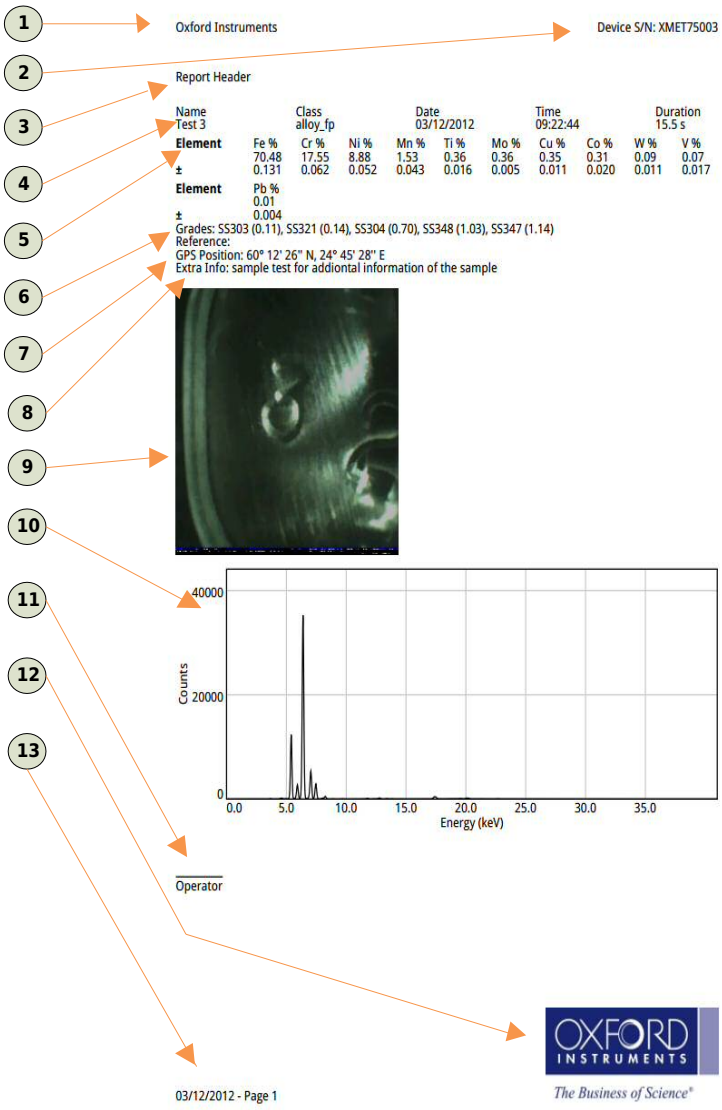
A Custom Report

This is a typical custom report. The report template provides full control of all these aspects of the report.



1. Margin: company information
2. Margin: serial number
3. Report header
4. Sample information
5. Element: concentration and +/-
6. Grade
7. GPS Position
8. Additional Information
9. Camera Image
10. Spectra
11. Operator information
12. Margin: logo
13. Margin: date and page number

Margins

The margins can include:

- Company information
- Company logo
- The device serial number
- The date and page number.

It is possible to place these items in any of the four margins.

Report header

The report can start with an introduction.

Sample information

Sample information includes:

- The sample name

- The mode or method
- The date and time
- The measurement time.

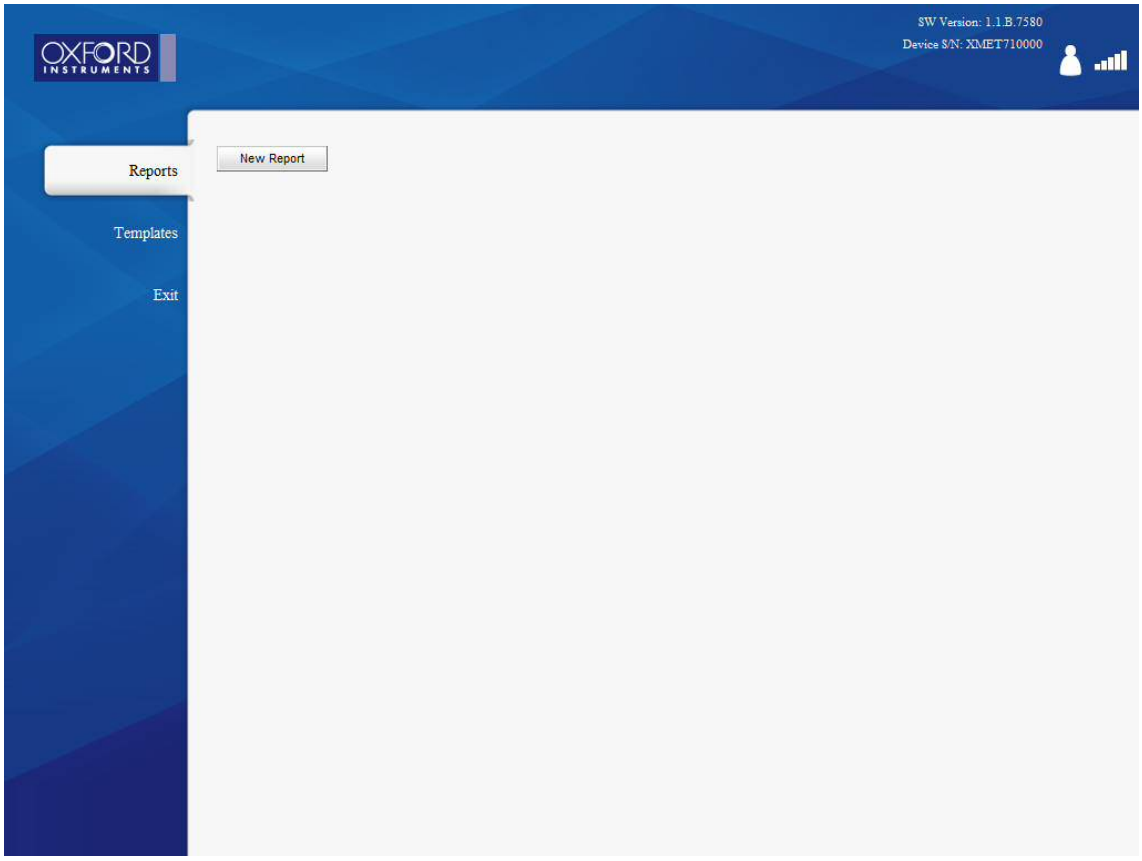
Element information	It is necessary to select the elements to appear in the report. Chosen elements that are not present in the sample donot appear in the report unless **All The Elements From The Result** option is selected . Element information can include the concentration and +/- value.
Grade	The report can include the grade information.
GPS Position	The report can include the GPS information.
Additional Information	The report can include the additional information for the sample.
Camera Image	The report can include the camera image of the sample.
Spectra	The report can include the spectra for the sample.
Operator information	The report can include information about the operator.

Create A Report

It is necessary to have a report template to create a report. Follow these steps to create a report.

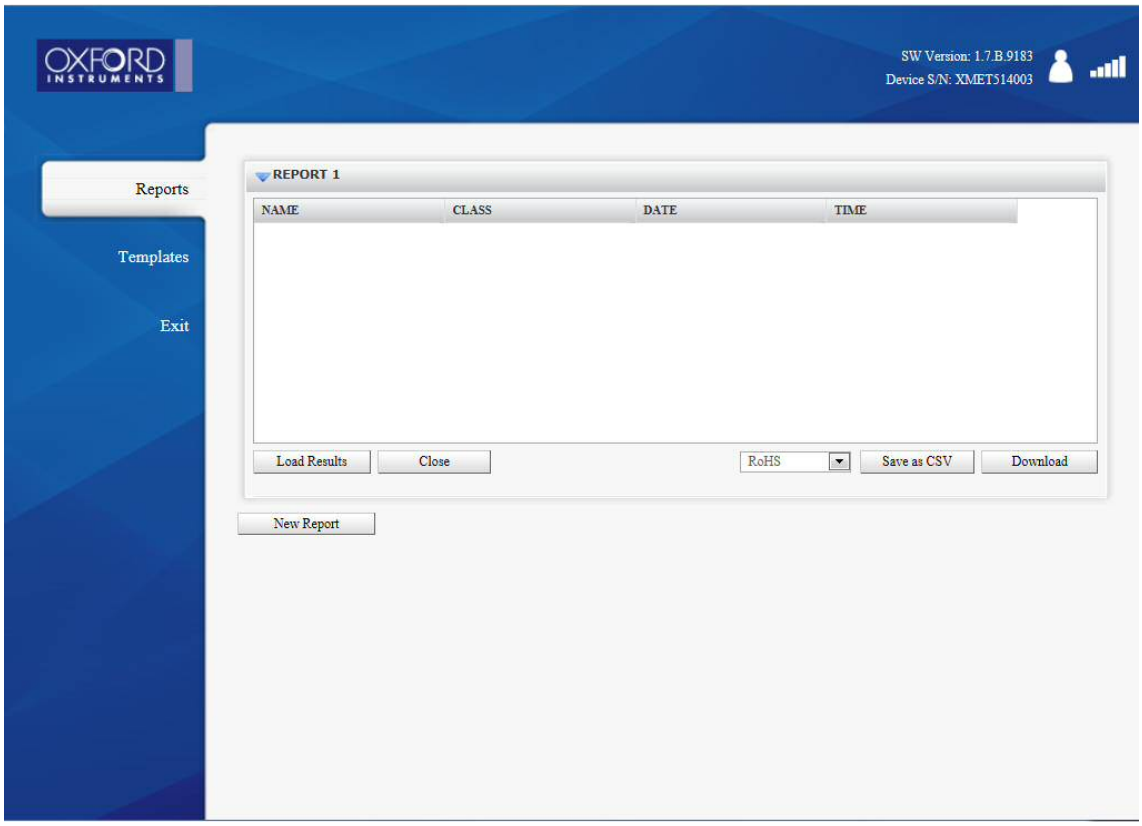
1. From the PC main screen, click **Report Generator**.

   The Reports screen appears.



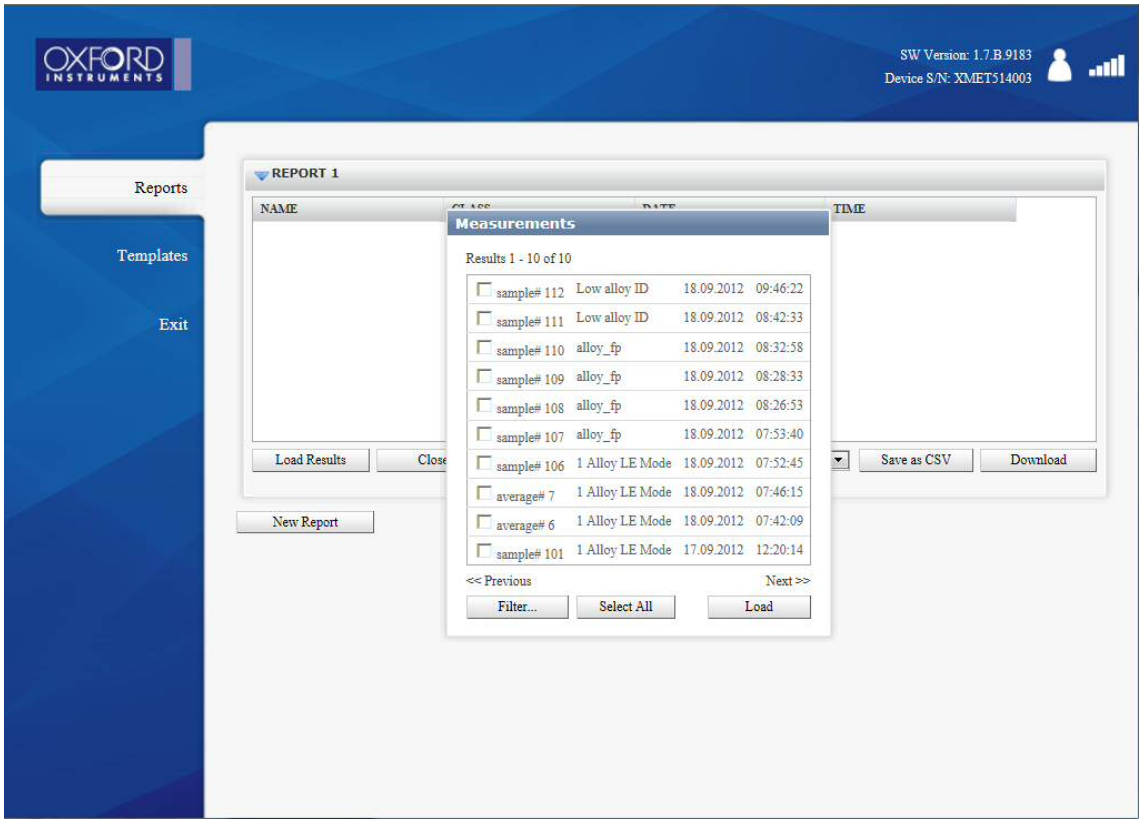
2. Click **New Report**.

   The Reports screen has a new report.



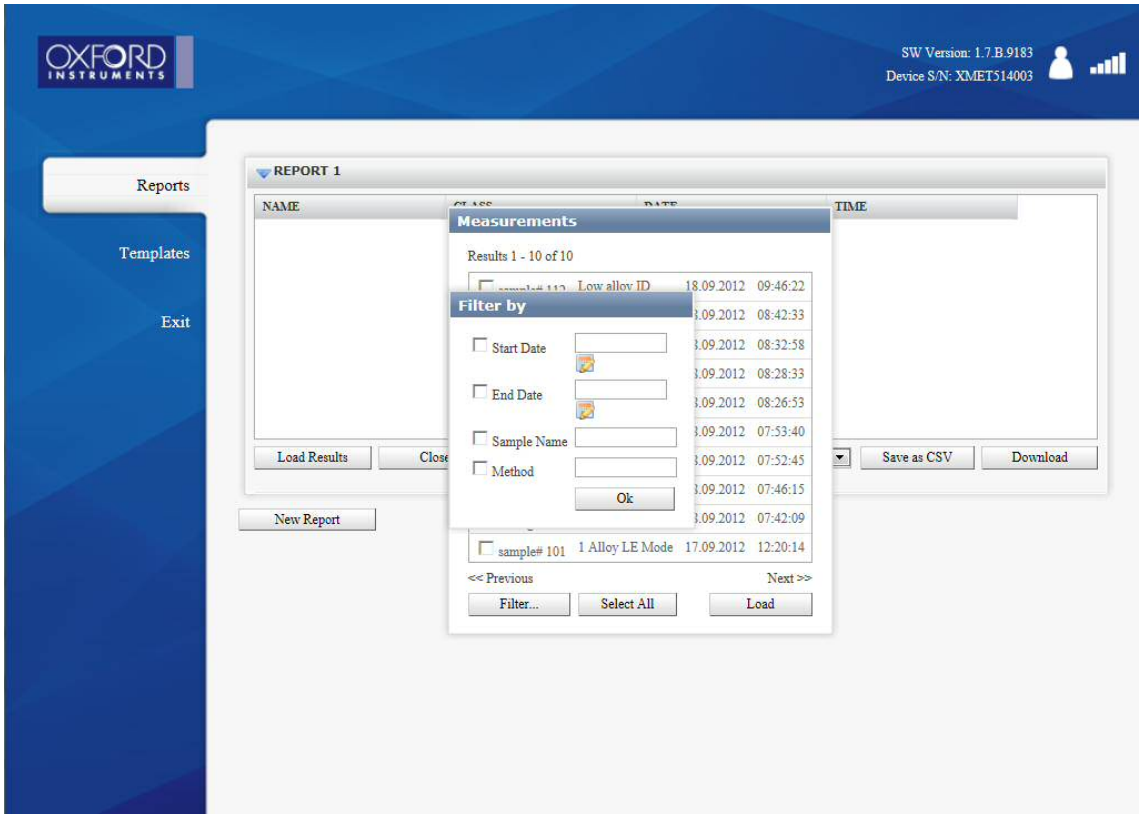
3. Click **Load Results**.

