



FX80/FX81 PON

Optical Power Meters

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1.0 General Information

This user manual is suitable for novice, intermediate, and experienced users and is intended to help use the features and capabilities of VeEX products successfully. It is assumed that the user has basic computer experience and skills, and is familiar with telecommunication and other concepts related to VeEX product usage, terminology, and safety.

Every effort was made to ensure that the information contained in this user manual is accurate. Information is subject to change without notice and we accept no responsibility for any errors or omissions. In case of discrepancy, the web version takes precedence over any printed literature. The content in this manual may vary from the software version installed in the unit. For condition of use and permission to use these materials for publication in other than the English language, contact VeEX, Inc.

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1.1 Customer Support

For more technical resources, visit www.veexinc.com.

For assistance or questions related to the use of this product, call or e-mail our customer care department for customer support. Before contacting our customer care department, have the product model, serial number, and software version ready. Please locate the serial number on the back of the chassis. Please provide this number when contacting VeEX, Inc. customer care.

Support hours may vary depending on the product.

Product Technical Support

Support is generally available 8:00 AM to 8:00 PM, Eastern Standard Time, Monday to Friday.

Phone: +1 510 651 0500

E-mail: customercare@veexinc.com

MPA Product Technical Support

Support is generally available 8:30 AM to 5:30 PM, Eastern Standard Time, Monday to Friday.

Phone: +1 877 929 4357

International: +1 727 475 1206

E-mail: serviceandsupport@veexinc.com

1.2 Warranty

For warranty information on VeEX products, go to <https://www.veexinc.com/Support/Warranty>.

To activate the warranty, please register your product at <https://www.veexinc.com/Support/ProductRegistration>.

1.3 Patent Information

VeEX product hardware and software may be protected by one or more patents on file with the United States Patent Office.

1.4 Documentation Conventions

Icons used in this manual:

	Marks a helpful tip (action or method), which can save time and improve usability of the product.
	Provides important information needed to use this product and avoid missteps.
	Cautions against an action or inactivity, which can hinder productivity.
	Strongly warns against a condition, an action, or inactivity which can lead to a health hazard, injury, equipment damage, data loss, and/or financial losses.
	Stop and read before continuing.

2.0 Safety Information



Safety precautions should be observed during all phases of operation of this instrument. The instrument has been designed to ensure safe operation however please observe all safety markings and instructions. Do not operate the instrument in the presence of flammable gases or fumes or any other combustible environment. VeEX Inc. assumes no liability for the customer's failure to comply with safety precautions and requirements.



Optical Connectors

Make sure that optical sources are inactive before connecting fiber to the test set to avoid skin or eye damage, or damage to the unit. It is recommended to:

- Deactivate the laser before connecting or disconnecting optical cables or patchcords.
- Never look directly into an optical patchcord or an optical interface (e.g. CFP, CFP2, CFP4, QSFP+, SFP+, SFP, OTDR, LS, VFL) while the laser is enabled. Even though optical transceivers are typically fitted with Class 1 lasers, which are considered eye safe, optical radiation for an extended period can cause irreparable damage to the eyes.
- Never use a fiber microscope to check the optical connectors when the laser source is active.

The operator is assumed to have received basic training in fiber optics and related testing and measurement practices.

3.0 Introduction

The FX80 and FX81 optical power meters are designed to verify, troubleshoot and perform service activation on next generation Passive Optical Networks (PON). The units feature a pass-through mode to measure optical levels on various wavelengths being transmitted between the Optical Line Terminal (OLT) and the Optical Network Unit/Terminal (ONU/ONT).

The FX80 supports GPON/EPON while the FX81 supports GPON/EPON including XG(S)-PON and 10G-EPON. The units can be connected onto the PON network at any available access point along the Optical Distribution Network (ODN). The access point can be at the OLT (central office - CO, head end or sub-headend or remote hut), Fiber Distribution Point (FDP 1 or 2/splitter (if connectorized) or at the ONU/ONT (customer premises - CP). The figure in Section [6.2.3. Performing Optical Power Measurements in PON](#) shows a typical PON with the four possible locations for measurement.

The FX80 and FX81 units passively measure signal levels to standards compliance:

- GPON and EPON channels: 1490 and optional 1550 nm RF video downstream, and 1310 nm upstream PON optical power levels. **(FX80 and FX81)**
- XG(S)-PON and 10G-EPON channels: 1270 nm upstream and 1577 downstream PON optical power levels. **(FX81 only)**

The measurement results can be transferred to a PC and/or Fiberizer™ Mobile Android, as well as uploaded to a Fiberizer™ Cloud account.



Both FX80 and FX81 PON power meters can be configured with additional options per customer requirements. The FX80 can be equipped with an optional VFL or Broadband OPM. The FX81 can be configured with optional Broadband OPM if RF Video measurement is not required.

3.1 FX80/81 Features

- Test B/E/GPON and/or XG(S)-PON optical signal levels at OLT, FDP or ONT/ONU
- Dual SC/APC low reflectance test ports for passive, pass-through measurement of optical signal levels
- High contrast LCD 128 x 64 pixels with backlight
- Pass/Fail or numeric measurement results
- Tone detection for fiber identification
- Rechargeable Li-Polymer battery including AC/DC adapter operation with 5V USB output
- Rugged compact design with protective rubber boot
- Optional Broadband InGaAs power meter **[FX80 and FX81 4-wavelength version only]**
- Optional Visual Fault Locator (VFL) **[FX80 only]**
- Windows PC desktop software (LTSync) or Fiberizer mobile software application (FMOLTS) for data transfer to PC, R-server or Fiberizer cloud for further analysis and reporting.

4.0 Overview

4.1 Control Elements



Colors, screen-labeled function keys, and screen fonts can vary with different device models and backlight settings.



FX80/FX81 front view: FX80 with opt BB-OPM on left, FX81 5-wavelength version on the right

[Power]: Turn device ON/OFF. Press and hold the button for 3 seconds. The VeEX logo, current date and time, and current mode of operation will be displayed.

[MODE]: Select the mode of operation: PON Burst, PON CW, Read, optional PM1/2, optional VFL (default is PON Burst/PON). For more information about FX80/FX81 modes, see [Section 6.1. Modes for Optical Power Measurements](#).

[Shift/Enter]: Edit a parameter and confirm selection when setting up the device; executes the selected action.

[Up], [Down]: Change the selected parameter.

Button Combinations:

[Shift/Enter]+[Up]: Save measurement results.

[Shift/Enter]+[Down]: Enter Instrument Settings mode.

[Shift/Enter]+[Mode]: Turn backlight ON/OFF.

[F1], [F2], [F3]: Context-defined, the function indicated at the screen bottom.

4.2 FX80/81 Test Ports

4.2.1 Optical Ports



FX80/FX81 optical ports

- **OLT:** optical connector port input which measures 1490 nm downstream power levels and optional 1550 nm (RF Video) in a GPON network. On FX81, measures 1577 nm downstream power levels for XGS-PON/10G-EPON.
- **ONT:** optical connector port input which measures 1310 nm upstream power level. On FX81, measures the 1270 nm upstream power levels for XGS-PON/10G-EPON.
- **OPM (optional):** Measures optical power in absolute and relative mode and to save the measurement results.
- **VFL (optional):** Use the 650 nm visual fault locator to visually locate breaks or excessive bends in fibers. **[FX80 Only]**



The FX80 can be configured with either optional OPM or VFL, but not both. The FX81 can only be configured with optional BB-OPM with 4 wavelengths.

4.2.2 Service Port

The service port (micro-USB) located on the left side of the device is used for battery charging and transferring OPM results to the LTSync and/or FMOLTS software application. An OTG cable may be needed for operations with an Android mobile device.

5.0 Getting Started

Before using the FX80 or FX81 power meter for the first time, fully charge the battery and set the local date and time. The date and time is required to time-stamp the test results.

5.1 Battery Charging

The unit is equipped with a built-in, rechargeable Li-Polymer smart charge battery which is partially charged upon delivery. VeEX recommends charging the battery to full capacity before using the power meter for the first time.



The device is powered from the built-in Li-Polymer battery and can be operated with the AC/ DC adaptor plugged in.

When the power meter is plugged into the AC/DC adapter, the Plugged icon () appears in the top left corner of the display. When the unit is operating on battery, the Battery icon () appears.



It is recommended to charge the battery at room temperature to preserve its life and to obtain maximum charge.

To charge the test unit, connect the AC/DC adaptor to the micro-USB service port located on the left side of the device. The charging time depends on the battery condition and ambient temperature. Use only the USB cables provided with the device to charge the battery.

While the FX80/FX81 battery is charging, the LED indicator on the front panel will turn orange. When the battery is fully charged, the LED indicator will turn green provided the FX80/FX81 is powered ON. The LED will turn off when the unit is powered OFF.



The Li-Polymer battery is designed for maximum safety. However, the battery may explode, leak, or catch fire when:

- *It is exposed to high temperatures*
- *It is damaged for any reason*

An auto-off feature, configured in the **Settings** mode, shuts down the unit when a low battery condition is reached.

5.1.1 Battery Replacement

Battery replacement in the field is not authorized or permitted. The unit must be returned to an authorized VeEX service center or sales partner for repair.

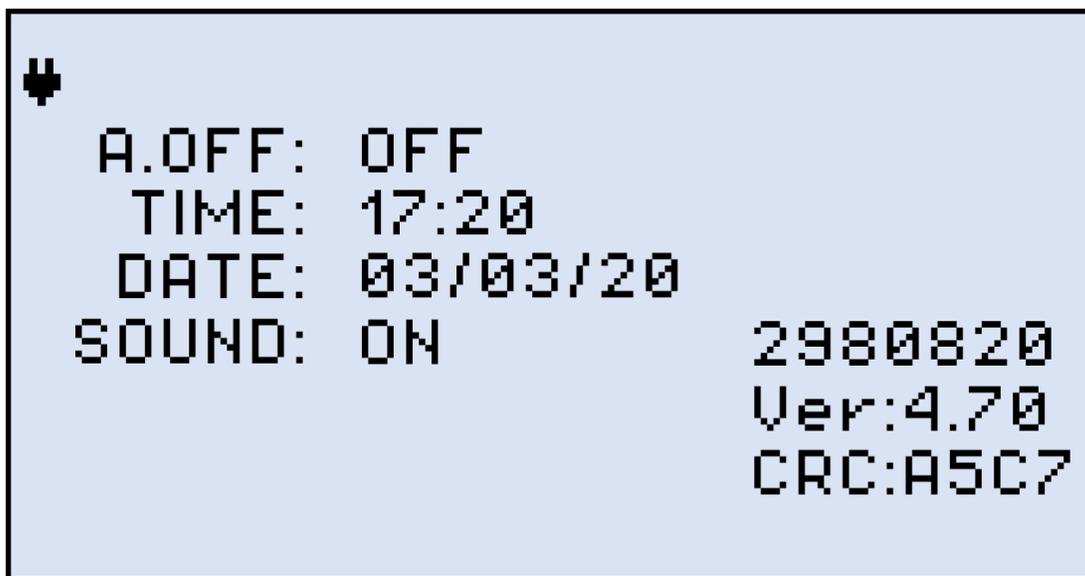
5.2 Configuring Device Settings

Before saving measurement results for the first time, set the device date and time.

To configure settings:

1. Power ON the FX80/FX81 by pressing and holding the **|Power|** button for 3 seconds.
2. Press **|Shift/Enter|+|Down|** to enter the **Settings** mode - the following parameters can be set:
 - **Auto Shutdown mode:** after the preset time of inactivity the device shuts down. The options are 45 min, 30 min, 15 min, and OFF (never).
 - **Time:** current time.
 - **Date:** current date.
 - **Sound:** if ON, pressing the keyboard buttons produces a sound.

The test parameter selected will flash and is then available to edit.



FX80/FX81 Instrument Setting screen

3. Press **|Up|** and **|Down|** to select the parameter to edit.
4. Press **|MODE|** to select the field to edit, then change the value, if necessary, by pressing **|Up|** and **|Down|**.

5. Press **[Shift/Enter]** to save the settings.

5.3 Resetting Test Device

To reset the FX80/FX81 power meter to factory default settings:

1. Disconnect the external power supply from the device.
2. With the device **OFF**, press and hold the red **[Power]** button for at least 15 seconds.

After the FX80/FX81 reboots, reset the date and time (see [Section 5.2. Configuring Device Settings](#)).



During reset, the threshold and reference values will be lost and they will have to be reset. Also, the ZERO level operation must be performed again. For more information, see Sections [6.2.1 Setting ZERO Level](#), [6.2.2 Pass/Fail Thresholds](#), and [6.3.2 Setting Power Reference Level](#).



The reset DOES NOT erase any previously stored measurement data.

6.0 Optical Power Measurements

6.1 Modes for Optical Power Measurements

PON Burst/PON: OLT to ONT pass-through test mode measures optical levels on active, in-service PON networks. It is specifically optimized for upstream burst signal measurement.

PON CW: OLT to ONT pass-through test mode measures optical levels on out-of-service PON networks that have ONU/ONT devices that can be set to maintenance CW test mode. Also useful for characterizing loss of Co-Existence (CEX) elements using a companion light source.

PM (PM1 or PM2): OPM test mode to measure any optical signal level. The signal can be CW, or modulated with 270, 330, 1000, or 2000 Hz. The Wave ID function will automatically set the wavelength calibration to match the input wavelength provided a compatible VeEX source is used.

6.2 PON Power Measurements

To use the FX80 or FX81 for PON measurements, connect the two fibers to the correct OLT and ONT test port.



FX80/FX81 Top Panel, FX80 or FX81 (4-wavelength) with opt. BB OPM on the left, FX81 (5-wavelength) on the right



For best results, wait 5 minutes after the FX80/81 is powered ON. This is recommended in environments with extreme temperature changes.

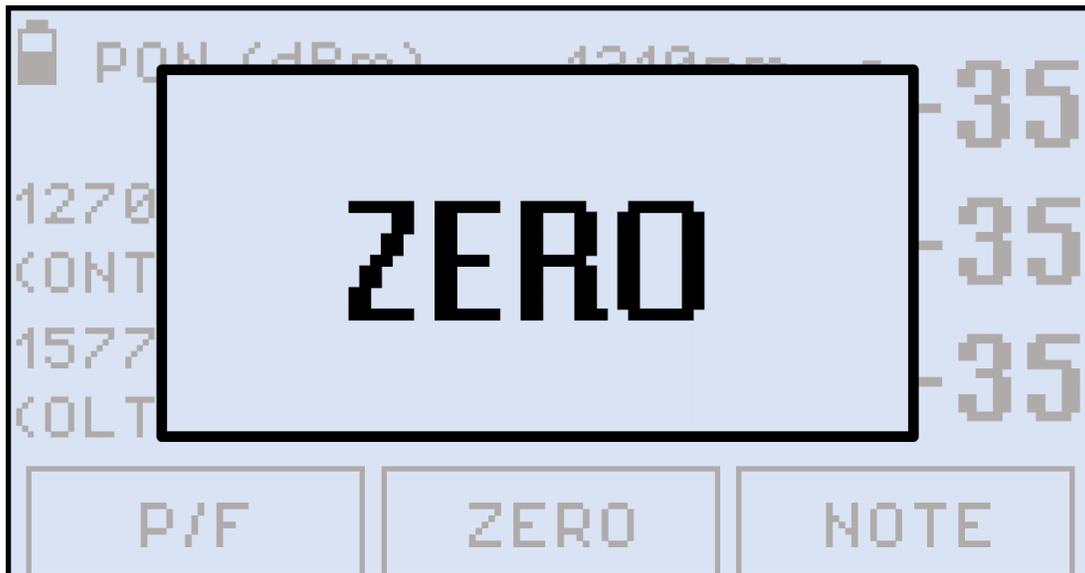
6.2.1 Setting ZERO Level



Set the ZERO level with the dust caps closed before first using the FX80/81 for PON power measurements. It is recommended to set the ZERO level prior to each new batch of measurements, or after measurement conditions have changed. Do NOT zero the power meter with the light source transmitting into the OPM port, or the device may stop reading values or show display random or inaccurate values.

To set the ZERO level:

1. Press the **|MODE|** button to enter the required measurement mode (PON Burst/PON or PON CW).
2. Press **|F2| (ZERO)**. The ZERO notification will display briefly on screen.



Setting the ZERO level, FX80/FX81

The FX80/81 is now ready for measurements.

6.2.2 Pass/Fail Thresholds

In addition to measuring the downstream and upstream signal levels, the FX80/FX81 PON can also be configured to provide Pass/Fail (P/F) notifications for each wavelength.

