

Neurodatascience.com



LORETA Progress Report

User Guide

LPR Basic

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I. GETTING STARTED

General Overview

The LORETA Progress Report (LPR) application helps consolidate and simplify the LORETA information generated by the NeuroGuide™ software from Applied Neuroscience. The LPR provides a convenient way to view LORETA Z-Score data for inclusion in Neuroguide SCL protocols or for building custom protocols for a data driven option to LORETA Z-score Neurofeedback training. The LPR can also be used to gauge session-to-session progress or progress over time once a series of LORETA sessions has completed.

In summary, the LPR is an easy-to-use tool that allows you to quickly view large amounts of data, make comprehensive training decisions and easily track your progress.

If you are using a pEMF system, such as NeuroField from NeuroField, Inc. as part of your training program, the LORETA Progress Report can be used along with the QEEG data to determine coil placement and/or electrode sites for NeuroField CFC/Real-Time Z-Score (RTZ) training. See www.NeuroField.org for more information.

Software You Will Need to Purchase

This version of the LORETA Progress report requires the use of Neuroguide Z-Score software that can be purchased through www.appliedneuroscience.com. In order to proceed with using the LPR application, you will need to purchase the following Neuroguide software modules from Applied Neuroscience:

- **[NG]** Neuroguide Basic
- **[LOR]** LORETA Current Density Normative Database
- **[NF2]** 3-Dimensional LORETA Z-Score Neurofeedback Add-on
- **[LCP]** LORETA Coherence and Phase Normative Database Add-on. Note: This product is only required if you want to import the Neuroguide Absolute Power, Coherence, and Phase (.tdt) data into the JTFA feature of the LPR. (See next section below for details.)
- **[LPR]** LORETA Phase Reset Normative Database Add-on. Note: This product is only required if you want to import the Neuroguide Phase Metrics (.tdt) LORETA Z score data into the LPR.

Files You Will Need to Generate

Once you have purchased the required software listed above, before proceeding to use the LPR you will need to generate and save specific files from within the Neuroguide software itself. These required files can then be imported into the LPR application and analyzed using a set of very powerful tools.

The LORETA Progress Report imports data saved from within Neuroguide as both LORETA Key Institute (.lor) files and as tab delimited text (.tdt) files. Individual LPR features require a specific

file type and associated Neuroguide files as follows: **Note:** Instructions on how to find, generate, and save these files are detailed in the next section below.

- LPR FFT Menu
 - Uses .lor file provided by LORETA Key Institute <http://www.uzh.ch/keyinst/loreta.htm>
 - Associated Neuroguide files:
 - LORETA Current Density
 - Raw Scores
 - Z Scores
- LPR JTFA Menu
 - Uses .tdt files provided by the Neuroguide LCP module
 - Associated Neuroguide files:
 - LORETA Absolute Power
 - LORETA Coherence
 - LORETA Phase Difference
- LPR JTFA Menu
 - Uses .tdt files provided by the Neuroguide LPR module
 - Associated Neuroguide files:
 - LORETA Phase Shift
 - LORETA Phase Lock

Note: The LPR can be very useful when simply analyzing the FFT data using only the .lor file. If you have the Key Institute .lor file, but have not purchased the Neuroguide LCP or LPR add-ons required to generate the associated .tdt files and analyze JTFA data, you only need the one .lor file.

Additionally, if you want to evaluate some but not all of the JTFA data and you have purchased either the LCP or the LPR modules, you will only need to generate and save the .tdt files associated with the module you purchased.

Sending in the Computer ID and Copying the License Files

Once you have downloaded the LPR demo and purchased LPR Basic, you will need to follow the instructions below to send in your Computer ID and Copy your License File once you have received it via email.

To Send in Your Computer ID:

1. Go to "C:\Program Files (x86)\NFTools\LPR Basic" and click on the application called "ComputerID.exe" as shown in the screenshot below.

Folder	x64	8/28/2016 12:38 PM	File folder
Folder	x86	8/28/2016 12:38 PM	File folder
Application extension	Arction.Direct3D9.dll	6/7/2016 9:26 AM	Application extension
Application extension	Arction.DirectX.dll	6/7/2016 9:26 AM	Application extension
Application extension	Arction.DirectXFiles.dll	3/3/2016 10:50 AM	Application extension
Application extension	Arction.DirectXInit.dll	6/7/2016 9:26 AM	Application extension
Application extension	Arction.Licensing.dll	6/7/2016 9:26 AM	Application extension
Application extension	Arction.LightningChartUltimate.dll	6/7/2016 9:26 AM	Application extension
Application	<input checked="" type="checkbox"/> ComputerID	2/4/2016 7:23 PM	Application
Application extension	DevExpress.Charts.v15.2.Core.dll	6/11/2016 5:25 PM	Application extension

A prompt with your Computer ID will appear.



2. Click on the “Copy ID to Clipboard” button and your Computer ID will be copied into your computer’s memory.
3. Open a new email message and paste your Computer ID into the email and send it to info@nftools.org.

To Copy Your License File:

Your license file will arrive via an email attachment. You will need to:

- Download the file (copy and paste it) from your email onto your desktop or into a designated folder.

Once you have received and downloaded it, the License File will need to be copied into the correct LPR Basic program directory. There are three options to do so. The first two options provide you with an automated solution and the third option is a manual procedure. Any one of these methods will result in a licensed LPR application:

“About” Menu Option – Use this method if your demo period has not expired and you can access the main menu:

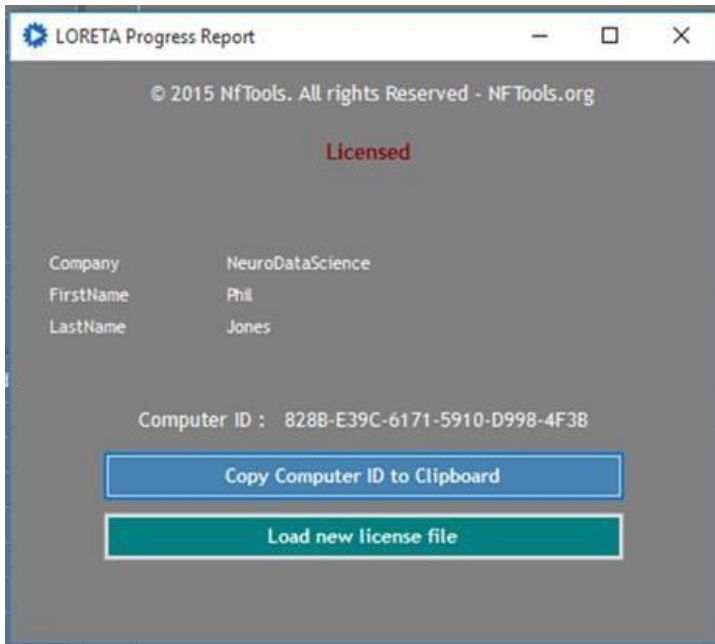
1. Launch the LPR application and click on “About” on the main menu bar. The “License Information” window will appear.
2. Click on the “Load new license file” button and navigate to the location where you downloaded your license file from the email. It will be listed as “Type” “License File” and may be a filename i.e. “PJones.license” or a named icon, such as:



3. Double-Click on your license file. If prompted with an "Access Denied" prompt, click on the "Continue" button. If prompted with a "User Account Control" button, click on "Yes".

The license file will be copied into the "C:\Program Files (x86)\NFTools\LPR Basic" folder for you, and your application will now be licensed when you launch the LPR program.

Note: Click on "About" from the LPR Main Menu and the Information window will now say "Licensed".



Computer.exe Option – Use this method if your demo period has expired or you are not able to open the application to access the main menu. In addition to displaying your Computer ID, you can also use the "ComputerID.exe" application to copy the license file as follows:

1. Go to "C:\Program Files (x86)\NFTools\LPR Basic" and click on the same "ComputerID.exe" application you used to generate your Computer ID in the section above.
2. Click on the "Load New License File" button and navigate to the location where you downloaded your license file from the email. It will be listed as "Type" "License File" and may be a filename i.e. "PJones.license" or a named icon, such as:



3. Double-Click on your license file. If prompted with an "Access Denied" prompt, click on the "Continue" button. If prompted with a "User Account Control" button, click on "Yes".

The license file will be copied into the "C:\Program Files (x86)\NFTools\LPR Basic" folder for you, and your application will now be licensed when you launch the LPR program.

Note: Click on “About” from the LPR main menu and the Information window will now say “Licensed”.

Windows Explorer Option – Use this method if you are comfortable using Windows Explorer to navigate to the appropriate directory manually:

1. Navigate directly to the LPR Basic program directory "C:\Program Files (x86)\NFTools\LPR Basic"
2. Copy and paste your license file into this directory along with the other files. If you are prompted with a “User Account Control” prompt, answer “Yes”.

The license file will be copied into the "C:\Program Files (x86)\NFTools\LPR Basic" folder and your application will now be licensed when you launch the LPR program. **Note:** Click on “About” from the LPR Main Menu and the Information window will now say “Licensed”.

Generating the .lor & .tdt Files

You are now almost ready to use the LPR program. In order to do so you must generate the required files as outlined in “General Overview” earlier in this document.

The LPR allows you to load a group of files (Batch Import both A and/or B) or simply load a Single A or B file. Because the correct file import is so critical to the efficacy of the application, when generating the required files, creating a directory structure and a file naming convention that makes sense to you is critical. It is a good idea to create a directory structure and file naming convention that allows you to easily locate and identify your (B) vs (A) files i.e. Client folder and a Sub Folder that allows you to store your files in one place and get to the data quickly. A sample naming convention might be:

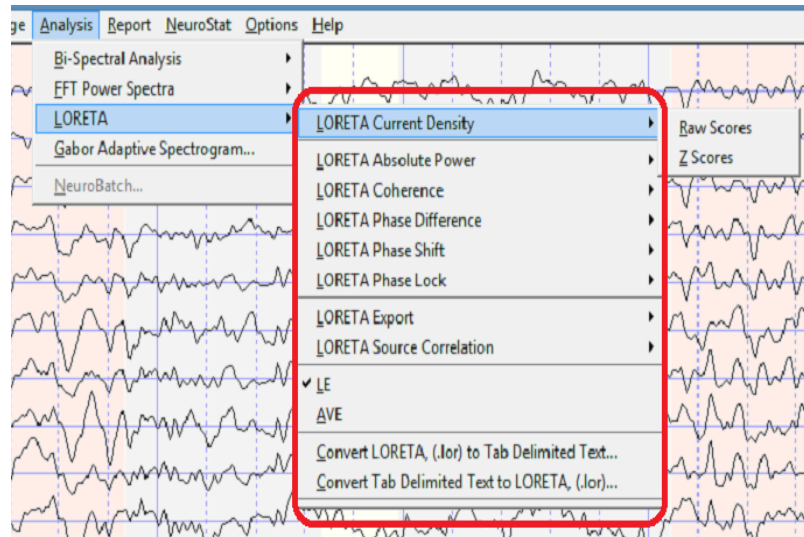
Before/Baseline **(B)** Files: C:/Client Data/RichardP/RP Batch B

- RP Q1 LOR EO
- RP Q1 LOR - Raw EO
- RP Q1 LOR tdt - AbsP EO
- RP Q1 LOR tdt - Coh EO
- RP Q1 LOR tdt - Ph EO

After **(A)** Files: C:/Client Data/RichardP/RP Batch A

- RP Q2 LOR EO
- RP Q2 LOR - Raw EO
- RP Q2 LOR tdt - AbsP EO
- RP Q2 LOR tdt - Coh EO
- RP Q2 LOR tdt - Ph EO

To Generate and Save the .Lor Files (Z Score and Raw:



1. From the Neuroguide Main Menu, select Analysis/LORETA/LORETA Current Density/Zscores as shown above, and the File/Save screen will appear.
2. Choose a name and location for the .LOR file and it will be saved in the .LOR file format.
Note: Before proceeding, be sure to note the file location for each of the files you have saved. You will need to browse to their location from the LPR software in order to import them.
3. The LORETA Viewer will now be open on your screen. Simply close the Viewer.
4. From the Neuroguide Main Menu, select Analysis/LORETA/LORETA Current Density/Raw Scores as shown above, and the File/Save screen will appear.
5. Repeat Steps 2 & 3 to name and save the .Lor Raw File.

If you have purchased the LPR and/or LCP modules continue below for instructions on how to generate the .tdt files. If not, you have what you need for importing into the LPR application and you are ready to go!

To Generate and Save the .tdt Files:

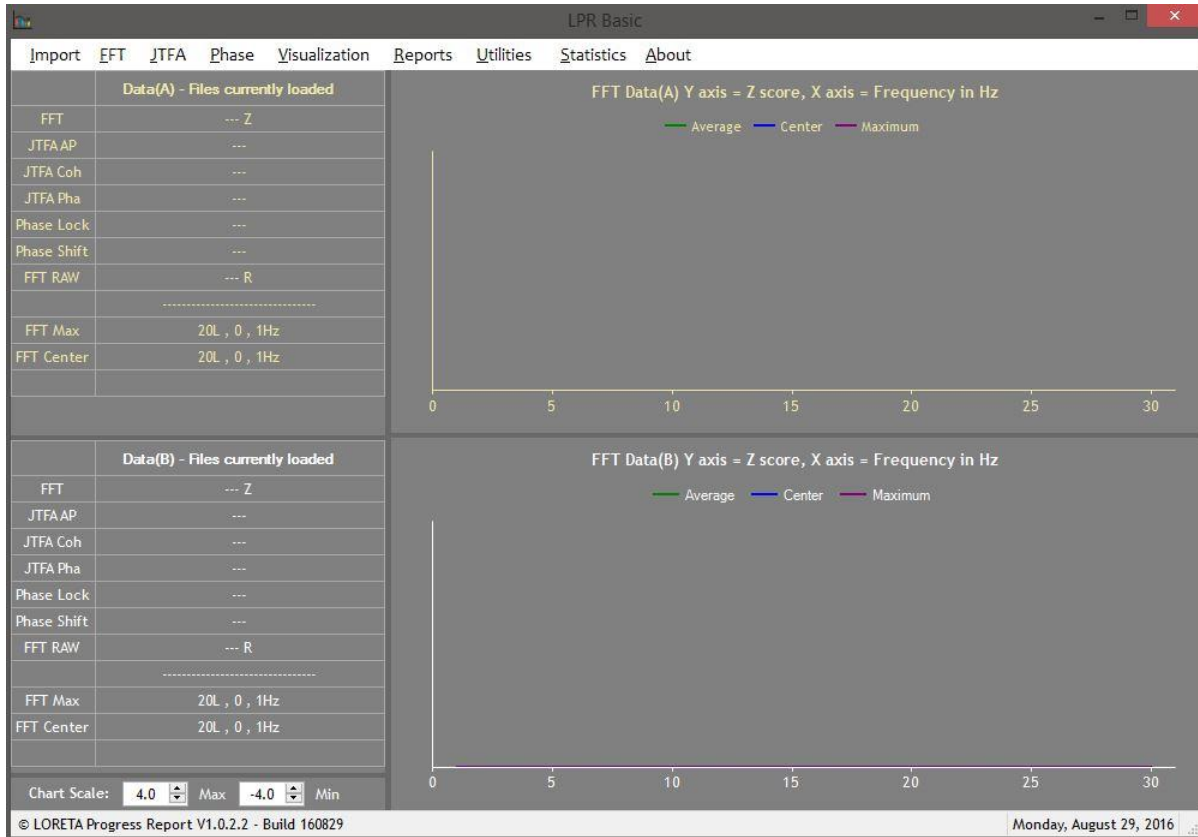
1. From the Neuroguide Main Menu bar, select Analysis/LORETA/LORETA Absolute Power/Zscores, and the LORETA Absolute Power Zscore map will appear on your screen.
2. From the Main Neuroguide Menu Select File/Save/Tab Delimited Text
3. Choose a name and location for the LOR Absolute Power file and the file will be saved in the .tdt file format.
4. Repeat Steps 1 – 3 to generate and save:
 - a. LOR Coherence .tdt file: Analysis/LORETA/LORETA Coherence/Z Scores
 - b. LOR Phase .tdt file: Analysis/LORETA/LORETA Phase Difference/Z Scores.

Note: The LOR Coherence and Phase files take a bit longer to generate. They will not appear on your screen immediately. Refer to your Neuroguide User Manual for further instructions on how to generate these Z-score data files.

5. If you want to simply import a single file you are now done generating and saving your files. However, if you are going to want to use the “Multi-File Import” option in the LPR application, create a Batch folder and Move or Copy the .lor files and all pertinent .tdt files into your folder for later batch import into the LPR.

II. LPR SOFTWARE BASICS

Main Screen Overview



When you launch the LPR Basic application, the Main Screen will not contain any data. There are four separate sections or areas within the LPR Main Screen:

- 1 - Main Menu Bar
- 2 - File Information Area – “Data(A) and Data(B) Files Currently Loaded” Windows
- 3 - FFT Data Graph Area – “FFT Data(A) and(B) Z Scores/Frequency” Graph Windows
- 4 - Chart Scale Area – “Max” and “Min” Thresholds

1 - Main Menu Bar / Function Keys

The Main Menu Bar allows you to select and activate the various modules contained in the LPR Basic application. You can navigate the Menu Bar and application modules via both the Mouse Cursor and/or the Function Keys. To navigate via Function Keys:

- a. Notice that the first letter of each item on the Main Menu Bar and the drop-down Menu Options is underlined.
- b. Press and Hold down the “Alt” key while first pressing the first letter of the Main Menu Bar item and then subsequently pressing the first letter of drop-down Menu

Option you want to access. **Important!!!!** Remember to continue holding down the “Alt” key while pressing both letters. For example the Functions Keys for:

- “Multi-File Import” = **Alt I M** (Hold down “Alt” while pressing I and then M”)
- “FFT Summary” = **Alt F S**
- “Phase Protocol Selection” = **Alt P P**
- “Protocol Report” = **Alt R P**

The instructions throughout this manual will use the Mouse/Cursor as the selection mechanism, however at any time you can switch the instructions to use the Function Keys as well.

An overview of the Main Menu Bar and the drop-down Menu Options (along with their designated Function Keys) are as follows: **Note:** Subsequent chapters will provide detailed information for using each option.

Import:

- Multi-File Import
- A - Load Single File
- B - Load Single File
- Clear Databases

FFT:

- Summary
- Current Session Data
- Variation FFT (B-A)
- Radar Chart
- BA Summary Chart
- All CSD Values

JTFA:

- JTFA Protocol Selection
- Variation JTFA (B-A)

Phase:

- Phase Protocol Selection
- Variation Phase (B-A)

Visualization:

- 3D Voxel / BA view
- Variation 3D
- Metrics Summary
- 2D Brodmann Map.

Reports:

- Protocol Report
- A - FFT Report
- B - FFT Report
- Network / SCL "Hits" Report

Utilities:

- BA Collections Editor
- Toggle Main Menu Color
- Frequency Band Editor
- Reset Main Chart Scale
- Custom Protocols
 - Backup
 - Restore

Statistics:

- Center/Max Correlation

About

2 - File Information Window

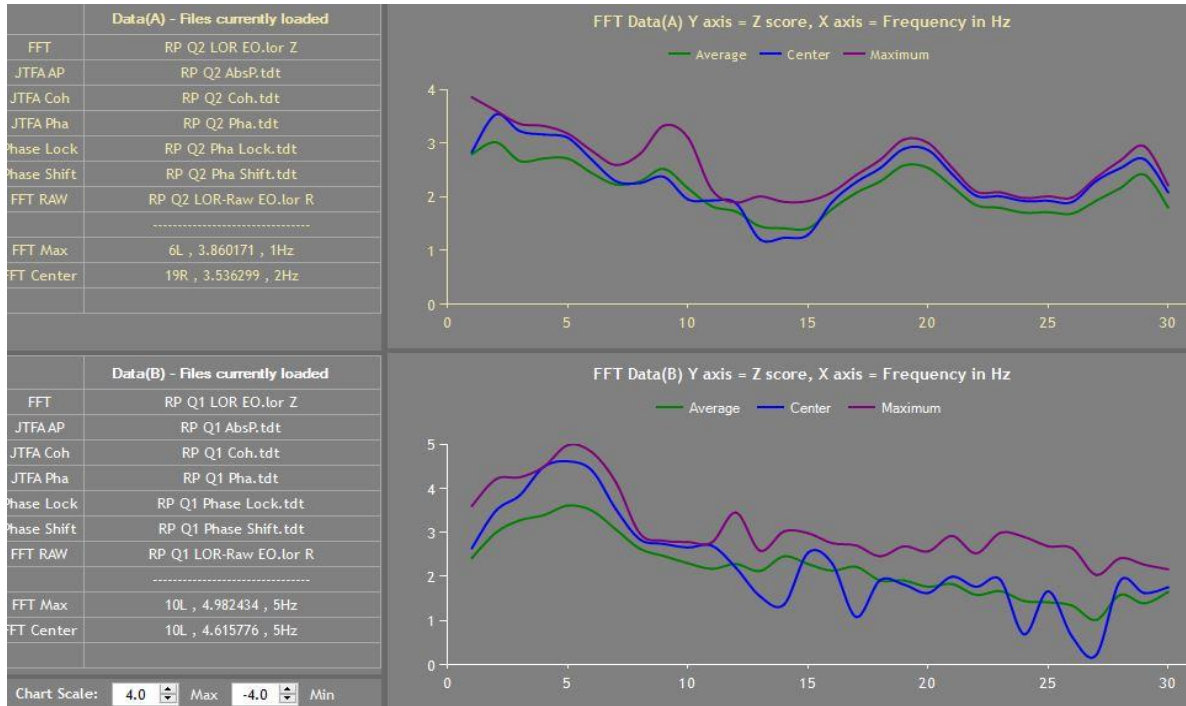
Data(A) - Files currently loaded		Data(A) - Files currently loaded	
FFT	RP Q2 LOR EO.lor Z	FFT	RP Q2 LOR EO.lor Z
JTFA AP	---	JTFA AP	RP Q2 AbsP.tdt
JTFA Coh	---	JTFA Coh	RP Q2 Coh .tdt
JTFA Pha	---	JTFA Pha	RP Q2 Ph .tdt
Phase Lock	---	Phase Lock	---
Phase Shift	---	Phase Shift	---
FFT RAW	--- R	FFT RAW	RP Q2 LOR-Raw EO.lor R
-----		-----	
FFT Max	7L , -1.358613 , 9Hz	FFT Max	7L , -1.358613 , 9Hz
FFT Center	24R , 0.1103424 , 4Hz	FFT Center	24R , 0.1103424 , 4Hz
Data(B) - Files currently loaded		Data(B) - Files currently loaded	
FFT	RP Q1 LOR EO.lor Z	FFT	RP Q1 LOR EO.lor Z
JTFA AP	---	JTFA AP	RP Q1 AbsP.tdt
JTFA Coh	---	JTFA Coh	RP Q1 Coh.tdt
JTFA Pha	---	JTFA Pha	RP Q1 Ph.tdt
Phase Lock	---	Phase Lock	---
Phase Shift	---	Phase Shift	---
FFT RAW	--- R	FFT RAW	RP Q1 LOR-Raw EO.lor R
-----		-----	
FFT Max	6R , -1.999647 , 13Hz	FFT Max	6R , -1.999647 , 13Hz
FFT Center	6R , -1.071153 , 11Hz	FFT Center	6R , -1.071153 , 11Hz
Chart Scale: 4.0 Max -4.0 Min		Chart Scale: 4.0 Max -4.0 Min	

Single Files Loaded

Multi-Files Loaded

This area of the Main Screen shows the file type and file names of the Neuroguide files that are currently loaded in the database. Data **(B)** in white text represents the Baseline files or files generated “Before” any training was conducted and Data **(A)** in yellow text represents the files generated “After” a set number of training sessions. Data (A) is always the most recent files that were generated, and will always be listed in the top window.

3 - FFT Data (A) & (B) Graphs Area



This area of the main LPR screen contains two graph windows that takes the data from the FFT Z score LORETA (.lor) files you loaded and plots the metrics for the FFT Data (B) - Before/Baseline in the bottom window and the FFT Data (A) – After (or most recent) in the upper window.

Whenever you load a new FFT Z Score .lor file from the Files/File Import option on the Main Menu Bar, the relevant Graph Window will update.

