VIAVI



Cable and Antenna Testing Fiber (OTDR) Testing OneAdvisor 800

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1. Cable and Antenna Testing

1.1 Scope

This document describes how to configure the OneAdvisor 800 for cable and antenna testing, including:

- Reflection tests: Return loss and VSWR
- Distance to Fault
- Cable Loss

The required products and parts to complete this procedure are as follows:

Description	Diagram
 OneAdvisor with the following functions: ONA-800 mainframe equipped with the following module: CA006MA: Cable and antenna analysis 6GHz 	
 OSL calibration Kit either Electronic (Manual or EZcal) JD78050509: Manual OSL calibration kit Type-N(m) JD70050509: EZcal, electronic OSL calibration kit Type-N(m) 	OSL Manual OSL EZcal
RF Cables - G700050531: RF Cable DC to 8 GHz Type-N M to Type- N (F) 1.5 m	RF Cable

1.2 OneAdvisor Overview

The OneAdvisor is a portable instrument for Cell Site installation and maintenance, the main test functions of OneAdvisor for cell site installation include:

- Cable and antenna analysis up to 6GHz
- Fiber Inspection verification
- Fiber validation (OTDR)

1.3 Cable and Antenna Analysis

The following procedure describes the steps to perform cable and antenna analysis with OneAdvisor.

1.3.1 Initial Setup

The following procedure describes the initial setup of cable and antenna analysis, including turn-up and connectivity.



		Description
1	Power ON OneAdvisor	Press and hold the ON/OFF button for 3 seconds to power on the OneAdvisor
2	Connectivity: connect the RF cable (cable under test or extension cable) into the CAA Module Reflection / RF Output port.	
3	Cable and Antenna Analysis mode: - Select {Home}, {Tests}, {CAA}, {CAA} - To select a measurement type, select the multi-grid icon - Choose either single or dual testing selecting the corresponding layout: - Single - Horizontal - Vertical - Select the desired measurement type: - Reflection VSWR - Reflection Return Loss - DTF VSWR - DTF Return Loss - 1 Port Cable Loss	



Step	Action		Descrip	tion							
	0	RF Source									
	0	Smith Chart									
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							Ve	ertical			
					Me	easuren	nent Typ	es Layo	ut		
			n Home	🔁 CAA 🏾 🌞 Fib	er Optics 🔏 Micr	roscope			[<mark>。</mark> •) 今 🔽 🚥	11:14 PM 03/18/2920
			Mode		Reflection \	VSWR	Test 1	DTF VSWR			
			Single	Horizonta	Lett I Vertical	🖍 Test 1	· ·	Right		×	==- _
			Left				Right				8
				~	~			\sim	~	See a second	
				VSWR	Reflection Return Loss	DTF VSWR		VSWR	Reflection Return Loss	DTF VSWR	÷
				R.W.	~	NN		Ren .	~	111	ŵ
				DTF Return Loss	1 Port Cable Loss	1 Port Phase		DTF Return Loss	1 Port Cable Loss	1 Port Phase	M
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				C	able and	d Anter	nna Mea	sureme	nt Types	S	

1.3.2 RF Reflection Test

The following procedure describes the steps to perform reflection tests (Return Loss or VSWR) with OneAdvisor.

Step	Action	Description
1	Reflection measurement mode:-Select the desired measurement layoutSelect the corresponding reflection measurement icon (Return Loss or VSWR).Note: Refer to the "Initial Setup" section for initial configuration and connectivity with OneAdvisor	Reflection VSWR Or Reflection Return Loss
		Reflection Test Measurement Types