Thresholds Definition

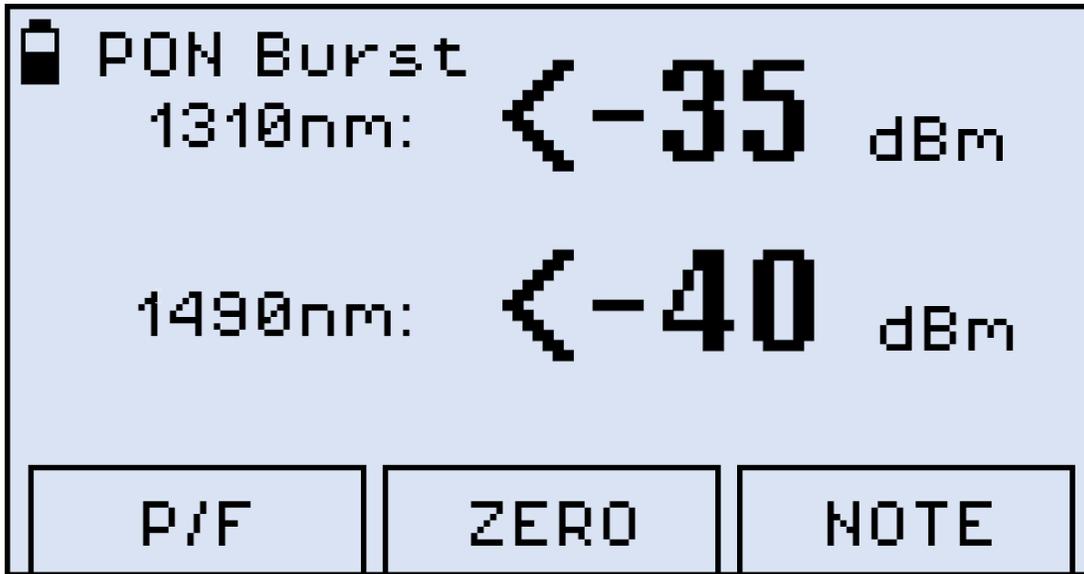
If the threshold value set for a wavelength in the Pass/Fail submenu is greater than or equal to the current power reading for that wavelength, a **FAIL** reading will be displayed.

If the threshold value set for a wavelength in the Pass/Fail submenu is less than the current power reading for that wavelength, a **PASS** reading will be displayed.

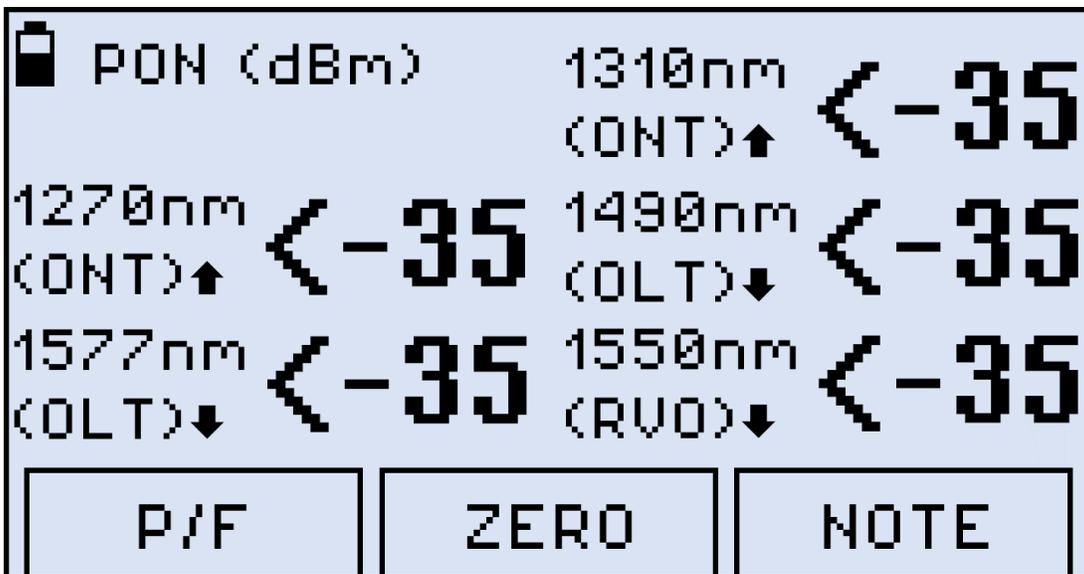
6.2.2.1 Creating User-Defined P/F Thresholds

To create P/F thresholds:

1. Press the **[MODE]** button to enter the required PON measurement mode (PON Burst/PON or PON CW) to set the thresholds. PON/PON Burst is used in the figures below, but the GUI is identical.

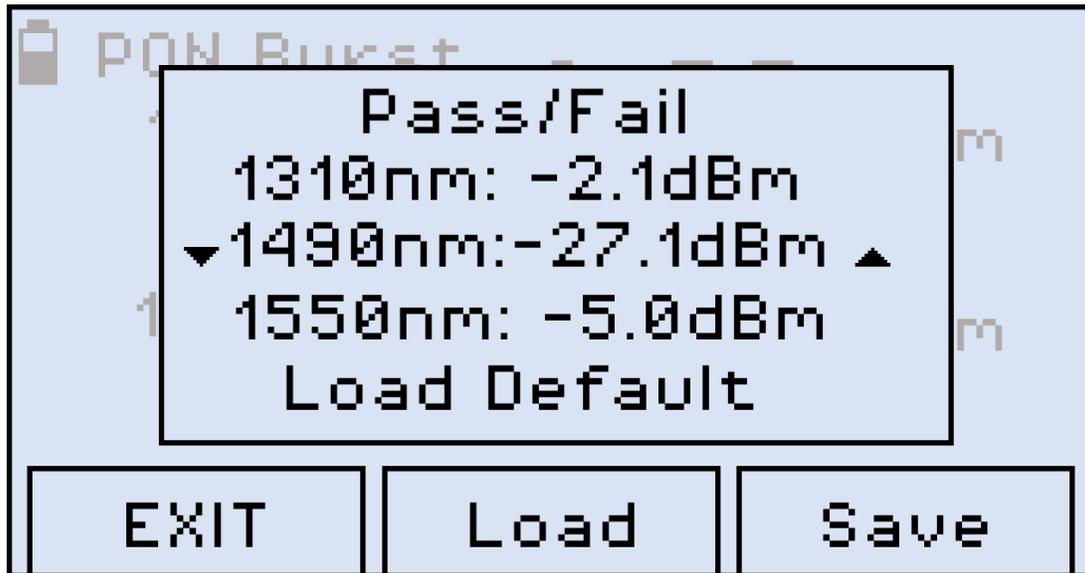


PON Burst mode, FX80

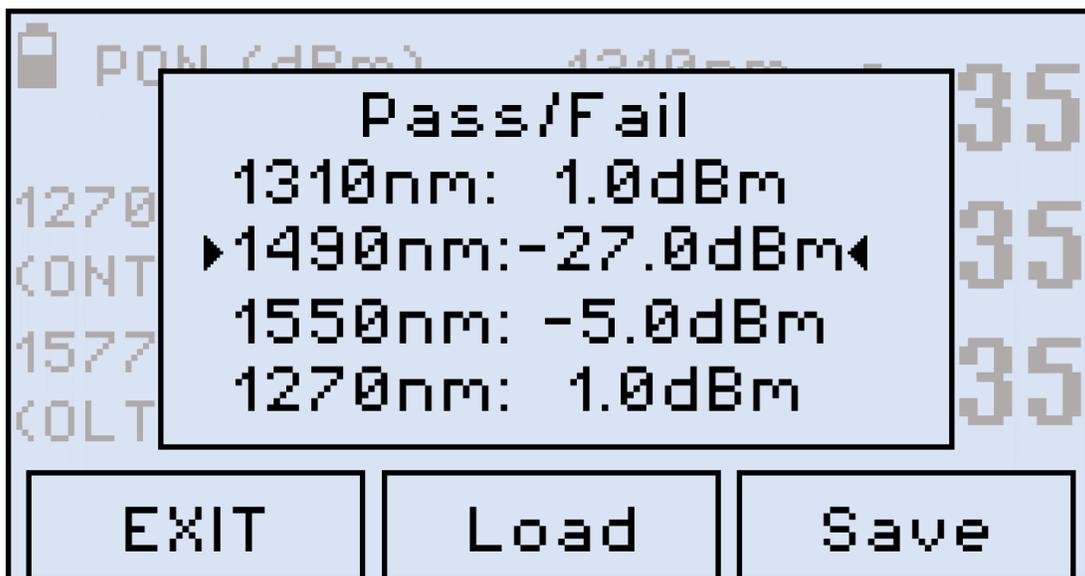


PON Burst mode, FX81

2. Press **F1 (P/F)**.



Setting Pass/Fail thresholds, FX80



Setting Pass/Fail thresholds, FX81

3. Press the **[Up]** and **[Down]** arrow button to select the wavelength.
4. Press **[Shift/Enter]** to set the threshold. The corresponding value starts flashing.
5. Set the necessary value pressing **[Up]** and **[Down]**.
6. Confirm the value by pressing **[Shift/Enter]**.
7. Press **[F1] (EXIT)** to exit the Setting Pass/Fail thresholds mode.

The FX80/FX81 is now ready to measure PON levels and compare values against the Pass/Fail thresholds settings. The thresholds settings will remain active until changed.



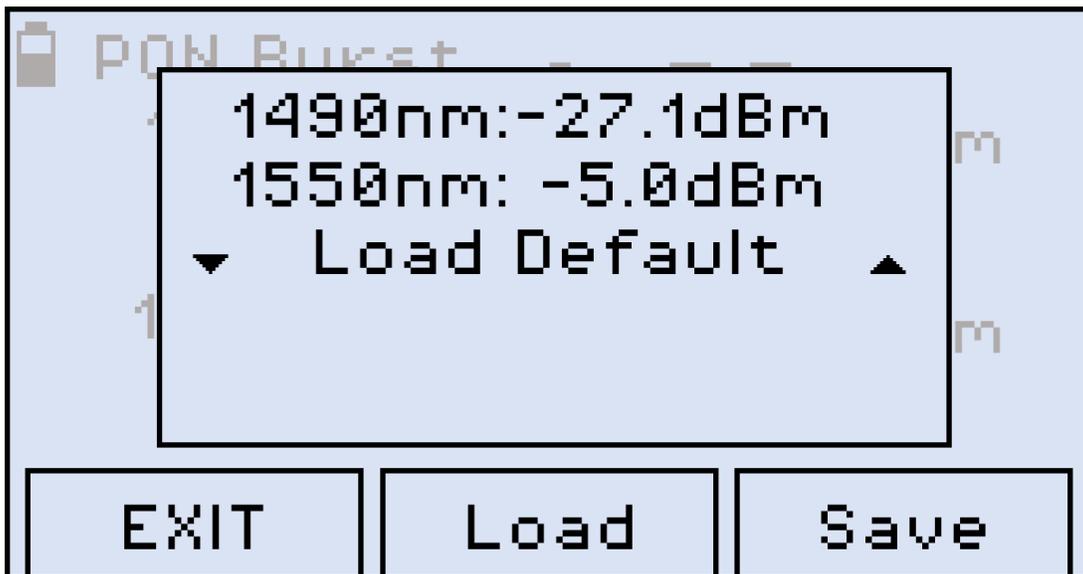
If the FX80/FX81 battery is allowed to fully discharge, all settings such as Pass/Fail and Device settings will return to original factory defaults. To retain Pass/Fail settings for future use, save them to a profile.

6.2.2.2 Creating a Pass/Fail Threshold Profile for Measurements

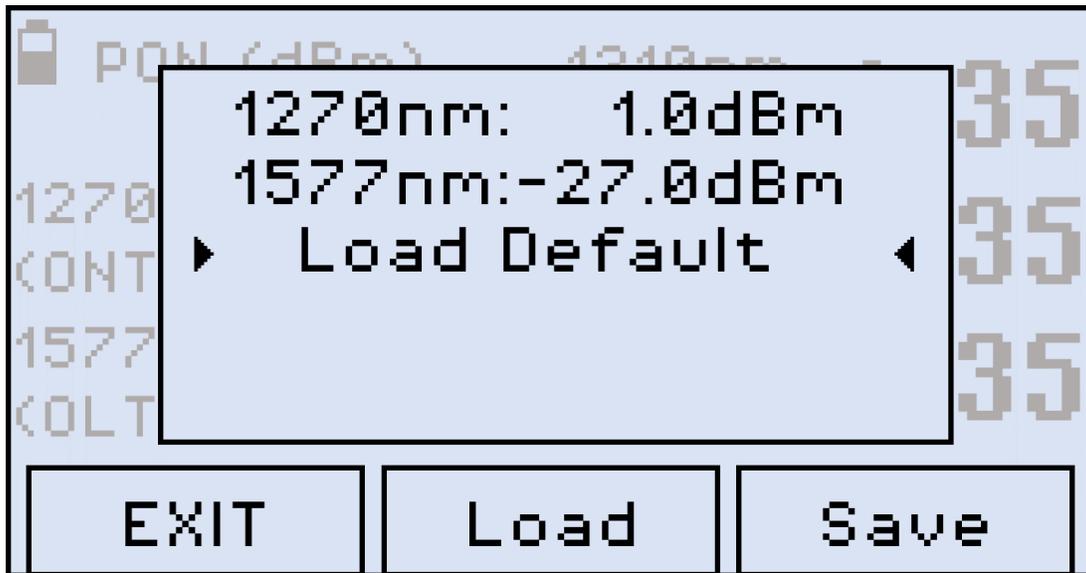
One profile with threshold values can be created and saved in memory for future recall.

To save the current set of thresholds as a profile:

1. In the P/F mode, enter the desired values, but do NOT exit the **Setting Pass/Fail thresholds** mode.
2. To save the values as the profile, press **[F3] (Save)**.
3. To load the previously saved profile, press **[F2] (Load)**. The values from the custom profile will appear immediately on the screen.
4. To load the default threshold profile, press **[Down]** until **Load Default** is selected, then press **[Shift/Enter]**. The values from the default profile appear immediately on the screen.



Selecting the Default profile, FX80



Selecting the Default profile, FX81

6.2.2.3 Thresholds Adhering to the Current 1G/10G PON Standards

The following tables are provided as reference to set thresholds adhering to the current 1G/10G PON standards when performing measurements onsite.

