

# Voltage & Burst Suppression

# Continuity and voltage of background EEG

Continuity	Voltage
<b>Continuous:</b> <1% periods of suppression ( $<10 \mu\text{V}$ ) or attenuation ( $\geq 10 \mu\text{V}$ but $<50\%$ of background voltage)	<b>High</b> $\geq 150 \mu\text{V}$
<b>Nearly continuous:</b> 1-9% periods of suppression or attenuation	<b>Normal</b> $>20$ to $<150 \mu\text{V}$
<b>Discontinuous:</b> 10-49% periods of suppression or attenuation	<b>Low</b> $10$ to $<20 \mu\text{V}$
<b>Burst-suppression</b> or <b>Burst-attenuation:</b> 50-99% periods of suppression or attenuation	<b>Suppressed</b> $<10 \mu\text{V}$
<b>Suppression:</b> $>99\%$ periods of suppression or attenuation	

## Voltage:

- Normal
- Low (most or all activity  $<20 \mu\text{V}$  in longitudinal bipolar with standard 10-20 electrodes, [measured from peak to trough])
- Suppressed (all activity  $<10 \mu\text{V}$ ). If nearly continuous or discontinuous, then this refers to the higher amplitude portion

Note for burst-suppression or burst-attenuation:

- Bursts must average  $\geq 0.5\text{s}$  and have at least 4 phases (polyphasic), if shorter or fewer phases, then they are single discharges
- Bursts within burst-suppression or burst-attenuation can last up to 30s

**Continuity:**  
Percentages for each category refer to the percentage of the record that is “attenuated” or “suppressed

