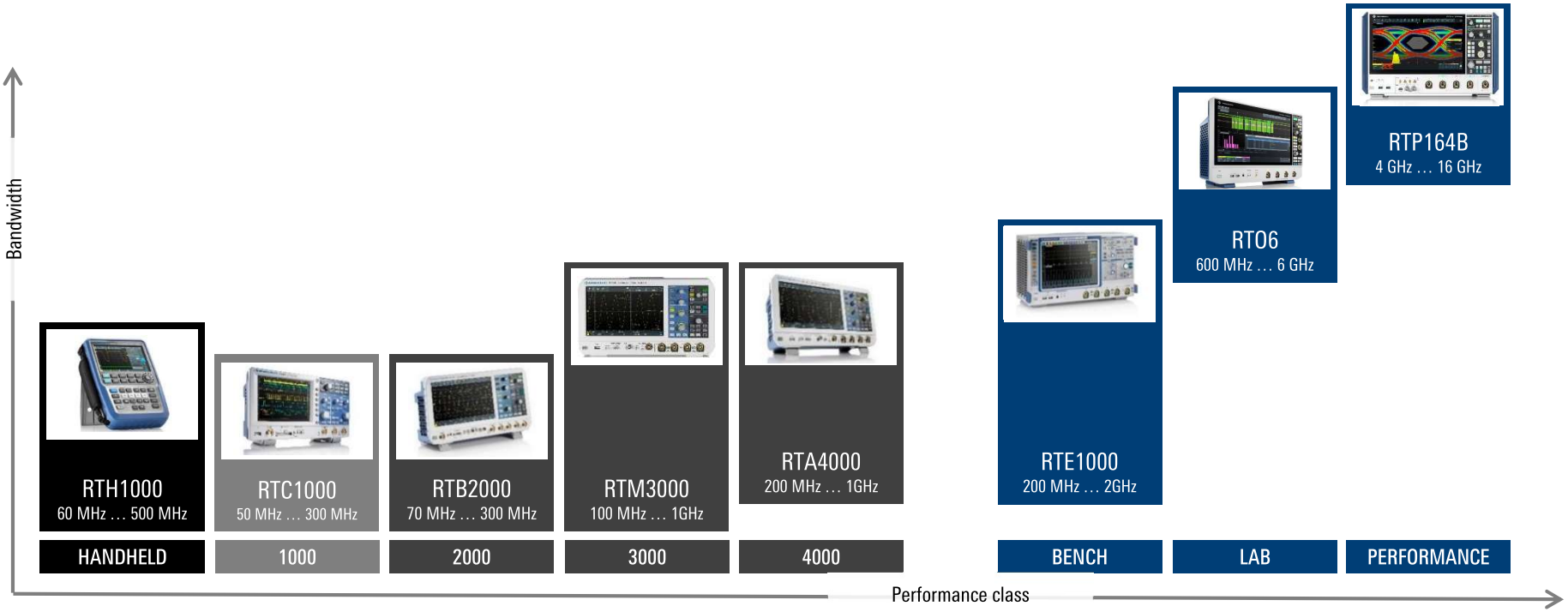
R&S®MXO 4 Product Presentation

New family of oscilloscopes: The R&S®MXO 4

R&S OSCILLOSCOPE PORTFOLIO

MOST MODERN SCOPE LINE FROM 50 MHZ TO 16 GHZ



Rohde & Schwarz

R&S OSCILLOSCOPE PORTFOLIO

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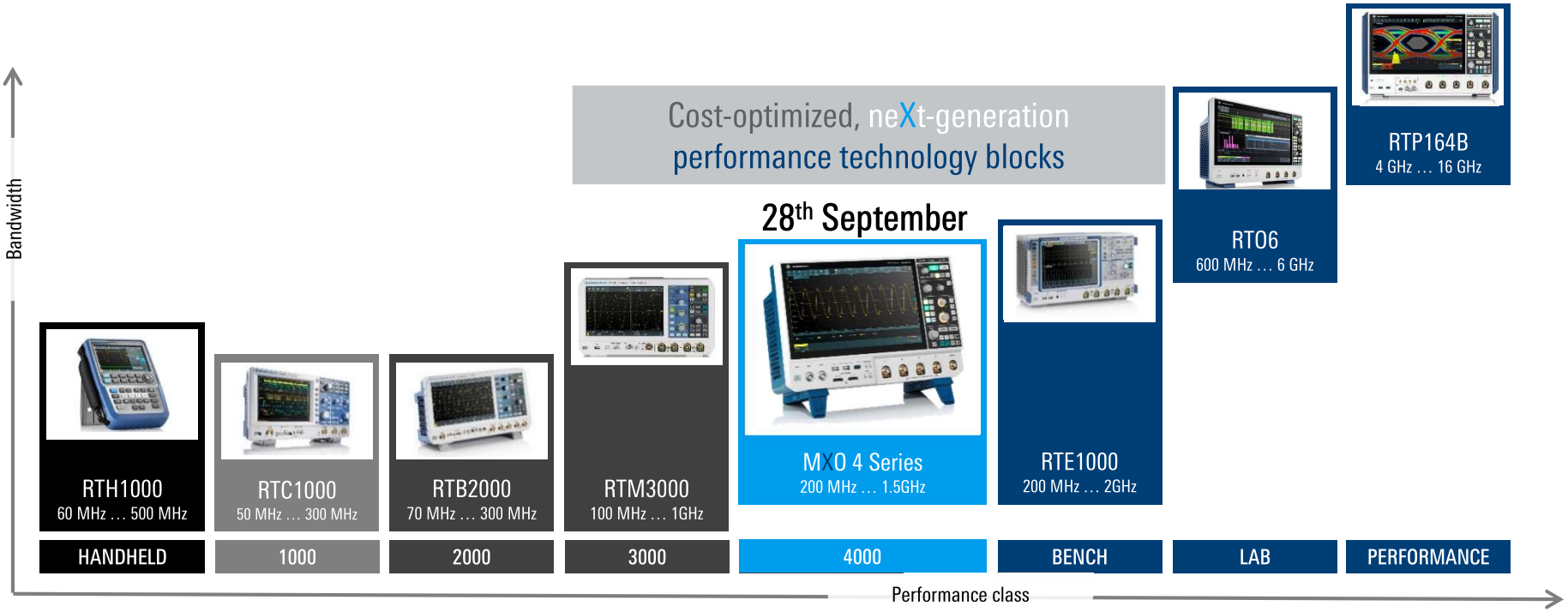


