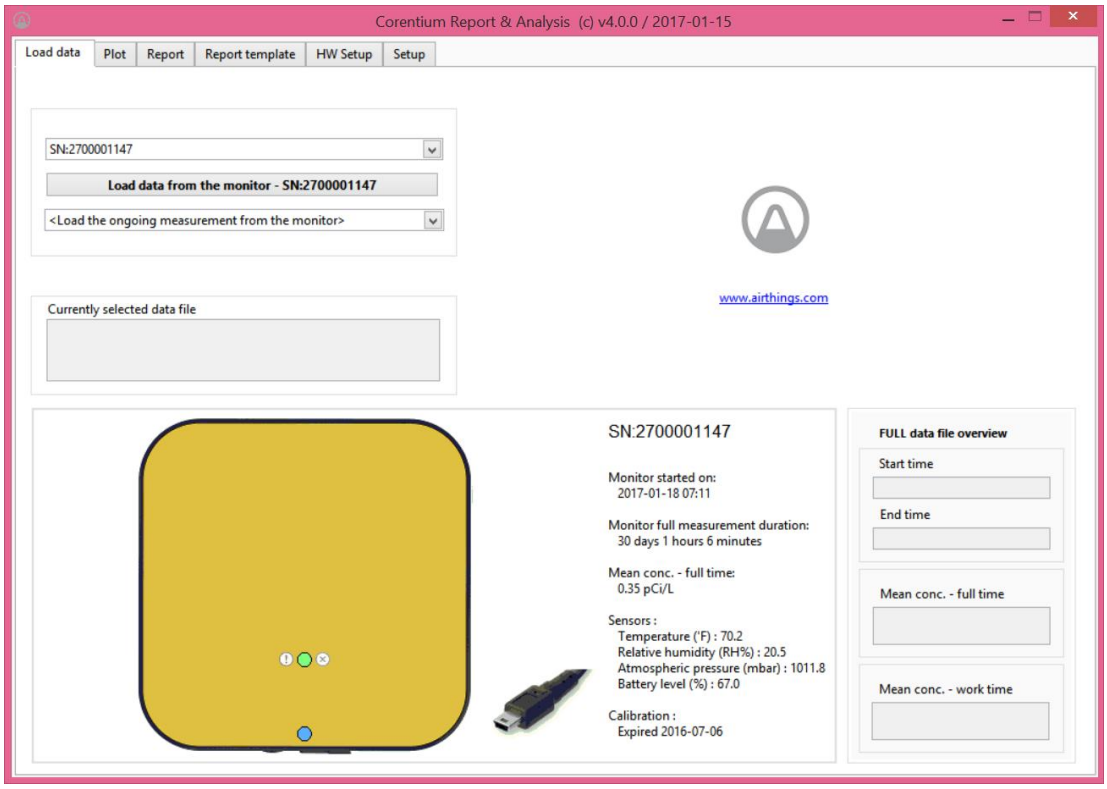
AIRTHINGS



CRA PC SOFTWARE
CORENTIUM REPORT & ANALYSIS

SOFTWARE MANUAL

v4.1

AIRTHINGS

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Date	File Name	Ver#Rev#	By	Approved
2015/12/07	SW Manual	V3R1	SSU	BMS
2016/01/28	SW Manual	V3R2	SSU	BMS
2016/05/30	SW Manual	V3R3	SSU	BMS
2016/10/04	SW Manual	V3R4	SSU	BMS
2017/02/17	SW Manual	V4R0	SSU	BMS
2018/04/22	SW Manual	V4R1	BMS	BMS

1 Introduction

This document describes the usage of the **'Corentium Plus/Pro Report and Analysis Software'** version **4.1**, in short referred to as **'CRA SW'**. This SW is used to analyze and generate reports from Radon measurements acquired by one (or more) Plus or Pro radon monitors by Airthings. **The SW can work only on PCs running Microsoft Windows operating system (XP and higher).**

Refer to the document 'CRA-Installation-Guide-English-V4-xxx.pdf' found on the USB memory stick for how to install the CRA SW and HW drivers and pre-requisites to run CRA SW. The PRO monitor is as shown in Figure 1-1.

(a) (b) (c)

Figure 1-1: (a) PRO monitor Top View (b) PRO monitor Bottom View (c) PRO monitor front view

The main points to remember during **installation running the SW for the first time** are:

- **DO NOT CONNECT THE PRO MONITOR TO THE PC BEFORE THE SW HAS BEEN INSTALLED!**
- **AFTER THE SW INSTALLLATION, YOU MUST PLUG IN A MONITOR BEFORE THE SW IS STARTED FOR THE FIRST TIME!**
- **DATA CAN BE READ FROM THE MONITOR ONLY AFTER 24HRS**

Naming conventions

CRA SW	- Corentium Plus/Pro Report & Analysis Software
PRO monitor	- Airthings Continuous Radon Monitor (CRM)
PC	- Computer, Notebook, Laptop
SW	- Software
HW	- Hardware

2 Opening CRA SW

Running CRA

1. Click the start button  (windows icon) in the lower left corner of windows. The Start menu allows you to select the basic functions of Microsoft Windows Environment.
2. From the start menu, click

   All Programs >> CRAxyx >> CRAxyz

   (or)

   Double-click on the shortcut icon as shown in Figure 2-1.

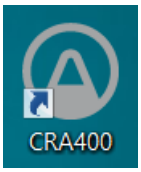


Figure 2-1: Desktop shortcut icon for starting the CRA SW

Exit the program

To close the program, click  (cross icon) on the upper right hand corner of the CRA SW main window indicated in Figure 3-1

3 User Interface

When the SW starts, the window appears as shown in Figure 3-1

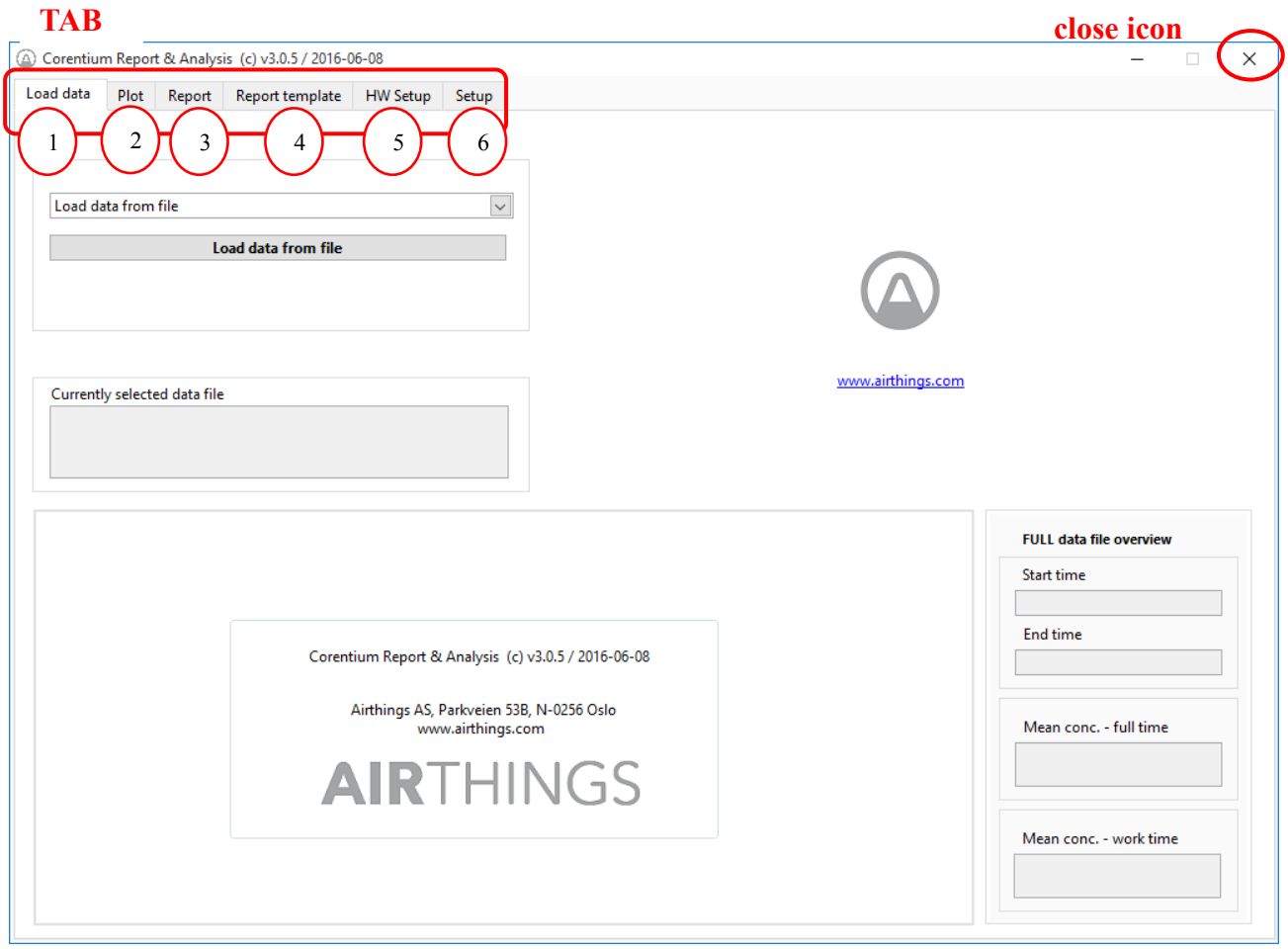


Figure 3-1: Main window view of the CRA SW application.

The CRA SW is based on a **"TAB"** view. The application has six main tabs as indicated in Figure 3-1.The **TAB's** can be opened by clicking on them (the last two tabs are HW Setup and CRA SW Setup).

An overview of the **TABs** is found in Table 3-1.

Load data	a) Upload data from a Pro monitor, or alternatively loads a data file that is stored earlier on the PC b) Navigate to the Report Wizard
Plot	a) Plots the radon concentration variation over time (i.e. *temporal* variations in the radon concentration) b) Calculate average radon concentration for the actual period.
Report	a) Sets the necessary Report options b) Choose the language and template of the report c) Generate a radon report
Report template	a) Customize a report template. Can be done by generating a new report template from scratch, or by modifying some of the existing report templates supplied with the CRA SW
HW Setup	a) Configures the Pro monitors hardware such as Delay selection, Test duration, HW lock and Lock old measurements
Setup	a) Configure the CRA SW settings like SW language, Measurement unit and seasonal correction factor.

Table 3-1: Overview of TABs.

4 TABS

This chapter explains the purpose and the feature of each Tab.

4.1 LOAD TAB

The Load Tab is sub-divided into the following three pane/sections/windows as shown in Figure 4-1

1. Load Interface
2. Report Wizard Interface
3. Summary

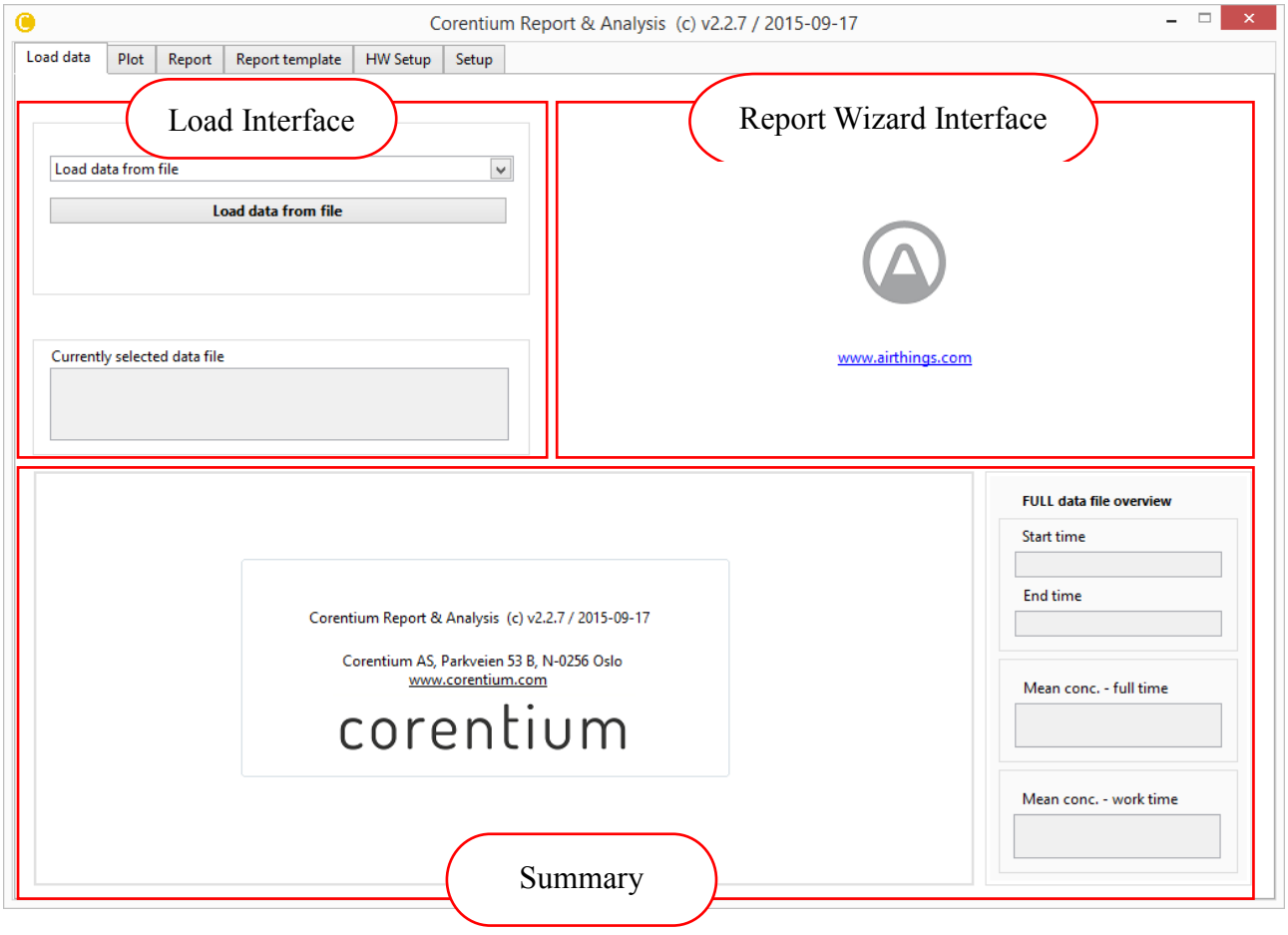


Figure 4-1: Load Tab divided into sections

The three functions of the **LOAD Tab** are:

1. Upload data from the PRO monitor. ***(Refer section 4.1.1)***
2. Open data stored locally in the computer. ***(Refer section 4.1.2)***
3. Navigate to Report Generation Wizard. ***(Refer section 4.1.3)***

4.1.1 Upload data from a PRO monitor

To upload data from a Pro monitor to the PC, follow the steps:

a. Connect USB cable from Pro monitor to PC as shown in Figure 4-2.

Figure 4-2: PRO monitor connected to PC

b. Once the connection is established successfully, one can notice the following changes as illustrated in Table 4-1 and displayed in Figure 4-3.

Section	Changes
Load Interface	a) **Pull down menu** displays Serial Number indicated by 1 b) **Load button** changed to ***"Load data from monitor - ..." indicated by*** 2 c) New **Pull down menu** as indicated by 3 pops up below the load button allowing to choose between the ***"Load the ongoing measurement from the monitor"*** or the ***"Select an older measurement from the monitor below"***
Report Wizard Interface	No changes
Summary	PRO monitor image displayed along with the summary.

Table 4-1: Load Tab windows changes

	Pull down menu : Allows you to select between different choices *Button : Push button to do a particular action*

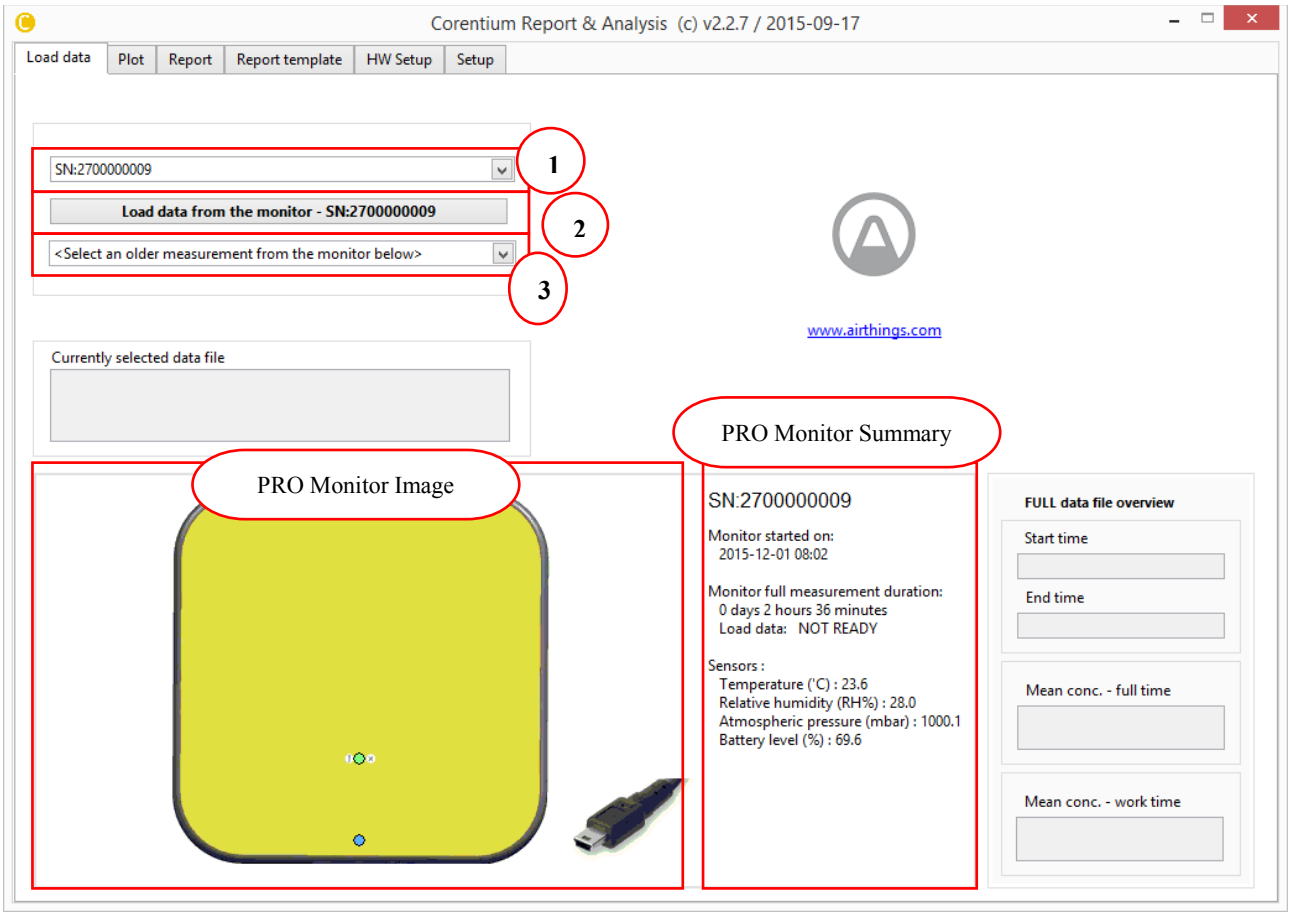


Figure 4-3: Load Tab window changes

	From 'PRO Monitor Image' section you would notice BLUE LED and GREEN LED Blinking. Blue LED blink indicates that the monitor is successfully connected. Green LED blink indicates the monitor is in operation mode and in good health status. If Yellow LED blinks it indicates warning but still operational. Warning message is displayed in the summary. RED LED blink indicates Error and the status is displayed in the summary.

c. Two types of data can be uploaded from PRO monitor to CRA SW:
   a. Ongoing measurement data/Recent data
   b. Old measurement data

Refer Figure 4-3 for the circled numbers

Upload Data	Steps
Ongoing/recent measurement	a) Make sure the **Pull down menu** (1) displays **"SN:2700ABCDEF"** b) **Load button** (2) displays ***"<Load data from monitor - ...>"*** and c) Push ***"Load data from monitor - ..."*** (2) .
Old measurement	a) **Pull down menu** (1) displays **"SN:2700ABCDEF"** b) New **Pull down menu** as indicated by (3) pops up below the **Load button.** Choose any old data set below ***"<Select an older measurement from the monitor below>".*** The data sets are in chronological order with the newest data sets at the top. Example for pull down menu (3) is shown in Figure 4-4 c) Push ***"Load data from monitor - ..."*** (2) .

Table 4-2: Upload data set from PRO Monitor to CRA SW

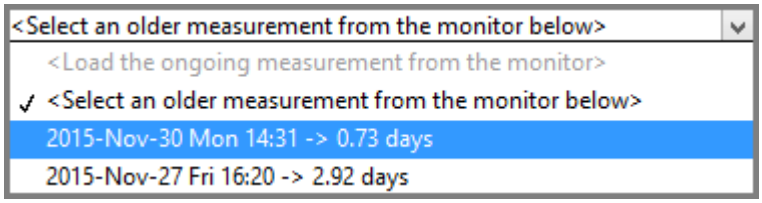


Figure 4-4: Pull down menu displaying old data set

From the above Figure 4-4, we can notice two data sets. Data set **"2015-Nov-27 Fri 16:20 -> 2.92"** is the oldest data set where the measurement was started on 27 Friday November 2015 and lasted for approximately 3 days. Second data set **"2015-Nov-30 Mon 14:31 -> 0.73 days"** was started on 30 Monday November 2015 14:31 and lasted for about 1 day.

d. After **"Load data from monitor"** button is pushed a window as shown in the Figure 4-5 opens indicating that Upload is in progress from PRO monitor to CRA SW.

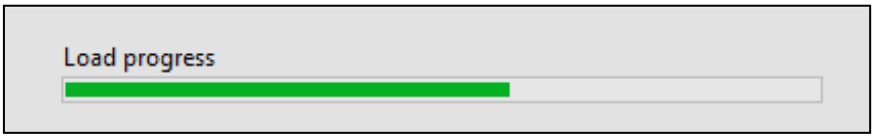


Figure 4-5: PRO monitor load progress window

⚠	*The data takes approximately 20 sec to upload from the PRO monitor. If unfortunately the contact between monitor and PC breaks during data upload an error message as shown in the following Figure 4-6.In this case try press continue and fix your connection*

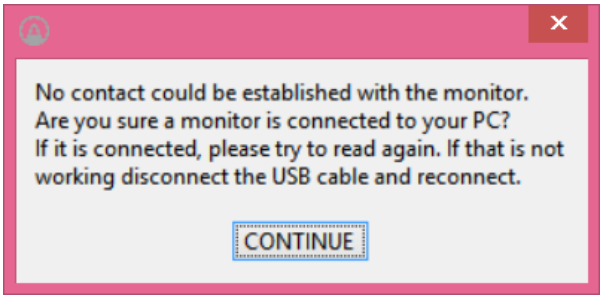


Figure 4-6: Error message displaying connection cannot be established with the Monitor

e. After uploading process is completed, a dialog window pops up to save the file with default extension of ***.cor**, as shown in the Figure 4-7.

