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CONNECT

2023 AUSTIN

How to get the most out of PXI VSTs

Cristian Muresan Hagau

Product Manager, RF Test

Agenda

PXI VST Refresh

New Production Introductions: PXIe-5842s
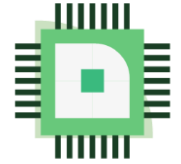
Hardware Architecture

Software Tools

Platform Benefits

VST Applications

Talk about VST at NI Connect

Business Unit Technical Sessions

Multichannel RF Data Recording and Analysis
Meeting Room 19A

5G Mid-Band, 5G mmWave, or Wi-Fi 7—Which Technology Will Consumers Adopt?
*Meeting Room 18B*

Characterizing Digital TRMs and ESA Systems
Meeting Room 19A

Covering the Full Radar Test Spectrum: From Digital to Analog and Component to System
Meeting Room 19A

Validating Satellite Datalinks with HIL and SLE
Meeting Room 19A

Navigating Wireless Infrastructure Test
Meeting Room 18B

Enabling the 6G Vision through Test and Measurement
*Meeting Room 18B*
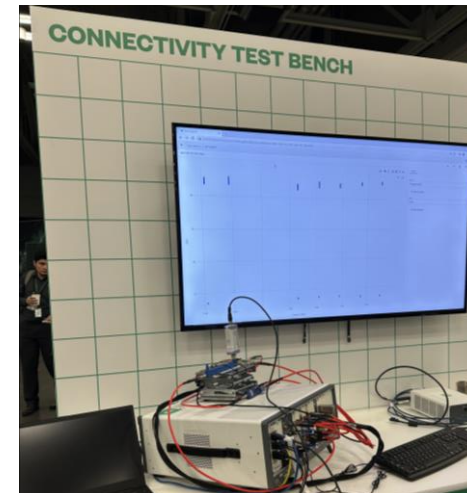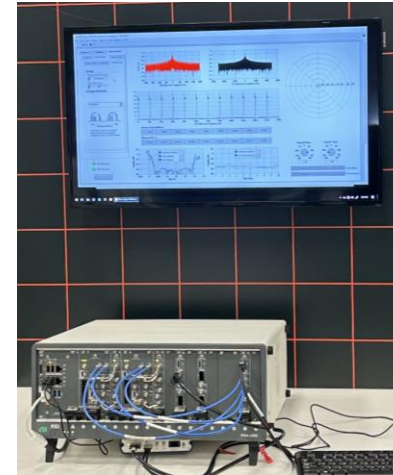
What is a PXI Vector Signal Transceiver?

The PXI Vector Signal Transceiver (VST) combines an RF and baseband vector signal analyzer and generator with a powerful FPGA and high-speed serial and parallel digital interfaces for real-time signal processing and control from baseband to mmWave.

ni.com

Two Distinct Approaches to RF Characterization

Traditional Approach	Platform-Based Approach

Traditional Approach
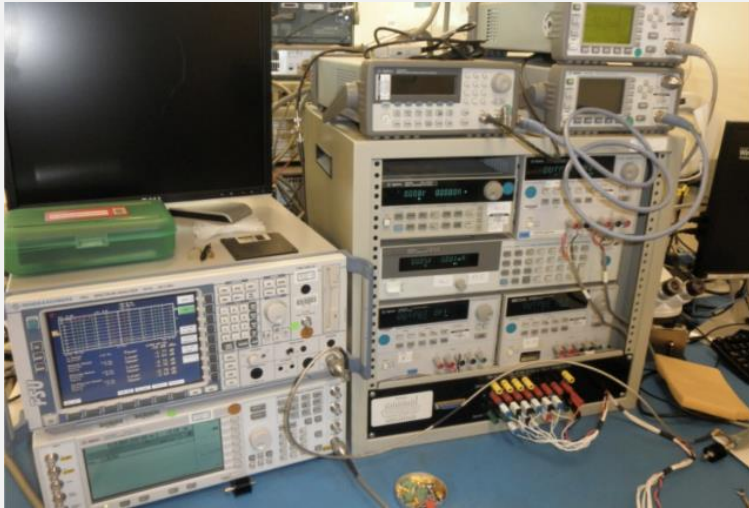
- Familiar user experience for many engineers
- Slower measurement speed
- Expensive to upgrade or replace – even Software
- Difficult to synchronize
- Large physical footprint
- Tradeoffs between speed and accuracy

Platform-Based Approach

- Familiar measurement APIs with interactive SFPs
- Faster and FPGA-accelerated measurement speed
- Less expensive to upgrade – especially Software
- Native synchronization technologies
- Smaller physical footprint
- R&D grade accuracy with production test speed

PXIe-5842 | Most Versatile & Capable PXI VST in the Industry

23 GHz* VSA with up to 2 GHz Instantaneous BW
* 26.5 GHz available in Q3.2023

PFI 0 (Trigger / Event)

High speed serial interface
MGT - 16 lanes @ 16Gbps
Full Rate IQ Data Streaming to
NI FPGA Co-processor
(*Available Q3.2023*)

VST Extension DIO Port

Integrated RF Signal Chain Pulse Modulation
Allows for optimization of On/Off Ratio
versus pulse width
(*Available Q3.2023*)

23 GHz* VSG with up to 2 GHz Instantaneous BW
* 26.5 GHz available in Q3.2023

High Performance Dual LO Synthesizer
Unique LO chains for RF Out and RF In (from PXIe-5655)

Multi-Instrument Synchronization
Expand channel count with phase coherency
LO / REF-sharing and TClk sync across the PXI backplane

Small form factor
Requires only 4 PXI slots
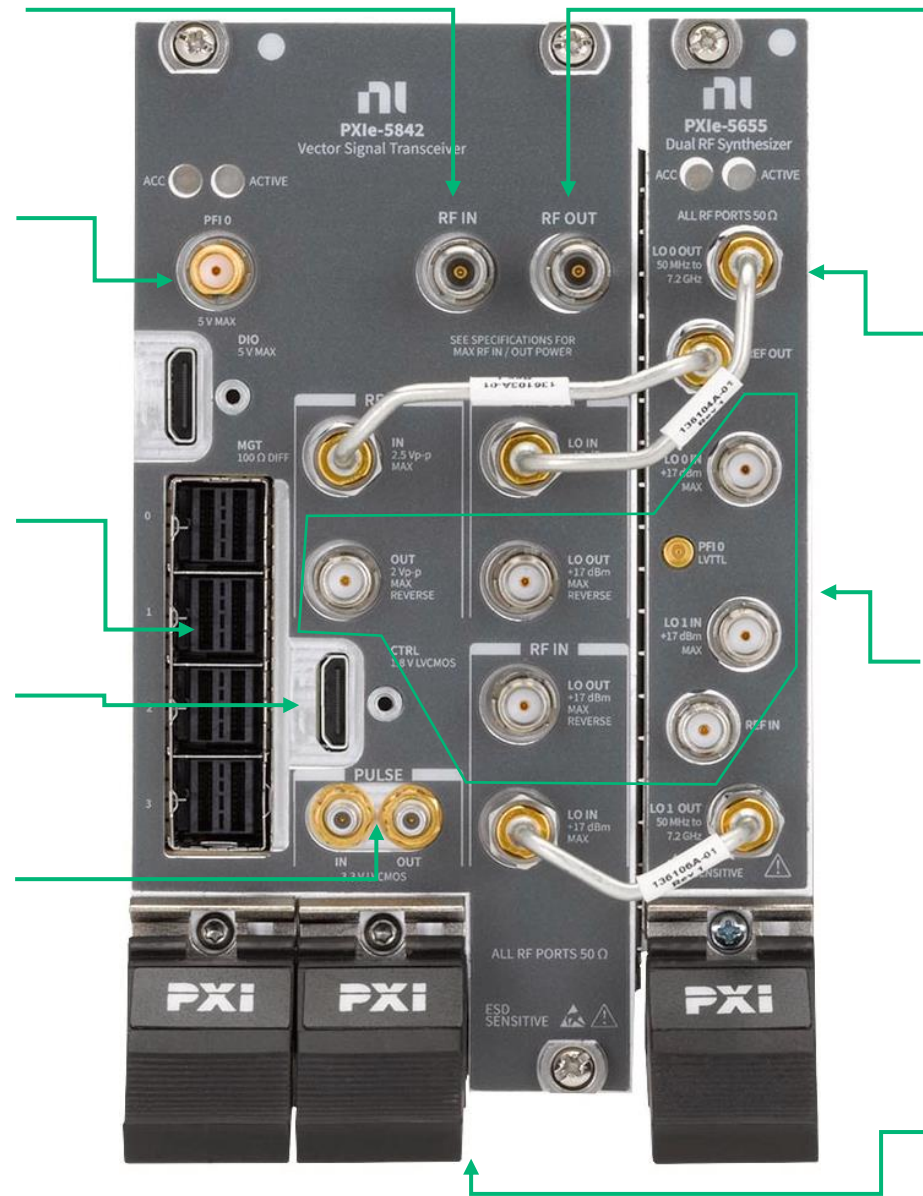
Highest Performance VST

Model Name	PXIe-5841	PXIe-5830	PXIe-5831	PXIe-5842 (new)
Frequency	9 kHz – 6 GHz	5 GHz – 12 GHz	5 GHz – 21 GHz	50 MHz – 23 GHz 30 MHz - 26.5 GHz (Q3.2023)
Bandwidth	1 GHz	1 GHz	1 GHz	Up to 2 GHz (4GHz PoC)
Slot Count	2 / 3	4	6	4
Tuning Time	380 us / 175 µs	500 µs	500 µs	230 µs
VSG Maximum Output Power (CW @ 5 GHz)	+ 20 dBm	+ 12 dBm	+ 12 dBm	+ 20 dBm
EVM (5G NR, 100 MHz, loopback @ 5.5 GHz)	-49 dB	-51 dB	-51 dB	-56 dB
Frequency Response (max BW) typ.	± 0.85 dB	± 1.1 dB	± 1.2 dB	± 0.35 dB
RF IN Average Noise Density (+0 dBm Ref Level)	-144 dBm/Hz	-142 dBm/Hz	-141 dBm/Hz	-146 dBm/Hz

PXIe-5842 | Configurations & Options

Scalable value at a scalable price, with no tradeoff on core performance

Q4'22 PXIe-5842 Fixed Configurations

Direction	Configuration
Analysis and Generation	8 GHz, 1 GHz BW
Analysis and Generation	12 GHz, 2 GHz BW
Analysis and Generation	23 GHz, 2 GHz BW

Q3'23 PXIe-5842 Hardware Options

Direction
Analysis and Generation
Analysis Only
Generation Only

Choose Direction

Frequency Range
30 MHz – 8 GHz
30 MHz – 12 GHz
30 MHz – 18 GHz
30 MHz – 26.5 GHz

Choose Frequency Range

| Bandwidth |
|---|
| 500 MHz BW |
| 1 GHz BW |
| 2 GHz BW |

Choose Bandwidth

Desired Configuration

PXIe-5842 Hardware

Hardware Block Diagram

- High-Quality RF Front End

- Multiple signal conditioning paths

- High Speed Data Converters

- FPGA-based shared signal processing between generation, analysis, pulsing and data movement

- High Performance LO (PXIe-5655) with unique LO chains for RF Out and RF In
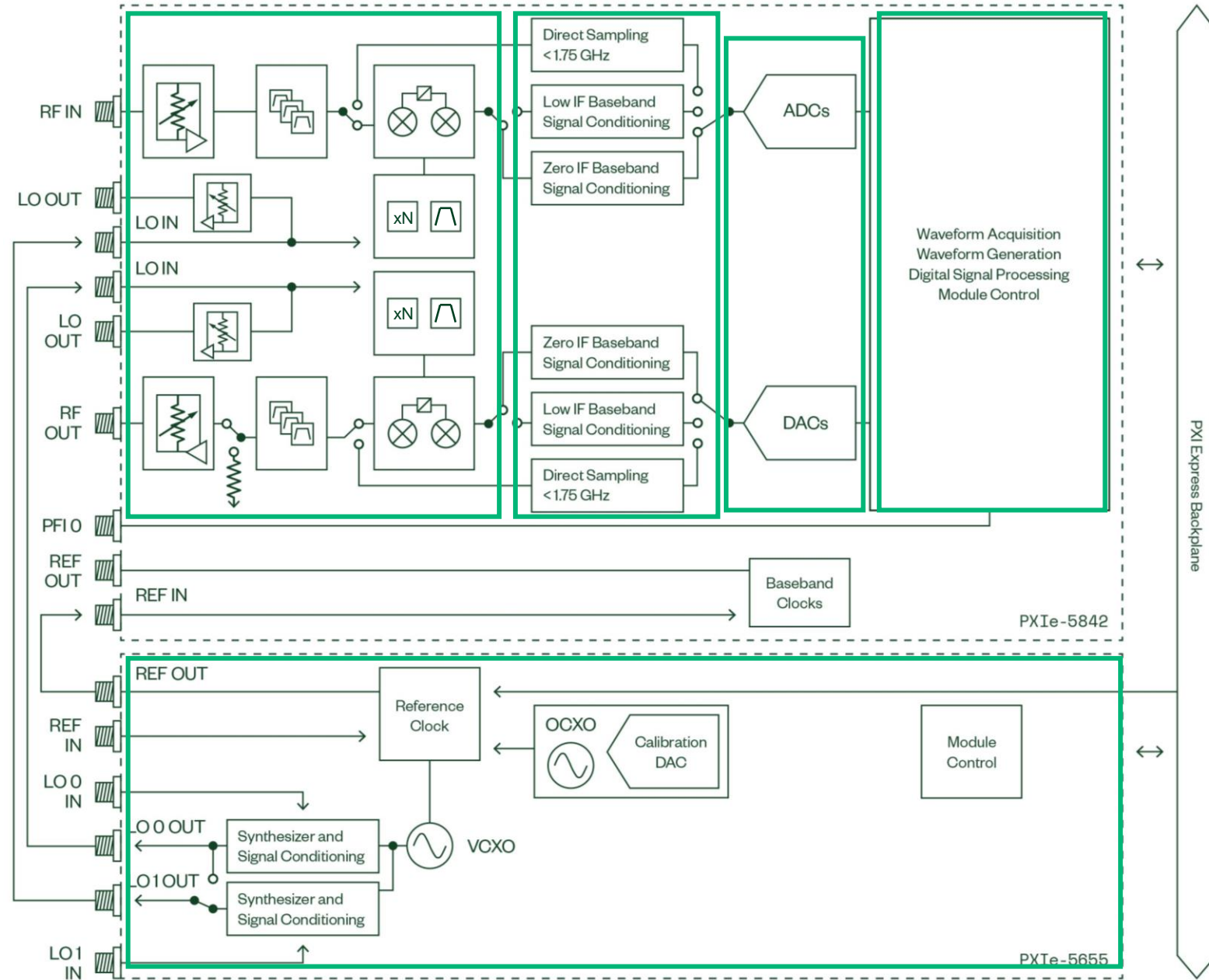
Multiple Signal Conditioning Paths

Multiple Signal Conditioning Paths:

- Direct RF sampling path for center frequencies below 1.75 GHz.

- Low IF conditioning path optimized for high dynamic range.

- Zero IF conditioning path optimized for wide bandwidth signals with IBW up to 2 GHz.
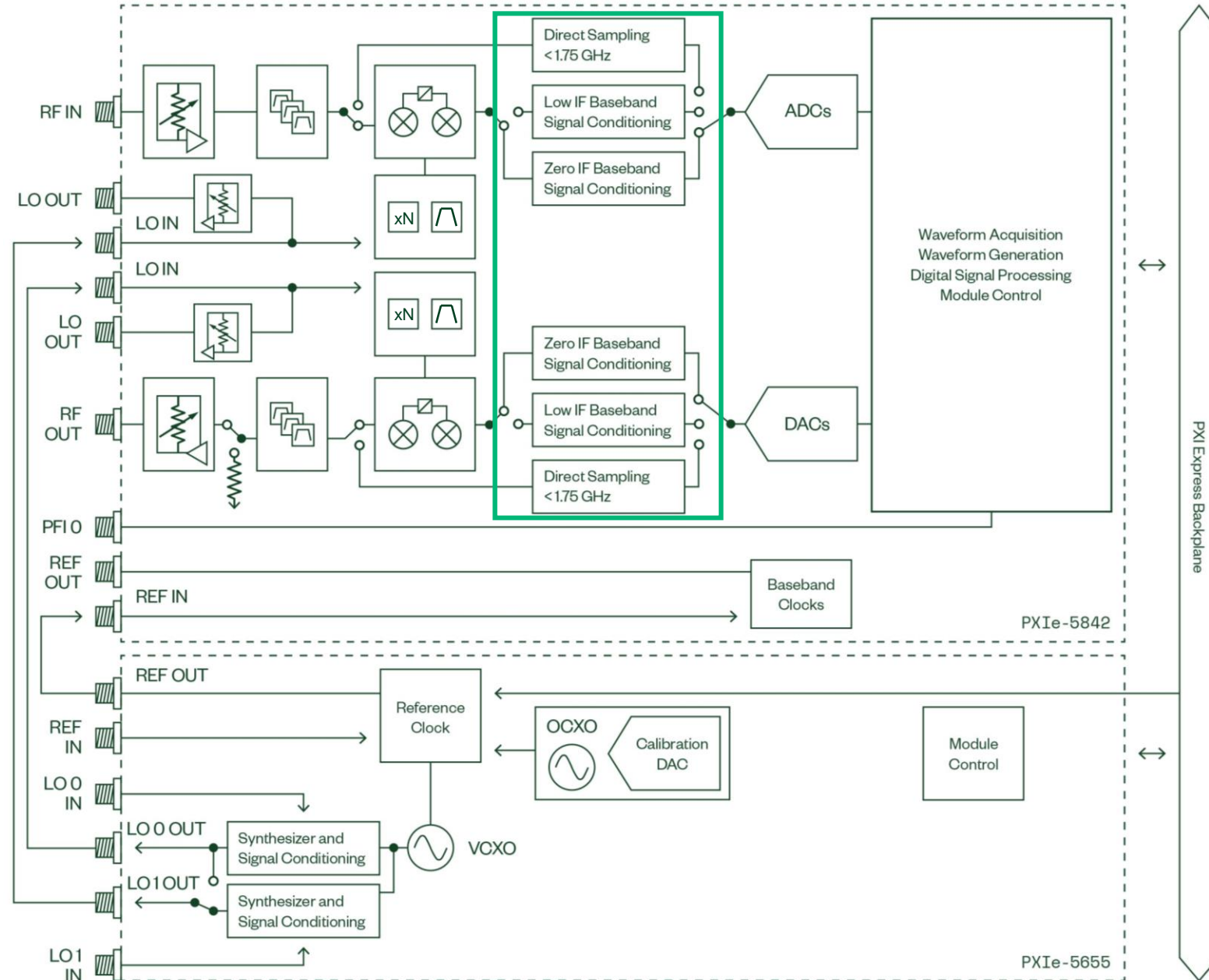
Multiple Signal Conditioning Paths

Selected path is a function of:

- Offset Mode

- Center Frequency
  - < 1.75 GHz (Direct Sampling)
  - > 1.75 GHz (Low IF or Zero IF)

