



**Name:**  
**Patient ID:**  
**Age:** 34  
**Sex:** Female

**Case ID:**  
**Report ID:**  
**Report Date:** 01.01.2021  
**Recording Date:** 01.01.2021

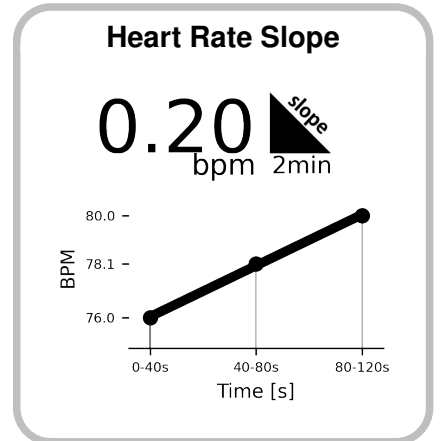
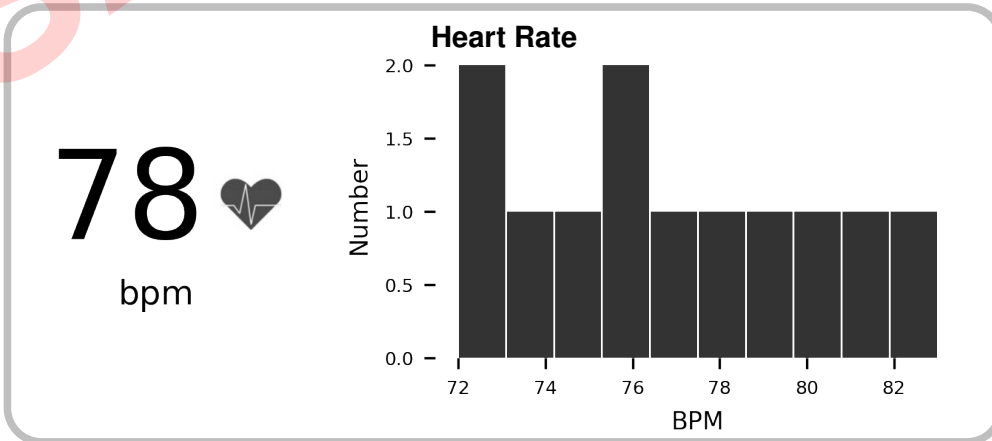
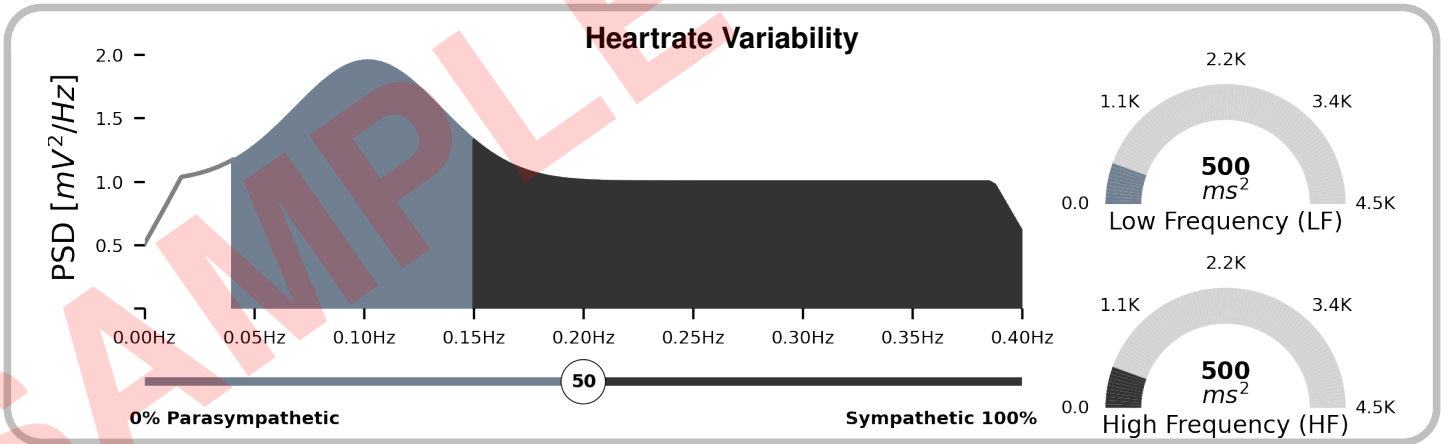
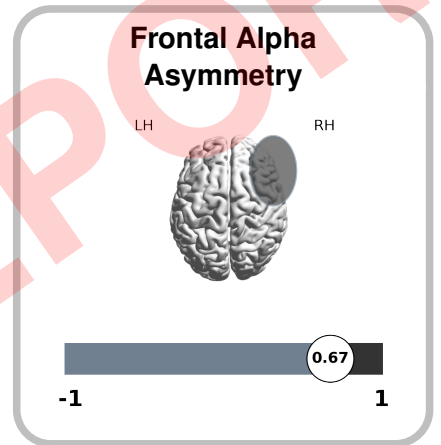
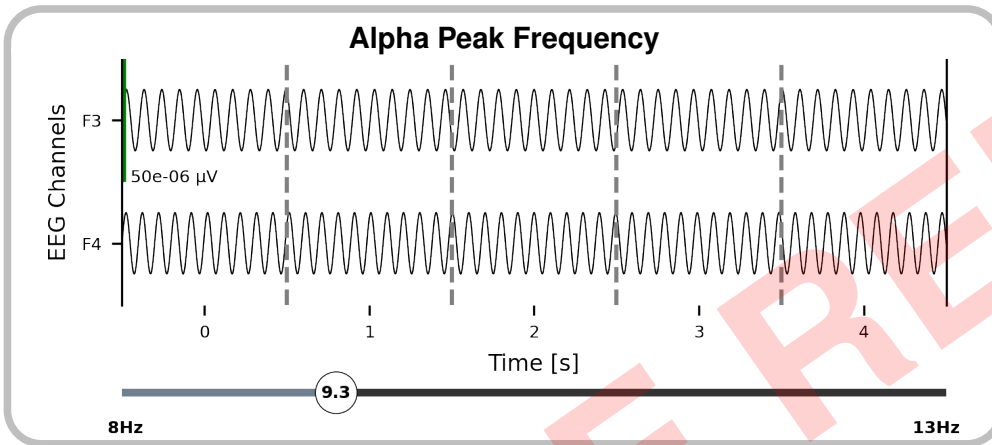