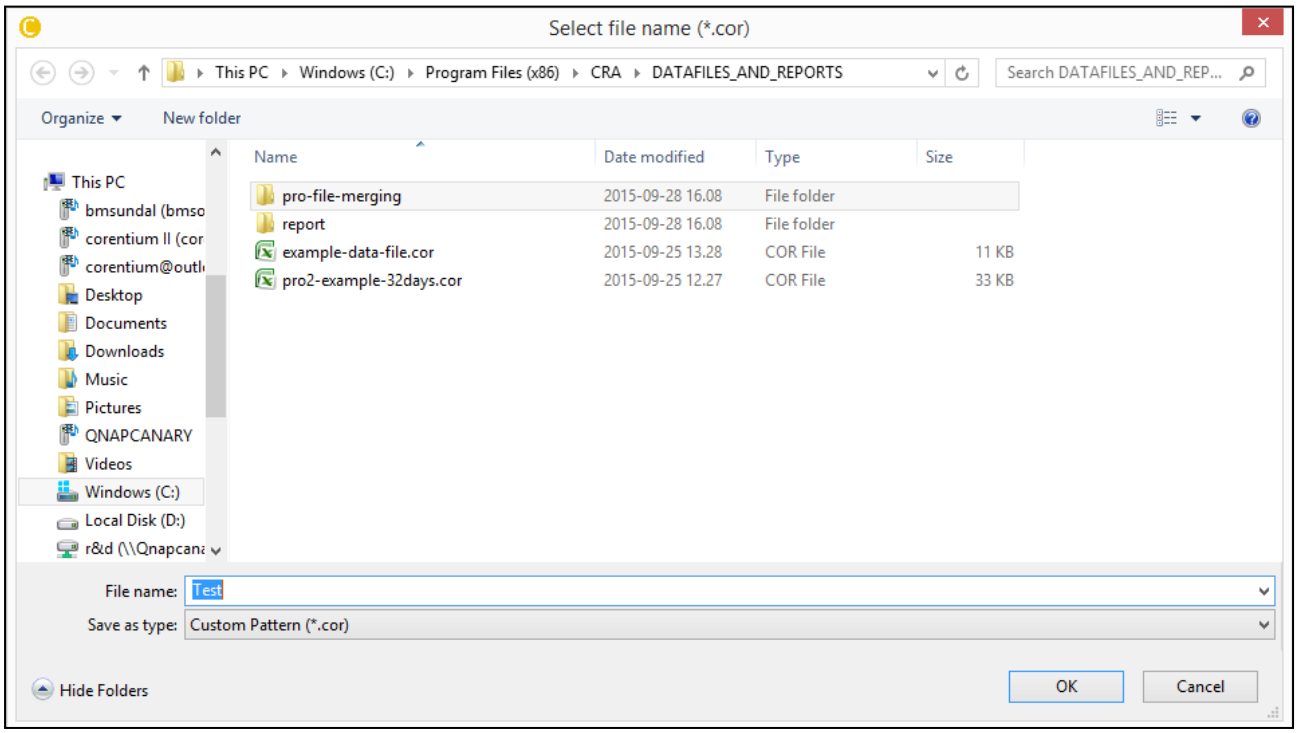


Figure 4-7: File dialog to save the Uploaded file from the PRO monitor

⚠	*Default file extension is .cor. CRA SW understands only *.cor extension file*

f. Once the data is saved as ***.cor** extension. CRA opens the file automatically from the folder.

- From Figure 4-8, Opened file and path to the file are indicated in Load interface section under **"Currently selected data file"**. This shows the name of the active file.
- From Figure 4-8**,** the uploaded data is displayed in Summary section. **Plot of radon concentration** on the left side of the Summary section and the **Measurements overview** on the right side of the Summary section such as start time, end time, average radon concentration and average radon concentration for work time (part of the week defined in Report tab)

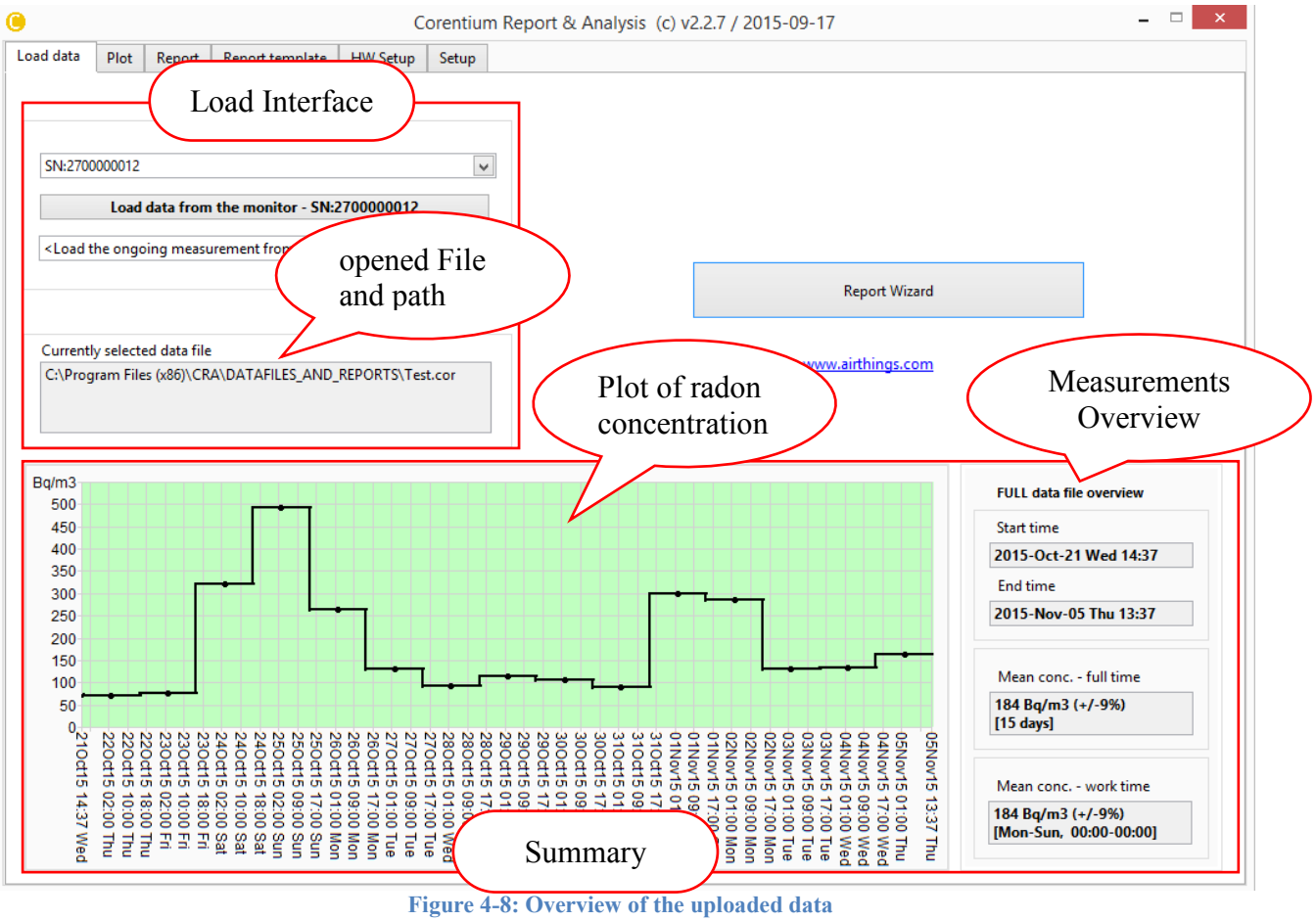


Figure 4-8: Overview of the uploaded data

⚠	*When data has been loaded from the PRO monitor, the monitor is free to start a new radon measurement. Remember to press the RESET-button when starting a new measurement.* *The PRO monitor should be kept with batteries inserted, even when the monitor is not in use. The batteries last at least 18 months and should be replaced as soon as the indicator 'LOW BAT' warning is indicated in CRA SW or the PRO monitor*

4.1.2 Open Saved/Existing file

The file stored in the PC is opened with or without connecting the PRO monitor. The procedure to open the file differs slightly based upon the state of CRA SW.

CRA SW works in two states:

a. Stand alone state -No connection between PRO monitor and CRA SW.

b. Dependent state - Connection between PRO monitor and CRA SW.

The procedure to open files during the above-mentioned states is described in-Table 4-3. The encircled numbers are indicated in Figure 4-3.

State	Steps
Stand alone	a) By default **Pull down menu** (1) displays ***"Load data from file"*** *b)* Push ***"Load data from file"*** button (2) .
Dependent State	a) By default **Pull down menu** (1) displays **"SN: 2700ABCDEF".** Select ***"Load data from file"*** from this pull down menu. *b)* Push ***"Load data from file"*** button (2) **.**

Table 4-3: Procedure to open files based on the state of CRA SW

After the load button is pressed the file dialog window pops up allowing you to select the file to be opened with only ***.cor** extension. Refer Table 4-9.

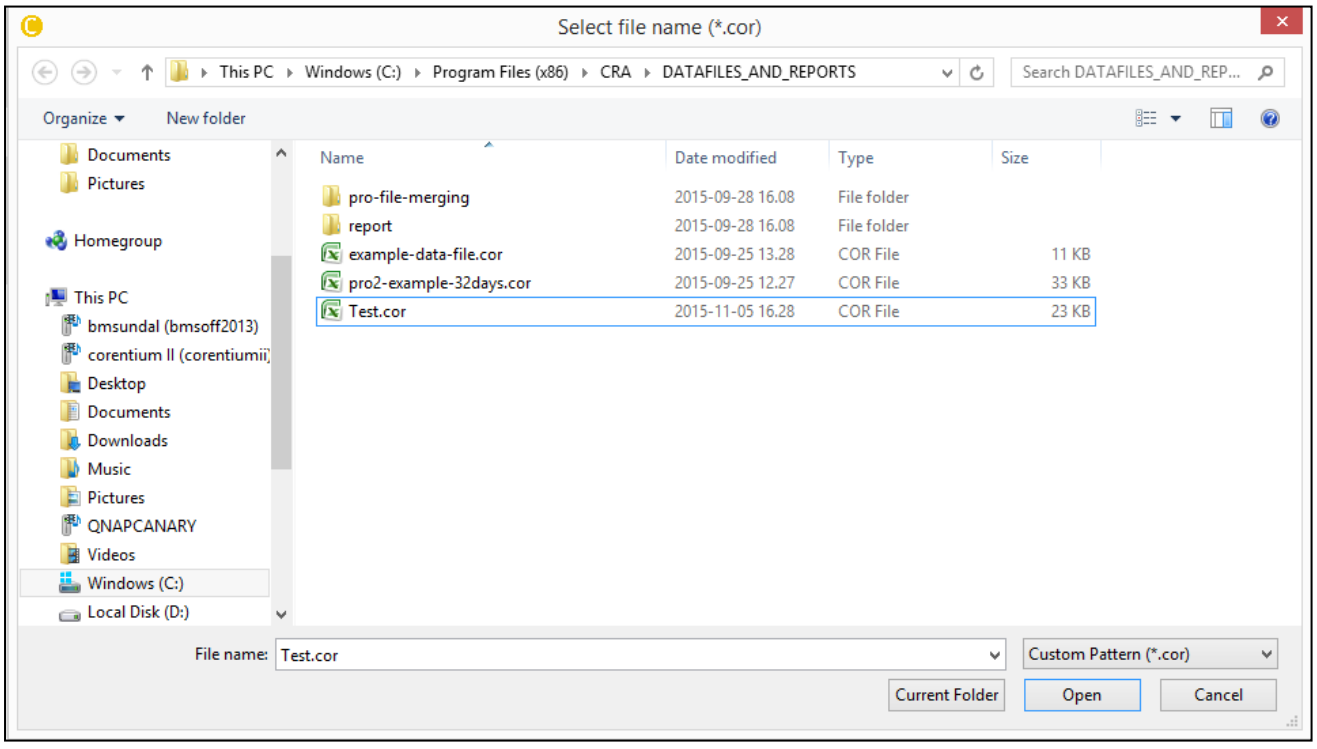


Figure 4-9: File dialog to open saved file

g. CRA opens the file with only ***.cor** extension:

- From Figure 4-8, opened file and path are shown in Load interface section under **"Currently selected data file"**. This shows the name of the active file.

- From Figure 4-8, the uploaded data is displayed under Summary section. **Plot of radon concentration** on the left side of the Summary section and the **Measurements overview** on the right side of the Summary section.

	*Example measurement files are provided under **C:\Program Files\ CRA\ DATAFILES_ AND_ REPORTS** folder. For work time, please refer later in the manual. The green background color in the summary of radon concentration plot highlight the selected time interval either in the Report Wizard or Report tab. This will be explained in detail in the following sections*

4.1.3 Navigate to Report Wizard Interface

To directly generate report push "Report Wizard" button. Report Wizard (Report Assistance) guides you generate report directly with few clicks. More details about Report Wizard can be found in section 0.

4.2 PLOT TAB

The Plot Tab window is sub divided into 3 sections as shown in Figure 4-10:

1. Plot Settings
2. Over view of Radon concentration in the plot
3. Plot Display

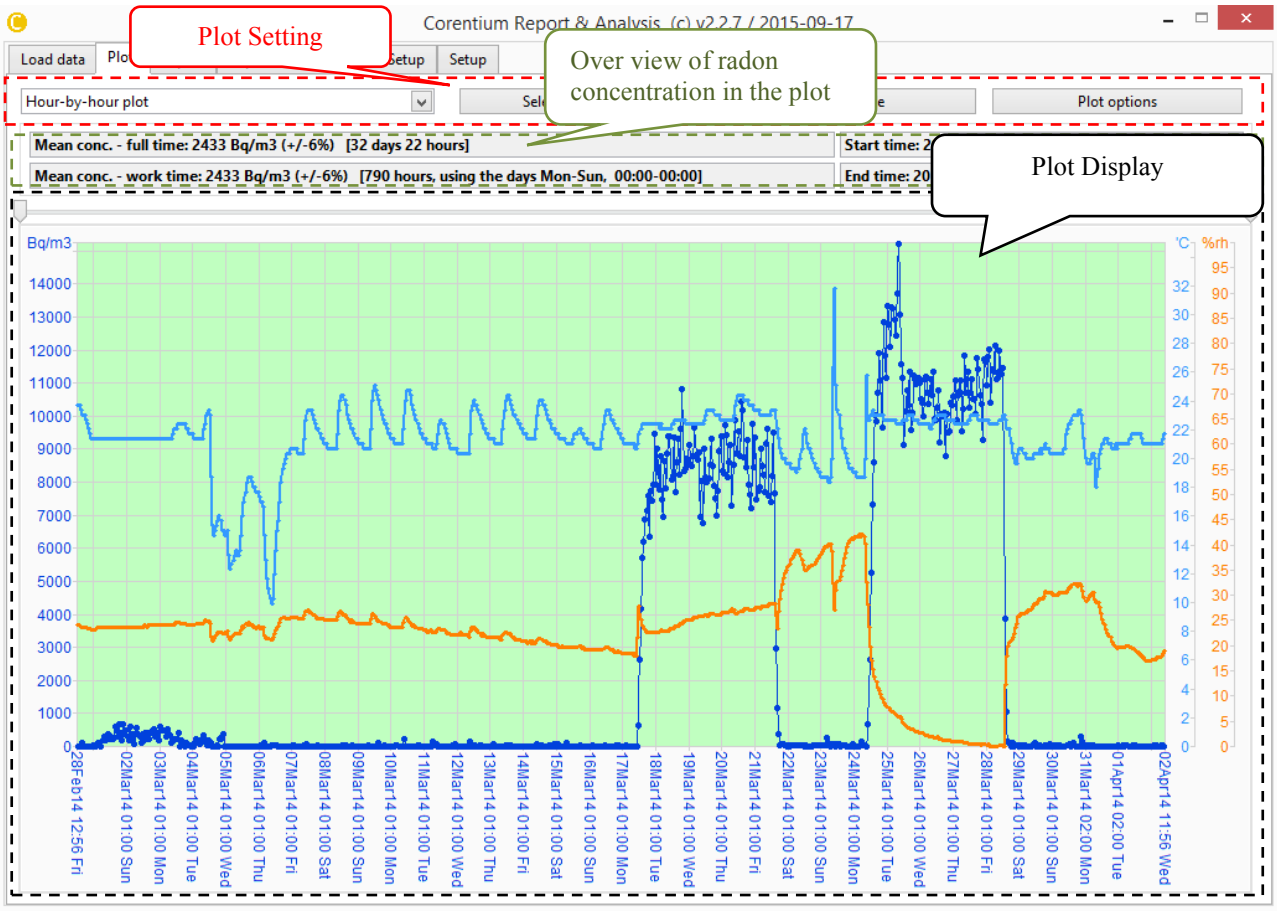


Figure 4-10: Plot TAB

This Plot Tab performs three main functions:

1. Manage settings of the plot
2. Visualize measured Data
3. Export the plot as image file or its contents in spreadsheet/excel format

The following part of this chapter will explain in detail the different sections of this Tab, its various function and settings.

4.2.1 Plot Settings

The settings for the Plot Display are performed in the plot settings section as shown in Figure 4-11.

The Plot settings section comprises of:

1. Pull down menu. ***(Refer section 4.2.1.1)***
2. Select Time interval button ***(Refer section 4.2.1.2)***
3. Plot to file button ***(Refer section 4.2.1.30)***
4. Plot option button ***(Refer section 4.2.1.4)***

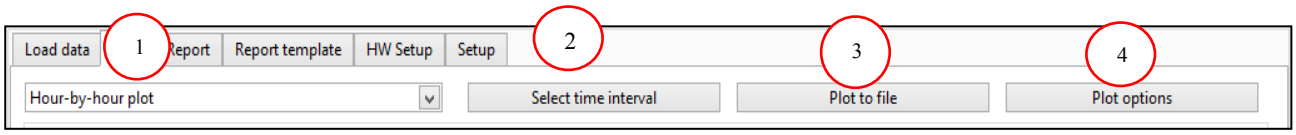


Figure 4-11: Plot TAB - Plot settings

4.2.1.1 Pull down menu

This pull down menu allows you to **choose the time resolution of the plot**. The various resolutions are described in Table 4-4.

Plot Resolution	Interval between each data point	Display parameters
Hour by Hour plot	1 Hour	Radon concentration Temperature Pressure Humidity Angle
Day by Day plot	One day (24 hrs)	Radon concentration Temperature Pressure Humidity Angle

Table 4-4: Plot TAB-Pull down menu

4.2.1.2 Select Time Interval

This button allows you to **choose the duration of the measurement** to be displayed in the plot. All encircled numbers are shown in Figure 4-12.

To set the duration of the measurement, follow the steps below:

- By pushing "Select Time Interval" button a pop dialog open as shown in the Figure 4-12.
- Start Time and End Time of the measurement can be chosen by moving the sliding cursors. By default the cursors are set for the maximum duration of the measurement available
  - Start Time - Green arrow
  - End Time - Red arrow
- The pull down menu indicated by 1 (encircled number 1) below the sliding cursors displays the measurement time in the following format
  - Year-Month-Date Day-Hour: Minute [Year-Week Number-day of the week]

  For example, the start time from Figure 4-12 is illustrated in the Table 4-5:

2014	Year
Feb	Month
28	Date
Fri	Day
12:56	Hour: Minute
W-09	Ninth Week
5	Fifth day of the week

Table 4-5: Currently selected start time-Date Format

- Fine tuning of the dates can be done from the pull down menu marked by 2
- **"Set time interval to maximum available"** set the measurement value to the maximum duration of the measurement available in the data file (default)
- **"Report Time duration"** displays the total time of the measurement chosen to display
- Finally, ***"OK"*** button is pushed to confirm the new changes to the measurement duration and "***CANCEL"*** button to discard changes.

