Fall 2007 Product Briefings

6GHz Vector Signal Analyzer and Vector Signal Generator
4X4 MIMO RF Test Systems
Model 4200-CVU C-V Measurement Solution

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

2007年秋季产品简介

6GHz矢量信号分析仪核矢量信号发生器
4X4 MIMO射频测试系统
4200-CVU C-V 测量解决方案

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

Keithley – The Leader in Test and Measurement For Device and Component Industries

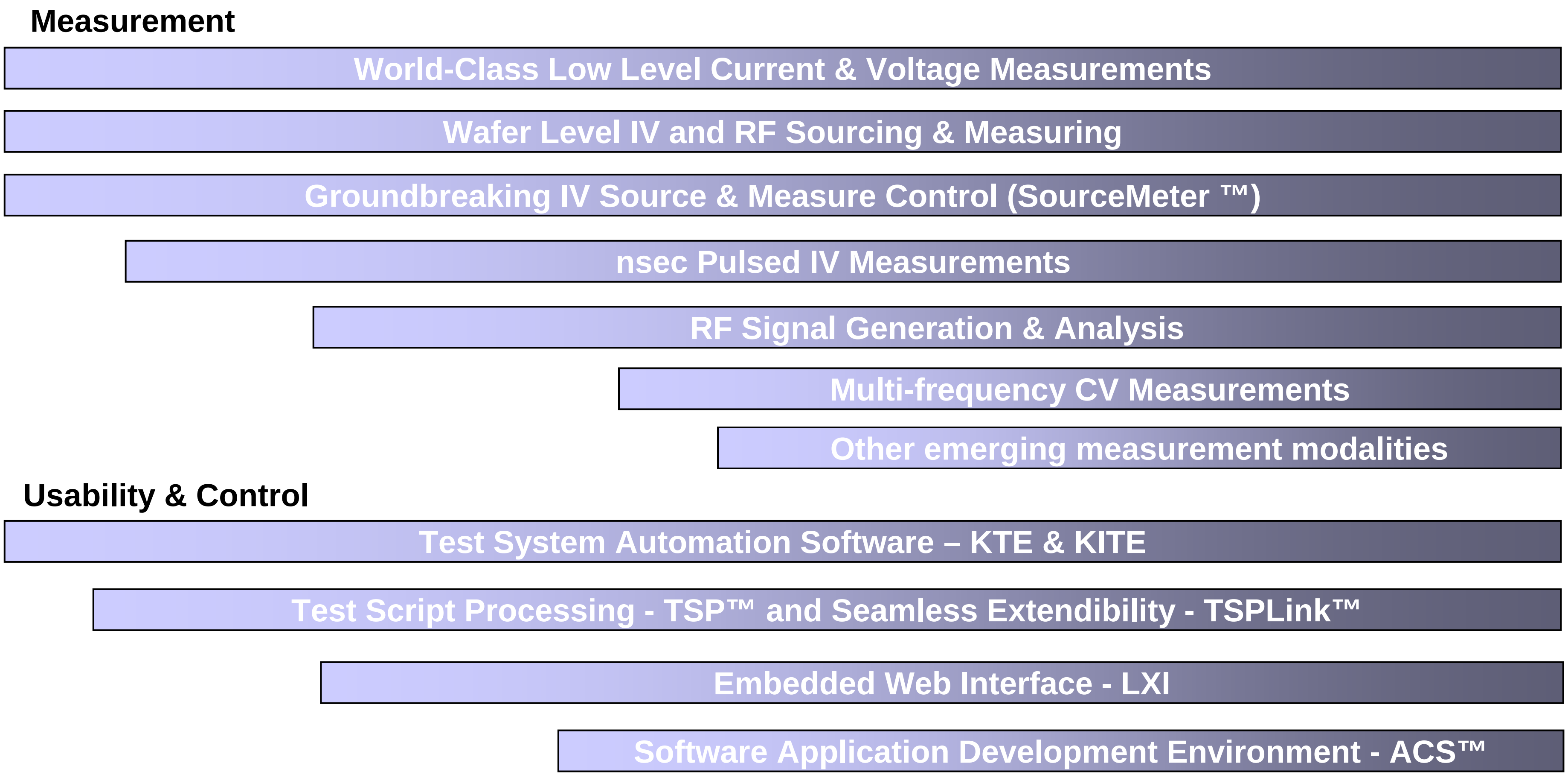
- Technology-leading solutions for more than 60 years
- Expanded measurement capabilities now include from DC to RF, from materials to board level testing
- Test solutions for emerging measurement needs from R&D to production
- In-depth applications expertise
- Expert sales, service, and support team worldwide
- Close collaboration and partnerships with our customers

KEITHLEY

吉时利 – 设备和元件测试测量领域的领军者

- 60多年始终保持领先的测试技术解决方案
- 涵盖直流到射频、材料到板极测试的广泛测量能力
- 为应对研发与生产对测量提出的新需求提出测试解决方案
- 全面深入的专业应用
- 销售、服务、产品支持专业人员遍布全球
- 同客户建立了紧密合作的伙伴关系

Keithley Capabilities Expand Over Time



Measurement

- World-Class Low Level Current & Voltage Measurements
- Wafer Level IV and RF Sourcing & Measuring
- Groundbreaking IV Source & Measure Control (SourceMeter ™)
- nsec Pulsed IV Measurements
- RF Signal Generation & Analysis
- Multi-frequency CV Measurements
- Other emerging measurement modalities

Usability & Control

- Test System Automation Software – KTE & KITE
- Test Script Processing - TSP™ and Seamless Extendibility - TSPLink™
- Embedded Web Interface - LXI
- Software Application Development Environment - ACS™

Keithley 不断提升的技术实力

测量

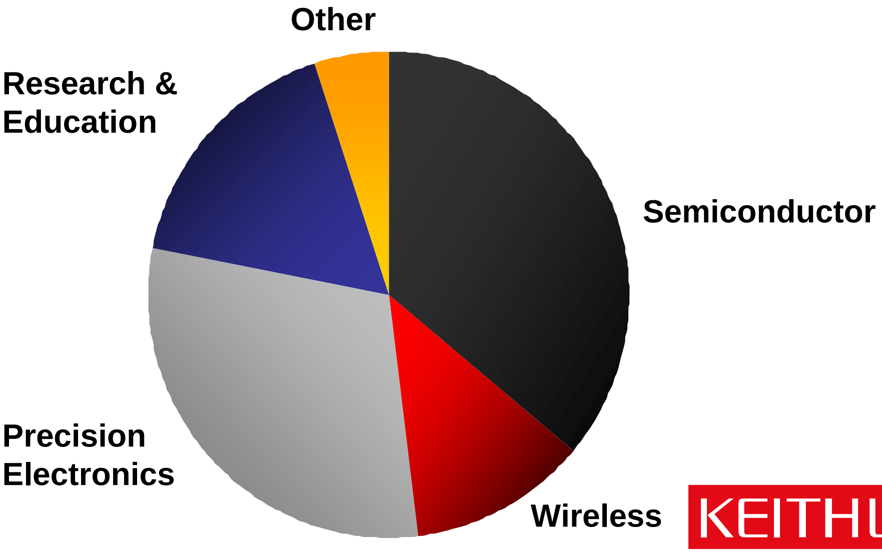
- 世界一流的低电平电流/电压测量
- 圆片级 IV 和射频源&测量
- 开创性的IV源&测量控制 (SourceMeter ™)
- 纳秒级脉冲IV测量
- 射频信号产生与分析
- 多频 CV 测量
- 其它新兴的测量形式

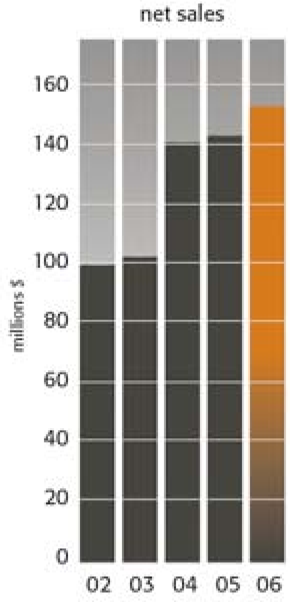
管理控制

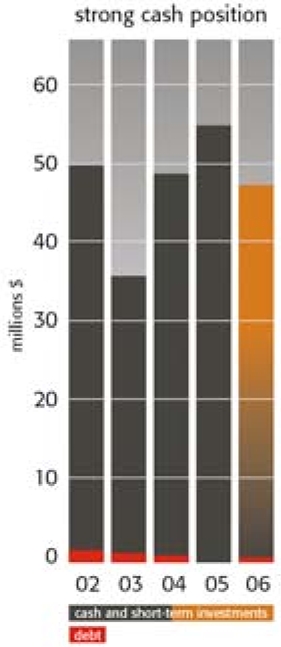
- 测试系统自动化软件 – KTE & KITE
- 测试脚本处理 - TSP™ 及其无缝扩展 - TSPLink™
- 嵌入式Web界面 - LXI
- 应用软件开发环境 - ACS™

Company Overview

- **Founded in 1946**
- **Headquarters located in Cleveland, Ohio**
- **More than 650 employees**
  - Average length of service >9 years
- **Sales offices and service centers worldwide**
- **Stock traded on NYSE since 1995**
- **Strong financial position**



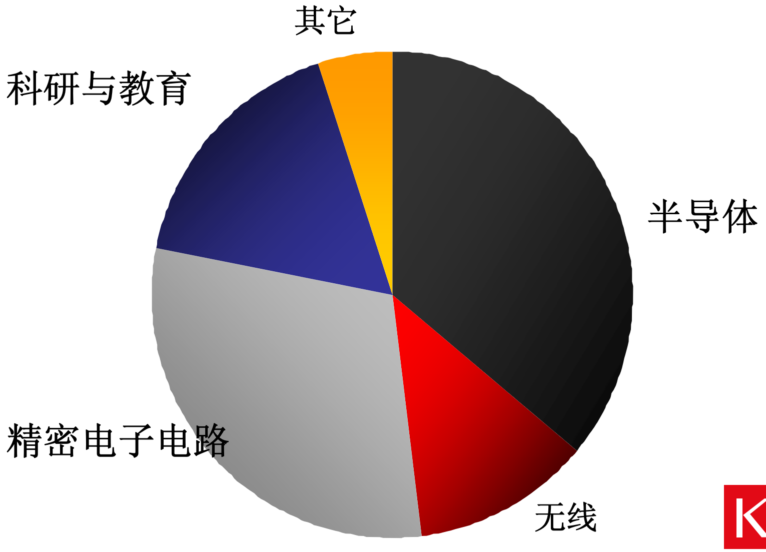


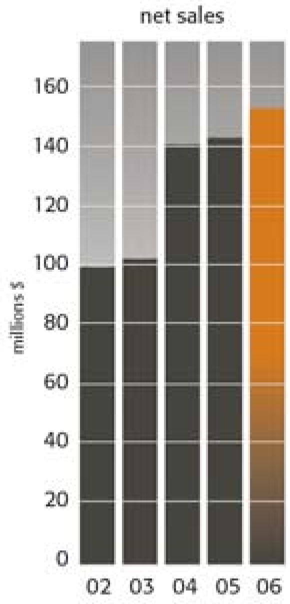


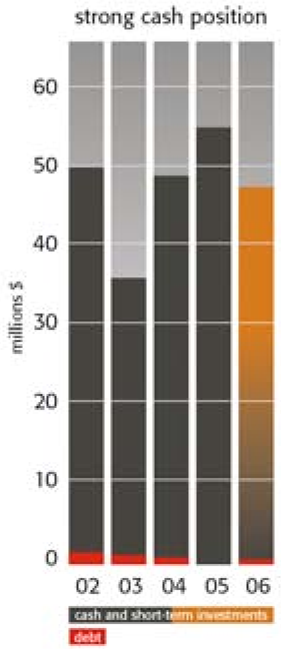
KEITHLEY

公司简介

- 创建于**1946**年
- 总部位于俄亥俄州克利夫兰市
- 雇员超过**650**人
  - 平均服务年限 >9 年
- 销售部和服务中心遍布全球
- **1995**年股票在纽约证券交易所上市
- 稳健的财务状况







