uplink
Marker-Handover	HandoverCommand HandoverComplete HandoverFailure IntraCellHandoverCommand IntraCellHandoverComplete IntraCellHandoverFailure ActiveSetUpdate ActiveSetUpdateComplete ActiveSetUpdateFailure IntraFreqHardHandoverCommand IntraFreqHardHandoverComplete IntraFreqHardHandoverFailure InterFreqHardHandoverCommand InterFreqHardHandoverComplete InterFreqHardHandoverFailure HandoverFromUTRANCommand HandoverFromUTRANFailure InterSystemHOToUTRANCommand HandoverToUTRANComplete Hard Handoff - CDMA to Analog Hard Handoff - Analog to CDMA Hard Handoff - CDMA to CDMA Active Set Handoff
Marker-HTTP	HTTP 2 Start HTTP Start HTTP STOP
Marker-IE Browse	IE Browse STOP IE Browse Start
Marker-IPDS	IP Data Session Start IP Data Session End IP Data Session User Break IP Data Session No Loop Mode Break IP Data Session Supervisor Break IP Data Session Max Count Break
Marker-MAIL	MAIL Start MAIL STOP
Marker-MMS	MMS STOP MMS Send End MMS Retrieve End MMS Reject End MMS Start MMS Notify Response Event
Marker-MOC Call	MOC Dial MOC Setup MOC Connect MOC ConnectFail MOC Disconnect MOC Release MOC ReleaseError MOC Break MOC CallError

Marker Category	Marker Description
	MOC SystemRelease MOC UserRelease
Marker-Pause	Pause Start Pause End
Marker-PING	PING Start PING STOP PING High Resolution STOP PING Start HR
Marker-POP3	POP3 Start Delete POP3 Start Get POP3 STOP
Marker-RRC State	RRC State Idle RRC State Connecting RRC State Cell_DCH RRC State Cell_FACH RRC State Cell_PCH URA_PCH RRC State Out of zone
Marker-SMS	SMS Start SMS Start Old SMS STOP
Marker-SMTP	SMTP Start SMTP STOP
Marker-Speech	Unknown Speech sample Start Speech sample Stop Evaluated part Start Evaluated part STOP
Marker-STREAM	STREAM STOP Stream Overall Marker QuickTime (QT) START Real Media (RM) START Windows Media (WM) START MPEG-4 using QT START 3GPP using QT START
Marker-UDP	UDP Downlink Start UPD Uplink Start UDP STOP
Marker-URA Update	URA Update Marker
Marker-User	Master Slave
Marker-VT Video	VT Video Unknown VT Video First received frame VT Video Last received frame VT Video First received frame of training sequence
Marker-WAP	WAP 2 Start WAP Start WAP STOP
Marker-WS	WSP/HTTP Redirect M_SEND_REQ WSP/HTTP Redirect M_SEND_CONF

Marker Category	Marker Description
	WSP/HTTP Redirect M_SEND_NOTIFY_IND WSP/HTTP Redirect M_SEND_NOTIFYRESP_IND WSP/HTTP Redirect M_RECEIVE_CONF WSP/HTTP Redirect M_ACKNOWLEDGE_IND WSP/HTTP Redirect M_DELIVERY_IND WSP/HTTP Redirect M_READREPLY WSP/HTTP Post M_SEND_REQ WSP/HTTP Post M_SEND_CONF WSP/HTTP Post M_SEND_NOTIFY_IND WSP/HTTP Post M_SEND_NOTIFYRESP_IND WSP/HTTP Post M_RECEIVE_CONF WSP/HTTP Post M_ACKNOWLEDGE_IND WSP/HTTP Post M_DELIVERY_IND WSP/HTTP Post M_READREPLY WSP/HTTP Get M_SEND_REQ WSP/HTTP Get M_SEND_CONF WSP/HTTP Get M_SEND_NOTIFY_IND WSP/HTTP Get M_SEND_NOTIFYRESP_IND WSP/HTTP Get M_RECEIVE_CONF WSP/HTTP Get M_ACKNOWLEDGE_IND WSP/HTTP Get M_DELIVERY_IND WSP/HTTP Get M_READREPLY128$M_SEND_REQ M_SEND_CONF M_SEND_NOTIFY_IND M_SEND_NOTIFYRESP_IND M_RECEIVE_CONF M_ACKNOWLEDGE_IND M_DELIVERY_IND M_READREPLY WS Disconnected Event WS Connected Event Continue Switching Protocols OK Created Accepted Non-Authorative Information No Content
Marker-WS	Reset Content Partial Content Multiple Choices Moved Permanently Moved Temporarily See Other Not Modified Use Proxy Temporary Redirect Bad Request Unauthorised Payment Required Forbidden Not Found Method Not Allowed

