Product Note

Managing Signals between DSA and VDC Modes

CoCo-80

This product note describes how to manage signals acquired in the CoCo DSA mode and associate them with a machine structure in the VDC database. It also demonstrates how to perform analysis on such signals including the Peak Search function.

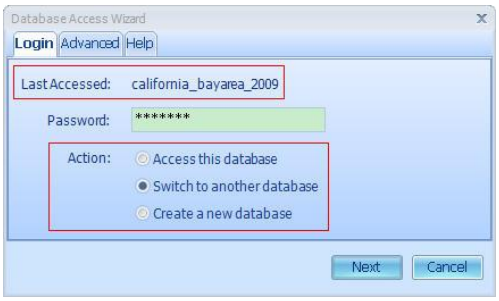
For day to day condition monitoring the CoCo can be used in VDC mode where a database is defined consisting of factories, machines, points and routes. However when a particular problem is identified, the CoCo can also be used in DSA mode for more advanced analysis such as octave spectra from a sound source, order spectra from a rotating machine or long time waveforms from a vibration source, etc. DSA mode measurements are not associated with the machine structure automatically. After the signals are downloaded from the CoCo to the PC using the EDM software, the measurements can be attached to the machine structure so that the measurements are associated with the machine in the database for future reference. After the signals are associated with the machine structure they can be analyzed using various tools including the Peak Search function.

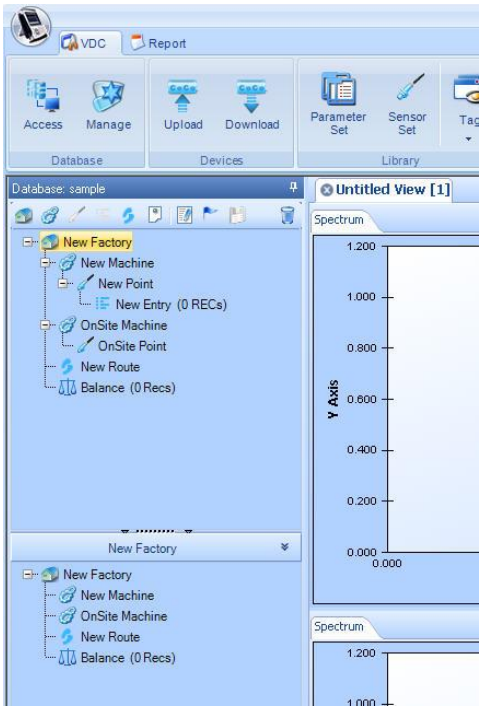
The following demonstrates a typical process including managing a database, acquire measurements with the CoCo in DSA mode, downloading data from the Coco to the PC, attaching signals to the database and finally performing a peak search analysis.

1) Manage the VDC Database

A database must be identified before signals can be attached to it. You can use an existing database or create a new one. Click on the Access button in the Database toolbar.

Next you can choose to access an existing database, switch to another database or create a new database.





When a new database is created, it automatically contains a default factory and a default route as shown in the database explorer. Items in the database have a hierarchical structure.

When you highlight a factory, a machine, a point, or an entry, its components are shown in the bottom pane. The hierarchical structure is summarized below.

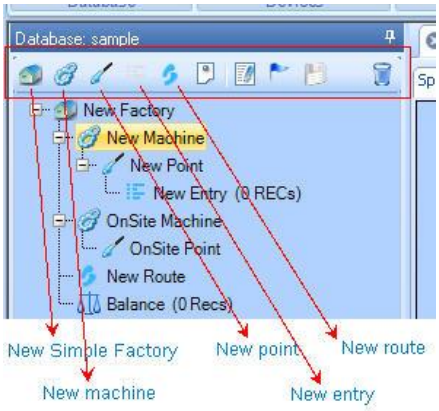
: a Factory contains machines and routes.

: a Machine contains points.

: a Point contains entries.

: an Entry contains Measurement Records (Waveforms, Spectra, and Readings.), Alarms, and Trend.

: a Route is a predefined collection of points that are measured for condition monitoring.



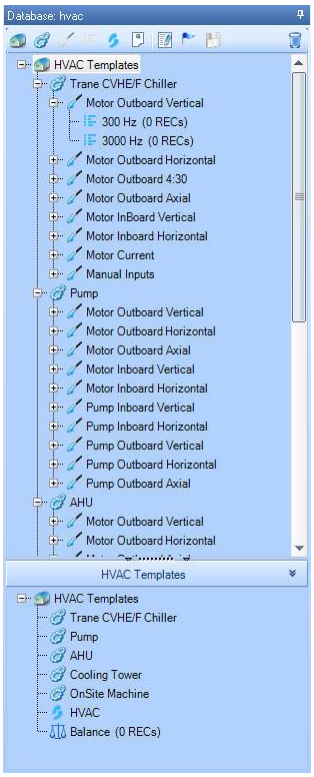
The buttons at the top of the database explorer let you create and modify items in the database. Buttons are highlighted if they are available operations and grayed if they are not available for the current selection.

