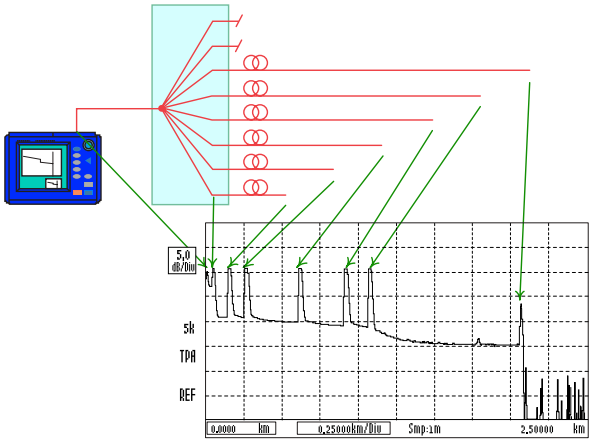
OTDR TRACE CHARACTERISTIC THROUGH THE COUPLER

Systems for point to multipoint applications use a coupler located between the central office and the home. The optical coupler usually introduces a relatively large loss into FTTx fiber network: typically 6 dB for a 1×4 coupler and 9 dB for a 1×8 coupler. To guarantee the quality of the FTTx network, it is necessary to check the total loss and characteristic using an OTDR, making it a very convenient tool for the to characterisation of the overall condition of the FTTx network. (FTTx: FTTB, FTTC, FTTH)



FTTB: Fiber to the building
FTTC: Fiber to the curb
FTTH: Fiber to the home

ORDERING INFORMATION

Model	Description	
	Wavelength (nm)	Dynamic Range (dB)
735031	1650	30
735032	1310/1550	34/32
735033	1310/1550	40/38
735034	1310/1550	43/41
735035	1310/1490/1550	34/30/32
735036	1310/1550/1625	40/38/33
735037	1310/1550/1650	40/38/30
735038	1310/1550/1625	40/38/36
735041	850/1300 1310/1550	21,5/23 (50/125μm) 22,5/24 (62,5/125μm) 40/38

Model	Suffix Code	Description
Connector type	-SCC	SC type connector
	-FCC	FC type connector
	-NON	No Universal adapter
	-USC	Universal adapter (SC)
	-UFC	Universal adapter (FC)
	-ASC	Angled-PC connector (SC) *2
Language	-HE	English and many European languages
Power cable	-F	VDE standard
	-Q	BS/Singapore standard
Options	/PM	Optical power monitor
	/SLS	Stabilised light source
	/VLS	Visible light source
	/PL	Built-in printer, LAN
	/DF	Dummy fiber (SMF)
	/SB	Shoulder belt

Model	Option availability						Remark
	/PM	/SLS	/VLS	/PL	/DF	/SB	
735031	-	√	√	√	√	√	1-port, SM1650nm, filter
735032	√	√	√	√	√	√	1-port, SM1310/1550nm
735033	√	√	√	√	√	√	1-port, SM1310/1550nm, High DR
735034	√	√	√	√	√	√	1-port, SM1310/1550nm, Higher DR
735035	√	√	√	√	√	√	1-port, SM1310/1490/1550nm
735036	√	√	-	√	√	√	2-port, SM1310/1550/1625nm, filter
735037	√	√	-	√	√	√	2-port, SM1310/1550/1650nm, filter
735038	√	√	√	√	√	√	1-port, SM1310/1550/1625nm
735041	√*1	√*1	-	√	√	√	2-port, MM850/1300nm, SM1310/1550nm

*1 : MMF is not supported.
*2 : An angled-PC connector cannot be used in the MM port of the 735041, -USC needs to be attached.
√ : Available.

