

# N7753C

## Optical Return Loss Meter

Fast swept-wavelength RL measurements

### RL Measurements with 70 dB Dynamic Range

The Keysight N7753C optical return loss meter measures the optical power into and reflected from the device under test and calculates the return loss. Factory calibrated parameters let you instantly start with the return loss measurement. To provide most accurate measurements over a wide dynamic range, a power monitor and the built-in step-by-step guide simplify accurate user calibration and eliminate the effects of dark current and parasitic backscatter.

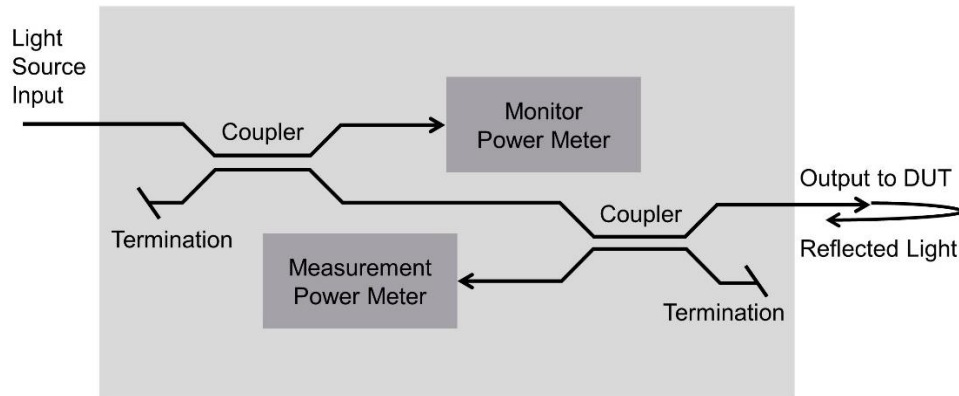
The N7753C is used together with an external single-mode fiber light source and can be synchronized with triggering from tunable laser sources to make wavelength-dependent measurements. This is enhanced with the 1M sample logging buffer and wide averaging time adjustment range of 1 microsecond to 10 seconds. The Lambda Scan Engine of the Photonic Application Suite will support this in future versions for advanced swept-RL and IL measurements with one or more sweeping tunable lasers to cover wavelengths from 1250 nm to 1640 nm.

Like all N77-C family products, the N7753C optical return loss meter sports an on-board graphical user interface for easy control without software installation, accessible via GbE LAN and USB 2.0 connections.



# High Stability with External Laser Source

The N7753C includes two power sensors and fiber couplers to provide a direct measurement of the optical return loss. One sensor measures the optical power reflected from the device under test to the instrument while the other sensor monitors the optical power passing through the instrument to the device under test. The calibrated ratio provides the return loss.



**Figure 1.** Optical return loss meter

## Definitions

Generally, all specifications are valid at the stated operating and measurement conditions and settings, with uninterrupted line voltage.

### Specifications (guaranteed)

Describes warranted product performance that is valid under the specified conditions. Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties changes in performance due to environmental changes and aging of components.

### Typical values (characteristics)

Characteristics describe the product performance that is usually met but not guaranteed. Typical values are based on data from a representative set of instruments.

### General characteristics

Give additional information for using the instrument. These are general descriptive terms that do not imply a level of performance.

# Technical Specifications (Preliminary)

## N7753C

|                                               |                                                                           |                                                              |
|-----------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------|
| Sensor element                                | InGaAs                                                                    |                                                              |
| Fiber type                                    | Standard single-mode fiber, 9/125 $\mu\text{m}$                           |                                                              |
| Input wavelength range                        | 1250 nm to 1640 nm                                                        |                                                              |
| Input power range                             | 0 dBm to +10 dBm                                                          |                                                              |
| Maximum safe input power                      | +16 dBm                                                                   |                                                              |
| Return loss range                             | 70 dB                                                                     |                                                              |
| <b>Rel. uncertainty of Return Loss</b>        | <b>with broadband source <sup>1, 2, 3, 6</sup></b>                        | <b>with Keysight Fabry-Perot laser <sup>1, 2, 3, 7</sup></b> |
| RL $\leq$ 55 dB                               | $\pm 0.25$ dB                                                             | Typical $\pm 0.5$ dB                                         |
| RL $\leq$ 60 dB                               | $\pm 0.30$ dB                                                             | Typical $\pm 1.0$ dB                                         |
| RL $\leq$ 65 dB                               | $\pm 0.65$ dB                                                             | Typical $\pm 2.0$ dB                                         |
| RL $\leq$ 70 dB                               | $\pm 1.7$ dB <sup>4</sup>                                                 | -                                                            |
| Total uncertainty                             | Add $\pm 0.2$ dB                                                          | Add typical $\pm 0.2$ dB                                     |
| <b>N7753CC Reference Cable Specifications</b> |                                                                           |                                                              |
| Return loss                                   | As printed on cable; nominal 14.8 dB from reference reflection on far end |                                                              |
| Return loss uncertainty <sup>5</sup>          | $\pm 0.2$ dB                                                              |                                                              |
| Calibration wavelengths                       | 1310 nm $\pm$ 15 nm,<br>1550 nm $\pm$ 15 nm                               |                                                              |

