SPEC SHEET

Encircled Flux (EF) test solutions

SPSB-EF LAUNCH MODE CONDITIONER AND FLS-600-NS1548 LIGHT SOURCE DESIGNED FOR CONTROLLED MULTIMODE LOSS TESTING



- Tier-1/2 solutions with controlled source launch conditions for maximum accuracy and repeatability designed to remove uncertainty from multimode fiber testing.

EF COMPLIANT

KEY FEATURES

- EF-compliant as per TIA-526-14-C and IEC 61280-4-1 Ed. 2.0 at 50 µm, 850/1300 nm guaranteed
- Optimized for multimode loss testing
- Tier-1/2 testing of multimode fibers as recommended in TIA-568
- Reference-grade UPC connectors for maximum precision and repeatability
- Built-in-EF-compliant light source–no extra equipment to manipulate

APPLICATIONS

- Data center/high-speed links
- Enterprise and private networks

COMPLEMENTARY PRODUCTS AND OPTIONS



Access OTDR
MAX-720C-Q1/QUAD



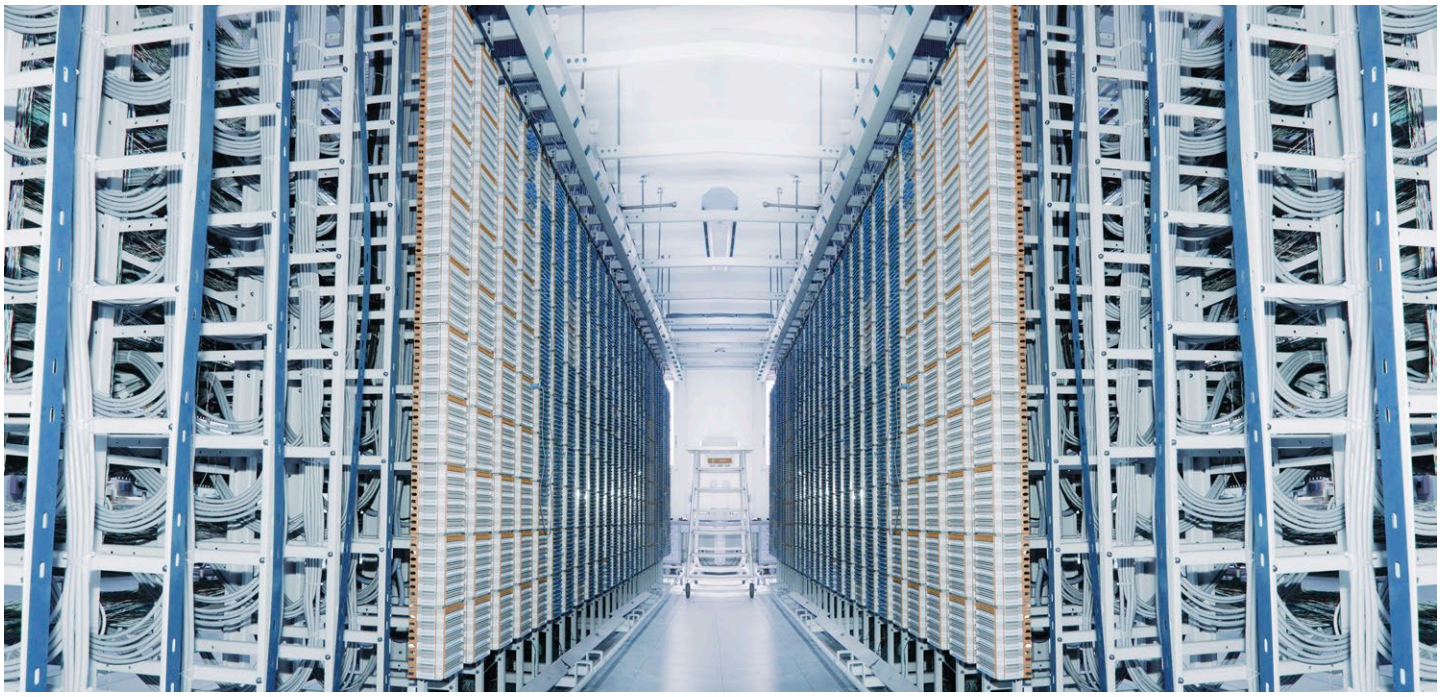
Visual fault locator
FLS-140

FastReporter

Data post-processing software
FastReporter

EXFO

UNDERSTANDING ENCIRCLED FLUX (EF)