Step	Action	Description
2	 Set the frequency band or range to perform reflection test: Select the frequency group of the top-bar navigation or the configuration icon from the side-bar navigation Set the required frequency range by selecting, the desired field, enter the frequency value and select {Apply} Note: Frequency is set by either {Start Frequency} and {Stop Frequency} or by {Center Frequency} and {Span Frequency} 	Center Freq 3006.25 MHz Span 5987.50 MHz Band Custom Band Top bar frequency group Side-bar configuration icon Start Frequency 12.50 MHz Stop Frequency 12.50 MHz Span Frequency 10.56 KHz Span Frequency 10.56 KHz Band Litt 0.500 MHz Band Litt Start Band Litt Start Brequency Start Brequency Band Litt Start Band Litt Band Litt Start Band Litt Band Litt Start Brequency Band Litt
3	 Calibrate the instrument: Select {Cal} icon from the side-bar navigation and follow the on-screen instructions. Note: If an RF extension cable is required, connect the RF extension cable into the CAA Module Reflection / RF Output port and on the other end of the RF extension cable connect the calibration kit. 	



Step	Action	Description
4	 Perform the reflection test: Connect the cable or cable and antenna system to be tested at the calibration point (CAA module RF port, or RF extension cable). 	Device Under Test (Cable or Cable and Antenna)
5	 Enable a PASS/FAIL indicator by setting a limit line: Select the configuration icon from the side-bar navigation Select the configuration title (the default is "Frequency") Select {Limit} Select {Pass/Fail} to turn it ON Select {Limit Line} Set the limit line value from the bottom-bar navigation (e.g20) Select {Limit Line} to turn it ON 	Frequency Limit Pass/Fail Pass/Fail Conordf Limit Line Limit Line Limit Line Limit Line Limit Value -20.00 dB
		Image: Wind in the second s



1.3.3 RF Distance to Fault (DTF)

The following procedure describes the steps to perform distance to fault tests (Return Loss or VSWR) with OneAdvisor.

Step	Action	Description
2 2	Action DTF measurement mode: - Select the desired measurement layout. - Select the corresponding DTF measurement icon (RTF in Return Loss or DTF in VSWR). Note: Refer to the "Initial Setup" and "RF Reflection Test" sections for initial configuration, connectivity and reflection test. Configure the DTF measurement: - Select the configuration icon and select {General} - Set the desired Data Points, Interference Rejection, Windowing, Units, and Bias.	Description
		General Cable and Antenna Settings
3	Configure the DTF distance measurement: - Select the measurement title {General} - Select {Distance} - Set the desired Start Distance, and Stop Distance.	



		 ✓ General → Distance 	Distance Start Distance 0.00 ft
			Stop Distance 36.08 ft
			Maximum Distance 1500.00 ft
			Suggested Span 3046.75 MHz
			Display Resolution 1.884 ft
		Distance Setting	g
4	Configure the cable type: - Select the measurement title	Cable Definition	Cable Definition
	{Distance}Select {Cable Definition}Select the cable from the		Propagation Velocity 0.880
	instruments data-base {Cable Name} or enter the		Cable Loss @ 1GHz 0.0220 dB/ft
	corresponding propagation velocity and cable loss at		Cable Name HFC-12D (1/2')
		Cable Type Settin	ng
5	 Enable a PASS/FAIL indicator by setting a limit line: Select the configuration icon from the side-bar navigation Select the configuration title (the default is "General") Select {Limit} Select {Pass (Fail) to turn it 	Pass/Fail On Off	Limit Line
	 Select {Pass/Pail} to turn it ON Select {Limit Line} Set the limit line value from the bottom-bar navigation (e.g20) Select {Limit Line} to turn it ON 	Limit Line On Off	Limit Value -20.00 dB



Step	Action	Description	
		A Home 2 CAA 😽 Fiber Optics	8:58 PM
		Test 1	+
		Mode DTF Return Loss	
		II W T4 Start 0.00 ft Center Freq 859.00 MHz Cable 310801 Data Points 100	S
		T2 T5 Stop 60,00 ft Span 70,00 MHz Velocity 0.821 Interference rejection OI T3 T6 Band Custom Band Loss (1 GHz) 0.0351 dB/ft Bias Voltage OI	
		0.00 Scale Unit: dB Sweep: 0.46 s Alt DTF Band: Off M1	- 8
			-
		-12.00	_
		-20.00	- T
			ŵ
		-36.00	M
			÷-
		-45.00	ø
		0ft 30.00 ft 60.00 ft	
		Limit Line Limit Value Warning Line Warning Value	×
		-20.00 dB On Off 1.00 dB	0
		DTF test with PASS/FAIL indicator	

1.3.4 RF Cable Loss

The following procedure describes the steps to perform cable loss tests with OneAdvisor.

