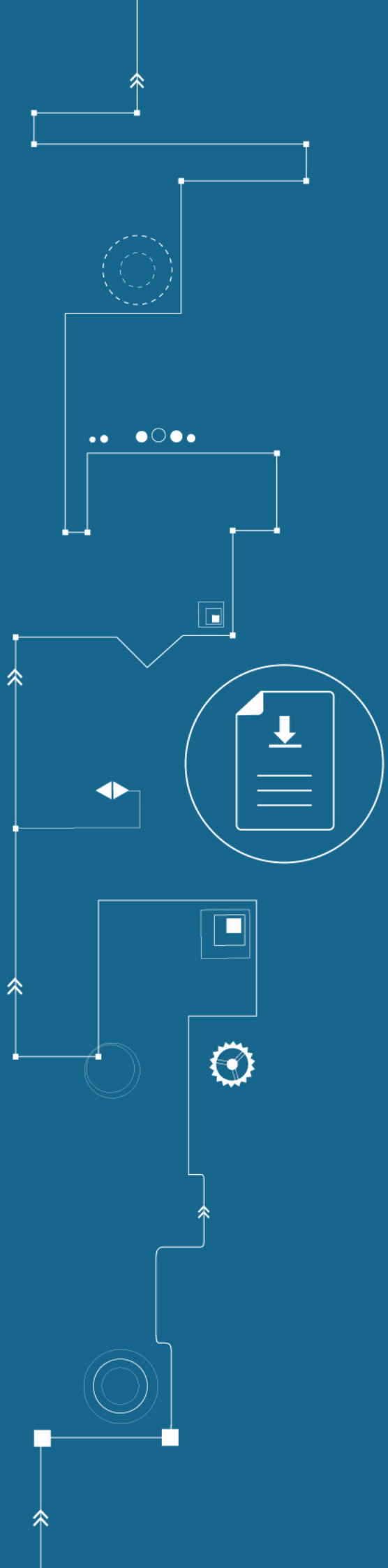
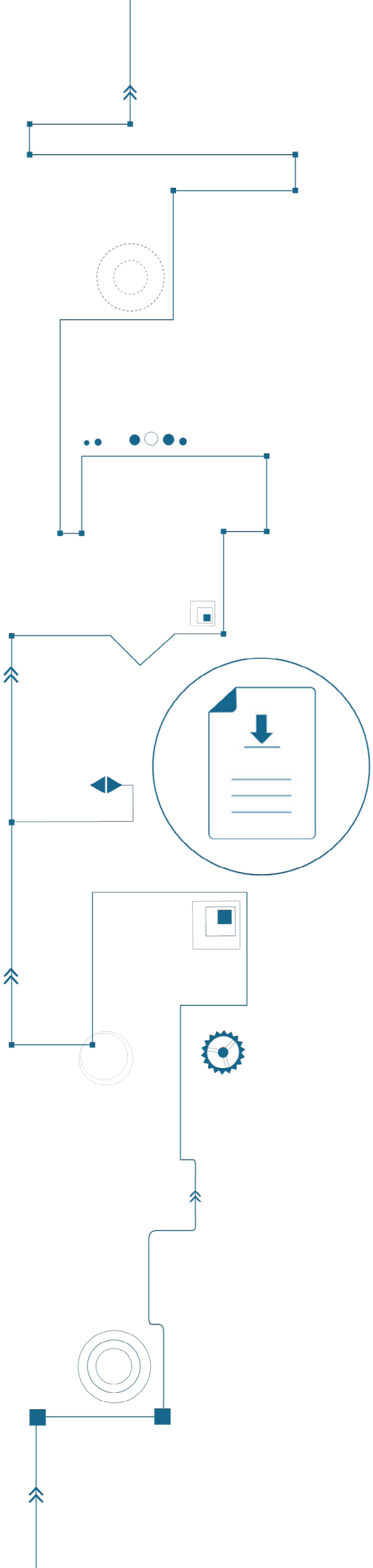
CUBRO
NETWORK VISIBILITY



