CEL-350 dBadge and Casella Insight PC Analysis Software

Overview of the software

The CASELLA INSIGHT software is a comprehensive Database Management System that runs on the Microsoft Windows operating system and uses the mySQL database engine. Casella Insight DMS allows the user to connect to multiple CEL-350 dBadges in order to control their operation and to download the measurement results. The dBadge dosimeters are designed to store the noise dose results in such a way that they can be interrogated at any time after the measurement run has taken place to apply alternative thresholds, criterion levels and perform “what if” scenarios on the time history profile.

Definitions of some of the terms used in the dBadge dosimetry system

Insight	the name of the pc software package that runs on most modern Windows operating systems including Win XP, Win Vista and Win 7
dBadge	the CEL-350 personal noise dosimeter with built-in microphone for collecting the worker’s noise exposure information results
database	a location on the computer for all the measurement results that is stored in a standard format which allows the user to view and manipulate it for hard copy reports
A weighting	the frequency response used in the dosimeter to most closely approximate the hearing response of the normal human hearing (this is the response specified in the OSHA/NIOSH/ACGIH measurement protocols)
Slow response	the standardized response of the dosimeter to the varying noise levels that actually occur during the measurement (specified in the protocol documents)
Exchange rate	the doubling rate in dB that is used to calculate the average noise level (or risk value) during the measurement (5 dB used for OSHA, 3 dB used for ACGIH and ISO)
Threshold level	the cutoff level of noise in decibels below which the dosimeter will exclude any readings and treat them as effectively 0 dB for the purposes of the calculation of the overall noise exposure. The lower threshold level (T1) is 80 dB for calculations for OSHA Hearing Conservation Amendment and ACGIH exposure. The upper threshold level (T2) is 90 dB for the calculation of the Permitted Exposure Level for OSHA.

Criterion level	the notional level of noise such that if it existed continuously for 8 hours would produce the allowed full worker's exposure to noise at the workplace. For OSHA the 100% dose Criterion level is equivalent to 90 dB for 8 hours. For ACGIH the 100% dose Criterion level is 85 dB for 8 hours.
Noise dose	the actual percentage of the allowed noise exposure expressed as a relative amount that corresponds to the maximum allowable limit called the Criterion level
Proj. noise dose	the calculated noise dose as a percentage that would be expected to be reached after exactly 8 hours based on the actual noise dose received so far in the real measurement. For example, if 10% noise dose is accumulated in 1 hour of measurement and all else is expected to stay constant then the projected 8 hour noise dose would be 8 x 10% = 80% at the end of the standard working day. Note that if the expected normal work day is longer, such as 12 hours, then the projected noise dose would be 12 x 10% = 120% in this example.
TWA	the time weighted average noise level calculated from the actual measured average noise for the complete shift spread over exactly 8 hours. Time weighted means that the collected noise exposure is always expressed as an equivalent 8 hour value even if the measurement duration was shorter or longer than 8 hours.
Lavg	the actual average noise level over the whole measurement time with the selected exchange rate, frequency response and time response. The average noise level may or may not have the threshold setting applied to it.
Maximum level	the highest noise reading during an interval with the specified frequency weighting and time response (that is normally with the A weighting and the Slow response)
Peak level	the absolute highest reading irrespective of the frequency weighting and time response selected in the dosimeter (that is normally without the A weighting or the Slow response). It is usually measured with the zero (or Z) frequency weighting that corresponds to the older Lin response on noise instruments.

Noise dosimetry basic concepts

Noise is one of the most common hazards in the modern workplace. The noisier it is the more likely it is that workers exposed to these high noise levels will eventually become deaf and suffer distinct social disabilities. High noise levels at work increase the risk of accidents and cause stress to the people so exposed. Most countries have published regulations that govern the way noise levels in the workplace are to be assessed to prevent un-necessary damage to worker's hearing. In the USA the OSHA regulations (Standard 29 CFR-1910: 95) states how workers should be monitored and the limits that currently apply to the noise exposure results.

In practice, noise levels are not steady all through the day so a single number or average noise level is specified for a nominal standardized 8-hour workday. Additionally, in recognition that sudden impulsive noise also contains significant harmful energy, a peak noise level limit is mandated that applies to any one single high noise level at any time. These limits in the OSHA standard are currently 90 dB for the average over the whole working day and a single peak limit of 140 dB for any single level. (Other recommendations, such as those issued by the ACGIH organization suggest a different exposure limit of 85 dB for an 8 hour exposure.) In view of the fact that higher noise levels are likely to cause more hearing damage than lower ones there is a trade off between the allowed exposure time and the level of that exposure. Twice as much noise risk must be linked to a halving of the allowed exposure time to maintain an overall daily allowable level.

The risk factor that is used by the OSHA regulations states that a doubling in the level of 5 dB must be balanced by a reduction by half in the exposure duration. So we talk about the 5 dB exchange rate as being the shorthand for the concept that each time the noise level goes up by 5 dB the exposure duration at that level must come down by a half. If we start at the permitted exposure level of 90 dB for 8 hours then this amount of total noise risk will be the same as 95 dB for 4 hours or 100 dB for 2 hours.

Many workers do work for a full 8 hours but this is not universal in all industries. Therefore, there has to be a way of normalizing any worker's exposure during their true daily tasks so that comparisons can be made from one workplace to another completely different one. Regardless of how long a worker is actually working and exposed to noise the concept of the time weighted average (TWA) noise level exists whereby all of the noise exposure received during their 7 hours 45 minutes or 8 hours 20 minutes is referenced to an equivalent 8 hour 0 minute day. This is the usefulness of the TWA value and is actually the value that is specified in the many workplace noise exposure regulations worldwide. The TWA will only be the same as the measured average noise level when a worker is exposed for exactly 8 hours.

If the noise measurements are done for a full shift then the modern noise dosimeter will calculate the true TWA. If the measurement is halted before the work shift has finished for any reason then this measurement is considered to be a "sample" and the calculated

TWA will likely be underestimated depending on the actual length of the sample period. If the sample is for half the shift, say in the morning only, then the TWA will be calculated at 5 dB less than the true answer because the calculation only includes the noise accumulated during the actual measurement and uses zero dB to pad the rest of the time out to 8 hours.

In this case the measured average noise level (Lavg) is most likely to give the best result. The peak level limit is a single value that might occur at any time during the workday so maybe true or may not be true depending upon the specific circumstances of the individual worker. If the true peak noise level occurs during the part of the day that was not monitored in a dosimetry study during a short or sample period then it will be impossible to be sure that it has been reported correctly.

If very high “peak” noise levels are reported by the dosimeter, then they may be due to non noise sources such as tapping on the microphone or the rubbing of clothing on them. If there are no good reasons to suspect high levels of impact noise for a particular measurement then the supervisor should investigate the causes in more detail and actually be present to witness whatever might be causing them. The CEL-350 records the peak levels on a minute by minute basis so it will be possible to relate their occurrence with what was going on in the work place at a specific time.

Noise measurements for an individual can be made with a suitable hand held sound level meter to measure each specific job task but an accurate knowledge of the exact exposure duration at each of these intervals must be considered too in order to make the right overall noise exposure calculation. A personal noise dosimeter such as the CEL-350 dBadge is the preferred instrument to collect the individual’s noise exposure because it is mounted on the worker and is exposed to the same noise as the worker is.

Practical considerations for noise dosimeters

Making noise measurements at work with a hand held sound level meter is one way to carry out assessments. However, it can be a very time consuming process if the worker is mobile and moves from place to place during the day. A more convenient way to collect the noise exposure results is to put the noise meter onto the actual worker to be monitored. This is in effect what a noise dosimeter is, a sound level meter that can be worn by the worker under investigation going wherever they go and receiving whatever they receive in terms of the changing noise levels. It also needs to be able to collect the noise in such a way that as many regulatory requirements can be met in the fewest number of measurements.

If an instrument is going to be bodily worn then it needs to be small and lightweight and as unobtrusive as possible. The CEL-350 dbadge system achieves all of these main practical tests and the acoustic ones too. It has the microphone built-in to the body of the main unit to prevent snags on cables or getting ripped off the worker by accident. It is less than 2.5 ounces so is very lightweight and small. Even better, it can measure all of the noise levels with the 5 and 3 dB exchange rates simultaneously with any threshold or criterion level from 70 to 90 dB so that virtually any major industrial noise exposure legislation can be monitored with a single run.

The design concept for the dBadge was to provide as small a package as possible to collect the noise exposure information and to save it for later viewing and analysis in a software package after the results have been downloaded to a personal computer. The advantage of this approach is that the dosimeter no longer needs to be “setup” in the “right way” to measure the noise according to a particular standard. It can measure in such a way that virtually any noise exposure standard used in any major industrialized country in the world can utilize the power in the modern computer to re-analyze the same information at any time now or in the future. It is much easier to provide users with the flexibility of a software program using a very familiar user interface that they are used to from other daily tasks than it is to put lots of buttons and controls on a small data collection device that is worn by the worker.

Data collection with the dBadge

The first decision that is normally made when carrying out personal noise dosimetry measurements is whether to do a full shift measurement or just a short sample from part of the day. The “truest” estimate of an individual’s noise exposure will, of course, be if all of the day’s noise exposure is included in the measurement. This implies making a long measurement from the very start of the shift all the way through to the very end of the workday to collect every decibel of noise that the worker is exposed to at the workplace. This may be practical for workers who have a complicated noise exposure pattern or who move about from area to area in an unpredictable fashion. However, the downside of this thorough approach is that with only one dosimeter available to a hygienist then only one worker per day can be assessed. A possible solution to this is to purchase multiple packs of instruments but this can be more expensive for small to medium sized organizations.

A more cost effective solution to this problem is to carry out “sample” measurements where the actual sample time is carried out over *anything* less than the normal full working day. In some situations it is possible to make a sample for as short as 1 hour. In other situations a sample may need to be a morning or afternoon part of a shift. In any case, the sample method will be considered to be valid as long as the hygienist is sure that the measurement interval chosen is completely representative of the normal workday. This is reasonably guaranteed for noise climates where the main sources of noise are variable or reasonably constant. However, great care should be taken when the noise climate has significant impulsive characteristics such as when punch presses may operate at some specific time during the day. It is extremely important to make sure that these noise levels are included any sample that is carried out since the highest noise levels are the most dangerous to the worker’s hearing.