ITU-T G.984-2 Standard Pass/Fail Thresholds

	1.244 Gbps DS direction					
	1490nm OLT Launch Power			1490 ONT/ONU Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	-4	1	5	-25	-25	-26
Max Avg Power (dBm)	1	6	9	-4	-4	-4

	2.488 Gbps DS direction					
	1490nm OLT Launch Power			1490 ONT/ONU Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	0	5	3	-21	-21	-28
Max Avg Power (dBm)	4	9	7	-1	-1	-8

2.488 Gbps US direction						
	1490nm OLT Launch Power			1490 ONT/ONU Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
Max Avg Power (dBm)	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined

1.244 Gbps US direction						
	1310nm ONT/ONU Launch Power			1310 OLT Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	-3	-2	2	-24	-28	-29
Max Avg Power (dBm)	2	3	7	-3	-7	-8

622 Mbps DS direction						
	1310nm ONT/ONU Launch Power			1310 ONU Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	-6	-1	-1	-27	-27	-32
Max Avg Power (dBm)	-1	4	4	-6	-6	-11

622 Mbps US direction						
	1310nm ONT/ONU Launch Power			1310 ONU Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	-6	-1	-1	-27	-27	-32
Max Avg Power (dBm)	-1	4	4	-6	-6	-11

	155 Mbps DS direction					
	1310nm ONT/ONU Launch Power			1310 ONU Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	-6	-4	-2	-27	-30	-33
Max Avg Power (dBm)	0	2	4	-5	-8	-11

	155 Mbps US direction					
	1310nm ONT/ONU Launch Power			1310 OLT Receive Power		
ODN Class	Class A	Class B	Class C	Class A	Class B	Class C
Min Avg Power (dBm)	-6	-4	-2	-27	-30	-33
Max Avg Power (dBm)	0	2	4	-5	-8	-11

ITU-T G.987.2 Standard Pass/Fail Thresholds (10G asymmetric)

	9.95328 Gbps DS direction															
	1577nm OLT Launch Power						1577nm ONT/ONU Receive Power									
ODN Class	Class N1		Class N2		Class E1		Class E2		Class N1		Class N2		Class E1		Class E2	
		N2a	N2b		E2a	E2b		N2a	N2b		E2a	E2b		E2a	E2b	
Min Avg Power (dBm)	2.0	4.0	10.5	6.0	8.0	14.5	-28.0	-28.0	-21.5	-28.0	-28.0	-21.5	-28.0	-28.0	-21.5	
Max Avg Power (dBm)	6.0	8.0	12.5	10.0	12.0	16.5	-8.0	-8.0	-3.5	-8.0	-9.0	-3.5	-8.0	-9.0	-3.5	

	2.44832 Gbps US direction							
	1270nm OLT Launch Power				1270nm ONT/ONU Receive Power			
ODN Class	Class N1	Class N2	Class E1	Class E2	Class N1	Class N2	Class E1	Class E2
Min Avg Power (dBm)	2.0	2.0	2.0	2.0	-27.5	-29.5	-31.5	-33.5
Max Avg Power (dBm)	7.0	7.0	7.0	7.0	-7.0	-9.0	-11	-13

ITU-T G.9807.1 Standard Pass/Fail Thresholds (10G symmetric)

9.95328 Gbps DS direction						
	1577nm OLT Launch Power			1577nm ONT/ONU Receive Power		
ODN Class	Class N1	Class N2	Class E1	Class N1	Class N2	Class E1
Min Avg Power (dBm)	2.0	4.0	6.0	-28.0	-28.0	-28.0
Max Avg Power (dBm)	5.0	7.0	9.0	-9.0	-9.0	-9.0

9.95328 Gbps US direction						
	1270nm ONT/ONU Launch Power			1270nm OLT Receive Power		
ODN Class	Class N1	Class N2	Class E1	Class N1	Class N2	Class E1
Min Avg Power (dBm)	4.0	4.0	4.0	-26.0	-28.0	-30.0
Max Avg Power (dBm)	9.0	9.0	9.0	-5.0	-7.0	-9.0

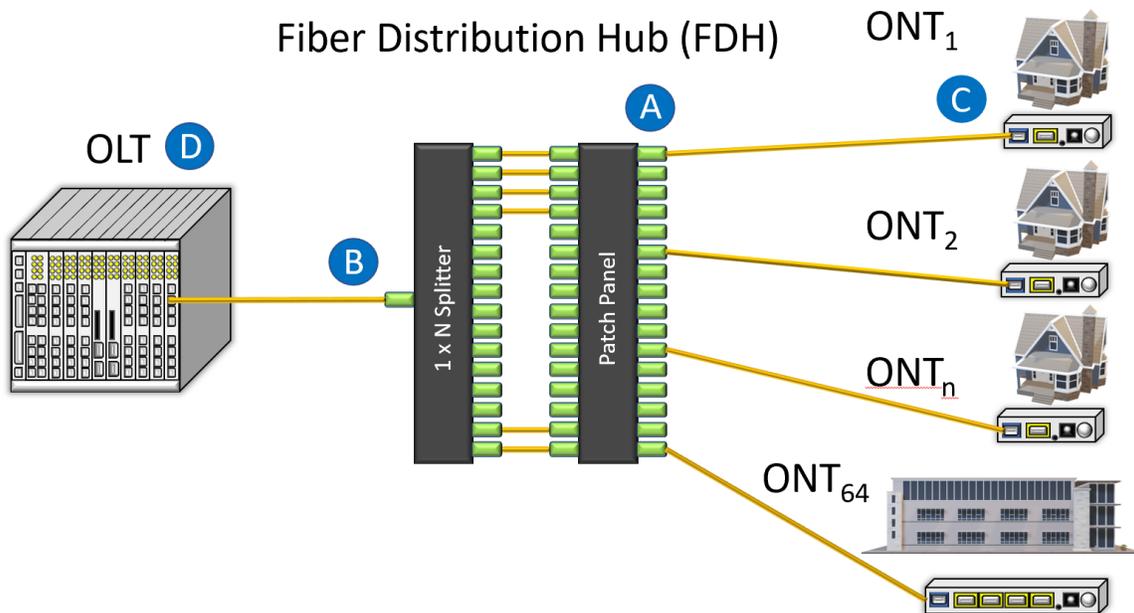
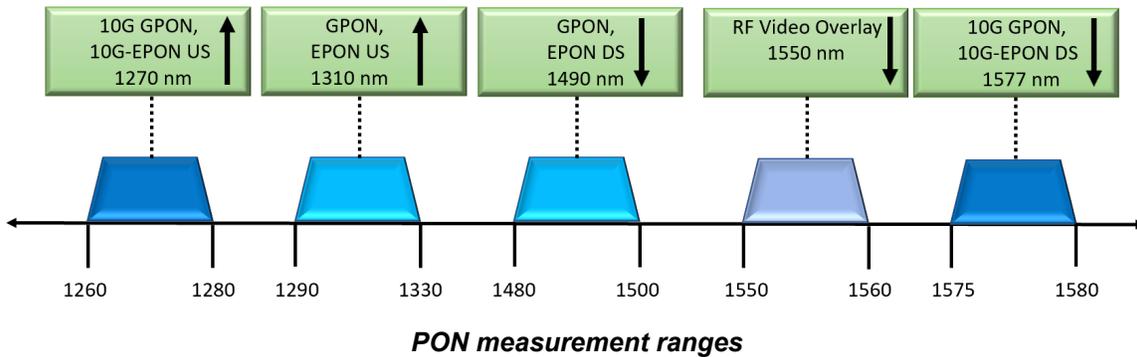
9.95328 Gbps DS direction						
	1490nm OLT Launch Power			1490nm ONT/ONU Receive Power		
OPL Class	Class B+	Class C+	N/A	Class B+	Class C+	N/A
Min Avg Power (dBm)	2.0	6.0	N/A	-27.0	-27.0	N/A
Max Avg Power (dBm)	5.0	9.0	N/A	-8.0	-8.0	N/A

9.95328 Gbps US direction						
	1310nm ONT/ONU Launch Power			1310nm OLT Receive Power		
OPL Class	Class B+	Class C+	N/A	Class B+	Class C+	N/A
Min Avg Power (dBm)	3.0	3.0	N/A	-26.0	-30.0	N/A
Max Avg Power (dBm)	8.0	8.0	N/A	-5.0	-9.0	N/A

6.2.3 Performing Optical Power Measurements in PON



Please inspect and clean fibers before connecting to the device.



A typical passive optical network (PON) with possible points of measurement

To measure optical power in a passive optical network (PON):

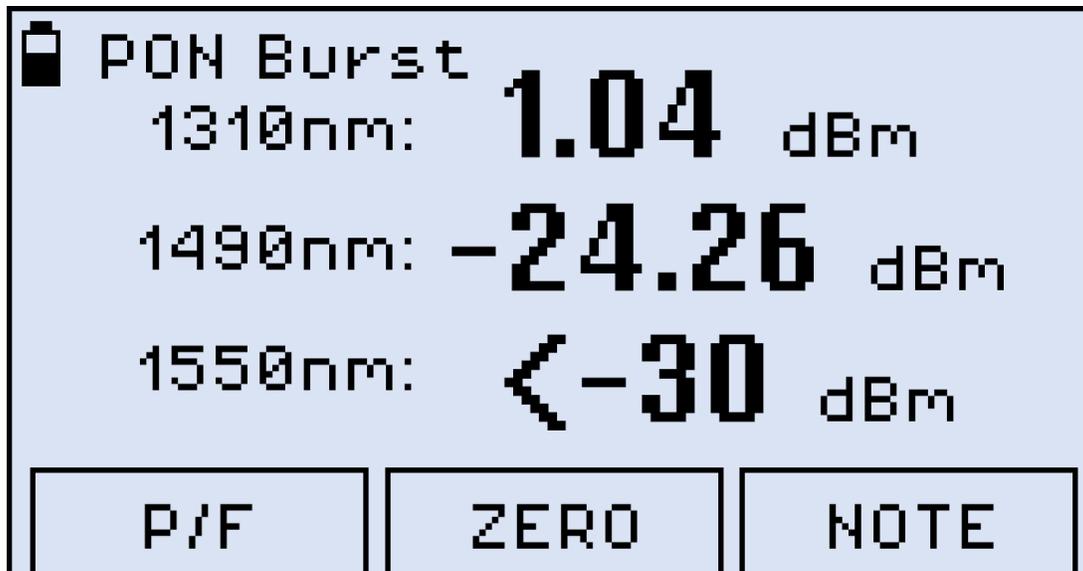
1. Select the necessary mode (PON Burst [or PON for FX81]) for active networks, or PON CW for networks without signals) by pressing the **[MODE]** button. See [Section 6.1. Modes for Optical Power Measurements](#) for details.
2. To test a PON network, the FX80/FX81, in the figure above, must be connected at the OLT and ONT of the network. the following locations: OLT [location B or D], Fiber Distribution Hub/Point (FDP) [location A] or ONU/ONT [location C] are the possible respective test points. At least one extra patchcord may be needed to perform a test.

If PON network elements have SC/UPC connectors and the FX80/FX81 has SC/APC, two conversion patchcords are needed.

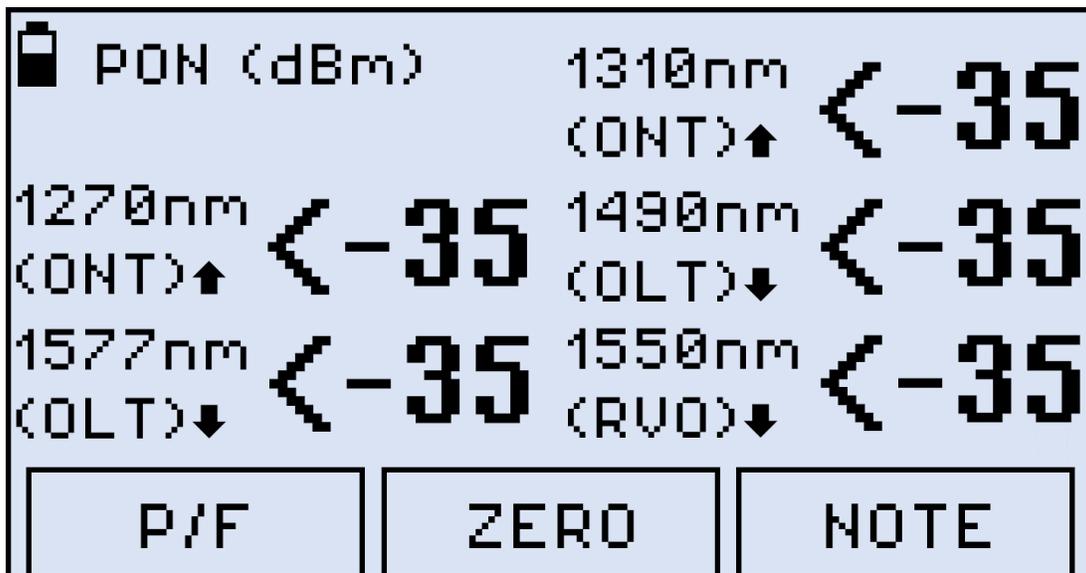


When first testing at the FDP-A location, if there is no drop line installed, the 1310 nm upstream will be seen only if a fiber is temporarily connected to the ONT. This may require two patch cords.

3. Connect fiber carrying downstream traffic from the OLT to the OLT test port. Confirm the 1490 nm (GPON/EPON) and 1577 nm (XGS-PON/10G-EPON) wavelengths are detected. The 1550 nm wavelength will only appear if the network includes RF video overlay signal traffic (RVO). If no signal(s) are detected, begin troubleshooting and make sure the proper test port is connected.
4. Once a valid 1490 nm and/or corresponding 1577 nm (XGS-PON/10G-EPON) signal level is confirmed, connect the ONU/ONT test port to measure the 1310 nm (GPON/EPON) and 1270 nm (XGS-PON/10G-EPON) upstream signal coming from the ONT. Since the upstream uses TDMA transmission, a small delay seeing the respective signal/s will be observed. If the ONT/ONU undergoes a power-cycle, it can take up to one minute or longer for ranging and activation to occur before the unit is fully operational again. The measurement results are displayed on screen. The example below shows typical values one might expect when connected at the ONU (location C) and no P/F thresholds have been set.

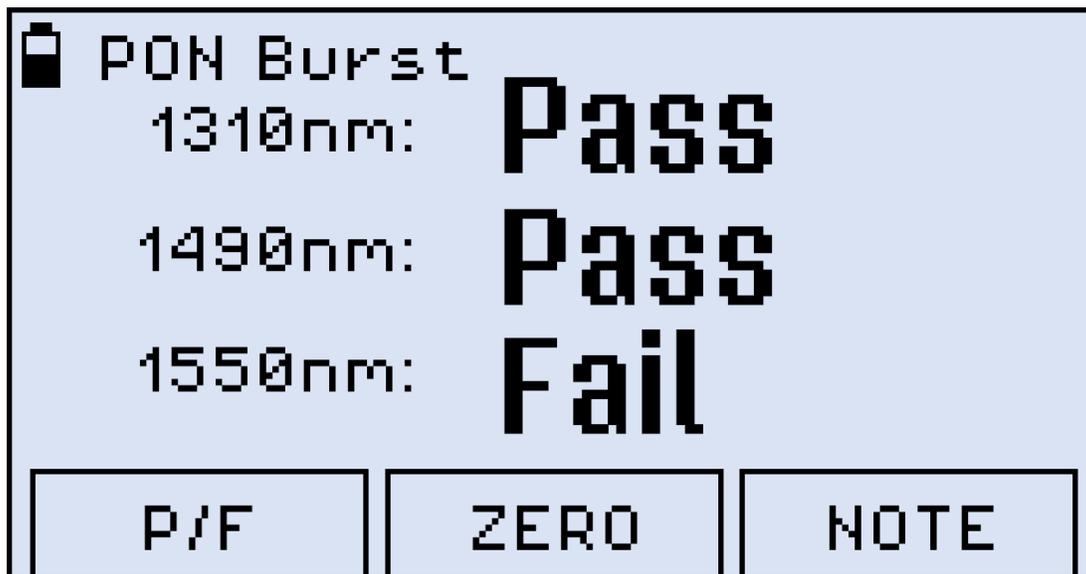


PON Burst mode measurement results as values, FX80

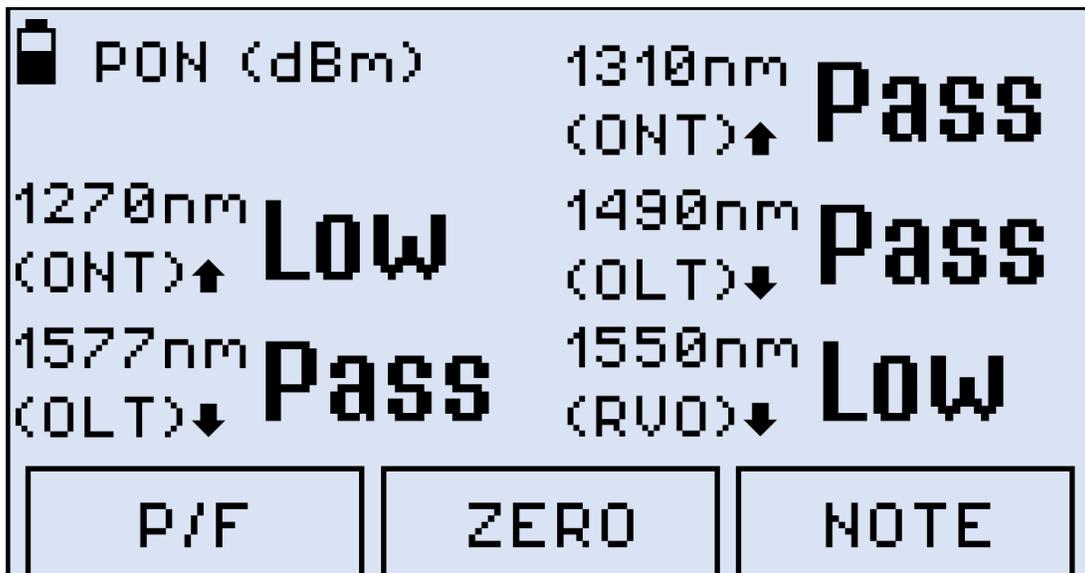


PON Burst mode measurement results as values, FX81

If P/F thresholds have been set, the measurement results are presented as **Pass** or **Fail** (see the example below).