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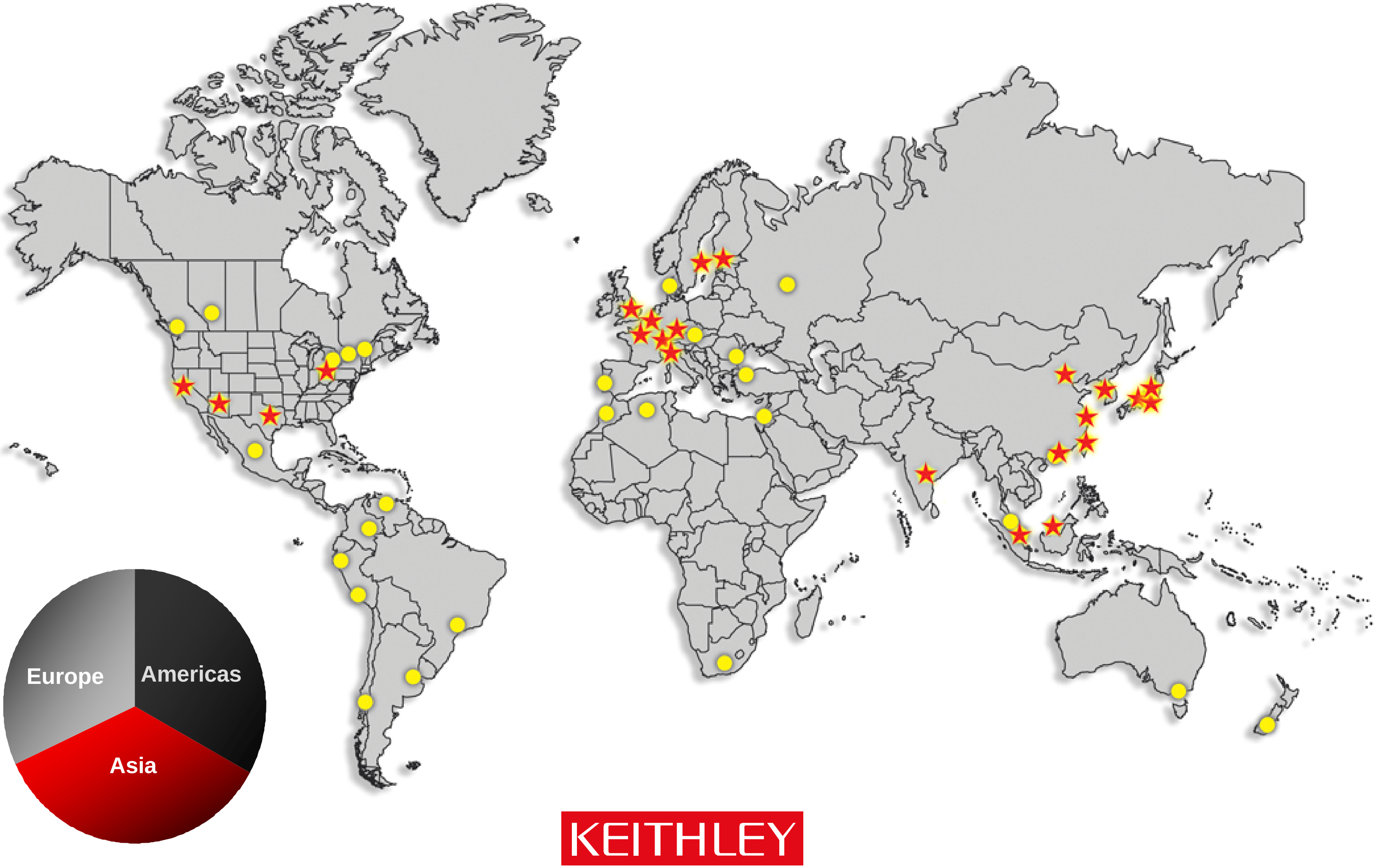
Integrated Worldwide Network of Product Sales, Service, and Application Support



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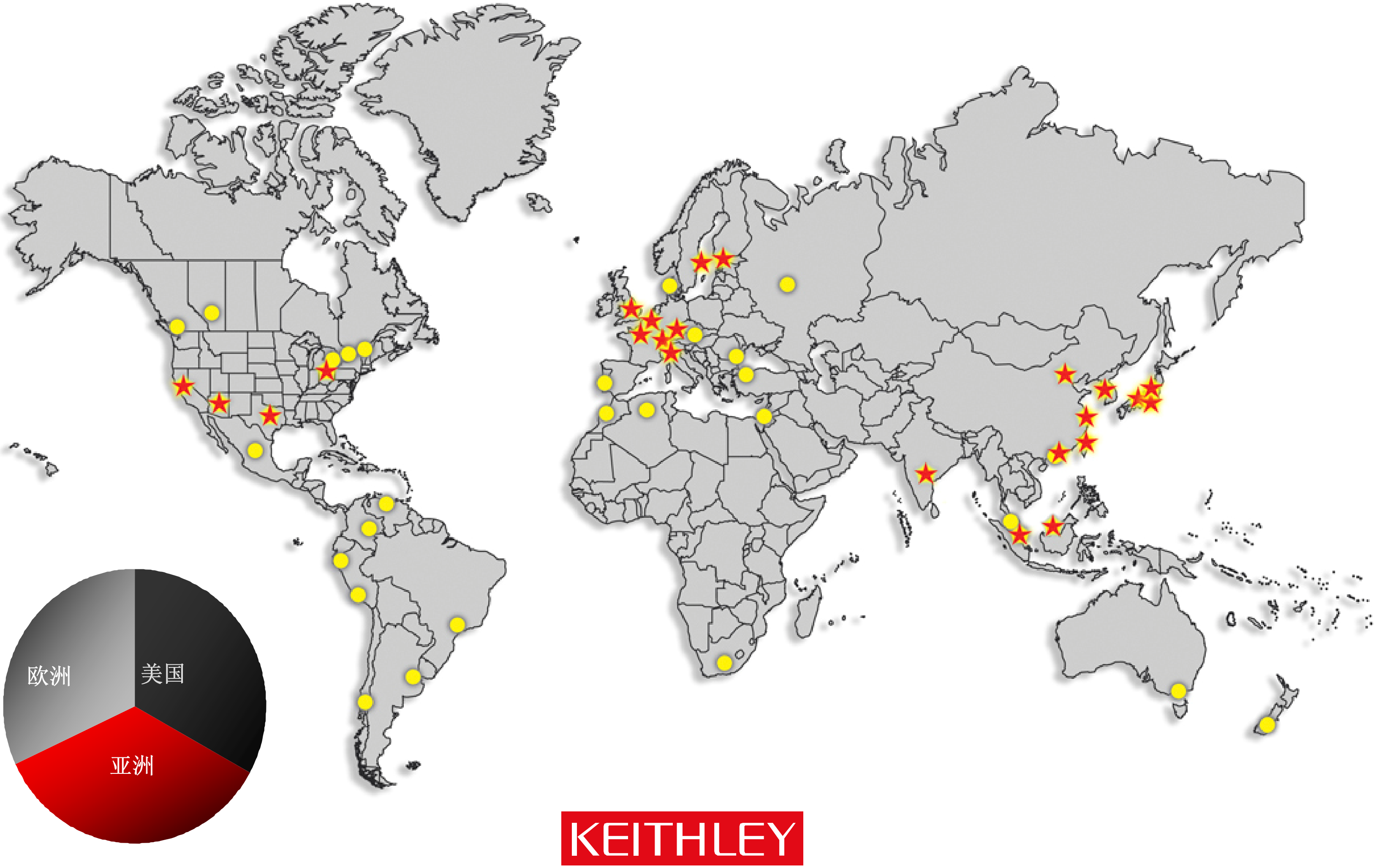
A GREATER MEASURE OF CONFIDENCE

产品的销售、服务、应用网点遍布全球



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A GREATER MEASURE OF CONFIDENCE

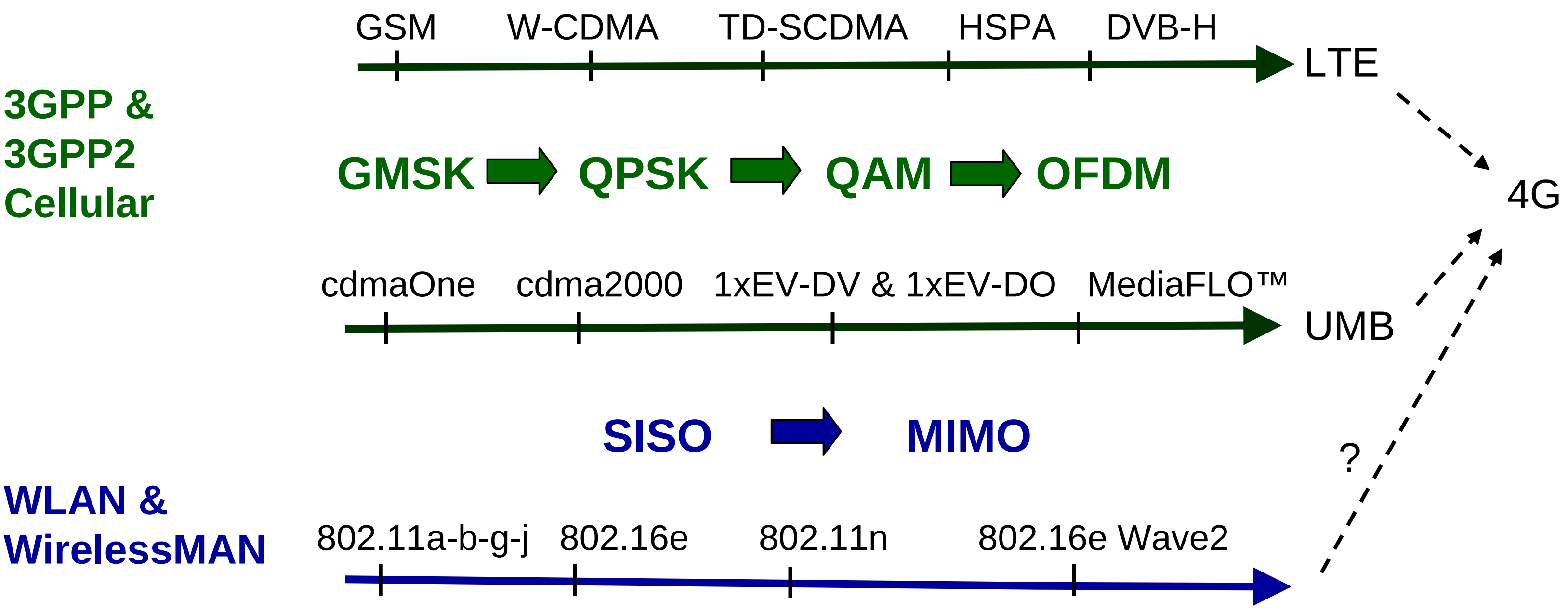
Tremendous Growth of Wireless Communication Market

- **RF Market is at Inflection Point Today**
  - Mobile communications is the world’s largest consumer market
  - Explosion of new, multi-function wireless communication devices
    - iPhone
    - Modules, chip sets as well
  - More bandwidth, multiple formats
    - WLAN (802.11x)
    - WiMAX
    - 4G LTE
    - UMB
  - Shift from voice to data
    - Need for more bandwidth
    - Rise in MIMO (multiple input, multiple output) technology

无线通讯市场增长迅速

- **射频市场当前面临转折点**
  - 移动通信是世界上最大的消费者市场
  - 新型的多功能无线通信器件蓬勃发展
    - iPhone
    - 模块、芯片组等
  - 更高带宽、多种格式
    - WLAN (802.11x)
    - WiMAX
    - 4G LTE
    - UMB
  - 从语音服务转换为数据服务
    - 更高的带宽需求
    - 催生了 MIMO (多输入多输出) 技术