EUROPEAN HEADQUARTERS

YOKOGAWA EUROPE B.V.
Euroweg 2,
3825 HD, Amersfoort
The Netherlands
Tel. +31 88 464 1429
Fax +31 88 464 1107
t&m@yokogawa.nl

http://tmi.yokogawa.com

EUROPE
TEST AND MEASUREMENT SALES NETWORK

THE NETHERLANDS
Yokogawa Europe B.V.
T&M Division -
Sales Netherlands & Belgium
Euroweg 2,
3825 HD, Amersfoort
The Netherlands
Tel. +31 88 464 1429
Fax +31 88 464 1107

GERMANY
Yokogawa Measurement
Technologies GmbH
Gewerbestrasse 17
D-82211 Herrsching
Germany
Tel. +49 815293 100
Fax +49 815293 1060

ITALY
Yokogawa Italia S.r.l.
Via Pelizza da Volpedo 53
20092 Cinisello Balsamo (MI)
Italy
Tel. +39 02 66 055 1
Fax +39 02 66 011 415

SPAIN IBERIA
Yokogawa Iberia S.A.
c/Lezama, N°22
28034 Madrid
Spain
Tel. +34 91 771 31 50
Fax +34 91 771 31 80

UNITED KINGDOM
Yokogawa Measurement
Technologies Ltd
Stuart Road, Manor Park
Runcorn, Cheshire
WA7 1TR
United Kingdom
Tel. +44 1928 597200
Fax +44 1928 597201

NORDIC
Yokogawa Measurement
Technologies A.B.
Finlandsgatan 52, 2fl
SE-164 74 Kista
Stockholm
Sweden
Tel. +46 8 477 1900
Fax +46 8 477 1999

T&M DISTRIBUTOR NETWORK
Yokogawa has an extensive distribution network. To find the representative in your country or close to you, go to http://tmi.yokogawa.com or call +31 (0) 88 464 1429 or email to t&m@nl.yokogawa.com

YOKOGAWA ELECTRIC CORPORATION
Yokogawa's global network of 19 manufacturing facilities, 89 affiliate companies, and over 650 sales and engineering offices spans 32 countries. Since its founding in 1915, the US$4 billion company has been engaged in cutting-edge research and innovation, securing more than 7,500 patents and registrations, including the world's first digital sensors for flow and pressure measurement. Industrial automation and control, test and measurement, information systems and industry support are the core businesses of Yokogawa. For more information about Yokogawa, please visit our web site at www.yokogawa.com

YOKOGAWA

APPLICATION NOTE

Using an Optical Time Domain Reflectometer in FTTx and other optical network applications

The worldwide spread of broadband services has stimulated the installation of optical fiber in metro and access networks, which in turn has increased the demand for portable and reliable test equipment to aid the installation and maintenance of these networks. The Yokogawa AQ7275 OTDR is designed for use in new network applications such as FTTx services.

AN-01-903

YOKOGAWA

KEY BENEFITS OF THE AQ7275

- The instrument has a 0.8 m dead zone, allowing events separated by this short distance to be detected.
- The internal Dummy Fiber helps to avoid near-end dead-zone effects as well as measuring the near-end connection loss.
- An optical power monitor function is available for checking the end point of the power level.
- An automatic 'save' function reduces the time taken to save hundreds of fiber measurements.
- Measuring at a wavelength of 1625nm makes it easy to detect bending losses on installed fibers
- OTDR trace characteristic through the coupler

HOW THESE KEY BENEFITS TRANSFORM THE MEASUREMENT PROCESS

0.8 M DEAD ZONE

To ensure a high-quality ODF (optical distributed frame), it is necessary to check the internal condition of the connector adaptor both during and after installation. Patch cables are typically several metres in length and to check the condition of the connector adaptor requires an OTDR with a very short dead zone. The Yokogawa has a 3 ns pulse width that allows the necessary dead zone to be achieved (Fig.1).