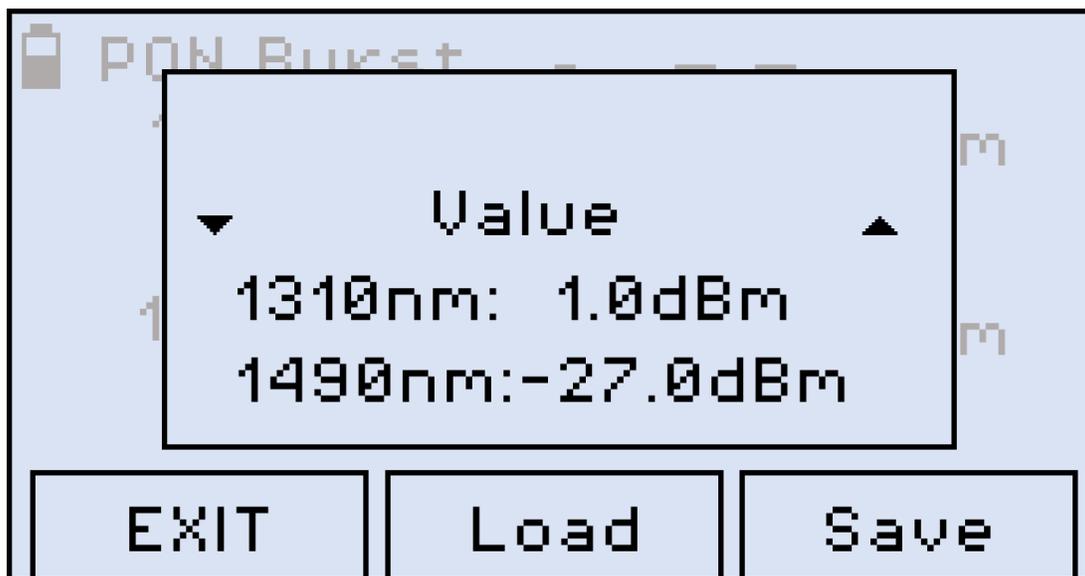


PON Burst mode measurement results as P/F thresholds, FX80

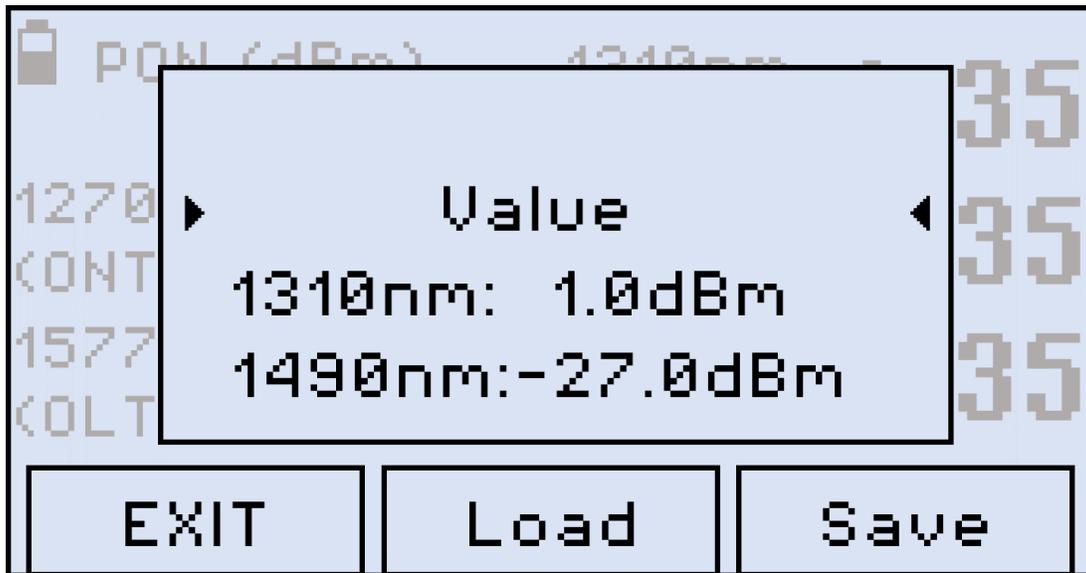


PON Burst mode measurement results as P/F thresholds, FX81

To switch back to actual values for the same measurement, press the **[F1] (P/F)** button.



Switching from thresholds to values for the same measurement, FX80



Switching from thresholds to values for the same measurement, FX81

With the 'Value' line selected >...<, press **[Shift/Enter]** to confirm the selection. The screen displays returns to representing numeric values for the same measurement.

6.3 Broadband Power Measurements (Optional for FX80/FX81 4-Wavelength Version)

The Broadband OPM features an InGaAs detector with a wavelength range from 800 to 1700 nm. Power readings can be absolute (dBm or watts) or relative (dB). To measure optical power, insert the test fiber on the OPM test port and press **[MODE]** until the PM1 or PM2 test mode appears at the upper left corner of the display.

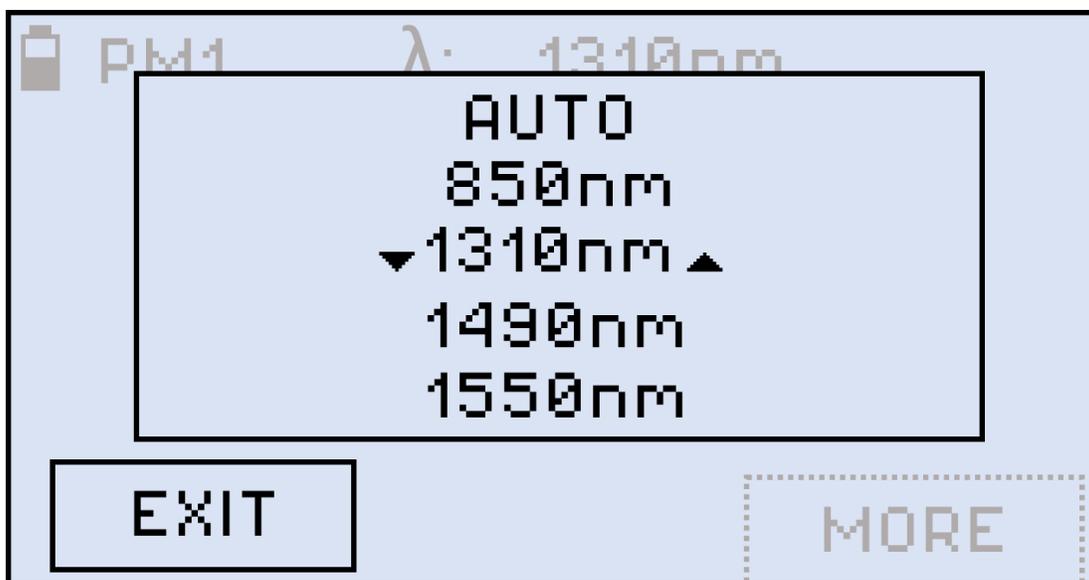


Results of PM measurement



The fiber under test must have only one wavelength. If there are several wavelengths, the measurement results will NOT be valid.

To change the wavelength, press the [F1] (WAVE) button. The resulting calibrated wavelength list is then shown below.

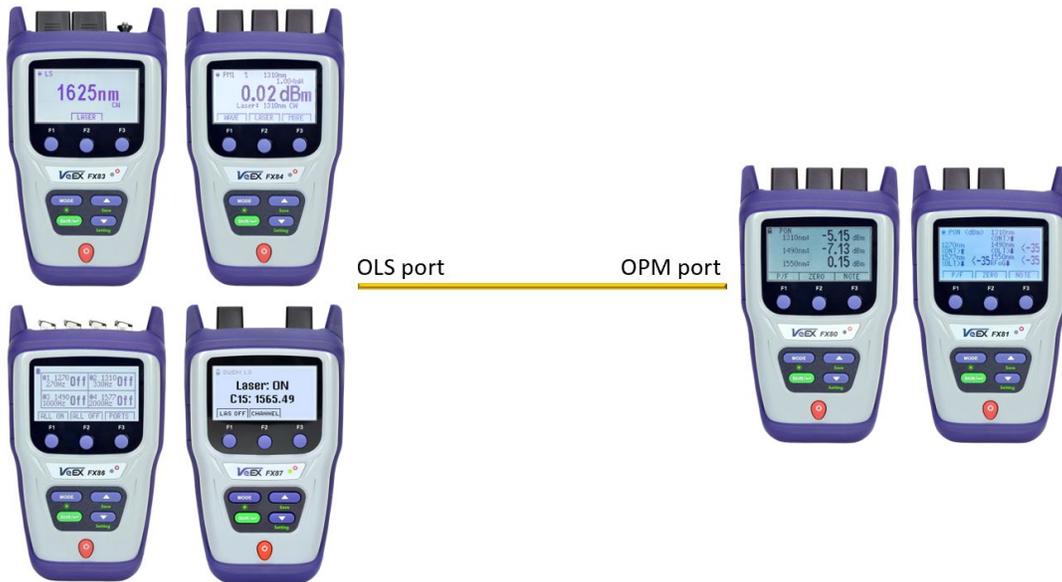


Selecting a wavelength for PM measurement

Select a wavelength by pressing the [Up] and [Down] buttons, then press the [Shift/Enter] button to confirm the selection. The new wavelength then appears in the top right corner of the display. For the previous wavelength to remain effective, select a wavelength and then press the [F1] (EXIT) button.

6.3.1 Using WaveID

When paired with a compatible VeEX light source, the optical signal employs a proprietary WaveID which sets the OPM to the correct wavelength calibration setting. When **[AUTO]** is set, the FX80/FX81 optional BB-OPM determines the wavelength automatically.



FX80/FX81 (on the right) connected over fiber under test to FX-8x OLS/OLTS/TLS/TLTS

Using FX86:

- Check if the wavelength selected is transmitted through the correct port. Press **PORTS [F3]**, select the port corresponding to the wavelength to transmit using the **[Up]** and **[Down]** keys and press **WID [F2]** to enable WaveID. FX86 WaveID can only be enabled one port at a time.

Using FX83/FX84/FX85:

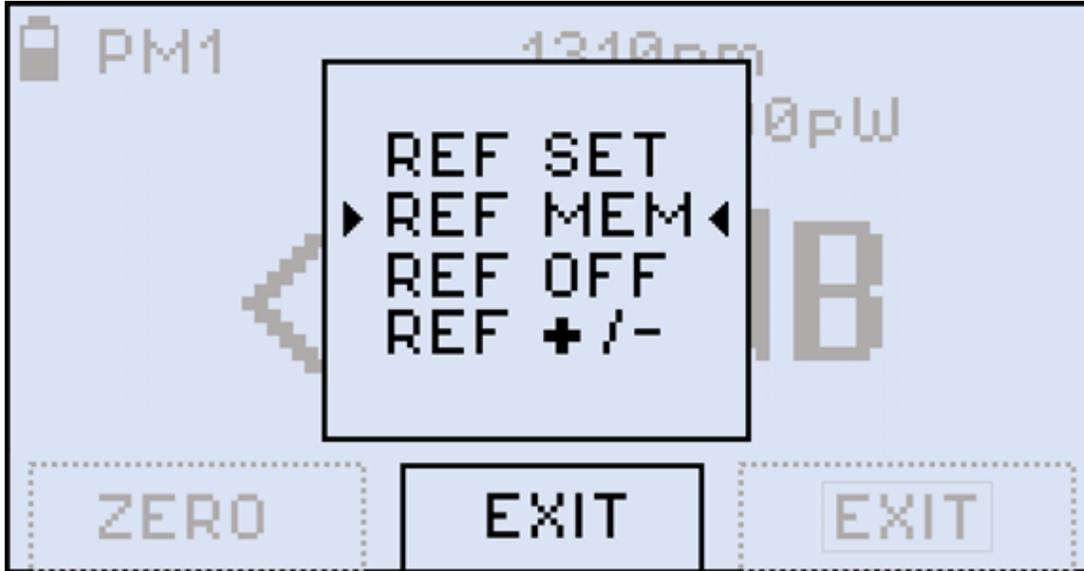
- In **LS** mode and in **PM1/PM2 (OLTS/OPM mode)**, press **LASER [F2]**, then select desired wavelength and press **Shift/Enter**.



If the [AUTO] option for a signal without WaveID or modulated is selected, the λ value goes blank and the measurement results are NOT valid.

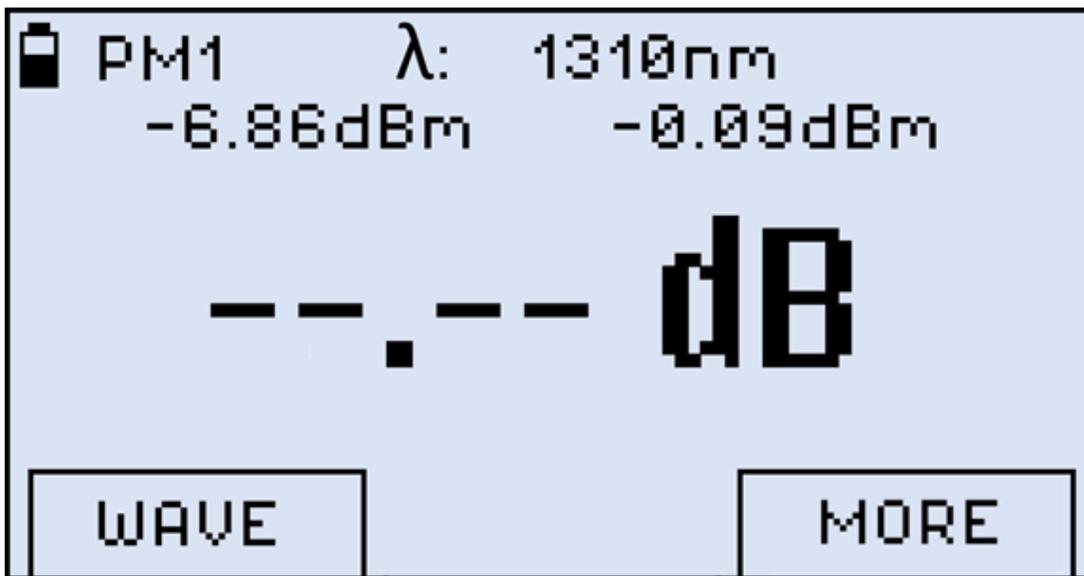
6.3.2 Setting Power Reference Level

To measure the fiber insertion loss, first set a reference level for each test wavelength. Set the reference level by pressing the **[F3] (OPTION)** button.



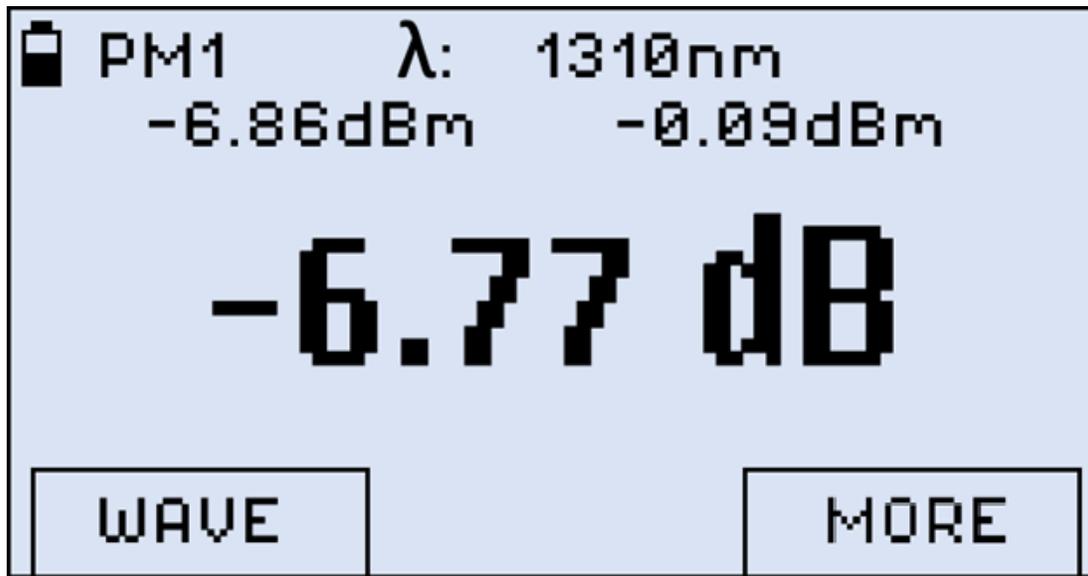
Selecting a reference option for PM measurement

- **REF SET** function: sets the current power value as the reference level. Select **REF SET** with the cursor and press the **[Shift/Enter]** button. The value onscreen then changes to **--.---dB**. The current reference level value is shown on the second row to the left (-6.86 dBm in the example below). [**REF SET** replaces **REF FIX** in later firmware versions]



Current power value set as the reference level

- **REF MEM function:** the previously saved reference level is set as active.
- **REF OFF function:** disables previously stored reference level. The measurement is shown in **dBm**.
- **REF +/- function:** adjusts the reference level in small increments. Press the **[Up]** and **[Down]** buttons to change the reference level by 0.01. To set the adjusted level as reference, press **[Shift/Enter]**. To exit without setting, press **[F3] (EXIT)**.