Continuing Evolution of RF Technology



3GPP & 3GPP2 Cellular

GSM W-CDMA TD-SCDMA HSPA DVB-H LTE

GMSK → QPSK → QAM → OFDM

cdmaOne cdma2000 1xEV-DV & 1xEV-DO MediaFLO™ UMB

4G

SISO → MIMO

WLAN & WirelessMAN

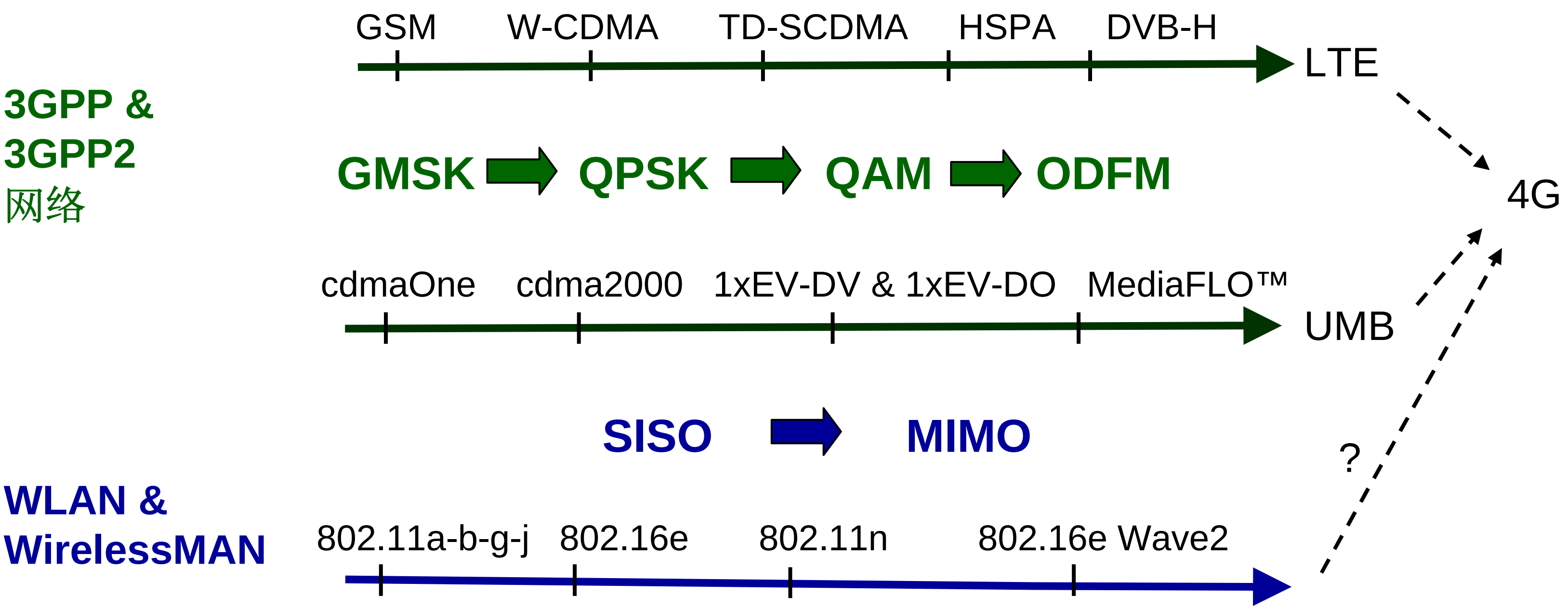
802.11a-b-g-j 802.16e 802.11n 802.16e Wave2

?

Signal Bandwidth 200kHz → 1.23MHz → 5MHz → 20MHz → 40MHz

Frequency 800MHz → 1.8GHz → 2.1GHz → 2.4GHz → 5.8GHz

不断发展的射频技术



3GPP & 3GPP2 网络

GSM | W-CDMA | TD-SCDMA | HSPA | DVB-H → LTE

GMSK → **QPSK** → **QAM** → **ODFM**

cdmaOne | cdma2000 | 1xEV-DV & 1xEV-DO | MediaFLO™ → UMB

SISO → **MIMO**

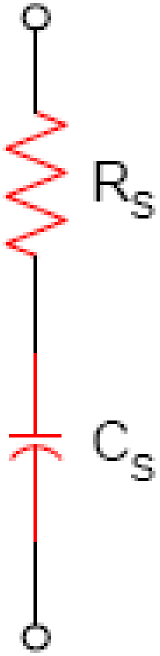
WLAN & WirelessMAN

802.11a-b-g-j | 802.16e | 802.11n | 802.16e Wave2 →

信号带宽 **200kHz** → **1.23MHz** → **5MHz** → **20MHz** → **40MHz**

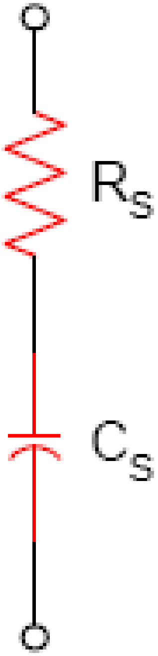
频率 **800MHz** → **1.8GHz** → **2.1MHz** → **2.4GHz** → **5.8MHz**

More device demand is driving more C-V Testing
What Is C-V Testing?



- **A fundamental research and process development tool**
- **Helps assure quality and reliability of semiconductor devices**
- **Particularly important for gate dielectric quality**
- **Provides a wealth of device and process information:**
  - dielectric thickness
  - bulk and interface charge characteristics
  - doping profiles
  - and much more

日益增多的元器件需求引致更多的C-V测试需求
什么是C-V测试？



- 是基础研究和工艺开发的工具
- 确保半导体器件的质量和可靠性
- 对栅极绝缘层的质量尤为重要
- 提供大量的器件和工艺信息：
    - 绝缘层厚度
    - 体、面电荷特性
    - 杂质浓度分布
    - 其它

Keithley's Industry Leading RF Test Systems

居业界领先水平的吉时利射频测试系统

Introducing the 2800, 2900 Family
4GHz and 6GHz VSA's and VSG's

- **4/6GHz frequency range**
- **40MHz analysis bandwidth**
- **80MHz generation bandwidth**
- **Mobile-WiMAX**
- **WLAN 802.11n**
- **MIMO Ready**

频率高达4GHz和6GHz 的2800、2900系列VSA与VSG

- 4/6GHz频率范围
- 40MHz分析带宽
- 80MHz信号发生带宽
- Mobile-WiMAX
- WLAN 802.11n
- 支持MIMO

Keithley's Technical Leadership is Changing the Traditional Paradigm with the Award-winning RF Vector Signal Analyzer & Generator

The first next-generation RF instrument platform for RF communication test needs today, and tomorrow.

- ✓ **High-speed measurements – reduces cost of test, shortens time-to-market**
- ✓ **High accuracy and repeatability – ensures high product quality and high production yields**
- ✓ **High flexibility – increases return on investment**
- ✓ **Low cost – extends capital budgets**

2800-series VSA

2900-series VSG

拥有领先技术的吉时利凭借其广受赞誉的射频矢量信号分析仪/发生器改变了传统的测量方案

能够满足当前及未来射频通信测试需求的业界第一个新一代射频设备平台：

- ✓ 高速测量—减少测试开销，缩短上市时间
- ✓ 高精度和可重复性— 确保产品的高质量和高产出
- ✓ 高度的灵活性—增加了投资的回报
- ✓ 低成本—扩展了投资效益

2800系列VSA

2900系列VSG

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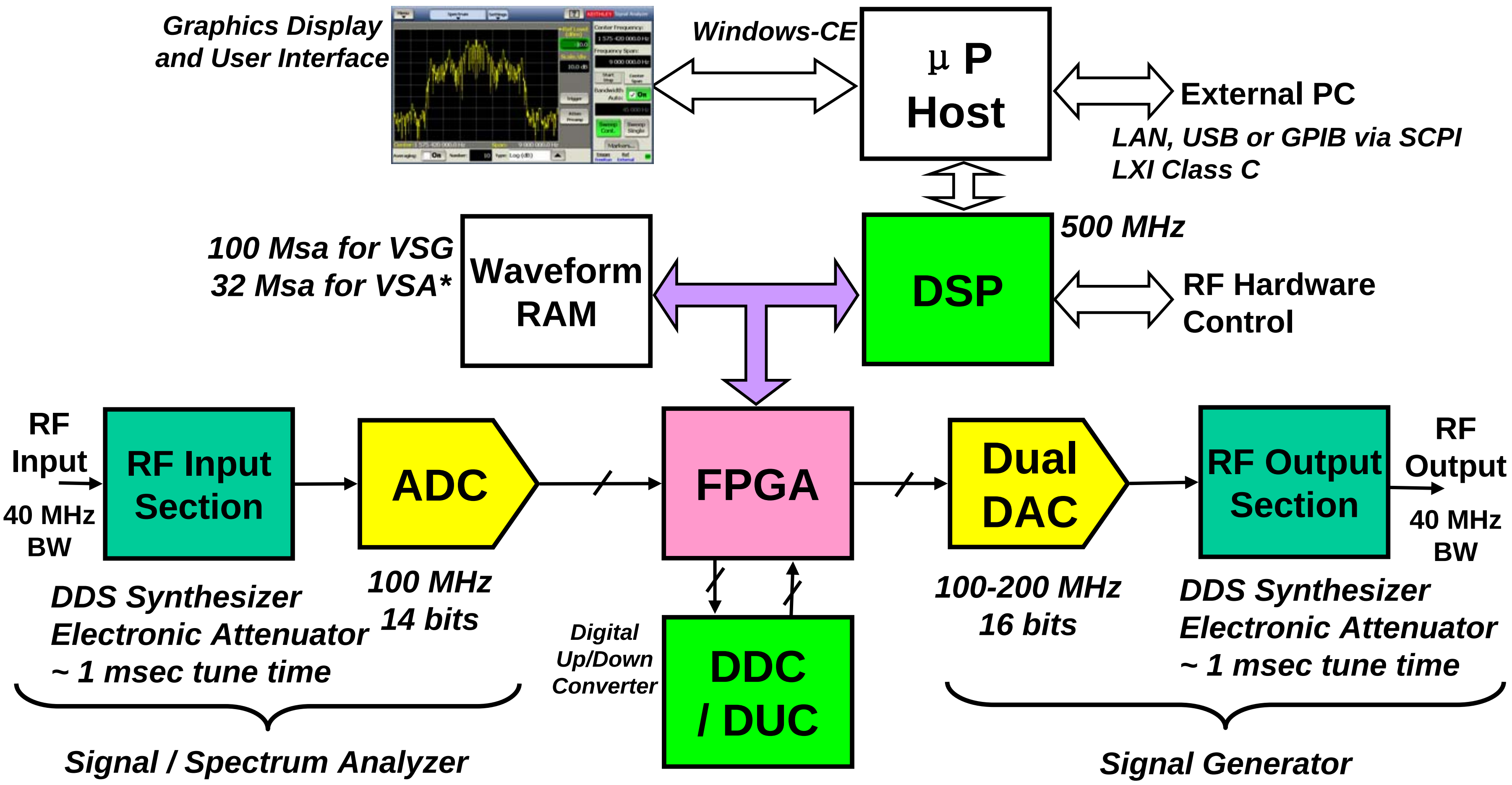
Keithley’s DSP-based SDR Architecture Optimized for High Speed, Accuracy and Flexibility



