

# Myths and Legends -

separating the facts from the “spin”

2011 SUMMER SEMINAR AND NETWORKING EVENT




**Mike Gilmore**  
Managing Director  
e-Ready Building Limited


Mobile: +44 (0) 7860 110563

FIA e-mail:  
[technical@fia-online.co.uk](mailto:technical@fia-online.co.uk)


e-mail:  
[mike.gilmore@e-readybuilding.com](mailto:mike.gilmore@e-readybuilding.com)


## Standards Activities

 **Member**  
JTC1 SC25 WG3: Generic Cabling  
*Ex-convenor*





JTC1 SC25 WG3 CITG: Cabling Implementation Task Group  
JTC1 SC25 WG3 IPTG: Industrial Premises (Cabling) Task Group

 **Convenor**  
TC215 WG1: Cabling design  
*Secretary*



TC215 WG2: Cabling installation - QA and installation practices  
*Member*  
TC215 WG3: Facilities and infrastructures

 **Leader - Special Task Force 362**  
Energy Efficiency and Broadband Deployment




 **Chairman**  
TCT7: Telecommunications - Installation Requirements  
*Chairman*

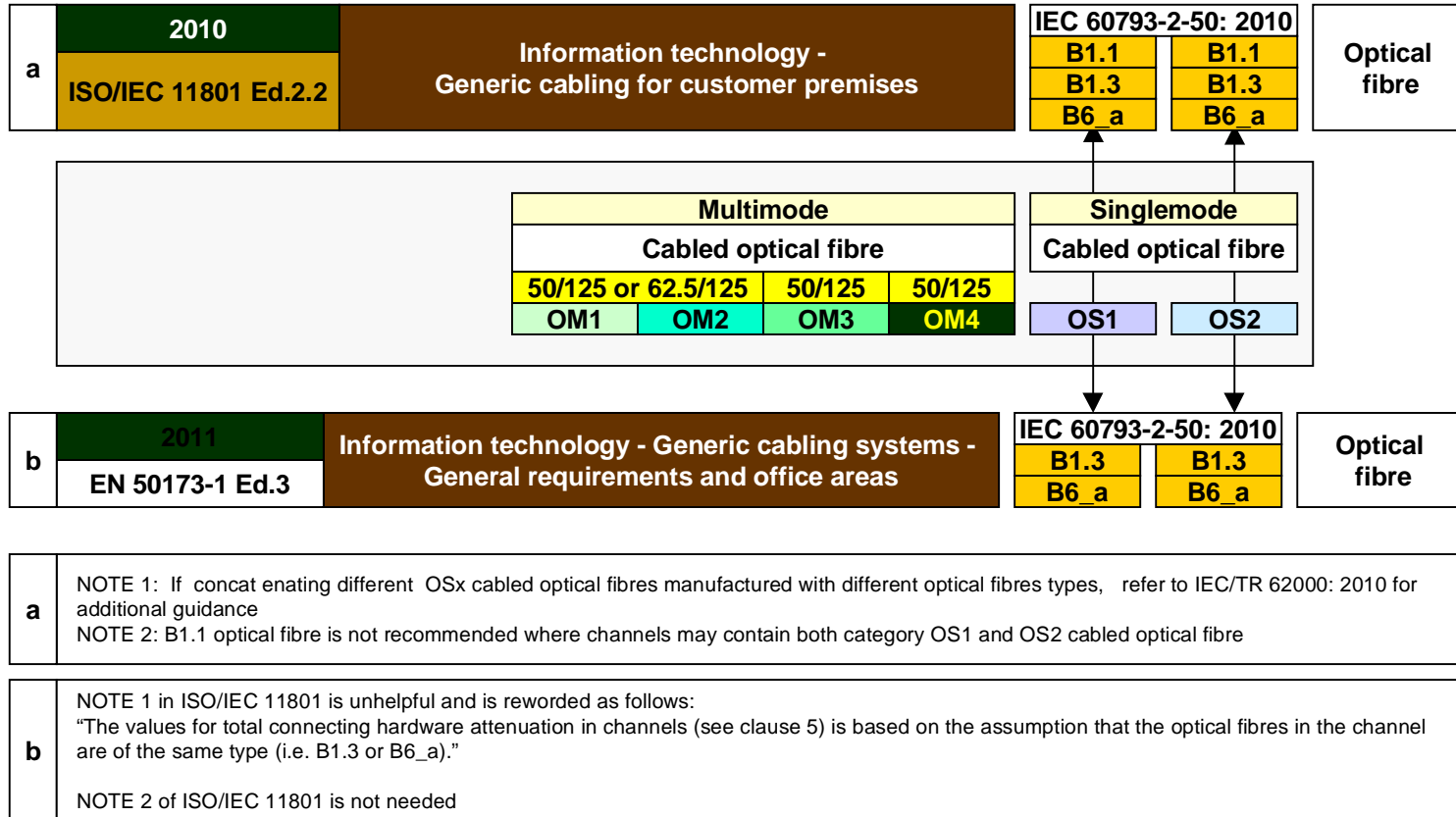


TCT7/-1: Cabling: Infrastructure design, planning and commissioning  
*Secretary*  
TCT7/-2: Cabling; Installation and UK implementation  
TCT7/-3: Facilities and infrastructures

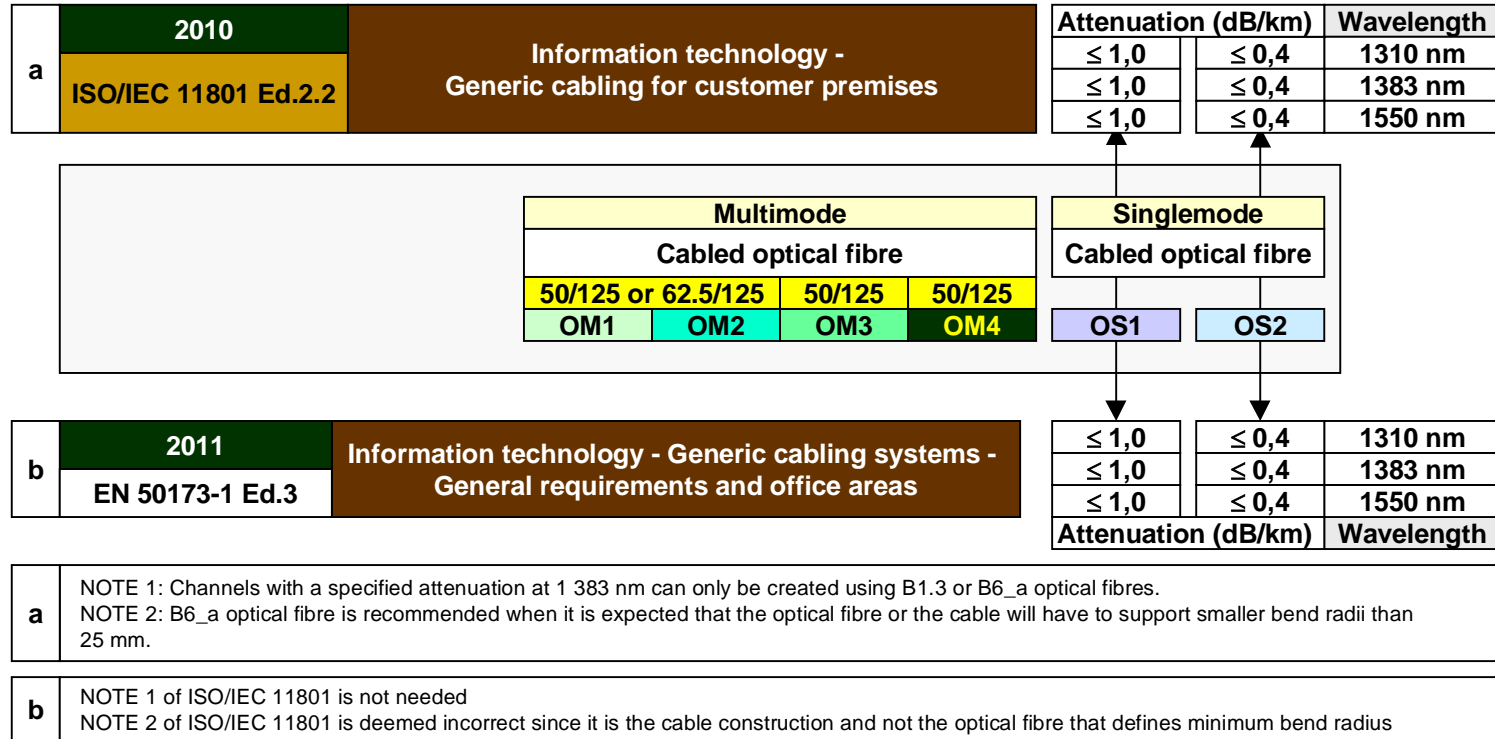
<b>FIA</b> <a href="http://www.fia-online.co.uk">www.fia-online.co.uk</a>	<b>Technical and Standards Director</b> Fibreoptic Industry Association
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 <a href="http://www.tiab-online.co.uk">www.tiab-online.co.uk</a>	<b>Director</b> Telecommunications Infrastructure Advisory Board
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# OS1 and OS2