THE IMPORTANCE OF QUALITY FOR OPTICAL TAPS

WHITE PAPER

JUN 2018



CUBRO
NETWORK VISIBILITY

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Introduction

Network visibility starts with Layer 1 and quality is an important consideration. Top quality components at this layer are vital to providing reliable data to all other applications. This means that rigorous testing and quality assurance for optical TAPs is a must. This is particularly true when considering bandwidth speeds of 100 Gbit and 400 Gbit links where the optical light budget is lower than on 10 Gbit and 1 Gbit links. Another major consideration is the fact that multiple fibers are used to construct the physical link for these bandwidth speeds. Therefore, it is also very important that these fibers have a very similar optical power.

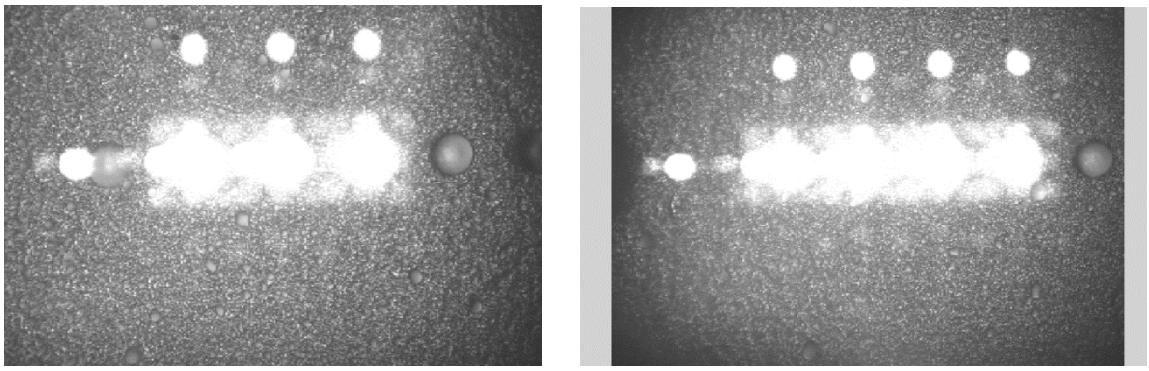
Achieving this level of quality assurance with a standard power meter is nearly impossible since all 4 fiber pairs must be measured at the same time.

Quality Control at Cubro

Cubro has developed a proprietary measurement device (1), that can measure up to 4 fiber pairs simultaneously, using all bandwidth speeds and all wavelength frequencies. This measurement method is not only very fast but produces repeatable results on each link; this is not often the case with standard optical power meters. The reason for this is that optical power meters are normally designed to measure longer optical fibers and not those of a very short distance.

The second key process for quality assurance is to visually inspect every connector for any contaminants or defects. We employ a fiber microscope (2) to accomplish this task. We even save a photo of each connector in a database for later reference and analysis in case a customer experiences an issue.

A visual inspection is also critical to ensure that all fibers in a connector are functioning. In the photos below we can see a properly functioning connector on the right where all fibers are lit; on the left is a faulty connector where one of the fiber pairs is dark.

