QUANTITATIVE EEG REPORT

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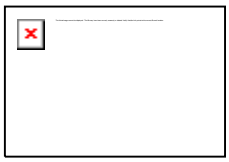
Client information:



Name: Mohammed Banat
DOB: Jan. 27, 1978
Gender/Handedness: Male Right-Handed
Medications: Trileptin

Methodology:

A 19-channel EEG was recorded using International 10-20 electrode placements and a linked-ear referential montage. Impedance was below 5 KOhms at each electrode site, and the EEG was digitized at 128 samples per second with low and high-pass filters set at 2 Hz and 45 Hz, ,respectively. EG data were obtained from four 3-4-minute replicated recordings during: 1) eyes closed, 2) eyes open, 3) reading for comprehension, and 4) mathematical problem solving. Data records underwent automatic artifact detection and removal, supplemented by additional manual review and removal as necessary. Spectral estimates were obtained by calculating Fast Fourier Transform coefficients (FFT), and evaluated primarily using a Laplacian mathematical reference conversion for optimal localization. Uncorrupted data were statistically compared to age-matched normative values.

History & Findings: Mr Banat suffers from an unusual seizure disorder and cognitive difficulties often associated with sleep patterns. Symptoms began at age 11 but a diagnosis was not determined until age 25. An Astrocytoma tumor was identified in the left temporal lobe. Most of the tumor was removed surgically in 2009 apparently after cognitive disturbances became an issue. A detailed background will be added later.

The present QEEG study was carried out to determine the exact EEG- revealed locus of functional disturbance, and to confirm the specific EEG frequencies associated with that locus to provide guidance for EEG Feedback treatment. In summary:

1. Quantitative EEG analysis (figs. 1-5 below) identified a region in the left temporal lobe convergent with MRI and PET scan findings (fig. 6).

2. The EEG abnormality was reliable in both the 4-8 and 11-14 Hz bands during attentive (eyes-open) states suitable for EEG feedback treatment. It is recommended that both of these frequency ranges be trained down (inhibited). The SMR 12-15 Hz frequency should later be reinforced (trained up), at the same time at site C3. More details will be provided after these findings are reviewed by all and discussed more directly.