4 - Chart Scale Area

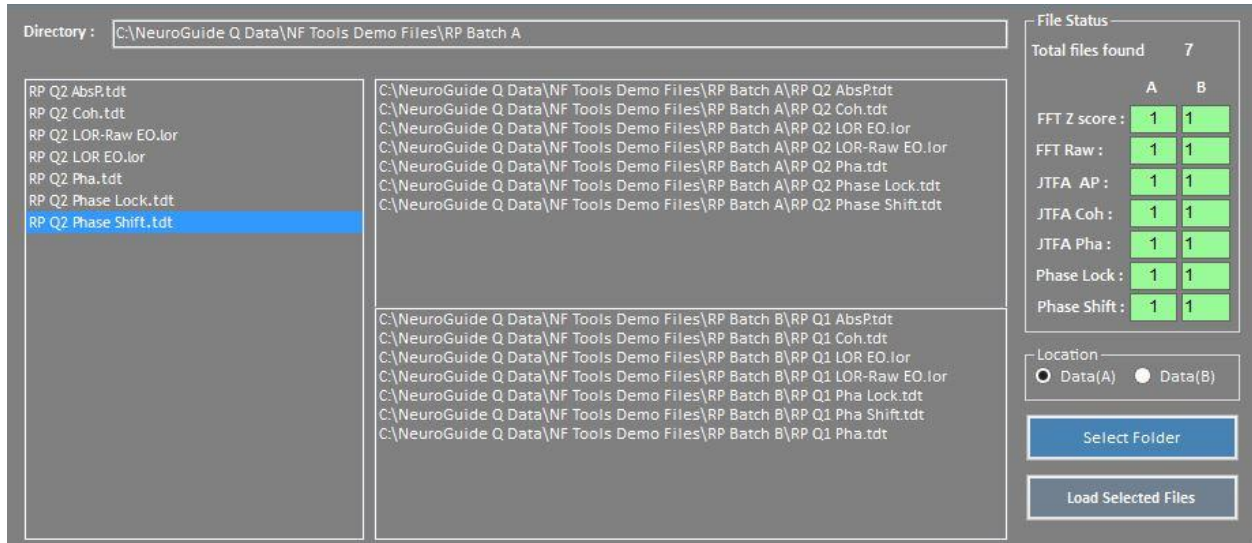


Allows you to change the Y Axis Scale for both the Data(B) and Data(A) graphs. Clicking on the Up or Down areas will scale the window accordingly.

III. IMPORT MENU

In order to proceed using the features in the “Import Menu”, you must have already generated and saved the required files. Refer to “I. Getting Started” earlier in this document for detailed instructions on what files to load and how to generate and save them.

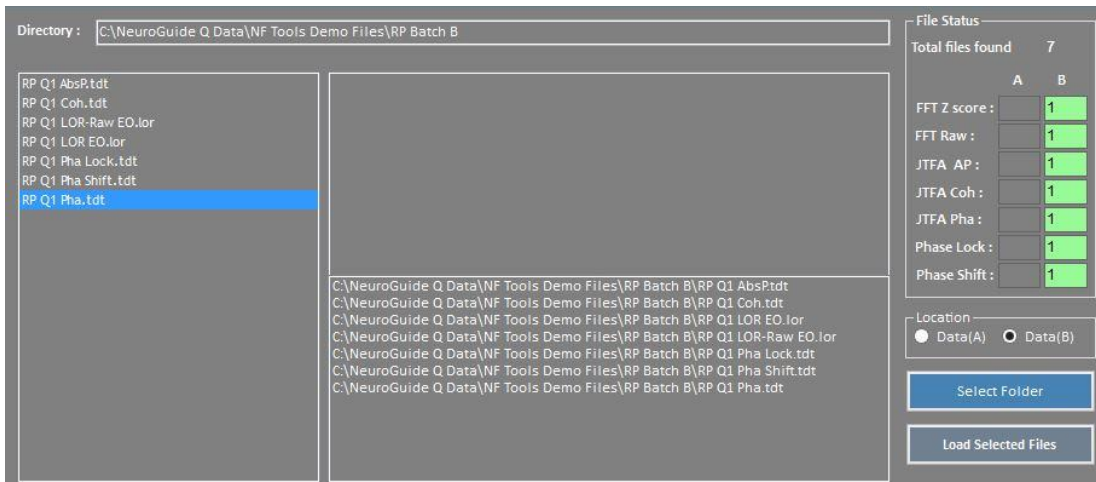
Multi-File Import



To Import a Group of Files into the LPR:

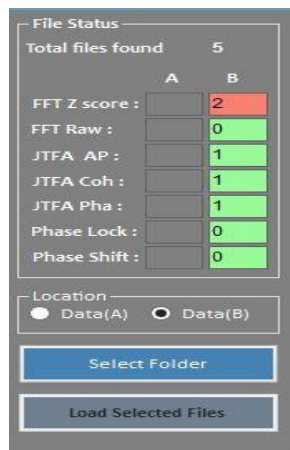
“Multi-File Import” allows you to point to a directory/folder and load all your files (.lor and .tdt) at once as a group of files. You can also simply load a single file using the “Multi-File Import” feature. To run a “Multi-File Import” of your Data(B) or Baseline files, do the following:

1. In the “Location” area of the “Multi-File Import” window, Select the “Data(B)” radio button. This represents the “Before” or “Baseline” data.
2. Click on the “Select Folder” button and navigate to the folder where your Data (B) baseline files are located.
3. Click on the folder name to highlight it and click on the “Ok” button. The files stored in the selected folder will be listed in the upper left window of the “Multi-File Import” window and the number of files will be listed on the right side in the “Total Files Found” area of “File Status”. **Note:** Only valid .tdt or .lor files will be moved to the selected files location.
4. Click on each file now listed in the “Multi-File Import” screen. Notice that the:



- Selected file name and path is displayed in the bottom window.
- “B” column in the “File Status” window is highlighted in green
- Number “1” is listed next to file type corresponding to the selected file.

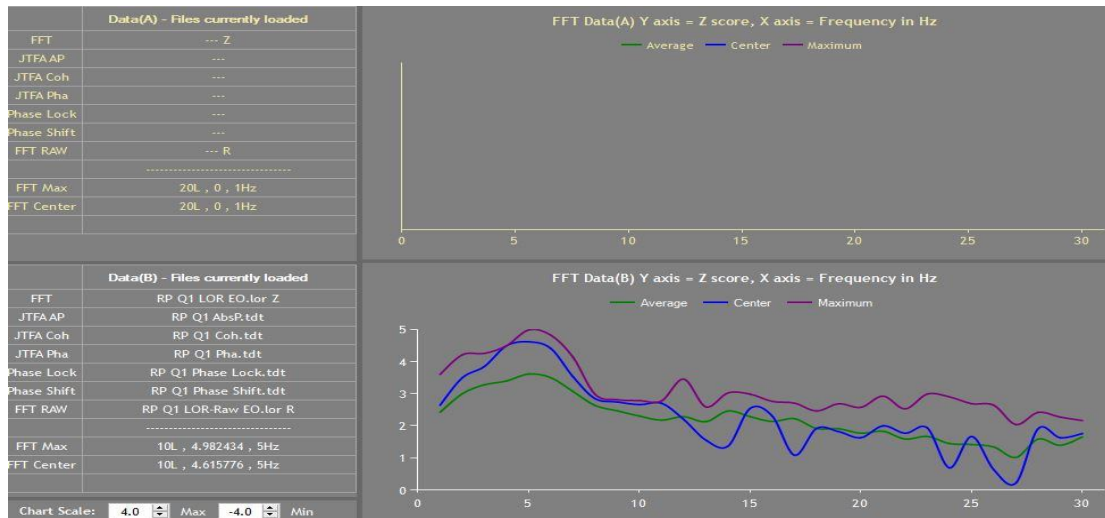
Note: If a file is selected that is already listed in the selected files area, the selection will be ignored. As each file is selected, notice the color in the status bar. It remains green if the number of files is less than eight and only one type of each file is loaded. If all boxes remain green, the files were properly chosen and you are good to go.



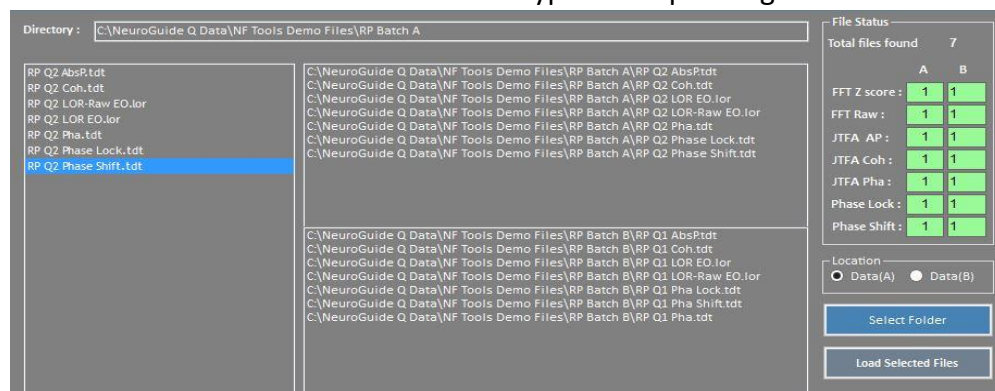
If the required criteria is not met, then the status area will turn red. If let’s say, accidentally you chose two of the same files as in the screenshot above, it will turn red signifying that’s not allowed and the software will not select the file. You can click on a file to remove it from the list and you can mix files from multiple locations.

5. Once all your files have been selected, click on the “Load Selected Files” button. The files will load into the appropriate database and a progress bar will appear letting you know which data is being load. When the number of “Files Loaded” prompt appears. Click on “Ok”. **Note:** It may take a minute for the prompt to appear.
6. If you have post-training files to load as well, i.e. Data(A), go to Step 7 below. If you simply want to take a look at your baseline data, exit the “Multi-File Import” window

and notice the LPR Main Screen. The selected files and FFT data will be loaded into the bottom “File Information” area in white text and if a FFT .lor file was included the import, the FFT Data graph for Data (B) will appear in the bottom window. **Note:** The Max and Center Voxel Brodmann Area location will be listed as well.

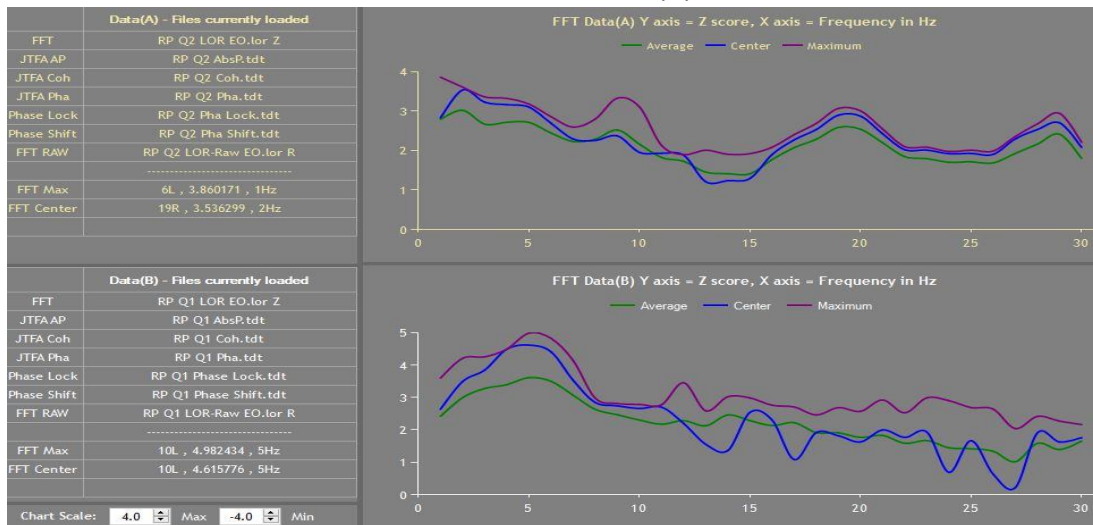


7. If you have post training files to compare to the baseline, repeat Steps 1 – 6 above for “Data (A)” as follows:
 - a. Select Import/Multi-File Import.
 - b. Click on the “Data(A)” radio button if it is not already selected.
 - c. Click on the “Select Folder” button and Navigate to the folder containing your most recent (post training) data files. Click to highlight the folder and select “OK”
 - d. Click on each file now listed in the “Multi-File Import” screen. Notice that the:
 - Selected file name and path is displayed in the top window.
 - “A” column in the “File Status” window is highlighted in green
 - Number “1” is listed next to file type corresponding to the selected file.



- e. Click on the “Load Selected Files” button and click on “OK” when the prompt appears.
- f. Exit the “Multi-File Import” screen and notice the LPR Main Screen. The selected files and FFT data will be loaded into the top “File Information” area in yellow text and if a FFT .lor file was included the batch, the FFT Data graph for Data (A)

will appear in the top window. **Note:** The Max and Center Voxel Brodmann Area location will be listed as well, and the Data(B) Info will remain there in White.



Note: If you have subsequent Data (A) files, say you compared post 5 sessions of training to baseline and now you want to compare post 10 sessions of training, follow the directions in Step 7 above. This will overwrite the Data (A) for post 5 sessions with your current Data (A) for post 10 sessions. You do not need to reload Data B.

A and B - Load Single File

You may only want to load a single file at a time rather than load in a group of files. The “Load Single File” feature gives you the flexibility to load either a single Baseline file, “B – Load Single File” or post training file, “A – Load Single File”.

To Load a “B - Single File”:

1. From the Main Menu Bar, Click on “Import/B - Load Single File” and navigate to the folder where your Data (B) baseline files are located.
2. Select to highlight the file you want to import and click on the “Open” button. The files listed will be loaded into the appropriate database and listed in the bottom left window of the LPR Main Screen. If an FFT .lor file was loaded, a graph will also appear in the bottom FFT Data(B) window. **Note:** Only valid .tdt or .lor files will be loaded.
3. Repeat Steps 1 and 2 for any subsequent baseline files you want to add.

To Load an “A - Single File”:

1. From the Main Menu Bar, Click on the “Import/A - Load Single File” and navigate to the folder where your Data (A) most recent files are located.
2. Select to highlight the file you want to import and click on the “Open” button. The files listed will be loaded into the appropriate database and listed in the top left window of the LPR Main Screen. If an FFT .lor file is loaded, a graph will also appear in the upper FFT Data(A) window. **Note:** Only valid .tdt or .lor files will be loaded.
3. Repeat Steps 1 and 2 for any additional recent files you want to add.

Clear Databases

Clear all Databases gives you the option to reset all databases to zero. As a result the LPR Main Screen will return to a default state with no files loaded or graphs displayed.

1. Click on Files/Clear All Databases.

Note: Selecting this option may take several minutes to complete. It will go through each file and remove the data from the database. When the FFT .lor files are removed, the graphs will be removed as well. It's a good idea clear the databases prior to loading and reviewing data for a different client in order to avoid confusion.

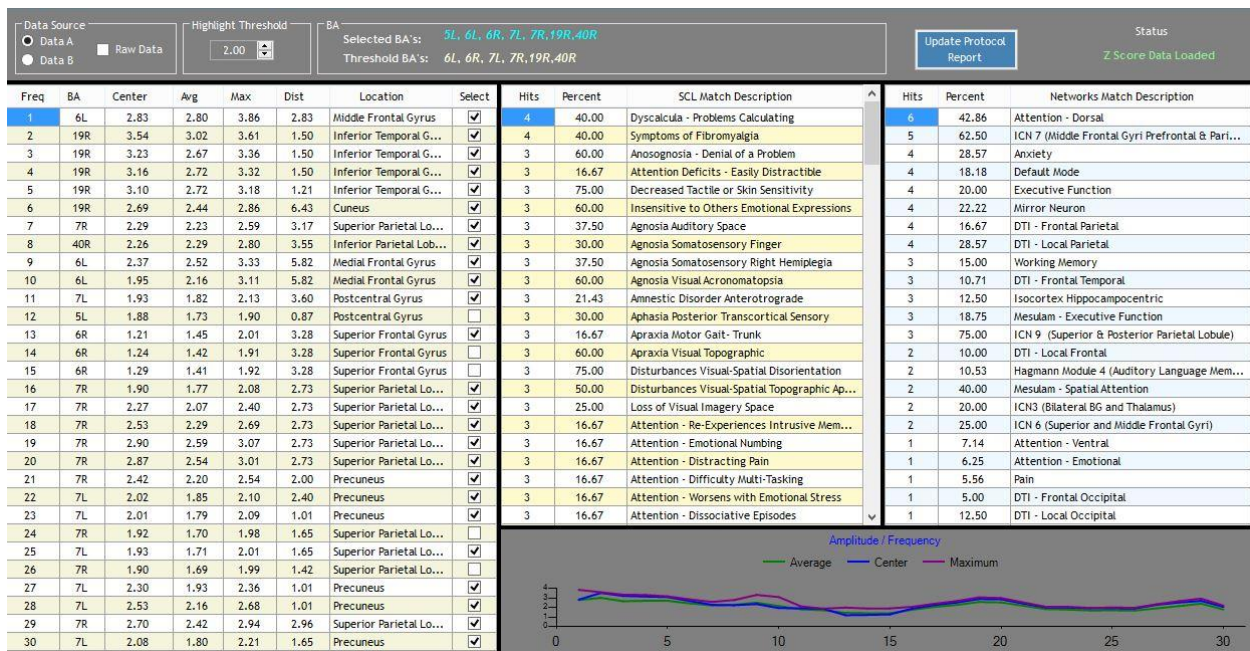
IV. FFT MENU

LORETA FFT Overview

LORETA FFT (Fast Fourier Transforms) data is defined in terms of voxels and either Raw or Z score data is accepted. The FFT Summary, described in the next section of this document, orders the CSD (Current Source Density) data from the selected .lor file relative to the absolute value of the most deviant voxel or data point on a three-dimensional grid of Brodmann Areas.

Maximum voxel means the largest value obtained for each specific frequency bin. Each frequency column for LORETA is 2394 voxels in depth. The most deviant value (deviant value = Abs (largest value)) is selected and referenced to the Brodmann Area it is contained in. The exact coordinates are also captured and used for calculating distance from the center voxel. The distance formula used is: In three-dimensional Euclidean space: Assuming the first Talairach coordinate (x1,y1,z1) and the second (x2,y2,z2) then distance = $\sqrt{(x2-x1)^2 + (y2-y1)^2 + (z2-z1)^2}$.

Summary



Clicking on "FFT/ Summary" will display the LORETA FFT data from the loaded .Lor file as described above. There are four separate sections or areas within the FFT Summary Window:

- Main Data Controls Area (Grey Band Area across the Top of window)
 - Data A, Data B Radio Buttons
 - Raw Data Check Box
 - Highlight Threshold
 - Selected and Threshold BA's

- Update Protocol Report Button
- FFT Summary Report Section (Far Left Area of the window)
- SCL/Network Match Section (Center and Far Right Areas of the window)
- FFT Data Graph Section (Bottom Area of the window)

To Navigate the Main Data Controls Section:

There are several Controls in the “Main Data Selection” area of the window that determine which .Lor file (A or B) and associated FFT data is displayed and saved to your Protocol Report. To select the file and associated data you’d like to view and/or save, do the following:

1. Notice that the name of selected .Lor file is automatically inserted into top of the window. **Xxx.lor:**
2. In the “**Data Source**” option area, select the data set that you want to display.
 - **Data A and B:** Radio Buttons that allow you to select your data set. Data B = Before/Baseline or pre training and Data A = After or post training for comparison. **Note:** By default Z Score and Data (A) is selected and displayed.
 - **Raw Data:** Check Box that displays raw data rather than Z Score data when checked.
3. In the “**Highlight Threshold**” option area, change the threshold value to set the upper and lower limit of the selection and highlight threshold you want. For example, a value of 2.0 will automatically select (put a check in the “Select” check box) any Max values ≥ 2.0 and highlight all values ≥ 2.0 in red and all values ≤ 2.0 in blue.
4. Go to the “**BA**” option area and notice what is displayed here:
 - **Selected BA.** This displays the Brodmann Areas from the .Lor file that represent the most deviant voxel. It is useful for getting a quick overview of the BMA’s included in the summary.
 - **Threshold BA’s.** This displays the Broadman Areas selected based on the “Highlight Threshold” setting. When the “Highlight Threshold” control is incremented (the threshold number is increased), the number of entries in this field will decrease. When the control is decremented (the threshold number is decreased) the number of entries in this field will increase. It is helpful for examining what Brodmann areas are affected by a specific Threshold, and for identifying the most extreme outliers as the threshold increases.
5. Click on the **Update Protocol Report** button. The selected FFT Frequencies and Brodmann locations will be moved to the protocol database and included in the Protocol Report for use when customizing protocols. **Note:** For detailed instructions on how to create an LPR Custom Protocol from the FFT Summary selections go to “Utilities/BA Collections Editor” section later in this document.
6. Notice the **Status** option area where the results of the “Data Type” selection is displayed. “Z score Data Loaded” displays if a Z score file (Data A or Data B) was

selected or “Raw Data Loaded” when “Raw Data” check box is selected. Will display “Working” when switching between Raw and Z Score data.

To View the FFT Summary Report Section:

Freq	BA	Center	Avg	ABS(Max)	Dist	Location	Select
1	25L	-1.11	-1.18	-1.22	3.48	Anterior Cingulate	<input type="checkbox"/>
2	20L	-1.70	-1.36	-1.85	2.98	Uncus	<input type="checkbox"/>
3	11L	-1.70	-1.71	-1.97	4.45	Middle Frontal Gyrus	<input type="checkbox"/>

1. Notice the data in each of the six columns in this area of the window. The columns and their meaning are as follows:
 - a) **Freq:** The frequency bin (1-30Hz for Z score 1-40Hz for Raw) of the Maximum Voxel.
 - b) **BA:** The Brodmann location of the Maximum Voxel for the Frequency bin.
 - c) **Center:** The value of the center voxel for the selected Brodmann area.
 - d) **Avg:** The average of all values within the selected Brodmann area.
 - e) **ABS (Max):** The Maximum value found for the Frequency (Freq).
 - f) **Dist:** The distance in 3d space between the center voxel and maximum voxel in voxels (mm/7)
 - g) **Location:** The Anatomical location (from the KEY Institute database) of the maximum voxel.
 - h) **Select** check box: If checked, this Brodmann area is added to the Protocol Report when the “Update FFT Protocol Report” button is clicked. The Box may be checked or unchecked manually or automatically when the “Highlight Threshold” control is incremented or decremented. The selections here correlate to the BA’s listed in the “Threshold BA’s” section of the window. **Note:** Once you click on the “Update Protocol Report” button, the selections may also be viewed by going to the LPR Basic Main Menu and selecting “Report/Protocol Report”.

To View the SCL/Network Match Section:

Hits	Percent	Networks Match Description
7	35.00	Isocortex Olfactocentric
6	21.43	DTI - Frontal Temporal
6	42.86	DTI - Local Temporal
6	25.00	Isocortex Hippocampocentric

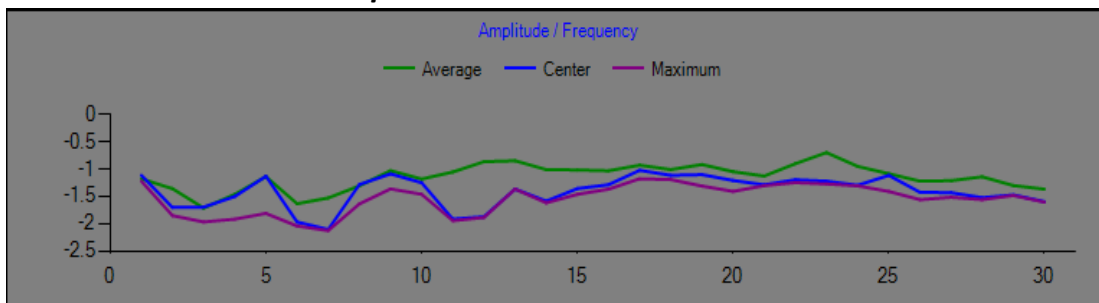
Hits	Percent	SCL Match Description
5	83.33	Auditory Sequencing Problems
4	40.00	Delusional
4	33.33	Insensitive to Others Feelings
4	20.00	Agnosia Somatosensory Mental Illness

1. Notice the data in each of the three columns in this area of the window. The columns and there meaning are as follows:

- **Hits:** The number of Brodmann area matches between the BA list and the SCL list or Network. The List of 30 Z score or 40 Raw Brodmann locations from the BA column is reduced by removing duplicates. The resulting list is compared to each SCL and Network list of Brodmann locations. If a match occurs a hit is recorded.
- **Percent:** The selected Brodmann areas divided by the number of Brodmann areas in each SCL or Network * 100. For example if there are 10 Brodmann areas in an SCL and 5 hits on that SCL, percent = $((5/10) * 100) \% = 50\%$.
- **Description:** Descriptive label for the SCL or Network.

Note – Clicking on any column header will reorder the column and all other columns either by lowest to highest or highest to lowest.

