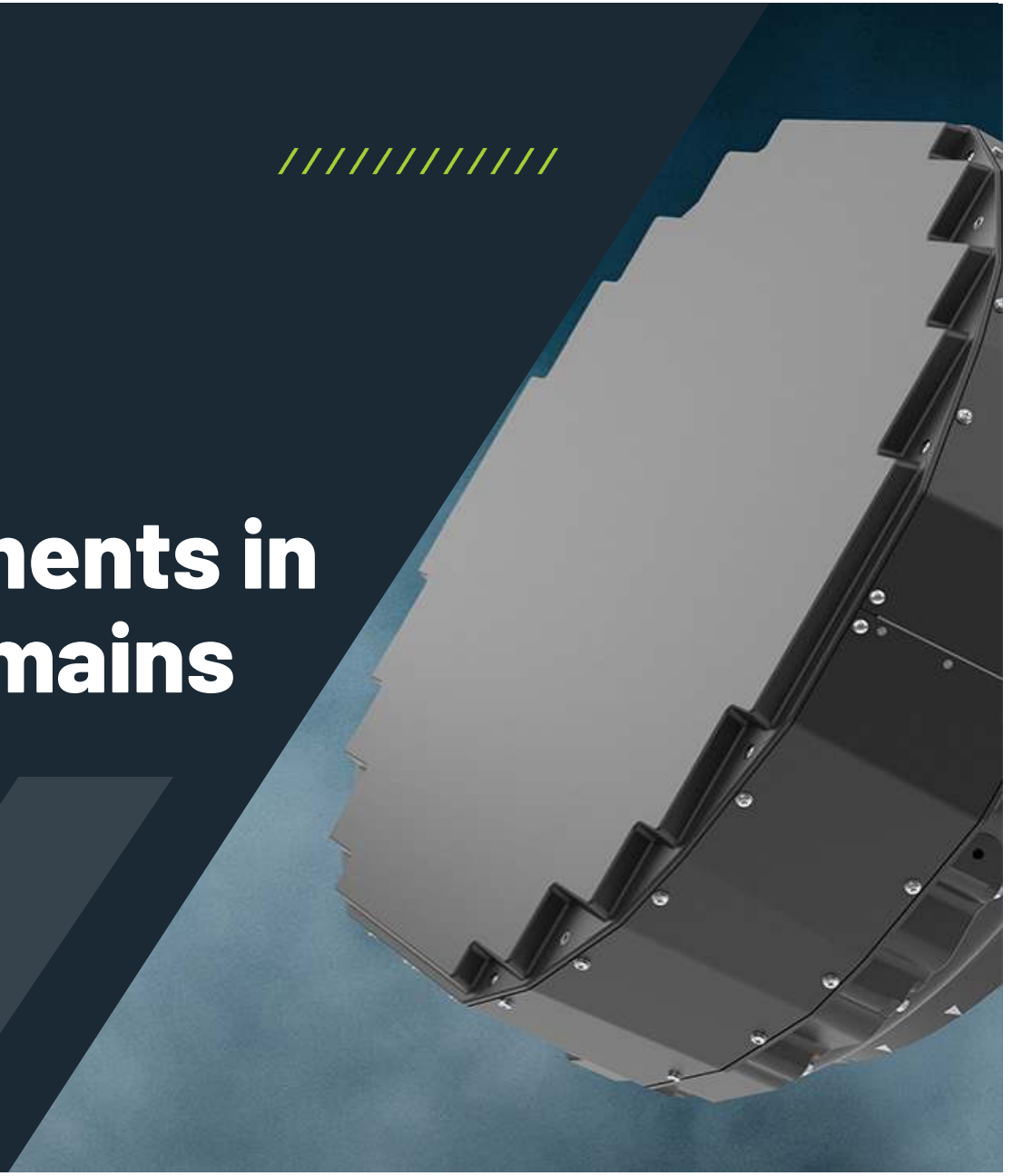
Tektronix®

IMS MicroApps

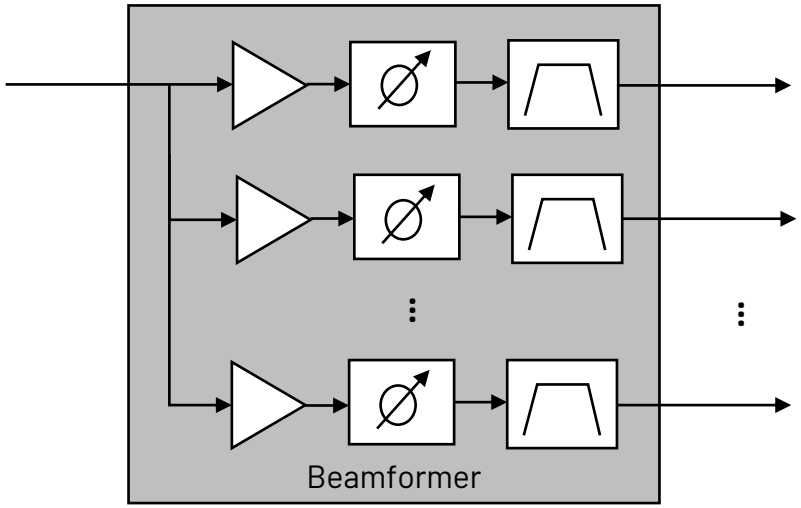
Multi-Channel Measurements in Frequency and Time Domains