By clicking on explorer buttons, you can create database items such as Factories, Machines, Points, Entries and Routes.

You can also right-click on each item to open a pop-up menu. The menu contains additional convenient commands for designing the database, such as edit, delete, copy, duplicate, etc.

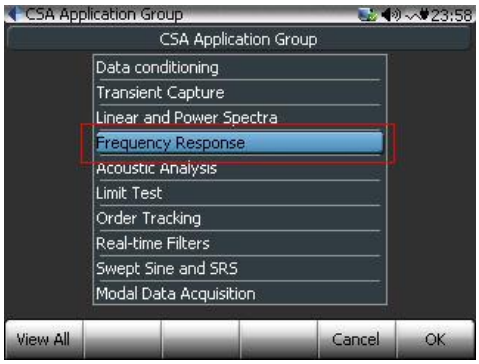
For more detailed description of database operations, please refer to the VDC Users Guide.

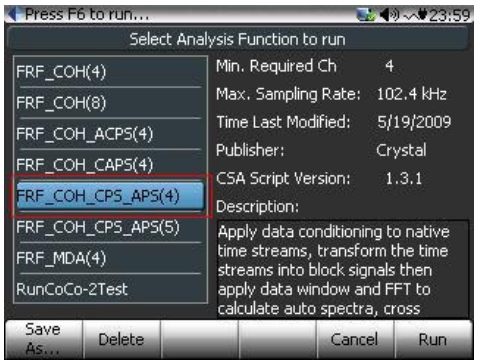
The figure below shows an example of a database with multiple Machines, Points and Entries. After a database is created you can attach signals but first you must acquire and download the data from the CoCo device.



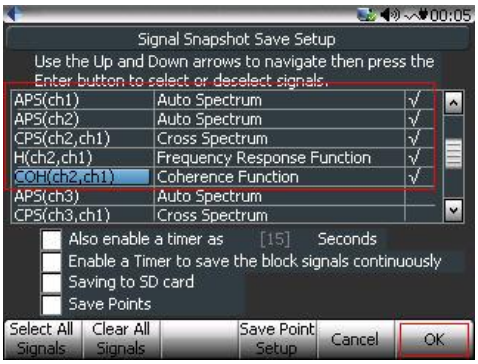
2) Acquiring a Measurement on the CoCo-80 in DSA Mode

The following is a brief summary of the steps to acquire a measurement on the CoCo-80 in DSA Mode. First press the Analysis button on CoCo and select a CSA group and a CSA that you would like to run.

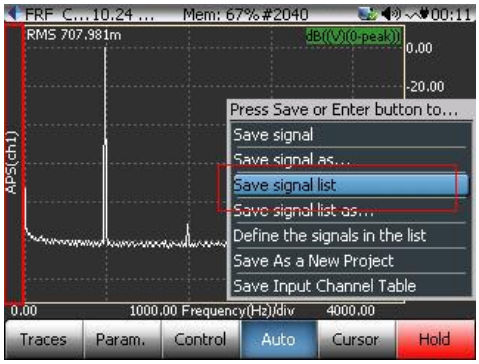


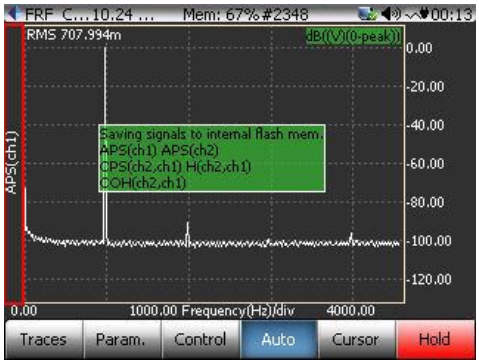


Next, press F2:Param. to setup the sampling rate/freq range, analysis parameters, and input channel table. Then select the Signal Save Predefined List to mark signals (spectra) you would like to save.

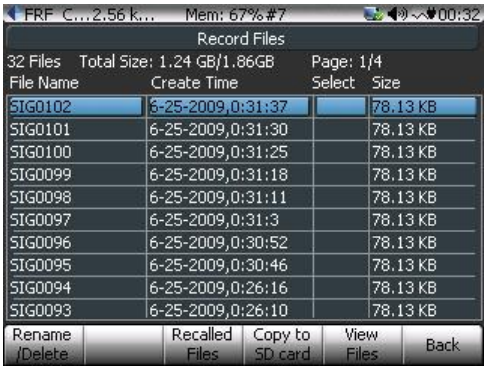


Next press the F6: Run button to run the CSA and start acquiring data. Then press the Save button and select Save Signal List. Those pre-selected signals (spectra) are saved in a file called SIGxxxx.