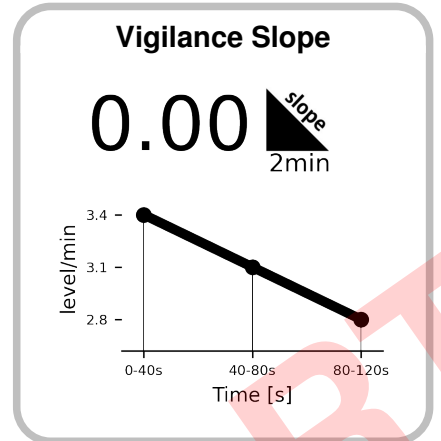
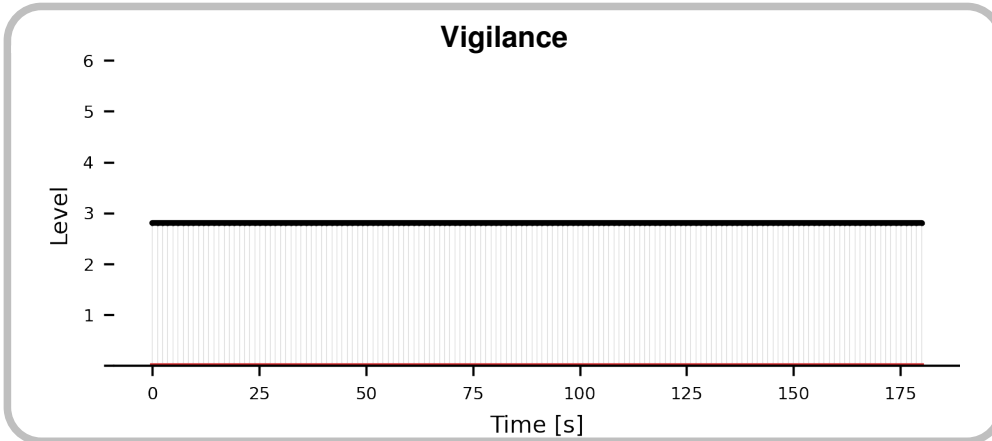
## EEG & ECG Biomarkers Report

- This report is intended to be used only by qualified medical practitioners.
- This report is intended to be used to improve decision-making within the scope of possible treatments already indicated for a patient.
- This report is exclusively suitable for adult patients.