The advantages of sampling for noise exposure are that considerably more workers can be measured with a smaller number of instruments and yet an accurate picture of the noise exposure will still be obtained. Statistically speaking, it may be better to get half a dozen sample measurements for 5 or 6 different individuals all doing the same tasks rather than a single longer measurement on just one of them. This is because there will always be a variation in the noise exposure of an individual worker and the one measurement that is made for the full shift may or may not be on a day that is truly representative of what actually happens from day to day. Having more measurement results for a group of similar workers also minimizes the risk that one of them may “tamper” with the instrument and so cause false results.

Practical advantages of using the CEL-350 dBadge

Since there are no setups that have to be preloaded before measurements can start because everything is measured at the same time it is very simple to make noise exposure measurements. Simply turn on the dBadge, wait for the startup routine to finish, fit the acoustic calibrator over the microphone and wait for the dosimeter to recognize the tone. The dosimeter will set itself automatically to the correct calibrator decibel level when the user confirms that they wish to perform a new calibration prior to a run. Remove the calibrator and fit the dosimeter to the worker using any one of the 4 standard mounting clip methods. Start the run and leave the worker to go abut their normal business. At the end of the day retrieve the dBadge and stop the run. Perform a post run calibration again if required (both the pre and post run calibrations are store for the run results) and then transfer the results to the computer running the Casella Insight program.

Download after the first run is not absolutely necessary if more measurements need to be taken because there is ample memory capacity for at least 20 full 8 hour daily measurements to be held until download is finally needed. Runs in the memory can be erased at the end of a successful download or can be left in the dosimeter to download again at another computer also running a copy of Casella Insight software. This allows multiple downloads from the same dosimeter if necessary. If the runs are not deleted from the dBadge at the end of a successful download then they can be manually deleted by the user via the configuration menu available at startup.

The "big picture"

The CEL-350 dBadge system is a very simple method for collecting personal noise exposure from individual workers in noisy workplaces. The resulting measurements can be used to understand the exposure of certain people who may be considered at risk to see if their noise exposures are above the required limits. A comprehensive survey for noise exposure consists of the following main steps to be able to judge the effectiveness of any noise control that may be in place or whether a hearing conservation plan is in order for a given company and the affected workforce.

Steps in the procedure:

- Decide who the individuals are that will be measured for noise exposure surveys.
- Install the analysis software, Casella Insight, onto a computer running a suitable MS Windows operating system.
- Decide whether the noise measurements will be made for a full working shift or if shorter representative sample measurements may be more efficient.
- Charge the batteries in the dBadge dosimeters ready for the measurements to take place.
- Download any previous results held in the memory of the dosimeters so that there is enough space to allow for the storage of new measurement results.
- Decide what mounting or fixing method is best for each worker to be included in the survey depending on what clothing or job function that they are performing.
- Perform an acoustic calibration on all of the dosimeters to set them to the correct level at the start of the measurements.
- Fix the dosimeters to the workers at the top of the shoulder with the microphone facing upwards noting the serial number of each dosimeter and who is wearing it.
- Start the recordings and lock the dosimeters against tampering if necessary.
- Make a note of what areas the workers will be in and what processes are going to take place during the measurements.
- Allow the dosimeters to accumulate a representative sample (or the complete shift) of the noise exposure of each person that wears it.
- At the end of the survey retrieve the dBadge dosimeters and recalibrate them all to establish what, if any, microphone drift may have occurred during the measurement.
- Connect the infrared interface to the computer and start Casella Insight software.
- Offer up the dBadges to the infrared adaptor and download all the dosimeters used for the survey.
- Create the database structure in a folder on the computer to represent the locations where the measurements were made.
- Allocate (or link) the downloaded measurements to the individuals who wore the dosimeters.
- Select the report options in the software to produce a hard copy output of the measurements with the required level of detail deemed to be necessary to satisfy the local health and safety regulations.

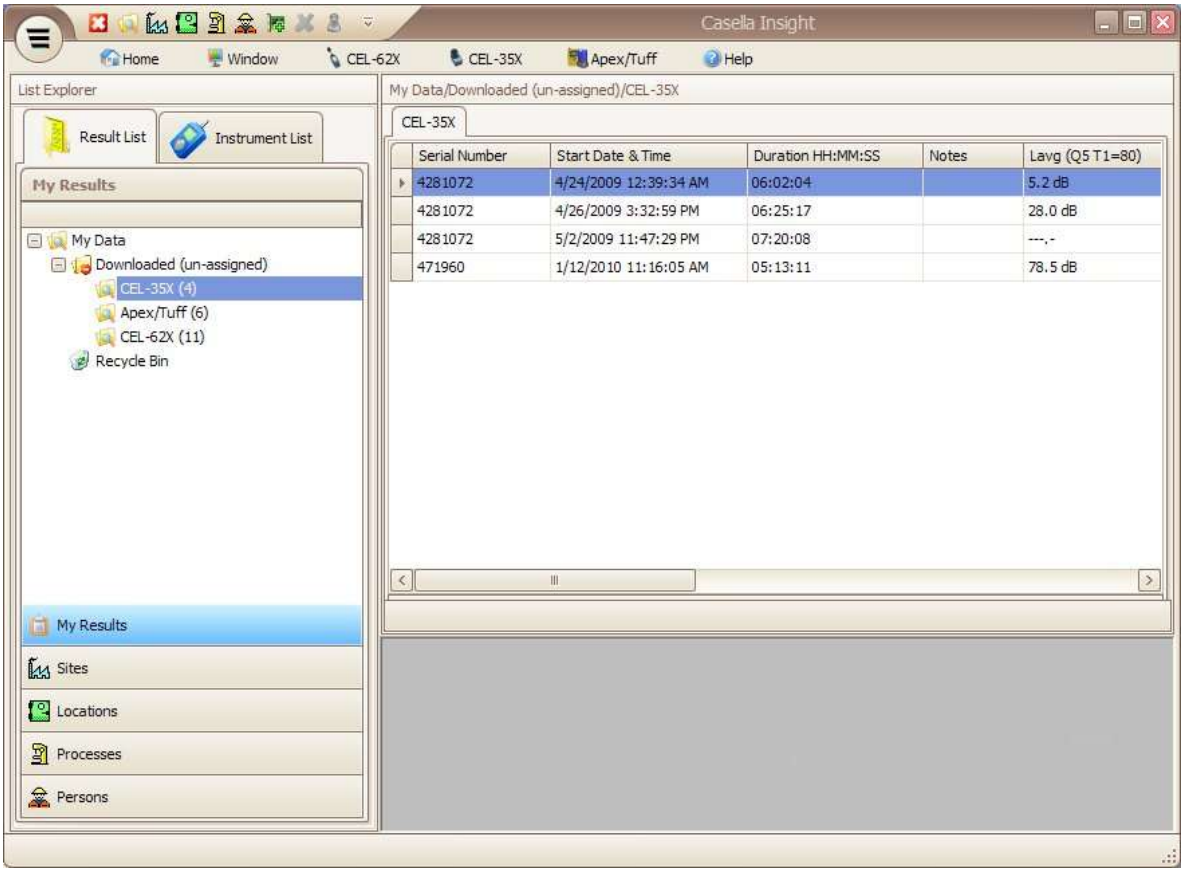
Starting the Casella Insight software program

Make sure that the infra red interface (193200B) is connected to the USB port on the computer first and then click on the Casella Insight shortcut 

on the desktop to start the program. The splash screen will appear on screen as the software loads all of the various modules that are needed to make it work.



The starting screen for Casella Insight will be displayed showing any previously downloaded runs (or the example runs that were loaded during the initial installation).

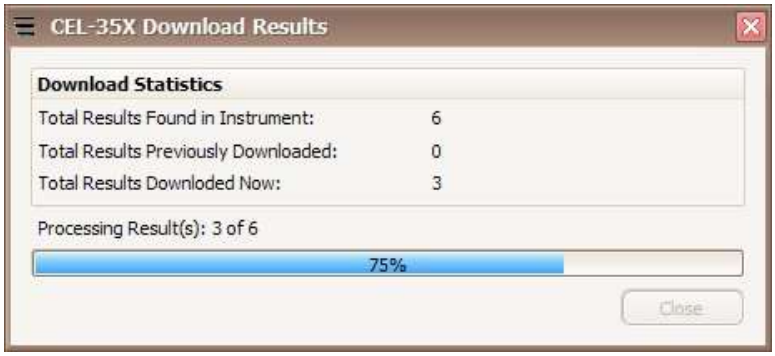


Downloading results to the computer

Another difficulty with regular noise dosimeters can be problems associated with inter-connecting cables. The dBadge overcomes these by having a built-in infrared interface that transmits the data to a receiving unit (shown below as the 193200B device) attached to the computer. The user does not have to worry about the right baud rate for transmission or set any start or stop bits as everything is taken care of automatically by the Casella Insight software and the dBadge. At the end of a measurement, after the post run calibration, just position the dBadge in front of the infrared adaptor and watch for the blue LED to flash to show that download is taking place.