Press the File button to see the list of saved signals. The figure below shows an example with files SIG0093 through SIG0102 saved.

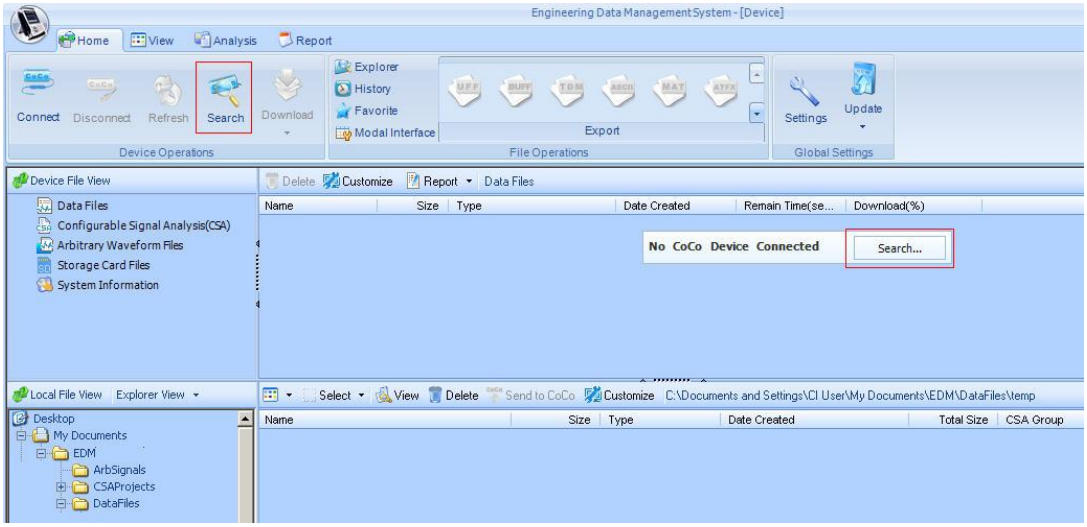


3) Download Data Files from CoCo to the PC

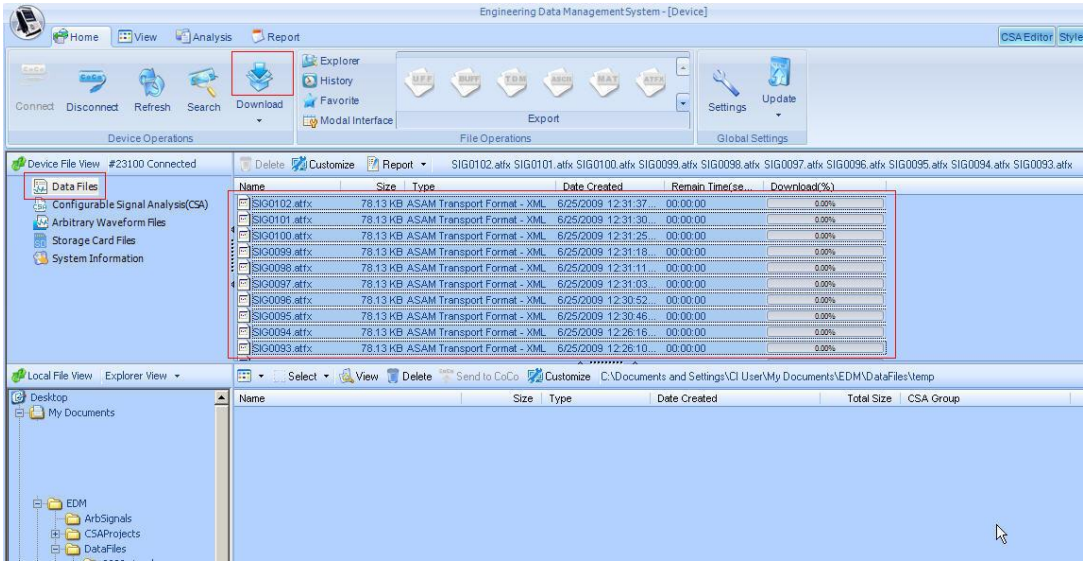
Now that the signals are saved on the CoCo you can download them to the PC using the EDM software in DSA (Dynamic Signal Analysis) mode.