- This report is not intended to drive diagnosis, to be used as a vital signs monitor, or to be used in any situation where measured parameters could result in immediate danger to the patient.
- This report is not intended to be used to determine whether a patient should undergo treatment. It is also not intended to be used to determine if a treatment is indicated or contraindicated for a patient.
- This report is not intended for use in cases of neurological pathologies, scalp abnormalities, head injuries (in the EEG), or cardiac pathologies (in the ECG).
- This report is not intended to drive diagnosis, to be used as a vital signs monitor, or to be used in any situation where measured parameters could result in immediate danger to the patient.

### Biomarker Correlations Summary

Condition	Treatment	Correlation
MDD	SSRI	Lower response rates than SNRI Vigilance Regulation 2min
	SNRI	Higher response rates than SSRI Vigilance Regulation 2min
	rTMS	10Hz left DLPFC has lower Response Rate than 1Hz right DLPFC Alpha Peak Frequency (APF)
	Ketamine (oral/i.v.)	Increased response rates for Ketamine Heart Rate (BPM), Vigilance Regulation: A1 Stages
	ECT	Higher response rates for ECT and less side effects Alpha Peak Frequency (APF)



## Biomarker Values

	Value (first 2min)	Normal Interval (2 SD)
<b>EEG:</b>		
Alpha Peak Frequency (APF) (Hz) .....	9.3	(8.0 – 11.7)
Frontal Alpha Asymmetry (FAA) .....	<b>0.7*</b>	(-0.3 – 0.3)
qEEG Alpha ( $\mu V^2$ ) .....	8.37	(0.0 – 144.0)
qEEG Beta ( $\mu V^2$ ) .....	<b>111.42*</b>	(0.0 – 16.0)
qEEG Delta ( $\mu V^2$ ) .....	14.36	(0.0 – 16.0)
qEEG Gamma1 ( $\mu V^2$ ) .....	<b>4.0*</b>	(0.0 – 2.0)
qEEG Gamma2 ( $\mu V^2$ ) .....	<b>5.11*</b>	(0.0 – 0.2)
qEEG Theta ( $\mu V^2$ ) .....	<b>42.11*</b>	(0.0 – 32.0)
Slow Basic Rhythm .....	Yes	–
Vigilance Regulation: 0 Stages (%) .....	20.0	(0.0 – 75.0)
Vigilance Regulation: A1 Stages (%) .....	88.0	–
Vigilance Level (Level) .....	<b>1.0*</b>	(2.2 – 6.0)
Vigilance Mean (Level) .....	3.1	(2.24 – 6.0)
Vigilance Regulation 2min (Level/min) .....	0.0	(-0.5 – 0.4)
Vigilance Regulation 9.9min (Level/min) .....	0.0	–
<b>ECG:</b>		
Heart Rate (BPM) (beats/min) .....	<b>78.0*</b>	(53.0 – 76.0)
Heart Rate Regulation (BPM Slope) (beats/min <sup>2</sup> ) .....	0.2	(-2.91 – 2.73)
Total HRV Power (ms <sup>2</sup> ) .....	4512.0	(0.0 – 8011.0)
Parasympathetic Activity (HF) (ms <sup>2</sup> ) .....	500.0	(0.0 – 4320.0)
Sympathetic Activity (LF) (ms <sup>2</sup> ) .....	500.0	(0.0 – 4242.0)
Relative Sympathetic Acitivity (LFnu) (%) .....	39.0	(7.0 – 96.0)

## Analysis Characteristics

- **EEG:** analysis completed successfully. **ECG:** analysis completed successfully.
- Channel(s) F4 were obtained through interpolation.
- All biomarkers were computed successfully.

