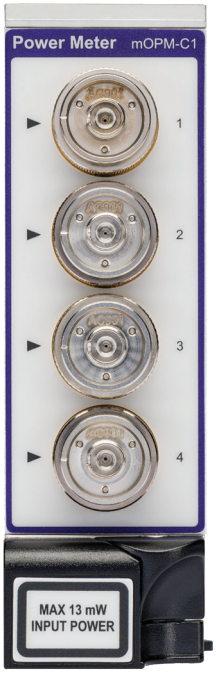
Data Sheet

VIAVI

Optical Power Meter(mOPM-C1)

MAP Series InGaAs Optical Power meter

The Multiple Application Platform (MAP) Optical Power Meter module (mOPM-C1) is a third-generation power meter that brings a range of panel-mount and remote-head configurations to the VIAVI Solutions MAP series.



The MAP Optical Power Meter (mOPM-C1) module extends the optical power measurement capability of the MAP series by offering four grades of optical performance in panel-mount or remote-head configurations with 1, 2, or 4 inputs per module. Designed with 4 unique performance ranges, versions are available for all applications. Models with 110dBm dynamic range are complimented by versions that support 26dBm input power.

The mOPM can be used for numerous applications such as measuring DUT settling time, cross talk, rise and fall times. It can also be used to measure synchronization and insertion loss stability. Also, allows for performance comparison (for example, comparing sequential switching to random switching).

Functional Description

All four performance grades are based on indium gallium arsenide (InGaAs) detectors and are suitable for applications using single-mode (SM) or multimode (MM) fiber. The response of the detector varies with the wavelength of the incident light. All versions feature high accuracy, high linearity, and extremely low polarization dependent loss (PDL). The high- and ultra-high-performance grades feature enhanced thermal stabilization. This enhances the wavelength range, enabling 90 dB dynamic range for the high-performance grade and 110 dB dynamic range for the ultra-high-performance grade. The high-power grade extends high-power measurement capability to +27 dBm.

Features and Benefits

- Panel-mount or remote-head configuration
- Single-, dual-, or quad-channel configurations available
- 250 kHz sampling rate for high-speed applications
- 750 to 1700 nm operating wavelength range
- 110 dB dynamic range and high-power options
- Compatible with single-mode and multimode fiber
- Ability to store up to 100,000 data points per channel

Applications

- Amplifier characterization
- Receiver and transmitter testing
- Absolute power measurement
- Optical switching time measurement

Compliance

- CE, CSA/UL/IEC61010–1, and LXI Class C requirements (when installed in a MAP chassis)

The mOPM uses detectors with intrinsically low uncertainty due to polarization: < ± 0.01 dB for the Premium-Performance and < ± 0.015 dB for the General-Purpose detector options. This helps maintain high repeatability in power measurements, virtually independent of the launch polarization of the light entering the detector. In general uncertainty due to polarization is less of a concern for high power measurement applications. Due to the filter element employed for the High-Power detector option, this value is < ± 0.07 dB.

An intuitive graphic user interface (GUI) is optimized for use in either a laboratory or a manufacturing environment.

Efficient transition between summary and detailed views (figure 1 and figure 2) allow users to operate at a system level or access the full power of a module.