- Bandwidth
  - Low IF if:
    - BW < 600 MHz & Center Freq. < 5.25 GHz
    - BW < 900 MHz & Center Freq. > 5.25 GHz
  - Zero IF, otherwise
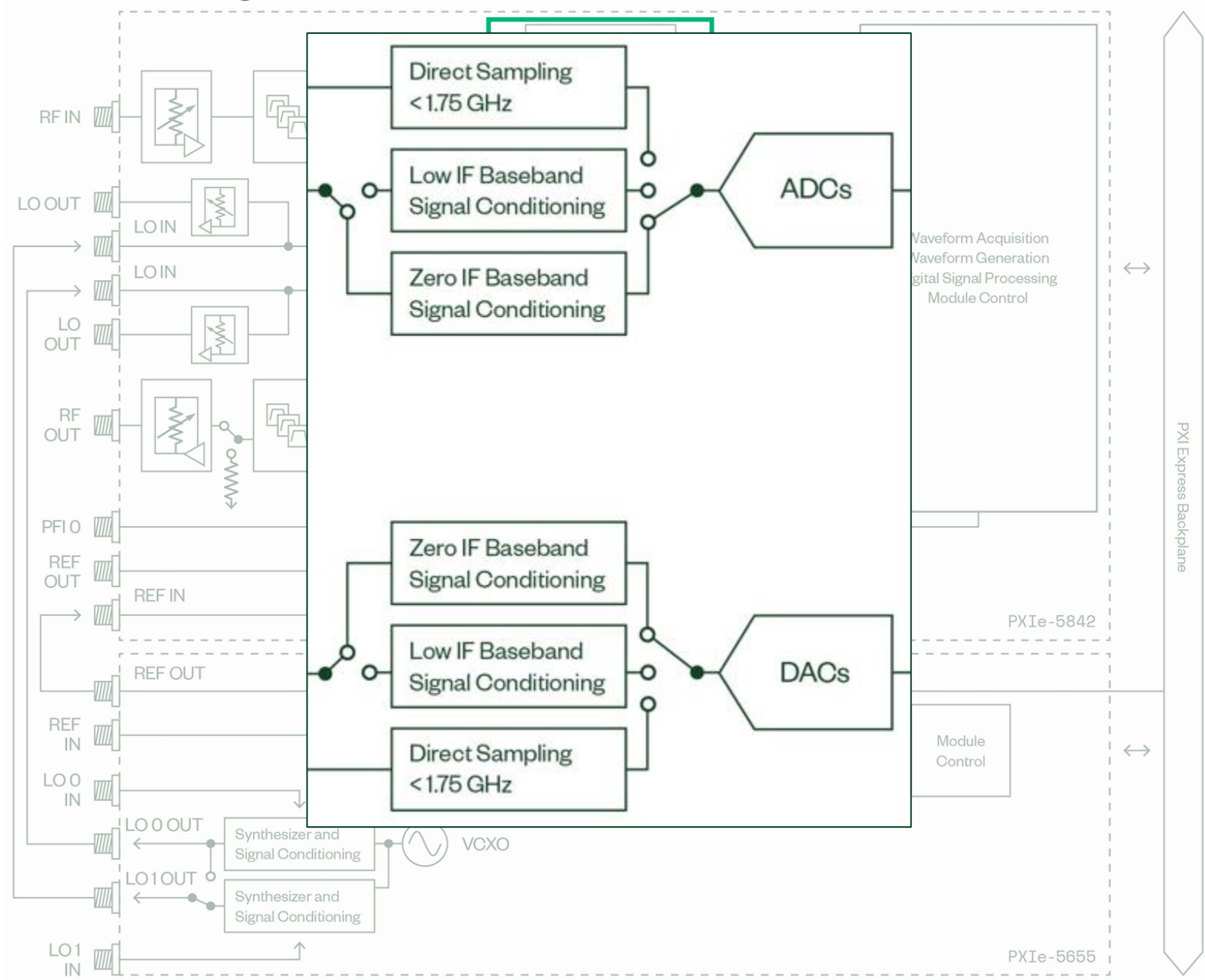
Direct Conversion

Benefits

Eliminates need for RF filters (especially switched filter)

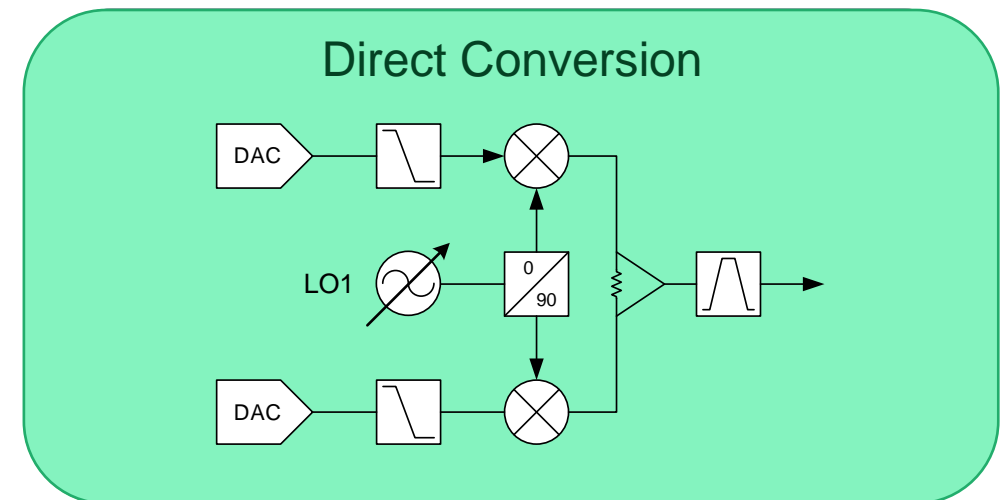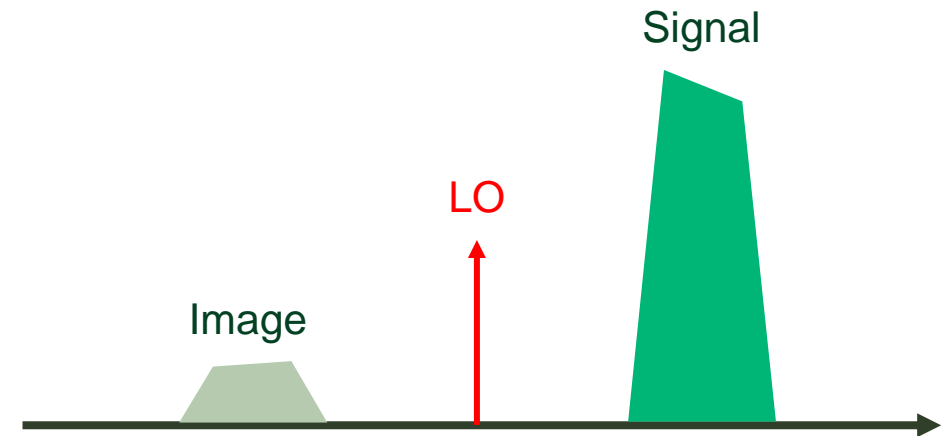For the same bandwidth, half sample-rate compared to super-heterodyne

Lower cost

Utilizes DACs in 1st Nyquist zone (higher dynamic range)

Drawbacks

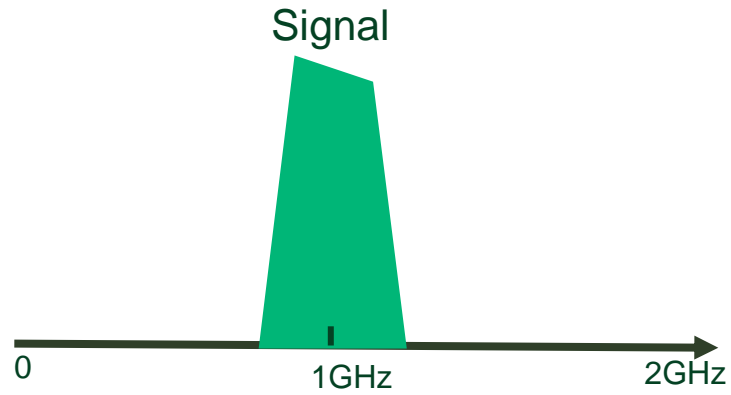Correction of I/Q impairments

    More difficult at higher frequencies
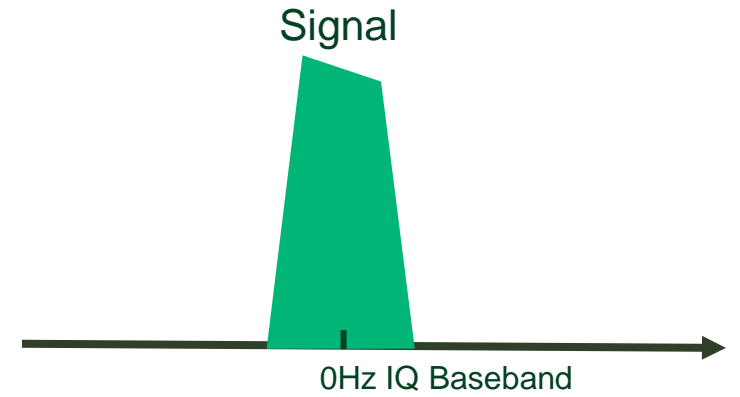
    Must correct impairments over tuning range

Multiple Signal Conditioning Paths
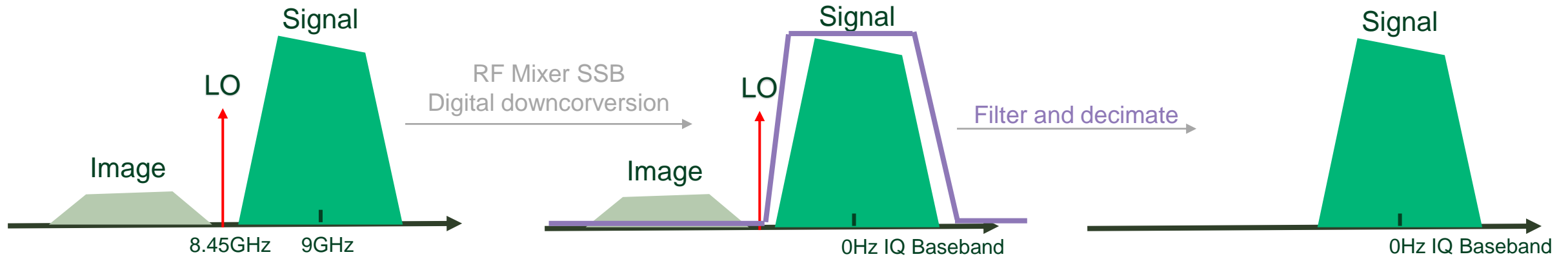
Direct Sampling

No LO Leakage / Image

Signal

0   1GHz   2GHz

Digital downcorversion →

Signal

0Hz IQ Baseband

Multiple Signal Conditioning Paths

Low IF

LO Offset at -550 MHz, No LO Leakage/Image

Signal

LO

Image

8.45GHz   9GHz

RF Mixer SSB
Digital downcorversion

Signal

LO

Image

0Hz IQ Baseband

Filter and decimate

Signal

0Hz IQ Baseband

Multiple Signal Conditioning Paths

Zero IF
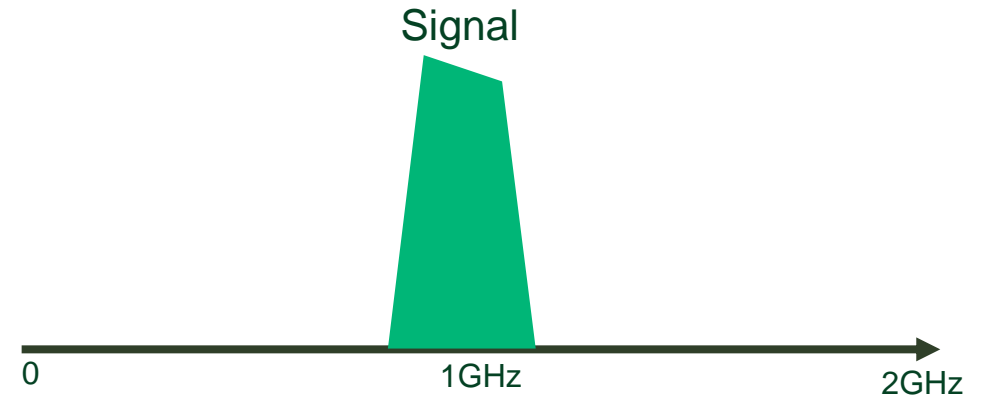
LO Leakage/Image in band

ni.com
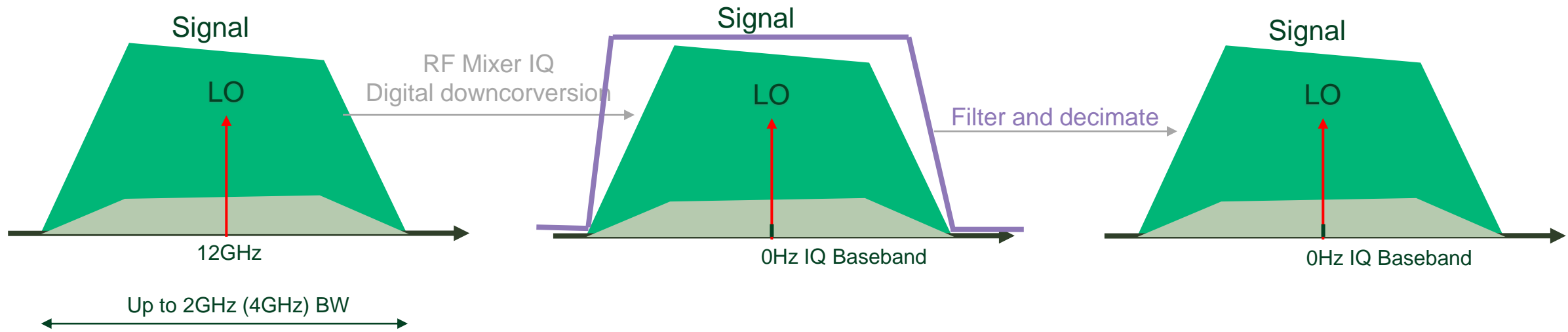
Multiple Signal Conditioning Paths

Direct Sampling
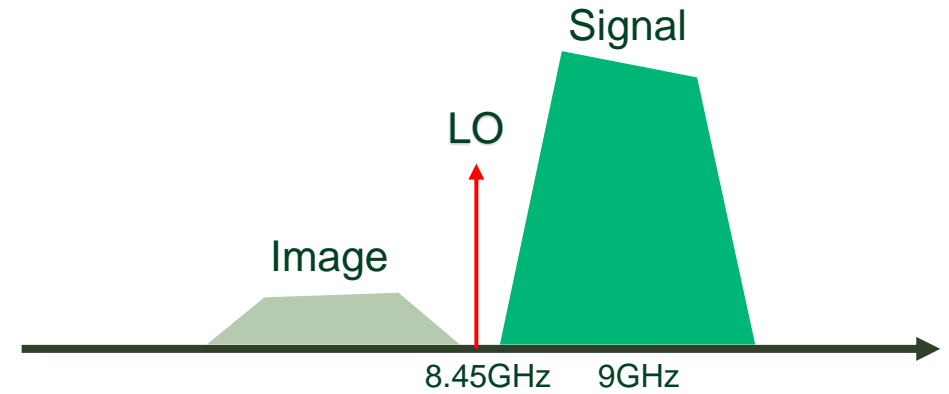
No LO Leakage / Image

Example: 500 MHz wide signal at 1GHz Center Frequency

Low IF

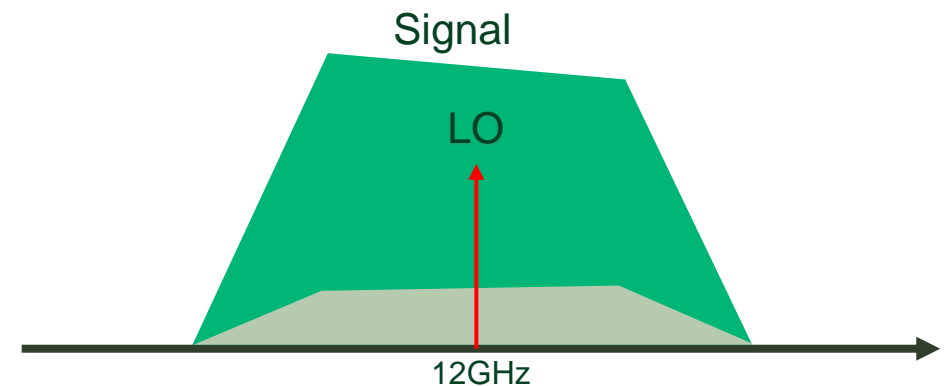LO Offset at -550 MHz, No LO Leakage/Image
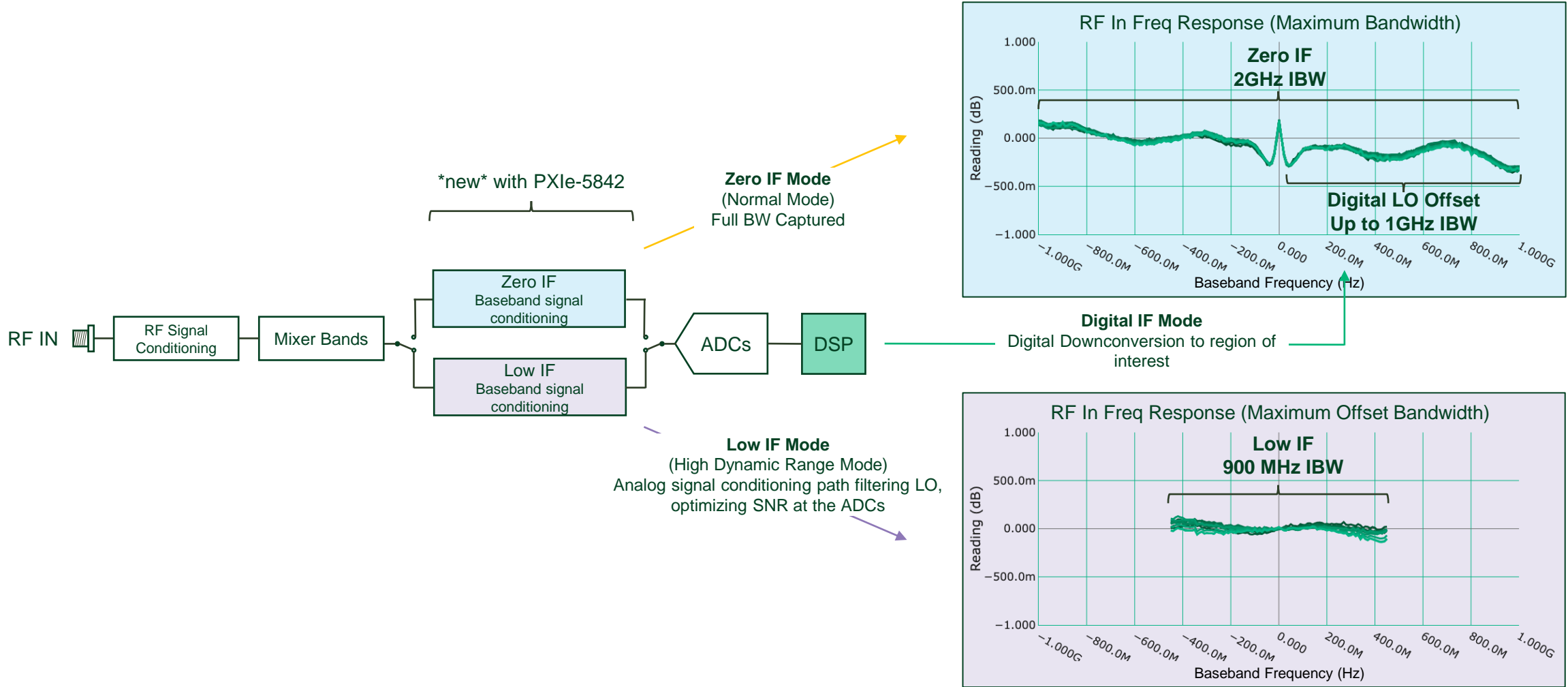
Example: 900MHz wide signal at 9GHz Center Frequency

Zero IF

LO Leakage/Image in band

ni.com Example: 2 GHz wide signal at 12 GHz Center Frequency

Enhanced LO Offset Mode

new with PXIe-5842

Zero IF Mode
(Normal Mode)
Full BW Captured

RF IN — RF Signal Conditioning — Mixer Bands — {Zero IF Baseband signal conditioning / Low IF Baseband signal conditioning} — ADCs — DSP

Low IF Mode
(High Dynamic Range Mode)
Analog signal conditioning path filtering LO, optimizing SNR at the ADCs

Digital IF Mode
Digital Downconversion to region of interest

RF In Freq Response (Maximum Bandwidth)

Zero IF 2GHz IBW

Digital LO Offset Up to 1GHz IBW

Reading (dB) vs Baseband Frequency (Hz)

RF In Freq Response (Maximum Offset Bandwidth)

Low IF 900 MHz IBW

Reading (dB) vs Baseband Frequency (Hz)