Step	Action	Description
1	 Cable Loss measurement mode: Select the desired measurement layout. Select the {Cable Loss} icon. Note: Refer to the "Initial Setup" section for initial configuration and connectivity.	1 Port Cable Loss Cable Loss Measurement
2	 Set the frequency band or range to perform reflection test: Select the frequency group of the top-bar navigation or the configuration icon from the side-bar navigation Set the required frequency range by selecting, the desired field, enter the frequency value and select {Apply} Note: Frequency is set by either {Start Frequency} and {Stop Frequency} or by {Center Frequency} and {Span Frequency} 	Center Freq 3006.25 MHz Span 5987.50 MHz Band Custom Band Top bar frequency group Side-bar configuration icon



Step	Action	Description
		Frequency Start Frequency 12.50 MHz Stop Frequency 6000.00 MHz Center Frequency 3006.25 MHz Span Frequency 5987.50 MHz Full Span Band List Custom Band Setting Frequency Range
3	Calibrate the instrument: - Select {Cal} icon from the side-bar navigation and follow the on-screen instructions. Note: If an RF extension cable is required, connect the RF extension cable into the CAA Module Reflection / RF Output port and on the other end of the RF extension cable connect the calibration kit.	<image/>
5	 Enable a PASS/FAIL indicator by setting a limit line: Select the configuration icon from the side-bar navigation Select the configuration title (the default is "Frequency") Select {Limit} Select {Pass/Fail} to turn it ON Select {Limit Line} 	Frequency Limit Pass/Fail On Off Limit Line Reflection Loss with PASS/FAIL indicator



Step	Action	Description	
	- Set the limit line value from	A Home 2 CAA 👻 Fiber Optics	•) 🗠 🛜 🚾 9:36 PM
	the bottom-bar navigation	Test 1 Test 1 G Cal ON (1) Cal ON (1)	
	(e.g5)	II W T4 Center Freq 859.00 MHz Data Points 1001 Top 0.00 dB T2 T5 Span 70.00 MHz Interference Rejection Off Bottom -2.00 dB T3 T6 Band Custam Band Number Shallow Off Bottom -2.00 dB	
1	Select {Linit Line} to turn it ON	0.00 Scale Unit: dB Trace Avg: -0.42 Sweep: 0.46 s	M1:-
		FATI	O
		-0.40	÷
		-0.80	Ŵ
		120	M
			÷-
l		-1.60	٥
l		-2.00 824.00 MHz 859.00 MHz	894.00 MHz Cal
		Limit Line Limit Value Warning Line Warning Value On Off -1.00 dB On Off 1.00 dB	×
		Cable Loss test with PASS/FAIL indicator	



2. Fiber (OTDR) Testing

2.1 Scope

This document explains how to connect to a fiber under test, configure Fiber to the Antenna (FTTA) OTDR test setups, run tests, and analyze results with a VIAVI OneAdvisor 800 equipped with an OTDR module (4100 series).

The required products and parts to complete this procedure are as follows:

Description	Diagram			
 OneAdvisor 800 with the following functions: ONA-800 mainframe equipped with the following module: OTDR module (E4100 series) EFTTASLM: Fiber to the Antenna and SmartLink Mapper. 	ONA Front View.			
 Fiber inspection tool, which can be one of the following: FBP-SD101: Digital Probe P5000I FIT-FC-KIT3: FiberCheck Autofocus WiFi Microscope 	Scope P5000I FiberCheck			
 Fiber Accessories: EPCSM10M-LC-LC: Fiber optic patch cable Optical Coupler to connect Launch Cable to BBU Jumper Cable or Trunk Cable 	Fiber Patch Panel Couplers			

The following information is required to complete the procedure:

- Type of Fiber (Multimode or Single Mode)
- Type of Connectors (SC UPC, SC APC, LC UPC, etc.)
- o Tower architecture:
 - Is there a BBU jumper cable?
 - Is there an RRU jumper cable?
- o RRU and BBU/Base Station IDs
- Fiber Code (1-Rx, 1-Tx, ..., 24-Tx)



2.2 Fiber Inspection Guidelines

- All fiber end-faces must be clean and pass an inspection test prior to connection.
- Use the VIAVI P5000i or FiberChek Probe microscope to inspect both sides of every connection being used (SFP Port, bulkhead connectors, patch cables, etc.)



2.3 Fiber Testing

All fibers and connectors should PASS the fiber inspection guidelines prior to connection. The OTDR may be connected to the fiber under test as follows:



Tower Architecture with BBU Jumper



Tower Architecture without BBU Jumper



Step	Action	Description
1	Power ON OneAdvisor	Press and hold the ON/OFF button for 3 seconds to power on the OneAdvisor 800.
		Power Button
2	Fiber Inspection:	
	the OneAdvisor 800 via USB.	
	- Select the Microscope icon:	USB Port
	Connect the Fiber Scope to the bulkhead and patch cord connector to inspect.	
	 Select the test icon: Test 	OneAdvisor 800 with Fiber Scope
	Clean bulkhead or patch cord as needed until the test results PASS.	
	Inspect and Clean the following:	Bulkhead Inspection Patch Cord Inspection
	 If the interface to the FUT is the BBU Jumper or Trunk Cable, connect the cable to an optical coupler with the same connector type. Inspect and clean the FUT connected to the coupler or Optical Patch Panel (OPP). Connectors of the Launch Cable. Connect the Launch Cable to the OTDR port. Connect the Launch Cable to 	Profile CAL Fiber Optics Microscope Mic
	the RRU.	Fiber Inspection Test



Step	Action	Description
3	Connectivity: connect the Fiber cable into the OTDR's port	Fiber Under Test (OTDR Module) OTDR Port
4	Fiber to the Antenna measurement mode: - Select {Home}, {Tests}, {Fiber 1 (41xxxx)}, {FTTA OTDR} Note: The 41xxxxx number will show the OTDR module number	Fiber 1 (41xxxxx) > ((A)) FTTA OTDR Measurement Mode
		Image: Section Att. dB Section Att. dB Section Km T. Loss dB FTTA Measurement Screen



Step	Action	Description
5	 To open a measurement setup: Navigate to the ONA- 800/disk/config/FTTA folder Testing setup options: For testing an RRU at the far end select {File}, {FTTA_RRU_Maintenance- OTDR , {Load} For testing to a loopback at the far end select {FTTA_RRU_ConstrLoop.SM- OTDR}, {Load} 	File FTTA_RRU_Maintenance.SM-OTDR Load Fiber Measurement Types (RRU far end or Loopback) $ \begin{bmatrix} Load as \\ FTTA \\ Config. \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$
	 Configure Analysis settings as follows: Set BBU Jumper to Yes if there is a BBU Jumper Cable between the Launch Cable and OVP Set BBU Jumper to No if the Launch Cable is directly connected to the OVP. Set RRU Jumper to Yes if there is a Junction Box/OVP at the top of the tower between the Trunk Cable and RRU Set RRU Jumper to No if there is no Junction Box or no RRU Jumper. 	BBU Jumper Yes RRU Jumper Yes Mode Maintenance Loopback Cable No Launch Cable End Event 1 Receive Cable Start No
	 Configure Link Description settings as follows: Set Base Station ID to the Base Station or BBU Identifier. Set RRU ID to the RRU Identifier or sector (Alpha, Beta, Gamma). Set Fiber Code to the fiber number and polarity using the up and down arrows. Set Change Fiber Nbr to Increment. Set Distance Unit to feet or meter. 	