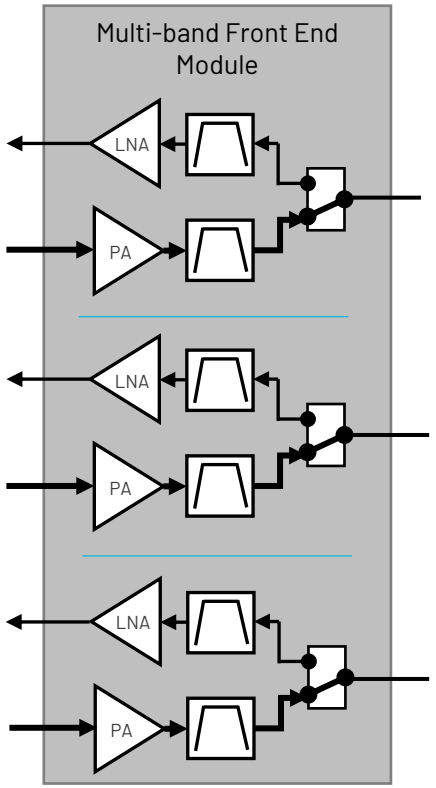
Alejandro Buritica – RF Product Manager



Multi-Channel RF Devices

NEW DEVICES WITH MULTIPLE SIGNAL PATHS

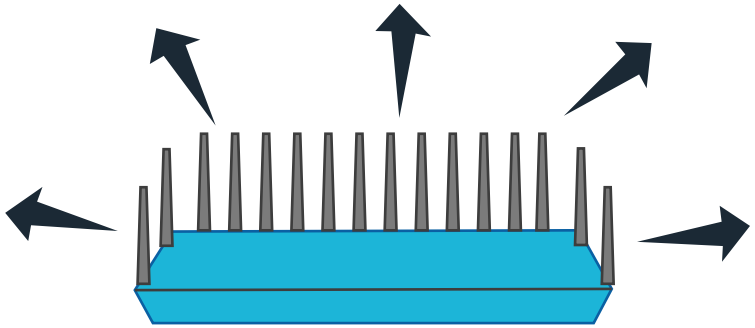




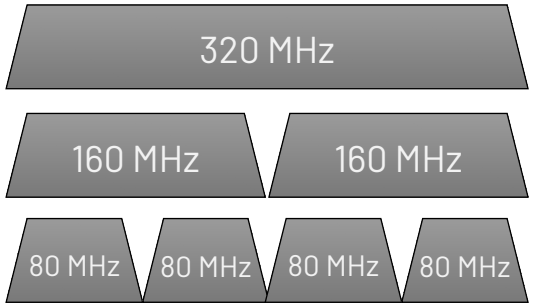
Beamformers

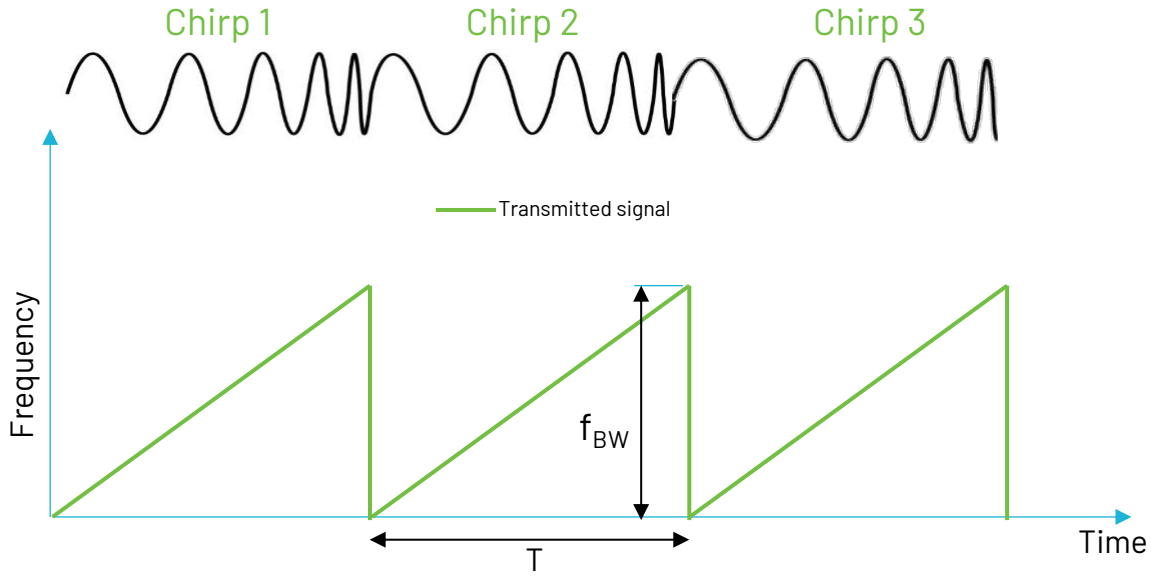
Multi-band FEMs

Multi-Channel RF Systems with Larger Bandwidth



16 Spatial Streams

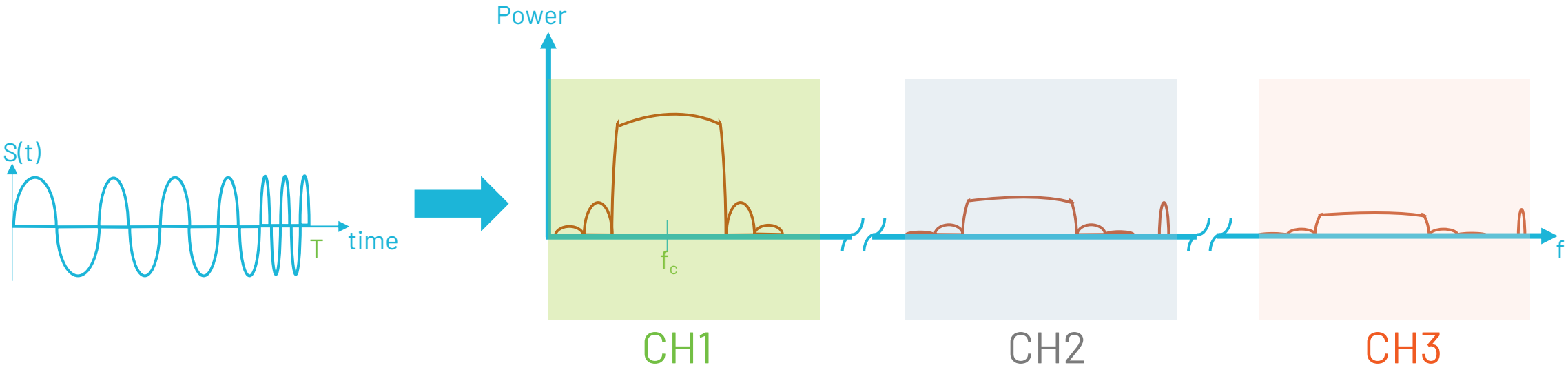




Wireless Communications (Wi-Fi 7)

