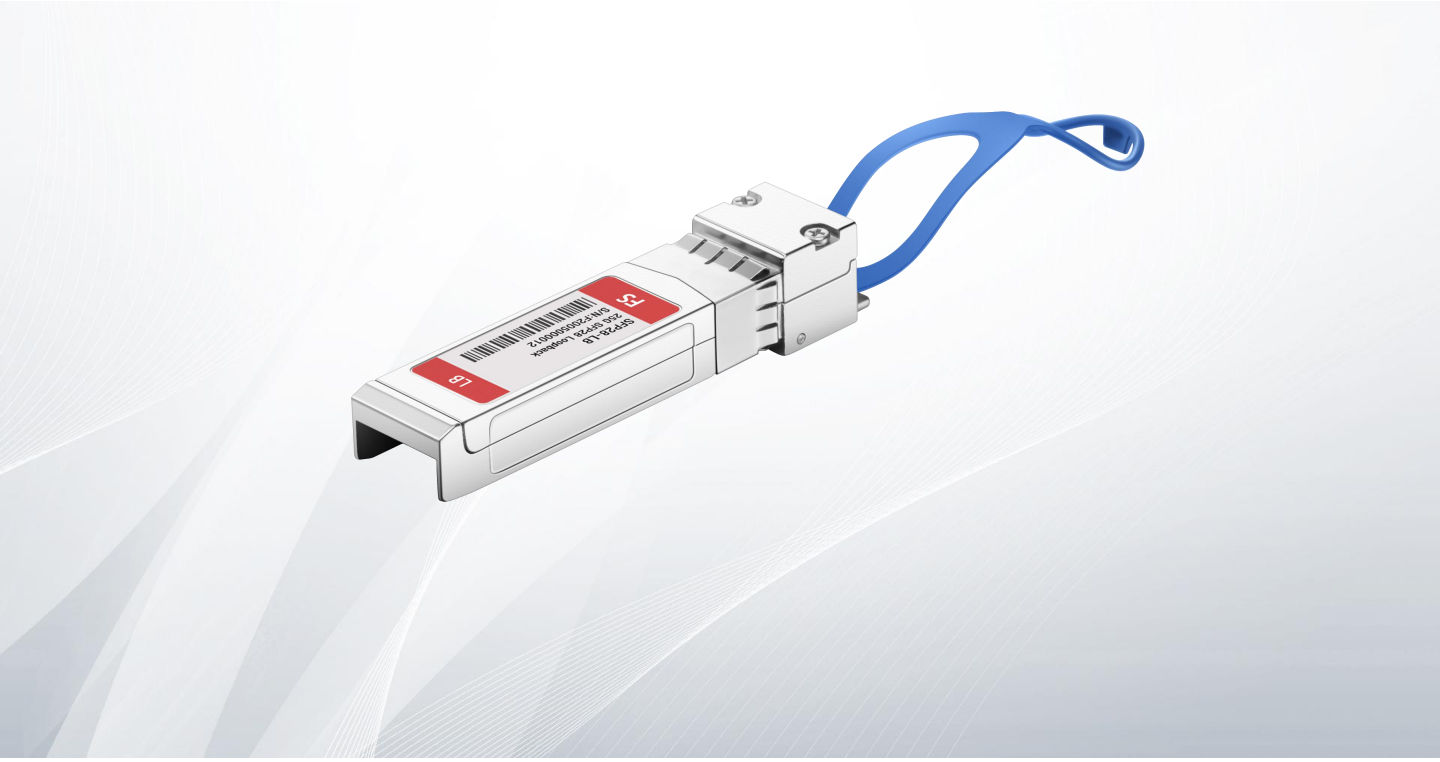
SFP28 25GBASE Passive Loopback Testing Module

SFP28-LB



Application

- SFP28 Port/System Testing
- Ethernet IEEE 802.3 (Gigabit, 10 Gigabit and 25 Gigabit Ethernet)
- SONET, SDH, GBE, Fiber Channel Support
- Board Level System Testing
- Power on Validation
- Excellent Signal Integrity
- Economical and Flexible 28Gbps SFP28 Port Testing

Features

- Customizable power consumption
- Custom memory maps available
- Supports 28Gbps total data rate
- Hot-pluggable MSA footprint
- Full SFF-8432 MSA compliant
- Temperature range from -20 ℃ to 85 ℃
- No reference clock required

Description

The SFP28 passive electrical loopback is used for testing SFP28 transceiver ports in board level test. The electrical loopback provides a cost-effective low loss method for SFP28 port testing.