Marker Category	Marker Description
	Not Acceptable Proxy Authentication Required Request Timeout Conflict Gone Length Required Precondition Failed Request Entity Too Large Request URI Too Large Unsupported Media Type Requested Range Not Satisfiable Expectation Failed Internal Server Error Not Implemented Bad Gateway Service Unavailable Gateway Timeout HTTP Version Not Supported WDP Error Receive failed WDP Error Send failed WDP Error Open failed WDP Error not opened WDP Error Out of memory WDP Error Unhandled exception occured in the upper layer WTP Error Abort
Marker-WS	WTP Error Invalid Tid WTP Error Unknown Ack WTP Error Unknown PDU WTP Error TPI Error WTP Error Timeout WTP Error result timeout WTP Error result retry WTP Hold-on acknowledge WTP Error Maximum of invoke requests exceeded WTP Error Memory allocation error WTP Error Illegal Data WTP Error Segmentation and Reassembly is disabled WTP Abort unknown WTP Abort protocol error WTP Abort invalid tid WTP Abort not implemented cl2 WTP Abort not implemented sar WTP Abort not implemented uack WTP Abort WTP version zero WTP Abort cap temp exceeded WTP Abort no response WTP Abort message too large WSP Abort protocol error WSP Abort disconnect WSP Abort suspend WSP Abort resume WSP Abort congestion WSP Abort connect error

Marker Category	Marker Description
	WSP Abort mru exceeded WSP Abort more exceeded WSP Abort peer req WSP Abort net error WSP Abort user req WSP Abort user rfs WSP Abort user pnd WSP Abort user dcr WSP Abort user dcu

Not Categorized Markers
MTC Dial
MTC Setup
MTC Connect
MTC ConnectFail
MTC Disconnect
MTC Release
MTC ReleaseError
MTC Break
MTC CallError
MTC SystemRelease
MTC UserRelease
Configuration MOC Dial
Configuration MOC Setup
Configuration MOC Connect
Configuration MOC ConnectFail
Configuration MOC Disconnect
Configuration MOC Release
Configuration MOC ReleaseError
Configuration MOC Break
Configuration MOC CallError
Configuration MOC SystemRelease
Configuration MOC UserRelease
Configuration MTC Dial
Configuration MTC Setup
Configuration MTC Connect
Configuration MTC ConnectFail
Configuration MTC Disconnect
Configuration MTC Release
Configuration MTC ReleaseError
Configuration MTC Break
Configuration MTC CallError
Configuration MTC SystemRelease
Configuration MTC UserRelease
VT MOC Dial

Not Categorized Markers
VT MOC Setup
VT MOC Connect
VT MOC ConnectFail
VT MOC Disconnect
VT MOC Release
VT MOC ReleaseError
VT MOC Break
VT MOC CallError
VT MOC SystemRelease
VT MOC UserRelease
VT MTC Dial
VT MTC Setup
VT MTC Connect
VT MTC ConnectFail
VT MTC Disconnect
VT MTC Release
VT MTC ReleaseError
VT MTC Break
VT MTC CallError
VT MTC SystemRelease
VT MTC UserRelease
VoIP MOC Dial (SIP Invite)
VoIP MOC Connect (SIP Invite OK)
VoIP MOC ConnectFail (Timeout)
VoIP MOC Disconnect (SIP Bye)
VoIP MOC Release (SIP Bye OK)
VoIP MOC ReleaseError (SIP Bye NOK or Timeout)
VoIP MOC Break
VoIP MOC CallError (SIP Invite NOK)
VoIP MOC SystemRelease
VoIP MOC UserRelease
VoIP MTC Dial (SIP Invite)
VoIP MTC Connect (SIP Invite OK)
VoIP MTC ConnectFail
VoIP MTC Disconnect (SIP Bye)
VoIP MTC Release
VoIP MTC ReleaseError (SIP Bye NOK or Timeout)
VoIP MTC Break
VoIP MTC CallError (SIP Invite NOK)
VoIP MTC SystemRelease
VoIP MTC UserRelease