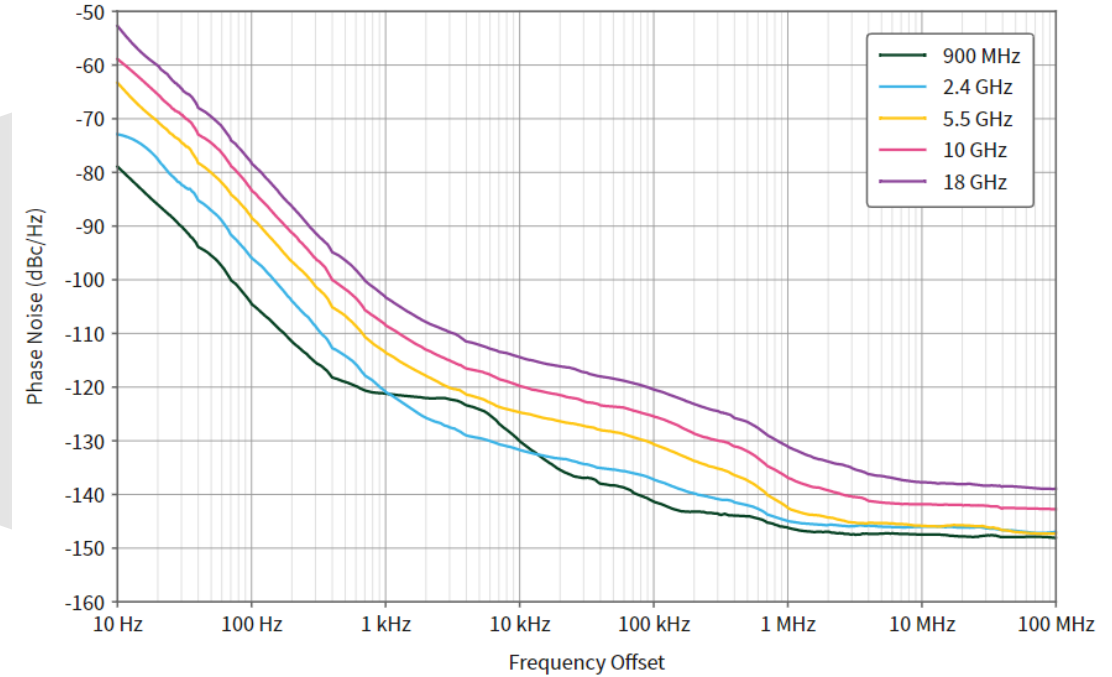# PXIe-5655 - High-Performance Dual LO

LO Out to PXIe-5842 RF OUT
Unique LO chains for RF Out and RF In

REF OUT to PXIe-5842
Unique LO chains for RF Out and RF In

External LO & REF IN for PXIe-5842
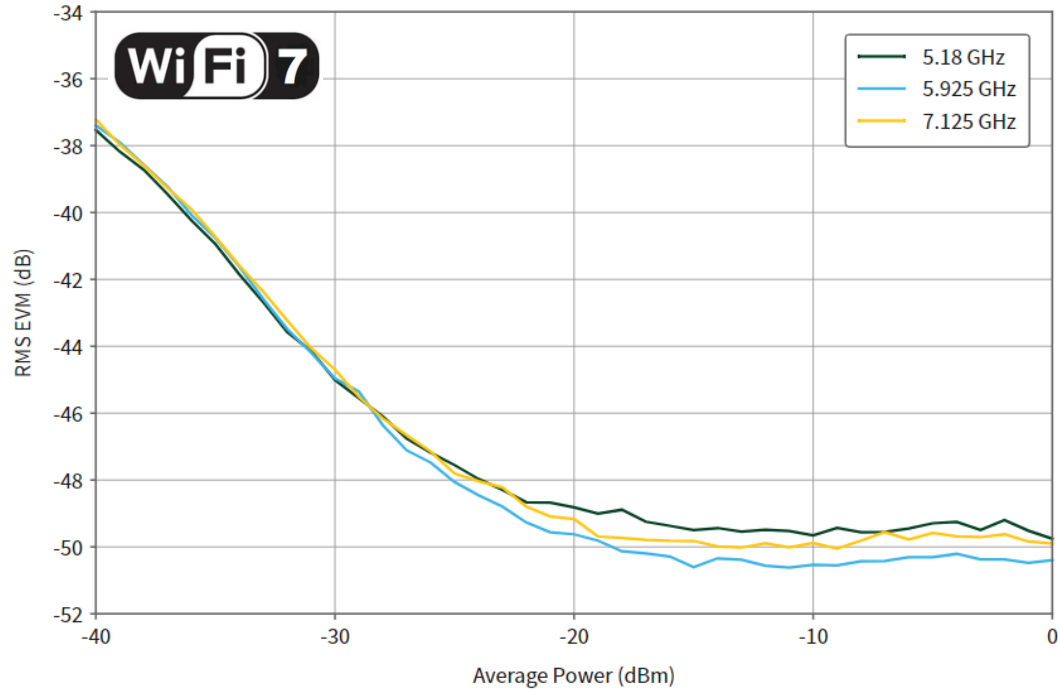Expand channel count with phase coherency

LO Out to PXIe-5842 RF IN
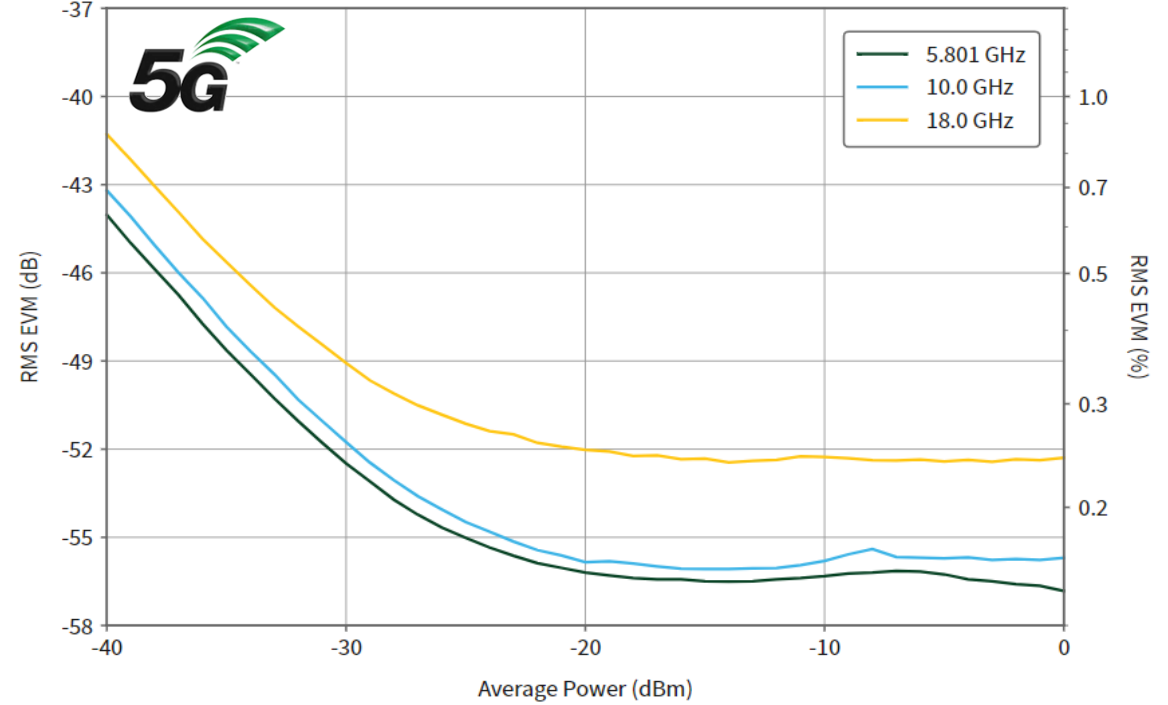Unique LO chains for RF Out and RF In

LO Sharing internal to PXIe-5655
Great performance in both independent or shared LO

World-class EVM Performance

Measured WLAN 802.11be 320 MHz, 4096 QAM

Model Name	EVM
PXIe-5842	< -49 dB
Competitor A PXI	-47 dB
Competitor A benchtop	-50 dB
Competitor B benchtop	-49.5 dB

Measured 5G NR FR1 & FR2, 1 CC × 100 MHz

Model Name	EVM
PXIe-5842	-55 dB
Competitor A PXI	-54 dB
Competitor A benchtop	-54 dB
Competitor B benchtop	-51.3 dB

Pulse modulation

- Native pulsed generation capabilities for Radar/EW applications
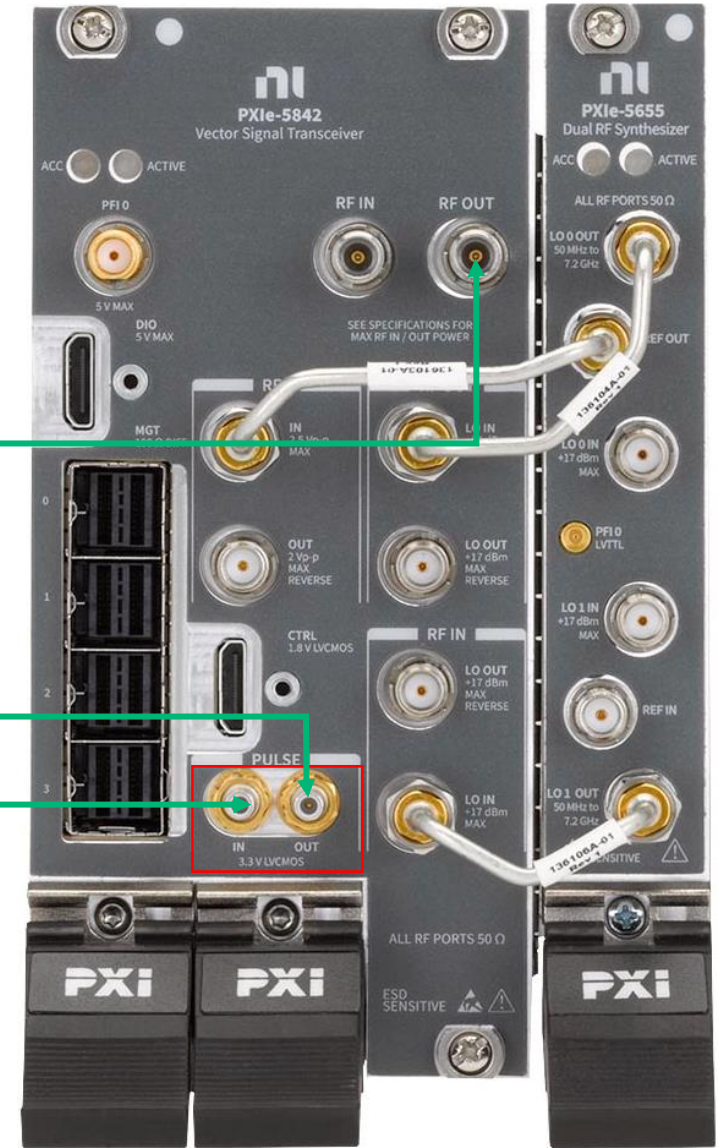- Programable on/off ratios
- Fast / Flexible pulse modes
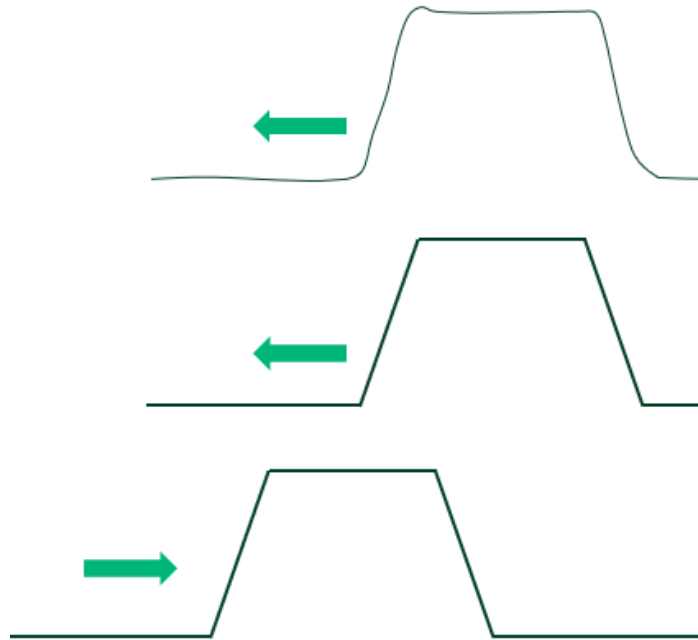
Pulsed RF Out

Pulse Out
VIDEO OUT, follows RF Out envelope

Pulse In
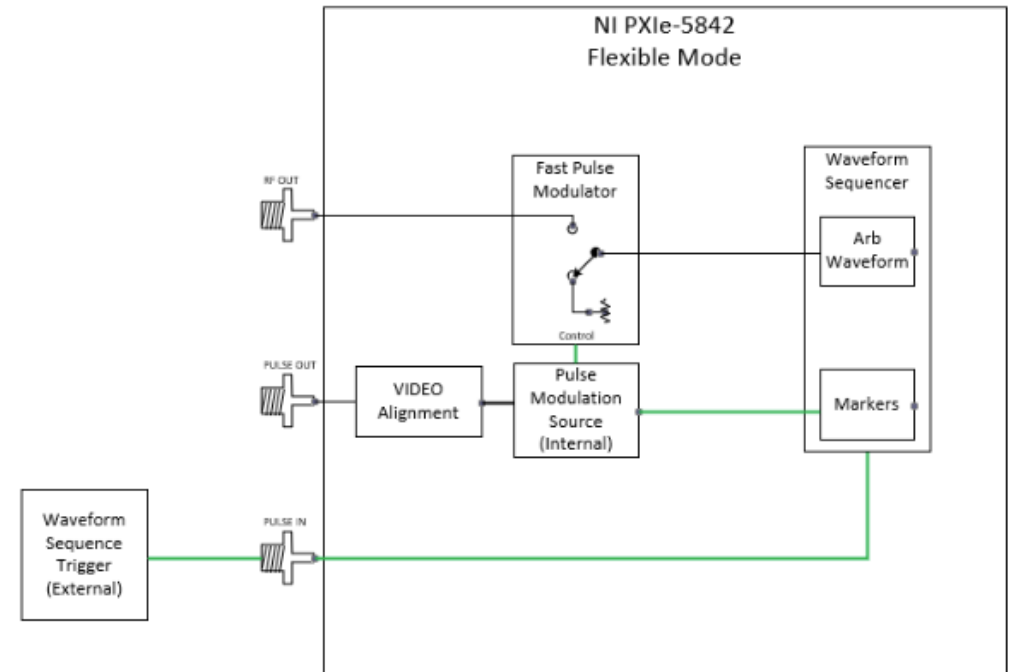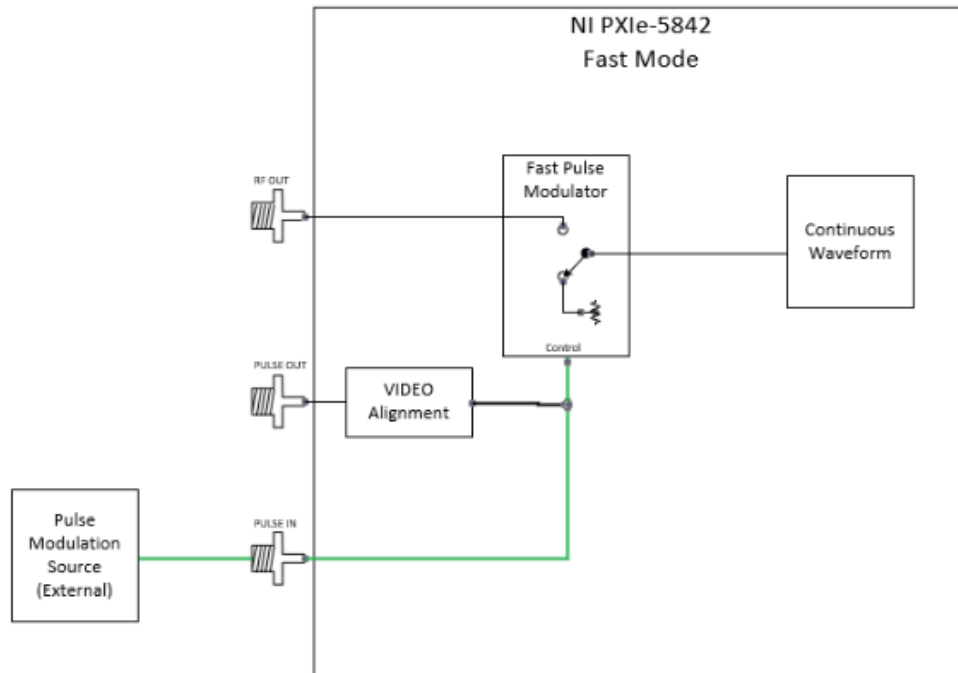External Pulse Input for fast pulse modulation

Pulse Modulation
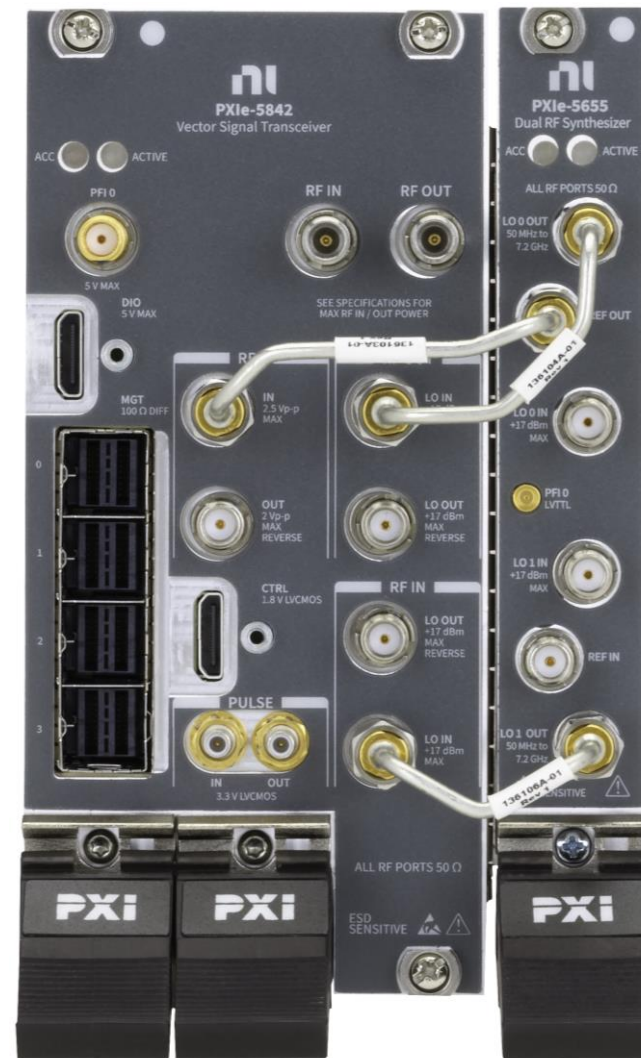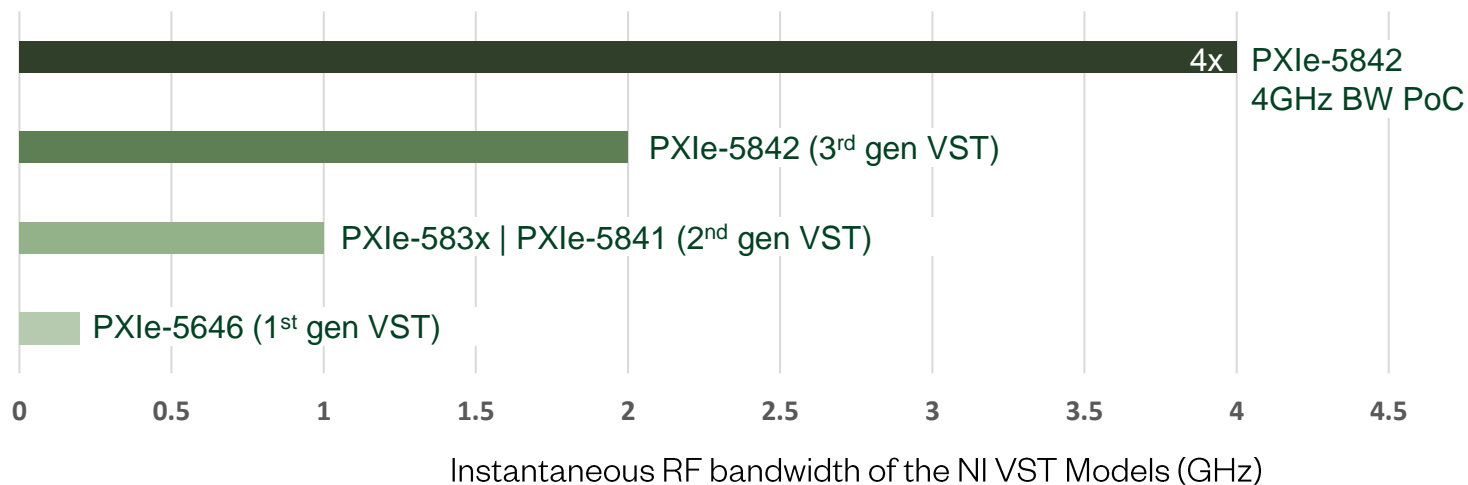
Pulse Modulation Source:

- Pulse In - fast, not waveform sample aligned
  - Lower latency
  - Lower jitter

- Marker - waveform sample aligned
  - Higher latency
  - Higher jitter

PXIe-5842 23GHz, 4 GHz IBW | PoC

- PXIe-5842 with 4 GHz IBW PoC based on standard PXIe-5842 2 GHz Hardware

- Expands instantaneous bandwidth to 4 GHz (above 8.8 GHz center frequency) and provides real-time signal processing and control at constant 5 GS/s sampling rate.