Rohde & Schwarz

R&S®ESSENTIALS

Next generation oscilloscope for accelerated insight

R&S®MXO 4 SERIES

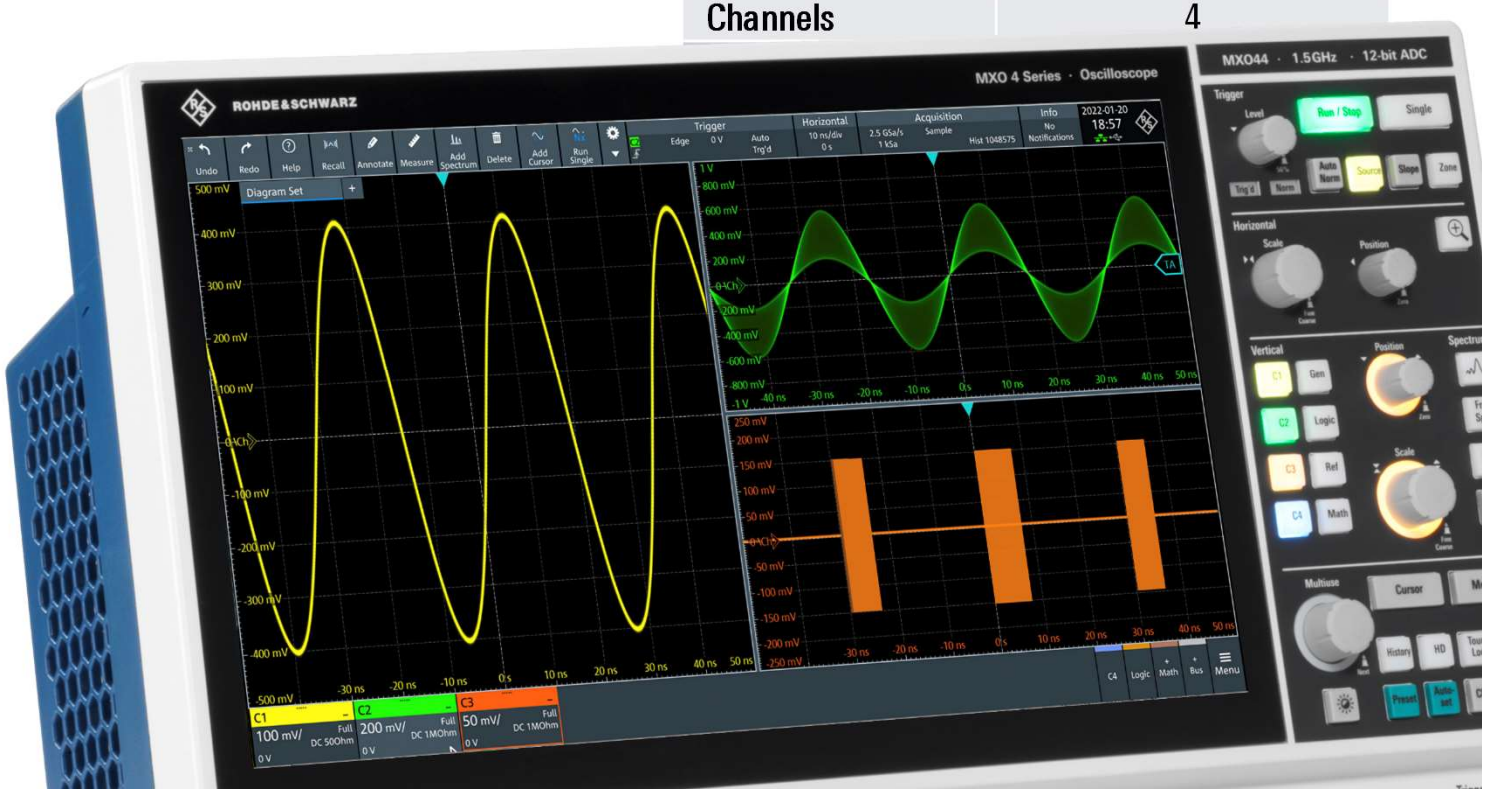
ROHDE&SCHWARZ

Make ideas real

AT A GLANCE

3 year warranty

MXO 4 Series Key Specifications	
Channels	4



INDUSTRY'S FIRST…

>4.5 Million wfms / sec

12 -bit ADC 18-bit HD

400 Mpts memory /ch

Digital trigger

2x ARB Gen 100 MHz

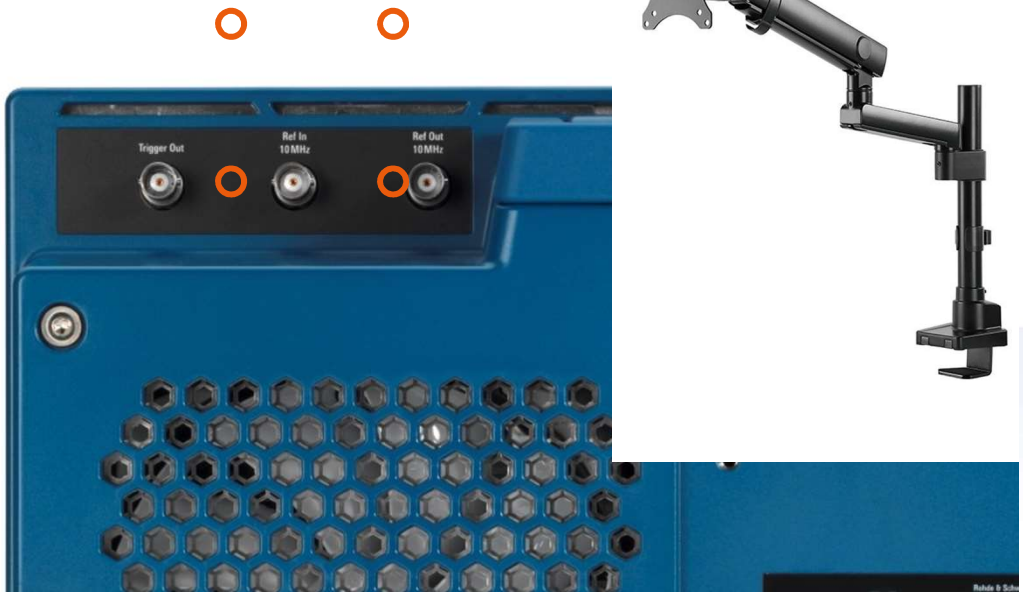
Standardized MSO 16ch 5GSa/s

AND AT THE BACK…

Newest I/O for new lab environment

AND VESA MOUNTING…

Best space saving for flexible setup

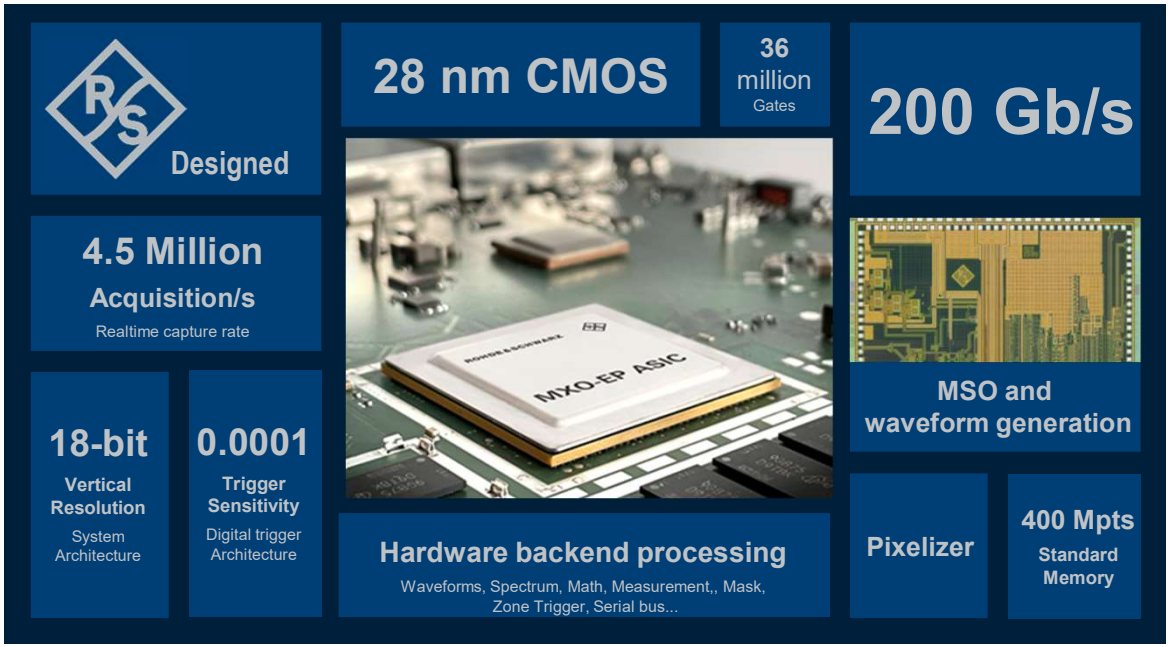


R&S®MXO 4 series

Features and benefits

Understand the new product

WORLD'S FASTEST PERFORMANCE



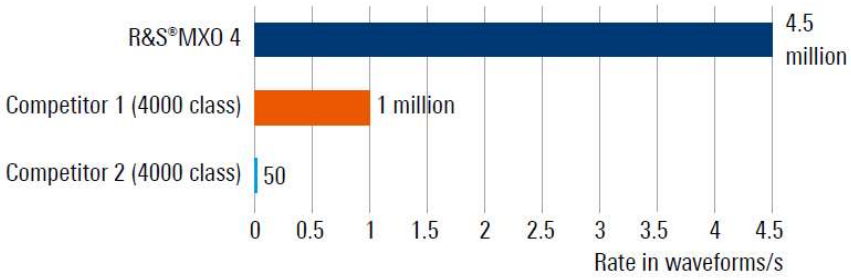
Understand the new product- eXcitingly Fast

FIND SIGNAL ANOMALIES QUICKLY

R&S®MXO 4 features

- Optimized signal processing & dedicated ASIC
- 4.5 million waveforms per second
- Smooth workflows – even with measurements, spectrum, math or long acquisitions

Real-time acquisition rate

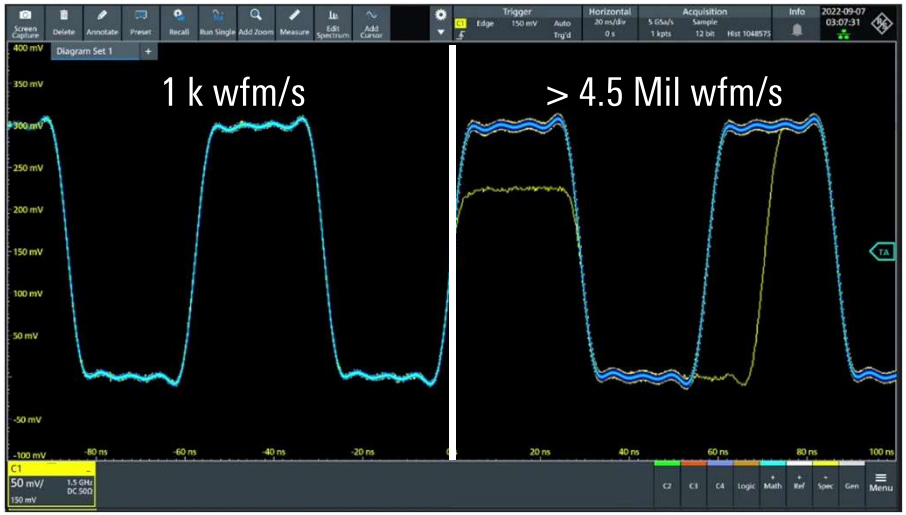


Understand the new product- eXcitingly Fast

INSTANTLY SEE INFREQUENT EVENTS

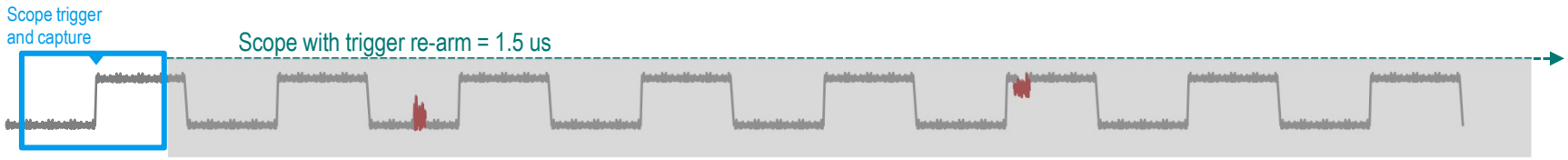
Customer benefit

- Acquire, process & display signals with unrivaled speed
- Detect signal faults & anomalies quickly
- Increase your statistical confidence



World's fastest update rate & Trigger rate

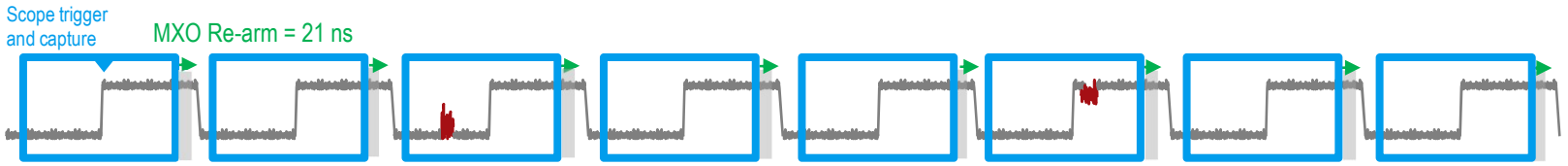
LOWEST BLIND TIME: SUPERIOR SIGNAL VISIBILITY



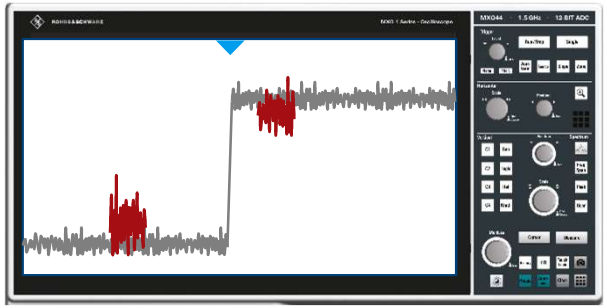
►During trigger re-arm, scope is blind

►Even scope at 600k wfm/s will have blind time > 1.5 us

Missing critical signal issues!