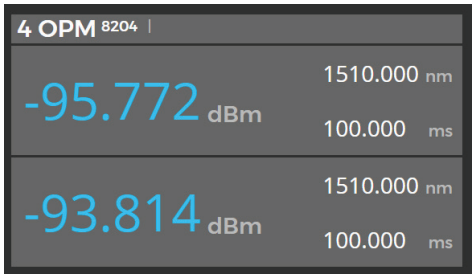


Figure 1 – mOPM MAP-300 summary view GUI

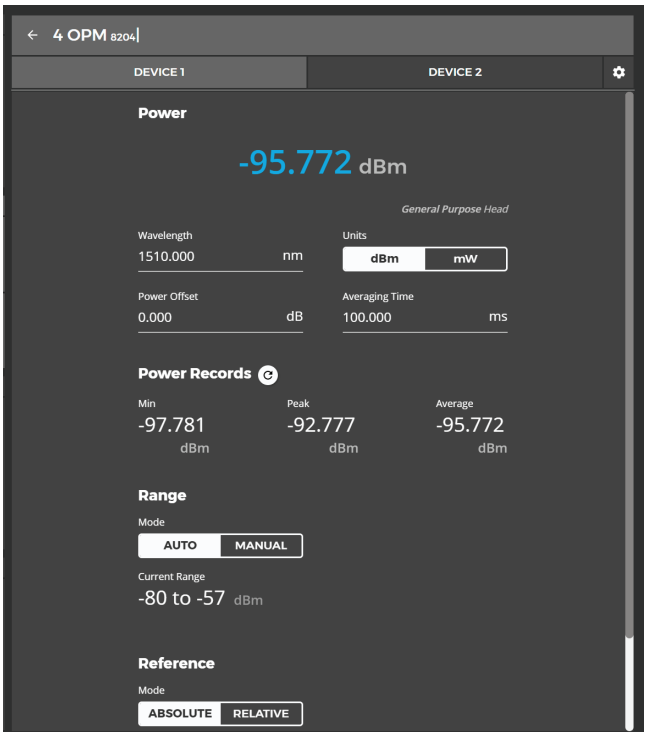


Figure 2 - mOPM MAP-300 detailed view GUI

Options and Configurations

The mOPM-C1 is available in four detector types in 1,2 or 4 detectors per cassette. It is also offered in cassette mounted or remote detector option.

	Options	Description
Detector type	2mm InGaAs General Purpose	· Measures power levels from -70 to +11 dBm over the wavelength range of 800 to 1650 nm. · Features high accuracy, very linear behavior and low relative uncertainty due to polarization.
	3mm InGaAs Premium performance	· Measures power levels from -80 to +11 dBm over the wavelength range of 750 to 1700 nm. · Features high accuracy, very linear behavior and extremely low relative uncertainty due to polarization.
	3mm InGaAs Ultra performance	· Measures power levels from -110 to +11 dBm over the wavelength range of 750 to 1700 nm. · In addition to the features of the Premium Performance detector, the Ultra Performance detector offers excellent stability for long term measurement of extremely low optical power levels. · Only available as a panel mount.
	Filtered 2mm InGaAs High power	· Measures power levels from -45 to +27 dBm over the wavelength range of 800 to 1650 nm. · Features high accuracy as well as very linear behavior.
	Integrated remote heads	· Measures absolute power · +33dB input power · 80dB dynamic range · Larger input aperture · Premium performance and PCT version
Flexible Detector Configuration	Cassette-mounted	· Detectors mounted directly on the cassette faceplate. · Configuration, the density available is 1, 2 or 4 detectors per single width cassette. · Must configure with identical detector type.
	Remote detector	· With electrical connectors to which remote detector heads can be attached. · Configuration, the density available is 1, 2 or 4 detectors per single width cassette. · Flexibility with remote heads to mix detector types.

The interface module is compatible with all performance grades of remote heads and can accommodate a mix of performance grades. For example, an application requiring a general-purpose optical power measurement (OPM) and a high-power OPM could be connected to the same remote head base module, thereby reducing the number of slots used in the MAP chassis.

Integrated Remote Heads

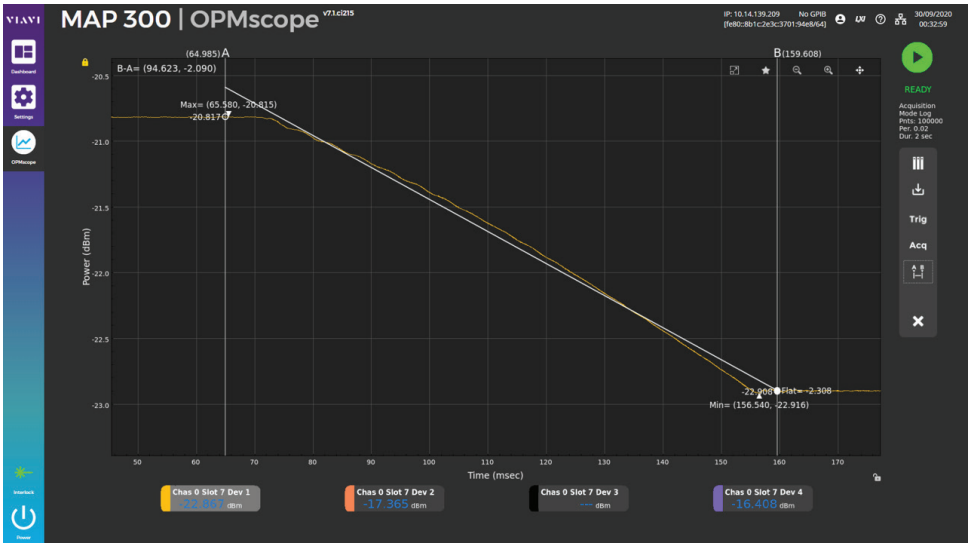
The VIAVI integrated remote heads feature a Teflon-based integrating sphere to minimize polarization-dependent loss and access high power. Available as a premium-performance variant and a variant specifically designed for use with MAP-PCT systems, integrated remote heads provide 90° launch and ideal spherical geometry for maximum repeatability. The integrated remote heads can measure high powers of >20dBm and 80dB dynamic range that can be used for amplifier and/or pump laser testing. They also provide a larger input aperture that is ideal for high port MPO connectors or duplex connectors. They are Measure IL for high port count MPO connectors with < 0.01dB positional variations.