- Examples available for 5G NR EVM measurements or streaming 4GHz BW to a PXIe co-processor

- NI Connect Demo: 6G Sub-THz Reference Architecture

	4x	PXIe-5842 4GHz BW PoC
		PXIe-5842 (3rd gen VST)
		PXIe-583x	PXIe-5841 (2nd gen VST)
		PXIe-5646 (1st gen VST)

0   0.5   1   1.5   2   2.5   3   3.5   4   4.5

Instantaneous RF bandwidth of the NI VST Models (GHz)

PXIe-5842 with 54GHz Frequency Extension

Innovation at mmWave
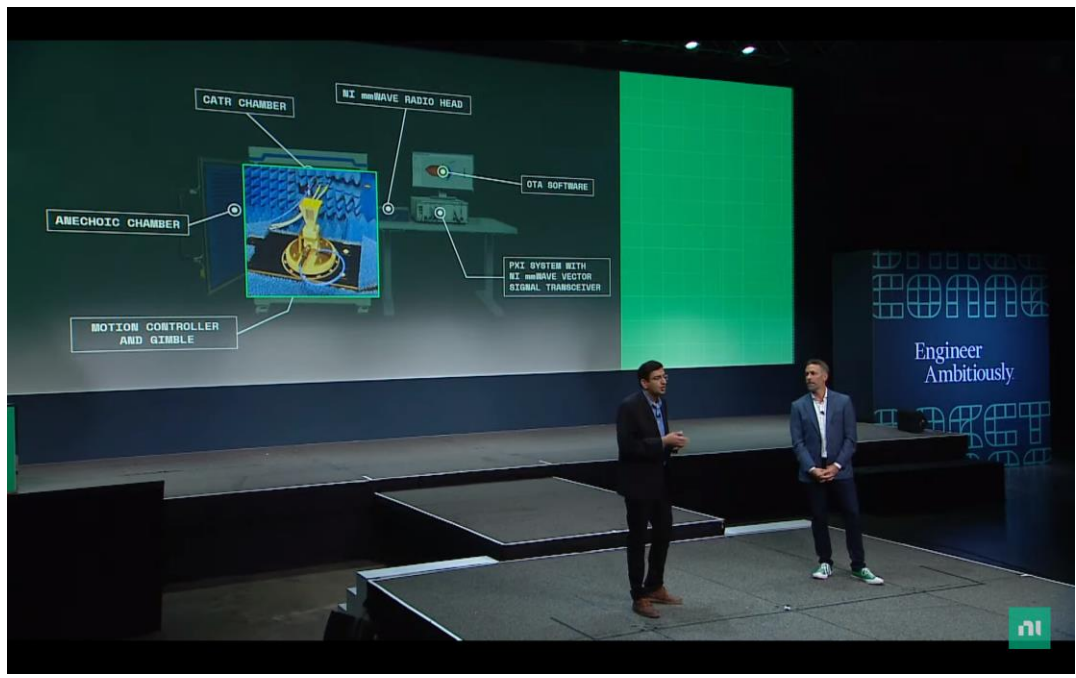
NI Connect 2022

Going beyond 44 GHz we have been working closely with NI as the lead user on the next generation mmwave technology that will allow us to actually enable it up to 54 GHz.
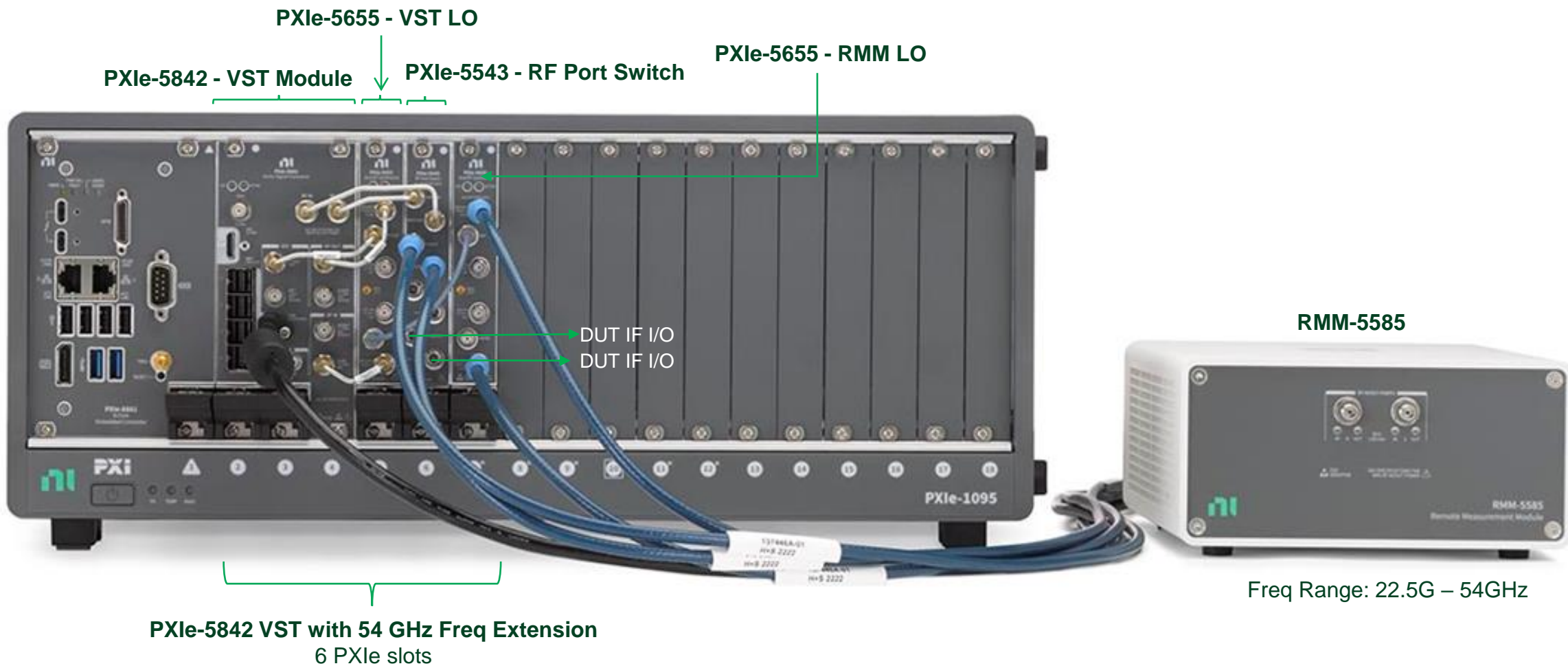**Guarav Verma - Qualcomm**

PXIe-5842 with 54GHz Frequency Extension

Third-generation VST provides extended bandwidth and frequency coverage into mmWave spectrum / V band

PXIe-5655 - VST LO

PXIe-5842 - VST Module

PXIe-5543 - RF Port Switch

PXIe-5655 - RMM LO

RMM-5585

DUT IF I/O
DUT IF I/O

PXIe-1095

PXIe-5842 VST with 54 GHz Freq Extension
6 PXIe slots

Freq Range: 22.5G – 54GHz

PXIe-5842 with 54GHz Frequency Extension
RMM-5585 – Remote Measurement Module

Final up/down conversion stage in the remote head

↓

RMM-5585
Remote Measurement Module

Benefits:

- Higher setup flexibility

  (position the head closer to the DUT)

- Higher power delivery at RF ports

  (due to lower cable loss at IF frequencies compared to mmWave frequencies)

	3m mmWave	1m IF + 2m mmWave
Max Tx Power (28GHz)	+23 dBm	+17 dBm
IF cable length	n/a	1 m
mmWave cable length	3 m	2 m
mmWave cable loss	19.5 dB	13 dB
Max delivered power	+3.5 dBm	+4 dBm

RMM-5585 – Remote Measurement Module

Complete coverage of 3GPP FR2 – 22.5 GHz to 54GHz

2x Bidirectional RF ports for mmWave DUT connections

Simultaneous operation of RF In & Out ports on a single RMM-5585

Independent frequency tuning of RF In & Out ports on RMM-5585

IF In & Out Ports to PXIe-5543 RF Port Switch
15-18 GHz range

High speed control from PXIe-5842

High Performance Dual LO Synthesizer
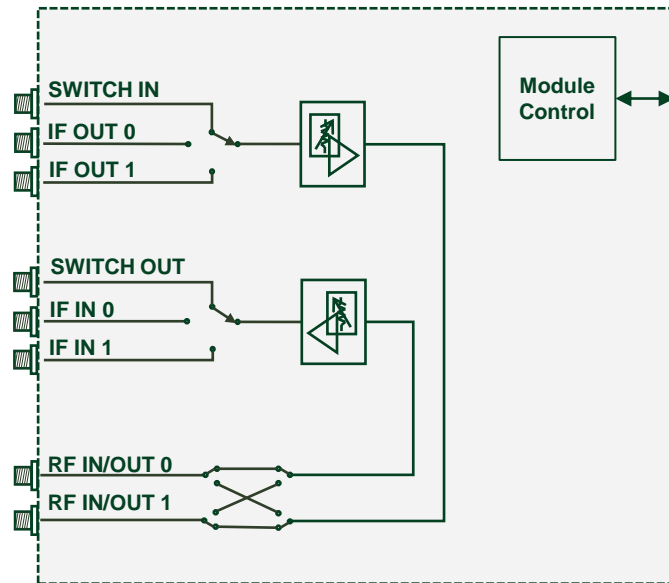Unique LO chains for RF Out and RF In (from PXIe-5655)

PXIe-5543 - RF Port Switch

Extension of PXIe-5842 RF Ports for testing IF-RF DUTs

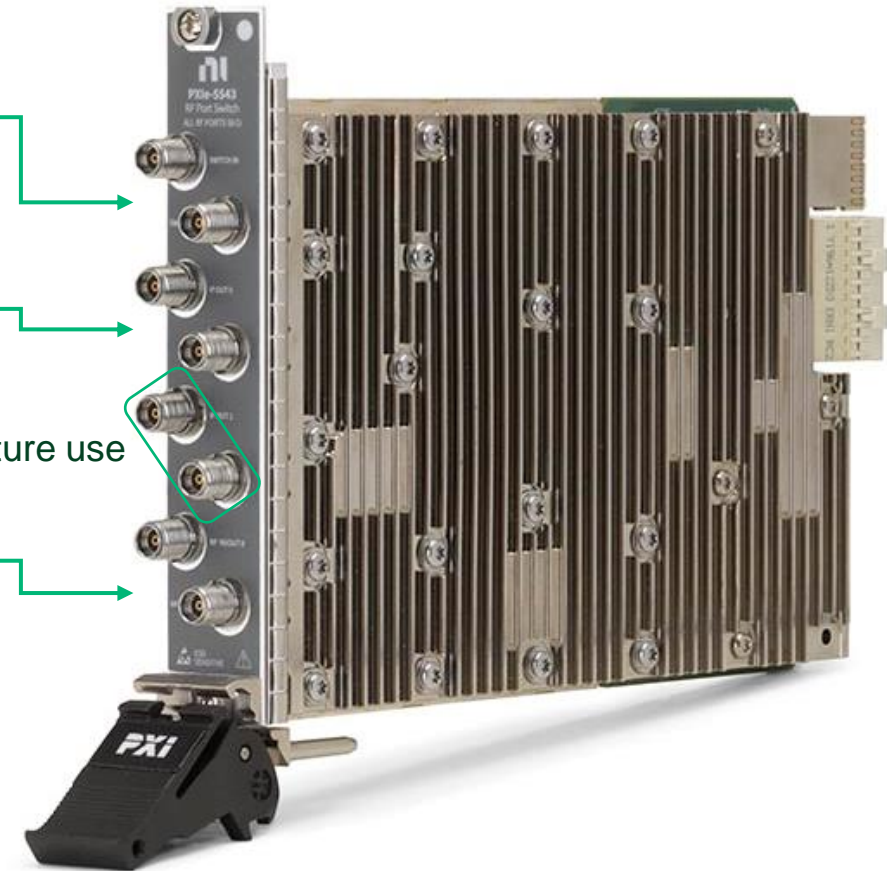Sold only as part of the PXIe-5842 with 54 GHz VST

Block Diagram

SWITCH In & Out
connections to PXIe-5842 module
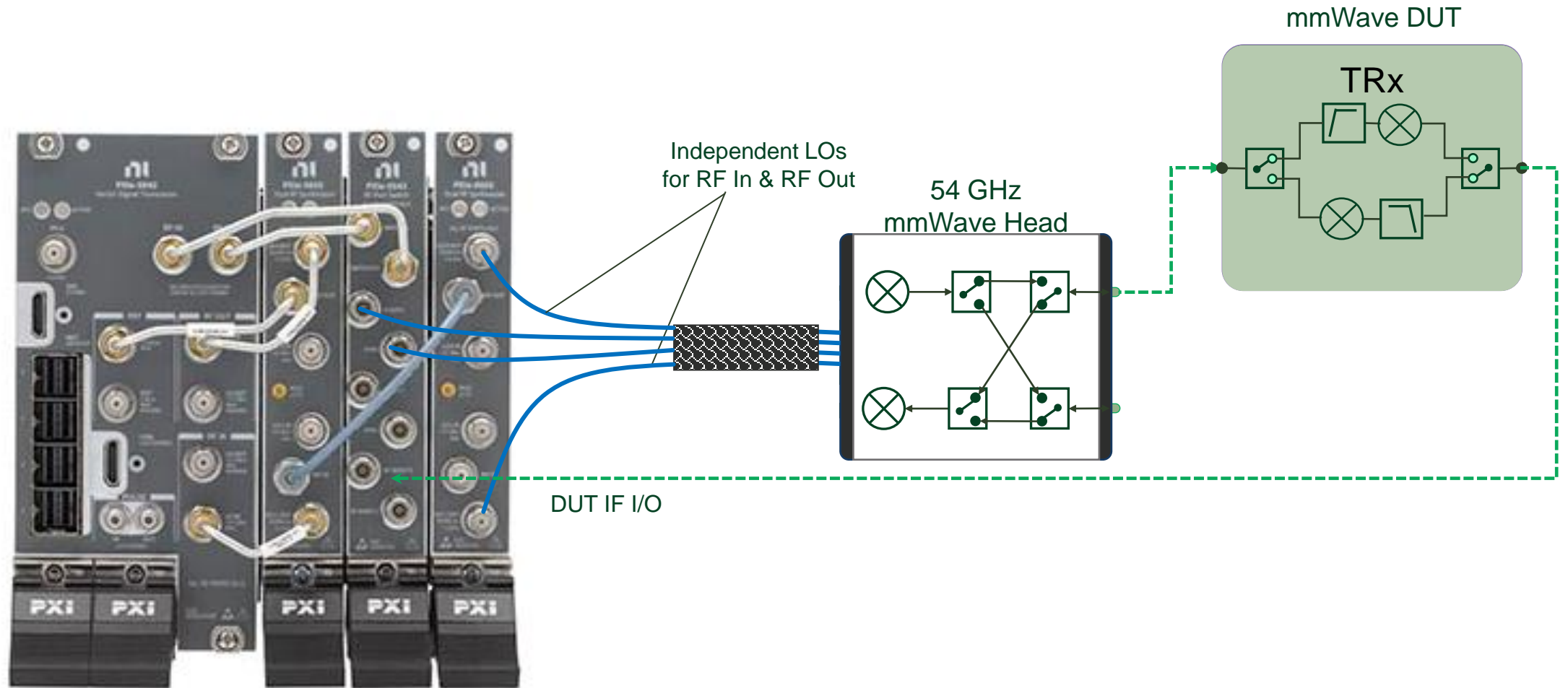
IF In & Out
connections to RMM-5585

Reserved for future use

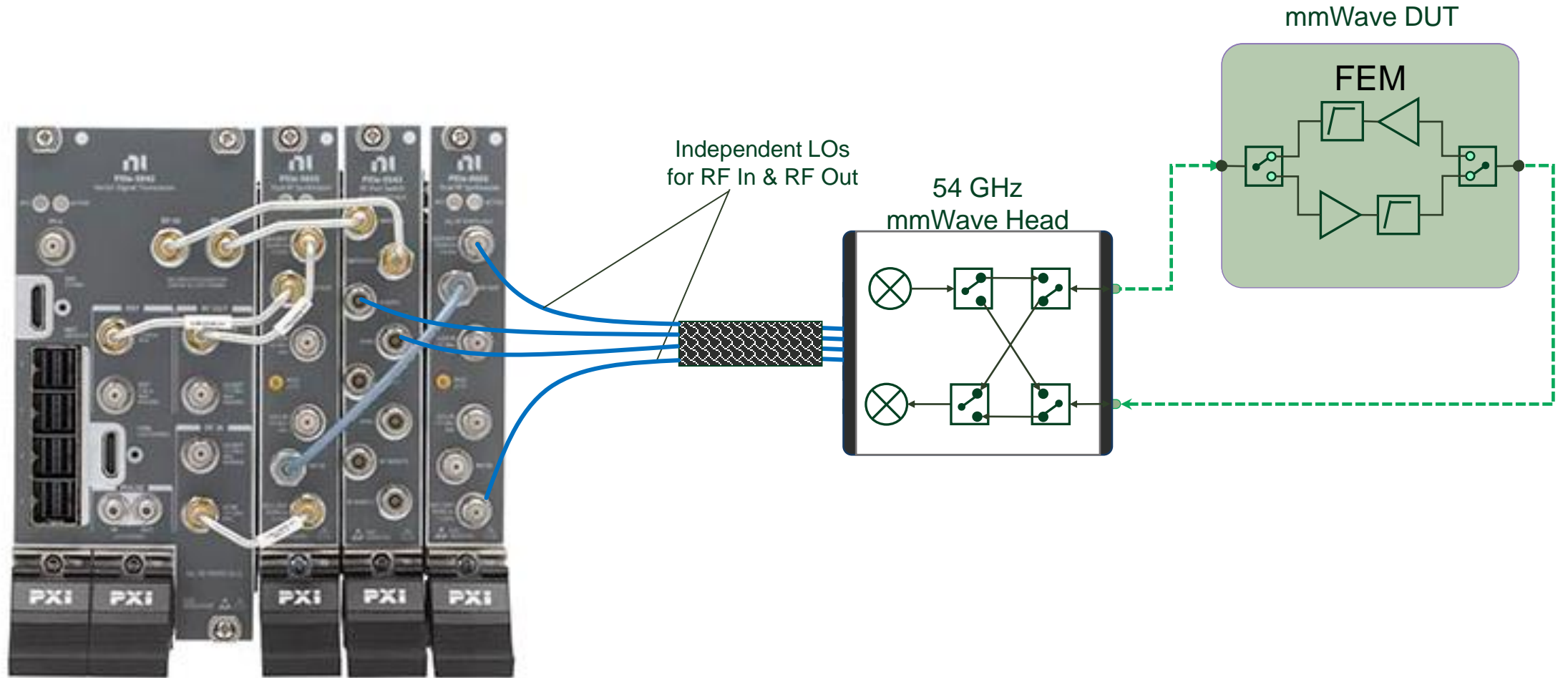**2x Bidirectional RF ports**
for IF DUT connections
200 MHz – 23 GHz

PXIe-5842 with 54GHz Frequency Extension | RF to IF

Bidirectional Test with Single RMM-5585

mmWave DUT

TRx

Independent LOs
for RF In & RF Out

54 GHz
mmWave Head

DUT IF I/O

PXIe-5842 with 54GHz Frequency Extension | RF to RF
Bidirectional Test with Single RMM-5585

Independent LOs for RF In & RF Out

54 GHz mmWave Head

mmWave DUT

FEM

mmWave VST Family

Specification	PXIe-5831	PXIe-5842 (new)
RF Frequency Range	22.5 GHz – 44 GHz	22.5 GHz – 54 GHz
IF Frequency Range	5 GHz – 21 GHz	200 MHz – 23 GHz
Instantaneous Bandwidth	1 GHz	2 GHz
Number of Radio Heads	1 or 2	1
• Direct Ports	2 unidirectional	2 bidirectional
• Switched Ports	Up to 32	N/A
PXI Slots	6	6
Loopback EVM (5G NR FR2) (100 MHz, 28 GHz, -30 to 0dBm Avg Power)	- 44 dB meas.	- 44 dB meas.
Leveled Output Power, CW, 28 GHz	+ 10 dBm	+ 14 dBm

PXIe-5842 | Extended Contiguous Frequency Coverage

Commercial Applications Spanning the RF Spectrum and SatCom Proliferation

| PXIe-5842 | mmWave Extension |

1 GHz · 2 GHz · 3 GHz · 4 GHz · 5 GHz · 6 GHz · 7 GHz · 10 GHz · 20 GHz · 30 GHz · 40 GHz · 50 GHz · 60 GHz

- Electronic Warfare
- AESA and SAR Radar
- Avionics & Navigation
- NewSpace and SatCom
- Interoperability and Coexistence
- 2G/3G/4G/5G
- 5G FR1
- 5G FR3
- 5G mmWave FR2
- < 1 GHz IoT MCU
- 2.4 GHz WLAN
- 5 GHz Wi-Fi
- 6 GHz Wi-Fi
- UWB

| Aerospace and Defense Applications | Semiconductor Applications |

- **Full coverage of Wireless Standards**
  - Bluetooth, WLAN, 5G NR FR1, FR2, FR3, Ultra-Wideband (UWB), NTN and radio prototyping can now all be tested with one capable and versatile instrument.