1. Insertion loss is in the range of 7 dB.
2. Averaging time 1 s,  
user calibration prior to measurement,  
constant temperature  $\pm 0.5$  K,  
Reference cable N7753CC used for total uncertainty,  
length of measurement patch cord is less than 2 meters,  
angled connector in perfect optical condition.
3. Warm-up time 60 minutes, unless previously stored at the same temperature.
4. Input power  $\geq$  +4 dBm.
5. Clean reference reflector in perfect optical condition (never connect labeled connector side!).
6. Verified with S-LED source, 1550 nm  $\pm$  20 nm, 50 nm optical 3-dB bandwidth and Erbium ASE source,  $>50$   $\mu\text{W/nm}$  spectral density.
7. Verified with Fabry Perot laser at 1310 nm  $\pm$  15 nm,  $<5.5$  nm spectral bandwidth (rms), and at 1550 nm  $\pm$  15 nm,  $<7.5$  nm spectral bandwidth (rms).

## General specifications

The Keysight N7753C optical return loss meter comes in a 19-inch, single-height-unit form factor and can be rack-mounted side-by-side with an additional unit, or with any N773-C optical switch, any N774-C optical power meter, any N776-C optical attenuator, or N778-C polarization analyzer or controller.

### N7753C

|                                                                                         |                                                                                                                                                         |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Line power                                                                              | AC 100 V to 240 V $\pm$ 10%, 50/60 Hz, 60 VA max.                                                                                                       |
| Operating temperature                                                                   | +10 °C to +40 °C                                                                                                                                        |
| Operating humidity                                                                      | $\leq$ 80%, non-condensing                                                                                                                              |
| Storage temperature                                                                     | –40 °C to +70 °C                                                                                                                                        |
| Max. operating altitude                                                                 | 2000 m                                                                                                                                                  |
| Warm-up time                                                                            | 20 minutes                                                                                                                                              |
| Recommended recalibration period                                                        | 2 years                                                                                                                                                 |
| Dimensions                                                                              | 420 mm $\times$ 212 mm $\times$ 43 mm (excluding front and back rubber cushions and connectors)                                                         |
| Weight                                                                                  | 3 kg (6 lbs)                                                                                                                                            |
| <b>User interface</b>                                                                   | <b>N7753C</b>                                                                                                                                           |
| LAN Access (1 Gbit/s):<br>HTTP<br>Telnet<br>VXI-11<br>SCPI-telnet<br>SCPI-raw<br>HISLIP | IPv4 and IPv6 Socket connection:<br>http://<ip_address> or http://<host_name><br>port 23<br>port 111 (IPv4 only)<br>port 5024<br>port 5025<br>port 4880 |
| USB Access (USB 2.0)                                                                    | Remote NDIS (virtual Ethernet link over USB);<br>USB Mass Storage functions (read-only)<br>USBTMC                                                       |

# Ordering Information

| Product/Option        | Description                                                                                                                                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N7753C                | Return Loss Meter (1 Channel) – Single Mode                                                                                                                                                                                     |
| N7753C-010            | External Source                                                                                                                                                                                                                 |
| <b>Product</b>        | <b>Required connector interfaces</b>                                                                                                                                                                                            |
| 81000xl               | Choose from a wide range of connector interfaces (2 required for input and output)                                                                                                                                              |
| <b>Product/option</b> | <b>Recommended accessories</b>                                                                                                                                                                                                  |
| N7753CC               | Reference cable                                                                                                                                                                                                                 |
| N7799C-1CM            | Rack Mount Kit for 2 half-width instruments, 1 Rack Height Unit. Includes low profile rails, fitted to Keysight System II racks with 24-inch-spaced mount points. Requires Filler Kit N7799C-0CM for mounting single instrument |
| N7799C-0CM            | Filler Kit for N7799C-1CM.<br>Required for single half-width instrument; includes front panel and base plate                                                                                                                    |
| N7799C-DOC            | Documentation of N77-C Platform, Physical Medium                                                                                                                                                                                |

## User interface screen captures

The N7753C optical return loss meter provides an on-board GUI, accessible via LAN or USB via browser. Responsive design ensures that the display adjusts to the browser window and the chosen zoom factor, allowing to comfortably arrange multiple instrument views on one screen. Operators can modify measurement settings, set markers, activate thresholds, run the calibration wizard, or change address settings via the GUI.