   The Measurements dialog box appears.



4. If required, click **Filter ...**.

   The Filter by dialog box appears.



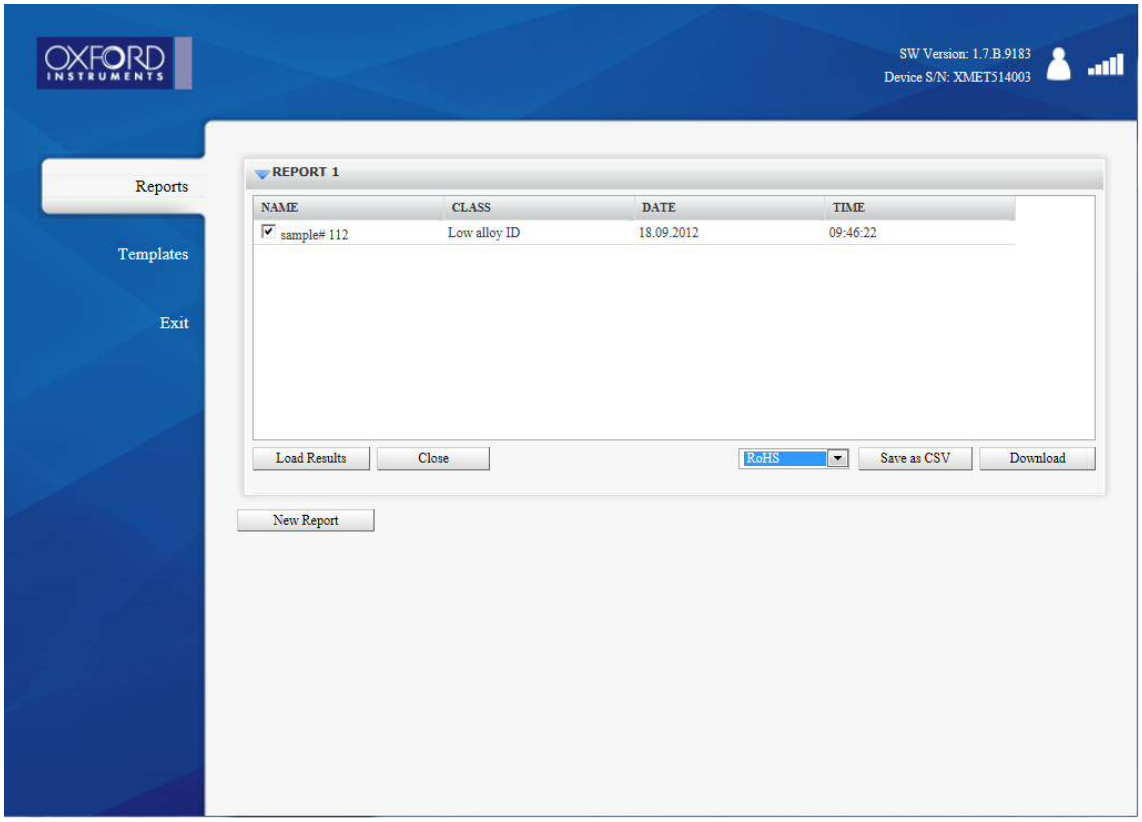
5. To use the filter, do one or more of the following, as required:

   - Click the **Start Date** tick box, and use the calendar to choose a date.
   - Click the **End Date** tick box, and use the calendar to choose a date.
   - Click the **Sample Name** tick box, and type all or part of the sample name.
   - Click the **Method** tick box, and type all or part of the Method name.

6. Click **OK** to return to the Measurements dialog box, with filtered results.

7. If required click **Select All** to select all the results for the report, and then click **Load**.

   The Reports screen shows the result or results for the report.



8. Select the required template for the report from the **Report Template** drop down list.
9. Do one of the following

   - Click **Save As CSV**
   - Click **Download** to download a PDF file.

   The File Download dialog box appears.

10. Click **Save** to save the file.

    The Zip file contains the report PDF file or the excel file(csv).

    Note: In MS excel 2007 or older versions, it may be difficult to open csv files in the readable format as csv file uses UTF-8 character encoding. In such cases follow the below steps

    - Open Microsoft Excel.
    - Click the Data tab on menu bar.
    - Click the From Text option
    - Browse to the saved csv file to be imported, select it and click the import button.
    - Follow the 3 steps of Text import Wizard which opens to your screen.
    - On Wizard first choose the file type that describes your data best. Usually in case of X-MET that is Delimited.
    - Select the format 65001: Unicode(UTF-8) from the File origin drop down list. When done click Next.
    - On the second Text Import Wizard step check whatever delimiters your data may have. Data preview shows how the data will appear on spread sheet. When done click Next.
    - Continue to last Text Import Wizard step and modify any columns data format, or deselect the unnecessary columns if any.
    - Click Finish and the imported file opens into MS spread sheet.

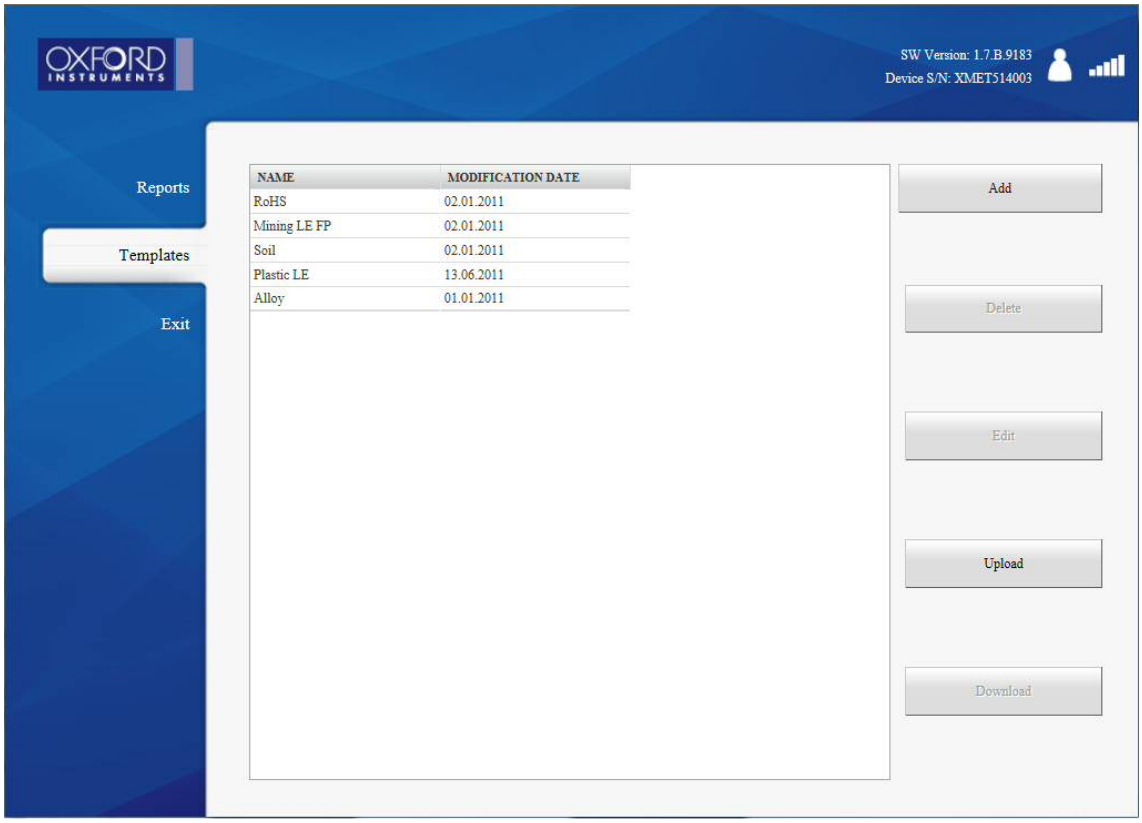
11. Click **Exit** to return to the PC main screen.

Add A Report Template

Follow these steps to add a report template.

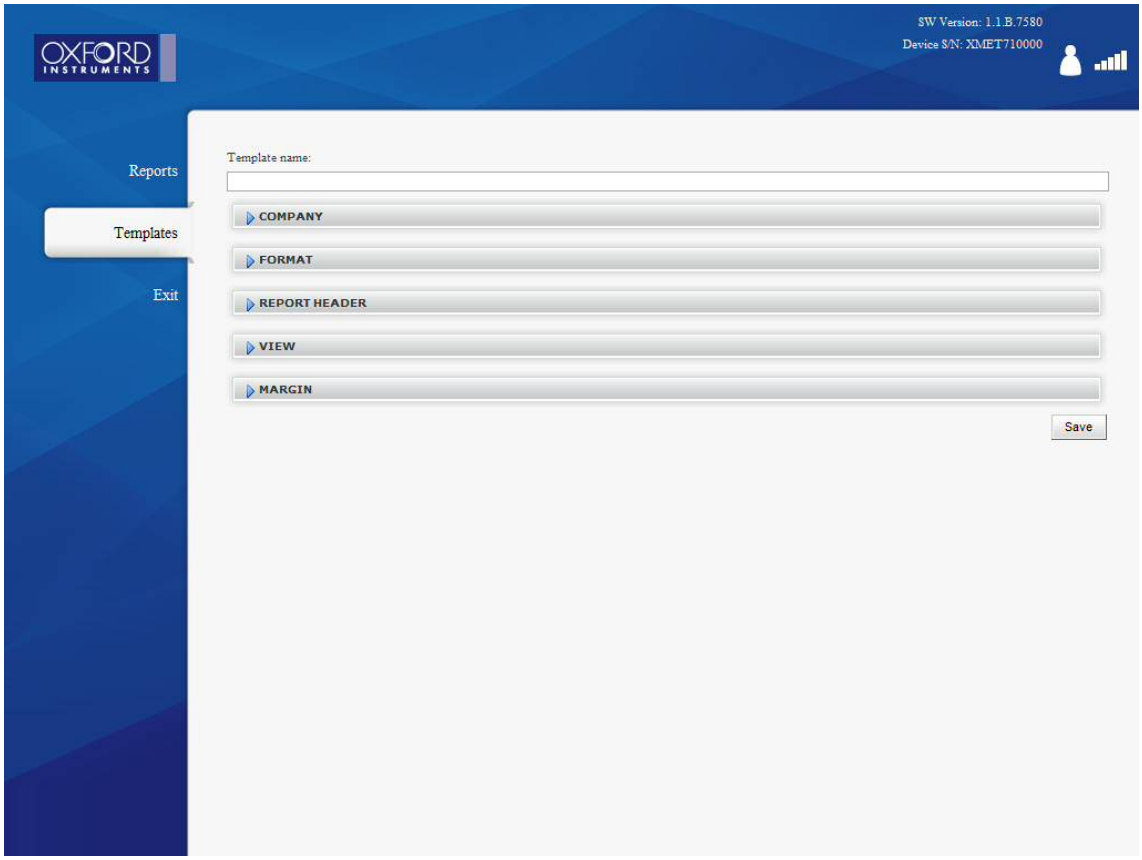
1. From the PC main screen, click **Report Generator**, and then click **Templates**.

   The Templates screen appears.



2. Click **Add**.

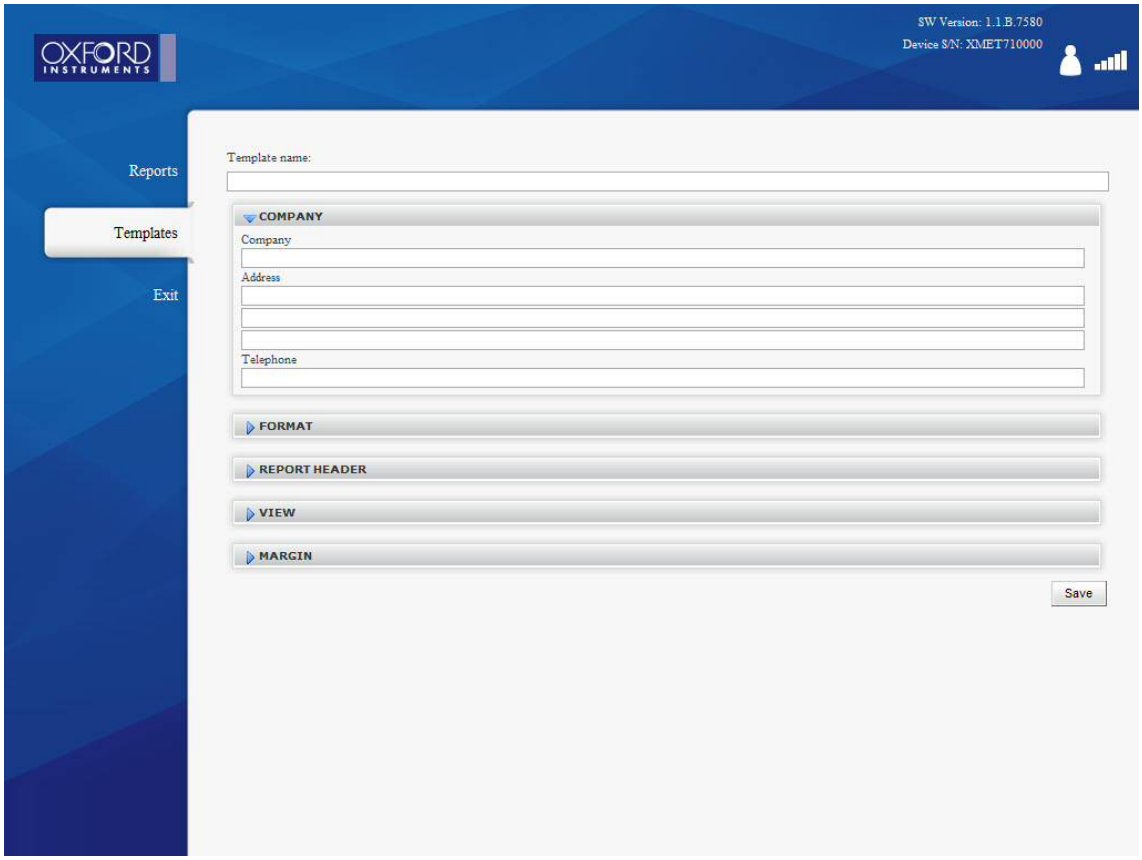
   The Template Design screen appears.