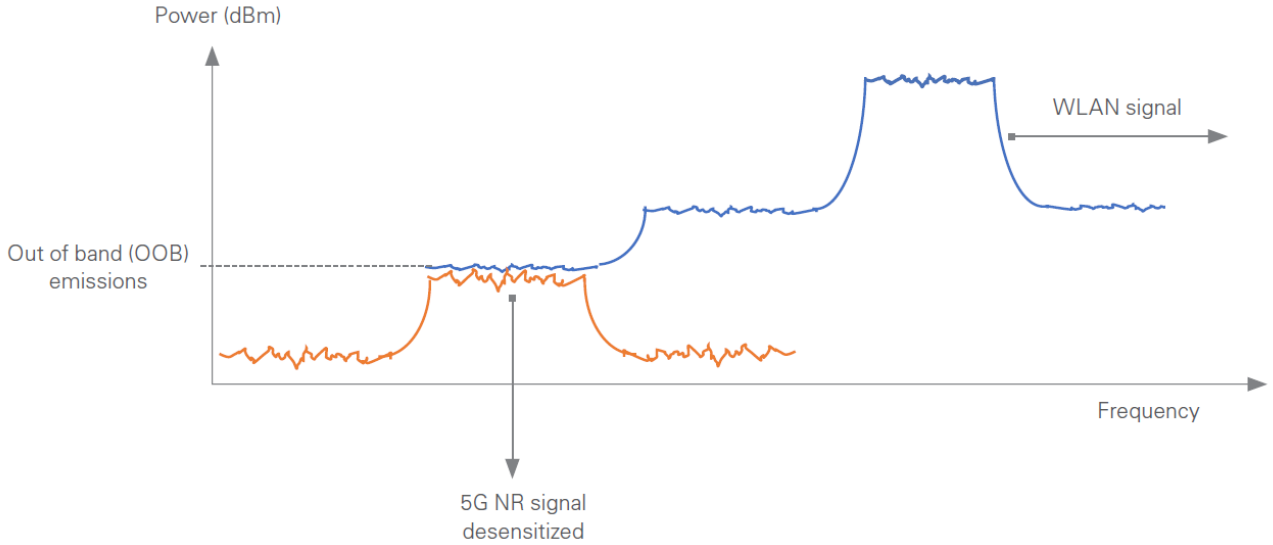
Radar

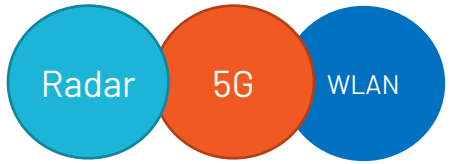
Understand Out-of-band Effects

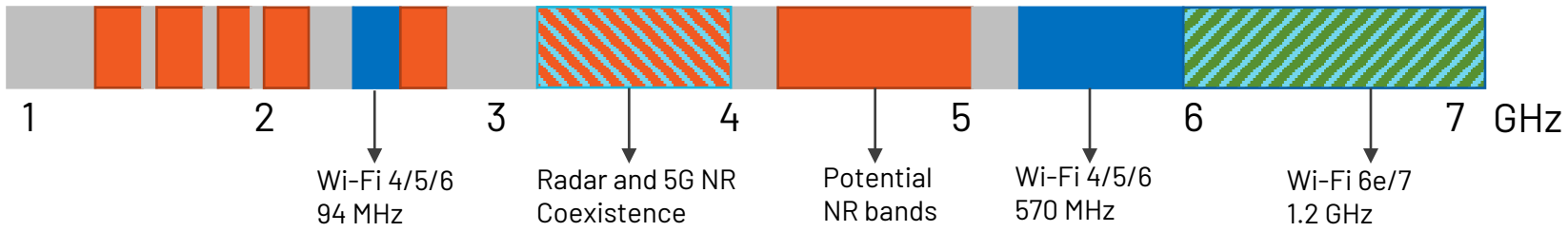


Measure Interference and Coexistence Effects

FLEXIBILITY TO TEST FOR COEXISTENCE OF RADAR, 5G, AND WI-FI