Connect the CoCo to the computer via one of the following connections: USB, Ethernet, or cross-over Ethernet cable. Press the Search toolbar button to locate the CoCo connection and then press the Connect button. Refer to

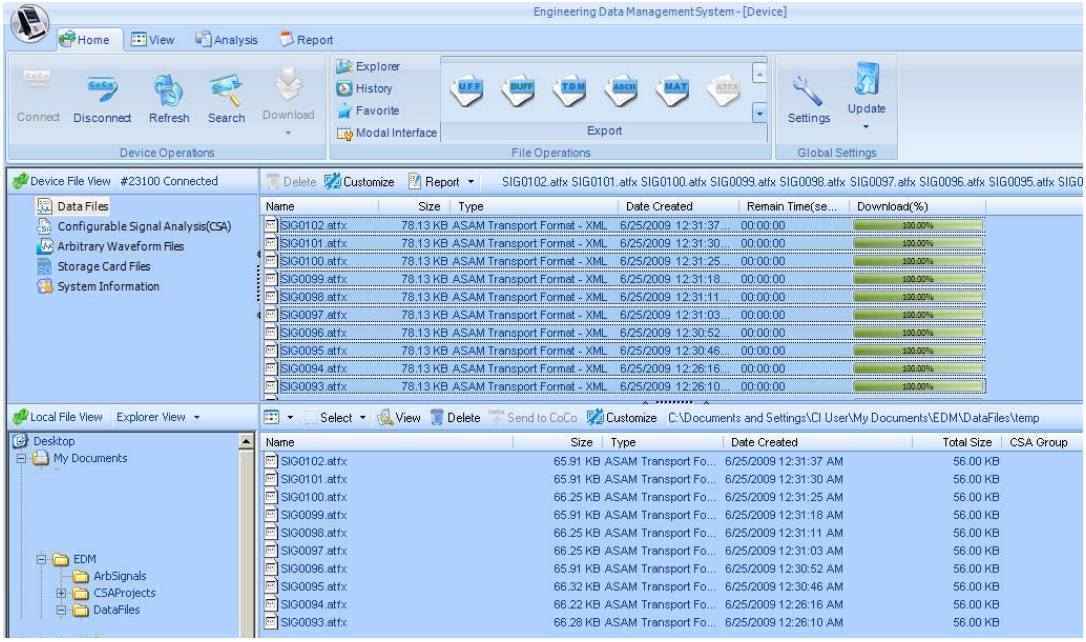
the CoCo manuals or technical documents on the CI support site for more details or step by step guides to managing the CoCo-to-PC communication.



After the connection is established between the CoCo and the PC you are ready to download the signals. Select the folder where you want the signals to be saved in the lower pane and select the signals that you want to download from the CoCo on the top right pane and press the Download button on the toolbar.

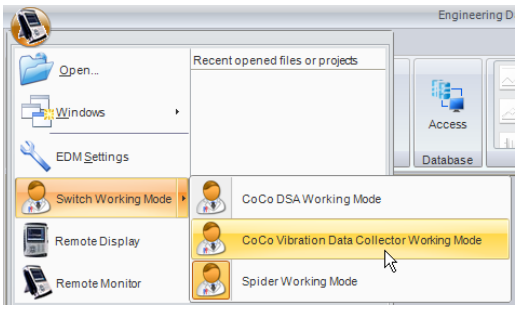


Notice the status as the signals are downloaded to the folder and displayed in the bottom right pane. Now the data is saved on the PC hard drive. At this point you can view and analyze the signals in DSA mode or as shown below, switch from DSA to VDC mode and attach the signals to the machine structure database. Note that in DSA mode data is not automatically included in a database structure as in VDC mode. Each measurement is saved as a separate data file with no machine, point or route information.

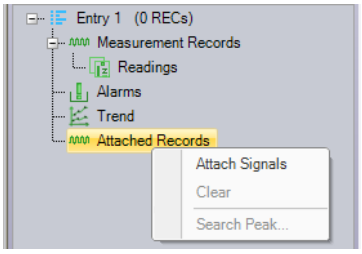


4) Attach Signals to the Database in EDM with VDC Mode

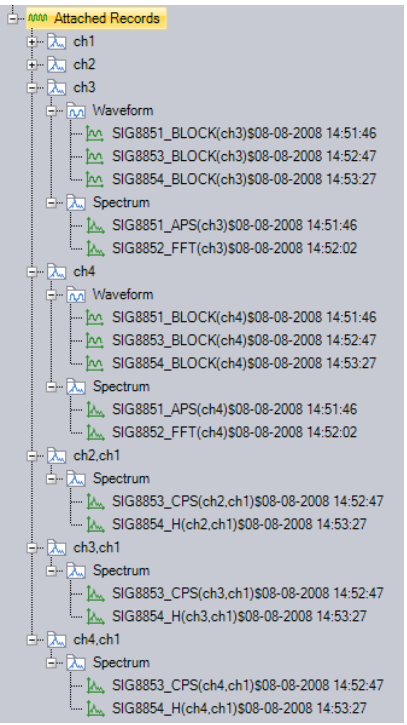
In order to associate the signals from DSA mode with the database you must attach them to the database structure in the EDM software in VDC mode. First change from DSA to VDC mode in the EDM software by selecting CoCo Vibration Data Collector Working Mode from the Start/Switch Working Mode menu.



Next, select an entry in the database and point to the category called Attached Records under the entry. Right-click on Attached Records and select Attach Signals from the pop-up menu. A dialog will pop up and let you select on ore more signals to attach.