3. Type a name for the report into the **Template Name** text box.

4. Click **Company**.

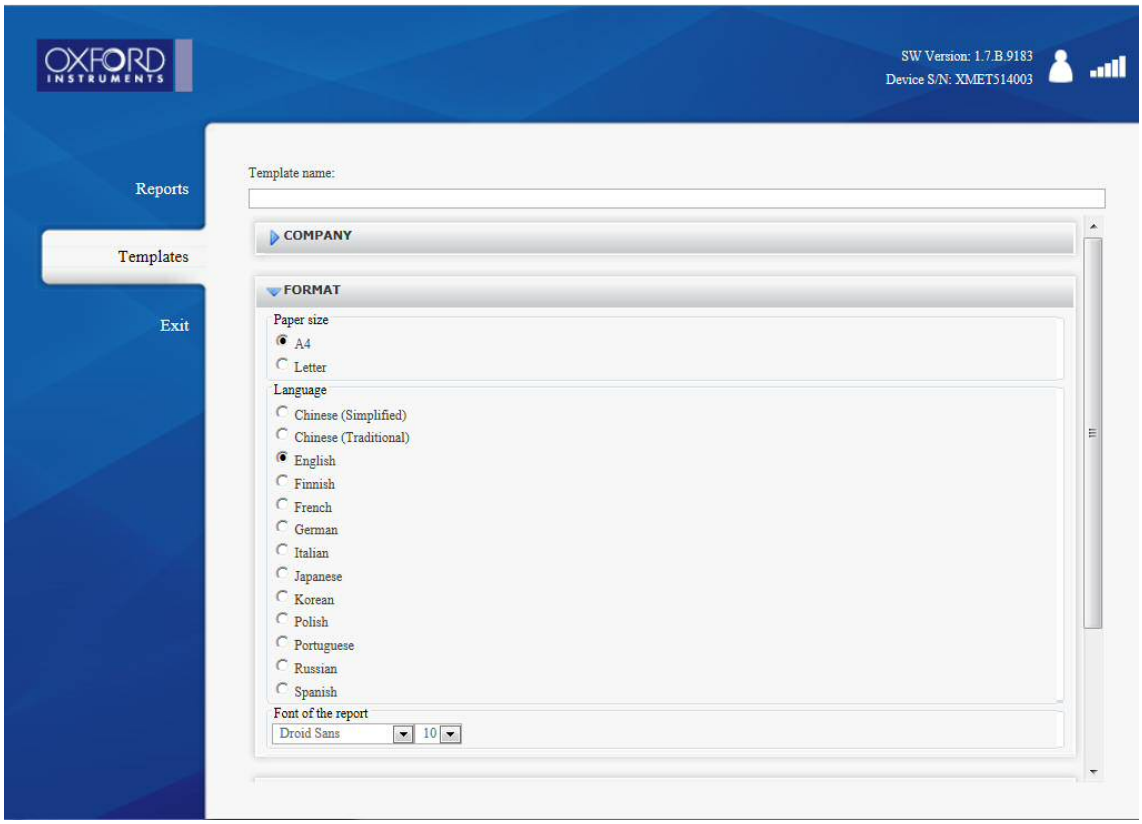
   The Company pane appears.



5. Enter the company information into the applicable text box.
6. Click **Company** to close the Company pane.

7. Click **Format**.

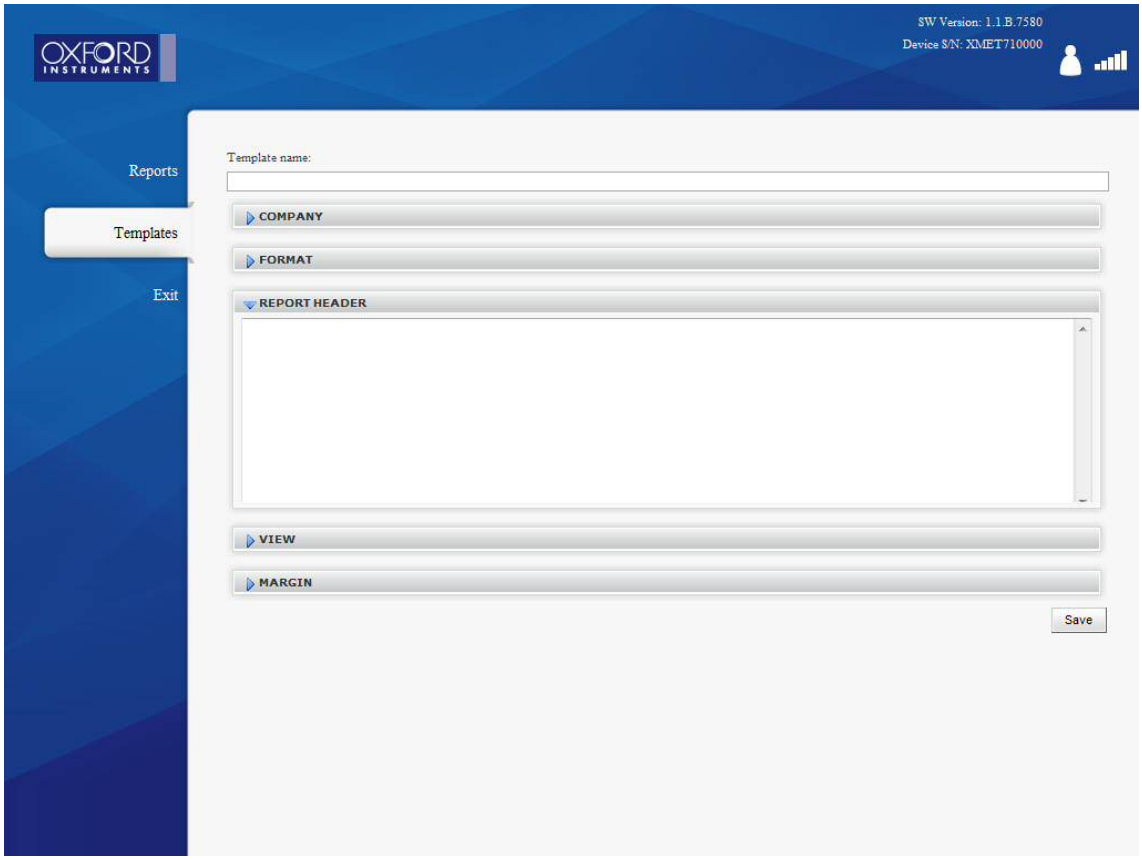
   The Format pane appears.



8. Click the applicable **Page Size**, select a **Language** and choose a **Font** from the drop down list. **Droid Sans Fallback** font should be used for Chinese , Japanese and Korean languages.
9. Click **Format** to close the Format pane.

10. Click **Report Header**.

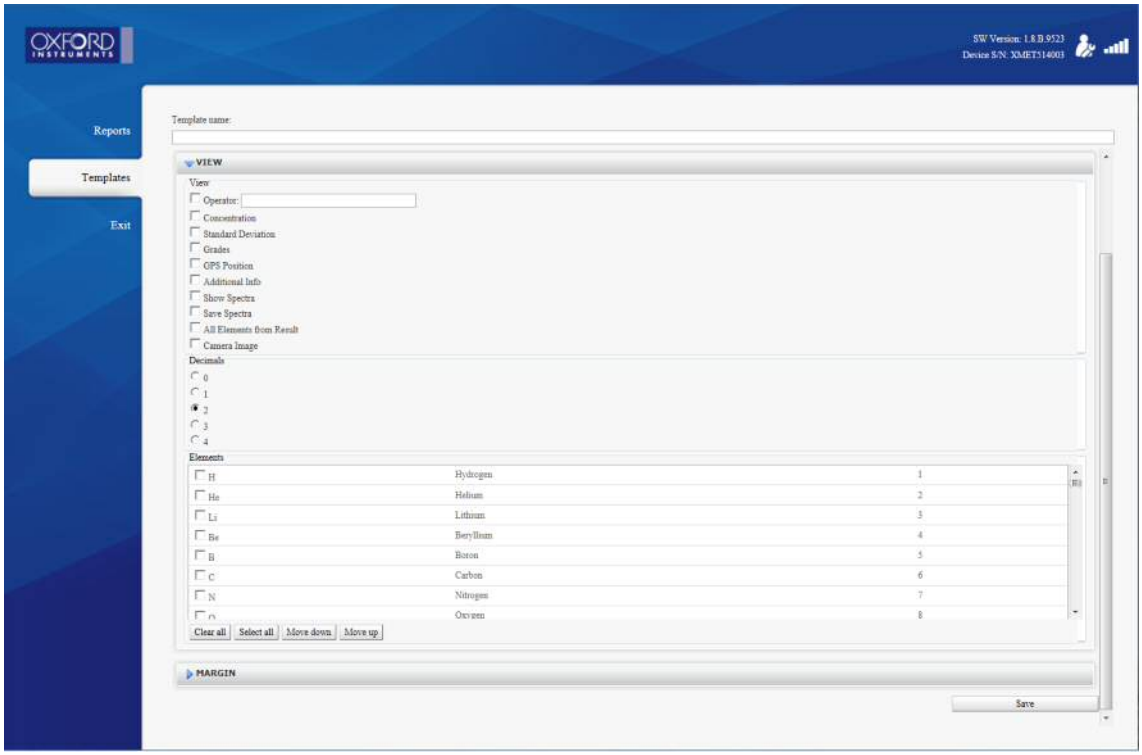
    The Report Header pane appears.



11. Type the report header into the text box.
12. Click **Report Header** to close the Report Header pane.

13. Click **View**.

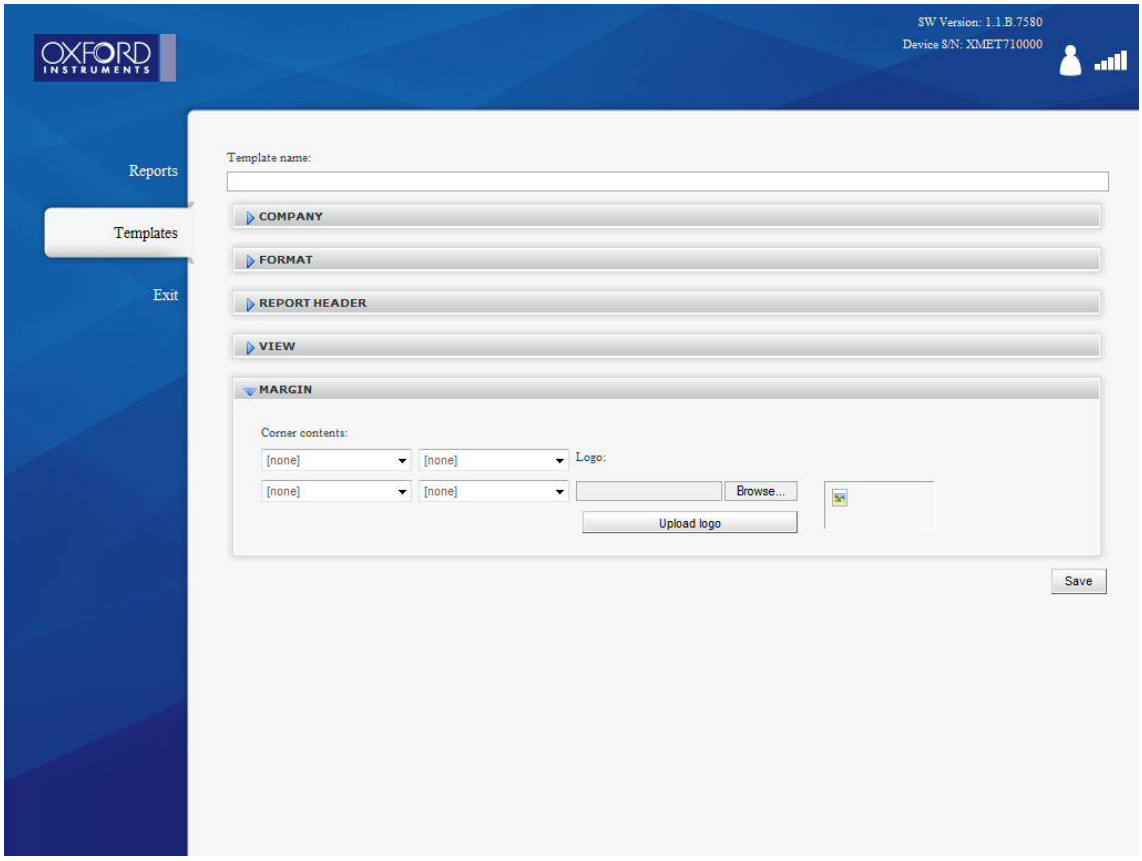
    The View pane appears.



14. Click the applicable tick box to select the items to appear on the report.
15. Type the operator information into the **Operator** text box.
16. Select the number of decimal places for the element concentrations from **Decimals**.
17. Click the applicable tick box to select the elements to appear on the report. The order in which the elements appear in the report can be changed by selecting **Move Down** and **Move Up** buttons.
18. Click **View** to close the View pane.

19. Click **Margin**.

    The Margin pane appears.



20. Click the applicable **Corner Contents** drop down list to choose the item to appear in that corner of the report.
21. To upload a logo file, do the following:
    a) Click **Browse** to search for the file on the PC.
    b) Click **Upload Logo** to upload the logo.

    The logo file appears on the Margin pane.
22. Click **Margin** to close the Margin pane.
23. When the report template is complete, click **Save** to save it and return to the Templates screen.
24. Click **Exit** to return to the PC main screen.