8.1.7 TEMS_Collectors_Events

Event Category	Event Description
.Common	EV-DO 1x Tune-away EV-DO Dynamic Rate EV-DO Fixed Rate EV-DO Island Narrowband Interference Polluter Datalink Failure EGPRS MS Out Of Memory PDU Error Activated AQM Out of Synch AQM Synched Authentication Failure Cell Reselection Deactivated Dedicated Mode Filemark GPS Position Invalid GPS Position Valid Idle Mode Limited Service Mode Location Area Update Location Area Update Failure No reported data No Service Mode Packet Mode RACH Error Recording Paused Recording Resumed Ringing Routing Area Update Routing Area Update Failure Rove In To GAN Rove In To GAN Failure Rove In To GAN Redirect Rove Out From GAN Rove Out From GAN Failure Scanning Mode Silent Call SMS Error
.Common	SMS Received SMS Sent More Than 3 Strong SCs RRC Connection Abnormal Release RRC Connection Reject RRC Established RRC Protocol Error SHO Procedure Complete SHO Procedure Complete Without Measurement Control
Access	EV-DO Access Failure

Event Category	Event Description
	EV-DO Access Success
Attach and Detach	PS Attach PS Attach Failure PS Detach
Call Ending	Call End Dropped Call
Call Setup Results	Blocked Call Call Established Call Setup
Call Start	Call Attempt Call Attempt Retry Call Initiation
CDMA Handoff Others	Hard Handoff Idle Handoff Idle Handoff To Analog Idle Handoff To CDMA Idle Handoff To EV-DO Traffic Handoff To Analog Traffic Handoff To CDMA Traffic Handoff To EV-DO
CDMA Soft Handoff	Soft Handoff 2-Way Soft Handoff 3-Way Soft Handoff 4-Way Soft Handoff 5-Way Soft Handoff 6-Way Soft Handoff Complete
Channel Type Switching	Channel Switch R4 to R5 Channel Switch R4 to R5 Failure Channel Switch R5 to R4 Channel Switch R5 to R4 Failure PS Channel Type Switch Complete PS Channel Type Switch Failure
Connection	EV-DO Connection Failure EV-DO Connection Success EV-DO Session Failure EV-DO Session Success
DCH Rate Switching	PS RAB Channel Rate Switch Complete PS RAB Channel Rate Switch Failure
EVDO_Handoff	EV-DO Handoff 1 Active EV-DO Handoff 2 Actives EV-DO Handoff 3 Actives EV-DO Handoff 4 Actives EV-DO Handoff 5 Actives EV-DO Handoff 6 Actives
Handover	Handover Intracell Handover Intracell Failure Handover Handover Failure Handover From GAN Handover From GAN Failure Handover To GAN

Event Category	Event Description
	Handover To GAN Failure HS Serving Cell HO HS Serving Cell HO Failure
Hard Handover	Intra-frequency Hard Handover Intra-frequency Hard Handover Failure
Idle Procedures	Inter-frequency Cell Reselection
LTE Attach	EUTRAN Attach Complete
LTE Detach	EUTRAN Detach Accept
LTE EUTRA Reporting Events	EUTRAN RRC A1 Event EUTRAN RRC A2 Event EUTRAN RRC A3 Event EUTRAN RRC A4 Event EUTRAN RRC A5 Event
LTE Handover	EUTRAN Inter-frequency Handover EUTRAN Inter-frequency Handover Failed EUTRAN Intra-frequency Handover EUTRAN Intra-frequency Handover Failed
LTE MIMO	MIMO Mode Changed
Measurement Report Events	Measurement Report 1 Measurement Report 2 Measurement Report 3 Measurement Report 6
Missing Neighbor Alerts	Missing CDMA Neighbor Missing GSM Neighbor Missing GSM Neighbor, GSM Symmetry Missing LTE Neighbor Missing TD-SCDMA Neighbor Missing WCDMA Intra-frequency Neighbor, based on DN reporting Missing WCDMA Neighbor
PDP Activation	PDP Context Activation Failure PDP Context Activation Time PDP Context Activation PDP Context Activation Failure 2
PDP Deactivation	PDP Context Deactivation
PING Results	Ping Timeout
Timer Expiry	T200 Expired T3126 Expired T3162 Expired T3168 Expired T3170 Expired
UE-Reported Failures	Radio Bearer Reconfiguration Failure Radio Bearer Setup Failure Security Mode Failure