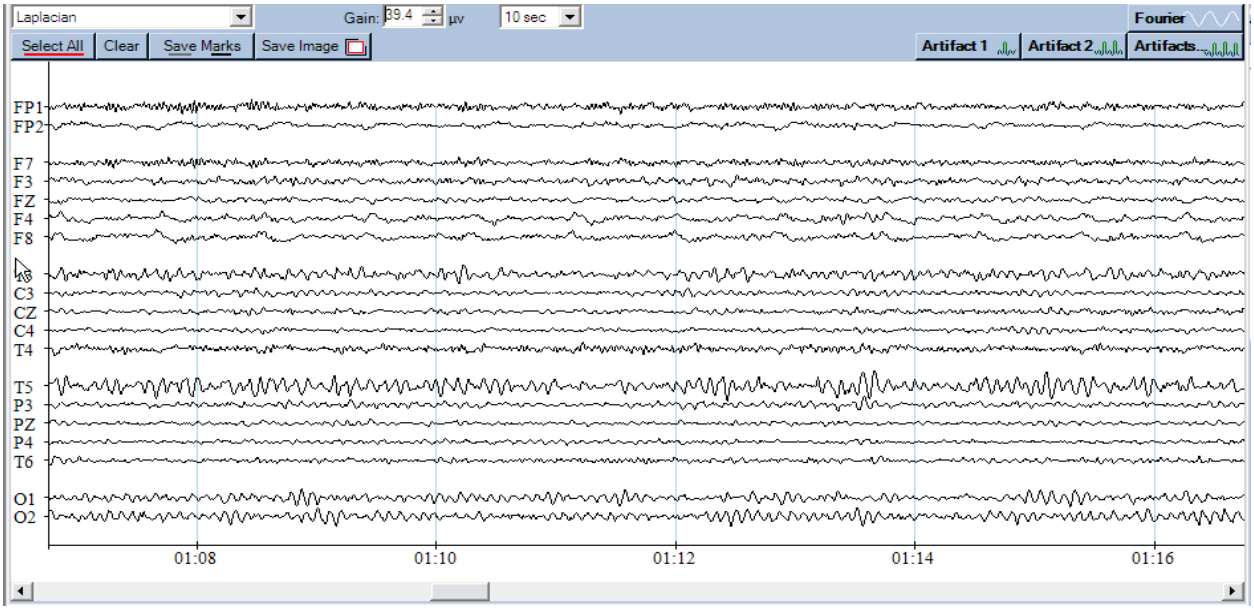


Figure 1. Nineteen channel digitized EEG 10 second sample during eye closed state. A typical dominant frequency pattern can be seen primarily at occipital sites. A higher amplitude atypical rhythmic pattern is seen at left posterior temporal lobe, and less so at left anterior temporal site. A possible right eye-movement artifact can be seen at lateral right frontal sites also.

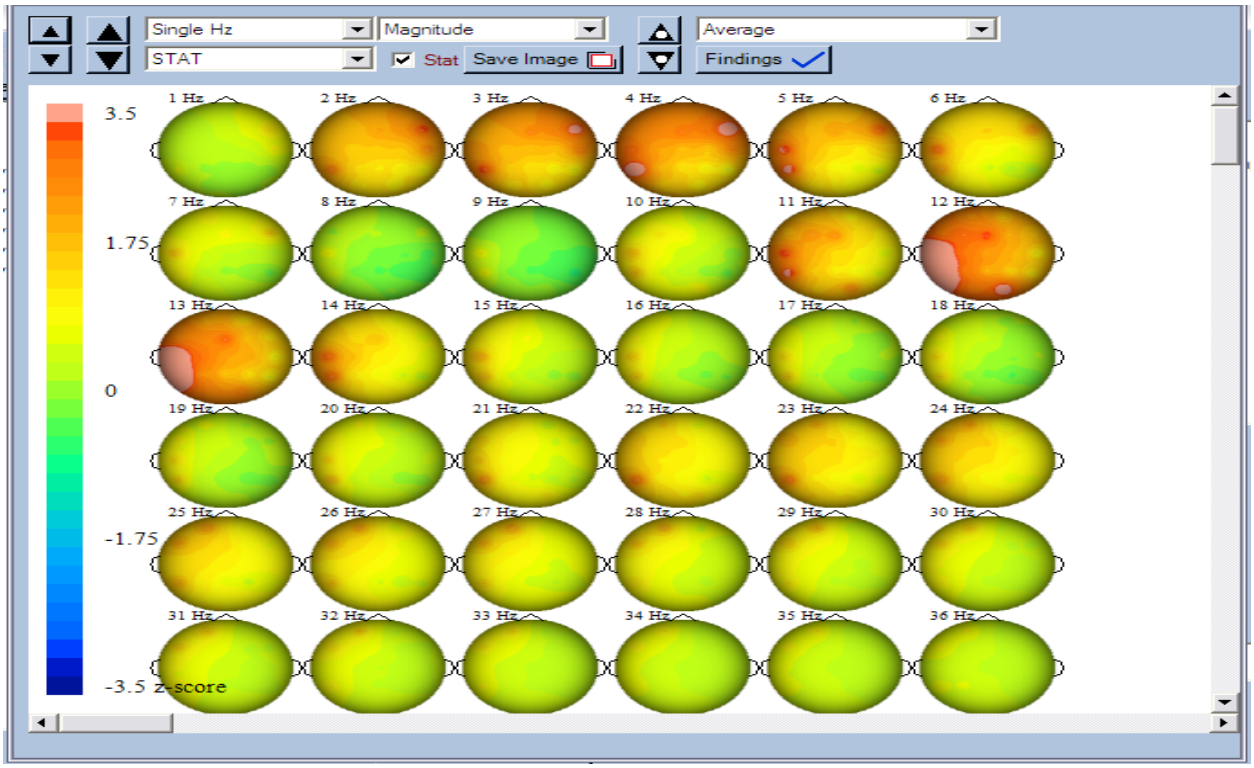


Figure 2. The magnitude distribution of single Hz frequencies between 1 and 36 Hz is shown here for skull representations with the eyes closed. Color scale at left statistical probabilities as compared to a normal database. Pink areas represent areas of significant (p=0.01) abnormal elevation at any site. Note primary abnormal zone in left temporal cortex between 11-14 Hz.

