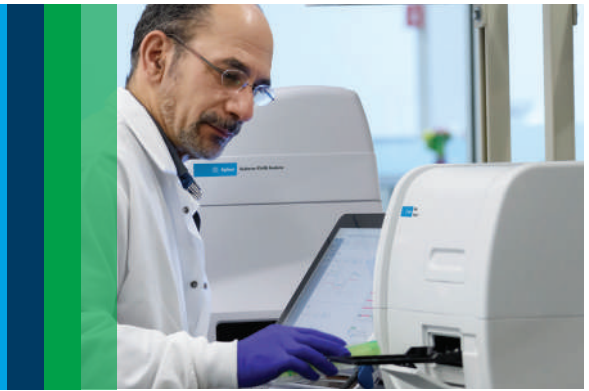


# Agilent BioTek Cytation 5 Cell Imaging Multimode Reader

Powerful imaging and microscopy, and advanced multimode detection



# Agilent BioTek Cytation 5 Cell Imaging Multimode Reader

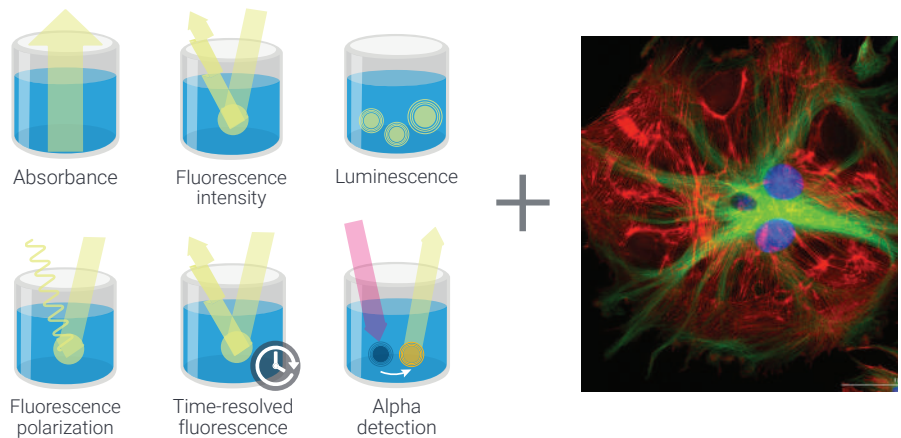


The Agilent BioTek Cytation 5 cell imaging multimode reader combines automated, digital microscopy and conventional microplate detection in a configurable, upgradable platform. This proprietary design, along with Agilent BioTek Gen5 microplate reader and imager software, enables automated workflows across a vast range of biochemical and imaging applications.



Cytation 5 shown with CO<sub>2</sub>/O<sub>2</sub> gas controller and dual-reagent injector.

## Multimode plate reader with sophisticated imaging



Cytation 5 extends the legacy of the Agilent BioTek multimode plate readers with a modular and upgradable imaging mode. Imaging opens up a range of applications for cell-based assays that cannot be performed on a standard plate reader. Information on cell morphology, localization of signal, cell count, and more is obtained using the Cytation 5 imaging mode.

**Plate reading:** absorbance, fluorescence; luminescence; advanced reading modes.

**Imaging:** fluorescence; phase contrast; high-contrast brightfield; brightfield; color brightfield.

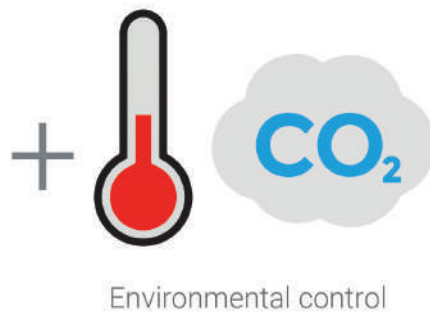
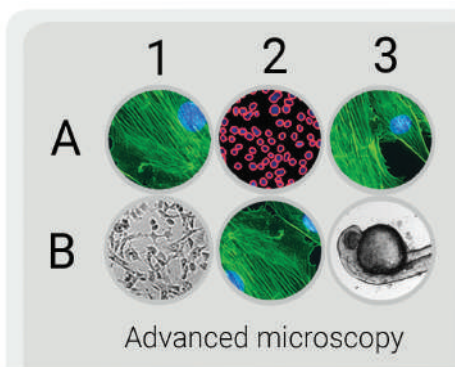
*"The combination of luminescence fluorescence and imaging covers a wide variety of assays from one instrument. It is robust and can accommodate numerous fluorescent wavelengths using LED cubes, has a wide range of objectives, and the software is easy to use."*