# OS1 and OS2



# Show Some Sensitivity

**BEND INSENSITIVE OPTICAL FIBRE**  
**DOES NOT EXIST**

**LESS BEND SENSITIVE OPTICAL FIBRE**

<b>SINGLEMODE</b>	<ul style="list-style-type: none"> <li>• developed to support difficult routing</li> <li>• installation in homes</li> <li>• installation of backbones of multi-tenant premises</li> </ul>
<b>MULTIMODE</b>	<ul style="list-style-type: none"> <li>• developed for ??????</li> <li>• perhaps to further “systematise” the OF market place</li> </ul>
	<ul style="list-style-type: none"> <li>• a large body of suppliers remain unconvinced</li> </ul>
	<ul style="list-style-type: none"> <li>• impact on bandwidth</li> </ul>
	<ul style="list-style-type: none"> <li>• impact on compatibility with LBS and normal OF</li> </ul>
	<ul style="list-style-type: none"> <li>• impact on testing</li> </ul>
	<ul style="list-style-type: none"> <li>• temptation to follow bad installation practices</li> </ul>

**WE DON'T INSTALL OPTICAL FIBRE**  
Installation bend radii are specified for cables  
  
LBS OF solutions could be considered to encourage less robust cable constructions

# Less Bend Sensitive OF - Singlemode

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## Optical fibres - Product specifications

IEC 60793-2, EN 60793-2, BS EN 60793-2

-50

Sectional specification for category B singlemode fibres (Ed.3: 2008)

Annex G	Category B6_a	G.657 A1	G.657 A2	No automatic compatibility with G.652
	Category B6_b	G.657 B2	G.657 B3	

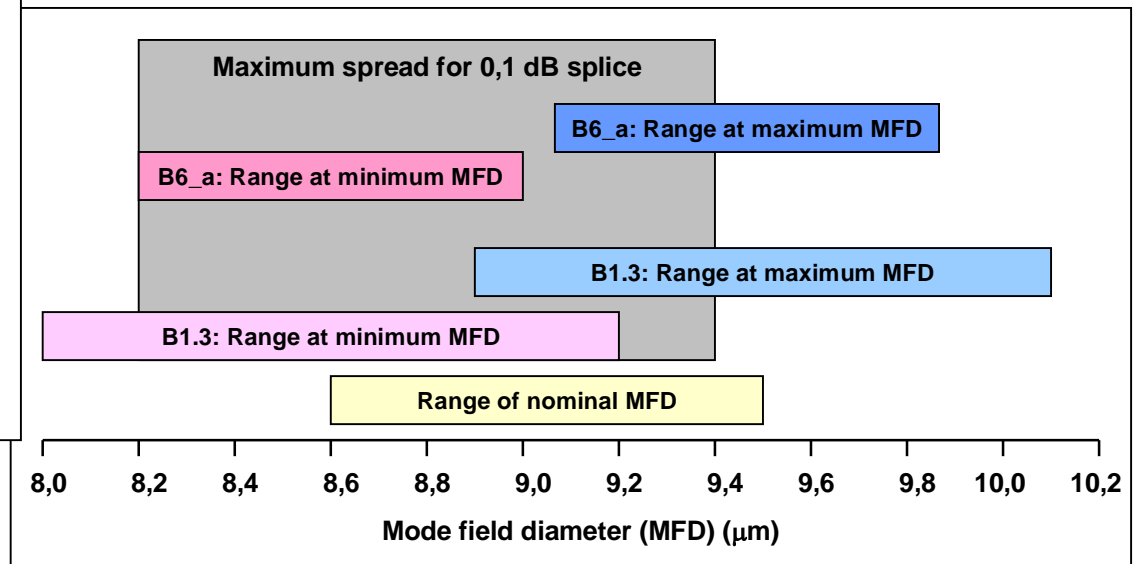
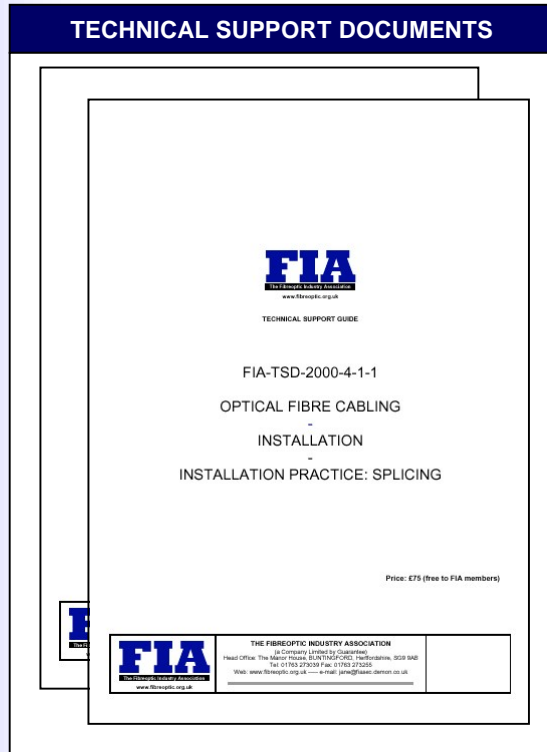
## Less bend sensitive optical fibres