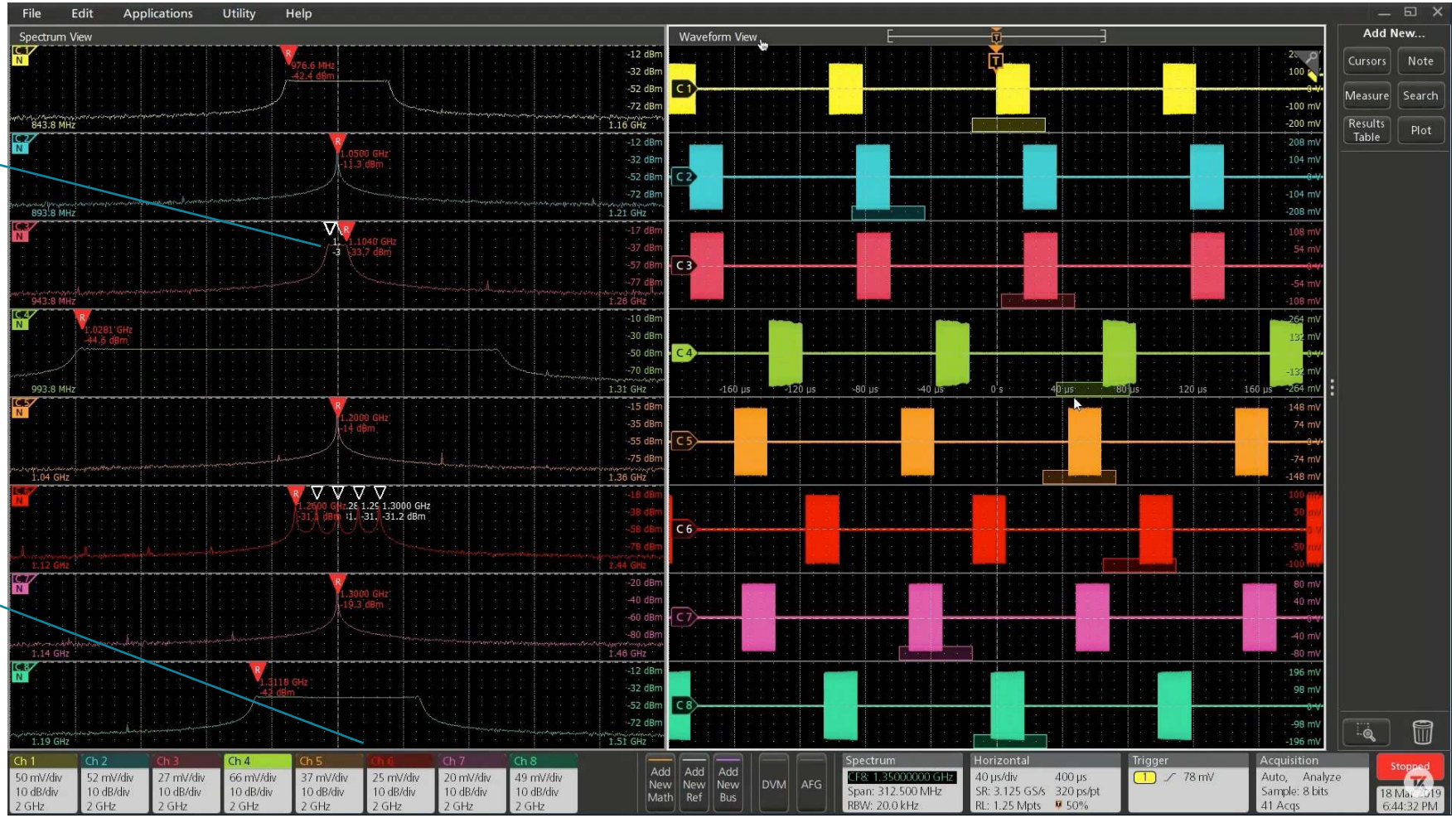




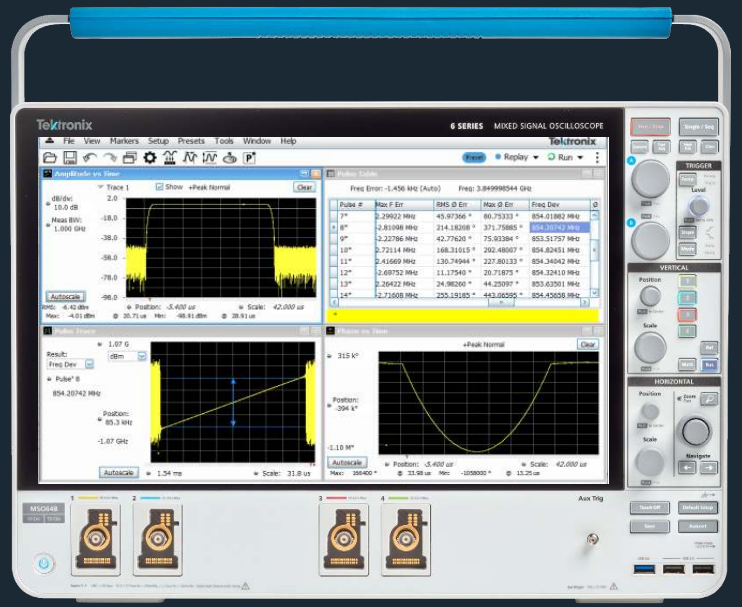
Correlate Events in Frequency to Events in Time

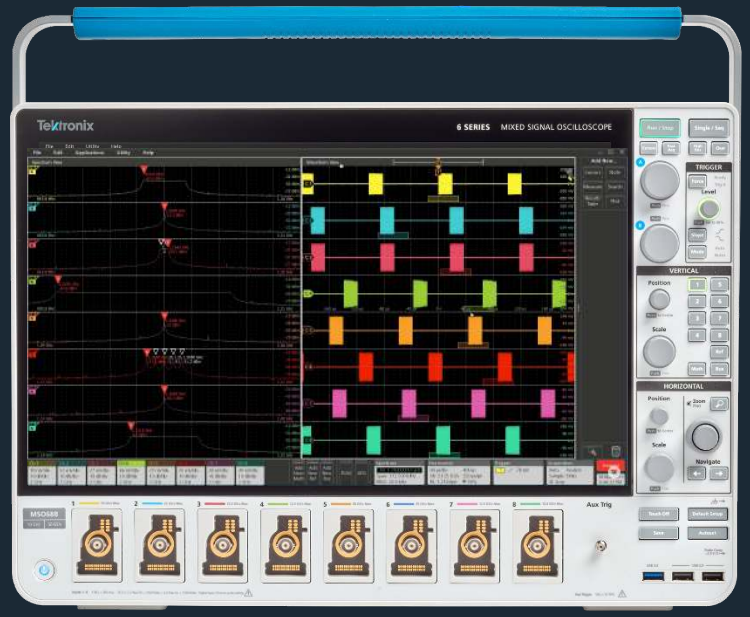
Display synchronized time and frequency domain views on multiple channels