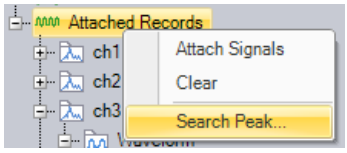


Under Attached Records, signals are classified by channel and signal types (time waveform or frequency spectrum). The display-name includes the file name followed by the signal name plus a time stamp. The figure below shows an example of several signals attached to the machine structure.



5) Peak Search of Many Spectra

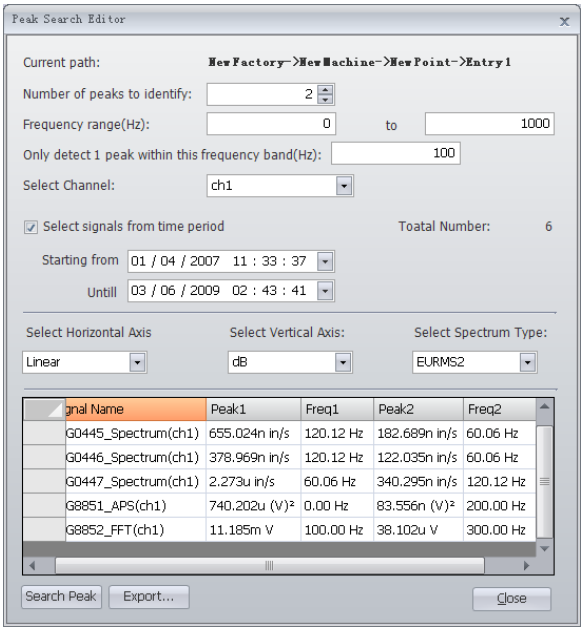
After the signals are attached you can analyze them with the EDM software. The example below shows a peak search among several spectra. First right-click on Attached Records and select Search Peak from the pop-up menu.



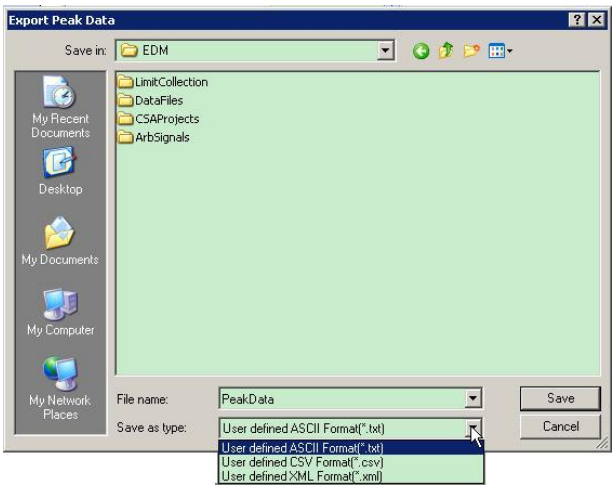
Enter the search criteria in the Peak Search Editor including:

Number of peaks to identify
Frequency range: search peaks in this frequency range
Only detect 1 peak within this frequency band: any smaller peaks in the frequency range centered on a large peak, will be ignored.
Select channel: search peaks among all signals under the selected channel
Select Signal from Time Period: search peaks among signals generated in the time period.
Horizontal Axis, Vertical Axis, Spectrum Type: format of spectrum. For peak detection, it should be Linear, Mag, EUpeak.

Click on Search Peak and peaks will be shown in the table and sorted from largest to smallest.



After the peaks are found they can be exported to a file. Press the Export button in the dialog box and select one of the file formats: txt, csv, and xml.

