Optical Frequency Domain Reflectometer

OFDR-APx Series



High Performance OFDR

Ultra-high resolution and superior sensitivity to ensure unparalleled analysis flexibility across diverse integrated devices and complex fiber assemblies, making it the ultimate tool for advanced optical diagnostics

Applications

- Photonic Integrated Circuits (PIC) development
- Complex micro-optics, waveguides and fiber optics assemblies
- Optical cables installation and maintenance
- Fiber connectors verification and optimization
- +++

Market Segments

- Optical Communications
- Optical Sensing
- Quantum
- +++

Industries

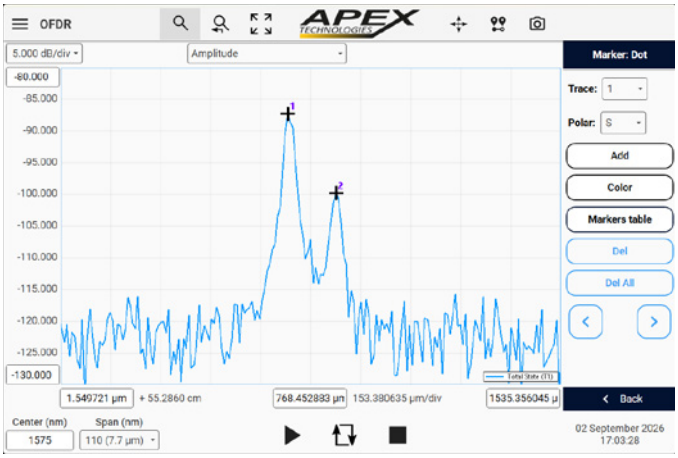
- Telecom / Datacom
- Energy
- Aerospace & Defense
- Automotive
- Academic Research
- Biomedical
- +++

OFDR-APB Series Advantages

Advantages	Benefits	Features
High Resolution	Locate small and adjacent defects and discontinuities, even in PICs	Narrow linewidth laser + Proprietary interferometric design
Large Measurement Range	Measure both very short waveguides and long fiber assemblies	Configured with 3 selectable length modes
High Dynamic Range	Detect weak reflections despite strong reflectors in the optical path	Largest dynamic range on the market + Highest sensitivity
Versatility	Measure components in both in reflection and *transmission*	Proprietary interferometric design
Ease of use	Time-saving efficiency	User-friendly interface & Remote control capabilities

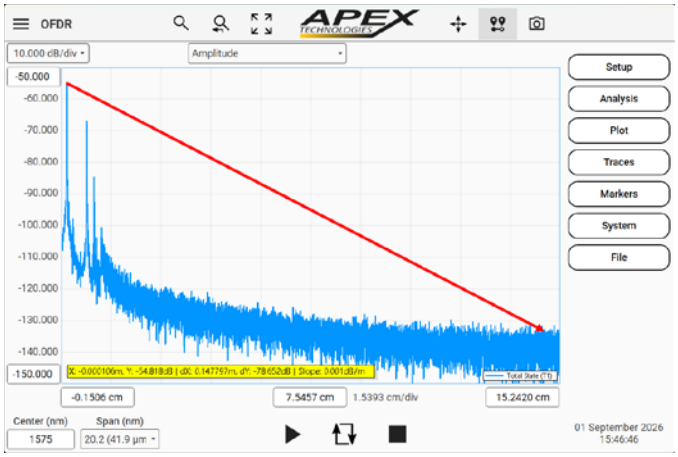
High Resolution & High Dynamic Range, for the Analysis of Complex Assemblies

High Resolution



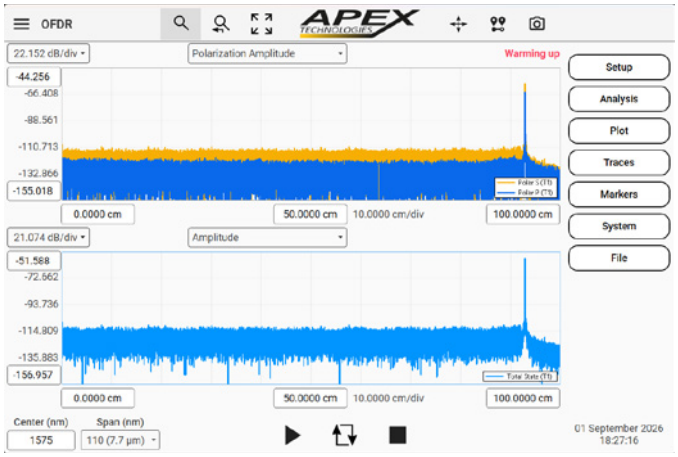
Few ten's of µm easily resolved and identified.