Recording Date:	01.01.2021		
Sampling Frequency:	256 Hz		
Total Recording Duration:	600s (10.0min)	Analysis Interval:	8s – 600s (9.9min)
Number of Channels:	24	Channel Types:	EEG(21) ECG(1) EOG(2)
		EOG Channel:	EOG (POL V1 – POL V2)
Number of Epochs:	180	Epochs with Artefacts:	<b>36 (20.0%)</b>
ECG Peaks:	97	Peaks Corrected:	4

## Interpretations

### EEG

- **Alpha Peak Frequency (APF) [2, 3, 5, 19, 26]** In this EEG, a low Alpha Peak Frequency was found. In this case, for depressive symptoms, a 1Hz TMS protocols over the rDLPFC may be more effective than 10Hz protocols over the left DLPFC. There is also a positive correlation with the response to Sertralin. ECT therapy shows particularly good response with low APF. In the case of ADHD, there is evidence suggesting that biofeedback methods might be more effective than Methylphenidate. (Evidence Level 2)
- **Frontal Alpha Asymmetry (FAA) [13, 24, 25]** In this EEG, a right dominant frontal alpha activity was found. In this case, female patients with depression show an improved response to SSRIs. (Evidence Level 2)
- **Basic Rhythm Slow [1]** In this EEG, a pathologically low Basic Rhythm Peak Frequency was found. In this case, a very slow basic rhythm is a sign of pathological activity with an organic cause, related to e.g. dementia or delirium. A slow basic rhythm <8Hz like here also has been associated with better response to Sertralin in comparison to Escitalopram and Venlafaxin in depressed patients. (Evidence Level 2)
- **Percentage of vigilance stage 0 [6]** In this EEG, a low occurrence of vigilance stage 0 was found. In this case correlation with a more likely response to combined SSRI with Cognitive Behavioral Therapy in Obsessive Compulsive Disorder in comparison to SSRI or CBT alone. (Evidence Level 2)
- **Percentage of vigilance stage A1 [11]** In this EEG, a high occurrence of vigilance stage A1 was found. In this case, high percentages of EEG-vigilance stage A1 are associated with a higher probability to respond to i.v. ketamine and oral ketamine. (Evidence Level 2)
- **Vigilance Level [23]** In this EEG, a low vigilance level was found. Low vigilance levels are associated with higher probability for remission of depression for SSRI treatment. (Evidence Level 2)
- **Vigilance Regulation 2min [12, 18, 20]** In this EEG increase or no initial decrease was found of vigilance during the first 2 minutes. For this case, literature shows lower response rates in depression to SSRIs and SNRIs can be more effective. (Evidence Level 2)
- **Vigilance Regulation [8, 9, 10, 12, 16, 17, 22, 23]** In this EEG, no decrease in vigilance was found during the analysis interval (9.9min). Commonly seen in patients diagnosed with depression or OCD. In this case, remission of depression is less likely with SSRI treatment. (Evidence Level 2)

### ECG

- **Heart Rate (BPM) [14]** In this ECG, a high heart rate was observed. In this case correlation with better response to ketamine (i.v.) in depression. (Evidence Level 2)
- **Heart Rate Regulation (BPM Slope) [18]** In this ECG, a decrease or no substantial increase in BPM was observed. In this case in depression, there is a correlation with lower response rates for venlafaxine (SNRI). SSRIs can be more effective. (Evidence Level 2)
- **Sum of Parasympathetic and Sympathetic Activity [14]** In this ECG, a high overall activity of the autonomic nervous system was observed.. In this case, less likely to respond to ketamine (i.v.) for major depression. (Evidence Level 2)
- **Absolute parasympathetic Activation [15]** In this ECG, high absolute parasympathetic activation was observed. In this case less likely response to SSRI, CBT or combination in obsessive compulsive disorder (Evidence Level 2)
- **Absolute Sympathetic Activation [21]** In this ECG, normal absolute sympathetic activation is observed. In this case compared to the average population, total sympathetic activity is normal.
- **Relative Sympathetic/Parasympathetic Activation [7]** In this ECG, a shift toward parasympathetic activity was observed. In this case no correlation with good response to Fluoxetine in generalized anxiety disorder. (Evidence Level 2)

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