The SFP28-LB is packaged in a standard MSA housing compatible with all SFP28 ports. Transmit data from the host is electrically routed (internal to the loopback module) to the receive data outputs and back to the host. Since the loopback module does not contain laser diodes, photodiodes, laser driver or trans impedance amplifier chips, etc., it provides an economical way to exercise SFP28 ports during R&D validation, production testing and field testing.

Product Specifications

I. Recommended Operation Condition

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Storage Temperature	Tstg	-40		85	ºC	
Ambient Operating Temperature	Ta	-20		85	ºC	
Data DC Voltage	Voffset	-10		10	Vpk	V (Tx+, Tx-, Rx+, Rx-) to ground
Supply Voltage	Vcc	3.13	3.3	3.47	Vdc	
Baud Rate	BRate	1.25	25	28	Gpbs	

II. Performance Specifications-Electrical

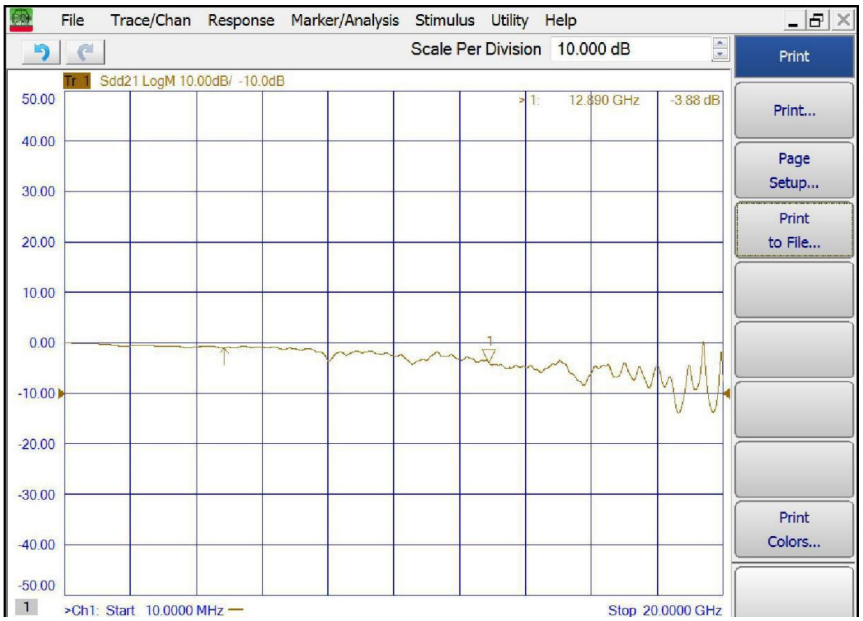
Parameter	Symbol	Min	Typ.	Max	Units	Notes
Bit Error Rate	Tstg	-40		85	ºC	
Supply Current – Serial ID write	Ta	-20		85	ºC	
Supply Current – Serial ID read	Voffset	-10		10	Vpk	V (Tx+, Tx-, Rx+, Rx-) to ground
Surge Current	Isurge			30	mA	Surge above steady state value

Note:

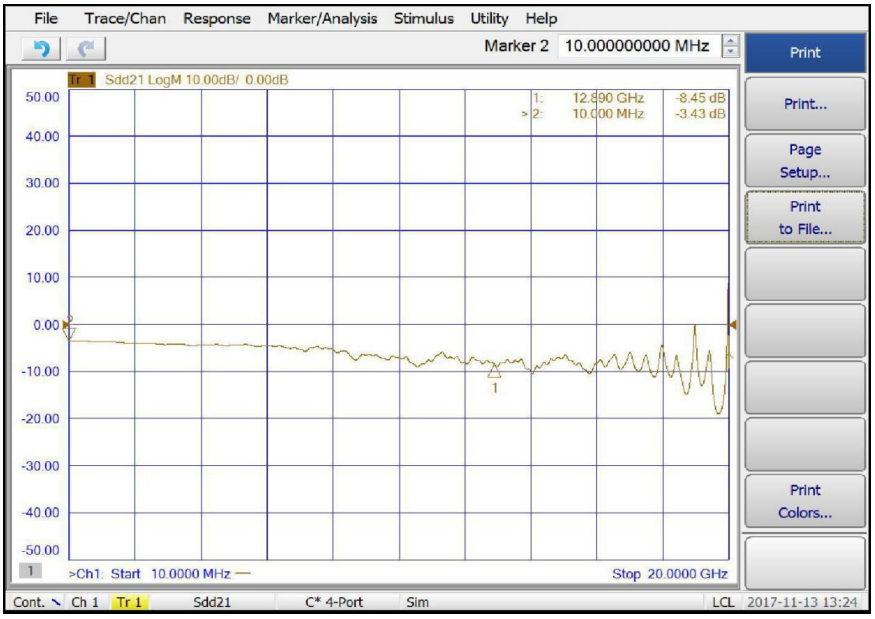
1.Tested with a 2^7-1, 2^23-1, 2^31-1 PRBS pattern

III. Data Path

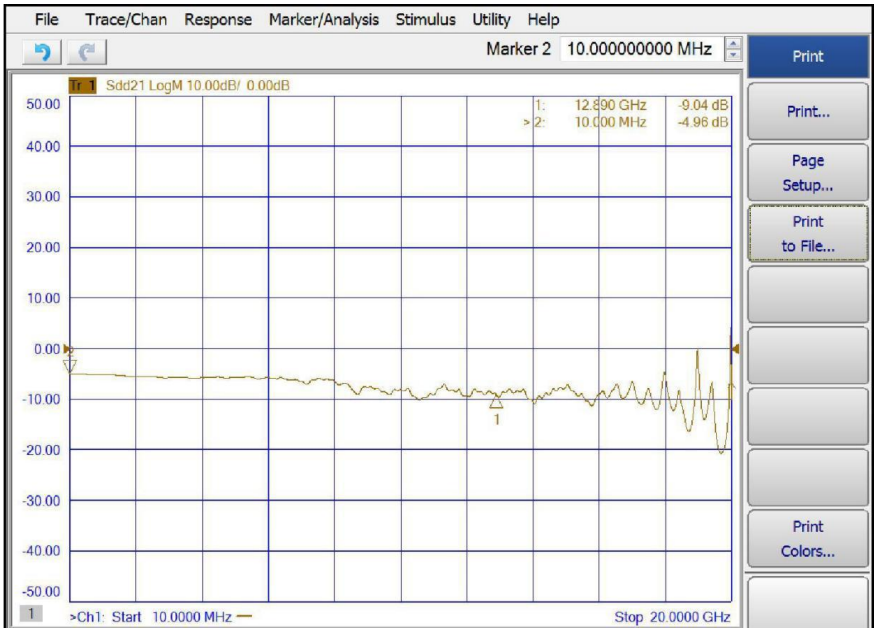
Parameter	Symbol	Min	Typ.	Max	Units	Notes
Impedance		90	100	110	ohms	Differential Impedance
Durability Cycles			100		Times	



SDD21-0dB (Transmit Insertion Loss)



SDD21-3.5dB (Transmit Insertion Loss)



SDD21-5dB (Transmit Insertion Loss)

