The Discovery 24 Channel EEG amplifier (Brain master Technologies, USA) is a physiological monitoring and feedback system. It offers monitoring and feedback of brain signals and include the measurement of EEG, direct current and slow cortical potentials (DC/SCP).

The recordings are made from the surface of the body using standard tin, gold, or silver chloride sensors. In these recordings sintered Ag/AgCl sensors were used.

Signal processing and feedback are provided by a PC running the software provided by BrainMaster Technologies Inc USA (BrainAvatar 4.6) and information is derived from spectral analysis of the EEG.

The Discovery uses optical and magnetic isolation/coupling technology to provide a safe, low-noise interface to the user's PC and provides EEG biofeedback monitoring, analysis and reports using a Windows PC with the supplied software.

With the BrainAvatar software, 19 channels of EEG can be recorded simultaneously. It can also display the sLoreta analysis visually in different brain areas while the recording is being done.

The QEEG is a standardized evaluation which requires recording EEG from 19 active electrodes in a linked ear montage as seen in Figure 1.

Figure 1: Placement of electrodes for QEEG as based on the 10/20 placement.

Each area on the scalp is cleaned using NuPrep skin preparation gel. This is an abrasive gel that removes any dead skin. Electrodes are then pressed onto the cleaned area using 10/20 conductive paste. Surrounding hair helps to keep electrodes in place. If there is not any hair surrounding the area as with Fp1 and Fp2, a piece of micropore tape can be used to help keep it in place.

Once an impedance of less than 5kOhm is obtained the data can be recorded. The subject is instructed to sit relaxed with minimal movement for 10 minutes – 5 minutes with the eyes closed and 5 minutes with the eyes open while the EEG is recorded. Once recorded the data can be uploaded in to the QEEGProTM^{TM} database to be processed. In the Bellabee tests we included eyes closed data only.

The QEEGProTM^{TM} database consists of resting state EEGs recorded from clients. Each client in the database filled out an extensive diagnostic and statistical-based questionnaire and by making use of statistical regression psychopathology was removed. The EEGs were recorded in the Netherlands between 2008 and 2014 and is updated yearly. It currently consists of 1482 eyes closed and 1231 eyes open recordings made using modern high-end amplifiers.

A Standardised Artefact Rejection Algorithm (S.A.R.A.) developed by Dr Andre Keizer was used for all the recordings in the database. It evaluates the raw EEG for eye blinks, horizontal eye movements, low and high frequency artefacts and epileptiform activity. All EEGs are processed anonymously and stored on the QEEGProTM^{TM} server for 6 months, after which it is deleted.

The following aspects can be compared:

- Absolute power: This is the amount of power at each electrode site for each frequency band that is compared to a database mean value.
- Relative power: This is each score relative to the total power of all the frequencies. The percentage of power in any band compared to the rest of the patient's EEG.
- Amplitude Asymmetry: The average difference between signals measured compared to normative database.
- Coherence: Coherence is the communication and coordination between two areas of the brain. Coherence focuses on Hyper (excessive) or Hypo (too

little) connectivity between two sites. Hypercoherence denotes functional rigidity. Hypocoherence in network sharing denotes functional isolation.

- Phase: A measure of the temporal relationship between two signals. Reflects the speed of information sharing between two sites, or between two sites and a third (or more) sites. Two sinewave signals are said to be "in phase" (have zero phase difference) when their peaks and valleys are aligned in time. (QEEGProTM, 2016)

For experimental purposes we illustrated Absolute power values as this is widely understood by most neurofeedback clinicians and has become more known in other medical professions as well.

Recordings with Bellabee were done as follows (All steps were recorded):

1. A baseline resting EEG was done in the eyes closed condition to before any Bellabee stimulation was done.
2. 4 Minutes of stimulation at 8 Hz was done.
3. The resting EEG was again recorded without any stimulation.
4. 4 Minutes of stimulation at 10 Hz.
5. The resting EEG was again recorded without any stimulation.
6. 4 Minutes of Stimulation at 12 Hz.
7. The resting EEG was again recorded without any stimulation.
8. 4 Minutes of stimulation at 15 Hz.
9. The resting EEG was again recorded without any stimulation.

The results summary as seen in our document includes the changes as recorded in the resting EEGs without any stimulation.