►MXO 4 trigger re-arm time is only 21 ns



Faster scope = more chance to capture rare events

Understand the new product- eXtremely Precise

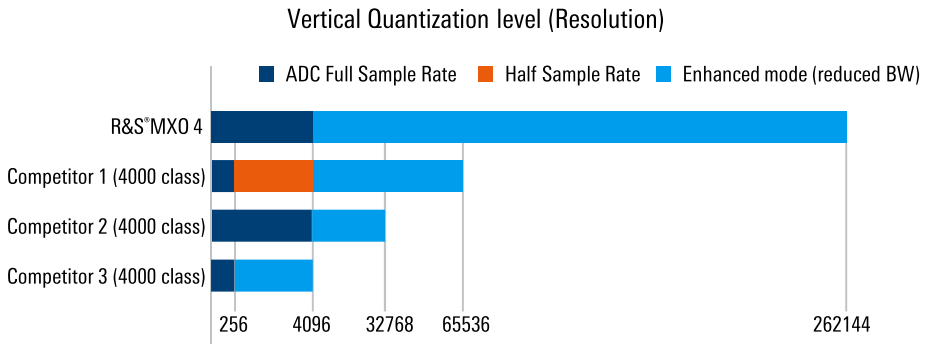
SEE YOUR SIGNALS ACCURATELY

Industry highest
18 bit architecture

Extremely precise

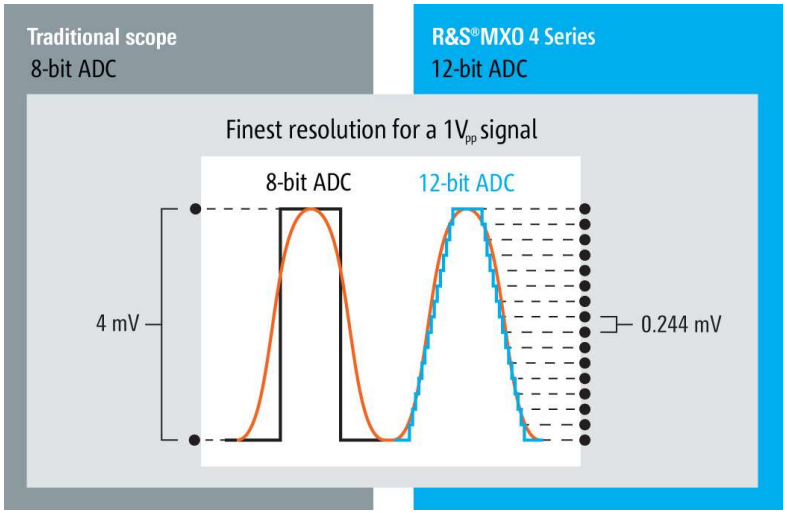
R&S®MXO 4 features

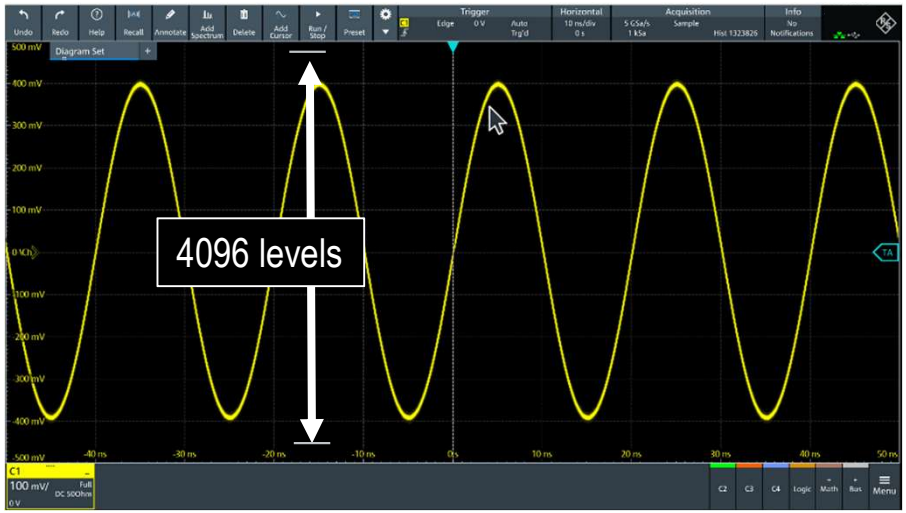
- 12-bit ADC all the time
- 18-bit architecture (with HD mode)



SEE YOUR SIGNALS ACCURATELY

- 12-bit ADC at all sample rate
- Lowest Noise: 120 uV full screen @ 1 mV/div, 1.5 GHz
- Largest offset range at highest sensitivity: +/- 5V @ 500 uV/div





Understand the new product- eXtremely Precise

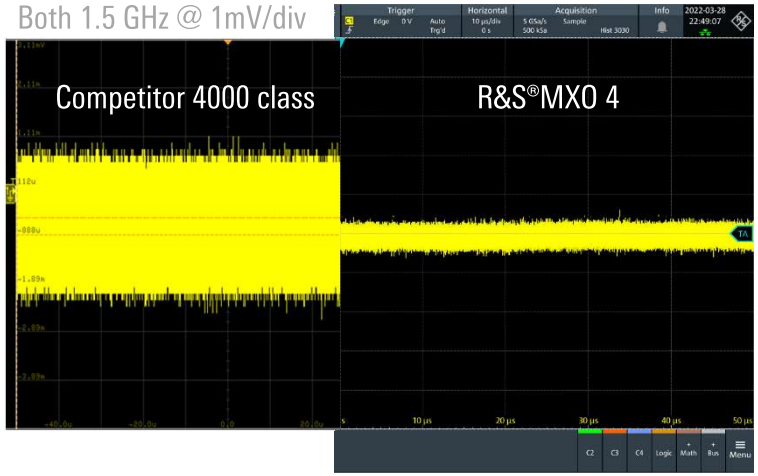
HIGHEST VERTICAL RESOLUTION

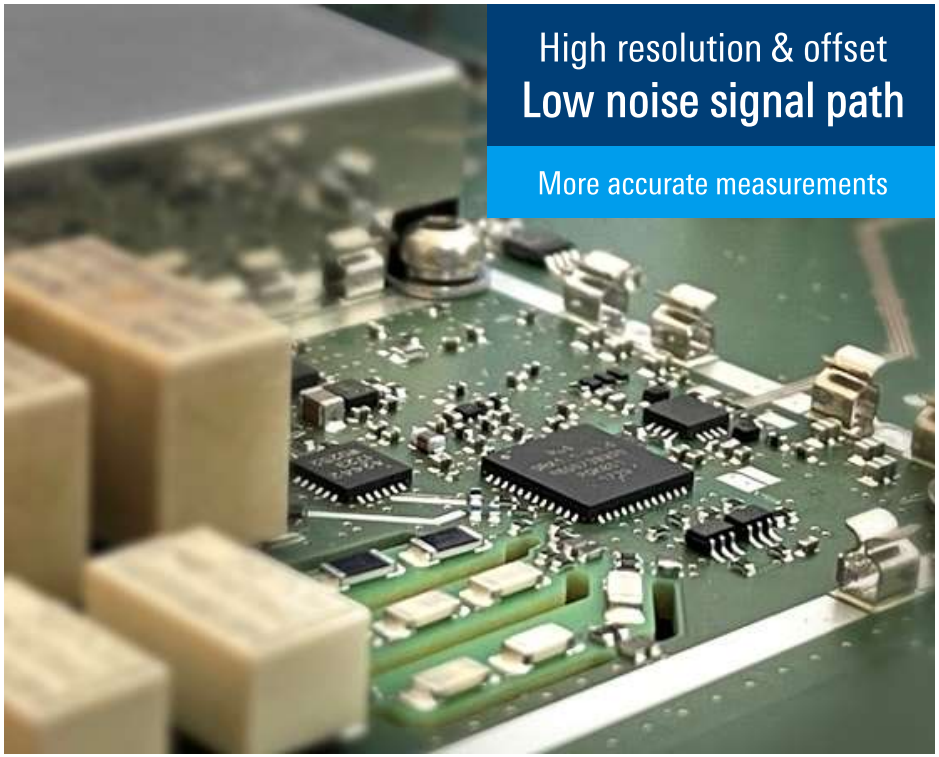
R&S®MXO 4 features

At 500uV/div:

- ► Lowest Noise: 120 uV full screen @ 1.5 GHz
- ► Largest offset range at highest sensitivity: +/- 5V

