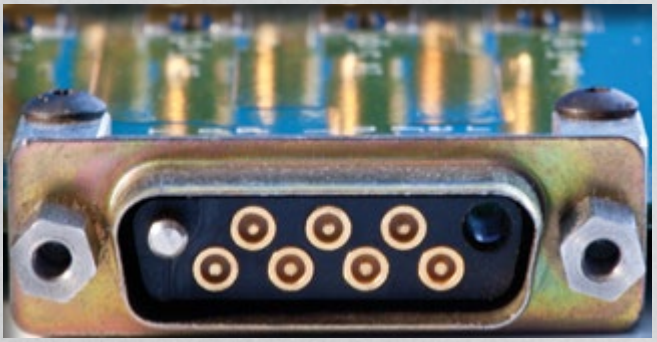
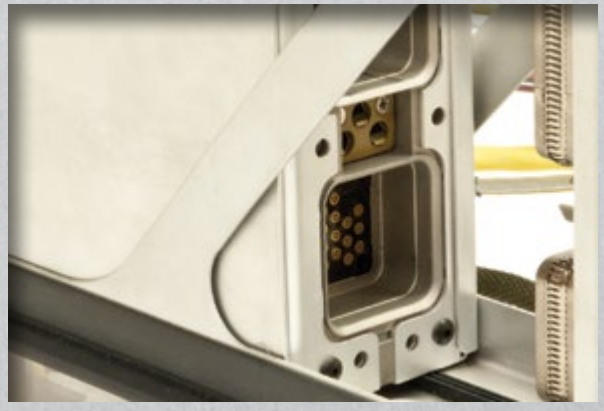
HDRFI

High Density RF Interconnect





CARLISLE
INTERCONNECT TECHNOLOGIES

HDRFI® Offerings

RF D-SUB & MIXED SIGNAL

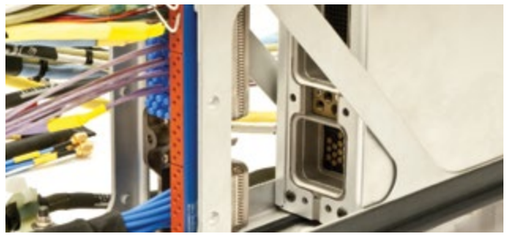
The RF D-Sub connector family is available in four different shell sizes and can be used in cable-to-cable, cable-to-board or board-to-board applications. Designed with high performance in mind, the insert arrangements are maximized to hold more impedance controlled size 16 type RF contacts than any other D-sub connector on the market today. The HDRFI RF contacts are press-in style and the connectors can accommodate standard D-sub backshells and mounting hardware.

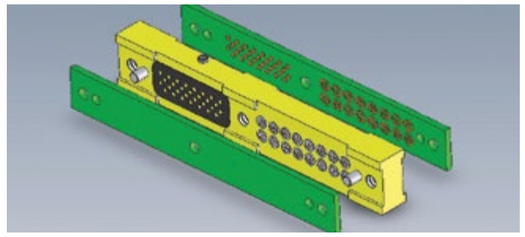
RF CIRCULAR & MIXED SIGNAL

The RF Circular connector family is designed for high performance applications where high vibration is a factor. The insert arrangements are maximized to hold more impedance controlled size 16 type RF contacts than any other circular connector on the market today. The circular product line consists of shell sizes 15 – 25 and are based on the D38999 specification. RF Circular Mixed Signal connectors combine both power and high frequency RF contacts into the same connector body. The signal pins are size 20, rated to 7 amps and are combined with the HDRFI RF contacts. The HDRFI RF contacts are press-in style and the connectors can accommodate standard D38999 backshells and hardware.

CUSTOM APPLICATIONS

HDRFI can be customized to fit almost any application. From custom board connectors, to insert arrangements that can have a common ground plane, to having each signal path isolated from each other.





