

The New Keysight N9042B UXA Signal Analyzer

**THE MOST ADVANCED SIGNAL ANALYZER
ON THE PLANET**

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TECHNOLOGIES**

INTRODUCTION

Meet the New Keysight N9042B UXA Signal Analyzer

Welcome to the all-new Keysight X-Series N9042B UXA Signal Analyzer - the most advanced signal analyzer on the planet. It sets a new level of performance for high frequency measurements. Frequency options up to 50 GHz cover the current 5G NR FR1 and FR2 bands as well as most radar, EW, and satellite bands. Analysis bandwidth can be configured to 1 GHz, 1.5 GHz, 2 GHz, or 4 GHz. Plus, a completely new front end provides low-noise performance and high dynamic range, addressing applications in Tx test such as EVM and other modulation quality tests while also excelling at measurements of low-level and unknown signals.

But we didn't stop there...

In addition to the N9042B, we developed the brand new V3050A Frequency Extender that enables you to extend the maximum frequency up to 110 GHz and features a low-noise design for outstanding sensitivity, fundamental mixing for high dynamic range, and a "remote head" form-factor that interfaces seamlessly to the N9042B.

And on top of all this, the N9042B can be used with the industry's first receiver calibrator (the Keysight U9361 RCal module) - offering you the ability to improve your amplitude accuracy by 10x.

Testing at mmWave frequencies creates unique challenges that require the highest performing test gear available. We understand these challenges, which is the exact reason we developed the N9042B UXA Signal Analyzer, V3050A Frequency Extender, and U9361 RCal Receiver Calibrator - giving you the tools you need to develop your next innovation.



N9042B UXA Signal Analyzer - Summary

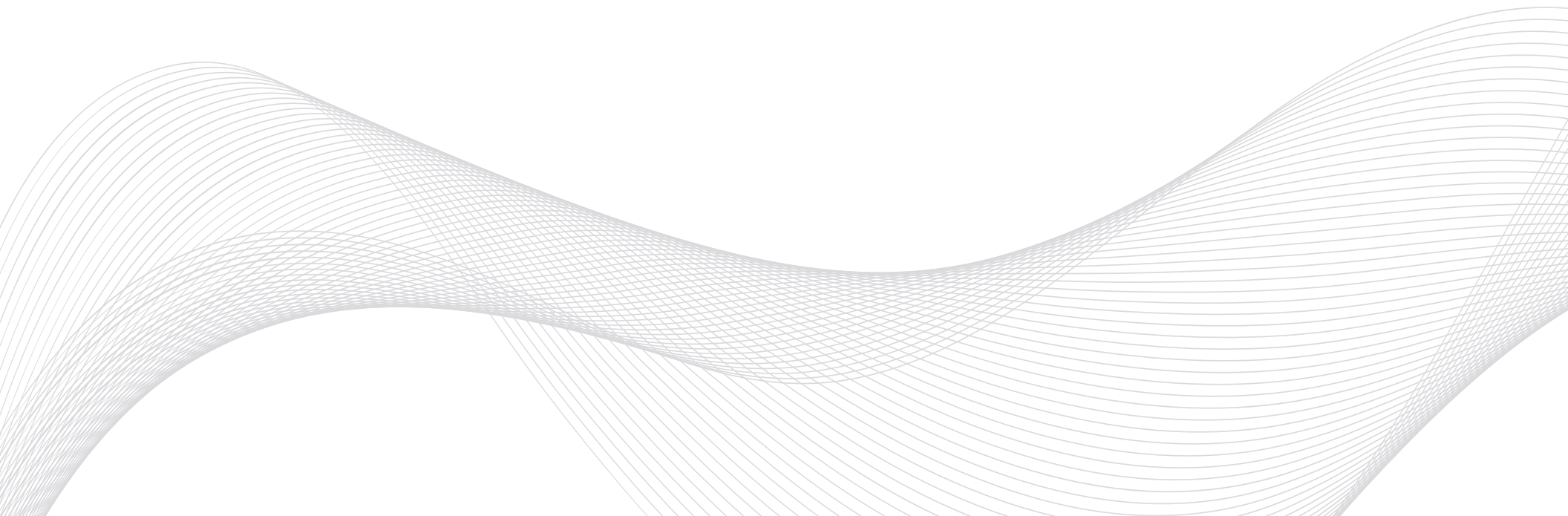
2 Hz to 110 GHz unbanded frequency range