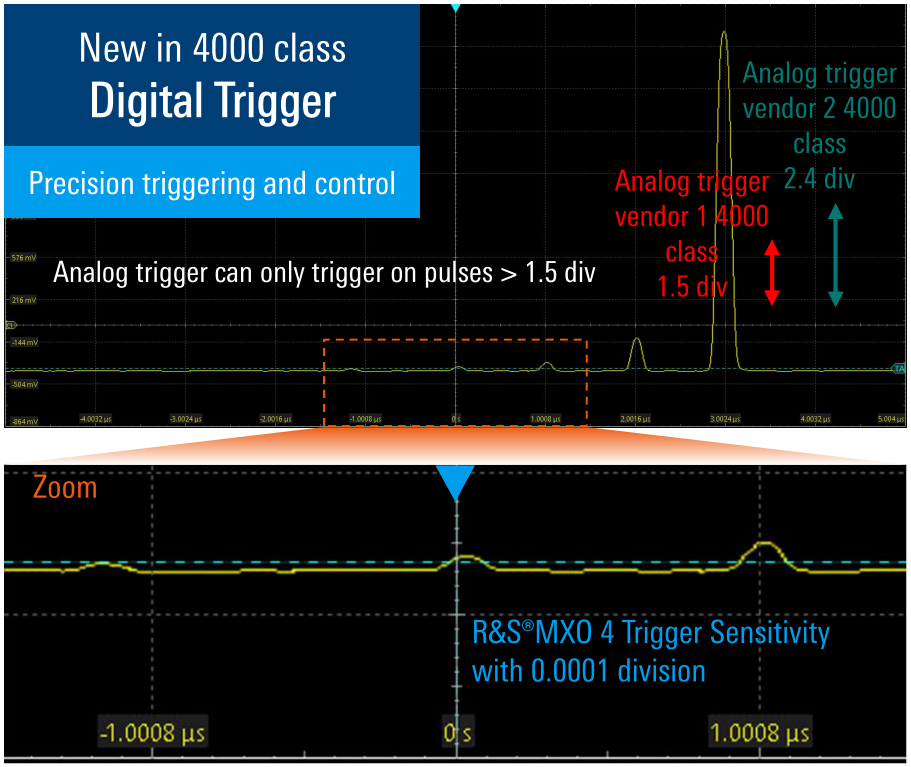
Both 1.5 GHz @ 1mV/div





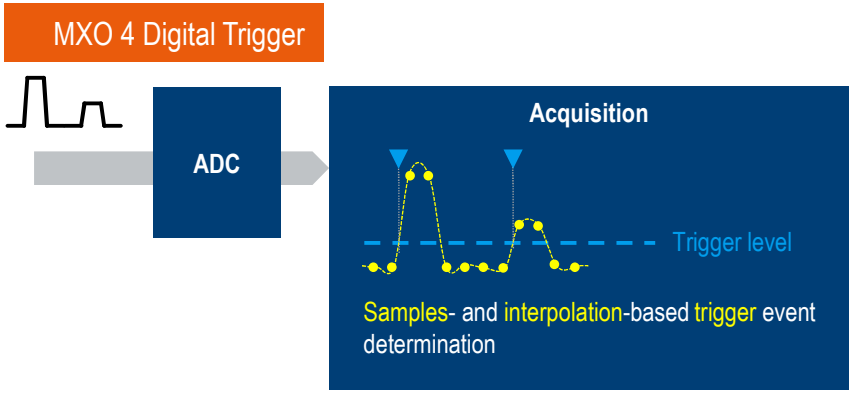
Understand the new product- eXtremely Precise

ISOLATE EVENTS WITH MORE PRECISION



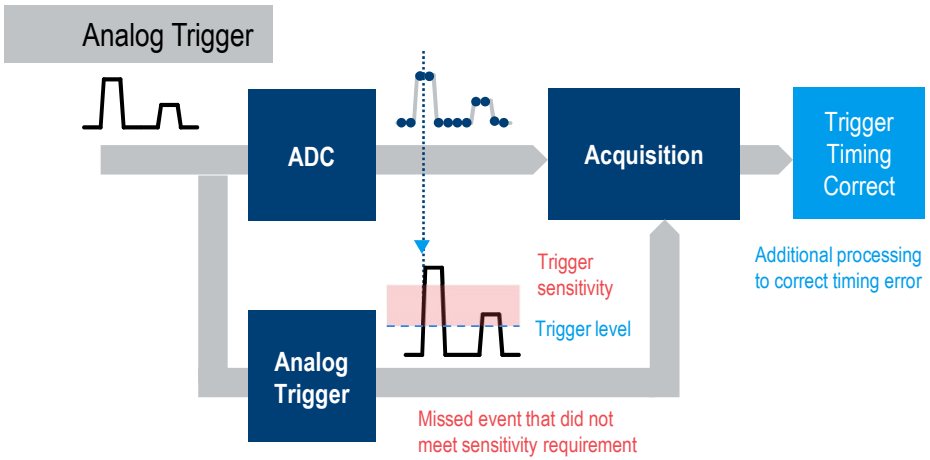
R&S®MXO 4 features

- Detect trigger event on sampled waveforms
- Adjustable trigger sensitivity
- Minimal trigger jitter < 1ps
- 18 bit architecture

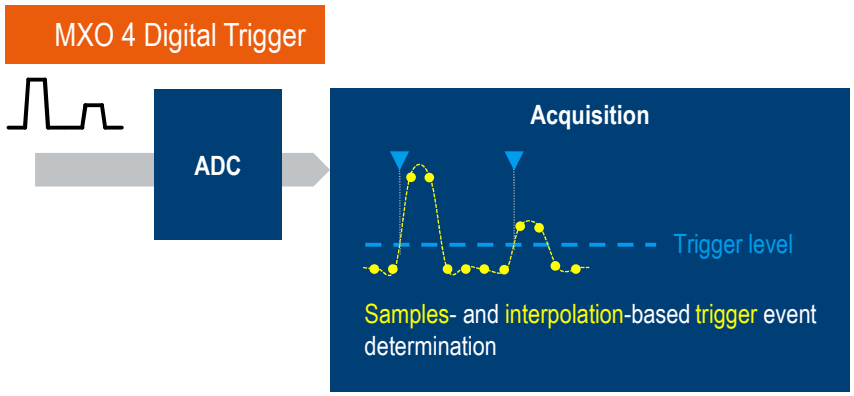


HIGH PRECISION DIGITAL TRIGGER

► In most 4000 class oscilloscope, limited processing power often use analog trigger



Limitation:
► Lower trigger sensitivity, more than 0.5 div
► Timing alignment between trigger and acquisition block



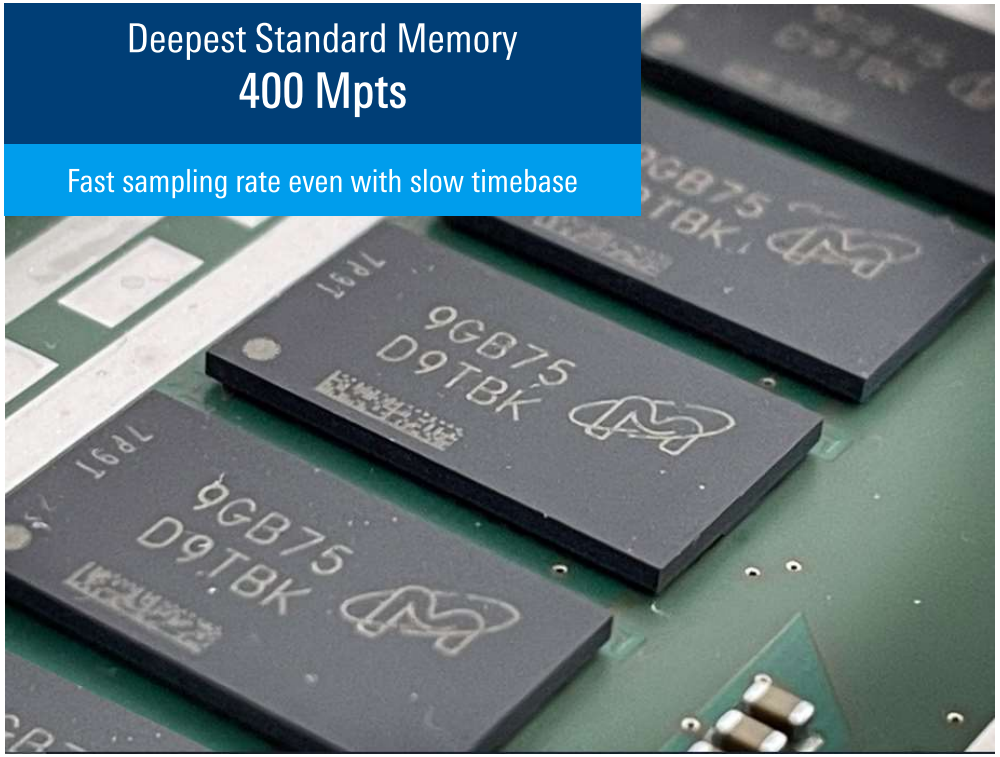
Advantages:
► Trigger sensitivity > ADC resolution
► Essentially no trigger jitter

Understand the new product- eXceptionally deep memory

CAPTURE MORE TIME

Deepest Standard Memory
400 Mpts

Fast sampling rate even with slow timebase



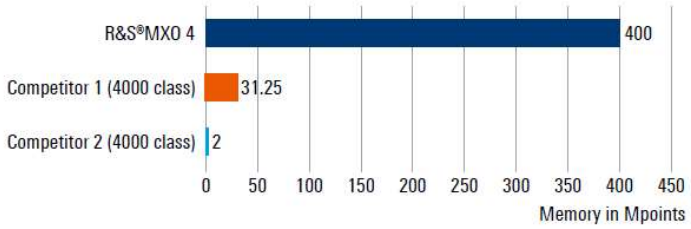
R&S®MXO 4 features

- Standard memory: 400 Mpts per channel
- Maximum memory: 800 Mpts on 2 channels
- Segmented memory & History mode

Customer benefit

- Measure more (at high sample rate)
- Capture distant trigger events
- Analyze previous acquisitions