Not Categorized Events
Data Activated
Attach Failure
Attach Setup Time
Data Deactivated

Not Categorized Events
DNS Host Name Resolution Failure
DNS Host Name Resolution Time
Email Receive End
Email Receive Error
Email Receive Start
Email Send End
Email Send Error
Email Send Start
FTP Download Data Transfer Cutoff
FTP Download Data Transfer Time
FTP Download End
FTP Download Error
FTP Download IP Service Access Failure
FTP Download IP Service Setup Time
FTP Download Mean Data Rate
FTP Download Service Not Accessible
FTP Download Setup Time
FTP Download Start
FTP Upload Data Transfer Cutoff
FTP Upload Data Transfer Time
FTP Upload End
FTP Upload Error
FTP Upload IP Service Access Failure
FTP Upload IP Service Setup Time
FTP Upload Mean Data Rate
FTP Upload Service Not Accessible
FTP Upload Setup Time
FTP Upload Start
HTTP Data Transfer Cutoff
HTTP Data Transfer Time
HTTP End
HTTP Error
HTTP IP Service Access Failure
HTTP IP Service Setup Time
HTTP Mean Data Rate
HTTP Service Not Accessible
HTTP Setup Time
HTTP Start
MMS Receive Data Transfer Cutoff
MMS Receive Data Transfer Time
MMS Receive End
MMS Receive Error
MMS Receive Start
MMS Retrieval Failure

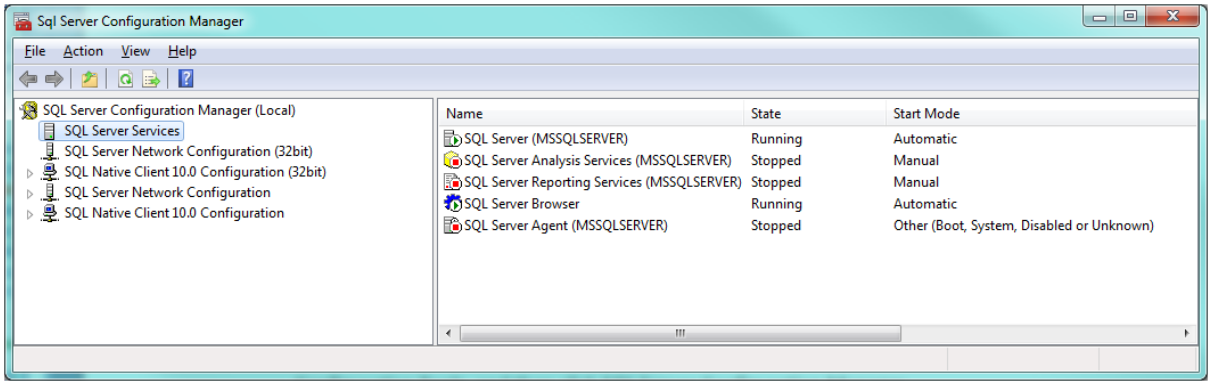
Not Categorized Events
MMS Retrieval Time
MMS Send Data Transfer Cutoff
MMS Send Data Transfer Time
MMS Send End
MMS Send Error
MMS Send Failure
MMS Send Start
MMS Send Time
Network Connect
Network Connect Error
PDP Context Cutoff
Ping End
Ping Error
Ping Roundtrip Time
Ping Start
Streaming End
Streaming Error
Streaming Intermediate Vsqi
Streaming Quality Mtqi
Streaming Quality Vsqi
Streaming Reproduction Cutoff
Streaming Reproduction Start Delay
Streaming Reproduction Start Failure
Streaming Service Access Time
Streaming Service Not Accessible
Streaming Session Cutoff
Streaming Start
Streaming State
TCP Download End
TCP Download Error
TCP Download Start
TCP Handshake Time
TCP Upload End
TCP Upload Error
TCP Upload Start
UDP Download End
UDP Download Error
UDP Download Total Packet Loss
UDP Download Start
UDP Upload End
UDP Upload Error
UDP Upload Total Packet Loss
UDP Upload Start
WAP Activation Failure

