Power Sub Miniature (PSM) Interface
Satellite Manufacturer Market Growth Drivers

5G Internet of Things (IoT)

Global Internet Access
SMA vs. TNC

- **Weight**
  - SMA: Up
  - TNC: Down

- **Size**
  - SMA: Down
  - TNC: Up

- **Performance**
  - SMA: Up
  - TNC: Down

- **Power Handling**
  - SMA: Down
  - TNC: Up
Power Sub Miniature (PSM) Interface

- Weight
- Size
- Performance
- Power Handling
Multipaction and Corona Breakdown

RF CYCLE

(1)

RF CYCLE

(2)

RF CYCLE

(3)

RF CYCLE

(4)

RF CYCLE

(5)

RF CYCLE

(6)

Fluxes Energy
1.02E-10

Parameters:
- Fluxes
- Energy
- Time
- Particles
PSM Design Features

- Cone/Wedge shaped dielectric
- Overlapped dielectric
- Larger coaxial line than SMA
- Uniform coaxial line
- Vent holes
PSM Design Features

PSM

[XX grams]

0.60” [15.24mm]

TNC

[XX + 50% grams]

1.00” [25.40mm]
Qualification

The interface has successfully completed both MIL-PRF-39012 and ESCC 3402 qualifications. The interface has successfully completed Multipaction / Corona / CW Power Handling Tests (ESA-VSC)

Brief summary of completed tests
- Corrosion
- Durability
- DWV
- Random & Sine Vibration
- Mechanical Shock
- Thermal Shock
- Corona
- RF High Pot
- Cable Retention Force
- RF Leakage
- VSWR / IL

**A qualification test report can be provided upon request**
Qualification

High Power Test Results (provided by ESA-VSC)

<table>
<thead>
<tr>
<th>High Power Test Results</th>
<th>Frequency</th>
<th>Temperature</th>
<th>RF Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipactor</td>
<td>1 GHz</td>
<td>+22°C</td>
<td>800 W peak</td>
</tr>
<tr>
<td>Power Handling (in vacuum)</td>
<td>1 GHz</td>
<td>+60°C</td>
<td>130 W CW</td>
</tr>
<tr>
<td>Power Handling (in vacuum)</td>
<td>4 GHz</td>
<td>+60°C</td>
<td>110 W CW</td>
</tr>
<tr>
<td>Power Handling (in vacuum)</td>
<td>11.6 GHz</td>
<td>+60°C</td>
<td>100 W CW</td>
</tr>
<tr>
<td>Corona</td>
<td>1 GHz</td>
<td>+22°C</td>
<td>100 W CW</td>
</tr>
<tr>
<td>Destructive Corona ¹</td>
<td>1 GHz</td>
<td>+22°C</td>
<td>800 W peak (1 hour)</td>
</tr>
<tr>
<td>Destructive Multipactor ²</td>
<td>1 GHz</td>
<td>+22°C</td>
<td>1500 W peak</td>
</tr>
</tbody>
</table>

¹ No breakdown was detected at 800 W peak. The maximum RF power capability of the test bed was 800 W peak for corona detection.

² No breakdown was detected at 1500 W peak. The maximum RF power capability of the test bed was 1500 W peak for multipaction detection.
# Performance Specification

## Environmental data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range</td>
<td>-65°C to +160°C (thermal vacuum test)</td>
</tr>
<tr>
<td>Thermal shock</td>
<td>MIL-STD-202, Method 107 Condition B</td>
</tr>
<tr>
<td>Moisture resistance</td>
<td>MIL-STD-202, Method 106</td>
</tr>
<tr>
<td>Corrosion</td>
<td>MIL-STD-202, Method 101 Condition B</td>
</tr>
<tr>
<td>Sine vibration</td>
<td>MIL-STD-202, Method 204, 28 g peak</td>
</tr>
<tr>
<td>Random vibration</td>
<td>MIL-STD-202, Method 214 Condition K-I, 46.3 g</td>
</tr>
<tr>
<td>Shock</td>
<td>MIL-STD-202, Method 213, 12000 g peak</td>
</tr>
</tbody>
</table>

## Electrical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>DC – 18 GHz</td>
</tr>
<tr>
<td>Return Loss (typical)</td>
<td>1 GHz: 36 dB ; 4 GHz: 31 dB ; 12 GHz: 28 dB ; 18 GHz: 26 dB</td>
</tr>
<tr>
<td>Insertion Loss (typical)</td>
<td>0.05 dB</td>
</tr>
<tr>
<td>Final specification</td>
<td>150 W CW at 1 GHz</td>
</tr>
<tr>
<td></td>
<td>76 W CW at 4 GHz</td>
</tr>
<tr>
<td></td>
<td>40 W CW at 12 GHz</td>
</tr>
<tr>
<td>Corona Threshold</td>
<td>200 W Peak</td>
</tr>
<tr>
<td>PIM performance (2x20W)</td>
<td>-168 dBC (3rd order power at 1900 MHz)</td>
</tr>
</tbody>
</table>
# Product Portfolio

| Cable Connectors | 11_PSM-50-3/4-1/111_UE | 21_PSM-50-3/4-1/111_UE |
| Surface & Panel Mount | 23_PSM-50-0-2/111_UE | 96_PSM-50-0-1/111_NE |

Can be combined with the following cable types:
- Flexible cables: Mini 141 H (32021E), SUCOFLEX 329
- Semi-Rigid cables: 35000 (low loss), EZ 141 (MIL-DTL-17)
Suitable Applications

**Space Flight**
- Payloads
- Power Amplifiers
- Phased Array Antennas
- Traveling-Wave-Tube Amplifiers (TWTAs)

**High Altitude Platforms**
- Traveling-Wave-Tube Amplifiers (TWTAs)
- Power Amplifiers
- Phased Array Antennas
- Tx Modules and Antenna Connections

**TVAC Environments**
- Adaptors
- Coaxial-Waveguide Junctions
- Coaxial Microwave Interconnections
Questions?