To View the FFT Data Graph Section:



1. Notice the “Amplitude/Frequency Graph at the bottom of the screen. Based on the .Lor data currently loaded, this line graph shows the following
 - Raw data or Z score data values on the Y axis and Frequency on the X axis.
 - Average Voxel values as a Green line
 - Center Voxel values as a Blue line
 - Maximum Voxel values as a Purple line

Current Session Data

BA1	AnatA1	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
13 L	Extra-Nuclear	0.22	0.86	0.98	0.95	1.02	1.14	0.87	0.48	0.48	0.42	0.95	0.56	0.
13 L	Inferior Frontal Gyrus	0.20	0.85	0.97	0.94	1.02	1.12	0.84	0.44	0.43	0.38	0.93	0.57	0.
13 L	Subcallosal Gyrus	0.03	0.72	0.88	0.85	0.88	0.90	0.60	0.20	0.17	0.16	0.70	0.49	0.
13 L	Insula	-0.42	0.23	0.22	0.30	0.31	0.17	-0.25	-0.33	-0.19	-0.29	0.00	-0.36	-0
13 L	Insula	0.06	0.67	0.75	0.72	0.77	0.72	0.40	0.10	0.13	0.05	0.53	0.17	0.
13 L	Extra-Nuclear	0.22	0.82	0.94	0.91	0.94	0.98	0.72	0.34	0.33	0.25	0.77	0.41	0.
13 L	Extra-Nuclear	0.31	0.92	1.06	1.05	1.09	1.21	0.97	0.55	0.52	0.46	0.99	0.62	0.
13 L	Insula	0.33	0.94	1.10	1.10	1.14	1.30	1.05	0.64	0.62	0.59	1.09	0.69	0.
13 L	Insula	-0.89	-0.38	-0.48	-0.19	-0.31	-0.39	-0.73	-0.65	-0.50	-0.57	-0.37	-0.76	-0
13 L	Insula	-0.88	-0.34	-0.44	-0.18	-0.31	-0.39	-0.74	-0.67	-0.51	-0.58	-0.39	-0.81	-0
13 L	Insula	-0.61	-0.03	-0.08	0.11	0.02	-0.09	-0.48	-0.48	-0.33	-0.43	-0.19	-0.56	-0
13 L	Insula	-0.48	0.12	0.08	0.23	0.18	0.05	-0.34	-0.39	-0.25	-0.35	-0.09	-0.44	-0
13 L	Insula	-0.26	0.35	0.36	0.42	0.42	0.30	-0.11	-0.23	-0.12	-0.21	0.10	-0.24	-0
13 L	Insula	-0.32	0.29	0.28	0.37	0.36	0.23	-0.17	-0.27	-0.16	-0.26	0.04	-0.29	-0
13 L	Insula	-0.01	0.59	0.64	0.63	0.67	0.62	0.23	0.02	0.09	0.00	0.41	0.00	-0
13 L	Insula	0.05	0.63	0.70	0.69	0.72	0.65	0.31	0.05	0.08	0.00	0.43	0.00	-0
13 L	Insula	0.19	0.77	0.86	0.84	0.87	0.87	0.57	0.26	0.26	0.17	0.65	0.27	0.
13 L	Insula	0.26	0.84	0.96	0.94	0.96	0.97	0.71	0.34	0.31	0.22	0.73	0.40	0.
13 L	Insula	0.36	0.94	1.08	1.08	1.11	1.20	0.98	0.57	0.52	0.44	0.97	0.61	0.
13 L	Insula	0.38	0.96	1.12	1.12	1.14	1.25	1.03	0.59	0.54	0.47	1.00	0.66	0.
13 L	Insula	0.40	0.98	1.15	1.17	1.20	1.35	1.13	0.69	0.65	0.61	1.11	0.73	0.
13 L	Insula	0.40	0.98	1.17	1.21	1.20	1.37	1.15	0.70	0.66	0.63	1.12	0.73	0.
13 L	Insula	-1.12	-0.69	-0.81	-0.50	-0.61	-0.60	-0.92	-0.78	-0.66	-0.65	-0.49	-0.91	-0
13 L	Insula	-1.09	-0.70	-0.83	-0.51	-0.63	-0.60	-0.91	-0.77	-0.65	-0.63	-0.47	-0.88	-0
13 L	Superior Temporal Gyrus	-1.06	-0.55	-0.65	-0.40	-0.52	-0.55	-0.89	-0.78	-0.63	-0.67	-0.50	-0.95	-0
13 L	Insula	-0.80	-0.31	-0.41	-0.15	-0.29	-0.36	-0.71	-0.64	-0.48	-0.56	-0.36	-0.77	-0
13 L	Insula	-0.58	0.00	-0.06	0.10	-0.02	-0.10	-0.51	-0.51	-0.33	-0.44	-0.23	-0.66	-0
13 L	Insula	-0.42	0.15	0.11	0.26	0.16	0.07	-0.34	-0.38	-0.24	-0.34	-0.09	-0.47	-0
13 L	Insula	-0.14	0.46	0.49	0.52	0.52	0.45	0.02	-0.13	-0.01	-0.11	0.22	-0.18	-0

“Current Session Data” displays the Raw or Z score FFT metrics associated with any entry in the Network or SCL list, including custom ROI (Region of Interest) entries you have created for a specific client. This utility is helpful for examining the Brodmann area metrics for a specific network or area of concern. By creating a CSV file, this utility is also useful for exploring changes as a result of training a specific Network, SCL, or custom ROI. **Note:** The Visualize Menu gives you the option to look at the same data described below, but in a graphical rather than data form.

To Navigate the “Current Session Data” Window:

There are several Controls in the “Current Session Data” window that determine which .Lor file (A or B) and associated FFT data is displayed. To select the file and associated data you’d like to view, do the following:

1. In the “**Network**” or “**SCL**” list area, select a desired name from the List. **Note:** The “ROI” Controls toggle between Network or SCL (including custom ROI’s) and determine which list is displayed here. The data to the right of this section will change accordingly and the list of Brodmann Areas associated with the selected Network or SCL will display below the list.
2. In the “**Data Source**” Controls area, select the data set that you want to display:
 - Data (A): Radio Button that allows you to select Data A = After or post training for comparison as your data set to display.
 - Data (B): Radio Button that allows you to select Data B = Before/Baseline or pre training as your data set to display.

3. In the “**Data Type**” Controls area, click on either the “Raw” or “Z Score” radio button to determine which data set will display. These are two very different set of metrics. When selecting “Raw” data selection you are looking at the raw voltage or the amplitude in terms of microvolts. Whereas with “Z Score” data selection you are looking at the location as a standard deviation value based on a normative database. Looking at mV rather than Zscores can often be more telling, especially when looking at outliers. If you are looking at the deviants it is more important in some cases to look at raw data to see what is exactly being represented.

Note: If you are looking at Raw, the threshold is always going to be unique to that subject. When thresholding data using Raw or mV, there is no “typical” threshold range (i.e. 2 and -2) as is the case with Zscores. You have to see what is the right range based on the individual client i.e. an alcoholic could have very low amplitude EEG say 3 – 5 mV whereas someone else may have a more typical mV range of say 12 – 15 mV all the way up to 50mV. So you need to threshold accordingly.

4. In the “**ROI**” Controls area, click on either the “Network” or “SCL” radio button to determine which list is referenced for viewing the data.
5. In the “**View**” Controls area, click on either the “Bin” radio button (separate 1Hz frequency bins) or the “Band” radio button. Details are as follows:
 - Selecting Bin view allows you to look at the individual frequencies rather than the frequencies averaged together as seen in Band view. Although looking at Z Scores in Band view is the most common means of reviewing the data, Bin view gives you further access to the lowest common denominator or the smallest data representation possible.
 - In other words, Band view allows you to see changes from one band (or averaged set of frequencies) to the next, whereas Bin view allows you to see changes in specific frequencies within a band.
 - This is similar to the 1hz Bin page versus Summary Page in Neuroguide QEEG report. **Note:** You can see the individual 1hz Bins here in Current Session Data, and you can see the same data in 3D View by selecting the Visualization menu item.
6. In the “**View Filter**” Controls area, click on the radio button corresponding to the specific data you’d like to display:
 - i) **BA Avg** - Averages all the rows that have identical BA locations.
 - j) **Center** - Displays the center voxel value for the BA.
 - k) **Max** - Displays the Max voxel value for the BA.
 - l) **Default** - Displays unmodified data for the Network / SCL selection.
7. Click on the “**Highlight threshold**” up or down arrows to set which values get highlighted. The values that are less than or equal or greater than or equal to the threshold value are highlighted. If the value is negative the highlight will be blue. If the value is positive the highlight will be red.

- Click on the **“Create CSV”** button to save the current view to a comma delimited file that can be directly read by Excel.

Note: Clicking on any column header in the data display window will reorder the column ascending to descending or descending to ascending.

To View Custom Protocol (or ROI):

If you have created a custom FFT Protocol or ROI using the **“BA Collections Editor”** (Refer to that section later in this document for details), you can come here and view the specific region of interest for a given client. You can also Save the data as a CSV file and track the changes between multiple data sets in Excel. (See the next Section below, **“Variation FFT (B-A)”** to use the LPR to track change between two data sets.) To do so:

- In the **“Network”** or **“SCL”** list area, select the Custom Protocol you created.
- Select **“Bands”**
- Select **“BA Avg”**
- Set the Threshold to **“2”** and **“-2”** or whatever threshold will show you the number of outliers you are satisfied with. As a result, you can now see the data specific to a selected individual.
- Save the data as a **“CSV”** file. Once you have the saved data, you can now track the changes between multiple data sets, either previous or subsequent. **Note:** This FFT data is pulled from the .lor file tied to a specific QEEG. The frequency at which you can track changes depends on how often you do a QEEG, generate a .Lor file, and create a CSV file.

Variation FFT (B-A)

BA1	AnatA1	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
13 L	Extra-Nuclear	-3.09	-3.26	-3.37	-2.93	-2.87	-3.06	-2.59	-1.83	-1.45	-1.15	-1.95	-0.90	-0.60	-0.41
13 L	Inferior Frontal Gyrus	-3.11	-3.29	-3.36	-2.91	-2.83	-2.99	-2.54	-1.74	-1.37	-1.12	-1.90	-0.90	-0.60	-0.43
13 L	Subcallosal Gyrus	-3.15	-3.41	-3.48	-3.00	-2.74	-2.68	-2.23	-1.39	-1.09	-1.01	-1.69	-1.00	-0.67	-0.54
13 L	Insula	-2.92	-3.01	-2.82	-2.42	-1.84	-1.76	-1.14	-0.80	-0.79	-0.40	-0.90	-0.38	-0.26	-0.11
13 L	Insula	-3.16	-3.28	-3.31	-2.84	-2.57	-2.08	-1.43	-1.20	-0.84	-1.60	-0.75	-0.50	-0.34	
13 L	Extra-Nuclear	-3.17	-3.30	-3.40	-2.97	-2.81	-2.91	-2.46	-1.71	-1.37	-1.04	-1.84	-0.92	-0.61	-0.44
13 L	Extra-Nuclear	-3.14	-3.29	-3.46	-3.09	-3.04	-3.19	-2.74	-1.94	-1.52	-1.23	-2.04	-1.03	-0.67	-0.48
13 L	Insula	-3.13	-3.31	-3.54	-3.21	-3.21	-3.34	-2.85	-2.06	-1.61	-1.38	-2.16	-1.04	-0.67	-0.45
13 L	Insula	-2.61	-2.43	-2.09	-2.02	-1.19	-1.14	-0.55	-0.41	-0.45	-0.08	-0.43	-0.13	-0.04	0.14
13 L	Insula	-2.63	-2.47	-2.19	-2.08	-1.26	-1.21	-0.60	-0.45	-0.49	-0.10	-0.46	-0.10	0.01	0.21
13 L	Insula	-2.84	-2.78	-2.50	-2.25	-1.51	-1.45	-0.85	-0.60	-0.62	-0.22	-0.64	-0.27	-0.16	0.00
13 L	Insula	-2.92	-2.92	-2.67	-2.35	-1.67	-1.60	-1.00	-0.69	-0.69	-0.29	-0.75	-0.35	-0.24	-0.10
13 L	Insula	-3.03	-3.12	-2.97	-2.57	-2.01	-1.94	-1.33	-0.91	-0.85	-0.46	-1.01	-0.48	-0.33	-0.20
13 L	Insula	-3.01	-3.07	-2.89	-2.50	-1.91	-1.83	-1.23	-0.84	-0.79	-0.40	-0.93	-0.45	-0.31	-0.19
13 L	Insula	-3.17	-3.27	-3.31	-2.89	-2.56	-2.51	-1.92	-1.39	-1.18	-0.78	-1.54	-0.64	-0.39	-0.22
13 L	Insula	-3.19	-3.29	-3.31	-2.88	-2.53	-2.48	-1.95	-1.34	-1.14	-0.76	-1.49	-0.74	-0.48	-0.34
13 L	Insula	-3.26	-3.36	-3.48	-3.09	-2.87	-2.87	-2.37	-1.71	-1.38	-1.00	-1.83	-0.89	-0.55	-0.38
13 L	Insula	-3.24	-3.35	-3.48	-3.10	-2.89	-2.92	-2.47	-1.73	-1.38	-1.04	-1.84	-1.00	-0.65	-0.49
13 L	Insula	-3.24	-3.37	-3.59	-3.27	-3.21	-3.32	-2.85	-2.05	-1.62	-1.29	-2.13	-1.14	-0.72	-0.52
13 L	Insula	-3.20	-3.34	-3.56	-3.24	-3.18	-3.30	-2.85	-2.02	-1.58	-1.30	-2.10	-1.15	-0.73	-0.53
13 L	Insula	-3.19	-3.34	-3.61	-3.34	-3.35	-3.47	-3.00	-2.17	-1.69	-1.45	-2.24	-1.16	-0.74	-0.50
13 L	Insula	-3.21	-3.38	-3.68	-3.43	-3.43	-3.51	-3.03	-2.20	-1.71	-1.51	-2.27	-1.16	-0.75	-0.50
13 L	Insula	-2.44	-2.19	-1.84	-1.87	-1.01	-0.99	-0.37	-0.31	-0.31	-0.01	-0.33	-0.02	0.06	0.28
13 L	Insula	-2.46	-2.17	-1.81	-1.85	-0.98	-0.97	-0.36	-0.29	-0.29	-0.01	-0.32	-0.04	0.02	0.24
13 L	Superior Temporal Gyrus	-2.52	-2.32	-2.04	-2.00	-1.15	-1.10	-0.47	-0.38	-0.40	-0.05	-0.38	0.00	0.12	0.34
13 L	Insula	-2.71	-2.51	-2.20	-2.11	-1.25	-1.21	-0.61	-0.44	-0.47	-0.09	-0.45	-0.13	-0.03	0.16
13 L	Insula	-2.88	-2.79	-2.60	-2.35	-1.59	-1.55	-0.90	-0.65	-0.67	-0.24	-0.65	-0.20	-0.08	0.11
13 L	Insula	-3.00	-2.96	-2.74	-2.45	-1.73	-1.67	-1.05	-0.72	-0.71	-0.29	-0.75	-0.35	-0.22	-0.07
13 L	Insula	-3.12	-3.20	-3.16	-2.77	-2.28	-2.23	-1.59	-1.13	-1.02	-0.60	-1.23	-0.53	-0.33	-0.17

The **“Variation FFT (B-A)”** window shows the changes from one data set to another relative to the Network, SCL, or Custom Protocol selected from the list. This is done by comparing, Data(A) and Data(B). Data(B) is typically the **“Before”** data set and Data(A) the **“After”** data set.

Difference, Percentage Change and Percentage Difference are available. Percentage Change is selected by default.

To Navigate the “Variation FFT (B-A)” Window:

There are several Controls in the “Variation FFT (B-A)” window that determine which FFT data is displayed for comparison. To select the data you’d like to view, do the following: **Note:** Data (A) and (B) are predefined as the Data Source for comparison.

1. In the “**Network**” or “**SCL**” list area, select a desired ROI from the List to use as comparison. **Note:** The “ROI” Controls toggle between Network or SCL and determines which list is displayed. The data to the right of this section will change accordingly and the list of Brodmann Areas associated with the selected Network or SCL will display below the list. Because Custom Protocols are stored in either the Network or SCL database, you can compare custom regions of interest as well. See the next section in this document for details.
2. In the “**View**” Controls area, click on either the “Bin” radio button to display columns as separate 1Hz frequency bins or the “Band” radio button to display columns as full frequency bands. See the “Current Session Data/View” Controls area in the previous section of this document for further details on selecting Bin view or Band view.
3. In the “**Data Type**” Controls area, click on either the “Raw” or “Z Score” radio button to determine which type of data will display when contrasting Data B-A. See the “Current Session Data/Data Type” Controls area in the previous section of this document for further details on selecting Raw or Z Scores.
4. In the “**ROI**” Controls area, click on either the “Network” or “SCL” radio button to determine which list is referenced for viewing the data.
5. In the “**View Filter**” Controls area, click on the radio button corresponding to the specific data you’d like to display:
 - **Avg** - Averages all the rows that have identical BA locations.
 - **Cnt** (Center) - Displays the center voxel value for the BA.
 - **N/A** - Displays unmodified data for the Network / SCL selection.
6. In the “**Change Filter**” Controls area, click on the radio button corresponding to the specific data you’d like to display:
 - **% Change** = $((B - A) / A) * 100$ - Represents the relative change between the old value and the new one.
 - **% Difference** = $(A - B / (A+B)/2) * 100$ – The difference between two values divided by the average of the two values. Shown as a percentage.
 - Diff = **(B-A)** – The value of Data(B) - Data(A)
 - A - Displays Data(A) values no modifications.
 - B - Displays Data(B) values no modifications.

7. Check the **“Filter by Protocol Selection”** box if you have made FFT selections, saved them to the Protocol Report database, and you only want those selections to be shown here. This is useful for tracking changes when using a Data Driven or Fusion Protocol.
8. Click on the **“Highlight threshold”** up or down arrows to set the highlighting of ABS(metrics) above or equal to the threshold value. Red is positive, Blue is negative.
9. Click on the **“Create CSV”** button to save current view to a comma delimited file that can be directly read by Excel.

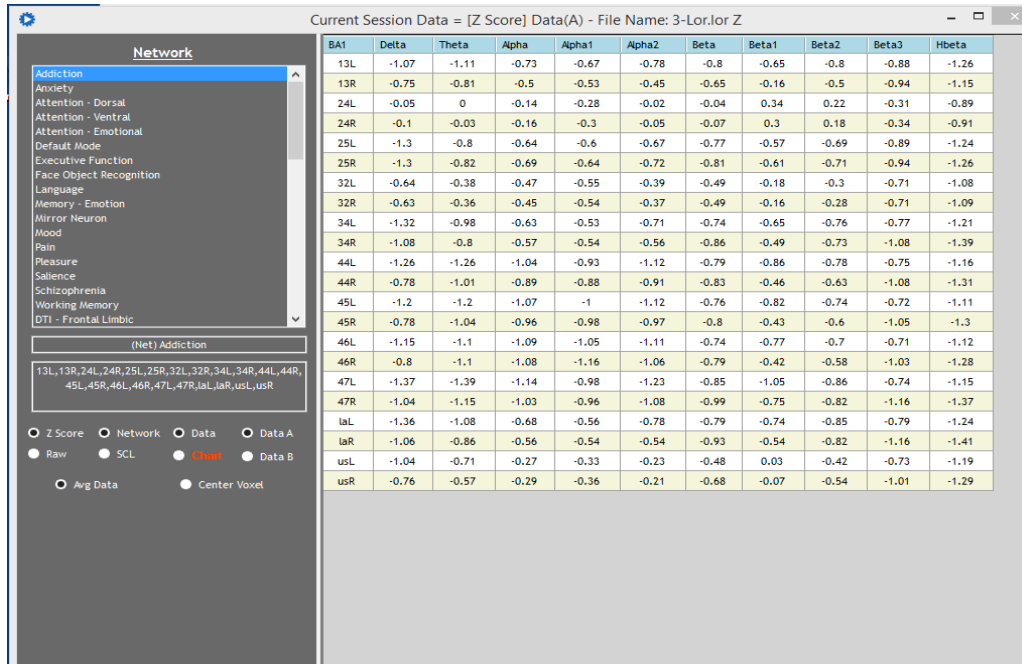
To Track a Custom FFT Protocol:

If you have created a Custom FFT Protocol or ROI using the “BA Collections Editor” (Refer to that section later in this document for details), you can come here and track the changes right in the LPR by comparing the two data sets (A) and (B) for a given client. An example is as follows:

1. Be sure that the .lor (A) and (B) files for the data sets you want to compare have been imported into the LPR.
2. In “ROI” select either “Network” or “SCL” depending on where you created your Custom Protocol.
3. Scroll down the list and select the Custom Protocol you want to use as your ROI for comparison.
4. In “View”, select “Bands”
5. In “Data Type” select “Z Score”
6. In “View Filter” select “Avg”.
7. In “Change Filter” select the controls for the specific data you would like to compare. You can track the Difference between the two data sets, the Percentage Change and the Percentage Difference.

Again, using “Variation FFT (B-A) is useful if you want to compare two sets of FFT data. If you would like to compare more than two sets, create a CSV file and you can compare multiple data sets in Excel.

Radar Chart



“Radar Chart” displays the condensed form of the Z Score or Raw data metrics in a tabular or polar graphic view. The data is automatically averaged into frequency bands and Brodmann areas. The data is representative of the Network or SCL selected.

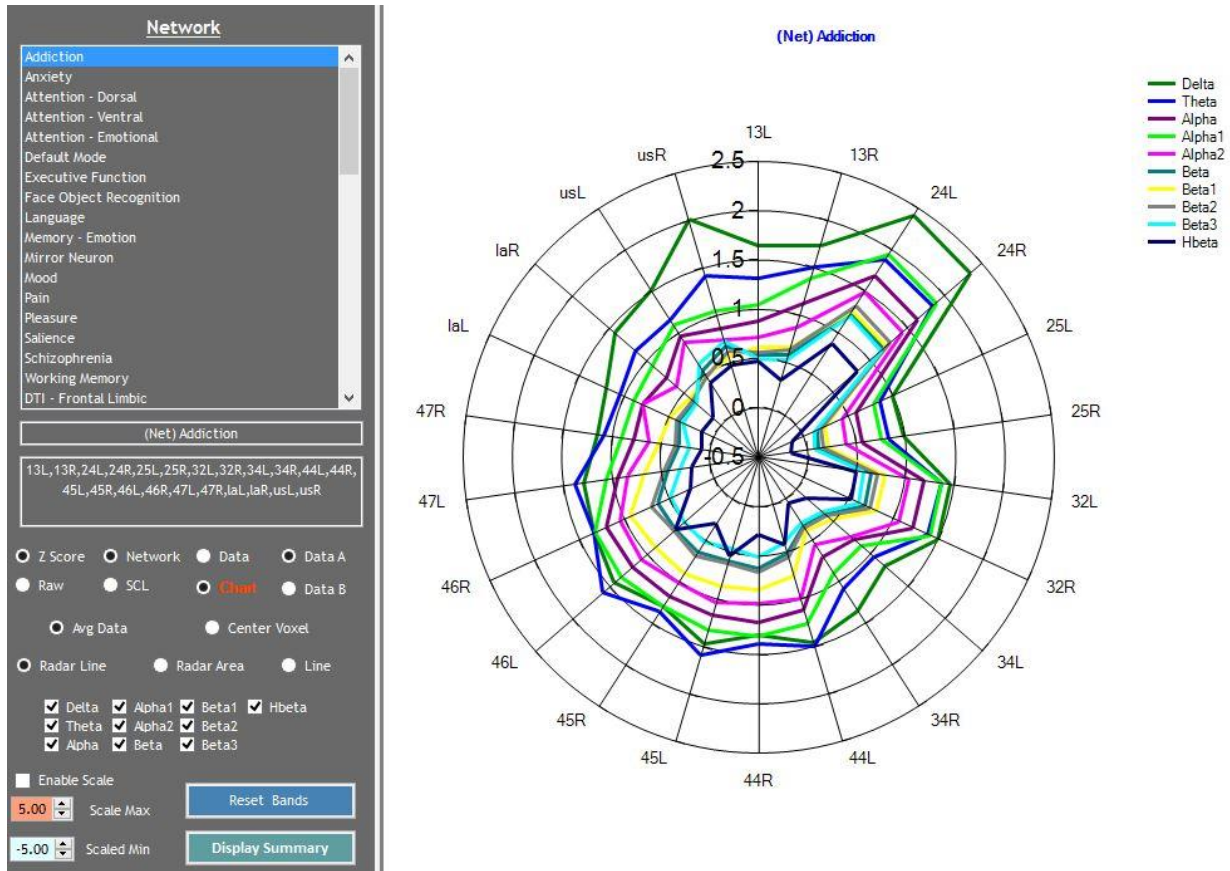
To Navigate the “Radar Chart” Window:

There are several Controls available for viewing the “Radar Chart”. The specific radio buttons and their corresponding functions are as follows:

- **Z score** - Selects and displays Z score data.
- **Raw** - Selects and displays Raw data.
- **Network** – Displays the available Networks in the Network list area at the top of the window for selection. Their associated Brodmann Areas are displayed in a separate section below the list.
- **SCL** - Displays the available SCLs in the SCL list area at the top of the screen for selection. Their associated Brodmann Areas are displayed in a separate section below the list.
- **Data** - Selects a data only presentation.
- **Chart** - Selects a chart only presentation of the displayed data.
- **Data A** - Selects data from Dataset (A).
- **Data B** - Selects data from Dataset (B).
- **Avg Data** - Displays the average of all values within the selected Brodmann areas.
- **Center Voxel** - Displays the center voxel value for the selected Brodmann areas.