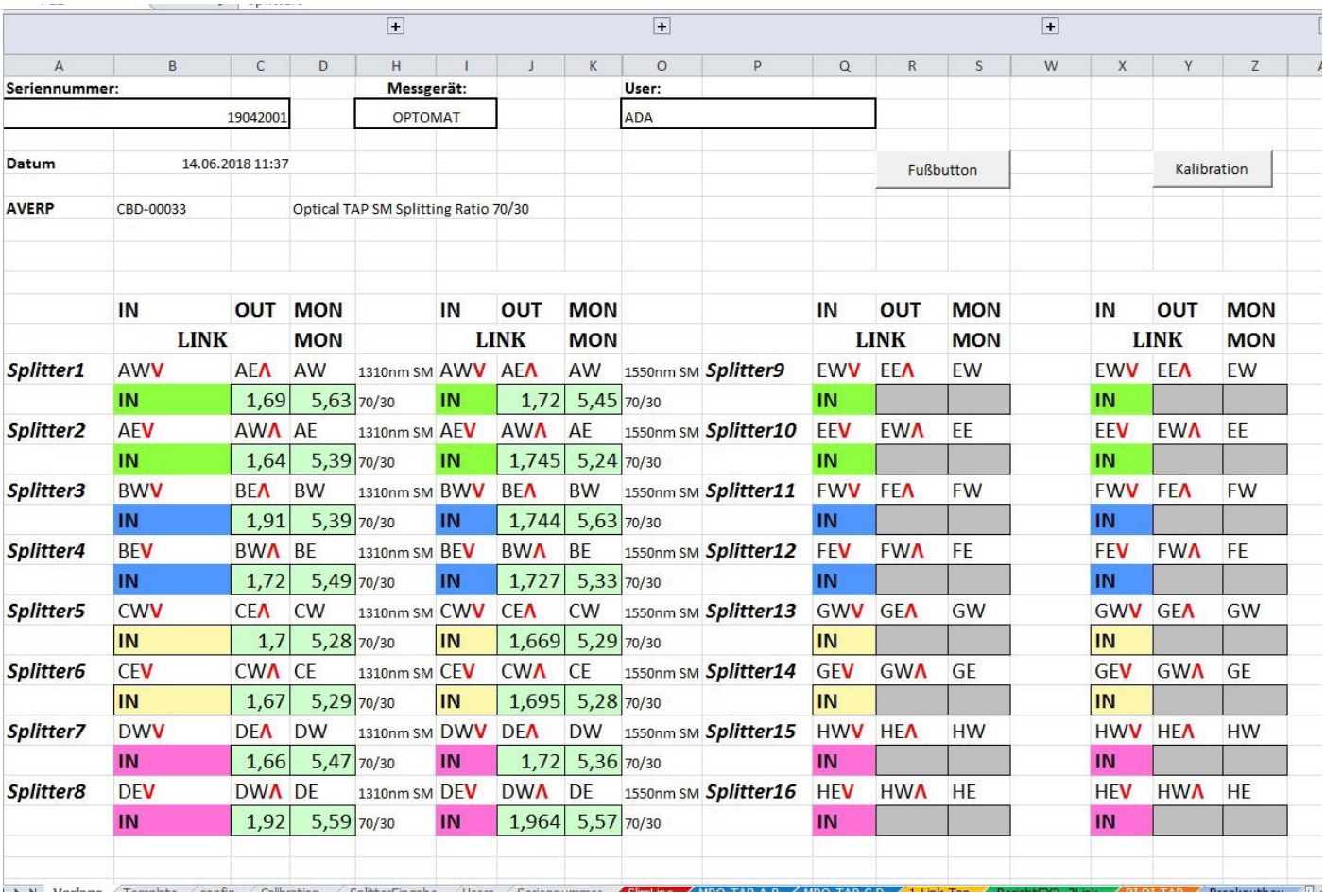


If a vendor, in the interest of saving time and expense, tests only a handful of fibers on the TAP or samples from a batch of products for QA, it could mean unforeseen issues for the customer. This is made even more serious when one considers that installation of a TAP requires scheduled downtime of the link. Cubro tests all fibers at all bandwidths and all wavelengths to ensure a quality experience for the customer.

At Cubro Network Visibility every TAP is built with exacting attention to detail and every single unit is inspected and tested upon completion. Each link of our fiber TAPs is examined and photographed using a precision microscope to ensure that no defects or contaminants are left on the fiber connector; this is critical for performance at higher bandwidths such as 100 Gbps. Speaking of bandwidth, every link of the optical TAP is also tested to handle speeds from 10 Mbps up to 100 Gbps. Currently, we are working on building a 400 Gbps testing solution as well.

For a TAP to function optimally and have a long life span it needs to be constructed of the highest quality materials and rigorously tested before it ever reaches the customer.

