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June 30, 2016

Letter Report No.102547295CRT-001
Project No. G102547295

Mr.Richard Mei
CommScope
1300 E. Lookout Drive
Suite 150
Richardson,TX 75082

Subject: On-site evaluation of OM3, OM4 and wideband multimode fiber for Differential Mode Delay (DMD) performance

Dear Mr. Mei,

Summary

This letter represents the results of the evaluation and tests of the above referenced fiber cables performed in compliance with test methods described in the following standards:

TIA-455-220-A (FOTP-220), Differential Mode Delay Measurement of Multimode Fiber in the Time Domain, dated January 2003

IEC 60793-1-49, Edition 2.0, Optical fibres – Part 1-49: Measurement methods and test procedures – Differential mode delay

This investigation was authorized by signed quotation numbers Qu-00674694, dated April 7, 2016 and Qu-00690563, dated April 19, 2016. Production samples were evaluated on May 4, 2016 and tested at CommScope's facility.

Samples tested

Two (2) fibers were exclusively compliant to the DMD templates and EMBc criteria of the following TIA and IEC standards, making them suitable for OM3 cabling. These fibers were identified with part numbers LS300CS5LTB-0A8 and LS300CS5LTB-3BD.

TIA-492AAAC, Revision B, Detail Specification for 850-nm Laser-Optimized, 50-µm Core Diameter/125-µm Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers, dated November 2009

IEC 60793-2-10, Edition 5.0, Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres (fiber model A1a.2, Sections D.1 and D.2)

Two (2) fibers were compliant to the DMD templates and EMBc criteria of the the following TIA and IEC standards, making them suitable for OM4 cabling. These fibers were identified with part numbers LS550CS5KTB-1AY and LS550CS5KTB-6A6.

> TIA-492AAAD Detail Specification for 850-nm Laser-Optimized, 50-µm Core Diameter/125-µm Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber, dated September 2009
>
> IEC 60793-2-10, Edition 5.0, Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres (fiber model A1a.3, Sections D.3 and D.4)

Two (2) fibers were compliant to the EMBc criteria of the following TIA standard, making them suitable for wideband cabling. These fibers were identified with part numbers LS550CS5GMP-5BL and LS550CS5GMP-3BN.

> TIA-492AAAE Detail Specification for 50-µm Core Diameter/125-µm Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers with Laser-Optimized Bandwidth Characteristics Specified for Wavelength Division Multiplexing, dated June 2016

Measurement description

Figure 1 is a schematic of the Differential Mode Delay (DMD) measurement system. It consists of a high speed Ti:Sapphire pulsed laser, alignment optics, a single mode fiber used as the probe fiber, a digitally controlled three axis fiber alignment stage, a three axis manual fiber alignment stage to secure the fiber under test, an oscilloscope to measure the optical pulse in the time domain, and software to accurately measure pulses while making 1 µm steps of the probe fiber in X & Y directions to excite different modes in the multimode fiber under test. The plots have four different colors representing the two measurements made in the X-direction (positive and negative from the center) and the two measurements made in the Y-direction (positive and negative from the center), thus producing a 4-quadrant assessment of the DMD of each sample.