Encircled Flux (EF) is a new standard that defines how to control the source launch conditions as specified in TIA-526-14-C and IEC 61280-4-1 Ed. 2.0.

Whether for an expanding enterprise business or a large-volume data center, the new high-speed data networks built with multimode fibers are running under tighter tolerances than ever before.

These multimode fibers are the trickiest links to test because the results depend greatly on each device's output conditions. Testing with different equipment often returns different test results, sometimes higher than the budget loss itself. This may mislead the technician or make it impossible to locate the fault, resulting in unsuccessful turn-ups or a longer network downtime. Now, cable installers can rely on their Tier-1 loss results and Tier-2 troubleshooting can be performed with maximum accuracy and utmost confidence of finding the actual problem.

CONSISTENCY AND REPEATABILITY

Whether built-in or packaged in the external launch conditioner, EXFO tunes each EF-compliant device to perfection in-house, ensuring that every unit meets the EF templates for both 850 and 1300 nm at 50 µm. This allows technicians and contractors to obtain reliable, consistent and repeatable results during construction, thus eliminating doubts and uncertainty. The test documentation that is generated will also help future-proof networks. When upgrades are needed, it will become easier and faster to know which circuits have to be activated, thereby saving time and troubles down the line.

TWO FIELD SOLUTIONS TO CHOOSE FROM

	MULTIMODE LIGHT SOURCE FOR CONSTRUCTION (TIER-1 BASIC)		MULTIMODE OTDR FOR TROUBLESHOOTING (TIER-2)
			
EF-Compliant test solutions	**FLS-600-NS1548**	**FLS-600**	**MaxTester 720C and FTBx-720C LAN/WAN access OTDR**
EF launch conditions	Built-in with reference grade jumper	Paired with External mode conditioner (SPtSB-EF-C30)	Paired with External mode conditioner (SPSB-EF-C30)
Key benefit	No extra tool to carry No need to use mandrels	Leverage your existing FLS-600 Get EF compliance with low cost of ownership	Compatible with iOLM multimode troubleshooting tool New or existing EXFO OTDRs can be retrofitted with equipment in the field
Results	Accurate and repeatable insertion loss (IL) measurement for successful turn-ups		Undoubtful and accurate fault location for quicker link repair, reducing mean time to recovery (MTTR)
Description	Like all EXFO portable instruments, the FLS-600 is built for the harshest test conditions. It features a keypad with LCD backlight, for easy operation in darker environments. Combined with an FPM-600 power meter, it automatically selects the testing wavelengths and sends the reference power value to ensure accurate results.		Packaged in a soft, light and convenient carrying case, it is compatible with EXFO OTDRs and the FLS-600 series. It includes 30 m of fiber to be used as a launch cable with OTDR.
Key features	EF-compliant for basic Tier-1 certification at 50 µm, 850/1300 nm guaranteed Four wavelengths on two ports: 850/1300 nm and 1310/1550 nm Error-free, time-saving test features		Covers OTDR dead zones, enabling loss measurement on the first and last connections of a fiber under test Increases the life of the source connector by reducing the number of matings on the connector Supports LC/UPC and SC/UPC connectors EF-compliant for extended Tier-2 certification at 50 µm, 850/1300 nm guaranteed
Outcome	Build and maintain a future-proof multimode fiber network with utmost reliability and accuracy.		