Step	Action	Description				
6	Run the test and select SmartLink,	START				
	Trace or Table.	SmartLink Trace Table				
	SmartLink view:					
	Displays as a series of icons	Run Test in either SmartLink, Trace, or Table				
	representing events (end-of-fiber,					
	launch cable, connector, etc.).	A Home Zeal PowerMeter A RadioAnalysis CAA 😽 Fiber Optics				
	Swipe to display more events.	SmartLink Trace Table				
	- The center of the display shows	Real Time				
	wavelength Acquisitions for					
	which all events are acceptable					
	are marked with a green check.	BBU BOT TWR TOP TWR				
	- Tap on any icon to display event	Laser (nm) Distance (ft) Loss (dB) Reflectance (dB)				
	type and pass/fail status and to	1310 65.45 0.119 -51.99				
	label each icon according to	1550 65.95 0.153 -53.02 Report				
	your tower architecture.					
	 In the lower display: 					
	• BBU: Connection (coupler)	Connector				
	between launch cable and	o 🖼 FTTA-SM				
	BBU Jumper Cable.	SmartLink View				
	BOT TWR: Optical Patch Banel at bottom of tower					
	\sim TOP TWB: lunction	🕅 ND MAA B (p Kalal Indument Renote Capity) - VNC Verser Image: A Market Capity - V				
	Box/Patch Panel at Top of	SmartLink Trace Table Event line O Info				
	tower	Station_ID				
	 RRU: End of RRU Jumper 	1 2 A: 20.1 m - 1.29 dB A-B: 20.1 m 0.609 dB Food Time 8: 0 m - 0.681 dB 30.27 dB km S S S				
	Cable	Setup				
	Trace view:					
	Results for each wavelength are					
	shown in different colors in the top	-5- 0 P Fast P 25 50 75 100 P Fast Report				
	section of the display.	Nb Evts : 4 Link Ort : 49.50 dB				
	Each event is listed in the lower	Event Ustance m Loss db Hellect. db Section Att. db Section m 1. Loss db 1 , col 0.00 0.401 -56.71 0.004 19.94				
	that violate pass/fail thresholds for	2 4 95.41 0.088 -56.50 -0.034 75.31 0.573 4 mm 115.25 m -14.50 0.004 19.94 0.666 677				
	loss or reflectance are shown in	o 🔜 FITA-SM				
	RED.	Trace View				
	Tap the icon following icon to Auto-					
	zoom the trace.					
	A					
	-					
	Tap 1 or 2 at the top of the display					
	to toggle between results for the					
	two wavelengths.					
	÷					



Step	Action	Description					
		🕈 🔒 Home 🛛 🔁 CAA 🏾 😽 Fiber Optics				📙 🜒 🛹	7:44 PM 02/25/2021
	Table View:	SmartLink Trace Table			Eve	nt line Olifo	START
	Each event on the FUT is displayed	All Failed			1310nm	1550nm	
	in tabular format.	Event Distance (m)	1 0	Loss (dB) Reflectance (dB)	0.492 -56.21	0.401 -56.71	Real Time
		Event Distance (m)	2 20.1	Loss (dB) Reflectance (dB)	0.207 -54.66	0.201 -55.36	Setup
		Event Distance (m)	3 95.41	Loss (dB) Reflectance (dB)	0.107 -56.2	0.088 -56.5	File
		DIFP Event Distance (m)	4 115.35	Loss (dB) Reflectance (dB)	-18.28	-14.5	-
			-	Table View			



3. Save Measurement Results

The following procedure describes the steps to save measurement results with OneAdvisor





4. Technical Support

Technical support is provided by:

- Phone: 1-844-GO-VIAVI (1-844-468-4284) options 3-2-3
- Email: <u>diagnostics.tac@viavisolutions.com</u>

Regularly new firmware updates for the CellAdvisor 5G are released and it is recommended to keep the instrument in the latest firmware to provide all the enhancements and bug fixes.

- For firmware updates go to: <u>http://celladvisor.updatemyunit.net/</u>
- For additional information of cell site test go to: <u>http://www.viavisolutions.com/en/products/network-test-and-certification/cell-site-test</u>