- **Continuous coverage from VHF into the K band**
  - Enable applications like radar target simulation, spectrum monitoring in electronic warfare and satellite communications or for parametric test of ESAs (Electronically Scanned Arrays) components commonly used in radar systems.

PXIe-5842 Software

Drivers and Doc

Same instrument drivers (RFSA, RFSG, RFmx) as other NI RF instrumentation

NI's RF instrumentation supports a breadth of programming languages: **LabVIEW, C/C++, C# .NET**

What you get with NI's best-in-class APIs:

- Well Documented API
- Shipped Examples
- Help Documentation

PXIe-5842 Usage

Getting started

Interactive SFP
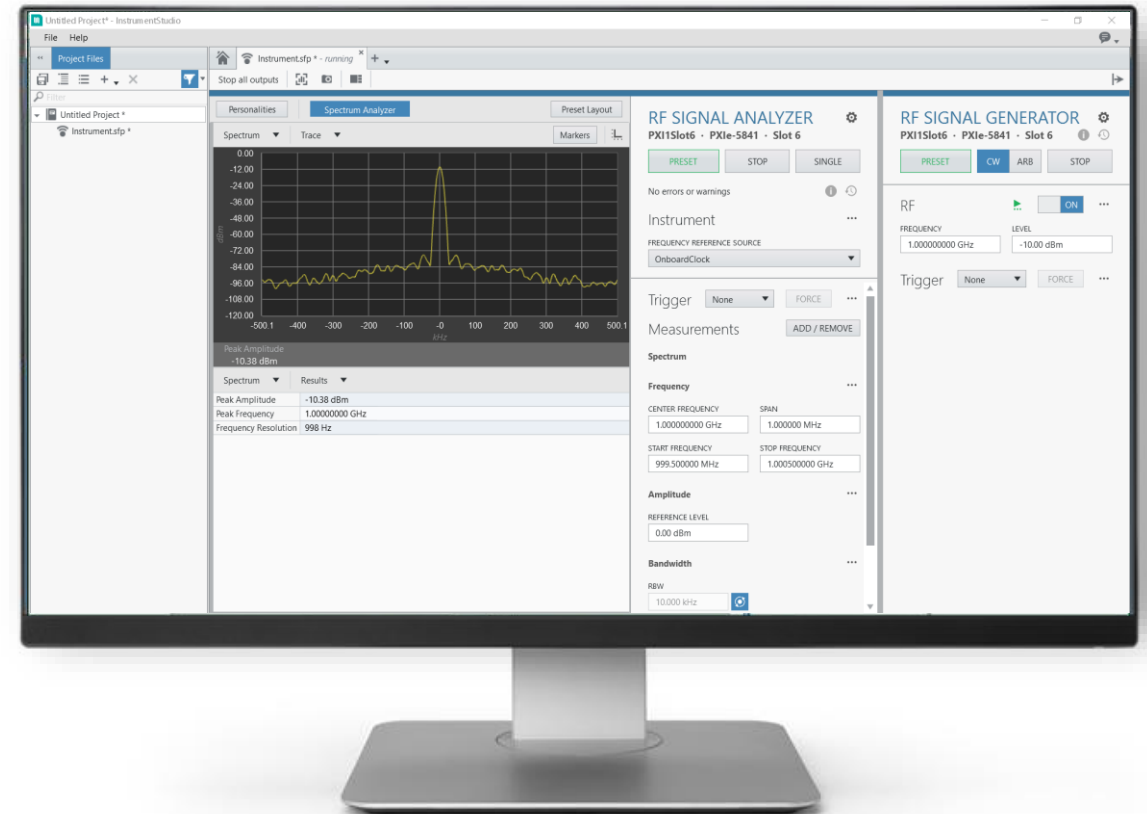
Unified environment for multiple modular instruments:
- Oscilloscopes
- Waveform Generators
- SMUs
- Digital
- RF instruments

Export configurations to code

Monitor and debug automated test systems
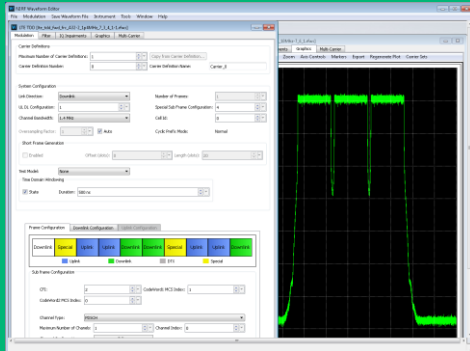
InstrumentStudio™ Software
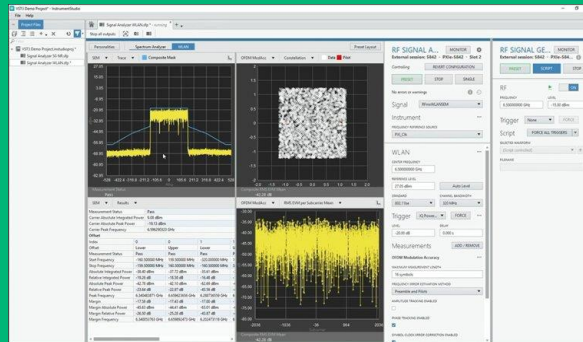*Interactive Application Software*

RFmx Application Software

A set of interoperable software applications that optimize NI RF instrumentation for general-purpose, cellular, connectivity, and aerospace/defense test applications.

GENERATE

RFmx Waveform Creator

MEASURE

RFmx Soft Front Panel in InstrumentStudio

AUTOMATE
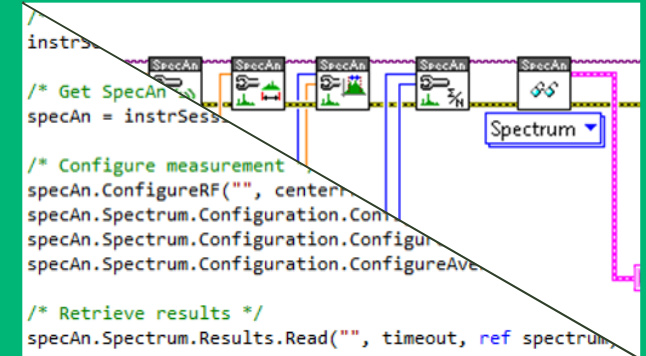
RFmx API

RFmx in Instrument Studio

Signal generation and measurement for general-purpose, cellular, connectivity, and aerospace/defense test applications.

Common spectral measurements—Gain insight into a wide range of general-purpose signals quickly and easily. Perform conventional spectrum analysis and interact with a variety of modulated signals.

- Spectrum Analysis
- Intermodulation
- Harmonics
- Phase Noise
- Noise Figure
- Adjacent Channel Power
- Channel Power
- Transmit Power
- Occupied Bandwidth
- …

RFmx in Instrument Studio

Signal generation and measurement for general-purpose, cellular, connectivity, and aerospace/defense test applications.
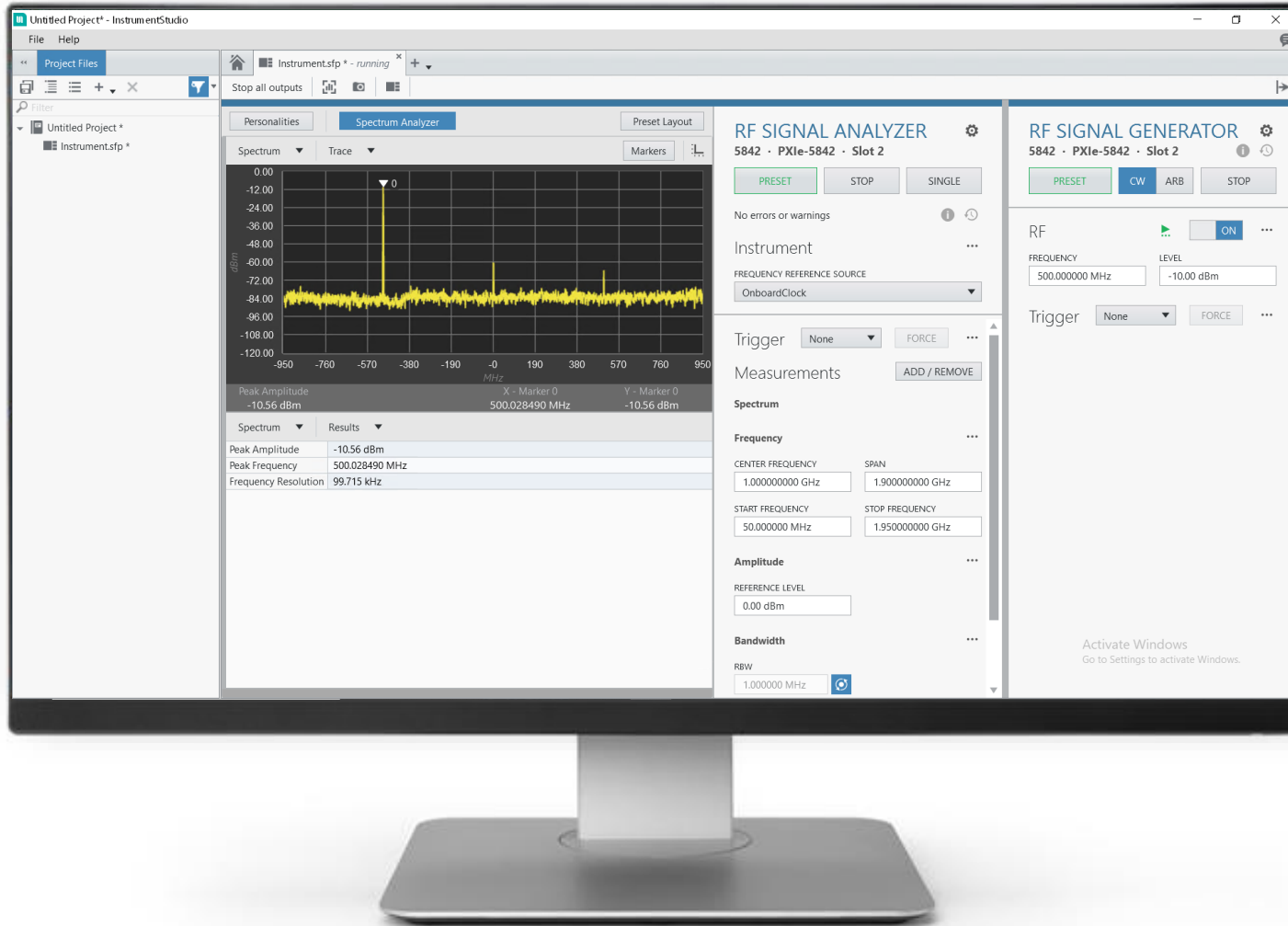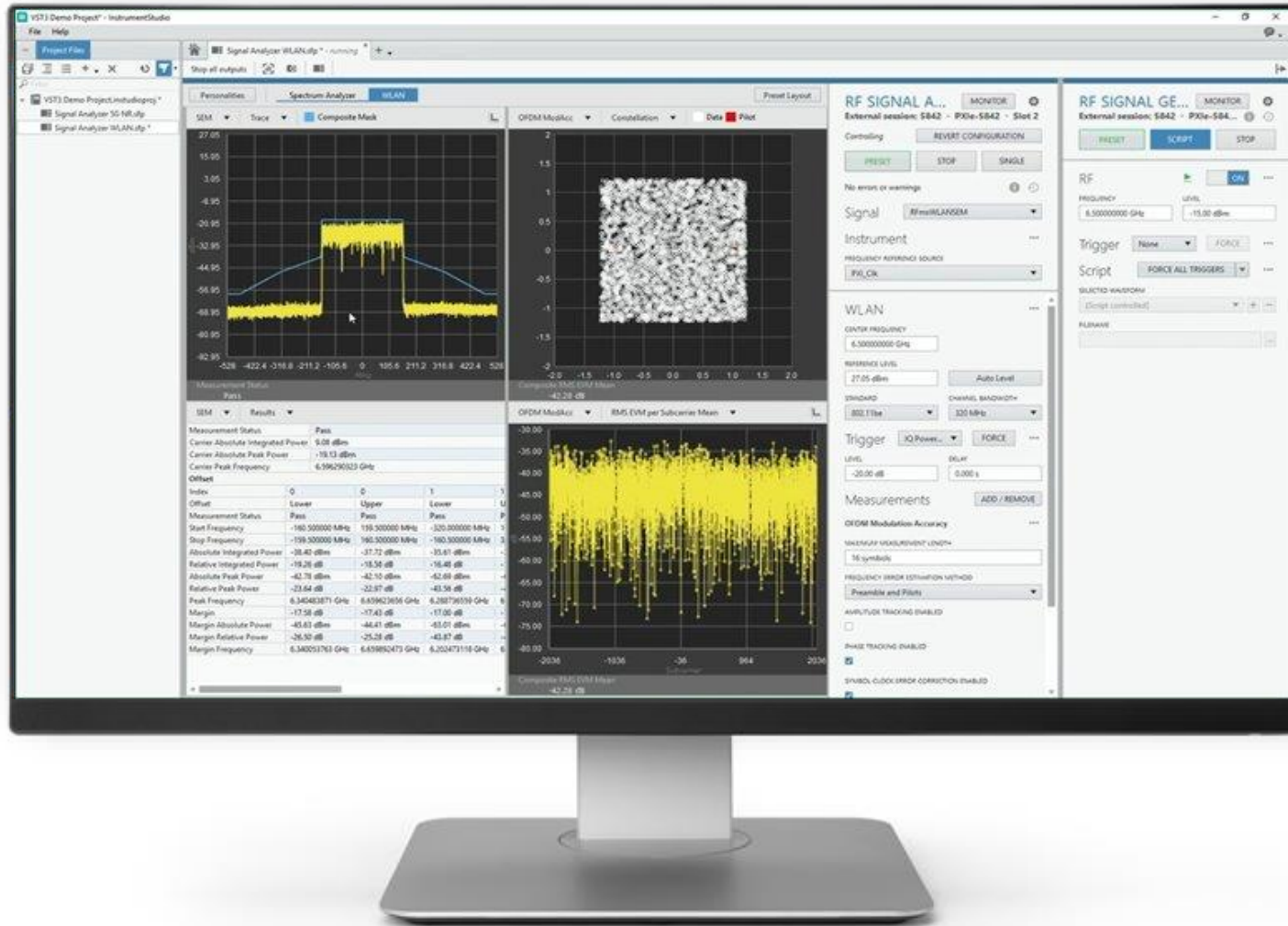

Standard Compliant Measurements—Test multiple wireless standards for cellular, connectivity and IoT signals. Select the personality of RFmx for your specific application and testing needs.
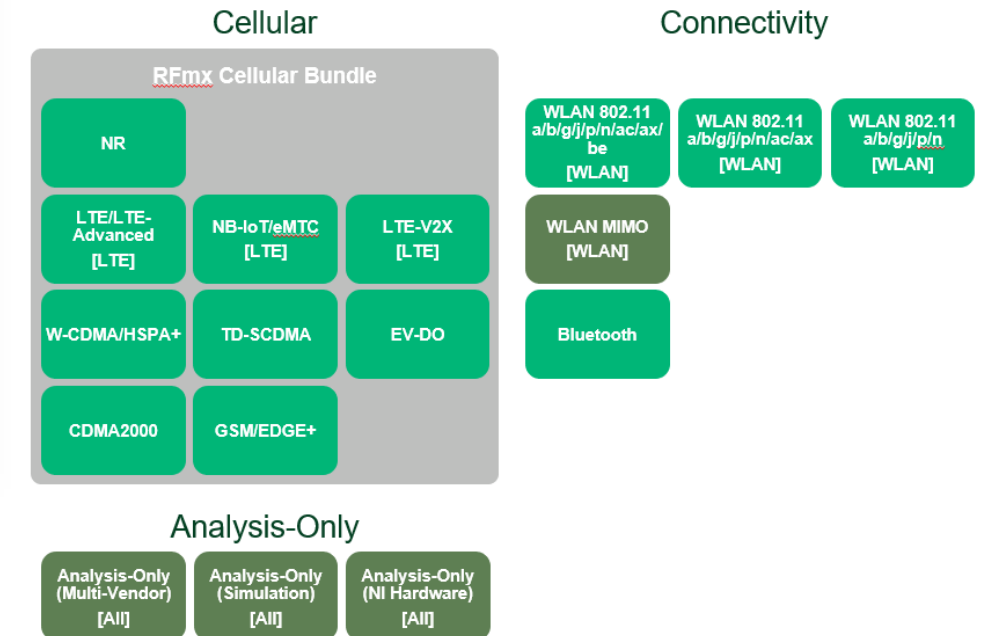
RFmx Pulse

Create pulse waveforms and perform common pulse measurements

Features:

- RFmx Waveform creation integration

- RFmx Pulse Soft Front Panel

- RFmx Pulse API

- Pulse types: Trapezoidal, Raised Cosine, Custom Profile, Custom IQ

- Modulation: BPSK, QPSK, LFM, AM/FM step, Barker code

- Measurements
  - Rise Time, Fall Time, Pulse Width
  - Droop, Overshoot, Ripple
  - Pulse Stability

- Target DUTs: RFIC and MMIC: Discrete components (PA, LNA, filter, circulator), transmit/receive modules (TRM), phased arrays (AESA, PESA)

Typical Application
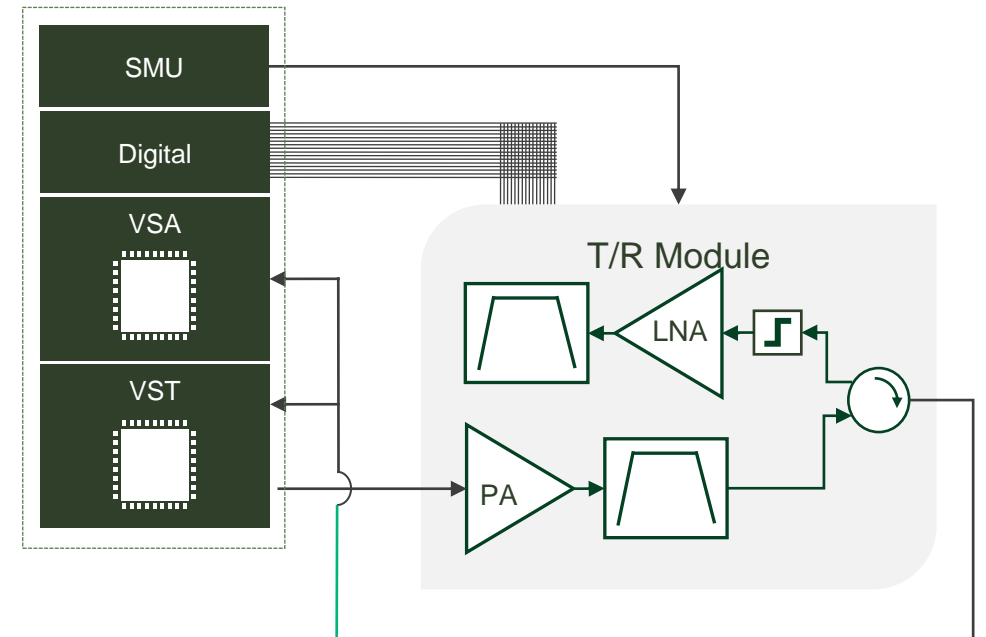
RF parametric test on radar/EW discrete components and devices