ITAR FREE

RoHS COMPLIANT

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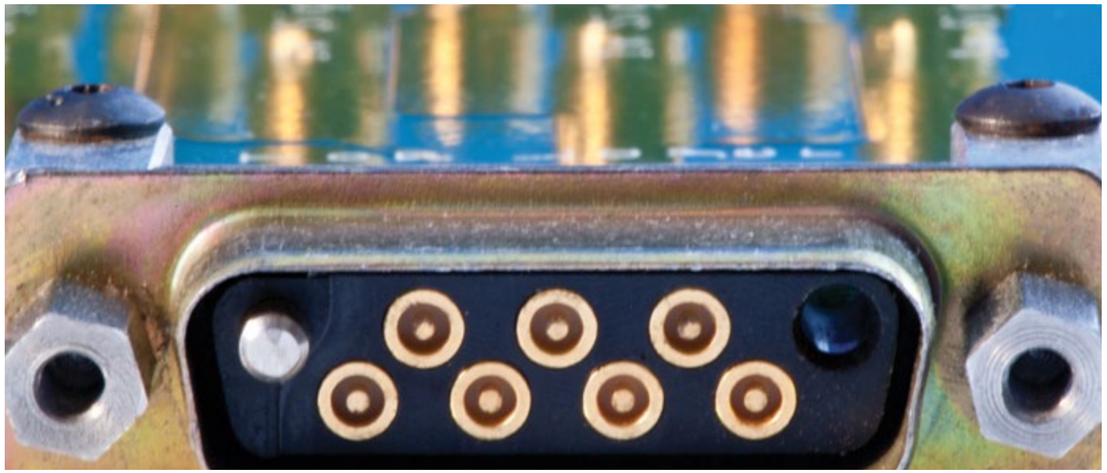


High Density RF Interconnect

HDRFI® is a patented Carlisle Interconnect Technologies connection system that transfers high frequency signals through a unique planar interface. This planar interface removes the need for typical pin and socket connections by utilizing a z-axis elastomer to provide the electrical path between the mated connectors. The elastomer is made up of silicone, impregnated with gold plated stainless steel wires and is arranged on a .035mm pitch. When compressed by the mating halves, the gold plated wires mechanically connect the two planar surfaces and creates an electrical EMI barrier to provide excellent isolation. HDRFI® is available only as an assembly in three product line offerings: D-Sub, RF Circular and custom applications. The assemblies can be used with a 26AWG coax for internal applications or 24AWG for external requirements. Consult factory for more information.

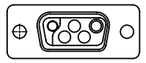
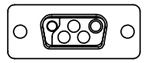
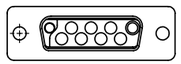
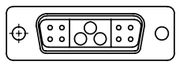
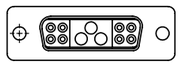
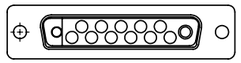
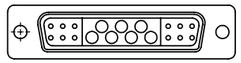
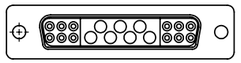
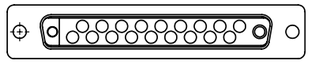
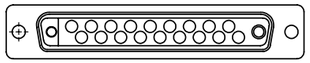
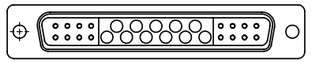
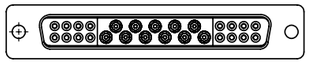
Features & Benefits

- » High Bandwidth
- » High Density
- » Small Form Factor
- » Typical Center to Center spacing 0.130”
- » Eliminates Stubbing
- » Alignment of the connector is not made through the RF path
- » Can be used differentially or single ended

Carlisle Interconnect Technologies / 7911 S 188th St. #100 / Kent, WA 98032 / T. 800.227.5953 / F. 425.251.8826 / www.CarlisleIT.com

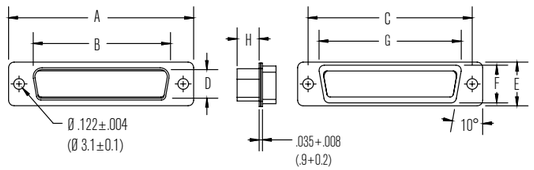
RF D-Sub & Mixed Signal

Configurations

Size	Shell Configuration
1	 3 RF  3 RF (Receptacle)
2	 7 RF  3 RF 8 D  3 RF 8 D (Receptacle)
3	 11 RF  7 RF 12 D  7 RF 12 D (Receptacle)
4	 18 RF  18 RF (Receptacle)  11 RF 16 D  11 RF 16 D (Receptacle)

