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AN INTRODUCTION TO OM4

by
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At their meeting in Barcelona (18th - 22nd February 2008), ISO/IEC JTC1 SC25 WG3 proposed the establishment of two new optical fibre types or Categories - one multimode and one singlemode. The multimode variant, currently termed OM4, provides more than twice the laser/VCSEL bandwidth than OM3 and is targeted to provide greater useable distance and/or lower system implementation costs for the next generation 40 Gb/s and 100 Gb/s Ethernet solutions that are currently in development. The singlemode variant, which currently has no designation, provides performance levels somewhere between those of OS1 and OS2 and is introduced in the FIA White Paper entitled "Understanding OM1, OM2, OM3, OS1, OS2 and more!".

The case for a new OM is more to do with state-of-the-art a la "Category 6_A" etc. It is recognised that while OM3, introduced in 2002, represented a significant development in terms of bandwidth of multimode optical fibre, the performance levels attained today are significantly in excess of that milestone. Manufacturers have long since been describing their products as OM3+, or enhanced OM3 or equivalent and of course there is no basis for comparison for their individual claims. That in itself does not always justify a new "Category" - although it seems to be enough in the balanced cabling arena - it is also important to offer that performance uplift to an application that can then demonstrate its benefits. This is what happened for OM3 when IEEE used it as their 300 metre mapping of 10GBASE-SR. A further improved bandwidth performance designation "OM4" has been offered to both IEEE and Fibre Channel.

The questions raised by this offer begin to grow in number as the offer is analysed. We all know that increased bandwidth should offer greater distances of support for current networks - but that will probably not be of interest to the applications committees who rarely if ever re-visit already published standards (for example we have no standards-based support for 1000BASE-SX over OM3). The main hope is that the new performance specification may be of interest of new applications, currently in development, such as 40 Gb/s and 100 Gb/s Ethernet. The benefits may be that the distance of support may be increased or that the number of parallel optical fibres required (currently at least four in each direction) may be reduced. However, there are many that cast doubt on these hopes, intimating that the equipment providers objective is to reduce the cost of the VCSEL/laser sources which may negate any benefit obtained for the higher bandwidth optical fibre cables.

Nevertheless, history has proved that once a new "Category" of anything is discussed, even at an elementary level, it will become reality. The current proposals are shown in the table below (along with all the other OM specifications). It has at least been agreed that the new specification products have to be backwards compatible with the existing OMs although there may be many twists and turns ahead.

Category	Maximum attenuation (dB/km)		Minimum modal bandwidth MHz×km		
			Overfilled launch		"Laser" launch
	850 nm	1 300 nm	850 nm	1 300 nm	850 nm
OM1	3,5	1,5	200	500	not specified
OM2	3,5	1,5	500	500	not specified
OM3	3,5	1,5	1 500	500	2 000
OM4	3,5	1,5	1 500	500	4 700

It is likely that marketing literature will contain the new designations quite soon. In terms of standardisation, it is unlikely that changes to the list of "OM"s and "OS"s will take place before 2009.

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