IV. Host Board Connector Pinout

Figure 1: MSA compliant Connector

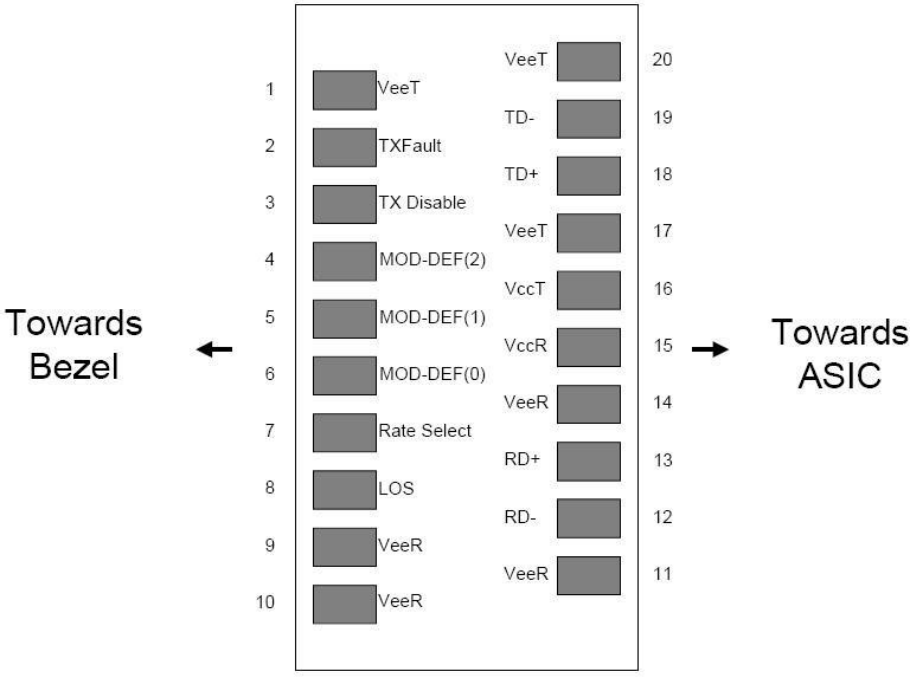


Figure 2: Pin Definitions

Pin	Logic	Description
1	TGND	Transmit Ground
2	TX_FAULT	Internally tied to Transmit ground. TX_FAULT is not implemented.
3	TX_DISABLE	Internally pulled up to Vcc through a 5.11k ohm resistor. TX_DISABLE is not implemented.
4	MOD_DEF(2)	Signal SDA (Data) of the 2-wire serial ID interface
5	MOD_DEF(1)	Signal SCL (Clock) of the 2-wire serial ID interface
6	MOD_DEF(0)	This pin is internally tied to Transmit ground
7	RATE SELECT	Pin is internally pulled low through a 33.2k resistor. Rate Select is not implemented.
8	LOS	Internally tied to Receiver Ground. LOS is not implemented.
9	RGND	Receiver Ground
10	RGND	Receiver Ground
11	RGND	Receiver Ground
12	RD-	Differential receiver outputs. User to terminate to 100 ohms differential
13	RD+	Differential receiver outputs. User to terminate to 100 ohms differentia
14	RGND	Receiver Ground
15	VCCR	Not Used.
16	VCCT	EEPROM Power
17	TGND	Transmit Ground

18	TD+	Differential transmitter inputs. Internally terminated to 100 ohms differential.
19	TD-	Differential transmitter inputs. Internally terminated to 100 ohms differential.
20	TGND	Transmit Ground

V. Memory Map

The EEPROM on the SFP28 passive cable assembly is designed for 256 addresses. The information for addresses 0 to 127 is listed below. This information can be tailored to any customer request. Any address can be altered to display customer specific information and more memory can be added if more addresses are needed. Addresses128 to 255 can be reserved for customer specific information that is in addition to the SFF 8472 specification.

Table 1: Memory Map (Specific Data Field Descriptions)

