	Test specification	Test Description	Test Result Analysis
Test No. 001	REQ-013 - The design shall utilise a computer or microcontroller.	Connect the MPU onto the PCB and supply the PCB with 12V and measure the 3.3V pin from the MPU to ensure 3.3V are outputting from the pin.	All conditions passed.
Test No. 002	REQ-014 - The design shall utilise a physical interface to take in user inputs.	Checking via python terminal to ensure the numpad inputs are received successfully.	All conditions passed.
Test No. 003	REQ-019 - The design shall utilise a combination of a display and LEDs to indicate the status of the device.	Powered the PCB to observe the green LEDs state and activated the hardware interlock switch, with no output, to observe the interlock LEDs state.	All conditions passed.
Test No. 004	REQ-018 - The design shall have one output channel.	For any 10VDC input, measure the output in ensuring the expecting output of 10VDC is returned.	All conditions passed.
Test No. 005	REQ-017 - The design output connection shall be a BNC or high-voltage BNC.	For any given input, measure the output BNC connector, expecting any value.	All conditions passed.
Test No. 006	REQ-001 - The design shall produce a DC output voltage of 0 – 200VDC.	For a maximum of 30VDC requested input, measure the output in ensuring the expecting output of up to 30VDC is returned.	Voltage above 30V output has not been tested, however all below 30V has passed.
Test No. 007	REQ-003 - The design shall produce an AC output voltage of 0 – 200Vrms.	For a maximum of 10VAC requested input, measure the output in ensuring the expecting output of up to $10VAC$ is returned.	Due to safety reasons, the team could not test up to 200Vrms, however all tests below 50Vrms have passed.
Test No. 008	REQ-024 - The design shall source input power from an external power supply adapter.	Used the power supply in Makers Lab to supply the PCB with $12V$ and measure the V_{ss} of the IC furthest away from input, indicating the IC is powered on.	All conditions passed.
Test No. 009	REQ-035 - The design shall be implemented on a PCB or protoboard if time constrained.	A series of continuity tests were taken placed after the PCB arrived.	All conditions passed.
Test No. 010	REQ-028 - The design shall accept nominal input voltages in the range of 5 - $30V_{DC}$.	A 12V input was applied to the 12-5V buck converter subsystem and the output of the converter was measured. Measured $5V$ at both 12-$5V$ buck converter.	All conditions passed.
Test No. 011	REQ-006 - The design shall have an adjustable output maximum current cut-off/trip limit tuneable in the range of 1 - 10mA.	Using the numpad, an input of desired current limit is selected and check python console to print the selected current limit.	All conditions passed.

Test No. 012	REQ-002 - The design shall produce a DC output voltage that is hardware interlock limited to 100V.	When the hardware interlock is enabled, request the power supply to output 110V. Observe the output, which should be 100V, instead of 110V.	Not tested, due to safety protocols.
Test No. 013	REQ-004 - The design shall produce an AC output voltage with hardware interlock limiting it to 50Vrms.	When the hardware interlock is enabled, request the power supply to output 60Vrms. Observe the output, which should be 50Vrms, instead of 60Vrms.	Not tested, due to safety protocols.
Test No. 014	REQ-005 - The design shall produce a maximum output current of 10mA.	After setting the current limit to 10mA in the user interface, place a load which draws more than 10mA. Observe the output using a multi meter and see if the power supply has been shut down.	The accuracy in sensing the current is not stable due to very low current.
Test No. 015	REQ-007 - The design shall protect the output from overcurrent by switching off the output in under 10 milliseconds.	Using a digital potentiometer at the output, apply load which draw more than 10mA. Start the timer in Python, once data has been sent to the digital potentiometer and when data is received from the ADC and the output has been shutoff, stop the timer and observe the elapsed time.	All conditions passed.
Test No. 016	REQ-008 - The design shall include a suitable, sealed case for safe handling.	Observe the case, in ensuring its fully sealed by a lock.	All conditions passed.
Test No. 017	REQ-009 - The design shall include a suitable case of a self-extinguishing material.	Not tested.	Not tested.
Test No. 018	REQ-010 - The design shall undergo preliminary testing with output voltages not exceeding 30V (peak) for both DC & AC.	A voltage of 35VDC was requested through the keypad to the MPU, and there was no potential at the output.	Condition 1: Only during testing.
Test No. 019	REQ-011 - The design shall comply with all relevant legal and regulatory requirements.	During the design and testing process, ensure that all design choices and testing methods are aligned with legal and regulatory requirement.	All conditions passed.
Test No. 020	REQ-012 - The design shall consist of a visual indication light to show when the interlock is engaged or disengaged.	During the modelling of the power supply case, ensure appropriate room is left to house LEDs in the front panel. The LED must be connected to the interlock module.	All conditions passed.
Test No. 021	REQ-015 - The design shall produce an AC output frequency of 50 - 300kHz sine wave.	Run the code which initiates communication to the DDS IC, and the measure the output on an oscilloscope to ensure the	All conditions passed.