PXI Platform benefits

NI Modular Hardware Platform – Product Portfolio

High Speed RAID Storage
- Up to 5 GB/s, 4 TB in-chassis
- Up to 5 GB/s, 24 TB external
- Based on NVMe technology

Flexible, Software Defined

High Speed Digital I/O
- Up to 28 Gbps
- 24 TX and RX Lanes
- Xilinx Kintext-7 and Virtex-7 FPGAs
- 2GB Onboard DRAM
- Gen 2x8 PXIe

Programmable DIO for Control
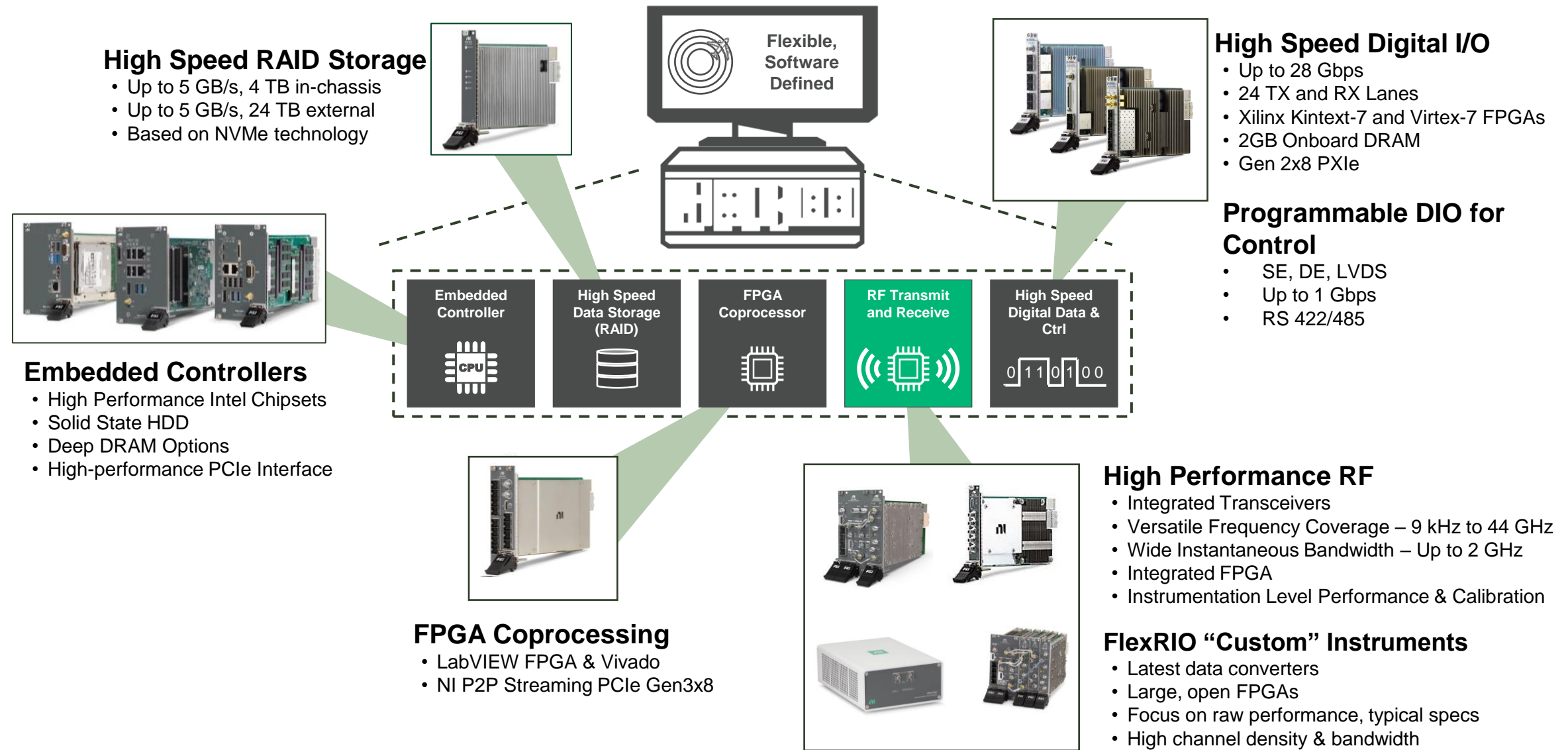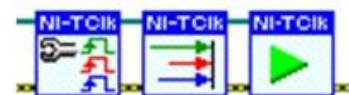- SE, DE, LVDS
- Up to 1 Gbps
- RS 422/485

Embedded Controllers
- High Performance Intel Chipsets
- Solid State HDD
- Deep DRAM Options
- High-performance PCIe Interface

Embedded Controller	High Speed Data Storage (RAID)	FPGA Coprocessor	RF Transmit and Receive	High Speed Digital Data & Ctrl

High Performance RF
- Integrated Transceivers
- Versatile Frequency Coverage – 9 kHz to 44 GHz
- Wide Instantaneous Bandwidth – Up to 2 GHz
- Integrated FPGA
- Instrumentation Level Performance & Calibration

FPGA Coprocessing
- LabVIEW FPGA & Vivado
- NI P2P Streaming PCIe Gen3x8

FlexRIO "Custom" Instruments
- Latest data converters
- Large, open FPGAs
- Focus on raw performance, typical specs
- High channel density & bandwidth

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Advanced Timing and Synchronization with PXI

BOX INSTRUMENTS

Box Instrument 17

• • •

Box Instrument 2

Box Instrument 1

External Clock Source

SINGLE-ENDED TRIGGERS

10 MHz CLOCK

PXI

Single-Ended Star Trigger

Differential Star Triggers

100 MHz Differential Clock

100 MHz Sync Clock

Single-Ended Triggers

10 MHz Clock

PXIe Controller

PXIe-5842
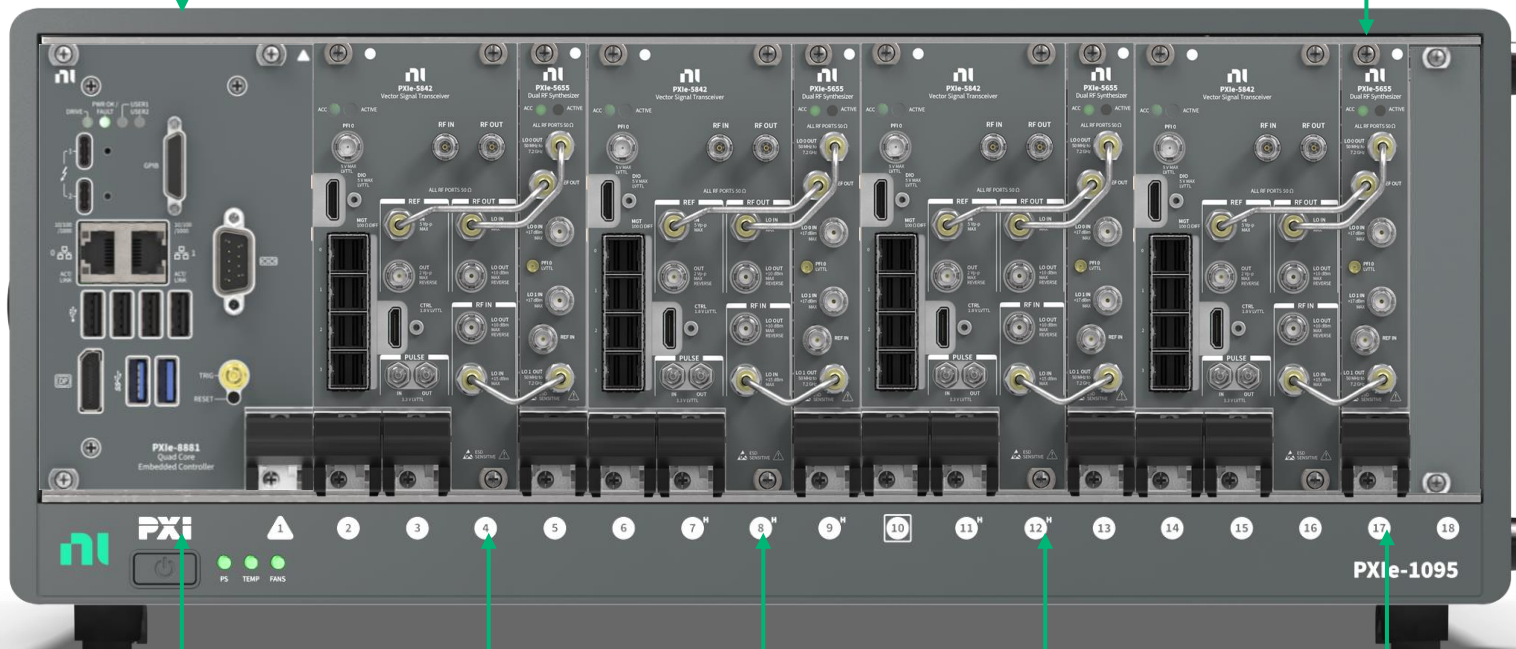
Instrument 2

• • •

Instrument N
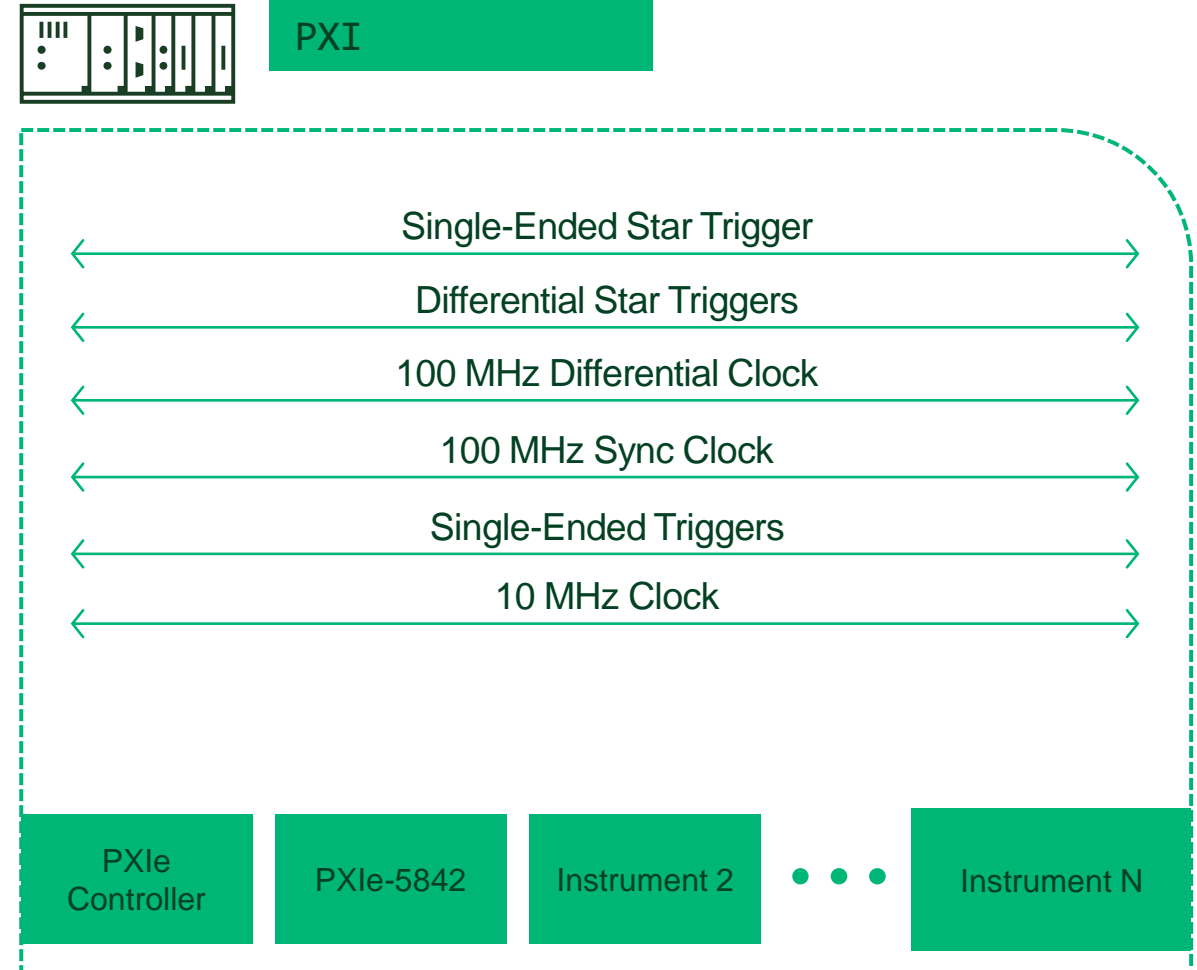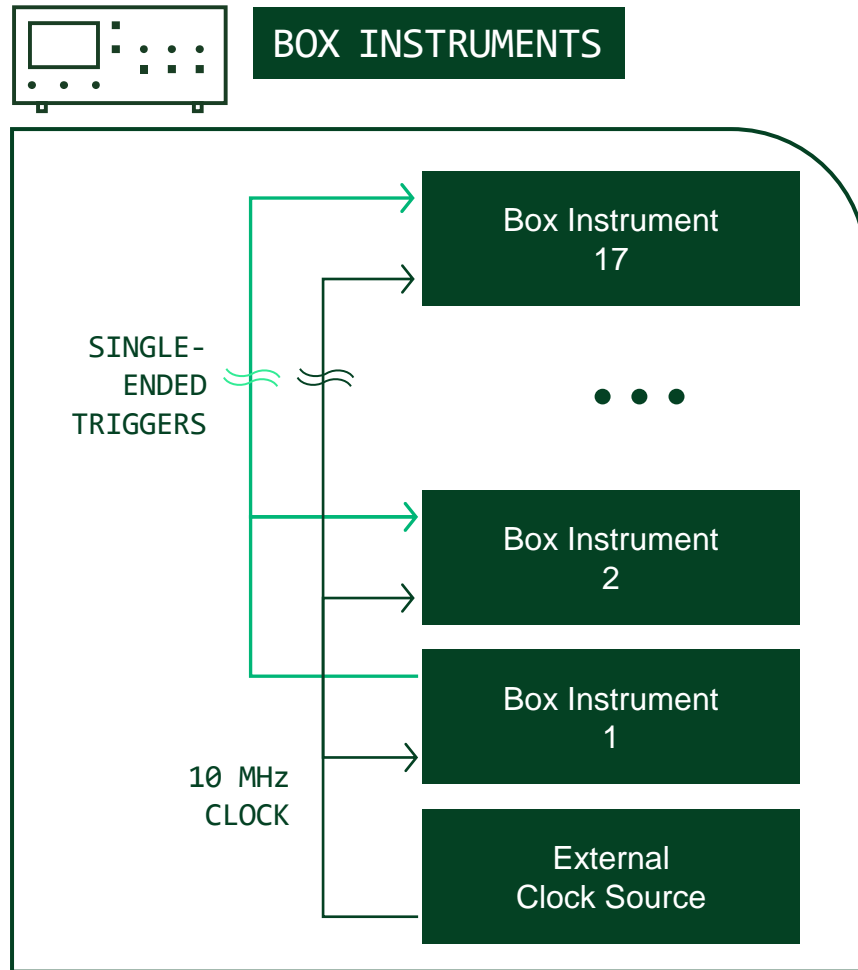
Multi-Channel synchronization

Synchronize up to 4 VST's in a single 18-slot chassis

TClk sync across the PXI backplane

Shared LOs for Phase-coherent MIMO Configurations

Typical 4x4 MIMO Configuration
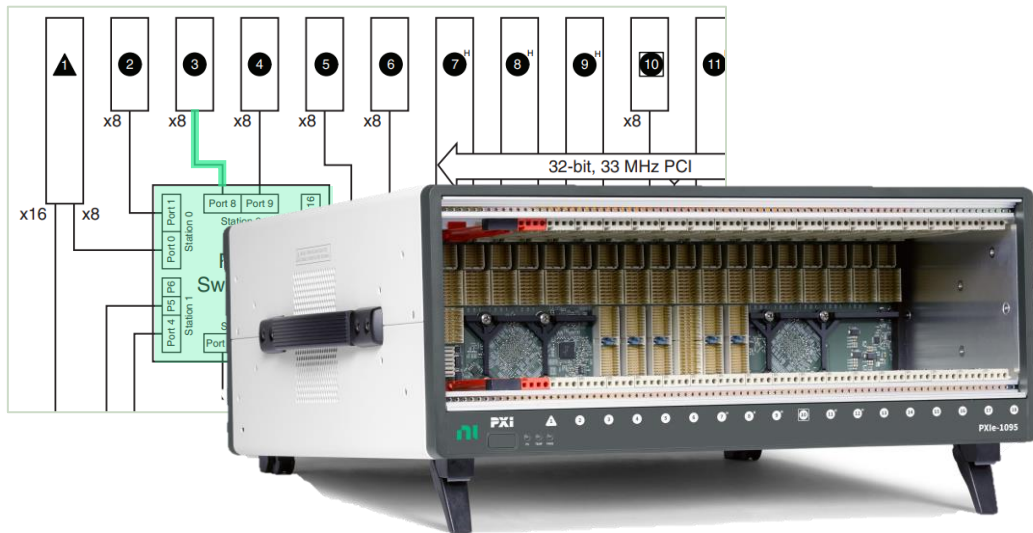
Simplified Reference Clock and Trigger Distribution

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FPGA Data Streaming

NI Peer-to-Peer (P2P)

- Point-to-point across PXI the backplane
- Up to 6.75 GB/s bidirectional
- Up to 1 GHz BW streaming
- <1 µs latency w/ PCIe Gen3 x8

Front-Panel High-Speed Serial (Q3.2023)

- Leverages FPGA Multigigabit Transceivers (MGTs)
- Up to 30 GB/s bidirectional
- Full BW streaming
- Lower latency

MGT Data streaming

Stream data to NI PXIe-7903 FPGA co-processor through Multi-Gigabit Transceiver (MGT) ports with 4 mini-SAS HD x4 cables.