	*By default the duration of the measurement is set automatically to the whole period available in the measurement file (data file)*

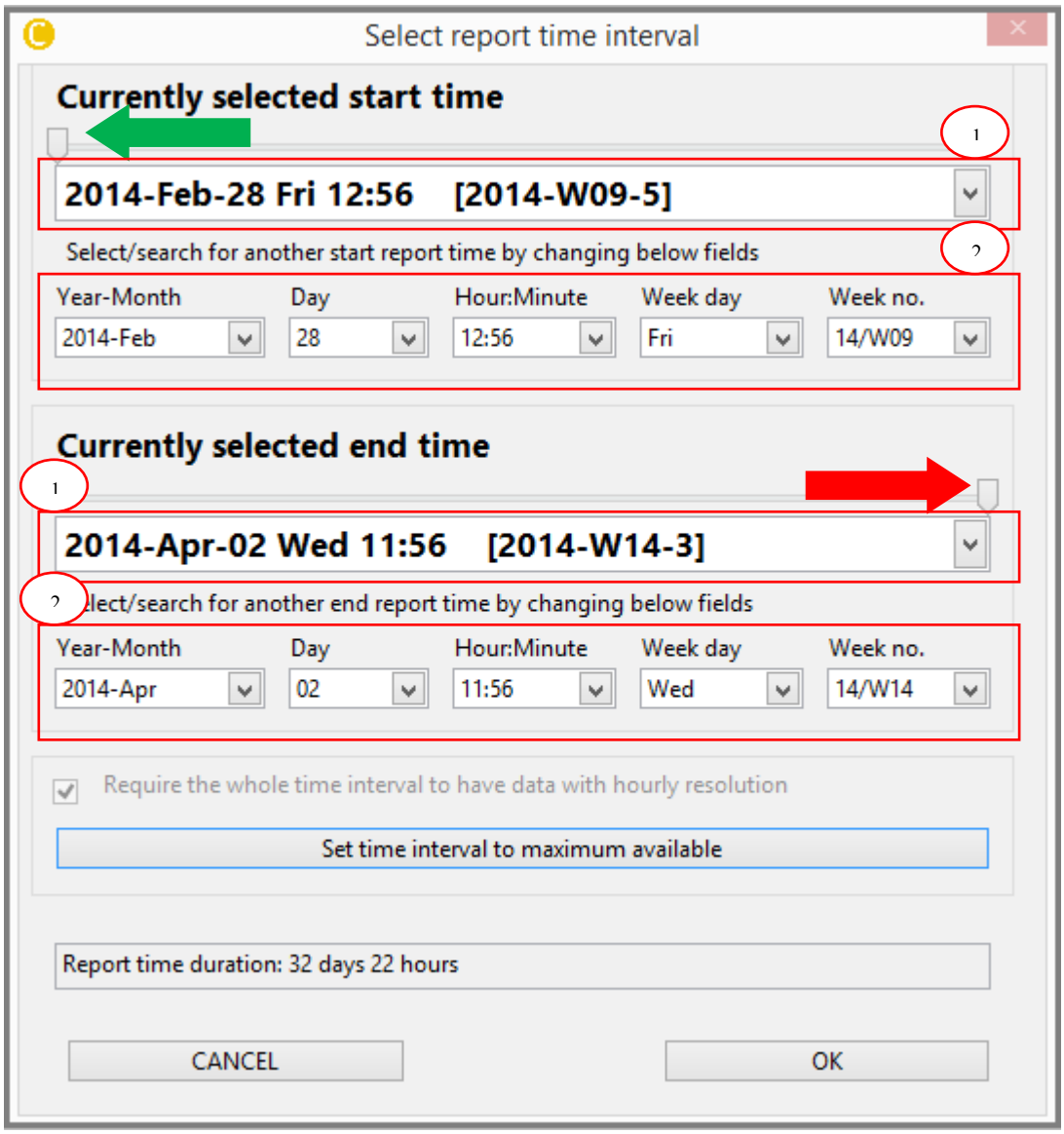


Figure 4-12: Plot TAB-Select report time interval

4.2.1.3 Plot to File

By pushing the **"Plot to File"** button in the plot settings section a pop up dialog appear as shown in the Figure 4-13 allowing the user to **Export the plot** in two different formats:

- As spreadsheet file in *.csv (comma-separated spreadsheet file) format
- As image file in *.jpg, *.bmp, *.png format

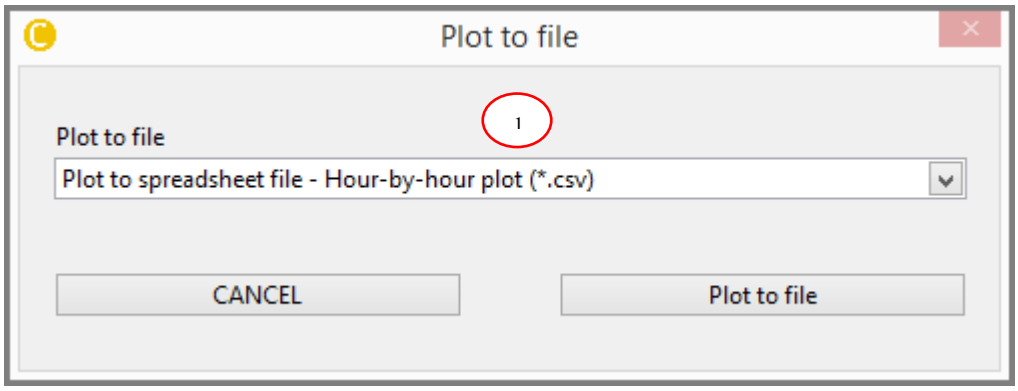


Figure 4-13: Plot TAB - Plot to file

Steps to export the plot:

- Choose the format form the **pull down menu** as indicated by 1 (encircled 1) from Figure 4-13
- Push ***"Plot to file"*** to export the selected format or ***CANCEL*** button to discard the changes and close the window

4.2.1.4 Plot Options

This button helps to **configure the appearance** of the plot. By pushing this button, a dialog box appears as shown Figure 4-14.

This box allows setting features of the plot:

- Turn ON/OFF Radon plot
- Data smoothing
- Activate the error bar
- Marker settings
- Line Style

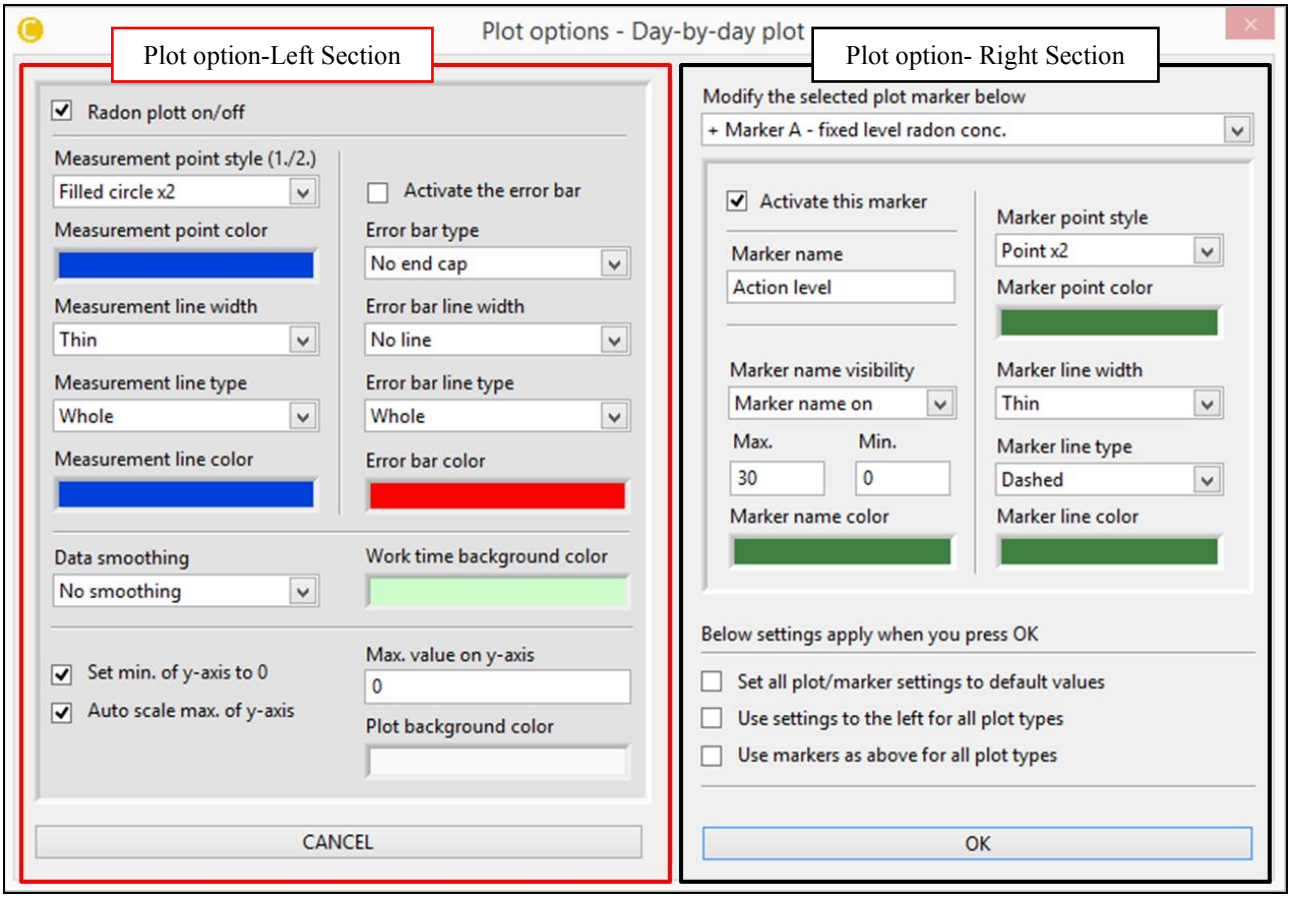


Figure 4-14: Plot TAB - Plot Options

The plot option dialog box is subdivided into two sections as shown in Figure 4-14:

a) Left Section indicated by Red rectangular box
b) Right Section indicated by Black rectangular box

a) The Left section is used to customize the **Plot settings for Radon Concentration** only. Refer Figure 4-15.

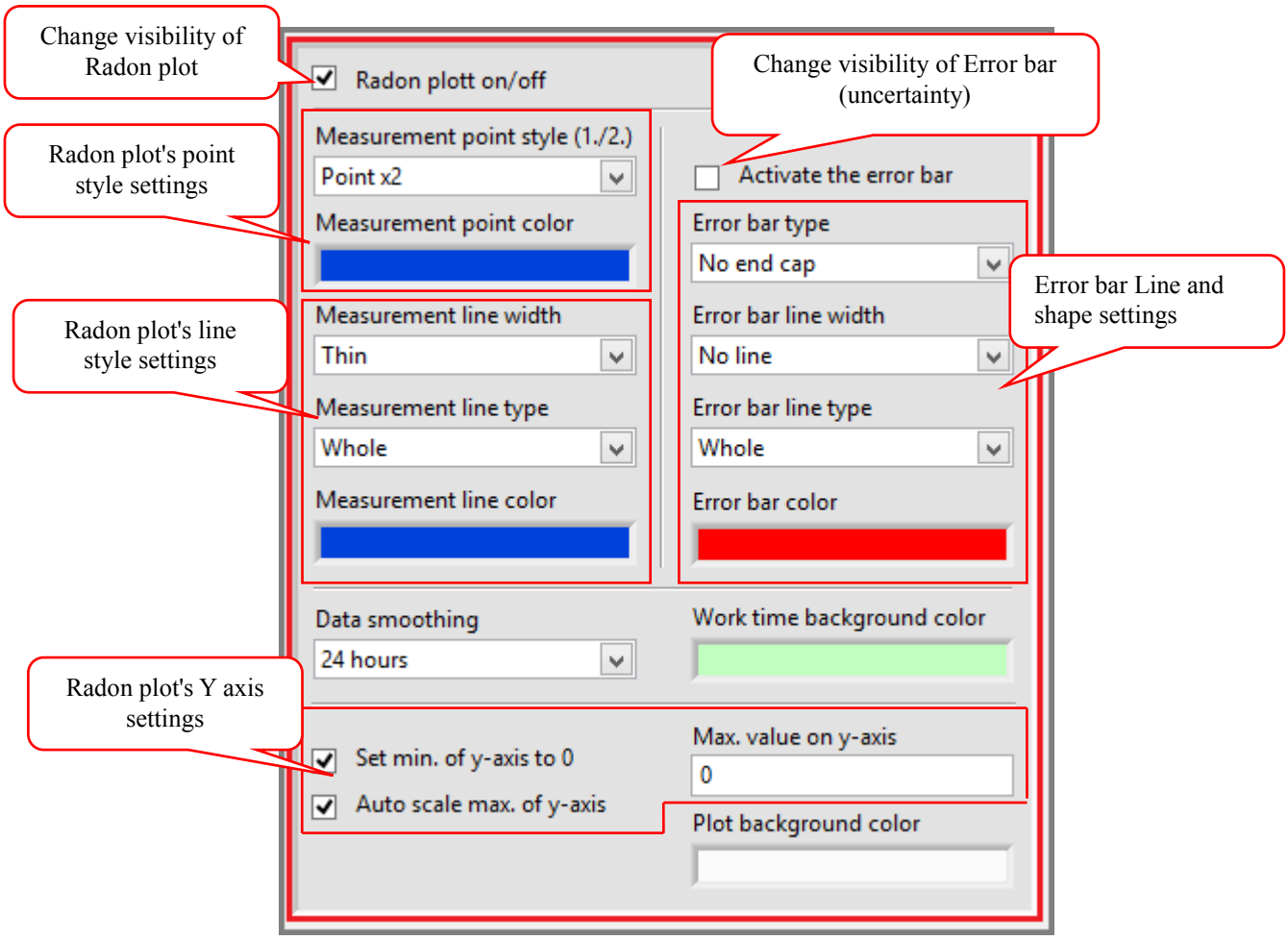


Figure 4-15: Plot TAB-Plot Options Left section

The Table 4-6 below describes the various setting for Radon plot.

Setting	Label	Description
Visibility of Radon plot	Radon plot on/off	Turn ON/OFF the display of Radon concentration plot
Radon plot's Point Style	Measurement point style	- symbols used when indicating points
	Measurement point color	- fill & background color of the symbol
Radon plot's		- option to choose between different line

Line Style	Measurement line width Measurement line type Measurement line color	widths - option to choose between different line types such as straight, dotted, dashed line etc., -line color of the radon concentration
Radon plot's Y-Axis Range	Set min. of y-axis to 0 Auto scale max. of y axis Max. value on y-axis	- set the min value of radon concentration. - max value of y is set based on the highest level of radon concentration - manually set the maximum value of radon concentration
Radon plot	Data smoothing	Replacing each data point with the average of the neighboring data points (± average of each point) given within the duration.
Visibility of Error bar	Activate error bar	Turn ON/OFF the Error bar (uncertainty) - indicate the degree of uncertainty found in each data point in the plot. At low radon concentration the uncertainty is large. If it's too large, it is advisable to increase the data smoothing setting.
Error bar line and shape Style	Error bar type Error bar line width Error bar line type Error bar color	- option to choose between different types of error bar shapes -option to choose between different line widths - option to choose between different line types such as straight, dotted, dashed line etc., -Color of the error bar
Plot color	Work time background color	Background color indicating the working day/time set in Report Tab (default green color)
Plot color	Plot background color	Background color of the plot (default white color)

Table 4-6: Plot Tab - Radon plot settings option

b) The **Right section** of the plot option dialog box is used to enable the visibility of other plot variables:

- Radon concentration's lower reference limits
- Radon concentration's higher reference limits
- Average Radon concentration
- Average radon concentration during work time
- Temperature
- Relative Humidity (RH%)
- Pressure (mbar)
- Zenith Angle (degrees)
- Events

The **Visibility** is enabled by selecting the appropriate plot variable (for example temperature, pressure etc.,) from "***Modify the selected plot marker below"*** pull down menu indicated by 1 and then check in ***"Activate this marker"*** indicated by 2 in Figure 4-16.

You can notice a **+ or - sign** in-front of the selection option in the "***Modify the selected plot marker below"*** pull down menu indicated by a red circle in Figure 4-16:

+ sign signifies that the plot is enabled

- sign signifies that the plot is not enable

	*Temperature, humidity, Atmospheric pressure, zenith angle plot are included under plot marker*

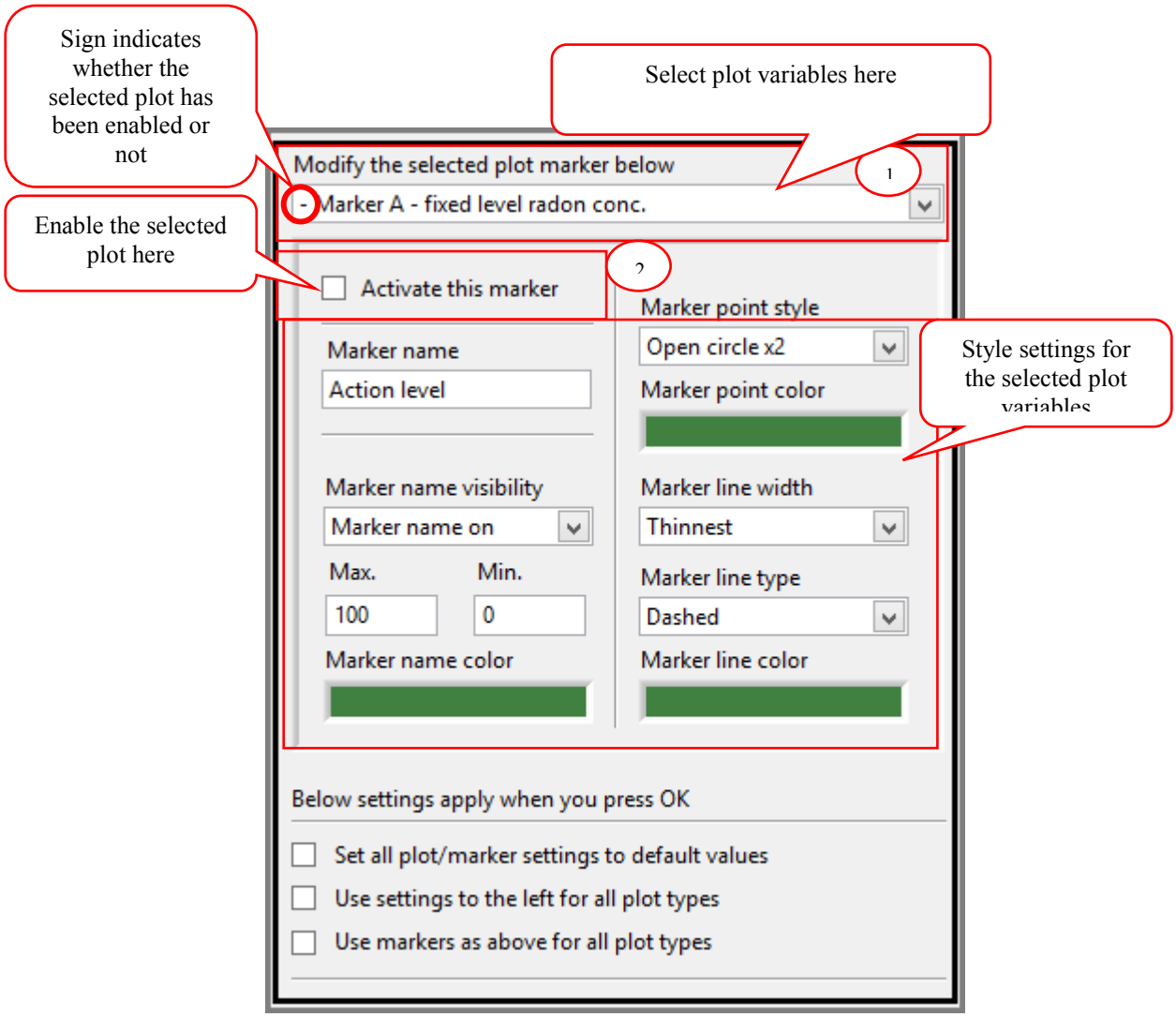


Figure 4-16: Plot TAB-Plot options Right section

"Modify the selected plot marker below" pull down menu has the following items that are described in the Table 4-7.

Marker A-fixed level radon conc.	Reference lines to mark the lower threshold limit
Marker B-fixed level radon conc.	Reference line to mark the upper threshold limit
Marker - the average radon conc.	Marker indicating the average radon concentration for a chosen time duration
Marker- average work time radon conc.	Marker indicating the average radon concentration for only the work days and time
Temperature ('C)	Temperature in ^{o}C
Relative humidity (RH%)	Relative air humidity measured
Atmospheric pressure (mbar)	Atmospheric pressure measured in milli-bar(mbar)
Zenith Angle (degrees)	Relative angle between the normal of the front face of the monitor and gravity's normal
Events !!!	Indicates various monitor events (click in plot).

Table 4-7: Plot TAB-Plot Options Right section plot selection menu

The settings for the marker are described in the following Table 4-8.

Activate this marker	Allows to turn ON/OFF the visibility of the plot
Marker name	Name of the plot Ex: Radon conc., temperature etc.,
Marker name visibility	Turn ON/OFF the visibility of the marker name
Max & Min	Minimum and maximum range of the parameters to be shown
Marker name color	Color of the marker name
Marker point style	Shape of the measurement points
Marker point color	Color of the measurement point
Marker line width	Width of the line connecting points
Marker line type	Style of the line connecting measurement points
Marker line color	Color of the line

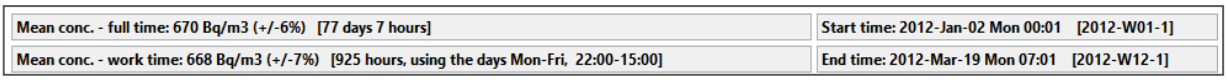
Table 4-8: Plot TAB-Plot Options Marker settings

Other optional settings are described in the Table 4-9.

Set all plot/marker settings to default values	Return the settings to its default values
Use settings to the left for all plot types	To use the radon concentration plot settings for all other plot types as well
Use markers as above for all plot types	

Table 4-9: Plot TAB-Plot Options other marker settings

4.2.2 Overview of Radon concentration in the plot



Overview section gives us information about:

- Average radon concentration for the entire duration
- Average radon concentration only during work days
- Measurement duration (Start Time and End Time)

4.2.3 Plot Display

Plot display is used to visualize the data based on the ***plot settings*** from section 0.

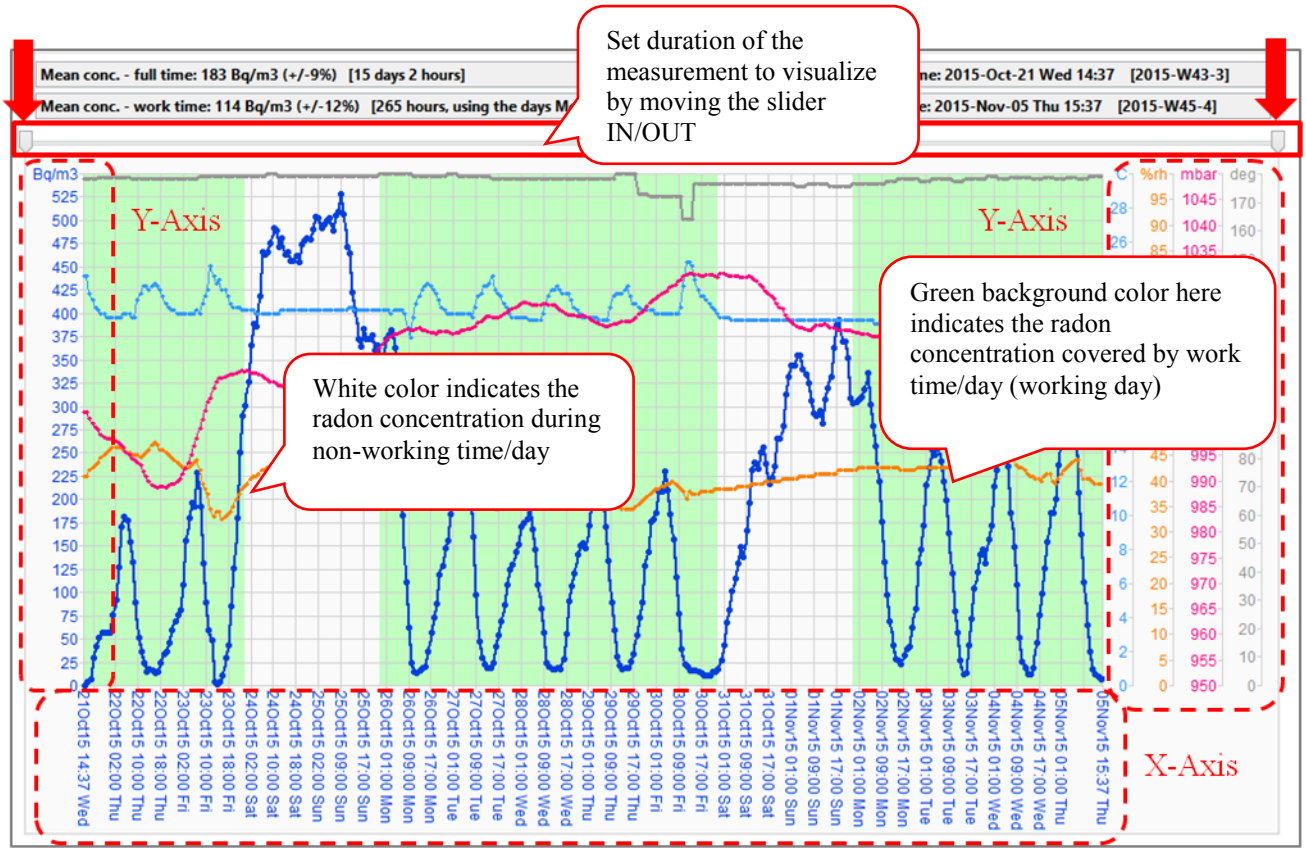


Figure 4-17: Plot TAB - Plot Display

The Plot is a 2-D graph with X and Y-Axis:

X-Axis	Time scale (Hours or days or weeks)
Y-Axis	Radon concentration (left side of the plot) Temperature, Humidity , Pressure, Zenith angle, Events (Right side of the plot)

Green background indicates the work time (Days chosen in the Report Tab). The mean concentration of the work time (green background area) is shown in the overview section (Mean conc. - work time).