		correct frequency output is acquired.	
Test No. 022	REQ-016 - The design shall produce a switchable output 100% amplitude modulated signal with a square wave signal for AC & DC outputs.	Applied a sine wave from the DDS IC and measured the output of the modulator IC using an oscilloscope. Obtained a 100% modulated square wave signal.	All conditions passed.
Test No. 023	REQ-020 - The design shall allow for output voltage adjustments with steps of 0.05V or less over full range of voltages.	Request the power supply to supply 10VDC, once successful, increase the requested voltage to 10.05VDC and observe the output.	Condition 1: Due to the digital potentiometers not working, analog potentiometers were used, hence step size of 0.05V or less is not stable.
Test No. 024	REQ-021 - The design shall allow for output frequency adjustments with steps of 10kHz for the carrier frequency.	First, use a MPU to set the DDS IC output frequency to 50kHz then measure the output. Secondly, set the DDS frequency to 60kHz via MPU and measure the output using an oscilloscope.	All conditions passed.
Test No. 025	REQ-022 - The design shall allow for current limit adjustments with steps of 2mA.	Initially the current limit is set to 10mA, meaning the output will be turned off when the MCU reads, 2.5080V from the ADC. Make an adjustment which changes the limit to 8mA and observe the code to see if the voltage at which the output shuts down has changed to 2.5064V.	All conditions passed.
Test No. 026	REQ-023 - The design shall produce a square wave signal with frequency range of 10-100Hz.	Whilst the output is connected to an oscilloscope, request the power supply to module a DC signal with 50Hz. Observe the oscilloscope to see if a square wave signal with 50Hz is produced.	All conditions passed.
Test No. 027	REQ-025 - The output type (DC/AC), voltage, modulation (ON/OFF) and output enable shall all be controlled via a digital input.	Whilst the MPU is powered on, input commands via the keypads to change DC, AC, modulation ON and OFF. Observe the code output, to see of the requested changes have been accepted.	All conditions passed.
Test No. 028	REQ-026 - The design shall minimise the voltage ripple as much as possible.	Ensure the design has used filtering capacitors and the power supplies (12-5V) has been well regulated.	All conditions passed.
Test No. 029	REQ-027 - The design shall allow for output frequency adjustment with steps of 10Hz for the square wave.	Create a base output signal by requesting a square wave with 50Hz. Once the output has been observed using an oscilloscope, change the requested square	All conditions passed.

		wave frequency to 60Hz and observe the oscilloscope.	
Test No. 030	The design shall include a suitable case that allows for programming and computer-based control without disassembly.	Not Tested	Design consists of easily removeable casing and accessible MPU connections for programming
Test No. 031	REQ-030 - All design files shall be uploaded to a Git repository with an open source / open hardware license for the project partner and other researchers.	Not Tested	Git Repository Created
Test No. 032	REQ-031 - The prototyping activities shall not exceed $350 for reimbursement purposes.	A cost register was used to keep track of the costs of components, ensuring it is under or equal to $350.	Condition 1: Used an already owned RPi 3. Condition 2: Used an already owned 5.5 inch display.
Test No. 033	REQ-032 - The design shall utilise components that are available in sufficient supply.	The components were selected from Mouser and after checking the status meaning if it's in stock, then the component could be selected.	All conditions passed.
Test No. 034	REQ-033 - The design shall operate nominally in room temperature conditions.	Power the system within load and ensure all chips are functions without heating up.	Condition 1: A heatsink was added to the pre-amplifier Op-Amp.
Test No. 035	REQ-034 - The design shall have an expected lifetime of approximately 10 years.	Choose components with long expected lifetime and high operational temperatures.	Condition 1: If the power supply is not exposed to water.
Test No. 036	REQ-036 - The design shall minimise electromagnetic interference produced as far as is practicable.	Not tested.	Not tested.
Test No. 037	REQ-037 - The design's size and weight shall be as low as possible.	Utilised SMD components to minimise weight and minimised the size of the PCB to reduce weight.	All conditions passed.
Test No. 038	REQ-038 - Frequency distortion of the sine wave shall be $\leq 2\%$	Not tested.	Not tested.
Test No. 039	REQ-039 - Step voltage ripple should be at least 10x smaller than the minimum step size (5mV)	Not tested.	Not tested.