

QUALIFICATION TEST PLAN (QUALIFICATION HARDWARE)

QUALIFICATION TEST PLAN

Upon completion of all manufacturing activities and processes, all space qualification hardware shall be tested according to and following the order of the test plan found in Table 4. DiTom can also customize each qualification test plan to individual customer specifications.

Please feel free to contact us at 559.255.7042 or sales@ditom.com for additional information.

TABLE 4 – QUALIFICATION TEST PLAN

| Test Description | Applicable Paragraph |
|---|----------------------|
| Initial Electrical Performance Test | Paragraph 8.1 |
| Storage Temperature Cycling | Paragraph 8.2 |
| Electrical Performance Test | Paragraph 8.1 |
| Thermal Shock | Paragraph 8.3 |
| Electrical Performance Test | Paragraph 8.1 |
| Sine Vibration | Paragraph 8.4 |
| Electrical Performance Test | Paragraph 8.1 |
| Random Vibration | Paragraph 8.4 |
| Electrical Performance Test | Paragraph 8.1 |
| Operational Temperature Cycling | Paragraph 8.5 |
| Thermal Vacuum Survival and Operational Temperature Cycling | Paragraph 8.6 |
| Final Electrical Performance Test | Paragraph 8.1 |

8.1 ELECTRICAL PERFORMANCE TESTS (INITIAL, IN-PROCESS, FINAL)

Electrical performance measurements shall be performed to verify the electrical performance of the isolator/circulator. Measured data displaying insertion loss, VSWR (every port), and isolation (isolator only) performance over the full operating bandwidth shall be captured for each test. During the initial and final electrical performance tests, RF leakage performance shall also be measured at the center frequency of operation. All electrical performance tests shall be captured on a calibrated VNA given sufficient time to warm up and kept in ambient conditions (18 - 26°C, 20-65% RH) for the entire duration of the test unless otherwise specified. Tolerances/margin of error for measurements shall be per the manufacturer's user manual specifications for the VNA being used. Please contact us for a detailed electrical performance measurement procedure and VNA tolerances.

8.2 STORAGE TEMPERATURE CYCLING

Non-operational temperature cycling shall be performed to ensure the hardware meets all electrical performance specifications after being exposed to the storage temperature range per Table 2. The hardware shall be exposed to each temperature extreme for a minimum of 1 hour. The rate of change between each temperature extreme shall not exceed 20°C/minute. The hardware shall be kept at ambient conditions for no less than 1h after the test is complete prior to electrical performance measurements. Please contact us for a detailed test procedure.

8.3 THERMAL SHOCK

Thermal shock testing shall be performed to ensure the hardware can survive rapid changes in ambient temperature without any degradation to its coatings, surfaces, or electrical performance. The hardware shall be cycled between the storage temperature extremes per Table 2 with short transition times between each of the two extremes. A total of 10 full cycles shall be employed. Please contact us for a detailed test procedure.

8.4 RANDOM/SINE VIBRATION

Random vibration testing shall be performed to ensure the hardware can survive the vibrations associated with the launch and ascent of satellite vehicles without any degradation to its coatings, surfaces, or electrical performance. Please contact us for a detailed test procedure.

8.5 OPERATIONAL TEMPERATURE CYCLING

Operational temperature cycling shall be performed to ensure the hardware meets all electrical performance specifications while being exposed to the operational temperature range per Table 2. The hardware shall be powered on and exposed to each temperature extreme for 10 minutes, at which point an electrical measurement shall be made. Please contact us for a detailed test procedure.

8.6 THERMAL VACUUM SURVIVAL AND OPERATIONAL TEMPERATURE CYCLING

Thermal vacuum cycling shall be performed to ensure the hardware meets all electrical performance specifications while being exposed to the operational temperature range and vacuum levels per Table 2. This test is meant to simulate the environment seen onboard an orbiting spacecraft. Please contact us for a detailed test procedure.