Adjust waveform and spectrum controls independently



6 Series B Oscilloscopes





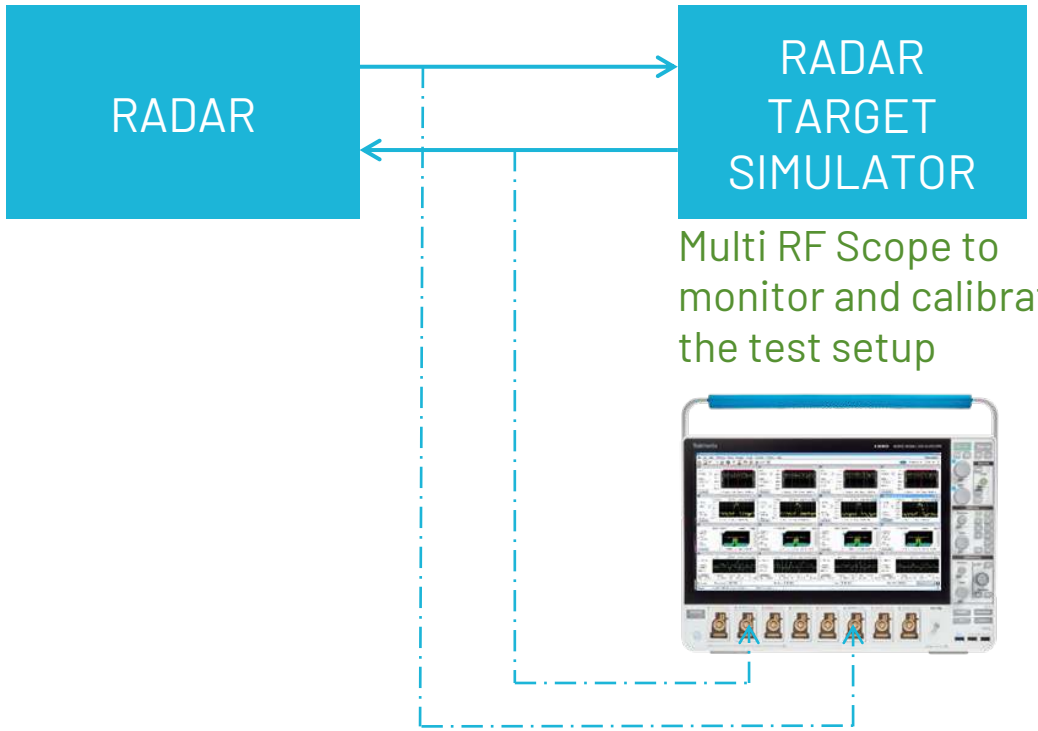
Up to 10 GHz bandwidth

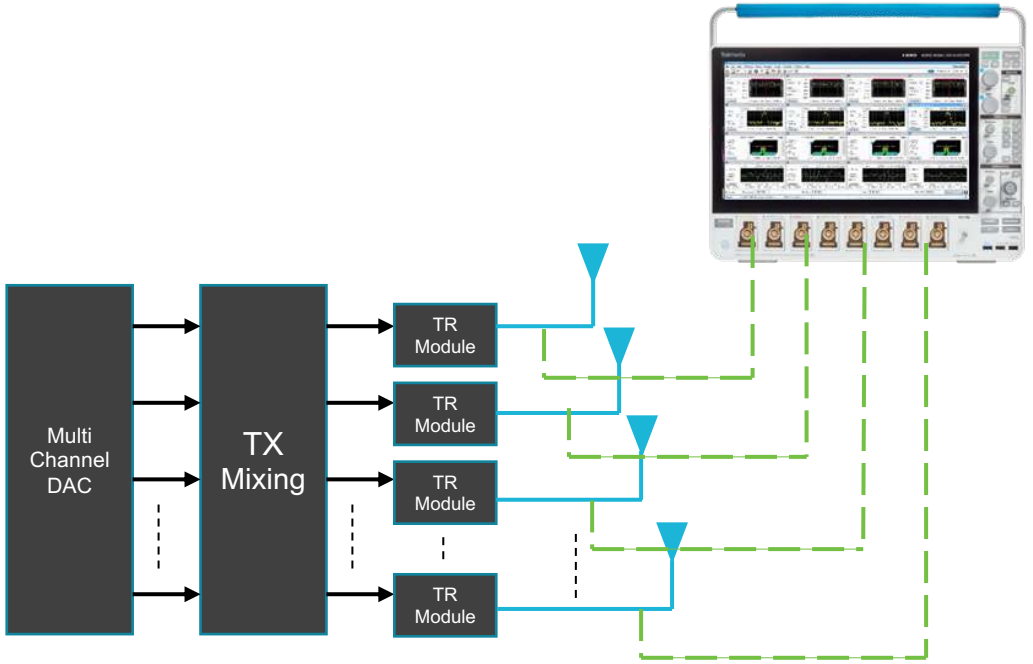
High signal fidelity with 12-bit ADCs and ultra-low noise