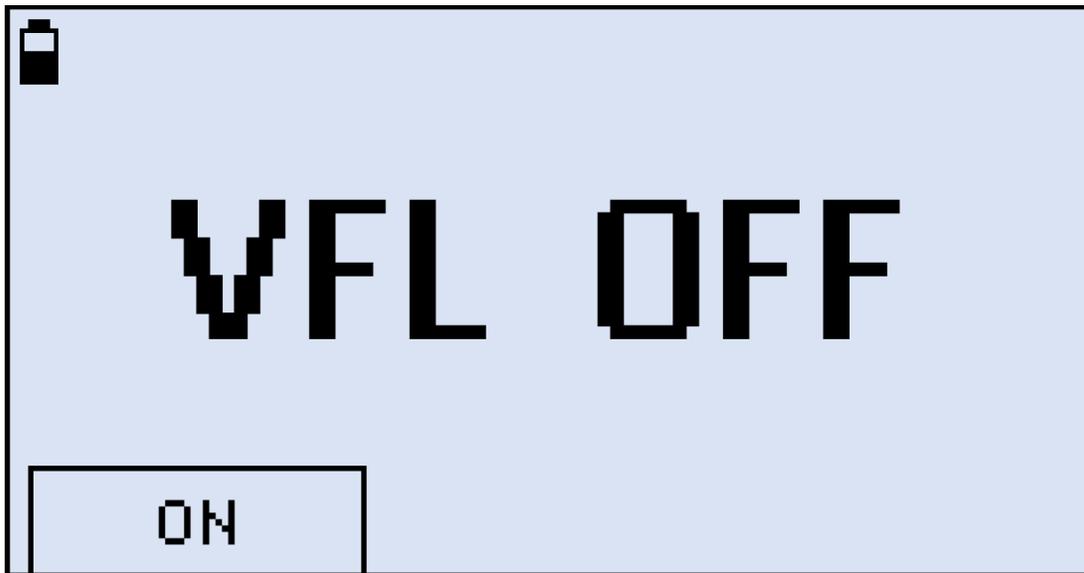
Broadband measurement taken against a reference level

6.4 Visual Fault Locator (VFL)

The FX80 can be equipped with a Visual Fault Locator (VFL).

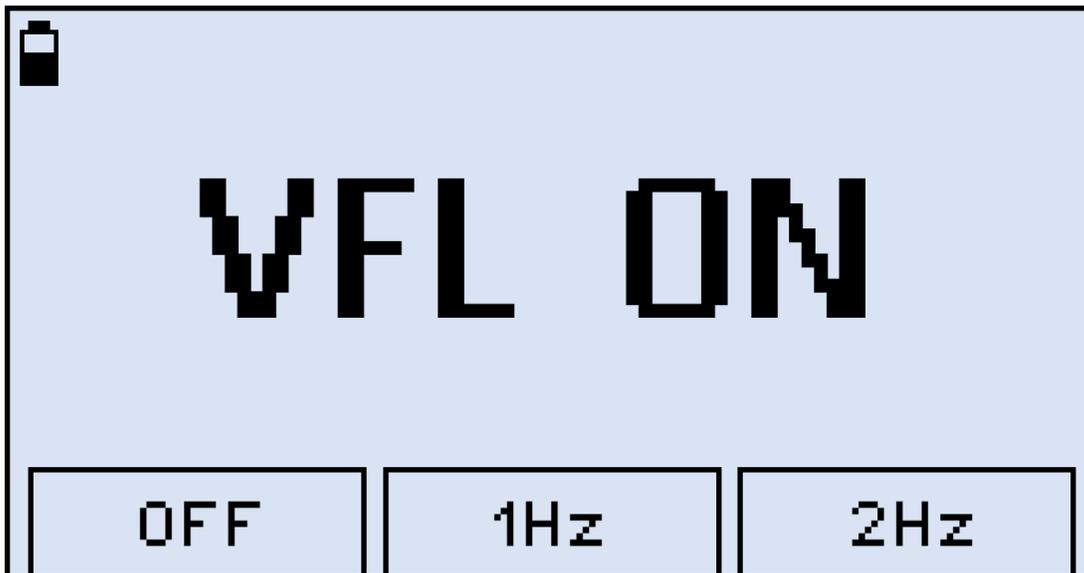
To test continuity:

1. Connect the fiber to the VFL port.
2. Press the **[MODE]** button until get the VFL mode appears (see the Figure below).



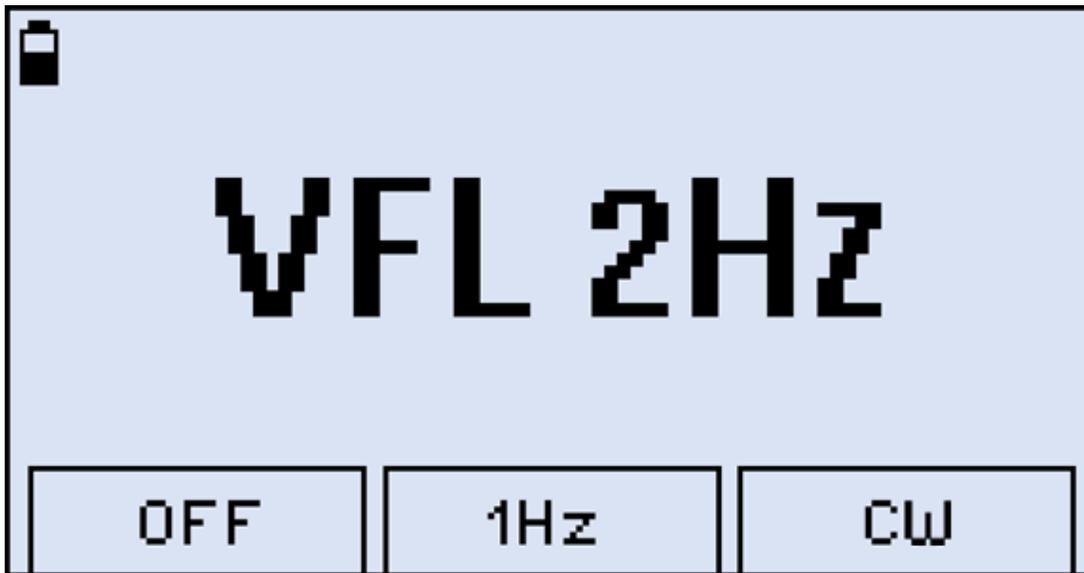
Starting VFL mode

3. Press the **|F1| (ON)** button to begin the test.



Starting VFL testing, continuous light

4. To modulate the light (1 or 2 Hz), press **|F2| (1Hz)** or **|F3| (2Hz)**, respectively. The pressed button then changes to continuous wave mode (**CW**).



VFL testing, modulated light

5. To switch from the VFL mode to another mode, press the **[MODE]** button.

7.0 Viewing Measurement Results (Read Mode)

To view measurement results, press the **[MODE]** button until the **Read** mode is displayed in the upper left corner of the display. Scroll up or down the records using the **[Up]** and **[Down]** buttons or go page up and page down by pressing **[F1]** and **[F2]**.



Viewing Measurement Results (Read mode)



*The FX80 can be optionally equipped with Bluetooth. If so, the Bluetooth sign appears in the top right corner in the **Read** mode.*

7.1 Editing Notes to Measurement Results

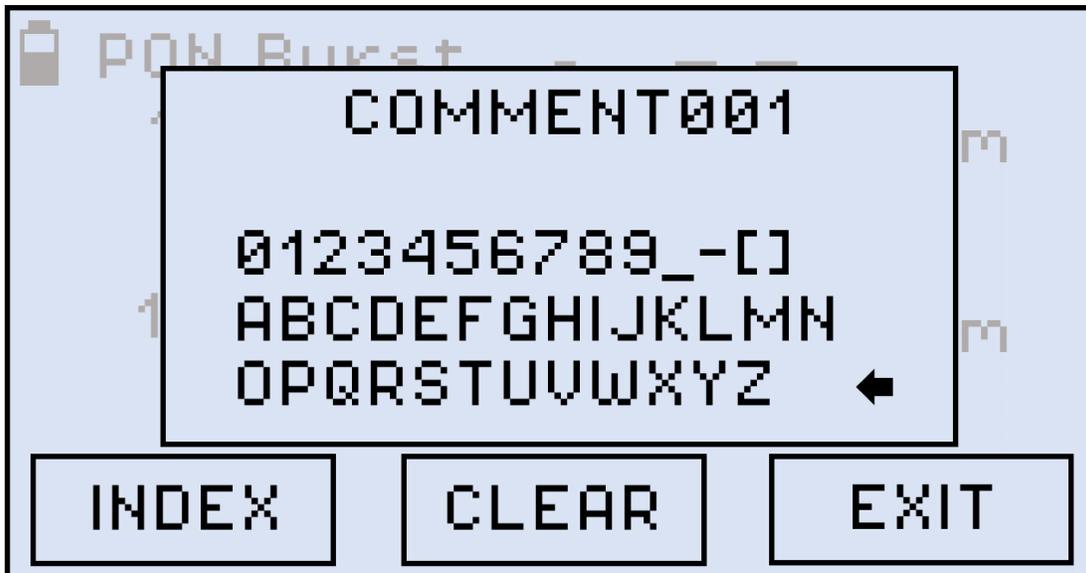
Upon initial use, every measurement is appended with the 'COMMENT###' note, where ### is the index incremented by "1" with every measurement. This note formatting is convenient when measuring several fibers within one batch or one splitter.



After editing a note, the updated text will apply to the next measurement.

To edit a note:

1. From the **Read** mode screen, press the **[F3] (MORE)** button and then **[F1] (NOTE)** button. The screen shown below then appears.



Editing comments to future measurement results

2. Press **[INDEX]** until the cursor in the top line starts flashing - then use **[Up]** and **[Down]** buttons to select the index number position.
3. Press **[COMMENT]** again to go to the list of symbols in the lower section. The active symbol then gets highlighted. Use the **[Up]** and **[Down]** buttons to select another symbol if necessary.
4. Press the **[Shift/Enter]** button to insert the selected symbol into the required position on the top line. The comment can include up to 10 symbols in total, with 7 symbols reserved for the comment text and 3 numbers for the comment number.
5. Press **[CLEAR]** to reset the index position to "000" when **[INDEX]** is selected or erase the whole note when **[COMMENT]** is selected.
6. To erase a symbol in the note, place the cursor after that symbol, then select the left arrow **←**) and execute the command by pressing the **[Shift/Enter]** button.
7. To save the note for the next measurement and exit the **NOTE** mode, press the **[F3] (EXIT)** button.

To save the current measurement results with the current note:

8. Press the **[Shift/Enter] + [Up]** button combination (**Save**). The **Saved** notification is briefly displayed onscreen, and current measurement results with the current note are saved in the device's memory.



Once the note is saved with measurement results, it cannot be edited.

8.0 Downloading Test Results to a PC

1. To transfer test results and create a report, download and install LTSync PC software from the VeEX website. New users are required to register customer details and device information.
2. Upon entering login credentials, the website will flash and navigate to VeEX customer portal page. Go to the **Functions** side-pane and look for **Secured Releases->Fiberizer Tab->Fiberizer LTSync**.

The screenshot shows the VeEX Customer Portal Software Releases Webpage. The page has a header with the VeEX logo and navigation links: MyVeEX, Products, Solutions, Support, News and Events. There are social media icons for US, YouTube, and LinkedIn. A search bar is located in the top right corner.

The main content area is titled 'Secured Releases' and contains a table of software releases. The table has columns for Release, Platform, Documents, and Date. The releases are categorized by product family: Fiberizer Desktop, Fiberizer Desktop Plus, Fiberizer Scope, and Fiberizer LTSync.

Release	Platform	Documents	Date
Release 10.10.78.8293	All	Release Notes	27-Aug-2019
Release 1.3.1	All	Release Notes	19-Sep-2019
Release 1.0.121.5927	All	Release Notes	29-Nov-2019
Release 1.0.829.8295	LTSync for FX40/FX45/FX50/FX80	Release Notes	27-Aug-2019

VeEX Customer Portal Software Releases Webpage

3. For detailed operating instructions, please refer to the corresponding manuals. More information on Fiberizer Cloud and LTSync can be found at the VeEX website (www.veexinc.com).

8.1 Installing the FX-8x USB Driver

A digitally signed Windows USB driver is required for connecting to the FX8x series. The driver is embedded in the LTSync software and will install automatically in the background when the software is installed. If for any reason, the USB driver installation fails, it may be necessary to install the driver manually. In such event, please follow the procedure below.



If the operator has used FX-4x series and FX-8x series optical power meter with LTSync to download results on the current PC system in the past, then this step can be **ignored**.

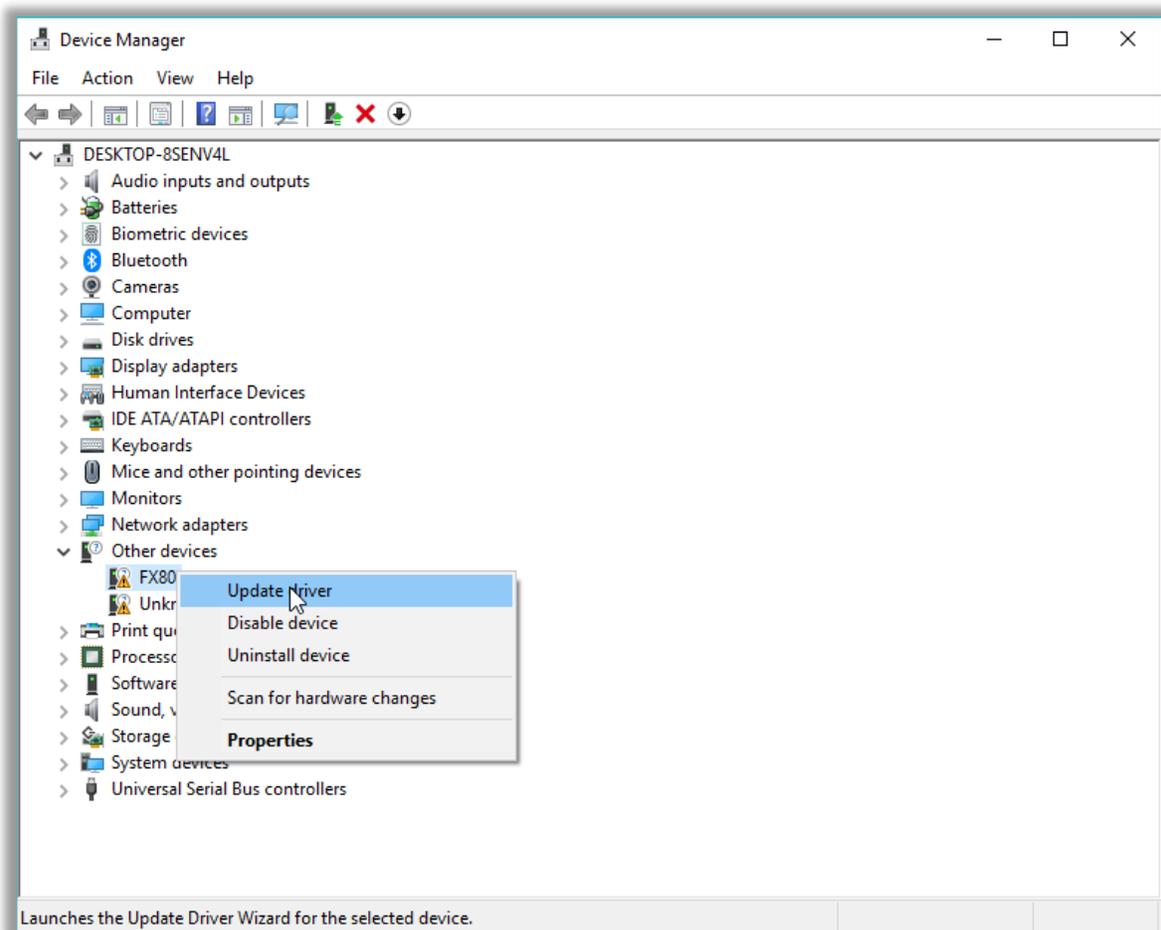
To install the USB driver:

1. Connect the VeEX power meter to the PC using a USB-A to micro-USB cable.
2. Launch Windows Device Manager and check for FX8x in the Other devices list.