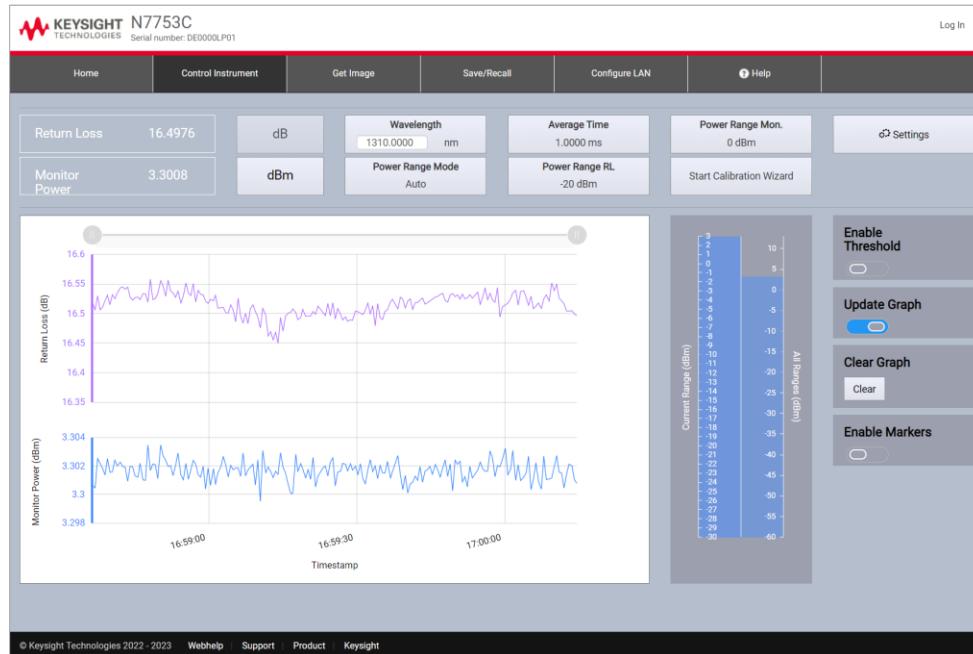


Figure 2. Web GUI (measurement) of N7753C

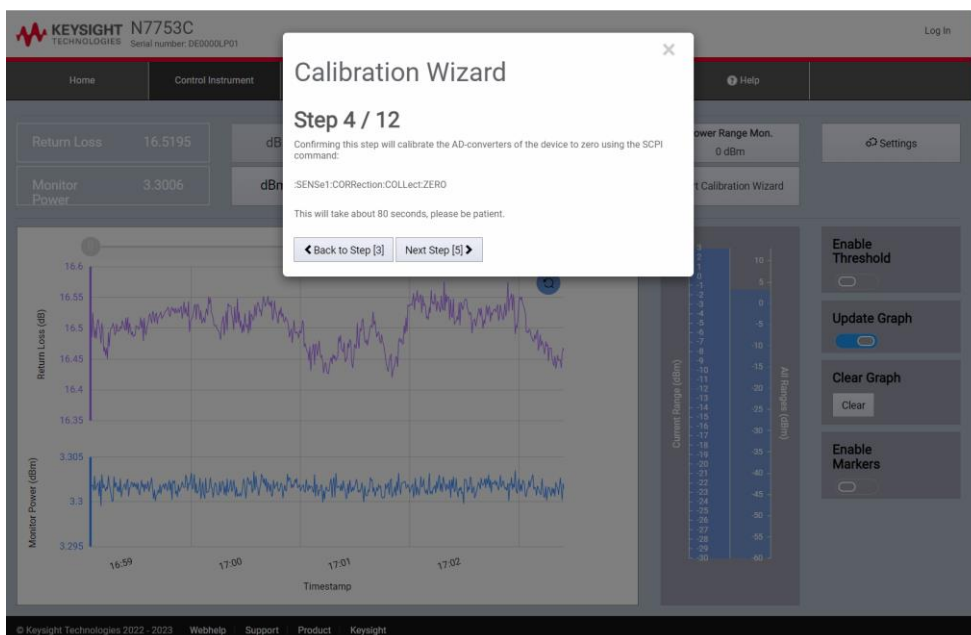


Figure 3. Web GUI (calibration wizard) of N7753C

## For more information

To find more optical test instruments, check the following links:

Optical test instruments: [www.keysight.com/find/oct](http://www.keysight.com/find/oct)

Optical signal conditioning products: [www.keysight.com/find/voa](http://www.keysight.com/find/voa)

Optical multiport power meters: [www.keysight.com/find/MPPM](http://www.keysight.com/find/MPPM)

Polarization solutions: [www.keysight.com/find/pol](http://www.keysight.com/find/pol)

Tunable laser sources: [www.keysight.com/find/tls](http://www.keysight.com/find/tls)



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