Watch the Video: Optical TAP testing with the self-developed test gear



Seriennummer:				Messgerät:				User:											
	19042001			OPTOMAT				ADA											
Datum	14.06.2018 11:37											Fußbutton					Kalibration		
AVERP	CBD-00033		Optical TAP SM Splitting Ratio 70/30																
	IN LINK	OUT	MON		IN LINK	OUT	MON			IN LINK	OUT	MON		IN LINK	OUT	MON			
Splitter1	AWV	AE∧	AW	1310nm SM	AWV	AE∧	AW	1550nm SM	Splitter9	EWV	EE∧	EW		EWV	EE∧	EW			
	IN	1,69	5,63	70/30	IN	1,72	5,45	70/30		IN				IN					
Splitter2	AEV	AW∧	AE	1310nm SM	AEV	AW∧	AE	1550nm SM	Splitter10	EEV	EW∧	EE		EEV	EW∧	EE			
	IN	1,64	5,39	70/30	IN	1,745	5,24	70/30		IN				IN					
Splitter3	BWV	BE∧	BW	1310nm SM	BWV	BE∧	BW	1550nm SM	Splitter11	FWV	FE∧	FW		FWV	FE∧	FW			
	IN	1,91	5,39	70/30	IN	1,744	5,63	70/30		IN				IN					
Splitter4	BEV	BW∧	BE	1310nm SM	BEV	BW∧	BE	1550nm SM	Splitter12	FEV	FW∧	FE		FEV	FW∧	FE			
	IN	1,72	5,49	70/30	IN	1,727	5,33	70/30		IN				IN					
Splitter5	CWV	CE∧	CW	1310nm SM	CWV	CE∧	CW	1550nm SM	Splitter13	GWV	GE∧	GW		GWV	GE∧	GW			
	IN	1,7	5,28	70/30	IN	1,669	5,29	70/30		IN				IN					
Splitter6	CEV	CW∧	CE	1310nm SM	CEV	CW∧	CE	1550nm SM	Splitter14	GEV	GW∧	GE		GEV	GW∧	GE			
	IN	1,67	5,29	70/30	IN	1,695	5,28	70/30		IN				IN					
Splitter7	DWV	DE∧	DW	1310nm SM	DWV	DE∧	DW	1550nm SM	Splitter15	HWV	HE∧	HW		HWV	HE∧	HW			
	IN	1,66	5,47	70/30	IN	1,72	5,36	70/30		IN				IN					
Splitter8	DEV	DW∧	DE	1310nm SM	DEV	DW∧	DE	1550nm SM	Splitter16	HEV	HW∧	HE		HEV	HW∧	HE			
	IN	1,92	5,59	70/30	IN	1,964	5,57	70/30		IN				IN					

Cubro includes the test results for our measurement protocol with every optical TAP. For a small additional fee, Cubro will provide the microscope photos of each connector on the TAP as well.

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TEST DATA

Name: Optical TAP SM Splitting Ratio 70/30
SN: 19042001

Fibre-Type		SM				SM				SM				SM																	
Splitter-Ratio		70/30				70/30				70/30				70/30																	
Port		A-W		A-E		B-W		B-E		C-W		C-E		D-W		D-E		E-W		E-E		F-W		F-E		G-W		G-E		H-W		H-E	
		Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.	Link	Mon.
Insertion Loss	dB	1,7	5,6	1,6	5,4	1,9	5,4	1,7	5,5	1,7	5,3	1,7	5,3	1,7	5,5	1,9	5,6														
Wavelength	nm	1310				1310				1310				1310																	
Insertion Loss	dB	1,7	5,5	1,7	5,2	1,7	5,6	1,7	5,3	1,7	5,3	1,7	5,3	1,7	5,4	2,0	5,6														
Wavelength	nm	1550				1550				1550				1550																	
Return Loss	dB	> 45																													
Directivity	dB	>50																													
Connector		LC/UPC																													
Operating Temperature		-10~+70°																													

Tested By: ADA **TEST DATE:** 14.06.2018

USED EQUIPMENT : Optomat
SN : 1
CALIBRATION DATE : 14.06.2018 11:43