Software Installation

No application specific software is required to use a PC with the X-MET8000 series. An Internet browser is the only software requirement to control the X-MET8000 series. However, a software driver is required for a PC operating system to control an application through a USB interface.

Software driver requirements by operating system:

- Windows XP: the USB memory device contains driver software to install, and a Microsoft Hotfix is available.

- Windows Vista and Windows 7: driver software loads automatically through Plug and Play.
- Linux and Mac OS X: driver software is part of the operating system.

Installation On Windows XP

Driver software does not load automatically. Follow these steps to install the driver software. It is necessary to have administrator privileges to install driver software.

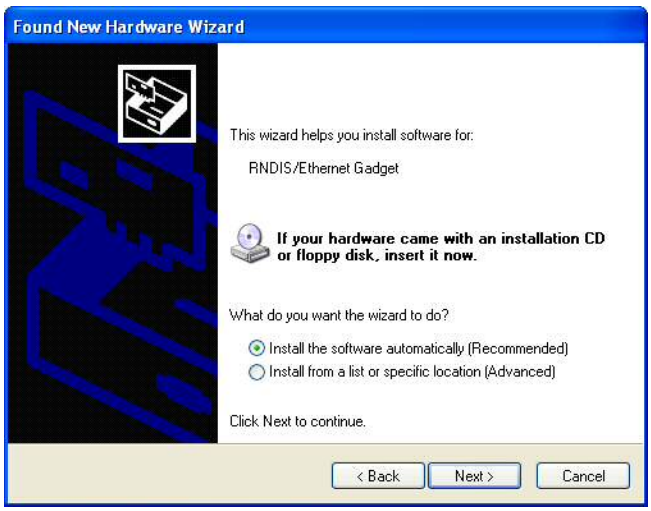
A Hotfix is available from Microsoft to make sure that the USB interface operates correctly: *http://support.microsoft.com/kb/959765*.

1. Plug the USB memory device with the driver software into the PC.
2. Connect the X-MET8000 series to the PC. Refer to *Connect To A PC And Login* on page 40.

   The Found New Hardware Wizard screen appears.

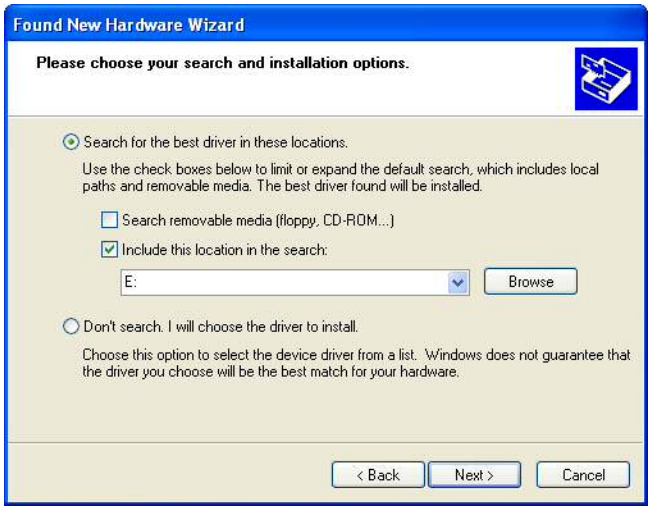
3. Click **No, not this time**, and then click **Next**.

   The Found New Hardware Wizard screen changes.



4. Click **Install from a list or specific location (Advanced)**, and then click **Next**.

   The Found New Hardware Wizard screen changes.



5. Click **Don't search. I will choose the driver to install.**, and then click **Next**.

   The Found New Hardware Wizard screen changes.

6. Click **Network adapters**, and then click **Next**.

   The Found New Hardware Wizard screen changes.

7. Click **Have Disk...**, and then click **Next**.

   An Install From Disk dialog box appears.

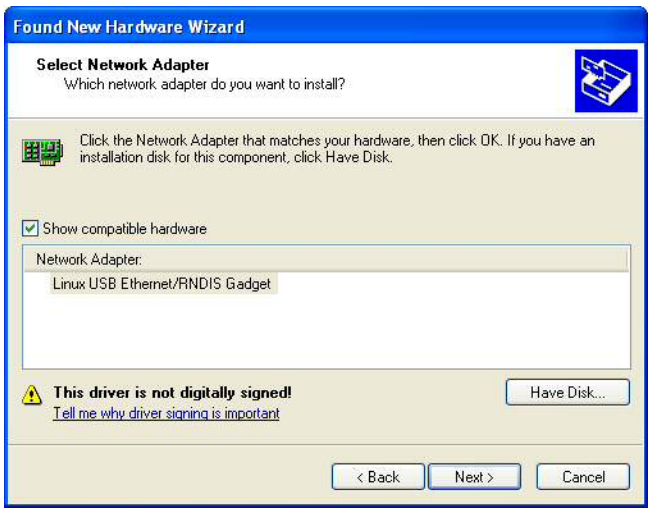
8. Click **Browse...**.

   An Install From Disk dialog box appears.

9. Select the USB memory device drive from the Locate File dialog box.
10. Select one of the following, as applicable for the operating system:

    - Windows XP 32 driver
    - Windows XP 64 driver

11. Click **Open** to return to the Install From Disk dialog box.
12. Click **OK** to return to the Found New Hardware Wizard screen.



13. Click **Next**.

    A Hardware Installation dialog box appears.

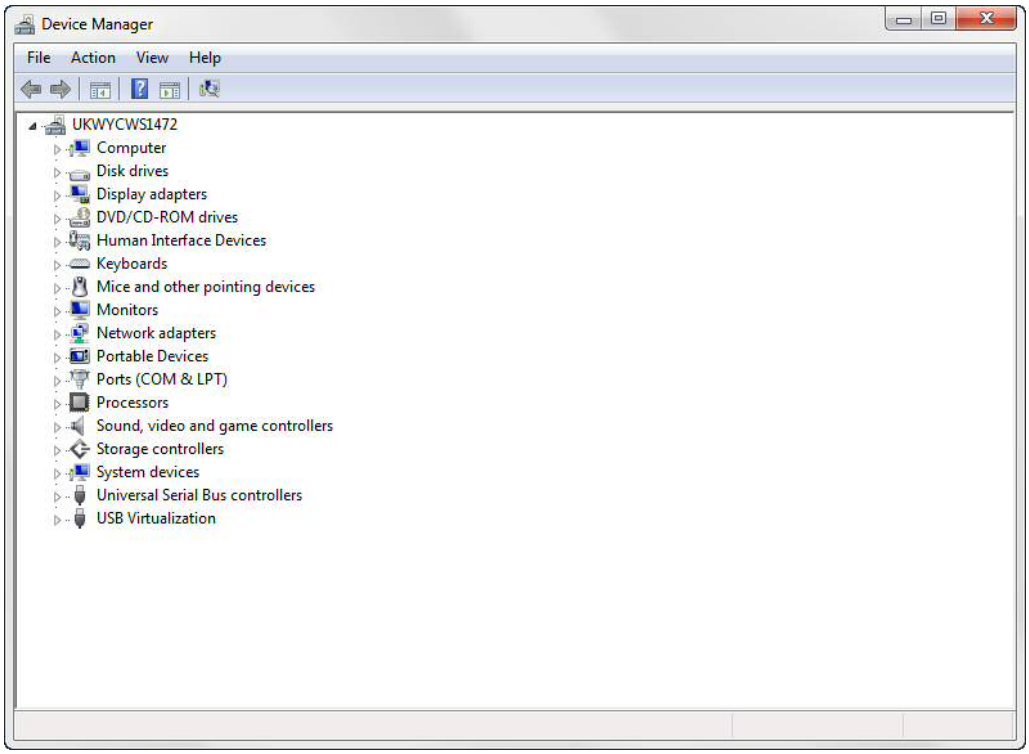
14. Click **Continue Anyway** to install the driver software.
15. Click **Finish** to close the Found New Hardware Wizard screen when installation is complete.

Installation On Windows 7 And Windows Vista

Driver software loads automatically. Follow these steps to install the driver software if it fails to install correctly. It is necessary to have administrator privileges to install driver software. This procedure is for Windows 7, but Windows Vista is similar.

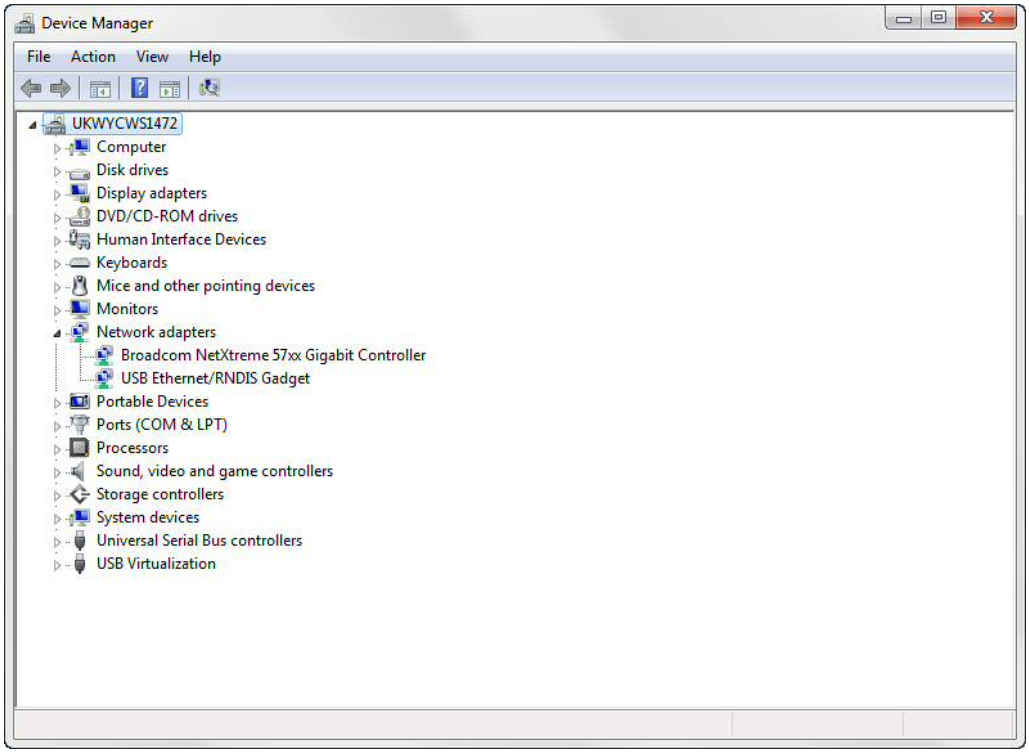
1. Connect the X-MET8000 series to the PC. Refer to *Connect To A PC And Login* on page 40.
2. Navigate: **Start** > **Control Panel** > **System and Security** > **System: Device Manager** .

   The Device Manager screen appears.



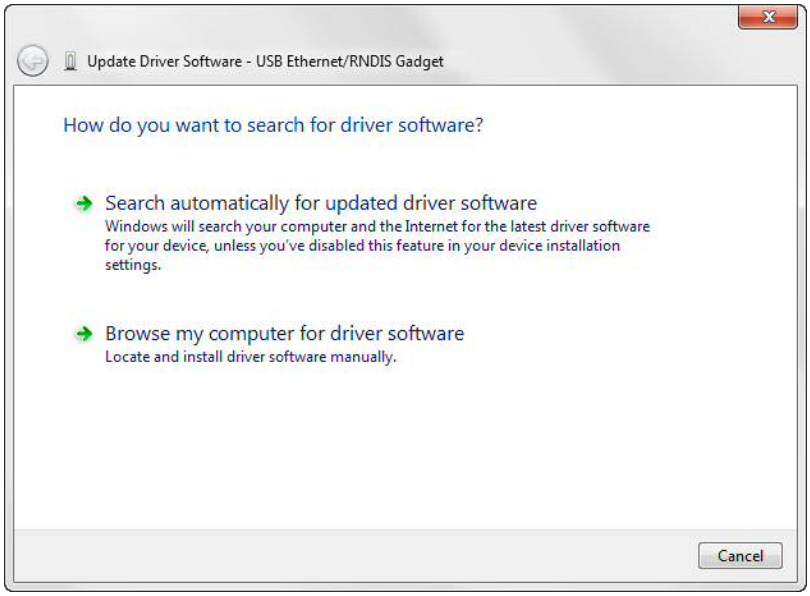
3. Navigate: **Network adapters** > **USB Ethernet/RNDIS Gadget** .

   The Device Manager screen shows the USB Ethernet/RNDIS Gadget adapter.



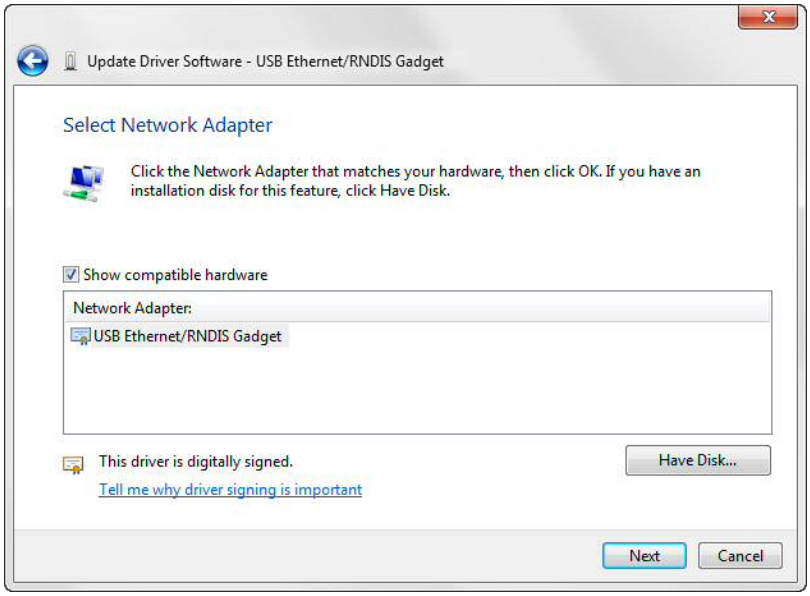
4. Navigate: **Action** > **Update Driver Software...** .

   The Update Driver Software screen appears.