4 GHz of corrected analysis bandwidth for both signal analysis and signal generation (when paired with the VXG)

Industry's best error vector magnitude (EVM)

Industry's best swept displayed average noise level (DANL)

Contents



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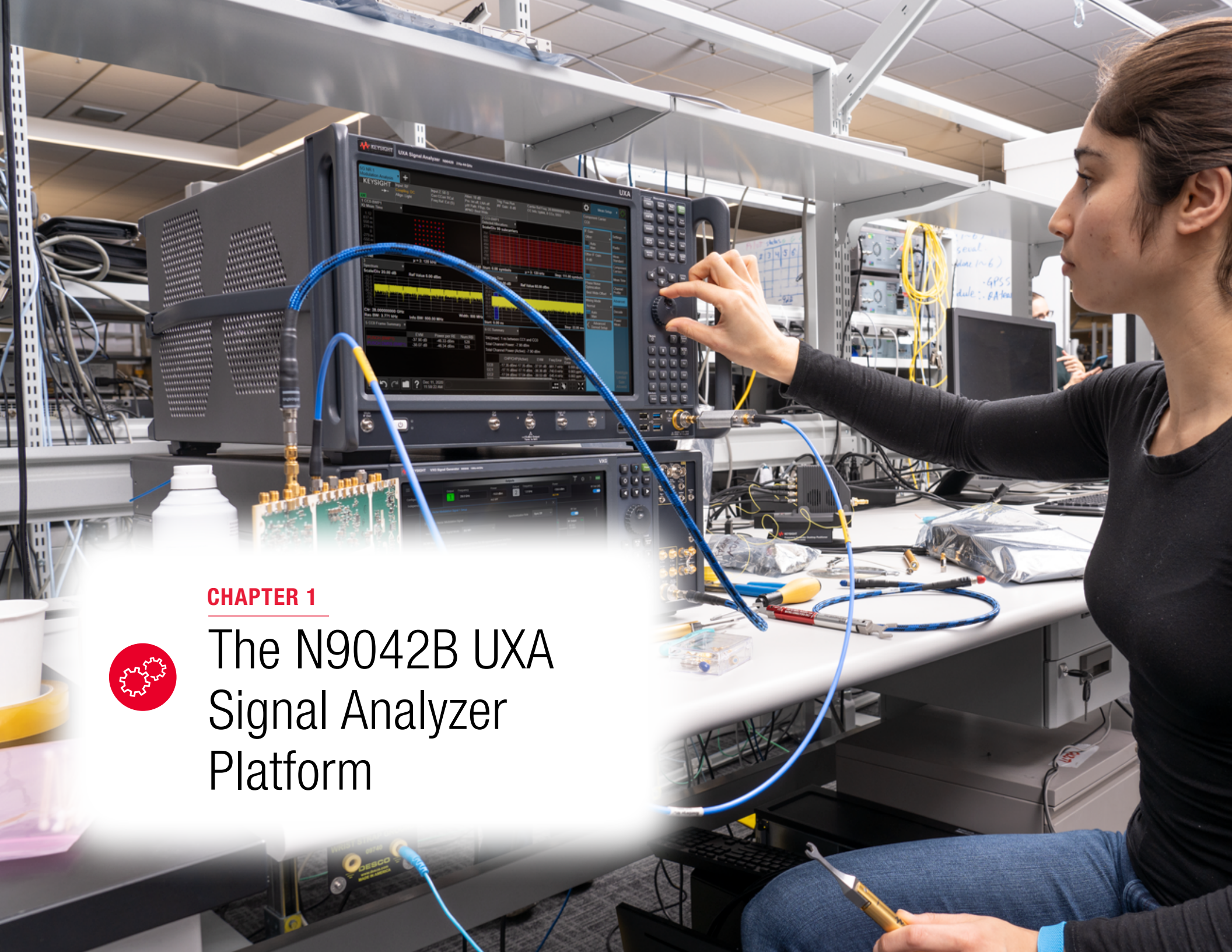