– **Laura McMullan,**  
CDC

- 3D cell culture
- Nucleic acid quantification
- Live cell imaging
- Biochemical assays
- Label-free cell counting
- Histology
- Calcium flux
- Apoptosis and necrosis
- Cell migration and invasion
- Cell proliferation
- Cell viability and toxicity
- Confluence
- Phenotypic assays
- Stem cell differentiation
- Transfection efficiency
- Whole-organism imaging
- Normalization
- Phagocytosis
- Signal transduction
- Translocation
- Fast kinetics
- Genotoxicity
- Immunofluorescence
- Microbiology

### Ready for any assay

With its combination of hybrid plate reading and advanced microscopy mode, Cytation 5 is truly ready for any assay. Contact us to learn how Cytation 5 can transform your lab and greatly increase your productivity.



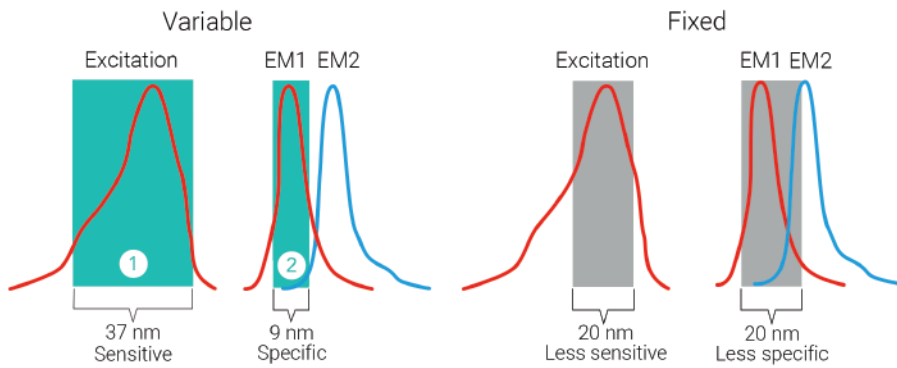
### Advanced microscopy—unlimited possibilities

Cytation 5 automates many traditionally manual microscopy tasks, from slide scanning to time-lapse live cell assays; from low to high magnification. Cytation 5 is ready for any imaging assay.

**Flexible hardware:** Six-objective turret, 1.25x to 60x, 20+ colors available, wide field of view (WFOV) camera.

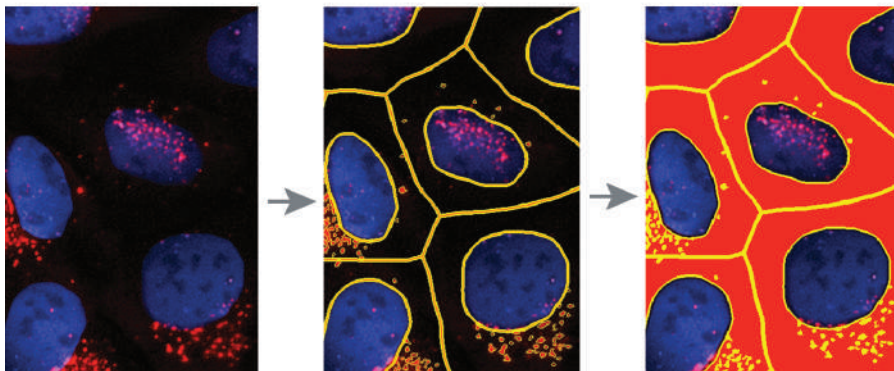
**Full automation:** Automated stage, autofocus, automated turret.

**Live cell imaging:** Temperature and gas (CO<sub>2</sub> and O<sub>2</sub>) control for time-lapse live cell imaging.



### Variable bandwidth for sensitivity and specificity

Cytation 5 offers quad monochromator optics with variable bandwidths. The excitation and emission bandwidths can be set between 9 and 50 nm in 1 nm increments. Large bandwidths **(1)** provide increased sensitivity and lower limits of detection. Small bandwidths **(2)** provide increased specificity when multiple signals are present, reducing crosstalk and enhancing assay performance.