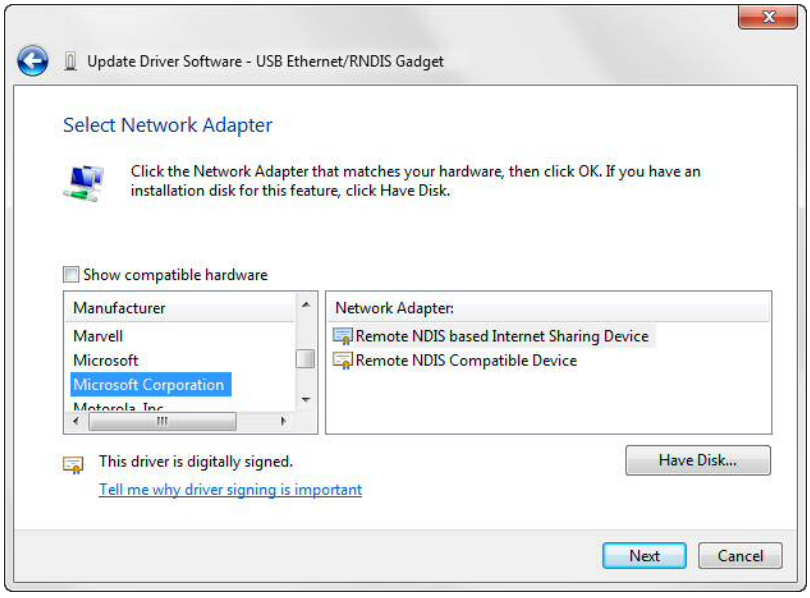
5. Navigate: **Browse my computer for driver software** > **Let me pick from a list of device drivers on my computer** .

   The Update Driver Software screen changes.



6. Click **Show compatible hardware** to deselect it.

   The Update Driver Software screen shows the available network adapters.



7. Navigate: **Microsoft Corporation** > **Remote NDIS Compatible Device** , and then click **Next**.

   An Update Driver Warning dialog box appears.

8. Click **Yes** to install the driver software.
9. Click **Close** to close the Update Driver Software screen when installation is complete.

Operation With A GPS

Using a GPS receiver in combination with the X-MET8000 Series can significantly improve the quality of the collected data by providing easy to use location information stored with the sample data.

The X-MET8000 Series has an internal GPS receiver that provides location information, optionally a consumer grade Bluetooth GPS like the Nokia LD-3W can be used to add location information to the X-MET8000 Series measurement data.

Using a Trimble handheld Trimble Field Computer with GPS and Trimble® TerraSync™ software or equivalent to store geographical features, positions, and attribute data the X-MET8000 Series can be used for accurate and reliable GIS.

A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include the time the message was transmitted and the satellite position at time of message transmission The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite this information is then used to compute the location of the GPS receiver. In typical GPS operation, four or more satellites must be visible to obtain an accurate result.

Bluetooth

Bluetooth is a short-range wireless communication technology. Devices with Bluetooth capabilities can exchange information over a distance of up to 30 feet (10 meters), without requiring a physical connection.

X-MET8000 series Internal GPS

The X-MET8000 series is equipped with an internal GPS receiver.

The internal GPS receiver complements the X-MET8000 series measurement data with location information.

Location accuracy for the internal GPS device is typically 10 meters (30 feet).

The Internal GPS receiver concists of a integrated GPS/GLONAS chip.

Acquisition times are approximately 45s/2s (cold/hot start).

Nokia LD-3W Bluetooth GPS

The Nokia LD-3W Bluetooth GPS receiver complements the X-MET8000 series measurement data with location information.

The use of an external Bluetooth GPS receiver can be feasible when operating in locations where the X-MET8000 series might not get reliable satellite reception and the external GPS receiver can be placed in a more favorable place.

Location accuracy for consumer GPS devices is typically 10 meters (30 feet).

The Nokia LD-3W consists of a Sirf Star III (High Sensitivity GPS microcontroller manufactured by SiRF Technology), 20 parallel channels

Acquisition times are approximately 45s/2s (cold/hot start).

Minimum operating time for the Nokia LD-3W is 15h with a standby time of up to 7 days depending on applications used and external conditions.

Trimble Field Computer and GPS

Using the X-MET8000 Series together with a Trimble Field Computer and Trimble® TerraSync™ software for fast and efficient field GIS data collection and maintenance where the X-MET8000 Series measurements are linked to geographical features, positions, and attribute data.

Achieve decimeter (10 cm / 4 inch) accuracy using real-time or post processed H-Star technology (dependent on H-Star-capable receiver and antenna combination used).

Can I use an external antenna with my Trimble Nomad 900 series?

The Trimble Nomad 900 series does not have an external antenna option. The device is designed to achieve 2 to 4 meter (HRMS, Horizontal Root Mean Square) accuracy with the integrated antenna, with SBAS (Satellite Based Augmentation Systems) corrections. If higher accuracy is required, you can use the optional Trimble Nomad 900 series Serial Boot accessory to connect an external GPS receiver via 9-Pin RS-232 Serial data connection. Many newer high-accuracy GPS receivers also offer a Bluetooth connectivity option.

How do I use the Trimble Nomad 900 series to ensure best GPS performance?

When collecting point features or vertices (corners or intersections of geometric shapes), Trimble recommends that you log GPS data for at least 30 seconds, using a 1-second logging rate. Collecting multiple positions for a static feature help to improve accuracy by averaging out the errors in individual GPS positions. In heavy canopy, or other difficult environments, logging for 1–2 minutes is recommended. Pausing briefly (5–10seconds) before logging a point feature or vertex also help to get the best performance from the receiver. This allows you to ensure that the internal GPS receiver is horizontal and correctly located over the feature you are mapping, and allows the computed position to settle and not be influenced by the recent movement of the handheld. Turning off A-GPS (Assisted Global Positioning System) will also increase GPS accuracy, but will increase time-to-fix (see the product user manual for details).

How does the Trimble Nomad 900 series perform in harsh GPS conditions?

- The Trimble Nomad 900 series can track all available GPS satellites. This allows you to get the best results when you work in many different environments, without having to adjust the GPS mask settings. The receiver performs well in harsh GPS environments, such as under heavy canopy and in urban areas.
- SiRFInstantFixII (satellite prediction technology) is embedded in the firmware of all Trimble Nomad 900 series units. This technology provides satellite orbit prediction info if Signal to Noise Ratio (SNR) is 28 or lower resulting in more satellites tracked, faster Time to First Fix, and improved performance in canyons and under canopy.

Major Differences Internal GPS vs. Nokia LD-3W vs. Trimble Field Computer

The internal GPS receiver is compairable to a consumer level GPS receiver and integrated in the X-MET8000 Series device.

The Nokia LD-3W is a consumer level Bluetooth GPS receiver that complements the X-MET8000 Series measurement data with location information.

Location accuracy of a consumer GPS is typically 10 meters (30 feet).

For more accurate location data use the X-MET8000 Series in combination with a Trimble Field Computer and Trimble® TerraSync™ software for fast and efficient field GIS data collection and maintenance where the X-MET8000 Series measurements are linked to geographical features, positions, and attribute data.

Achieve decimeter (10 cm / 4 inch) accuracy using real-time or post processed H-Star technology (dependent on H-Star-capable receiver and antenna combination used)

Setup and use the Internal GPS

Setup the X-MET8000 series for use with the internal GPS receiver to add location information to the measurements.

Enable Internal GPS ***DRAFT***

Follow these steps to enable the internal GPS receiver.

1. Navigate: **Status Bar** > **Wireless** .

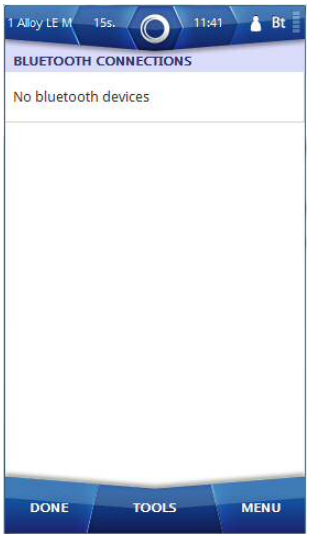
   The Wireless screen appears.

2. Tap GPS.

   The GPS screen appears.

3. Tap the **ON** tick box.

   The screen changes.



4. Tap **Done** to return to the wireless screen.
5. Tap **Done** twice again to return to the main screen.

Check GPS Information

Once a Bluetooth connection is made to the GPS receiver, it is possible to check the GPS position data and satellite information. Follow these steps to check the GPS information.

1. Navigate: **Status Bar** > **Wireless**

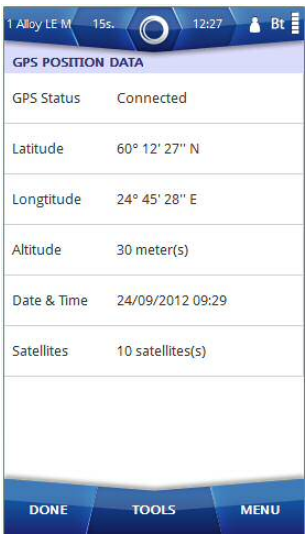
   The Wireless screen appears.

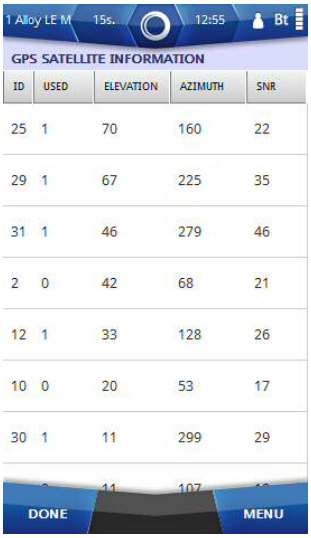
2. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

3. Tap **View GPS Information**.

   The GPS Position Data screen appears.





4. Tap: **Tools** > **Refresh Now** to refresh the GPS Position Data.
5. Tap: **Tools** > **View Satellites**

   The GPS Satellite Information screen appears.
6. Tap **Done** to return to the GPS Position Data screen.
7. Tap **Done** to return to the Bluetooth Settings screen.
8. Tap **Done** twice again to return to the main screen.

Setup and use the Nokia LD-3W Bluetooth GPS

Setup the X-MET8000 series for use with the Nokia LD-3W Bluetooth GPS receiver to add location information to the measurements.

Install battery and charge Nokia LD-3W Bluetooth GPS

When using the Nokia LD-3W Bluetooth GPS receiver for the first time, install the battery in the Nokia LD-3W and charge it before use.

Please refer to the Nokia LD-3W Bluetooth GPS Module Users Guide for further information.

Switch on the Nokia LD-3W Bluetooth GPS receiver

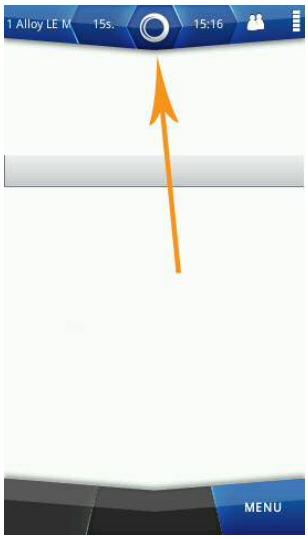
Switch on the Nokia LD-3W Bluetooth GPS receiver by pressing the power-key on the Nokia LD-3W Bluetooth receiver for one second.

Please note that a GPS receiver will not get a fix on the location indoors.

Add Nokia LD-3W Bluetooth GPS Connection

Follow these steps to connect to a Nokia LD-3W Bluetooth GPS.

1. Navigate: **Status Bar** .



2. Navigate: **Wireless** .

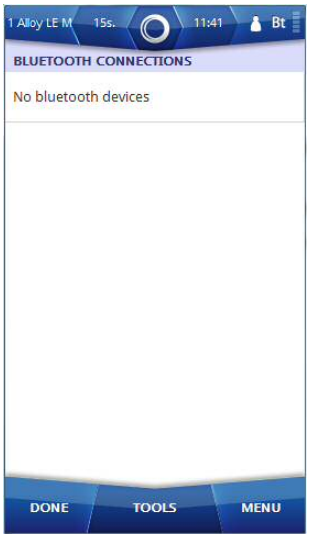
   The Wireless screen appears.

3. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

4. Tap the **ON** tick box.

   The Bluetooth Settings screen changes.



5. Tap **Set Device Name** to give the X-MET8000 series a device name.
6. Use the virtual keyboard to type an applicable name, and then tap **Done** to return to the Bluetooth Settings screen.
7. Tap **View Connections**.

   The Bluetooth Connections screen appears.

8. Tap: **Tools** > **Discover New Devices** .

   The Bluetooth Device Discovery screen appears, and a search for the Bluetooth devices begin.

   When the search is complete, the screen shows the available Bluetooth devices.

9. If necessary, tap: **Tools** > **Discover Again** .

   Another search for the Bluetooth devices begins, and the Bluetooth Device Discovery screen updates.

10. Tap on the discovered Nokia LD-3W Bluetooth device.

    The Set Pin Code for Bluetooth Device screen appears.

11. Enter the correct Pin Code, for a Nokia LD-3W this is **0000**.
12. Tap **Done** twice to return to the Bluetooth Connections screen.

    The Nokia LD-3W Bluetooth device is added to the Bluetooth Connections screen.

13. Tap on the newly added Nokia LD-3W Bluetooth device and select **Tools** and choose Connect to GPS Receiver.

    The Bluetooth Connections screen updates.

14. Tap **Done** to return to the Bluetooth Settings screen.
15. Tap **Done** twice again to return to the main screen.

Check GPS Information

Once a Bluetooth connection is made to the GPS receiver, it is possible to check the GPS position data and satellite information. Follow these steps to check the GPS information.

1. Navigate: **Status Bar** > **Wireless**

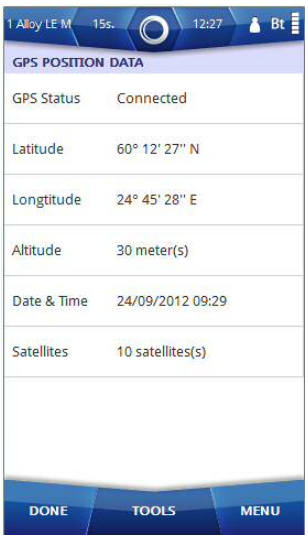
   The Wireless screen appears.

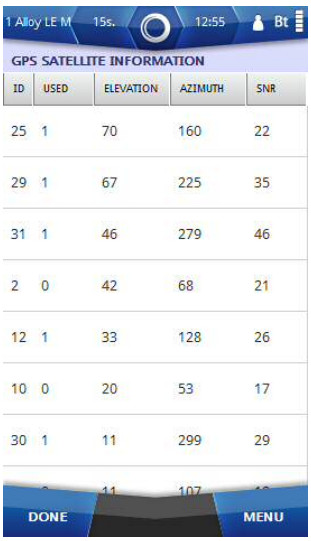
2. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

3. Tap **View GPS Information**.

   The GPS Position Data screen appears.





4. Tap: **Tools** > **Refresh Now** to refresh the GPS Position Data.

5. Tap: **Tools** > **View Satellites**

   The GPS Satellite Information screen appears.