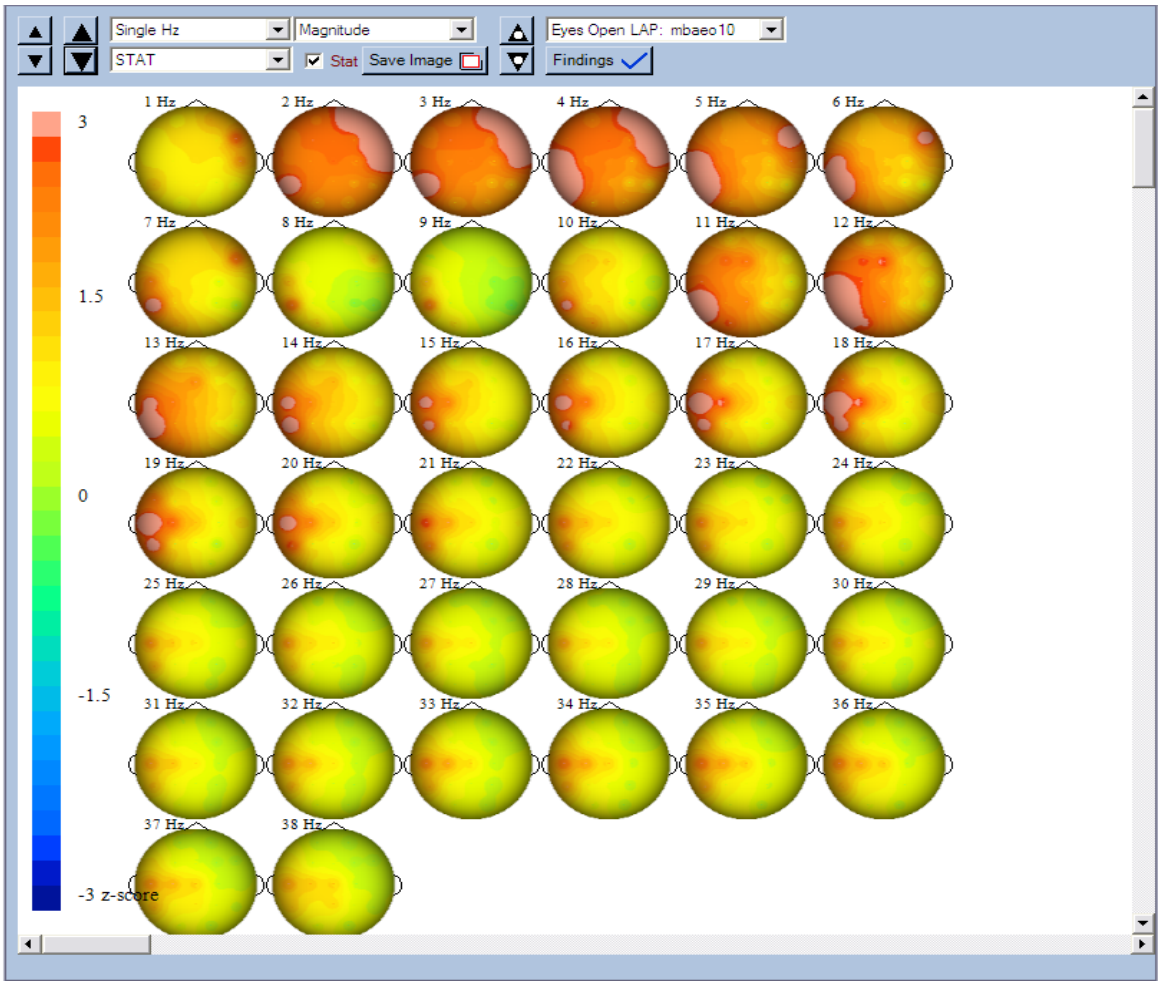


Figure 3. Single Hz maps and expanded band quantitative analysis are shown here with eyes open. Findings are similar to those with eyes closed above. However, the degree and distribution of abnormal activity is slightly altered, apparently due to the increased attention associated with open eyes. The abnormal slow frequency activity seen at frontal sites appears to be due to slow eye movement artifact and has no bearing on this assessment.