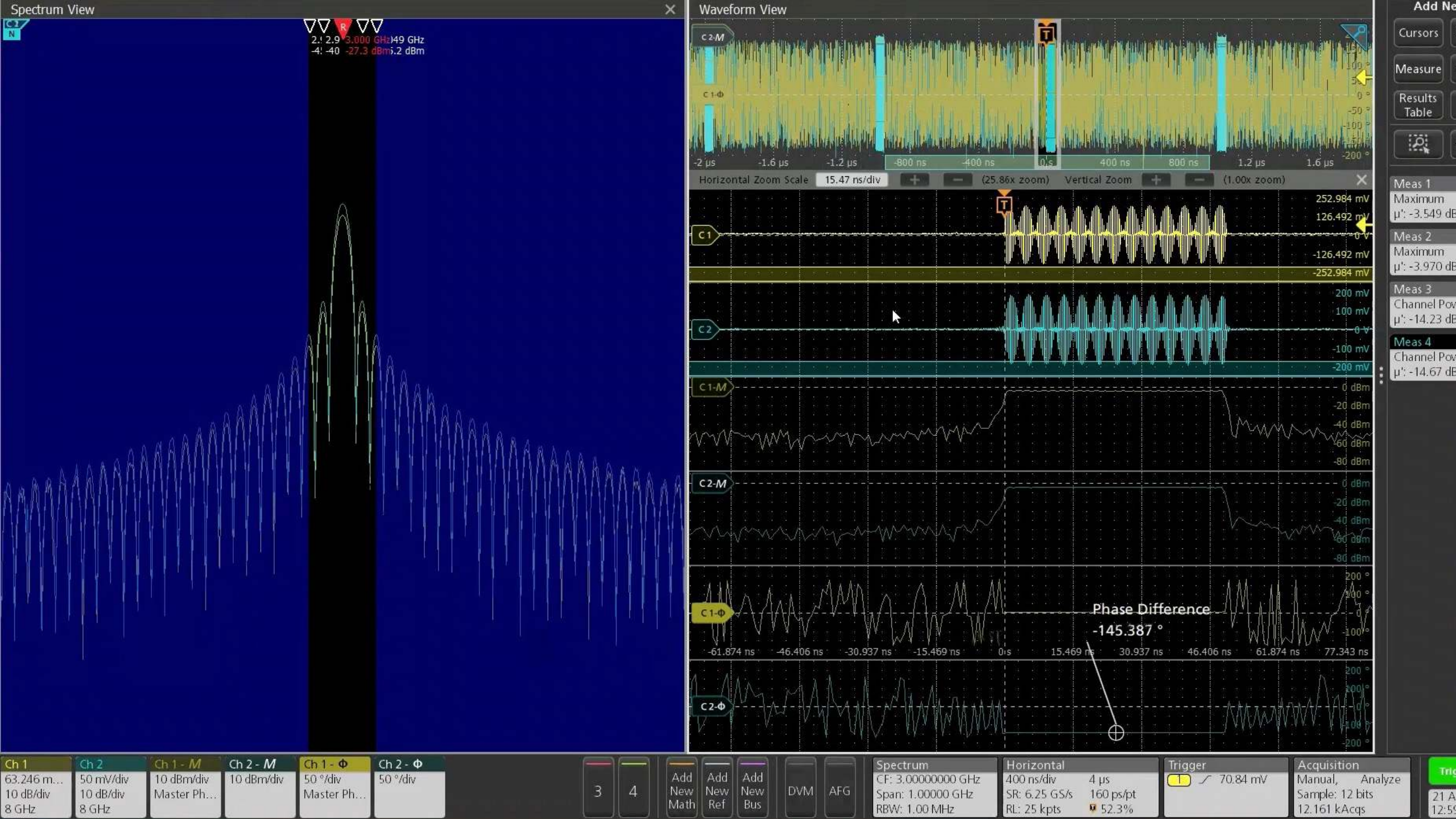
4, 6 or 8 Channel inputs

Phase-Synchronous, Multi- Channel RF Analyzer

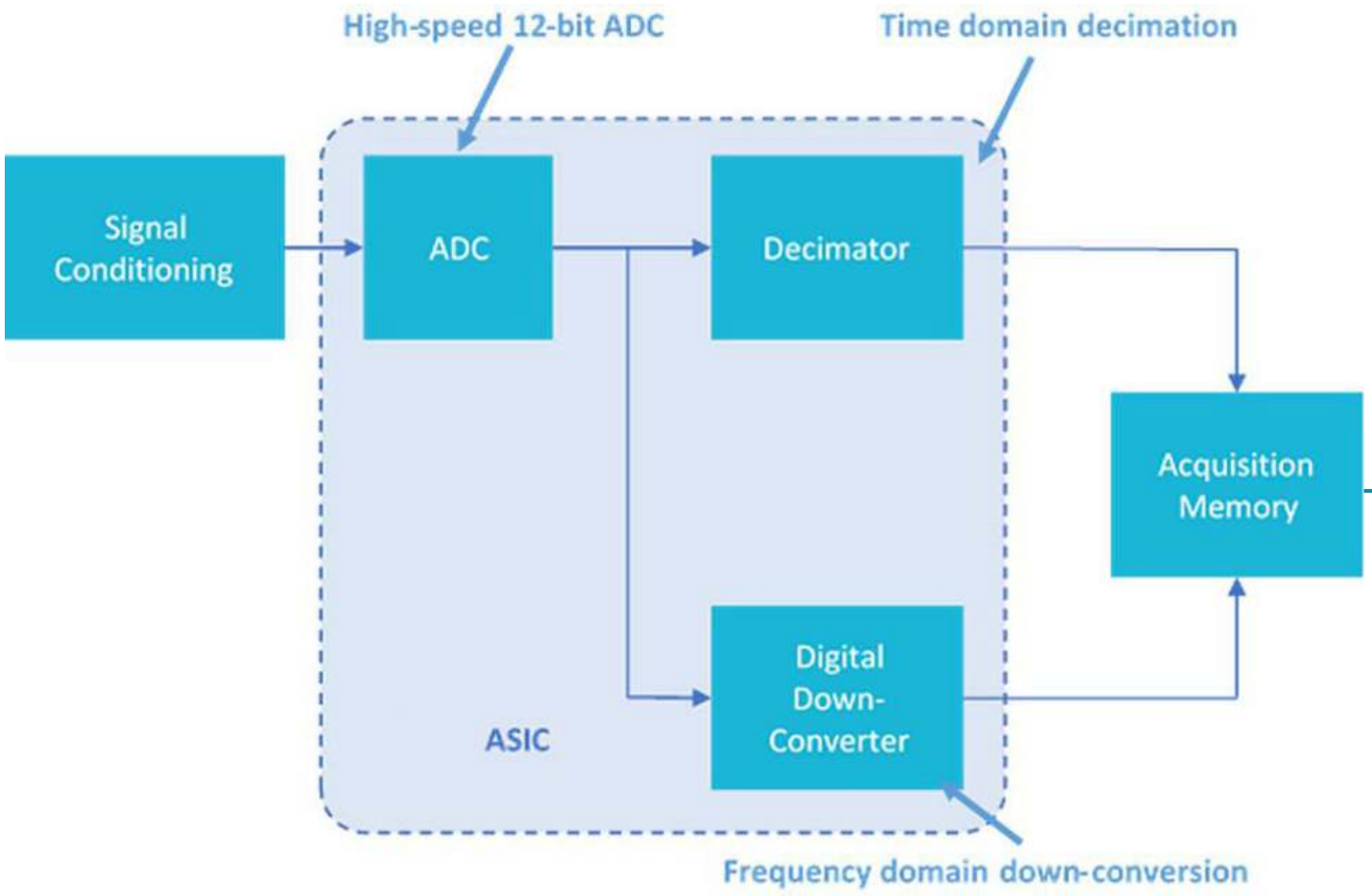
RADAR Test Scenarios

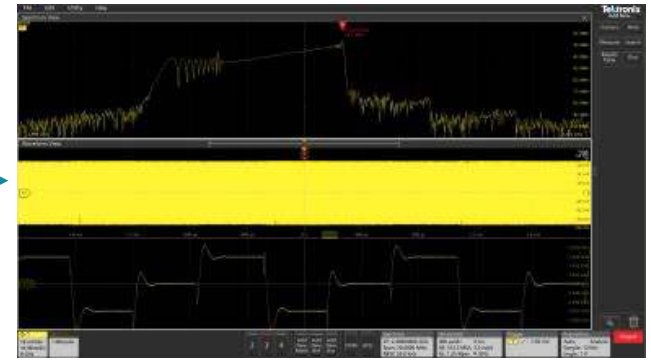


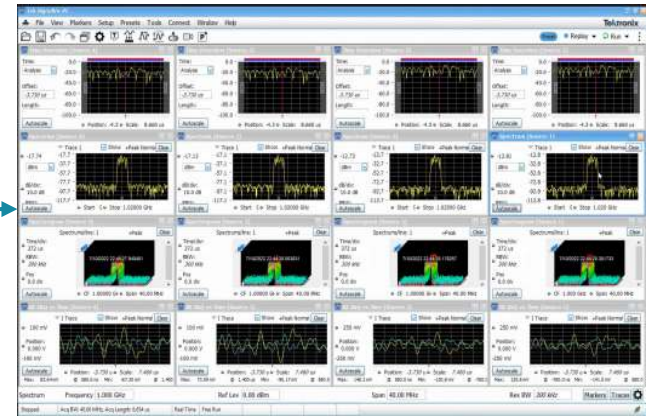



Spectrum View
Waveform View
Horizontal Zoom Scale 15.47 ns/div (25.86x zoom) Vertical Zoom (1.00x zoom)
Phase Difference
-145.387 °
Cursors
Measure
Results Table
Meas 1
Maximum
Meas 2
Maximum
Meas 3
Meas 4
Ch 1
63.246 m...
10 dB/div
8 GHz
Ch 2
50 mV/div
10 dB/div
8 GHz
Ch 1 - M
10 dBm/div
Master Ph...
Ch 2 - M
10 dBm/div
Ch 1 - Φ
50 °/div
Master Ph...
Ch 2 - Φ
50 °/div
Add New Math
Add New Ref
Add New Bus
DVM
AFG
Spectrum
CF: 3.00000000 GHz
Span: 1.00000 GHz
RBW: 1.00 MHz
Horizontal
400 ns/div
SR: 6.25 GS/s
RL: 25 kpts
4 µs
160 ps/pt
52.3%
Trigger
70.84 mV
Acquisition
Manual, Analyze
Sample: 12 bits
12.161 kAcqs