High Dynamic Range



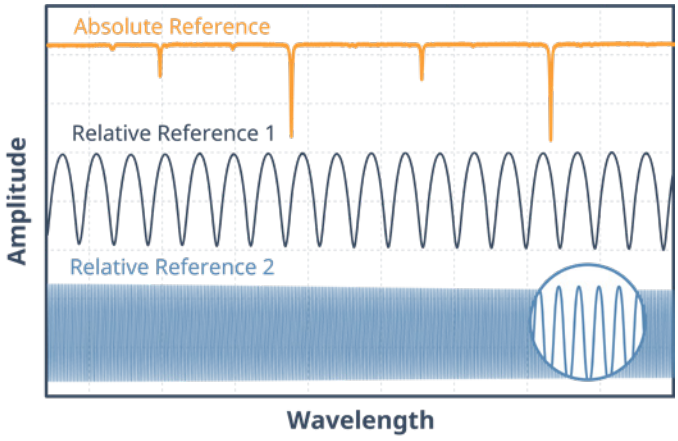
Weak Rayleigh backscattering measured along with strong reflections.

Polarization Diversity



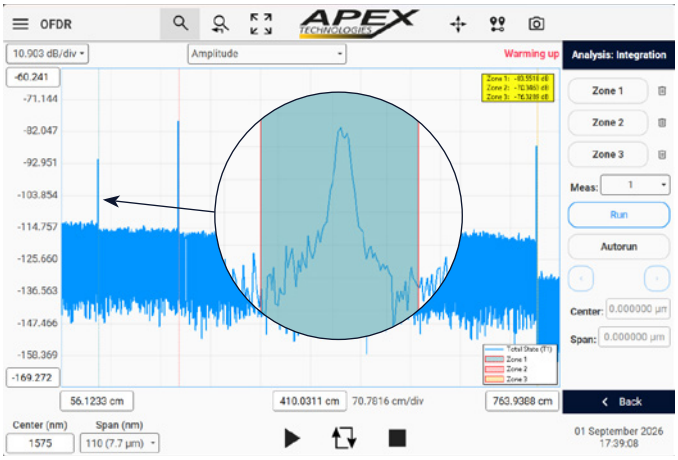
Two (2) orthogonal polarization states are measured independantly and displayed, individually or combined

High Wavelength Accuracy



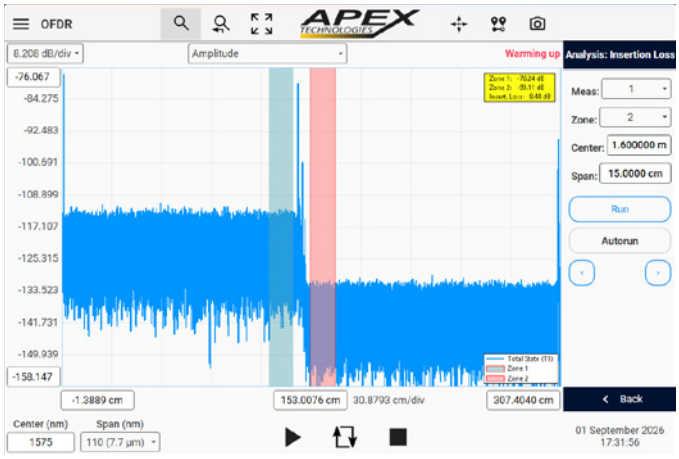
Absolute accuracy of the tunable laser source, maintained using three (3) distinct wavelength references, also allowing the analyzer to be used as a wavelength meter.