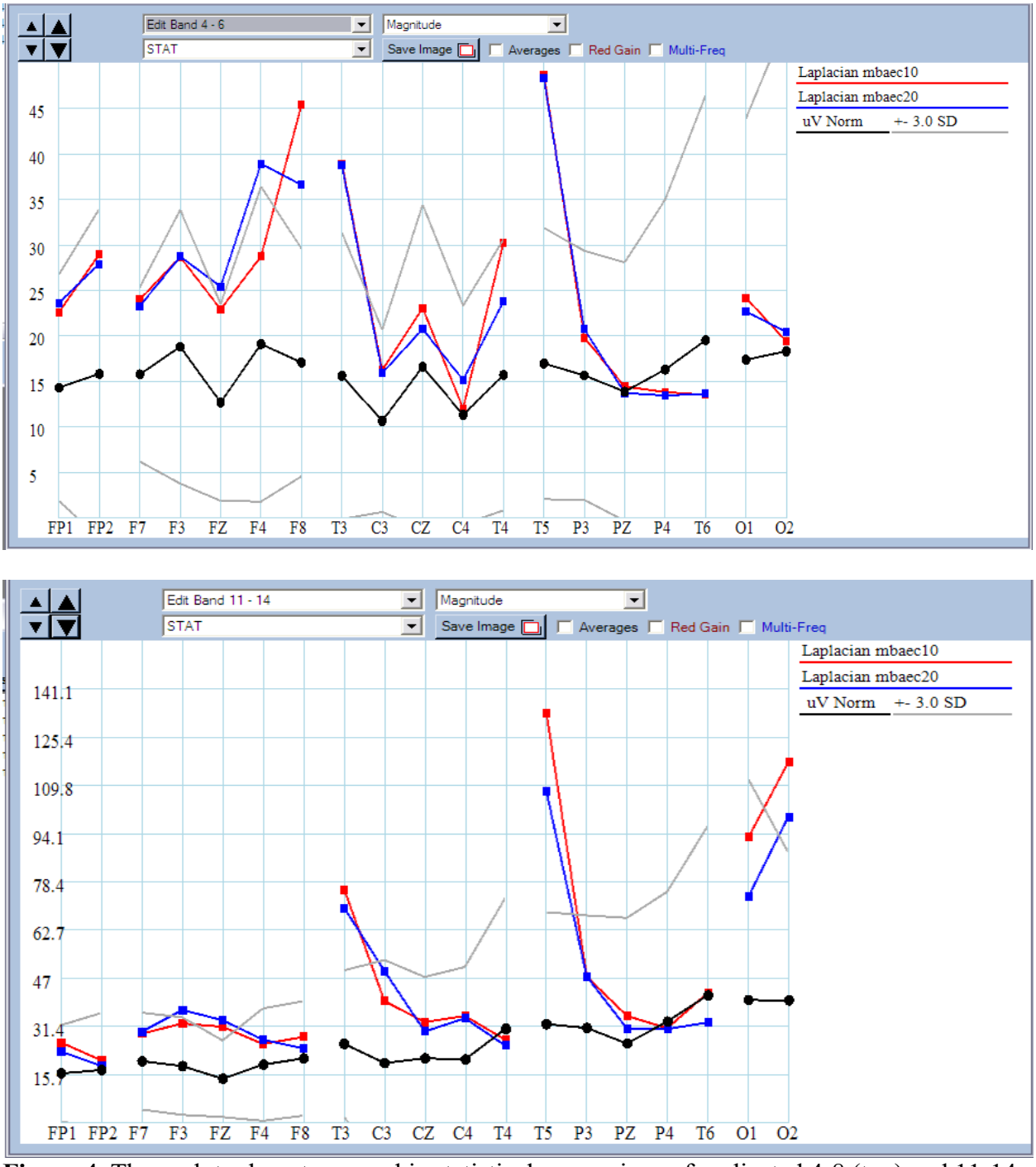


Figure 4. These plots show topographic statistical comparison of replicated 4-8 (top) and 11-14 (bottom)Hz data from two separate eyes-closed recordings (red & blue curves) with normative database values (black curves) as well as plus-minus 3 standard deviation variance (sdv) at all 19 sites. Subject values exceeding positive sdv limits are significantly abnormal (p= 0.99). Reliable abnormal elevations in left temporal lobe (T3 & T4) are clearly indicated. Atypical slow eye-movement artifact is present only in 4-8 Hz band.