Spectrum Analysis on All Channels

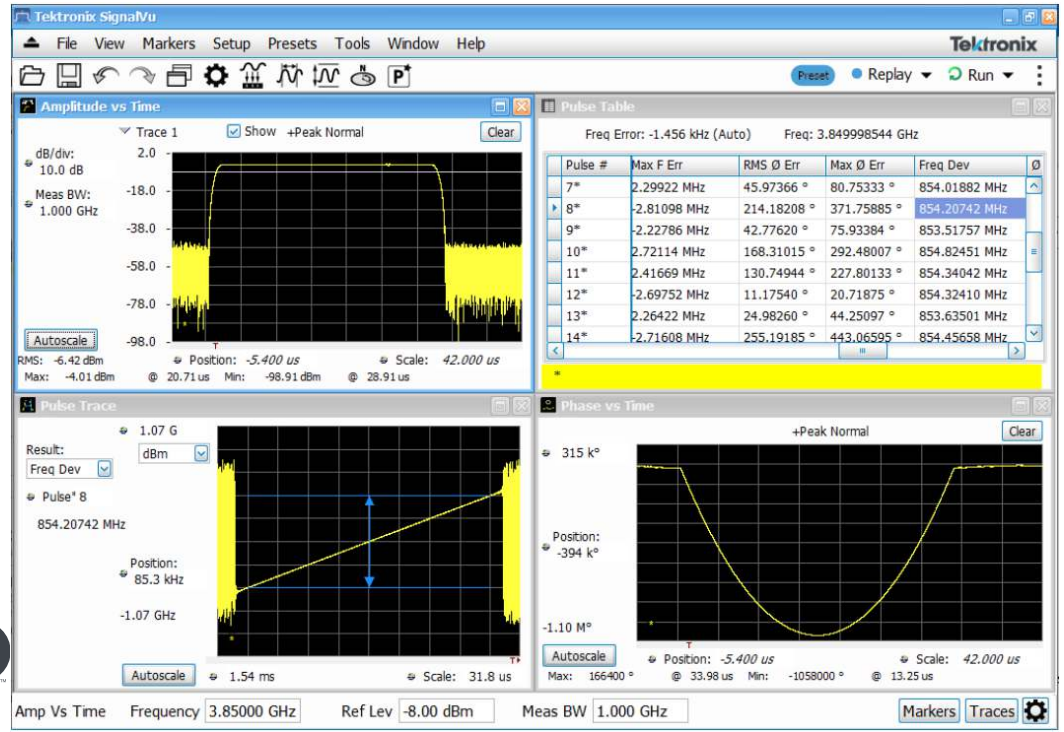




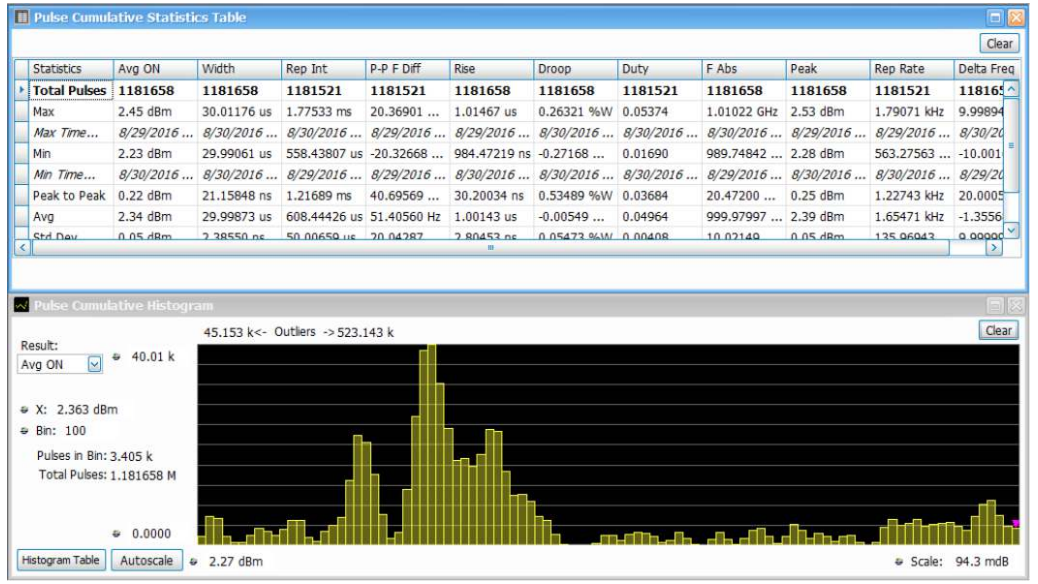


Pulse Analysis Capabilities

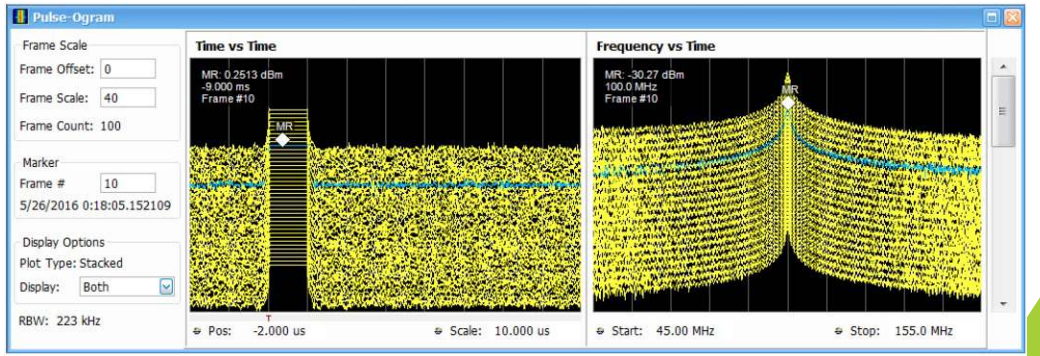
- Achieve deep insight into multi-emitter pulse train behavior with more than 30 automated pulse parameter measurements and statistics over millions of pulses
- Show outliers, target range, and speed
- Support for up to 8 phase-coherent channels