Return Loss Analysis



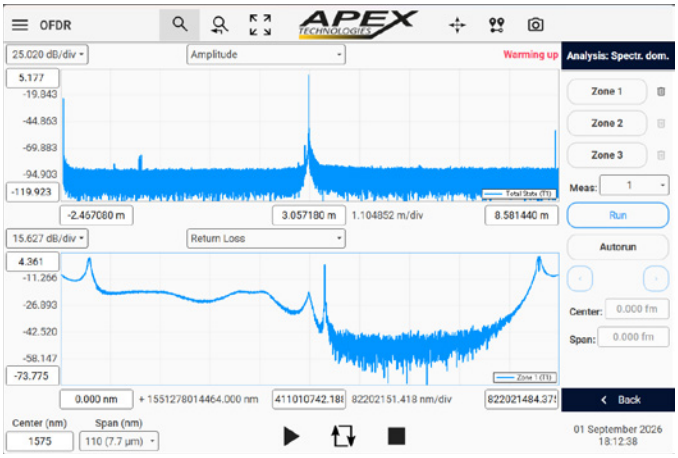
Integrate up to three (3) zones directly on the screen, or automate your return loss analysis through remote scripts.

Insertion Loss Analysis



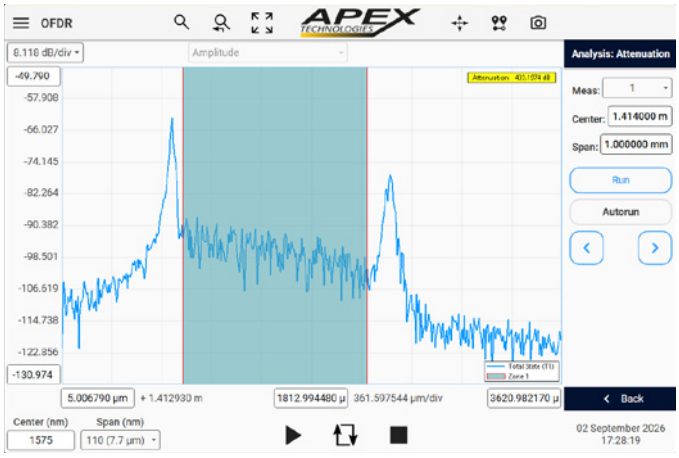
Analyze the insertion losses of your PIC functions or components with high precision.

Spectral Analysis



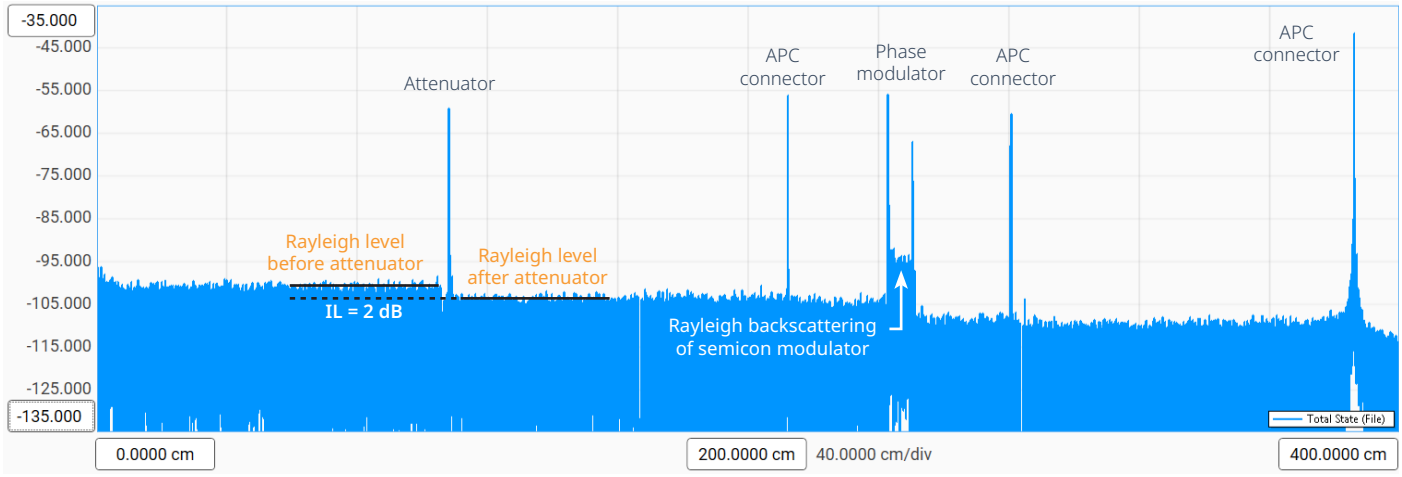
Visualize the wavelength dependent losses and group delay, from reflection and transmission measurements.