To Navigate the “Chart” Display Window:

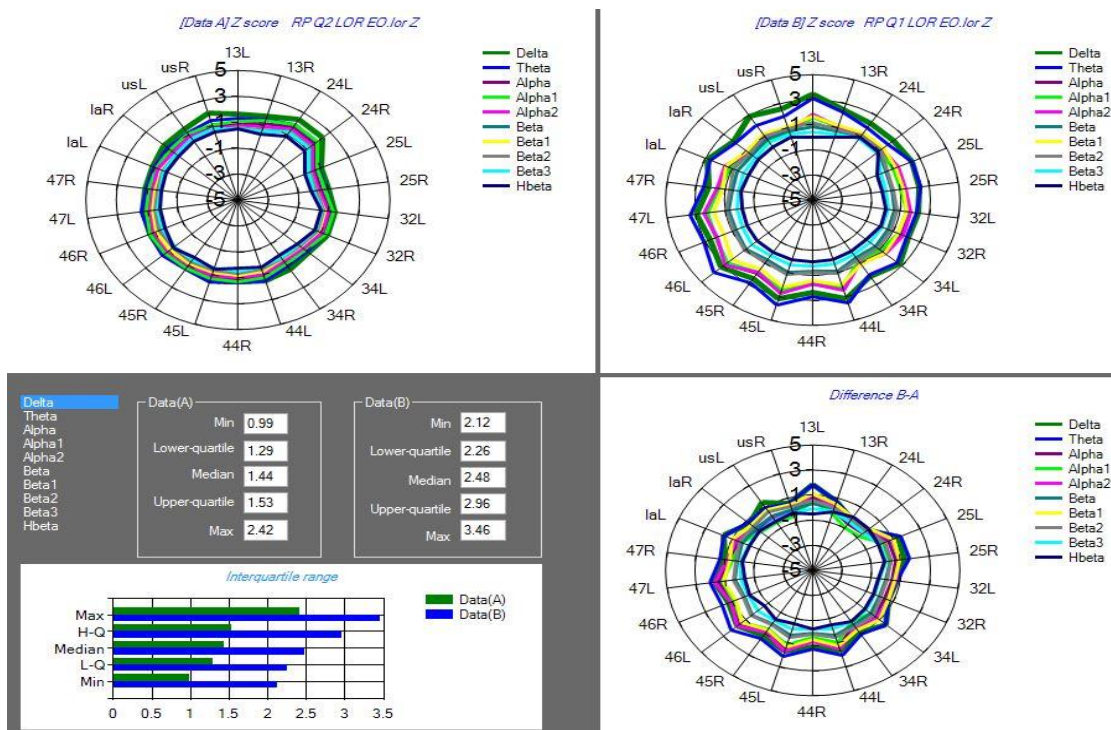
When the orange “Chart” control radio button is clicked, the display changes to a chart display.



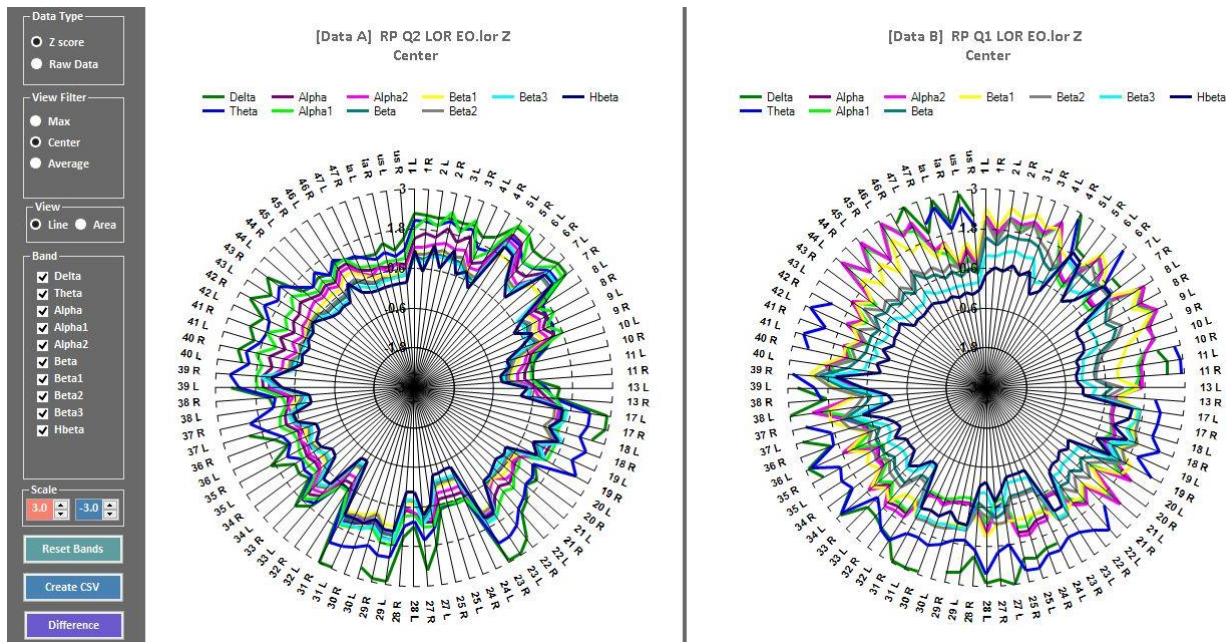
There are several additional Controls available once “Chart” is selected. The specific radio buttons and their corresponding functions are as follows:

- **Radar Line** - Selects a line for each data series in the radar chart.
- **Radar Area** - When selected fills in the area under the radar line. **Note:** “Radar Line” must be selected prior to selecting “Radar Area”.
- **Line** - Selects a simple line graph.
- **Delta, Theta... Checkboxes** - When checked, the line or area representing the specific frequency band is visible. When unchecked the line or area is not visible.
- **Enable Scale** - Enables the manual scaling of the chart Y axis. **Important Note:** Checking and unchecking the “Enable Scale” check box sets the chart scale changes. In other words, if you change values in the “Scale Max” or “Scale Min” you must click on “Enable Scale” to see the changes. As a result anytime you change values in “Scale Max” or “Scale Min” you must uncheck and recheck “Enable Scale”. Unchecking “Enable Scale” will present an automatic view that uses the min and max values of the dataset to generate the scale. See “Scale Max, Scale Min” for more details.

- **Scale Max, Scale Min** – Sets the minimum and maximum values for the manual scale. **Note:** When the “Enable Scale” is checked then the chart is redrawn using the values in “Scale Max” and “Scale Min”. The Frequency checkboxes are reset every time the “Update Chart Scale” button is clicked. If the “Enable Scale” is unclicked then the “Update Chart Scale” button will redraw the chart with the automatic scaling for the Y axis.
- **Reset Bands Button** - Selects all of the Frequency Band checkboxes.
- **Display Summary Button** - This produces a separate window that shows Data(A), Data(B) and the Difference (B-A). It also shows the distribution of values for each frequency for Data(A) and Data(B). Simply select the band of interest to view the distribution of values.



BA Summary Chart

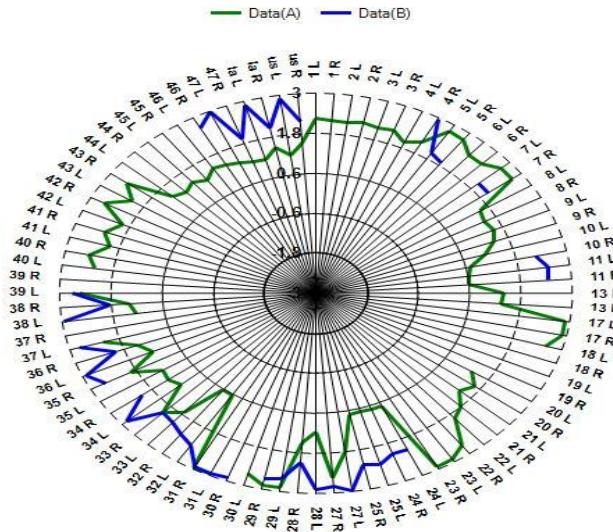


To Navigate the “BA Summary Chart” Window:

There are several Controls available for viewing the “BA Summary Chart”. The specific radio buttons and their corresponding functions are as follows:

- **Data Type** - The display can be either Z-score or Raw data.
- **View Filter** - Selects Max voxel values, Center voxel Values or the average of values in each Brodmann area.
- **View** - Displays a line (Default) or an area chart.
- **Band** - By checking or unchecking a band you can enable or disable the display of that band on the chart.
- **Scale** - Changing the values in the Red(Max) or blue(Min) will modify the presentation scale of the chart.
- **Reset Bands** Button - Checks all of the band checkboxes.
- **Create CSV** Button - Saves current view to a comma delimited file that can be directly read by Excel.
- **Difference** Button – Displays an additional chart showing the difference (B -A) for each band for all 88 Brodmann areas. **Note:** This chart contains several Controls with the same functionality as listed here.

[Data A] RP Q2 LOR EO.lor Z, [Data B] RP Q1 LOR EO.lor Z
Delta - Center



All CSD Values

voxelnum	xtal	ytal	ztal	BA1	AnatA1	F1	F2	F3	F4	F5	F6	F7	F8	F9
1	-51	-12	-34	20 L	Inferior Temporal Gyrus	0.04	0.75	0.83	0.68	0.94	0.89	0.54	0.22	0.2
2	-45	-12	-34	20 L	Inferior Temporal Gyrus	0.01	0.72	0.81	0.68	0.94	0.84	0.52	0.16	0.2
3	-38	-12	-34	20 L	Uncus	-0.05	0.67	0.77	0.67	0.91	0.78	0.47	0.09	0.1
4	-31	-12	-34	20 L	Uncus	-0.09	0.64	0.73	0.66	0.88	0.75	0.44	0.05	0.0
5	32	-12	-34	20 R	Uncus	-1.09	-0.66	-0.76	-0.51	-0.50	-0.59	-0.68	-0.71	-0.7
6	39	-12	-34	20 R	Inferior Temporal Gyrus	-1.11	-0.74	-0.85	-0.59	-0.58	-0.67	-0.75	-0.77	-0.7
7	46	-12	-34	20 R	Inferior Temporal Gyrus	-1.11	-0.79	-0.92	-0.65	-0.65	-0.75	-0.82	-0.83	-0.8
8	52	-12	-34	20 R	Inferior Temporal Gyrus	-1.10	-0.82	-0.96	-0.69	-0.69	-0.80	-0.87	-0.87	-0.8
9	-51	-6	-34	20 L	Inferior Temporal Gyrus	0.03	0.73	0.82	0.67	0.92	0.90	0.57	0.26	0.2
10	-45	-6	-34	20 L	Inferior Temporal Gyrus	0.01	0.72	0.82	0.69	0.93	0.89	0.60	0.24	0.2
11	-38	-6	-34	20 L	Inferior Temporal Gyrus	-0.02	0.70	0.81	0.71	0.93	0.87	0.59	0.20	0.2
12	-31	-6	-34	20 L	Uncus	-0.05	0.68	0.78	0.70	0.91	0.84	0.54	0.15	0.1
13	-24	-6	-34	36 L	Uncus	-0.06	0.67	0.77	0.70	0.90	0.85	0.53	0.14	0.1
14	25	-6	-34	36 R	Uncus	-1.04	-0.53	-0.63	-0.38	-0.40	-0.45	-0.58	-0.62	-0.6
15	32	-6	-34	20 R	Uncus	-1.09	-0.63	-0.73	-0.48	-0.49	-0.56	-0.65	-0.69	-0.7
16	39	-6	-34	20 R	Inferior Temporal Gyrus	-1.12	-0.72	-0.84	-0.58	-0.60	-0.67	-0.74	-0.76	-0.7
17	46	-6	-34	20 R	Inferior Temporal Gyrus	-1.13	-0.78	-0.92	-0.66	-0.68	-0.75	-0.82	-0.83	-0.8
18	52	-6	-34	20 R	Inferior Temporal Gyrus	-1.13	-0.81	-0.96	-0.70	-0.72	-0.81	-0.87	-0.87	-0.8
19	-51	1	-35	21 L	Middle Temporal Gyrus	0.02	0.72	0.82	0.67	0.91	0.91	0.61	0.31	0.3
20	-45	1	-35	38 L	Middle Temporal Gyrus	0.03	0.74	0.84	0.72	0.94	0.96	0.67	0.34	0.3
21	-38	1	-35	20 L	Inferior Temporal Gyrus	0.03	0.75	0.86	0.75	0.97	0.99	0.71	0.34	0.3
22	-31	1	-35	20 L	Inferior Temporal Gyrus	0.01	0.74	0.85	0.76	0.97	0.99	0.70	0.31	0.3
23	-24	1	-35	38 L	Uncus	-0.03	0.71	0.81	0.73	0.93	0.93	0.62	0.22	0.2
24	18	1	-35	36 R	Uncus	-0.99	-0.45	-0.54	-0.30	-0.33	-0.36	-0.51	-0.56	-0.6
25	25	1	-35	38 R	Uncus	-1.03	-0.51	-0.62	-0.37	-0.40	-0.43	-0.56	-0.60	-0.6
26	32	1	-35	20 R	Middle Temporal Gyrus	-1.09	-0.62	-0.73	-0.47	-0.51	-0.55	-0.65	-0.67	-0.7
27	39	1	-35	38 R	Middle Temporal Gyrus	-1.12	-0.70	-0.82	-0.56	-0.61	-0.65	-0.73	-0.75	-0.7
28	46	1	-35	21 R	Middle Temporal Gyrus	-1.14	-0.77	-0.91	-0.65	-0.69	-0.75	-0.82	-0.82	-0.8
29	52	1	-35	21 R	Middle Temporal Gyrus	-1.16	-0.82	-0.97	-0.71	-0.75	-0.82	-0.88	-0.88	-0.8
30	-45	8	-35	21 L	Middle Temporal Gyrus	0.05	0.77	0.87	0.76	0.98	1.05	0.76	0.43	0.4

Highlight Threshold

2.00 -2.00

View

Bin Band

Data Source

Data(A) Data(B)

Data Type

Z Score Raw

BA View

None Single BA

View Filter

Max Center

[Create CSV](#)

“All CSD Values” displays the .lor file in a table format with voxel number, talairach coordinates, Brodmann location, anatomical location and frequency bin appended. Clicking on any column header will reorder the column and all other columns either by lowest to highest or highest to lowest.

To Navigate the “All CSD Values” Window:

There are several Controls in the “All CSD Values” window that determine which .Lor file (A or B) and associated FFT data is displayed. To select the file and associated data you’d like to view, do the following:

1. In the “**View**” Controls area, click on either the “Bin” radio button (separate 1Hz frequency bins) or the “Band” radio button. See the “Current Session Data/View” Controls section earlier in this document for further details on selecting Bin view or Band view.
2. In the “**Data Source**” Controls area, select the data set that you want to display:
 - Data (A): Radio Button that allows you to select Data A = After or post training for comparison as your data set to display.
 - Data (B): Radio Button that allows you to select Data B = Before/Baseline or pre training as your data set to display.
3. In the “**Data Type**” Controls area, click on either the “Raw” or “Z Score” radio button to determine which type of data will display. See the “Current Session Data/Data Type” Controls area in the previous section of this document for further details on selecting Raw or Z Scores.
4. In the “**BA View**” Controls area, click on the Single BA radio button to view only a single Brodmann Area. The default is “None”, meaning no filters.
5. In the “**View Filter**” Controls area, click on Max voxel values, Center voxel Values or the average of values in each Brodmann area.
6. In the “**Highlight Threshold**” Controls area, check either the “Max” checkbox to highlight the rows containing the max voxel coordinates or the “Center” checkbox to highlight the rows containing the center voxel coordinates.
7. Click on the “**Create CSV**” button to save the presented data to a comma delimited file that can be directly read by Excel.

Note: Clicking on any column header in the data display window will reorder the column ascending to descending or descending to ascending.

V. JTFA MENU

JTFA Protocol Selection

BA Pair	Delta	Theta	Alpha1	Alpha2	Beta1	Beta2	Beta3	HBeta
1 L	-1.61	-1.24	-0.86	-0.78	-1.23	-1.36	-1.04	-0.89
2 L	-1.48	-1.18	-0.92	-0.81	-1.22	-1.33	-1.04	-0.81
3 L	-1.57	-1.23	-0.92	-0.81	-1.24	-1.36	-1.08	-0.87
4 L	-1.00	-0.69	-0.74	-0.73	-0.81	-0.89	-0.77	-0.64
5 L	-0.76	-0.90	-0.82	-0.83	-0.98	-0.81	-1.04	-1.02
6 L	-0.88	-0.79	-0.87	-0.89	-1.15	-1.29	-0.89	-0.66
7 L	-0.69	-0.92	-0.82	-0.84	-0.97	-0.83	-1.22	-1.11
8 L	-1.31	-1.10	-1.03	-0.94	-1.19	-1.10	-0.87	-0.71
9 L	-1.38	-1.21	-1.07	-0.97	-1.22	-1.13	-0.92	-0.78
10 L	-0.57	-0.50	-0.47	-0.41	-0.50	-0.59	-0.67	-0.67
11 L	-0.58	-0.53	-0.54	-0.47	-0.55	-0.63	-0.72	-0.68
13 L	-1.20	-0.85	-0.84	-0.86	-0.86	-0.85	-0.76	-0.72
17 L	-1.16	-0.96	-0.55	-0.53	-0.59	-0.81	-1.16	-1.10
18 L	-1.06	-0.84	-0.45	-0.47	-0.69	-1.04	-1.08	-0.88
19 L	-1.29	-1.03	-0.64	-0.63	-0.85	-1.17	-1.09	-0.77
20 L	-1.57	-1.24	-1.00	-0.98	-0.99	-0.91	-0.76	-0.77
21 L	-1.62	-1.47	-1.15	-1.00	-1.00	-0.95	-0.71	-0.81
22 L	-1.81	-1.34	-0.92	-0.84	-0.99	-1.00	-0.73	-0.68
23 L	-1.15	-1.03	-0.62	-0.59	-0.62	-0.80	-1.19	-1.09
24 L	-0.77	-0.64	-0.67	-0.60	-0.63	-0.69	-0.74	-0.69
25 L	-0.75	-0.71	-0.70	-0.62	-0.69	-0.73	-0.76	-0.74
27 L	-0.92	-0.73	-0.43	-0.51	-0.67	-0.91	-0.76	-0.60
28 L	-1.38	-1.02	-0.76	-0.88	-0.94	-0.83	-0.68	-0.66
29 L	-2.08	-1.57	-0.95	-0.85	-1.11	-1.20	-0.84	-0.79
30 L	-0.96	-0.60	-0.37	-0.42	-0.45	-0.68	-0.95	-0.96
31 L	-1.02	-0.80	-0.51	-0.52	-0.51	-0.68	-1.04	-1.05
32 L	-0.50	-0.65	-0.66	-0.57	-0.70	-0.73	-0.73	-0.76
33 L	-1.16	-0.94	-0.68	-0.59	-0.65	-0.77	-1.01	-0.75
34 L	-1.15	-0.82	-0.79	-0.90	-0.84	-0.77	-0.63	-0.61
35 L	-1.09	-0.87	-0.53	-0.68	-0.97	-0.95	-0.69	-0.60

The “JTFA Protocol Selection” window displays the Absolute Power, Coherence and Phase Z Score metrics from either the (A) or (B) .tdt file., depending on what is selected as the “Data Source”. This utility is helpful for both examining the Brodmann Area JTFA metrics for a specific Network, SCL or Custom ROI (region of Interest/area of concern) as well as exploring JTFA changes as a result of training.

To Navigate the “JTFA Protocol Selection” Window:

There are several Controls in the “JTFA Protocol Selection” window that determine which .tdt file (A or B) and associated JTFA data is displayed and saved to your Protocol Report. To select the file and associated data you’d like to view and/or save, do the following:

- In the “**Data Source**” Controls area, select the data set that you want to display:
 - Data (A):** Radio Button that allows you to select Data A = After or post training for comparison as your data set to display.
 - Data (B):** Radio Button that allows you to select Data B = Before/Baseline or pre training as your data set to display.
- Go to the “**Data Type**” Controls area, and select the data set that you want to display:
 - Absolute Power (AP)**
 - Coherence (Coh)**
 - Phase (Pha)**

- In the “ROI” Controls area, click on the appropriate radio button to determine which data is filtered for viewing and/or saving to the “Protocol Report”. Only the Brodmann areas in the selected Network or SCL will be shown.

BA Pair	Delta	Theta	Alpha1	Alpha2	Beta1	Beta2	Beta3	HBeta
1 R - 7 R	1.22	-0.11	-1.10	-0.37	-0.91	-0.35	-0.53	-0.90
2 R - 7 R	1.45	0.39	-0.07	-0.58	-0.20	-0.51	0.05	-0.42
3 R - 7 R	1.53	0.39	-0.21	-0.41	-0.11	-0.28	0.12	-0.36
4 R - 7 R	2.11	0.50	-0.74	-1.07	-0.87	-0.07	-0.97	-1.26
5 R - 7 R	1.72	1.13	0.63	0.38	0.13	0.83	0.57	0.54
6 R - 7 R	1.93	0.08	0.21	-0.30	-0.24	-0.75	-1.46	-1.23
7 R - 8 R	1.34	-0.22	-0.54	-0.81	-0.60	-0.30	-0.08	-1.59
7 R - 9 R	1.31	-0.28	-0.52	-0.79	-0.52	-0.27	-0.08	-1.66
7 R - 10 R	0.67	0.64	-0.70	0.14	0.07	-0.90	-0.90	-0.12
7 R - 11 R	0.94	-0.03	0.12	-0.67	-0.11	-1.38	-0.57	-0.85
7 R - 13 R	1.20	-0.43	-0.28	-0.28	-0.88	0.39	-0.92	-1.58
7 R - 17 R	2.29	0.91	0.51	0.96	1.54	1.00	0.78	0.52
7 R - 18 R	0.50	-0.77	-1.58	-0.90	-1.14	-1.53	-1.66	-1.47
7 R - 19 R	1.02	-0.28	-1.72	-1.08	-1.11	-1.55	-1.56	-1.31
7 R - 20 R	0.92	-0.89	-1.49	-1.03	-0.55	-0.93	-1.30	-1.71
7 R - 21 R	0.99	-0.58	-1.43	-0.84	-0.78	-0.87	-0.87	-1.31
7 R - 22 R	1.16	-0.23	-0.76	-1.00	-0.59	0.00	-1.01	-1.15
7 R - 23 R	2.29	0.93	0.67	1.00	1.52	1.32	1.18	1.31
7 R - 24 R	0.75	-0.28	0.08	-0.60	0.21	-0.85	-0.29	-0.95
7 R - 25 R	0.68	-0.52	0.01	-0.84	-0.10	-1.57	-0.62	-0.99
7 R - 27 R	-0.34	-1.02	-0.77	0.00	0.43	0.91	-0.56	-0.90
7 R - 28 R	0.82	-1.08	-0.72	-0.40	0.24	0.30	-1.40	-1.40
7 R - 29 R	0.31	-1.38	-0.67	-0.56	-0.56	0.54	-0.63	-1.01
7 R - 30 R	0.34	-0.36	0.18	0.69	1.40	1.19	0.78	0.31
7 R - 31 R	2.18	0.80	0.72	1.00	1.40	1.34	1.27	1.49
7 R - 32 R	0.79	0.50	0.03	-0.01	0.58	-0.66	-0.89	-0.77
7 R - 33 R	0.90	-0.92	-0.28	0.00	-0.90	0.17	-1.24	-1.29
7 R - 34 R	0.74	-0.75	-0.61	-0.28	0.41	0.17	-1.06	-1.31
7 R - 35 R	0.20	-0.88	-0.91	-0.69	0.00	0.69	-1.08	-1.41
7 R - 36 R	0.81	-1.19	-0.78	-0.53	0.08	-0.06	-1.40	-1.37

Type	BA_Pair	Metric	Band	Del
Anosognosia - Denial of a Problem				
Anxiety				
Attention Deficits - Easily Distractible				
Auditory Sequencing Problems				
Balance Problems				
Blurred Vision				
Chronic Pain				
Compulsive Behaviors and/or Thoughts				
Concentration Problems				
Decreased Tactile or Skin Sensitivity				
Delusional				
Depression (Sad & Blue)				

Data Source: Data A Data B

Data Type: AP Coh Pha

ROI: All SCL Custom Net

Show only inclusive BA's

Highlight Threshold:

Add 10 / Bottom 10

Reset Threshold

Clear All Selections

Update Protocol Report

Create Custom Protocol

Remove Custom Protocol

Create CSV

The Controls and their functions are as follows:

- Net** - Selects Network view and displays the Brodmann Areas listed in the selected network. The “Top Ten” will select from the BMA’s in the chosen network.
- SCL** - Selects the SCL view and displays the Brodmann Areas listed in the selected SCL as show in the screenshot below. The “Top Ten” will select from the BMA’s in the chosen symptom.
- All** - Returns the presentation to all Brodmann areas. The “Top Ten” will select from All BMA’s.
- Custom** - Displays the Custom Protocols you have created, and will allow you to select the protocol of interest.