6. Tap **Done** to return to the GPS Position Data screen.
7. Tap **Done** to return to the Bluetooth Settings screen.
8. Tap **Done** twice again to return to the main screen.

Take A Measurement

Follow these steps to measure the sample.

1. Carefully hold the X-MET8000 series so that it touches the sample, and that both the proximity and measurement windows are covered.

   Do not press the X-MET8000 series into the sample.

   The proximity indicators change to green.

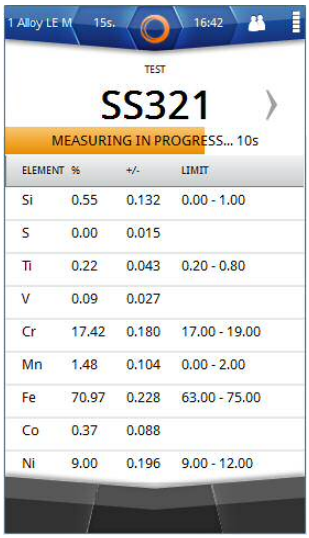
2. Pull and hold the trigger firmly.

   The X-ray On indicators blink red.

3. Keep the X-MET8000 series upright and steady during the measurement.

   Use both hands to hold the X-MET8000 series and keep them away from the sample.

   The Results screen refreshes approximately every 2 seconds.



4. At the end of the measurement time, the X-MET8000 series makes a ‘ping’ sound. Release the trigger to stop the measurement.

   The measurement stops, and the X-MET8000 series displays the result.

   It is possible to release the trigger and stop the measurement before the ‘ping’ sound.

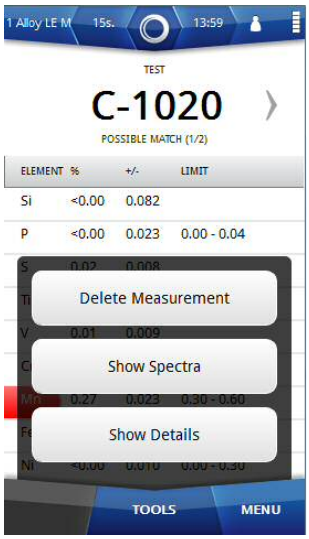
   Follow these steps again to make the next measurement.

   Flick the screen to left or right to access other results.

Read stored location information

The location information is stored with the measurement data in the X-MET8000 series.

To view the location information stored with the last measurement, tap **Tools**, **Show Details**.

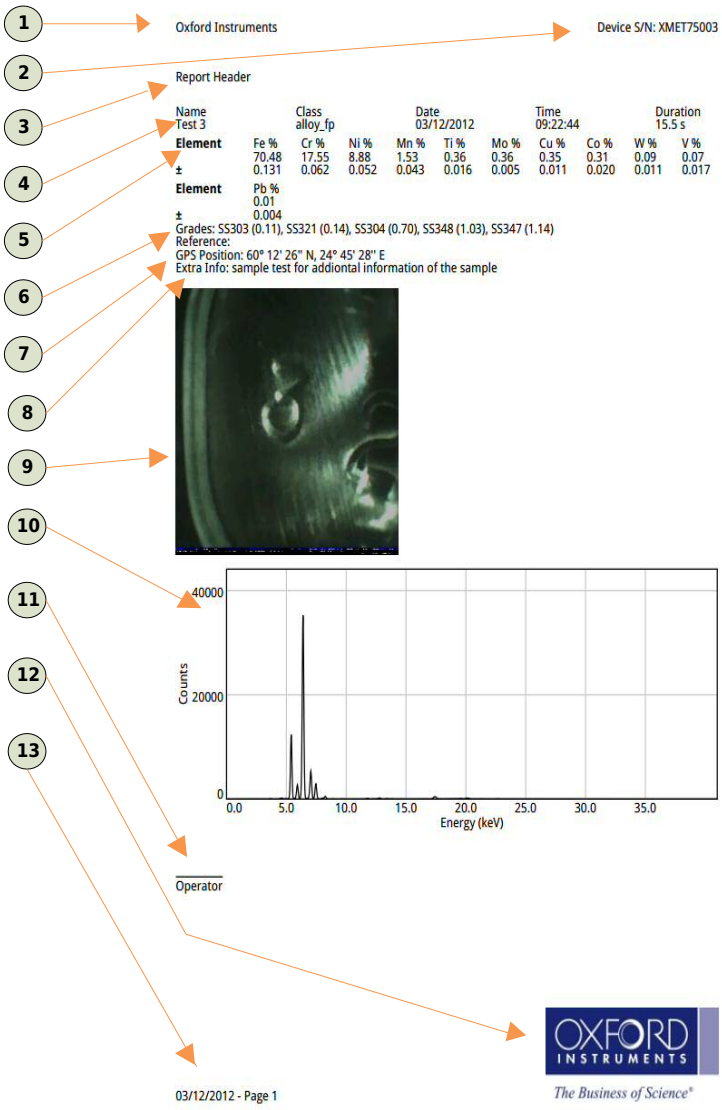


The location information is included in all available report formats.

Please refer to the X-MET8000 series Supervisors Guide for more information on generating reports.

A Custom Report

This is a typical custom report. The report template provides full control of all these aspects of the report.



Margins

The margins can include:

- Company information
- Company logo
- The device serial number
- The date and page number.

It is possible to place these items in any of the four margins.

Report header

The report can start with an introduction.

Sample information

Sample information includes:

- The sample name

	• The mode or method • The date and time • The measurement time.
Element information	It is necessary to select the elements to appear in the report. Chosen elements that are not present in the sample do not appear in the report unless **All The Elements From The Result** option is selected . Element information can include the concentration and +/- value.
Grade	The report can include the grade information.
GPS Position	The report can include the GPS information.
Additional Information	The report can include the additional information for the sample.
Camera Image	The report can include the camera image of the sample.
Spectra	The report can include the spectra for the sample.
Operator information	The report can include information about the operator.

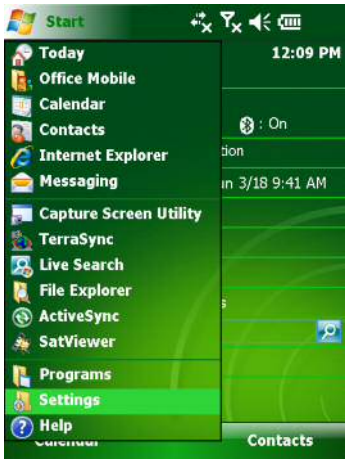
Setup and use a Trimble Field Computer and GPS

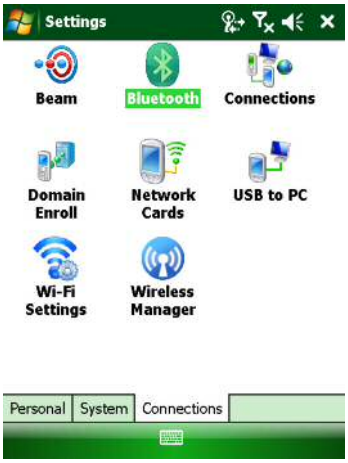
Connecting the X-MET8000 series to a Trimble Field Computer and Trimble® TerraSync™ software.

Enable Bluetooth on the Trimble

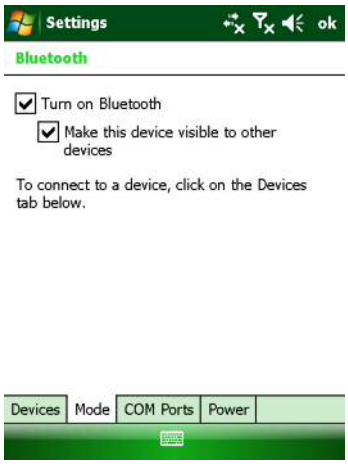
Follow these steps to enable Bluetooth on the Trimble Nomad 900 series.

1. On the Trimble Nomad 900 series, Navigate: **Start** > **Settings** > **Connections** .





2. Tap: **Bluetooth** > **Mode** .



3. Make sure the **Enable Bluetooth** has a checkmark.

   For the Trimble Nomad 900 series to be visible to other devices, also make sure the **Make this device visible to other devices** has a checkmark.

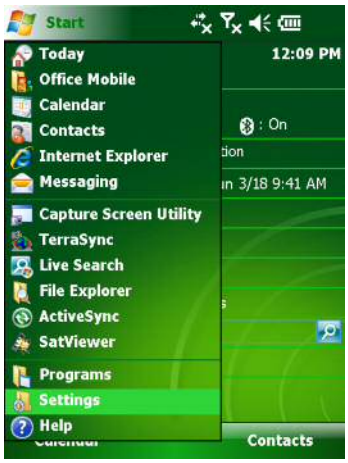
   Bluetooth is now enabled.

4. Tap **OK** in the upper right corner to close the Bluetooth settings screen
5. Tap **X** in the upper right corner to close settings and return to the default start screen.

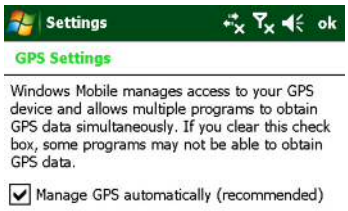
Setup a Trimble Field Computer and GPS

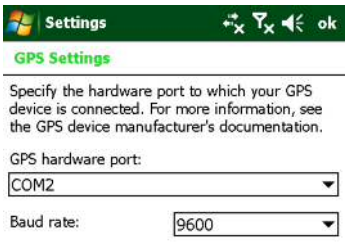
Setup a Trimble Nomad 900 series or equivalent Handheld Field Computer to provide GPS connection for multiple programs using this guide. To use other GPS and/or data collecting devices, please refer to the user's guides for these. GPS settings:

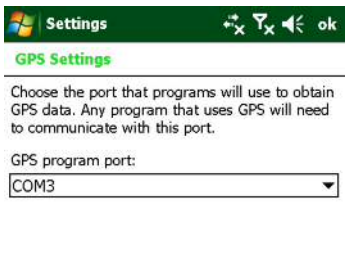
1. If you are using only one GPS-aware application, for example Trimble® TerraSync™, these settings do not need to be changed. However, to use multiple GPS-aware applications simultaneously, tap **Start** > **Settings** > **System** > **GPS** .



2. Next select the following tabs:
   a) **Access:** The GPS Intermediate Driver allows multiple applications to access the GPS receiver (disabled by default). To enable the GPS Intermediate Driver, select the check box.
   b) **Hardware:** COM2 is the hardware port dedicated for the built-in GPS. Verify that COM2 is selected. The internal GPS communicates at 9600 baud by default. If it has been modified by a third party program, adjust to match the receiver baud rate.
   c) **Programs:** Programs that use GPS need to know which port to use to access GPS data. Ensure that the COM port on the GPS- aware application is set to the same port as shown in the Programs tab of the GPS applet. The programs port must be a different port than the hardware port.





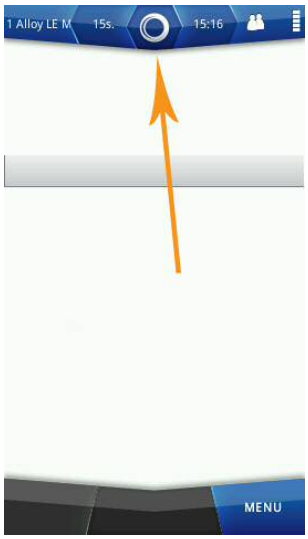


3. Tap **OK** in the upper right corner to close the GPS settings screen
4. Tap **X** in the upper right corner to close settings and return to the default start screen.

Add Trimble Bluetooth GPS Connection

Follow these steps to connect the X-MET8000 Series to a Trimble Nomad 900 series Bluetooth GPS.

1. Navigate: **Status Bar** .



2. Navigate: **Wireless** .

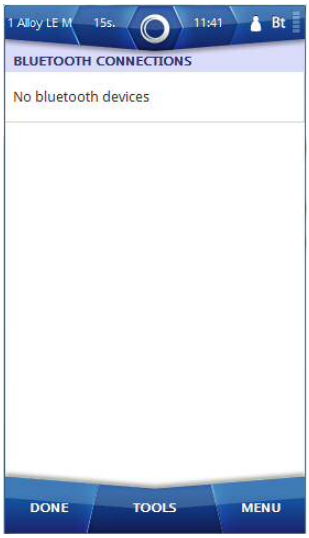
   The Wireless screen appears.

3. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

4. Tap the **ON** tick box.

   The Bluetooth Settings screen changes.



5. Tap **Set Device Name** to give the X-MET8000 series an unique and recognizable device name.
6. Use the virtual keyboard to type an applicable name, and then tap **Done** to return to the Bluetooth Settings screen.
7. Tap **View Connections**.

   The Bluetooth Connections screen appears.

8. Tap: **Tools** > **Discover New Devices** .

   The Bluetooth Device Discovery screen appears, and a search for the Bluetooth devices begin.

   When the search is complete, the screen shows the available Bluetooth devices.

9. If necessary, tap: **Tools** > **Discover Again** .

   Another search for the Bluetooth devices begins, and the Bluetooth Device Discovery screen updates.

10. Tap on the discovered Trimble GPS Receiver device, this might show up as a blank field if no identification is given to the Trimble GPS Receiver.

    The Set Pin Code for Bluetooth Device screen appears.

11. Enter a Pin Code

    A screen appears on the Trimble GPS Receiver verifying that the connection is allowed

12. Tap **Yes** on the Trimble GPS Receiver to allow the connection.

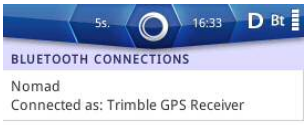
    A screen asking for the pin code will appear on the Trimble GPS Receiver

13. Enter the same pin code that was entered on the X-MET8000 series in step 11 and tap **Next**.

    The Trimble GPS Receiver is added to the Bluetooth Connections screen.

14. On the X-MET8000 series, tap on the newly added Trimble GPS device and select **Tools** and choose Connect to GPS Receiver.

    The Bluetooth Connections screen updates.

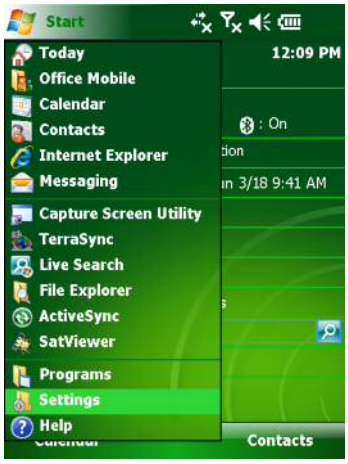


15. Tap **Done** to return to the Bluetooth Settings screen.
16. Tap **Done** twice again to return to the main screen.

Add Serial Port to the Trimble

Follow these steps to add a serial port for external sensors on the Trimble Nomad 900 series Bluetooth GPS.