Atenuation Analysis

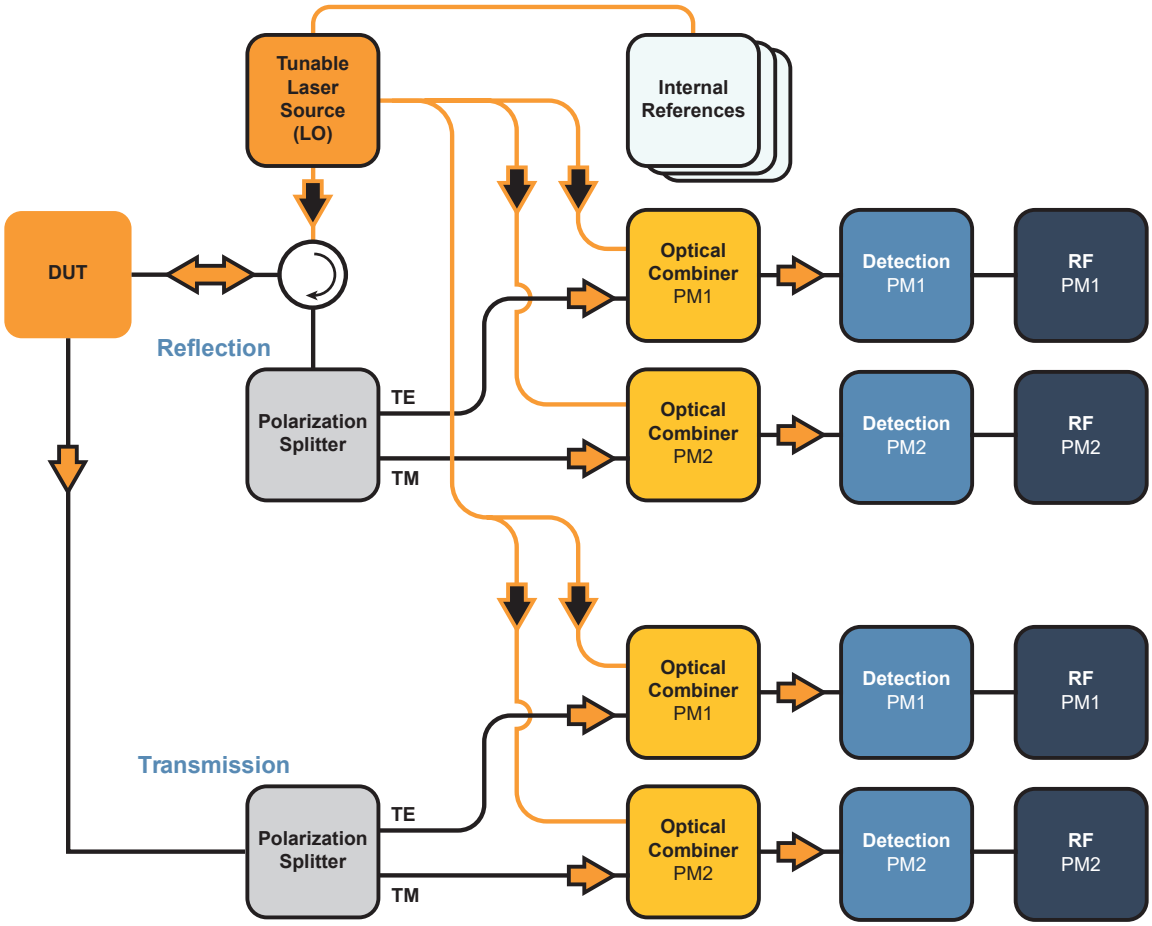


Precise measurement of the attenuation rate of PIC delay lines, modulators, or enhanced-backscattering fibers and waveguides.