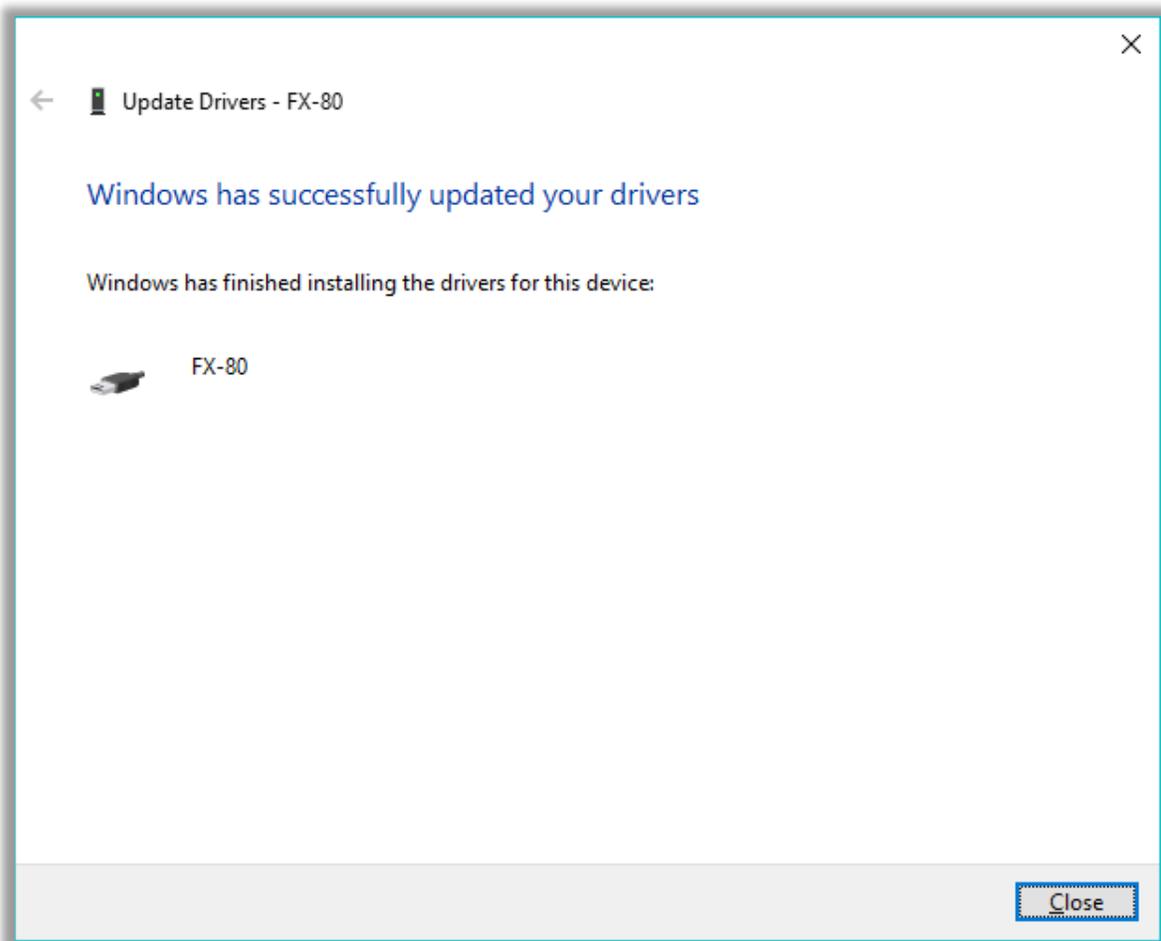
FX8x will be flagged with exclamation mark if the device driver is not installed.

3. Download the driver from the VeEX website:
<https://www.veexinc.com/ProductCategory/FiberOptics>.
4. In the Windows Device Manager, right-click the FX8x item, then select **Update driver**.



Installing the driver for FX8x

5. Select **Browse my computer for driver** software, define the path where the downloaded driver is to be saved, and then click **Next**. The driver installation begins, A new window appears when the driver has been updated successfully.



The driver for FX8x successfully installed

8.2 Transferring Measurement Results to a PC

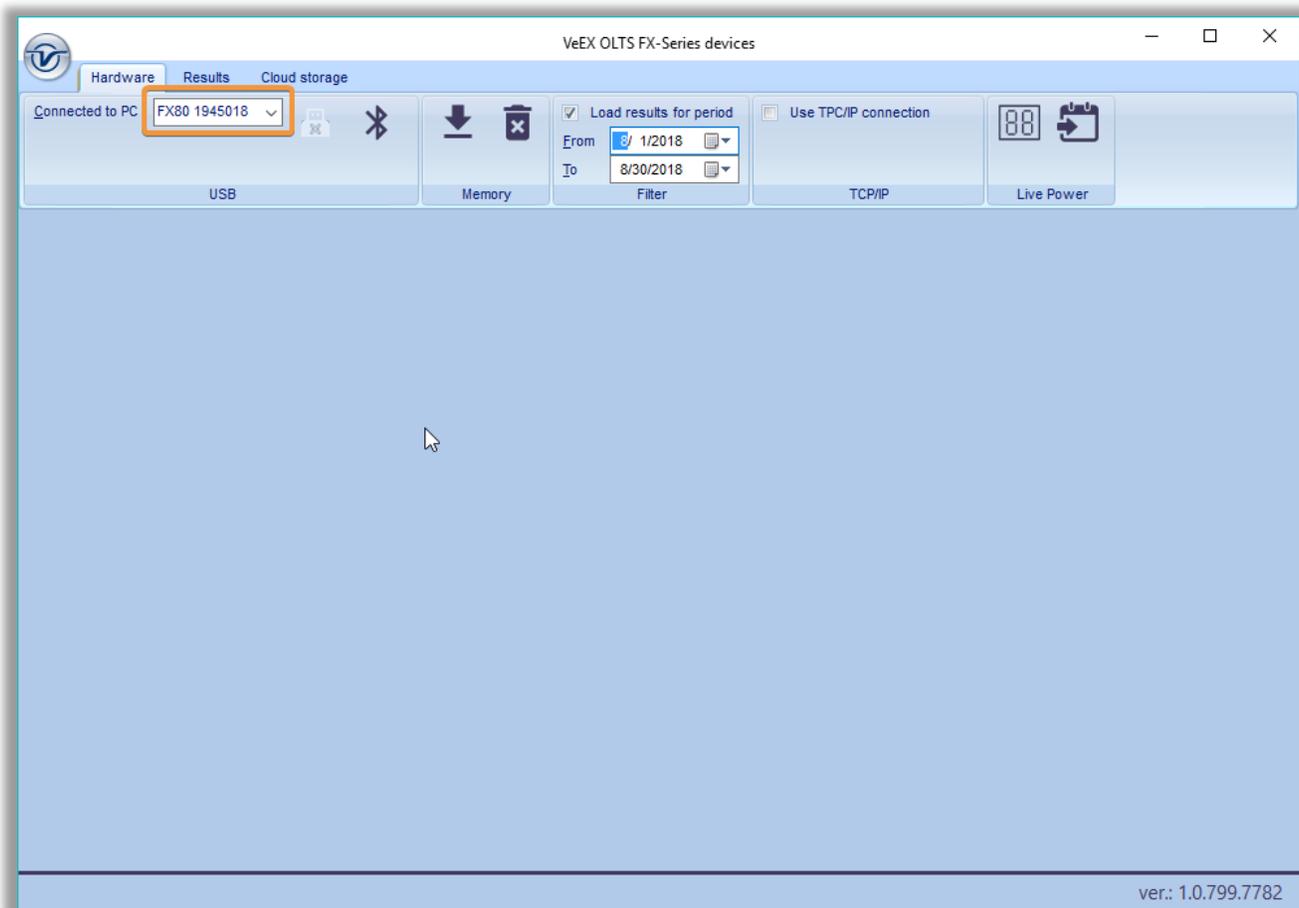
To create a report, first transfer test results to a Windows PC using LTSync software. This can be done using a micro-USB cable or via optional Bluetooth connection.



To transfer the measurement results via the micro-USB cable, install the USB driver (see [Section 8.1. Installing the FX-8x USB Driver](#)). For Bluetooth transfer, no driver is needed.

8.2.1 Transfer Results Using Micro-USB Cable

To transfer measurement results to the PC using the micro-USB cable, connect the provided cable to a compatible power meter and to the PC. The figure below shows that a device is connected and the unique product ID.



FX80 is connected to PC in LTSync, its serial number is recognized by the program

To view the measurement results onscreen, click the [**Download**] button . Results will appear in a table, as shown in the figure below. Use the scroll bar to view all results.



For more information on using LTSync, see the LTSync User Manual at www.veexinc.com.

VeEX OLTS FX40/45/50 - FX80_318617_2017-11-15 19_19_12

Hardware Results Cloud storage

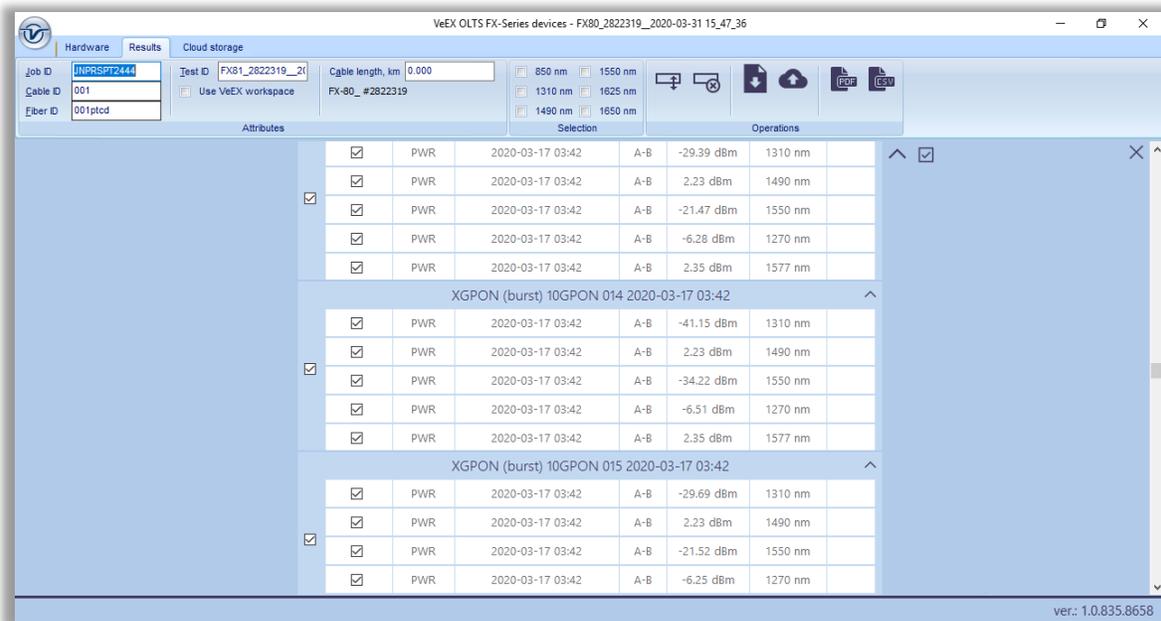
Job ID: Tuesday Cable length: 28 km
 Cable ID: TwinPeaks
 Fiber ID: 012-XYZ

Attributes Selection Operations

PON (burst) 3CM 18 2017-11-15 18:14							
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:14	A-B	-54.43 dBm	1310 nm		
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:14	A-B	-113.13 dBm	1490 nm		
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:14	A-B	-76.10 dBm	1550 nm		
PON (CW) 03CM 19 2017-11-15 18:24							
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:24	A-B	-54.43 dBm	1310 nm	FAIL	
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:24	A-B	-113.13 dBm	1490 nm	FAIL	
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:24	A-B	-100.35 dBm	1550 nm	FAIL	
PON (burst) 03CM 20 2017-11-15 18:24							
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:24	A-B	-54.43 dBm	1310 nm	FAIL	
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:24	A-B	-113.13 dBm	1490 nm	FAIL	
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:24	A-B	-88.48 dBm	1550 nm	FAIL	
PON (burst) 03CM 21 2017-11-15 18:58							
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:58	A-B	-26.95 dBm	1310 nm	FAIL	
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:58	A-B	-8.43 dBm	1490 nm	PASS	
<input checked="" type="checkbox"/>	PWR	2017-11-15 18:58	A-B	-70.46 dBm	1550 nm	FAIL	

ver.: 1.0.653.7035

FX80 Measurement results table

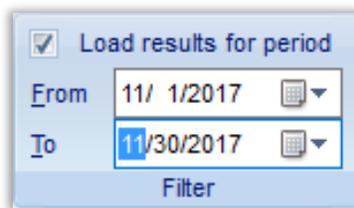


FX81 Measurement results table

To prepare measurement results for a report, enter the relevant information into the fields in the **Attributes** section (see, for example, the Figure above).

The displayed results can be filtered by the test group and/or wavelength by selecting the desired results to be worked with, in the main viewing area (see, for example, the Figure above).

To download results of a certain period, go to the **Hardware** tab and select the **[Load results for period]** checkbox. This brings (see the Figure below).



Filtering measurement results by time

To delete a row of results, select its checkbox, then click the **[Delete row]** button (🗑️, see it, for example, in the Figure above). Several rows of test results can be selected and deleted at the same time.

To move a row to another group, highlight the row by clicking it, after which the border around the row will turn orange. Drag-and-drop this row to another group if needed. Alternatively, highlight the row, click the **[Move row]** button (📁, see it, for example, in the Figure above), then highlight the desired group.



Only one row at a time can be moved.

A row can be moved to another group only if there is no measurement with that wavelength in the group

To save the measurement results to a PC, click the [**Save to PC**] button .

To erase all test results from the FX80/FX81 memory, select the **Hardware** tab and click the [**Erase all memory**] button .

8.2.2 Transferring Measurement Results via Bluetooth

To transfer measurement results to the PC or mobile device via Bluetooth, the FX80/FX81 must be equipped with Bluetooth option.

For instructions on pairing the unit via Bluetooth, see the [FX8x Test Results Transfer LTSync Quick Guide](#) available from the FX80/81 product page on the website at www.veexinc.com.

To transfer results via Bluetooth:

1. Pair the devices with the standard Bluetooth pairing procedure. If paired, the FX80/FX81 should appear in the **Bluetooth & Other Devices** list in the Windows X **Device Manager**. See the icon example below, taken in Win10:



FX-80 paired and displayed in Bluetooth & Other Devices list (Win10)



Please note that every FX8x series (FX80, FX82, FX84, FX85, etc.) are shown as FX8x; however, their serial numbers are different.

2. Launch **LTSync** on the PC.
3. Power on the FX80/FX81 and enter the [**Read**] mode. The Bluetooth sign appears at the top right corner of the screen (see below).



Read mode with Bluetooth

4. In LTSync, select the Hardware tab and click the Bluetooth button . The FX80/FX81 serial number appears in the **[Connected to PC]** field. If there are several devices connected to the PC via Bluetooth, select the desired device in the drop-down list. After the FX80/FX81 and PC are connected, the Bluetooth sign inverts its colors (see below).



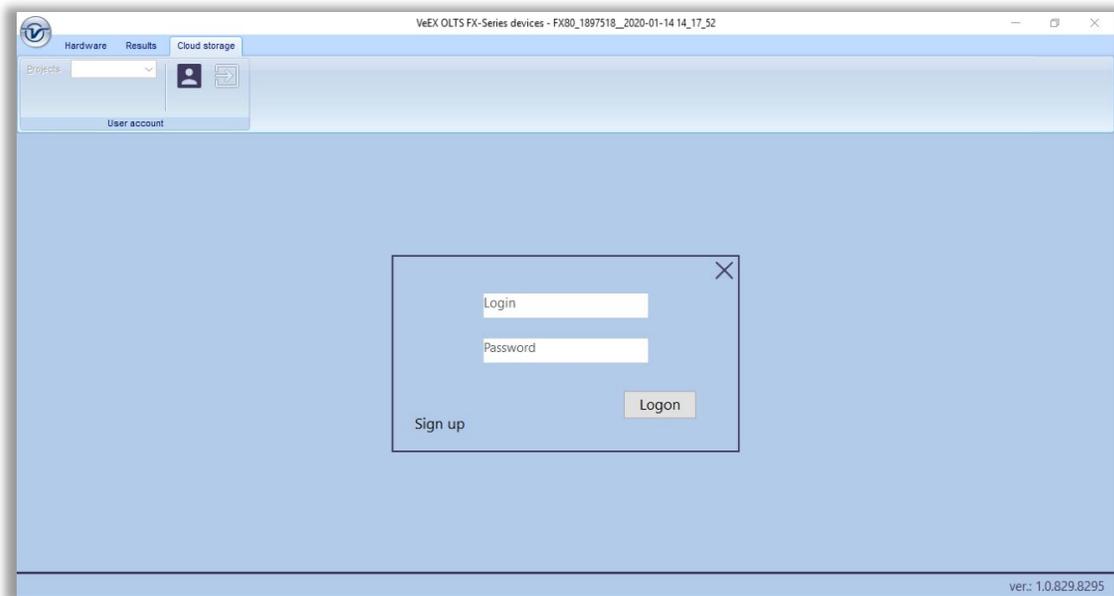
FX80 and PC connected, shows Bluetooth sign with inverted colors

5. To transfer measurement results from the FX80/FX81 to the PC, click **[Download]**  in the **Memory** section of LTSync.