1. On the Trimble Nomad 900 series, Navigate: **Start** > **Settings** > **Connections** .

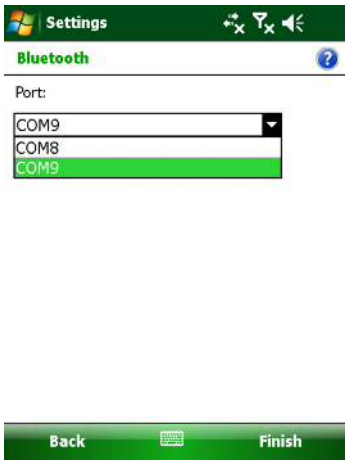


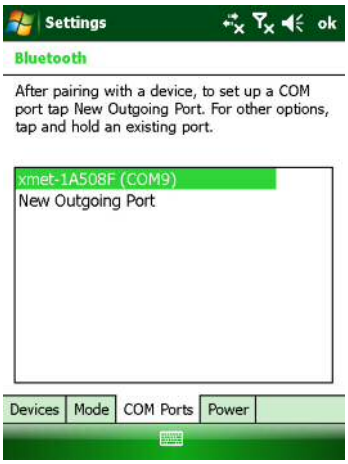
2. Tap: **Bluetooth** > **Com Ports** > **New Outgoing Port** .

3. Tap **Next**.

   The **Port Selection** drop down list appears.

4. Select the next free **COM** port from the list and tap **Finish**.



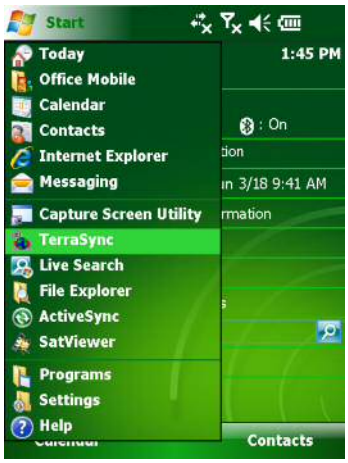


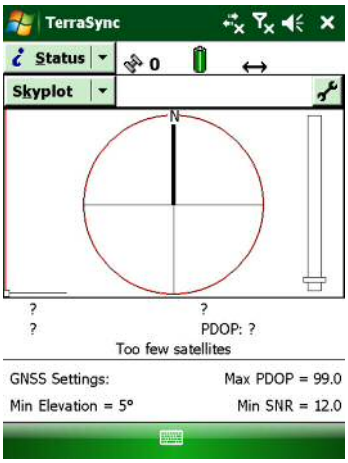
5. Tap **OK** in the upper right corner to close the Bluetooth settings screen
6. Tap **X** in the upper right corner to close settings and return to the default start screen.

Configure Trimble® TerraSync™ with X-MET8000 Series as external sensor

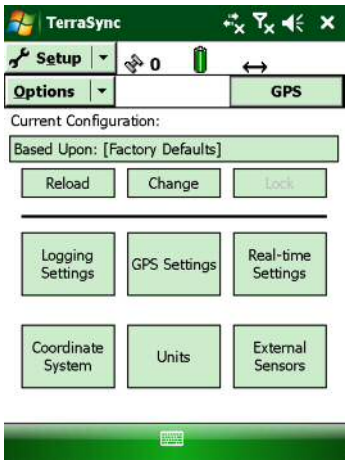
Follow these steps to setup Trimble® TerraSync™ to use the X-MET8000 Series as external sensor.

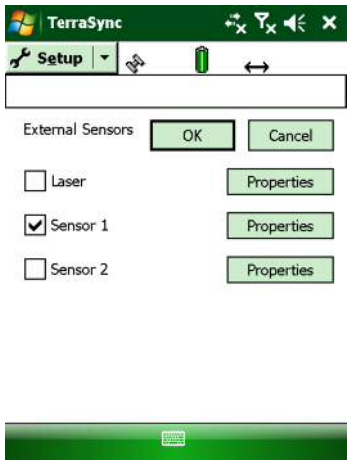
1. On the Trimble Nomad 900 series, Navigate: **Start** > **TerraSync** .





2. Navigate: **Status** > **Setup**



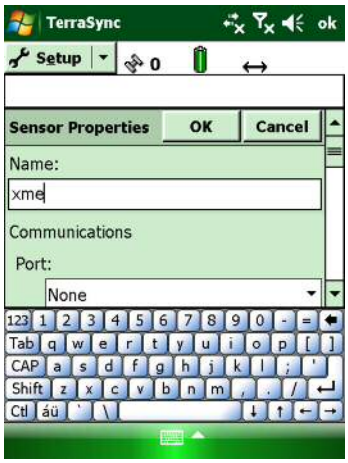


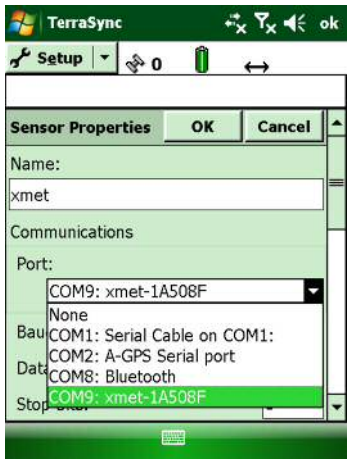
3. Tap **External Sensors**.

   The External Sensor configuration screen appears.

4. Verify that the **Sensor 1** checkbox is a checked, if not tap on the checkbox to the left of **Sensor 1**.

5. Tap **Properties** for **Sensor 1** and enter an applicable name.





6. Tap the **Port** dropdown list and select the **COM**-port previously assigned to the X-MET8000 Series

7. Enter the configuration data for the sensor as per table 1 depending on the required storage option, Full Data or Summary.

Table 5: Configuration table

Property	Value
Name	X-MET
Port	(The COM port configured previously)
Baud Rate	9600
Data Bits	8
Stop Bits	1
Parity	None
Prefix String	$PXMTM, (Full Data) **OR** $PXMTM, BEGIN, (Summary)
Suffix String	\0a\0d
Max Bytes	200
Time Out	0
Receiver Mode	Unsolicited
Logging Intervals	All
Data Destination	Uninterpreted (Full Data) **OR** As Attribute (Summary)

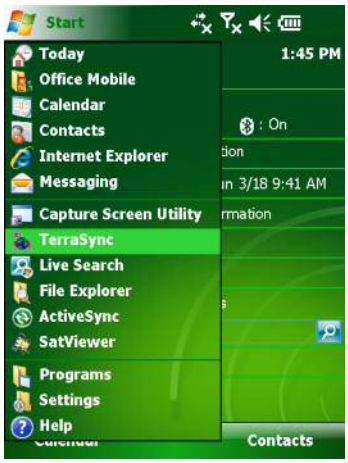
8. Tap **OK** twice to store and exit the sensor configuration.
9. Verify that the information transfers from the X-MET8000 Series by follow the steps in the next chapter.

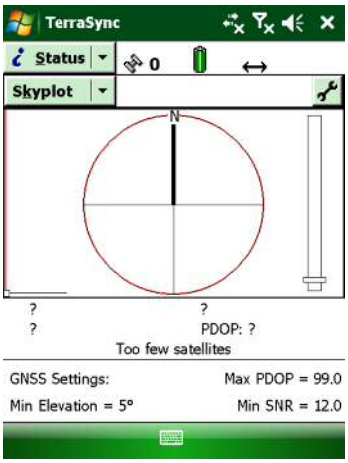
Collect Features to Trimble® TerraSync™ with X-MET8000 series as external sensor

Follow these steps to verify that the X-MET8000 series information transfers to Trimble® TerraSync™.

The X-MET8000 series and Trimble Field Computer are properly configured and powered on.

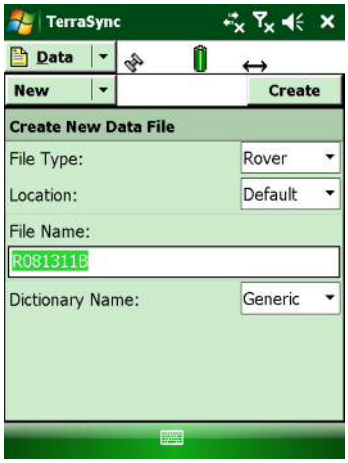
1. On the Trimble Nomad 900 series, Navigate: **Start** > **TerraSync** .

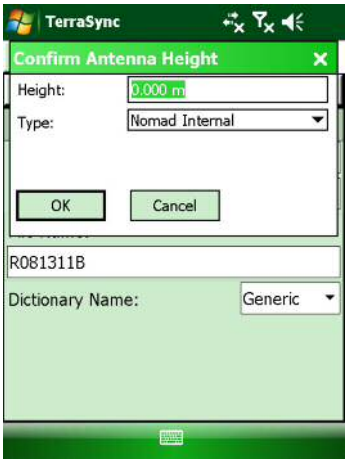




2. Navigate: **Status** > **Data** .

   Create New Data File-screen appears



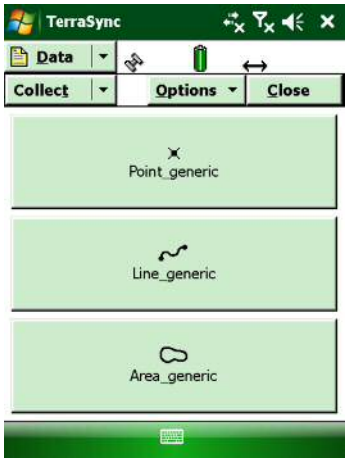


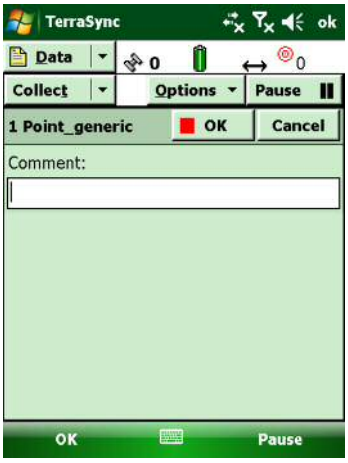
3. Enter a **File Name** if needed.
4. Tap **Create**

   Confirm Antenna Height screen appears

5. Enter correction information if needed and tap **OK**.

   The Method section screen appears

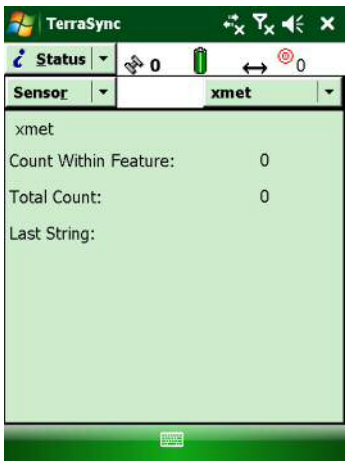


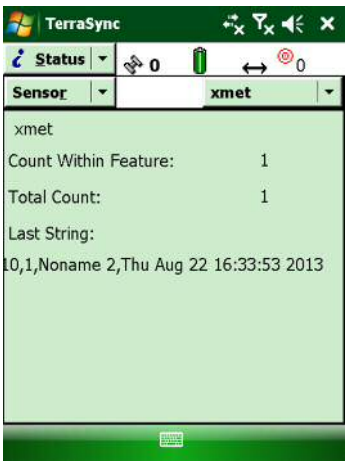


6. Tap on one of the methods to start collecting features. The basic procedure for capturing point, line, and polygon features is the same, except as described below.

   - Point features - Remain on station while contributory positions are captured.
   - Line features – Move directly along the feature's complete alignment as positions are captured.
   - Area features – Move directly along the feature's complete perimeter as positions are captured

7. To view a summary of the collected sensor data, Navigate: **Data** > **Status** then **Skyplot** > **Sensor** .





8. Make a measurement using the X-MET8000 series.

   The measurement count for the X-MET8000 series sensor increases in Trimble® TerraSync™ for every measurement made using the X-MET8000 series.

How-To use the Trimble® TerraSync™ Data

How to use Trimble® TerraSync™ data and the measurements from the X-MET8000 series.

Post processed differential correction in the GPS Pathfinder Office software is the most accurate way to process GNSS (Global Navigation Satellite System) data. In the field, you collected autonomous and/or real- time corrected data, while base data was stored at base stations nearby. The data sets are loaded into the GPS Pathfinder Office software where corrections are applied. Any real-time data that has been collected can be “recorrected” in the GPS Pathfinder Office software to achieve the best possible results.

After you display your corrected data file, you can:

• Edit any unwanted positions

• Verify that the feature information is correct, and edit any attributes

• Export your data to a format that integrates with your software requirements.

To install Trimble® TerraSync™/Pathfinder/ArcGIS and similar software please refer to the installation guides for the software in question.

To transfer the Trimble® TerraSync™ software files between a data collector and an office computer, you need one of the following installed on the office computer:

• Compatible version of the GPS Pathfinder Office software

• The Trimble Data Transfer utility, which is available for free download from the Trimble website at http://www.trimble.com/datatransfer.html

You also need one of the following installed on the office computer:

• ActiveSync technology, version 4.5 or later, if you are running a Microsoft Windows operating system other than the Windows Vista operating system.

• Windows Mobile Device Center, if you are running the Windows 7 or Windows Vista operating system.

Transfer the data files from Trimble® TerraSync™ using the Data Transfer utility in the Pathfinder Office Software for post processing.

The X-MET8000 series measurement results are included in the Trimble® TerraSync™ data files if the Full Data option is used and has to be parsed before use as Trimble® TerraSync™ limits messages to 256 characters and the measurement results are split over multiple messages. If the Summary option is used for the X-MET8000 series data, the measurement files must be fetched separately from the X-MET8000 series device. The Measurement ID contained in the summary can be used to obtain the full measurement result using the X-MET8000 series Application Programming Interface (XAPI).

Troubleshooting GPS

Use this information to diagnose any problems with the X-MET8000 series and GPS or Location. If this information does not deal with the problem, refer to the local Oxford Instruments representative.

Troubleshooting GPS

If the X-MET8000 series can't connect to the GPS receiver, follow these steps:

Verify that the GPS receiver is switched On.

Verify that Bluetooth is enabled on X-MET8000 series, if not enable Bluetooth on the X-MET8000 series.

Verify that the GPS device is recognized by the X-MET8000 series and that the GPS device is connected as a GPS-device on the X-MET8000 series.

Check the satellite information on the X-MET8000 series.

If none of the above resolves the problem, go through the GPS/Bluetooth setup procedure for the X-MET8000 series.