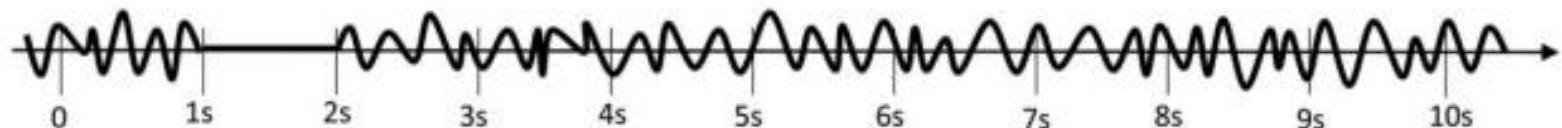
Continuous

<1%



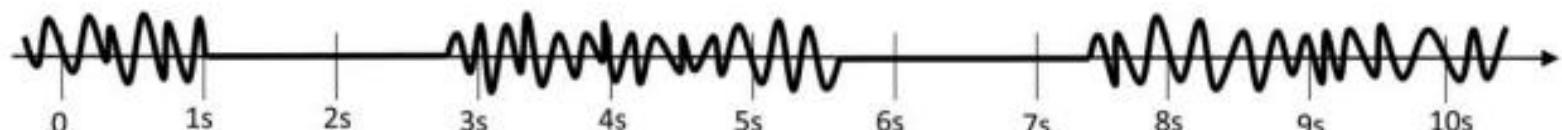
Nearly continuous

1 to 9%



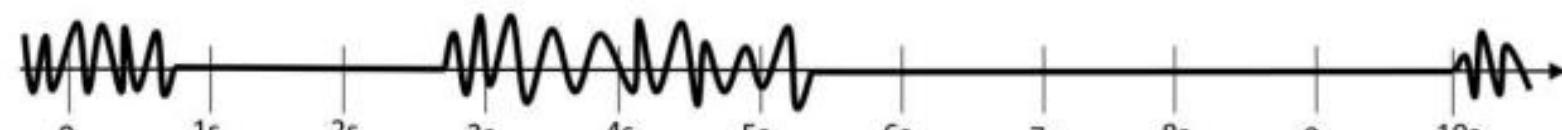
Discontinuous

10 to 49%



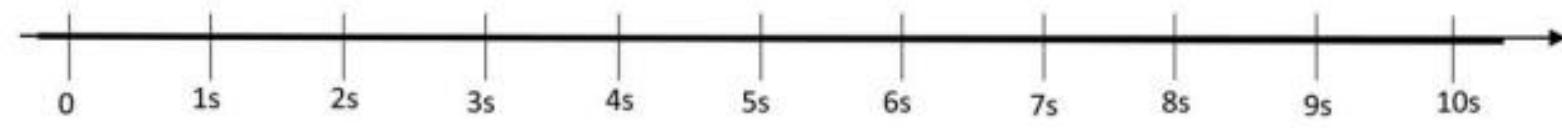