Note: When Net or SCL is selected the Add Top / Bottom 10 button disappears. When N/A is selected the Add Top / Bottom 10 button reappears.

- Click on the “Highlight” up or down arrows to set which values get highlighted in the left side window. The values that are less than or equal (\leq) or greater than or equal (\geq) to the threshold value are highlighted. If the value is negative the highlight will be blue. If the value is positive the highlight will be red. See screenshot below.

BA Pair	Delta	Theta	Alpha1	Alpha2	Beta1	Beta2	Beta3	HBeta
1 L	-1.61	-1.24	-0.86	-0.78	-1.23	-1.36	-1.04	-0.89
2 L	-1.48	-1.18	-0.92	-0.81	-1.22	-1.33	-1.04	-0.81
3 L	-1.57	-1.23	-0.92	-0.81	-1.24	-1.36	-1.08	-0.87
4 L	-1.00	-0.69	-0.74	-0.73	-0.81	-0.89	-0.77	-0.64
5 L	-0.76	-0.90	-0.82	-0.83	-0.98	-0.81	-1.04	-1.02
6 L	-0.88	-0.79	-0.87	-0.89	-1.15	-1.29	-0.89	-0.66
7 L	-0.69	-0.92	-0.82	-0.84	-0.97	-0.83	-1.22	-1.11
8 L	-1.31	-1.10	-1.03	-0.94	-1.19	-1.10	-0.87	-0.71
9 L	-1.38	-1.21	-1.07	-0.97	-1.22	-1.13	-0.92	-0.78
10 L	-0.57	-0.50	-0.47	-0.41	-0.50	-0.59	-0.67	-0.67
11 L	-0.58	-0.53	-0.54	-0.47	-0.55	-0.63	-0.72	-0.68
13 L	-1.20	-0.85	-0.84	-0.86	-0.86	-0.85	-0.76	-0.72
17 L	-1.16	-0.96	-0.55	-0.53	-0.59	-0.81	-1.16	-1.10
18 L	-1.06	-0.84	-0.45	-0.47	-0.69	-1.04	-1.08	-0.88
19 L	-1.29	-1.03	-0.64	-0.63	-0.85	-1.17	-1.09	-0.77
20 L	-1.57	-1.24	-1.00	-0.98	-0.99	-0.91	-0.76	-0.77
21 L	-1.62	-1.47	-1.15	-1.00	-1.00	-0.95	-0.71	-0.81
22 L	-1.81	-1.34	-0.92	-0.84	-0.99	-1.00	-0.73	-0.68
23 L	-1.15	-1.03	-0.62	-0.59	-0.62	-0.80	-1.19	-1.09
24 L	-0.77	-0.64	-0.67	-0.60	-0.63	-0.69	-0.74	-0.69
25 L	-0.75	-0.71	-0.70	-0.62	-0.69	-0.73	-0.76	-0.74
27 L	-0.92	-0.73	-0.43	-0.51	-0.67	-0.91	-0.76	-0.60
28 L	-1.38	-1.02	-0.76	-0.88	-0.94	-0.83	-0.68	-0.66
29 L	-2.08	-1.57	-0.95	-0.85	-1.11	-1.20	-0.84	-0.79
30 L	-0.96	-0.60	-0.37	-0.42	-0.45	-0.68	-0.95	-0.96
31 L	-1.02	-0.80	-0.51	-0.52	-0.51	-0.68	-1.04	-1.05
32 L	-0.50	-0.65	-0.66	-0.57	-0.70	-0.73	-0.73	-0.76
33 L	-1.16	-0.94	-0.68	-0.59	-0.65	-0.77	-1.01	-0.75
34 L	-1.15	-0.82	-0.79	-0.90	-0.84	-0.77	-0.63	-0.61
35 L	-1.09	-0.87	-0.53	-0.68	-0.97	-0.95	-0.69	-0.60

Type	BA_Pair	Metric	Band	Del
AP	27 R	-0.35	Alpha1	Del
AP	46 R	-0.36	Alpha2	Del
AP	30 L	-0.37	Alpha1	Del
AP	46 R	-0.39	Alpha1	Del
AP	30 R	-0.39	Alpha1	Del
AP	30 R	-0.40	Beta1	Del
AP	10 L	-0.41	Alpha2	Del
AP	30 R	-0.41	Alpha2	Del
AP	46 R	-0.41	Beta1	Del
AP	30 L	-0.42	Alpha2	Del
AP	41 L	-2.23	Delta	Del
AP	29 L	-2.08	Delta	Del
AP	40 L	-1.99	Delta	Del
AP	43 L	-1.88	Delta	Del
AP	42 L	-1.86	Delta	Del
AP	22 L	-1.81	Delta	Del
AP	41 L	-1.76	Theta	Del
AP	40 R	-1.67	Delta	Del
AP	39 R	-1.67	Beta3	Del
AP	43 R	-1.64	Delta	Del
AP	27 R	-0.35	Alpha1	Del

Data Source: Data A Data B

Data Type: AP Coh Pha

ROI: All SCL Custom Net

Show only inclusive BA's

Highlight Threshold:

5. Click on the “Add Top / Bottom 10” button to populate the “Selection Area” of the window shown in the screenshot above - areas marked in yellow. Either AP, Coh or Pha values will be displayed depending on what is currently selected in the “Data Type” controls. The top highest and lowest values will be listed.

There are several additional options for displaying data in the “Selection Area”:

- a. To add additional values to the list, say you added AP and now you want to add Coh values, go to the “Data Type” Controls area, activate the Coh radio button, and click on the “Add Top / Bottom 10” button. The Coh values will be added to the list. Repeat this step if you also want to add Phase values to the list.
- b. To add additional values to the list once the Top or Bottom Ten are displayed, click on any value in the left side window of the screen and that value will be added to the selection list.
- c. Once any value has been added to the selection list, clicking on the “Del” button will remove it.

Note: The Selection list is accumulative and keeps all values unless cleared or deleted or the window is closed.

6. Notice that there are several buttons on this screen. Their names and functions are as follows:

- **Reset Threshold** - Resets the Highlight threshold values to 2.00 and -2.00.
- **Clear All Selections** - Clears ALL selected values from the selection area.
- **Update Protocol Report** - Copies current selections to the protocol report database. **Note:** Again the selections are accumulative. If you want to add AP,

Coh and Pha to the Protocol Report all at once, don't clear selections until all three have been added.

- **Create Custom Protocol** - Takes the items in the Yellow selection area of the JFTA window and creates a Custom JFTA Protocol that can then be used as a filter to view a custom dataset for a given client. A name prompt allows you to create a unique name for your protocol and saves the metrics you have selected under that name. **Note:** After selecting your custom protocol for viewing, the displayed data will depend on what "Data Type" is selected. See section below.
- **Delete Custom Protocol** – Deletes the Custom Protocol you created from the list.
- **Create CSV** - Copies all of the values shown in the left window to a CSV file which can be read directly by Excel or many other applications.

To Create & Track a Custom JFTA Protocol:

Creating a Custom JFTA Protocol (and Phase Shift/Lock Protocol) is a bit different than creating a Custom FFT Protocol. For FFT, in the "BA Collections Editor" you have the ability to create a Custom Protocol/ROI (Region of Interest) by modifying and/or adding entries into the SCL or Networks database. To track changes between two data sets, you can then use the Variation FFT (B-A) option since the Custom Protocols are stored in the Network or SCL database and available for selection. To track changes between multiple FFT datasets, you would need to create a CSV file for each set for comparison in Excel.

With JFTA and Phase it's a bit different. You create a Custom Protocol/ROI by adding entries into the Custom Protocol list. As a result, they are not a Network or SCL and thus are not listed in the "Variation (B-A)" window. To track JFTA and Phase changes, you create a CSV file which then allows you to then compare multiple data sets in Excel.

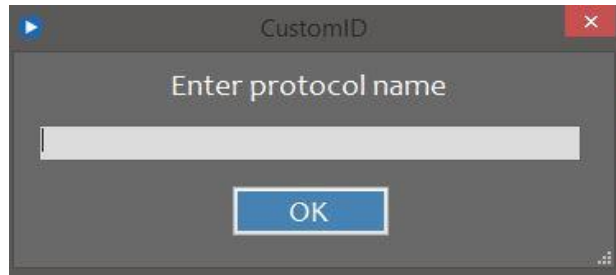
Note: FFT pulls data from the .lor file and JFTA and Phase pulls data from the .tdt files.

To create a custom JFTA Protocol, do the following:

1. In "JFTA Menu" go to "JFTA Protocol Selection" where you will first define the data set.

The screenshot displays the NeuroGuide software interface. On the left is a large table with columns: BA Pair, Delta, Theta, Alpha1, Alpha2, Beta1, Beta2, Beta3, Hbeta, Type, BA_Par, Metric, Band, and Del. The table contains data for various Brodmann Area pairs (e.g., 7 R - 19 R, 7 R - 39 R, etc.) and their corresponding metrics. A yellow box highlights a selection window titled 'Anosognosia - Denial of a Problem' with a list of symptoms including Anxiety, Attention Deficits - Easily Distractible, Auditory Sequencing Problems, Balance Problems, Blurred Vision, Chronic Pain, Compulsive Behaviors and/or Thoughts, Concentration Problems, Decreased Tactile or Skin Sensitivity, Delusional, and Depression (Sad & Blue). To the right of the table are control panels for 'Data Source' (Data A, Data B), 'Data Type' (AP, Coh, Pha), 'ROI' (All, SCL, Net), 'Highlight Threshold' (set to 1.70), and buttons for 'Add 10 / Bottom 10', 'Reset Threshold', 'Clear All Selections', 'Update Protocol Report', 'Create Custom Protocol', 'Remove Custom Protocol', and 'Create CSV'.

2. Select the “Data Source”. **Note:** “A” will pull data from the “.tdt” files imported using either “A – Single” or “Data Source A” during Multi-File import into the LPR. “B” will pull from the B-Set.
3. In the “ROI” control area, select “Net” if you want to view data for Brodmann Areas in a specific Network, “SCL” for Brodmann Areas in a specific symptom or “All” for all Brodmann Areas. For this example we will use “All”.
4. Notice that there are no lists when “All” is selected. If “Net” or “SCL” were selected, the subsequent list would appear to select from.
5. In “Data Type” set it to “AP”. The data will be pulled from the “AP.tdt” file imported into the LPR.
6. Set “Highlight Threshold” to 2.0 and -2.0 or whatever brings in a good set of outliers both negative and positive.
7. Click on the “Add Top 10 / Bottom 10” button to add metrics for AP into the Selection Window. This will give you all the outliers above and below the set threshold.
8. Change the “Data Type” to “Coh” and Repeat Steps 6 and 7. The Coherence data will be appended to the bottom of the Absolute Power data in the “Selection Window”
Change the “Data Type” to “Pha” and Repeat Steps 6 and 7. The Phase data will be appended to the bottom of the Absolute Power and Coherence data in the “Selection Window”
Note – Clicking on any column header will reorder the column and all other columns either by lowest to highest or highest to lowest.
9. Click on “Update Protocol Report” to save your Top 10/Bottom 10 JTFA selections for AbsP, Coh, and Pha to a report that you can then use to create a Custom Protocol in Neuroguide for training.
10. Click on the “Create Custom Protocol” button to capture the AP, Coh and Pha metrics you selected and save them so you can evaluate the changes over time or compare the dataset with other clients. The “Enter protocol name” prompt will appear.



11. Name your JTFA protocol and it will be added to the Protocol database.
12. Once your protocol has been created, select “Custom” in the “ROI” area and your new protocol will be displayed in the list. Select your custom protocol from the list.
13. Click on “Data Type” “AP”. Only the AP data will appear in the left data window. Click on the “Create CSV” button to copy all of the AP values shown in the left window to a CSV file which can be read directly by Excel or many other applications. You can then use Excel to track the data.
14. Repeat Step 14 for “Coh” and “Pha” so you have 3 csv files, one for each AbP, coh, and Pha for tracking.
15. Open your .csv files in Excel and track multiple datasets using the various Excel features.

Important!!!! When upgrading to a new version of the LPR, be sure to use the “BackUp” feature in the “Utilities/Custom Protocol” Menu option to backup your Custom Protocols before upgrading. When done with the upgrade, use the “Restore” feature and your Custom Protocols will be retrieved automatically and appear in your Custom Protocol list. See the “Utilities” section later in this document for details.

Variation JTFA (B-A)

Network

- Addiction
- Anxiety
- Attention - Dorsal
- Attention - Ventral
- Attention - Emotional
- Default Mode
- Executive Function
- Face Object Recognition
- Language
- Memory - Emotion
- Mirror Neuron
- Mood
- Pain
- Pleasure
- Saliency
- Schizophrenia
- Working Memory
- DTI - Frontal Limbic

(N)Addiction

13L, 13R, 24L, 24R, 25L, 25R, 32L, 32R, 34L, 34R, 44L, 44R, 45L, 45R, 46L, 46R, 47L, 47R, IaL, IaR, uSL, uSR

ROI: Net SCL None

Data Type: AP Coh Pha

Change Filter: % Change % Diff Diff (B-A) A B

Filter by Protol Selection

Highlight Threshold:

Create CSV

Location	Delta	Theta	Alpha1	Alpha2	Beta1	Beta2	Beta3	HBeta
13 L	3.64	2.98	1.69	1.81	1.58	0.90	0.30	0.09
13 R	2.42	1.45	0.61	0.61	0.56	0.33	0.28	0.09
24 L	2.79	2.30	1.26	1.33	1.19	0.71	0.33	0.14
24 R	2.78	2.29	1.25	1.31	1.18	0.70	0.33	0.14
25 L	2.69	2.43	1.51	1.49	1.33	0.78	0.39	0.18
25 R	2.67	2.38	1.45	1.43	1.30	0.79	0.43	0.19
32 L	1.76	1.44	0.68	0.59	0.53	0.21	-0.01	-0.03
32 R	1.65	1.28	0.54	0.49	0.44	0.17	-0.02	-0.03
34 L	4.54	4.61	2.74	3.56	3.25	1.72	0.61	0.26
34 R	2.78	1.69	0.68	0.66	0.65	0.45	0.30	0.11
44 L	4.07	4.21	3.54	3.27	2.82	1.67	0.74	0.32
44 R	2.41	1.70	0.81	0.68	0.67	0.44	0.31	0.12
45 L	4.11	4.35	3.90	3.66	3.14	1.88	0.87	0.41
45 R	2.53	1.93	0.99	0.84	0.81	0.52	0.39	0.15
46 L	4.36	5.43	6.43	6.34	5.63	3.25	1.31	0.61
46 R	2.36	1.36	0.56	0.47	0.48	0.36	0.27	0.12
47 L	4.11	4.03	3.21	3.06	2.50	1.42	0.57	0.25
47 R	2.42	1.45	0.64	0.57	0.55	0.37	0.24	0.09

The “Variation JTFA (B - A)” window shows the changes from one session to another relative to the Network or SCL selected. This is done by comparing two different data sets, Data(A) and Data(B). Data(B) is typically the “Before” data set and Data(A) the “After” data set or “Current” data set. Difference, Percentage Change, and Percentage Difference are the available data types to display, with Percentage Change the default.

To Navigate the “Variation JTFA (B-A)” Window:

There are several Controls in the “Variation JTFA (B-A)” window that determine which JTFA data is displayed. To select the data you’d like to view, do the following: **Note:** Data (A) and (B) are predefined as the Data Source here.

1. In the “**Network**” or “**SCL**” list area, select a desired name from the List. **Note:** The “ROI” Controls toggle between Network and SCL and determine which list is displayed here. The data to the right of this section will change accordingly and the list of Brodmann Areas associated with the selected Network or SCL will display below the list.
2. In the “**ROI**” Controls area, click on either the “Network”, “SCL”, or “None” radio button to determine which list is referenced for viewing the data.
3. In the “**Data Source**” Controls area, click on either the “AP”, “Coh” or “Pha” radio button to determine which type of data will display when contrasting JTFA Data B-A.
4. In the “**Contrast**” Controls area, click on the radio button corresponding to the specific data you’d like to display:
 - **% Change** = $((B - A) / A) * 100$ - Represents the relative change between the old value and the new one.
 - **% Difference** = $(A - B / (A+B)/2) * 100$ – The difference between two values divided by the average of the two values. Shown as a percentage.
 - **Diff** = $(B-A)$ – The value of Data(B) - Data(A)
 - A - Displays Data(A) values no modifications.
 - B - Displays Data(B) values no modifications.
5. Check the “**Filter by Protocol Selection**” box if you have made JTFA selections, saved them to the Protocol Report database, and you only want those selections to be shown here. This is useful for tracking changes when using a Data Driven or Fusion Protocol.
6. Click on the “**Highlight threshold**” up or down arrows to set the highlighting of ABS(metrics) above or equal to the threshold value. Red is positive, Blue is negative.
7. Click on the “**Save Current View to CSV**” button to save current view to a comma delimited file that can be directly read by Excel.

VI. PHASE

Phase Protocol Selection

BA Pair	Delta	Theta	Alpha1	Alpha2	Beta1	Beta2	Beta3	HBeta
1 L	-1.61	-1.24	-0.86	-0.78	-1.23	-1.36	-1.04	-0.89
2 L	-1.48	-1.18	-0.92	-0.81	-1.22	-1.33	-1.04	-0.81
3 L	-1.57	-1.23	-0.92	-0.81	-1.24	-1.36	-1.08	-0.87
4 L	-1.00	-0.69	-0.74	-0.73	-0.81	-0.89	-0.77	-0.64
5 L	-0.76	-0.90	-0.82	-0.83	-0.98	-0.81	-1.04	-1.02
6 L	-0.88	-0.79	-0.87	-0.89	-1.15	-1.29	-0.89	-0.66
7 L	-0.69	-0.92	-0.82	-0.84	-0.97	-0.83	-1.22	-1.11
8 L	-1.31	-1.10	-1.03	-0.94	-1.19	-1.10	-0.87	-0.71
9 L	-1.38	-1.21	-1.07	-0.97	-1.22	-1.13	-0.92	-0.78
10 L	-0.57	-0.50	-0.47	-0.41	-0.50	-0.59	-0.67	-0.67
11 L	-0.58	-0.53	-0.54	-0.47	-0.55	-0.63	-0.72	-0.68
13 L	-1.20	-0.85	-0.84	-0.86	-0.86	-0.85	-0.76	-0.72
17 L	-1.16	-0.96	-0.55	-0.53	-0.59	-0.81	-1.16	-1.10
18 L	-1.06	-0.84	-0.45	-0.47	-0.69	-1.04	-1.08	-0.88
19 L	-1.29	-1.03	-0.64	-0.63	-0.85	-1.17	-1.09	-0.77
20 L	-1.57	-1.24	-1.00	-0.98	-0.99	-0.91	-0.76	-0.77
21 L	-1.62	-1.47	-1.15	-1.00	-1.00	-0.95	-0.71	-0.81
22 L	-1.81	-1.34	-0.92	-0.84	-0.99	-1.00	-0.73	-0.68
23 L	-1.15	-1.03	-0.62	-0.59	-0.62	-0.80	-1.19	-1.09
24 L	-0.77	-0.64	-0.67	-0.60	-0.63	-0.69	-0.74	-0.69
25 L	-0.75	-0.71	-0.70	-0.62	-0.69	-0.73	-0.76	-0.74
27 L	-0.92	-0.73	-0.43	-0.51	-0.67	-0.91	-0.76	-0.60
28 L	-1.38	-1.02	-0.76	-0.88	-0.94	-0.83	-0.68	-0.66
29 L	-2.08	-1.57	-0.95	-0.85	-1.11	-1.20	-0.84	-0.79
30 L	-0.96	-0.60	-0.37	-0.42	-0.45	-0.68	-0.95	-0.96
31 L	-1.02	-0.80	-0.51	-0.52	-0.51	-0.68	-1.04	-1.05
32 L	-0.50	-0.65	-0.66	-0.57	-0.70	-0.73	-0.73	-0.76
33 L	-1.16	-0.94	-0.68	-0.59	-0.65	-0.77	-1.01	-0.75
34 L	-1.15	-0.82	-0.79	-0.90	-0.84	-0.77	-0.63	-0.61
35 L	-1.09	-0.87	-0.53	-0.68	-0.97	-0.95	-0.69	-0.60

Type	BA_Pair	Metric	Band	Del
AP	27 R	-0.35	Alpha1	Del
AP	46 R	-0.36	Alpha2	Del
AP	30 L	-0.37	Alpha1	Del
AP	46 R	-0.39	Alpha1	Del
AP	30 R	-0.39	Alpha1	Del
AP	30 R	-0.40	Beta1	Del
AP	10 L	-0.41	Alpha2	Del
AP	30 R	-0.41	Alpha2	Del
AP	46 R	-0.41	Beta1	Del
AP	30 L	-0.42	Alpha2	Del
AP	41 L	-2.23	Delta	Del
AP	29 L	-2.08	Delta	Del
AP	40 L	-1.99	Delta	Del
AP	43 L	-1.88	Delta	Del
AP	42 L	-1.86	Delta	Del
AP	22 L	-1.81	Delta	Del
AP	41 L	-1.76	Theta	Del
AP	40 R	-1.67	Delta	Del
AP	39 R	-1.67	Beta3	Del
AP	43 R	-1.64	Delta	Del
AP	27 R	-0.35	Alpha1	Del

Data Source
 Data A Data B

Data Type
 AP Coh Pha

ROI
 All SCL
 Custom Net

Show only inclusive BA's

Highlight Threshold

Add 10 / Bottom 10

Reset Threshold

Clear All Selections

Update Protocol Report

Create Custom Protocol

Remove Custom Protocol

Create CSV

The “Phase Protocol Selection” window displays the Phase Shift and Phase Lock Z Score metrics from either the (A) or (B) .tdt file., depending on what is selected as the “Data Source”. This utility is helpful for both examining the Brodmann Area Phase metrics for a specific Network, SCL or Custom ROI (region of Interest/area of concern) as well as exploring Phase Shift and Lock changes as a result of training. **Note:** This Protocol Selection is for Phase Shift and Phase Lock only. Phase metrics can be selected and viewed from the “JTFA Protocol Selection” menu.

To Navigate the “Phase Protocol Selection” Window:

There are several Controls in the “Phase Protocol Selection” window that determine which .tdt file (A or B) and associated LORETA Phase data is displayed and saved to your Protocol Report. To select the file and associated data you’d like to view and/or save, do the following:

- In the “**Data Source**” Controls area, click on the radio button corresponding to the specific data you’d like to use:
 - Data (A):** Radio Button that allows you to select Data A = After or post training for comparison as your data set to display.
 - Data (B):** Radio Button that allows you to select Data B = Before/Baseline or pre training as your data set to display.
- Go to the “**Data Type**” Controls area, and select the data set that you want to display:
 - Phase Lock

- Phase Shift
3. In the “**ROI**” Controls area, click on the appropriate radio button to determine which data is filtered for viewing and/or saving to the “Protocol Report”. Only the Brodmann areas in the selected Network or SCL will be shown. The Controls and their functions are as follows:
 - **N/A** = All Brodmann Areas
 - **Net** = The Brodmann Areas listed in the Network Selection
 - **SCL** = The Brodmann Areas listed in the SCL Selection
 - **Custom** - Displays the custom protocols you have created, and will allow you to select the protocol of interest.
 4. Click on the “**Highlight**” up or down arrows to set which values get highlighted in the left side window. The values that are less than or equal (\leq) or greater than or equal (\geq) to the threshold value are highlighted. If the value is negative the highlight will be blue. If the value is positive the highlight will be red.
 5. Click on the “**Add Top / Bottom 10**” button to populate the “Selection Area” of the window shown in the screenshot above - areas marked in yellow. Either AP, Coh or Pha values will be displayed depending on what is currently selected in the “Data Selection Controls”. The top highest and lowest values will be listed.

There are several additional options for displaying data in the “Selection Area”:

- a. To add additional values to the list, say you added AP and now you want to add Coh values, go to the “Data Selection” Controls area, activate the Coh radio button, and click on the “Add Top / Bottom 10 from Data selection”. The Coh values will be added to the list. Repeat this step if you also want to add Phase values to the list.
- b. To add additional values to the list once the Top or Bottom Ten are displayed, click on any value in the left side window of the screen and that value will be added to the selection list.
- c. Once any value has been added to the selection list, clicking on the “Del” button will remove it.

Note: The Selection list is accumulative and keeps all values unless cleared or deleted or the window is closed.