Standard memory per channel



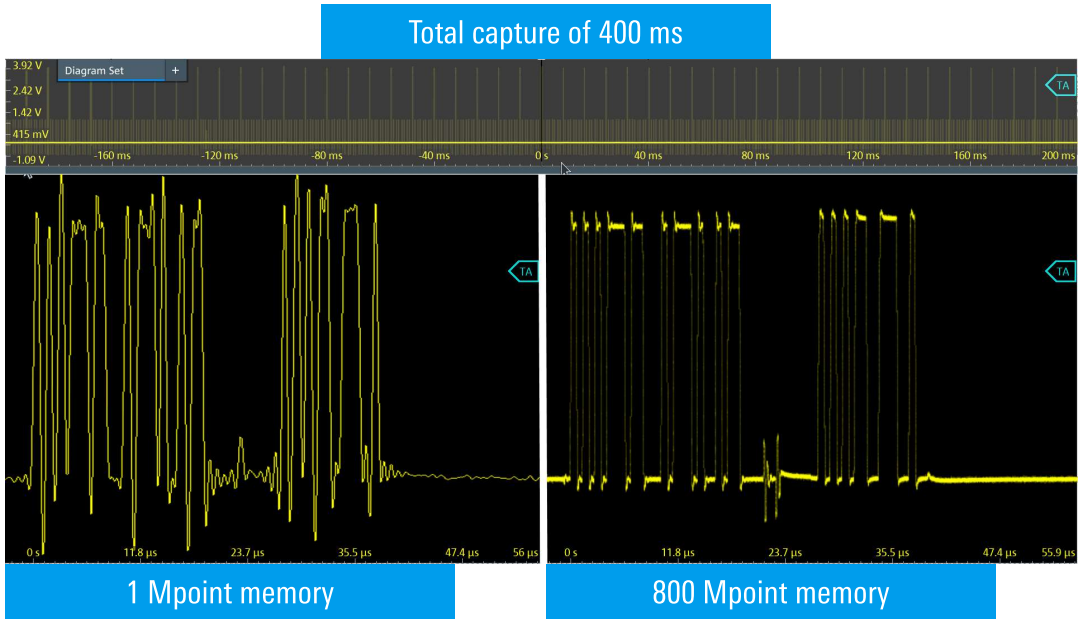
Understand the new product- eXceptionally deep memory

FAST SAMPLING RATE EVEN WITH SLOW TIMEBASE

- You never know when you need to see more…
  - Power up/power down events
  - Issues where cause and symptom separated by longer time
  - serial bus activity

- Support 5000s/div

Sampling rate	Duration (400 Mpts)	Duration (800 Mpts)
5 GSa / s	80 msec	160 msec
500 MSa / s	0.8 sec	1.6 sec
5 MSa / s	80 sec	160 sec
8 kSa / s	50000 sec	100000 sec (1.15 days)

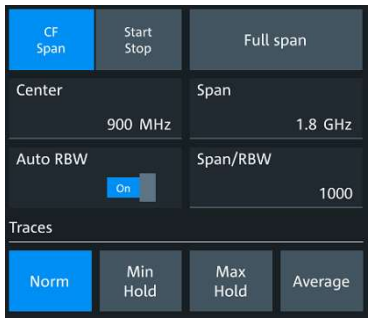


Understand the new product- eXcitingly Fast

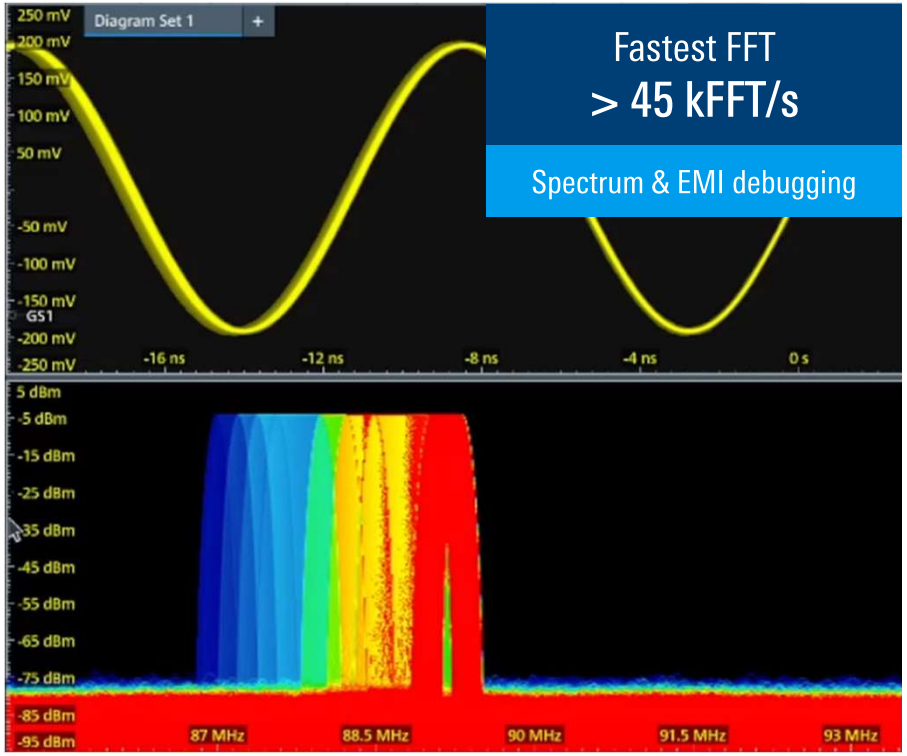
SPECTRUM ANALYSIS

R&S®MXO 4 features

- Fastest RF insights into your measurement
- Independent span/RBW control vs time base
- Automatic peak list and max/min-hold measurement
- Standard spectrum features



RF Characteristic	
Spectrum Update Rate	> 45k FFT/s
Sensitivity / Noise density	-160 dBm (1 Hz)
Noise figure	14 dB
Dynamic range	92 dB
SFDR	68 dBc
2nd Harmonic distortion	-52 dBc
3rd Harmonic distortion	-46 dBc



Understand the new product- Superior user eXperience

FUN TO USE

Improving user experience
Better and easier UI

Shortest learning curve

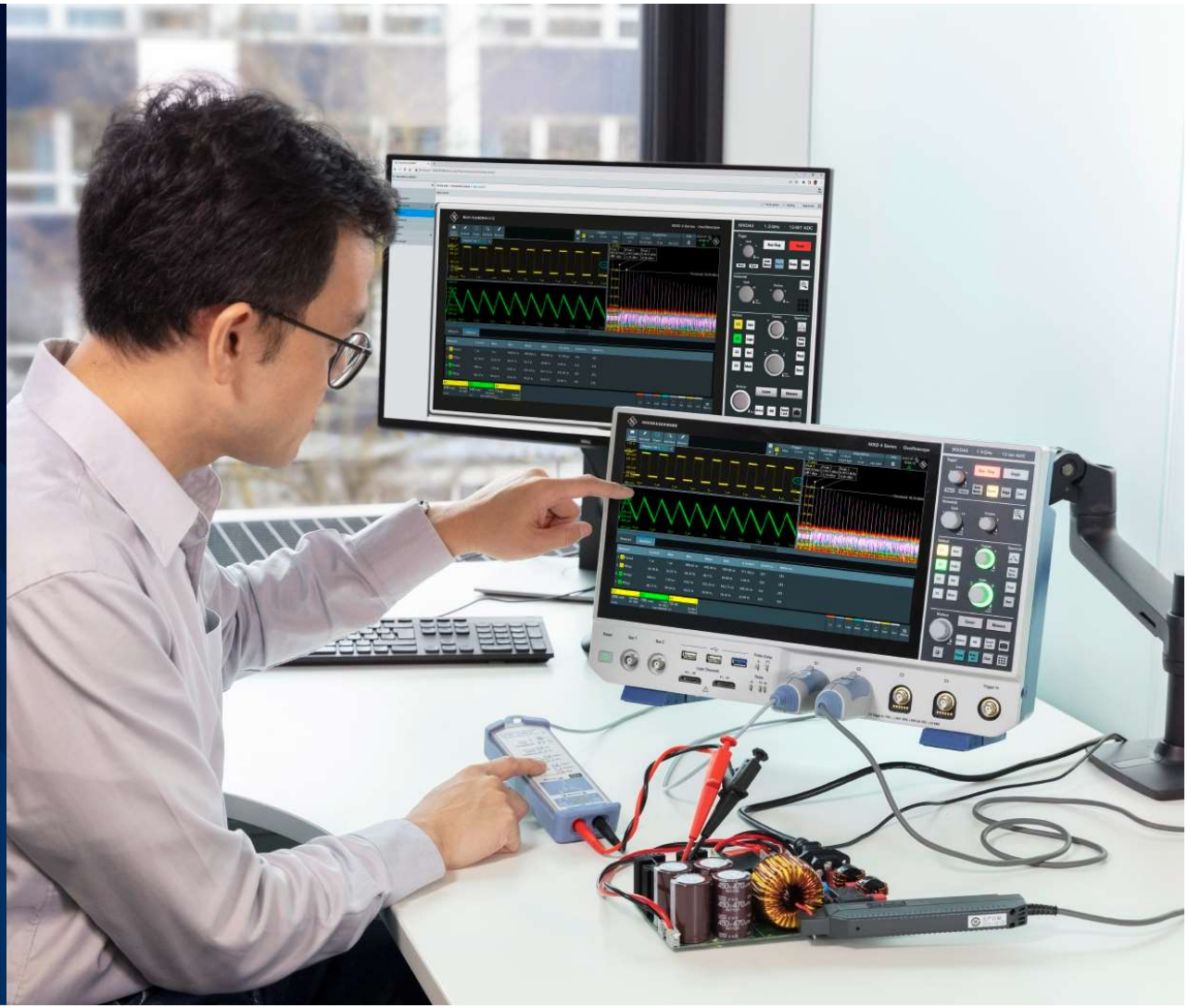
Understand the new product

SYNERGIZED TECHNOLOGY BLOCKS

>4.5 Million	wfms / sec	Capture faster and see more
12 -bit	ADC 18-bit HD	Enabling highest resolution
400 Mpts	memory /ch	Deeper memory to capture more
Digital	trigger	Advance architecture enabling performance

YOUR GO-TO TOOL
READY FOR MANY USES

- Spectrum
- EMI
- Logic
- Serial Bus
- Power
- Power Integrity
- Frequency Response
- Arbitrary Generator