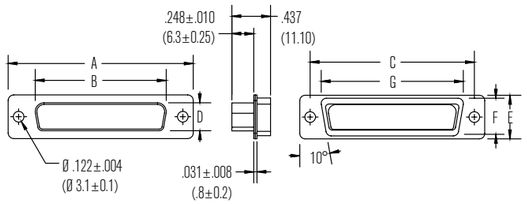
Shell Dimensions

Male



Shell Size	A ±.016 (±0.4)	B -.008 (-0.2)	C ±.006 (±0.15)	D -.008 (-0.2)	E ±.016 (±0.4)	F ±.012 (±0.3)	G ±.012 (±0.3)	H -.012 (-0.3)
1	1.213 (30.8)	0.665 (16.9)	0.984 (25.0)	0.323 (8.2)	0.492 (12.5)	0.425 (10.8)	0.76 (19.3)	0.24 (6.1)
2	1.539 (39.1)	0.992 (25.2)	1.311 (33.3)	0.323 (8.2)	0.492 (12.5)	0.425 (10.8)	1.083 (27.5)	0.24 (6.1)
3	2.087 (53.0)	1.531 (38.9)	1.852 (47.04)	0.323 (8.2)	0.492 (12.5)	0.425 (10.8)	1.626 (41.3)	0.236 (6.0)
4	2.728 (69.3)	2.177 (55.3)	2.5 (63.5)	0.323 (8.2)	0.492 (12.5)	0.425 (10.8)	2.272 (57.7)	0.236 (6.0)

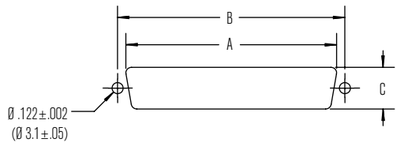
Receptacle



Shell Size	A ±.016 (±0.4)	B -.008 (-0.2)	C ±.006 (±0.15)	D -.008 (-0.2)	E ±.016 (±0.4)	F ±.012 (±0.3)	G ±.012 (±0.3)
1	1.213 (30.8)	0.646 (16.4)	0.984 (25.0)	0.315 (8.0)	0.492 (12.5)	0.425 (10.8)	0.76 (19.3)
2	1.539 (39.1)	0.972 (24.7)	1.311 (33.3)	0.315 (8.0)	0.492 (12.5)	0.425 (10.8)	1.083 (27.5)
3	2.087 (53.0)	1.531 (38.9)	1.852 (47.04)	0.315 (8.0)	0.492 (12.5)	0.425 (10.8)	1.626 (41.3)
4	2.728 (69.3)	2.161 (54.9)	2.5 (63.5)	0.315 (8.0)	0.492 (12.5)	0.425 (10.8)	2.272 (57.7)

All dimensions are in inches.

Panel Cutouts



Front Mount

Shell Size	A ±.008 (±0.2)	B ±.004 (±0.1)	C ±.008 (±0.2)
1	.874 (22.2)	0.984 (25.0)	0.484 (12.3)
2	1.201 (30.5)	1.311 (33.3)	0.484 (12.3)
3	1.744 (44.3)	1.852 (47.04)	0.484 (12.3)
4	2.390 (58.3)	2.5 (63.5)	0.484 (12.3)

Rear Mount

Shell Size	A ±.008 (±0.2)	B ±.004 (±0.1)	C ±.008 (±0.2)
1	.807 (20.5)	0.984 (25.0)	0.449 (11.4)
2	1.134 (28.80	1.311 (33.3)	0.449 (11.4)
3	1.673 (42.5)	1.852 (47.04)	0.449 (11.4)
4	2.327 (59.1)	2.5 (63.5)	0.449 (11.4)

All dimensions are in inches.

Selection Guide

HDRFI/ 60 A 2 MS

Insert Style

RF	Loaded with RF contacts only
MS	Mixed Signal

Shell Size

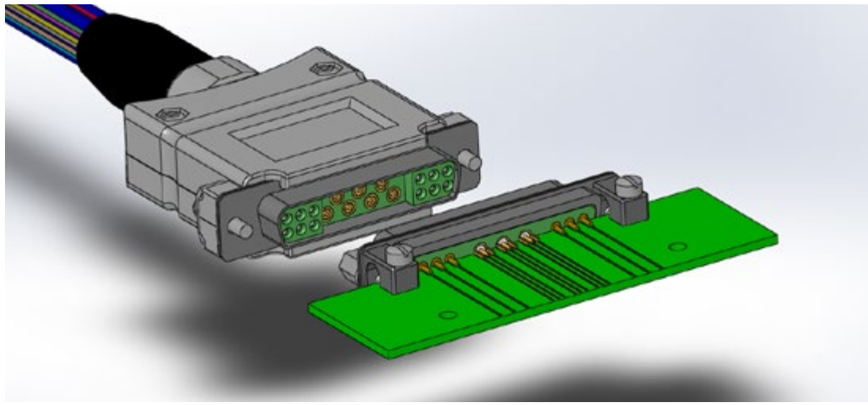
1
2
3
4

Service Class

A	Zinc Trivalent Yellow Trivalent Chromate Yellow Dye with Sealer, per ASTM-B-633, Type II, SC2, Yellow
B	Other (Consult factory)