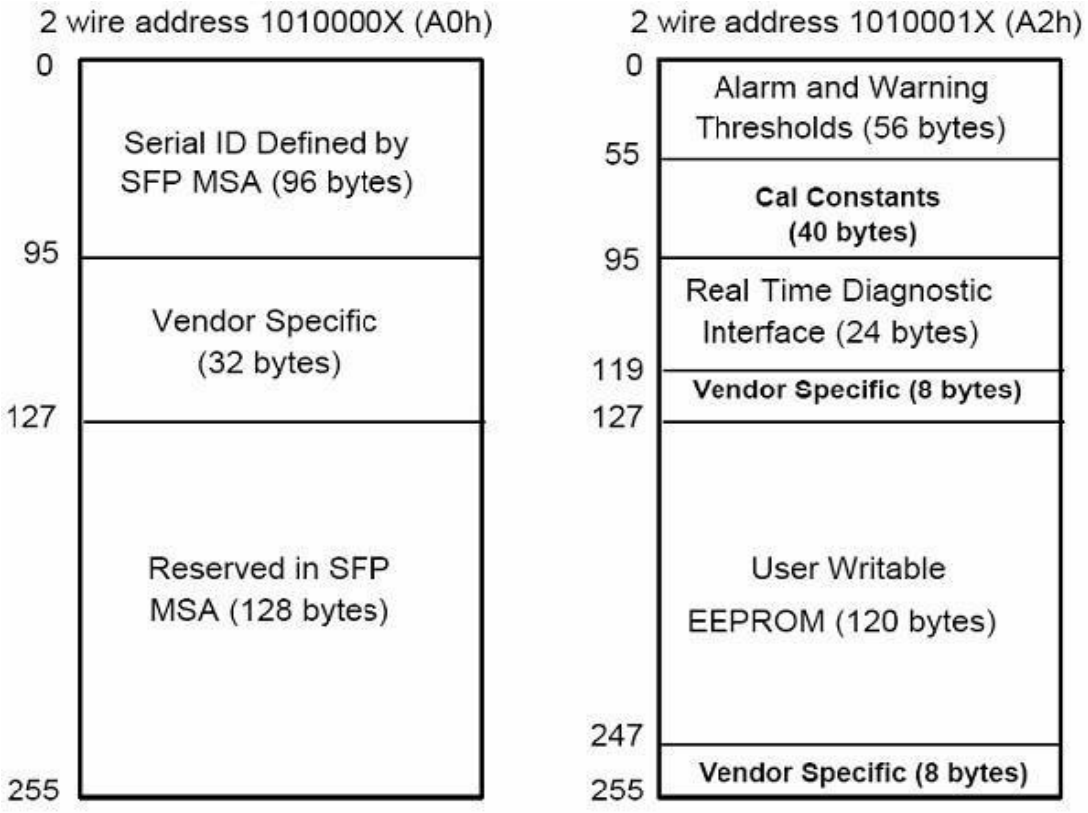


Table 2: EEPROM Serial ID Memory Contents (A0h)

Part Number		SFP28-LB		
		Device 0xA0		
DATA Address (DEC)	**DATA Address (HEX)**	**Value (HEX)**	**Name of Field**	**Description**
0	0	0x03	Identifier	SFP+
1	1	0x04	Ext. Identifier	Serial ID
2	2	0x80	Connector	Vendor Specific
3	3	0x01	Transceiver	
4	4	0x00		
5	5	0x00		
6	6	0x00		
7	7	0x00		
8	8	0x04		SFP+ Passive copper
9	9	0x80		Twin Axial Pair (TW)
10	A	0x00		
11	B	0x06	Encoding	64B/66B
12	C	0x67	BR, Nominal	25500MBs
13	D	0x00	Rate Identifier	Unspecified
14	E	0x00	Length (SMF,km)	Unsupported
15	F	0x00	Length (SMF)	Unsupported
16	10	0x00	Length (50um)	Unsupported

17	11	0x00	Length (62.5um)	Unsupported
18	12	0x00	Length (cable)	Unspecified
19	13	0x00	Length (OM3)	Unsupported
20	14	0x31		
21	15	0x30		
22	16	0x47		
23	17	0x74		
24	18	0x65		
25	19	0x6B		
26	1A	0x20		
27	1B	0x20		
28	1C	0x20		
29	1D	0x20		
30	1E	0x20		
31	1F	0x20		
32	20	0x20		
33	21	0x20		
34	22	0x20		
35	23	0x20		
36	24	0x00	Transceiver	25GBASE-CR CA-S