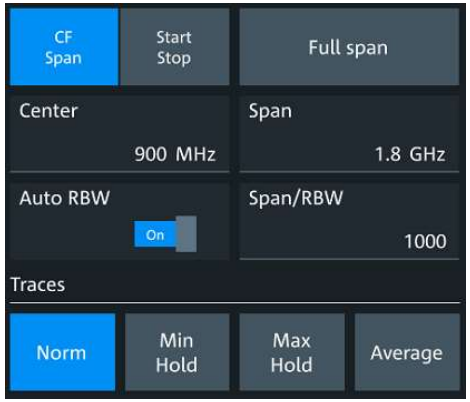


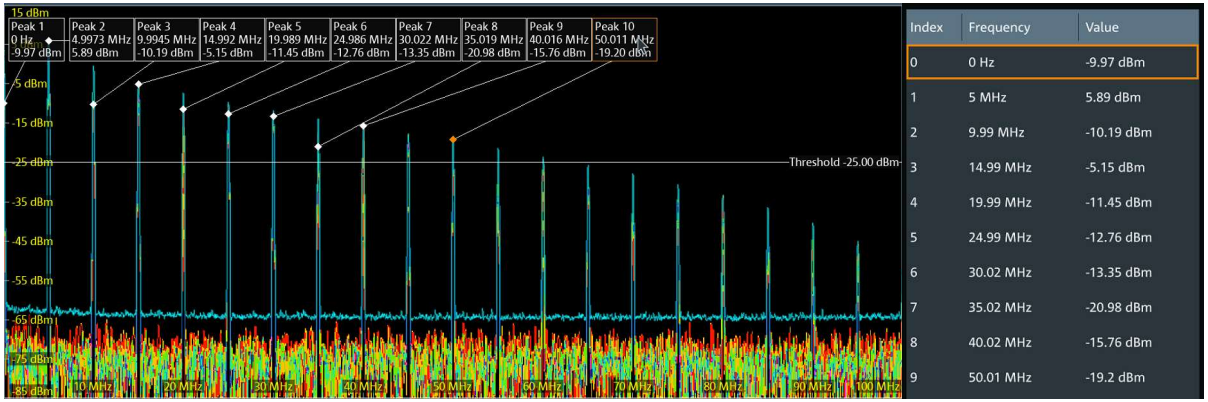
Your Go-To Tool

PRISTINE RF MEASUREMENT CAPABILITY

- ► Fastest RF insights into your measurement
- ► Superb RF performance to correlate timed events
- ► Automatic peak list and max/min-hold measurement
- ► Frequency analysis made easy

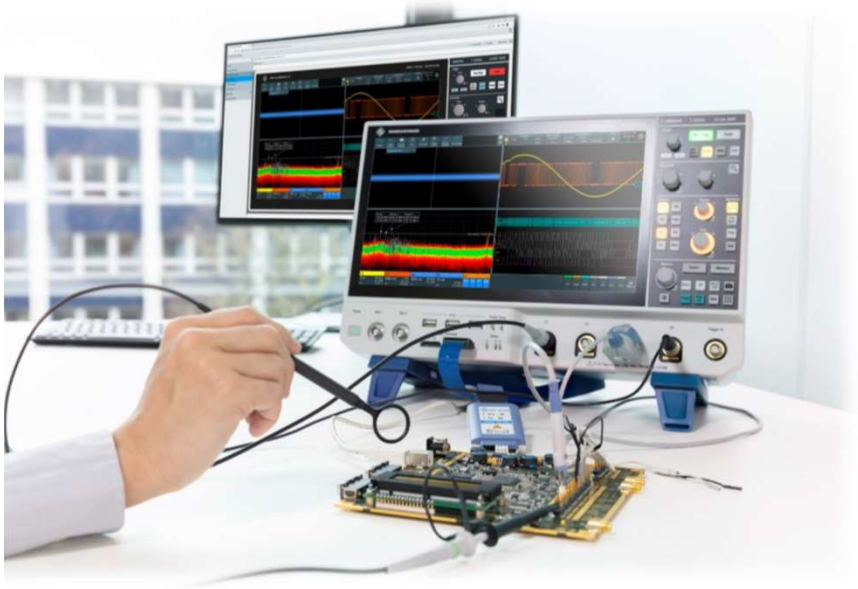
Deep memory and decoupled time & spectrum settings for easy navigation

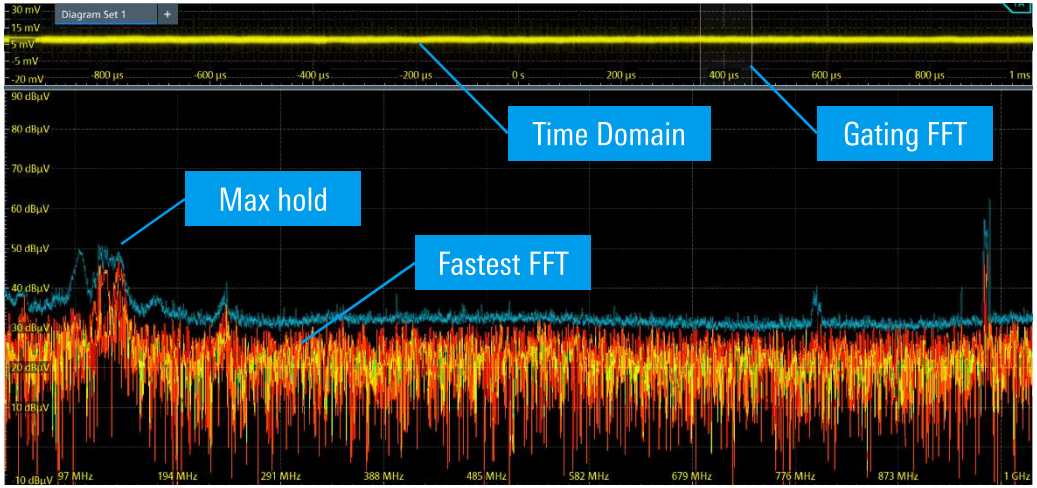




Your Go-To Tool

INSIGHTFUL EMI DEBUG





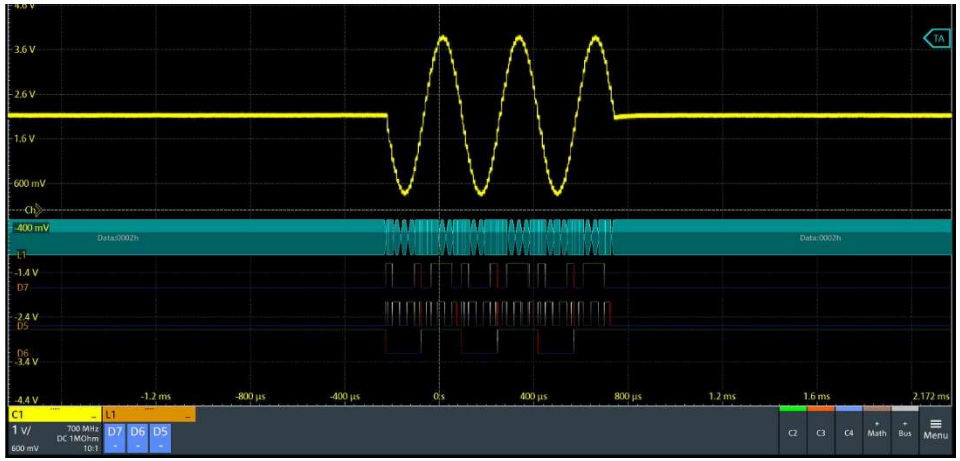
- Fast FFT to capture intermitted EMI fault
- Time and Spectrum correlated to find emission

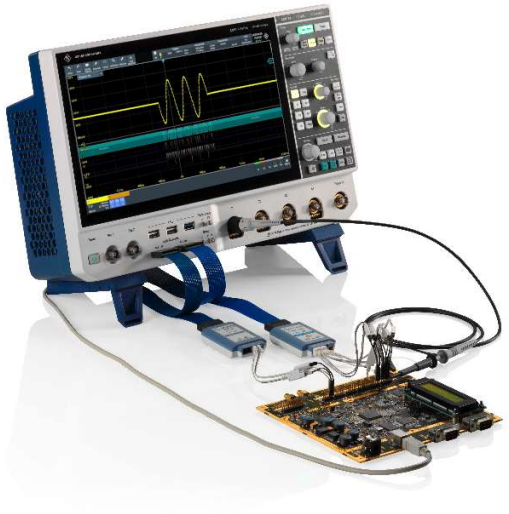
Responsive and easy setup for debug work

Your Go-To Tool

LOGIC ANALYSIS BY DEFAULT

- MSO is built into every instrument
- Only need logic probes to start using 16 digital channels
- Analysis of low-speed serial buses with digital channels
- Expand the channel count quickly for timing analysis



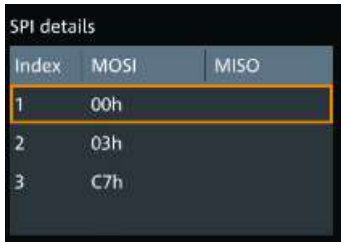


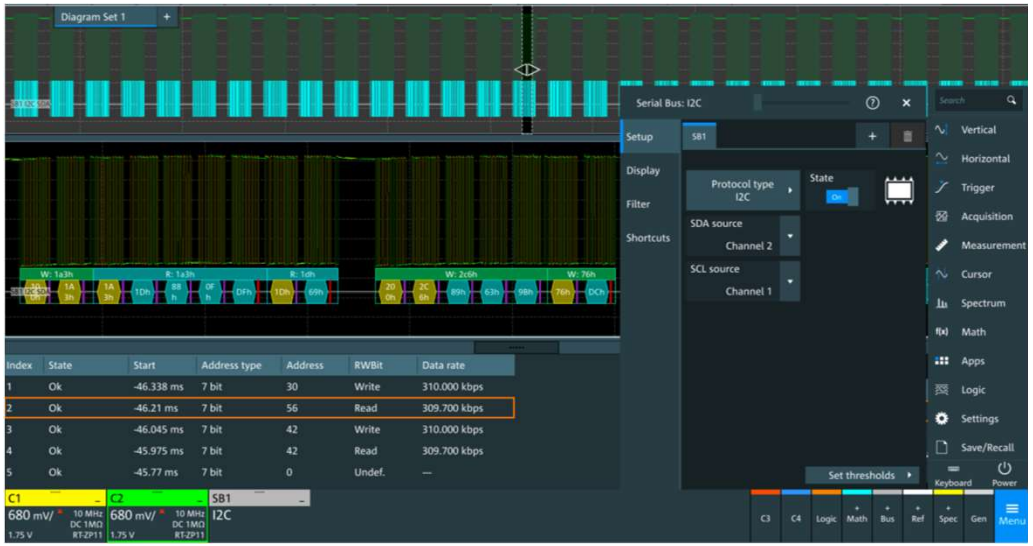
16	Digital channels
5 GSa/s	Sample rate
400 MHz	Toggle rate