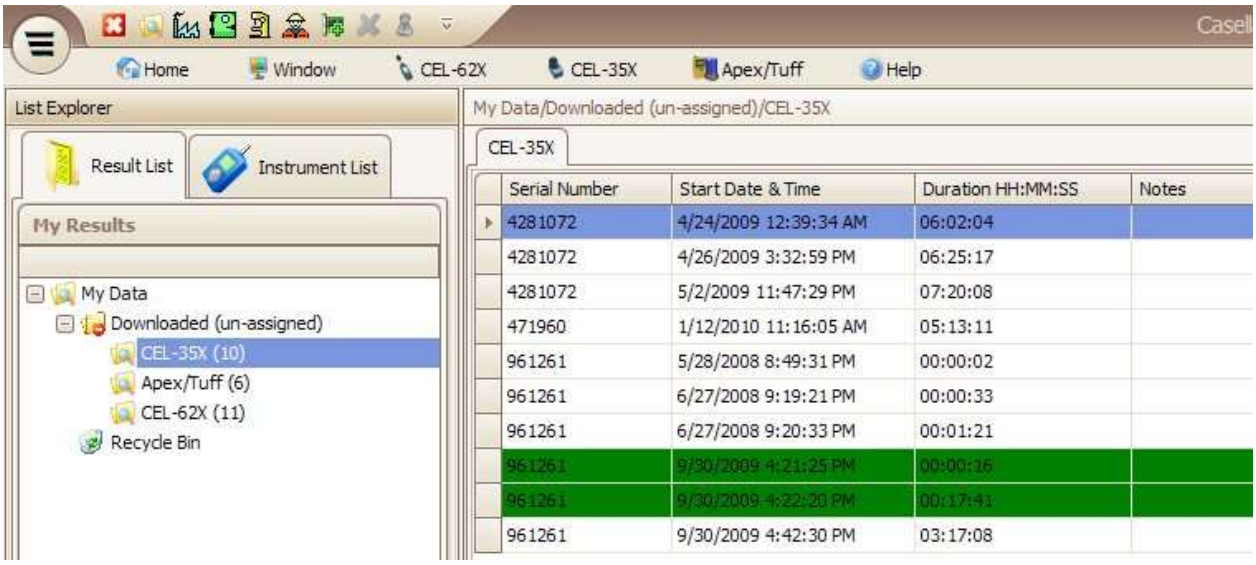
The Downloading Results to database progress box will be shown on screen during the download



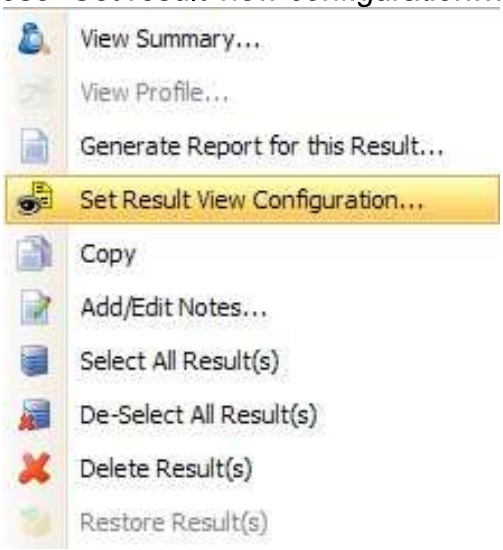
At the end of the process it will show confirmation that the download has been successful. Click on the Close button to finish the download process. The newly downloaded runs will have been added to the list shown in the My Results tab for the CEL-35X instrument.

Analyzing the measurement results with Casella Insight

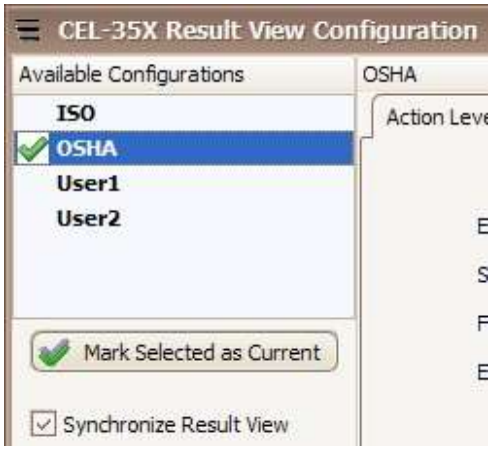
Once the measurement results from a single (or multiple) dBadges have been successfully downloaded the run(s) can be analyzed by the Casella Insight software as required. The download process drops all the measurement results into the dBadge specific area of the database that can be seen when the Result tab in the top left hand corner window is selected with the mouse.



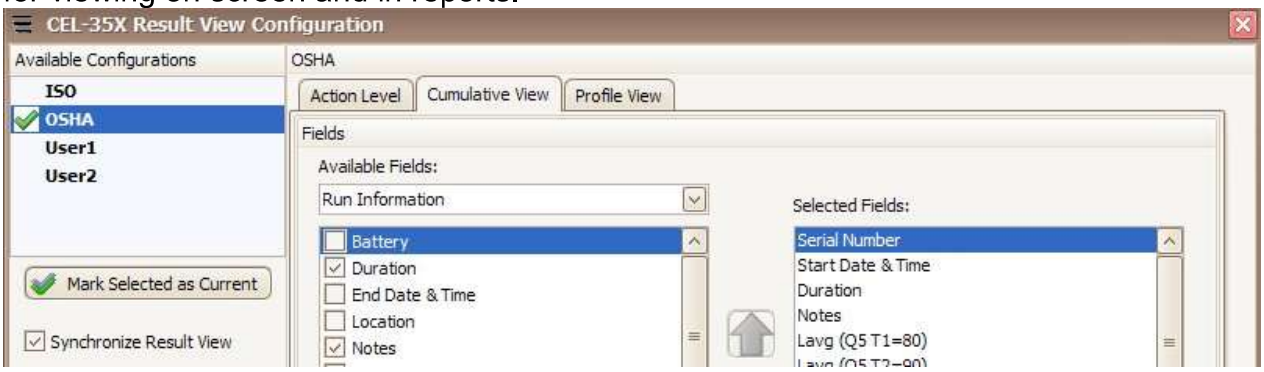
The unallocated downloaded runs are shown in the right hand window in the window called “My Data/Downloaded (un-assigned)/CEL-35X”. This location can be thought of as the “desktop” where all the runs are placed initially after download until they have been “linked” or “assigned” to the wearer of the dosimeter. By default, the ISO view of the run information is shown in this table. Right click with the mouse on one of the rows of run information and choose “Set result view configuration…” from the menu.



The Result View dialog box will be shown with the ISO view currently set as the default view. Highlight the second item in the list OSHA and click on “Mark selected as current” to change the default view over to see the results in the US OSHA style.



Click on the “Cumulative View” tab to select the specific set of results that are required for viewing on screen and in reports.

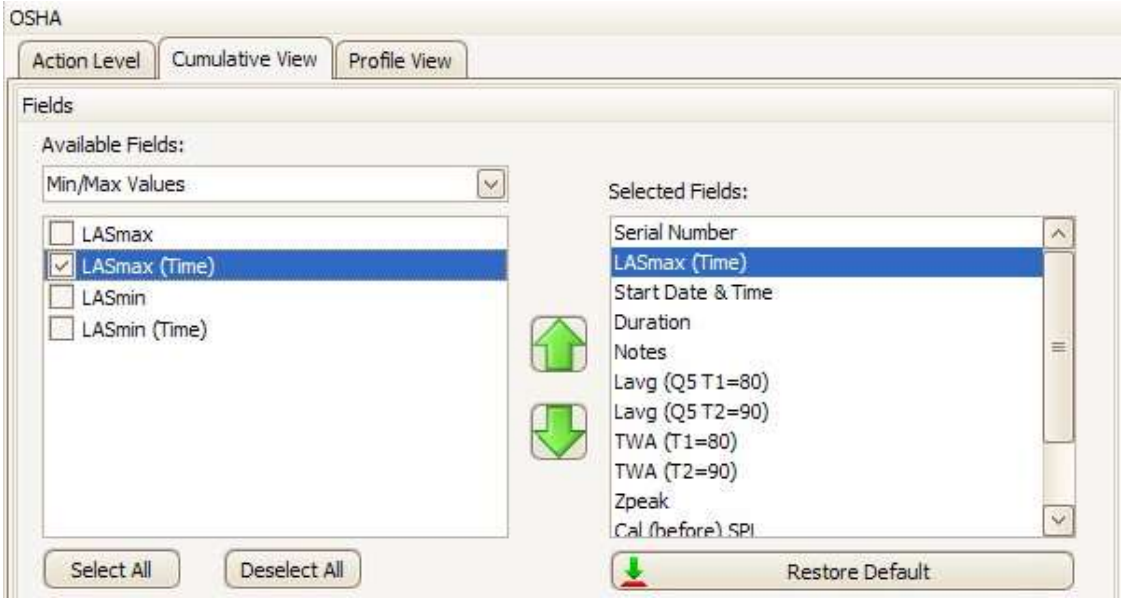


All items that are checked in the left hand window of available fields are copied across to the right hand window and will be displayed/printed when viewed on screen. The total amount of run information is grouped into 8 sub-sections as follows;

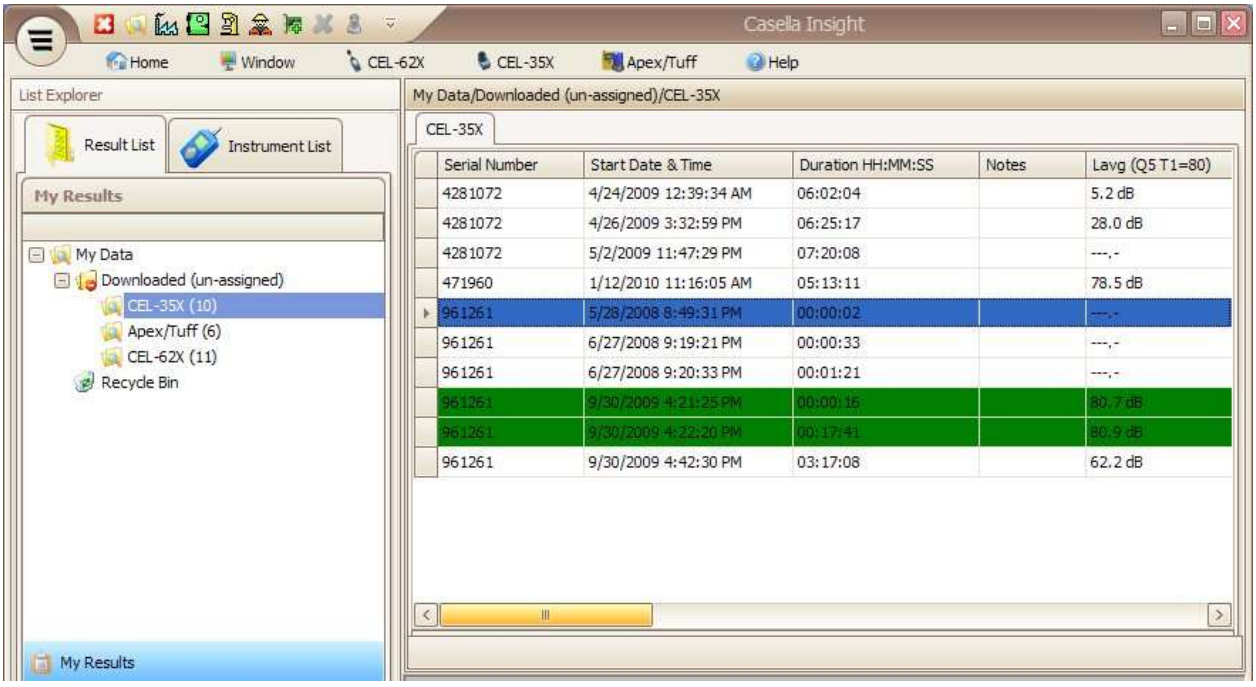
Run information
Calibration information
Min/Max values
Peak values
Average values (Q3)
Average values (Q5)
Settings
Profiles