		G.657 A1		G.657 A2		
Radius (mm)		15	10	15	10	7,5
Turns		10	1	10	1	1
Δ att	1550 nm	0,25	0,75	0,03	0,1	0,5
	1625 nm	1,0	1,5	0,1	0,2	1,0

FOR INFORMATION	
"Normal" optical fibres	
	<b>B1.3</b>
Radius (mm)	30
Turns	100
Δ att	1550 nm
	1625 nm
	ns
	0,1

# Singlemode LBS OF - Compatibility

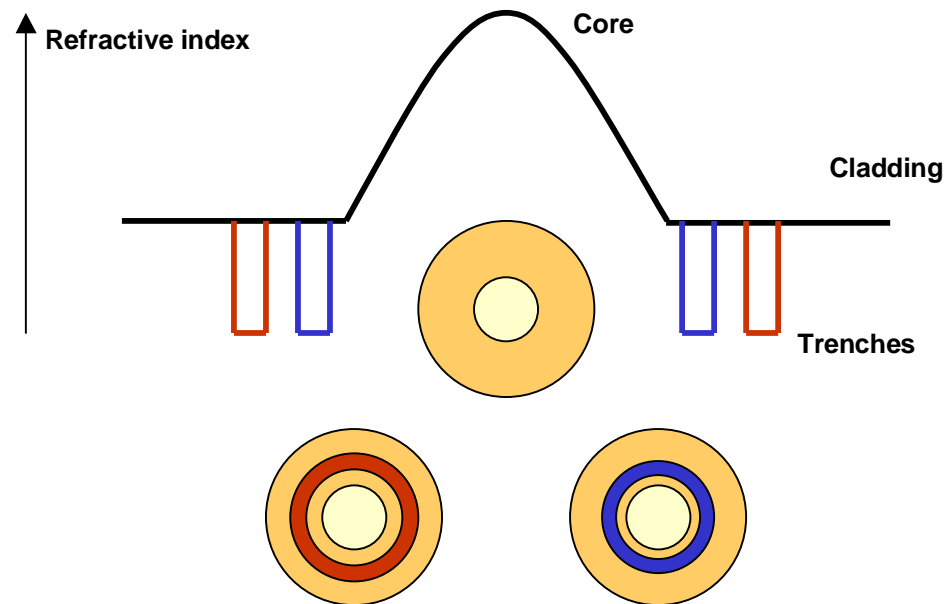
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# Less Bend Sensitive OF - Multimode

