SpaceNXT™ MWC Series

Ku-Band Multiway Isolated Splitter
SpaceNXT™ MWC Series
Ku-Band Multiway Isolated 1:2 Splitter

Smiths Interconnect’s SpaceNXT™ MWC Series is part of an overarching initiative aimed at creating a broad range of high-reliability connectivity solutions that are readily available to the market and are pre-tested and qualified for next generation space applications. SpaceNXT™ solutions provide customers with high reliability technology while reducing their cost of ownership by shifting the testing responsibility away from them. This enables operators to overcome potential market entry barriers while enjoying the benefits of an established technology partner.

The SpaceNXT™ MWC Series is a 2-way Ku-Band isolated splitter that operates from 10.7 to 12.8 GHz. The current solution is qualified to operate in Ku-Band frequencies, however the processes and package are suitable from S to K-Band using a suite of existing modular designs. MWC Series is ideally designed to offer the commercial satellite uplink band (downlink also available) with specific attention to achieving phase stable output amplitude characteristics. It is suitable for a variety of space application from MEO/GEO satellites to deep space probes.

The MWC isolated splitter Series offers a compact and low mass structure featuring field replaceable connectors that can be adapted for alternative mechanical or electrical arrangements. It provides an insertion loss under 1.4 dB and ad inter channel isolation of 35dB. The devices are housed in an EMC shielded, RoHS compliant stackable aluminum casing and offer a factory configurable solution to operate as a combiner or a splitter.

Testing is performed in house and in compliance with general space qualification flows, incorporating industry-standard environmental requirements or custom screening and qualification flows provided by users as preferred.

Product Features
- 2-port Ku-Band isolated splitter
- Operating from 10.7 to 12.8 GHz
- Return loss all ports 18 dB min
- Low insertion loss, <1.4 dB over temperature
- Independently isolated outputs
- Field replaceable SMA connectors
- EMC shielded, RoHS stackable housing
- Factory configuration to operate as a combiner or a splitter
- Qualified in accordance with a generic environmental test sequence. Test report available on request

Applications
- MEO/GEO satellites
- Deep space probes
- Ground support equipment, suitable for TVAC
## Technical Characteristics

**Isolated 1:2 Splitter**

### Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td>10.70 – 12.80 GHz</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-20˚C to +70˚C</td>
</tr>
<tr>
<td><strong>Storage Temperature</strong></td>
<td>-40˚C to +85˚C</td>
</tr>
<tr>
<td><strong>Qualification Temperature</strong></td>
<td>-25˚C to +80˚C</td>
</tr>
<tr>
<td><strong>Isolation</strong></td>
<td>20 dB min (P1 to P2 or P3)</td>
</tr>
<tr>
<td></td>
<td>35dB min (P2-P3, P3-P2)</td>
</tr>
<tr>
<td><strong>Return Loss (50 Ohms)</strong></td>
<td>18 dB min</td>
</tr>
<tr>
<td><strong>Insertion Loss</strong></td>
<td>1.40 dB max (over operating temperature)</td>
</tr>
<tr>
<td><strong>Transmission Loss</strong></td>
<td>4.4 dB max (includes coupling loss)</td>
</tr>
<tr>
<td><strong>Transmission Loss Stability</strong></td>
<td>0.45 dB max (over temperature and life)</td>
</tr>
<tr>
<td><strong>Transmission Loss Flatness</strong></td>
<td>0.08/100 dB/MHz max</td>
</tr>
<tr>
<td><strong>Coupling Loss</strong></td>
<td>3.0 dB nom</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>1 Watt CW incident at P1</td>
</tr>
<tr>
<td><strong>EMC</strong></td>
<td>-80 dBi max</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>39g nom</td>
</tr>
<tr>
<td><strong>Output Amplitude Balance</strong></td>
<td>0.5 dB max</td>
</tr>
<tr>
<td><strong>Phase Balance</strong></td>
<td>+/- 10˚ max</td>
</tr>
<tr>
<td><strong>Phase Stability vs Temperature</strong></td>
<td>&lt; 4˚ phase/15˚</td>
</tr>
<tr>
<td><strong>Group Delay Variation</strong></td>
<td>5.0 ns</td>
</tr>
<tr>
<td><strong>Material / Finish</strong></td>
<td>Passivated Aluminium</td>
</tr>
</tbody>
</table>