Choose the sub-section and then place a check mark in the box for the result that is required to be viewed. The result order can be changed in the Selected Field window by dragging them up or down with the mouse. Items at the top of the list appear to the left on screen in the table view or at the top of the report when printed out. For example, to add the maximum sound level information choose Min/Max values from the drop down list and place a check mark in the LASmax (Time) box to add this item. It will be inserted

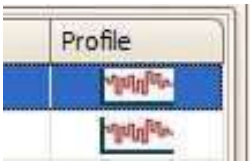
underneath the currently highlighted item in the right hand list of Selected Fields. Use the Up/Down green arrows to change its position or the mouse to make it appear where it is needed.



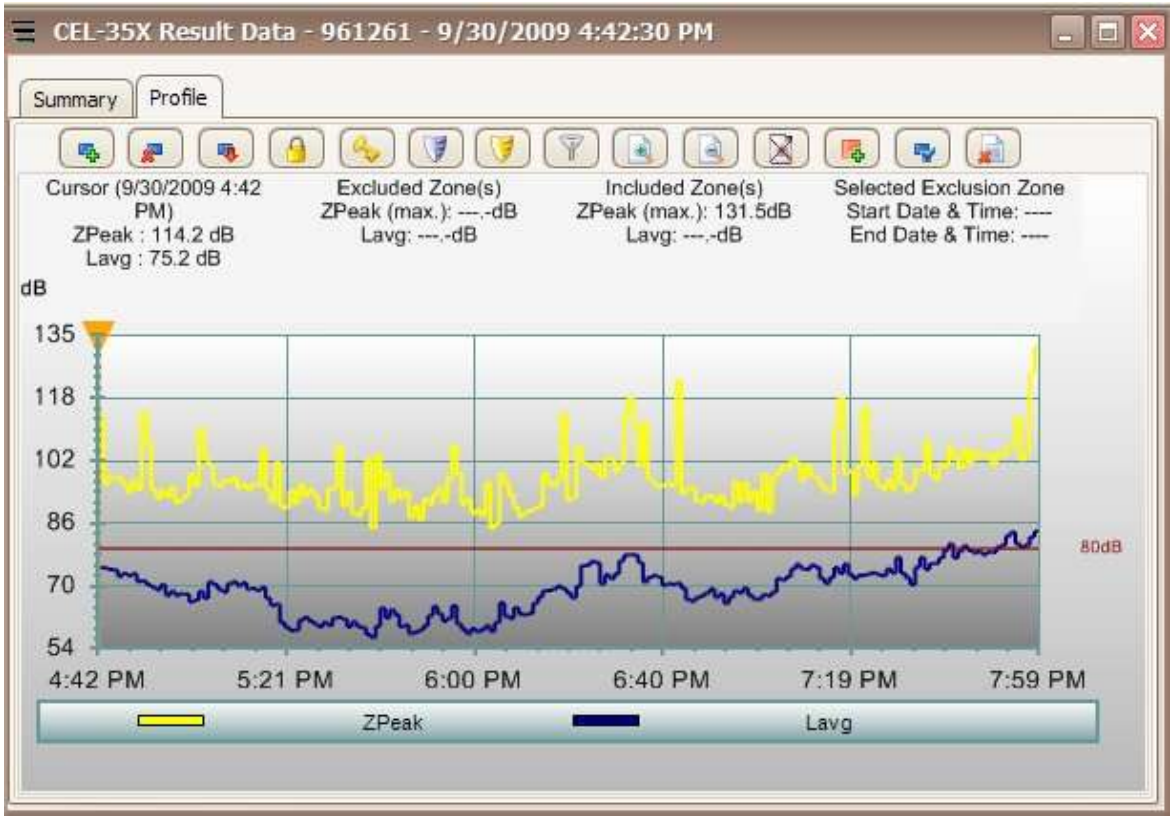
Click on the OK button at the bottom of the dialog box to leave this screen and save the new selected items.



Simply click on the chosen run in the grey area at the left of the row to highlight the run you want to see and then drag the slider bar horizontally to see all of the fields that are displayed. Selecting the OSHA view in the “Result View Configuration” dialog box will make sure that the results that are required for an OSHA style display are chosen out of the potential 70+ different fields that are available.

Normally, if there is a small chart icon (in red) in the column labeled “Profile” for the selected run (longer than 1 minute) then a time history profile chart is available that allows the different noise levels during the run to be displayed as a chart. Double click on the chart icon 

and the time history profile will open up in a new window below the cumulative record window.



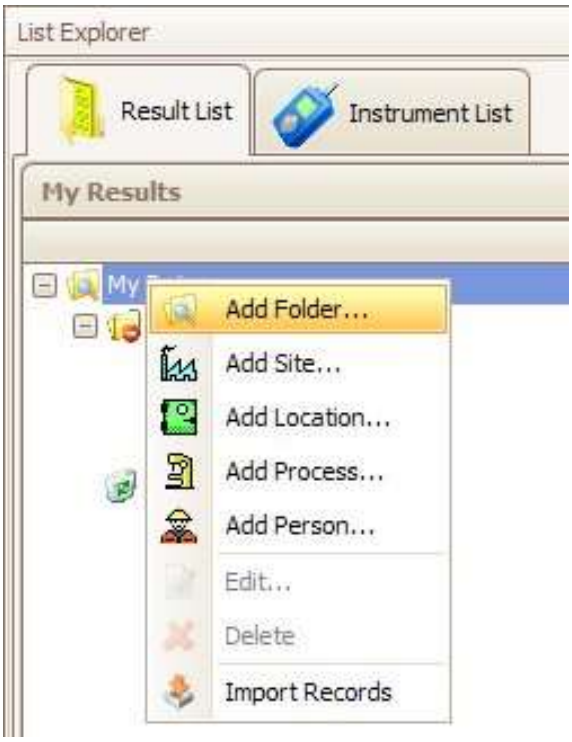
If the OSHA view has been previously selected then the chart displays the Lavg (blue line with the 5 dB exchange rate) and the ZPeak (yellow line) time history for the run. The time interval of the samples is always set to 1-minute duration so the number of data points will depend on the total duration of the run. An 8-hour recording will have 480 time samples to display in the chart.

In this case the 1 minute time average levels are shown in blue and the peak levels in yellow. It is possible change the colors used for the chart traces if required and to alter the background color by right clicking in the chart area and selecting “Chart settings…” from the menu. The under lying numerical values that were used to build the chart can be displayed as a table by right clicking in the graph area and selecting “View table”. Make any required changes and view the selected information. Charts can be copied to the clipboard for inclusion into a standard word processing document, or tables can be copied and loaded into a spreadsheet if required.

Once the downloaded run results have been inspected informally as described above it is time to create the database that will be used to link these measurements with the company where they were carried out and the personnel who were actually wearing the dBadges. This allows a more formal and representative structure to be created that will enable comprehensive reports to be generated and printed for each area of the company that was surveyed.

Creating the database structure

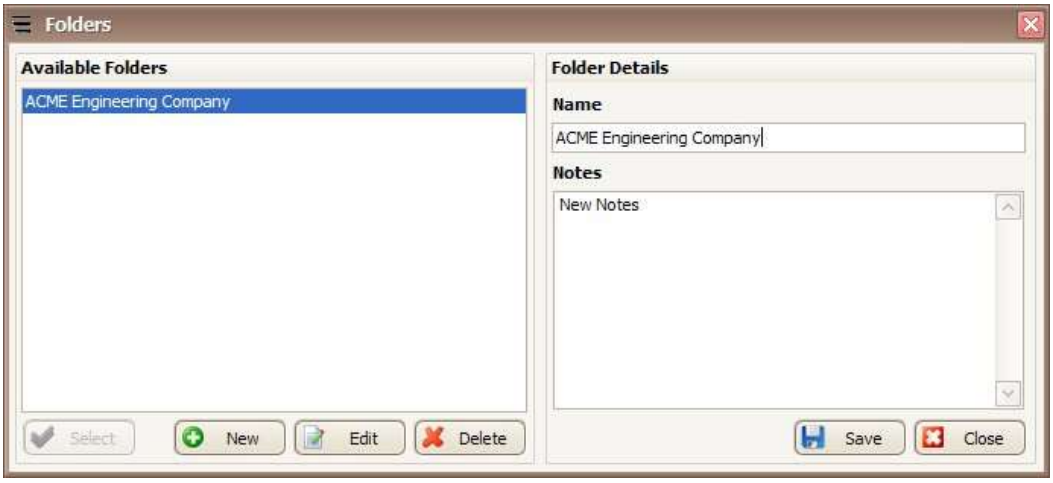
Make sure that the “Result List” tab is selected in the List Explorer window on the left of the main screen. The left hand (empty white vertical) portion of the screen is the place where a “tree” will be created that adequately describes how and where and on whom the measurements were taken. Click on “My Data” and right click and select “Add folder”.