Burst-attenuation/  
Burst-suppression

50 to 99%



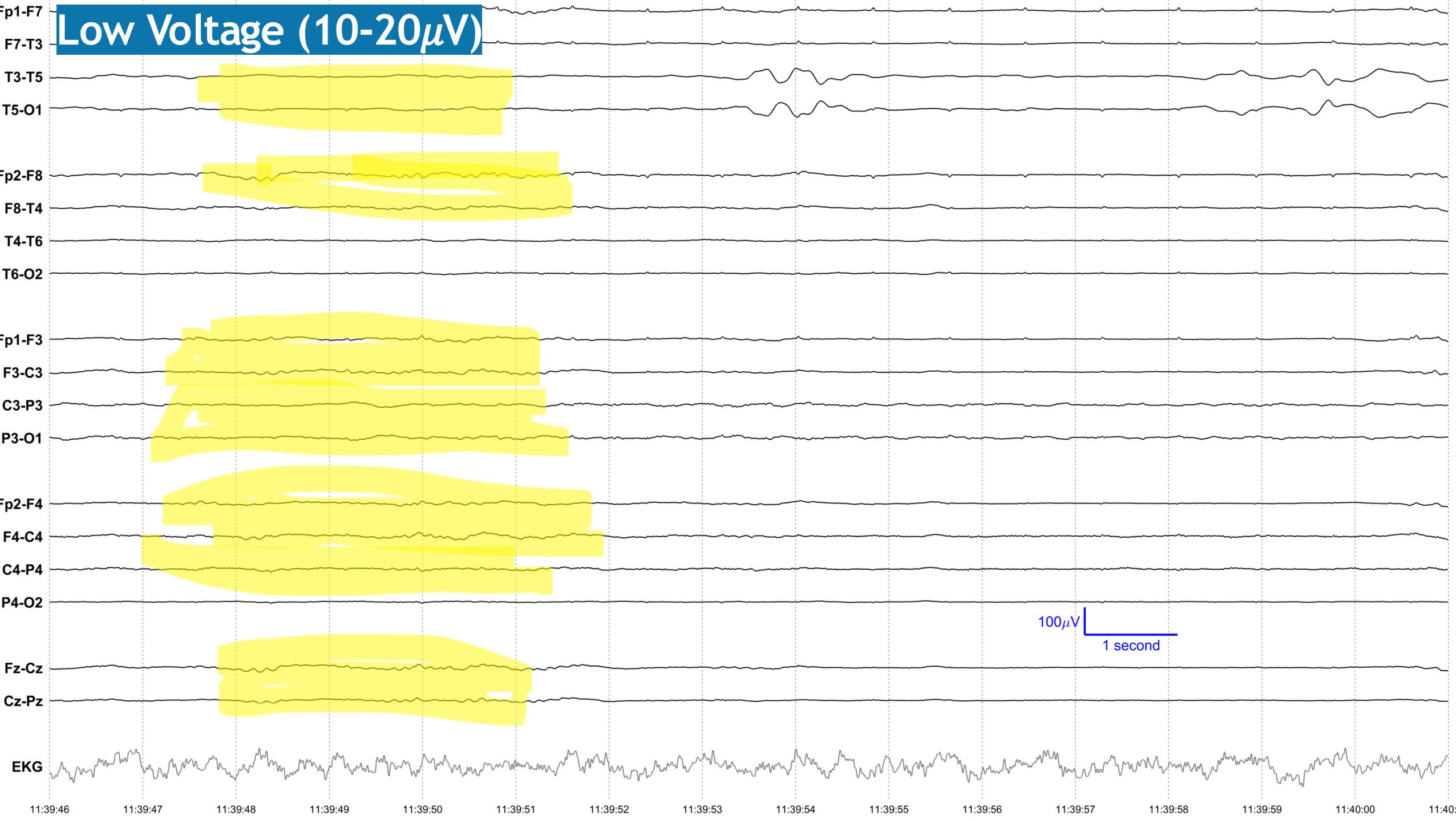
Attenuation/  
Suppression

>99%

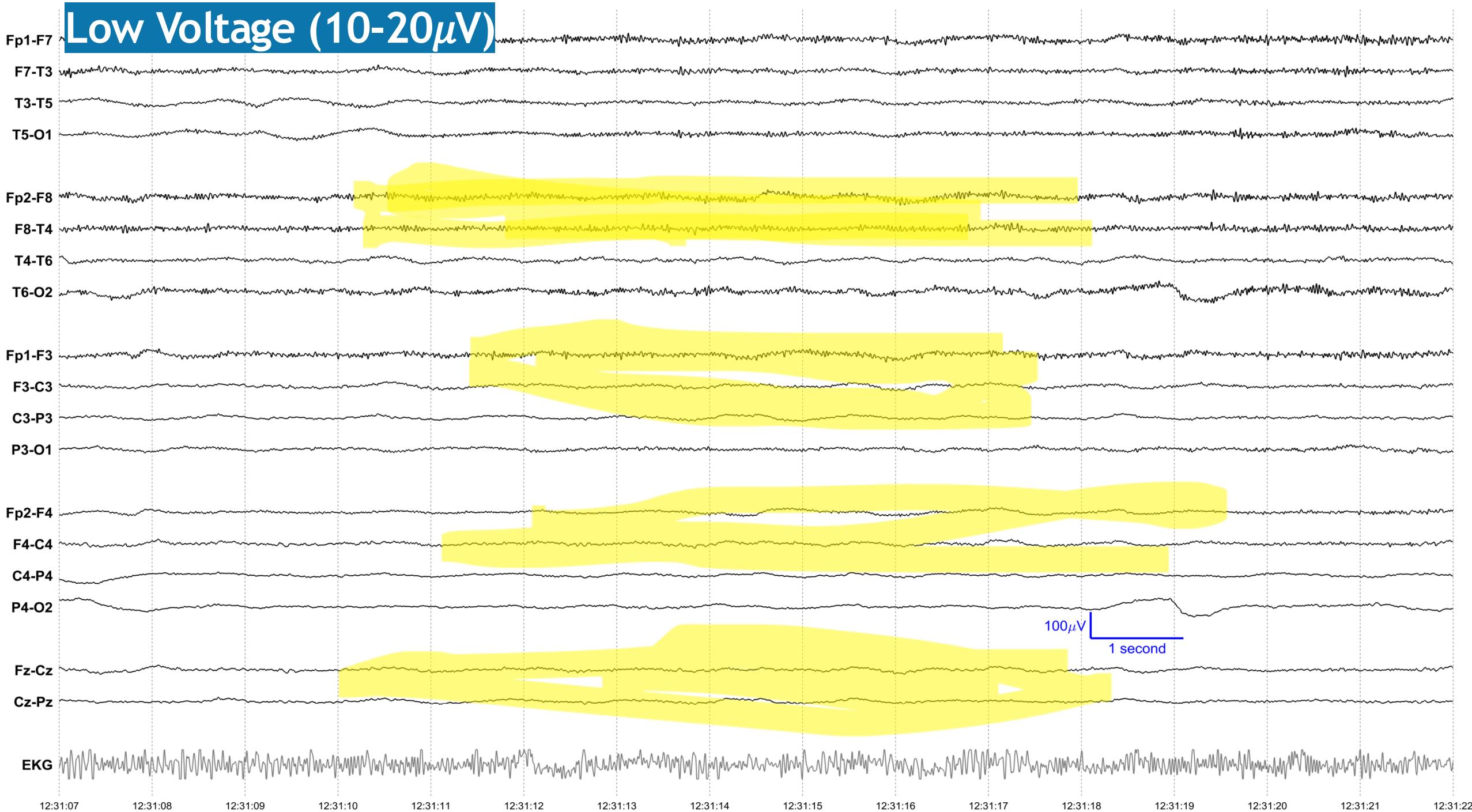




# Attenuation / Low Voltage (10-20 $\mu$ V)



# Low Voltage (10-20 $\mu$ V)



# Generalized Brief Attenuations

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1-F7

7-T3

3-T5

5-O1

2-F8

8-T4

4-T6

6-O2

1-F3

3-C3

3-P3

3-O1

2-F4

4-C4

4-P4

4-O2

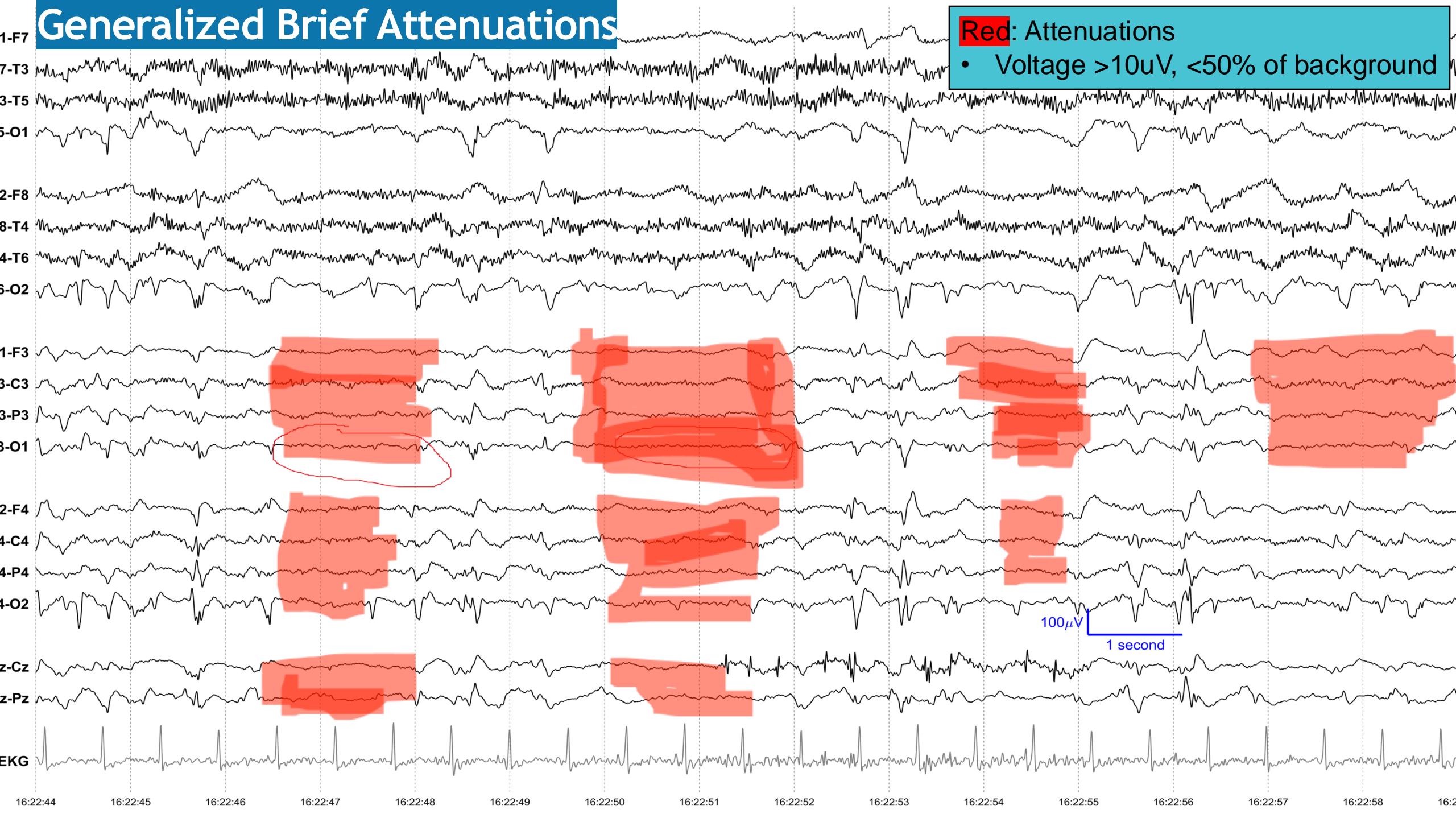
z-Cz

z-Pz

