Network Communication: All nodes within system are connected to central node via network and communicate with the central node.

Node Power Readings: Node sensors are able to detect a specific radio frequency and return a reading of the power.

Final Test: Field test requiring placement of all nodes. A radio at frequency X will be placed within the node array area and the nodes will properly communicate with the nodal network by sending the power reading from the unknown radio.

**Part 1: RF Power Measurement**

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| **Specification** | **How tested (what is the circuit condition, what test equipment is used, how is it configured and connected)** | **Definition of Success** |
| Open-circuit output voltage, 1.25V | With no load connected to the output, set the potentiometer to the minimum value. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (+) output terminal and the black (-) lead on the common terminal. | DMM reading of 1.25V or lower |
| Open-circuit output voltage, 15V | With no load connected to the output, set the potentiometer to the maximum value. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (+) output terminal and the black (-) lead on the common terminal. | DMM reading of 15V or higher |
| Current source, 1A | With two 5Ω 5W resistors in parallel as the load, set the potentiometer to a setting that outputs 10V and measure the current of the output. Use an Agilent DMM set to DC Current. Place the red (+) lead on the (+) output terminal and the black (-) lead on the load (in series). | DMM reading of 1 ±0.1A |
| Output regulation, 200mV | While the power supply is set at 10V, measure the open circuit output voltage without a load. Next, at the same 10V, measure the output voltage across two 5Ω 5W resistors in series. Compare these two values. The difference between these values is the output regulation. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (+) regulator input terminal and the black (-) lead on the regulator output terminal. | DMM reading of ≤200mV |
| Output ripple, 5mV | Use an Agilent Oscilloscope to measure the change in voltage of the smoothed ripple decay. Place the red (+) lead on the (+) regulator input terminal and the black (-) lead on the regulator output terminal. | Oscilloscope reading of ≤5mV |

**Part 2: Internal Network Communication**

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| **Specification** | **How tested (what is the circuit condition, what test equipment is used, how is it configured and connected)** | **Definition of Success** |
| Open-circuit output voltage, -1.25V | With no load connected to the output, set the potentiometer to the minimum value. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (-) output terminal and the black (-) lead on the common terminal. | DMM reading of -1.25V or higher |
| Open-circuit output voltage, -15V | With no load connected to the output, set the potentiometer to the maximum value. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (-) output terminal and the black (-) lead on the common terminal. | DMM reading of -15V or lower |
| Current source, 1A | With two 5Ω 5W resistors in parallel as the load, set the potentiometer to a setting that outputs -10V and measure the current of the output. Use an Agilent DMM set to DC Current. Place the red (+) lead on the (-) output terminal and the black (-) lead on the load (in series). | DMM reading of -1 ±0.1A |
| Output regulation, 200mV | While the power supply is set at -10V, measure the open circuit output voltage without a load. Next, at the same -10V, measure the output voltage across two 5Ω 5W resistors in series. Compare these two values. The difference between these values is the output regulation. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (+) regulator input terminal and the black (-) lead on the regulator output terminal. | DMM reading of ≤200mV |
| Output ripple, 5mV | Use an Agilent Oscilloscope to measure the change in voltage of the smoothed ripple decay. Place the red (+) lead on the (-) regulator input terminal and the black (-) lead on the regulator output terminal. | Oscilloscope reading of ≤5mV |

**Part 3: GPS Location**

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| **Specification** | **How tested (what is the circuit condition, what test equipment is used, how is it configured and connected)** | **Definition of Success** |
| Open-circuit output voltage, 5V | With no load connected to the output, measure the voltage of the output. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (+) output terminal and the black (-) lead on the common terminal. | DMM reading between 4.75-5.25V |
| Current source, 3A | With three 5Ω 5W resistor in parallel as the load, measure the current of the output. Use an Agilent DMM set to DC Current. Place the red (+) lead on the (+) output terminal and the black (-) lead on the load (in series). | DMM reading of 3 ±0.1A |
| Output regulation, 200mV | Measure the open circuit output voltage without a load. Next, measure the output voltage across three 5Ω 5W resistors in series. Compare these two values. The difference between these values is the output regulation. Use an Agilent DMM set to DC Volts. Place the red (+) lead on the (+) regulator input terminal and the black (-) lead on the regulator output terminal. | DMM reading of ≤200mV |
| Output ripple, 5mV | Use an Agilent Oscilloscope to measure the change in voltage of the smoothed ripple decay. Place the red (+) lead on the (+) regulator input terminal and the black (-) lead on the regulator output terminal. | Oscilloscope reading of ≤5mV |

**Part 4: Direction Finding Algorithm**

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| --- | --- | --- |
| **Specification** | **How tested (what is the circuit condition, what test equipment is used, how is it configured and connected)** | **Definition of Success** |
| Output voltage (peak), 6.3V | Use an Agilent Oscilloscope to measure the peak voltage of the 6.3VAC. Place the red (+) lead on the (-) output terminal and the black (-) lead on the common terminal. | Oscilloscope reading of 6.3±1.0 VAC |
| Output current, 1A | Using an Agilent Oscilloscope with two 5Ω 5W resistor in series as the load, measure the current of the output. Place the red (+) lead on the (+) output terminal and the black (-) lead on the load (in series). | Oscilloscope reading of 1 ±0.1A |
| **Note**: Verification of the 12.6 CTAC output is similar to the 6.3VAC and not needed for this lab. | | |