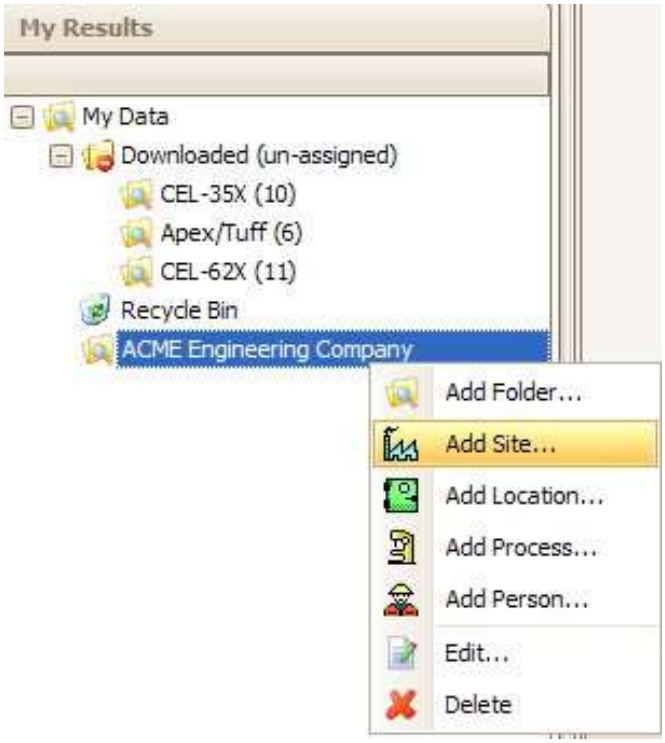
The dialog box below will appear.



Initially, the list will be empty so click on the “New” button to add a new folder as follows.



Enter the company name into the “Name” field and optionally add any brief notes to identify the company in a meaningful way for the future. Click on “Save” to save the new folder. The new folder with the title you have just created will appear in the left hand part of this dialog box. If there are other different companies that should be included in the measurements that you make then repeat this step and add them too. New company folders are added in alphabetical order in the list of available folders as you create them. Highlight the folder name you need and click the “Select” button to add the folder to the tree structure as shown.



Right click on the new folder name and select “Add Site” to create a new site name for the trees structure. Once created in a similar way for a new folder select the site and right click to add a new location.

Create as many new Sites, Locations, Processes and Persons as necessary to reliably represent the required layout of the measurements in the CEL-350 dosimeters. For example in a large organization the following lists may be relevant to the noise measurements that need to be carried out.

Organization	ACME Engineering Company
Site(s)	Texas, Illinois, New Jersey
Location(s)	Dallas, Chicago, Trenton
Process(es)	Manufacturing, Paint shop, Power room
Person(s)	Jack, Jill, Jim, Joe

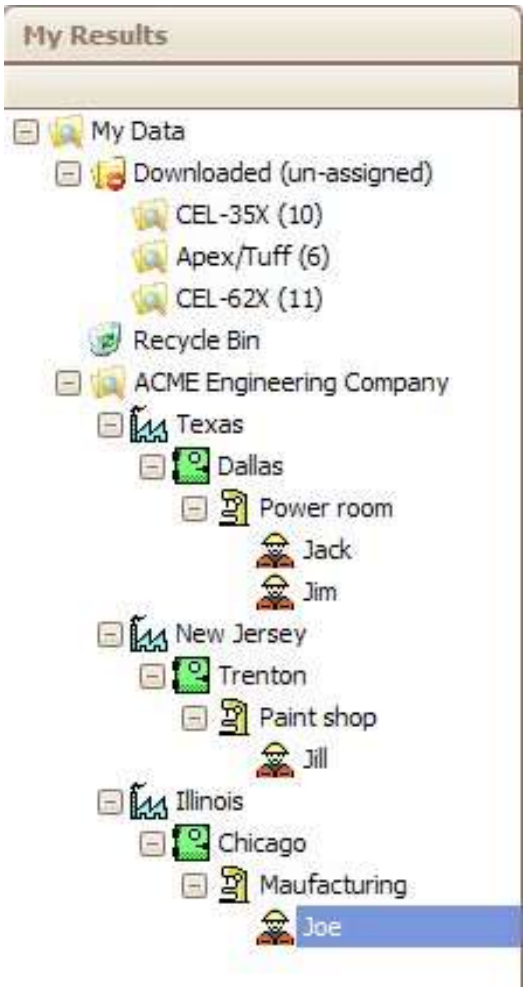
Creating the Folders, etc in the structure window makes it easy to keep the measurements from different companies organized and separate from each other. Add as many folders, sites, locations, processes and persons as necessary to create an adequate structure to hold the downloaded results from all the measurements that are made.

To select the required person from the list of all available people that have been previously created, right click on the position in the structure where the person needs to be added and select “Add Person” from the menu. The list of available Persons will be shown.



Simply highlight the person in the list and click on Select to add to the structure at the chosen position.

The above example is shown below.



Once the structure is in place it is possible to link the noise dosimetry measurements to the operators who wore the dosimeters. This will enable the hygienist to view the measurement results by “Person” or by “Process” or by “Location” or by “Site” at any given company that has been added with a “Folder”.

Hard copy reports can then be generated by individual person (or persons) for sites/locations/processes with multiple personnel to obtain a very comprehensive understanding of the noise exposures for any given situation. We will now see how to allocate the downloaded measurements to the various elements in the database structure that we have just created.

All of the various nodes that can be created have a free form text box that can be used to add pertinent information about that particular Site, Location etc. Use the Notes box in the result table to add specific information about a particular run, e.g. what other items of noisy machinery were being operated during the actual measurements.

Linking the noise measurements to the database structure

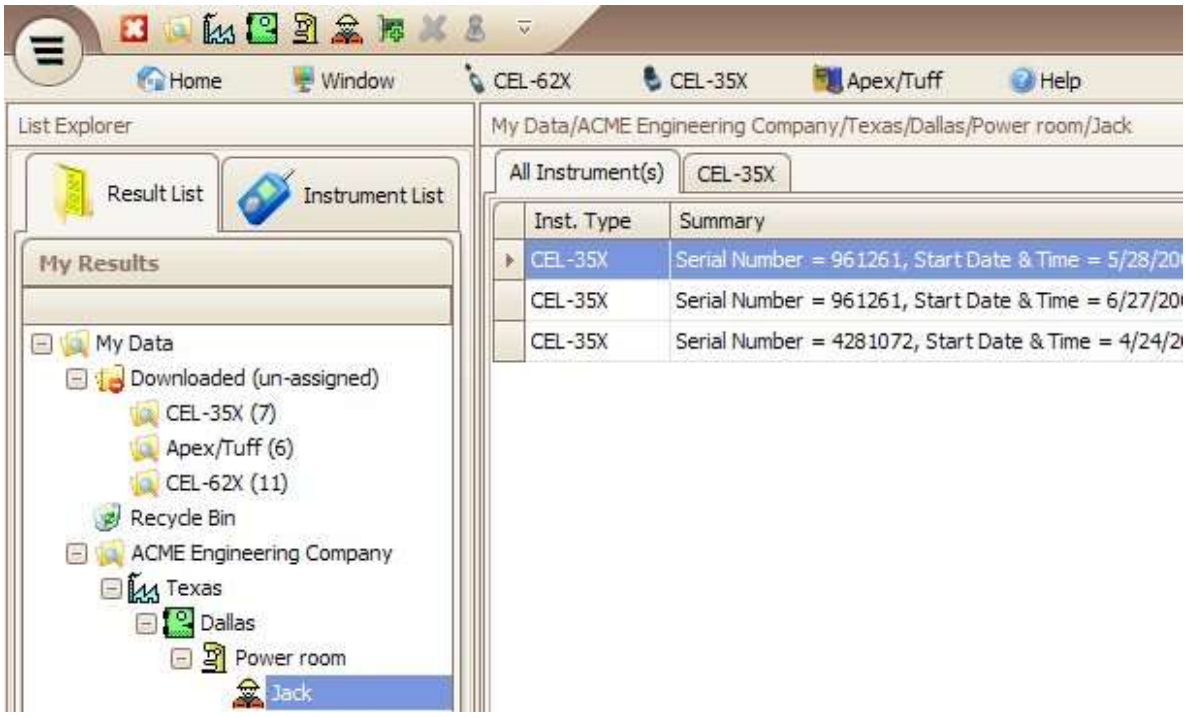
The noise measurement results are very simply allocated (or linked) to the individuals who wore the dosimeters by selecting the “CEL-35X” folder icon below the “Downloaded (un-assigned)” folder in the My Results window. The number in () after the CEL-35X shows how many downloaded runs have yet to be assigned to a worker. Search through the displayed list that is initially arranged by dosimeter serial number. Click on the column heading to sort by that particular parameter. This makes it easier to find a run on a specific date using the start date and time of every measurement.

Click anywhere on the required measurement run to select it from the list to drag and drop it onto the name of the individual that has already been created in the structure. Click on the run and carefully drag it until the end of the mouse pointer is exactly over the relevant person in the structure window using the arrow at the left to guide the placement correctly on the structure. Then drop the run to allocate it to that chosen person.

A single run can be allocated in this way for an individual or a new run can be added to the structure for any given worker. If this is a repeat measurement carried out after an earlier set of measurements then all the previous run results and the newly allocated run will now be shown for that individual. Note that it is not possible to drag and drop a measurement run onto a yellow “folder” icon in the structure window. You can only drop a run onto a site, a location, a process or a person.

If measurements have been made in a common area that is considered to represent a number of people with the same exposure to workplace noise then drag and drop the measurement onto a “process” instead of an individual person.

Once the measurement run (or runs) have been allocated to the individual (or process) they will appear in all “up-stream” nodes in the structure. This means that if there is a site with a location 1 and a location 2 and the individual that was measured is in location 2 then his noise readings will appear if the site or location 2 is selected but not if location 1 is selected. Runs allocated to the selected node will appear as shown below.