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All equipment is calibrated and maintained by the Keysight Premier Rental Partners so your team can



CHAPTER 1



The N9042B UXA Signal Analyzer Platform

CHAPTER 1

The N9042B UXA Signal Analyzer Platform

There are four core components of the N9042B UXA Signal Analyzer Platform - all designed to help you overcome your toughest mmWave test challenges.



N9042B UXA Signal Analyzer

- 2 Hz to 50 GHz frequency range
- Industry leading 4 GHz of corrected bandwidth for both analysis and generation (with the Keysight VXG)
- Best performance for EVM, swept DANL, and dynamic range



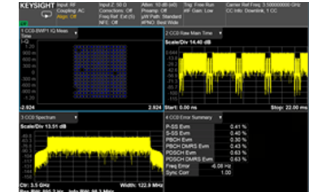
V3050 Frequency Extender

- Continuous, unbanded frequency coverage from 2 Hz to 110 GHz
- USB-powered and controlled
- Remote head form factor moves point-of-connection to device under test (DUT)
- Outstanding sensitivity, high dynamic range
- Seamless interface to the N9042B UXA



U9361 RCal Receiver Calibrator

- World's only receiver calibrator
- Improve your test Rx system accuracy by 10x
- Seamlessly move reference plane to the output of the DUT with easy-to-use, simple command structure and automation
- Models to 110 GHz
- Compact, palm-size, USB-powered and controlled
- Ultra-stable and repeatable, with precision factory cal data inside
- Both magnitude and phase corrections



X-Series Apps and VSA Software

- Runs up to 40% faster on the N9042B UXA
- X-Series applications ensure your designs meet the latest standards, offer insight into device performance, produce trusted results, and provide the same measurement science / expertise across multiple hardware platforms
- VSA software offers a comprehensive set of tools for demodulation and vector signal analysis - supports more than 75 signal standards and modulation types



CHAPTER 2



Measurement Challenges

CHAPTER 2

Measurement Challenges

Millimeter-wave technology is transforming wireless communications. Next generation 5G, satellite, and automotive radar communications are achieving higher data throughput and super-fine range resolution using ultra-wide bandwidth. Millimeter-wave technology is a key enabler, providing ample margin for performance improvements; However, it also creates challenges such as path loss, tight design margins, complex modulation, and stringent standards.

Wireless technologies increase signal bandwidth and use higher-order modulation schemes to achieve faster data rates. Wider bandwidth is an alluring millimeter-wave feature. However, wider bandwidth and higher modulation schemes introduce challenges related to link quality requirements at millimeter-wave frequencies. Any skew in a flange connection can cause unwanted reflections that degrade signal quality and power. Therefore, it is critical that you take extra care to evaluate millimeter-wave components and devices accurately. This is where the N9042B UXA can help.

Common challenges when testing at millimeter-wave frequencies include:

- **Significant Path Loss** - significant path loss between instruments and DUTs results in a lower signal-to-noise ratio, making signal analysis measurement (such as EVM, adjacent channel power, and spurious emissions) challenging
- **Wideband Noise** - millimeter-wave frequency bands provide wider bandwidths and this increased analysis bandwidth introduces more noise which reduces the SNR in measurements and makes accurate millimeter-wave measurements more difficult
- **Modulation Complexity** - Complex modulation schemes require extreme accuracy to discern the constellation.

The new N9042B UXA signal analyzer helps you overcome these challenges by providing the highest frequency coverage, widest analysis bandwidth, and best EVM, swept DANL, and dynamic range available.