Graphics Display and User Interface

Windows-CE

µ P Host

External PC

LAN, USB or GPIB via SCPI
LXI Class C

100 Msa for VSG
*32 Msa for VSA**

Waveform RAM

DSP

500 MHz

RF Hardware Control

RF Input

40 MHz BW

RF Input Section

ADC

FPGA

Dual DAC

RF Output Section

RF Output

40 MHz BW

DDS Synthesizer
Electronic Attenuator
~ 1 msec tune time

100 MHz
14 bits

Digital Up/Down Converter

DDC / DUC

100-200 MHz
16 bits

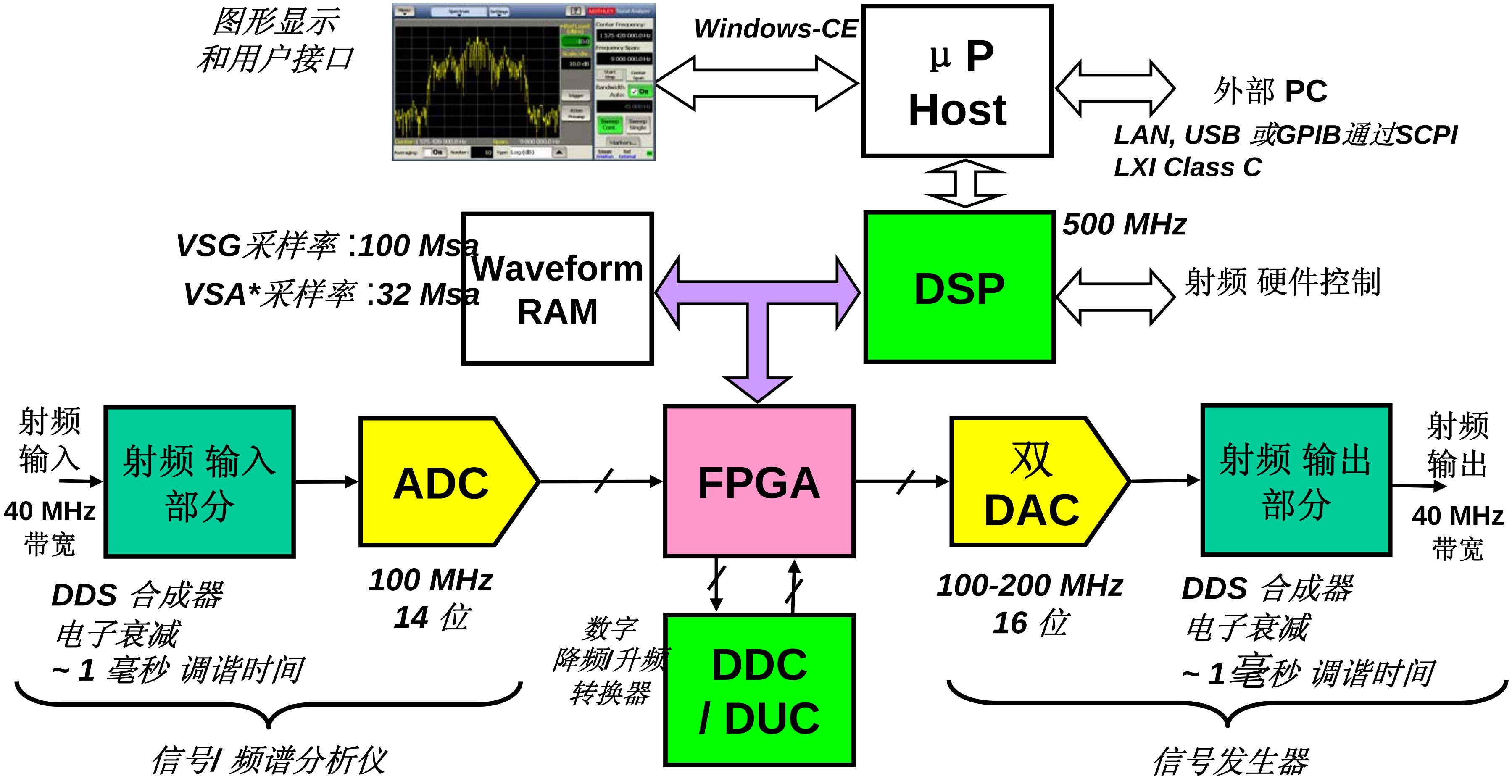
DDS Synthesizer
Electronic Attenuator
~ 1 msec tune time

Signal / Spectrum Analyzer

Signal Generator

* Limited to 30 sec sweep times. Up to 50 Msa can be utilized.

基于DSP的SDR架构，更快速、更精确、更灵活



图形显示
和用户接口

Windows-CE

µ P
Host

外部 PC

LAN, USB 或GPIB通过SCPI
LXI Class C

VSG采样率 :100 Msa
*VSA*采样率 :32 Msa*

Waveform
RAM

500 MHz

DSP

射频 硬件控制

射频
输入
40 MHz
带宽

射频 输入
部分

ADC

FPGA

双
DAC

射频 输出
部分

射频
输出
40 MHz
带宽

DDS 合成器
电子衰减
~ 1 毫秒 调谐时间

100 MHz
14 位

数字
降频升频
转换器

DDC
/ DUC

100-200 MHz
16 位

DDS 合成器
电子衰减
~ 1毫秒 调谐时间

信号/ 频谱分析仪

信号发生器

* 扫描时间不超过30秒。最大采样率为50 Msa.

Model 2820 Vector Signal Analyzer

- **6GHz frequency range**

  40MHz signal bandwidth

  Test a wide variety of signals
  - 802.11x WLAN signals
  - 802.16e mobile-WiMAX signals
  - GSM, EDGE, W-CDMA, cdma2000, SISO WLAN, and more…

2820矢量信号分析仪

- **6GHz 频率范围**
  40MHz 信号带宽
  测试各种各样的信号
  - 802.11x WLAN 信号
  - 802.16e mobile-WiMAX 信号
  - GSM, EDGE, W-CDMA, cdma2000, SISO WLAN等

Model 2920 Vector Signal Generator

- **Frequency range to 6GHz**
- **Up to 80 MHz bandwidth**
- **100 MSamples of arbitrary waveform memory generator**
- **Test a wide variety of signals**
  - 802.11x WLAN signals
  - 802.16e mobile-WiMAX signals
  - GSM, EDGE, W-CDMA, cdma2000, SISO WLAN, and more…

2920 型矢量信号发生器

- 频率范围可达**6GHz**
- 高达**80MHz**的带宽
- 速率为**100M**次采样的任意波形存储发生器
- 测试各种各样的信号
  - 802.11x WLAN 信号
  - 802.16e mobile-WiMAX 信号
  - GSM, EDGE, W-CDMA, cdma2000, SISO WLAN等

MIMO: The Future of RF Technology

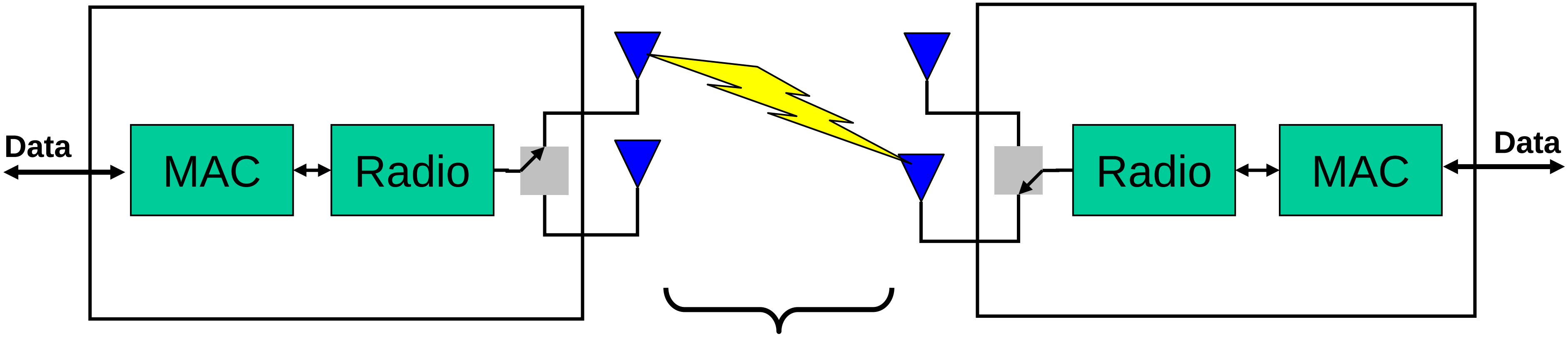
- **MIMO uses multiple antennas for both transmission and reception**
- **MIMO systems provide:**
  - Increased data transmission rates
  - Increased signal bandwidth efficiency
  - Up to 4X4 channels

MIMO: 射频技术的未来

- **MIMO** 使用多个天线进行发送和接收
- **MIMO系统支持:**
  - 更高的数据传输速率
  - 更高的信号带宽
  - 最高 4X4通道

What is SISO?
Single-Input Single-Output

Traditional WiFi – SISO Architecture

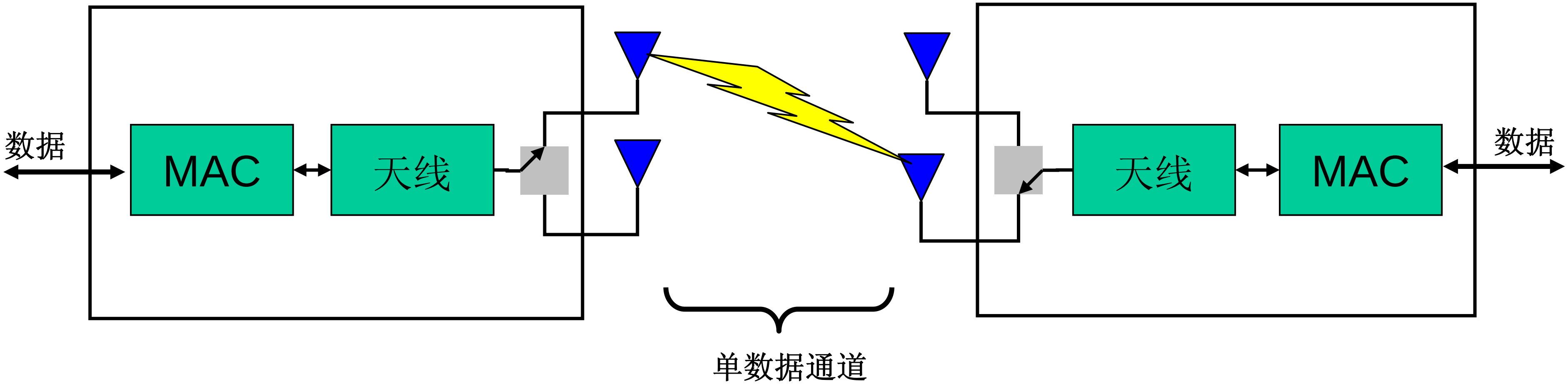


Single Data Channel

- One radio, only one antenna used at a time (e.g., 1 x 1)
- Antennas constantly switched for best signal path
- Only one data “stream” and a single data channel

