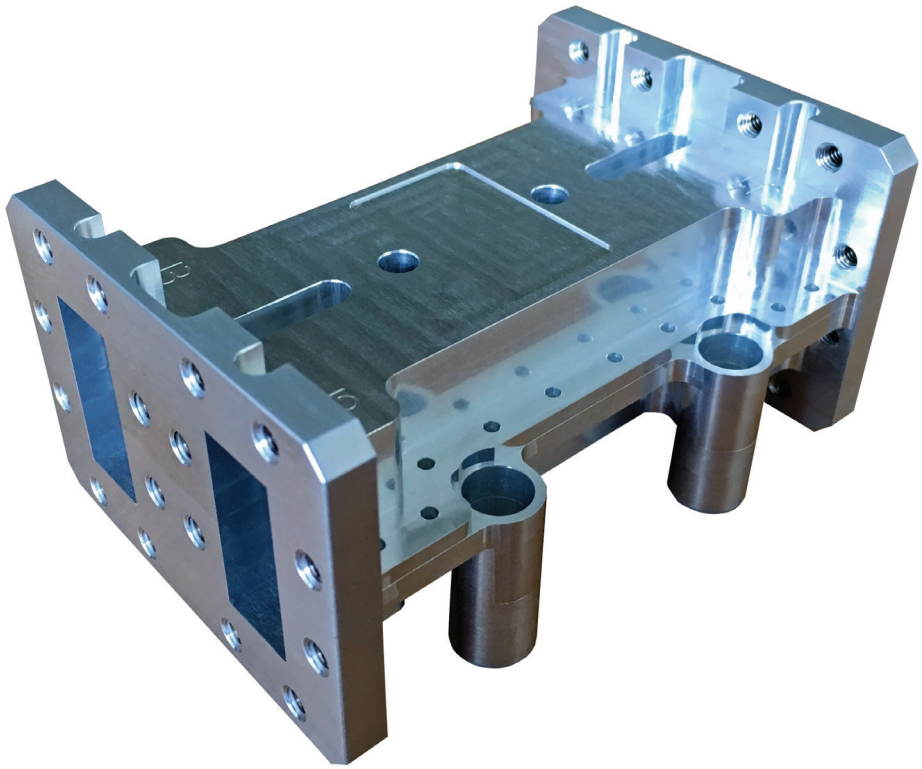
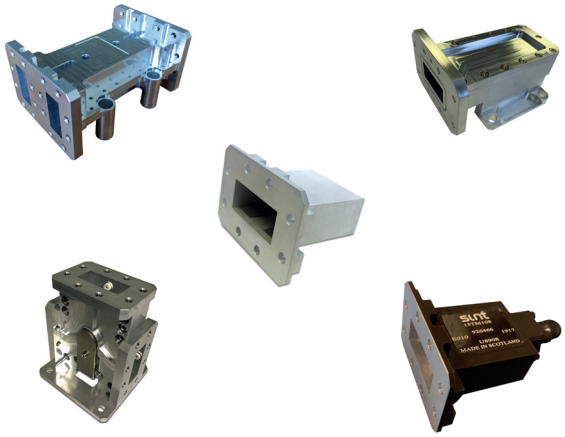
smiths interconnect

X-Band Passive Components

WR112 Waveguide Components



WR112 Waveguide Components



Broad range of X-band WR112 waveguides for space applications

Smiths Interconnect offers a comprehensive range of broadband WR112 waveguide components designed for mission critical applications including satellite communications, commercial datalinks and deep space mission management (TT&C).

The X-Band family of waveguide passive components are part of Smiths Interconnect's overarching initiative to create a broad range of readily accessible space qualified waveguide isolators, circulators, terminations, transitions, hybrids and couplers.

Our waveguides passive components are optimised to operate over broad assigned frequency bands. Product screening and qualification are conducted in-house using our comprehensive suite of test facilities including thermal shock and cycling, sine/random vibration, mechanical shock and, where appropriate, CW and peak power under TVAC, critical power and seeded multipaction. Summary and qualification data reports are available to prospective customers.

The devices are supplied in aluminium housings with a standard clear passivation coating. Low emissivity paint or precious metal plating is available on request. High power devices can be supplied with low emissivity black paint finish if desired.