Troubleshooting unavailable Location

The X-MET8000 series can't determine the location, GPS-device is present.

Make sure the GPS device has a clear view of the sky, please note that GPS-receivers do not work properly indoors.

Place the GPS receiver in a good location with clear view of the sky to get a fix on the location.

If the GPS receiver is unable to get a fix on the location, restart the GPS receiver.

Check satellite data in the X-MET8000 series to verify that the location information is available on the X-MET8000 series.

If the problem persists please refer to the GPS receivers manual for more information.

Troubleshooting Trimble® TerraSync™

In case of problems with Trimble devices, Trimble® TerraSync™ or other equipment, follow these steps and for further information refer to the users guides for the equipment in question.

Verify that the Trimble-GPS receiver is switched On.

Verify that Bluetooth is enabled on both the X-MET8000 series and the GPS device, if not then enable Bluetooth.

Verify that the GPS device is recognized by the X-MET8000 series and that the GPS device is connected as a GPS-device on the X-MET8000 series.

Verify that the X-MET8000 series is visible as an external sensor in Trimble® TerraSync™, if not please follow the setup instructions.

X-MET Application Programming Interface

The X-MET8000 series provides software access to measurement data and other information over USB or WLAN connection.

X-MET Application Programming Interface (XAPI)

XAPI is a RESTful web service accessible via the URL http://10.0.0.1:8080/xapi/ if the X-MET8000 series is configured to use the default IP address of 10.0.0.1. The data is returned in XML format. This document contains examples of retuned data and an XML Schema Document "xapi.xsd" is provided for reference. The X-MET8000 series can also be configured to push new measurement results to a HTTP server.

Oxford Instruments Analytical Customer Support provides example files for usage of the XAPI on request.

Resources

The following resources under the XAPI URL can be queried with HTTP GET request.

/ A directory of top level resources. The following list is returned in software version 1.2:

```
<DirectoryListing>
   <Entry name ="Measurements" xlink="measurements" />
   <Entry name ="Methods" xlink="methods" />
   <Entry name ="Report Templates" xlink="reporttemplates" />
   <Entry name ="Report PDF" xlink="reportpdf" />
   <Entry name ="Push Client Settings"
       xlink="pushclientsettings" />
</DirectoryListing>
```

/measurements A list of all available measurements. The list can be filtered using HTTP GET parameters **startDate**, **endDate**, **measurementNamePart** and **methodNamePart**. For example, the URL /measurements?startDate=2011-02-16 lists measurements with date 16th February 2011 or later. Entries in the list have the **datetime**, **methodName**, **id** and **name** attributes:

```
<Measurements>
  <MeasurementRef datetime="2011-01-01T13:01:56.253"
    methodName="metal_fp" id="1" xlink="1"
    name="Noname 1" />
</Measurements>
```

Individual measurement resources are located at **/measurements/<id>** where the <id> is the ID number of the measurement. Normal Measurements use the **Measurement** root element, average measurements have an **AverageMeasurement** element instead. Depending on the method used there is at least one **FundamentalParametersResult**, **EmpiricalAssayResult** or **EmpiricalIdentificationResult** element. An average measurement also have an **AverageResult** element.

FP and empirical assay results contain **ConcentrationResults** and **Grades** elements while an identification method result contains an **IdentificationResults** element instead. The **Spectrums**, **AdditionalInfo**, and **Location** (GPS position) elements are common to all result types.

```
<Measurement measurementTime="2011-01-01T13:01:56.253"
             id="1" name="Noname 1">
 <Result>
  <FundamentalParametersResult1
   measurementTime="2011-01-01T13:01:56.253"
   name="Noname 1" measurementDuration="6">
  <ScreeningInfo>
   <ScreeningMethod name="metal_fp" />
```

```
  </ScreeningInfo>
  <spectrums>
   <Spectrums>
    <SpectrumRef xlink="/xapi/spectrums/1" />
   </Spectrums>
  </spectrums>
  <ConcentrationResults>
   <ConcentrationResult name="Fe"
     standardDeviation="0.259588"
     numberOfDecimals="2" concentration="68.6963"
     unit="%" />
   </ConcentrationResults>
   <Grades>
    <Grade name="SS316" match="0.612988">
     <GradeElement elementShortName="Fe"
                   highLimit="0.8" result="OK"
                   lowLimit="0.6" />
     </Grade>
    </Grades>
   </FundamentalParametersResult>
  </Result>
</Measurement>
```

/spectrums The resource **/spectrums/<id>** contains the mapping from channels to energy (**slope>** and **intercept** units), measurement parameters (**current** and **voltage** and the counts for each channel.

```
<Spectrum slope="20046" name=""
  measurementTime="2011-01-01T13:04:15 current="10"
  intercept="0" voltage="40" id="3" accumulationTime="5">
 <Counts value="0" channel="0" />
 <Counts value="0" channel="1" />
  ...
</Spectrum>
```

/methods A list of methods in the device with method ID and name.

```
<Methods>
  <MethodInfo id="1" name="Aluminium" />
  <MethodInfo id="2" name="Aluminium ID" />
  <MethodInfo id="3" name="alloy_fp" />
</Methods>
```

/reporttemplates A list of report templates in the device with name, modification date and ID.

The ID is used for generating PDF reports.

```
<ReportTemplates>
  <ReportTemplateInfo
    modificationDate="2011-01-01T14:31:10.249"
    id="1" name="basic" />
</ReportTemplates>
```

/reportpdf Generate and return a measurement report in the PDF format used by the report generator in device GUI and web GUI. Report template and measurements must be selected using the **reportTemplateId** and **measurementId** GET parameters. For example, the URL /reportpdf?reportTemplateId=1&mesurementId=10&mesurementId=12 would generate report PDF using template 1 ad containing the two measurements with IDs 10 and 12.

/pushclientsettings returns current settings of the push client. The default values are

```
<pushclientsettings>
  <server-url>http://localhost:5000/measservice</server-url>
  <user>user</user>
```

```
  <password>password</password>
  <buffersize>0</buffersize>
  <retryinterval>60</retryinterval>
  <send-measurements>false</send-measurements>
  <send-spectrums>false</send-spectrums>
</pushclientsettings>
```

The parameters are explained below.

Push API

The X-MET8000 series can be configured to send new measurements and spectra to a specified URL in HTTP POST requests. The push client is enabled and configured by performing a HTTP PUT request to the **/pushclientsettings** resource in the format defined above. If the PUT request was successful, HTTP Status code 200 OK is returned and the new settings come to effect immediately. In case of an error, HTTP Status code 400 Bad Request is returned and settings are not modified. Settings are saved and restored when the X-MET8000 series device is restarted.

The following parameters can be set:

- **server-url:** Valid server URL to the root directory of the push-server.
- **user:** Username used in HTTP Basic authentication.
- **password:** Password used in HTTP basic authentication.
- **buffersize:** The amount of extra spectra and measurement results that are stored in a queue in case of a connection error. Buffer size must be an integer in range [0, 100]. **No data is sent if buffer size is set to 0.**
- **retryinterval:** Interval in second between retry attempts in case of a connection error. Value must be a positive integer.
- **send-measurements:** Configures if measurements results are sent to the server. Valid values are "true" and "false".
- **send-spectrums:** Configures if spectra are sent to the server. Valid values are "true" and "false".

Push Client sends spectra and measurement results to the server whenever a new spectrum or result is finished. Measurements are sent in a HTTP POST request to the URL **<server-url>/[serial-number]/measurements** where **[serial-number]** is the serial number of the X-MET7000 series

Measurement results are sent in the same XML format that is used for the **/measurements** resource, except that the Spectrums element containing links to spectra is replaced with a SpectrumData element containing the data directly.

Spectra are sent to the URL **<server-url>/[serial-number]/spectrums** in the same XML format used for the **/spectrum** resource.

Push Client uses HTTP Basic authentication when communicating with the server. In case of an error, Push Client keeps spectra and measurements in the queue and tries sending again every <retryinterval> seconds.

Additional Troubleshooting

Additional troubleshooting information applicable to a supervisor. When it is necessary to service the X-MET8000 series, a supervisor can do a test measurement and save diagnostics information to send to Oxford Instruments.

A test measurement does not use the methods to define the measurement parameters, but allows a supervisor to set them directly. The diagnostics information should include a particular test measurement with the Alloy CRM sample, and is saved to a compressed archive tar file.

Missing Menus Or Methods

Problem

Occasionally, certain menu items and methods are not available.

Solution

This can occur when a supervisor logs in as an operator. A supervisor can access more of the features and functions of the X-MET8000 series. The features and functions available to an operator are suitable for someone who takes measurements most of the time.

A supervisor can access all of the methods available within the X-MET8000 series, including the empirical calibrations. An operator does not need to access empirical calibrations because a mode will auto select the most applicable calibration.

Do A Test Measurement

Follow these steps to do a test measurement. Use the Alloy CRM sample, or an applicable check sample or check samples for the measurement.

1. Do one of the following:
   - Navigate: **Menu** > **Time**
   - Navigate: **Status Bar** > **Measurement Time**

   Make sure that Timed Assay is set correctly.

2. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Test Measurement** .

   The Test Measurement screen appears.

3. Tap **Measurement Time**.
4. Use the numeric keypad to type the measurement time, and then tap **Done** to return to the Test Measurement screen.
5. Tap **Measurement Parameters**.

   The Parameter Selection screen appears.

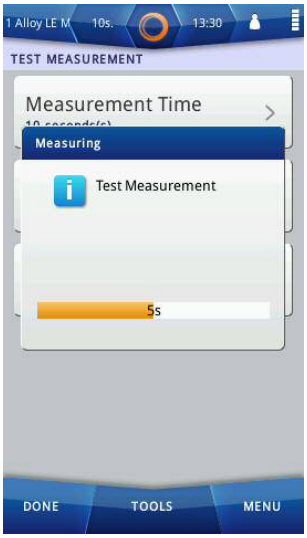
6. Tap one of the following to select it:

   - **40 kV 10 µA Filt 1**
   - **45 kV 15 µA Filt 4**
   - **25 kV 20 µA Filt 1**
   - **15 kV 45 µA Filt 3**
   - **45 kV 40 µA Filt 2**
   - **13 kV 45 µA Filt 3**

7. Make sure that the correct measurement parameter is selected, and then tap **Done** to return to the Test Measurement screen.

8. Tap **DPP Parameters**.

   The Parameter Selection screen appears.



9. Tap one of the following to select it:

   - **T(p) = 0.4 µs**
   - **T(p) = 0.6 µs**
   - **T(p) = 0.8 µs**
   - **T(p) = 1.1 µs**
   - **T(p) = 1.5 µs**

10. Make sure that the correct measurement parameter is selected, and then tap **Done** to return to the Test Measurement screen.
11. Take a measurement in the usual way.

    A Measuring dialog box appears.

    The Test Measurement screen appears at the end of the measurement.

    Refer to: *View The Spectra* on page 111.

12. Tap **Done** three times to return to the main screen.

Save Diagnostics Information

Follow these steps to save the diagnostics information to a compressed archive tar file. This includes a test measurement with specific parameters and the Alloy CRM sample.

1. Open the connector cover underneath the display to access the external connections.

2. Plug a USB memory device into the USB A connector.
3. Refer to: *Do A Test Measurement* on page 250 and set these parameters.
   - **Measurement Time**: 60 s
   - **Measurement Parameters**: **40 kV 10 µA Filt 4**
   - **DPP Parameters**: **T(p) = 1.1 µs**
4. Take the test measurement with the Alloy CRM sample.
5. Tap: **Tools** > **Save Diagnostics** .

   The diagnostics information is saved to a tar file on the USB memory device.
6. Tap **Done** three times to return to the main screen.

Radiation Specifications

The Finnish Radiation and Nuclear Safety Authority, STUK, tested the X-MET8000.

X-MET8000	Test Report TR/9/13

Primary Beam Intensity

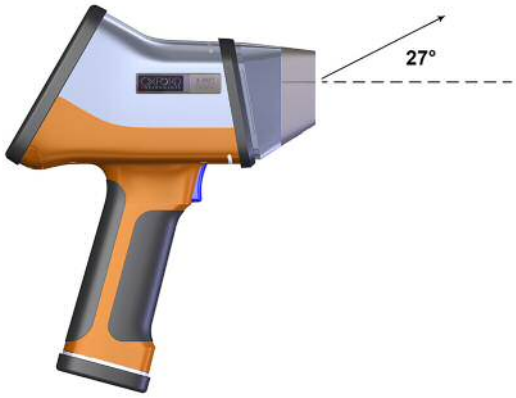
There are regulatory limits for the permissible radiation dose rate absorbed by hands and eyes during a year. These limits then define the maximum exposure time for hands and eyes against the sample window surface of the X-MET8000 series and also at a distance of 100 cm to it.

!! XMET7000 VALUES!!	Hands	Eyes
Permissible dose rate	50 mSv/year	15 mSv/year
Maximum exposure time, sample window surface	97 s	26 s
Maximum exposure time, 100 cm distance	100 h	30 h

- X-ray beam parameters: 50 kV / 50 µA
- Dose rate, sample window surface: 2,061 mSv/h
- Dose rate, 100 cm distance: 0.5 mSv/h

Primary Beam Direction

The safety features prevent the generation of an X-ray beam unless a sample is present. The X-ray beam is at an angle of approximately 27° upwards.



Scattered Radiation Profile

The Finnish Radiation and Nuclear Safety Authority, STUK, tested the X-MET8000 at 17 positions around the analyzer with a stainless steel sample. Some measurements were against the body, some were at a distance of 10 cm.

Stainless steel sample	SS316 plate, 10 mm thick

Scattered Radiation Profile Test Points

Position	Distance	Position	Distance	Position	Distance
1	10 cm	7	10 cm	13	0 cm
2	10 cm	8	10 cm	14	0 cm
3	10 cm	9	10 cm	15	0 cm
4	10 cm	10	10 cm	16	0 cm
5	10 cm	11	0 cm	17	0 cm
6	10 cm	12	0 cm		

Scattered Radiation Profile, X-MET8000, Steel Sample

Position	Dose Rate	Position	Dose Rate	Position	Dose Rate
1	< 1 µSv/h	7	< 1 µSv/h	13	< 1 µSv/h
2	< 1 µSv/h	8	< 1 µSv/h	14	< 1 µSv/h
3	< 1 µSv/h	9	< 1 µSv/h	15	< 1 µSv/h
4	< 1 µSv/h	10	< 1 µSv/h	16	< 1 µSv/h
5	< 1 µSv/h	11	< 1 µSv/h	17	< 1 µSv/h
6	< 1 µSv/h	12	< 1 µSv/h		