DEVELOPED FOR EXCELLENCE

MAXBAND® BROADBAND OM5 MULTIMODE FIBRES

The combination of multimode fibre and vertical-cavity surface-emitting laser (VCSEL) has always been a broadly competitive, cost-effective short-range networking solution.

The 40GBASE-SR4 solution currently popular in data centers is gradually being upgraded to 100GBASE-SR4. The IEEE 802.3bs standard including the 400GBASE-SR16 solution was released in 2017, which allows OM3/OM4/OM5 optical fibres to transmit signals at 25 Gbps over a single channel in 400 Gbps systems. The feature these solutions have in common is their adoption of parallel transmission technology.

Continuously increasing network speeds impose increasing numbers of the optical fibre when adopting parallel transmission technology in data centers. The single-fibre bidirectional (BiDi) and shortwave wavelength division multiplexing (SWDM) technologies are alternative solutions, which both increase utilization of fibre resources.

The 100 Gbps BiDi solution utilizes single-fibre bidirectionally with four-level pulse amplitude modulation (PAM4) technology, offering a rate of 50 Gbps on a single channel. Simultaneously transmitting signals in the 850 nm and 910 nm windows on one fibre, bidirectional transmission at 100 Gbps is possible with a pair of optical fibres, reducing fibre usage by 50%.

The 100 Gbps SWDM4 solution adopts wavelength division multiplexing, which supports transmission over four wavelength channels, ranging from 850 nm - 950 nm, on one fibre. Compared to 100GBASE-SR4, it offers a 75% fibre usage reduction, which greatly lower cost and simplify cabling.

Tables 1 & 2, below, give results from tests on YOFC OM5 multimode fibres under the 400G OSFP SR8 optical transceiver parallel transmission scheme (850 nm and 908 nm wavelengths), and the wavelength division multiplexed 100G SWDM4 optical transceiver (850 nm - 940 nm band) transmission scheme. Table 1 shows that under 400G OSFP SR8 transmission, OM5 fibre supports link transmission over 500 meters in the 850 nm window, and 300 meters in the 908 nm window. Table 2 shows that under 100G SWDM4 transmission, OM5 fibre supports link transmission over 400 meters.

These results demonstrate the potential for application of OM5 fibre for short-range, high-speed transmission at 100 Gbps, 400 Gbps, and perhaps even 1.6 Tbps in future.

Fibre Length(m)		850nm		908nm	
		Bit Error Rate	Received Optical Power (dBm)	Bit Error Rate	Received Optical Power (dBm)
Back to Back		0	0.30	2.3E-11	2.15
OM5	200	5.0E-12	-0.17	4.0E-7	2.28
	300	2.7E-9	-0.48	3.2E-6	2.06
	400	4.6E-7	-0.73	7.0E-4	1.87
	500	1.2E-5	-0.90	LOSS	—

Table 1 Results for 400G OSFP SR8 on OM5 Fibre at 850 nm & 908 nm Wavelengths

Fibre Length(m)		Received Optical Power (dBm)			
		850 nm	880 nm	910 nm	940 nm
Back to Back		-11.2	-11.0	-12.2	-12.8
OM5	200	-7.7	-9.0	-10.6	-10.4
	300	-5.7	-8.4	-10.6	-9.0
	400	-5.4	-7.8	-10.2	-7.8

Table 2 Received Optical Power of OM5 Fibre at 5E-5 Bit Error Rate under 100G SWDM4 Transmission

Note: During these tests, a bit error rate tester was used to monitor the bit error rate during transmission, without forward error correction (FEC).

YOFC's proprietary plasma chemical vapor deposition (PCVD) process permits unparalleled precise control of the refractive index profile during multimode fibre manufacture, making it ideal for high-end multimode fibre manufacture. Through various technical means, such as optimizing the material component proportioning and upgrading manufacturing platforms, YOFC is continuously improving the quality of high-end OM5 multimode fibre. YOFC's innovative material components designing significantly improved optical fibre bandwidths, providing a reliable bandwidth margin in 850 nm - 950 nm WDM application scenarios. Furthermore, YOFC's internal control parameters for the OM5 fibre specification are considerably stricter than compliance with international standards demands. Thus YOFC OM5 fibre has excellent reliability in data connectivity covering the application scenarios including single-wavelength wave and multi-wavelength WDM in the 850 nm - 950 nm range.