Pulse statistics table and pulse histogram

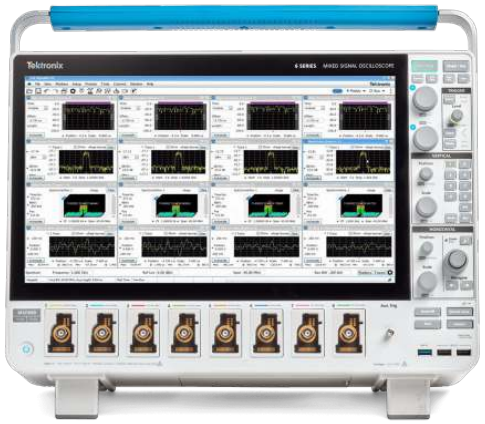


Pulse-O-gram




Tek SignalVu-PC
File View Markers Setup Presets Tools Connect Window Help
Tektronix
Preset Replay Run
Channel 2
Channel 1
Pulse Table : Source 2 : Meas2
Freq Error: 798.2 Hz (Auto)
Freq: 3.000000798 GHz
Pulse # Avg ON Width Rep Int Time
1 -4.47 dBm 1.00000 us 49.99998 us 24.98110 us
2 -4.46 dBm 1.00000 us 54.99999 us 74.98109 us
3 -4.48 dBm 999.99659 ns 59.99998 us 129.98107 us
4 -4.47 dBm 999.99920 ns 64.99998 us 189.98106 us
5 -4.47 dBm 1.00000 us 69.99999 us 254.98105 us
6 -4.46 dBm 1.00000 us 74.99998 us 324.98103 us
7 -4.47 dBm 1.00000 us 79.99998 us 399.98099 us
8 -4.48 dBm 1.00000 us 84.99998 us 479.98098 us
9 -4.47 dBm 1.00001 us 89.99998 us 564.98096 us
10 -4.47 dBm 1.00000 us -- s 654.98095 us
Channel 2
Time Overview : Source 2 : Meas2
Time: Linked
Offset: -5.000 us
Length: 693.639 us
dB/div: 10.0 dB
MR: -45.18 dBm
985.040 ns M1
Autoscale
Position: -81.058 us
Scale: 1.013 ms
Time Overview : Source 1 : Meas1
Time: Linked
Offset: -5.000 us
Length: 873.087 us
dB/div: 10.0 dB
MR: -39.64 dBm
985.040 ns
Autoscale
Position: -81.058 us
Scale: 1.013 ms
Pulse Table : Source 1 : Meas1
Freq Error: 800.9 Hz (Auto)
Freq: 3.000000801 GHz
Pulse # Avg ON Width Rep Int Time
1 -4.13 dBm 1.00001 us 49.99998 us -18.88070 ns
2 -4.13 dBm 1.00000 us 49.99998 us 49.98111 us
3 -4.12 dBm 1.00000 us 49.99998 us 99.98109 us
4 -4.13 dBm 1.00000 us 49.99998 us 149.98108 us
5 -4.12 dBm 1.00000 us 49.99999 us 199.98106 us
6 -4.13 dBm 999.99988 ns 49.99998 us 249.98107 us
7 -4.13 dBm 1.00000 us 49.99999 us 299.98104 us
8 -4.12 dBm 1.00000 us 49.99998 us 349.98104 us
9 -4.13 dBm 1.00001 us 49.99999 us 399.98101 us
10 -4.11 dBm 1.00000 us 49.99998 us 449.98099 us
11 -4.12 dBm 1.00000 us 49.99998 us 499.98099 us
12 -4.13 dBm 1.00000 us 50.00000 us 549.98096 us
13 -4.12 dBm 999.99727 ns 49.99998 us 599.98099 us
14 -4.13 dBm 999.99875 ns 49.99998 us 649.98097 us
15 -4.13 dBm 999.99886 ns 49.99998 us 699.98094 us
16 -4.12 dBm 1.00000 us 49.99999 us 749.98091 us
17 -4.13 dBm 999.99852 ns 49.99998 us 799.98089 us
18 -4.12 dBm 999.99875 ns -- s 849.98092 us
Channel 1
Spectrum : Source 2 : Meas2
Trace 1 Show +Peak Normal
Clear
0.00 dBm
dB/div: 10.0 dB
RBW: 10.0 kHz
VBW:
Segments: 3
MR: -62.11 dBm
3 GHz
Autoscale
Start 2.75000 GHz
Stop 3.25000 GHz
Spectrum : Source 1 : Meas1
Trace 1 Show +Peak Normal
Clear
0.00 dBm
dB/div: 10.0 dB
RBW: 10.0 kHz
VBW:
Segments: 3
MR: -61.34 dBm
3 GHz
Autoscale
Start 2.75000 GHz
Stop 3.25000 GHz
Pulse Table Settings
Source: Source 2
Restore Defaults
Measurements Params Define Levels Freq Estimation
Show in Pulse Table:
Delta Frequency
Freq Abs
Pulse-Pulse Freq Difference
Pulse-Pulse Phase Difference
Time
Select all
Clear all
Pulse Trace
Frequency 3.00000 GHz
Ref Lev 0.00 dBm
Markers Traces
Stopped
Acq BW: 2.00 GHz, Acq Length: 1.013 ms
Real Time
Power

Tektronix Solutions for RADAR Test



5 or 6 Series MSO:
Up to 10 GHz in frequency, up to 2 GHz in bandwidth, 8-RF inputs

Multi-channel RF capture and analysis, low phase noise and wide dynamic range

RSA7000B:
Up to 26.5GHz of frequency range, 800MHz acquisition bandwidth, 1-input

Real time analysis for lab,
Raid drive for long recordings, low phase noise for accurate Tx test

RSA306B/RSA500/RSA600
9 kHz-18 GHz, 40 MHz acquisition bandwidth, 1-input

Real time analysis for field spectrum management, design,

THANK YOU

Contact information:

Alejandro Buritica

RF Product Manager

alejandro.buritica@tektronix.com