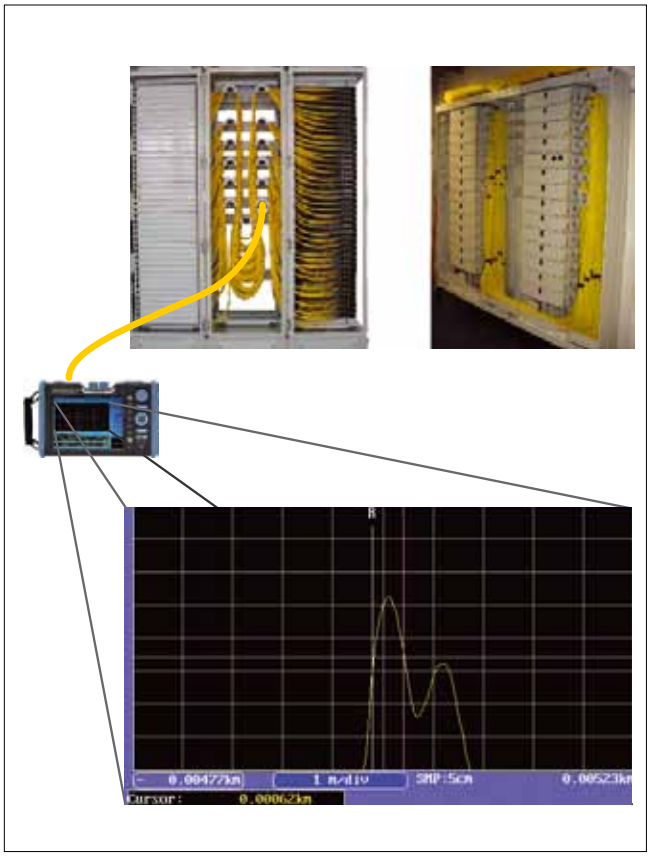


Figure. 1. Waveform display showing ODF measurement using 0.8 m dead zone

INTERNAL DUMMY FIBER

A built-in Dummy fiber, approximately 100m long, is available which sits between the laser and the output connector of the OTDR. The use of a Dummy fiber is invaluable for FTTx use, in order to make measurements which include the near end connector at a patch panel, for example (see fig.2). With the Dummy fiber uniquely situated inside the OTDR, the user does not need to bring an external reel of fiber to the site.

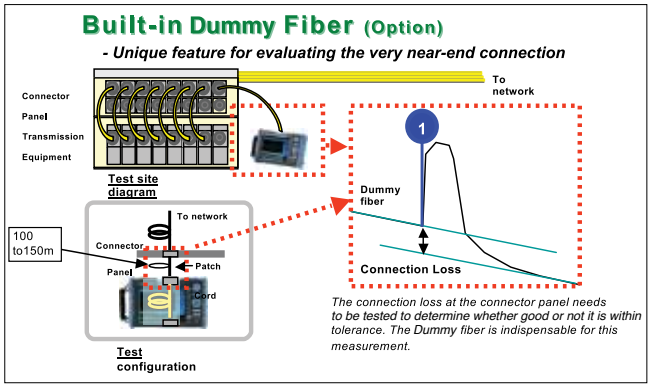


Fig.2. Built-in Dummy fiber for evaluating near-end connection

The resulting display is shown in Fig.3.
A reference marker will appear and the trace of the Dummy fiber will be displayed in a different color to distinguish between it and the measured fiber.

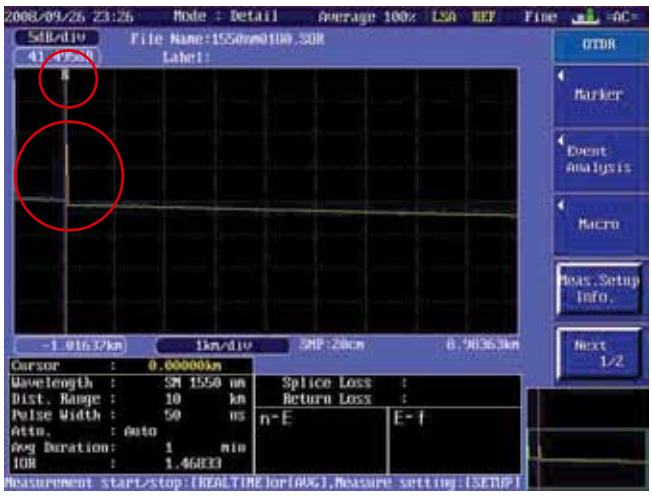


Fig. 3. Display of measurements made using built-in Dummy Fiber; different colours are used to distinguish the waveforms from the Dummy Fiber and the measured Fiber

OPTICAL POWER MONITOR FUNCTION

For installation at the FTTx end-user side, it is necessary to check the power level. The AQ7275 includes an optional power monitor function, and is easily switched between operating modes (Fig.4).

Power measurements are made over the range from –50 to –5dBm with an accuracy within ±0.5dB.