In addition to setting the time interval (measurement duration) using the "***select time interval***" button described in the section 4.2.1.2, one can also select a particular time interval by using the following methods:

- Time selectors sliders shown using red arrows
- Pressing left click of mouse button and dragging
- Keyboard short cuts

Time selector using sliders:

Zoom In	Move pointers inwards or towards each other
Zoom Out	Move pointers outwards

Time selector using mouse button (Works only inside the plot):

Zoom in	Press left click button continuously and drag right then release
Zoom out	Press left click button continuously and drag left then release

Time selector using keyboard shortcuts:

Key	**Function**
Home	Full view of the measurement
Arrow up	‘Zoom in’. The center of the new time interval will be where the mouse is pointing.
Arrow down	‘Zoom out’ .The center of the new time interval will be at the time where the mouse is pointing.
Arrow left	‘Pan left’
Arrow right	‘Pan right

Reading Measurement Points

Data values from each measurement point can be read by clicking in the plot on a measurement point shown as a point circle/open circle/filled circle etc. A small pop-up window will appear. The pop-up window shows the following parameters:

- Date Time [Data smoothing]
- Radon concentration (uncertainty)
- Data Time - when the data was acquired
- Temperature
- Relative Humidity
- Atmospheric pressure
- Zenith Angle

The pop up window is closed by clicking its close symbol (X) in the upper right corner.

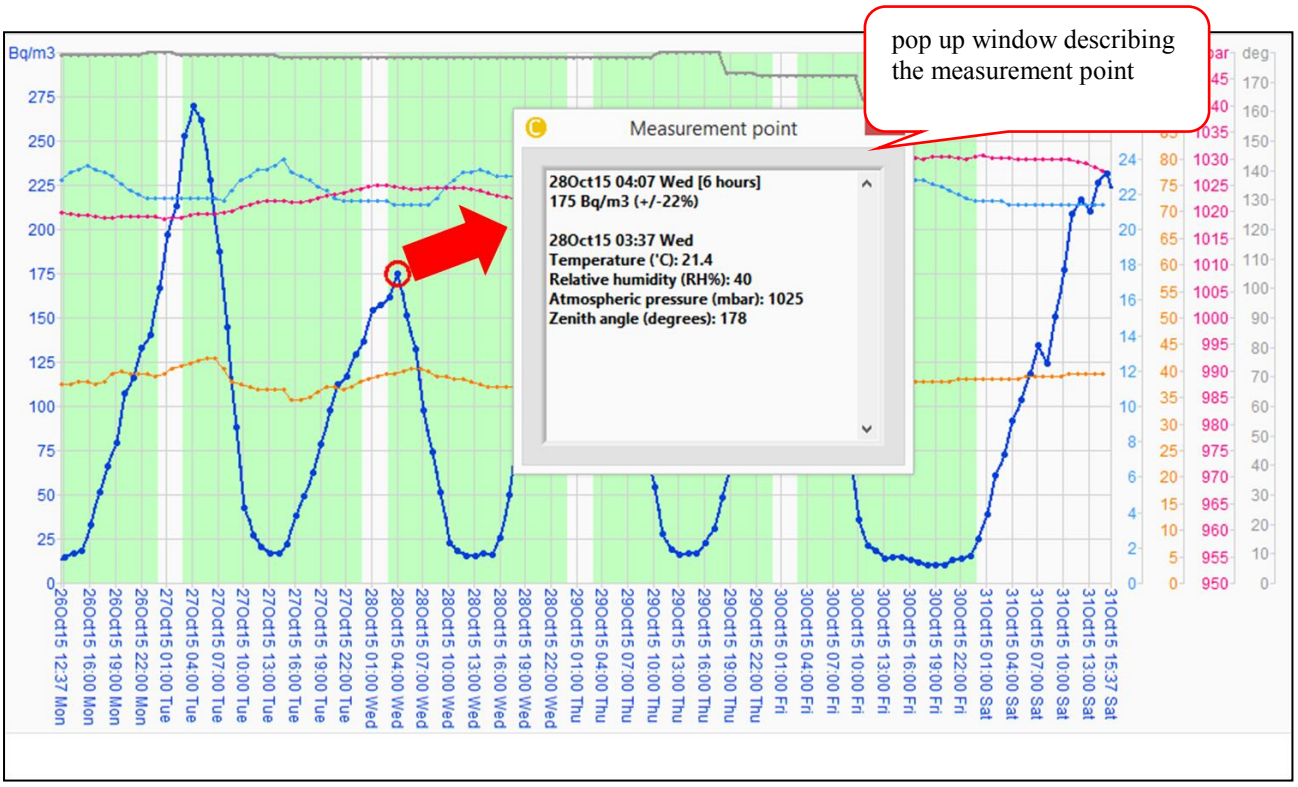


Figure 4-18: Plot TAB-Reading individual measurement point

4.3 REPORT TAB

The Report tab is used to **select Report language, format of report template and to generate a report**.

The **Report TAB** can be divided into the following parts: (Refer Figure 4-19)

A. Generate Report
B. Report Option - Fine tune time duration
C. Report Option - Set work time
D. File Summary
E. Support functions - Open user manual, open user report, E-Mail report
F. Choose Report Language and Template
G. Create a new tag or Add a new tag
H. Add information to the Tags

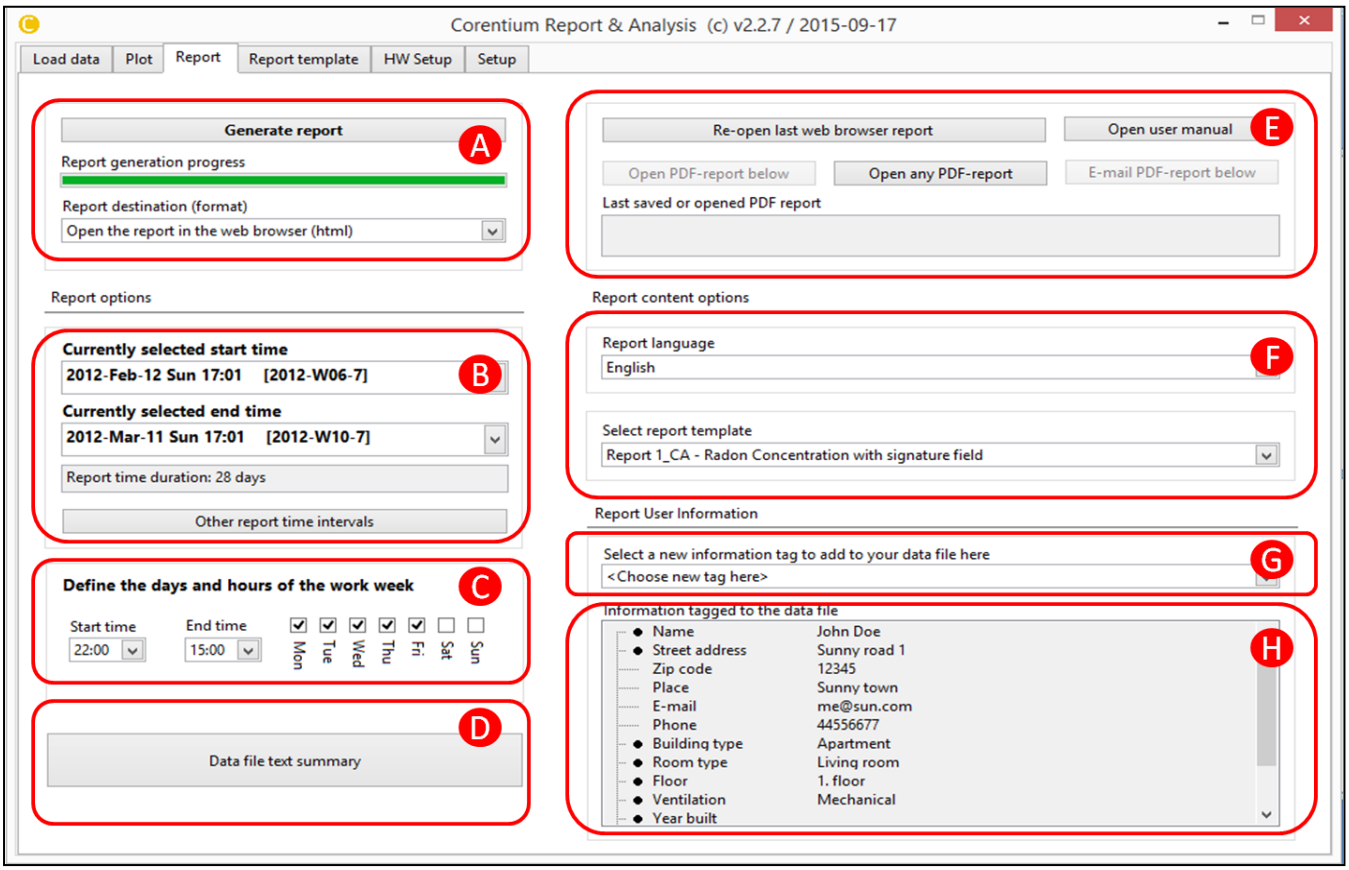


Figure 4-19: Report TAB- Overview

4.3.1 Generate Report

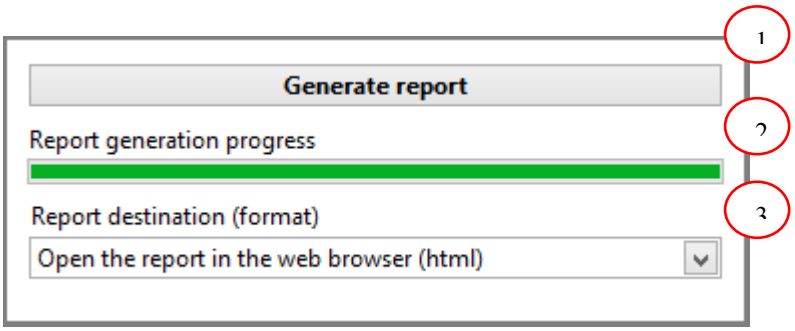


Figure 4-20: Report TAB - Generate Report

The number indications in Figure 4-20 are described below:

1. Generate report Button
    - Button to generate the report
2. Report Generation Progress bar
    - Indicates the progress of building a report. The report is build completely only after reaching 100%
3. Report format
    - Select the format of the report. The formats are:

Format	Function
Open the report in the web browser (html)	Open the report using internet explorer
Save the report to a PDF-file (12 bit colors)	Uses 12 bit color mapping to build the report # Small file size
Save the report to a PDF-file (24 bit colors)	Uses 24 bit color mapping to build the report # Large file size
Save the report to a PDF-file (black/white)	Build pdf file using black and white color

Table 4-10: Report TAB - Generate report format

To Generate a report :

Select the format you want to open the report from pull down menu ***"Report destination (format)"*** (3) and push **"Generate report"** button indicated by (1)

⚠	*Install Acrobat Reader, Sumatra pdf, xps etc., to open the pd file*

4.3.2 Report Option - Fine tune the time duration

This section allows you to adjust the selected time interval (report time duration) even more precisely in ± hours

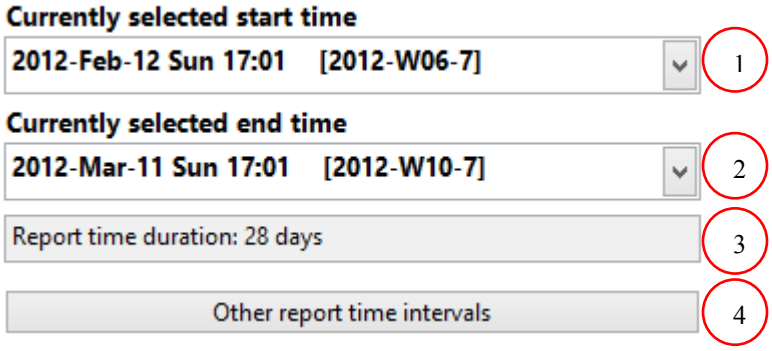


Figure 4-21: Report TAB - Report option tune time duration

The number indications in Figure 4-21 are described below:

1. Currently selected start time

    - Pull down menu to refine (Fine tunes) the starting time in ± hours or ± days from the earlier selected Report time interval start time (**"PLOT TAB >> Select Time interval"**) or by pushing the **"Other report time intervals button"**
    - Format: **YYYY-MM-DD Day Time [YYYY-Week number-day of that week]**

2. Currently selected end time

    - Pull down menu to refine (Fine tune) the end time in ± hours or ± days from the earlier selected Report time interval end time **"PLOT TAB >> Select Time interval"** or by pushing the **"Other report time intervals button"**
    - Format: **YYYY-MM-DD Day Time [YYYY-Week number-day of that week]**

3. Report Time Duration

    - Total time duration of the selected time interval in days and hours

4. Other report time intervals

    - The time interval to be taken into account in the Report. Similar to **"PLOT TAB >> Select Time interval"**

To refine a time duration:

Assuming you have chosen a report time interval from the PLOT TAB, you can further refine the time interval by ±hours or ±days by selecting the ±time form the pull down menus 1 and 2

4.3.3 Report Option - Set work time

In this section one can set the work time (week days/office days) to be taken into consideration when calculating the radon concentration

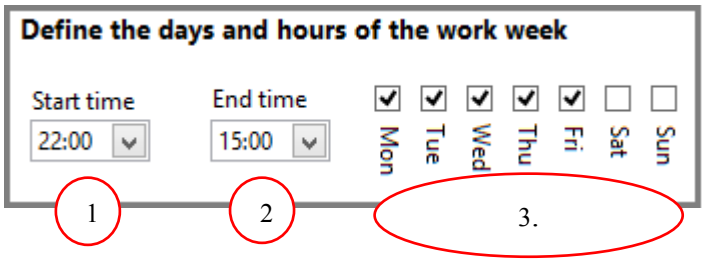


Figure 4-22: Report TAB-Report options Set work time

The number indications in Figure 4-22 are described below:

1. Start time
    - Start time in Hours (24 Hour format) for all week days chosen
2. End time
    - End time in Hours (24 Hour format) for all week days chosen
3. Work Time Days
    - Defines the week days to take into account for calculating the average radon concentration

⚠	*In this manual we use the term* *Full Time Average or Mean conc. -full time : Average concentration for the selected measurement interval* *Work Time Average or Mean conc. - work time : Average concentration for the selected work days*

<u>To set working days</u>:

The work time can be set by selecting a common start & end time from the pull down menu (1) & (2) and check in the week days indicated by (3)

4.3.4 File Summary

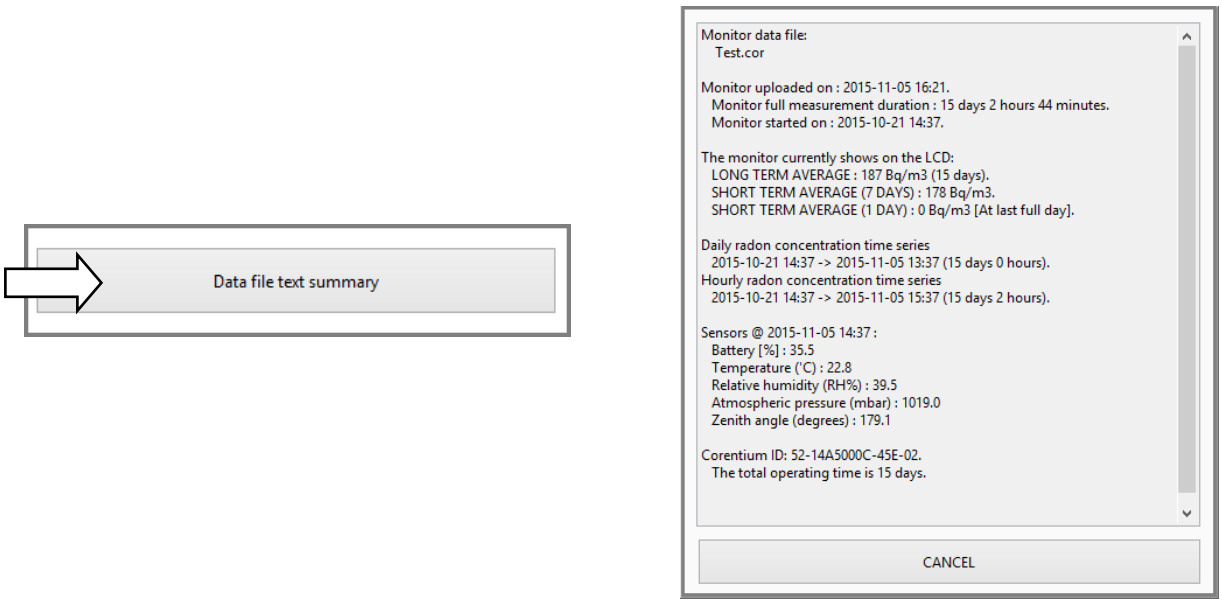


Figure 4-23 : (a) Report TAB - Data Summary button (b) Summary of the measurement file

By pushing the button as shown in Figure 4-23 (a), a detailed report of the file is displayed as shown in Figure 4-23 (b).

The file summary gives the following details:

- Data file name
- Date the measurement was Uploaded from monitor
- Whole measurement period of the measurement (Full measurement duration)
- Long term average
- Short term average
- Other sensor reading's
  - Battery
  - Temperature
  - Relative Humidity
  - Atmospheric pressure
  - Zenith Angle

4.3.5 Support functions - Open user manual, open user report, E-Mail report

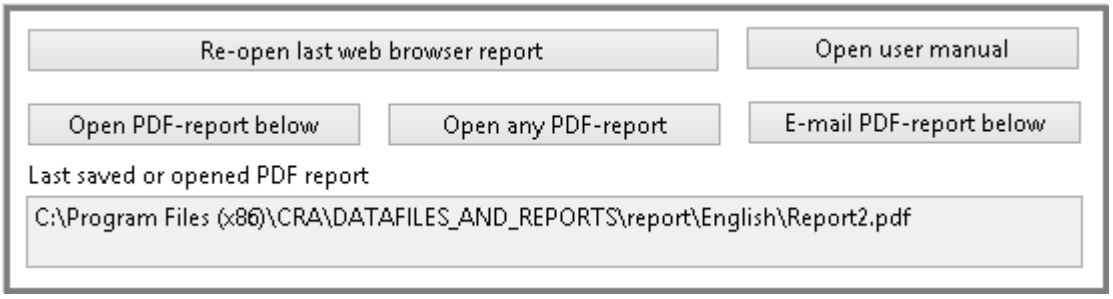


Figure 4-24: Report TAB - Quick support functions

CRA offers some quick support functions to view and e-mail reports.

The number indications in Figure 4-24 are described below:

1. Re-open last web browser report : Re-open the last report opened in the web browser
2. Open user manual : Open this document
3. Open PDF-report below : Opens the last generated PDF report referred to in the text field 6 **Nr.6 *(Last saved or opened pdf report)***
4. Open any PDF report : Open a file menu that allows browsing to any PDF report (or other pdf file) on the computer and open it in Adobe Reader.

   The link to the file is displayed in text field 6 **Nr.6 (Last saved or opened pdf report)**
5. Email below PDF report : Open a separate window that allows email to be sent with attachment as PDF of report. For more details refer **E-Mailing Report**
6. Last saved or opened PDF report : Text field showing the link to the PDF report

E-Mailing Report

Email PDF - report button open a separate window as shown in Figure 4-25.

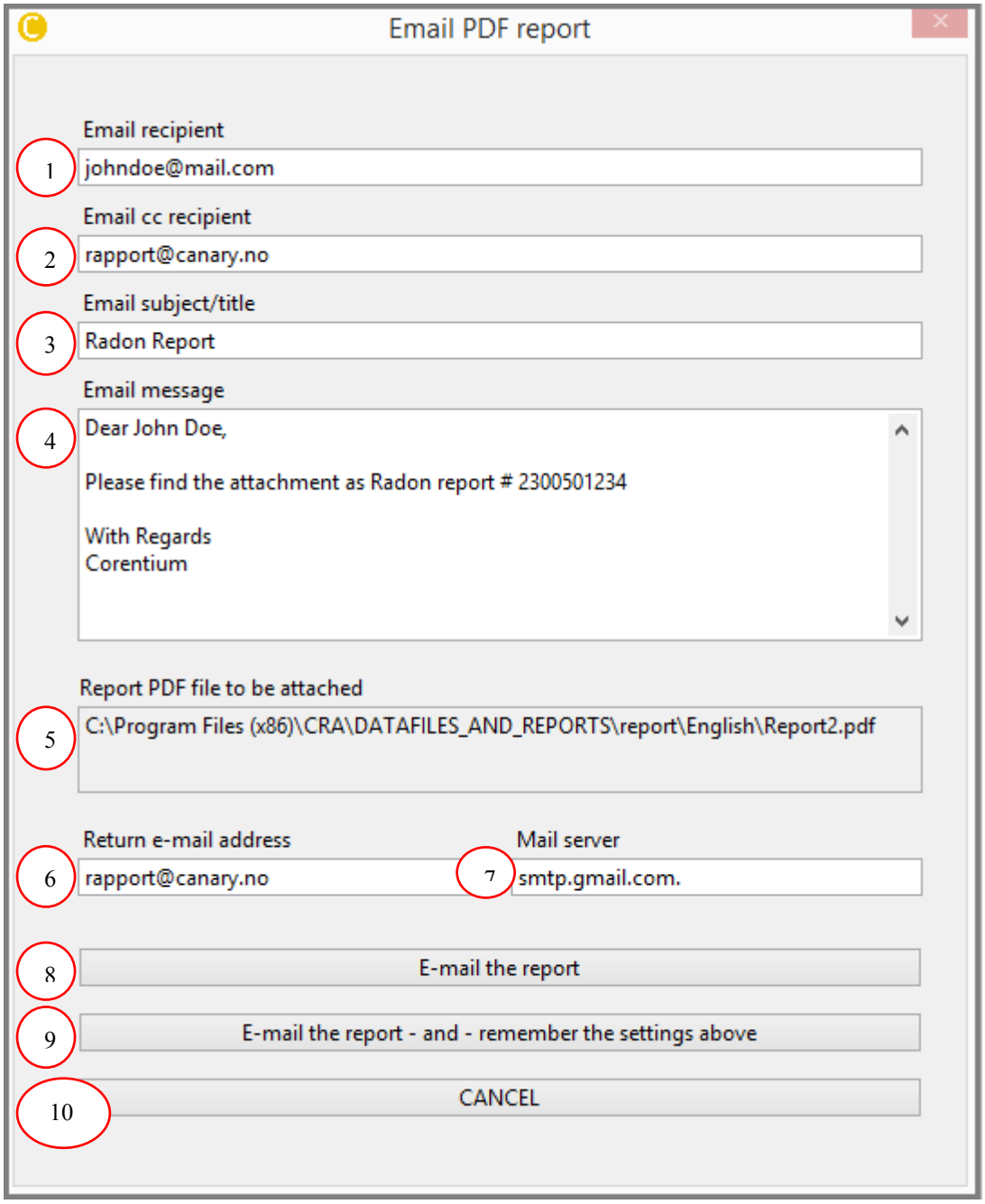


Figure 4-25: Report TAB - Emailing report

This E-mail window has settings to be setup to send an E-Mail.