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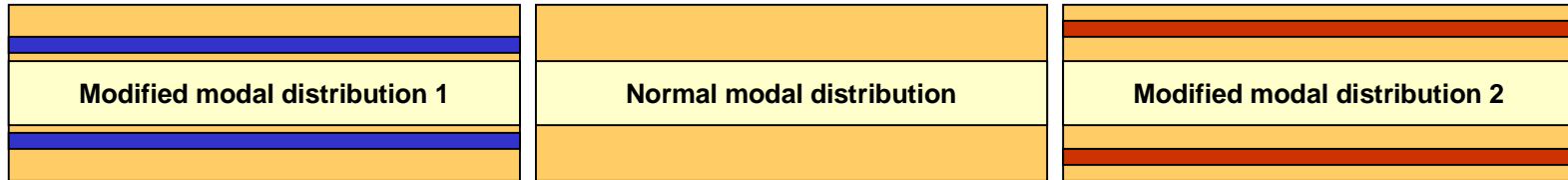
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## TRENCH WARFARE

The presence of trenches to prevent light escaping the core modifies the modal power distribution within the core

# Multimode LBS OF - Compatibility

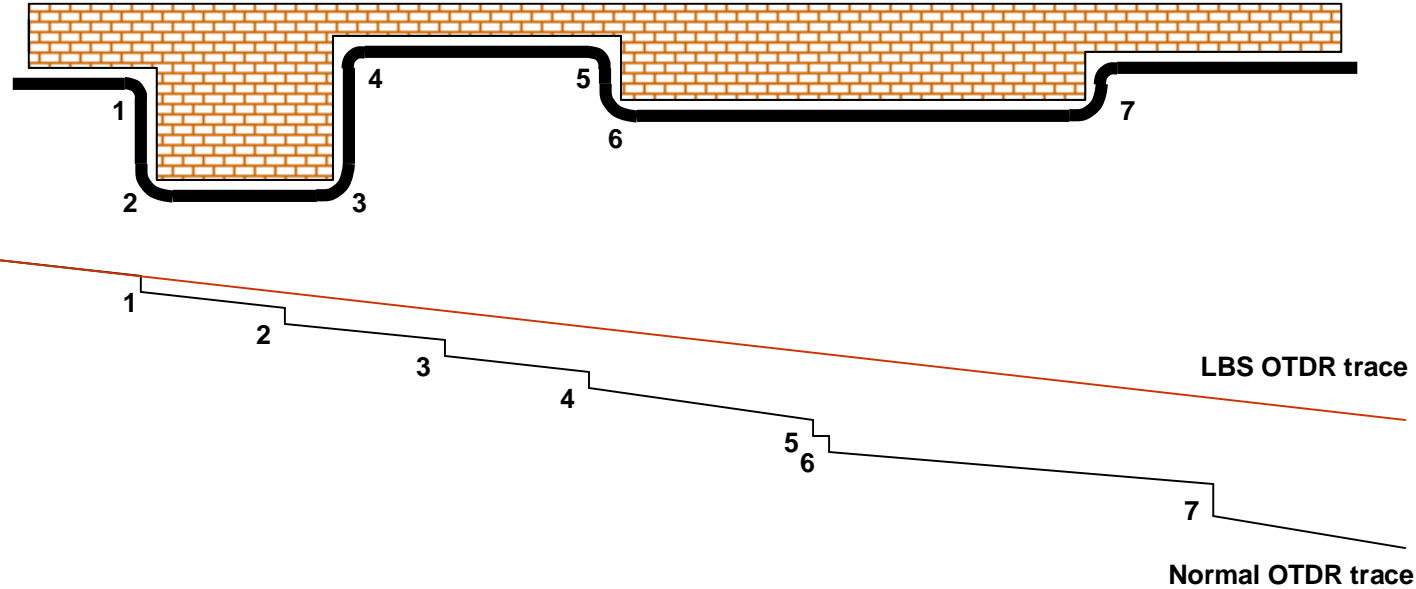


COMPATIBILITY ISSUES
Insertion loss: Normal to LBS
Insertion loss: LBS to LBS
Testing: compatibility of test cords
Testing: production of reference test leads

STANDARDISATION REQUIRED
The first proposal for BI-MMF was offered to IECSC86A/WG1 in April 2010
“the standards community are active to solve compatibility issues” <small>Gerard Kuyt, Convenor IEC SC86A/WG1</small>
In the interim, compatibility has to be seen to be a major problem

# Multimode LBS OF - Reliability

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RELIABILITY ISSUES
Strain still exists
Probability of failure still exists
Test results show no problems - do we want this?