什么是 SISO?
单输入单输出（Single-Input Single-Output）

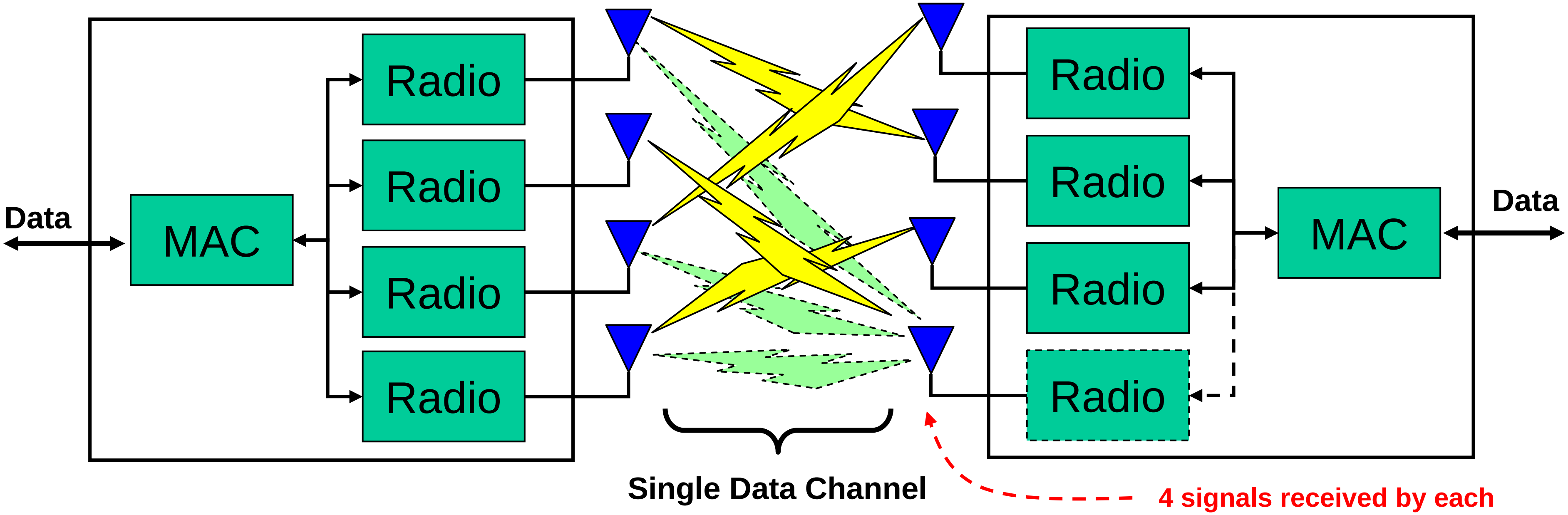
典型的 WiFi – SISO 结构



- 每台无线设备每次只使用一副天线 (例如 1 x 1)
- 不断的切换天线以获得最佳信号路径
- 只有一个数据流和一个数据通道

What is MIMO?
Multiple-Input Multiple-Output

MIMO Architecture

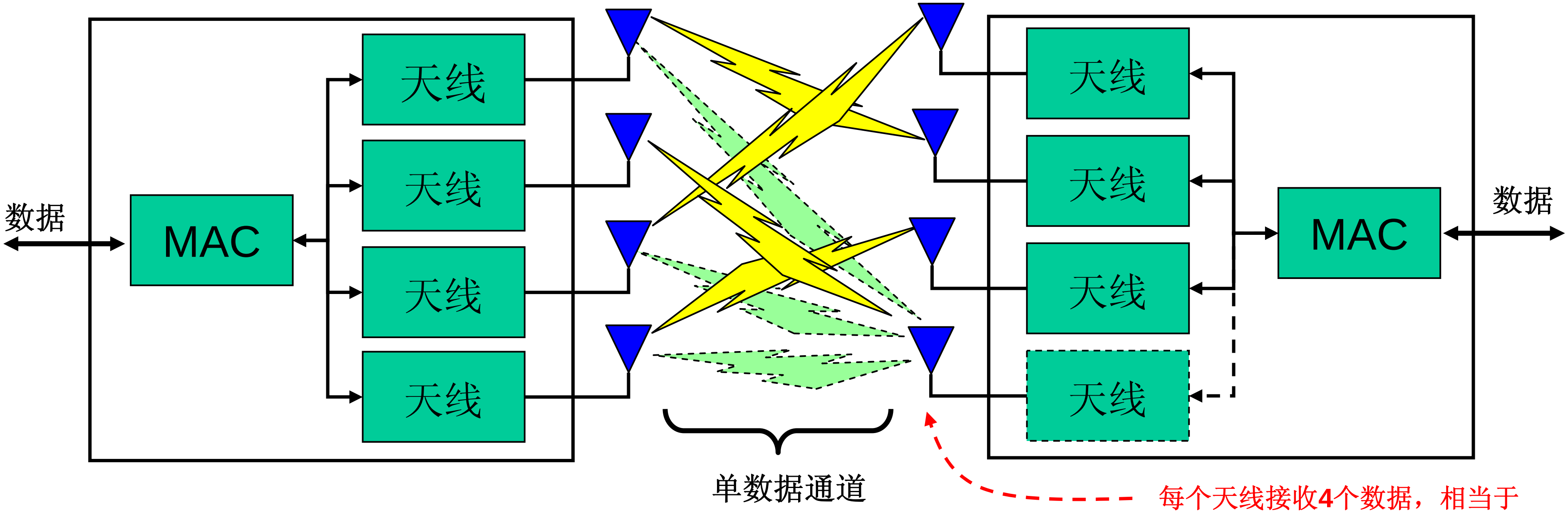


4 signals received by each antenna = up to 16 signals to decode.

- **Multiple radios and antennas used at a time**
- **Radios constantly optimizing best signal paths**
- **Multiple data “streams” in a single data channel**
- **Number of antennas may be different (e.g., 4 x 3)**

什么是 MIMO?
多入多出（Multiple-Input Multiple-Output ）

MIMO 结构



每个天线接收4个数据，相当于有16个数据解码.

- 每次可同时使用多个无线设备和多副天线
- 无线设备不断优化最佳的信号路径
- 在一个数据通道内有多个数据流
- 收发天线的数目可能不同 (例如, 4 x 3)

The Need for MIMO Testing

- **Who is using MIMO testing?**
  - Technology research
  - Product development and production
  - Wireless equipment designers and manufacturers
  - Manufacturers of modules and sub-assemblies
  - RFIC devices
  - Researchers investigating MIMO RF technology
  - R&D designers and manufacturing engineers working on wireless connectivity solutions and defense/aerospace applications

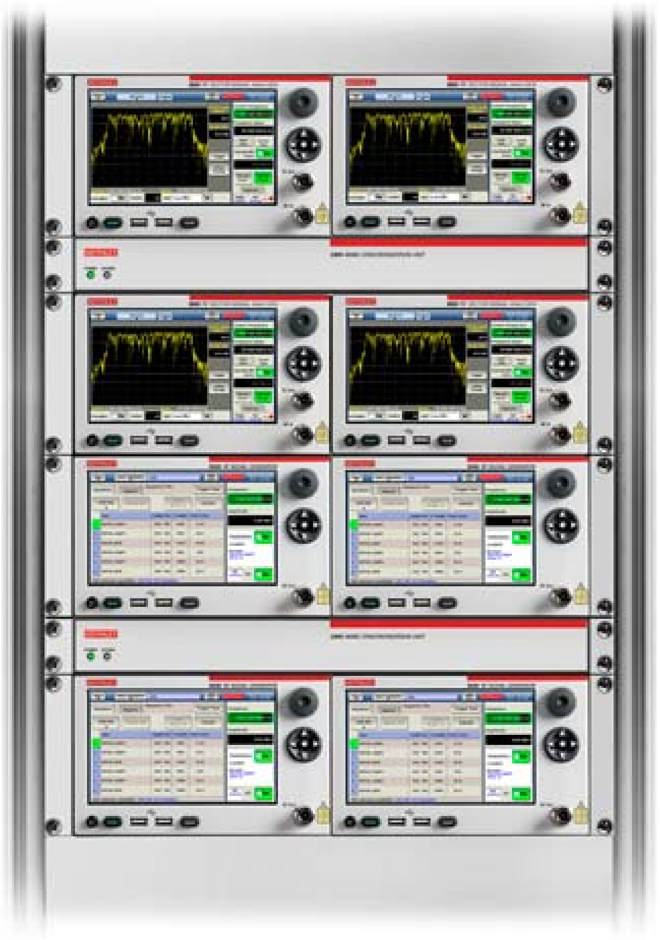
MIMO测试需求

- **MIMO测试的用户包括**
  - 技术研究
  - 产品开发与生产
  - 无线设备的设计与制造商
  - 模块、微型组件的制造商
  - RFIC器件
  - MIMO 射频技术研究人员
  - 从事无线互连方案和国防、航天应用领域的研发人员和制造工程师

Introducing MIMO RF Test System

2895 Synchronization Unit, 28011 Measurement Software

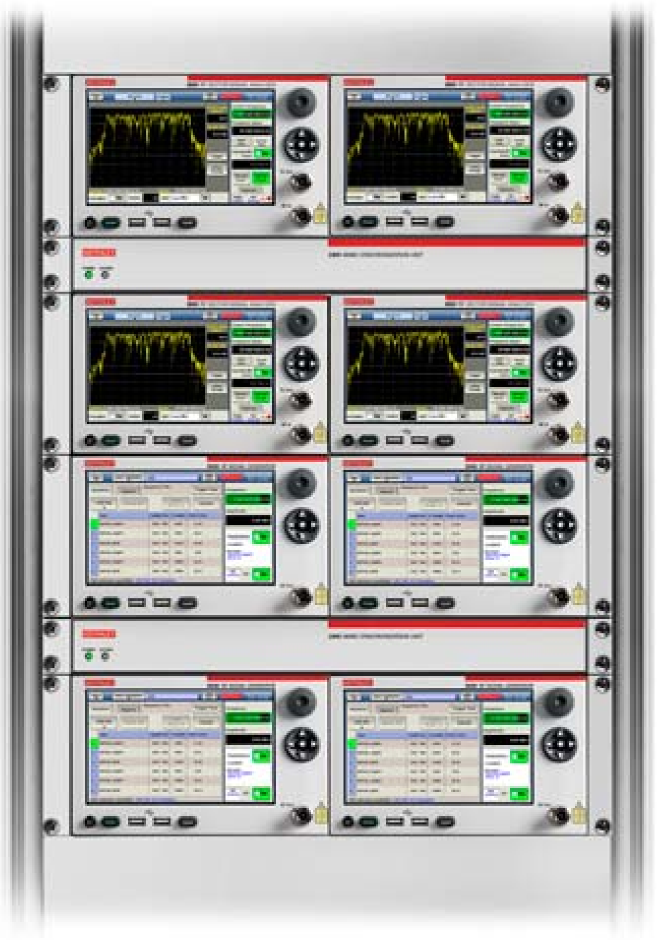
- **Taking single channel instrument to the next step**



MIMO射频测试系统简洁

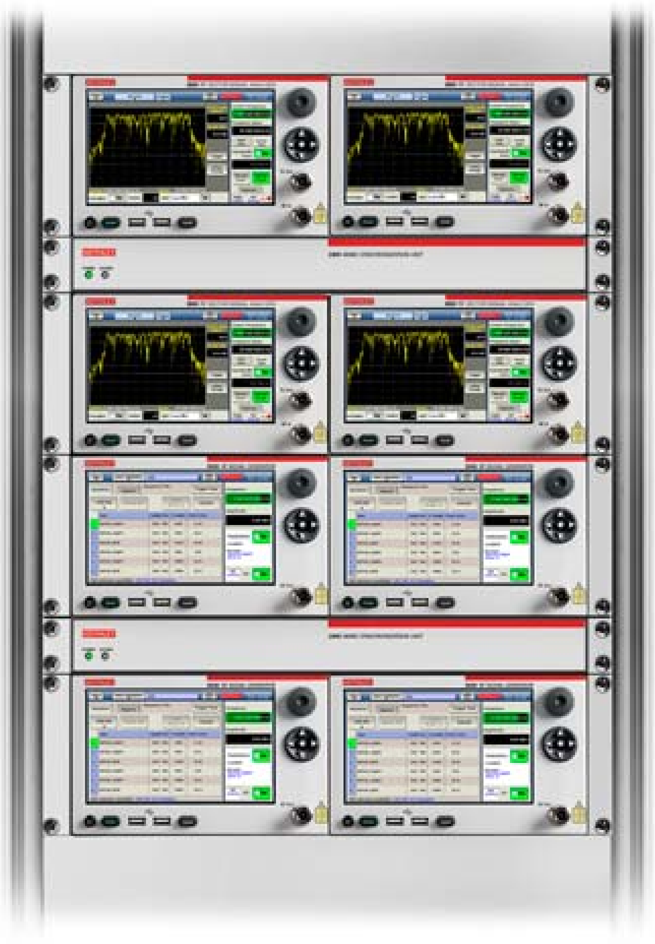
2895型同步单元、28011型测量软件

- 首先采用单通道仪器



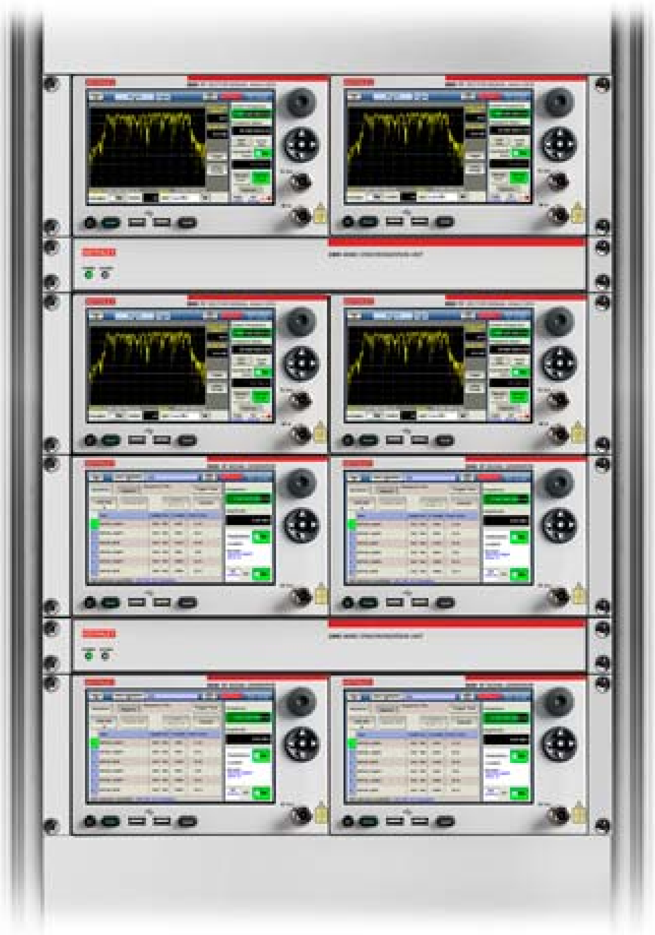
Industry’s Leading 4X4 MIMO RF Test System