Industries Where the N9042B UXA Signal Analyzer Can Help

The industries below are some of the most common ones dealing with these millimeter-wave challenges:



Cellular Communications

Testing 5G components and devices per the 3GPP 5G New Radio (5G NR) standard releases 15 and 16 requires a solution with higher accuracy, sensitivity, and bandwidth capability.

The N9042B UXA signal analyzer helps you test the true performance of your transmitter designs with the industry's best residual error vector magnitude (EVM) and 5G NR signal analysis software suite to perform transmitter downlink and uplink measurements with one-button simplicity.



Satellite Communications

Today's satellite communication systems require a more sophisticated approach to wideband component characterization. You need a test solution with the widest analysis bandwidth and highest frequency range to characterize the performance of your satellite designs.

The N9042B UXA signal analyzer and the M9484C VXG signal generator deliver 4 GHz of corrected bandwidth for both analysis and generation. The UXA also provides the highest unbanded, preselected frequency range to help you characterize your most sophisticated satellite designs.



CHAPTER 3

Features & Specifications



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Features & Specifications

Some of the core features and capabilities of the N9042B UXA analyzer include:

- See signals clearly with an unbanded sweep from 2 Hz to 110 GHz and up to 4 GHz of analysis bandwidth
- Characterize your 5G NR transmitter accurately with the industry's best error vector magnitude (EVM)
- Find out-of-band emissions or spurs quickly in your radar designs with the industry's best swept displayed average noise level (DANL)
- Develop high-throughput satellite communication designs with 4 GHz of corrected analysis and generation bandwidth (when paired with VXG signal generator)
- Achieve a 10x improvement in magnitude accuracy with the new U9361 RCal Receiver Calibrator



Test the Real Performance of Your Millimeter Wave Transceiver

Specifications

Frequency Options	
526	2 Hz to 26.5 GHz
544	2 Hz to 44 GHz
550	2 Hz to 50 GHz
With V3050A	Up to 110 GHz

Bandwidth Options	Option Number
1 GHz	N9042B-R10
1.5 GHz	N9042B-R15
2 GHz	N9042B-R20
4 GHz	N9042B-R40

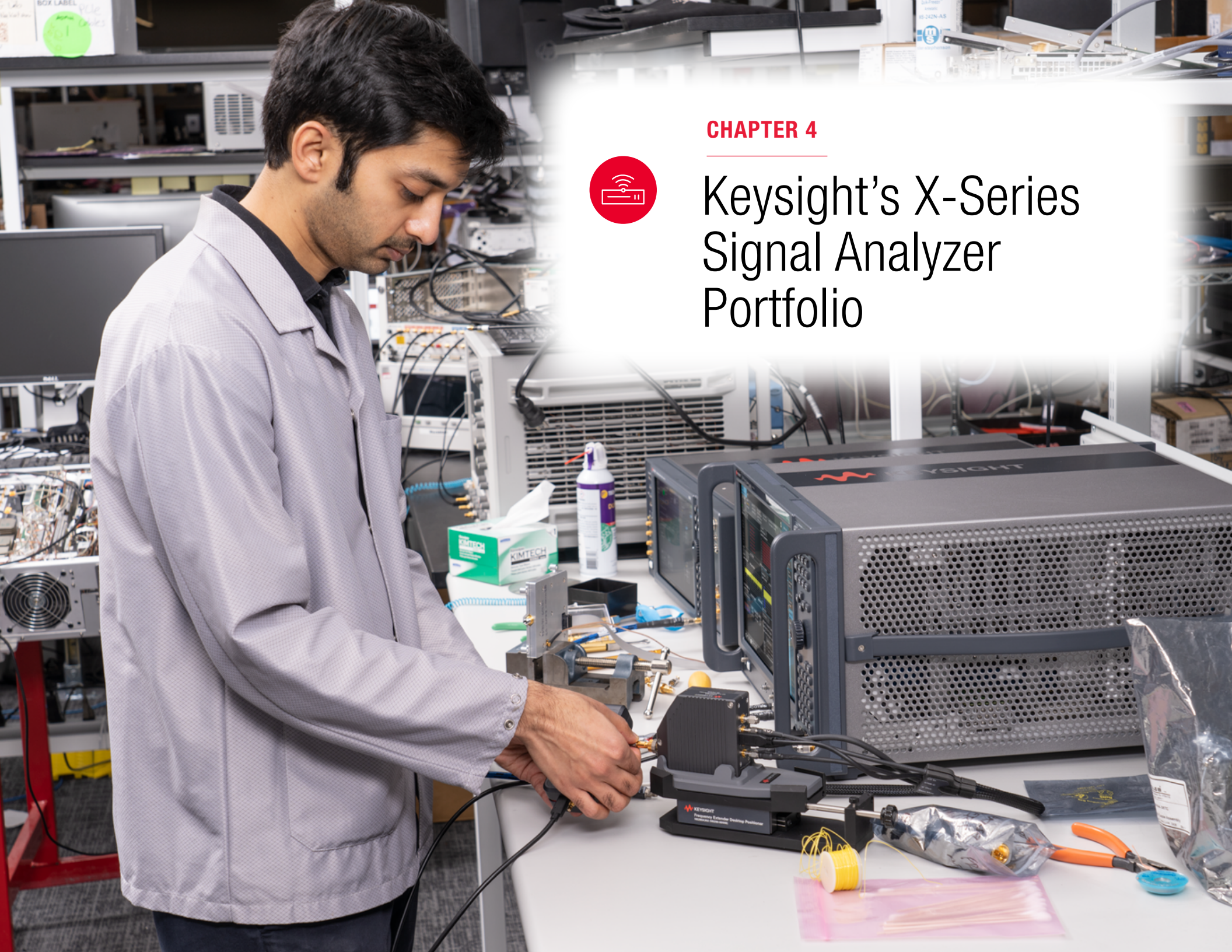
Absolute Amplitude Accuracy	
@ 50 MHz	+/- 0.12 dB (typical)
@ any frequency, any path	+/- (abs amp at 50 MHz + frequency response)