Features & Benefits

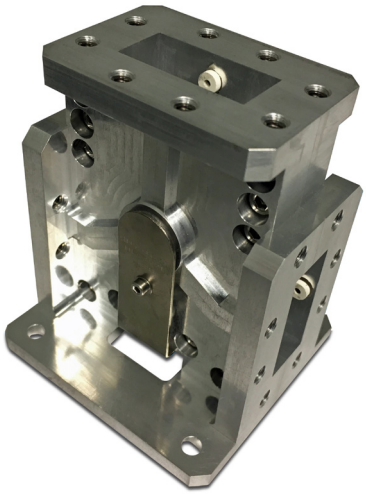
- Broad range of space qualified X-band waveguide products available with qualification data
- Broadband requiring fewer part options to address the allocated frequency band
- Temperature stable and multipaction free
- Minor mechanical modifications can be incorporated upon request, (circulation, flange detail etc)
- In-house facilities for average, multipaction, critical power, mechanical-shock and sine/random vibration environmental stress
- Sample data and test reports available to assist the design and qualification process

Applications

- LEO Satellities
- MEO Satellites
- GEO Satellites

X-Band WR112 high-power circulator

D35/833333



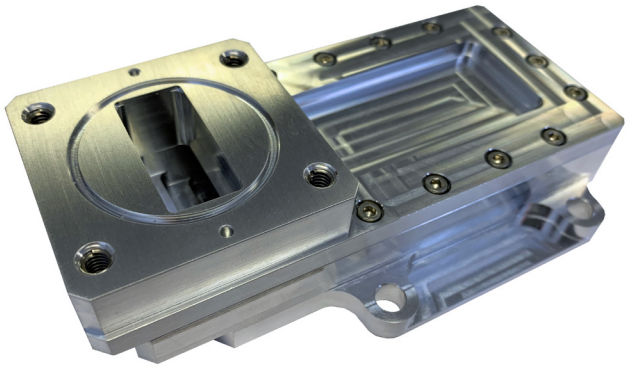
The X-Band WR112 high-power circulators were designed to be used in the 7-9 GHz range and for TWTA and TT&C data communications applications. This WR112 circulator is rated as No Licence Required (NLR).

Specifications

High-power circulator	Performance
Part Number	15CD362
Function	Circulator
Non-operating	-30 to +135C
Acceptance	-20 to +120C
PFM & Qualifaction	-25 to +125C
Operating Frequency	7.2 to 9.0 GHz
Insertion Loss	0.15dB max
Return Loss	20dB min
Power handling	340W CW [PFM], 215W CW [FM]
Multipaction	340W pk by test, 677W pk by analysis
Radiated Emissions	80dBi min
Mass	224g nom
Environment	LEO and GEO applications

X-Band WR112 high-power termination

C83327



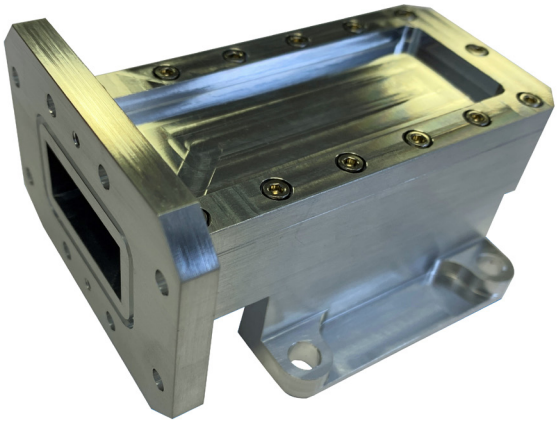
The X-Band WR112 high-power termination is designed for use in the 7.2-10.2 GHz range for TWTA and TT&C data communication applications. This WR112 termination is rated as No License Required (NLR).