The number indications in Figure 4-25 are described below:

1.	Email recipient	:	Email address of the receiver
2.	Email cc recipient (optional)	:	CC (carbon copy) of the current mail
3.	Email subject	:	Subject of the mail
4.	Email message	:	Body of E-mail
5.	Report PDF file to be attached	:	Attached PDF file (Radon report) in the E-mail
6.	Return e-mail address	:	Senders Email address
7.	Mail server	:	Outgoing server address
8.	E-mail the report	:	Send button
9.	Email the report – remember above settings	:	Send E-mail and save the settings for the next E-mail
10.	Cancel		Close the Email window

4.3.6 Choosing the report content

The language and the format of the report template defines the content of the report.

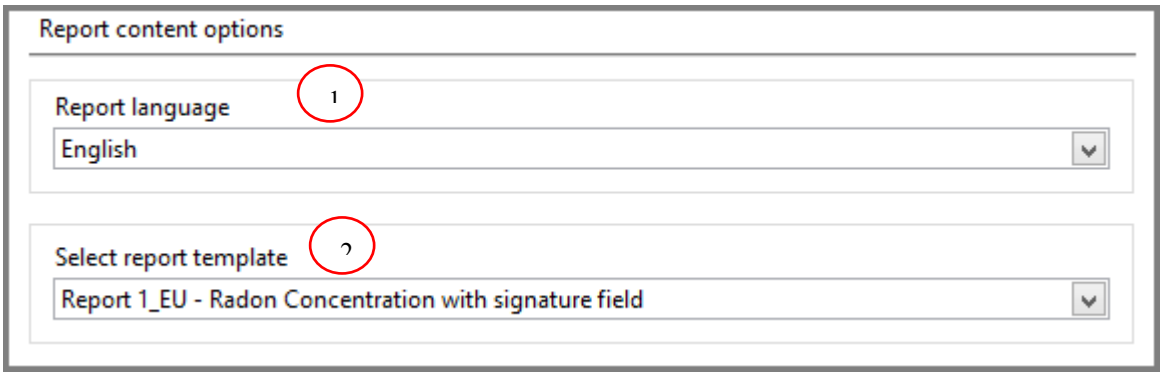


Figure 4-26: Report TAB - Report content

The number indications in Figure 4-26 are described below:

1.	Report Language	:	Choose the language you wish to have the report from the pull down menu
2.	Select report template	:	Select between predefined template formats given by Airthings or customized templates created from the REPORT TEMPLATE TAB. Predefined template formats are shown in **Appendix I and Appendix II**

⚠	*It is mandatory to select a report language and report template before generating a report*

4.3.7 Create /Add existing Tag

	*TAG refers to adding extra information to the data file you Uploaded from the monitor*

Add existing tags:

Existing tags can be added by selecting the TAG NAME from the pull down menu as shown in the Figure 4-27.

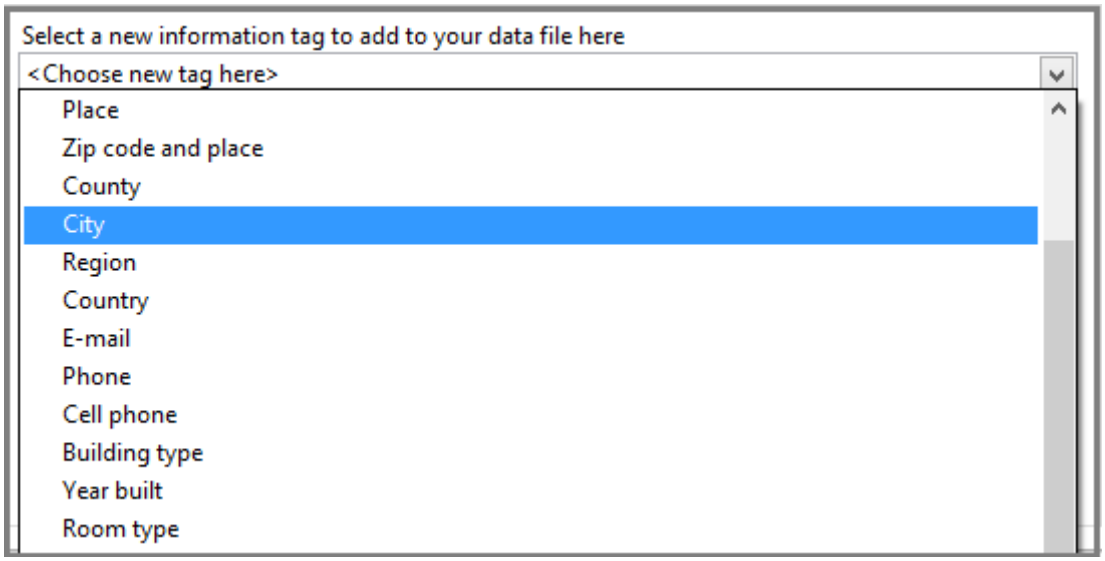


Figure 4-27: Report TAB - Add existing tags to data file

Create new tags:

To create your own TAG NAME select "***<create a user-defined tag>"*** from the pull down menu as shown in Figure 4-27. Once selected, a new window appears as shown in the Figure 4-28.

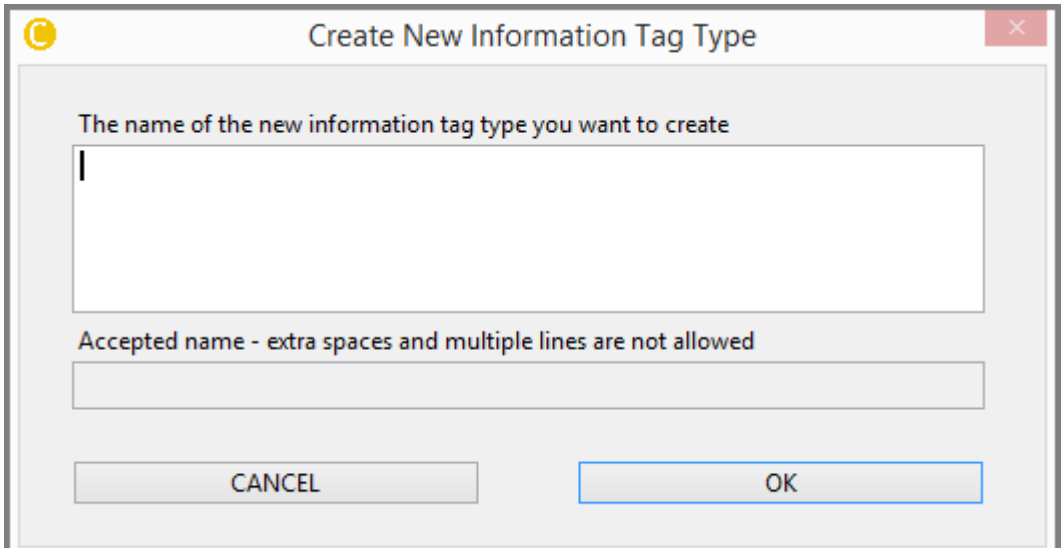


Figure 4-28: Report TAB - Create new Tags

New TAG NAME is entered in ***"new information tag type ..."*** field and pushed "***OK"*** button

4.3.8 Add information to the Tags

This section allows you to add information to the TAG NAME in the data file.

Figure 4-29: Report TAB - TAG Information

Figure 4-29 shows the information tagged to the data file.
The left section displays the TAG NAME and the right section shows the TAG INFORMATION/ Value. The Tag value or Tag information is added by Double clicking the **TAG NAME.** When clicked a new window pops up as shown in the Figure 4-30.

The Tag Name and the Tag value are edited/added/Deleted by the following fields indicated in Figure 4-30:

1. Information tag name : Choose the tag name you want to add the TAG value
2. Information tag new value : Information or value to be added to the TAG NAME
3. Information tag current value : Previous value in the TAG NAME
4. Cancel : Close the window
5. Ok : Accept the changes done to the TAG NAME
6. Delete this information tag : TAG NAME and TAG VALUE removed from the data file

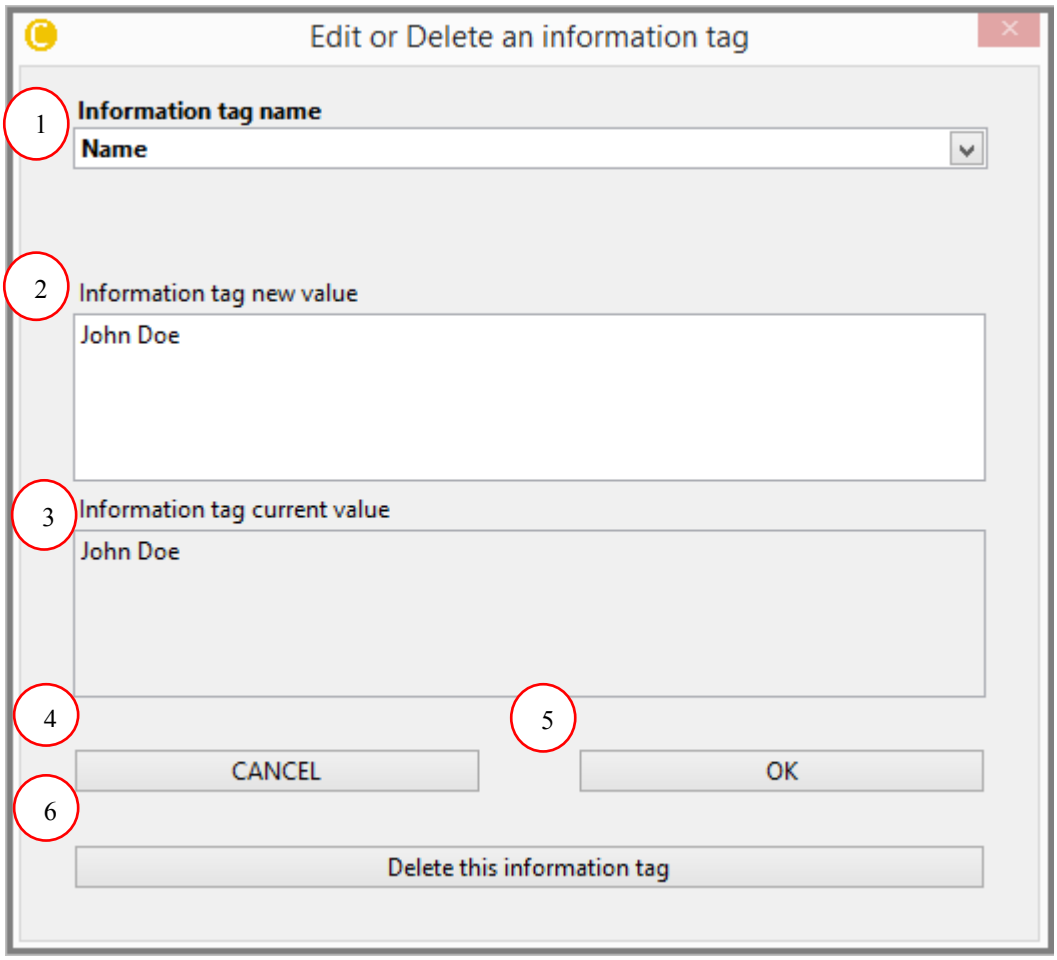


Figure 4-30: Report TAB -Add/Edit/Delete Tag value

⚠	*If a particular TAG NAME cannot be deleted through the "**Edit or Delete an information tag**" window it means that the TAG NAME is fixed by the template format that you have selected from the "Select report template" menu. To remove it from that particular template navigate to the REPORT TEMPLATE Tab >>Report Template Tree menu >> Double click on Info about the meas. (name, addr,etc)>>from "Select a tag to add it, select it again to delete it" pull down menu select that particular tag to delete..*

4.4 REPORT TEMPLATE TAB

In this TAB, one can edit/create a new template for a new report.

Predefined Standard template formats can be chosen from the ***Report content options*** in **REPORT TAB** (Refer section 0).

However, advanced users can customize the report template. Figure 4-31 shows the **'Report template'** tab with items indicated with numbers.

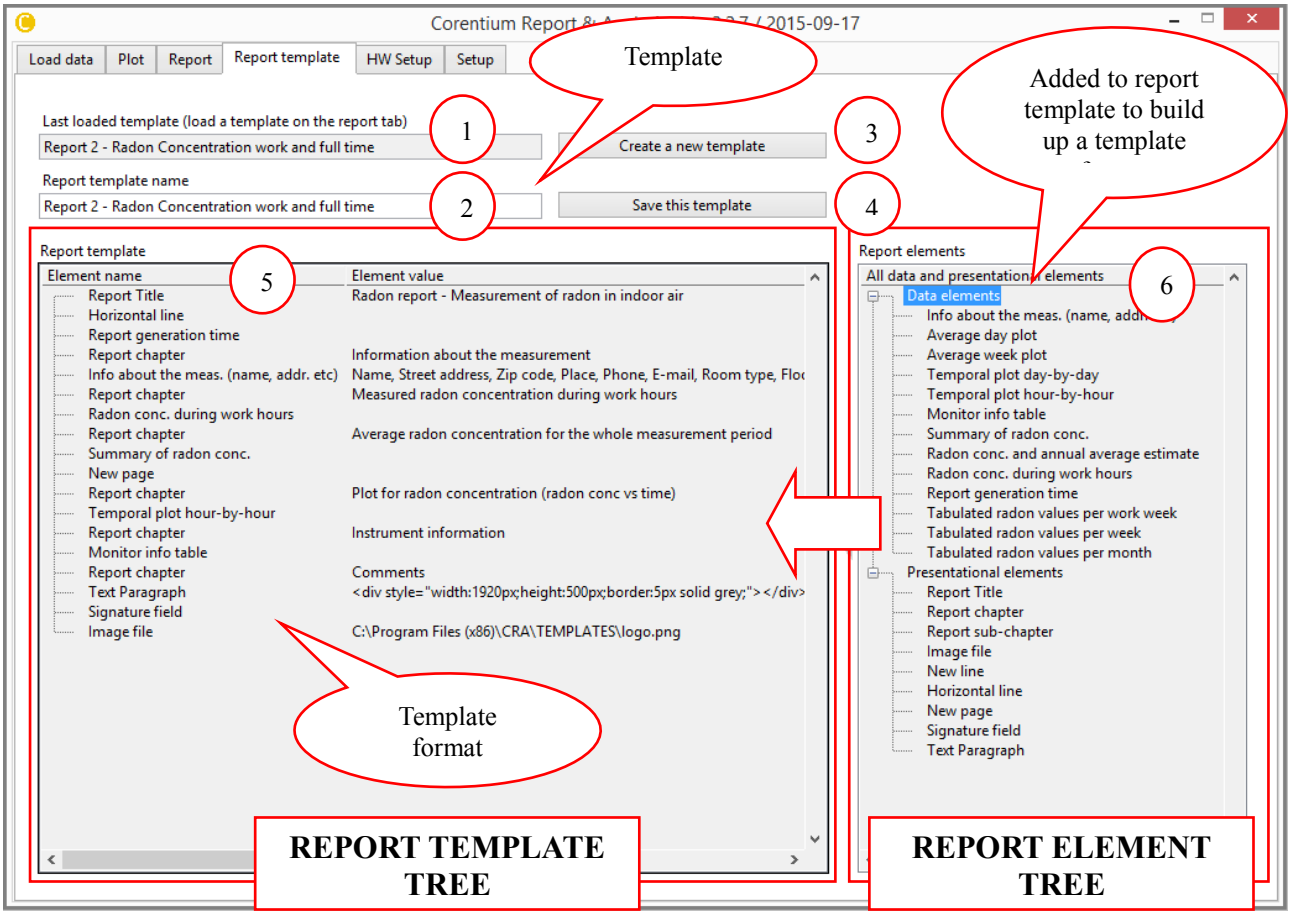


Figure 4-31: Report Template TAB - Overview window

The number indications in Figure 4-31 are described below:

1.	Last loaded template….	:	Shows the name of the template chosen in **REPORT TAB**
2.	Report template name	:	New name for the edited/customized template. New name is accepted only if **"Save this template"** button is pressed.
3.	Create a new template	:	Will start an empty new template
4.	Save this template	:	Save the report template shown in "Report template name"
5.	Report Template	:	Contents of the report template (Element) Element - Presentation elements and Data elements.
6.	Report Elements	:	Contains Data Elements and Presentation elements. Refer section 0 for more detail.

4.4.1 Report Template

The format for a Report Template is defined by **Report Elements** indicated as (6) in Figure 4-31. Report template format is build by arranging the Report Elements in the **Report Template** indicated as (5) in Figure 4-31. Elements from Report template section are added to the Report template section by double clicking the element in Report Element name. Added Elements to Report template has its Name and Value as shown in Figure 4-32.

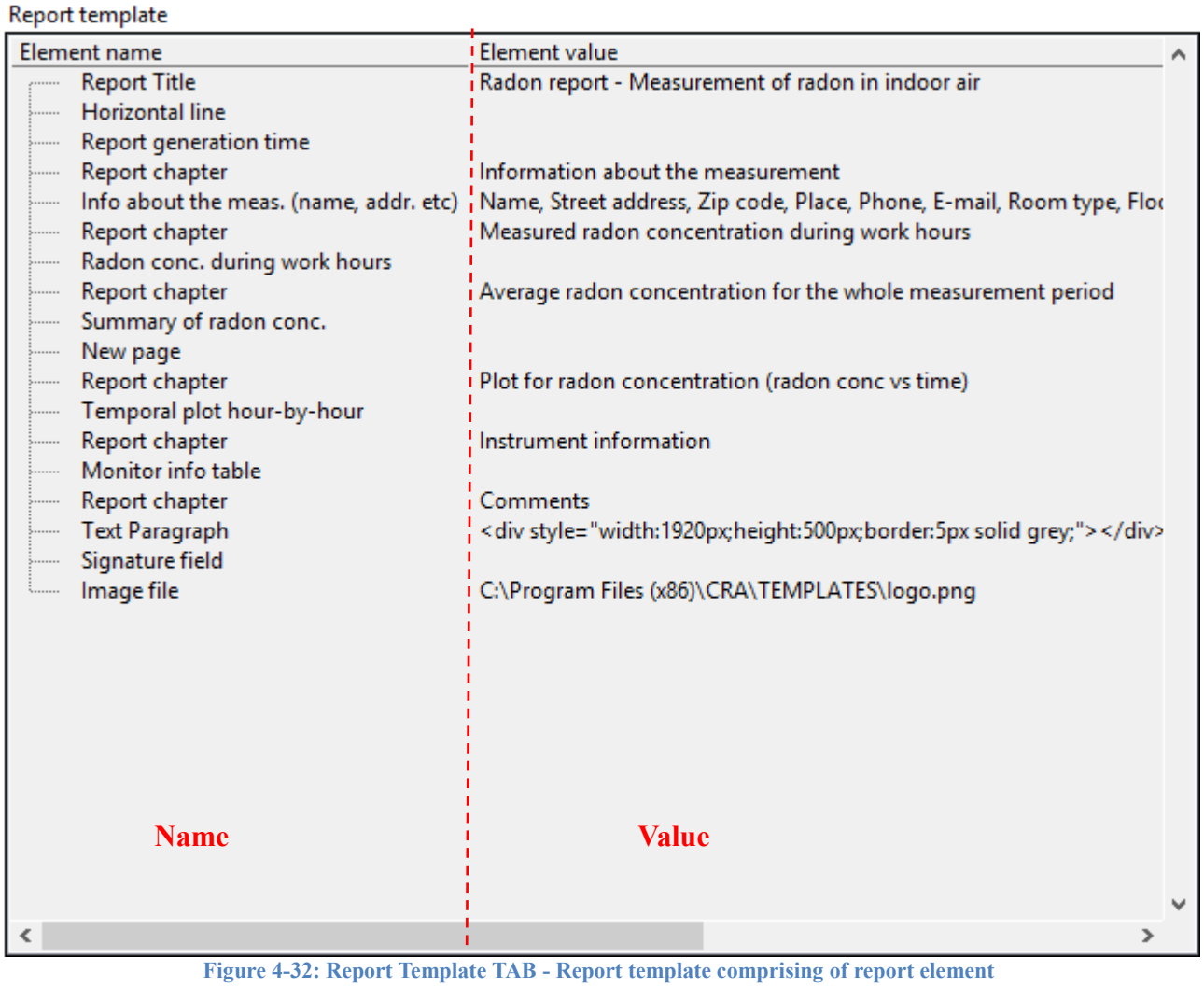


Figure 4-32: Report Template TAB - Report template comprising of report element

⚠	*Element value can be edited only if a configurable element. Refer 0*

4.4.2 Report Elements

Report Elements are of two main types as shown in Figure 4-33.