Not Categorized Events
WAP Activation Time
WAP End
WAP Error
WAP Page Data Transfer Cutoff
WAP Page Data Transfer Time
WAP Page Mean Data Rate
WAP Page Request Failure
WAP Page Request Time
WAP Portal Access Time
WAP Portal Not Accessible
WAP Site Access Time
WAP Site Not Accessible
WAP Start
Cell Change Order From UTRAN
Cell Change Order From UTRAN Failure
Cell Change Order To UTRAN
Cell Change Order To UTRAN Failure
Cell Reselection From UTRAN
Cell Reselection To UTRAN
Compressed Mode Entered
Compressed Mode Exited
Handover From UTRAN
Handover From UTRAN Failure
Handover To UTRAN
Handover To UTRAN Failure
Baton Handover
Baton Handover Failure
Hard Handover
Hard Handover Failure
Inter-frequency Handover
Inter-frequency Handover Failure
Radio Link Addition
Radio Link Addition Failure
Radio Link Removal
Radio Link Removal Failure
Radio Link Replacement
Radio Link Replacement Failure

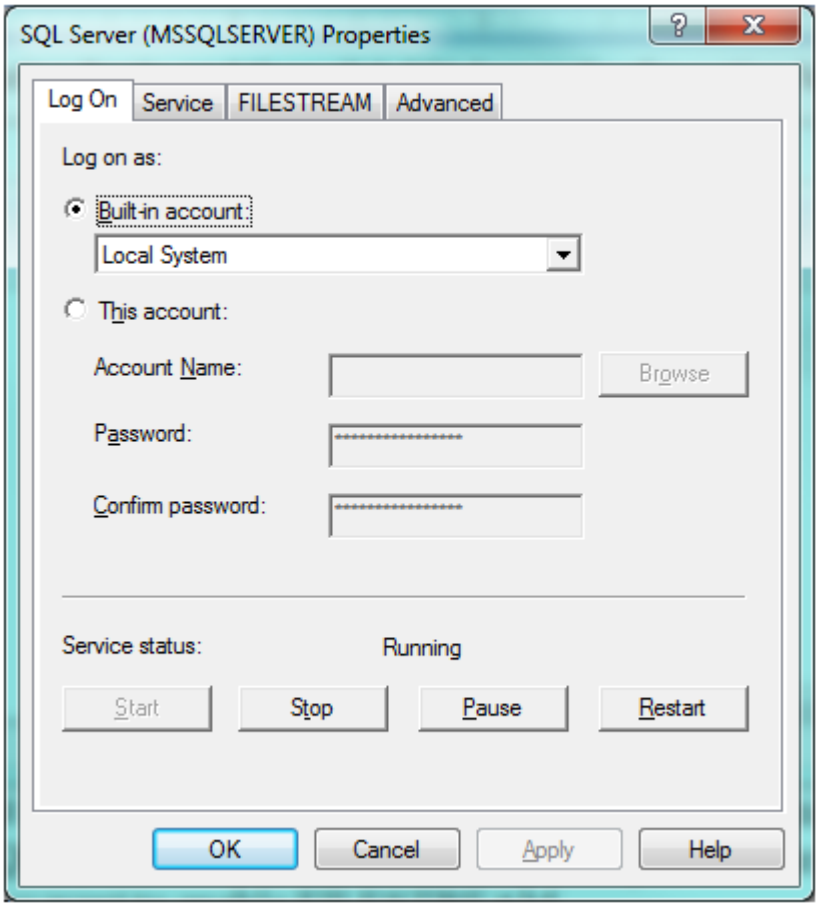
8.2 Enabling FILESTREAM in SQL Server 2008 R2

You must enable FILESTREAM on the Database Engine instance of the SQL Server. The following steps describe how to enable FILESTREAM by using the SQL Server Configuration Manager.