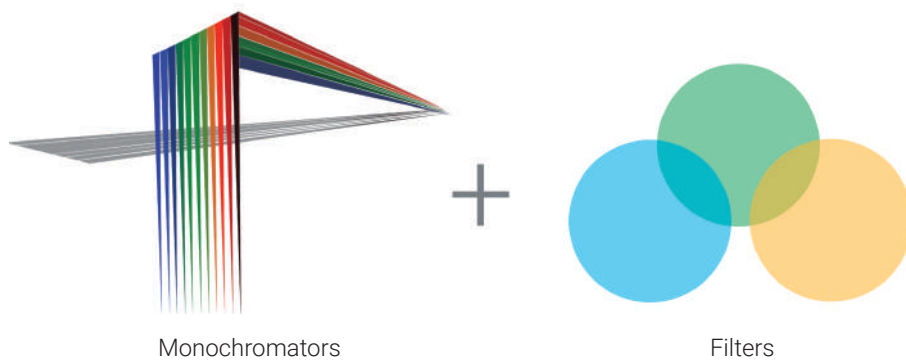


### Powerful image processing and analysis

No need to process and analyze images one by one on a dedicated computer. In Gen5, preprogram your analysis tasks and walk away.

**Image processing:** stitching, Z-projection, deconvolution, digital phase contrast.

**Image analysis:** cell count, confluence, cytoplasm analysis, intracellular analysis, subpopulation analysis, signal translocation, and much more.



### Hybrid plate reader–flexibility and performance

With its unique combination of monochromator and filter optics, Cytation 5 is an advanced plate reader that delivers both the flexibility and performance you need for any microplate assay in your lab.

**Monochromator:** variable bandwidth, absorbance, fluorescence, luminescence.

**Filters:** fluorescence polarization, time-resolved fluorescence, Alpha laser.



### Cytation 5

The Cytation 5, along with Gen5 software, can easily automate and manage a broad range of imaging, microscopy, and multimode detection application workflows.

1	1	2	3	2	1	2	3
A	1989	13885	1157	A			
B	1960	3703	16597	B			
C	13209	3132	1629	C			

### Hit picking—multimode detection and imaging saves time and data storage

- (1) Plate reader quickly identifies GFP-positive wells.
- (2) Only GFP-positive wells are imaged, saving both time and computer memory.



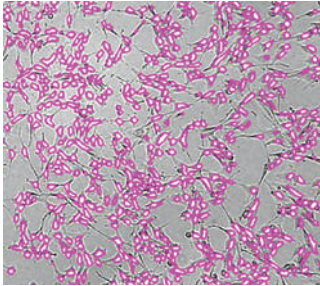
### Microvolume analysis with the Take3 microvolume plate

Enable microvolume analysis with the Cytation 5 using the Agilent BioTek Take3 microvolume plate. Measure up to 16 or 48 samples in one run and save time compared to using single-sample devices. Gen5 microplate reader and imager software has customizable protocols for ssDNA, dsDNA, RNA, and protein quantification in 2 µL.



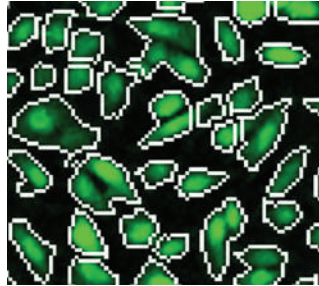
# Applications—imaging

## Label-free cell counting



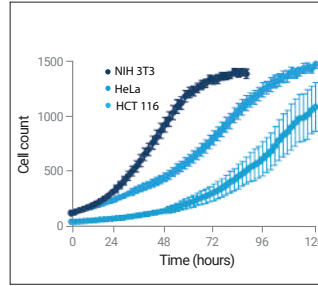
Use high-contrast brightfield imaging for accurate label-free cell counting without the need for cell labeling dyes.

## Calcium kinetics



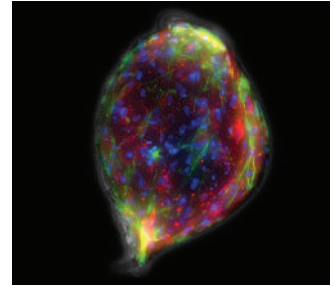
The Cytation 5 dual-reagent injectors enable capture and analysis of fast inject/image assays like calcium kinetics.

## Time-lapse live cell imaging



Cell proliferation studies require controlled environments. Cytation 5 automates image capture through analysis.