Shell Style

60	Plug
61	Receptacle
62	Panel Mount
63	Edge Launch
64	Vertical Launch

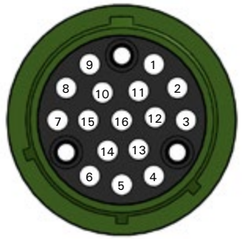


Insert Arrangements

RF Circular

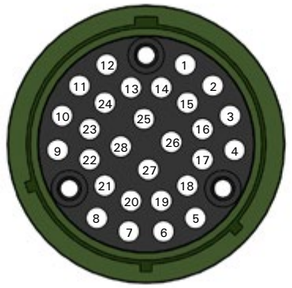
Shell 15
9-RF

Shell 17
12-RF

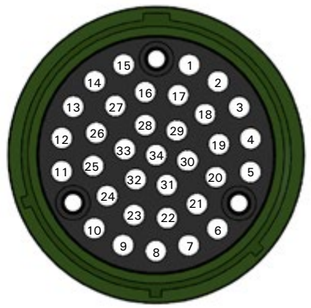


Shell 19
16-RF

Shell 21
24-RF



Shell 23
28-RF

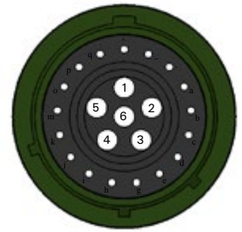


Shell 25
34-RF

RF Circular Mixed Signal

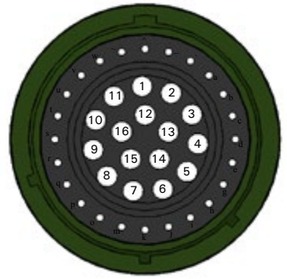
Shell 15
13 - size 20 / 3-RF

Shell 17
15 - size 20 / 4-RF

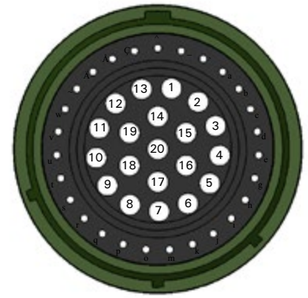


Shell 19
17 - size 20 / 6-RF

Shell 21
20 - size 20 / 12-RF

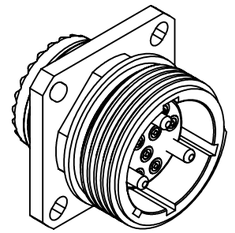


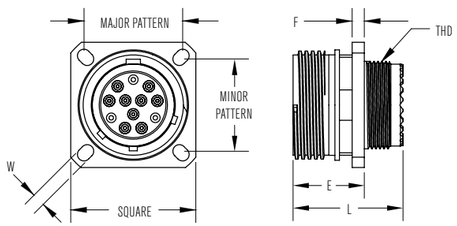
Shell 23
24 - size 20 / 16-RF



Shell 25
27 - size 20 / 20-RF

Dimensions and Panel Cutout





Shell / Insert	Square	Pattern Major	Pattern Minor	W	THD	L	F	E	Panel Hole ±.005
15-9	1.230	.970	.906	.125	M22 x 1.0	1.080	.120	.700	1.005
17-11	1.312	1.062	.0970	.125	M25 x 1.0	1.080	.120	.700	1.195
19-16	1.437	1.156	1.062	.125	M28 x 1.0	1.080	.120	.700	1.255
21-24	1.562	1.250	1.156	.125	M31 X 1.0	1.080	.120	.700	1.380
23-28	1.688	1.375	1.250	.156	M34 x 1.0	1.080	.120	.700	1.515
25-34	1.812	1.500	1.375	.156	M37 x 1.0	1.080	.120	.700	1.630

All dimensions are in inches.

Selection Guide

HDRFI/ 10 A 21 MS N

Keying Options
See Keying Options

Insert Style
- RF — Loaded with RF contacts only
- MS — Mixed Signal

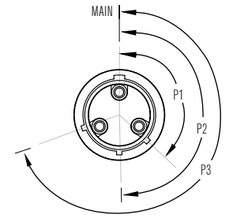
Shell Size
15, 17, 19, 21, 23, 25

Service Class
- A — Cadmium per QQ-P-416F – Type 2, Class 2
- B — Black Anodize per Mil-A-8625 – Type II, .4 mil
- C — Electroless Nickel per ASTM 733-90 SC2 – Type 1, Class 5

Shell Style
- 10 — Wall Mount Receptacle
- 20 — Straight Plug
- 30 — Jam Nut Receptacle

