Driver Drowsiness Detection Validation Plan:
ML/SP - Machine Learning/Signal Processing

Test Name	Success Criteria	Methodology	Result	Owner
ML/SP Accuracy	> 90% success rate	Collect strongly labeled data (fully awake/drowsy) in real time of Coady/Ali and ensure classification accuracy is above 90% over 15-minute intervals	Passed, 93.6% accuracy over 800 classifications	Ali, Coady
ML/SP Performance	For 5 second chunk of data, output drowsiness state in < 5 seconds	Send a 5 second chunk of real-time data to ML/SP and ensure a classification is output within the next 5 seconds	Passed, average of 0.18 seconds for signal processing and model output	Ali, Coady
ML/SP Transition Detection	System is able to plot the point when someone goes from awake to drowsy	Collect data over a long session of Coady/Ali when going from an awake to drowsy state and plot the classification over time	RCNN model successfully classifies awake into drowsy, tends toward drowsy	Ali, Coady
EEG Filter Lower Limit	f=8-12 Hz	When we close our eyes for a short period of time there should be a spike on our FFT spectrum analyzer in the range of 8-12 Hz	Passed	Dakota
EEG Filter Upper Limit	f<=30 Hz	Our upper frequency range of fatigue is 30 Hz and want to test if power line interference (around 60 Hz) spikes which would cause noise and misreadings.	Passed	Dakota
Voltage Amplification	Input Voltage = 148 mV - 812 mV amplified up to 1.25 V	Max voltage rating desired is 1.25 V from the amplifier IC.	Passed, Input = 200 mV (differential), Output = 1.24 V	Dakota
Amplified Final Voltage Readings	0.148<V<0.81172 But V<1.3 V Input 20 Hz, 160mV	Final voltage readings have amplified from millivolts to volts	Passed, Vrms = 0.809 V	Dakota
System voltage input	6 V	Verifying components receive proper operating voltages to function correctly.	Regulated to +-5V	All