## 3D cell culture



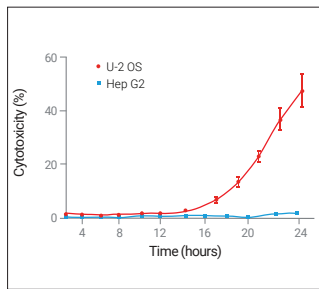
Automate 3D spheroid and tumorous assays using environmental control and Agilent BioTek Automated Media Exchange with an Agilent BioTek liquid handler. Z-stack, Z-project, and analyze with Gen5 software.

## Microbiology



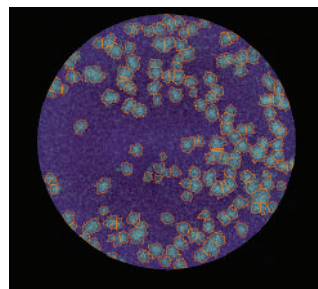
High-magnification objectives, multiple imaging channels, and advanced image analysis capabilities enable analysis of a variety of microorganisms.

## Cell viability/toxicity



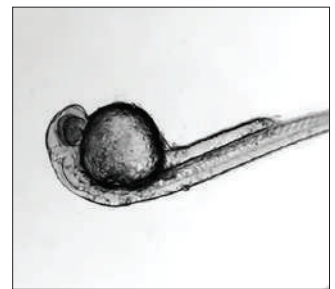
Classic live/dead assays use fluorescent probes or membrane-impermeable dyes; viability or toxicity is measured in real time.

## Virology



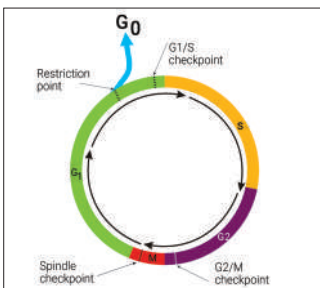
The flexibility of the Cytation 5 and Gen5 software enable a variety of assays to be imaged and analyzed when performing viral research.

## Whole-organism imaging



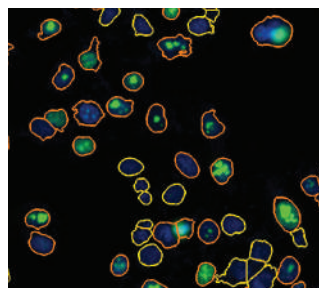
Essential to current drug screening methods, whole organisms like zebrafish and nematodes are effectively imaged and analyzed with Cytation 5 and Gen5 software.

## Cell cycle analysis



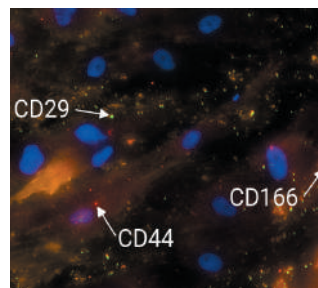
The progression of cell growth through the cell cycle is a highly regulated process. Automated histogram analysis of objects facilitates threshold definition.

## Transfection efficiency



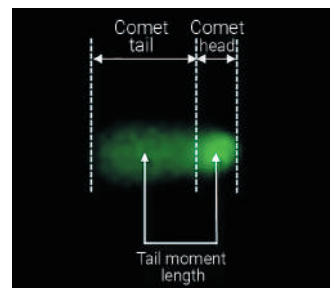
Cytation 5 provides intuitive image analysis for automating the assessment of transfection efficiency.

## Stem cell differentiation



Cytation 5, when integrated with the Agilent BioTek BioSpa 8 automated incubator and MultiFlo FX multimode dispenser, automates analysis of the lengthy process of stem cell differentiation to find highly physiologically relevant cells for drug discovery.

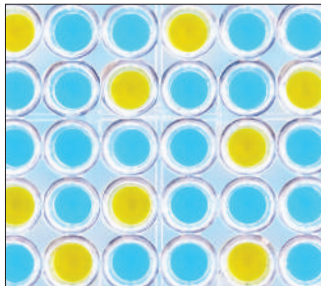
## Genotoxicity



The destructive effects of mutagens such as high-energy radiation and chemicals on nuclear DNA are measured with the comet assay and H2AX immunofluorescence assays. Cytation 5 is an ideal imaging platform for these assays.