37	25	0x00		
38	26	0x00	Vendor OUI	Unspecified
39	27	0x00		
40	28	0x43		
41	29	0x41		
42	2A	0x42		
43	2B	0x2D		
44	2C	0x53		
45	2D	0x46		
46	2E	0x50		
47	2F	0x2D		
48	30	0x4C		
49	31	0x42		
50	32	0x30		
51	33	0x20		
52	34	0x20		
53	35	0x20		

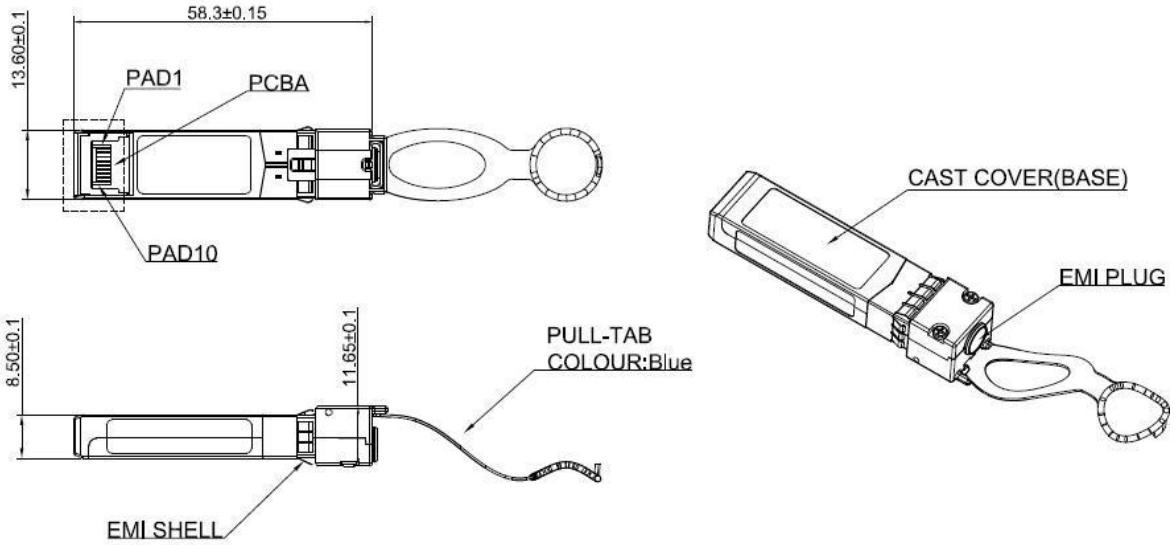
54	36	0x20		
55	37	0x20		
56	38	0x30		
57	39	0x31	Vendor Rev	01
58	3A	0x20		
59	3B	0x20		
60	3C	0x00	Laser wavelength (Passive/Active Cable Specification Compliance)	Unspecified
61	3D	0x00		
62	3E	0x00	Unallocated	
63	3F	0x00	CC_BASE	
64	40	0x00	Options	Unspecified
65	41	0x00		
66	42	0x00	BR, max	Unspecified
67	43	0x00	BR, min	Unspecified
68	44	0x53		
69	45	0x31	Vendor SN	
70	46	0x38		

71	47	0x30		
72	48	0x38		
73	49	0x30		
74	4A	0x31		
75	4B	0x30		
76	4C	0x30		
77	4D	0x30		
78	4E	0x31		
79	4F	0x20		
80	50	0x20		
81	51	0x20		
82	52	0x20		
83	53	0x20		
84	54	0x31		
85	55	0x38		
86	56	0x30		
87	57	0x38		
			Date Code	180801
88	58	0x30		
89	59	0x31		
90	5A	0x20		
91	5B	0x20		

92	5C	0x00	Diagnostic Monitoring Type	Unsupported
93	5D	0x00	Enhanced Options	Unspecified
94	5E	0x00	SFF-8472 Compliance	Unspecified
95	5F	0x00	CC_EXT	
96	60	0x00		
97	61	0x00		
98	62	0x00		
99	63	0x00		
100	64	0x00		
101	65	0x00		
102	66	0x00		
103	67	0x00		
104	68	0x00	Vendor Specific	Vendor Specific EEPROM
105	69	0x00		
106	6A	0x00		
107	6B	0x00		
108	6C	0x00		
109	6D	0x00		
110	6E	0x00		
111	6F	0x00		
112	70	0x00		