1. Data Elements
2. Presentation Elements

Data Elements	:	Measurement information
Presentation Elements	:	Report layout

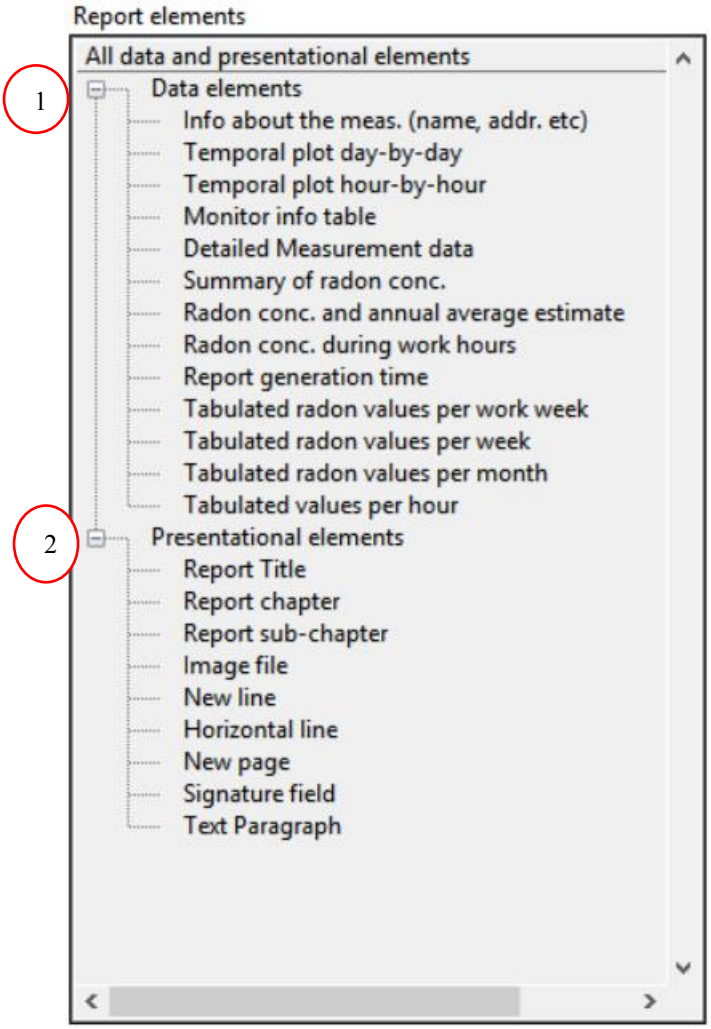
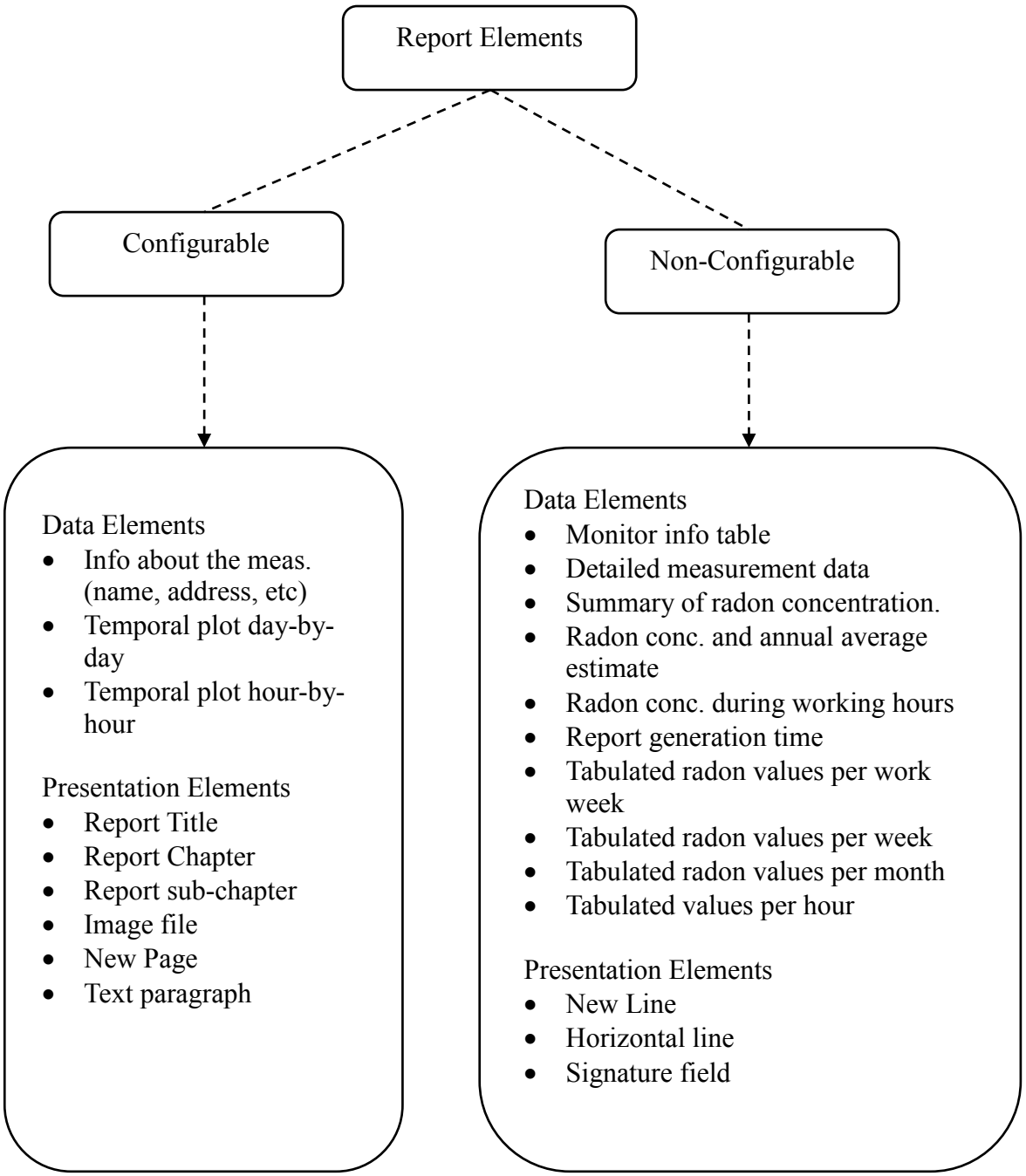


Figure 4-33: Report Template TAB - Report Elements

All Data Elements are described in Table 4-11.

Report Element are further classified into configurable and non-configurable - Elements that can be changed/edited falls under the category of configurable and other under non-configurable.



Configurable Elements

Configurable elements can be edited/changed by **Double clicking** *element value* at Report template tree. Edit or Delete Report Element window pops up after the double click. The content of the **Edit or Delete Report Element window** are different for various elements. The different windows contents are explained in this section.

Edit or Delete report Element TYPE I

Report Title, Report chapter, Report sub-chapter have similar configurable window content as shown in the Figure 4-34.

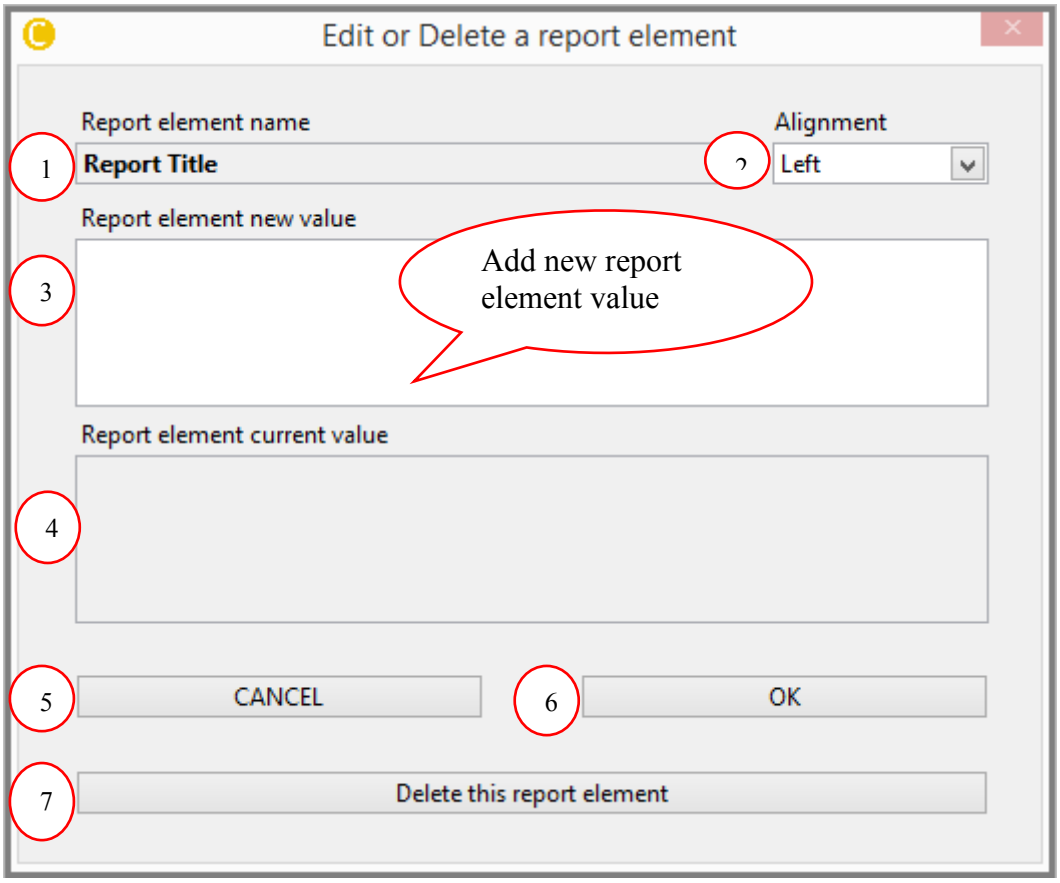


Figure 4-34: Report Template TAB - Edit or Delete report element window for Title, chapter and subchapter

The numbered items in the above Figure 4-34 are illustrated below:

1. Report Element Name : Report Title or Report chapter or Report sub-chapter name (this can't be edited)
2. Alignments : Position of TAG value in the document. Left, Right and center can be chosen from the pull down menu
3. Report Element new value : Add /Edit New tag value to the Element name
4. Report Element current value : Tag value contained in the Tag Name
5. Cancel : Close this window without accepting the changes
6. Ok : Accept the changes and save the Information tags.
7. Delete this report Element : Remove this report element from the Report template tree

Edit or Delete report Element TYPE II

Double click >> Info about the meas. (name, address, etc..) from report template tree a pop up window as shown in Figure 4-35.

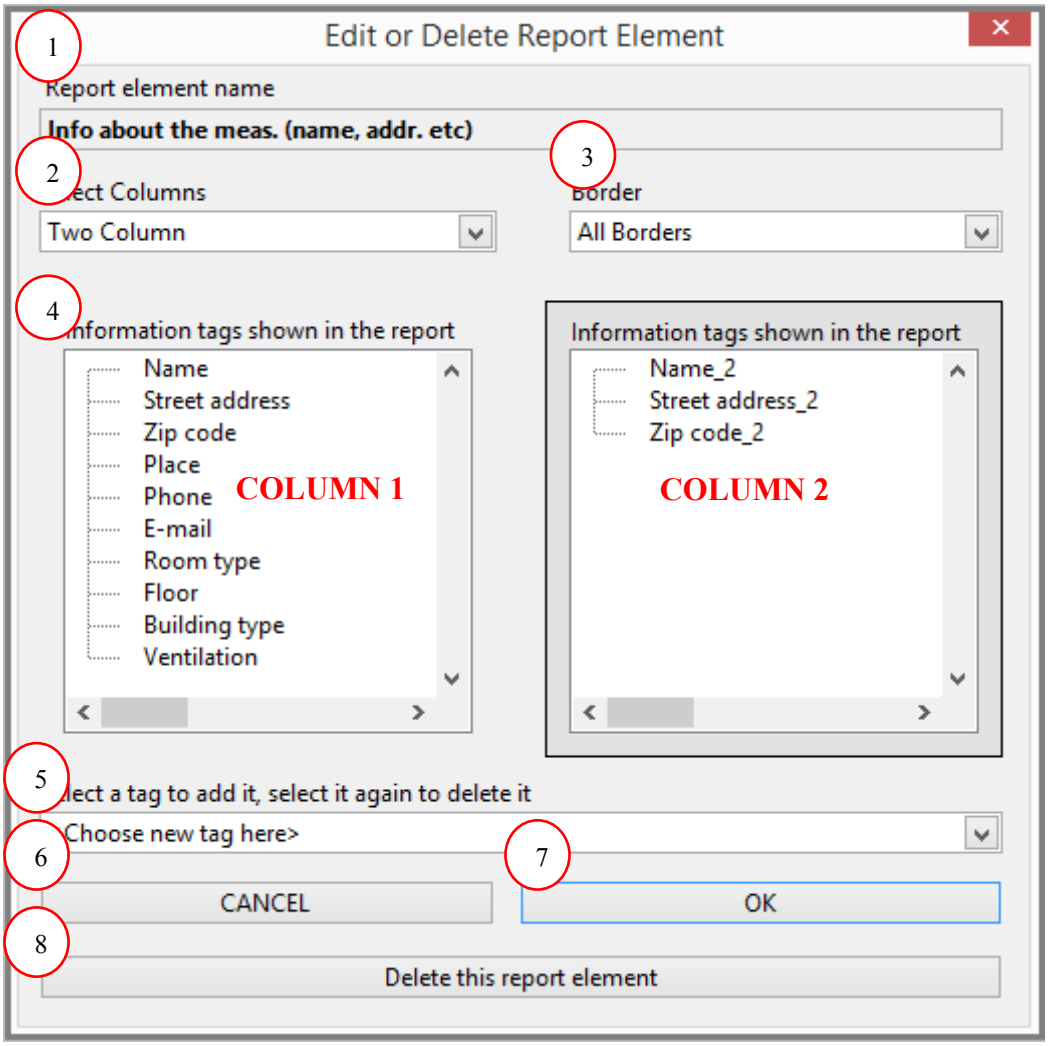


Figure 4-35 : Report Template TAB - Info about the meas. (name, address, etc..)

The numbered items in the above Figure 4-35 are explained below:

1. Report Element Name : Info about the meas. (name, address, etc) (this can't be edited)
2. Select Columns : User information tags are usually displayed as tables in the document. From pull down menu one can choose between single column and two column table. When two column menus are selected two Information tags appear, ***Left side*-Column 1** and ***Right side*-Column 2**. Columns can be selected by clicking on top of it and adding the tags
3. Border : Refers to the border for user information table. One can select between options such as No Border, All Borders, Outside borders

4. Information tags shown in the report : Tags displayed in the document and added to the data file.
5. Select a tag to add it... : Pull down menu that contains the tag names. Tag is added by selecting **column 1** or **column 2** and then choosing the tag form the pull down menu in this field.
6. Cancel : Close this window without accepting the changes
7. Ok : Accept the changes and save the Information tags.
8. Delete this report Element : Remove this report element from the Report template tree

⚠	*TAGS in REPORT TAB>>Information tagged to data file can be added and deleted using this window. Tags can be arranged in any order by dragging and dropping.*

Edit or Delete report Element TYPE III

Double click >> Image file from report template tree a pop up window as shown in Figure 4-36.

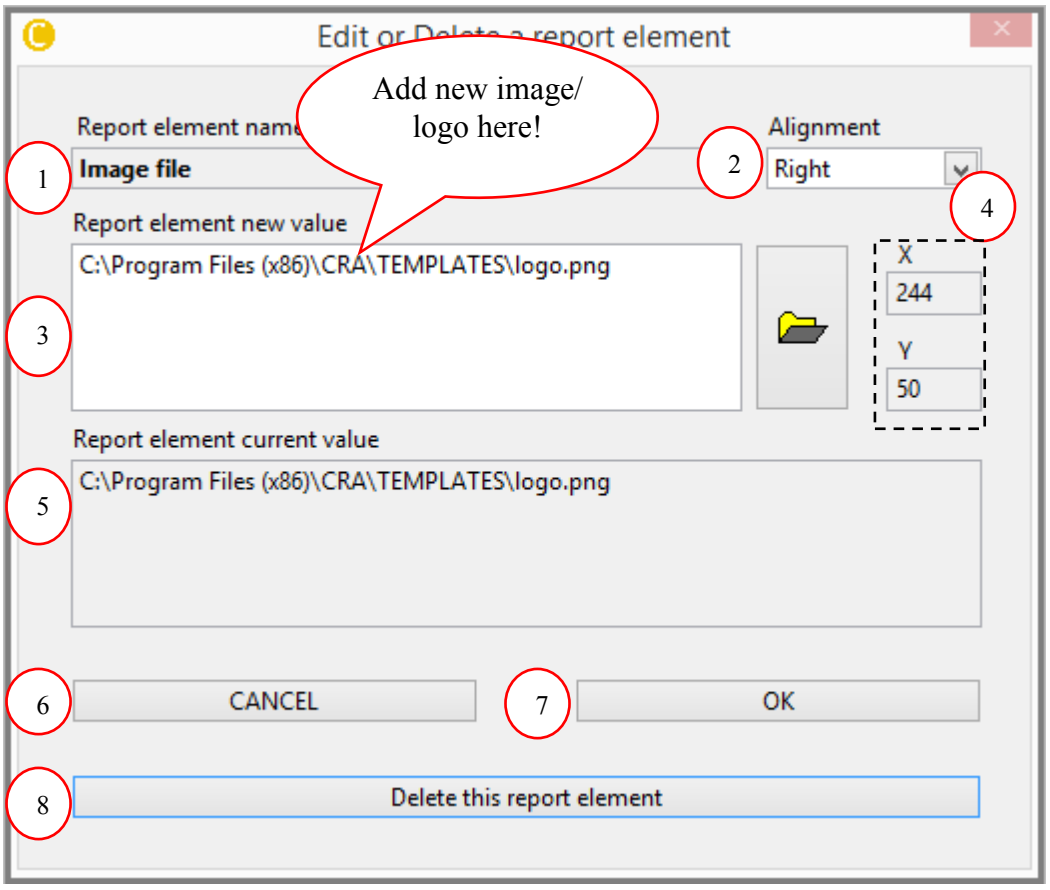


Figure 4-36: Report Template TAB-Image file

Image files of formats *.jpg, *.png and *.bmp can be added to the report template.

The numbered items in the above Figure 4-36 are illustrated as follows:

1. Report Element Name : Image File
2. Alignments : Position of image in the document. Left, Right and center can be chosen from the pull down menu
3. Report Element new value : Add /Edit New image file to the Element name
4. X &Y : Pixel dimensions of the image file selected
5. Report Element current value : Current image.
6. Cancel : Close this window without accepting the changes
7. Ok : Accept the changes and save the Information tags.
8. Delete this report Element : Remove this report element from the Report template tree

⚠	*An image file should have a resolution of 300 dpi to be reasonably well represented in the document An image of A4 size has X = 1944pixels by Y=2768 pixels.*

Adding/Removing elements to/from report template tree

To add Elements to Report Element tree follow the following step:

Double click the Element from the Report Element tree as shown in Figure 4-37. The Element is automatically added to the Report Template.

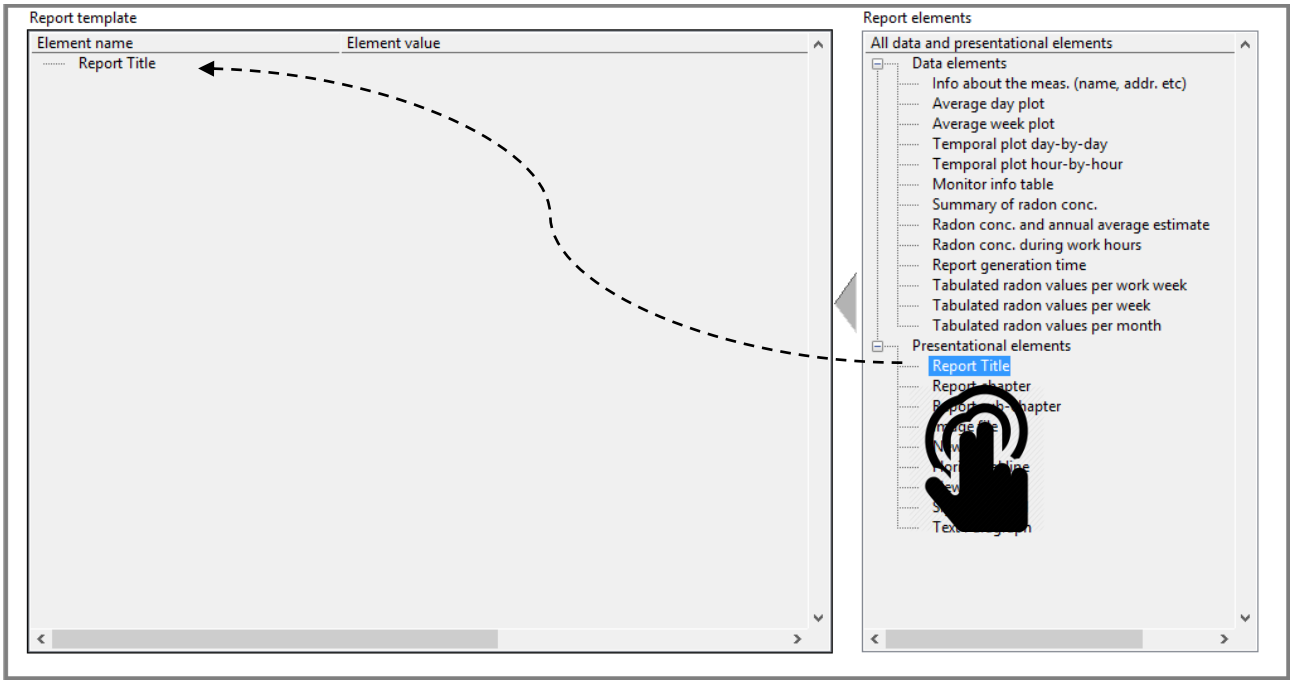


Figure 4-37: Report Template TAB - Add element to report template tree

To remove Elements from Report Template tree **Double click** on the Element in Report template tree, a pop up window appears as shown in figure then press the "Delete this report Element".