Specifications

High-power termination	Performance
Part Number	15TE127
Function	Termination
Non-operating	-40 to +150C
PFM & Qualifaction	-25 to +135C
Acceptance	-20 to +130C
Operating Frequency	7.2 to 10.2 GHz
Return Loss	20dB min
Power handling	340W CW [PFM], 215W CW [FM]
Multipaction	680W pk by test, 1354W pk by analysis
Radiated Emissions	80dBi min
Mass	360g nom
Environment	Deep space missions, GEO applications

X-Band WR112 high-power termination

D35/83393



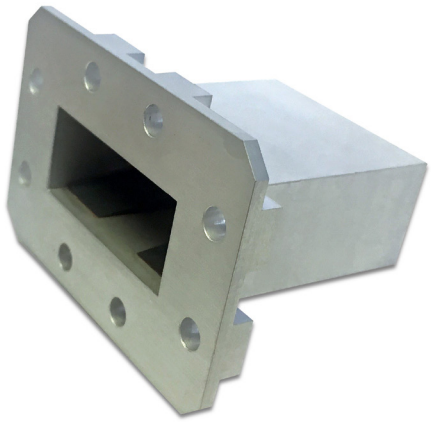
The X-Band WR112 high-power termination is designed to terminate the junction to create the 15HD366. It is designed to be used in the 8.0-8.4 GHz range and has substantial flight heritage in GEO & deep space missions.

Specifications

High-power termination	Performance
Part Number	D35/83393
Function	Termination
Non-operating	-45 to +125C
PFM & Qualifaction	-25 to +125C
Acceptance	-25 to +125C
Operating Frequency	8.0 to 8.4 GHz
Return Loss	25dB min
Power handling	80W CW [FM]
Multipaction	10dB min by analysis
Radiated Emissions	80dBi min
Mass	360g nom
Environment	Deep space missions, GEO and hybrid application

X-Band WR112 medium-power termination

C35/83387



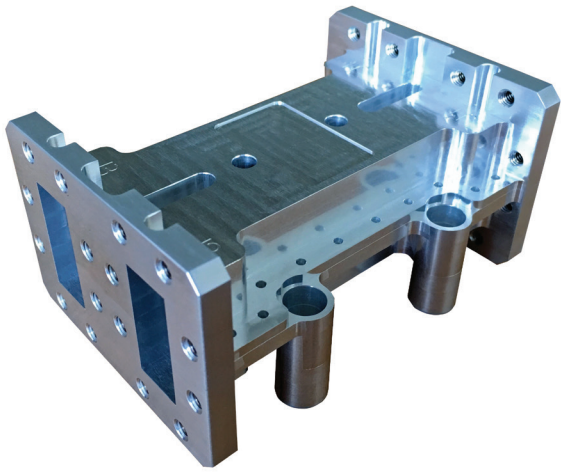
The X-Band WR112 medium-power termination was designed to be used in the 7-10 GHz frequency range in TWTA and TT&C data communications applications. Most WR112 parts are classed as No License Required (NLR).

Specifications

High-power termination	Performance
Part Number	15TE128
Function	Termination
Non-operating	-45 to +120C
PFM & Qualifaction	-35 to +125C
Acceptance	-35 to +120C
Operating Frequency	7.0 to 10.0 GHz
Return Loss	23dB min
Power handling	3W CW [PFM], 2W CW [FM]
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	37g nom
Environment	Deep space and GEO applications

WR112 2x2 hybrid coupler

D83359



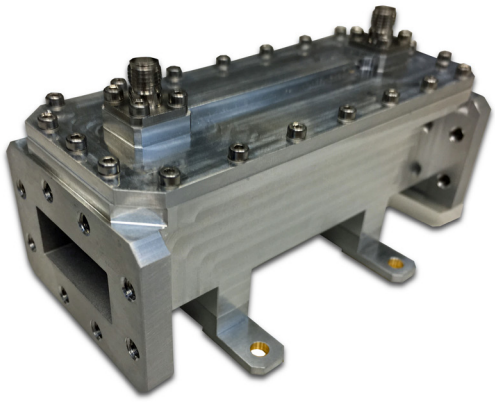
The WR112 2x2 hybrid couplers are designed as a power splitter or combiner with their function and power handling capacity dependent on how they are used and whether one of the ports is suitably terminated. This item is arranged so that the coupling is between the broad walls and boasts substantial flight heritage in LEO missions. Broad-wall coupling is employed to make a more compact product.