EKG

Red: Attenuations

- Voltage  $>10\mu\text{V}$ ,  $<50\%$  of background



16:22:44

16:22:45

16:22:46

16:22:47

16:22:48

16:22:49

16:22:50

16:22:51

16:22:52

16:22:53

16:22:54

16:22:55

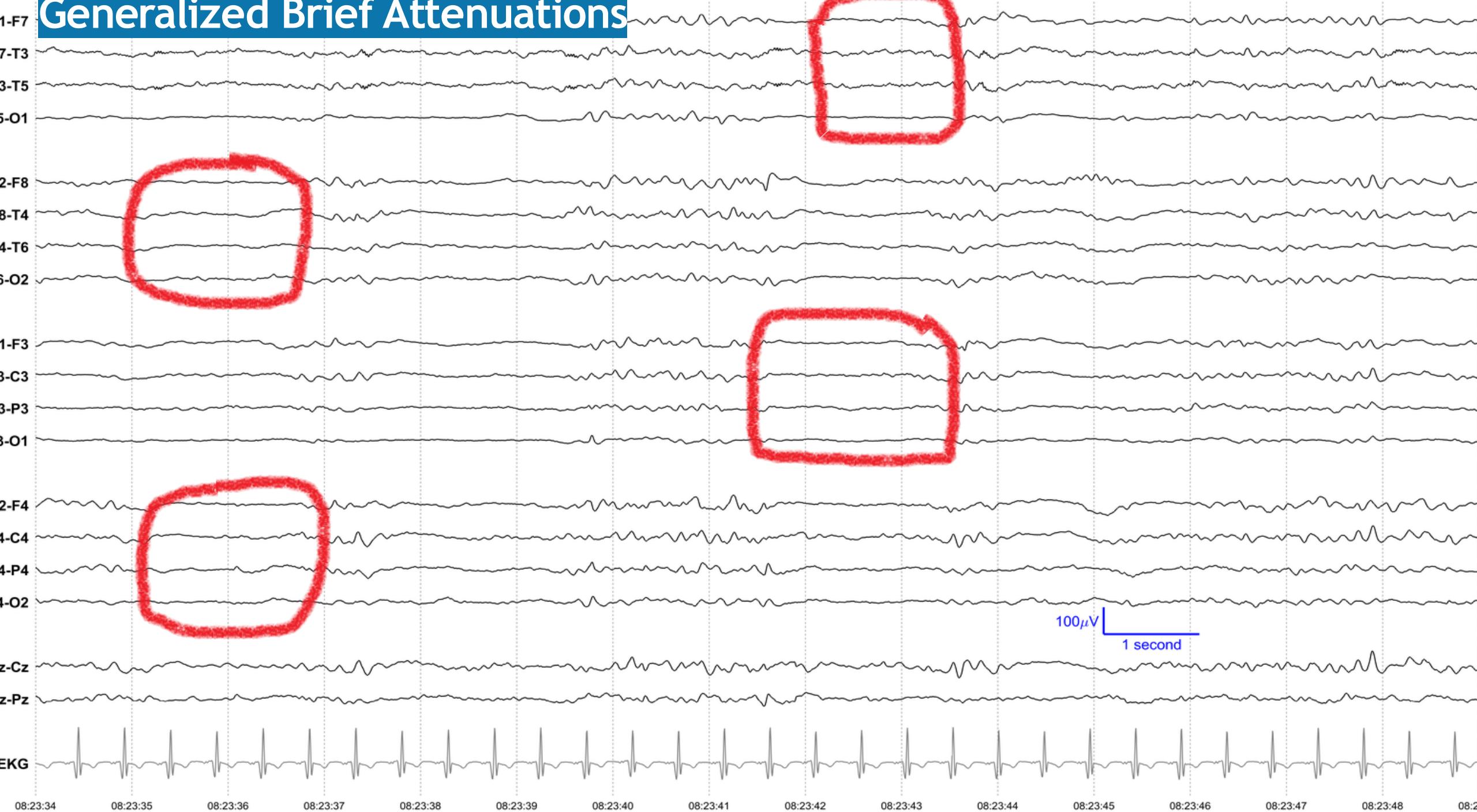