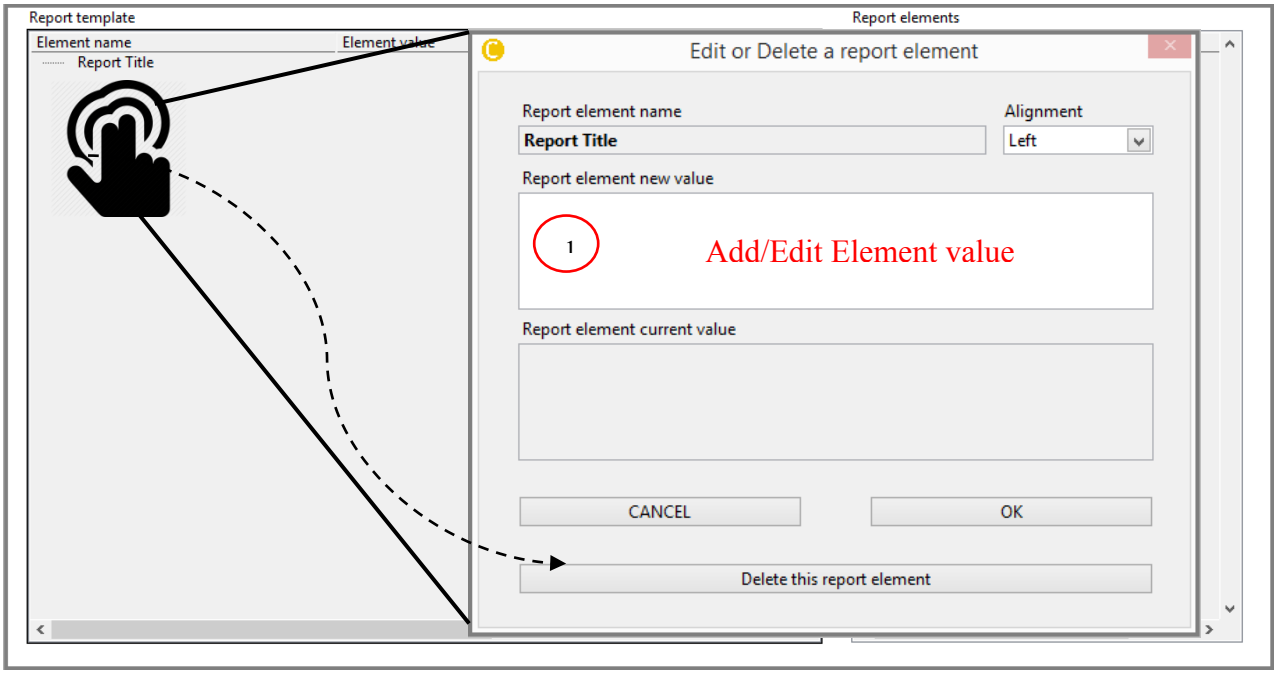


Figure 4-38: Report Template TAB - Remove element from report template tree

This procedure is allowed only for configurable Elements whereas other non-configurable element can be directly removed by clicking YES on the pop menu as shown in Figure 4-39.

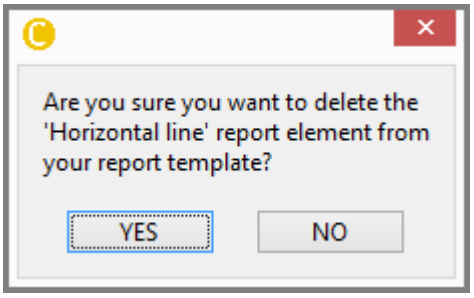


Figure 4-39: Report Template TAB -remove non-configurable element

Similarly, Elements VALUES can be added/edited to Report Element NAME by adding/editing the values in the ***Report element new value*** item field as shown by Nr 1 in Figure 4-38.

Arranging Elements on the Report Template

Elements in the 'Report template' can be rearranged by dragging and dropping them at any position within the tree structure.

Table 4-11 summarizes the content of each data element.

Data Elements	Data Value
Temporal plot day-by-day	Plot showing the average radon concentration for the selected time interval, work week and work time
Temporal plot hour-by-hour	Plot shows the average radon concentration of each hour for the selected time interval, work week and work time
Monitor info table	Table displaying the date file under investigation, monitor's serial number and measurement duration
Detailed measurement data	Table displaying the minimum, maximum and average of radon concentration, temperature, pressure, humidity for the whole measurement period
Summary of radon concentration	Table displaying the stat time & end time of the measurement, total duration of the measurement and average radon concentration for the measurement duration
Radon conc. and annual average estimate	Table showing the summary of radon conc. + Estimated annual average
Radon conc. during work hours	Table displaying the summary of radon concentration only during the work days and during the work time
Report generation time	Current date and time
Tabulated radon values per work week	Tabulate the average radon concentration for working days in the week within time interval selected
Tabulated radon values per week	Tabulate the average radon concentration for all days in the week and within the selected time interval
Tabulated radon values per month	Tabulate the average radon concentration for all the months within the selected time interval
Tabulated values per hour	Tabulate the radon concentration for the last 48 hours of measurement.

Table 4-11: Report Template TAB - Data elements content

4.5 HW Setup TAB

This TAB configures the MONITOR (Corentium PRO only).

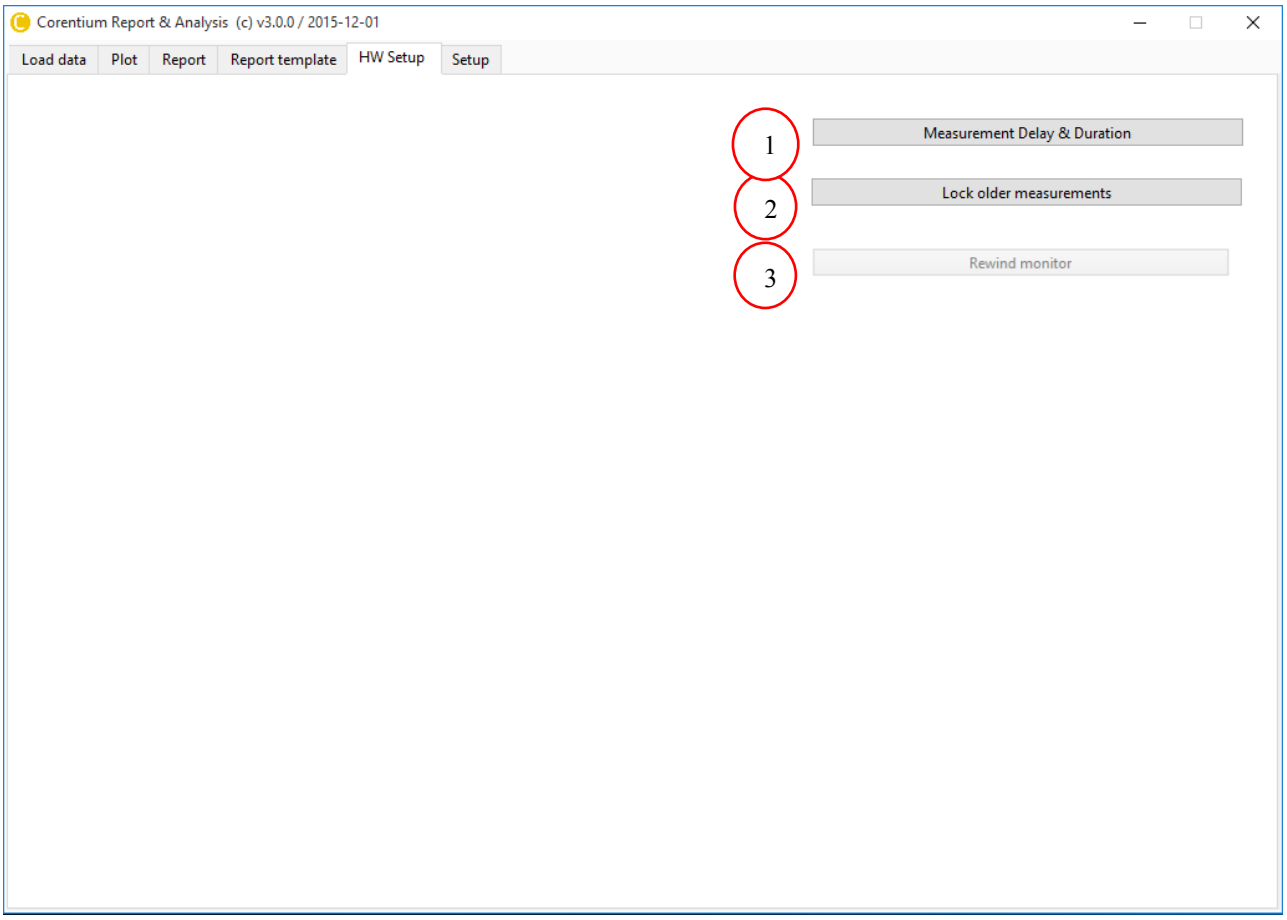


Figure 4-40: HW setup TAB - Window

The hardware configurable functions indicated by encircled numbers in Figure 4-40 are described below:

1. Measurement Delay & Duration : Window pops up as shown in Figure 4-41. Delays the measurement for the time set. Locks the monitor during the measurement duration. During the measurement duration the monitor acquires data but remains non responsive to any button push/interface
2. Lock older measurements : By pushing this button a window, pop up as shown in Figure 4-42 called Edit lock allowing you to set a key (password). With this setup you can secure previous measurements in the monitor flash.
3. Rewind monitor : USE WITH CARE! This will delete all data sets in your monitor. It frees up memory space in your monitor. Before doing this you should make sure you have downloaded all data sets in the monitor that you want to keep to your PC.

⚠	*Key (Password) accepts only Numeric digits (max 9 digits). Default value is 123456*

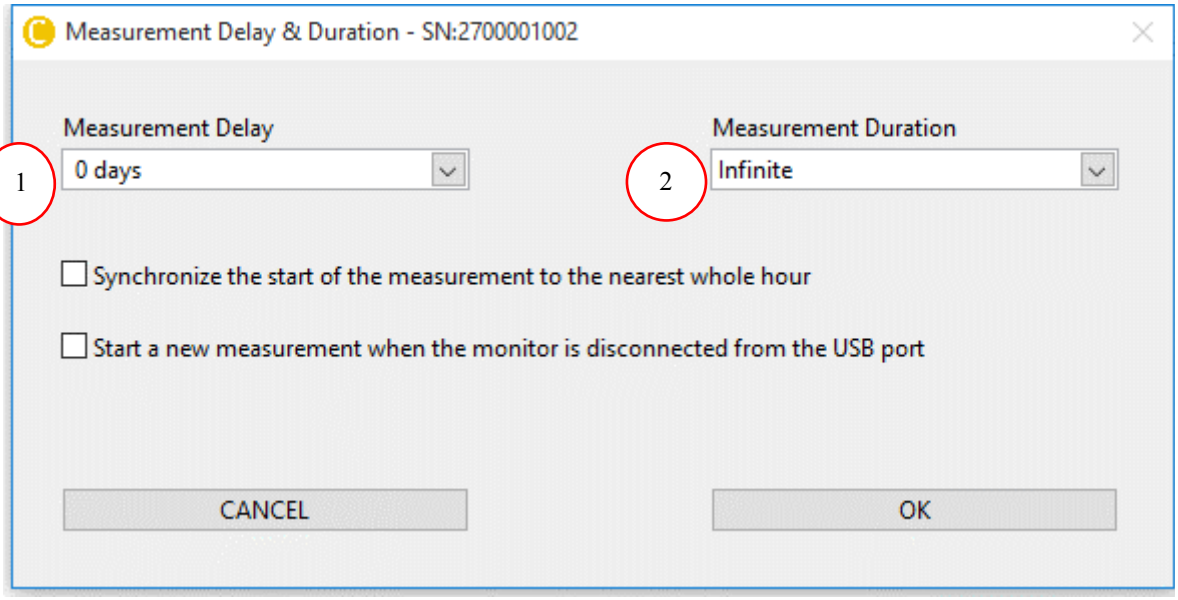


Figure 4-41: Measurement Delay & Duration Window

1. Measurement Delay Selection : Waits until the setup time has elapsed. Measurement can be delayed between 1hr to 3 days.
2. Measurement Duration : This sets the length of the measurement duration i.e., How long the monitor needs to measure data. Default is infinite, meaning data is acquired until the monitor is reset.

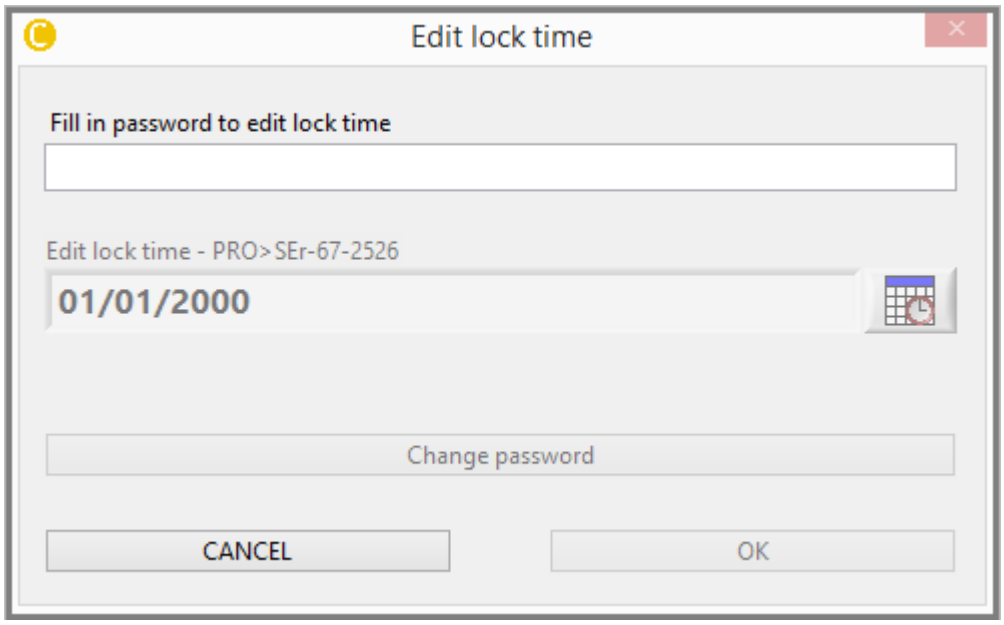


Figure 4-42 : HW setup TAB - Lock

4.6 Setup TAB

Setup tab is used to configure the CRA SW settings.

⚠	*By default the SW configuration is based on regional setting of the computer. CRA allows you to confirm the settings the first time you open the tool.*

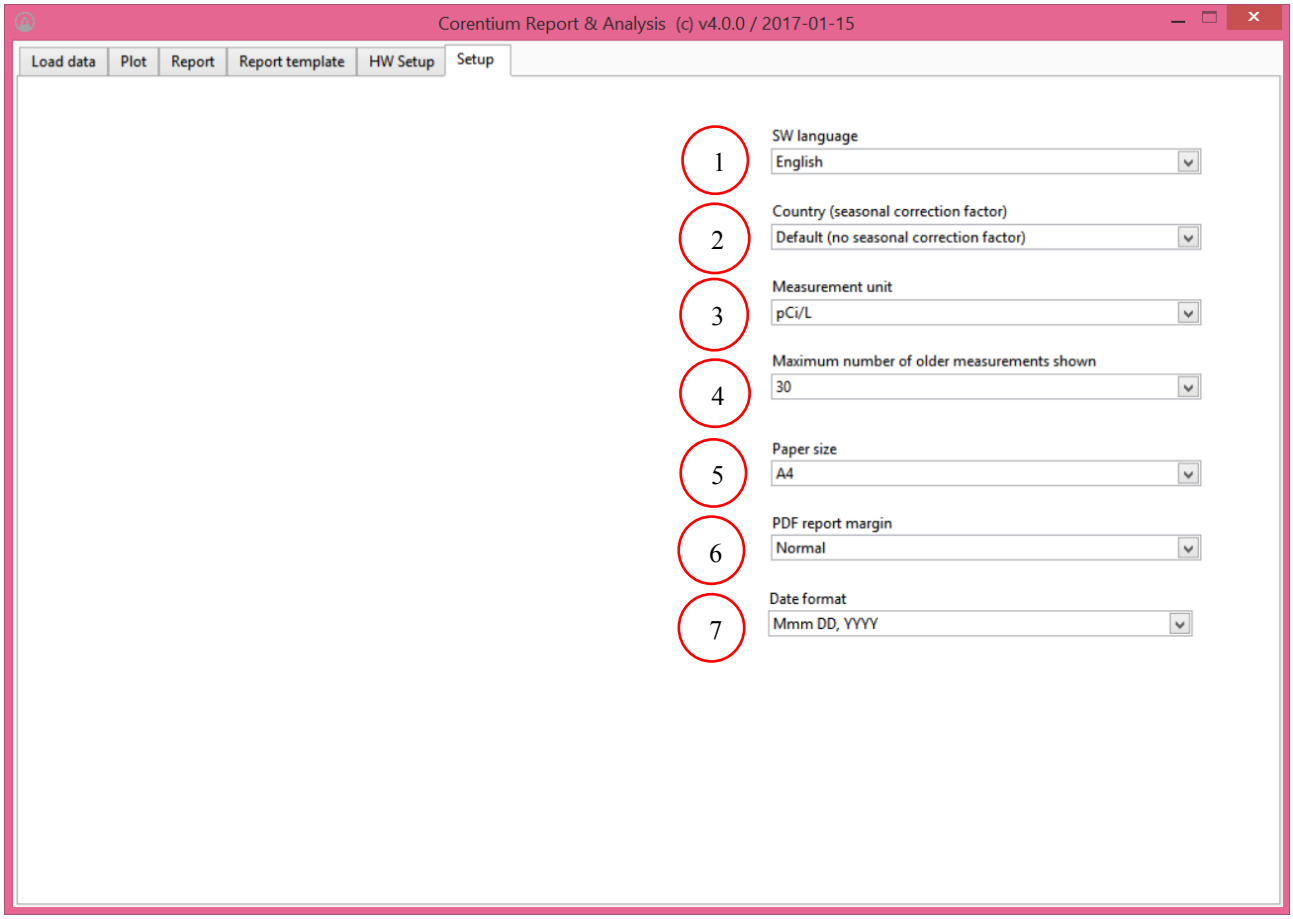


Figure 4-43 : Setup TAB - CRA SW settings

The SW can also be configured manually through the following options. The options indicated by encircled numbers in Figure 4-43 are described below:

1. SW language : The language used by CRA SW is set using the pull-down menu. User can select between Norwegian(Norsk), English, Swedish (Svensk), German (Deutsch), French (Français), Danish (Dansk), Italian (Italiano), Spanish (Español)
2. Country : This mainly implies whether to take seasonal correction factor for your country into account. You can also choose default where no seasonal correction factors are applied when calculating the annual estimate
3. Measurement unit : Select between **'Bq/m³'** or **'pCi/L'**. Based on the measurement Unit selected, the measured values are automatically converted and

displayed by CRA

4. Maximum number of older measurement : Limits the number of old measurements to be shown on the **LOAD DATA TAB** when selecting the item "***<Select an older measurement from the monitor below>"***. Default 10 older measurements are listed, but it can be changed to 30, 100 and 300. We recommend that you use the default setting.
5. Paper size : You can select paper size for the PDF report. By default 'Letter' size is set on startup if the units were pCi/L and 'A4' set if the units were Bq/m3.
6. PDF report margin : The margins around the text/figures on each page of your PDF report is configurable. The settings are: 'Normal' (quite large margins, this is the only setting in older SW versions). 'Thinner' selects margins that are about 2/3 of the 'Normal' margins amd 'Thinnest' selects margins that are about 1/3 of the 'Normal' margins.
7. Date format : Select your date format used in SW and reporting. If set to 'Standard' it will behave like earlier CRA SW versions. You can now set explicitly other date formats o help customize your report as you like.

4.7 Report Wizard

Report Wizard is used to quickly generate a report with a built in template.

The following steps are used to generate a report:

1. Load data from monitor/Load data from the file from **LOAD TAB**. Refer section 4.1.2 for more details. You will observe the radon concentration displayed in the summary section of the **LOAD TAB.**

2. Push Report Wizard as indicated by red arrow in Figure 4-44. You would be navigated automatically to Report duration window

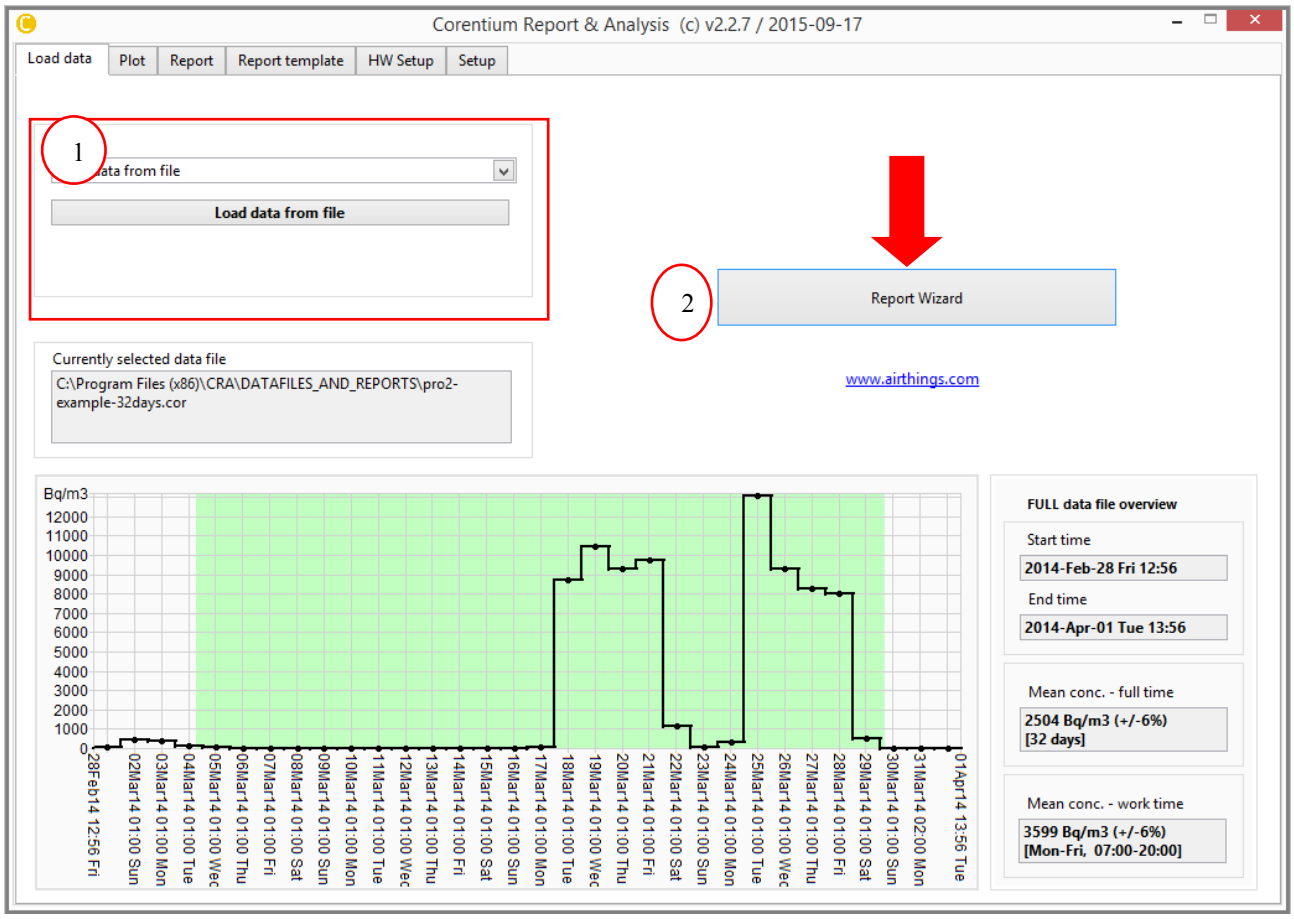


Figure 4-44: Report Wizard

3. Report Duration window:

Encircled letters in Figure 4-45 indicated the description below:

a. **Time Selection:** Select report time duration by sliding the start time and end time pointer as indicated by red arrows in Figure 4-45.