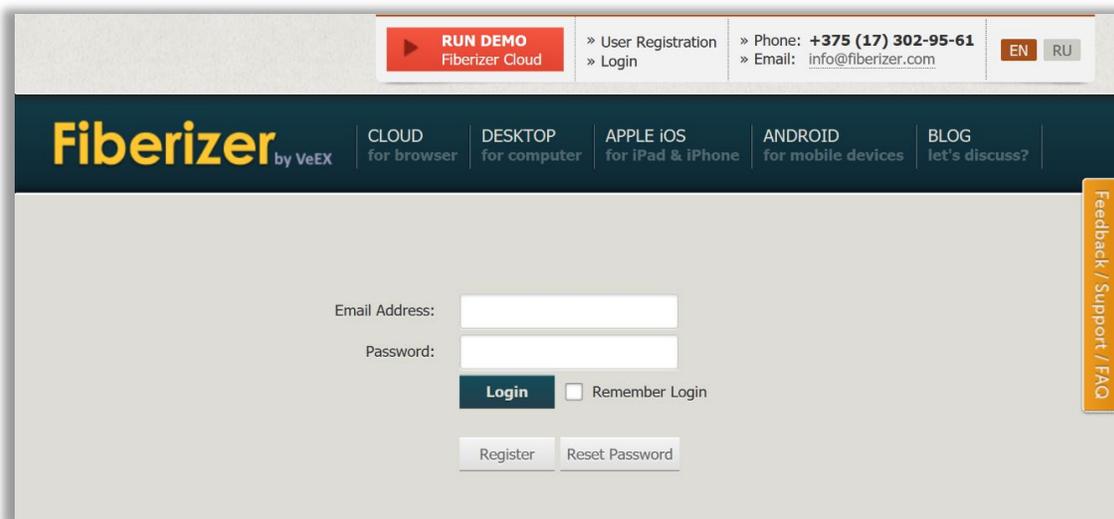
The time it takes to transfer results depends on the amount of data that is saved.

9.0 Uploading Measurement Results to Fiberizer Cloud

The Fiberizer Cloud account can be accessed within the LTSync program. To do this, go to the Cloud storage tab and click the **[Log in to Fiberizer Cloud]** button (👤), then enter credentials in the resulting form.



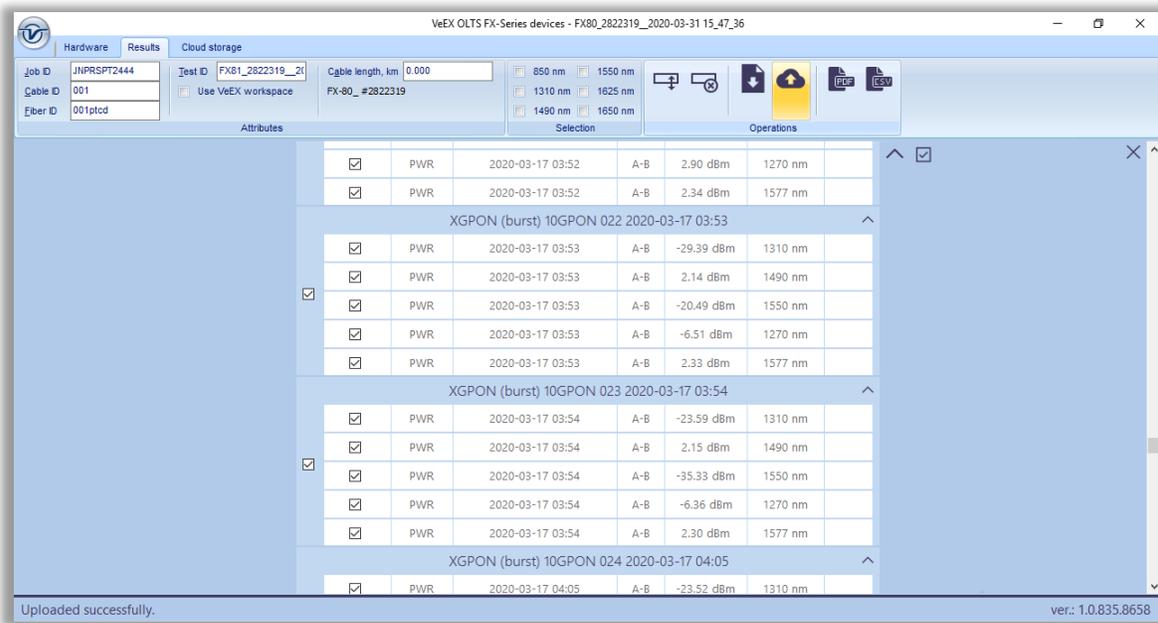
LTSync Fiberizer Cloud Login Profile



Fiberizer Main website registration window after clicking "Sign Up"

If no Fiberizer Cloud account exists, click the **[User Register in Fiberizer Cloud]** button (👤), then register there.

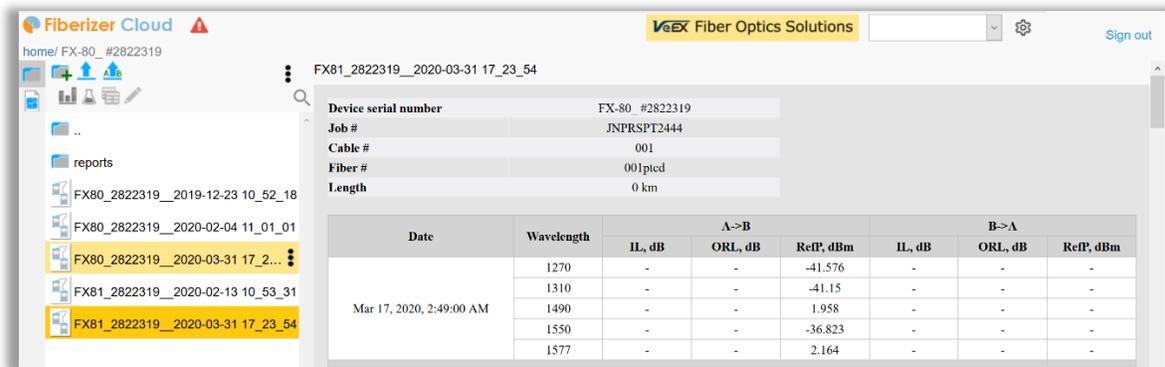
To upload measurement results to Fiberizer Cloud, go to the **Results** tab and click the **[Upload to Fiberizer Cloud]** button (📁). Then **LTSync** creates a folder in the Fiberizer Cloud account named after the connected device (for example, **FX8x 2822319**) and uploads measurement results into this folder.



Fiberizer Cloud Upload button (highlighted in orange) with previous successful upload



- The status bar at the bottom left shows the status of the current operation.
- The measurement results are saved as an **.oxtls** file.



Measurement results uploaded to Fiberizer Cloud

To log out from the Fiberizer Cloud account, go to the **Cloud storage** tab and click the **[Log out from Fiberizer Cloud]** button (🚪).

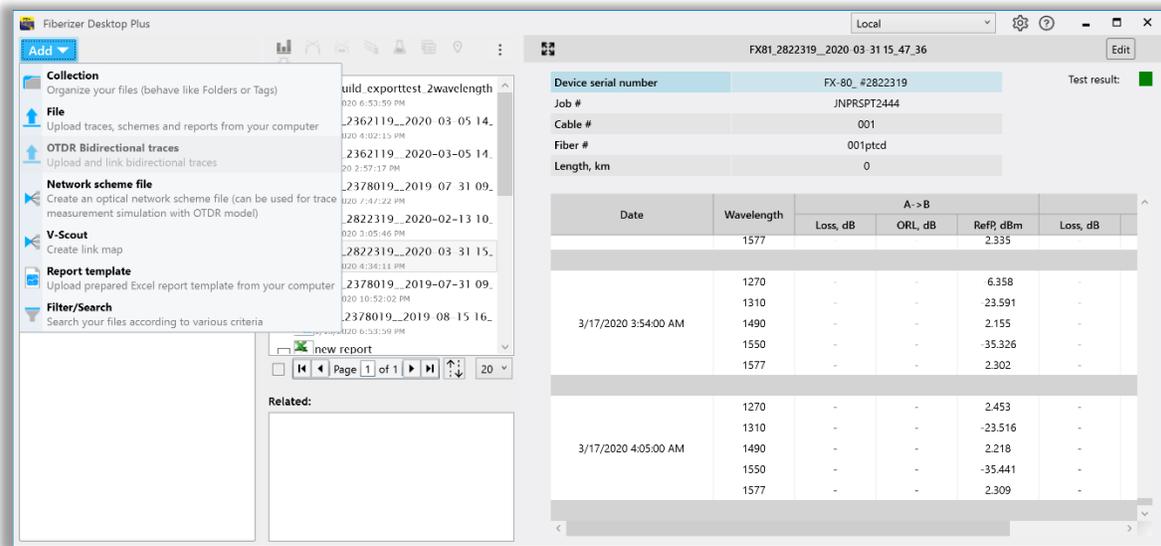
9.1 Uploading Measurement Results to Fiberizer Desktop Plus



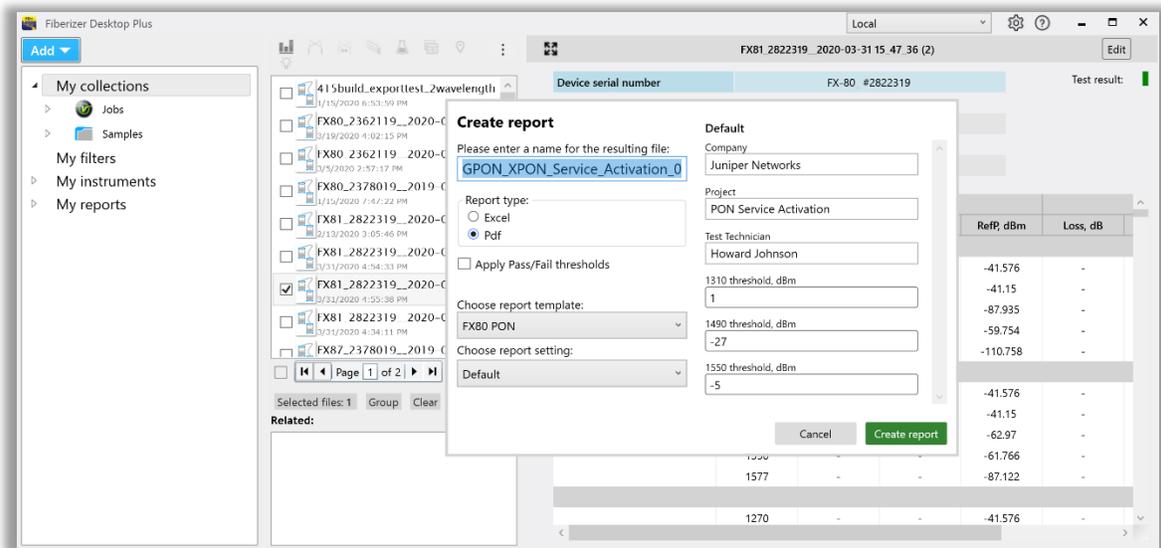
Refer to Section [8.0. Downloading Test Results to a PC](#) for the VeEX Customer Portal Software Releases Webpage instructions to download the latest Fiberizer Desktop Plus version.

Use Fiberizer Desktop Plus software to upload measurement files from oxlts, sor, etc formats and perform advanced post-processing results: managing and merging results, generate pdfs/excel files, and other functionalities explained more in detail in its dedicated manual.

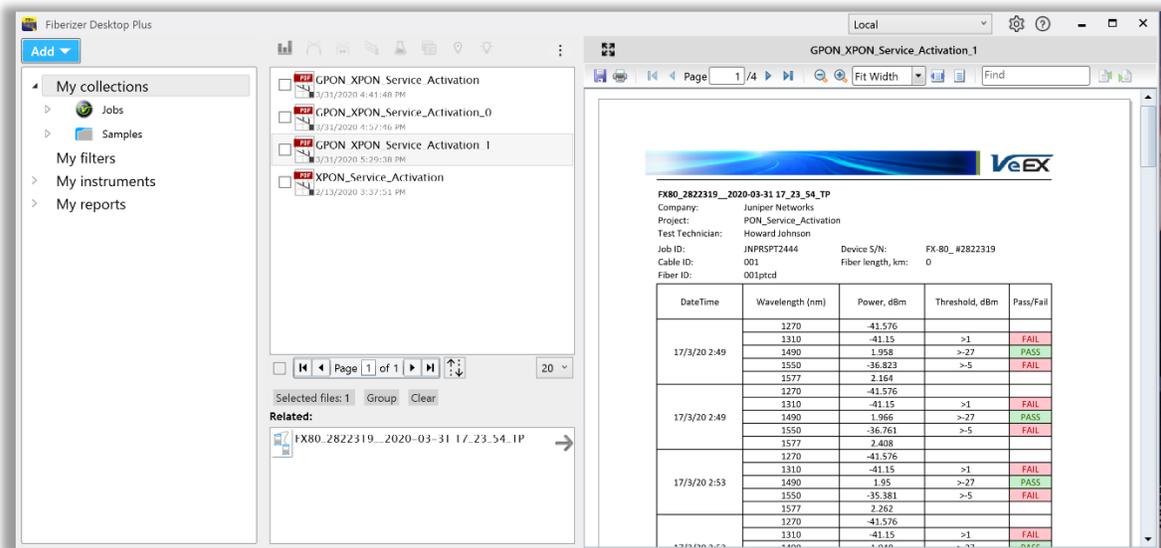
The screenshots below show the procedure to upload measurement files to Fiberizer Desktop Plus repository window and generate PDF/Excel reports.