Your Go-To Tool

SERIAL BUS ANALYSIS

- Hardware-based triggering
- Color-coded protocol frames
- Decode table with frame details

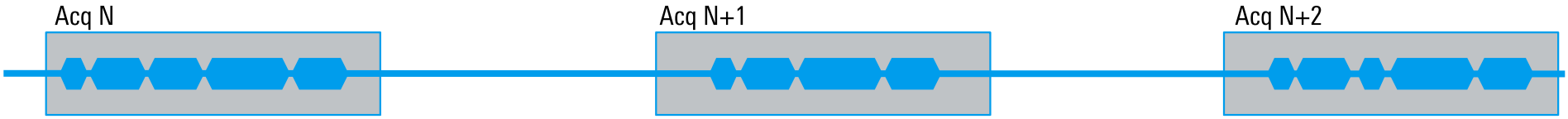




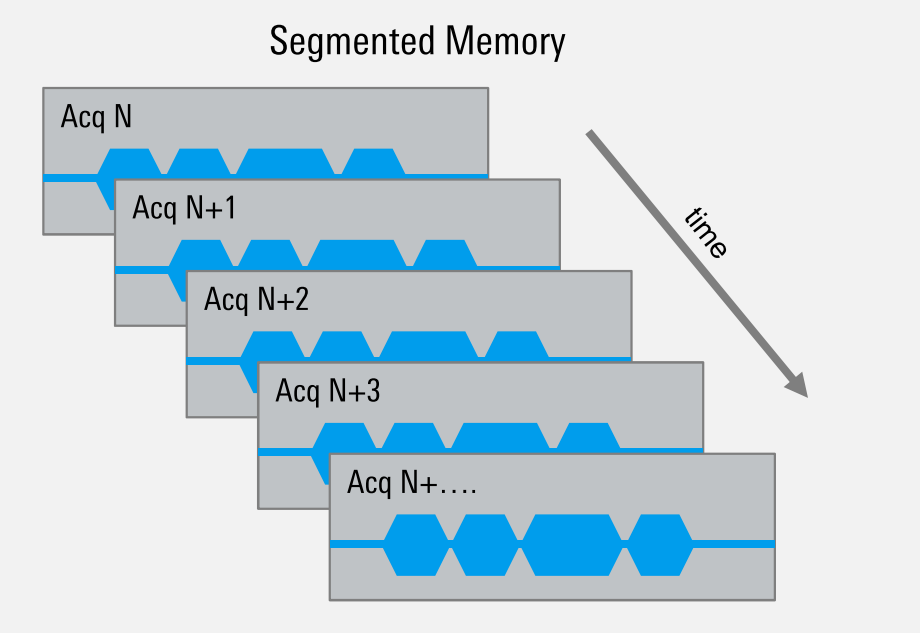
Protocol trigger and decode design for easy setup and insightful display

Your Go-To Tool

SERIAL BUS ANALYSIS INNOVATION



- Capture more packet with deep memory
- Leverage on the segmented memory to record more packets
  - Only capture around trigger, not the dead time in between
  - 10k segments (standard)
  - 1M segments
    - with option B108 memory extension option



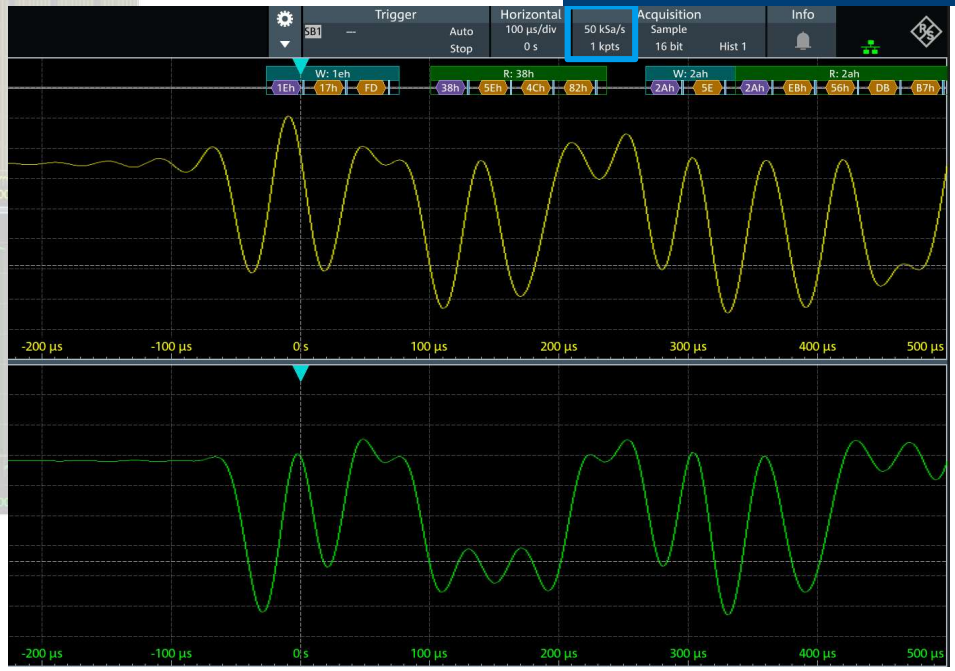
Capture more events

Your Go-To Tool

EXTENDING SERIAL BUS CAPTURE TIME

"Fast" 1.25 GSa/s SR:
Decodes correctly

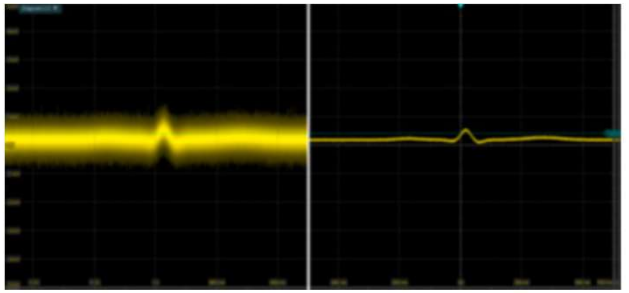
"Slow" 50 kSa/s SR:
Decodes correctly....
Even though waveform are severely under sampled

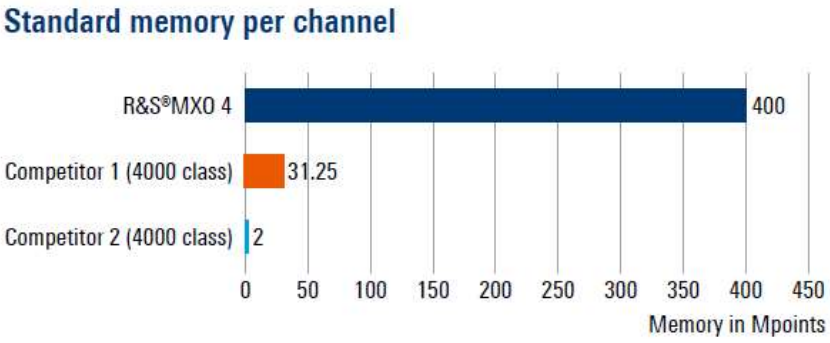


Your Go-To Tool

ENGINEERED FOR POWER MEASUREMENTS

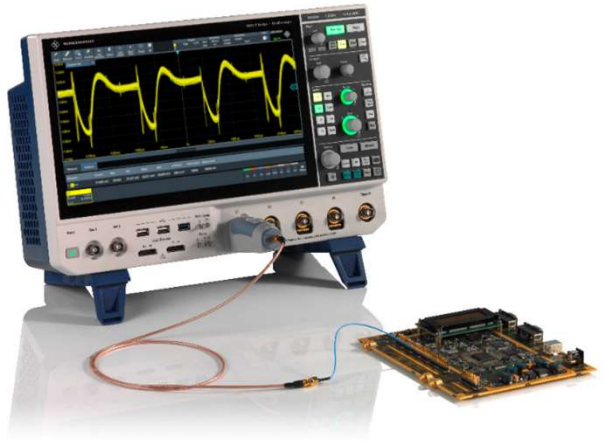
- See power signal details with up to 18 bit resolution
- Maintaining fast sample rates with deepest memory
- Digital trigger for enhanced debugging capabilities
- Extensive probe portfolio: High voltage and current probes