- **Industry-Leading Performance**
  - Flexible 2, 3, or 4-channel configurations
  - 40MHz signal bandwidth
  - 1 nsec signal sampler synchronization
  - 1 nsec peak-to-peak signal sampler jitter
  - 1° peak-to-peak RF-carrier phase jitter
  - High-performance: -40dB EVM (Error Vector Magnitude)
  - Uses standard MIMO-ready instruments
  - Industry leading signal analysis MIMO software



具有业界领先水平的 **4X4 MIMO** 射频 测试系统

- 业界领先的性能
  - 灵活的2、3或4通道配置
  - 40MHz信号带宽
  - 1 纳秒的信号采样同步
  - 1纳秒峰-峰信号采样抖动
  - 1° 峰-峰射频-载波相位抖动
  - 高性能： -40dB EVM （误差矢量振幅 ）
  - 采用标准的MIMO仪器
  - 行业领先的信号分析MIMO软件



KEITHLEY

Keithley's MIMO RF Test Solution Solves MIMO Testing Challenges

- ✓ **High-speed measurements – reduces cost of test, shortens time-to-market**
  - Keithley's innovative, high-performance DSP SDR instruments make it fast and easy to test
  - Wide scope of test from R & D to production
- ✓ **High accuracy and repeatability – ensures high product quality and high production yields**
  - Complicated OFDM/MIMO signal structures
- ✓ **High flexibility – increases return on investment**
  - Easy migration path from SISO to MIMO test
- ✓ **Low cost of test per channel – extends capital budgets**
  - Unique DSP SDR architecture provides new industry leading price point

吉时利MIMO 射频测试解决方案有效应对MIMO 测试挑战

✓ **高速测量–减少测试开销，缩短上市时间**

吉时利创新的高性能DSP SDR设备使测试变得更快捷、更简单

广泛应用于从研发阶段到生产阶段的测试

✓ **高精度和可重复性–确保产品的高质量和高产出**

复杂的 OFDM/MIMO 信号结构

✓ **高度灵活–增加了投资回报**

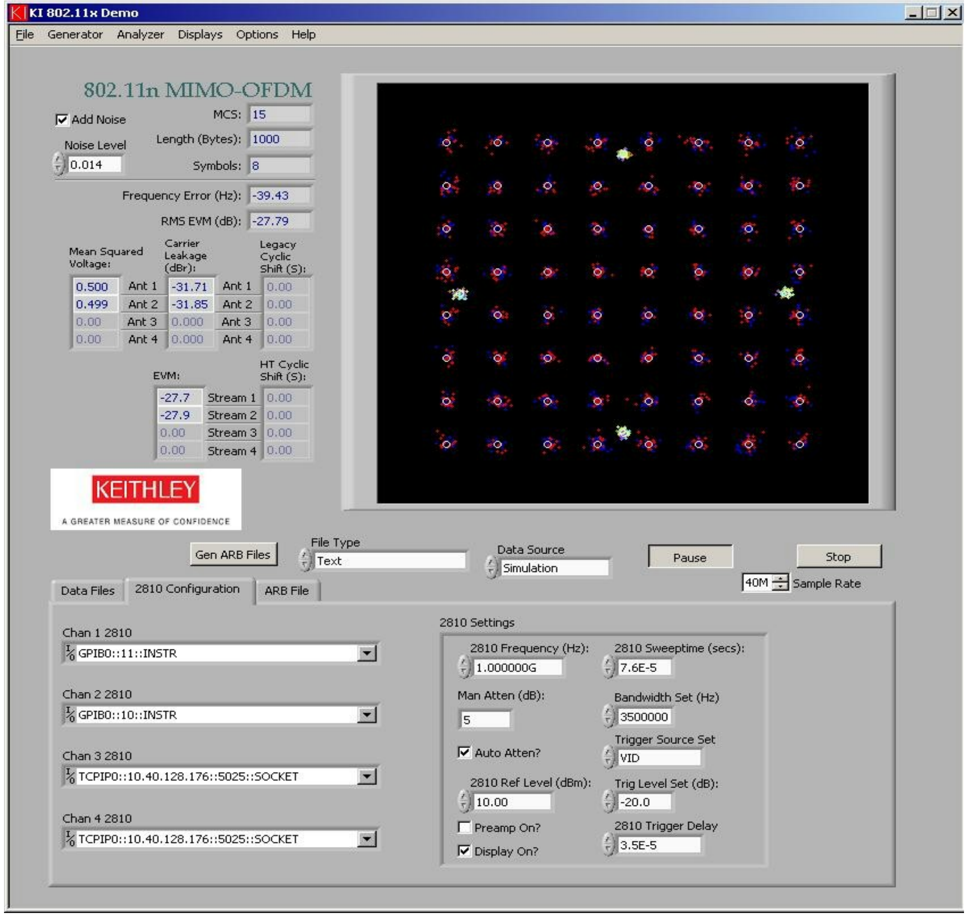
便于从SISO转向MIMO测试

✓ **每通道低成本测试–扩展了投资效益**

独特的 DSP SDR 架构，指导业内价格点

Model 280111 MIMO Signal Analysis Software

- Industry leading PC-based signal analysis tool
- Multi-channel analysis of 802.11n signals
- Supports analysis of 4X4 MIMO signals



802.11n MIMO-OFDM

☑ Add Noise

Noise Level: 0.014

MCS: 15

Length (Bytes): 1000

Symbols: 8

Frequency Error (Hz): -39.43

RMS EVM (dB): -27.79

Mean Squared Voltage:		Carrier Leakage (dBr):		Legacy Cyclic Shift (S):
0.500	Ant 1	-31.71	Ant 1	0.00
0.499	Ant 2	-31.85	Ant 2	0.00
0.00	Ant 3	0.000	Ant 3	0.00
0.00	Ant 4	0.000	Ant 4	0.00

EVM:		HT Cyclic Shift (S):
-27.7	Stream 1	0.00
-27.9	Stream 2	0.00
0.00	Stream 3	0.00
0.00	Stream 4	0.00

File Type: Text

Data Source: Simulation

Sample Rate: 40M

Chan 1 2810: GPIB0::11::INSTR

Chan 2 2810: GPIB0::10::INSTR

Chan 3 2810: TCPIP0::10.40.128.176::5025::SOCKET

Chan 4 2810: TCPIP0::10.40.128.176::5025::SOCKET

2810 Settings

2810 Frequency (Hz): 1.000000G

2810 Sweeptime (secs): 7.6E-5

Man Atten (dB): 5

Bandwidth Set (Hz): 3500000

☑ Auto Atten?

Trigger Source Set: VID

2810 Ref Level (dBm): 10.00

Trig Level Set (dB): -20.0

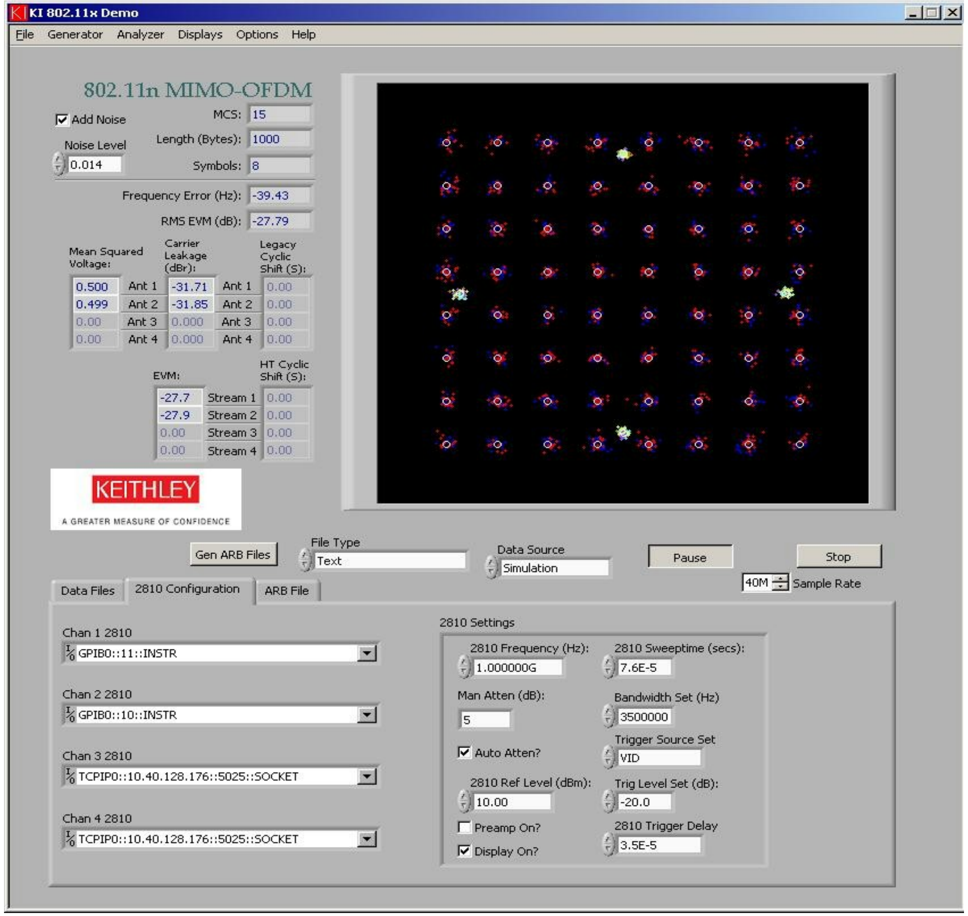
☐ Preamp On?

2810 Trigger Delay: 3.5E-5

☑ Display On?

280111型MIMO 信号分析软件

- 行业领先的基于**PC**的信号分析工具
- 对**802.11n**信号进行多通道分析
- 支持**4X4 MIMO** 信号分析



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☑ Display On?

Keithley’s RF Products Re-define Communications Test

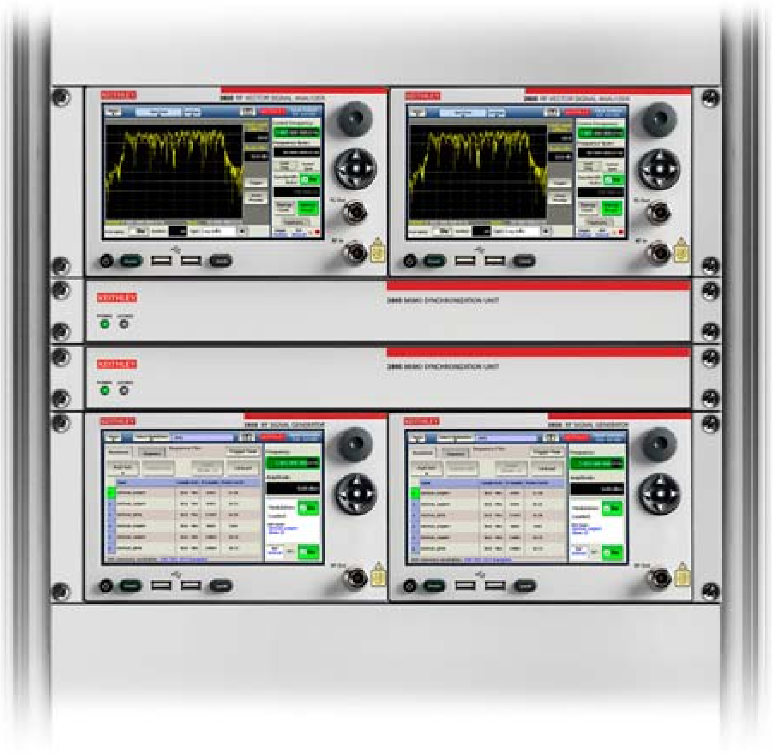
- DSP-based Software Defined radio platform supports testing for today and tomorrow