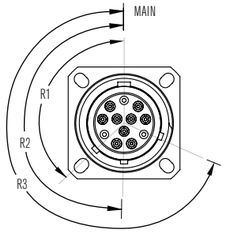
Keying Options

Plug (Mating View)



Key / Angle (cw from 12:00)	Main	P1	P2	P3
Normal	0	133	180	250
A	0	135	180	225
B	0	95	180	212
C	0	100	155	200
D	0	75	155	200
E	0	30	155	280

Receptacle (Mating View)



Key / Angle (cw from 12:00)	Main	R1	R2	R3
Normal	0	133	180	250
A	0	135	180	225
B	0	95	180	212
C	0	100	155	200
D	0	75	155	200
E	0	30	155	280

Custom Applications

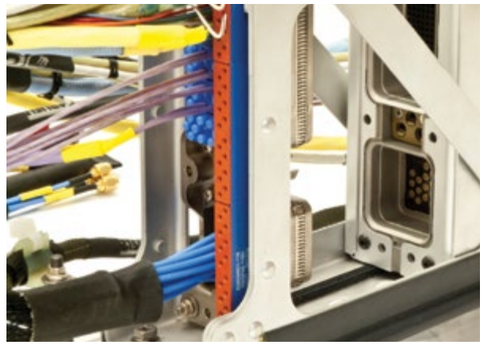
ARINC

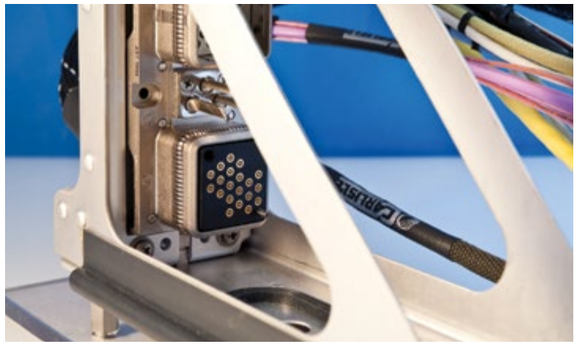
CarlisleIT's custom inserts fit into any standard ARINC 600 Series Size 2 or 3 shell.

» Shell Modules A,B,D or F will accommodate up to 33 RF connectors

» Shell Modules C or F will accommodate up to 20 RF connectors

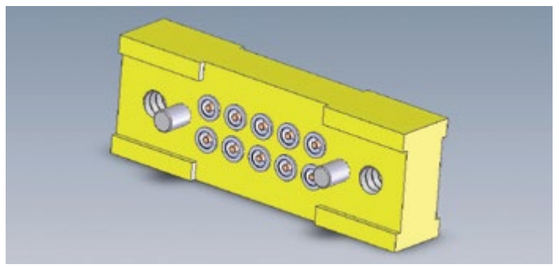
» All Coaxial Connections will work from DC to 40 Ghz

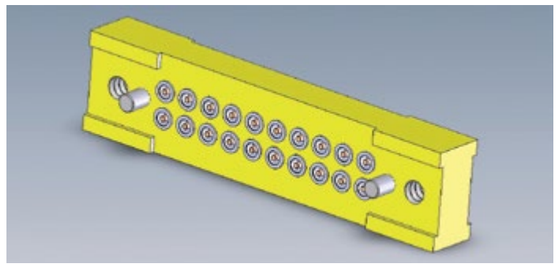


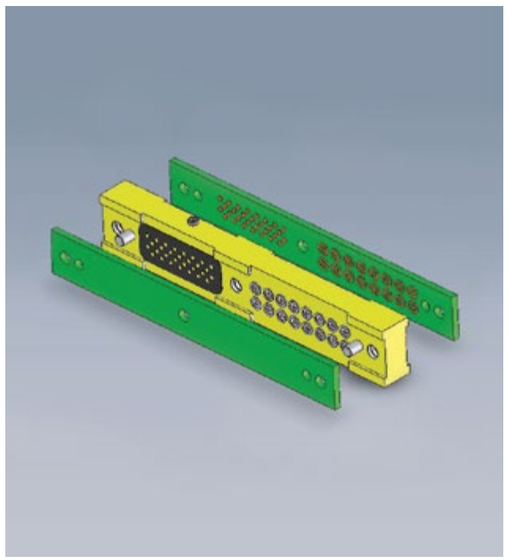


Mezzanine

CarlisleIT's HDRFI Mezzanine connectors are designed for high frequency board-to-board applications and with the ability to sandwich two circuit boards on top of each other without the need for multiple connectors. Connectors are not soldered to the boards so they can be easily removed. Since there is no pin and socket, there is no chance for bent pins. The Mezzanine configuration was created with the tight confines of "inside-the-box" applications in mind. When space is limited, CarlisleIT can design your mezzanine connector with different mating heights.