Your Go-To Tool

POWER INTEGRITY

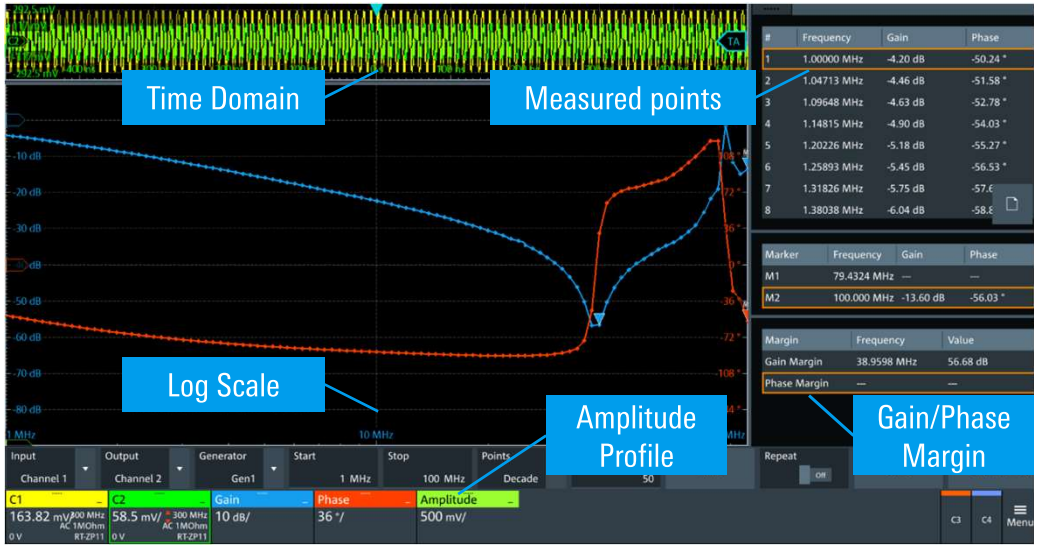


18-bit resolutions and fast acquisitions makes result correlation faster and precise

- Highest offset at <10mV/div sensitivity (±5V at 1:1)
- Low noise and high sensitivity of 500uV/div
- Easy bandwidth control to limit high frequency noise
- Spectrum domain for additional insights
- Support for ZPR power rail probes for ±60V offset

Your Go-To Tool

FREQUENCY RESPONSE ANALYSIS



- Flexible tools for:
  - Frequency response, S21
  - Control loop response
  - Power supply rejection ratio

All-in-one tool analytic tool and future enhancements for impedance & lower start frequency

Your Go-To Tool

ARBITRARY GENERATOR

2 Channels	Generator
100 MHz	Bandwidth
312.5 MSa/s	Sample rate
40 Mpts	Memory length
16 bits	Vertical resolution

Flexible signal generations and capable of recording and replaying captured waveform

Function Generator
Sine
Square
Ramp
DC
Pulse
Cardinal sine
Cardiac
Gauss
Lorentz
Exponential Rise/Fall
Modulation
Amplitude
Frequency
Frequency Shift Keying
Pulse Width
Sweep

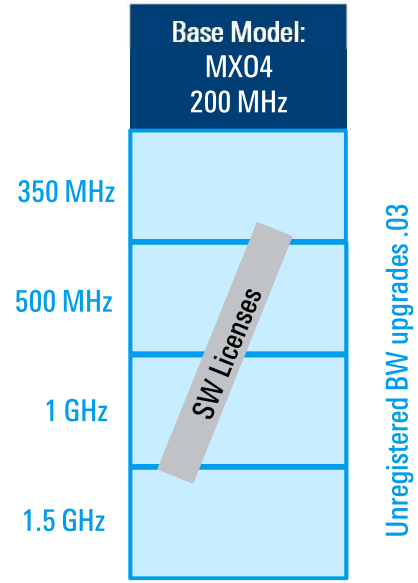
Rohde & Schwarz

OPTIONS & AVAILABILITY

R&S®MXO 4 BANDWIDTH UPGRADE

Base Unit	Upgrades	Also available as a package
MXO44 1335.5050.04		MXO44-242 OSCILLOSCOPE 4CH 200 MHZ 1335.5050P02
+	MXO4-B243 350 MHz option 1335.4276.02	MXO44-243 OSCILLOSCOPE 4CH 350 MHZ 1335.5050P03
+	MXO4-B245 500 MHz option 1335.4299.02	MXO44-245 OSCILLOSCOPE 4CH 500 MHZ 1335.5050P05
+	MXO4-B2410 1 GHz option 1335.4318.02	MXO44-2410 OSCILLOSCOPE 4CH 1 GHZ 1335.5050P10
+	MXO4-B2415 1.5 GHz option 1335.4330.02	MXO44-2415 OSCILLOSCOPE 4CH 1.5 GHZ 1335.5050P15

3 year warranty



R&S®MXO 4 HW OPTIONS

HW Option	Coverage
MXO4-B1 MIXED-SIGNAL-OPTION 1335.4130.02	Include 2x MSO logic probes that enable MSO function on the MXO
MXO4-B6 ARBITRARY WAVEFORM GEN. 1335.4147.02	License to enable built-in 2 channels waveform generator with frequency up to 100 MHz
MXO4-B108 MEMORY OPTION 800MPTS 1335.5772.02	Enable interleaving of memory to enhance the standard 400Mpts per channel into 800Mpts, history/segmented memory increase to 1M acquisitions/segments

Options & Availability

R&S®MXO 4 SW BUNDLES PRICING:

SW Bundle	Coverage
MXO4-K510 Low speed serial bus 1335.5195.02	I2C, SPI, RS232, UART
MXO4-K520 Automotive Protocols 1335.5550.02	CAN, CAN-FD, CAN-XL, LIN
MXO4-K36 Frequency response analysis 1335.5572.02	Bode Analysis, PSRR, Impedance

More protocols and analysis function to be available in the future

Options & Availability

EXTENSIVE PROBE PORTFOLIO

- R&S®MXO 4 comes with R&S Probe Interface
- Logic probe (up to 2x 8 digital channels) available: MXO-B1
- RT-Z2T probes to work on TekConnect II probes

MXO 4 comes with standard 4 x 700 MHz passive probes

Options & Availability

R&S® MXO 4 SUPPORT FOR R&S PROBE PORTFOLIO

High voltage

Single ended compact

Differential modular

Power rail

Standard

Broadband

Differential High voltage

Differential compact

EMC near field

Current

PASSIVE

ACTIVE

SPECIALIZED

Lastly…

WHY BUY R&S MXO4?

World first oscilloscope with 4.5 million wfm/s

Industry leading 18 bit HD mode with 12 bit ADC

Deepest standard memory of 400 Mpts per channels

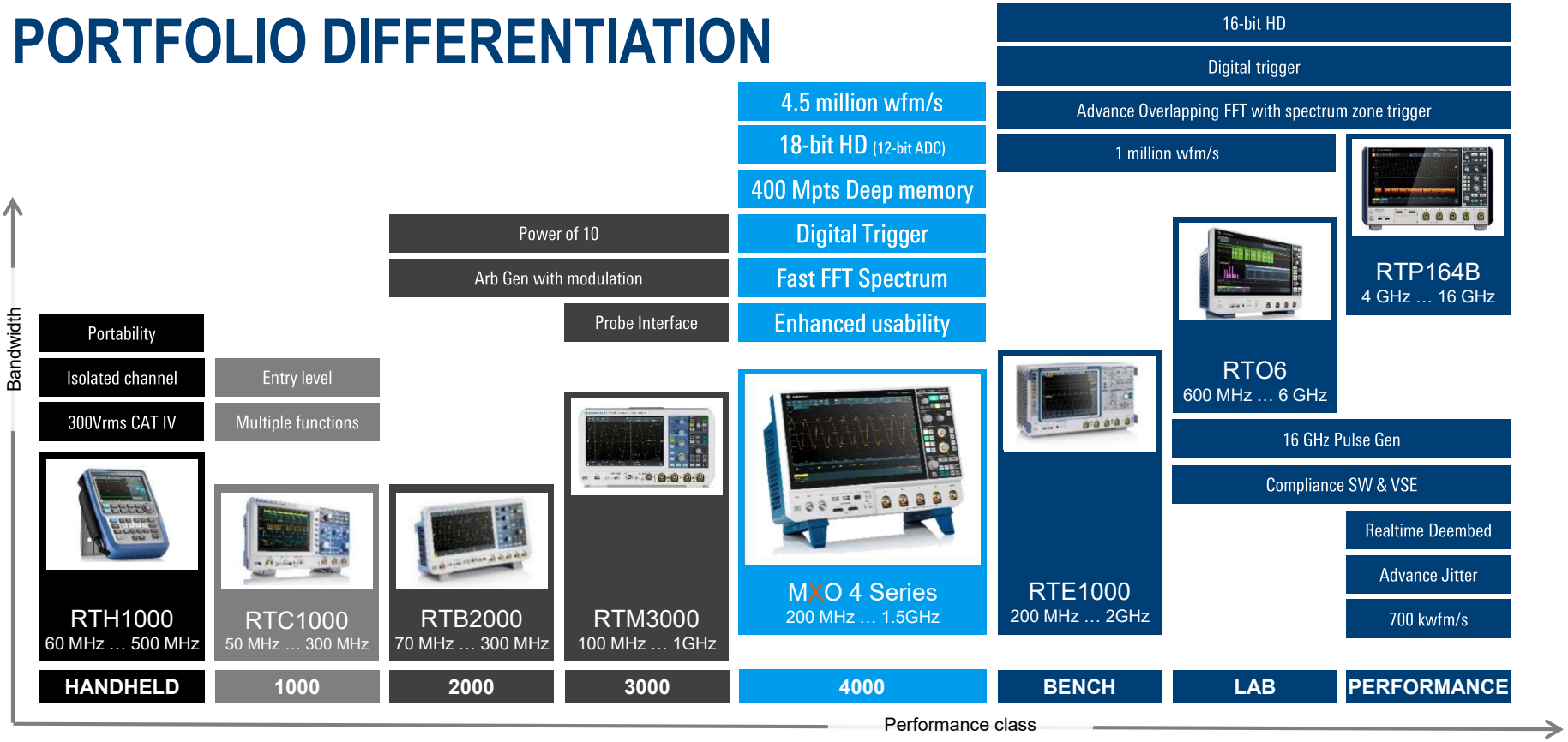
First in class to implement digital trigger technology

Fastest FFT spectrum update rate in the class

R&S®ESSENTIALS

R&S®MXO 4 SERIES

Next-generation oscilloscope for accelerated insight

eXcitingly fast • eXtremely precise • eXceptionally deep memory

PORTFOLIO DIFFERENTIATION