# Length Matters



- HOME ▾
- FTTX ▾
- TEST & MEASUREMENT ▾
- EQUIPMENT DESIGN ▾
- CABLE/MSO ▾
- NETWORKING ▾

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## CommScope's OM4 fiber enables 100 Gigabit Ethernet to reach 340 meters

Application	40GBASE-SR4 100GBASE-SR10	
Cabled OF Category	50/125 <b>OM3</b>	50/125 <b>OM4</b>
Bandwidth of interest (MHz.km)	2000	4700
Channel length (m, max.)	100	150

# Length Matters

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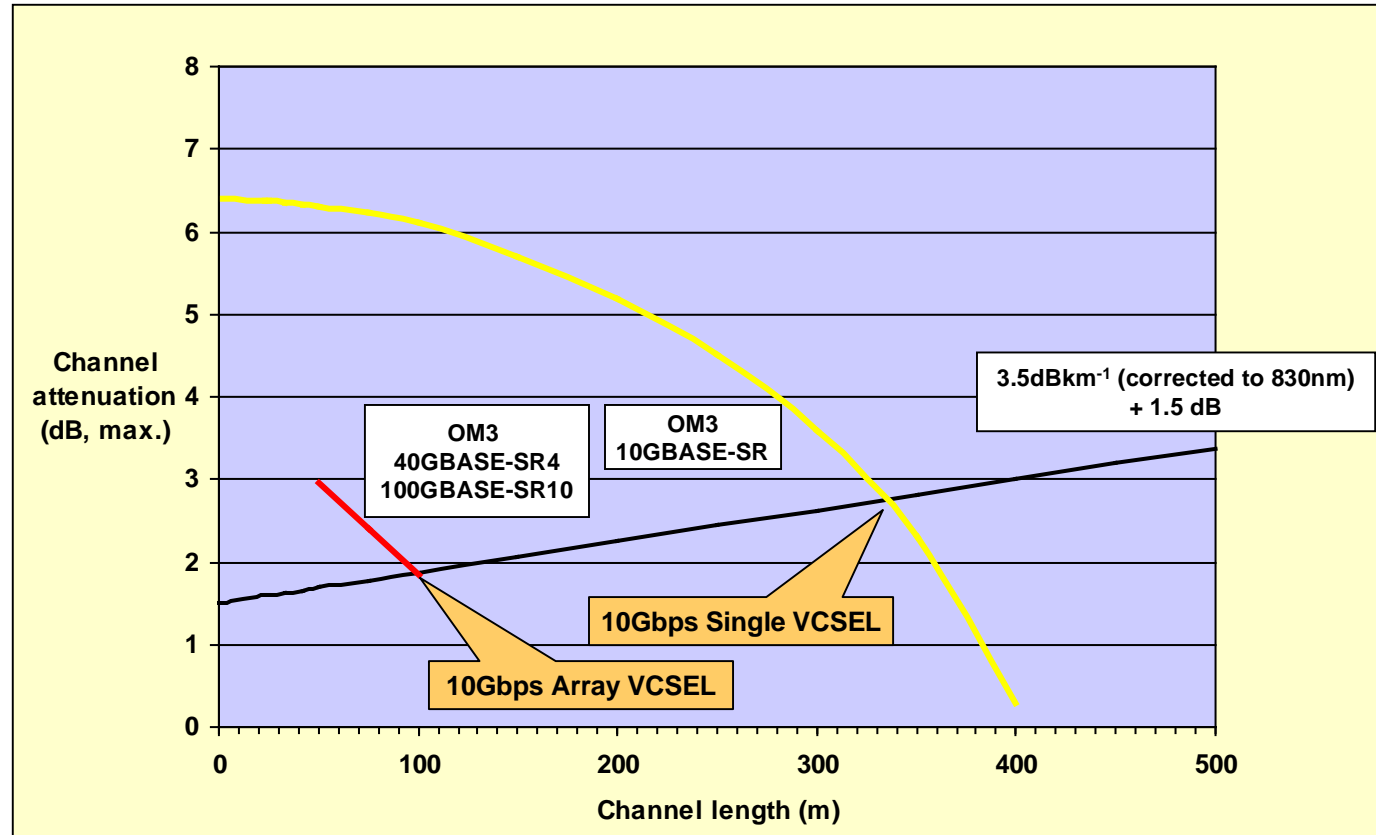
DEVICE PERFORMANCE	LED	ARRAY VCSEL	SINGLE VCSEL
LENGTH DEPENDENCE - OF MODAL BANDWIDTH	NONE	LESS THAN LINEAR	LINEAR
LENGTH DEPENDENCE CHANNEL INSERTION LOSS (MAX)	OF MODAL BANDWIDTH LOW   HI	OF MODAL BANDWIDTH LOW   HI	OF MODAL BANDWIDTH LOW   HI
	← NO DIFFERENTIAL →	← MINIMAL DIFFERENTIAL →	← GREATER DIFFERENTIAL →