✓ High-speed measurements

✓ High accuracy and repeatability

✓ High flexibility

✓ Low cost



KEITHLEY

A GREATER MEASURE OF CONFIDENCE

重新定义了通信测试标准的吉时利射频产品

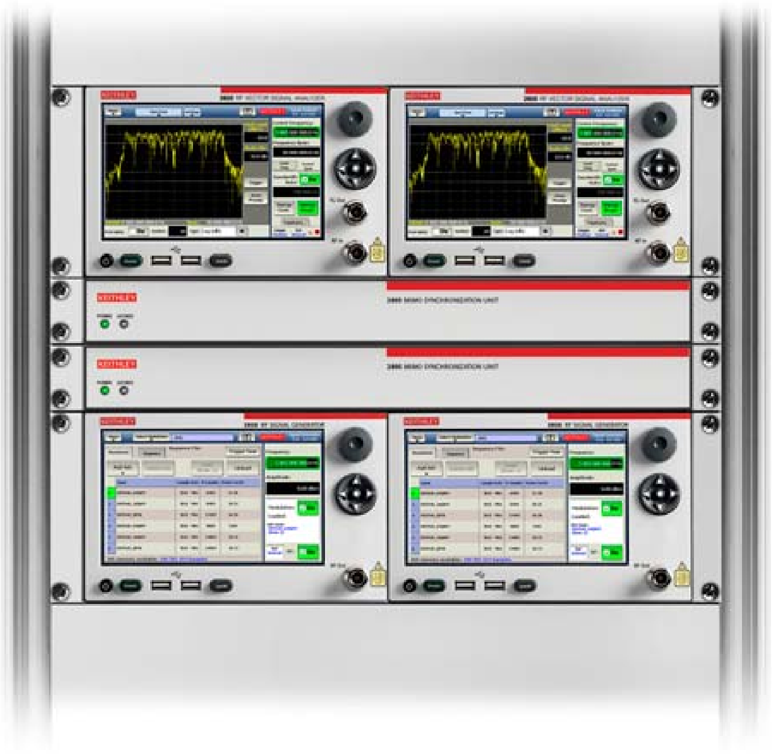
- 基于**DSP**的软件无线电平台，支持当今及未来的测试

✓ 高速测量

✓ 高精确性和高重复性

✓ 高灵活性

✓ 低成本



KEITHLEY

A GREATER MEASURE OF CONFIDENCE

Expanding Keithley's Model 4200 Semiconductor Characterization System with New C-V Capability

Model 4200-CVU:
C-V As Easy As I-V

KEITHLEY

扩展C-V测试功能的吉时利4200半导体特征分析系统

4200-CVU：

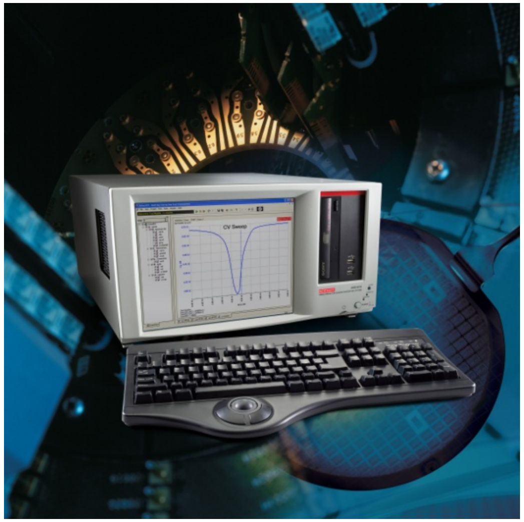
使C-V测试像 I-V测试一样容易

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

Capacitance-Voltage Testing Built on Industry Leading Model 4200 System

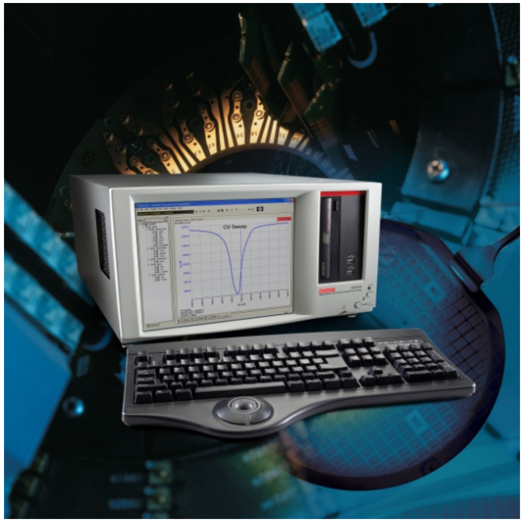
- Up to 8 medium- or high-power SMUs
- Dual-channel pulse and waveform generators
- Integrated digital oscilloscope
- C-V Instrument New
- All controlled by KTEI software environment
- Supports external instruments, switch matrixes, probers, hot chucks, and test fixtures
- Streamlines test setup, sequence control, and data analysis



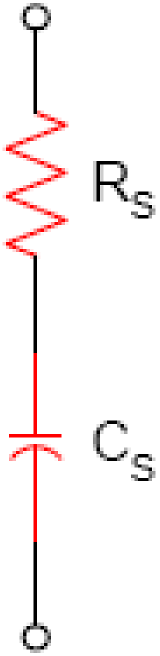
在行业领先的4200系统上进行电容-电压测试

- **8**个中、高功率**DC**源测量单元（**SMU**）
- 双通道脉冲和波形发生器
- 集成电路示波器
- **C-V**设备
- 通过**KTEI** 软件环境进行集成控制
- 支持外部设备，包括开关矩阵、探测器、高温卡盘及其他测试设备
- 包括测试配置、序列控制和数据分析在内的一整套功能

New



What Is C-V Testing?

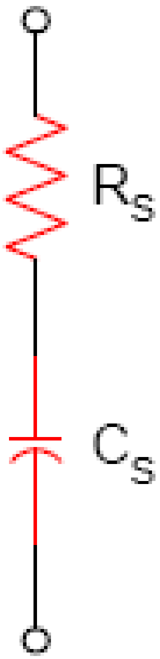


- A fundamental research and process development tool
- Helps assure quality and reliability of semiconductor devices
- Particularly important for gate dielectric quality
- Provides a wealth of device and process information:
  - dielectric thickness
  - bulk and interface charge characteristics
  - doping profiles
  - and much more

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

什么是C-V测试？



- 是基础研究和工艺开发的工具
- 确保半导体器件的质量和可靠性
- 对栅极绝缘层的质量尤为重要
- 提供大量的器件和工艺信息：
  - 绝缘层厚度
  - 体、面电荷特性
  - 杂质浓度分布
  - 其它

Who’s Making C-V Measurements?

☐ 95% of All Wafer Fabs

☐ 75% of All Wafer Labs

Typical Applications

- device characterization
- modeling
- process monitoring
- new material development
- reliability improvements

Model 4200-CVU will typically be used for on-wafer C-V testing

谁需要进行C-V测量?

□ 高达95%的圆片生产厂商

□ 高达75%的圆片实验室

典型应用

- 器件特征分析
- 建模
- 工艺监测
- 新材料研发
- 提高可靠性

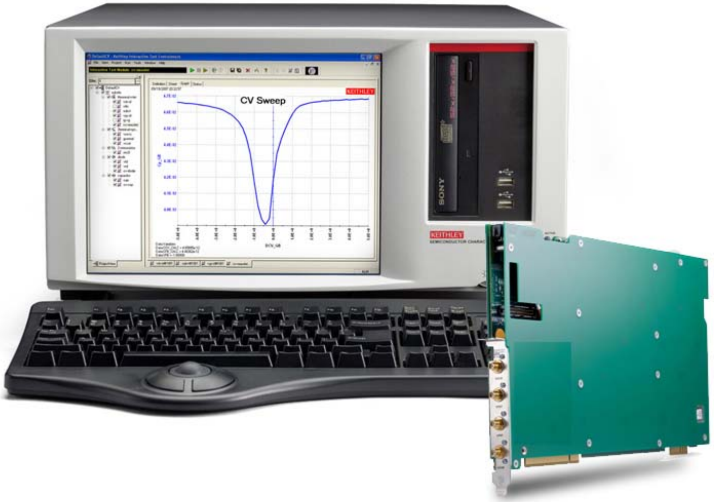
4200-CVU将广泛应用于圆片C-V测试

Keithley’s Model 4200-CVU Instrument

- Integrated directly into the 4200-SCS chassis
- Measure capacitance from attoFarads nanoFarads (nF)
- Test at frequencies from 10kHz to 10M
- Fully-configured system, that includes cables, connectors and test library
- Most comprehensive test libraries and sample tests
- Integrated into KTEI software interface
- Users at all levels perform C-V tests like experts

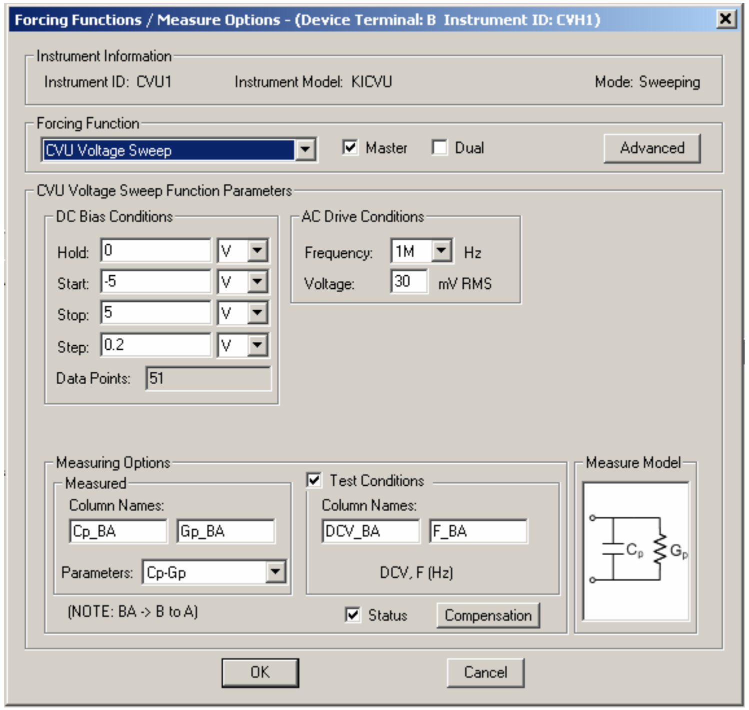
吉时利 4200-CVU测试仪

- 能够与4200-SCS机架直接集成
- 电容测量范围从埃法（aF）到飞法（nF）
- 10kHz到 10MHz的频率测量范围
- 完全可配置的系统，包括线缆、连接器和测试库
- 最全面的测试库和测试范例
- 集成了KTEI软件界面
- 各种层次的用户都可以进行专业的C-V测量



Industry’s Most Comprehensive Software for Immediate Expert C-V Measurements

- **Ready to run right out of the box**
- **Familiar point-and-click interface**
- **Setup, run, and sequence tests**
- **Analyze and graph results**
- **Manage projects, test, and data**
- **Bundled with a wide variety of sample projects for quick start up**



Forcing Functions / Measure Options - (Device Terminal: B Instrument ID: CVH1)

Instrument Information

Instrument ID: CVU1
Instrument Model: KICVU
Mode: Sweeping

Forcing Function

CVU Voltage Sweep ☑ Master ☐ Dual

CVU Voltage Sweep Function Parameters

DC Bias Conditions

Hold: 0 V
Start: -5 V
Stop: 5 V
Step: 0.2 V
Data Points: 51

AC Drive Conditions

Frequency: 1M Hz
Voltage: 30 mV RMS

Measuring Options

Measured

Column Names: Cp_BA Gp_BA
Parameters: Cp-Gp

(NOTE: BA -> B to A)

☑ Test Conditions

Column Names: DCV_BA F_BA
DCV, F (Hz)