113	71	0x00		
114	72	0x00		
115	73	0x00		
116	74	0x00		
117	75	0x00		
118	76	0x00		
119	77	0x00		
120	78	0x00		
121	79	0x00	Vendor Specific	Vendor Specific EEPROM
122	7A	0x00		
123	7B	0x00		
124	7C	0x00		
125	7D	0x00		
126	7E	0x00		
127	7F	0x00		
128-255	80-FF	0XFF	Reserved	Reserved for SFF-8079

VI. Mechanical Dimensionsmensions

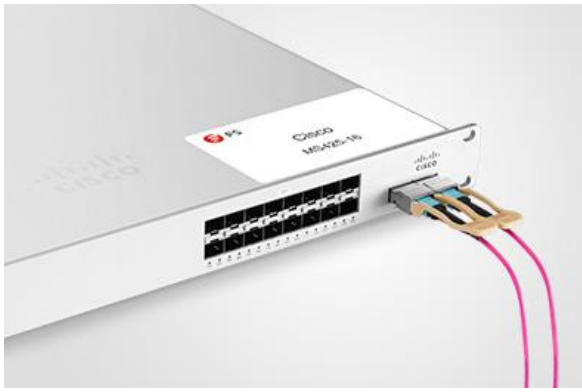


Test Center

I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.

Cisco Catalyst C9500-24Y4C



Cisco MS425-16

Brocade VDX 6940-144S

Dell EMC Networking Z9100-ON

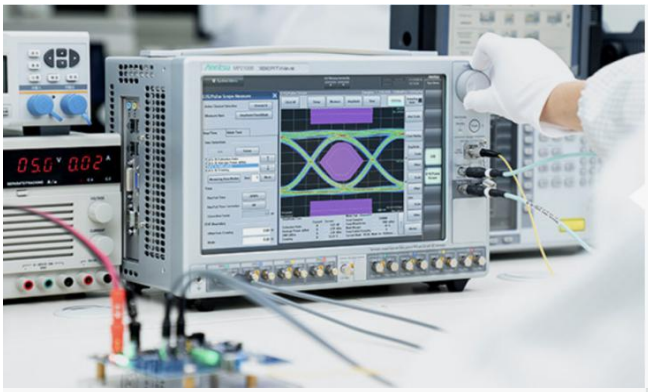
Force⑩tm S60-44T

HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Single Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator the input and output signal quality.

- Eye Pattern Measurements: Jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

2. Reliability and Stability Testing

Subject the transceivers to dramatic in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0℃ to 70℃
- Extended: -5℃ to 85℃
- Industrial: -40℃ to 85℃

3. Transfer Rate and Protocol Testing

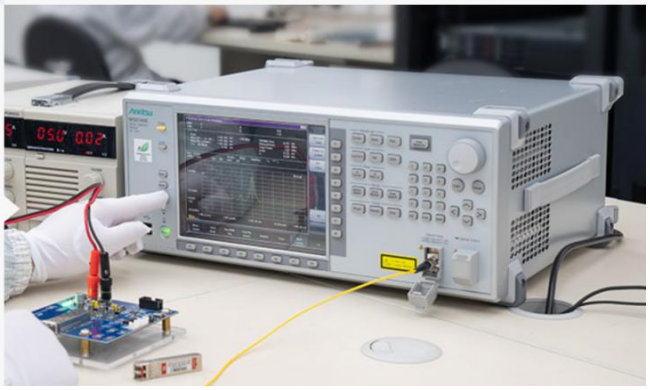
Test the actual transfer data rate and the transmission ability under different protocols with Networks Master Pro.