Electrical Performance

Frequency and Time Domain Measurements

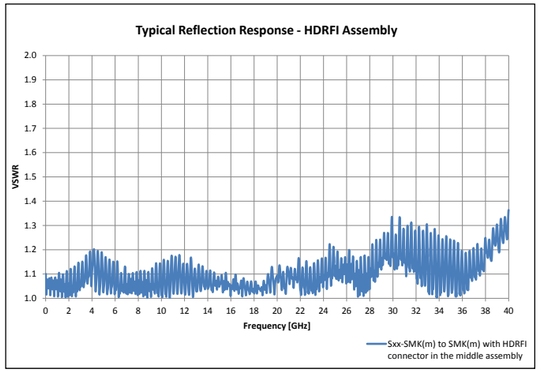
» Frequency domain measurements (insertion loss and VSWR) were performed using Agilent PNA E8364B, 2.4mm calibration, 4000 sampling points from 10MHz to 40GHz.

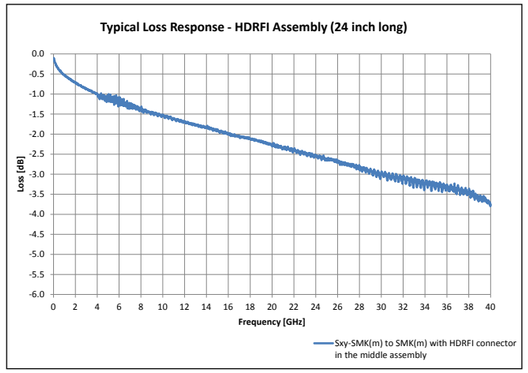
» The VSWR measurements include the effect of a set of 2.4mm-2.92mm adapters.

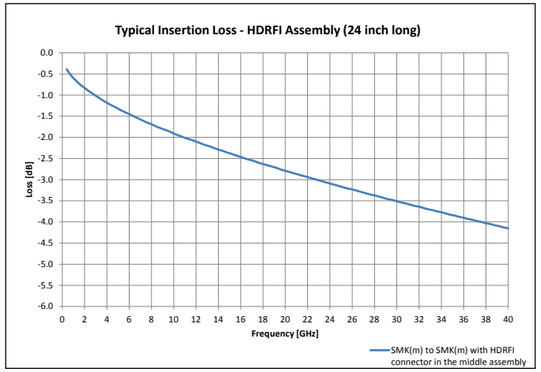
» The loss of adapters has been subtracted from the insertion loss measurements.

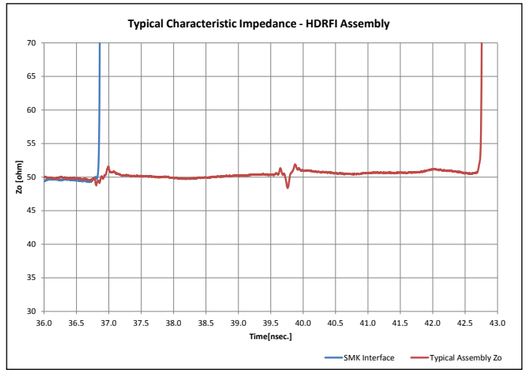
» Time domain measurements were performed with TDS 8200 and TDR sampling module 80E04.

The following plots represent a set of two HDRFI assemblies, 12 inch long each:







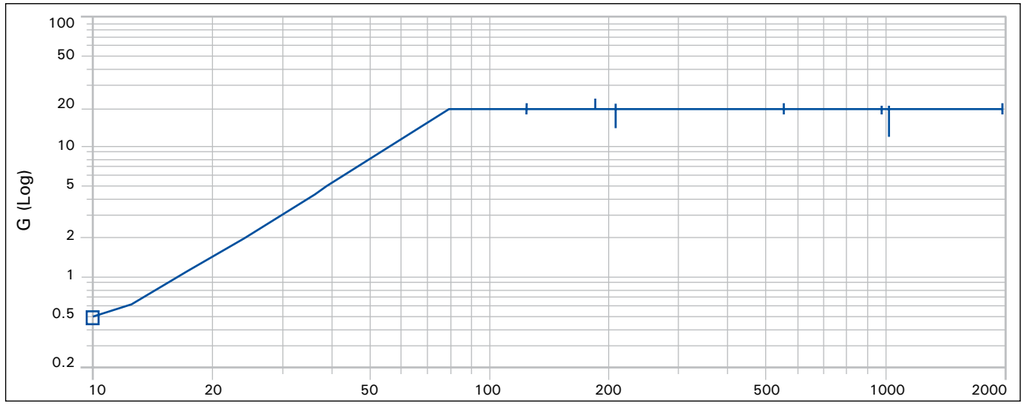


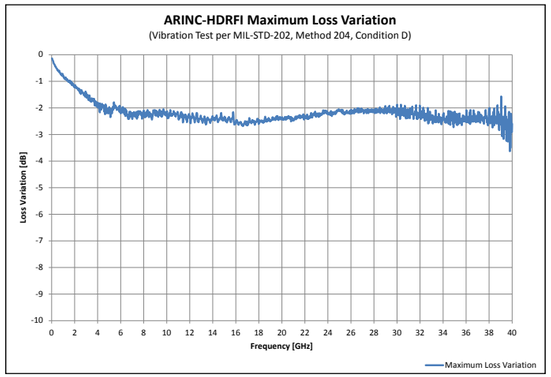
Electrical Performance

Vibration Test Report

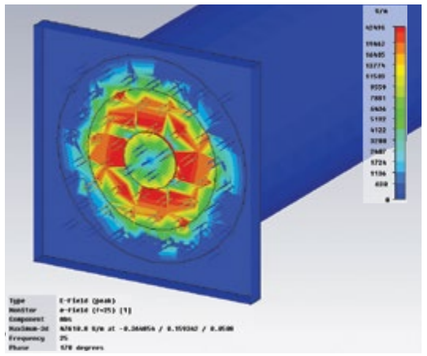
» Vibration profile was performed per MIL-STD-202, method 204, condition D.
» Test duration: over 4 hours
» Number of sweeps: 12 sweeps about 20 minutes long each
» Anritsu VNA: taking measurements every 7 minutes for the duration of test

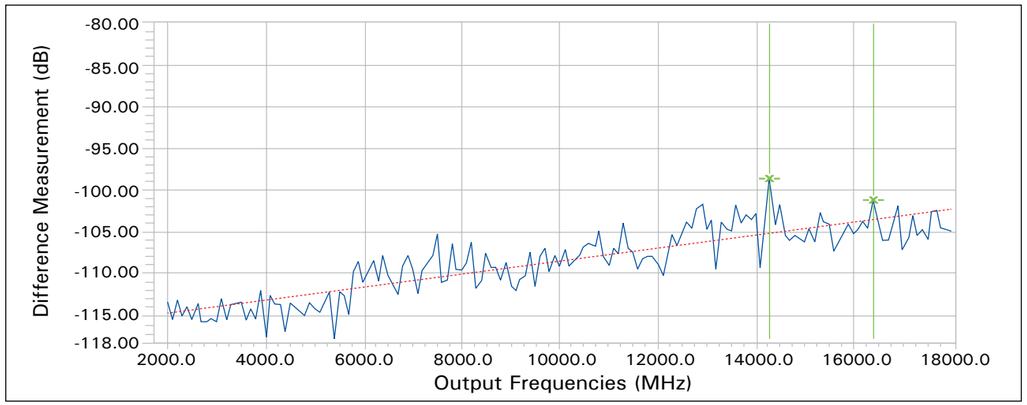
The following graph shows a sample of the vibration frequency distribution for over 10 minutes:





EMI Single Cross Section





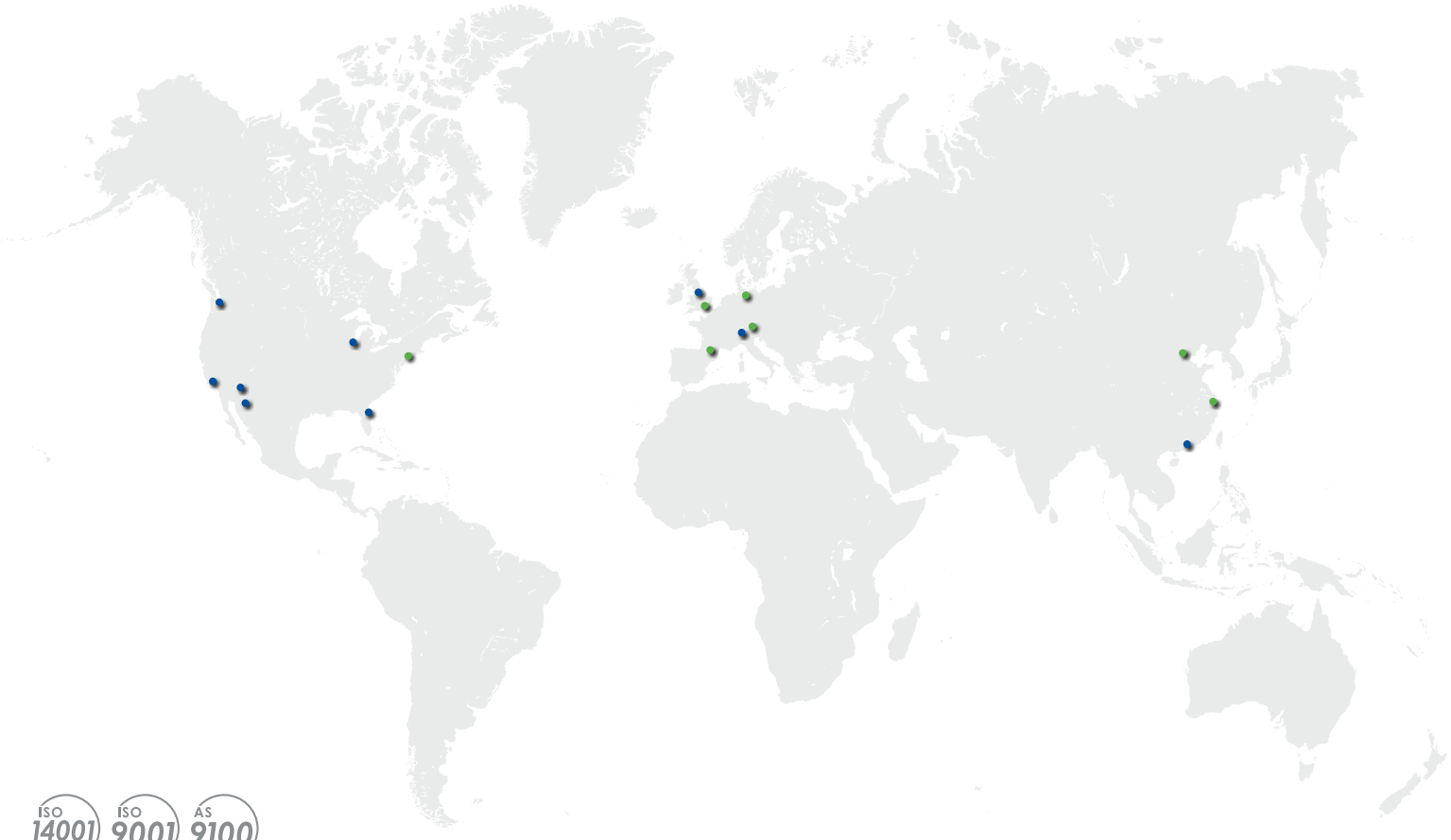
Specifications

Mechanical	
On-Center Spacing	0.130" Center-to-Center Minimum
Mating/Compression Force	0.6 Lbs / Coax Contact
Durability	2,000 Mating Cycles
Operating Temperature	-20° C to +120° C

Electrical		
Insulation Resistance		100 MΩ Minimum
Dielectric Withstand Voltage		1,000 Vrms @ Sea Level
Current Rating @ 70° C		1.0 Amp
Contact Resistance (max)		150 MΩ
Nominal, Impedance		50 Ω
CW Power Rating (max)		20 Watts
Frequency Range		To 40 GHz
Insertion Loss (mated pair)		0.25dB @ 40 GHz
VSWR (max)	Up to 4 GHz	1.18
	4 - 12 GHz	1.25
	12 - 18 GHz	1.35
	18 - 26 GHz	1.40
	26 - 40 GHz	1.45

Environmental	
Mechanical Shock	EIA 364, Test #27 – 70 G's,10 Millisecond, 1/2 sine, 5 cycles
Random Vibration	EIA 364, Test #28 – 8.8 G's RMS, 50 to 2 khz, 1 hr/axis, 3 axis
Mixed Flowing Gas	EIA 364 , Test #65 $C1_2$ 10 ppb, NO_2 200 ppb, H_2S 10 ppb,SO_2 100 ppb, exposure 20 days, mated
Thermal Shock	EIA 364 Test #32 -65° C to 150° C , 5 cycles, mated
Humidity (Thermal Cycling)	EIA 364 Test #31 25° C to 65° C @ 90 to 95% R.H., continuous 500 hours, mated
Temperature Life	EIA 364 Test #17 120° C, 500 hours 1.0 Amp, mated

CARLISLE
INTERCONNECT TECHNOLOGIES



ISO 14001 CERTIFIED · ISO 9001 CERTIFIED · AS 9100 CERTIFIED

All of our facilities are
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