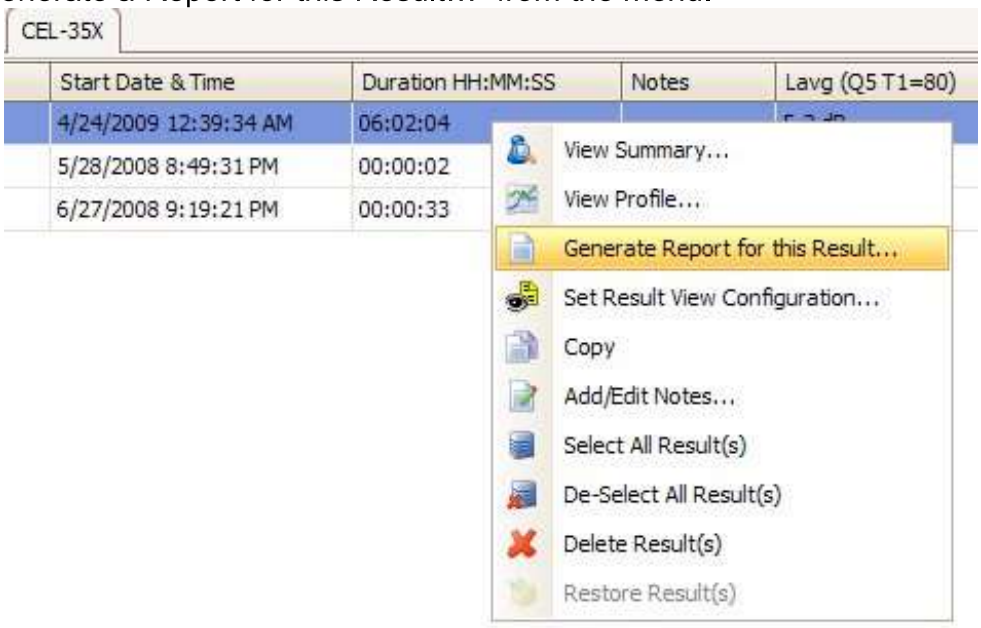


In this case the window at the right shows all of the measurements that have been allocated to “Jack” who is associated with the “Power room” in the “Dallas” location of the “Texas” site. Note that the currently selected node from the structure is shown just above the “All Instrument(s)” tab. In this case it shows “My Data/ACME Engineering Company/Texas/Dallas/Power room/Jack” as a confirmation.

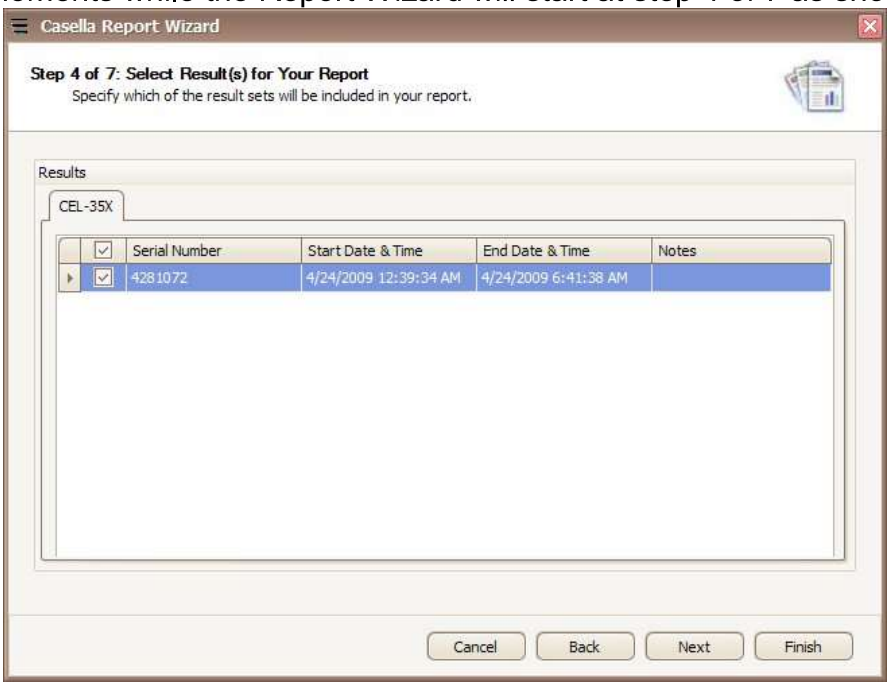
The table in the right hand window initially shows the Summary information but can show the results from the noise dBadges simply by clicking in the “CEL-35X” tab instead. Once the “CEL-35X” tab is selected then the displayed set of results can be sorted by date, dBadge serial number or by any of the available fields by clicking on the column heading as before. Clicking again on the label at the top of the column will cause the listing to be re-ordered in the opposite alphabetic direction, that is, last to first instead of first to last.

Producing a report on the results

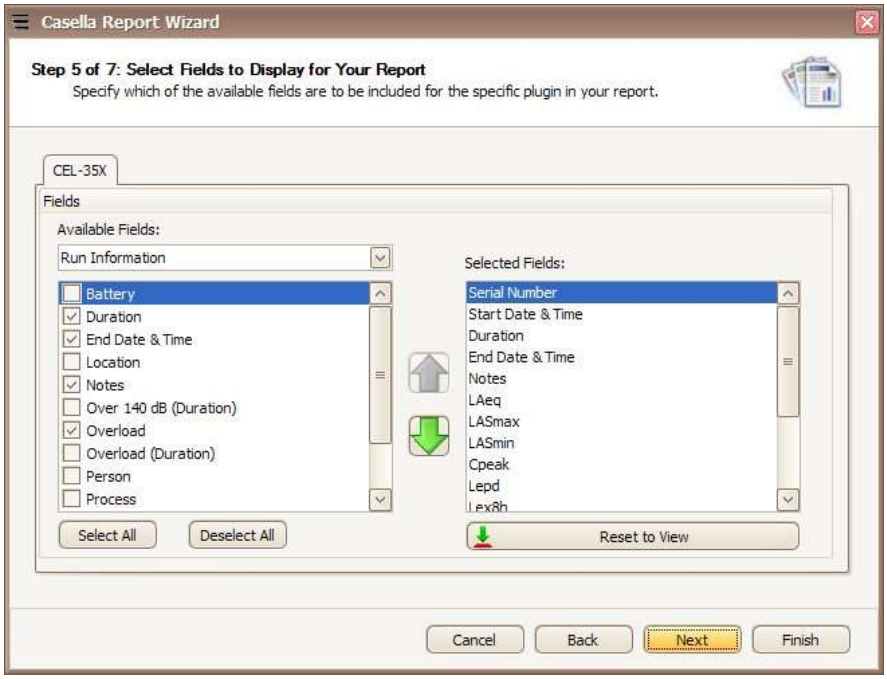
In addition to viewing the results on screen it is also possible to produce a simple hard copy report of either a single measurement or a full report at any position on the structure listing all the measurements below that point. For a simple unallocated (or one that has already been linked to an individual) single measurement report simply click to highlight the run in the right hand cumulative record window and select the chosen row. Select “Generate a Report for this Result…” from the menu.



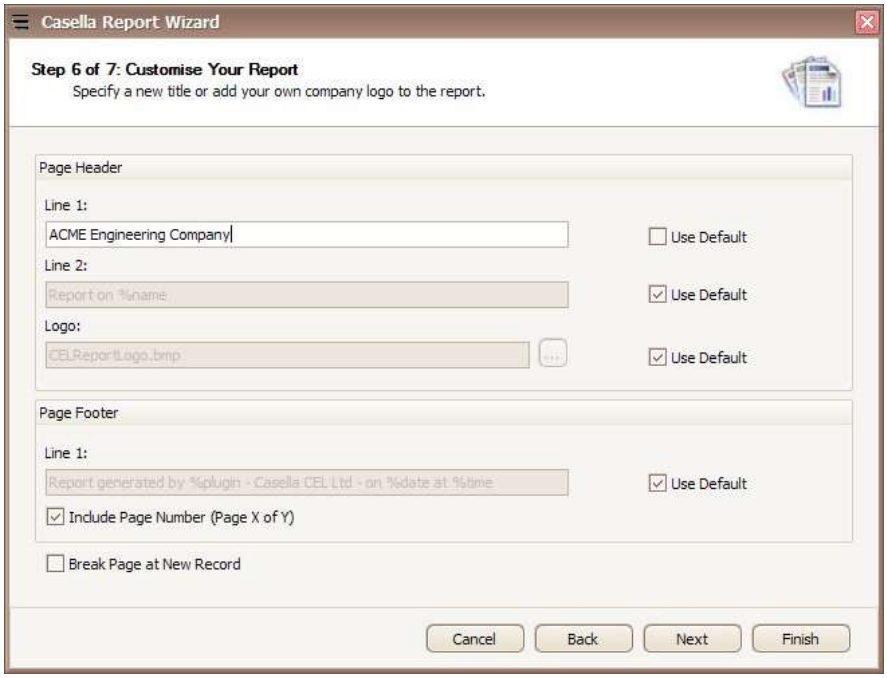
After a few moments while the Report Wizard will start at step 4 of 7 as shown below.



If more than one instrument or run is displayed then simply uncheck or check the results that are to be included in the report and click Next to continue.