Figure 3 - Integrated Remote Head OPM in MAP-330

Super Application: OPMscope

The OPMscope is a super application designed for use with the mOPM-C1 line of power meters on the MAP-200 and 300 platforms. This software feature is an intuitive tool geared for designers and allows graphical representation of optical signals, much like a digital sampling scope, but in the optical domain. This tool can be used to trigger on rising or falling edges, with the ability to see history using pre-trigger data points. It lets users pan and zoom to see details and monitor transients and exports up to 100,000 captured data for extended analysis from up to four optical heads simultaneously.

The new MAP-300 platform offers an enhanced OPMscope user experience. It allows the user to gather traces from up to 8 mainframes with a maximum offering of 256 devices, while MAP-200 offers only 4 traces. The MAP-300 super application offers enhanced markers and data export.



Chassis and Modular Family

The VIAVI Multiple Application Platform (MAP) is a modular, rack mountable or benchtop, optical test and measurement platform with chassis' that can host 2, 3 or 8 application modules. The LightDirect family of modules are characterized by their simple control and single function nature. Individually or together they form the foundation of a diverse array of optical test applications. The web enabled multiuser interface is simple and intuitive. LXI compliant with a full suite of SCPI based automation drivers and PC based management tools, the VIAVI MAP is optimized for both the lab to manufacturing environments.

The mOPM is part of the LightDirect module family. Alongside the many other modules, such as light sources, polarization scramblers, variable optical attenuators, and spectrum analyzers, the MAP series is the ideal, modular platform for photonic system and module testing.

The mOPM is compatible with all current MAP-300 and MAP-200 chassis.

LightDirect

Specifications

For more information on this or other products and their availability, please contact your local VIAVI account manager or VIAVI directly at 1-844-GO-VIAVI (1-844-468-4284) or to reach the VIAVI office nearest you, visit viavisolutions.com/contacts.