TOI	
Standard path (swept, preselector on, LNA off, PA off)	
10 to 350 MHz	+18 dBm
> 350 MHz to 1.1 GHz	+19 dBm
> 1.1 GHz to 3.0 GHz	+21 dBm
> 3.0 to 3.6 GHz	+22 dBm
> 3.6 to 13.6 GHz	+19 dBm
> 13.6 to 21 GHz	+16 dBm
> 21 to 26.5 GHz	+18 dBm
> 26.5 to 34.5 GHz	+19 dBm
> 34.5 to 50 GHz	+14 dBm

Standard Path DANL (swept, preselector on, LNA off, PA off)	
2 to 10 Hz	-90 dBm (nominal)
> 10 to 100 Hz	-115 dBm (nominal)
> 100 Hz to 1 kHz	-128 dBm (nominal)
> 1 to 9 kHz	-138 dBm (nominal)
> 9 to 100 kHz	-146 dBm
> 100 kHz to 1 MHz	-155 dBm
> 1 to 10 MHz	-156 dBm
> 10 MHz to 1.2 GHz	-155 dBm
> 1.2 to 2.1 GHz	-154 dBm
> 2.1 to 3.6 GHz	-152 dBm
> 3.6 to 6.6 GHz	-150 dBm
> 6.6 to 8.4 GHz	-151 dBm
> 8.4 to 13.6 GHz	-149 dBm
> 13.5 to 17.1 GHz	-149 dBm
> 17.1 to 22.5 GHz	-146 dBm

DANL (continued)	
> 22.5 to 26.5 GHz	-143 dBm
> 26.5 to 30 GHz	-140 dBm
> 30 to 34.5 GHz	-139 dBm
> 34.5 to 37 GHz	-135 dBm
> 37 to 40 GHz	-134 dBm
> 40 to 45 GHz	-132 dBm
> 45 to 50 GHz	-129 dBm





CHAPTER 4



Keysight's X-Series Signal Analyzer Portfolio

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Keysight's X-Series Signal Analyzer Portfolio