Specifications

Hybrid coupler	Performance
Part Number	15WC401
Function	Hybrid Coupler
Non-operating	-45 to +125C
PFM & Qualifaction	-30 to +125C
Acceptance	-25 to +120C
Operating Frequency	7.2 to 8.4 GHz
Insertion Loss	0.10dB max
Return Loss	23dB min
Isolation	23dB min
Coupling	-33+/-0.2dB max
Amplitude Balance	0.2dBp-p max
Power handling	375W CW [PFM], 12W CW [FM]
Radiated Emissions	80dBi min
Multipaction	21dB min
Mass	240g nom
Environment	Deep Space, LEO and GEO applications

X-Band WR112 SMA test coupler

D83328



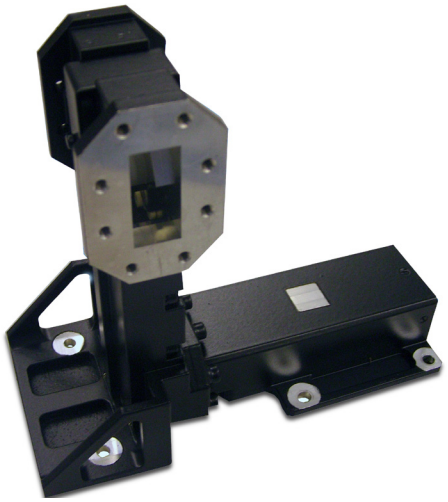
The X-Band WR112 SMA test coupler features forward and reverse couplers with SMA interfaces and is used in transmission systems. The power handling refers to the power being transmitted through the main path.

Specifications

Test coupler	Performance
Part Number	15TC401
Function	Test Coupler
Non-operating	-45 to +125C
PFM & Qualifaction	-30 to +125C
Acceptance	-30 to +120C
Operating Frequency	7.2 to 9.2 GHz
Return Loss	23dB min
Directivity	20dB min
Insertion Loss	0.09dB max
Coupling	-33.0+/-0.2 dB max
Power handling	375W CW [PFM], 375W CW [FM]
Radiated Emissions	80dBi min
Multipaction	10dB by analysis
Mass	240g nom
Environment	LEO missions

X-Band WR112 high-power isolator

C35/82970



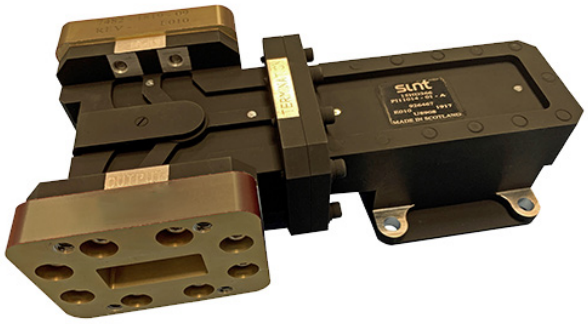
The X-Band WR112 high-power isolator is designed for use in the 8-8.5 GHz range for TWTA applications for communications and TT&C. It boasts an interesting flight heritage deep space programs including missions to Mars and Mercury and shortly on the Juice mission to Jupiter. These devices exist in several variants ranging from 100W to 180W CW. The use of low emissivity paint is a requirement of the originating user.

Specifications

High-power isolator	Performance
Part Number	15HD360
Function	Isolator
Non-operating	-50 to +140C
PFM & Qualifaction	-25 to +135C
Acceptance	-15 to +100C
Operating Frequency	8.0 to 8.5 GHz
Insertion Loss	<0.10dB max
Return Loss	<26dB min
Isolation	<23dB min
Power handling	160W CW [FWD], 120W CW [REV]
Multipaction	>10dB by analysis
Radiated Emissions	80dBi min
Mass	520g nom
Environment	Deep space missions

X-Band WR112 high-power isolator

C35/83394



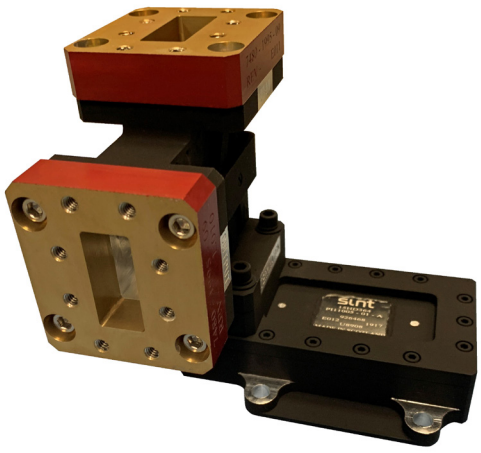
The X-Band WR112 high-power isolator was designed to be used in the 8.3 to 8.5 GHz frequency range for data link and TT&C communications. It boasts an interesting flight heritage and has been used on missions to Mars and Mercury. These devices exist in several variants ranging from 100W to 180W CW. The use of low emissivity paint is a requirement of the originating user.