Parameters	General Purpose	Premium Performance	Ultra Performance	High Power
Detector type	InGaAs	TEC InGaAs	TEC InGaAs	Filtered InGaAs
Detector size	2 mm	3 mm	3 mm	2 mm
Wavelength range	800 – 1650 nm	750 – 1700 nm	750 – 1700 nm	800 – 1630 nm
Fiber type[1]		SMF and MMF with NA 0.27 (maximum core size 62.5 µm)	SMF and MMF with NA 0.27 (maximum core size 62.5 µm)	
Dynamic range	+11 dBm to –70 dBm	+11 dBm to –80 dBm	+11 dBm to –100 dBm	+27 dBm to –45 dBm
Uncertainty at reference conditions[2]	±2.5% (800 – 1510 nm) ±2.4% (1510 – 1600 nm) ±2.7% (1600 – 1635 nm)	±2.2% (800 – 1510 nm) ±2.3% (1510 – 1600 nm) ±2.5% (1600 – 1635 nm)	±2.2% (800 – 1510 nm) ±2.3% (1510 – 1600 nm) ±2.5% (1600 – 1635 nm)	±3.9% (800 – 960 nm) ±3.6% (960 – 1300 nm) ±3.7% (1300 – 1510 nm) ±3.8% (1510 – 1600 nm) ±4.0% (1600 – 1635 nm)
Total uncertainty[3]	±3.2 % ±5 pW (800 – 900 nm) ±5.2 % ±5 pW (900 – 960 nm) ±3.1 % ±5 pW (960 – 1510 nm) ±3.1 % ±5 pW (1510 – 1600 nm) ±3.8 % ±5 pW (1600 – 1635 nm)	±3.0% ±1 pW (800 – 1510 nm) ±3.1% ±1 pW (1510 – 1600 nm) ±3.4% ±1 pW (1600 – 1635 nm)	±3.0% ±0.2 pW (800 – 1510 nm) ±3.1% ±0.2 pW (1510 – 1600 nm) ±3.4% ±0.2 pW (1600 – 1635 nm)	±4.6% ±100 pW (800 – 900 nm) ±7.9% ±100 pW[6] (900 – 960nm) ±3.9% ±100 pW (960 – 1300 nm) ±4.4% ±100 pW (1300 – 1510 nm) ±4.5% ±100 pW (1510 – 1600 nm) ±5.2% ±100 pW (1600 – 1635 nm)
Linearity (at 23 ±5°C)	±0.010 dB ±5 pW	±0.010 dB ±1 pW	±0.010 dB ±0.1 pW	±0.010 dB ±100 pW (for –45 dBm to +10 dBm) ±0.03 dB (for +10 dBm to +27 dBm)
Noise (peak to peak)[4]	2 pW	1 pW	<0.1 pW	50 pW
Return loss	>55 dB type			
Relative uncertainty due to polarization[5]	±0.015 dB	±0.01 dB	±0.01 dB	±0.07 dB
Maximum number of channels (panel mount)	1,2 or 4			
Sampling time	4 µs (250 kHz)			
Averaging time	20 µs to 5 s			
Buffer size	100,000 points			
Supported connectors[7]	FC, ST, LC, E2000, MU, MTP or bare fiber			
Recalibration period	1 year			
Warm-up time	30 min			
Operating temperature	5 to 40°C	5 to 40°C	5 to 33°C	5 to 40°C
Humidity	15 – 80% relative humidity, non-condensing			
Module				
Dimensions (W x H x D)	4.06 x 13.26 x 37.03 cm (1.6 x 5.22 x 14.58 in)			
Weight	1.2 kg (2.65 lb)			
Remote Head				
Cable length	1.4 m (4.5 ft)			
Dimensions	13.8 cm x 5 cm x 5 cm (5.4 in x 2 in x 2 in) excluding cable			
Weight	0.6 kg (1.3 lb)			

[1]For 62.5 µm core fiber, additional uncertainty of 1% (PC) or 2% (APC) must be added due to overfill of 2 mm detector.
[2]Fiber SMF-28, T= 23 ±5°C, spectral width of source <6 nm, optical power on detector = -20 dBm.
[3]SMF 28, N/A of fiber ≤0.27, temperature, humidity, and power range per table.
[4]1 second averaging time, 300 consecutive measurements (300s), T = 23 ±5°C.
[5]All states of polarization, constant power, straight connector, T = 23 ±5°C WL = 1550 nm ±30 nm, MPMHP at WL = 1310 nm.
[6]For 900 – 960 nm only, uncertainty indicated is for 15 – 35°C.
[7]Note that MT connector size prevents the use of adjacent channels. Therefore, a 4-channel cassette only allows 2 MT input at a time.

Specifications continued

Parameters	Premium Performance (mOPM-C1RHIS)	PCT System (mOPM-C1RHIP)
Detector type	InGaAs	
Detector size	3mm	2mm
Wavelength range	750 – 1700 nm	800 – 1650 nm
Fiber type	SMF and MMF with NA 0.33 (maximum core size 2000 µm)	
Dynamic range	+33 dBm to -55 dBm	+3 dBm to -55 dBm
Uncertainty at reference condition[1]	±4.4% (800 – 950 nm)	±4.5% (800 – 950 nm)
	±2.5% (960 – 1635 nm)	±2.9% (960 – 1635 nm)
Total uncertainty[2]	±4.6% ±60 pW (800 – 950 nm) -55dBm to +10dBm	+- 4.9% +- 100 pW (800 0 950 nm)
	±3.7% ±60 pW (960 – 1635 nm) -55dBm to +10dBm	±3.7% ±100 pW (960 – 1635 nm)
	±4.7% (800 – 950 nm) +10dBm to +20dBm	–
	±3.8% (960 – 1635 nm) +10dBm to +20dBm	
	±5.0% (800 – 950 nm) +20dBm to +33dBm	
	±4.0% (960 – 1635 nm) +20dBm to +33dBm	
Total uncertainty Linearity (at 23 ±5°C)	±0.010 dB ±100 pW (–55 dBm to +10dBm)	±0.010 dB ±150 pW (–55 dBm to +3dBm)
	±0.03 dB (+10 dBm to +20 dBm)	
	±0.06dB (+20 dBm to +33 dBm)	
Noise (peak to peak)[3]	60 pW	100 pW
Return loss	>55 dB typical	>55 dB typical
Relative uncertainty due to polarization[4]	≤ ±0.005 dB	≤ ±0.005 dB
Maximum number of channels (Panel mount)	1,2, or 4	1,2, or 4
Recalibration period	>55 dB	>55 dB
Warm-up time	30 minutes	
Operating temperature	5 to 40°C (41 to 104°F)	
Humidity	RH 15-80%, non-condensing	