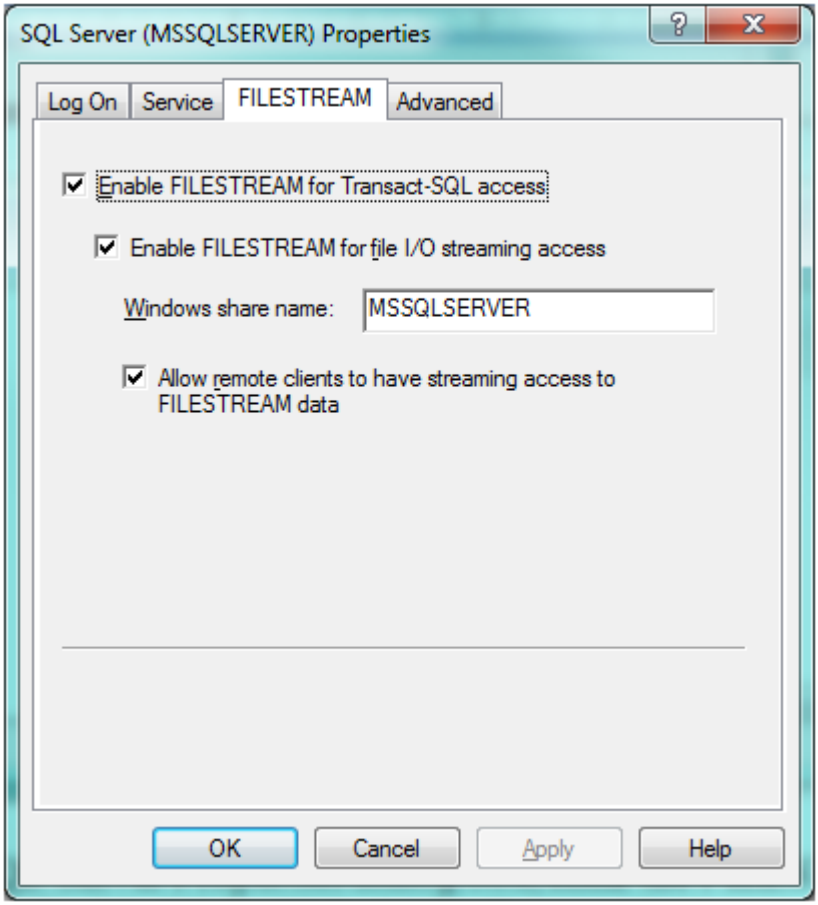
1. From the Start menu, go to All Programs | Microsoft SQL Server 2008 R2 | Configuration Tools | SQL Server Configuration Manager.
2. In the list of services, right-click SQL Server Services, and select Open from the context menu.



3. In the SQL Server Configuration Manager snap-in, locate the instance of SQL Server on which you want to enable FILESTREAM.
4. Right-click the instance, and select Properties from the context menu. The SQL Server Properties dialog will be displayed.


SQL Server (MSSQLSERVER) Properties
Log On
Service
FILESTREAM
Advanced
Log on as:
Built-in account:
Local System
This account:
Account Name:
Browse
Password:
Confirm password:
Service status:
Running
Start
Stop
Pause
Restart
OK
Cancel
Apply
Help

5. Go to the FILESTREAM tab. Make the settings described below, and then click Apply.



   - Select the **Enable FILESTREAM for Transact-SQL access** check box.
   - If you want to read and write FILESTREAM data from Windows, select **Enable FILESTREAM for file I/O streaming access**. Enter the applicable name in the Windows Share Name box.
   - If remote clients must access the FILESTREAM data that is stored on this share, select **Allow remote clients to have streaming access to FILESTREAM data**.

6. In SQL Server Management Studio, click New Query to display the Query Editor.
7. In the Query Editor, enter the following Transact-SQL code:

```
EXEC sp_configure filestream_access_level, 2
RECONFIGURE
```

8. Click Execute.
9. Restart the SQL Server service.

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