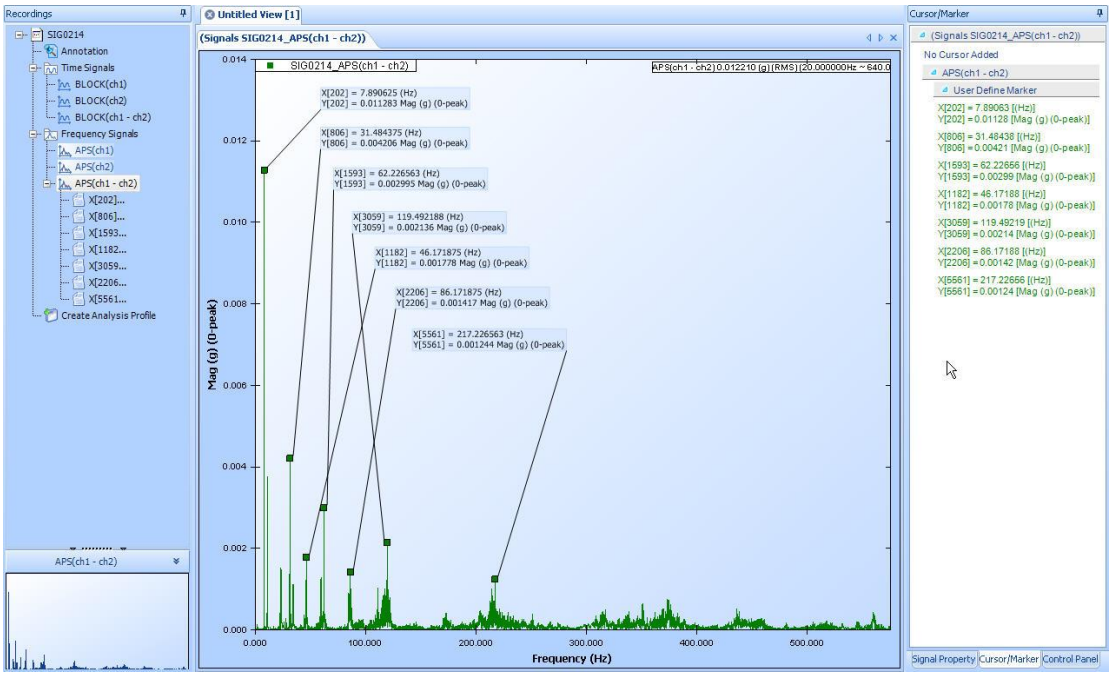


Below are three examples of peak searches with the same data but using different search criteria and the search results presented below.

Example 1

The following figures shows the peak search results with
Number of peaks to identify = 7
Frequency range = 0~1000Hz
Only detect 1 peak within this frequency band = **20Hz**

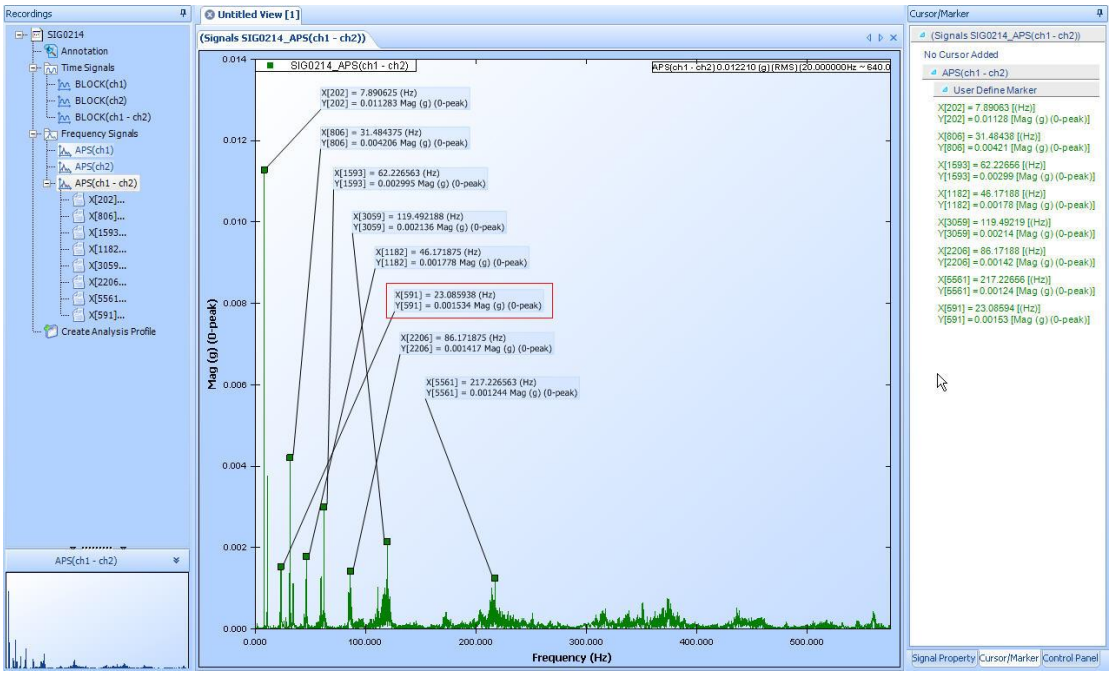
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Signal Name	Peak1	Freq1	Peak2	Freq2	Peak3	Freq3	Peak4	Freq4	Peak5	Freq5	Peak6	Freq6	Peak7	Freq7	
2		[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	
3																
4	SIG0214_APS(ch1 - ch2)	110.650m	7.89	41.244m	31.48	29.369m	62.23	20.950m	119.49	17.436m	46.17	13.896m	86.17	12.195m	217.23	
5																
6																