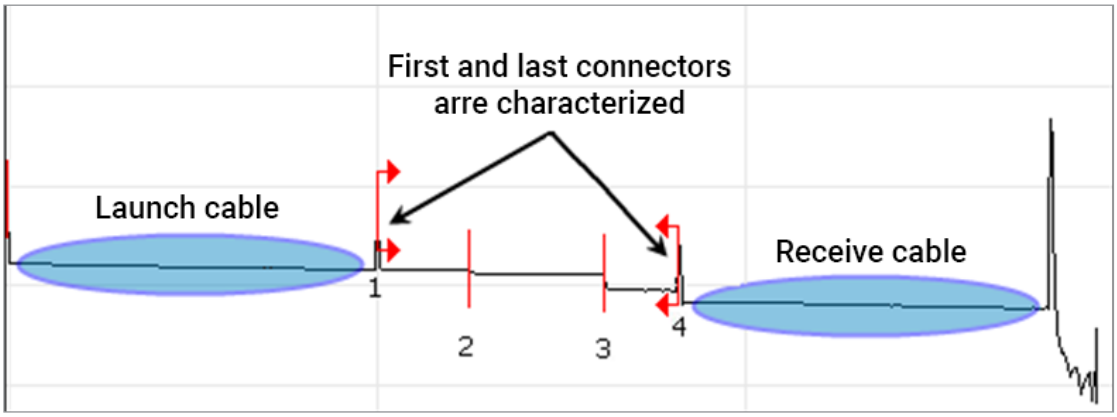
Note: EF-compliant launch conditions with SPSB-EF external launch conditioner can only be acheived when paired with EXFO products as listed in this table. This may not be possible with OTDRs or light sources from other manufacturers.

THE NECESSITY OF LAUNCH AND RECEIVE CABLES

Link characterization is often performed using an OTDR. However, despite the fact that an OTDR has the shortest dead zones, the way loss is measured in a link means that to characterize the first and last connectors, an OTDR needs a launch cable, also called a pulse suppressor box.

The reason for this is that the loss associated with an event is the difference between the backscattering levels measured before and after the event. To account for the dead zone, a backscattering level must be obtained before the first connector. This requires inserting a length of fiber between the OTDR port and the first connector of the fiber under test. At the other end, the same length of fiber is inserted after the last connector.

In order to measure the loss of the first and last connectors, it is important to use launch and receive cables. The SPSB-EF has an internal 30-meter fiber that allows complete end-to-end loss while still maintaining the EF launch conditions up to the first connector of the link. By complying with the EF standards, faulty connectors are easily located when troubleshooting high-speed multimode links.



Note: To measure the loss in the first connector with the SPSB-EF launch cable, the OTDR pulse width should be 100 ns or shorter and the connection to the OTDR port should have a relfection value of –45 dB or better. A 50 µm test link must also be selected.

FLS-600-NS1548 SPECIFICATIONS

TECHNICAL SPECIFICATIONS [a]		
Model	**12C**	**23BL**
Central wavelength (nm)	850 ± 25 1300 50/–20	1310 ± 20 1550 ± 20
Spectral width [b, c] (nm)	50/135	≤5
Launch conditions [c]	Encircled Flux compliant at 50 µm, 850/1300 nm (guaranteed)	
Auto-switching	Yes	Yes
Tone generation	270 Hz, 1 kHz, 2 kHz	270 Hz, 1 kHz, 2 kHz
Battery life (hours) (typical in Auto mode)	50	50
Warranty (year)	1	1

GENERAL SPECIFICATIONS		
Size (H × W × D)		190 mm × 100 mm × 62 mm (7 ½ in × 4 in × 2 ½ in)
Weight		0.48 kg (1.1 lb)
Temperature	Operating Storage	–10 °C to 50 °C (14 °F to 122 °F) –40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity		0 % to 95 % non-condensing

STANDARD ACCESSORIES

User guide, certificate of calibration, instrument stickers in six languages, AC adapter/charger, lithium ion battery, shoulder strap, carrying case.