[1]Fiber SMF-28, T= 23 ±5°C, spectral width of source <6 nm, continuous wave, power level of -20 dBm.
[2]SMF 28, N/A of fiber ≤ 0.27, input at center of sphere, temperature, humidity, and power range per table.
[3]1 second averaging time, 300 consecutive measurements (300s), T = 23 ±5°C.
[4]All states of polarization, constant power, straight connector, T = 23 ±5°C, WL = 1550 nm ±30 nm.

Ordering Information

Description	Part Number
Panel-Mount Sensor Option	
Single channel	MOPM-C1PMH1-MPMxxxx
Dual channel	MOPM-C1PMH2-MPMxxxx
Quad channel	MOPM-C1PMH4-MPMxxxx
Remote Head Base Cassette	
Single channel remote interface cassette	MOPM-C1RH1
Dual channel remote interface cassette	MOPM-C1RH2
Quad channel remote interface cassette	MOPM-C1RH4
Remote Head Option	
2mm InGaAs general purpose head cassette	MOPM-C1RHGP
2mm InGaAs high power remote head	MOPM-C1RHHP
2mm InGaAs PCT system remote head	MOPM-C1RHPCT
3mm InGaAs Premium purpose remote head	MOPM-C1RHPP
Integrated Remote Head Options	
Integrated premium performance remote head	MOPM-C1RHIS
Integrated PCT system remote head	MOPM-C1RHIP
Applications	
Optical scope licensed super application for MOPM-B1 and mOPM-C1 power meters	MSUP-OPMSCOPE
Optical scope licensed super application for mOPM-C1 cassettes	MSUP-300A-OPMSCOPE

Sample Configurations for Panel Mount

Type of Detector	Single Channel	Dual Channel	Quad Channel
General Purpose	MOPM-C1PMH1-MPMGP	MOPM-C1PMH2-MPMGP	MOPM-C1PMH4-MPMGP
High Power	MOPM-C1PMH1-MPMHP	MOPM-C1PMH2-MPMHP	MOPM-C1PMH4-MPMHP
Premium Performance	MOPM-C1PMH1-MPMPP	MOPM-C1PMH2-MPMPP	MOPM-C1PMH4-MPMPP
Ultra Performance	MOPM-C1PMH1-MPMUP	MOPM-C1PMH2-MPMUP	MOPM-C1PMH4-MPMUP

Note: All mOPM-C1 come with 1, 2, or 4 SC (AC903), LC (AC918), or FC (AC901) detector adaptors.

Shown: mOPM-C1 module and remote head with module.

Accessories

Accessories (Optional)	Product and description	
Inspection and cleaning tool	CleanBlastPRO	The patented VIAVI Solutions® CleanBlastPRO fiber end-face cleaning system provides a fast, effective, and cost-efficient solution for removing dirt and debris from connectors in most common applications.
	FiberChek probe microscope	One-button FiberChek Probe delivers a reliable, fully autonomous, handheld inspection solution for every fiber technician.
	P5000i fiber microscope	Automated Fiber Inspection and Analysis Probe provides PASS/FAIL capability to PC, laptops, mobile devices and VIAVI test solutions.
Detector adaptor	A complete range of single ferrule, duplex, and bare fiber power meter adaptor are available at VIAVI. Refer to the AC adaptor selection guide for more information.	

A wider range of inspection tools are available at VIAVI. More information about the products and accessories can be accessed through our website at www.viavisolutions.com. For further assistance please contact your local VIAVI account manager or VIAVI directly at 1-844-GO-VIAVI (1-844-468-4284) or to reach the VIAVI office nearest you, visit viavisolutions.com/contacts.

Power Meter Adaptors

VIAVI Solutions

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