Specifications

High-power isolator	Performance
Part Number	15HD366
Function	Isolator
Non-operating	-50 to +140C
PFM & Qualifaction	-25 to +135C
Acceptance	-15 to +100C
Operating Frequency	8.3 to 8.5 GHz
Insertion Loss	<0.10dB max
Return Loss	23dB min
Isolation	23dB min
Power handling	80W CW [FWD], 120W CW [REV]
Multipaction	>10dB by analysis
Radiated Emissions	80dBi min
Mass	520g nom
Environment	Double Asteroid Redirection Test (DART) and deep space missions

X-Band WR112 high-power isolator

D35/83391 (CW) & D35/83391 (CCW)



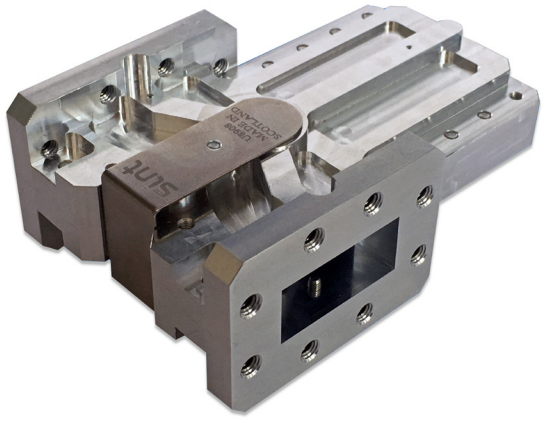
The X-Band WR112 high-power isolators were designed to be used in the 8.35 to 8.5 GHz frequency range and used on the output of a deep space transmission system. It has substantial flight heritage and was qualified for the harshest of space environments. The use of low emissivity paint is a requirement of the originating user.

Specifications

High-power isolator	Performance
Part Number	15HD364 (CW) & 15HD365 (CCW)
Function	Isolator
Non-operating	-35 to +120C
Acceptance	-25 to +55C
Operating Frequency	8.35 to 8.5 GHz
Insertion Loss	0.1dB
Return Loss	23dB min
Isolation	23dB min
Power handling	80W CW [FM]
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	530g nom
Environment	Deep space missions

X-Band WR112 low-power isolator

C35/83380



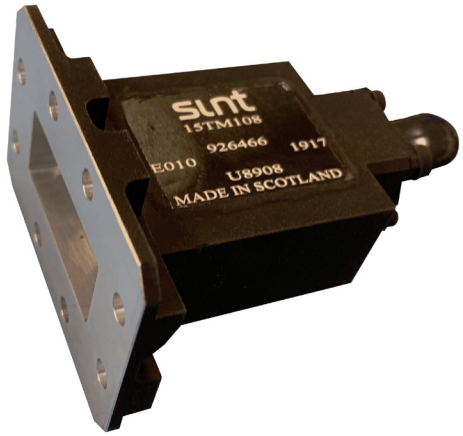
The 15HD363 low-power X-Band WR112 isolator was designed to be used in a variety of low to medium power applications and is used primarily n receiver applications in low earth orbit.

Specifications

Low-power isolator	Performance
Part Number	15HD363
Function	Isolator
Non-operating	-40 to +85C
Acceptance	-35 to +70C
Operating Frequency	7.5 to 8.3 GHz
Insertion Loss	0.12dB max
Isolation	23dB min
Power handling	1W CW
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	196g nom
Environment	LEO & GEO missions

X-Band WR112 high-power transition

C35/83394



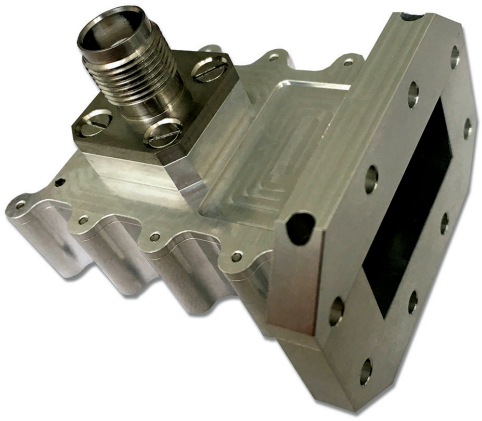
The X-Band WR112 high-power transition was designed to be used in the 7.1 to 8.5 GHz frequency range and used in TT&C and related applications. This device has substantial flight heritage in GEO & deep space applications and is supplied in various mechanical forms.