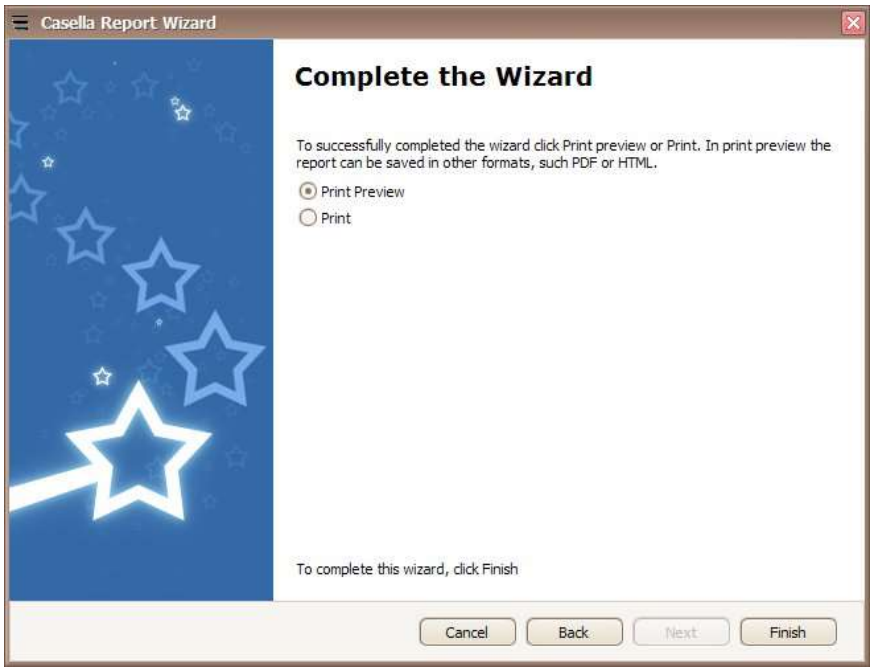


Make any specific changes to the way the information is to be printed or click on the “Reset to View” button to make the report contain the same fields (in the same order) as the displayed information from the table of results. Click on the Next button to continue.



Uncheck the “Use default” setting against the Line 1 entry and type in the name of the company as shown above. A logo image can be inserted into the report that will appear in the top right hand corner of the page if required. The logo must be in the bmp format and should be no bigger than xx x yy pixels. Make any other changes required and select Next to continue.

The final step of the report wizard will be displayed. Select the Print radio button at the top of the screen to directly print the report to any connected printer or leave the selection on Print Preview and select Finish to see how the report will actually look.



A typical report is shown in Appendix A

Previewing the Result Report

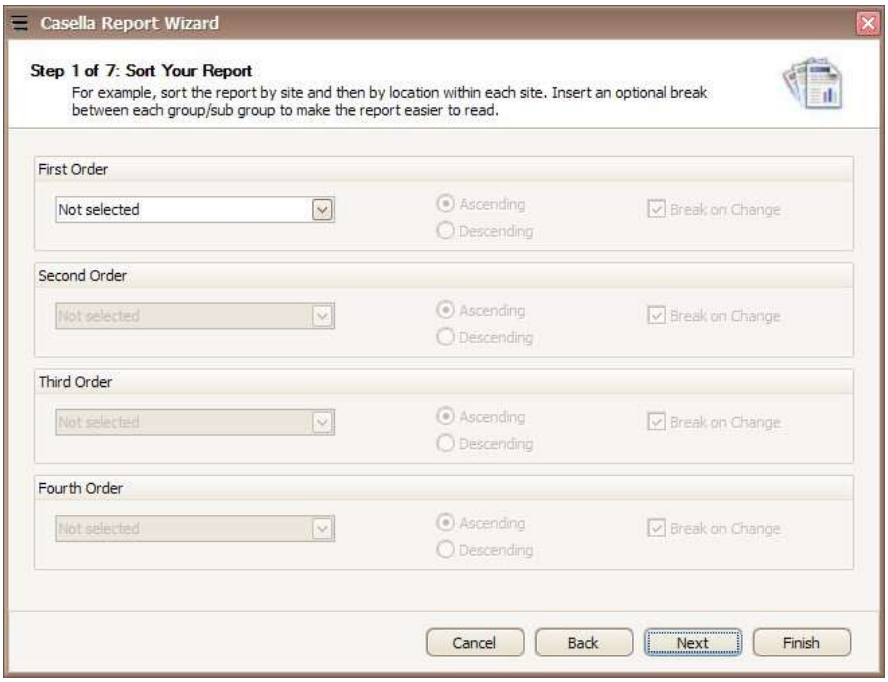
The Report Preview window will open showing how the report will look if printed. If a multi-page report has been generated from a number of measurements then thumbnail images of the pages will be shown on the right hand side of the screen to allow quick navigation to the required page of results. If this is not shown then click on the icon immediately to the right of the Save button to show the thumbnails.

Click on the Save button to choose the type of file format to save the report. Many different types are available depending on what software will be used to view the information. The “Adobe pdf” format is a standard choice to make a report file that can be emailed to colleagues or clients once the measurements have been finished.

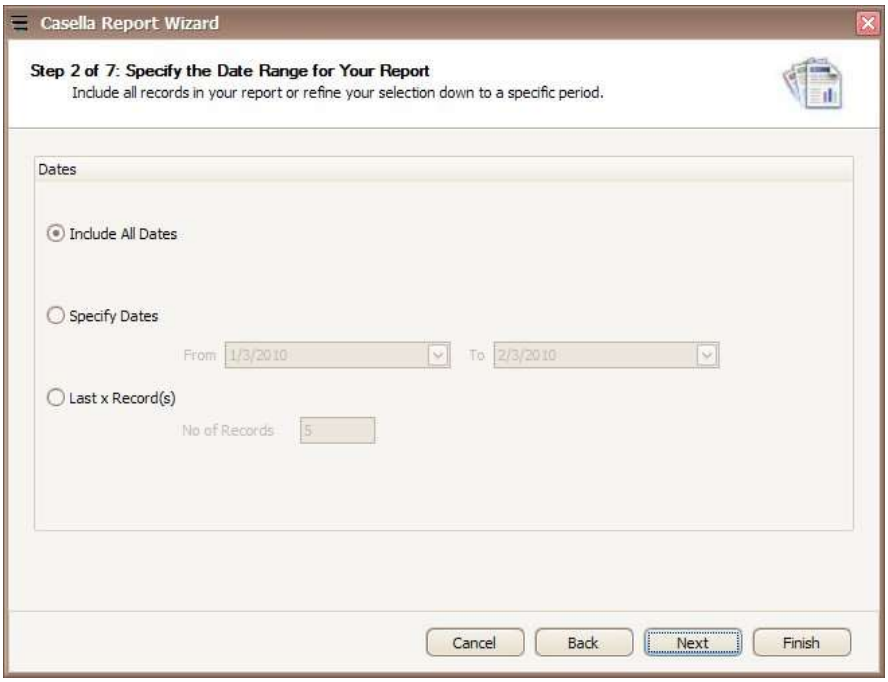
For an OSHA view of the data the report will look similar to Appendix A.

To produce a report for multiple people or at a specific location select the highest node on the database structure and then select “Generate Report for this site/location…” The report wizard will appear with steps 1 to 7 allowing the user to configure the report to suit their needs. There are 3 extra steps for the wizard when selecting a location in the structure rather than an individual set of results.

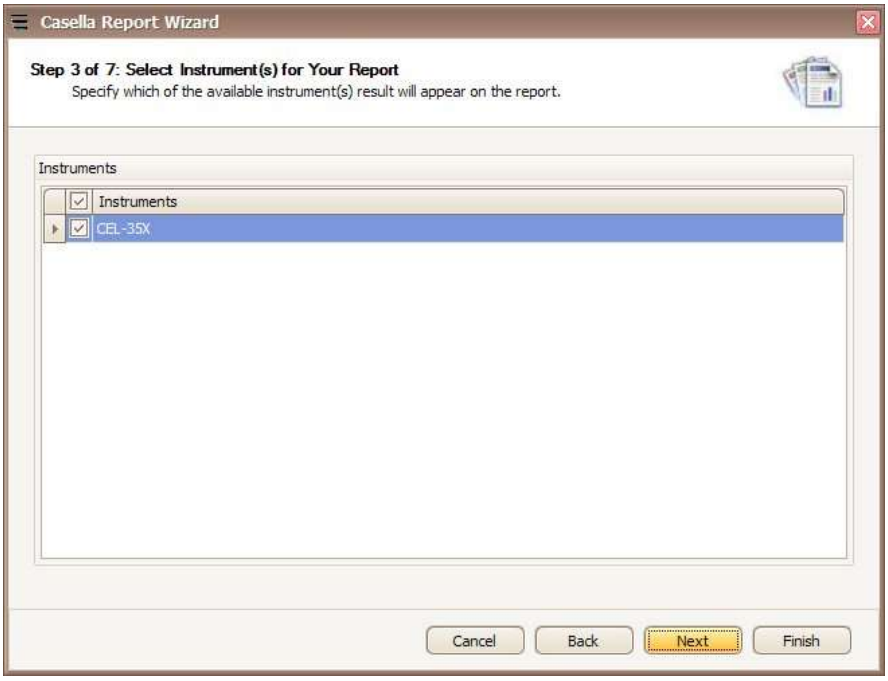
The first step allows the user to select the sort order.



The report can be ordered in any available way, with ascending or descending order and breaks for the next set of results for clarity. Click the Next button to continue.



Results from all recording dates or just a specific range can be selected in this step, or just the last selected number of measurements if there are multiple runs present in the database.



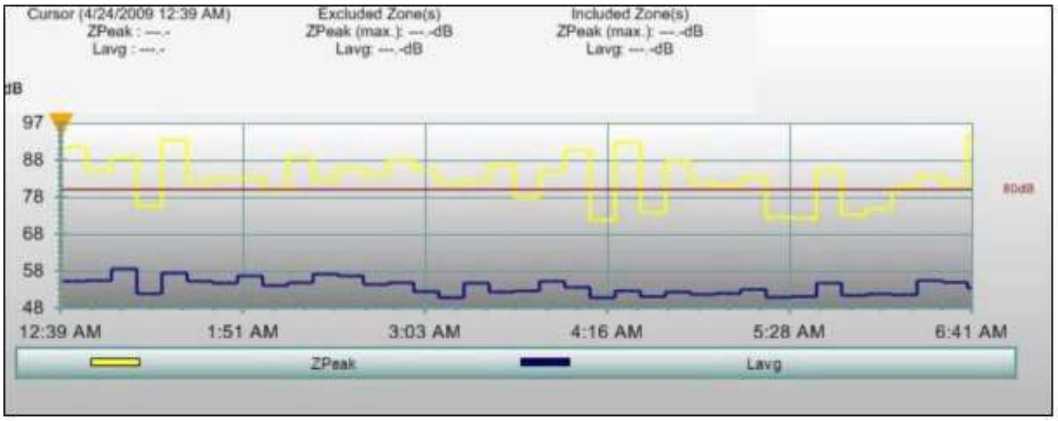
If there are results from different instruments that are present in the structure, for example from pumps or other safety equipment then they can be removed or included as required. Click on the Next button to proceed to step 4 of 7 as before and then go on to the print preview screen. An example is shown in Appendix B.