N9042B UXA



110 GHz Max Freq

-174 dBm DANL @ 1 GHz

11 GHz Max Analysis BW

-134 dBc/Hz Phase Noise @ 1 GHz (10 kHz offset)

N9010B EXA



44 GHz Max Freq

40 MHz Max Analysis BW

-172 dBm DANL @ 1 GHz

-109 dBc/Hz Phase Noise @ 1 GHz (10 kHz offset)

N9020/21B MXA



50 GHz Max Freq

160 / 510 MHz Max Analysis BW

-172 dBm DANL @ 1 GHz

-114 / -129 dBc/Hz Phase Noise @ 1 GHz (10 kHz offset)

N9030B PXA



50 GHz Max Freq

510 MHz Max Analysis BW

-174 dBm DANL @ 1 GHz

-136 dBc/Hz Phase Noise @ 1 GHz (10 kHz offset)

N9032B PXA



50 GHz Max Freq

2 GHz Max Analysis BW

-167 dBm DANL @ 1 GHz

-136 dBc/Hz Phase Noise @ 1 GHz (10 kHz offset)

N9040/41B UXA



50 / 110 GHz Max Freq

1 GHz / 5 GHz Max Analysis BW

-174 dBm DANL @ 1 GHz

-135 dBc/Hz Phase Noise @ 1 GHz (10 kHz offset)

CONCLUSION

Keysight N9042B UXA Signal Analyzer

At millimeter-wave frequencies, signal quality is more susceptible to impairments such as modulation errors, phase noise, and distortion. The new N9042B UXA X-Series signal analyzer provides the industry's widest analysis bandwidth and deepest dynamic range to help you solve your most difficult millimeter-wave challenges.

FOR MORE INFORMATION

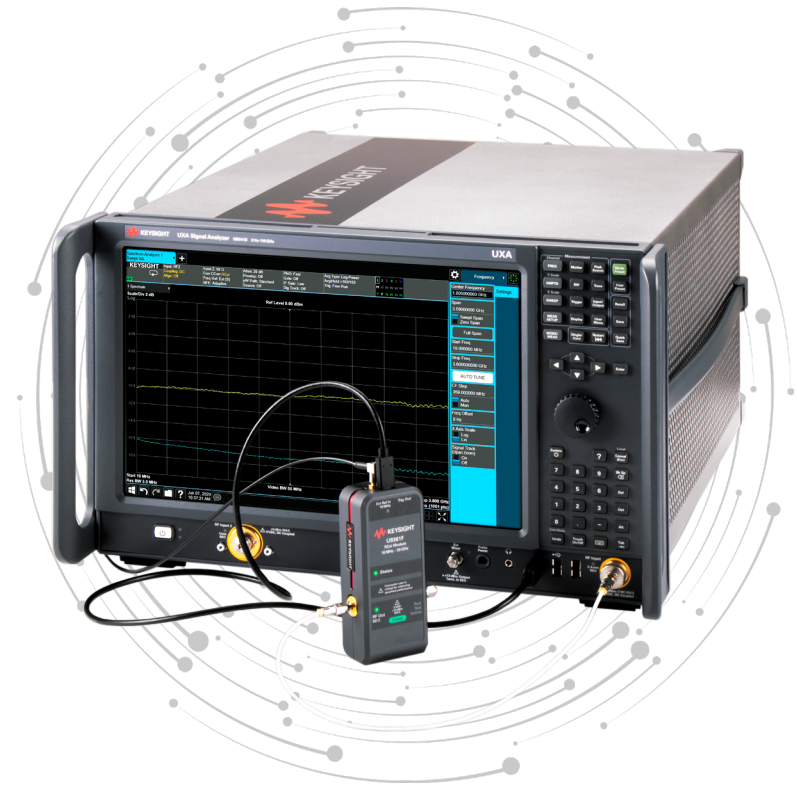
For more insights on the N9042B UXA signal analyzer, please see the following resources:

[Website](#)

[Data Sheet](#)

[Configuration Guide](#)

[mmW Challenges White Paper](#)





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