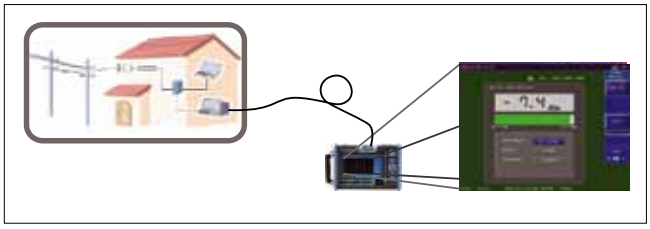
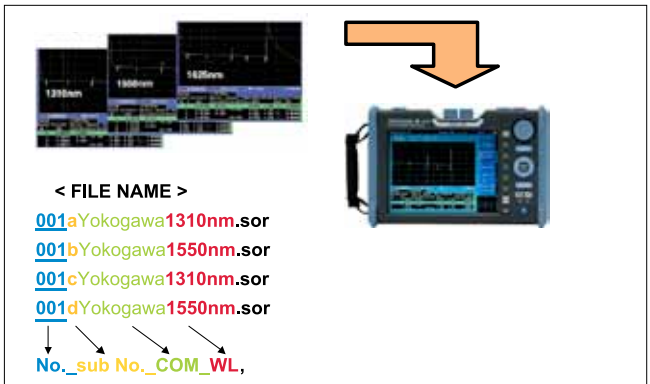


Fig. 4. Optical power monitoring at the FTTx end-user side

AUTOMATIC 'SAVE' FUNCTION

For measurements on a large number of fibers, the automatic 'save' function speeds the production of reports and allows traces to be rapidly saved to a PC or system database. The AQ7275 has a unique filing format which allows easy arrangement of data and the addition of comments (Fig.5) before saving.

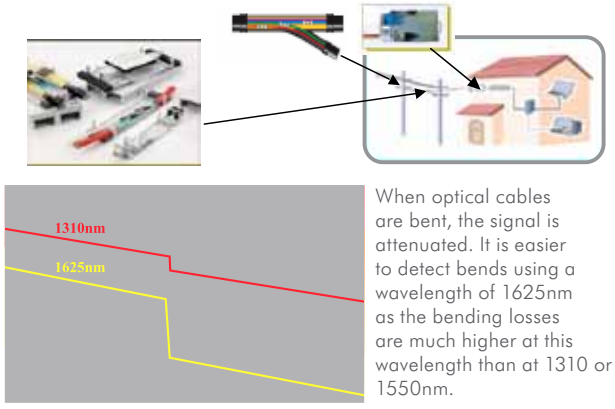


When the data for each test is saved to the AQ7275, information about the file contents can be included in the filename. The user can choose to automatically number the file and/or include a comment and the test wavelength in the name. This enables the test result from a particular fiber and wavelength to be easily selected for further analysis.

Fig. 5. Automatic 'save' function showing the unique file name

1625nm WAVELENGTH MEASUREMENTS

Post-installation bending losses occur at and around termination points where fibers have to be bent. The normal measurement wavelengths of 1310nm and 1550nm are not sensitive enough to measure these bending losses accurately, so the AQ7275 uses a wavelength of 1625nm for better indication of the loss (Fig.6).



When optical cables are bent, the signal is attenuated. It is easier to detect bends using a wavelength of 1625nm as the bending losses are much higher at this wavelength than at 1310 or 1550nm.

Fig. 6 Using the 1625nm wavelength to detect bending losses

The 1625nm wavelength is also used for the surveillance of active optical networks, in which network operators need to maintain network quality on the active line. Such systems typically use 1310nm and 1550nm for the actual data line, so 1625nm is generally preferred for the monitor wavelength (Fig.7).

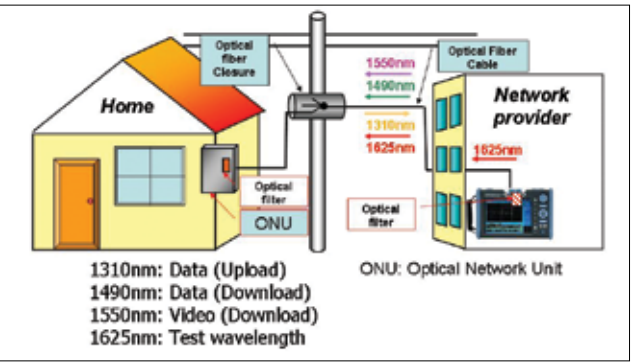


Fig. 7. Using the 1625nm wavelength for surveillance of an active optical network