6. There are several buttons on this screen. Their names and functions are as follows:
 - **Reset Threshold** - Resets the Highlight threshold values to 2.00 and -2.00.
 - **Clear All Selections** - Clears ALL selected values from the selection area.
 - **Update Protocol Report** - Copies current selections to the protocol report database. **Note:** Again the selections are accumulative. If you want to add AP, Coh and Pha to the Protocol Report all at once, don’t clear selections until all three have been added.
 - **Create Custom Protocol** - Takes the items in the Selection Window area of the Phase window and creates a Custom Phase Shift or Phase Lock Protocol that can then be used as a filter to view a custom dataset for a given client. A name

prompt allows you to create a unique name for your protocol and saves the metrics you have selected under that name. **Note:** After selecting your custom protocol for viewing, the displayed data will depend on what “Data Type” is selected. See section below.

- **Delete Custom Protocol** – Deletes the Custom Protocol you created from the list.
- **Create CSV** - Copies all of the values shown in the left window to a CSV file which can be read directly by Excel or many other applications.

To Create & Track a Custom Phase Protocol:

Creating a Custom Phase Protocol (and JTFA Protocol) is a bit different than creating a Custom FFT Protocol. For FFT, in the “BA Collections Editor” you have the ability to create a Custom Protocol/ROI (Region of Interest) by modifying and/or adding entries into the SCL or Networks database. To track changes between two data sets, you can then use the Variation FFT (B-A) option since the Custom Protocols are stored in the Network or SCL database and available for selection. To track changes between multiple FFT datasets, however, you would create a CSV file for each set for comparison in Excel.

With Phase and JTFA it’s a bit different. You create a Custom Protocol/ROI by adding entries into the Custom Protocol list. As a result, they are not a Network or SCL and thus are not listed in the “Variation (B-A)” window. To track Phase and JTFA changes, you create a CSV file which then allows you to compare multiple data sets in Excel.

To create a custom Phase Shift or Phase Lock Protocol, do the following:

1. In “Phase Menu” go to “Phase Protocol Selection” where you will first define the data set using the various controls.



The image shows a control panel for configuring a Phase Protocol. It includes several sections with radio buttons and a checkbox:

- Data Source:** Radio buttons for Data A and Data B.
- Data Type:** Radio buttons for Lock and Shift.
- ROI:** Radio buttons for All, Custom, Net, and SCL.
- Show only inclusive BA's:** A checkbox that is currently unchecked.
- Highlight:** Two numeric input fields with up/down arrows. The first field contains '2.00' and the second contains '-2.00'.
- Buttons:** A series of buttons: 'Add Top 10 / Bottom 10', 'Reset Threshold', 'Clear All Selections', 'Update Protocol Report', 'Create Custom Protocol', 'Remove Custom Protocol', and 'Create CSV'.

2. Select the "Data Source". **Note:** "A" will pull data from the ".tdt" files imported using either "A – Single" or "Data Source A" during Multi-File import into the LPR. "B" will pull from the B-Set.
3. In the "ROI" control area, select "Net" if you want to view data for Brodmann Areas in a specific Network, "SCL" for Brodmann Areas in a specific symptom or "All" for all Brodmann Areas. For this example we will use "All".
4. Notice that there are no lists when "All" is selected. If "Net" or "SCL" were selected, the subsequent list would appear to select from.
5. In "Data Type" set it to "Lock". The data will be pulled from the "PhaseLock.tdt" file imported into the LPR.
6. Set "Highlight Threshold" to 2.0 and -2.0 or whatever brings in a good set of outliers both negative and positive.
7. Click on the "Add Top 10 / Bottom 10" button to add metrics for Phase Lock into the Selection Window. This will give you all the outliers above and below the set threshold.
8. Change the "Data Type" to "Shift" and Repeat Steps 6 and 7. The Phase Shift data will be appended to the bottom of the Phase Lock data in the "Selection Window"
Note – Clicking on any column header will reorder the column and all other columns either by lowest to highest or highest to lowest.
9. Click on "Update Protocol Report" to save your Top 10/Bottom 10 Phase selections for Phase Shift and Phase Lock to a report that you can then use to create a Custom Protocol in Neuroguide for training.
10. Click on the "Create Custom Protocol" button to capture the Phase Shift and Lock metrics you selected and save them so you can evaluate the changes over time or compare the dataset with other clients. The "Enter protocol name" prompt will appear.



11. Name your Phase protocol and it will be added to the Protocol database.
12. Once your protocol has been created, select "Custom" in the "ROI" area and your new protocol will be displayed in the list. Select your custom protocol from the list.
13. Click on "Data Type" "Shift". Only the Phase Shift data will appear in the left data window. Click on the "Create CSV" button to copy all of the Phase Shift values shown in the left window to a CSV file which can be read directly by Excel or many other applications. You can then use Excel to track the data.
14. Repeat Step 13 for "Lock" so you have 2 csv files, one for each Phase Shift and Phase Lock for tracking.
15. Open your .csv files in Excel and track multiple datasets using the various Excel features.

Important!!!! When upgrading to a new version of the LPR, be sure to use the “BackUp” feature in the “Utilities/Custom Protocol” Menu option to backup your Custom Protocols before upgrading. When done with the upgrade, use the “Restore” feature and your Custom Protocols will be retrieved automatically and appear in your Custom Protocol list. See the “Utililities” section later in this document for details.

Variation Phase (B-A)

Location	Delta	Theta	Alpha1	Alpha2	Beta1	Beta2	Beta3	HBeta
13 L	3.64	2.98	1.69	1.81	1.58	0.90	0.30	0.09
13 R	2.42	1.45	0.61	0.61	0.56	0.33	0.28	0.09
24 L	2.79	2.30	1.26	1.33	1.19	0.71	0.33	0.14
24 R	2.78	2.29	1.25	1.31	1.18	0.70	0.33	0.14
25 L	2.69	2.43	1.51	1.49	1.33	0.78	0.39	0.18
25 R	2.67	2.38	1.45	1.43	1.30	0.79	0.43	0.19
32 L	1.76	1.44	0.68	0.59	0.53	0.21	-0.01	-0.03
32 R	1.65	1.28	0.54	0.49	0.44	0.17	-0.02	-0.03
34 L	4.54	4.61	2.74	3.56	3.25	1.72	0.61	0.26
34 R	2.78	1.69	0.68	0.66	0.65	0.45	0.30	0.11
44 L	4.07	4.21	3.54	3.27	2.82	1.67	0.74	0.32
44 R	2.41	1.70	0.81	0.68	0.67	0.44	0.31	0.12
45 L	4.11	4.35	3.90	3.66	3.14	1.88	0.87	0.41
45 R	2.53	1.93	0.99	0.84	0.81	0.52	0.39	0.15
46 L	4.36	5.43	6.43	6.34	5.63	3.25	1.31	0.61
46 R	2.36	1.36	0.56	0.47	0.48	0.36	0.27	0.12
47 L	4.11	4.03	3.21	3.06	2.50	1.42	0.57	0.25
47 R	2.42	1.45	0.64	0.57	0.55	0.37	0.24	0.09

The “Variation Phase (B-A)” window shows the changes from one session to another relative to the Network or SCL selected. This is done by comparing two different data sets, Data(A) and Data(B). Data(B) is typically the “Before” data set and Data(A) the “After” data set or “Current” data set. Difference, Percentage Change, and Percentage Difference are the available data types to display, with Percentage Change the default.

To Navigate the “Variation Phase (B-A)” Window:

There are several Controls in the “Variation Phase (B-A)” window that determine which Phase data is displayed. To select the data you’d like to view, do the following: **Note:** Data (A) and (B) are predefined as the Data Source here.

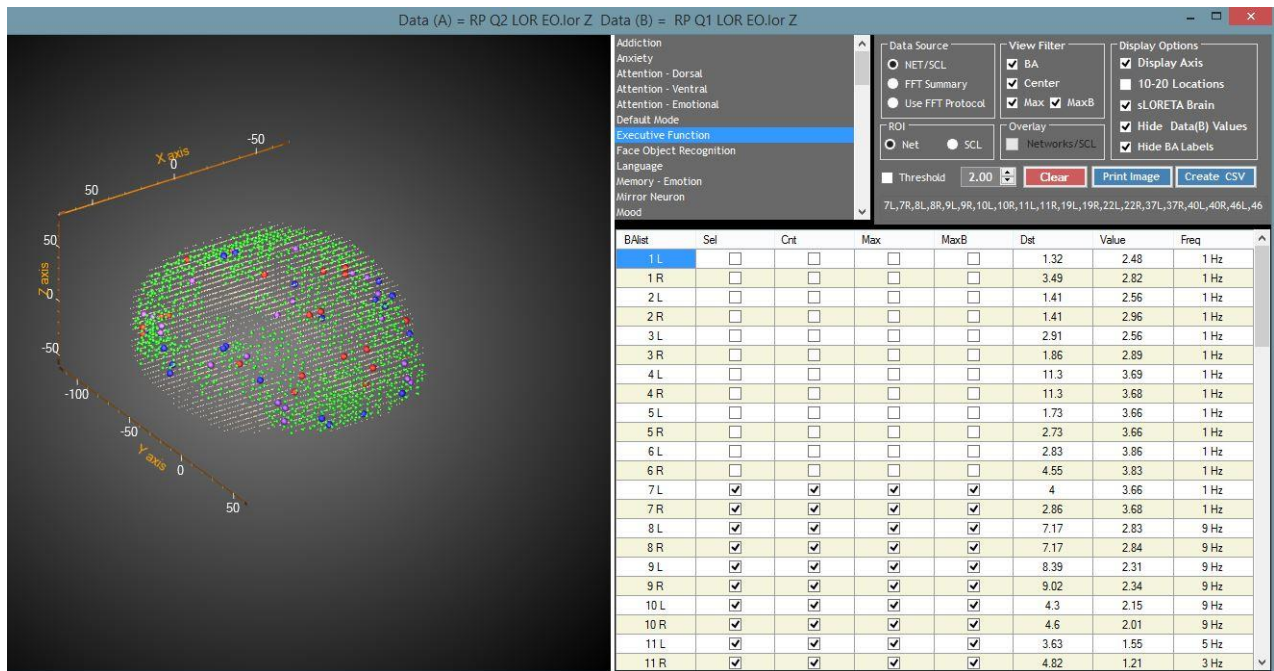
1. In the “**Network**” or “**SCL**” list area, select a desired name from the List. **Note:** The “ROI” Controls toggle between Network and SCL and determine which list is displayed here. The data to the right of this section will change accordingly and the list of Brodmann Areas associated with the selected Network or SCL will display below the list.
2. In the “**ROI**” Controls area, click on either the “Network”, “SCL”, or “None” radio button to determine which list is referenced for viewing the data.
3. In the “**Data Source**” Controls area, click on either the “AP”, “Coh” or “Pha” radio button to determine which type of data will display when contrasting JTFA Data B-A.

4. In the **“Contrast”** Controls area, click on the radio button corresponding to the specific data you’d like to display:
 - % Change = $((B - A) / A) * 100$ - Represents the relative change between the old value and the new one.
 - % Difference = $(A - B / (A+B)/2) * 100$ – The difference between two values divided by the average of the two values. Shown as a percentage.
 - Diff = $(B-A)$ – The value of Data(B) - Data(A)
 - A - Displays Data(A) values no modifications.
 - B - Displays Data(B) values no modifications.
5. Check the **“Filter by Protocol Selection”** box if you have made JTFA selections, saved them to the Protocol Report database, and you only want those selections to be shown here. This is useful for tracking changes when using a Data Driven or Fusion Protocol.
6. Click on the **“Highlight Threshold”** up or down arrows to set the highlighting of ABS(metrics) above or equal to the threshold value. Red is positive, Blue is negative.
7. Click on the **“Create CSV”** button to save current view to a comma delimited file that can be directly read by Excel.

VII. VISUALIZATION

3D Voxel / BA View

The LPR Graphic Viewer is a 3D representation of all of the LORETA coordinates from the KEY Institute database. Each Brodmann Area is selectable and highlights the Area location as well as the maximum and center voxel location.



The Main window shows the sLORETA points in gray by default. When a Brodmann Area is selected the color coding is as follows:

- LORETA points are Green
- Max Data(A) in Red,
- Max Data(B) in Purple
- Center voxel in Blue.

Using the mouse, the graphic is rotatable and the display can be zoomed in and out. Network or SCL may be selected.

To Navigate the “3D Voxel / BA View” Window:

There are several Controls in the “3D Voxel / BA View” window that determine which data is displayed. To select the particular data you’d like to view, do the following:

1. In the “**Network**” or “**SCL**” list area, select a desired name from the List. **Note:** The “ROI” Controls toggle between Network and SCL and determine which list is displayed here. Once a selection from the list has been made, the Brodmann Areas associated with that selection will be checked in the “Sel” column of the table below.

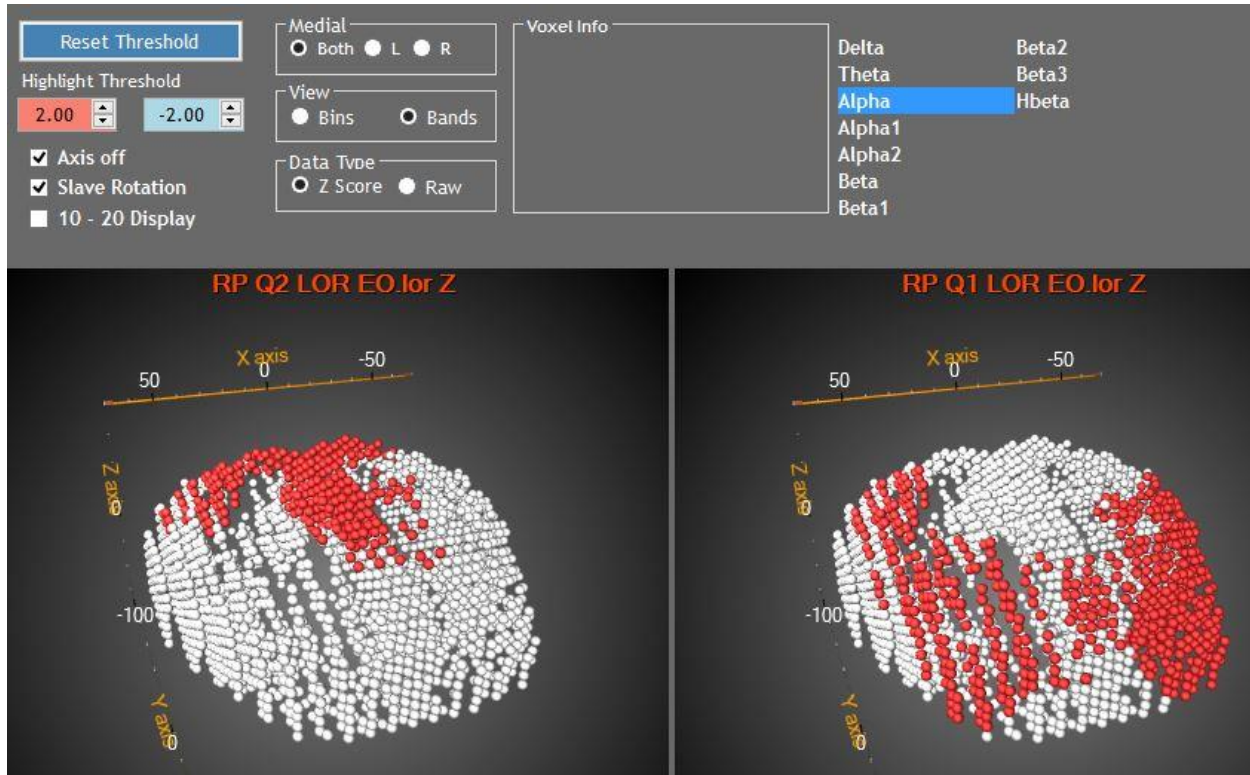
2. In the “**Data Source**” Controls area, click on the radio button corresponding to the specific source of the Brodmann Area data you’d like to display on the 3D Graphic Viewer. **Note:** These radio buttons by themselves will not display data points unless you have one of the “View Filter” options checked as well. See “View Filter” below for more information. The controls in the “Data Source” area and their corresponding functions are as follows:
 - **NET/SCL** – This accesses the Brodmann Areas from either the Network or SCL Predefined list to display as data points.
 - **FFT Summary** – This accesses the BA’s that were selected in the FFT Summary window to display as data points.
 - **Use FFT Protocol** - This accesses the BA’s that were selected and saved in the FFT Protocol Report to display as data points. Using this option along with Max, MaxB and Center is useful for showing change over time.
3. In the “**ROI**” Controls area, click on either the “Net” or “SCL” radio button to determine which list is displayed for selection. Only the Brodmann areas listed in the Network or SCL description will be shown as follows:
 - **Net** - Allows the selection of networks and uses the list of Brodmann areas associated with the selected network for display.
 - **SCL** - Allows the selection of SCL items and uses the list of Brodmann areas associated with the selected SCL for display.
4. In the “**View Filter**” area select which data points you’d like to view in the 3D Graphic Viewer for the “Data Source” you selected and its associated Brodmann areas. The Controls in the “View Filter” area and their corresponding functions are as follows:
 - **BA** – If checked displays all the Brodmann areas in Green.
 - **Center** - If checked displays the Center voxel location in Blue.
 - **Max** – If checked displays the most deviant voxel for the Brodmann location in Data (A) in Red.
 - **MaxB** – If checked displays the most deviant voxel for the Brodmann location in Data (B) in Purple.

For example: if you choose “Default Mode” and select the “BA” and “Center” radio buttons from the “View Filter” Controls area, all of the voxels that represent the BA’s for “Default Mode” will turn Green in the 3D Graphic Viewer and all the Center voxels for the same BA’s will turn Blue.
5. Go to the “Display Options” area of the window. There are several checkboxes that control what you see in the 3D Graphic Viewer. The available check boxes and their functions are as follows:
 - **Display Axis** - Axis lines can be made visible or invisible. The default is visible.
 - **10-20 Locations** - Displays the 10-20 locations. The default is invisible.
 - **sLORETA Brain** - Displays the sLORETA voxels as gray points: The default is on.
 - **Hide Data(B) Values** - When checked hides the Data(B) values from the display.
 - **Hide BA Labels** – Hides the Brodmann area label.

6. Notice that there are several additional Radio Buttons and/or Checkboxes in the window. Their names and functions are as follows:
 - **“Overlay”** - When checked, this allows the overlay of any network or SCL over the FFT Summary or the FFT protocol selections. The overlay voxels that represent the SCL or network will be displayed in yellow. **Note:** When NET/SCL is checked this option is disabled.
 - **Use FFT Protocol** - This displays the BA’s that were saved in the FFT protocol report. Using this option along with Max, MaxB and Center is useful for showing change over time.
 - **Clear** - This button clears and resets the display.
 - **Print Image** – Allows the printing of the plot image.
7. Click on the **“Create CSV”** button to save current view to a comma delimited file that can be directly read by Excel.
8. The **Data Display** area contains the selected data source in a table format. The columns in the table and their descriptions are as follows:
 - **BAlist** - This is the list of the 88 Brodmann areas represented in NeuroGuide.
 - **Sel** - If checked, displays the Brodmann area in green on the 3D display.
 - **Cnt** - If checked, displays the center voxel location for that Brodmann area in Blue. The center voxel location is the location selected by NeuroGuide.
 - **Max** - If selected, displays the location of the most deviant voxel value (positive or negative) for that Brodmann area in red.
 - **MaxB** - If selected, displays the location of the most deviant voxel value (positive or negative) for that Brodmann area in purple.
 - **Dst** - The distance in voxels from the center voxel to the max voxel for that Brodmann area.
 - **DstB** - The distance in voxels from the center voxel to the maxB voxel for that Brodmann area.
 - **Value** - The maximum value or most deviant voxel value for that Brodmann area.
 - **ValueB** - The maximum value or most deviant voxel value for MaxB for that Brodmann area.
 - **Freq** - The frequency where the maximum value was found for that Brodmann area.
 - **FreqB** - The frequency where the maximum value ValueB was found for that Brodmann area.

Note: The Value and Freq may be different than the FFT display as this display is finding the most deviant value for that specific Brodmann area and the frequency it belongs to. Each BA has multiple entries in the database. Each entry is a talairach coordinate and a group of talairach coordinates describes a BA. For example, if you take all of the entries for BA1 L you have 3 coordinates each with 30 frequencies, of those 90 metrics what is the maximum value for frequency 1, frequency 2, etc. The FFT display shows the most deviant value for each frequency and then Brodmann area it belongs to.

Variation 3D



“Variation 3D” shows the changes in LORETA voxel values from Session B to Session A, where B is “Before” and A is “After”. The data is presented either in single frequency Bins or in Bands, and the image may be both rotated and zoomed. Clicking on a voxel in either display will present that voxel’s information in the top center within the “Voxel Info” box. **Note:** All data is FFT only.

To Navigate the “Variation 3D Window:

There are several Controls in the “Variation 3D” window that determine which data is displayed. To select the particular data you’d like to view, do the following:

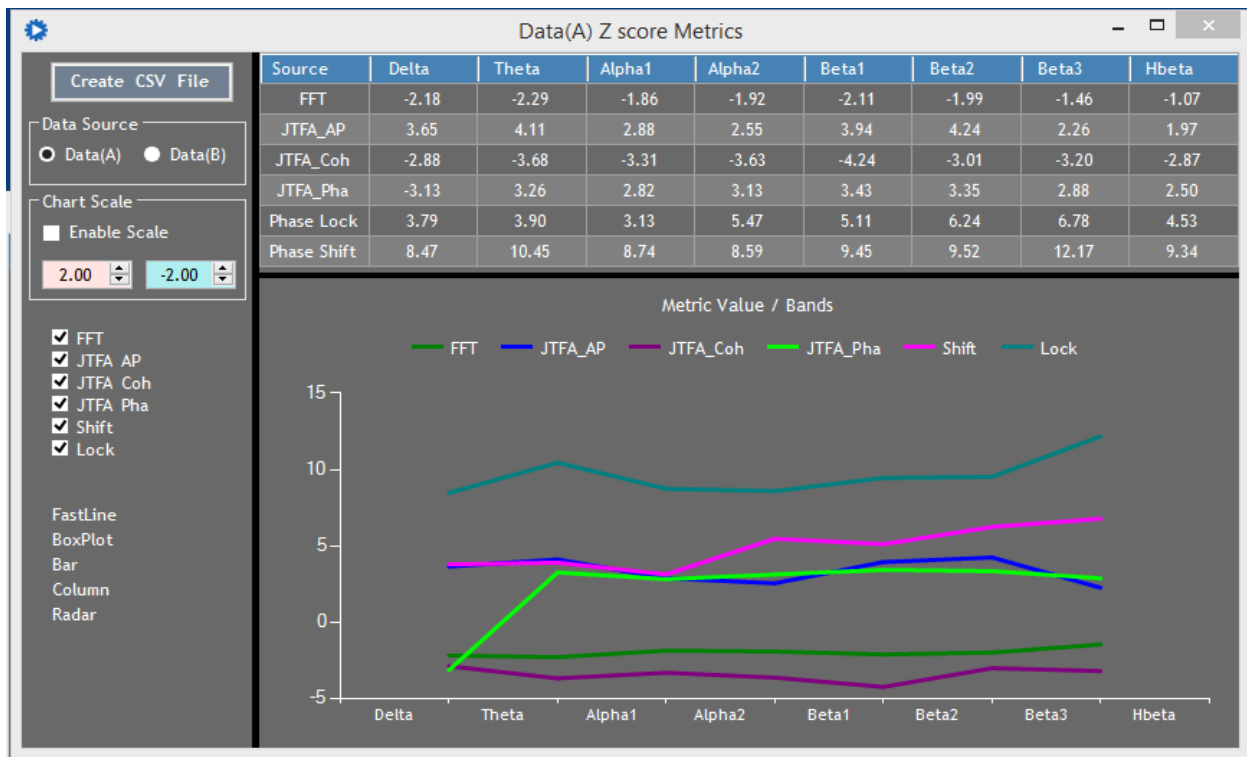
1. In the “**Data Type**” Controls area, click on either the “Raw” or “Z Score” radio button to select either:
 - **Z Score** – Will use Z Score FFT values for Data (A) and Data (B).
 - **Raw** – Will use Raw FFT values for Data (A) and Data (B).

See the “FFT/Current Session Data/Data Type” Controls description earlier in this document for further details on selecting Raw or Z Scores.

2. In the “**View**” Controls area, click on either the:
 - **Bin** radio button to list and select single 1Hz frequency bins to display and contrast, or
 - **Band** radio button to list and select full frequency bands to display and contrast. See the “FFT/Current Session Data/View” Controls description earlier this document for further details on selecting Bin view or Band view.

- In the “**Medial**” Controls area select which hemisphere you’d like to view in the 3D Graphic Viewer:
 - **Both** - Displays left and right hemispheres.
 - **L** – Displays only the left hemisphere.
 - **R** – Displays only the right hemisphere.
- Notice that there are several Checkboxes in the window. Their functions are as follows:
 - **Axis On /Off** - Turns on or off the axis lines.
 - **Slave Rotation** – Both displays are synchronized for zoom and rotation.
 - **10 – 20 Display** - Turns on or off the 10 - 20 labels.
- Click on the up or down arrows to set the highlighting of ABS(metrics) above or equal to the threshold value. Red is positive, Blue is negative. **Reset Threshold** - Resets the values of the upper and lower threshold to 2.00 and -2.00.