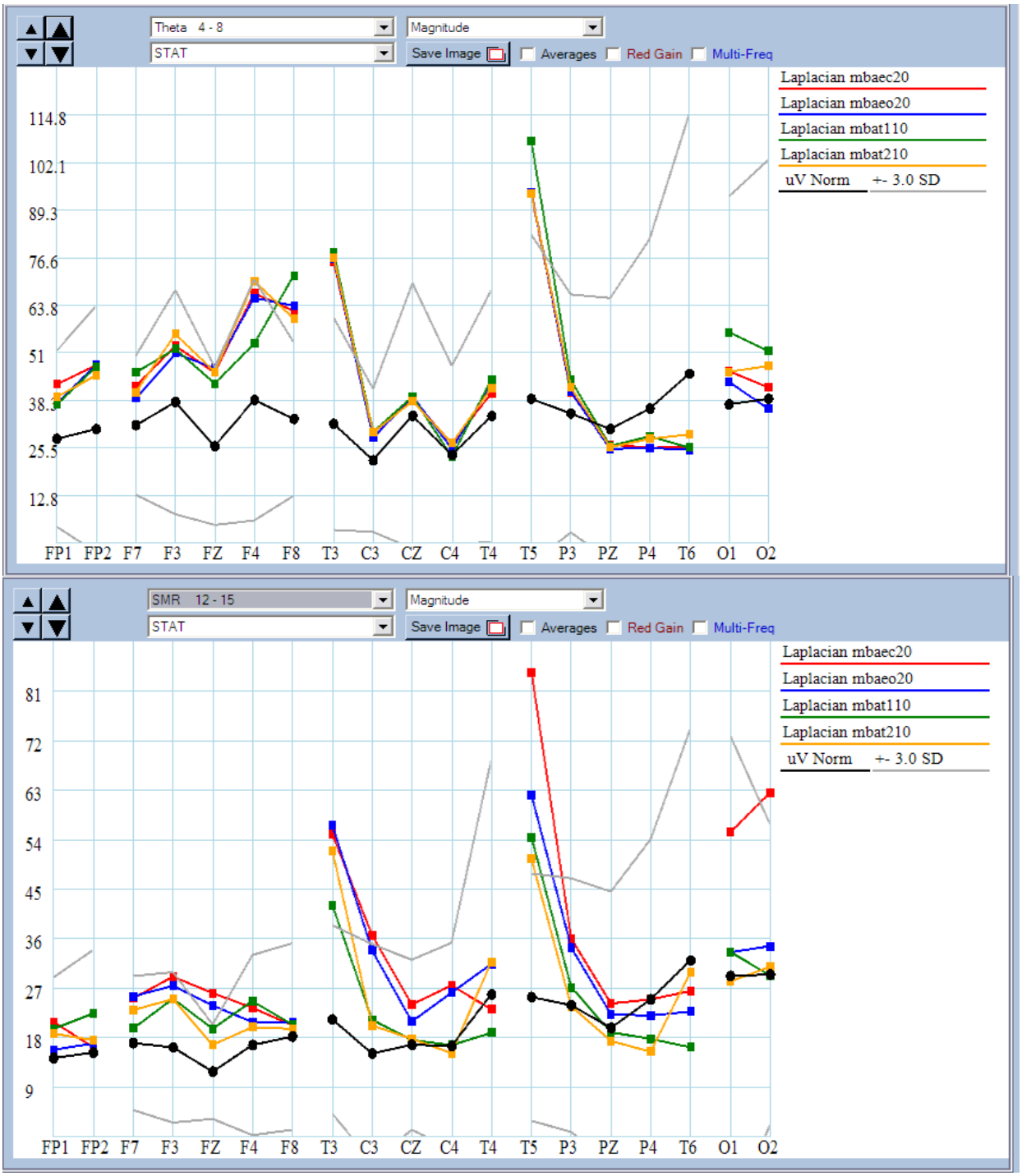


Figure 5. The topographic analyses seen here present spectral magnitude plots across all test states (eye closed = red,, eyes open + blue, reading = green, and math = gold) for 4-8 and 11-15 Hz frequency bands.. They are compared with database means and sdv values for eyes closed condition as above. Analysis of each condition separately confirmed fact that both of these frequencies are significantly and reliably statistically deviant from normal population across all test conditions.