⚠	*By default the measurement duration is set for the maximum duration of the measurement*

b. **Day Selection:** Select Workdays (Weekdays) by checking the boxes. Also select the working hours from Start Time and End Time.

⚠	*This selection is important if you need to calculate the average radon concentration in work place, office etc., By default the working days are selected between Monday to Friday and the working hours for 7:00 to 20:00*

c. Click **Next** >> To go to Report Selection window
d. Click **Cancel** >> Return to **LOAD TAB**

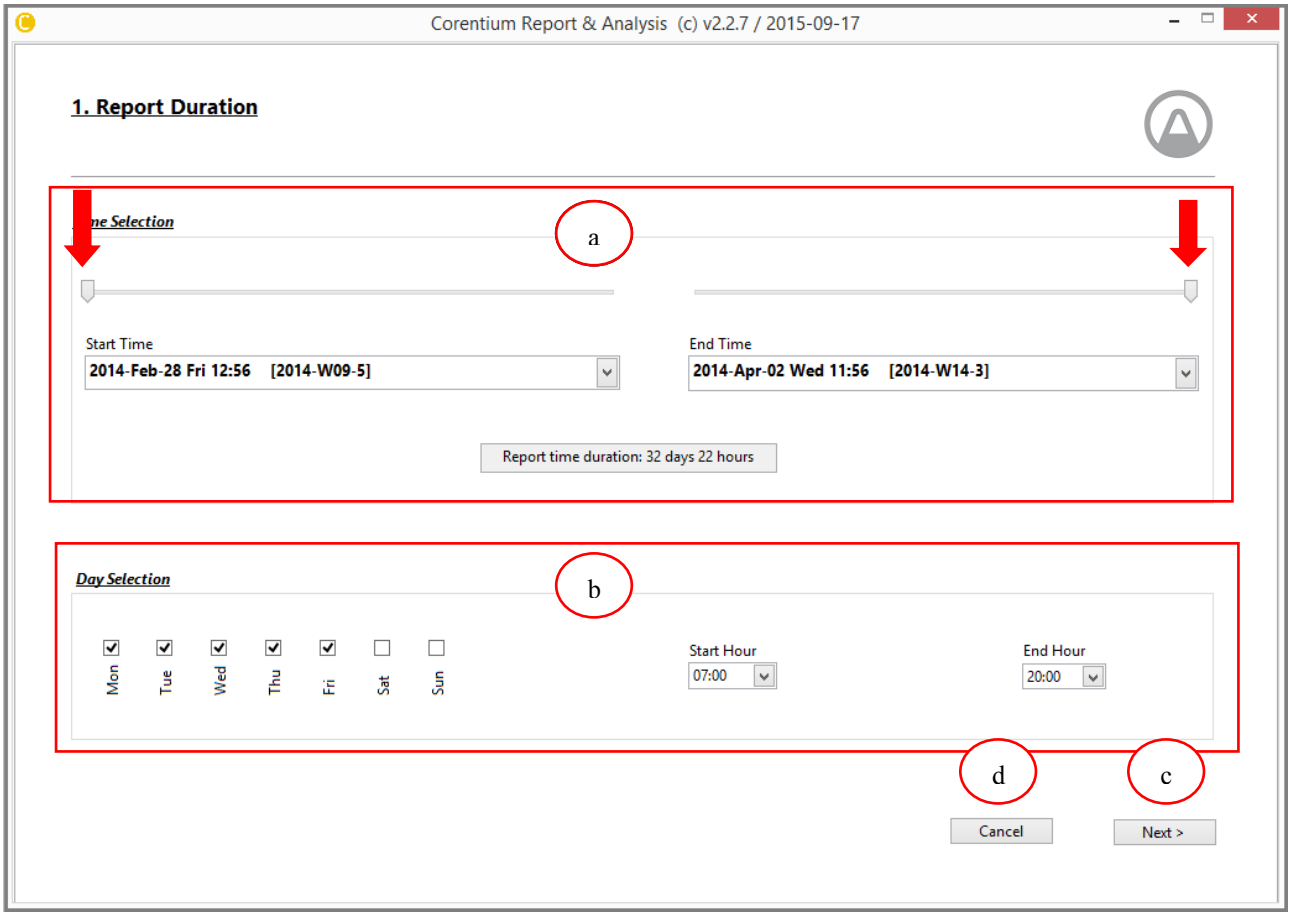


Figure 4-45: Report Wizard-Report Duration

4. Report Selection:

Encircled letters in Figure 4-46 indicated the description below:

a. **Report Language:** Language of the report is chosen from this pull down menu.
b. **Select report template:** You can choose between the standard template format or the customized format created by you. There are two types of standard templates
    i. Radon concentration with signature field. ***Refer 4.8*** ***Appendix*** I
    ii. Radon concentration work and full time. ***Refer 4.9*** ***Appendix*** II
c. **Plots in the template:** This selection menu controls the visibility of Markers and other sensor variables in the plot. Check In the boxes to make it visible

⚠	*This selection menu appears only if the template contains plot and allows you to select between different plots*

d. Click **Back** >> To go to Report Duration window
e. Click **Cancel** >> To Return to the Load Tab
f. Click **Next** >> To go to User Information Tab

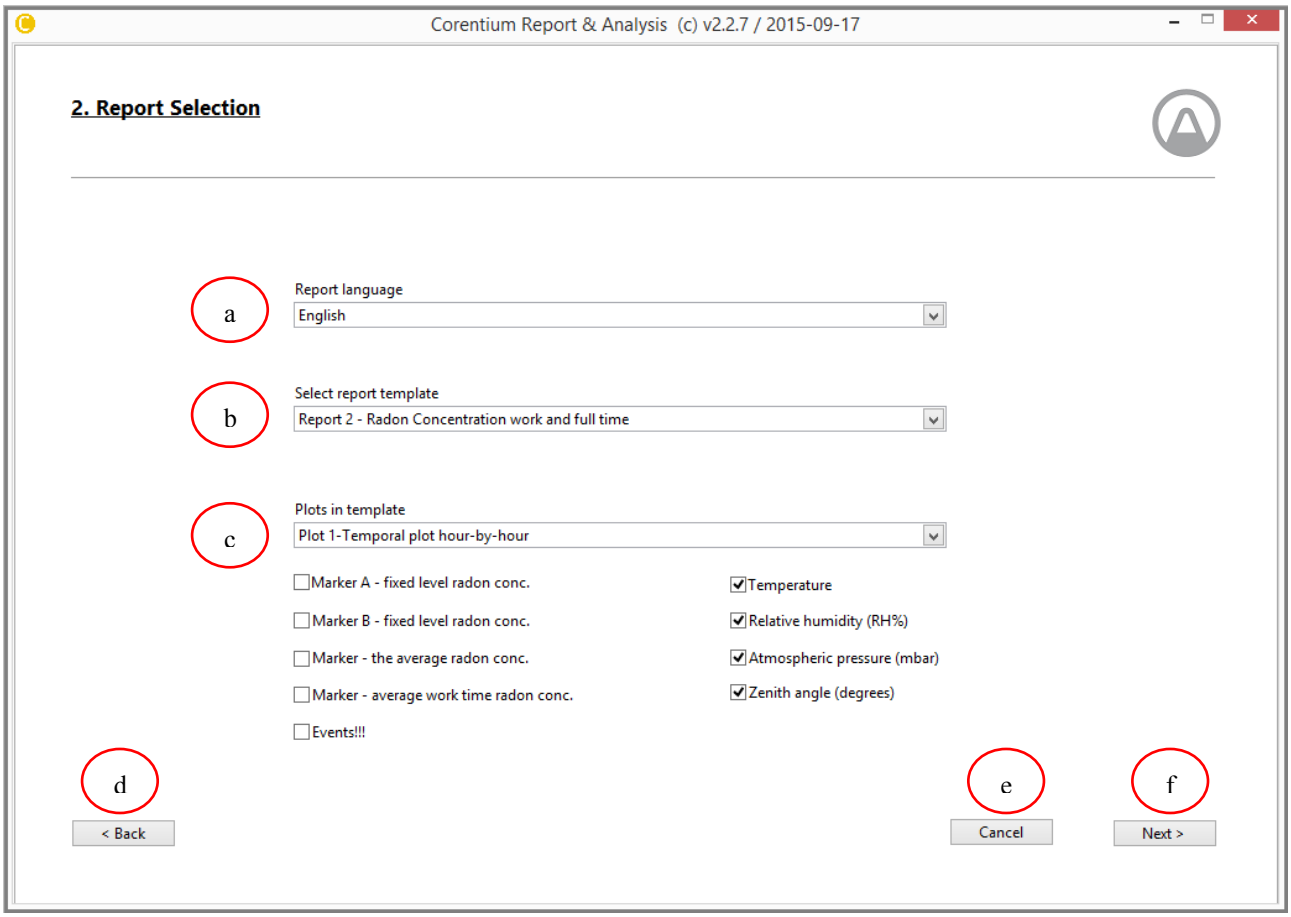


Figure 4-46: Report Wizard-Report Selection

5. Report User Information :

Encircled letters in Figure 4-47 indicated the description below:

a. Add user details
b. Click **Next >>** To go to Report Generation window
c. Click **Back >>** To go to Report Selection window
d. Click **Cancel >>** To return to LOAD TAB

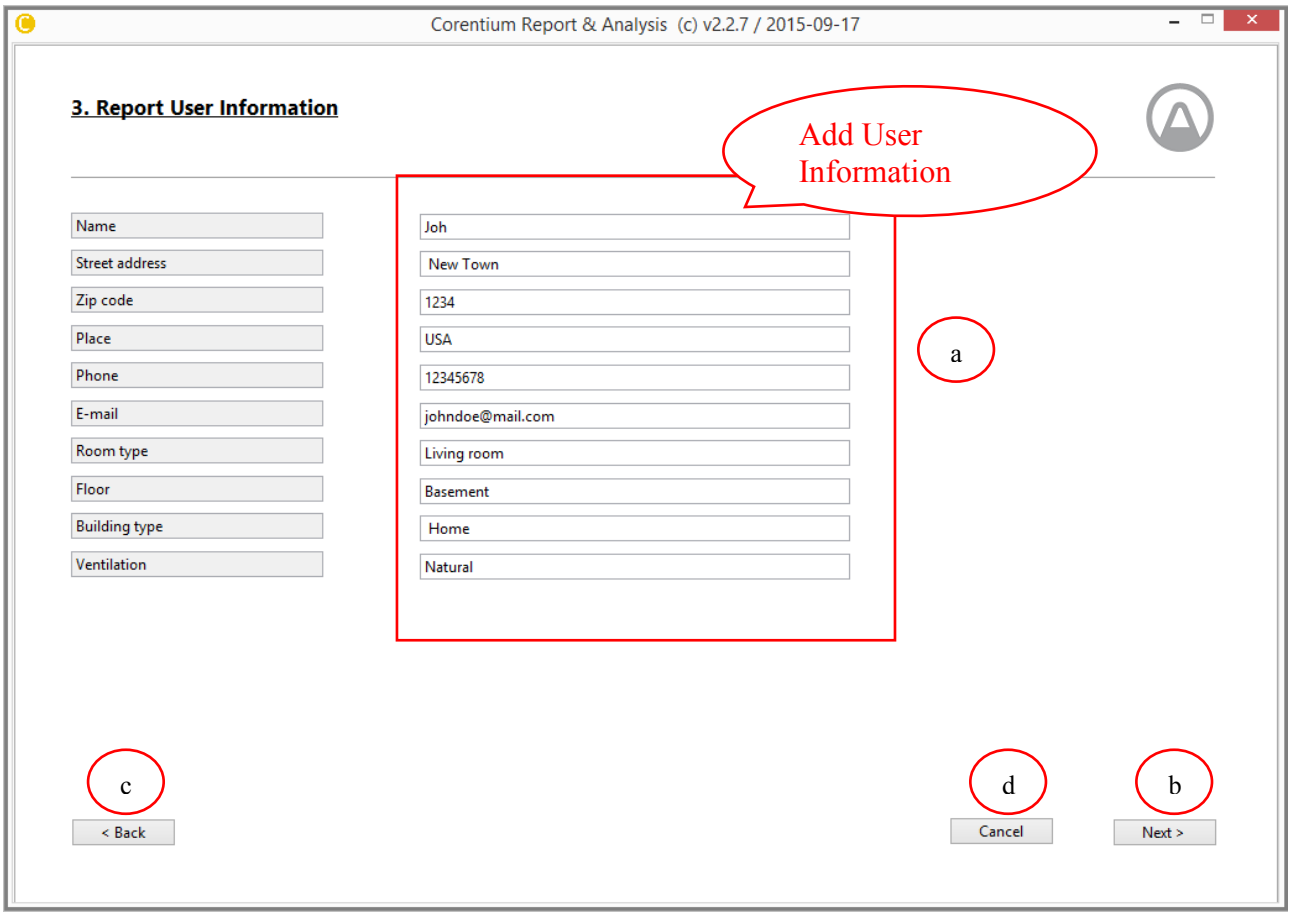


Figure 4-47: Report Wizard - Report User Information

6. Report Generation:

The final Step of this process is the Report Generation It has three options indicated by encircled letters in Figure 4-48.

a. **View Report:** Report is generated in PDF format and opened automatically
b. **Save report to file:** Build the report and allows to save the file
c. **E-mail report:** Send Email with the report as an attachment. Refer section 0

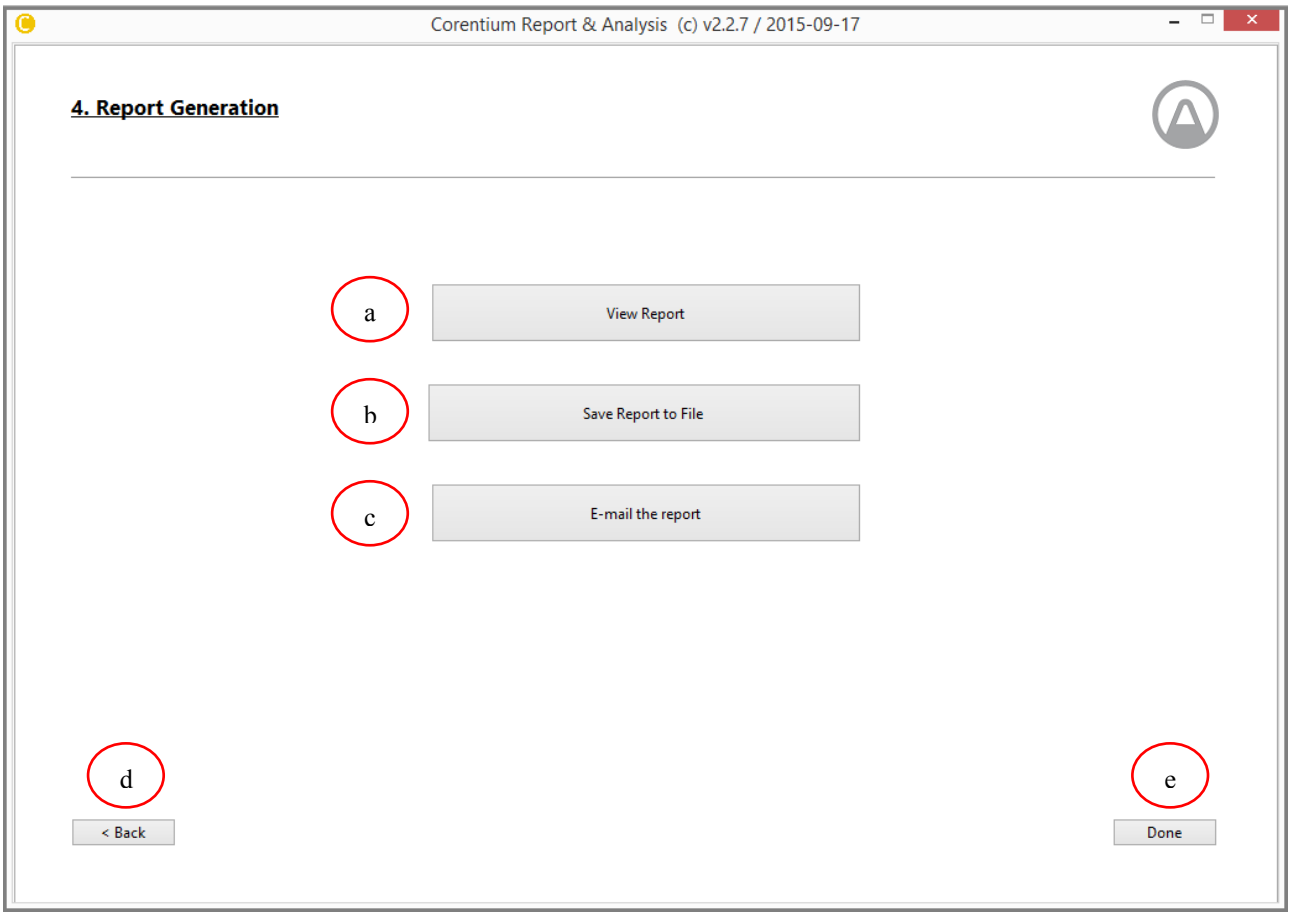


Figure 4-48: Report Wizard - Report Generation

4.8 Appendix I

Report 1

Radon Report - Measurement of Radon in Indoor Air

Report generated 2015-12-04 09:30

Information about measurement

Name	Joh
Street address	New Town
Zip code and place	1234, Minnesota
Building type	Home
Year built	1987
Room type	Living room
Floor	Basement
Ventilation	Natural

Measured radon concentration

Measurement started	Measurement ended	[1]Measured value radon conc.
2014-Feb-28 Fri 12:56	2014-Apr-02 Wed 11:56	65.8 pCi/L (±6%)
32 days 22 hours measurement duration		

[1]The measured value is given as the measured radon concentration ± an estimated measurement uncertainty (one standard deviation).

Comments

I certify that the measurement is done as per the recommendations of Corentium AS. Please check the information from the Radiation Protection Authority to learn more about the action level - **http://www.epa.gov/radon/**

Place Date Signature

corentium

4.9 Appendix II

Report 2 (Page 1)

Radon report - Measurement of radon in indoor air

Report generated 2015-12-04 09:02

Information about the measurement

Name	Joh
Street address	New Town
Zip code	1234
Place	USA
Phone	12345678
E-mail	johndoe@mail.com
Room type	Living room
Floor	Basement
Building type	Home
Ventilation	Natural

Measured radon concentration during work hours

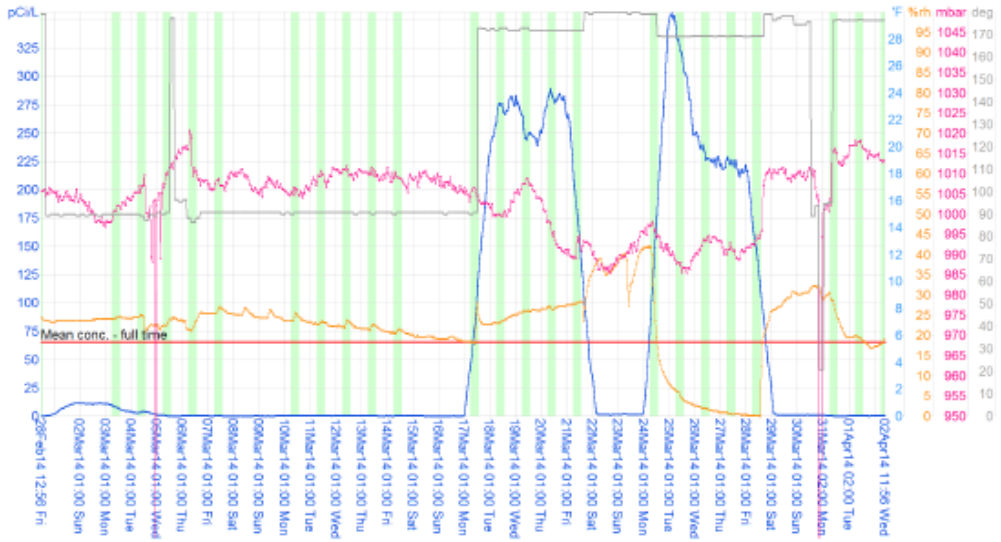
Measurement started	Measurement ended	[1]Measured value radon conc.
2014-Feb-28 Fri 12:56	2014-Apr-02 Wed 11:56	94.7 pCi/L (±6%)
Mon-Fri, 07:00-15:00 (183 hours)		
[1]The measured value is given as the measured radon concentration ± an estimated measurement uncertainty (one standard deviation).		

Average radon concentration for the whole measurement period

Measurement started	Measurement ended	[1]Measured value radon conc.
2014-Feb-28 Fri 12:56	2014-Apr-02 Wed 11:56	65.8 pCi/L (±6%)
32 days 22 hours measurement duration		
[1]The measured value is given as the measured radon concentration ± an estimated measurement uncertainty (one standard deviation).		

Report 2 (Page 2)

Plot for radon concentration (radon conc vs time)



The plot shows the time interval from 2014-Feb-28 Fri 12:56 to 2014-Apr-02 Wed 11:56 (790 hours). Average radon concentration in this period is **65.8 pCi/L** (±6%). If one includes only Mon-Fri, 07:00-15:00 (a total of 183 hours), one finds an average radon concentration of **94.7 pCi/L** (±6%).

Instrument information

Monitor data file	pro2-example-32days.cor
Monitor serial number	SN:2004000013
Monitor full measurement duration	32 days 22 hours 17 minutes. Monitor started on 2014-02-28 12:56. Monitor uploaded on 2014-04-02 12:13.

Comments

Place Date Signature

4.10 For Advanced User's

If experienced with web site development and having knowledge about customizing web pages using CSS style sheets, one would have an additional way of further customizing the report pages according to own preferences by modifying the CSS style sheets used by the CRA SW.

When the CRA SW presents a report in the web browser the CSS style sheet used is found at:

- C:\Program Files\CRA\TEMPLATES\standard.css

When the CRA SW sends a report to a pdf file the CSS style sheet used is found at:

- C:\Program Files\CRA\TEMPLATES\ standard-2x-no-margins.css

If one decides to alter these files in order to customize for example fonts, colors, table borders etcetera, make sure to back-up the original files in case ending up in a situation where the report generation does not work properly anymore. That will prevent the need for re-installing the CRA SW in case of problems.