Metrics Summary



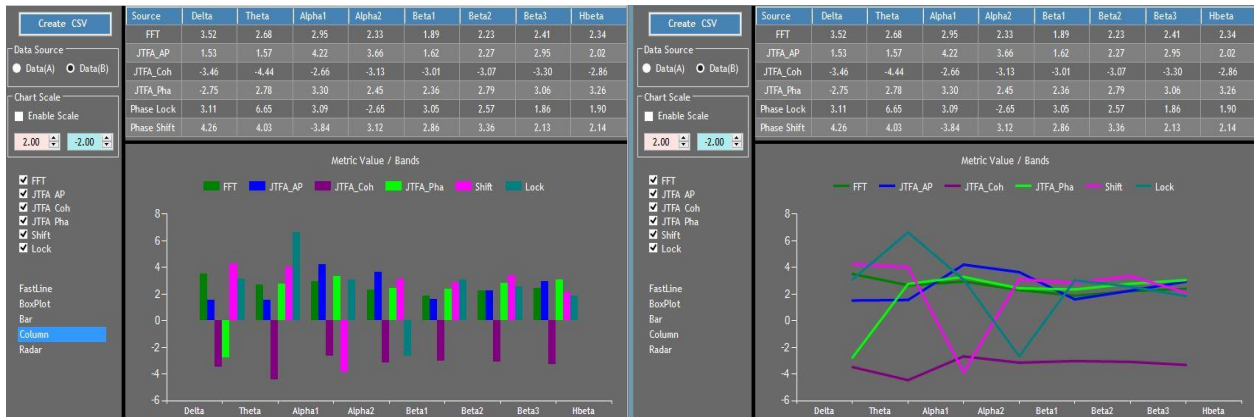
Metrics summary simply takes all the data from FFT, JTFA and LORETA Phase and displays the most deviant Z Score values for each band. This was created to examine the relationships between the different data sets. For example: How does FFT relate to JTFA AP from a most deviant voxel perspective.

To Navigate the “Metrics Summary” Window:

There are several Controls available for viewing the “Metrics Summary”. The specific radio buttons and their corresponding functions are as follows:

- **Create CSV** - Copies all of the values shown to a CSV file which can be read directly by Excel or many other applications.
- **Data Source** - Selects data set A or B for presentation.
- **Chart Scale** - Allows adjustment of the chart scale for comparison.

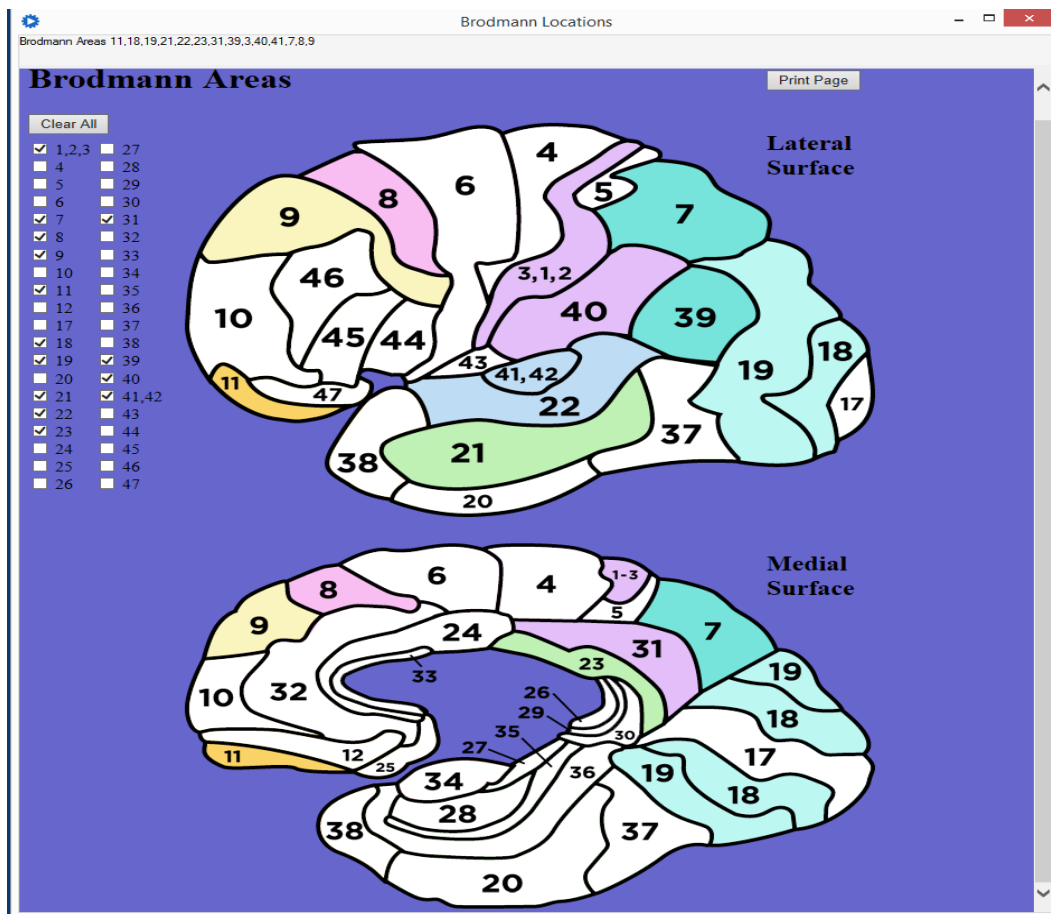
Note: This application allows you to open multiple windows for side by side comparison.



- **Check Boxes** - (FFT ... Lock) If checked the data source (series) is visible if not checked the data source is not shown.
- **Graph Types** - Changes the graphical presentation.

Note: When using the “Radar” chart, select another chart type then reselect “Radar” after modifying the check boxes.

2D Brodmann Map



The Brodmann Map displays the locations of the FFT selected Brodmann areas in a 2D graphic.

To Navigate the "2D Brodmann Map":

There are a few Controls available for viewing the "2D Brodmann Map". The specific Controls and their corresponding functions are as follows:

- **Check Boxes** - Clicking on a specific Check Box and Corresponding Brodmann area highlights or un-highlights the area in the 2D Brodmann Map. By default, the areas are highlighted by the selected BA's displayed in the FFT summary application for Data(A).
- **Clear All** - Clears all selections.
- **Print Page** - Sends the current view to the printer.

Note: This is a web application and will not work without an internet connection.

VIII. REPORTS

Protocol Report

Selected Protocol Summary Report 8/9/2016 2:04:21 PM

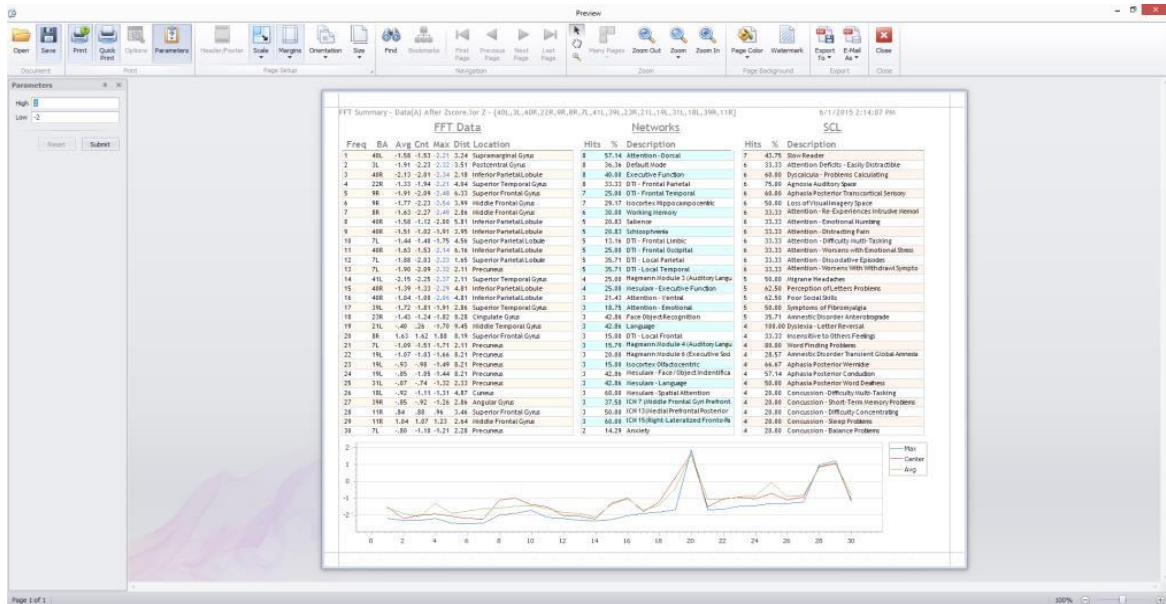
FFT			JTFA AP			JTFA Coh			JTFA Pha			LORETA Phase Lock			LORETA Phase Shift		
BA	Band	Value	Band	BA	Value	Band	BA	Value	Band	BA	Value	Band	BA Pair	Value	Band	BA Pair	Value
6 L	Delta	3.86	Beta2	2 L	4.24	Theta	8 R - 23 R	3.67	Beta1	4 R - 37 R	3.43	Alpha1	44 R - 45 R	-2.60	Alpha2	2 R - 3 R	-1.39
19 R	Delta	3.61	Theta	2 L	4.11	Theta	9 R - 23 R	3.52	Beta2	37 R - 41 R	3.35	Alpha2	2 R - 3 R	-2.69	Alpha2	11 L - 24 L	-0.74
19 R	Delta	3.36	Beta2	3 L	4.00	Theta	8 R - 31 R	3.50	Theta	23 R - 42 R	3.26	Beta1	2 R - 3 R	-3.53	Beta2	2 R - 3 R	-1.64
19 R	Delta	3.32	Theta	1 L	3.95	Theta	9 R - 31 R	3.40	Beta2	13 R - 37 R	3.21	Beta1	2 L - 3 L	-2.55	Beta2	33 L - 33 R	-1.16
19 R	Theta	3.18	Beta1	2 L	3.94	Theta	8 R - 17 R	3.26	Theta	23 R - 43 R	3.15	Beta2	1 L - 42 L	6.24	Beta2	2 R - 6 R	-0.78
19 R	Theta	2.86	Theta	3 L	3.91	Theta	9 R - 17 R	3.15	Beta1	37 R - 41 R	3.15	Beta2	1 L - 29 L	6.21	Beta2	28 L - Amy L	-0.58
7 R	Theta	2.59	Theta	18 R	3.79	Theta	2 R - 35 R	3.01	Alpha2	13 R - 35 R	3.13	Beta2	1 L - 43 L	6.06	Beta2	2 L - 3 L	-0.37
40 R	Theta	2.80	Beta1	3 L	3.79	Theta	3 R - 35 R	2.98	Beta1	13 R - 37 R	3.07	Beta2	1 L - 41 L	6.03	Beta3	1 L - 43 L	12.17
6 L	Alpha2	3.33	Delta	30 R	3.65	Theta	6 L - 8 L	2.83	Theta	23 R - 41 R	3.06	Beta2	4 L - 45 L	5.94	Beta3	1 L - 42 L	11.80
6 L	Alpha2	3.11	Delta	30 L	3.58	Theta	7 R - 27 R	2.82	Theta	17 R - 42 R	2.97	Beta2	33 L - 33 R	-2.65	Beta3	1 L - 41 L	11.72
7 L	Alpha2	2.13	Hbeta	11 R	-0.54	Beta1	13 R - 35 R	-4.24	Delta	6 L - 8 L	-3.13	Beta3	1 L - 43 L	6.78	Beta3	32 L - 33 L	9.94
6 R	Beta1	2.01	Hbeta	11 L	-0.54	Theta	13 R - Hip R	-3.68	Delta	6 L - 9 L	-3.10	Beta3	1 L - 41 L	6.34	Beta3	41 L - 44 L	9.64
7 R	Beta2	2.08	Hbeta	25 R	-0.53	Alpha2	13 R - Hip R	-3.63	Theta	6 L - 9 L	-2.73	Beta3	1 L - 42 L	6.28	Beta3	2 R - 3 R	-0.42
7 R	Beta2	2.40	Hbeta	25 L	-0.53	Theta	13 R - 28 R	-3.58	Theta	6 L - 8 L	-2.71	Beta3	1 L - 29 L	6.27	Hbeta	2 R - 3 R	-0.36
7 R	Beta2	2.69	Hbeta	24 R	-0.53	Alpha2	13 R - 35 R	-3.57	Delta	4 L - 6 L	-2.34	Beta3	1 L - 40 L	6.20	Theta	31 R - 39 R	10.45
7 R	Beta3	3.07	Hbeta	24 L	-0.53	Theta	13 R - Amy R	-3.57	Alpha1	8 L - 9 L	-2.32	Beta3	3 R - 6 R	-2.88	Theta	37 R - 39 R	10.31
7 R	Beta3	3.01	Hbeta	32 R	-0.51	Theta	13 R - 34 R	-3.55	Theta	8 L - 9 L	-2.28	Beta3	8 R - 9 R	-2.64	Theta	31 R - 37 R	9.88
7 R	Beta3	2.54	Hbeta	10 L	-0.51	Alpha2	13 R - 28 R	-3.46	Theta	4 L - 6 L	-2.21	Hbeta	3 R - 24 R	-2.56	Theta	19 R - 31 R	9.84
7 L	Beta3	2.10	Hbeta	10 R	-0.50	Alpha2	13 R - Amy R	-3.46	Alpha1	8 R - 9 R	-2.17	Hbeta	3 R - 25 R	-2.53	Theta	6 R - 39 R	9.82
7 L	Beta3	2.09	Hbeta	32 L	-0.50	Beta1	13 R - Hip R	-3.45	Theta	8 R - 9 R	-2.12	Hbeta	2 R - 3 R	-2.52	Theta	24 L - 24 R	-1.01
7 L	Beta3	2.01															
7 L	Hbeta	2.36															
7 L	Hbeta	2.68															
7 R	Hbeta	2.94															
7 L	Hbeta	2.21															

The "Protocol Report" prints a one page document that contains all of the protocol selections made from the following LPR Menu Bar and Window Options:

- FFT
 - a) "FFT Summary"
 - b) "Update Protocol Report" Button
- JTFA
 - a) "JTFA Protocol Selection"
 - b) "Add Top 10 / Bottom 10" Button for either "AbsP", "Coh", and/or "Pha" Radio Button Selections
 - c) "Update Protocol Report" Button
- Phase
 - a) "Phase Protocol Selection"
 - b) "Add Top 10 / Bottom 10" Button for either "Lock" and/or "Shift" Radio Button Selections
 - c) "Update Protocol Report" Button

The report may be printed or saved to several different formats such as pdf and bitmap. You can also add a watermark of your own in text or picture.

A - FFT Report and B - FFT Report



These reports display the same data as the “FFT” Menu / “FFT Summary” option. “A - FFT Report” shows Data(A) values and “B - FFT Report” shows Data(B) values.

To Navigate the “A - FFT Report” and/or “B - FFT Report”

There are several Controls in the “A - FFT Report” window that determine which data is displayed. To view your data do the following: **Note:** The step-by-step instructions below apply to generating “B - FFT Report” as well.

1. Go to “Reports” on the Main Menu Bar and select “A - FFT Report”. Notice that once the Report is selected, the “Preview” window will appear with “The document does not contain any pages” written in the middle of the screen.
2. Go to the “Parameters” Control Area in the upper left corner of the Window and Click on the up or down arrows to set the Max high and low values to highlight when the data is displayed. The default is set at 2 and -2.
3. Click on the “Submit” button to apply the values you have selected, and the “FFT Report Current(A) Report with the highlighted Max values will appear on the screen.
4. Repeat Steps 1 – 3 for “FFT Report Previous(B)” to generate a Report using Data (B) values.

The highlighted values may be changed and updated anytime. Simply adjust the up down arrows and then click on the “Submit Button” which will either apply or re-apply the highlights for the High and Low Max values based on your selection. An additional Control and its function is as follows:

- **Reset** - Resets the High and Low values to 2 and -2.

Network / SCL “Hits” Report

Data(A) Data(B) Raw Data(A) Raw Data(B) Print / Export Networks Print / Export SCL

Hits	%	Network	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17
6	42.86	Attention - Dorsal	6L*	6R*	7L*	7R*	8L	8R	9L	9R	19L	19R*	39L	39R	40L	40R*			
5	62.50	ICN 7 (Middle Frontal Gyri Prefrontal & Parietal Gyri)	6L*	6R*	7L*	7R*	40L	40R*	46L	46R									
4	28.57	Anxiety	4L	4R	6L*	6R*	7L*	7R*	10L	10R	13L	13R	21L	21R	laL	laR			
4	18.18	Default Mode	2L	2R	7L*	7R*	10L	10R	11L	11R	19L	19R*	29L	29R	30L	30R	31L	31R	35L
4	20.00	Executive Function	7L*	7R*	8L	8R	9L	9R	10L	10R	11L	11R	19L	19R*	22L	22R	37L	37R	40L
4	22.22	Mirror Neuron	1L	1R	5L*	5R	6L*	6R*	13L	13R	27L	27R	40L	40R*	44L	44R	45L	45R	46L
4	16.67	DTI - Frontal Parietal	1L	1R	2L	2R	3L	3R	5L*	5R	7L*	7R*	8L	8R	9L	9R	10L	10R	39L
4	28.57	DTI - Local Parietal	1L	1R	2L	2R	3L	3R	5L*	5R	7L*	7R*	19L	19R*	39L	39R			
3	15.00	Working Memory	7L*	7R*	8L	8R	9L	9R	24L	24R	30L	30R	31L	31R	32L	32R	33L	33R	40L
3	10.71	DTI - Frontal Temporal	4L	4R	6L*	6R*	8L	8R	9L	9R	10L	10R	20L	20R	21L	21R	22L	22R	38L
3	12.50	Isocortex Hippocampocentric	7L*	7R*	8L	8R	9L	9R	10L	10R	19L	19R*	20L	20R	21L	21R	22L	22R	31L
3	18.75	Mesulam - Executive Function	5L*	5R	7L*	7R*	8L	8R	9L	9R	10L	10R	11L	11R	46L	46R	47L	47R	
3	75.00	ICN 9 (Superior & Posterior Parietal Lobule)	5L*	5R	7L*	7R*													
2	10.00	DTI - Local Frontal	4L	4R	6L*	6R*	8L	8R	9L	9R	10L	10R	11L	11R	44L	44R	45L	45R	46L
2	10.53	Hagmann Module 4 (Auditory Language Memory)	1R	2R	3R	4R	6R*	20R	21R	22R	27R	28R	34R	35R	36R	37R	38R	39R	40R*
2	40.00	Mesulam - Spatial Attention	6R*	7R*	8R	9R	39R												
2	20.00	ICN3 (Bilateral BG and Thalamus)	3L	3R	4L	4R	6L*	6R*	24L	24R	32L	32R							

Hits	%	SCL	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17
4	40.00	Dyscalculia - Problems Calculating	7L*	7R*	19L	19R*	30L	30R	39L	39R	40L	40R*							
4	40.00	Symptoms of Fibromyalgia	5L*	5R	7L*	7R*	13L	13R	39L	39R	40L	40R*							
3	60.00	Anosognosia - Denial of a Problem	7R*	18R	19R*	39R	40R*												
3	16.67	Attention Deficits - Easily Distractible	7L*	7R*	8L	8R	9L	9R	24L	24R	30L	30R	31L	31R	32L	32R	33L	33R	40L
3	75.00	Decreased Tactile or Skin Sensitivity	5L*	5R	7L*	7R*													
3	60.00	Insensitive to Others Emotional Expressions	7R*	19R*	38R	39R	40R*												
3	37.50	Agnosia Auditory Space	7L*	7R*	39L	39R	40L	40R*	41L	41R									
3	30.00	Agnosia Somatosensory Finger	1L	1R	2L	2R	3L	3R	5L*	5R	7L*	7R*							
3	37.50	Agnosia Somatosensory Right Hemiplegia	1L	2L	3L	4L	5L*	6L*	7L*	8L									
3	60.00	Agnosia Visual Acromatopsia	7R*	18R	19R*	39R	40R*												
3	21.43	Amnesic Disorder Anterograde	7L*	7R*	17L	17R	18L	18R	19L	19R*	27L	27R	30L	30R	39L	39R			
3	30.00	Aphasia Posterior Transcortical Sensory	7L*	7R*	22L	22R	37L	37R	39L	39R	40L	40R*							
3	16.67	Apraxia Motor Gait- Trunk	1L	1R	2L	2R	3L	3R	4L	4R	5L*	5R	6L*	6R*	8L	8R	9L	9R	10L
3	60.00	Apraxia Visual Topographic	7R*	19R*	37R	39R	40R*												
3	75.00	Disturbances Visual-Spatial Disorientation	7R*	19R*	37R	40R*													
3	50.00	Disturbances Visual-Spatial Topographic Apraxia	7R*	19R*	23R	30R	37R	40R*											
3	25.00	Loss of Visual Imagery Space	7L*	7R*	17L	17R	18L	18R	19L	19R*	31L	31R	39L	39R					

The “Network / SCL Hits Report” displays the data that was selected and calculated in order to produce the actual number of “Hits” that gets sorted and displayed in the “Hits” column in the “FFT Summary” window - “SCL/Network Match Descriptions” sections. This Report is also useful to get a “birds’-eye” view of the overall scope of the Brodmann Areas affecting multiple Networks or SCL.

To Navigate the “Network / SCL Hits Report”:

There are a few Controls available for viewing the “Network/SCL Hits Report”. The specific Controls and their corresponding functions are as follows:

- **Data(A), Data(B), Raw Data(A), Raw Data(B)** - Selects the Data Source to display. The highlighted background with addition of an asterisk indicates a hit for the BA in the list corresponding to the Network or the SCL.
- **Print / Export Networks, Print / Export SCL** - Presents a Print Preview of the report that may be saved or printed.

IX. UTILITIES

BA Collections Editor

Description:

Selected BA Locations:
13L 13R 24L 24R 25L 25R 32L 32R 34L 34R 44L 44R 45L 45R 46L 46R 47L 47R laL laR usL usR

ROI
 Network SCL

Controls

Addiction	<input type="checkbox"/>	1L	<input type="checkbox"/>	11L	<input checked="" type="checkbox"/>	25L	<input type="checkbox"/>	36L	<input checked="" type="checkbox"/>	46L
Anxiety	<input type="checkbox"/>	1R	<input type="checkbox"/>	11R	<input checked="" type="checkbox"/>	25R	<input type="checkbox"/>	36R	<input checked="" type="checkbox"/>	46R
Attention - Dorsal	<input type="checkbox"/>	2L	<input checked="" type="checkbox"/>	13L	<input type="checkbox"/>	27L	<input type="checkbox"/>	37L	<input checked="" type="checkbox"/>	47L
Attention - Emotional	<input type="checkbox"/>	2R	<input checked="" type="checkbox"/>	13R	<input type="checkbox"/>	27R	<input type="checkbox"/>	37R	<input checked="" type="checkbox"/>	47R
Attention - Ventral	<input type="checkbox"/>	3L	<input type="checkbox"/>	17L	<input type="checkbox"/>	28L	<input type="checkbox"/>	38L	<input checked="" type="checkbox"/>	laL
DTI - Frontal Limbic	<input type="checkbox"/>	3R	<input type="checkbox"/>	17R	<input type="checkbox"/>	28R	<input type="checkbox"/>	38R	<input checked="" type="checkbox"/>	laR
DTI - Frontal Occipital	<input type="checkbox"/>	4L	<input type="checkbox"/>	18L	<input type="checkbox"/>	29L	<input type="checkbox"/>	39L	<input checked="" type="checkbox"/>	usL
DTI - Frontal Parietal	<input type="checkbox"/>	4R	<input type="checkbox"/>	18R	<input type="checkbox"/>	29R	<input type="checkbox"/>	39R	<input checked="" type="checkbox"/>	usR
DTI - Frontal Temporal	<input type="checkbox"/>	5L	<input type="checkbox"/>	19L	<input type="checkbox"/>	30L	<input type="checkbox"/>	40L	<input type="checkbox"/>	
DTI - Local Frontal	<input type="checkbox"/>	5R	<input type="checkbox"/>	19R	<input type="checkbox"/>	30R	<input type="checkbox"/>	40R	<input type="checkbox"/>	
DTI - Local Limbic	<input type="checkbox"/>	6L	<input type="checkbox"/>	20L	<input type="checkbox"/>	31L	<input type="checkbox"/>	41L	<input type="checkbox"/>	
DTI - Local Occipital	<input type="checkbox"/>	6R	<input type="checkbox"/>	20R	<input type="checkbox"/>	31R	<input type="checkbox"/>	41R	<input type="checkbox"/>	
DTI - Local Parietal	<input type="checkbox"/>	7L	<input type="checkbox"/>	21L	<input checked="" type="checkbox"/>	32L	<input type="checkbox"/>	42L	<input type="checkbox"/>	
DTI - Local Temporal	<input type="checkbox"/>	7R	<input type="checkbox"/>	21R	<input checked="" type="checkbox"/>	32R	<input type="checkbox"/>	42R	<input type="checkbox"/>	
Default Mode	<input type="checkbox"/>	8L	<input type="checkbox"/>	22L	<input type="checkbox"/>	33L	<input type="checkbox"/>	43L	<input type="checkbox"/>	
Executive Function	<input type="checkbox"/>	8R	<input type="checkbox"/>	22R	<input type="checkbox"/>	33R	<input type="checkbox"/>	43R	<input type="checkbox"/>	
Face Object Recognition	<input type="checkbox"/>	9L	<input type="checkbox"/>	23L	<input checked="" type="checkbox"/>	34L	<input checked="" type="checkbox"/>	44L	<input type="checkbox"/>	
Hagmann Module 1 (Vision)	<input type="checkbox"/>	9R	<input type="checkbox"/>	23R	<input checked="" type="checkbox"/>	34R	<input checked="" type="checkbox"/>	44R	<input type="checkbox"/>	
	<input type="checkbox"/>	10L	<input checked="" type="checkbox"/>	24L	<input type="checkbox"/>	35L	<input checked="" type="checkbox"/>	45L	<input type="checkbox"/>	
	<input type="checkbox"/>	10R	<input checked="" type="checkbox"/>	24R	<input type="checkbox"/>	35R	<input checked="" type="checkbox"/>	45R	<input type="checkbox"/>	

The “BA Collections Editor” gives you the ability to modify and/or add entries into the SCL and Networks database. This is especially useful for creating and tracking custom protocols or ROI’s (Regions of Interest) for a specific client. It is also useful for keeping up to date with the latest configurations of Brodmann areas.