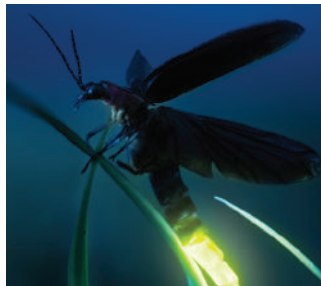
# Applications—multimode detection

## ELISA



ELISA methods with colorimetric, fluorescent, and luminescent substrates are easily detected with Cytation 5.

## Luciferase reporter assays



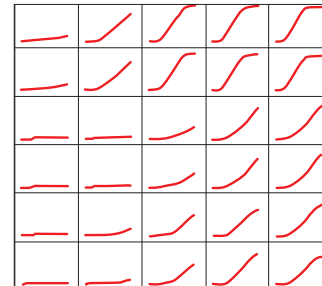
Luciferase-based reporter assays measure luminescent signal. This enables users to quantify the activity of factors that affect particular signaling pathways.

## Nucleic acid and protein quantification



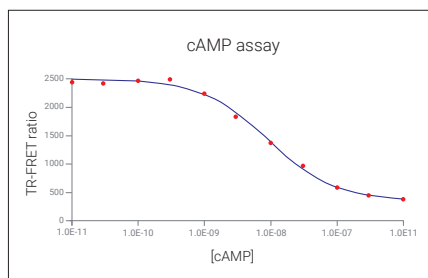
Nucleic acid and protein quantification assays can be executed by spectrophotometric or fluorescent determination with Cytation 5, in microplates or in microvolumes with the Agilent BioTek Take3 microvolume plate.

## Cell growth



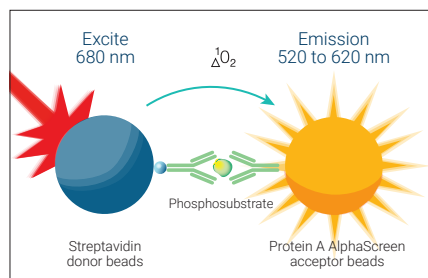
Microbial growth assays, such as those using yeast and bacteria, can be measured by several methods, including turbidimetric measurements with Cytation 5.

## TR-FRET



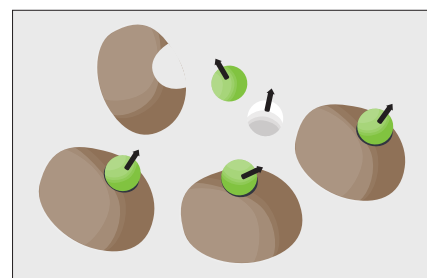
TR-FRET and HTRF are sensitive, robust methods. Cytation 5 and Gen5 provide excellent sensitivity for optimal Z-factors.

## AlphaScreen



AlphaScreen technology provides high signal-to-background ratios. The measurable energy transfer is emitted in the 520 to 620 nm range.

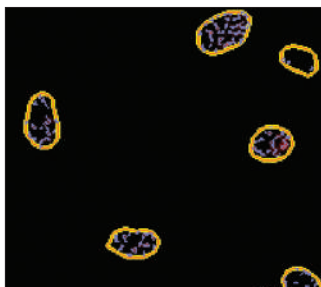
## Fluorescence polarization



Fluorescence polarization is widely used in research labs to study molecular binding or dissociation events, and in screening labs to screen for drug candidates.

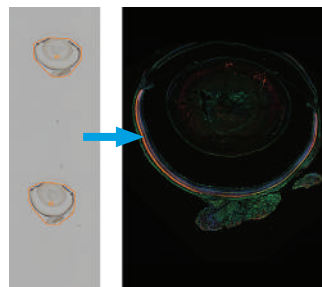
# Applications—advanced imaging modules and overlays

## Spot counting



The Agilent BioTek spot counting module allows the user to gain information about a second set of objects within primary and/or secondary mask compartments, which are tied to the original primary mask data.

## Automatic region of interest



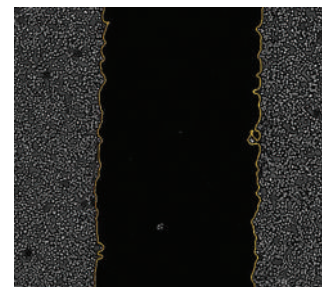
The automatic region-of-interest (AutoROI) module is a three-step process to eliminate superfluous image capture. A low-magnification step quickly images the entire area. The regions of interest are automatically identified, and high-magnification imaging of the areas then occurs.