Summary:
- FlexRIO Co-processor and High-Speed Serial Instrument
- Largest, highest-performance FlexRIO FPGA
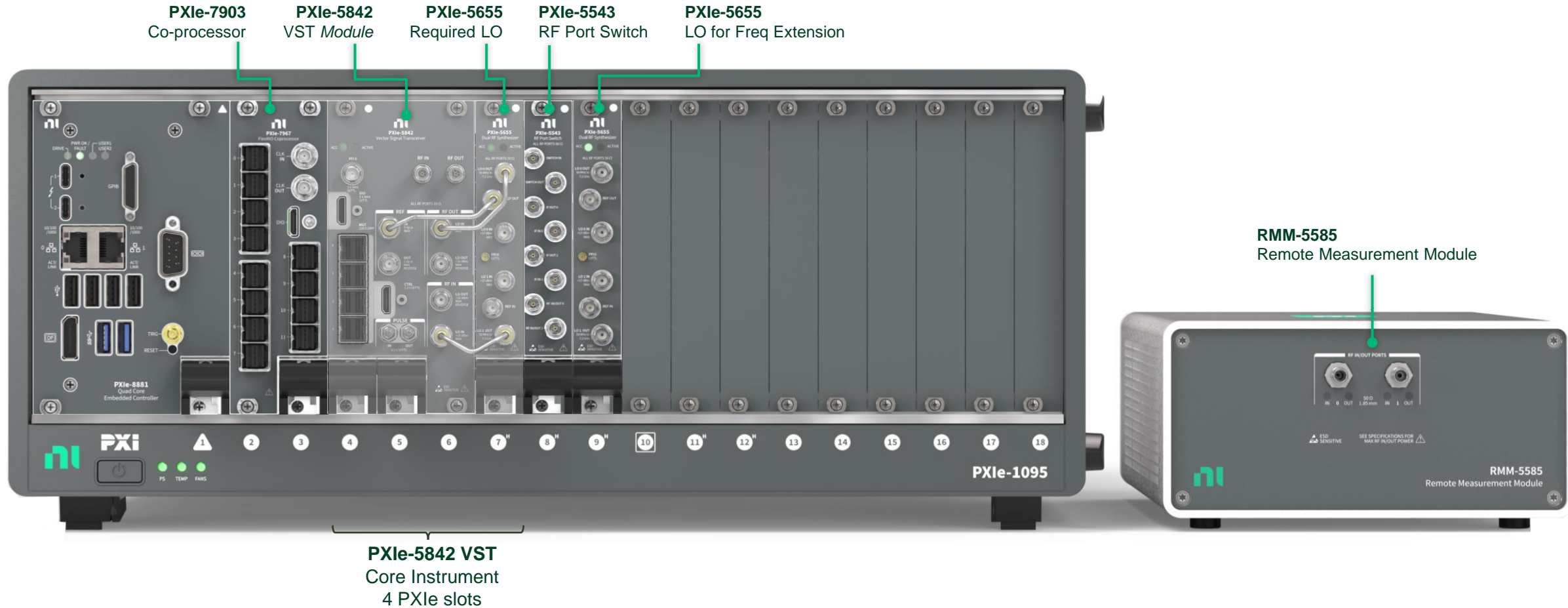- High-speed streaming interface to one or more VST instruments

Key features:
- VU11P FPGA
- 12 miniSAS zHD Connectors
- Initial protocol support: 100 GbE, Aurora(for VST)
- Memory: ~25GB/s per Bank; 2 10GB Density per Bank

Up to 4GHz BW streaming
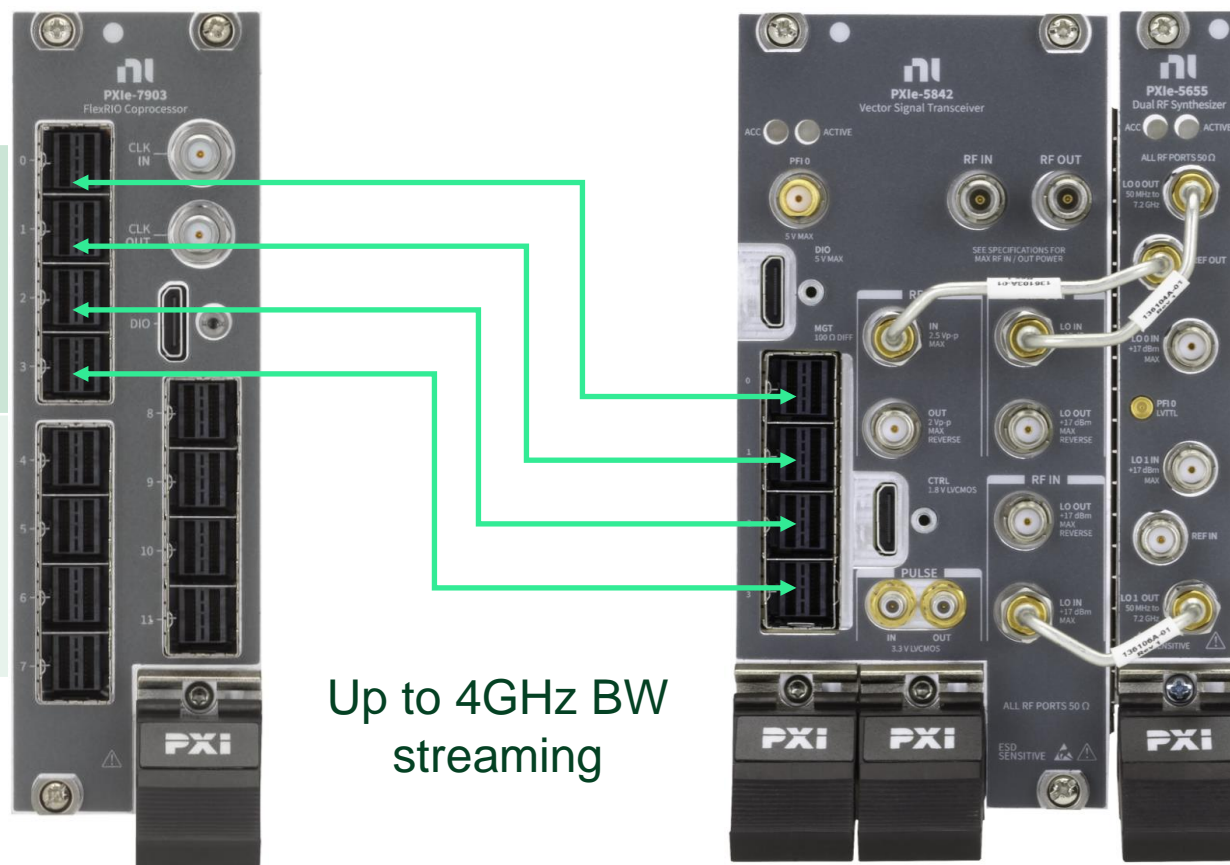
PXIe-5842 | Core Functionality Expansion

Expand the core capabilities of the PXIe-5842 VST through additional platform elements

PXIe-7903
Co-processor

PXIe-5842
VST *Module*

PXIe-5655
Required LO

PXIe-5543
RF Port Switch

PXIe-5655
LO for Freq Extension

RMM-5585
Remote Measurement Module

PXIe-5842 VST
Core Instrument
4 PXIe slots

Applications for the VST

VST Target Applications
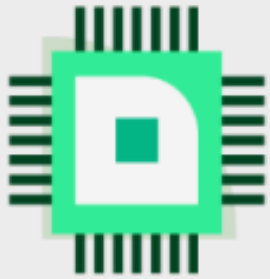
Semiconductor and Electronics

Transportation

Aerospace, Defense, and Government

Portfolio Business

Semiconductor Production Test	Semiconductor Device Validation	Real-time Spectrum Monitoring	Record and Playback	IoT Device Test
Semiconductor Test System (STS)	Wireless Infrastructure Test	MMIC / TRM Validation & Test	RADAR System Level Validation	Advanced Wireless Research
		Telemetry and Datalink Validation	SATCOM	

Accelerate Validation of RF Front-ends
NI's Modular Validation Lab Bench with DC, Digital, Analog, and RF instruments

Sweep frequency, power, and output load – **no programming**

Run fast and easy DUT Control with MIPI, SPI, and other digital protocols

Linearize wideband PAs with built-in, state-of-the-art **DPD algorithms**

Get accurate measurements with **fast output power servo**

Calibrate and adjust pathlosses with S-parameter de-embedding

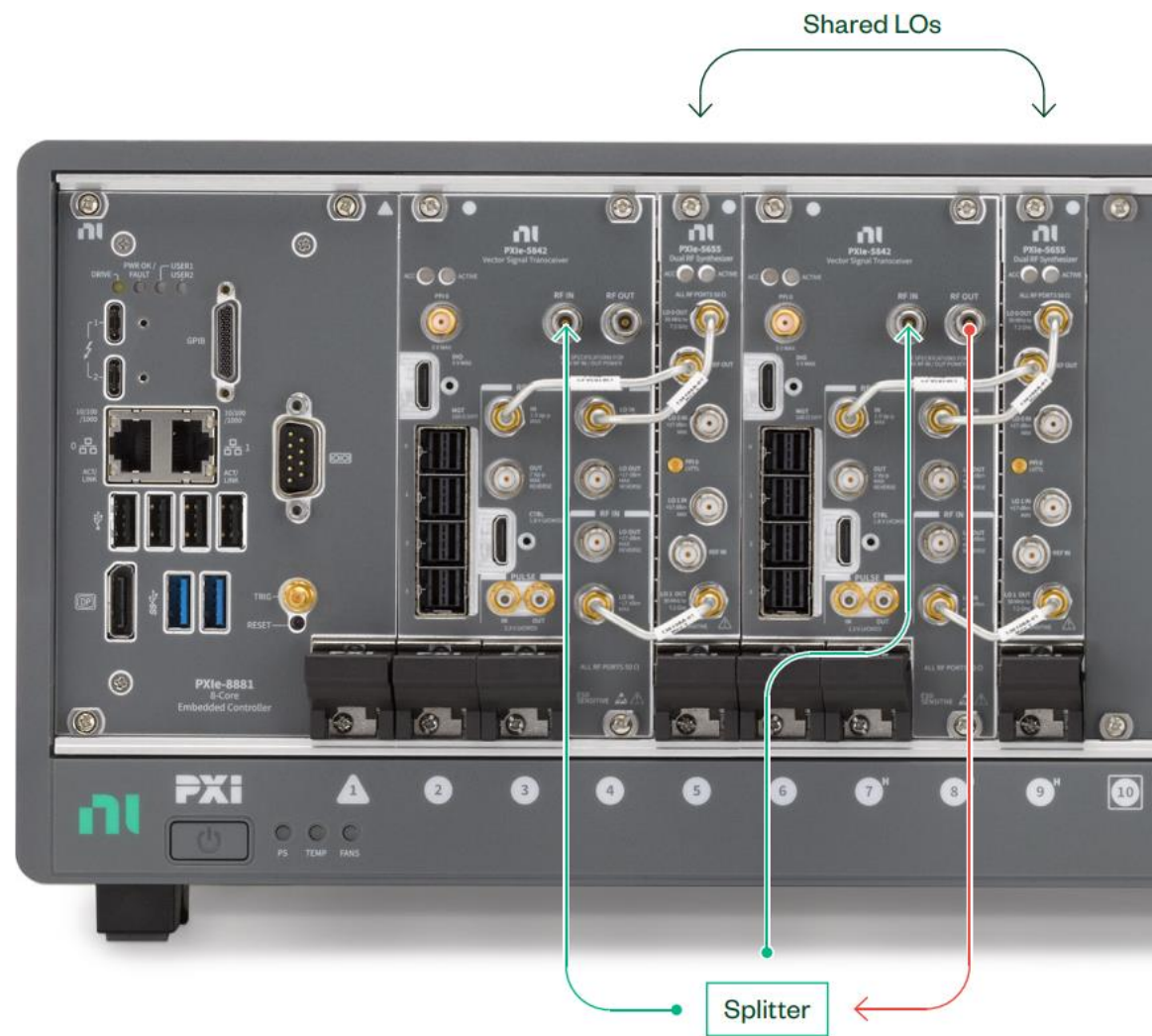Validate **non-50 Ω operation** with control of Focus Microwaves tuners
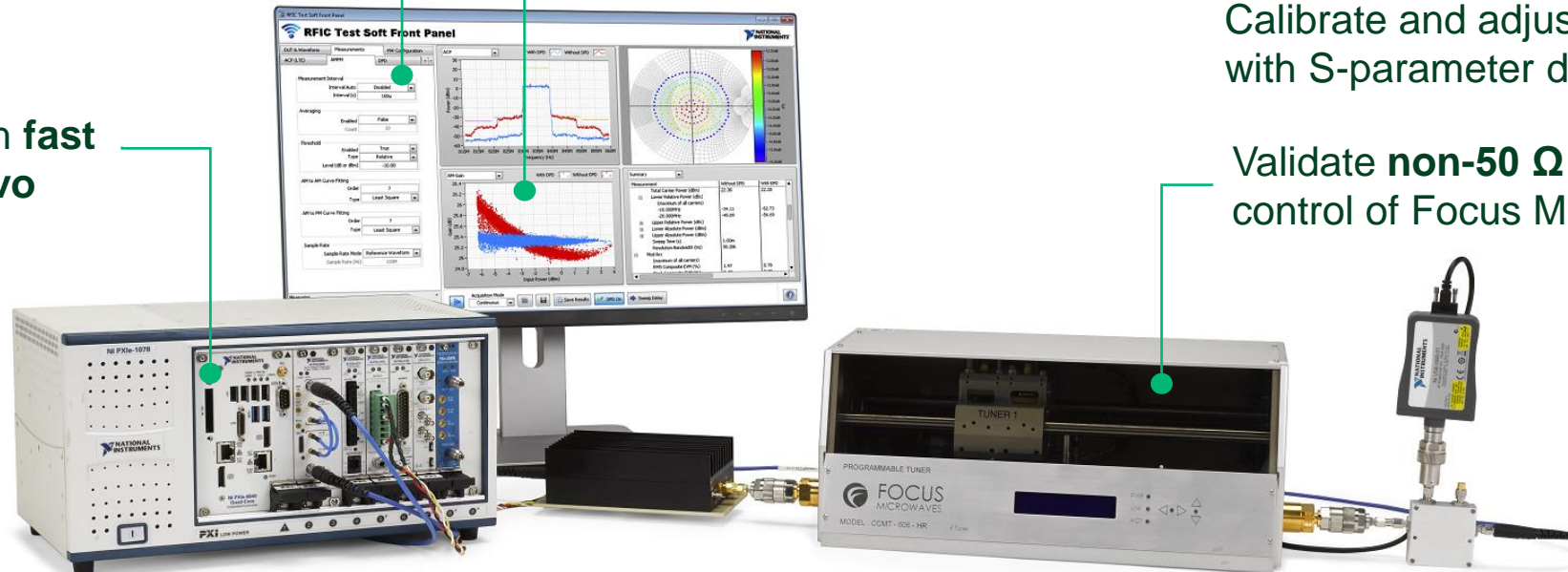
NI's Patented Cross-Correlation Wideband EVM Technique

Ultimate EVM performance

Stimulus Signal : PXIe-5842

Measurement VSAs: PXIe-5842

*Cabling not shown

Cross-correlation for EVM

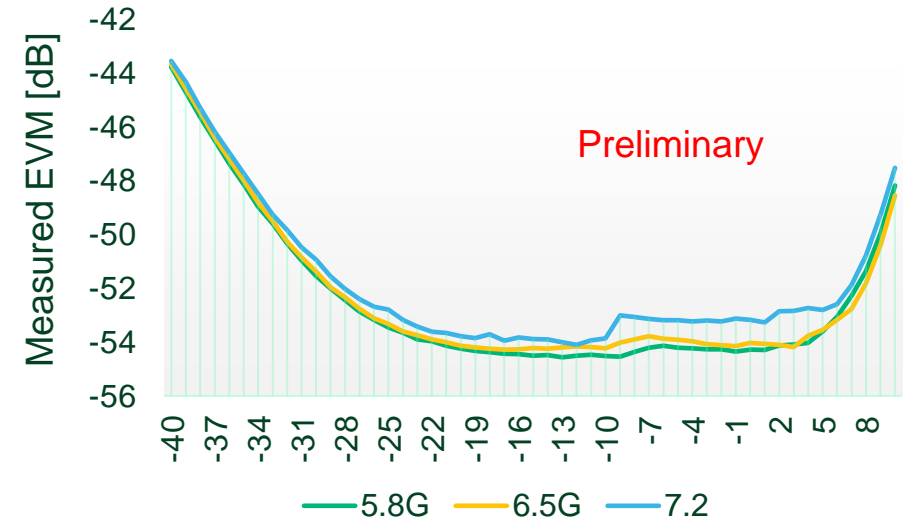NI's patented cross-correlation algorithms can help achieve ~ 3 dB improvement in EVM

- On top of best-in-class EVM performance from the PXIe-5842

- Available for WLAN and 5G (single carrier uplink) waveforms

- Patent: US10841019B1
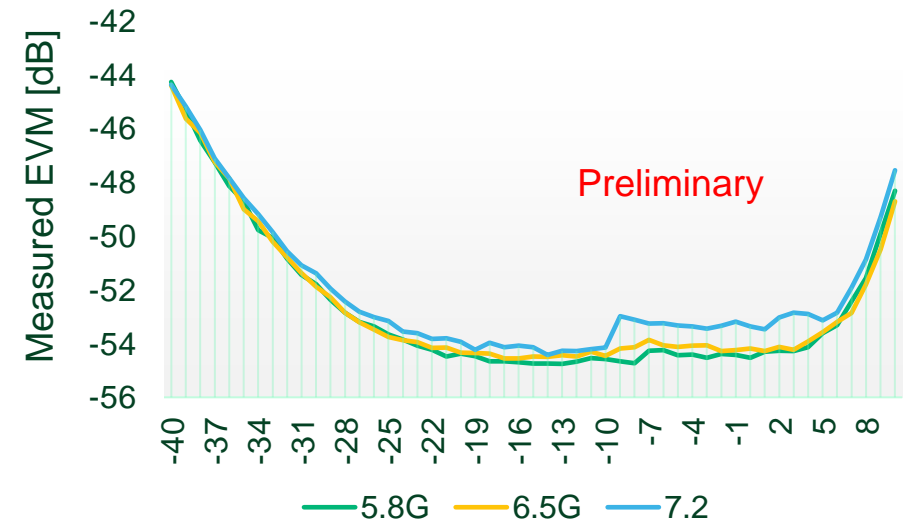
PXIe-5842 cross correlation EVM loopback, measured*

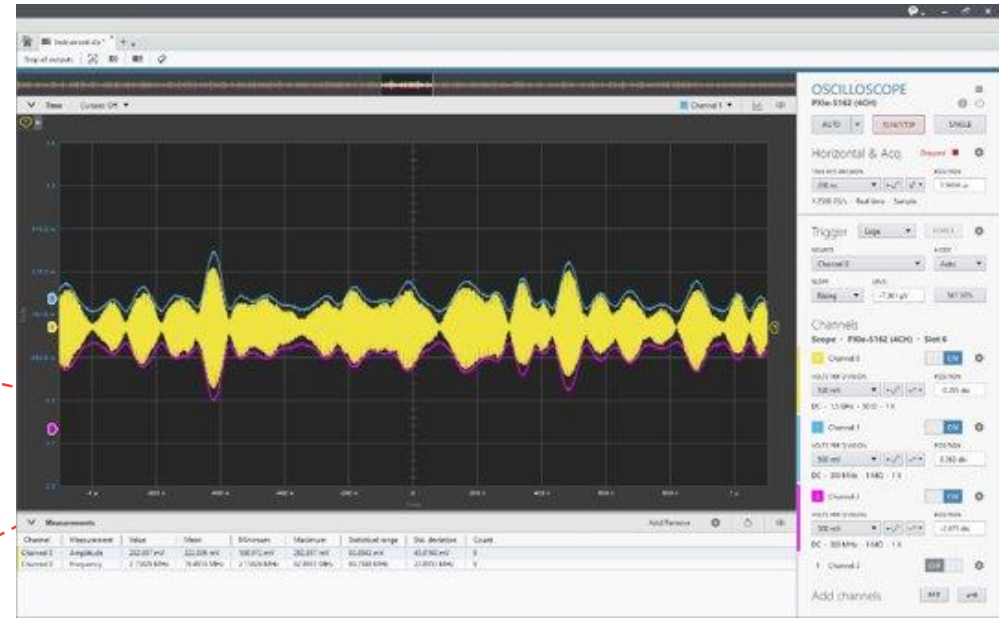| -57 dB | Wi-Fi 7, 80 MHz bandwidth, 6 GHz |
| -53 dB | Wi-Fi 7, 320 MHz bandwidth, 6 GHz |
| -59 dB | 5G NR, 100 MHz bandwidth, 5.5 GHz |