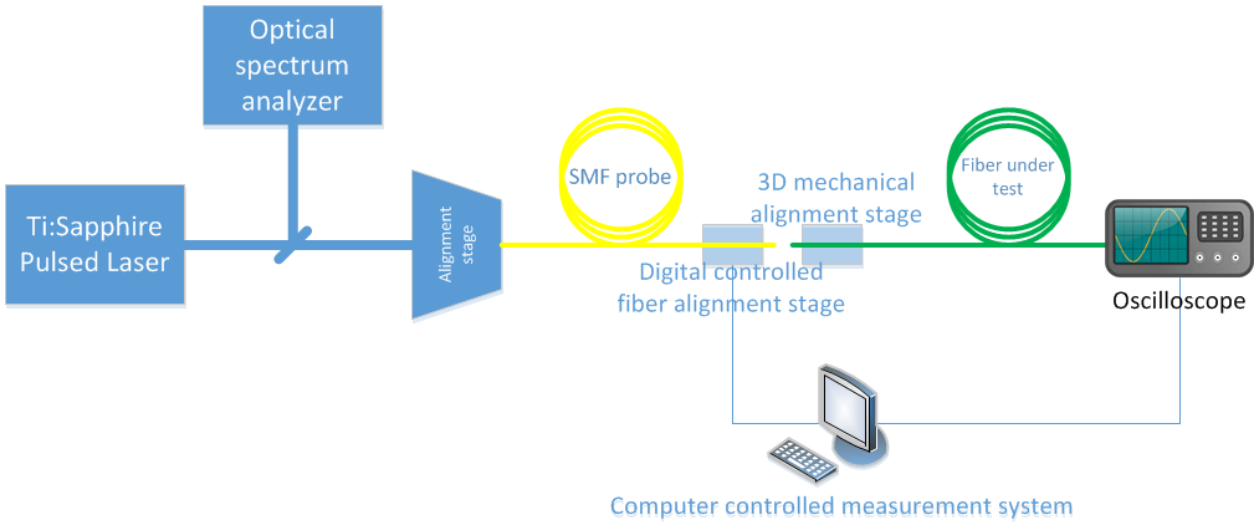


Fig. 1: DMD measurement system

Test equipment used

The following equipment was employed in conducting the tests.

Equipment used	Model number	Instrument ID	Calibration date	Calibration due date
Keysight (Agilent) oscilloscope	DSO-X 3034A	MY53160570	April 6, 2016	April 6, 2017
Ando optical spectrum analyzer	AQ6317B	BC1053	April 8, 2016	April 8, 2017
Tektronik 50 GHz sampling module	80E01	B010615	April 7, 2016	April 7, 2017
Tektronik 50 GHz sampling module	80E01	B010612	April 7, 2016	April 7, 2017
Tektronik communications signal analyzer	CSA8000	B021216	April 7, 2016	April 7, 2017
Newport optical power meter	2936-R	15850	December 28, 2015	December 28, 2016
Newport detector	918D-IG-OD3R	1069	December 22, 2015	December 22, 2016
Newport detector	918D-IG-OD3R	10023	December 22, 2015	December 22, 2016
Power meter	33-0498-000	14Q85	May 31, 2015	May 31, 2017

Conclusion

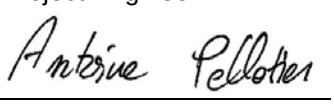
The fiber specimens were tested for DMD performance in accordance with the standards referred to on page 1 and were found to be in compliance with the applicable requirements of the respective sectional specification for OM3, OM4 and wideband cabling. The testing was witnessed at CommScope's facility.

The DMD test results are enclosed to this Letter Report and are summarized in the table below.

Cable Category	CommScope Name	Part Number	Compliant to
OM3	CommScope LazrSPEED® 300	LS300CS5LTB-0A8	TIA-492AAAC-B
OM3	CommScope LazrSPEED® 300	LS300CS5LTB-3BD	TIA-492AAAC-B
OM4	CommScope LazrSPEED® 550	LS550CS5KTB-1AY	TIA-492AAAD
OM4	CommScope LazrSPEED® 550	LS550CS5KTB-6A6	TIA-492AAAD
WBMMF	CommScope LazrSPEED® 550 WideBand Multimode Fiber	LS550CS5GMP-5BL	TIA-492AAAE
WBMMF	CommScope LazrSPEED® 550 WideBand Multimode Fiber	LS550CS5GMP-3BN	TIA-492AAAE

If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact the undersigned.

Please note, this Letter Report does not represent authorization for the use of any Intertek certification marks.

Completed by:	Antoine Pelletier	Reviewed by:	Ken Riedl
Title:	Project Engineer	Title:	Senior Project Engineer
Signature:		Signature