16:22:56

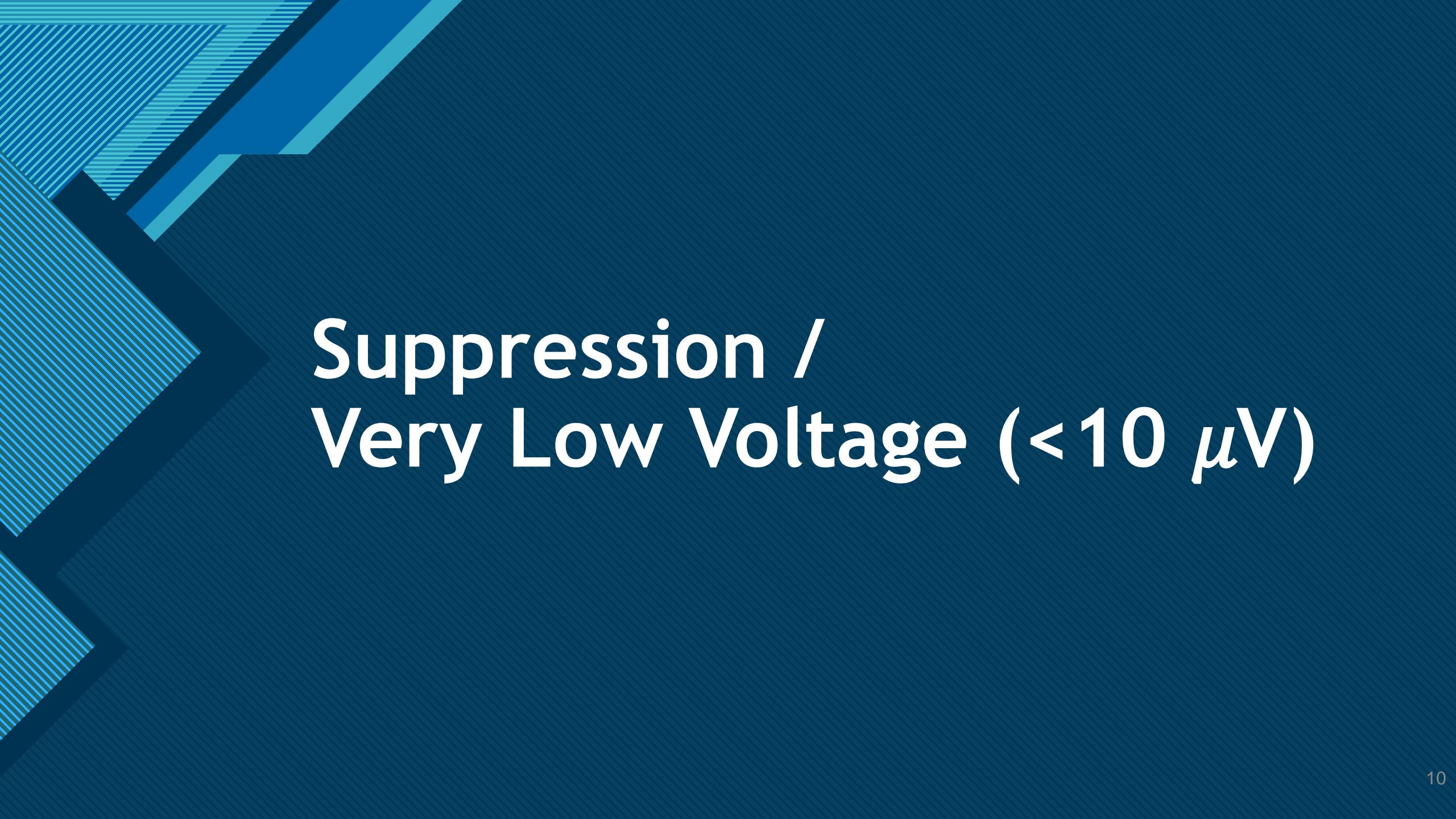
16:22:57

16:22:58

16:2

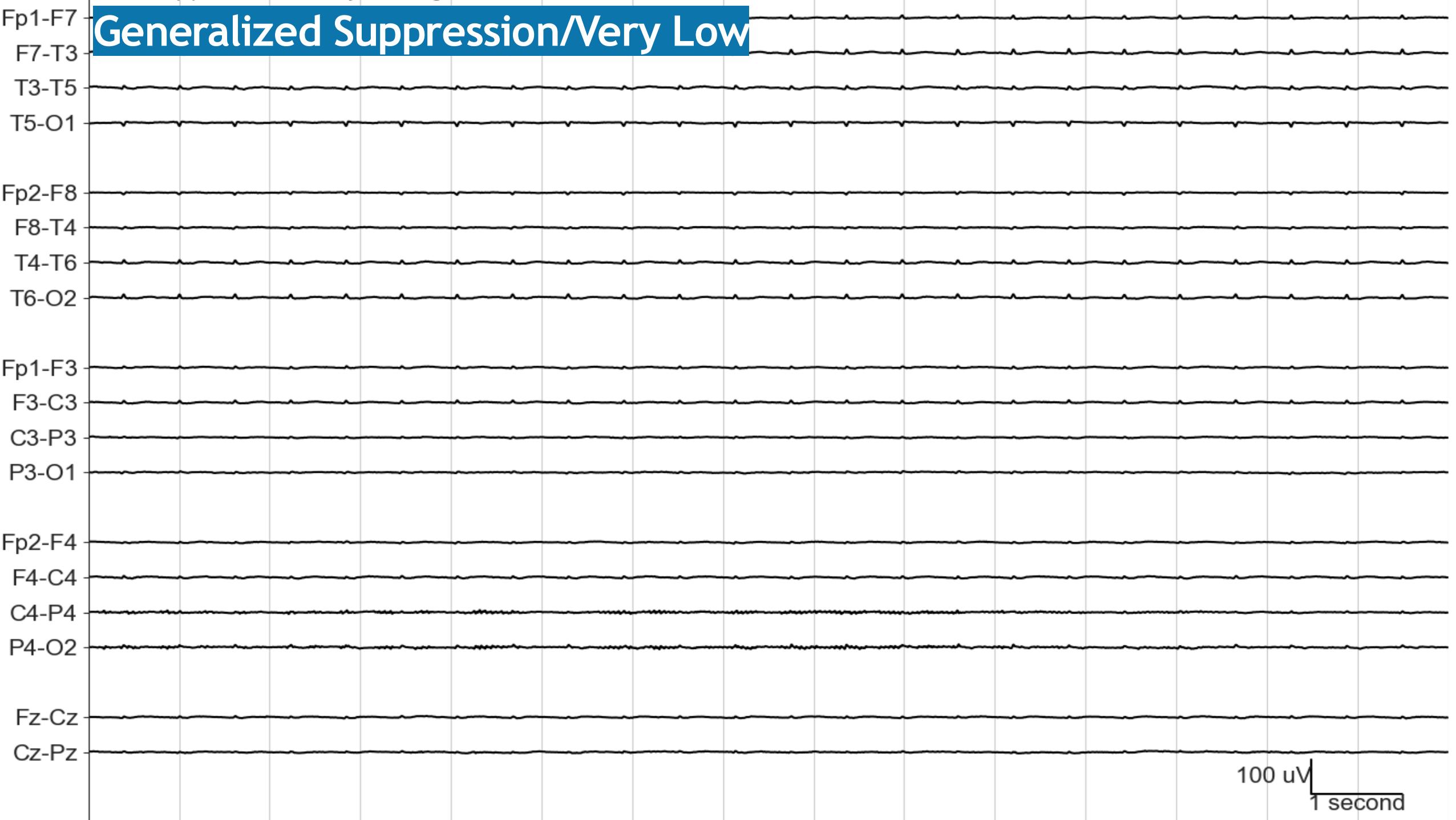
# Generalized Brief Attenuations



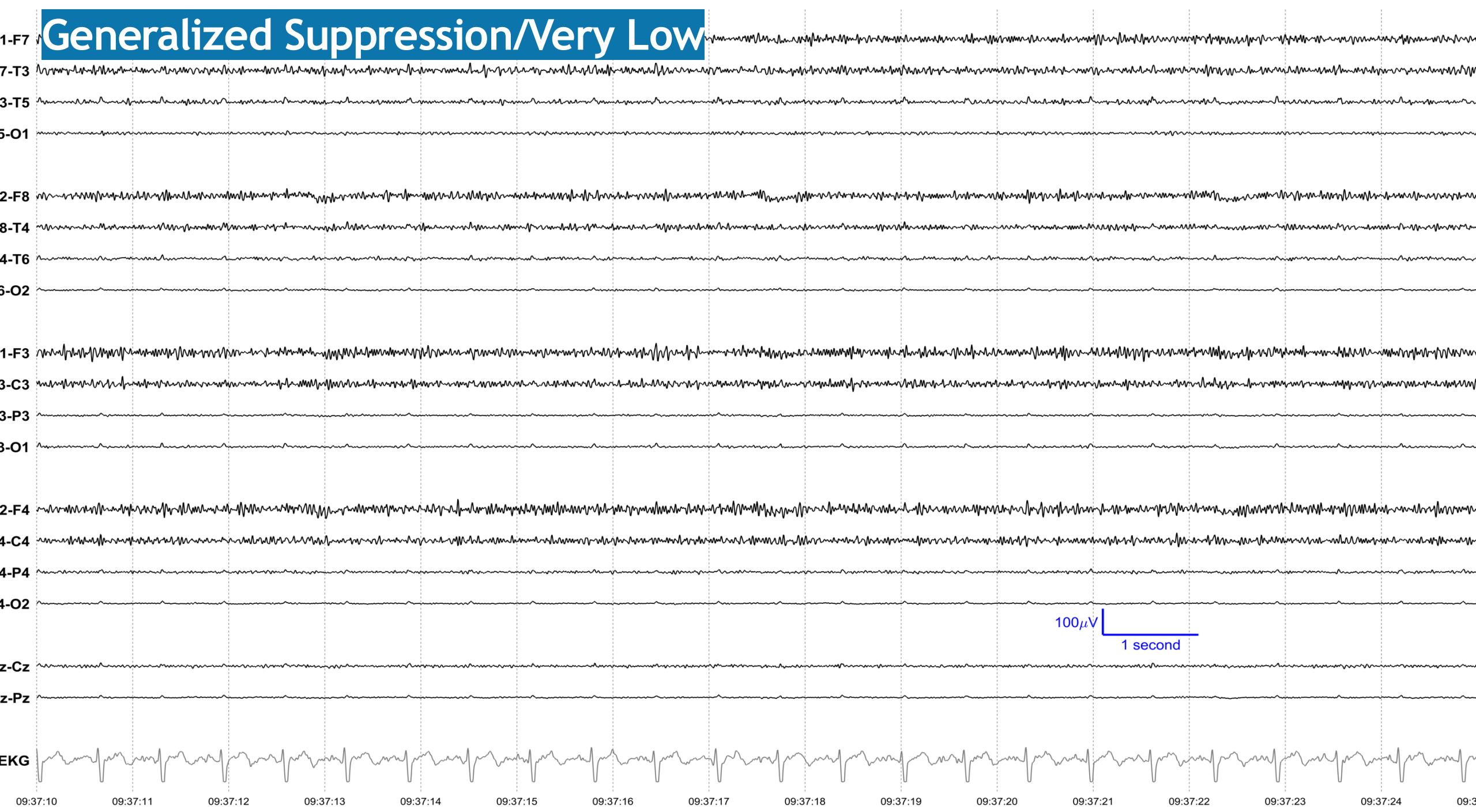


Suppression /  
Very Low Voltage (<10  $\mu$ V)