*approximate values

Normal with 500 iterations

Preliminary

Fast Convergence

Preliminary

Tightly synchronized envelope generation to test ET performance

PXI Controller

Precision Power Supply

Arbitrary Waveform Generator

High Speed Digital I/O & PPMU

High-Speed Digitizer

Vector Signal Transceiver

Shaped Envelope

Splitter

MIPI RFFE Control

Power Modulator

PA

Measured PA Behavior
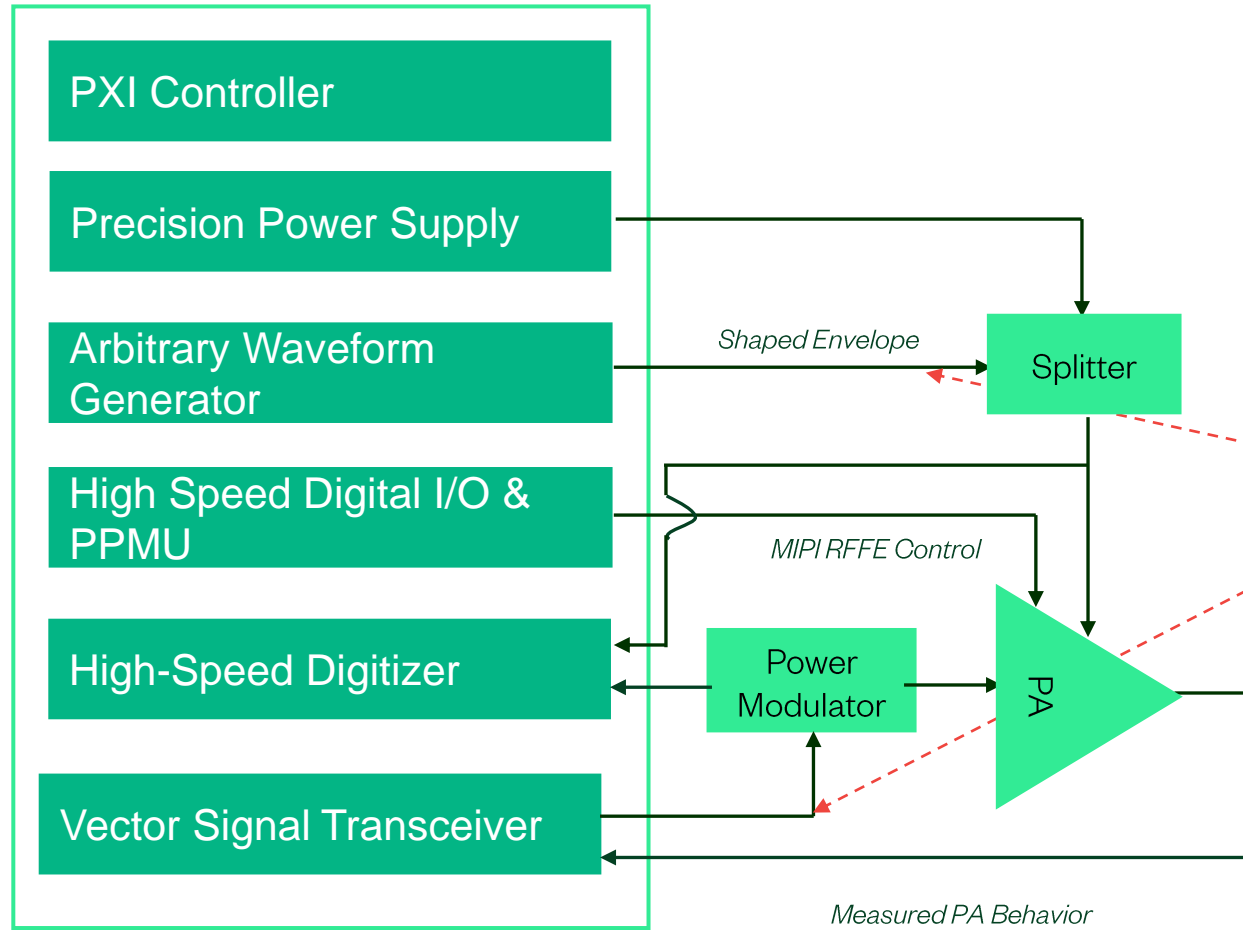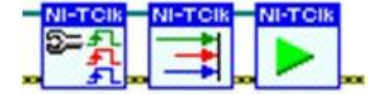
Testing Solutions from Lab to Production that

Accelerate Time to Market

Validation & Characterization
Production speed & density in the lab

High Volume Manufacturing
Lab-grade measurements in production

Same
Instruments

Same
Measurement
Science

Same Software

Industry-leading portfolio of compact high-performance instruments

Semiconductor Production Test Offerings

	1. Custom In-House Tester	2. Augment Existing Tester	3. NI STS
NI Offering	PXI, LabVIEW, TestStand	PXI, LabVIEW, TestStand,	PXI in STS (test head), cabling, calibration accessories, PXI, LabVIEW, TestStand
Integration	Customer, or Partner	Customer, or Partner	Last mile integration: NI, customer or partner

OTA Validation Reference Architecture

Support for PXIe-5842 with 54 GHz Frequency Extension

- 2 GHz instantaneous bandwidth, 2 bidirectional ports
- Simplified configuration with 1 remote measurement module – 1 instrument, 1 connection

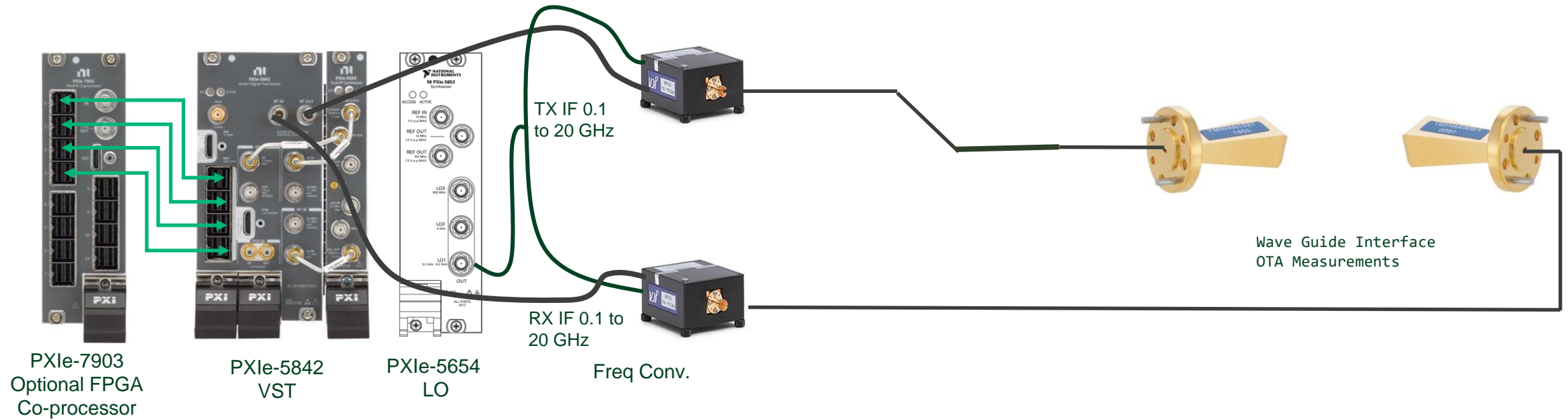BOJAY Chamber support up to 50 GHz

- New antenna required to upgrade from 44 GHz to 50 GHz
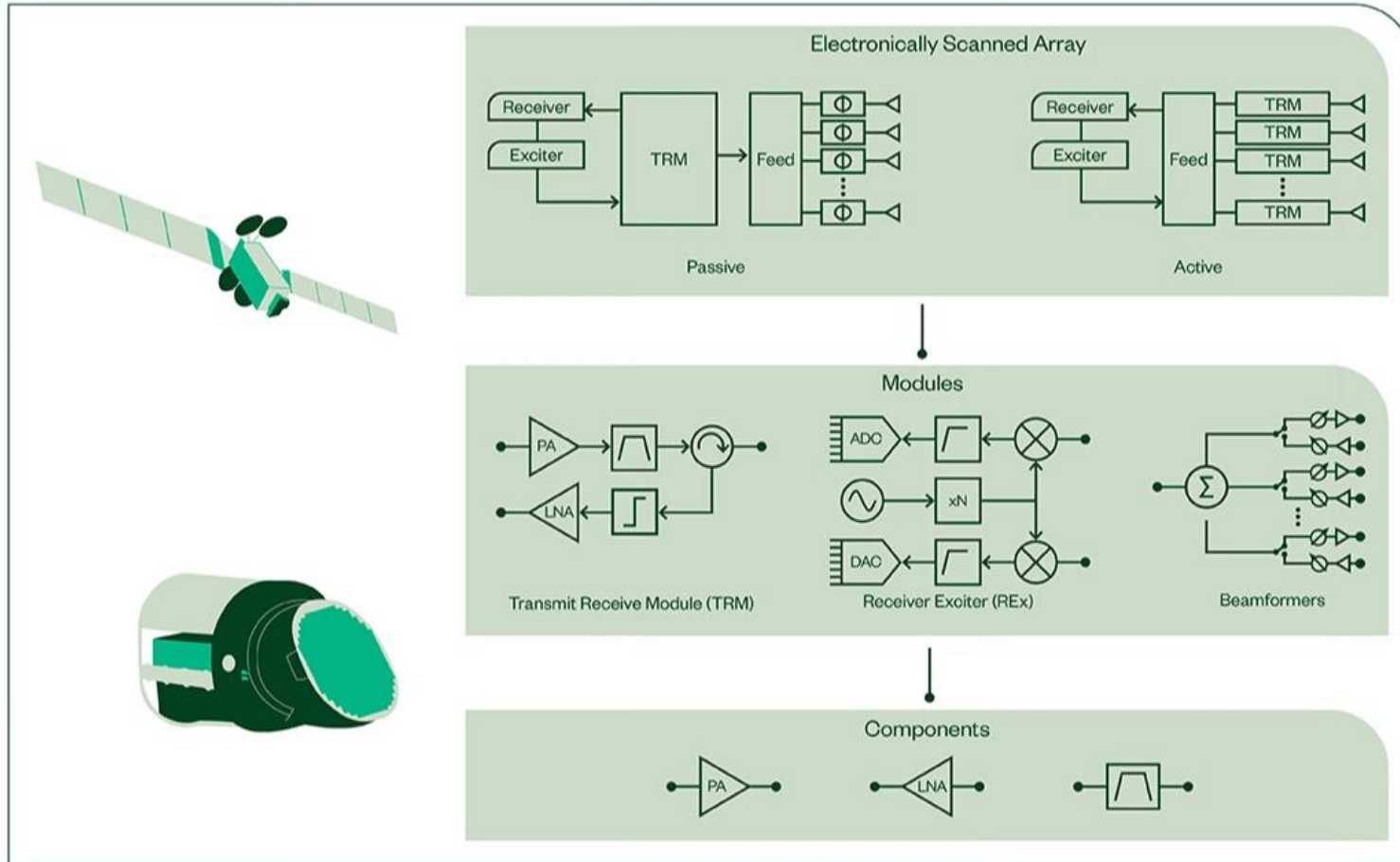- BJ-8019-NI and BJ-8019-NI-B chambers

Advanced Research

6G Sub-THz Reference Architecture

- RF measurements for sub-THz RFICs and devices

- Real-time data streaming & FPGA based processing

TX IF 0.1 to 20 GHz

RX IF 0.1 to 20 GHz

Wave Guide Interface
OTA Measurements

PXIe-7903
Optional FPGA
Co-processor

PXIe-5842
VST

PXIe-5654
LO

Freq Conv.

Simplified Setup

Electronically Scanned Array Characterization

Pulsed RF Measurements

Key Measurement Capabilities

- Power and phase stability
- Network analysis and S-parameters
- Pulse profile and stability
- Power added efficiency
- Spectral analysis
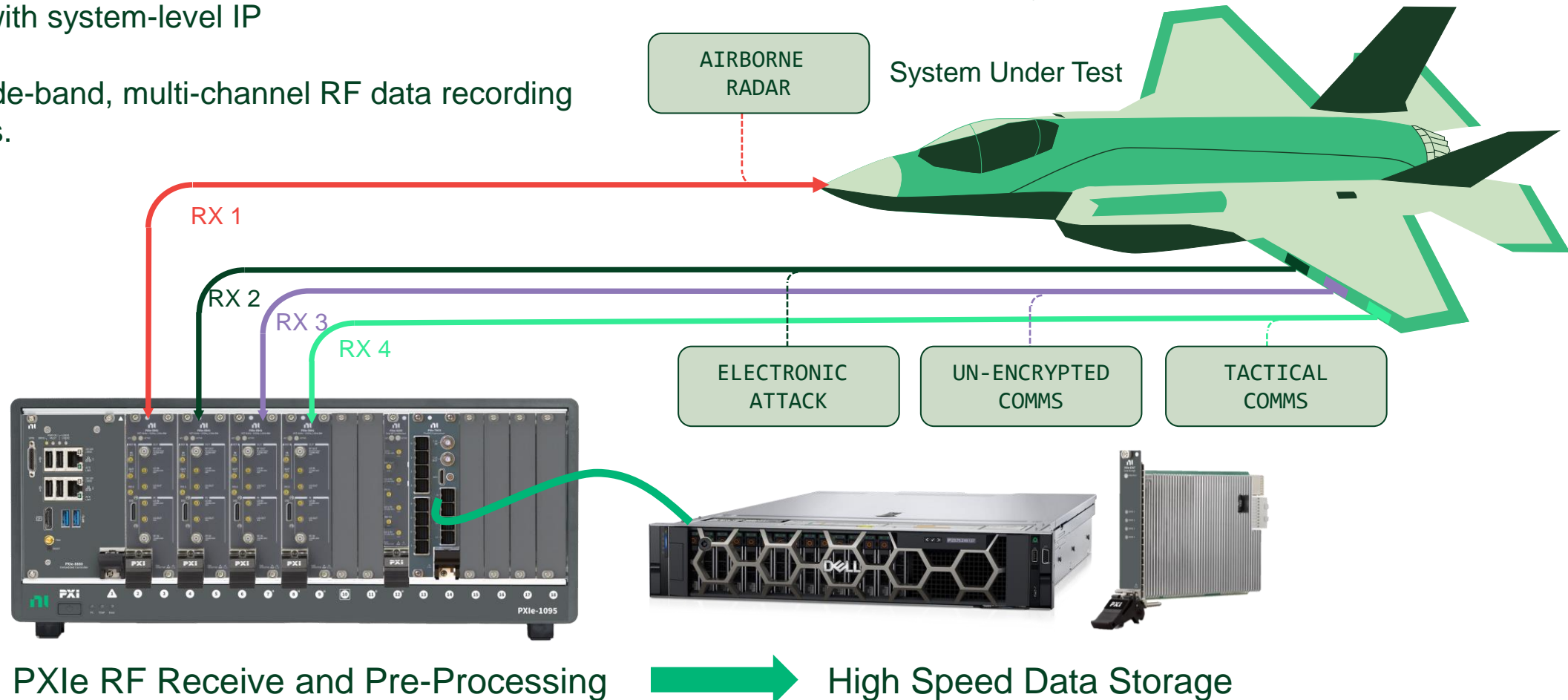- Phase noise

Multichannel RF Record & Playback Solution

What is the NI Multichannel RF Record and Playback Solution?

- Configuration of RF Modules, Digital Interfaces, FPGA Coprocessors with external servers & data storage combined with system-level IP
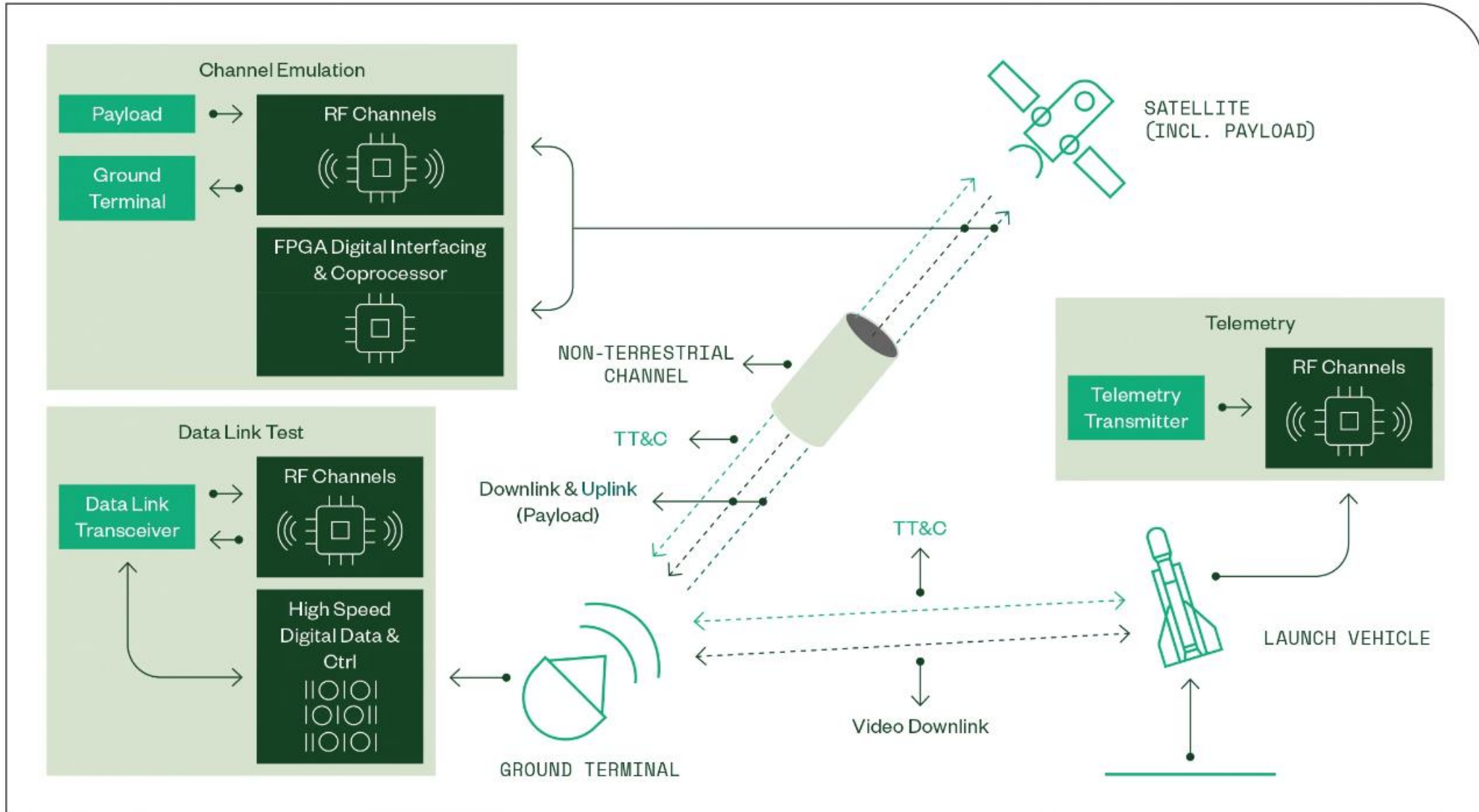
  Enables wide-band, multi-channel RF data recording applications.
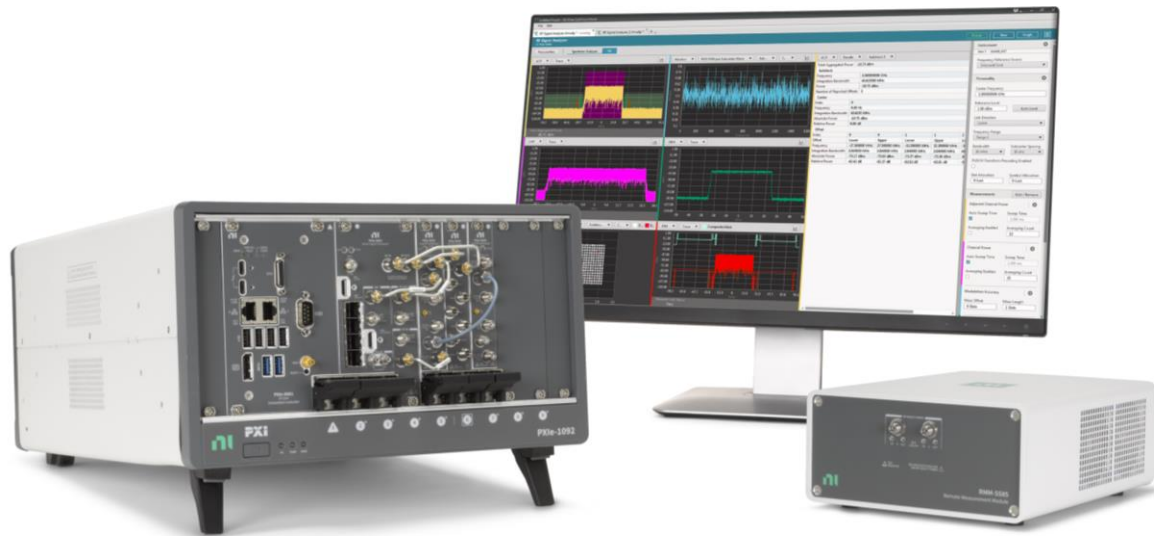
Features

- Wideband Data Recording to Disk Over 100 GbE
- Multi-Channel Phase-Alignment & Synchronization
- In-Line Data Analysis with FPGA Coprocessor

System Under Test

AIRBORNE RADAR

RX 1
RX 2
RX 3
RX 4

ELECTRONIC ATTACK

UN-ENCRYPTED COMMS

TACTICAL COMMS

PXIe RF Receive and Pre-Processing

High Speed Data Storage

ni.com

*RAID limited to 2 channels at 1 GHz IBW

Satellite Communications and Telemetry Validation Solution

Conclusion

- VST product family: wide range of capabilities

- Unique RF Capabilities in the PXI platform

- Will continued to evolve and improve over time to fit customer needs

- VST is a core instrument for a lot of Solutions in Aerospace and Defense or Semiconductor & Electronics applications

Overall, the PXI VST is a powerful and versatile instrument that combines the functionality of a vector signal analyzer and vector signal generator, offering engineers and researchers a comprehensive tool for RF signal generation, analysis, and testing within a modular and scalable platform.
Chat GPT

Next Steps

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ni.com/semiconductor

ni.com/aerospace-defense