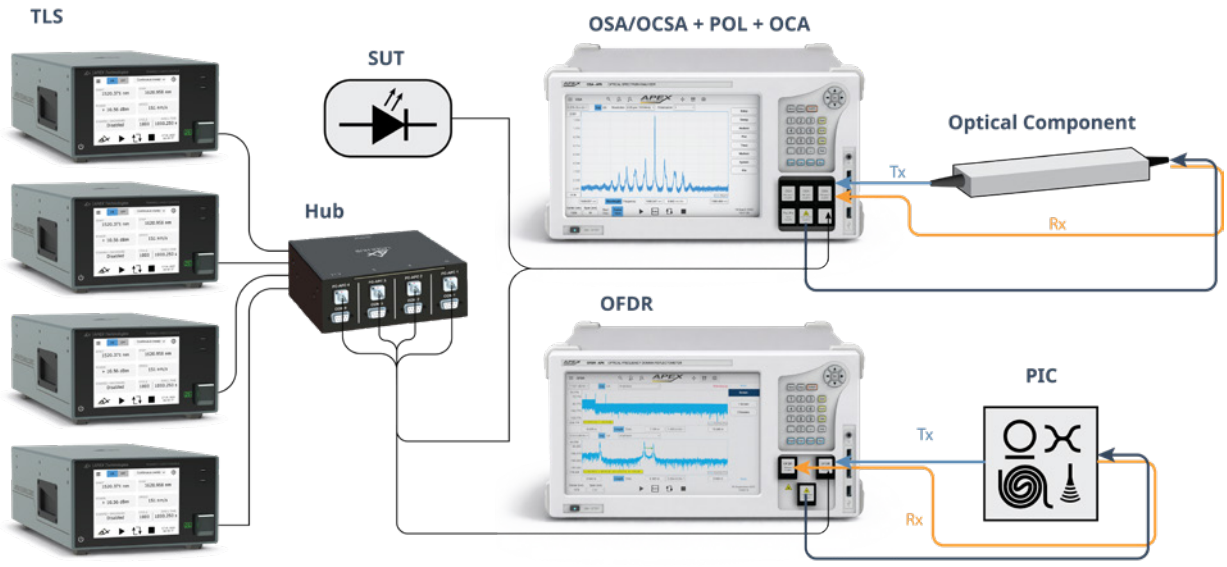
Example of simple fiber assembly with DUT



Fully referenced measurement paths



The ultimate optical test and measurement laboratory setup



The external tunable laser source option allows for a versatile test setup where the same laser(s) can be used on different APEX Technologies analyzers while remaining available for other experiments in the facility.

A versatile optical test and measurement equipment



Passive-component loss & reflection mapping
EO modulator insertion loss
Fiber & component research (specialty fibers, FBGs, passive devices)



PIC on-chip loss & reflection localization



Nuclear fusion — beamline optical assembly diagnostics



High-power fiber-laser assemblies (Yb / Nd:YAG + FBGs) — 1 µm band



Multi- / hollow-core fiber loss, reflections & length



Datacenter optical-infrastructure qualification & fault localization



Distributed thermal-gradient mapping
(battery packs, transformers, motors, heat exchangers, datacenters)



Composite structural health monitoring & shape sensing
(airframes, wing-box, UAVs, wind turbines, civil structures)



Satellite & airframe distributed strain & temperature
(incl. TVAC testing)



Nuclear fission — containment & civil-structure monitoring



Geothermal / downhole temperature profiling

Configurations

	OFDR-AP5	OFDR-AP6-O	OFDR-AP6-CL
Tunable Laser Sources *Wavelength Ranges*	*1037-1069 nm*	*1260-1360 nm*	*1520-1630 nm*
Included	• *Reflection mode* With all analysis functions and full transfer function export • *Distributed sensing* Temperature and strain measurements • *Tunable Laser Output* With laser control GUI • *Remote Control* Standard SCPI commands + python Driver) • *Internal wavelength references* Absolute & relative • *Three (3) calibrated sensitivity modes* Low, medium, and high sensivity • *Three (3) length modes* Select 3 out of 6 available length modes		
Options	*External Benchtop Local Oscillator* Standalone tunable laser offers versatility and full power output. Replaces internal TLS.		
	Transmission Measurement Provides total length, total insertion loss, and the wavelength-dependent transfer function (loss and group delay) of the connected DUT.		
	GPU Fast Measurement Enhanced processing speed (up to 2Hz) for live measurements.		
Length modes – Reflection[1]	2 | 11 | 45 | 90 | 181 | 244 meters		
Length modes – Transmission	4 | 22 | 90 | 180 | 362 | 488 meters		

(1) Refers to maximum length. Select 3 out of 6.