Appendix A – copy of run data from a single allocated measurement.

ACME Engineering Company

Report On Jack

Instrument Model	**CEL-350**		
Serial Number	4281072	Cal (before) SPL	113.99 dB
Start Date & Time	4/24/2009 12:39:34 AM	Cal Drift	0 dB
Duration	06:02:04 HH:MM:SS	Overload	No
Lavg (Q5 T1=80)	5.2 dB	LASmax (Time)	82.1 dB (4/24/2009 1:06:16 AM)
Lavg (Q5 T2=90)	---.- dB	Proj Dose (Q5 C=90 T1=80)	0%
TWA (T1=80)	3.2 dB	Proj Dose (Q5 C=90 T2=90)	0%
TWA (T2=90)	---.- dB		
Zpeak (Time)	112.9 dB (4/24/2009 1:06:16 AM)		
Notes			



Report Generated By Insight CEL-35x - Casella CEL Ltd - On 2/4/2010 At 3:03:51 PM Page 1 of 1

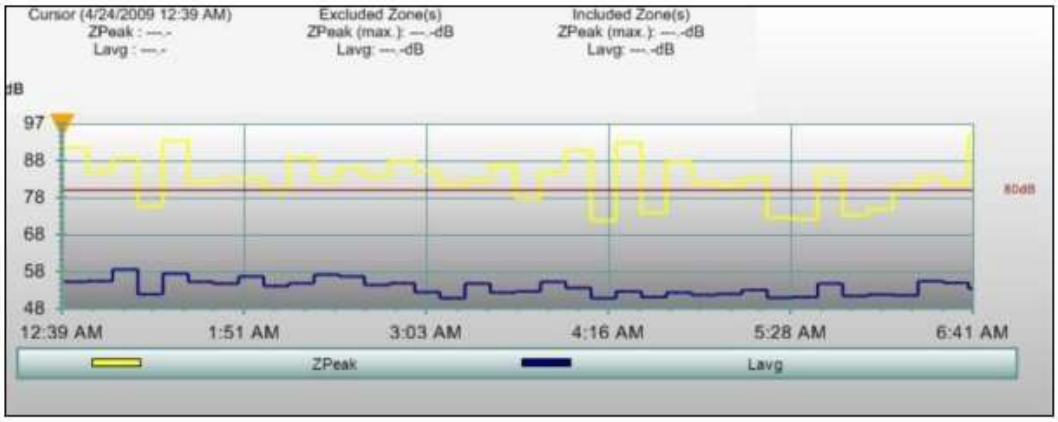
Appendix B – copy of a set of runs associated with a specific site with multiple workers.

ACME Engineering Company

Report On Texas

Report Sorted/Grouped By:

Instrument Model	CEL-350		
Serial Number	4281072	Cal (before) SPL	113.99 dB
Start Date & Time	4/24/2009 12:39:34 AM	Cal Drift	0 dB
Duration	06:02:04 HH:MM:SS	Overload	No
Lavg (Q5 T1=80)	5.2 dB	LASmax (Time)	82.1 dB (4/24/2009 1:06:16 AM)
Lavg (Q5 T2=90)	---.- dB	Proj Dose (Q5 C=90 T1=80)	0%
TWA (T1=80)	3.2 dB	Proj Dose (Q5 C=90 T2=90)	0%
TWA (T2=90)	---.- dB		
Zpeak (Time)	112.9 dB (4/24/2009 1:06:16 AM)		
Notes			



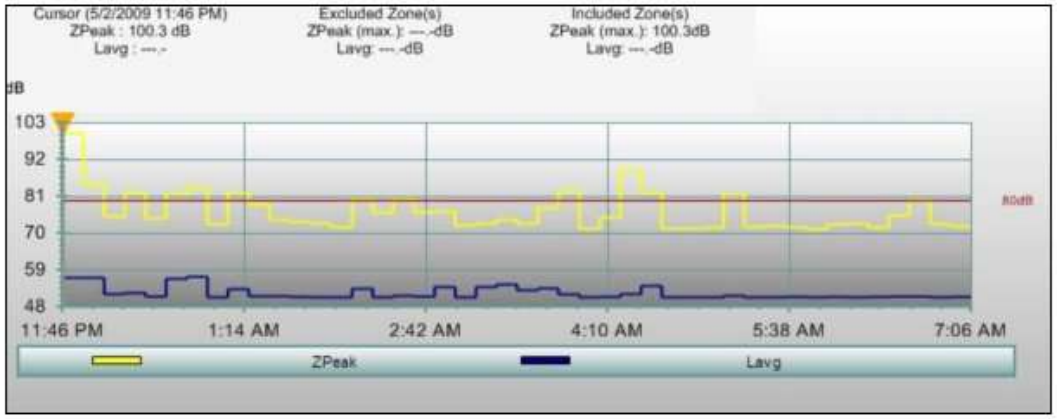
Instrument Model	CEL-350		
Serial Number	4281072	Cal (before) SPL	113.99 dB
Start Date & Time	5/2/2009 11:47:29 PM	Cal Drift	0 dB
Duration	07:20:08 HH:MM:SS	Overload	No
Lavg (Q5 T1=80)	---.- dB	LASmax (Time)	71.4 dB (5/2/2009 11:47:39 PM)
Lavg (Q5 T2=90)	---.- dB	Proj Dose (Q5 C=90 T1=80)	0%
TWA (T1=80)	---.- dB	Proj Dose (Q5 C=90 T2=90)	0%
TWA (T2=90)	---.- dB		
Zpeak (Time)	100.3 dB (5/2/2009 11:47:39 PM)		
Notes			

Report Generated By Insight CEL-35x - Casella CEL Ltd - On 2/4/2010 At 3:30:23 PM Page 1 of 2

ACME Engineering Company

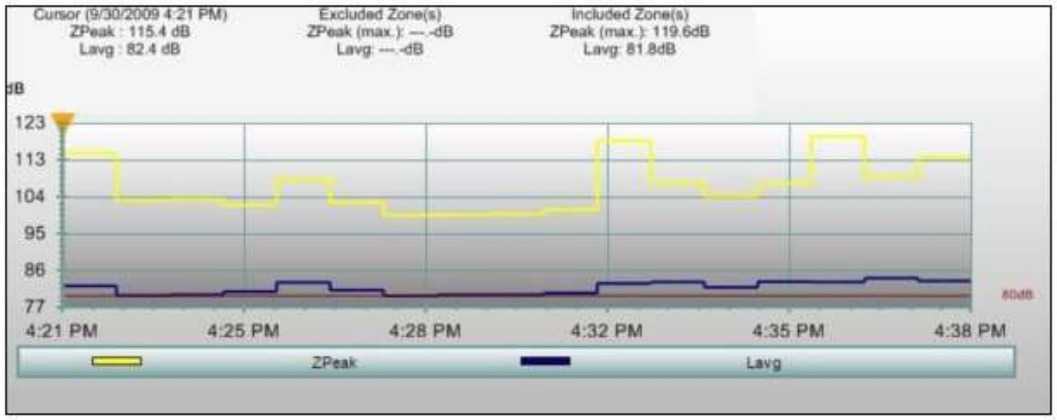
Report On Texas

Report Sorted/Grouped By:



Instrument Model	CEL-350		
Serial Number	961261	Cal (before) SPL	113.99 dB
Start Date & Time	9/30/2009 4:22:20 PM	Cal Drift	-0.05 dB
Duration	00:17:41 HH:MM:SS	Overload	No
Lavg (Q5 T1=80)	80.9 dB	LASmax (Time)	92.6 dB (9/30/2009 4:36:53 PM)
Lavg (Q5 T2=90)	46.9 dB	Proj Dose (Q5 C=90 T1=80)	28.2%
TWA (T1=80)	57.1 dB	Proj Dose (Q5 C=90 T2=90)	0.3%
TWA (T2=90)	23.1 dB		
Zpeak (Time)	119.6 dB (9/30/2009 4:36:27 PM)		

Notes



Report Generated By Insight CEL-35x - Casella CEL Ltd - On 2/4/2010 At 3:30:23 PM Page 2 of 2

In this report the 3 run results are spread over 2 pages as shown above.

Typical *dB*adge operation

Measurements can be made with the CEL-350 dBadge in 4 simple steps as shown below.

1 Before you start
   a. Charge the *dB*adge to show sufficient battery life (> 8 hours)
   b. Turn on the *dB*adge (push left button)
   c. Pre-calibrate the *dB*adge before the start of the measurement
      a. Remove windscreen (push down on ring & turn counter-clockwise)
      b. Install calibrator on microphone (gently push all the way down)
      c. Turn on calibrator (wait for about 5 seconds to be recognized)
      d. When dBadge screen reads CALIBRATE? push right button of dBadge
      e. When calibration is complete, remove calibrator (pull gently straight up) and carefully re-install the windscreen

2 Start the measurement
   d. Clip *dB*adge to employee (middle of the shoulder microphone pointing straight up)
   e. Push and hold both buttons for 3 seconds to begin and show run symbol in display

3 End the measurement
   f. Push and hold both buttons for 3 seconds countdown to Stop
   g. Remove *dB*adge from employee (read results from screen if required)
   h. Post calibrate the *dB*adge (same procedure as pre-calibrate)

4 Install and start the Casella Insight database management system software
   i. Remember to enter the required Registration Code after the 30 day trial period otherwise you will not be able to make the download and any previous runs will not be shown (they will re-appear as soon as the registration code is entered).

5 Downloading data to P.C. (after successful installation of Casella Insight)
   j. Attach IR adapter to computer then start Casella Insight software
   k. Turn on *dB*adge and wait for about 5 seconds
   l. Place dBadge IR port facing the IR adapter (download should be automatic) blue LED flashes to show download in progress

Note: The dBadge can be locked to prevent tampering by holding down the right button while pushing the left button 3 times after a run has begun. Unlock the dBadge in the same way at the end of the run.