Specifications

High-power transition	Performance
Part Number	15TM108
Function	Transition End launched TNC transition with shorted centre contact
Non-operating	-60 to +100C
Acceptance	-25 to +85C
Operating Frequency	7.1 to 8.5 GHz
Insertion Loss	0.2dB max
Return Loss	23dB min
Power handling	70W CW
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	66g nom
Environment	GEO and deep space missions

X-Band WR112 high-power transition

C108269



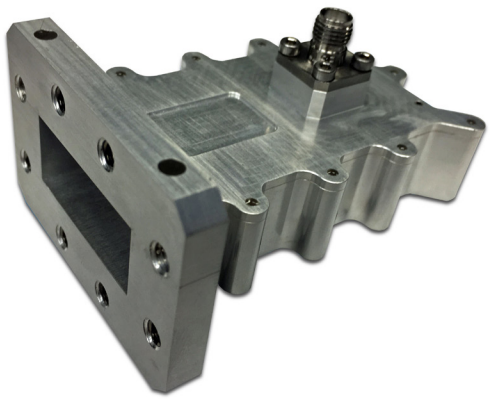
The X-Band WR112 high-power transition was designed to be used in the 7.1 to 8.5 GHz frequency range and used in TT&C and related applications. This device has substantial flight heritage in GEO & deep space application and is supplied in various mechanical forms.

Specifications

High-power Transition	Performance
Part Number	15TM105
Function	Orthogonally launched TNC transition with shorted centre contact
Non-operating	-40 to +95C
Acceptance	-40 to +80C
Operating Frequency	7.1 to 8.5 GHz
Insertion Loss	0.15dB min
Return Loss	23dB min
Power handling	80W CW [PFM], 12W CW [FM]
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	80g nom
Environment	GEO and deep space missions

X-Band WR112 medium-power transition

C108511



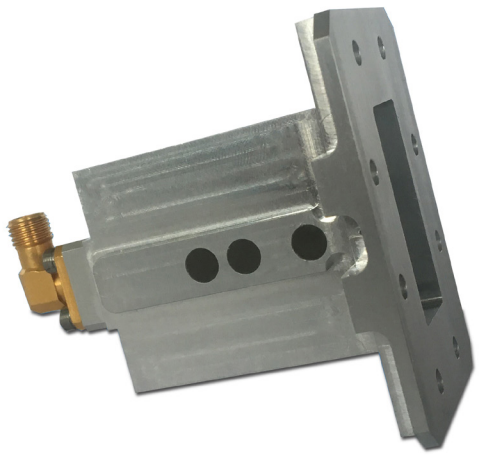
The X-Band WR112 high-power transition was designed to be used in the 7.2 to 9.0 GHz frequency range and used in TT&C and related applications. This device has substantial flight heritage in GEO & LEO applications and is supplied in various mechanical forms.

Specifications

High-power transition	Performance
Part Number	15TM106
Function	Orthogonally launched SMA transition with shorted centre contact
Non-operating	-55 to +125C
Acceptance	-40 to +120C
Operating Frequency	7.2 to 9.0 GHz
Insertion Loss	0.15dB max
Return Loss	23dB min
Power handling	16W CW
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	83g nom
Environment	LEO, GEO and deep space missions

X-Band WR112 low-power transition

C182900



The X-Band WR112 low-power transition is used in feed to a power combining system. This device has flight heritage with deep space missions and is supplied in a variety of mechanical forms.

Specifications

Low-power transition	Performance
Part Number	15TM103
Function	End launched right angled SMA transition with shorted centre contact
Non-operating	-40 to +90C
Acceptance	-25 to +85C
Operating Frequency	7.1 to 8.5 GHz
Insertion Loss	0.20dB max
Return Loss	23dB min
Power handling	2W CW
Radiated Emissions	80dBi min
Multipaction	10dB min by analysis
Mass	80g nom
Environment	GEO and deep space missions