☑ Status

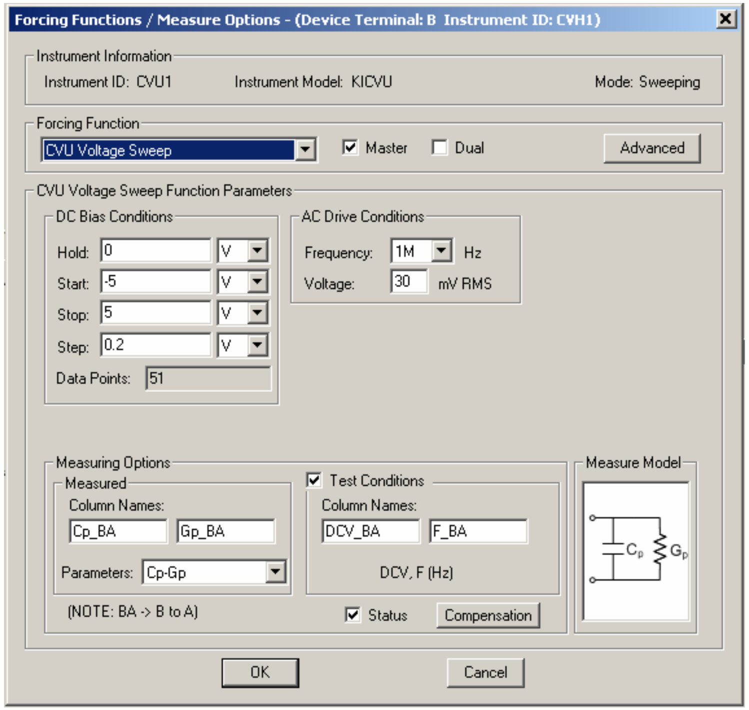
Measure Model

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

业内功能最全面的快速专业C-V测试软件

- 即装即用
- 直观的点击式界面
- 设置、运行、序列测试
- 结果分析和图形化
- 管理项目、测试和数据
- 附带了大量的工程范例，快速上手



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DCV, F (Hz)

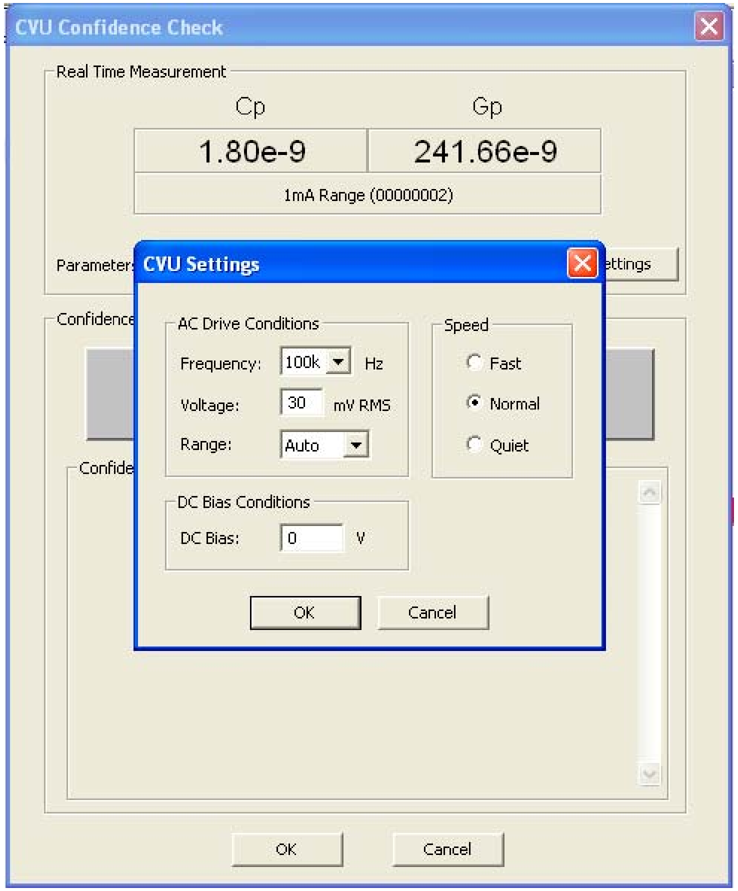
☑ Status

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

Only System Offering Advanced Diagnostic Tools

- Confidence Check button with advice
- Real-time front panel control
- Isolate and validate portions of test setup



CVU Confidence Check

Real Time Measurement

Cp	Gp
1.80e-9	241.66e-9

1mA Range (00000002)

CVU Settings

AC Drive Conditions

Frequency: 100k Hz

Voltage: 30 mV RMS

Range: Auto

Speed

○ Fast

● Normal

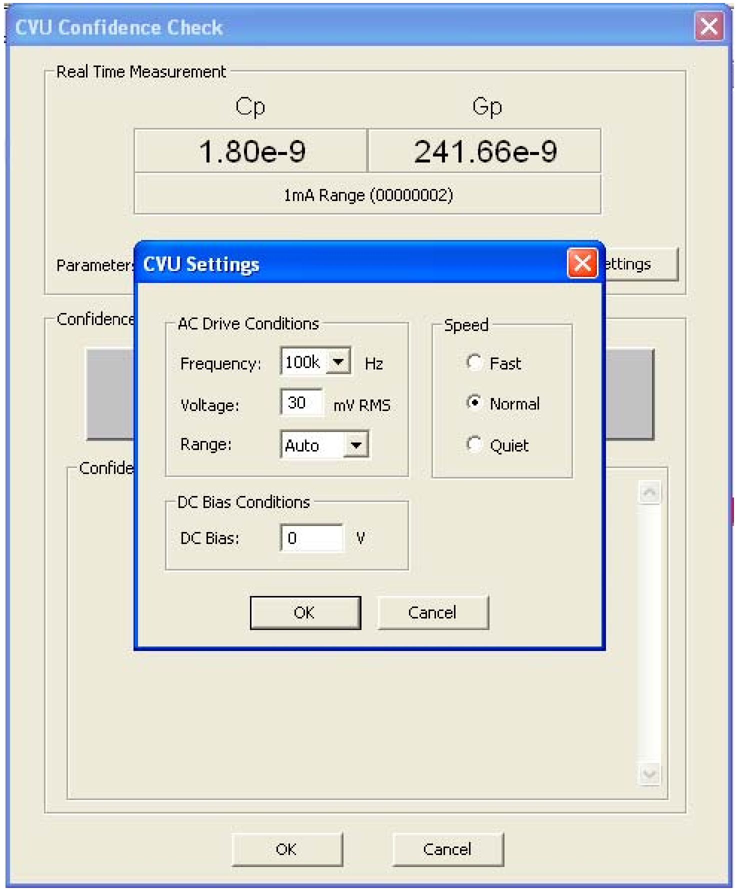
○ Quiet

DC Bias Conditions

DC Bias: 0 V

唯一包含高级诊断工具的系统

- 辅助诊断的 “Confidence Check ”按扭
- 实时控制面板
- 独立有效的测试设置



Cp	Gp
1.80e-9	241.66e-9

1mA Range (00000002)

Frequency: 100k Hz

Voltage: 30 mV RMS

Range: Auto

○ Fast
● Normal
○ Quiet

DC Bias: 0 V

Faster C-V Than Ever

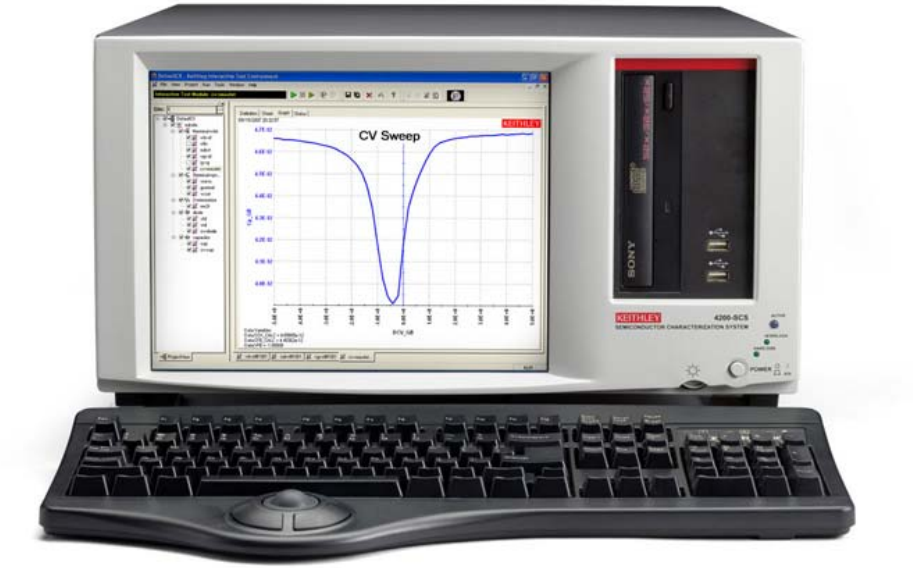
- **Shorter Test Program Development Time**
  - 8 bundled C-V test libraries
  - Broad range of sample tests with parameter extraction examples
  - Includes sample data from actual devices
  - Software supports user developed programs
  - Well documented and open environment allows users to easily modify sample projects
  - Enables customized analysis and parameter extractions

有史以来最快的C-V测试

- 大大缩短了测试程序的开发时间
  - 附带8个C-V测试库
  - 包含大量参数提取实例的测试范例
  - 来源于实际器件的数据范例
  - 支持用户二次开发的软件
  - 定义清晰的开放式环境，用户能够轻松地修改项目范例
  - 支持自定义分析和参数提取

Fully Integrated Hardware and Software

- **Exceptional measurement speed, accuracy, and efficiency**
- **Advanced digital design for high performance**

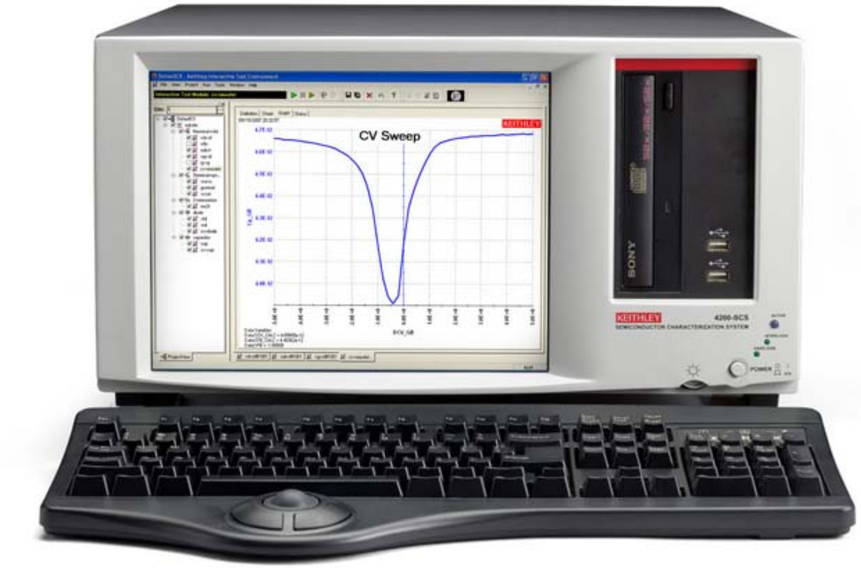


4200-CVU instrument speeds up test times

KEITHLEY

高度集成的软硬件

- 非凡的测量速度、精度、效率
- 先进的高性能数字电路设计



4200-CVU缩短了测试时间

Model 4200-CVU
Keithley Takes the Lead in C-V Testing

- **I-V, C-V, and pulse measurements in one test system**
- **Smallest form factor**
- **Easily move from one kind of test to another**
- **Powerful software for test and data management**
- **Investment protection**
  - Model 4200-CVU compatible with every 4200-SCS ever built
  - Easy upgrade path protects user investment while providing latest technology
  - Lowest cost of ownership

4200-CVU
吉时利在C-V测试中拔得头筹

- 在一个测试系统中集成I-V、C-V和脉冲测量
- 最精巧的外观尺寸
- 在不同类型的测试任务中轻松切换
- 功能强大的测试和数据管理软件
- 投资保护
  - 4200-CVU与所有早期的 4200-SCS产品兼容
  - 轻松升级，紧跟技术潮流，有效保护用户投资
  - 成本最低的投资选择

Model 4200-CVU Re-defines C-V Testing

- **C-V as easy as I-V**
  - Best user experience with the shortest learning curve
- **Faster C-V than ever**
  - Included libraries and sample tests shorten or eliminate development
  - Modern, high performance circuitry – eight patents pending
- **The most complete Semiconductor Characterization System**
  - Most applications served by a single semiconductor test instrument
- **Best cost of ownership**
  - Lab managers increase productivity in characterization and modeling

4200-CVU 改写了 C-V 测试历史

- **C-V测试像I-V测试一样容易**
  - 最短的学习使用过程，为用户带来最佳的使用体验
- **更快速的C-V测试能力**
  - 内建库和测试样例缩短了开发进程
  - 先进的高性能电路——8项专利申请中
- **最完整的半导体特征分析系统**
  - 一台半导体测试仪器就能够解决大部分应用需求
- **最佳投资选择**
  - 提高半导体特征分析与建模效率的有力助手