Example 2

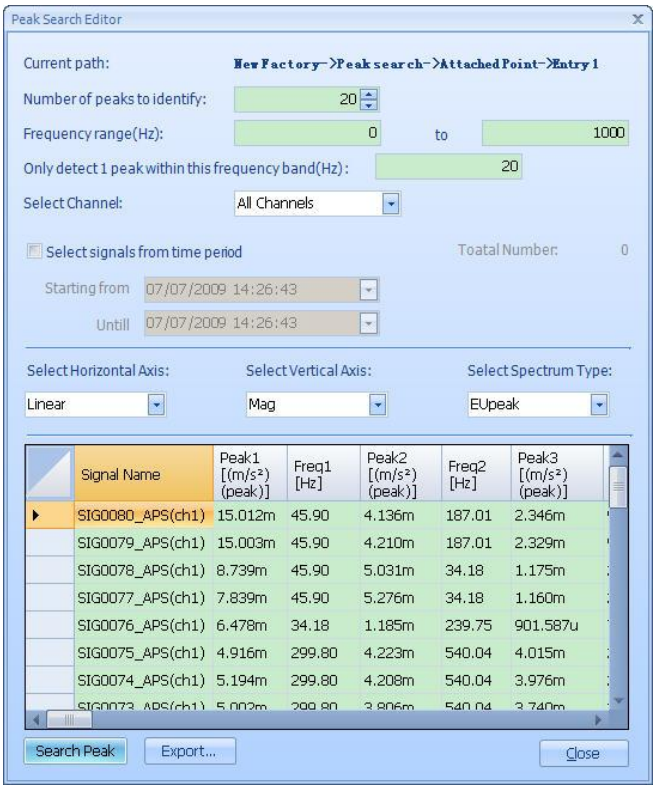
Number of peaks to identify = 7
Frequency range = 0~1000Hz
Only detect 1 peak within this frequency band = **10Hz**
Peak 6 at 23.09 Hz wasn't in the search results because "Only detect 1 peak within this frequency band" is smaller in this case.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Signal Name	Peak1	Freq1	Peak2	Freq2	Peak3	Freq3	Peak4	Freq4	Peak5	Freq5	Peak6	Freq6	Peak7	Freq7	
2		[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	[(m/s^2) (	[Hz]	
3																
4	SIG0214_APS(ch1 - ch2)	110.650m	7.89	41.244m	31.48	29.369m	62.23	20.950m	119.49	17.436m	46.17	15.039m	23.09	13.896m	86.17	
5																
6																



Example 3

Number of peaks to identify = 20
Frequency range = 0~1000Hz
Only detect 1 peak within this frequency band = **20Hz**
Select Channel: **All channels**



Signal Name	Peak1 [(m/s²) (peak)]	Freq1 [Hz]	Peak2 [(m/s²) (peak)]	Freq2 [Hz]	Peak3 [(m/s²) (peak)]
SIG0080_APS(ch1)	15.012m	45.90	4.136m	187.01	2.346m
SIG0079_APS(ch1)	15.003m	45.90	4.210m	187.01	2.329m
SIG0078_APS(ch1)	8.739m	45.90	5.031m	34.18	1.175m
SIG0077_APS(ch1)	7.839m	45.90	5.276m	34.18	1.160m
SIG0076_APS(ch1)	6.478m	34.18	1.185m	239.75	901.587u
SIG0075_APS(ch1)	4.916m	299.80	4.223m	540.04	4.015m
SIG0074_APS(ch1)	5.194m	299.80	4.208m	540.04	3.976m
SIG0073_APS(ch1)	5.002m	299.80	3.806m	540.04	3.740m