## Single-cell object tracking



The Agilent BioTek Gen5 object tracking module provides the ability to track single objects over time. Relative motility can be visualized by selecting single cells or entire populations within an image. Calculated metrics include total distance, Euclidean distance, and mean, median, and maximum object velocity.

## Scratch Assay application



The Agilent BioTek Scratch Assay app provides an integrated workflow to capture images of, and analyze, 2D scratch-wound healing assays. Predefined protocols for 24- and 96-well plates include auto-exposure, built-in image processing, and analysis to calculate average wound width, percent wound confluence, and maximum wound healing rates.

# Peripherals



## BioSpa 8 automated incubator

The BioSpa 8 environmental controls and labware handling capabilities, integrated with Cytation 5, facilitate long-term live cell kinetic imaging processes for up to eight microplates and other labware.



## BioStack microplate stacker

The BioStack microplate stacker manages up to 50 microplates for automated imaging or multimode operations, including de and relidding of microplates used with cell-based assays.



## CO<sub>2</sub>/O<sub>2</sub> controller

The compact gas controller maintains control of CO<sub>2</sub> and O<sub>2</sub> levels in the Cytation 5 to support live cell assays.

## Dual-reagent injector

The dual-reagent injector module enables fast inject/read processes. Angled injector tips protect cell monolayers from shear stress during injection.





### AutoScratch wound making tool

The AutoScratch wound making tool automatically creates reproducible scratch wounds in cell monolayers grown in 24- or 96-well microplates, used for cell migration and invasion studies.



### Peltier cooling module

The Peltier cooling module cools the interior of the Cytation 5 after incubated processes, enabling efficient switching between multiple applications without unwanted temperature influences. The cooling module maintains environmental stability allowing less than a 1 °C rise in ambient temperature, regardless of external and internal temperature fluctuation.



### Take3 microvolume plate

Measure multiple 2  $\mu$ L samples at a time with the Take3 microvolume plate, which is used with Cytation 5. Microvolume nucleic acid and protein quantification are fast and easy.



# Technical Details



General	
Microplate Types	Monochromator: 6- to 384-well plates Filters: 6- to 1536-well plates Imaging: 6- to 1536-well plates
Other Labware Supported	Microscope slides, Petri and cell culture dishes, cell culture flasks (T25), counting chambers (hemocytometer) Take3 microvolume plates
Environmental Controls	Temperature control to 65 °C CO <sub>2</sub> /O <sub>2</sub> controller Peltier cooling module
Shaking	Linear, orbital, double-orbital
Automation	BioSpa 8, BioStack, and third-party automation capability
Modularity and Configurability	Cytation 5 has many available configurations including imaging only, multimode only, and combinations. Modules can be added as laboratory needs change
Imaging	
Imaging Modes	Fluorescence, brightfield, high-contrast brightfield, color brightfield, phase contrast
Imaging Methods	Single color, multicolor, montage, time lapse, Z-stacking
Light Source	Long-life LEDs
Camera	Sony CMOS, 16-bit grayscale, standard or WFOV
Imaging Objectives/Capacity	1.25x to 60x magnification/six-position automated turret
Imaging Filter Cubes	More than 20 filter/LED cubes available
Imaging Filter Cube Capacity	Four color channels plus brightfield
Autofocus Methods	Image-based and laser autofocus
Multimode Detection	
Detection Modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence Alpha
Reading Methods	End point, kinetic, spectral scanning, well-area scanning

Learn more and buy online:

**[www.agilent.com/lifesciences/biotek](http://www.agilent.com/lifesciences/biotek)**

Get answers to your technical questions and  
access resources in the Agilent Community:

**[community.agilent.com](http://community.agilent.com)**

U.S. and Canada

**1-800-227-9770**

**[agilent\\_inquiries@agilent.com](mailto:agilent_inquiries@agilent.com)**

Europe

**[info\\_agilent@agilent.com](mailto:info_agilent@agilent.com)**

Asia Pacific

**[inquiry\\_lsca@agilent.com](mailto:inquiry_lsca@agilent.com)**

DE93781711

This information is subject to change without notice.

© Agilent Technologies, Inc. 2021, 2023  
Published in the USA, April 12, 2023  
5994-2403EN