LASER SAFETY



INVISIBLE LASER RADIATION

VIEWING THE LASER OUTOUT WITH CERTAIN OPTICAL INSTRUMENTS (FOR EXAMPLE, EYE LOUPES, MAGNIFIERS AND MICROSCOPES) WITHIN A DISTANCE OF 100 MM MAY POSE AN EYE HAZARD

CLASS 1M LASER PRODUCT

SPSB-EF SPECIFICATIONS

EXTERNAL LAUNCH MODE CONDITIONER TECHINICAL SPECIFICATIONS	
Model	**SPSB-EF-C30**
Total insertion loss (dB) [d]	< 1
Fiber length [e]	34 m (112 ft)
Launch conditions [c]	Encircled Flux compliant at 50 µm, 850/1300 nm (guaranteed)
Optical source for EF compatibility	FLS-600-12D, MAX-720C-Q1/QUAD, FTBx-720C-Q1/QUAD, FTB-720C-Q1/QUAD
Available connectors	SC to LC FC to FC SC to SC FC to LC

GENERAL SPECIFICATIONS		
Size (H × W × D)		165 mm × 165 mm × 40 mm (6 ½ in × 6 ½ in × 1 $^{9}/_{16}$ in)
Weight		0.3 kg (0.7 lb)
Temperature	Operating Storage	–10 °C to 50 °C (14 °F to 122 °F) –40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity		0 % to 95 % non-condensing

a. Guaranteed unless otherwise specified. All specifications valid at 23 °C ± 1 °C.

b. RMS for FP lasers; and –3 dB width for LEDs (typical values for LEDs).

c. Compliant with TIA-526-14-C and IEC 61280-4-1 Ed. 2.0.

d. Using a 50 µm fiber at the input of the SPSB-EF.

e. To measure the first connector loss, reflection value of OTDR port must be –45 dB or better and a maximum pulse width of 100 ns must be used.

ORDERING INFORMATION

FLS-600-NS1548-XX-XX-XX-XX

Model
12C = 850/1300 nm LED source 50/125 µm

Multimode connector with reference grade jumper [a]
EI-EUI-91-1 = UPC/SC with TJ-CR-91-91 (SC/UPC – SC/UPC)
EI-EUI-91-2 = UPC/SC with TJ-CR-91-101 (SC/UPC – LC/UPC)
EI-EUI-91-3 = UPC/SC with TJ-CR-91-90 (SC/UPC – ST/UPC)
EI-EUI-91-4 = UPC/SC with TJ-CR-91-89 (SC/UPC – FC/UPC)

Source option
00 = Without source option
23BL = 1310/1550 nm laser source 9/125 µm

Singlemode connector [b]
EI-EUI-28 = UPC/DIN 47256
EI-EUI-76 = UPC/HMS-10/AG
EI-EUI-89 = UPC/FC narrow key
EI-EUI-90 = UPC/ST
EI-EUI-91 = UPC/SC
EI-EUI-95 = UPC/E-2000
EI-EUI-98 = UPC/LC
EA-EUI-28 = APC/DIN 47256
EA-EUI-89 = APC/FC narrow key
EA-EUI-91 = APC/SC
EA-EUI-95 = APC/E-2000
EA-EUI-98 = APC/LC

Example: FLS-600-NS1548-12C-EI-EUI-91-2-23BL-EI-EUI-91

SPSB-EF-XX-XX

Model
C30 = Encircled flux external launch conditioner, multimode fiber 50/125 µm, 34 meters including pigtails

Connector
89-89 (FC/UPC to FC/UPC)
89-101 (FC/UPC to LC/UPC)
91-91 (SC/UPC to SC/UPC)
91-101 (SC/UPC to LC/UPC)

Example: SPSB-EF-C30-91-101

a. For multimode port, UPC/SC connector is mandatory.
b. For singlemode port. Only available if 23BL source option is selected.

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