General Specifications

Parameters	Values
Remote Control	1 Gigabit Ethernet
Connectors	FC/APC
Weight	21 kg (46 lbs)
Power	115/230 VAC, 50/60 Hz, 350 W
Operating T°	+5 to 35 °C
Storage T°	-10 – +50 °C
Humidity	20 – 80% RH non-condensing

Performance Specifications

Parameters	Values
Wavelength absolute accuracy	± 1.5 pm
Wavelength relative accuracy	< 0.5 pm
Maximum optical power	+6 dBm
Sensitivity	-135 dB
Total range	-10 to -132 dB
WDL dynamic range	60 dB
WDL resolution	± 0.001 dB
GD range	6 ps
GD accuracy	0.01 ps
Reflection mode	
Max RL dynamic range	85 dB
IL dynamic range	18 dB
Amplitude repeatability	± 0.05 dB
Absolute Distance Accuracy	± 0.1 dB
Length repeatability	± 12 µm
Transmission mode	
IL dynamic range	82 dB
Amplitude repeatability	± 0.05 dB
Absolute Distance Accuracy	± 0.1 dB
Length repeatability	± 24 µm

Measurement Times *vs* Length & Resolution

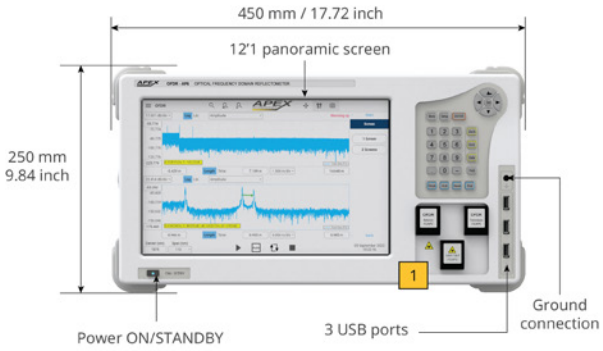
Legend: Standard measurement time | **GPU measurement time**

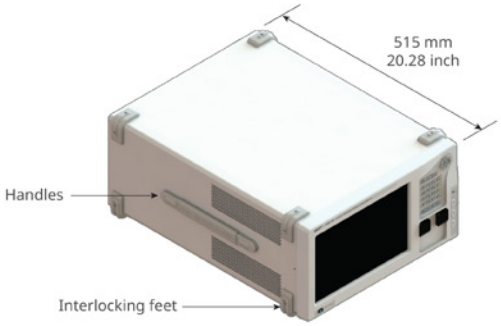
Length	8 µm[1]	16 µm	31 µm	42 µm
2 m	3.0 s | **0.6 s**	1.6 s | **0.5 s**	1.4 s | **0.4 s**	–
11 m	8.0 s | **1.4 s**	4.5 s | **0.8 s**	3.0 s | **0.6 s**	–
45 m	33 s | **4.6 s**	16 s | **2.5 s**	10 s | **1.4 s**	–
90 m	–	33 s | **4.6 s**	16 s | **2.5 s**	–
181 m	–	–	34 s | **5.2 s**	–
244 m	–	–	–	34 s | **5.2 s**

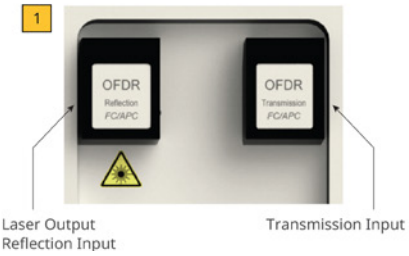
(1) Only available for O and C+L lasers.

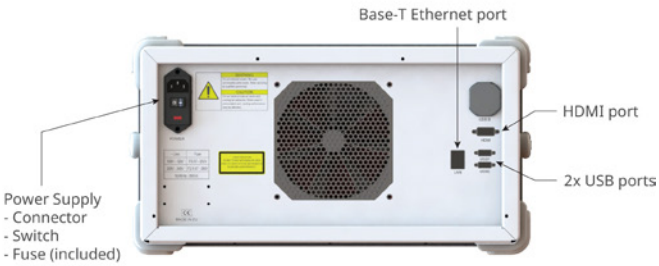
See the invisible ▶ Create the impossible

APEX Technologies – Experts in Next Generation Test Equipment









APEX Technologies

9bis, rue ANGIBOUST
91460 MARCOUSSIS
FRANCE
+33 (0)1 69 63 26 30

www.apex-t.com

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