To Navigate the “BA Collections Editor”:

The specific instructions to either Add, Delete, Modify, or Restore Brodmann Areas/Custom FFT Protocols to a Network or SCL are as follows:

To Add / Create a Custom FFT Protocol:

Use this option to create and track an FFT Custom Protocol (ROI) using specific Brodmann areas that the FFT Summary says are abnormal for a specific client. To prepare;

1. Got to “FFT Menu/Summary” and make your selections. See “FFT Menu/Summary” section earlier in this document for details.
2. Click on the “Update Protocol Report button” and your selections will be saved to a report.
3. Go to “Report” menu “Protocol Report” and the FFT column of the report will be populated with your selections. Click on the “Export” dropdown and save your report to

pdf or whatever format works best for you. This will allow you to either view or print your selections while creating your custom protocol report. .

To Create your custom protocol:

1. In the “BA Collections Editor” select SCL or Network depending on which list you want to add the custom protocol to.
2. Click on the “Add New” button and all checkboxes will automatically clear.
3. Enter a Description which gives it a name.
4. Check the Brodmann areas designated in the FFT column of the Protocol Report. **Note:** Clicking again on a checked box will remove the selection.
5. Click on the “Add” button and your custom protocol with selected Brodmann areas for a specific client will be added to the list for tracking. **Note:** For details on tracking changes using the Custom Protocol go to “FFT/Variations FFT (B-A)” earlier in this document.

Important!!!! When upgrading to a new version of the LPR, be sure to use the “BackUp” feature in the “Utilities/Custom Protocol” menu option to Backup your Custom Protocols before upgrading. When done with the upgrade, use the “Restore” feature and your Custom Protocols will be retrieved automatically and appear in your designated Network or SCL list. See the “Utilities” section later in this document for details on “Backup and Restore”.

To Delete:

1. Select SCL or Network.
2. Select the item in the list
3. Click on the “Delete” button.

To Update:

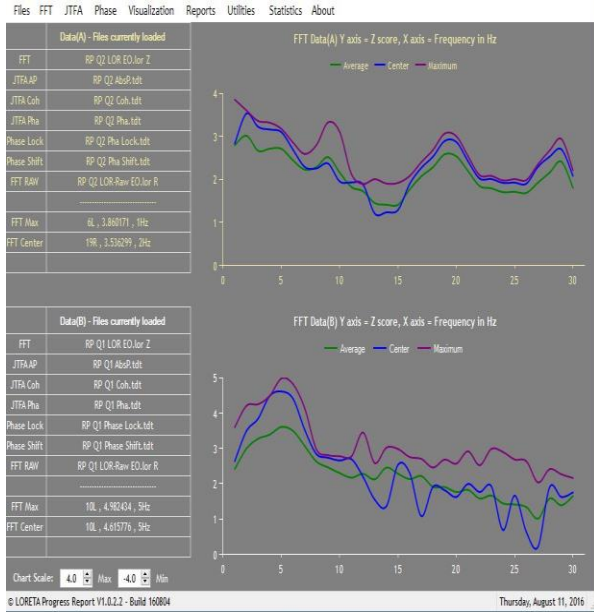
1. Select SCL or Network.
2. Select the item in the list
3. Check or uncheck the corresponding check boxes
4. Modify the description if needed.
5. Click the “Update” button.

To Restore:

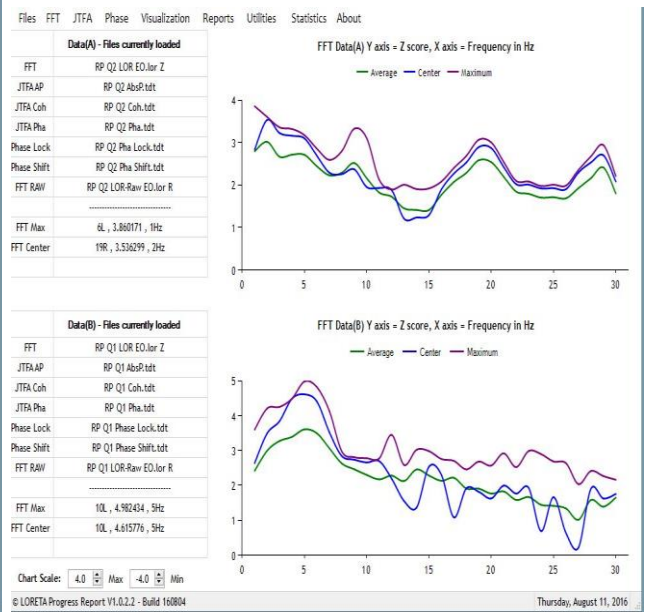
1. Click on the “Restore” button. This will restore the working database to the default database.
Using the button is helpful if you commit changes and wish to start over.

Toggle Main Menu Color

Clicking on “Toggle Main Menu Color” will change the background color of the Window from Dark Grey to White as seen in the screenshots below:

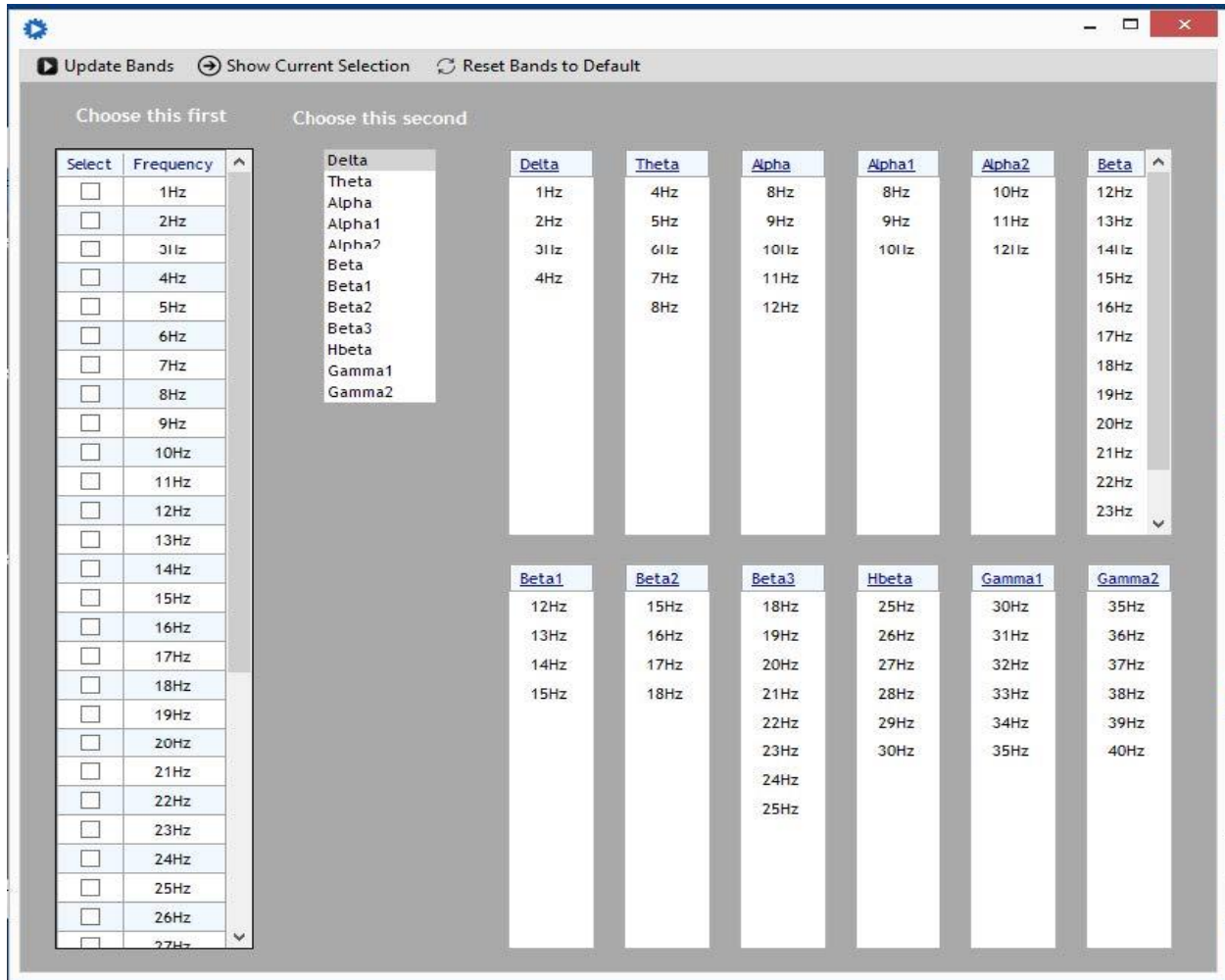


Default Drk Grey Color



Toggle White Color

Frequency Band Editor



This utility allows the editing and modifying of the frequency bands used by LPR Basic. The default setting is Neuroguide compatible.

To Navigate the “Frequency Band Editor”:

Specific instructions to edit Frequency Bands are as follows:

1. In the “**Choose this First**” Frequency Controls area, select the frequencies you want to include in the Band you are editing.
2. Once the desired Frequencies are checked, go to the “**Choose this Second**” Band Controls area, and select/highlight the Band where you want to include the selected frequencies. The corresponding Band Selection Box will be cleared of current entries and the selected frequencies will then populate the band selection area. **Note:** Clicking on a Band first before selecting specific frequencies will clear the Band Selection Box of its current entries and leave it blank.
3. Repeat Steps 1 and 2 for any subsequent bands you want to change.
4. When finished editing, click on “**Update Bands**” to add the new configuration to the database.

Additional Controls in the “Frequency Band Editor” and their function area as follows:

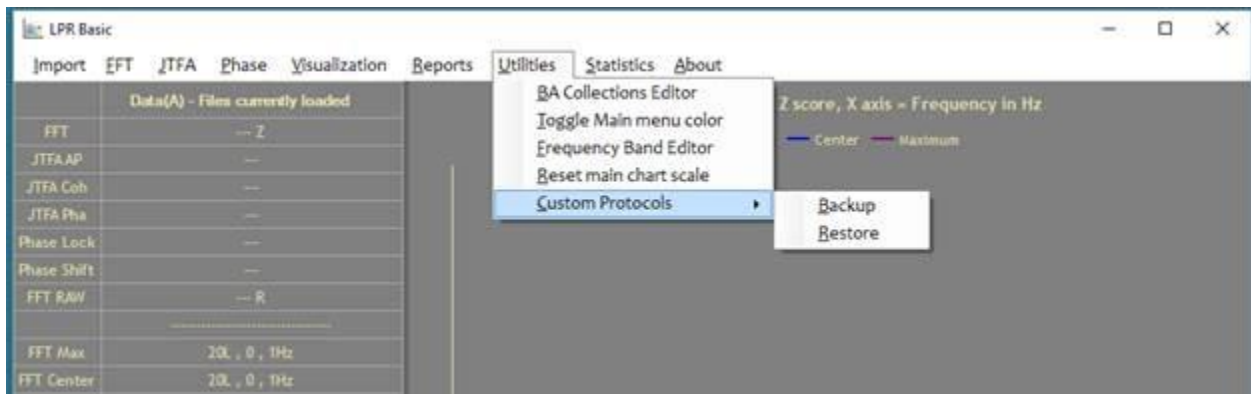
- **“Show Current Selection”** will populate the selection boxes with the current configuration in the database.
- **“Reset Bands to Default”** will clear the current configuration and reset the database to the default configuration.

Reset Main Chart Scale

Clicking on “Reset Main Chart Scale” will reset the Chart Scale to the default values of 4.0 Max and -4.0 Min:



Custom Protocols – Backup & Restore




With the LPR you have the ability to create Custom Protocols in order to view a precise ROI (Region of Interest) and then track the changes between multiple data sets for that ROI for a specific client. When it is time to update the LPR software, the “Backup and Restore” feature will save all these custom protocols and then retrieve them once the upgrade is complete.

To Backup Custom Protocols:

Creates a backup for:

- **FFT Custom Protocols:** Created using the “BA Collections Editor” and stored in either the Network or SCL list.
- **JTFA Custom Protocols:** Created using “JTFA Protocol Selection” and stored in the JTFA Custom Protocol list.
- **Phase Lock and Phase Shift Custom Protocols:** Created using “Phase Protocol Selection” and stored in the Phase Custom Protocol list.

Backup ×

 Custom protocol files backed up

OK

When you click on the “Backup” option from the “Utilities/Custom Protocol” menu, all of your Custom Protocols will automatically get backed up and a confirmation alert will appear.

This backup keeps your custom selections intact when upgrading or if you need to reinstall LPR Basic.

To Restore Custom Protocols:

Restores the custom FFT Protocols (Networks and SCL), JTFA Protocols, and Phase Shift Phase Lock Protocols saved during the Backup process. Note: Restore will overwrite any Custom Protocols that had not been backed up, so be sure that you do not create new Custom Protocols after a Backup or else they will be deleted when you Restore.

Overwrite Warning ×



This will OVERWRITE the current custom protocols

OK

Cancel

When you click on the “Restore” option from the “Utilities/Custom Protocol” menu, an alert message will appear reminding you that any Custom Protocols created after the last backup will be deleted. If this is the case, click on “Cancel” and perform a backup. Otherwise click on “Okay”.

Restore ×



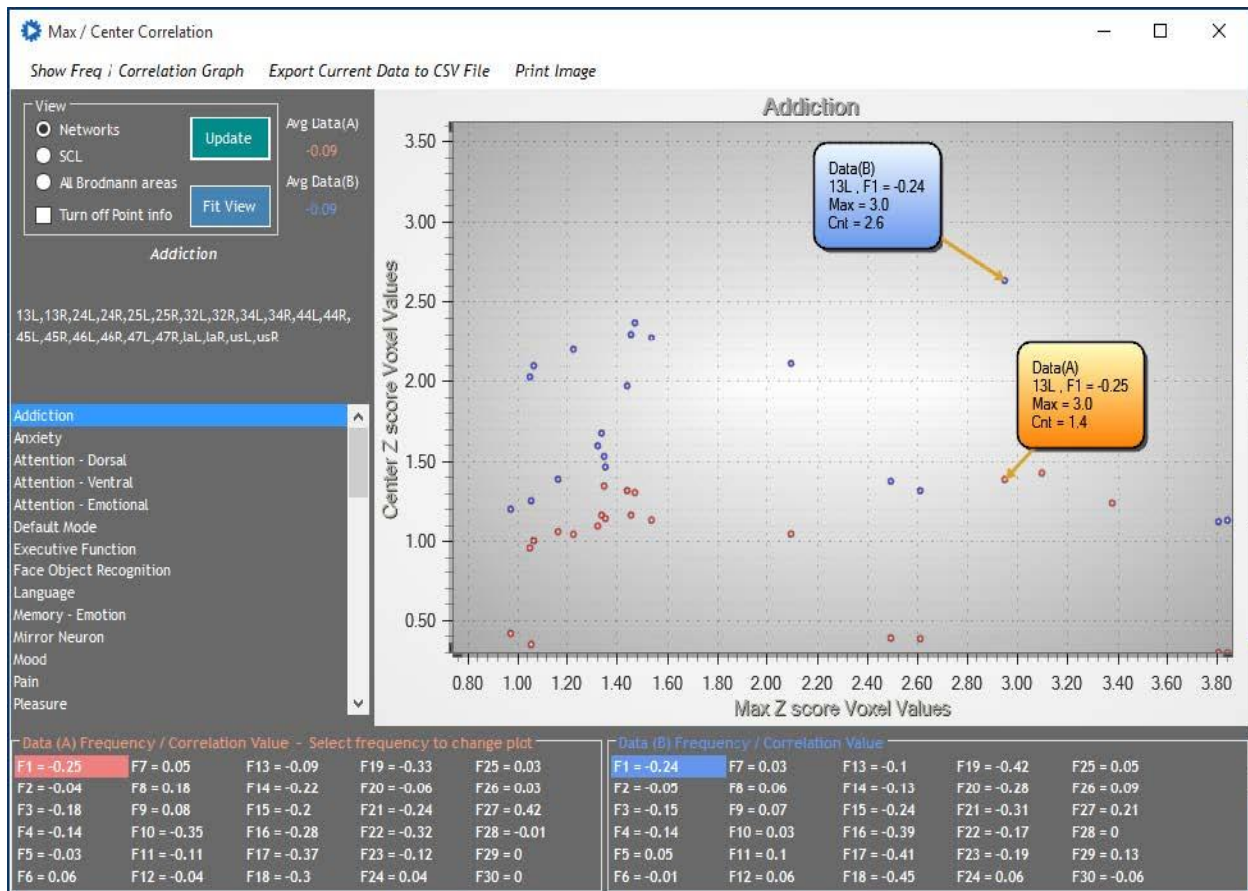
Custom protocol files restored

OK

Your Custom Protocols will automatically get restored and a confirmation alert will appear.

X. STATISTICS

Center / Max Correlation



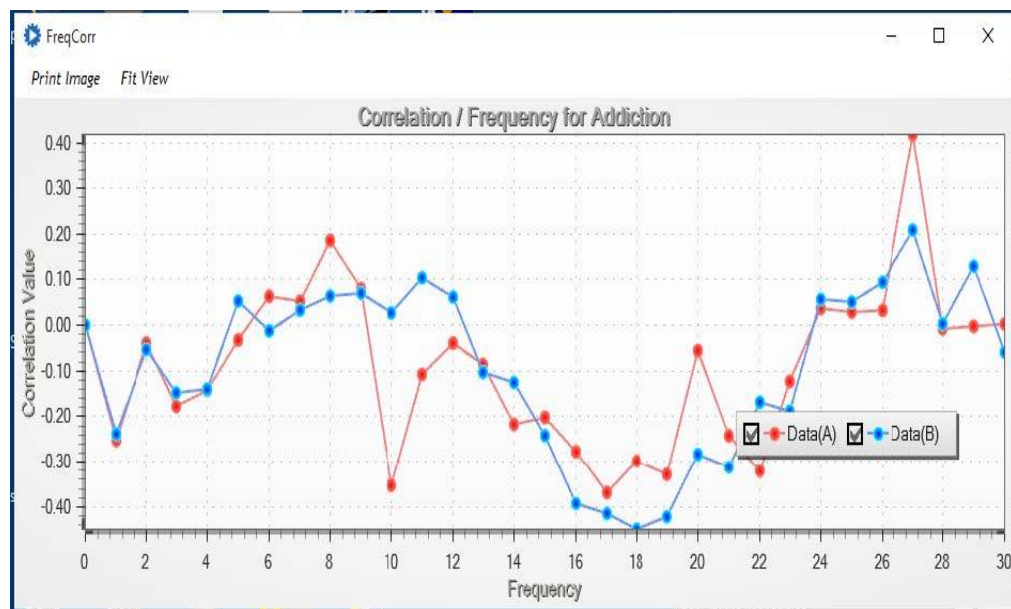
“Center / Max Correlation” correlates the center voxel with the most deviant voxel in each Brodmann area in each frequency using the Pearson product-moment correlation coefficient. A scatter plot of the distribution of the Z score values is offered.

To Navigate the “Correlation” Window:

There are several Controls in the “Statistics/Correlation” window that determine which data is displayed. To select which particular list is referenced for viewing and the data you’d like to view, do the following:

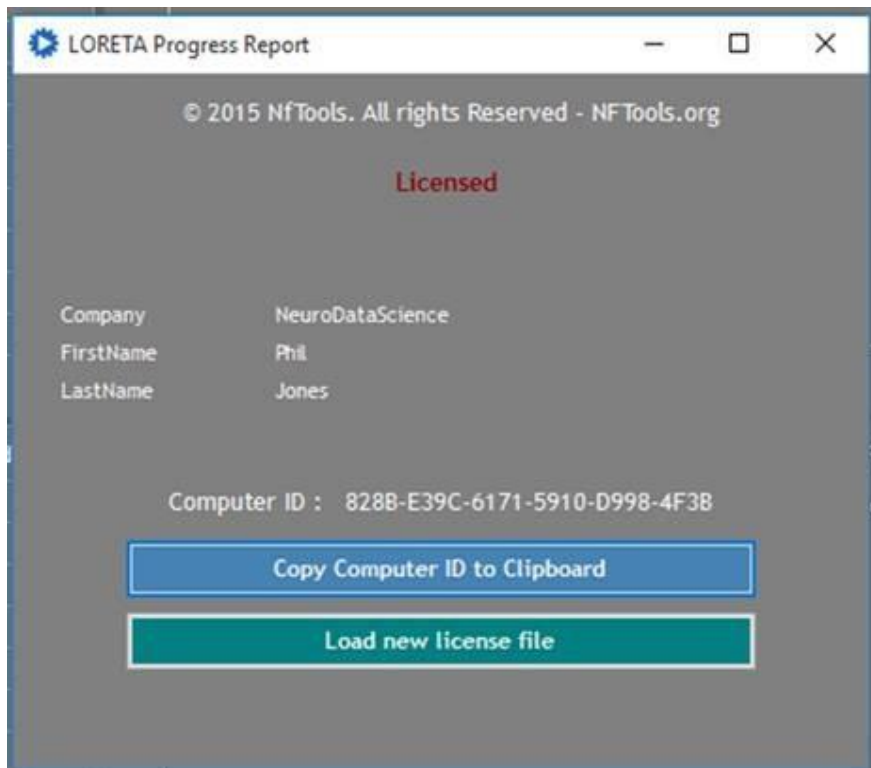
1. In the “ROI” Controls area click on a Radio Button or Check Box corresponding to the data you would like to view. The Controls and their functions are as follow.
 - **Networks** – Selects Brodmann areas contained within the Network selection.
 - **SCL** – Selects Brodmann areas contained within the SCL selection.
 - **All Brodmann areas** – Selects all 88 Brodmann areas and displays correlation by frequency.
 - **Turn off Point Info** – If checked makes the Point callout boxes invisible.

- **Data (A) On/Off** – If checked Displays the correlation for each dataset for each of the 30 frequencies
 - **Data (B) On/Off** – If checked Displays the correlation for each dataset for each of the 30 frequencies
 - Note:** Clicking on a desired Data A frequency (F1...F30) – Highlights the frequency in both Data (A) and Data (B) sections and displays the corresponding scatter plot.
 - **Fit View** button – Will fit the current point view to the display. The mouse scroll wheel if available will also zoom in and out of the display.
2. Notice the Main Menu Bar. Additional Controls and their functions are as follows:
- **Show Freq / Correlation Graph** – Displays a simple line chart showing the variance between center and max values for each frequency.



- Within this display, an additional Menu Bar is available with options to:
- **Print Image** – Prints the displayed image.
 - **Fit View** – Automatically scales the graph for the best presentation.
 - **Export Current Data to CSV File** - *Export data to CSV File* – Exports the data for Data A and Data B including correlation values to an Excel compatible spreadsheet.
 - **Print Image** - Prints the displayed image.

XI. ABOUT



Within this window, several buttons are available with options to:

- **Copy Computer ID to Clipboard** - Copies the Computer ID to the clipboard so that it can easily be pasted into an email. The Computer ID is needed to license the computer for activation beyond the 30 day evaluation period.
- **Load new License File** - Uploads a license file to the application to license, extend the license or add licenses for additional modules or upgrades.

Note: See "1. Getting Started" for detailed instructions on the options to Copy Computer ID and Load the New License File.