---

*Schematic of an Isolated Splitter and Combiner*
Technical Characteristics

Isolated 1:2 Splitter

Qualification

<table>
<thead>
<tr>
<th>Random Vibration (3-Axis)</th>
<th>Frequency</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 50 Hz</td>
<td>+6.0 dB/Octave</td>
<td></td>
</tr>
<tr>
<td>50 - 600 Hz</td>
<td>0.5 g2/Hz</td>
<td></td>
</tr>
<tr>
<td>600 - 2000 Hz</td>
<td>-4.5 dB/Octave</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>23.6 gRMS</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>180 seconds in each of the 3 mutually perpendicular axes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sine Vibration (3-Axis)</th>
<th>Frequency</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 22.6 Hz</td>
<td>6.4 mm (0.25 in.) (0–peak)</td>
<td></td>
</tr>
<tr>
<td>22.6 - 50 Hz</td>
<td>13.0 g</td>
<td></td>
</tr>
<tr>
<td>50 - 100 Hz</td>
<td>10.0 g</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>Sweep rate 2 octave/min, 3 mutually perpendicular axes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical Shock</th>
<th>Frequency (Hz)</th>
<th>Level [SRS Q = 10]</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>280 g</td>
<td></td>
</tr>
<tr>
<td>850</td>
<td>1,260 g</td>
<td></td>
</tr>
<tr>
<td>4,000</td>
<td>4,200 g</td>
<td></td>
</tr>
<tr>
<td>10,000</td>
<td>4,200 g</td>
<td></td>
</tr>
<tr>
<td>Number of events</td>
<td>3 shocks per axis (18 in total)</td>
<td></td>
</tr>
</tbody>
</table>

TVAC Test at Operational Qualification Temperature

<table>
<thead>
<tr>
<th>Pressure in TVAC chamber to</th>
<th>1 x 10⁻⁶ Torr max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-25°C and +80°C</td>
</tr>
<tr>
<td>Low Power</td>
<td>1 Watts CW at P1</td>
</tr>
</tbody>
</table>

Thermal Cycle (Non-Operating Temperature Limits)

<table>
<thead>
<tr>
<th>Conditions</th>
<th>25°C to 80°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hour dwell at each temperature extreme</td>
<td></td>
</tr>
<tr>
<td>Transition Rate</td>
<td>4°C per minute Nominal (52 mm Hg per second)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>70%</td>
</tr>
<tr>
<td>Number of Cycles</td>
<td>50</td>
</tr>
<tr>
<td>Applicable Standard</td>
<td>MIL-STD-202 Method 7</td>
</tr>
</tbody>
</table>

Particle Impact Noise Detection (P.I.N.D.)

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Ambient Temperature 40Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>20g peak</td>
</tr>
<tr>
<td>Standard</td>
<td>MIL-STD-883</td>
</tr>
</tbody>
</table>
Technical Characteristics

Isolated 1:2 Splitter

Ambient Test Results - Return Loss

P1 Return Loss

P2 Return Loss

P3 Return Loss
Ambient Test Results - Insertion Phase

P1-P2/P3 INSERTION PHASE BALANCE

P1-P2 INSERTION PHASE

P1-P3 INSERTION PHASE
**Ambient Test Results - Insertions**

![Graph showing isolation (dB) vs. frequency (GHz)]

- **ISOLATIONS (P2-P1, P3-P2, P1-P3)**
- **Frequency (GHz)**: 10, 10.5, 11, 11.5, 12, 12.5, 13
- **Isolation (dB)**: -60, -50, -40, -30, -20, -10, 0