- Ethernet
- Fiber Channel
- SDH/SONET
- CPRI

4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width

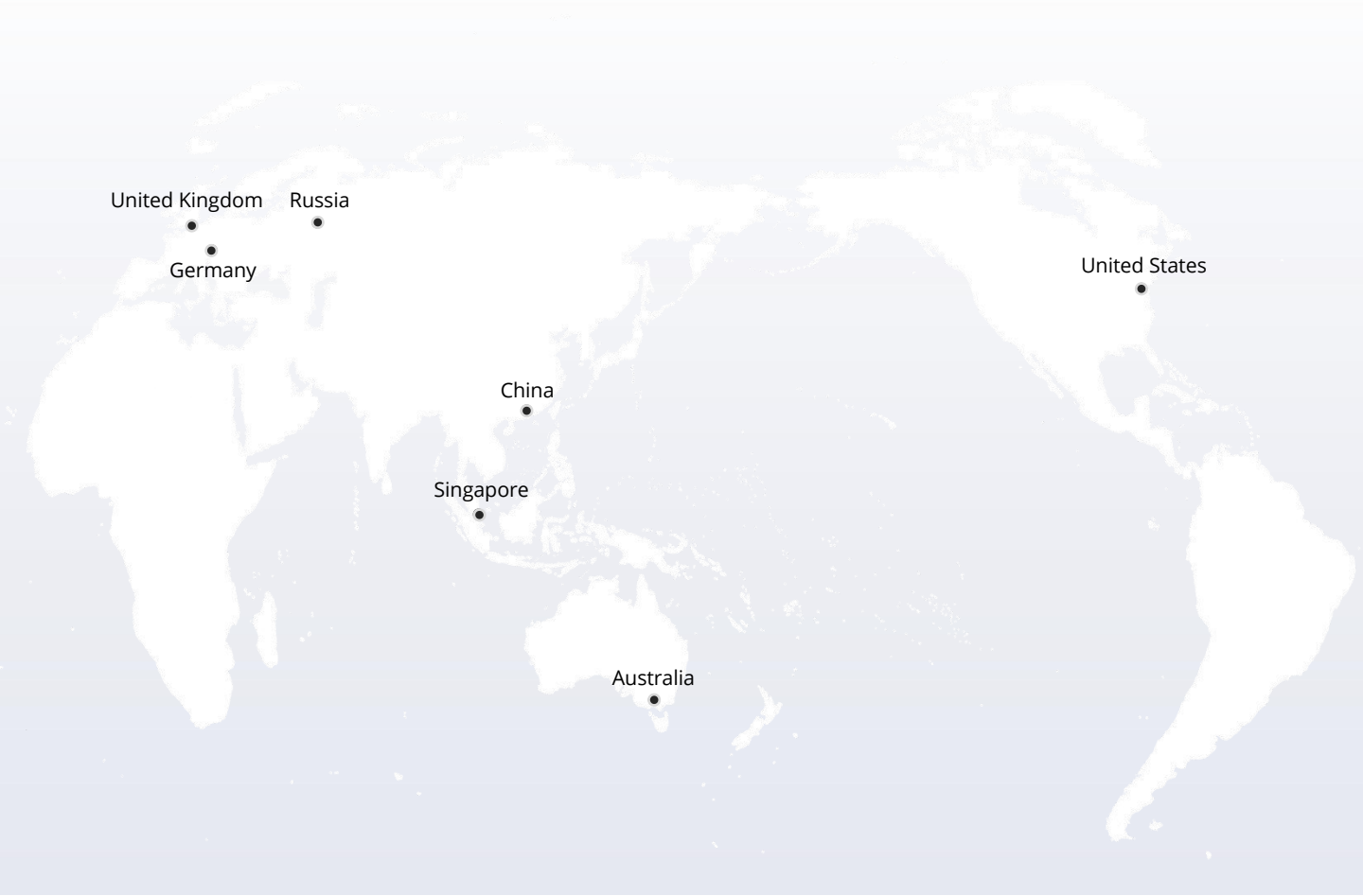


Order Information

Part Number	Description
Q28-LB	QSFP28 Passive Loopback Testing Module, 0dB, 0W
QSFP-LB	QSFP+ Passive Loopback Testing Module, 0dB, 0W
SFP28-LB	SFP28 Passive Loopback Testing Module, 0dB, 0W
10GSFP-LPM	SFP+ Passive Loopback Testing Module, 0dB, 0W

Notes:

25G SFP+ Passive Loopback Testing Module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.



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