# Generalized Suppression/Very Low



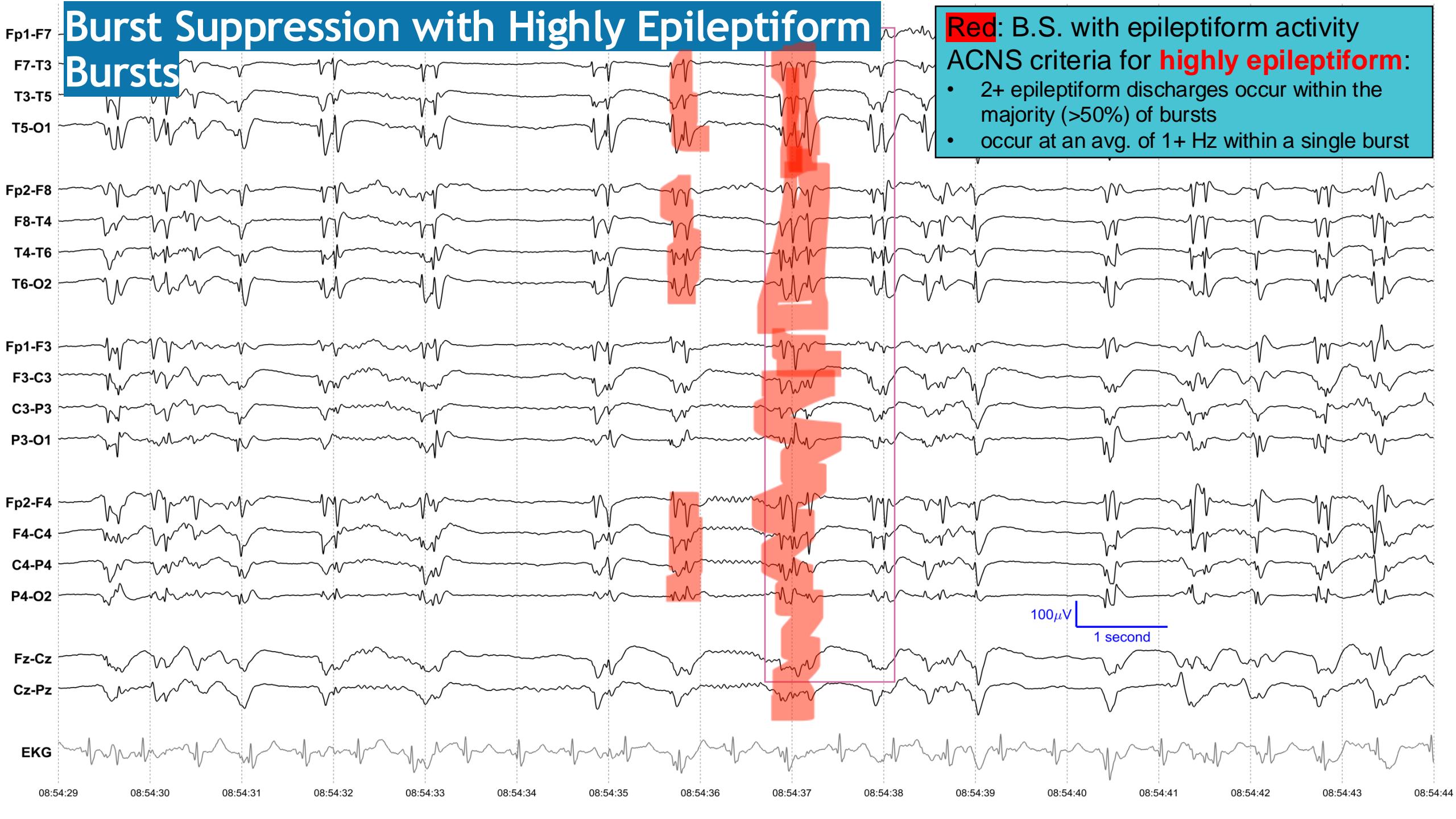
# Generalized Suppression/Very Low



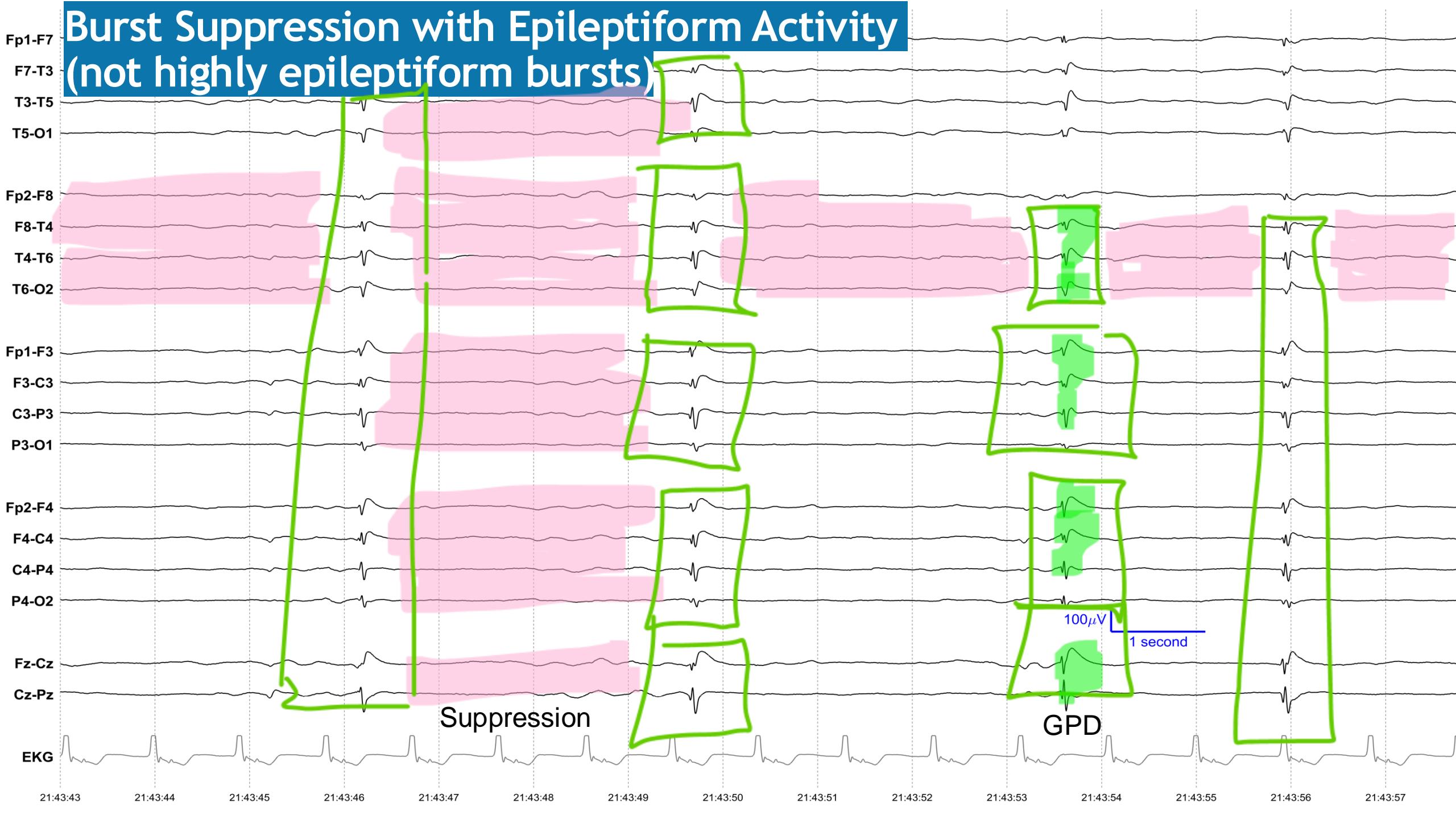
# Burst Suppression

- with Epileptiform Activity
- without Epileptiform Activity

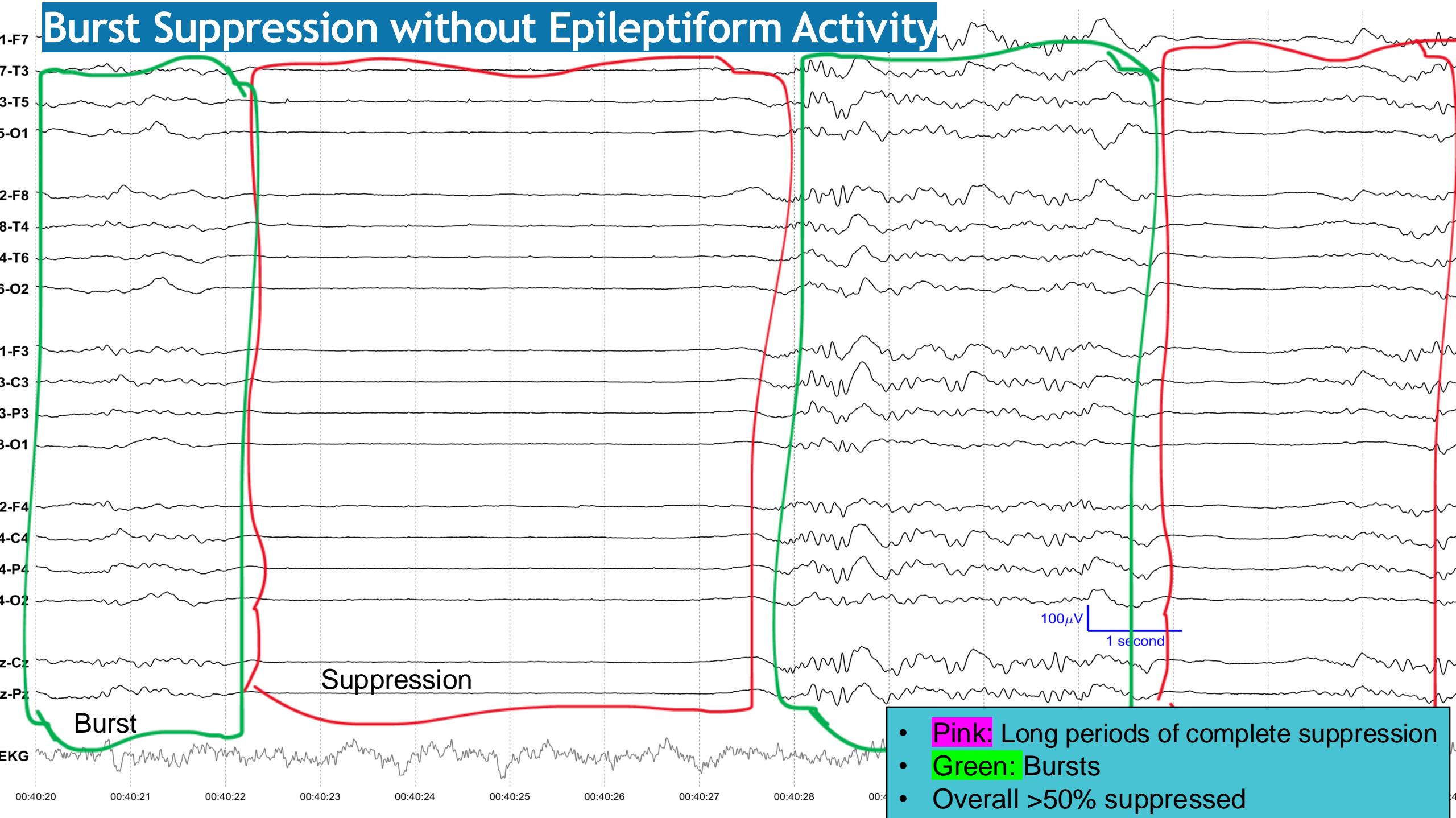
# Burst Suppression with Highly Epileptiform Bursts



# Burst Suppression with Epileptiform Activity (not highly epileptiform bursts)



# Burst Suppression without Epileptiform Activity



**Note: Bursts within non-epileptiform burst suppression patterns are comprised of some type of waveform or combination of waveforms. Therefore, these patterns will always include the background frequency (delta, theta, alpha, and/or beta) as part of the background.**

**Revisit Module A to refresh on background frequencies.**

# Wrap-up: Voltage & Burst Suppression

Definitions:  
Continuity, Voltage

Attenuation / Low  
Voltage (10-20 uV)

Generalized Brief  
Attenuations

Suppression / Very  
Low Voltage (<10  
uV)

Burst Suppression  
with Epileptiform  
Activity

Burst Suppression  
without Epileptiform  
Activity