- **Typical P2-P1**
- **Typical P3-P2**
- **Typical P1-P3**
- **Marker 10.7 GHz**
- **Marker 12.8 GHz**
- **SPEC LINE**

**Ambient Test Results - Amplitude Balance**

![Graph showing output amplitude balance (dB) vs. frequency (GHz)]

- **OUTPUT AMPLITUDE BALANCE P1-P2 - P1-P3**
- **Frequency (GHz)**: 10, 10.5, 11, 11.5, 12, 12.5, 13
- **OAB (dB)**: -0.3, -0.2, -0.1, 0, 0.1, 0.2, 0.3

- **Typical**
- **Marker 10.7 GHz**
- **Marker 12.8 GHz**
- **SPEC LINE HI**
- **SPEC LINE LO**
Ambient Test Results - Insertion Loss

**P1-P2 INSERTION LOSS**

- Frequency (GHz): 10 to 13
- Insertion Loss (dB): -5 to 0

**P1-P3 INSERTION LOSS**

- Frequency (GHz): 10 to 13
- Insertion Loss (dB): -5 to 0
Ambient Test Results - Group Delay

P1-P2/P3 GROUP DELAY VARIATION

P1-P3 GROUP DELAY

P1-P2 GROUP DELAY
Disclaimer 2020

All of the information included in this catalogue is believed to be accurate at the time of printing. It is recommended, however, that users should independently evaluate the suitability of each product for their intended application and be sure that each product is properly installed, used and maintained to achieve desired results.

Smiths Interconnect makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use.

Smiths Interconnect reserves the right to modify design and specifications, in order to improve quality, keep pace with technological development or meet specific production requirements.

No reproduction or use without express permission of editorial and pictorial content, in any manner.
Product Portfolio

- Cable Assemblies
- Connector Solutions
- Defence Antenna Systems
- Ferrites & Passive Sub-Assemblies
- Filters
- Multi-Function RF Systems
- RF Components
- SATCOM Systems
- Semiconductor Test
- Time & Frequency Systems
- Transceivers
Global Support

Americas
- Costa Mesa, CA
  +1 714 371 1100
  info.us@smithsinterconnect.com
- Milpitas, CA
  +1 408 957 9607 x 1125
  info.us@smithsinterconnect.com
- Stuart, FL
  +1 772 286 9300
  info.us@smithsinterconnect.com
- Kirkland, QC, Canada
  +1 514 842 5179
  info.us@smithsinterconnect.com
- Hudson, MA
  +1 978 568 0451
  info.us@smithsinterconnect.com
- Northampton, MA
  +1 413 582 9620
  info.northampton@smithsinterconnectinc.com
- Tampa, FL
  +1 813 901 7200
  info.tampa@smithsinterconnectinc.com
- Kansas City, KS
  +1 913 342 5544
  info.us@smithsinterconnect.com
- Salisbury, MD
  +1 800 780 2169
  info.us@smithsinterconnect.com
- Thousand Oaks, CA
  +1 805 267 0100
  info.thousandoaks@smithsinterconnectinc.com

Europe
- Deggendorf, Germany
  +49 991 250 120
  info.de@smithsinterconnect.com
- Genoa, Italy
  +39 010 60361
  info.it@smithsinterconnect.com
- Dundee, UK
  +44 1382 427 200
  info.dundee@smithsinterconnect.com
- Rouen, France
  +33 2 32 96 91 76
  info.fr@smithsinterconnect.com
- Elstree, UK
  +44 20 8236 2400
  info.uk@smithsinterconnect.com

Asia
- Bangalore, India
  +91 080 4241 0529
  info.in@smithsinterconnect.com
- Singapore
  +65 6846 1655
  info.asia@smithsinterconnect.com
- Mianyang, China
  +86 816 231 5566
  HSICS5@hf-smiths.com
- Suzhou, China
  +86 512 6273 1188
  info.asia@smithsinterconnect.com
- Shanghai, China
  +86 21 2283 8008
  info.asia@smithsinterconnect.com