Application	40GBASE-SR4 100GBASE-SR10		10GBASE-SR/SW		
Cabled OF Category	50/125 OM3	50/125 OM4	62.5/125 OM1	50/125 OM2	50/125 OM3
Bandwidth of interest (MHz.km)	2000	4700	200	500	2000
Channel length (m, max.)	100	150	33	82	300

# The Difference the VCSEL Makes

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# The Smaller Print

LIGHTWAVE, FEBRUARY 1, 2011

CommScope Inc., a provider of infrastructure tools for communications networks, has enabled a 100 Gigabit Ethernet (GbE) data transmission over **off-the-shelf, 340-meter, multimode fiber-optic cabling with 7 MPO connections**. The demonstration took place at Cisco Live! in London using SYSTIMAX LazrSpeed multimode fiber cabling, in collaboration with Ixia and Reflex Photonics Inc.

The 100GbE standard was ratified in June 2010 by the IEEE 802.3ba committee for transmissions up to 150 meters of OM4 fiber cable. CommScope's 340-meter link proves that the range could be effectively doubled through the combined use of **high-performance connectivity** solutions and **advanced optoelectronics**, reveals a representative.

This demonstration was the first to take place publicly, rather than in closed-door laboratory environments.

# Length Matters

**IEEE only specifies worst case scenario**  
**FIA DAN001 provides the specified numbers**



**The Fibreoptic Industry Association**  
[www.fia-online.co.uk](http://www.fia-online.co.uk)

Secretary: Jane Morrison  
The Manor House  
BUNTINGFORD  
Hertfordshire SG9 9AB  
United Kingdom  
Tel: +44 (0) 1763 273039 Fax: +44 (0) 1763 273255  
e-mail: [jane@fiasec.demon.co.uk](mailto:jane@fiasec.demon.co.uk)

OPTICAL FIBRE CABLING AND DATA NETWORKS  
SUMMARY APPLICATION NOTE: DAN001

(Issue)	ISO/IEC 8802-3: 100BASE-FX	1 300	50	6,3	2 000	OF-2000	6,3	2 000	OF-2000	6,3	2 000	OF-2000
			62,5	11,0	2 000	OF-2000	11,0	2 000	OF-2000	-	-	-
IEEE 802.3: 10GBASE-SR/SW	850		50	-	-	-	1,80	82	-	2,60	300	OF-300
			62,5	1,60	32	-	-	-	-	-	-	-
IEEE 802.3: 10GBASE-LX4 <sup>a</sup>	1 300		50	2,0	300	OF-300	2,0	300	OF-300	2,0	300	OF-300
			62,5	2,0	300	OF-300	2,0	300	OF-300	-	-	-
IEEE 802.3: 40GBASE-SR4 <sup>a</sup>	850		50 <sup>d</sup>	-	-	-	-	-	-	1,90 <sup>d</sup>	100 <sup>d</sup>	OF-100
			50 <sup>e</sup>	-	-	-	-	-	-	1,50 <sup>f</sup>	150 <sup>f</sup>	OF-100
			50 <sup>e</sup>	-	-	-	-	-	-	1,90 <sup>d</sup>	100 <sup>d</sup>	OF-100
IEEE 802.3: 100GBASE-SR10 <sup>c</sup>	850		50 <sup>d</sup>	-	-	-	-	-	-	1,90 <sup>d</sup>	100 <sup>d</sup>	OF-100
			50 <sup>e</sup>	-	-	-	-	-	-	1,50 <sup>f</sup>	150 <sup>f</sup>	OF-100

<sup>a</sup> CIL is the maximum channel insertion loss (or optical power budget, as applicable) as defined in the application standard.  
<sup>b</sup> Z is the lower of:  
the maximum channel length specified in the application standard;  
a calculated length from the CIL with 1,5 dB allocated to connecting hardware.

- any other figures depend upon suppliers guarantees
- do they guarantee it or just shout about it?
- what do they require in return
- is it viable for your client

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