Measurement results uploaded to Fiberizer Desktop Plus – File Upload



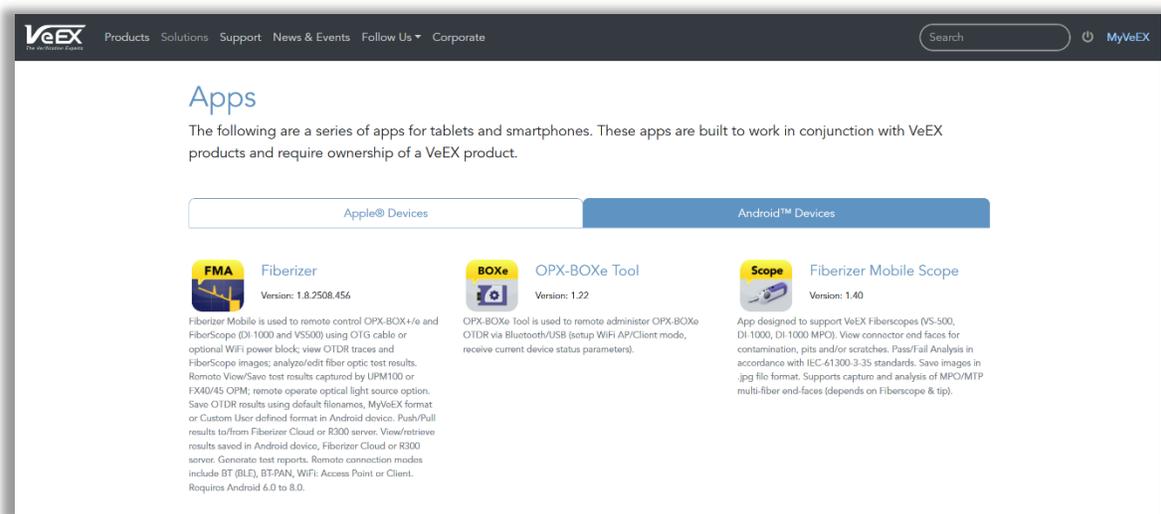
PDF/CSV Report Generation



PDF Report Generated

9.2 Downloading Measurement Results to Fiberizer Mobile OLTS (FMOLTS) for Android

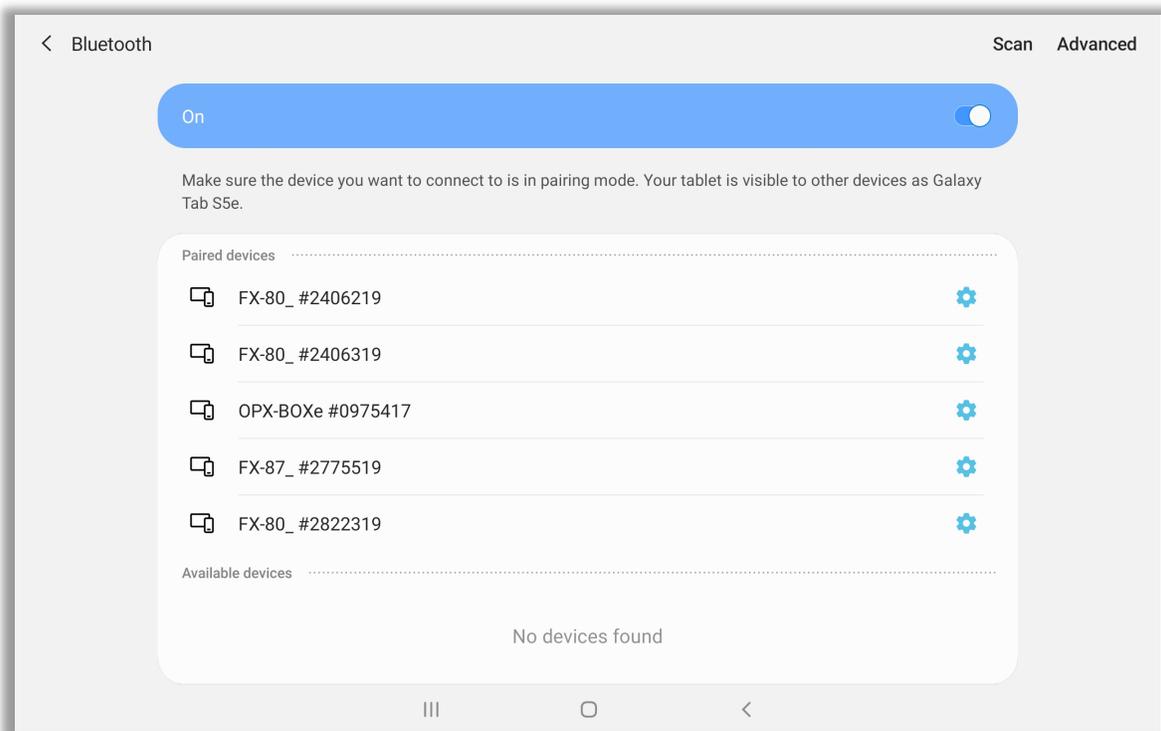
The Fiberizer Mobile OLTS Android app is available on Google Play and the VeEX Apps page at <https://www.veexinc.com/Apps> under Android devices.



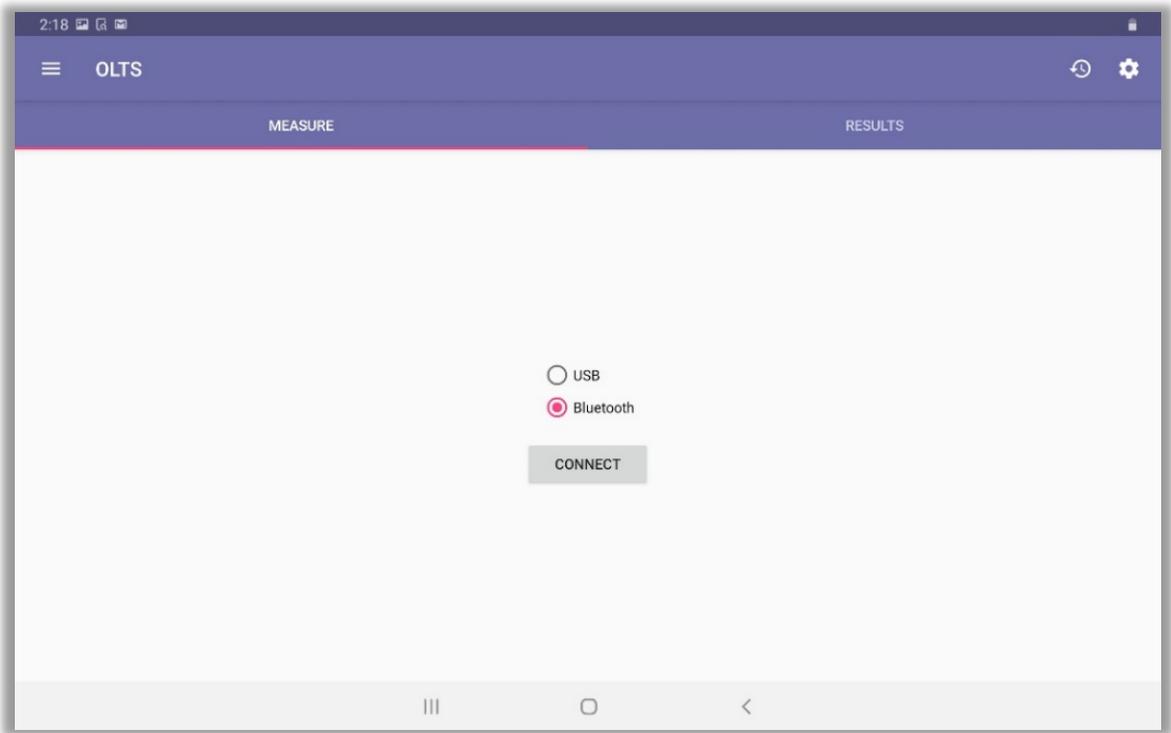
VeEX Apps Home Page

Use the FMOLTS Android application to transfer test results from FX-4x and FX-8x series OPMs via Bluetooth or USB connection (using VeEX compatible OTG cable).

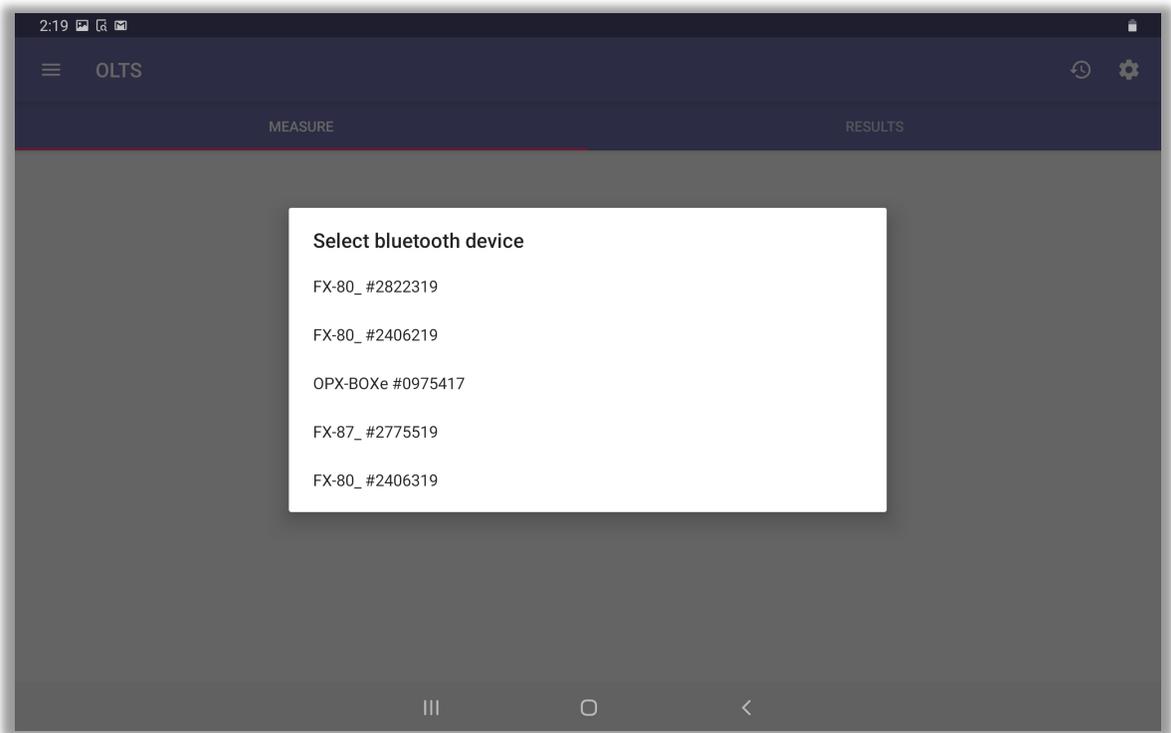
The screenshots below show the procedure to transfer results from FX80/FX81 to the Android mobile device to be saved to mobile device’s storage and/or uploaded to Fiberizer Cloud.



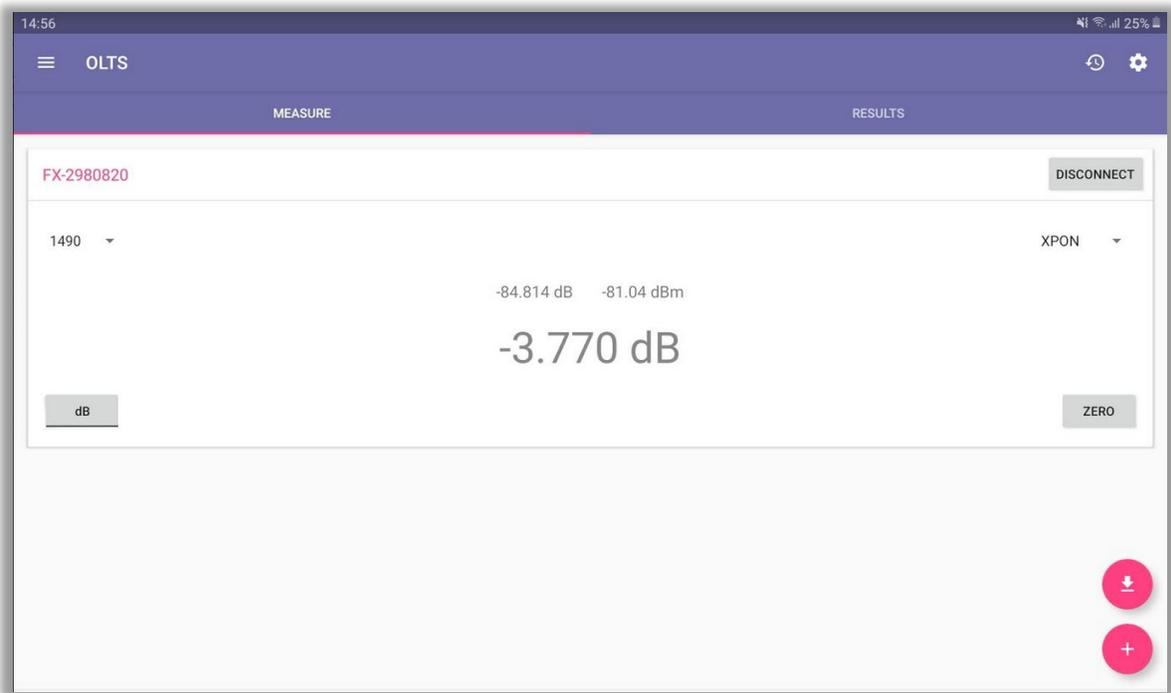
Android OS Settings -> Bluetooth Pairing



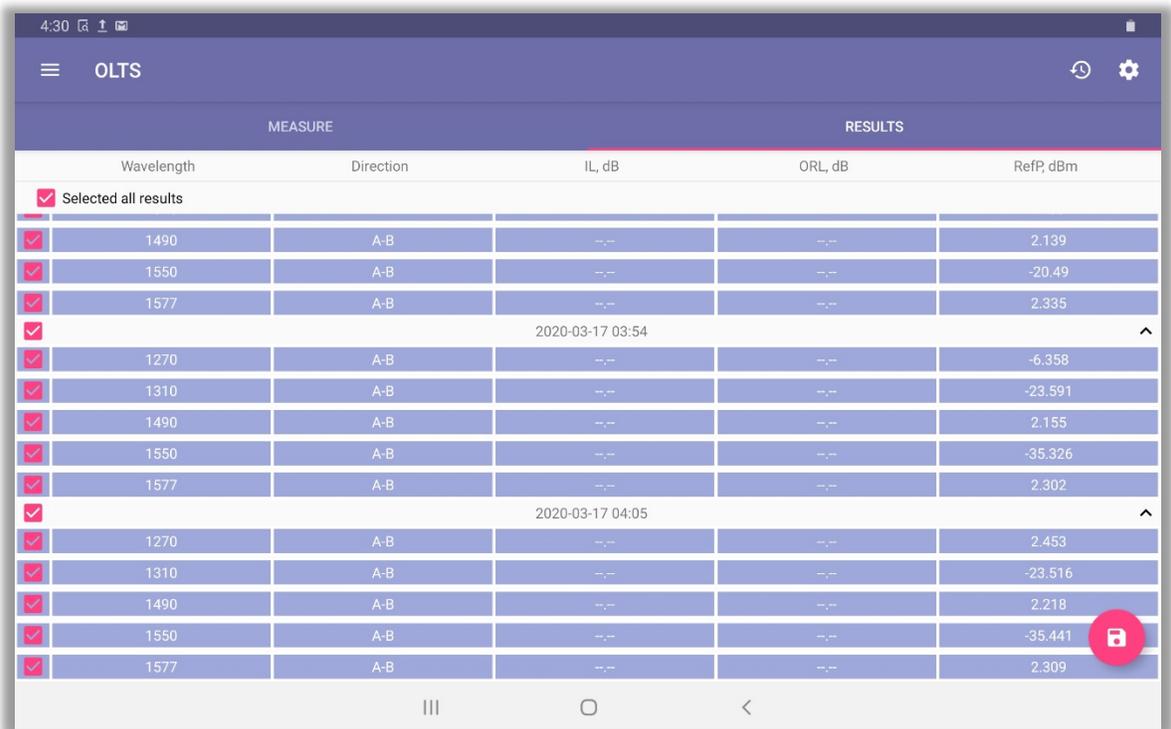
Bluetooth device connection menu



Bluetooth device pairing selection in app



Test result shown on the main screen



Downloaded FX81 results

For more information, see the *FMOLTS User Manual*.

10.0 Certifications and Declarations



Declaration of Conformity

What is CE?

The CE marking is a mandatory European marking for certain product groups to indicate conformity with the essential health and safety requirements set out in European Directives. To permit the use of a CE mark on a product, proof that the item meets the relevant requirements must be documented.

Use of this logo implies that the unit conforms to requirements of European Union and European Free Trade Association (EFTA). EN61010-1

For a copy of the CE Declaration of Conformity relating to VeEX products, please contact VeEX customer service.



ROHS Statement

RoHS Compliance

VeEX QUALITY AND ENVIRONMENTAL POLICY

Our quality and environmental policy is to limit and progressively eliminate the use of hazardous substances and chemicals in the design and manufacture of our products.

VeEX products are classified as Monitoring and Control Instruments under Article 2, Section (1), Category 9 of the WEEE 2002/96/EC Directive.

RoHS and WEEE Position Statement

The Council of the European Union and the European Parliament adopted Directive 2002/95/EC (January 27, 2003), to Reduce the use of certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment, and Directive 2002/96/EC on Waste Electrical and Electronics Equipment(WEEE), with the purpose of reducing the environmental impact of waste electrical and electronic equipment. Both were later recast by Directives 2011/65/EU and 2012/19/EU respectively. All VeEX products being placed on the EU market conform with these directives.

Additional RoHS substance restrictions for the Monitoring and Control Instruments were adopted by EU Directive 2015/863 (March 31, 2015). These new restrictions will take effect from July 22, 2021. VeEX has established a program to ensure that from July 22, 2021, all its products to be sold and shipped into the EU market will conform with (EU) 2015/863.

VeEX Inc. is committed to comply with RoHS and WEEE Directives to minimize the environmental impact of our products.

For more information about RoHS as it relates to VeEX Inc, go to the VeEX web site at www.veexinc.com/ROHS.

11.0 About VeEX

VeEX Inc., a customer-oriented communications test and measurement company, develops innovative test and monitoring solutions for next generation telecommunication networks and services. With a blend of advanced technologies and vast technical expertise, VeEX products address all stages of network deployment, maintenance, field service turn-up, and integrate service verification features across copper, fiber optics, CATV/DOCSIS, mobile 4G/5G backhaul and fronthaul, next generation transport network, Fibre Channel, carrier & metro Ethernet technologies, WLAN and synchronization.

Visit us online at www.veexinc.com for the latest updates and additional documentation.

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