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Signal Name	Peak1	Freq1	Peak2	Freq2	Peak3	Freq3	Peak4	Freq4	Peak5	Freq5	Peak6	Freq6	Peak7	Freq7	Peak
2		[(m/s^2)	[Hz]	[(m/s^2)	[Hz]	[(m/s^2)	[Hz]	[(m/s^2)	[Hz]	[(m/s^2)	[Hz]	[(m/s^2)	[Hz]	[(m/s^2)	[Hz]	[(m/s
3																
4	SIG0080_APS(ch1)	15.012m	45.9	4.136m	187.01	2.346m	91.8	2.014m	141.11	1.696m	282.71	1.314m	239.75	1.220m	359.86	984.3
5	SIG0079_APS(ch1)	15.003m	45.9	4.210m	187.01	2.329m	91.8	2.034m	141.11	1.691m	282.71	1.306m	239.75	1.215m	359.86	1.001
6	SIG0078_APS(ch1)	8.739m	45.9	5.031m	34.18	1.175m	239.75	1.173m	187.01	1.050m	91.8	815.660u	141.11	785.207u	719.73	765.4
7	SIG0077_APS(ch1)	7.839m	45.9	5.276m	34.18	1.160m	239.75	839.427u	91.8	815.741u	719.73	714.052u	313.96	709.145u	600.1	705.8
8	SIG0076_APS(ch1)	6.478m	34.18	1.185m	239.75	901.587u	719.73	878.100u	313.96	794.281u	695.8	679.445u	600.1	652.529u	839.84	580.6
9	SIG0075_APS(ch1)	4.916m	299.8	4.223m	540.04	4.015m	240.23	3.225m	180.18	3.002m	885.25	2.719m	479.98	2.557m	120.12	2.432
10	SIG0074_APS(ch1)	5.194m	299.8	4.208m	540.04	3.976m	239.75	3.277m	885.25	3.181m	180.18	2.891m	479.49	2.477m	120.12	2.348
11	SIG0073_APS(ch1)	5.002m	299.8	3.806m	540.04	3.740m	239.75	2.859m	180.18	2.620m	479.98	2.283m	120.12	2.252m	600.1	1.593
12	SIG0072_APS(ch1)	4.758m	299.8	3.438m	239.75	2.503m	180.18	2.051m	479.98	2.012m	120.12	1.707m	600.1	1.407m	839.84	1.387
13	SIG0214_APS(ch1)	95.699m	7.89	18.369m	119.49	13.818m	46.17	13.709m	23.09	12.584m	59.53	12.458m	34.3	7.611m	86.17	7.369
14	SIG0080_APS(ch2)	24.983m	45.9	3.569m	282.71	3.024m	141.11	1.739m	359.86	1.583m	193.85	1.069m	328.61	1.057m	239.75	1.031
15	SIG0079_APS(ch2)	24.988m	45.9	3.628m	282.23	3.066m	141.11	1.738m	359.86	1.582m	193.85	1.068m	328.61	1.058m	240.23	1.032
16	SIG0078_APS(ch2)	15.481m	34.18	13.658m	45.9	1.630m	282.23	1.493m	479.98	1.446m	141.11	1.278m	104.49	1.026m	359.86	1.016
17	SIG0077_APS(ch2)	16.236m	34.18	11.969m	45.9	1.561m	479.98	1.340m	104.49	1.259m	282.23	1.208m	141.11	1.055m	209.47	1.012
18	SIG0076_APS(ch2)	19.959m	34.18	1.658m	104.49	1.462m	479.98	1.373m	209.47	955.350u	120.12	913.066u	359.86	553.583u	313.96	530.9
19	SIG0075_APS(ch2)	42.718m	299.8	22.470m	359.86	15.944m	240.23	12.630m	419.92	11.029m	60.06	8.986m	120.12	7.183m	479.98	6.071
20	SIG0074_APS(ch2)	43.372m	299.8	22.917m	359.86	13.776m	239.75	12.668m	419.92	11.496m	60.06	9.241m	120.12	7.081m	479.98	5.148
21	SIG0073_APS(ch2)	40.177m	299.8	21.452m	359.86	12.721m	239.75	11.474m	419.92	10.446m	60.06	8.320m	120.12	6.415m	479.98	4.804
22	SIG0072_APS(ch2)	36.672m	299.8	18.856m	359.86	11.286m	239.75	9.450m	419.92	8.925m	60.06	7.078m	120.12	4.171m	180.18	4.137
23	SIG0214_APS(ch2)	61.647m	10.9	42.464m	31.48	21.506m	86.17	17.652m	62.23	17.331m	111.09	7.185m	74.65	7.091m	251.56	6.766
24	SIG0080_APS(ch3)	23.349m	45.9	4.909m	187.01	4.196m	141.11	2.865m	359.86	2.494m	282.71	2.266m	91.8	1.849m	313.96	1.296
25	SIG0079_APS(ch3)	23.374m	45.9	5.002m	187.01	4.256m	141.11	2.854m	359.86	2.526m	282.71	2.236m	91.8	1.840m	313.96	1.311
26	SIG0078_APS(ch3)	12.064m	45.9	10.399m	34.18	3.535m	359.86	2.328m	141.11	2.118m	313.96	1.596m	104.49	1.480m	187.01	1.221
27	SIG0077_APS(ch3)	10.907m	34.18	10.296m	45.9	3.588m	359.86	2.153m	313.96	2.040m	141.11	1.673m	104.49	1.081m	91.8	1.003
28	SIG0076_APS(ch3)	13.344m	34.18	3.559m	359.86	2.587m	313.96	2.063m	104.49	1.237m	325.68	1.168m	206.05	834.023u	565.92	830.5
29	SIG0075_APS(ch3)	4.268m	60.06	4.047m	299.8	3.994m	120.12	3.063m	180.18	2.706m	240.23	2.041m	359.86	1.907m	1.95	1.158
30	SIG0074_APS(ch3)	4.332m	299.8	4.247m	60.06	4.068m	120.12	2.981m	180.18	2.523m	240.23	1.880m	359.86	1.085m	419.92	988.3
31	SIG0073_APS(ch3)	3.877m	60.06	3.752m	120.12	3.634m	299.8	2.601m	180.18	2.215m	240.23	1.305m	359.86	757.891u	419.92	735.1
32	SIG0072_APS(ch3)	3.334m	60.06	3.326m	120.12	2.963m	299.8	2.009m	180.18	1.716m	239.75	956.577u	359.86	803.946u	2.44	577.9