PET Date: Nov 11, 2008
MRI Date: Nov 11, 2008
Representation of Patient's Cortical Structure

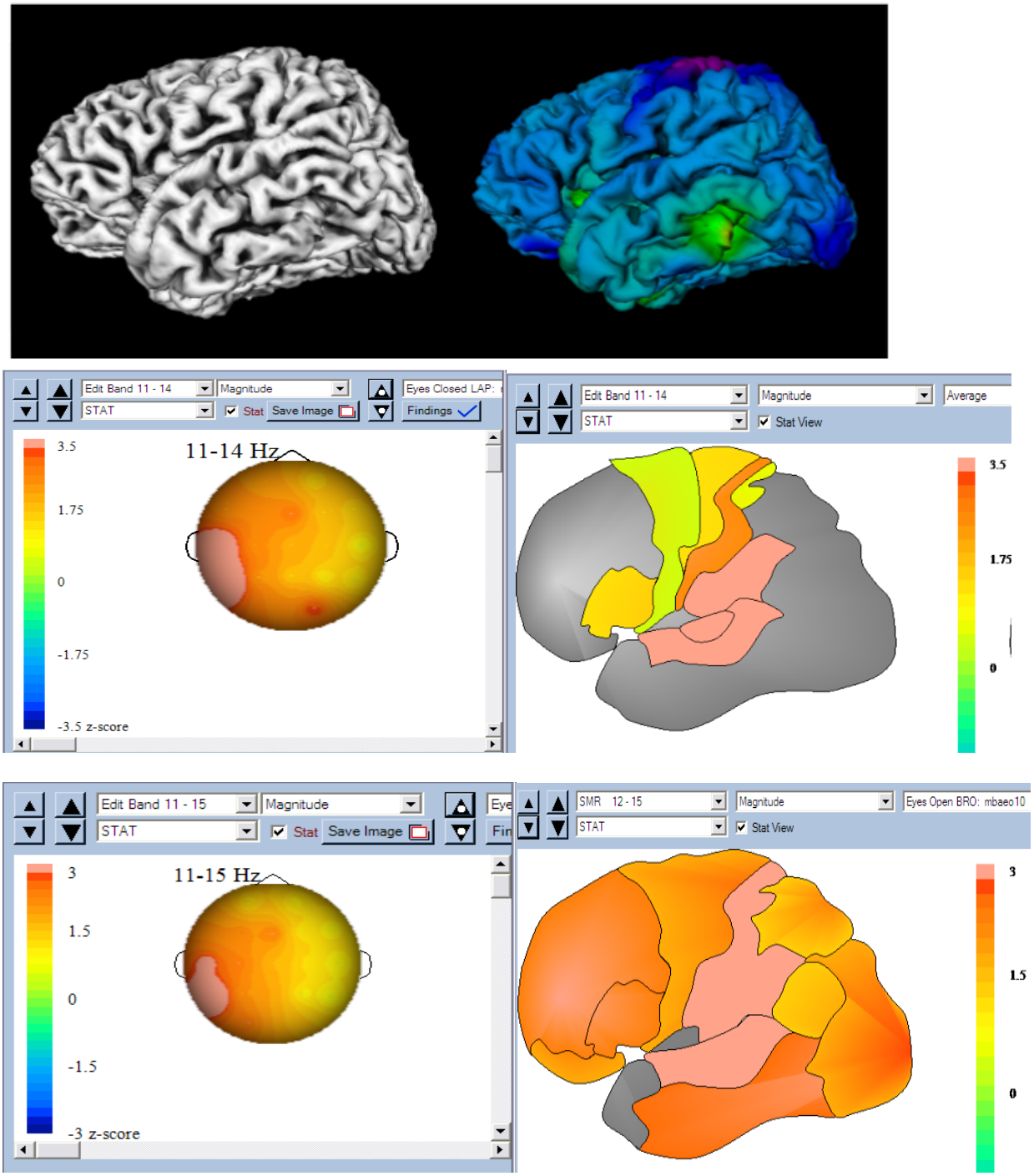


Figure 6. Collage of images comparing PET and MRI findings (top) with statistical fingings using QEEG brain map and Brodmann Area evaluations of 11-15 Hz activity during eyes closes (mid) and eyes open (bottom) states. Findings are comparable in identifying same abnormal region in left temporal lobe. However, disruption of parietal areas is greater with eyes open.